CR-V

1997-2000
Service Manual

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How to Use This Manual

This manual contains technical information for the 1997 – 2000 CR-V. It is divided into 24 sections. The first page of each section is marked with a black tab that lines up with its corresponding thumb index tab on this page and the back cover. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

1. A table of contents, or an exploded view index showing:
   - Parts disassembly sequence.
   - Bolt torques and thread sizes.
   - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Special Information

⚠ WARNING Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTICE

The purpose of these messages is to help prevent damage to the vehicle, other property, or the environment.

NOTE: Gives helpful information.

CAUTION: Detailed descriptions of *standard workshop* procedures, safety principles and service operations are not included. Please note that this manual contains warnings and cautions against some specific service methods which could cause PERSONAL INJURY, damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA might be done, or of the possible hazardous consequences of every conceivable way, nor could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized.

First Edition 11/99

HONDA MOTOR CO., LTD.
Service Publication Office

Specifications apply to U.S.A. and Canada

As sections with * include SRS components; special precautions are required when servicing.

General Info
Specifications
Maintenance
Engine Electrical
Engine
Cooling
Fuel and Emissions
*Transaxle
*Steering
Suspension
*Brakes (Including ABS)
*Body
*Heater and Air Conditioning
*Body Electrical
*Restraints

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General Information

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Chassis and Paint Codes

U.S. 1997 Model

Vehicle Identification Number

JHLRD184*VC000001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD
HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20B4

Body Type and Transmission Type
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
5: LX (with ABS)

Check Digit

Model Year
V: 1997

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20B4 - 2000001

Engine Type
B20B4: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

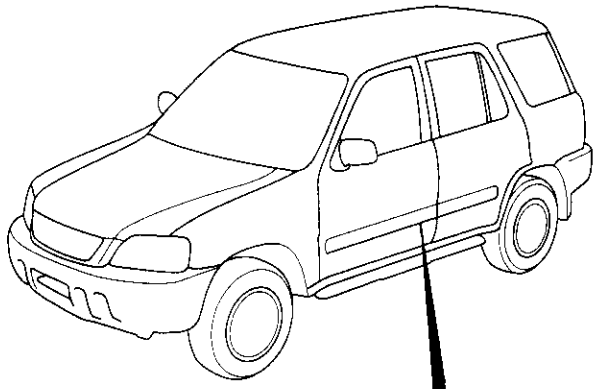
MDMA - 1000001

Transmission Type
MDMA: 4-speed Automatic
SDMA: 4-speed Automatic

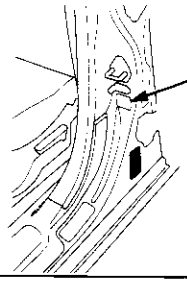
Serial Number

Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
G-82P	Cypress Green Pearl
NH-552M	Sebring Silver Metallic
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-84P
KA S2B A1 C

Paint Code

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U.S. 1998 Model

Vehicle Identification Number

JHL RD1 7 4 * W C 000001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20B4
RD2: CR-V/B20B4

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
6: EX

Check Digit

Model Year
W: 1998

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20B4 - 3000001

Engine Type
B20B4: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

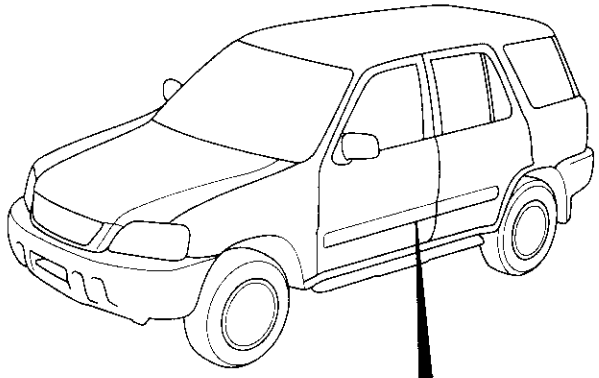
MDLA - 1000001

Transmission Type
MDLA: 4-speed Automatic
M4TA: 4-speed Automatic
SBXM: 5-speed Manual

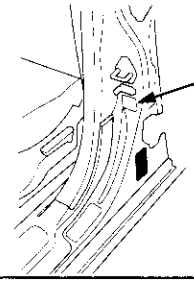
Serial Number
MDLA, SBXM: 1000001 ~
M4TA: 3000001 ~

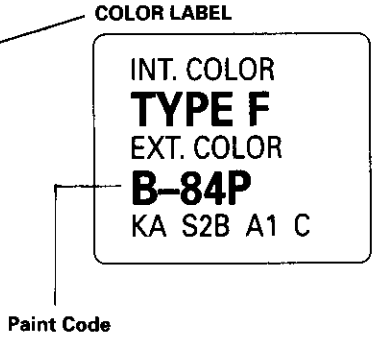
Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
G-82P	Cypress Green Pearl
NH-552M	Sebring Silver Metallic
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.





Chassis and Paint Codes

U.S. 1999 Model

Vehicle Identification Number

JHL RD174*XC000001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20Z2
RD2: CR-V/B20Z2

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
6: EX

Check Digit

Model Year
X: 1999

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20Z2 - 1000001

Engine Type
B20Z2: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

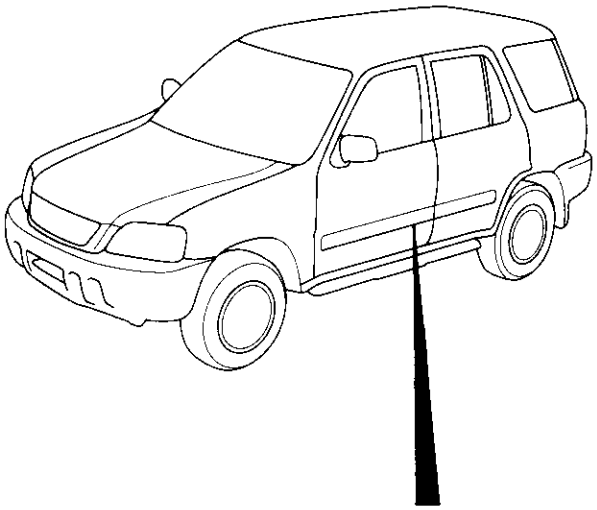
MDLA - 2000001

Transmission Type
MDLA: 4-speed Automatic
MDMA: 4-speed Automatic
SBXM: 5-speed Manual

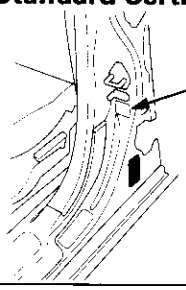
Serial Number
MDLA: 2000001~
MDMA: 1000001~
SBXM: 2000001~

Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
B-92P	Nighthawk Black Pearl
G-95P	Clover Green Pearl
NH-578	Taffeta White
NH-552M	Sebring Silver Metallic
R-81	Milano Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-84P
KA S2B A1 C

Paint Code

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U.S. 2000 Model

Vehicle Identification Number

JHL RD1 7 4 * Y C 000001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20Z2
RD2: CR-V/B20Z2

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
6: EX
7: SE

Check Digit

Model Year
Y: 2000

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20Z2 - 2000001

Engine Type
B20Z2: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

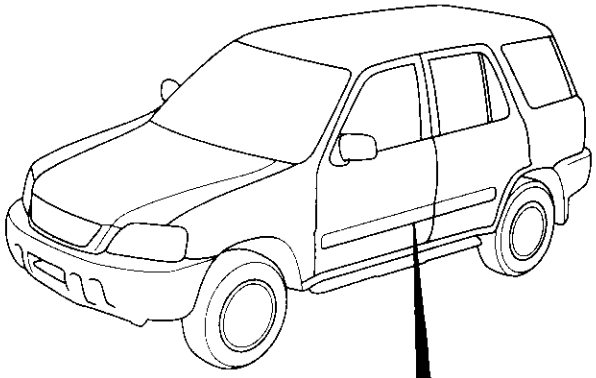
MDLA - 3000001

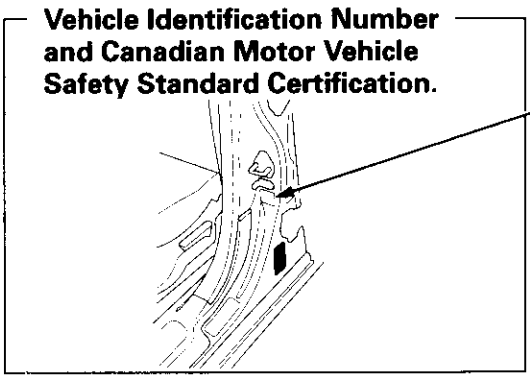
Transmission Type
MDLA: 4-speed Automatic
MDMA: 4-speed Automatic
SBXM: 5-speed Manual

Serial Number
MDLA: 3000001~
MDHA: 2000001~
SBXM: 2000001~

Paint Code

Paint Code	Color
B-92P	Nighthawk Black Pearl
B-95P	Electron Blue Pearl
G-95P	Clover Green Pearl
NH-578	Taffeta White
NH-552M	Sebring Silver Metallic
R-81	Milano Red





Chassis and Paint Codes

Canada 1997 Model

Vehicle Identification Number

JHL RD1 8 5 * V C 800001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20B4

Body Type and Transmission Type
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
5: LX

Check Digit

Model Year
V: 1997

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20B4 - 2000001

Engine Type
B20B4: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

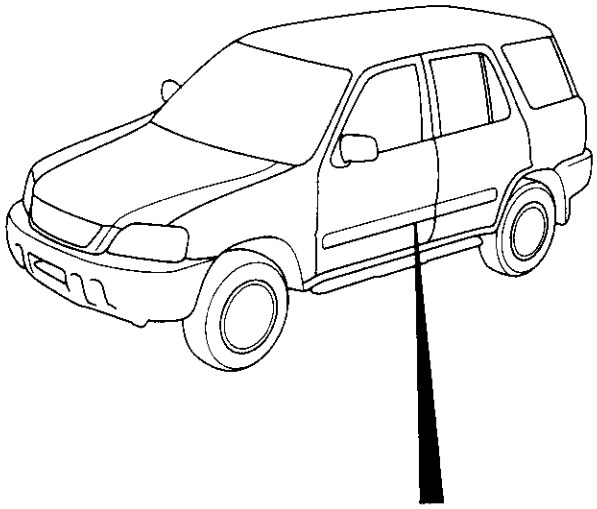
MDMA - 1000001

Transmission Type
MDMA: 4-speed Automatic
SDMA: 4-speed Automatic

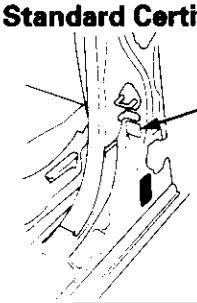
Serial Number

Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
G-82P	Cypress Green Pearl
NH-552M	Sebring Silver Metallic
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-84P
KC S2B C2 C

Paint Code

Canada 1998 Model

Vehicle Identification Number

JHL RD1 7 4 * W C 800001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD
HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20B4

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
5: EX

Check Digit

Model Year
W: 1998

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20B4 - 3000001

Engine Type
B20B4: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

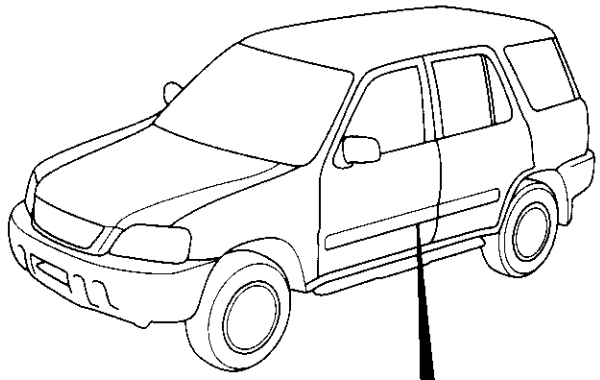
M4TA - 3000001

Transmission Type
M4TA: 4-speed Automatic
SBXM: 5-speed Manual

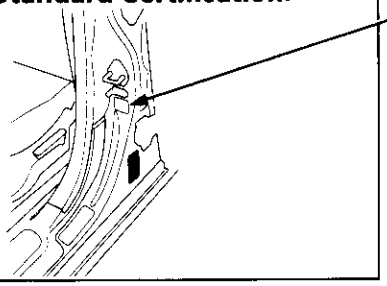
Serial Number
SBXM: 1000001~
M4TA: 3000001~

Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
G-82P	Cypress Green Pearl
NH-552M	Sebring Silver Metallic
NH-592P	Flamenco Black Pearl
R-94	San Marino Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
B-84P
KC S2B C2 C

Paint Code

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Chassis and Paint Codes

Canada 1999 Model

Vehicle Identification Number

JHL RD1 7 4 * X C 800001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20Z2

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
5: EX

Check Digit

Model Year
X: 1999

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20Z2 - 1000001

Engine Type
B20Z2: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

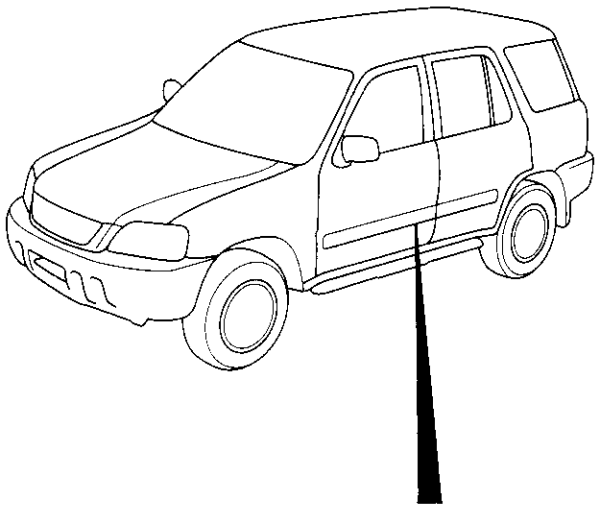
MDMA - 1000001

Transmission Type
MDMA: 4-speed Automatic
SBXM: 5-speed Manual

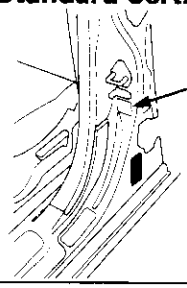
Serial Number
MDMA: 1000001~
SBXM: 2000001~

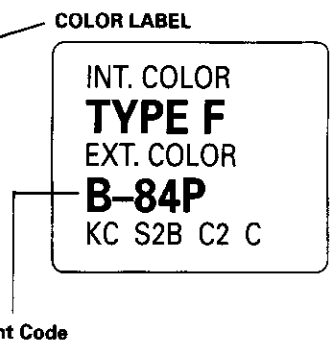
Paint Code

Paint Code	Color
B-84P	Supermarine Blue Pearl
B-92P	Nighthawk Black Pearl
G-95P	Clover Green Pearl
NH-552M	Sebring Silver Metallic
R-81	Milano Red



Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.





Canada 2000 Model

Vehicle Identification Number

JHL RD1 7 4 * Y C 800001

Manufacturer, Make and Type of Vehicle
JHL: HONDA MOTOR CO., LTD
HONDA, Multipurpose Passenger Vehicle (MPV)

Line, Body and Engine Type
RD1: CR-V/B20Z2

Body Type and Transmission Type
7: 5-door/5-speed Manual
8: 5-door/4-speed Automatic

Vehicle Grade (Series)
4: LX
5: EX
7: SE

Check Digit

Model Year
Y: 2000

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Engine Number

B20Z2 - 2000001

Engine Type
B20Z2: 2.0 ℓ DOHC Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

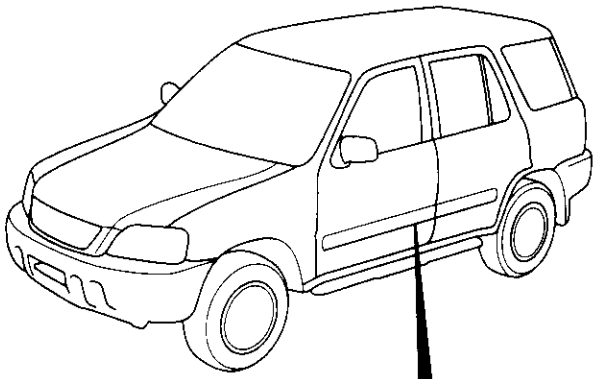
MDMA - 2000001

Transmission Type
MDMA: 4-speed Automatic
SBXM: 5-speed Manual

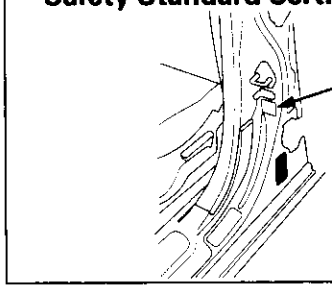
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SBXM: 2000001~

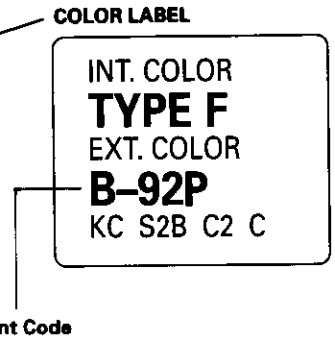
Paint Code

Paint Code	Color
B-96P	Eternal Blue Pearl
B-92P	Nighthawk Black Pearl
G-95P	Clover Green Pearl
NH-552M	Sebring Silver Metallic
R-81	Milano Red
YR-524M	Naples Gold Metallic

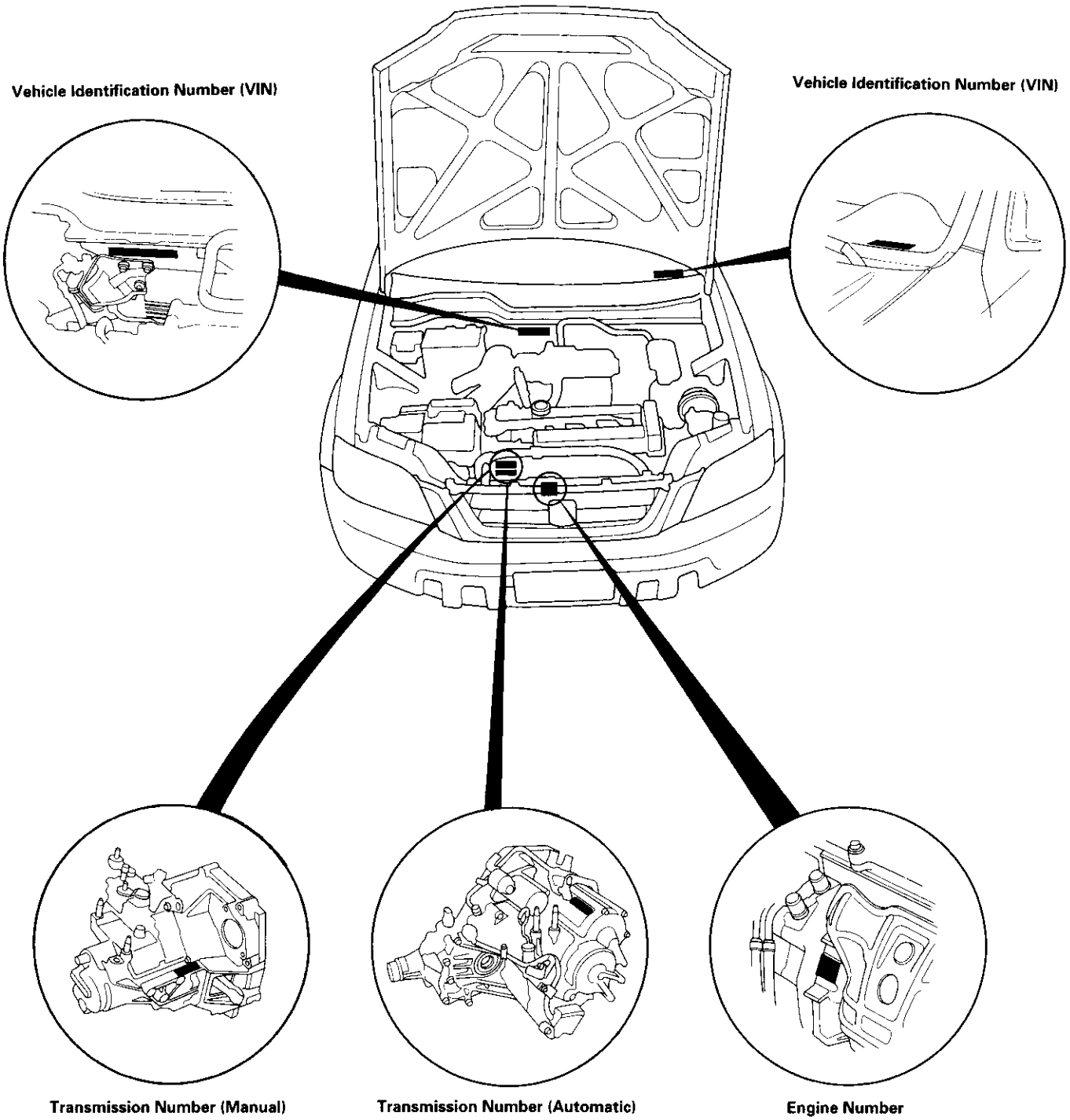


Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.

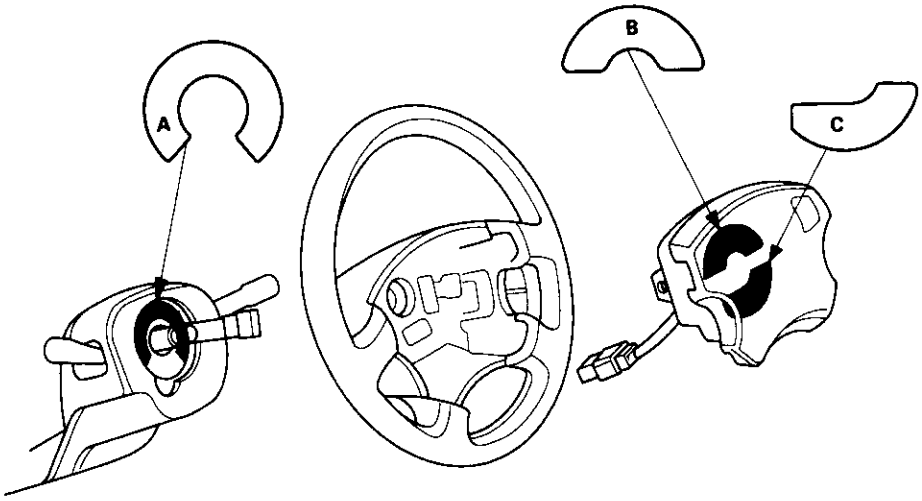




Identification Number Locations



Warning/Caution Label Locations



A: CABLE REEL CAUTION

SRS
INSTALLATION OF THE SRS CABLE REEL IS CRITICAL TO THE PROPER OPERATION OF THE SRS SYSTEM. REFER TO THE SERVICE MANUAL FOR DETAILED INSTALLATION INSTRUCTIONS.

B: DRIVER MODULE DANGER

⚠ DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE, AND DISPOSAL PROCEDURES, REFER TO SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

C: DRIVER MODULE WARNING

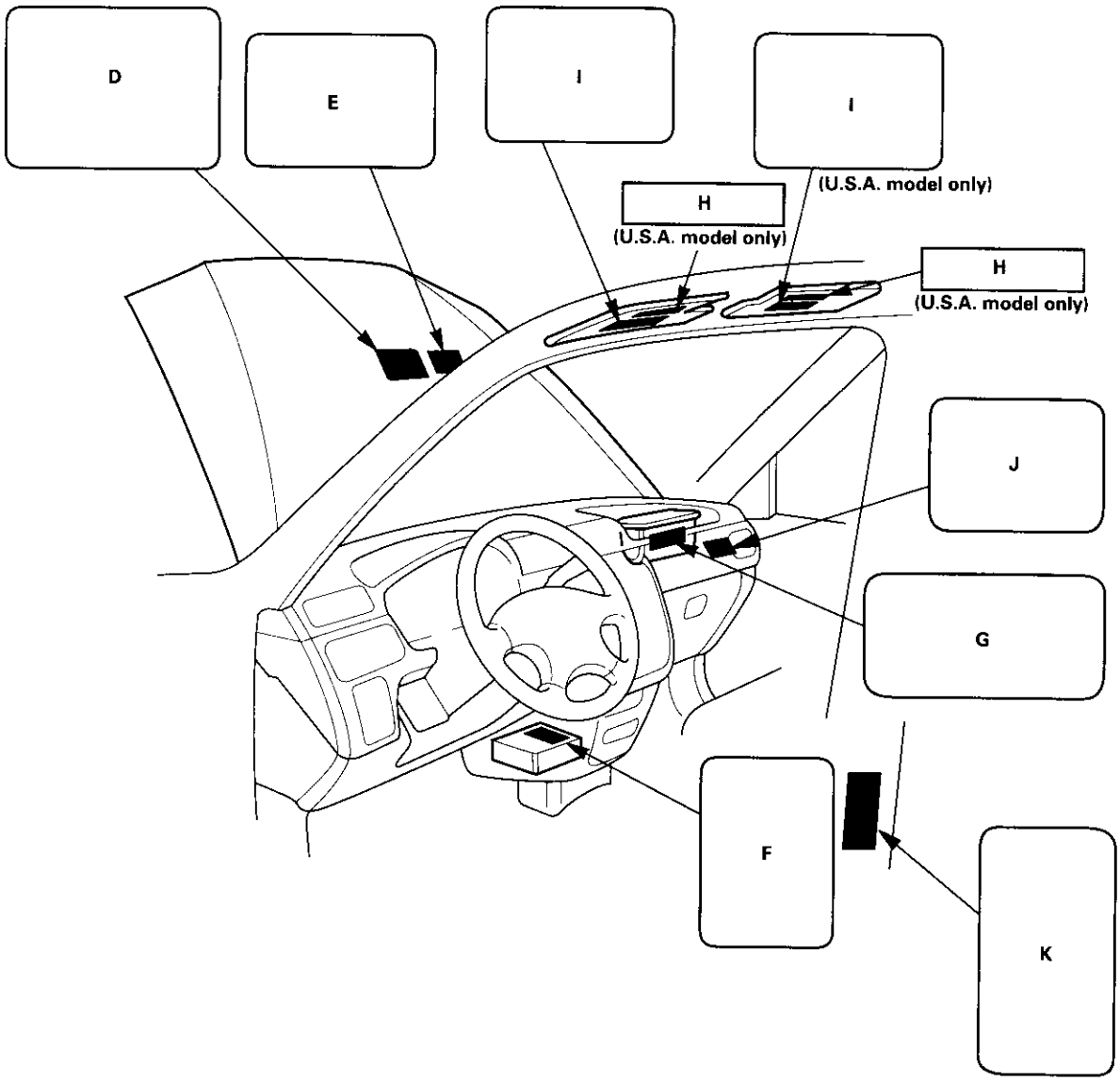
⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.
  THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

(cont'd)

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Warning/Caution Label Locations

(cont'd)



D: SRS WARNING (HOOD)

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
THIS VEHICLE IS EQUIPPED WITH DRIVER AND FRONT SEAT PASSENGER AIRBAGS.
ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
TAMPERING WITH, DISCONNECTING OR USING ELECTRICAL TEST EQUIPMENT ON THE SRS WIRING CAN MAKE THE SYSTEM INOPERATIVE OR CAUSE ACCIDENTAL FIRING OF THE INFLATOR.

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT YOU. FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

E: STEERING COLUMN NOTICE (HOOD)

NOTICE
TO PREVENT SRS DAMAGE, REMOVE STEERING WHEEL BEFORE REMOVING STEERING SHAFT CONNECTING BOLT.

F: MONITOR NOTICE

NOTICE SRS
- NO SERVICEABLE PARTS INSIDE.
- REFER TO SERVICE MANUAL FOR DETAILED INSTRUCTIONS.

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G: FRONT SEAT PASSENGER AIRBAG MODULE DANGER

⚠ DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER, OR HEAVY METALS SUCH AS COPPER, LEAD, OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE, AND DISPOSAL PROCEDURES REFER TO THE SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.
  THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

H: PASSENGER INFORMATION (U.S.A. model)
(U.S.A. '97 model)

AIRBAG SEE OTHER SIDE.

(U.S.A. '98 – 00 models)

AIRBAG WARNING
FLIP VISOR OVER.

I: SRS INFORMATION
(U.S.A. '97 model
Canada '97 – 00 models)

CAUTION
TO AVOID SERIOUS INJURY:
- FOR MAXIMUM SAFETY PROTECTION IN ALL TYPES OF CRASHES, YOU MUST ALWAYS WEAR YOUR SAFETY BELT.
- DO NOT INSTALL REARWARD-FACING CHILD SEATS IN ANY FRONT PASSENGER SEAT POSITION.
- DO NOT SIT OR LEAN UNNECESSARILY CLOSE TO THE AIRBAG.
- DO NOT PLACE ANY OBJECTS OVER THE AIRBAG OR BETWEEN THE AIRBAG AND YOURSELF.
- SEE THE OWNER'S MANUAL FOR FURTHER INFORMATION AND EXPLANATIONS.
- THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.
- THE DATE OF INSTALLATION IS SHOWN ON THE DRIVER'S DOORJAMB.

(U.S.A. '98 – 00 models)

WARNING
DEATH OR SERIOUS INJURY CAN OCCUR.
- CHILDREN 12 AND UNDER CAN BE KILLED BY THE AIRBAG.
- THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN.
- NEVER PUT A REAR-FACING CHILD SEAT IN THE FRONT.
- SIT AS FAR BACK AS POSSIBLE FROM THE AIRBAG.
- ALWAYS USE SEAT BELTS AND CHILD RESTRAINTS.
- THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.
- THE DATE OF INSTALLATION IS SHOWN ON THE DRIVER'S DOORJAMB.

J: FRONT PASSENGER AIRBAG WARNING
(U.S.A. '98 – 00 models)

WARNING
CHILDREN CAN BE KILLED OR INJURED BY THE PASSENGER AIRBAG.
THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN 12 AND UNDER.
MAKE SURE ALL CHILDREN USE SEAT BELTS OR CHILD SEATS.

K: FRONT SEATBELT TENSIONER WARNING

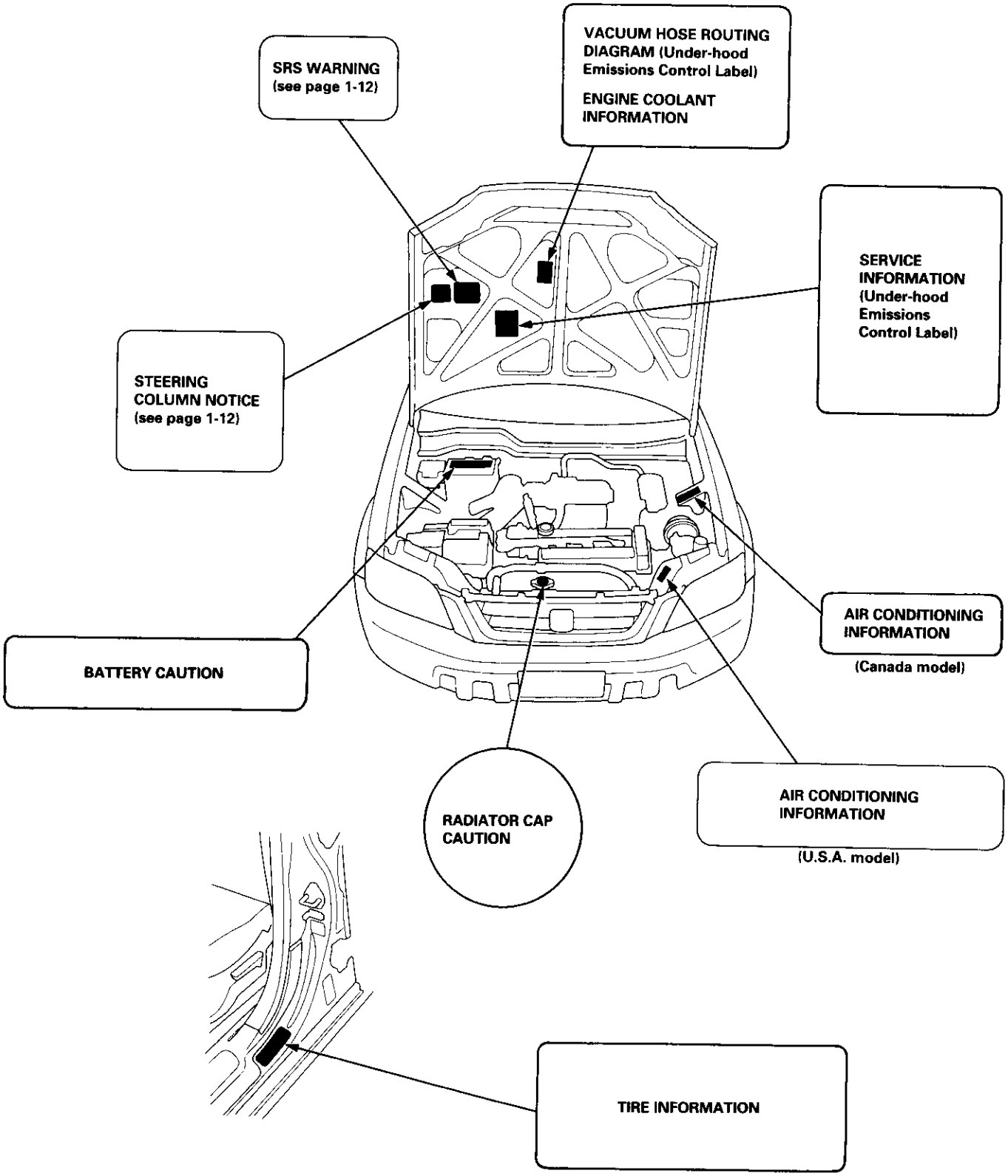
WARNING
EXPLOSIVE MATERIAL INSIDE
YOU CAN BE SERIOUSLY HURT OR BURNED.
- DO NOT TAMPER OR DISASSEMBLE.
  NO SERVICEABLE PARTS INSIDE.
- REFER TO SERVICE MANUAL FOR COMPLETE INSTRUCTIONS.

(cont'd)

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Warning/Caution Label Locations

(cont'd)



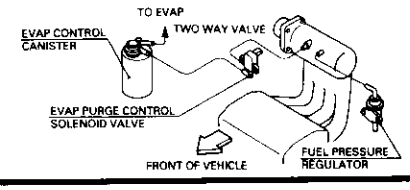
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Under-hood Emissions Control Label

Emission Group Identification (1997 model)

Example:

VACUUM HOSE ROUTING DIAGRAM



17277-P3F-A00

IMPORTANT VEHICLE INFORMATION
ENGINE FAMILY-VHN2.01JGKEK
DISPLACEMENT-2.0 LITER
EVAPORATIVE FAMILY-VHN1077BYMBP

CATALYST

REFER TO SERVICE MANUAL FOR ADDITIONAL INFORMATION.
TUNE UP CONDITIONS:
ENGINE AT NORMAL OPERATING TEMPERATURE.
ALL ACCESSORIES TURNED OFF. COOLING FAN OFF.
TRANSMISSION IN NEUTRAL
NO OTHER ADJUSTMENTS NEEDED.

IDLE SPEED	AUTOMATIC TRANSMISSION		750 ± 50 rpm
IGNITION TIMING AT IDLE			16° ± 2° BTDC
VALVE LASH	IN		0.10 ± 0.02 mm COLD
	EX		0.18 ± 0.02 mm COLD
SPARK PLUG	TYPE	NGK: ZFR5F-11	ND: KJ16CR-L11
	GAP		1.1 $^{0}_{-0.1}$ mm

THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW LIGHT-DUTY TRACKS.

K•A

201JGKEE

HONDA MOTOR CO., LTD.

17275-P3F-A01

LOADED I/M TESTING OF PERMANENT FOUR-WHEEL DRIVE OR TRACTION CONTROL-EQUIPPED VEHICLES MUST BE CONDUCTED ON A FOUR-WHEEL DRIVE SPEED SYNCHRONIZED DYNAMOMETER.
OTHERWISE, A NON-LOADED TEST PROCEDURE MUST BE PERFORMED.

50ST (50 States):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW LIGHT DUTY TRUCKS.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW LIGHT DUTY TRUCKS.

CAL (California):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW TLEV LIGHT DUTY TRUCKS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: V HN 2.0 1 J G K E K

Model Year
V: 1997
Manufacturer
HN: Honda
Displacement
Class
1: Light Duty Vehicle
Fuel System and Number of Valves
J: Electronic Sequential Multiport Injection (three or more valves per cylinder)
Fuel Type
G: Gasoline
Standard
F: 49 or 50 States Tier 1
K: 49 or 50 States Tier 1
1: California Tier 1
2: California TLEV
3: California LEV
4: California ULEV
Catalyst
E, F, G, H: Three Way Catalyst
OBD
K – T: OBD Equipped

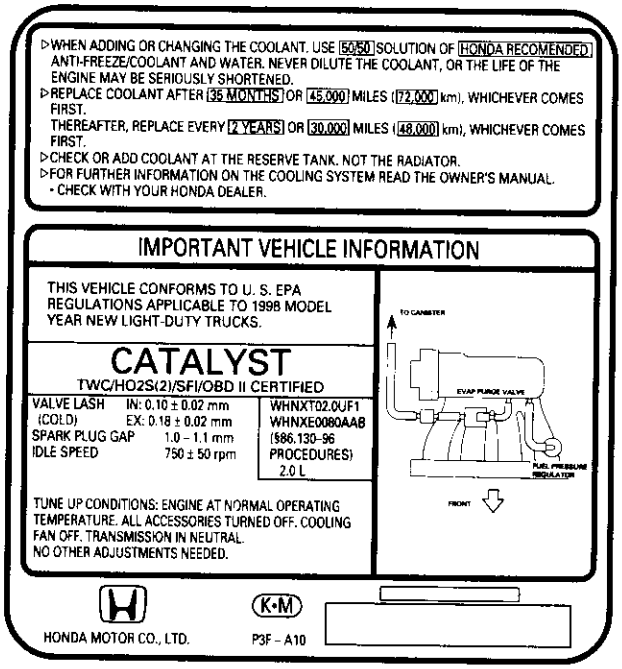
Evaporative Family: V HN 1 077 B Y M B P

Model Year
V: 1997
Manufacturer
HN: Honda
Storage System
1: Canister
Canister Working Capacity (grams)
Canister Configuration
A: Plastic Housing (Closed Bottom)
B: Plastic Housing (Open Bottom)
Fuel System
Y: Fuel Injection
Fuel Tank
M: Metal
Standard
A: Current Evap
B: Enhanced Evap
Wild Card

Under-hood Emissions Control Label

Emission Group Identification (1998 model)

Example:



50ST (50 States):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW LIGHT DUTY TRUCKS.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW LIGHT DUTY TRUCKS.

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THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW TLEV LIGHT DUTY TRUCKS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: W HNX T 02.0 UF1

- **Model Year**
  - W: 1998
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - V: LDV
  - T: LDT
- **Displacement**
- **Sequence Characters**

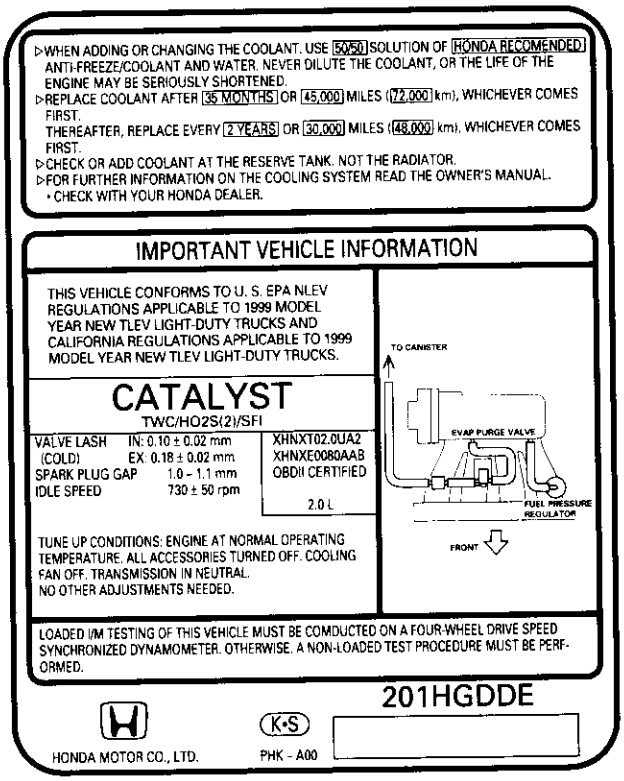
Evaporative Family: W HNX E 0080 AAB

- **Model Year**
  - W: 1998
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - E: EVAP
  - R: EVAP/ORVR
- **Canister Work Capacity**
- **Sequence Characters**

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Emission Group Identification (1999 model)

Example:



50 State TLEV + NLEV (Unrestricted)

THIS VEHICLE CONFORMS TO U.S. EPA NLEV REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW TLEV LIGHT DUTY TRUCKS AND CALIFORNIA REGULATIONS APPLICABLE TO 1999 MODEL YEAR NEW LIGHT DUTY TRUCKS.

Engine and Evaporative Families

Engine Family: X HNX T 02.0 UA2

- **Model Year**
  - X: 1999
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - V: LDV
  - T: LDT
- **Displacement**
- **Sequence Characters**

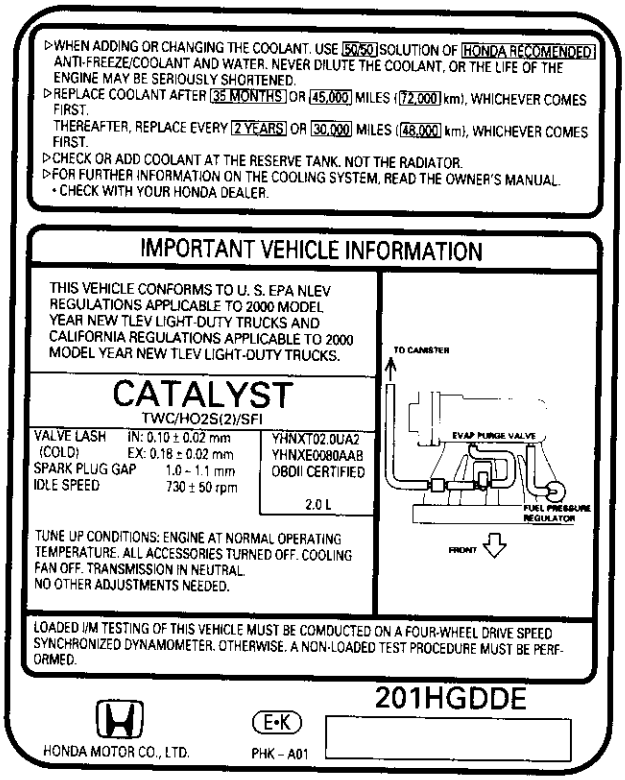
Evaporative Family: X HNX E 0080 AAB

- **Model Year**
  - X: 1999
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - E: EVAP
  - R: EVAP/ORVR
- **Canister Work Capacity**
- **Sequence Characters**

Under-hood Emissions Control Label

Emission Group Identification (2000 model)

Example:



50 State TLEV + NLEV (Unrestricted)

THIS VEHICLE CONFORMS TO U.S. EPA NLEV REGULATIONS APPLICABLE TO 2000 MODEL YEAR NEW TLEV LIGHT DUTY TRUCKS AND CALIFORNIA REGULATIONS APPLICABLE TO 2000 MODEL YEAR NEW LIGHT DUTY TRUCKS.

Engine and Evaporative Families

Engine Family: Y HNX T 02.0 UA2

- **Model Year**
  - Y: 2000
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - V: LDV
  - T: LDT
- **Displacement**
- **Sequence Characters**

Evaporative Family: Y HNX E 0080 AAB

- **Model Year**
  - Y: 2000
- **Manufacturer Subcode**
  - HNX: HONDA
- **Family Type**
  - E: EVAP
  - R: EVAP/ORVR
- **Canister Work Capacity**
- **Sequence Characters**

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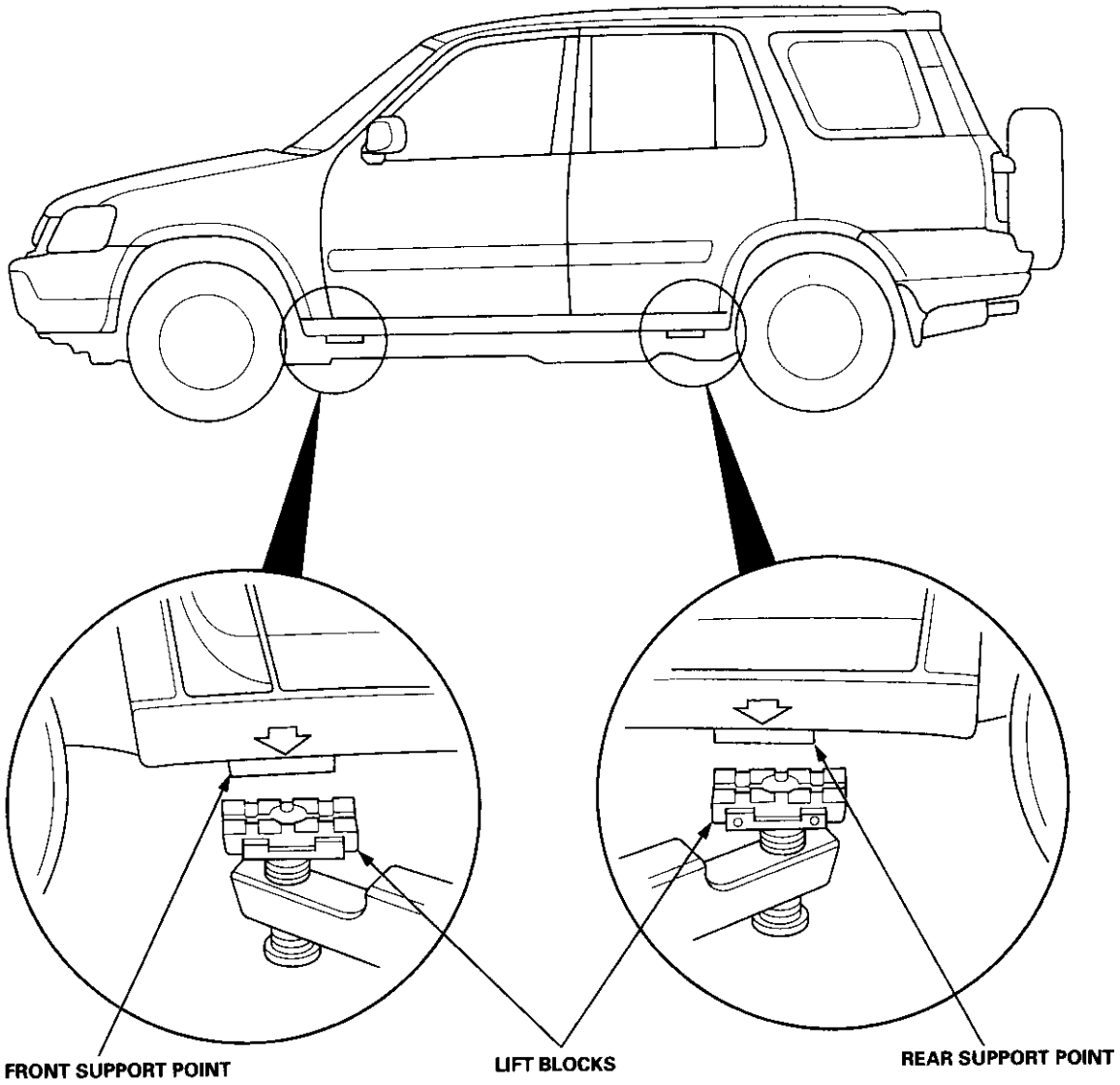
Lift and Safety Stands

⚠ WARNING When heavy rear components such as suspension, fuel tank, spare tire and tailgate are to be removed, place additional weight in the trunk before hoisting. When substantial weight is removed from the rear of the vehicle, the center of gravity may change and can cause the vehicle to tip forward on the hoist.

NOTE: Since each tire/wheel assembly weighs approximately 30 lbs (14 kg), placing the front wheels in the cargo area can assist with weight distribution.

1. Place the lift blocks as shown.
2. Raise the hoist a few inches (centimeters), and rock the vehicle to be sure it is firmly supported.
3. Raise the hoist to full height, and inspect the lift points for solid support.

NOTE: Use the same support points to support the vehicle on safety stands.



Lift and Support Points

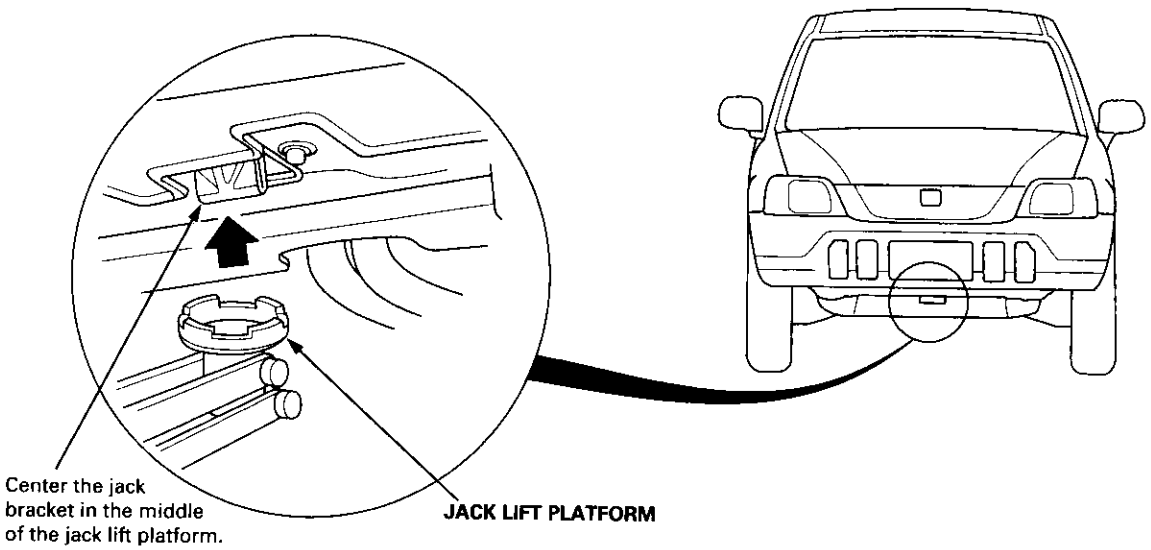
Floor Jack

1. Block the rear wheels when raising the front of the vehicle; block the front wheels when raising the rear of the vehicle.
   Place the blocks behind and ahead of the wheels.
2. Raise the vehicle high enough to insert the safety stands.
3. Adjust and place the safety stands so the vehicle will be approximately level, then lower the vehicle onto them.

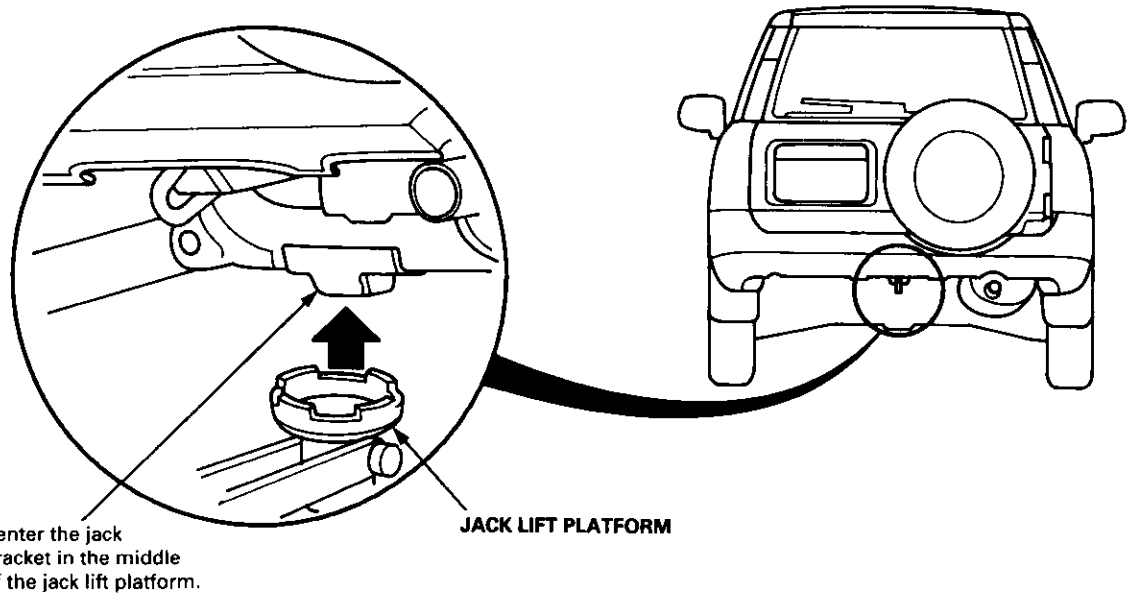
⚠ WARNING

- **Always use safety stands when working on or under any vehicle that is supported by only a jack.**
- **Never attempt to use a bumper jack for lifting or supporting the vehicle.**

Front:



Rear:



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Towing

If the vehicle needs to be towed, call a professional towing service. Never tow the vehicle behind another vehicle with just a rope or chain. It is very dangerous.

Emergency Towing

There are three popular methods of towing a vehicle.

Flat-bed Equipment — The operator loads the vehicle on the back of a truck. This is the best way of transporting the vehicle.

Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two tires remain on the ground. The vehicle's suspension and body can be seriously damaged if this method of towing is attempted.

Sling-type Equipment — The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the vehicle off the ground. The vehicle's suspension and body can be seriously damaged if this method of towing is attempted. This methed of towing the CR-V is unacceptable.

The only recommended way of towing the CR-V is on a flat-bed truck. Two wheel drive CR-V's may also be towed with all four wheels on the ground.

NOTICE

Towing the four-wheel drive CR-V with only two wheels on the ground will damage parts of the 4WD system. If this vehicle is damaged, it should be towed on a flat-bed truck or trailer.

If the 2 wheel drive CR-V is towed with all four wheels on the ground, do the following:

Manual Transmission

- Release the parking brake.
- Shift the transmission in Neutral.

Automatic Transmission

- Release the parking brake.
- Start the engine.
- Shift to D4 position, then N position.
- Turn off the engine.

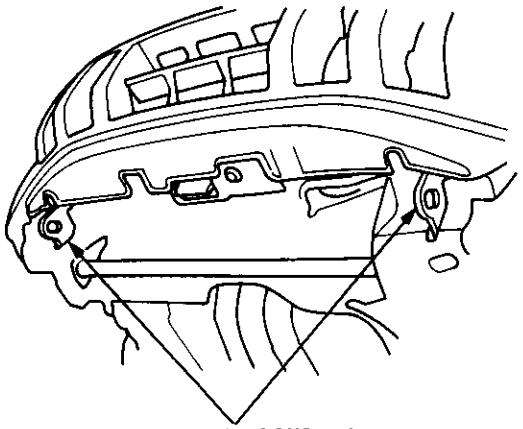
NOTICE

Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine, the vehicle must be transported on a flat-bed truck.

If the vehicle is towed with four wheels on the ground, it is best to tow the vehicle no farther than 50 miles (80 km), and keep the speed below 35 mph (55 km/h).

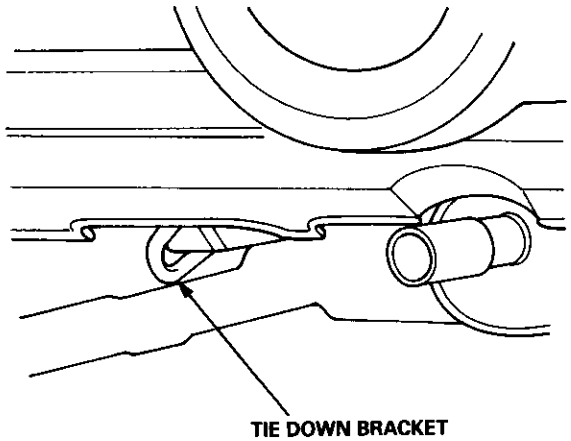
Trying to lift or tow the vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.

Front:



TOWING HOOKS and TIE DOWN BRACKETS

Rear:



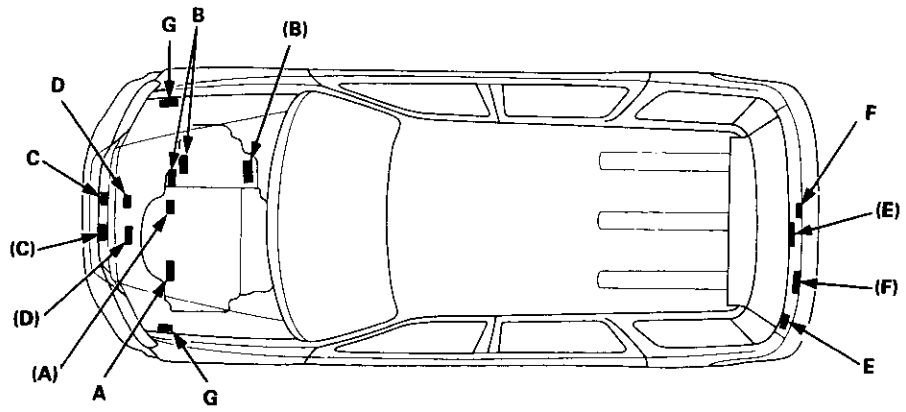
TIE DOWN BRACKET

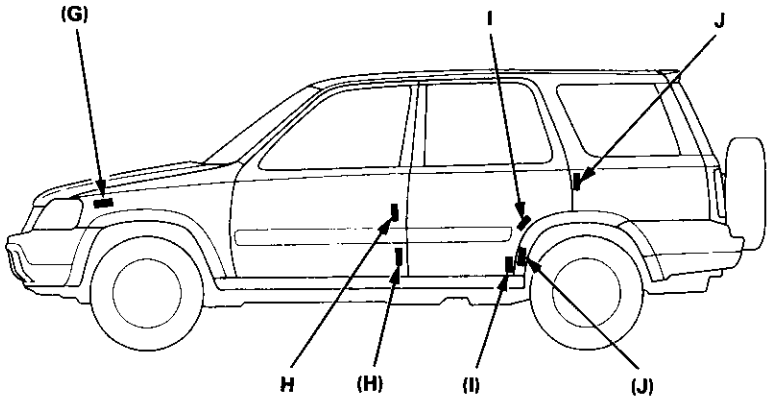
Parts Marking Locations

To deter vehicle theft, certain major components are marked with the vehicle identification number (VIN). Original parts will have self-adhesive labels or labels attached with a break-off bolt. Replacement body parts will have self-adhesive labels, and replacement engine and transmission parts will be stamped with a code for spare parts.

NOTE:
- Be careful not to damage the parts marking labels during body repairs. Mask the labels before repainting.
- Label location letters without parenthesis indicate original parts. Letters with parenthesis indicate replacement parts.

A, (A): Engine
B, (B): Transmission
C, (C): Front Bumper
D, (D): Hood
E, (E): Tailgate
F, (F): Rear Bumper
G, (G): Front Fenders (Left and Right)
H, (H): Front Doors (Left and Right)
I, (I): Rear Doors (Left and Right)
J, (J): Outer Side Panel (Left and Right)





Precautions for Real-time 4WD (Four-wheel Drive)

Under normal conditions, the vehicle is in 2WD (front-wheel drive). However, the system will instantly transmit appropriate driving force to the rear wheels (depending on the driving force of the front wheels and the road conditons).

The Real-time 4WD-Dual Pump System does not have a manual switch to disable the 4WD system. Whenever service work requires spinning the front or rear wheels with the engine, always lift up and support the vehicle so all four wheels are off the ground (see page 1-19).

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Specifications

Standards and Service Limits 2-2
Design Specifications 2-12
Body Specifications 2-14

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Standards and Service Limits

Engine Electrical — Section 4

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ignition coil	Rated voltage V	12	
	Primary winding resistance Ω at 68°F (20°C)	0.63 – 0.77	
Ignition wire	Resistance at 68°F (20°C) kΩ	25 max.	
	Firing order	1 – 3 – 4 – 2	
Spark plug	Type	See Section 4	
	Gap	1.0 – 1.1 (0.039 – 0.043)	———
Ignition timing	At idle °BTDC	16 ± 2 (Red)	
Alternator belt*1	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	8.5 – 11.5 (0.33 – 0.45) with used belt 5.5 – 8.0 (0.22 – 0.31) with new belt	
	Belt tension N (kgf, lbf) Measured with belt tension gauge	340 – 490 (35 – 50, 77 – 110) with used belt 690 – 880 (70 – 90, 150 – 200) with new belt	
Alternator	Output A (at 13.5 V, hot and 6,000 alternator rpm) A/T	95	
	M/T	90	———
	Brush length	10.5 (0.41)	1.5 (0.06)
Starting motor	Output kW A/T	1.1	
	Mica depth M/T	1.0	———
	Commutator runout	0.5 – 0.8 (0.02 – 0.03)	0.2 (0.008)
	Commutator O.D.	0 – 0.02 (0 – 0.0008)	0.05 (0.002)
	Brush length	27.9 – 28.0 (1.0984 – 1.1024)	27.0 (1.06)
	Brush spring tension N (kgf, lbf)	14.0 –14.5 (0.55 – 0.57)	9.0 (0.35)
		13.7 – 17.7 (1.40 – 1.80, 3.09 – 3.97)	———

*1 When using a new belt, adjust deflection to new value. Run the engine for 5 minutes then turn it off. Readjust deflection to used belt value.

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm and wide open throttle kPa (kgf/cm², psi)	Nominal Minimum Maximum variation	1,230 (12.5, 178) 930 (9.5, 135) 200 (2.0, 28)	
Cylinder head	Warpage		———	0.05 (0.002)
	Height		131.95 – 132.05 (5.195 – 5.199)	———
Camshaft	End play		0.05 – 0.15 (0.002 – 0.006)	0.5 (0.02)
	Camshaft-to-holder oil clearance		0.030 – 0.069 (0.0012 – 0.0027)	0.15 (0.006)
	Total runout		0.03 (0.001) max.	0.04 (0.002)
	Cam lobe height '97, '98 models	IN	33.204 (1.3072)	———
		EX	33.528 (1.3200)	———
	'99, '00 models	IN	33.716 (1.3274)	———
		EX	33.528 (1.3200)	———
Valve	Valve clearance (Cold)*	IN	0.08 – 0.12 (0.003 – 0.005)	———
		EX	0.16 – 0.20 (0.006 – 0.008)	———
	Valve stem O.D.	IN	6.580 – 6.590 (0.2591 – 0.2594)	6.55 (0.258)
		EX	6.550 – 6.560 (0.2579 – 0.2583)	6.52 (0.257)
	Stem-to-guide clearance	IN	0.02 – 0.05 (0.001 – 0.002)	0.08 (0.003)
		EX	0.05 – 0.08 (0.002 – 0.003)	0.11 (0.004)
Valve seat	Width	IN	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
		EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
	Stem installed height	IN	40.765 – 41.235 (1.6049 – 1.6234)	41.485 (1.6333)
		EX	42.765 – 43.235 (1.6837 – 1.7022)	43.485 (1.7120)
Valve spring	Free length	IN	42.36 (1.668)	———
		EX	44.32 (1.745)	———
Valve guide	I.D.	IN	6.61 – 6.63 (0.260 – 0.261)	6.65 (0.262)
		EX	6.61 – 6.63 (0.260 – 0.261)	6.65 (0.262)
	Installed height	IN	13.75 – 14.25 (0.541 – 0.561)	———
		EX	15.75 – 16.25 (0.620 – 0.640)	———

*: Measured between the camshaft and rocker arm.

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Unit of length: mm (in)

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter		84.00 – 84.02 (3.307 – 3.308)	84.07 (3.310)
	Bore taper		———	0.05 (0.002)
Piston	Skirt O.D.*1 from bottom of skirt		83.98 – 83.99 (3.306 – 3.307)	83.97 (3.306)
	Clearance in cylinder		0.01 – 0.04 (0.0004 – 0.0016)	0.05 (0.002)
	Groove width (For ring)	Top	1.240 – 1.250 (0.0488 – 0.0492)	1.26 (0.050)
		Second	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
		Oil	2.805 – 2.825 (0.1104 – 0.1112)	2.84 (0.112)
Piston ring	Ring-to-groove clearance	Top	0.055 – 0.080 (0.0022 – 0.0031)	0.13 (0.005)
		Second	0.035 – 0.060 (0.0014 – 0.0024)	0.13 (0.005)
	Ring end gap	Top	0.20 – 0.30 (0.008 – 0.012)	0.60 (0.024)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
		Oil	0.20 – 0.50 (0.008 – 0.020)	0.70 (0.028)
Piston Pin	O.D.		20.996 – 21.000 (0.8266 – 0.8268)	———
	Pin-to-piston clearance		0.010 – 0.017 (0.0004 – 0.0007)	———
Connecting rod	Pin-to-rod interference		0.015 – 0.032 (0.0006 – 0.0013)	———
	Small end bore diameter		20.968 – 20.981 (0.8255 – 0.8260)	———
	Large end bore diameter	Nominal	48.0 (1.89)	———
	End play installed on crankshaft		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Main journal diameter			
	No. 1, 2, 4 and 5 journals		54.976 – 55.000 (2.1644 – 2.1654)	———
	No. 3 journal		54.970 – 54.994 (2.1642 – 2.1651)	———
	Rod journal diameter		44.976 – 45.000 (1.7707 – 1.7717)	———
	Taper		0.005 (0.0002) max.	0.010 (0.0004)
	Out-of-round		0.005 (0.0002) max.	0.010 (0.0004)
	End play		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Runout		0.03 (0.001) max.	0.04 (0.002)
Bearing	Main bearing-to-journal oil clearance			
	No. 1, 2, 4 and 5 journals		0.024 – 0.042 (0.0009 – 0.0017)	0.06 (0.002)
	No. 3 journal		0.030 – 0.048 (0.0012 – 0.0019)	0.06 (0.002)
	Rod bearing-to-journal oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002)

*1: '97, '98 models 15 mm (0.6 in)
'99, '00 models 20 mm (0.8 in)

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Standards and Service Limits

Engine Lubrication — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	4.6 (4.9, 4.0) for engine overhaul 3.8 (4.0, 3.3) for oil change, including filter 3.5 (3.7, 3.1) for oil change, without filter	
Oil pump	Inner-to-outer rotor clearance Pump housing-to-outer rotor clearance Pump housing-to rotor axial clearance	0.04 – 0.16 (0.002 – 0.006) 0.10 – 0.19 (0.004 – 0.007) 0.02 – 0.07 (0.001 – 0.003)	0.20 (0.008) 0.20 (0.008) 0.15 (0.006)
Relief valve	Pressure setting at engine oil temp. 176°F (80°C) kPa (kgf/cm², psi) At Idle At 3,000 rpm	 70 (0.7, 10) min. 340 (3.5, 50) min.	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt, Imp qt) A/T [Including engine, heater, [cooling line and reservoir] M/T Reservoir capacity: 0.6 ℓ (0.63 US qt, 0.53 Imp qt)	5.9 (6.2, 5.2) for overhaul 3.9 (4.1, 3.4) for coolant change 6.0 (6.3, 5.3) for overhaul 4.0 (4.2, 3.5) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm², psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Starts to open °F (°C) Fully open °F (°C) Valve lift at fully open	169 – 176 (76 – 80) 194 (90) 8.0 (0.31) min.
Cooling fan	Thermoswitch "ON" temperature °F (°C) Thermoswitch "OFF" temperature °F (°C)	196 – 203 (91 – 95) Subtract 5 – 14 (3 – 8) from actual "ON" temperature

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)	
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm², psi) '97, '98 models '99, '00 models	 260 – 310 (2.7 – 3.2, 38 – 46) 270 – 320 (2.8 – 3.3, 40 – 47)	
Fuel tank	Capacity ℓ (US gal, Imp gal)	58 (15.3, 12.8)	
Engine	Idle speed with headlights and cooling fan off rpm	MT	AT (N or P position)
	'97 model	———	750 ± 50
	'98 model	750 ± 50	750 ± 50
	'99, '00 models	730 ± 50	730 ± 50
	Fast idle rpm '97 model	———	1,500 ± 200
	'98 model	1,500 ± 200	1,500 ± 200
	'99, '00 models	1,600 ± 200	1,600 ± 200
	Idle CO %	0.1 max.	

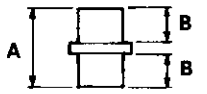
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Unit of length: mm (in)

Clutch — Section 12

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor	183 (7.20)	———
	Stroke	135 – 145 (5.31 – 5.71)	———
	Free play	7 – 22 (0.28 – 0.87)	———
	Pedal play	1 – 9 (0.04 – 0.35)	———
	Disengagement height to floor	72 (2.83) min.	———
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth	1.2 – 1.7 (0.05 – 0.07)	0.2 (0.01)
	Thickness	8.4 – 9.1 (0.33 – 0.36)	6.0 (0.24)
Pressure plate	Warpage	0.03 (0.001) max.	0.15 (0.006)
	Diaphragm spring finger alignment	0.6 (0.02) max.	0.8 (0.03)

Manual Transmission — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	1.7 (1.8, 1.4) for oil change 2.1 (2.2, 1.8) for overhaul	
Mainshaft	End play	0.11 – 0.18 (0.004 – 0.007)	Adjust
	Diameter of ball bearing contact area (clutch side)	27.977 – 27.990 (1.1015 – 1.1020)	27.94 (1.100)
	Diameter of needle bearing contact area	37.984 – 38.000 (1.4954 – 1.4961)	37.93 (1.493)
	Diameter of ball bearing contact area (transmission housing side)	27.987 – 28.000 (1.1018 – 1.1024)	27.94 (1.100)
	Runout	0.02 (0.001) max.	0.05 (0.002)
Mainshaft 3rd and 4th gears	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.080 (1.6961)
	End play	0.06 – 0.21 (0.002 – 0.008)	0.3 (0.01)
	Thickness 3rd gear	34.92 – 34.97 (1.375 – 1.377)	34.8 (1.37)
	4th gear	31.42 – 31.47 (1.237 – 1.239)	31.3 (1.23)
Mainshaft 5th gear	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.080 (1.6961)
	End play	0.06 – 0.21 (0.002 – 0.008)	0.3 (0.01)
	Thickness	30.92 – 30.97 (1.217 – 1.219)	30.8 (1.21)
Countershaft	Diameter of needle bearing contact area	36.000 – 36.015 (1.4173 – 1.4179)	35.95 (1.415)
	Diameter of ball bearing and needle bearing contact area	24.987 – 25.000 (0.9837 – 0.9843)	24.94 (0.982)
	Diameter of 1st gear contact area	36.984 – 37.000 (1.4561 – 1.4567)	36.93 (1.454)
	Runout	0.02 (0.001) max.	0.05 (0.002)
Countershaft 1st gear	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.08 (1.696)
	End play	0.06 – 0.18 (0.002 – 0.007)	0.23 (0.009)
	Thickness	26.95 – 27.00 (1.061 – 1.063)	———
Countershaft 2nd gear	I.D.	47.009 – 47.025 (1.8507 – 1.8514)	47.08 (1.854)
	End play	0.07 – 0.14 (0.003 – 0.006)	0.18 (0.007)
	Thickness	28.92 – 28.97 (1.139 – 1.141)	———
Spacer collar (Mainshaft 4th and 5th gears)	I.D.	31.002 – 31.012 (1.2205 – 1.2209)	31.06 (1.223)
	O.D.	37.989 – 38.000 (1.4956 – 1.4961)	37.94 (1.494)
	Length  A	56.45 – 56.55 (2.222 – 2.226)	———
	B	26.03 – 26.08 (1.025 – 1.027)	26.01 (1.024)
Reverse idler gear	I.D.	20.016 – 20.043 (0.7880 – 0.7891)	20.09 (0.7909)
	Gear-to-reverse gear shaft clearance	0.036 – 0.084 (0.0014 – 0.0033)	0.160 (0.0063)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.85 – 1.10 (0.033 – 0.043)	0.4 (0.02)
Dual cone synchro	Clearance (ring pushed against gear)		
	Outer synchro ring-to-synchro cone	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
	Synchro cone-to-gear	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
	Outer synchro ring-to-gear	0.95 – 1.68 (0.037 – 0.066)	0.6 (0.02)
Shift fork	Finger thickness 3rd/4th shift fork	7.4 – 7.6 (0.29 – 0.30)	———
	Except above	6.2 – 6.4 (0.24 – 0.25)	———
	Fork-to-synchro sleeve clearance	0.35 – 0.65 (0.014 – 0.026)	1.0 (0.039)

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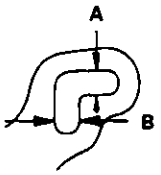
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Standards and Service Limits

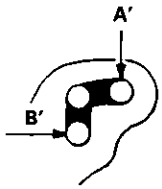
Manual Transmission (cont'd) — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Reverse shift fork	Pawl groove width	13.0 – 13.3 (0.51 – 0.52)	———
	Fork-to-reverse idler gear clearance	0.5 – 1.1 (0.02 – 0.04)	1.8 (0.07)
	Groove width*1 at A	7.05 – 7.25 (0.278 – 0.285)	———
	at B	7.4 – 7.7 (0.29 – 0.30)	———
	Fork-to-5th/reverse shift shaft clearance*2		
	at A′	0.05 – 0.35 (0.002 – 0.014)	0.5 (0.02)
	at B′	0.4 – 0.8 (0.02 – 0.03)	1.0 (0.04)
Shift arm A	Shift fork diameter at contact area	12.9 – 13.0 (0.508 – 0.512)	———
	Shift arm A-to-shift fork shaft clearance	0.2 – 0.5 (0.008 – 0.020)	0.6 (0.024)
Shift arm C	Shift arm C-to-shift arm B clearance	0.05 – 0.25 (0.002 – 0.01)	———
	Diameter of shift arm B contact area	12.9 – 13.0 (0.508 – 0.512)	———
Select arm	Select arm-to-shift arm A clearance	0.05 – 0.25 (0.002 – 0.01)	———
	Diameter of shift arm A contact area	7.9 – 8.0 (0.311 – 0.315)	———
Select lever	O.D.	15.941 – 15.968 (0.6276 – 0.6287)	———
	Transmission housing clearance	0.032 – 0.086 (0.0013 – 0.0034)	———
Shift lever	O.D.	15.941 – 15.968 (0.6276 – 0.6287)	———
	Shift arm cover clearance	0.032 – 0.127 (0.0013 – 0.0050)	———
Differential carrier	Pinion shaft contact area I.D.	18.010 – 18.028 (0.7091 – 0.7098)	———
	Carrier-to-pinion shaft clearance	0.027 – 0.057 (0.0011 – 0.0022)	0.1 (0.004)
	Driveshaft, intermediate shaft contact area I.D.	28.005 – 28.025 (1.1026 – 1.1033)	———
	Carrier-to-driveshaft clearance	0.025 – 0.066 (0.0010 – 0.0026)	0.12 (0.005)
	Carrier-to-intermediate shaft clearance	0.055 – 0.091 (0.0022 – 0.0036)	0.15 (0.006)
Differential pinion gear	Backlash	0.05 – 0.15 (0.002 – 0.006)	———
	I.D.	18.042 – 18.066 (0.7103 – 0.7113)	———
	Pinion gear-to-pinion shaft clearance	0.059 – 0.095 (0.0023 – 0.0037)	0.15 (0.006)
Differential tapered roller bearing preload Starting torque N·m (kgf·cm, lbf·in)		1.4 – 2.5 (14 – 26, 12 –23)	Adjust
Transfer	Diameter of roller bearing contact area		
	Transfer shaft (driven gear side)	33.984 – 34.000 (1.337 – 1.339)	33.93 (1.336)
	Transfer shaft (middle of shaft)	27.977 – 27.990 (1.101 – 1.102)	27.92 (1.099)
	Transfer drive gear	40.002 – 40.018 (1.575 – 1.576)	39.95 (1.573)
	Transfer driven gear shaft (driven gear side)	35.002 – 35.018 (1.378 – 1.379)	34.95 (1.376)
	Transfer driven gear shaft (splined side)	26.975 – 26.988 (1.062 – 1.063)	26.92 (1.060)
	Transfer gear backlash	0.06 – 0.16 (0.002 – 0.006)	Adjust
	Total starting torque N·m (kgf·cm, lbf·in)	2.68 – 3.47 (27.3 – 35.4, 23.7 – 30.7)	Adjust

*1: Measuring points



*2: Measuring points



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Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	4WD	6.8 (7.2, 6.0) for overhaul 2.9 (3.1, 2.6) for fluid change	
		2WD	5.9 (6.2, 5.2) for overhaul 2.7 (2.9, 2.4) for fluid change	
Hydraulic pressure kPa (kgf/cm², psi)	Line pressure at 2,000 rpm in [N] or [P] position		830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	1st clutch pressure at 2,000 rpm in [D4] position			
	1st-hold clutch pressure at 2,000 rpm in [1] position			
	2nd clutch pressure at 2,000 rpm in [2] position		800 – 850 (8.2 – 8.7, 120 – 124)	760 (7.7, 110)
	3rd clutch pressure at 2,000 rpm in [D3] position ('97, '98 models), or [D] position with O/D OFF indicator light ON ('99, '00 models)			
	4th clutch pressure at 2,000 rpm in [D4] position ('97, '98 models), or [D] position with O/D OFF indicator light OFF ('99, '00 models)			
Stall speed rpm (Check with vehicle on level ground)			2,550	2,400 – 2,700
Clutch	Clutch initial clearance	1st	0.65 – 0.85 (0.026 – 0.033)	———
		2nd, 3rd, 4th	0.40 – 0.60 (0.016 – 0.024)	———
		1st-hold	0.5 – 0.8 (0.020 – 0.031)	———
	Clutch return spring free length	1st, 2nd, 3rd, 4th	31.1 (1.22)	29.1 (1.15)
		1st-hold	34.6 (1.36)	32.6 (1.28)
	Clutch disc thickness		1.88 – 2.00 (0.074 – 0.079)	Until grooves worn out
	Clutch plate thickness	2nd, 3rd, 4th	1.95 – 2.05 (0.077 – 0.081)	Discoloration
		1st, 1st-hold	1.55 – 1.65 (0.061 – 0.065)	Discoloration
	Clutch end plate thickness (1st)	Mark 1	2.05 – 2.10 (0.081 – 0.083)	Discoloration ↕ Discoloration
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	
	Clutch end plate thickness (2nd, 4th)	Mark 6	2.55 – 2.60 (0.100 – 0.102)	Discoloration ↕ Discoloration
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	
		Mark 11	3.05 – 3.10 (0.120 – 0.122)	
		Mark 12	3.15 – 3.20 (0.124 – 0.126)	
		Mark 13	3.25 – 3.30 (0.128 – 0.130)	
		Mark 14	3.35 – 3.40 (0.132 – 0.134)	
		Mark 15	3.45 – 3.50 (0.136 – 0.138)	
		Mark 16	3.55 – 3.60 (0.140 – 0.142)	
		Mark 17	3.65 – 3.70 (0.144 – 0.146)	
	Clutch end plate thickness (3rd)	Mark 8	2.75 – 2.80 (0.108 – 0.110)	Discoloration ↕ Discoloration
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	
		Mark 11	3.05 – 3.10 (0.120 – 0.122)	
		Mark 12	3.15 – 3.20 (0.124 – 0.126)	
		Mark 13	3.25 – 3.30 (0.128 – 0.130)	
		Mark 14	3.35 – 3.40 (0.132 – 0.134)	
		Mark 15	3.45 – 3.50 (0.136 – 0.138)	
		Mark 16	3.55 – 3.60 (0.140 – 0.142)	
		Mark 17	3.65 – 3.70 (0.144 – 0.146)	
	Clutch end plate thickness (1st-hold)	Mark 1	2.05 – 2.10 (0.081 – 0.083)	Discoloration ↕ Discoloration
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	
		No mark	2.45 – 2.50 (0.096 – 0.098)	
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	

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Standards and Service Limits

Automatic Transmission (cont'd)— Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Diameter of needle bearing contact area		
	On mainshaft stator shaft bearing	23.980 – 23.993 (0.9441 – 0.9446)	Wear or damage
	On mainshaft 2nd gear	35.975 – 35.991 (1.4163 – 1.4169)	↕
	On mainshaft 4th gear collar	31.975 – 31.991 (1.2589 – 1.2595)	↕
	On mainshaft 1st gear collar	30.975 – 30.991 (1.2195 – 1.2201)	↕
	On countershaft (torque converter housing side)	36.004 – 36.017 (1.4175 – 1.4180)	↕
	On countershaft 3rd gear	35.980 – 35.996 (1.4165 – 1.4172)	↕
	On countershaft 4th gear	27.980 – 27.993 (1.1016 – 1.1021)	↕
	On countershaft reverse gear collar	31.975 – 31.991 (1.2589 – 1.2595)	↕
	On countershaft 1st gear collar	31.975 – 31.991 (1.2589 – 1.2595)	↕
	On sub-shaft (transmission housing side)	25.991 – 26.000 (1.0233 – 1.0236)	↕
	On sub-shaft 4th gear collar	22.9935 – 23.0065 (0.9053 – 0.9058)	↕
	On reverse idler gear shaft	13.990 – 14.000 (0.5508 – 0.5512)	Wear or damage
	Inside diameter of needle bearing contact area		
	On mainshaft 1st gear	35.000 – 35.016 (1.3780 – 1.3786)	Wear or damage
	On mainshaft 2nd gear	41.000 – 41.016 (1.6142 – 1.6148)	↕
	On mainshaft 4th gear	38.000 – 38.016 (1.4961 – 1.4967)	↕
	On countershaft 1st gear	38.000 – 38.016 (1.4961 – 1.4967)	↕
	On countershaft 3rd gear	41.000 – 41.016 (1.6142 – 1.6148)	↕
	On countershaft 4th gear	33.000 – 33.016 (1.2992 – 1.2998)	↕
	On countershaft reverse gear	38.000 – 38.016 (1.4961 – 1.4967)	↕
	On sub-shaft 4th gear	32.000 – 32.016 (1.2598 – 1.2605)	↕
	On reverse idler gear	18.007 – 18.020 (0.7089 – 0.7094)	↕
	Reverse idler gear shaft holder I.D.	14.416 – 14.434 (0.5676 – 0.5683)	Wear or damage
	End play		
	Mainshaft 1st gear	0.05 – 0.16 (0.002 – 0.006)	———
	Mainshaft 2nd gear	0.05 – 0.13 (0.002 – 0.005)	———
	Mainshaft 4th gear	0.05 – 0.16 (0.002 – 0.006)	———
	Countershaft 1st gear	0.1 – 0.5 (0.004 – 0.020)	———
	Countershaft 3rd gear	0.05 – 0.17 (0.002 – 0.007)	———
	Countershaft 4th gear	0.10 – 0.18 (0.004 – 0.007)	———
	Sub-shaft 4th gear	0.05 – 0.17 (0.002 – 0.007)	———
	Reverse idler gear	0.05 – 0.18 (0.002 – 0.007)	———
	Countershaft reverse gear	0.10 – 0.25 (0.004 – 0.010)	———
	Selector hub O.D.	51.87 – 51.90 (2.042 – 2.043)	Wear or damage
	Mainshaft 4th gear collar length	49.50 – 49.55 (1.9488 – 1.9508)	———
	Mainshaft 4th gear collar flange thickness	4.435 – 4.525 (0.1746 – 0.1781)	Wear or damage
	Mainshaft 1st gear collar length	27.00 – 27.05 (1.063 – 1.065)	———
	Countershaft distance collar length	38.97 – 39.00 (1.534 – 1.535)	———
		39.02 – 39.05 (1.536 – 1.537)	———
		39.07 – 39.10 (1.538 – 1.539)	———
		39.12 – 39.15 (1.540 – 1.541)	———
		39.17 – 39.20 (1.542 – 1.543)	———
		39.22 – 39.25 (1.544 – 1.545)	———
		39.27 – 39.30 (1.546 – 1.547)	———
		38.87 – 38.90 (1.530 – 1.531)	———
		38.92 – 38.95 (1.532 – 1.533)	———
	Countershaft 3rd gear collar length	21.15 – 21.20 (0.8327 – 0.8346)	———
	Countershaft reverse gear collar length	14.5 – 14.6 (0.571 – 0.575)	———
	Countershaft reverse gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage
	Countershaft 1st gear collar length	14.5 – 14.6 (0.571 – 0.575)	———
	Countershaft 1st gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage
	Sub-shaft 4th gear collar length	24.0 – 24.1 (0.945 – 0.949)	———
	Sub-shaft 4th gear collar flange thickness	2.95 – 3.10 (0.116 – 0.122)	Wear or damage

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Unit of length: mm (in)

— Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Mainshaft 2nd gear thrust washer thickness	3.97 – 4.00 (0.156 – 0.157) 4.02 – 4.05 (0.158 – 0.159) 4.07 – 4.10 (0.160 – 0.161) 4.12 – 4.15 (0.162 – 0.163) 4.17 – 4.20 (0.164 – 0.165) 4.22 – 4.25 (0.166 – 0.167) 4.27 – 4.30 (0.168 – 0.169) 4.32 – 4.35 (0.170 – 0.171) 4.37 – 4.40 (0.172 – 0.173) 4.42 – 4.45 (0.174 – 0.175)	Wear or damage ↕ Wear or damage
	Thrust washer thickness Mainshaft ball bearing left side Mainshaft 1st gear Countershaft 3rd gear splined washer Sub-shaft 4th gear thrust washer	 2.95 – 3.05 (0.116 – 0.120) 2.43 – 2.50 (0.096 – 0.098) 4.95 – 5.00 (0.195 – 0.197) 2.93 – 3.00 (0.115 – 0.118)	 Wear or damage ↕ Wear or damage
	One-way clutch contact area I.D. Countershaft 1st gear Parking gear Mainshaft feed pipe A, O.D. (at 15 mm from end) Mainshaft feed pipe B, O.D. (at 30 mm from end) Countershaft feed pipe O.D. (at 15 mm from end) Sub-shaft feed pipe O.D. (at 15 mm from end) Mainshaft sealing ring thickness (29 mm and 35 mm) Mainshaft bushing I.D. Mainshaft bushing I.D. Countershaft bushing I.D. Sub-shaft bushing I.D. Mainshaft sealing ring groove width	 83.339 – 83.365 (3.2810 – 3.2821) 66.685 – 66.698 (2.6254 – 2.6259) 8.97 – 8.98 (0.353 – 0.354) 5.97 – 5.98 (0.2350 – 0.2354) 7.97 – 7.98 (0.3138 – 0.3142) 7.97 – 7.98 (0.3138 – 0.3142) 1.87 – 1.97 (0.074 – 0.078) 6.018 – 6.030 (0.2369 – 0.2374) 9.000 – 9.015 (0.3543 – 0.3549) 8.000 – 8.022 (0.3150 – 0.3158) 8.000 – 8.022 (0.3150 – 0.3158) 2.025 – 2.075 (0.0797 – 0.0811)	 Wear or damage Wear or damage 8.95 (0.352) 5.95 (0.234) 7.95 (0.313) 7.95 (0.313) 1.82 (0.072) 6.045 (0.2380) 9.03 (0.356) 8.03 (0.316) 8.03 (0.316) 2.095 (0.082)
ATF pump	ATF pump gear side clearance ATF pump gear-to-body clearance Drive Driven ATF pump driven gear I.D. ATF pump driven gear shaft O.D.	0.03 – 0.05 (0.001 – 0.002) 0.1050 – 0.1325 (0.004 – 0.005) 0.0350 – 0.0625 (0.001 – 0.002) 14.016 – 14.034 (0.5518 – 0.5525) 13.980 – 13.990 (0.5504 – 0.5508)	0.07 (0.003) ——— ——— Wear or damage Wear or damage
Regulator valve body	Sealing ring contact area I.D.	35.000 – 35.025 (1.3780 – 1.3782)	35.050 (1.3799)
Stator shaft	Inside of diameter of bearing contact area On torque converter side On ATF pump side	 27.000 – 27.021 (1.063 – 1.064) 29.000 – 29.013 (1.1417 – 1.1422)	 Wear or damage Wear or damage
Shifting device and parking brake control	Reverse shift fork finger thickness Parking brake pawl Parking gear	5.90 – 6.00 (0.232 – 0.236) ——— ———	5.40 (0.213) Wear or other defect
Servo body	Shift fork shaft bore I.D. Shift fork shaft valve bore I.D.	14.000 – 14.010 (0.5512 – 0.5516) 37.000 – 37.039 (1.4567 – 1.4582)	——— 37.045 (1.4585)
Differential carrier	Pinion shaft contact area I.D. Carrier-to-pinion shaft clearance Driveshaft/intermediate shaft contact are I.D. 2WD 4WD Carrier-to-driveshaft clearance Carrier-to-intermediate shaft clearance	18.010 – 18.028 (0.709 – 0.710) 0.023 – 0.057 (0.001 – 0.002) 26.025 – 26.045 (1.0246 – 1.0254) 28.025 – 28.045 (1.103 – 1.104) 0.045 – 0.086 (0.002 – 0.003) 0.075 – 0.111 (0.003 – 0.004)	——— 0.1 (0.004) ——— ——— 0.12 (0.005) 0.15 (0.006)
Differential pinion gear	Backlash I.D. Pinion gear-to-pinion shaft clearance	0.05 – 0.15 (0.002 – 0.006) 18.042 – 18.066 (0.7103 – 0.7113) 0.055 – 0.095 (0.0022 – 0.0037)	——— ——— 0.15 (0.006)
Set ring-to-bearing outer race clearance		0 – 0.15 (0 – 0.006)	Adjust
Transfer	Diameter of roller bearing contact area Transfer shaft (transfer gear side) Transfer shaft (middle of shaft) Transfer drive gear Transfer driven gear shaft (driven gear side) Transfer driven gear shaft (splined side) Transfer gear backlash Total starting torque N·m (kgf·cm, lbf·in)	 38.485 – 38.500 (1.515 – 1.516) 27.977 – 27.990 (1.101 – 1.102) 40.002 – 40.018 (1.575 – 1.576) 35.002 – 35.018 (1.378 – 1.379) 26.975 – 26.988 (1.062 – 1.063) 0.060 – 0.160 (0.002 – 0.006) 2.68 – 3.47 (27.3 – 35.4, 23.7 – 30.7)	 38.43 (1.513) 27.92 (1.099) 39.95 (1.573) 34.95 (1.376) 26.92 (1.060) Adjust Adjust

(cont'd)

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Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	87.8 (3.457)	16.5
	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	11.0
	Stator reaction spring	4.5 (0.177)	35.4 (1.394)	30.3 (1.193)	1.9
	Modulator valve spring	1.4 (0.055)	9.4 (0.370)	35.0 (1.378)	10.9
	Torque converter check valve spring				
	'97 model	1.1 (0.043)	8.4 (0.331)	36.4 (1.433)	12.0
	'98 – 00 models	1.2 (0.047)	8.4 (0.331)	32.4 (1.276)	12.7
	Cooler relief valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
	Relief valve spring	1.1 (0.043)	8.6 (0.339)	37.1 (1.461)	13.4
	2nd orifice control valve spring	0.7 (0.028)	6.6 (0.260)	34.8 (1.370)	22.0
	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	41.3 (1.626)	16.3
	2-3 shift valve spring	0.9 (0.035)	7.6 (0.299)	57.0 (2.244)	26.8
	3-4 shift valve spring	0.9 (0.035)	7.6 (0.299)	57.0 (2.244)	26.8
	1st accumulator spring	2.1 (0.083)	16.0 (0.630)	89.1 (3.508)	16.2
	4th accumulator spring B	2.3 (0.091)	10.2 (0.402)	51.6 (2.031)	13.8
	4th accumulator spring A	2.6 (0.102)	17.0 (0.669)	88.4 (3.480)	14.2
	2nd accumulator spring A	2.4 (0.094)	29.0 (1.142)	39.0 (1.535)	2.9
	3rd accumulator spring A	2.8 (0.110)	17.5 (0.689)	94.3 (3.713)	15.9
	2nd accumulator spring B	1.6 (0.063)	9.0 (0.354)	20.7 (0.815)	6.1
	3rd accumulator spring B	2.1 (0.083)	31.0 (1.220)	38.2 (1.504)	2.6
	3rd sub accumulator spring	2.7 (0.106)	17.0 (0.669)	39.0 (1.535)	6.3
	2nd accumulator spring C	2.2 (0.087)	14.5 (0.571)	68.0 (2.677)	13.9
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
	Lock-up timing valve spring	0.9 (0.035)	8.1 (0.319)	81.4 (3.205)	47.8
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.0 (1.496)	14.1
	3-4 orifice control valve spring	0.6 (0.024)	6.6 (0.260)	37.9 (1.492)	31.6
	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	52.1 (2.051)	20.8
	CPB valve spring	0.9 (0.035)	8.1 (0.319)	47.2 (1.858)	18.3
	4th exhaust valve spring	0.9 (0.035)	6.1 (0.240)	36.4 (1.433)	19.5

Differential (4WD) — Section 15

	MEASUREMENT	STANDARD (NEW)
Differential fluid	Capacity ℓ (US qt, Imp qt)	1.2 (1.3, 1.1) at overhaul 1.0 (1.1, 0.9) at fluid change

Steering — Section 17

	MEASUREMENT	STANDARD (NEW)
Steering wheel	Rotational play at steering wheel circumference	0 – 10 (0 – 0.39)
	Starting load at steering wheel circumference N (kgf, lbf) Engine running	29 (3.0, 6.6)
Gearbox	Angle of rack-guide-screw loosened from locked position	
	'97, '98 models	10° ± 5°
	'99, '00 models	20° MAX.
Pump	Pump pressure with shut-off valve closed kPa (kgf/cm², psi)	6,900 – 7,800 (70 – 80, 995 – 1,138)
Power steering fluid	Recommended fluid	Honda power steering fluid.
	Fluid capacity For overhaul	0.85 (0.90, 0.75)
	ℓ (US qt, Imp qt) For reservoir	0.4 (0.42, 0.35)
Power steering belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	11.0 – 14.5 (0.43 – 0.57) with used belt 7.5 – 10.0 (0.30 – 0.40) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge	390 – 540 (40 – 55, 88 – 121) with used belt 740 – 880 (75 – 90, 165 – 198) with new belt

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

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Unit of length: mm (in)

Suspension — Section 18

MEASUREMENT				STANDARD (NEW)	
Wheel alignment	Camber		Front	0°00′ ± 1°	
			Rear	−1°00′ ± 1°	
	Caster		Front	2°10′ ± 1°	
	Total toe		Front	0 ± 3 (0 ± 1/8)	
			Rear	IN 2^{+2}_{-1} (1/16 ± 1/16)	
	Front wheel turning angle		Inward wheel	37°00′ ± 2°	
			Outward wheel	31°30′ (Reference)	
Wheel bearing	End play		Front	0 – 0.05 (0 – 0.002)	
			Rear	0 – 0.05 (0 – 0.002)	
				STANDARD (NEW)	SERVICE LIMIT
Wheel	Rim runout	Aluminum wheel	Axial	0 – 0.7 (0 – 0.03)	2.0 (0.08)
			Radial	0 – 0.7 (0 – 0.03)	1.5 (0.06)
		Steel wheel	Axial	0 – 1.0 (0 – 0.04)	2.0 (0.08)
			Radial	0 – 1.0 (0 – 0.04)	1.5 (0.06)

Brakes — Section 19

MEASUREMENT				STANDARD (NEW)	
Parking brake lever	Play in stroke at 196 N (20 kgf, 44 lbf) lever force			To be locked when pulled: 2 – 6 notches	
Foot brake pedal	Pedal height (with floor mat removed)		M/T	155 (6 1/8)	
			A/T	161 (6 5/16)	
	Free play			1 – 5 (1/16 – 3/16)	
Master cylinder	Piston-to-pushrod clearance			0 – 0.4 (0 – 0.02)	
				STANDARD (NEW)	SERVICE LIMIT
Disc brake	Disc thickness	Front	'97, '98 models	22.9 – 23.1 (0.902 – 0.909)	21.0 (0.83)
			'99, '00 models	23.6 – 23.8 (0.929 – 0.937)	21.0 (0.83)
	Disc runout		Front	———	0.10 (0.004)
	Disc parallelism		Front	———	0.015 (0.0006)
	Pad thickness		Front	10.5 – 11.5 (0.41 – 0.45)	1.6 (0.06)
Rear brake drum	I.D.			219.9 – 220.0 (8.657 – 8.661)	221.0 (8.701)
	Lining thickness			3.9 – 4.5 (0.15 – 0.18)	2.0 (0.08)

Air Conditioning — Section 22

MEASUREMENT			STANDARD (NEW)
Air conditioning system	Lubricant type: KEIHIN SP-10 (P/N 38897 – P13 – A01AH or 38899 – P13 – A01)		
	Lubricant capacity mℓ (fl oz, Imp oz)	Condenser	25 (5/6, 0.9)
		Evaporator	40 (1 1/3, 1.4)
		Line or hose	10 (1/3, 0.4)
		Receiver	10 (1/3, 0.4)
Compressor (KEIHIN)	Lubricant type: SP-10		
	Lubricant capacity mℓ (fl oz, Imp oz)		130^{+20}_{0} ($4\ 1/3^{+2/3}_{0}$, $4.6^{+0.7}_{0}$)
	Stator coil resistance at 68°F (20°C) Ω		3.05 – 3.35
	Pulley-to-pressure plate clearance		0.5 ± 0.15 (0.02 ± 0.006)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		7.5 – 10.5 (0.30 – 0.41) with used belt 5.0 – 7.0 (0.20 – 0.28) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge		390 – 540 (40 – 55, 88 – 120) with used belt 740 – 880 (75 – 90, 170 – 200) with new belt

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

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Design Specifications

	ITEM		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall length		4,510 mm	177.6 in	
	Overall width		1,750 mm	68.9 in	
	Overall height		1,608 mm	63.3 in	
	Wheelbase		2,622 mm	103.2 in	
	Track	Front	1,533 mm	60.4 in	
		Rear	1,534 mm	60.4 in	
	Seating capacity		5 (five)		
WEIGHT (USA)	Gross vehicle weight rating (GVWR)		———	4,165 lbs	
WEIGHT (CANADA)	Gross vehicle weight rating (GVWR)		1,900 kg	———	
ENGINE	Type		Water-cooled, 4-stroke DOHC gasoline engine		
	Cylinder arrangement		Inline 4-cylinder, transverse		
	Bore and stroke		84.0 x 89.0 mm	3.31 x 3.50 in	
	Displacement		1,973 cm³ (mℓ)	120 cu-in	
	Compression ratio	'97, '98 models	9.2		
		'99, '00 models	9.6		
	Valve train		Belt driven, DOHC 4 valves per cylinder		
	Lubrication system		Forced and wet sump, trochoid pump		
	Oil pump displacement at 6,000 engine rpm		50 ℓ (53 US qt, 44 Imp qt)/minute		
	Water pump displacement at 7,600 engine rpm		140 ℓ (148 US qt, 123 Imp qt)/minute		
	Fuel required		UNLEADED gasoline with 86 Pump Octane Number or Higher		
STARTER	Type		Planetary gear reduction		
	Normal output		A/T: 1.1 kW M/T: 1.0 kW		
	Nominal voltage		12 V		
	Hour rating		30 seconds		
	Direction of rotation		Clockwise as viewed from gear end		
	Weight		3.7 kg	8.2 lbs	Approx.
CLUTCH	Clutch type	M/T	Single plate dry, diaphragm spring		
		A/T	Torque converter		
	Clutch facing area	M/T	203 cm²	31.5 sq-in	
TRANSMISSION	Transmission type	M/T	Synchronized 5-speed forward, 1 reverse		
		A/T	Electronically controlled 4-speed automatic, 1 reverse		
	Primary reduction		Direct 1 : 1		
	Type		Manual transmission		
	Gear ratio	1st	3.500		*1: '97 – 99 models *2: '00 model
		2nd	1.956		
		3rd	1.344		
		4th	1.071		
		5th	0.812		
		Reverse	3.000*1, 3.461*2		
	Final reduction	Gear type	Single helical gear		
		Gear ratio	4.562		
	Transfer		0.434		
	Rear differential		2.533		
	Type		Automatic transmission		
	Gear ratio	1st	2.722		
		2nd	1.516		
		3rd	1.079		
		4th	0.711		
		Reverse	1.955		
	Final reduction	Gear type	Single helical gear		
		Gear ratio	4.357		
	Transfer		0.393		

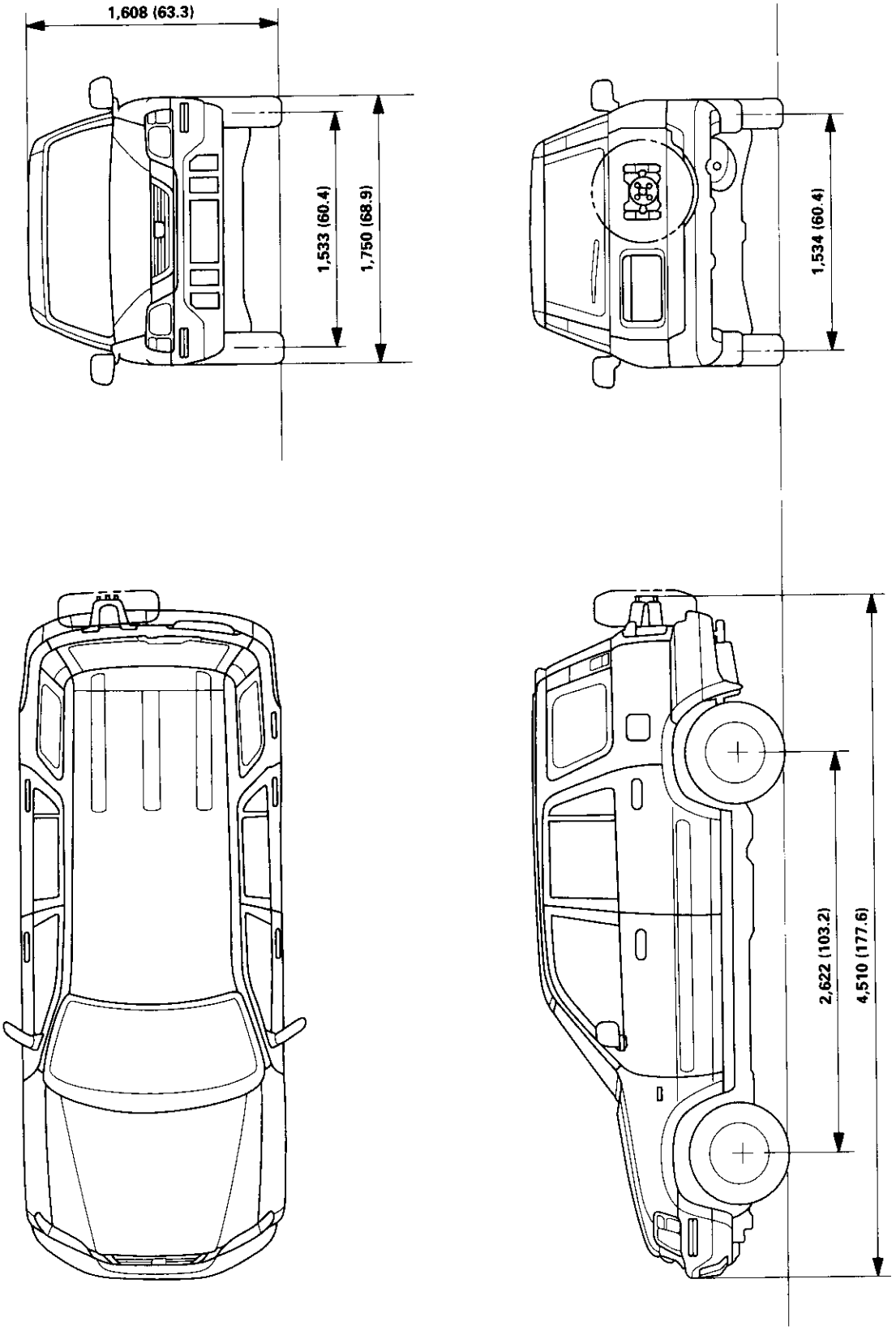
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	ITEM		METRIC	ENGLISH	NOTES
AIR CONDITIONING	Cooling capacity		3,520 Kcal/h	14,000 BTU/h	
	Compressor	Type/manufacturer	Scroll/KEIHIN		
		No. of cylinder	—		
		Capacity	85.7 mℓ/rev	5.23 cu-in/rev	
		Max. speed	10,000 rpm		
		Lubricant capacity	130 mℓ	4 1/3 fl oz	
		Lubricant type	SP-10		
	Condenser	Type	Corrugated fin		
	Evaporator	Type	Corrugated fin		
	Blower	Type	Sirocco fan		
		Motor input	200 W/12 V		
		Speed control	4-speed		
		Max. capacity	440 m³/h	15,500 cu-ft/h	
	Temperature control		Air-mix type		
	Compressor clutch	Type	Dry, single plate, poly-V-belt drive		
		Power consumption	40 W max./12 V		At 68°F (20°C)
	Refrigerant	Type	HFC-134a (R-134a)		
		Quantity	700 $^{0}_{-50}$ g	24.7 $^{0}_{-1.8}$ oz	
STEERING SYSTEM	Type		Power assisted, rack and pinion		
	Overall ratio		16.3		
	Turns, lock-to-lock		3.1		
	Steering wheel diameter		380 mm	15.0 in	
SUSPENSION	Type	Front	Independent double wishbone, coil spring with stabilizer		
		Rear	Independent double wishbone, coil spring with stabilizer		
	Shock absorber	Front and Rear	Telescopic, hydraulic nitrogen gas-filled		
WHEEL ALIGNMENT	Camber	Front	0°		
		Rear	−1°00′		
	Caster	Front	2°10′		
	Total toe	Front	0 mm	0 in	
		Rear	In 2 mm	In 1/16 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc		
		Rear	Power-assisted self-adjusting drum		
	Pad surface area	Front	49 cm² x 2	7.6 sq-in x 2	
	Lining surface area	Rear	73 cm² x 2	11.3 sq-in x 2	Drum brake
	Parking brake	Type	Mechanical actuating, rear two wheel brakes		
TIRE	Size and pressure		See tire information label.		
ELECTRICAL	Battery		12 V – 36 AH/5 HR		
	Starter		12 V – 1.0, 1.1 kW		
	Alternator		12 V – 100 A		
	Fuses				
	In under-dash fuse/relay box		7.5 A, 10 A, 15 A, 20 A		
	In under-hood fuse/relay box		7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A 100 A		
	In under-hood ABS fuse/relay box		7.5 A, 20 A, 40 A		
	Headlights		12 V – 60/55 W		
	Front turn signal lights		12 V – 21 W ('97 model), 12 V – 27 W ('98 – 00 models)		
	Front parking lights		12 V – 5 W ('97 model), 3 CP ('98 – 00 models)		
	Front side marker lights		12 V – 8 W		
	Rear side marker lights		12 V – 3 CP		
	Rear turn signal lights		12 V – 21 W		
	Brake/parking lights		12 V – 21/5 W		
	Back-up lights		12 V – 21 CP (18 W)		
	Ceiling lights (front/rear)		12 V – 8 W		
	License plate light		12 V – 8 W		
	Spotlights		12 V – 5 W		
	High mount brake light		12 V – 21 W		
	Ignition key light		12 V – 1.4 W		
	Ashtray light		12 V – 1.4 W		
	Gauge lights		12 V – 1.4 W, 3 W, 3.4 W		
	Indicator lights		12 V – 0.84 W, 1.12 W, 1.4 W, 3 W, LED		
	Illumination and pilot lights		12 V – 0.84 W, 1.4 W, LED		
	Heater illumination lights		12 V – 1.4 W		

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Body Specifications

Unit: mm (in)



Maintenance

Lubrication Points 3-2
Maintenance Schedule for 1997 Model (Normal Conditions) 3-4
Maintenance Schedule for 1997 Model (Severe Conditions) 3-6
Maintenance Schedule for 1998 – 2000 Models (Normal Conditions) 3-8
Maintenance Schedule for 1998 – 2000 Models (Severe Conditions) 3-10

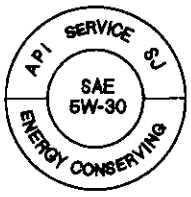
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Lubrication Points

For the details of lubrication points and type of lubricants to be applied, refer to the illustrated index and various work procedures (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

NO.	LUBRICATION POINTS		LUBRICANT
1	Engine		API Service Grade: Use SJ "Energy Conserving" grade oil. The oil container may also display the API Certification seal shown below. Make sure it says "For Gasoline Engines." SAE viscosity: See chart below.
2	Transmission	Manual	Genuine Honda MTF*1
		Automatic	Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*2
3	Rear differential		Genuine Honda CVT Fluid
4	Brake line (includes ABS line)		Genuine Honda DOT 3 Brake Fluid*3
5	Clutch Line		Brake fluid DOT 3 or DOT 4*3
6	Shift lever pivots (Manual transmission)		Grease with molybdenum disulfide
7	Release fork (Manual transmission)		Urea Grease UM264 P/N 41211 – PY5 – 305
8	Power steering gearbox		Steering grease P/N 08733 – B070E
9	Throttle cable end (Dashboard lower panel hole)		Silicone grease
10 11 12 13 14 15	Throttle cable end (Throttle link) Brake master cylinder pushrod Pedal linkage Battery terminals Fuel fill lid Clutch master cylinder pushrod		Multi-purpose grease
16 17 18 19 20	Hood hinges and hood lock Tailgate hinges Hatch glass hinges Door hinges, upper and lower Door opening detent		Honda White Lithium Grease
21 22	Caliper Piston seal, Dust seal, Caliper pin, Piston Shift cable and select cable (Manual transmission)		Silicone grease
23	Brake line joints (Front and rear wheelhouse)		Rust preventives
24	Power steering system		Genuine Honda Power Steering Fluid*4
25	Air conditioning compressor		Compressor oil: SP-10 (P/N 38897 – P13 – A01AH or 38899 – P13 – A01) For Refrigerant: HFC-134a (R-134a)

API SERVICE LABEL

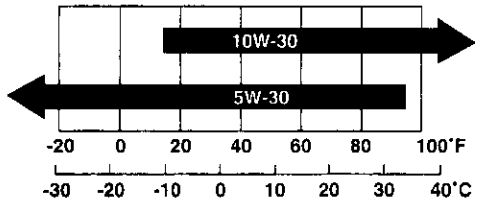


API CERTIFICATION SEAL



Recommended Engine Oil

Engine oil viscosity for ambient temperature ranges



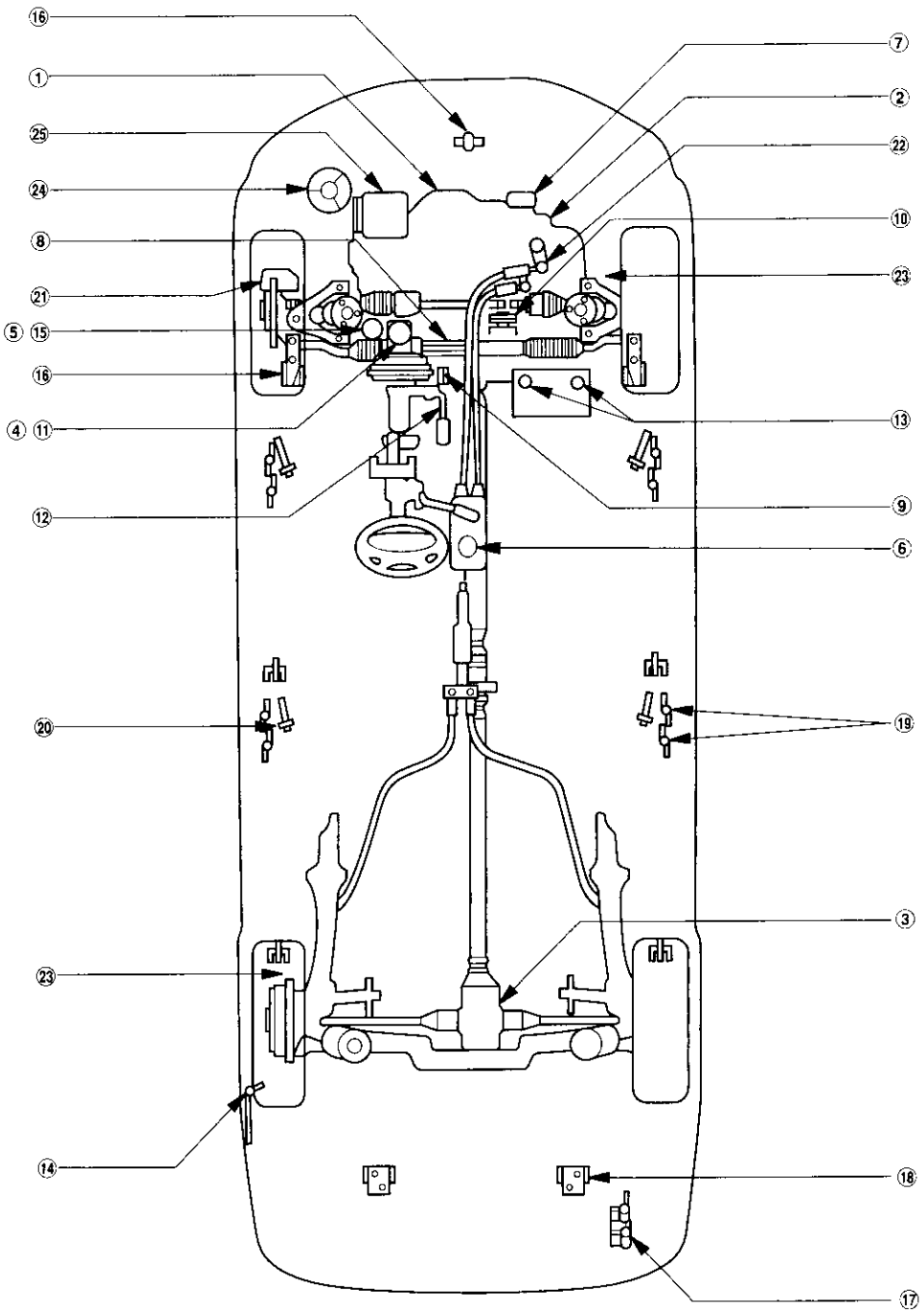
*1: Always use Genuine Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.

*2: Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

*3: Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

*4: Always use Genuine Honda Power Steering Fluid. Using any other type of power steering fluid or automatic transmission fluid can caused increased wear and poor steering in cold weather.

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NOTE: Lubricate all hinges, latches, and locks once a year.
In corrosive areas, more frequent lubrication is necessary.
We recommend Honda White Lithium Grease.

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Follow the Normal Conditions Maintenance Schedule if the severe driving conditions specified in the Severe Conditions Maintenance Schedule on pages 3-6 and 3-7 do not apply.

Service at the indicated distance or time whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		Every 7,500 miles (12,000 km) or 12 months								Capacity for change with filter: 3.8 ℓ (4.0 US qt, 3.3 Imp qt)	8-4, 5
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5, 6
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-194
Inspect valve clearance		Adjust only if noisy						●		Intake 0.08 – 0.12 mm (0.003 – 0.005 in) Exhaust 0.16 – 0.20 mm (0.006 – 0.008 in) Measured between the camshaft and rocker arm when cold.	6-3, 4
Replace spark plugs			●		●		●		●	NGK: ZFR5F-11, DENSO: KJ16CR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	4-21
Replace timing belt and inspect water pump								●		Check water pump for signs of seal leakage.	6-10, 11, 10-11
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator belt: 8.5 – 11.5 mm (0.33 – 0.45 in) P/S pump belt: 11.0 – 14.5 mm (0.43 – 0.57 in) A/C compressor belt: 7.5 – 10.5 mm (0.30 – 0.41 in)	4-34 17-14 22-69
Inspect idle speed								●		750 ± 50 rpm (in N or P position)	11-169, 170
Replace engine coolant				●		●		●		Capacity for change: 3.9 ℓ (4.1 US qt, 3.4 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			2.9 ℓ (3.1 US qt, 2.6 Imp qt) for change with Genuine Honda Premium Formula ATF	14-161
Replace rear differential fluid							●			1.0 ℓ (1.1 US qt, 0.9 Imp qt) for change with Genuine Honda CVT Fluid	15-14
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness, and free movement. • Check the calipers for leakage.	19-4, 9, 11
Replace brake fluid				●			●			Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 2 to 6 notches.	19-6
Replace air conditioning filter			●		●		●		●	Replace every 15,000 miles (24,000 km) if the vehicle is driven primarily in urban areas that have high concentrations of soot in the air from industry and diesel-powered vehicles. Replace the air conditioning filter more often if air flow from the climate control system becomes less than usual.	22-50
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram in the Owner's Manual.	——

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Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		●	●	●	●	●	●	●	●	Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-13, 23
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-8, 9, 19, 20
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage or leakage.	19-4, 27
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-161, 15-14, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2, 3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-6, 7
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-171
Inspect supplemental restraint system		10 years after production									—

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For Canada models: Follow the Severe Conditions Maintenance Schedule on pages 3-6 and 3-7.

Follow the Severe Conditions Maintenance Schedule if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 3-7):

Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Replace every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 3.8 ℓ (4.0 US qt, 3.3 Imp qt)	8-4, 5, 6
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element		●	●	●	●	●	●	●	●		11-194
Inspect valve clearance		Adjust only if noisy						●		Intake 0.08 – 0.12 mm (0.003 – 0.005 in) Exhaust 0.16 – 0.20 mm (0.006 – 0.008 in) Measured between the camshaft and rocker arm when cold.	6-3, 4
Replace spark plugs			●		●		●		●	NGK: ZFR5F-11, DENSO: KJ16CR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	4-21
Replace timing belt*1 and inspect water pump								●		Check water pump for signs of seal leakage.	6-10, 11, 10-11
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator belt: 8.5 – 11.5 mm (0.33 – 0.45 in) P/S pump belt: 11.0 – 14.5 mm (0.43 – 0.57 in) A/C compressor belt: 7.5 – 10.5 mm (0.30 – 0.41 in)	4-34 17-14 22-69
Inspect idle speed								●		750 ± 50 rpm (in N or P position)	11-169, 170
Replace engine coolant				●		●		●		Capacity for change: 3.9 ℓ (4.1 US qt, 3.4 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		●	2.9 ℓ (3.1 US qt, 2.6 Imp qt) for change with Genuine Honda Premium Formula ATF	14-161
Replace rear differential fluid					●				●	1.0 ℓ (1.1 US qt, 0.9 Imp qt) for change with Genuine Honda CVT Fluid	15-14
Inspect front and rear brakes		Inspect every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness, and free movement. • Check the calipers for leakage.	19-4, 9, 11
Replace brake fluid				●			●			Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 2 to 6 notches.	19-6
Replace air conditioning filter			●		●		●		●	Replace every 15,000 miles (24,000 km) if the vehicle is driven primarily in urban areas that have high concentrations of soot in the air from industry and diesel-powered vehicles. Replace the air conditioning filter more often if air flow from the climate control system becomes less than usual.	22-50

*1: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under –20°F, –29°C).

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Service at the indicated distance or time whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Lubricate locks and hinges		●	●	●	●	●	●	●	●	Lubricate all hinges, latches and locks.	3-2, 3
Rotate tires (check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram in the Owner's Manual.	——
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-13, 23
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-8, 9, 19, 20
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage or leakage.	19-4, 27
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-161, 15-14, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2, 3
Exhaust system*		●	●	●	●	●	●	●	●	Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-6, 7
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-171
Lights and controls										Check all lighting functions.	23-81
Vehicle underbody										Check for damage and fluid leaks.	——
Inspect supplemental restraint system		10 years after production									——

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the vehicle is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-4 and 3-5.

Follow the Normal Conditions Maintenance Schedule if the severe driving conditions specified in the Severe Conditions Maintenance Schedule on pages 3-10 and 3-11 do not apply.

Service at the indicated distance or time whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		Every 7,500 miles (12,000 km) or 12 months								Capacity for change with filter: 3.8 ℓ (4.0 US qt, 3.3 Imp qt)	8-4, 5
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5, 6
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-194
Inspect valve clearance		Adjust only if noisy						●		Intake 0.08 – 0.12 mm (0.003 – 0.005 in) Exhaust 0.16 – 0.20 mm (0.006 – 0.008 in) Measured between the camshaft and rocker arm when cold.	6-3, 4
Replace spark plugs			●		●		●		●	NGK: ZFR5F-11*1, ZFR6F-11*2, DENSO: KJ16CR-L11*1, KJ20CR-L11*2 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	4-21
Replace timing belt* and inspect water pump								●		Check water pump for signs of seal leakage.	6-10, 11, 10-11
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator belt: 8.5 – 11.5 mm (0.33 – 0.45 in) P/S pump belt: 11.0 – 14.5 mm (0.43 – 0.57 in) A/C compressor belt: 7.5 – 10.5 mm (0.30 – 0.41 in)	4-34 17-14 22-69
Inspect idle speed*								●		MT: 750 ± 50 rpm*1 730 ± 50 rpm*2 AT: 750 ± 50 rpm (in N or P position)*1 730 ± 50 rpm (in N or P position)*2	11-169, 170
Replace engine coolant				●		●		●		Capacity for change: MT: 4.0 ℓ (4.2 US qt, 3.5 Imp qt) AT: 3.9 ℓ (4.1 US qt, 3.4 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			MT: 1.7 ℓ (1.8 US qt, 1.4 Imp qt) for change with Genuine Honda MTF AT: 2WD 2.7 ℓ (2.9 US qt, 2.4 Imp qt) 4WD 2.9 ℓ (3.1 US qt, 2.6 Imp qt) for change with Genuine Honda Premium Formula ATF	13-3 14-161
Replace rear differential fluid							●			1.0 ℓ (1.1 US qt, 0.9 Imp qt) for change with Genuine Honda CVT Fluid	15-14
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness, and free movement. • Check the calipers for leakage.	19-4, 9, 11
Replace brake fluid				●			●			Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 2 to 6 notches.	19-6
Replace air conditioning filter			●		●		●		●	Replace every 15,000 miles (24,000 km) if the vehicle is driven primarily in urban areas that have high concentrations of soot in the air from industry and diesel-powered vehicles. Replace the air conditioning filter more often if air flow from the climate control system becomes less than usual.	22-50
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram in the Owner's Manual.	——

*1: '98 model *2: '99, '00 models

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Service at the indicated distance or time whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		●	●	●	●	●	●	●	●	Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-13, 23
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-8, 9, 19, 20
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)										Check for damage or leakage.	19-4, 27
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3, 14-161, 15-14, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2, 3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-6, 7
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-171

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For Canada models: Follow the Severe Conditions Maintenance Schedule on pages 3-10 and 3-11.

Follow the Severe Conditions Maintenance Schedule if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 3-11):

Service at the indicated distance or time whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 3.8 ℓ (4.0 US qt, 3.3 Imp qt)	8-4, 5, 6
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element		●	●	●	●	●	●	●	●		11-194
Inspect valve clearance		Adjust only if noisy						●		Intake 0.08 – 0.12 mm (0.003 – 0.005 in) Exhaust 0.16 – 0.20 mm (0.006 – 0.008 in) Measured between the camshaft and rocker arm when cold.	6-3, 4
Replace spark plugs			●		●		●		●	NGK: ZFR5F-11*3, ZFR6F-11*4, DENSO: KJ16CR-L11*3, KJ2OCR-L11*4 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	4-21
Replace timing belt*, *1 and inspect water pump								●		Check water pump for signs of seal leakage.	6-10, 11, 10-11
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator belt: 8.5 – 11.5 mm (0.33 – 0.45 in) P/S pump belt: 11.0 – 14.5 mm (0.43 – 0.57 in) A/C compressor belt: 7.5 – 10.5 mm (0.30 – 0.41 in)	4-34 17-14 22-69
Inspect idle speed*								●		MT: 750 ± 50 rpm*3 730 ± 50 rpm*4 AT: 750 ± 50 rpm (in N or P position)*3 730 ± 50 rpm (in N or P position)*4	11-169, 170
Replace engine coolant				●		●		●		Capacity for change: MT: 4.0 ℓ (4.2 US qt, 3.5 Imp qt) AT: 3.9 ℓ (4.1 US qt, 3.4 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		●	MT: 1.7 ℓ (1.8 US qt, 1.4 Imp qt) for change with Genuine Honda MTF AT: 2WD 2.7 ℓ (2.9 US qt, 2.4 Imp qt) 4WD 2.9 ℓ (3.1 US qt, 2.6 Imp qt) for change with Genuine Honda Premium Formula ATF	13-3 14-161
Replace rear differential fluid					●				●	1.0 ℓ (1.1 US qt, 0.9 Imp qt) for change with Genuine Honda CVT Fluid	15-14
Inspect front and rear brakes		Every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness, and free movement. • Check the calipers for leakage.	19-4, 9, 11
Replace brake fluid				●			●			Use Genuine Honda DOT 3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 2 to 6 notches.	19-6
Replace air conditioning filter*2			●		●		●		●	Replace every 15,000 miles (24,000 km) if the vehicle is driven primarily in urban areas that have high concentrations of soot in the air from industry and diesel-powered vehicles. Replace the air conditioning filter more often if air flow from the climate control system becomes less than usual.	22-50
Clean antenna mast		●	●	●	●	●	●	●	●		23-103

*1: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under –20°F, –29°C).

*2: Air conditioning filter should be replaced every 24,000 km (15,000 miles) if the vehicle is driven primarily in areas that have high concentrations of soot in the air from industry and diesel-powered vehicles.
It should be more often if air flow from the climate control system becomes less than usual.

*3: '98 model *4: '99, '00 models

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Service at the indicated distance or time whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Lubricate all hinges, locks, and latches		●	●	●	●	●	●	●	●	Lubricate all hinges, latches, and locks.	3-2, 3
Rotate tires (check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram in the Owner's Manual.	——
Visually inspect the following items:											
Tie rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								Check steering linkage for looseness. Check condition of boots. Check for fluid leaks.	17-13, 23
Suspension components										Check the bolts for tightness. Check condition of ball joint boots.	18-8, 9, 19, 20
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines (including ABS)		●	●	●	●	●	●	●	●	Check for damage of leakage.	19-4, 27
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 13-3, 14-161, 15-14, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks, and deterioration. Check for proper fan operation.	10-2, 3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks, and tightness.	9-6, 7
Fuel lines and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-171
Lights and controls										Check all lighting functions.	23-81
Vehicle underbody										Check for damage and fluid leaks.	——

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Honda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the vehicle is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-8 and 3-9.

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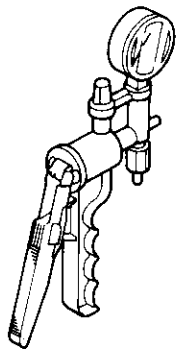
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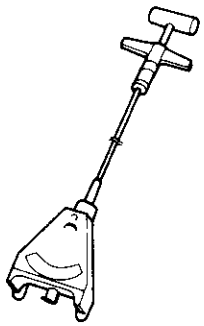
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X – 041 – XXXXX	Vacuum Pump/Gauge, 0 – 30 in.Hg.	1	4-41
*②	07JGG – 001010A	Belt Tension Gauge	1	4-34
③	07PAZ – 0010100	SCS Service Connector	1	4-16

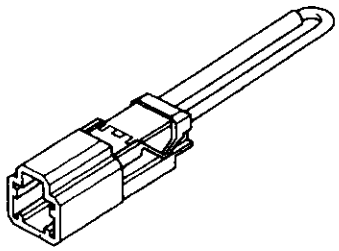
* Included in the Belt Tension Gauge Set, T/N 07JGG – 001000A



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②

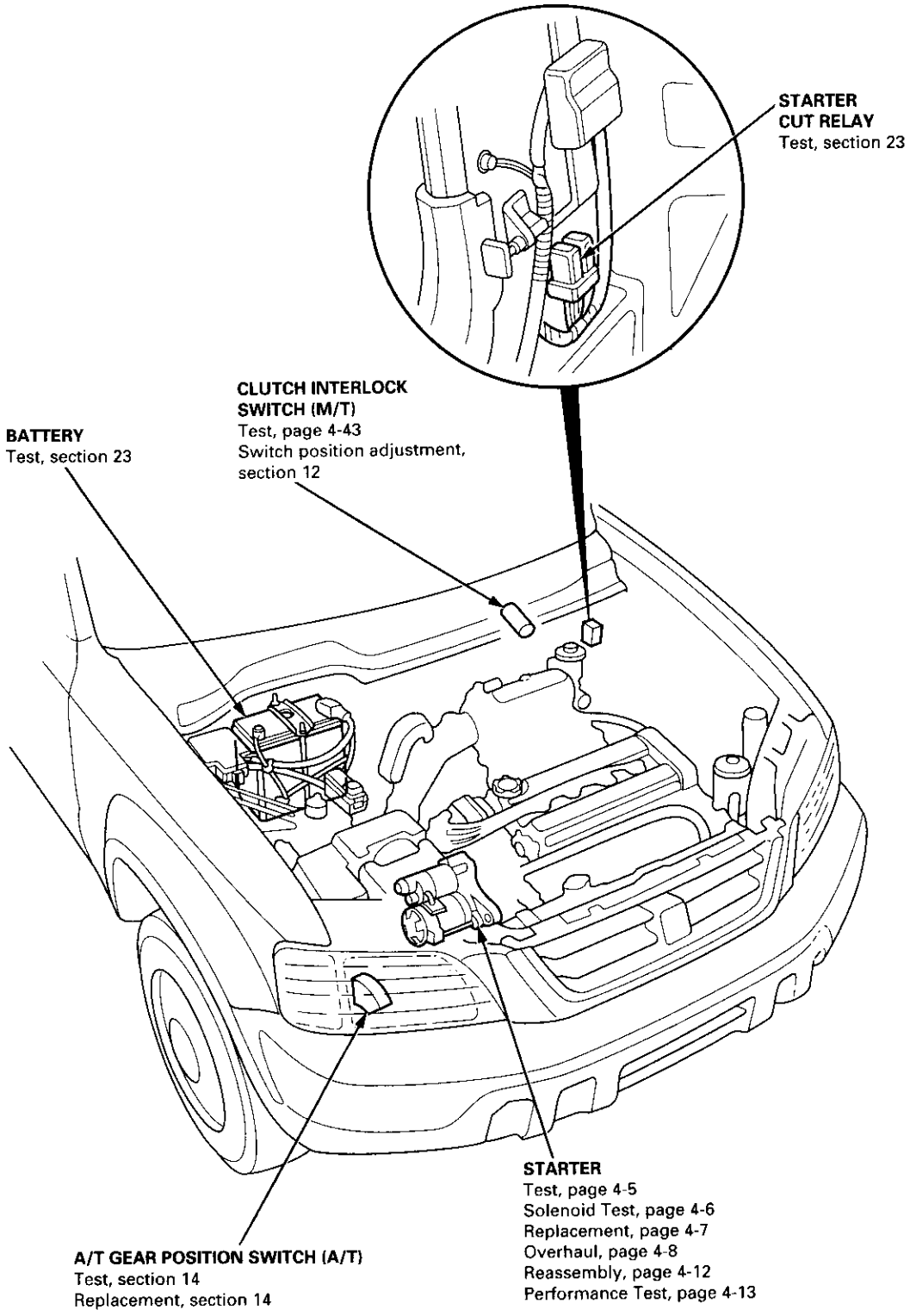


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Starting System

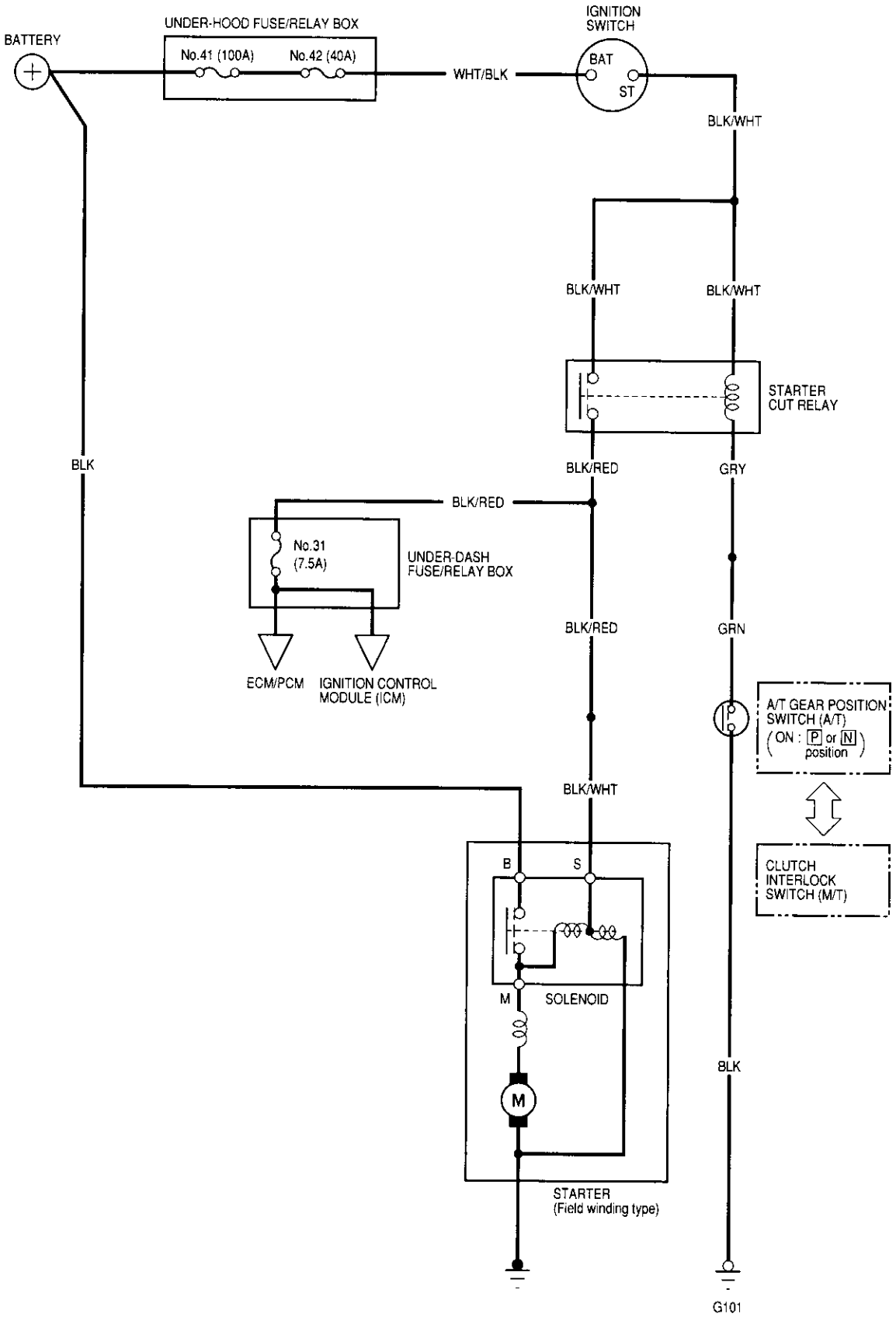
Component Location Index



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Starting System

Circuit Diagram



Starter Test

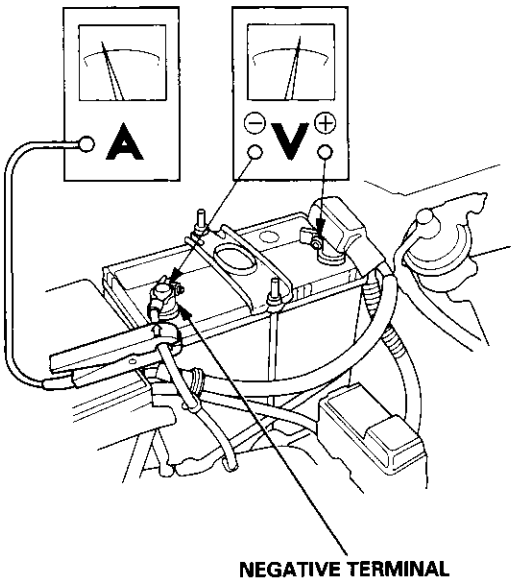
NOTE: The air temperature must be between 59 and 100°F (15 and 38°C) before testing.

Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

Alternate Procedure:

- Use the following equipment:
  — Ammeter, 0 – 400 A
  — Voltmeter, 0 – 20 V (accurate within 0.1 volt)
  — Tachometer, 0 – 1,200 rpm
- Hook up a voltmeter and ammeter as shown.



NOTE: After this test, or any subsequent repair, reset the ECM/PCM to clear any codes (see section 11).

Check the Starter Engagement:

1. Remove the No. 44 (15 A) fuse from the under-hood fuse/relay box.

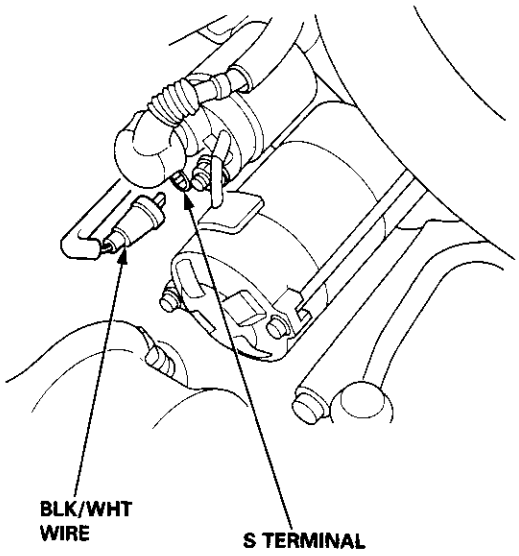
2. Turn the ignition switch to START (III) with the shift lever in N or P position (A/T) or with the clutch pedal depressed (M/T). The starter should crank the engine.

   - If the starter does not crank the engine, go to step 3.
   - If it cranks the engine erratically or too slowly, go to "Check for Wear and Damage" on the next page.

3. Check the battery, battery positive cable, ground, starter cut relay, and the wire connections for looseness and corrosion. Test again.
   If the starter still does not crank the engine, go to step 4.

4. Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter.

5. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal.
   The starter should crank the engine.



   - If the starter still does not crank the engine, remove it, and diagnose its internal problem.
   - If the starter cranks the engine, go to step 6.

6. Check the ignition switch (see section 23).

7. Check the starter cut relay (see section 23).

8. Check the A/T gear position switch (A/T) or the clutch interlock switch (M/T).

9. Check for an open in the wire between the ignition switch and starter.

(cont'd)

Starter Test (cont'd)

Check for Wear and Damage
The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it, and inspect the starter drive gear and torque converter ring gear or flywheel ring gear for damage.

Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. If damaged, replace the gears.

Check Cranking Voltage and Current Draw
Cranking voltage should be no less than 8.7 volts on A/T models, and 8.0 volts on M/T models.
Current draw should be no more than 230 amperes on A/T models, and 200 amperes on M/T models.

If cranking voltage is too low, or current draw too high, check for:
- dead or low battery.
- open circuit in starter armature commutator segments.
- starter armature dragging.
- shorted armature winding.
- excessive drag in engine.

Check Cranking rpm
Engine speed during cranking should be above 100 rpm.
If speed is too low, check for:
- loose battery or starter terminals.
- excessively worn starter brushes.
- open circuit in commutator segments.
- dirty or damaged helical splines or drive gear.
- defective drive gear overrunning clutch.

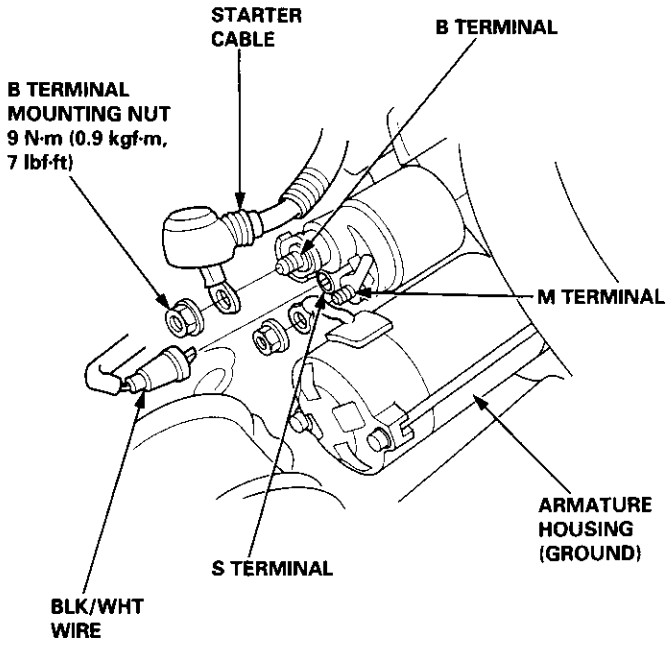
Check Starter Disengagement

With the shift lever in [N] or [P] position (A/T) or with the clutch pedal depressed (M/T), turn the ignition switch to START (III), and release to ON (II).
The starter drive gear should disengage from the torque converter ring gear or flywheel ring gear when you release the key.

If the drive gear hangs up on the torque converter ring gear or flywheel ring gear, check for:
- solenoid plunger and switch malfunction.
- dirty drive gear assembly or damaged overrunning clutch.

Starter Solenoid Test

1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.

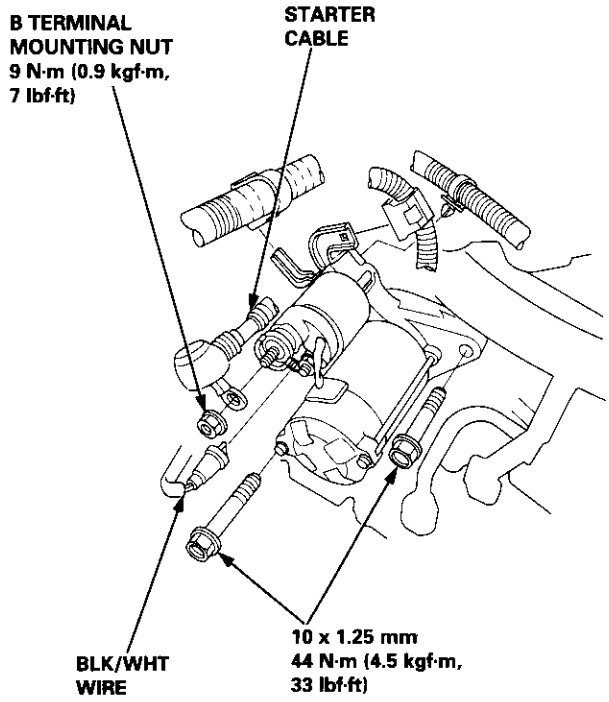


2. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.

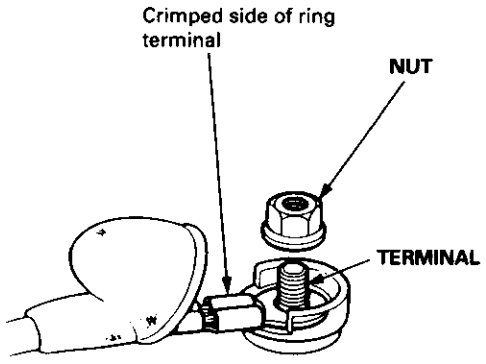
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Starter Replacement

1. Disconnect the battery negative cable.
2. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S terminal.



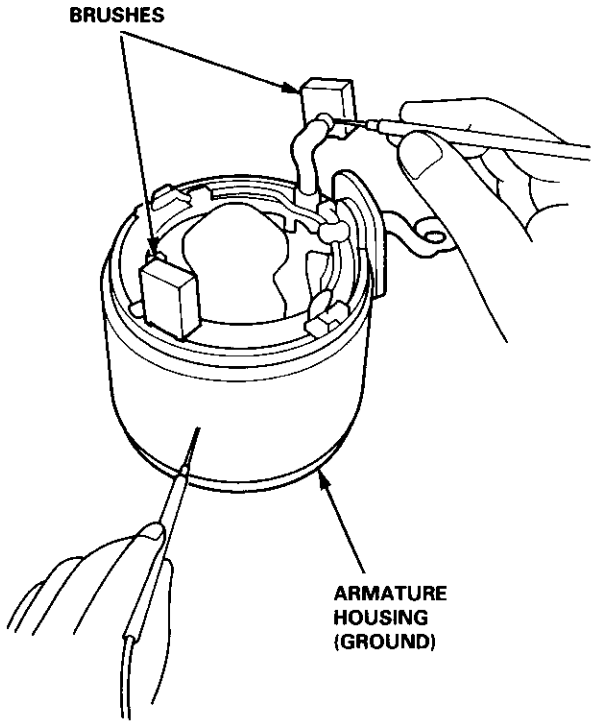
3. Remove the two bolts holding the starter, then remove the starter.
4. Install in the reverse order of removal. When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



5. Connect the battery positive cable and negative cable to the battery.

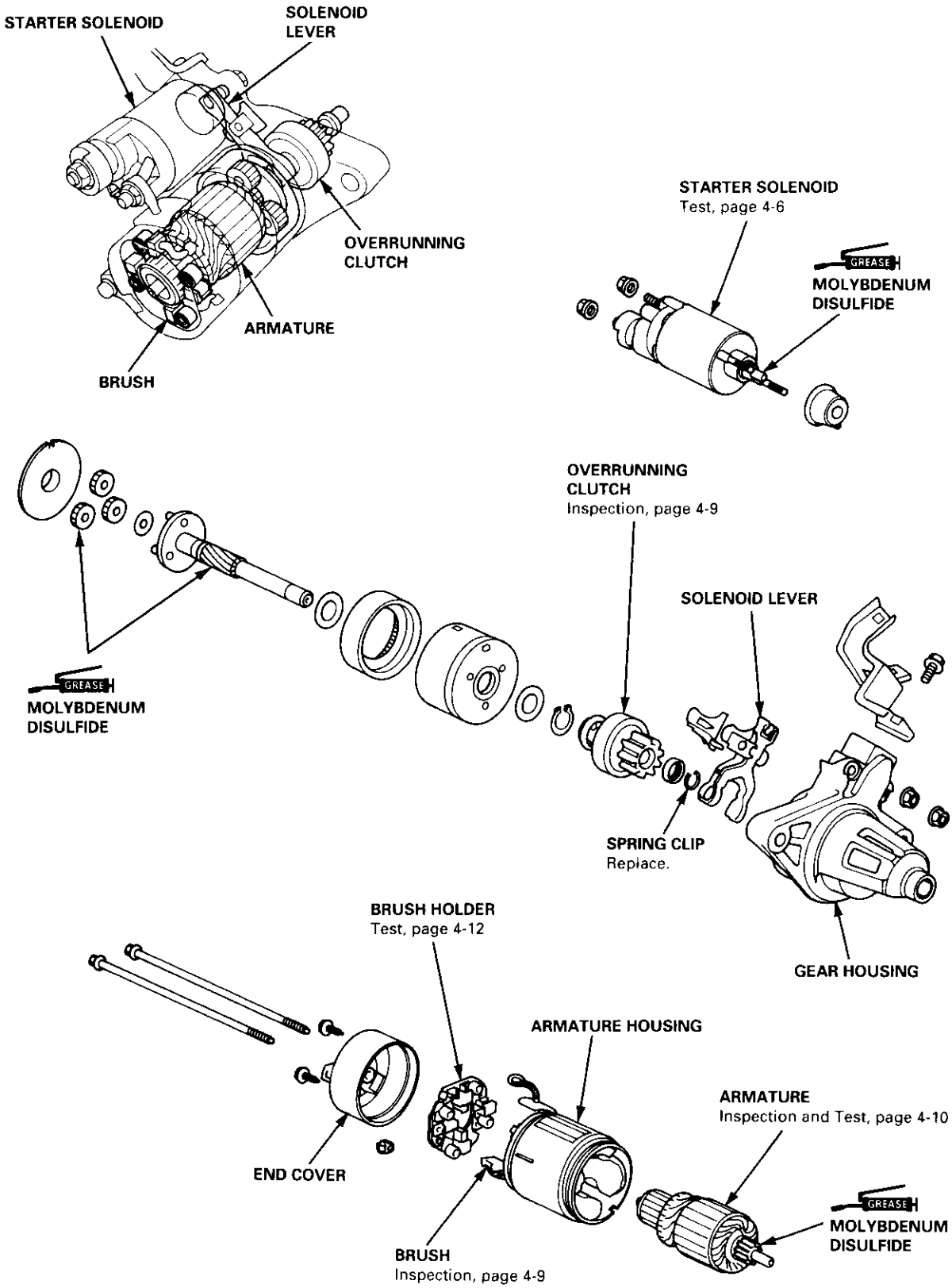
Field Winding Test

1. Check for continuity between the brushes. If there's no continuity, replace the armature housing.
2. Check for continuity between each brush and the armature housing (ground). If there is continuity, replace the armature housing.



Starting System

Starter Overhaul

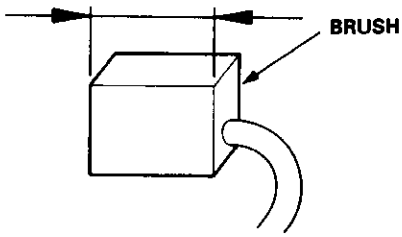


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Brush Inspection

Measure the brush length. If it is not within the service limit, replace the brush (or brush holder assembly).

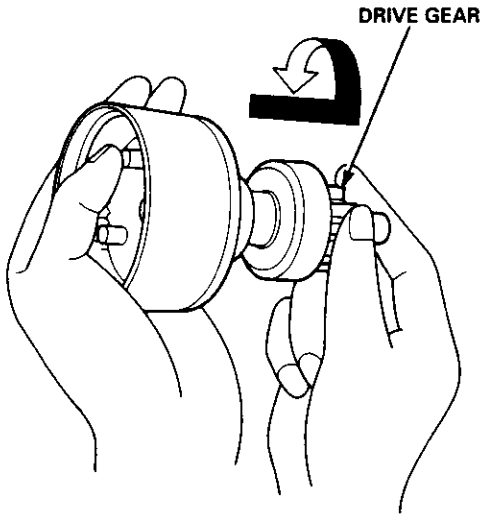
Brush Length
Standard (New): 14.0 – 14.5 mm (0.55 – 0.57 in)
Service Limit: 9.0 mm (0.35 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.
2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.

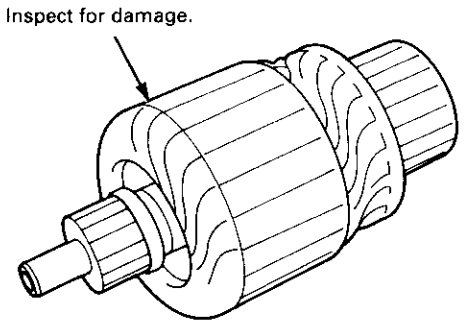


3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.
4. Check the condition of the torque converter ring gear or the flywheel ring gear if the starter drive gear teeth are damaged.

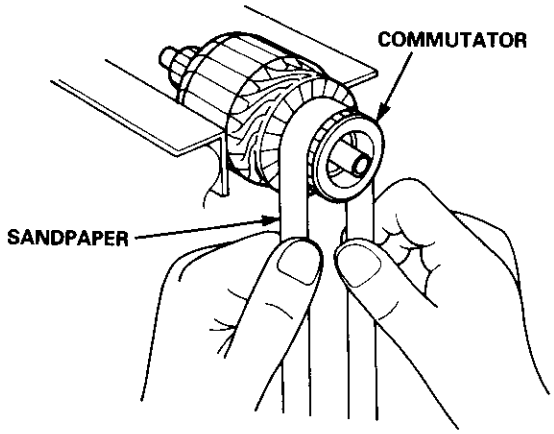
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Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the field winding. If there is wear or damage, replace the armature.

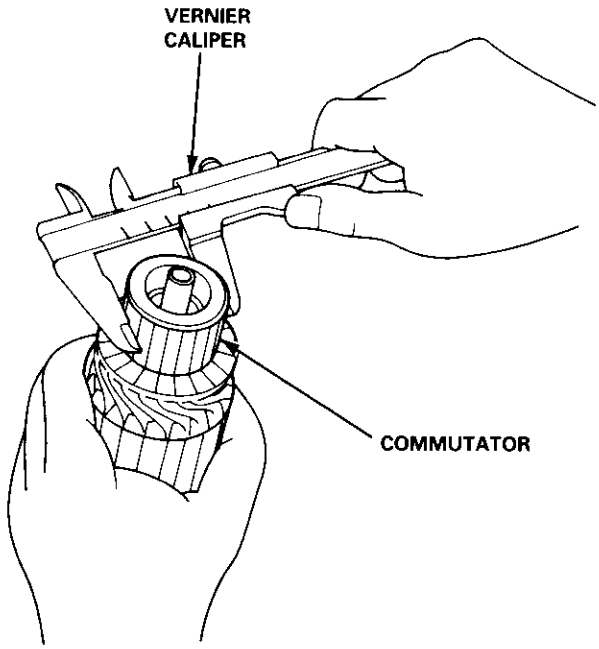


2. Check the commutator surface. If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper.



3. Check the commutator diameter. If commutator diameter is below the service limit, replace the armature.

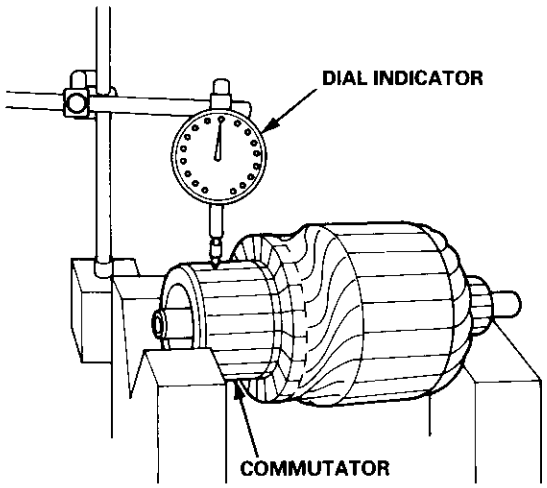
Commutator Diameter
Standard (New): 27.9 – 28.0 mm (1.09 – 1.10 in)
Service Limit: 27.0 mm (1.06 in)



4. Measure the commutator runout.

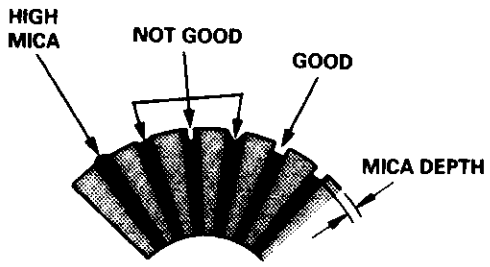
- If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
- If the commutator runout is not within the service limit, replace the armature.

Commutator Runout
Standard (New): 0 – 0.02 mm (0 – 0.0008 in)
Service Limit: 0.05 mm (0.002 in)



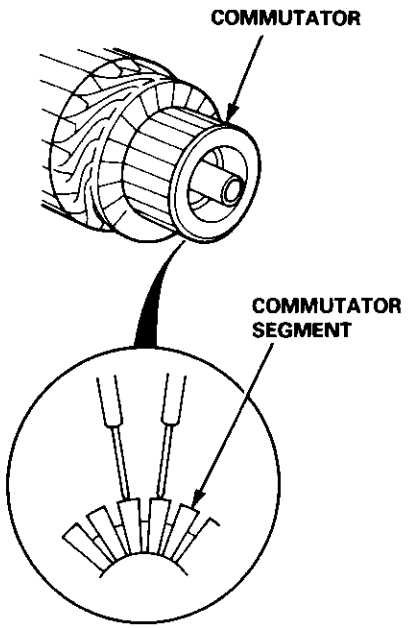
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5. Check the mica depth. If necessary, undercut the mica with a hacksaw blade to achieve proper depth. If the service limit cannot be maintained, replace the armature.

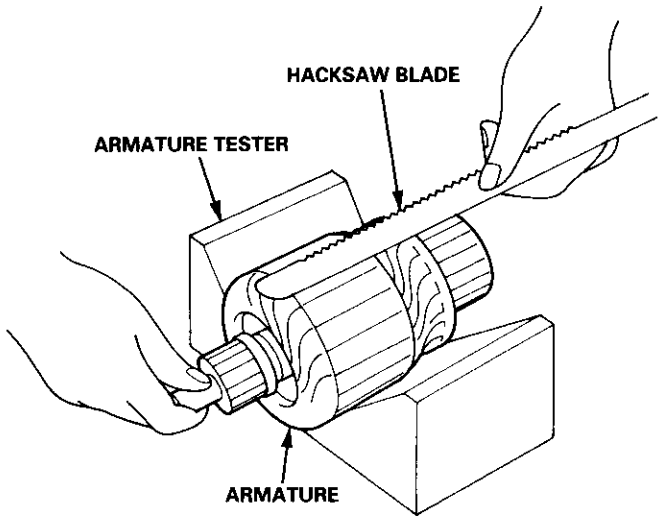


Commutator Mica Depth
Standard (New): 0.5 – 0.8 mm (0.02 – 0.03 in)
Service Limit: 0.2 mm (0.008 in)

6. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.

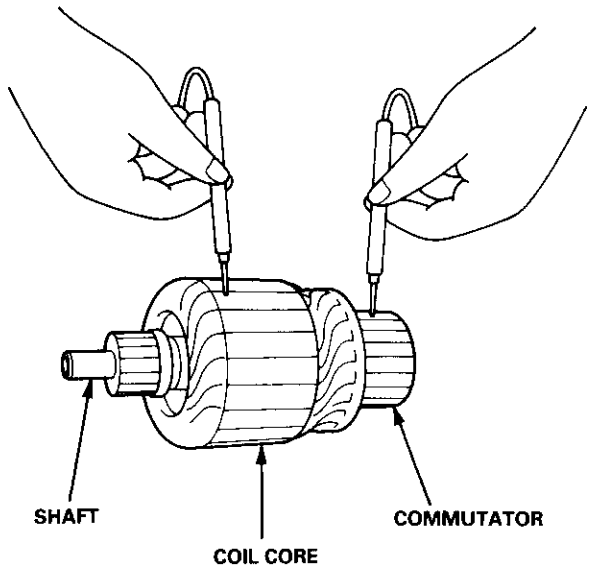


7. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

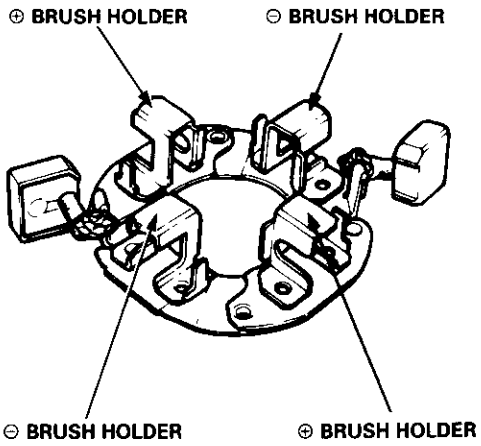
8. With an ohmmeter, check that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If there is continuity, replace the armature.



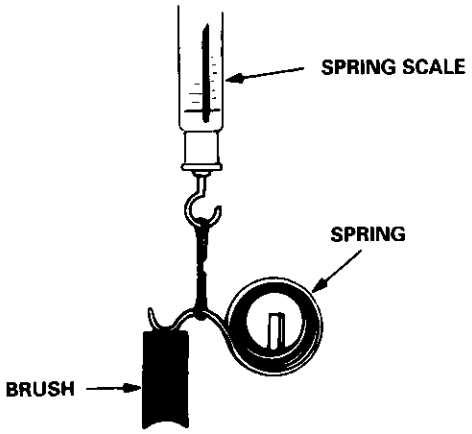
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Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders. If there is continuity, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.

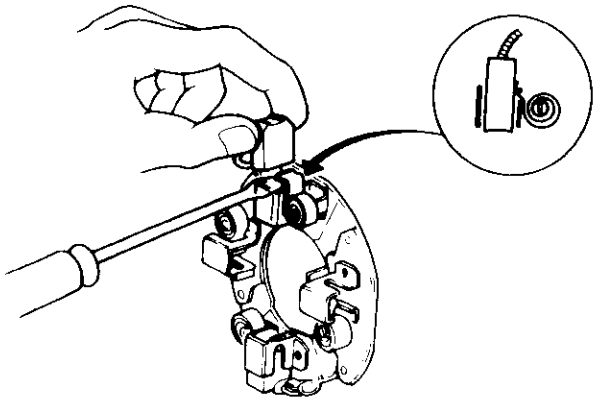


Spring Tension: 13.7 – 17.7 N
(1.40 – 1.80 kgf, 3.09 – 4.00 lbf)

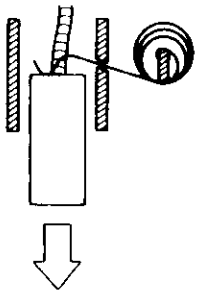
Starter Reassembly

NOTE: Use the illustration on page 4-8 as reference for reassembly.

1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

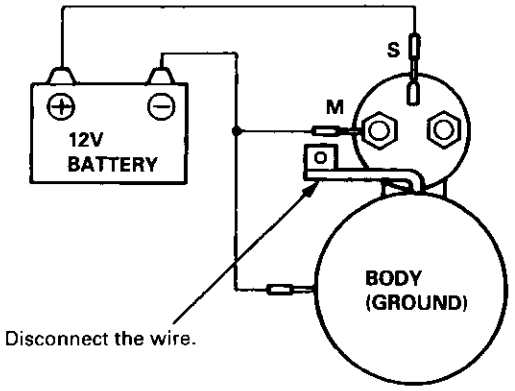


3. Install the end cover on the brush holder.

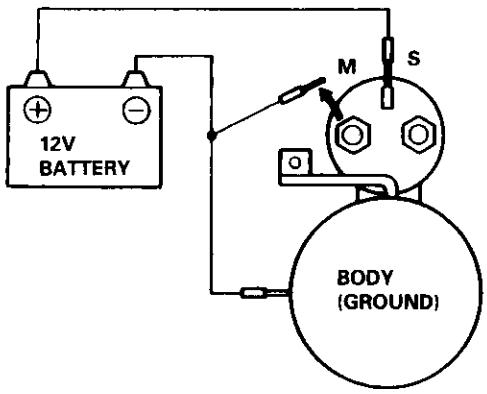
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Performance Test

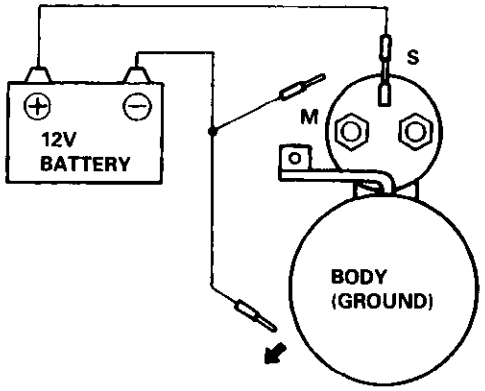
1. Disconnect the wire from terminal M.
2. Make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the vehicle).
3. Connect the battery as shown. If the starter pinion pops out, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



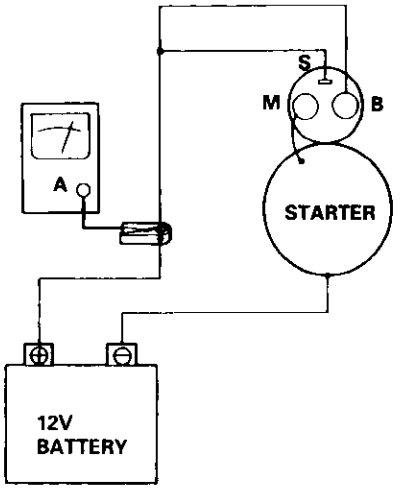
4. Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



5. Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



6. Clamp the starter firmly in a vise.
7. Connect the starter to the battery as described in the diagram below, and confirm that the motor starts and keeps rotating.



8. If the electric current and motor speed meet the specifications when the battery voltage is at 11.5 V, the starter is working properly.

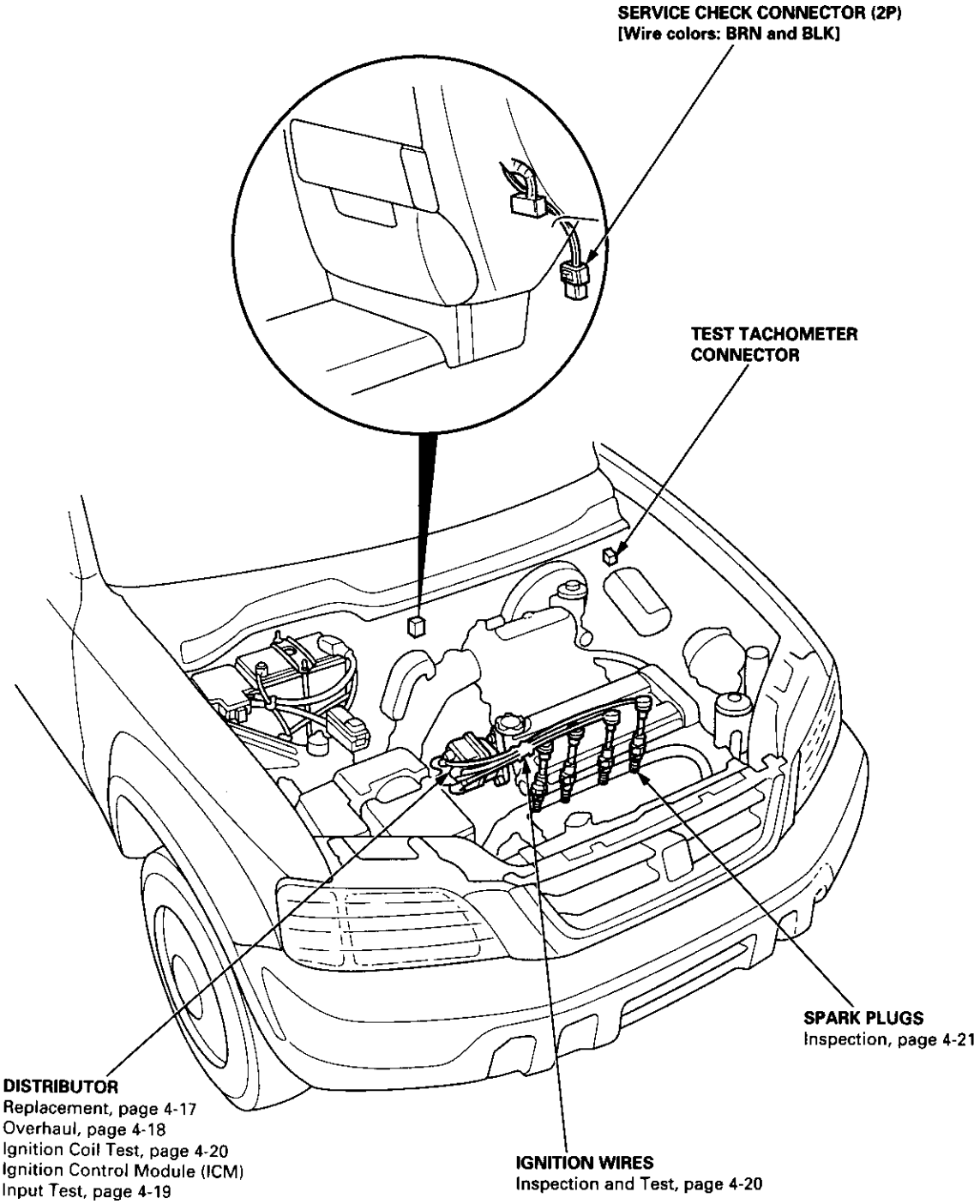
Specifications:

Maker	Electric current	Motor speed
DENSO	90 A or less	3,000 rpm or more

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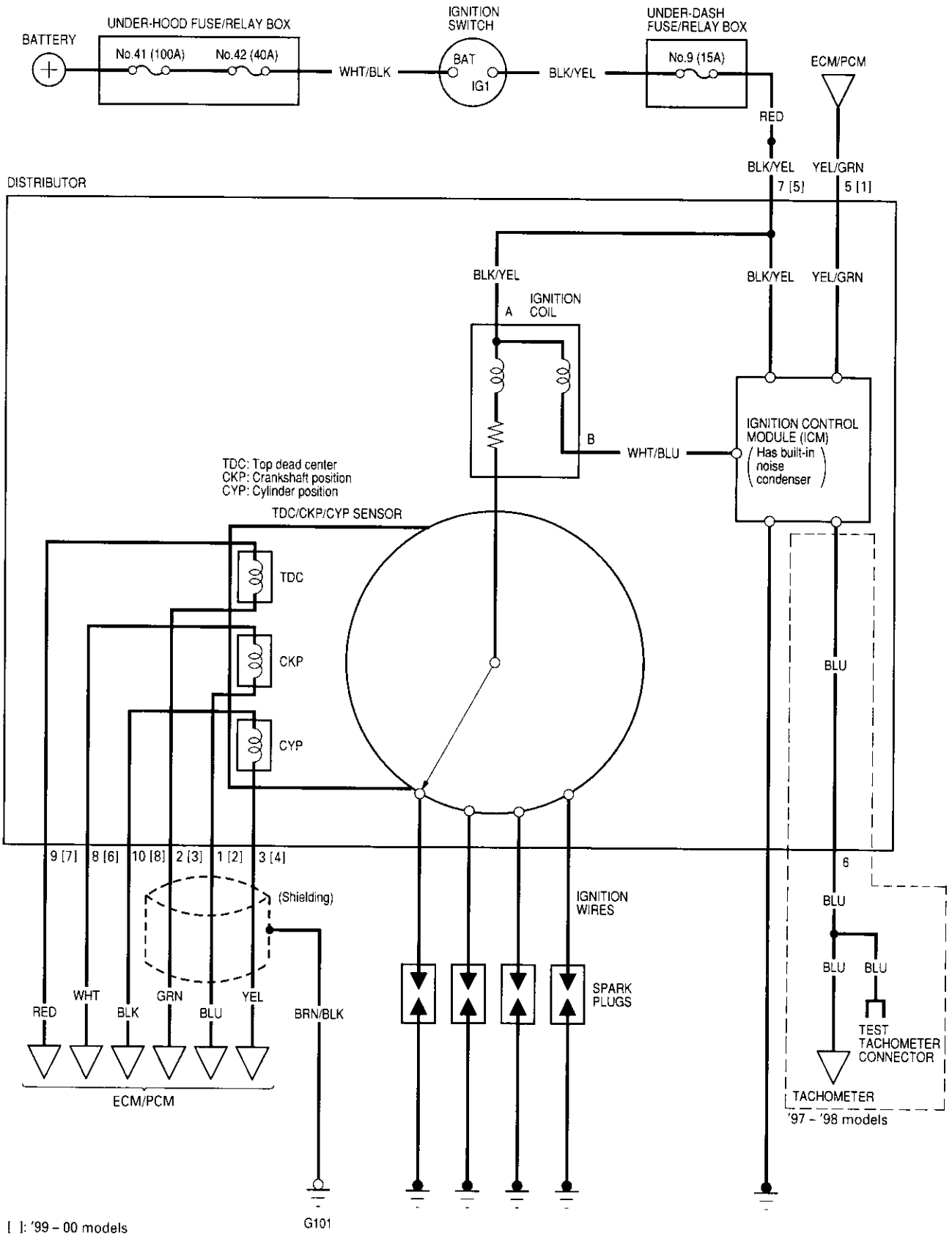
Component Location Index

IGNITION TIMING CONTROL SYSTEM
- Idle speed Inspection/Adjustment, section 11
- Inspection and Setting, page 4-16



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Circuit Diagram



[ ]: '99 – 00 models

Ignition Timing Inspection and Setting

1. Check the idle speed, and adjust it if necessary (see section 11).

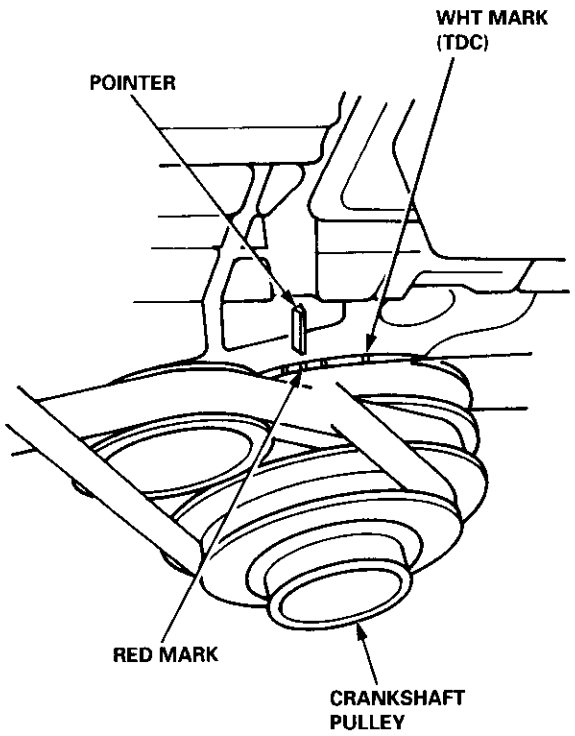
2. Pull out the service check connector 2P (BRN and BLK wires) from the connector holder located under the dash on the front passenger side, then connect the SCS service connector (P/N 07PAZ – 0010100) to it.

3. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in [N] or [P], M/T in neutral) until the radiator fan comes on, then let it idle.

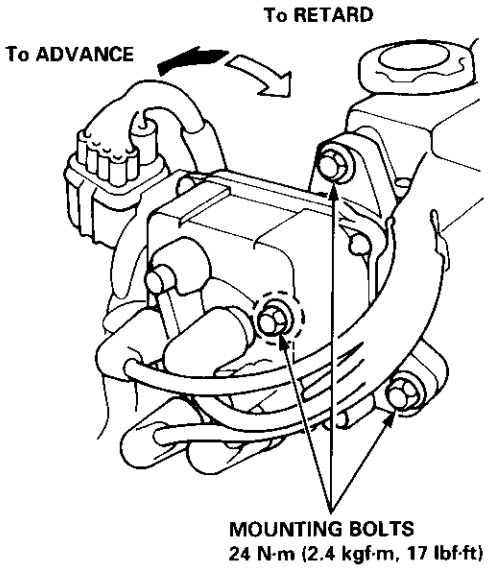
4. Connect the timing light to the No. 1 ignition wire, then point the light toward the pointer on the timing belt cover.

5. Check the ignition timing in no load conditions: headlights, blower fan, rear window defogger, and air conditioner are not operating.

   Ignition Timing:
   M/T: 16° ± 2° BTDC (RED) idling in neutral
   A/T: 16° ± 2° BTDC (RED) idling in [N] or [P]



6. If necessary, adjust the ignition timing as follows. Loosen the distributor mounting bolts, and turn the distributor ignition (DI) housing counterclockwise to advance the timing or clockwise to retard the timing.



7. Tighten the distributor mounting bolts, and recheck the ignition timing.

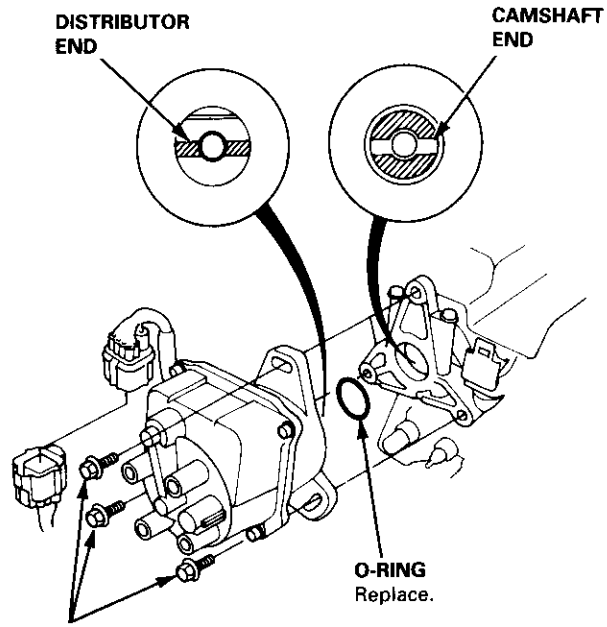
8. Disconnect the SCS service connector from the service check connector.

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Distributor Replacement

Removal:

1. Disconnect the connector from the distributor.
2. Disconnect the ignition wires from the distributor ignition (DI) cap.
3. Remove the mounting bolts from the distributor, then remove the distributor from the cylinder head.

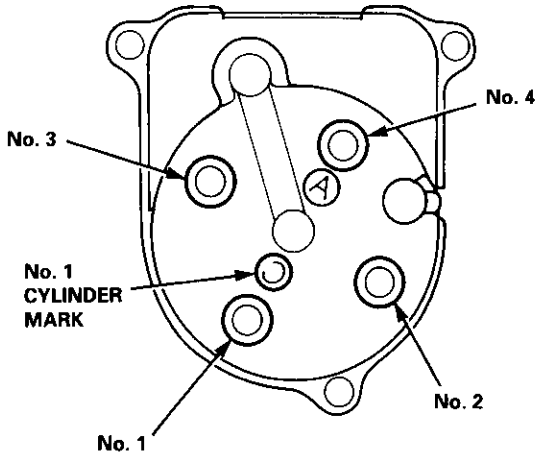


Installation:

1. Bring the No. 1 piston to compression stroke TDC.
2. Coat a new O-ring with engine oil, then install it.
3. Align the lug on the end of the distributor and its mating grooves in the camshaft end, then slip the distributor into position.

   NOTE: The lug on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.

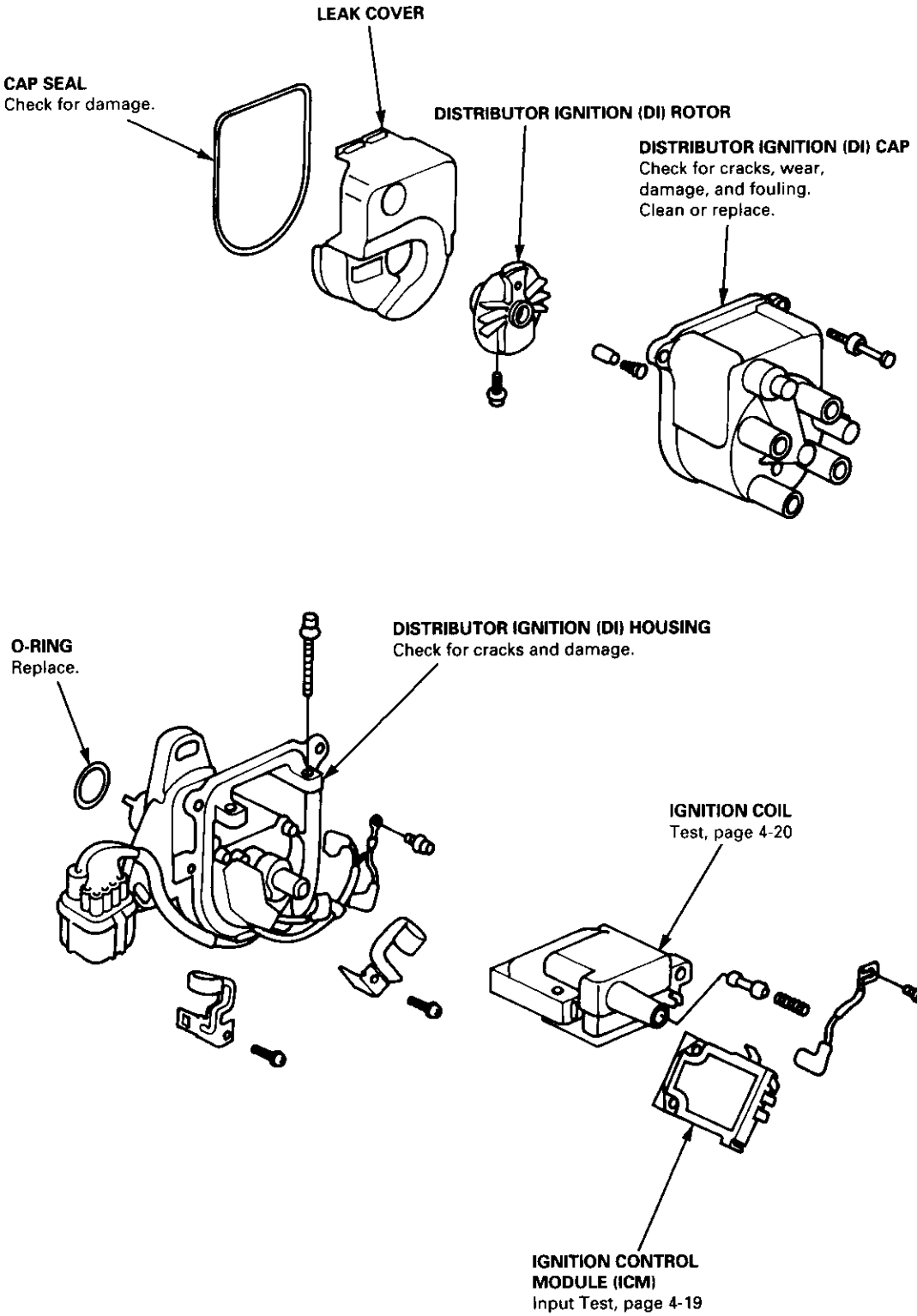
4. Install the mounting bolts, and tighten them lightly.
5. Connect the ignition wires to the distributor ignition (DI) cap as shown.



6. Connect the connector to the distributor.
7. Set the ignition timing (see previous page).
8. After setting the ignition timing, tighten the mounting bolts.

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Distributor Overhaul

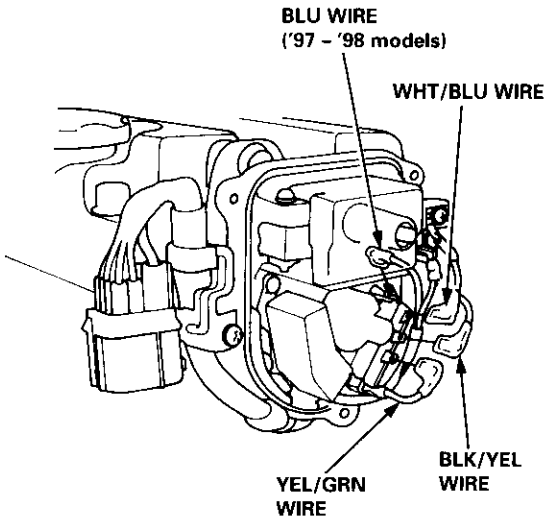


Ignition Control Module (ICM) Input Test

NOTE:
- See section 11 when the malfunction indicator lamp (MIL) comes on.
- Perform an input test for the ignition control module (ICM) after finishing the fundamental tests for the ignition system and the fuel and emissions systems.
- '97 – '98 models: The tachometer should operate normally if the ICM is OK.

1. Remove the distributor ignition (DI) cap, the distributor ignition (DI) rotor, and the leak cover.

2. Disconnect the wires from the ICM.



3. Turn the ignition switch ON (II). Check for voltage between the BLK/YEL wire and body ground. There should be battery voltage.
   - If there is no battery voltage, check the BLK/YEL wire between the ignition switch and the ICM.
   - If there is battery voltage, go to step 4.

4. Turn the ignition switch ON (II). Check for voltage between the WHT/BLU wire and body ground. There should be battery voltage.
   - If there is no battery voltage, check:
     — ignition coil.
     — WHT/BLU wire between the ICM and ignition coil.
   - If there is battery voltage, go to step 5.

5. '97 model: Disconnect the ECM/PCM connector A (32P). Check for continuity on the YEL/GRN wire between the ICM and ECM/PCM. There should be continuity.
   '98 – 00 models: Disconnect the ECM/PCM connector B (25P). Check for continuity on the YEL/GRN wire between the ICM and ECM/PCM. There should be continuity.

6. Check for continuity on the YEL/GRN wire to body ground. There should be no continuity.

7. Reconnect the ECM/PCM connector.

8. '97 – '98 models: Check for continuity on the BLU wire between the test tachometer connector and the ICM. There should be continuity.

9. '97 – '98 models: Check for continuity on the BLU wire to body ground. There should be no continuity.

10. If all the tests are normal, replace the ICM.

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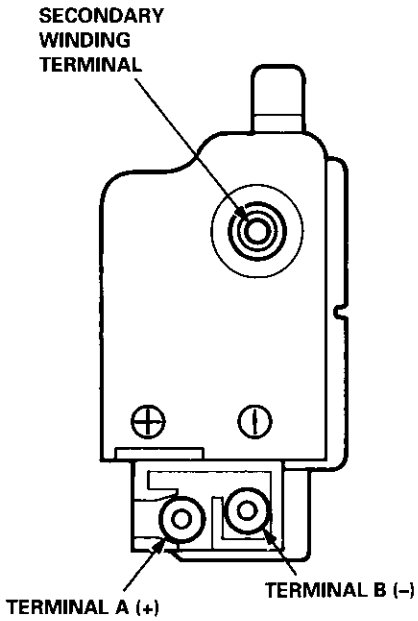
Ignition Coil Test

Using an ohmmeter, measure resistance between the terminals. If the resistance is not within specifications, replace the ignition coil.

NOTE: Resistance will vary with the coil temperature; specifications are at 68°F (20°C).

Primary Winding Resistance
(Between the A and B terminals):
0.63 – 0.77 Ω

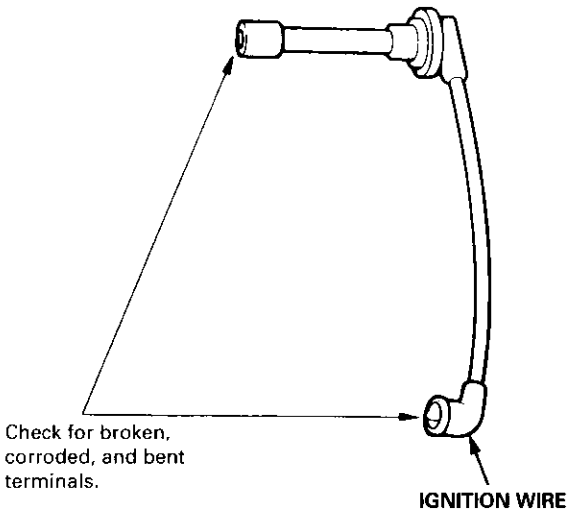
Secondary Winding Resistance
(Between the A and secondary winding terminals):
12.8 – 19.2 kΩ



Ignition Wire Inspection and Test

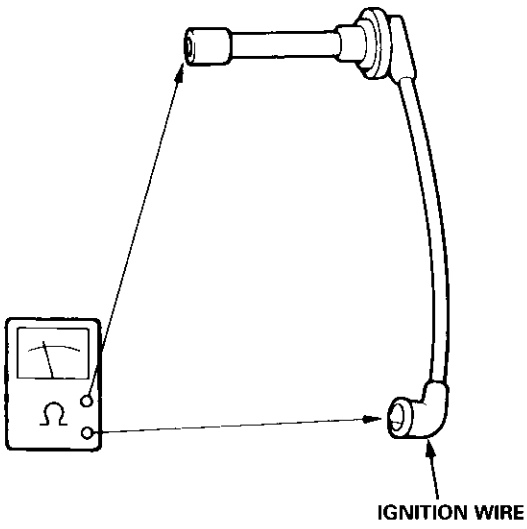
1. Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

2. Check the condition of the ignition wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the ignition wire.



3. Connect the ohmmeter probes and measure resistance.

Ignition Wire Resistance:
25 kΩ max. at 68°F (20°C)

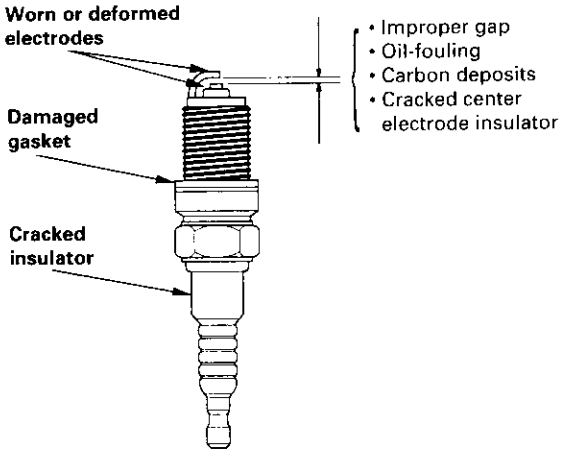


4. If the resistance exceeds 25 kΩ, replace the ignition wire.

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Spark Plug Inspection

- Inspect the electrodes and ceramic insulator for:



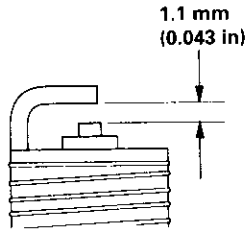
Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too hot
- Insufficient cooling

Fouled plug may be caused by:
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too cold
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition wires

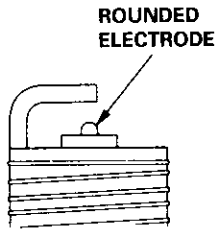
2. Check the electrode gap.
   - Adjust the gap with a suitable gapping tool.

Electrode Gap

Standard	1.1 $^{0}_{-0.1}$ mm (0.043 $^{0}_{-0.004}$ in)



- Replace the plug if the center electrode is rounded as shown below:



Spark Plugs

'97 – '98 models:

ZFR5F-11 (NGK) KJ16CR-L11 (DENSO)

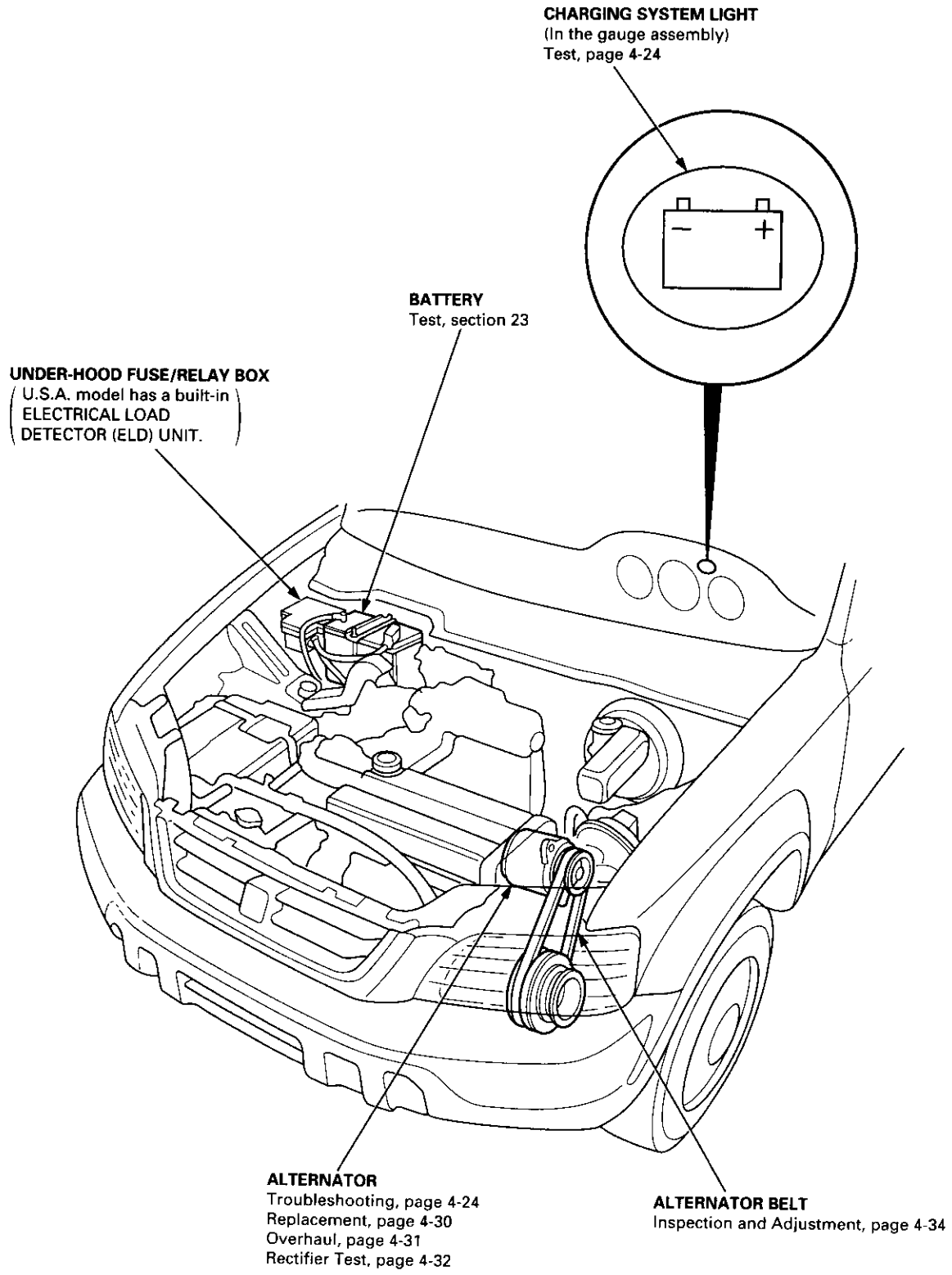
'99 – 00 models:

ZFR6F-11 (NGK) KJ20CR-L11 (DENSO)

3. Apply a small quantity of anti-seize compound to the plug threads, and screw the plugs into the cylinder head finger-tight. Then torque them to 18 N·m (1.8 kgf·m, 13 lbf·ft).

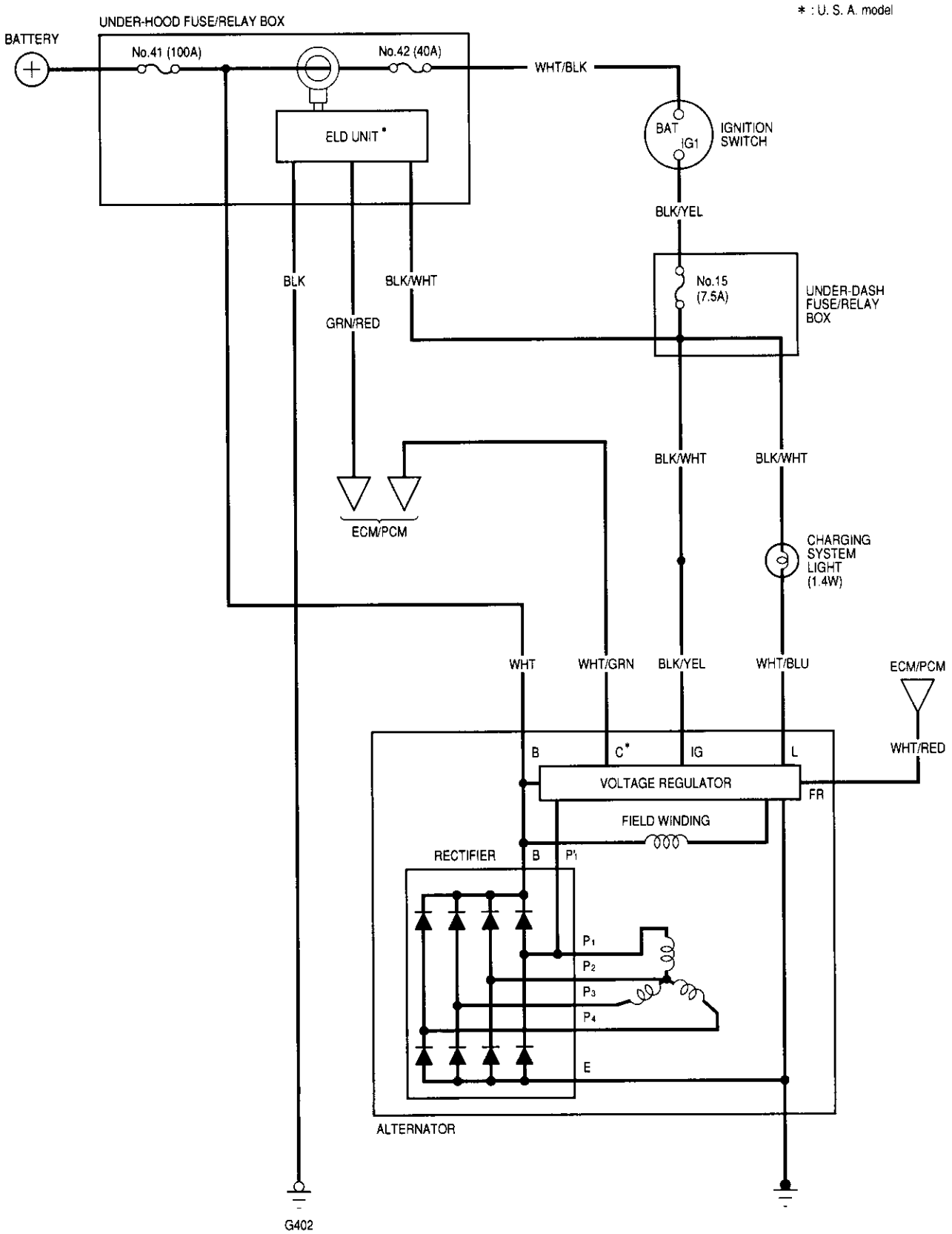
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Component Location Index



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Circuit Diagram



Troubleshooting

If the charging system light does not come on or does not go off, or the battery is dead or low, test the following items in the order listed below:

1. Battery (see section 23)
2. Charging system light
3. Voltage
4. Alternator control system (U.S.A. model)
5. Alternator/regulator

Charging System Light Test

Charging System Light Check:
Turn the ignition switch ON (II), and make sure the charging system light comes on.

Does the charging system light come on?

NO → **Check for a blown No. 15 (7.5 A) fuse and a blown charging system light bulb. If the fuse and bulb are OK, repair the open in the WHT/BLU wire.**

YES

Charging System Light Check (cont'd):
Start the engine.

Does the charging system light go off?

YES → **Perform the Alternator/Regulator Test (see page 4-28).**

NO

Voltage Check:
Measure the voltage at the No. 1 [No. 2] terminal of the 4P [3P] connector with the ignition switch ON (II).

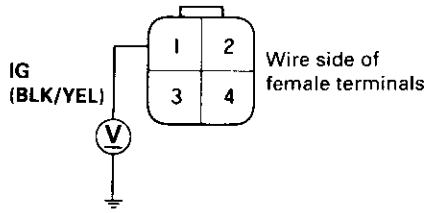
Is there battery voltage?

NO → **Repair the open in the BLK/YEL wire between the alternator and under-dash fuse/relay box.**

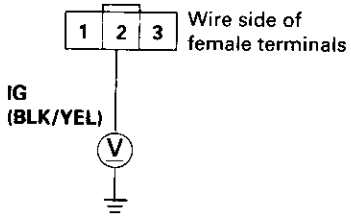
YES

(To next page)

ALTERNATOR 4P CONNECTOR (U.S.A. model)



ALTERNATOR 3P CONNECTOR (Canada model)



[ ]: Canada model

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(From previous page)

Check the L circuit:
1. Turn the ignition switch OFF.
2. Disconnect the 4P [3P] connector from the alternator.
3. Turn the ignition switch ON (II).

Does the charging system light come on?

NO → **Test and repair the alternator components.**

YES

Repair the short to ground in the WHT/BLU wire.

[ ]: Canada model

(cont'd)

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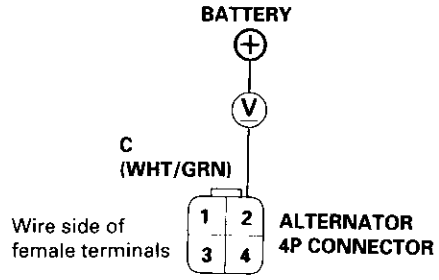
Troubleshooting (cont'd)

'97 model: Alternator Control System Test (U.S.A. model)

NOTE: Before testing, check proper operation of the ELD by checking for a DTC (see section 11).

Check for a short in the circuit (ALTC line):
1. Disconnect the 4P connector from the alternator.
2. Start the engine, and turn the headlights (high beam) ON.
3. Measure voltage between the 4P connector terminal No. 2 and the positive terminal of the battery.

CAUTION: Be sure to use a voltmeter with its positive terminal connected to battery positive and its negative terminal to the 4P connector terminal No. 2.

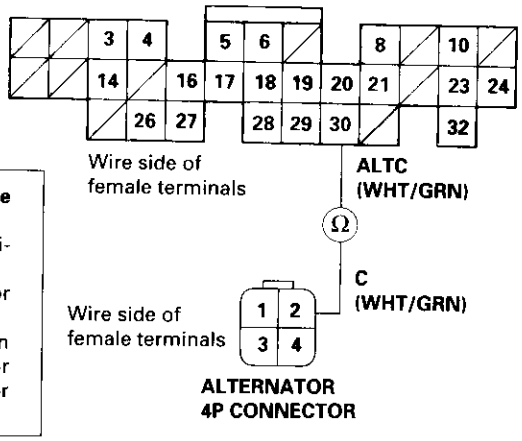


Is there 1 V or less?

YES

NO

Check for an open in the wire (ALTC line):
1. Turn the headlight and ignition switch OFF.
2. Disconnect the 32P connector from the ECM/PCM.
3. Check for continuity between the ECM/PCM 32P connector terminal No. 30 and alternator 4P connector terminal No. 2.



Is there continuity?

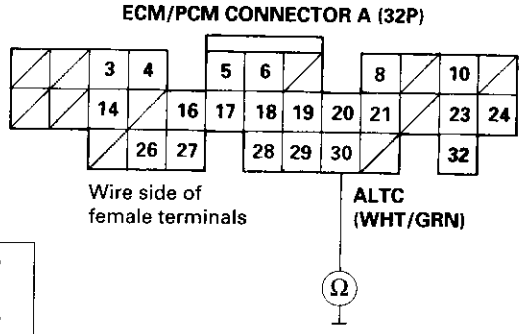
NO

Repair open in the wire between the alternator and ECM/PCM.

YES

Test and repair the alternator components.

Check for a short in the wire (ALTC line):
1. Turn the headlight and ignition switch OFF.
2. Disconnect the 32P connector from the ECM/PCM.
3. Check for continuity between the ECM/PCM 32P connector terminal No. 30 and body ground.



Is there continuity?

NO

Substitute a known-good ECM/PCM, and recheck.
If prescribed voltage is now available, replace the original ECM/PCM.

YES

Repair short in the wire between the alternator and the ECM/PCM.

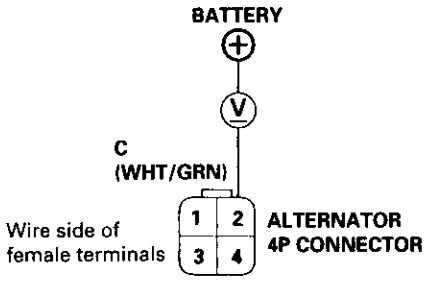
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'98 – '99 models: Alternator Control System Test (U.S.A. model)

NOTE: Before testing, check proper operation of the ELD by checking for a DTC (see section 11).

Check for a short in the circuit (ALTC line):
1. Disconnect the 4P connector from the alternator.
2. Start the engine, and turn the headlights (high beam) ON.
3. Measure voltage between the 4P connector terminal No. 2 and the positive terminal of the battery.

CAUTION: Be sure to use a voltmeter with its positive terminal connected to battery positive and its negative terminal to the 4P connector terminal No. 2.

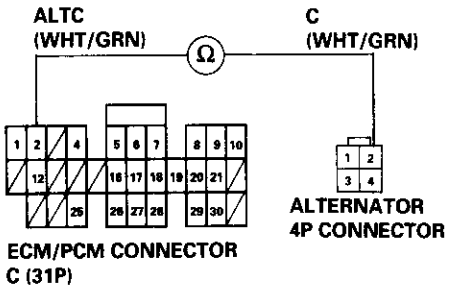


Is there 1 V or less?

YES

NO

Check for an open in the wire (ALTC line):
1. Turn the headlight and ignition switch OFF.
2. Disconnect the 31P connector from the ECM/PCM.
3. Check for continuity between the ECM/PCM 31P connector terminal No. 2 and alternator 4P connector terminal No. 2.



Is there continuity?

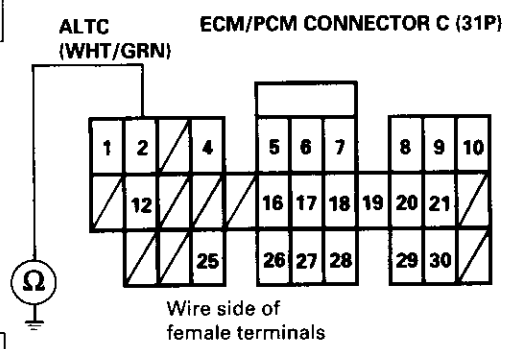
NO

Repair open in the wire between the alternator and ECM/PCM.

YES

Test and repair the alternator components.

Check for a short in the wire (ALTC line):
1. Turn the headlight and ignition switch OFF.
2. Disconnect the 31P connector from the ECM/PCM.
3. Check for continuity between the ECM/PCM 31P connector terminal No. 2 and body ground.



Is there continuity?

NO

Substitute a known-good ECM/PCM, and recheck.
If prescribed voltage is now available, replace the original ECM/PCM.

YES

Repair short in the wire between the alternator and the ECM/PCM.

(cont'd)

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Troubleshooting (cont'd)

Alternator/Regulator Test

NOTE: Make sure the battery is sufficiently charged (see section 23).

Alternator/Regulator Test:
1. Connect a Sun VAT-40 (or equivalent tester), and turn the selector switch to position 1 (starting).
2. Shift to neutral (A/T in [P] or [N]) position, and start the engine. Hold the engine at 3,000 rpm with no load until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage over 15.1 V?

YES → **Replace the voltage regulator.**

NO

Alternator/Regulator Test (cont'd):
1. Release the accelerator pedal, and let the engine idle.
2. Make sure all accessories are turned off. Turn the selector switch to position 2 (charging).
3. Remove the inductive pick-up, and zero the ammeter.
4. Place the inductive pick-up over the battery ground cable so that the arrow points to the battery negative terminal.
5. Raise the engine speed to 2,000 rpm, and hold it there.

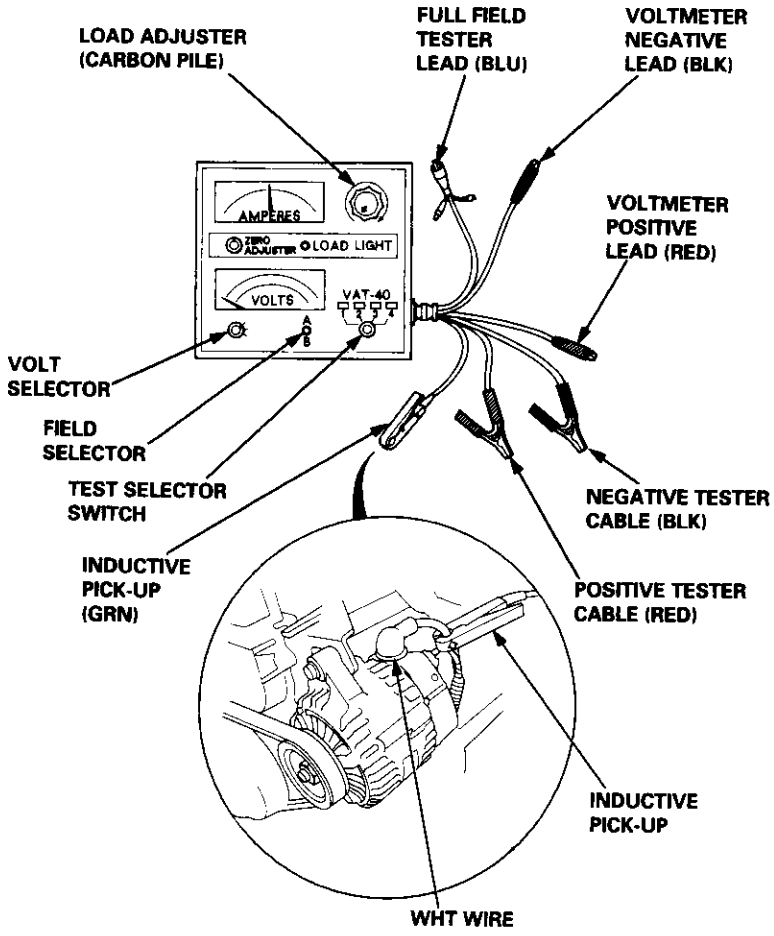
Is the voltage less than 13.5 V?

YES → **Test and repair the alternator components.**

NO

Alternator/Regulator Test (cont'd):
Apply a load with a VAT-40 until the battery voltage drops to between 12 – 13.5 V.

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Is the amperage 65 A or more?

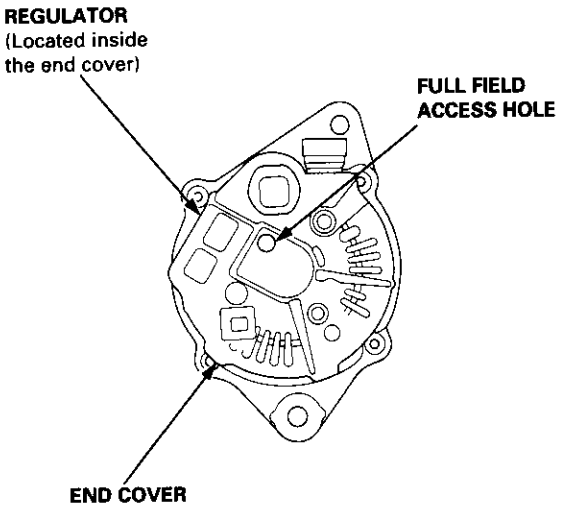
YES → **The charging system is OK.**

NO

Alternator/Regulator Test (cont'd): With the engine speed still at 2,000 rpm, full-field the alternator.

CAUTION: The voltage will rise quickly when the alternator is full-fielded. Do not allow the voltage to exceed 18 V; it may damage the electrical system.

NOTE: Attach a probe to a VAT-40 full field test lead, and insert the probe into the full field access hole at the back of the alternator. Switch the field selector to the "A (Ground)" position momentarily, and check the amperage reading.



Is the alternator output 65 A or more?

NO → **Test and repair the alternator components.**

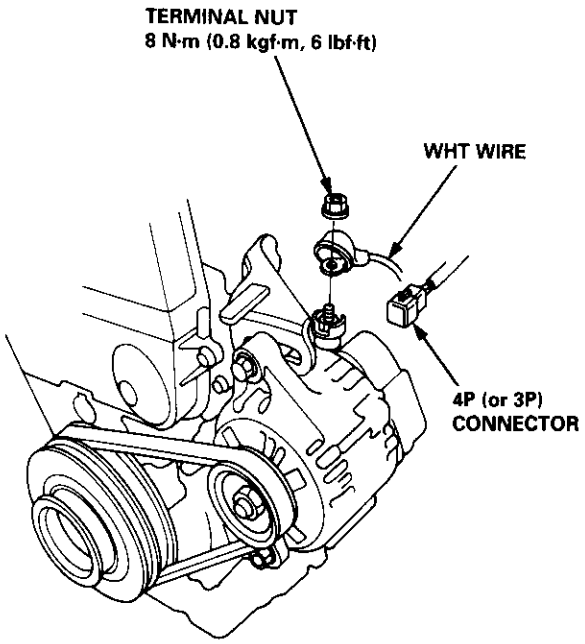
YES

Replace the voltage regulator.

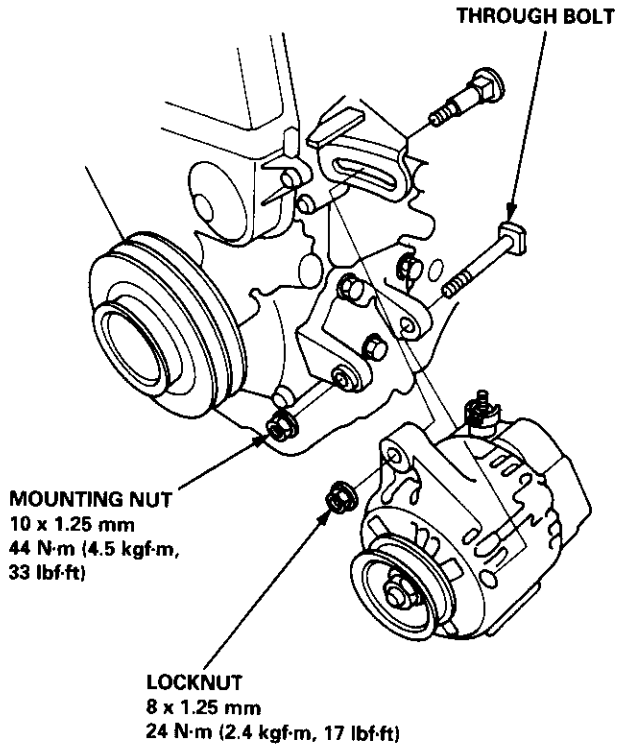
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Alternator Replacement

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Disconnect the 4P (or 3P) connector and WHT wire from the alternator.



3. Remove the adjusting bolt and mounting nut, then remove the alternator belt.
4. Pull out the through bolt, then remove the alternator.



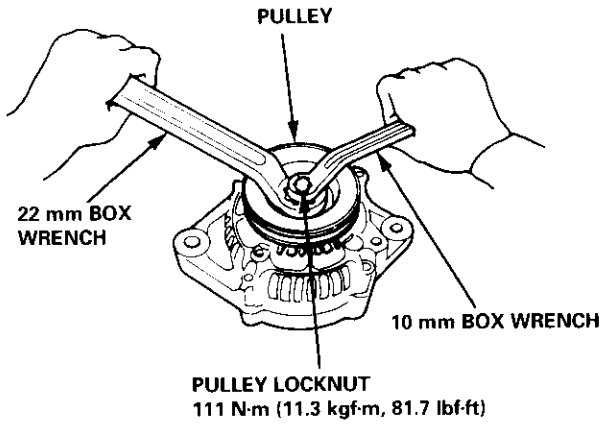
5. Install the alternator in reverse order of removal.
6. Adjust the alternator belt tension after installation (see page 4-34).

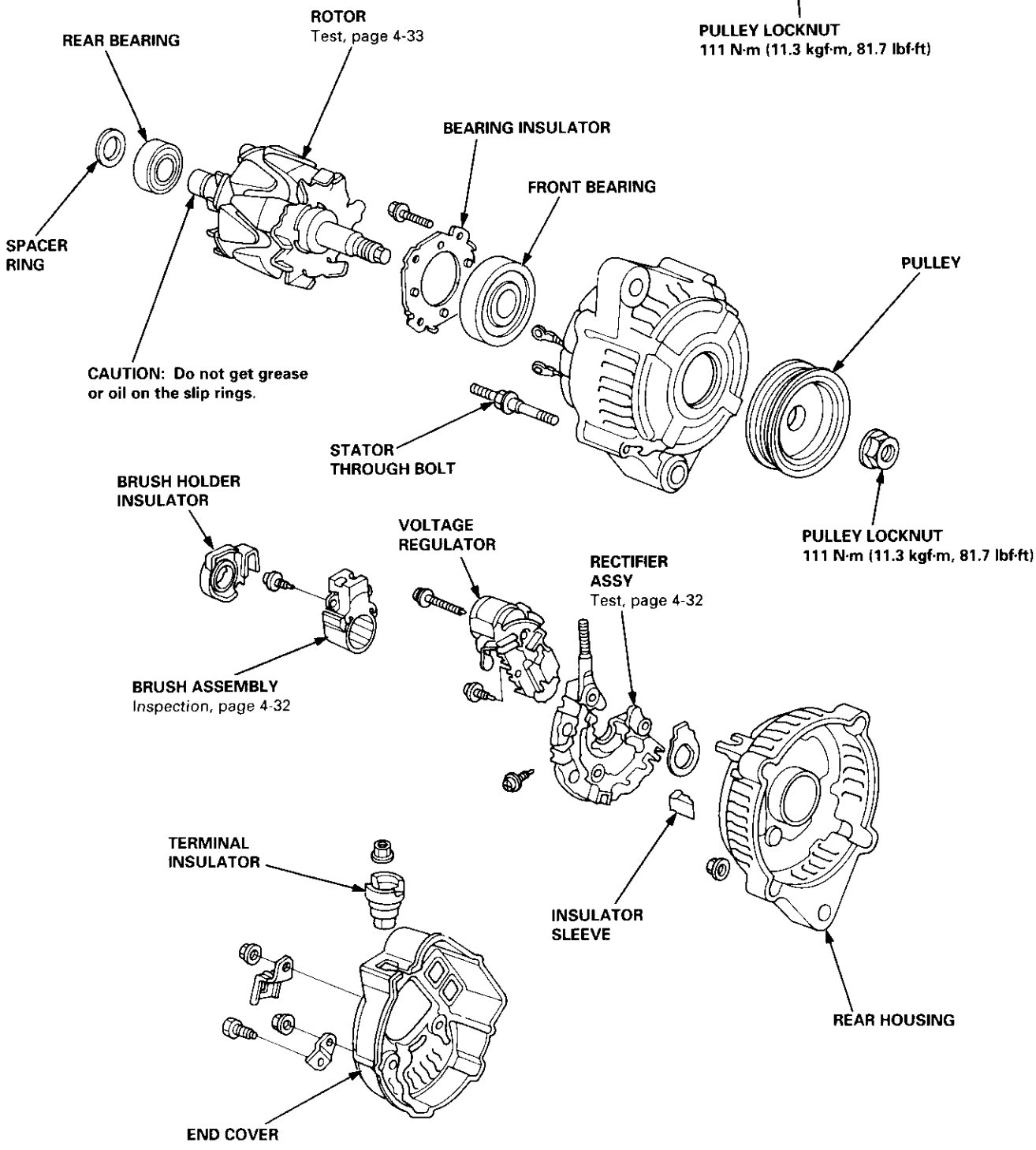
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Alternator Overhaul

NOTE: Do not remove the pulley unless the front bearing needs replacement.

To loosen the pulley locknut, use the tools as shown. If necessary, use an impact wrench.



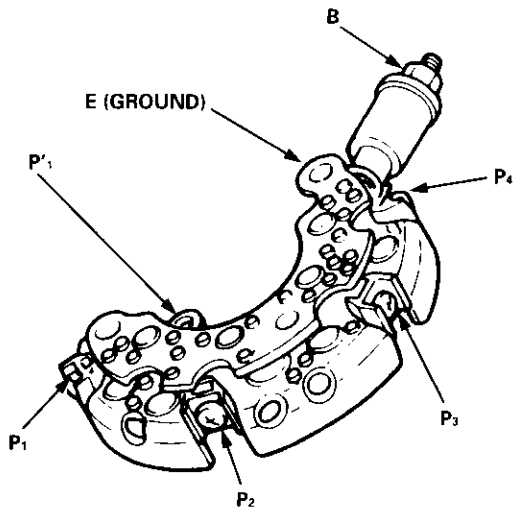


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Rectifier Test

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes (four pairs), each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 16 checks.

1. Check for continuity in each direction between
   — the B and P terminals.
   — E (ground) and P terminals.
   All diodes should have continuity in only one direction.



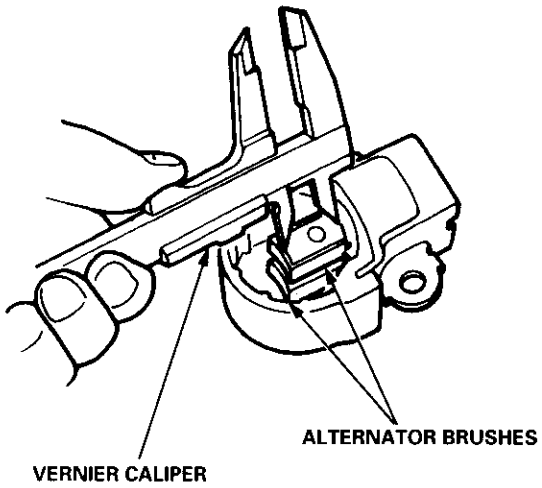
2. If any of the diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

Alternator Brush Inspection

1. Remove the end cover, then take out the brush holder by removing its two screws.

2. Measure the length of the brushes with a vernier caliper.

   Alternator Brush Length:
   Standard (New): 10.5 mm (0.41 in)
   Service Limit: 1.5 mm (0.06 in)

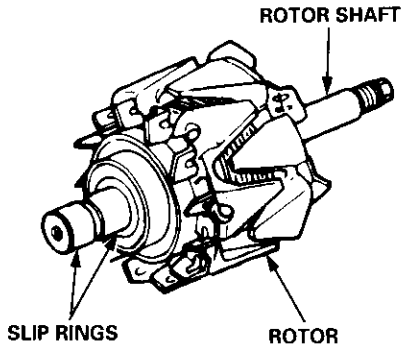


3. If the brushes are less than the service limit, replace the alternator brush assembly.

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Rotor Slip Ring Test

1. Check the resistance between the slip rings.
   There should be 1.8 – 3.0 ohms.
   - If resistance meets the specification, go to step 2.
   - If resistance does not meet the specification, replace the alternator.

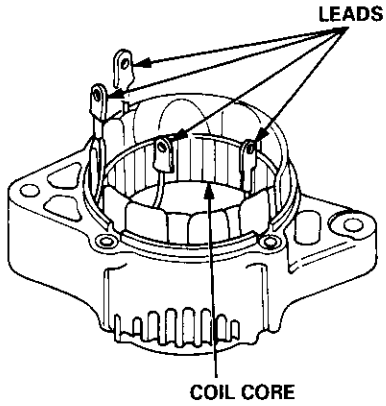


2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.

3. If the rotor fails either continuity check, replace the alternator.

Stator Test

1. Check that there is continuity between each pair of leads.



2. Check that there is no continuity between each lead and the coil core.

3. If the coil fails either continuity check, replace the alternator.

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Alternator Belt Inspection and Adjustment

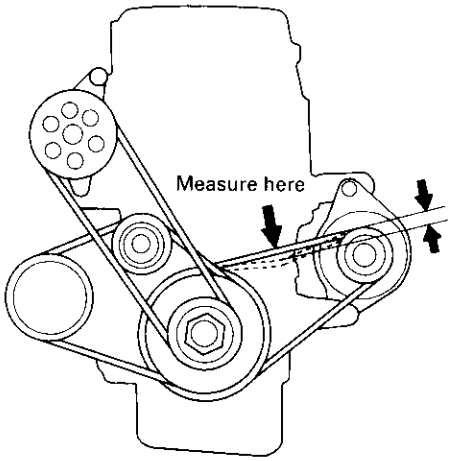
NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Deflection method:

Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and crankshaft pulley.

Deflection:
Used Belt: 8.5 – 11.5 mm (0.33 – 0.45 in)
New Belt: 5.5 – 8.0 mm (0.22 – 0.31 in)

NOTE: If the belt is worn or damaged, replace it.

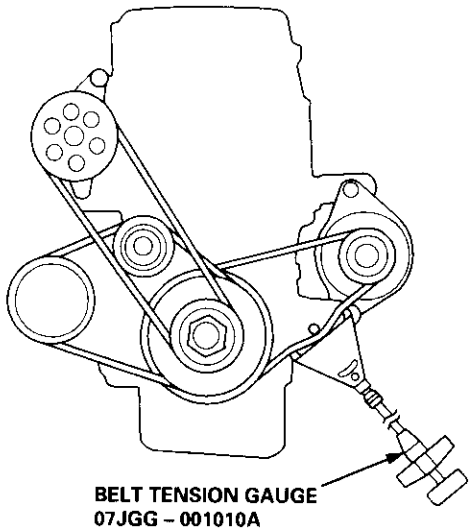


Belt tension gauge method:

Attach the belt tension gauge to the belt and measure the tension. Follow the gauge manufacturer's instructions.

Tension:
Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)
New Belt: 690 – 880 N (70 – 90 kgf, 150 – 200 lbf)

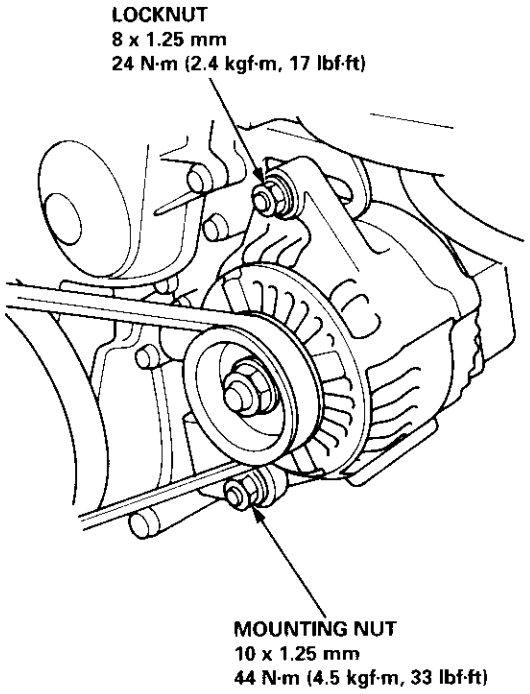
NOTE: If the belt is worn or damaged, replace it.



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If adjustment is necessary:

1. Loosen the mounting nut and the locknut.
2. Move the alternator to obtain the proper belt tension, then retighten the nuts.

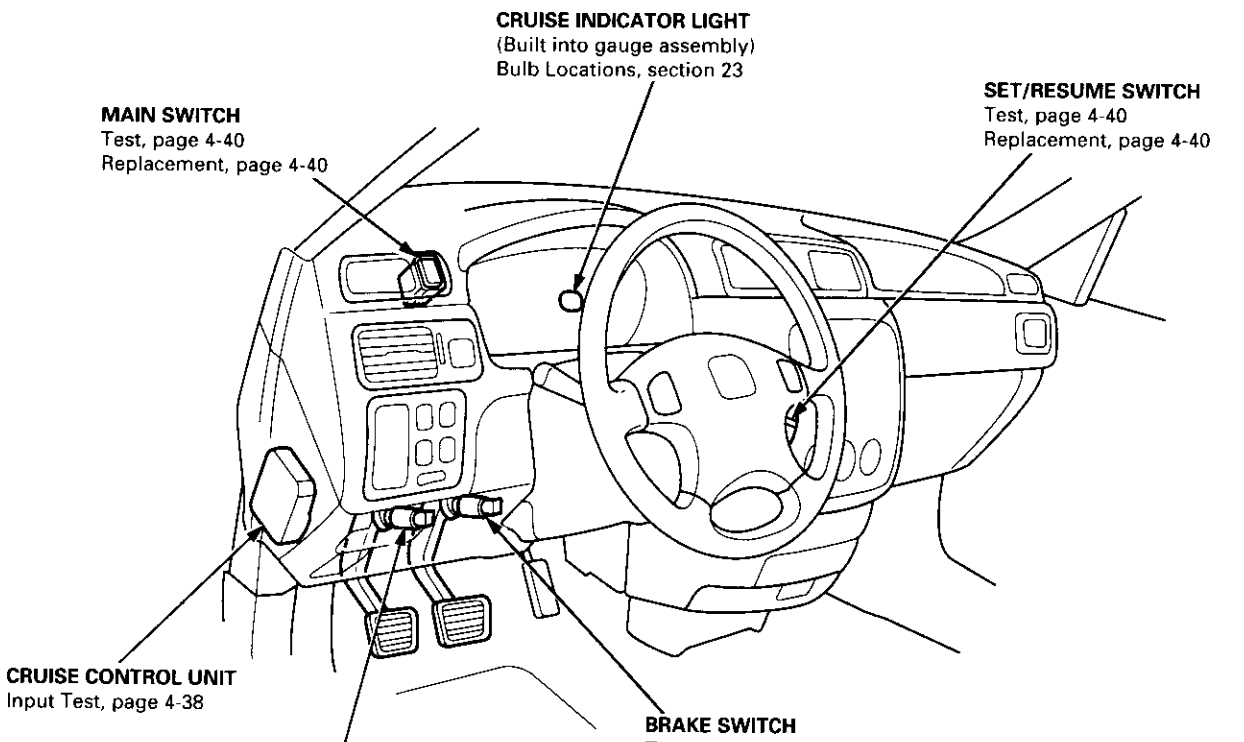


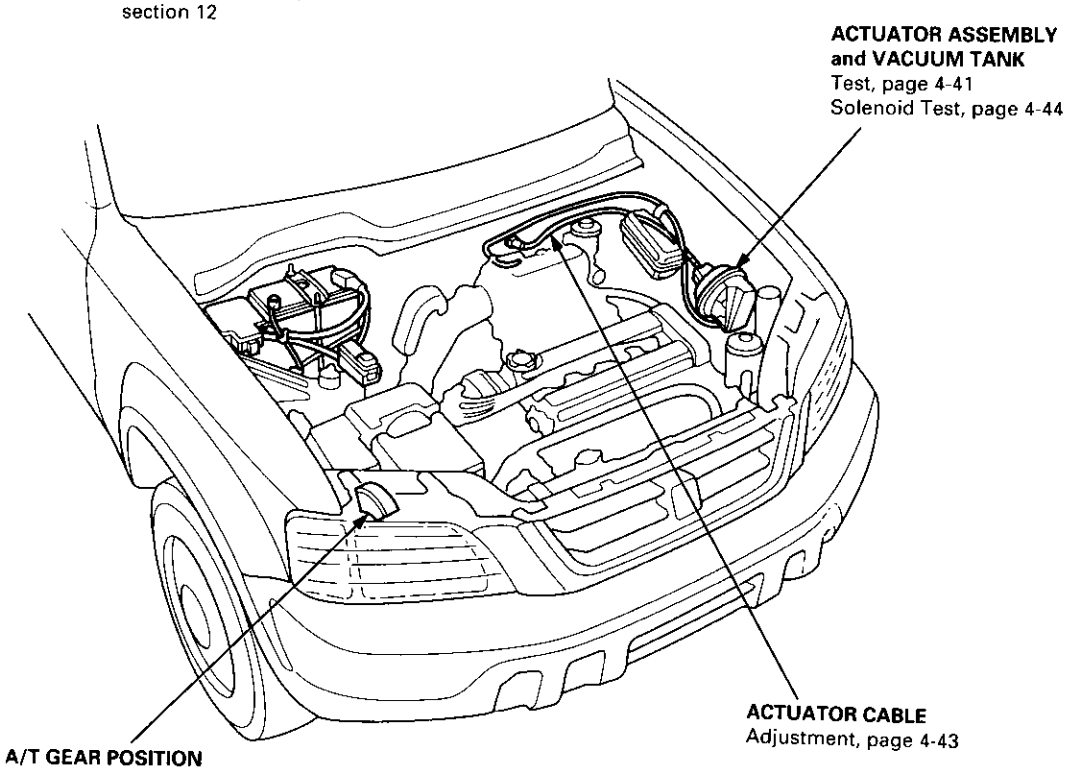
3. Recheck the deflection or tension of the belt.

   NOTE: For the power steering pump belt and A/C compressor belt adjustments, refer to section 17 and section 22.

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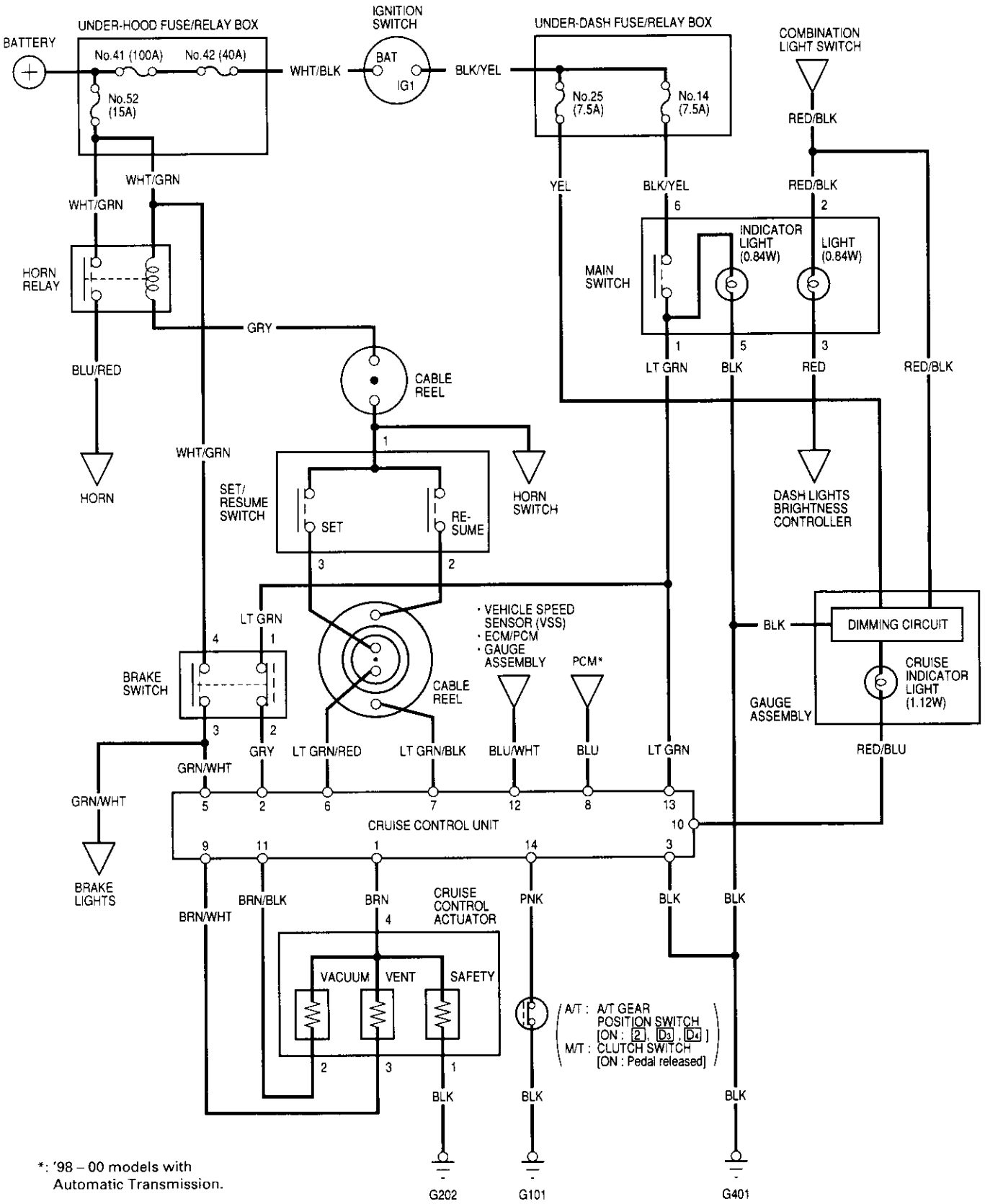
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Circuit Diagram



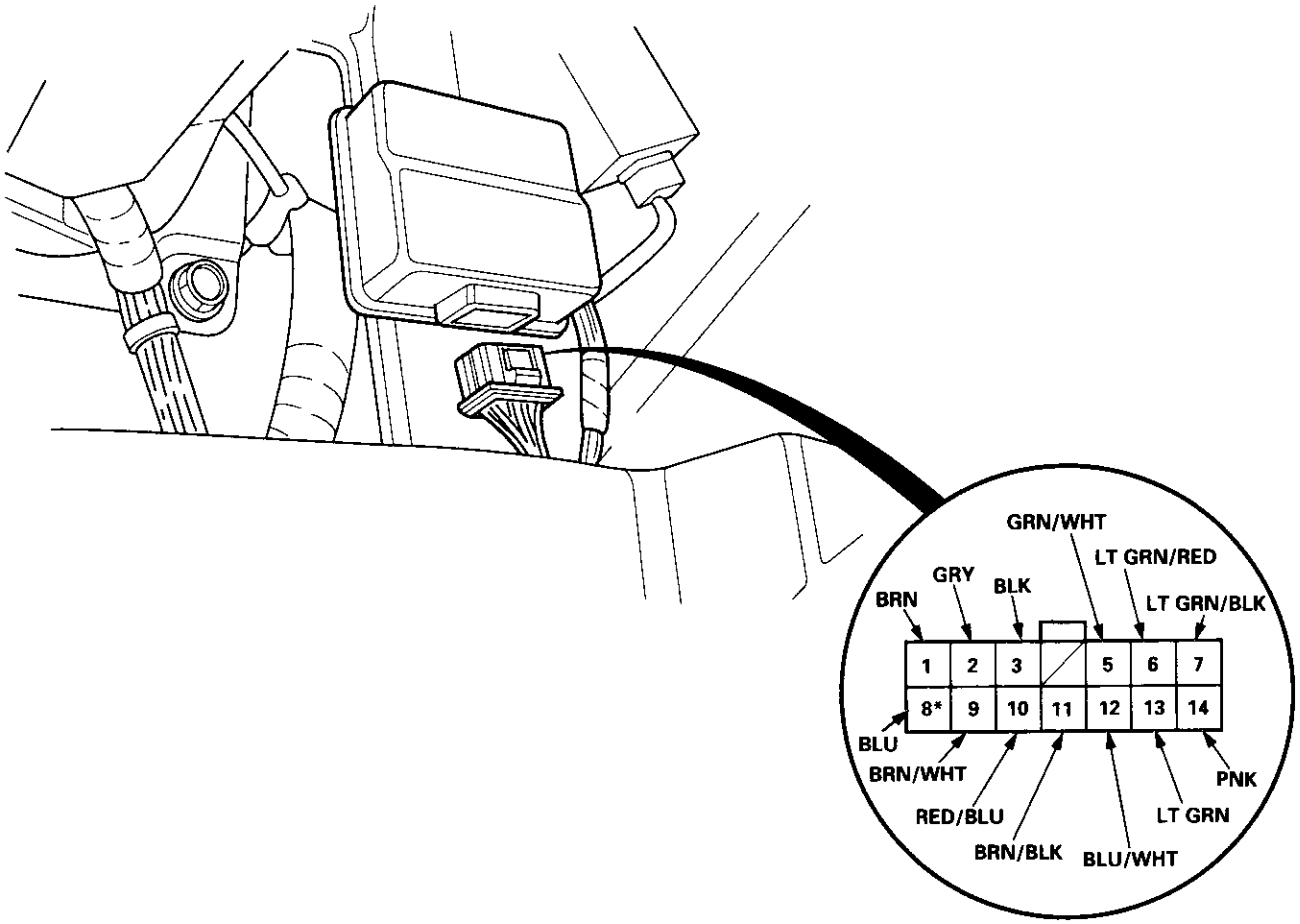
*: '98 – 00 models with Automatic Transmission.

Control Unit Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the driver's dashboard lower cover and knee bolster (see section 20).
2. Disconnect the 14P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.

   If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   If the terminals look OK, make the following input tests at the connector.
   — If any test indicates a problem, find and correct the cause, then recheck the system.
   — If all the input tests prove OK, the control unit must be faulty; replace it.



*: '98 – 00 models with Automatic Transmission.

Wire side of female terminals

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Disconnect the 14P connector from the control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
9	BRN/WHT	Under all conditions	Check for resistance to ground: There should be 80 – 120 Ω.	• Faulty actuator solenoid • Poor ground (G202) • An open in the wire
1	BRN	Under all conditions	Check for resistance to ground: There should be 40 – 60 Ω.	
11	BRN/BLK	Under all conditions	Check for resistance to ground: There should be 70 – 110 Ω.	
2	GRY	Ignition switch ON (II), main switch ON and brake pedal depressed, then released	Check for voltage to ground: There should be 0 V with the pedal depressed and battery voltage with the pedal released.	• Faulty brake switch • An open in the wire
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
5	GRN/WHT	Brake pedal depressed, then released	Check for voltage to ground: There should be battery voltage with the pedal depressed, and 0 V with the pedal released.	• Blown No. 52 (15 A) fuse in the under-hood fuse/relay box • Faulty brake switch • An open in the wire
6	LT GRN/ RED	Set button pushed	Check for voltage to ground: There should be battery voltage.	• Blown No. 52 (15 A) fuse in the under-hood fuse/relay box • Faulty horn relay • Faulty set/resume switch • Faulty cable reel • An open in the wire
7	LT GRN/ BLK	Resume button pushed		
10	RED/BLU	Ignition switch ON (II)	Attach to ground: Cruise indicator light in the gauge assembly should come on.	• Blown bulb • Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Faulty dimming circuit in the gauge assembly • An open in the wire
12	BLU/WHT	Ignition switch ON (II) and main switch ON; raise the front of the vehicle, block one wheel and rotate the other wheel slowly.	Check for voltage between the BLU/WHT ⊕ and BLK ⊖ terminals: There should be 0 – 5 V or more –0 – 5 V or more repeatedly.	• Faulty vehicle speed sensor (VSS) • An open in the wire
13	LT GRN	Ignition switch ON (II) and main switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (7.5 A) fuse in the under-dash fuse/relay box • Faulty main switch • An open in the wire
14	PNK	A/T: Shift lever in 2, D3 or D4 M/T: Clutch pedal released	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity when the shift lever is in other positions or when the clutch pedal is depressed.	• Faulty A/T gear position switch (A/T) • Faulty or misadjusted clutch switch (M/T) • Poor ground (G101) • An open in the wire

Reconnect the 14P connector to the control unit.

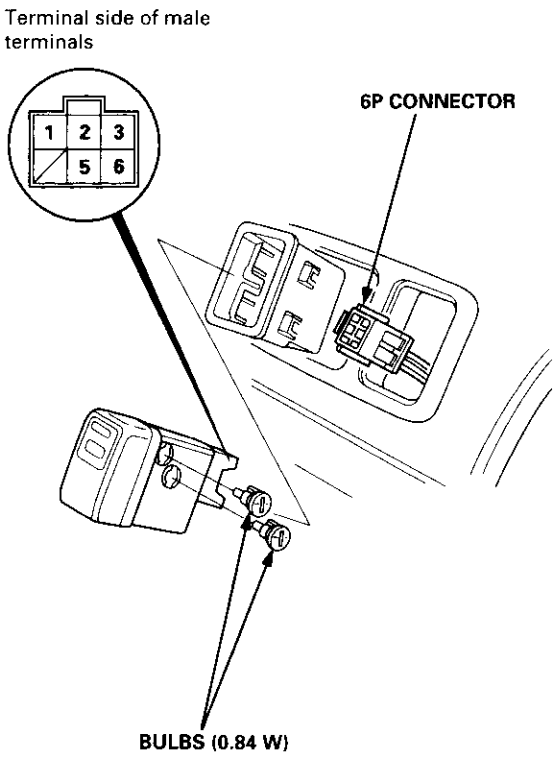
8*	BLU	Start the engine, turn the main switch ON, and drive the vehicle over 25 mph (40 km/h) with the cruise control set	Check for voltage to ground: There should be approx. 5 V	• Faulty cruise control unit • Short to ground

*: '98 – 00 models with Automatic Transmission.

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Main Switch Test/Replacement

1. Carefully pry the switch out of the instrument panel.
2. Disconnect the 6P connector from the switch.



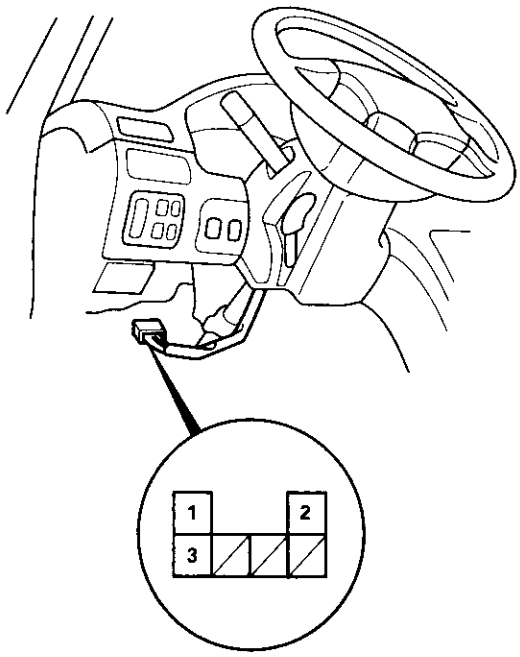
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	5		1	6	3		2
OFF	○	⊙	○		○	⊙	○
ON	○	⊙	○	○	○	⊙	○

If there is no continuity, replace the switch.

Set/Resume Switch Test/Replacement

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Disconnect the driver's airbag and front passenger's airbag connectors (see section 24).
3. Remove the dashboard lower cover and knee bolster.
4. Disconnect the 6P connector between the cable reel sub harness and the main wire harness.



Wire side of female terminals

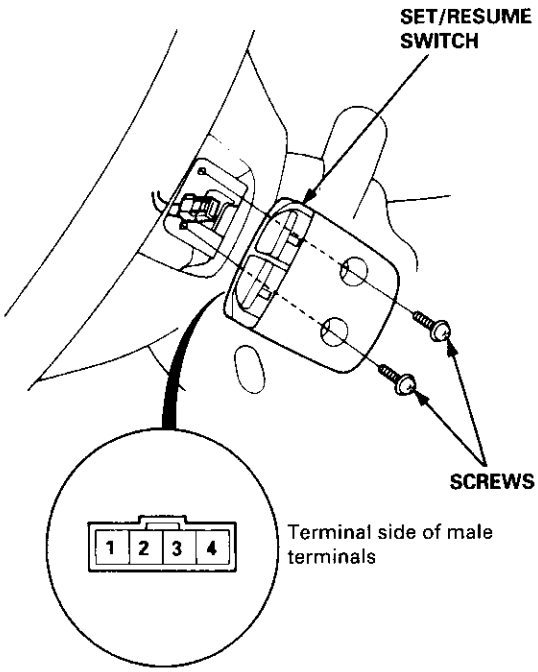
5. Check for continuity between the terminals of the 6P connector in each switch position according to the table.

Position \ Terminal	1	2	3
SET (ON)		○	○
RESUME (ON)	○		○

- If there is continuity, and it matches the table, the switch is OK.
- If there is no continuity in one or both positions, go to step 6.

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6. Remove the two screws, then remove the switch.



7. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	3
SET (ON)	○		○
RESUME (ON)	○	○	

- If there is continuity, and it matches the table, replace the cable reel.
- If there is no continuity in one or both positions, replace the switch.

8. If all tests prove OK, reconnect the cable reel sub-harness connector.

9. Reconnect the driver's airbag and front passenger's airbag connectors, and reinstall the access panel on the steering wheel.

10. Reconnect the battery positive cable, then the negative cable.

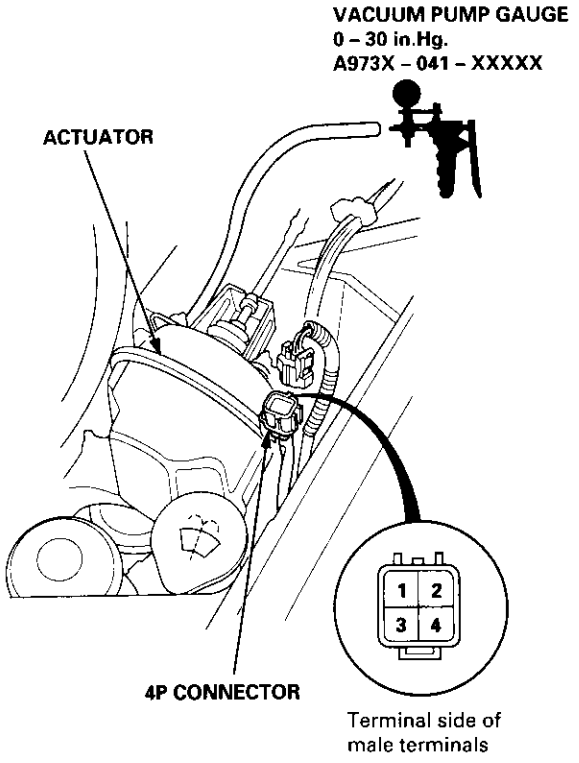
11. After connecting the airbag connectors, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

Actuator Test

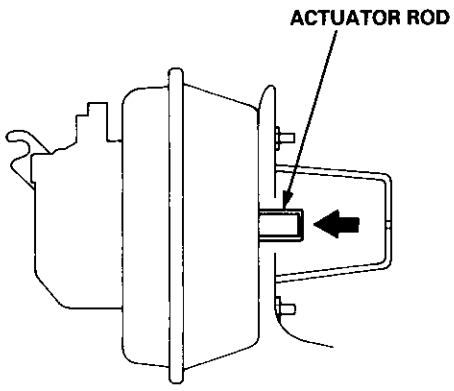
1. Disconnect the actuator cable from the actuator rod and the 4P connector.

2. Connect battery power to the No. 4 terminal and ground to the No. 1, No. 2 and No. 3 terminals.

3. Connect a vacuum pump to the vacuum hose. Then apply vacuum to the actuator.



4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.

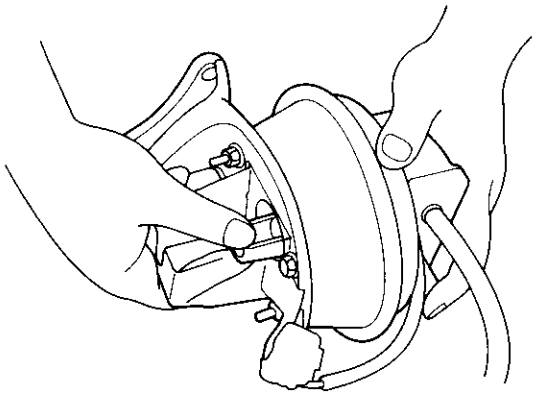


(cont'd)

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Actuator Test (cont'd)

5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it out. If you can, it is defective.



6. Disconnect ground from the No. 3 terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.

7. Repeat steps 2 through 5, and disconnect ground from the No. 1 terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.

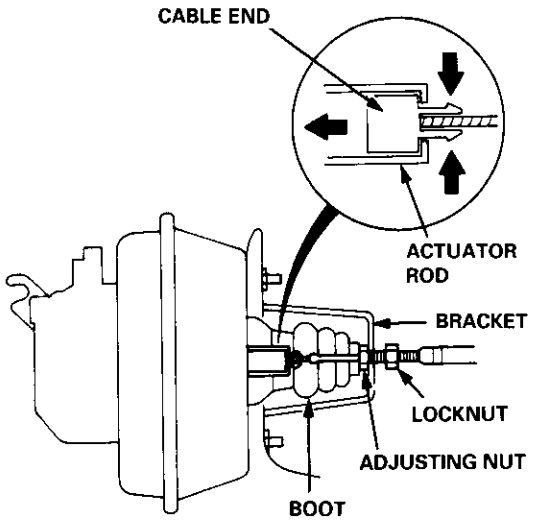
8. If you replace the solenoid valve assembly, be sure to use new O-rings on each solenoid.

9. Disconnect power and ground from the 4P connector. Disconnect the vent hose from the actuator. Connect a vacuum pump to the actuator vent hose port, and apply vacuum. The actuator rod should pull in completely. If not, the vacuum valve is stuck open. Replace the actuator.

Actuator Replacement

1. Pull back the boot, and loosen the locknut. Then disconnect the cable from the bracket.

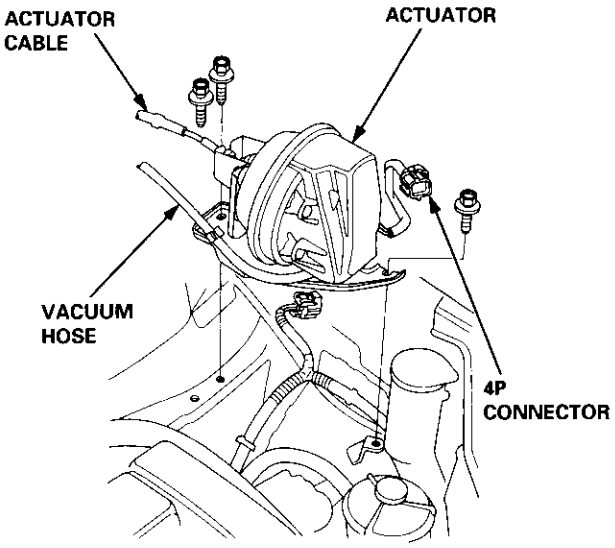
2. Disconnect the cable end from the actuator rod.



3. Disconnect the 4P connector from the actuator.

4. Disconnect the vacuum hose from the vacuum tank. Pull out the vent hose.

5. Remove the three mounting bolts and the actuator with the bracket.



6. If necessary, disconnect the cable end from the linkage over the accelerator pedal, then turn the grommet 90° in the bulkhead, and remove the cable.

7. Install in the reverse order of removal, and adjust free play at the actuator rod after connecting the cable (see page 4-43).

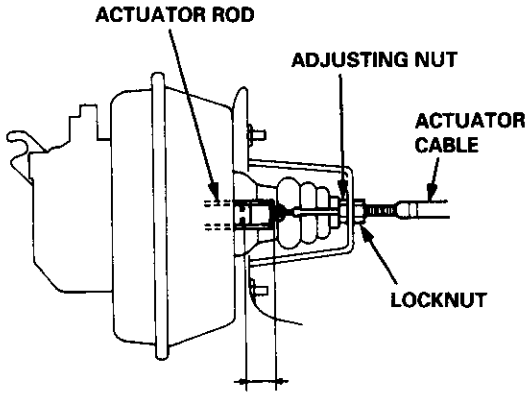
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Actuator Cable Adjustment

1. Check that the actuator cable operates smoothly with no binding or sticking.

2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

3. Measure the amount of movement of the actuator rod until the cable pulls on the accelerator lever (engine speed starts to increase). Free play should be 11 ± 1.0 mm (0.43 ± 0.04 in).



LOCKNUT FREE PLAY: 11 ± 1.0 mm (0.43 ± 0.04 in)

4. If free play is not within specs, loosen the locknut, and turn the adjusting nut as required.

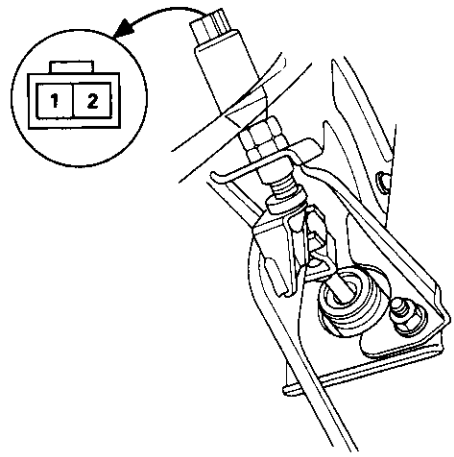
   NOTE: If necessary, check the throttle cable free play (see section 11), then recheck the actuator rod free play.

5. Retighten the locknut, and recheck the free play.

Clutch Switch Test

1. Disconnect the 2P connector from the clutch switch.

CLUTCH SWITCH 2P CONNECTOR
Terminal side of male terminals



2. Remove the clutch switch.

3. Check for continuity between the terminals according to the table.

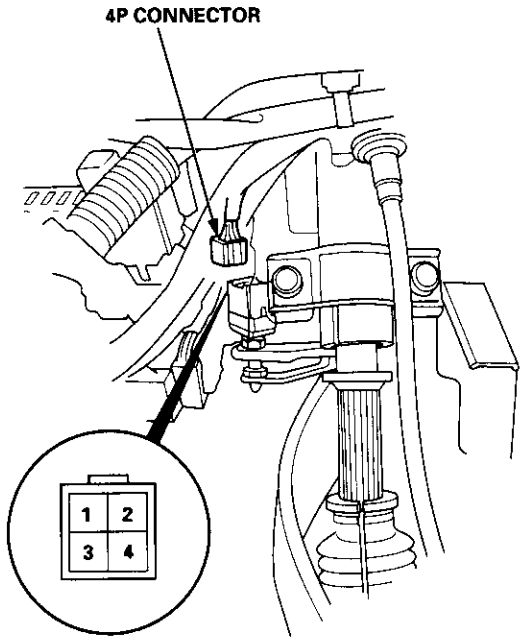
Terminal / Clutch Switch	2	3
DEPRESSED		
RELEASED	○	○

4. If necessary, replace the switch or adjust the pedal height (see section 12).

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Brake Switch Test

1. Disconnect the 4P connector from the switch.
2. Remove the brake switch.



Terminal side of male terminals

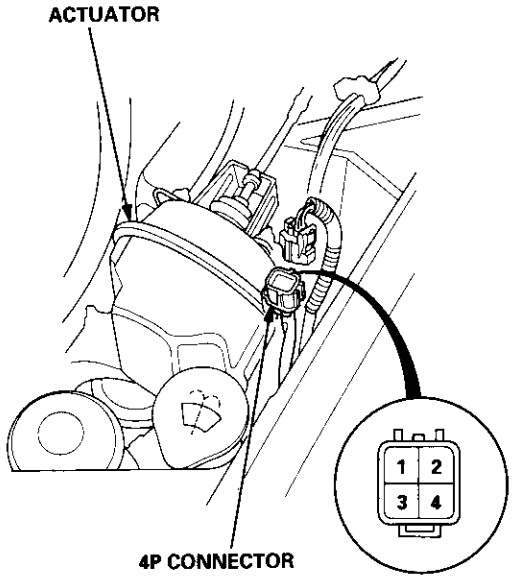
3. Check for continuity between the terminals according to the table.

Terminal / Brake Switch	1	2	3	4
RELEASED	○	○		
PUSHED			○	○

4. If necessary, replace the switch or adjust pedal height (see section 19).

Actuator Solenoid Test

1. Disconnect the 4P connector from the actuator.

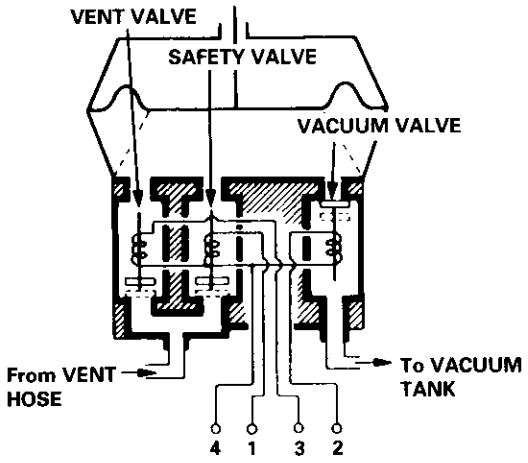


Terminal side of male terminals

2. Check for resistance between the terminals according to the table.

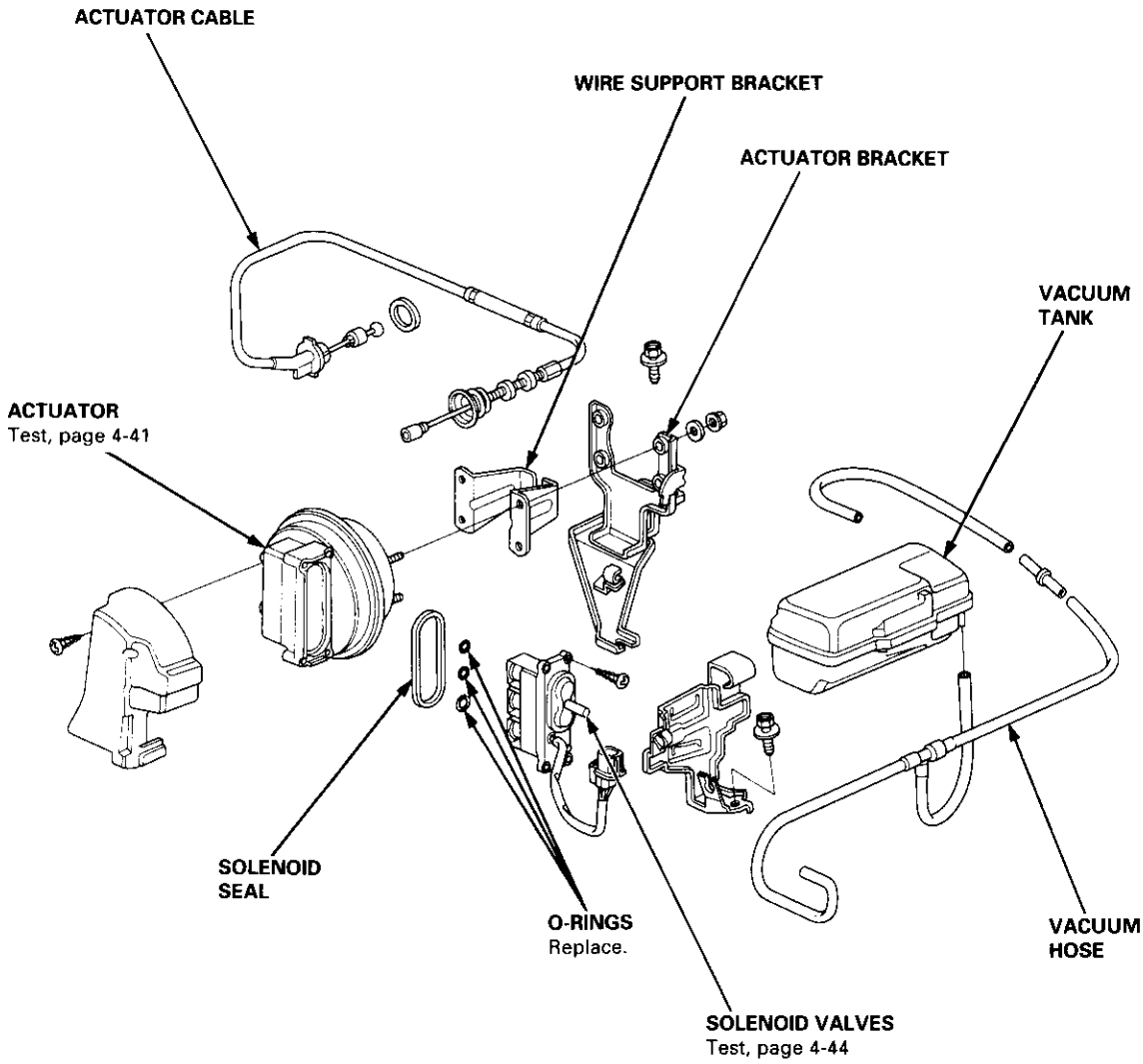
Terminal / Resistance (Ω)	1	2	3	4
VENT SOLENOID 40 – 60 Ω			○	○
VACUUM SOLENOID 30 – 50 Ω		○		○
SAFETY SOLENOID 40 – 60 Ω	○			○

NOTE: Resistance will vary slightly with temperature; specified resistance is at 68°F (20°C).



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Actuator Disassembly



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Engine

Engine Removal/Installation 5-1
Cylinder Head/Valve Train 6-1
Engine Block 7-1
Engine Lubrication 8-1
Intake Manifold/Exhaust System 9-1
Cooling 10-1



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Engine Removal/Installation

Engine Removal/Installation

Removal 5-2

Installation 5-12



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Engine Removal/Installation

Removal

⚠ WARNING

- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine.**
- **Make sure the vehicle will not roll off stands and fall while you are working under it.**

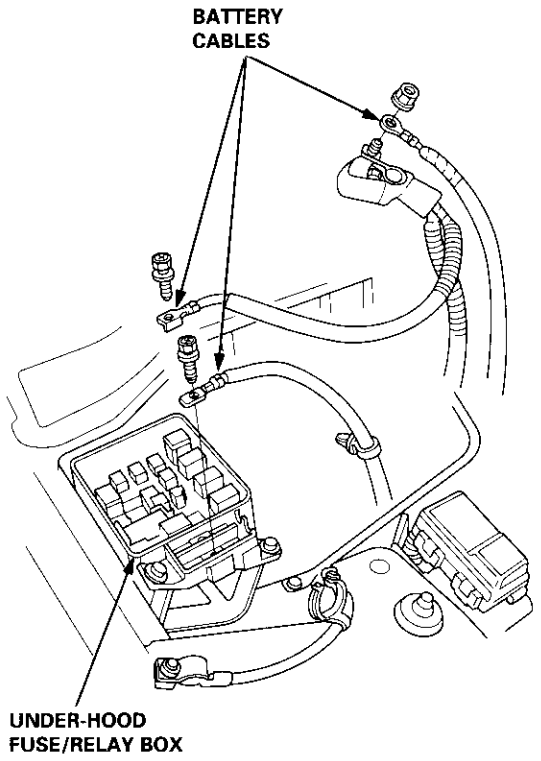
NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.

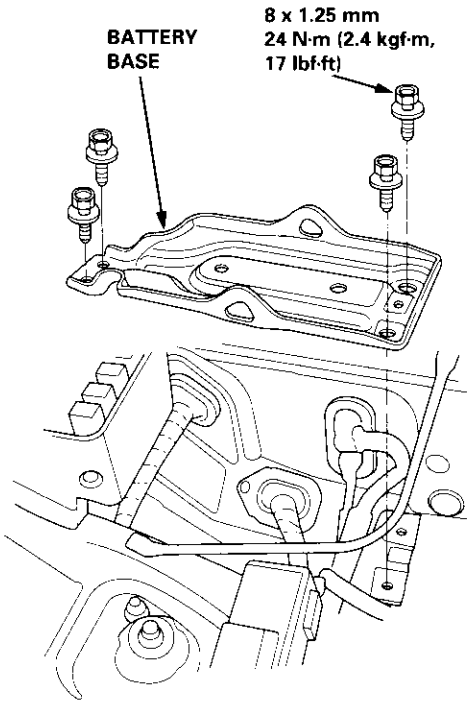
1. Secure the hood in the open position.

2. Disconnect the battery negative terminal first, then the positive terminal.

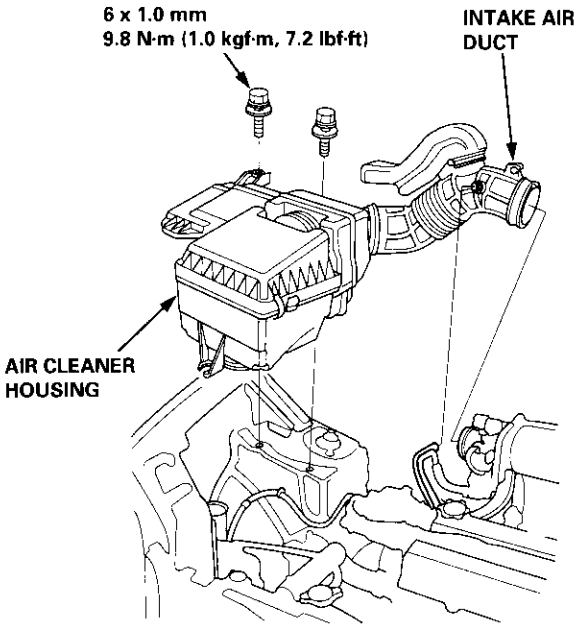
3. Disconnect the battery cables from the under-hood fuse/relay box and battery positive terminal.



4. Remove the battery and battery base.



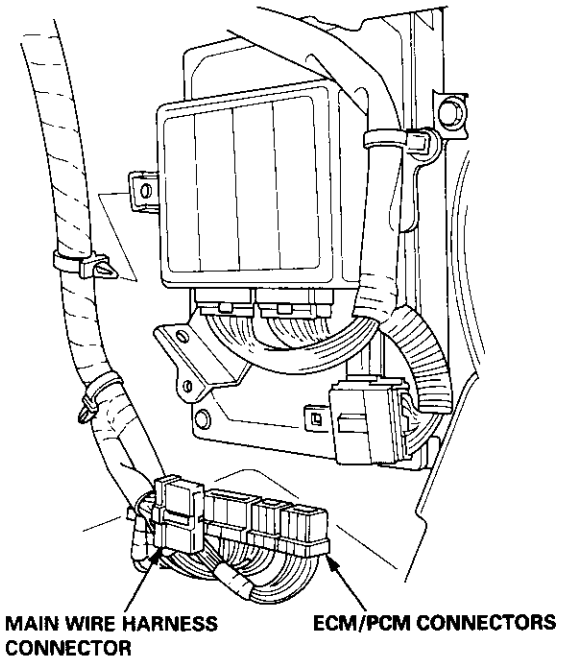
5. Remove the intake air duct and air cleaner housing.



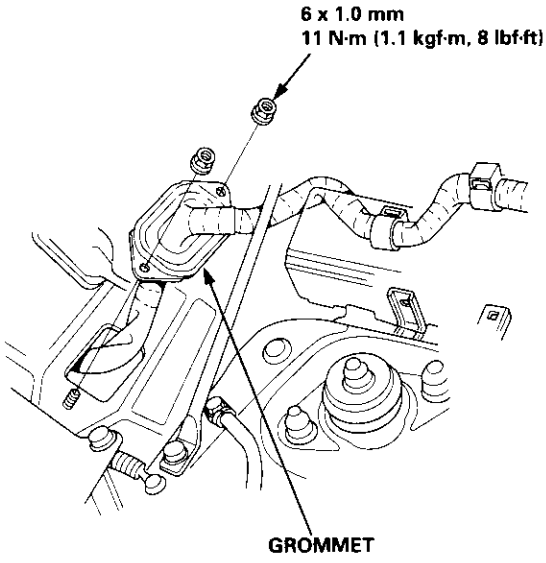
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6. Disconnect the engine control module (ECM)/powertrain control module (PCM) connectors from the ECM/PCM.

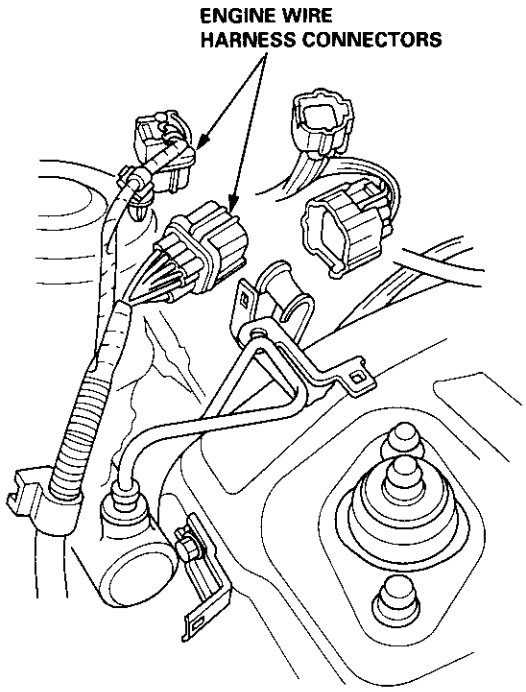
7. Disconnect the main wire harness connector.



8. Remove the grommet and wire harness clamps, then pull out the ECM/PCM connectors.



9. Disconnect the engine wire harness connectors on the left side of the engine compartment.



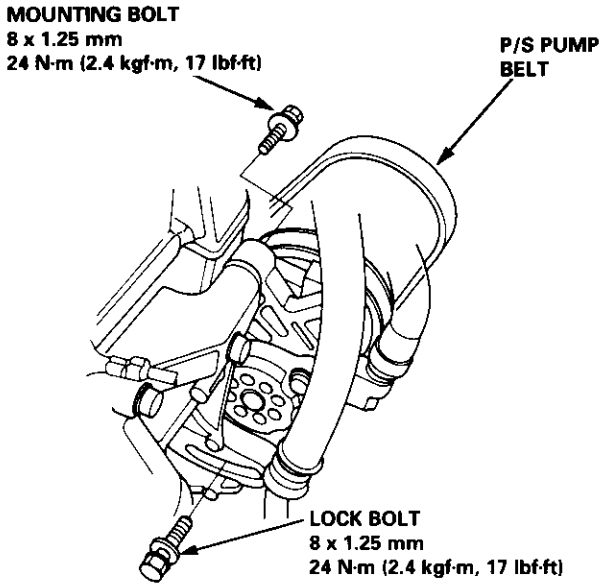
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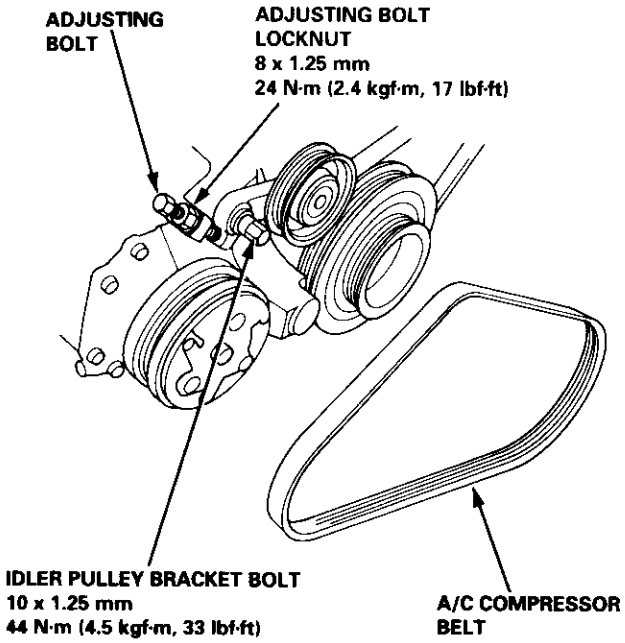
Removal (cont'd)

10. Remove the cruise control actuator (see section 4).

11. Remove the mounting bolt and lock bolt, then remove the P/S pump belt and pump.



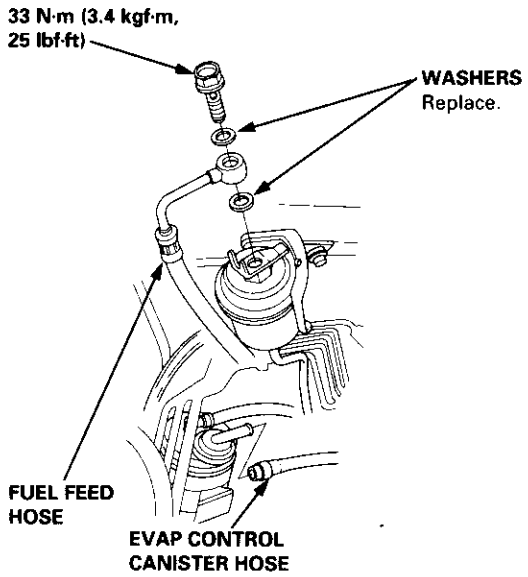
12. Loosen the idler pulley bracket bolt and adjusting bolt, then remove the air conditioning (A/C) compressor belt.



13. Relieve fuel pressure (see section 11).

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame or spark away from the work area. Drain fuel only into an approved container.

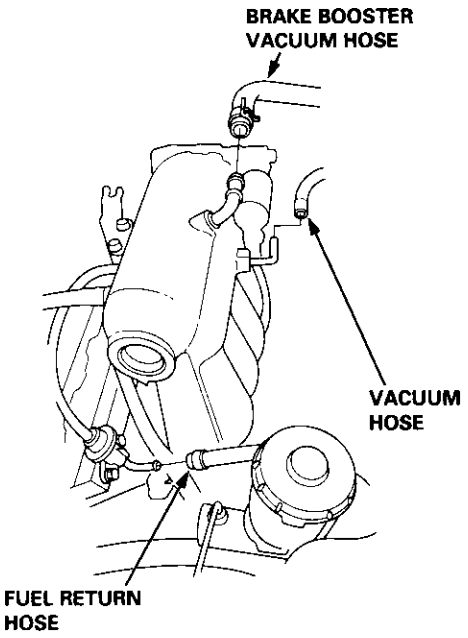
14. Remove the evaporative emission (EVAP) control canister hose and fuel feed hose.



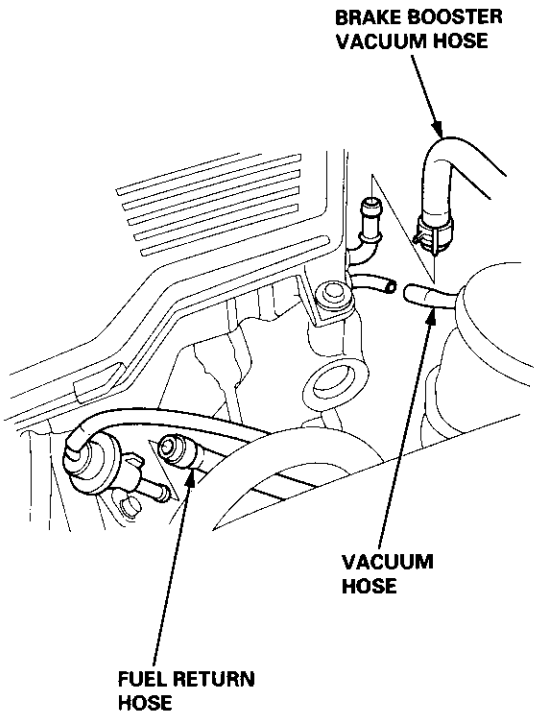
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15. Remove the brake booster vacuum hose, fuel return hose and vacuum hose.

'97 – 98 models:

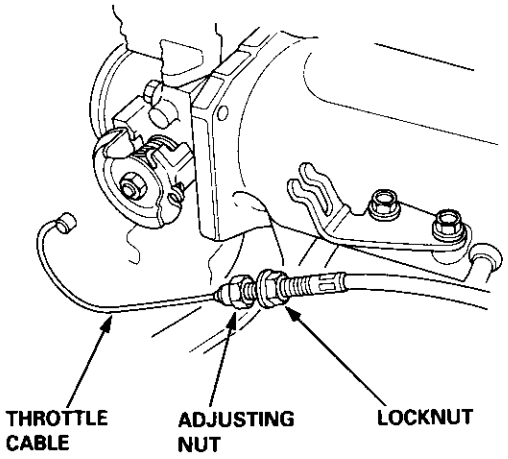


'99 – 00 models:

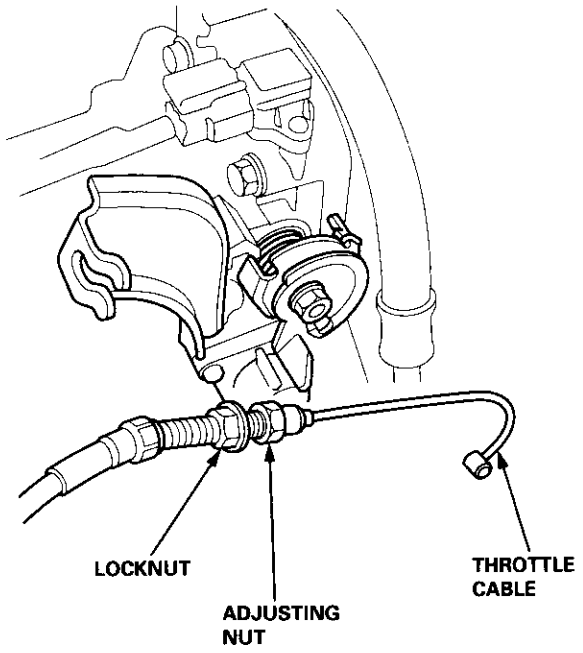


16. Remove the throttle cable by loosening the locknut, then slip the cable end out of the accelerator linkage. Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.

'97 – 98 models:



'99 – 00 models:

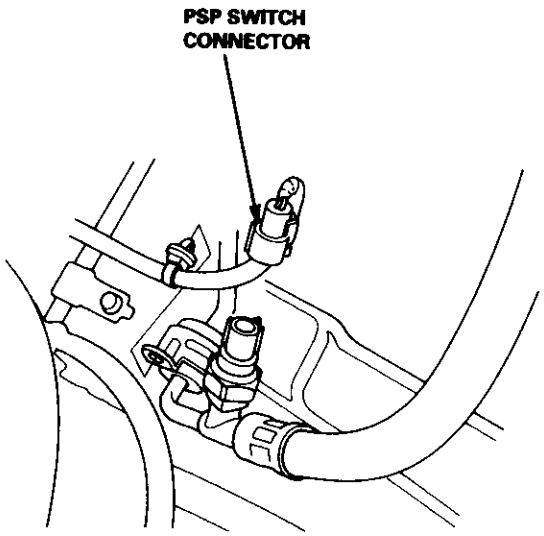


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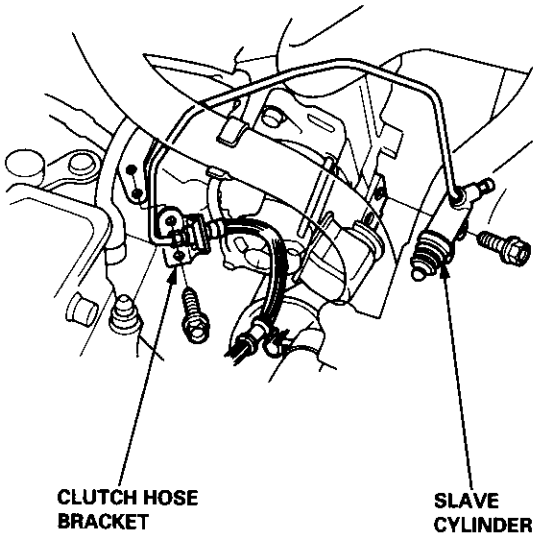
Removal (cont'd)

17. Disconnect the power steering pressure (PSP) switch connector, and remove the wire harness clamp.

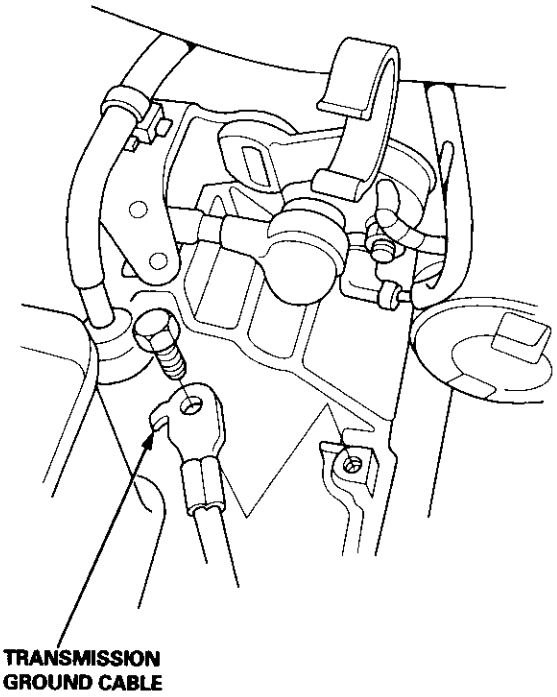


18. Remove the slave cylinder and clutch hose bracket (M/T).

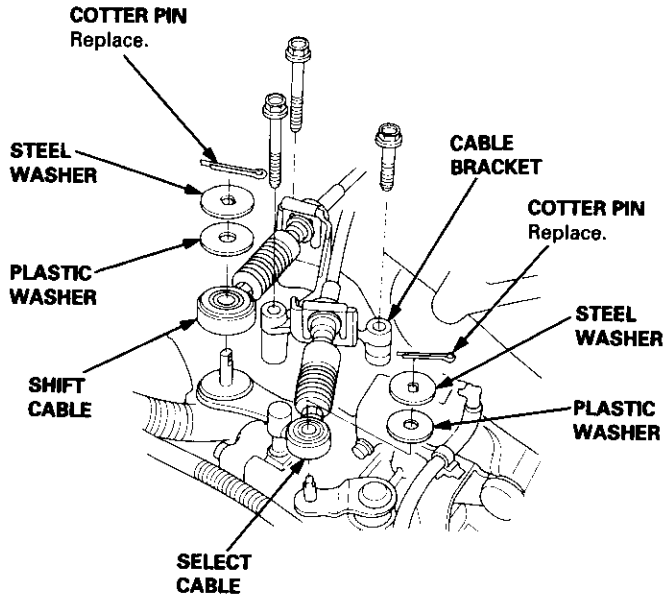
NOTE:
- Do not disconnect the pipe/hose assembly.
- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the pipe/hose assembly.



19. Disconnect the transmission ground cable (M/T).



20. Remove the cotter pins, then remove the steel washers, plastic washers, shift cable, and select cable from the levers (M/T).



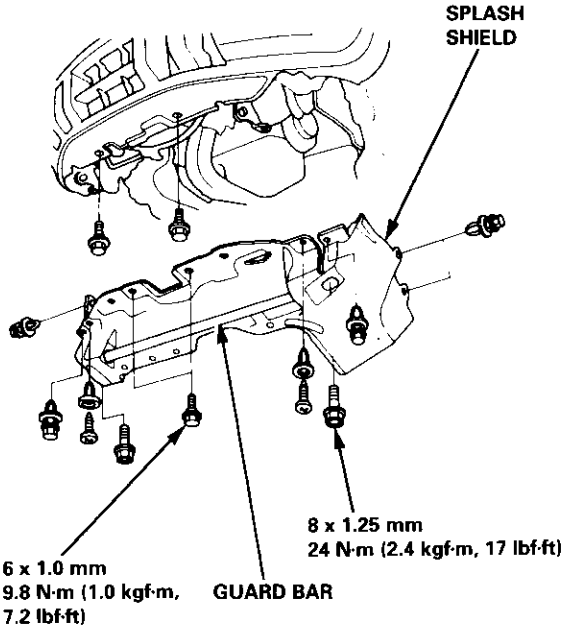
21. Remove the cable bracket from the clutch housing (M/T).

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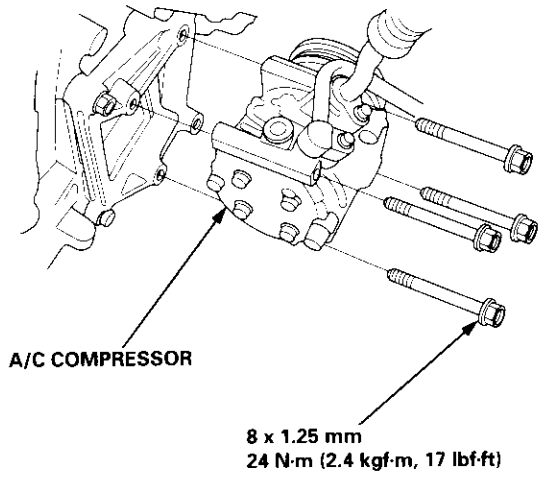
22. Remove the radiator cap.

⚠ WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

23. Raise the hoist to full height.
24. Remove the front tires/wheels.
25. Remove the guard bar and splash shield.

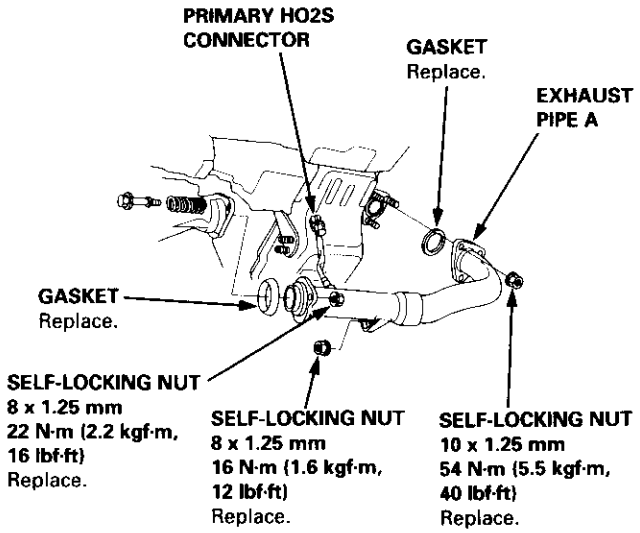


26. Loosen the drain plug in the radiator. Drain the engine coolant (see page 10-5).
27. Drain the transmission oil or fluid. Reinstall the drain plug using a new washer [see section 13 (M/T) or section 14 (A/T)].
28. Drain the engine oil. Reinstall the drain bolt using a new washer (see page 8-4).
29. Remove the A/C compressor. Do not disconnect the A/C hoses.

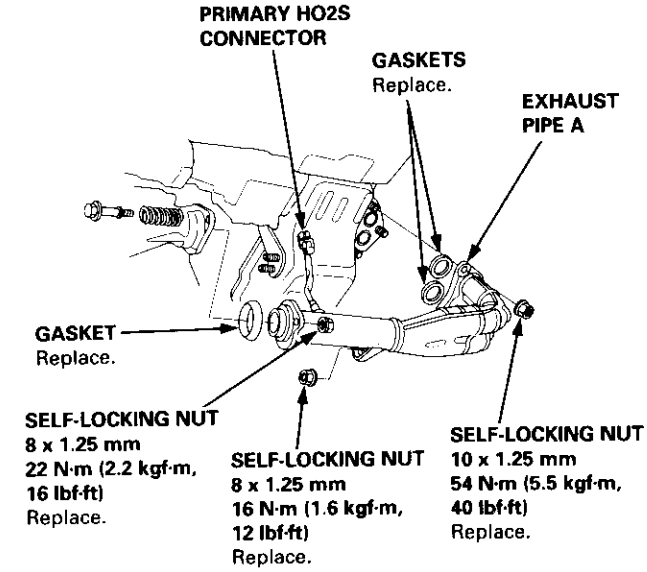


30. Disconnect the primary heated oxygen sensor (primary HO2S) connector, then remove exhaust pipe A.

'97 – 98 U.S. models (California):



'97 – 98 U.S. models (Except California):
'99 – 00 models:

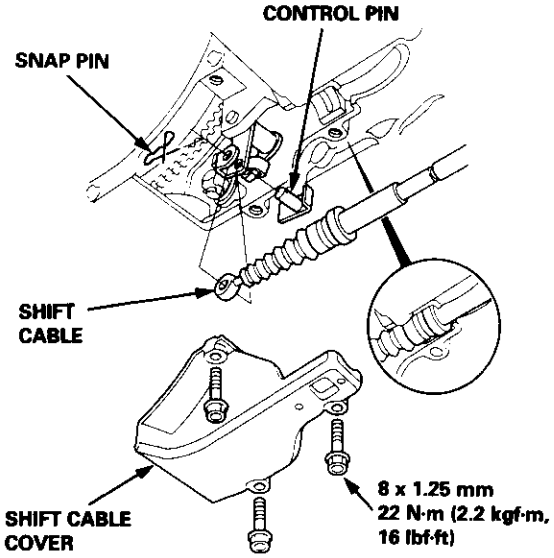


(cont'd)

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Removal (cont'd)

31. Remove the shift cable. Take care not to bend the cable when removing it. Always replace any kinked cable with new one (A/T).



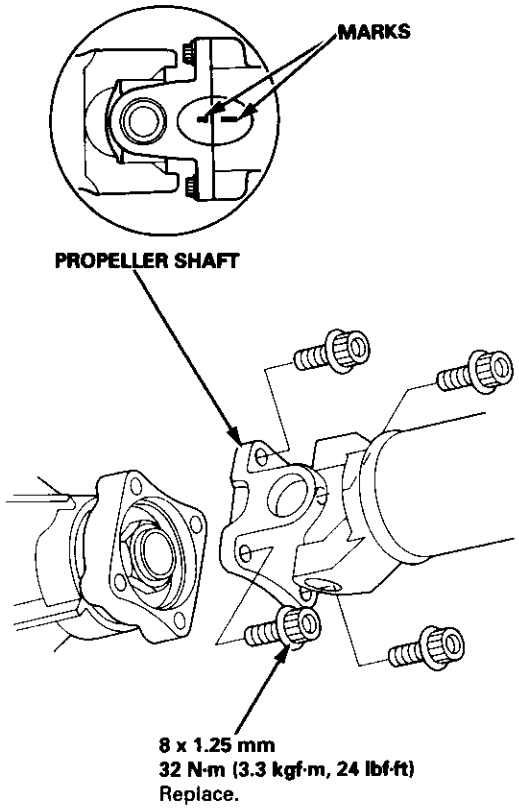
32. Remove the right damper fork (see section 18).

33. Disconnect the suspension lower arm ball joints (see section 18).

34. Remove the driveshafts (see section 16). Coat all precision-finished surface with clean engine oil. Tie plastic bags over the driveshaft ends.

35. Make marks on the transfer companion flange and propeller shaft as shown. Use these marks to set the propeller shaft in the proper position when reinstalling (4WD).

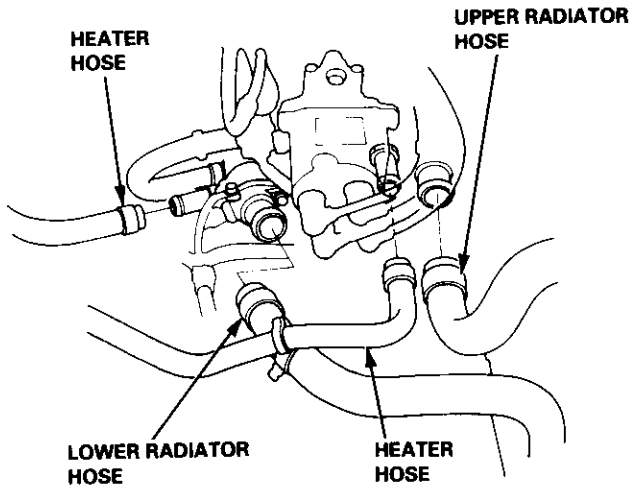
36. Remove the four bolts securing the propeller shaft, then separate the propeller shaft from the transfer companion flange (4WD).



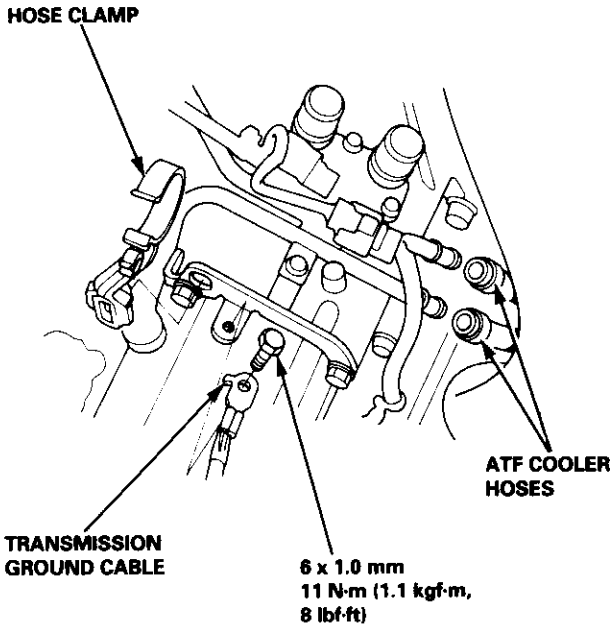
37. Lower the hoist.

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38. Remove the upper and lower radiator hoses and heater hoses.



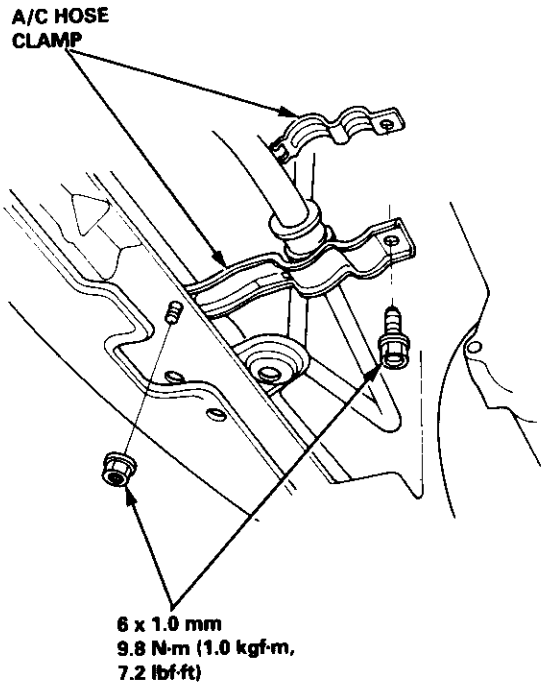
39. Remove the transmission ground cable and hose clamp (A/T).



40. Remove the ATF cooler hoses, then plug the ATF cooler hoses and lines (A/T).

41. Remove the radiator (see page 10-4).

42. Remove the A/C hose clamp.

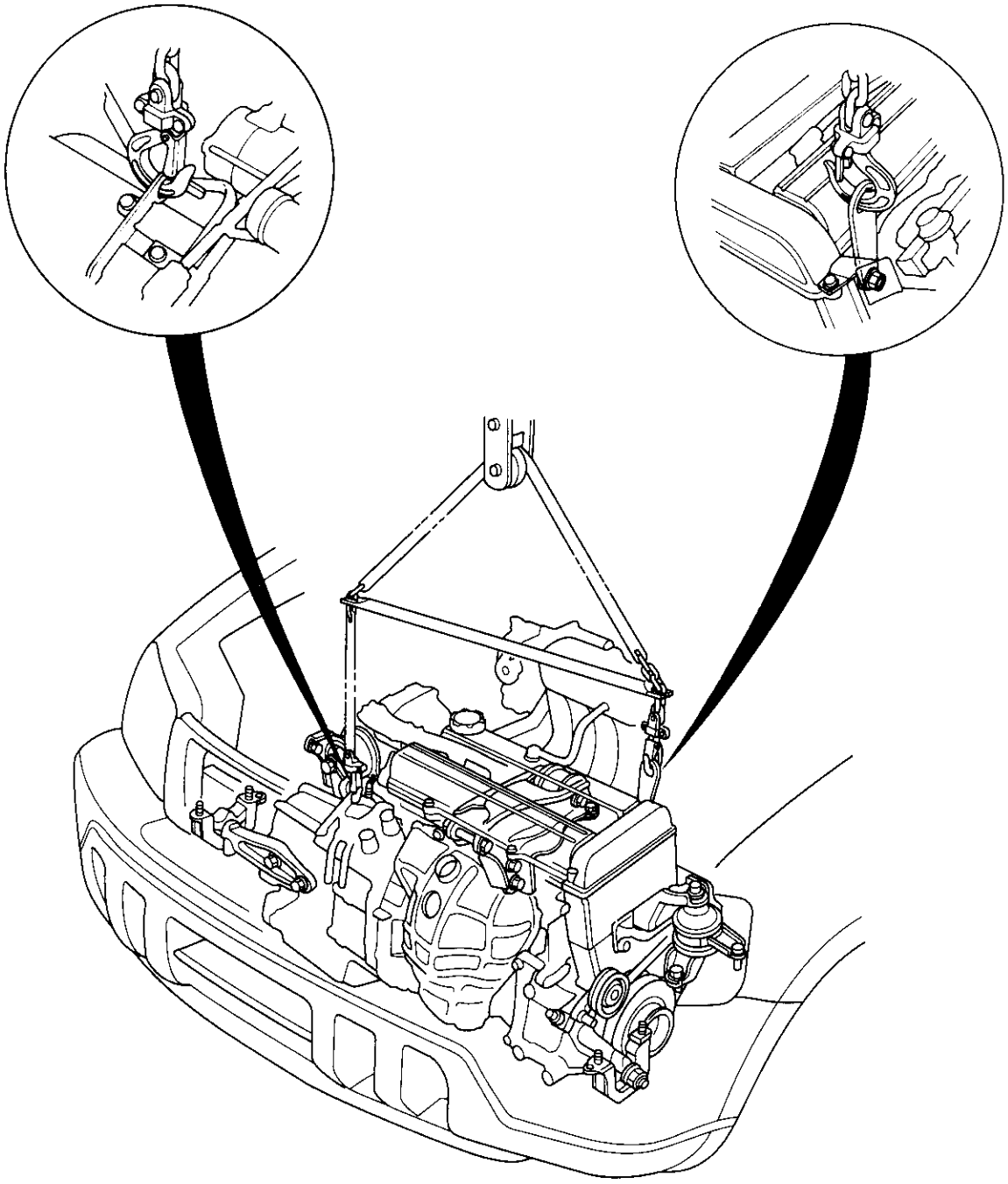


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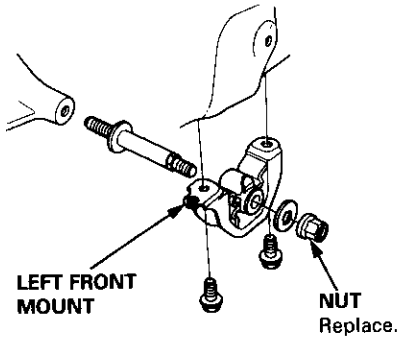
Removal (cont'd)

43. Attach the chain hoist to the engine.

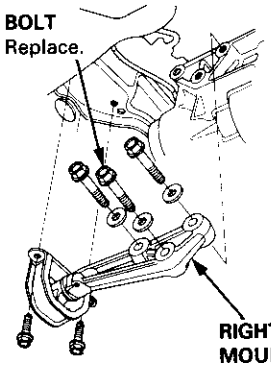


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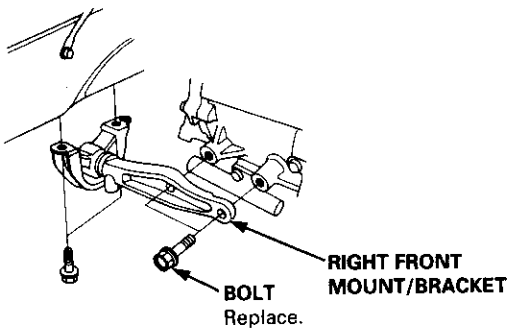
44. Remove the left and right front mounts and brackets.



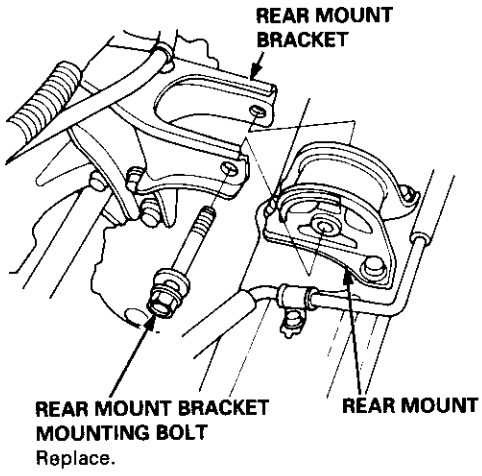
M/T:



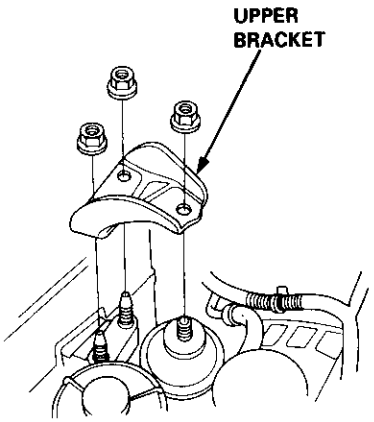
A/T:



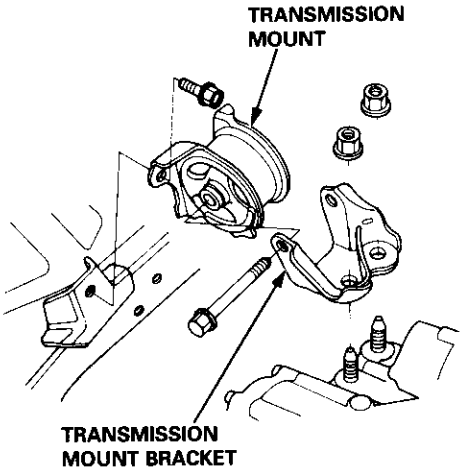
45. Remove the rear mount bracket mounting bolt.



46. Remove the upper bracket.



47. Remove the transmission mount bracket, then remove the transmission mount.



48. Check that the engine/transmission is completely free of vacuum hoses, fuel and coolant hoses, and electrical wiring.

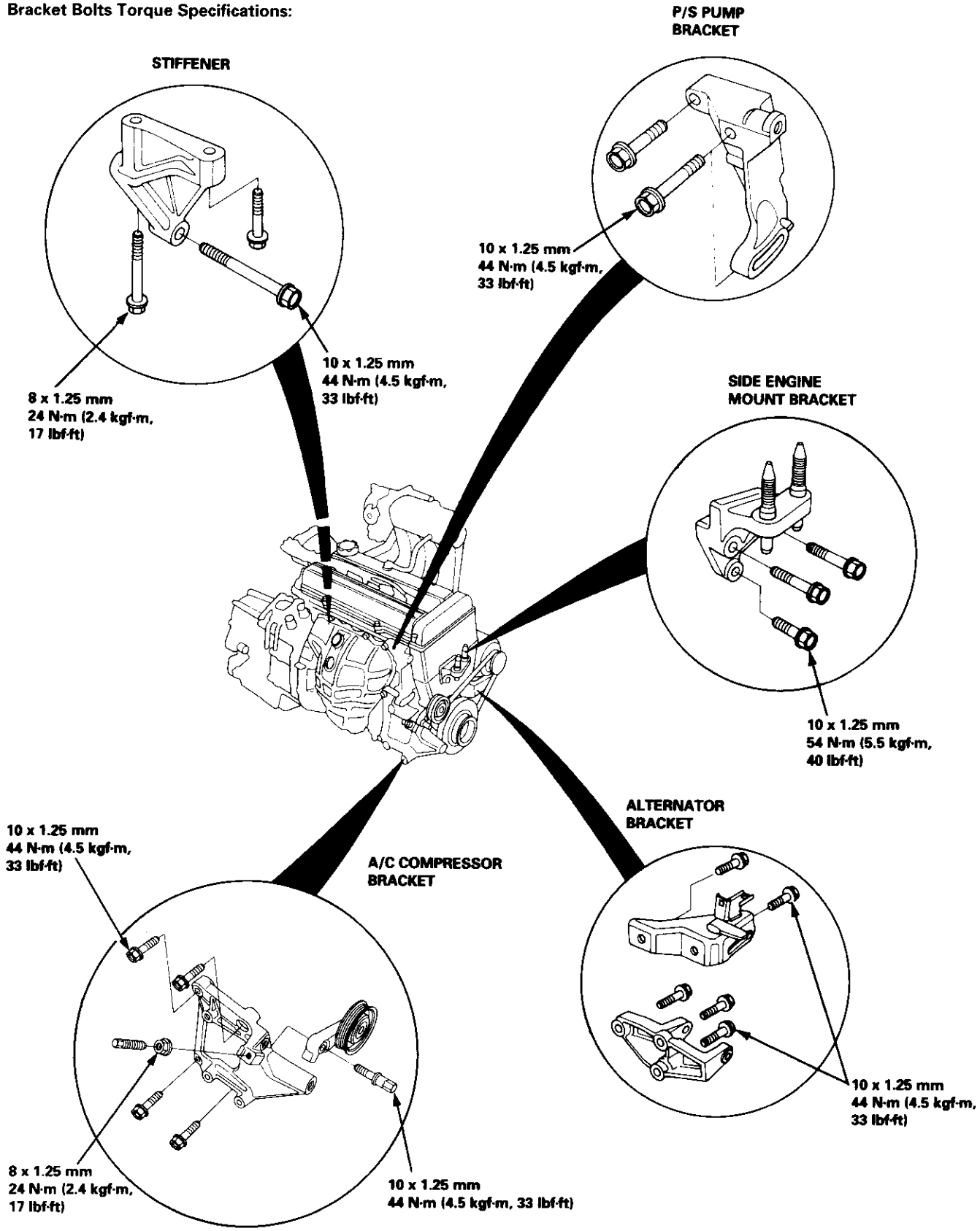
49. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine/transmission.

50. Raise the engine all the way, and remove it from the vehicle.

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Installation

Bracket Bolts Torque Specifications:



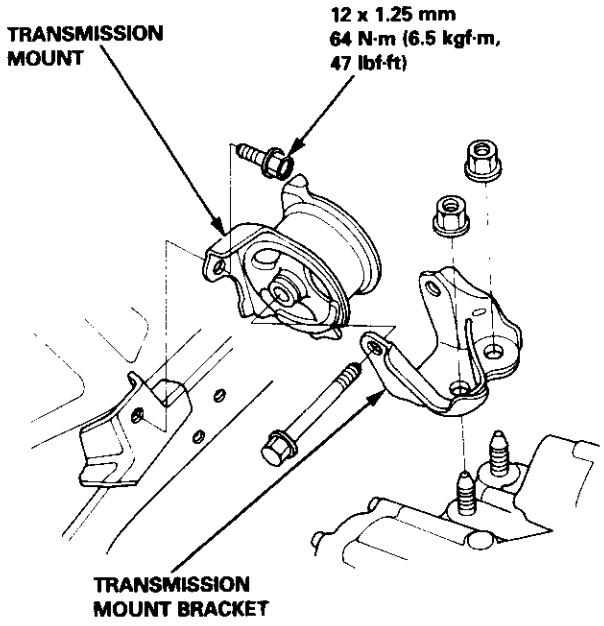
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Engine Installation:

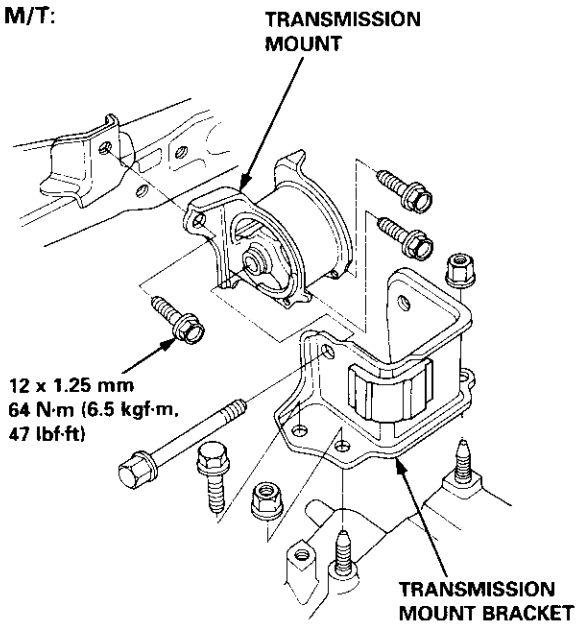
Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

1. Install the transmission mount and bracket, then tighten the bolts on the frame side. Do not tighten the bolts/nuts on the transmission side.

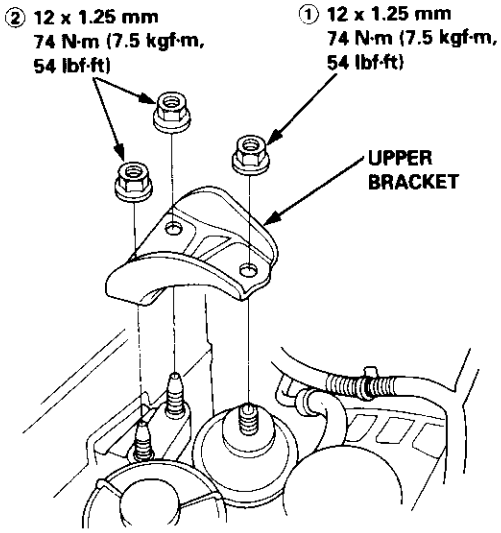
A/T:



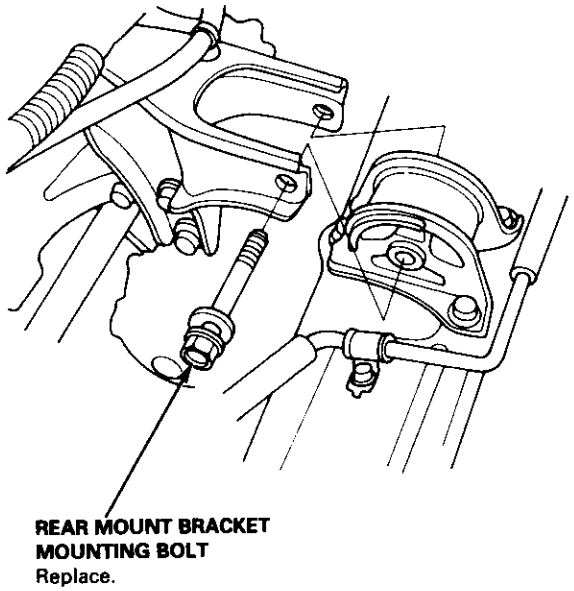
M/T:



2. Install the upper bracket, then tighten the nuts in the numbered sequence.



3. Install the rear mount bracket mounting bolt. Do not tighten the bolt.



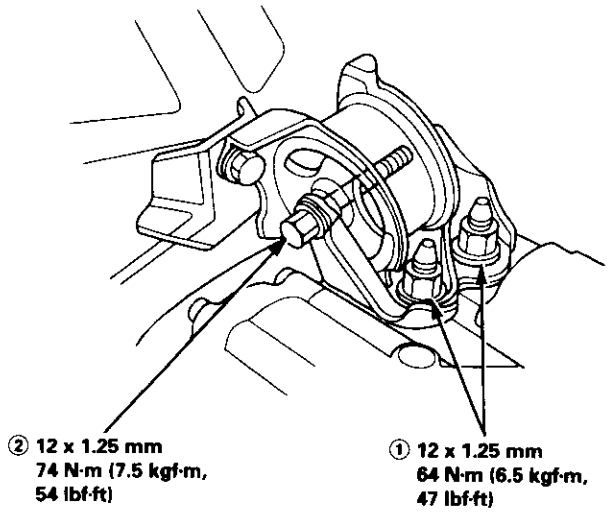
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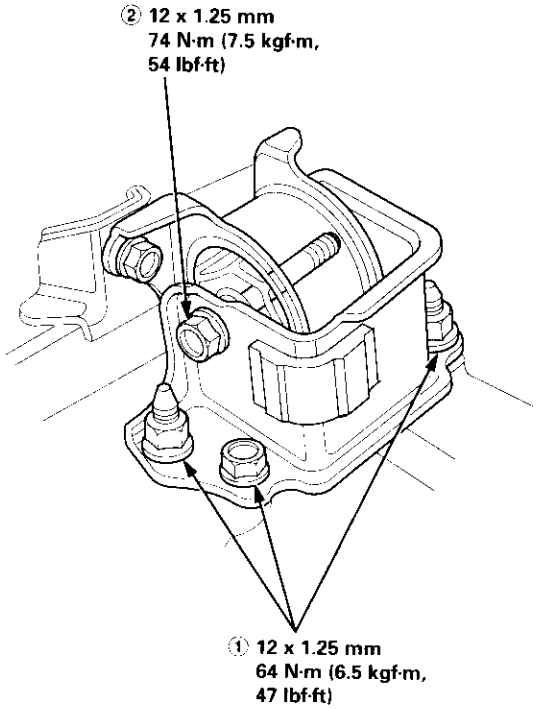
Installation (cont'd)

4. Tighten the bolt/nuts on the transmission mount bracket in the numbered sequence.

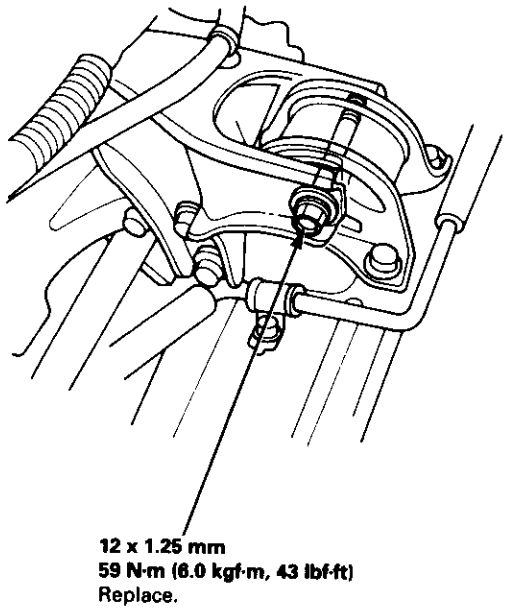
A/T:



M/T:



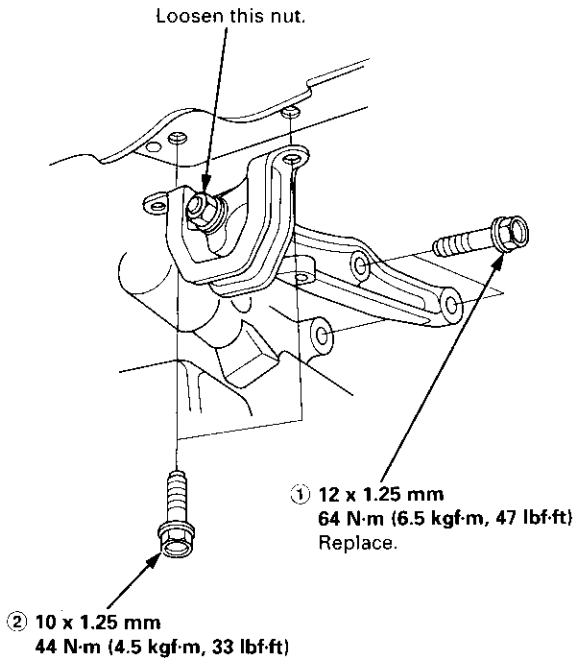
5. Tighten the rear mount bracket mounting bolt.



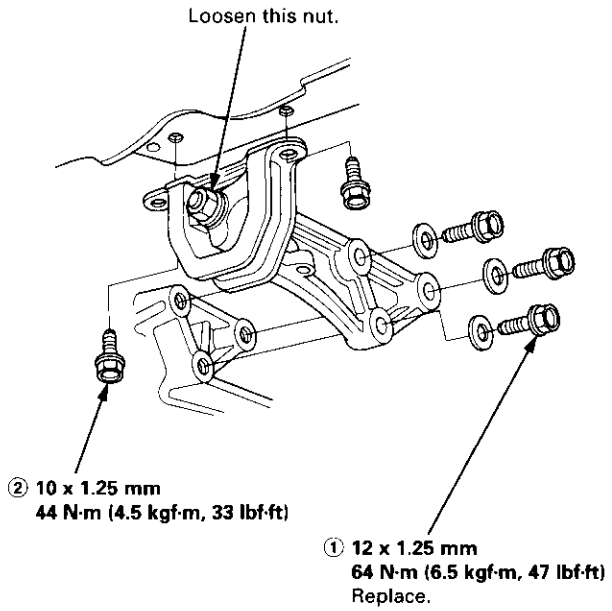
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6. Install the right front mount/bracket, then tighten the bolts in the numbered sequence.

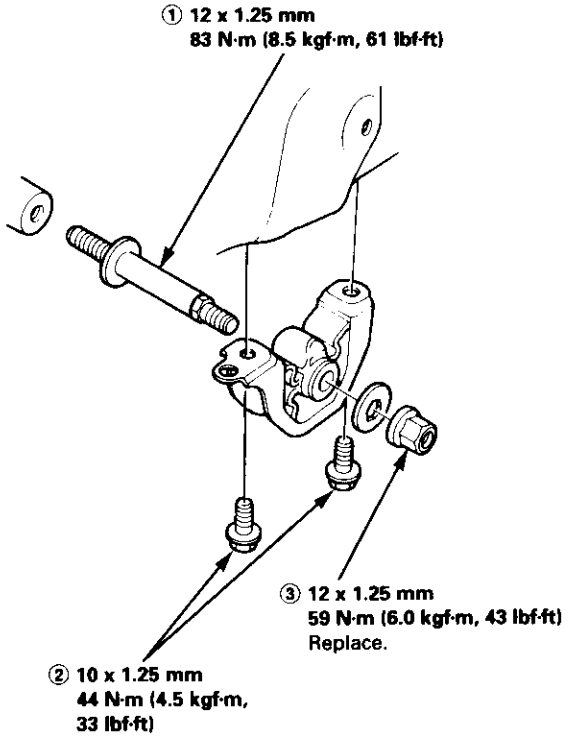
A/T:



M/T:



7. Install the left front mount, then tighten the bolts/nut in the numbered sequence.



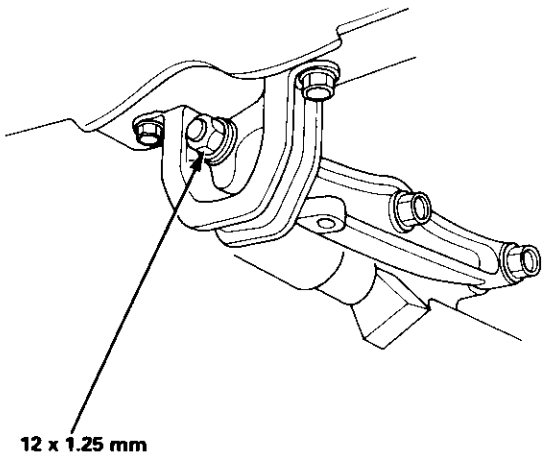
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Installation (cont'd)

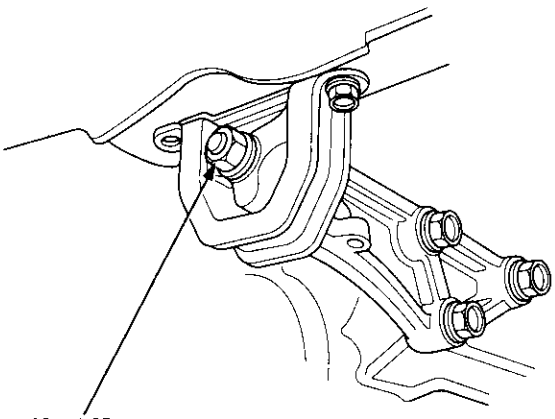
8. Tighten the nut on the right front mount.

A/T:



12 x 1.25 mm
59 N·m (6.0 kgf·m, 43 lbf·ft)
Replace.

M/T:



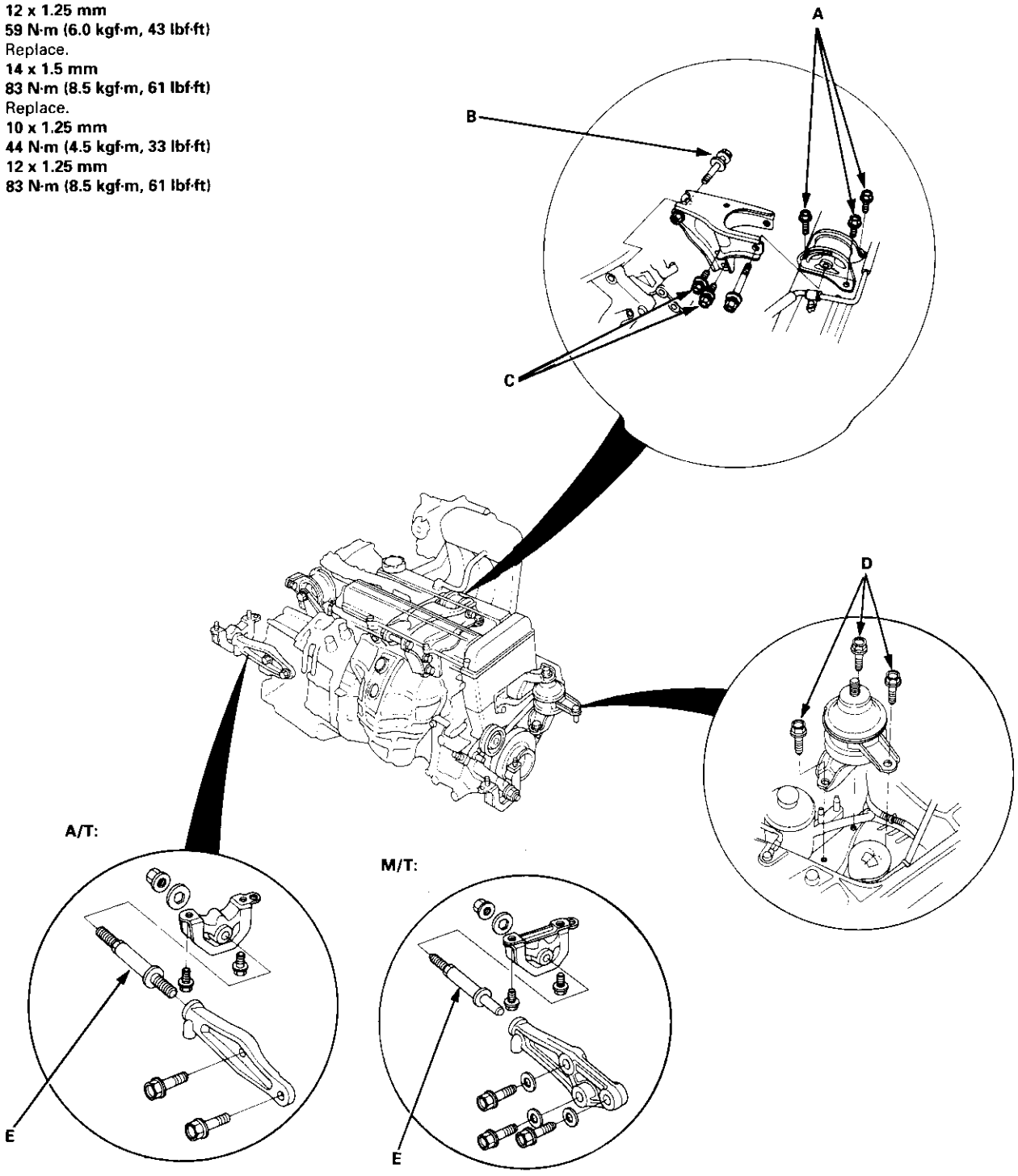
12 x 1.25 mm
59 N·m (6.0 kgf·m, 43 lbf·ft)
Replace.

9. Perform the following checks and adjustments:
   - Check that the spring clip on the ends of the driveshaft and intermediate shaft clicks into place. Use new spring clips.
   - Adjust the shift cable (see section 14).
   - Adjust the throttle cable (see section 11).
   - Refill the engine with engine oil (see page 8-4).
   - Refill the transmission with oil or fluid (see section 13 or 14).
   - Refill the radiator with engine coolant (see page 10-5).
   - Bleed air from the cooling system with the heater valve open (see page 10-5).
   - Clean the battery posts and cable terminals with sandpaper, assemble them, then apply grease to prevent corrosion.
   - Inspect for fuel leakage (see section 11).
     After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes.
     Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.

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Mount and Bracket Bolts/Nuts Torque Value Specifications:

A: **10 x 1.25 mm**
64 N·m (6.5 kgf·m, 47 lbf·ft)
B: **12 x 1.25 mm**
59 N·m (6.0 kgf·m, 43 lbf·ft)
Replace.
C: **14 x 1.5 mm**
83 N·m (8.5 kgf·m, 61 lbf·ft)
Replace.
D: **10 x 1.25 mm**
44 N·m (4.5 kgf·m, 33 lbf·ft)
E: **12 x 1.25 mm**
83 N·m (8.5 kgf·m, 61 lbf·ft)



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Cylinder Head/Valve Train

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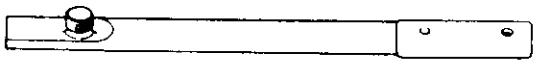
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Special Tools

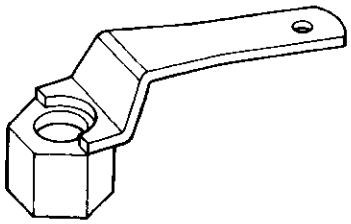
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAA – 001020A	Socket, 19 mm	1	6-7
②	07JAB – 001020A	Holder Handle	1	6-7
③	07MAB – PY3010A	Pulley Holder Attachment, 50 mm, Offset	1	6-7
④	07757 – PJ1010A	Valve Spring Compressor Attachment	1	6-23, 29
⑤	07942 – 6570100	Valve Guide Driver, 6.6 mm	1	6-25, 26
⑥	07984 – 657010D	Valve Guide Reamer, 6.6 mm	1	6-27



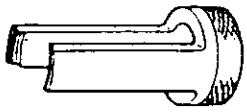
①



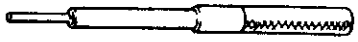
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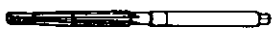
③



④



⑤



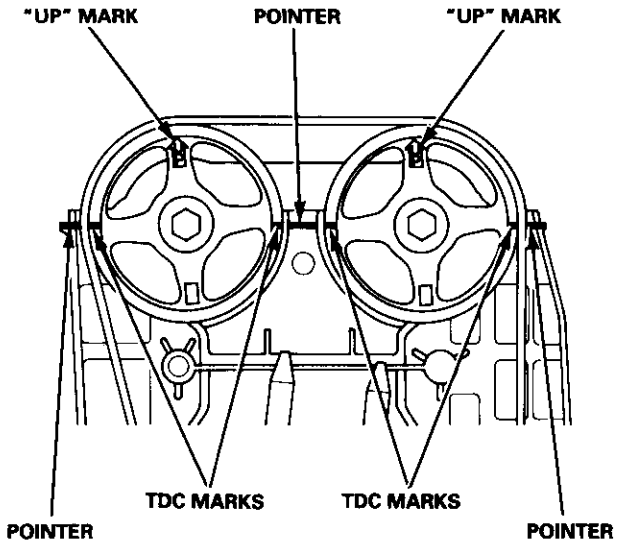
⑥

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Adjustment

Adjust the valves only when the cylinder head temperature is less than 100°F (38°C).

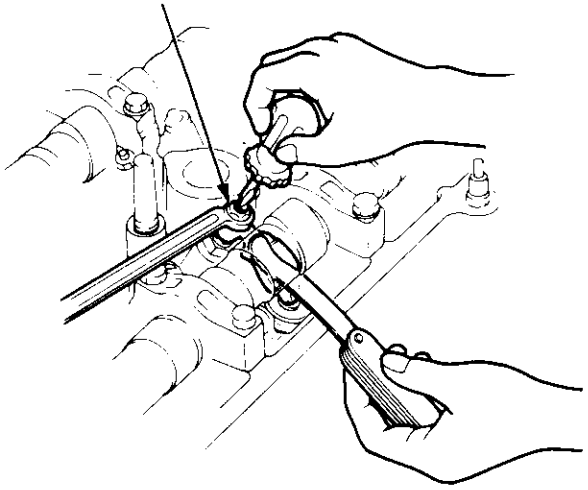
1. Remove the cylinder head cover.
2. Remove the middle cover (see page 6-11).
3. Set the No. 1 piston at TDC. The "UP" mark on the pulleys should be at the top, and the TDC marks on the pulleys should align with the pointers on the back cover.



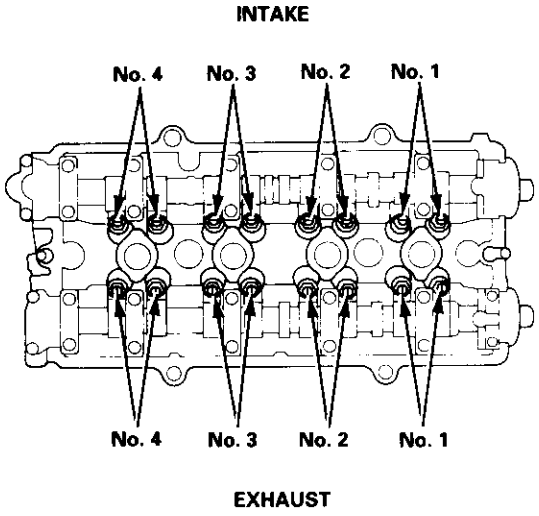
4. Adjust the valves on No. 1 cylinder.

   Intake: 0.08 – 0.12 mm (0.003 – 0.005 in)
   Exhaust: 0.16 – 0.20 mm (0.006 – 0.008 in)

5. Loosen the locknut, and turn the adjustment screw until the feeler gauge slides back and forth with a slight amount of drag.



Adjusting Screw Locations:

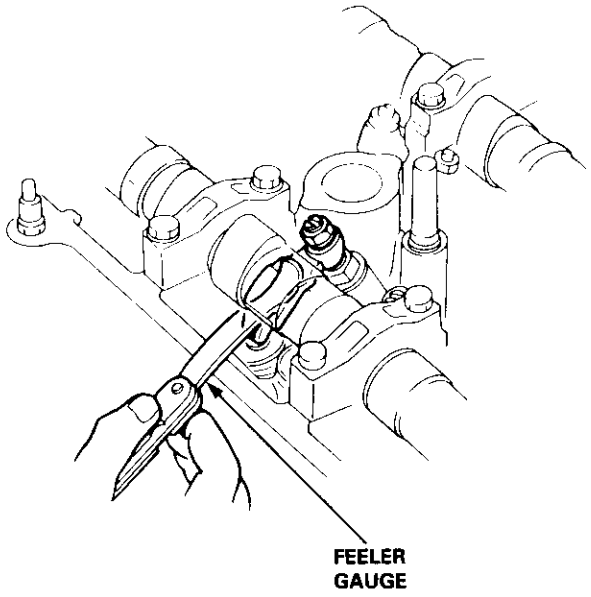


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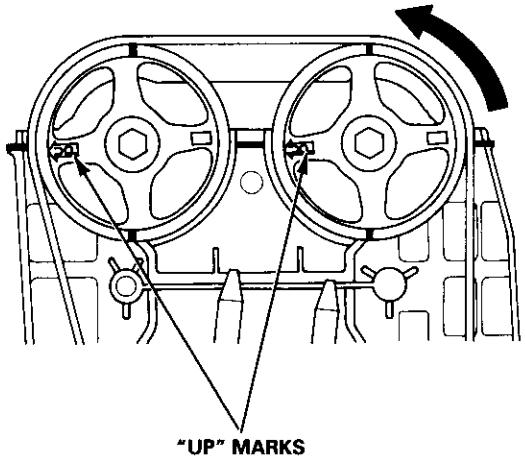
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Adjustment (cont'd)

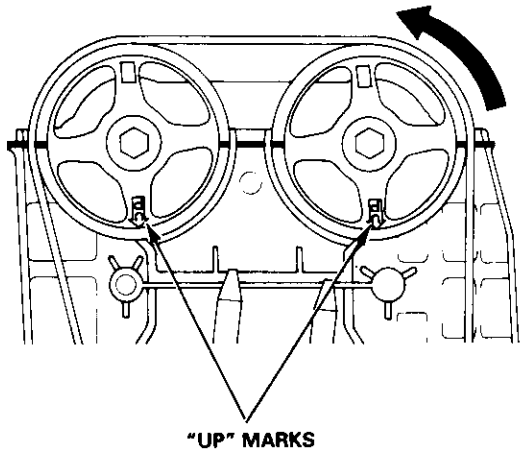
6. Tighten the locknut, and check the clearance again. Repeat the adjustment if necessary.



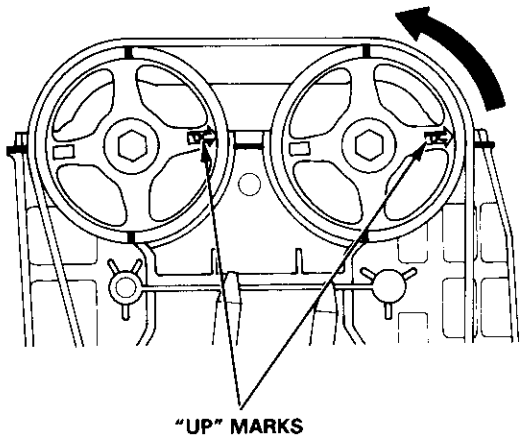
7. Rotate the crankshaft 180° counterclockwise (camshaft pulley turns 90°).
The "UP" marks should be on the exhaust side. Adjust the valves on No. 3 cylinder.



8. Rotate the crankshaft 180° counterclockwise to bring No. 4 piston to TDC.
The "UP" marks should be pointing straight down. Adjust the valves on No. 4 cylinder.



9. Rotate the crankshaft 180° counterclockwise to bring No. 2 piston to TDC.
The "UP" marks should be on the intake side. Adjust the valves on No. 2 cylinder.



10. Install the cylinder head cover (see page 6-32).

11. Retorque the crankshaft pulley bolt (see page 6-7).

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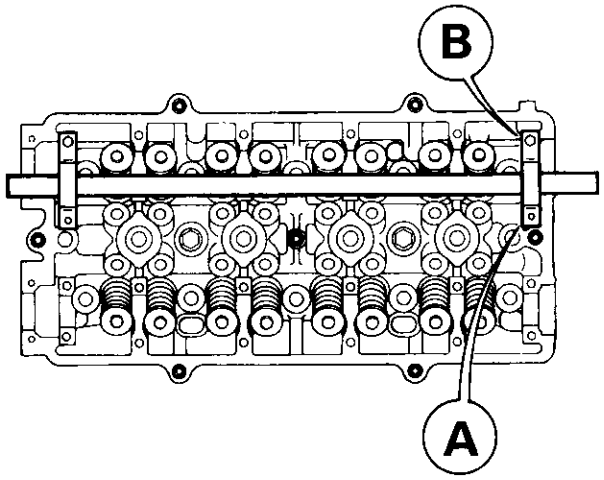
Replacement (cylinder head removal not required)

The procedure shown below applies when using the in-car valve spring compressor (Snap-on YA8845 with YA8845-2A 7/8" attachment). Use approved eye protection.

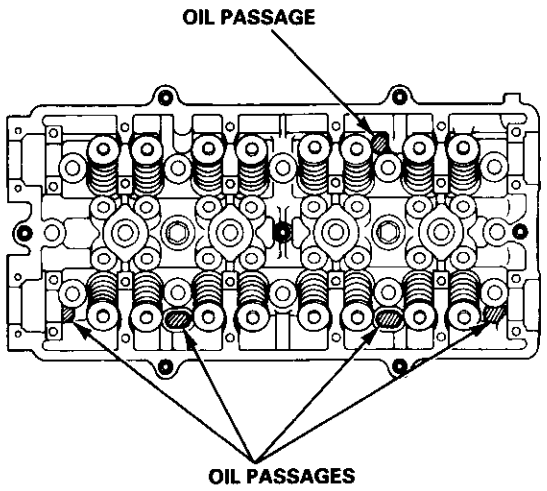
1. Turn the crankshaft so that the No. 1 and the No. 4 pistons are at top dead center (TDC).
2. Remove the cylinder head cover.
3. Remove the distributor.
4. Loosen and disconnect the timing belt from the camshaft pulleys.
5. Remove the camshaft holder bolts, then remove the camshaft holders, the camshafts and rocker arms.

Intake Valve Seals

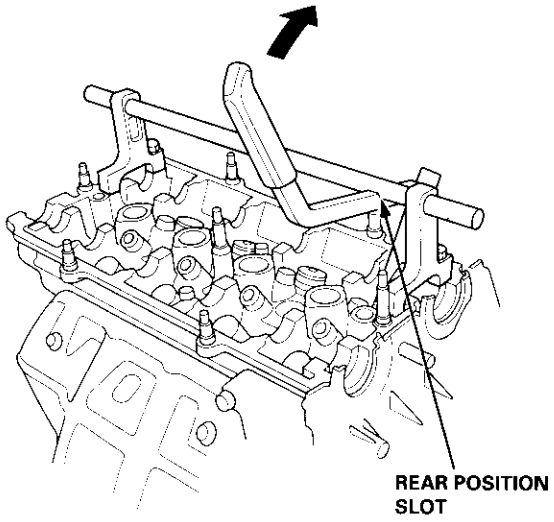
6. Using the 6 mm bolts supplied with the tool, mount the two uprights to the cylinder head at the end camshaft holders. The uprights fit as shown.
7. Insert the cross shaft through the top hole of the two uprights.



8. Select the 7/8 in. diameter long compressor attachment, and fasten the attachment to the front hole of the lever arm with the speed pin supplied.
9. Position the piston at TDC, and insert an air adaptor into the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing the springs and removing the valve keepers.
10. Put shop towels over the oil passages to prevent the valve keepers from falling into the cylinder head.



11. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the rear position slot on the lever as shown.



(cont'd)

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Replacement (cylinder head removal not required) (cont'd)

12. Using an upward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.

13. Repeat step 11 for the other valve in that cylinder.

14. Remove the valve seals (see page 6-24).

15. Install the valve seals (see page 6-29).

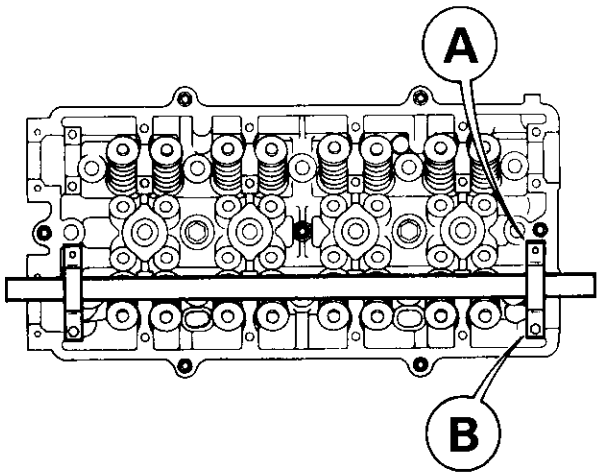
16. Install the springs, the retainers and the keepers in reverse order of removal.

17. Repeat steps 9 to 16 for the other three cylinders.

Exhaust Valve Seals

18. Using the 6 mm bolts supplied with the tool, mount the two uprights to the cylinder head at the end camshaft holders. The uprights fit as shown.

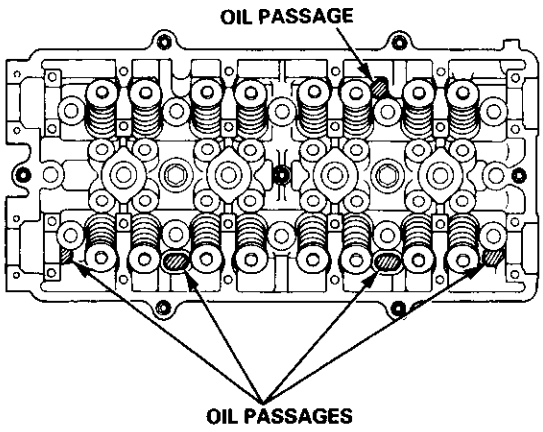
19. Insert the cross shaft through the bottom hole of the two uprights.



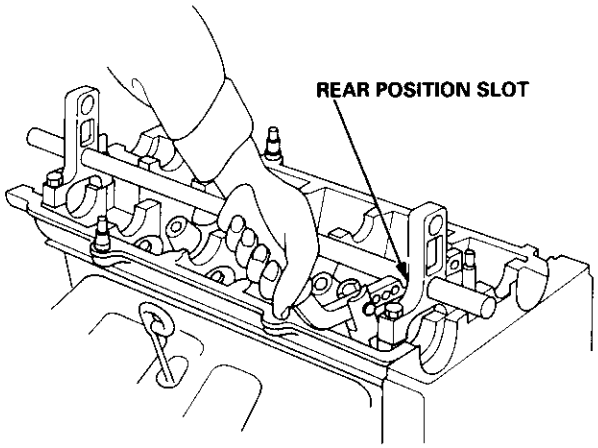
20. Select the 7/8 in. diameter short compressor attachment, and fasten the attachment to the No. 4 hole of the lever arm with the speed pin supplied.

21. Position the piston at TDC, and insert an air adaptor into the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing the springs and removing the valve keepers.

22. Put shop towels over the oil passages to prevent the valve keepers from falling into the cylinder head.



23. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the rear position slot on the lever as shown.



24. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.

25. Repeat step 24 for the other valve in that cylinder.

26. Remove the valve seals (see page 6-24).

27. Install the valve seals (see page 6-29).

28. Install the springs, the retainers and the keepers in reverse order of removal.

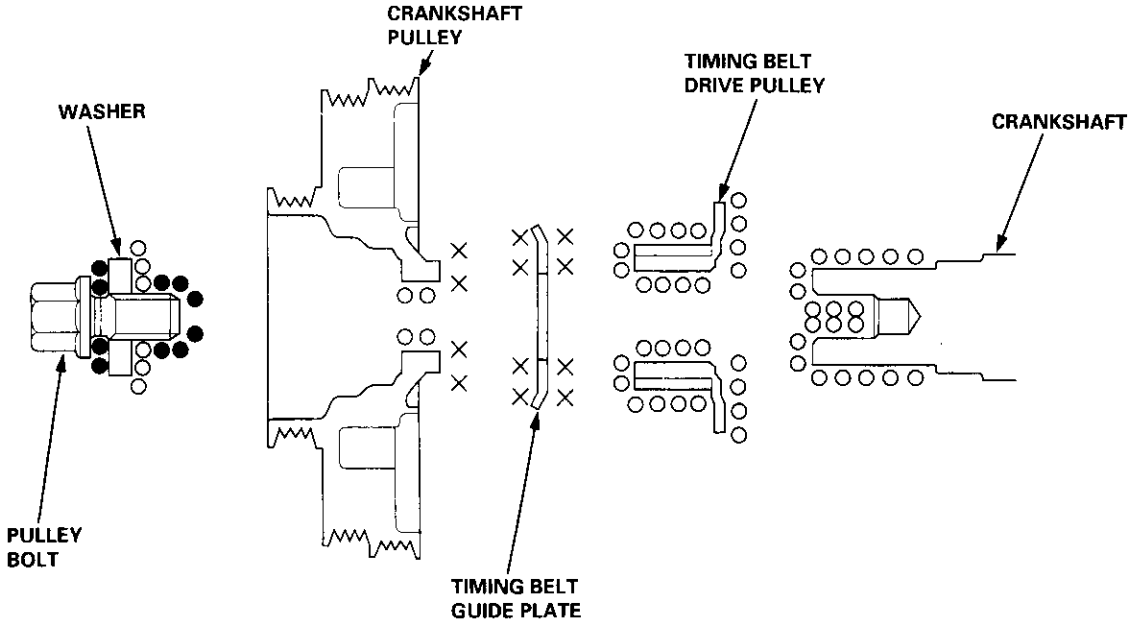
29. Repeat steps 21 to 28 on the other three cylinders.

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Replacement

When installing and tightening the pulley, follow the procedure below.

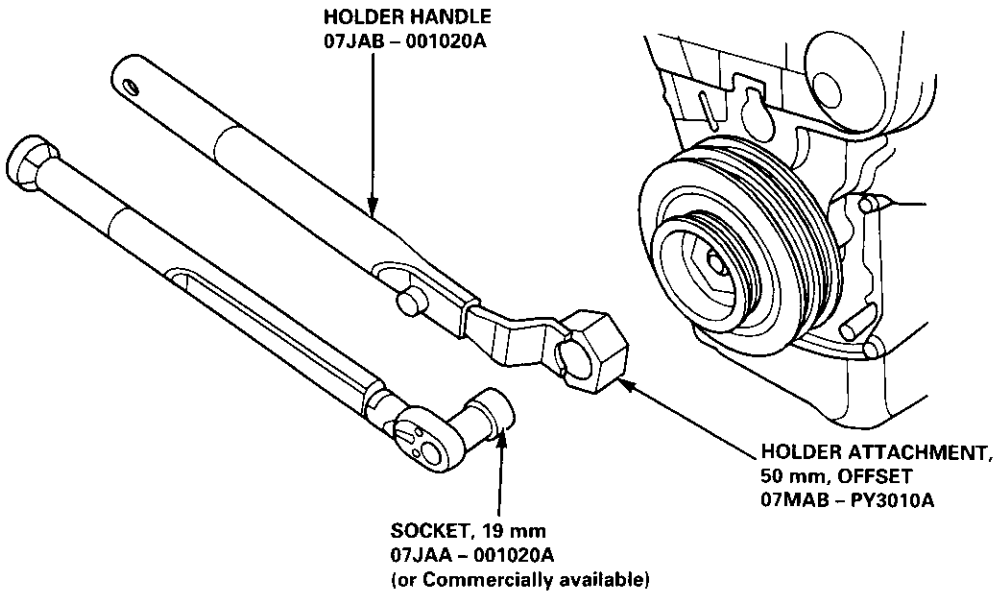
Clean, remove any oil, and lubricate points shown below.
○: Clean
x : Remove any oil
●: Lubricate



Crankshaft pulley bolt size and torque value:

14 x 1.25 mm
177 N·m (18.0 kgf·m, 130 lbf·ft)

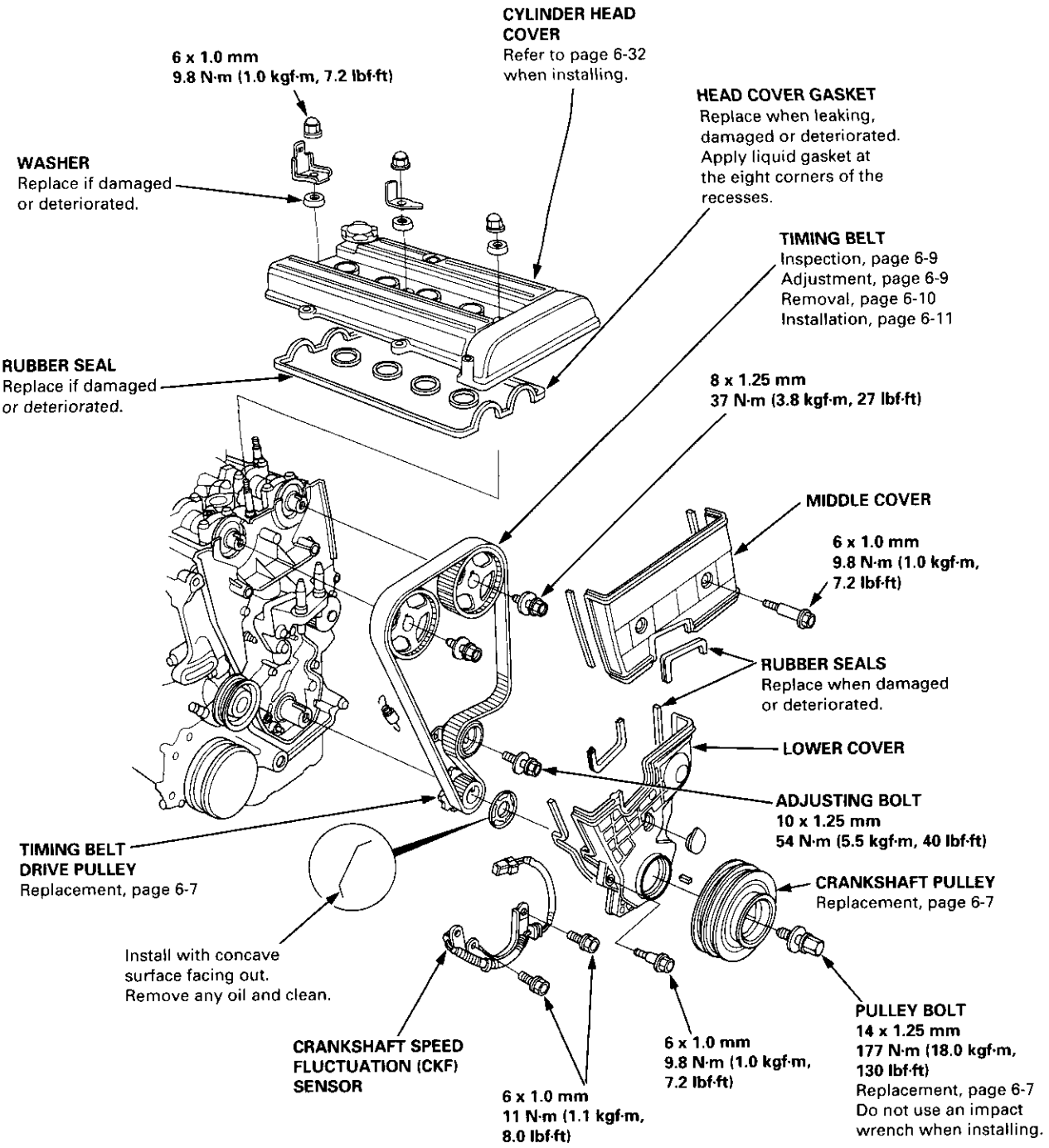
NOTE: Do not use an impact wrench when installing.



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Timing Belt

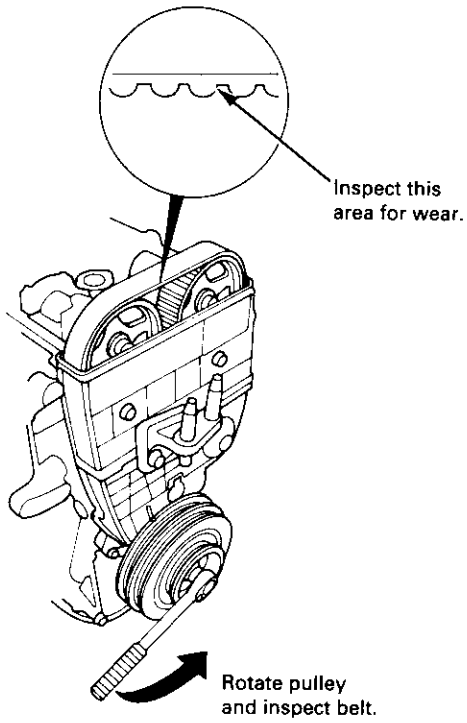
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Inspection

1. Remove the cylinder head cover.
2. Inspect the timing belt for cracks and oil or coolant soaking. Replace the belt if it is oil or coolant soaked. Remove any oil or solvent that gets on the belt.

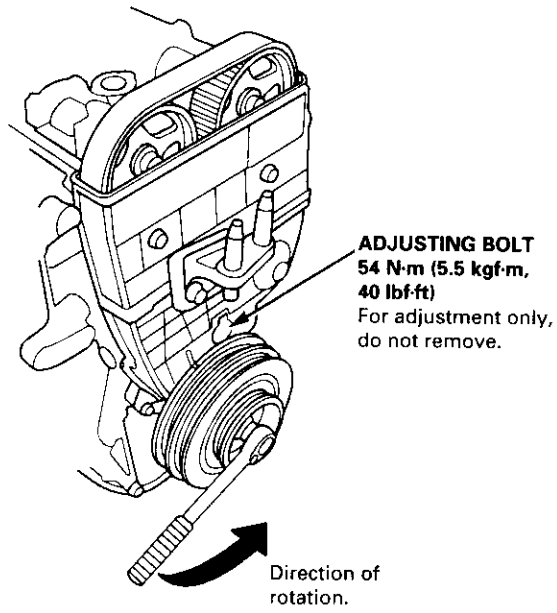


3. After inspecting, retorque the crankshaft pulley bolt to 177 N·m (18.0 kgf·m, 130 lbf·ft).
4. Install the cylinder head cover (see page 6-32).

Tension Adjustment

NOTE:
- Always adjust the timing belt tension with the engine cold.
- Always rotate the crankshaft counterclockwise when viewed from the pulley side. Rotating it clockwise may result in improper adjustment of the belt tension.

1. Remove the cylinder head cover.
2. Set the No. 1 piston at TDC (see page 6-12).
3. Rotate the crankshaft five or six revolutions to set the belt.
4. Set the No. 1 piston at TDC.
5. Loosen the adjusting bolt 1/2 turn (180°) only.



6. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley.
7. Tighten the adjusting bolt to the specified torque.
8. After adjusting, retorque the crankshaft pulley bolt to 177 N·m (18.0 kgf·m, 130 lbf·ft).
9. Install the cylinder head cover (see page 6-32).

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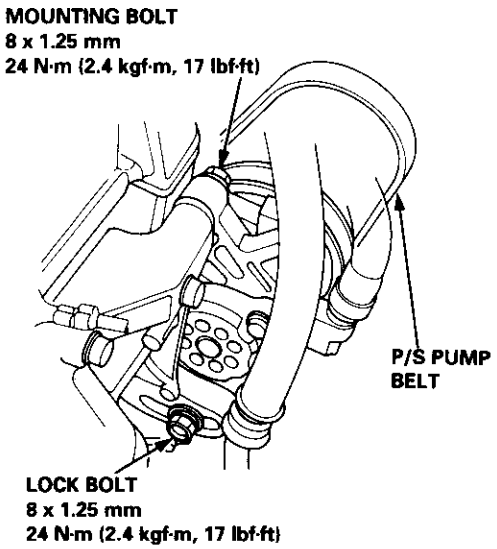
Removal

Replace the timing belt at 105,000 miles (168,000 km) according to the maintenance schedule (normal conditions/severe conditions). If the vehicle is regularly driven in either of the following conditions, replace the timing belt at 60,000 miles (U.S.A.) 100,000 km (Canada).
— In very high temperatures (over 110°F, 43°C).
— In very low temperatures (under –20°F, –29°C).

1. Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC).

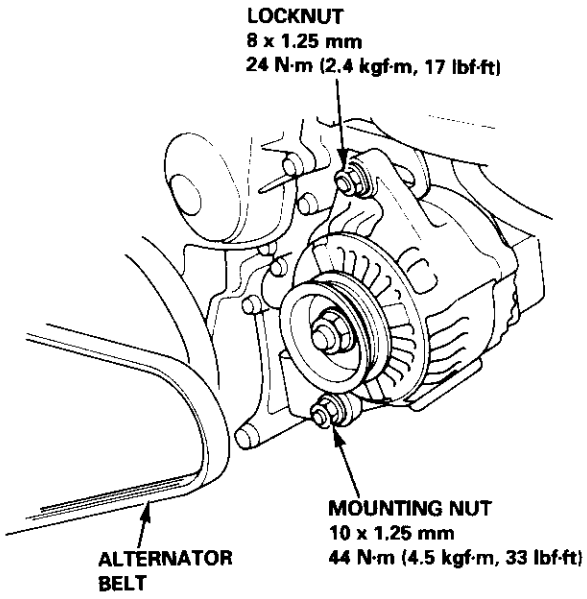
2. Remove the guard bar and splash shield (see page 5-7).

3. Loosen the mounting bolt and lock bolt, then remove the power steering (P/S) pump belt.



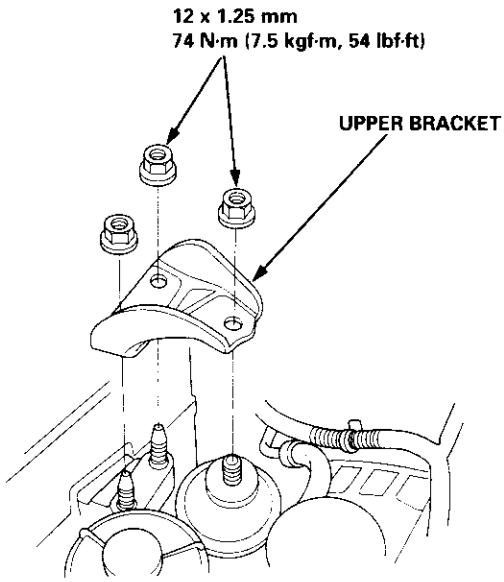
4. Loosen the idler pulley bracket bolt and adjusting bolt, then remove the air conditioning (A/C) compressor belt (see page 5-4).

5. Loosen the mounting nut and locknut, then remove the alternator belt.



6. Remove the cruise control actuator (see section 4).

7. Support the engine with a jack, then remove the upper bracket. Make sure to place a cushion between the oil pan and the jack.



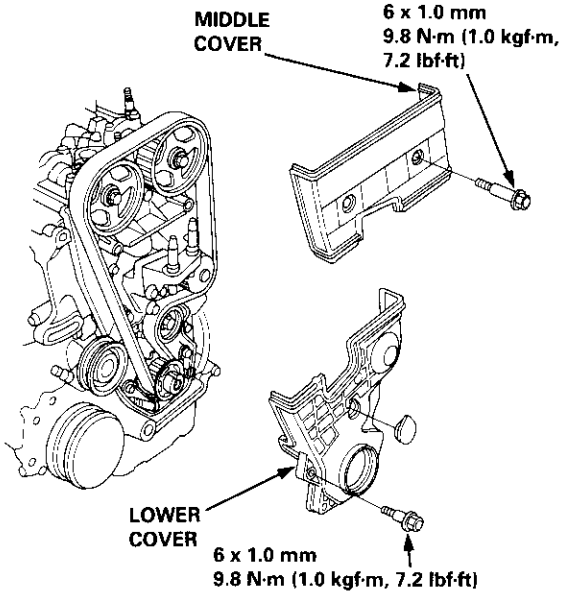
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8. Remove the cylinder head cover.

   NOTE: Refer to page 6-32 when installing the cylinder head cover.

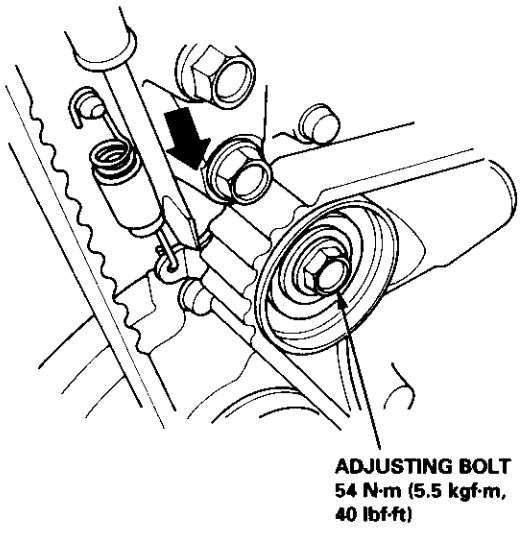
9. Remove the crankshaft pulley (see page 6-7).

10. Remove the middle cover and lower cover. Do not use these covers to store removed items.



11. Mark the direction of rotation on the timing belt.

12. Loosen the adjusting bolt 180°. Push the tensioner to remove tension from the timing belt, then retighten the adjusting bolt.

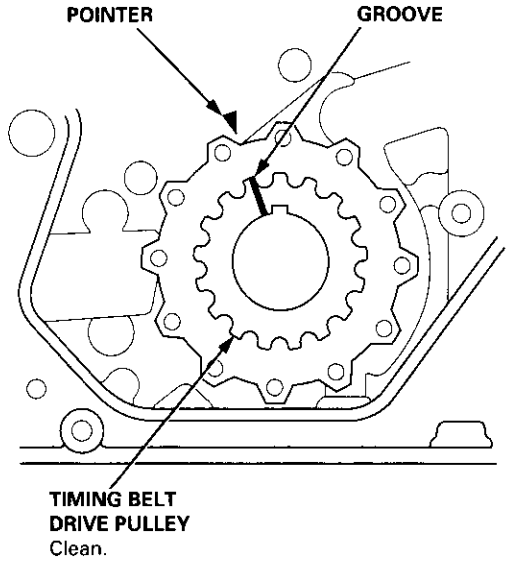


13. Remove the timing belt.

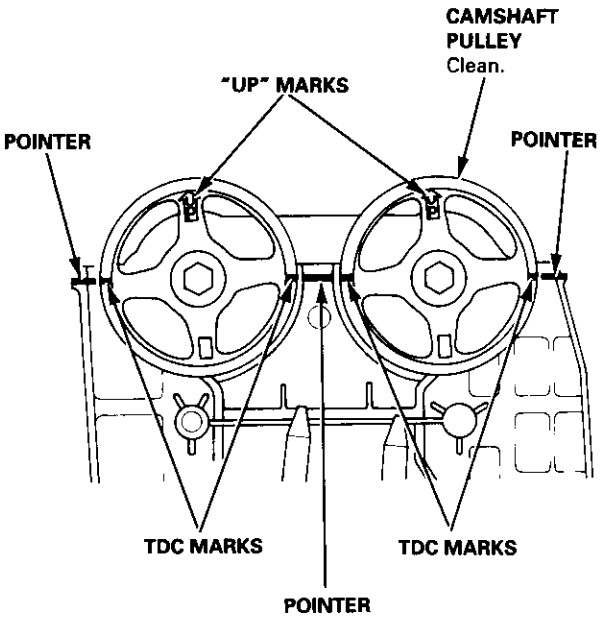
Installation

Install the timing belt in the reverse order of removal; Only key points are described here.

1. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the groove on the timing belt drive pulley to the pointer on the oil pump.



2. Set the camshaft pulleys so that the No. 1 piston is at TDC. Align the TDC marks on the camshaft pulleys to the pointers on the back cover.



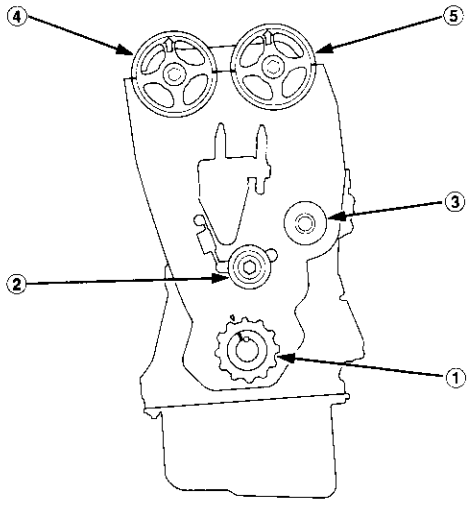
(cont'd)

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Installation (cont'd)

3. Install the timing belt tightly in the sequence shown. ① Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Water pump pulley → ④ Exhaust camshaft pulley → ⑤ Intake camshaft pulley.

   NOTE: Make sure the timing belt drive pulley and camshaft pulleys are at TDC.



4. Loosen and retighten the adjusting bolt to tension the timing belt.

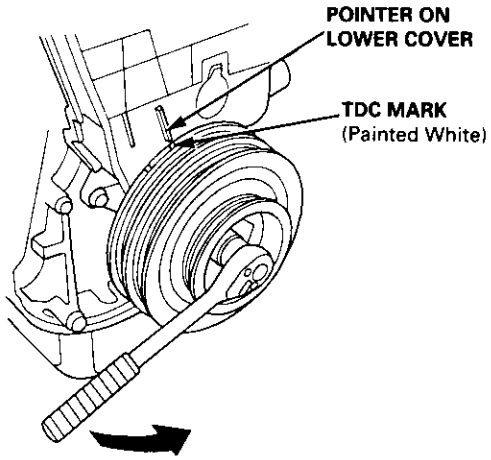
5. Clean, then install the lower cover and middle cover.

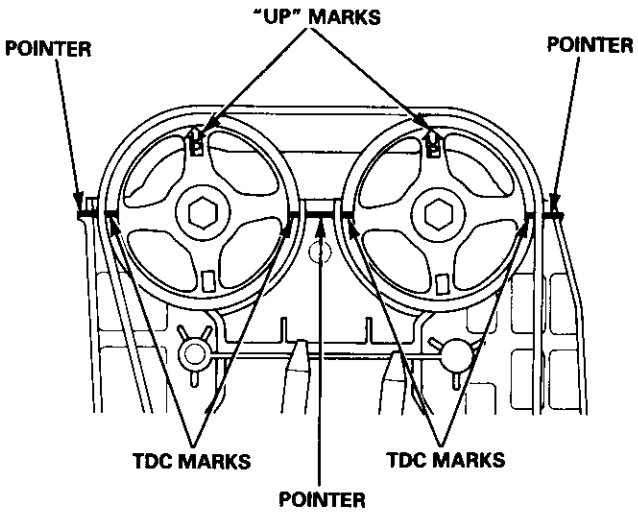
6. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-7).

7. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.

8. Adjust the timing belt tension (see page 6-9).

9. Check that the crankshaft pulley and camshaft pulleys are both at TDC.





10. If the camshaft pulleys are not positioned at TDC, remove the timing belt, adjust the position following the procedure on page 6-11, then reinstall the timing belt.

11. Install the cylinder head cover (see page 6-32).

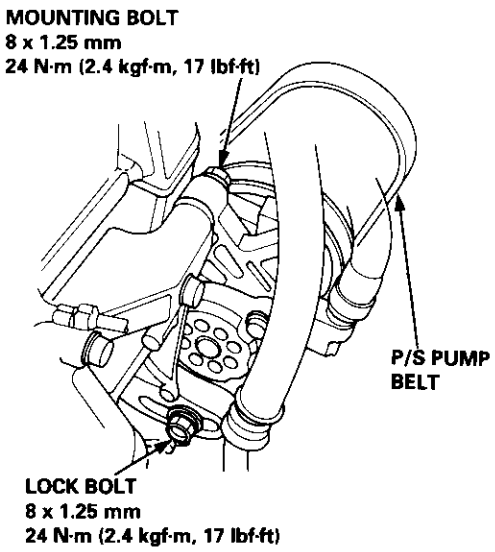
12. After installation, adjust the tension on each belt.
    - See section 4 for alternator belt tension adjustment.
    - See section 22 for A/C compressor belt tension adjustment.
    - See section 17 for P/S pump belt tension adjustment.

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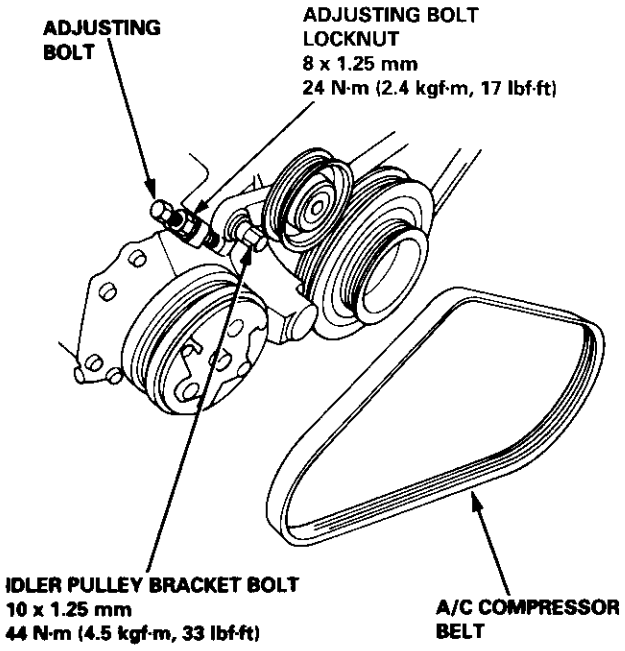
Replacement

1. Remove the guard bar and splash shield (see page 5-7).

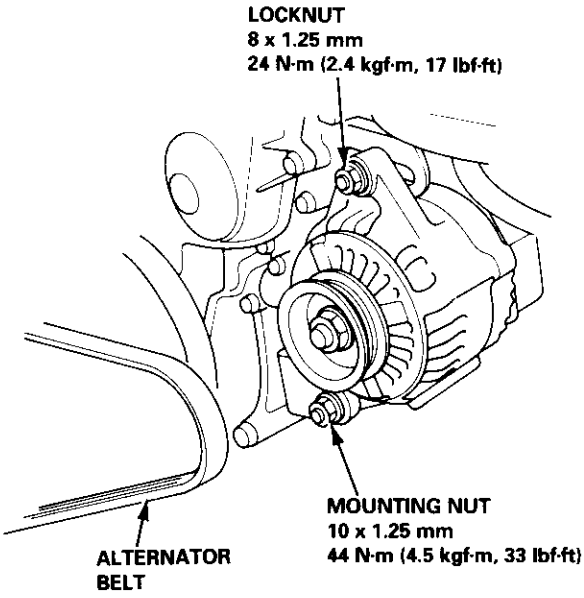
2. Loosen the lock bolt and mounting bolt, then remove the P/S pump belt.



3. Loosen the adjusting bolt and idler pulley bracket bolt, then remove the A/C compressor belt.



4. Loosen the locknut and mounting nut, then remove the alternator belt.

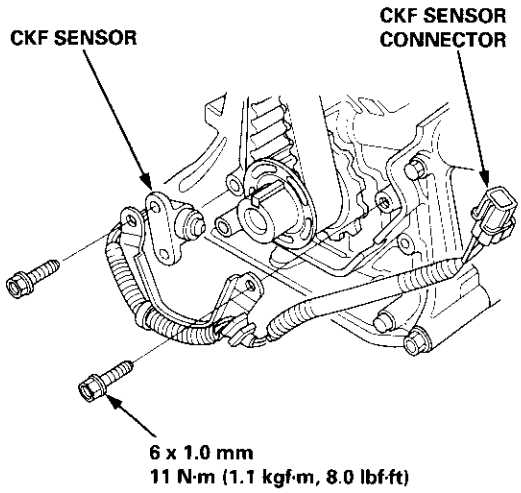


5. Remove the cylinder head cover.

6. Remove the crankshaft pulley (see page 6-7).

7. Remove the middle cover and the lower cover.

8. Disconnect the CKF sensor connector, then remove the CKF sensor.



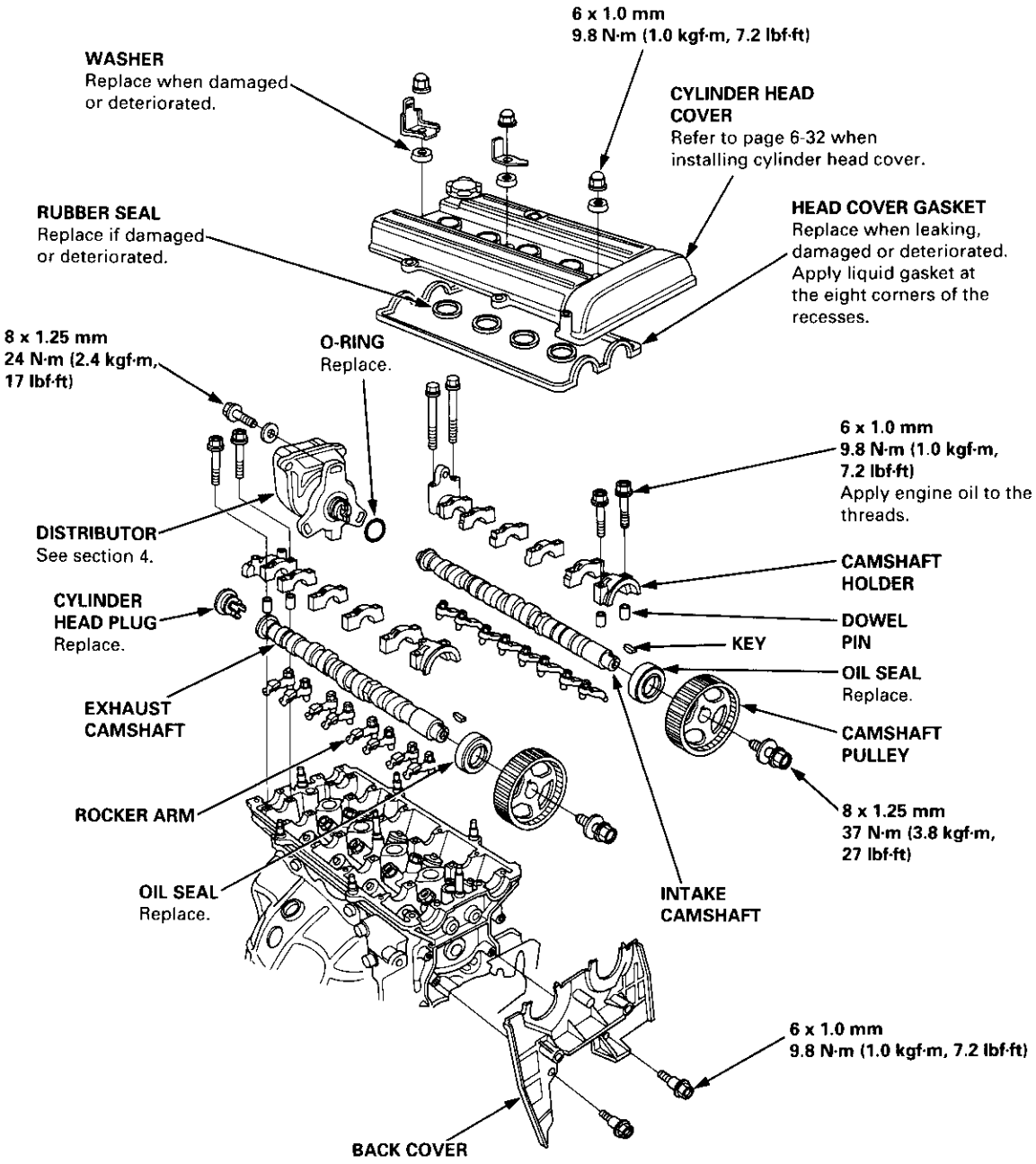
9. Install the CKF sensor in reverse order of removal.

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Cylinder Head

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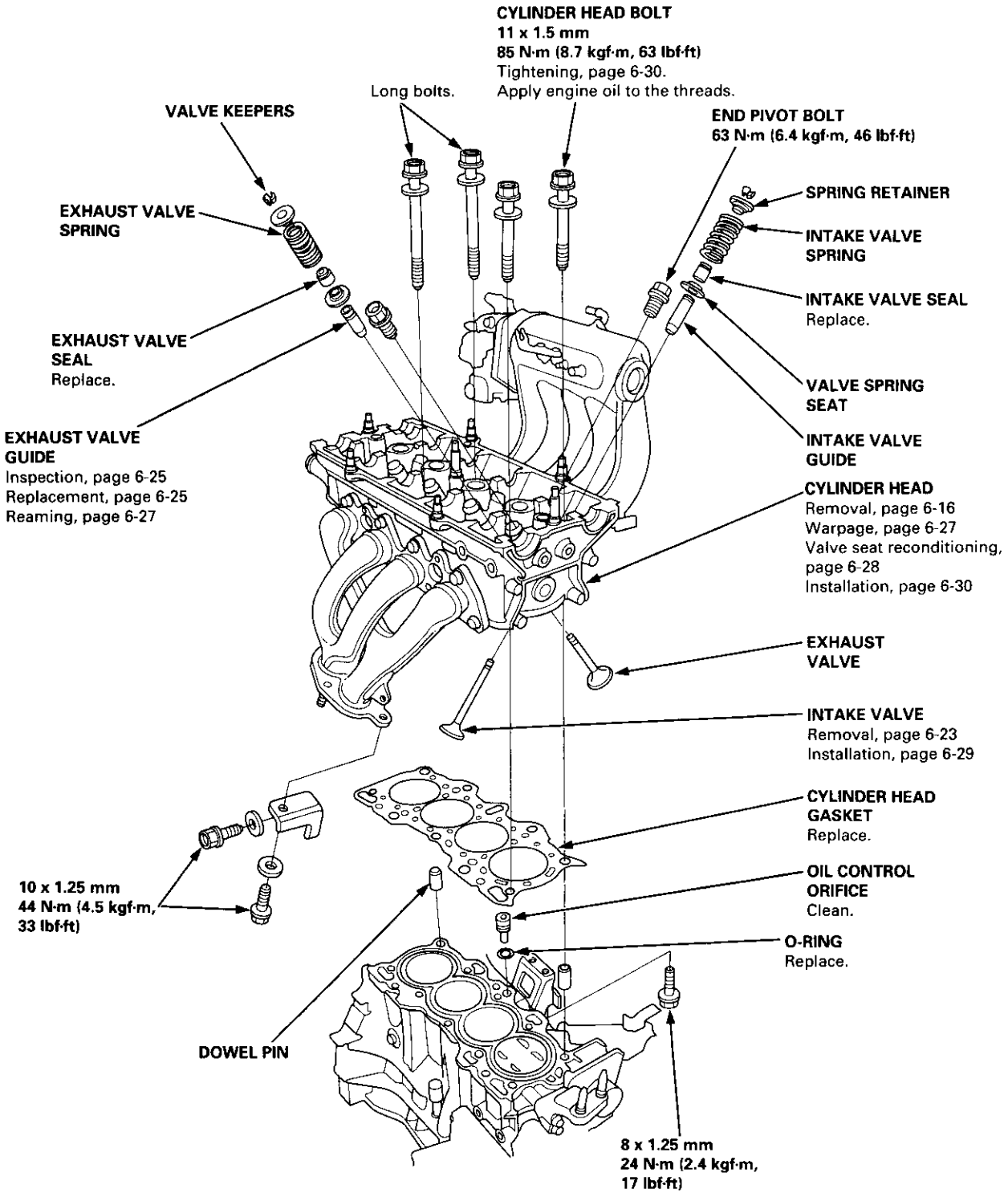
To avoid damage, wait until the engine coolant temperature drops below 100°F (38°C) before removing the cylinder head.



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When handling a metal gasket, take care not to fold it or damage the contact surface.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact parts.



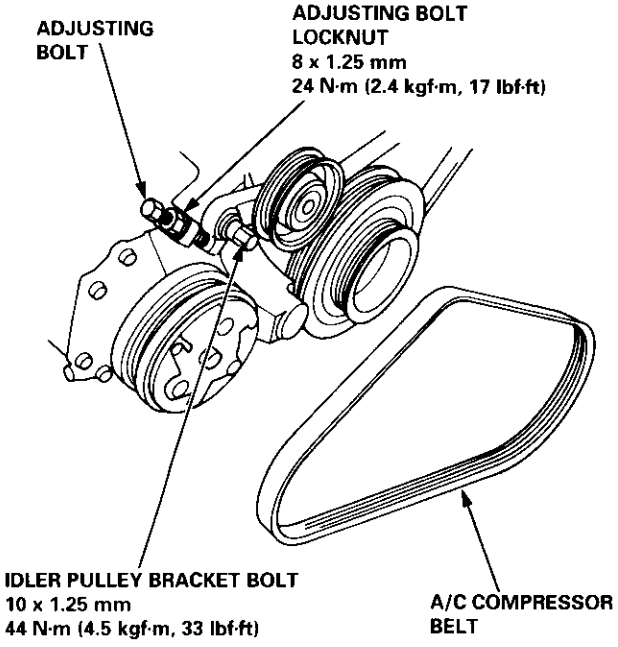
Removal

Engine removal is not required for this procedure.

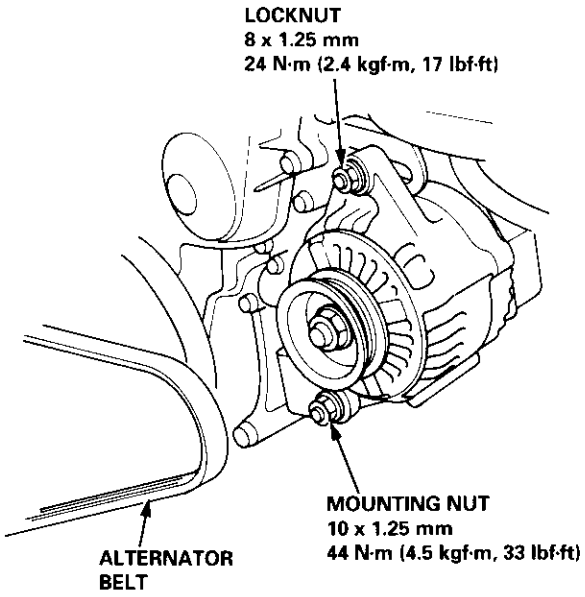
⚠ WARNING Make sure jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine.

NOTE:
- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.
- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the retaining bolts.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.

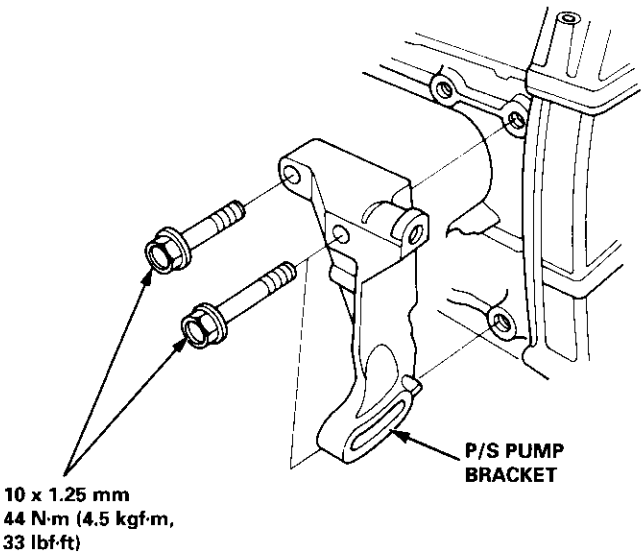
1. Disconnect the negative terminal from the battery.
2. Drain the engine coolant (see page 10-5). Remove the radiator cap to speed draining.
3. Remove the intake air duct and air cleaner housing (see page 5-2).
4. Remove the mounting bolt and lock bolt, then remove the power steering (P/S) pump belt and pump (see page 5-4).
5. Loosen the idler pulley bracket bolt and adjusting bolt, then remove the air conditioning (A/C) compressor belt.



6. Loosen the locknut and mounting nut, then remove the alternator belt.



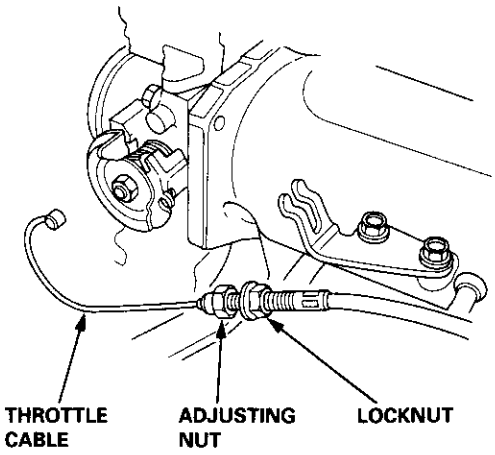
7. Remove the P/S pump bracket.



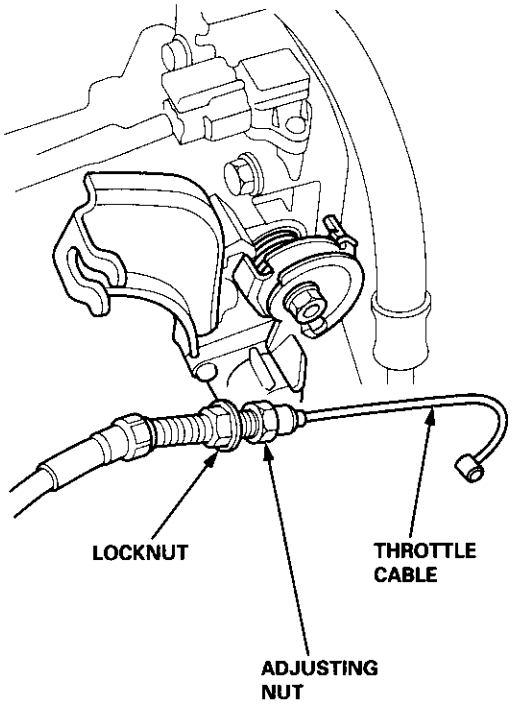
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8. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle linkage. Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.

'97 – 98 models:



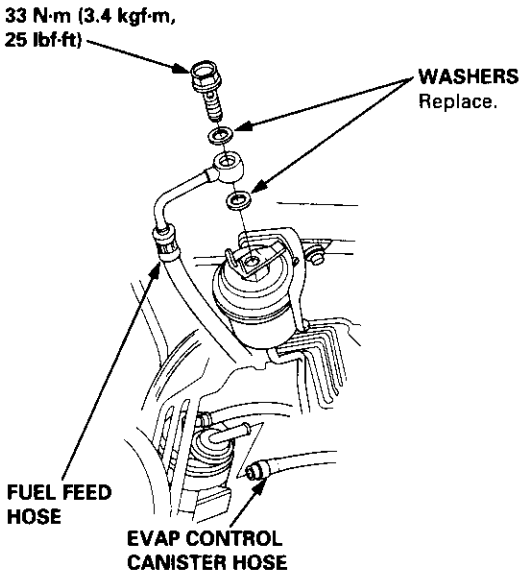
'99 – 00 models:



9. Relieve fuel pressure (see section 11).

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame or sparks away from the work area. Drain fuel only into an approved container.

10. Remove the evaporative emission (EVAP) control canister hose and fuel feed hose.



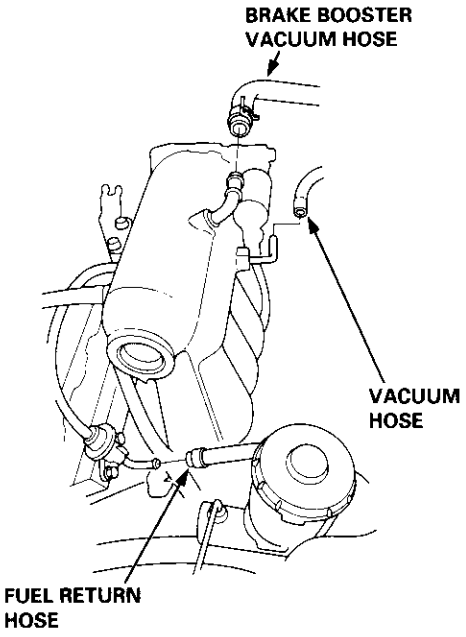
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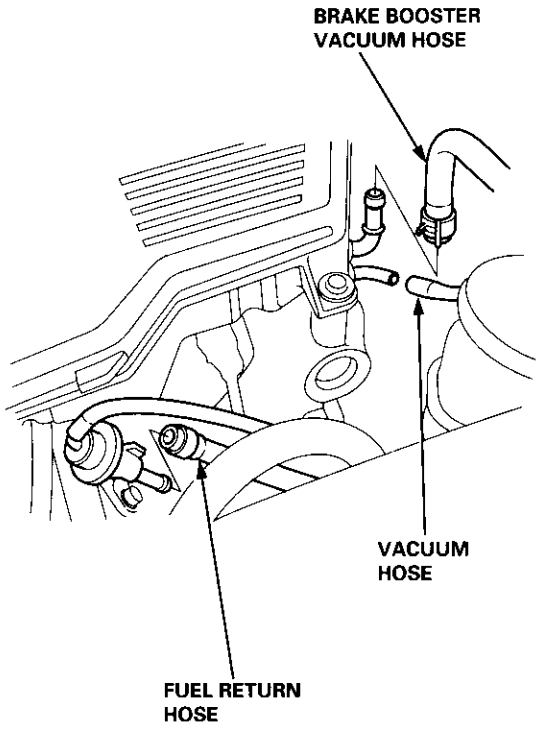
Removal (cont'd)

11. Remove the brake booster vacuum hose, fuel return hose, and vacuum hose.

'97 – 98 models:

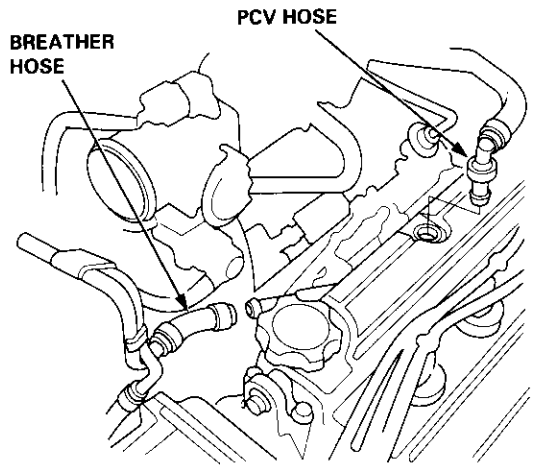


'99 – 00 models:

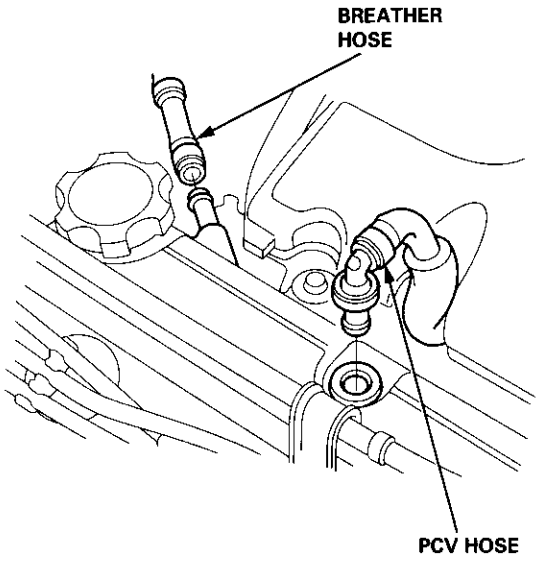


12. Remove the breather hose and positive crankcase ventilation (PCV) hose.

'97 – 98 models:

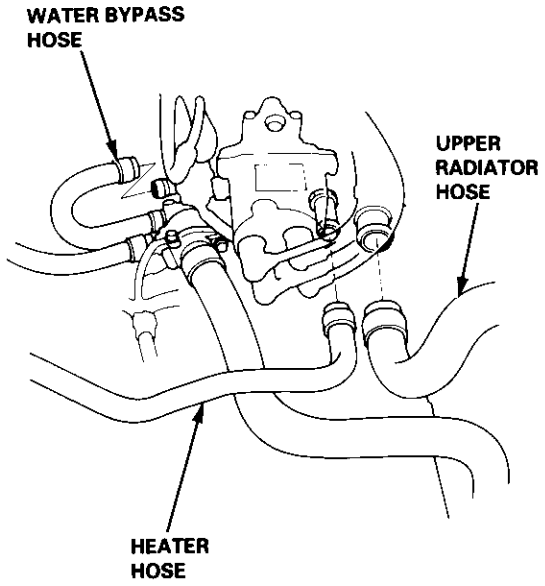


'99 – 00 models:



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13. Remove the upper radiator hose, heater hose and water bypass hose.



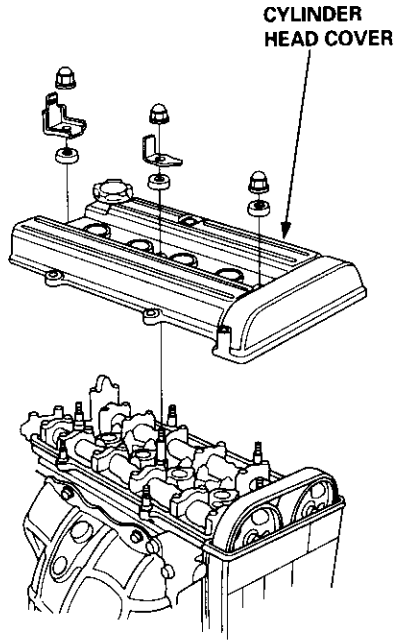
14. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.
    - Four fuel injector connectors
    - Engine coolant temperature (ECT) sensor connector
    - Radiator fan switch connector
    - Coolant temperature gauge sending unit connector
    - Throttle position sensor connector
    - Manifold absolute pressure (MAP) sensor connector
    - Primary heated oxygen sensor (primary HO2S) connector
    - Idle air control (IAC) valve connector
    - Distributor connector

15. Remove the spark plug caps and distributor from the cylinder head.

16. Remove the cruise control actuator (see section 4).

17. Support the engine with a jack, then remove the upper bracket. Make sure to place a cushion between the oil pan and the jack (see page 6-10).

18. Remove the cylinder head cover.



19. Inspect the timing belt (see page 6-9).

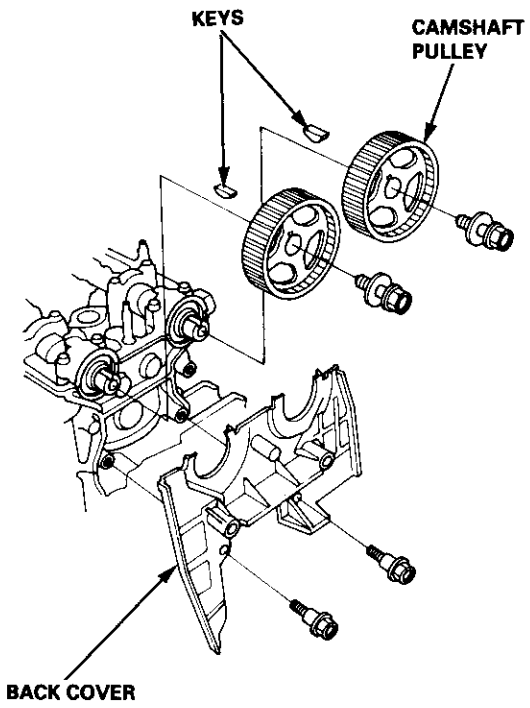
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Removal (cont'd)

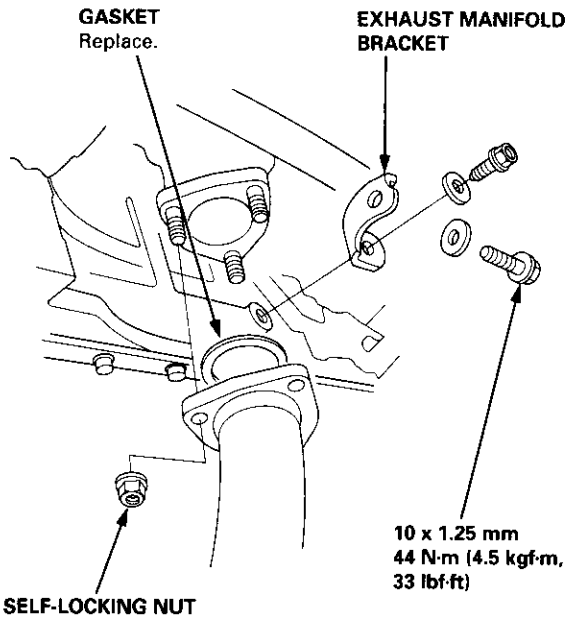
20. Remove the timing belt (see page 6-10).

21. Remove the camshaft pulleys and back cover.

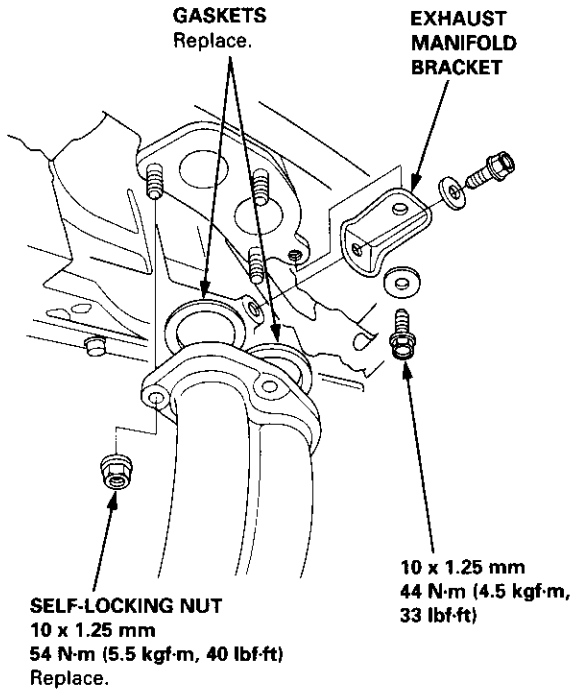


22. Remove the exhaust manifold bracket and self-locking nuts.

'97 – 98 U.S. models (California):

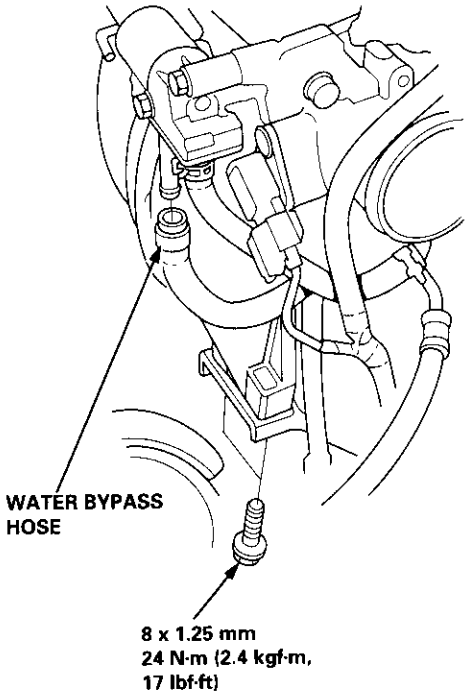


'97 – 98 U.S. models (Except California):
'99 – 00 models:

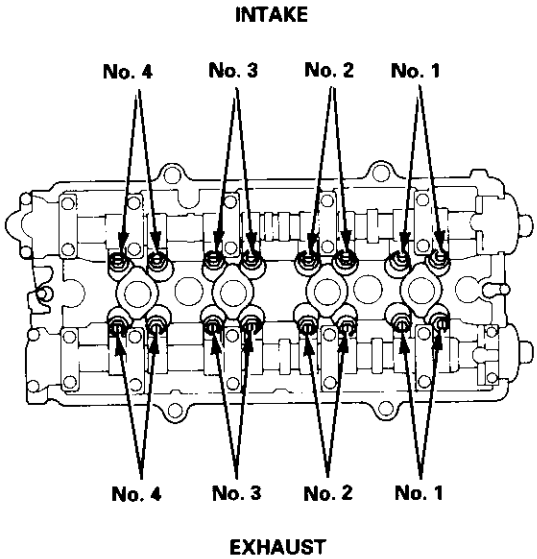


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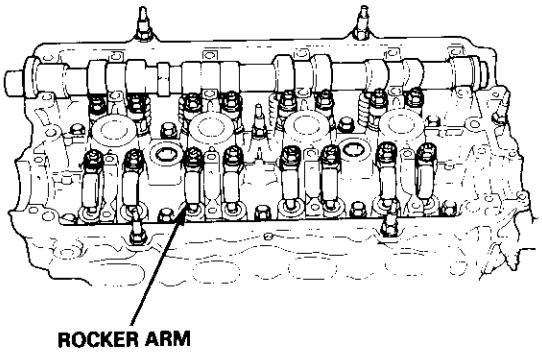
23. Remove the intake manifold mounting bolts and water bypass hose.



24. Loosen the locknuts and adjusting screws.

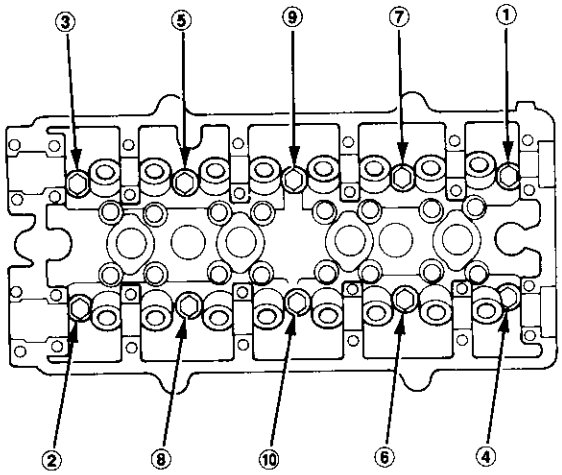


25. Remove the camshaft holder bolts, then remove the camshaft holders and rocker arms. Make note of the rocker arm positions.



26. Remove the cylinder head bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE:

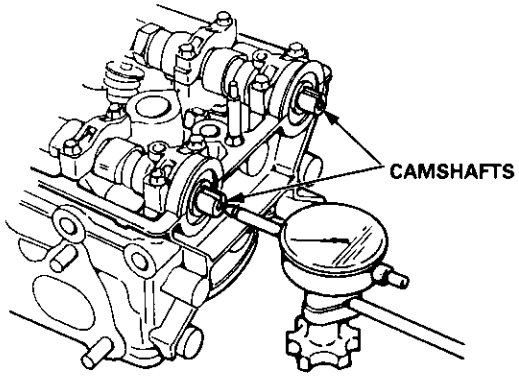


27. Remove the cylinder head.

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Inspection

1. Loosen the adjusting screws.
2. Remove the camshaft holders.
3. Mark the rocker arms, then remove them.
4. Reinstall the camshaft and holders. Tighten the camshaft holder bolts in a crisscross pattern, beginning with the inner bolts.
   9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
5. Seat the camshafts by pushing them toward the distributor end of the head with a screwdriver.
6. Zero the dial indicator against the end of the camshaft, push the camshaft back and forth and read the end play.
   Camshaft End Play:
   Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)
   Service Limit: 0.5 mm (0.02 in)

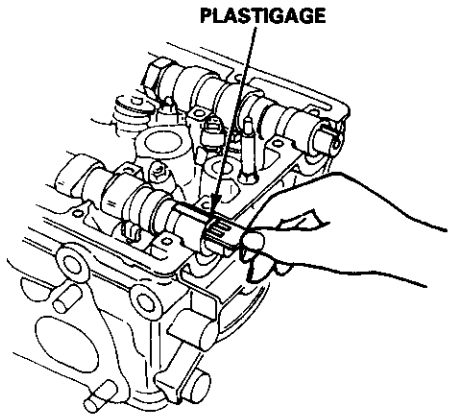


7. Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern. Then remove the camshaft holder bolts from the cylinder head.
8. Lift the camshafts out of the cylinder head, wipe them clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
9. Clean the camshaft journal surfaces in the cylinder head, then set the camshaft back in place. Place a plastigage strip across each journal.
10. Install the camshaft holders, and torque the bolts to the values and in the sequence shown on page 6-31.

    NOTE: Do not rotate the camshafts during inspection.

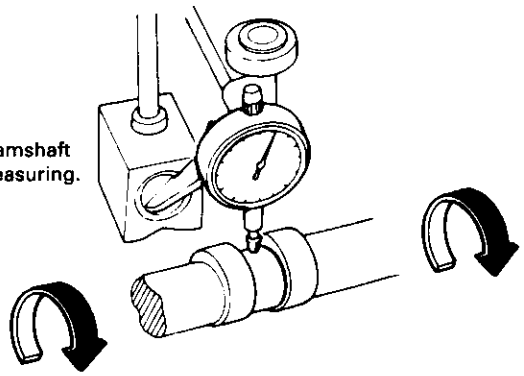
11. Remove the camshaft holders. Measure the widest portion of plastigage on each journal.

    Camshaft-to Holder Oil Clearance:
    Standard (New): 0.030 – 0.069 mm (0.0012 – 0.0027 in)
    Service Limit: 0.15 mm (0.006 in)



12. If camshaft-to-holder oil clearance is out of tolerance:
    - And the camshaft has already been replaced, you must replace the cylinder head.
    - If the camshaft has not been replaced, first check total runout with the camshaft supported on V-blocks.

    Camshaft Total Runout:
    Standard (New): 0.03 mm (0.001 in) max.
    Service Limit: 0.04 mm (0.002 in)



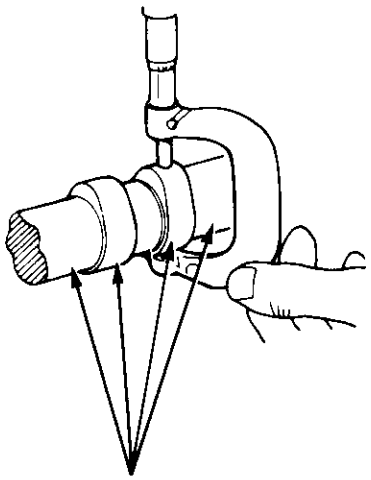
— If the total runout of the camshafts is within tolerance, replace the cylinder head.

— If the total runout is out of tolerance, replace the camshafts and recheck. If the oil clearance is still out of tolerance, replace the cylinder head.

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13. Measure the cam lobe height.

Cam Lobe Height Standard (New)
'97 – 98 models:
INTAKE: 33.204 mm (1.3072 in)
EXHAUST: 33.528 mm (1.3200 in)
'99 – 00 models:
INTAKE: 33.716 mm (1.3274 in)
EXHAUST: 33.528 mm (1.3200 in)

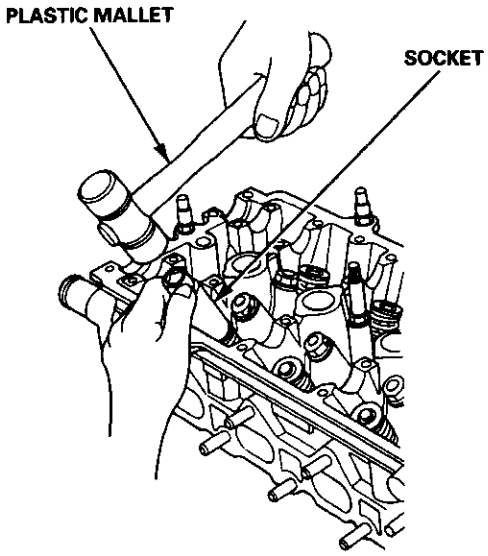


Inspect this area for wear.

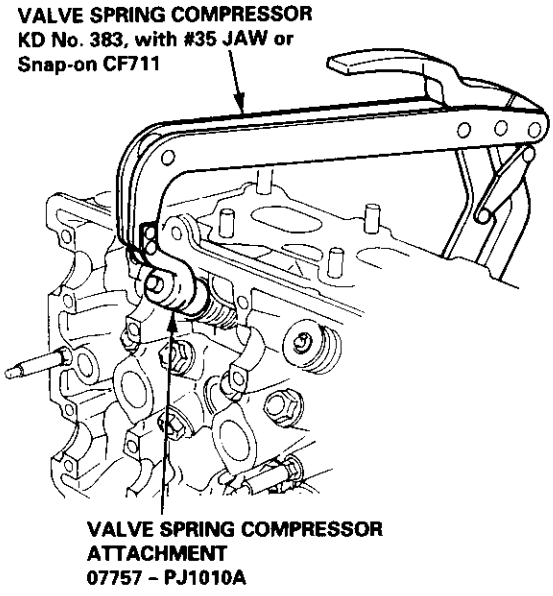
Removal

Identify the valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



2. Install the spring compressor. Compress the spring and remove the valve keeper.

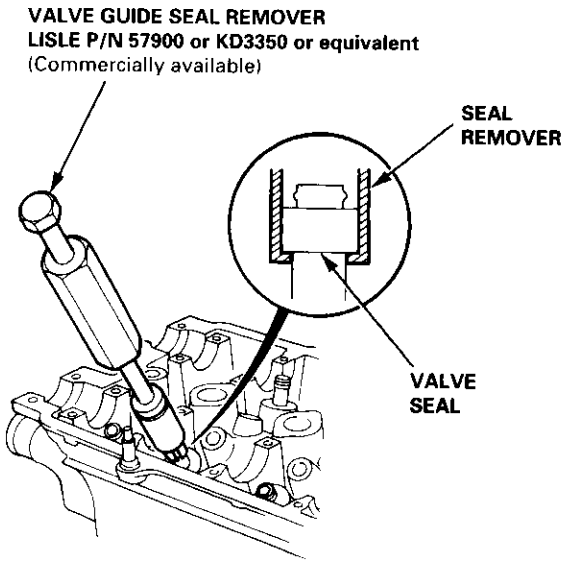


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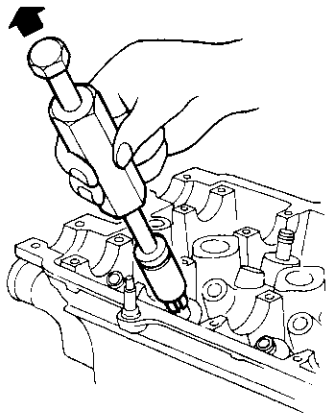
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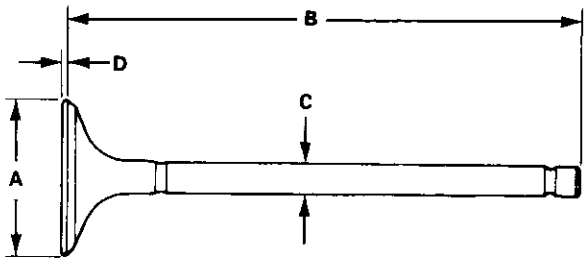
Removal (cont'd)

3. Install the valve guide seal remover.



4. Remove the valve seal.





Intake Valve Dimensions

A Standard (New):	30.85 – 31.15 mm (1.215 – 1.226 in)
B Standard (New):	103.80 – 104.10 mm (4.087 – 4.098 in)
C Standard (New):	6.580 – 6.590 mm (0.2591 – 0.2594 in)
C Service Limit:	6.55 mm (0.258 in)
D Standard (New):	1.35 – 1.65 mm (0.053 – 0.065 in)
D Service Limit:	1.15 mm (0.045 in)

Exhaust Valve Dimensions

A Standard (New):	27.85 – 28.15 mm (1.096 – 1.108 in)
B Standard (New):	104.00 – 104.30 mm (4.094 – 4.106 in)
C Standard (New):	6.550 – 6.560 mm (0.2579 – 0.2583 in)
C Service Limit:	6.52 mm (0.257 in)
D Standard (New):	1.65 – 1.95 mm (0.065 – 0.077 in)
D Service Limit:	1.45 mm (0.057 in)

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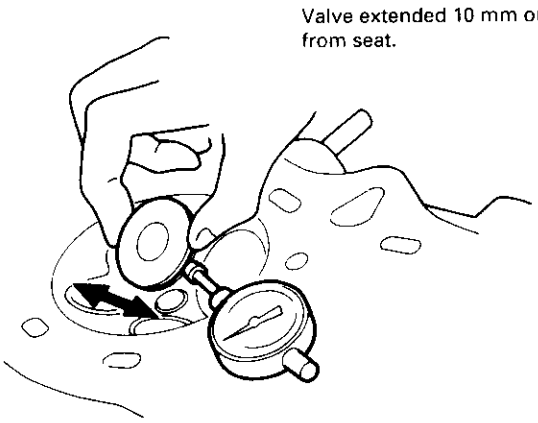
Valve Guides

Valve Movement

1. Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

   Intake Valve Stem-to-Guide Clearance:
   Standard (New): 0.04 – 0.10 mm (0.002 – 0.004 in)
   Service Limit: 0.16 mm (0.006 in)

   Exhaust Valve Stem-to-Guide Clearance:
   Standard (New): 0.10 – 0.16 mm (0.004 – 0.006 in)
   Service Limit: 0.22 mm (0.009 in)



   If the measurement exceeds the service limit, recheck using a new valve.

2. If the measurement is now within the service limit, reassemble using a new valve.

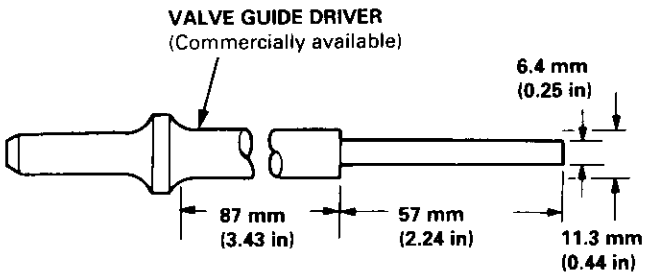
3. If the measurement still exceeds the limit, subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge.
   Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

   Intake Valve Stem-to-Guide Clearance:
   Standard (New): 0.02 – 0.05 mm (0.001 – 0.002 in)
   Service Limit: 0.08 mm (0.003 in)

   Exhaust Valve Stem-to-Guide Clearance:
   Standard (New): 0.05 – 0.08 mm (0.002 – 0.003 in)
   Service Limit: 0.11 mm (0.004 in)

Replacement

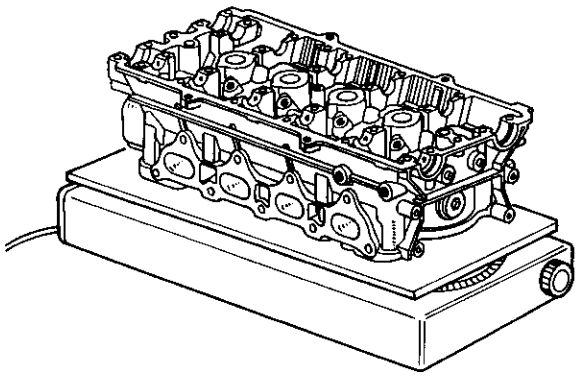
1. As illustrated below, use a commercially available air-impact valve guide driver attachment modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



   or
   VALVE GUIDE DRIVER, 6.6 mm
   07942 – 6570100

2. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.

3. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.



   CAUTION: To avoid burns, use heavy gloves when handling the heated cylinder head.

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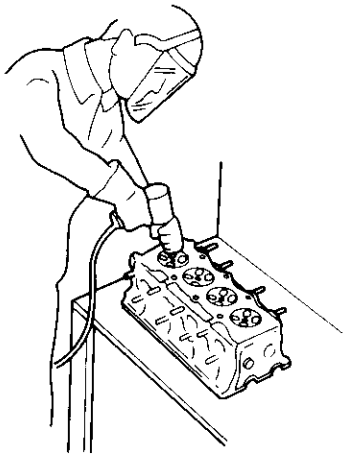
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Replacement (cont'd)

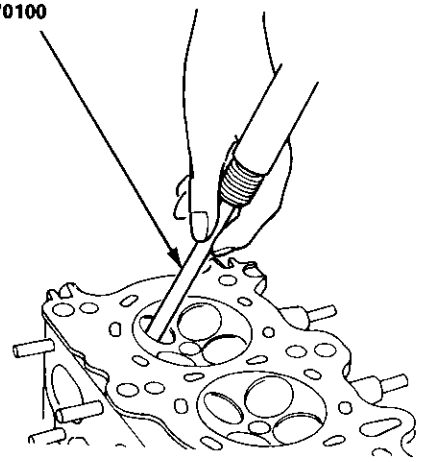
4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver.

   CAUTION: Always wear safety goggles or a face shield when driving valve guides.

5. Turn the head over and drive the guide out toward the camshaft side of the head.



VALVE GUIDE DRIVER, 6.6 mm
07942 – 6570100

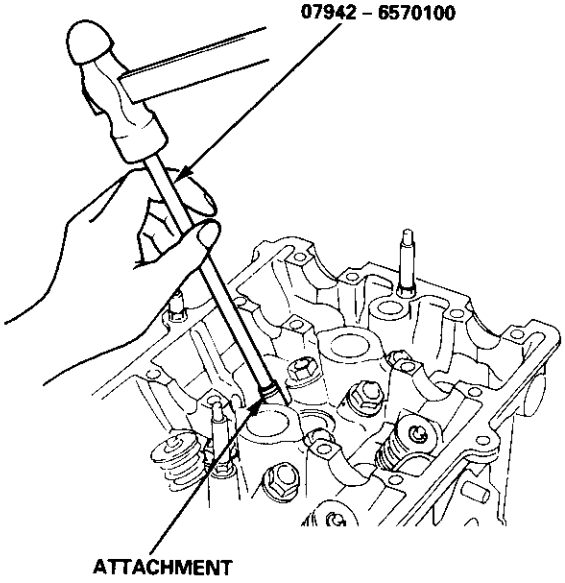


6. If a valve guide won't move, drill it out with a 8.0 mm (5/16 in) bit, then try again. Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

7. Remove the new guide(s) from the freezer, one at a time, as you need them.

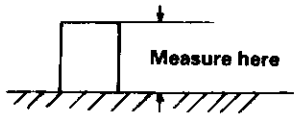
8. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide in to the specified installed height. If you have all 16 guides to do, you may have to reheat the head.

VALVE GUIDE DRIVER, 6.6 mm
07942 – 6570100



ATTACHMENT

Valve Guide Installed Height:
Intake: 13.75 – 14.25 mm (0.541 – 0.561 in)
Exhaust: 15.75 – 16.25 mm (0.620 – 0.640 in)

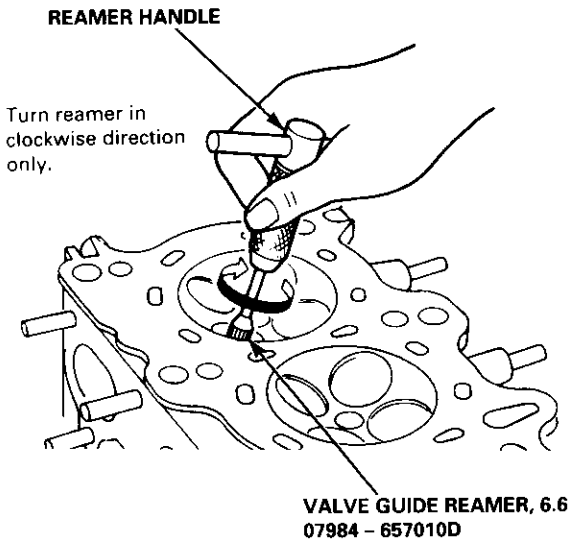


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Reaming

NOTE: For new valve guides only.

1. Coat the reamer and the valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with a valve (see page 6-25).
6. Verify that the valves slide in the intake and exhaust valve guides without exerting pressure.

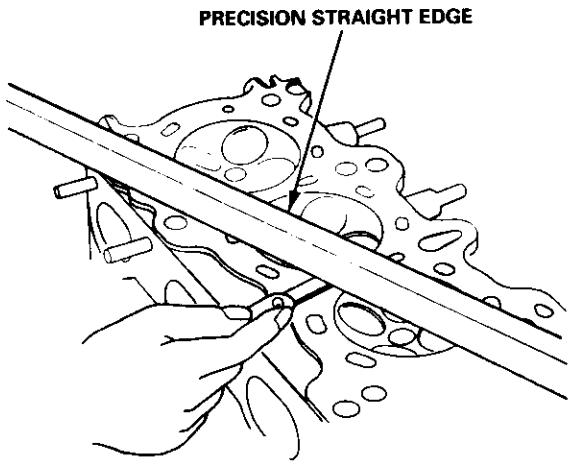


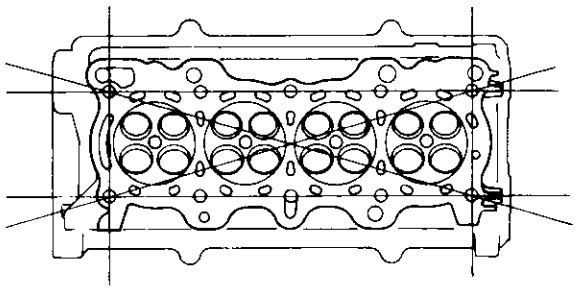
Warpage

NOTE: If camshaft-to-holder oil clearances (see page 6-22) are not within specification, the head cannot be resurfaced.

If camshaft-to-holder oil clearances are within specifications, check the head for warpage. Measure along the edges, and three ways across the center.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 132.0 mm (5.20 in).





Cylinder Head Height:
Standard (New): 131.95 – 132.05 mm (5.195 – 5.199 in)

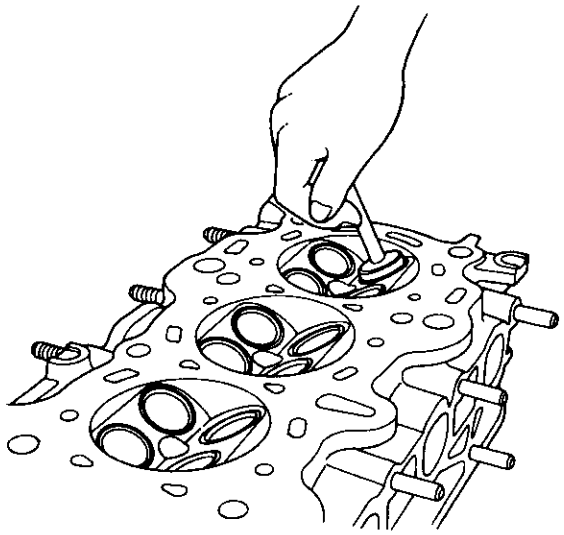
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Valve Seats

Reconditioning

If the guides are worn (see page 6-25), replace them (see page 6-25) before reconditioning the valve seats.

1. Renew the valve seats in the cylinder head using a valve seat cutter.

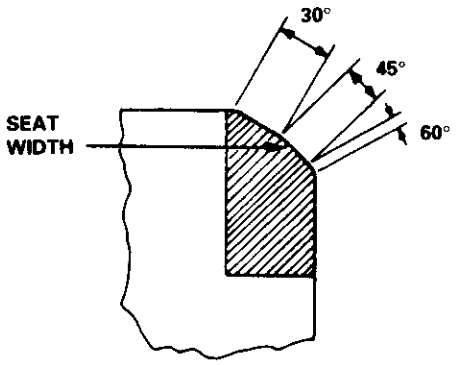


2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.

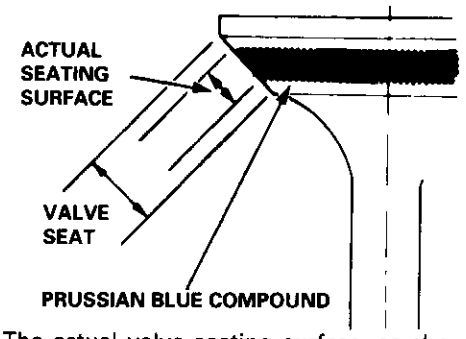
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check width of seat and adjust accordingly.

4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width (Intake and Exhaust):
Standard (New): 1.25 – 1.55 mm (0.049 – 0.061 in)
Service Limit: 2.0 mm (0.08 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.

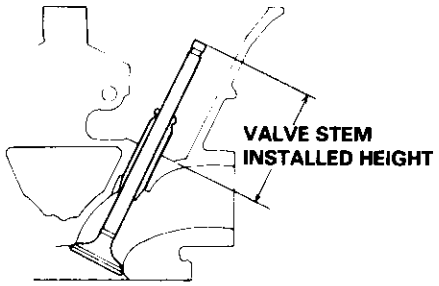


6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

   NOTE: The final cut should always be made with the 45° cutter.

7. Insert the intake and exhaust valves in the head, and measure valve stem installed height.

Intake Valve Stem Installed Height:
Standard (New): 40.765 – 41.235 mm (1.6049 – 1.6234 in)
Service Limit: 41.485 mm (1.6333 in)
Exhaust Valve Stem Installed Height:
Standard (New): 42.765 – 43.235 mm (1.6837 – 1.7022 in)
Service Limit: 43.485 mm (1.7120 in)



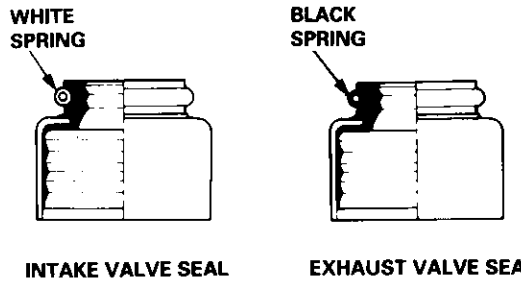
8. If valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

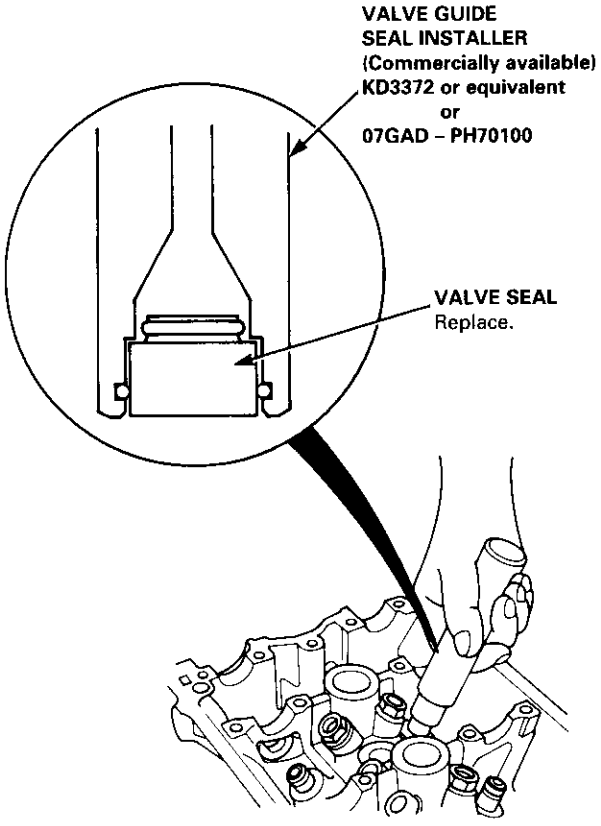
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Installation

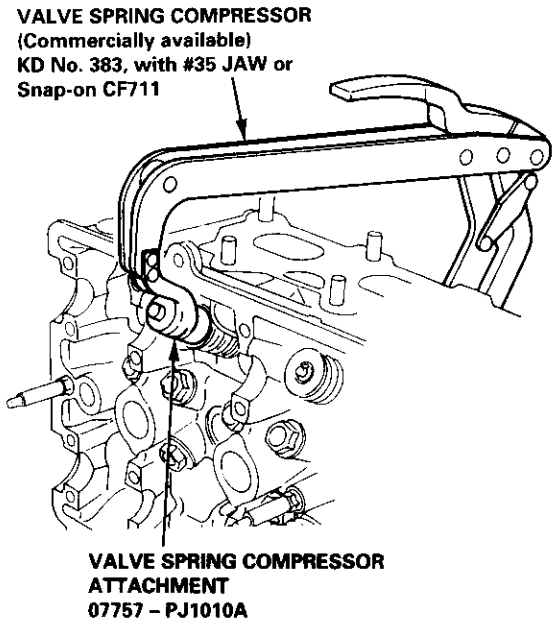
1. Coat the valve stems with oil. Insert the valves into the valve guides.
2. Check that the valves move up and down smoothly.
3. Install the spring seats on the cylinder head.
4. Install the valve seals using the special tool.

   NOTE: Exhaust and intake valve seals are not interchangeable.

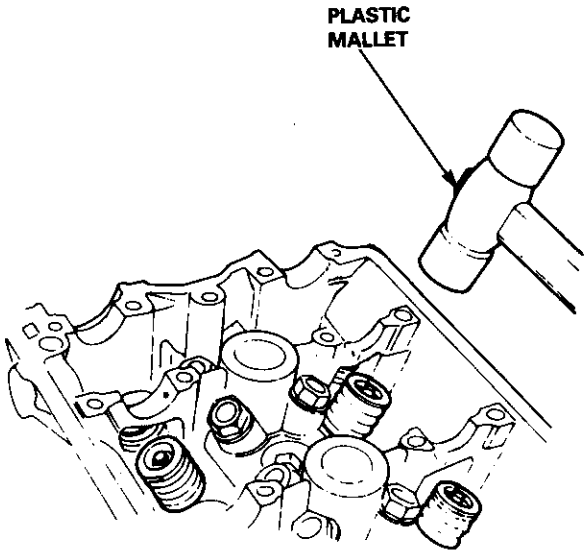




5. Install the valve spring and valve retainer. Place the end of the valve spring with closely wound coils toward the cylinder head.
6. Install the valve spring compressor. Compress the spring, and install the valve keepers.



7. Lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of the valve and valve keepers. Tap the valve stem only along its axis so you do not bend the stem.



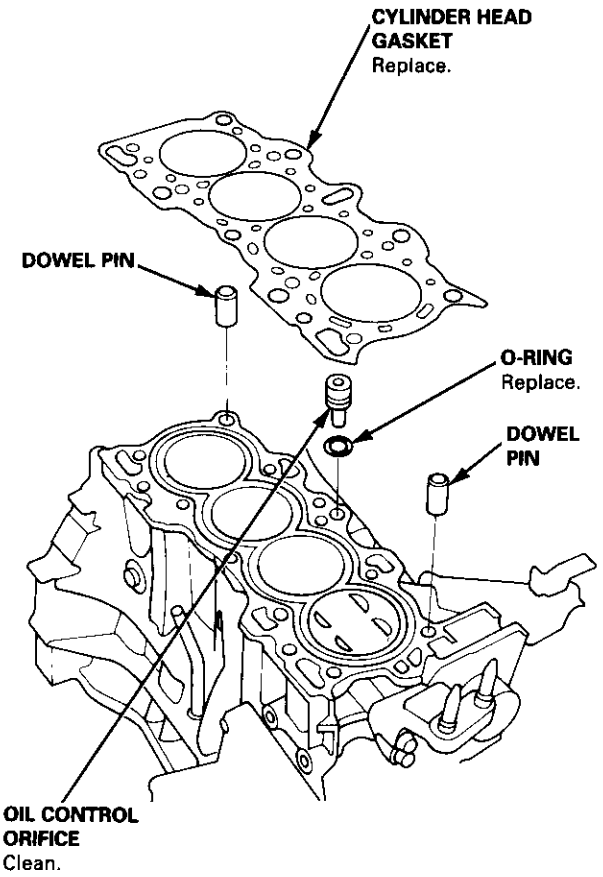
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Installation

Install the cylinder head in the reverse order of removal:

1. Clean the cylinder head and block surfaces.

2. Clean the oil control orifice. Install the cylinder head gasket, dowel pins and the oil control orifice on the cylinder block. Always use a new cylinder head gasket.

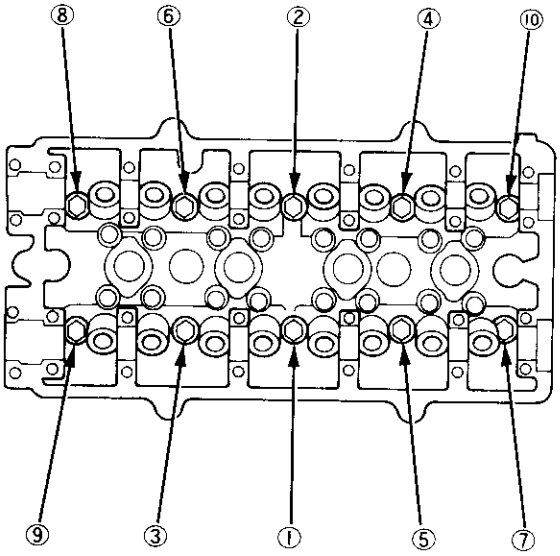


3. Apply clean engine oil to the bolt threads and under the bolt heads.

4. Tighten the cylinder head bolts in two steps. In the first step tighten all bolts, in sequence, to about 29 N·m (3.0 kgf·m, 22 lbf·ft); in the final step, tighten in the same sequence to 85 N·m (8.7 kgf·m, 63 lbf·ft).

   Use a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and do not overtighten.
   If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

CYLINDER HEAD BOLTS TORQUE SEQUENCE:



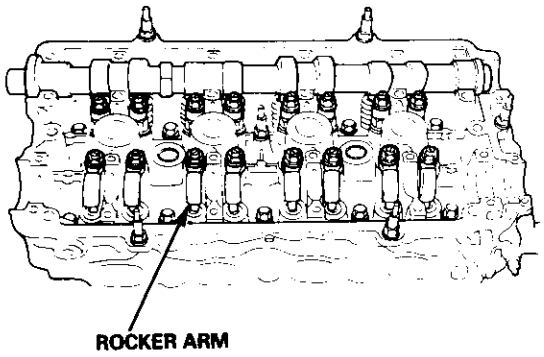
5. Tighten the intake manifold mounting bolts (see page 6-21).

6. Install the exhaust manifold bracket, and tighten the new self-locking nuts (see page 6-20).

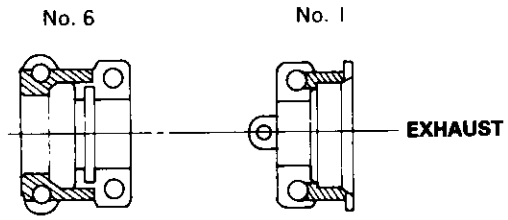
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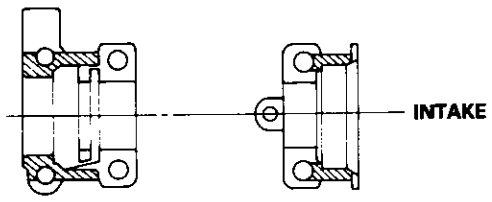
7. Place the rocker arms on the pivots and the valve stems. Put the rocker arms in their original positions.

8. Install the camshafts, then install the oil seals with the open side (spring) facing in. Make sure that the keyways on the camshafts are facing up and the No. 1 piston is at TDC.



9. Clean and dry the cylinder head mating surfaces. Apply liquid gasket (P/N 08718 – 0001 or 08718 – 0003) to the head mating surfaces of the No. 1 and No. 6 camshaft holders on both the intake and exhaust side.





Apply liquid gasket to the shaded areas.

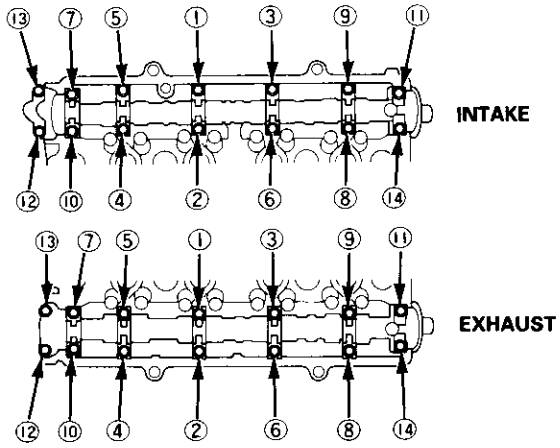
10. Install the camshaft holders.

NOTE:
- "I" or "E" marks are stamped on the camshaft holders.
- The arrows marked on the camshaft holders should point at the timing belt.

11. Tighten each bolt in two steps to ensure that the rockers do not bind on the valves.

12. Wipe off the excess liquid gasket from the No. 1 and No. 6 camshaft holders with a shop towel.

Specified torque:
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
Apply engine oil to the bolt threads.

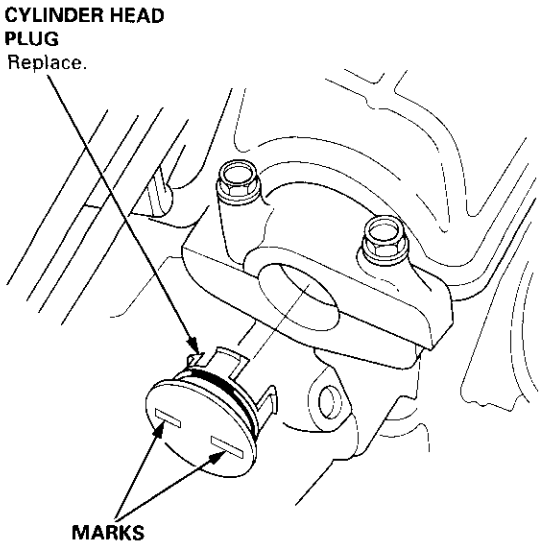


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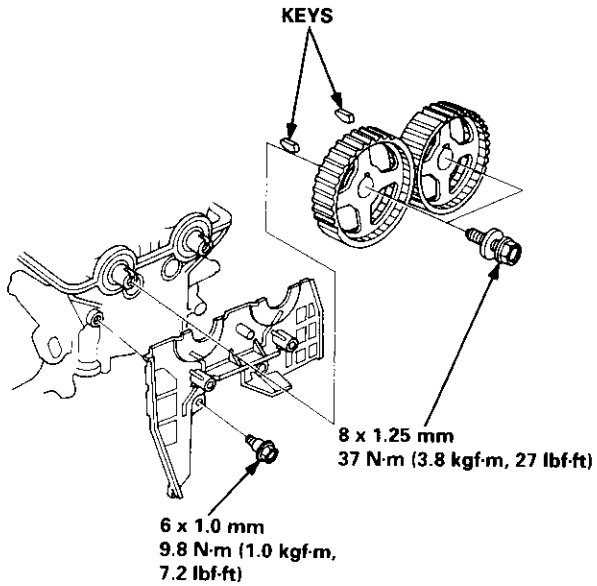
Installation (cont'd)

13. Align the marks on the cylinder head plug to the cylinder head upper surface, then install the cylinder head plug in the end of the cylinder head.



14. Install the back cover.

15. To set the camshafts at TDC position for the No. 1 piston, align the holes in the camshafts with the holes in the No. 1 camshaft holders and insert 5.0 mm pin punches in the holes. Install the keys into the camshaft grooves.



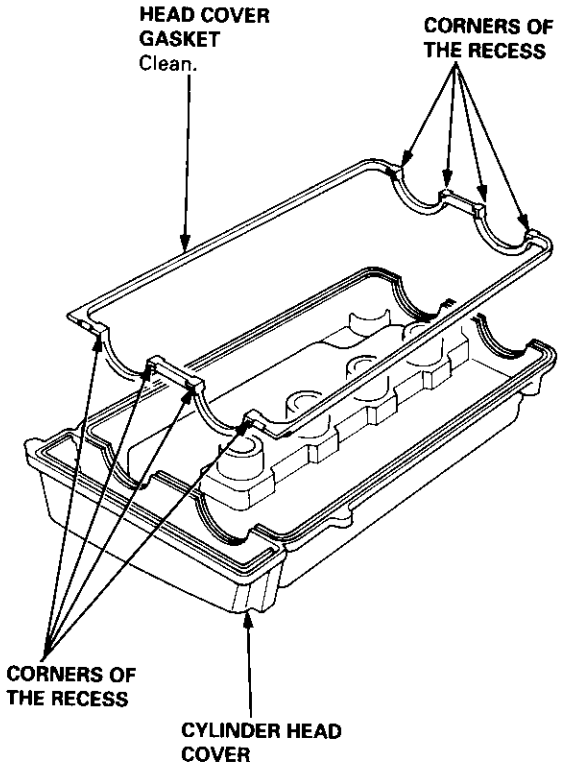
16. Push the camshaft pulleys onto the camshafts, then tighten the retaining bolts to the torque specified.

17. Install the timing belt (see page 6-11).

18. Adjust the valve clearance (see page 6-3).

19. Thoroughly clean the head cover gasket and the groove.

20. Install the head cover gasket in the groove of the cylinder head cover. Seat the head cover gasket in the recesses for the camshaft first, then work it into the groove around the outside edges. Make sure the head cover gasket is seated securely in the corners of the recesses with no gap.

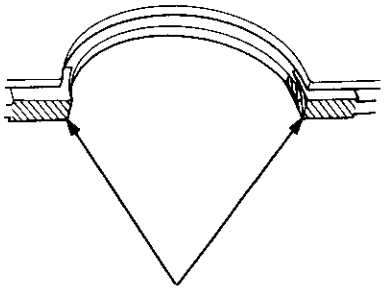


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21. Check that the mating surfaces are clean and dry.

22. Apply liquid gasket, part No. 08718 – 0001 or 08718 – 0003, to the head cover gasket at the eight corners of the recesses.

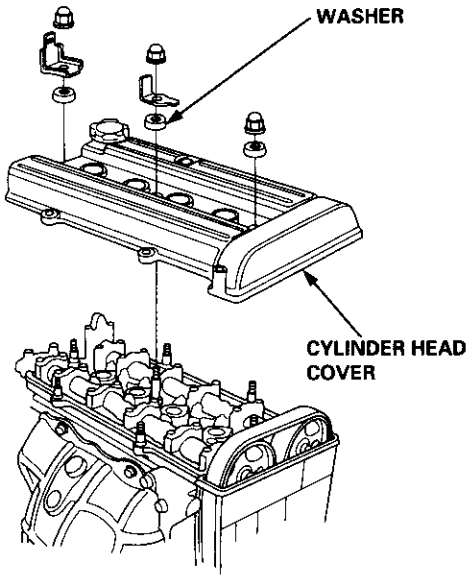
    NOTE:
    - Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
    - After assembly, wait at least 30 minutes before filling the engine with oil.



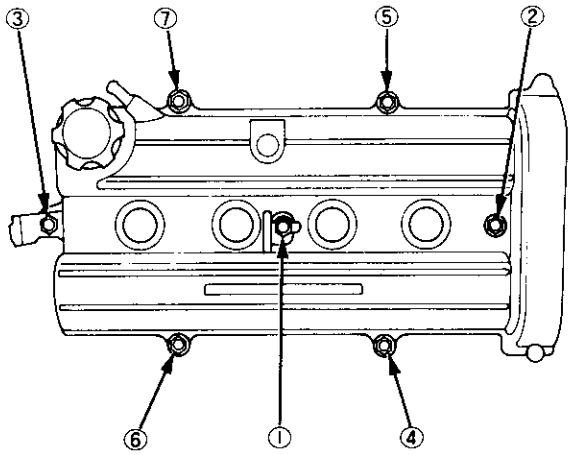
Apply liquid gasket to the shaded areas.

23. Hold the head cover gasket in the groove by placing your fingers on the camshaft holder contacting surfaces (top of the semicircles).
    Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

24. Inspect the cover washers. Replace any washer that *is damaged or deteriorated.*



25. Tighten the nuts in two or three steps. In the final step, tighten all nuts, in sequence, to 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft).



26. Check that all tubes, hoses and connectors are installed correctly.

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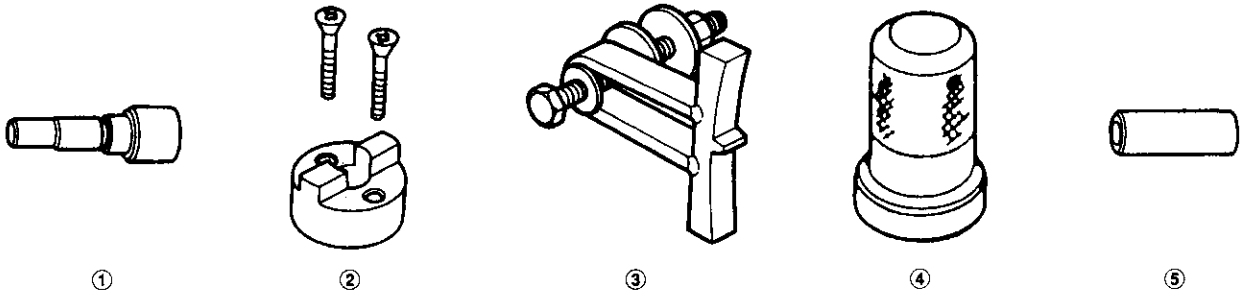
Engine Block

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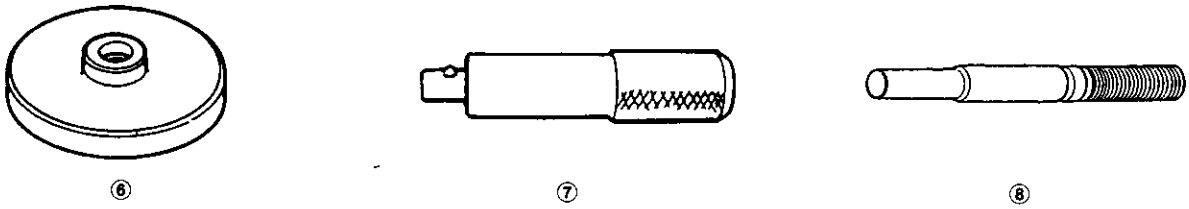
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Special Tools

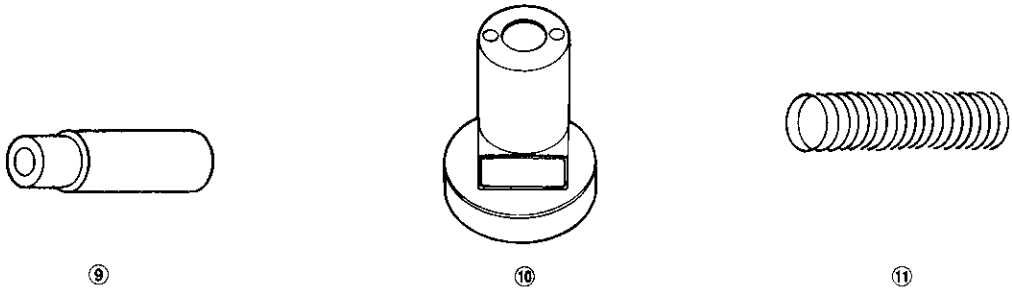
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF – PH60300	Piston Pin Base Insert	1	7-14, 15
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④	07LAD – PT30101	Seal Driver	1	7-23
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⑩	07973 – 6570500	Piston Base	1	7-14, 15
⑪	07973 – 6570600	Piston Base Spring	1	7-14, 15



① ② ③ ④ ⑤



⑥ ⑦ ⑧

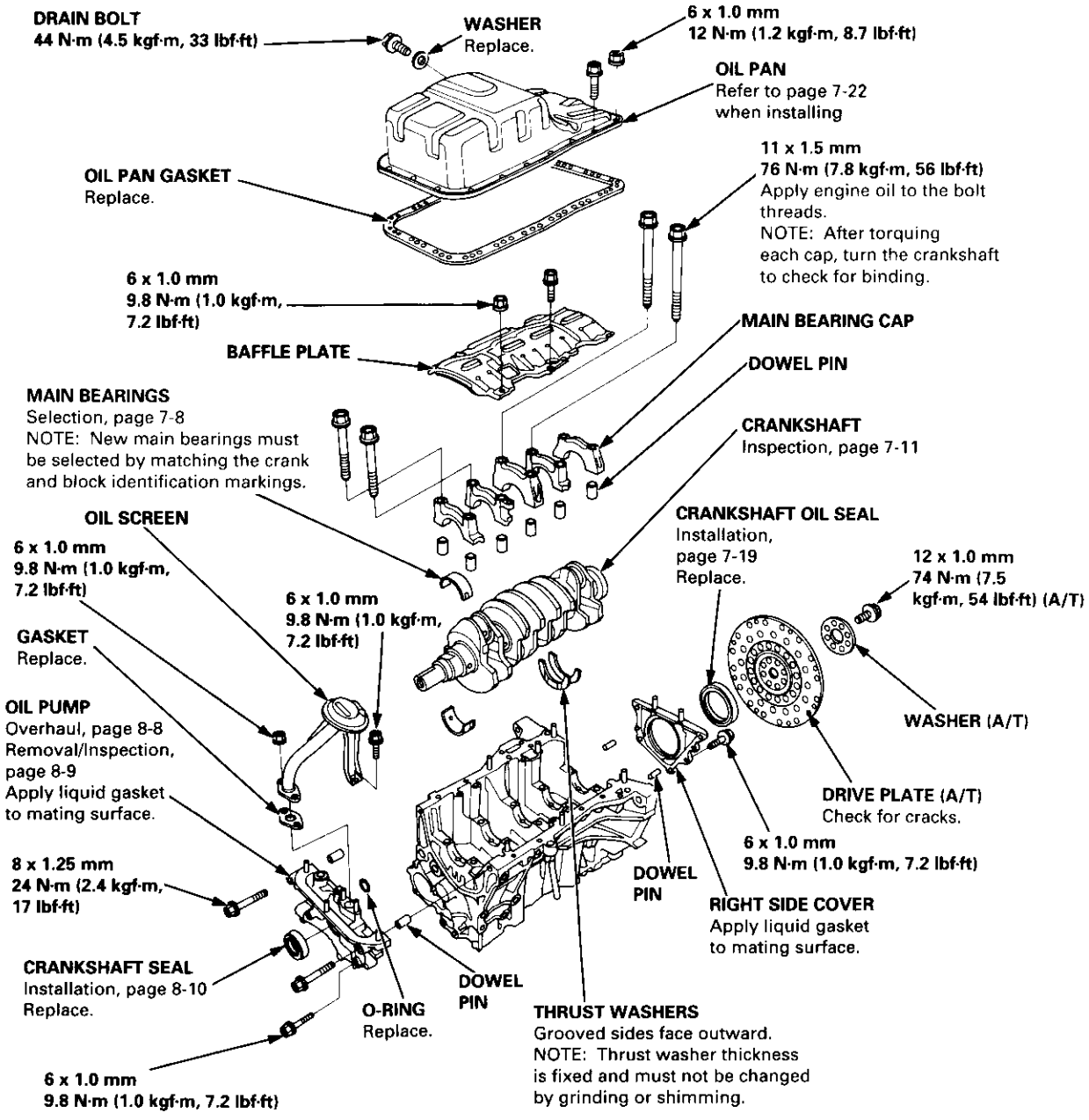


⑨ ⑩ ⑪

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Lubricate all internal parts with engine oil during reassembly.

Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
Use liquid gasket, Part No. 08718 – 0001 or 08718 – 0003.
Clean the oil pan gasket mating surfaces before installing the oil pan.



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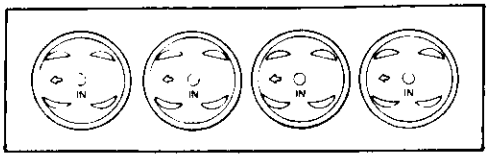
Illustrated Index (cont'd)

NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (see pages 7-9).

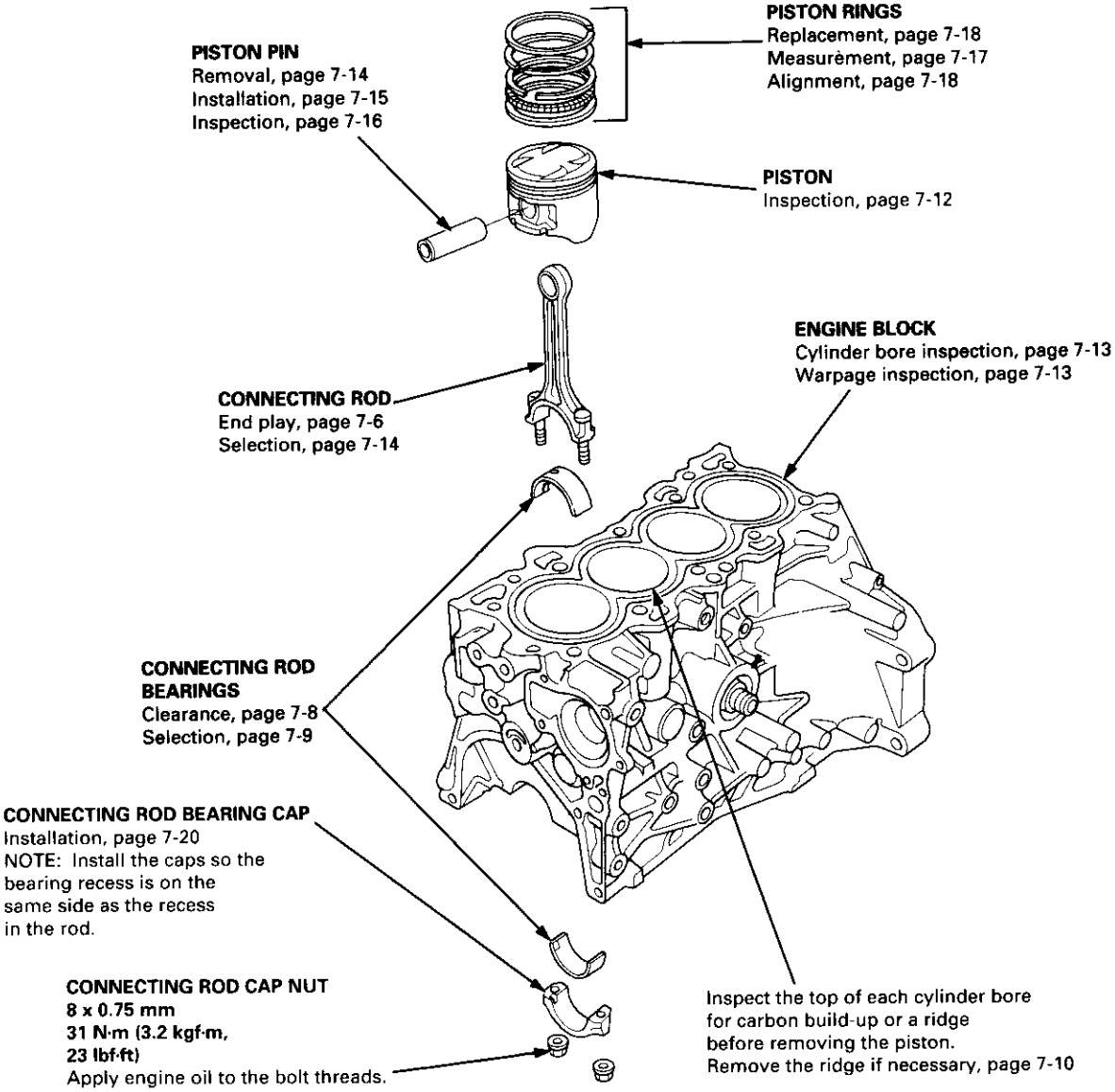
Lubricate all internal parts with engine oil during reassembly.

PISTON INSTALLATION DIRECTION:

EXHAUST



INTAKE

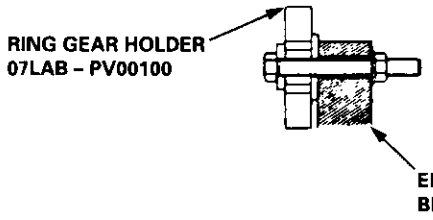


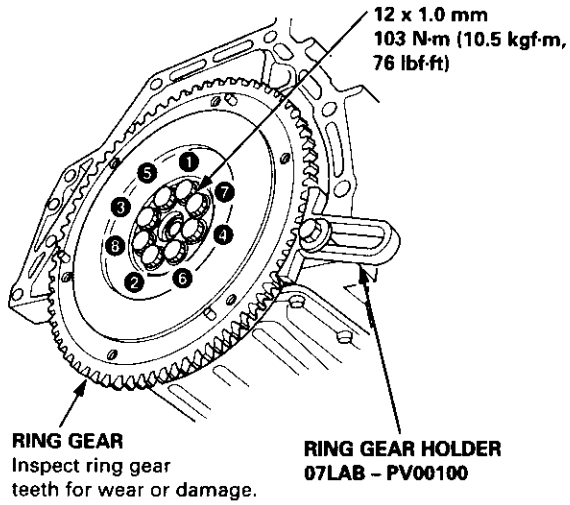
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Replacement

Manual Transmission:

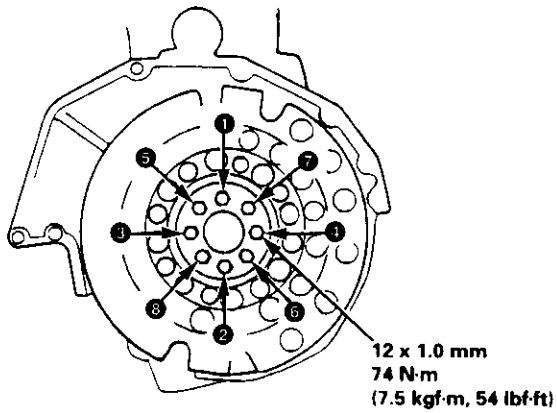
Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.





Automatic Transmission:

Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.

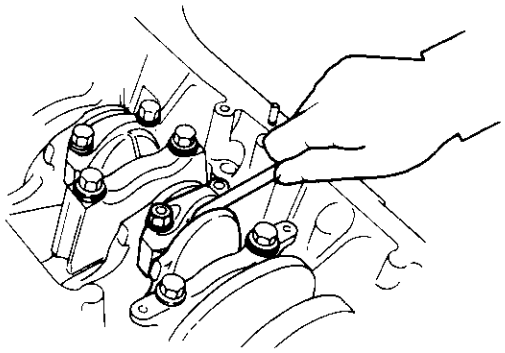


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End Play

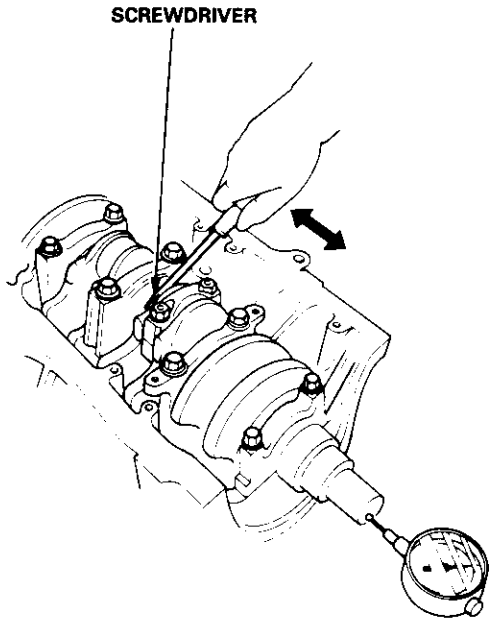
1. Measure the connecting rod end play with a feeler gauge.

   Connecting Rod End Play:
   Standard (New): 0.15 – 0.30 mm (0.006 – 0.012 in)
   Service Limit: 0.40 mm (0.016 in)



2. If the connecting rod end play is out-of-tolerance, install a new connecting rod.
   If it is still out-of-tolerance, replace the crankshaft (see pages 7-9 and 7-20).

3. Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; the dial reading should not exceed the service limit.



   Crankshaft End Play:
   Standard (New): 0.10 – 0.35 mm (0.004 – 0.014 in)
   Service Limit: 0.45 mm (0.018 in)

4. If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary. Thrust washer thickness is fixed and must not be changed either by grinding or shimming.

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Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.

2. Clean each main journal and bearing half with a clean shop towel.

3. Place a strip of plastigage across each main journal.

   NOTE: If the engine is still in the vehicle when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolt, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time.

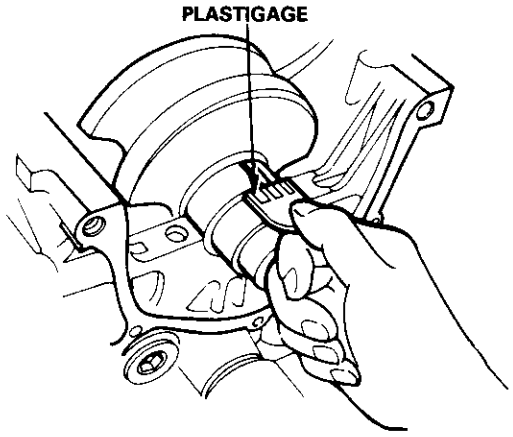
4. Reinstall the bearings and caps, then torque the bolts.

   1st step: 25 N·m (2.5 kgf·m, 18 lbf·ft)
   Final step: 76 N·m (7.8 kgf·m, 56 lbf·ft)

   NOTE: Do not rotate the crankshaft during inspection.

5. Remove the bearing cap again, and measure the widest part of the plastigage.

   Main Bearing-to-Journal Oil Clearance:
   Standard (New):
   No. 1, 2, 4, 5 Journals:
   0.024 – 0.042 mm (0.0009 – 0.0017 in)
   No. 3 Journal:
   0.030 – 0.048 mm (0.0012 – 0.0019 in)
   Service Limit: 0.06 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the vehicle), remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust the clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

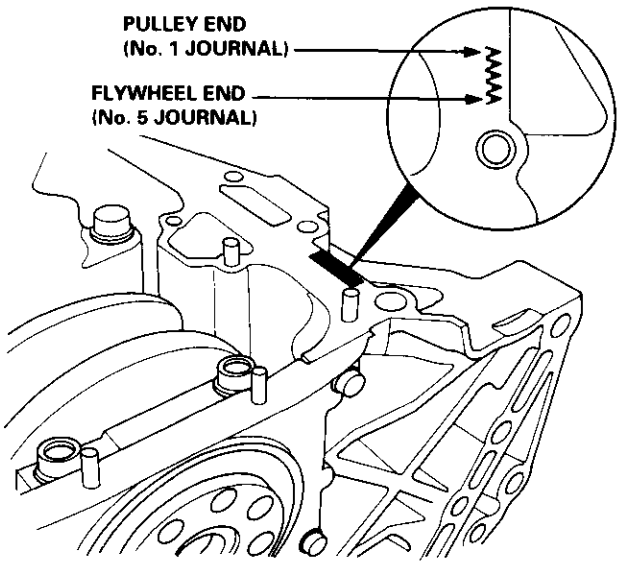
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Main Bearings

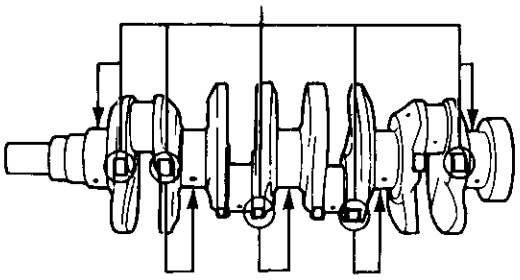
Selection

Crankshaft Bore Code Location

Letters have been stamped on the end of the block as a code for the size of each of the 5 main journal bores.
Use them, and the numbers or bars stamped on the crank (codes for main journal size), to choose the correct bearings.
If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.



Main Journal Code Locations (Numbers or Bars)



Bearing Identification
Color code is on the edge of the bearing.

→ Larger crank bore

A	B	C	D

→ Smaller bearing (thicker)

Smaller main journal	Smaller bearing (thicker)			
1 or I	Red	Pink	Yellow	Green
2 or II	Pink	Yellow	Green	Brown
3 or III	Yellow	Green	Brown	Black
4 or IIII	Green	Brown	Black	Blue

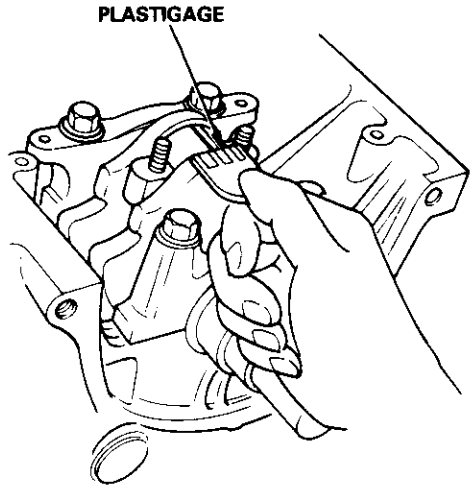
Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place the plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts.

   Torque: 31 N·m (3.2 kgf·m, 23 lbf·ft)

   NOTE: Do not rotate the crankshaft during inspection.
5. Remove the rod cap and bearing half, and measure the widest part of the plastigage.

   Connecting Rod Bearing-to-Journal Oil Clearance:
   Standard (New): 0.020 – 0.038 mm (0.0008 – 0.0015 in)
   Service Limit: 0.05 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust the clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

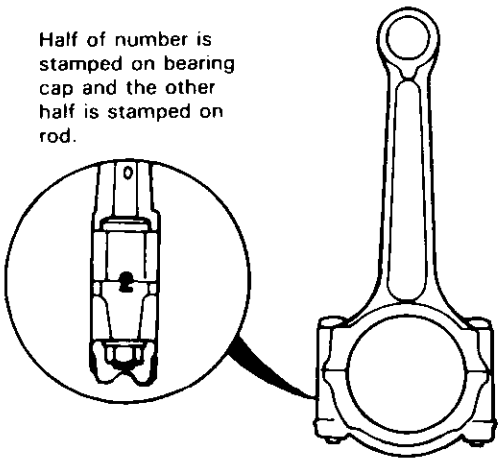
Connecting Rod Bearings

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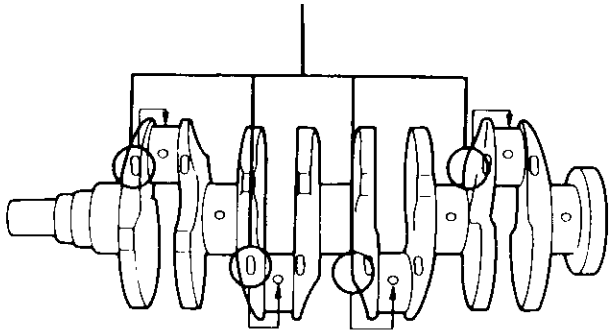
Selection

Connecting Rod Code Location

Numbers have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters stamped on the crankshaft (codes for rod journal size), to choose the correct bearings.
If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.



Connecting Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing. → Larger big end bore

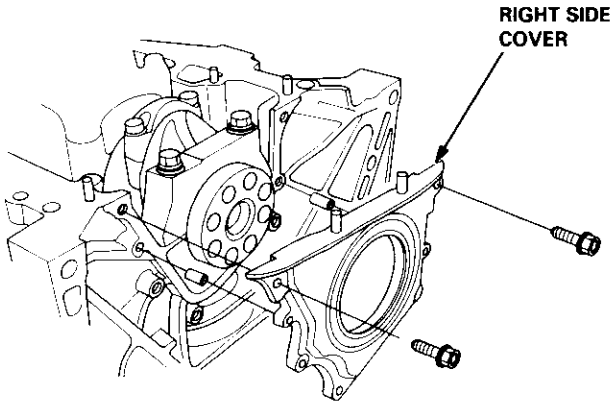
1	2	3	4

→ Smaller bearing (thicker)

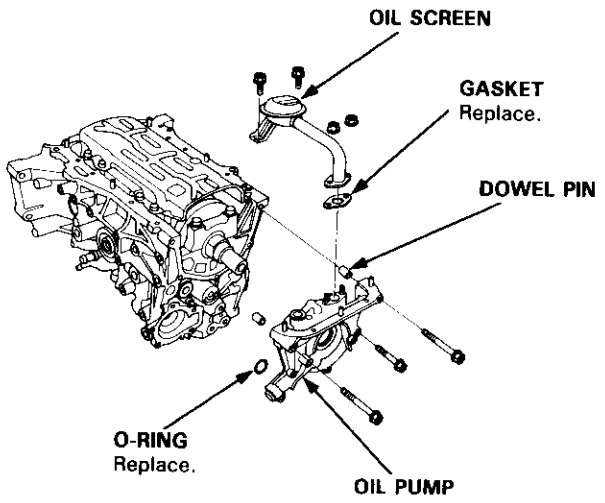
Smaller rod journal	Smaller bearing (thicker)			
A or I	Red	Pink	Yellow	Green
B or II	Pink	Yellow	Green	Brown
C or III	Yellow	Green	Brown	Black
D or IIII	Green	Brown	Black	Blue

Removal

1. Remove the oil pan assembly.
2. Remove the right side cover.



3. Remove the oil screen.
4. Remove the oil pump.



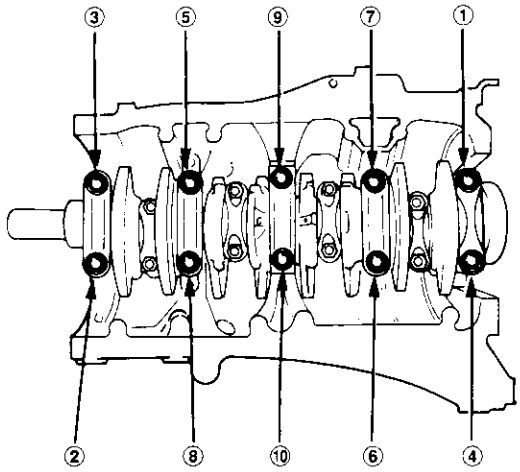
5. Remove the baffle plate.

(cont'd)

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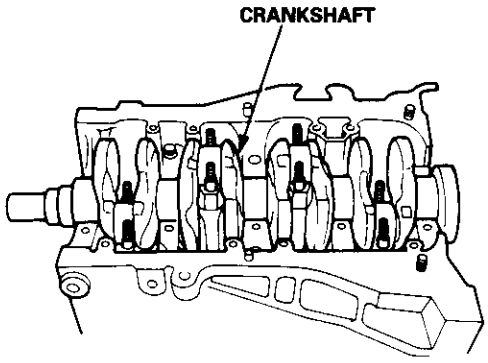
Removal (cont'd)

6. Remove the bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.



7. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.

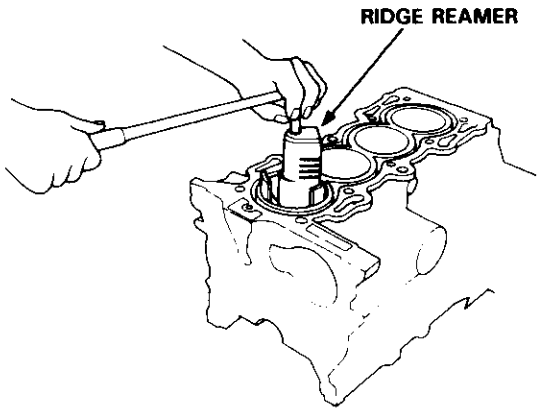
8. Lift the crankshaft out of the engine, being careful not to damage the journals.



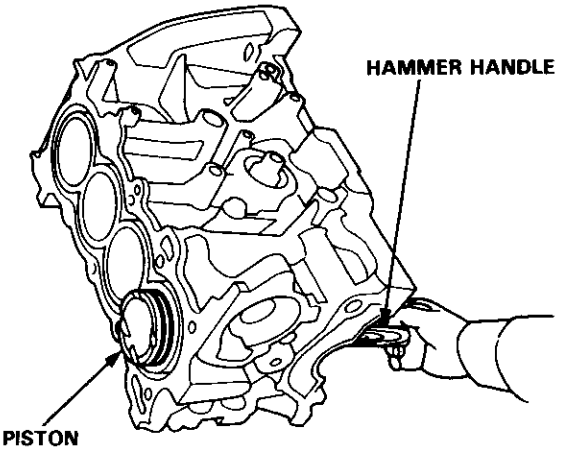
9. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.

10. Reinstall the main caps and bearings on the engine in proper order.

11. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.



12. Use the wooden handle of a hammer to drive the pistons out.



13. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.

14. To avoid mixup on reassembly, mark each piston/connecting rod assembly with its cylinder number.

    NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

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Inspection

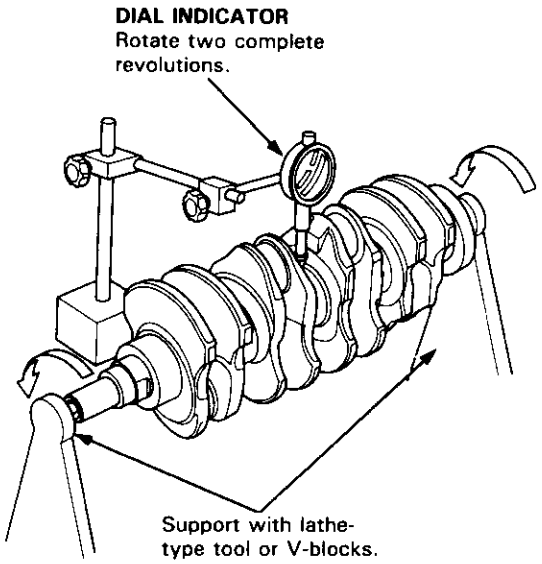
1. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.

2. Check the keyway and threads.

Alignment

3. Measure the runout on all main journals to make sure the crank is not bent. The difference between measurements on each journal must not be more than the service limit.

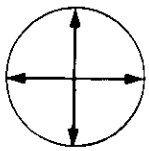
Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)

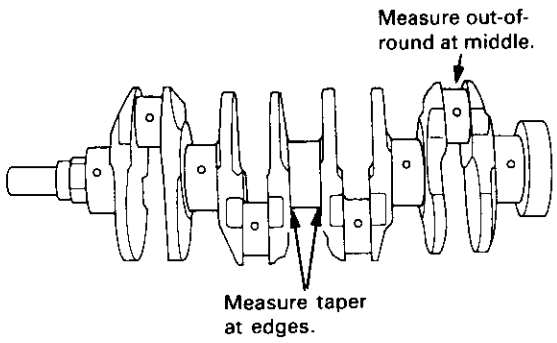


Out-of-Round and Taper

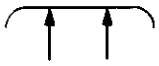
4. Measure out-of-round at the middle of each rod and main journal in two places. The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)









5. Measure taper at the edges of each rod and main journal. The difference between measurements on each journal must not be more than the service limit.

Journal Taper:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)

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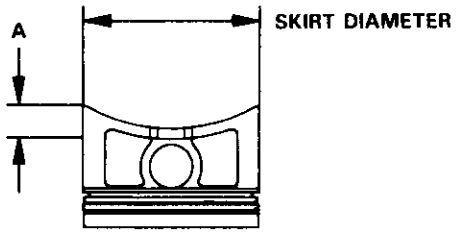
Inspection

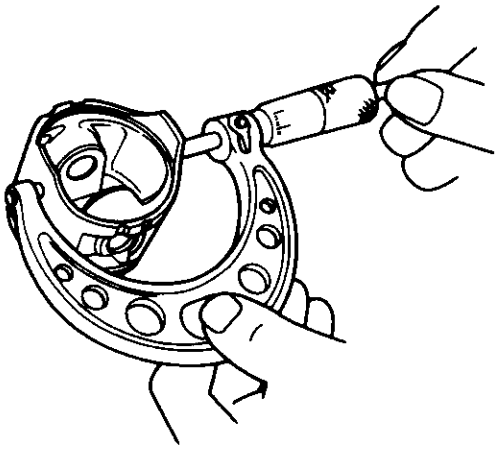
1. Check each piston for distortion or cracks.

2. Measure the piston diameter at distance A from the bottom of the skirt.

   A: '97 – 98 models 15 mm (0.6 in)
   '99 – 00 models 20 mm (0.8 in)

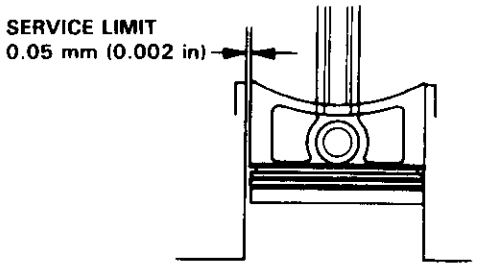
   Piston Diameter:
   Standard (New): 83.980 – 83.990 mm (3.3063 – 3.3067 in)
   Service Limit: 83.970 mm (3.3059 in)





3. Calculate the difference between the cylinder bore diameter (see page 7-13) and the piston diameter.

   Piston-to-Cylinder Clearance:
   Standard (New): 0.010 – 0.040 mm (0.0004 – 0.0016 in)
   Service Limit: 0.05 mm (0.002 in)

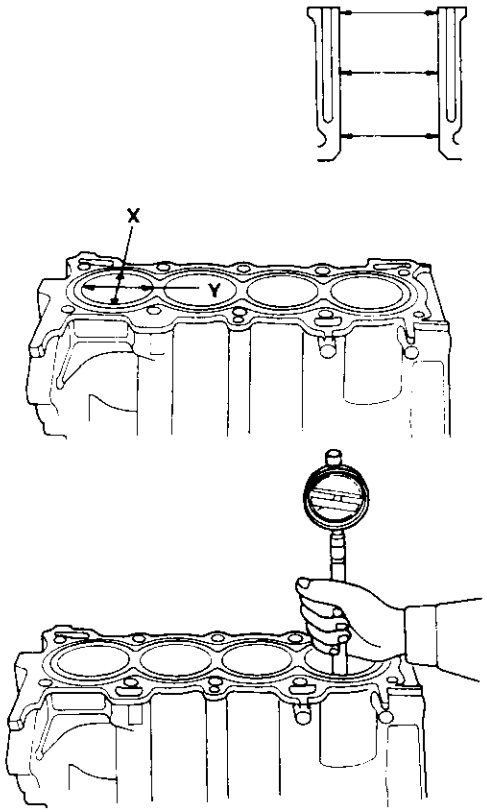


If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

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Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder. If the measurements in any cylinder are beyond the Service Limit, replace the block.

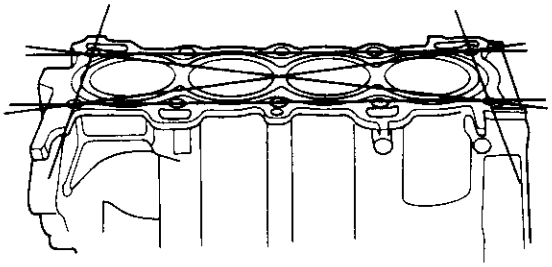


Cylinder Bore Size:
Standard (New): 84.00 – 84.02 mm (3.307 – 3.308 in)
Service Limit: 84.07 mm (3.310 in)

Bore Taper:
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

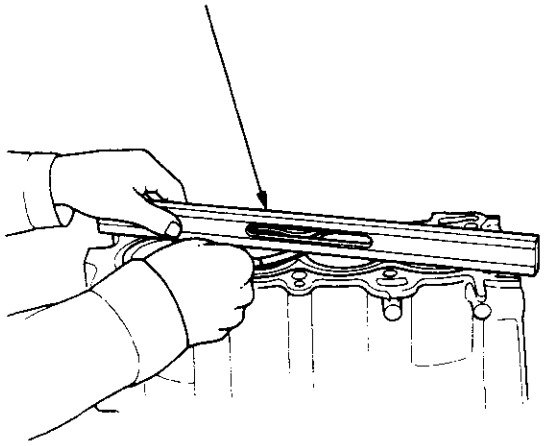
2. Check the top of the block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Engine Block Warpage:
Standard (New): 0.07 mm (0.003 in) max.
Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE

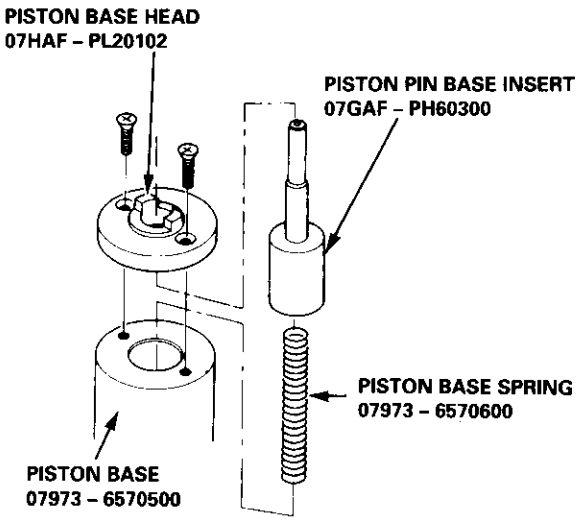


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Piston Pins

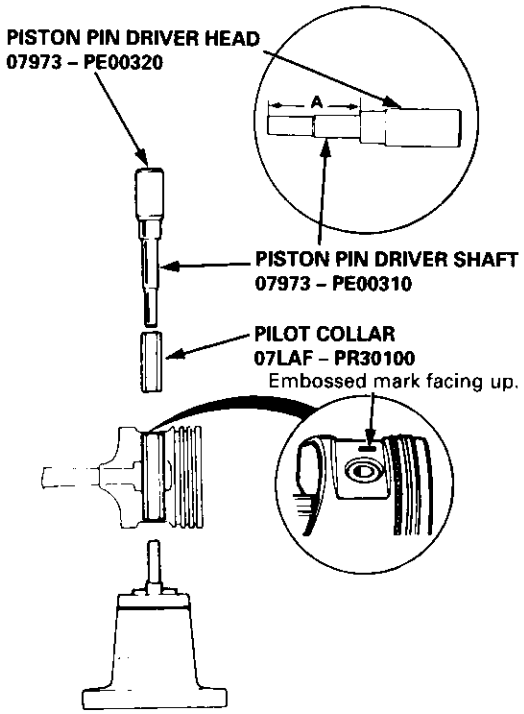
Removal

1. Assemble the Piston Pin Tools as shown.



2. Adjust the length A of the piston pin driver.

A: 49.70 mm (1.957 in)



3. Place the piston on the piston base, and press the pin out with a hydraulic press. Make sure that the recessed portion of the piston aligns with the lips on the collar.

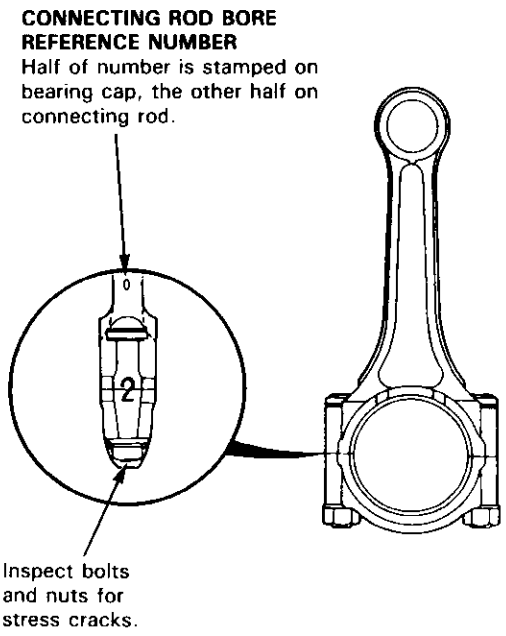
Connecting Rods

Selection

Each rod falls into one of four tolerance ranges (from 0 to + 0.024 mm (0 to + 0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3, or 4) indicating the range.
You may find any combination of 1, 2, 3, or 4 in any engine.

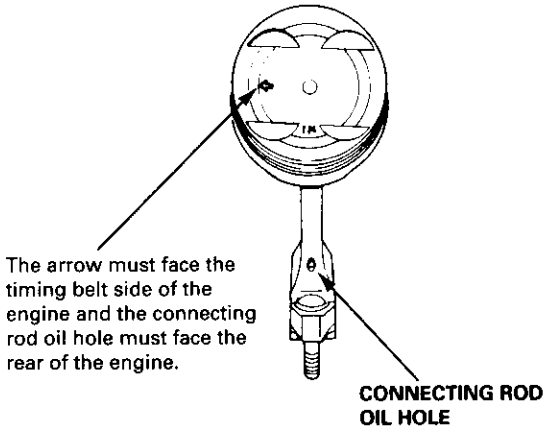
Normal Bore Size: 48.0 mm (1.89 in)

Inspect the connecting rod for cracks and heat damage.



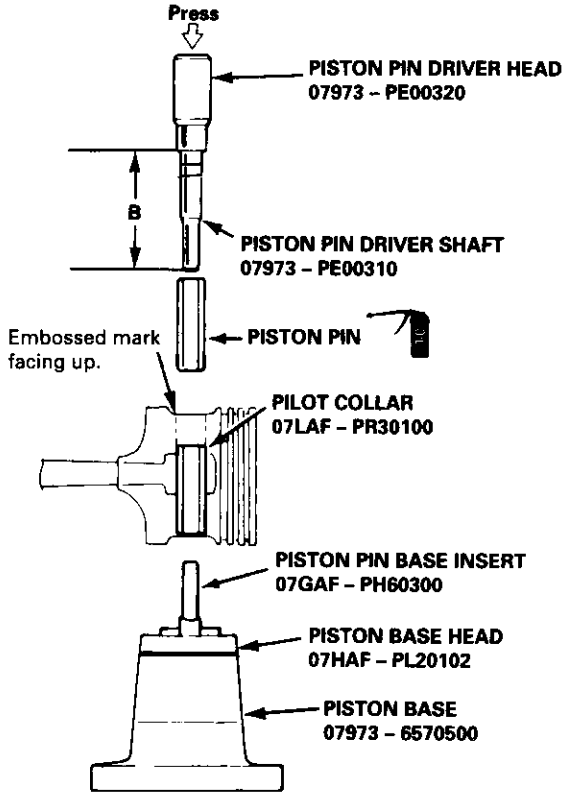
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Installation



1. Adjust the length B of the piston pin driver and shaft.

B: 49.70 mm (1.957 in)



2. Place the piston on the piston base and press the pin in with a hydraulic press. Make sure that the recessed portion of the piston aligns with the lugs on the piston base head.

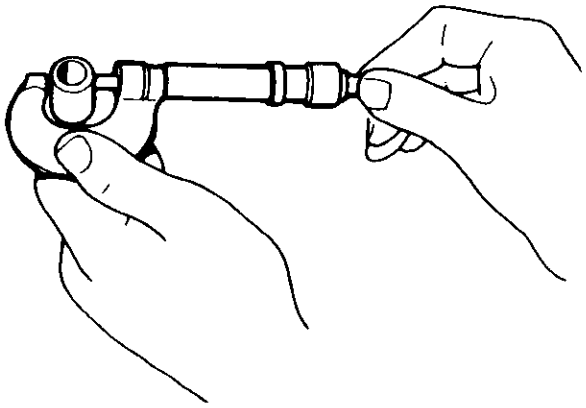
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Piston Pins

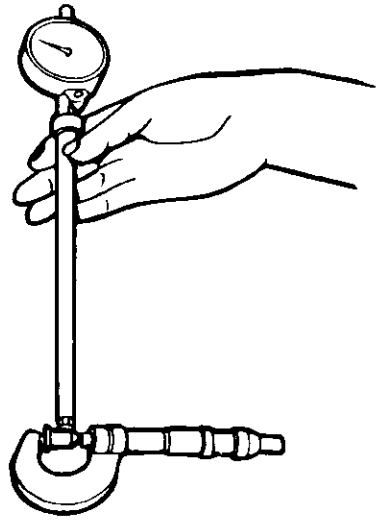
Inspection

1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): 20.996 – 21.000 mm
(0.8266 – 0.8268 in)
Oversize: 20.998 – 21.002 mm
(0.8267 – 0.8268 in)



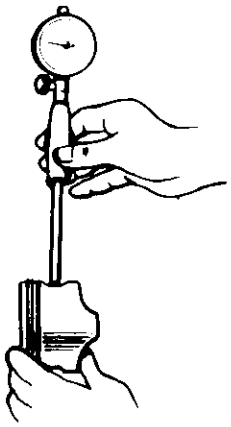
2. Zero the dial indicator to the piston pin diameter.



3. Measure the piston pin-to-piston clearance. If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

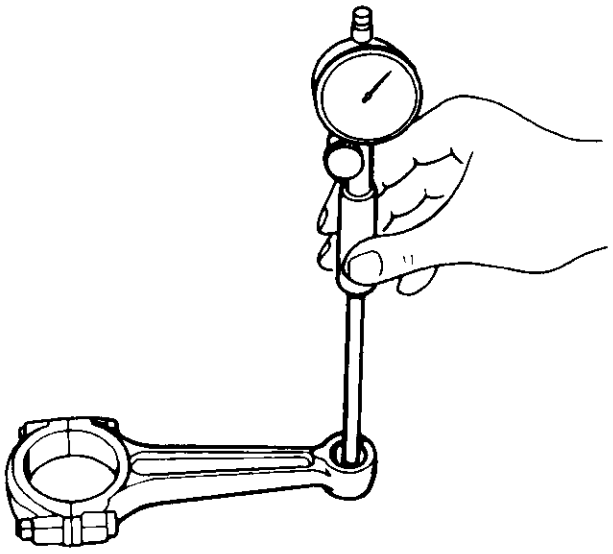
NOTE: All replacement piston pins are oversize.

Piston Pin-to-Piston Clearance:
Standard (New): 0.010 – 0.017 mm
(0.0004 – 0.0007 in)



4. Check the difference between the piston pin diameter and the connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference:
Standard (New): 0.015 – 0.032 mm
(0.0006 – 0.0013 in)



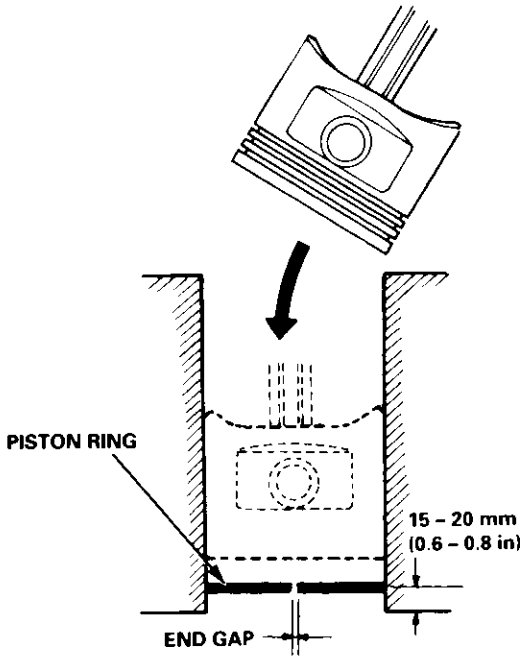
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End Gap

1. Using a piston, push a new ring into the cylinder bore 15 – 20 mm (0.6 – 0.8 in) from the bottom.

2. Measure the piston ring end-gap with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-13.

Piston Ring End-Gap:
Top Ring
Standard (New): 0.20 – 0.30 mm (0.008 – 0.012 in)
Service Limit: 0.60 mm (0.024 in)
Second Ring
Standard (New): 0.40 – 0.55 mm (0.016 – 0.022 in)
Service Limit: 0.70 mm (0.028 in)
Oil Ring
Standard (New): 0.20 – 0.50 mm (0.008 – 0.020 in)
Service Limit: 0.70 mm (0.028 in)

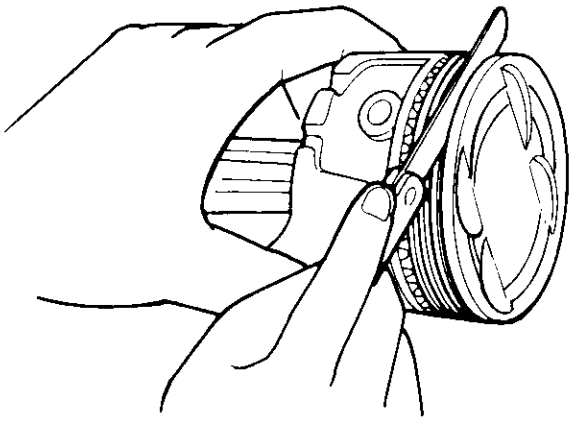


Ring-to-Groove Clearance

After installing a new set of rings, measure the ring-to-groove clearances:

Top Ring Clearance:
Standard (New): 0.055 – 0.080 mm (0.0022 – 0.0031 in)
Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance:
Standard (New): 0.035 – 0.060 mm (0.0014 – 0.0024 in)
Service Limit: 0.13 mm (0.005 in)



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Piston Rings

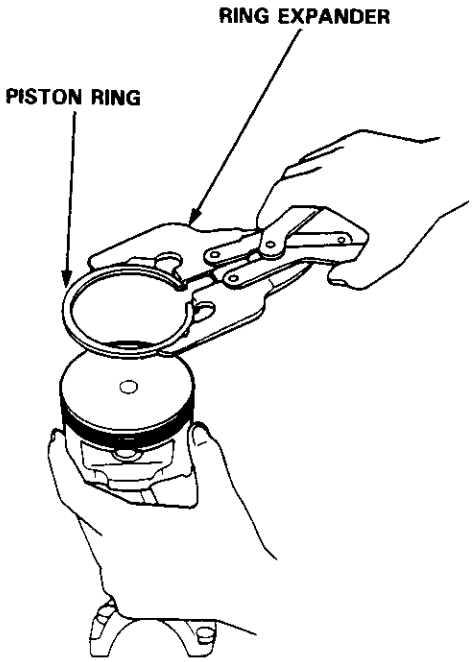
Replacement

1. Using a ring expander, remove the old piston rings.
2. Clean all the ring grooves thoroughly with a squared-off broken ring or a ring groove cleaner with a blade to fit the piston grooves.

   The top ring groove is 1.2 mm (0.042 in) wide, the second ring groove is 1.2 mm (0.042 in) wide, and the oil ring groove is 2.8 mm (0.11 in) wide. File down a blade if necessary.

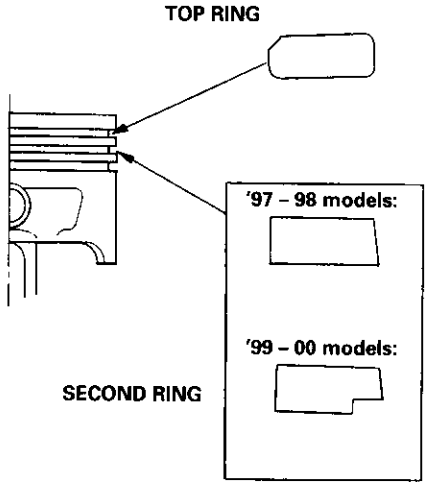
   Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.
3. Install the new rings in the proper sequence and position (shown in the right column).

   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

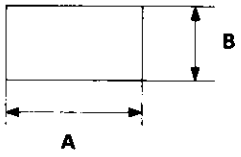


Alignment

1. Install the rings as shown.

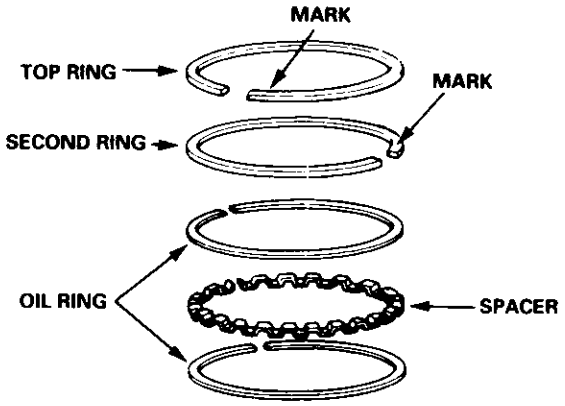


Piston Ring Dimensions:



Top Ring (standard):
A: 3.1 mm (0.12 in)
B: 1.2 mm (0.05 in)
Second Ring (standard):
A: 3.4 mm (0.13 in)
B: 1.2 mm (0.05 in)

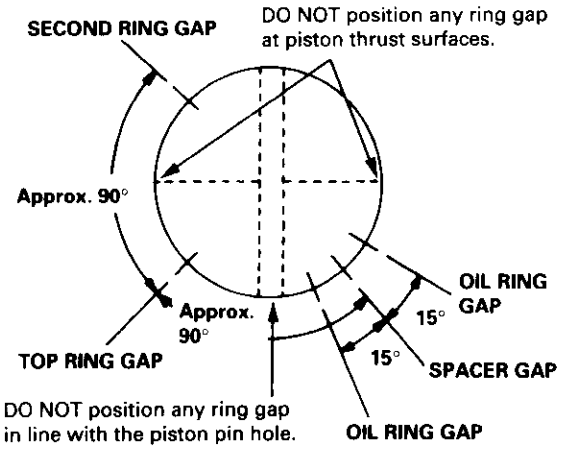
NOTE: The manufacturing marks must be facing upward.



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2. Rotate the rings in their grooves to make sure they do not bind.

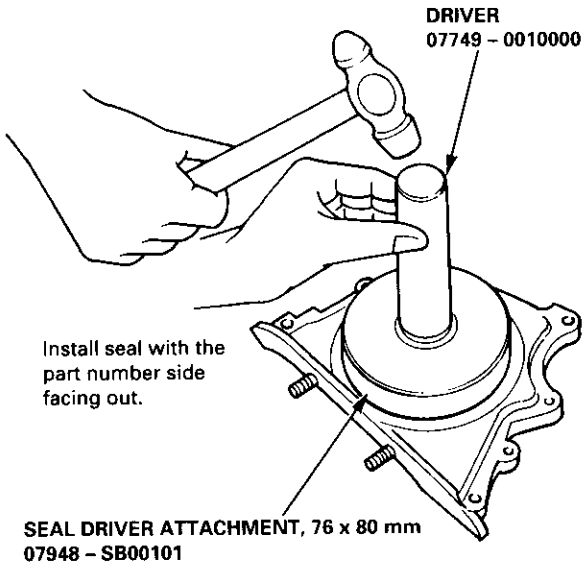
3. Position the ring end gaps as shown:



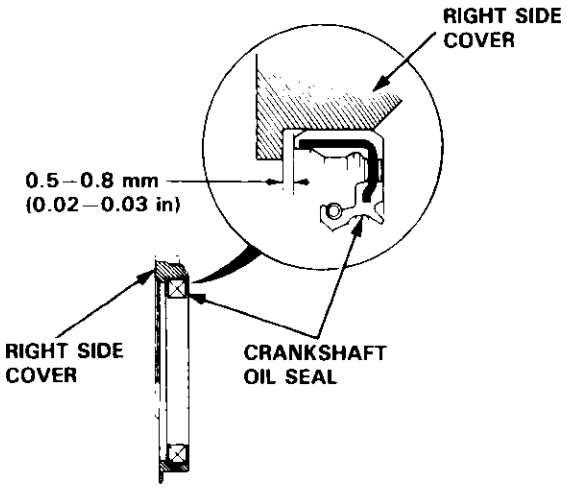
Installation

1. The seal mating surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of the seal.

2. Drive the crankshaft oil seal squarely into the right side cover.



3. Confirm that the clearance is equal all the way around with a feeler gauge.
Clearance: 0.5 – 0.8 mm (0.02 – 0.03 in)



NOTE: Refer to pages 7-23 and 8-10 for installation of the oil pump side crankshaft oil seal.

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Installation

1. Apply a coat of engine oil to the ring grooves and cylinder bores.

If the crankshaft is already installed:

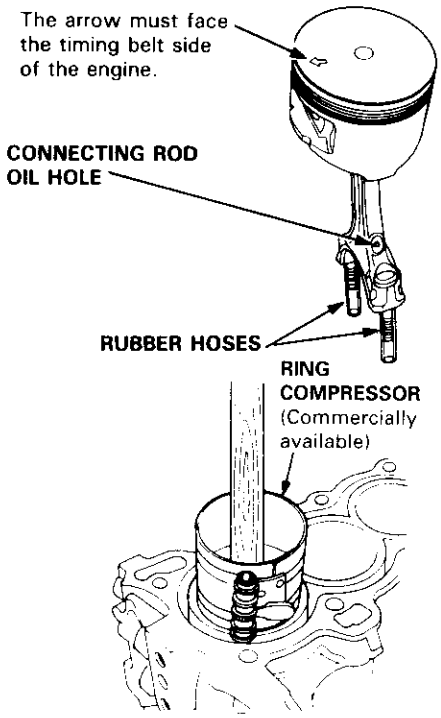
2. Set the crankshaft to BDC for each cylinder.
3. Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
4. Install the ring compressor, and check that the bearing is securely in place.
5. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer. Maintain downward force on the ring compressor to prevent rings from expanding before entering the cylinder bore.
6. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing piston into place.
7. Install the rod caps with bearings, and torque the nuts to:

   31 N·m (3.2 kgf·m, 23 lbf·ft)

   Apply engine oil to the bolt threads.

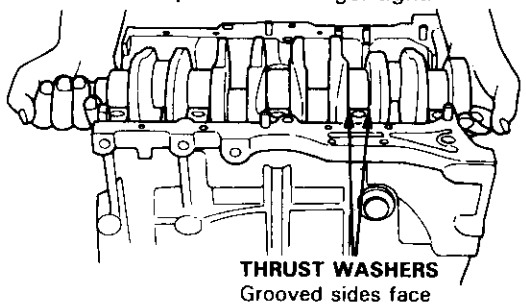
If the crankshaft is not installed:

2. Remove the rod caps and bearings, and install the ring compressor.
3. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer. Maintain downward force on the ring compressor to prevent rings from expanding before entering the cylinder bore.
4. Position all the pistons at top dead center.



Installation

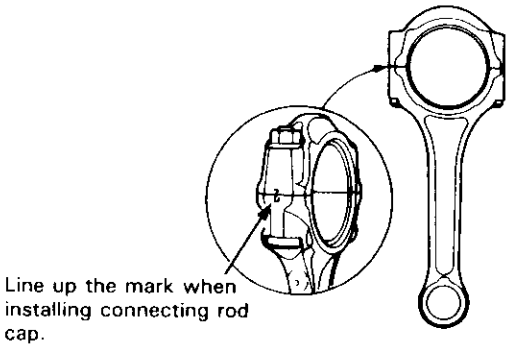
1. Apply a coat of engine oil to the main bearings and rod bearings.
2. Insert the bearing halves in the cylinder block and connecting rods.
3. Hold the crankshaft so the rod journals for cylinders No. 2 and No. 3 are straight down.
4. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3. Install the rod caps and nuts finger-tight.



5. Rotate the crankshaft clockwise, and seat the journals into connecting rods No. 1 and No. 4. Install the rod caps and nuts finger-tight. Install the caps so the bearing recess is on the same side as the recess in the rod.
6. Check the rod bearing clearance with plastigage (see page 7-8), then torque the capnuts.

   Torque:
   31 N·m (3.2 kgf·m, 23 lbf·ft)
   Apply engine oil to the bolt threads.

7. Install the thrust washers on the No. 4 journal.



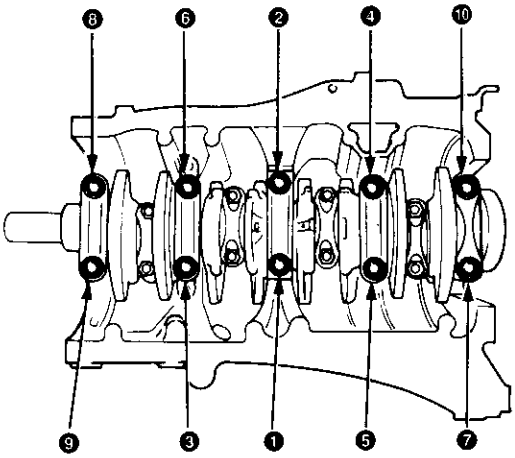
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8. Coat the thrust washer surfaces and bolt threads with oil.

9. Install the main bearing caps.
Check clearance with plastigage (see page 7-7), then tighten the bearing cap bolts in 2 steps.

First step: 25 N·m (2.5 kgf·m, 18 lbf·ft)
Second step: 76 N·m (7.8 kgf·m, 56 lbf·ft)

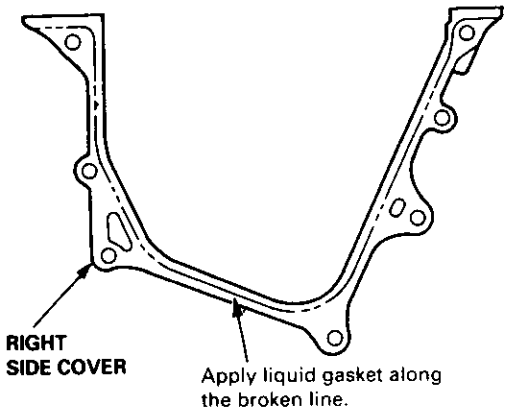
MAIN BEARING CAP BOLTS TIGHTENING SEQUENCE

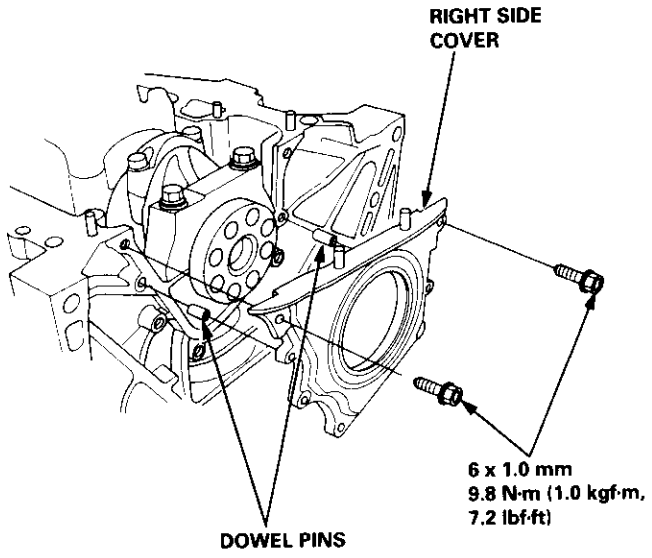


NOTE: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

10. Clean and dry the right side cover mating surfaces.

11. Apply liquid gasket, part No. 08718 – 0001 or 08718 – 0003, evenly to the block mating surface of the right side cover and to the inner threads of the bolt holes. Install it on the cylinder block.





NOTE:
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

(cont'd)

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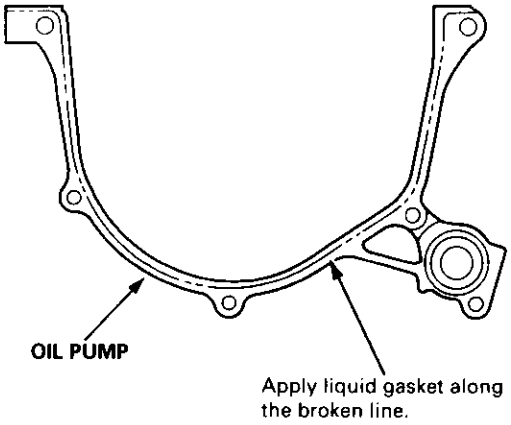
Installation (cont'd)

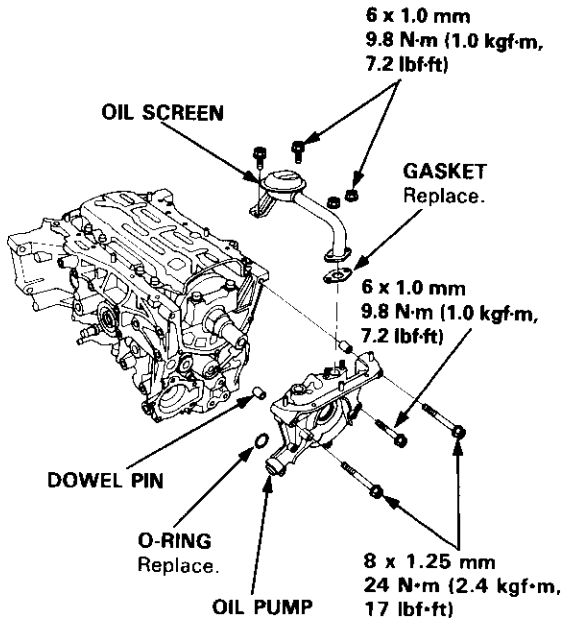
12. Apply liquid gasket to the oil pump mating surface of the block.

13. Apply a light coat of oil to the crankshaft, the lip of the seal, and the O-rings.

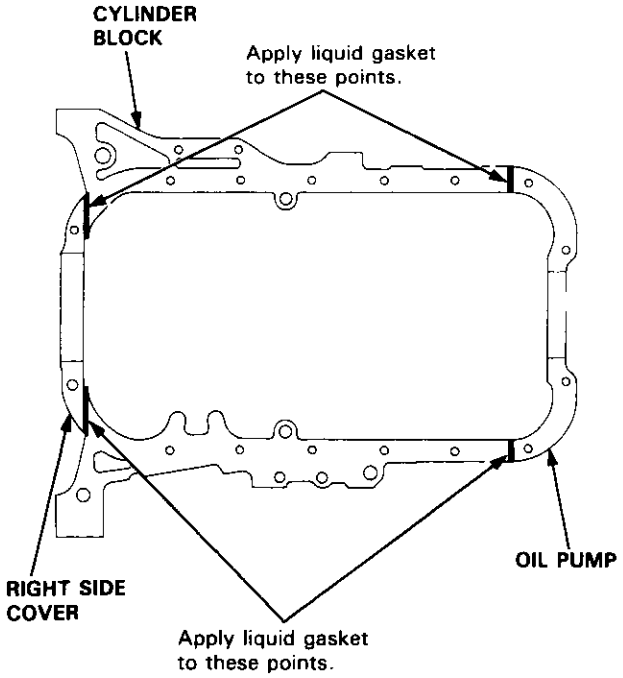
14. Apply grease to the lips of the oil seals.

15. Align the inner rotor with the crankshaft, then install the oil pump. When the pump is in place, clean any excess grease off the crankshaft, then check that the oil seal lips are not distorted.

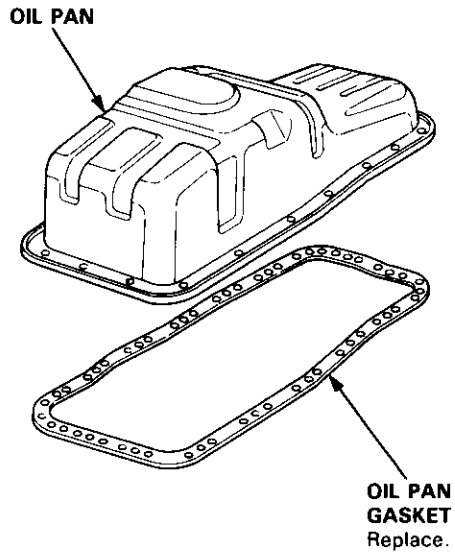




16. Apply liquid gasket on the oil pump and right side cover mating areas.

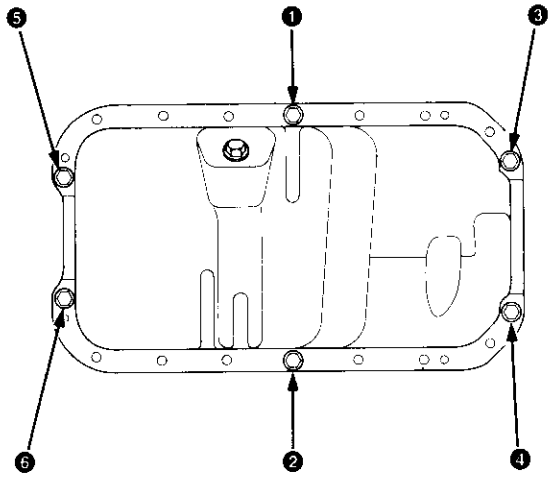


17. Install the oil pan gasket and oil pan. Wait no more than five minutes after applying liquid gasket.



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18. Tighten the bolts and nuts finger tight at six points.



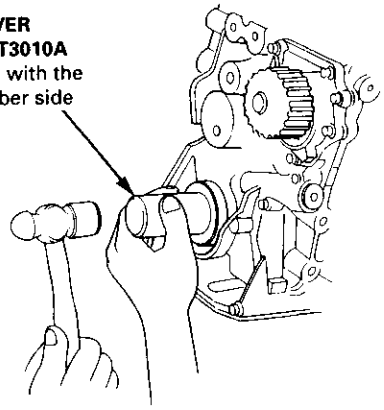
19. Tighten all bolts and nuts, starting from nut ①, clockwise in three steps. Excessive tightening can cause distortion of the oil pan gasket and oil leakage.

Torque: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

Installation

1. Dry the crankshaft oil seal housing.
2. Apply a light coat of grease to the crankshaft and to the lips of the seals.
3. Using the special tool, drive in the timing pulley-end seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

SEAL DRIVER
07LAD – PT3010A
Install seal with the parts number side facing out.

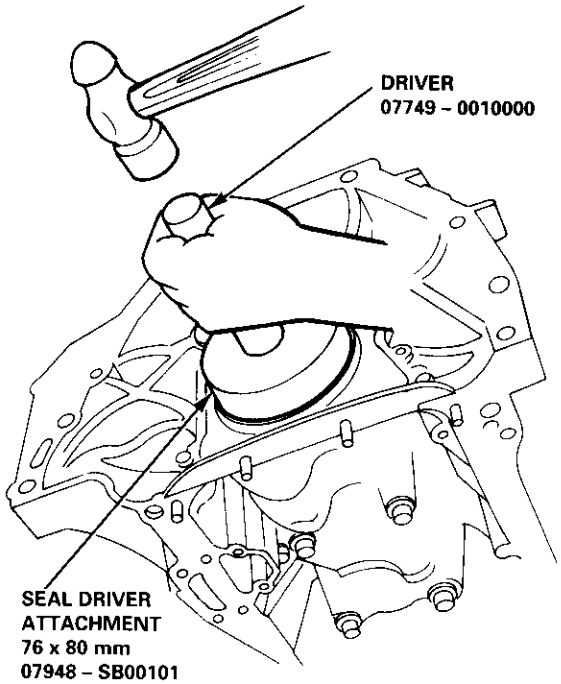


(cont'd)

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Installation (cont'd)

4. Measure the flywheel-end seal thickness and the oil seal housing depth. Using the special tool, drive the flywheel-end seal into the rear cover to the point where the clearance between the bottom of the oil seal and the right side cover is 0.5 – 0.8 mm (0.02 – 0.03 in) (see page 7-19). Align the hole in the driver attachment with the pin on the crankshaft.



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Engine Lubrication

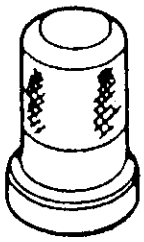
Special Tools 8-2
Illustrated Index 8-3
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  Inspection 8-4
  Replacement 8-4
Oil Filter
  Replacement 8-5
Oil Pressure Switch
  Testing 8-7
Oil Pressure
  Testing 8-7
Oil Pump
  Overhaul 8-8
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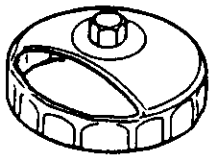
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAD – PT3010A	Seal Driver	1	8-10
②	07912 – 6110001	Oil Filter Wrench	1	8-6

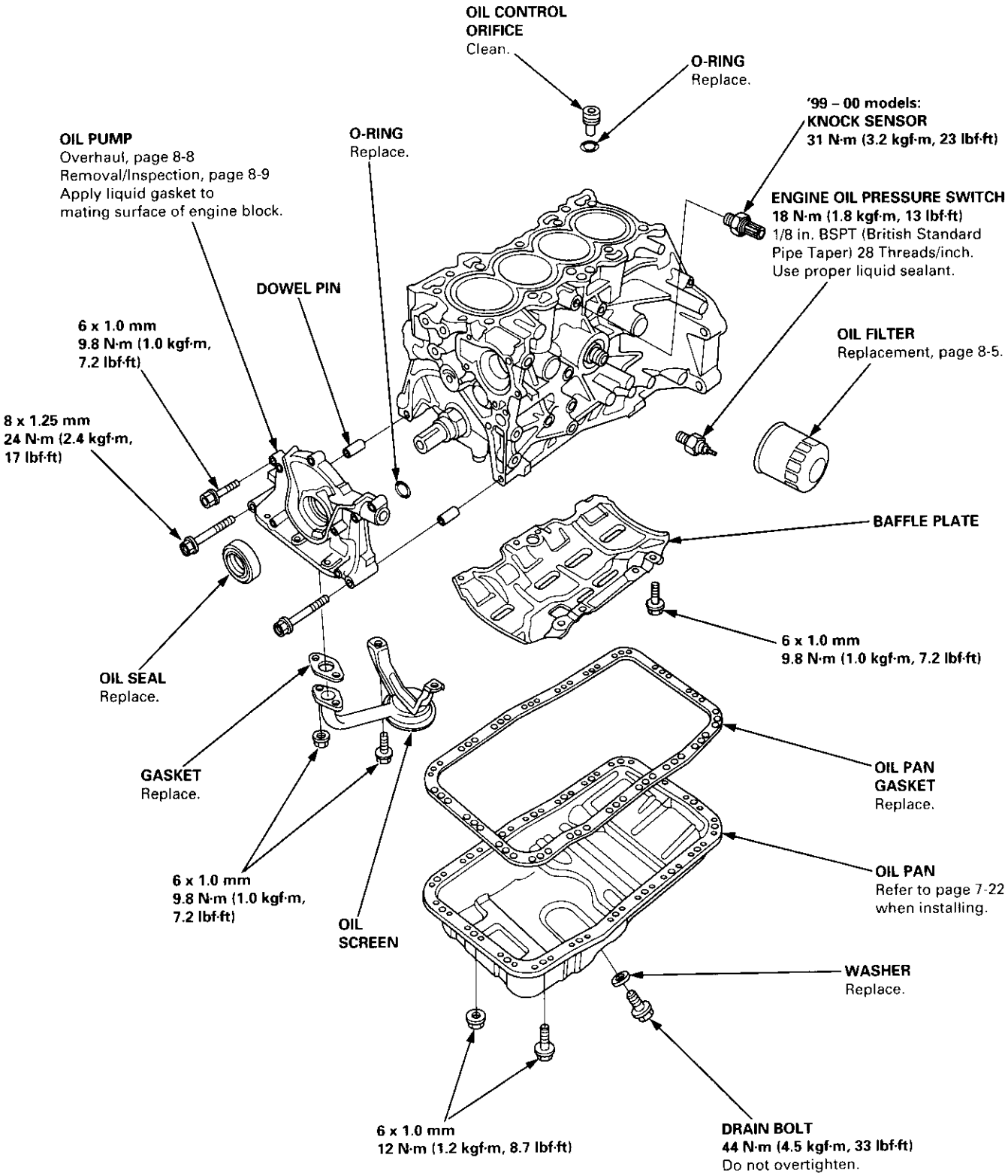


①



②

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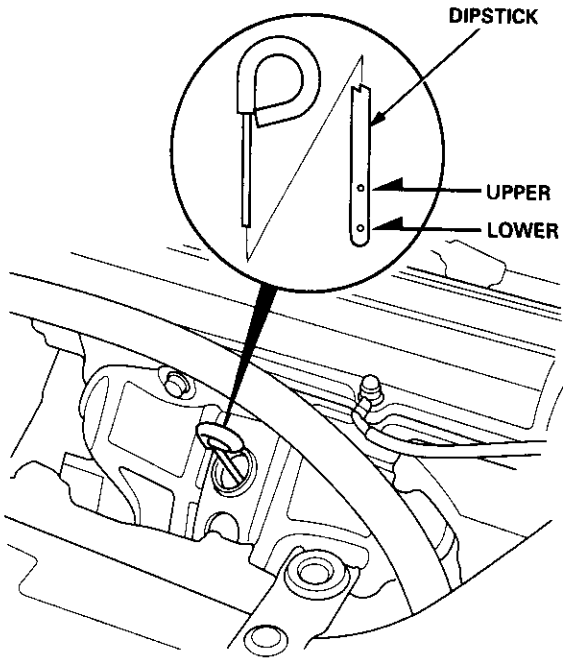


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Engine Oil

Inspection

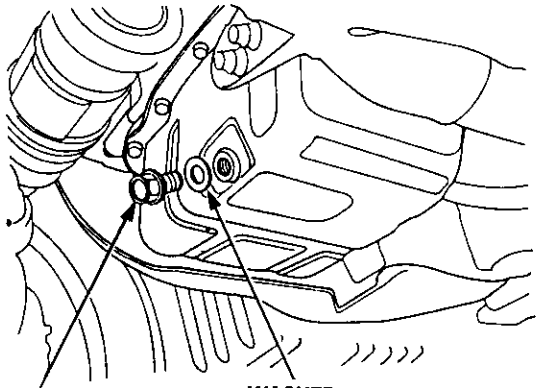
1. Park the vehicle on level ground, and turn off the engine. Allow the oil a few minutes to drain back into the oil pan so the dipstick will show the actual level.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks. Insert the dipstick carefully to avoid bending it.
3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.



Replacement

CAUTION: Remove the drain plug carefully while the engine is hot; the hot oil may cause scalding.

1. Warm up the engine.
2. Drain the engine oil.



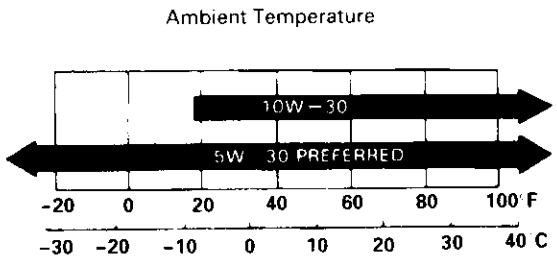
3. Reinstall the drain bolt with a new washer, and refill with the recommended oil.

Requirement	API Service Grade: Use "Energy Conserving" SJ or "Energy Conserving II" SH grade oil. SAE 5W – 30 preferred: You can also use an oil that bears the API CERTIFICATION mark.
Capacity	3.5 ℓ (3.7 US qt, 3.1 Imp qt) at oil change. 3.8 ℓ (4.0 US qt, 3.3 Imp qt) at oil change including filter. 4.6 ℓ (4.9 US qt, 4.0 Imp qt) after engine overhaul.
Change interval	Every 7,500 miles (12,000 km) or 12 months (Normal conditions) Every 3,750 miles (6,000 km) or 6 months (Severe conditions).

NOTE: Under normal conditions, the oil filter should be replaced at every other oil change. Under severe conditions, the oil filter should be replaced at each oil change.

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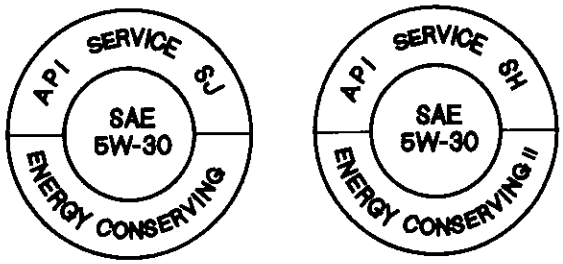
The numbers in the middle of the API Service label tell you the oil's SAE viscosity or weight. Select the oil for your vehicle according to this chart:



An oil with a viscosity of 5 W – 30 is preferred for improved fuel economy and year-round protection in the vehicle. You may use a 10 W – 30 oil if the climate in your area is limited to the temperature range shown on the chart.



API CERTIFICATION SEAL



API SERVICE LABEL

4. Run the engine for more than three minutes, then check for oil leakage.

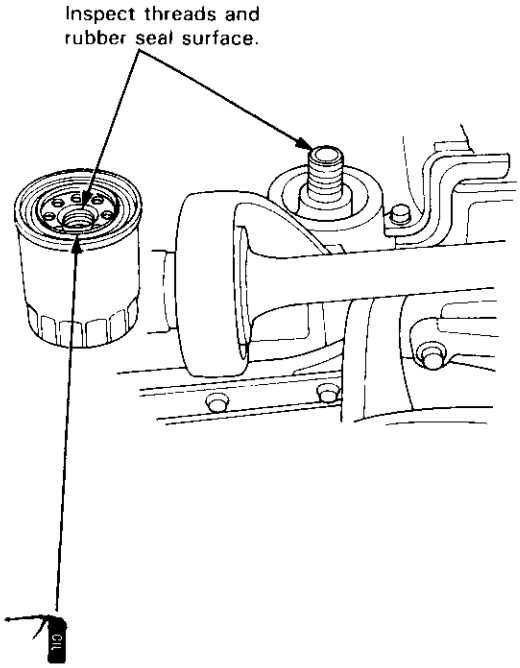
Replacement

CAUTION: After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

1. Remove the oil filter with the special oil filter wrench.

2. Inspect the threads and rubber seal on the new filter. Wipe off the seat on the engine block, then apply a light coat of oil to the filter rubber seal.

   NOTE: Use only filters with a built-in bypass system.



(cont'd)

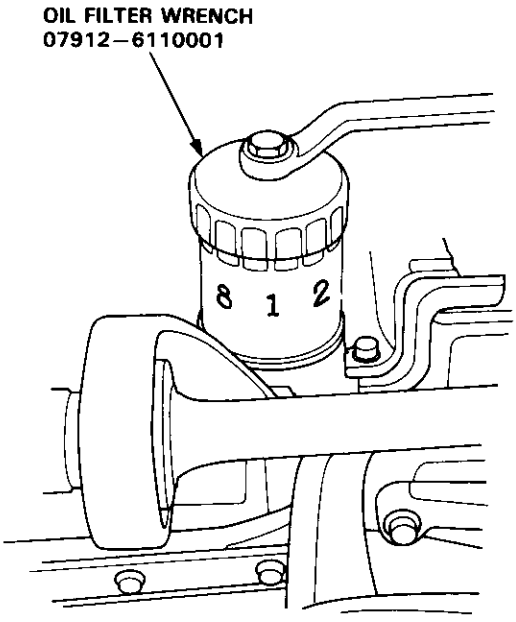
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Replacement (cont'd)

3. Install the oil filter by hand.

4. After the rubber seal seats, tighten the oil filter clockwise with the special tool.

   Tighten: 7/8 turn clockwise
   Tightening torque: 22 N·m (2.2 kgf·m 16 lbf·ft)

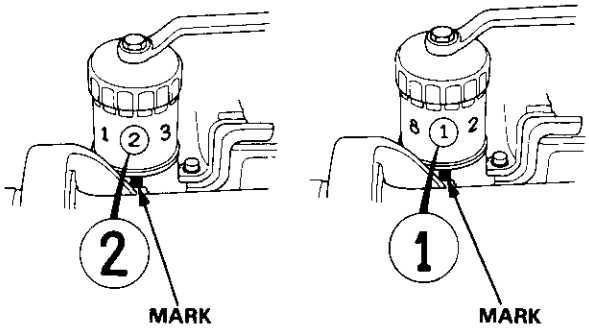


Some filters have eight numbers (1 to 8) printed on the surface of the filter.

The following explains the procedure for tightening filters using these numbers.

1) Make a mark on the cylinder block under the number that shows at the bottom of the filter when the rubber seal is seated.

2) Tighten the filter by turning it clockwise seven numbers from the makes point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated.

Number after tightening.

Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

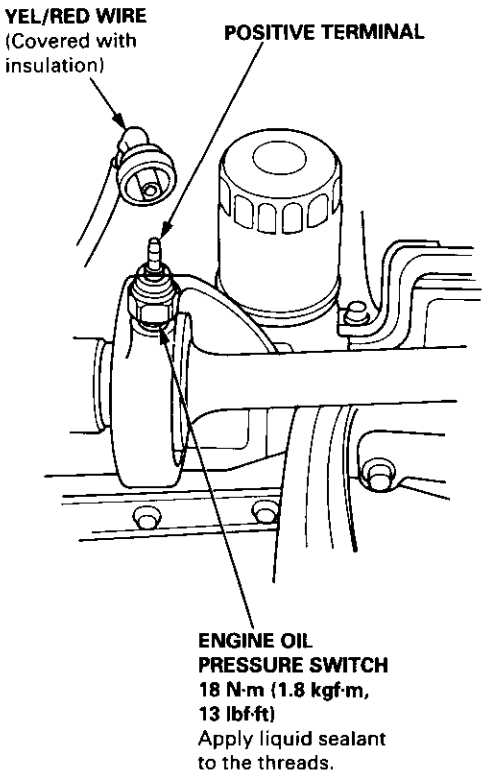
5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage and oil level.

   CAUTION: Installation using other than the above procedure could result in serious engine damage due to oil leakage.

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Testing

1. Remove the YEL/RED wire from the engine oil pressure switch.
2. Check for continuity between the positive terminal and the engine (ground). There should be continuity with the engine stopped. There should be no continuity with the engine running.

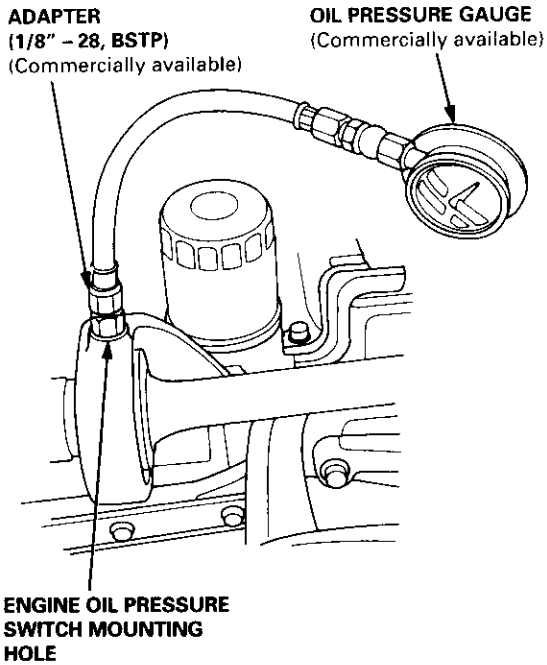


3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure.

Testing

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Connect a tachometer.
2. Remove the engine oil pressure switch, and install an oil pressure gauge.



3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

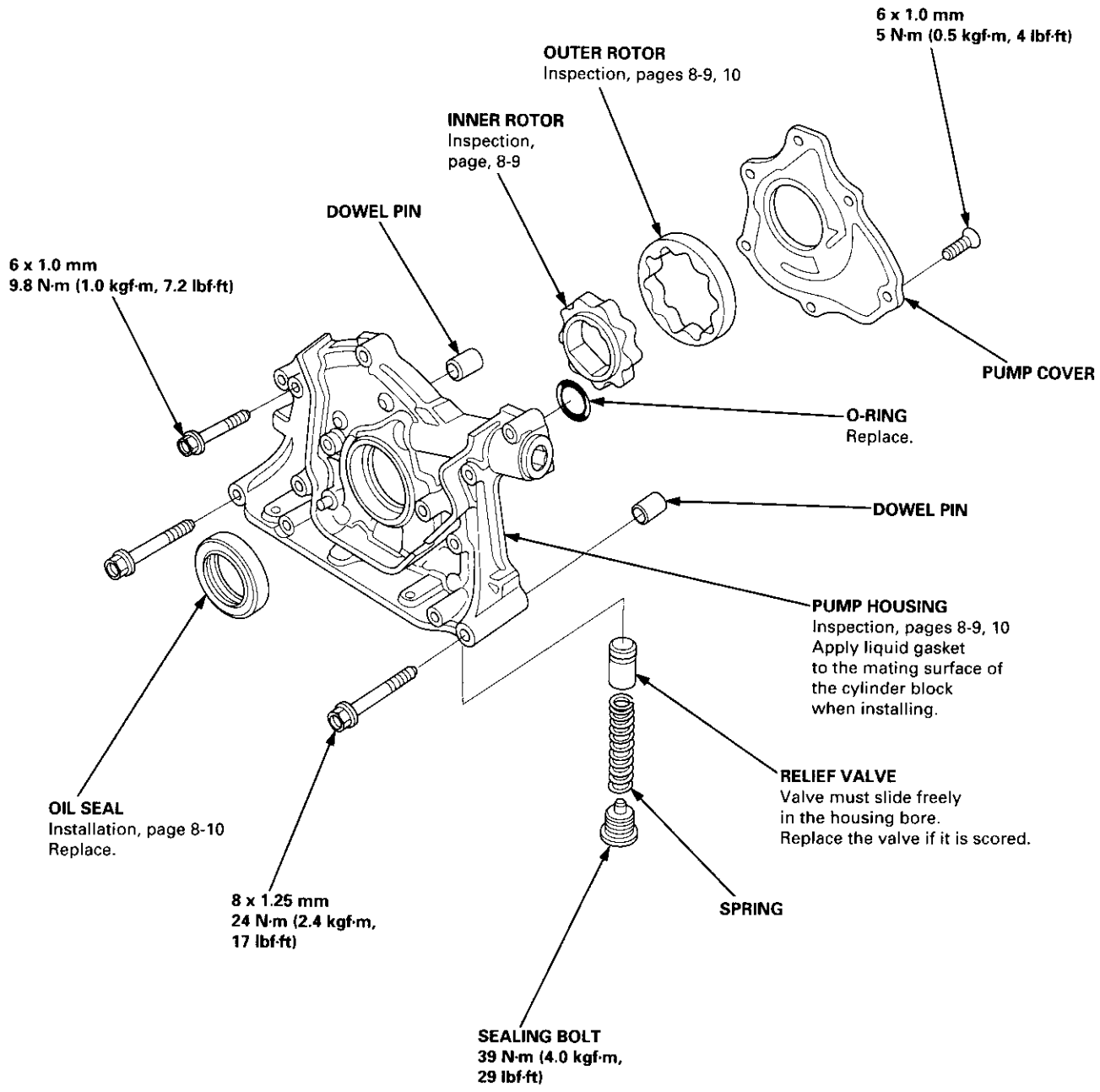
Engine Oil Temperature: 176°F (80°C)
Engine Oil Pressure:
At Idle: 70 kPa (0.7 kgf/cm², 10 psi) minimum
At 3,000 rpm: 340 kPa (3.5 kgf/cm², 50 psi) minimum

5. If oil pressure in not within specifications, inspect the oil pump (see page 8-9).

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Oil Pump

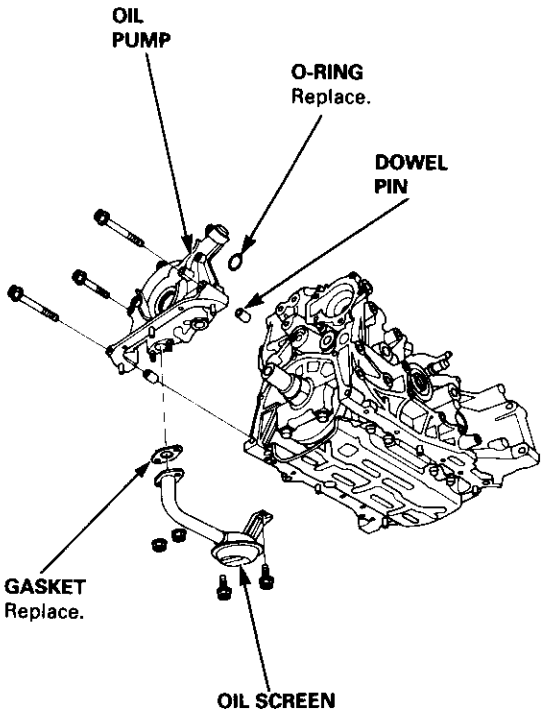
Overhaul



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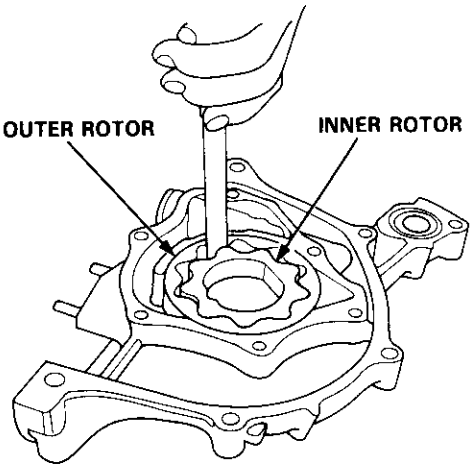
Removal/Inspection/Installation

1. Drain the engine oil.
2. Turn the crankshaft, and align the white groove on the crankshaft pulley with the pointer on the lower cover.
3. Remove the cylinder head cover and middle cover.
4. Remove the power steering pump belt, air conditioner belt and the alternator belt.
5. Remove the crankshaft pulley, and remove the lower cover.
6. Remove the timing belt.
7. Remove the drive pulley.
8. Remove the oil pan and oil screen.
9. Remove the oil pump.



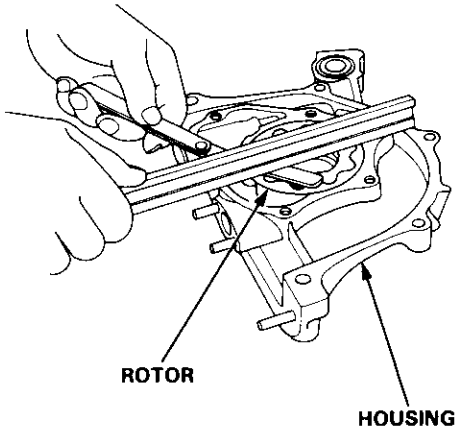
10. Remove the screws from the pump housing, then separate the housing and cover.
11. Check the inner-to-outer rotor radial clearance on the pump rotor. If the inner-to-outer rotor clearance exceeds the service limit, replace the inner and outer rotors.

Inner Rotor-to Outer Rotor Radial Clearance
Standard (New): 0.04 – 0.16 mm (0.002 – 0.006 in)
Service Limit: 0.20 mm (0.008 in)



12. Check the housing-to-rotor axial clearance on the pump rotor. If the housing-to-rotor axial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

Housing-to-Rotor Axial Clearance
Standard (New): 0.02 – 0.07 mm (0.001 – 0.003 in)
Service Limit: 0.15 mm (0.006 in)



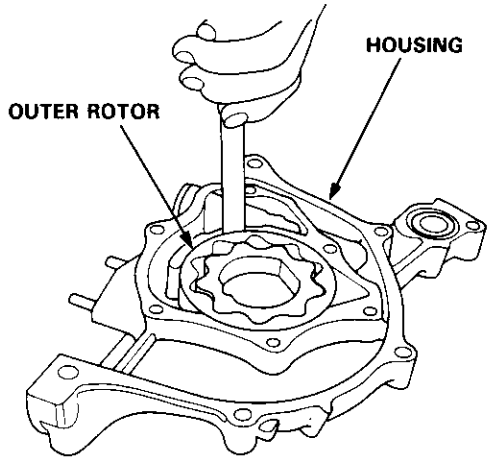
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Removal/Inspection/Installation (cont'd)

13. Check the housing-to-outer rotor radial clearance. If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

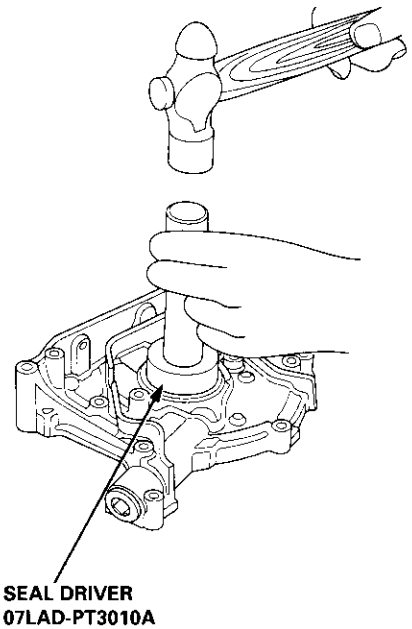
    Housing-to-Outer Rotor Radial Clearance
    Standard (New): 0.10 – 0.19 mm (0.004 – 0.007 in)
    Service Limit: 0.20 mm (0.008 in)



14. Inspect both rotors and the pump housing for scoring or other damage. Replace parts if necessary.

15. Remove the old oil seal from the oil pump.

16. Gently tap in the new crankshaft oil seal until the special tool bottoms on the pump.



17. Reassemble the oil pump, applying liquid thread lock to the pump housing screws.

18. Check that the oil pump turns freely.

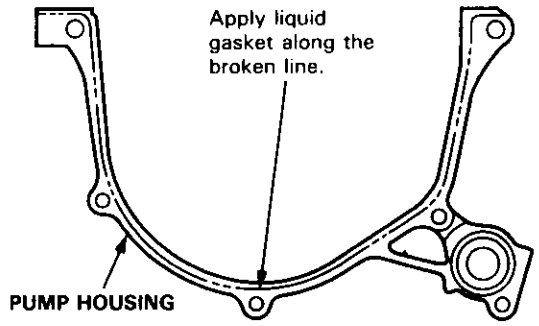
19. Apply a light coat of oil to the seal lip.

20. Clean and dry the oil pump mating surfaces.

21. Install the two dowel pins and a new O-ring on the cylinder block.

22. Apply liquid gasket, part No. 08718-0001 or 08718-0003, to the cylinder block mating surface of the oil pump. Apply the liquid gasket evenly, in a narrow bead centered on the mating surface. Do not apply liquid gasket to the O-ring grooves.

23. Apply liquid gasket to the inner threads of the bolt holes.



NOTE:
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

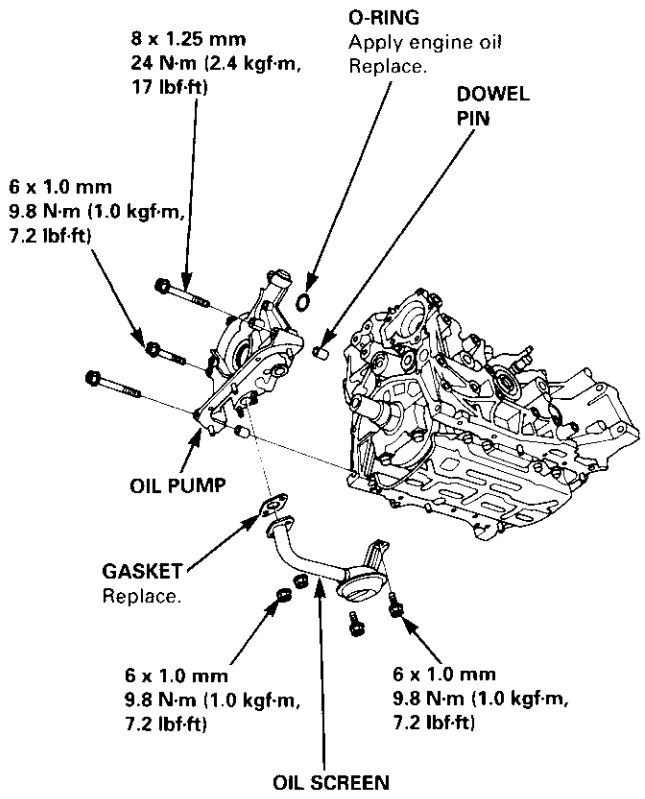
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24. Apply grease to the lip of the oil pump seal.

25. Install the oil pump onto the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

26. Install the oil screen.

27. Install the oil pan (see page 7-22).



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Intake Manifold/Exhaust System

Intake Manifold
Replacement 9-2
Exhaust Manifold
Replacement 9-4
Exhaust Pipe and Muffler
Replacement 9-6



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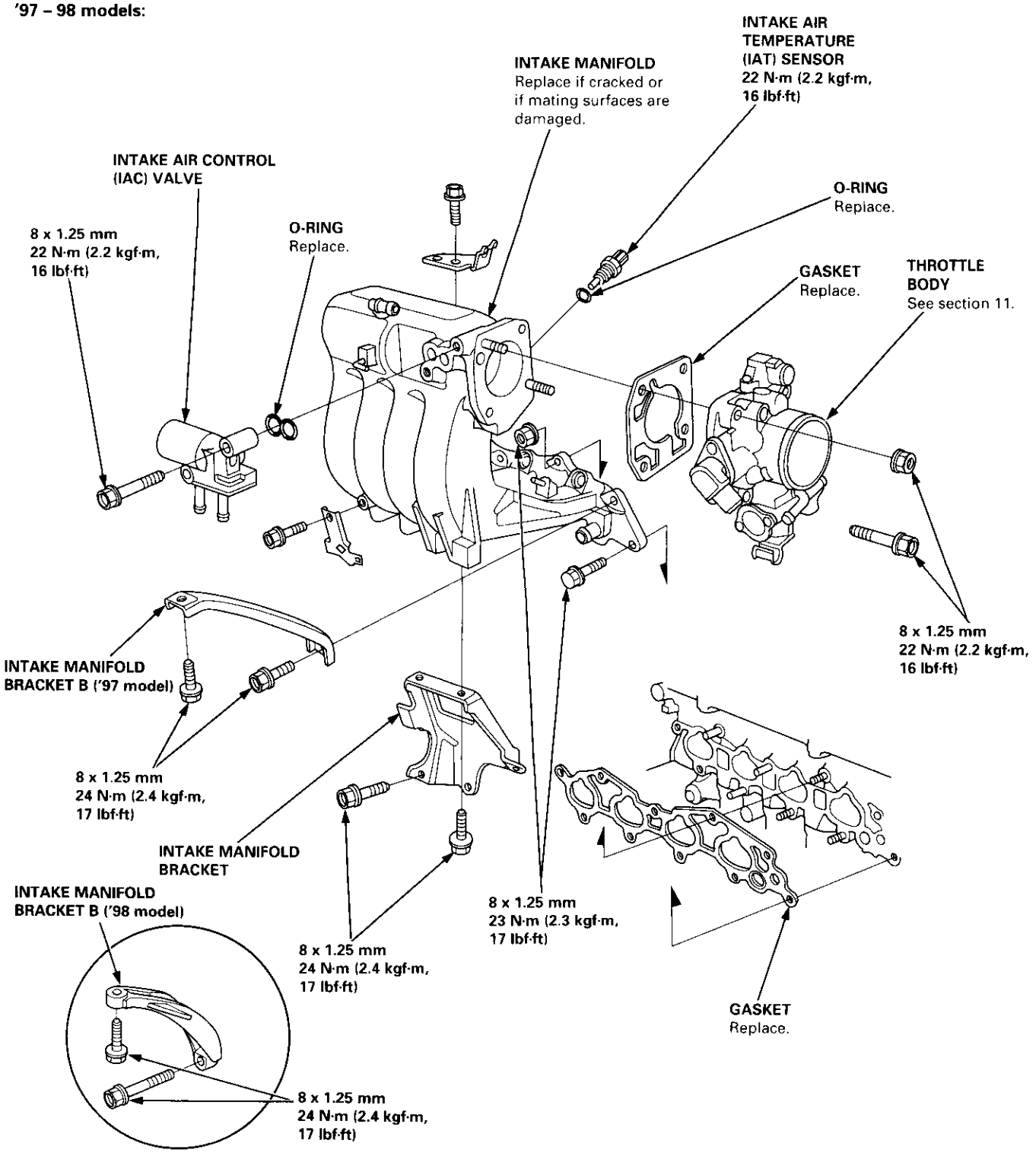
Intake Manifold

Replacement

NOTE:

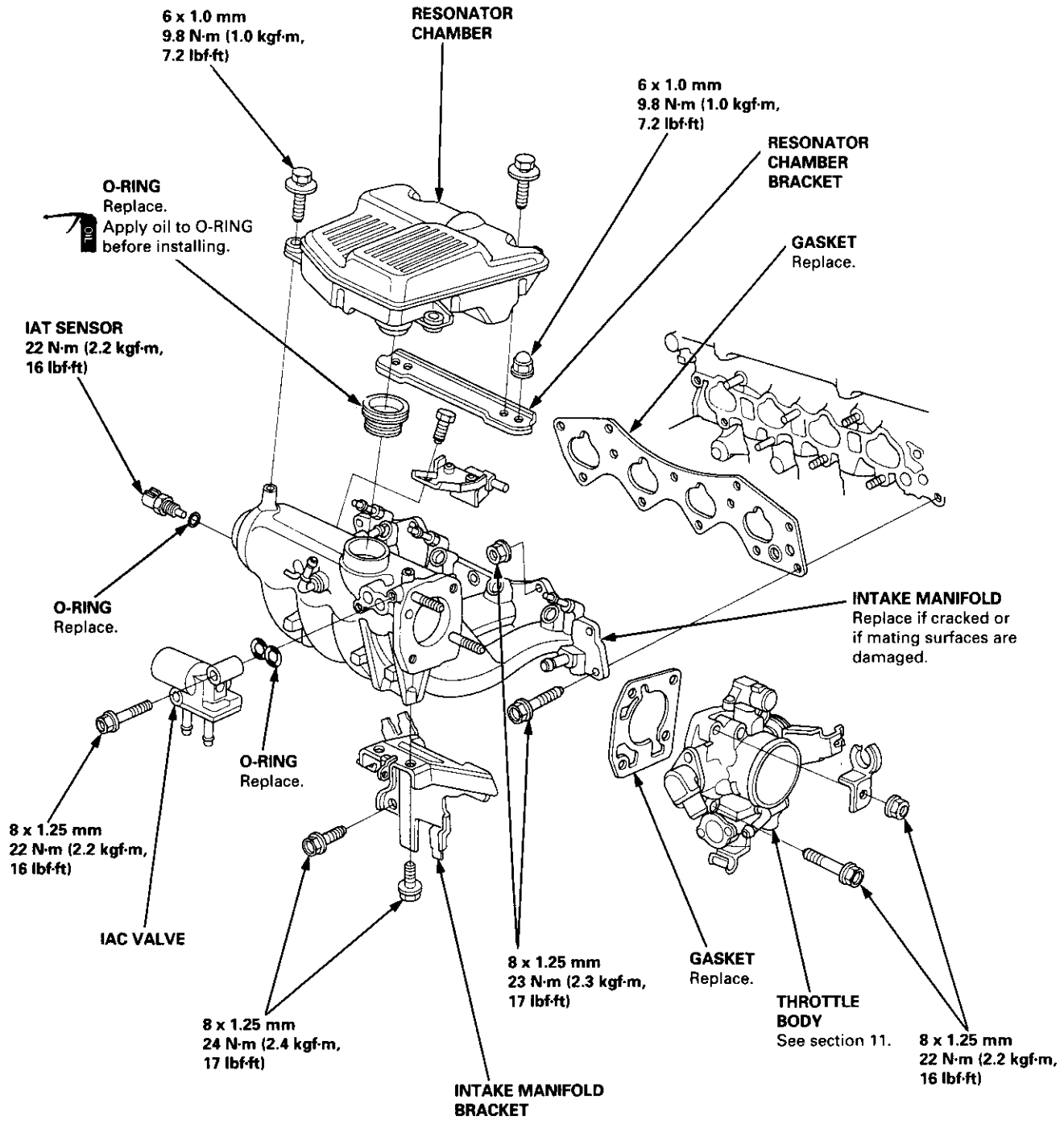
- Use new O-rings and gaskets when reassembling.
- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.

'97 – 98 models:



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'99 – 00 models:



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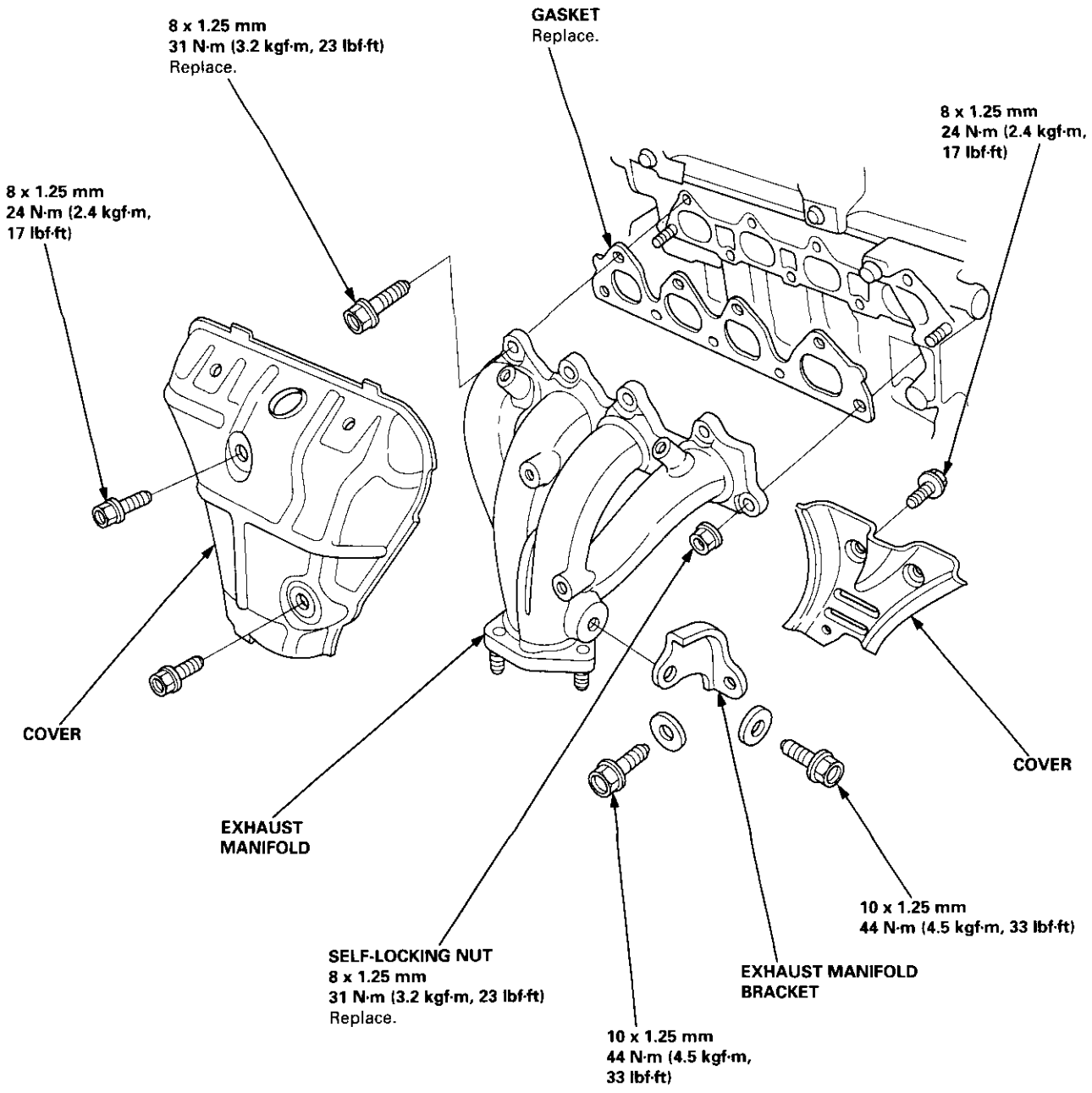
Exhaust Manifold

Replacement

NOTE:

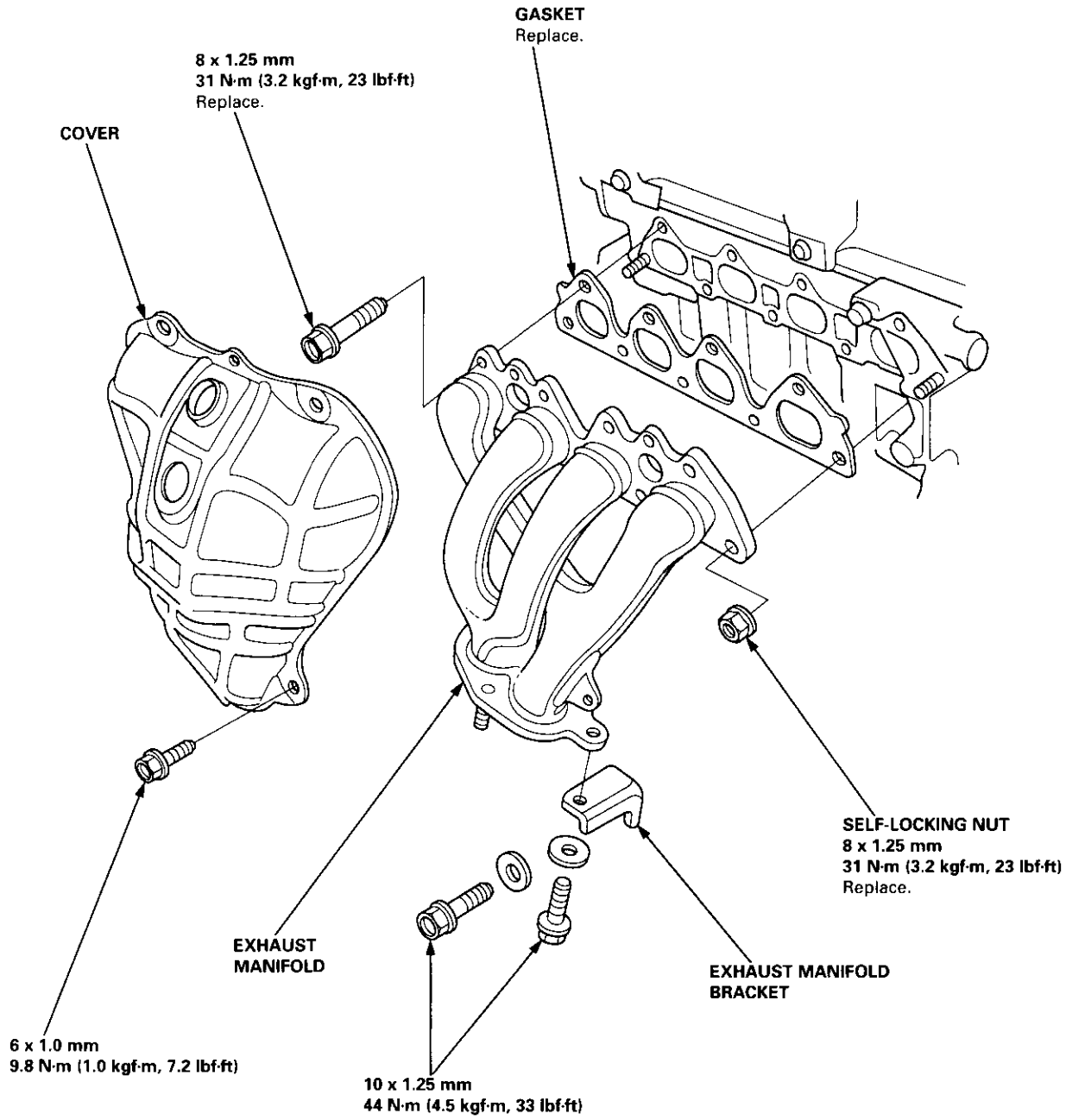
- Use new gaskets and self-locking nuts when reassembling.
- Check for folds or scratches on the surface of the gasket.
- Replace with a new gasket if damaged.

'97 – 98 U.S. models (California):



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'97 – 98 U.S. models (Except California):
'99 – 00 models:



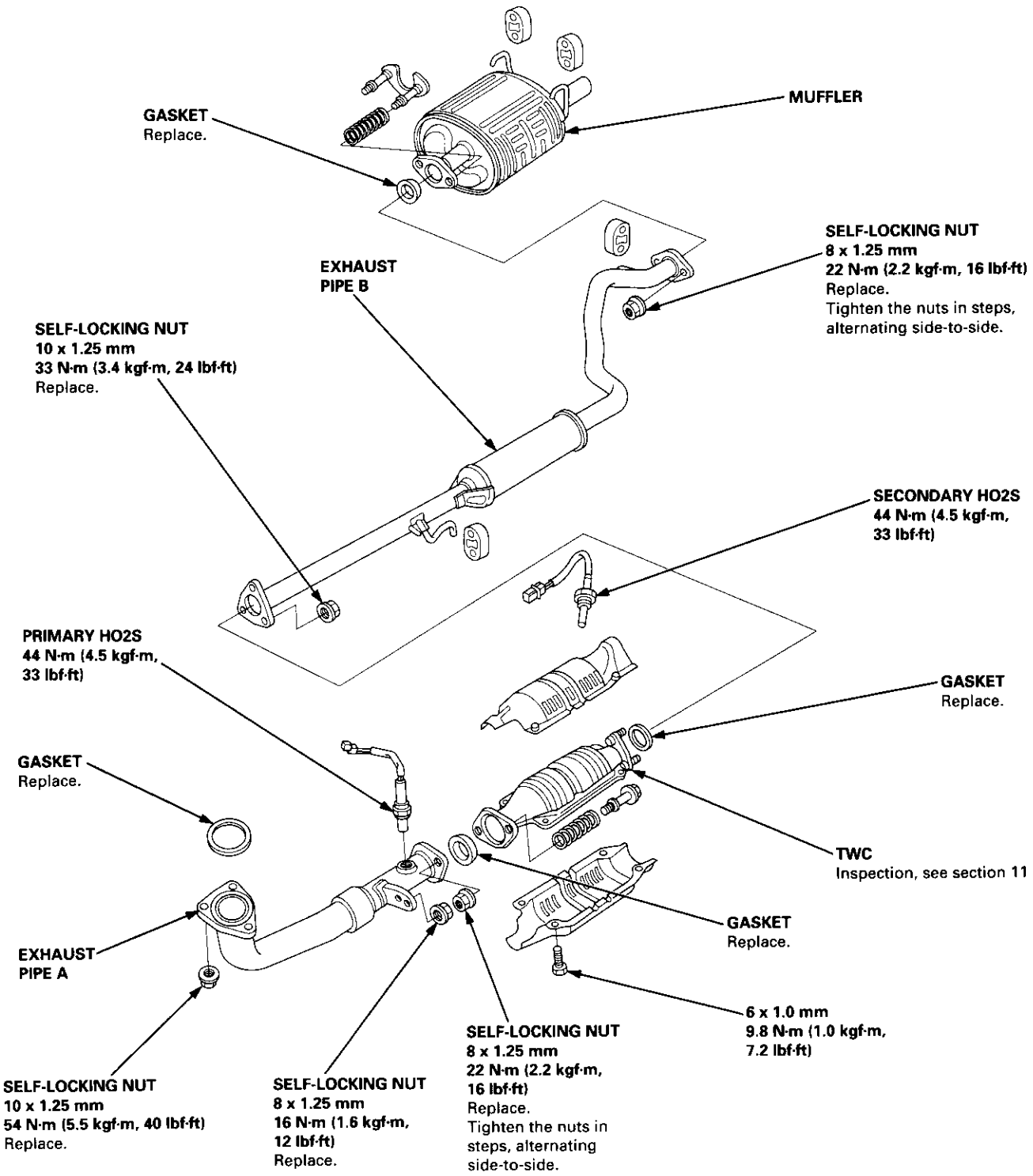
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Exhaust Pipe and Muffler

Replacement

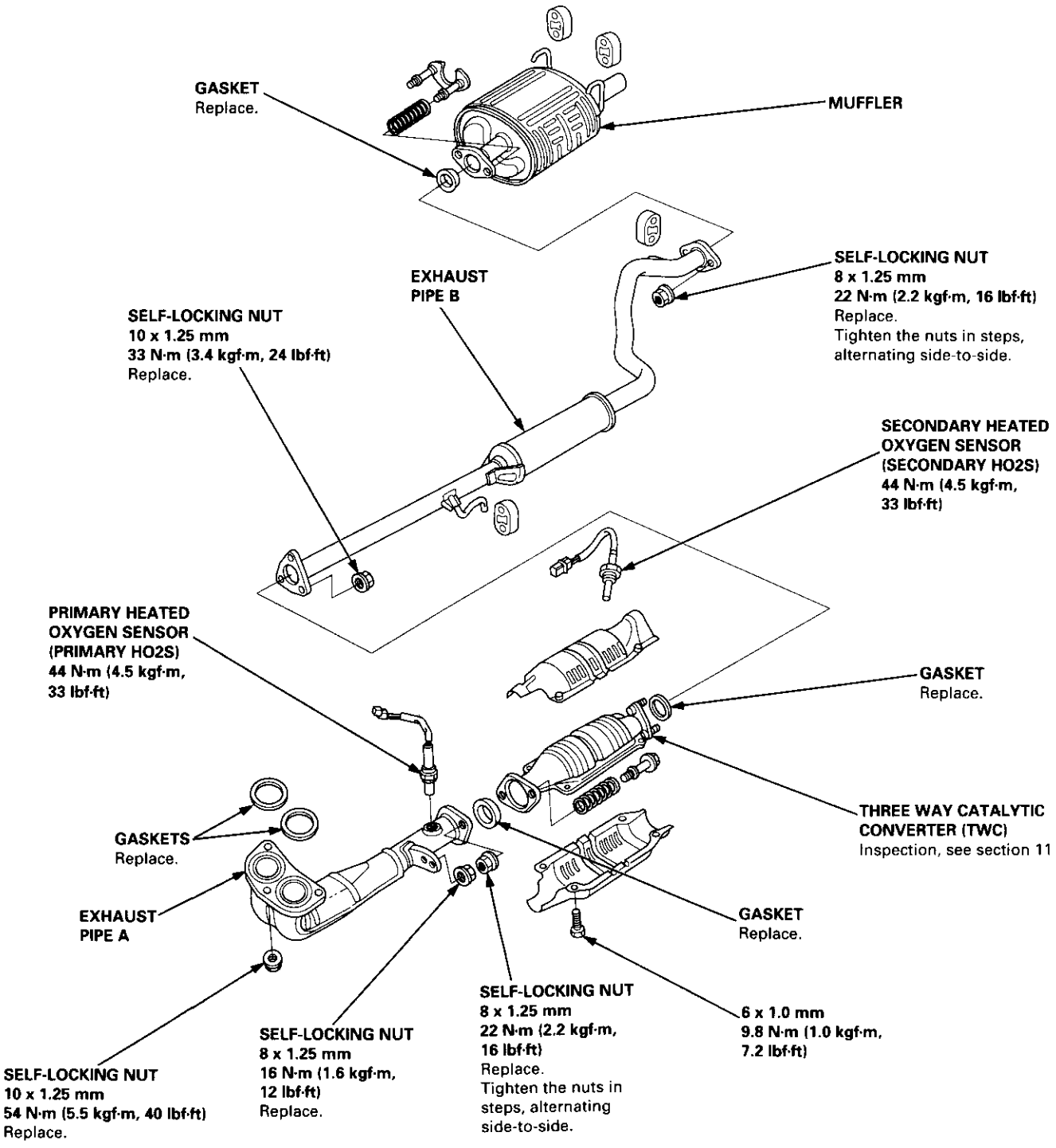
NOTE: Use new gaskets and self-locking nuts when reassembling.

'97 – 98 U.S. models (California):



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'97 – 98 U.S. models (Except California):
'99 – 00 models:



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Cooling

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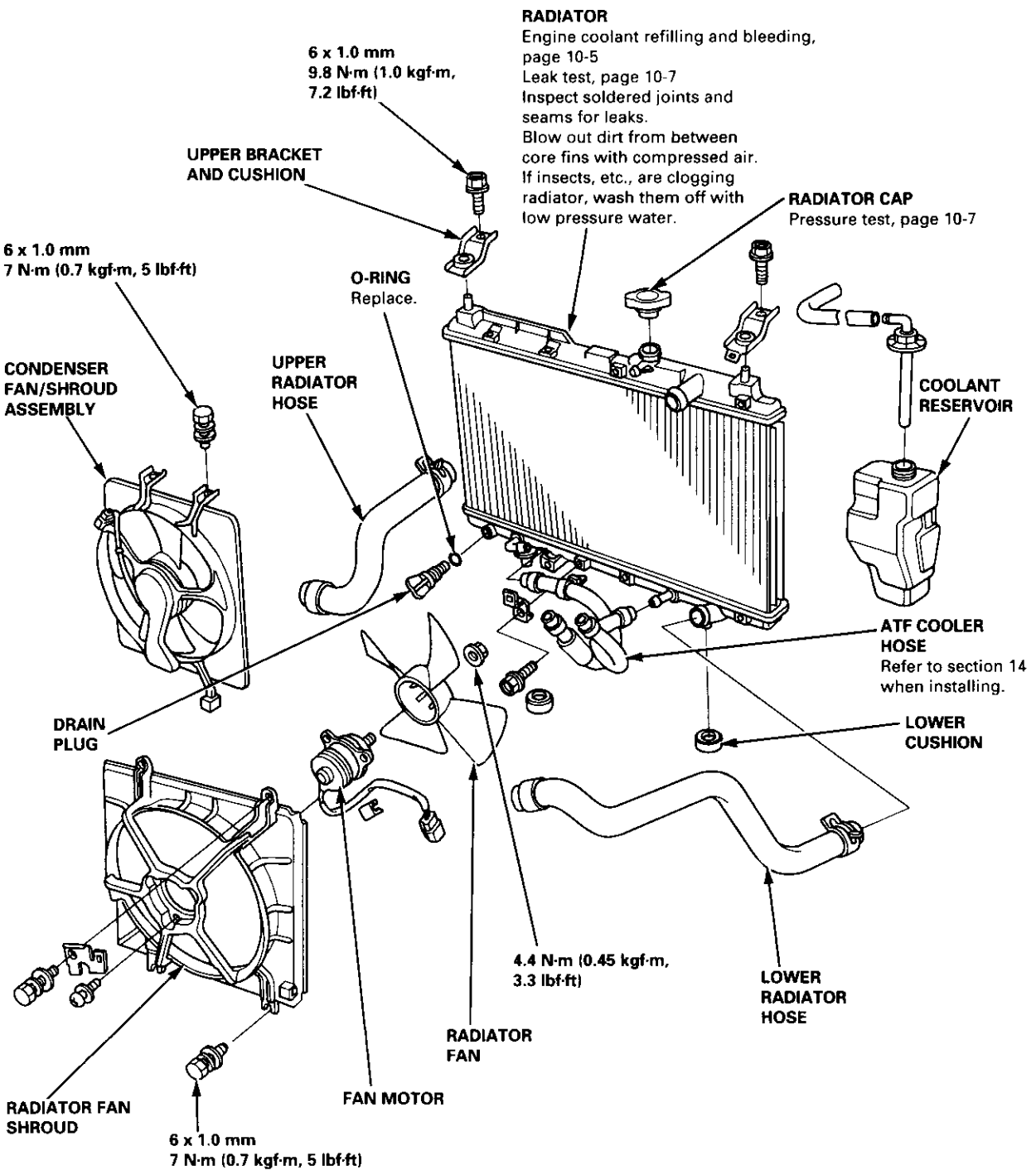
Illustrated Index

CAUTION: The system is under high pressure when the engine is hot. To avoid danger of releasing scalding engine coolant, remove the cap only when the engine is cool.

Total Cooling System Capacity [Including 0.6 ℓ (0.63 US qt, 0.53 Imp qt) for heater and reservoir]:
A/T: 5.9 ℓ (6.2 US qt, 5.2 Imp qt)
M/T: 6.0 ℓ (6.3 US qt, 5.3 Imp qt)

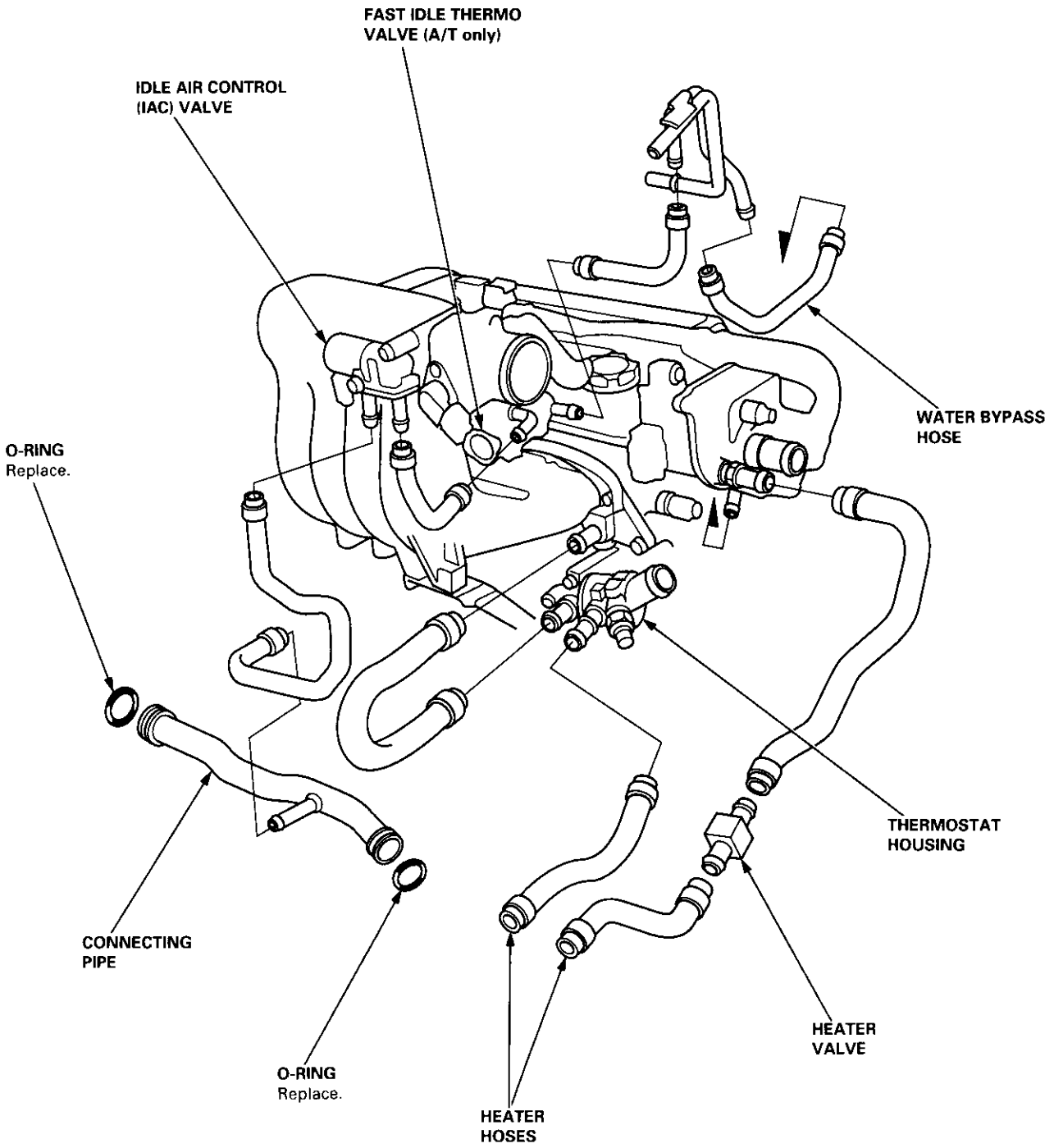
If any engine coolant spills on the painted portions of the body, rinse it off immediately.

Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
Check all hose clamps and retighten if necessary.



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Engine Hose Connections:



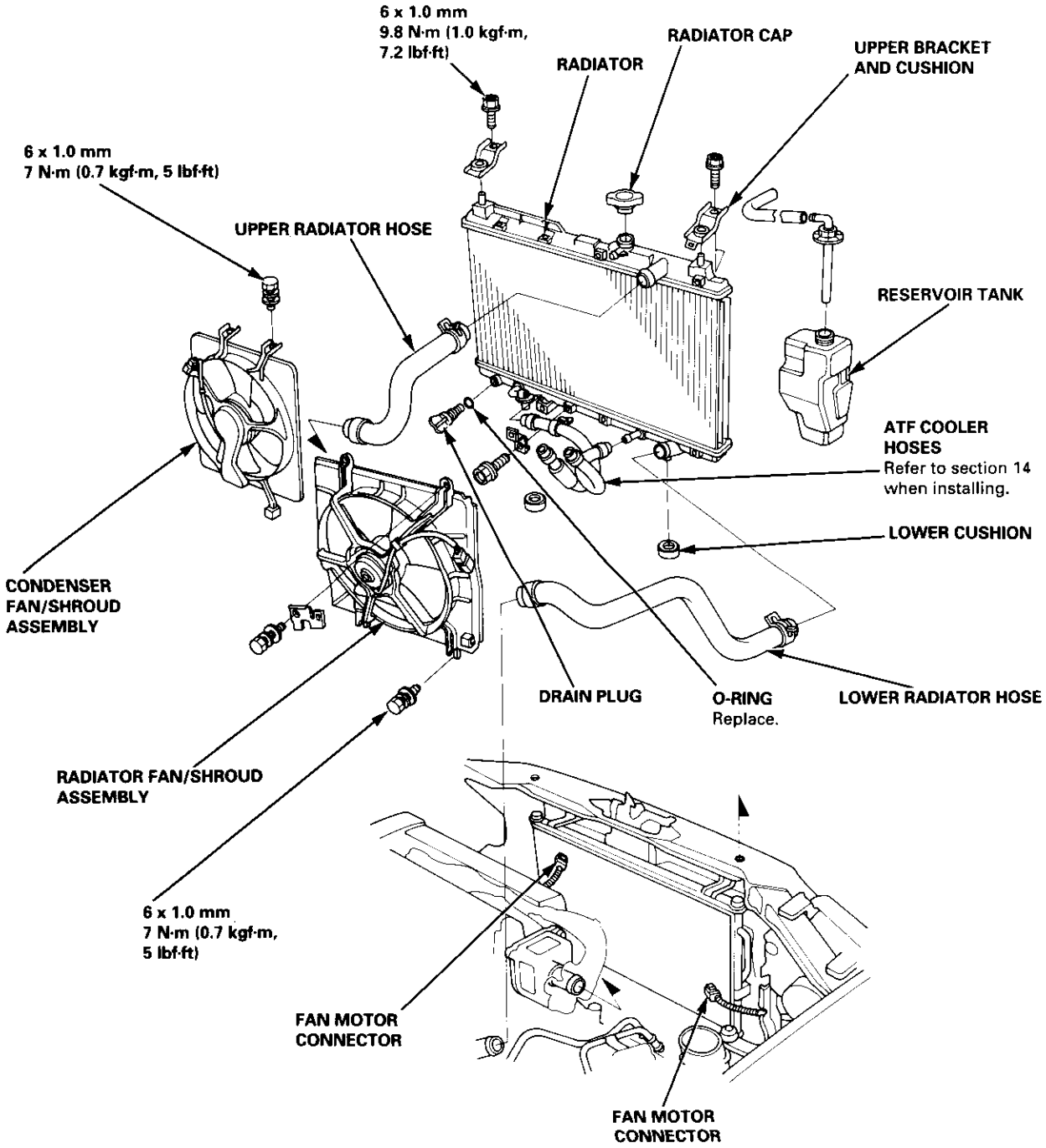
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Radiator

Replacement

1. Drain the engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connector.
4. Remove the radiator upper bracket, then pull up the radiator.
5. Remove the fan shroud assemblies and other parts from the radiator.
6. Install the radiator in the reverse order of removal.

NOTE:
- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.



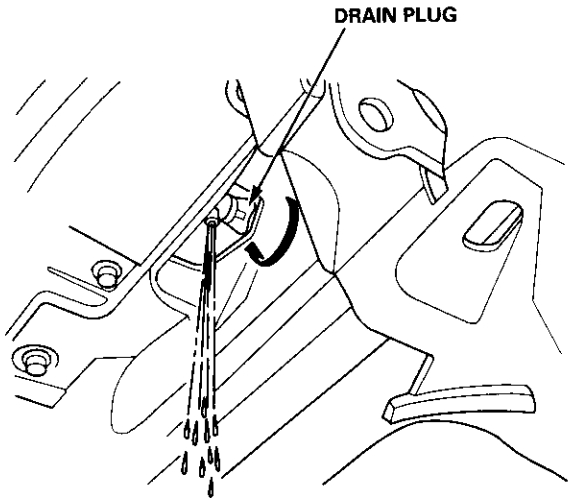
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Engine Coolant Refilling and Bleeding

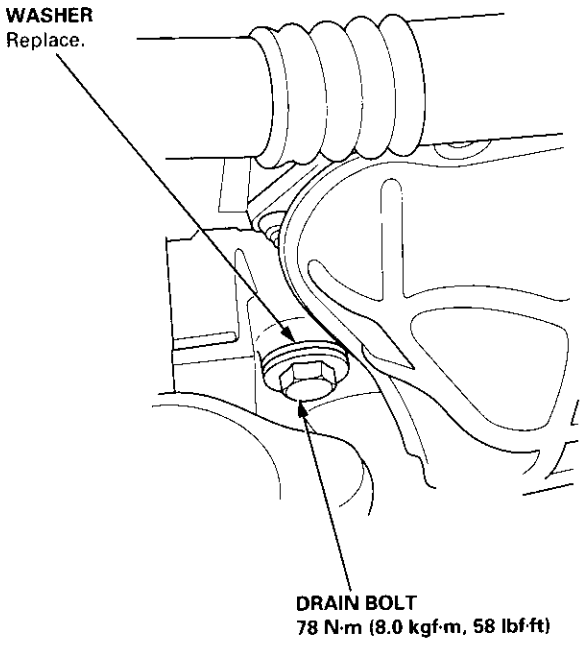
1. Slide the heater temperature control lever to maximum heat.
   Make sure the engine and radiator are cool to the touch.

2. Remove the radiator cap.

3. Loosen the drain plug, and drain the coolant.



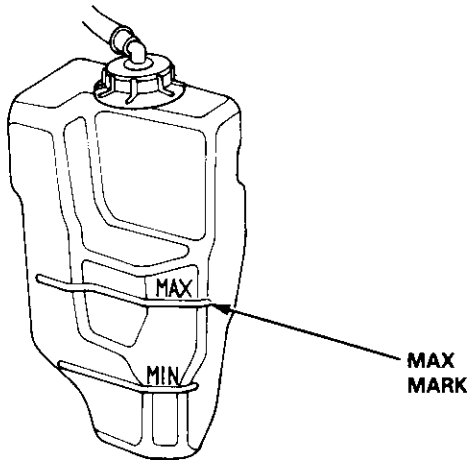
4. Remove the drain bolt from the cylinder block.



5. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.

6. Tighten the radiator drain plug securely.

7. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.



(cont'd)

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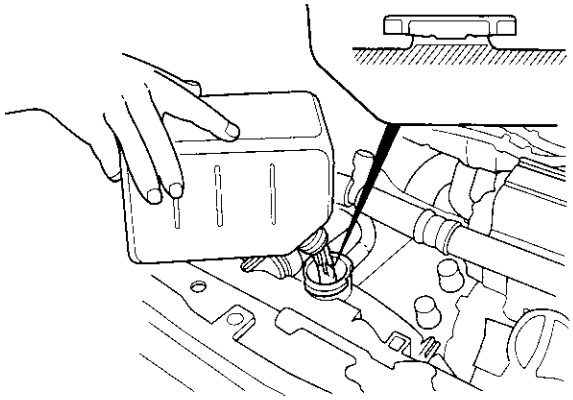
Engine Coolant Refilling and Bleeding (cont'd)

8. Mix the recommended antifreeze with an equal amount of water in a clean container.

   NOTE:
   - Always use Genuine Honda Antifreeze/Coolant. Using a non-Honda coolant can result in corrosion, causing the cooling system to malfunction or fail.
   - For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing. Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.
   - Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the coolant.

   Engine Coolant Refill Capacity [including 0.6 ℓ (0.63 US qt, 0.53 Imp qt) for heater and reservoir]:
   A/T: 3.9 ℓ (4.1 US qt, 3.4 Imp qt)
   M/T: 4.0 ℓ (4.2 US qt, 3.5 Imp qt)

9. Pour coolant into the radiator up to the base of the filler neck. When pouring engine coolant, do not let coolant spill on any electrical parts or the paint. If any coolant spills, rinse it off immediately.



10. Start the engine, and let it run until it warms up (the radiator fan comes on at least twice).

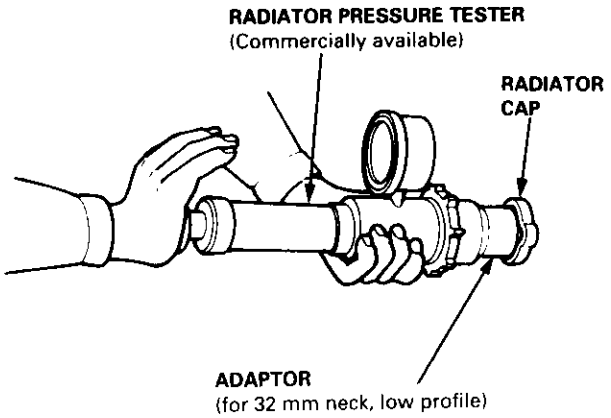
11. Turn off the engine. Check the level in the radiator, add coolant if needed.

12. Put the radiator cap on tightly, then run the engine again and check for leaks.

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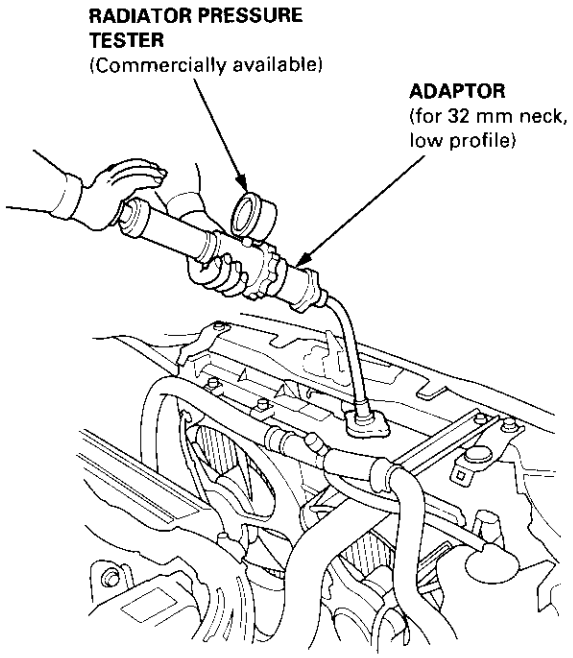
Cap Testing

1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



Testing

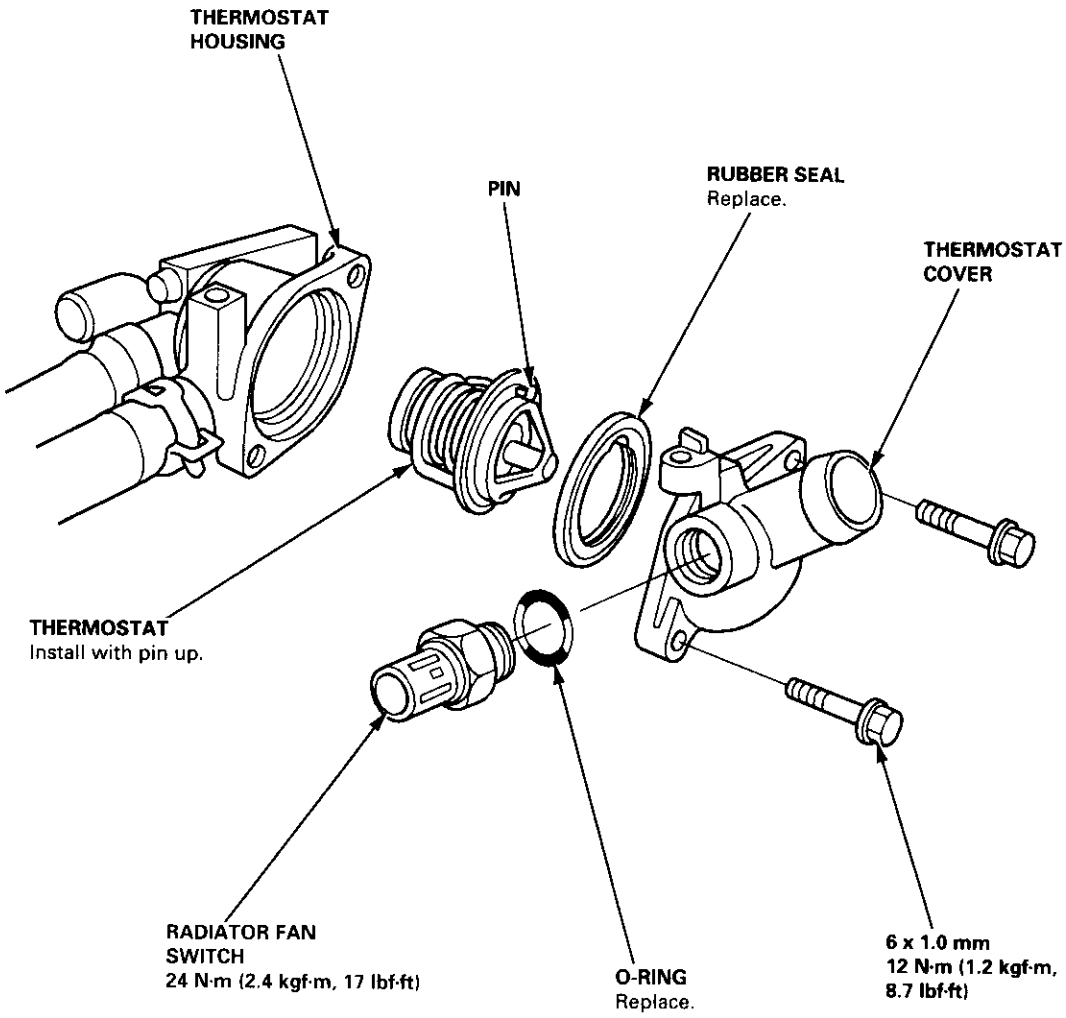
1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator, and apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).
3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the tester, and reinstall the radiator cap.
5. Check for engine oil in the coolant and/or coolant in the engine oil.



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Thermostat

Replacement



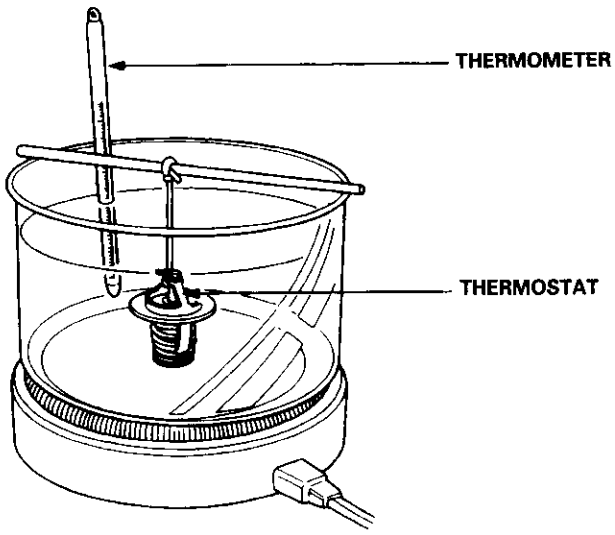
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Testing

Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

1. Suspend the thermostat in a container of water. Do not let the thermometer touch the bottom of the hot container.



2. Heat the water, and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.

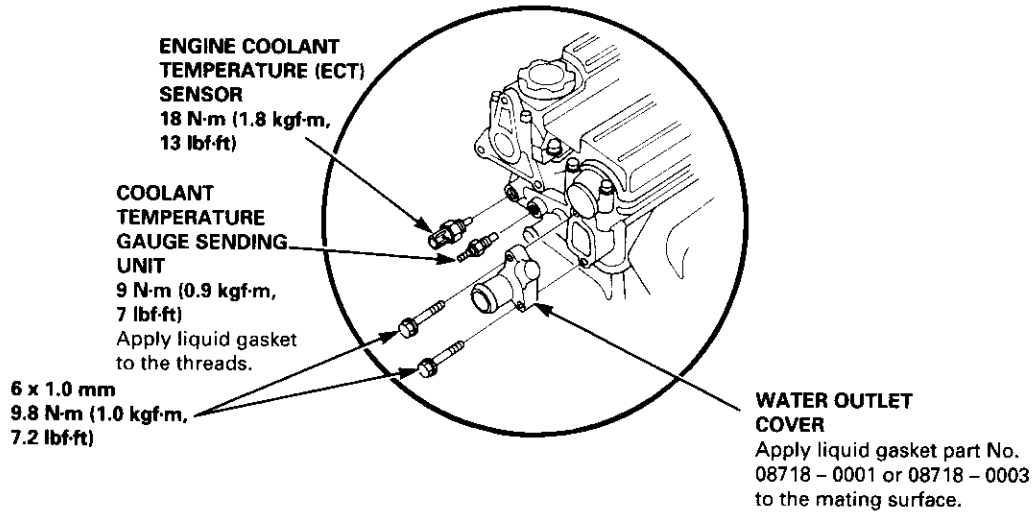
3. Measure the lift height of the thermostat when fully open.

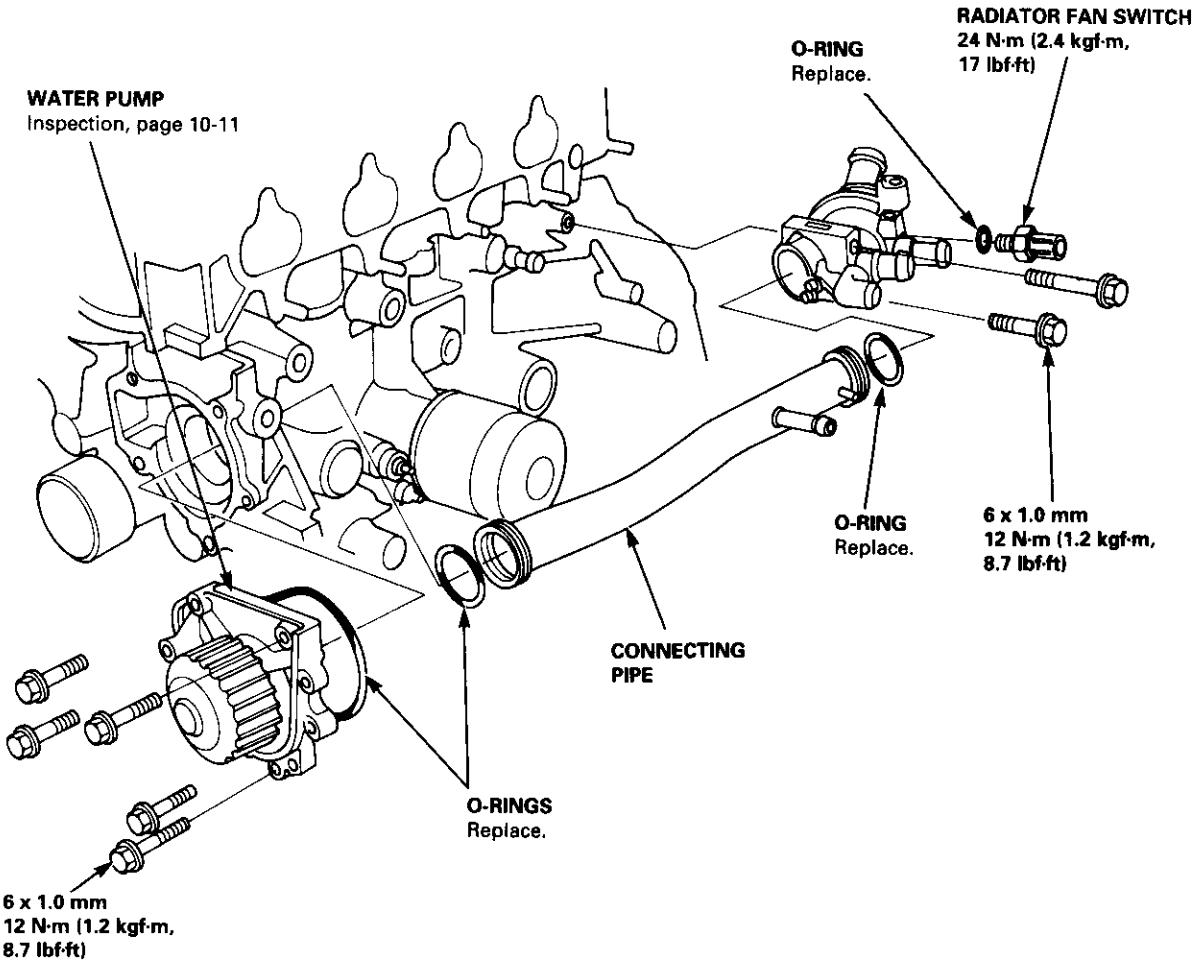
STANDARD THERMOSTAT
Lift height: above 8.0 mm (0.31 in)
Starts opening: 169 – 176°F (76 – 80°C)
Fully open: 194°F (90°C)

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Water Pump

Illustrated Index



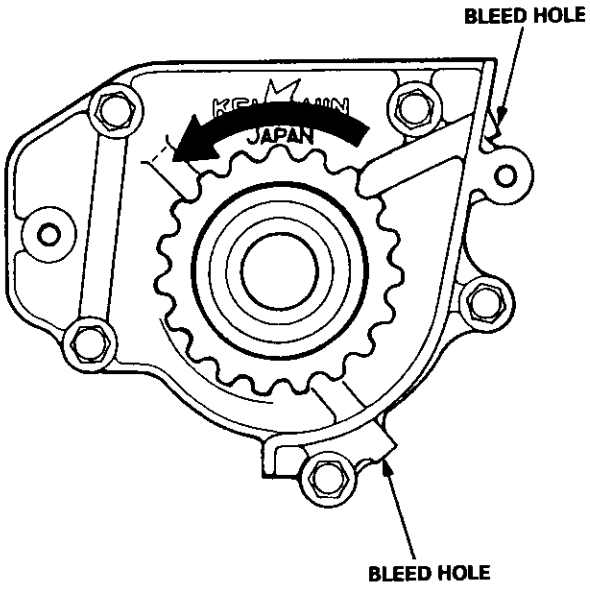


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Inspection

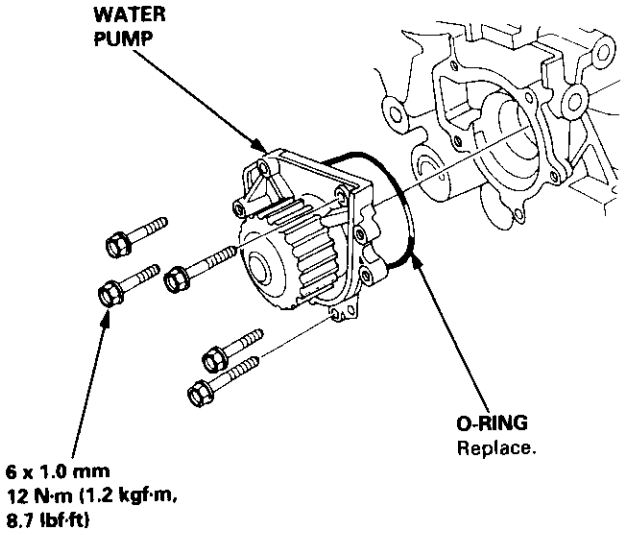
1. Remove the timing belt (see section 6).
2. Turn the water pump pulley counterclockwise. Check that it turns freely.
3. Check for signs of seal leakage.

   NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see section 6).
2. Remove the water pump by removing five bolts.
3. Inspect, repair and clean the O-ring groove and the mating surface with the cylinder block.

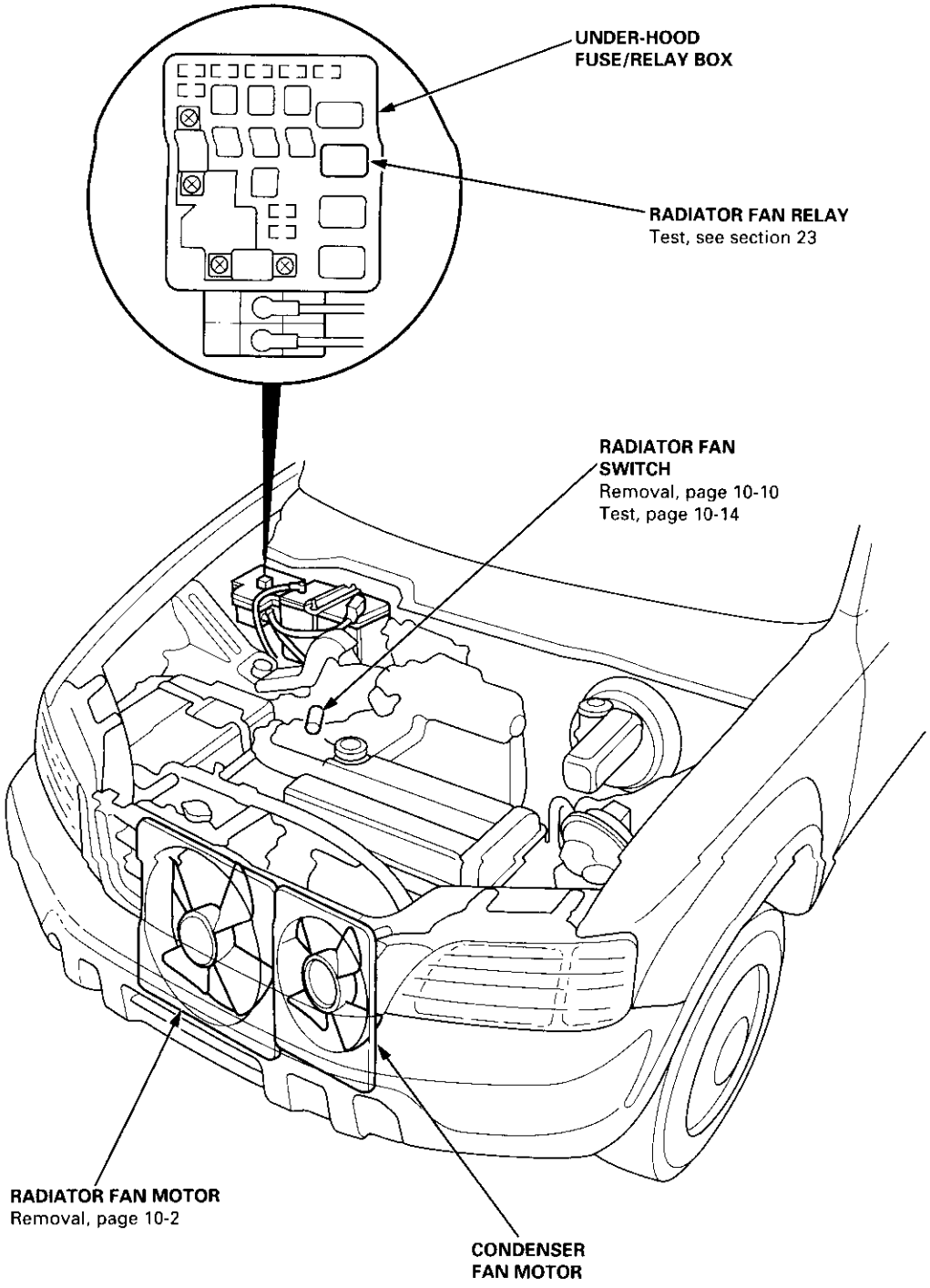


4. Install the water pump in the reverse order of removal.

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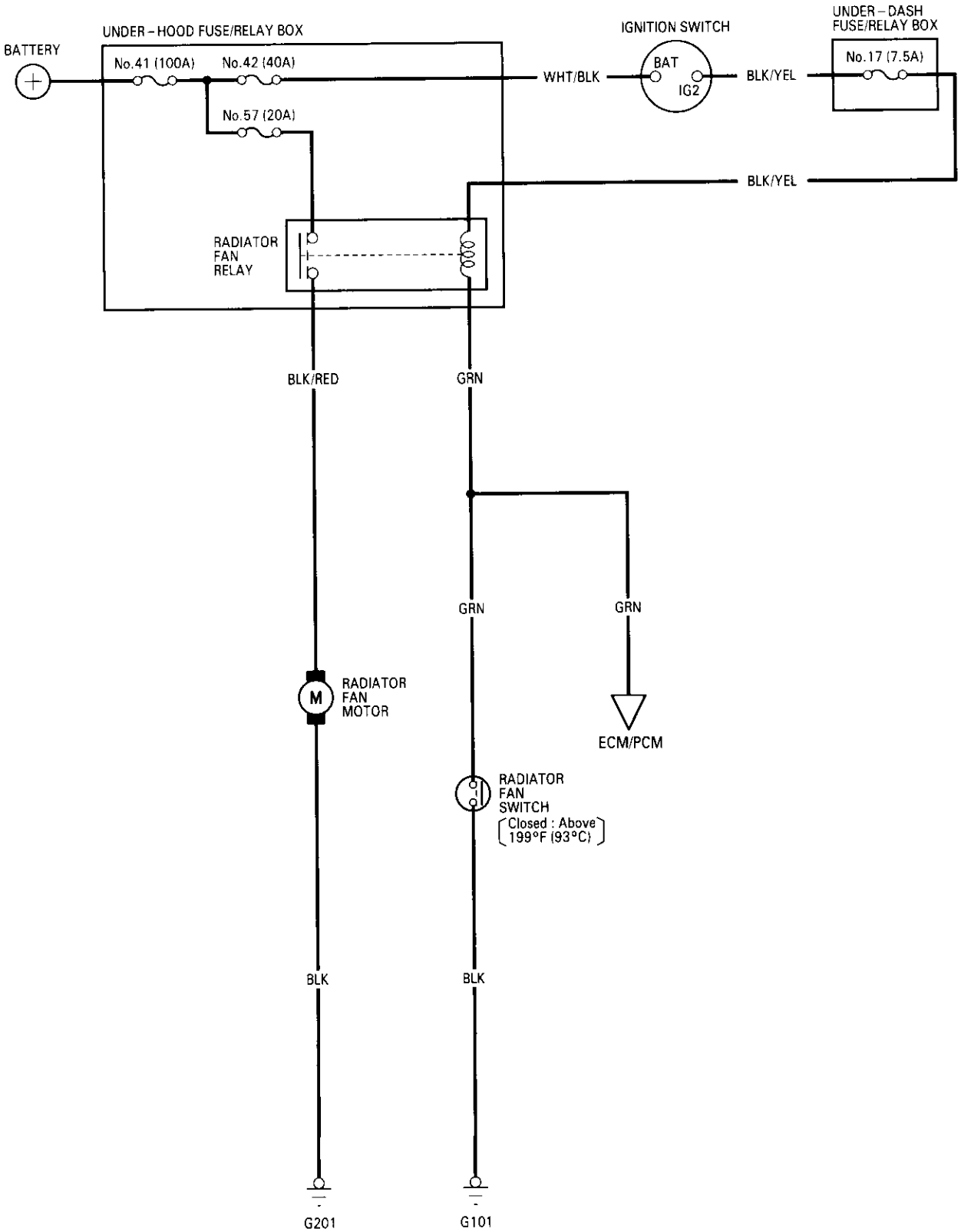
Fan Control

Component Location Index



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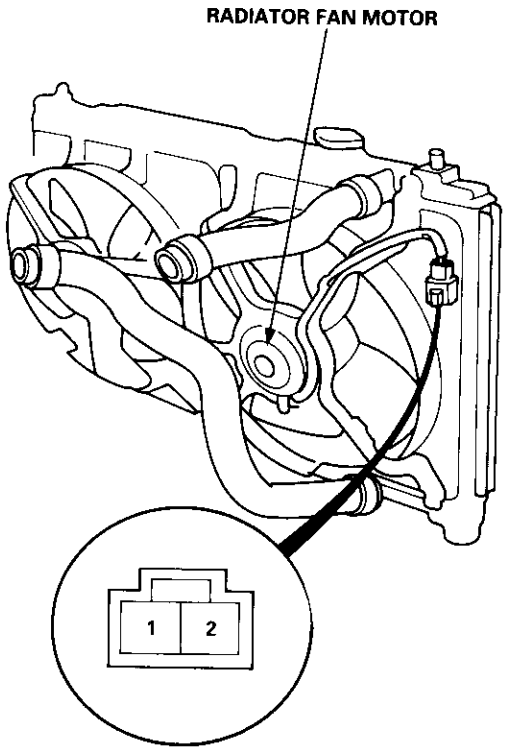
Circuit Diagram



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Fan Motor Testing

1. Disconnect the 2P connector.



2. Test the motor by connecting battery power to the No. 2 terminal and ground to the No. 1 terminal.

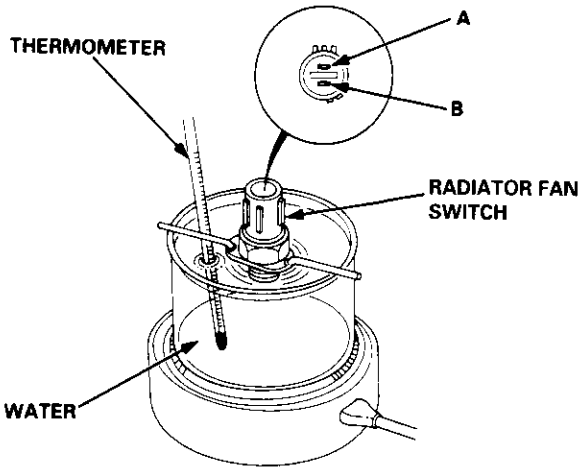
3. If the motor fails to run or does not run smoothly, replace it.

Radiator Fan Switch Testing

⚠ WARNING Removing the radiator fan switch while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator fan switch.

1. Remove the radiator fan switch from the thermostat housing (see page 10-10).

2. Suspend the radiator fan switch in a container of water as shown.



3. Heat the water, and check the temperature with a thermometer. Do not let the thermometer touch the bottom of the hot container.

4. Measure the continuity between the A and B terminals according to the table.

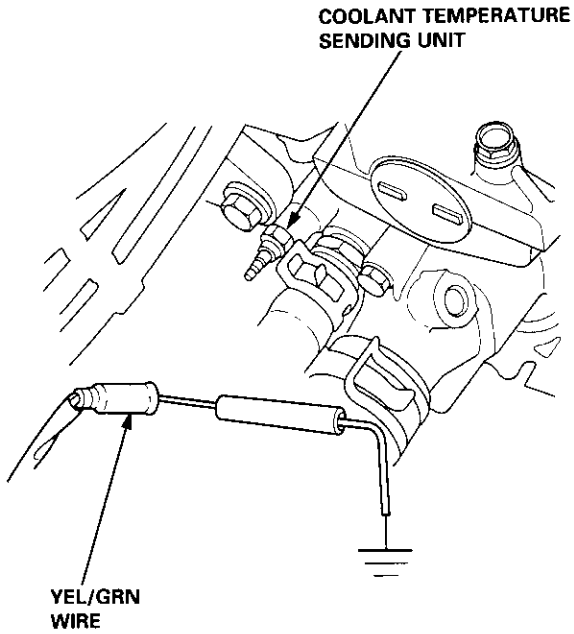
Operation		Temperature	Terminal A	Terminal B
SWITCH	ON	196 – 203°F (91 – 95°C)	○——	——○
	OFF	5 – 14°F (3 – 8°C) lower than the temperature when it goes on		

5. Bleed the air from the cooling system after installing the radiator fan switch (see page 10-5).

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Gauge Testing

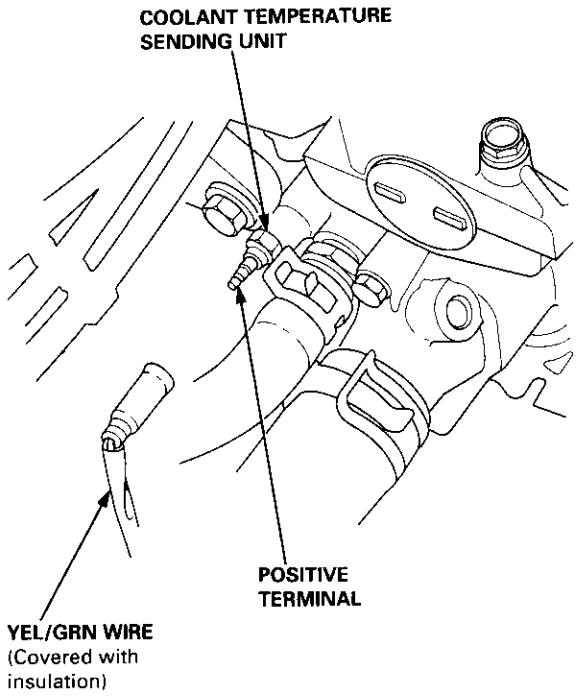
1. Check the No. 25 (7.5 A) fuse in the under-dash fuse/relay box before testing.
2. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature sending unit, and ground it with a jumper wire.



3. Turn the ignition switch ON (II). Check that the pointer of the coolant temperature gauge starts moving toward the "H" mark. Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.
4. If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire.
5. If the wires are OK, replace the coolant temperature gauge.
6. If the coolant temperature gauge works, test the coolant temperature sending unit.

Coolant Temperature Sending Unit Testing

1. Disconnect the YEL/GRN wire from the coolant temperature sending unit.



2. Using an ohmmeter, measure the change in resistance between the positive terminal and the engine (ground) with the engine cold and with the engine at operating temperature.

Temperature	133°F (56°C)	185 – 212°F (85 – 100°C)
Resistance (Ω)	137	46 – 30

3. If the readings are substantially different from the specifications above, inspect the coolant level and the cooling system. If the cooling system is OK, replace the sending unit.

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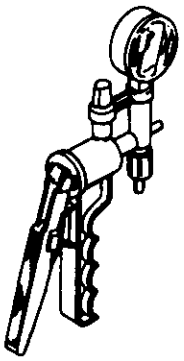


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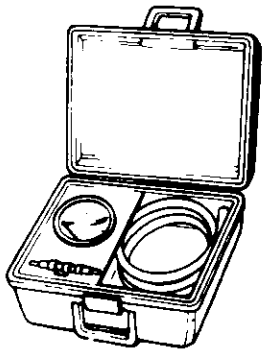
Special Tools

Special Tools

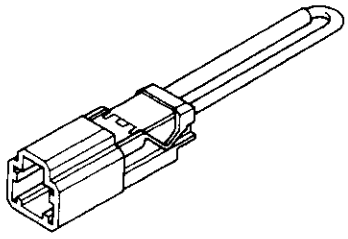
Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X – 041 – XXXXX	Vacuum Pump/Gauge, 0 – 30 in.Hg		11-207, 208, 214, 215, 216, 217, 220, 221, 222, 223, 224
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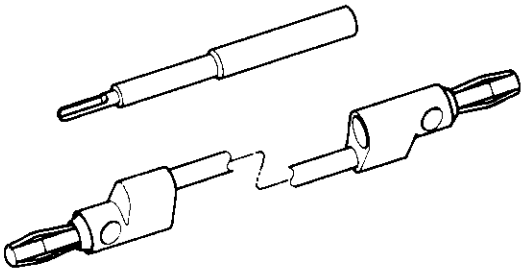
①



②



③



④



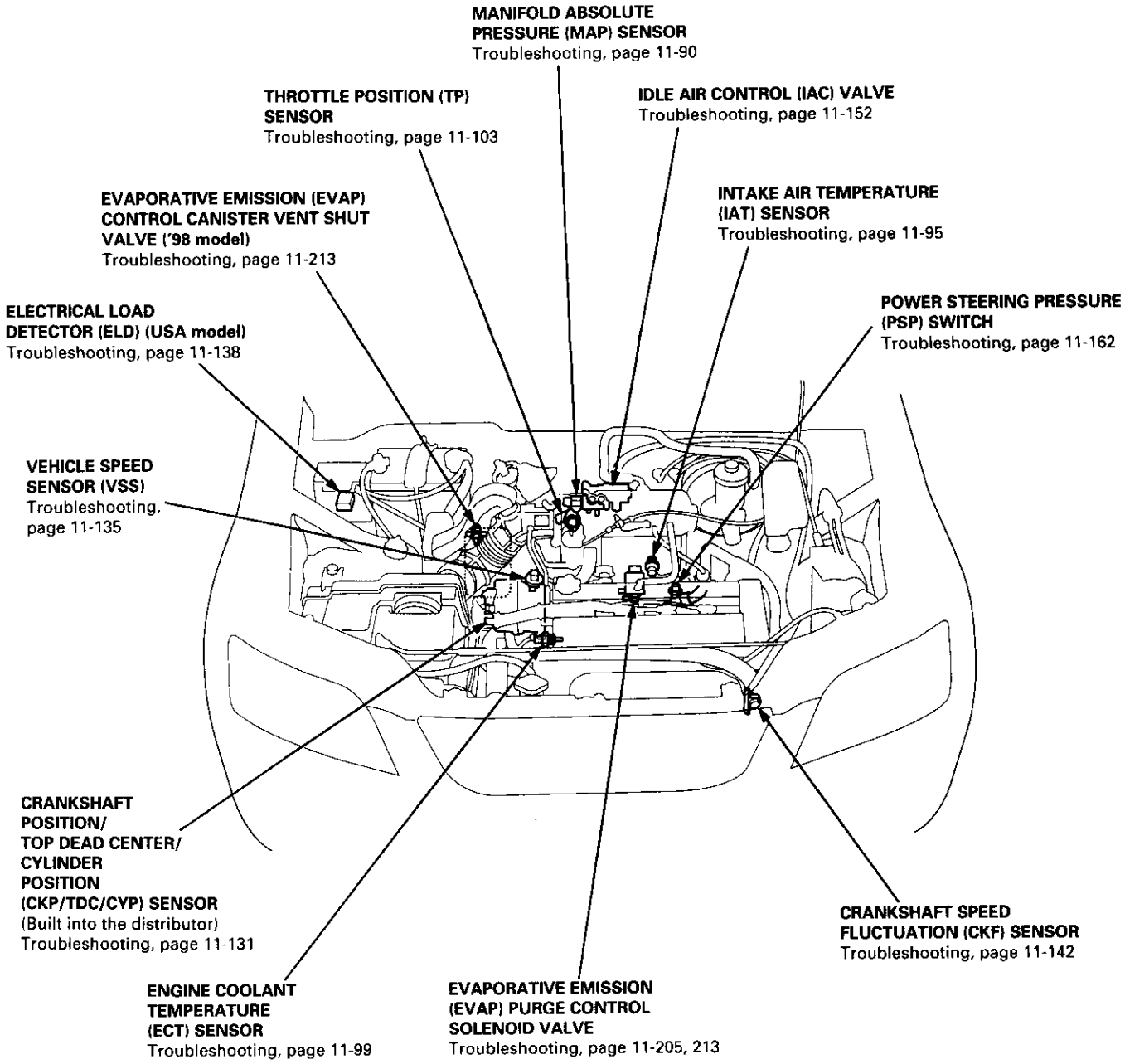
⑤

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Component Locations

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'97 – 98 models:



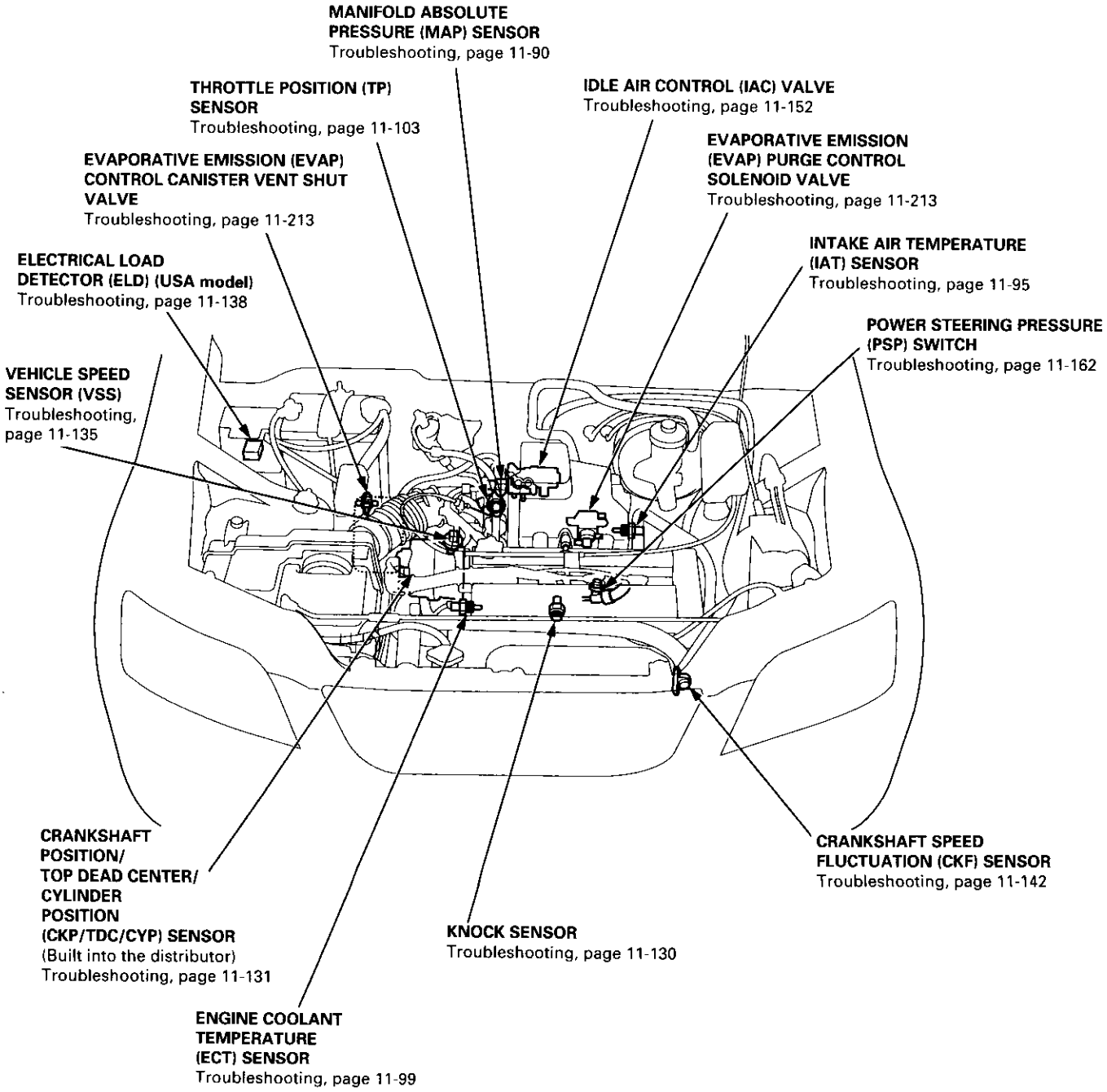
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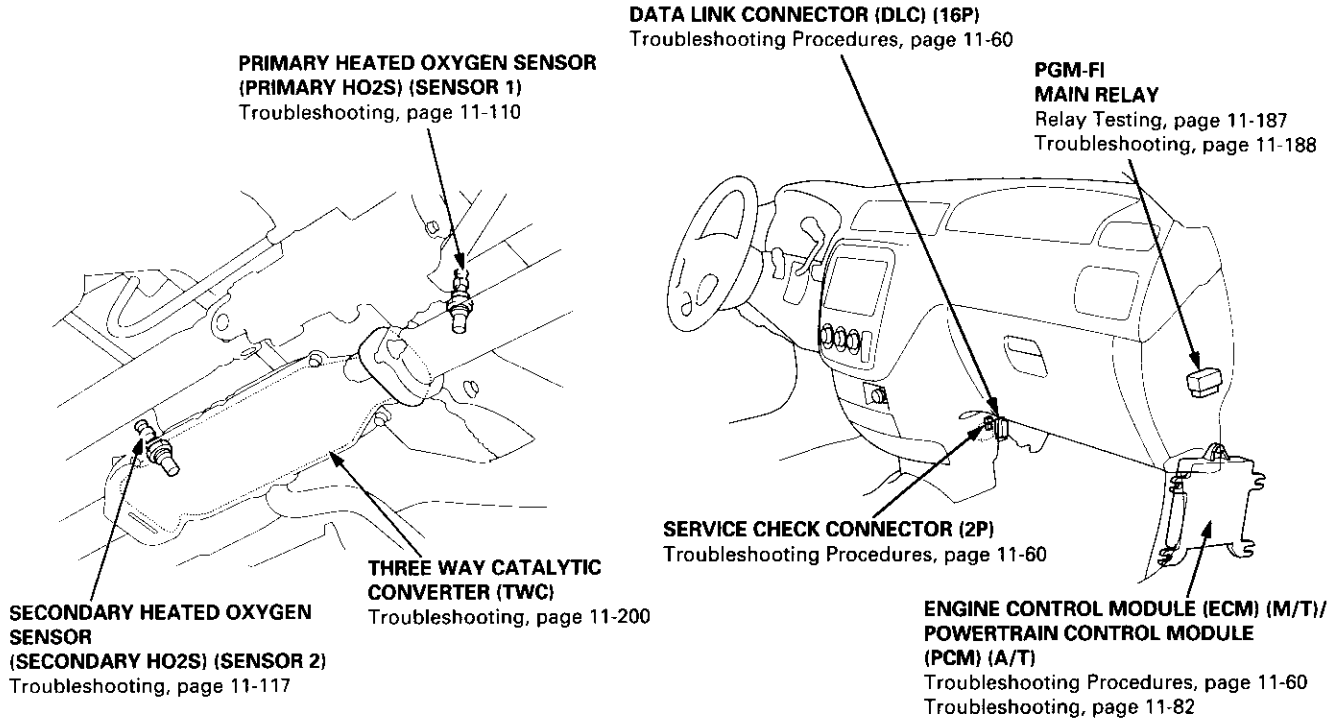
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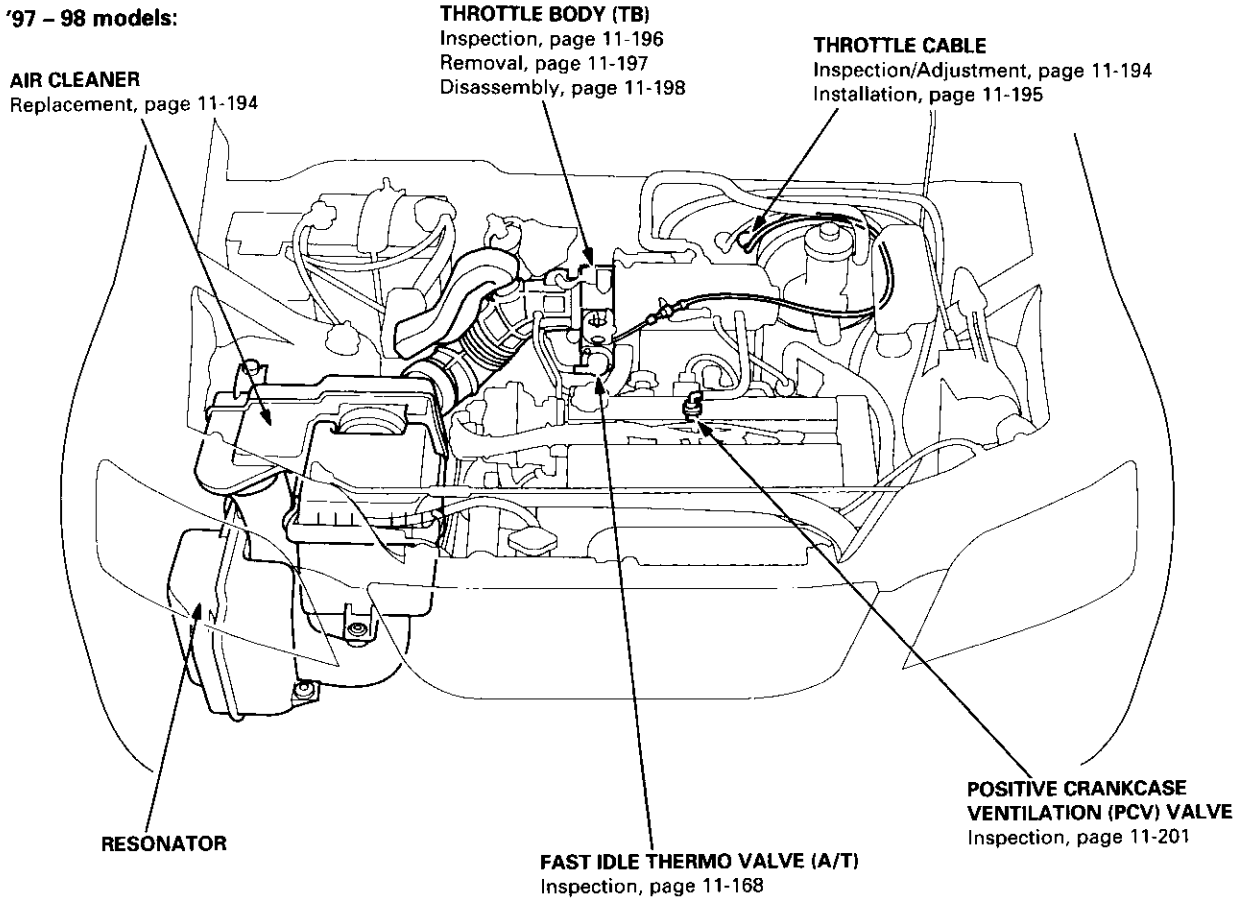
'99 – 00 models:



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'97 – 98 models:



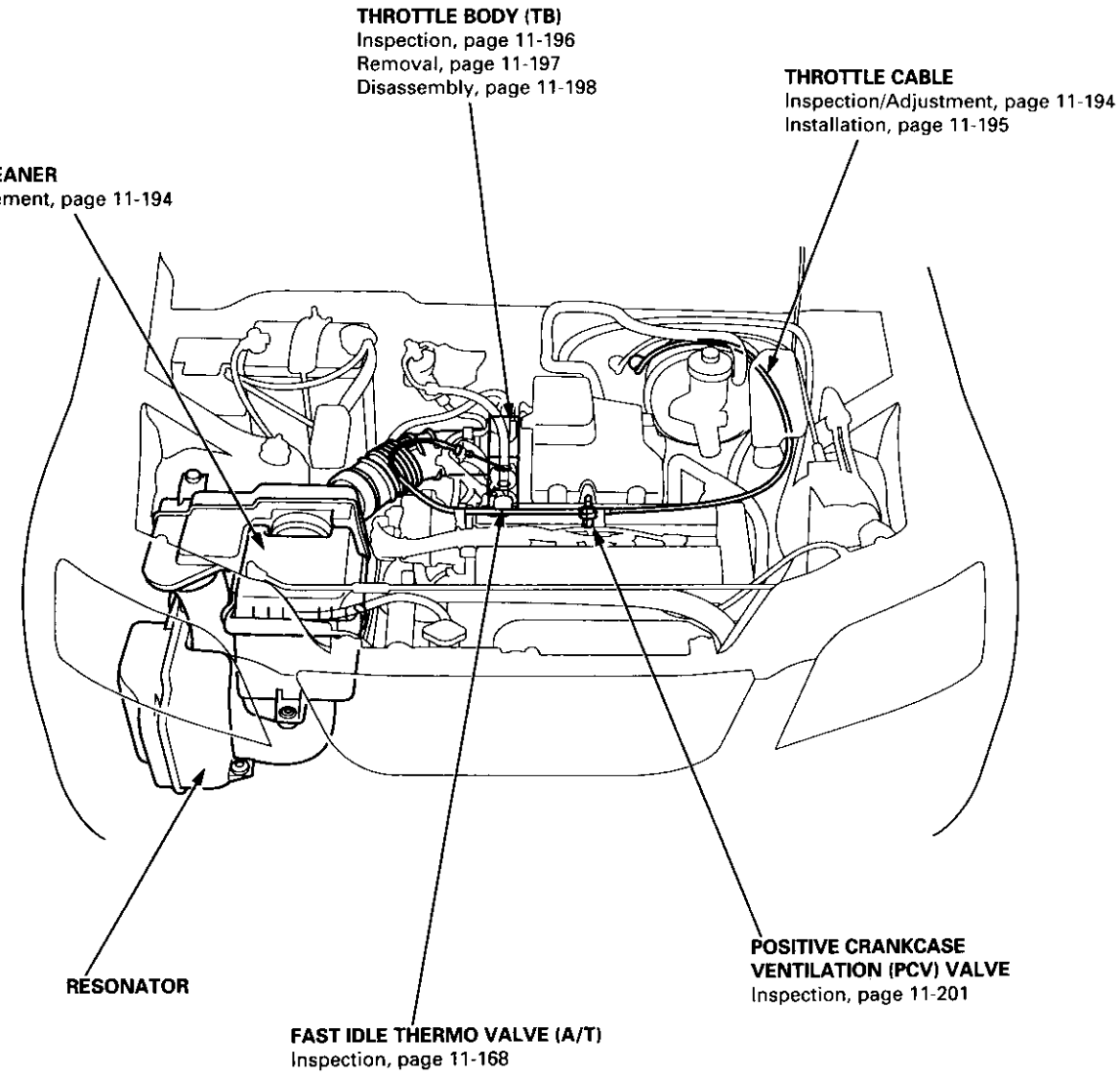
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Component Locations

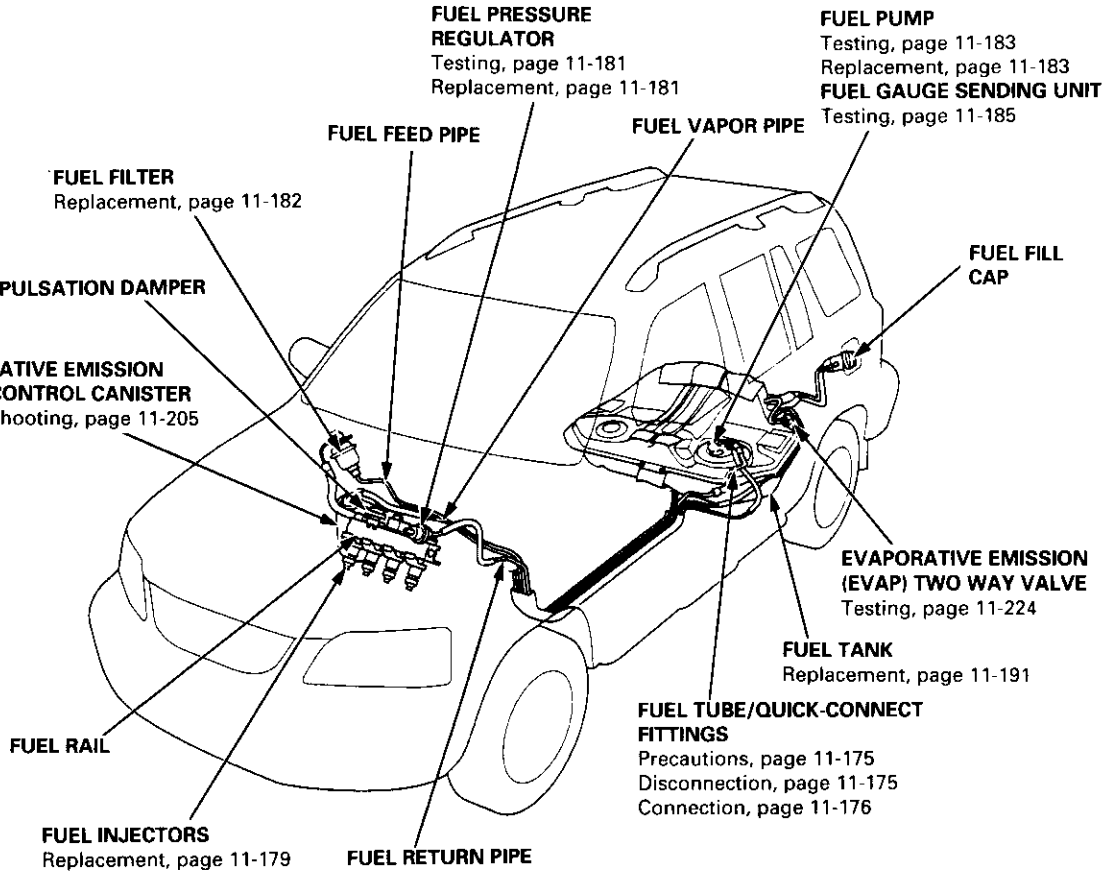
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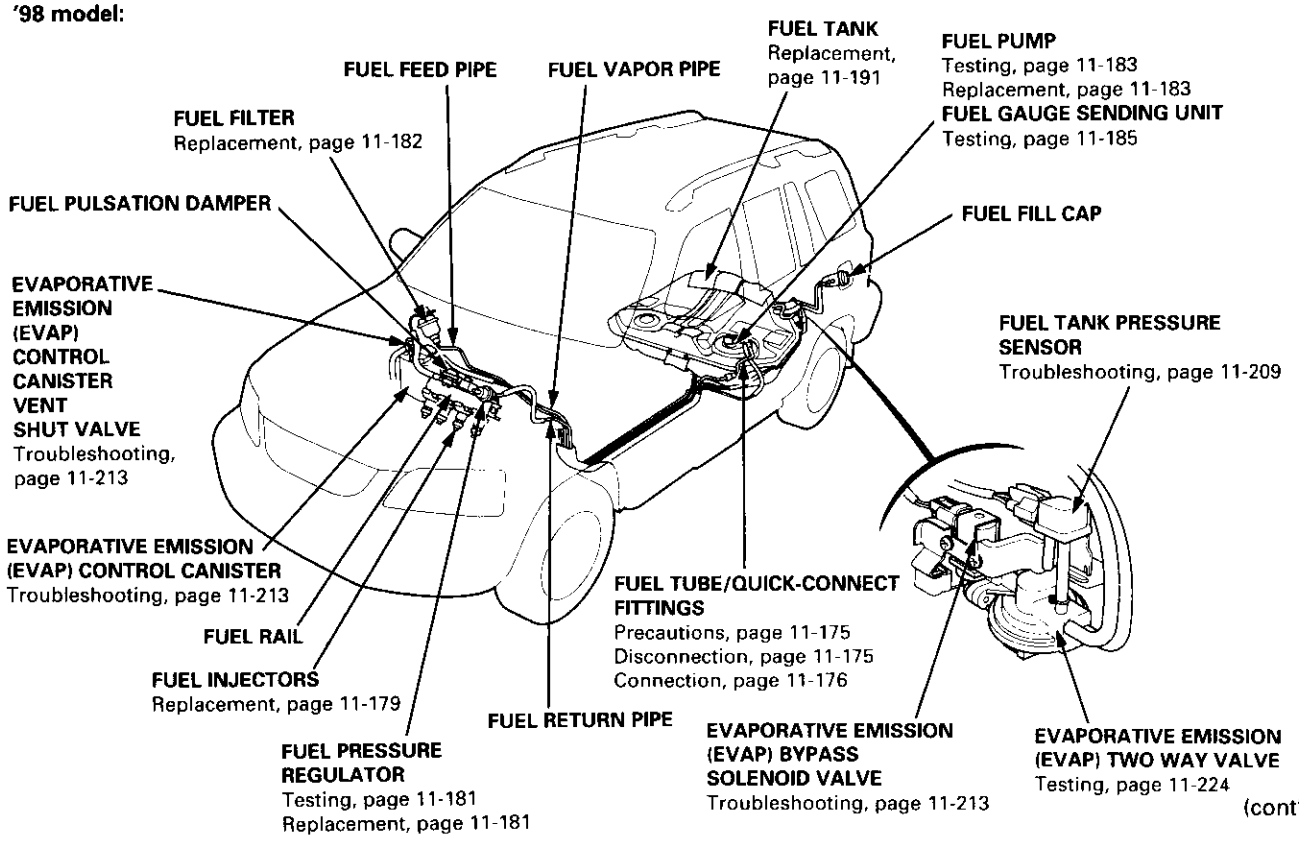


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'97 model:



'98 model:



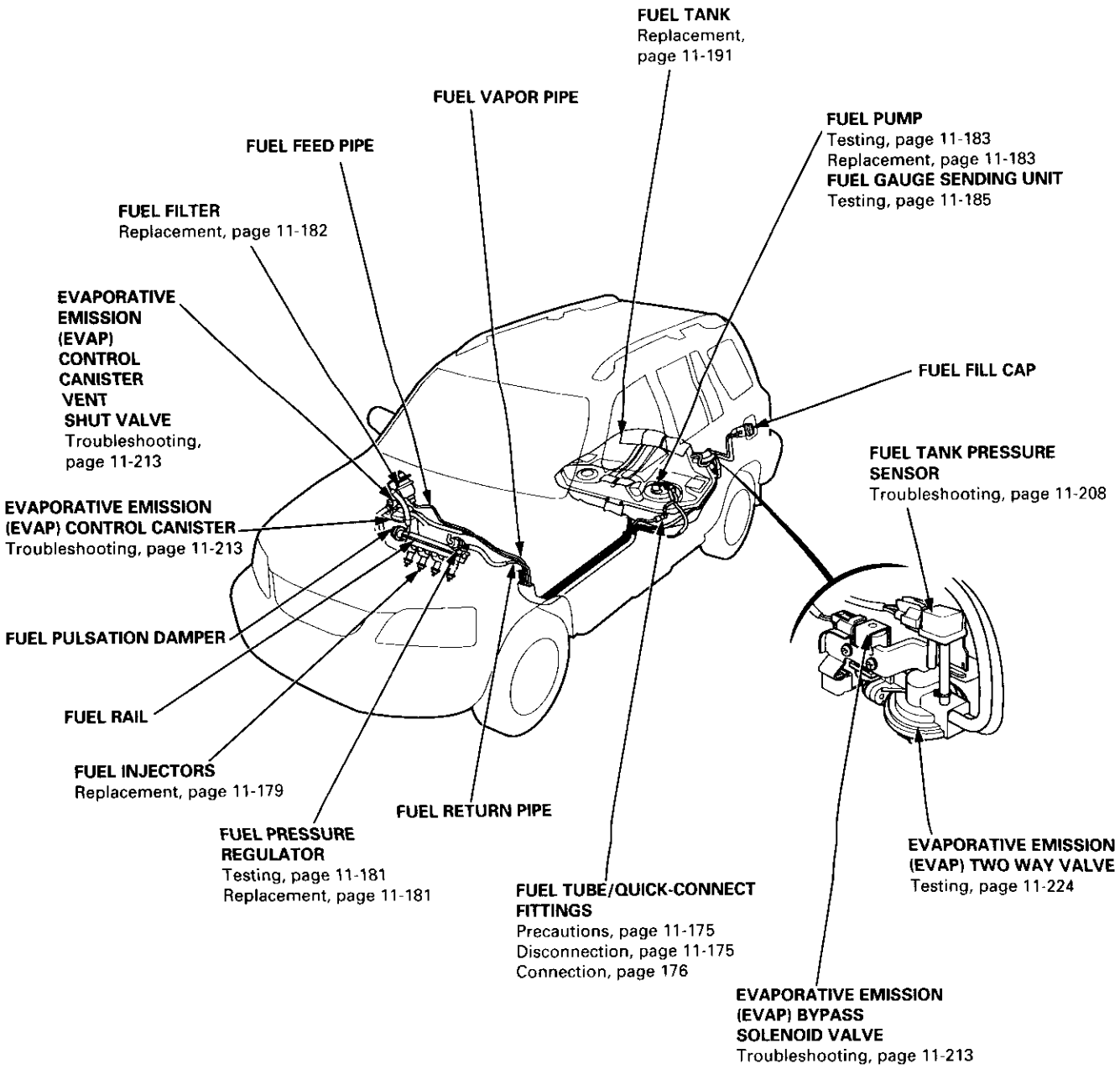
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Component Locations

Index (cont'd)

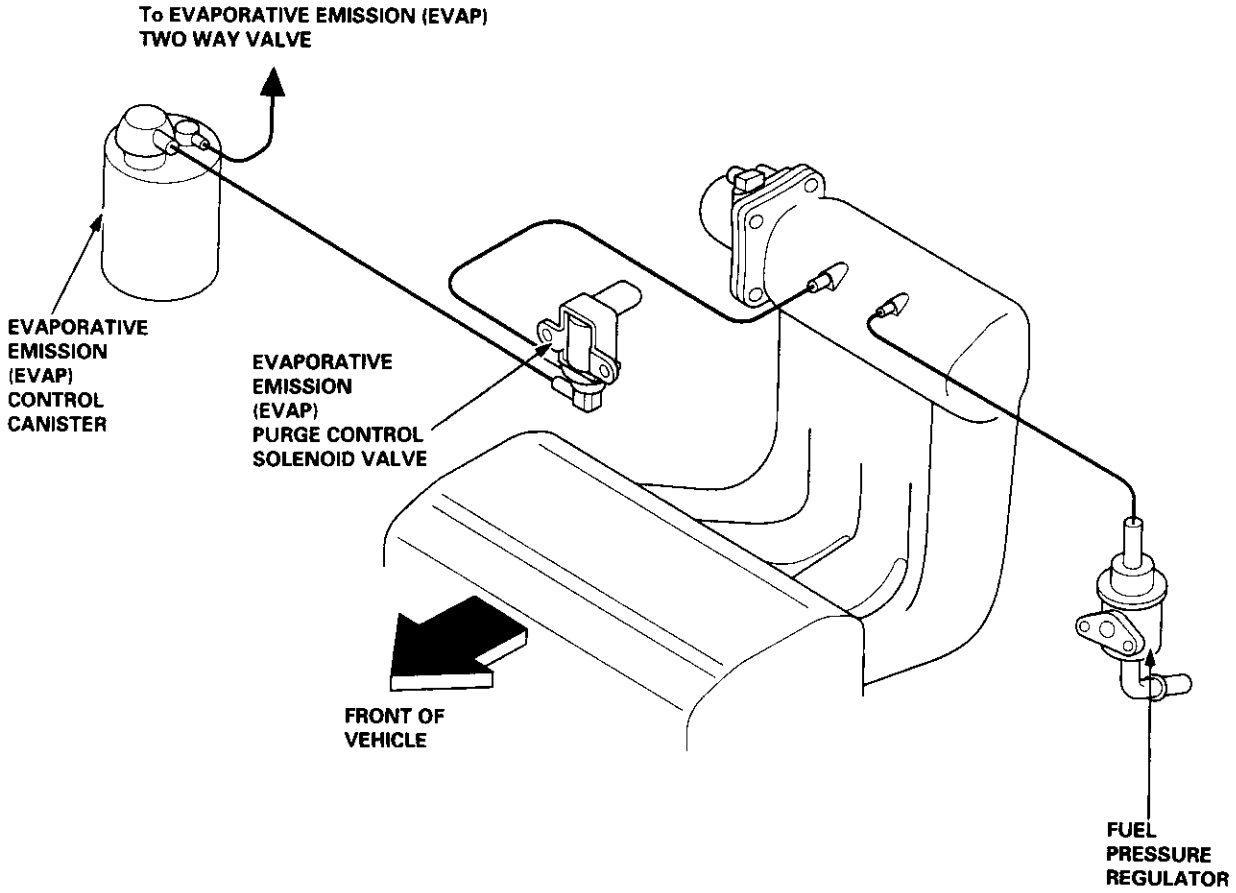
'99 – 00 models:



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Vacuum Connections

'97 model:



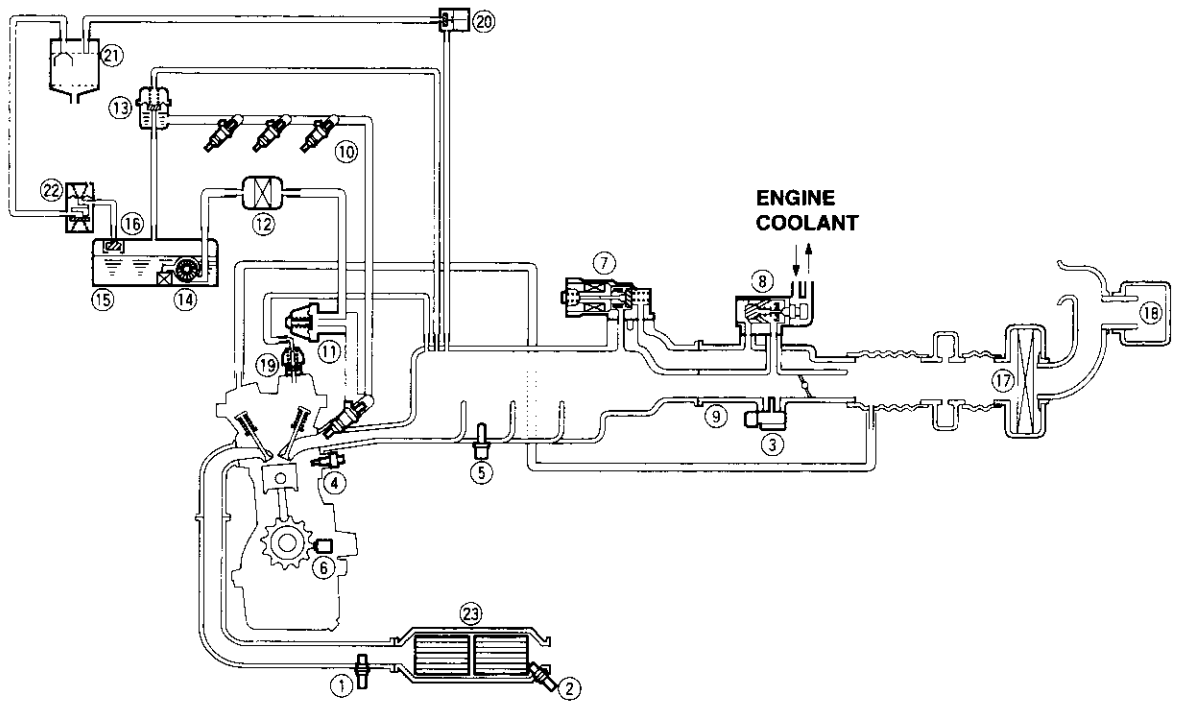
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System Description

Vacuum Connections (cont'd)

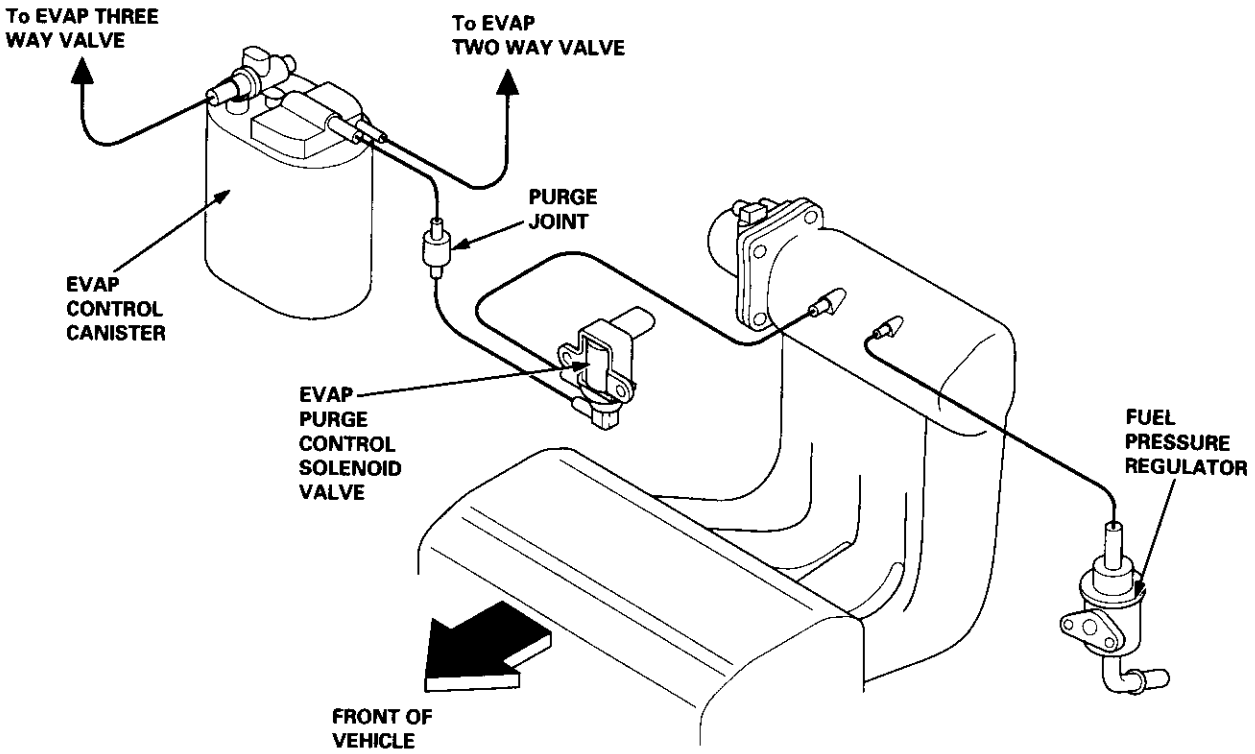
'97 model:



① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO2S, SENSOR 1)
② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S, SENSOR 2)
③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR
⑦ IDLE AIR CONTROL (IAC) VALVE
⑧ FAST IDLE THERMO VALVE
⑨ THROTTLE BODY (TB)
⑩ FUEL INJECTOR
⑪ FUEL PULSATION DAMPER
⑫ FUEL FILTER
⑬ FUEL PRESSURE REGULATOR
⑭ FUEL PUMP
⑮ FUEL TANK
⑯ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑰ AIR CLEANER
⑱ RESONATOR
⑲ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
⑳ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉑ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉒ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉓ THREE WAY CATALYTIC CONVERTER (TWC)

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'98 model:



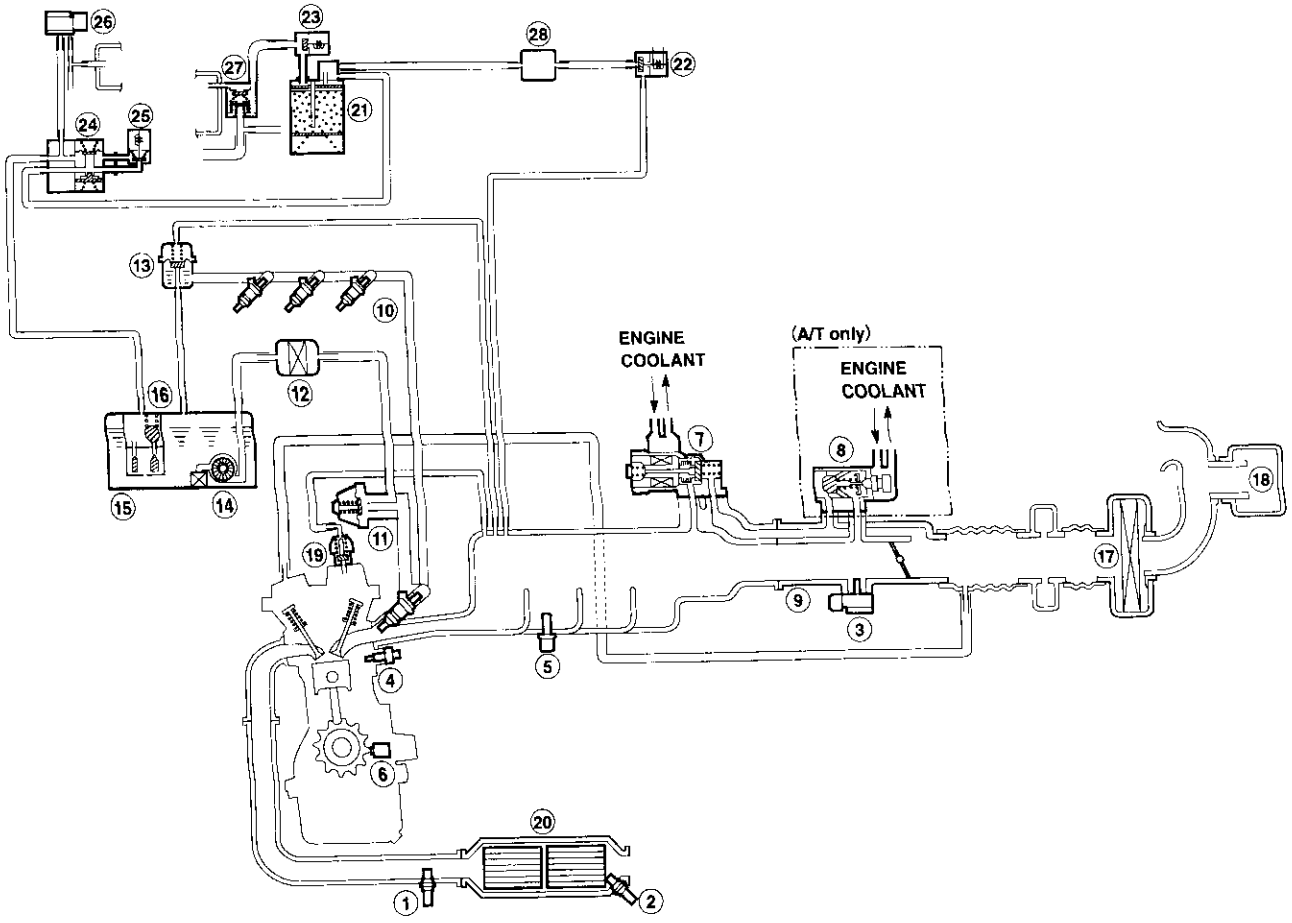
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System Description

Vacuum Connections (cont'd)

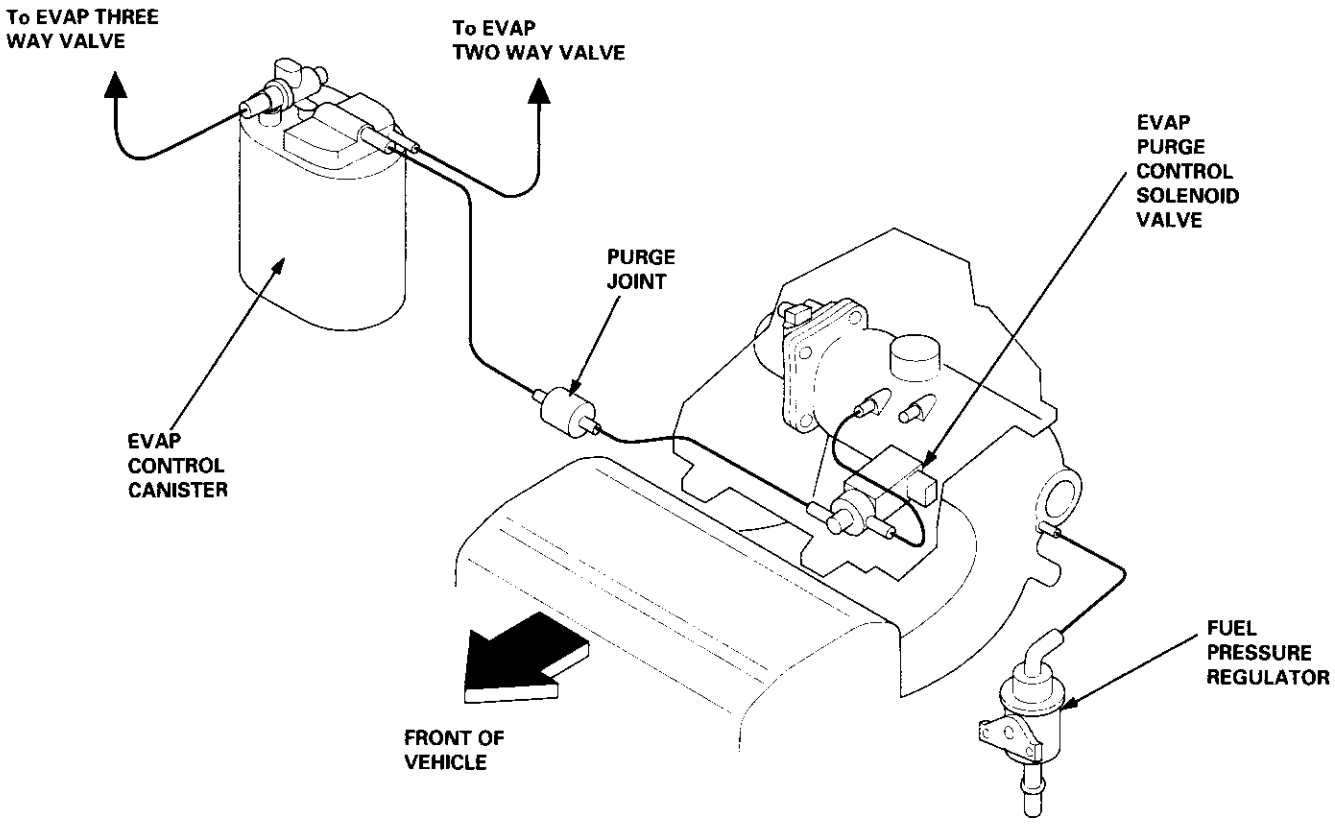
'98 model:



① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO2S, SENSOR 1)
② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S, SENSOR 2)
③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR
⑦ IDLE AIR CONTROL (IAC) VALVE
⑧ FAST IDLE THERMO VALVE (A/T)
⑨ THROTTLE BODY (TB)
⑩ FUEL INJECTOR
⑪ FUEL PULSATION DAMPER
⑫ FUEL FILTER
⑬ FUEL PRESSURE REGULATOR
⑭ FUEL PUMP
⑮ FUEL TANK
⑯ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑰ AIR CLEANER
⑱ RESONATOR
⑲ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
⑳ THREE WAY CATALYTIC CONVERTER (TWC)
㉑ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉒ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉓ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE
㉔ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉕ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE
㉖ FUEL TANK PRESSURE SENSOR
㉗ EVAPORATIVE EMISSION (EVAP) THREE WAY VALVE
㉘ PURGE JOINT

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'99 – 00 models:



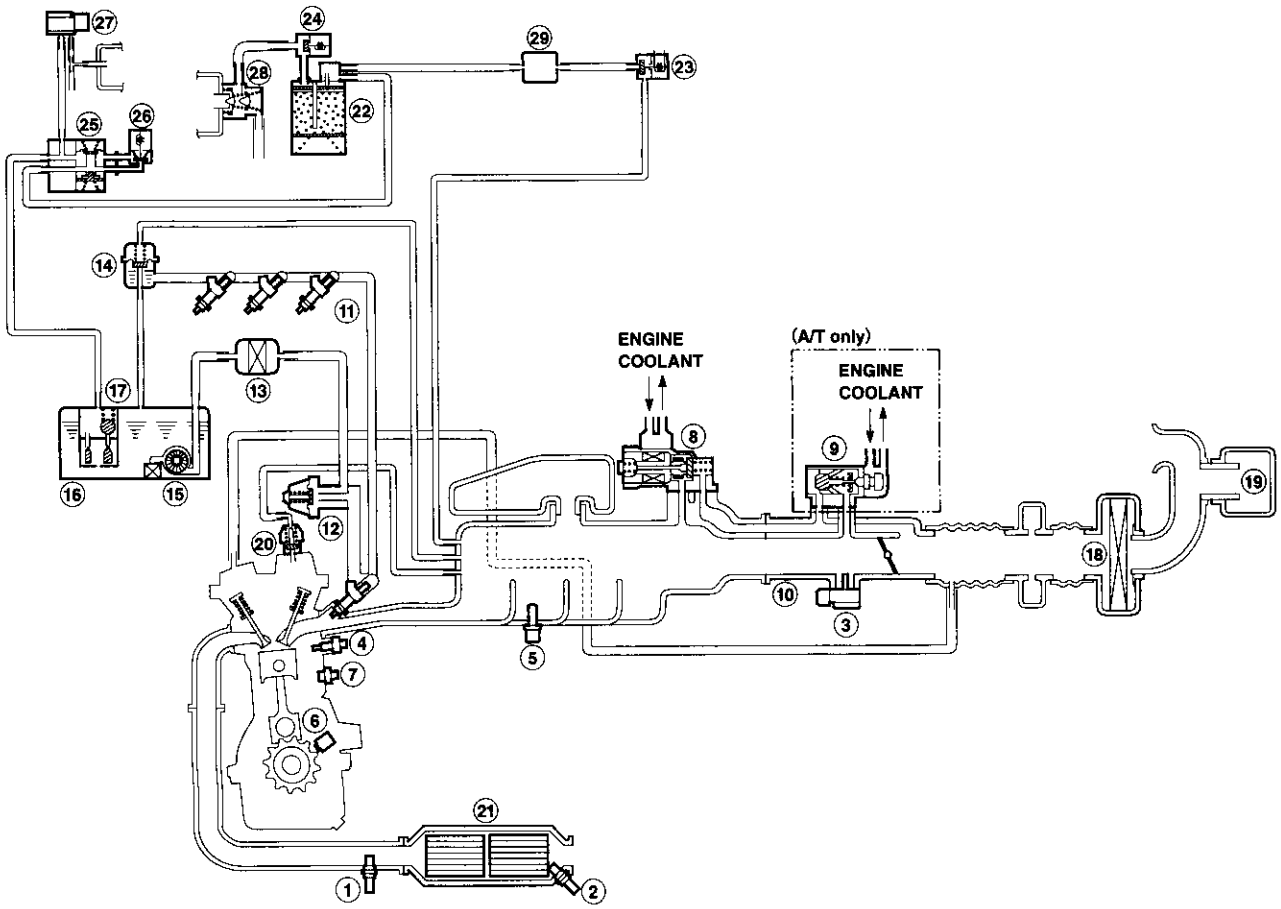
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System Description

Vacuum Connections (cont'd)

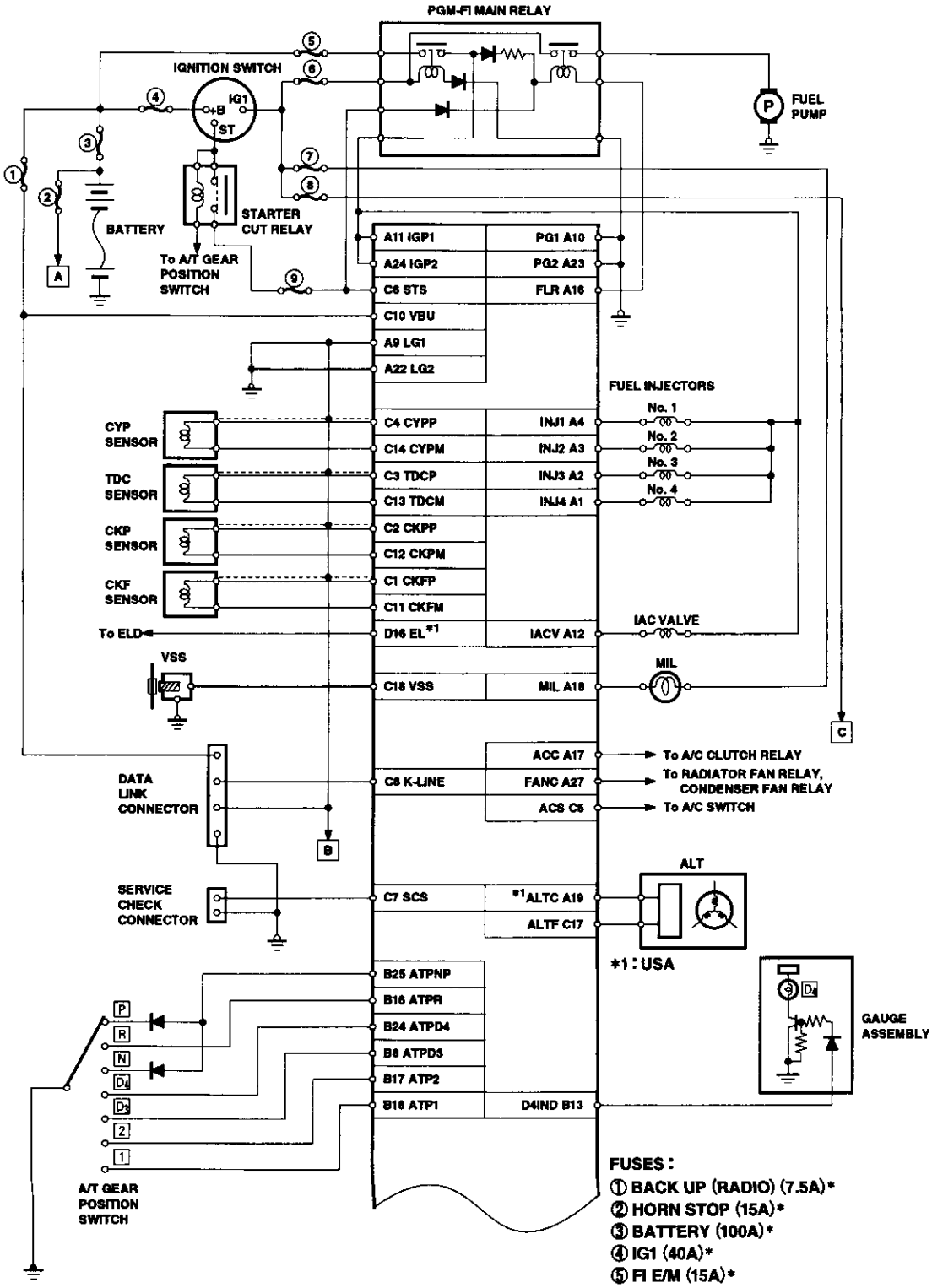
'99 – 00 models:



① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO2S, SENSOR 1)
② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S, SENSOR 2)
③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR
⑦ KNOCK SENSOR (KS)
⑧ IDLE AIR CONTROL (IAC) VALVE
⑨ FAST IDLE THERMO VALVE (A/T)
⑩ THROTTLE BODY (TB)
⑪ FUEL INJECTOR
⑫ FUEL PULSATION DAMPER
⑬ FUEL FILTER
⑭ FUEL PRESSURE REGULATOR
⑮ FUEL PUMP
⑯ FUEL TANK
⑰ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑱ AIR CLEANER
⑲ RESONATOR
⑳ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
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㉓ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉔ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE
㉕ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉖ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE
㉗ FUEL TANK PRESSURE SENSOR
㉘ EVAPORATIVE EMISSION (EVAP) THREE WAY VALVE
㉙ PURGE JOINT

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Electrical Connections — '97 Model



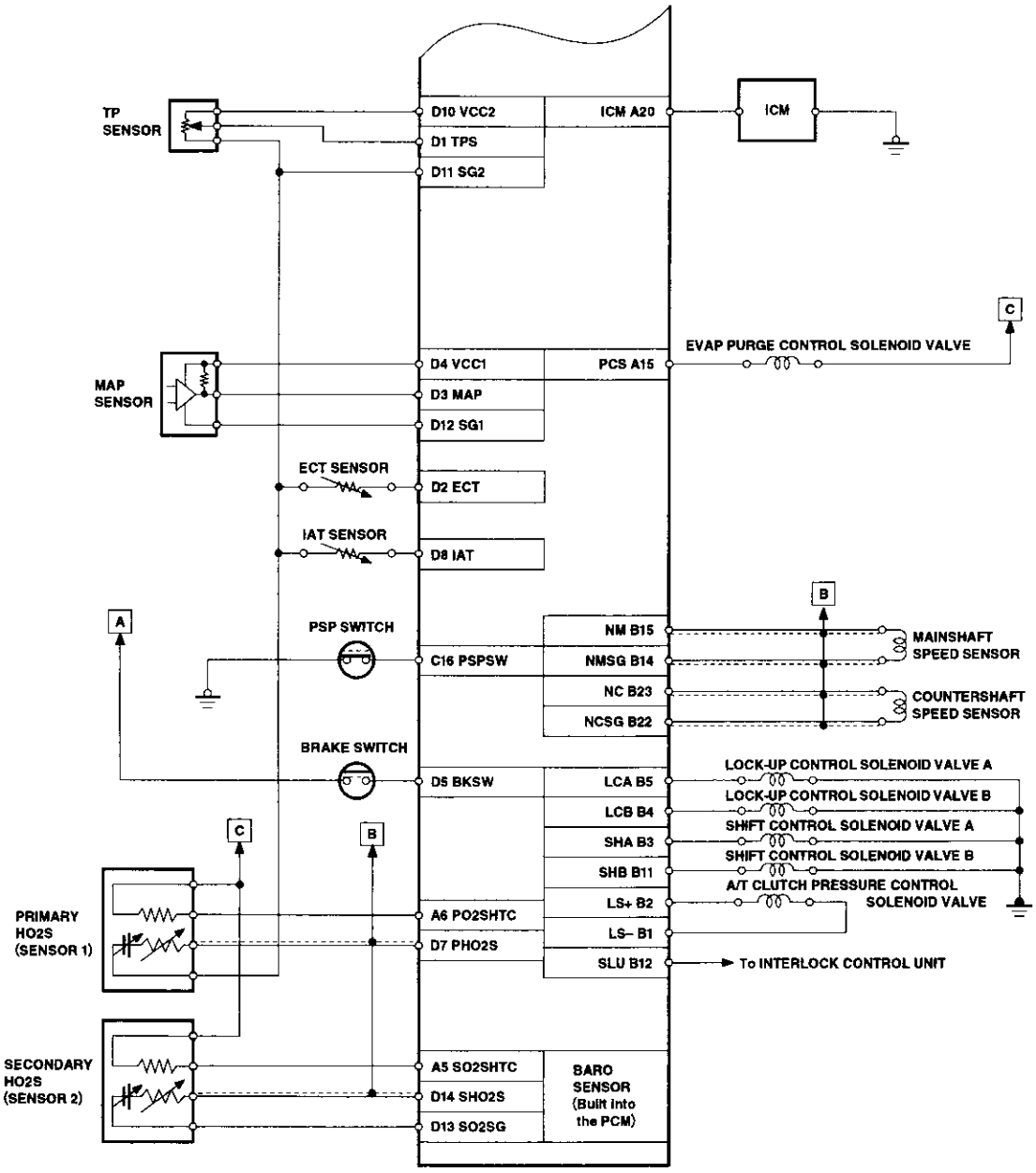
FUSES :

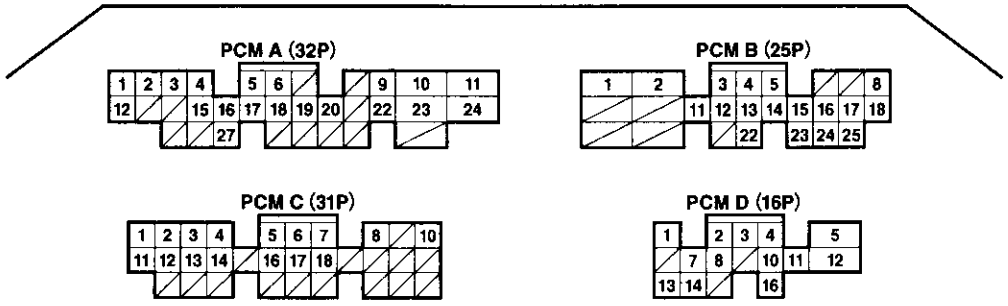
① BACK UP (RADIO) (7.5A)*
② HORN STOP (15A)*
③ BATTERY (100A)*
④ IG1 (40A)*
⑤ FI E/M (15A)*
⑥ No. 13 FUEL PUMP (15A)
⑦ No. 25 METER (7.5A)
⑧ No. 15 ALTERNATOR SP SENSOR (7.5A)*
⑨ No. 31 STARTER SIGNAL (7.5A)
*: in the under-hood fuse/relay box

(cont'd)

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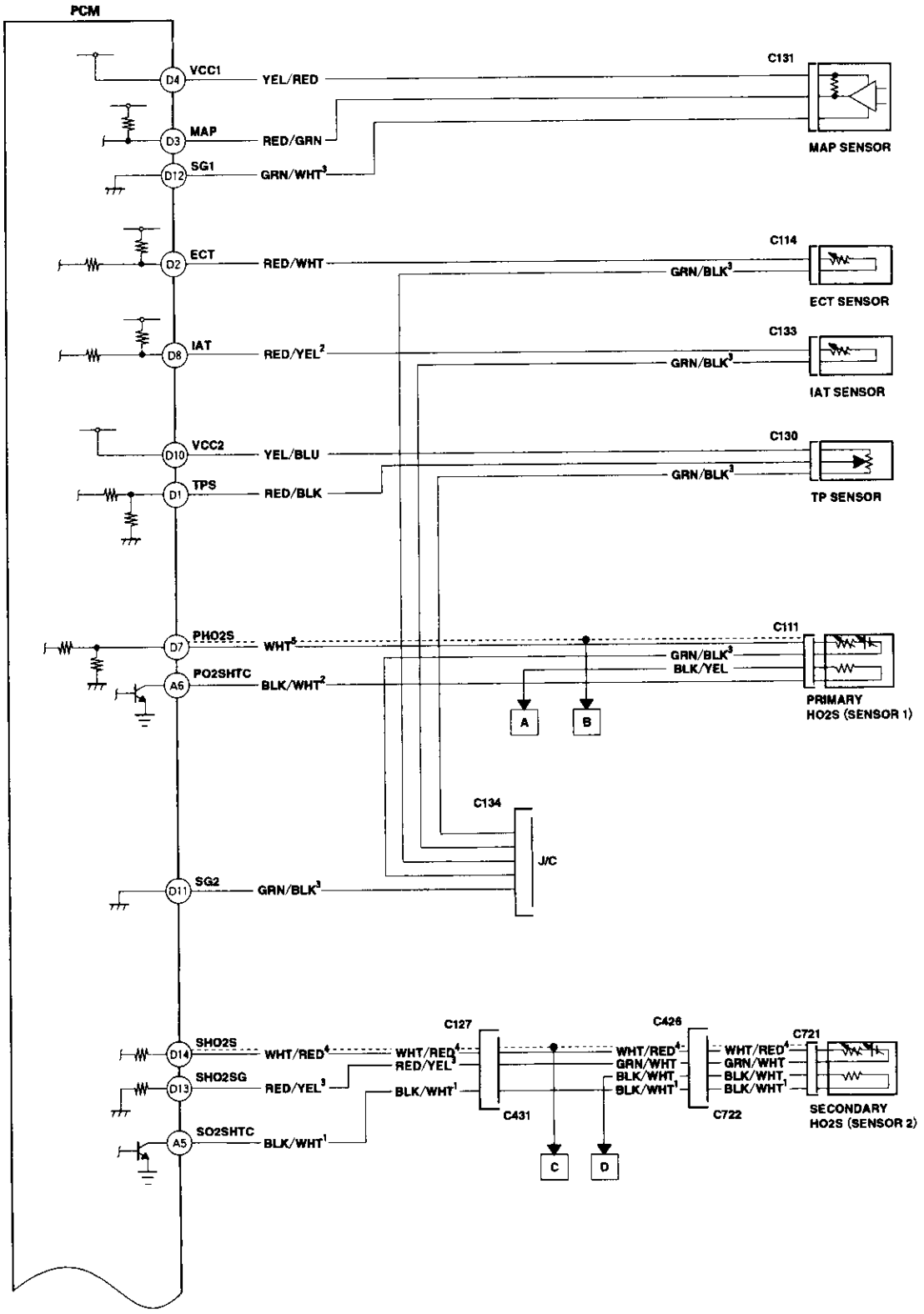
Electrical Connections — '97 Model (cont'd)





TERMINAL LOCATIONS

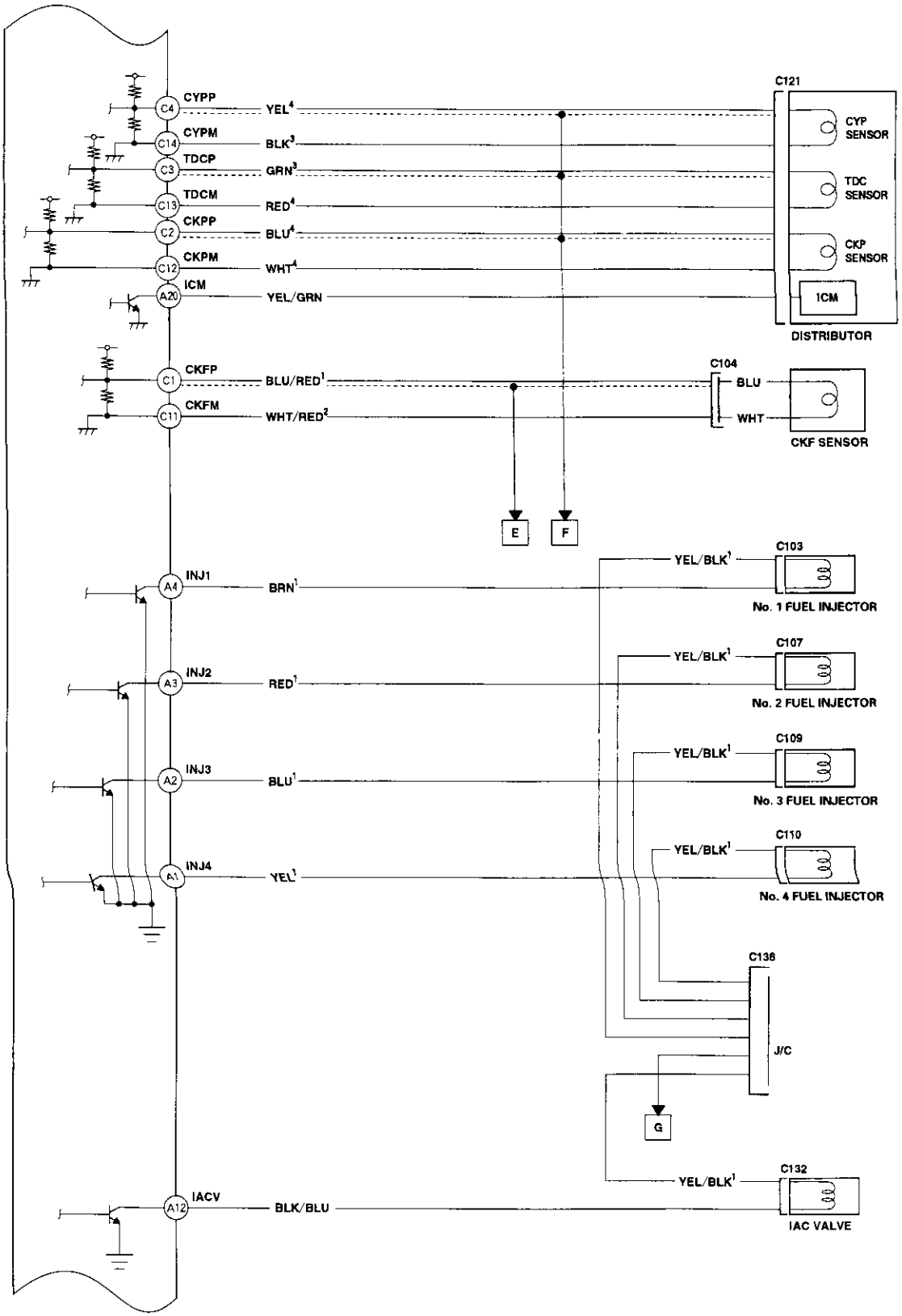
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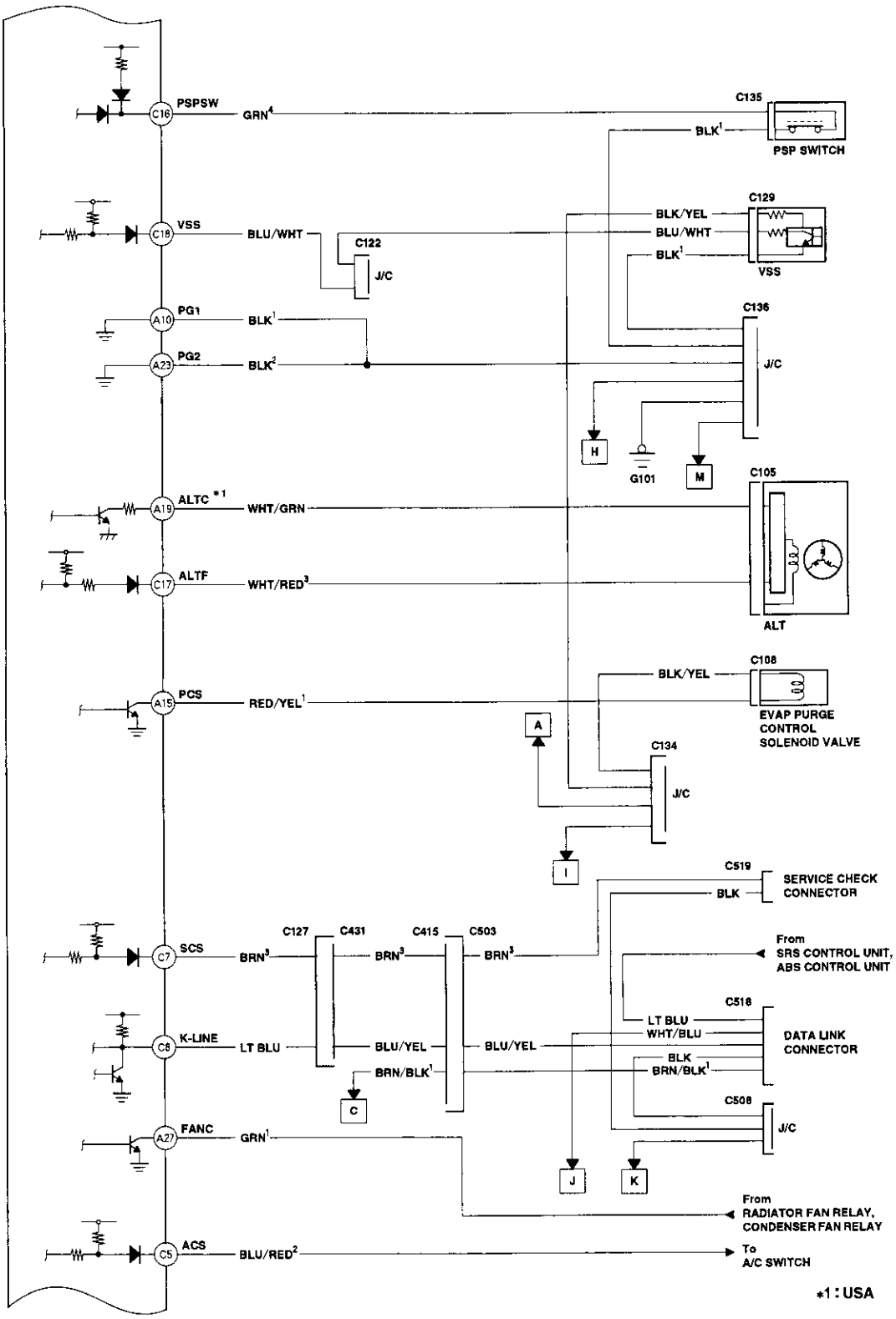
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Electrical Connections — '97 Model (cont'd)



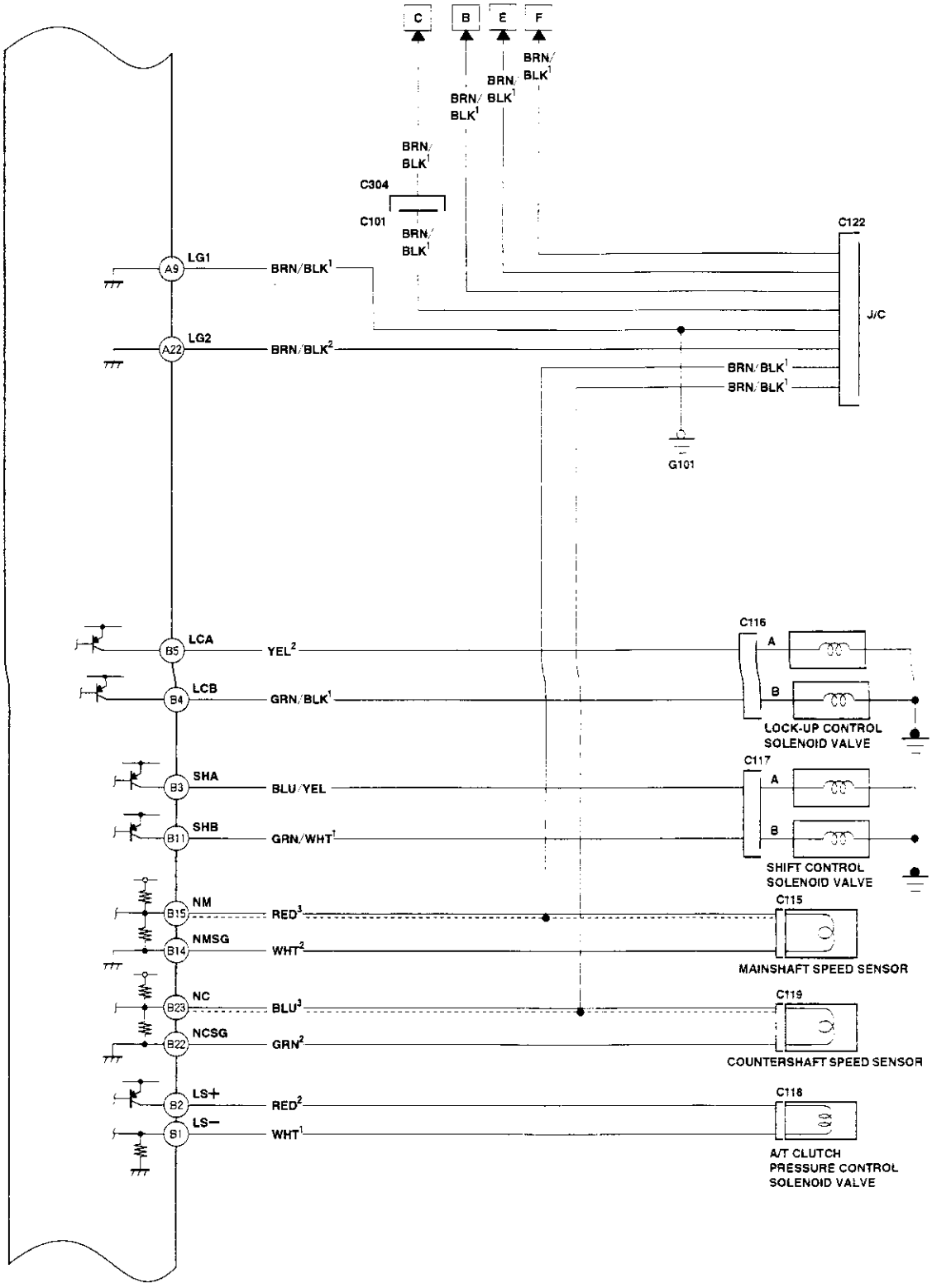
www.emanualpro.com



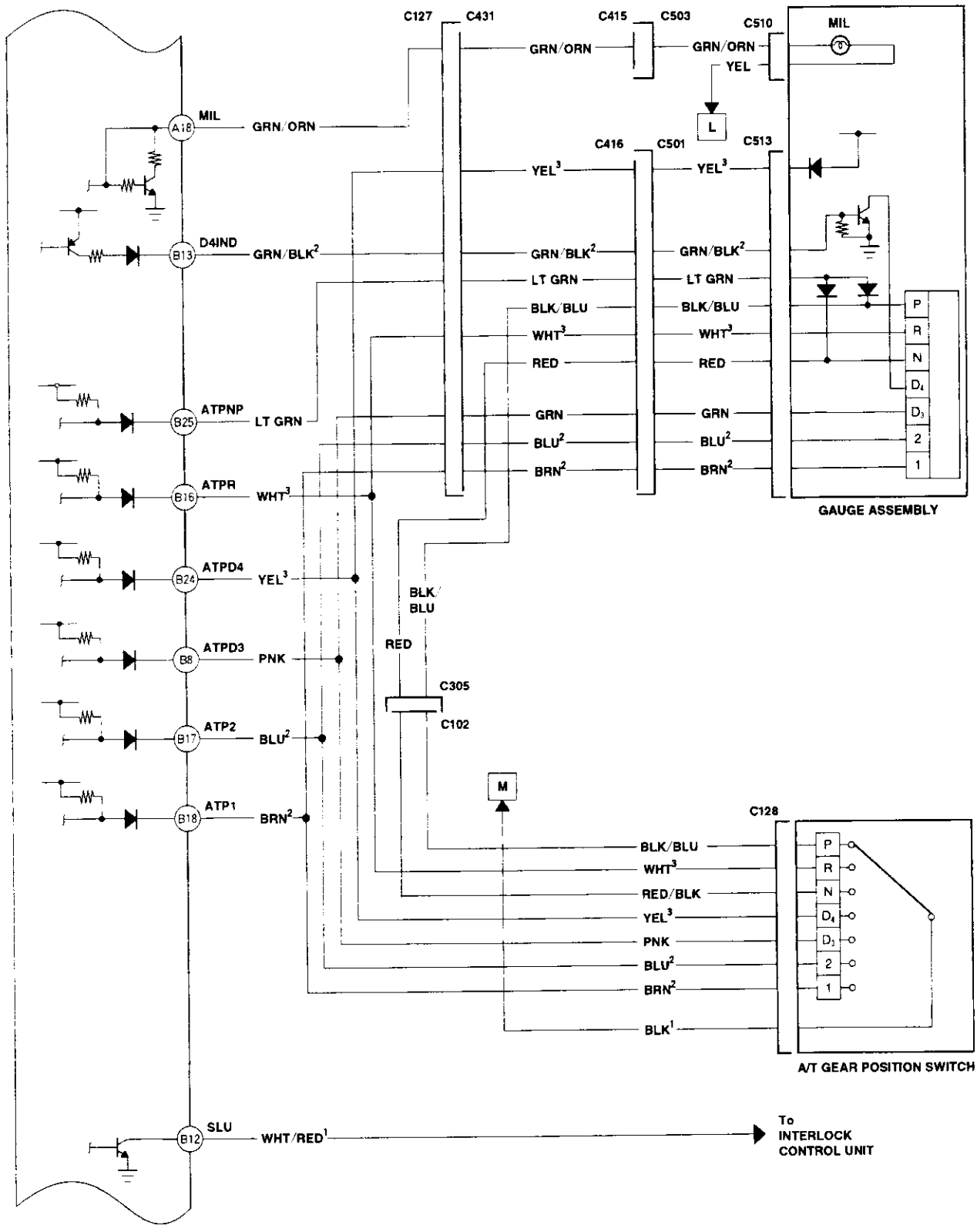
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Electrical Connections — '97 Model (cont'd)



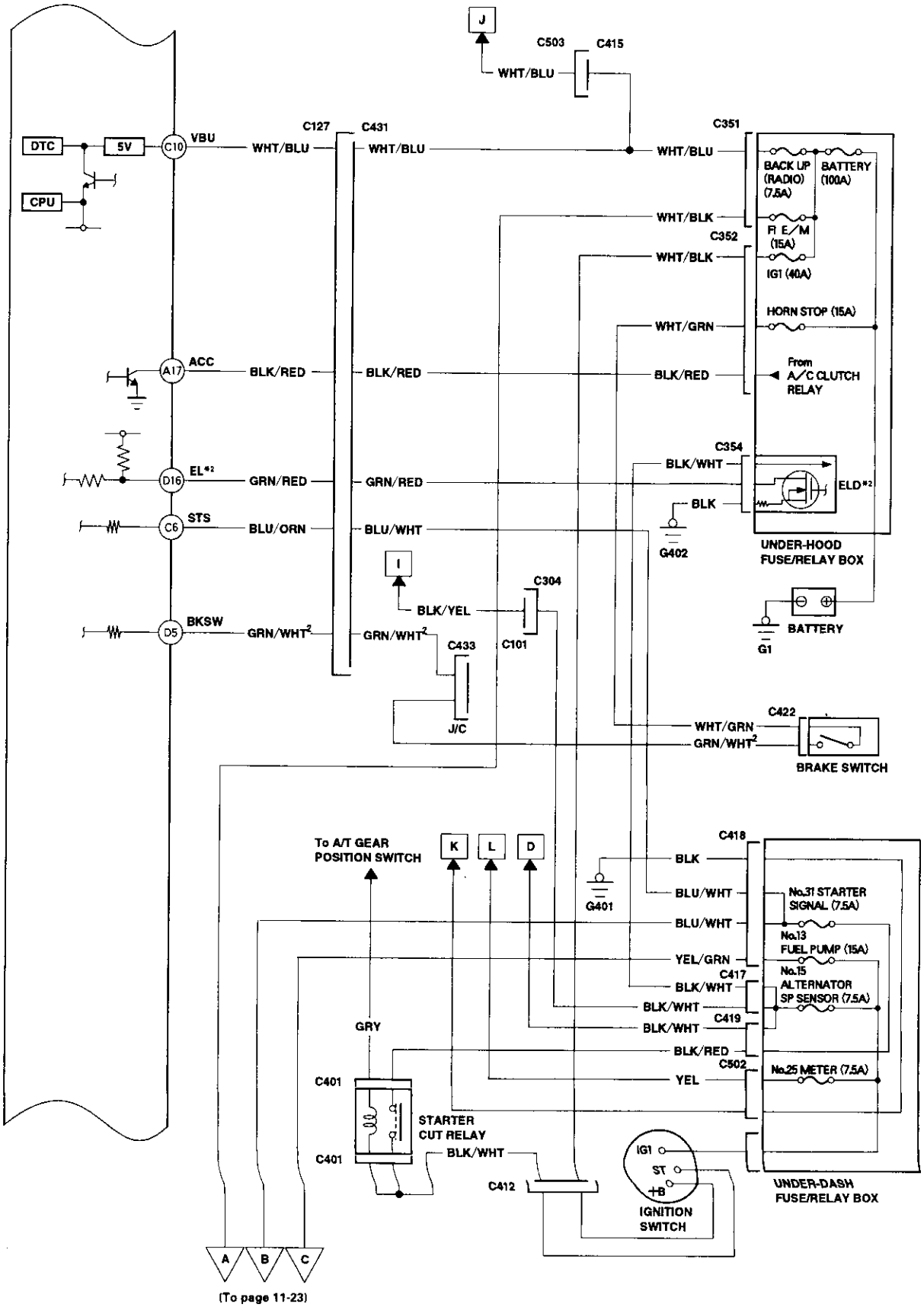
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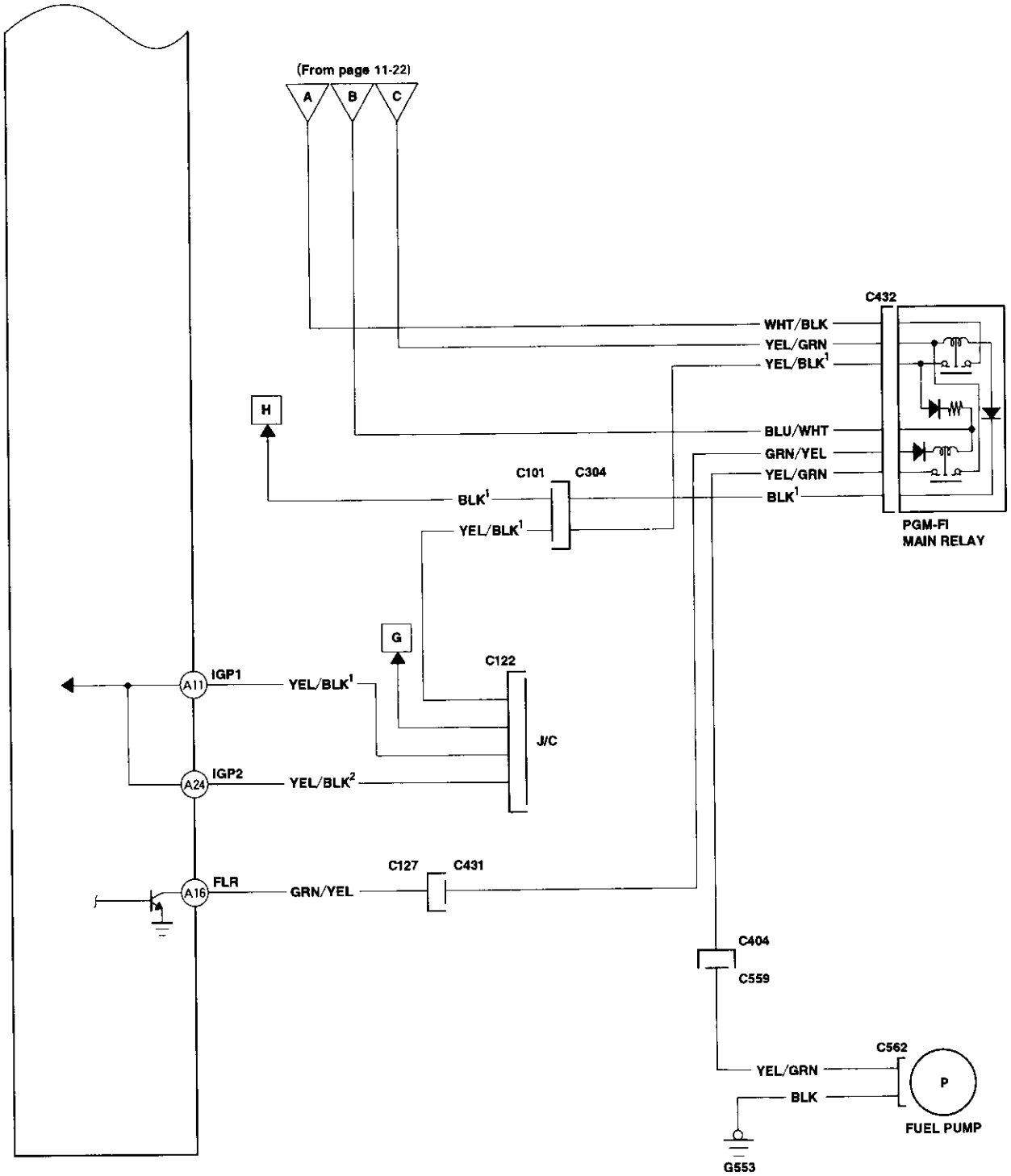
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Electrical Connections — '97 Model (cont'd)



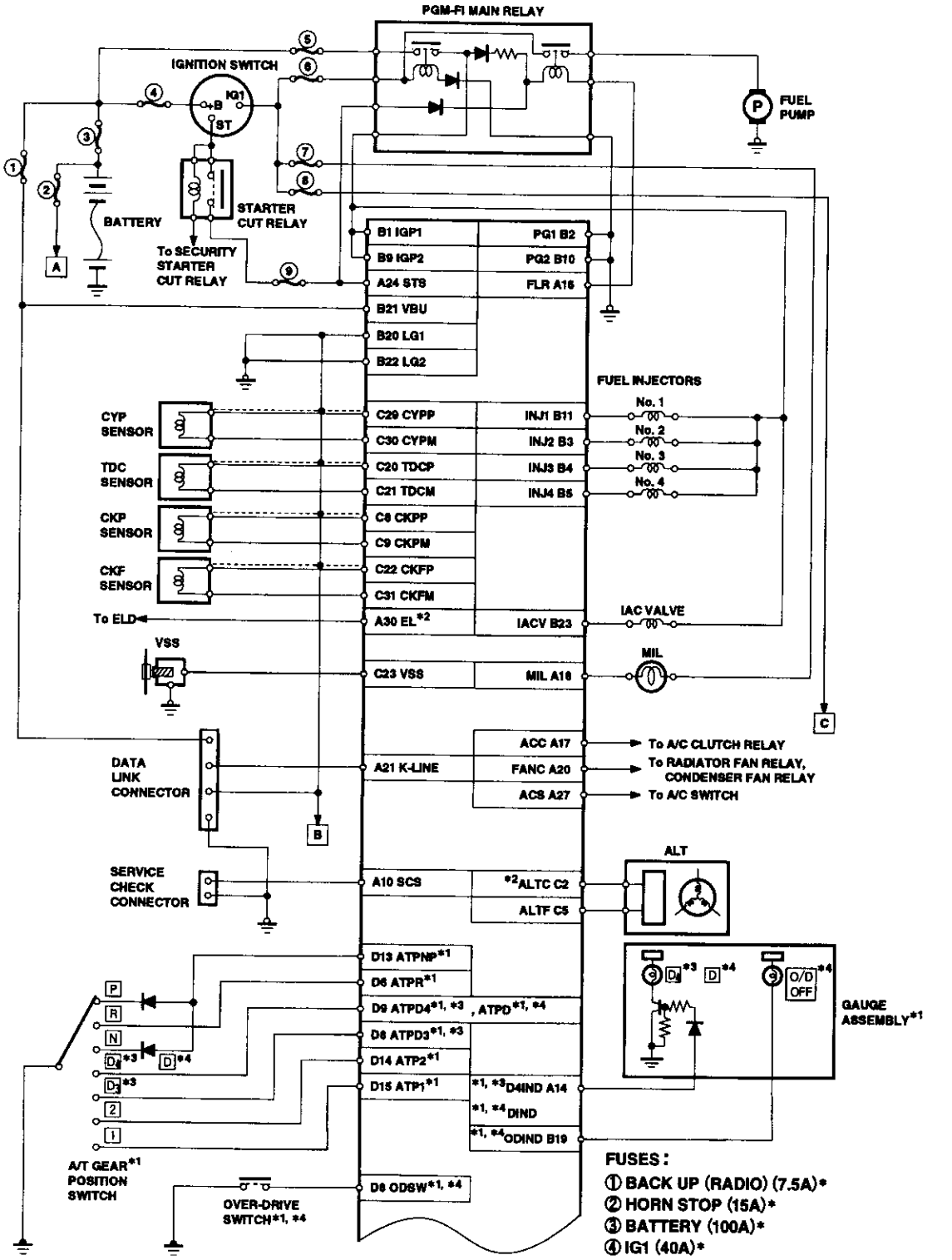
*2: USA

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Electrical Connections — '98 – 00 Models



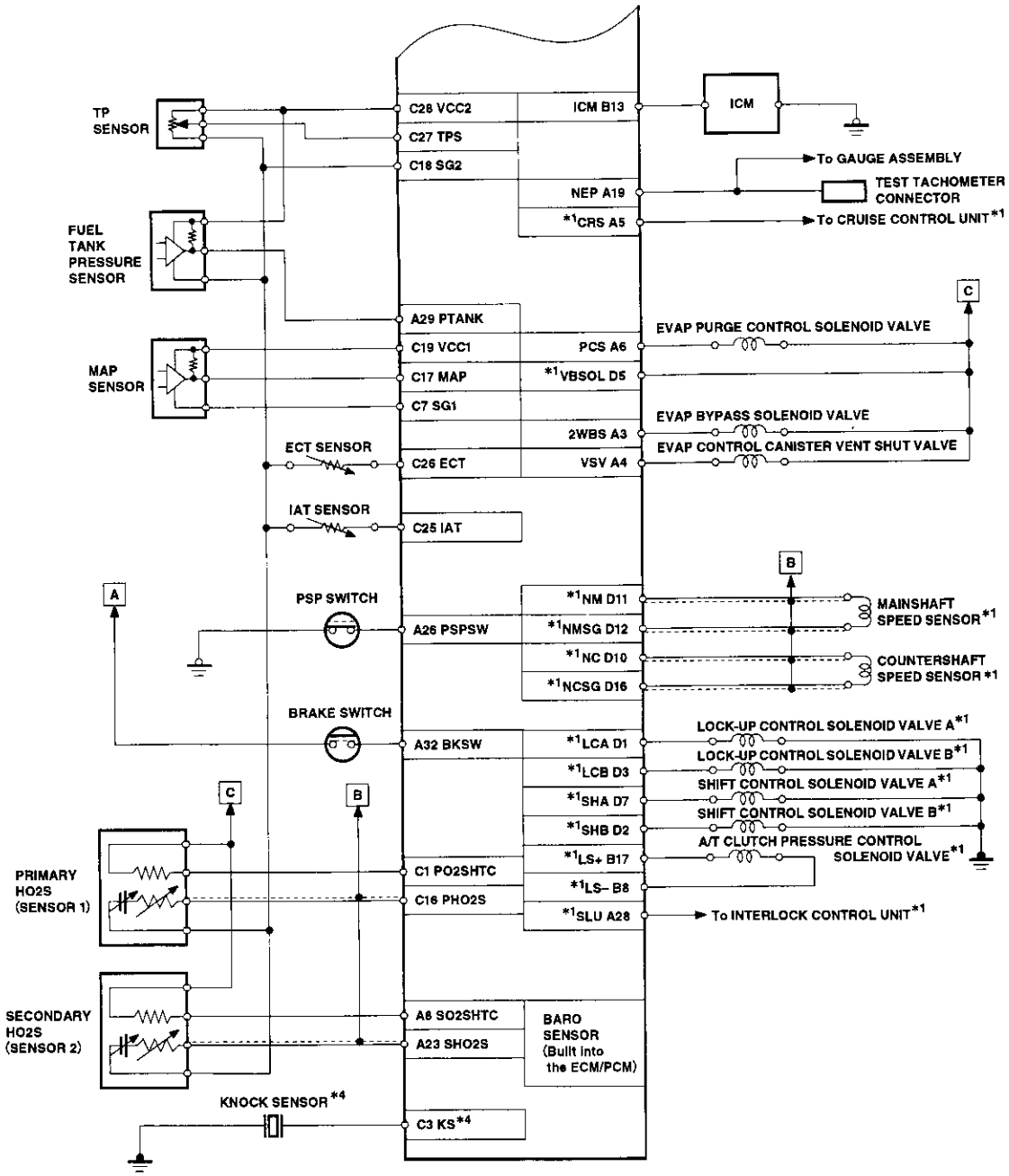
*1: A/T
*2: USA
*3: '98 model
*4: '99 – 00 models

FUSES:

① BACK UP (RADIO) (7.5A)*
② HORN STOP (15A)*
③ BATTERY (100A)*
④ IG1 (40A)*
⑤ FI E/M (15A)*
⑥ No. 13 FUEL PUMP (15A)
⑦ No. 25 METER (7.5A)
⑧ No. 15 ALTERNATOR SP SENSOR (7.5A)*
⑨ No. 31 STARTER SIGNAL (7.5A)

*: in the under-hood fuse/relay box

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ECM/PCM A (32P)

		3	4		5	6		8		10						
	14		16	17	18	19	20	21		23	24					
		26	27		28	29	30			32						

ECM/PCM B (25P)

1	2				3	4	5									8
9	10	11				13									17	
19	20				21	22				23						

ECM/PCM C (31P)

1	2	3			5		7			8	9											
					16	17	18	19	20	21	22											
		23		25		26	27	28		29	30	31										

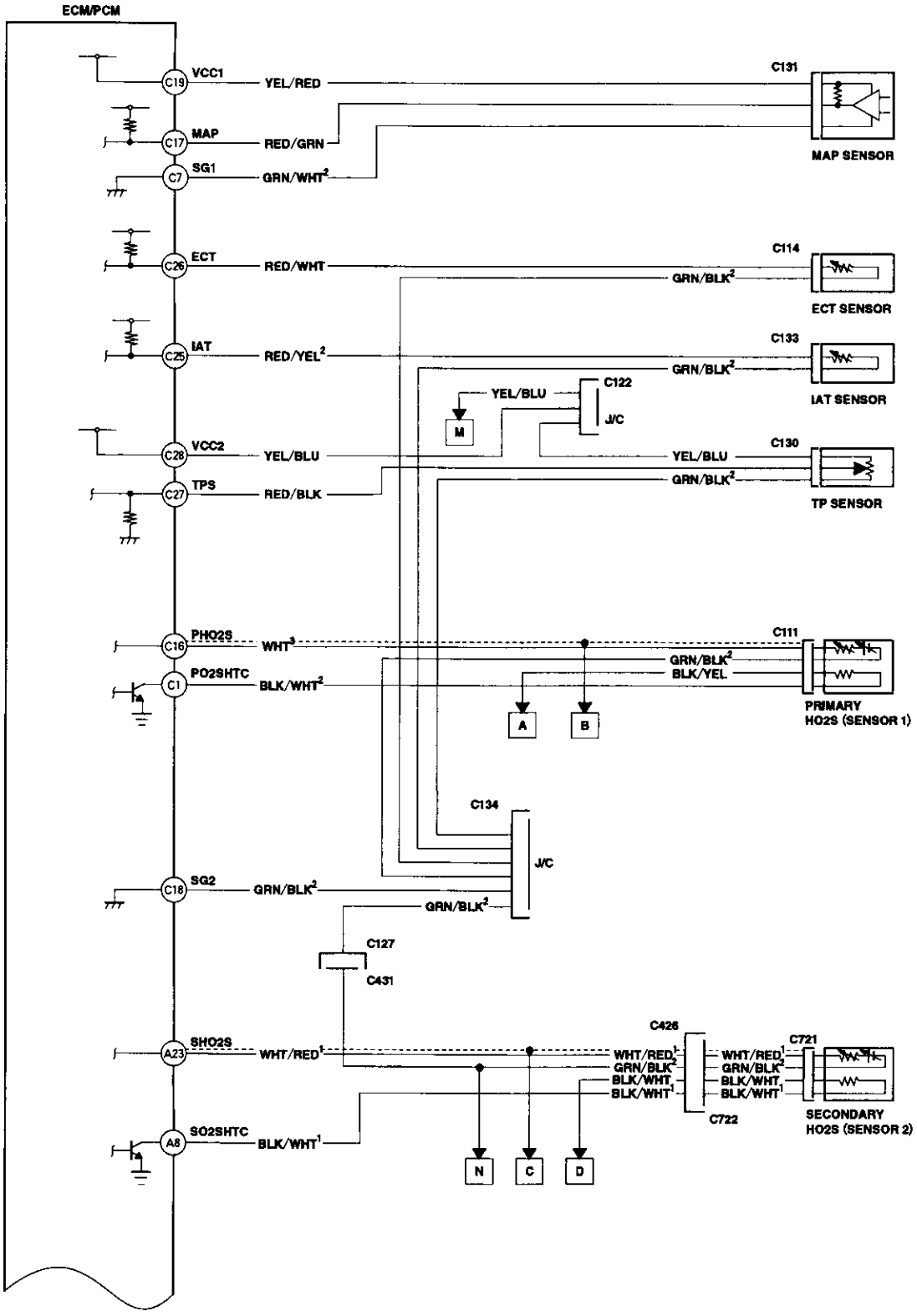
PCM D (16P)

1					2	3					5					
6	7	8	9	10	11	12										
13	14	15		16												

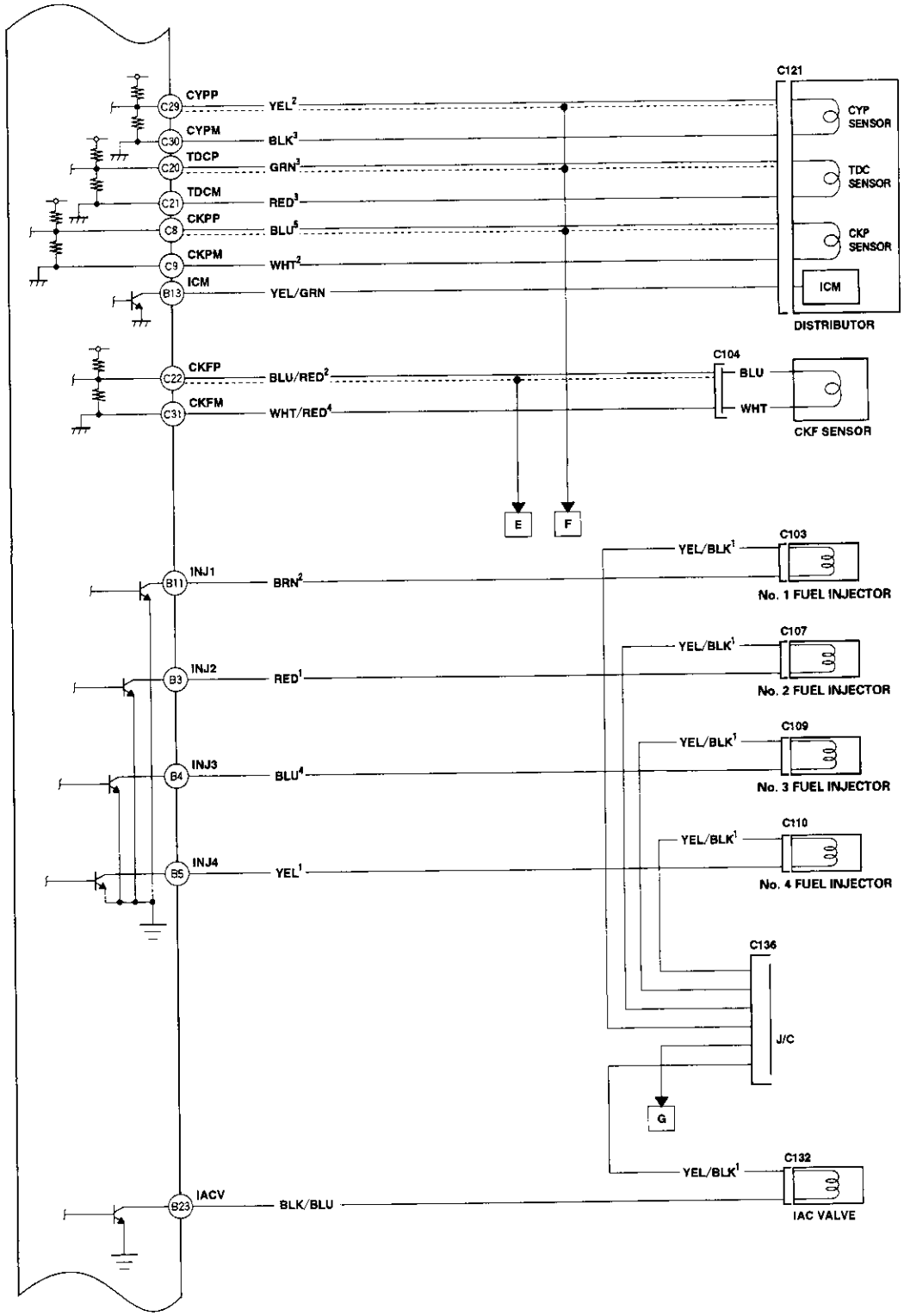
TERMINAL LOCATIONS

(cont'd)

Electrical Connections — '98 – 00 Models (cont'd)

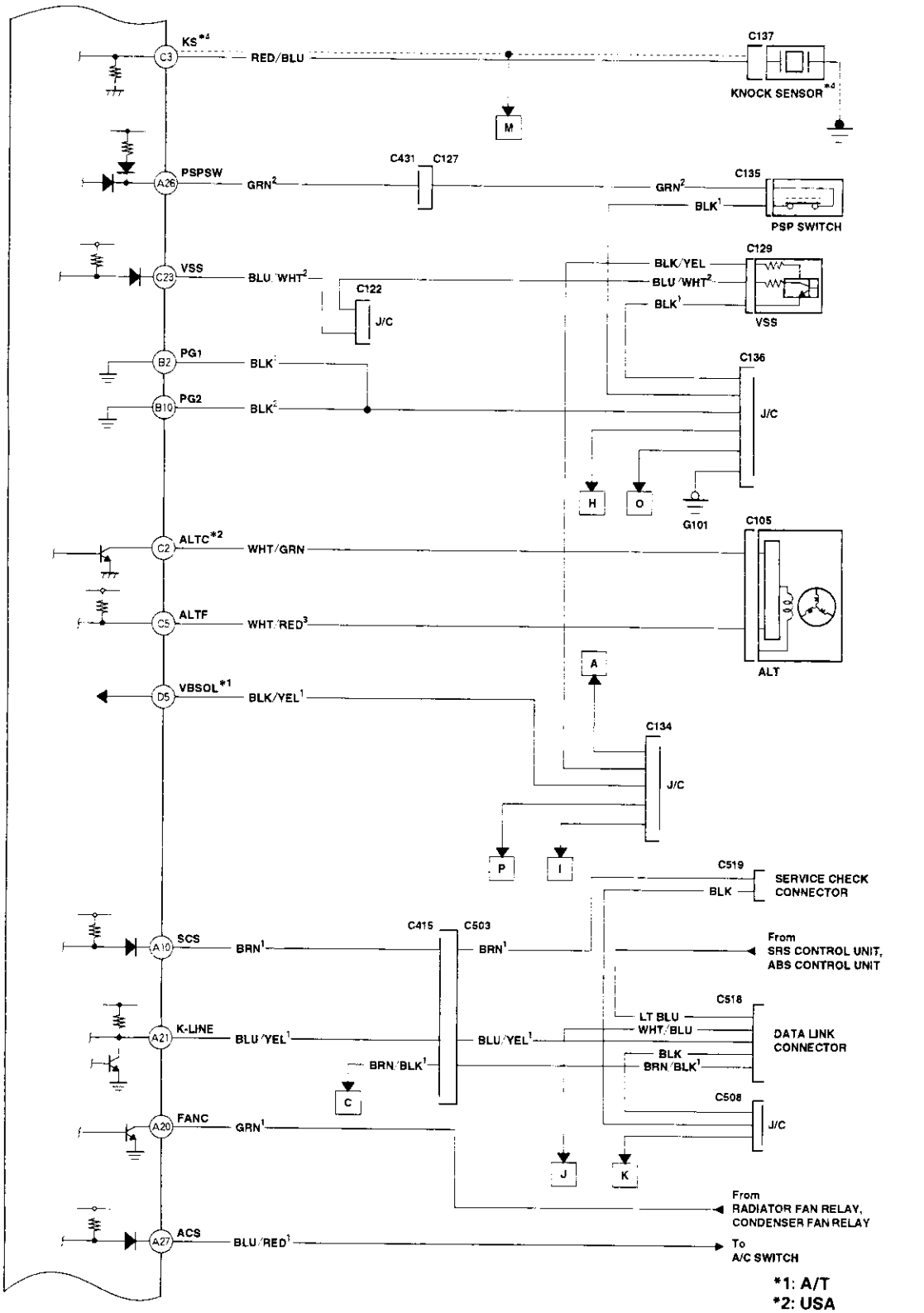


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C121
CYPP
C29
YEL[2]
CYPM
C30
BLK[3]
TDCP
C20
GRN[3]
TDCM
C21
RED[3]
CKPP
C8
BLU[5]
CKPM
C9
WHT[2]
ICM
B13
YEL/GRN
CYP SENSOR
TDC SENSOR
CKP SENSOR
ICM
DISTRIBUTOR
C104
CKFP
C22
BLU/RED[2]
CKFM
C31
WHT/RED[4]
BLU
WHT
CKF SENSOR
E
F
C103
YEL/BLK[1]
INJ1
B11
BRN[2]
No. 1 FUEL INJECTOR
C107
YEL/BLK[1]
INJ2
B3
RED[1]
No. 2 FUEL INJECTOR
C109
YEL/BLK[1]
INJ3
B4
BLU[4]
No. 3 FUEL INJECTOR
C110
YEL/BLK[1]
INJ4
B5
YEL[1]
No. 4 FUEL INJECTOR
C136
J/C
G
C132
YEL/BLK[1]
IACV
B23
BLK/BLU
IAC VALVE

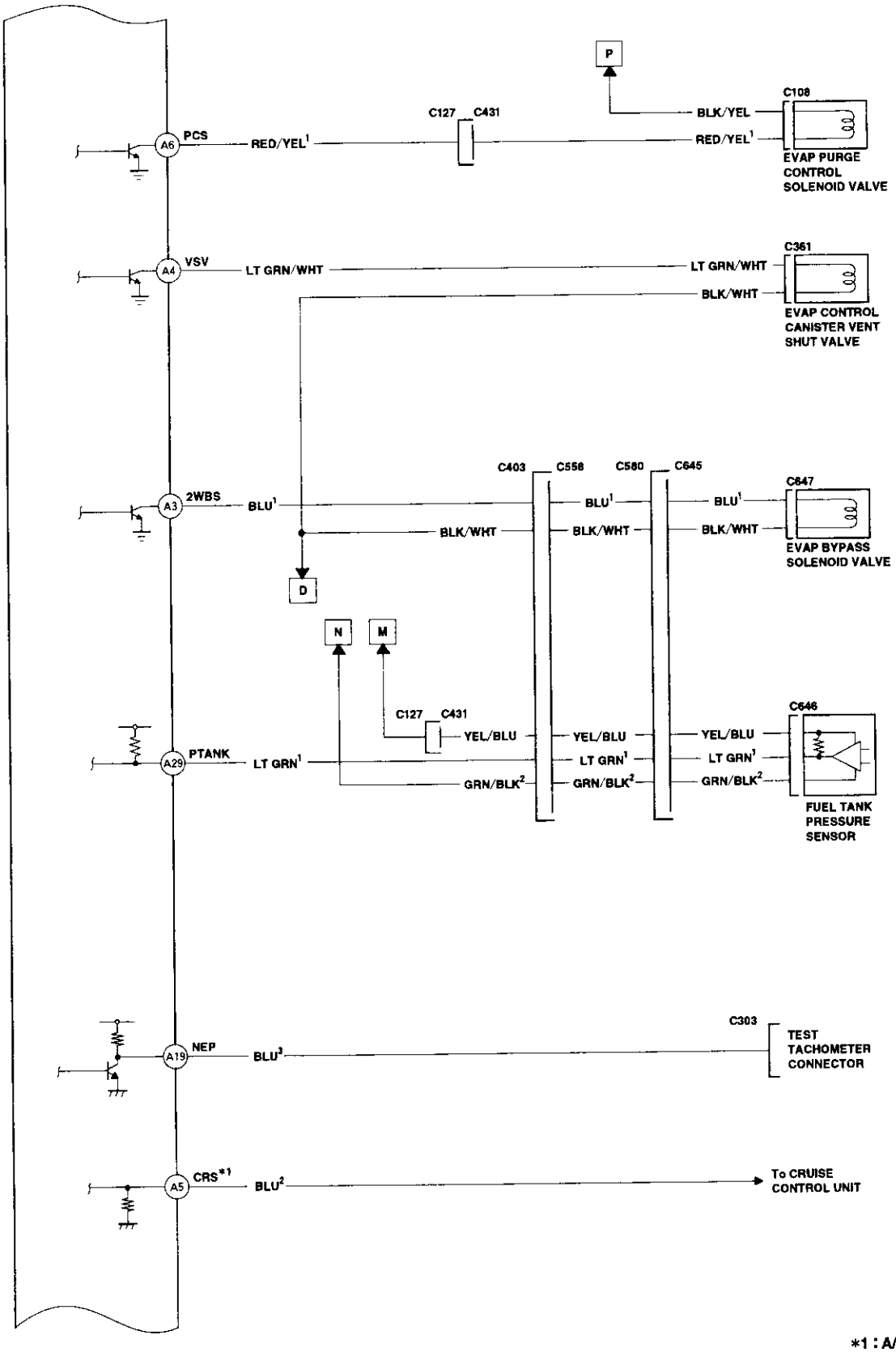
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Electrical Connections — '98 – 00 Models (cont'd)



*1: A/T
*2: USA
*4: '99 – 00 models

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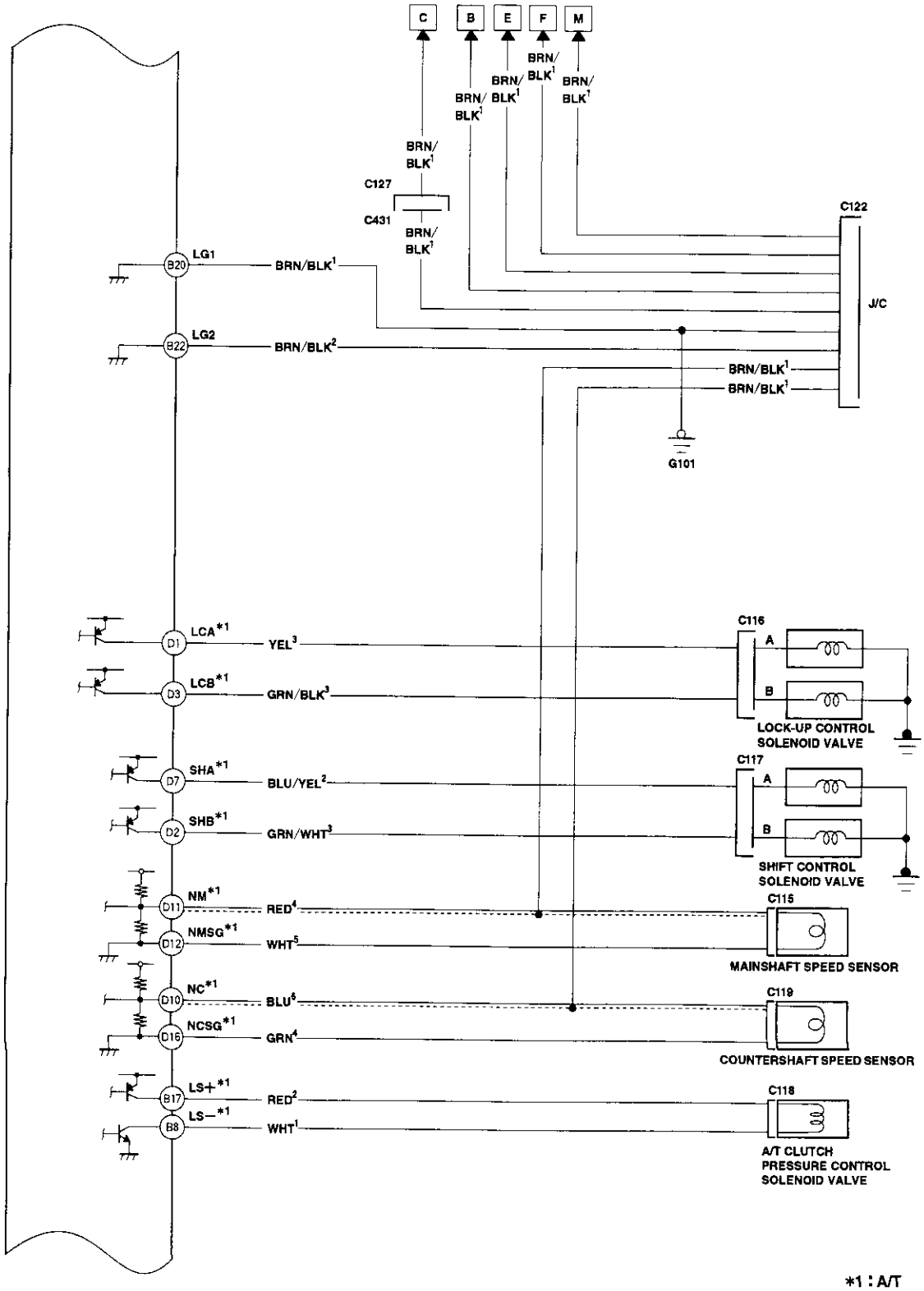


*1 : A/T

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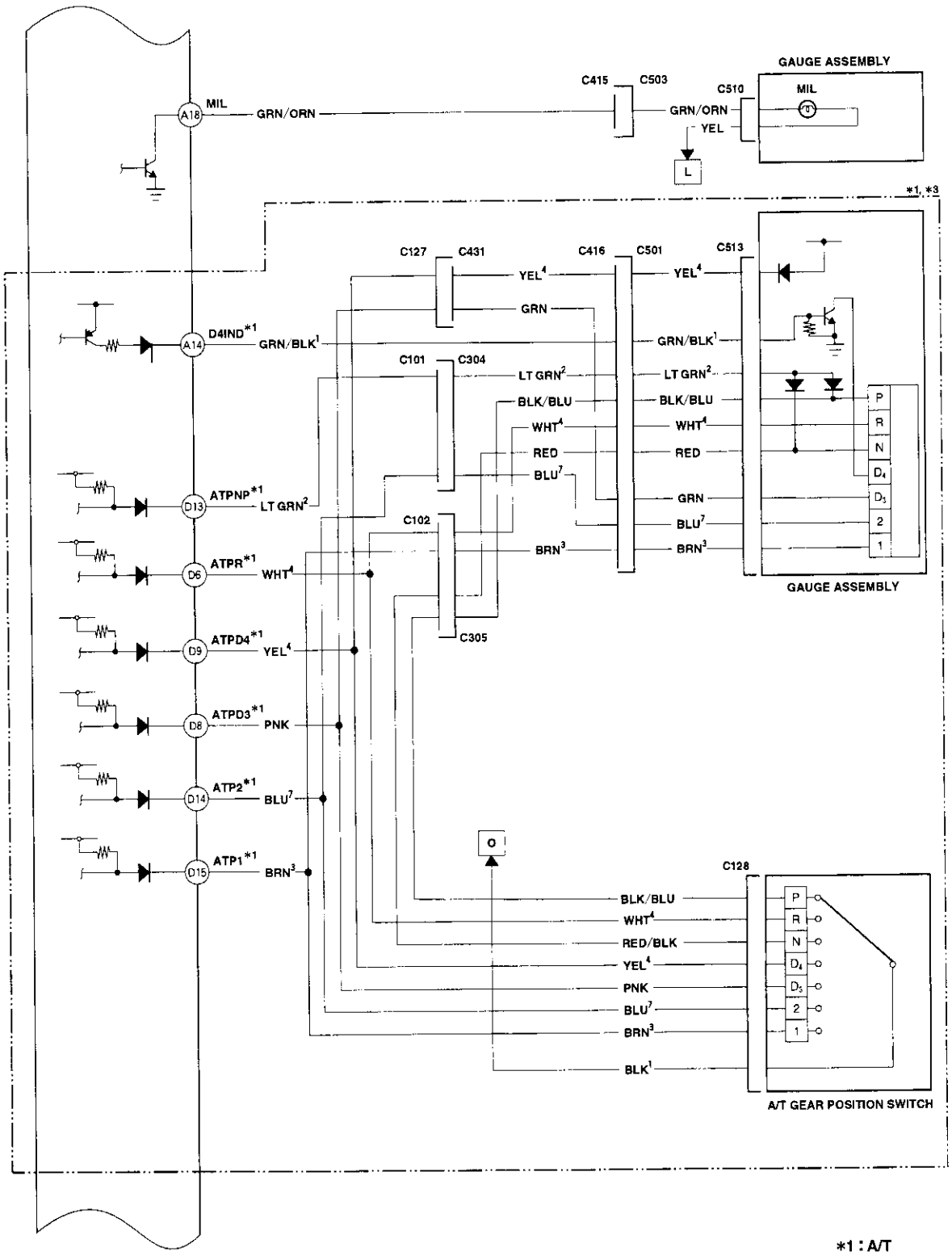
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Electrical Connections — '98 – 00 Models (cont'd)



*1 : A/T

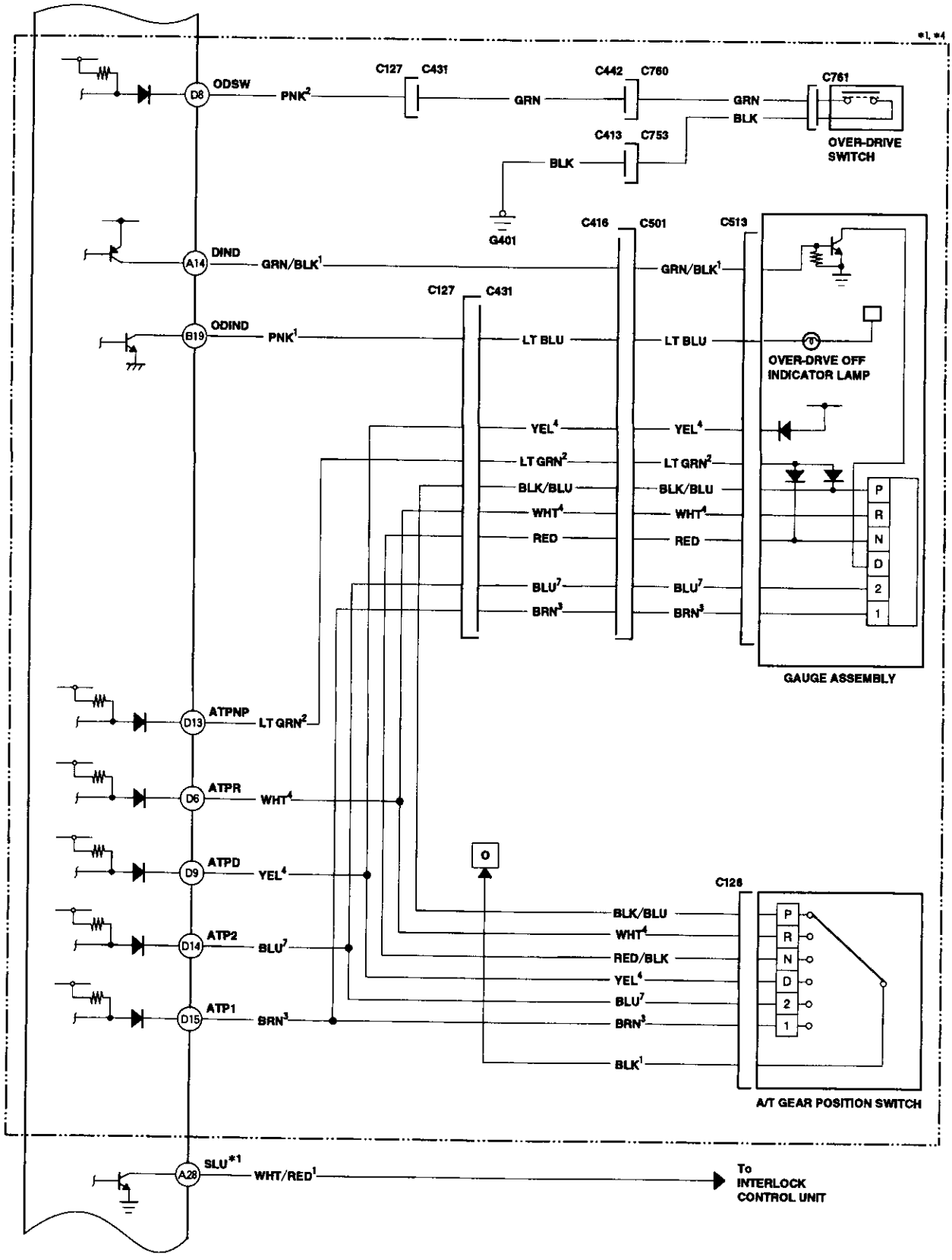
www.emanualpro.com



*1 : A/T
*3 : '98 model

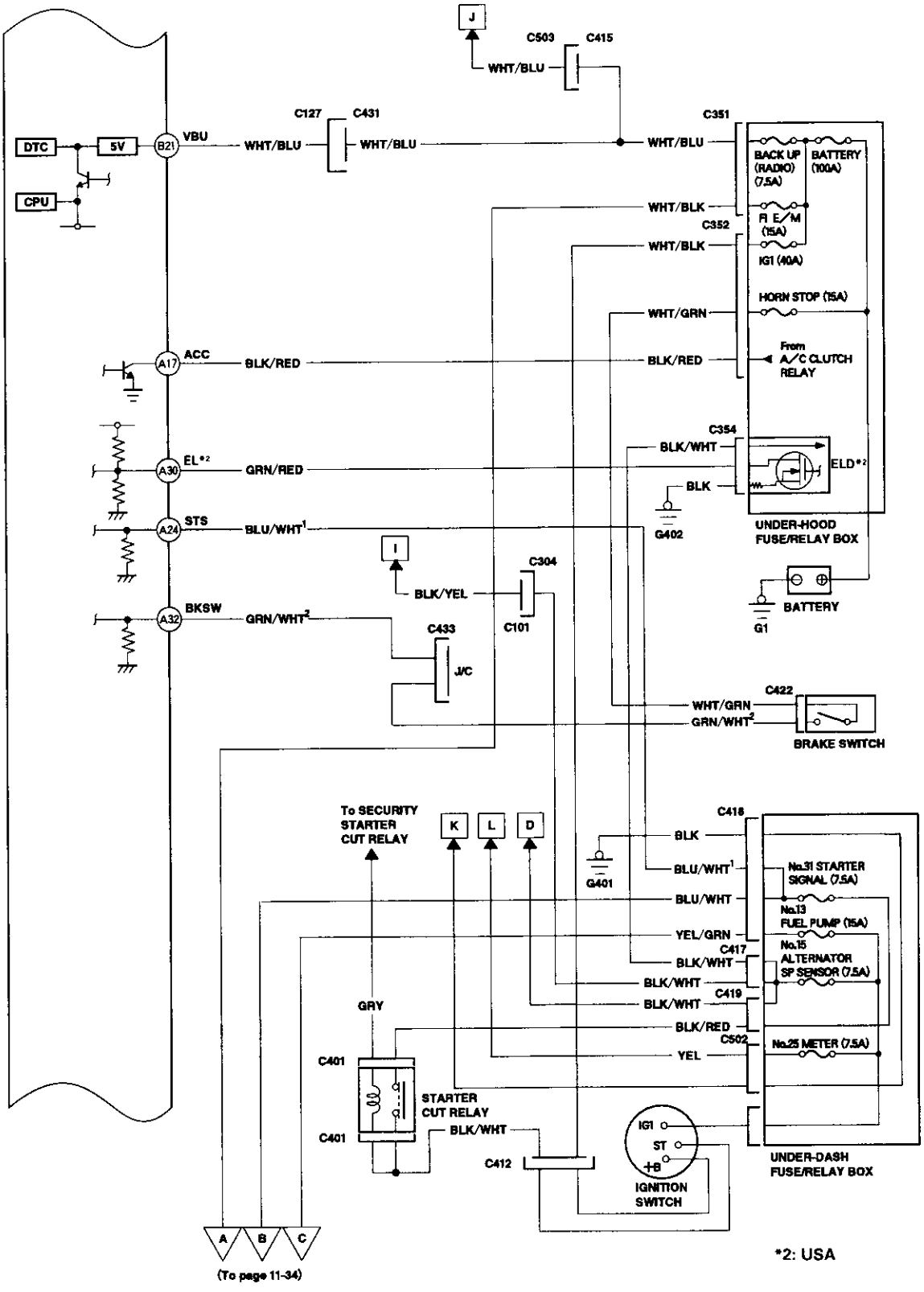
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Electrical Connections — '98 – 00 Models (cont'd)



*1: A/T
*4: '99 – 00 models

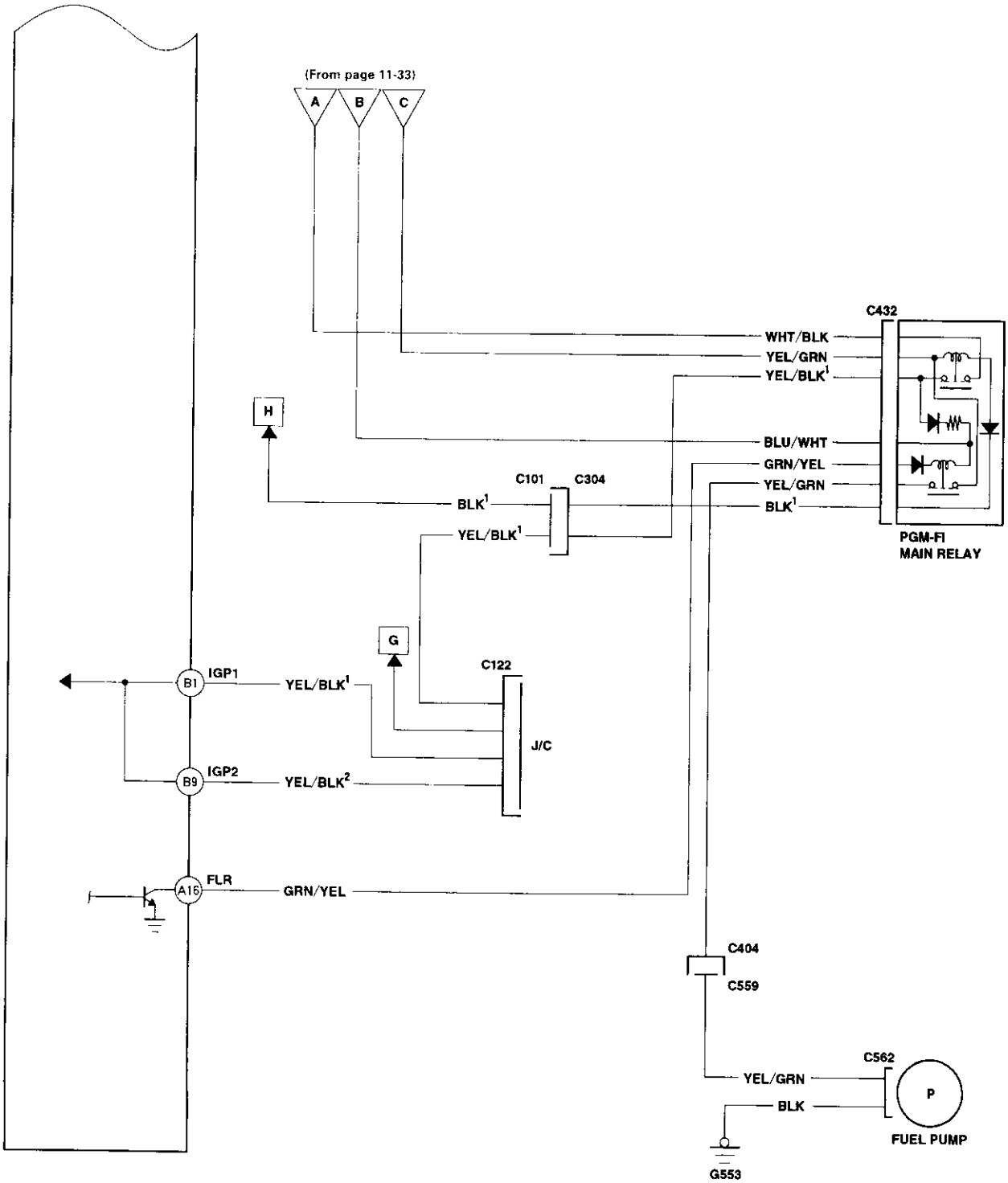
www.emanualpro.com



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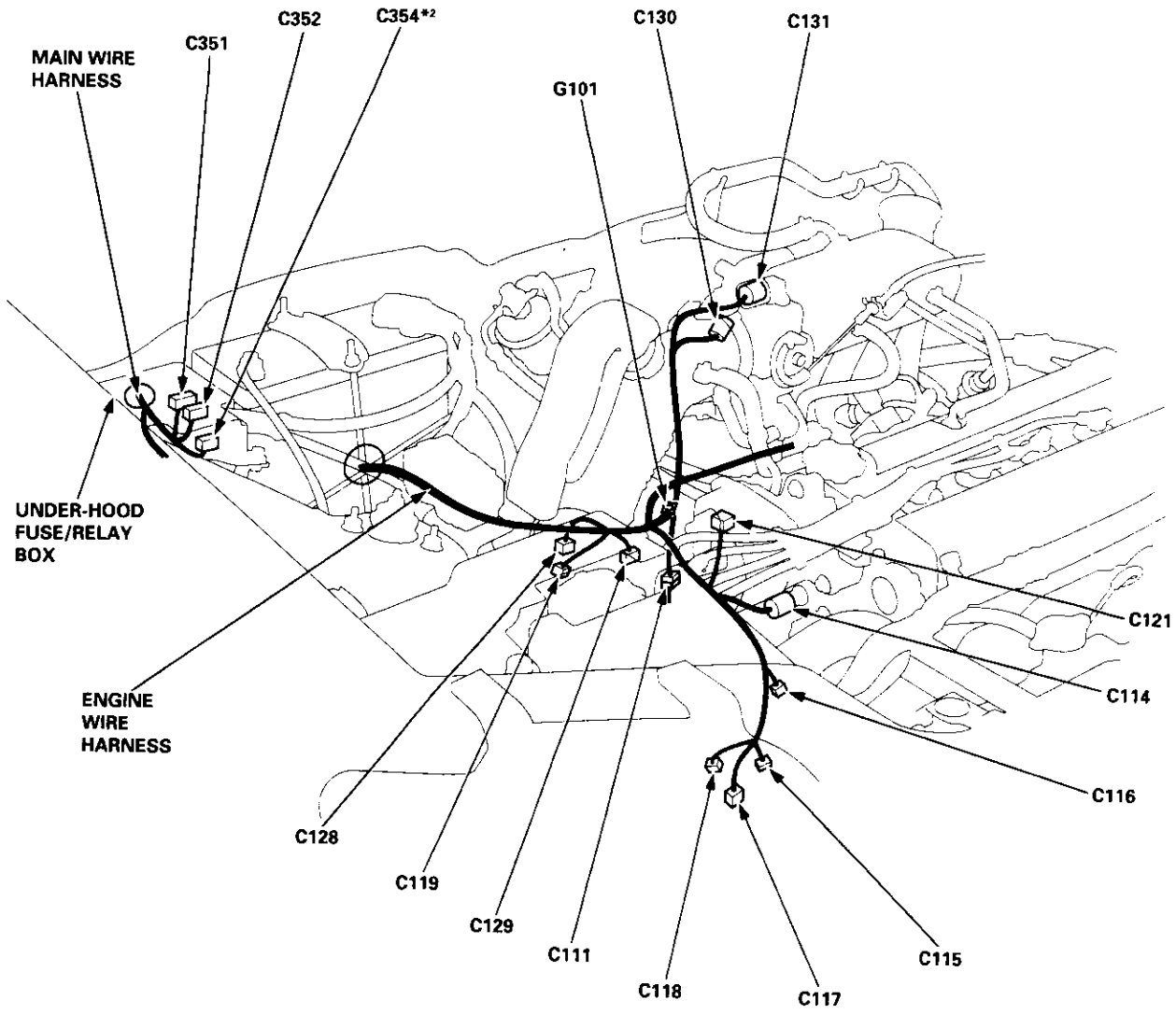
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Electrical Connections — '98 – 00 Models (cont'd)



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System Connectors [Engine Compartment] — '97 Model



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C111



①	WHT[5]
②	GRN/BLK[3]
③	BLK/YEL
④	BLK/WHT[2]

C114



1	RED/WHT
2	GRN/BLK[1]

C115



①	WHT[2]
②	RED[3]

C116



①	GRN/BLK[1]
②	YEL[2]

C117



1	BLU/YEL
2	GRN/WHT[1]

C118



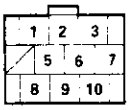
①	RED[2]
②	WHT[1]

C119



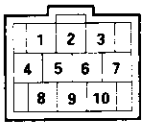
1	GRN[2]
2	BLU[3]

C121



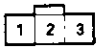
①	BLU[4]	8	BLU
②	GRN[3]	7	BLK/YEL
③	YEL[4]	⑥	WHT[4]
4	——	⑨	RED[4]
⑤	YEL/GRN	⑩	BLK[3]

C128



①	BLK[1]	⑥	BLU[2]
2	LT BLU	⑦	BRN[2]
3	GRY	⑧	BLK/BLU
④	YEL[1]	⑨	WHT[2]
⑤	PNK	⑩	RED/BLK

C129



①	BLK[1]
②	BLK/YEL
③	BLU/WHT

C130



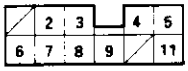
①	GRN/BLK[3]
②	RED/BLK
③	YEL/BLU

C131



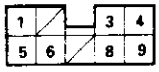
①	YEL/RED
②	GRN/WHT[3]
③	RED/GRN

C351



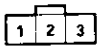
1	——	6	WHT/RED
2	WHT/BLU	⑦	WHT/BLK
3	WHT/GRN	⑧	WHT/BLU
4	BLK	9	WHT/GRN
5	WHT/RED	10	——
		11	BLU/WHT

C352



1	GRN	⑤	BLK/RED
2	——	6	BLK/YEL
3	WHT/BLK	7	——
④	WHT/BLK	⑧	WHT/GRN
		9	WHT

C354*2



①	BLK/WHT
②	BLK
③	GRN/RED

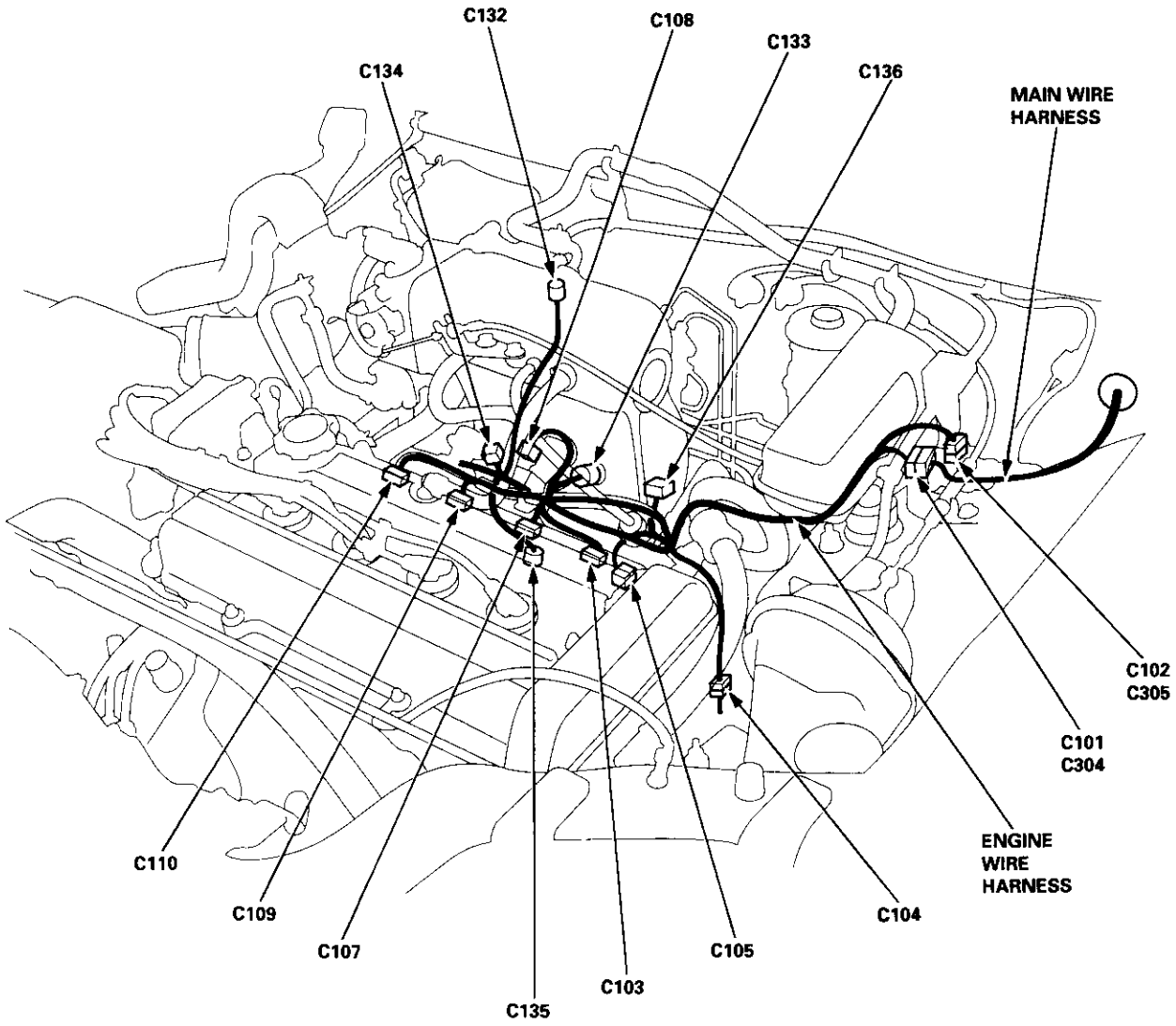
*2: USA

NOTE:
- Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

(cont'd)

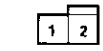
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System Connectors [Engine Compartment] — '97 Model (cont'd)



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C103



①	YEL/BLK[1]
②	BRN[1]

C104



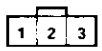
①	BLU/RED[1]
②	WHT/RED[1]

C105 (USA)



1	BKL/YEL
②	WHT/GRN
3	WHT/BLU
④	WHT/RED[3]

C105 (Canada)



①	WHT/RED[3]
2	BLK/YEL
3	WHT/BLU

C107



①	YEL/BLK[1]
②	RED[1]

C108



1	BLK/YEL
②	RED/YEL[1]

C109



①	YEL/BLK[1]
②	BLU[1]

C110



①	YEL/BLK[1]
③	YEL[1]

C132



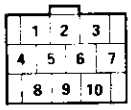
①	BLK/BLU
②	YEL/BLK[1]

C133



①	GRN/BLK[3]
②	RED/YEL[2]

C134



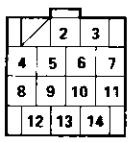
①	BLK/YEL	⑥	BLK/YEL
2	BLK/YEL	⑦	BLK/YEL
③	BLK/YEL	⑧	GRN/BLK[3]
④	GRN/BLK[3]	⑨	GRN/BLK[3]
⑤	GRN/BLK[3]	⑩	GRN/BLK[2]

C135



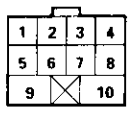
①	GRN[1]
②	BLK[1]

C136



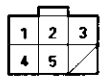
1	—	8	BLK
②	YEL/BLK[1]	⑨	BLK[1]
③	YEL/BLK[1]	⑩	BLK[1]
④	YEL/BLK[1]	⑪	BLK[1]
⑤	YEL/BLK[1]	⑫	BLK[1]
⑥	YEL/BLK[1]	⑬	BLK[1]
⑦	YEL/BLK[1]	⑭	BLK[1]

C304



①	BLK/WHT	6	WHT/BLU
②	BLK[1]	7	YEL/GRN
3	YEL/RED	8	BLU
④	BRN/BLK[1]	9	BLK/RED
⑤	YEL/BLK[1]	10	RED

C305



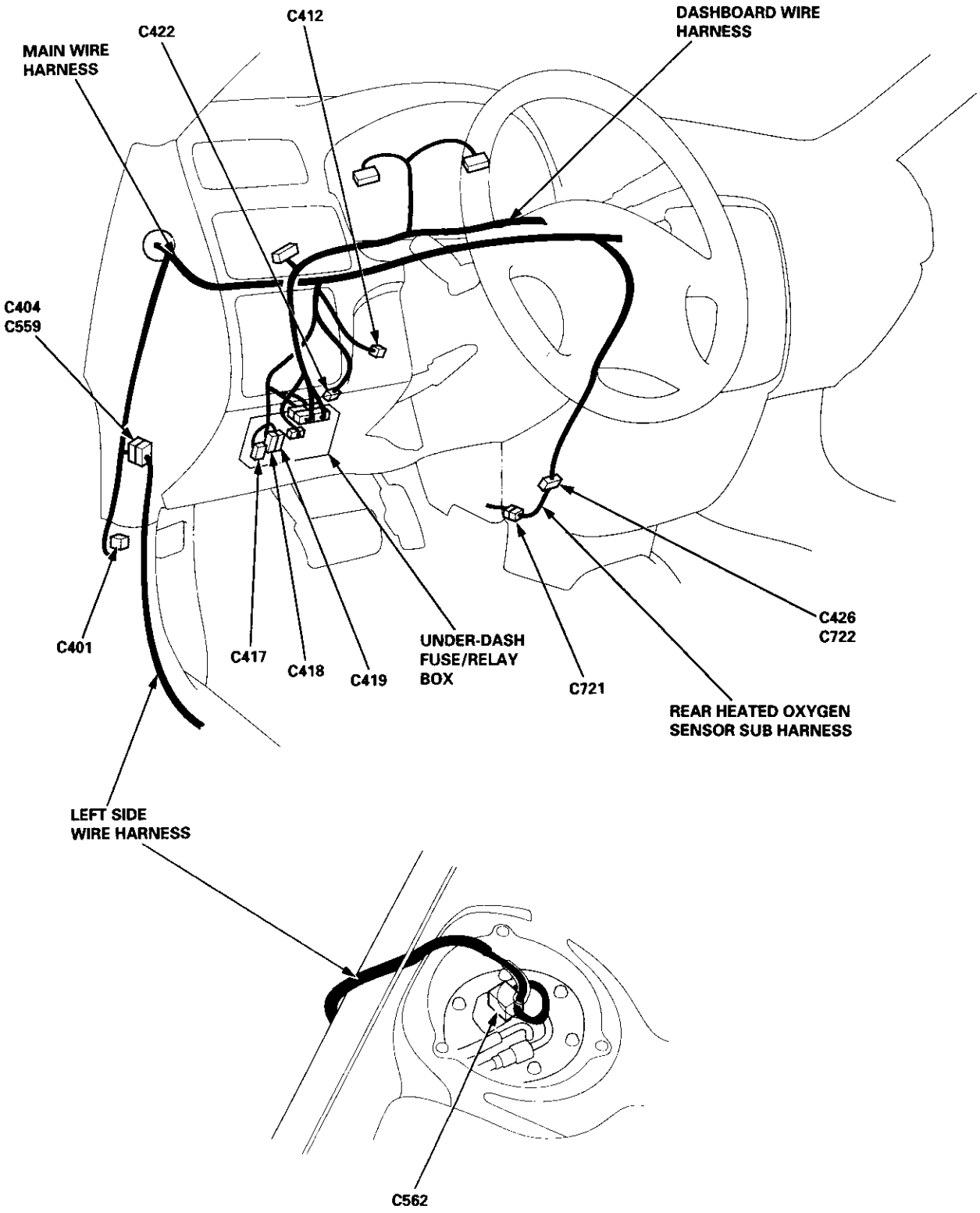
1	GRY
②	RED
3	WHT/RED
④	BLK/BLU
5	PNK
6	—

NOTE:
- Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

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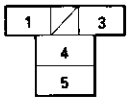
System Description

System Connectors [Dash and Floor] — '97 Model



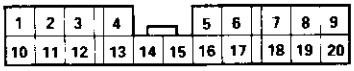
www.emanualpro.com

C401



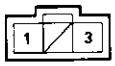
①	BLK/WHT
②	—
③	GRY
④	BLK/RED
⑤	BLK/WHT

C404



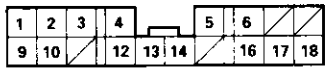
1	LT GRN/RED	⑪	YEL/GRN
2	BLU/BLK	12	WHT
3	GRN/BLK	13	WHT/GRN
4	YEL/RED	14	YEL/GRN
5	WHT/RED	15	YEL
6	GRN/WHT	16	YEL/BLK
7	YEL/BLK	17	BLU/ORN
8	YEL/RED	18	BLU/YEL
9	LT GRN	19	GRN/BLU
10	GRN/WHT	20	LT GRN/BLK

C412



①	BLK/WHT
2	—
③	WHT/BLK

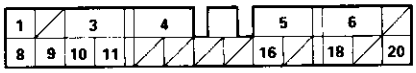
C417



1	RED/YEL	10	GRN/YEL
2	BLK/BLU*	11	—
3	RED/GRN	⑫	BLK/WHT
4	GRN/BLK	⑬	BLK/WHT
5	RED/BLU	14	GRN/RED
6	WHT/BLU	15	—
7	—	16	GRN/RED
8	—	17	RED/GRN
9	RED/WHT	18	RED/GRN

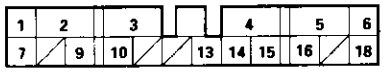
*: With ABS

C418



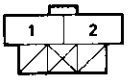
1	RED/BLU	⑪	BLU/WHT
2	—	12	—
③	BLK	13	—
4	RED/GRN	14	—
5	WHT/GRN	15	—
6	WHT/BLU	16	BLK/WHT
7	—	17	—
⑧	YEL/GRN	18	WHT/GRN
9	BLK/YEL	19	—
⑩	BLU/WHT	20	WHT/RED

C419



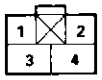
1	RED	10	YEL/RED
2	WHT/RED	11	—
3	WHT	12	—
④	BLK/RED	13	WHT/GRN
5	WHT	⑭	BLK/WHT
6	WHT/RED	15	GRN/RED
7	WHT/BLK	16	YEL
8	—	17	—
9	YEL/BLK	18	RED/GRN

C422
(without cruise control)



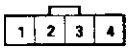
①	GRN/WHT[2]
②	WHT/GRN
3	—
4	—

C422
(with cruise control)



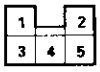
1	LT GRN
2	GRY
③	GRN/WHT[2]
④	WHT/GRN

C426



①	BLK/WHT
②	GRN/WHT
③	WHT/RED*
④	BLK/WHT[1]

C562



1	GRN/YEL
2	BLK
③	BLK
④	YEL/GRN
5	YEL/BLK

C721



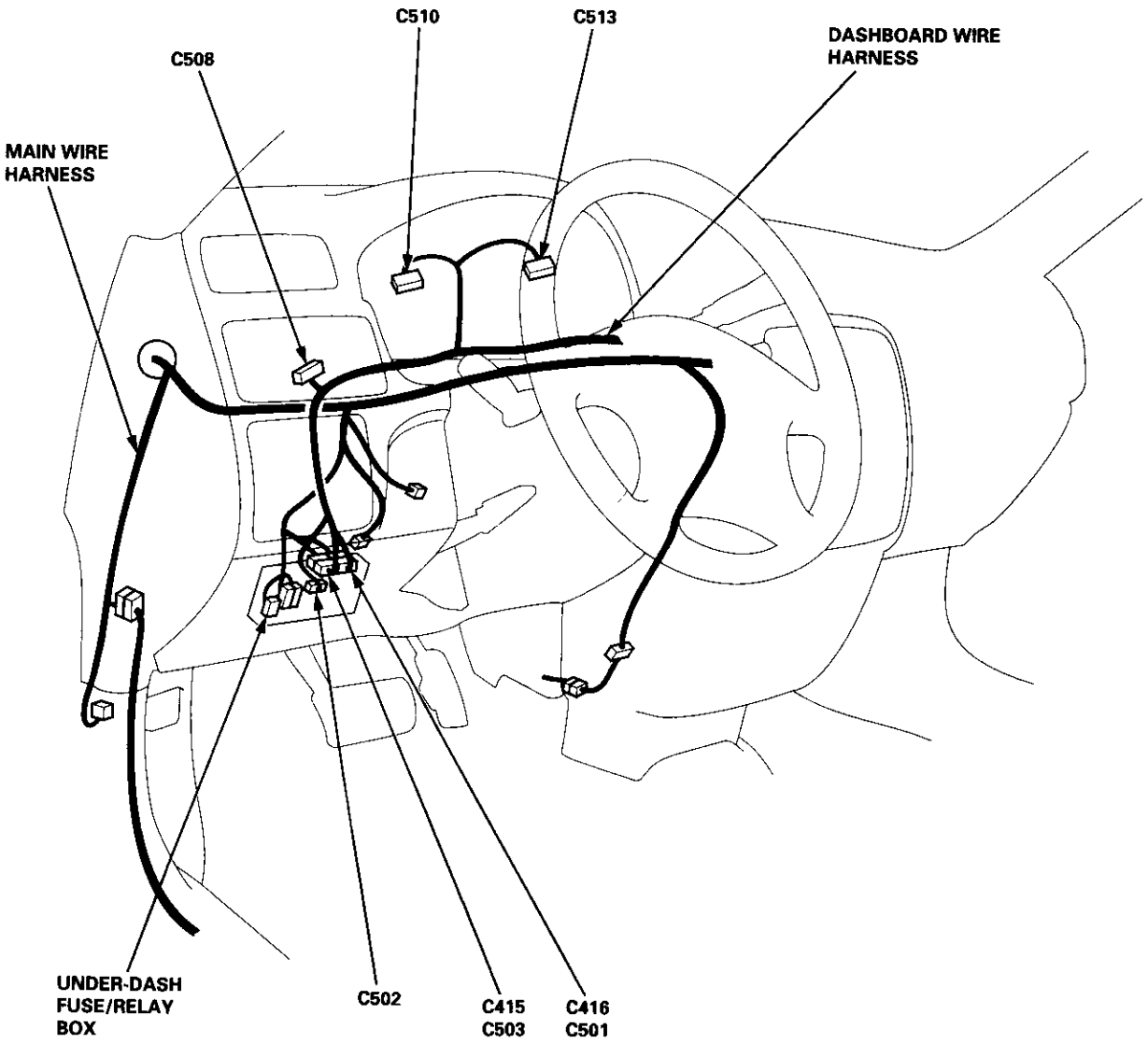
①	WHT/RED*
②	GRN/WHT
③	BLK/WHT[1]
④	BLK/WHT

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

(cont'd)

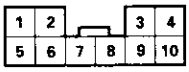
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System Connectors [Dash and Floor] — '97 Model (cont'd)



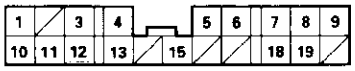
www.emanualpro.com

C501



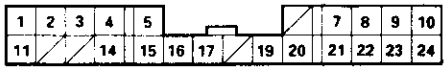
①	YEL[1]	⑥	LT GRN
②	GRN	7	YEL
③	BLU[1]	⑧	BLK/BLU
④	BRN[2]	⑨	WHT[3]
⑤	GRN/BLK[1]	⑩	RED

C502



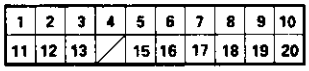
1	RED/GRN	11	YEL/BLK
2	—	12	BLK/YEL
3	WHT/BLU	13	YEL/GRN
④	BLK	14	—
5	GRN/WHT	15	RED/BLK
6	GRN/RED	16	—
7	GRN/ORN	17	—
8	BLU/YEL	18	BLK/WHT
9	GRN/YEL	19	YEL/RED
⑩	YEL	20	—

C503



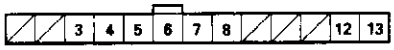
1	YEL	13	—
2	RED/BLU	⑭	WHT/BLU
3	LT GRN	⑮	BRN/BLK[1]
4	BLU/RED	16	LT BLU
5	BLU	⑰	BRN[3]
6	—	18	—
⑦	BLU/YEL	19	WHT/BLK
8	BLU/BLK	20	BLU
9	BLU/WHT	㉑	GRN/ORN
10	YEL/GRN	22	YEL/RED
11	YEL/GRN	23	BRN/BLK
12	—	24	RED/GRN

C508



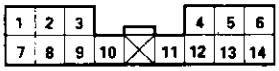
1	RED	11	RED
2	RED	12	RED
3	YEL	⑬	BLK
4	YEL	14	—
5	YEL	⑮	BLK
6	YEL	⑯	BLK
7	RED/BLK	17	BLK
8	RED/BLK	18	BLK
9	RED/BLK	19	BLK
10	RED/BLK	20	BLK

C510



1	—	8	BLU
2	—	9	—
3	YEL/RED	10	—
④	YEL	11	—
⑤	GRN/ORN	12	RED
6	RED/GRN	13	RED/BLK
7	GRN/RED		

C513



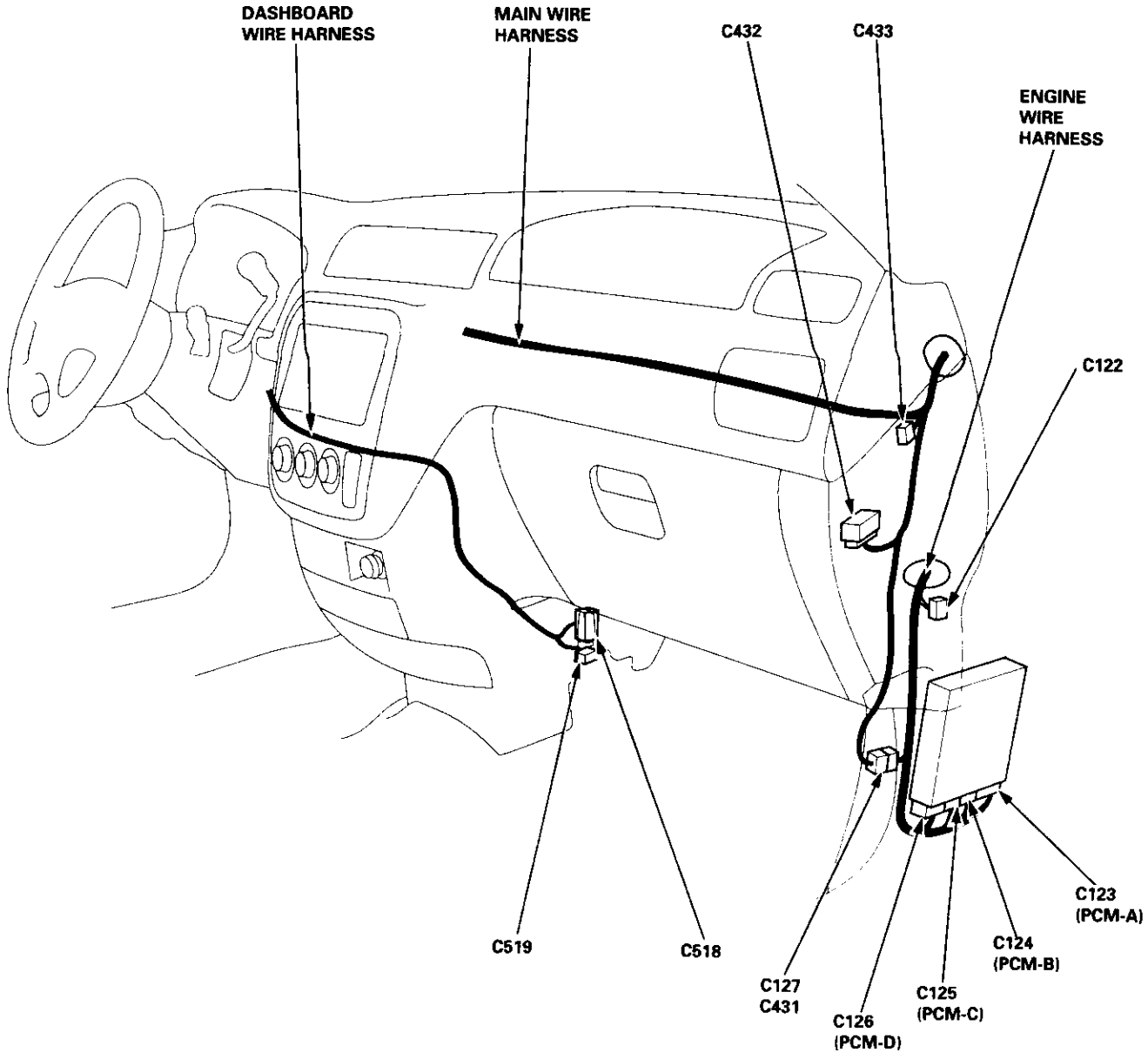
1	YEL	8	BLK
2	RED/BLK	⑨	GRN/BLK[2]
3	RED	⑩	GRN
④	BLU[2]	⑪	RED
⑤	BLK/BLU	⑫	WHT[3]
⑥	BRN[2]	13	YEL
⑦	YEL[1]	⑭	LT GRN

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

(cont'd)

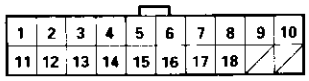
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System Connectors [Dash and Floor] — '97 Model (cont'd)



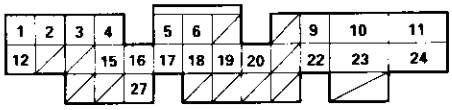
www.emanualpro.com

C122



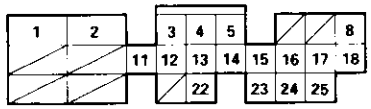
1	GRN	⑪	BRN/BLK[1]
2	GRN	⑫	BRN/BLK[1]
3	GRN	⑬	BRN/BLK[1]
④	YEL/BLK[1]	⑭	BRN/BLK[1]
⑤	YEL/BLK[1]	⑮	BRN/BLK[1]
⑥	YEL/BLK[1]	⑯	BRN/BLK[1]
⑦	YEL/BLK[2]	⑰	BRN/BLK[1]
⑧	BLU/WHT	⑱	BRN/BLK[1]
⑨	BLU/WHT	19	—
10	BLU/WHT	20	—

C123 (PCM-A)



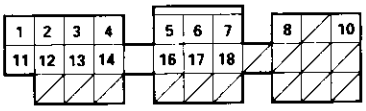
①	YEL[1]	⑫	BLK/BLU	㉓	BLK[2]
②	BLU[1]	13	—	㉔	YEL/BLK[2]
③	RED[1]	14	—	25	—
④	BRN[1]	⑮	RED/YEL[1]	26	—
⑤	BLK/WHT	⑯	GRN/YEL	㉗	GRN[1]
⑥	BLK/WHT[2]	⑰	BLK/RED	28	—
7	—	⑱	GRN/ORN	29	—
8	—	⑲	WHT/GRN	30	—
⑨	BRN/BLK[1]	⑳	YEL/GRN	31	—
⑩	BLK[1]	21	—	32	—
⑪	YEL/BLK[1]	㉒	BRN/BLK[2]		

C124 (PCM-B)



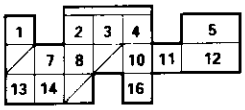
①	WHT[1]	⑪	GRN/WHT[1]	21	—
②	RED[2]	⑫	WHT/RED[1]	㉒	GRN[2]
③	BLU/YEL	⑬	GRN/BLK[2]	㉓	BLU[2]
④	GRN/BLK[1]	⑭	WHT[2]	㉔	YEL[3]
⑤	YEL[2]	⑮	RED[2]	㉕	LT GRN
6	—	⑯	WHT[3]		
7	—	⑰	BLU[2]		
⑧	PNK	⑱	BRN[2]		
9	—	19	—		
10	—	20	—		

C125 (PCM-C)



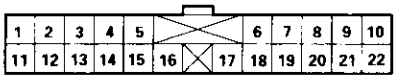
①	BLU/RED[1]	⑫	WHT[1]	23	—
②	BLU[1]	⑬	RED[4]	24	—
③	GRN[3]	⑭	BLK[3]	25	—
④	YEL[4]	15	—	26	—
⑤	BLU/RED[3]	⑯	GRN[4]	27	—
⑥	BLU/ORN	⑰	WHT/RED[1]	28	—
⑦	BRN[3]	⑱	BLU/WHT	29	—
⑧	LT BLU	19	—	30	—
9	—	20	—	31	—
⑩	WHT/BLU	21	—		
⑪	WHT/RED[2]	22	—		

C126 (PCM-D)



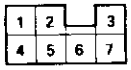
①	RED/BLK	9	—
②	RED/WHT	⑩	YEL/BLU
③	RED/GRN	⑪	GRN/BLK[3]
④	YEL/RED	⑫	GRN/WHT[1]
⑤	GRN/WHT[2]	⑬	RED/YEL[3]
6	—	⑭	WHT/RED[4]
⑦	WHT[5]	15	—
⑧	RED/YEL[2]	⑯	GRN/RED

C127



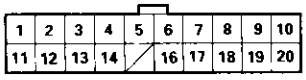
①	GRN/BLK[2]	⑫	BRN[2]
②	WHT/RED[4]	⑬	BLU[2]
③	WHT[3]	⑭	BLK/WHT[1]
④	LT GRN	⑮	PNK
⑤	YEL[3]	⑯	GRN/RED
6	GRN	⑰	GRN/WHT[2]
7	BLU/RED	18	BLU/WHT
⑧	GRN/ORN	⑲	BLK/RED
⑨	BRN[3]	⑳	GRN/YEL
⑩	WHT/BLU	㉑	LT BLU
⑪	RED/YEL[3]	㉒	BLU/ORN

C432



①	GRN/YEL	⑤	YEL/GRN
②	BLU/WHT	⑥	YEL/BLK[1]
③	BLK[1]	⑦	WHT/BLK
④	YEL/GRN		

C433



1	BLK	11	LT GRN/RED
2	BLK	12	LT GRN/RED
3	BLK	13	LT GRN/RED
4	WHT/GRN	14	LT BLU
5	WHT/GRN	15	—
6	WHT/GRN	16	LT BLU
7	BRN	⑰	GRN/WHT[1]
8	BRN	18	GRN/WHT
9	BRN	⑲	GRN/WHT[2]
10	WHT/BLK	20	WHT/BLK

C518



1	—	9	—
2	—	10	—
3	—	11	—
4	—	⑫	BLK
5	—	⑬	BRN/BLK[1]
⑥	LT BLU	14	—
7	—	⑮	BLU/YEL
⑧	WHT/BLU	16	—

C519

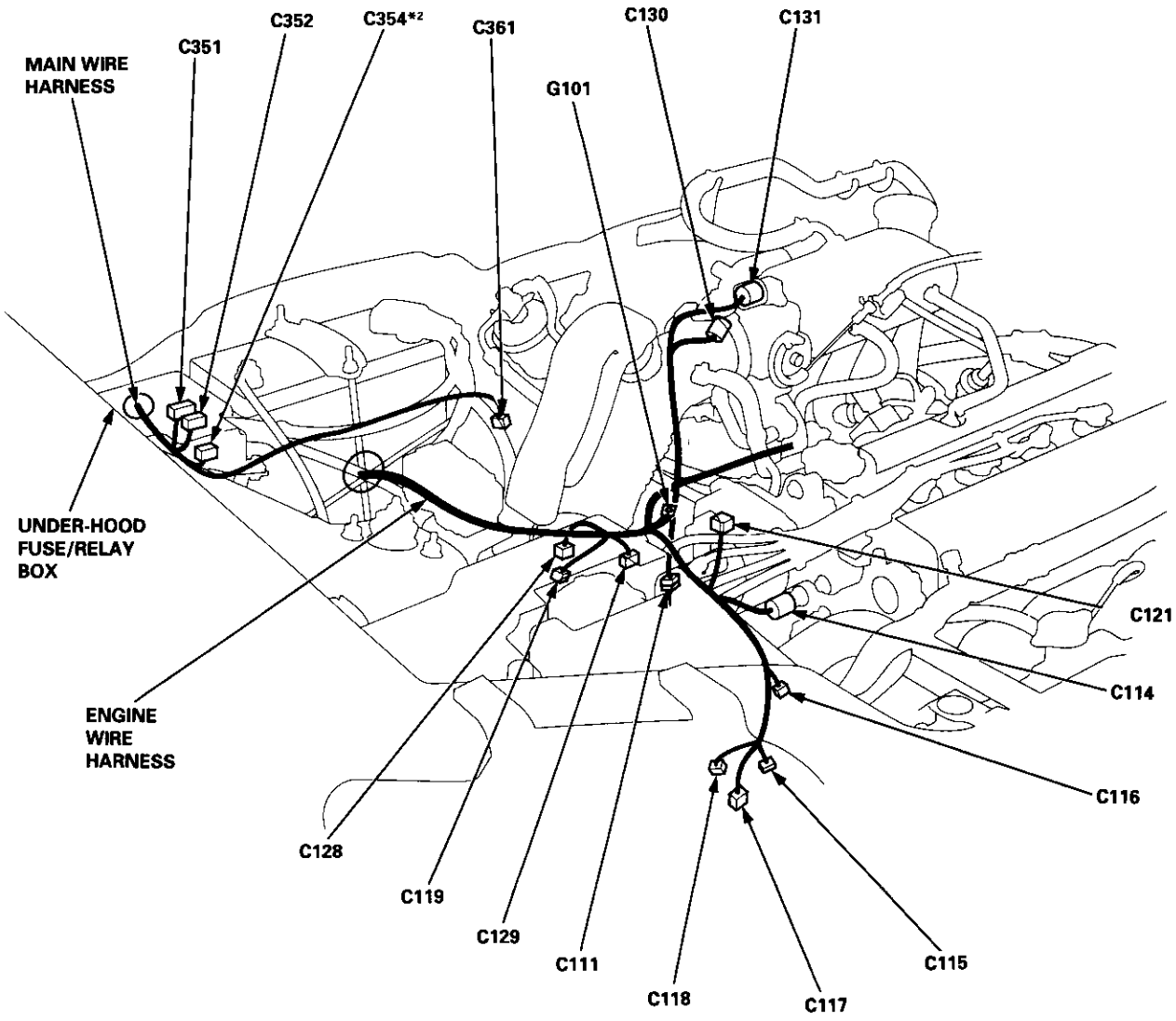


①	BRN[3]
②	BLK

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

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System Connectors [Engine Compartment] — '98 Model



*2: USA

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C111



①	WHT[1]
②	GRN/BLK[2]
③	BLK/YEL
④	BLK/WHT[2]

C114



①	RED/WHT
②	GRN/BLK[2]

C115



①	WHT[5]
②	RED[4]

C116



①	GRN/BLK[2]
②	YEL[3]

C117



①	BLU/YEL[2]
②	GRN/WHT[3]

C118



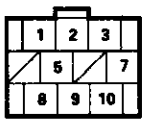
①	RED[2]
②	WHT[1]

C119



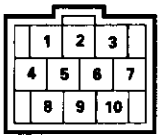
①	GRN[4]
②	BLU[6]

C121



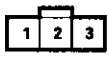
①	BLU[5]	6	——
②	GRN[3]	7	BLK/YEL
③	YEL[2]	⑧	WHT[2]
4	——	⑨	RED[3]
⑤	YEL/GRN	⑩	BLK[3]

C128



①	BLK[1]	⑥	BLU[7]
2	LT BLU	⑦	BRN[3]
3	GRY	⑧	BLK/BLU
④	YEL[4]	⑨	WHT[4]
⑤	PNK	⑩	RED/BLK

C129



①	BLK[1]
②	BLK/YEL
③	BLU/WHT[2]

C130



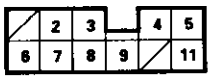
①	GRN/BLK[2]
②	RED/BLK
③	YEL/BLU

C131



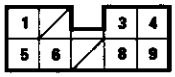
①	YEL/RED
②	GRN/WHT[2]
③	RED/GRN

C351



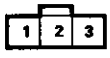
1	——	6	WHT/RED
2	WHT/BLU	⑦	WHT/BLK
3	WHT/GRN	⑧	WHT/BLU
4	BLK	9	WHT/GRN
5	WHT/RED	10	——
		11	BLU/WHT

C352



1	GRN	⑤	BLK/RED
2	——	6	BLK/YEL
3	WHT/BLK	7	——
④	WHT/BLK	⑧	WHT/GRN
		9	WHT

C354*2



①	BLK/WHT
②	BLK
③	GRN/RED

C361



①	LT GRN/WHT
②	BLK/WHT

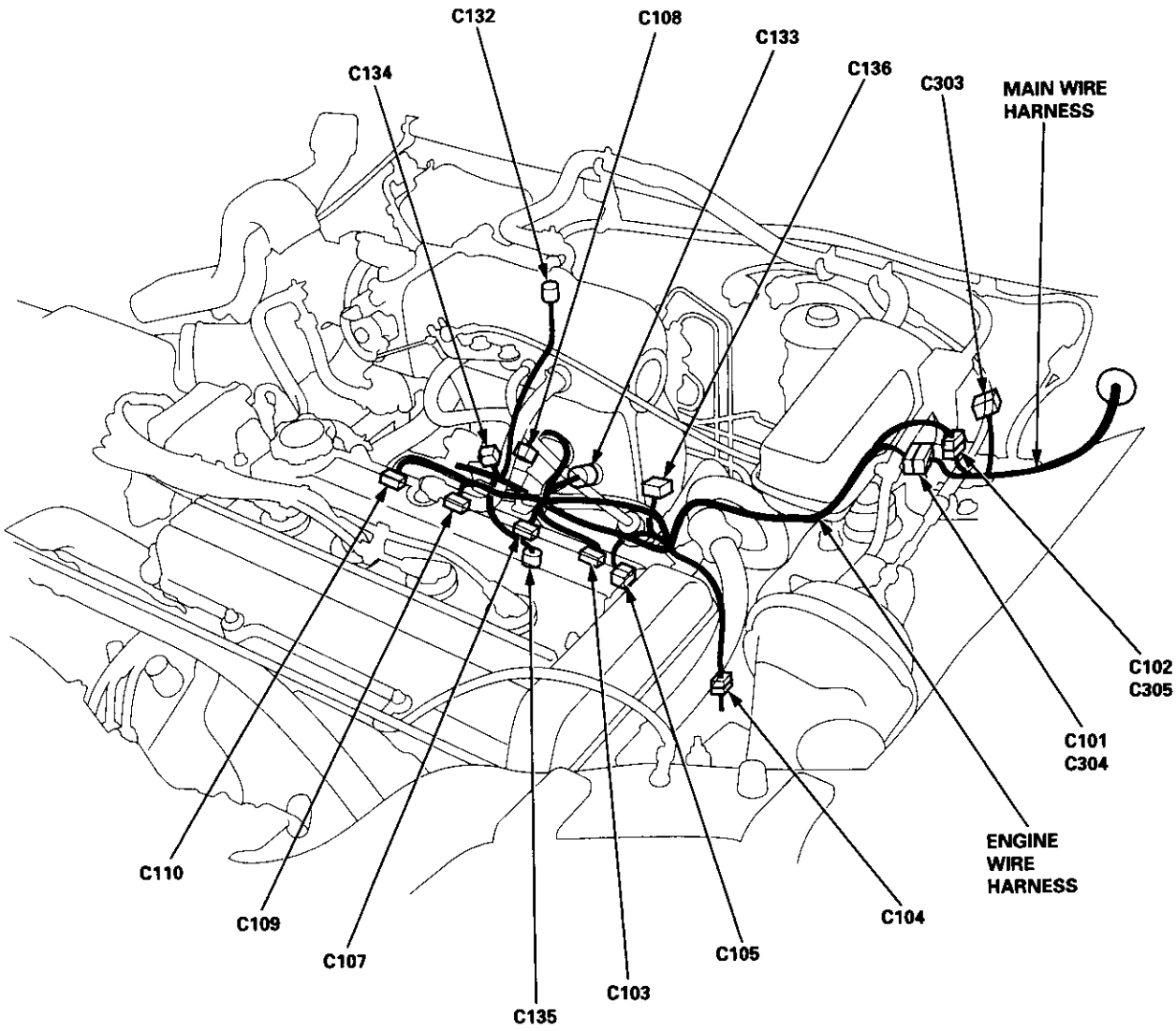
*2: USA

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

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System Connectors [Engine Compartment] — '98 Model (cont'd)



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C103



①	YEL/BLK[1]
②	BRN[2]

C104



①	BLU/RED[2]
②	WHT/RED[4]

C105 (USA)



1	BLK/YEL
②	WHT/GRN
3	WHT/BLU
④	WHT/RED[3]

C105 (Canada)



①	WHT/RED[2]
2	BLK/YEL
3	WHT/BLU

C107



①	YEL/BLK[1]
②	RED[1]

C108



①	BLK/YEL
②	RED/YEL[1]

C109



①	YEL/BLK[1]
②	BLU[4]

C110



①	YEL/BLK[1]
②	YEL[1]

C132



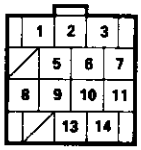
①	BLK/BLU
②	YEL/BLK[1]

C133



①	GRN/BLK[2]
②	RED/YEL[2]

C134



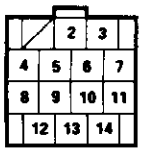
①	BLK/YEL	⑧	GRN/BLK[2]
2	BLK/YEL	⑨	GRN/BLK[2]
③	BLK/YEL	⑩	GRN/BLK[2]
4	——	⑪	GRN/BLK[2]
⑤	BLK/YEL	12	——
⑥	BLK/YEL	⑬	GRN/BLK[2]
⑦	BLK/YEL	⑭	GRN/BLK[2]

C135



①	GRN[2]
②	BLK[1]

C136



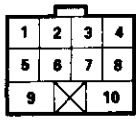
1	——	8	BLK
②	YEL/BLK[1]	⑨	BLK[1]
③	YEL/BLK[1]	⑩	BLK[1]
④	YEL/BLK[1]	⑪	BLK[1]
⑤	YEL/BLK[1]	⑫	BLK[1]
⑥	YEL/BLK[1]	⑬	BLK[1]
⑦	YEL/BLK[1]	⑭	BLK[1]

C303



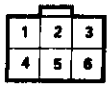
1	——
②	BLU[3]

C304



①	BLK/WHT	6	WHT/BLU
②	BLK[1]	7	YEL/GRN
3	YEL/RED	⑧	BLU[1]
④	LT GRN[2]	9	BLK/RED
⑤	YEL/BLK[1]	10	RED

C305



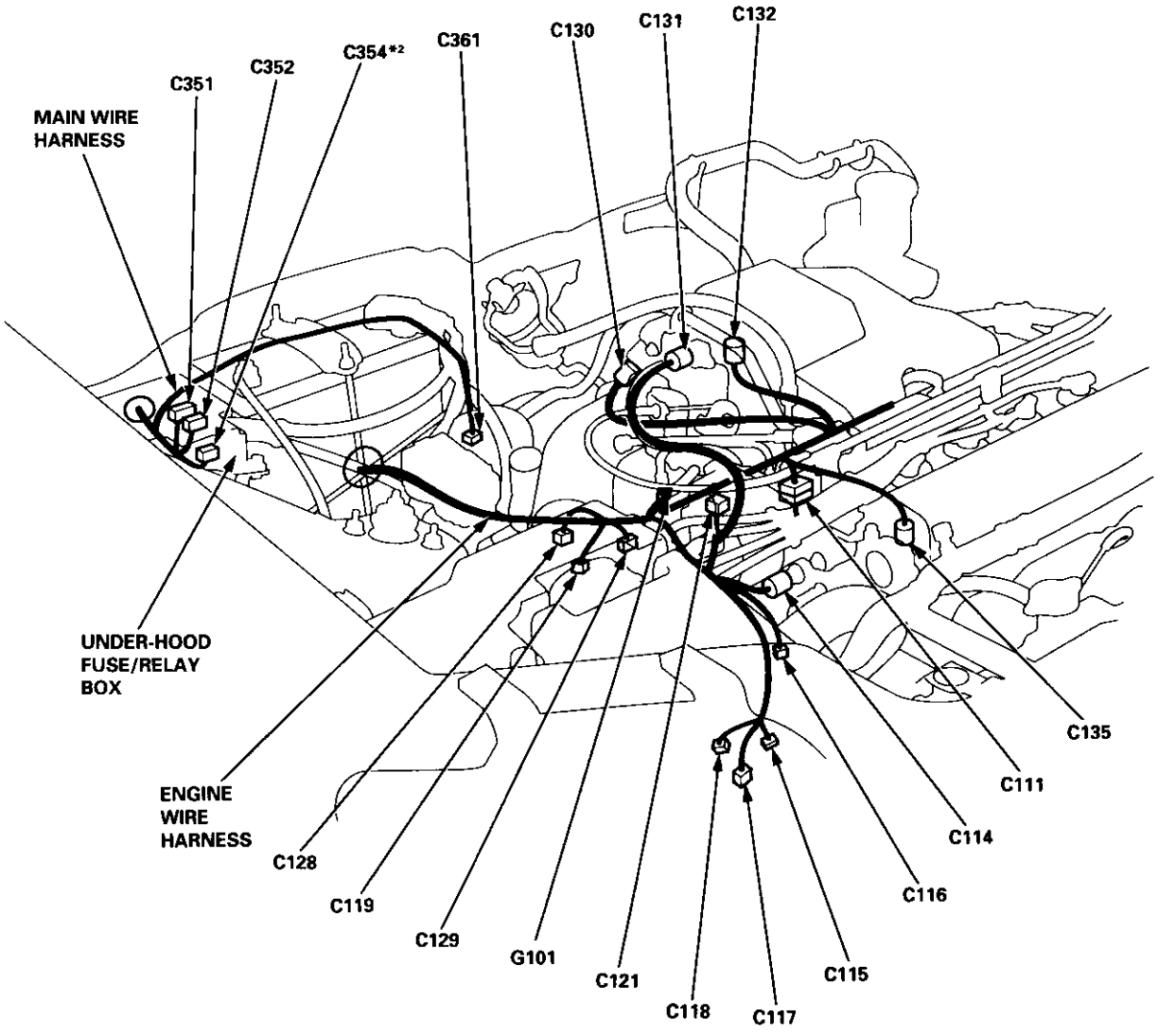
1	GRN
②	RED
③	WHT[4]
④	BLK/BLU
5	PNK
⑥	BRN[2]

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

(cont'd)

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System Connectors [Engine Compartment] — '99 – 00 Models



*2: USA

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C111



①	WHT[3]
②	GRN/BLK[2]
③	BLK/YEL
④	BLK/WHT[2]

C114



①	RED/WHT
②	GRN/BLK[2]

C115



①	WHT[3]
②	RED[4]

C116



①	GRN/BLK[3]
②	YEL[3]

C117



①	BLU/YEL[2]
②	GRN/WHT[3]

C118



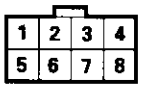
①	RED[2]
②	WHT[1]

C119



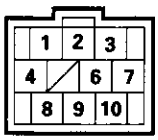
①	GRN[4]
②	BLU[4]

C121



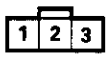
①	YEL/GRN	5	BLK/YEL
②	BLU[5]	⑥	WHT[2]
③	GRN[3]	⑦	RED[3]
④	YEL[2]	⑧	BLK[3]

C128



①	BLK[1]	⑥	BLU[7]
2	LT BLU	⑦	BRN[3]
3	GRY	⑧	BLK/BLU
④	YEL[4]	⑨	WHT[4]
5	——	⑩	RED/BLK

C129



①	BLK[1]
②	BLK/YEL
③	BLU/WHT[2]

C130



①	GRN/BLK[2]
②	RED/BLK
③	YEL/BLU

C131



①	YEL/RED
②	GRN/WHT[2]
③	RED/GRN

C132



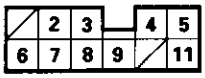
①	BLK/BLU
②	YEL/BLK[1]

C135



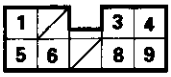
①	GRN[2]
②	BLK[1]

C351



1	——	6	WHT/RED
2	WHT/BLU	⑦	WHT/BLK
3	WHT/GRN	⑧	WHT/BLU
4	BLK	9	WHT/GRN
5	WHT/RED	10	——
		11	BLU/WHT

C352



1	GRN	⑤	BLK/RED
2	——	6	BLK/YEL
3	WHT/BLK	7	——
④	WHT/BLK	⑧	WHT/GRN
		9	WHT

C354*2



①	BLK/WHT
②	BLK
③	GRN/RED

C361



①	LT GRN/WHT
②	BLK/WHT

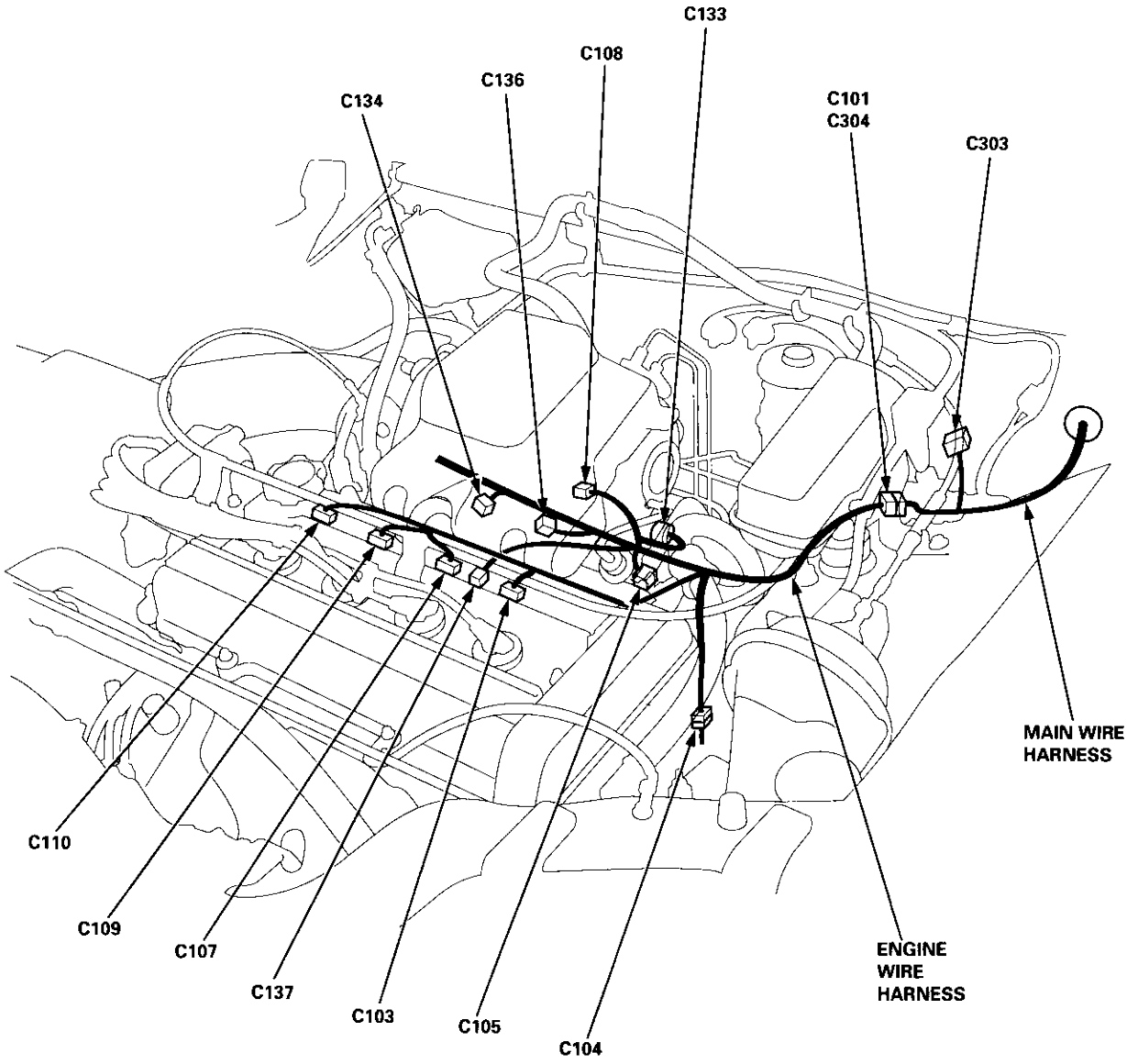
*2: USA

NOTE:
- Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

(cont'd)

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System Connectors [Engine Compartment] — '99 – 00 Models (cont'd)



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C103



1	YEL/BLK[1]
2	BRN[2]

C104



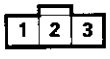
1	BLU/RED[2]
2	WHT/RED[4]

C105 (USA)



1	BLK/YEL
2	WHT/GRN
3	WHT/BLU
4	WHT/RED[3]

C105 (Canada)



1	WHT/RED[3]
2	BLK/YEL
3	WHT/BLU

C107



①	YEL/BLK[1]
②	RED[1]

C108



1	BLK/YEL
2	RED/YEL[1]

C109



①	YEL/BLK[1]
②	BLU[4]

C110



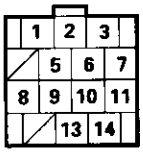
1	YEL/BLK[1]
2	YEL[1]

C133



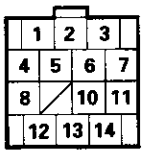
1	GRN/BLK[2]
2	RED/YEL[2]

C134



1	BLK/YEL	⑧	GRN/BLK[2]
2	BLK/YEL	⑨	GRN/BLK[2]
3	BLK/YEL	⑩	GRN/BLK[2]
4	——	⑪	GRN/BLK[2]
⑤	BLK/YEL	12	——
⑥	BLK/YEL	⑬	GRN/BLK[2]
7	BLK/YEL	⑭	GRN/BLK[2]

C136



①	BLK[1]	⑧	YEL/BLK[1]
②	BLK[1]	9	——
③	BLK[1]	⑩	YEL/BLK[1]
4	BLK	⑪	YEL/BLK[1]
⑤	BLK[1]	⑫	YEL/BLK[1]
⑥	BLK[1]	⑬	YEL/BLK[1]
⑦	BLK[1]	⑭	YEL/BLK[1]

C137



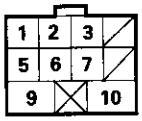
①	RED/BLU

C303



1	——
2	BLU[3]

C304

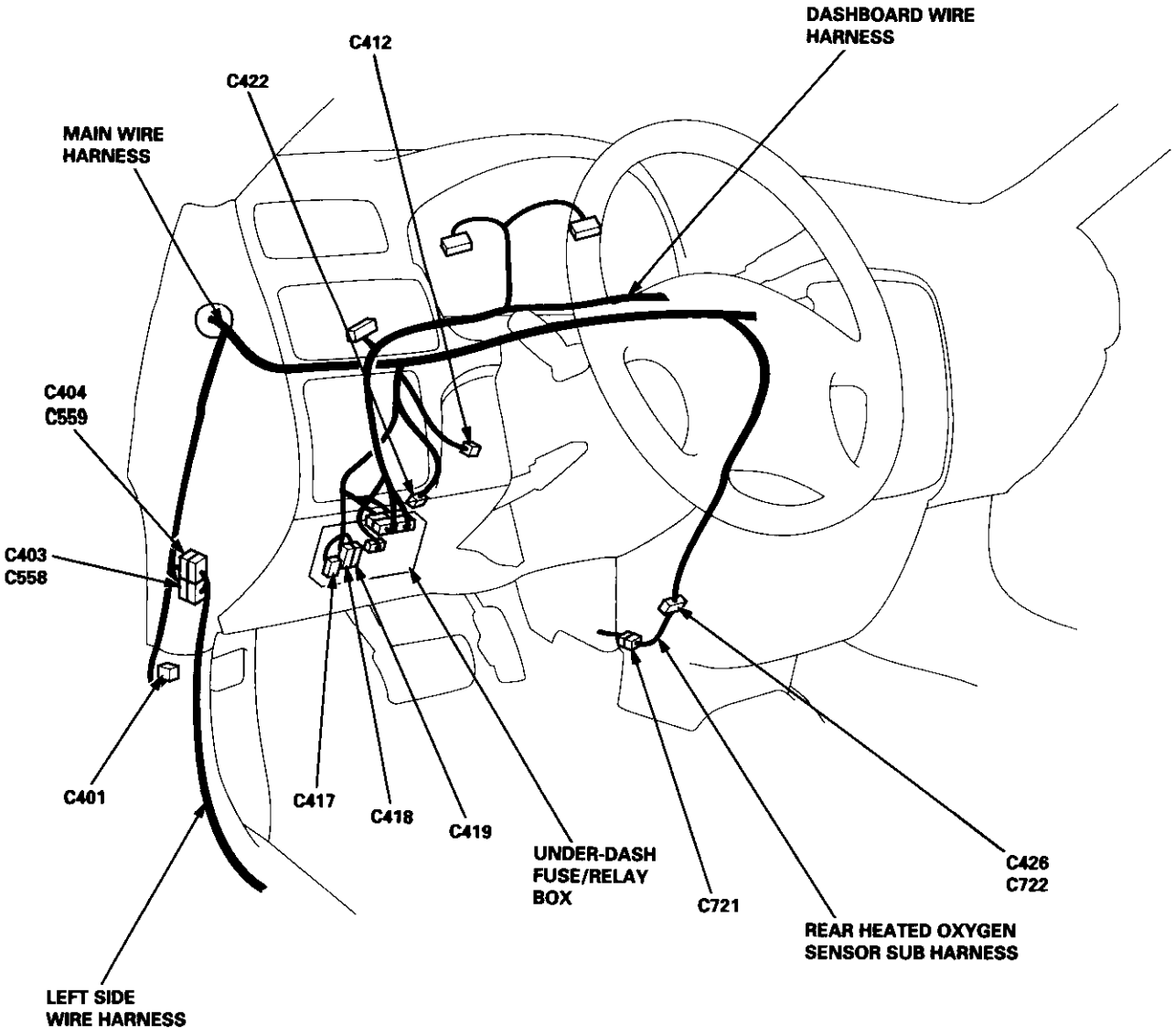


①	BLK/WHT	6	WHT/BLU
②	BLK[1]	7	YEL/GRN
3	YEL/RED	8	——
4	——	9	BLK/RED
⑤	YEL/BLK[1]	10	RED

NOTE:
- Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

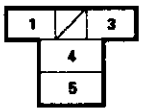
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System Connectors [Dash and Floor] — '98 – 00 Models



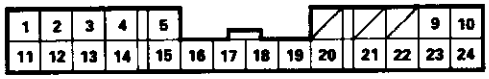
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C401



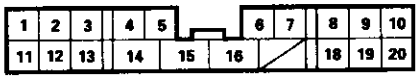
①	BLK/WHT
2	——
③	GRY
④	BLK/RED
⑤	BLK/WHT

C403



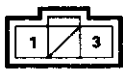
1	BLU/YEL	13	GRN/RED
2	GRN/YEL	14	BLU/RED
3	GRY	15	YEL
4	GRN/WHT	16	GRN/WHT
5	GRN/ORN	17	YEL/BLK
6	——	18	YEL/RED
7	——	19	RED/BLU
8	——	㉚	GRN/BLK²
9	RED	㉛	BLK/WHT
10	WHT	㉜	YEL/BLU
11	GRY	㉝	LT GRN¹
12	LT BLU	㉞	BLU¹

C404



1	BLU/BLK	11	YEL/RED
2	LT GRN/RED	12	WHT/RED
3	GRN	13	WHT/GRN
4	YEL/BLU	⑭	YEL/GRN
5	GRN/WHT	15	WHT/RED
6	LT GRN/BLK	16	GRN/BLK
7	LT GRN	17	——
8	BLU/ORN	18	YEL/GRN
9	BLU/YEL	19	YEL
10	GRN/BLK	20	YEL/BLK

C412



①	BLK/WHT
2	——
③	WHT/BLK

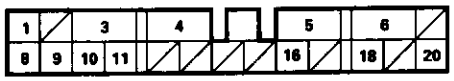
C417



1	RED/YEL	10	GRN/YEL
2	BLK/BLU*	11	——
3	RED/GRN	⑫	BLK/WHT
4	GRN/BLK	⑬	BLK/WHT
5	RED/BLU	14	GRN/RED
6	WHT/BLU	15	——
7	——	16	GRN/RED
8	——	17	RED/GRN
9	RED/WHT	18	RED/GRN

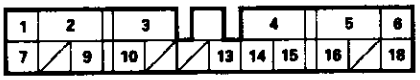
*: With ABS

C418



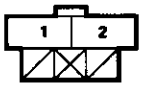
1	RED/BLU	⑪	BLU/WHT
2	——	12	——
③	BLK	13	——
4	RED/GRN	14	——
5	WHT/GRN	15	——
6	WHT/BLU	16	BLK/WHT
7	——	17	——
⑧	YEL/GRN	18	WHT/GRN
9	BLK/YEL	19	——
⑩	BLU/WHT	20	WHT/RED

C419



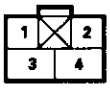
1	RED	10	YEL/RED
2	WHT/RED	11	——
3	WHT	12	——
④	BLK/RED	13	WHT/GRN
5	WHT	⑭	BLK/WHT
6	WHT/RED	15	GRN/RED
7	WHT/BLK	16	YEL
8	——	17	——
9	YEL/BLK	18	RED/GRN

C422
(without cruise control)



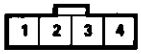
①	GRN/WHT¹
②	WHT/GRN
3	——
4	——

C422
(with cruise control)



1	LT GRN
2	GRY
③	GRN/WHT¹
④	WHT/GRN

C426



①	BLK/WHT
②	GRN/WHT²
③	WHT/RED¹
④	BLK/WHT¹

C721



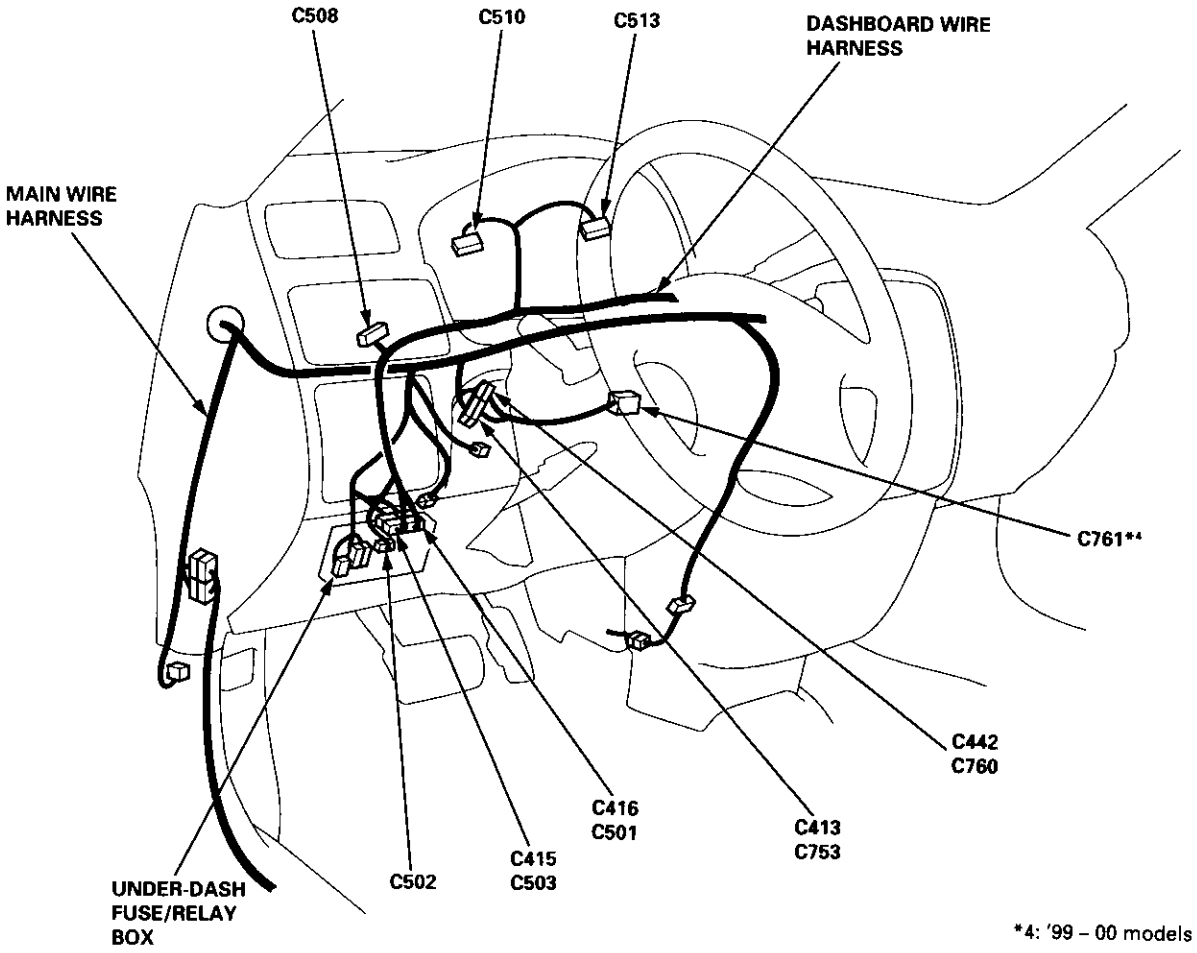
①	WHT/RED¹
②	GRN/WHT²
③	BLK/WHT¹
④	BLK/WHT

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).
• ○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

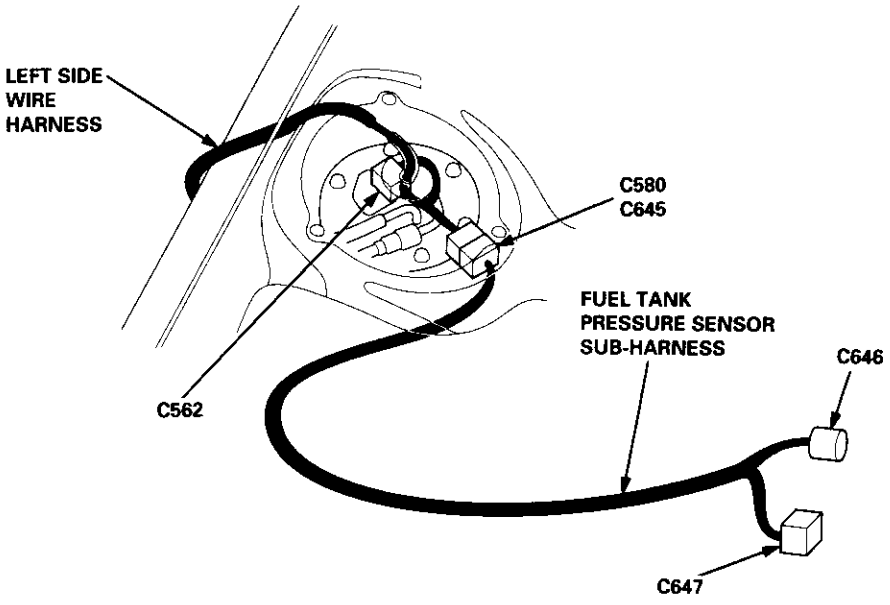
(cont'd)

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System Connectors [Dash and Floor] — '98 – 00 Models (cont'd)



*4: '99 – 00 models



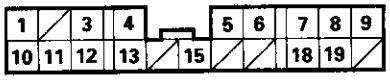
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C501



①	YEL*	⑥	LT GRN²
②	GRN LT BLU*4	7	YEL
		⑧	BLK/BLU
③	BLU¹	⑨	WHT¹
④	BRN²	⑩	RED
⑤	GRN/BLK¹		

C502



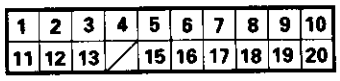
1	RED/GRN	11	YEL/BLK
2	——	12	BLK/YEL
3	WHT/BLU	13	YEL/GRN
④	BLK	14	——
5	GRN/WHT	15	RED/BLK
6	GRN/RED	16	——
7	GRN/ORN	17	——
8	BLU/YEL	18	BLK/WHT
9	GRN/YEL	19	YEL/RED
⑩	YEL	20	——

C503



1	YEL	13	——
2	RED/BLU	⑭	WHT/BLU
3	LT GRN	⑮	BRN/BLK¹
4	BLU/RED	16	LT BLU
5	BLU	⑰	BRN¹
6	——	18	——
⑦	BLU/YEL¹	19	WHT/BLK
8	BLU/BLK	20	BLU
9	BLU/WHT	㉑	GRN/ORN
10	YEL/GRN	22	YEL/RED
11	YEL/GRN	23	BRN/BLK
12	——	24	RED/GRN

C508



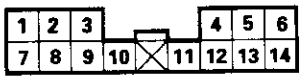
1	RED	11	RED
2	RED	12	RED
3	YEL	⑬	BLK
4	YEL	14	——
5	YEL	⑮	BLK
6	YEL	⑯	BLK
7	RED/BLK	17	BLK
8	RED/BLK	18	BLK
9	RED/BLK	19	BLK
10	RED/BLK	20	BLK

C510



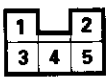
1	——	8	BLU
2	——	9	——
3	YEL/RED	10	——
④	YEL	11	——
⑤	GRN/ORN	12	RED
6	RED/GRN	13	RED/BLK
7	GRN/RED		

C513



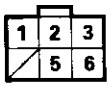
1	YEL	8	BLK
2	RED/BLK	⑨	GRN/BLK¹
3	RED	⑫	GRN BLU*4
④	BLU² BRN²*4	⑪	RED
⑤	BLK/BLU	⑫	WHT*
⑥	BRN³ LT BLU*4	13	YEL
		⑭	LT GRN²
⑦	YEL*		

C562



1	GRN/YEL
2	BLK
③	BLK
④	YEL/GRN
5	YEL/BLK

C580



①	BLU¹
②	LT GRN¹
③	BLK/WHT
4	——
⑤	YEL/BLU
⑥	GRN/BLK²

C646



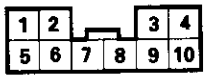
①	YEL/BLU
②	GRN/BLK²
③	LT GRN¹

C647



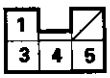
①	BLK/WHT
②	BLU¹

C753



1	GRN	6	WHT/BLK
2	GRN/BLK	7	YEL/BLU
3	BLU/YEL	8	WHT/BLK
4	BLU	9	BLU/BLK
5	LT GRN/RED	⑩	BLK

C760



①	GRN
2	——
3	RED
4	YEL/BLK
5	YEL

C761*4



①	GRN
②	BLK
3	WHT/BLK
4	BLK

*4: '99 – 00 models

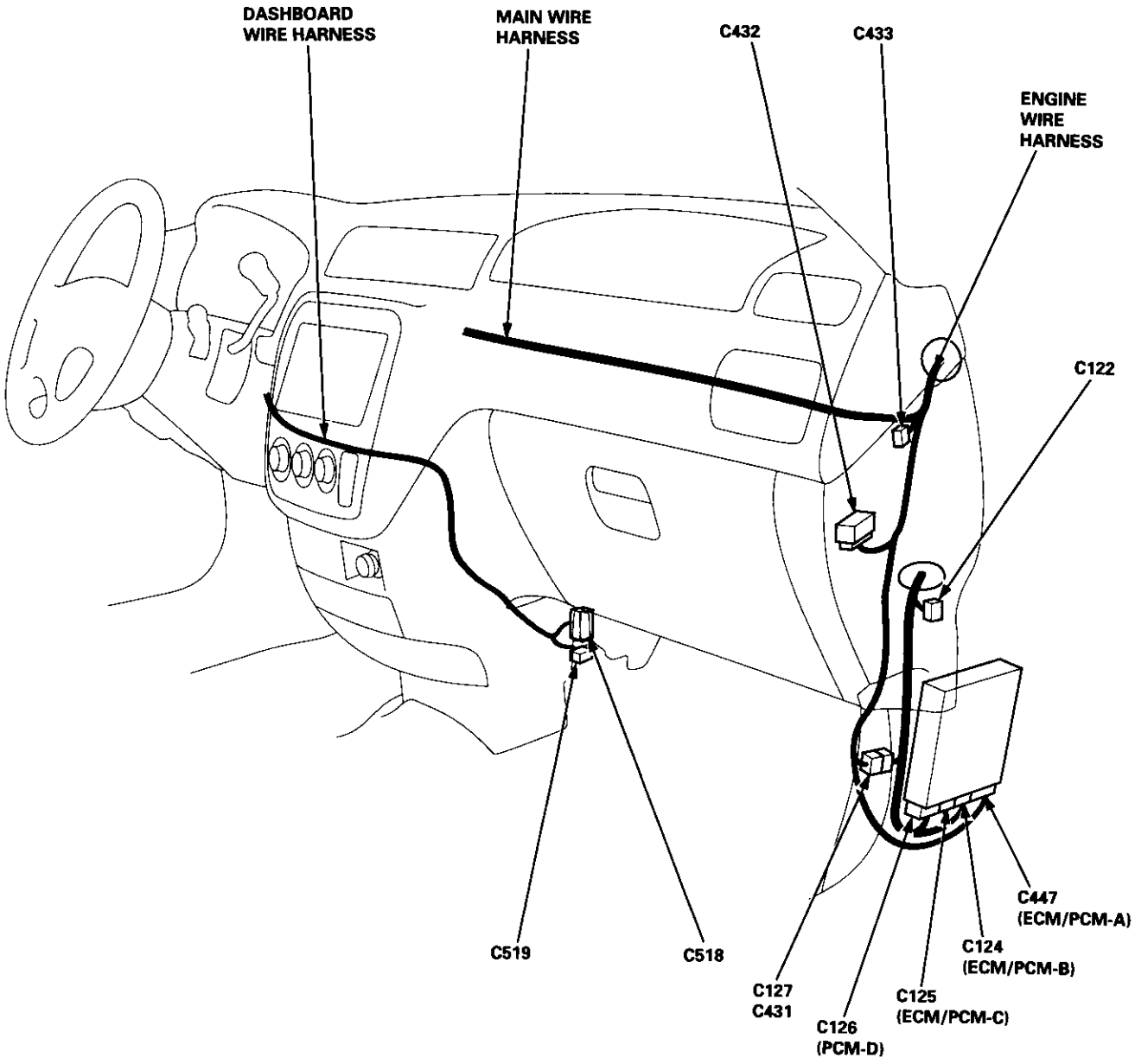
NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK¹ and YEL/BLK² are not the same).
• ○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

(cont'd)

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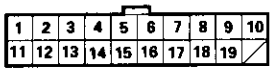
System Description

System Connectors [Dash and Floor] — '98 – 00 Models (cont'd)



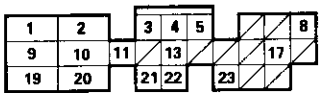
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C122



①	YEL/BLU	⑪	BRN/BLK[1]
②	YEL/BLU	⑫	BRN/BLK[1]
③	YEL/BLU	⑬	BRN/BLK[1]
④	YEL/BLK[1]	⑭	BRN/BLK[1]
⑤	YEL/BLK[1]	⑮	BRN/BLK[1]
⑥	YEL/BLK[1]	⑯	BRN/BLK[1]
⑦	YEL/BLK[2]	⑰	BRN/BLK[1]
⑧	BLU/WHT[2]	⑱	BRN/BLK[1]
⑨	BLU/WHT[2]	⑲	BRN/BLK[1]
10	BLU/WHT	20	——

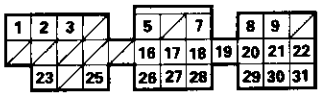
C124 (ECM/PCM-B)



①	YEL/BLK[1]	⑪	BRN[2]	㉑	WHT/BLU
②	BLK[1]	12	——	㉒	BRN/BLK[2]
③	RED[1]	⑬	YEL/GRN	㉓	BLK/BLU
④	BLU[4]	14	——	24	——
⑤	YEL[1]	15	——	25	——
6	——	16	——		
7	——	⑰	RED[2*1]		
⑧	WHT[1*1]	18	——		
⑨	YEL/BLK[2]	⑲	PNK[1*4]		
⑩	BLK[2]	⑳	BRN/BLK[1]		

*1: A/T
*4: '99 - 00 models

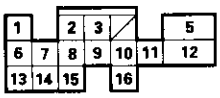
C125 (ECM/PCM-C)



①	BLK/WHT[2]	13	——	㉕	RED/YEL[2]
②	WHT/GRN	14	——	㉖	RED/WHT
③	RED/BLU*4	15	——	㉗	RED/BLK
4	——	⑯	WHT[2]	㉘	YEL/BLU
⑤	WHT/RED[3]	⑰	RED/GRN	㉙	YEL[2]
6	——	⑱	GRN/BLK[2]	㉚	BLK[3]
⑦	GRN/WHT[2]	⑲	YEL/RED	㉛	WHT/RED[3]
⑧	BLU[3]	⑳	GRN[2]		
⑨	WHT[2]	㉑	RED[3]		
10	——	㉒	BLU/RED[2]		
11	——	㉓	BLU/WHT[2]		
12	——	24	——		

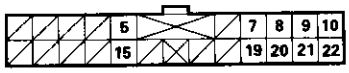
*4: '99 model

C126 (PCM-D)*1



①	YEL[3]	⑨	YEL[4]
②	GRN/WHT[3]	⑩	BLU[4]
③	GRN/BLK[3]	⑪	RED[4]
4	——	⑫	WHT[3]
⑤	BLK/YEL	⑬	LT GRN[2]
⑥	WHT[4]	⑭	BLU[1]
⑦	BLU/YEL[2]	⑮	BRN[3]
⑧	PNK[2]	⑯	GRN[4]

C127*3



1	——	12	——
2	——	13	——
3	——	14	——
4	——	⑮	PNK
⑤	YEL[4]	16	——
6	——	17	——
7	GRN	18	——
⑧	GRN/BLK[2]	⑲	BLU/WHT[2]
⑨	GRN[2]	⑳	YEL/BLU
⑩	WHT/BLU	㉑	RED/YEL[1]
11	——	㉒	BRN/BLK[1]

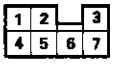
C127*4



①	LT GRN[2]	12	GRY
②	WHT[4]	⑬	RED/BLK
③	BLK/BLU	⑭	BLU[2]
④	BRN[3]	⑮	PNK[2]
⑤	YEL[4]	⑯	PNK[1*]
6	——	17	——
7	GRN	18	——
⑧	BRN/BLK[2]	⑲	BLU/WHT[2]
⑨	GRN	⑳	YEL/BLU
⑩	WHT/BLU	㉑	RED/YEL[1]
⑪	PNK[1]	㉒	BRN/BLK[1]

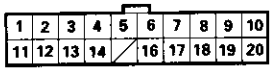
*: With cruise control

C432



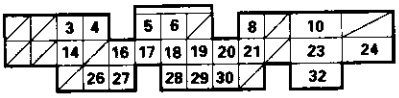
①	GRN/YEL	⑤	YEL/GRN
②	BLU/WHT	⑥	YEL/BLK[1]
③	BLK[1]	⑦	WHT/BLK
④	YEL/GRN		

C433



1	BLK	11	LT GRN/RED
2	BLK	12	LT GRN/RED
3	BLK	13	LT GRN/RED
4	WHT/GRN	14	LT BLU
5	WHT/GRN	15	——
6	WHT/GRN	16	LT BLU
7	BRN	⑰	GRN/WHT[1]
8	BRN	18	GRN/WHT
9	BRN	⑲	GRN/WHT[1]
10	WHT/BLK	20	WHT/BLK

C447 (ECM/PCM-A)



1	——	13	——	25	——
2	——	⑭	GRN/BLK[1*1]	㉖	GRN[2]
③	BLU[1]	15	——	㉗	BLU/RED[1]
④	LT GRN/WHT	⑯	GRN/YEL	㉘	WHT/RED[3*1]
⑤	BLU[2*1]	⑰	BLK/RED	㉙	LT GRN[1]
⑥	RED/YEL[1]	⑱	GRN/ORN	㉚	GRN/RED
7	——	⑲	BLU[3]	31	——
⑧	BLK/WHT[1]	⑳	GRN[1]	㉜	GRN/WHT[1]
9	——	㉑	BLU/YEL[1]		
⑩	BRN[1]	22	——		
11	——	㉓	WHT/RED[1]		
12	——	㉔	BLU/WHT[1]		

*1: A/T

C518



1	——	9	——
2	——	10	——
3	——	11	——
4	——	⑫	BLK
5	——	⑬	BRN/BLK[1]
⑥	LT BLU	14	——
7	——	⑮	BLU/YEL[1]
⑧	WHT/BLU	16	——

C519



①	BRN[1]
②	BLK

*1: A/T
*3: '98 model
*4: '99 – 00 models

NOTE:
- Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
- ○: Related to Fuel and Emissions System.
- — Connector with male terminals (double outline): View from terminal side
  — Connector with female terminals (single outline): View from wire side

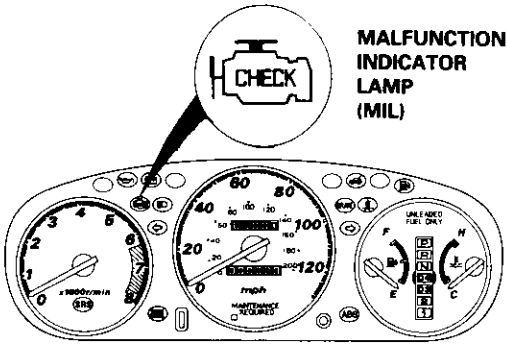
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Troubleshooting Procedures

I. How To Begin Troubleshooting
When the Malfunction indicator Lamp (MIL) has been reported on, or there is a driveability problem, use the appropriate procedure below to diagnose and repair the problem.

A. When the MIL has come on:

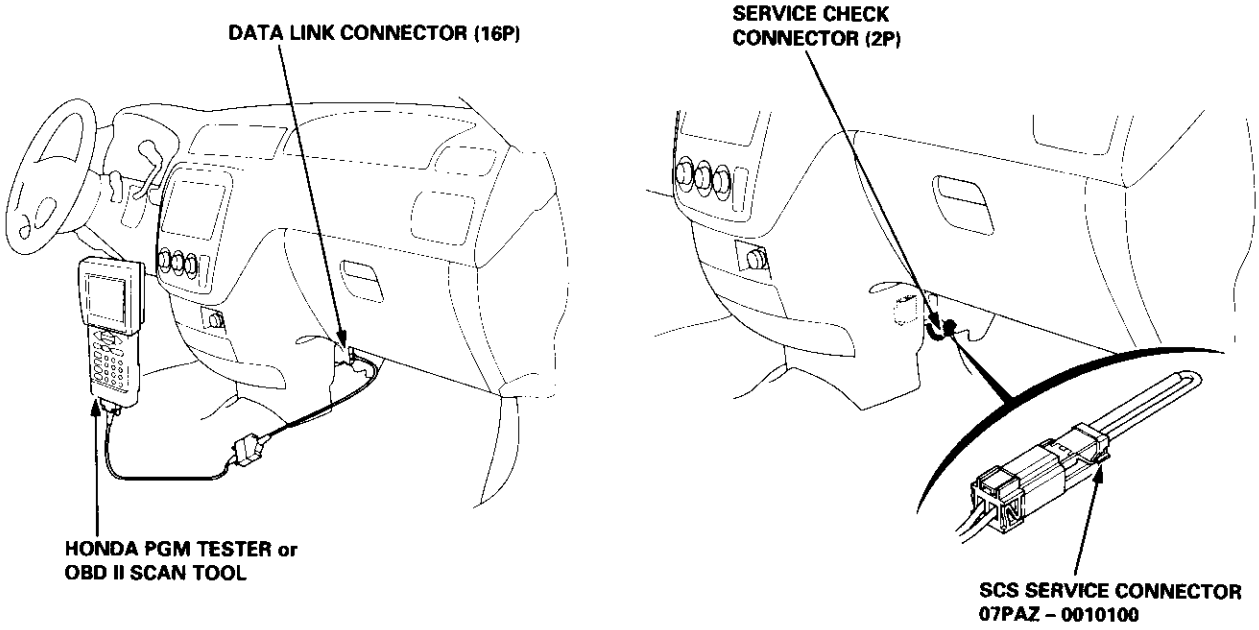
1. Connect the Honda PGM Tester or an OBD II scan tool to the 16P Data Link Connector (DLC) located behind the right side of the center console.
2. Turn the ignition switch ON (II).
3. Check the DTC and note it. Also check and note the freeze frame data.
Refer to the Diagnostic Trouble Code Chart and begin troubleshooting.



NOTE:
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.
- The scan tool or tester can read the Diagnostic Trouble Codes (DTC), freeze frame data, current data, and other Engine Control Module (ECM)/Powertrain Control Module (PCM) data.
- Freeze frame data indicates the engine conditions when the first malfunction, misfire or fuel trim malfunction was detected. It can be useful information when troubleshooting.

B. When the MIL has not come on, but there is a driveability problem, refer to the Symptom Chart on page 11-64.

C. DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.
Connect the SCS service connector to Service Check Connector as shown. (The 2P Service Check Connector is located behind the right side of the center console.) Turn the ignition switch ON (II).

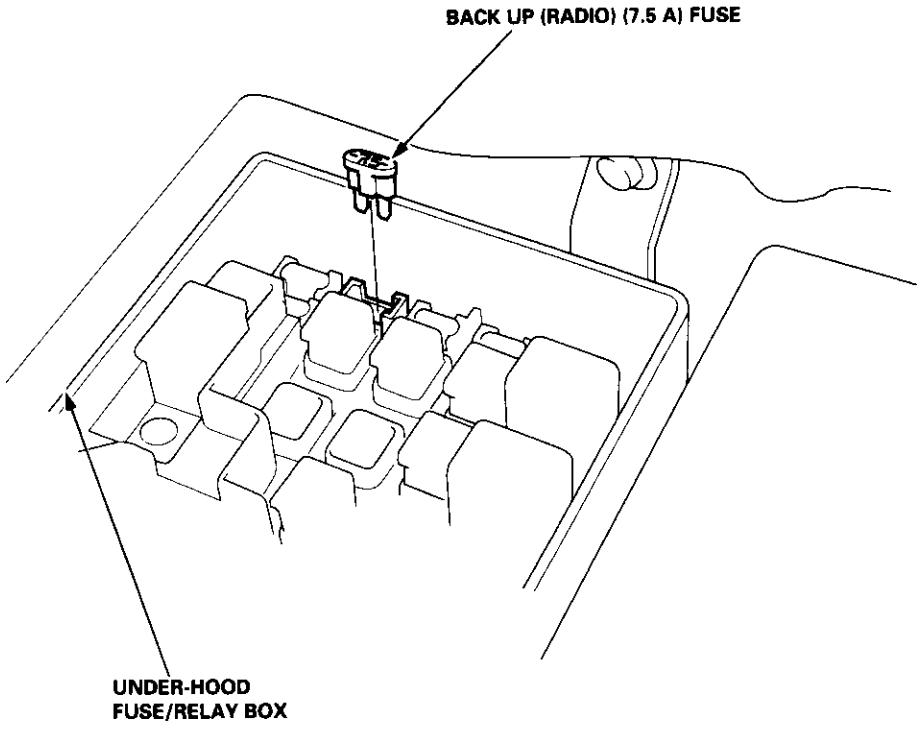


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II. Engine Control Module (ECM)/Powertrain Control Module (PCM) Reset Procedure

Either of the following actions will reset the ECM/PCM.

- Use the OBD II scan tool or Honda PGM Tester to clear the ECM's/PCM's memory. (See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.)
- Turn the ignition switch OFF. Remove the BACK UP (RADIO) (7.5 A) fuse from the under-hood fuse/relay box for 10 seconds.



III. Final Procedure (this procedure must be done after any troubleshooting)

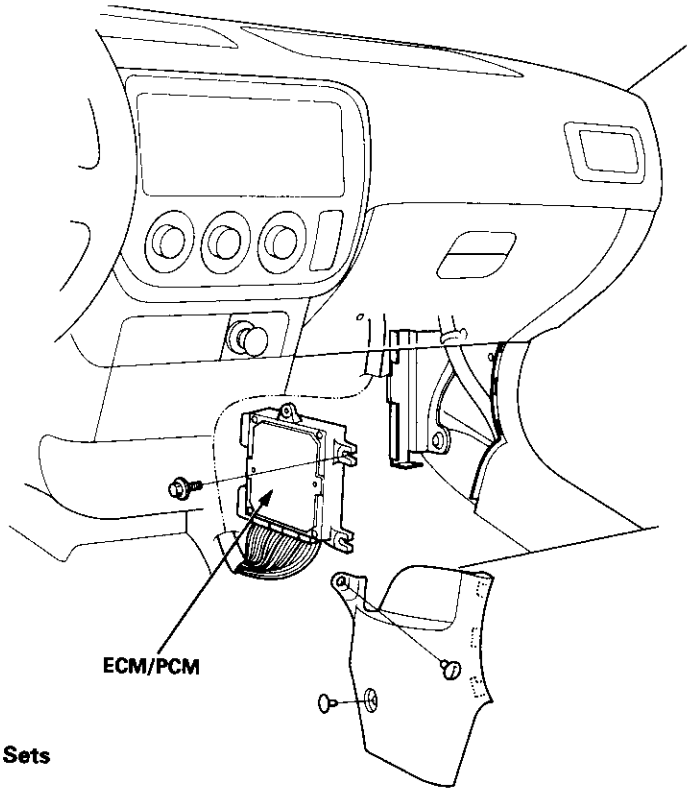
1. Remove the SCS Service Connector if it is connected. If the SCS service connector is connected, and there are no DTCs stored in the ECM/PCM, the MIL will stay on when the ignition switch is turned ON (II).
2. Do the ECM/PCM Reset Procedure.
3. Turn the ignition switch OFF.
4. Disconnect the OBD II scan tool or Honda PGM Tester from the Data Link Connector (16P).

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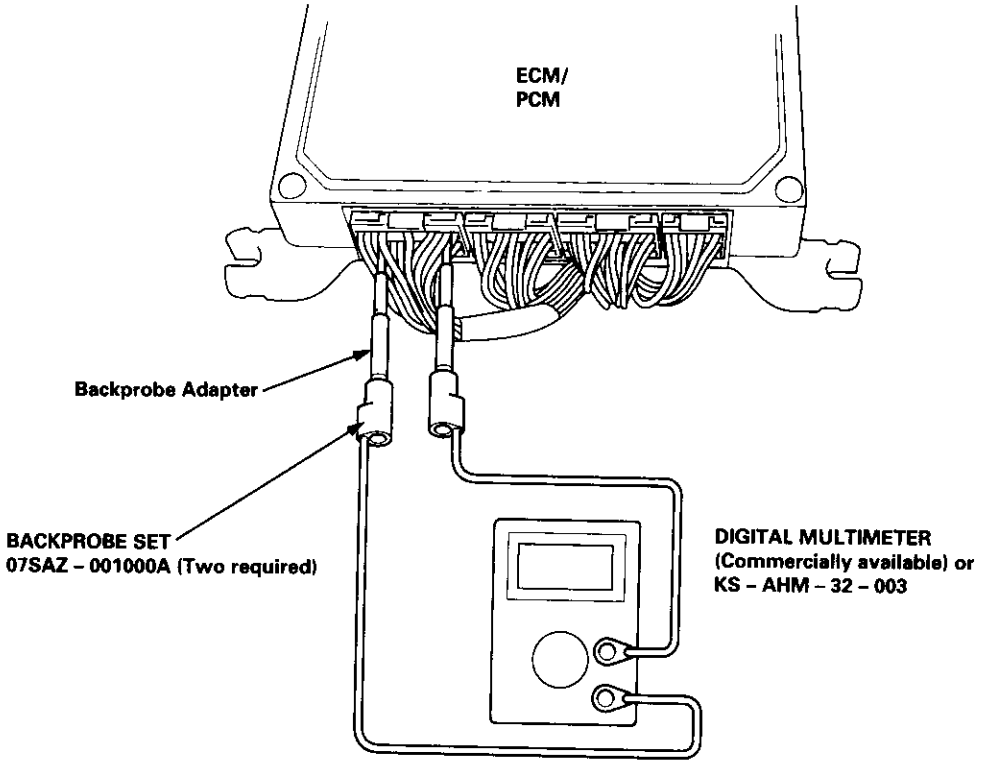
Troubleshooting Procedures (cont'd)

If the inspection for a particular code requires voltage or resistance checks at the ECM/PCM connectors, remove the right kick panel. Unbolt the ECM/PCM, and connect the backprobe sets and a digital multimeter as described below. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.



How to Use the Backprobe Sets

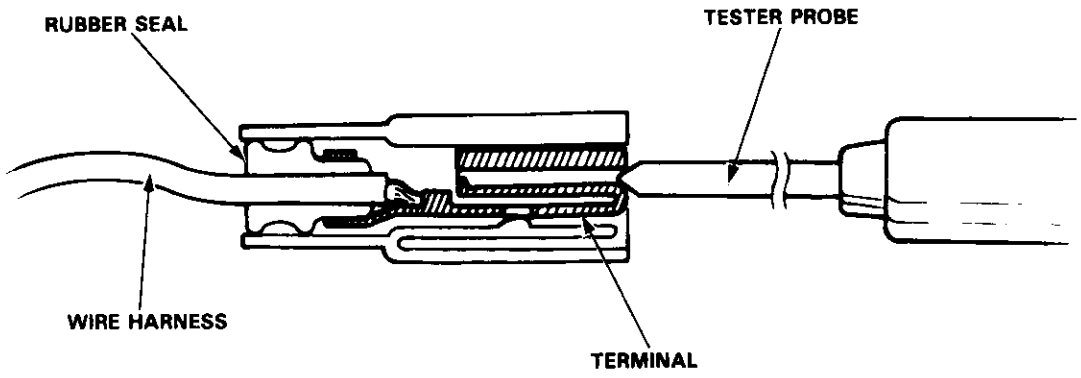
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.



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CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- Bring the tester probe into contact with the terminal from the terminal side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.



(cont'd)

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Troubleshooting Procedures (cont'd)

Symptom Chart

Listed below are symptoms and probable causes for problems that DO NOT cause the Malfunction Indicator Lamp (MIL) to come on. If the MIL was reported on, go to page 11-60.
Troubleshoot each probable cause in the order listed (from left to right) until the symptom is eliminated.
The probable cause and troubleshooting page reference can be found below.

SYMPTOM	PROBABLE CAUSE
Engine will not start	4, 2, 3, 5, 20, 15, 1
Hard starting	2, 4, 12, 17, 14, 19
Cold fast idle too low	7, 8, 9, 6, 17
Cold fast idle too high	7, 8, 9, 11, 10
Idle speed fluctuates	9, 7, 8, 11, 10
Misfire or rough running	Troubleshoot for misfire on pages 11-126, 127
Low power	2, 10, 11, 13, 17, 18, 20
Engine stalls	2, 4, 12, 7, 20, 9, 5, 16

Other Probable Causes for an engine that will not start:
- — Compression
- — Intake air leakage
- — Engine locked up
- — Timing belt
- — Starting system
- — Overheating
- — Battery

Probable Cause List (For the DTC Chart, see page 11-75.)

Probable Cause	Page	System
1	11-82	Engine Control Module (ECM)/Powertrain Control Module (PCM)
2	11-178	Fuel pressure
3	11-187	PGM-FI main relay
4	Section 4	Ignition system
5	11-131, 146	Crankshaft Position/Top Dead Center/Cylinder Position sensor circuit
6	11-95	Intake Air Temperature (IAT) sensor circuit
7	11-152	Idle Air Control (IAC) Valve
8	11-168	Fast idle thermo valve
9	11-169	Idle speed adjustment
10	11-196	Throttle body
11	11-194	Throttle cable
12	11-90	Manifold Absolute Pressure (MAP) sensor
13	11-103	Throttle Position (TP) sensor
14	11-137	Barometric pressure (BARO) sensor
15	Section 14	A/T gear position signal
16	11-166	Brake switch signal
17	11-194	Air Cleaner
18	11-199	Three Way Catalytic Converter (TWC)
19	11-203	Evaporative emission (EVAP) control
20	———	Contaminated fuel

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ECM/PCM Data

By connecting the OBD II scan tool or the Honda PGM Tester to the 16P data link connector (DLC), various data can be retrieved from the ECM/PCM. The items listed in the table below conform to the SAE recommended practice.
The Honda PGM Tester also reads data beyond that recommended by SAE.
Understanding this data will help to find the causes of intermittent failures or engine problems.

NOTE:

- The "operating values" given below are approximate values and may be different depending on the environment and the individual vehicle.
- Unless noted otherwise, "at idle speed" means idling with the engine completely warmed up, transmission in position Park or neutral and the A/C and all accessories turned off.

Data	Description	Operating Value	Freeze Data
Diagnostic Trouble Code (DTC)	If the ECM/PCM detects a problem, it will store it as a code consisting of one letter and four numbers. Depending on the problem, an SAE-defined code (P0xxx) or a Honda-defined code (P1xxx) will be output to the tester.	If no problem is detected, there is no output.	YES
Engine Speed	The ECM/PCM computes engine speed from the signals sent from the Crankshaft Position sensor. This data is used for determining the time and amount of fuel injection.	Nearly the same as tachometer indication At idle speed: '97 – 98 models: 750 ± 50 rpm '99 – 00 models: 730 ± 50 rpm	YES
Vehicle Speed	The ECM/PCM converts pulse signals from the Vehicle Speed Sensor (VSS) into speed data.	Nearly the same as speedometer indication	YES
Manifold Absolute Pressure (MAP)	The absolute pressure caused in the intake manifold by engine load and speed.	With engine stopped: Nearly the same as atmospheric pressure At idle speed: 28 – 41 kPa (210 – 310 mmHg, 8.3 – 12.2 inHg)	YES
Engine Coolant Temperature (ECT)	The ECT sensor converts coolant temperature into voltage and signals the ECM/PCM. The sensor is a thermistor whose internal resistance changes with coolant temperature. The ECM/PCM uses the voltage signals from the ECT sensor to determine the amount of injected fuel.	With cold engine: Same as ambient temperature and IAT With engine warmed up: approx. 163 – 212°F (73 – 100°C)	YES
Heated Oxygen Sensor (HO2S) (Primary, Sensor 1) (Secondary Sensor 2)	The Heated Oxygen Sensor detects the oxygen content in the exhaust gas and sends voltage signals to the ECM/PCM. Based on these signals, the ECM/PCM controls the air/fuel ratio. When the oxygen content is high (that is, when the ratio is leaner than the stoichiometric ratio), the voltage signal is lower. When the oxygen content is low (that is, when the ratio is richer than the stoichiometric ratio), the voltage signal is higher.	0.0 – 1.25 V At idle speed: about 0.1 – 0.9 V	NO

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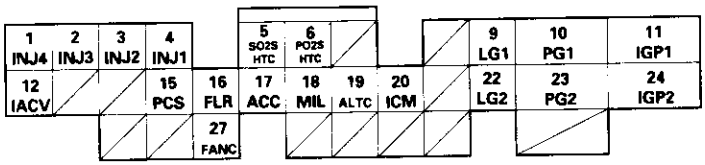
Troubleshooting Procedures (cont'd)

Data	Description	Operating Value	Freeze Data
HO2S Feedback Loop Status	Loop status is indicated as "open" or "closed". Closed: Based on the HO2S output, the ECM/PCM determines the air/fuel ratio and controls the amount of injected fuel. Open: ignoring HO2S output, the ECM/PCM refers to signals from the TP, MAP, and ECT sensors to control the amount of injected fuel.	At idle speed: closed	YES
Short Term Fuel Trim	The air/fuel ratio correction coefficient for correcting the amount of injected fuel when HO2S feedback is in the closed loop status. When the signal from the HO2S is weak, short term fuel trim gets higher, and the ECM/PCM increases the amount of injected fuel. The air/fuel ratio gradually gets richer, causing a higher HO2S output. Consequently, the short term fuel trim is lowered, and the ECM/PCM reduces the amount of injected fuel. This cycle keeps the air/fuel ratio close to the stoichiometric ratio when in closed loop status.	± 20%	YES
Long Term Fuel Trim	Long term fuel trim is computed from short term fuel trim and indicates changes occuring in the fuel supply system over a long period. If long term fuel trim is higher than 1.00, the amount of injected fuel must be increased. If it is lower than 1.00, the amount of injected fuel must be reduced.	± 20%	YES
Intake Air Temperature (IAT)	The IAT sensor converts intake air temperature into voltage and signals the ECM/PCM. When intake air temperature is low, the internal resistance of the sensor increases, and the voltage signal is higher.	With cold engine: Same as ambient temperature and ECT	YES
Throttle Position	Based on the accelerator pedal position, the opening angle of the throttle valve is indicated.	At idle speed: approx. 10%	YES
Ignition Timing	Ignition timing is the ignition advance angle set by the ECM/PCM. The ECM/PCM matches ignition timing to the driving conditions.	At idle speed: 16° ± 4° BTDC with the SCS service connector connected.	NO
Calculated Load Value (CLV)	CLV is the engine load calculated from the MAP data.	At idle speed: 28 – 41% At 2,500 rpm with no load: 13 – 26%	YES

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Powertrain Control Module Terminal Arrangement — '97 Model

PCM CONNECTOR A (32P)



Wire side of female terminals

PCM CONNECTOR A (32P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL	INJ4 (No. 4 FUEL INJECTOR)	Drives No. 4 fuel injector.	With engine running: duty controlled
2	BLU	INJ3 (No. 3 FUEL INJECTOR)	Drives No. 3 fuel injector.	
3	RED	INJ2 (No. 2 FUEL INJECTOR)	Drives No. 2 fuel injector.	
4	BRN	INJ1 (No. 1 FUEL INJECTOR)	Drives No. 1 fuel injector.	
5	BLK WHT	SO2SHTC (SECONDARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives secondary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: duty controlled
6	BLK/WHT	PO2SHTC (PRIMARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives primary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: duty controlled
9	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the PCM control circuit.	Less than 1.0 V at all times
10	BLK	PG1 (POWER GROUND)	Ground for the PCM power circuit.	
11	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the PCM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
12	BLK/BLU	IACV (IDLE AIR CONTROL VALVE)	Drives IACV.	With engine running: duty controlled
15	RED/YEL	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve.	With engine running, engine coolant below 154°F (68°C): battery voltage With engine running, engine coolant above 154°F (68°C): duty controlled
16	GRN/YEL	FLR (FUEL PUMP RELAY)	Drives fuel pump relay.	0 V for two seconds after turning ignition switch ON (II), then battery voltage
17	BLK/RED	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay.	With compressor ON: 0 V With compressor OFF: battery voltage
18	GRN/ORN	MIL (MALFUNCTION INDICATOR LAMP)	Drives MIL.	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
19*	WHT/GRN	ALTC (ALTERNATOR CONTROL)	Sends alternator control signal.	With fully warmed-up engine running: battery voltage During driving with small electrical load: 0 V
20	YEL/GRN	ICM (IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): battery voltage With engine running: pulses
22	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the PCM control circuit.	Less than 1.0 V at all times
23	BLK	PG2 (POWER GROUND)	Ground for the PCM power circuit.	
24	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the PCM control circuit.	With ignition switch ON (II): battery voltage With engine switch OFF: 0 V
27	GRN	FANC (RADIATOR FAN CONTROL)	Drives radiator fan relay.	With radiator fan running: 0 V With radiator fan stopped: battery voltage

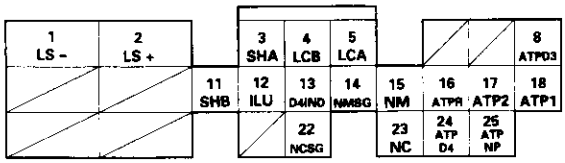
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Powertrain Control Module Terminal Arrangement — '97 Model (cont'd)

PCM CONNECTOR B (25P)



Wire side of female terminals

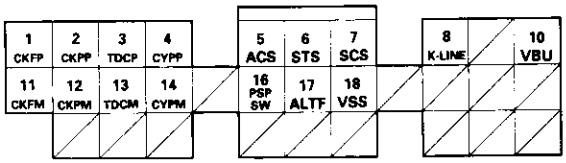
PCM CONNECTOR B (25P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	WHT	LS – (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE –)	Drives A/T clutch pressure control solenoid valve	With ignition switch ON (II): duty controlled
2	RED	LS + (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE +)	Drives A/T clutch pressure control solenoid valve	With ignition switch ON (II): duty controlled
3	BLU/YEL	SHA (SHIFT CONTROL SOLENOID VALVE A)	Drives shift control solenoid valve A.	In 2nd, R position, in 2nd and 3rd gear in D4, D3 position: Battery voltage In 1st gear in D4, D3 position, in 4th gear in D4 position: 0 V
4	GRN/BLK	LC B (LOCK-UP CONTROL SOLENOID VALVE B)	Drives lock-up control solenoid valve B.	With full lock-up: Battery voltage With half lock-up: duty controlled
5	YEL	LC A (LOCK-UP CONTROL SOLENOID VALVE A)	Drives lock-up control solenoid valve A.	With lock-up ON: battery voltage With lock-up OFF: 0 V
8	PNK	ATPD3 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D3 position: 0 V In any other position: battery voltage
11	GRN/WHT	SHB (SHIFT CONTROL SOLENOID VALVE B)	Drives shift control solenoid valve B.	In 1st, 2nd position, in 1st and 2nd gear in D4, D3 position: Battery voltage In R position, in 3rd gear in D4, D3, in 4th gear in D4 position: 0 V
12	WHT/RED	ILU (INTERLOCK CONTROL UNIT)	Detects interlock control unit signal.	With ignition switch ON (II) and brake pedal depressed: battery voltage
13	GRN/BLK	D4 IND (D4 INDICATOR LIGHT)	Drives D4 indicator light.	With D4 indicator light turned ON: battery voltage With D4 indicator light turned OFF: 0 V
14	WHT	NMSG (MAINSHAFT SPEED SENSOR GROUND)	Ground for mainshaft speed sensor.	
15	RED	NM (MAINSHAFT SPEED SENSOR)	Detects mainshaft speed sensor signal.	With engine running: pulses
16	WHT	ATPR (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In R position: 0 V In any other position: battery voltage
17	BLU	ATP2 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 2nd position: 0 V In any other position: battery voltage
18	BRN	ATP1 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 1st position: 0 V In any other position: battery voltage
22	GRN	NCSG (COUNTERSHAFT SPEED SENSOR GROUND)	Ground for countershaft speed sensor.	
23	BLU	NC (COUNTERSHAFT SPEED SENSOR)	Detects countershaft speed sensor signal.	With ignition switch ON (II), and front wheels rotating: pulses
24	YEL	ATPD4 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D4 position: 0 V In any other position: battery voltage
25	LT GRN	ATPNP (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In park or neutral: 0 V In any other position: about 5 V

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PCM CONNECTOR C (31P)



Wire side of female terminals

PCM CONNECTOR C (31P)

NOTE: Standard battery voltage is 12 V.

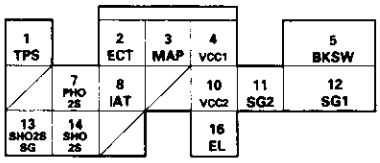
Terminal number	Wire color	Terminal name	Description	Signal
1	BLU/RED	CKFP (CKF SENSOR P SIDE)	Detects CKF sensor.	With engine running: pulses
2	BLU	CKPP (CKP SENSOR P SIDE)	Detects CKP sensor.	With engine running: pulses
3	GRN	TDCP (TDC SENSOR P SIDE)	Detects TDC sensor.	With engine running: pulses
4	YEL	CYPP (CYP SENSOR P SIDE)	Detects CYP sensor.	With engine running: pulses
5	BLU/RED	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal.	With A/C switch ON: 0 V With A/C switch OFF: battery voltage
6	BLU/ORN	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal.	With starter switch ON (III): battery voltage With starter switch OFF: 0 V
7	BRN	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the connector connected: 0 V With the connector disconnected: about 5 V or battery voltage
8	LT BLU	K-LINE	Sends and receives scan tool signal.	With ignition switch ON (II): pulses
10	WHT/BLU	VBU (VOLTAGE BACK UP)	Power source for the PCM control circuit. Power source for the DTC memory	Battery voltage at all times
11	WHT/RED	CKFM (CKF SENSOR M SIDE)	Ground for CKF sensor signal.	
12	WHT	CKPM (CKP SENSOR M SIDE)	Ground for CKP sensor signal.	
13	RED	TDCM (TDC SENSOR M SIDE)	Ground for TDC sensor signal.	
14	BLK	CYPM (CKP SENSOR M SIDE)	Ground for CYP sensor signal.	
16	GRN	PSPSW (P/S PRESSURE SWITCH)	Detects PSP switch signal.	At idle with steering wheel in straight ahead position: 0 V At idle with steering wheel at full lock: battery voltage
17	WHT/RED	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal.	With fully warmed up engine running: 0 V-battery voltage (depending on electrical load)
18	BLU/WHT	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal.	With ignition switch ON (II) and front wheels rotating: cycles 0 V – 5 V or battery voltage

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Powertrain Control Module Terminal Arrangement — '97 Model (cont'd)

PCM CONNECTOR D (16P)



Wire side of female terminals

PCM CONNECTOR D (16P)

NOTE: Standard battery voltage is 12 V.

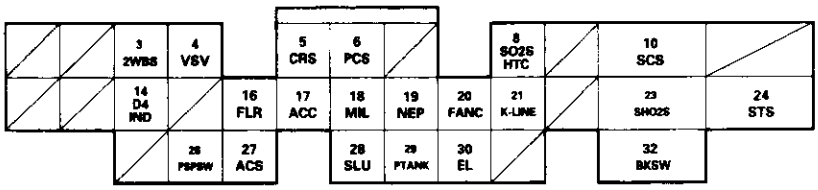
Terminal number	Wire color	Terminal name	Description	Signal
1	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal.	With throttle fully open: about 4.8 V With throttle fully closed: about 0.5 V
2	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR	Detects ECT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
3	RED/GRN	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal.	With ignition switch ON (II): about 3 V At idle: about 1.0 V (depending on engine speed)
4	YEL/RED	VCC1 (SENSOR VOLTAGE)	Power source for MAP sensor.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
5	GRN/WHT	BKSW (BRAKE SWITCH)	Detects brake switch signal.	With brake pedal released: 0 V With brake pedal depressed: battery voltage
7	WHT	PHO2S (PRIMARY HEATED OXYGEN SENSOR SENSOR 1)	Detects heated primary oxygen sensor (sensor 1) signal.	With throttle fully opened from idle with fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
8	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
10	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Provides sensor voltage.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
11	GRN/BLK	SG2 (SENSOR GROUND)	Sensor ground.	Less than 1.0 V at all times
12	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor.	Less than 1.0 V at all times
13	RED/YEL	SHO2S SG (SECONDARY HEATED OXYGEN SENSOR, SENSOR 2 GROUND)	Ground for secondary heated oxygen sensor (sensor 2).	
14	WHT/RED	SHO2S (SECONDARY HEATED OXYGEN SENSOR, SENSOR 2)	Detects secondary heated oxygen sensor (sensor 2) signal.	With throttle fully opened from idle with fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
16*	GRN/RED	EL (ELD)	Detects ELD signal.	With parking lights turned on at idle: about 2.5 – 3.5 V With low beam headlights turned on at idle: about 1.5 – 2.5 V

*: USA

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Engine/Powertrain Control Module Terminal Arrangement — '98 – 00 Models

ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

ECM/PCM CONNECTOR A (32P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
3	BLU	2WBS (EVAP BYPASS SOLENOID VALVE)	Drives EVAP bypass solenoid valve.	With ignition switch ON (II): battery voltage
4	LT GRN/WHT	VSV (EVAP CONTROL CANISTER VENT SHUT VALVE)	Drives EVAP control canister vent shut valve.	With ignition switch ON (II): battery voltage
5*1	BLU	CRS (CRUISE CONTROL SIGNAL)	Shift Down signal input from cruise control unit.	When cruise control is used: pulses
6	RED/YEL	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve.	With engine running, engine coolant, below 154°F (68°C): battery voltage With engine running, engine coolant, above 154°F (68°C): duty controlled
8	BLK/WHT	SO2SHTC (SECONDARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives secondary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: duty controlled
10	BRN	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the terminal connected: 0 V With the terminal disconnected: about 5 V or battery voltage
14*1	GRN/BLK	D4IND (D4 INDICATOR)*3 DIND (D INDICATOR)*4	Drives D4*3, D*4 indicator light.	With D4*3, D*4 indicator light turned ON: battery voltage With D4*3, D*4 indicator light turned OFF: 0 V
16	GRN/YEL	FLR (FUEL PUMP RELAY)	Drives fuel pump relay.	0 V for two seconds after turning ignition switch ON (II), then battery voltage
17	BLK/RED	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay.	With compressor ON: 0 V With compressor OFF: battery voltage
18	GRN/ORN	MIL (MALFUNCTION INDICATOR LIGHT)	Drives MIL.	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
19	BLU	NEP (ENGINE SPEED PULSE)	Outputs engine speed pulse.	With engine running: pulses
20	GRN	FANC (RADIATOR FAN CONTROL)	Drives radiator fan relay.	With radiator fan running: 0 V With radiator fan stopped: battery voltage
21	BLU/YEL	K-LINE	Sends and receives scan tool signal.	With ignition switch ON (II): pulses
23	WHT/RED	SHO2S (SECONDARY HEATED OXYGEN SENSOR, SENSOR 2)	Detects secondary heated oxygen sensor (sensor 2) signal.	With throttle fully opened from idle with fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
24	BLU/WHT	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal.	With starter switch ON (III): battery voltage With starter switch OFF: 0 V
26	GRN	PSPSW (P/S PRESSURE SWITCH SIGNAL)	Detects PSP switch signal.	At idle with steering wheel in straight ahead position: 0 V At idle with steering wheel at full lock: battery voltage
27	BLU/RED	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal.	With A/C switch ON: 0 V With A/C switch OFF: about 5 V
28*1	WHT/RED	SLU (INTERLOCK CONTROL UNIT)	Drives interlock control unit.	With ignition switch ON (II) and brake pedal depressed: battery voltage
29	LT GRN	PTANK (FUEL TANK PRESSURE SENSOR)	Detects fuel tank pressure sensor signal.	With ignition switch ON (II) and fuel fill cap opened: about 2.5 V
30*5	GRN/RED	EL (ELD)	Detects ELD signal.	With parking lights turned on at idle: about 2.5 – 3.5 V With low beam headlights turned on at idle: about 1.5 – 2.5 V
32	GRN/WHT	BKSW (BRAKE SWITCH)	Detects brake switch signal.	With brake pedal released: 0 V With brake pedal depressed: battery voltage

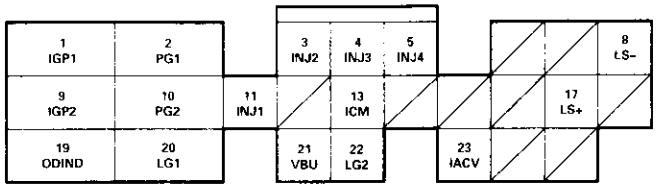
*1: A/T
*2: M/T
*3: '98 model
*4: '99 – 00 models
*5: USA

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Engine/Powertrain Control Module Terminal Arrangement — '98 – 00 Models (cont'd)

ECM/PCM CONNECTOR B (25P)



Wire side of female terminals

ECM/PCM CONNECTOR B (25P)

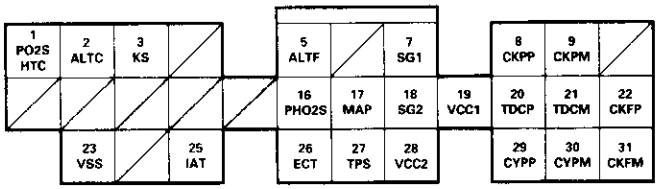
NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the ECM/PCM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
2	BLK	PG1 (POWER GROUND)	Ground for the ECM/PCM control circuit.	Less than 1.0 V at all times
3	RED	INJ2 (No. 2 FUEL INJECTOR)	Drives No. 2 fuel injector.	With engine running: duty controlled
4	BLU	INJ3 (No. 3 FUEL INJECTOR)	Drives No. 3 fuel injector.	
5	YEL	INJ4 (No. 4 FUEL INJECTOR)	Drives No. 4 fuel injector.	
8*1	WHT	LS– (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE – SIDE)	A/T clutch pressure control solenoid valve power supply negative terminal.	With ignition switch ON (II): duty controlled
9	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the ECM/PCM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
10	BLK	PG2 (POWER GROUND)	Ground for the ECM/PCM control circuit.	Less than 1.0 V at all times
11	BRN	INJ1 (No. 1 FUEL INJECTOR)	Drives No. 1 fuel injector.	With engine running: duty controlled
13	YEL/GRN	ICM (IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): battery voltage With engine running: pulses
17*1	RED	LS+ (A/T CLUTCH PRESSURE CONTROL SOLENOID VALVE + SIDE)	A/T clutch pressure control solenoid valve power supply positive terminal	With ignition switch ON (II): duty controlled
19*4	PNK	ODIND (OVER-DRIVE OFF INDICATOR)	Drives OVER-DRIVE OFF indicator light.	With OVER-DRIVE OFF indicator light turned ON: 0 V With OVER-DRIVE OFF indicator light turned OFF: battery voltage
20	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the ECM/PCM control circuit.	Less than 1.0 V at all times
21	WHT/BLU	VBU (VOLTAGE BACK UP)	Power source for the ECM/PCM control circuit. Power source for the DTC memory.	Battery voltage at all times
22	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the ECM/PCM control circuit.	Less than 1.0 V at all times
23	BLK/BLU	IACV (IDLE AIR CONTROL VALVE)	Drives IAC valve.	With engine running: duty controlled

*1: A/T
*2: M/T
*3: '98 model
*4: '99 – 00 models

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ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

ECM/PCM CONNECTOR C (31P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	BLK/WHT	PO2SHTC (PRIMARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives primary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: duty controlled
2*5	WHT/GRN	ALTC (ALTERNATOR CONTROL)	Sends alternator control signal.	With fully warmed – up engine running: battery voltage During driving with small electrical load: 0 V
3*4	RED/BLU	KS (KNOCK SENSOR)	Detects KS signal.	With engine knocking: pulses
5	WHT/RED	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal.	With fully warmed up engine running: 0 V – battery voltage (depending on electrical load)
7	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor.	Less than 1.0 V at all times
8	BLU	CKPP (CKP SENSOR P SIDE)	Detects CKP sensor.	With engine running: pulses
9	WHT	CKPM (CKP SENSOR M SIDE)	Ground for CKP sensor.	
16	WHT	PHO2S (PRIMARY HEATED OXYGEN SENSOR, SENSOR 1)	Detects primary heated oxygen sensor (sensor 1) signal.	With throttle fully opened from idle with fully, warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
17	RED/GRN	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal.	With ignition switch ON (II): about 3 V At idle: about 1.0 V (depending on engine speed)
18	GRN/BLK	SG2 (SENSOR GROUND)	Sensor ground.	Less than 1.0 V at all times
19	YEL/RED	VCC1 (SENSOR VOLTAGE)	Power source to MAP sensor.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
20	GRN	TDCP (TDC SENSOR P SIDE)	Detects TDC sensor.	With engine running: pulses
21	RED	TDCM (TDC SENSOR M SIDE)	Ground for TDC sensor.	
22	BLU/RED	CKFP (CKF SENSOR P SIDE)	Detects CKF sensor.	With engine running: pulses
23	BLU/WHT	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal.	With ignition switch ON (II) and front wheels rotating: cycles 0 V – about 5 V or battery voltage
25	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
26	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR)	Detects ECT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
27	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal.	With throttle fully open: about 4.8 V With throttle fully closed: about 0.5 V
28	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Provides sensor voltage.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
29	YEL	CYPP (CYP SENSOR P SIDE)	Detects CYP sensor.	With engine running: pulses
30	BLK	CYPM (CYP SENSOR M SIDE)	Ground for CYP sensor.	
31	WHT/RED	CKFM (CKF SENSOR M SIDE)	Ground for CKF sensor signal.	

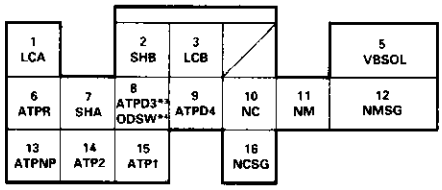
*1: A/T *3: '98 model
*2: M/T *4: '99 – 00 models
*5: USA

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Powertrain Control Module Terminal Arrangement — '98 – 00 Models (cont'd)

ECM/PCM CONNECTOR D (16P)



Wire side of female terminals

PCM CONNECTOR D (16P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1*1	YEL	LC A (LOCK-UP CONTROL SOLENOID VALVE A)	Drives lock-up control solenoid valve A.	With lock-up ON: battery voltage With lock-up OFF: 0 V
2*1	GRN/WHT	SHB (SHIFT CONTROL SOLENOID VALVE B)	Drives shift control solenoid valve B.	In 1st, 2nd position, in 1st and 2nd gear in D4, D3 (D)*4 position: battery voltage In P, R, N position, in 3rd gear in D4, D3 (D)*4 position, in 4th gear in D4 (D)*4 position: 0 V
3*1	GRN/BLK	LC B (LOCK-UP CONTROL SOLENOID VALVE B)	Drives lock-up control solenoid valve B.	With full lock-up: Battery voltage With half lock-up: duty controlled
5*1	BLK/YEL	VBSOL (BATTERY VOLTAGE FOR SOLENOID VALVE)	Power source of solenoid valve.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
6*1	WHT	ATPR (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In R position: 0 V In any other position: battery voltage
7*1	BLU/YEL	SHA (SHIFT CONTROL SOLENOID VALVE A)	Drives shift control solenoid valve A.	In 2nd, R position, in 2nd and 3rd gear in D4, D3 (D)*4 position: battery voltage In 1st gear in D4, D3 (D)*4 position, in 4th gear in D4 (D)*4 position, in P, N position: 0 V
8*1,*3	PNK	ATPD3 (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D3 position: 0 V In any other position: battery voltage
8*1,*4	PNK	ODSW (OVER-DRIVE SWITCH)	Detects OVER-DRIVE switch signal.	With Over-Drive OFF (O/D OFF indicator light turned ON): 0 V With Over-Drive ON (O/D OFF indicator light turned OFF): about 5 V
9*1	YEL	ATPD4*3, D*4 (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D4*3, D*4 position: 0 V In any other position: battery voltage
10*1	BLU	NC (COUNTERSHAFT SPEED SENSOR)	Detects countershaft speed sensor signals.	With ignition switch ON (II), and front wheels rotating: pulses
11*1	RED	NM (MAINSHAFT SPEED SENSOR)	Detects mainshaft speed sensor signals.	With engine running: pulses
12*1	WHT	NMSG (MAINSHAFT SPEED SENSOR GROUND)	Ground for mainshaft speed sensor.	
13*1	LT GRN	ATPNP (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In park or neutral: 0 V In any other position: about 5 V
14*1	BLU	ATP2 (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 2nd position: 0 V In any other position: battery voltage
15*1	BRN	ATP1 (AT GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 1st position: 0 V In any other position: battery voltage
16*1	GRN	NCSG (COUNTERSHAFT SPEED SENSOR GROUND)	Ground for countershaft speed sensor.	

*1: A/T *3: '98 model
*2: M/T *4: '99 – 00 models

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Diagnostic Trouble Code (DTC) Chart

DTC (MIL indication*)	Detection Item	Probable Cause	Page
P0107 (3)	Manifold Absolute Pressure Circuit Low Input	• Open or short in MAP sensor circuit • MAP sensor • ECM/PCM	11-90
P0108 (3)	Manifold Absolute Pressure Circuit High Input	• Open in MAP sensor circuit • MAP sensor • ECM/PCM	11-92
P0111*3 (10)	Intake Air Temperature Circuit Range/Performance Problem	• IAT sensor	11-95
P0112 (10)	Intake Air Temperature Circuit Low Input	• Short in IAT sensor circuit • IAT sensor • ECM/PCM	11-96
P0113 (10)	Intake Air Temperature Circuit High Input	• Open in IAT sensor circuit • IAT sensor • ECM/PCM	11-97
P0116 (86)	Engine Coolant Temperature Circuit Range/Performance Problem	• ECT sensor • Cooling system	11-99
P0117 (6)	Engine Coolant Temperature Circuit Low Input	• Short in ECT sensor circuit • ECT sensor • ECM/PCM	11-100
P0118 (6)	Engine Coolant Temperature Circuit High Input	• Open in ECT sensor circuit • ECT sensor • ECM/PCM	11-101
P0122 (7)	Throttle Position Circuit Low Input	• Open or short in TP sensor circuit • TP sensor • ECM/PCM	11-103
P0123 (7)	Throttle Position Circuit High Input	• Open in TP sensor circuit • TP sensor • ECM/PCM	11-107
P0131 (1)	Primary Heated Oxygen Sensor *Circuit Low Voltage* (Sensor 1)	• Short in Primary HO2S (Sensor 1) *circuit* • Primary HO2S (Sensor 1) • Fuel supply system • ECM/PCM	11-110
P0132 (1)	Primary Heated Oxygen Sensor Circuit High Voltage (Sensor 1)	• Open in Primary HO2S (Sensor 1) circuit • Primary HO2S (Sensor 1) • ECM/PCM	11-113
P0133 (61)	Primary Heated Oxygen Sensor Slow Response (Sensor 1)	• Primary HO2S (Sensor 1) • Exhaust system	11-116
P0135 (41)	Primary Heated Oxygen Sensor Heater Circuit Malfunction (Sensor 1)	• Open or short in Primary HO2S (Sensor 1) heater circuit • ECM/PCM	11-121

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.

**: The D4 (D)*5 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: A/T *3: '97 model *5: '99 – 00 models

*2: M/T *4: '98 model

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Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0137 (63)	Secondary Heated Oxygen Sensor Circuit Low Voltage (Sensor 2)	• Short in Secondary HO2S (Sensor 2) circuit • Secondary HO2S (Sensor 2) • ECM/PCM	11-117
P0138 (63)	Secondary Heated Oxygen Sensor Circuit High Voltage (Sensor 2)	• Open in Secondary HO2S (Sensor 2) circuit • Secondary HO2S (Sensor 2) • ECM/PCM	11-118
P0139 (63)	Secondary Heated Oxygen Sensor Slow Response (Sensor 2)	• Secondary HO2S (Sensor 2)	11-120
P0141 (65)	Secondary Heated Oxygen Sensor Heater Circuit Malfunction (Sensor 2)	• Open or short in Secondary HO2S (Sensor 2) heater circuit • ECM/PCM	11-121
P0171 (45)	System Too Lean	• Fuel supply system • Primary HO2S (Sensor 1) • MAP sensor • Contaminated fuel • Valve clearance • Exhaust leakage	11-124
P0172 (45)	System Too Rich	• Fuel supply system • Primary HO2S (Sensor 1) • MAP sensor • Contaminated fuel • Valve clearance	11-124
P0300*4, *5 and some of P0301 (71), P0302 (72), P0303 (73), P0304 (74)	Random Misfire	• Ignition system • Fuel supply system • MAP sensor • IAC valve • Contaminated fuel • Lack of fuel	11-126
P0301 (71), P0302 (72), P0303 (73), P0304 (74)	— Cylinder 1 — Cylinder 2 — Cylinder 3 — Cylinder 4 Misfire Detected	• Fuel injector • Fuel injector circuit • Ignition system • Low compression • Valve clearance	11-127
P0325*5 (23)	Knock Sensor (KS) Circuit Malfunction	• Open or short in Knock Sensor (KS) circuit • Knock Sensor (KS) • ECM/PCM	11-130
P0335 (4)	Crankshaft Position Sensor Circuit Low Input	• Crankshaft Position Sensor • Crankshaft Position Sensor circuit • ECM/PCM	11-131
P0336 (4)	Crankshaft Position Sensor Range/Performance	• Crankshaft Position Sensor • Timing belt skipped teeth	11-131
P0420 (67)	Catalyst System Efficiency Below Threshold	• Three Way Catalytic converter • Secondary HO2S (Sensor 2)	11-200
P0441*3 (92)	Evaporative Emission Control System Insufficient Purge Flow	• EVAP Purge Control Solenoid valve • EVAP Purge Control Solenoid valve circuit • Throttle Body (purge port) • Tubing • PCM	11-205
P0451*5	Fuel Tank Pressure Sensor Circuit Range/Performance	• Fuel Tank Pressure Sensor • ECM/PCM	11-208
P0452*4, *5 (91)	Fuel Tank Pressure Sensor Circuit Low Input	• Open or Short in Fuel Tank Pressure Sensor circuit • Fuel Tank Pressure Sensor • ECM/PCM	11-209
P0453*4, *5 (91)	Fuel Tank Pressure Sensor Circuit High Input	• Open in Fuel Tank Pressure Sensor circuit • Fuel Tank Pressure Sensor • ECM/PCM	11-211

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.

**: The D4 (D)*5 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: A/T *3: '97 model *5: '99 – 00 models

*2: M/T *4: '98 model

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DTC (MIL indication)	Detection Item	Probable Cause	Page
P0500 (17)*2	Vehicle Speed Sensor Circuit Malfunction	• Vehicle Speed Sensor • Vehicle Speed Sensor circuit • ECM	11-135
P0501 (17)*1	Vehicle Speed Sensor Circuit Malfunction	• Vehicle Speed Sensor • Vehicle Speed Sensor circuit • PCM	11-135
P0505 (14)	Idle Control System Malfunction	• IAC valve • Throttle Body • Fast idle thermo valve*1	11-150
P0700 P0715 P0720 P0730 P0740 P0753 P0758 (70)*1**	Automatic Transaxle	——	Section 14
P1106 (13)	Barometric Pressure Circuit Range/Performance Problem	• ECM/PCM (Baro sensor)	11-137
P1107 (13)	Barometric Pressure Circuit Low Input	• ECM/PCM (Baro sensor)	11-137
P1108 (13)	Barometric Pressure Circuit High Input	• ECM/PCM (Baro sensor)	11-137
P1121 (7)	Throttle Position Lower Than Expected	• TP sensor	11-109
P1122 (7)	Throttle Position Higher Than Expected	• TP sensor	11-109
P1128 (5)	Manifold Absolute Pressure Lower Than Expected	• MAP sensor	11-94
P1129 (5)	Manifold Absolute Pressure Higher Than Expected	• MAP sensor	11-94
P1297 (20)	Electrical Load Detector Circuit Low Input	• Electrical Load Detector • Electrical Load Detector circuit • ECM/PCM	11-138
P1298 (20)	Electrical Load Detector Circuit High Input	• Electrical Load Detector • Electrical Load Detector circuit • ECM/PCM	11-140
P1300*3 and some of P0301 P0302 P0303 P0304 (71) (72) (73) (74)	Random Misfire	• Ignition system • Fuel supply system • MAP sensor • IAC valve • Contaminated fuel • Lack of fuel	11-126

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.

**: The D4 (D)*5 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: A/T *3: '97 model *5: '99 – 00 models

*2: M/T *4: '98 model

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Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1336 (54)	Crankshaft Speed Fluctuation Sensor Intermittent Interruption	• CKF sensor	11-142
P1337 (54)	Crankshaft Speed Fluctuation Sensor No Signal	• CKF sensor • CKF sensor circuit • ECM/PCM	11-142
P1359 (8)	Crankshaft Position/Top Dead Center Sensor/Cylinder Position Connector Disconnection	• CKP/TDC/CYP sensor circuit	11-146
P1361 (8)	Top Dead Center Sensor Intermittent Interruption	• TDC sensor	11-131
P1362 (8)	Top Dead Center Sensor No Signal	• TDC sensor • TDC sensor circuit • ECM/PCM	11-131
P1381 (9)	Cylinder Position Sensor Intermittent Interruption	• CYP sensor	11-131
P1382 (9)	Cylinder Position Sensor No Signal	• CYP sensor • CYP sensor circuit • ECM/PCM	11-131
P1456*4, *5 (90)	Evaporative Emission Control System Leak Detected (Fuel Tank System)	• Fuel fill cap • Vacuum connection • Fuel tank • Fuel tank pressure sensor • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • EVAP control canister • EVAP purge control solenoid valve	11-213
P1457*4, *5 (90)	Evaporative Emission Control System Leak Detected (EVAP Control Canister System)	• Vacuum connection • EVAP control canister • Fuel tank pressure sensor • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • Fuel tank • EVAP purge control solenoid valve	11-219
P1508 (14)	Idle Air Control Valve Circuit Failure	• IAC valve • IAC valve circuit • ECM/PCM	11-152
P1607 (–)	Engine Control Module/Powertrain Control Module Internal Circuit Failure A	• ECM/PCM	11-147
P1705 P1706 P1753 P1758 P1768 (70)*1 **	Automatic Transaxle	——	Section 14

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.

**: The D4 (D)*5 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

*1: A/T *3: '97 model *5: '99 – 00 models

*2: M/T *4: '98 model

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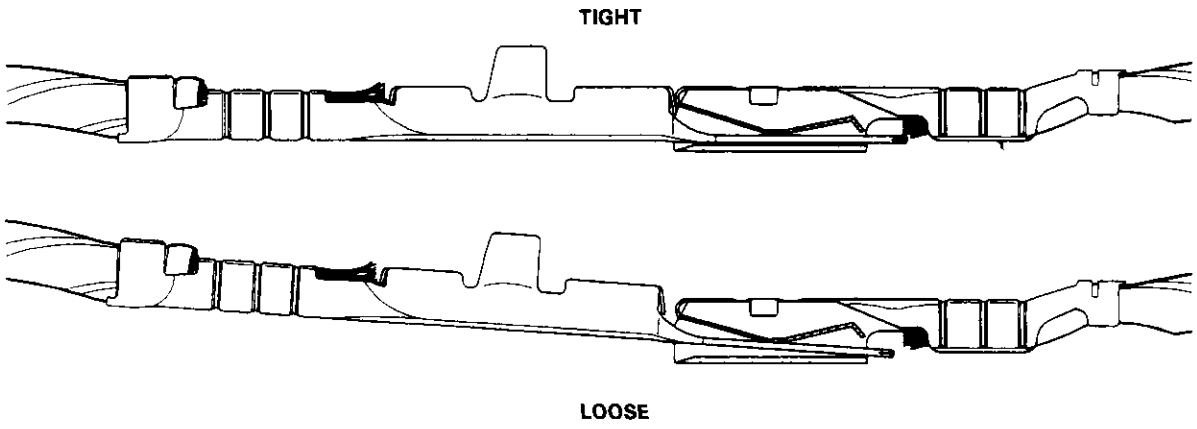
How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: If you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START (bold type)	Describes the conditions or situation to start a troubleshooting flowchart.
ACTION	Asks you to do something; perform a test, set up a condition etc.
DECISION	Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

NOTE:

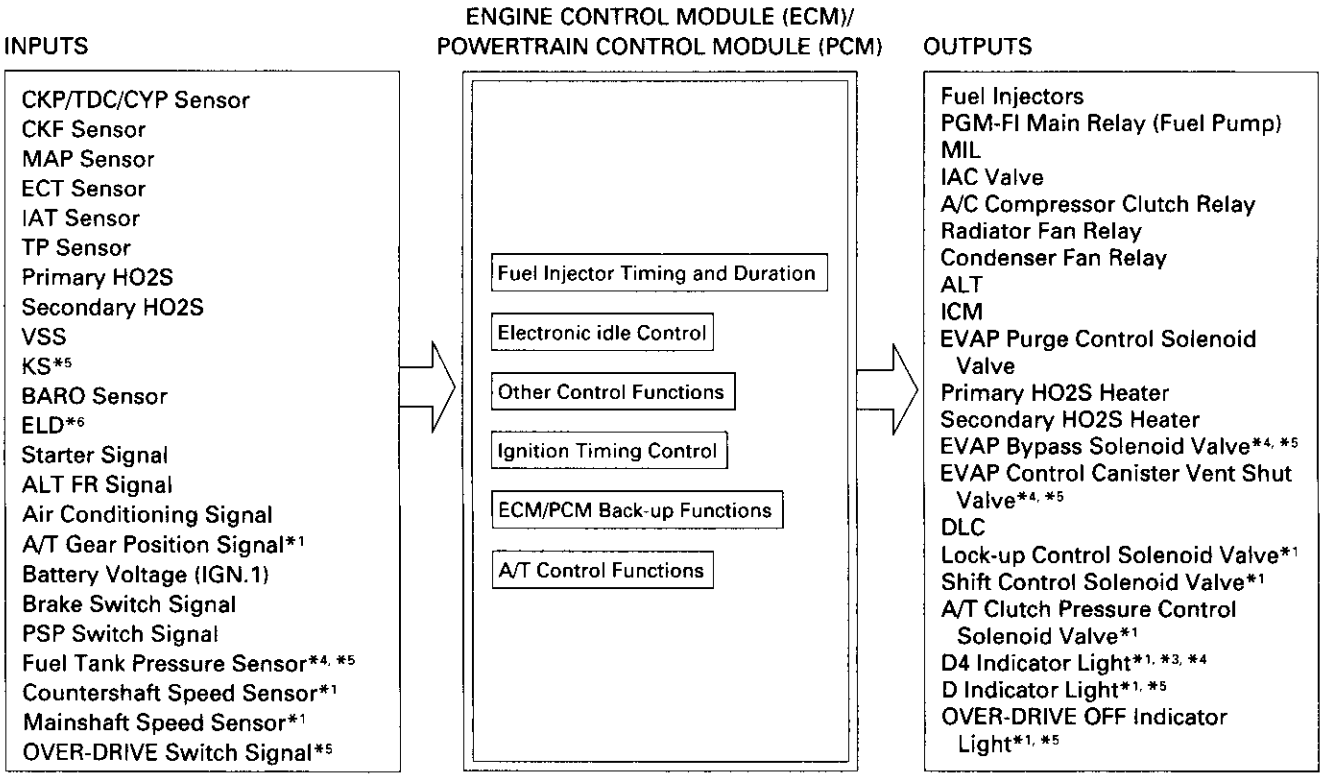
- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK at this time. If the Malfunction Indicator Lamp (MIL) on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting (see illustration below).
- Most of the troubleshooting flowcharts have you reset the Engine Control Module (ECM)/Powertrain Control Module (PCM) and try to duplicate the Diagnostic Trouble Code (DTC). If the problem is intermittent and you can't duplicate the code, do not continue though the flowchart. To do so will only result in confusion and, possibly, a needlessly replaced ECM/PCM.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECM's/PCM's), this can sometimes mean something works, but not the way it's supposed to.



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PGM-FI System

System Description



*1: A/T
*2: M/T
*3: '97 model
*4: '98 model
*5: '99 – 00 models
*6: USA

PGM-FI System

The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel injector Timing and Duration

The ECM/PCM contains memories for the basic discharge durations at various engine speeds and manifold pressure. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the transmission is in gear, the brake pedal is depressed, the P/S load is high, or the alternator is charging, the ECM/PCM controls current to the IAC Valve to maintain the correct idle speed.

Ignition Timing Control

- The ECM/PCM contains memories for basic ignition timing at various engine speeds and manifold air flow rates. Ignition timing is also adjusted for engine coolant temperature.
- A knock control system was adopted which sets the ideal ignition timing for the octane rating of the gasoline used.*5

Other Control Functions

1. Starting Control
   When the engine is started, the ECM/PCM provides a rich mixture by increasing fuel injector duration.
2. Fuel Pump Control
   - When the ignition switch is initially turned on (II), the ECM/PCM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
   - When the engine is running, the ECM/PCM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the ECM/PCM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.

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3. Fuel Cut-off Control
   - During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 970 rpm ('97 – 98 models), 920 rpm ('99 – 00 models).
   - Fuel cut-off action also takes place when engine speed exceeds 6,500 rpm ('97 – 98 models), 6900 rpm ('99 – 00 models), regardless of the position of the throttle valve, to protect the engine from over-revving.
     With A/T model, the PCM cuts the fuel at engine speeds over 5,000 rpm when the vehicle is not moving.*2
4. A/C Compressor Clutch Relay
   When the ECM/PCM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure a smooth transition to the A/C mode.
5. Evaporative Emission (EVAP) Purge Control Solenoid Valve
   When the engine coolant temperature is above 154°F (68°C), the ECM/PCM controls the EVAP purge control solenoid valve which controls vacuum to the EVAP purge control canister.
6. Alternator Control
   The system controls the voltage generated at the alternator in accordance with the electrical load and driving mode, which reduces the engine load to improve the fuel economy.

PCM Fail-safe/Back-up Functions

1. Fail-safe Function
   When an abnormality occurs in a signal from a sensor, the ECM/PCM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.
2. Back-up Function
   When an abnormality occurs in the ECM/PCM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.
3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]
   When an abnormality occurs in a signal from a sensor, the ECM/PCM supplies ground for the MIL and stores the DTC in erasable memory. When the ignition is initially turned on (II), the ECM/PCM supplies ground for the MIL for two seconds to check the MIL bulb condition.
4. Two Trip Detection Method
   To prevent false indications, the Two Trip Detection Method is used for the HO2S*1, fuel metering-related, idle control system, ECT sensor and EVAP control system self-diagnostic functions. When an abnormality occurs, the ECM/PCM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the ECM/PCM informs the driver by lighting the MIL. However, to ease troubleshooting, this function is cancelled when you jump the service check connector. The MIL will then blink immediately when an abnormality occurs.
5. Two (or Three) Driving Cycle Detection Method ('97 model)
   A "Driving Cycle" consists of starting the engine, beginning closed loop operation, and stopping the engine. If misfiring that increases emissions or EVAP control system malfunction is detected during two consecutive driving cycles, or TWC deterioration is detected during three consecutive driving cycles, the ECM/PCM turns the MIL on. However, to ease troubleshooting, this function is cancelled when you jump the service check connector. The MIL will then blink immediately when an abnormality occurs.

*1: '97 – 98 models
*2: '99 – 00 models

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Powertrain Control Module (PCM) — '97 Model

The Malfunction Indicator Lamp (MIL) never comes on (even for two seconds) after ignition is turned on (II), or it's on dimly and flickers.

NOTE: If this symptom is intermittent, check for a loose fuse No. 25 METER (7.5 A) in the under-dash fuse/relay box, a poor connection at PCM terminal A18, or an intermittent open in the GRN/ORN wire between the PCM (A18) and the gauge assembly.

Turn the ignition switch ON (II).

Is the charging system light on?

NO

- **Repair short or open in the wire between No. 25 METER (7.5 A) fuse and gauge assembly.**
- **Replace No. 25 METER (7.5 A) fuse.**

YES

Try to start the engine.

Does the engine start?

NO

Check for an open in the wires (PG1, PG2 lines):
1. Turn the ignition switch ON (II).
2. Measure voltage between body ground and PCM connector terminals A10 and A23 individually.

YES

Check for an open in the wire or bulb (MIL line):
1. Turn the ignition switch OFF.
2. Connect the PCM connector terminal A18 to body ground with a jumper wire.
3. Turn the ignition switch ON (II).

Is there less than 1.0 V?

NO

Repair open in the wire(s) between PCM and G101 (located at the thermostat housing that had more than 1.0 V.

YES

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

Is the MIL on?

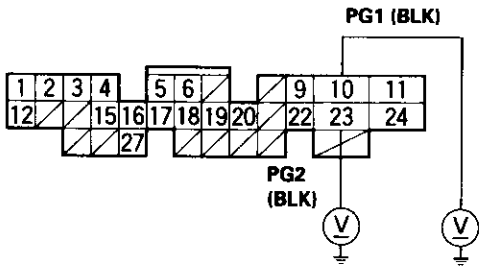
NO

- **Repair open in the wires between PCM (A18) and gauge assembly.**
- **Replace the MIL bulb.**

YES

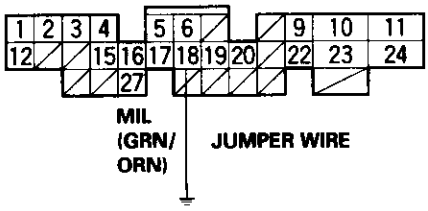
Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PCM CONNECTOR A (32P)



Wire side of female terminals

PCM CONNECTOR A (32P)



Wire side of female terminals

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The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Check the Diagnostic Trouble Code (DTC):
1. Connect an OBD II scan tool or Honda PGM Tester.
2. Turn the ignition switch ON (II).
3. Read the DTC with the scan tool or Honda PGM Tester.

Are any DTC(s) indicated?

YES → **Go to troubleshooting procedures (see page 11-60).**

NO

Check the DTC by MIL indication:
1. Turn the ignition switch OFF.
2. Connect the SCS service connector to the service check connector.
3. Turn the ignition switch ON (II).

Does the MIL indicate any DTC?

YES → **— Repair open or short in wire between the PCM (C8) and Data Link Connector.**
— Go to troubleshooting procedures (see page 11-60).

NO

Try to start the engine.

Does the engine start?

NO → (A)

YES

Check for a short in the wire (SCS line):
1. Turn the ignition switch OFF and turn the ignition switch ON (II).
2. Measure voltage between the PCM connector terminal C7 and body ground.

Is there approx. 5 V?

NO → **Repair short to body ground in the wire between PCM (C7) and service check connector.**

YES

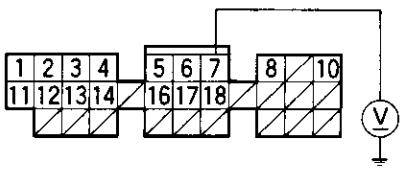
(To page 11-84)

NOTE:
- When there is no Diagnostic Trouble Code (DTC) stored, the MIL will stay on if the SCS service connector is connected and the ignition switch is on.
- If this symptom is intermittent, check for:
  — A loose FI E/M (15 A) fuse in the under-dash fuse/relay box
  — A loose No. 13 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box
  — An intermittent short in the wire between the PCM (C7) and the service check connector
  — An intermittent short in the wire between the PCM (A18) and the gauge assembly
  — An intermittent short in the wire between the PCM (D4) and the MAP sensor
  — An intermittent short in the wire between the PCM (D10) and the TP sensor.
  — PGM-FI main relay.
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

NOTE: An open or short in the wire between the PCM (C8) and the DLC will keep the scan tool or Honda PGM Tester from communicating with the PCM. You should interpret this as no DTCs are indicated.

(To page 11-84)

PCM CONNECTOR C (31P)



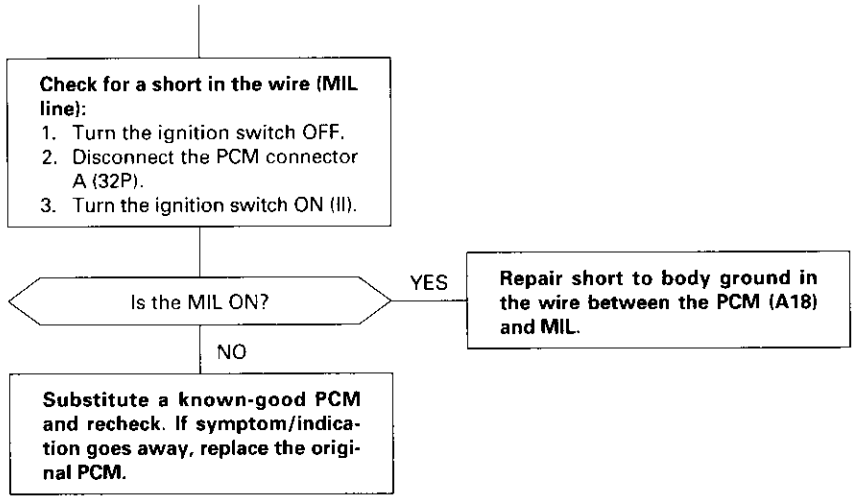
Wire side of female terminals

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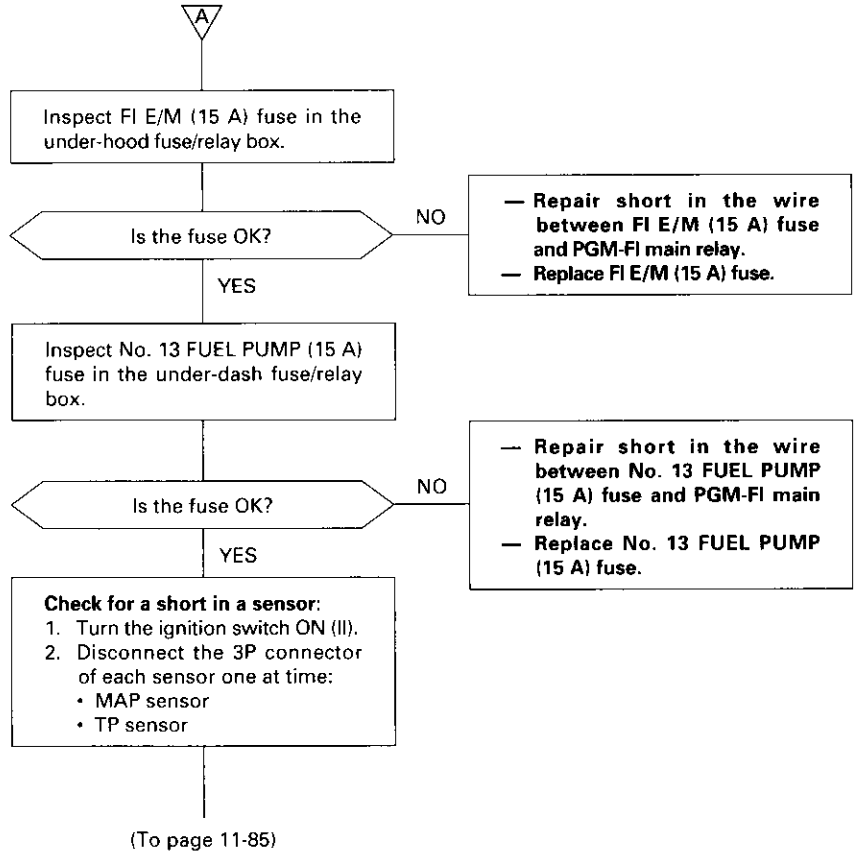
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Powertrain Control Module (PCM) — '97 Model (cont'd)

(From page 11-83)



(From page 11-83)



(To page 11-85)

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(From page 11-84)

Does the MIL go off?

YES → **Replace the sensor that caused the light to go out.**

NO

Check for a short in the wires (VCC lines):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector D (16P).
3. Check for continuity between body ground and PCM connector terminals D4 and D10 individually.

Is there continuity?

YES → **— Repair short to body ground in the wire between the PCM (D4) and the MAP sensor.**
— Repair short to body ground in the wire between the PCM (D10) and the TP sensor.

NO

Check for an open in the wires (IGP lines):
1. Disconnect the fuel injector connectors and IAC valve connector.
2. Turn the ignition switch ON (II).
3. Measure voltage between body ground and PCM connector terminals A11 and A24 individually.

Is there battery voltage?

NO → **— Repair open in the wire(s) between the PCM (A11, A24) and the PGM-FI main relay.**
— Check for poor connections or loose wires at the PGM-FI main relay.
— Test the PGM-FI main relay (see page 11-187).

YES

Check for an open in the wires (LG lines):
1. Turn the ignition switch OFF.
2. Reconnect all sensor connectors.
3. Reconnect the PCM connector D (16P).
4. Turn the ignition switch ON (II).
5. Measure voltage between body ground and PCM connector terminals A9 and A22 individually.

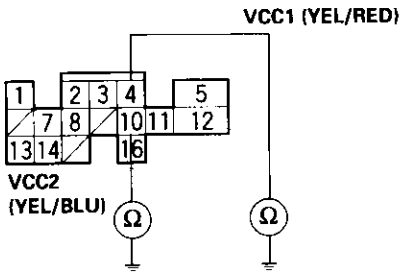
Is there less than 1.0 V?

NO → **Repair open in the wire(s) between the PCM (A9, A22) and G101 (located at the thermostat housing) that had more than 1.0 V.**

YES

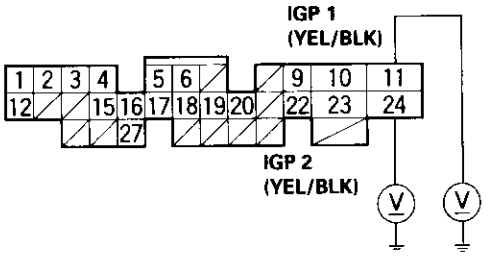
Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PCM CONNECTOR D (16P)

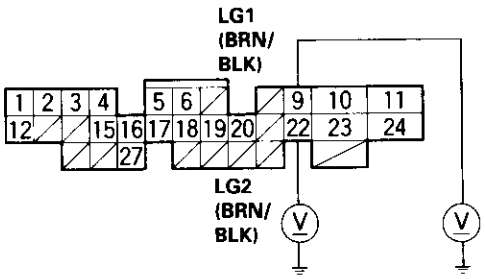


Wire side of female terminals

PCM CONNECTOR A (32P)



Wire side of female terminals



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Engine Control Module/Powertrain Control Module (ECM/PCM) — '98 – 00 Models

The Malfunction Indicator Lamp (MIL) never comes on (even for two seconds) after the ignition is turned ON (II).

Turn the ignition switch ON (II).

NOTE:
- If this symptom is intermittent, check for:
  - — A loose FI E/M (15 A) fuse in the under-hood fuse/relay box
  - — A loose No. 25 METER (7.5 A) fuse in the under-dash fuse/relay box
  - — A loose No. 13 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box
  - — An intermittent short in the wire between the ECM/PCM (A18) and the gauge assembly
  - — An intermittent short in the wire between the ECM/PCM (C19) and the MAP sensor
  - — An intermittent short in the wire between the ECM/PCM (C28), the TP sensor, the EGR valve lift sensor and/or fuel tank pressure sensor
  - — A faulty PGM-FI main relay

Is the low oil pressure light on?

NO

— Repair short or open in the wire between the No. 25 METER (7.5 A) fuse and the gauge assembly.
— Replace the No. 25 METER (7.5 A) fuse.

YES

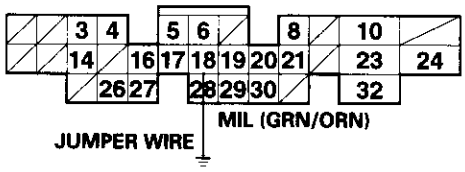
Try to start the engine.

Does the engine start?

YES

Check for an open in the wire or bulb (MIL line):
1. Turn the ignition switch OFF.
2. Connect the ECM/PCM connector terminal A18 to body ground with a jumper wire.
3. Turn the ignition switch ON (II).

ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

Is the MIL on?

NO

— Repair open in the wires between the ECM/PCM (A18) and the gauge assembly.
— Replace the MIL bulb.

YES

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

NO

1. Turn the ignition switch OFF.
2. Inspect the FI E/M (15 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO

— Repair short in the wire between the FI E/M (15 A) fuse and the PGM-FI main relay.
— Replace the FI E/M (15 A) fuse.

YES

Inspect the No. 13 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO

— Repair short in the wire between the No. 13 FUEL PUMP (15 A) fuse and the PGM-FI main relay.
— Replace the No. 13 FUEL PUMP (15 A) fuse.

YES

(To page 11-87)

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(From page 11-86)

Check for an open in the wires (IGP lines):
1. Disconnect the fuel injector and IAC valve connectors.
2. Turn the ignition switch ON (II).
3. Measure voltage between body ground and ECM/PCM connector terminals B1 and B9 individually.

Is there battery voltage?

NO

- **Repair open in the wire(s) between the ECM/PCM (B1, B9) and the PGM-FI main relay.**
- **Check for poor connections or loose wires at the PGM-FI main relay.**
- **Test the PGM-FI main relay (see page 11-187).**

YES

Check for an open in the wires (PG, LG lines):
1. Reconnect the fuel injector and IAC valve connectors.
2. Measure voltage between body ground and ECM/PCM connector terminals B2, B10, B20 and B22 individually.

Is there less than 1.0 V?

NO

Repair open in the wire(s) between the ECM/PCM and G101 (located at the thermostat housing) that had more than 1.0 V.

YES

Check for a short in the wires (VCC1, VCC2 lines):
Measure voltage between body ground and ECM/PCM connector terminals C19 and C28 individually.

Is there approx. 5 V?

NO

Check for a short in a sensor:
While measuring voltage between body ground and ECM/PCM connector terminals C19 and C28 individually, disconnect the 3P connector of each sensor one at time:
- MAP sensor
- TP sensor
- Fuel tank pressure sensor

Is there approx. 5 V?

NO

Repair short in the wire between the MAP sensor, TP sensor, Fuel tank pressure sensor and the ECM/PCM (C19, C28).

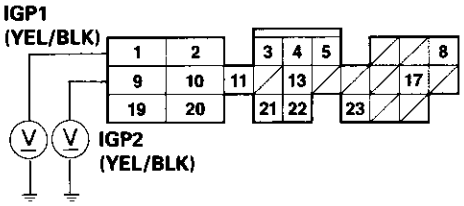
YES

Replace the sensor that had approx. 5 V.

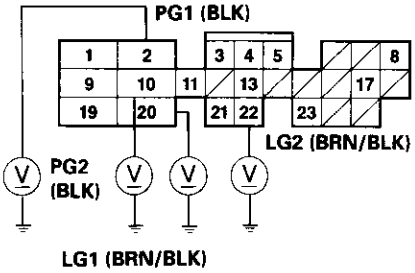
YES

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

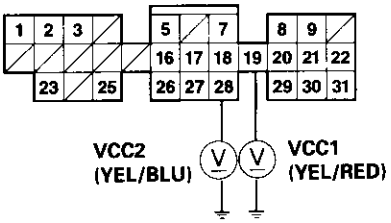
ECM/PCM CONNECTOR B (25P)



Wire side of female terminals



ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

(cont'd)

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Engine Control Module/Powertrain Control Module (ECM/PCM) — '98 – 00 Models (cont'd)

The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Check the Diagnostic Trouble Code (DTC):
1. Connect a scan tool or Honda PGM Tester.
2. Turn the ignition switch ON (II).
3. Read the DTC with the scan tool or Honda PGM Tester.

Are any DTC(s) indicated?

YES → **Go to troubleshooting procedures. (see page 11-60)**

NO

Check the DTC by MIL indication:
1. Turn the ignition switch OFF.
2. Connect the SCS service connector to the service check connector.
3. Turn the ignition switch ON (II).

Does the MIL indicate any DTC?

YES → **— Repair open or short in wire between the ECM/PCM (A21) and Data Link Connector.**
— Go to troubleshooting procedures. (see page 11-60)

NO

Try to start the engine.

Does the engine start?

NO → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

YES

Check for a short in the wire (SCS line):
1. Turn the ignition switch OFF and turn the ignition switch ON (II).
2. Measure voltage between body ground and the ECM/PCM connector terminal A10.

Is there battery voltage?

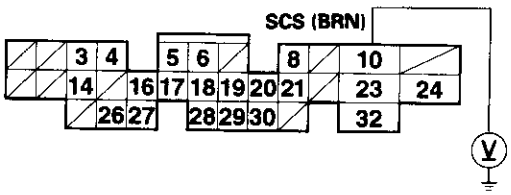
NO → **Repair short to body ground in the wire between the ECM/PCM (A10) and service check connector.**

YES

(To page 11-89)

NOTE:
- When there is no Diagnostic Trouble Code (DTC) stored, the MIL will stay on if the SCS service connector is connected and the ignition switch is ON (II).
- If this symptom is intermittent, check for:
  — An intermittent short in the wire between the ECM/PCM (A10) and the service check connector
  — An intermittent short in the wire between the ECM/PCM (A18) and the gauge assembly
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

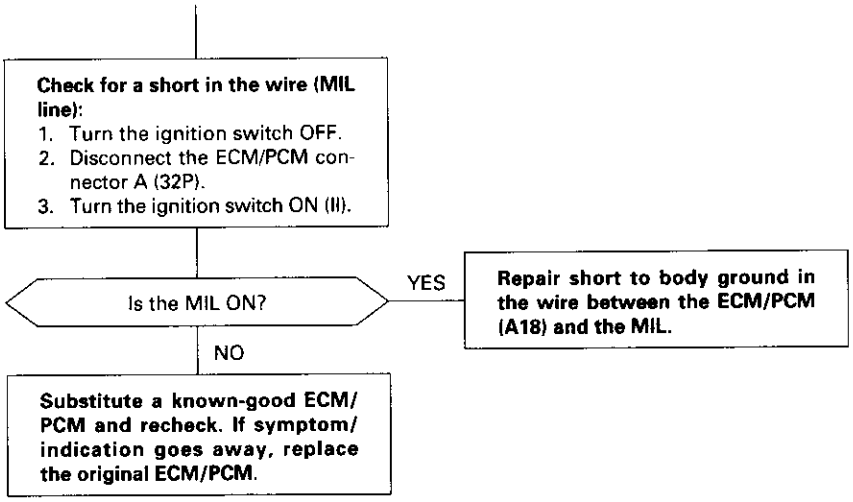
ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

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(From page 11-88)

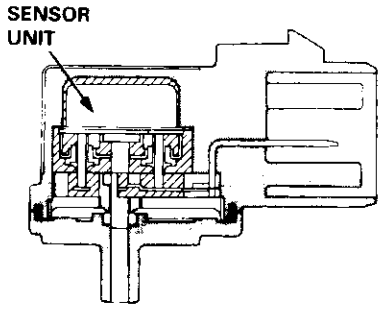


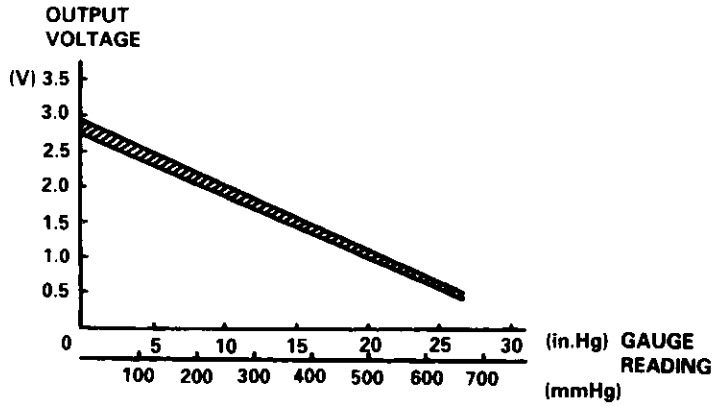
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Manifold Absolute Pressure (MAP) Sensor

P0107 The scan tool indicates Diagnostic Trouble Code (DTC) P0107: A low input (high vacuum) problem in the Manifold Absolute Pressure (MAP) sensor.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECM/PCM.





— The MIL has been reported on.
— DTC P0107 is stored.

Problem verification:
1. Turn the ignition switch ON (II).
2. Check the MAP with the scan tool.

Is approx. 101 kPa (760 mmHg, 30 in.Hg), 2.9 V indicated?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C131 (MAP sensor) and at the ECM/PCM.**

NO

Check for an open in wire (VCC1 line):
1. Turn the ignition switch OFF.
2. Disconnect the MAP sensor connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the MAP sensor connector No. 1 terminal and No. 2 terminal.

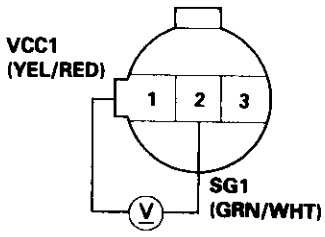
Is there approx. 5 V?

NO → **Repair open in the wire between the ECM/PCM (D4, C19*) and the MAP sensor.**

YES

(To page 11-91)

MAP SENSOR 3P CONNECTOR (C131)



Wire side of female terminals

www.emanualpro.com

(From page 11-90)

Check for an open or short in the MAP sensor:
Check the MAP with the scan tool.

Is approx. 2 kPa (15 mmHg, 0.6 in.Hg), 0.1 V or less indicated?

NO → **Replace the MAP sensor.**

YES

Check for a short in the wire (MAP line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector D (16P), (C (31P))*.
3. Check for continuity between the MAP sensor connector No. 3 terminal and body ground.

Is there continuity?

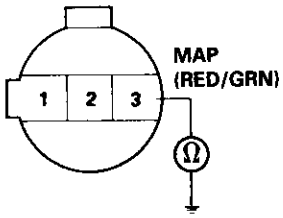
YES → **Repair short in the wire between the ECM/PCM (D3, C17*) and the MAP sensor.**

NO

Substitute a known-good ECM/PCM and recheck. If normal MAP is indicated, replace the original ECM/PCM.

*: '98 – 00 models

MAP SENSOR 3P CONNECTOR (C131)



Wire side of female terminals

(cont'd)

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Manifold Absolute Pressure (MAP) Sensor (cont'd)

P0108 The scan tool indicates Diagnostic Trouble Code (DTC) P0108: A high voltage (low vacuum) problem in the Manifold Absolute Pressure (MAP) sensor.

— The MIL has been reported on.
— DTC P0108 is stored.

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Check the MAP with the scan tool.

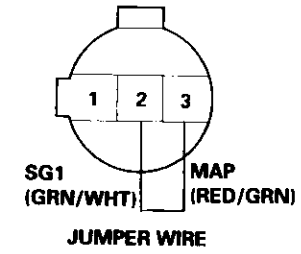
Is 101 kPa (760 mmHg, 30 in.Hg), 2.9 V or higher indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C131 (MAP sensor) and the ECM/PCM.**

YES

Check for an open in the MAP sensor:
1. Turn the ignition switch OFF.
2. Disconnect the MAP sensor 3P connector.
3. Install a jumper wire between the MAP sensor 3P connector terminals No. 3 and No. 2.
4. Turn the ignition switch ON (II).
5. Check the MAP with the scan tool.

MAP SENSOR 3P CONNECTOR (C131)



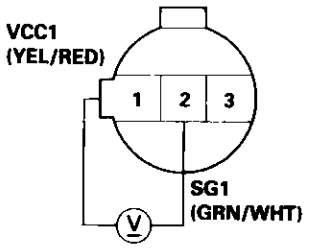
Wire side of female terminals

Is 101 kPa (760 mmHg, 30 in.Hg), 2.9 V or higher indicated?

NO → **Replace the MAP sensor.**

YES

Check for an open in wire (SG1 line):
1. Remove the jumper wire.
2. Measure voltage between the MAP sensor 3P connector terminals No. 1 and No. 2.



Is there approx. 5 V?

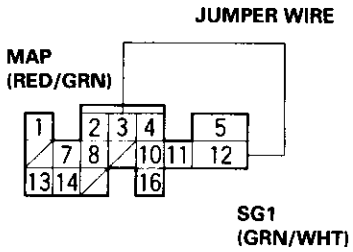
NO → **Repair open in the wire between the ECM/PCM (D12, C7*) and the MAP sensor.**

YES

('97 model)

Check for an open in the wire (MAP line):
1. Turn the ignition switch OFF.
2. Install a jumper wire on the PCM connectors between D3 and D12.
3. Turn the ignition switch ON (II).
4. Check the MAP with the scan tool.

PCM CONNECTOR D (16P)



Wire side of female terminals

Is 101 kPa (760 mmHg, 30 in.Hg), 2.9 V or higher indicated?

NO → **Repair open in the wire between the PCM (D3) and the MAP sensor.**

YES

(To page 11-93)

*: '98 – 00 models

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(From page 11-92)

('98 – 00 models)

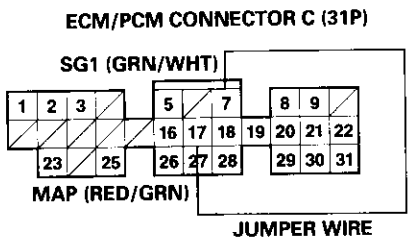
Check for an open in the wire (MAP line):
1. Turn the ignition switch OFF.
2. Install a jumper wire on the ECM/PCM connectors between C7 and C17.
3. Turn the ignition switch ON (II).
4. Check the MAP with the scan tool.

Is 101 kPa (760 mmHg, 30 in.Hg), 2.9 V or higher indicated?

NO → **Repair open in the wires between the ECM/PCM (C17) and the MAP sensor.**

YES

Substitute a known-good ECM/PCM and recheck. If normal MAP is indicated, replace the original ECM/PCM.



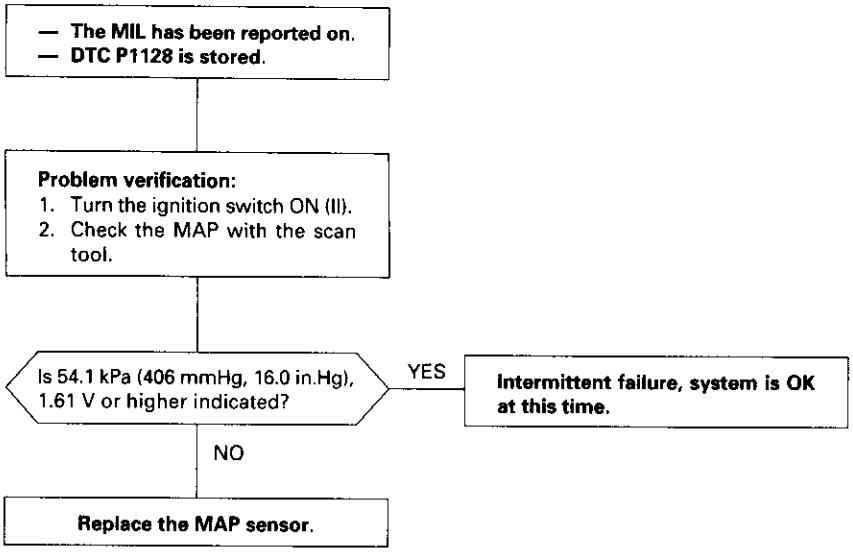
Wire side of female terminals

(cont'd)

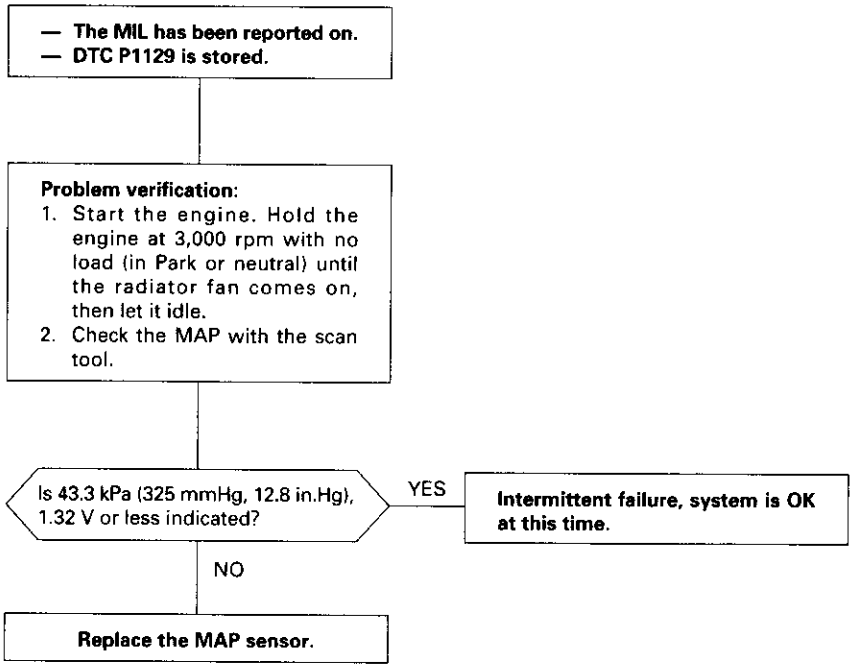
.emanualpro.com

Manifold Absolute Pressure (MAP) Sensor (cont'd)

P1128 The scan tool indicates Diagnostic Trouble Code (DTC) P1128: Manifold Absolute Pressure (MAP) lower than expected.



P1129 The scan tool indicates Diagnostic Trouble Code (DTC) P1129: Manifold Absolute Pressure (MAP) higher than expected.



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Intake Air Temperature (IAT) Sensor

P0111 ('97 model) The scan tool indicates Diagnostic Trouble Code (DTC) P0111: A range/performance problem in the Intake Air Temperature (IAT) Sensor circuit.

The IAT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.

— The MIL has been reported on.
— DTC P0111 is stored.
— Or from Probable Cause List.

Problem verification:
1. Turn the ignition switch OFF.
2. Disconnect the IAT sensor 2P connector.
3. Remove the IAT sensor.
4. Reconnect the IAT sensor 2P connector.
5. Leave the IAT sensor exposed to ambient temperature.
6. Turn the ignition switch ON (II).
7. Check the IAT with the scan tool.

Is ambient temperature indicated? — NO → **Replace the IAT sensor.**

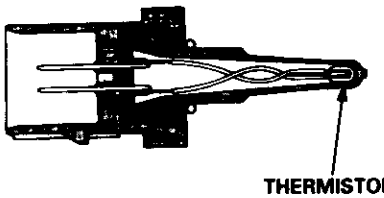
YES

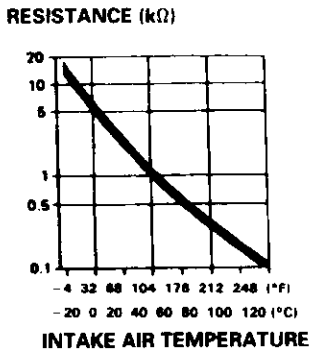
Check the IAT sensor output:
1. Warm the IAT sensor with a hair dryer.
2. Check the IAT with the scan tool.

Did the IAT rise 2.0°F (1.0°C) or more from the ambient temperature? — YES → **Intermittent failure, system is OK at this time.**

NO

Replace the IAT sensor.





(cont'd)

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Intake Air Temperature (IAT) Sensor (cont'd)

P0112 The scan tool indicates Diagnostic Trouble Code (DTC) P0112: A low voltage (high temperature) problem in the Intake Air Temperature (IAT) sensor circuit.

The IAT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.

— The MIL has been reported on.
— DTC P0112 is stored.
— Or from Probable Cause List.

Problem verification:
1. Turn the ignition switch ON (II).
2. Check the IAT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO → Is the correct ambient temperature indicated*1?

NO → **Replace the IAT sensor.**

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C133 (IAT sensor) and at the ECM/PCM.**

YES →

Check for a short in the IAT sensor:
1. Disconnect the IAT sensor 2P connector.
2. Check the IAT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO → **Replace the IAT sensor.**

YES →

Check for a short in the wire (IAT line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector (D (16P), C (31P)*).
3. Check for continuity between the IAT sensor 2P connector terminal No. 2 and body ground.

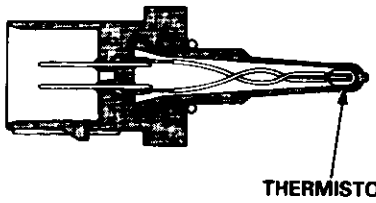
Is there continuity?

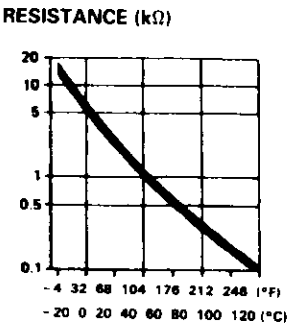
YES → **Repair short in the wire between the ECM/PCM (D8, C25*) and the IAT sensor.**

NO →

Substitute a known-good ECM/PCM and recheck. If normal IAT is indicated, replace the original ECM/PCM.

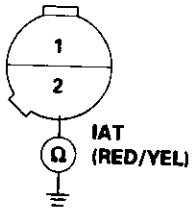
*: '98 – 00 models





*1: If the engine is warm, it will be higher than ambient temperature.

IAT SENSOR 2P CONNECTOR (C133)



Wire side of female terminals

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P0113 The scan tool indicates Diagnostic Trouble Code (DTC) P0113: A high voltage (low temperature) problem in the Intake Air Temperature (IAT) sensor circuit.

— The MIL has been reported on.
— DTC P0113 is stored.

Problem verification:
1. Turn the ignition switch ON (II).
2. Check the IAT with the scan tool.

Is −4°F (−20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C133 (IAT sensor) and at the ECM/PCM.**

YES

Check for an open in the IAT sensor:
1. Disconnect the IAT sensor 2P connector.
2. Connect the IAT sensor 2P connector terminals No. 1 and No. 2 with a jumper wire.
3. Check the intake air temperature with the scan tool.

Is −4°F (−20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Replace the IAT sensor.**

YES

('97 model)

Check for an open in the wires (IAT, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect PCM connector terminals D8 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the IAT with the scan tool.

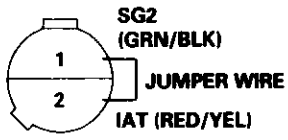
Is −4°F (−20°C) or less (or L-limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Repair open in the wires between the PCM (D8, D11) and the IAT sensor.**

YES

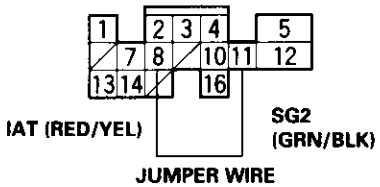
(To page 11-98)

IAT SENSOR 2P CONNECTOR (C133)



Wire side of female terminals

PCM CONNECTOR D (16P)



Wire side of female terminals

(cont'd)

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Intake Air Temperature (IAT) Sensor (cont'd)

(From page 11-97)

('98 – 00 models)

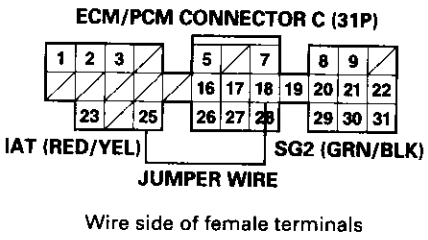
Check for an open in the wires (IAT, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect ECM/PCM connector terminals C18 and C25 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the IAT with the scan tool.

Is –4°F (–20°C) or less (or L-limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Repair open in the wires between the ECM/PCM (C18, C25) and the IAT sensor.**

YES

Substitute a known-good ECM/PCM and recheck. If normal IAT is indicated, replace the original ECM/PCM.

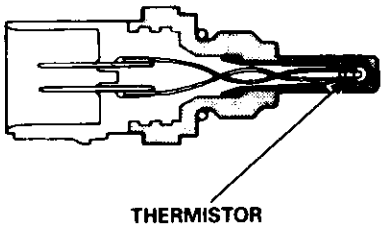


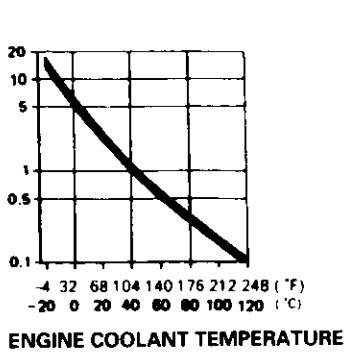
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Engine Coolant Temperature (ECT) Sensor

P0116 The scan tool indicates Diagnostic Trouble Code (DTC) P0116: A range/performance problem in the Engine Coolant Temperature (ECT) Sensor circuit.

The ECT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the engine coolant temperature increases as shown below.





NOTE: If DTC P0117 and/or P0118 are stored at the same time as DTC P0116, troubleshoot those DTCs first, then troubleshoot DTC P0116.

Possible Cause

- ECT sensor deterioration
- Malfunction in the thermostat and cooling system

Troubleshooting Flowchart

— The MIL has been reported on.
— DTC P0116 is stored.

↓

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. With the scan tool, check the ECT.

↓

Is 176 – 200°F (80 – 93°C) or 0.4 – 0.7 V indicated?

YES → **Intermittent failure, system is OK at this time. Check the thermostat and the cooling system.**

NO ↓

Check the thermostat and the cooling system. If they are OK, replace the ECT sensor.

(cont'd)

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Engine Coolant Temperature (ECT) Sensor (cont'd)

P0117 The scan tool indicates Diagnostic Trouble Code (DTC) P0117: A low voltage (high temperature) problem in the Engine Coolant Temperature (ECT) sensor circuit.

— The MIL has been reported on.
— DTC P0117 is stored.

Problem verification:
1. Turn the ignition switch ON (II).
2. Check the ECT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C114 (ECT sensor) and at the ECM/PCM.**

YES

Check for a short in the ECT sensor:
1. Disconnect the ECT sensor 2P connector.
2. Check the ECT with the scan tool.

Is 302°F (150°C) or higher (or H-Limit in Honda mode of PGM Tester) or 0 V indicated?

NO → **Replace the ECT sensor.**

YES

Check for a short in the wire (ECT line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector D (16P), (C (31P)*).
3. Check for continuity between the ECT sensor 2P connector terminal No. 1 and body ground.

Is there continuity?

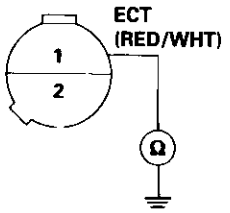
YES → **Repair short in the wire between the ECM/PCM (D2, C26*) and the ECT sensor.**

NO

Substitute a known-good ECM/PCM and recheck. If normal ECT is indicated, replace the original ECM/PCM.

*: '98 – 00 models

ECT SENSOR 2P CONNECTOR (C114)



Wire side of female terminals

www.emanualpro.com

P0118 The scan tool indicates Diagnostic Trouble Code (DTC) P0118: A high voltage (low temperature) problem in the Engine Coolant Temperature (ECT) sensor circuit.

— The MIL has been reported on.
— DTC P0118 is stored.

Problem verification:
1. Turn the ignition switch ON (II).
2. Check the ECT with the scan tool.

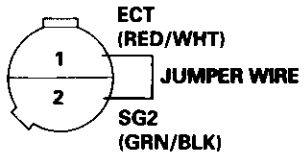
Is –4°F (–20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C114 (ECT sensor) and at the ECM/PCM.**

YES

Check for an open in the ECT sensor:
1. Disconnect the ECT sensor 2P connector.
2. Connect the ECT sensor 2P connector terminals No. 1 and No. 2 with a jumper wire.
3. Check the ECT with the scan tool.

ECT SENSOR 2P CONNECTOR (C114)



Wire side of female terminals

Is –4°F (–20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

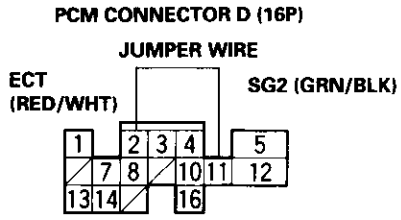
NO → **Replace the ECT sensor.**

YES

('97 model)

Check for an open in the wires (ECT, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect PCM connector terminals D2 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the ECT with the scan tool.

PCM CONNECTOR D (16P)



Wire side of female terminals

Is –4°F (–20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Repair open in the wires between the PCM (D2, D11) and the ECT sensor.**

YES

(To page 11-102)

(cont'd)

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Engine Coolant Temperature (ECT) Sensor (cont'd)

(From page 11-101)

('98 – 00 models)

Check for an open in the wires (ECT, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect ECM/PCM connector terminals C18 and C26 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the ECT with the scan tool.

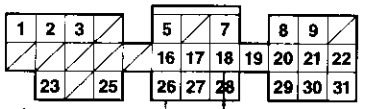
Is –4°F (–20°C) or less (or L-Limit in Honda mode of PGM Tester) or 5 V indicated?

NO → **Repair open in the wires between the ECM/PCM (C18, C26) and the ECT sensor.**

YES

Substitute a known-good ECM/PCM and recheck. If normal ECT is indicated, replace the original ECM/PCM.

ECM/PCM CONNECTOR C (31P)



ECT (RED/WHT) **SG2 (GRN/BLK)**

JUMPER WIRE

Wire side of female terminals

www.emanualpro.com

Throttle Position (TP) Sensor

P0122 The scan tool indicates Diagnostic Trouble Code (DTC) P0122: A low input (voltage) problem in the Throttle Position (TP) sensor circuit.

The TP Sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle position changes, the throttle position sensor varies the voltage signal to the ECM/PCM.

'97 model:

— The MIL has been reported on.
— DTC P0122 is stored.

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then turn the ignition switch OFF.
2. Turn the ignition switch ON (II).
3. Check the throttle position with the scan tool.

Is there approx. 10% when the throttle is fully closed and approx. 90% when the throttle is fully opened?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C130 (TP sensor) and at the PCM.**

NO

Check for an open in the wire (VCC2 line):
1. Turn the ignition switch OFF.
2. Disconnect the TP sensor 3P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the TP sensor 3P connector terminals No. 1 and No. 3.

Is there approx. 5 V?

NO → **Check for an open in wire (VCC2 line):**
Measure voltage between PCM connector terminals D10 and D11.

YES

Check for an open or short in TP sensor:
1. Turn the ignition switch OFF.
2. At the sensor side, measure resistance between the TP sensor 3P connector terminals No. 1 and No. 2 with the throttle fully closed.

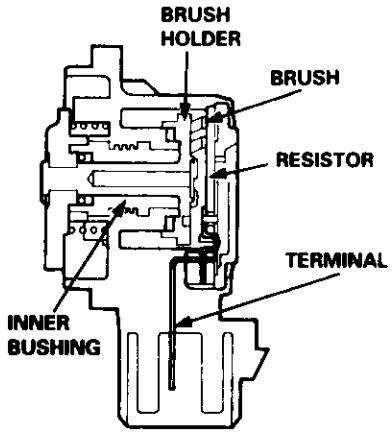
(To page 11-104)

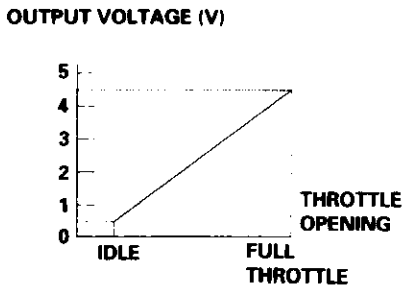
Is there approx. 5 V?

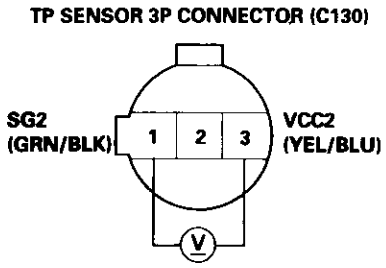
YES → **Repair open in the wire between PCM (D10) and TP sensor.**

NO

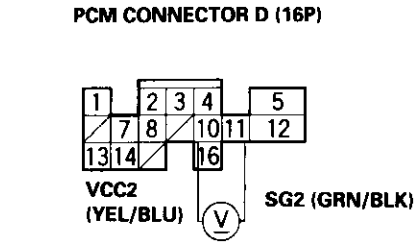
Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.



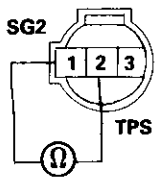




Wire side of female terminals



Wire side of female terminals



Terminal side of male terminals

(cont'd)

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Throttle Position (TP) Sensor (cont'd)

(From page 11-103)

Is there approx. 0.5 – 0.9 kΩ?

NO → **Replace the throttle body.**

YES

Check for an open or short in the TP sensor:
Measure resistance between the TP sensor 3P connector terminals No. 2 and No. 3 with the throttle fully closed.

Is there approx. 4.5 kΩ?

NO → **Replace the throttle body.**

YES

Check for an open in the PCM (TPS line):
1. Reconnect the TP sensor 3P connector.
2. Turn the ignition switch ON (II).
3. Measure voltage between PCM connector D (16P) terminals D1 and D11.

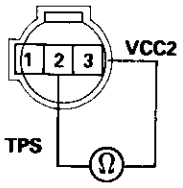
Is there approx. 0.5 V when the throttle is fully closed and approx. 4.5 V when the throttle is fully opened?

YES → **Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.**

NO

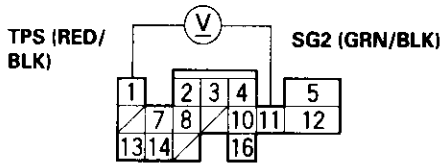
Repair short in the wire between the PCM (D1) and the TP sensor.

TP SENSOR 3P CONNECTOR



Terminal side of male terminals

PCM CONNECTOR D (16P)



Wire side of female terminals

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'98 – 00 models:

— The MIL has been reported on.
— DTC P0122 is stored.

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then turn the ignition switch OFF.
2. Turn the ignition switch ON (II).
3. Check the throttle position with the scan tool.

Is there approx. 10% when the throttle is fully closed and approx. 90% when the throttle is fully opened?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C130 (TP sensor) and at the ECM/PCM.**

NO

Check for an open or short in the wire (VCC2 line):
1. Turn the ignition switch OFF.
2. Disconnect the TP sensor 3P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the TP sensor 3P connector terminals No. 1 and No. 3.

Is there approx. 5 V?

NO → **Check for an open in wire (VCC2 line):**
Measure voltage between ECM/PCM connector terminals C18 and C28.

Is there approx. 5 V?

YES → **Repair open in the wire between the ECM/PCM (C28) and the TP sensor.**

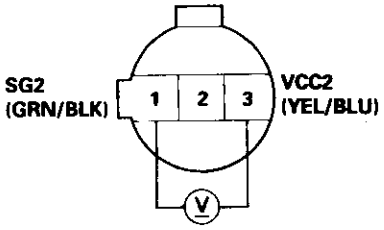
NO → **Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.**

YES

Check for an open or short in TP sensor:
1. Turn the ignition switch OFF.
2. At the sensor side, measure resistance between the TP sensor 3P connector terminals No. 1 and No. 2 with the throttle fully closed.

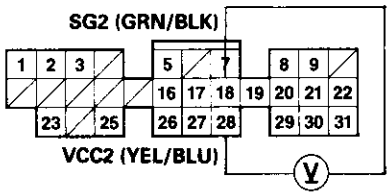
(To page 11-106)

TP SENSOR 3P CONNECTOR (C130)

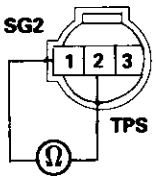


Wire side of female terminals

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals



Terminal side of male terminals

(cont'd)

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Throttle Position (TP) Sensor (cont'd)

(From page 11-105)

Is there approx. 0.5 – 0.9 kΩ?

NO → **Replace the throttle body.**

YES

Check for an open or short in the TP sensor:
Measure resistance between the TP sensor 3P connector terminals No. 2 and No. 3 with the throttle fully closed.

Is there approx. 4.5 kΩ?

NO → **Replace the throttle body.**

YES

Check for an open in the ECM/PCM (TPS line):
1. Reconnect the TP sensor connector.
2. Turn the ignition switch ON (II).
3. Measure voltage between ECM/PCM connector C (31P) terminals C18 and C27.

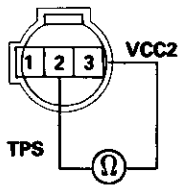
Is there approx. 0.5 V when the throttle is fully closed and approx. 4.5 V when the throttle is fully opened?

YES → **Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.**

NO

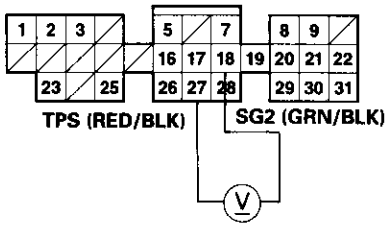
Repair short in the wire between the ECM/PCM (C18) and the TP sensor.

TP SENSOR 3P CONNECTOR



Terminal side of male terminals

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

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P0123 The scan tool indicates Diagnostic Trouble Code (DTC) P0123: A high voltage problem in the Throttle Position (TP) sensor circuit.

— The MIL has been reported on.
— DTC P0123 is stored.

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on. then turn the ignition switch OFF.
2. Turn the ignition switch ON (II).
3. Check the throttle position with the scan tool.

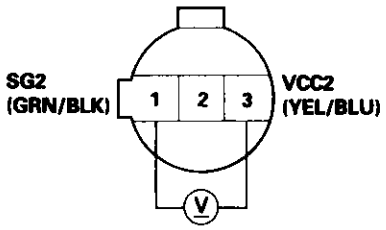
Is there approx. 10% when the throttle is fully closed and approx. 90% when the throttle is fully opened?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C130 (TP sensor) and at the ECM/PCM.**

NO

Check for an open in the TP sensor:
1. Turn the ignition switch OFF.
2. Disconnect the TP sensor 3P connector.
3. Turn the ignition switch ON (II).
4. At the wire harness side, measure voltage between the TP sensor 3P connector terminals No. 1 and No. 3.

TP SENSOR 3P CONNECTOR (C130)



Wire side of female terminals

Is there approx. 5 V?

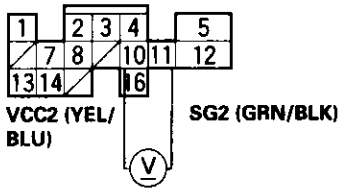
YES → **Replace the throttle body.**

NO

('97 model)

Check for an open in the wire (SG2 line):
Measure voltage between PCM connector terminals D10 and D11.

PCM CONNECTOR D (16P)



Wire side of female terminals

Is there approx. 5 V?

YES → **Repair open in the wire between the PCM (D11) and the TP sensor.**

NO

(To page 11-108)

(cont'd)

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Throttle Position (TP) Sensor (cont'd)

(From page 11-107)

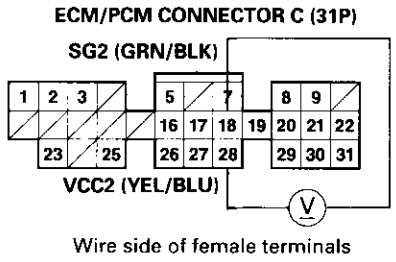
('98 – 00 models)

Check for an open in the wire (SG2 line):
Measure voltage between ECM/PCM connector C (31P) terminals C18 and C28.

Is there approx. 5 V?

YES → **Repair open in the wire between the ECM/PCM (C18) and the TP sensor.**

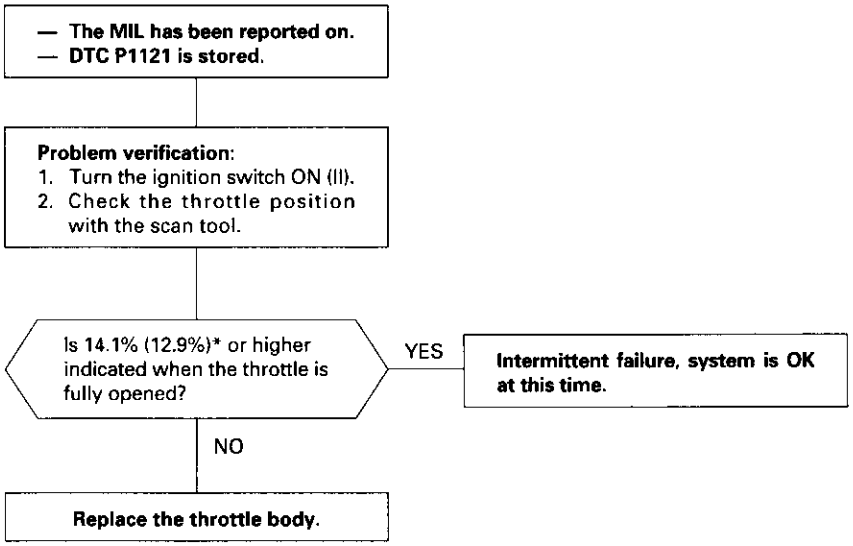
NO → **Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.**



Wire side of female terminals

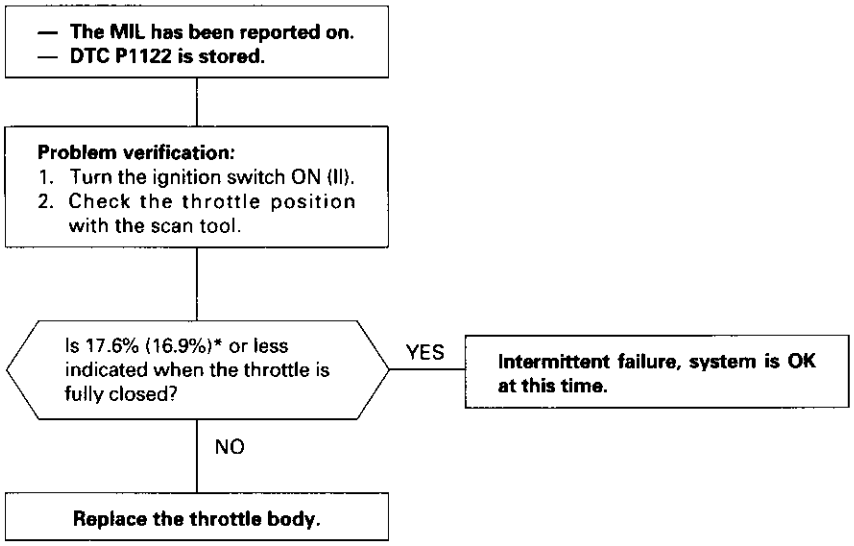
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P1121 The scan tool indicates Diagnostic Trouble Code (DTC) P1121: Throttle Position (TP) lower than expected.



*: '99 – 00 models

P1122 The scan tool indicates Diagnostic Trouble Code (DTC) P1122: Throttle Position (TP) higher than expected.

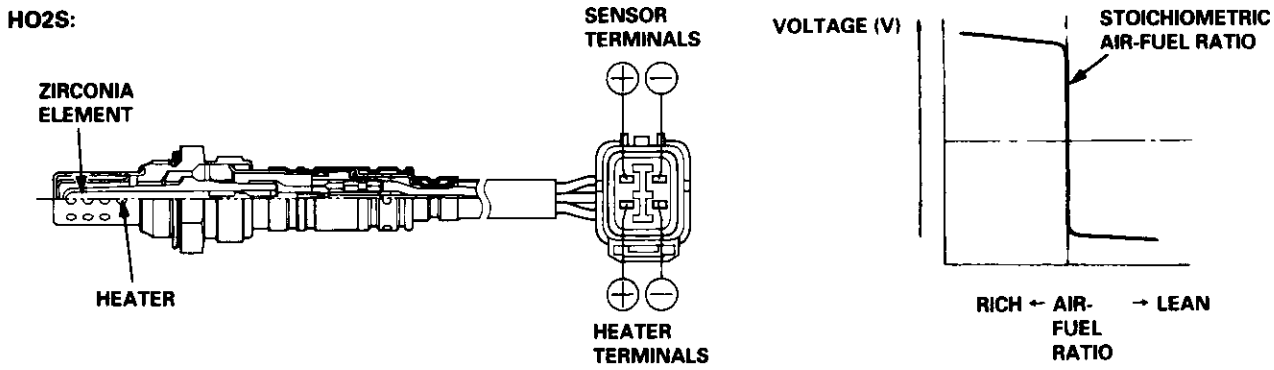


*: '99 – 00 models

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Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1)

The Heated Oxygen Sensors (HO2S) detect the oxygen content in the exhaust gas and signal the ECM/PCM. In operation, the ECM/PCM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The Primary HO2S (Sensor 1) is installed in exhaust pipe A.



P0131 The scan tool indicates Diagnostic Trouble Code (DTC) P0131: A low voltage problem in the Primary Heated Oxygen Sensor (HO2S) (Sensor 1) circuit.

'97 – 98 models:

— The MIL has been reported on.
— DTC P0131 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Test-drive with the A/T in [2] position (M/T in 4th gear)
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during acceleration using wide open throttle.

Does the voltage stay at 0.1 V or less?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C111 (Primary HO2S, Sensor 1) and at the ECM/PCM.**

YES

Check the fuel pressure (see page 11-178).

Is it normal?

NO → **Repair the fuel supply system.**

YES

(To page 11-111)

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(From page 11-110)

Check for a short in the HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) 4P connector.
3. Start the engine and let it idle.
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Does it stay at 0.1 V or less?

NO → **Replace the HO2S (Sensor 1).**

YES

Check for a short in the wire (PHO2S line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector (D (16P), C (31P)*).
3. Check for continuity between the Primary HO2S (Sensor 1) 4P connector terminal No. 1 and body ground.

Is there continuity?

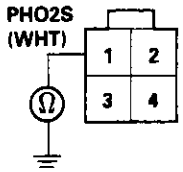
YES → **Repair short in the wire between the ECM/PCM (D7, C16*) and the Primary HO2S (Sensor 1).**

NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

*: '98 model

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111)



Wire side of female terminals

(cont'd)

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Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) (cont'd)

'99 – 00 models:

— The MIL has been reported on.
— DTC P0131 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during acceleration using wide open throttle.

Does the voltage stay at 0.5 V or less?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C111 (Primary HO2S, Sensor 1) and at the ECM/PCM.**

YES

Check the fuel pressure (see page 11-178).

Is it normal?

NO → **Repair the fuel supply system.**

YES

Check for a short in the HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) 4P connector.
3. Start the engine and let it idle.
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Does it stay at 0.5 V or less?

NO → **Replace the HO2S (Sensor 1).**

YES

Check for a short in the wire (PHO2S line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector C (31P).
3. Check for continuity between the Primary HO2S (Sensor 1) 4P connector terminal No. 1 and body ground.

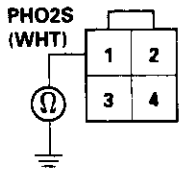
Is there continuity?

YES → **Repair short in the wire between the ECM/PCM (C16) and the Primary HO2S (Sensor 1).**

NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111)



Wire side of female terminals

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P0132 The scan tool indicates Diagnostic Trouble Code (DTC) P0132: A high voltage problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) circuit.

'97 – 98 models:

— The MIL has been reported on.
— DTC P0132 is stored.

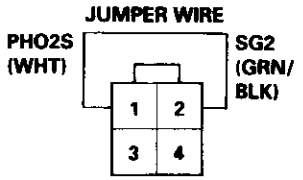
Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Test-drive with the A/T in [2] position (M/T in 4th gear).
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during deceleration using completely closed throttle.

Does the voltage stay at 1.0 V or more?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C111 (Primary HO2S, Sensor 1) and ECM/PCM.**

YES

Check for an open in the Primary HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) connector.
3. Connect the Primary HO2S (Sensor 1) 4P connector terminals No. 1 and No. 2 with a jumper wire.
4. Turn the ignition switch ON (II).
5. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.



Wire side of female terminals

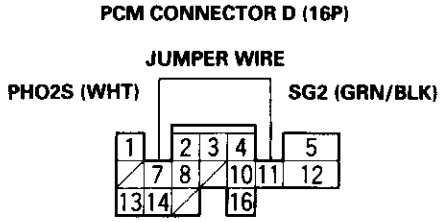
Is there 1.0 V or more?

NO → **Replace the Primary HO2S.**

YES

('97 model)

Check for an open in the wires (PHO2S, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect PCM connector terminals D7 and D11 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.



Wire side of female terminals

Is there 1.0 V or more?

NO → **Repair open in the wire between the PCM (D7 or D11) and the Primary HO2S (Sensor 1).**

YES

(To page 11-114)

(cont'd)

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Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) (cont'd)

(From page 11-113)

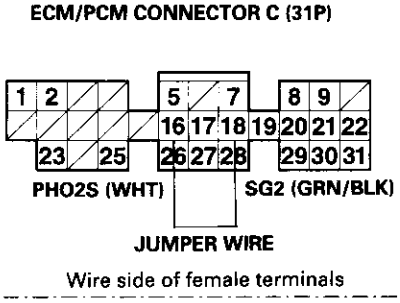
('98 model)

Check for an open in the wire (PHO2S line):
1. Turn the ignition switch OFF.
2. Connect ECM/PCM connector terminals C16 and C18 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Primarly HO2S (Sensor 1) output voltage with the scan tool.

Is there 1.0 V or more?

YES → **Repair open in the wire between the ECM/PCM (C16) and the Primary HO2S (Sensor 1).**

NO → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**



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'99 – 00 models:

— The MIL has been reported on.
— DTC P0132 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Check the Primary HO2S (Sensor 1) output voltage with the scan tool during deceleration using completely closed throttle.

Does the voltage stay at 1.5 V or more?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C111 (Primary HO2S, Sensor 1) and at the ECM/PCM.**

YES

Check for an open in the Primary HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Primary HO2S (Sensor 1) connector.
3. Connect the Primary HO2S (Sensor 1) 4P connector terminals No. 1 and No. 2 with a jumper wire.
4. Turn the ignition switch ON (II).
5. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

Is there 1.5 V or more?

NO → **Replace the Primary HO2S.**

YES

Check for an open in the wire (PHO2S line):
1. Turn the ignition switch OFF.
2. Connect ECM/PCM connector terminals C16 and C18 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Primary HO2S (Sensor 1) output voltage with the scan tool.

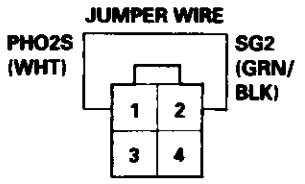
Is there 1.5 V or more?

YES → **Repair open in the wire between the ECM/PCM (C16) and the Primary HO2S (Sensor 1).**

NO

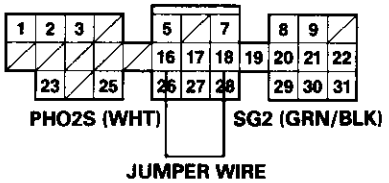
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111)



Wire side of female terminals

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

(cont'd)

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Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) (cont'd)

P0133 The scan tool indicates Diagnostic Trouble Code (DTC) P0133: A slow response problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) circuit.

Description

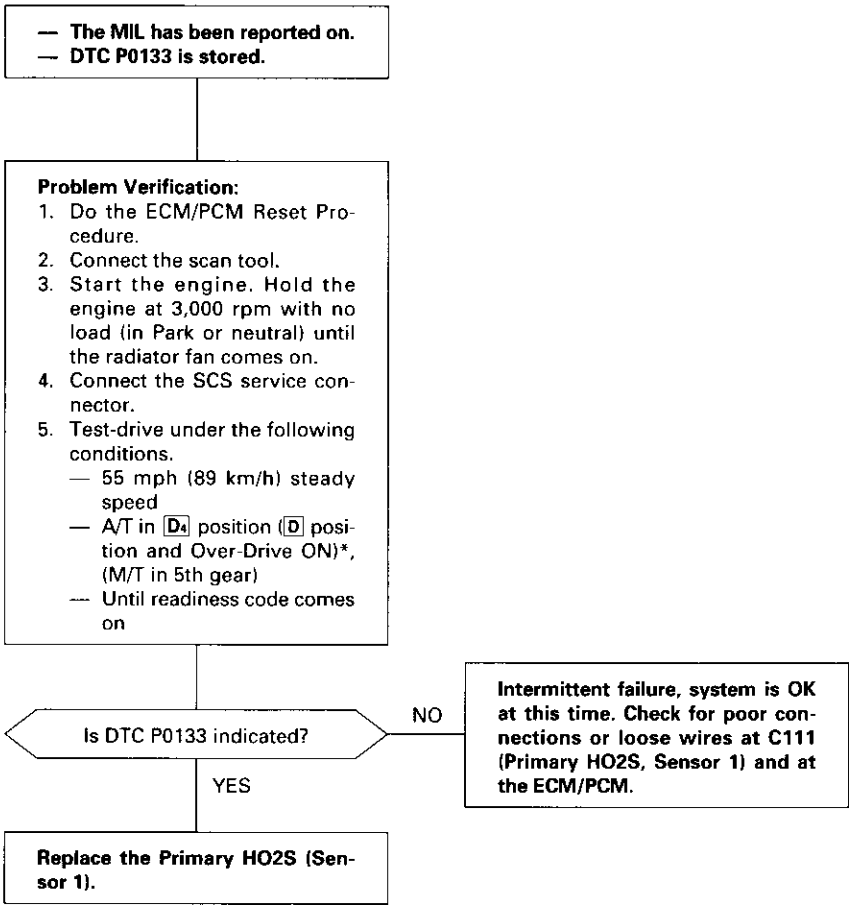
By controlling the air/fuel ratio with a Primary HO2S (Sensor 1) and a Secondary HO2S (Sensor 2), the deterioration of the Primary HO2S (Sensor 1) can be evaluated by its feedback period. When the feedback period of the HO2S exceeds a certain value during stable driving conditions, the sensor will be judged as deteriorated.
When deterioration has been detected during two consecutive trips, the MIL comes on and DTC P0133 will be stored.

NOTE: If DTC P0131, P0132 and/or P0135 are stored at the same time as DTC P0133, troubleshoot those DTCs first, then troubleshoot DTC P0133.

Possible Cause

- Primary HO2S (Sensor 1) Deterioration
- Primary HO2S Heater (Sensor 1) Deterioration
- Exhaust system leakage

Troubleshooting Flowchart



*: '99 – 00 models

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Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2)

P0137 The scan tool indicates Diagnostic Trouble Code (DTC) P0137: A low voltage problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) circuit.

— The MIL has been reported on.
— DTC P0137 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Check the Secondary HO2S (Sensor 2) output voltage at 3,000 rpm with the scan tool.

Does the voltage stay at 0.3 V or less?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C127 (located on ECM/PCM bracket), C721 (Secondary HO2S, Sensor 2) and at the ECM/PCM.**

YES

Check for a short in the Secondary HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Secondary HO2S (Sensor 2) 4P connector.
3. Start the engine.
4. Check the Secondary HO2S (Sensor 2) output with the scan tool.

Does the voltage stay at 0.3 V or less?

NO → **Replace the Secondary HO2S (Sensor 2).**

YES

Check for a short in the wire (SHO2S line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector (D (16P), A (32P)*).
3. Check for continuity between the Secondary HO2S (Sensor 2) 4P connector terminal No. 1 and body ground.

Is there continuity?

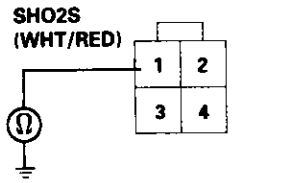
YES → **Repair short in the wire between the ECM/PCM (D14, A23*) and the Secondary HO2S (Sensor 2).**

NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

*: '98 – 00 models

SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C721)



Wire side of female terminals

(cont'd)

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Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) (cont'd)

P0138 The scan tool indicates Diagnostic Trouble Code (DTC) P0138: A high voltage problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) circuit.

— The MIL has been reported on.
— DTC P0138 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
3. Check the Secondary HO2S (Sensor 2) output voltage at 3,000 rpm with the scan tool.

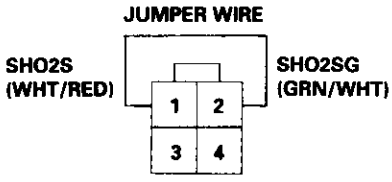
Does the voltage stay at 0.6 V or more?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C127 (located on ECM/PCM bracket), C721 (Secondary HO2S, Sensor 2) and at the ECM/PCM.**

YES

Check for an open in the Secondary HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the Secondary HO2S (Sensor 2) 4P connector.
3. Connect the Secondary HO2S (Sensor 2) 4P connector terminals No. 1 and No. 2 with a jumper wire.
4. Turn the ignition switch ON (II).
5. Check the Secondary HO2S (Sensor 2) output voltage with the scan tool.

SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C721)



Wire side of female terminals

Is there 0.6 V or more?

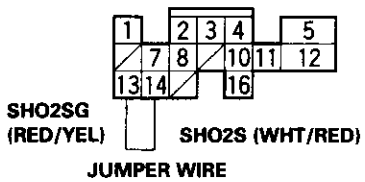
NO → **Replace the Secondary HO2S (Sensor 2).**

YES

('97 model)

Check for an open in the wires (SHO2S, SG2 lines):
1. Turn the ignition switch OFF.
2. Connect PCM connector terminals D14 and D13 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Secondary HO2S (Sensor 2) output voltage with the scan tool.

PCM CONNECTOR D (16P)



Wire side of female terminals

Is there 0.6 V or more?

NO → **Repair open in the wire between the PCM (D14 or D13) and the Secondary HO2S (Sensor 2).**

YES

(To page 11-119)

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(From page 11-118)

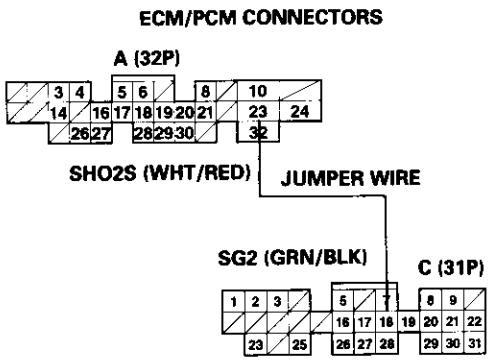
('98 – 00 models)

Check for an open in the wire (SHO2S line):
1. Turn the ignition switch OFF.
2. Connect ECM/PCM connector terminals A23 and C18 with a jumper wire.
3. Turn the ignition switch ON (II).
4. Check the Secondary HO2S (Sensor 2) output voltage with the scan tool.

Is there 0.6 V or more?

NO → **Repair open in the wire between the ECM/PCM (A23) and the Secondary HO2S (Sensor 2).**

YES → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

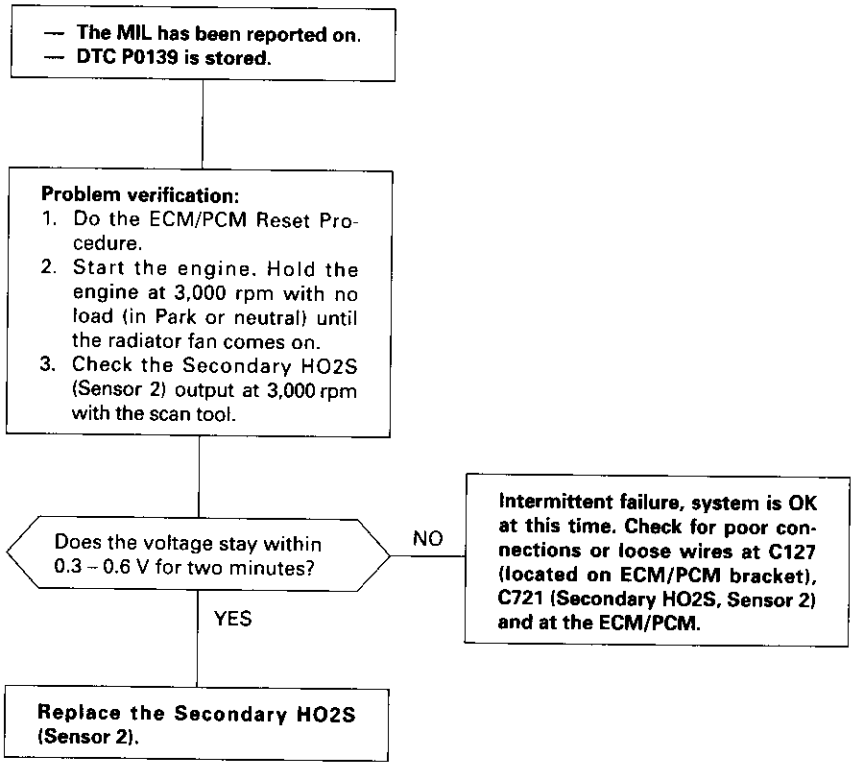


(cont'd)

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Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) (cont'd)

P0139 The scan tool indicates Diagnostic Trouble Code (DTC) P0139: A slow response problem in the Secondary Heated Oxygen Sensor (HO2S) (Sensor 2) circuit.



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Heated Oxygen Sensor (HO2S) Heater

P0135 The scan tool indicates Diagnostic Trouble Code (DTC) P0135: A problem in the Primary Heated Oxygen Sensor (Primary HO2S) (Sensor 1) Heater circuit.

P0141 The scan tool indicates Diagnostic Trouble Code (DTC) P0141: A problem in the Secondary Heated Oxygen Sensor (Secondary HO2S) (Sensor 2) Heater circuit.

— The MIL has been reported on.
— DTC P0135, and/or P0141 are stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine.

Is DTC P0135 or P0141 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C111 (Primary HO2S, Sensor 1), C127 (located on ECM/PCM bracket), C721 (Secondary HO2S, Sensor 2)* and at the ECM/PCM.**

YES

Check for an open or short in the HO2S:
1. Turn the ignition switch OFF.
2. Disconnect the HO2S (Primary or Secondary*) (Sensor 1 or Sensor 2) 4P connector.
3. At the HO2S side, measure resistance between the HO2S 4P connector terminals No. 3 and No. 4.

Is there 10 – 40 Ω?

NO → **Replace the HO2S (Primary or Secondary*).**

YES

Check for continuity between body ground and the HO2S 4P connector terminals No. 3 and No. 4 individually.

Is there continuity?

YES → **Replace the HO2S (Primary or Secondary*).**

NO

Check for an open or short in the wires (PO2SHTC, SO2SHTC* line):
1. Turn the ignition switch ON (II).
2. Measure voltage between the HO2S 4P connector terminals No. 3 and No. 4.

Is there battery voltage?

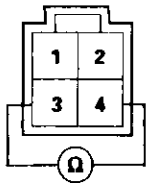
YES → B

NO → A

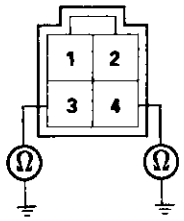
('97 model: To page 11-122)
('98 – 00 models: To page 11-123)

('97 model: To page 11-122)
('98 – 00 models: To page 11-123)

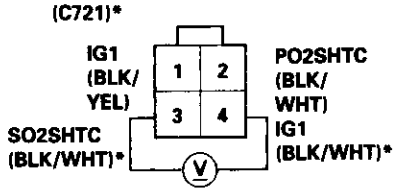
PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111), SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C721)*



Terminal side of male terminals



PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111), SECONDARY HO2S (Sensor 2) 4P CONNECTOR (C721)*



Wire side of female terminals

(cont'd)

*: P0141

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Heated Oxygen Sensor (HO2S) Heater (cont'd)

('97 model)

(From page 11-121)

A

Check for an open or short in the wire (IG1 line):
Measure voltage between the HO2S 4P connector terminal No. 3 (secondary: No. 4) and body ground.

Is there battery voltage? — NO → **Repair open or short in the wire between the No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse and the HO2S (Primary, Secondary*).**

YES

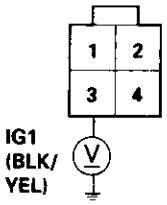
Check for an open in the wire (PO2SHTC, SO2SHTC* line):
1. Turn the ignition switch OFF.
2. Reconnect the HO2S 4P connector.
3. Disconnect the PCM connector A (32P).
4. Turn the ignition switch ON (II).
5. Measure voltage between PCM connector terminals A6 and A10 (A5 and A10)*.

Is there 0.1 V or less? — YES → **Repair open in the wire between the PCM (A6, A5)* and the HO2S (Primary, Secondary*).**

NO

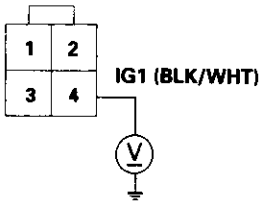
Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111)



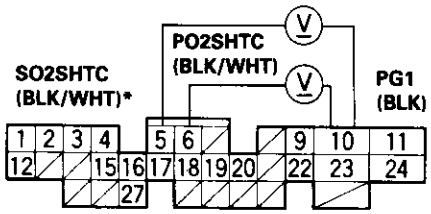
Wire side of female terminals

SECONDARY HO2S (SENSOR 2) 4P CONNECTOR (C721)*



Wire side of female terminals

PCM CONNECTOR A (32P)



Wire side of female terminals

(From page 11-121)

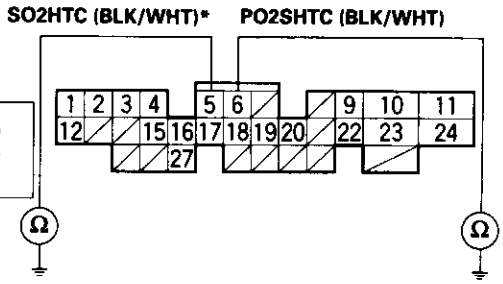
B

Check for a short in the wire (PO2SHTC, SO2SHTC* line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (32P).
3. Check for continuity between the PCM connector terminal A6 (A5)* and body ground.

Is there continuity? — YES → **Repair short in the wire between the PCM (A6, A5*) and the HO2S (Primary, Secondary*).**

NO

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.



*: P0141

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('98 – 00 models)

(From page 11-121)

A

Check for an open in the wires (IGP, IG1* line):
Measure voltage between the primary HO2S 4P connector terminal No. 3 (secondary HO2S: No. 4) and body ground.

Is there battery voltage?

NO → **Repair open or short in the wire between the No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse and the HO2S (Primary, Secondary*).**

YES

Check for an open in the wires (PO2SHTC, SO2SHTC* line):
1. Turn the ignition switch OFF.
2. Reconnect the HO2S 4P connector.
3. Disconnect the ECM/PCM connector C (31P) (ECM/PCM connector A (32P))*.
4. Turn the ignition switch ON (II).
5. Measure voltage between ECM/PCM connector terminals B2 and C1 (B2 and A8)*.

Is there 0.1 V or less?

YES → **Repair open in the wire between the ECM/PCM (C1, A8*) and the HO2S (Primary, Secondary*).**

NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

(From page 11-121)

B

Check for a short in the wires (PO2SHTC, SO2SHTC* line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector C (31P) (ECM/PCM connector A (32P))*.
3. Check for continuity between ECM/PCM connector terminal C1 (A8)* and body ground.

Is there continuity?

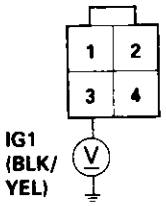
YES → **Repair short in the wire between the ECM/PCM (C1, A8*) and the HO2S (Primary, Secondary*).**

NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

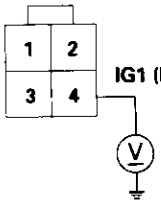
*: P0141

PRIMARY HO2S (Sensor 1) 4P CONNECTOR (C111)



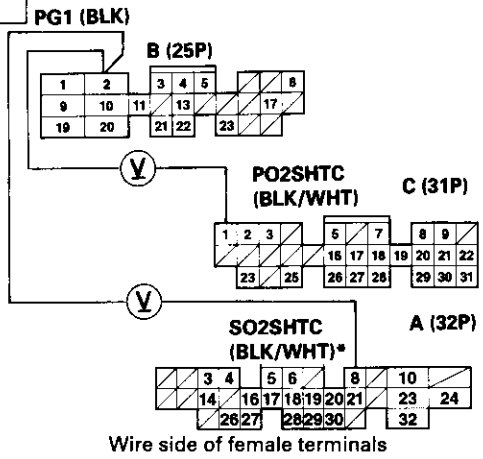
Wire side of female terminals

SECONDARY HO2S (SENSOR 2) 4P CONNECTOR (C721)*



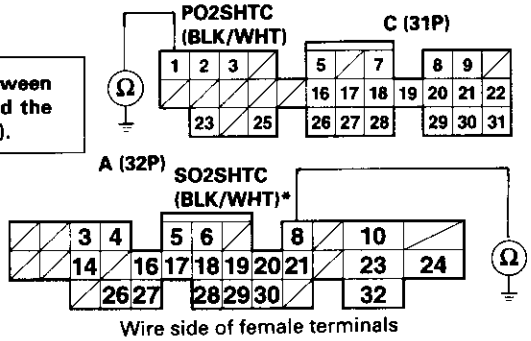
Wire side of female terminals

ECM/PCM CONNECTORS



Wire side of female terminals

ECM/PCM CONNECTORS



Wire side of female terminals

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Fuel Supply System

P0171 The scan tool indicates Diagnostic Trouble Code (DTC) P0171: The fuel system is too lean.

P0172 The scan tool indicates Diagnostic Trouble Code (DTC) P0172: The fuel system is too rich.

Description

By monitoring the Long Term Fuel Trim, long term malfunctions in the fuel system will be detected.
If a malfunction has been detected during two consecutive trips, the MIL will come on and DTC P0171 and/or P0172 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as DTC P0171 and/or P0172, troubleshoot those DTCs first, then troubleshoot DTC P0171 and/or P0172.

P0107, P0108, P1128, P1129: MAP Sensor
P0135: Primary HO2S (Sensor 1) Heater
P0137, P0138: Secondary HO2S (Sensor 2)
P0141: Secondary HO2S (Sensor 2) Heater
P0441*1: EVAP System Insufficient Purge Flow
P1456*2, P1457*2: EVAP System Insufficient Purge Flow

*1: '97 model
*2: '98 – 00 models

Possible Cause

DTC P0171
System too lean

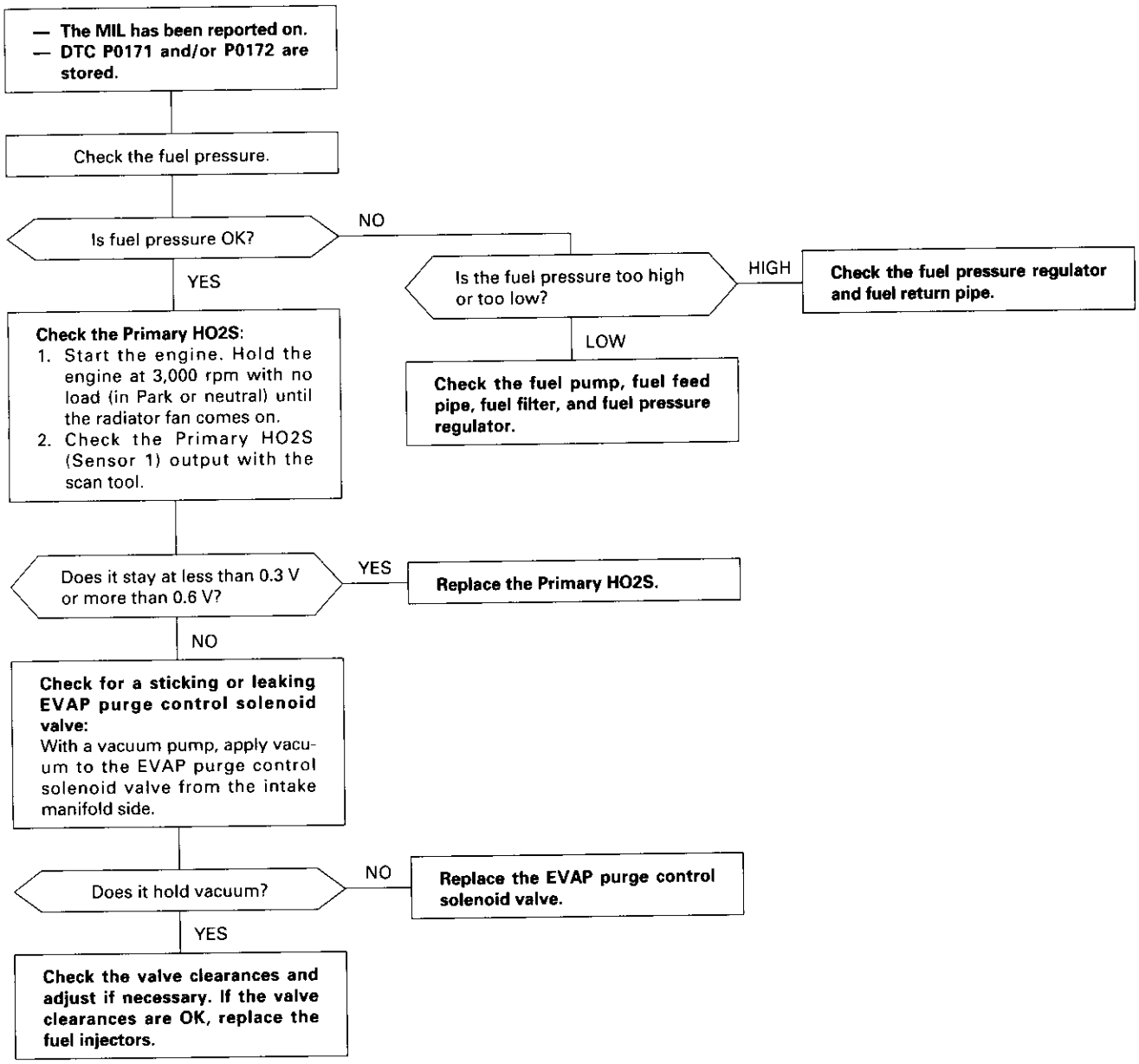
- Fuel Pump insufficient flow/pressure
- Fuel Feed Line clogged, leaking
- Fuel Pressure Regulator stuck open
- Fuel Filter clogged
- Fuel Injector clogged, air leakage
- Gasoline doesn't meet Owner's Manual spec.
- Primary HO2S (Sensor 1) deteriorated
- Valve Clearance
- Exhaust leak

DTC P0172
System too rich

- Fuel Pressure Regulator clogged, stuck closed
- Fuel Return Pipe clogged
- Fuel Injector leaking
- Gasoline doesn't meet Owner's Manual spec.
- Primary HO2S (Sensor 1) deteriorated
- EVAP Purge Control Solenoid Valve leaking, stuck opened
- Valve Clearance

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Troubleshooting Flowchart



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Random Misfire

P0300[*2], **P1300**[*1] and some of **P0301 through P0304**

The scan tool indicates Diagnostic Trouble Code (DTC) P0300*2, P1300*1 and some of P0301 – P0304: Random misfire.

Description

Misfire detection is accomplished by monitoring the crankshaft speed with the crankshaft speed fluctuation (CKF) sensor which is attached to the crankshaft.

If misfiring strong enough to damage the catalyst is detected, the MIL will blink during the time of its occurrence, and DTC P0300*2, P1300*1 and some of DTCs P0301 through P0304 will be stored. Then, after misfire has ceased, the MIL will come on.

If misfiring that increases emissions is detected during two consecutive driving cycles, the MIL will come on, and DTC P0300*2, P1300*1 and some of DTCs P0301 through P0304 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as a misfire DTC, troubleshoot those DTCs first, then troubleshoot the misfire DTC.

P0106, P1128, P1129: MAP sensor
P0171, P0172: Fuel metering
P0505: Idle Control System
P1336, P1337: CKF sensor
P1361, P1362: TDC sensor
P1381, P1382: CYP sensor
P1508: IAC valve

*1: '97 model
*2: '98 – 00 models

Possible Cause

- Fuel pump insufficient fuel pressure, amount of flow
- Fuel line clogging, blockage, leakage
- Fuel filter clogging
- Fuel pressure regulator stuck open
- Distributor malfunction
- Ignition coil wire open, leakage
- Ignition control module malfunction
- Valves carbon deposit
- Compression low
- Fuel does not meet Owner's Manual spec., lack of fuel

Troubleshooting

By test-driving, determine the conditions during which misfire occurs. Depending on these conditions, test in the order described in the table below.

Possible cause / Page / Condition	Crankshaft speed fluctuation sensor	Fuel pressure	Distributor and Ignition wires	ICM	Valve Clearance
	section 6	11-178	section 23	section 23	section 6
Only low rpm and load	③	①			②
Only accelerating		②	①	③	
Only high rpm and load	⑤	①	②	③	④
Not specification	⑤	①	②	③	④

NOTE: If misfire doesn't recur, some possible causes are fuel that doesn't meet owner's manual spec, lack of fuel, carbon deposits on spark plug, etc.

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Misfire Detected in One Cylinder

P0301 The scan tool indicates Diagnostic Trouble Code (DTC) P0301: Cylinder 1 misfire detected.

P0302 The scan tool indicates Diagnostic Trouble Code (DTC) P0302: Cylinder 2 misfire detected.

P0303 The scan tool indicates Diagnostic Trouble Code (DTC) P0303: Cylinder 3 misfire detected.

P0304 The scan tool indicates Diagnostic Trouble Code (DTC) P0304: Cylinder 4 misfire detected.

Description

Misfire detection is accomplished by monitoring the crankshaft speed with the crankshaft speed fluctuation (CKF) sensor which is attached to the crankshaft.

If misfiring strong enough to damage the catalyst is detected, the MIL will blink during the time of its occurrence, and DTC P0301, P0302, P0303 and/or P0304 will be stored. Then, after the misfire has ceased, the MIL will come on.

If misfiring that increases emissions is detected during two consecutive driving cycles, the MIL will come on, and DTC P0301, P0302, P0303 and/or P0304 will be stored.

NOTE: If some of the DTCs listed below are stored at the same time as a misfire DTC, troubleshoot those DTCs first, then troubleshoot the misfire DTC.

P0107, P0108, P1128, P1129: MAP sensor
P0171, P0172: Fuel supply system
P0441: EVAP insufficient purge flow
P1336, P1337: CKF sensor
P1359, P1361, P1362: TDC sensor
P1381, P1382: CYP sensor

Possible Cause

- Fuel injector clogging, fuel leakage, air leakage
- Fuel injector circuit open or shorted
- Spark plug carbon deposits, fouling, malfunction
- Ignition wires open, leaking
- Distributor malfunction
- Compression low
- Valve clearance out of specification

(cont'd)

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Misfire Detected in One Cylinder (cont'd)

Troubleshooting Flowchart

— The MIL has been reported on.
— DTC P0301, P0302, P0303, or P0304 is indicated.

Check the fuel injector function: Start the engine, and listen for a clicking sound at the fuel injector in the problem cylinder.

Does it click?

NO

Check for an open or short in the harness between the ECM/PCM and the fuel injector.

Are the wires OK?

NO

Repair open or short in the wire.

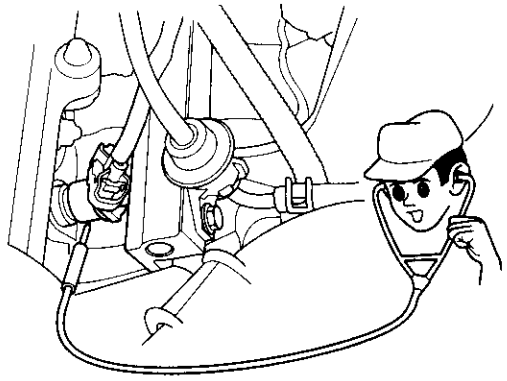
YES

— Replace the fuel injector.
— Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

YES

Problem verification:
1. After checking the freeze data, do the ECM/PCM Reset Procedure.
2. Exchange the spark plug from the problem cylinder with one of another cylinder.
3. Connect the SCS service connector.
4. Test-drive the vehicle several times in the range of the freeze data.

NOTE:
- If there is no freeze data of misfiring, just clear the DTC.
- If there is no freeze data of misfiring, test drives under various conditions are necessary.

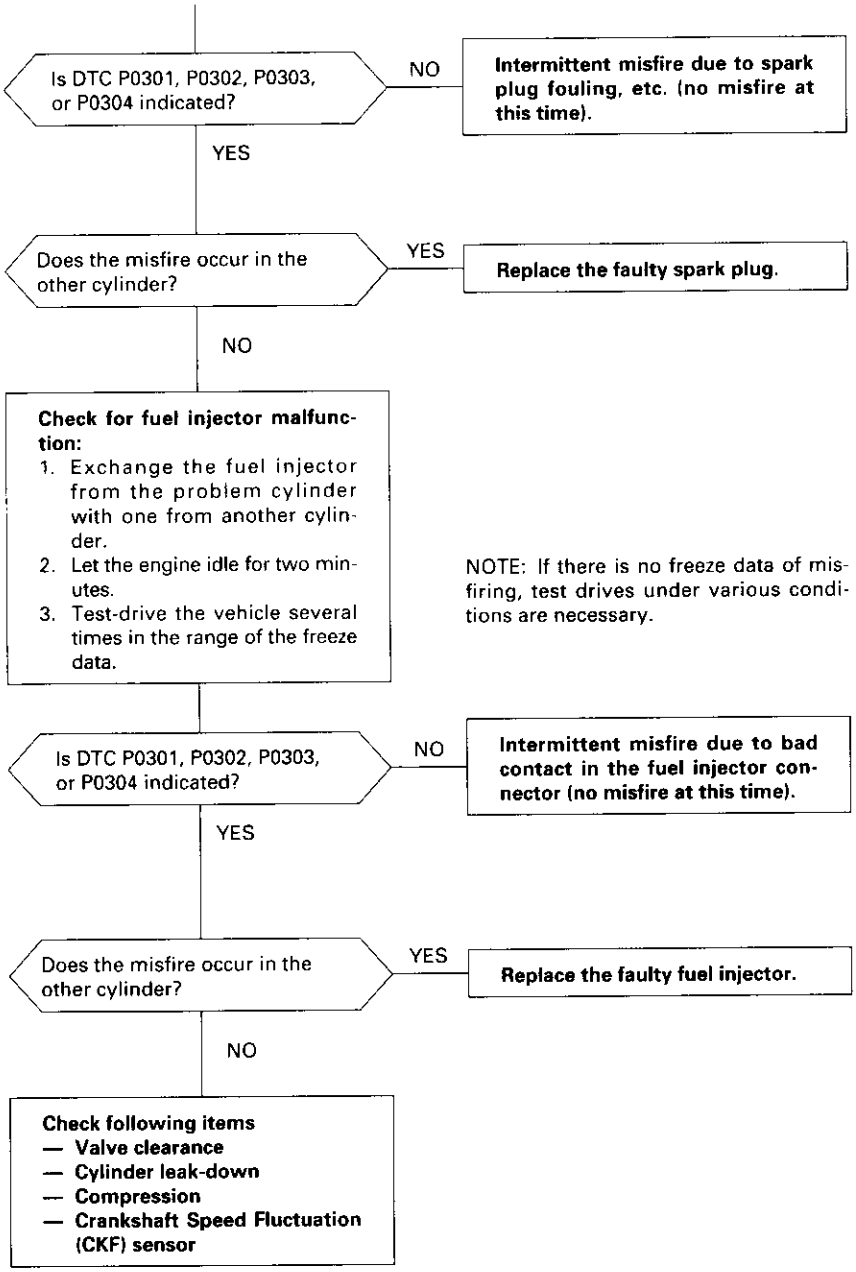


The illustration shows '97 – 98 models, '99 – 00 models are similar.

(To page 11-129)

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(From page 11-128)



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Knock Sensor (KS)

P0325 ('99 – 00 models) The scan tool indicates Diagnostic Trouble Code (DTC) P0325: A malfunction in the circuit of the Knock Sensor (KS).

— The MIL has been reported on.
— DTC P0325 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
3. Hold the engine at 3,000 – 4,000 rpm for at least 60 seconds.

Is DTC P0325 indicated?
- NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
  Check for poor connections or loose wires at C137 (knock sensor (KS)) and at the ECM/PCM.
- YES

Check for a short in the wire (KS line):
1. Turn the ignition switch OFF.
2. Disconnect the knock sensor 1P connector.
3. Check for continuity between ECM/PCM connector terminals C3 and body ground.

Is there continuity?
- YES → **Repair short in the wire between the ECM/PCM (C3) and the knock sensor.**
- NO

Check for an open in the wire (KS line):
Check for continuity between ECM/PCM connector terminal C3 and knock sensor connector terminal No. 1.

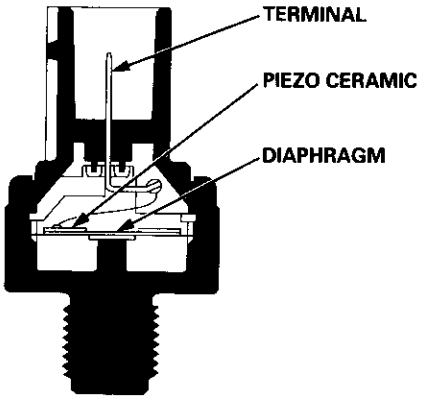
Is there continuity?
- NO → **Repair open in the wire between the ECM/PCM (C3) and the knock sensor.**
- YES

Substitute a known-good knock sensor and recheck.

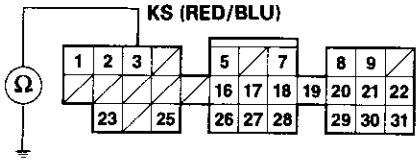
NOTE: Torque the knock sensor to 31 N·m (3.2 kgf·m, 23 lbf·ft).

Is DTC P0325 indicated?
- NO → **Replace the original knock sensor.**
- YES

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

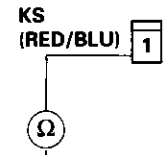


ECM/PCM CONNECTOR C (31P)



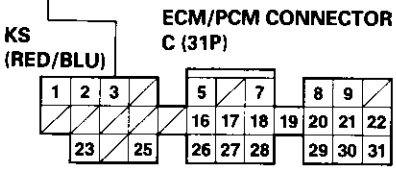
Wire side of female terminals

KS 1P CONNECTOR (C137)



Wire side of female terminals

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

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Crankshaft Position/Top Dead Center/Cylinder Position (CKP/TDC/CYP) Sensor

P0335 The scan tool indicates Diagnostic Trouble Code (DTC) P0335: A malfunction in the Crankshaft Position (CKP) sensor circuit.

P0336 The scan tool indicates Diagnostic Trouble Code (DTC) P0336: A range/performance problem in the Crankshaft Position (CKP) sensor circuit.

P1361 The scan tool indicates Diagnostic Trouble Code (DTC) P1361: Intermittent interruption in the Top Dead Center (TDC) sensor circuit.

P1362 The scan tool indicates Diagnostic Trouble Code (DTC) P1362: No signal in the Top Dead Center (TDC) sensor circuit.

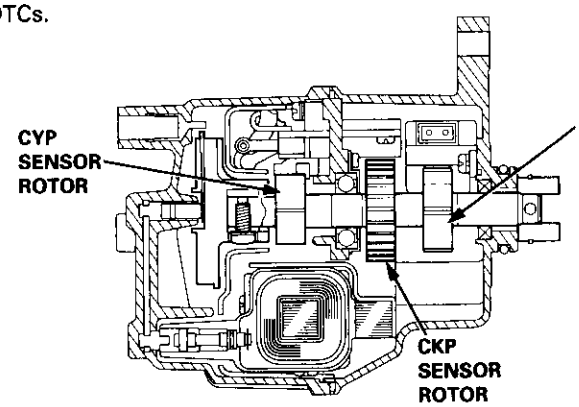
P1381 The scan tool indicates Diagnostic Trouble Code (DTC) P1381: Intermittent interruption in the Cylinder Position (CYP) sensor circuit.

P1382 The scan tool indicates Diagnostic Trouble Code (DTC) P1382: No signal in the Cylinder Position (CYP) sensor circuit.

Description

The CKP Sensor determines timing for fuel injection and ignition of each cylinder and also detects engine speed. The TDC Sensor determines ignition timing at start-up (cranking) and when crank angle is abnormal. The CYP Sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder. The CKP/TDC/CYP Sensor is built into the distributor.

NOTE: If DTC P1359 is stored at the same time as DTC P0335, P0336, P1361, P1362, P1381 and/or P1382, troubleshoot DTC P1359 first, then troubleshoot those DTCs.



'97 model:

— The MIL has been reported on.
— DTC P0335, P0336, P1361, P1362, P1381 and/or P1382 are stored.

Problem verification:
1. Do the PCM Reset Procedure.
2. Start the engine.

Is DTC P0335, P0336, P1361, P1362, P1381 and/or P1382 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C121 (distributor) and at the PCM.**

YES

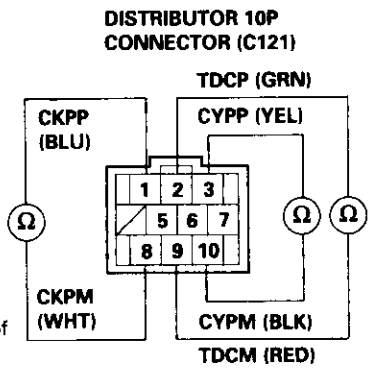
Check for an open in the CKP/TDC/CYP sensor:
1. Turn the ignition switch OFF.
2. Disconnect the distributor 10P connector.
3. Measure resistance between the terminals of the indicated sensor (see table).

Is there 350 – 700 Ω?

NO → **Replace the distributor ignition housing (see section 4).**

YES

(To page 11-132)



Terminal side of male terminals

SENSOR	DTC	SENSOR TERMINAL	PCM TERMINAL	WIRE COLOR
CKP	P0335 P0336	1	C2	BLU
		8	C12	WHT
TDC	P1361 P1362	2	C3	GRN
		9	C13	RED
CYP	P1381 P1382	3	C4	YEL
		10	C14	BLK

(cont'd)

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Crankshaft Position/Top Dead Center/Cylinder Position (CKP/TDC/CYP) Sensor (cont'd)

(From page 11-131)

Check for a short in the CKP/TDC/CYP sensor:
Check for continuity to body ground on both terminals of the indicated sensor individually (see table on page 11-131).

Is there continuity? — YES → **Replace the distributor ignition housing (see section 4).**

NO

Check for an open in the wires (CKP/TDC/CYP lines):
1. Reconnect the distributor 10P connector.
2. Disconnect PCM connector C (31P).
3. Measure resistance between the terminals of the indicated sensor on the PCM connector (see table on page 11-131).

Is there 350 – 700 Ω? — NO → **Repair open in the indicated sensor wires (see table on page 11-131).**

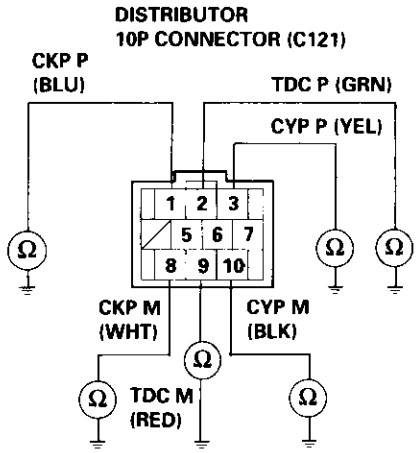
YES

Check for a short in the wires (CKP/TDC/CYP lines):
Check for continuity between body ground and PCM connector terminals C2, C3 and/or C4 individually.

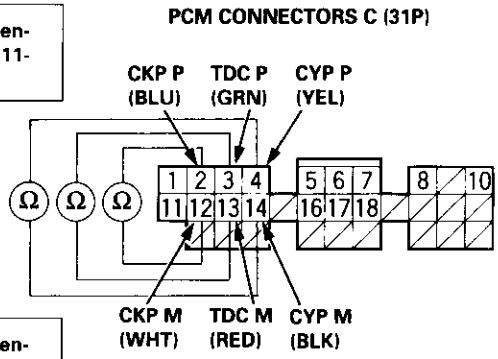
Is there continuity? — YES → **Repair short in the indicated sensor wires (see table on page 11-131).**

NO

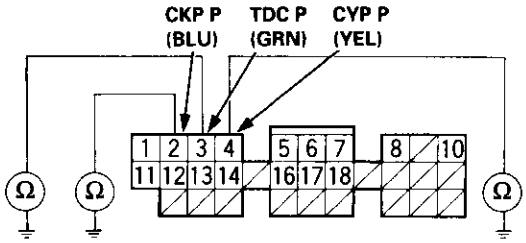
Substitute a known-good PCM, and recheck. If symptom/indication goes away, replace the original PCM.



Terminal side of male terminals



Wire side of female terminals



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'98 – 00 models:

— **The MIL has been reported on.**
— **DTC P0335, P0336, P1361, P1362, P1381 and/or P1382 are stored.**

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine.

Is DTC P0335, P0336, P1361, P1362, P1381 and/or P1382 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C121 (distributor) and at the ECM/PCM.**

YES

Check for an open in the CKP/TDC/CYP sensor:
1. Turn the ignition switch OFF.
2. Disconnect the distributor 10P (8P)* connector.
3. Measure resistance between the terminals of the indicated sensor (see table).

Is there 350 – 700 Ω?

NO → **Replace the distributor ignition housing (see section 4).**

YES

Check for a short in the CKP/TDC/CYP sensor:
Check for continuity to body ground on both terminals of the indicated sensor individually (see table).

Is there continuity?

YES → **Replace the distributor ignition housing (see section 4).**

NO

Check for an open in the wires (CKP/TDC/CYP lines):
1. Reconnect the distributor 10P (8P)* connector.
2. Disconnect ECM/PCM connector C (31P).
3. Measure resistance between the terminals of the indicated sensor on the ECM/PCM connector (see table).

Is there 350 – 700 Ω?

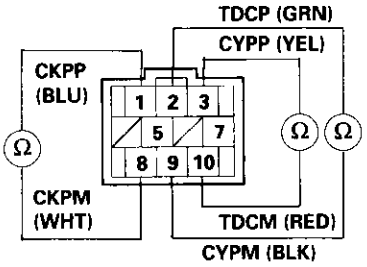
NO → **Repair open in the indicated sensor wires (see table).**

YES

(To page 11-134)

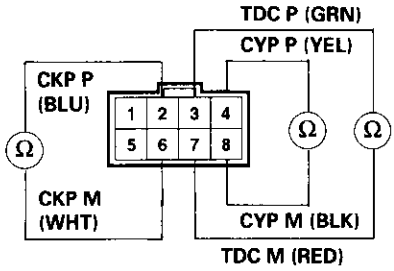
*: '99 – 00 models

'98 model:
DISTRIBUTOR 10P CONNECTOR (C121)



Terminal side of male terminals

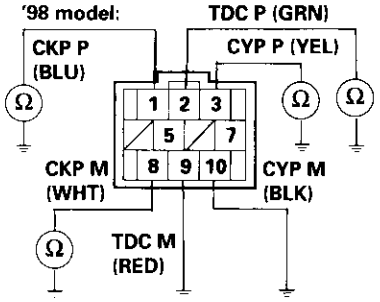
'99 – 00 models:
DISTRIBUTOR 8P CONNECTOR (C121)



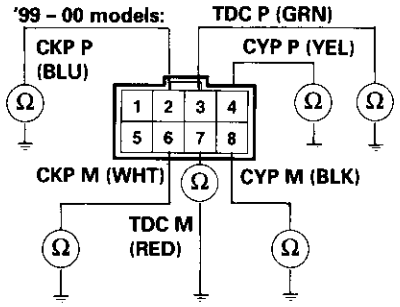
Terminal side of male terminals

SENSOR	DTC	SENSOR TERMINAL ( ):'99 model	ECM/PCM TERMINAL	WIRE COLOR
CKP	P0335 P0336	1 (2)	C8	BLU
		8 (6)	C9	WHT
TDC	P1361 P1362	2 (3)	C20	GRN
		9 (7)	C21	RED
CYP	P1381 P1382	3 (4)	C29	YEL
		10 (8)	C30	BLK

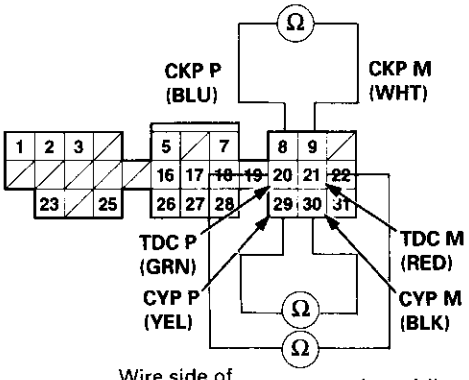
'98 model:



'99 – 00 models:



ECM/PCM CONNECTORS C (31P)



Wire side of female terminals

(cont'd)

Crankshaft Position/Top Dead Center/Cylinder Position (CKP/TDC/CYP) Sensor (cont'd)

(From page 11-133)

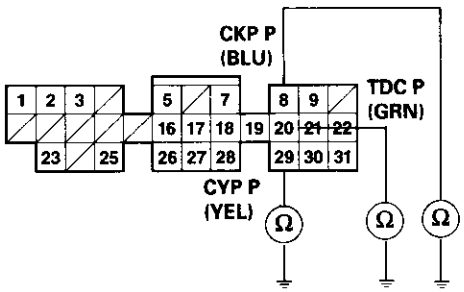
Check for a short in the wires (CKP/TDC/CYP lines):
Check for continuity between body ground and ECM/PCM connector terminals C8, C20 and/or C29 individually.

Is there continuity?

YES — **Repair short in the indicated sensor wires (see table on page 11-133).**

NO — **Substitute a known-good ECM/PCM, and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

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Vehicle Speed Sensor (VSS)

P0500 *2, **P0501** *1 The scan tool indicates Diagnostic Trouble Code (DTC) P0500*2 or P0501*1: A range/performance in the Vehicle Speed Sensor (VSS) circuit.

*1: A/T
*2: M/T

'97 model:

— The MIL has been reported on.
— DTC P0501 is stored.

Problem verification:
1. Test-drive the vehicle.
2. Check the vehicle speed with the scan tool.

Is the correct speed indicated?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C129 (VSS) and at the PCM.**

NO

Check for an open in the PCM:
1. Turn the ignition switch OFF.
2. Block the rear wheels and set the parking brake.
3. Jack up the front of the vehicle and support it with safety stands.
4. Turn the ignition switch ON (II).
5. Block the right front wheel and slowly rotate the left front wheel by hand.
6. Measure voltage between PCM connector terminals C18 and A9.

NOTE: Do not use the engine to turn the front wheels with the rear wheels on the ground. The 4WD system will engage and the vehicle will suddenly lurch forward.

Does the voltage pulse 0 V and 5 V or battery voltage?

YES → **Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.**

NO

Check for a short in the PCM:
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector C (31P).
3. Turn the ignition switch ON (II).
4. Block the right front wheel and slowly rotate the left front wheel.
5. Measure voltage between PCM connector terminals C18 and A9.

Does the voltage pulse 0 V and 5 V or battery voltage?

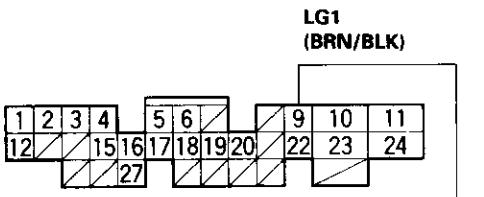
YES → **Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.**

NO

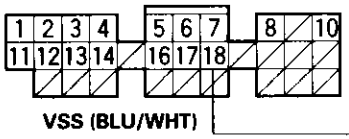
— Repair short in the wire between the PCM (C18), cruise control unit, speedometer, and VSS.
— Repair open in the wire between the PCM (C18) and the VSS.
— If wire is OK, test the VSS (see section 23).

PCM CONNECTORS

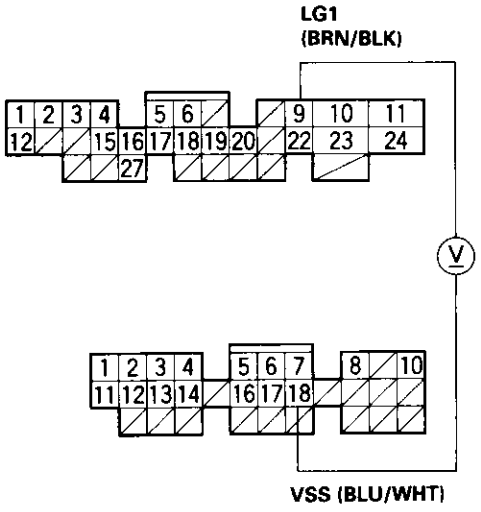
A (32P)



C (31P)



Wire side of female terminals



(cont'd)

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Vehicle Speed Sensor (VSS) (cont'd)

'98 – 00 models:

— The MIL has been reported on.
— DTC P0500*2 or P0501*1 is stored.

Problem verification:
1. Test-drive the vehicle.
2. Check the vehicle speed with the scan tool.

Is the correct speed indicated?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C129 (VSS) and at the ECM/PCM.**

NO

Check for an open in the ECM/PCM:
1. Turn the ignition switch OFF.
2. Block the rear wheels and set the parking brake.
3. Jack up the front of the vehicle and support it with safety stands.
4. Turn the ignition switch ON (II).
5. Block the right front wheel and slowly rotate the left front wheel.
6. Measure voltage between ECM/PCM connector terminals B20 and C23.

NOTE (4WD): Do not use the engine to turn the front wheels with the rear wheels on the ground. The 4WD system will engage and the vehicle will suddenly lurch forward.

Does the voltage pulse between 0 V and 5 V or battery voltage?

YES → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

NO

Check for a short in the ECM/PCM:
1. Turn the ignition switch OFF.
2. Disconnect ECM/PCM connector C (31P).
3. Turn the ignition switch ON (II).
4. Block the right front wheel and slowly rotate the left front wheel.
5. Measure voltage between ECM/PCM connector terminals B20 and C23.

Does the voltage pulse between 0 V and 5 V or battery voltage?

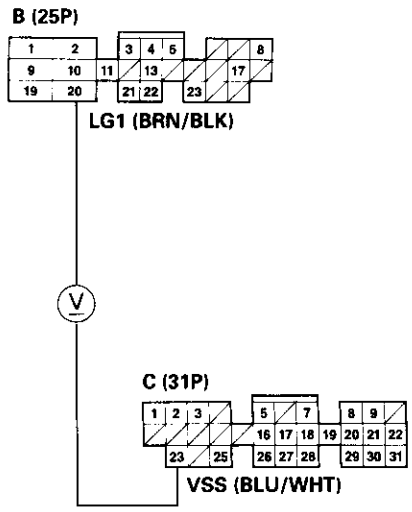
YES → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

NO

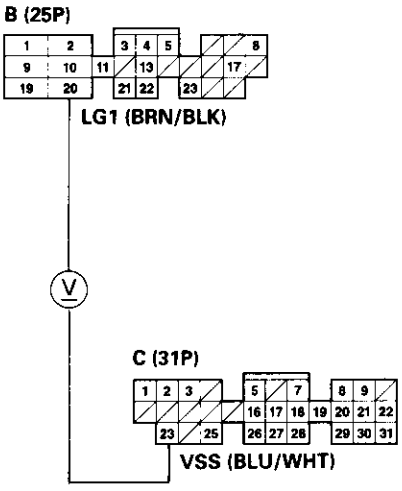
— Repair short in the wire between the ECM/PCM (C23) and the VSS.
— Repair open in the wire between the ECM/PCM (C23) and the VSS.
— If wire is OK, test the VSS (see section 23).

*1: A/T
*2: M/T

ECM/PCM CONNECTORS



Wire side of female terminals



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Barometric Pressure (BARO) Sensor

P1106 The scan tool indicates Diagnostic Trouble Code (DTC) P1106: A range/performance problem in the Barometric Pressure (BARO) Sensor circuit.

— The MIL has been reported on.
— DTC P1106 is stored.

Problem verification:
1. Do the ECM/PCM reset procedure.
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
3. Connect the SCS service connector.
4. Test-drive with the A/T in [2] position, M/T in 4th gear.
5. Accelerate for five seconds using wide open throttle.

Is DTC P1106 indicated?

NO → **Intermittent failure, system is OK at this time.**

YES

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

P1107 The scan tool indicates Diagnostic Trouble Code (DTC) P1107: A low voltage problem in the Baro sensor circuit.

P1108 The scan tool indicates Diagnostic Trouble Code (DTC) P1108: A high voltage problem in the Baro sensor circuit.

— The MIL has been reported on.
— DTC P1107 or P1108 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Turn the ignition switch ON (II).

Is DTC P1107 or P1108 indicated?

NO → **Intermittent failure, system is OK at this time.**

YES

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

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Electrical Load Detector (ELD) (USA Model)

P1297 The scan tool indicates Diagnostic Trouble Code (DTC) P1297: A low voltage problem in the Electrical Load Detector (ELD) circuit.

'97 model:

— DTC P1297 is stored.

Problem verification:
1. Do the PCM Reset Procedure.
2. Start the engine.
3. Turn on the headlights.

Is DTC P1297 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C127 (located on PCM bracket), C354 (ELD) and at the PCM.**

YES

Check for short in the ELD:
Measure voltage between body ground and the ELD 3P connector terminal No. 3.

Is there approx. 4.5 V?

YES → **Replace the ELD.**

NO

Check for a short in the wire (EL line):
1. Turn the ignition switch OFF.
2. Disconnect PCM connector D (16P).
3. Check for continuity between body ground and PCM connector terminal D16.

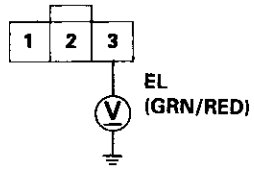
Is there continuity?

YES → **Repair short in the wire between the PCM (D16) and the ELD.**

NO

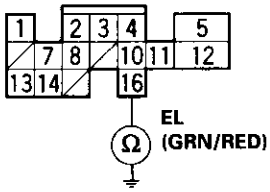
Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

ELD 3P CONNECTOR (C354)



Wire side of female terminals

PCM CONNECTOR D (16P)



Wire side of female terminals

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'98 – 00 models:

— DTC P1297 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine.
3. Turn on the headlights.

Is DTC P1297 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C354 (ELD) and at the ECM/PCM.**

YES

Check for short in the ELD:
Measure voltage between body ground and the ELD 3P connector terminal No. 3.

Is there approx. 4.5 V?

YES → **Replace the ELD.**

NO

Check for a short in the wire (EL line):
1. Turn the ignition switch OFF.
2. Disconnect ECM/PCM connector A (32P).
3. Check for continuity between body ground and ECM/PCM connector terminal A30.

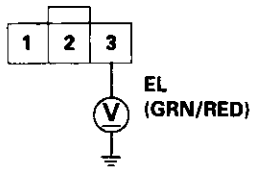
Is there continuity?

YES → **Repair short in the wire between the PCM (A30) and the ELD.**

NO

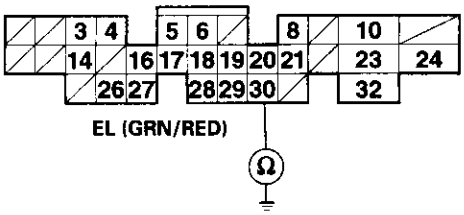
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

ELD 3P CONNECTOR (C354)



Wire side of female terminals

ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

(cont'd)

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Electrical Load Detector (ELD) (USA Model) (cont'd)

P1298 The scan tool indicates Diagnostic Trouble Code (DTC) P1298: A high voltage problem in the Electrical Load Detector (ELD) circuit.

'97 model:

— DTC P1298 is stored.

Problem verification:
1. Do the PCM Reset Procedure.
2. Start the engine.
3. Turn on the headlights.

Is DTC P1298 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C127 (located on PCM bracket), C354 (ELD) and at the PCM.**

YES

Check for an open in the wire (IG1 line):
1. Turn the ignition and headlights OFF.
2. Disconnect the ELD 3P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the ELD 3P connector terminal No. 1.

Is there battery voltage?

NO → **Repair open in the wire between the No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse in the under-dash fuse/relay box and the ELD.**

YES

Check for an open in the wire (GND line):
1. Turn the ignition switch and headlights OFF.
2. Disconnect the ELD 3P connector.
3. Check for continuity between body ground and the ELD 3P connector terminal No. 2.

Is there continuity?

NO → **Repair open in the wire between the ELD connector and G402.**

YES

Check for an open in the wire (EL line):
Check for continuity between the ELD 3P connector terminal No. 3 and PCM connector terminal D16.

Is there continuity?

YES → **Check for a malfunction in the ELD:**
1. Reconnect the ELD 3P connector.
2. Start the engine and allow it to idle.
3. While measuring voltage between PCM connector terminals D16 and A9, turn the headlights on (low).

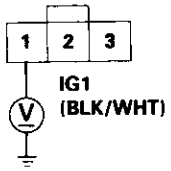
Does the voltage drop?

YES → **Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.**

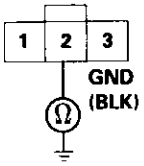
NO → **Replace the ELD.**

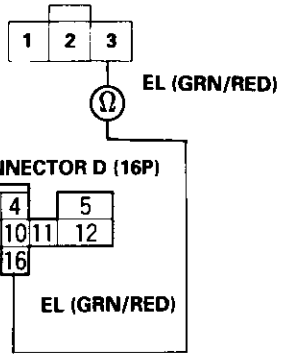
Repair open in the wire between the PCM (D16) and the ELD.

ELD 3P CONNECTOR (C354)



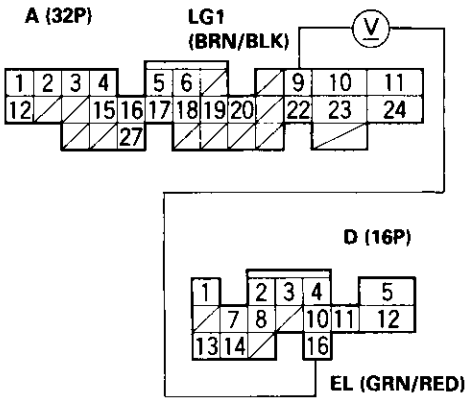
Wire side of female terminals





Wire side of female terminals

PCM CONNECTORS



Wire side of female terminals

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'98 – 00 models:

— DTC P1298 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine.
3. Turn on the headlights.

Is DTC P1298 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C354 (ELD) and at the ECM/PCM.**

YES

Check for an open in the wire (IG1 line):
1. Turn the ignition and headlights OFF.
2. Disconnect the ELD 3P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the ELD 3P connector terminal No. 1.

Is there battery voltage?

NO → **Repair open or short in the wire between the No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse in the under-dash fuse/relay box and the ELD.**

YES

Check for an open in the wire (GND line):
1. Turn the ignition switch and headlights OFF.
2. Disconnect the ELD 3P connector.
3. Check for continuity between body ground and the ELD 3P connector terminal No. 2.

Is there continuity?

NO → **Repair open in the wire between the ELD connector and G402.**

YES

Check for an open in the wire (EL line): Check for continuity between the ELD 3P connector terminal No. 3 and ECM/PCM connector terminal A30.

Is there continuity?

NO → **Repair open in the wire between the ECM/PCM (A30) and the ELD.**

YES

Check for a malfunction in the ELD:
1. Reconnect the ELD 3P connector.
2. Start the engine and allow it to idle.
3. While measuring voltage between ECM/PCM connector terminals A30 and B20, turn the headlights on (low).

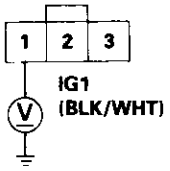
Does the voltage drop?

NO → **Replace the ELD.**

YES

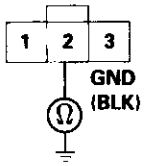
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

ELD 3P CONNECTOR (C354)

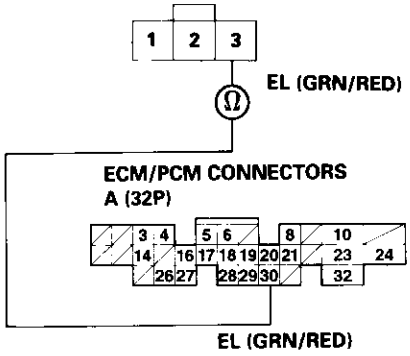


Wire side of female terminals

ELD 3P CONNECTOR (C354)



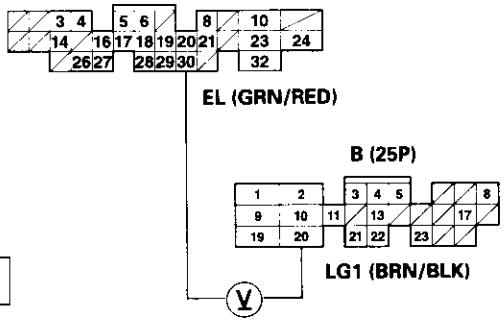
Wire side of female terminals



Wire side of female terminals

ECM/PCM CONNECTORS

A (32P)



Wire side of female terminals

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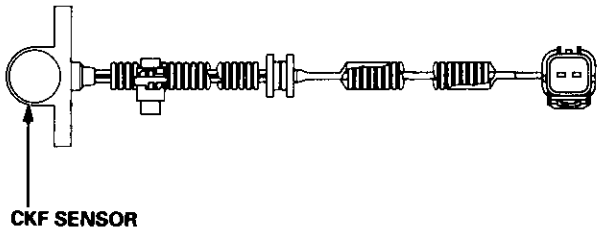
Crankshaft Speed Fluctuation (CKF) Sensor

P1336 The scan tool indicates Diagnostic Trouble Code (DTC) P1336: Intermittent interruption in the Crankshaft Speed Fluctuation (CKF) sensor circuit.

P1337 The scan tool indicates Diagnostic Trouble Code (DTC) P1337: No signal in the Crankshaft Speed Fluctuation (CKF) sensor circuit.

Description
The diagnostic system has a pulser rotor on the crankshaft and a pulse pick-up sensor on the engine block. The ECM/PCM monitors the crankshaft speed fluctuation based on the CKF sensor signal, and judges that an engine misfire occurred if the fluctuation goes beyond a predetermined limit.

'97 model:



— The MIL has been reported on.
— DTC P1336 and/or P1337 are stored.

Problem verification:
1. Do the PCM Reset Procedure.
2. Start the engine.

Is DTC P1336 and/or P1337 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C104 (CKF sensor) and at the PCM.**

YES

Check for an open in the CKF sensor:
1. Turn the ignition switch OFF.
2. Disconnect the CKF sensor 2P connector.
3. Measure the resistance between the CKF sensor 2P connector terminals No. 1 and No. 2.

Is there 1.6 – 3.2 kΩ?

NO → **Replace the CKF sensor (see section 6).**

YES

Check for a short in the CKF sensor:
Check for continuity between body ground and the CKF sensor 2P connector terminals No. 1 and No. 2 individually.

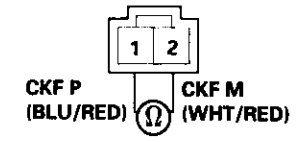
Is there continuity?

YES → **Replace the CKF sensor (see section 6).**

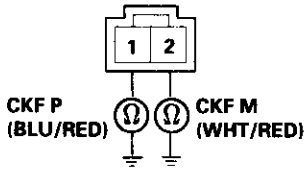
NO

(To page 11-143)

CKF SENSOR 2P CONNECTOR (C104)



Terminal side of male terminals



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(From page 11-142)

Check for an open in the wires (CKF lines):
1. Reconnect the CKF sensor 2P connector.
2. Disconnect the PCM connector C (31P).
3. Measure resistance between PCM connector terminals C1 and C11.

Is there 1.6 – 3.2 kΩ?

NO → **Repair open in the wire between the PCM (C1, C11) and the CKF sensor.**

YES

Check for a short in the wires (CKF lines):
Check for continuity between body ground and PCM connector terminal C1.

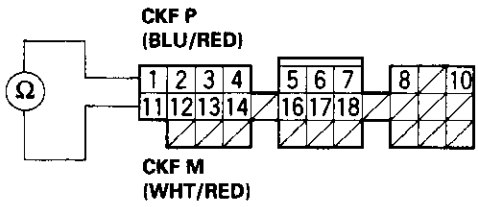
Is there continuity?

YES → **Repair short in the wire between the PCM (C1) and the CKF sensor.**

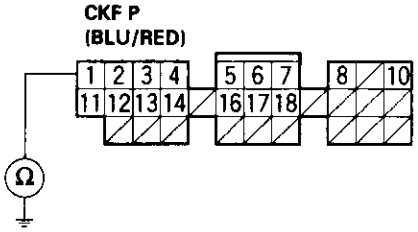
NO

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PCM CONNECTOR C (31P)



Wire side of female terminals



(cont'd)

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Crankshaft Speed Fluctuation (CKF) Sensor (cont'd)

'98 – 00 models:

— The MIL has been reported on.
— DTC P1336 and/or P1337 are stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine.

Is DTC P1336 and/or P1337 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C104 (CKF sensor) and at the ECM/PCM.**

YES

Check for an open in the CKF sensor:
1. Turn the ignition switch OFF.
2. Disconnect the CKF sensor 2P connector.
3. Measure the resistance between the CKF sensor 2P connector terminals No. 1 and No. 2.

Is there 1.6 – 3.2 kΩ?

NO → **Replace the CKF sensor (see section 6).**

YES

Check for a short in the CKF sensor:
Check for continuity between body ground and the CKF sensor 2P connector terminals No. 1 and No. 2 individually.

Is there continuity?

YES → **Replace the CKF sensor (see section 6).**

NO

Check for an open in the wires (CKF lines):
1. Reconnect the CKF sensor 2P connector.
2. Disconnect ECM/PCM connector C (31P).
3. Measure resistance between ECM/PCM connector terminals C22 and C31.

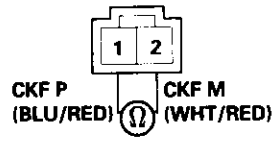
Is there 1.6 – 3.2 kΩ?

NO → **Repair open in the wire between the ECM/PCM (C22, C31) and the CKF sensor.**

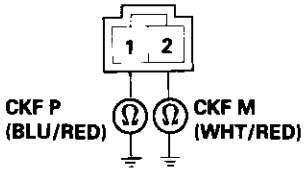
YES

(To page 11-145)

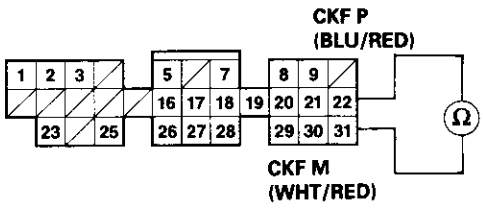
CKF SENSOR 2P CONNECTOR (C104)



Terminal side of male terminals



ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

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(From page 11-144)

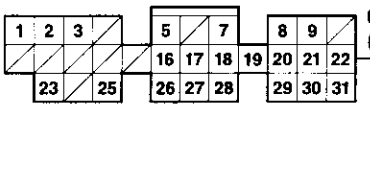
Check for a short in the wires (CKF lines):
Check for continuity between body ground and ECM/PCM connector terminal C22.

Is there continuity?

YES → **Repair short in the wire between the ECM/PCM (C22) and the CKF sensor.**

NO → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

ECM/PCM CONNECTOR C (31P)

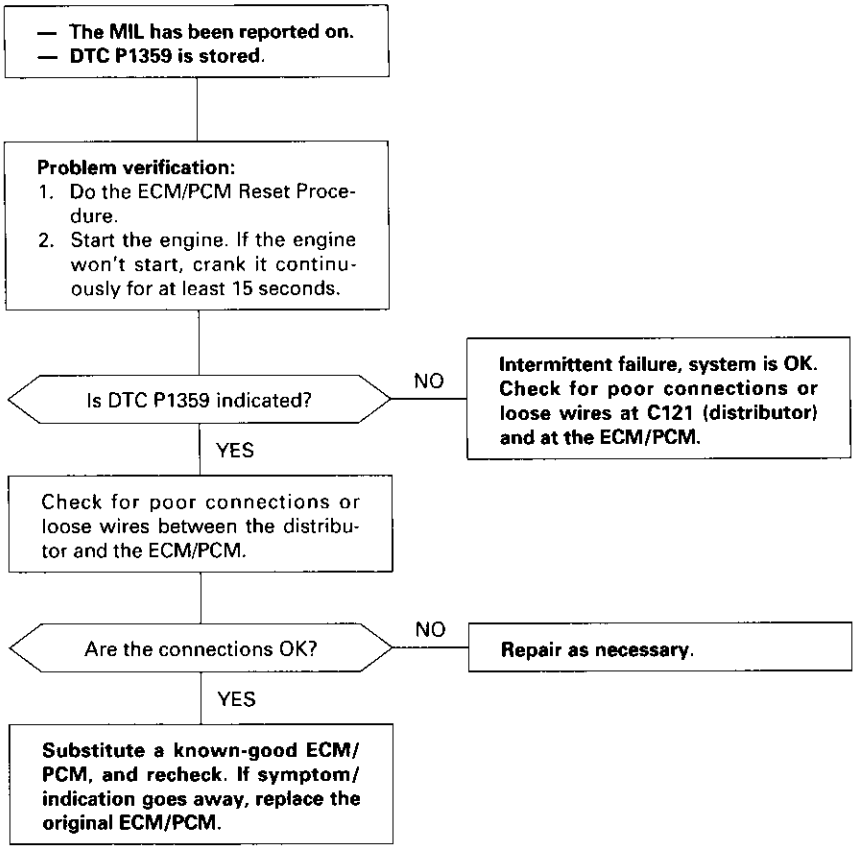


Wire side of female terminals

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Crankshaft Position/Top Dead Center/Cylinder Position (CKP/TDC/CYP) Sensor

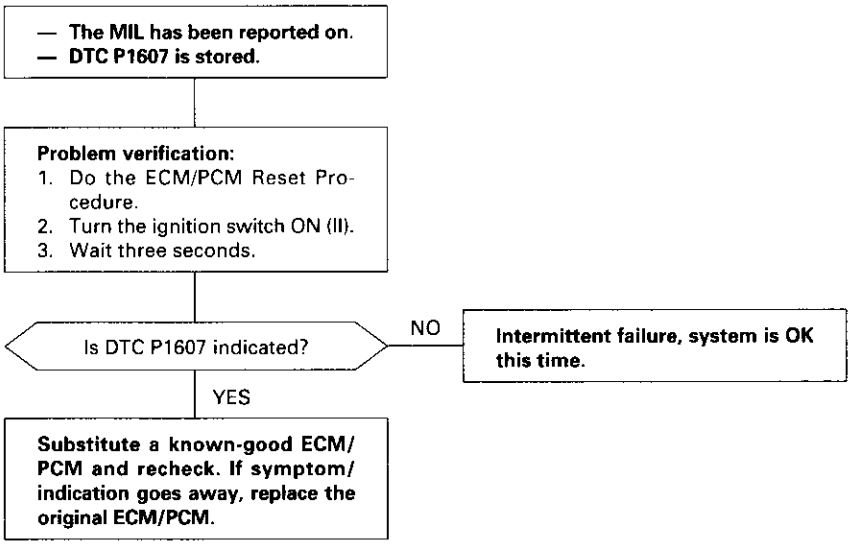
P1359 The scan tool indicates Diagnostic Trouble Code (DTC) P1359: A problem in the Crankshaft Position/Top Dead Center/Cylinder Position (CKP/TDC/CYP) sensor circuit.



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ECM/PCM Internal Circuit

P1607 The scan tool indicates Diagnostic Trouble Code (DTC) P1607: An ECM/PCM Internal Circuit Problem.

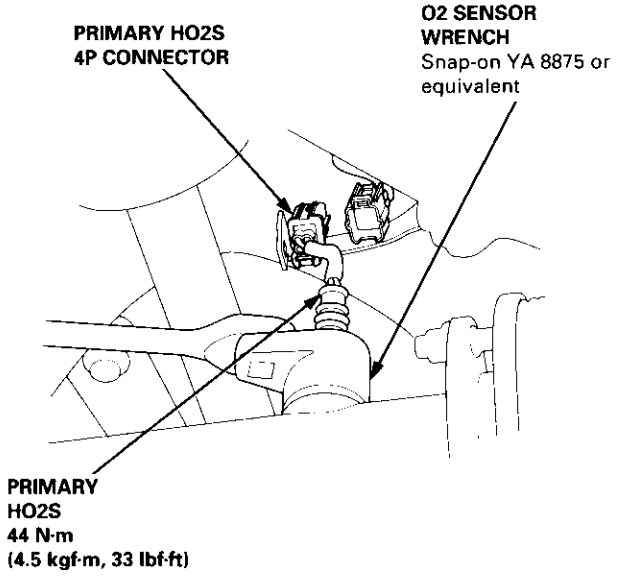


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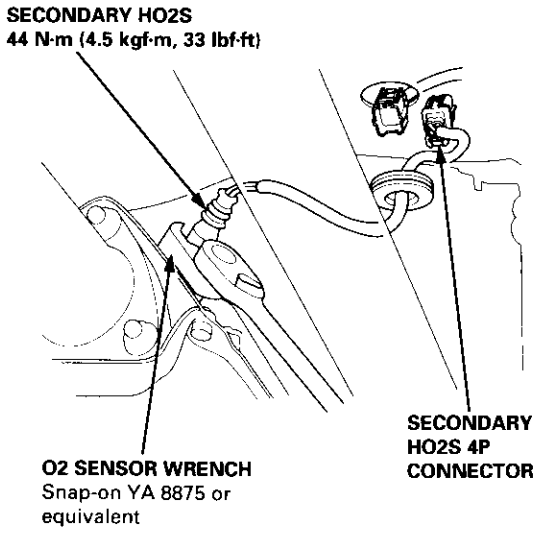
HO2S Replacement

1. Disconnect the HO2S 4P connector, and remove the HO2S.

PRIMARY HO2S:



SECONDARY HO2S:



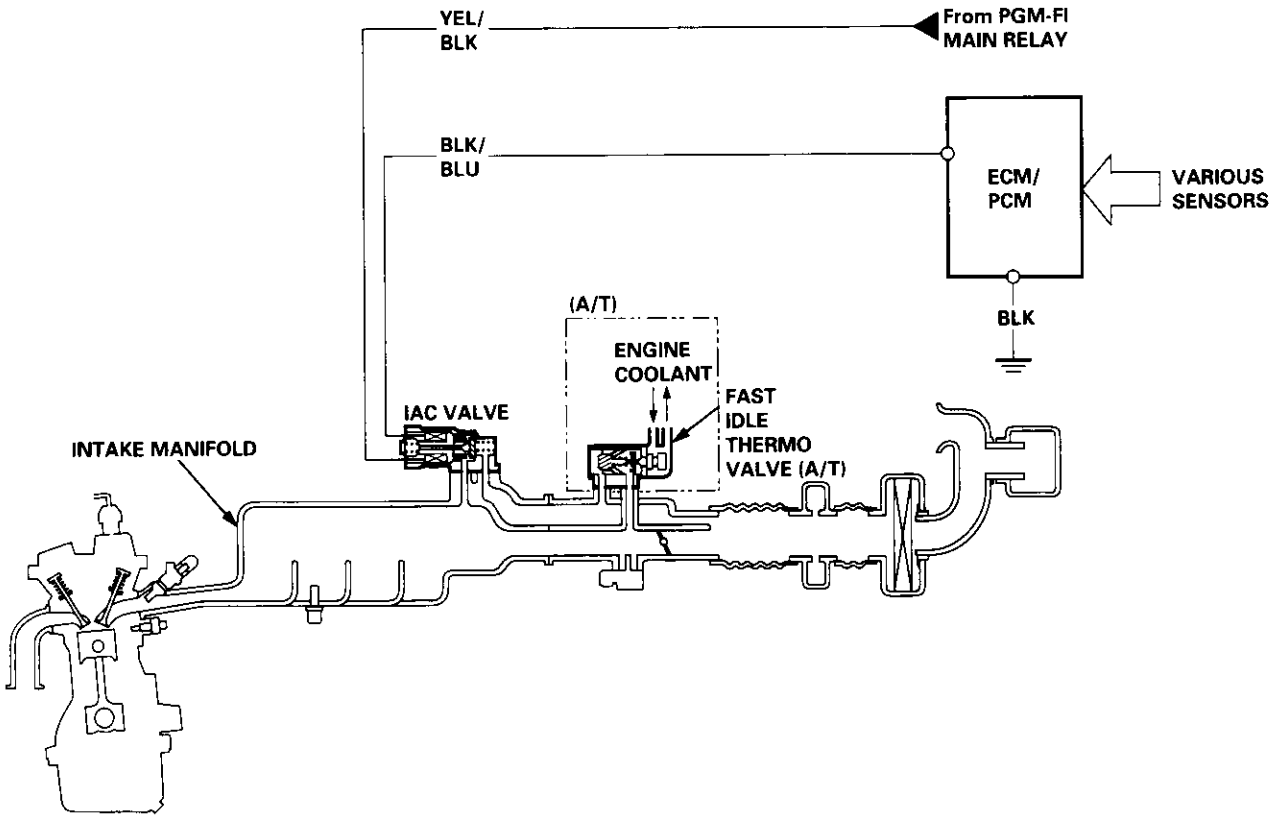
2. Install the HO2S in reverse order of removal.

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Idle Control System

System Description

The idle speed of the engine is controlled by the Idle Air Control (IAC) Valve.
The valve changes the amount of air bypassing into the intake manifold in response to electric current controlled by the ECM/PCM. When the IAC Valve is activated, the valve opens to maintain the proper idle speed.



1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150 – 300 rpm.

2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.

3. When the idle speed is out of specification and the scan tool does not indicate Diagnostic Trouble Code (DTC) P0505 or P1508, check the following items:
   - Adjust the idle speed (see page 11-169, 170)
   - Air conditioning signal (see page 11-155)
   - ALT FR signal (see page 11-159)
   - Starter switch signal (see page 11-161)
   - A/T gear position signal (see section 14)
   - PSP switch signal (see page 11-162)
   - Brake switch signal (see page 11-166)
   - Fast idle thermo valve (see page 11-168)
   - Hoses and connections
   - IAC valve and its mounting O-rings

4. If the above items are normal, substitute a known-good IAC valve and readjust the idle speed (see page 11-169, 170).

   If the idle speed still cannot be adjusted to specification (and the scan tool does not indicate DTC P0505 or P1508) after IAC valve replacement, substitute a known-good ECM/PCM and recheck. If symptom goes away, replace the original ECM/PCM.

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Idle Control System

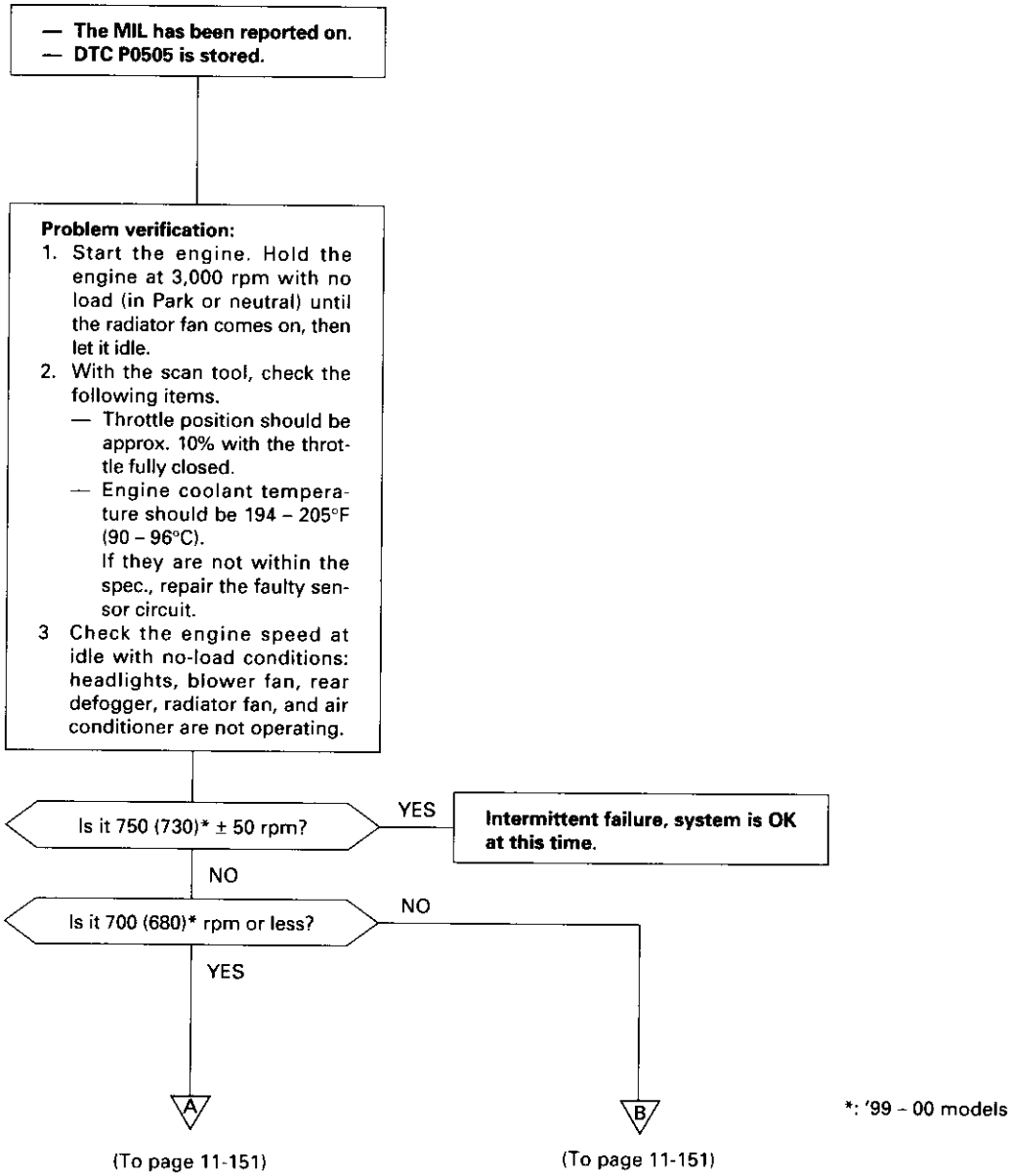
P0505 The scan tool indicates Diagnostic Trouble Code (DTC) P0505: Idle control system malfunction.

NOTE: If DTC P1508 is stored at the same time as DTC P0505, troubleshoot DTC P1508 first, then troubleshoot DTC P0505.

Possible Cause

- IAC valve mechanical malfunction
- Throttle body clogged port, improper adjustment
- Intake manifold gasket leakaging
- Intake air hose loose leakaging
- Vacuum hose leakaging
- ECT sensor incorrect output
- Throttle Position sensor incorrect output

Troubleshooting Flowchart



*: '99 – 00 models

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(From page 11-150)

A

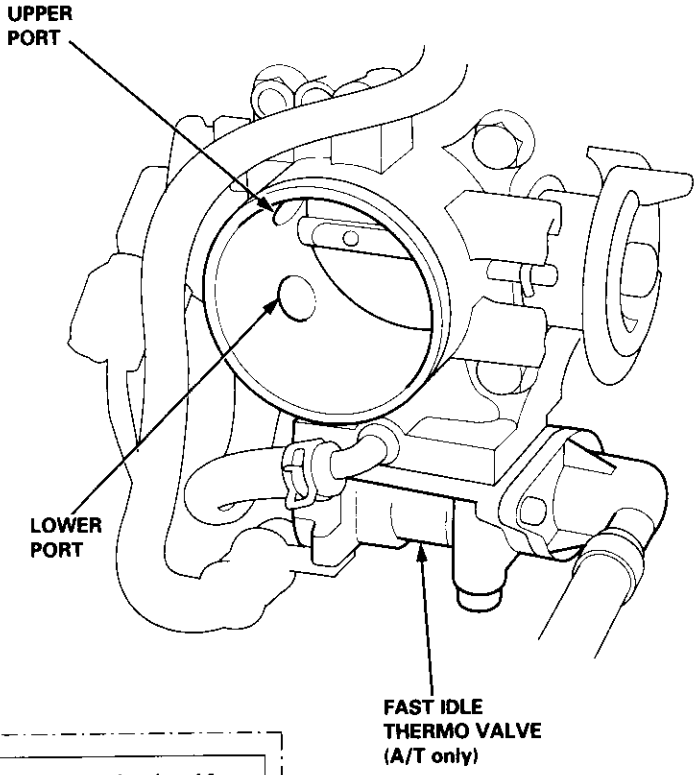
Check the IAC valve:
Disconnect the 2P connector from the IAC valve.

Does the engine speed drop or the engine stall?

NO → **Replace the IAC valve.**

YES

Adjust the (base) idle speed (see page 11-169, 170). If the base idle speed cannot be adjusted, clean the ports in the throttle body.



(From page 11-150)

B

(A/T)

Check the fast idle thermo valve:
1. Turn the ignition switch OFF.
2. Remove the intake air duct from the throttle body.
3. Start the engine and let it idle.
4. Put your finger on the lower port in the throttle body.

Does the engine speed drop?

YES → **Check engine coolant level and for air in the cooling system. If OK, replace the fast idle thermo valve.**

NO

Put your finger on the upper port in the throttle body.

Does the engine speed drop?

NO → **Check for vacuum leaks, make sure the throttle valve is completely closed, and repair as necessary.**

YES

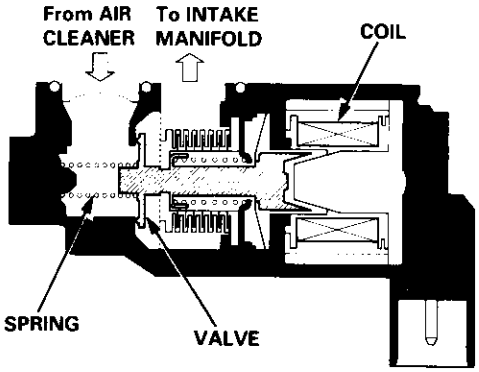
Adjust the idle speed (see page 11-169, 170). If the adjustment does not correct the problem, replace the IAC valve.

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Idle Air Control (IAC) Valve

P1508 The scan tool indicates Diagnostic Trouble Code (DTC) P1508: A problem in the Idle Air Control (IAC) valve circuit.

The IAC Valve changes the amount of air bypassing the throttle body in response to a current signal from the ECM/PCM in order to maintain the proper idle speed.



'97 model:

— The MIL has been reported on.
— DTC P1508 is stored.

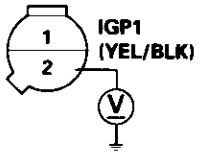
Problem verification:
1. Do the PCM Reset Procedure.
2. Start the engine, and warm it up to normal operating temperature.

Is DTC P1508 indicated? NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C132 (IAC valve) and at the PCM.**

YES

Check for an open in the wire (IGP1 line):
1. Turn the ignition switch OFF.
2. Disconnect the IAC valve 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the IAC valve 2P connector terminal No. 2.

IAC VALVE 2P CONNECTOR (C132)



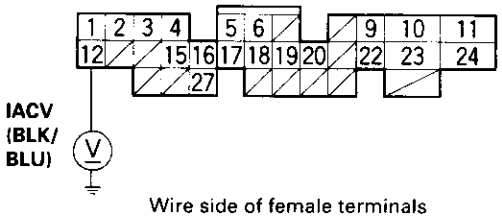
Wire side of female terminals

Is there battery voltage? NO → **Repair open in the wire between the IAC valve and the PGM-FI main relay.**

YES

Check for an open or short in the wire (IACV line):
1. Turn the ignition switch OFF and reconnect the IAC valve 2P connector.
2. Disconnect the PCM connector A (32P).
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and PCM connector terminal A12.

PCM CONNECTOR A (32P)



Wire side of female terminals

(To page 11-153)

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(From page 11-152)

Is there battery voltage?

NO → **Repair open or short in the wire between the PCM (A12) and the IAC valve.**

YES

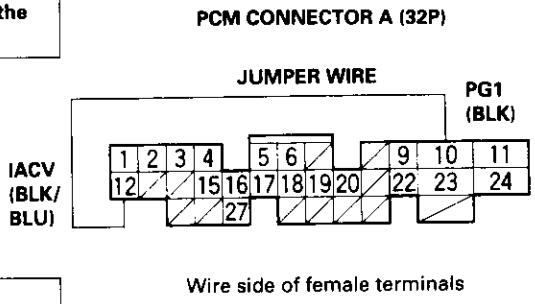
Check the IAC valve function: Momentarily connect PCM connector terminals A12 and A10 with a jumper wire several times.

Does the IAC valve click?

NO → **Replace the IAC valve.**

YES

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.



(cont'd)

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Idle Air Control (IAC) Valve (cont'd)

'98 – 00 models:

— The MIL has been reported on.
— DTC P1508 is stored.

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Start the engine, and warm it up to normal operating temperature.

Is DTC P1508 indicated?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C132 (IAC valve) and at the ECM/PCM.**

YES

Check for an open in the wire (IGP1 line):
1. Turn the ignition switch OFF.
2. Disconnect the IAC valve 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the IAC valve 2P connector terminal No. 2.

Is there battery voltage?

NO → **Repair open in the wire between the IAC valve and the PGM-FI main relay.**

YES

Check for an open or short in the wire (IACV line):
1. Turn the ignition switch OFF and reconnect the IAC valve 2P connector.
2. Disconnect ECM/PCM connector B (25P).
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and ECM/PCM connector terminal B23.

Is there battery voltage?

NO → **Repair open or short in the wire between the ECM/PCM (B23) and the IAC valve.**

YES

Check the IAC valve function:
Momentarily connect ECM/PCM connector terminals B23 and B2 with a jumper wire several times.

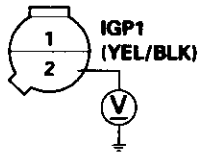
Does the IAC valve click?

NO → **Replace the IAC valve.**

YES

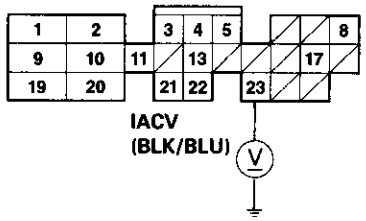
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

IAC VALVE 2P CONNECTOR (C132)

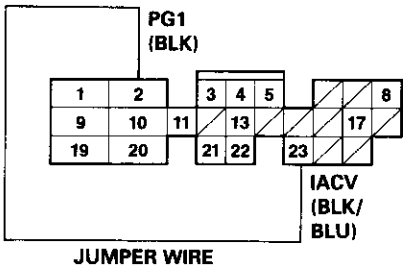


Wire side of female terminals

ECM/PCM CONNECTOR B (25P)



Wire side of female terminals



JUMPER WIRE

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Air Conditioning Signal

This signals the ECM/PCM when there is a demand for cooling from the air conditioning system.

'97 model:

Inspection of Air Conditioning Signal.

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the A/C pressure switch 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals C5 and A9.

Is there battery voltage?

NO

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect PCM connector C (31P).
3. Check for continuity between body ground and PCM connector terminal C5.

YES

Is there continuity?

YES

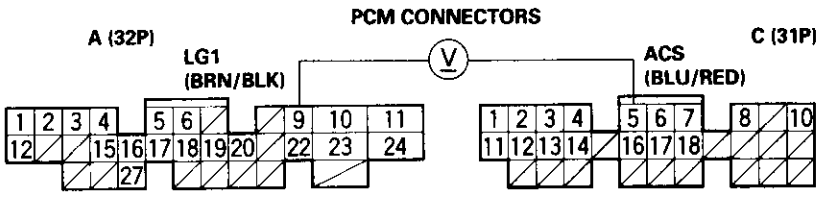
Repair short in the wire between the PCM (C5) and the A/C pressure switch.

NO

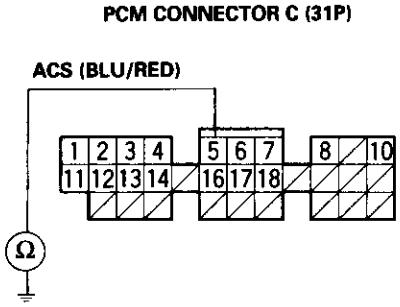
— **Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.**
— **See the air conditioner inspection (see section 22).**

Check for an open in the wire (ACC line):
1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch 2P connector.
3. Turn the ignition switch ON (II).
4. Momentarily connect PCM connector terminals A9 and A17 with a jumper wire several times.

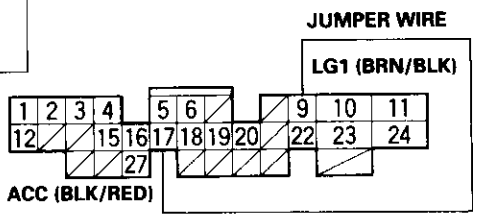
(To page 11-156)



Wire side of female terminals



Wire side of female terminals



Wire side of female terminals

(cont'd)

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Air Conditioning Signal (cont'd)

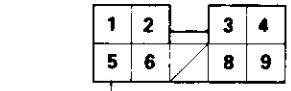
(From page 11-155)

Is there a clicking noise from the A/C compressor clutch?

NO

Check for an open in the wire (ACC line):
Momentarily connect the under-hood fuse/relay box 9P connector terminal No. 5 to body ground with a jumper wire several times.

UNDER-HOOD FUSE/RELAY BOX 9P CONNECTOR (C352)



JUMPER WIRE

ACC (BLK/RED)
Wire side of female terminals

Is there a clicking noise from the A/C compressor clutch?

NO

See air conditioner inspection (see section 22).

YES

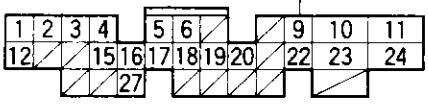
Repair open in the wire between the PCM (A17) and the A/C clutch relay.

YES

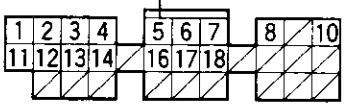
Check the A/C operation:
1. Start the engine.
2. Turn the blower switch ON.
3. Turn the A/C switch ON.

PCM CONNECTORS

A (32P)
LG1 (BRN/BLK)



C (31P)
ACS (BLU/RED)



Wire side of female terminals

Does the A/C operate?

NO

Check for an open in the wire (ACS line):
Measure voltage between PCM connector terminals A9 and C5.

YES

Air conditioning signal is OK.

Is there less than 1.0 V?

NO

Repair open in the wire between the PCM (C5) and the A/C switch.

YES

— **Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.**
— **See the air conditioner inspection (see section 22).**

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'98 – 00 models:

Inspection of Air Conditioning Signal.

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the A/C pressure switch 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM/PCM connector terminals A27 and B20.

Is there battery voltage?

NO

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect ECM/PCM connector A (32P).
3. Check for continuity between body ground and ECM/PCM connector terminal A27.

YES

Check for an open in the wire (ACC line):
1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch 2P connector.
3. Turn the ignition switch ON (II).
4. Momentarily connect ECM/PCM connector terminals A17 and B20 with a jumper wire several times.

(To page 11-158)

Is there continuity?

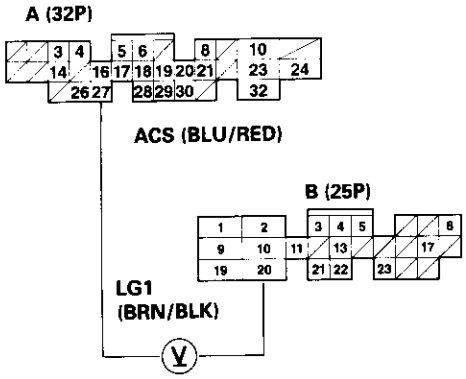
YES

Repair short in the wire between the ECM/PCM (A27) and the A/C pressure switch.

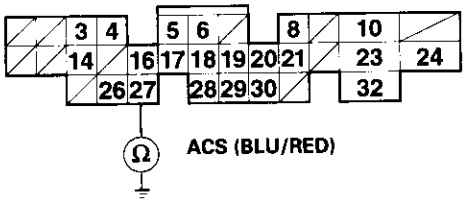
NO

— **Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.**
— **See the air conditioner inspection (see section 22).**

ECM/PCM CONNECTORS

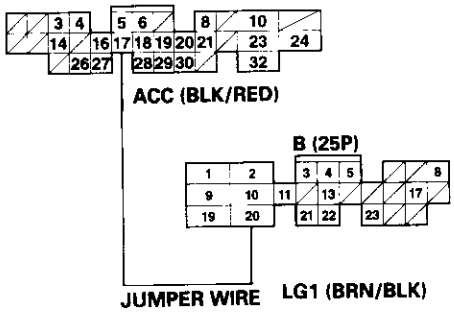


ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

ECM/PCM CONNECTORS



(cont'd)

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Air Conditioning Signal (cont'd)

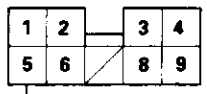
(From page 11-157)

Is there a clicking noise from the A/C compressor clutch?

NO

Check for an open in the wire (ACC line):
Momentarily connect the under-hood fuse/relay box 9P connector terminal No. 5 to body ground with a jumper wire several times.

UNDER-HOOD FUSE/RELAY BOX 9P CONNECTOR (C352)



JUMPER WIRE

ACC (BLK/RED)
Wire side of female terminals

YES

Is there a clicking noise from the A/C compressor clutch?

NO

See air conditioner inspection (see section 22).

YES

Repair open in the wire between the ECM/PCM (A17) and the A/C clutch relay.

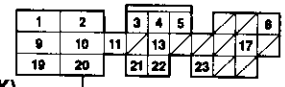
ECM/PCM CONNECTORS

A (32P)



ACS (BLU/RED)

B (25P)



LG1 (BRN/BLK)



Wire side of female terminals

Check the operation of the A/C:
1. Start the engine.
2. Turn the blower switch ON.
3. Turn the A/C switch ON.

Does the A/C operate?

NO

Check for an open in the wire (ACS line):
Measure voltage between ECM/PCM connector terminals A27 and B20.

YES

Air conditioning signal is OK.

Is voltage less than 1.0 V?

NO

Repair open in the wire between the ECM/PCM (A27) and the A/C switch.

YES

- **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**
- **See the air conditioner inspection (see section 22).**

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Alternator (ALT) FR Signal

This signals the ECM/PCM when the Alternator (ALT) is charging.

'97 model:

Inspection of ALT FR Signal.

Check for a short in the wire (ALT F line):
1. Disconnect the 4P (3P)* connector from the ALT.
2. Turn the ignition switch ON (II).
3. Measure voltage between PCM connector terminals C17 and A9.

Is there approx. 5 V?

NO

Check for a short in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect PCM connector C (31P).
4. Check for continuity between body ground and PCM connector terminal C17.

Is there continuity?

YES

Repair short in the wire between the PCM (C17) and the ALT.

NO

Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.

YES

Check the operation of the ALT:
1. Turn the ignition switch OFF.
2. Reconnect the ALT 4P (3P)* connector to the ALT.
3. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
4. Measure voltage between PCM connector terminals C17 and A9.

Does the voltage decrease when headlights and rear defogger are turned on?

YES

ALT FR signal is OK.

NO

Check for an open in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect PCM connector C (31P).
4. Disconnect the 4P (3P)* connector from the ALT.
5. Connect the ALT 4P (3P)* connector terminal No. 4 (No. 1)* to body ground with a jumper wire.
6. Check for continuity between body ground and PCM connector terminal C17.

Is there continuity?

NO

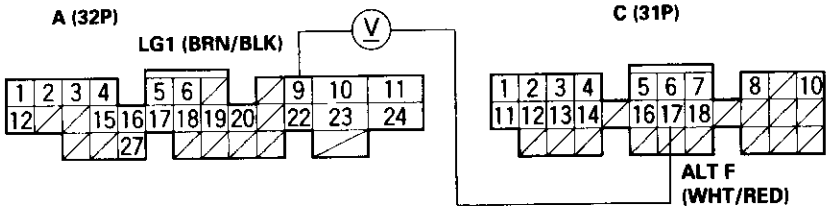
Repair open wire between the PCM (C17) and the ALT.

YES

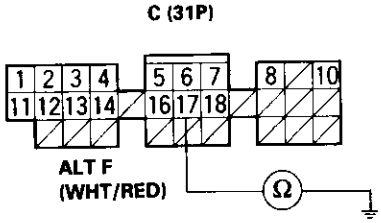
See the ALT inspection (see section 23).

*: Canada

PCM CONNECTORS



Wire side of female terminals

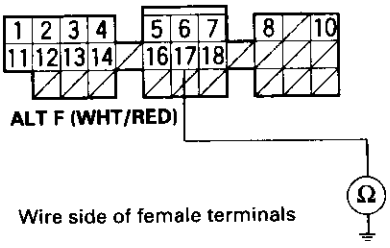


ALT CONNECTOR (C105)



Wire side of female terminals

PCM CONNECTOR C (31P)



Wire side of female terminals

(cont'd)

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Alternator (ALT) FR Signal (cont'd)

'98 – 00 models:

Inspection of ALT FR Signal.

Check for a short in the wire (ALT F line):
1. Disconnect the 4P (3P)* connector from the ALT.
2. Turn the ignition switch ON (II).
3. Measure voltage between ECM/PCM connector terminals C5 and B20.

Is there approx. 5 V?

NO

Check for a short in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect ECM/PCM connector C (31P).
4. Check for continuity between body ground and ECM/PCM connector terminal C5.

Is there continuity?

YES

Repair short in the wire between the ECM/PCM (C5) and the ALT.

NO

Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.

YES

Check the operation of the ALT:
1. Turn the ignition switch OFF.
2. Reconnect the ALT 4P (3P)* connector to the ALT.
3. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
4. Measure voltage between ECM/PCM connector terminals C5 and B20.

Does the voltage decrease when headlights and rear defogger are turned on?

YES

ALT FR signal is OK.

NO

Check for an open in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect ECM/PCM connector C (31P).
4. Disconnect the 4P (3P)* connector from the ALT.
5. Connect the ALT 4P (3P)* connector terminal No. 4 (No. 1)* to body ground with a jumper wire.
6. Check for continuity between body ground and ECM/PCM connector terminal C5.

Is there continuity?

NO

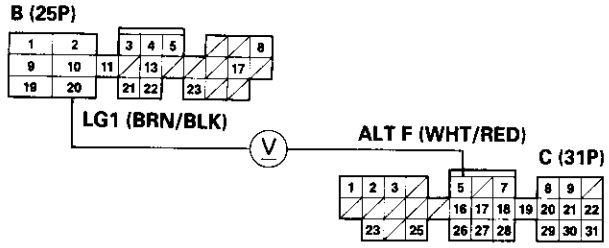
Repair open wire between the ECM/PCM (C5) and the ALT.

YES

See the ALT inspection (see section 4).

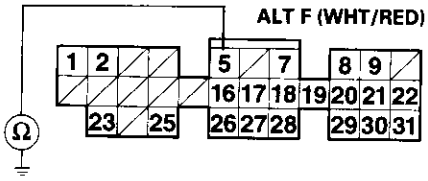
*: Canada

ECM/PCM CONNECTORS



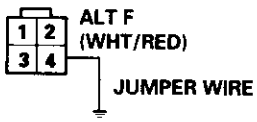
Wire side of female terminals

ECM/PCM CONNECTOR C (31P)

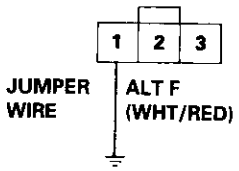


Wire side of female terminals

ALT CONNECTOR (C105)

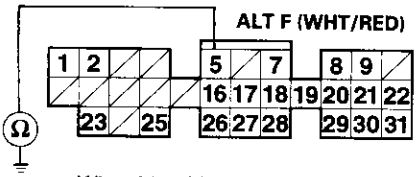


3P*



Wire side of female terminals

ECM/PCM CONNECTOR C (31P)



Wire side of female terminals

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Starter Switch Signal

This signals the ECM/PCM when the engine is cranking.

'97 model:

Inspection of Starter Switch Signal.

Check for an open or short in the wire (STS line):
Measure voltage between PCM connector terminals C6 and A9 with the ignition switch in the start (III) position.

Is there battery voltage?

NO → Inspect the No. 31 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

YES → **Starter switch signal is OK.**

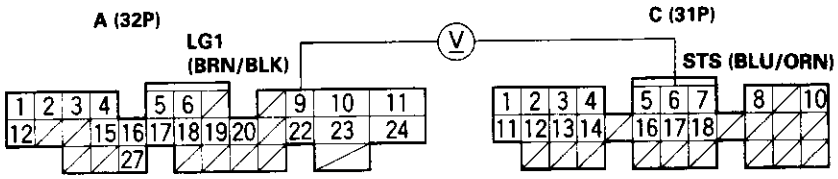
Is the fuse OK?

NO → **— Repair short in the wire between the PCM (C6) and the No. 31 STARTER SIGNAL (7.5 A) fuse or the PGM-FI main relay.**
— Replace the No. 31 STARTER SIGNAL (7.5 A) fuse.

YES → **Repair open in the wire between the PCM (C6) and the No. 31 STARTER SIGNAL (7.5 A) fuse.**

NOTE: Transmission in [N] or [P] position.

PCM CONNECTORS



'98 – 00 models:

Inspection of Starter Switch Signal.

Check for an open or short in the wire (STS line):
Measure voltage between ECM/PCM connector terminals A24 and B20 with the ignition switch in the start position (III).

Is there battery voltage?

NO → Inspect the No. 31 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

YES → **Starter switch signal is OK.**

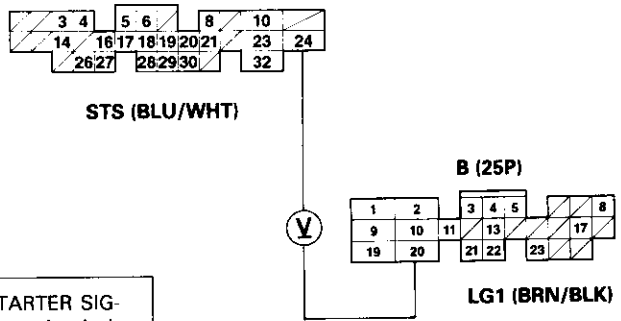
Is the fuse OK?

NO → **— Repair short in the wire between the ECM/PCM (A24) and the No. 31 STARTER SIGNAL (7.5 A) fuse or the PGM-FI main relay.**
— Replace the No. 31 STARTER SIGNAL (7.5 A) fuse.

YES → **Repair open in the wire between the ECM/PCM (A24) and the No. 31 STARTER SIGNAL (7.5 A) fuse.**

NOTE:
- M/T: Clutch pedal must be depressed.
- A/T: Transmission in [N] or [P] position.

ECM/PCM CONNECTORS



www.emanualpro.com

Power Steering Pressure (PSP) Switch Signal

This signals the ECM/PCM when the power steering load is high.

'97 model:

Inspection of PSP switch signal.

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch ON (II).
2. Measure voltage between PCM connector terminals C16 and A9.

Is there less than 1.0 V?

NO

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the PSP switch 2P connector.
3. Turn the ignition switch ON (II).
4. At the harness side, connect the PSP switch 2P connector terminals No. 1 and No. 2 with a jumper wire.
5. Measure voltage between PCM connector terminals C16 and A9.

YES

Check the operation of the PSP switch:
1. Start the engine
2. Turn the steering wheel to the full lock position*.
3. Measure voltage between PCM connector terminals C16 and A9.

Is there less than 1.0 V?

NO

— Repair open in the wire between the PCM (C16) and the PSP switch.
— Repair open in BLK wire between the PSP switch and G101.

YES

Replace the PSP switch.

Is there battery voltage?

NO

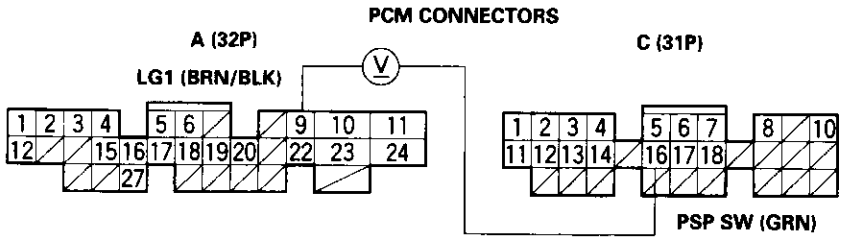
YES

PSP switch signal is OK.

(To page 11-163)

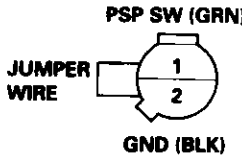
*: Do not hold the steering wheel at full lock for more than five seconds.

PCM CONNECTORS



Wire side of female terminals

PSP SWITCH 2P CONNECTOR (C135)

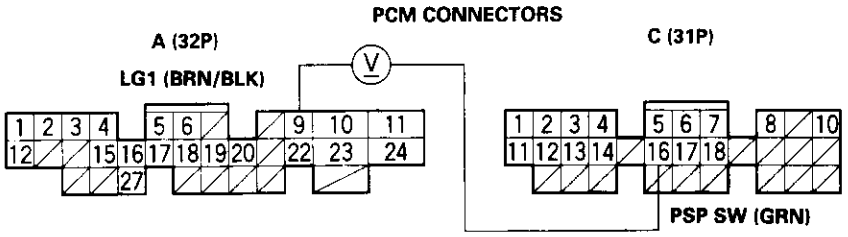


Wire side of female terminals

www.emanualpro.com

(From page 11-162)

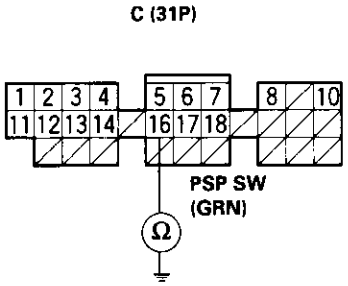
Check for a short in the PSP switch:
1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the PSP switch.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals C16 and A9.



Is there battery voltage?

NO

Check for a short in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect PCM connector C (31P).
3. Check for continuity between body ground and PCM connector terminal C16.



YES

Replace the PSP switch.

Is there continuity?

YES

Repair short in the wire between the PCM (C16) and the PSP switch.

NO

Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.

(cont'd)

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Power Steering Pressure (PSP) Switch Signal (cont'd)

'98 – 00 models:

Inspection of PSP switch signal.

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch ON (II).
2. Measure voltage between ECM/PCM connector terminals A26 and B20.

Is there less than 1.0 V?

NO

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the PSP switch 2P connector.
3. Turn the ignition switch ON (II).
4. At the wire side, connect the PSP switch 2P connector terminals No. 1 and No. 2 with a jumper wire.
5. Measure voltage between ECM/PCM connector terminals A26 and B20.

YES

Check the operation of the PSP switch:
1. Start the engine
2. Turn steering wheel to the full lock position*.
3. Measure voltage between ECM/PCM connector terminals A26 and B20.

Is there less than 1.0 V?

NO

— Repair open in the wire between the ECM/PCM (A26) and the PSP switch.
— Repair open in BLK wire between the PSP switch and G101.

YES

Replace the PSP switch.

Is there battery voltage?

NO

YES

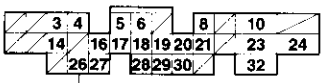
PSP switch signal is OK.

(To page 11-165)

*: Do not hold the steering wheel at full lock for more than five seconds.

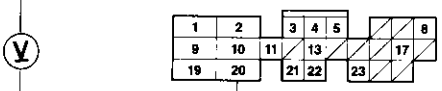
ECM/PCM CONNECTORS

A (32P)



PSP SW (GRN)

B (25P)

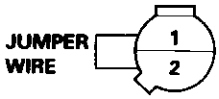


LG1 (BRN/BLK)

Wire side of female terminals

PSP SWITCH 2P CONNECTOR (C135)

PSP SW (GRN)



GND (BLK)

Wire side of female terminals

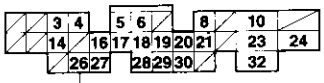
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(From page 11-164)

Check for a short in the PSP switch:
1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the PSP switch.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM/PCM connector terminals A26 and B20.

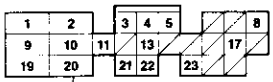
ECM/PCM CONNECTORS

A (32P)



PSP SW (GRN)

B (25P)



LG1 (BRN/BLK)



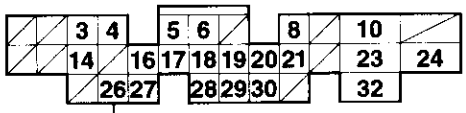
Wire side of female terminals

Is there battery voltage?

NO

Check for a short in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect ECM/PCM connector A (32P).
3. Check for continuity between body ground and ECM/PCM connector terminal A26.

A (32P)



PSP SW (GRN)



Wire side of female terminals

YES

Replace the PSP switch.

Is there continuity?

YES

Repair short in the wire between the ECM/PCM (A26) and the PSP switch.

NO

Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.

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Brake Switch Signal

This signals the ECM/PCM when the brake pedal is depressed.

Inspection of Brake Switch Signal.

Are the brake lights on without pressing the brake pedal?

YES → **Inspect the brake switch (see section 19).**

NO

Press the brake pedal.

Do the brake lights come on?

NO → Inspect the HORN, STOP (15 A) fuse in the under-hood fuse/ relay box.

YES

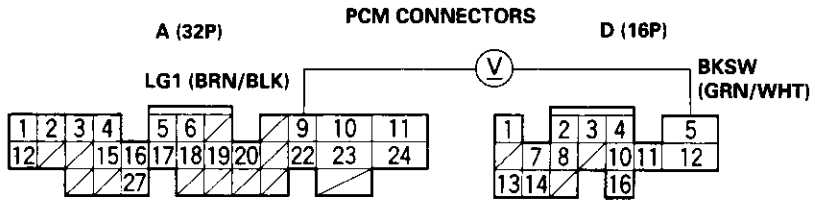
Is the fuse OK?

NO → **— Repair short in the wire between the brake switch and the HORN, STOP (15 A) fuse.**
— Replace the HORN, STOP (15 A) fuse.

YES → **— Repair open in the wire between the brake switch and the HORN, STOP (15 A) fuse.**
— Inspect the brake switch (see section 19).

('97 model)

Check for an open in the wire (BKSW line):
1. Press the brake pedal.
2. Measure voltage between PCM connector terminals D5 and A9 with the brake pedal pressed.



Is there battery voltage?

NO → **Repair open in the wire between the PCM (D5) and the brake switch.**

YES

(To page 11-167)

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(From page 11-166)

('98 – 00 models)

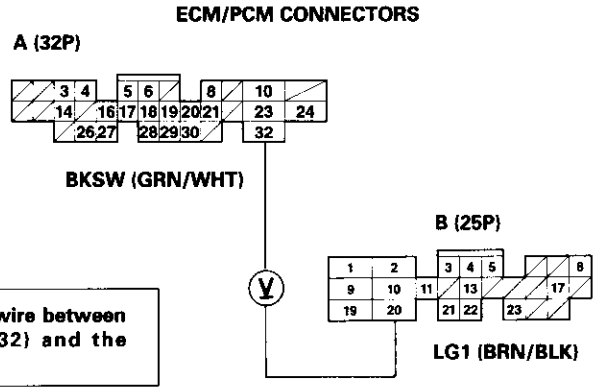
Check for an open in the wire (BKSW line):
1. Press the brake pedal.
2. Measure voltage between ECM/PCM connector terminals A32 and B20 with the brake pedal pressed.

Is there battery voltage?

NO → **Repair open in the wire between the ECM/PCM (A32) and the brake switch.**

YES

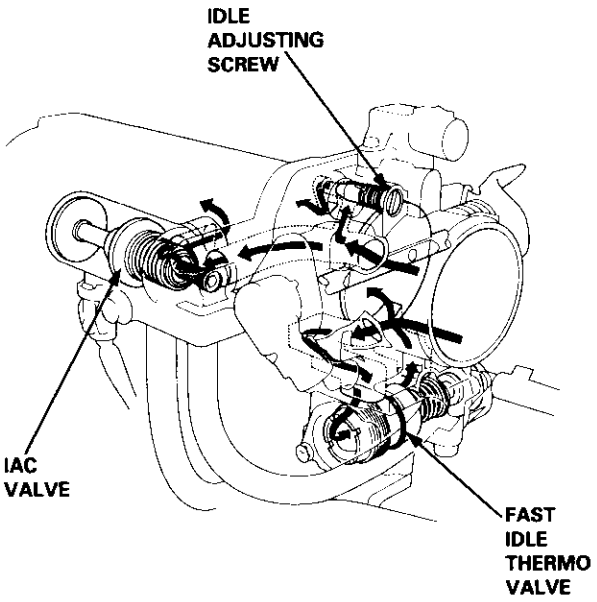
Brake switch signal is OK.

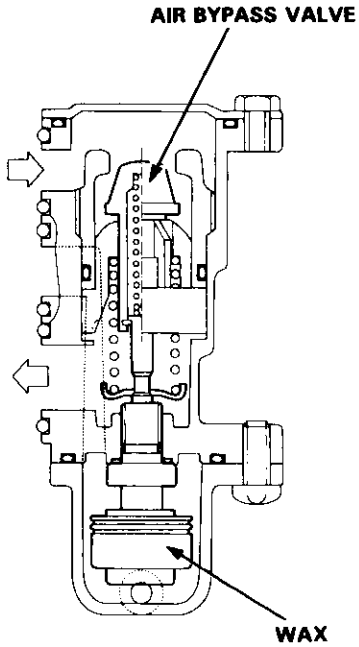


Fast Idle Thermo Valve (A/T)

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle thermo valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the intake manifold.

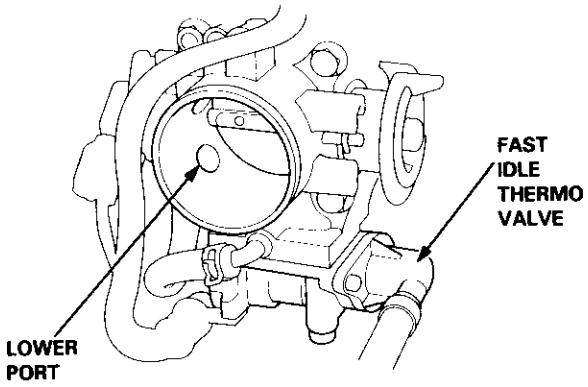




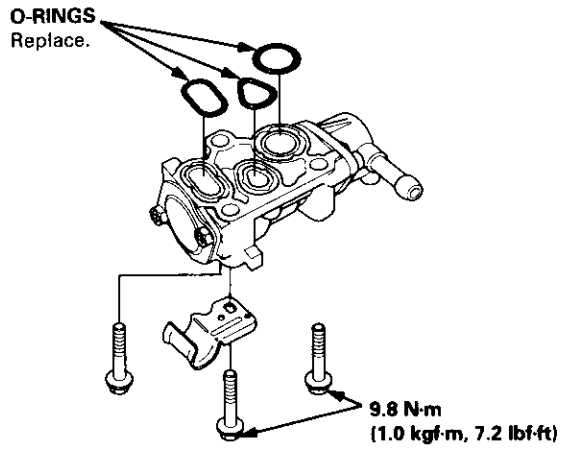
Inspection

NOTE: The fast idle thermo valve is factory adjusted; it should not be disassembled.

1. Remove the intake air duct from the throttle body.
2. Start the engine.
3. Put your finger over the lower port in throttle body, and make sure that there is air flow with the engine cold (engine coolant temperature below 86°F, 30°C).



If there is no air flow, replace the fast idle thermo valve and retest.



4. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
5. Check that the valve is completely closed. If the valve is leaking, the idle speed will drop when you cover the lower port. Check the engine coolant level and for air in the engine cooling system (see section 10). If the cooling system is OK, replace the fast idle thermo valve and recheck.

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Idle Speed Setting

Inspection/Adjustment

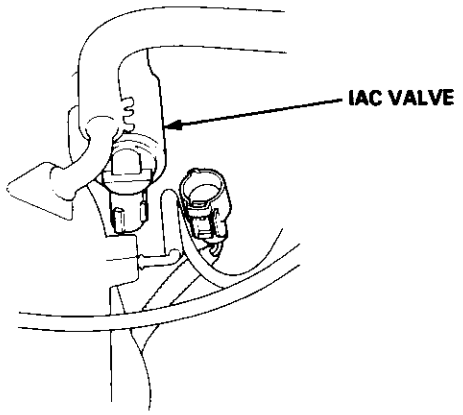
'97 model:

NOTE:
- Before setting the idle speed, check the following items:
  — The MIL has not been reported on.
  — Ignition timing
  — Spark plugs
  — Air cleaner
  — PCV system
- (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.

2. Connect a tachometer or a Honda PGM Tester.

3. Disconnect the 2P connector from the Idle Air Control (IAC) valve.

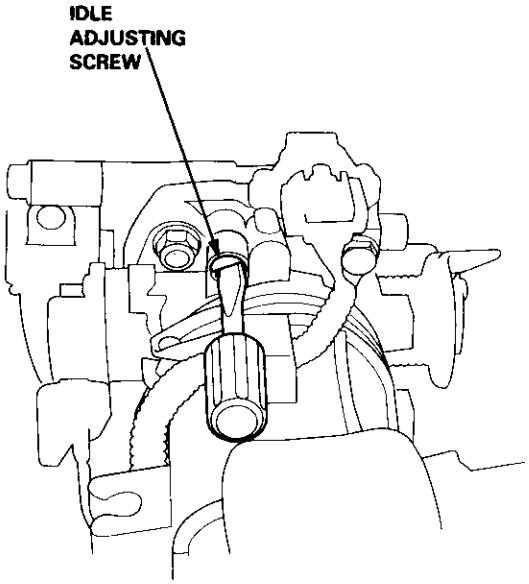


4. If the engine stalls, restart the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1,000, then slowly release the pedal until the engine idles.

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

   Idle speed should be:
   480 ± 50 rpm (in Park or neutral)

   Adjust the idle speed, if necessary, by turning the idle adjusting screw.



6. Turn the ignition switch OFF.

7. Reconnect the 2P connector to the IAC valve, then remove the BACK UP (RADIO) (7.5 A) fuse in the under-hood fuse/relay box for 10 seconds to reset the PCM.

8. Restart and let the engine idle with no-load conditions for one minute, then check the idle speed.

   NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

   Idle speed should be:
   750 ± 50 rpm (in Park or neutral)

9. Let the engine idle for one minute with the headlights (Low) ON, and check the idle speed.

   Idle speed should be:
   750 ± 50 rpm (in Park or neutral)

10. Turn the headlights off. Let the engine idle for one minute with the headlights (Low) ON, heater fan switch at HI and air conditioner on, then check the idle speed.

    Idle speed should be:
    780 ± 50 rpm (in Park or neutral)

    If the idle speed is not within specification, see the symptom chart on page 11-64. (cont'd)

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Idle Speed Setting (cont'd)

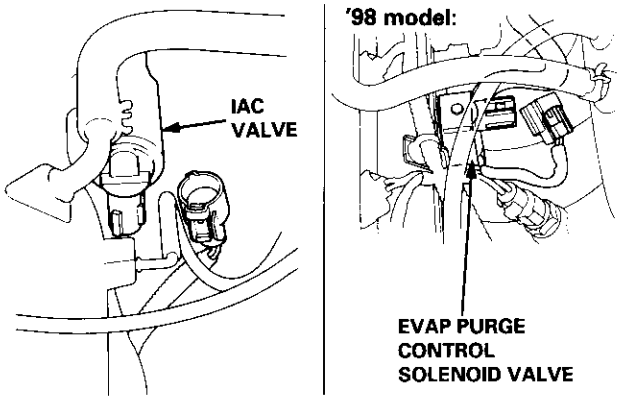
'98 – 00 models:

NOTE: Before setting the idle speed, check the following items:
— The MIL has not been reported on.
— Ignition timing
— Spark plugs
— Air cleaner
— PCV system

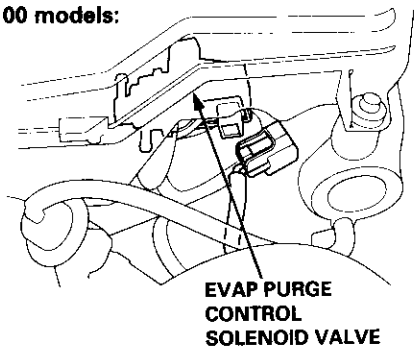
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.

2. Connect a tachometer.

3. Disconnect the IAC valve 2P connector and the EVAP purge control solenoid valve 2P connector.



'99 – 00 models:

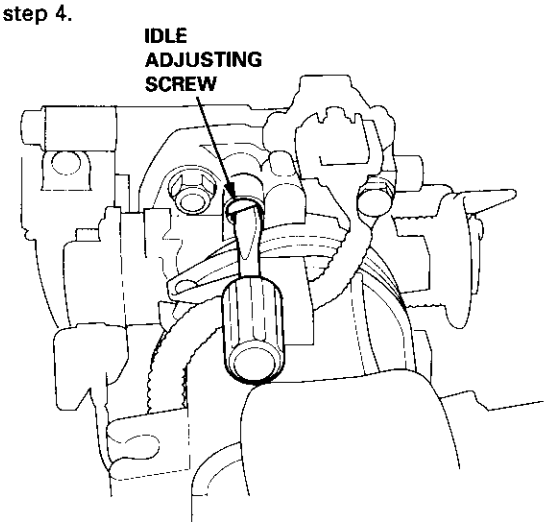


4. If the engine stalls, restart the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1,000, then slowly release the pedal until the engine idles.

5. Check the idle in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

   Idle speed should be:
   480 ± 50 rpm (in Park or neutral)

   If necessary, adjust the idle speed, by turning the idle adjusting screw.
   After adjusting the idle speed, recheck the ignition timing (see section 4). If it is out of spec, go back to step 4.



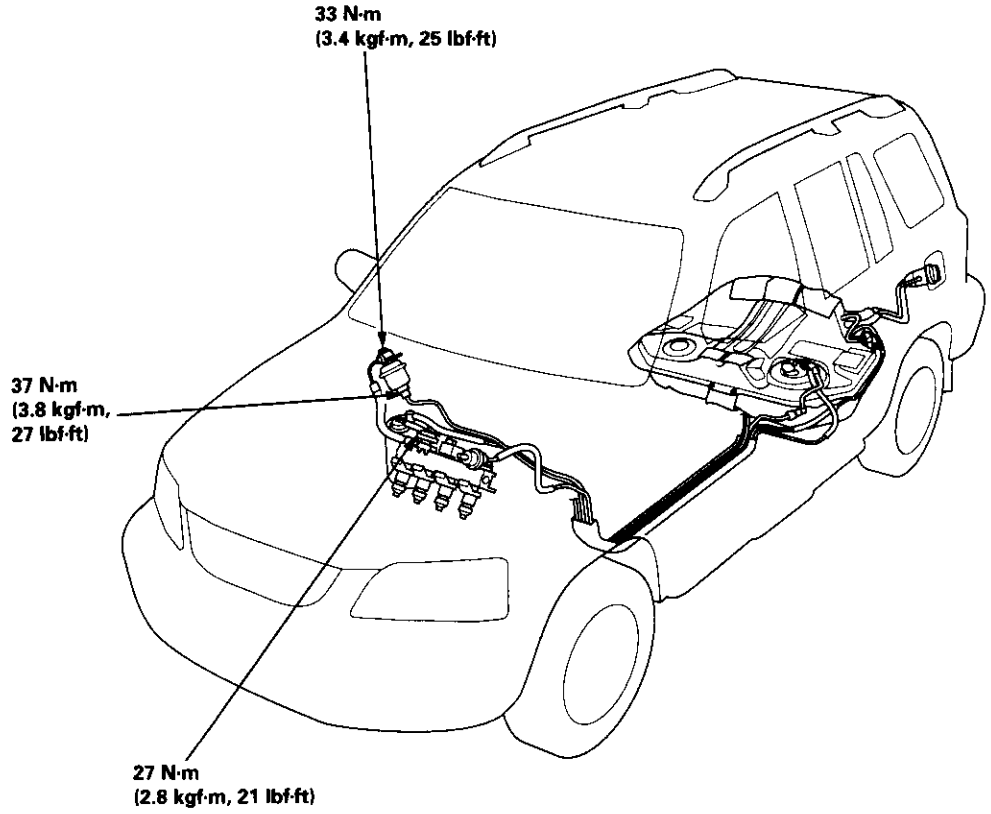
6. Turn the ignition switch OFF.
7. Reconnect the 2P connectors to the IAC valve and the EVAP purge control solenoid valve, then do the ECM/PCM reset procedure.
8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.
   Idle speed should be:
   '98 model:
   750 ± 50 rpm (in Park or neutral)
   '99 – 00 models:
   730 ± 50 rpm (in Park or neutral)
   NOTE: If the idle speed increases to 780 ± 50 rpm (770 ± 50 rpm)*, this means the EVAP system is purging the canister. To stop the purging temporarily, raise the engine speed above 1,000 rpm with the accelerator pedal, then slowly release the pedal.
   *: '99 – 00 models
9. Let the engine idle for one minute with the headlights (Low) ON, and check the idle speed.
   Idle speed should be:
   '98 model:
   750 ± 50 rpm (in Park or neutral)
   '99 – 00 models:
   730 ± 50 rpm (in Park or neutral)
10. Turn the headlights off. Let the engine idle for one minute with the heater fan switch at HI and air conditioner on, then check the idle speed.
    Idle speed should be:
    '98 model:
    780 ± 50 rpm (in Park or neutral)
    '99 – 00 models:
    770 ± 50 rpm (in Park or neutral)
    If the idle speed is not within specification, see the Symptom Chart on page 11-64.

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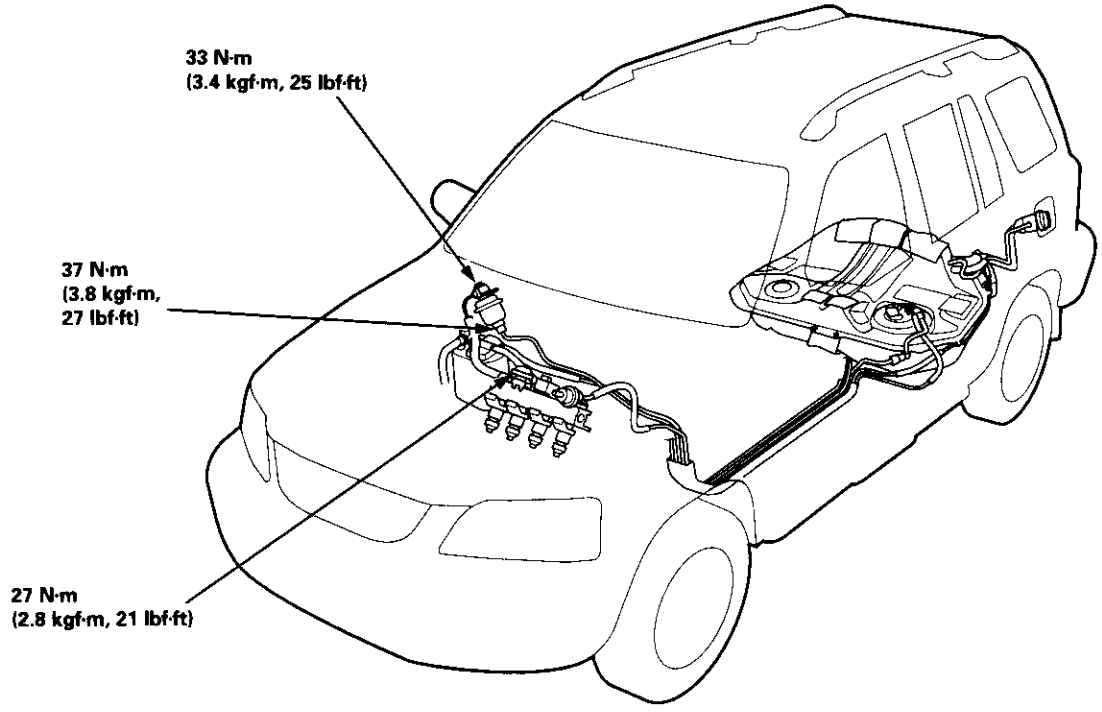
Fuel Lines

Check fuel system lines, hoses, fuel filter, and other components for damage, leaks or deterioration, and replace if necessary.

'97 model:



'98 model:

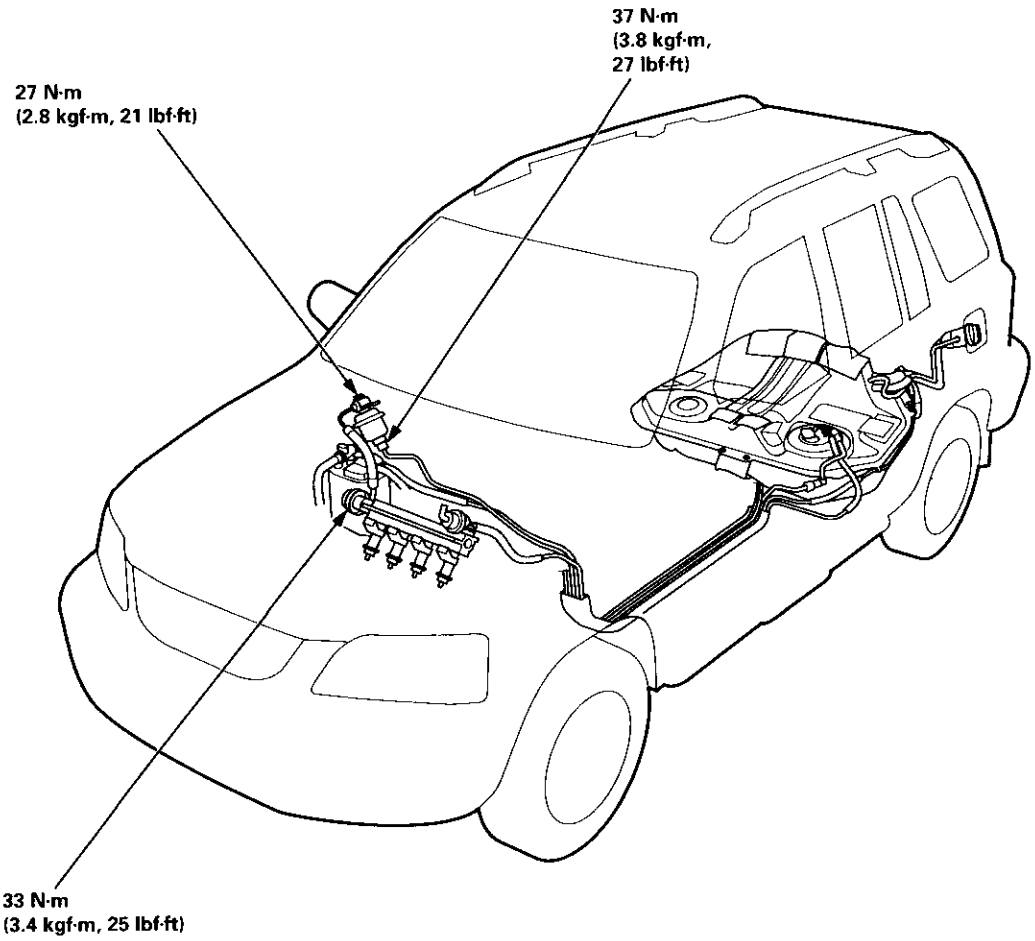


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Fuel Lines (cont'd)

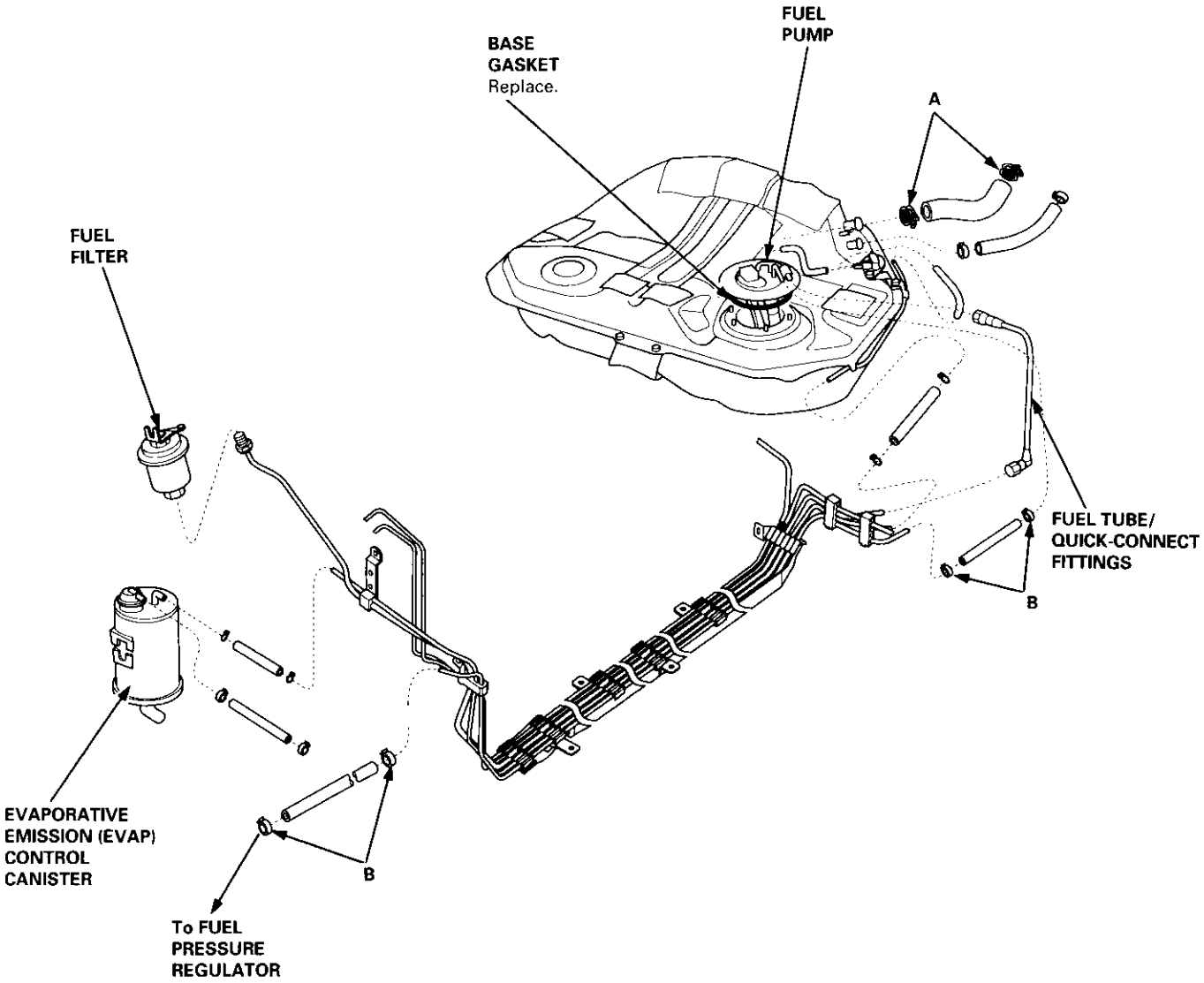
'99 – 00 models:

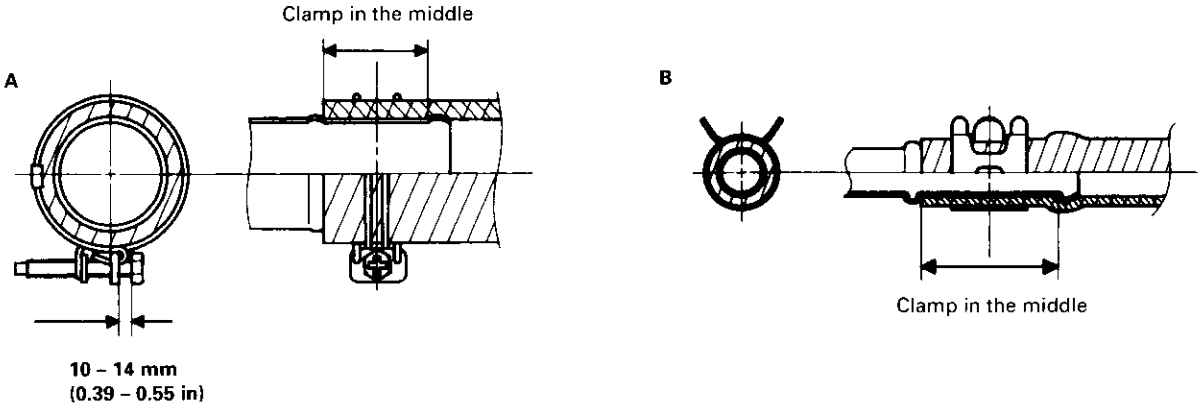


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'97 model:

Check all hose clamps, and retighten if necessary.





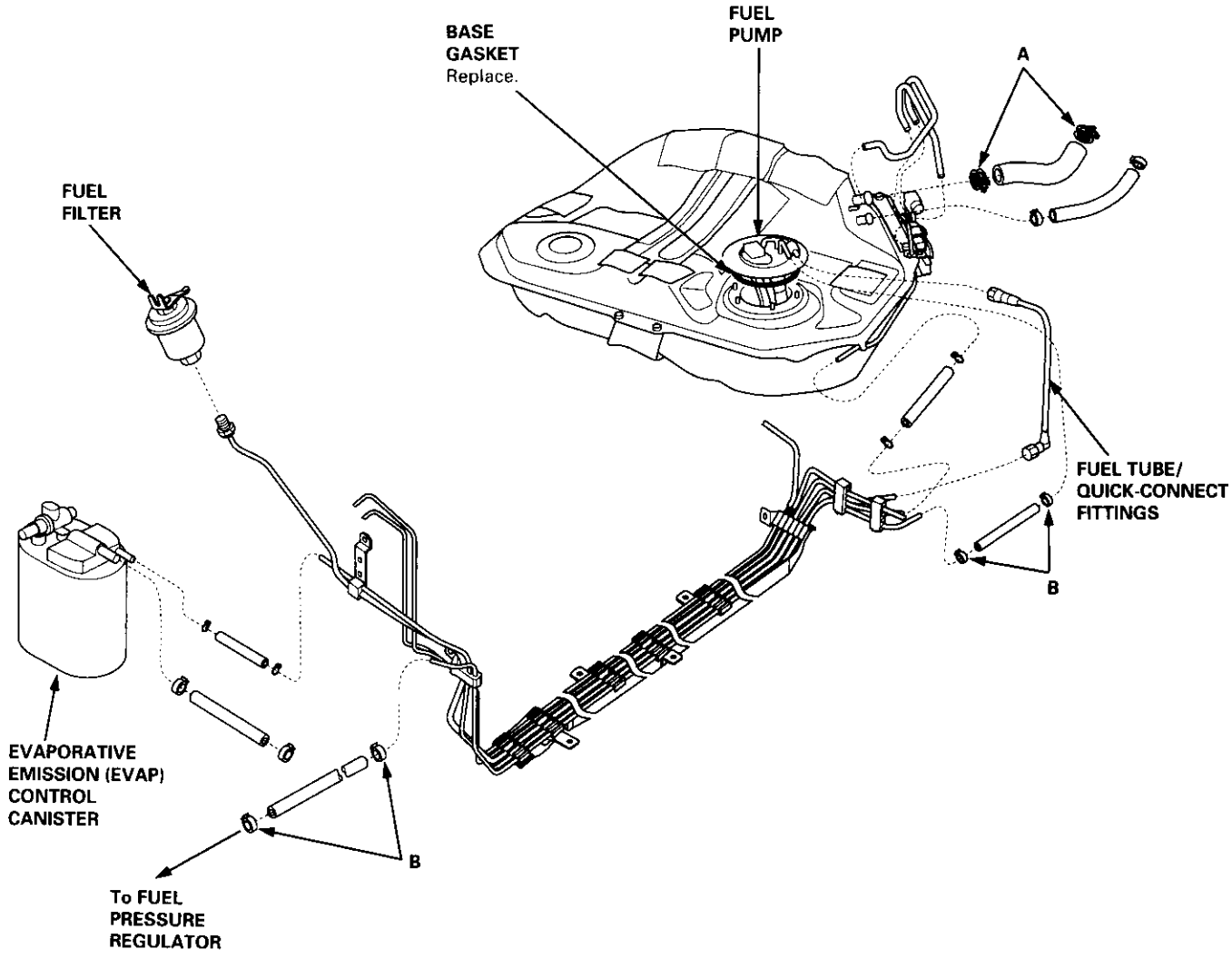
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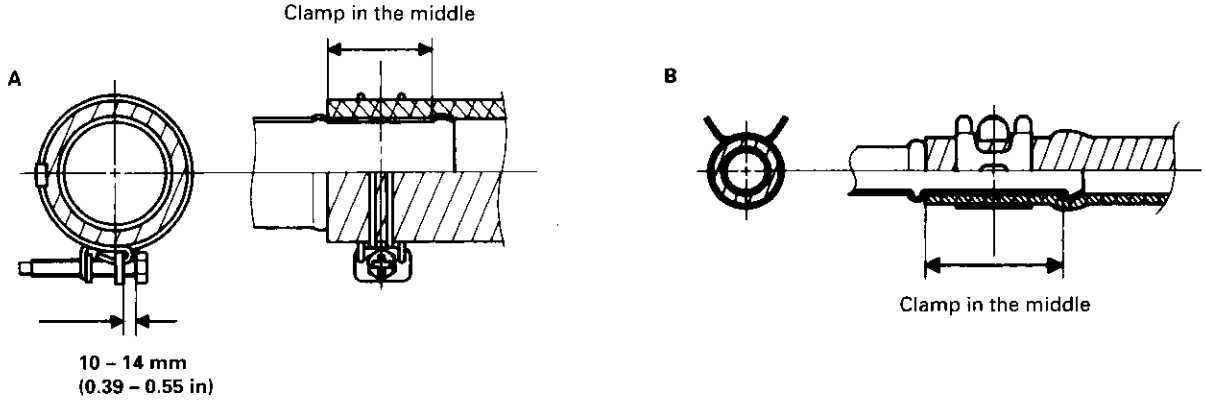
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Fuel Lines (cont'd)

'98 – 00 models:

Check all hose clamps, and retighten if necessary.





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Fuel Tube/Quick-Connect Fittings

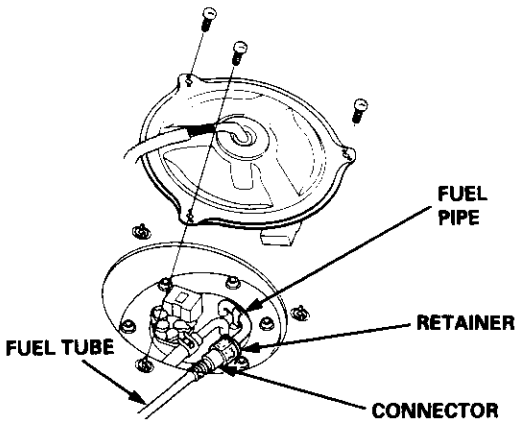
Precautions

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

The fuel tube/quick-connect fittings assembly connects the in-tank fuel pump with the fuel feed pipe. For removing or installing the fuel pump and fuel tank, it is necessary to disconnect or connect the quick-connect fittings. Pay attention to following:

- The fuel tube/quick-connect fittings assembly is not heat-resistant; be careful not to damage it during welding or other heat-generating procedures.
- The fuel tube/quick-connect fittings assembly is not acid-proof; do not touch it with a shop towel which was used for wiping battery electrolyte. Replace the fuel tube/quick-connect fittings assembly if it came into contact with electrolyte or something similar.
- When connecting or disconnecting the fuel tube/quick-connect fittings assembly, be careful not to bend or twist it excessively. Replace it if damaged.

A disconnected quick-connect fittings can be reconnected, but the retainer on the mating pipe cannot be reused once it has been removed from the pipe. Replace the retainer when
- replacing the fuel pump.
- replacing the fuel feed pipe.
- it has been removed from the pipe.
- it is damaged.

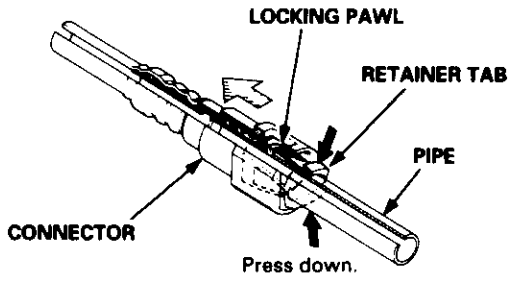


Disconnection

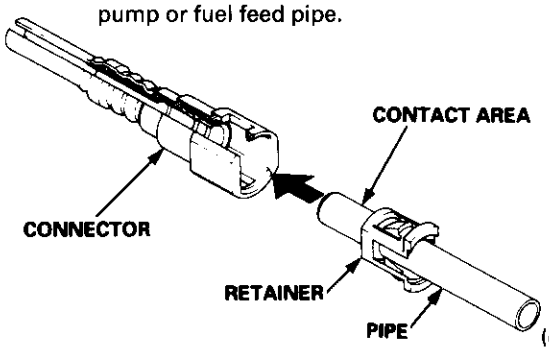
⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Disconnect the battery negative cable.
2. Remove the fuel fill cap to relieve fuel pressure in the tank.
3. Relieve fuel pressure (see page 11-178).
4. Check the fuel quick-connect fittings for dirt, and clean if necessary.
5. Hold the connector with one hand and press down the retainer tabs with the other hand, then pull the connector off.

   NOTE:
   - Be careful not to damage the pipe or other parts. Do not use tools.
   - If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
   - Do not remove the retainer from the pipe; once removed, the retainer must be replaced with a new one.



6. Check the contact area of the pipe for dirt and damage.
   - If the surface is dirty, clean it.
   - If the surface is rusty or damaged, replace the fuel pump or fuel feed pipe.

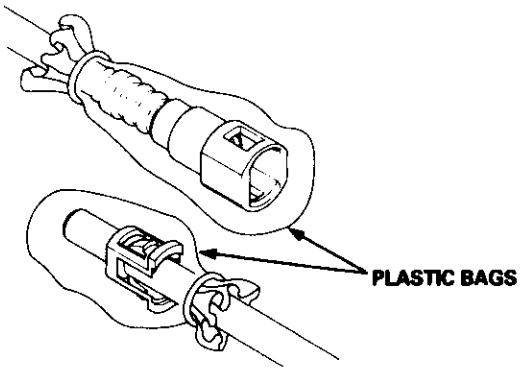


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Fuel Tube/Quick-Connect Fittings (cont'd)

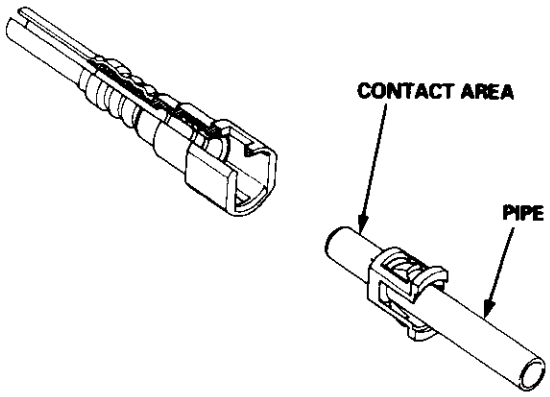
7. To prevent damage and keep out foreign matter, cover the disconnected connector and pipe end with plastic bags.



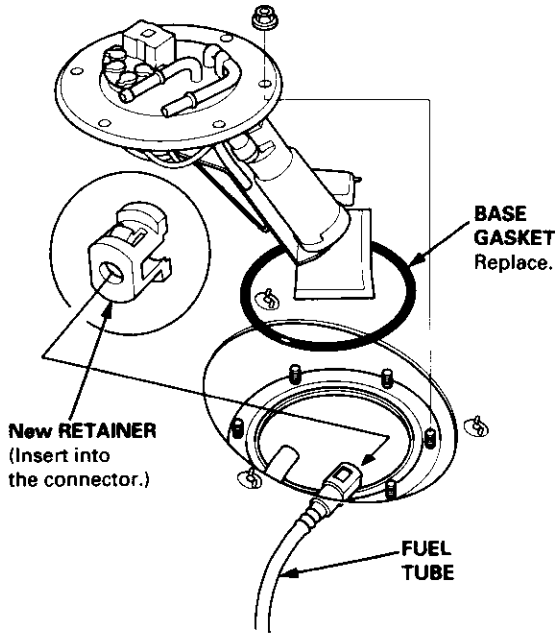
Connection

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Check the pipe contact area for dirt and damage, and clean if necessary.

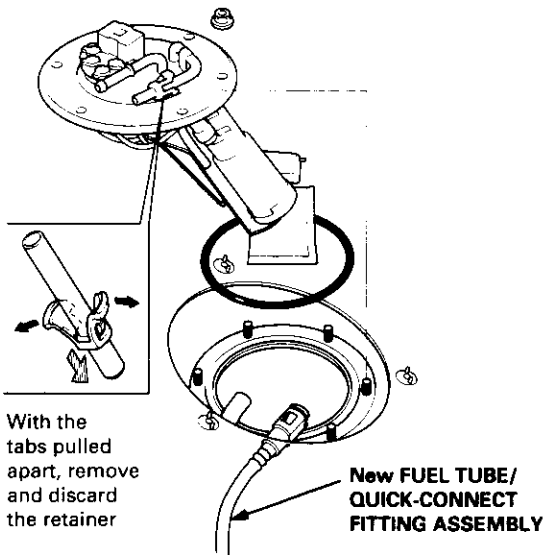


2. Insert a new retainer into the connector if the retainer is damaged, or after
   - replacing the fuel pump.
   - replacing the fuel feed pipe.
   - removing the retainer from the pipe.



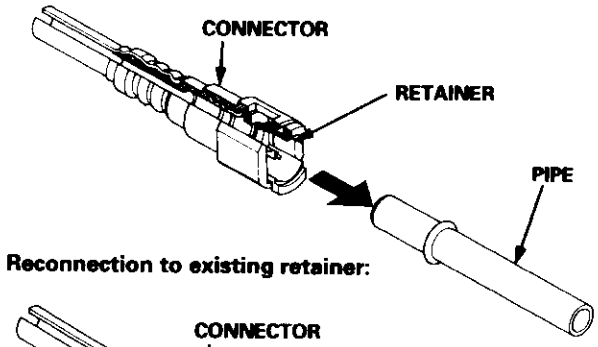
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3. Before connecting a new fuel tube/quick-connect fitting assembly, remove the old retainer from the mating pipe.

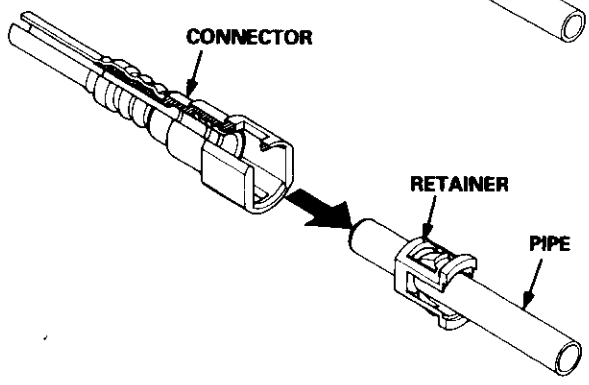


4. Align the quick-connect fittings with the pipe, and align the retainer locking pawls with the connector grooves. Then press the quick-connect fittings onto the pipe until both retainer pawls lock with a clicking sound.

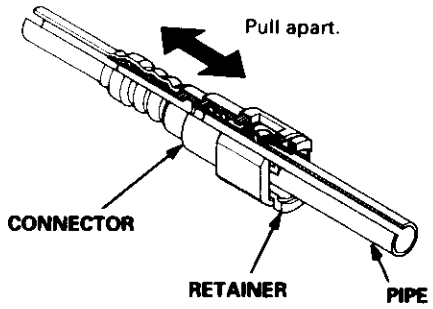
   NOTE: If it is hard to connect, put a small amount of new engine oil on the pipe end.



Reconnection to existing retainer:



5. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.



6. Reconnect the battery negative cable, and turn the ignition switch ON (II). The fuel pump will run for about two seconds, and fuel pressure will rise. Repeat two or three times, and check that there is no leakage in the fuel supply system.

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System Description

The fuel supply system consists of a fuel tank, in-tank high-pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

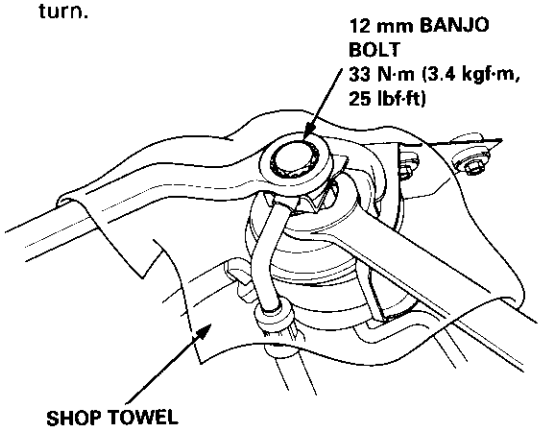
Relieving

Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 12 mm banjo bolt on the top of the fuel filter.

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.**
- **Be sure to relieve fuel pressure while the ignition switch is off.**

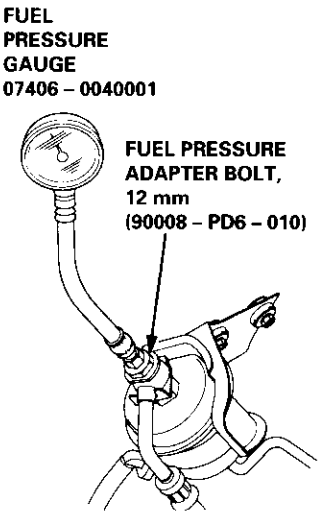
1. Write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Remove the fuel fill cap.
4. Use a box end wrench on the 12 mm banjo bolt at the fuel filter while holding the fuel filter with another wrench.
5. Place a rag or shop towel over the 12 mm banjo bolt.
6. Slowly loosen the 12 mm banjo bolt one complete turn.

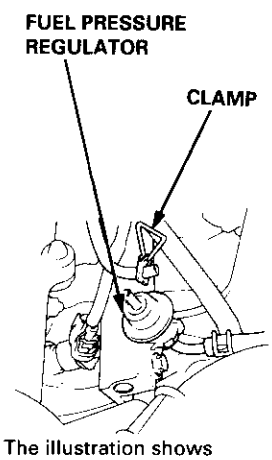


NOTE: Replace the washers whenever the 12 mm banjo bolt is loosened or removed.

Inspection

1. Relieve fuel pressure.
2. Remove the 12 mm banjo bolt on the fuel filter while holding the fuel filter with another wrench. Attach the 12 mm fuel pressure adapter bolt and the special tool.





The illustration shows '97 – 98 models, '99 – 00 models are similar.

3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch on (II), wait for two seconds, turn it off, then back on again and read the fuel pressure.
   Pressure should be:
   '97 – 98 models:
   260 – 310 kPa (2.7 – 3.2 kgf/cm², 38 – 46 psi)
   '99 – 00 models:
   270 – 320 kPa (2.8 – 3.2 kgf/cm², 40 – 47 psi)
4. Reconnect vacuum hose to the fuel pressure regulator.
   Pressure should be:
   '97 – 98 models:
   210 – 250 kPa (2.1 – 2.6 kgf/cm², 30 – 37 psi)
   '99 – 00 models:
   220 – 260 kPa (2.2 – 2.7 kgf/cm², 31 – 38 psi)
   If the fuel pressure is not as specified, first check the fuel pump (see page 11-183). If the fuel pump is OK, check the following:
   - If the fuel pressure is higher than specified, inspect for:
     — Pinched or clogged fuel return hose or line.
     — Faulty fuel pressure regulator (see page 11-181).
   - If the fuel pressure is lower than specified, inspect for:
     — Clogged fuel filter.
     — Faulty fuel pressure regulator (see page 11-181).
     — Fuel line leakage.

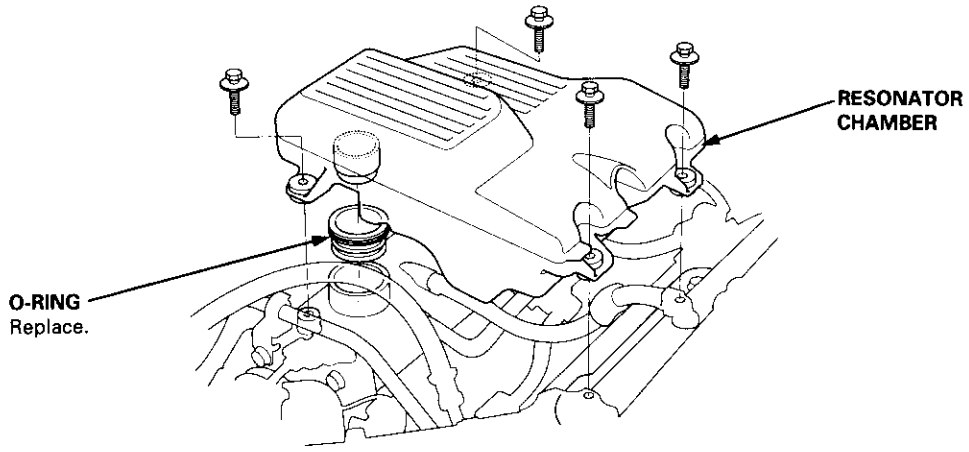
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Fuel Injectors

Replacement

1. Relieve the fuel pressure (see page 11-178).

2. Remove the resonator chamber ('99 – 00 models).



3. Disconnect the connectors from the fuel injectors, and disconnect the IAT sensor 2P connector ('97 – 98 models) and EVAP purge control solenoid valve 2P connector ('97 – 98 models).

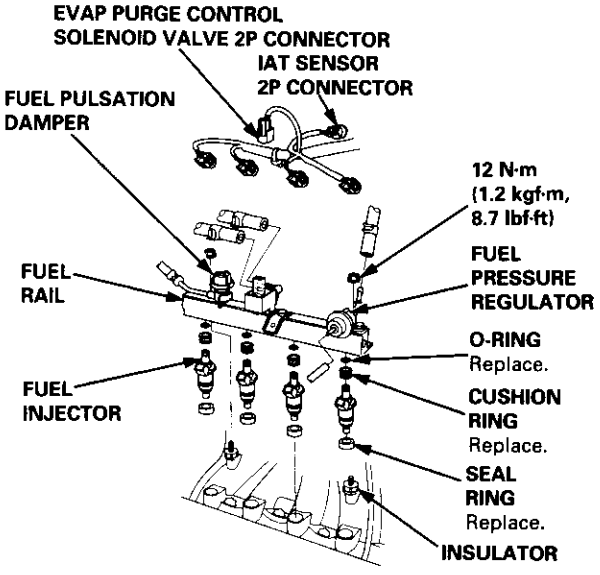
4. Disconnect the PCV valve and the vacuum hose from the fuel pressure regulator.
   Place a shop towel over the fuel return hose, then disconnect it from the fuel pressure regulator.

5. Remove the retainer nuts on the fuel rail.

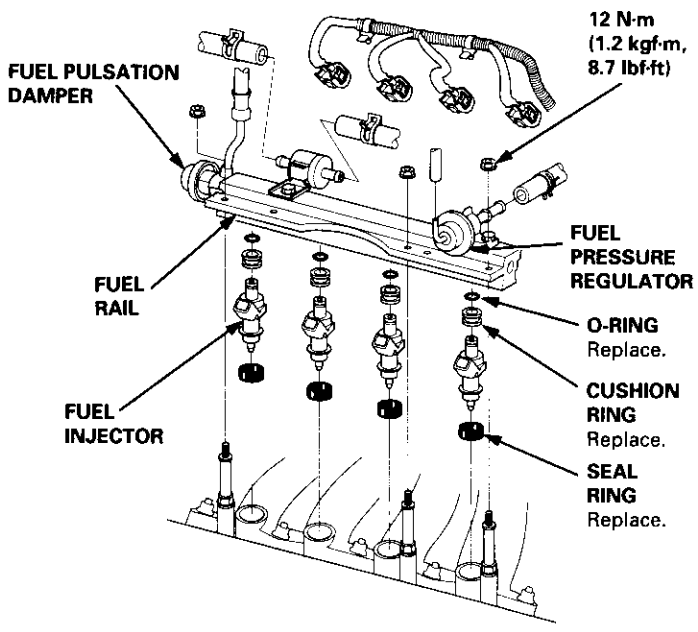
6. Disconnect the fuel rail.

7. Remove the fuel injectors from the intake manifold.

'97 – 98 models:



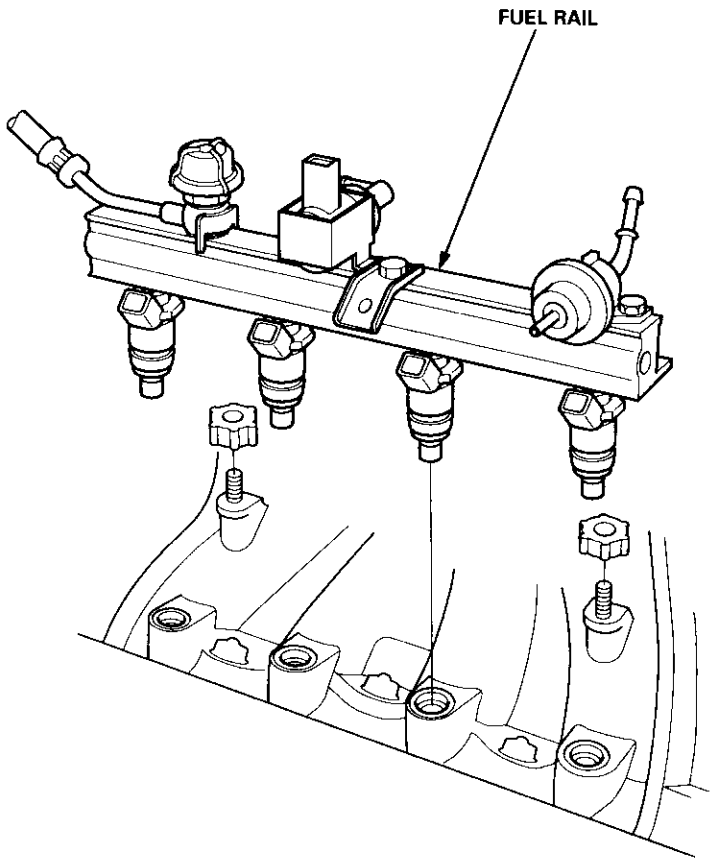
'99 – 00 models:



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Fuel Injectors (cont'd)

8. Slide new cushion rings onto the fuel injectors.
9. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
10. Insert the fuel injectors into the fuel rail first.
11. Coat new seal rings with clean engine oil, and press them into the intake manifold.
12. To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.



The illustration shows '97 – 98 models, '99 – 00 models are similar.

13. Install and tighten the retainer nuts.
14. Connect the vacuum hoses and fuel return hose to the fuel pressure regulator.
15. Connect the PCV valve.
16. Connect the connectors to the fuel injectors, the IAT sensor ('97 – 98 models), and the EVAP purge control solenoid valve ('97 – 98 models).
17. Coat a new O-ring with clean engine oil, and install the resonator chamber ('99 – 00 models).
18. Turn the ignition switch ON (II), but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

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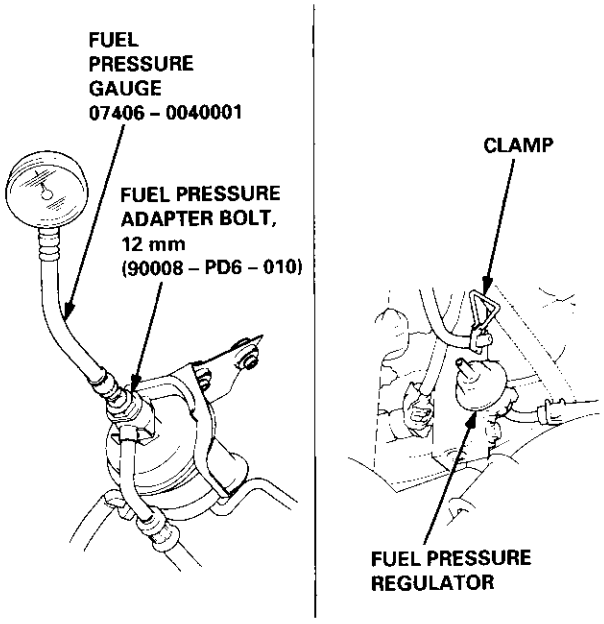
Fuel Pressure Regulator

Testing

1. Attach the special tool and the 12 mm fuel pressure adapter bolt to the fuel filter (see page 11-178).

2. Start the engine.

   Pressure should be:
   '97 – 98 models:
   260 – 310 kPa (2.7 – 3.2 kgf/cm², 38 – 46 psi)
   '99 – 00 models:
   270 – 320 kPa (2.8 – 3.3 kgf/cm², 40 – 47 psi)
   (with the fuel pressure regulator vacuum hose disconnected and pinched)



The illustration shows '97 – 98 models, '99 – 00 models are similar.

3. Reconnect the vacuum hose to the fuel pressure regulator.

4. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.

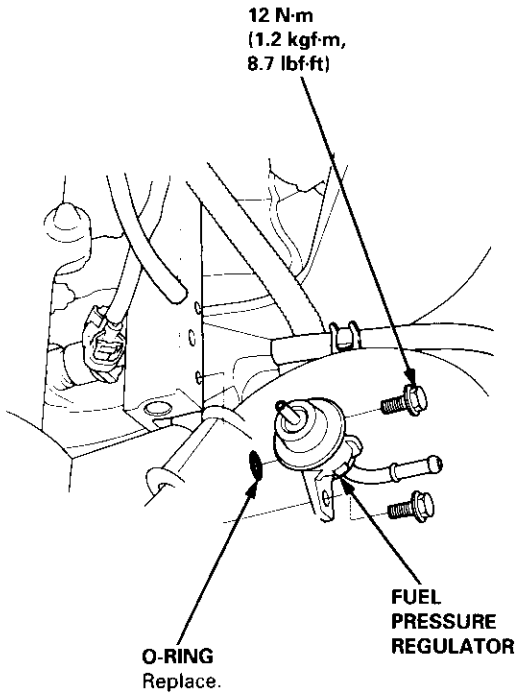
   If the fuel pressure did not rise, replace the fuel pressure regulator.

Replacement

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-178).

2. Disconnect the vacuum hose and fuel return hose.

3. Remove the two 6 mm retainer bolts and the fuel pressure regulator.



The illustration shows '97 – 98 models, '99 – 00 models are similar.

4. Apply clean engine oil to a new O-ring, and carefully install it into its proper position.

5. Install the fuel pressure regulator in the reverse order of removal.

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Fuel Filter

Replacement

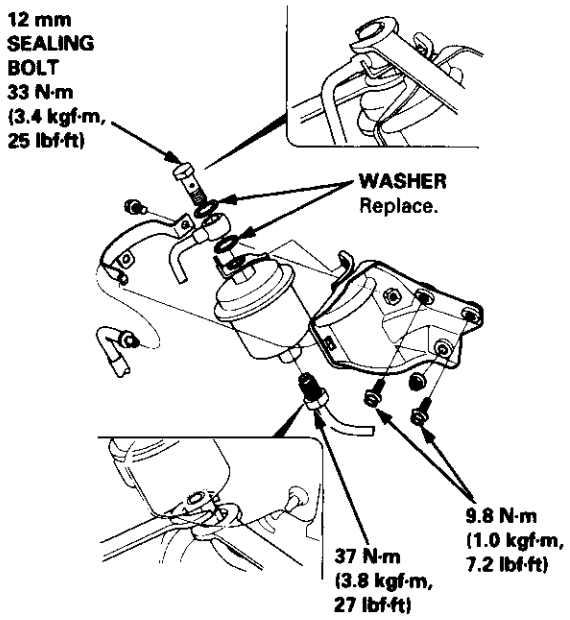
⚠ WARNING

- **Do not smoke while working on fuel system. Keep open flame away from your work area.**
- **While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.**

The fuel filter should be replaced whenever the fuel pressure drops below the specified value* with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

***: '97 – 98 models: 260 – 310 kPa (2.7 – 3.2 kgf/cm², 38 – 46 psi)**
'99 – 00 models: 270 – 320 kPa (2.8 – 3.2 kgf/cm², 40 – 47psi)

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (see page 11-178).
3. Remove the engine wire harness bracket and power steering feed hose clamp.
4. Remove the banjo bolt and the fuel feed pipe while supporting the fuel filter with another wrench, as shown.
5. Remove the fuel filter clamp and fuel filter.
6. Install the new fuel filter in the reverse order of removal, and note these items:
   - When assembling, use new washers as shown.
   - Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



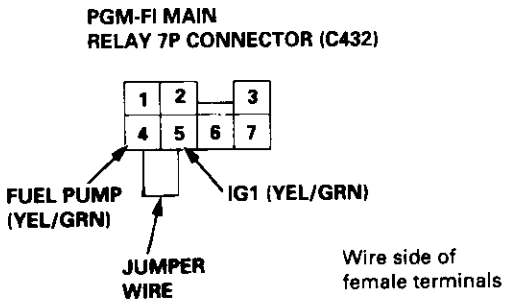
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Fuel Pump

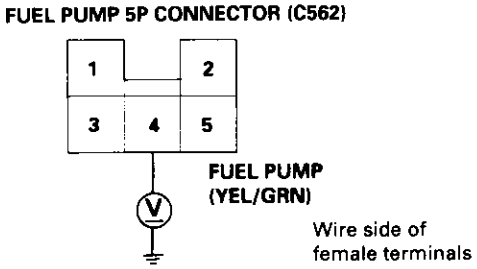
Testing

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON (II), you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds when ignition switch is first turned ON (II). If the fuel pump does not make noise, check it as follows:

1. Fold the left rear seat cushion forward, and remove the base frame cover (see section 20).
2. Remove the access panel from the floor.
3. Make sure the ignition switch is OFF, then disconnect the fuel pump 5P connector.
4. Connect the PGM-FI main relay 7P connector terminal No. 4 and No. 5 with a jumper wire.



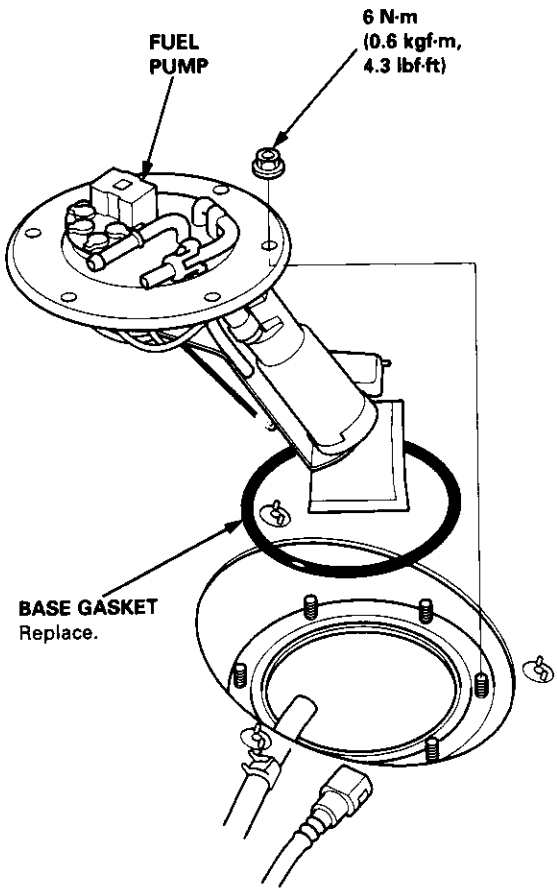
5. Check that battery voltage is available between the fuel pump 5P connector terminal No. 4 and body ground when the ignition switch is turned ON (II).



- If battery voltage is available, check the fuel pump ground. If the ground is OK, replace the fuel pump.
- If there is no voltage, check the wire harness (see page 11-188).

Replacement

1. Fold the left rear seat cushion forward, and remove the base frame cover (see section 20).
2. Remove the access panel from the floor.
3. Relieve the fuel pressure (see page 11-178).
4. Disconnect the fuel lines.
5. Disconnect the 5P connector from the fuel pump.
6. Remove the fuel pump mounting nuts.



7. Remove the fuel pump from the fuel tank.
8. Install the fuel pump in the reverse order of removal.

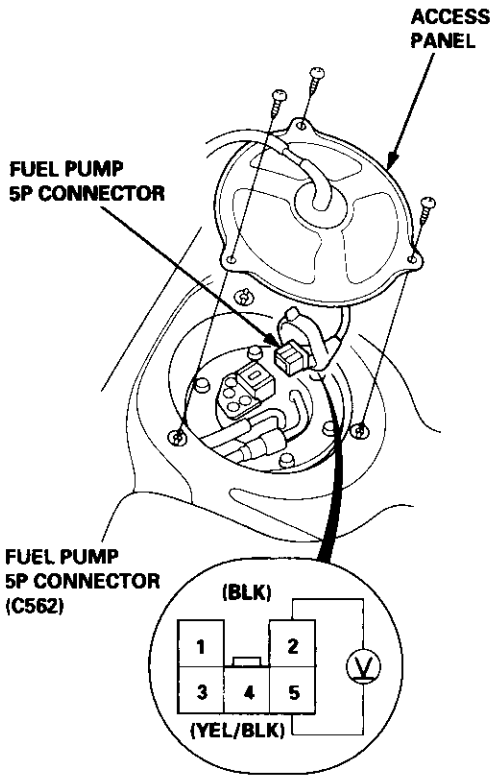
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Fuel Gauge

Testing

NOTE: Refer to section 23 for the fuel gauge system circuit diagram.

1. Check the No. 25 METER (7.5 A) fuse in the underdash fuse/relay box before testing.
2. Fold the left rear seat cushion forward, and remove the base frame cover (see section 20).
3. Remove the access panel from the floor.
4. Disconnect the 5P connector from the fuel pump.
5. Measure voltage between the 5P connector terminals No. 2 and No. 5 with the ignition switch ON (II). There should be between 5 and 8 V.



Wire side of female terminals

- If the voltage is as specified, go to step 6.
- If the voltage is not as specified, check for:
  — an open in the YEL/BLK or BLK wire.
  — poor ground (G552).

6. Turn the ignition switch OFF.
7. Attach a jumper wire between the No. 2 and No. 5 terminals, then turn the ignition switch ON (II).
8. Check that the pointer of the fuel gauge starts moving toward the "F" mark. Turn the ignition switch OFF before the pointer reaches "F" on the gauge dial. Failure to do so may damage the fuel gauge.

   NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

   - If the pointer of the fuel gauge does not move at all, replace the gauge.
   - If the gauge is OK, inspect the fuel gauge sending unit.

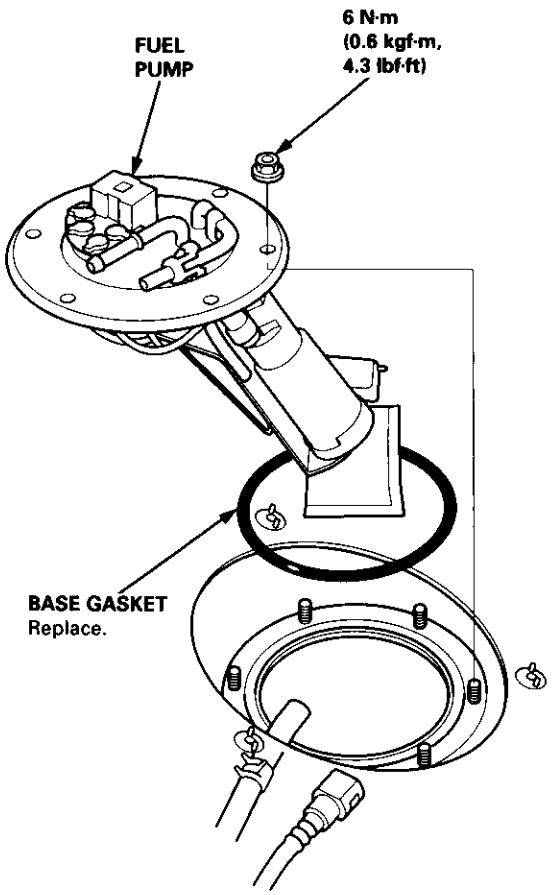
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Fuel Gauge Sending Unit

Testing

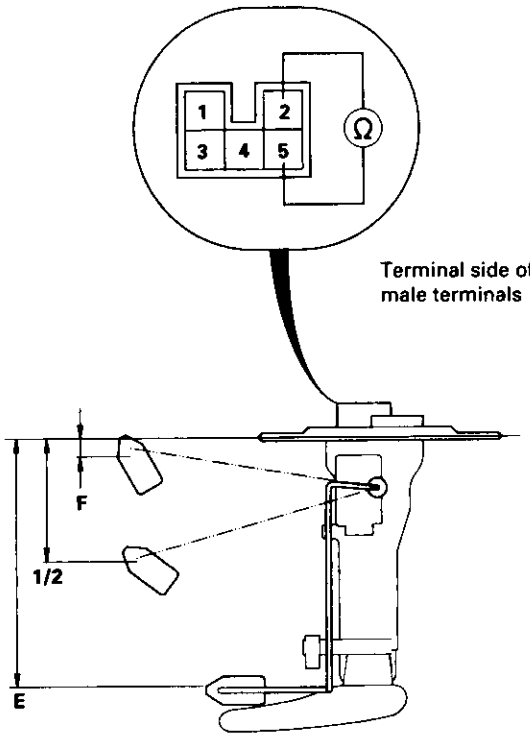
⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from your work area.

1. Fold the left rear seat cushion forward, and remove the base frame cover (see section 20).
2. Remove the access panel.
3. With the ignition switch OFF, disconnect the 5P connector from the fuel pump.
4. Relieve fuel pressure (see page 11-178).
5. Disconnect the fuel lines.
6. Remove the fuel pump.



7. Measure the resistance between the No. 2 and No. 5 terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105 – 108	29.5 – 35.5	3.5 – 5



If you do not get the above readings, replace the fuel pump.

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Low Fuel Indicator System

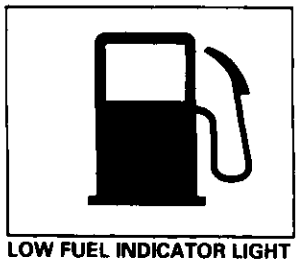
Indicator Light Testing

NOTE: Refer to section 23 for the low fuel indicator circuit diagram.

1. Check the No. 25 METER (7.5 A) fuse in the under-dash fuse/relay box before testing.
2. Park the vehicle on level ground.

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from the work area. Drain fuel only into an approved container.

3. Drain the fuel into an approved container. Then install the drain bolt with a new washer.
4. Add less than 8 ℓ (2.1 U.S. Gal, 1.8 Imp. Gal) of fuel, and turn the ignition switch ON (II). The low fuel indicator light should come on within four minutes.



LOW FUEL INDICATOR LIGHT

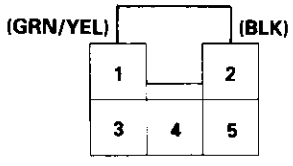
- If the light comes on within four minutes, go to step 8.
- If the light does not come on within four minutes, go to step 5.

5. Remove the seat cushion (see section 20).
6. Remove the fuel tank access panel from the floor, and disconnect the 5P connector from the fuel pump.
7. Connect the No. 1 and No. 2 terminals with a jumper wire.

- If the light comes on, check the sending unit.
- If the light does not come on, check for:
  — an open in the GRN/YEL wire between the fuel unit and fuel gauge assembly.
  — blown bulb.
  — poor ground (G552).

FUEL PUMP 5P CONNECTOR (C562)

JUMPER WIRE



Wire side of female terminals

8. Add 4 ℓ of fuel (1.1 U.S. Gal, 0.9 Imp. Gal). The light should go off within four minutes.

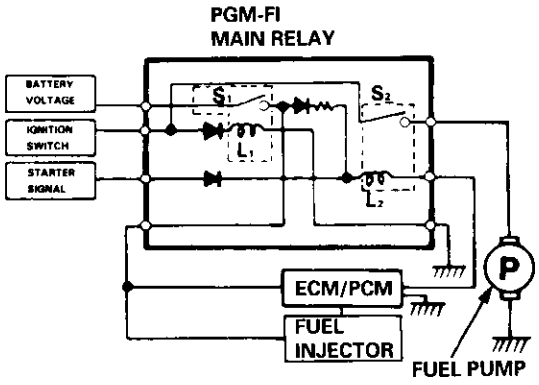
- If the light does not go off, check for:
  — a short in the GRN/YEL wire between the fuel gauge sending unit and fuel gauge assembly.
  — faulty gauge assembly.
- If the light goes off, the low fuel indicator light is OK.

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PGM-FI Main Relay

Description

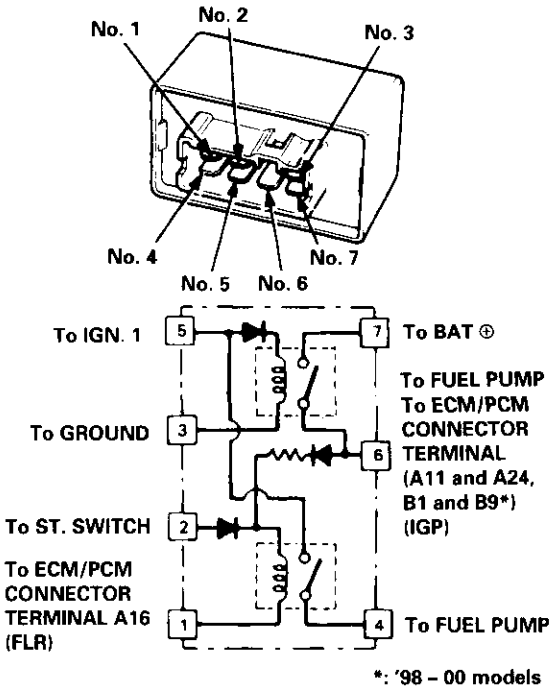
The PGM-FI main relay actually contains two individual relays. This relay is located at the passenger side of the cowl. One relay is energized whenever the ignition is on which supplies the battery voltage to the ECM/PCM, power to the fuel injectors, and power for the second relay. The second relay is energized for two seconds when the ignition is switched on, and when the engine is running, to supply power to the fuel pump.



Relay Testing

NOTE: If the engine starts and continues to run, the PGM-FI main relay is OK.

1. Remove the glovebox and the passenger's dashboard lower cover (see section 20).
2. Remove the PGM-FI main relay.
3. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.
   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the PGM-FI main relay and retest.



4. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No. 6 terminal of the PGM-FI main relay.
   - If there is continuity, go on to step 4.
   - If there is no continuity, replace the PGM-FI main relay and retest.
5. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.
   - If there is continuity, the PGM-FI main relay is OK.
   - If there is no continuity, replace the PGM-FI main relay and retest. (cont'd)

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PGM-FI Main Relay (cont'd)

Troubleshooting

— Engine will not start.
— Inspection of PGM-FI main relay and relay harness.

Check for an open in the wire (GND line):
1. Turn the ignition switch OFF.
2. Disconnect the PGM-FI main relay 7P connector.
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 3 and body ground.

Is there continuity?
- NO → **Repair open in the wire between the PGM-FI main relay and G101.**
- YES ↓

Check for an open or short in the wire (BAT line):
Measure voltage between the PGM-FI main relay 7P connector terminal No. 7 and body ground.

Is there battery voltage?
- NO → **— Repair open or short in the wire between the PGM-FI main relay and the FI E/M (15 A) fuse.**
  — Replace the FI E/M (15 A) fuse in the under-hood fuse/relay box.
- YES ↓

Check for an open or short in the wire (IG1 line):
1. Turn the ignition switch ON (II).
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 5 and body ground.

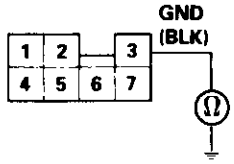
Is there battery voltage?
- NO → **— Repair open or short in the wire between the PGM-FI main relay and the No. 13 FUEL PUMP (15 A) fuse.**
  — Replace the No. 13 FUEL PUMP (15 A) fuse in the under-dash fuse/ relay box.
- YES ↓

Check for an open or short in the wire (STS line):
1. Turn the ignition switch to the START (III) position.
   NOTE:
   - M/T: Clutch pedal must be depressed.
   - A/T: Transmission in N or P position.
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 2 and body ground.

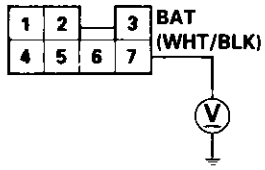
Is there battery voltage?
- NO → **— Repair open or short in the wire between the PGM-FI main relay and the No. 31 STARTER SIGNAL (7.5 A) fuse.**
  — Replace the No. 31 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.
- YES ↓

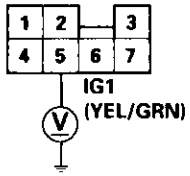
('97 model: To page 11-189)
('98 – 00 models: To page 11-190)

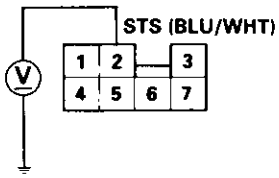
PGM-FI MAIN RELAY 7P CONNECTOR (C432)



Wire side of female terminals







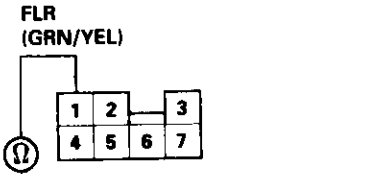
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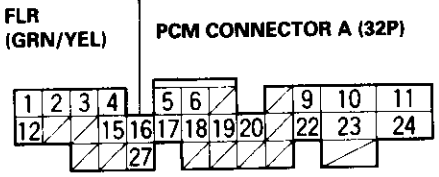
(From page 11-188)

('97 model)

Check for an open in the wire (FLR line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (32P).
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 1 and PCM connector terminal A16.

PGM-FI MAIN RELAY 7P CONNECTOR (C432)





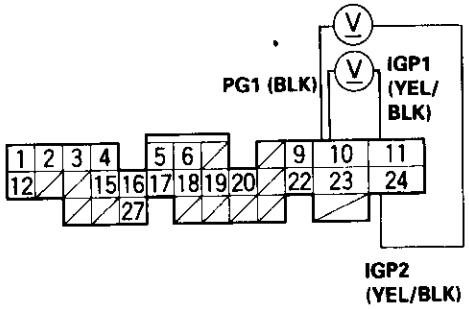
Wire side of female terminals

Is there continuity?

NO → **Repair open in the wire between the PCM (A16) and the PGM-FI main relay.**

YES

Check for an open in the wires (IGP1, IGP2 lines):
1. Reconnect the PCM connector A (32P).
2. Reconnect the PGM-FI main relay connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals A11 and A10, and between A24 and A10.

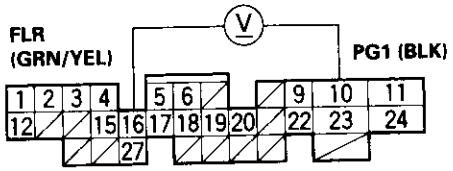


Is there battery voltage?

NO → **— Repair open in the wire between the PCM (A11, A24) and the PGM-FI main relay.**
— Replace the PGM-FI main relay.

YES

Check for an open in the PCM:
1. Turn the ignition switch OFF.
2. Measure voltage between PCM connector terminals A16 and A10 when the ignition switch is first turned ON (II) for two seconds.



Is there 1.0 V or less?

NO → **Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.**

YES

Check the PGM-FI main relay (see page 11-187).

(cont'd)

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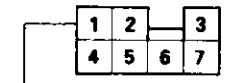
PGM-FI Main Relay (cont'd)

(From page 11-188)

('98 – 00 models)

Check for an open in the wire (FLR line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector A (32P).
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 1 and ECM/PCM connector terminal A16.

PGM-FI MAIN RELAY 7P CONNECTOR (C432)



FLR (GRN/YEL)

ECM/PCM CONNECTOR A (32P)



FLR (GRN/YEL)

Wire side of female terminals

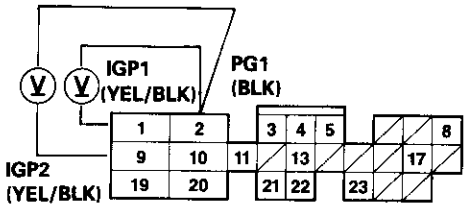
Is there continuity?

NO — **Repair open in the wire between the ECM/PCM (A16) and the PGM-FI main relay.**

YES

Check for an open in the wires (IGP1, IGP2 lines):
1. Reconnect the ECM/PCM connector B (25P).
2. Reconnect the PGM-FI main relay connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM/PCM connector terminals B1 and B2, and between B9 and B2.

ECM/PCM CONNECTOR B (25P)



Wire side of female terminals

Is there battery voltage?

NO — **Repair open in the wire between the ECM/PCM (B1, B9) and the PGM-FI main relay.**
— **Replace the PGM-FI main relay.**

YES

Check for an open in the ECM/PCM:
1. Turn the ignition switch OFF.
2. Measure voltage between ECM/PCM connector terminals A16 and B2 when the ignition switch is first turned ON (II) for two seconds.

ECM/PCM CONNECTORS

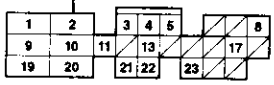
A (32P)



FLR (GRN/YEL)

B (25P)

PG1 (BLK)



Wire side of female terminals

Is there 1.0 V or less?

NO — **Substitute a known-good ECM/PCM and recheck. If prescribed voltage is now available, replace the original ECM/PCM.**

YES

Check the PGM-FI main relay (see page 11-187).

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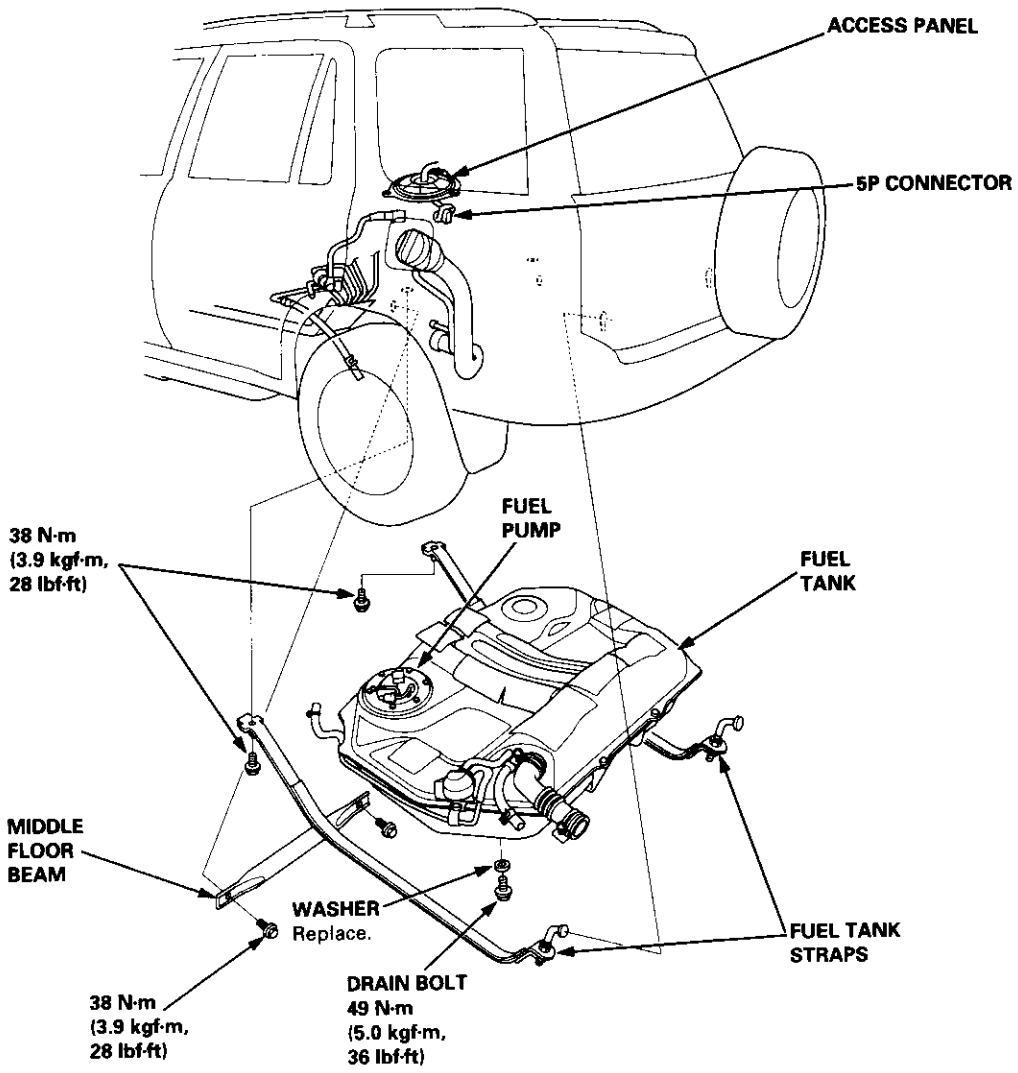
Fuel Tank

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Relieve the fuel pressure (see page 11-178).
2. Fold the left rear seat cushion forward, and remove the base frame cover (see section 20).
3. Remove the access panel from the floor.
4. Disconnect the 5P connector (C562) and 6P connector (C580) ('98 – 00 models).
5. Disconnect the fuel return hose and quick-connect fittings (see page 11-175).
6. Jack up the vehicle, and support it with jackstands.
7. Remove the middle floor beam.
8. Remove the drain bolt, and drain the fuel into an approved container.
9. Disconnect the hoses (see page 11-173, 174). Slide back the clamps, then twist hoses as you pull, to avoid damaging them.
10. Place a jack, or other support, under the tank.
11. Remove the strap nuts, and let the straps fall free.
12. Remove the fuel tank. If it sticks on the undercoat applied to its mount, carefully pry it off the mount.
13. Install the drain bolt with a new washer, then coat the drain bolt with Noxrust 124B. Allow the Noxrust to dry for 20 minutes.
14. Install parts in the reverse order of removal.

'97 model:

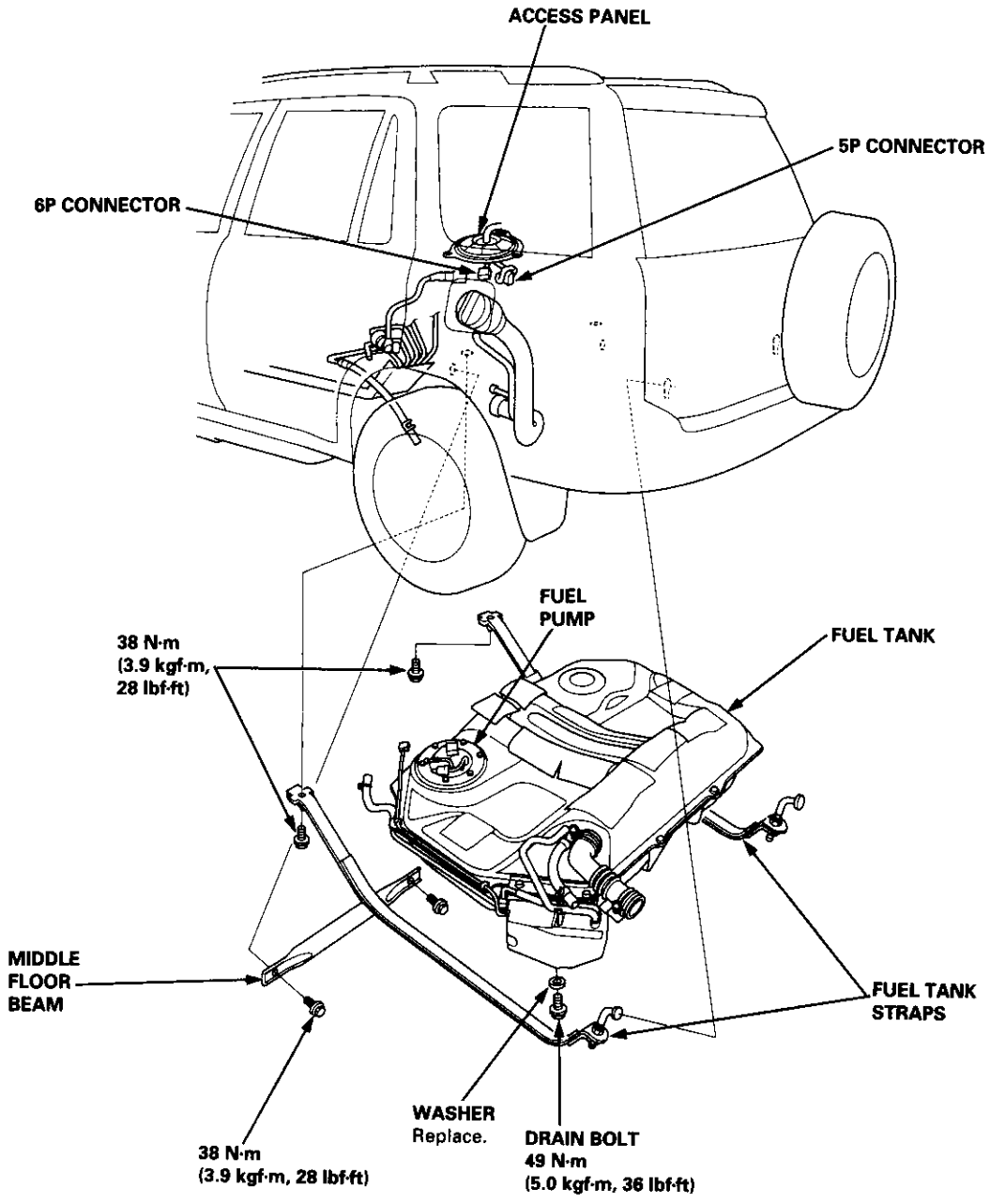


(cont'd)

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Fuel Tank (cont'd)

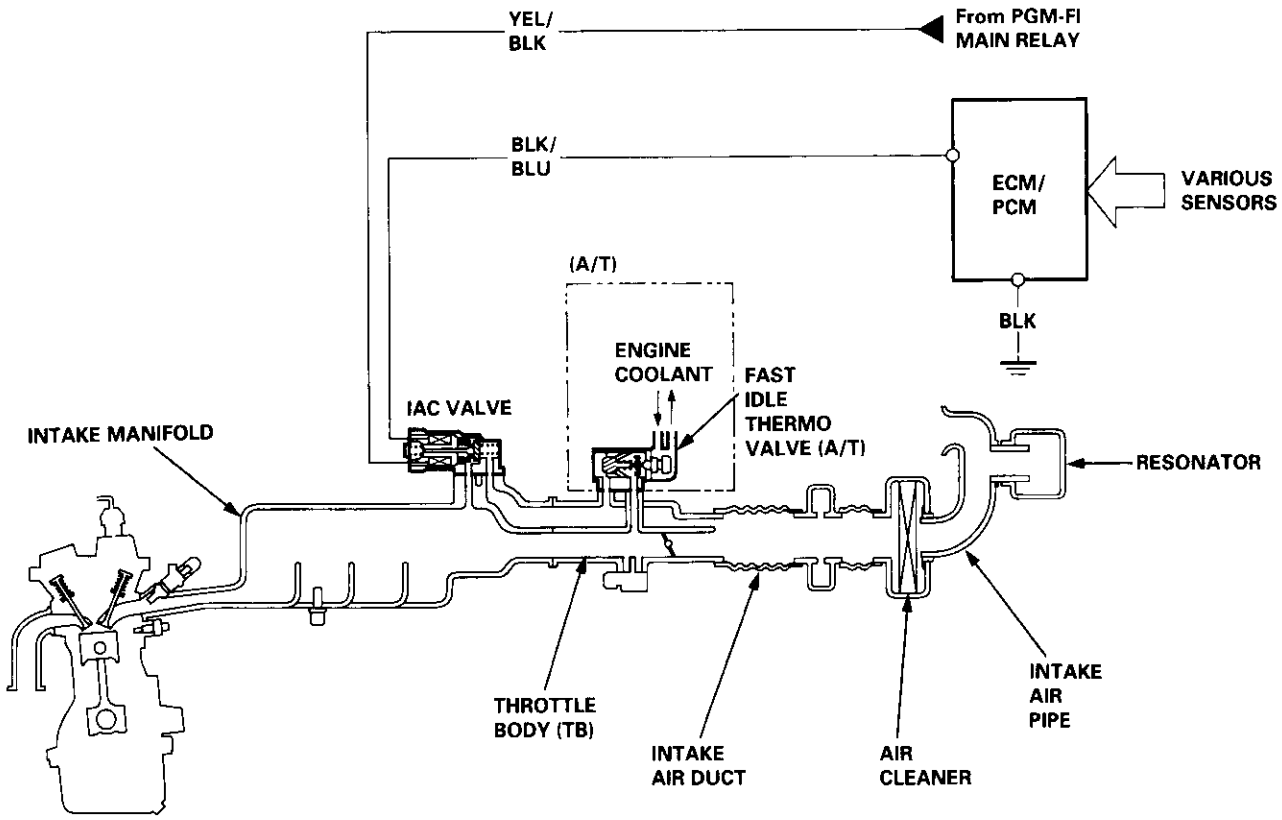
'98 – 00 models:



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System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner, intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve, and intake manifold. A resonator in the intake air pipe provides additional silencing as air is drawn into the system.



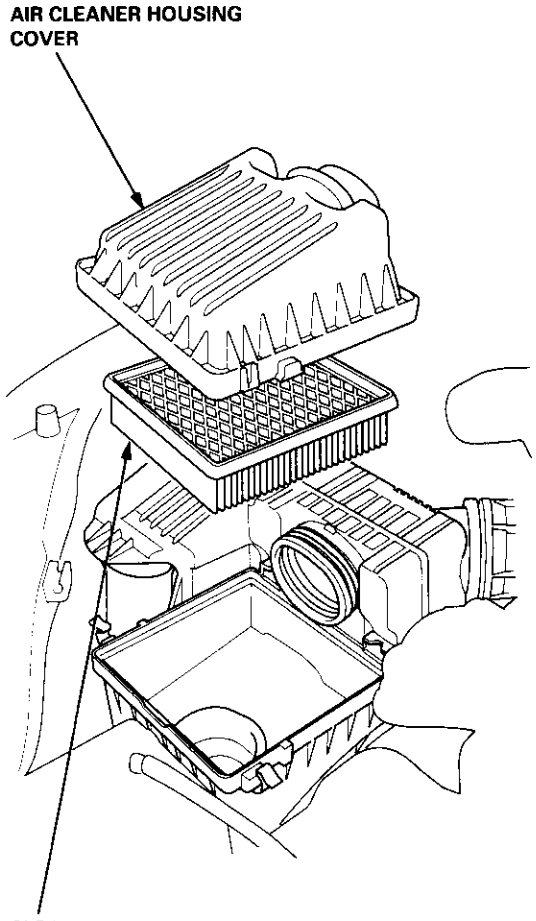
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Intake Air System

Air Cleaner

Air Cleaner Element Replacement

NOTE: Do not clean the air cleaner element by blowing it off with compressed air.



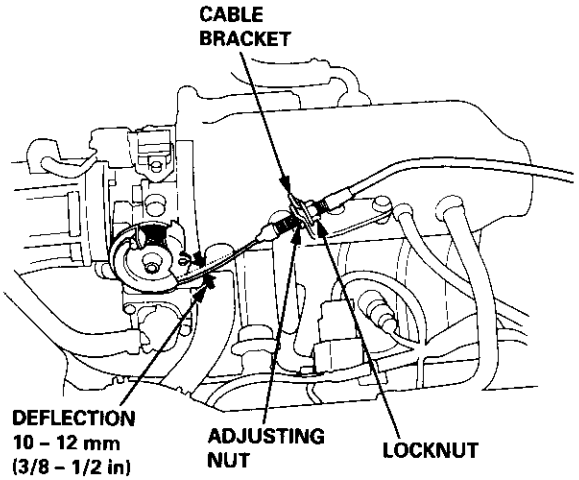
AIR CLEANER ELEMENT
Normal conditions:
Replace air cleaner element every 30,000 miles (48,000 km) or 24 months whichever comes first.
Severe conditions:
Replace air cleaner element every 15,000 miles (24,000 km) or 12 months whichever comes first.

Throttle Cable

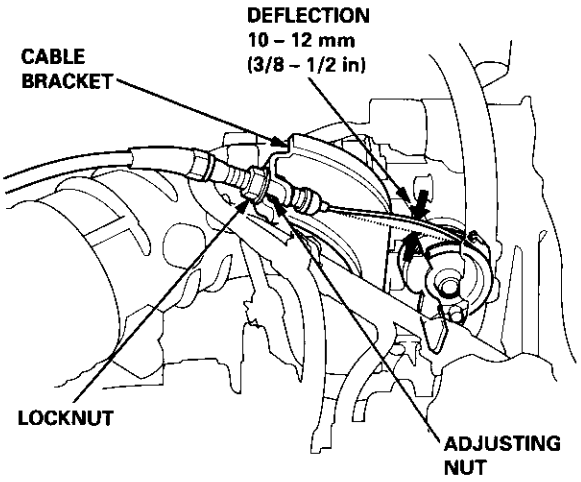
Inspection/Adjustment

1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 – 12 mm (3/8 – 1/2 in.).

'97 – 98 models:



'99 – 00 models:



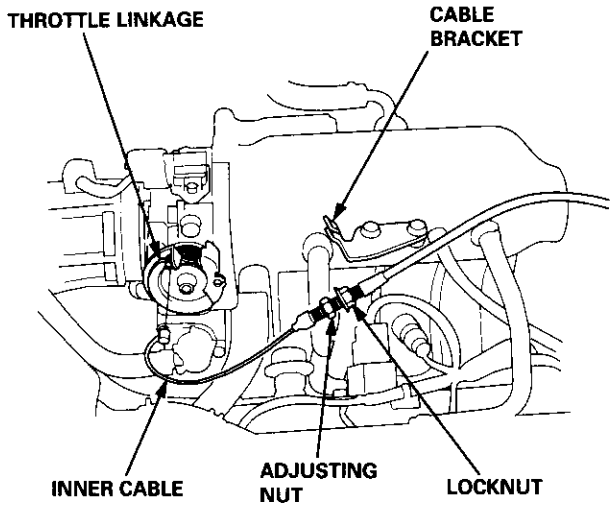
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.

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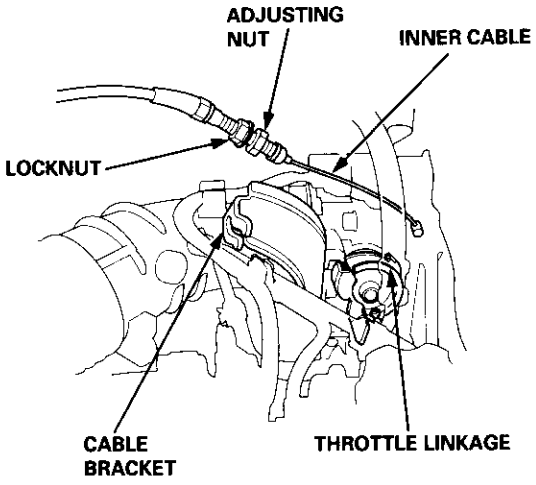
Installation

1. Open the throttle valve fully, then install the throttle cable in the throttle linkage, and install the cable housing in the cable bracket.

'97 – 98 models:



'99 – 00 models:



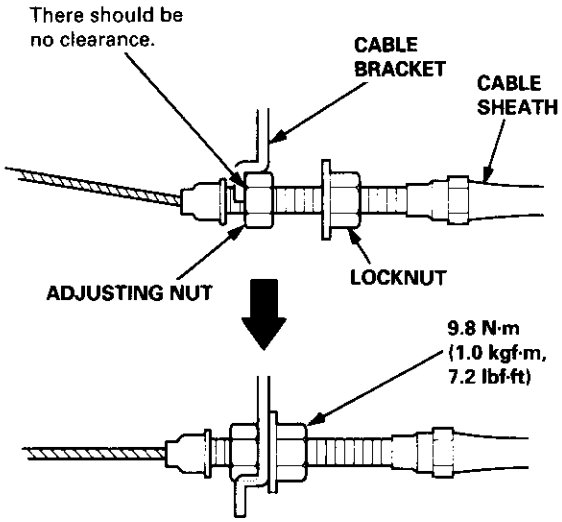
2. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.

3. Hold the cable sheath, removing all slack from the cable.

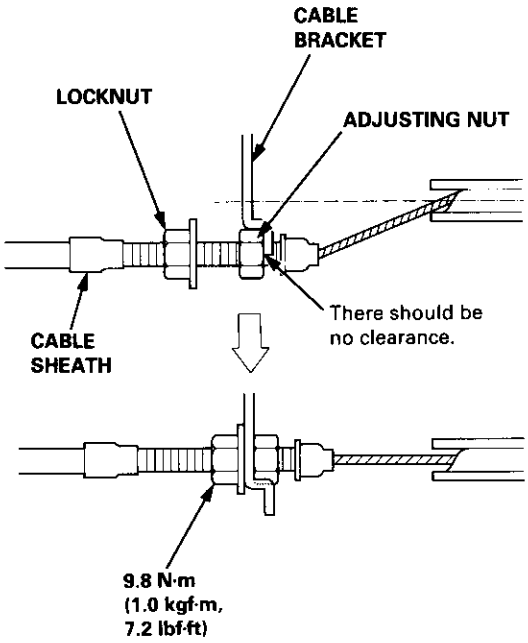
4. Set the locknut on the cable bracket.
   Adjust the adjusting nut so that its free play is 0 mm.

5. Remove the cable sheath from the throttle bracket, reset the adjusting nut and tighten the locknut.

'97 – 98 models:



'99 – 00 models:

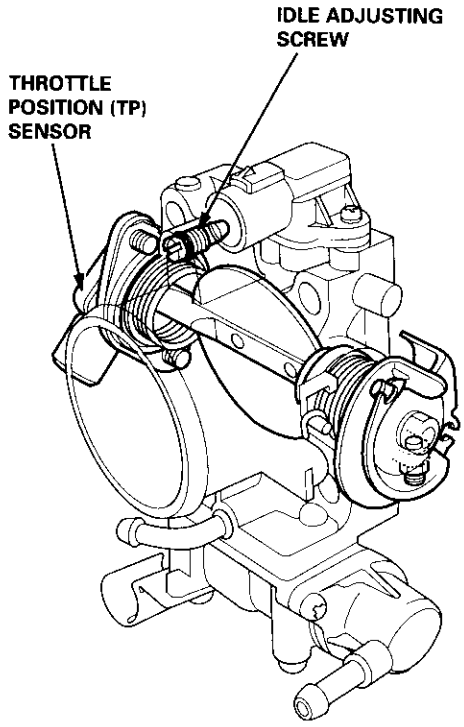


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Throttle Body

Description

The throttle body is a single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw which regulates the bypass air is located on the top of the throttle body.



The illustration shows '97 – 98 models, '99 – 00 models are similar.

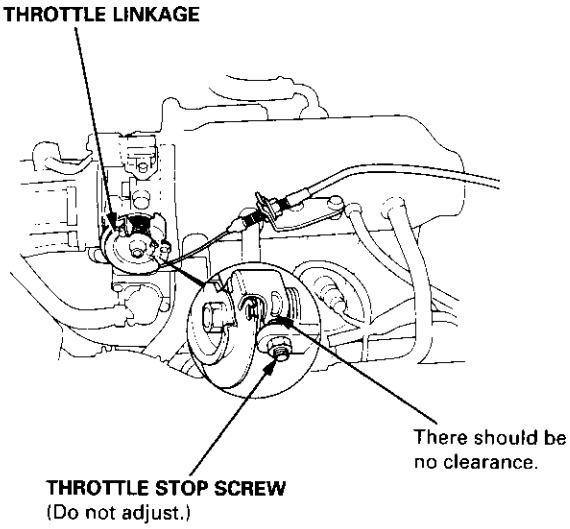
Inspection

Check that the throttle cable operates smoothly without binding or sticking.

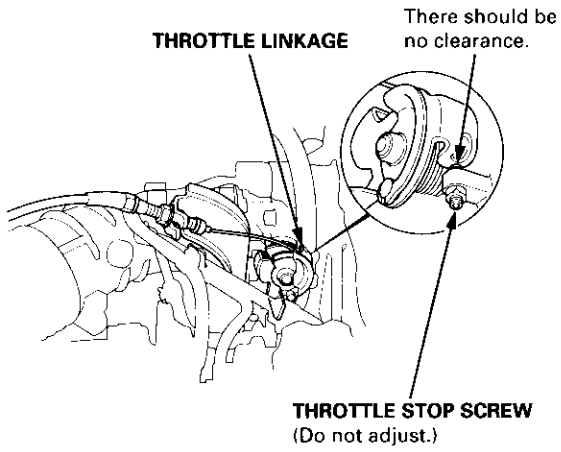
If there are any abnormalities, check for:

- Excessive wear or play in the throttle valve shaft.
- Sticky or binding throttle lever at the fully closed position.
- Clearance between throttle stop screw and throttle lever at the fully closed position.

'97 – 98 models:



'99 – 00 models:

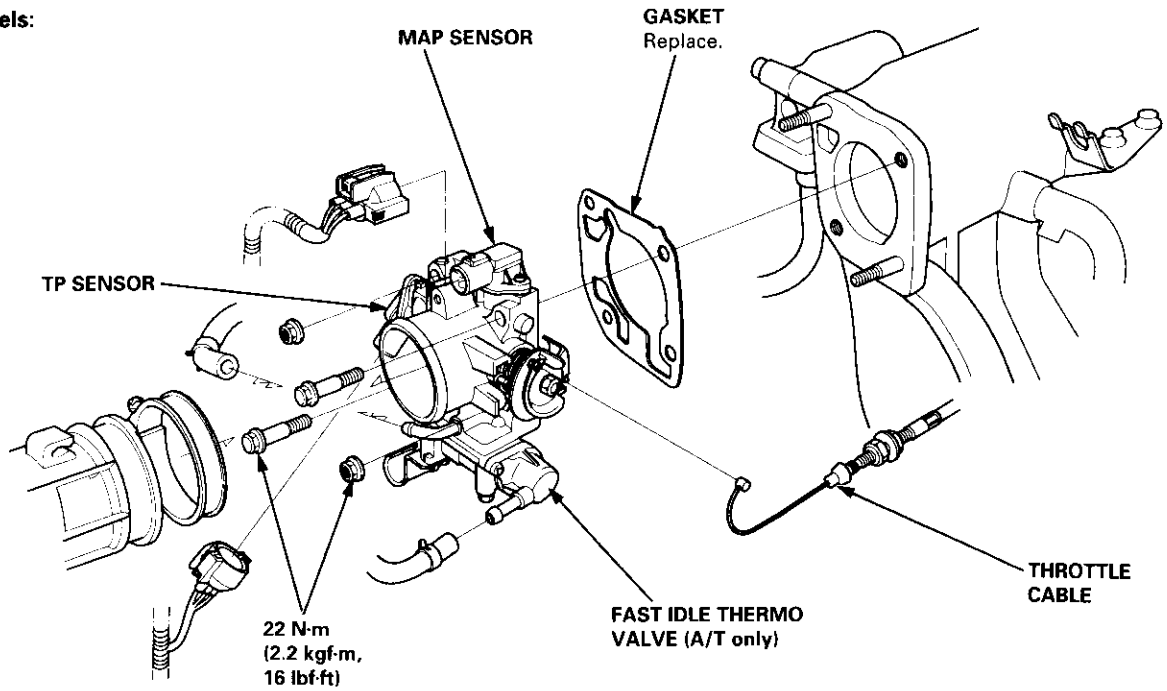


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

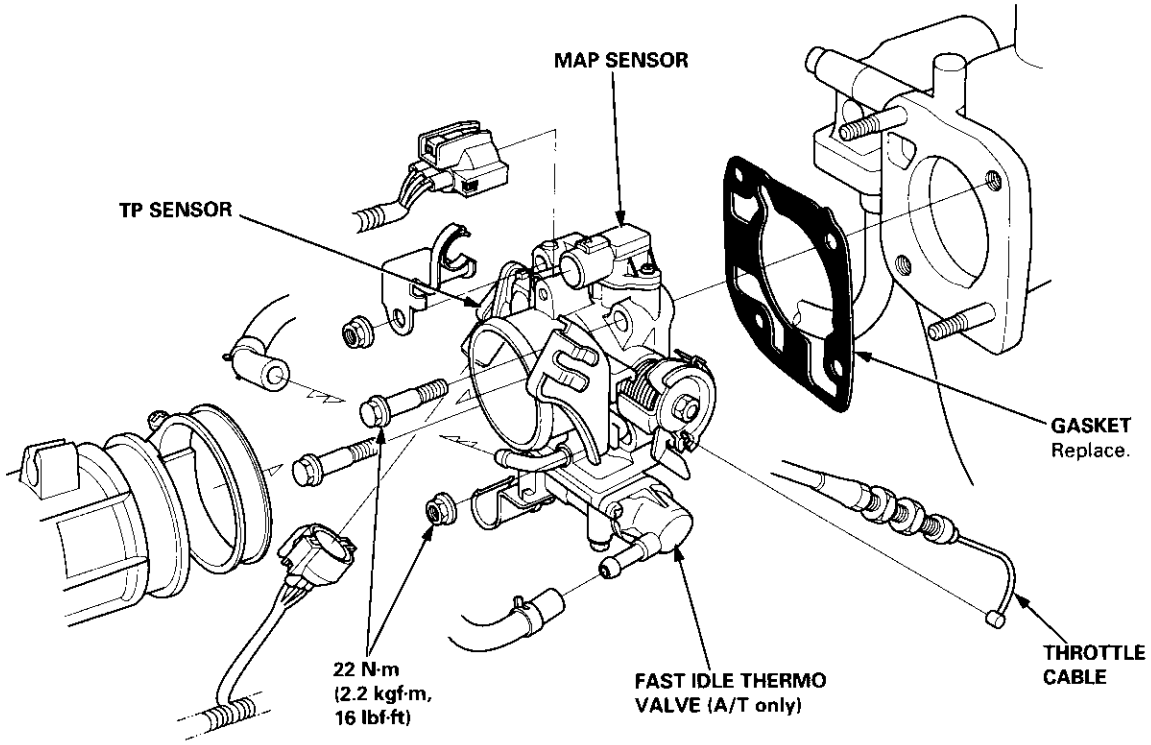
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Removal

'97 – 98 models:



'99 – 00 models:



NOTE:

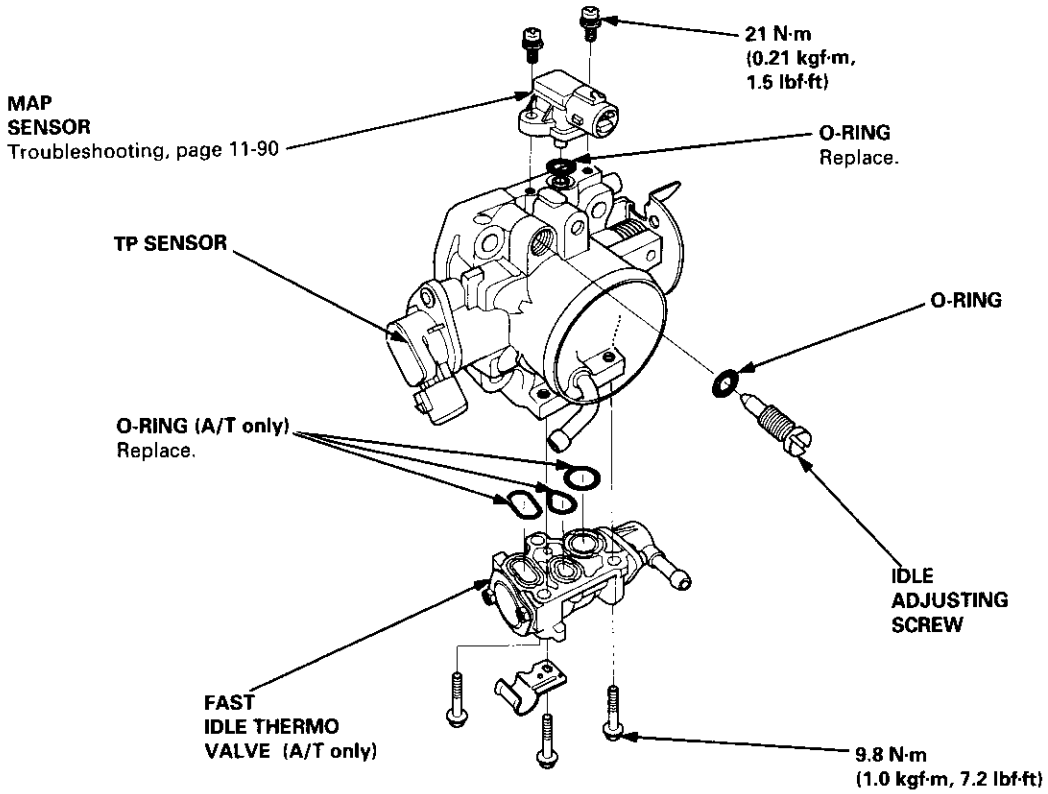
- Do not adjust the throttle stop screw.
- After reassembly, adjust the throttle cable (see page 11-194).
- The TP sensor is not removable.

(cont'd)

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Throttle Body (cont'd)

Disassembly



The illustration shows '97 – 98 models, '99 – 00 models are similar.

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System Description

The emission control system includes, a Three Way Catalytic Converter (TWC), Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system. The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

⚠ WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Connect a tachometer.
3. Check and, if necessary, adjust the idle speed, (see page 11-169, 170).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

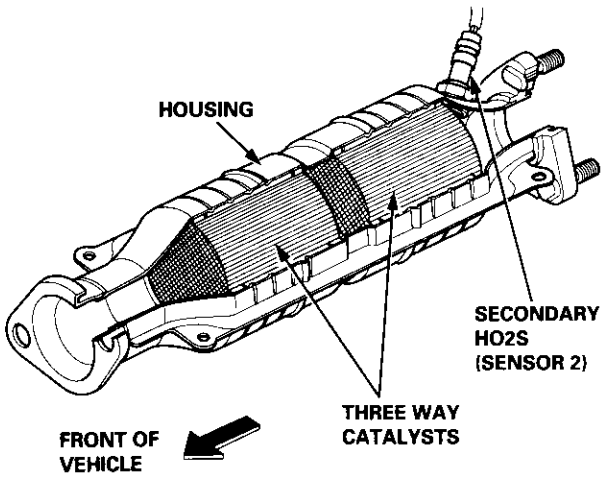
   (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

   CO meter should indicate 0.1% maximum.

Three Way Catalytic Converter (TWC)

Description

Three Way Catalytic Converter (TWC):
The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.



(cont'd)

Three Way Catalytic Converter (TWC) (cont'd)

P0420 The scan tool indicates Diagnostic Trouble Code (DTC) P0420: Catalyst system efficiency below threshold.

Description

This system evaluates the catalyst's capacity by means of the HO2S (Primary and Secondary) output during stable driving conditions. If deterioration has been detected during three consecutive driving cycles, the MIL comes on and DTC P0420 will be stored.

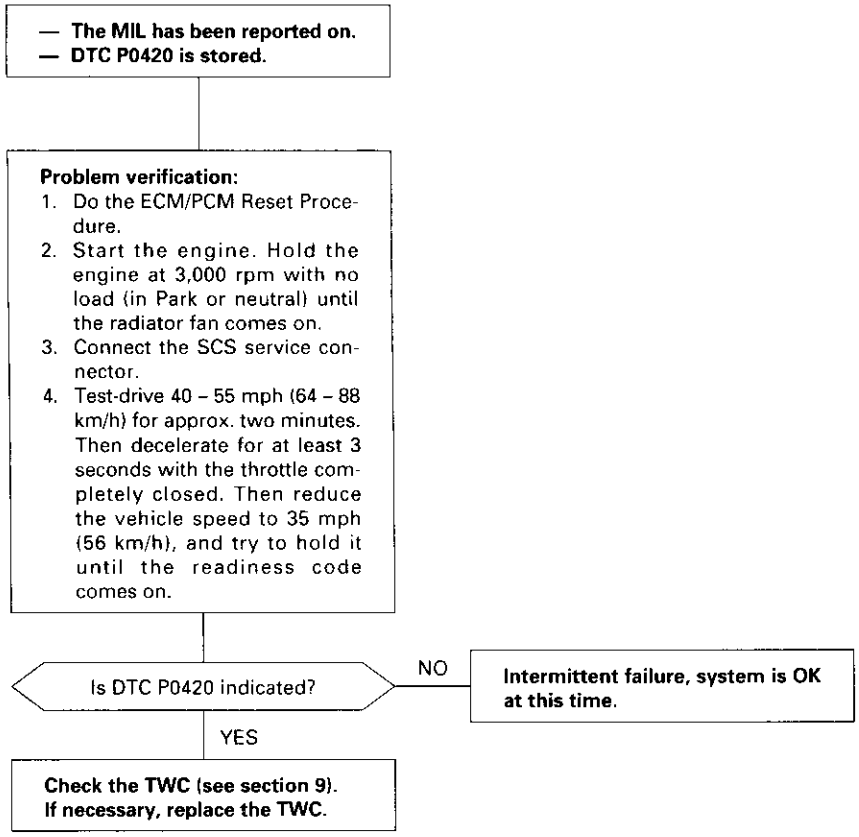
NOTE: If some of the DTCs listed below are stored at the same time as DTC P0420, troubleshoot those DTCs first, then troubleshoot DTC P0420.

P0137, P0138: Secondary HO2S (Sensor 2)
P0141: Secondary HO2S (Sensor 2) Heater

Possible Cause

- TWC Deterioration
- Exhaust system leakage

Troubleshooting Flowchart

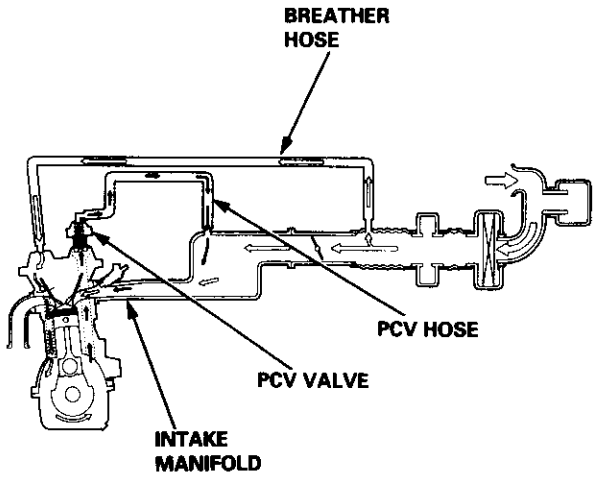


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Positive Crankcase Ventilation (PCV) System

Description

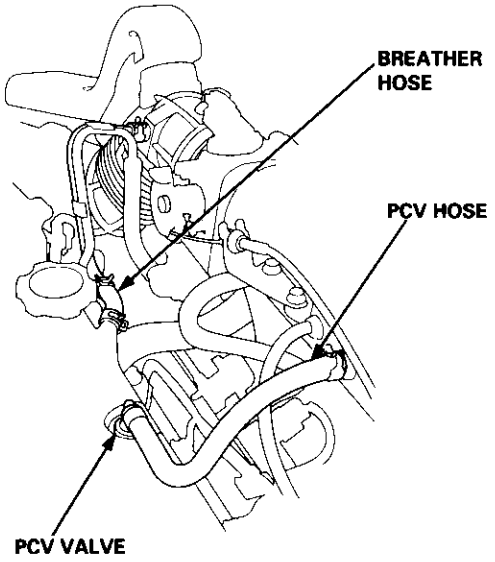
The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.



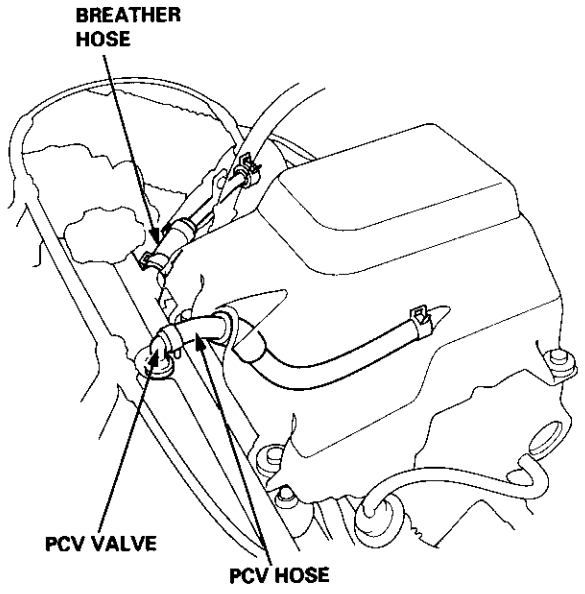
Inspection

1. Check the PCV hoses and connections for leaks and clogging.

'97 – 98 models:



'99 – 00 models:



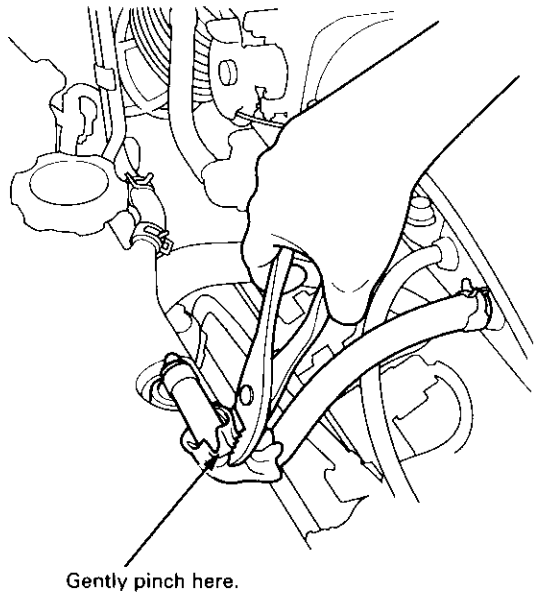
(cont'd)

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Positive Crankcase Ventilation (PCV) System (cont'd)

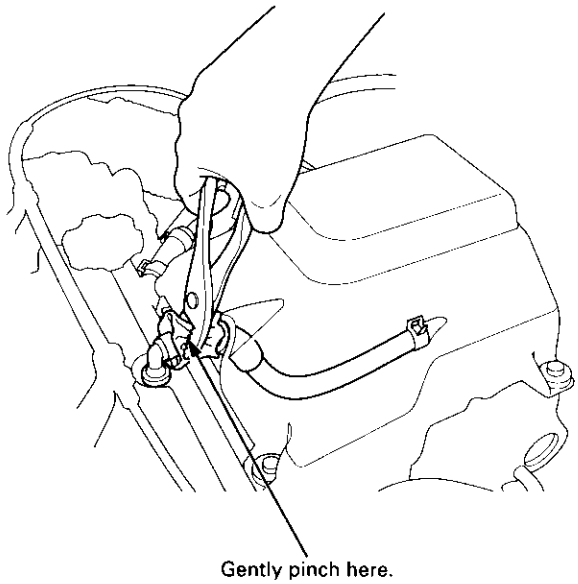
2. At idle, make sure there is a clicking sound from the PCV valve when the hose between the PCV valve and intake manifold is lightly pinched with your fingers or pliers.

'97 – 98 models:



Gently pinch here.

'99 – 00 models:



Gently pinch here.

If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

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Evaporative Emission (EVAP) Controls

Description:

The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Evaporative Emission (EVAP) Control Canister
An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

B. Vapor Purge Control System
EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the intake manifold. The purging vacuum is controlled by the EVAP purge control solenoid valve.

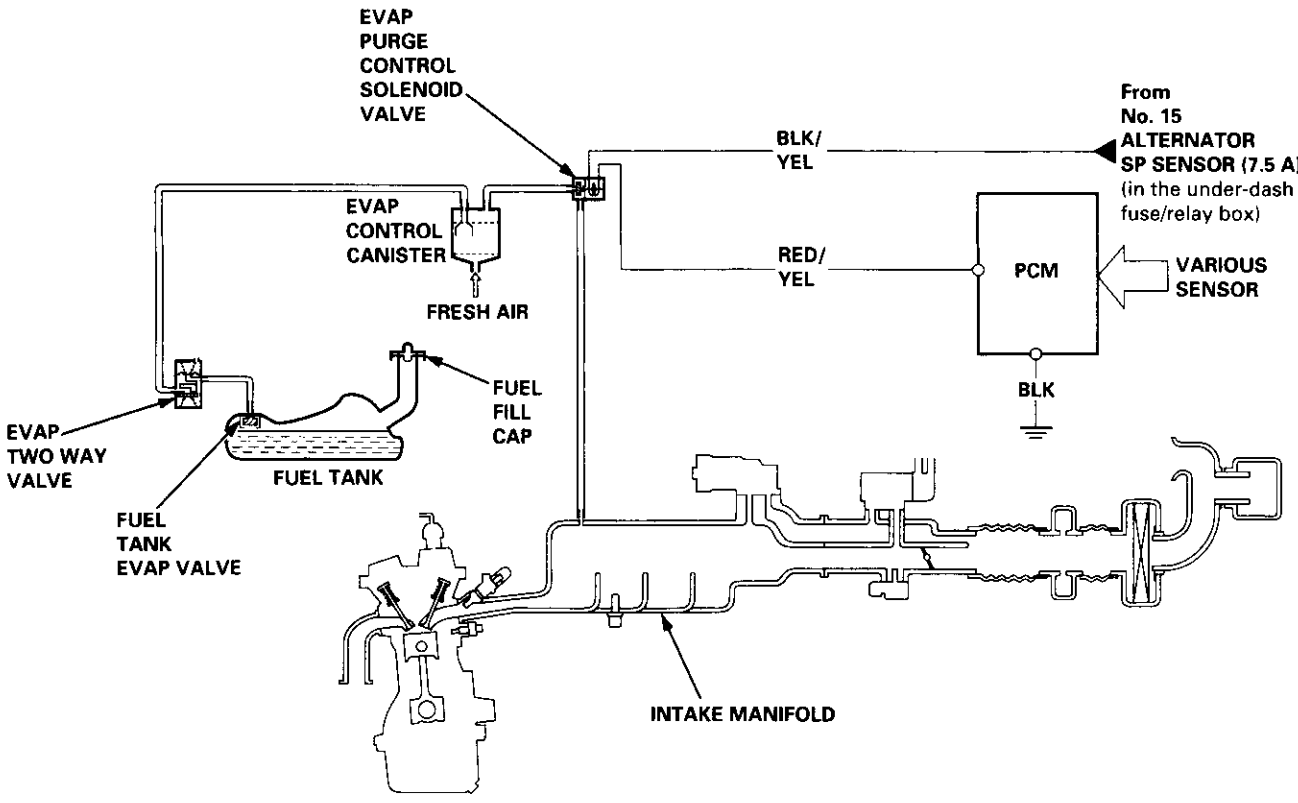
EVAP PURGE CONTROL SOLENOID VALVE DUTY CONTROLLED AFTER STARTING ENGINE

↑

ENGINE COOLANT TEMPERATURE ABOVE 154°F (68°C)

C. Fuel Tank Vapor Control System
When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.

'97 model:

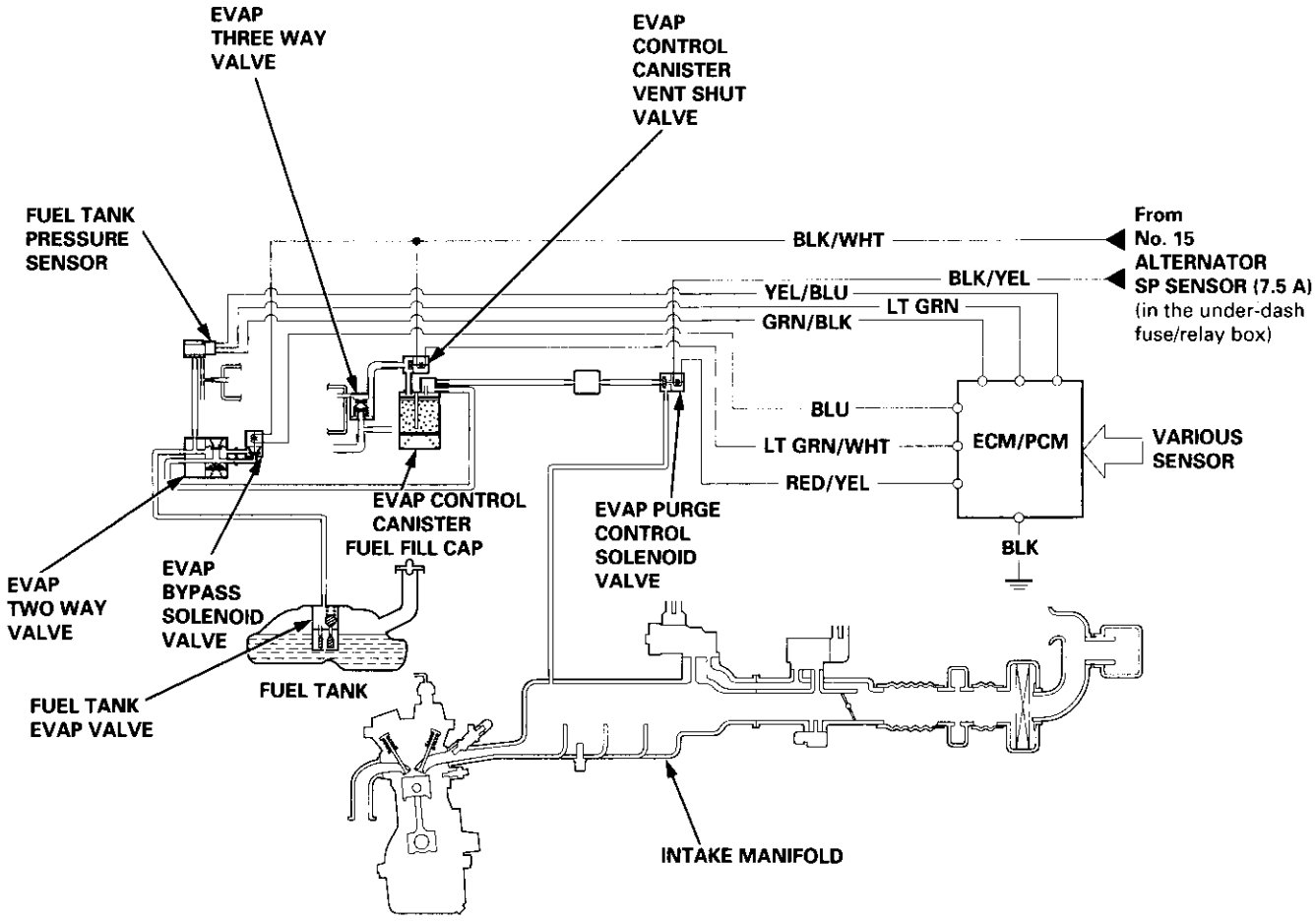


(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

'98 – 00 models:



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'97 model:

P0441 The scan tool indicates Diagnostic Trouble Code (DTC) P0441: Evaporative Emission (EVAP) control system insufficient purge flow.

Description

By monitoring the purge line vacuum with the MAP sensor, the PCM can detect insufficient EVAP control system purge flow.

Possible Cause

- EVAP Purge Control Solenoid Valve
- EVAP Purge Control Solenoid Valve Circuit
- EVAP Control Canister
- Vacuum Lines
- PCM

Troubleshooting Flowchart

— The MIL has been reported on.
— DTC P0441 is stored.

Problem verification:
1. Start the engine. Hold the engine at 3,000 rpm with no load (in Park or neutral) until the radiator fan comes on.
2. Do the PCM Reset Procedure.
3. Connect the SCS service connector.
4. Test-drive under following conditions on the road.
   — Without any electrical load
   — Transmission in D3 or D4 position
   — Engine speed between 1,200 – 2,400 rpm.
   — Decelerate from 50 mph (80 km/h) to 15 mph (24 km/h)

Is DTC P0441 indicated? — NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C108 (EVAP purge control solenoid valve) and at the PCM.**

YES

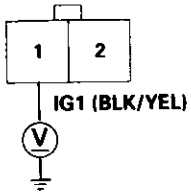
Check for an open in the wire (IG1 line):
1. Turn the ignition switch OFF.
2. Disconnect the EVAP purge control solenoid valve 2P connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and the EVAP purge control solenoid valve 2P connector terminal No. 1.

Is there battery voltage? — NO → **Repair open in the wires between the EVAP purge control solenoid valve and the No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse.**

YES

(To page 11-206)

EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C108)



Wire side of female terminals

(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-205)

Check the EVAP purge control solenoid valve:
1. Reconnect the EVAP purge control solenoid valve 2P connector.
2. Connect PCM connector terminals A15 and A10 with a jumper wire.

Does the solenoid valve click when the jumper is connected?

NO

Check for an open or short in the wire (PCS line):
Measure voltage between PCM connector terminal A15 and body ground.

Is there battery voltage?

NO

Check for a short in the wire (PCS line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (32P).
3. Disconnect the EVAP purge control solenoid valve 2P connector.
4. Check for continuity between body ground and PCM connector terminal A15.

YES

Replace the EVAP purge control solenoid valve.

Is there continuity?

YES

Repair short in the wires between the EVAP purge control solenoid valve and the PCM (A15).

NO

Repair open in the wires between the EVAP purge control solenoid valve and the PCM (A15).

YES

Check the vacuum lines:
Check the vacuum lines of EVAP system for misrouting, leakage, breakage and clogging.

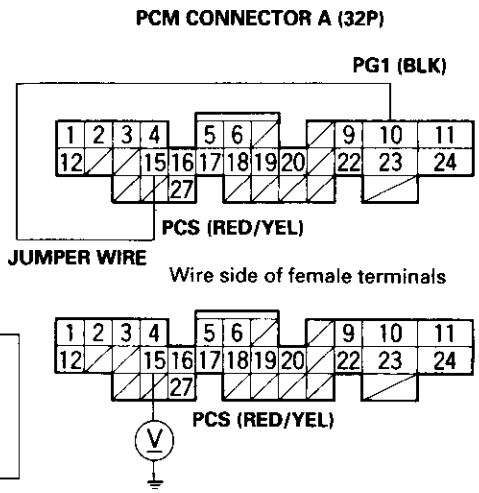
Are the vacuum lines OK?

NO

Repair or replace vacuum lines as necessary.

YES

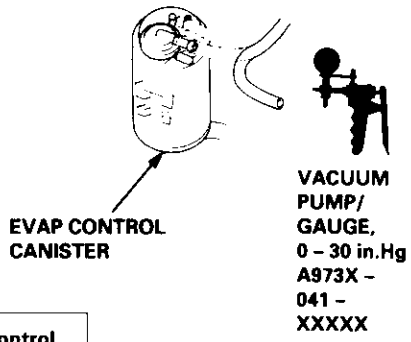
(To page 11-207)



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(From page 11-206)

Check the EVAP purge control solenoid valve:
1. Disconnect the vacuum hose from the EVAP control canister.
2. Connect the vacuum pump to the hose and apply vacuum.

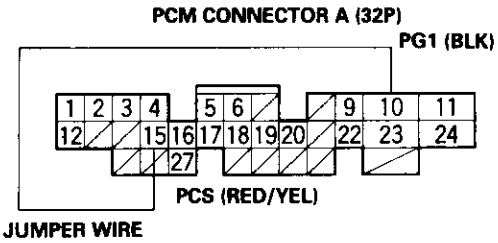


Does it hold vacuum?

NO → **Replace the EVAP purge control solenoid valve.**

YES

Check the EVAP control canister:
1. Reconnect the vacuum hose to the EVAP control canister.
2. Connect a vacuum gauge to the purge air hose.
3. Connect PCM connector terminals A15 and A10 with a jumper wire.
4. Start the engine.
5. Check the vacuum.



Does vacuum appear on the gauge?

NO → **Replace the EVAP control canister.**

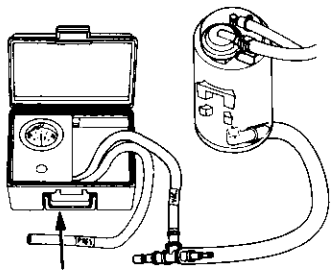
YES

Check the EVAP two way valve (see page 11-224).

Does the EVAP two way valve work properly?

NO → **Replace the EVAP two way valve.**

YES



Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

'99 – 00 models:

P0451 The scan tool indicates Diagnostic Trouble Code (DTC) P0451: The Fuel Tank Pressure sensor circuit range/performance problem.

— The MIL has been reported on.
— DTC P0451 is stored.

Check for the fuel tank pressure sensor:
1. Do the ECM/PCM Reset Procedure.
2. Remove the fuel fill cap.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between ECM/PCM connector terminals A29 and C18.

Is there approx. 2.5 V?

NO → **Check the vacuum lines for restriction or blockage repair as necessary. If OK, replace the fuel tank pressure sensor.**

YES

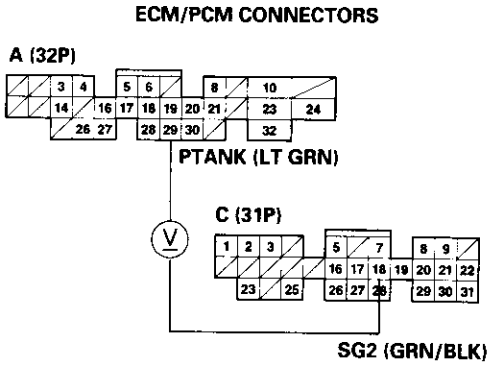
Check for the fuel tank pressure sensor:
1. Disconnect the hose between the EVAP two way valve and the fuel tank pressure sensor at the EVAP two way valve end.
2. Connect a vacuum pump to the open end of that hose.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between ECM/PCM connector terminals A29 and C18, and carefully apply vacuum on the hose one stroke at a time.
5. The voltage should smoothly drop from the starting approx. 2.5 V down to approx. 1.5 V. STOP applying vacuum when the voltage drops to approx. 1.5 V or damage to the fuel tank pressure sensor may occur.

Does the voltage drop to approx. 1.5 V and hold?

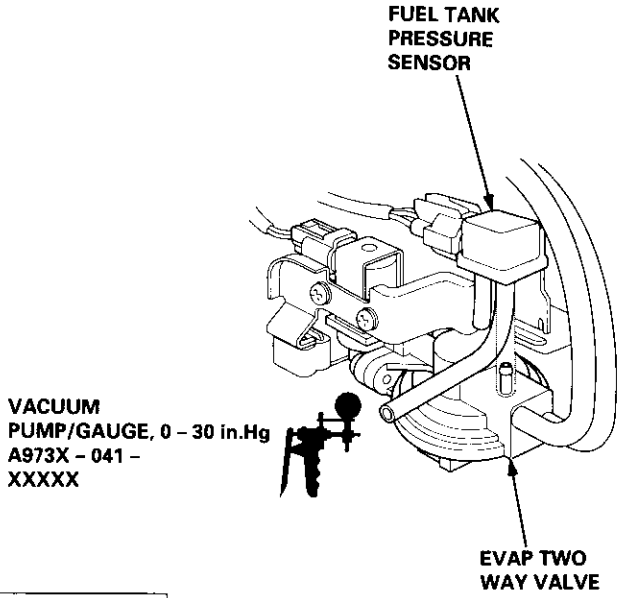
NO → **Replace the fuel tank pressure sensor.**

YES

Intermittent failure, system is OK at this time. Check for poor connections or loose hose at fuel tank pressure sensor and fuel tank.



Wire side of female terminals

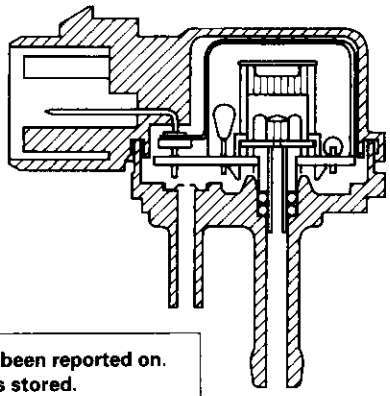


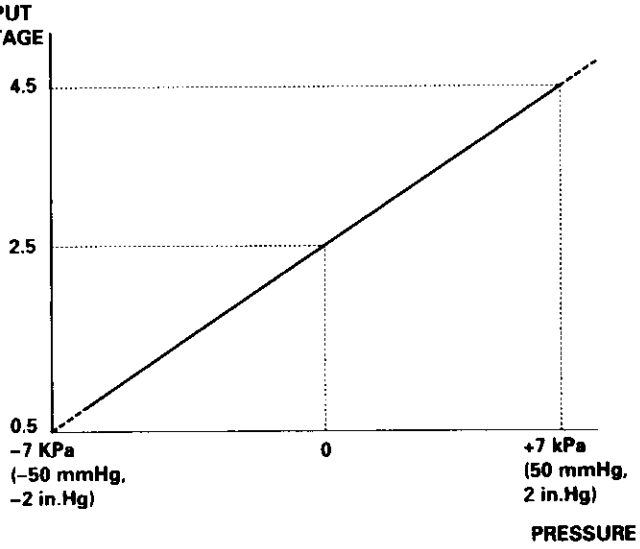
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'98 – 00 models:

P0452 The scan tool indicates Diagnostic Trouble Code (DTC) P0452: A low voltage problem in the Fuel Tank Pressure sensor.

The fuel tank pressure sensor converts fuel tank absolute pressure into electrical signals and inputs the ECM/PCM.





— **The MIL has been reported on.**
— **DTC P0452 is stored.**

Check the vacuum lines:
Check the vacuum lines of the fuel tank pressure sensor for misrouting, leakage, breakage and clogging.

Are the vacuum lines OK?

NO → **Repair or replace vacuum lines as necessary.**

YES

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Remove the fuel fill cap.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between body ground and ECM/PCM terminal A29.

Is there approx. 2.5 V?

YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C580 (located at access panel), C646 (fuel tank pressure sensor) and at the ECM/PCM.**

NO

Check for an open in wire (VCC2 line):
1. Turn the ignition switch OFF.
2. Reinstall the fuel fill cap.
3. Disconnect the fuel tank pressure sensor 3P connector.
4. Turn the ignition switch ON (II).
5. Measure voltage between the fuel tank pressure sensor 3P connector No. 1 terminal and No. 2 terminal.

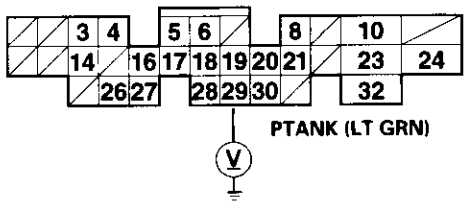
Is there approx. 5 V?

NO → **Repair open in the wire between the fuel tank pressure sensor and the ECM/PCM (A29).**

YES

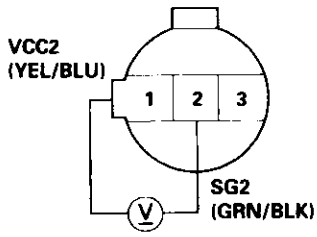
(To page 11-210)

ECM/PCM CONNECTOR A (32P)



Wire side of female terminals

FUEL TANK PRESSURE SENSOR 3P CONNECTOR (C646)



Wire side of female terminals

(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-209)

Check for a short in the wire (PTANK line):
Measure voltage between the fuel tank pressure sensor 3P connector No. 3 terminal and No. 2 terminal.

Is there approx. 5 V?

YES → **Replace the fuel tank pressure sensor.**

NO

Check for a short in the wire (PTANK line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM/PCM connector A (32P).
3. Check for continuity between the fuel tank pressure sensor 3P connector No. 3 terminals and body ground.

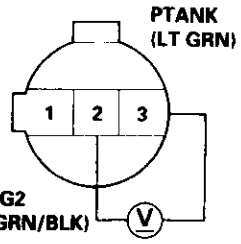
Is there continuity?

YES → **Repair short in the wire between the fuel tank pressure sensor and the ECM/PCM (A29).**

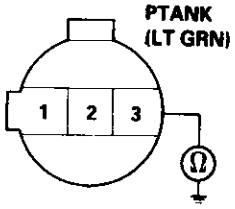
NO

Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.

FUEL TANK PRESSURE SENSOR 3P CONNECTOR (C646)



Wire side of female terminals



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'98 – 00 models:

P0453 The scan tool indicates Diagnostic Trouble Code (DTC) P0453: A high voltage problem in the Fuel Tank Pressure sensor.

— The MIL has been reported on.
— DTC P0453 is stored.

Check the vacuum lines:
Check the vacuum lines of the fuel tank pressure sensor for misrouting, leakage, breakage and clogging.

Are the vacuum lines OK? NO → **Repair or replace vacuum lines as necessary.**

YES

Problem verification:
1. Do the ECM/PCM Reset Procedure.
2. Remove the fuel fill cap.
3. Turn the ignition switch ON (II).
4. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between body ground and ECM/PCM terminal A29.

Is there approx. 2.5 V? YES → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at C580 (located at access panel), C646 (fuel tank pressure sensor) and at the ECM/PCM.**

NO

Check for an open in the wire (SG2 line):
1. Turn the ignition switch OFF.
2. Reinstall the fuel fill cap.
3. Disconnect the fuel tank pressure sensor 3P connector.
4. Turn the ignition switch ON (II).
5. Measure voltage between the fuel tank pressure sensor 3P connector terminals No. 1 and No. 2.

Is there approx. 5 V? NO → **Repair open in the wire between the fuel tank pressure sensor and the ECM/PCM (C18).**

YES

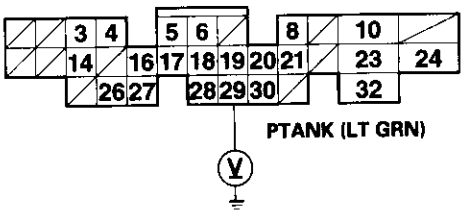
Check for an open in the wire (PTANK line):
Measure voltage between the fuel tank pressure sensor 3P connector No. 3 terminal and No. 2 terminal.

Is there approx. 5 V? YES → **Replace the fuel tank pressure sensor.**

NO

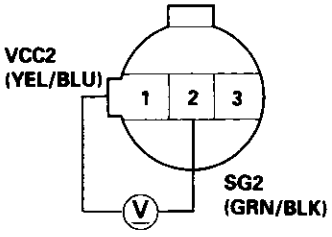
(To page 11-212)

ECM/PCM CONNECTOR A (32P)

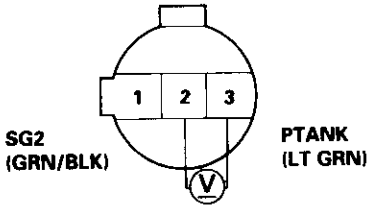


Wire side of female terminals

FUEL TANK PRESSURE SENSOR 3P CONNECTOR (C646)



Wire side of female terminals



(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

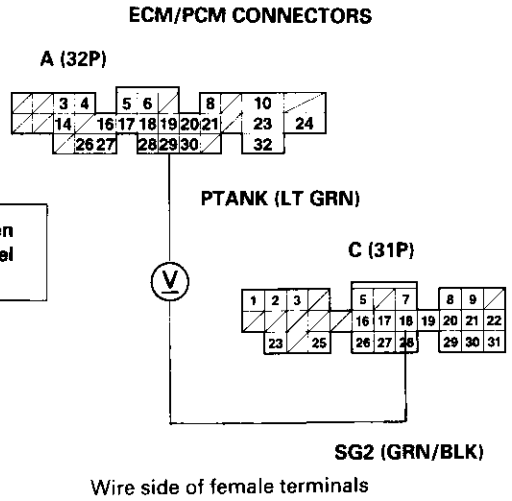
(From page 11-211)

Check for an open in the wire (PTANK line):
Measure voltage between ECM/PCM connector terminals A29 and C18.

Is there approx. 5 V?

YES → **Repair open in the wire between the ECM/PCM (A29) and the fuel tank pressure sensor.**

NO → **Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.**

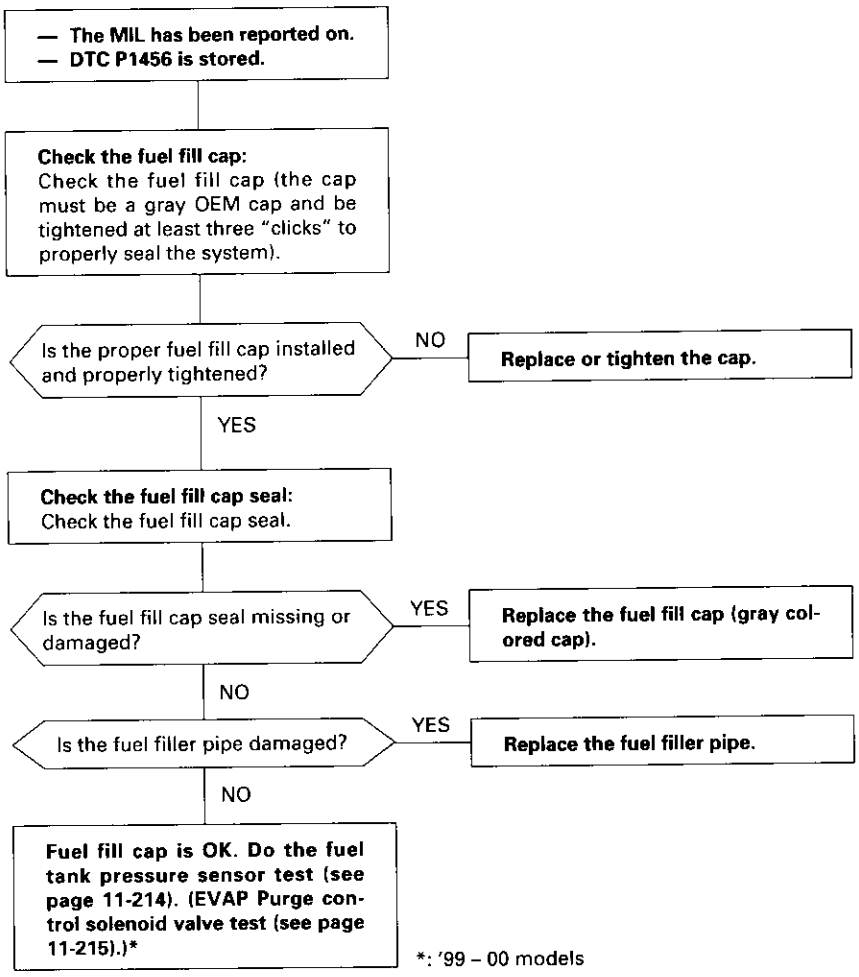


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'98 – 00 models:

P1456 The scan tool indicates Diagnostic Trouble Code (DTC) P1456: Evaporative Emission (EVAP) control system leak detected (fuel tank system).

Troubleshooting Flowchart



*: '99 – 00 models

(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

P1456 (cont'd)

('98 model only)

Fuel tank pressure sensor test. (The continuation of DTC P1456 troubleshooting.)

Check the fuel tank pressure sensor:
1. Remove the fuel fill cap.
2. Turn the ignition switch ON (II).
3. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between ECM/PCM connector terminals A29 and C18.

Is there approx. 2.5 V?

NO → **Check the vacuum lines for restriction or blockage repair as necessary. If OK, replace the fuel tank pressure sensor.**

YES

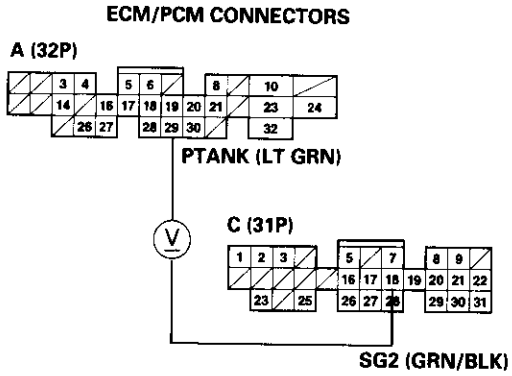
Check the fuel tank pressure sensor:
1. Turn the ignition switch OFF.
2. Disconnect the hose between the EVAP two way valve and the fuel tank pressure sensor at the EVAP two way valve end.
3. Connect a vacuum pump to the open end of that hose.
4. Turn the ignition switch ON (II).
5. Monitor the FTP Sensor voltage with the Honda PGM Tester, or measure voltage between ECM/PCM connector terminals A29 and C18, and carefully apply vacuum on the hose one stroke at a time.
6. The voltage should smoothly drop from the starting approx. 2.5 V down to approx. 1.5 V. Stop applying vacuum when the voltage drops to approx. 1.5 V or damage to the fuel tank pressure sensor may occur.

Does the voltage drop to approx. 1.5 V and hold?

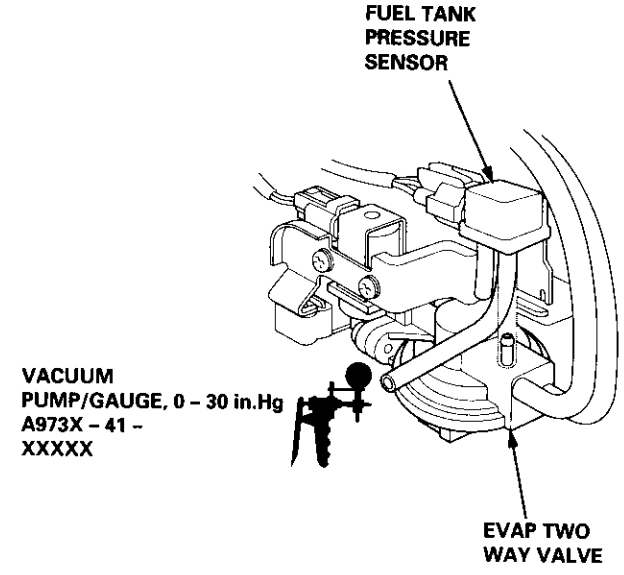
YES → **Fuel tank pressure sensor is OK. Do the EVAP purge control solenoid valve test (see page 11-215).**

NO

Replace the fuel tank pressure sensor.



Wire side of female terminals



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EVAP purge control solenoid valve test.
(The continuation of DTC P1456 troubleshooting.)

Check the EVAP purge control solenoid valve:
1. Disconnect the vacuum hose from the EVAP control canister, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.

Does the valve hold vacuum?

YES — **EVAP purge control solenoid valve is OK. Do the EVAP bypass solenoid valve test (see page 11-216)**

NO

Check the EVAP purge control solenoid valve:
1. Turn the ignition switch OFF.
2. Disconnect the EVAP purge control solenoid valve 2P connector.
3. Check for continuity between the EVAP purge control solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

NO — **Replace the EVAP purge control solenoid valve.**

YES

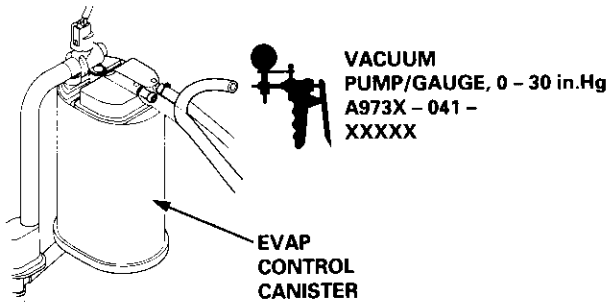
Check for a short in the wire (PCS line):
1. Disconnect the ECM/PCM connector A (32P).
2. Check for continuity between the EVAP purge control solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

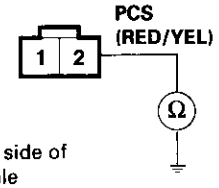
YES — **Repair short in the wire between the ECM/PCM (A6) and the EVAP purge control solenoid valve.**

NO

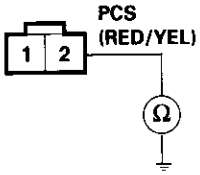
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.



EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C108)



Wire side of female terminals



(cont'd)

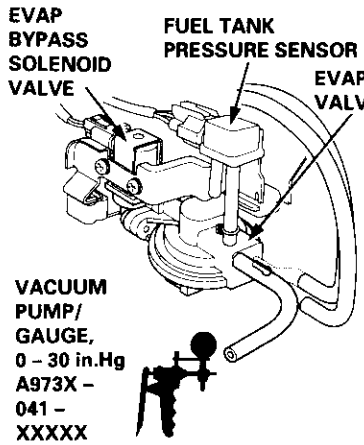
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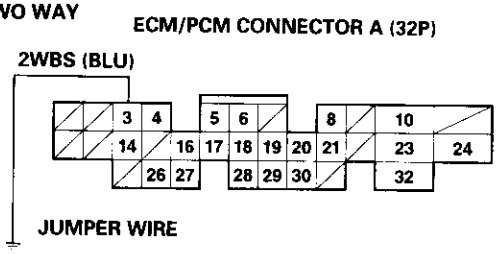
Evaporative Emission (EVAP) Controls (cont'd)

P1456 (cont'd)

EVAP bypass solenoid valve test. (The continuation of DTC P1456 troubleshooting.)

Check the EVAP bypass solenoid valve:
1. Disconnect the vacuum hose from the EVAP two way valve, and connect a vacuum pump to the hose.
2. Connect the ECM/PCM connector terminal A3 to the body ground with a jumper wire.
3. Turn the ignition switch ON (II).
4. Apply vacuum to the hose.



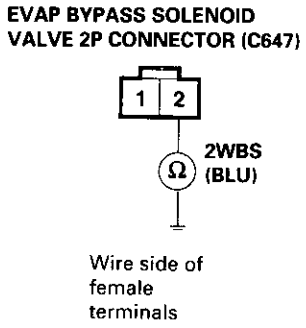


Does the valve hold vacuum?

NO → **EVAP bypass solenoid valve/ EVAP two way valve is OK. Do the EVAP control canister vent shut valve test (see page 11-217).**

YES

Check for an open in the wire (2WBS line):
1. Turn the ignition switch OFF.
2. Disconnect the EVAP bypass solenoid valve 2P connector.
3. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

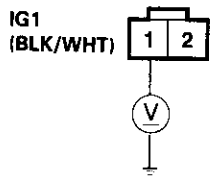


Is there continuity?

NO → **Repair open in the wire between the EVAP bypass solenoid valve and ECM/PCM (A3).**

YES

Check for an open in the wire (IG1 line):
1. Turn the ignition switch ON (II).
2. Measure voltage between the EVAP bypass solenoid valve 2P connector terminal No. 1 and body ground.

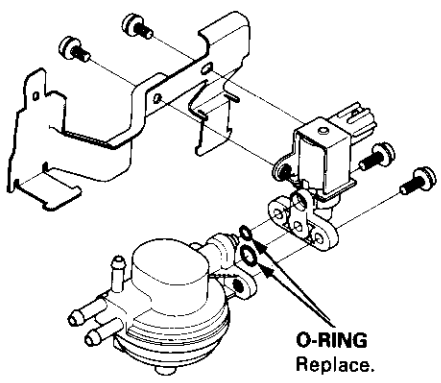


Is there battery voltage?

YES → **Replace the EVAP bypass solenoid *valve and O-rings.***

NO

Repair open in the wire between the EVAP bypass solenoid valve and No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse.



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EVAP control canister vent shut valve test.
(The continuation of DTC P1456 troubleshooting.)

Check the EVAP control canister vent shut valve:
1. Disconnect the vacuum hose from the EVAP three way valve, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.

Does the valve hold vacuum?

NO → **EVAP control canister vent shut valve is OK. Do the vacuum hoses and connections test (see page 11-218).**

YES

Check the EVAP control canister vent shut valve:
1. Turn the ignition switch OFF.
2. Disconnect the EVAP control canister vent shut valve 2P connector.
3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.

Is there continuity?

NO → **Replace the EVAP control canister vent shut valve and O-ring.**

YES

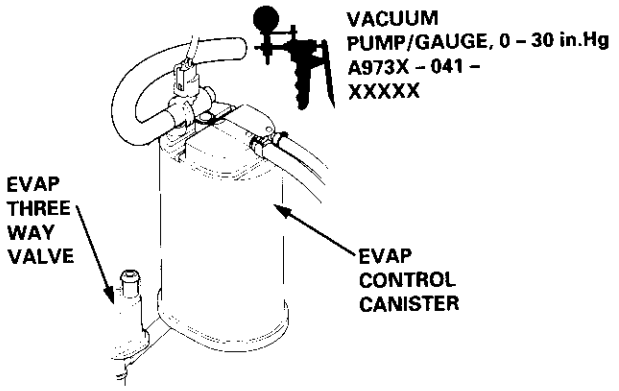
Check for a short in the wire (VSV line):
1. Disconnect the ECM/PCM connector A (32P).
2. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.

Is there continuity?

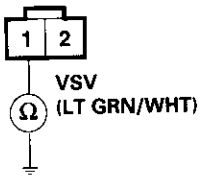
YES → **Repair short in the wire between the ECM/PCM (A4) and the EVAP control canister vent shut valve.**

NO

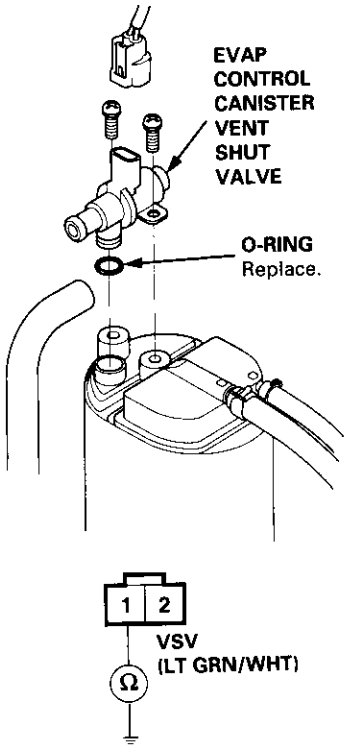
Substitute a known-good ECM/PCM and recheck. If symptom/indication goes away, replace the original ECM/PCM.



EVAP CONTROL CANISTER VENT SHUT VALVE 2P CONNECTOR (C361)



Wire side of female terminals

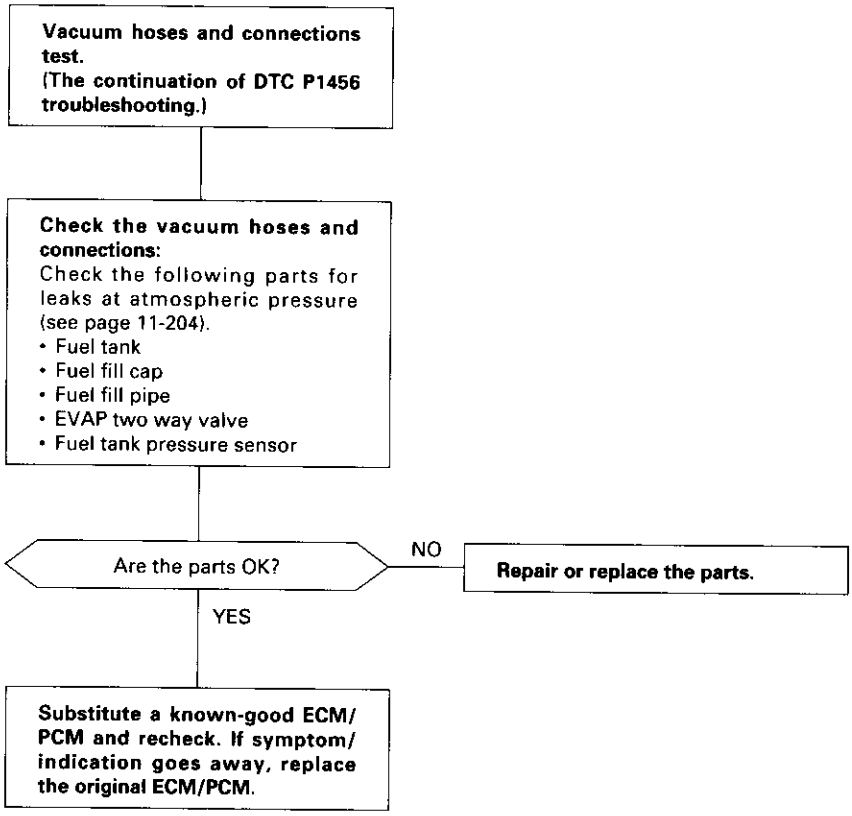


(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

P1456 (cont'd)

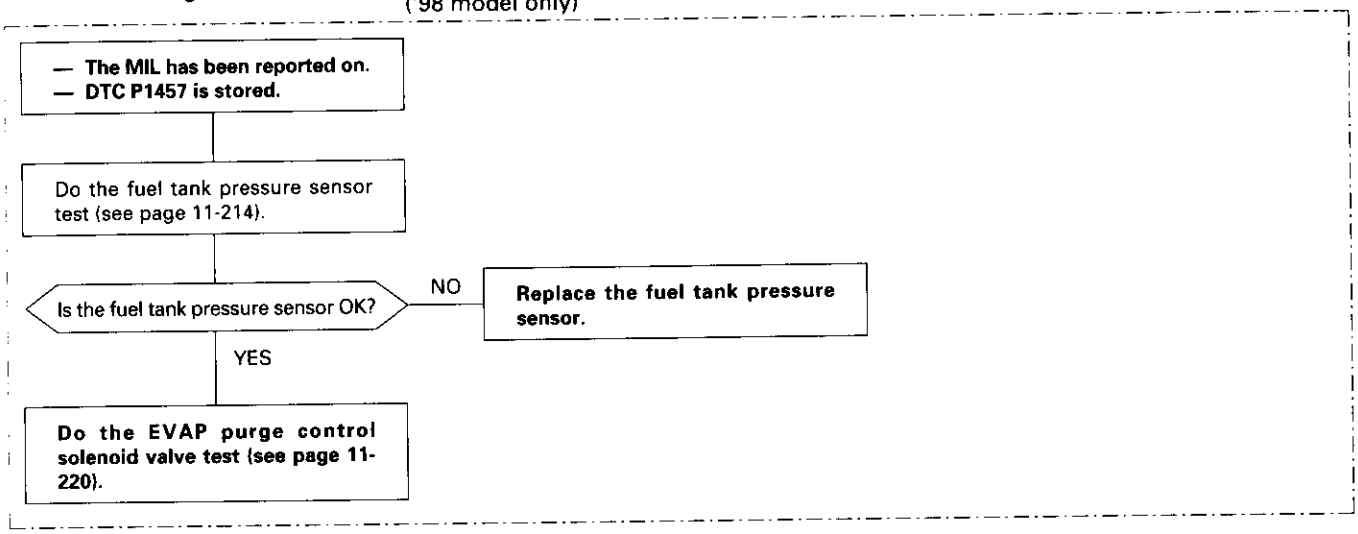


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'98 – 00 models:

P1457 The scan tool indicates Diagnostic Trouble Code (DTC) P1457: Evaporative Emission (EVAP) control system leak detected (EVAP control canister system).

Troubleshooting Flowchart ('98 model only)



(cont'd)

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Evaporative Emission (EVAP) Controls (cont'd)

P1457 (cont'd)

— The MIL has been reported on.
— DTC P1457 is stored.
(EVAP purge control solenoid valve test.)*

Check the EVAP purge control solenoid valve:
1. Disconnect the vacuum hose from the EVAP control canister, and connect a vacuum pump to the hose.
2. Connect the ECM/PCM connector terminal A6 to the body ground with a jumper wire.
3. Turn the ignition switch ON (II).
4. Apply vacuum to the hose.

Does the valve hold vacuum?

NO — **EVAP purge control solenoid valve is OK. Do the EVAP bypass solenoid valve test (see page 11-221).**

YES

Check for an open in the wire (PCS line):
1. Turn the ignition switch OFF.
2. Disconnect the EVAP purge control solenoid valve 2P connector.
3. Check for continuity between the EVAP purge control solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

NO — **Repair open in the wire between the EVAP purge control solenoid valve and the ECM/PCM (A6).**

YES

Check for an open in the wire (IG1 line):
1. Turn the ignition switch ON (II).
2. Measure voltage between the EVAP bypass solenoid valve 2P connector terminal No. 1 and body ground.

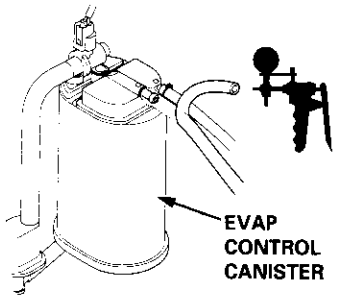
Is there battery voltage?

YES — **Replace the EVAP purge control solenoid valve.**

NO

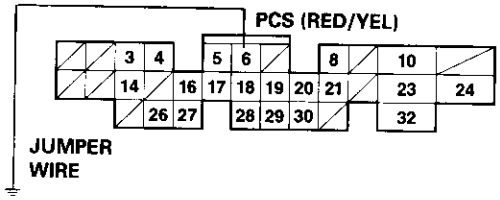
Repair open in the wire between the EVAP purge control solenoid valve and No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse.

*: Continued for '98 model



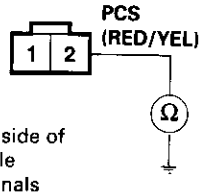
VACUUM PUMP/GAUGE, 0 – 30 in.Hg A973X – 041 – XXXXX

ECM/PCM CONNECTOR A (32P)

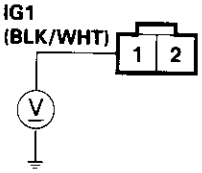


Wire side of female terminals

EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR (C108)



Wire side of female terminals



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EVAP bypass solenoid valve test. (The continuation of DTC P1457 troubleshooting.)

Check the EVAP bypass solenoid valve:
1. Disconnect the vacuum hose from the EVAP two way valve, and connect a vacuum pump to the hose.
2. Turn the ignition switch ON (II).
3. Apply vacuum to the hose.

Does the valve hold vacuum?

YES → **EVAP bypass solenoid valve/ EVAP two way valve is OK. Do the EVAP control canister vent shut valve test (see page 11-222).**

NO

Check the EVAP bypass solenoid valve:
1. Turn the ignition switch OFF.
2. Disconnect the EVAP bypass solenoid valve 2P connector.
3. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

NO → **Replace the EVAP bypass solenoid valve and O-rings.**

YES

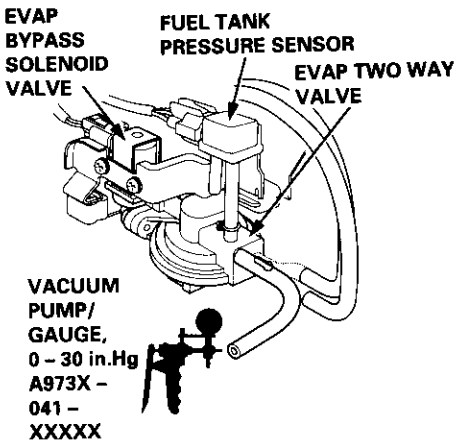
Check for a short in the wire (2WBS line):
1. Disconnect ECM/PCM connector A (32P).
2. Check for continuity between the EVAP bypass solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

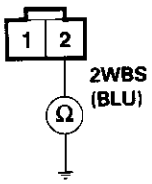
YES → **Repair short in the wire between the ECM/PCM (A3) and the EVAP bypass solenoid valve.**

NO

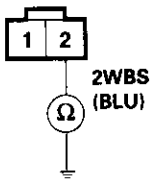
Substitute a known-good ECM/ PCM and recheck. If symptom/ indication goes away, replace the original ECM/PCM.

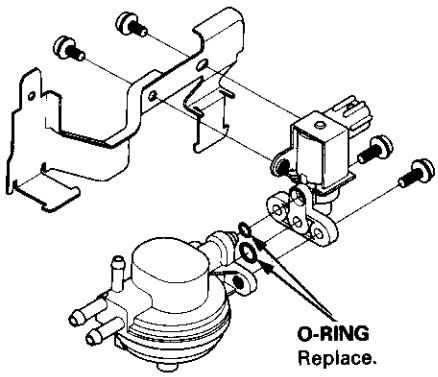


EVAP BYPASS SOLENOID VALVE 2P CONNECTOR (C647)



Wire side of female terminals





(cont'd)

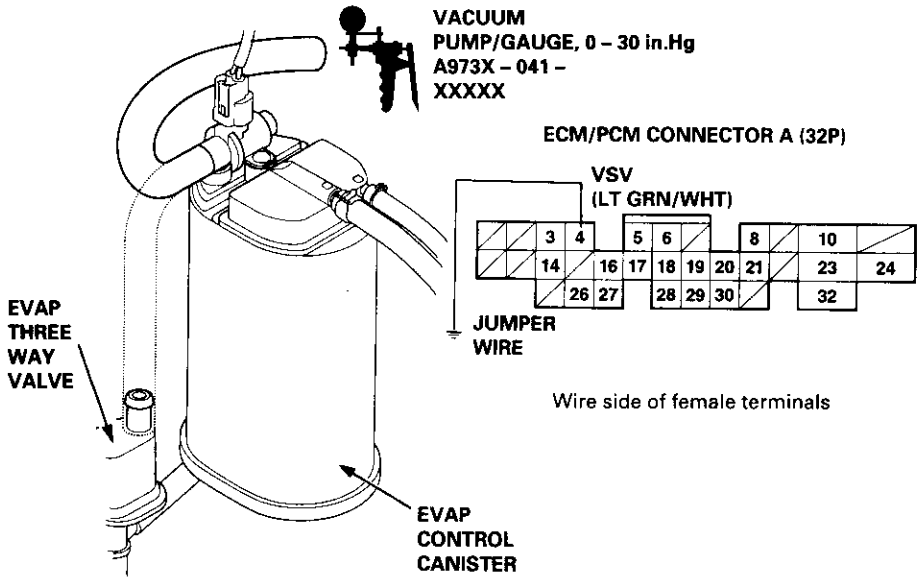
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Evaporative Emission (EVAP) Controls (cont'd)

P1457 (cont'd)

EVAP control canister vent shut valve test.
(The continuation of DTC P1457 troubleshooting.)

Check the EVAP control canister vent shut valve:
1. Disconnect the vacuum hose from the EVAP three way valve, and connect a vacuum pump to the hose.
2. Connect the ECM/PCM connector terminal A4 to the body ground with a jumper wire.
3. Turn the ignition switch ON (II).
4. Apply vacuum to the hose.

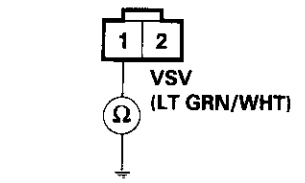


Does the valve hold vacuum?

YES → **EVAP control canister vent shut valve is OK. Do the canister system leak test (see page 11-223).**

NO

Check for an open in the wire (VSV line):
1. Turn the ignition switch OFF.
2. Disconnect the EVAP control canister vent shut valve 2P connector.
3. Check for continuity between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.

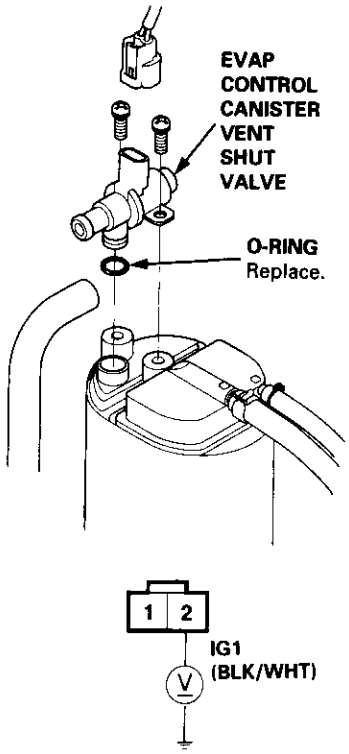


Is there continuity?

NO → **Repair open in the wire between the EVAP control canister vent shut valve and the ECM/PCM (A4).**

YES

Check for an open in the wire (IG1 line):
1. Turn the ignition switch ON (II).
2. Measure voltage between the EVAP control canister vent shut valve 2P connector terminal No. 1 and body ground.



Is there battery voltage?

YES → **Replace the EVAP control canister vent shut valve and O-ring.**

NO

Repair open in the wire between the EVAP control canister vent shut valve and No. 15 ALTERNATOR SP SENSOR (7.5 A) fuse.

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Canister system leak test. (The continuation of DTC P1457 troubleshooting.)

Check the EVAP control canister vent shut valve line and connections:

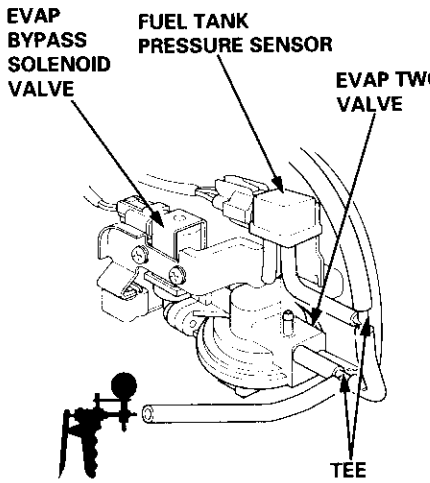
1. Turn the ignition switch OFF.
2. Connect to three-way tee fittings into the hose from the EVAP control canister to the EVAP two way valve. Connect the fuel tank pressure sensor to one of the tee fittings and the vacuum pump to the other.
3. Remove the vent hose from the EVAP control canister vent shut valve and cap the port to seal the fresh air vent for the EVAP control canister.
4. Turn the ignition switch ON (II).
5. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM/PCM connector terminals A29 and C18 slowly pump the vacuum pump using a stroke every 1 – 2 seconds.
6. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
   NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
7. Monitor that voltage for 20 seconds.

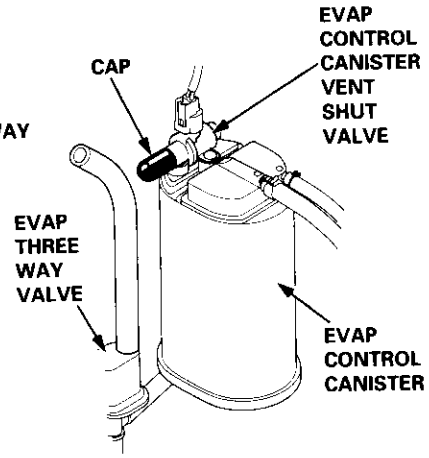
Does the voltage drop to 1.5 V and holds at least 20 seconds?

NO

YES

Inspect the EVAP control canister vent shut valve line and connections.





Check the EVAP purge control solenoid valve line and connections:

1. Turn the ignition switch OFF.
2. Disconnect the purge line hose from the EVAP control canister and plug the port.
3. Turn the ignition switch ON (II).
4. While monitoring the FTP Sensor voltage with the Honda PGM Tester, or measuring voltage between ECM/PCM connector terminals A29 and C18 slowly pump the vacuum pump using a stroke every 1 – 2 seconds.
5. Continue to pump vacuum until that voltage drops to approx. 1.5 V.
   NOTE: Make sure that the engine coolant temperature still above 95°F (35°C) and your vacuum pump has no leak.
6. Monitor that voltage for 20 seconds.

Does the voltage drop to 1.5 V and holds at least 20 seconds?

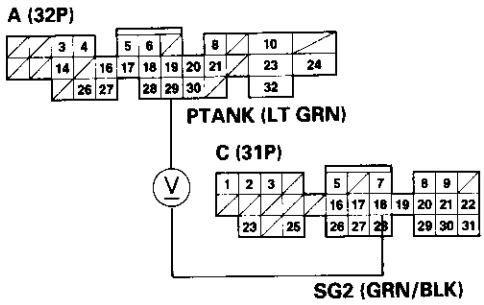
YES

Inspect the EVAP purge control solenoid valve line and connections. If they are OK, do the EVAP two way valve test (see page 11-224).

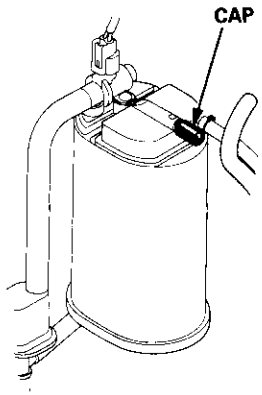
NO

Replace the EVAP control canister.

ECM/PCM CONNECTORS



Wire side of female terminals



(cont'd)

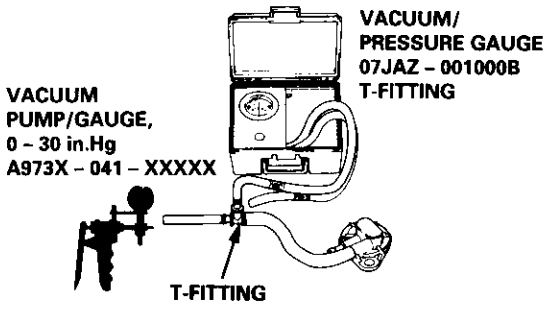
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Evaporative Emission (EVAP) Controls (cont'd)

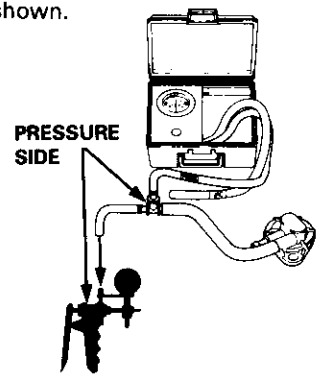
Evaporative Emission (EVAP) Two Way Valve Testing

'97 model:

1. Remove the fuel fill cap.
2. Remove the vapor line from the EVAP two way valve on the fuel tank, and connect it to a T-fitting from a vacuum gauge and a vacuum pump as shown.



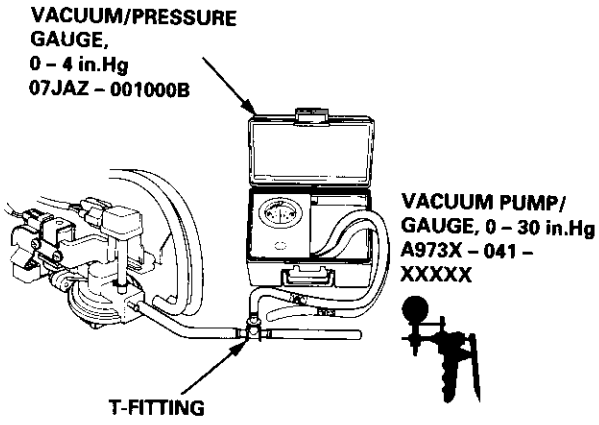
3. Apply vacuum slowly and continuously while watching the gauge. The vacuum should stabilize momentarily at 0.7 – 2.0 kPa (5 – 15 mmHg, 0.2 – 0.6 in.Hg).
   If the vacuum stabilizes (valve opens) below 0.7 kPa (5 mmHg, 0.2 in.Hg) or above 2.0 kPa (15 mmHg, 0.6 in.Hg), install a new valve and retest.
4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.



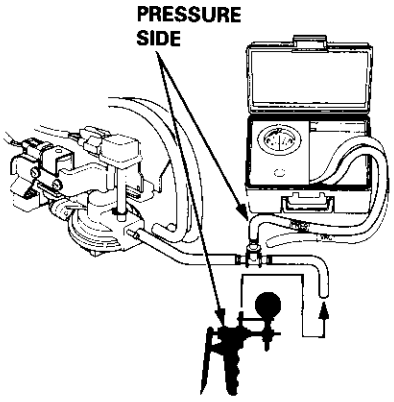
5. Slowly pressurize the vapor line while watching the gauge. The pressure should stabilize at 1.3 – 4.7 kPa (0 – 35 mmHg, 0.4 – 1.4 in.Hg).
   - If the pressure momentarily stabilizes (valve opens) at 1.3 – 4.7 kPa (10 – 35 mmHg, 0.4 – 1.4 in. Hg), the valve is OK.
   - If the pressure stabilizes below 1.3 kPa (10 mmHg, 0.4 in,Hg) or above 4.7 kPa (35 mmHg, 1.4 in.Hg), install a new valve and retest.

'98 – 00 models:

1. Remove the fuel fill cap.
2. Remove the vapor line from the EVAP two way valve (located above the EVAP control canister), and connect it to a T-fitting from vacuum gauge and vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge.
   The vacuum should stabilize momentarily at 0.8 – 2.1 kPa (6 – 16 mmHg, 0.2 – 0.6 in.Hg).
   If the vacuum stabilizes (valve opens) below 0.8 kPa (6 mmHg, 0.2 in.Hg) or above 2.1 kPa (16 mmHg, 0.6 in.Hg), install a new valve and retest.
4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.
   The pressure should stabilize momentarily above 1.0 kPa (8 mmHg, 0.3 in.Hg).
   - If the pressure momentarily stabilizes (valve opens) above 1.0 kPa (8 mmHg, 0.3 in.Hg), the valve is OK.
   - If the pressure stabilizes below 1.0 kPa (8 mmHg, 0.3 in.Hg), install a new valve and retest.

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Transaxle

Clutch 12-1
Manual Transmission 13-1
Automatic Transmission 14-1
Differential 15-1
Driveshafts 16-1



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Clutch

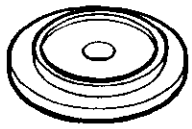
Special Tools 12-2
Illustrated Index 12-3
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  Removal/Installation 12-5
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  Removal/Installation 12-6
Pressure Plate
  Removal/Inspection 12-7
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  Removal/Inspection 12-8
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  Installation 12-10
Release Bearing
  Removal/Inspection 12-11
  Installation 12-12



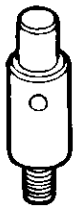
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Special Tools

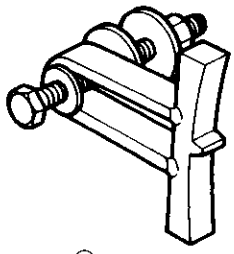
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAF – PM7011A	Clutch Alignment Disc	1	12-7
②	07NAF – PR30100	Clutch Alignment Shaft	1	12-7, 8, 10, 11
③	07LAB – PV00100 or 07924 – PD20003	Ring Gear Holder	1	12-7, 9, 10, 11
④	07746 – 0010100	Attachment, 32 x 35 mm	1	12-10
⑤	07749 – 0010000	Driver	1	12-10
⑥	07936 – 3710100	Handle	1	12-7, 8, 10, 11



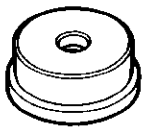
①



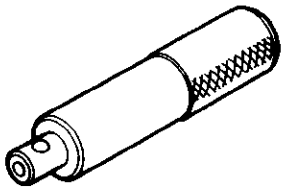
②



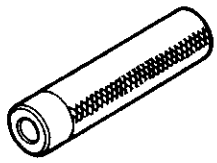
③



④



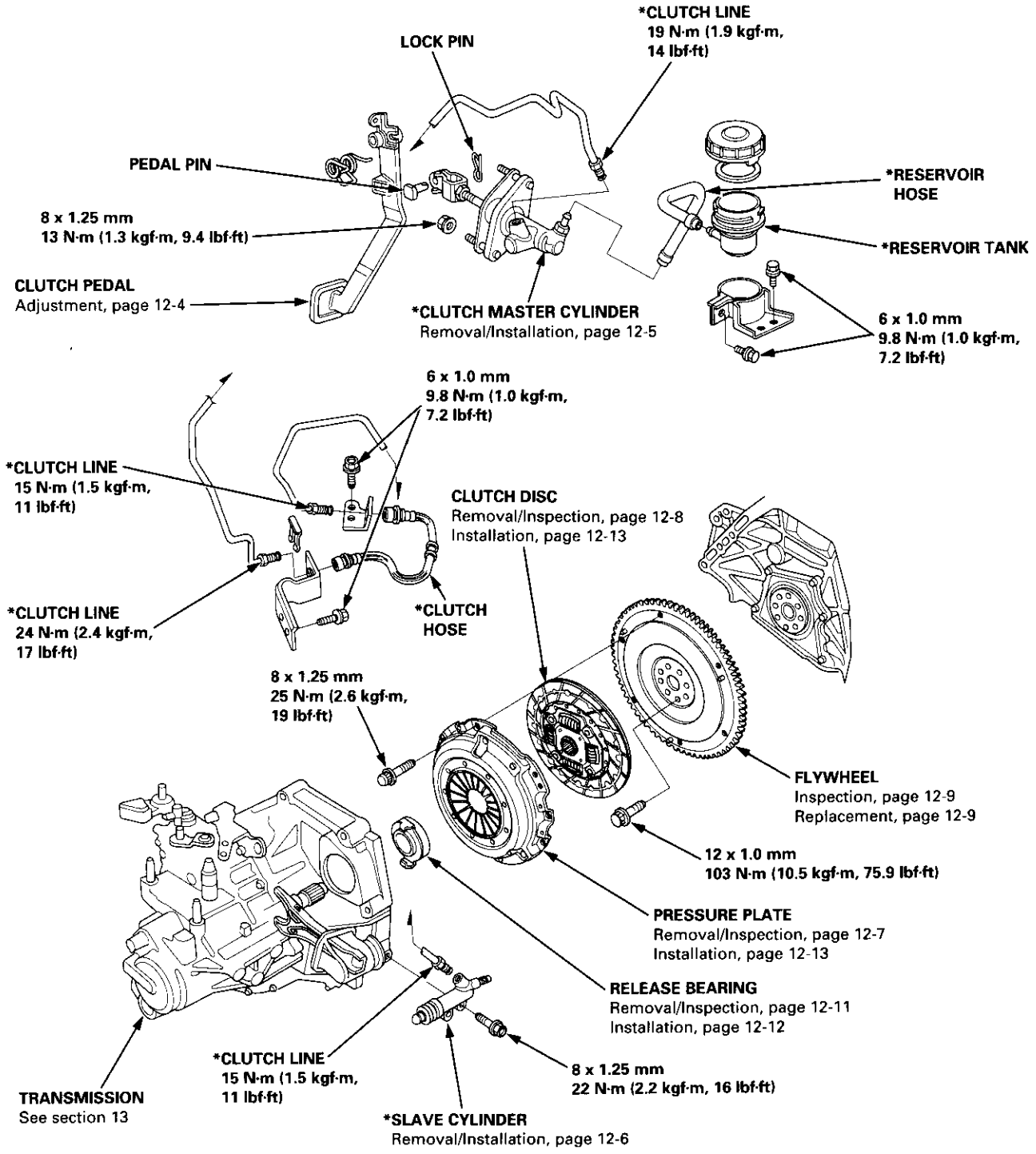
⑤



⑥

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NOTE:
- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked * are removed, the clutch hydraulic system must be bled (see page 12-6).
- Inspect the hoses for damage, leaks, interference, and twisting.



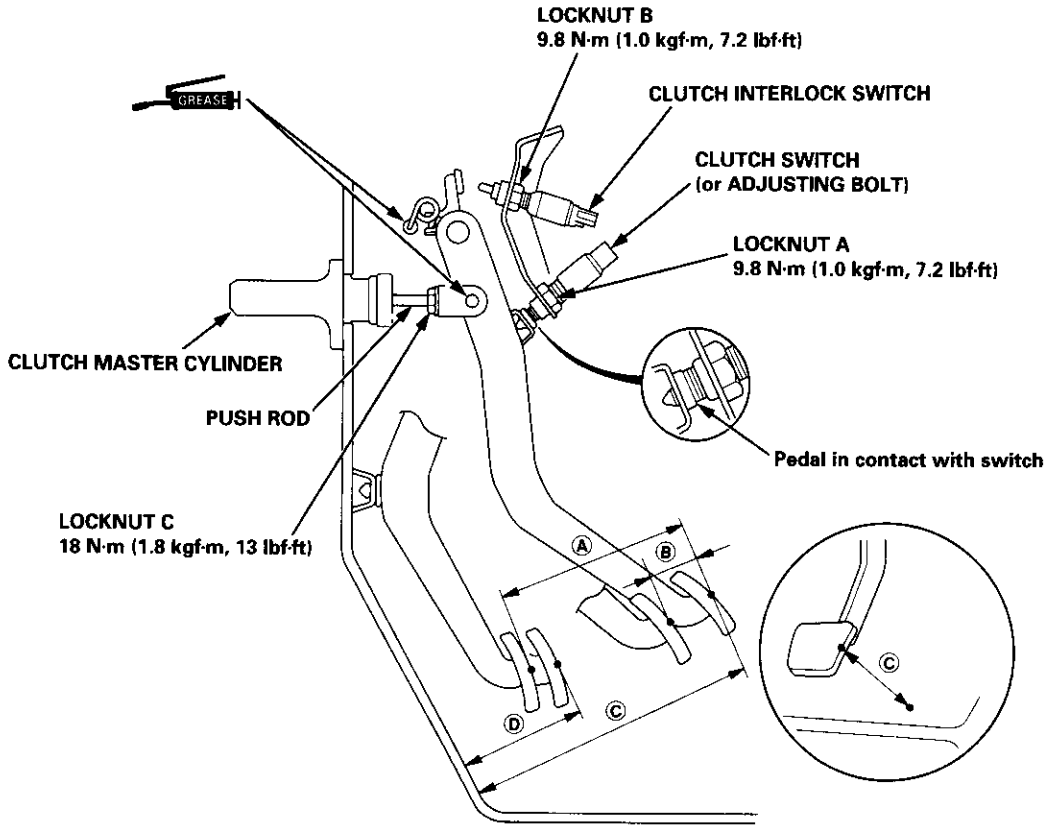
Clutch Pedal

Adjustment

NOTE:
- To check the clutch interlock switch and clutch switch, see section 23.
- The clutch is self-adjusting to compensate for wear.

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the clutch switch (or adjusting bolt) until it no longer touches the clutch pedal.
2. Loosen locknut C, and turn the push rod in or out to get the specified stroke (Ⓐ) and height (Ⓒ) at the clutch pedal.
3. Tighten locknut C.
4. Thread in the clutch switch (or adjusting bolt) until it contacts the clutch pedal.
5. Turn the clutch switch (or adjusting bolt) in an additional 3/4 to 1 full turn.
6. Tighten locknut A.
7. Loosen locknut B on the clutch interlock switch.
8. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
9. Release the clutch pedal 15 – 20 mm (0.59 – 0.79 in) from the fully depressed position and hold it there. Adjust the position of the clutch interlock switch so that the engine will start with the clutch pedal in this position.
10. Tighten locknut B.



Ⓐ (STROKE at PEDAL): 135 – 145 mm (5.31 – 5.71 in)
Ⓑ (TOTAL CLUTCH PEDAL FREE PLAY): 7 – 22 mm (0.28 – 0.87 in) include the pedal play 1 – 9 mm (0.04 – 0.35 in)
Ⓒ (CLUTCH PEDAL HEIGHT): 183 mm (7.20 in) to the floor
Ⓓ (CLUTCH PEDAL DISENGAGEMENT HEIGHT): 72 mm (2.83 in) minimum to the floor

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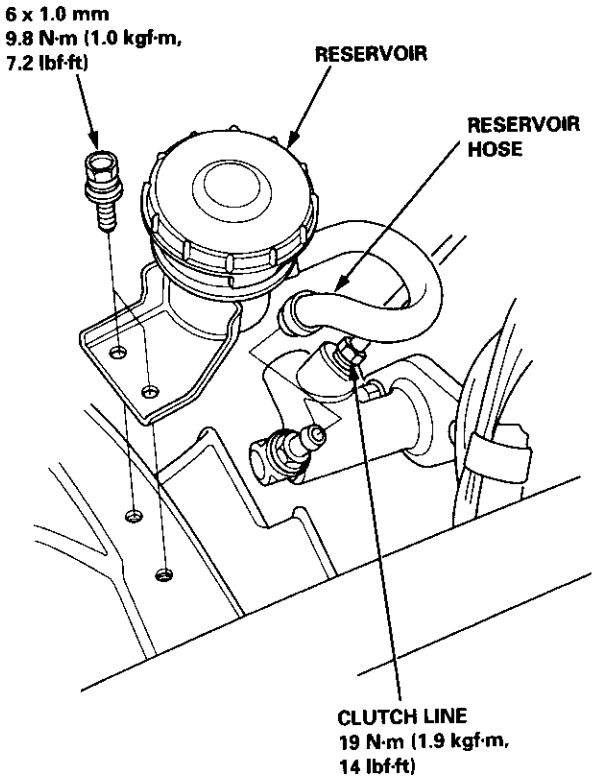
Clutch Master Cylinder

Removal/Installation

CAUTION:
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Plug the end of the clutch line and reservoir hose with a shop towel to prevent brake fluid from coming out.**

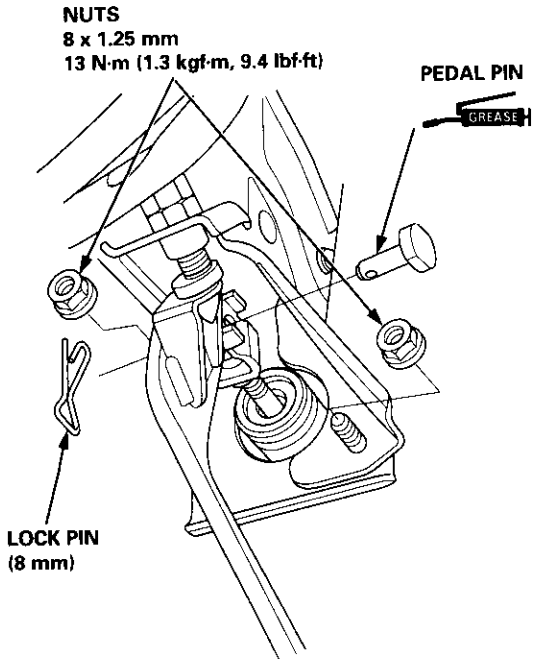
1. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.

2. Disconnect the clutch line and reservoir hose from the clutch master cylinder.

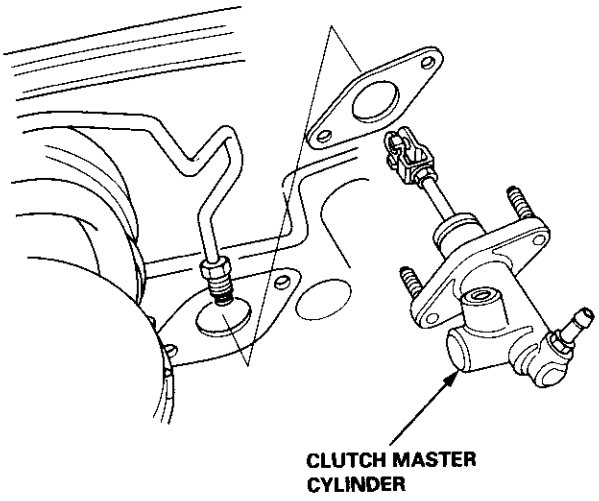


3. Remove the reservoir from the engine compartment bulkhead.

4. Pry out the lock pin, and pull the pedal pin out of the yoke. Remove the nuts.



5. Remove the clutch master cylinder.



6. Install the clutch master cylinder in the reverse order of removal.

   NOTE: Bleed the clutch hydraulic system (see page 12-6).

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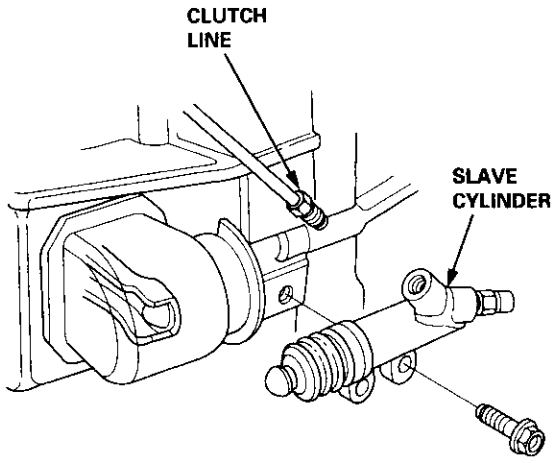
Slave Cylinder

Removal/Installation

CAUTION:
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Plug the end of the clutch line with a shop towel to prevent brake fluid from coming out.**

GREASE: Super High Temp Urea Grease (P/N 08798 – 9002).
GREASE: Brake Assembly Lube or equivalent rubber grease.

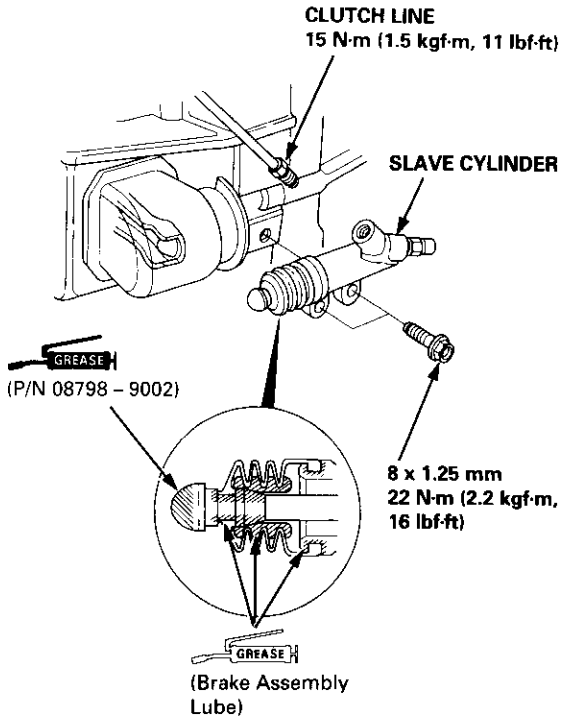
1. Disconnect the clutch line from the slave cylinder.



2. Remove the slave cylinder from the clutch housing.

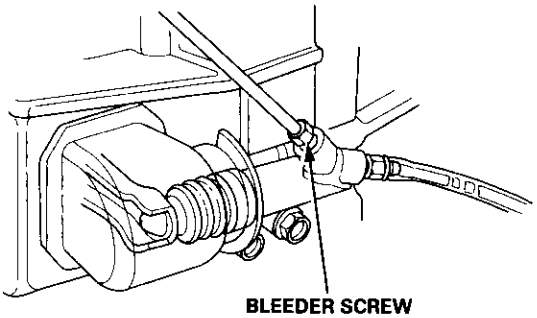
3. Install the slave cylinder in the reverse order of removal.

NOTE: Make sure the boot is installed on the slave cylinder.



4. Bleed the clutch hydraulic system.

- Attach a hose to the bleeder screw, and suspend the hose in a container of brake fluid.
- Make sure there is an adequate supply of fluid at the clutch master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
- Refill the clutch master cylinder with fluid when done.
- Always use Genuine Honda DOT3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
- Confirm clutch operation, and check for leaking fluid.

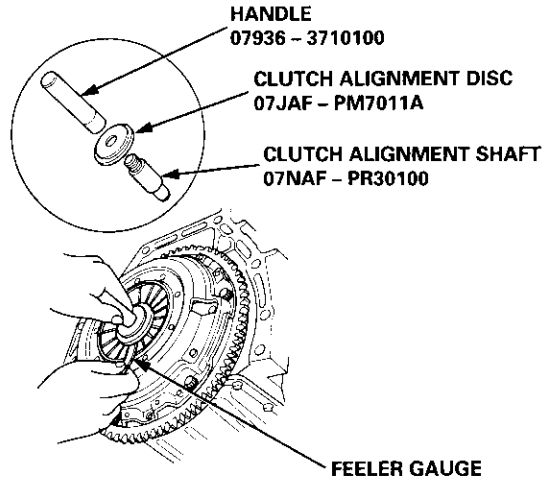


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Removal/Inspection

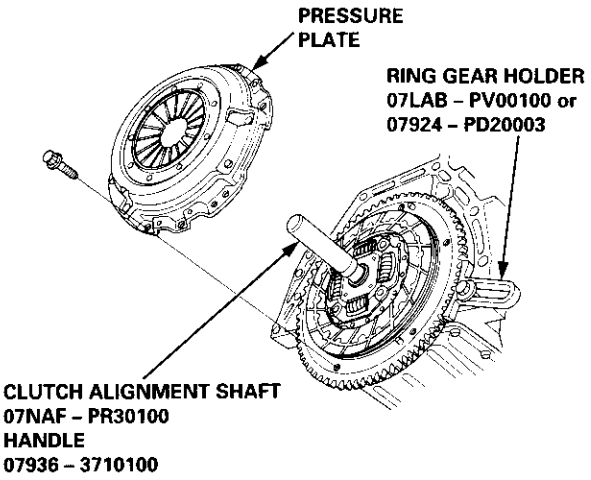
1. Check the diaphragm spring fingers for height using the special tools and a feeler gauge.

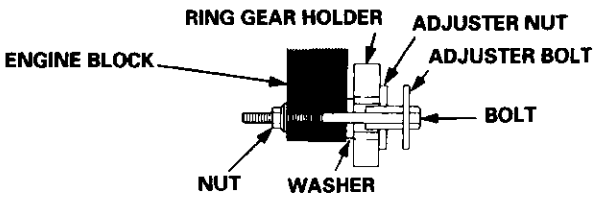
   Standard (New): 0.6 mm (0.02 in) max.
   Service Limit: 0.8 mm (0.03 in)



   If the height is more than the service limit, replace the pressure plate.

2. Install the special tools as shown.

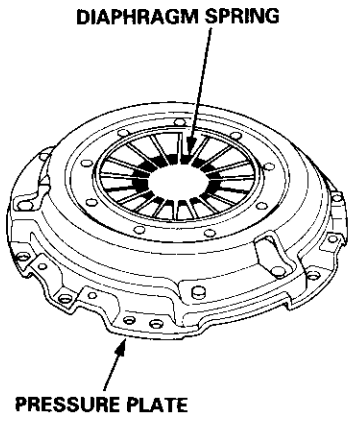




3. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.

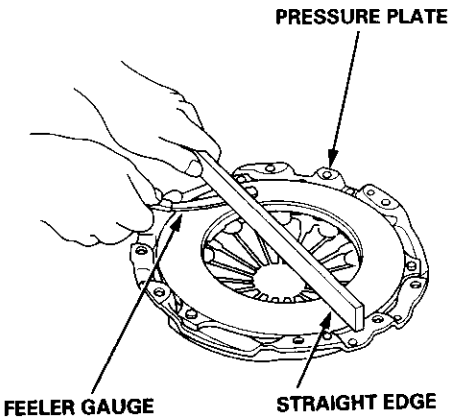
4. Inspect the pressure plate surface for wear, cracks, and burning.

5. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.



6. Inspect for warpage using a straight edge and feeler gauge. Measure across the pressure plate.

   Standard (New): 0.03 mm (0.001 in) max.
   Service Limit: 0.15 mm (0.006 in)



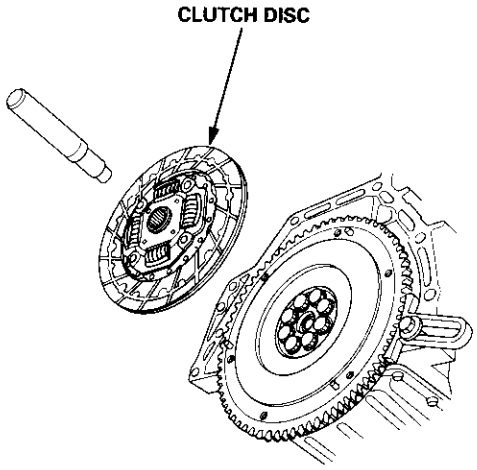
   If the warpage is more than the service limit, replace the pressure plate.

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Clutch Disc

Removal/Inspection

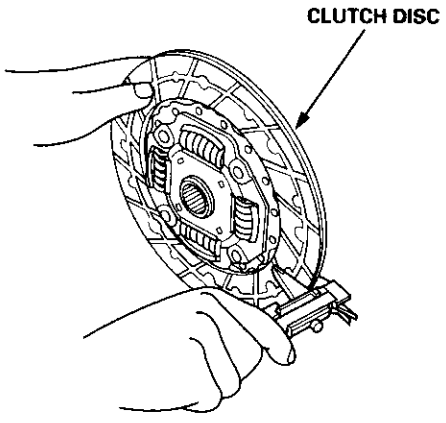
1. Remove the clutch disc and special tools.



2. Inspect the lining of the clutch disc for signs of slipping or oil. If the clutch disc is burned black or oil soaked, replace it.

3. Measure the clutch disc thickness.

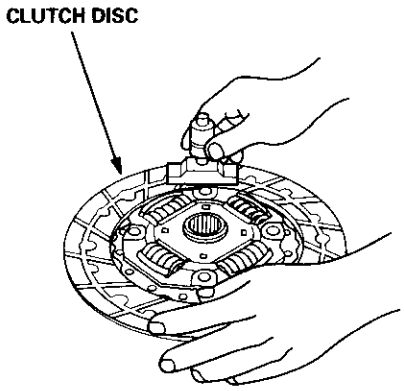
Standard (New): 8.4 – 9.1 mm (0.33 – 0.36 in)
Service Limit: 6.0 mm (0.24 in)

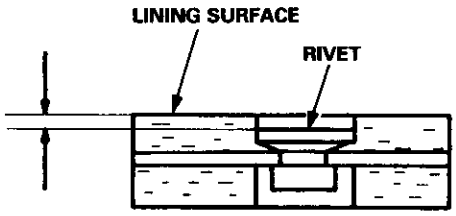


If the thickness is less than the service limit, replace the clutch disc.

4. Measure the rivet depth from the lining surface to the rivets, on both sides.

Standard (New): 1.2 – 1.7 mm (0.05 – 0.07 in) min.
Service Limit: 0.2 mm (0.008 in)





If the rivet depth is less than the service limit, replace the clutch disc.

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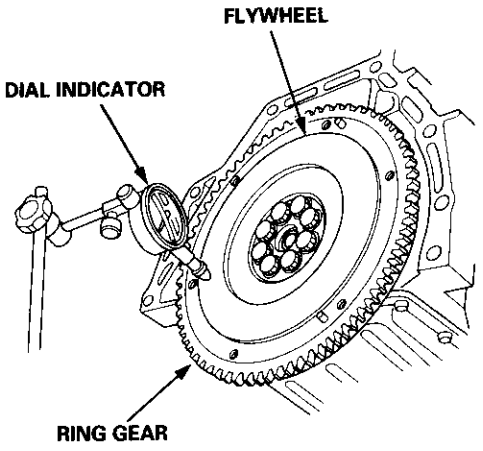
Inspection

1. Inspect the ring gear teeth for wear and damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks, and burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

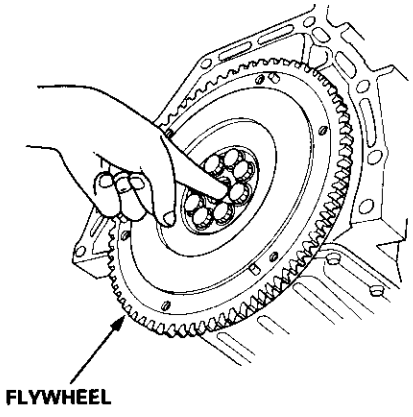
   NOTE: The runout can be measured with engine installed.

   Standard (New): 0.05 mm (0.002 in) max.
   Service Limit: 0.15 mm (0.006 in)

   If the runout is more than the service limit, replace the flywheel and recheck the runout.

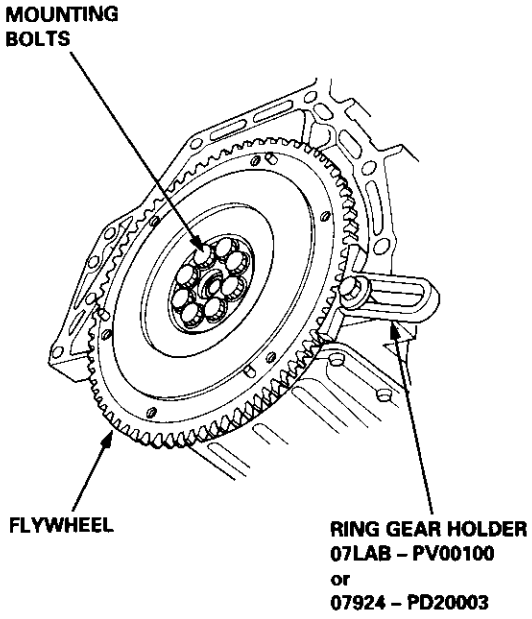


4. Turn the inner race of the flywheel bearing with your finger. The bearing should turn smoothly and quietly. Check that the bearing outer race fits tightly in the flywheel. If the race does not turn smoothly, quietly, or fit tight in the flywheel, replace the bearing.

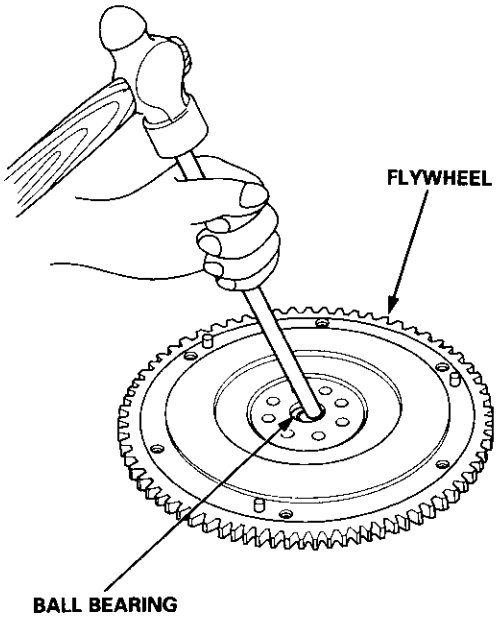


Replacement

1. Install the special tool as shown.
2. Remove the flywheel mounting bolts in a crisscross pattern in several steps, and remove the flywheel.



3. Remove the ball bearing from the flywheel.

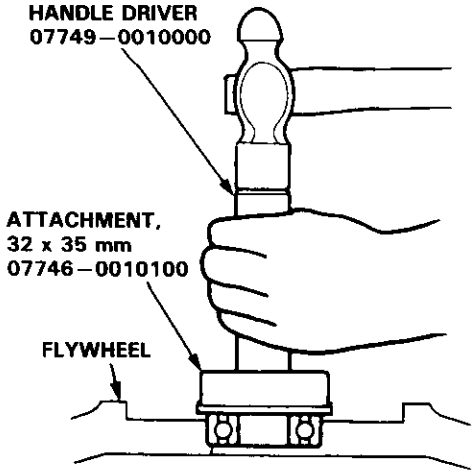


(cont'd)

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Replacement (cont'd)

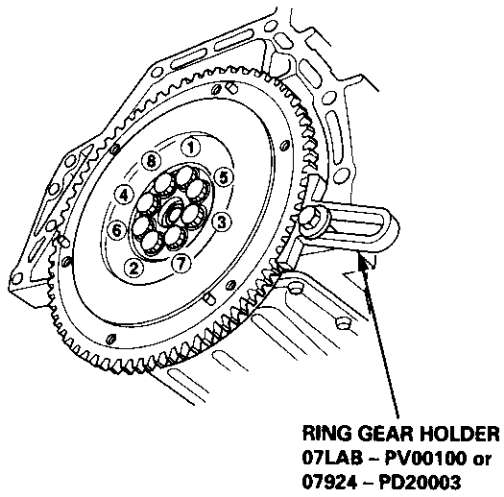
4. Drive the new bearing into the flywheel using the special tools.



5. Align the hole in the flywheel with the crankshaft dowel pin, and install the flywheel. Install the mounting bolts finger-tight.

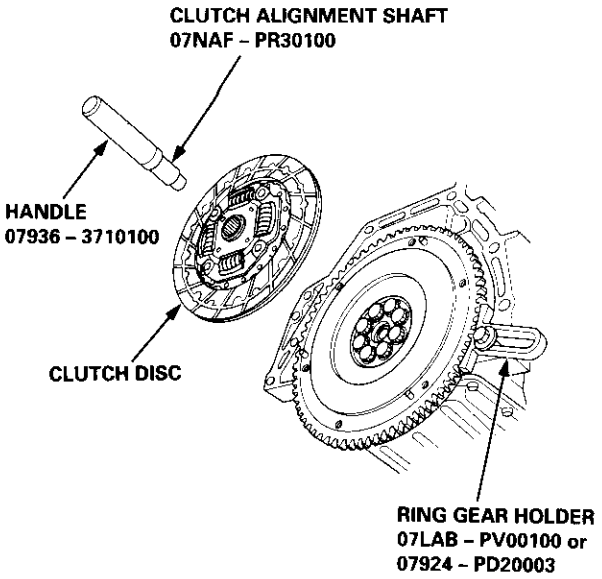
6. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps as shown.

Torque:
12 x 1.0 mm
103 N·m (10.5 kgf·m, 75.9 lbf·ft)



Installation

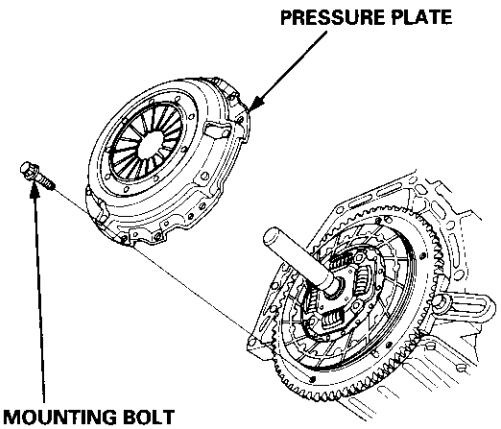
1. Install the ring gear holder.



2. Apply grease to the spline of the clutch disc, then install the clutch disc using the special tools.

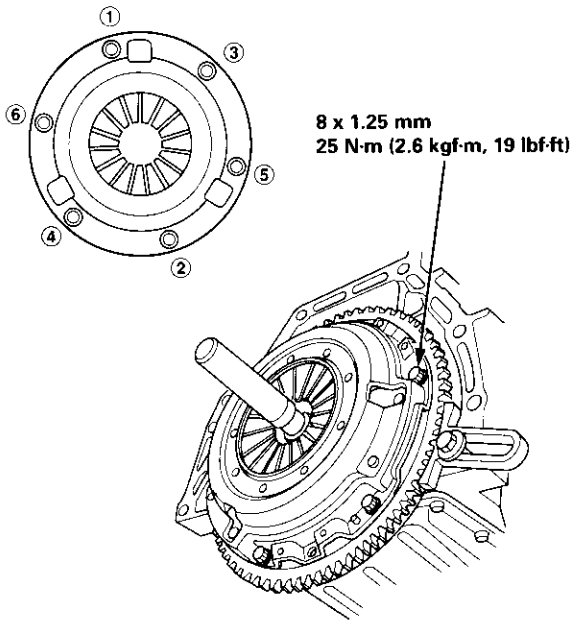
   NOTE: Use only Super High Temp Urea Grease (P/N 08798 – 9002).

3. Install the pressure plate.



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4. Torque the mounting bolts in a crisscross pattern as shown. Tighten the bolts in several steps to prevent warping the diaphragm spring.

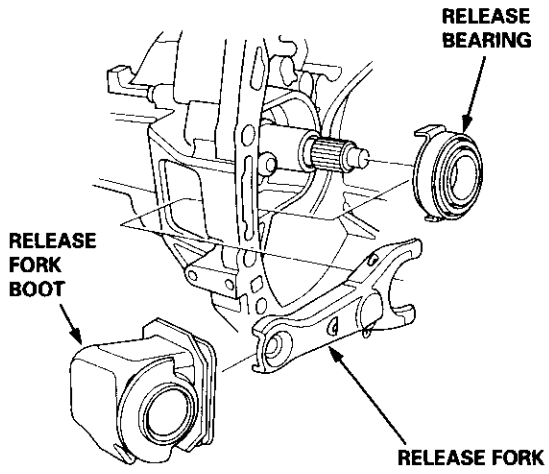


5. Remove the special tools.

6. Check the diaphragm spring fingers for height (see page 12-7).

Removal/Inspection

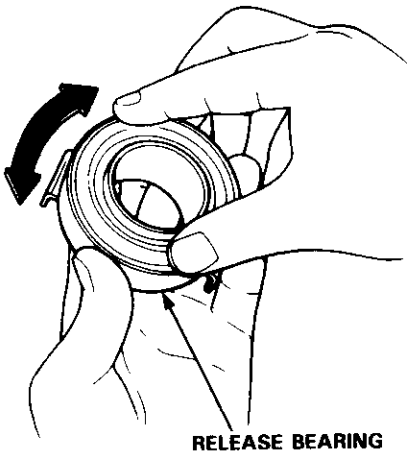
1. Remove the release fork boot from the clutch housing.



2. Remove the release fork and release bearing from the clutch housing.

3. Check the release bearing for play by spinning it by hand.

NOTE: The release bearing is packed with grease. Do not wash it in solvent.



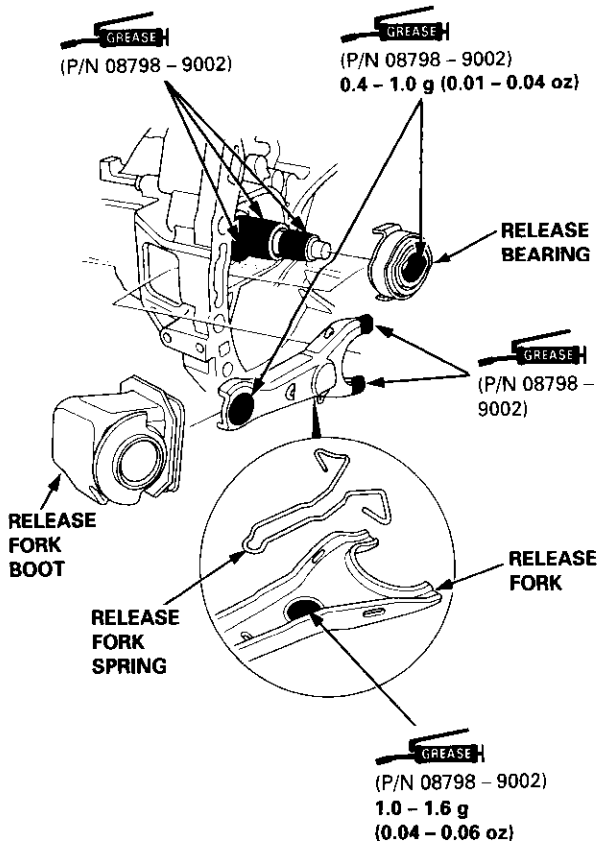
If there is excessive play, replace the release bearing with a new one.

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Installation

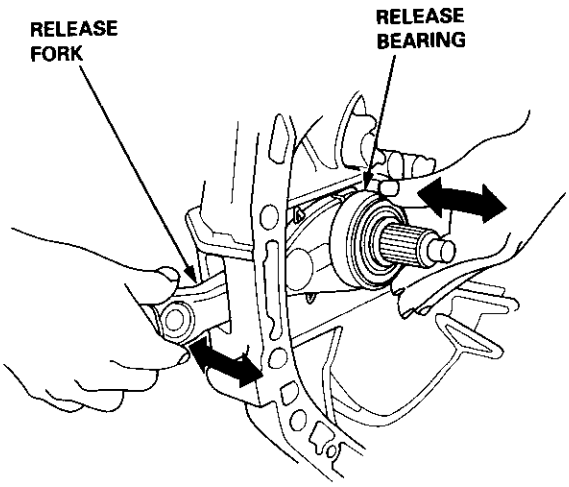
NOTE: Use only Super High Temp Urea Grease (P/N 08798 – 9002).

1. With the release fork slid between the release bearing pawls, install the release bearing on the mainshaft while inserting the release fork through the hole in the clutch housing.



2. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt sequarely.

3. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.



4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.

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Manual Transmission

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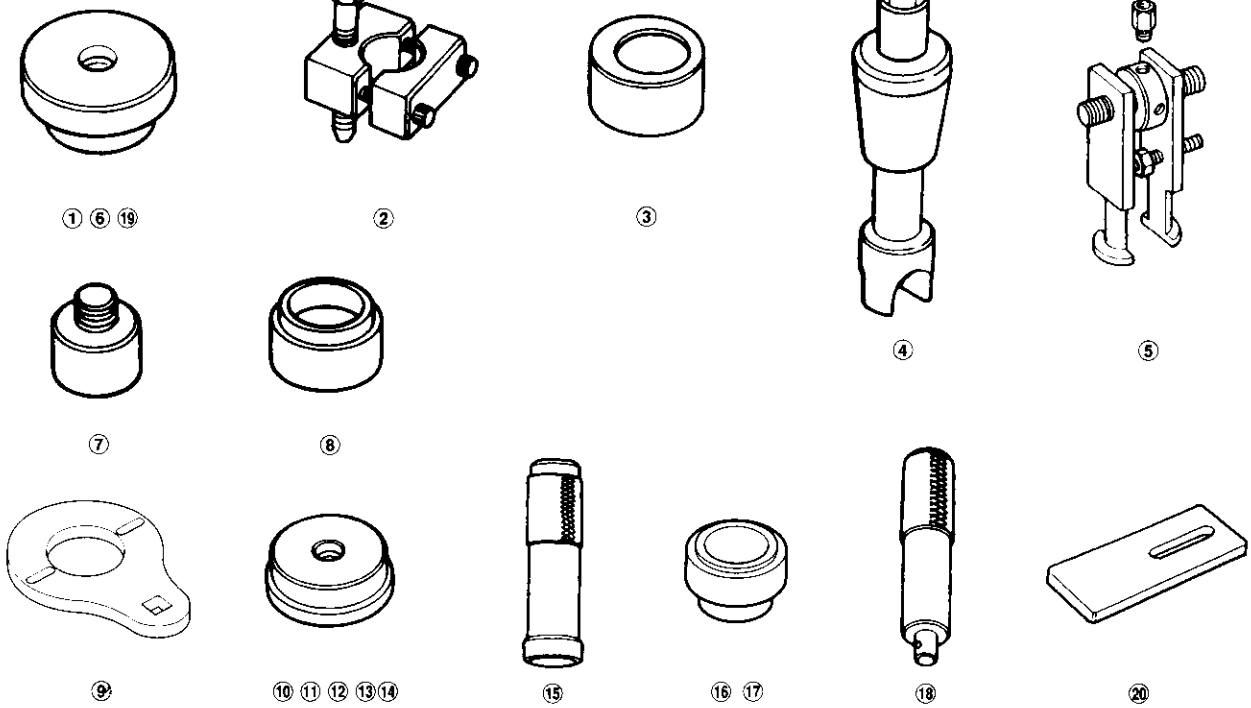


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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD – PG40100	Driver Attachment	1	13-43
②	07GAJ – PG20110	Mainshaft Holder	1	13-66
③	07GAJ – PG20130	Mainshaft Base	1	13-66
④	07HAJ – PK40201	Preload Inspection Tool	1	13-41
*⑤	07JAC – PH80000	Adjustable Bearing Remover Set	1	13-62, 63
⑥	07JAD – PH80101	Driver Attachment	1	13-43, 53
⑦	07JAD – PH80400	Pilot, 28 x 30 mm	1	13-43
⑧	07LAD – PW50601	Attachment, 40 x 50 mm	1	13-39, 49
⑨	07RAB – 0020000	Companion Flange Holder	1	13-48, 54, 57, 58
⑩	07746 – 0010100	Attachment, 32 x 35 mm	1	13-18, 68
⑪	07746 – 0010300	Attachment, 42 x 47 mm	1	13-27, 34, 62
⑫	07746 – 0010400	Attachment, 52 x 55 mm	1	13-40, 51
⑬	07746 – 0010500	Attachment, 62 x 68 mm	1	13-40, 50, 51, 61, 62, 63
⑭	07746 – 0010600	Attachment, 72 x 75 mm	1	13-40
⑮	07746 – 0030100	Driver, 40 mm I.D.	1	13-27, 34,35, 49, 53
⑯	07746 – 0030300	Attachment, 30 mm I.D.	1	13-35
⑰	07746 – 0030400	Attachment, 35 mm I.D.	1	13-27, 34
⑱	07749 – 0010000	Handle	1	13-18, 27, 34, 40, 43, 49, 50, 51, 53, 61, 62, 63, 68
⑲	07947 – SD90200	Attachment	1	13-49
⑳	07979 – PJ40001	Magnet Stand Base	1	13-66

* Must be used with commercially available 3/8" – 16 Slide Hammer.

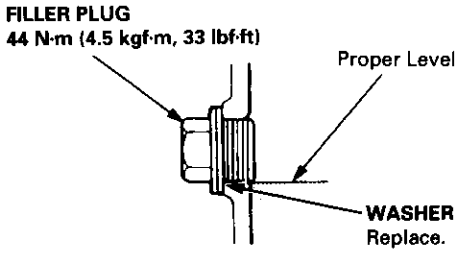


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Transmission Fluid

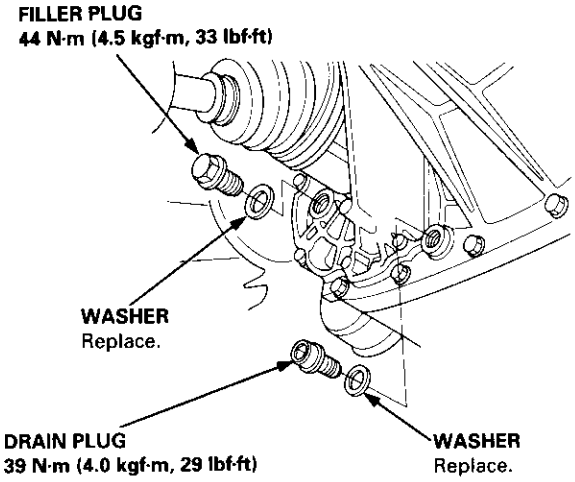
NOTE: Check the fluid with the engine OFF and vehicle on level ground.

1. Remove the filler plug, then check the level and condition of the fluid.



2. The fluid level must be up to the filler hole. If it is below the hole, add fluid until it runs out, then reinstall the filler plug with a new washer.

3. If the transmission fluid is dirty, remove the drain plug and drain the fluid.



4. Reinstall the drain plug with a new washer, and refill the transmission fluid to the proper level.

   NOTE: The drain plug washer should be replaced at every fluid change.

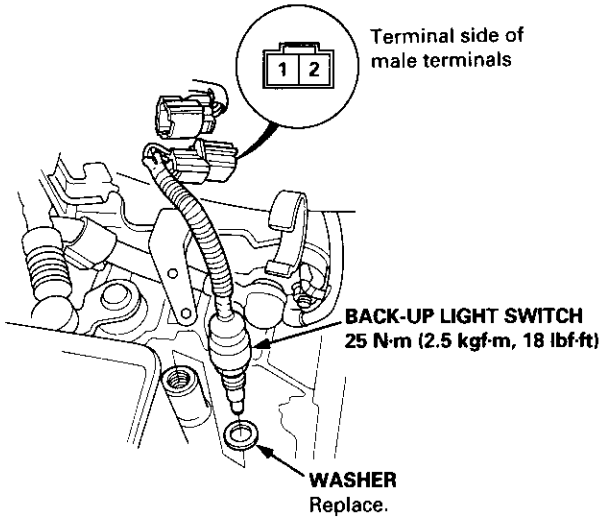
5. Reinstall the filler plug with a new washer.

   Fluid Capacity
   1.7 ℓ (1.8 US qt, 1.5 Imp qt) at oil change
   2.1 ℓ (2.2 US qt, 1.8 Imp qt) at overhaul

   Always use Genuine Honda Manual Transmission Fluid (MTF). Using motor oil can cause stiffer shifting because it does not contain the proper additives.

Test/Replacement

1. Disconnect the connectors from the switch.



2. Check for continuity between the No. 1 and No. 2 terminals.

   - There should be continuity when the shift lever into reverse.
   - There should be no continuity when the shift lever in position except reverse.

3. If necessary, replace the switch.

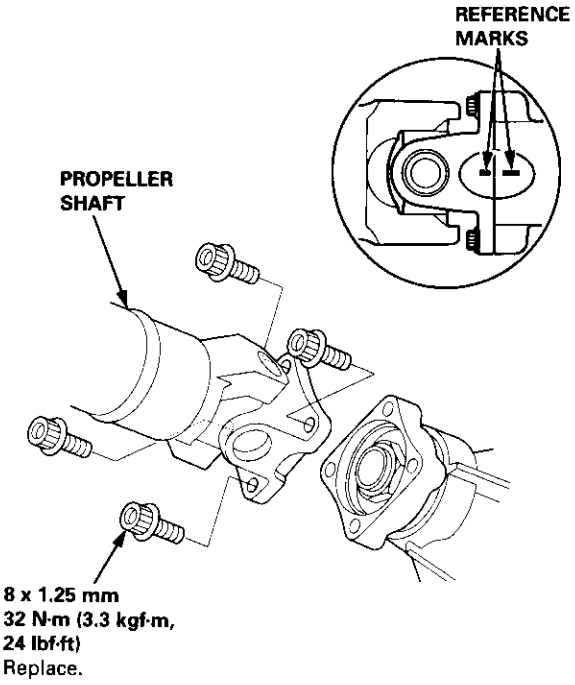
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Transfer Assembly

Inspection

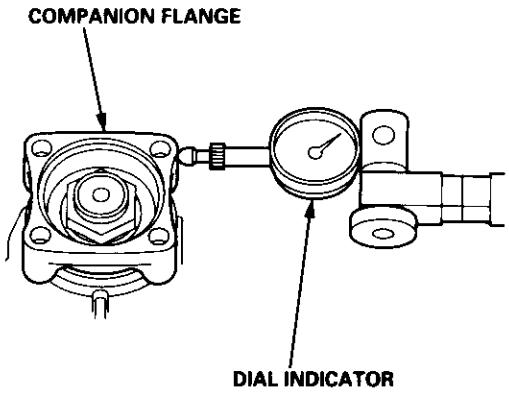
⚠ WARNING Make sure lifts, jacks, and safety stands are placed properly (see section 1).

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift to neutral position.
4. Make a reference mark across the propeller shaft and the transfer assembly flanges.



5. Separate the propeller shaft from the transfer assembly.
6. Set a dial indicator on the transfer assembly flange, then measure the transfer gear backlash.

   STANDARD: 0.06 – 0.16 mm (0.002 – 0.006 in)



7. If the measurement is out of specification, remove the transfer assembly and adjust transfer gear backlash (see page 13-44 thru 13-61).
8. Check the transfer oil seal for damage and fluid leaks.
9. If oil seal replacement is required, remove the transfer assembly, replace the oil seal, and adjust the total starting torque (see page 13-44 thru 13-61).

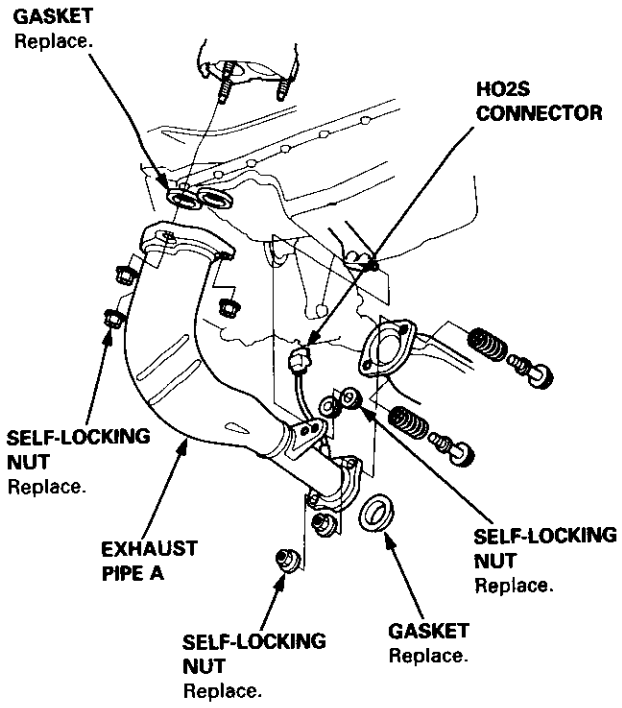
   NOTE: Do not replace the oil seal when the transfer assembly is installed on the transmission.

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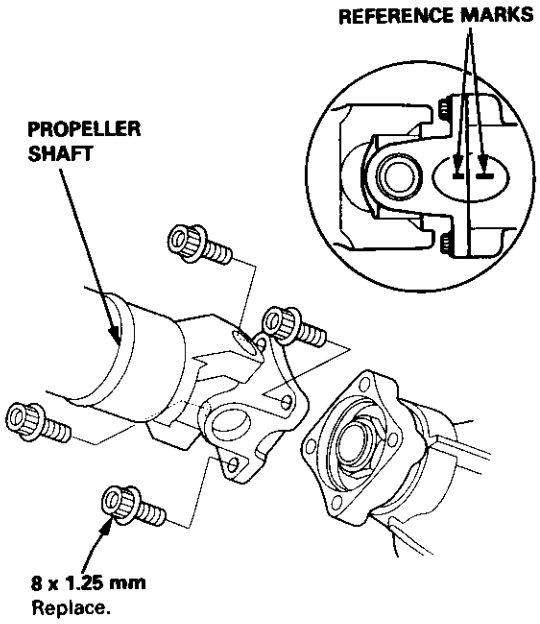
Removal

⚠ WARNING Make sure the lifts, jacks, and safety stands are placed properly (see section 1).

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Drain the manual transmission fluid. Reinstall the drain plug with a new sealing washer.
4. Disconnect the heated oxygen sensor (HO2S) connector.

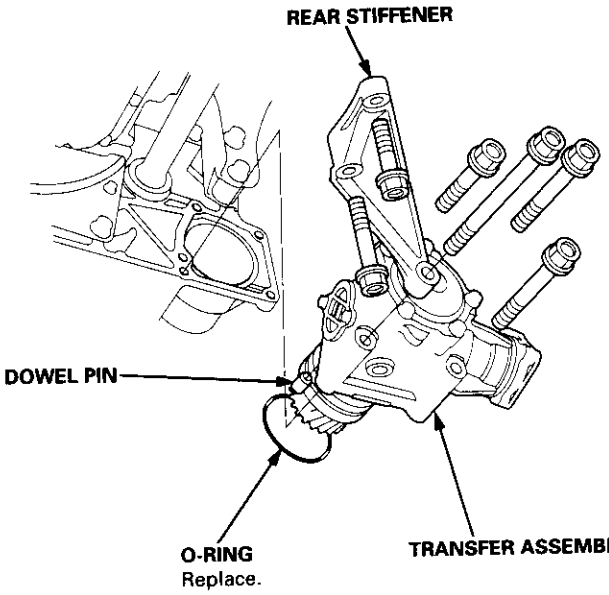


5. Remove exhaust pipe A.
6. Make reference marks across the propeller shaft and the transfer assembly flanges.



7. Separate the propeller shaft from the transfer assembly flanges.
8. Remove the rear stiffener, then remove the transfer assembly.

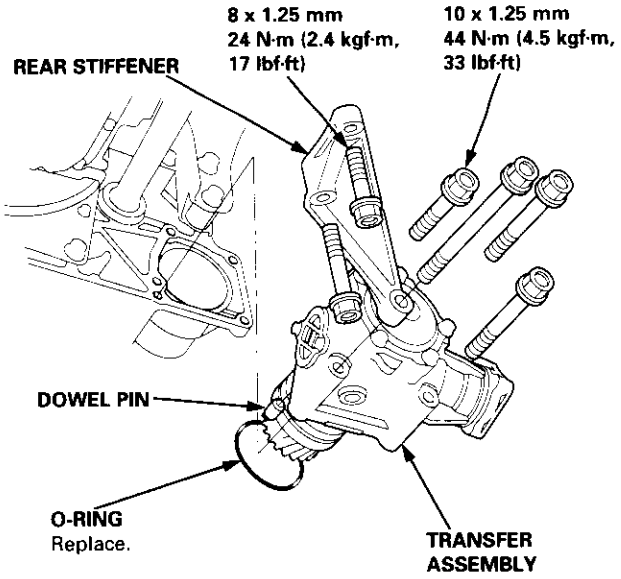
   NOTE: While servicing the transfer assembly, do not allow dust or other foreign particles to enter the transmission.



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Installation

1. Install a new O-ring on the transfer assembly.



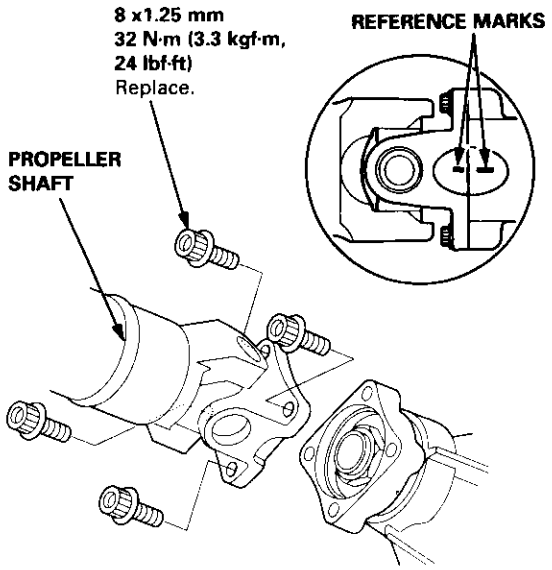
2. Clean the areas where the transfer assembly contacts the transmission with solvent or carburetor cleaner, and dry with compressed air. Then apply MTF to the contact areas.

3. Install the transfer assembly on the transmission.

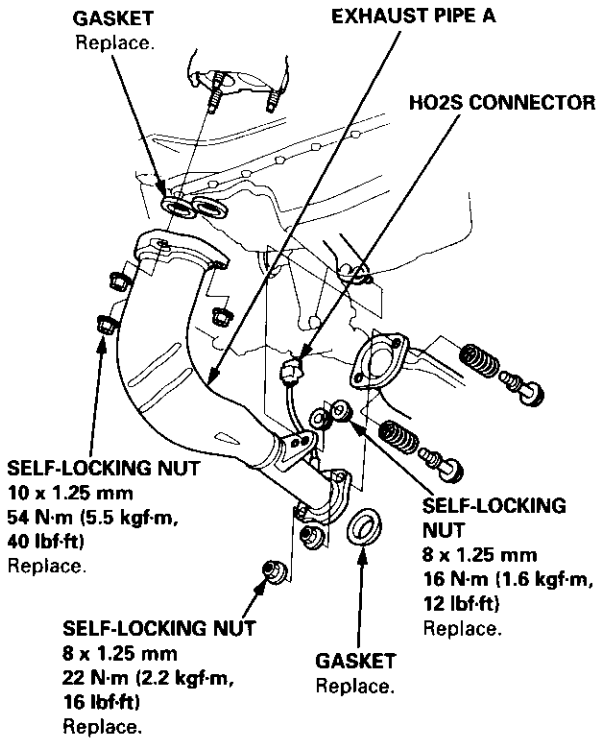
   NOTE: While installing the transfer assembly on the transmission, do not allow dust or other foreign particles to enter the transmission.

4. Install the rear stiffener.

5. Install the propeller shaft to the transfer assembly by aligning the reference marks.



6. Install the exhaust pipe A.



7. Connect the heated oxygen sensor (HO2S) connector.

8. Refill the transmission with MTF (see page 13-3).

9. Start the engine, and run it to normal operating temperature (the radiator fan comes on). Turn the engine off, and check fluid level.

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Removal

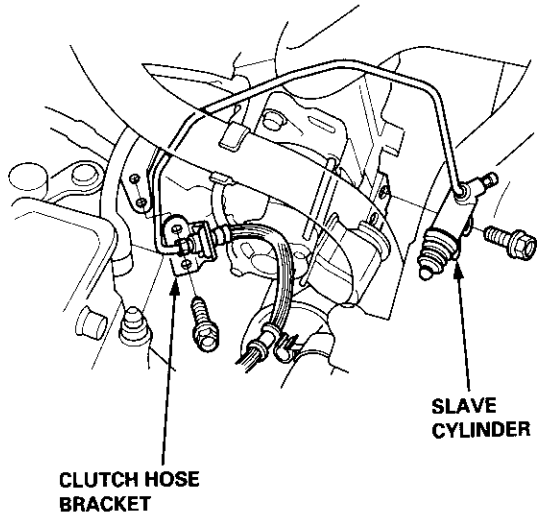
⚠ WARNING

- **Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct position on the engine.**
- **Apply parking brake and block rear wheels so vehicle will not roll off stands and fall on you while working under it.**

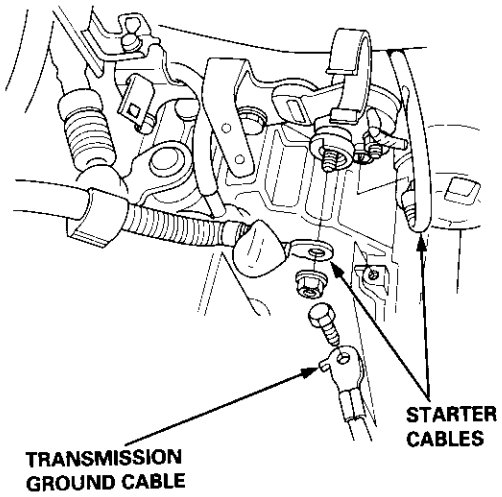
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the negative (–) cable first, then the positive (+) cable from the battery.
2. Remove the intake air duct and air cleaner housing (see section 5).
3. Remove the slave cylinder and clutch hose bracket.

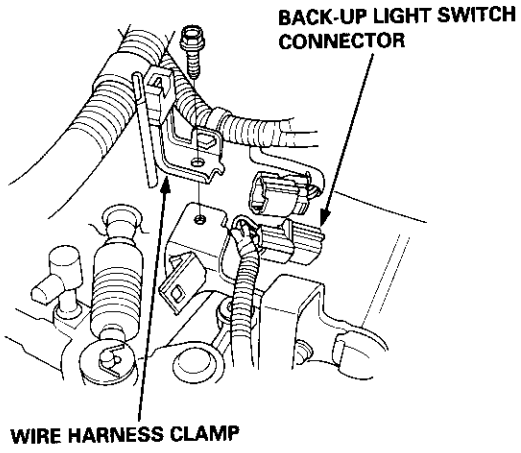
   NOTE:
   - Do not operate the clutch pedal once the slave cylinder has been removed.
   - Take care not to bend the clutch line.



4. Disconnect the starter cables and transmission ground cable.



5. Disconnect the back-up light switch connector and wire harness clamp.

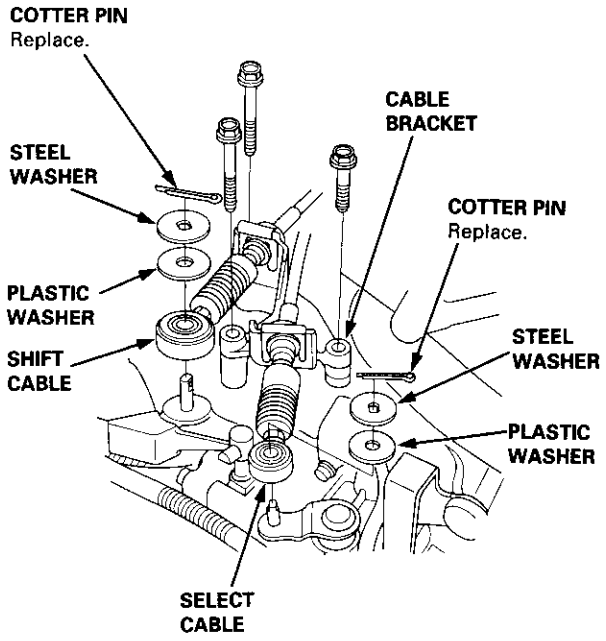


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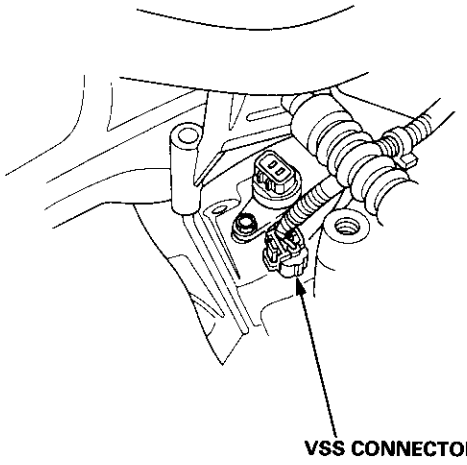
Removal (cont'd)

6. Remove the cotter pins, then remove the steel washers, plastic washers, shift cable, and select cable from the levers.

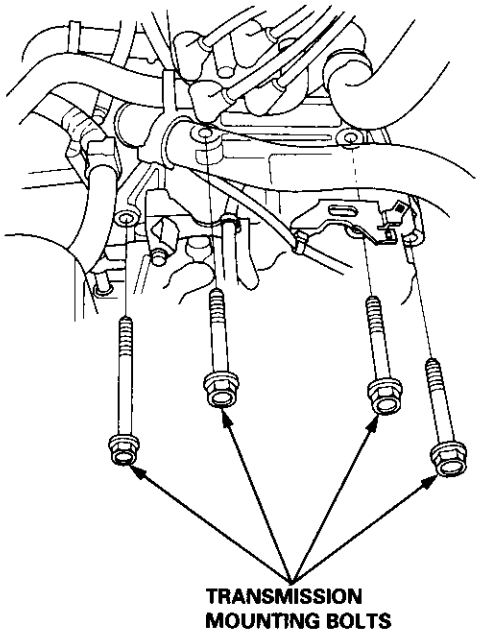


7. Remove the cable bracket from the clutch housing.

8. Disconnect the vehicle speed sensor (VSS) connector.

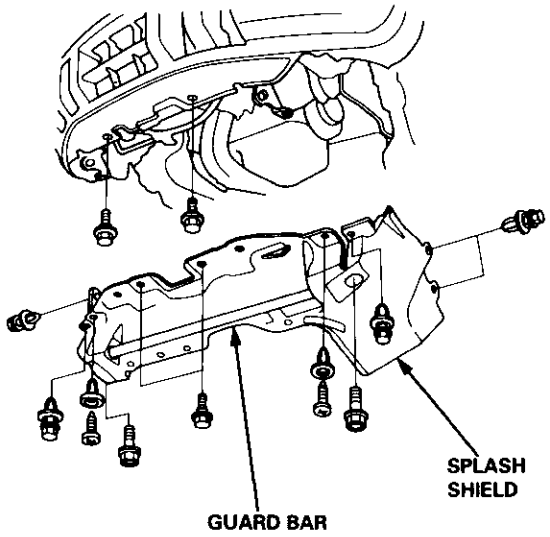


9. Remove the four upper transmission mounting bolts.



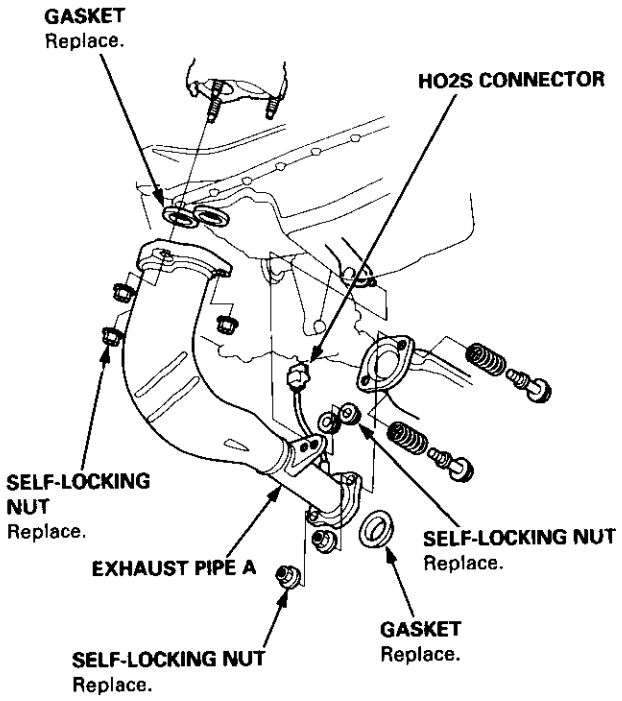
10. Drain transmission fluid (see page 13-3).

11. Remove the guard bar and the splash shield.

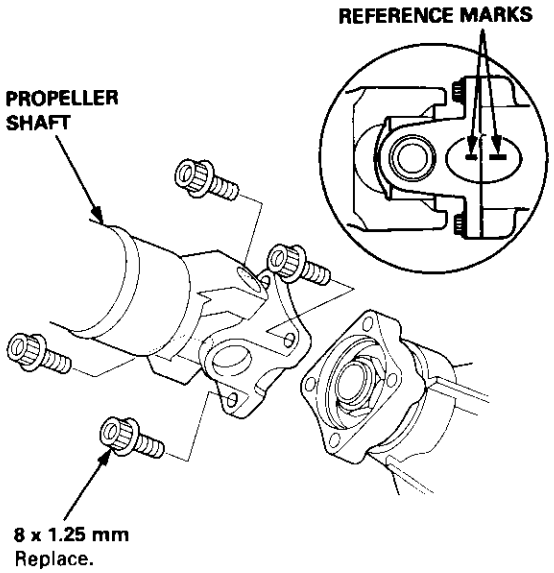


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12. Disconnect the heated oxygen sensor (HO2S) connector, then remove the exhaust pipe A.

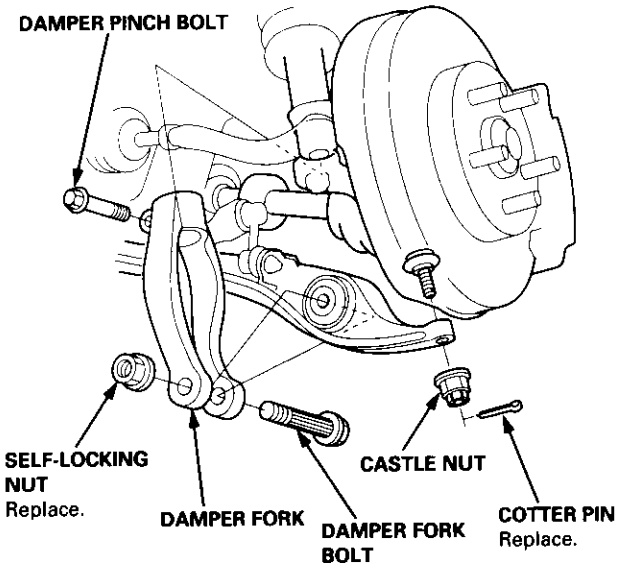


13. Mark reference marks on the joint of the transfer and the propeller shaft.

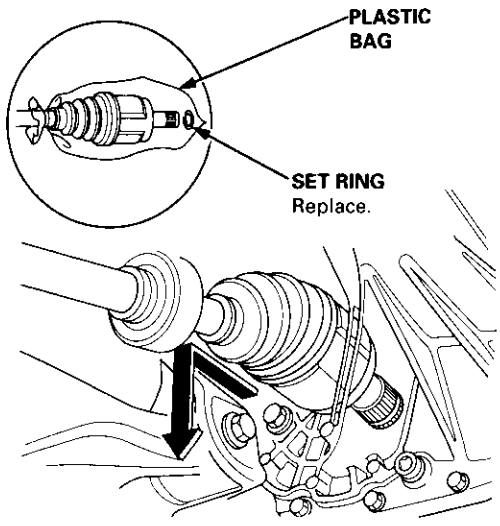


14. Separate the propeller shaft from the transfer assembly.

15. Remove the cotter pins, and castle nuts, then separate the ball joints from the lower arm (see section 18).



16. Remove the right damper fork bolt, then separate right damper fork and damper.
17. Pry the right driveshaft out of the differential, and pry the left driveshaft out of the intermediate shaft (see section 18).
18. Pull out the inboard joint, and remove the right and left driveshaft (see section 18).
19. Tie plastic bags over the driveshaft ends. Coat all precision finished surfaces with clean engine oil.

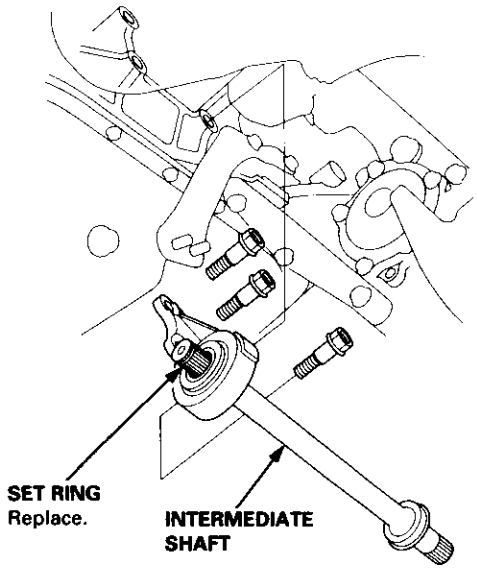


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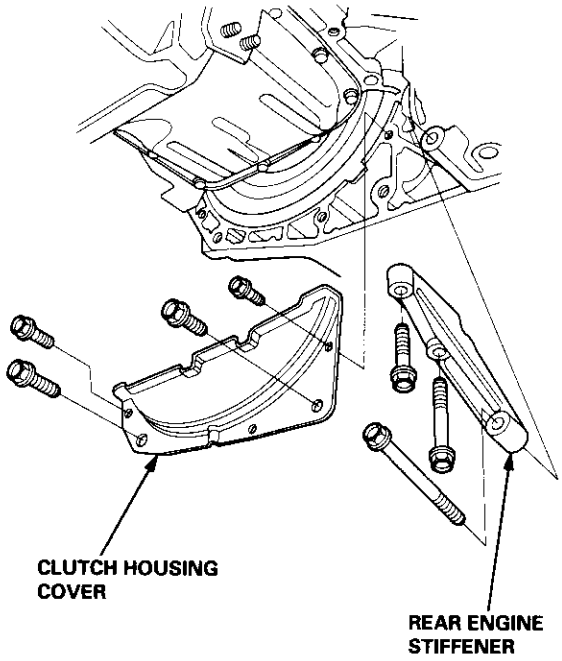
Removal (cont'd)

20. Remove the intermediate shaft.

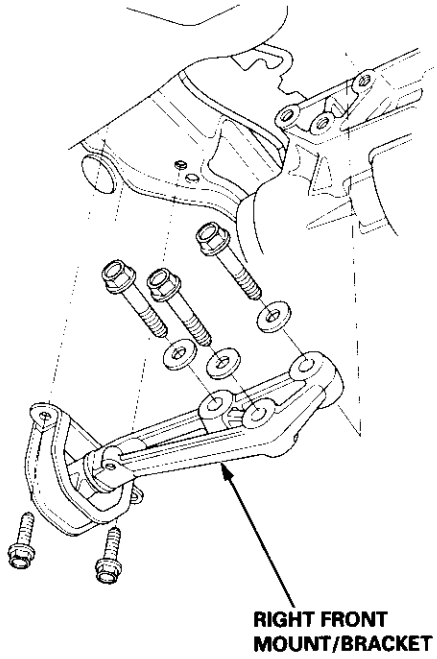


21. Tie plastic bags over the both ends of the intermediate shaft. Coat all precision finished surfaces with clean engine oil.

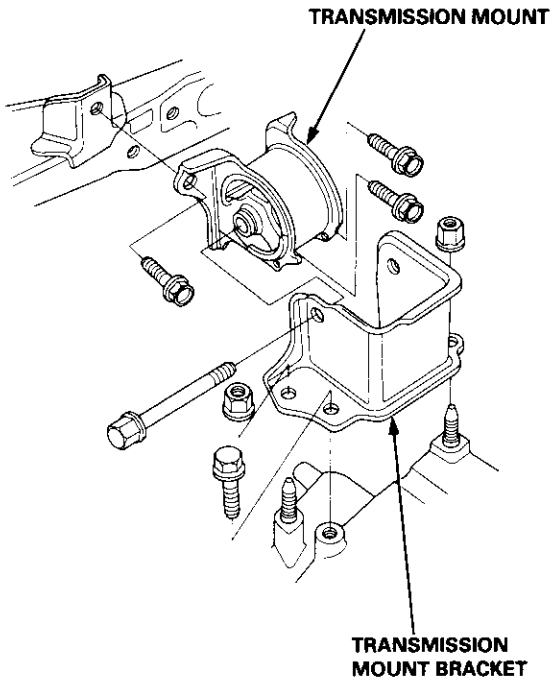
22. Remove the rear engine stiffener and clutch housing cover.



23. Remove the right front mount/bracket.

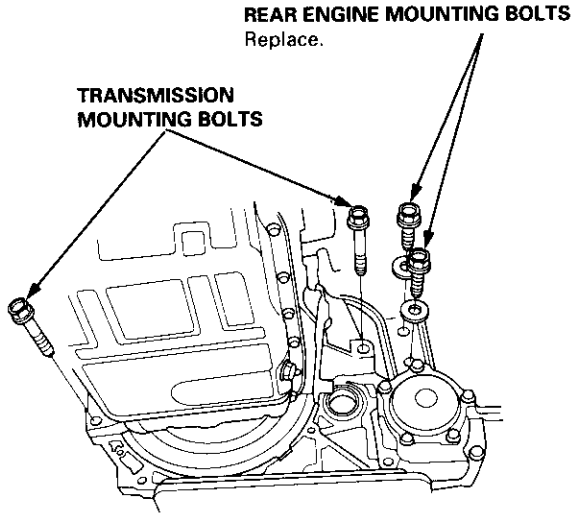


24. Place a jack under the transmission, raise it just enough to take it off of the mounts, then remove the transmission mount bracket and transmission mount.



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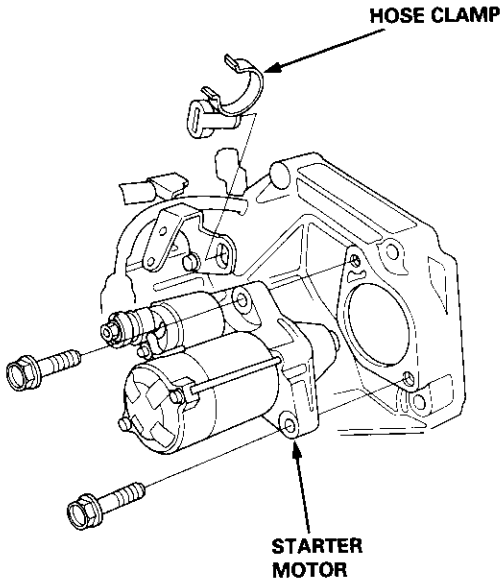
25. Remove the transmission mounting bolts and the rear engine mounting bolts.



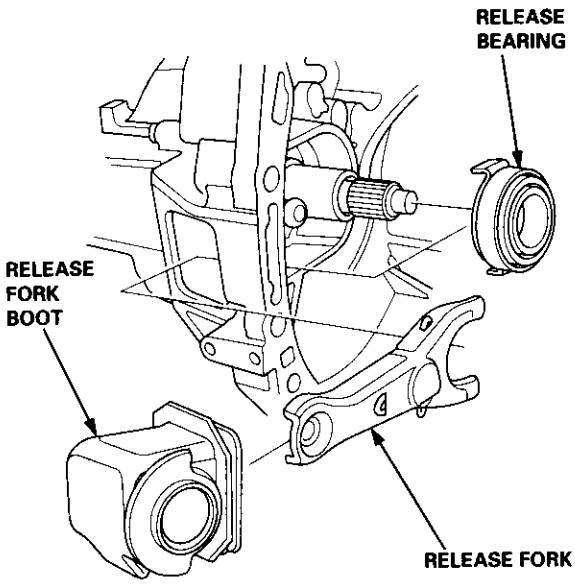
26. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

    NOTE: Take care not to bend the clutch line.

27. Remove the starter motor and hose clamp from the transmission housing.



28. Remove the release fork boot, release bearing, and release fork from the clutch housing.



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Transmission Assembly

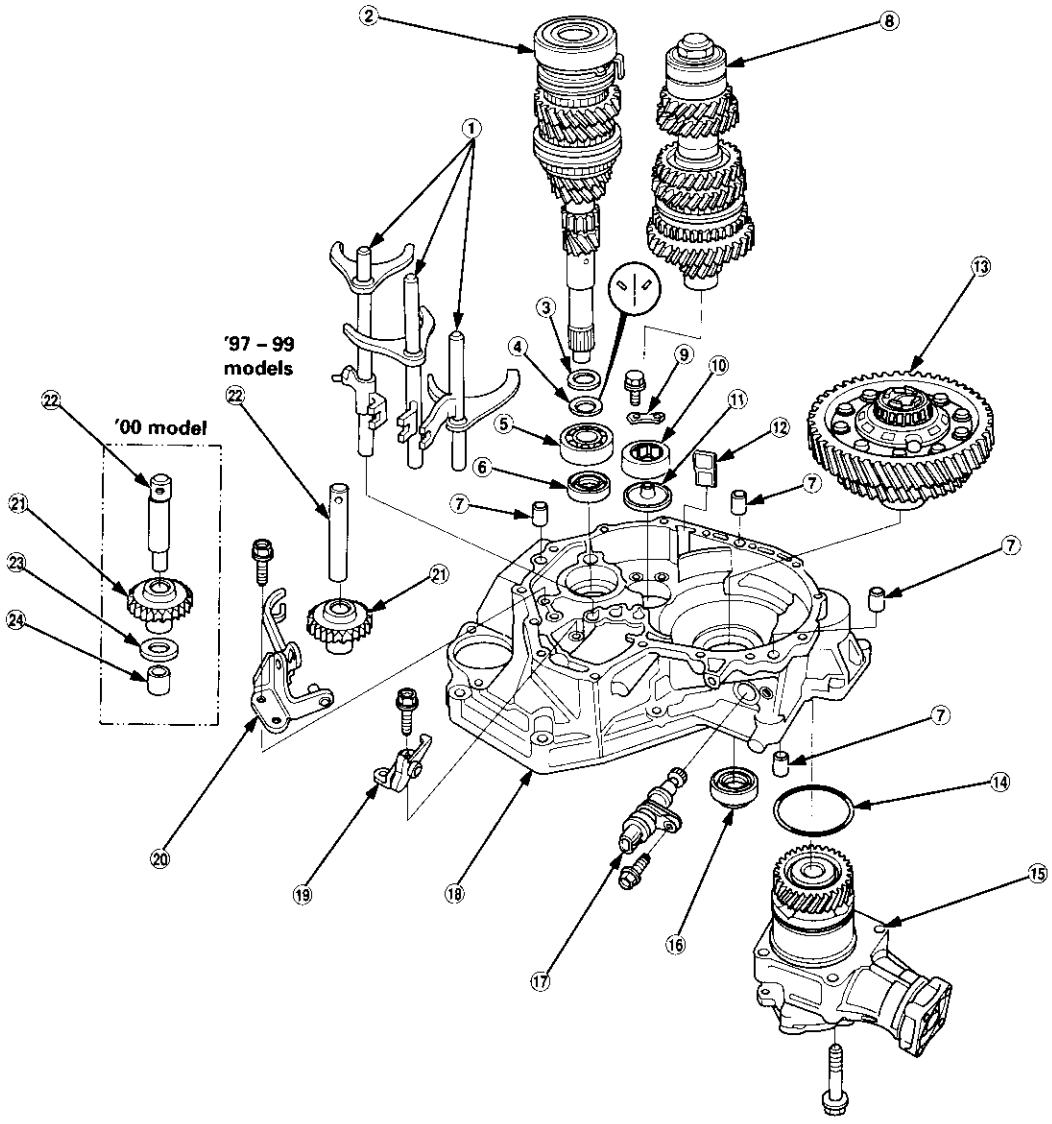
Illustrated Index

Refer to the drawing below for the transmission disassembly/reassembly.
Clean all the parts thoroughly in solvent, and dry with compressed air.

OIL Lubricate all the parts with MTF before reassembly.

NOTE:

- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 08718 – 0001 or 08718 – 0003) (see page 13-69, 71).
- Always clean the magnet ⑫ whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.

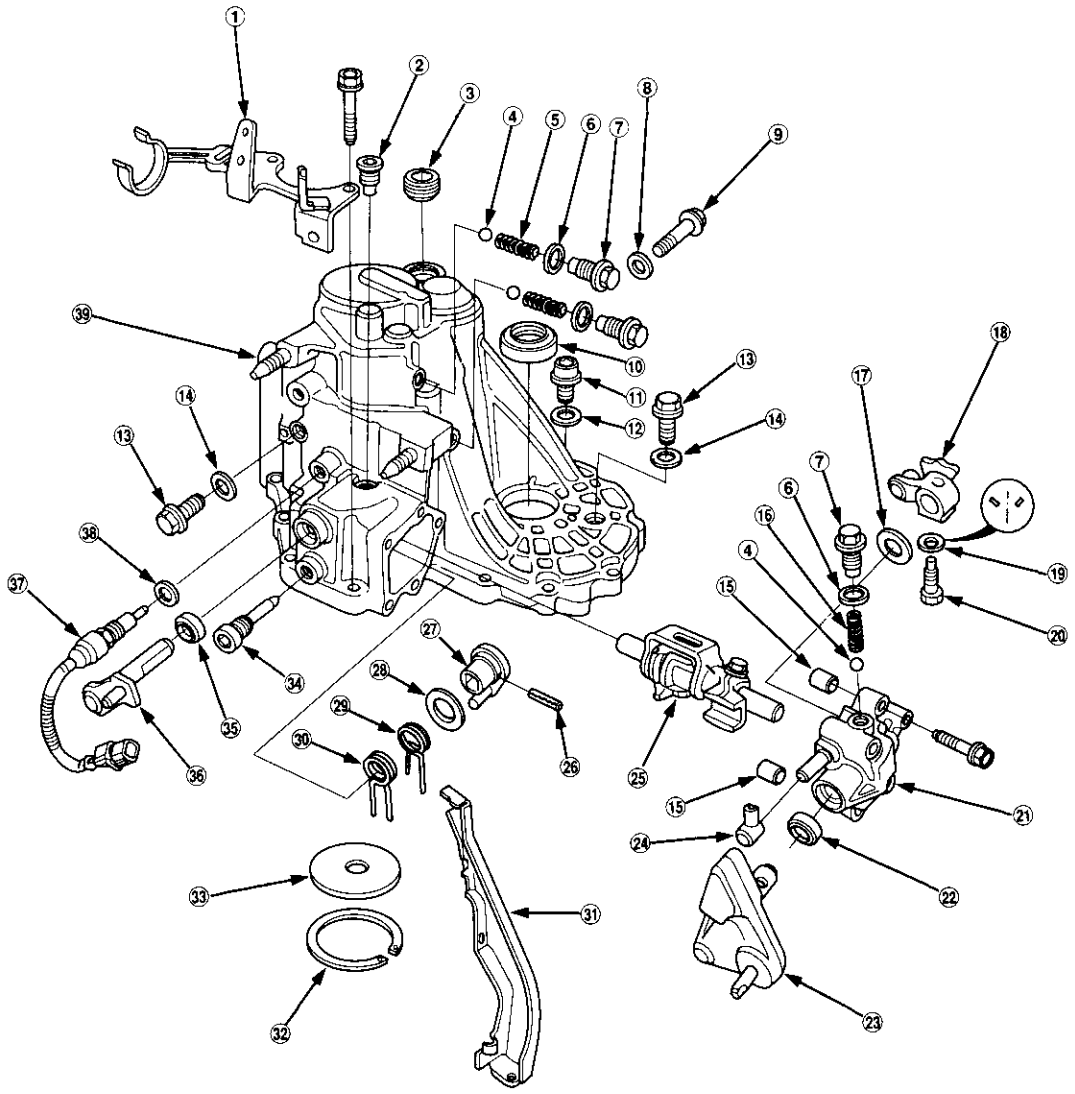


① **SHIFT FORK ASSEMBLY**
• Index page, 13-21
② **MAINSHAFT ASSEMBLY**
• Index page, 13-23
③ **28 mm WASHER**
④ **28 mm SPRING WASHER**
⑤ **BALL BEARING**
⑥ **OIL SEAL** Replace.
⑦ **14 x 20 mm DOWEL PIN**
⑧ **COUNTERSHAFT ASSEMBLY**
• Index page, 13-28

⑨ **NEEDLE SET PLATE**
⑩ **NEEDLE BEARING**
⑪ **OIL GUIDE C PLATE**
⑫ **MAGNET**
⑬ **DIFFERENTIAL ASSEMBLY**
• Index page, 13-38
⑭ **O-RING** Replace.
⑮ **TRANSFER ASSEMBLY**
• Index page, 13-44

⑯ **OIL SEAL** Replace.
⑰ **VEHICLE SPEED SENSOR**
⑱ **CLUTCH HOUSING**
⑲ **REVERSE LOCK CAM**
⑳ **REVERSE SHIFT HOLDER**
㉑ **REVERSE IDLE GEAR**
㉒ **REVERSE GEAR SHAFT**
㉓ **THRUST WASHER, 20 x 36 x 2**
㉔ **COLLER, 15 x 20 x 20**

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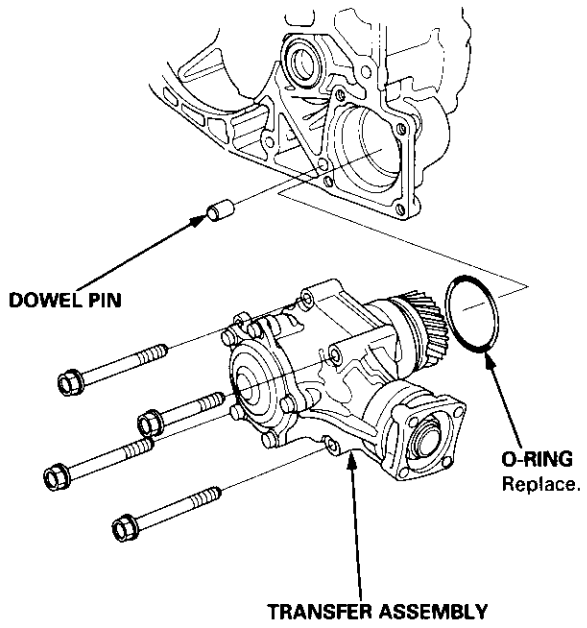


① **TRANSMISSION HANGER**
② **INTERLOCK BOLT**
③ **32 mm SEALING BOLT**
④ **STEEL BALL (5/16 in.)**
⑤ **SPRING 26.1 mm (1.03 in.)**
⑥ **WASHER** Replace.
⑦ **SET BALL SCREW**
⑧ **WASHER** Replace.
⑨ **FLANGE BOLT**
⑩ **OIL SEAL** Replace.
⑪ **DRAIN PLUG**
⑫ **WASHER** Replace.
⑬ **FILLER PLUG**
⑭ **WASHER** Replace.
⑮ **10 x 12 mm DOWEL PIN**
⑯ **SPRING 25.6 mm (1.01 in.)**
⑰ **THRUST WASHER**
⑱ **SHIFT ARM C**
⑲ **CONICAL SPRING WASHER**
⑳ **SPECIAL BOLT**
㉑ **SHIFT ARM COVER**
㉒ **OIL SEAL** Replace.
㉓ **SHIFT LEVER**
㉔ **BREATHER CAP**
㉕ **SHIFT ARM SHAFT ASSEMBLY**
㉖ **SPRING PIN** Replace.
㉗ **SELECT ARM**
㉘ **THRUST WASHER**
㉙ **5TH/REVERSE SELECT RETURN SPRING**
㉚ **SELECT RETURN SPRING**
㉛ **OIL GUTTER PLATE**
㉜ **78 mm SHIM**
㉝ **OIL GUIDE M PLATE**
㉞ **SELECT SPRING BOLT**
㉟ **OIL SEAL** Replace.
㊱ **SELECT LEVER**
㊲ **BACK-UP LIGHT SWITCH**
㊳ **WASHER** Replace.
㊴ **TRANSMISSION HOUSING**

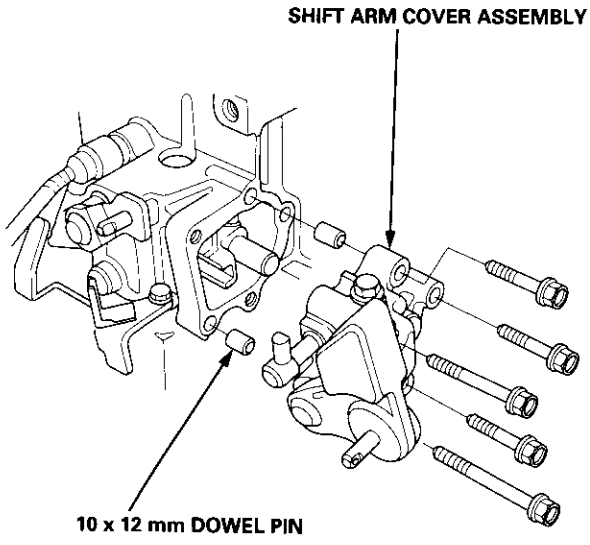
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Disassembly

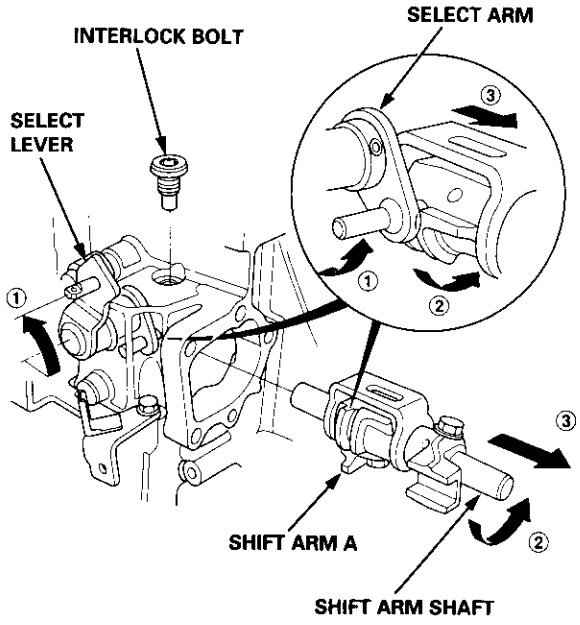
1. Remove the transfer assembly.



2. Remove the shift arm cover assembly, and wipe it clean of the sealant.



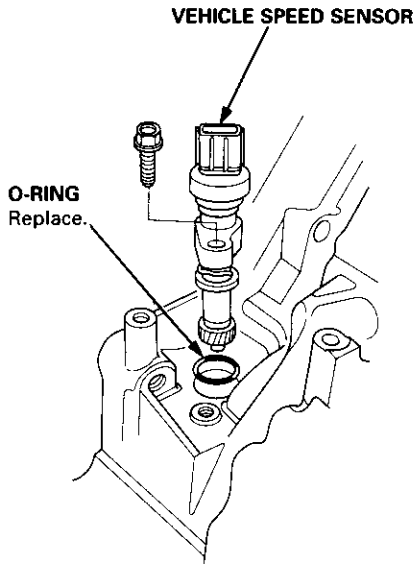
3. Remove the interlock bolt.



4. Turn the select lever counterclockwise, then remove the shift arm A finger from the groove of the shift forks.

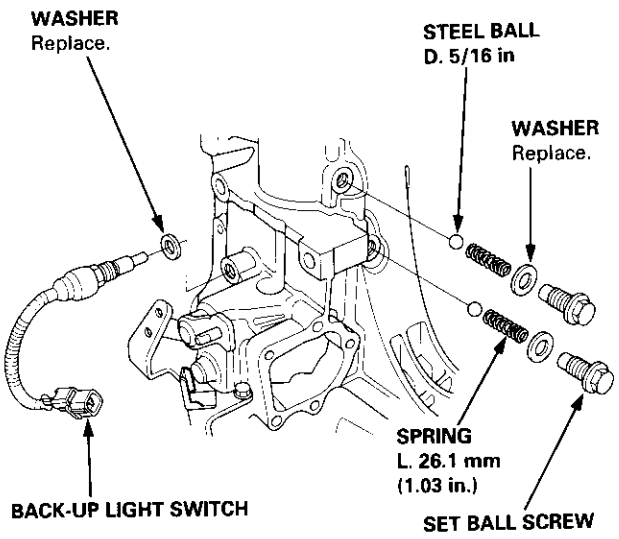
5. Turn the shift arm shaft counterclockwise and remove the select arm finger from the groove of the shift arm A, then remove the shift arm shaft assembly.

6. Remove the vehicle speed sensor (VSS).

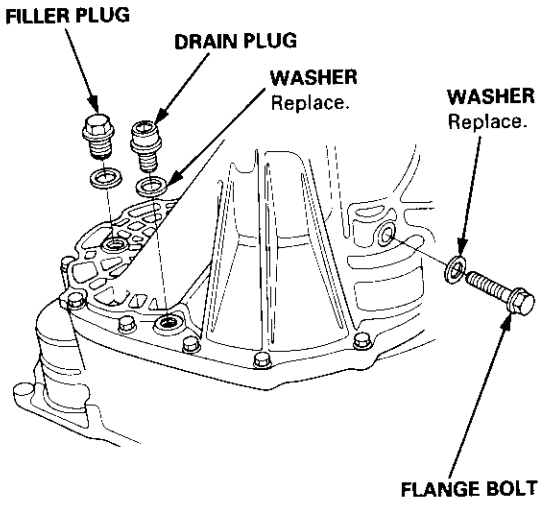


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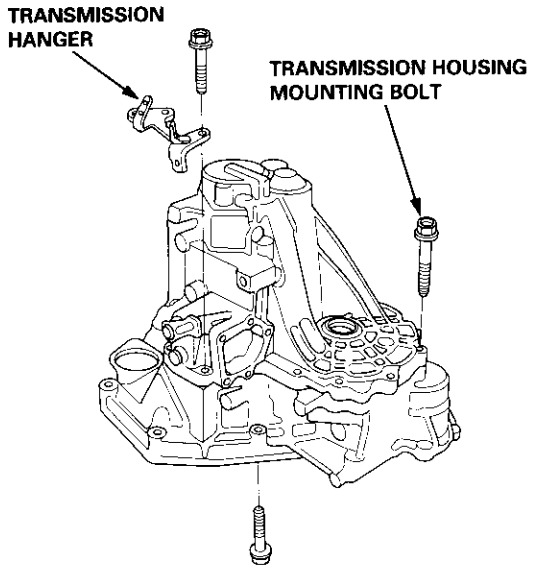
7. Remove the set ball screws, washers, springs, steel balls, and back-up light switch.



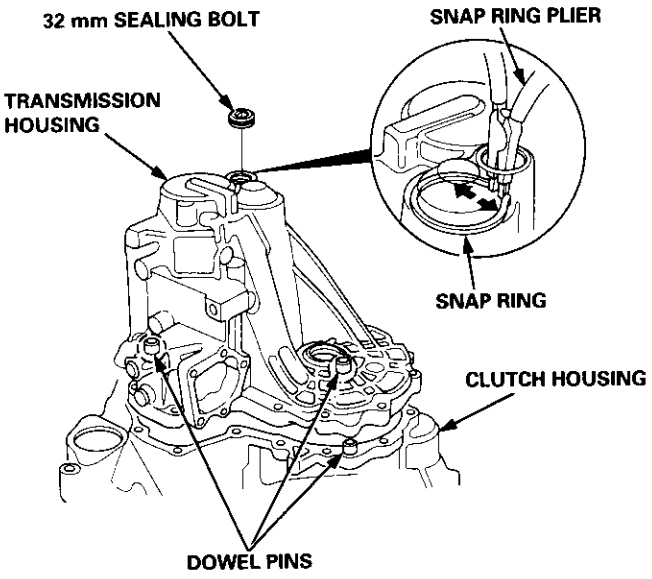
8. Remove the flange bolt, drain plug, and filler plug.



9. Remove the transmission housing mounting bolts in a crisscross pattern in several steps.



10. Remove the 32 mm sealing bolt.



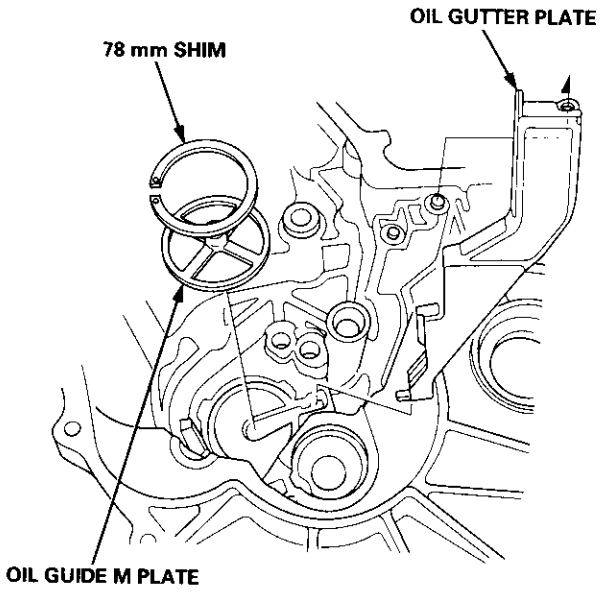
11. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring plier.
12. Separate the transmission housing from the clutch housing.
13. Remove the dowel pins, and wipe it clean of the sealant.

(cont'd)

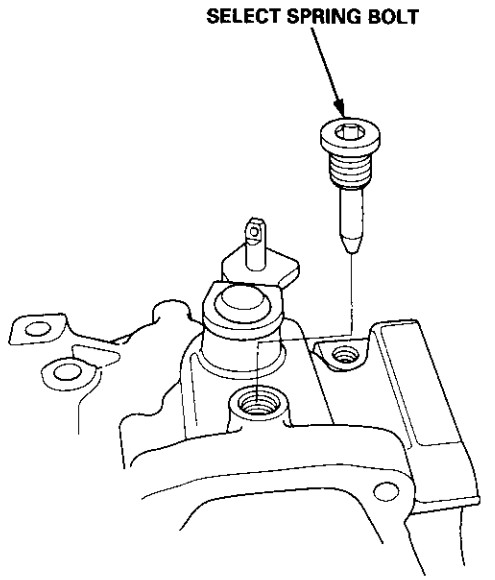
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Disassembly (cont'd)

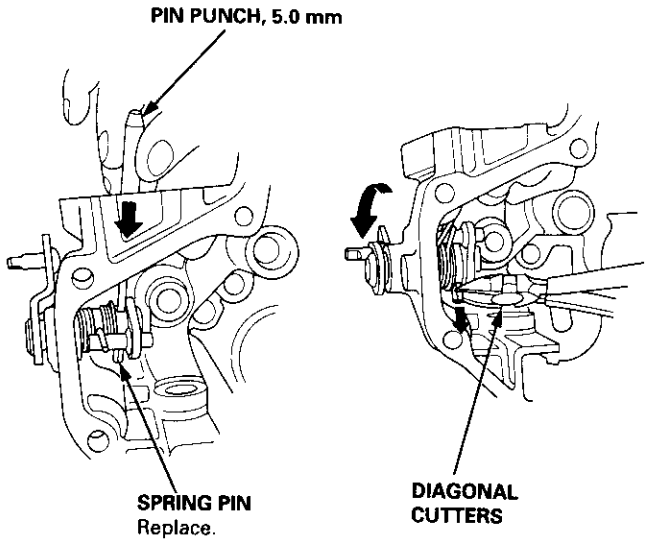
14. Remove the oil gutter plate, 78 mm shim, and oil guide M plate.



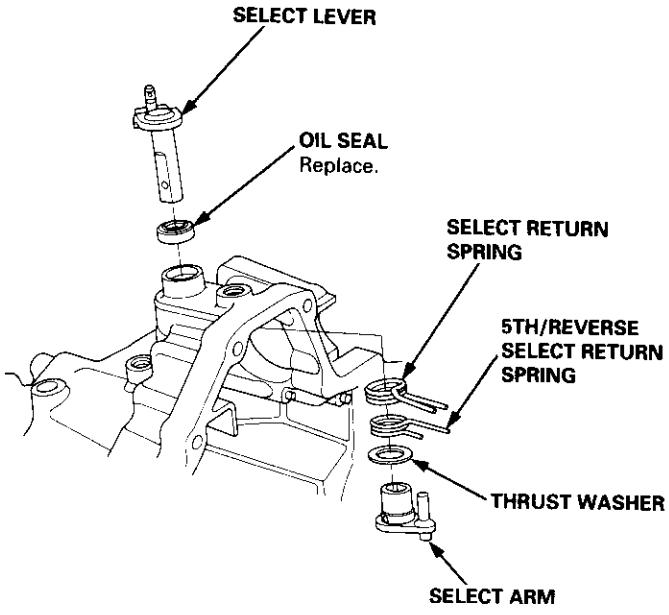
15. Remove the select spring bolt.



16. Remove the spring pin using the pin punch and a pair of diagonal cutters.



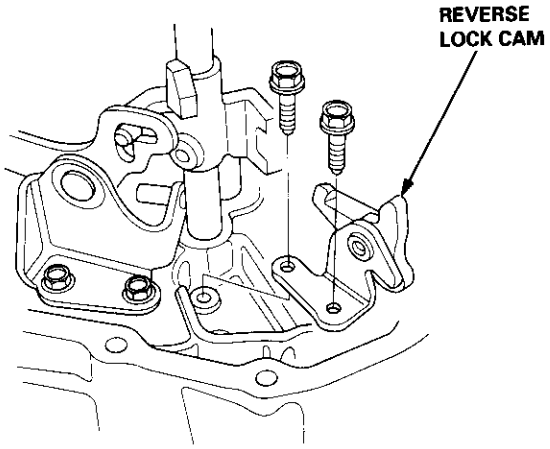
17. Remove the select lever, springs, washer, and select arm.



18. Remove the oil seal.

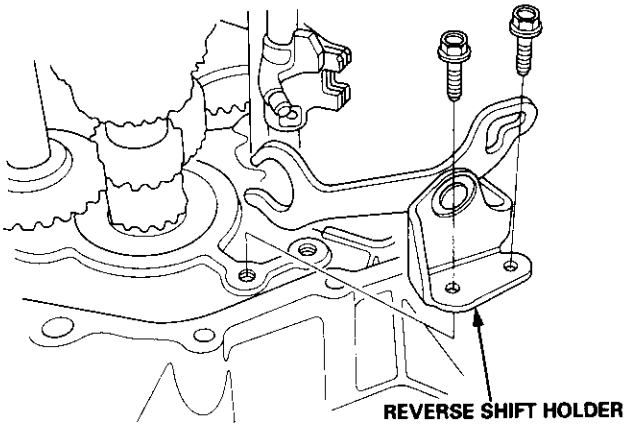
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19. Remove the reverse lock cam.

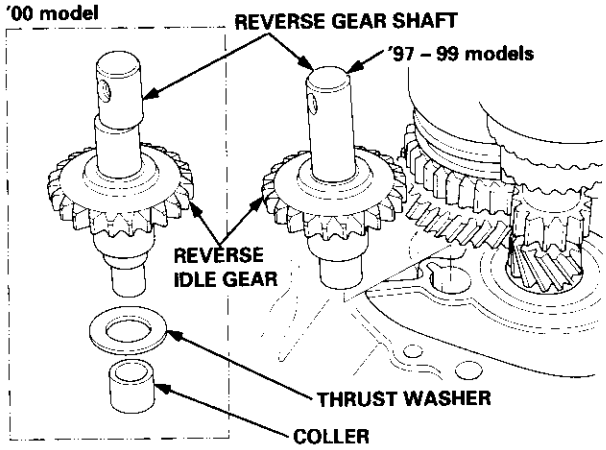


20. If necessary, check the clearance of the reverse shift holder (see page 13-20).

21. Remove the reverse shift holder.

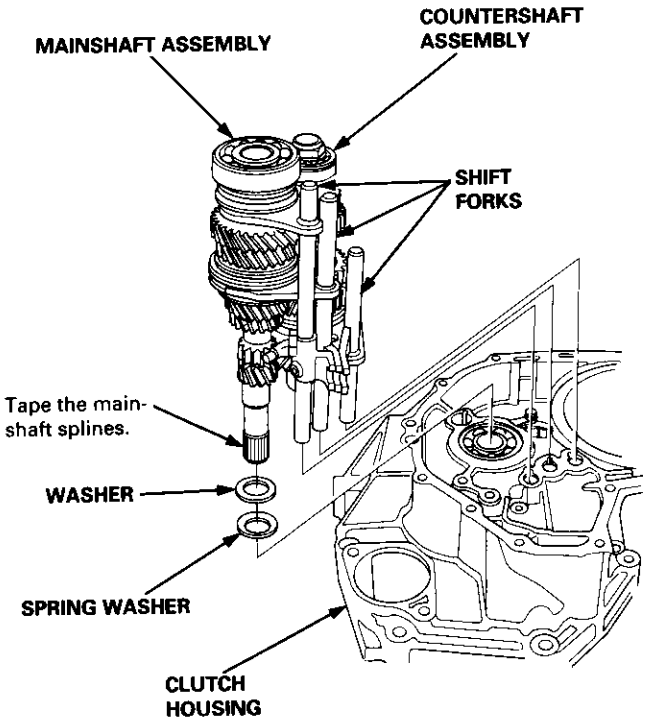


22. '97 – 99 models: Remove the reverse gear shaft and the reverse idler gear.
'00 model: Remove the reverse gear shaft, reverse idler gear, thrust washer and the coller.

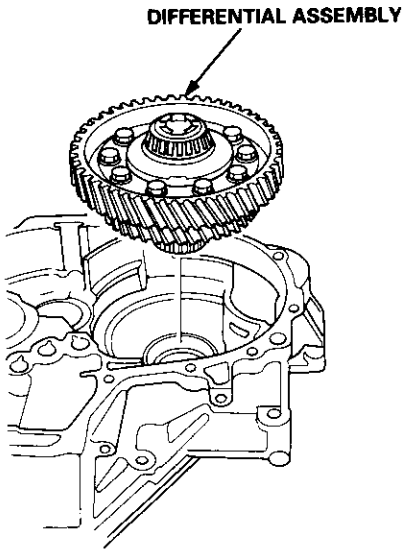


23. Remove the mainshaft and countershaft assemblies with the shift forks from the clutch housing.

NOTE: Before removing the mainshaft and countershaft assemblies, tape the mainshaft spline to protect it.



24. Remove the differential assembly.



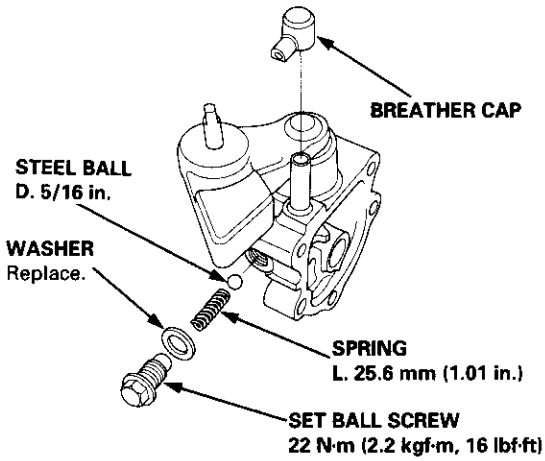
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Shift Arm Cover/Shift Arm Shaft Assembly

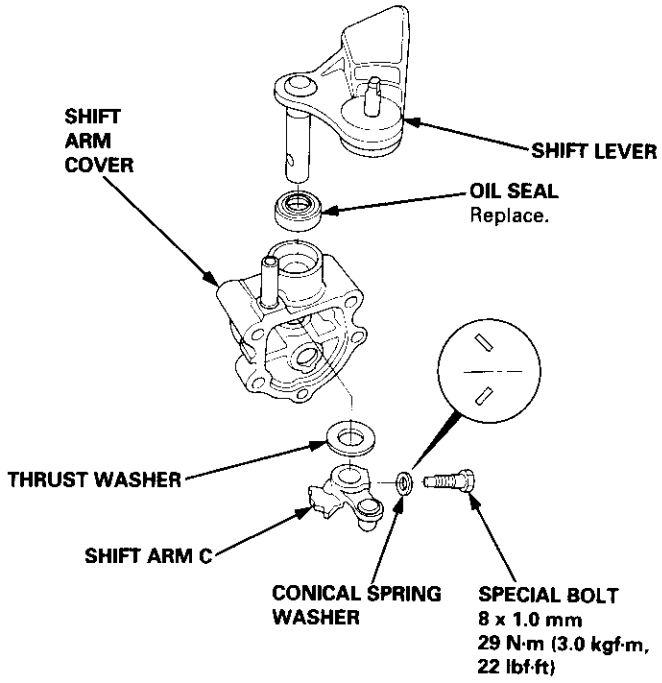
Disassembly/Reassembly

Shift Arm Cover Assembly

1. Remove the breather cap and set ball screw, washer, spring, and steel ball.



2. Remove the special bolt and conical spring washers.

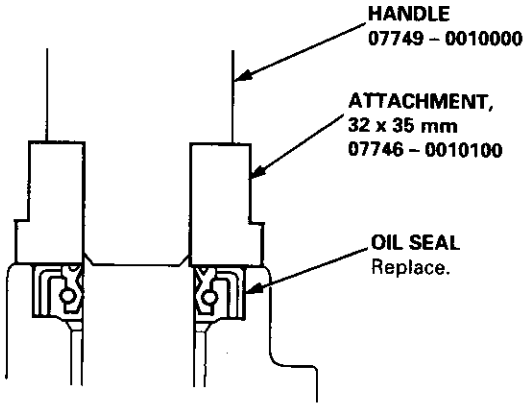


3. Remove the shift lever, shift arm C, and thrust washer from the shift arm cover.

4. Remove the oil seal.

   NOTE: Install the thrust washer with the alloy surface toward shift arm cover.

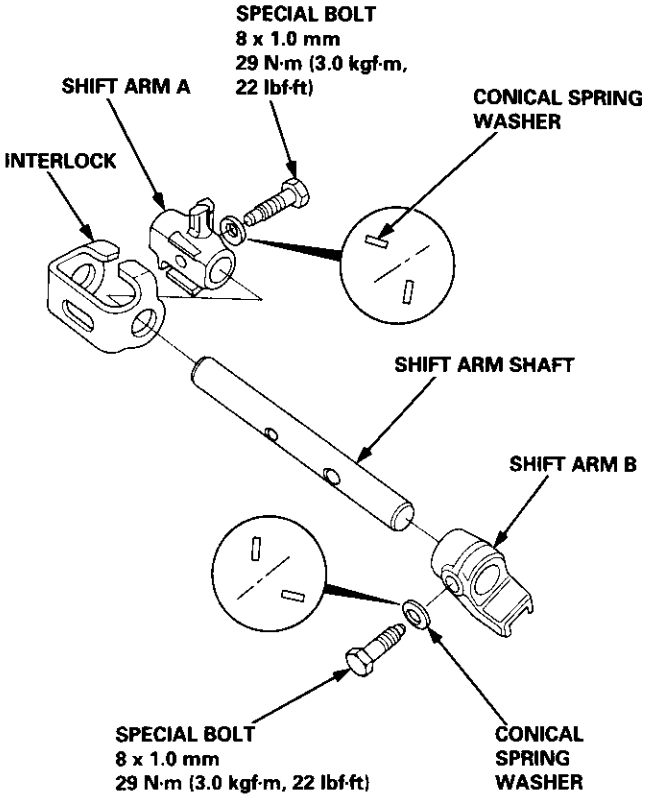
5. Install the oil seal in to the shift arm cover using the special tools.



6. Reassemble the shift arm cover in the reverse order of disassembly.

Shift Arm Shaft Assembly

1. Remove the special bolts and conical spring washers.



2. Remove the interlock, shift arm A, and shift arm B from the shift arm shaft.

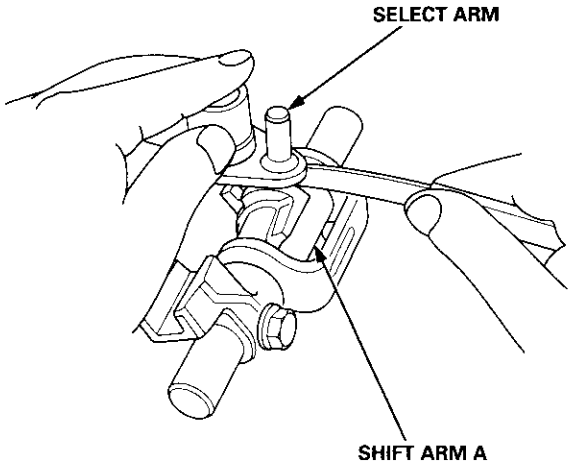
3. Install in the reverse order of removal.

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Clearance Inspection

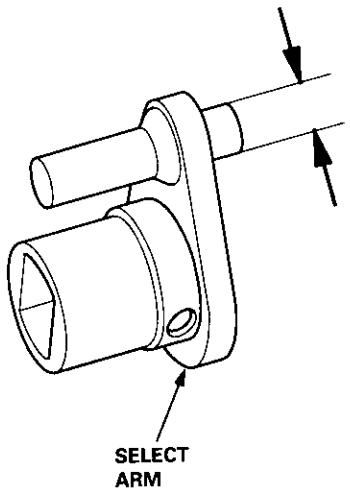
1. Measure the clearance between the shift arm A and select arm.

   Standard: 0.05 – 0.25 mm (0.002 – 0.01 in)
   Service Limit: 0.5 mm (0.02 in)



2. If the clearance are more than the service limit, measure the diameter of the select arm pin.

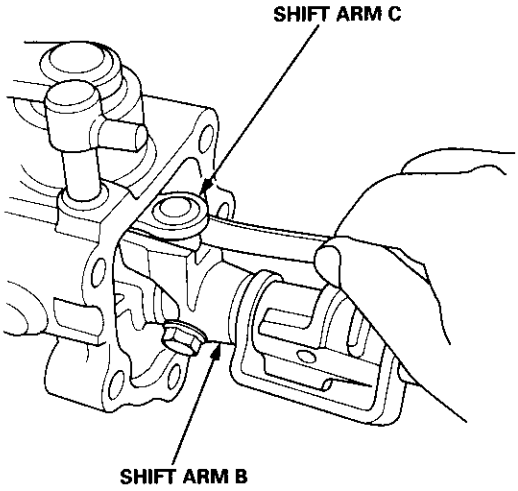
   Standard: 7.9 – 8.0 mm (0.311 – 0.315 in)



- If the diameter of the select arm pin is less than the service limit, replace the select arm with a new one.
- If the diameter of the select arm pin is within the service limit, replace the shift arm A with a new one.

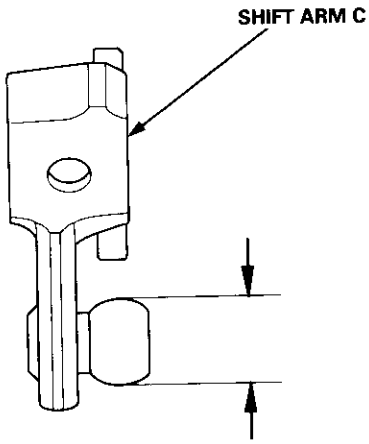
3. Measure the clearance between the shift arm B and shift arm C.

   Standard: 0.05 – 0.25 mm (0.002 – 0.01 in)
   Service Limit: 0.5 mm (0.02 in)



4. If the clearance are more than the service limit, measure the diameter of the shift arm C.

   Standard: 12.9 – 13.0 mm (0.508 – 0.512 in)



- If the diameter of the shift arm C is less than the service limit, replace the shift arm C with a new one.
- If the diameter of the shift arm C is within the service limit, replace the shift arm B with a new one.

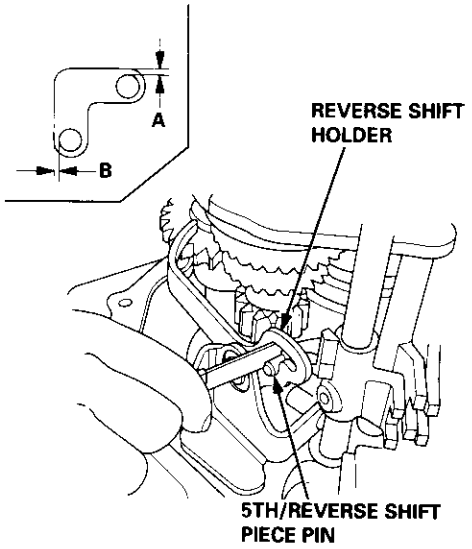
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Reverse Shift Holder

Clearance Inspection

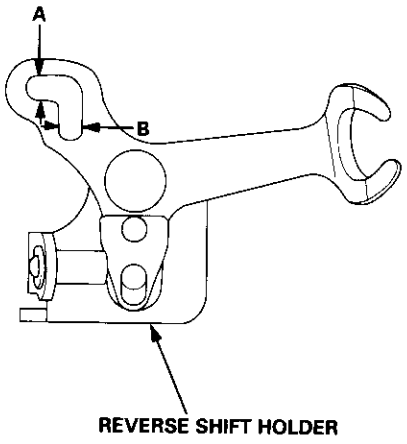
1. Measure the clearances between the reverse shift holder and 5th/reverse shift piece pin.

Standard: **A: 0.05 – 0.35 mm (0.002 – 0.014 in)**
B: 0.4 – 0.8 mm (0.02 – 0.03 in)
Service Limit: A: 0.5 mm (0.02 in)
B: 1.0 mm (0.04 in)



2. If the clearances are more than the service limit, measure the widths of the groove in the reverse shift holder.

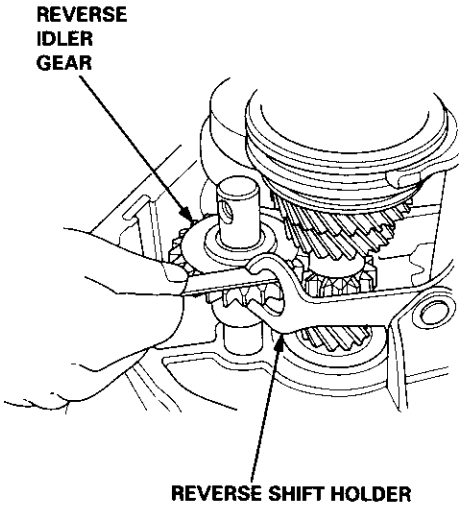
Standard: A: 7.05 – 7.25 mm (0.278 – 0.285 in)
B: 7.4 – 7.7 mm (0.29 – 0.30 in)



- If the widths of the grooves are not within the standard, replace the reverse shift holder with a new one.
- If the widths of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

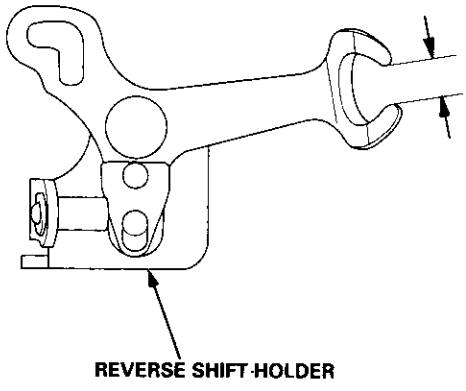
3. Measure the clearance between the reverse idler gear and reverse shift holder.

Standard: **0.5 – 1.1 mm (0.02 – 0.04 in)**
Service Limit: 1.8 mm (0.07 in)



4. If the clearance is more than the service limit, measure the width of the reverse shift holder.

Standard: 13.0 – 13.3 mm (0.512 – 0.524 in)



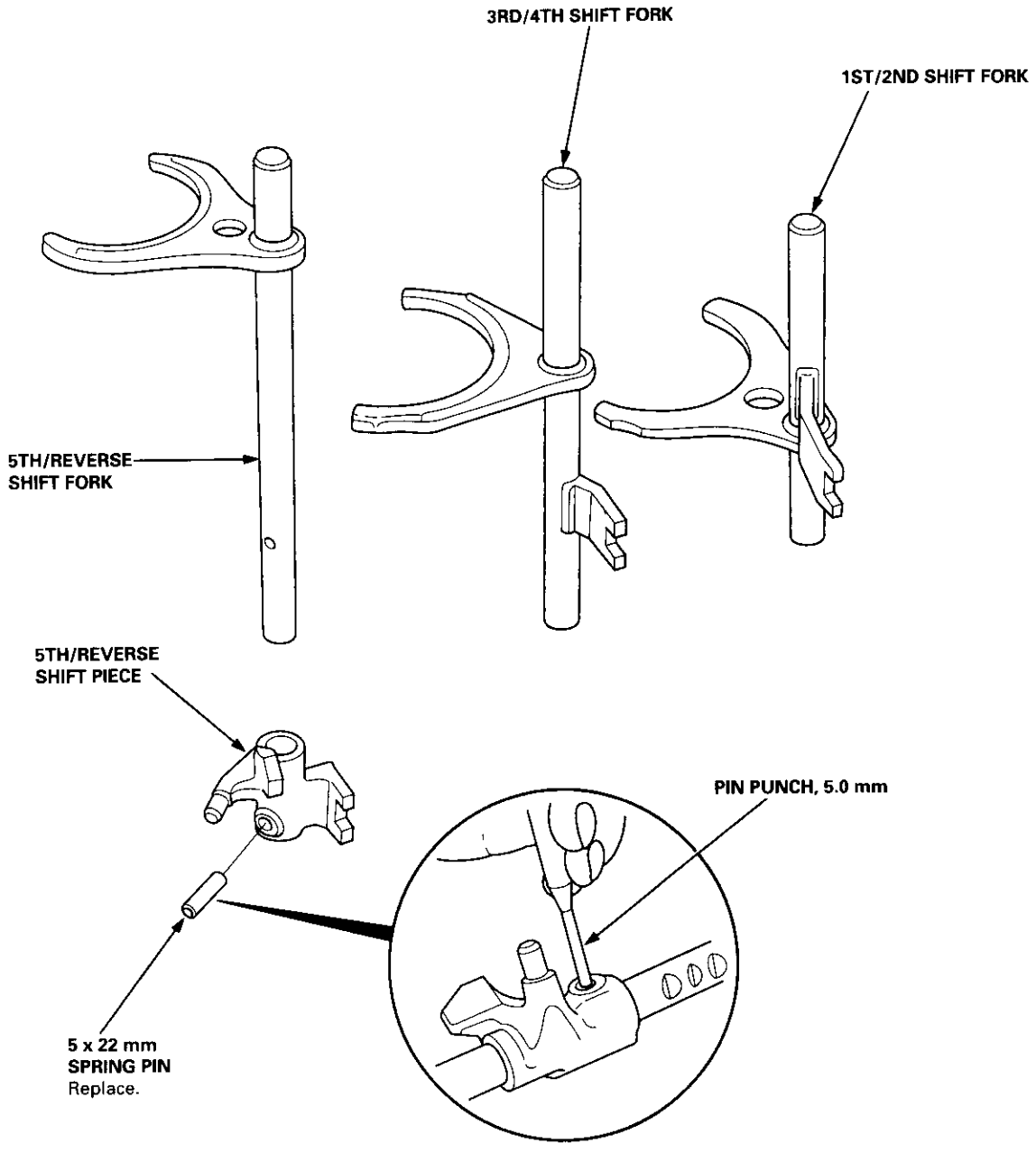
- If the width is not within the standard, replace the reverse shift holder with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

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Shift Fork Assembly

Disassembly/Reassembly

OIL Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



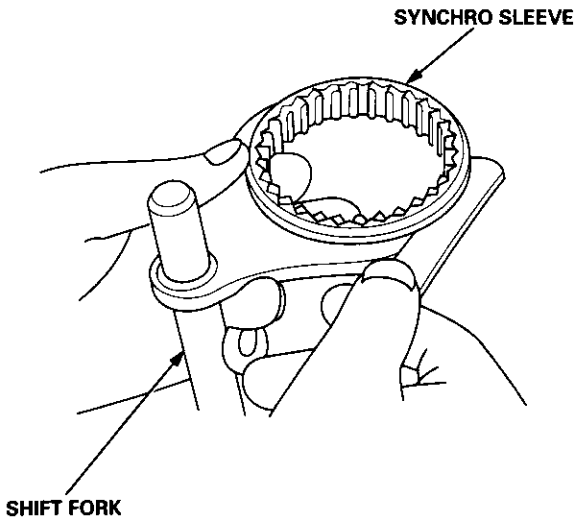
Shift Fork Assembly

Clearance Inspection

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

1. Measure the clearance between each shift fork and its matching synchro sleeve.

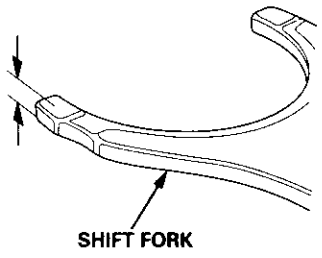
   Standard: 0.35 – 0.65 mm (0.014 – 0.026 in)
   Service Limit: 1.0 mm (0.039 in)



2. If the clearance exceeds the service limit, measure the thickness of the shift fork fingers.

Standard:

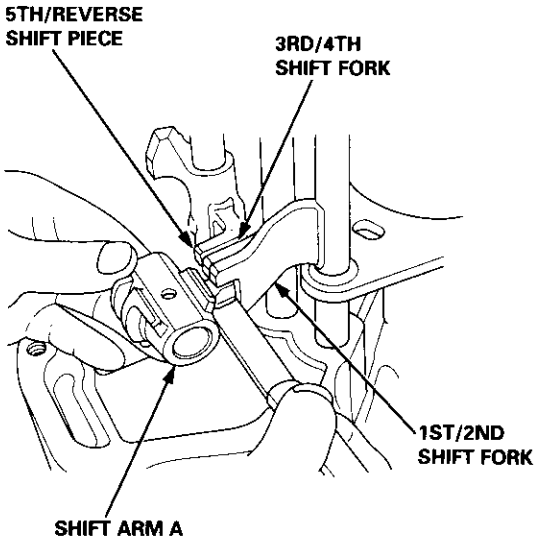
3rd/4th shift fork	7.4 – 7.6 mm (0.29 – 0.30 in)
1st/2nd shift fork 5th shift fork	6.2 – 6.4 mm (0.24 – 0.25 in)



- If the thickness of the shift fork finger is less than the standard, replace the shift fork with a new one.
- If the thickness of the shift fork finger is within the standard, replace the synchro sleeve with a new one.

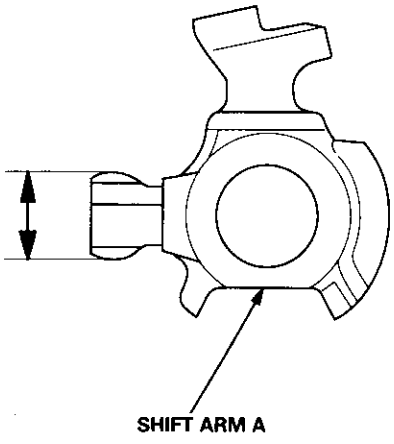
3. Measure the clearance between the shift fork and the shift arm A.

   Standard: 0.2 – 0.5 mm (0.008-0.020 in)
   Service Limit: 0.6 mm (0.024 in)



4. If the clearance exceeds the service limit, measure the width of the shift arm A.

   Standard: 12.9 – 13.0 mm (0.508 – 0.512 in)



- If the width of the shift arm A is less than the standard, replace the shift arm A with a new one.
- If the width of the shift arm A is within the standard, replace the shift fork or shift piece with a new ones.

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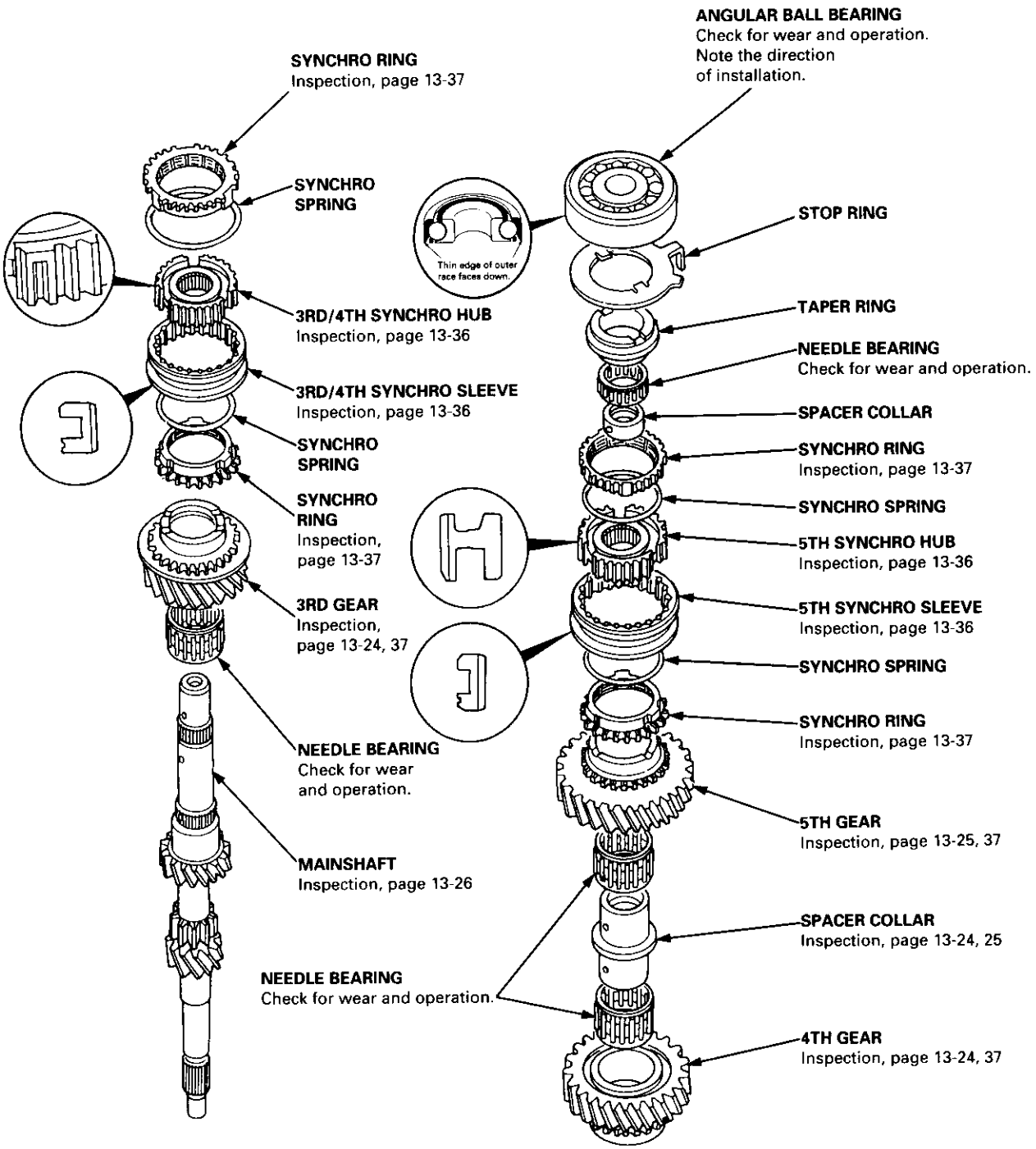
Mainshaft Assembly

Index

Note the following during reassembly:

- The 3rd/4th, and 5th synchro hubs, and the ball bearing are installed with a press.
- Install the angular ball bearing with the thin-edged outer race facing the stop ring.

OIL Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.



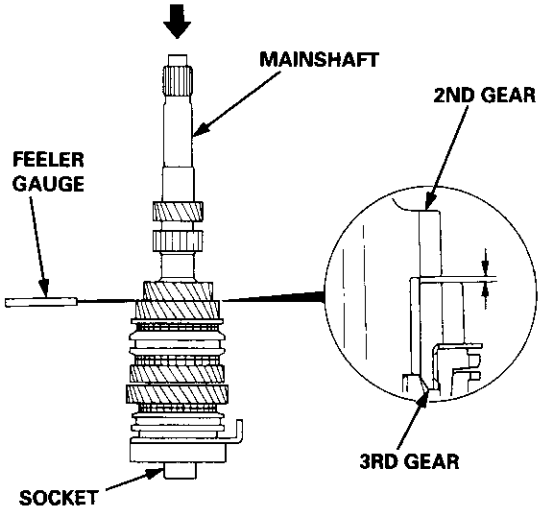
Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

1. Support the bearing inner race with a socket, and push down on the mainshaft.

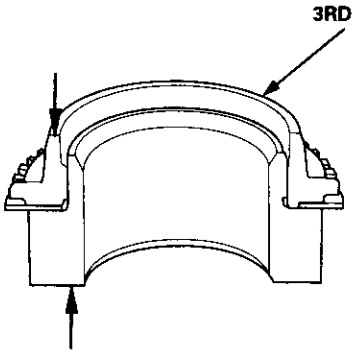
2. Measure the clearance between 2nd and 3rd gears.

   Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
   Service Limit: 0.3 mm (0.01 in)



3. If the clearance is more than the service limit, measure the thickness of 3rd gear.

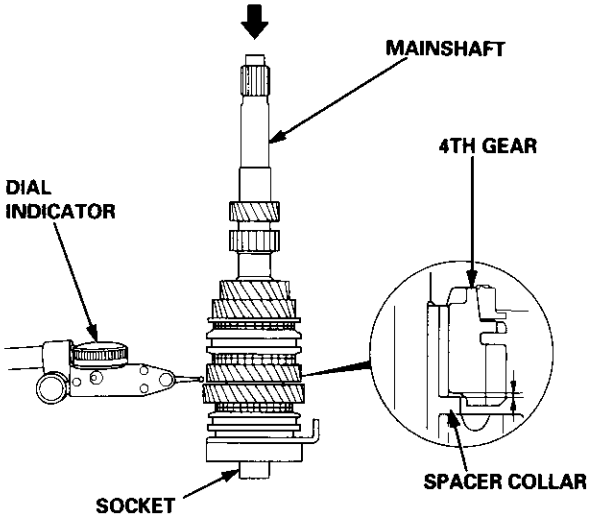
   Standard: 34.92 – 34.97 mm (1.375 – 1.377 in)
   Service Limit: 34.8 mm (1.37 in)



- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

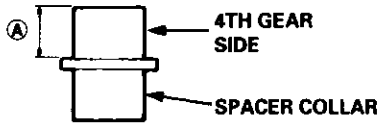
4. Measure the clearance between 4th gear and the spacer collar.

   Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
   Service Limit: 0.3 mm (0.01 in)



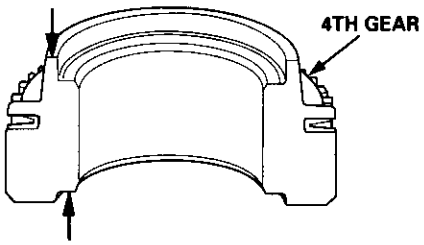
5. If the clearance is more than the service limit, measure distance Ⓐ on the spacer collar.

   Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)
   Service Limit: 26.01 mm (1.024 in)



6. If distance Ⓐ is less than the service limit, replace the spacer collar with a new one.
   If distance Ⓐ is within the service limit, measure the thickness of 4th gear.

   Standard: 31.42 – 31.47 mm (1.237 – 1.239 in)
   Service Limit: 31.3 mm (1.23 in)

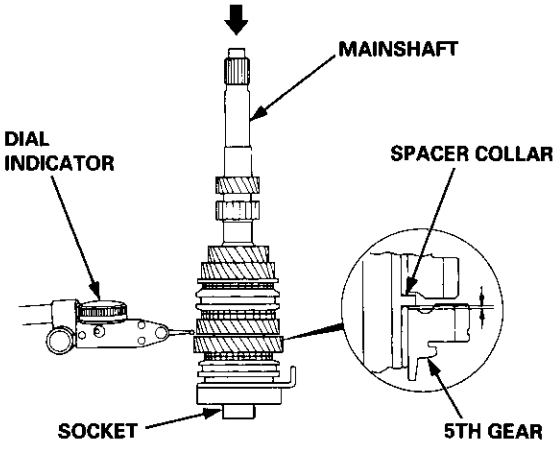


- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

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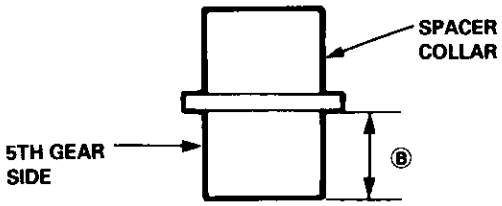
7. Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
Service Limit: 0.3 mm (0.01 in)



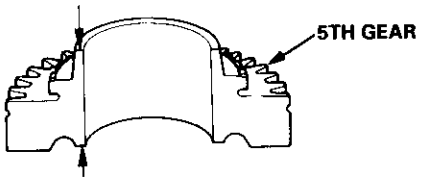
8. If the clearance is more than the service limit, measure distance Ⓑ on the spacer collar.

Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)
Service Limit: 26.01 mm (1.024 in)



9. If distance Ⓑ is less than the service limit, replace the spacer collar with a new one.
If distance Ⓑ is within the service limit, measure the thickness of 5th gear.

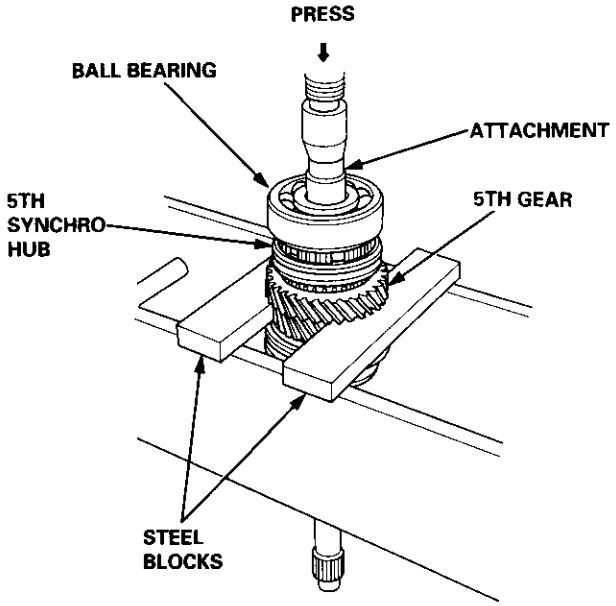
Standard: 30.92 – 30.97 mm (1.217 – 1.219 in)
Service Limit: 30.8 mm (1.21 in)



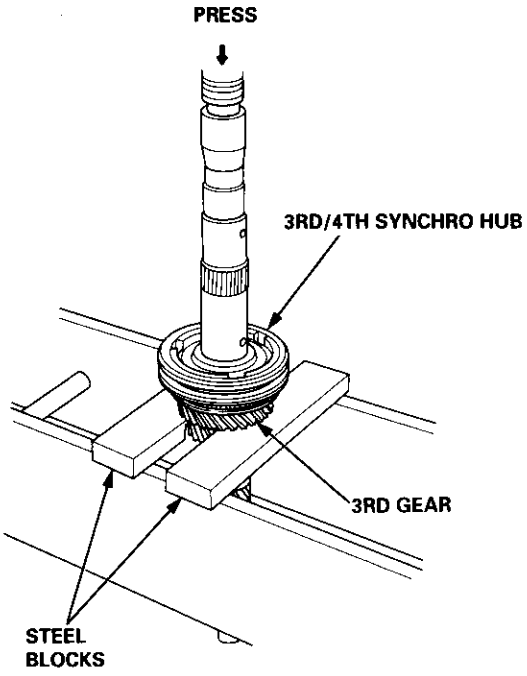
- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

Disassembly

1. Support 5th gear on steel blocks, and press the mainshaft out of the 5th synchro hub, as shown. Do not use a jaw-type puller, because it can damage the gear teeth.



2. In the same manner as above, support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub, as shown.



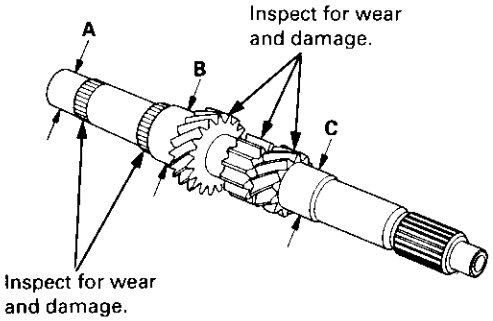
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Mainshaft Assembly

Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, and C.

Standard:
A (Ball bearing surface): 27.987 – 28.000 mm (1.1018 – 1.1024 in)
B (Needle bearing surface): 37.984 – 38.000 mm (1.4954 – 1.4961 in)
C (Ball bearing surface): 27.977 – 27.990 mm (1.1015 – 1.1020 in)
Service Limit: A: 27.94 mm (1.100 in)
B: 37.93 mm (1.493 in)
C: 27.94 mm (1.100 in)



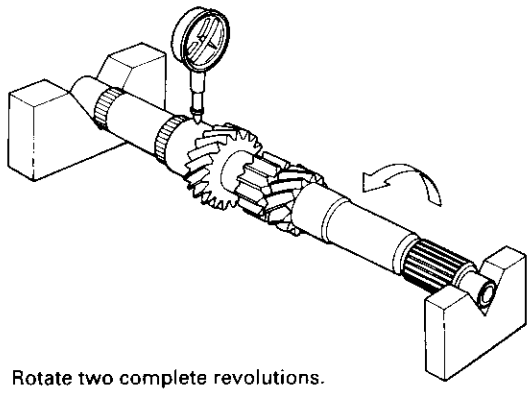
Inspect oil passages for clogging.

If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: 0.02 mm (0.0008 in) max.
Service Limit: 0.05 mm (0.002 in)

NOTE: Support the mainshaft at both ends as shown.



Rotate two complete revolutions.

If the runout is more than the service limit, replace the mainshaft with a new one.

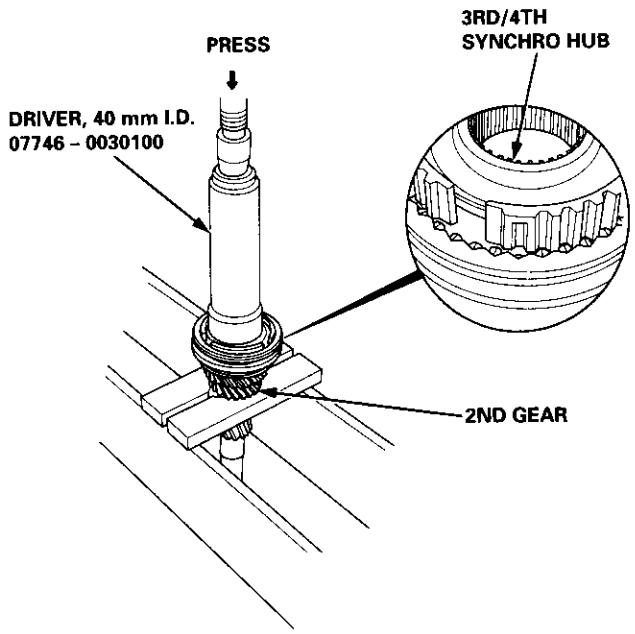
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Reassembly

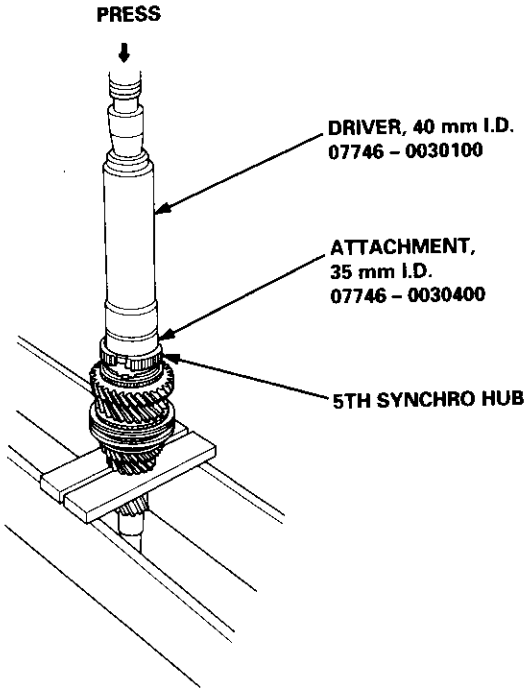
NOTE: Refer to page 13-23 for reassembly sequence.

1. Support 2nd gear on steel blocks as shown, then install the 3rd/4th synchro hub using the special tools and a press as shown.

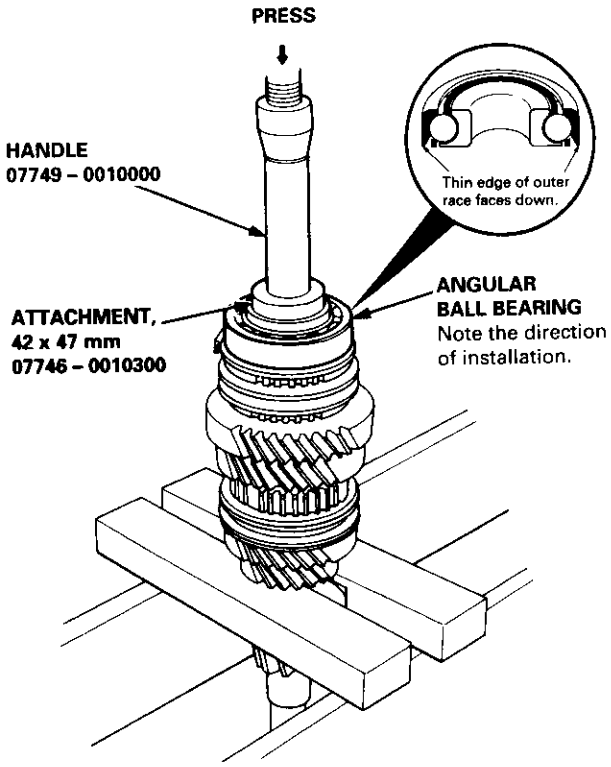
   NOTE: After installing, inspect the operation of the 3rd/ 4th synchro hub set.



2. Install the 5th synchro hub using the special tools and a press.



3. Install the angular ball bearing using the special tools and a press. Note the direction of installation.



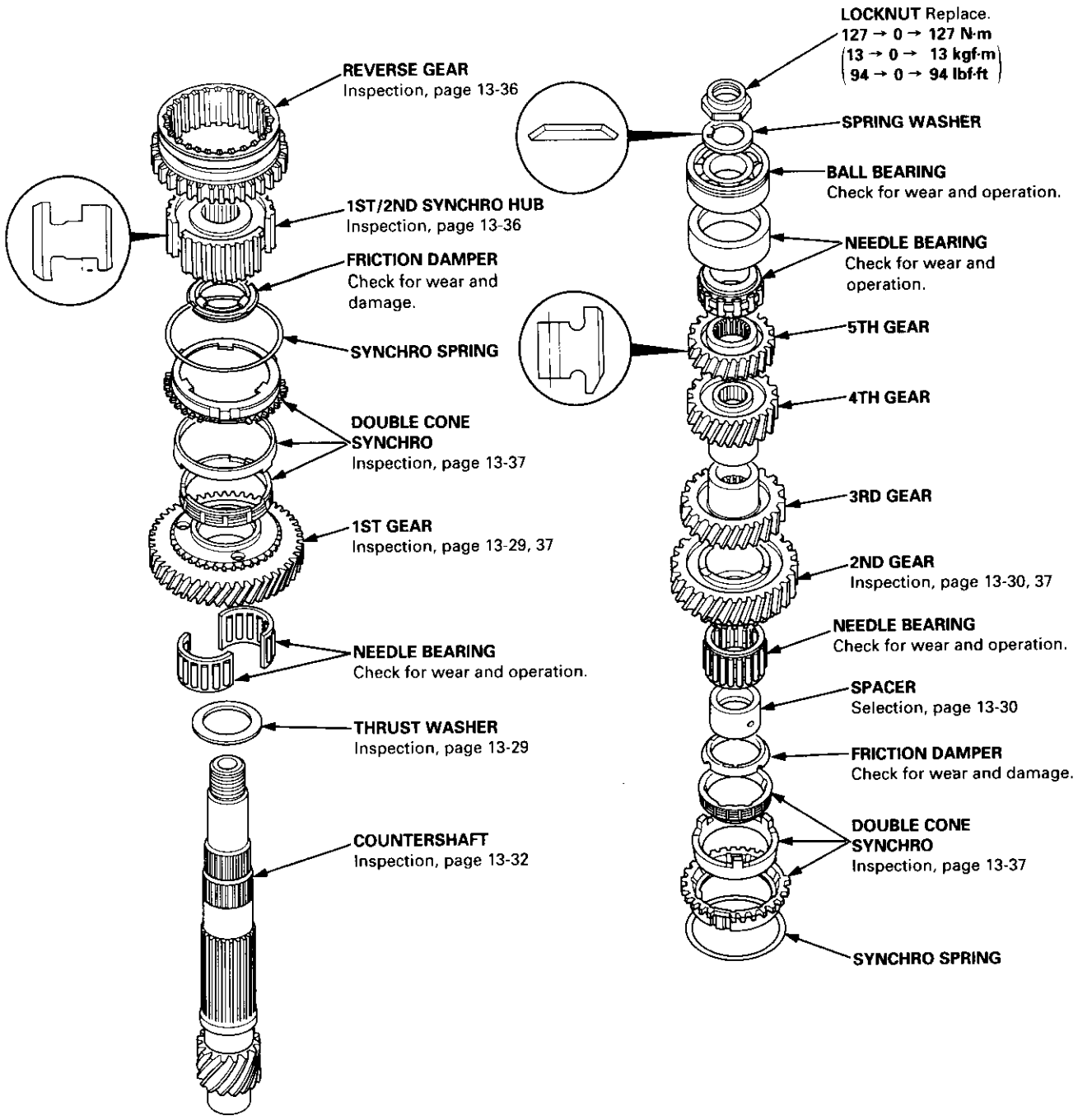
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Countershaft Assembly

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NOTE: The 3rd, 4th, and 5th gear are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd, 4th, and 5th gears, however, should be installed with a press before lubricating them.



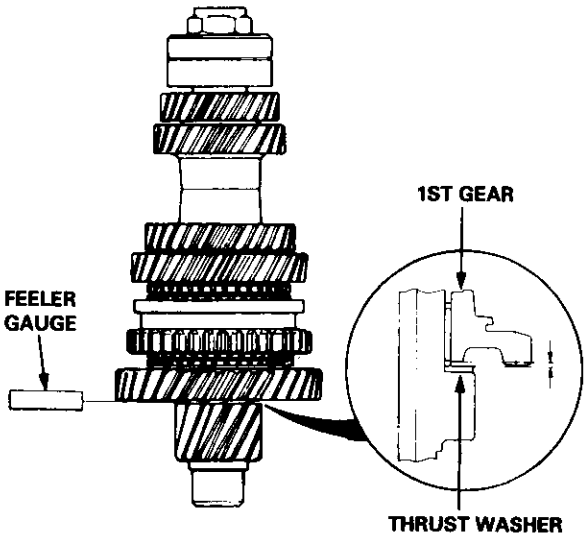
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Clearance Inspection

NOTE: If replacement us required, always replace the synchro sleeve and hub as a set.

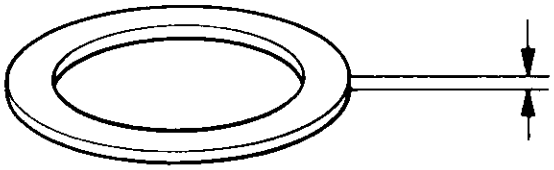
1. Measure the clearance between the 1st gear and thrust washer.

   Standard: 0.06 – 0.18 mm (0.002 – 0.007 in)
   Service Limit: 0.23 mm (0.009 in)



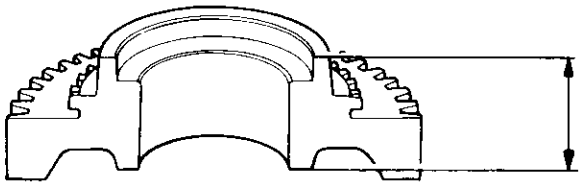
2. If the clearance is more than the service limit, measure the thickness of the thrust washer.

   Standard: 1.95 – 1.97 mm (0.077 – 0.078 in)



3. If the thickness is less than the standard, replace the thrust washer with a new one. If the thickness is within the service limit, measure the thickness of the 1st gear.

   Standard: 26.95 – 27.00 mm (1.061 – 1.063 in)



- If the thickness of 1st gear is less than the standard, replace 1st gear with a new one.
- If the thickness of 1st gear is within the standard, replace 1st/2nd synchro hub with a new one.

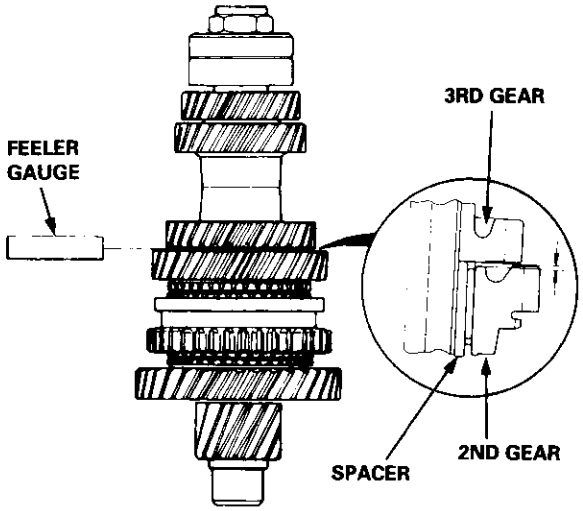
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Clearance Inspection (cont'd)

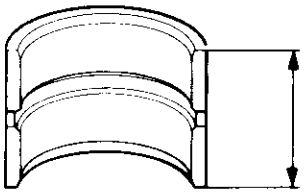
4. Measure the clearance between the 2nd gear and 3rd gear.

   Standard: 0.07 – 0.14 mm (0.003 – 0.006 in)
   Service Limit: 0.18 mm (0.007 in)



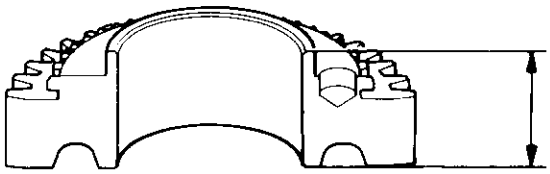
5. If the clearance is more than the service limit, measure the thickness of the spacer.

   Standard: 29.07 – 29.09 mm (1.144 – 1.145 in)



6. If the thickness is less than the standard, replace the spacer with a new one.
   If the thickness is within the standard, measure the thickness of the 2nd gear.

   Standard: 28.92 – 28.97 mm (1.139 – 1.141 in)

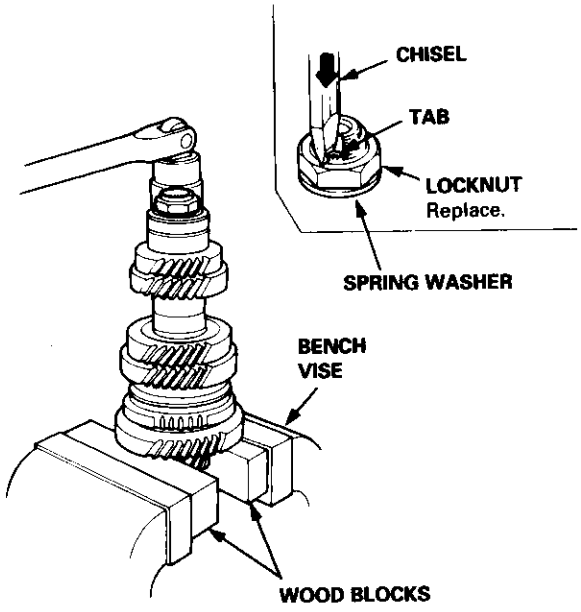


- If the thickness of 2nd gear is less than the standard, replace 2nd gear with a new one.
- If the thickness of 1st gear is within the standard, replace 1st/2nd synchro hub with a new one.

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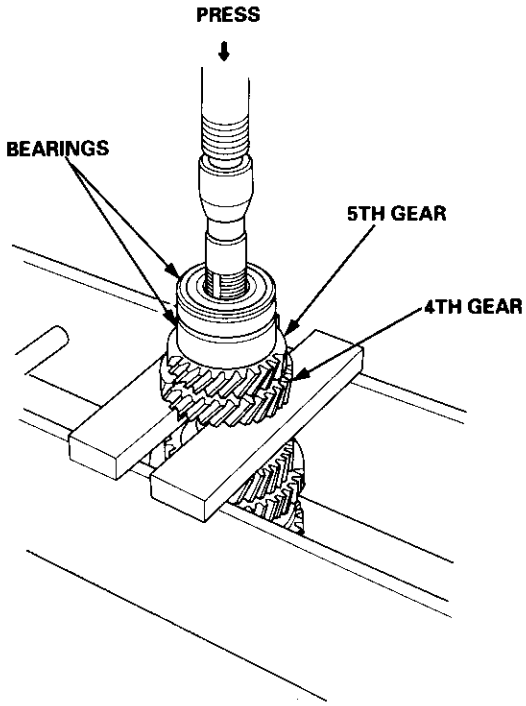
Disassembly

1. Securely clamp the countershaft assembly in a bench vise with wood blocks.

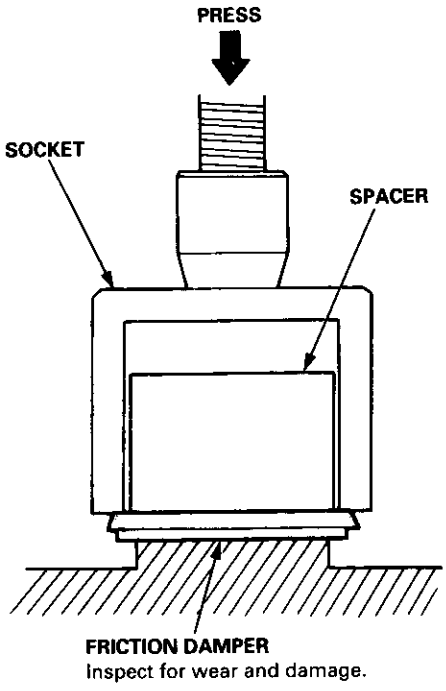


2. Raise the locknut tab from the groove in the countershaft, then remove the locknut and the spring washer.

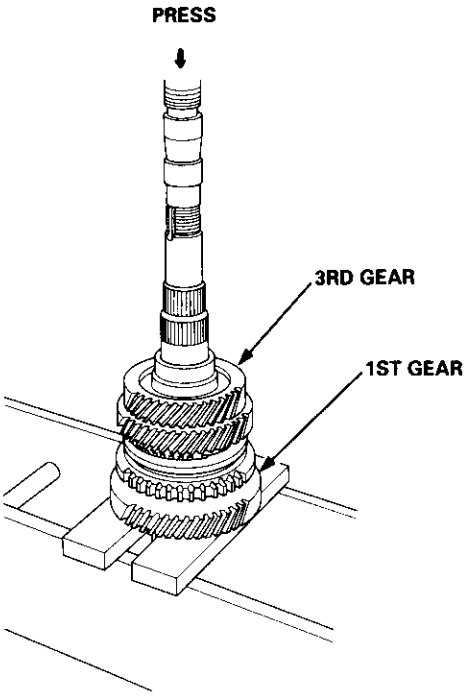
3. Remove the ball bearing using a press as shown.



4. Remove the friction damper from the spacer using a press and a socket.



5. Support 1st gear on steel blocks, and press the countershaft out of 3rd gear.

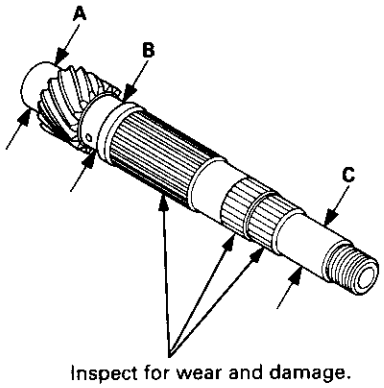


Countershaft Assembly

Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the countershaft at points A, B, and C.

Standard: **A: 36.000 – 36.015 mm (1.4173 – 1.4179 in)**
B: 36.984 – 37.000 mm (1.4561 – 1.4567 in)
C: 24.987 – 25.000 mm (0.9837 – 0.9843 in)
Service Limit: A: 35.95 mm (1.415 in)
B: 36.93 mm (1.454 in)
C: 24.94 mm (0.982 in)



Inspect for wear and damage.

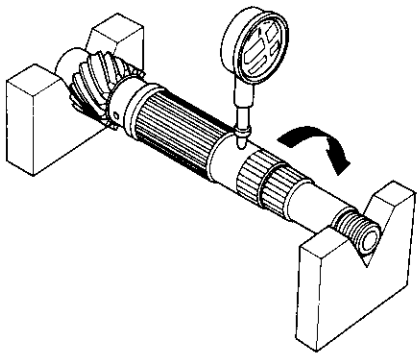
If any part of the countershaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: **0.02 mm (0.0008 in) max.**
Service Limit: 0.05 mm (0.002 in)

NOTE: Support the countershaft at both ends as shown.

Rotate two complete revolutions.



If the runout exceeds the service limit, replace the countershaft with a new one.

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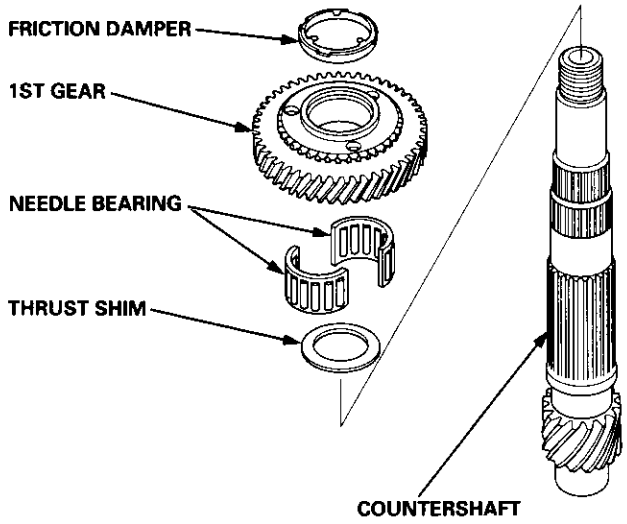
Reassembly

Note these items during reassembly:

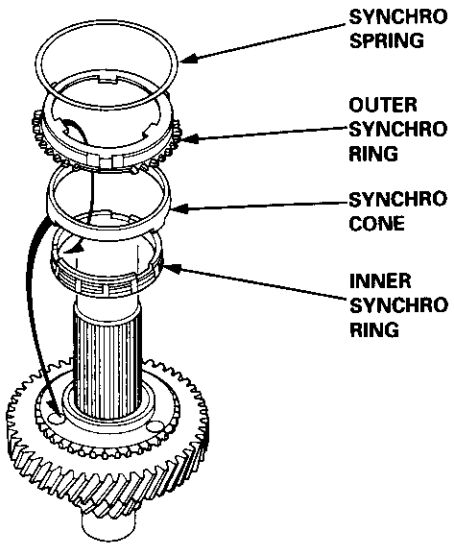
- Press the 3rd, 4th, and 5th gear on the countershaft without lubrication.
- When installing the 3rd, 4th, and 5th gears, support the shaft on steel blocks and install the gears using a press.
- Refer to page 13-28 for reassembly sequence.

1. Install the thrust shim, needle bearing, 1st gear, and friction damper.

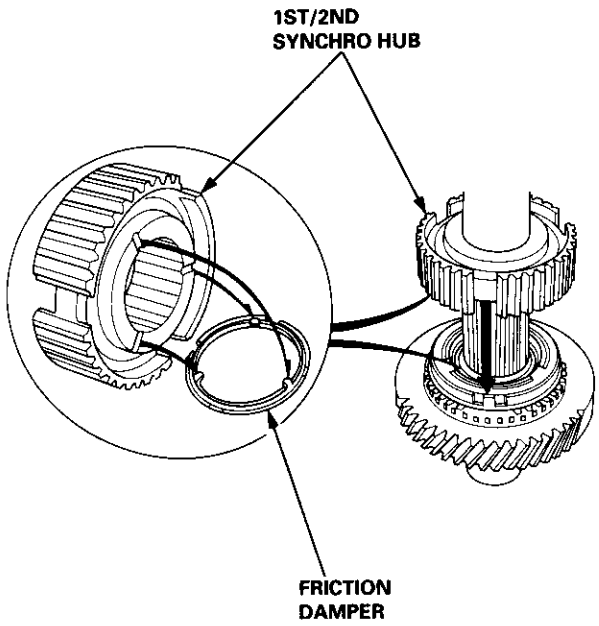
   NOTE: Reassembly the friction damper on the 1st gear before installation.



2. Install the double cone synchro.



3. Install the 1st/2nd synchro hub by align the friction damper fingers with 1st/2nd synchro hub grooves.

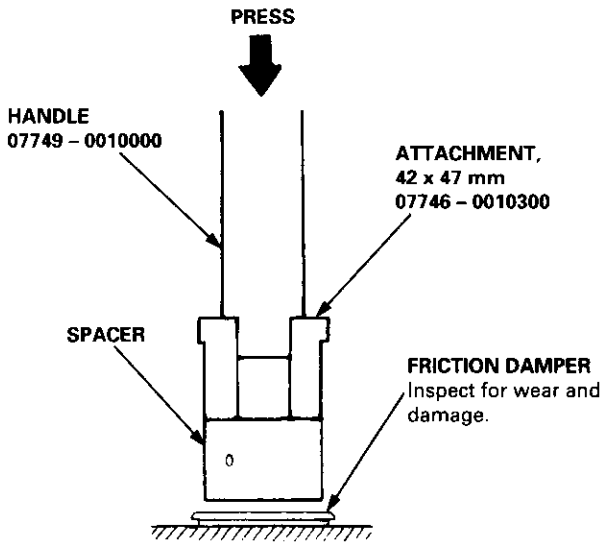


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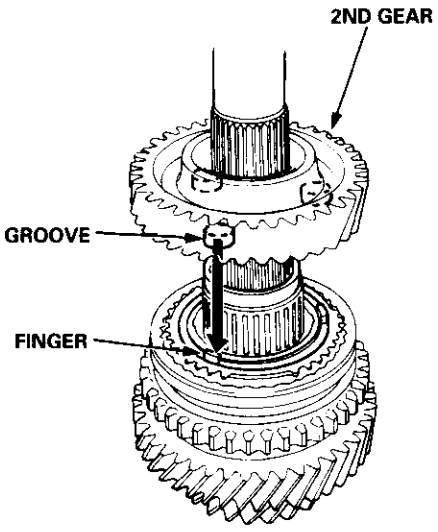
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Reassembly (cont'd)

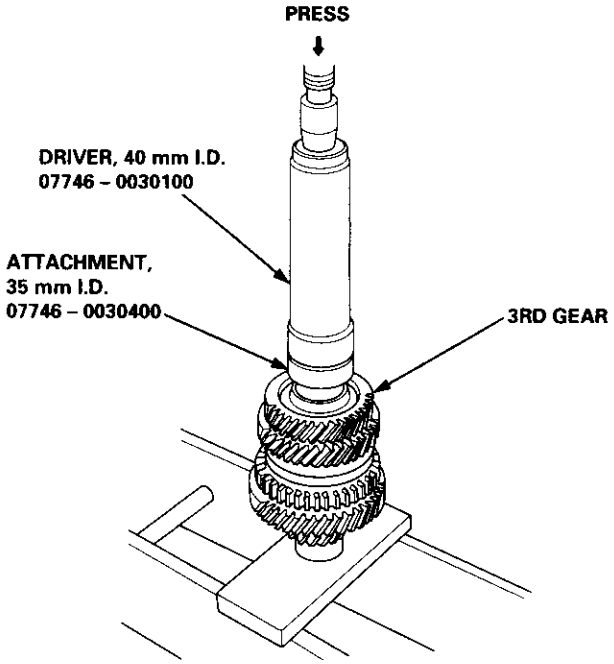
4. Reassembly the friction damper on the spacer using the special tools and a press.



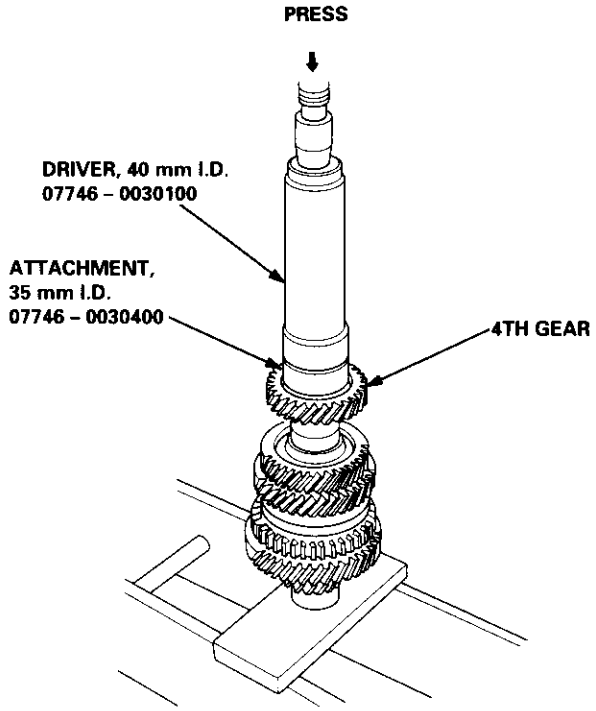
5. Install the 2nd gear by align the synchro cone the fingers with 2nd gear grooves.



6. Support the countershaft on a steel block as shown and install 3rd gear using the special tools and a press.

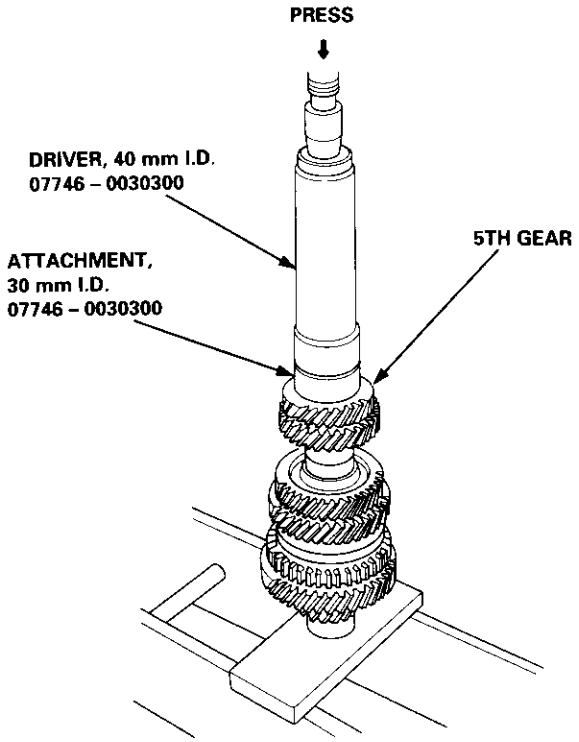


7. Install 4th gear using the special tools and a press.

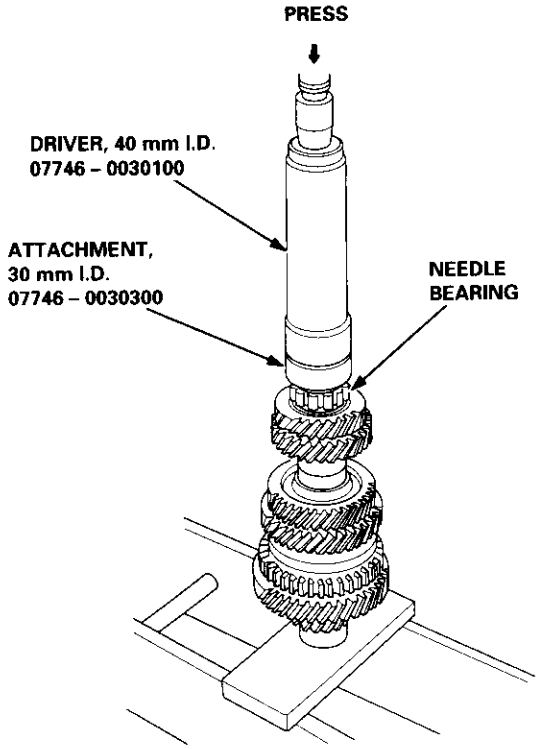


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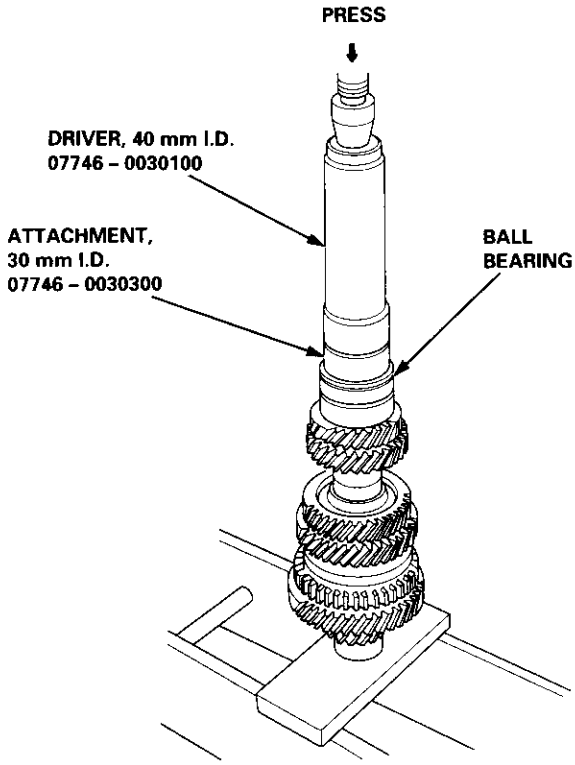
8. Install 5th gear using the special tools and a press.



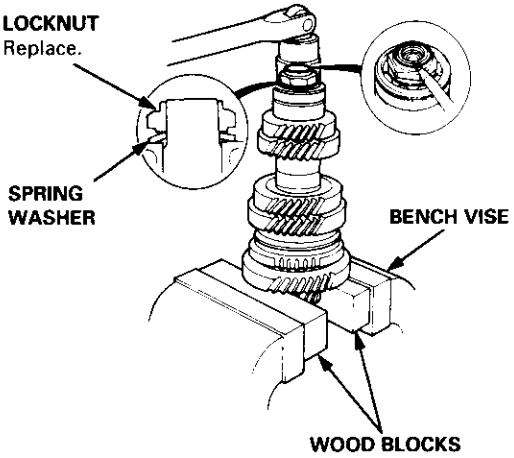
9. Install the needle bearing using the special tools and a press, then install the bearing outer race.



10. Install the ball bearing using the special tools and a press.



11. Securely clamp the countershaft assembly in a bench vise with wood blocks.



12. Install the spring washer.

13. Install the new locknut to the correct torque, then stake the locknut tab into the groove.

Torque: 127 → 0 → 127 N·m (13 → 0 → 13 kgf·m, 94 → 0 → 94 lbf·ft)

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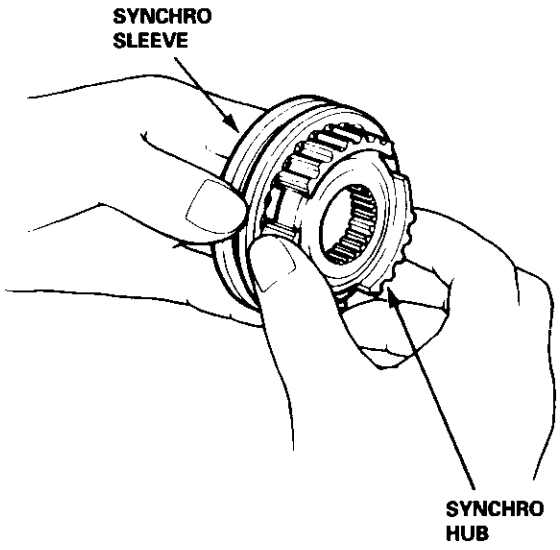
Synchro Sleeve, Synchro Hub

Inspection

1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.

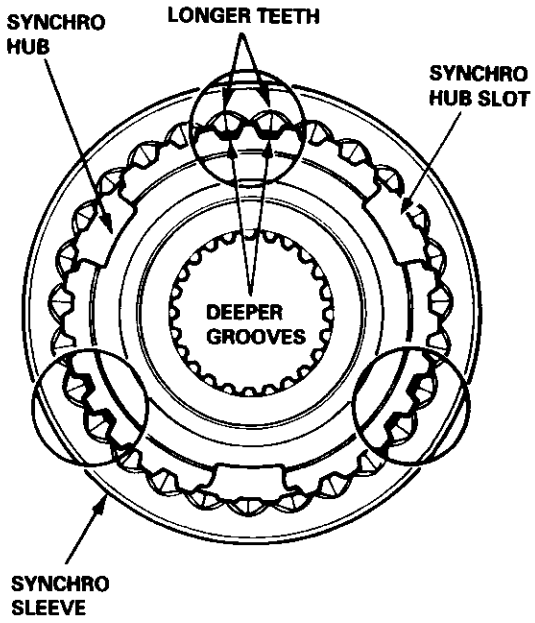
2. Install each synchro hub in its mating synchro sleeve, and check for freedom of movement.

   NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.



Installation

When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub. Do not install the synchro sleeve with its longer teeth in the 1st/2nd synchro hub slots because it will damage the spring ring.



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Inspection

1. Inspect the synchro ring and gear.

   A: Inspect the inside of the synchro ring for wear.

   B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).

   C: Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).

   D: Inspect the gear hub thrust surface for wear.

   E: Inspect the cone surface for wear and roughness.

   F: Inspect the teeth on all gears for uneven wear, scoring, galling, and cracks.

2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

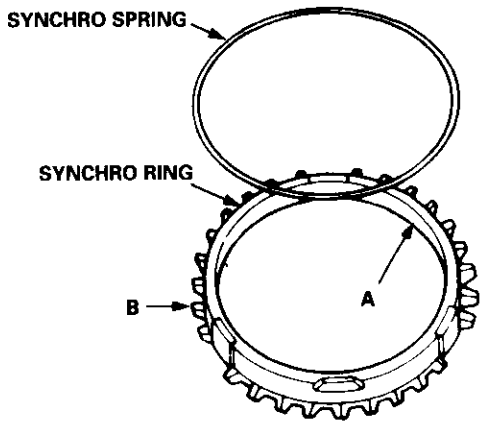
   Measure the clearance between the synchro ring and gear all the way around.

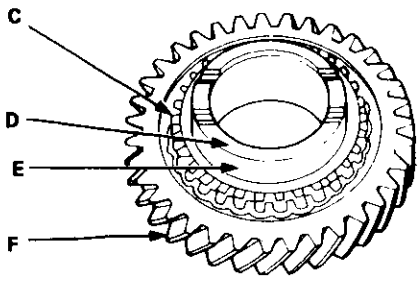
   NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

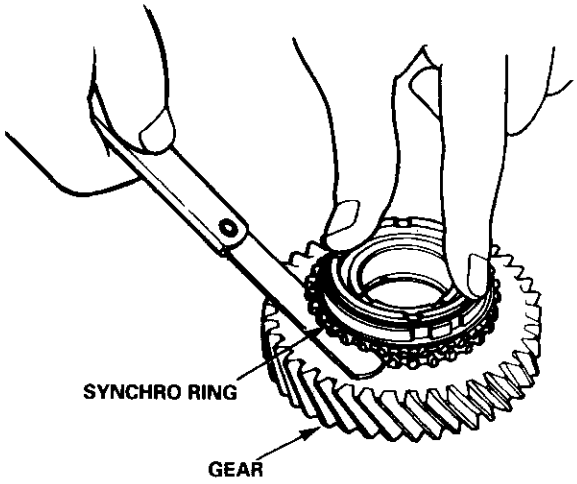
   Synchro Ring-to-Gear Clearance
   Standard: 0.85 – 1.10 mm (0.033 – 0.043 in)
   Service Limit: 0.4 mm (0.02 in)

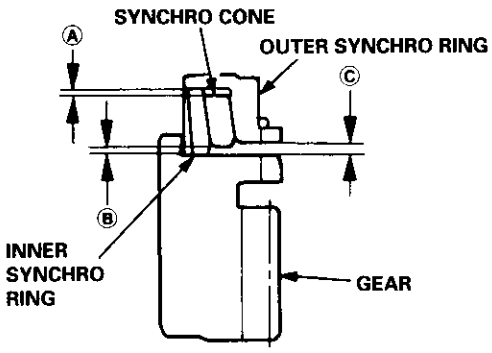
   Double Cone Synchro-to-Gear Clearance
   Standard:
   Ⓐ: (Outer Synchro Ring to Synchro Cone)
   0.5 – 1.0 mm (0.02 – 0.04 in)
   Ⓑ: (Synchro Cone to Gear)
   0.5 – 1.0 mm (0.02 – 0.04 in)
   Ⓒ: (Outer Synchro Ring to Gear)
   0.95 – 1.68 mm (0.037 – 0.066 in)
   Service Limit:
   Ⓐ: 0.3 mm (0.01 in)
   Ⓑ: 0.3 mm (0.01 in)
   Ⓒ: 0.6 mm (0.02 in)

   If the clearance is less than the service limit, replace the synchro ring and synchro cone.



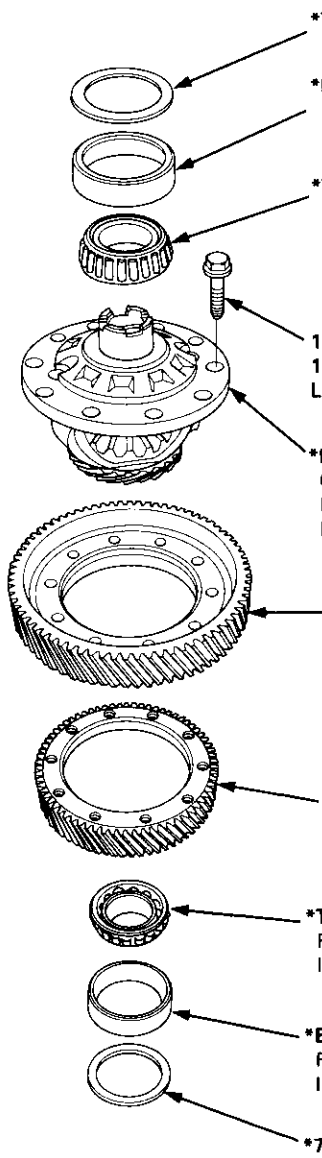






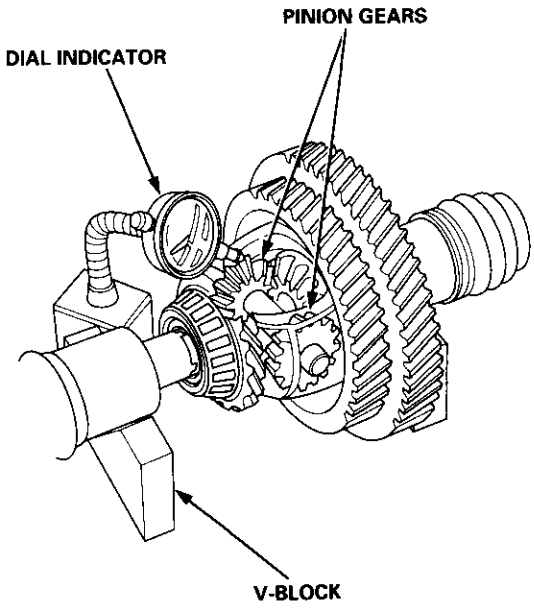
Index

NOTE: If the * mark parts were replaced, the tapered roller bearing preload must be adjusted (see page 13-41).



Backlash Inspection

1. Place the differential assembly on V-blocks and install both axles.



2. Measure the backlash of both pinion gears.

   Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)

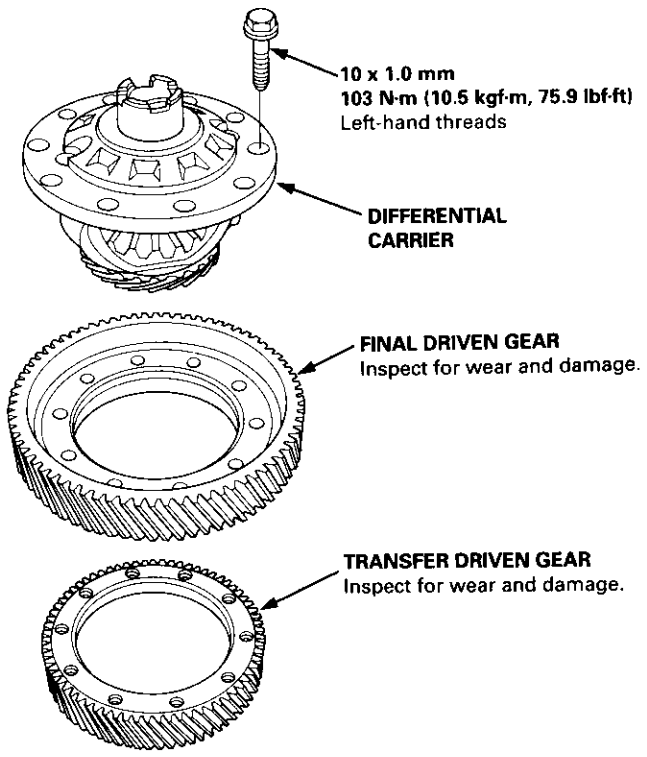
   If the backlash is not within the standard, replace the differential carrier.

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Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, and remove the final driven gear from the differential carrier.

   NOTE: The final driven gear bolts have left-hand threads.



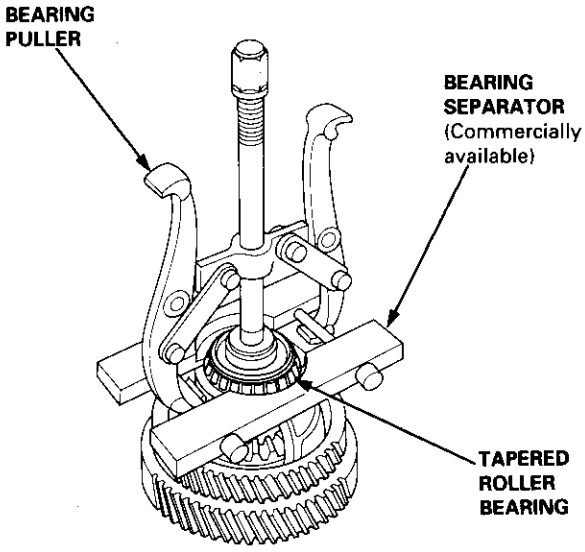
2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

Tapered Roller Bearing Replacement

Note these items:

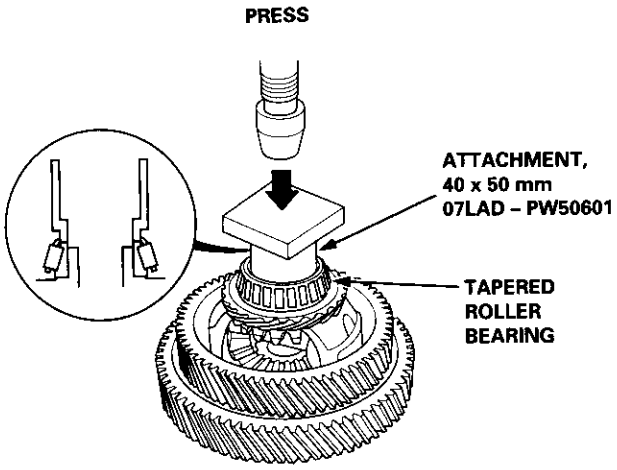
- The tapered roller bearing and bearing outer race should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.
- Check the tapered roller bearings for wear and rough rotation. If the tapered roller bearings are OK, removal is not necessary.

1. Remove the tapered roller bearings using a bearing puller and a bearing separator as shown.



2. Install new tapered roller bearings using the special tool as shown.

   NOTE: Drive the tapered roller bearings on until they bottom against the differential carrier.



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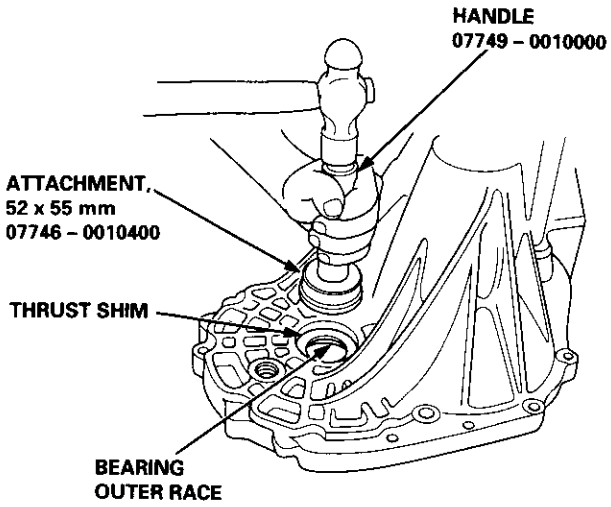
Bearing Outer Race Replacement

Note these items:
- The bearing outer race and tapered roller bearing should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.

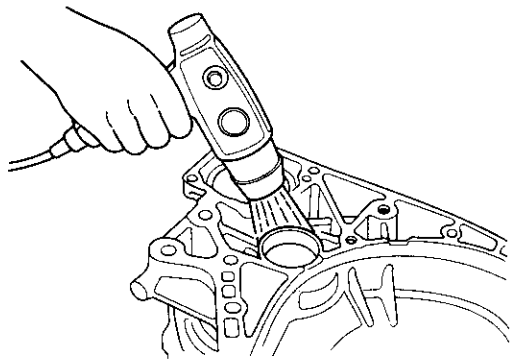
1. Remove the oil seals from the transmission housing and clutch housing (see page 13-43).

2. Drive the bearing outer race and thrust shim out of the transmission housing, or remove the bearing outer race and 75 mm shim from the clutch housing by heating the clutch housing to about 212°F (100°C) with a heat gun. Do not reuse the thrust shim if the outer race was driven out.

TRANSMISSION HOUSING:



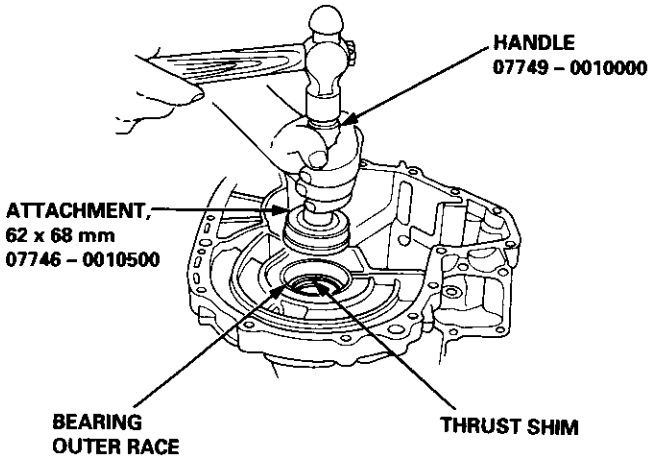
CLUTCH HOUSING:



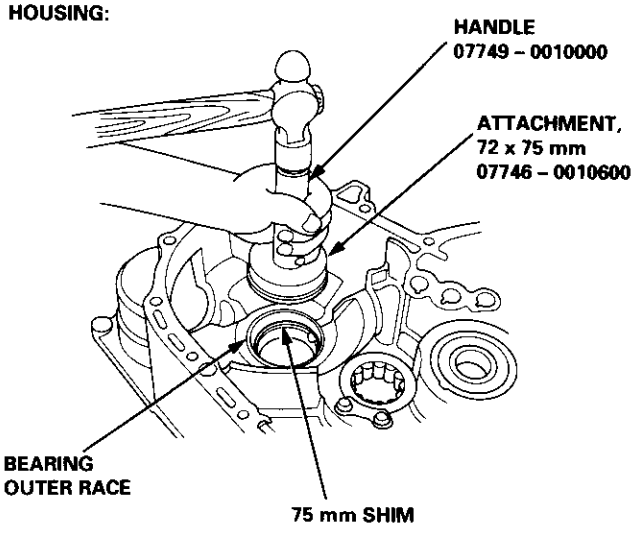
3. Install the thrust shim or 75 mm shim and the bearing outer race in the transmission housing and clutch housing using the special tools.

   Note these items during bearing replacement:
   - Install the bearing outer race squarely.
   - Check that there is no clearance between the bearing outer race, thrust shim or 75 mm shim and housing.

TRANSMISSION HOUSING:



CLUTCH HOUSING:



4. Install the oil seal (see page 13-43).

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Tapered Roller Bearing Preload Adjustment

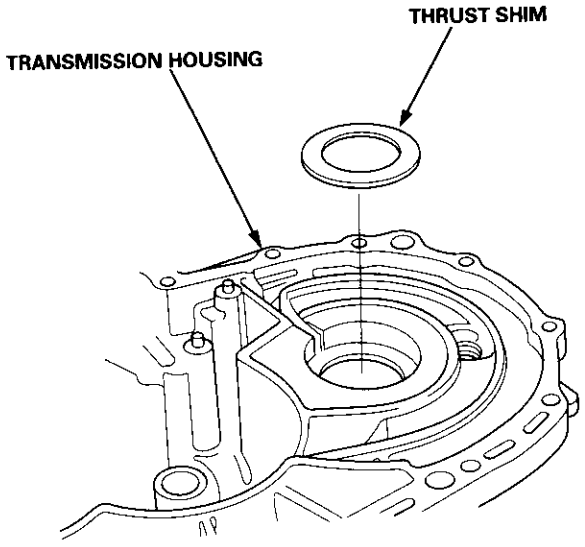
If any of the items listed below were replaced, the tapered roller bearing preload must be adjusted.

- Transmission housing
- Clutch housing
- Differential carrier
- Tapered roller bearing and bearing outer race
- Thrust shim
- 75 mm shim

1. Remove the bearing outer race and thrust shim from the transmission housing (see page 13-40).

   NOTE:
   - Do not reuse the thrust shim if the bearing outer race was driven out.
   - Let the transmission cool to room temperature if the bearing outer race was removed by heating the clutch housing.

2. Do not use more than one thrust shim to adjust the tapered bearing preload. First try the same size thrust shim that was removed. There are no shims used on the clutch housing side.



3. After installing the thrust shim, install the bearing outer race in the transmission housing (see page 13-40).

4. With the mainshaft and countershaft removed, install the differential assembly, and torque the clutch housing and transmission housing.

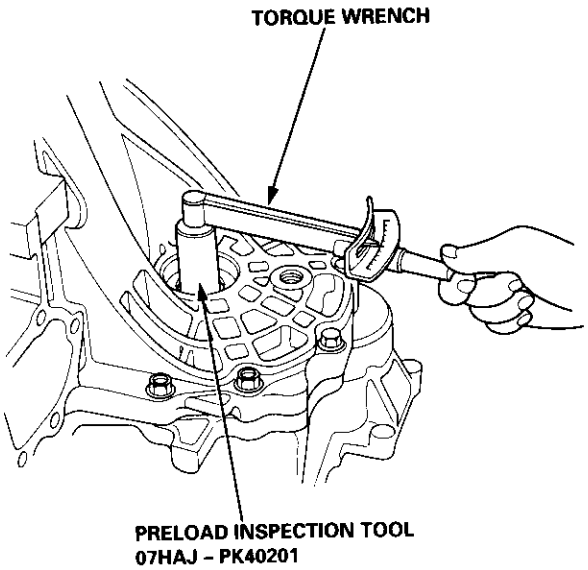
   NOTE: It is not necessary to use sealing agent between the housings.

   TORQUE: 8 x 1.25 mm: 27 N·m
   (2.8 kgf·m, 20 lbf·ft)

5. Rotate the differential assembly in both directions to seat the tapered roller bearings.

6. Measure the tapered roller bearing preload at normal room temperature. Measure the starting torque of the differential assembly in both directions with the special tool and a torque wrench.

   STANDARD: 1.4 – 2.5 N·m
   (14 – 26 kgf·cm, 12 – 23 lbf·in)



(cont'd)

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Tapered Roller Bearing Preload Adjustment (cont'd)

7. If the tapered roller bearing preload is not within the standard, select the thrust shim which will give the correct tapered roller bearing preload from the following table.

   NOTE: Changing the thrust shim to the next size will increase or decrease tapered roller bearing preload about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in).

THRUST SHIM

	Part Number	Thickness
A	41381 – PX5 – 000	1.90 mm (0.0748 in)
B	41382 – PX5 – 000	1.93 mm (0.0760 in)
C	41383 – PX5 – 000	1.96 mm (0.0772 in)
D	41384 – PX5 – 000	1.99 mm (0.0783 in)
E	41385 – PX5 – 000	2.02 mm (0.0795 in)
F	41386 – PX5 – 000	2.05 mm (0.0807 in)
G	41387 – PX5 – 000	2.08 mm (0.0819 in)
H	41388 – PX5 – 000	2.11 mm (0.0831 in)
I	41389 – PX5 – 000	2.14 mm (0.0843 in)
J	41390 – PX5 – 000	2.17 mm (0.0854 in)
K	41391 – PX5 – 000	2.20 mm (0.0866 in)
L	41392 – PX5 – 000	2.23 mm (0.0878 in)
M	41393 – PX5 – 000	2.26 mm (0.0890 in)
N	41394 – PX5 – 000	2.29 mm (0.0902 in)
O	41395 – PX5 – 000	2.32 mm (0.0913 in)
P	41396 – PX5 – 000	2.35 mm (0.0925 in)
Q	41397 – PX5 – 000	2.38 mm (0.0937 in)
R	41398 – PX5 – 000	2.41 mm (0.0949 in)
S	41399 – PX5 – 000	2.44 mm (0.0961 in)
T	41400 – PX5 – 000	2.47 mm (0.0972 in)
AA	41873 – P16 – 000	1.66 mm (0.0654 in)
AB	41874 – P16 – 000	1.69 mm (0.0665 in)
AC	41875 – P16 – 000	1.72 mm (0.0677 in)
AD	41876 – P16 – 000	1.75 mm (0.0689 in)
AE	41877 – P16 – 000	1.78 mm (0.0701 in)
AF	41878 – P16 – 000	1.81 mm (0.0713 in)
AG	41879 – P16 – 000	1.84 mm (0.0724in)
AH	41880 – P16 – 000	1.87 mm (0.0736 in)

8. Recheck the tapered roller bearing preload.

9. How to select the correct thrust shim:
   -1) Compare the tapered roller bearing preload you get with the thrust shim that was removed, with the specified preload of 1.4 – 2.5 N·m (14 – 26 kgf·cm, 12 – 23 lbf·in).
   -2) If your measured tapered roller bearing preload is less than specified, subtract yours from the specified.
   If yours is more than specified, subtract the specified from your measurement.

   For example with a 2.17 mm (0.0854 in) thrust shim:

   Ⓐ specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
   – you measure 0.6 N·m (6 kgf·cm, 5 lbf·in)
   1.9 N·m (20 kgf·cm, 18 lbf·in) less

   Ⓑ you measure 3.3 N·m (34 kgf·cm, 30 lbf·in)
   – specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
   0.8 N·m (8 kgf·cm, 7 lbf·in) more

   -3) Each shim size up or down from standard makes about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in) difference in tapered roller bearing preload.

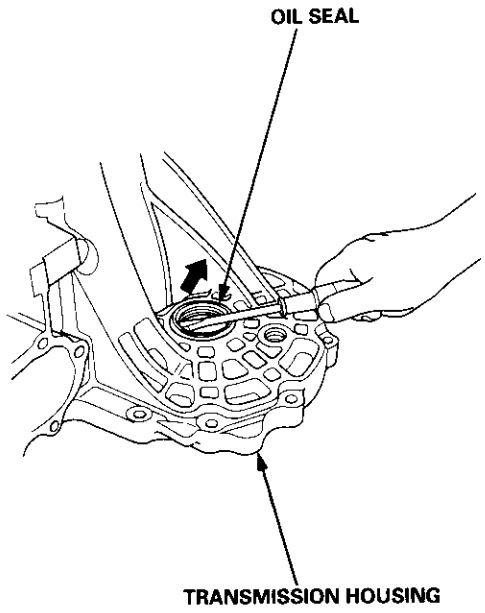
   In example Ⓐ, your measured tapered roller bearing preload was 1.9 N·m (20 kgf·cm, 18 lbf·in) less than standard so you need a thrust shim five sizes thicker than standard (try the 2.32 mm (0.0913 in) thrust shim, and recheck).
   In example Ⓑ, your measurement was 0.8 N·m (8 kgf·cm, 7 lbf·in) more than standard, so you need a thrust shim two sizes thinner (try the 2.11 mm (0.0831 in) thrust shim, and recheck).

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Oil Seal Replacement

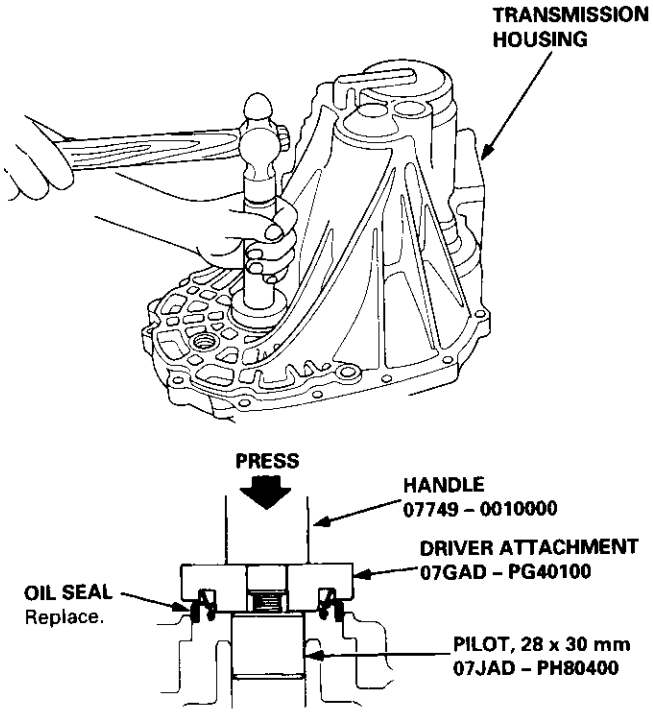
Transmission Housing:

1. Remove the oil seal from the transmission housing.



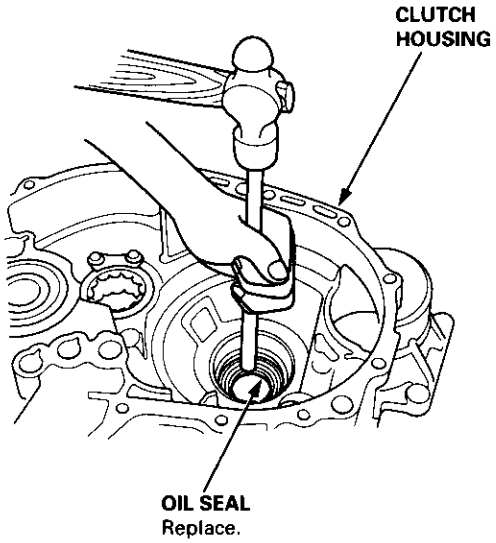
2. Install the new oil seal into the transmission housing using the special tools.

   NOTE: Install oil seal up to ±0.5 mm (±0.02 in) from transmission housing end surface.



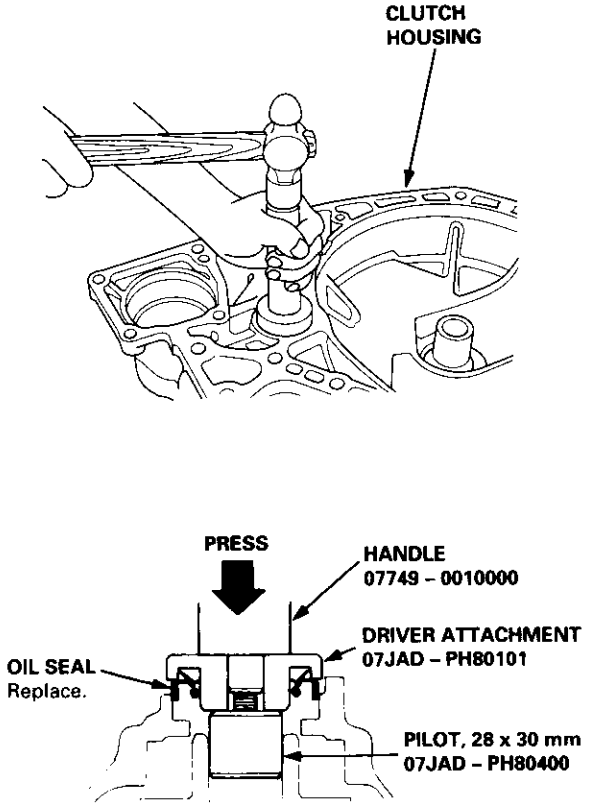
Clutch Housing:

1. Remove the oil seal from the clutch housing.



2. Install the new oil seal into the clutch housing using the special tools.

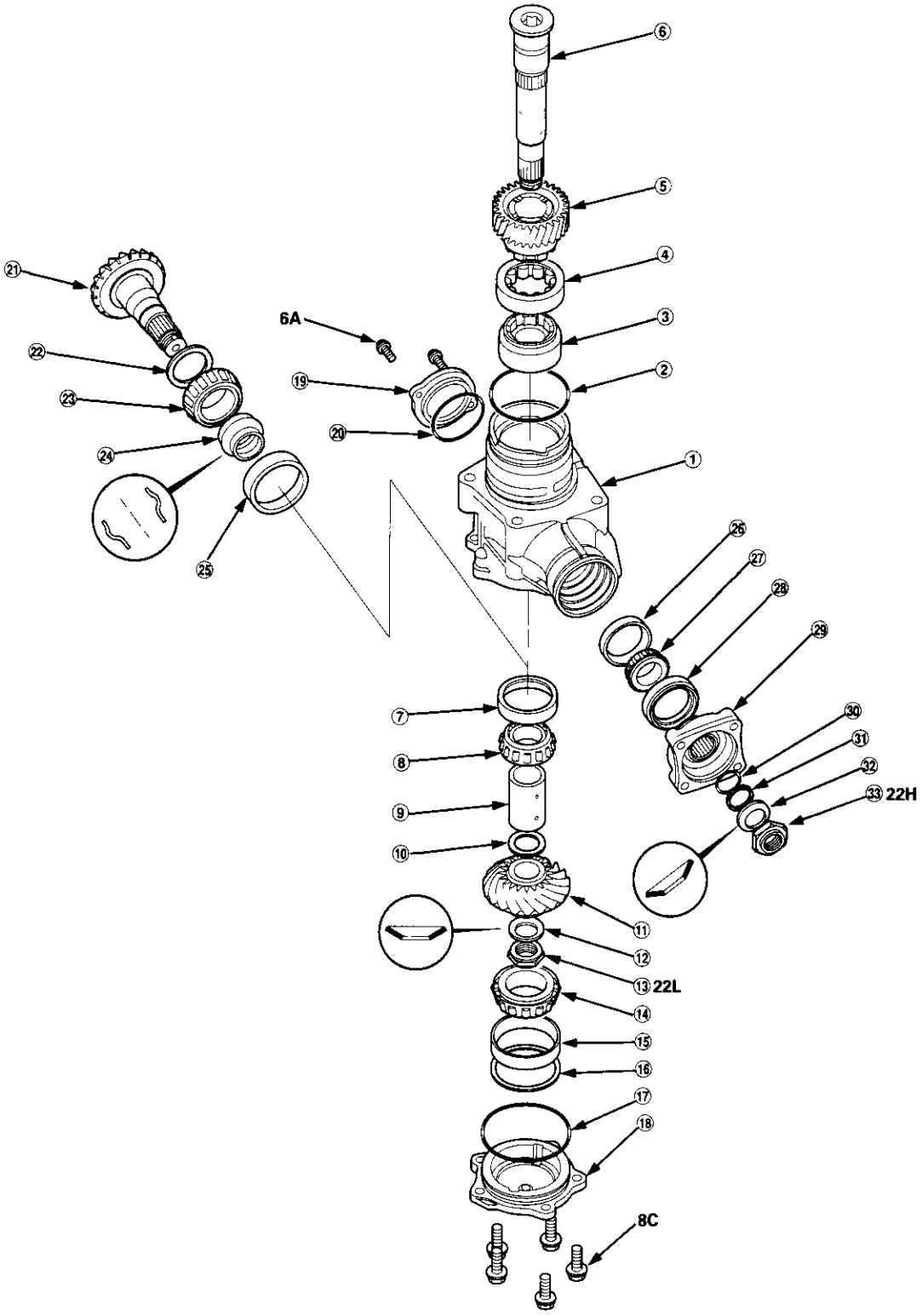
   NOTE: Install oil seal up to ±0.5 mm (±0.02 in) from transmission housing end surface.



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Transfer Assembly

Illustrated Index



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① **TRANSFER HOUSING**
② **O-RING** Replace.
③ **DAMPER HUB**
④ **NEEDLE BEARING**
⑤ **TRANSFER DRIVEN GEAR**
⑥ **TRANSFER SHAFT**
⑦ **TAPERED ROLLER BEARING OUTER RACE**
⑧ **TAPERED ROLLER BEARING**
⑨ **TRANSFER SHAFT COLLAR**
⑩ **THRUST SHIM, 25 mm** Selective part
⑪ **TRANSFER DRIVE GEAR (HYPOID GEAR)**
⑫ **CONICAL SPRING WASHER** Replace.
⑬ **TRANSFER SHAFT LOCKNUT, 22 x 1.25 mm** Left-hand threads, replace.
⑭ **TAPERED ROLLER BEARING**
⑮ **TAPERED ROLLER BEARING OUTER RACE**
⑯ **THRUST SHIM, 68 mm** Selective part
⑰ **O-RING** Replace.
⑱ **TRANSFER COVER A**
⑲ **TRANSFER COVER B**
⑳ **O-RING** Replace.
㉑ **TRANSFER DRIVEN GEAR SHAFT (HYPOID GEAR)**
㉒ **THRUST SHIM, 35 mm** Selective part
㉓ **TAPERED ROLLER BEARING**
㉔ **TRANSFER SPACER** Replace.
㉕ **TAPERED ROLLER BEARING OUTER RACE**
㉖ **TAPERED ROLLER BEARING OUTER RACE**
㉗ **TAPERED ROLLER BEARING**
㉘ **OIL SEAL** Replace.
㉙ **COMPANION FLANGE**
㉚ **O-RING** Replace.
㉛ **BACK-UP RING**
㉜ **CONICAL SPRING WASHER** Replace.
㉝ **TRANSFER DRIVEN GEAR SHAFT LOCKNUT, 22 x 1.25 mm** Replace.

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
8C	24 N·m (2.4 kgf·m, 17 lbf·ft)	8 x 1.25 mm	
22L	118 N·m (12.0 kgf·m, 86.8 lbf·ft)	22 x 1.25 mm	Transfer shaft locknut: Left-hand threads
22H	132 – 216 N·m (13.5 – 22.0 kgf·m, 97.6 – 159 lbf·ft)	22 x 1.25 mm	Transfer driven gear shaft locknut Tightening torque: depending on Total Starting Torque value

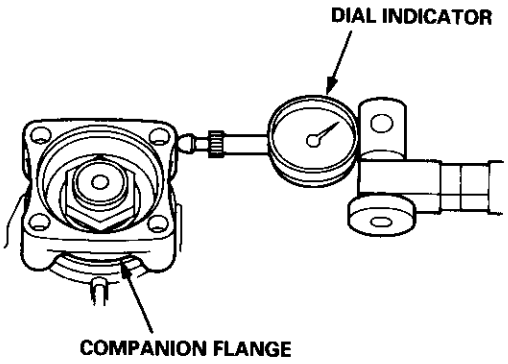
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Inspection

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

Transfer Gear (Hypoid gear) Backlash Measurement

1. Set a dial indicator on the companion flange as shown.



2. Measure the transfer gear backlash.

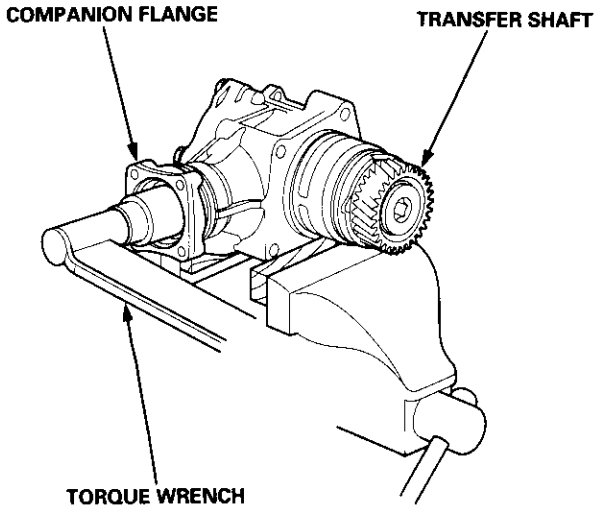
   STANDARD: 0.06 – 0.16 mm (0.002 – 0.006 in)

Total Starting Torque Measurement

3. Rotate the companion flange several times to seat the tapered roller bearing.

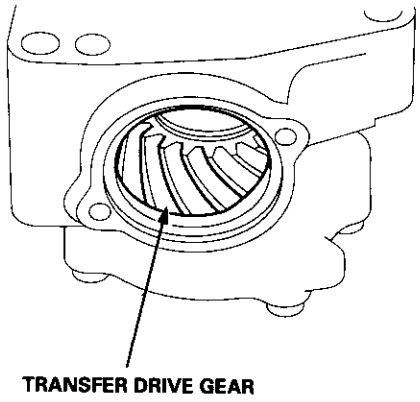
4. Measure the starting torque (companion flange side) using a torque wrench.

   STANDARD:
   2.68 – 3.47 N·m
   (27.3 – 35.4 kgf·cm, 23.7 – 30.7 lbf·in)



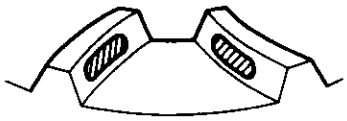
Transfer Gear (Hypoid gear) Tooth Contact Inspection

5. Remove transfer cover B, then apply Prussian Blue to both sides of the transfer gear teeth lightly and evenly.



6. Rotate the companion flange in both directions until the transfer gear rotates one full turn in both directions.

7. Check the transfer gear tooth contact pattern.

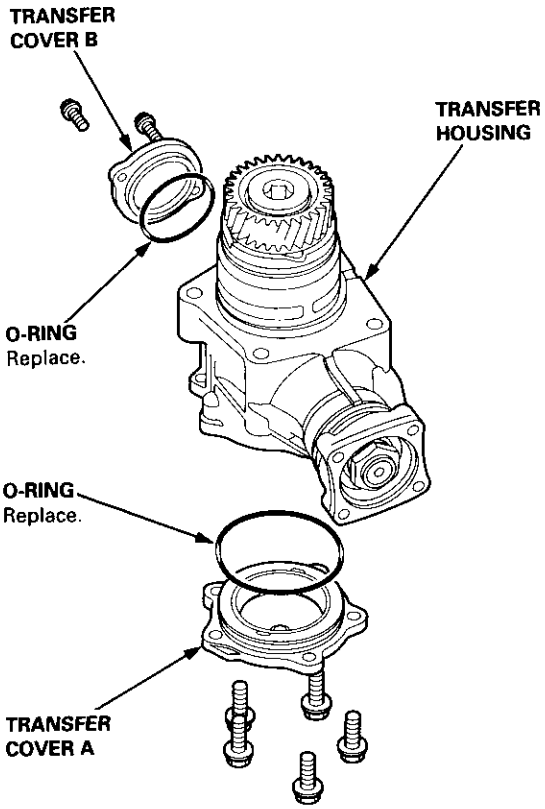


8. If the measurements or the tooth contact pattern are not within the standard, disassemble the transfer assembly, replace worn or damaged parts, and reassemble it.

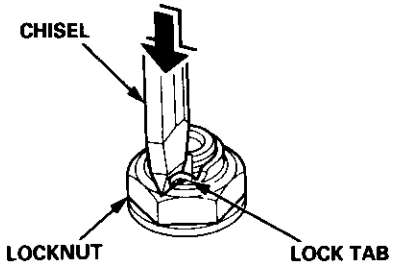
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Disassembly

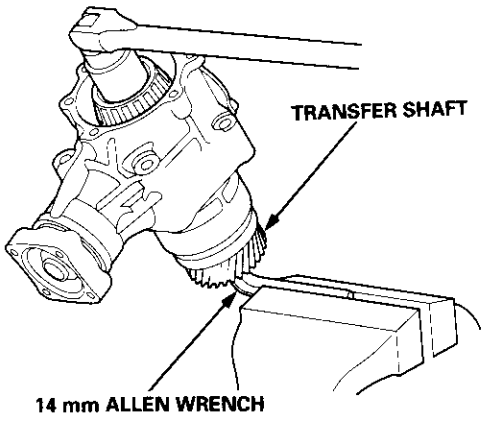
1. Remove the transfer covers A and B.



2. Cut the lock tabs of the locknut using a chisel. Keep all of the chiseled particles out of the transfer housing.

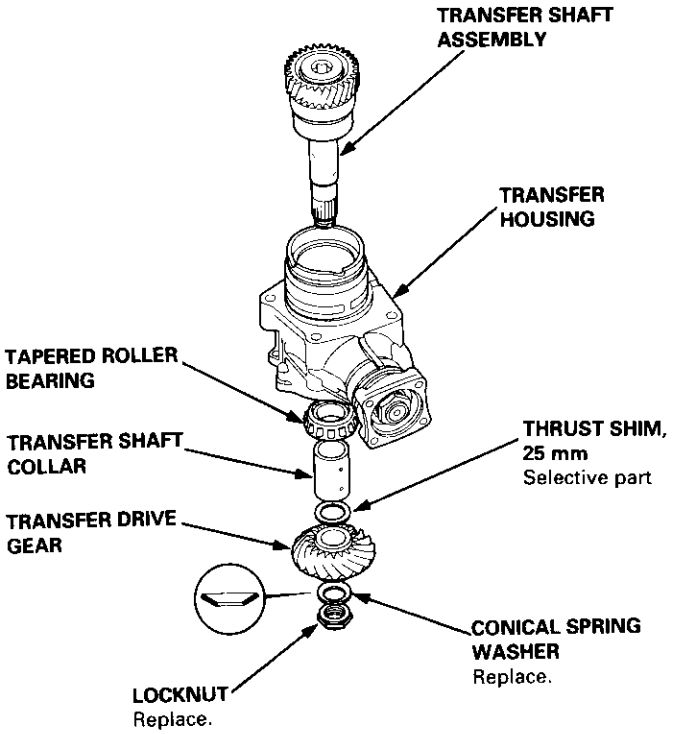


3. Hold the transfer shaft with a 14 mm Allen wrench clamped in a bench vise.



4. Loosen the transfer shaft locknut. The transfer shaft locknut has left-hand threads.

5. Remove the transfer shaft assembly, transfer drive gear, 25 mm thrust shim, transfer shaft collar, and tapered roller bearing from the transfer housing.

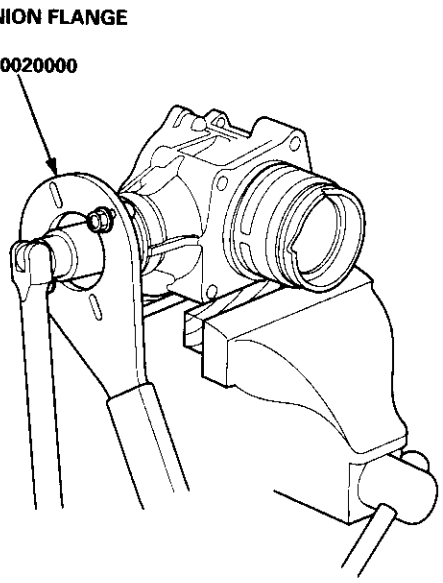


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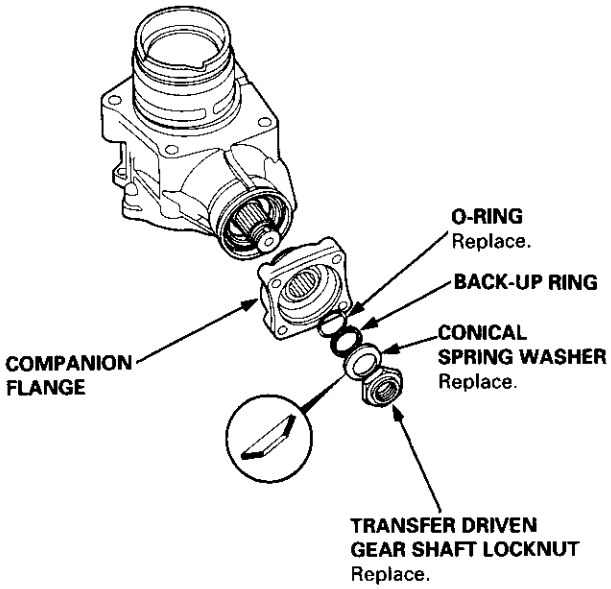
Disassembly (cont'd)

6. Secure the transfer housing in a bench vise with soft jaws.

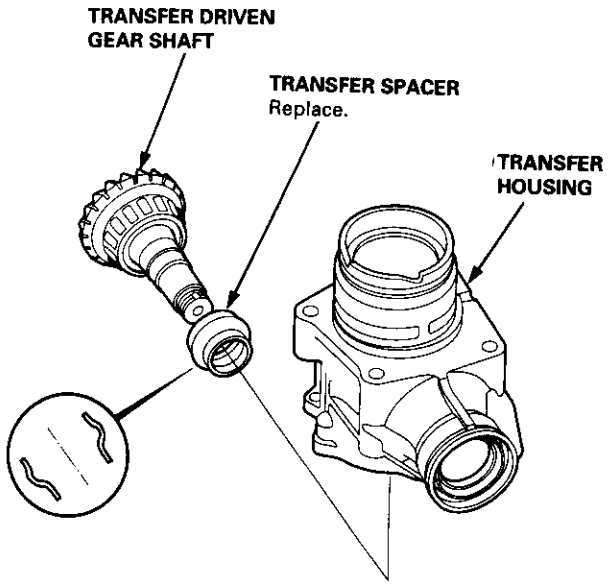


7. Install the special tool on the companion flange, then loosen the transfer driven gear shaft locknut.

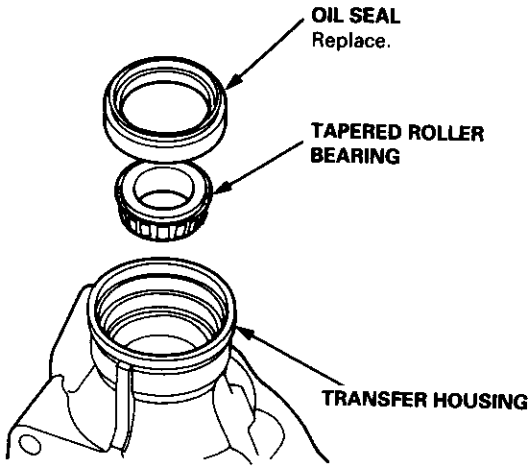
8. Remove the transfer driven gear shaft locknut, conical spring washer, back-up ring, O-ring, and companion flange.



9. Remove the transfer driven gear shaft, then remove the transfer spacer from the transfer driven gear shaft.



10. Remove the oil seal and the tapered roller bearing from the transfer housing.

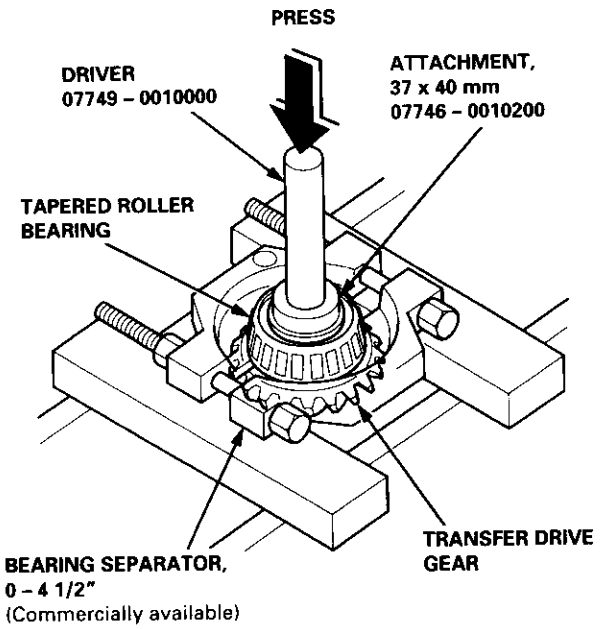


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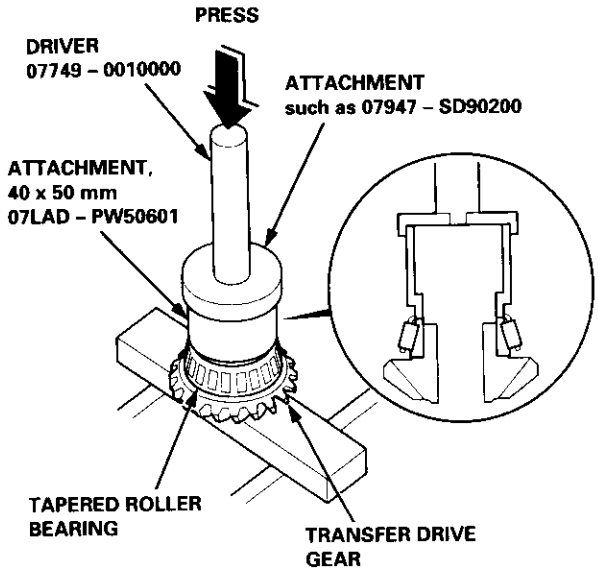
Transfer Drive Gear Bearing Replacement

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing from the transfer drive gear using the special tools and a press.



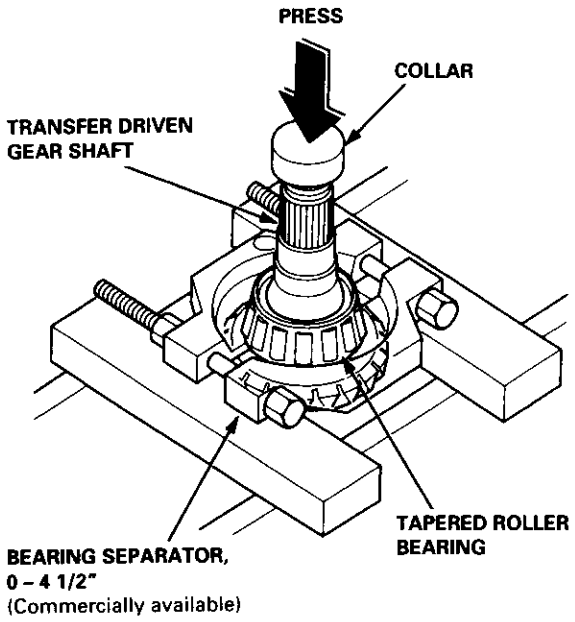
2. Install the new tapered roller bearing in the transfer drive gear using the special tools and a press.



Transfer Driven Gear Shaft Bearing Replacement

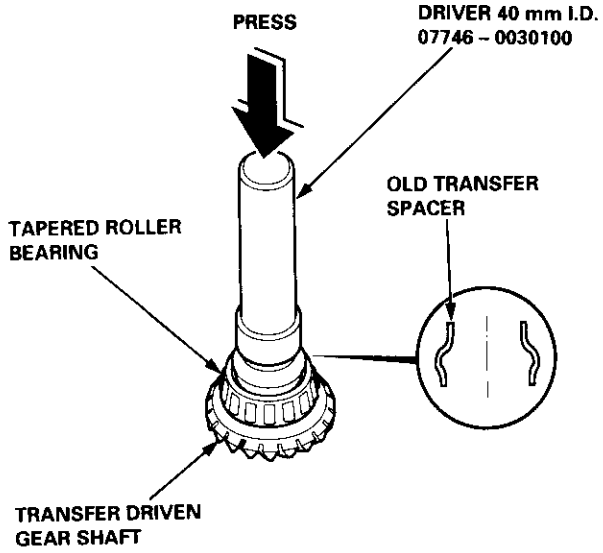
NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing from the transfer driven gear shaft using a press and a collar.



2. Install the 35 mm thrust shim on the transfer driven gear shaft.
3. Install the new tapered roller bearing on the transfer driven gear shaft using the special tools and a press.

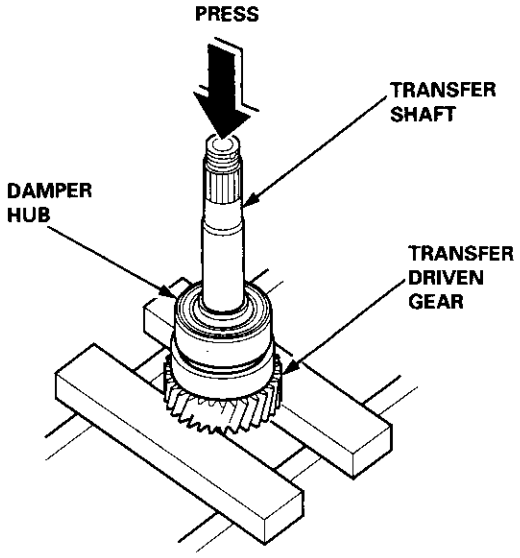
   NOTE: Use old transfer spacer for bearing installation, then discard it.



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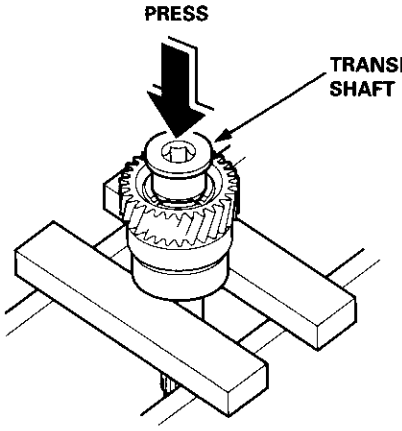
Transfer Shaft Disassembly/ Reassembly

1. Support the transfer driven gear on steel blocks, then press the transfer shaft out of damper hub.



2. Align the damper hub grooves and transfer driven gear teeth, and reassemble the damper hub, needle bearing, and transfer driven gear.

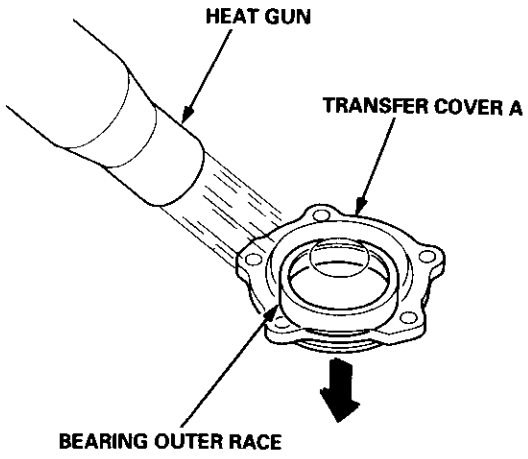
3. Install the transfer shaft using a press.



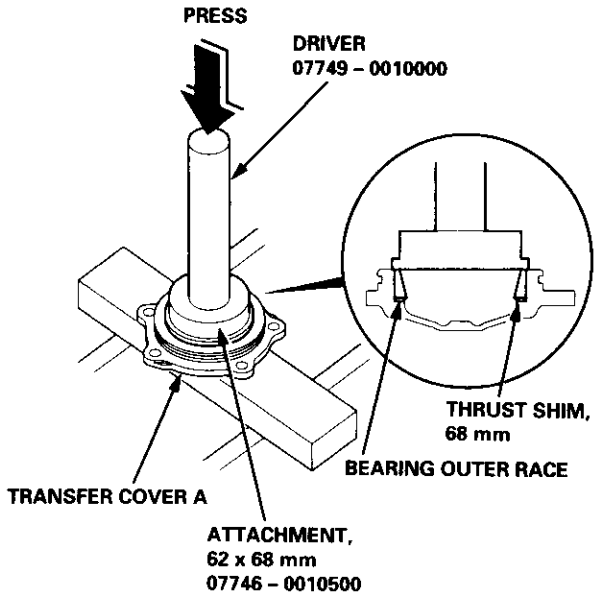
Transfer Cover A Bearing Outer Race Replacement

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing outer race from transfer cover A by heating the cover to almost 212°F (100°C) using a heat gun. Do not heat the cover over 212°F (100°C).



2. Install the 68 mm thrust shim in transfer cover A.



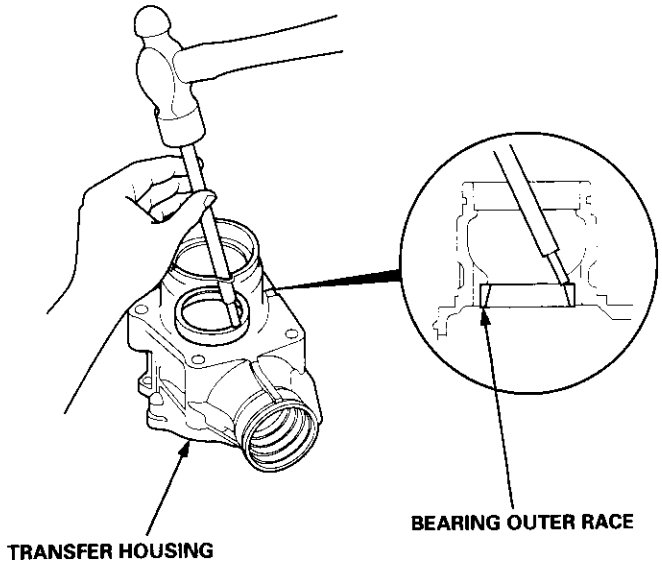
3. Install the tapered roller bearing outer race using the special tools and a press.

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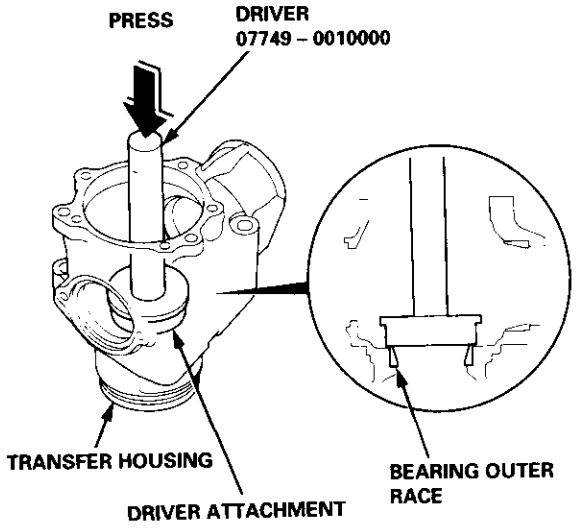
Transfer Housing Bearing Outer Race Replacement

NOTE: Coat all parts with MTF during reassembly.

1. Remove the tapered roller bearing outer race from the transfer housing.

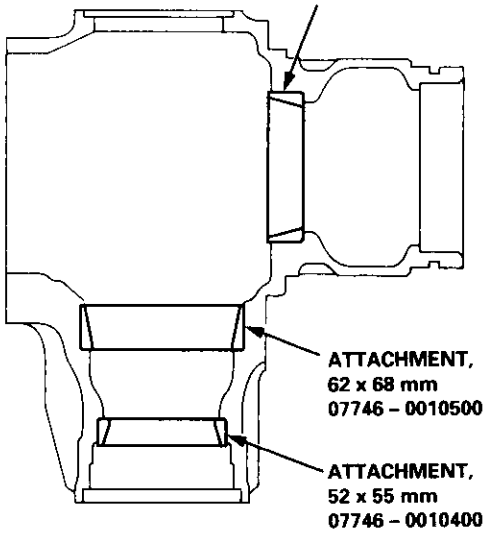


2. Install the new tapered roller bearing outer race using the special tools and a press.



Bearing Outer Race Locations and Special Tool Applications

TRANSFER HOUSING
Sectional View



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Reassembly

Note these items during reassembly:

- While reassembling the transfer assembly:
  - — Check and adjust the transfer gear tooth contact.
  - — Measure and adjust the transfer gear backlash.
  - — Check and adjust the tapered roller bearing starting torque.
- Coat all parts with MTF during reassembly.
- Replace the tapered roller bearing and the bearing outer race as a set if either part is replaced.
- Replace the transfer drive gear and the transfer driven gear shaft as a set if either part is replaced.

Outline of Assembly

1. Select the 35 mm thrust shim.
   Perform this procedure if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.

2. Preassemble the parts to check and adjust transfer gear backlash and transfer gear tooth contact.

3. Disassemble the parts, then assemble the transfer driven gear shaft and its related parts.

4. Measure and adjust the starting torque of the transfer driven gear shaft tapered roller bearing.

5. Assemble the transfer shaft and its related parts.

6. Measure and adjust the total starting torque.

35 mm Thrust Shim Selection

1. Select the 35 mm thrust shim if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.

   Calculate the thickness of the 35 mm thrust shim using the formula below.

   FORMULA: $\frac{A}{100} - \frac{B}{100} + C = X$

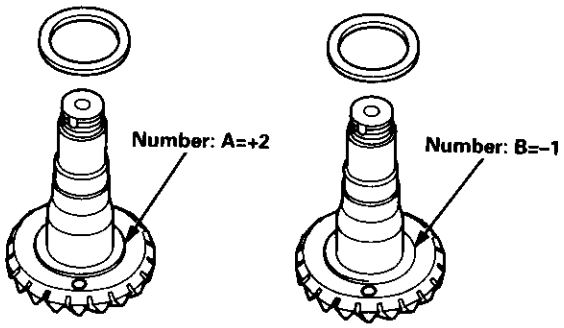
   A: Number on the existing transfer driven gear shaft
   B: Number on the replacement transfer driven gear shaft
   C: Thickness of the existing 35 mm thrust shim
   X: Thickness needed for the replacement 35 mm thrust shim

   NOTE: The number on the transfer driven gear shaft is shown in 1/100 mm.

EXAMPLE:

C: EXISTING 35 mm THRUST SHIM Thickness: C=1.05 mm

X: REPLACEMENT 35 mm THRUST SHIM Thickness: X=?? mm



A: EXISTING TRANSFER DRIVEN GEAR SHAFT

B: REPLACEMENT TRANSFER DRIVEN GEAR SHAFT

$$X = \frac{A}{100} - \frac{B}{100} + C$$
$$= \frac{2}{100} - \frac{-1}{100} + 1.05$$
$$= 0.02 + 0.01 + 1.05$$
$$= 1.08 \text{ (mm)}$$

Select 35 mm thrust shim thickness of 1.08 mm (0.043 in). If the tapered roller bearing on the transfer driven gear shaft is replaced.

Measure the thickness of the replacement bearing and the existing bearing, and calculate the difference of the bearing thickness. Adjust the thickness of the existing 35 mm thrust shim by the amount of difference in bearing thickness, and select the replacement 35 mm thrust shim. Do not use more than one 35 mm thrust shim to adjust the transfer gear backlash.

THRUST SHIM, 35 mm

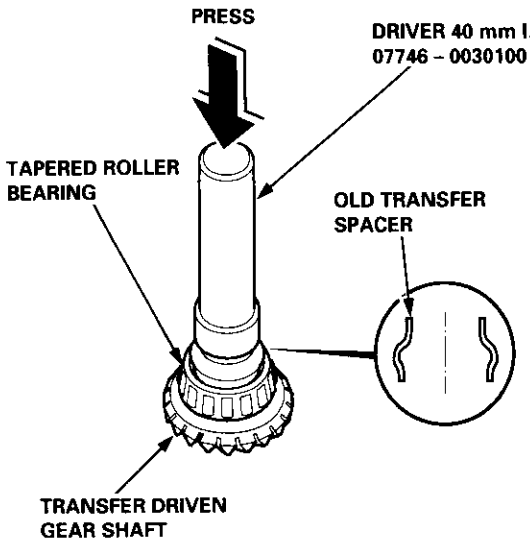
Shim No.	Part Number	Thickness
A	41361 – PS3 – 000	0.72 mm (0.028 in)
B	41362 – PS3 – 000	0.75 mm (0.030 in)
C	41363 – PS3 – 000	0.78 mm (0.031 in)
D	41364 – PS3 – 000	0.81 mm (0.032 in)
E	41365 – PS3 – 000	0.84 mm (0.033 in)
F	41366 – PS3 – 000	0.87 mm (0.034 in)
G	41367 – PS3 – 000	0.90 mm (0.035 in)
H	41368 – PS3 – 000	0.93 mm (0.037 in)
I	41369 – PS3 – 000	0.96 mm (0.038 in)
J	41370 – PS3 – 000	0.99 mm (0.039 in)
K	41371 – PS3 – 000	1.02 mm (0.040 in)
L	41372 – PS3 – 000	1.05 mm (0.041 in)
M	41373 – PS3 – 000	1.08 mm (0.043 in)
N	41374 – PS3 – 000	1.11 mm (0.044 in)

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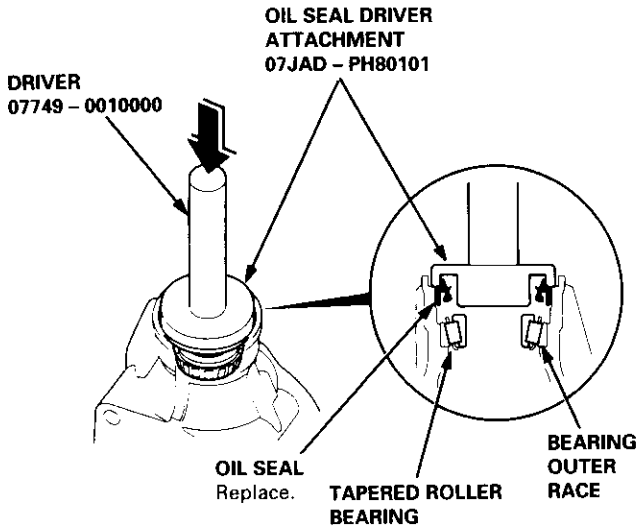
Transfer Gear Backlash Inspection and Transfer Gear Tooth Contact Inspection

2. Install the 35 mm thrust shim on the transfer driven gear shaft, then install the tapered roller bearing using the special tools and a press.

   NOTE: Use old transfer spacer for bearing installation, then discard it.

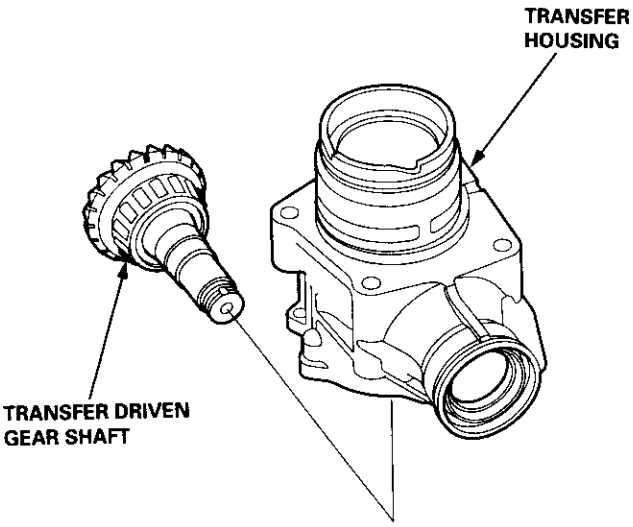


3. Install the bearing outer race, then the tapered bearing on the companion flange side of the transfer housing.

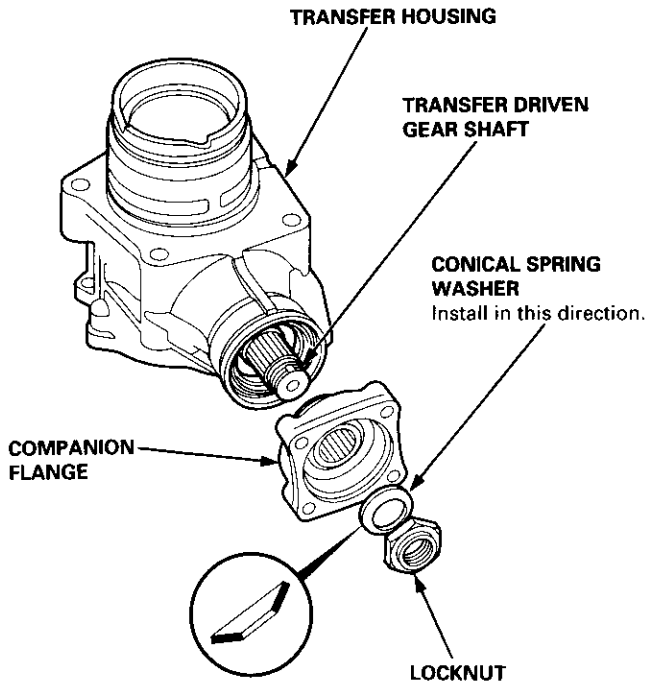


4. Install the new oil seal on the transfer housing using the special tools.

5. Install the transfer driven gear shaft in the transfer housing. Do not install the transfer spacer on the transfer driven gear shaft in this step.



6. Install the companion flange, conical spring washer, and locknut on the transfer driven gear shaft. Do not install the O-ring and the back-up ring on the transfer gear shaft in this step.

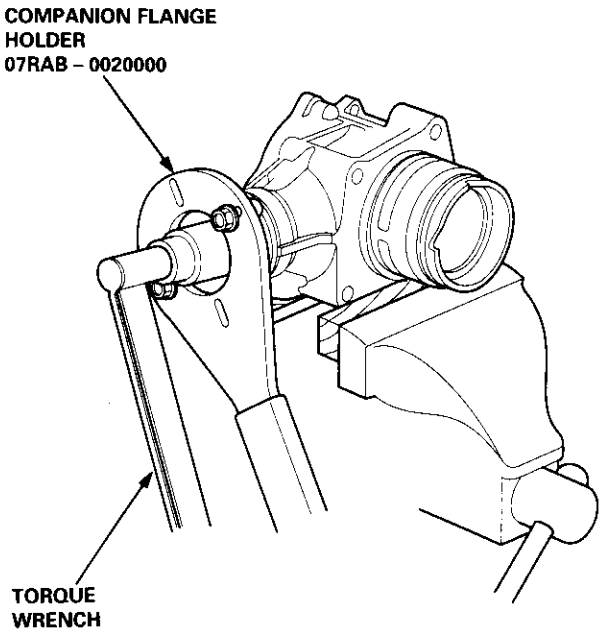


(cont'd)

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Reassembly (cont'd)

7. Secure the transfer housing in a bench vise with soft jaws, then install the special tool on the companion flange. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.



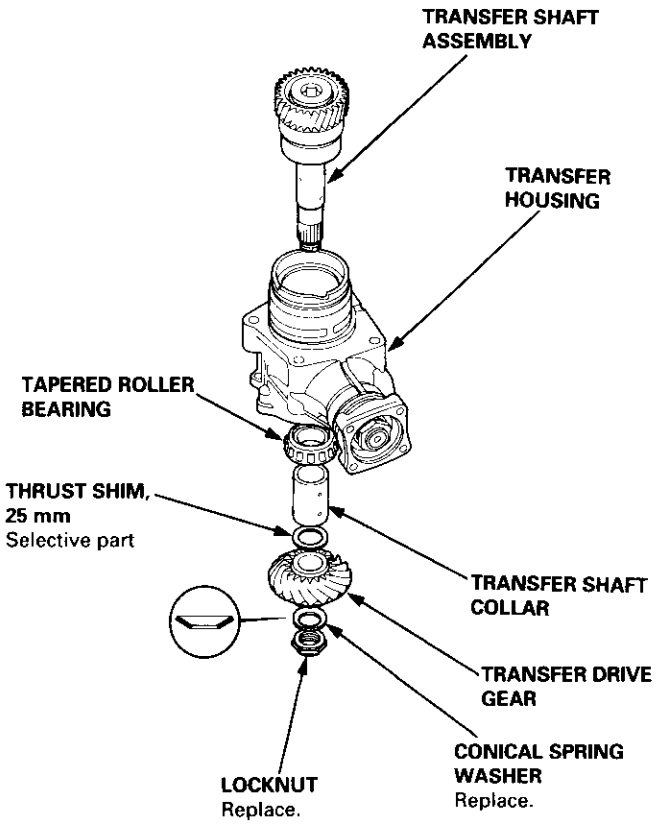
8. Tighten the locknut while measuring the starting torque so the starting torque is within 0.98 – 1.39 N·m (10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in).

   NOTE:
   - Coat the threads of the locknut, and the shaft with MTF before installing the locknut.
   - Do not stake the locknut in this step.

   STARTING TORQUE:
   0.98 – 1.39 N·m
   (10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in)

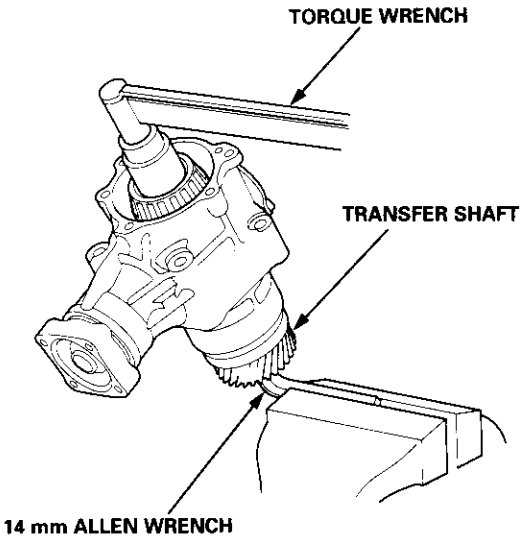
9. Install the transfer shaft assembly in the transfer housing, then install the tapered roller bearing, transfer shaft collar, 25 mm thrust shim, transfer drive gear, conical spring washer, and locknut on the transfer shaft.

   NOTE:
   - Coat the threads of the locknut, and the shaft with MTF before installing the locknut.
   - Do not stake the locknut in this step.



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10. Hold the transfer shaft with a 14 mm Allen wrench clamped in a bench vise.

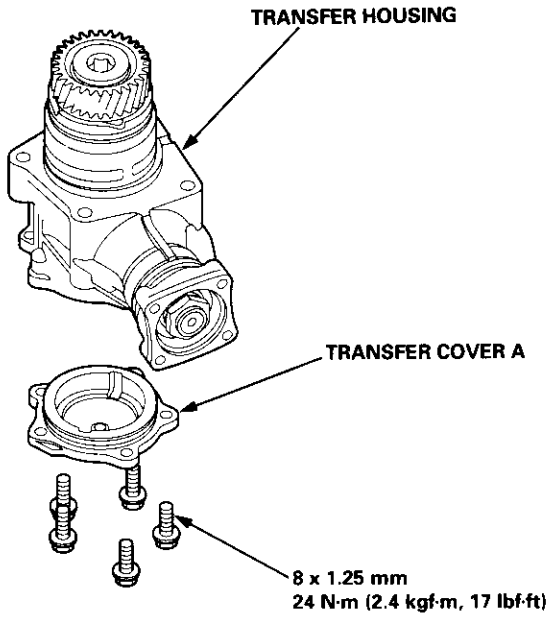


11. Tighten the transfer shaft locknut.

NOTE:
- The transfer shaft locknut has left-hand threads.
- Do not stake the locknut in this step.

TORQUE: 118 N·m (12.0 kgf·m, 86.8 lbf·ft)

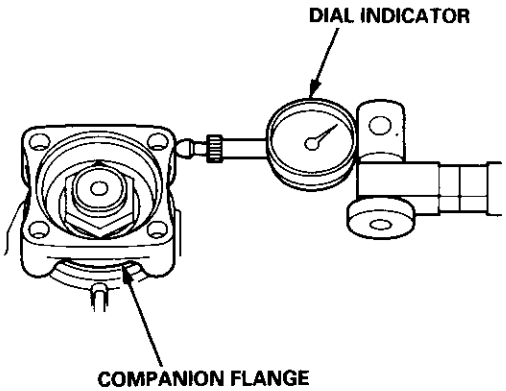
12. Temporarily install the transfer cover A without the O-ring.



13. Rotate the companion flange several times to seat the tapered roller bearing.

14. Set a dial indicator on the companion flange, then measure the transfer gear backlash.

STANDARD: 0.06 – 0.16 mm (0.002 – 0.006 in)



15. If the measurement is not within the standard, remove the transfer shaft locknut and replace the 25 mm thrust shim. Select and install a new 25 mm thrust shim, then recheck the measurement. Do not use more than one 25 mm thrust shim to adjust the transfer gear backlash.

THRUST SHIM, 25 mm

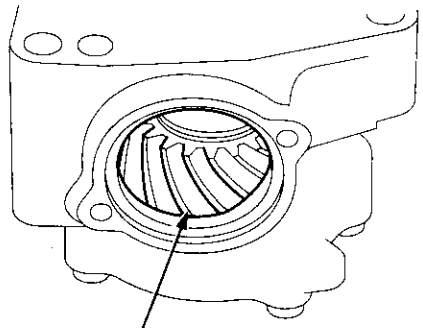
Shim No.	Part Number	Thickness
1	29411 – P1C – 000	1.70 mm (0.067 in)
2	29412 – P1C – 000	1.73 mm (0.068 in)
3	29413 – P1C – 000	1.76 mm (0.069 in)
4	29414 – P1C – 000	1.79 mm (0.070 in)
5	29415 – P1C – 000	1.82 mm (0.072 in)
6	29416 – P1C – 000	1.85 mm (0.073 in)
7	29417 – P1C – 000	1.88 mm (0.074 in)
8	29418 – P1C – 000	1.91 mm (0.075 in)
9	29419 – P1C – 000	1.94 mm (0.076 in)
10	29420 – P1C – 000	1.97 mm (0.078 in)
11	29421 – P1C – 000	2.00 mm (0.079 in)
12	29422 – P1C – 000	2.03 mm (0.080 in)
13	29423 – P1C – 000	2.06 mm (0.081 in)
14	29424 – P1C – 000	2.09 mm (0.082 in)
15	29425 – P1C – 000	2.12 mm (0.083 in)
16	29426 – P1C – 000	2.15 mm (0.085 in)
17	29427 – P1C – 000	2.18 mm (0.086 in)
18	29428 – P1C – 000	2.21 mm (0.087 in)
19	29429 – P1C – 000	2.24 mm (0.088 in)

(cont'd)

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Reassembly (cont'd)

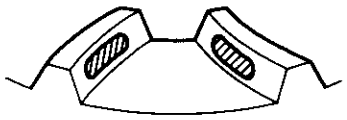
16. Apply Prussian Blue to both sides of the transfer gear teeth lightly and evenly.



17. Rotate the companion flange in both directions until the transfer gear rotates one full turn in both directions.

18. Check the transfer gear tooth contact pattern.

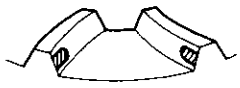
CORRECT TOOTH CONTACT PATTERN



INCORRECT TOOTH CONTACT PATTERN



TOE CONTACT



HEEL CONTACT



FLANK CONTACT



FACE CONTACT

19. If the transfer gear tooth contact is incorrect, adjust the transfer gear tooth contact with a 35 mm or 25 mm thrust shim.

NOTE:
- To select a 35 mm thrust shim, refer to page 13-52.
- Do not use more than one 35 mm shim to adjust the transfer gear tooth contact.
- To select the 25 mm thrust shim, refer to page 13-55.
- Do not use more than one 25 mm shim to adjust the transfer gear tooth contact.

- **Toe Contact**
  Use a thicker 35 mm thrust shim to move the transfer driven gear shaft toward the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear away from the transfer driven gear shaft to adjust the transfer gear backlash as follows:
  - Increase the thickness of the 25 mm thrust shim.
  - Reduce the thickness of the 68 mm thrust shim by the amount of increased thickness of the 25 mm thrust shim.

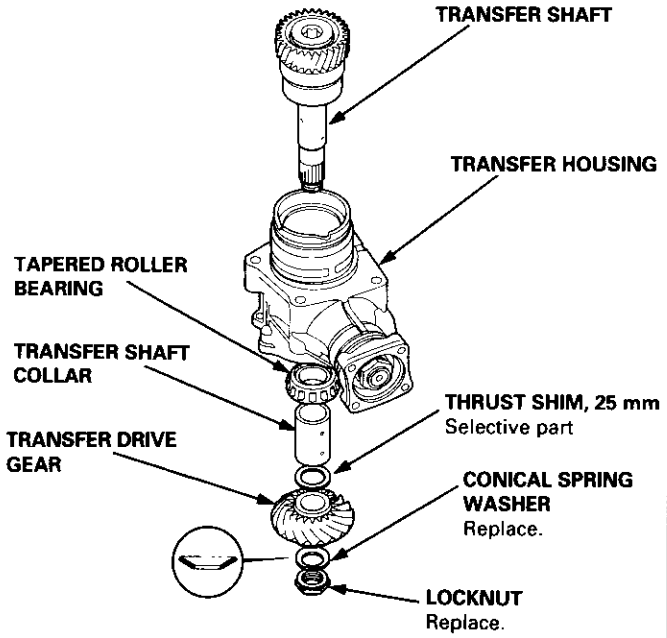
- **Heel Contact**
  Use a thinner 35 mm thrust shim to move the transfer driven gear shaft away from the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear toward the transfer driven gear shaft to adjust the transfer gear backlash as follows:
  - Reduce the thickness of the 25 mm thrust shim.
  - Increase the thickness of the 68 mm thrust shim by the amount of reduced thickness of the 25 mm thrust shim.

- **Flank Contact**
  Use a thinner thrust shim to move the transfer drive gear toward the transfer driven gear shaft. Flank contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Heel Contact.

- **Face Contact**
  Use a thicker thrust shim to move the transfer drive gear away from the transfer driven gear shaft. Face contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Toe Contact.

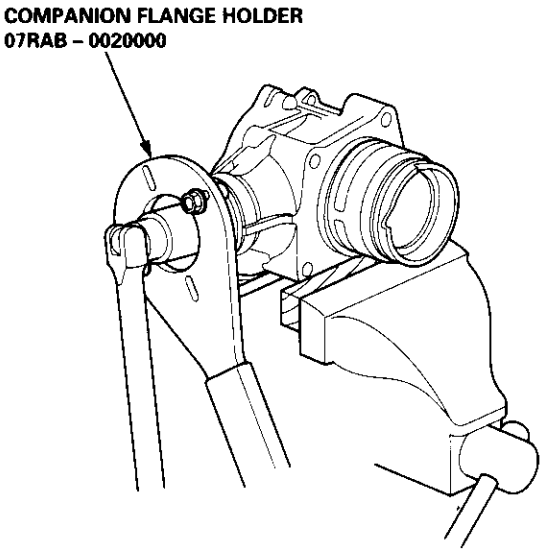
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20. Remove the parts on the transfer shaft, and remove the transfer shaft from the transfer housing.



Transfer Driven Gear Shaft Starting Torque Inspection and Adjustment

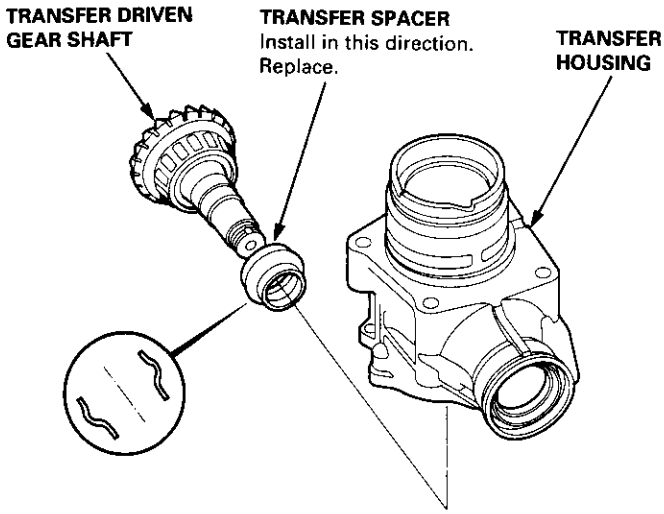
21. Secure the transfer housing in a bench vise with soft jaws.



22. Install the special tool on the companion flange, then remove the transfer driven gear shaft locknut and the conical spring washer.

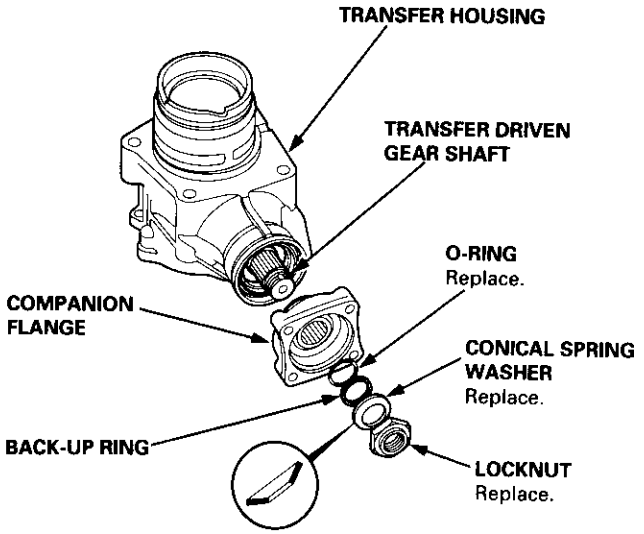
23. Remove the transfer driven gear shaft and the companion flange.

24. Install the new transfer spacer on the transfer driven gear shaft, then install them in the transfer housing.



25. Install the companion flange, O-ring, back-up ring, conical spring washer and locknut on the transfer driven gear shaft.

NOTE:
- Coat the threads of the locknut, O-ring and transfer shaft with MTF before installing the locknut.
- Install the conical spring washer in the direction shown.

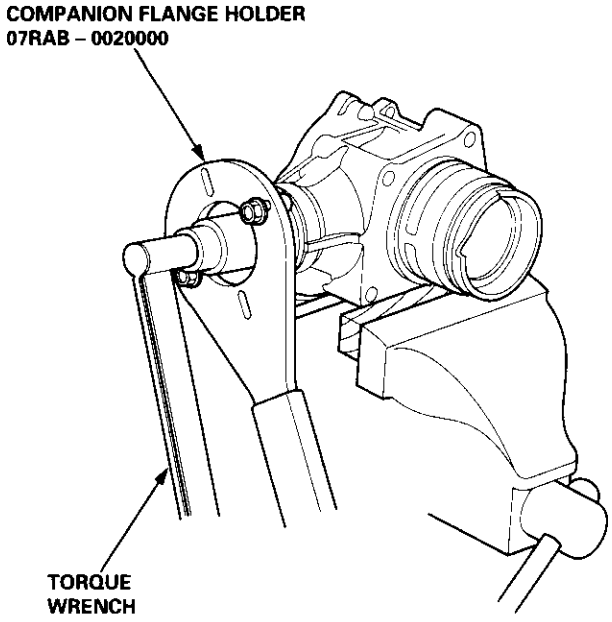


(cont'd)

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Reassembly (cont'd)

26. Secure the transfer housing in a bench vise with soft jaws.

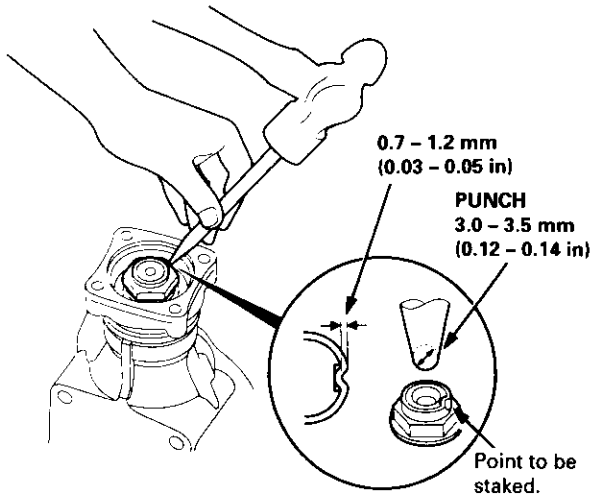


27. Install the special tool on the companion flange, then tighten the transfer driven gear shaft locknut while measuring the starting torque of the transfer driven gear shaft.

STARTING TORQUE:
0.98 – 1.39 N·m
(10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in)
TIGHTENING TORQUE:
132 – 216 N·m
(13.5 – 22.0 kgf·m, 97.6 – 159 lbf·ft)

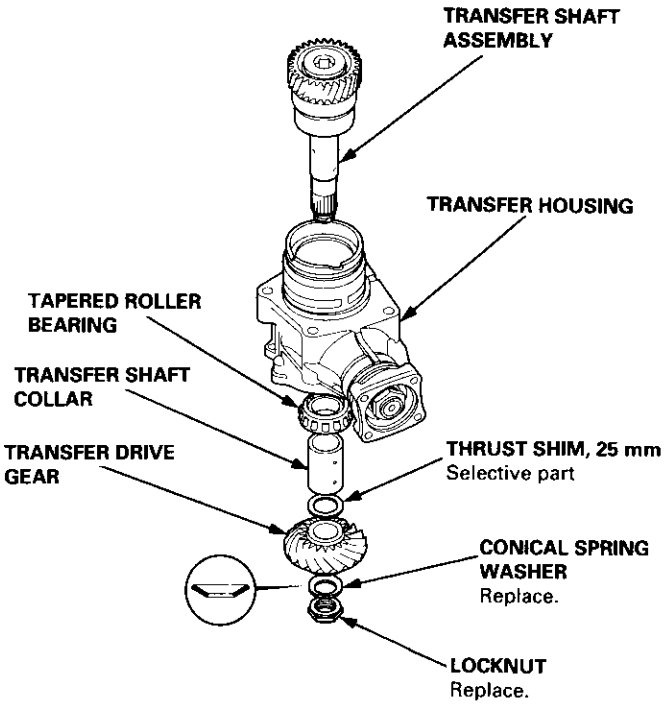
NOTE:
- Rotate the companion flange several times to seat the tapered roller bearing, then measure the starting torque.
- If the starting torque exceeds 1.39 N·m (14.2 kgf·cm, 12.3 lbf·in), replace the transfer spacer and reassemble the parts. Do not adjust the torque with the locknut loose.
- If the tightening torque exceeds 216 N·m (22.0 kgf·m, 159 lbf·ft), replace the transfer spacer and reassemble the parts.
- Write down the measurement of the starting torque: it is used to measure the total starting torque.

28. Stake the locknut into the transfer driven gear shaft using a 3.5 mm punch.



29. Install the transfer shaft assembly in the transfer housing, then install the tapered roller bearing, transfer shaft collar, 25 mm thrust shim, transfer drive gear, conical spring washer, and transfer shaft locknut on the transfer shaft.

NOTE:
- Coat the threads of the locknut and transfer shaft with MTF before installing the locknut.
- Install the conical spring washer in the direction shown.

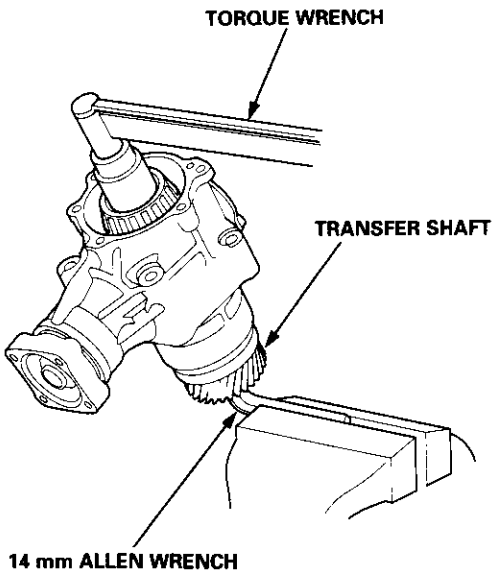


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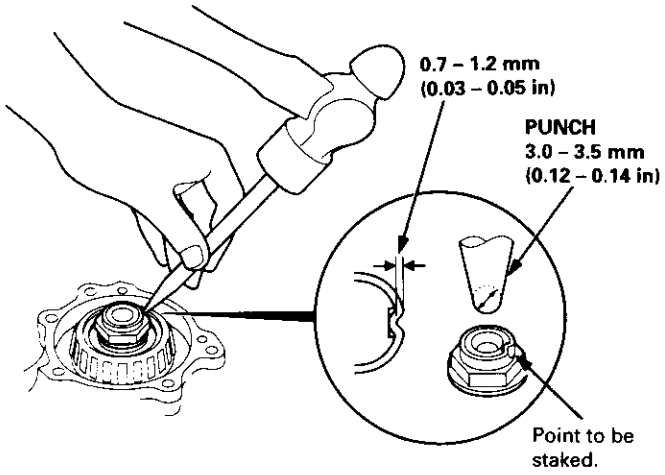
30. Hold the transfer shaft with a 14 mm Allen wrench clamped in a bench vise.

NOTE: The locknut has left-hand threads.

TORQUE: 118 N·m (12.0 kgf·m, 86.8 lbf·ft)

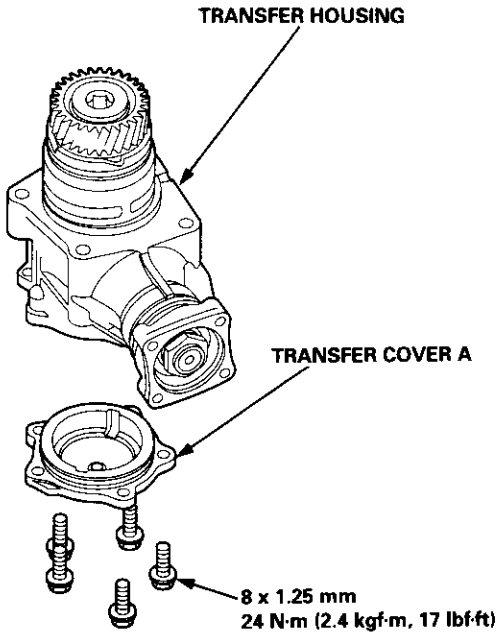


31. Stake the locknut on the transfer shaft using a 3.5 mm punch.

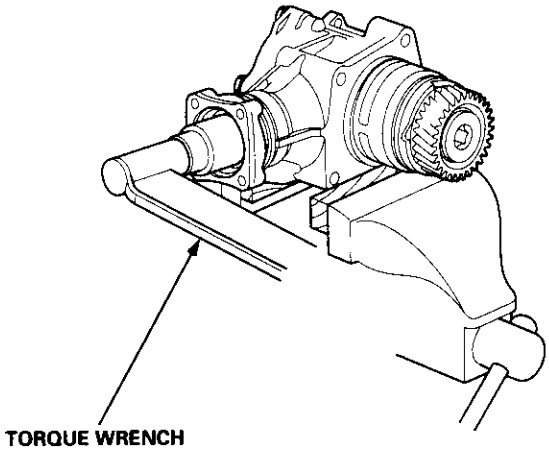


Total Starting Torque Inspection and Adjustment

32. Temporarily install transfer cover A without the O-ring.



33. Secure the transfer housing in a bench vise with soft jaws, then rotate the companion flange several times to fit the tapered roller bearing.



34. Measure the total starting torque.

TOTAL STARTING TORQUE:
1.70 – 2.08 N·m (17.3 – 21.2 kgf·cm, 15.0 – 18.4 lbf·in) + Transfer Driven Gear Shaft Starting Torque Value (wrote down in step 27).

(cont'd)

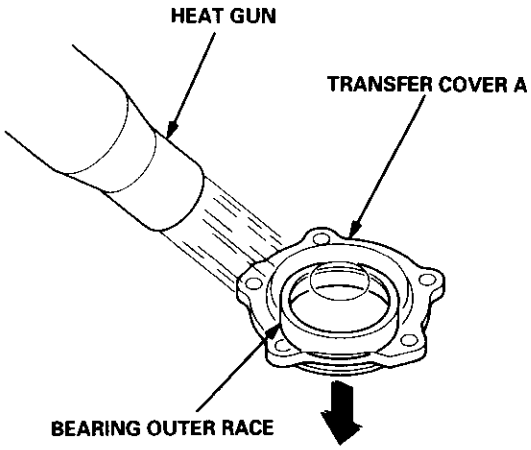
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Reassembly (cont'd)

35. Remove transfer cover A.

36. If the measurement is out of specification, remove the 68 mm thrust shim from transfer cover A by heating the cover to almost 212°F (100°C) using a heat gun. Do not heat the cover higher than 212°F (100°C). Let the cover cool to room temperature before adjusting the starting torque.

    If the measurement is within the specification, go to step 40.



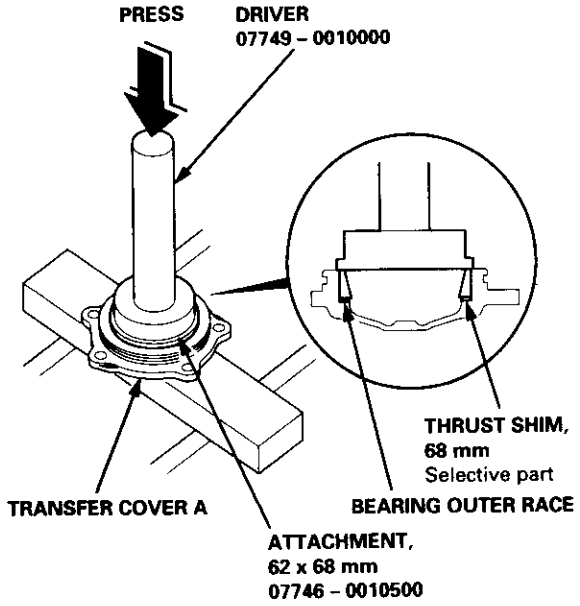
37. Select the 68 mm thrust shim.

THRUST SHIM, 68 mm

Shim No.	Part Number	Thickness
ZV	23974 – P1C – 020	1.41 mm (0.056 in)
ZW	23975 – P1C – 020	1.44 mm (0.057 in)
ZX	23976 – P1C – 020	1.47 mm (0.058 in)
ZY	23977 – P1C – 020	1.50 mm (0.059 in)
ZZ	23978 – P1C – 020	1.53 mm (0.060 in)
A	23941 – PW5 – 000	1.56 mm (0.061 in)
B	23942 – PW5 – 000	1.59 mm (0.063 in)
C	23943 – PW5 – 000	1.62 mm (0.064 in)
D	23944 – PW5 – 000	1.65 mm (0.065 in)
E	23945 – PW5 – 000	1.68 mm (0.066 in)
F	23946 – PW5 – 000	1.71 mm (0.067 in)
G	23947 – PW5 – 000	1.74 mm (0.069 in)
H	23948 – PW5 – 000	1.77 mm (0.070 in)
I	23949 – PW5 – 000	1.80 mm (0.071 in)
J	23950 – PW5 – 000	1.83 mm (0.072 in)
K	23951 – PW5 – 000	1.86 mm (0.073 in)
L	23952 – PW5 – 000	1.89 mm (0.074 in)
M	23953 – PW5 – 000	1.92 mm (0.076 in)
N	23954 – PW5 – 000	1.95 mm (0.077 in)
O	23955 – PW5 – 000	1.98 mm (0.078 in)
P	23956 – PW5 – 000	2.01 mm (0.079 in)
Q	23957 – PW5 – 000	2.04 mm (0.080 in)
R	23958 – PW5 – 000	2.07 mm (0.081 in)
S	23959 – PW5 – 000	2.10 mm (0.083 in)
T	23960 – PW5 – 000	2.13 mm (0.084 in)
U	23961 – PW5 – 000	2.16 mm (0.085 in)
V	23962 – PW5 – 000	2.19 mm (0.086 in)
W	23963 – PW5 – 000	2.22 mm (0.087 in)
X	23964 – PW5 – 000	2.25 mm (0.089 in)
Y	23965 – PW5 – 000	2.28 mm (0.090 in)
Z	23966 – PW5 – 000	2.31 mm (0.091 in)
AA	23967 – PW5 – 000	2.34 mm (0.092 in)
AB	23968 – PW5 – 000	2.37 mm (0.093 in)
AC	23969 – PW5 – 000	2.40 mm (0.094 in)
AD	23970 – PW5 – 000	2.43 mm (0.096 in)
AZ	23941 – PW8 – 000	2.46 mm (0.097 in)
BZ	23942 – PW8 – 000	2.49 mm (0.098 in)
CZ	23943 – PW8 – 000	2.52 mm (0.099 in)
DZ	23944 – PW8 – 000	2.55 mm (0.100 in)
EZ	23945 – PW8 – 000	2.58 mm (0.102 in)

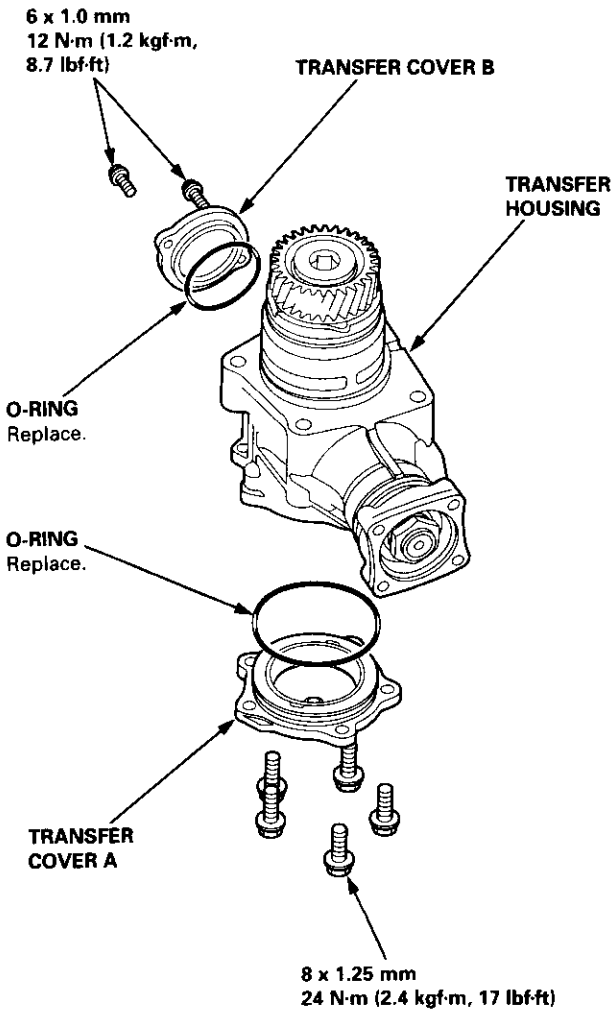
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38. Install the 68 mm thrust shim using the special tools.



39. After replacing the 68 mm thrust shim, recheck and make sure the total starting torque is within the specification.

40. Coat the new O-rings with MTF, install them on transfer covers A and B, then install the covers on the transfer housing.

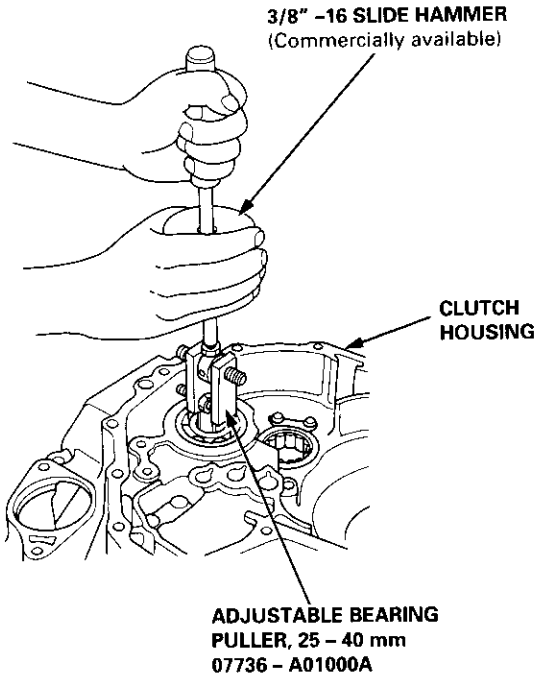


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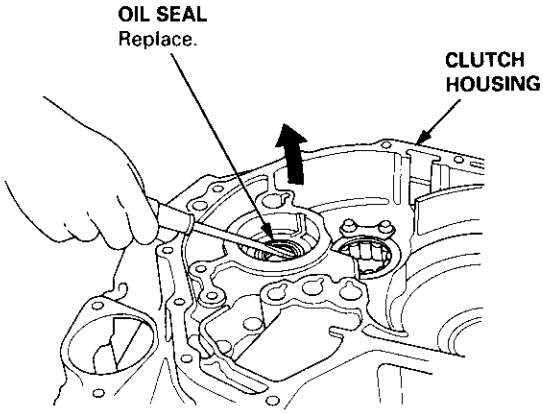
Mainshaft Bearing/Oil Seal

Replacement

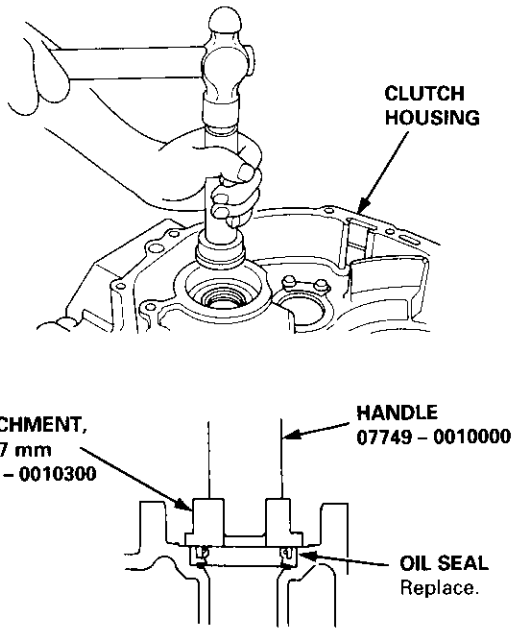
1. Remove the ball bearing using the special tool.



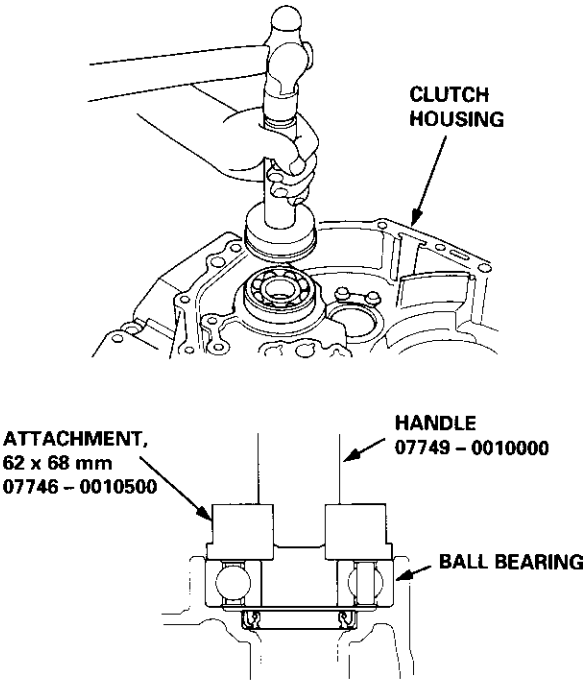
2. Remove the oil seal from the clutch housing.



3. Drive the new oil seal in from the transmission side using the special tools.



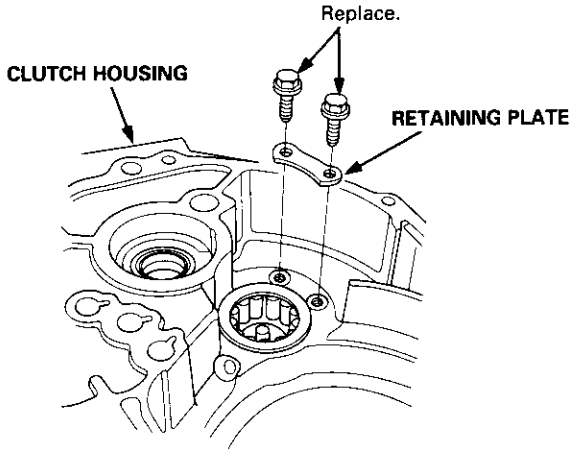
4. Drive the new ball bearing in from the transmission side using the special tools.



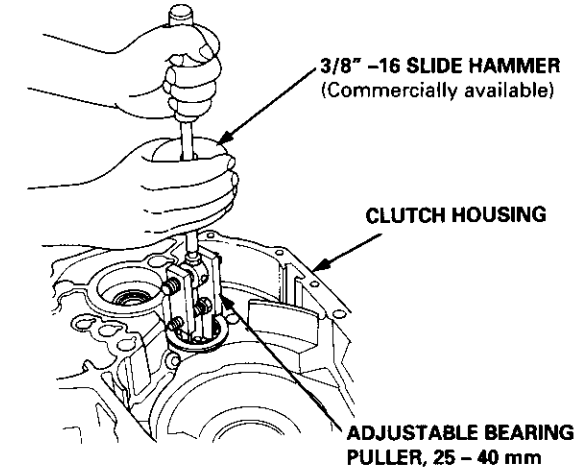
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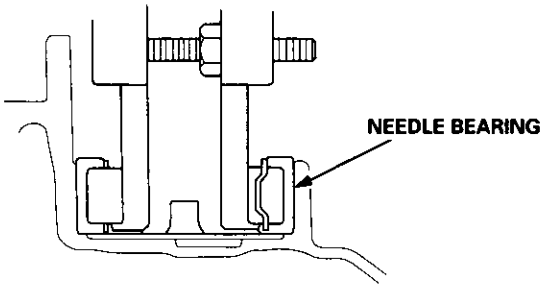
Replacement

1. Remove the retaining plate from the clutch housing.



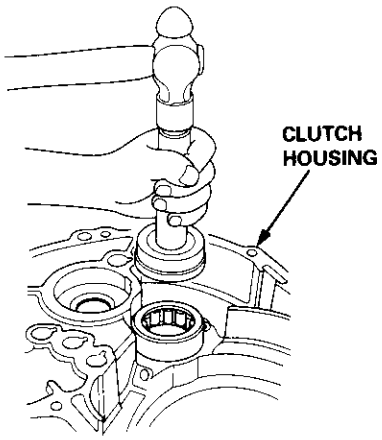
2. Remove the needle bearing using the special tool, then remove the oil guide plate.

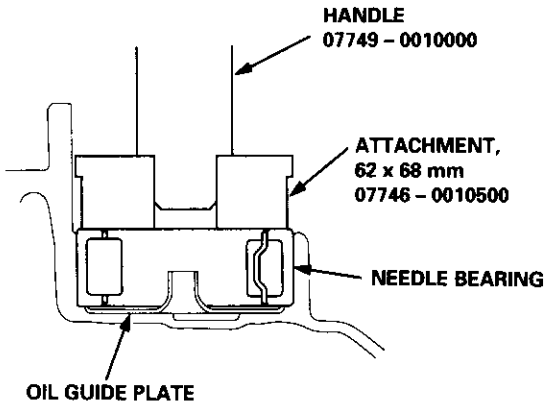




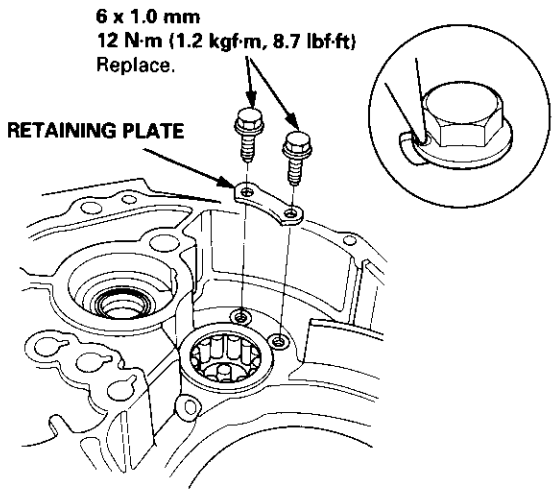
3. Position the oil guide plate.

4. Drive the needle bearing using the special tools.





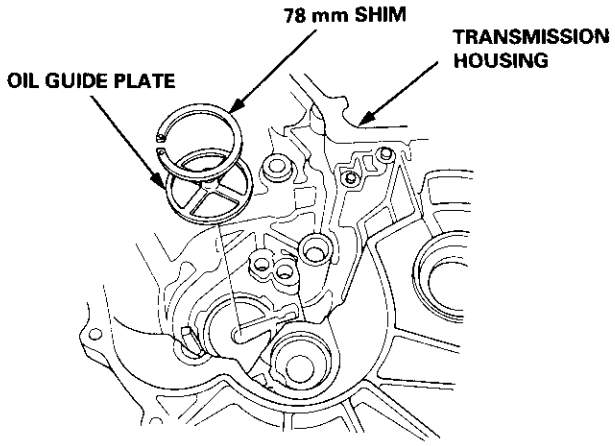
5. Install the retaining plate, and stake the bolt heads into the groove in the retaining plate.



Mainshaft Thrust Clearance

Adjustment

1. Remove the 78 mm shim and oil guide plate from the transmission housing.

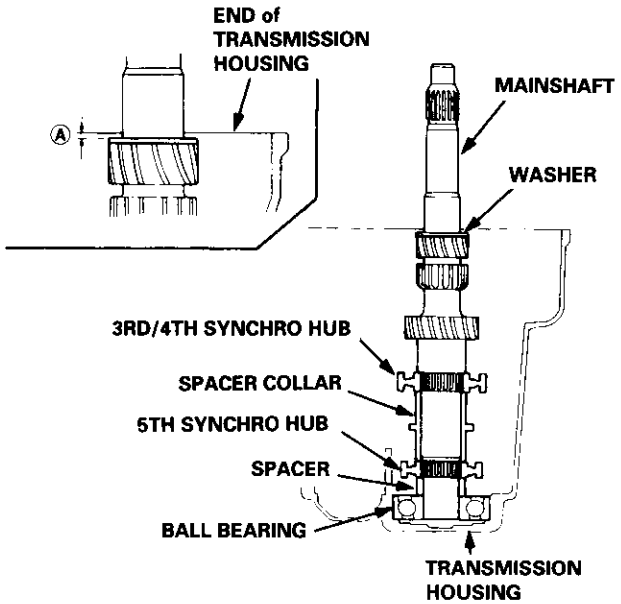


2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, spacer, and ball bearing on the mainshaft, then install the above assembly in the transmission housing.

3. Install the washer on the mainshaft.

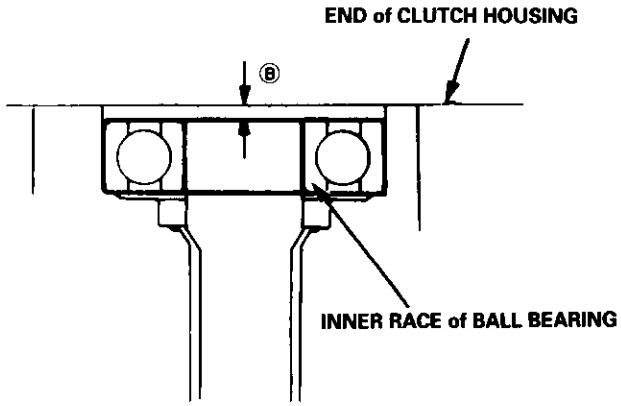
4. Measure distance Ⓐ between the end of the transmission housing and washer.

   NOTE:
   - Use a straight edge and vernier caliper.
   - Measure at three locations and average the reading.



5. Measure distance Ⓑ between the end of the clutch housing and bearing inner race.

   NOTE:
   - Use a straight edge and depth gauge.
   - Measure at three locations and average the readings.



6. Select the proper 78 mm shim from the chart by using the formula below.

   Shim Selection Formula:

   From the measurements you made in steps 4 and 5:
   –1. Add distance Ⓑ (step 5) to distance Ⓐ (step 4).

   –2. From this number, subtract 0.93 (which is the midpoint of the flex range of the clutch housing bearing spring washer).

   –3. Take this number and compare it to the available shim sizes in the chart.

   (For example)

A: 2.39	2.61
+ B: 0.22	– 0.93
= 2.61	= 1.68

   Try the 1.68 mm (0.0661 in) shim.

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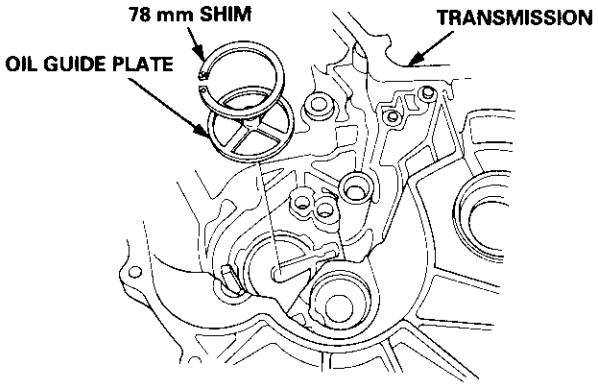
78 mm SHIM

	Part Number	Thickness
A	23941 – P16 – 000	1.20 mm (0.0472 in)
B	23942 – P16 – 000	1.23 mm (0.0484 in)
C	23943 – P16 – 000	1.26 mm (0.0496 in)
D	23944 – P16 – 000	1.29 mm (0.0508 in)
E	23945 – P16 – 000	1.32 mm (0.0520 in)
F	23946 – P16 – 000	1.35 mm (0.0531 in)
G	23947 – P16 – 000	1.38 mm (0.0543 in)
H	23948 – P16 – 000	1.41 mm (0.0555 in)
I	23949 – P16 – 000	1.44 mm (0.0567 in)
J	23950 – P16 – 000	1.47 mm (0.0579 in)
K	23951 – P16 – 000	1.50 mm (0.0591 in)
L	23952 – P16 – 000	1.53 mm (0.0602 in)
M	23953 – P16 – 000	1.56 mm (0.0614 in)
N	23954 – P16 – 000	1.59 mm (0.0626 in)
O	23955 – P16 – 000	1.62 mm (0.0638 in)
P	23956 – P16 – 000	1.65 mm (0.0650 in)
Q	23957 – P16 – 000	1.68 mm (0.0661 in)
R	23958 – P16 – 000	1.71 mm (0.0673 in)
S	23959 – P16 – 000	1.74 mm (0.0685 in)
T	23960 – P16 – 000	1.77 mm (0.0697 in)
U	23961 – P16 – 000	1.80 mm (0.0709 in)
V	23962 – P16 – 000	1.83 mm (0.0720 in)
W	23963 – P16 – 000	1.86 mm (0.0732 in)
X	23964 – P16 – 000	1.89 mm (0.0744 in)
Y	23965 – P16 – 000	1.92 mm (0.0756 in)
Z	23966 – P16 – 000	1.95 mm (0.0768 in)
AA	23967 – P16 – 000	1.98 mm (0.0780 in)
AB	23968 – P16 – 000	2.01 mm (0.0791 in)
AC	23969 – P16 – 000	2.04 mm (0.0803 in)
AD	23970 – P16 – 000	2.07 mm (0.0815 in)
AE	23971 – P16 – 000	2.10 mm (0.0827 in)
AF	23972 – P16 – 000	2.13 mm (0.0839 in)
AG	23973 – P16 – 000	2.16 mm (0.0850 in)
AH	23974 – P16 – 000	2.19 mm (0.0862 in)
AI	23975 – P16 – 000	2.22 mm (0.0874 in)
AJ	23976 – P16 – 000	2.25 mm (0.0886 in)
AK	23977 – P16 – 000	2.28 mm (0.0898 in)
AL	23978 – P16 – 000	2.31 mm (0.0909 in)
AM	23979 – P16 – 000	2.34 mm (0.0921 in)
AN	23980 – P16 – 000	2.37 mm (0.0933 in)

7. Check the thrust clearance in the manner described below.

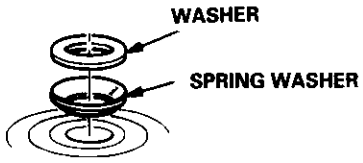
   NOTE: Measurement should be made at normal room temperature.

   -1. Install the 78 mm shim selected and oil guide plate in the transmission housing.



   -2. Install the spring washer and washer on the ball bearing.

   NOTE:
   - Clean the spring washer, washer and thrust shim thoroughly before installation.
   - Install the spring washer, washer and thrust shim properly.



   -3. Install the mainshaft in the clutch housing.

   -4. Place the transmission housing over the mainshaft and onto the clutch housing.

   -5. Tighten the clutch and transmission housings with several 8 mm bolts.

   NOTE: It is not necessary to use sealing agent between the housings.

   -6. Tap the mainshaft with a plastic hammer.

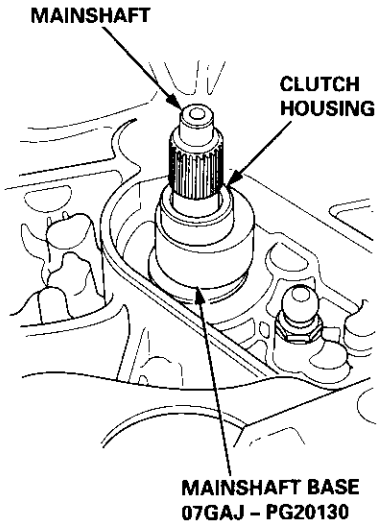
(cont'd)

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Mainshaft Thrust Clearance

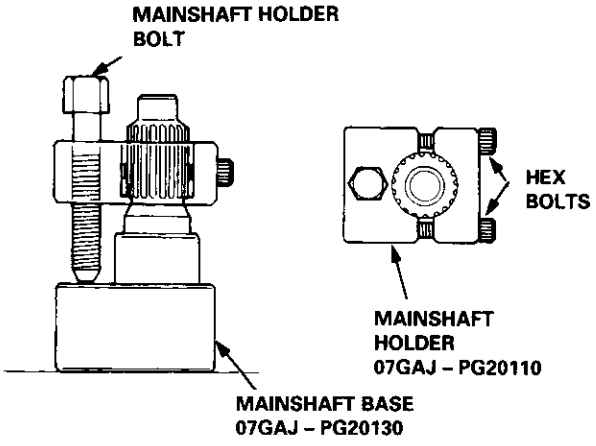
Adjustment (cont'd)

-7. Slide the mainshaft base over the mainshaft.



-8. Attach the mainshaft holder to the mainshaft as follows:

NOTE:
- Back-out the mainshaft holder bolt and loosen the two hex bolts.
- Fit the holder over the mainshaft so its lip is towards the transmission.
- Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



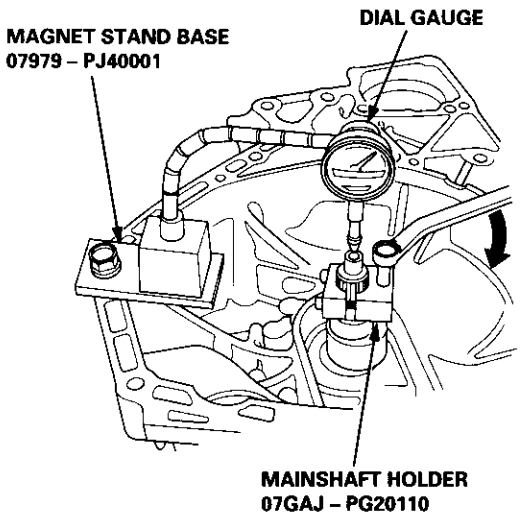
-9. Seat the mainshaft fully by tapping its end with a plastic hammer.

-10. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

-11. Zero a dial gauge on the end of the mainshaft.

-12. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

NOTE: Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.



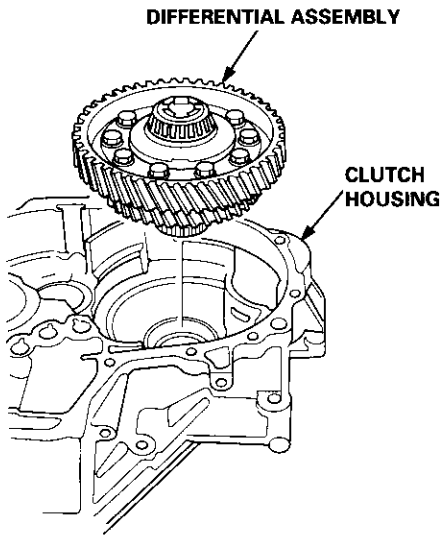
-13. If the reading is within the standard, the clearance is correct.
If the reading is not within the standard, recheck the shim thickness.

Standard: 0.11 - 0.18 mm (0.004 - 0.007 in)

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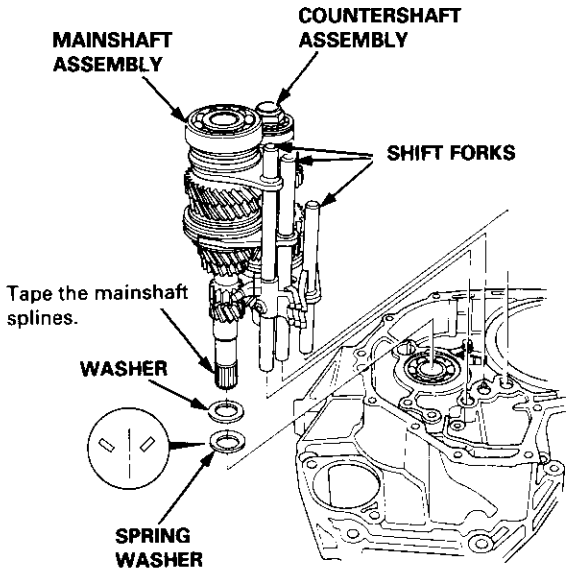
Reassembly

1. Install the differential assembly in the clutch housing.

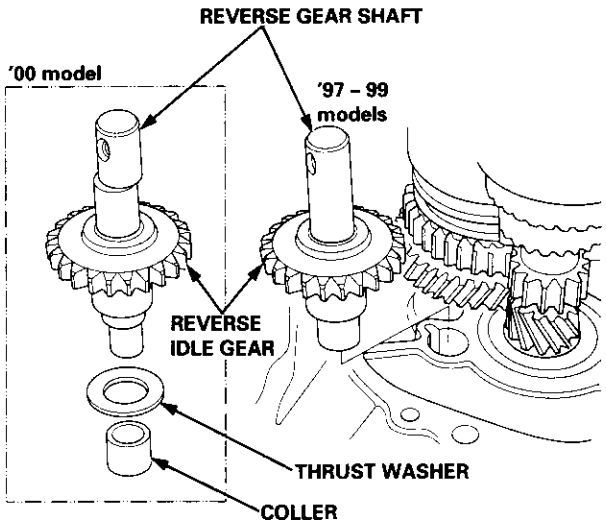


2. Install the spring washer and washer with the angle against the clutch housing as shown.

3. Tape the mainshaft splines, insert the mainshaft and countershaft into the shift forks, and install them as an assembly.

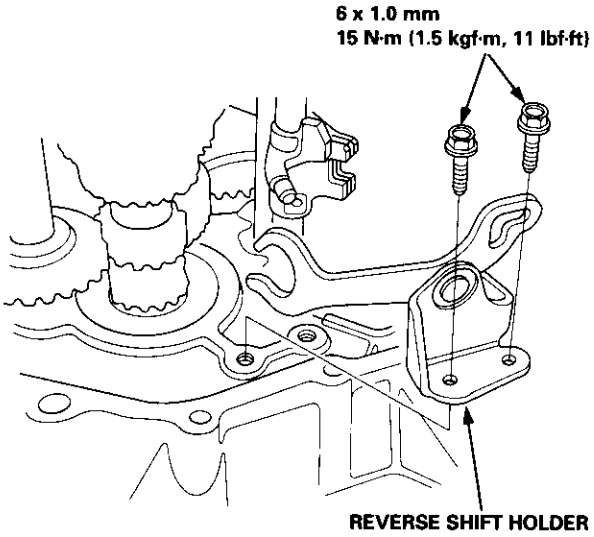


4. '97 – 99 models: Install the reverse idle gear and reverse gear shaft in the clutch housing.
   '00 model: Install the coller, thrust washer, reverse idler gear and the reverse gear shaft in the clutch housing.



NOTE: Install the reverse gear shaft ('00 model) in the direction shown.

5. Install the reverse shift holder in the clutch housing with the 5th/reverse shift piece pin positioned in the slot of the reverse shift fork.

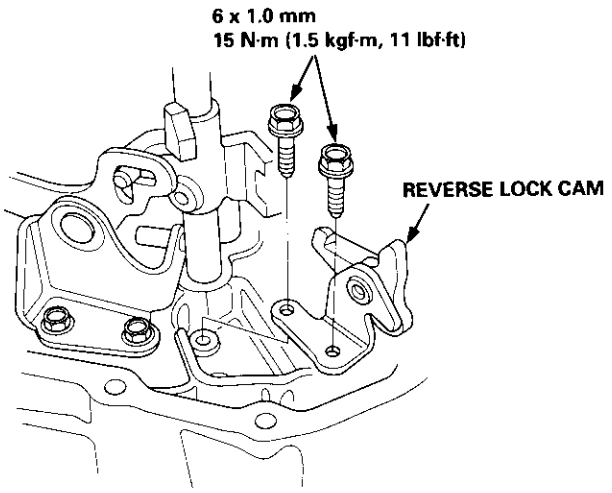


(cont'd)

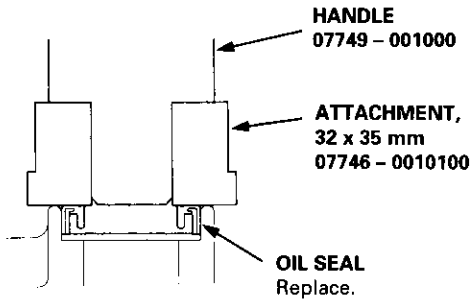
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Reassembly (cont'd)

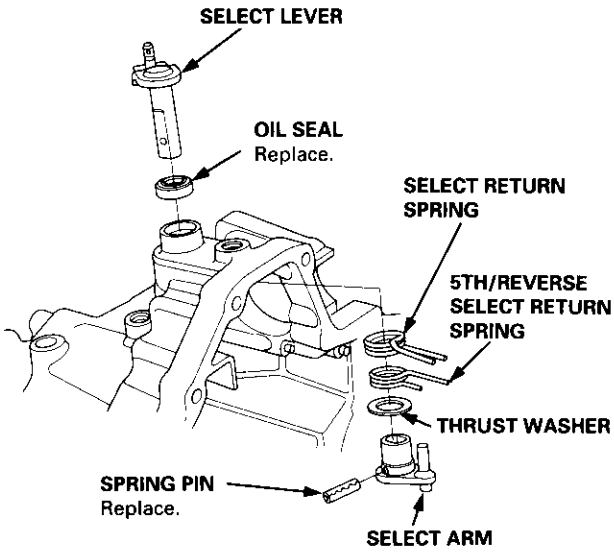
6. Install the reverse lock cam on the clutch housing.



7. Install the oil seal.

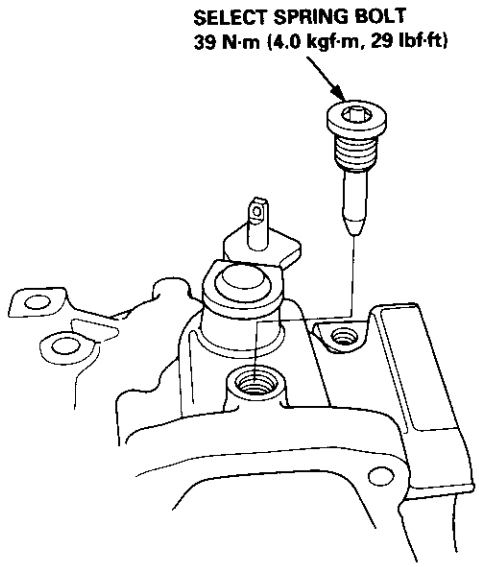


8. Install the select lever, spring washer, and springs on the select arm.



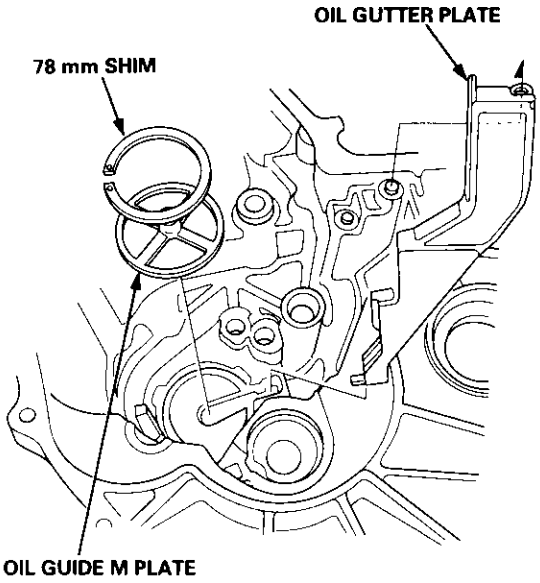
9. Install the select arm and spring pin.

10. Apply liquid gasket (P/N 08718 – 0001 or 08718 – 0003) to the select spring bolt threads, then install the select spring bolt.



11. Install the oil guide M plate, 78 mm shim, and oil gutter plate in the transmission housing.

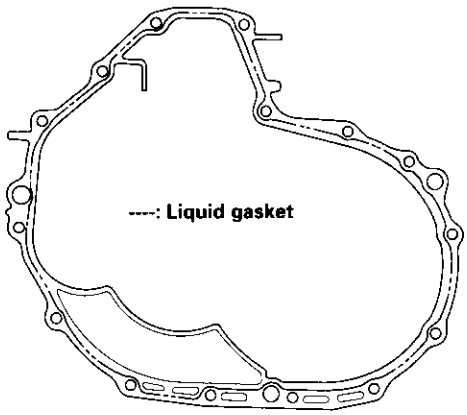
NOTE: Select the 78 mm shim according to the measurements made on page 13-64.



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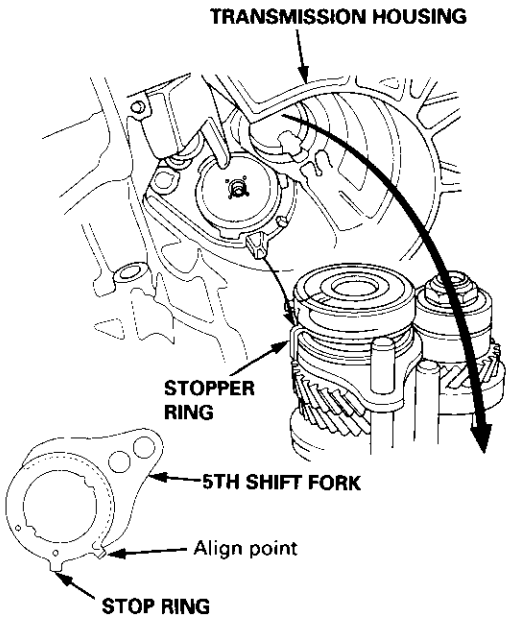
12. Apply liquid gasket to the surface of the transmission housing as shown.

    Note these items:
    - Use liquid gasket (P/N 08718 – 0001 or 08718 – 0003).
    - Remove the dirty fluid from the sealing surface.
    - Seal the entire circumference of the bolt holes to prevent fluid leakage.
    - If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
    - Allow it to cure at least 20 minutes after assembly before filling the transmission with MTF.

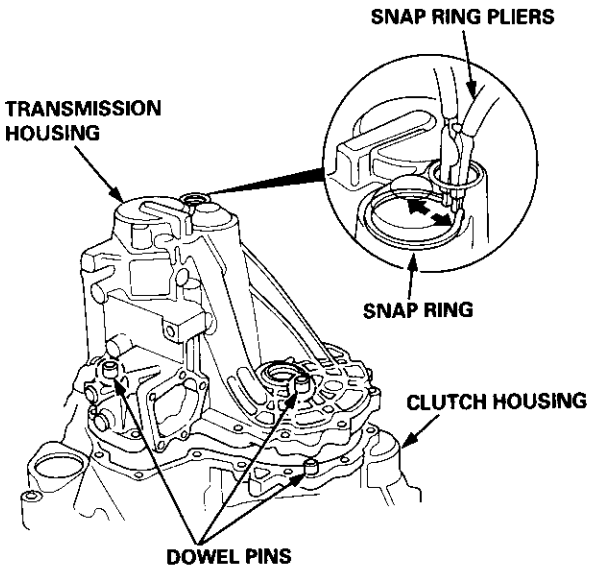


13. Install the 14 x 20 mm dowel pins.

14. Set the stopper ring as shown. Place the transmission housing over the clutch housing, being careful to line up the shafts. Be sure to align the stop ring with the 5th shift fork finger tip.

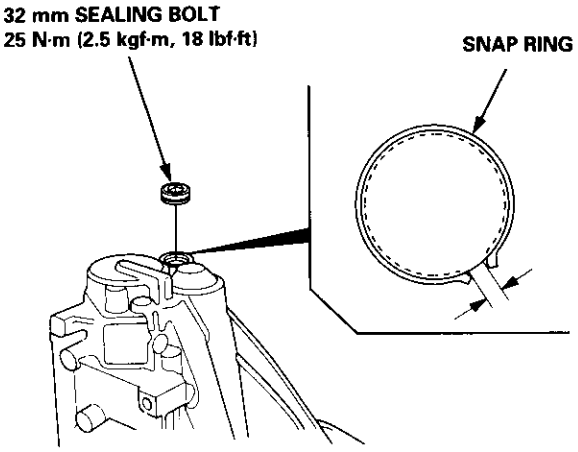


15. Lower the transmission housing with the snap ring pliers, and set the snap ring into the groove of the countershaft bearing.



16. Check that the snap ring is securely seated in the groove of the countershaft bearing.

    Dimension A as installed: 3.6 – 6.3 mm (0.142 – 0.248 in)



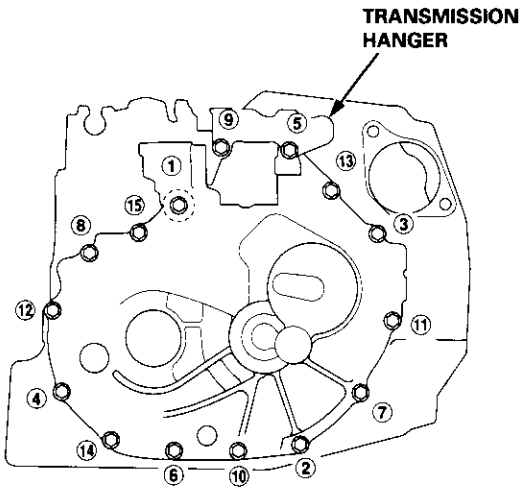
17. Apply liquid gasket (P/N 08718 – 0001 or 08718 – 0003) to the 32 mm sealing bolt threads, then install the 32 mm sealing bolt. (cont'd)

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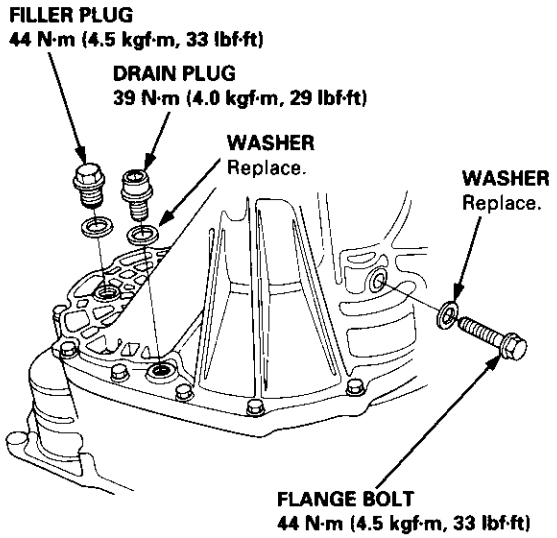
Reassembly (cont'd)

18. Install transmission hanger, then tighten the bolts in a crisscross pattern in several steps as shown.

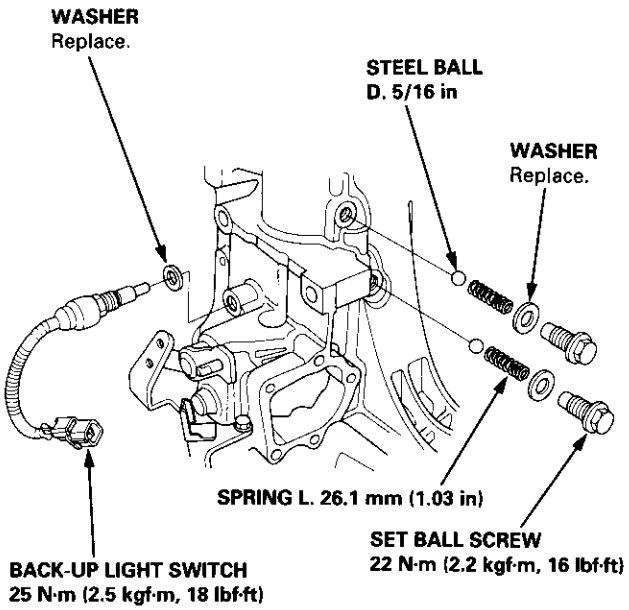
    8 x 1.25 mm bolts: 27 N·m (2.8 kgf·m, 20 lbf·ft)



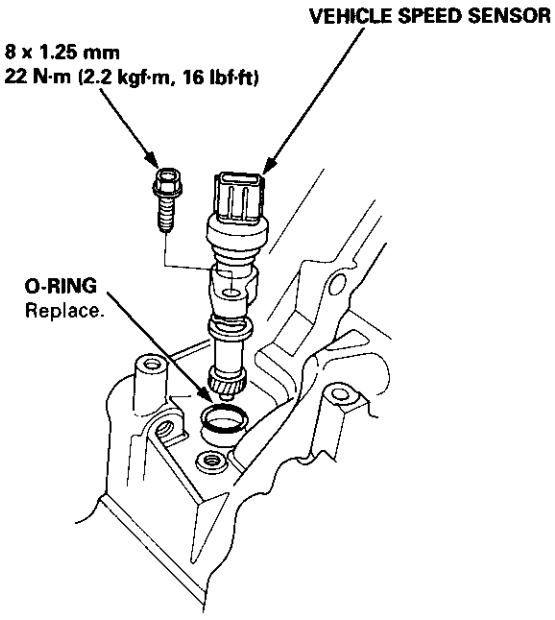
19. Install flange bolt, washers, drain plug, and filler plug.



20. Install the steel balls, springs, washers, set ball screws, back-up light switch.

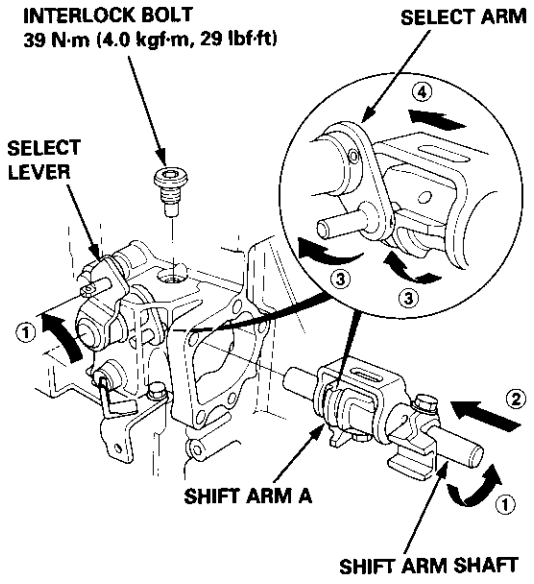


21. Install the vehicle speed sensor (VSS).



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22. Turn the select lever and shift arm shaft counterclockwise, then insert the shift arm shaft.

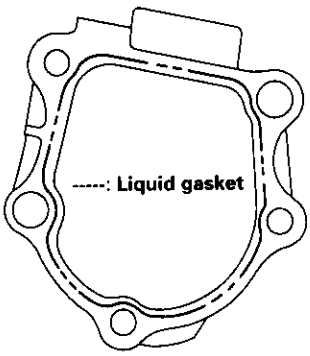


23. Align the shift arm A groove and select arm finger by turn the shift arm shaft and select lever clockwise, then install the shift arm shaft assembly.

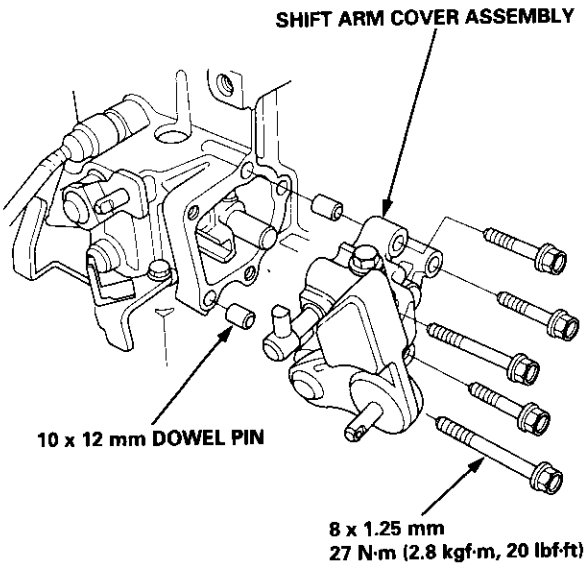
24. Apply liquid gasket (P/N 08718 – 0001 or 08718 – 0003) to the threads, then install the interlock bolt.

25. Apply liquid gasket to the surface of the shift arm cover as shown.

    Note these items:
    - Use liquid gasket (P/N 08718 – 0001 or 08718 – 0003).
    - Remove the dirty oil from the sealing surface.
    - Seal the entire circumference of the bolt holes to prevent oil leakage.
    - If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
    - Allow it to cure at least 20 minutes after assembly before filling the transmission with MTF.

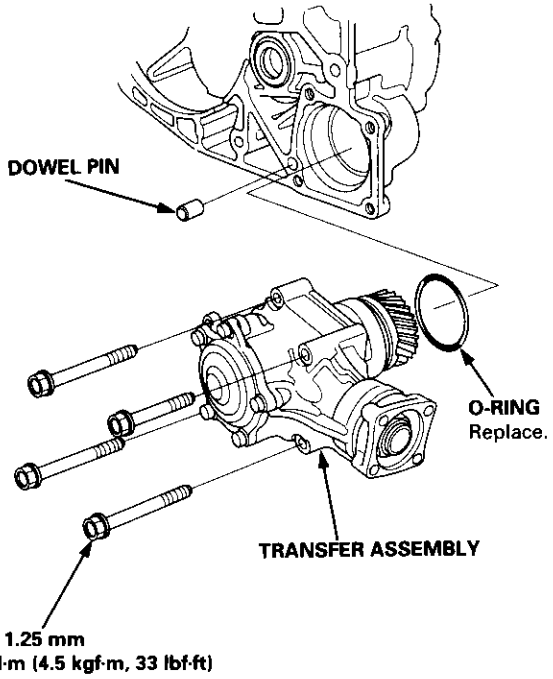


26. Install the shift arm cover assembly.



27. Install the transfer assembly.

    NOTE: Lubricate MTF to the O-ring and contact areas.

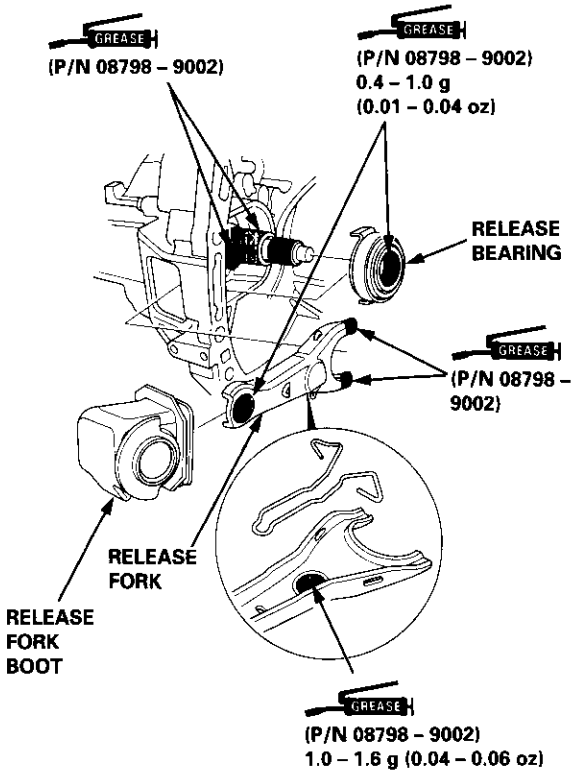


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Installation

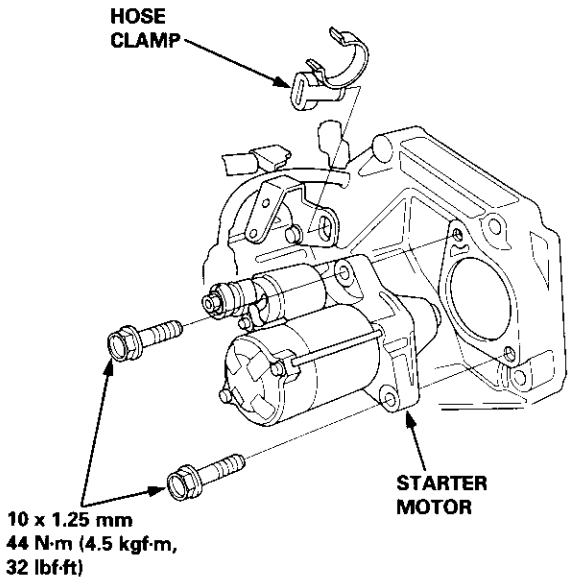
1. Check that the dowel pins are installed in the clutch housing.

2. Apply grease to the release fork and release bearing.



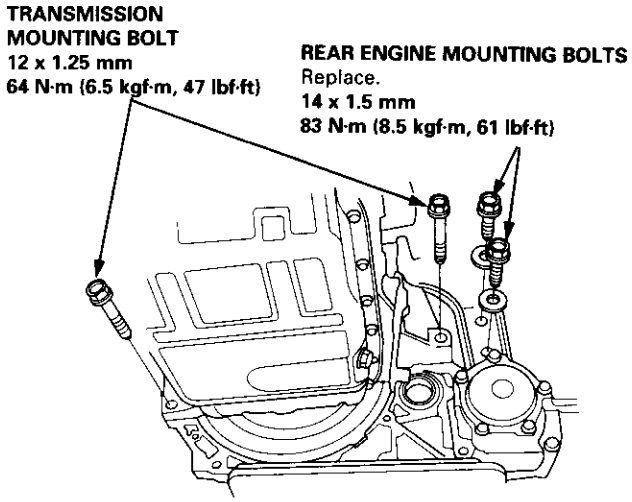
3. Install the release bearing, release fork, and release fork boot to the clutch housing.

4. Install the starter motor and hose clamp.



5. Place the transmission on the transmission jack, and raise it to the engine level.

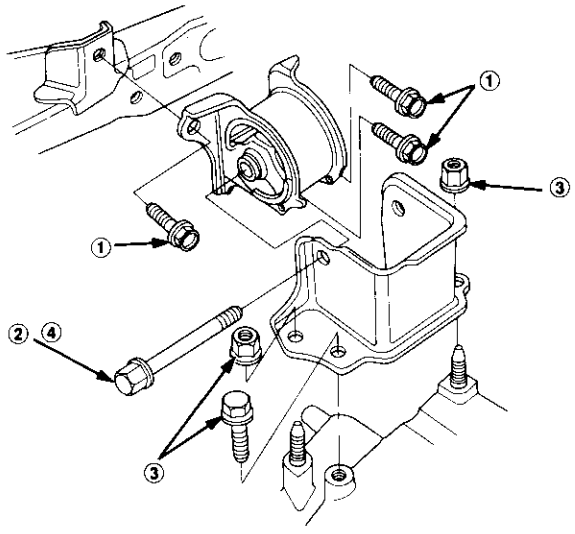
6. Install the transmission mounting bolts and the rear engine mounting bolts.



7. Rise the transmission, then install the transmission mount bracket and transmission mount.

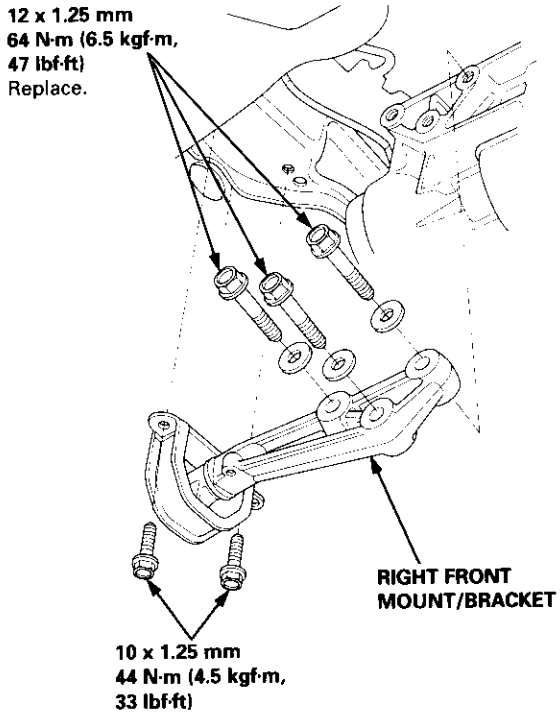
- Torque the mounting bolts and nuts in the sequence shown.
- Check that the bushing are not twisted or offset.

①, ③: 12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)
②: Temporary tightening
④: 12 x 1.25 mm
74 N·m (7.5 kgf·m, 54 lbf·ft)

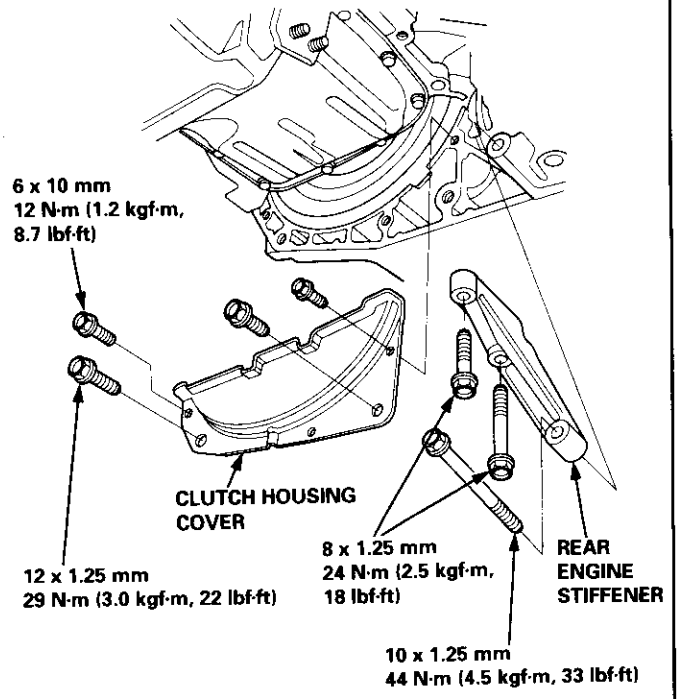


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8. Install the right front mount/bracket.

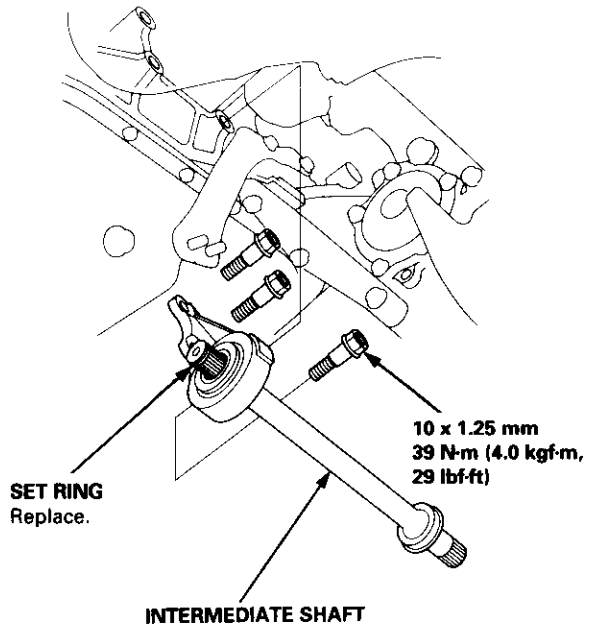


9. Install the clutch housing cover and rear engine stiffener.

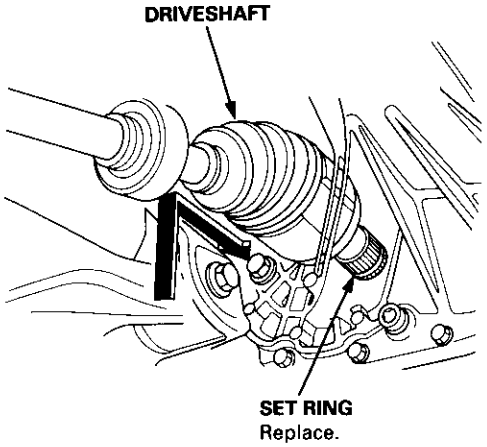


10. Pour transmission fluid of 1 liter from the driveshaft inserted hole.

11. Install the intermediate shaft (see section 18). While installing the intermediate shaft in the differential, be sure not to allow dust and other foreign particles to enter the transmission.



12. Install the driveshafts (see section 18). While installing the driveshaft(s) in the differential, be sure not to allow dust and other foreign particles to enter the transmission.

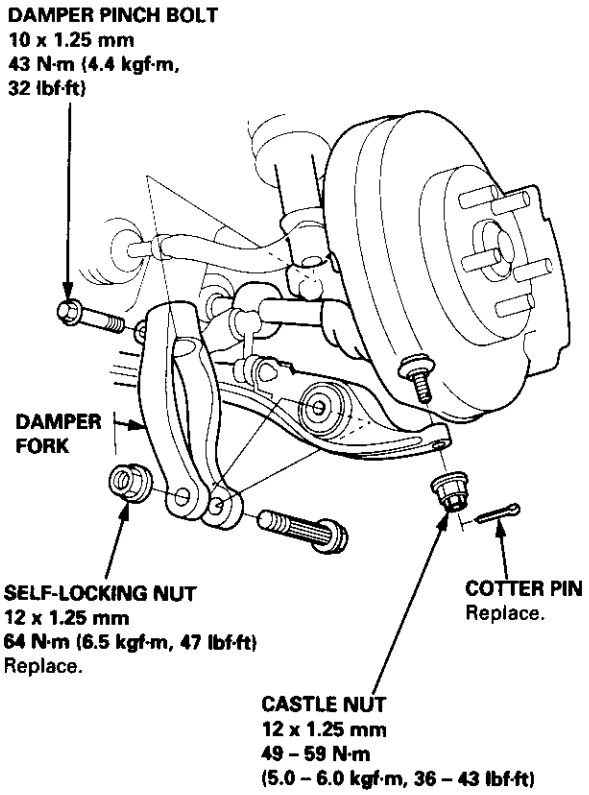


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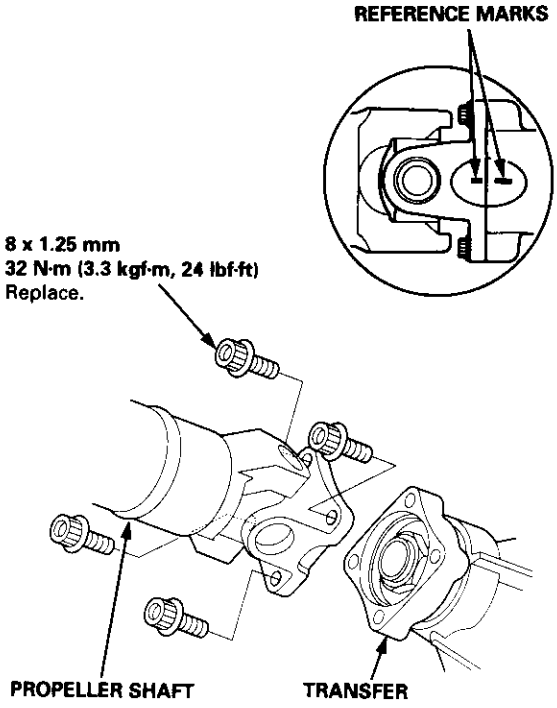
Installation (cont'd)

13. Install the ball joints onto the lower arms.

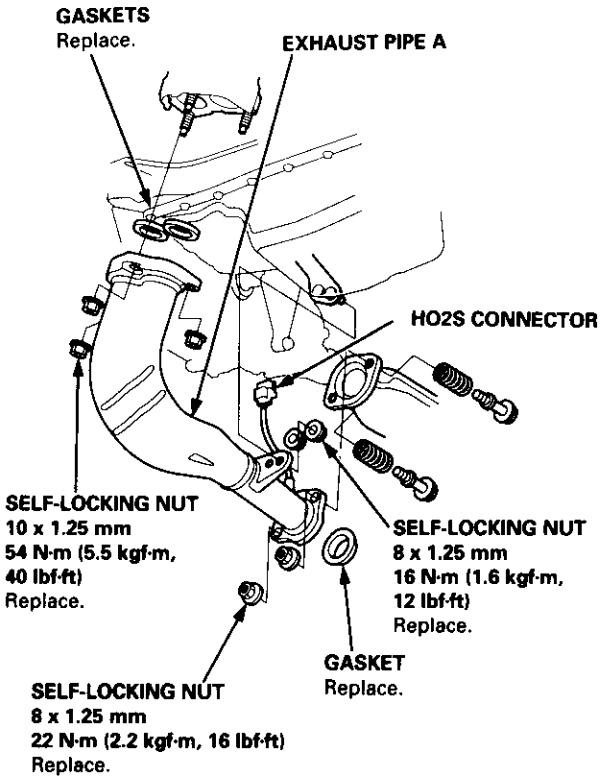


14. Install the right damper fork bolt.

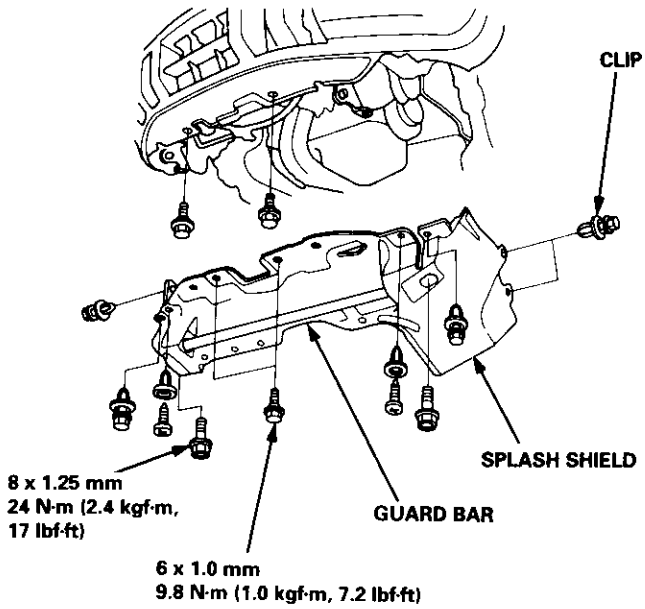
15. Install the propeller shaft to the transfer assembly by aligning the reference marks.



16. Install the exhaust pipe A, then connect the heated oxygen sensor (HO2S) connector.



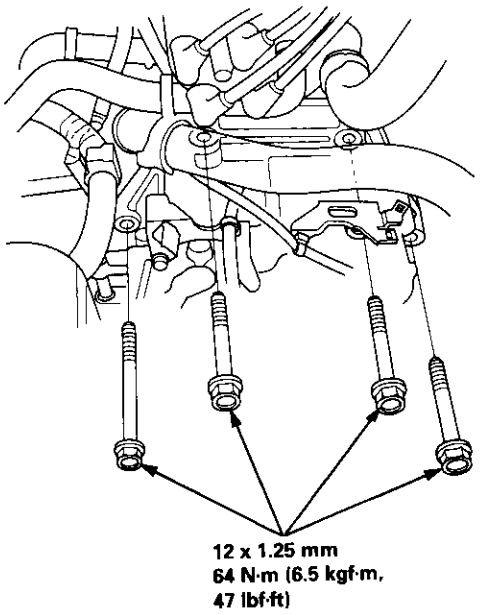
17. Install the guard bar and the splash shield.



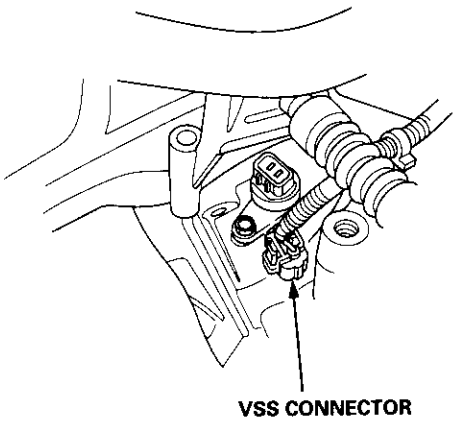
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18. Refill the transmission fluid (see page 13-3).

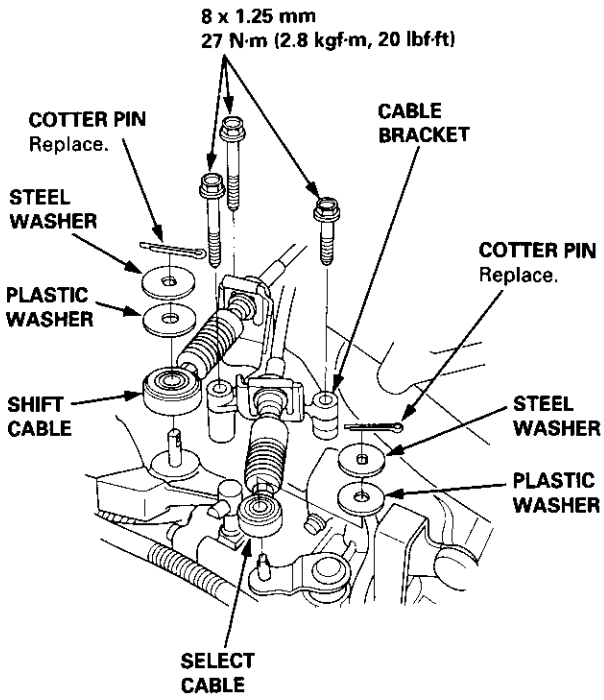
19. Install the four upper transmission mounting bolts.



20. Connect the vehicle speed sensor (VSS) connector.

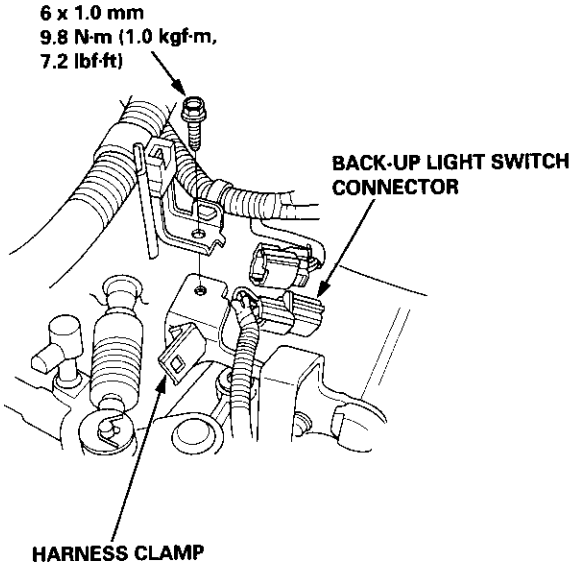


21. Install the cable bracket from the clutch housing.



22. Install the shift cable and select cable to the levers, then install plastic washers, steel washers, and cotter pins.

23. Connect the back-up light switch connector, and install the wire harness clamp.

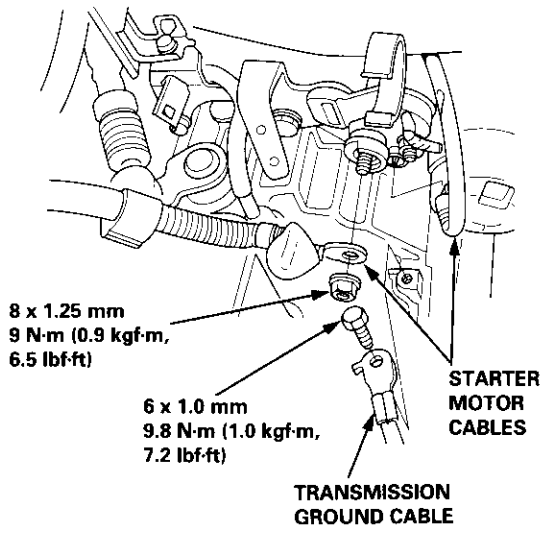


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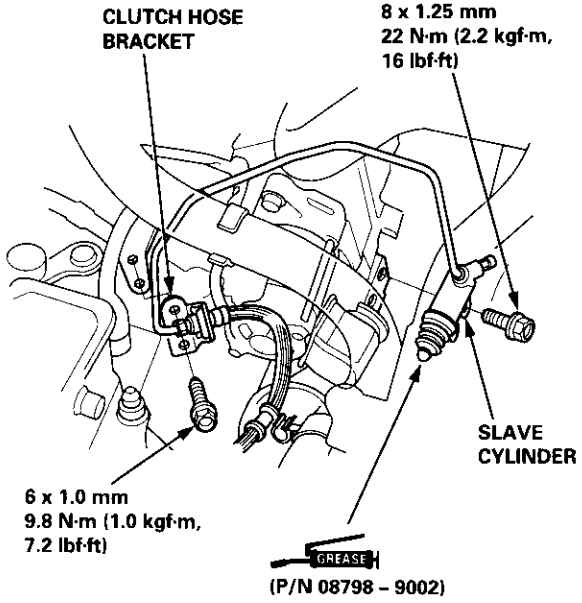
Installation (cont'd)

24. Connect the starter cables and transmission ground cable.

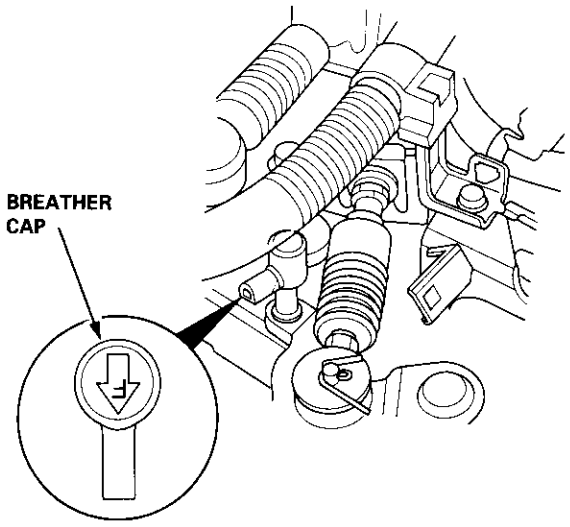


25. Apply grease to the push rod on the slave cylinder, then install the slave cylinder and clutch hose bracket.

NOTE: Use only Super High Temp Urea Grease (P/N 08798 – 9002).



26. Turn the breather cap so that the "F" mark points at the right side of the vehicle as shown.



27. Install the intake air duct and air cleaner housing (see section 5).

28. Connect the positive (+) cable first, then the negative (–) cable to the battery.

29. Check the level of the transmission fluid.

30. Check the clutch operation.

31. Shift the transmission and check for smooth operation.

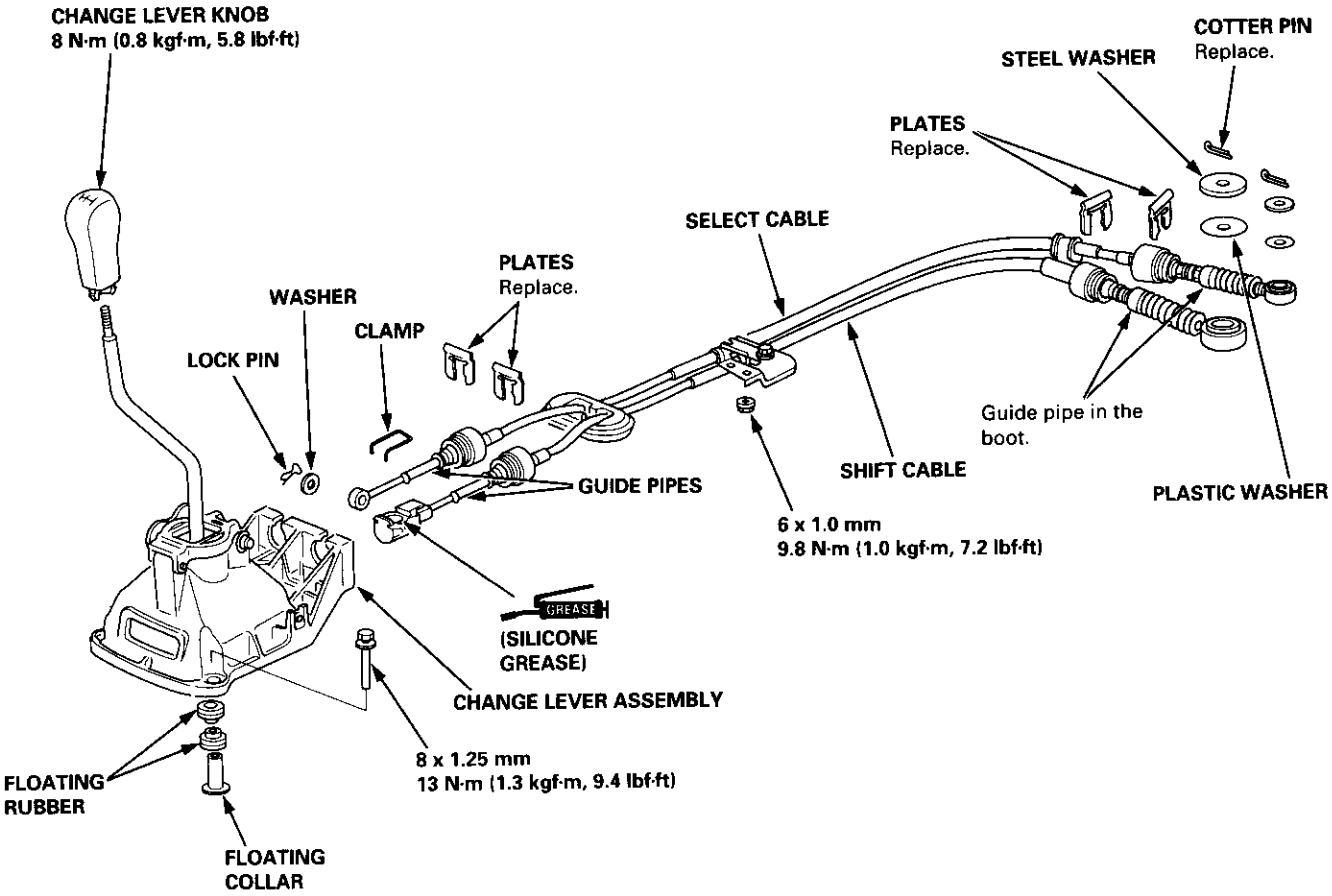
32. Check the front wheel alignment (see section 18).

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Overhaul

Note these items:

- Inspect rubber parts for wear and damage when disassembling.
- Check that the new cotter pin is seated firmly.
- Be careful not to damage the guide pipe when removing the cables.



Automatic Transmission

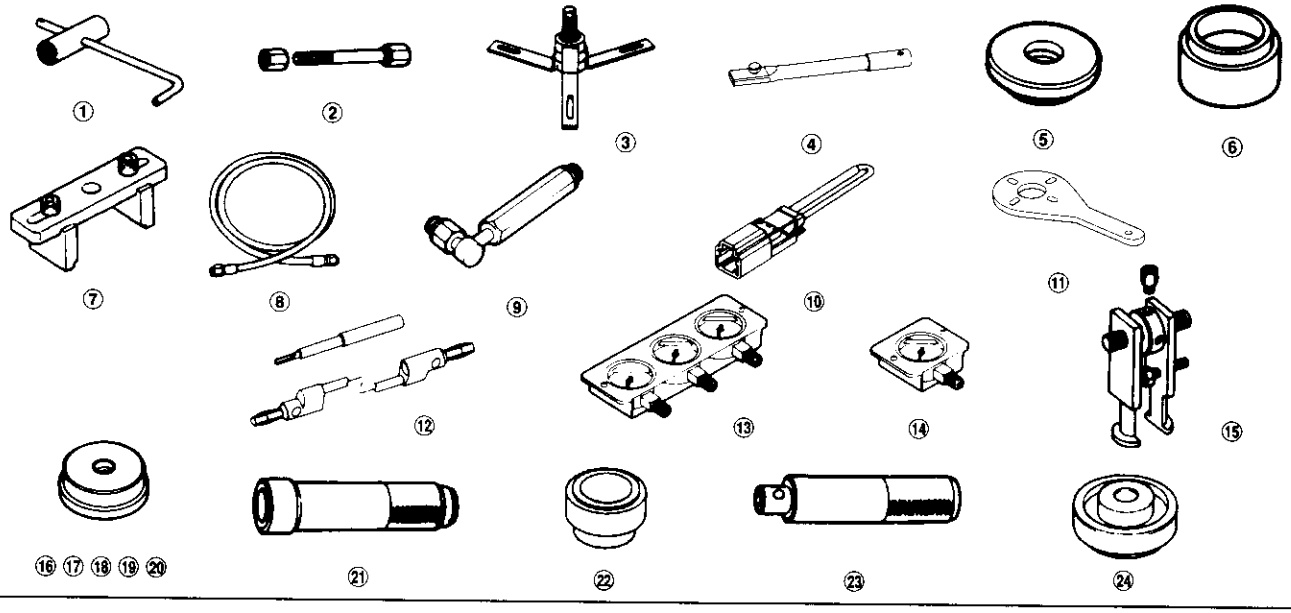
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Special Tools

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①	07GAB – PF50101 or 07GAB – PF50100	Mainshaft Holder	1	14-187, 254
②	07GAE – PG40200 or 07GAE – PG4020A	Clutch Spring Compressor Bolt Assembly	1	14-216, 219
*③	07HAC – PK40102	Housing Puller	1	14-189
④	07JAB – 001020A	Holder Handle	1	14-236, 242, 245, 246
⑤	07JAD – PH80101	Oil Seal Driver Attachment	1	14-225, 241
⑥	07LAD – PW50601	Attachment, 40 x 50 mm	1	14-237
**⑦	07LAE – PX40100	Clutch Spring Compressor Attachment	2	14-216, 219
⑧	07MAJ – PY4011A	A/T Pressure Hose, 2210 mm	4	14-161
⑨	07MAJ – PY40120	A/T Pressure Hose Adapter	4	14-161
⑩	07PAZ – 0010100	SCS Service Connector	1	14-57
⑪	07RAB – TB4010A or 07RAB – TB4010B	Companion Flange Holder	1	14-236, 242, 245, 246
⑫	07SAZ – 001000A	Backprobe Set	2	14-58, 157
⑬	07406 – 0020400	A/T Oil Pressure Gauge Set w/Panel	1	14-161
⑭	07406 – 0070300	A/T Low Pressure Gauge w/Panel	1	14-161
***⑮	07736 – A01000B or 07736 – A01000A	Adjustable Bearing Puller, 25 – 40 mm	1	14-229, 230
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⑰	07746 – 0010200	Attachment, 37 x 40 mm	1	14-237
⑱	07746 – 0010400	Attachment, 52 x 55 mm	1	14-239
⑲	07746 – 0010500	Attachment, 62 x 68 mm	1	14-212, 227, 228, 229, 230, 238, 14-239, 249
⑳	07746 – 0010600	Attachment, 72 x 75 mm	1	14-227, 229
㉑	07746 – 0030100	Driver 40 mm I.D.	1	14-207, 223, 226, 237, 241
㉒	07746 – 0030400	Attachment, 35 mm I.D.	1	14-237, 241
㉓	07749 – 0010000	Driver	1	14-211, 212, 225, 227, 228, 229, 14-230, 237, 238, 239, 241, 249
㉔	07947 – SD90200	Seal Driver Attachment	1	14-225

* If the top arm is too short, replace it with 07SAC – P0Z01001.
** 07HAE – PL50101 may be used to substitute one of these tools.
*** Must be used with commercially available 3/8"-16 slide hammer.



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Description

General Operation

The Automatic transmission is a 3-element torque converter and triple-shaft electronically controlled unit which provides 4 speeds forward and 1 reverse speed. The unit is positioned in line with the engine.
There are two types of automatic transmission on CR-V; the four-wheel drive (4WD) model ('97 – 00), and the front-wheel drive (2WD) model ('98 – 00).

Torque Converter, Gears, and Clutches
The torque converter consists of a pump, turbine, and stator assembly in a single unit. The torque converter is connected to the engine crankshaft. These parts turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is started. The torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.
The transmission has three parallel shafts: the mainshaft, the countershaft, and the sub-shaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the 1st, 2nd, and 4th clutches, and gears for 3rd, 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with the 4th gear). The countershaft includes the 3rd clutch and gears for 3rd, 2nd, 4th, reverse, 1st, and park. Reverse and 4th gears can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector is moved. The sub-shaft includes the 1st-hold clutch and gears for 1st and 4th.
The gears on the mainshaft are in constant mesh with those on the countershaft and sub-shaft. When certain combinations of gears are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide [D4], [D3], [2], [1], and [R] position ('97 – 98 models), and [D], [2], [1], and [R] position ('99 – 00 models).

Electronic Control
The electronic control system consists of the Powertrain Control Module (PCM), sensors, a linear solenoid, and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The PCM is located below the dashboard, under the kick panel on the passenger's side.

Hydraulic Control
The valve bodies include the main valve body, the secondary valve body, the regulator valve body, the servo body, and the lock-up valve body. They are bolted to the torque converter housing. The main valve body contains the manual valve, the 1-2 shift valve, the 2nd orifice control valve, the CPB (Clutch Pressure Back-up) valve, the modulator valve, the servo control valve, the relief valve, and ATF pump gears. The secondary valve body contains the 2-3 shift valve, the 3-4 shift valve, the 3-4 orifice control valve, the 4th exhaust valve and the CPC (Clutch Pressure Control) valve. The regulator valve body contains the pressure regulator valve, the torque converter check valve, the cooler relief valve, and the lock-up control valve. The servo body contains the servo valve which is integrated with the reverse shift fork, and the accumulators. The lock-up valve body contains the lock-up shift valve and the lock-up timing valve. The linear solenoid and the shift control solenoid valve A/B are bolted to the outside of the transmission housing, and the lock-up control solenoid valve A/B is bolted to the outside of the torque converter housing. Fluid from the regulator passes through the manual valve to the various control valves. The clutches receive fluid from their respective feed pipes or internal hydraulic circuit.

Shift Control Mechanism
Input from various sensors located throughout the vehicle determines which shift control solenoid valve the PCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear. The shift control solenoid valves A and B are controlled by the PCM.

Lock-up Mechanism
In [D4] position ('97 – 98 models) and in [D] position ('99 – 00 models), in 3rd and 4th, and in [D3] position in 3rd ('97 – 98 models) and in [D] position with Over-Drive (O/D) is OFF (by pressing the O/D switch) in 3rd ('99 – 00 models), pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the PCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and the linear solenoid. When lock-up control solenoid valves A and B activate, the modulator pressure changes. The lock-up control solenoid valves A and B and the linear solenoid are controlled by the PCM.

(cont'd)

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Description

General Operation (cont'd)

Gear Selection
'97 – 98 Models
The shift lever has seven positions; [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th ranges, [D3] 1st through 3rd ranges, [2] 2nd gear, and [1] 1st gear.

'99 – 00 Models
The shift lever has six positions; [P] PARK, [R] REVERSE, [N] NEUTRAL, [D] 1st through 4th ranges, and 1st through 3rd (when Over-Drive (O/D) is OFF) ranges, [2] 2nd gear, and [1] 1st gear.

Position	Description
[P] PARK	Front wheels locked; park pawl engaged with park gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.
[N] NEUTRAL	All clutches released.
[D4] DRIVE ('97 – 98) [D] DRIVE ('99 – 00) (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd, and 1st on deceleration to stop. The lock-up mechanism operates in 3rd and 4th gear.
[D3] DRIVE ('97 – 98) [D] DRIVE with Over-Drive (O/D) is OFF ('99 – 00) (1st through 3rd)	Used for rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd then 3rd, depending on vehicle speed and throttle position. Downshifts through lower gears on deceleration to stop. The lock-up mechanism comes into operation in 3rd gear.
[2] SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking or better traction starting off on loose or slippery surfaces.
[1] FIRST	Driving in 1st gear; stays in 1st gear, does not shift up. For engine braking.

Starting is possible only in [P] and [N] positions, using a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator
This indicator in the instrument panel shows which gear has been selected.

Transfer Mechanism (4WD)
The transfer mechanism consists of the transfer shaft drive gear, the transfer shaft, the transfer drive gear, the transfer driven gear shaft, and the companion flange. The transfer mechanism assembly is on the rear side of the transmission, beside the differential. The transfer shaft drive gear on the final driven gear drives the transfer shaft driven gear. Power is transmitted to the rear differential via the transfer shaft and the propeller shaft.

Clutches
The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When the hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear. When hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other. This allows the gear to spin independently on its shaft, transmitting no power.

1st Clutch
The 1st clutch engages/disengages 1st gear, and is located at the end of the mainshaft, just behind the end cover.
The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold or [1] position, and is located at the middle of the sub-shaft. The 1st-hold clutch is supplied hydraulic pressure by its ATF feed pipe within the sub-shaft.

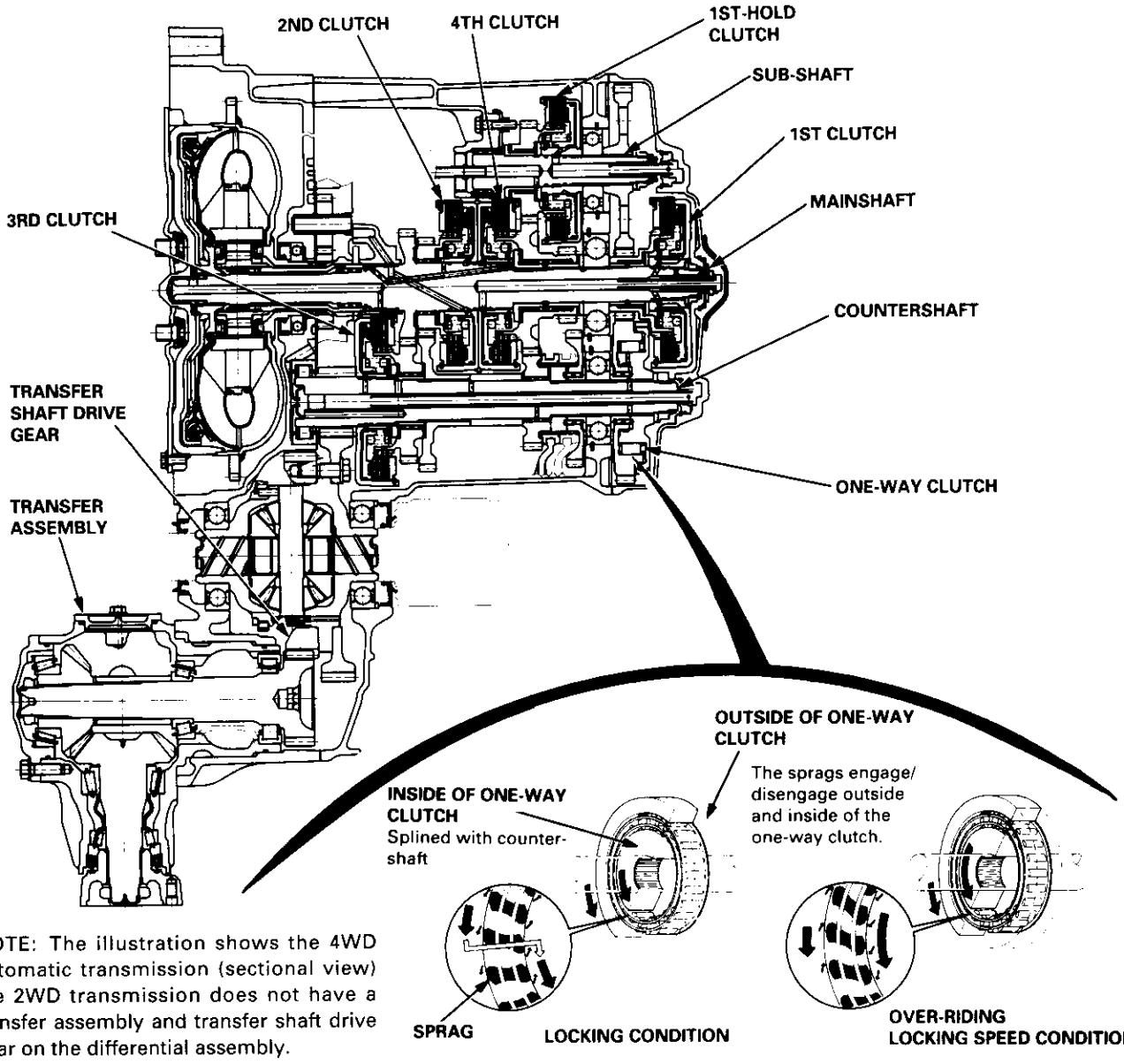
2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located at the middle of the mainshaft. The 2nd clutch is joined back-to-back to the 4th clutch. The 2nd clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

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3rd Clutch
The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft, opposite the end cover. The 3rd clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

4th Clutch
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 2nd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

One-way Clutch
The one-way clutch is positioned between the park gear and the countershaft 1st gear, with the park gear splined to the countershaft. The countershaft 1st gear provides the outer race surface, and the park gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear. The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the D4, D3, D, or 2 position. The one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the D4, D3, D, or 2 position.
This is because the increased rotational speed of the gears on the countershaft over-ride the locking "speed range" of the one-way clutch. The one-way clutch free-wheels when the 1st clutch is engaged.



NOTE: The illustration shows the 4WD automatic transmission (sectional view) the 2WD transmission does not have a transfer assembly and transfer shaft drive gear on the differential assembly.

Description

Power Flow

POSITION \ PART		TORQUE CONVERTER	1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARK GEAR
							GEAR	CLUTCH		
P		○	×	×	×	×	×	×	×	○
R		○	×	×	×	×	×	○	○	×
N		○	×	×	×	×	×	×	×	×
D4 or D	1ST	○	×	○*2	×	×	×	×	×	×
	2ND	○	×	○*1	○	×	×	×	×	×
	3RD	○	×	○*1	×	○	×	×	×	×
	4TH	○	×	○*1	×	×	○	○	×	×
D3 or D with Over-Drive (O/D) is OFF	1ST	○	×	○*2	×	×	×	×	×	×
	2ND	○	×	○*1	○	×	×	×	×	×
	3RD	○	×	○*1	×	○	×	×	×	×
2		○	×	○*1	○	×	×	×	×	×
1		○	○	○	×	×	×	×	×	×

○: Operates, ×: Doesn't operate.
*1: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.
*2: The one-way clutch engages when accelerating, and slips when decelerating.

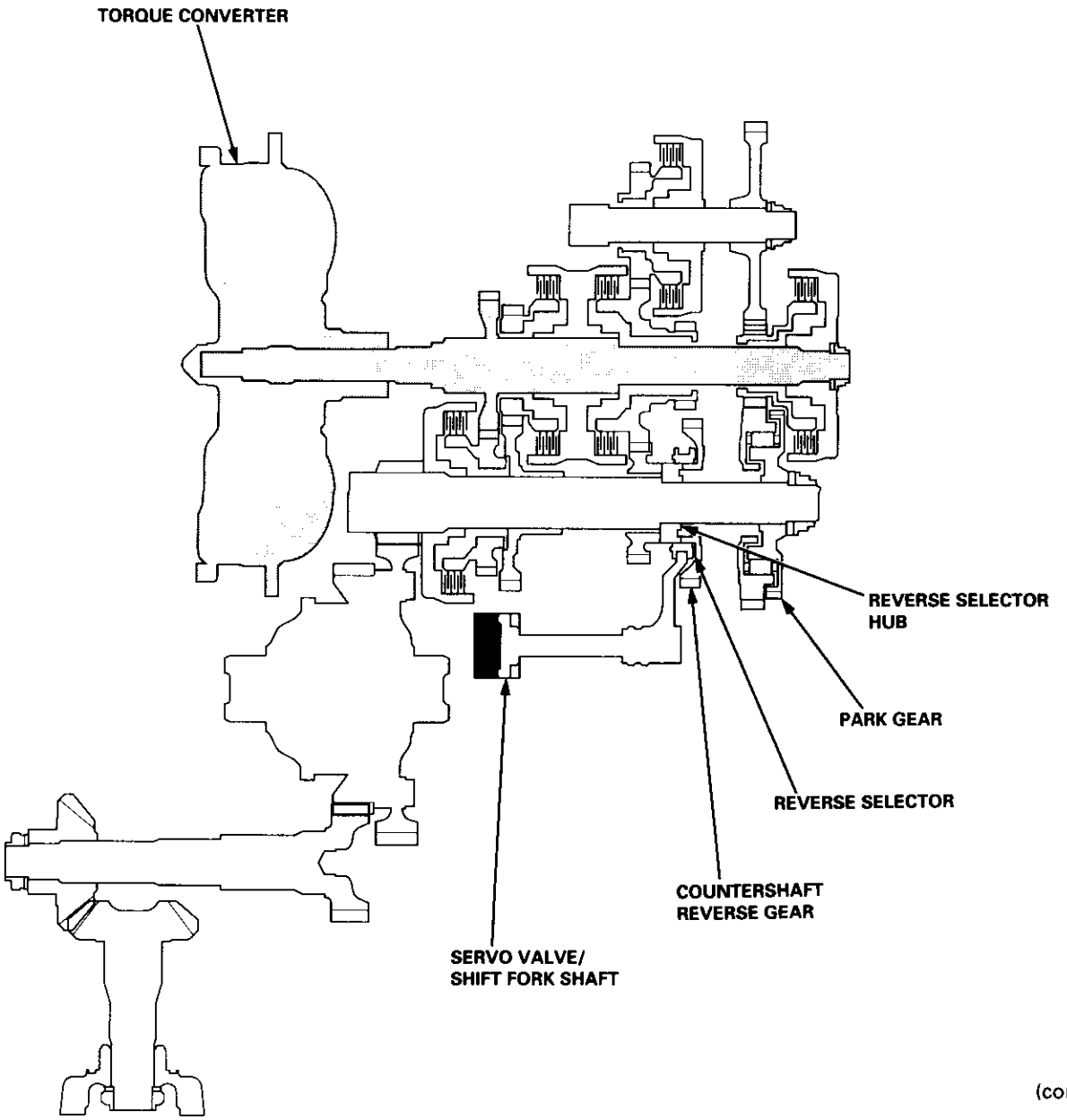
NOTE: D4 and D3 positions are on the '97 – '98 models; D position is on the '99 – 00 models.

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[P] Position
Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.
The countershaft is locked by the park pawl interlocking the park gear.

[N] Position
Engine power transmitted from the torque converter drives the mainshaft, but hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft 4th gear is engaged with the reverse selector hub and the countershaft by the reverse selector, when the shift lever is shifted in [N] position from [D4] or [D] position. The countershaft reverse gear is engaged when shifted from [R] position.

NOTE: The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.



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Power Flow (cont'd)

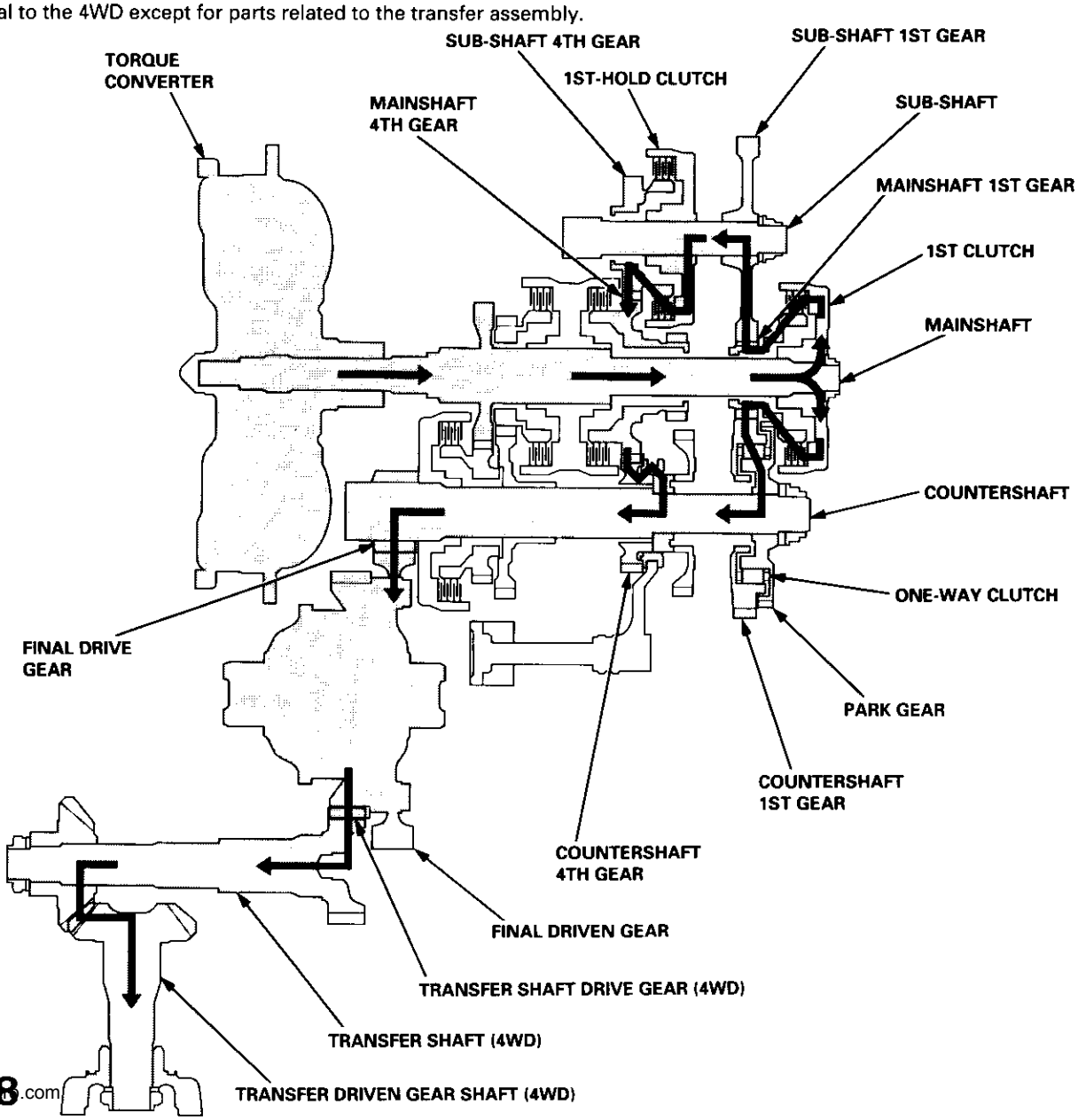
[1] Position

In [1] position, hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch.

The power flow when accelerating is as follows:

1. Hydraulic pressure is applied to the 1st clutch on the mainshaft, and power is transmitted via the 1st clutch to the mainshaft 1st gear.
2. Hydraulic pressure is also applied to the 1st-hold clutch on the sub-shaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch, and via the sub-shaft 1st gear to the 1st-hold clutch. The one-way clutch is used to drive the countershaft, and the 1st-hold clutch drives the countershaft via the 4th gears.
3. Power is transmitted to the final drive gear, which drives the final driven gear, and the transfer shaft drive gear (4WD).
4. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE: The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.



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1 Position

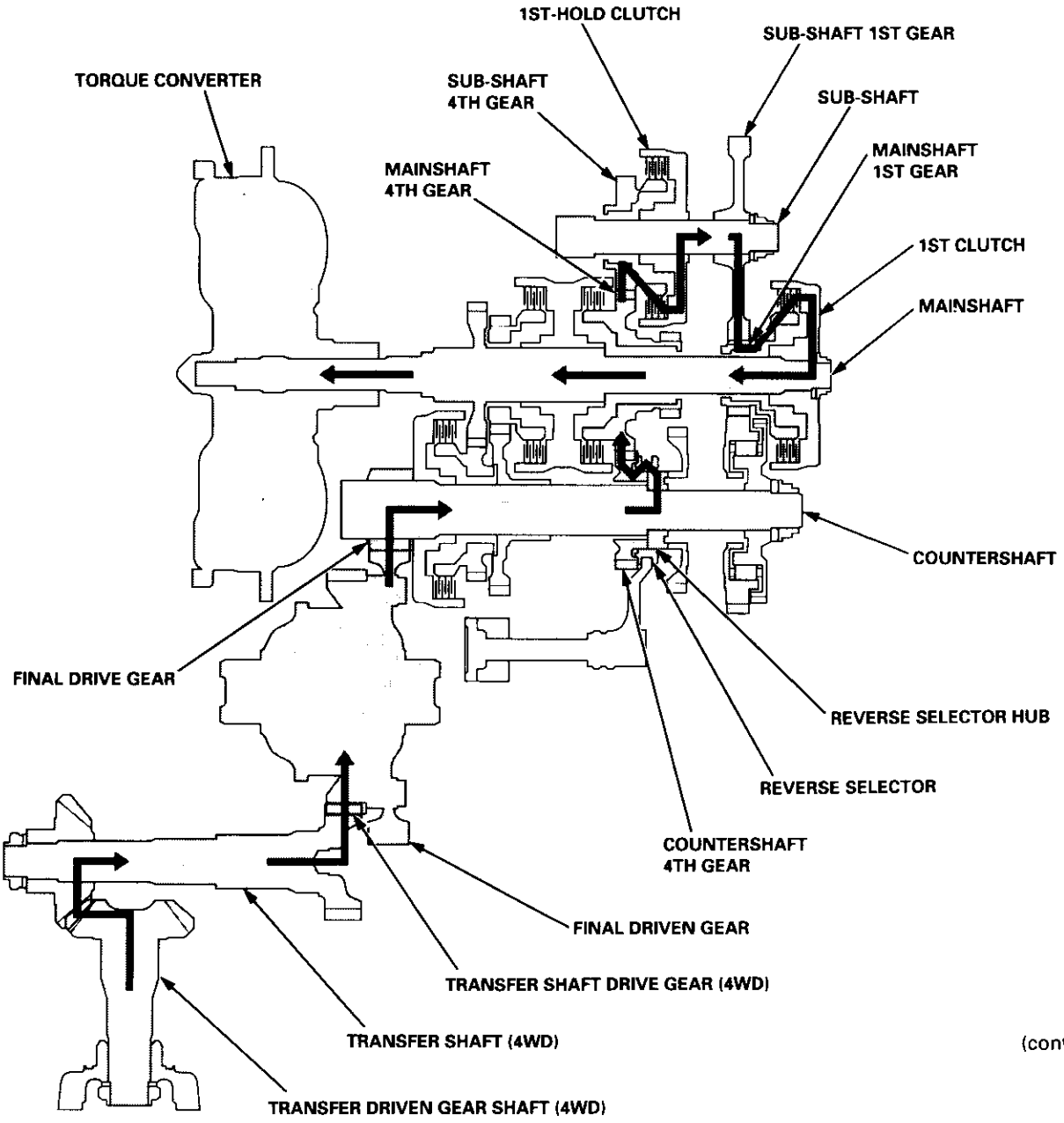
The power flow when decelerating is as follows:

1. Rolling resistance from the road surface goes through the front wheels (and rear wheels: 4WD) to the final drive gear, then to the sub-shaft 1st gear via the 4th gear, and 1st-hold clutch which is applied during deceleration.

2. The one-way clutch is free because the application of torque is reversed.

3. The counterforce conveyed to the countershaft 4th gear turns the sub-shaft 4th gear via the mainshaft 4th gear. Since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear.

   NOTE: The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.



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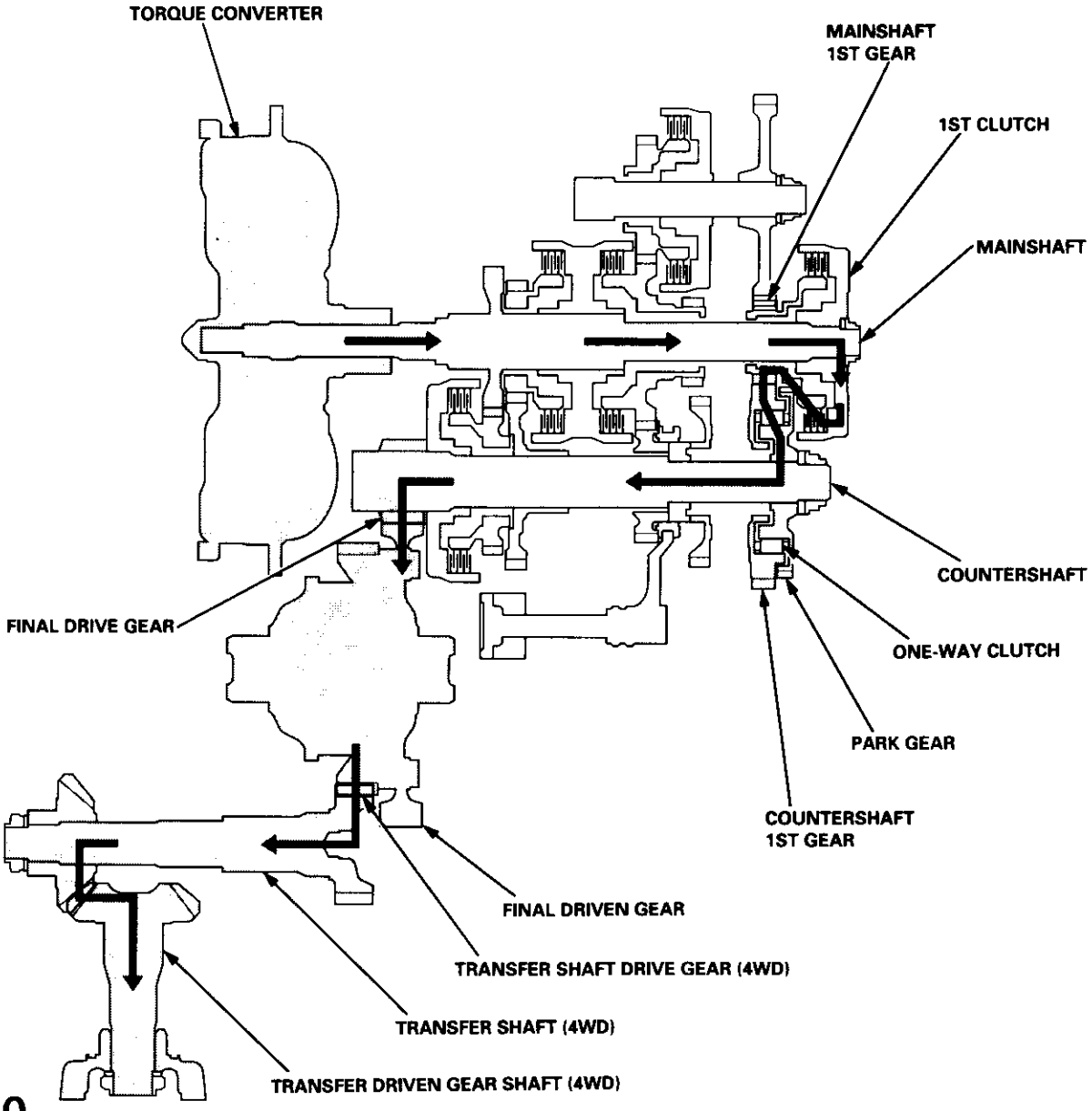
Power Flow (cont'd)

1st Gear (D4, D3 or D position)

In D4, D3, or D position, the optimum gear is selected from 1st, 2nd, 3rd, and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
2. Power is transmitted to the countershaft 1st gear, which drives the countershaft via the one-way clutch.
3. Power is transmitted to the final drive gear, which drives the final driven gear and the transfer shaft drive gear (4WD).
4. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE:
- In D4, D3, D, or 2 position, hydraulic pressure is not applied to the 1st-hold clutch.
- The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.

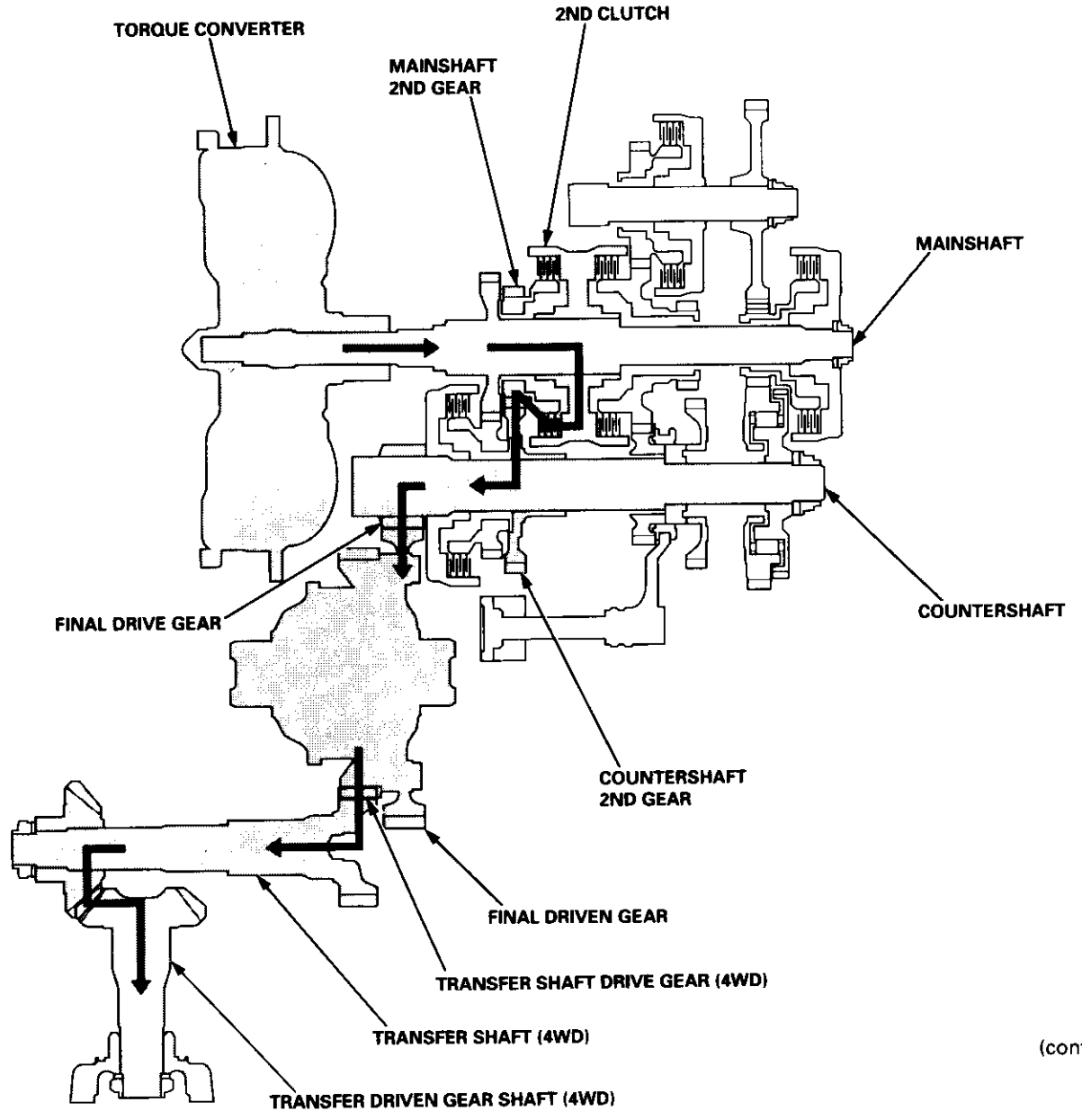


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2nd Gear (D4, D3, D, or 2 position)

1. Hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
2. Power is transmitted to the countershaft 2nd gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear and the transfer shaft drive gear (4WD).
4. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE:
- Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.
- The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.



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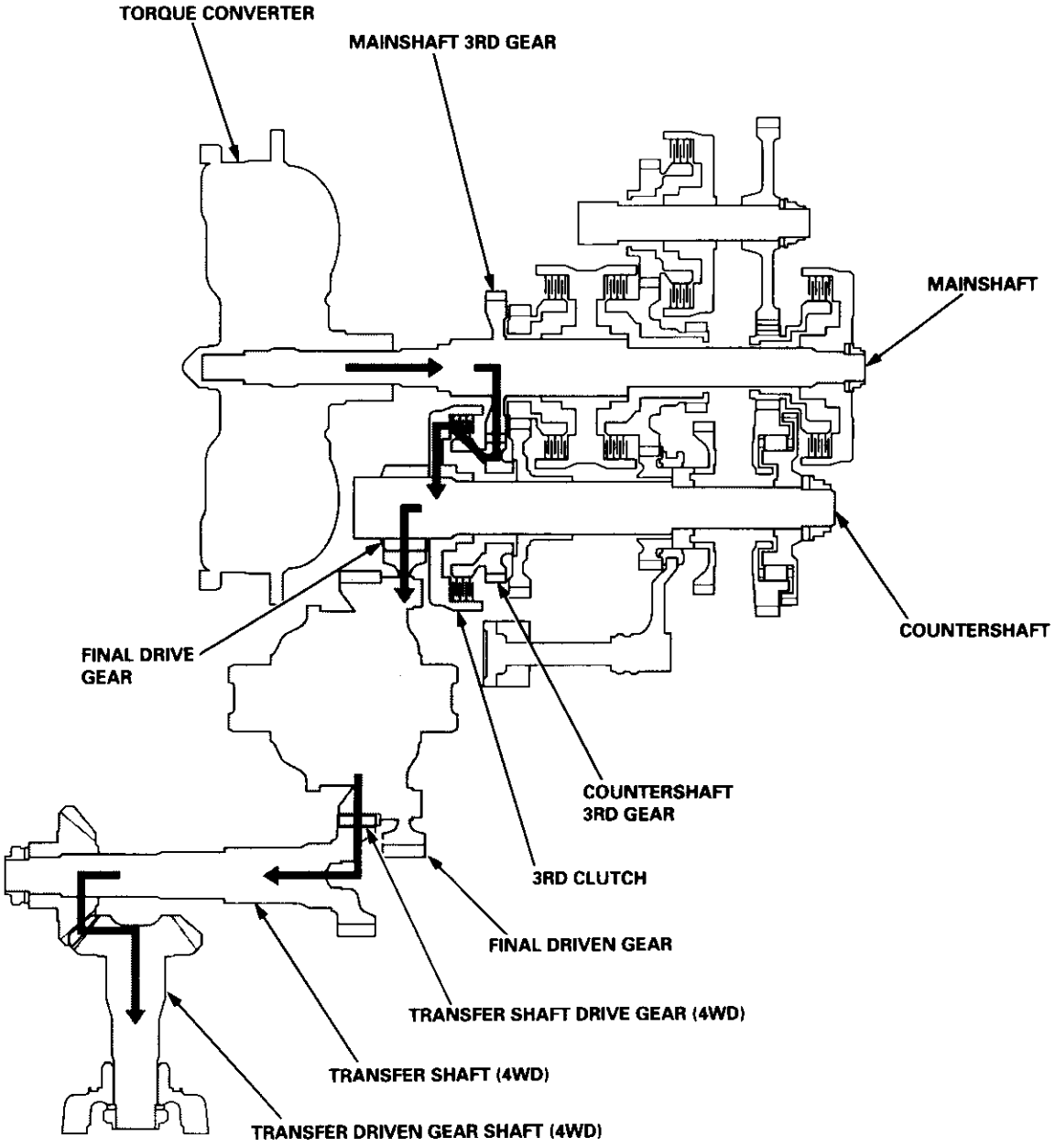
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Power Flow (cont'd)

3rd Gear (D4, D3, or D position)

1. Hydraulic pressure is applied to the 3rd clutch. Power from the mainshaft 3rd gear is transmitted to the countershaft 3rd gear.
2. Power is transmitted to the final drive gear, which drives the final driven gear and the transfer shaft drive gear (4WD).
3. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE:
- Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.
- The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.

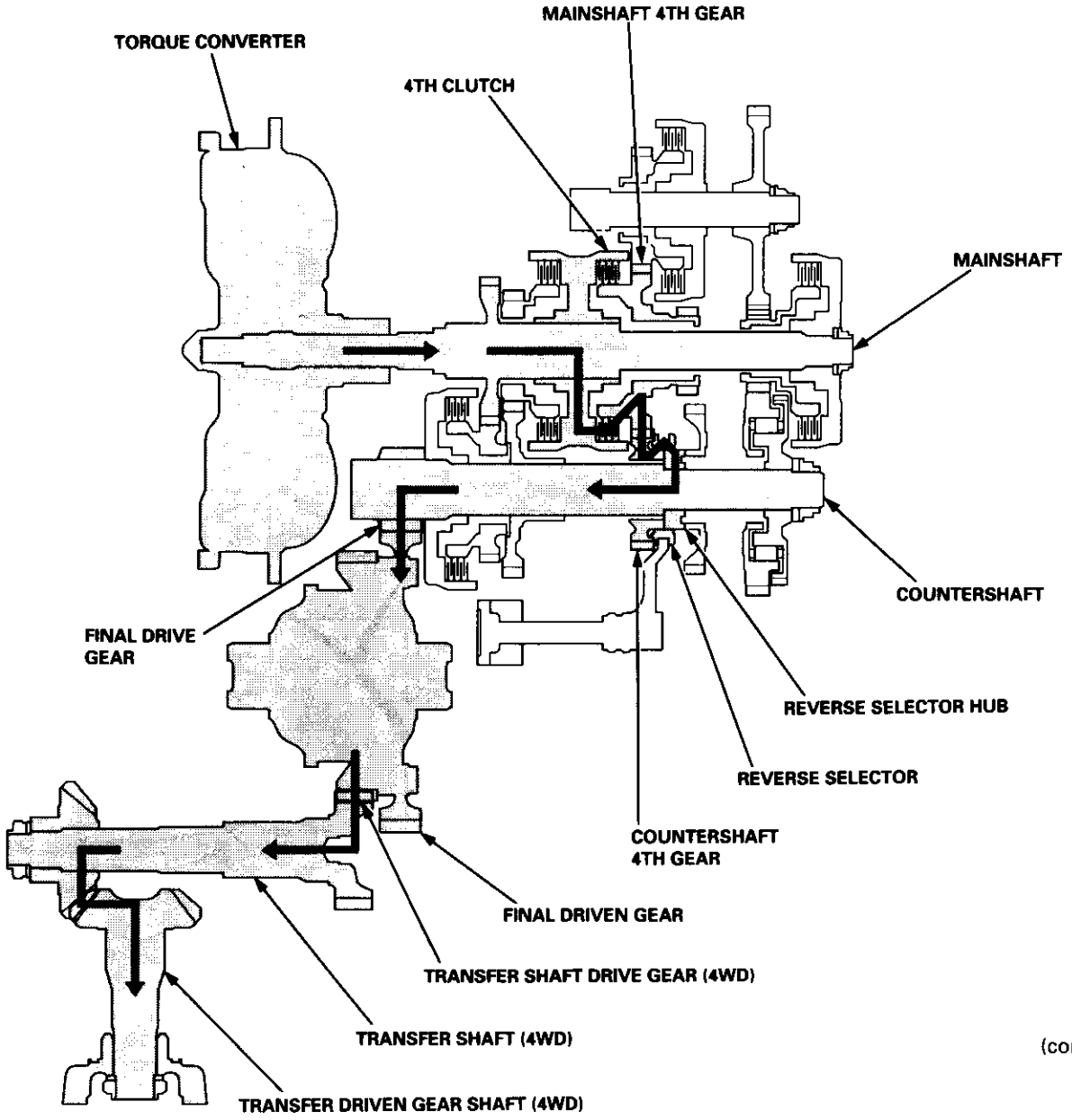


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4th Gear (D4 or D position)

1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
2. Power is transmitted to the countershaft 4th gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear and the transfer shaft drive gear (4WD).
4. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE:
- Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.
- The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.



(cont'd)

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Power Flow (cont'd)

[R] position

1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, the reverse selector hub, and the countershaft reverse gear.

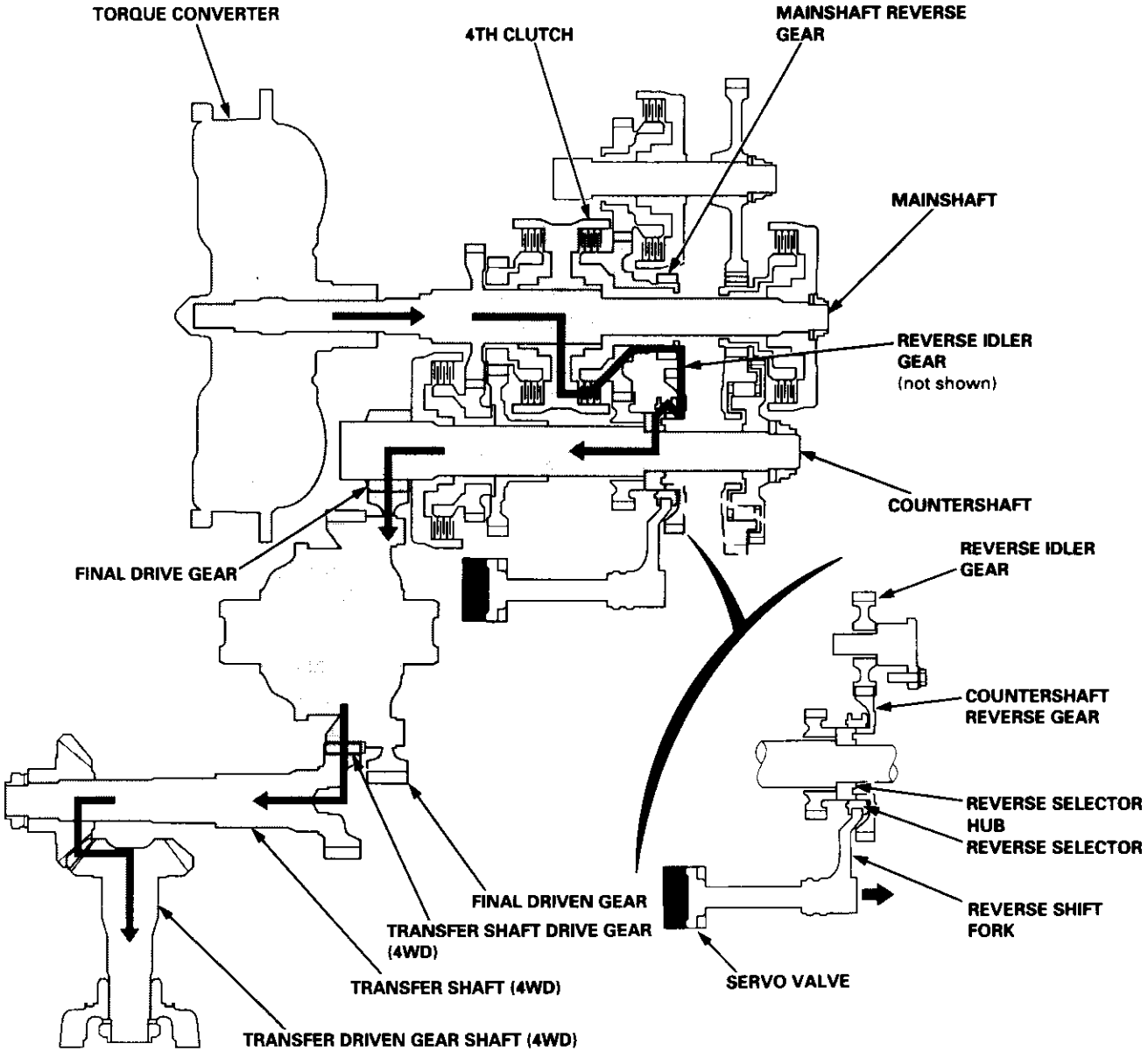
2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.

3. Rotational direction of the countershaft reverse gear is changed via the reverse idler gear.

4. Power is transmitted to the final drive gear, which drives the final driven gear and the transfer shaft drive gear (4WD).

5. The transfer shaft drive gear drives the transfer shaft and the transfer driven gear shaft (4WD).

NOTE: The illustration shows the 4WD automatic transmission; power flow of the 2WD automatic transmission is identical to the 4WD except for parts related to the transfer assembly.

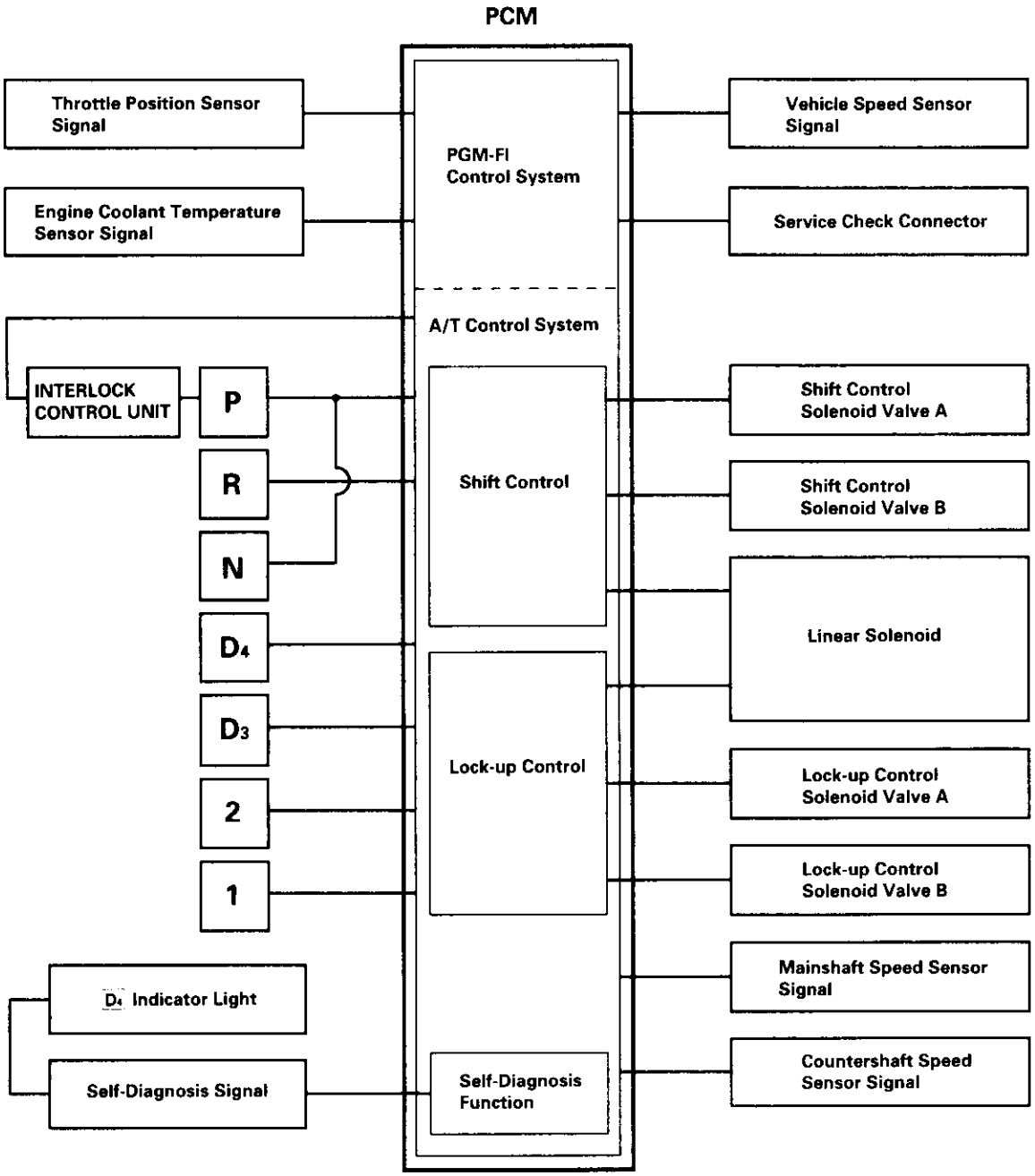


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Electronic Control System

The electronic control system consists of a Powertrain Control Module (PCM), sensors, a linear solenoid, and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The PCM is located below the dashboard, under the kick panel on the passenger's side.

'97 – 98 Models

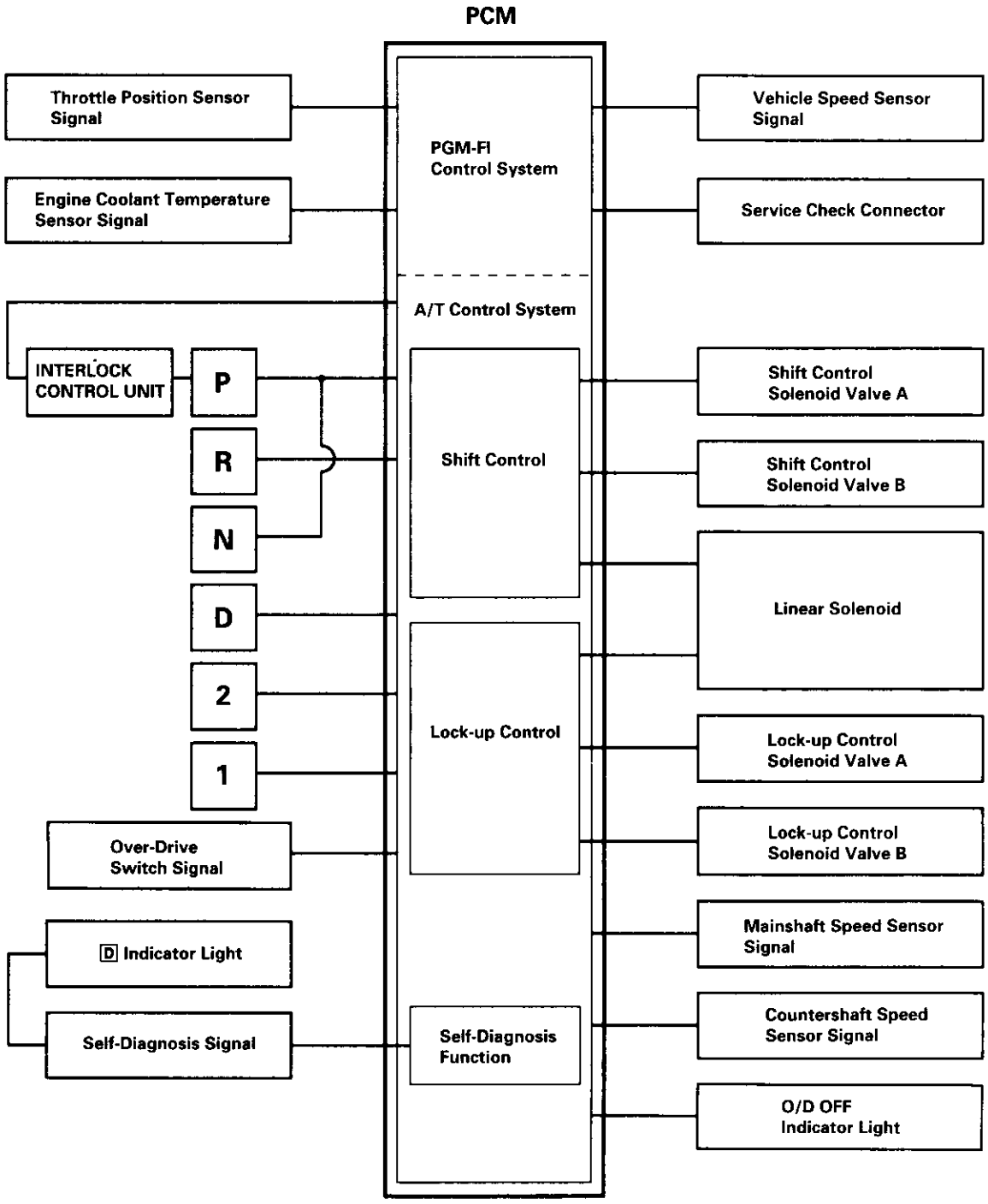


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Electronic Control System (cont'd)

'99 – 00 Models



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Shift Control

The PCM determines which gear should be selected by various signals sent from sensors, and actuates the shift control solenoid valves A and B to control shifting. Also, a Grade Logic Control System has been adopted to control shifting in D4 and D3 ('97 – 98), and D ('99 – 00) position while the vehicle is ascending or descending a slope, or reducing speed.

Position	Gear	Shift Control Solenoid Valve A	Shift Control Solenoid Valve B
D4, D3, or D	1st	OFF	ON
	2nd	ON	ON
	3rd	ON	OFF
D4 or D	4th	OFF	OFF
2	2nd	ON	ON
1	1st	OFF	ON
R*	Reverse	ON	OFF

*See page 14-37 for reverse inhibitor control description.

Lock-up Control

From sensor input signals, the PCM determines whether to turn the lock-up ON or OFF, and activates lock-up control solenoid valve A and/or B accordingly. Lock-up does not occur until the engine is warm. The combination of driving signals to lock-up control solenoid valves A and B and the linear solenoid pressure is shown in the table below.

Lock-up Conditions	Lock-up Control Solenoid Valve A	Lock-up Control Solenoid Valve B	Linear Solenoid Pressure
Lock-up OFF	OFF	OFF	High
Lock-up, Half	ON	Duty operation OFF ↔ ON	Low
Lock-up, Full	ON	ON	High
Lock-up during deceleration	ON	Duty operation OFF ↔ ON	Low

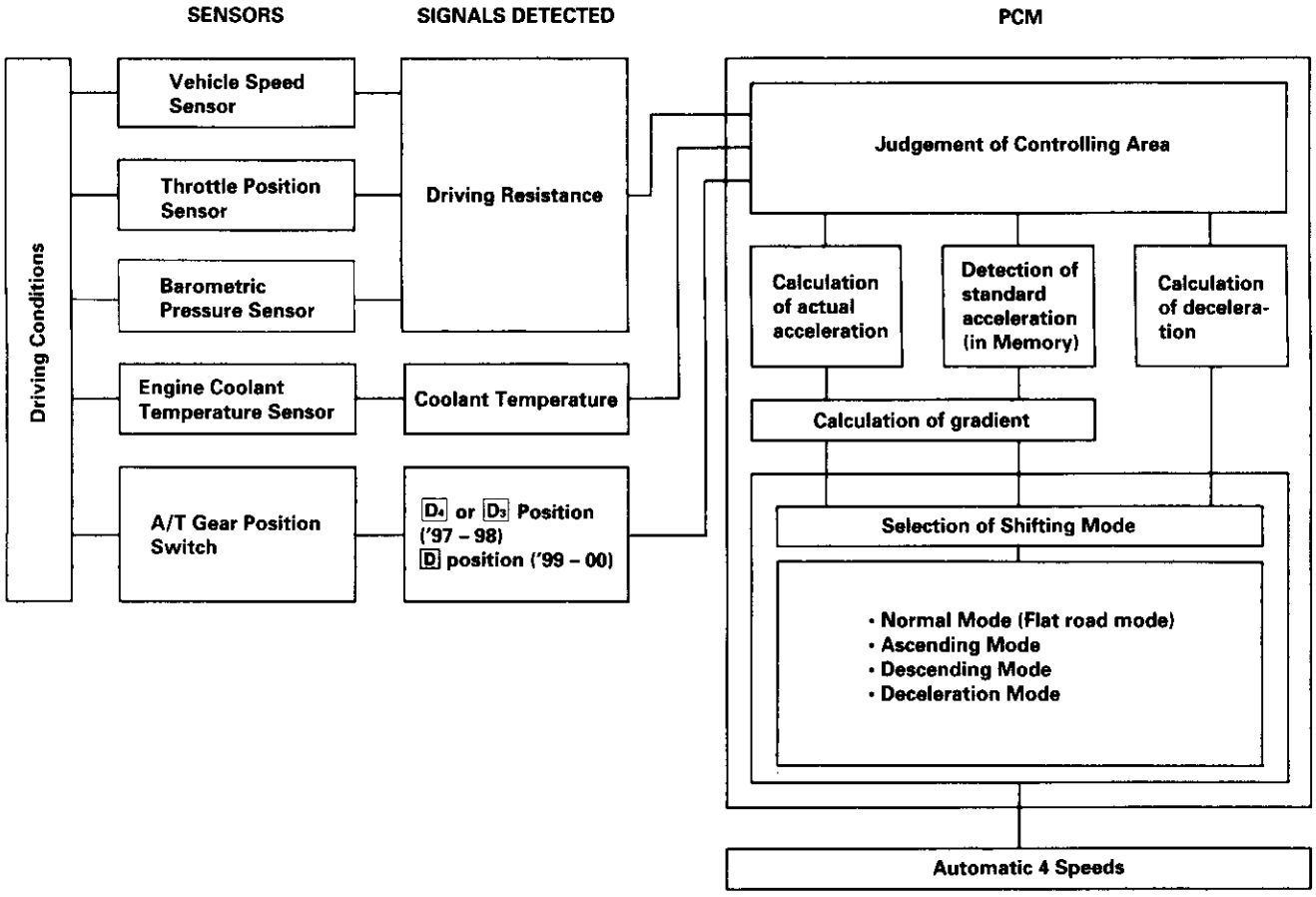
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Electronic Control System (cont'd)

Grade Logic Control System

How it works:
The PCM compares actual driving conditions with memorized driving conditions, based on the input from the vehicle speed sensor, the throttle position sensor, the barometric pressure sensor ('98 model), the engine coolant temperature sensor, the brake switch signal, and the shift lever position signal, to control shifting while the vehicle is ascending or descending a slope, or reducing speed.

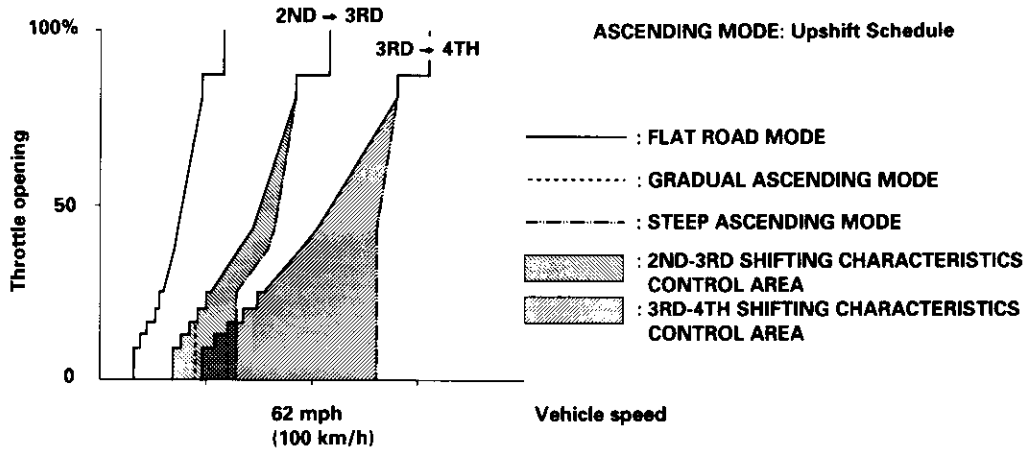


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Ascending Control ('97 Model)

When the PCM determines that the vehicle is climbing a hill in D4 and D3 positions, the system extends the engagement area of 2nd gear and 3rd gear to prevent the transmission from frequently shifting between 2nd and 3rd gears, and between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed.

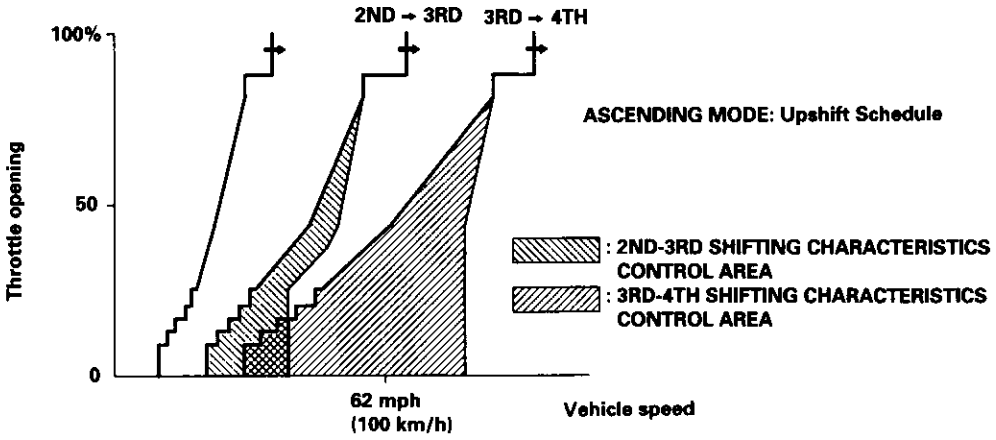
NOTE:
- Shift schedules stored in the PCM between 2nd and 3rd gears, and between 3rd and 4th gears, enable the PCM's fuzzy logic to automatically select the most suitable gear according to the magnitude of a gradient.
- Fuzzy logic is a form of artificial intelligence that lets computers respond to changing conditions much like a human mind would.



Ascending Control ('98 – 00 Models)

When the PCM determines that the vehicle is climbing a hill in D4 and D3 positions ('98 model), and in D position ('99 – 00 models), the system extends the engagement area of 2nd gear and 3rd gear to prevent the transmission from frequently shifting between 2nd and 3rd gears, and between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed.

NOTE: Shift schedules stored in the PCM between 2nd and 3rd gears, and between 3rd and 4th gears, enable to select the most suitable gear according to the magnitude of a gradient.



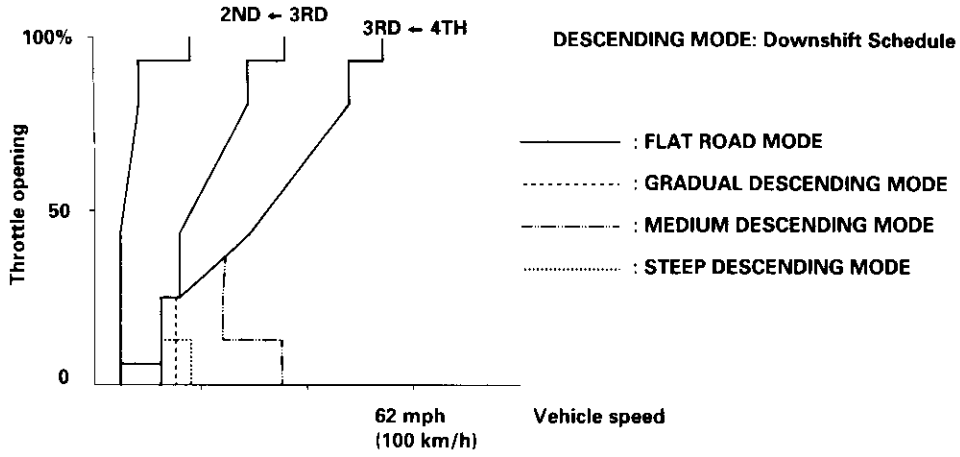
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Electronic Control System (cont'd)

Descending Control

When the PCM determines that the vehicle is going down a hill in D4 and D3 positions ('97 – 98 models), and in D position ('99 – 00 models), the shift-up speed from 3rd to 4th gear and from 2nd to 3rd (when the throttle is closed) becomes faster than the set speed for flat road driving to widen the 3rd gear and 2nd gear driving areas. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending. There are three descending modes with different 3rd gear driving areas and 2nd gear driving areas according to the magnitude of a gradient stored in the PCM. When the vehicle is in 4th gear, and you are decelerating when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to higher gear.

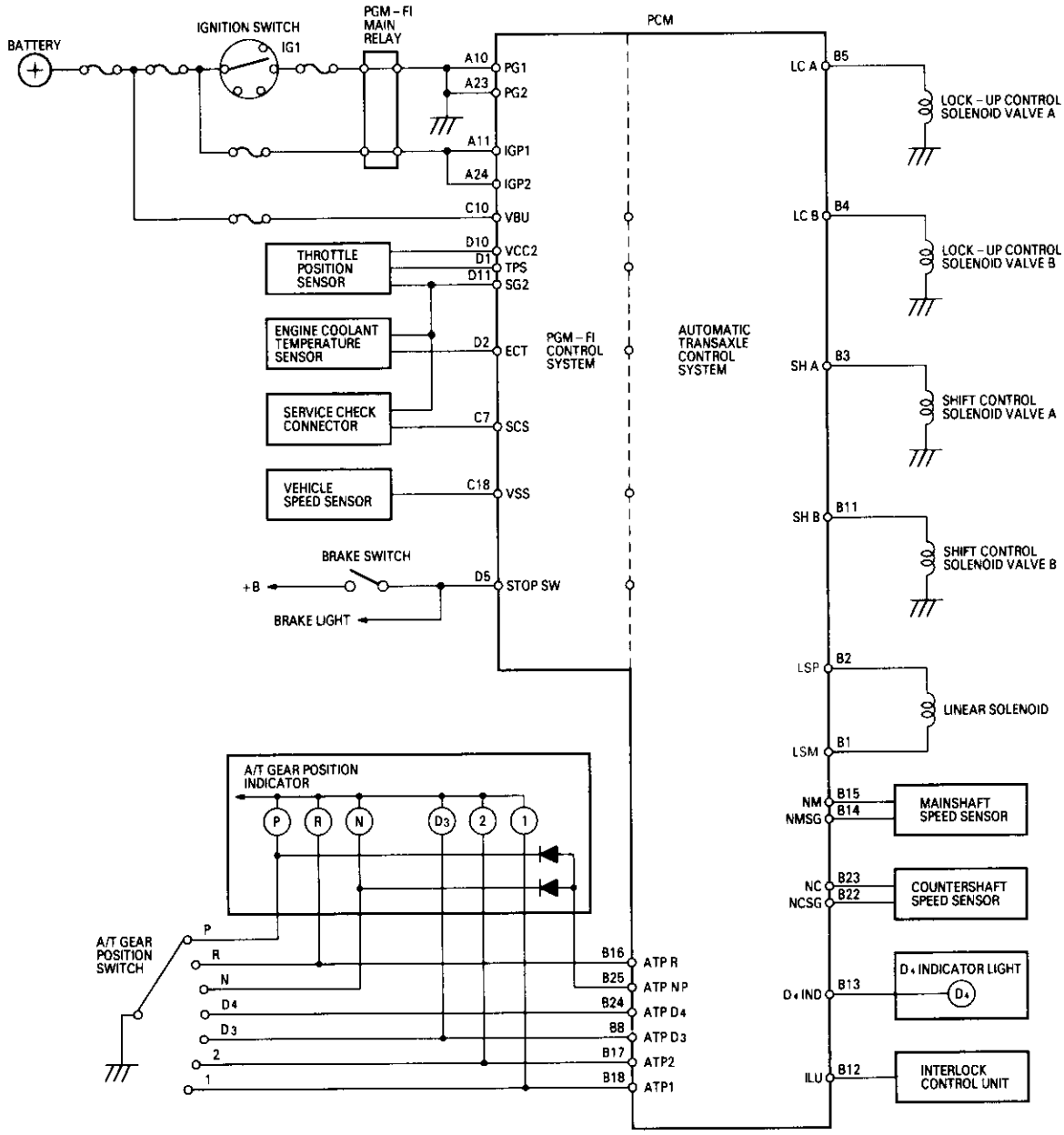


Deceleration Control

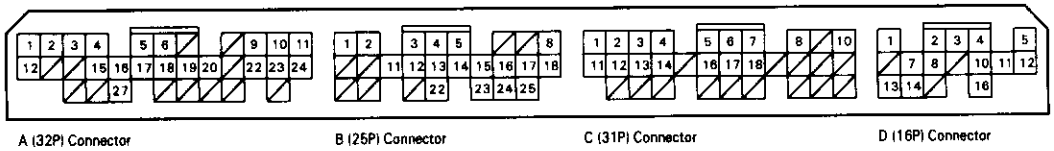
When the vehicle goes around a corner, and needs to decelerate first and then accelerate, the PCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 27 mph (43 km/h), the PCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.

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Circuit Diagram and Terminal Locations-'97 Model



PCM Terminal Locations



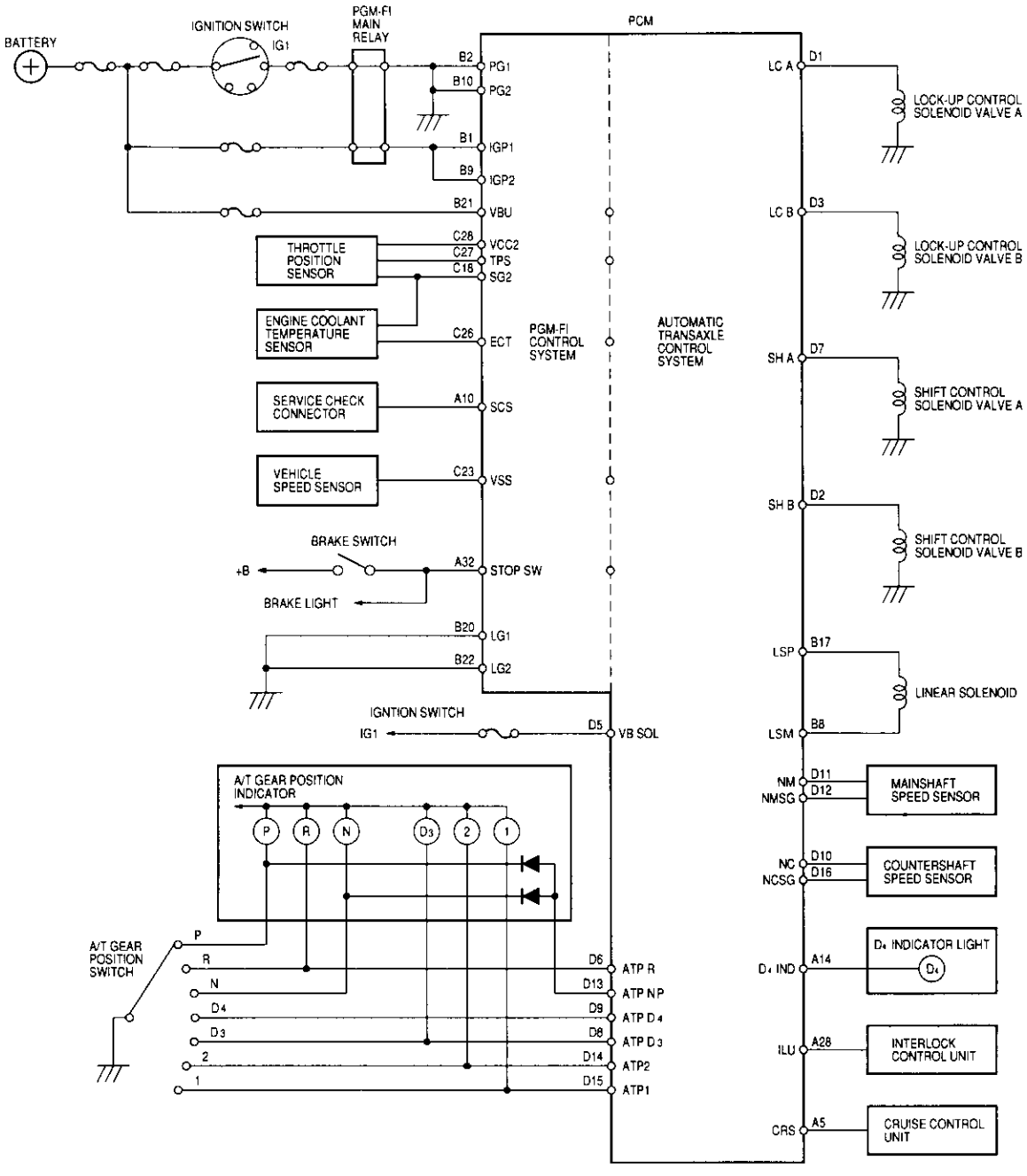
A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

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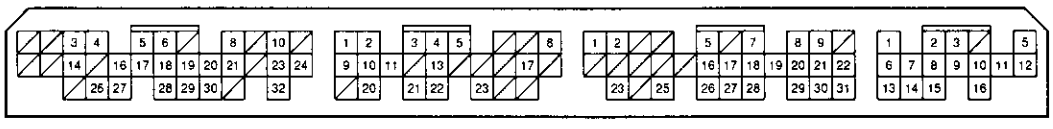
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Electronic Control System (cont'd)

Circuit Diagram and Terminal Locations-'98 Model



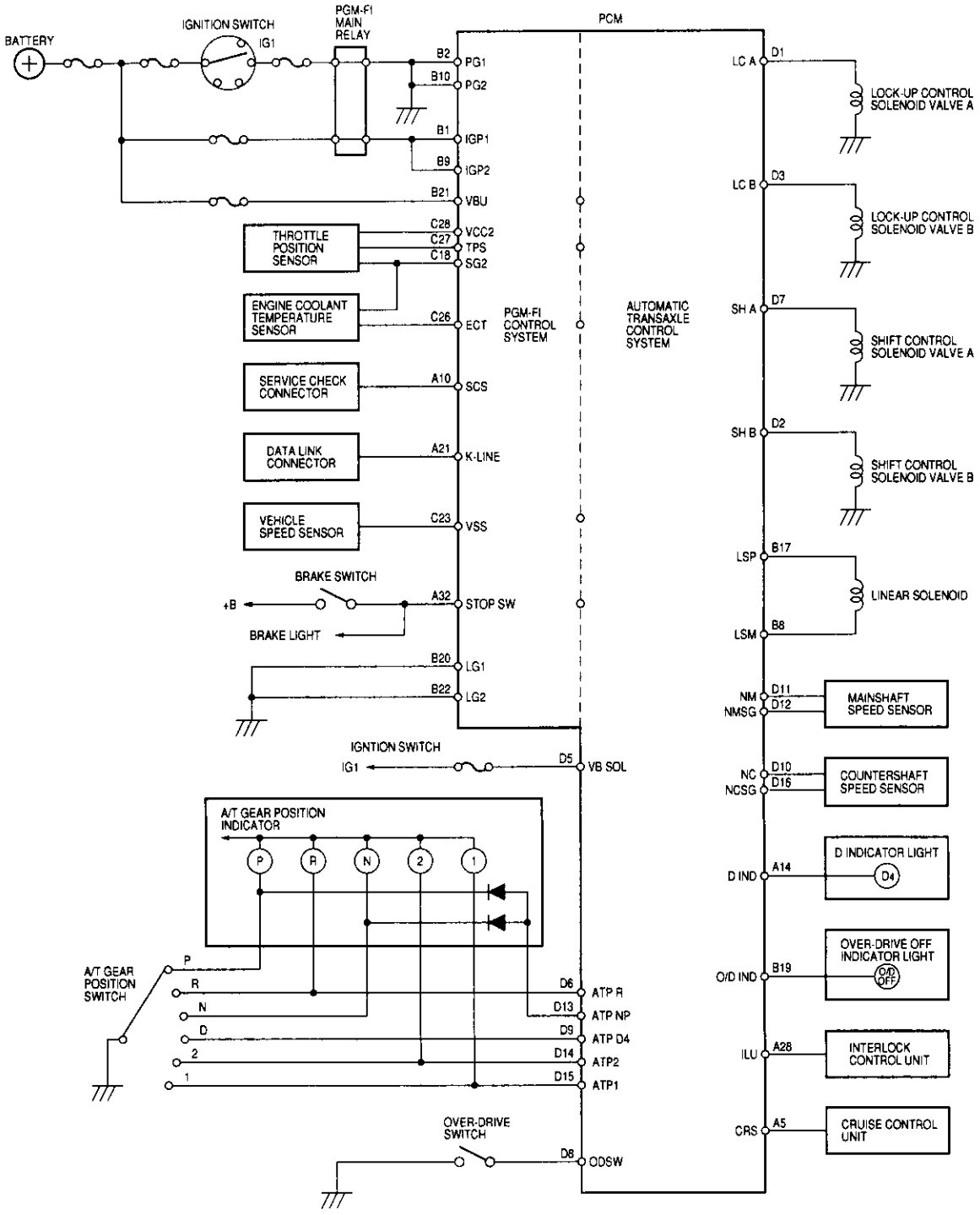
PCM Terminal Locations



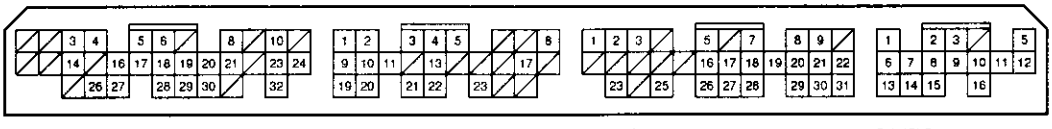
A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

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Circuit Diagram and Terminal Locations-'99 – 00 Models



PCM Connector Terminal Locations



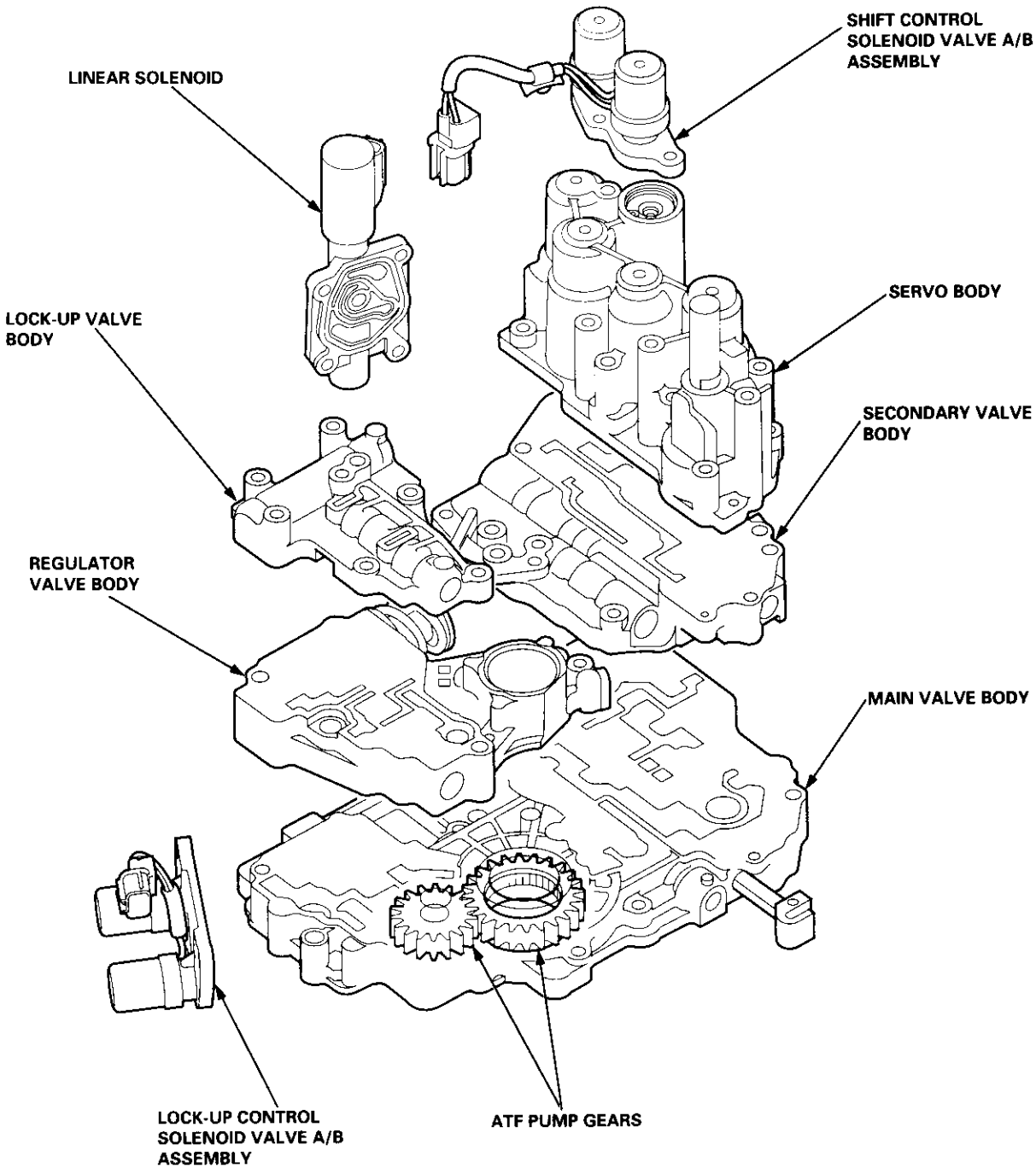
A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

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Description

Hydraulic Control

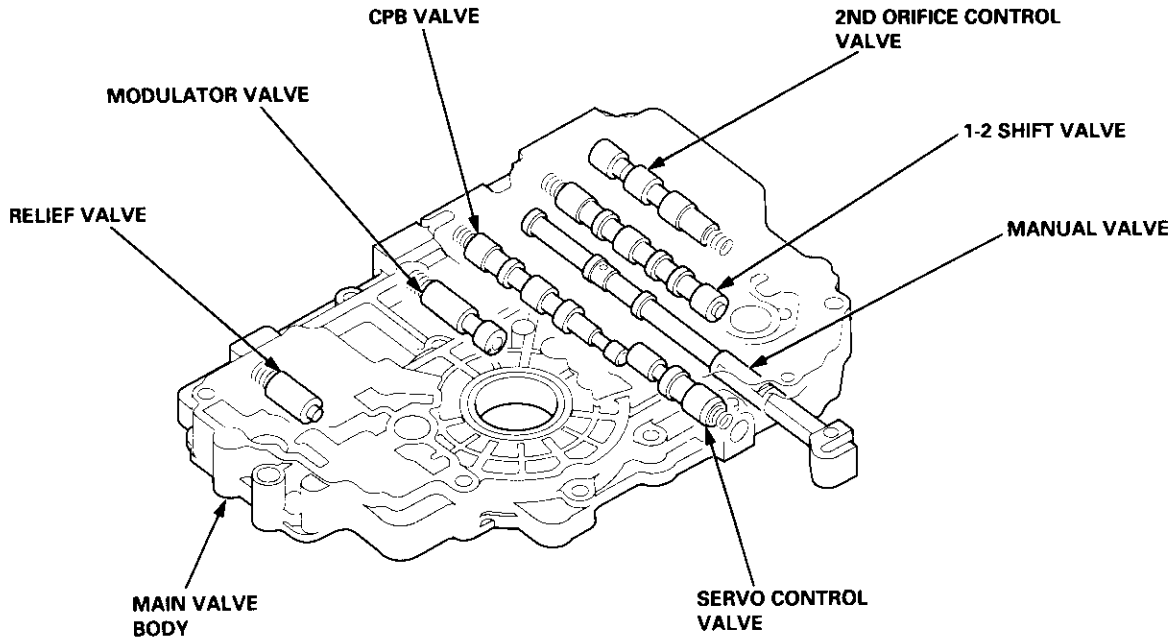
The hydraulic control system is controlled by the ATF pump, valves, accumulators, and electronically controlled solenoids. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine. Fluid from the ATF pump flows through the regulator valve to maintain specified pressure, through the main valve body, to the manual valve, directing pressure to each clutch. The valve body includes the main valve body, the regulator valve body, the lock-up valve body, the secondary valve body, the servo body, the linear solenoid, the shift control solenoid valve A/B assembly, and the lock-up control solenoid valve A/B assembly. The shift control solenoid valve A/B assembly and the linear solenoid are bolted on the outside of the transmission housing. The lock-up control solenoid valve A/B assembly is bolted on the outside of the torque converter housing.



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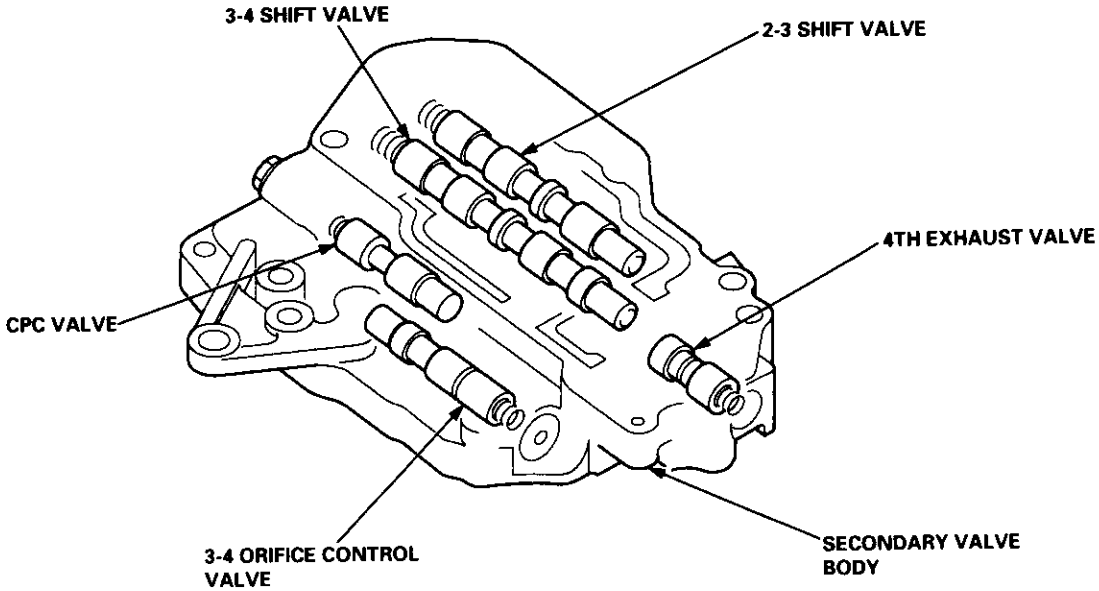
Main Valve Body

The main valve body houses the manual valve, the 1-2 shift valve, the 2nd orifice control valve, the CPB valve, the modulator valve, the servo control valve, and the relief valve. The primary functions of the main valve body are to switch fluid pressure on and off, and to control the hydraulic pressure going to the hydraulic control system.



Secondary Valve Body

The secondary valve body is located on the main valve body. The secondary valve body houses the 2-3 shift valve, the 3-4 shift valve, the 3-4 orifice control valve, the 4th exhaust valve, and the CPC valve.

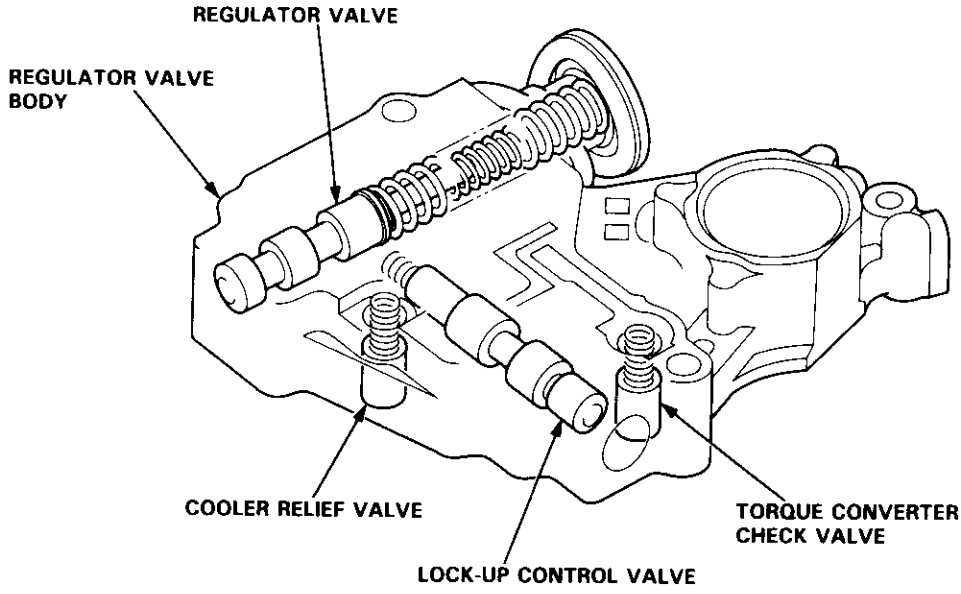


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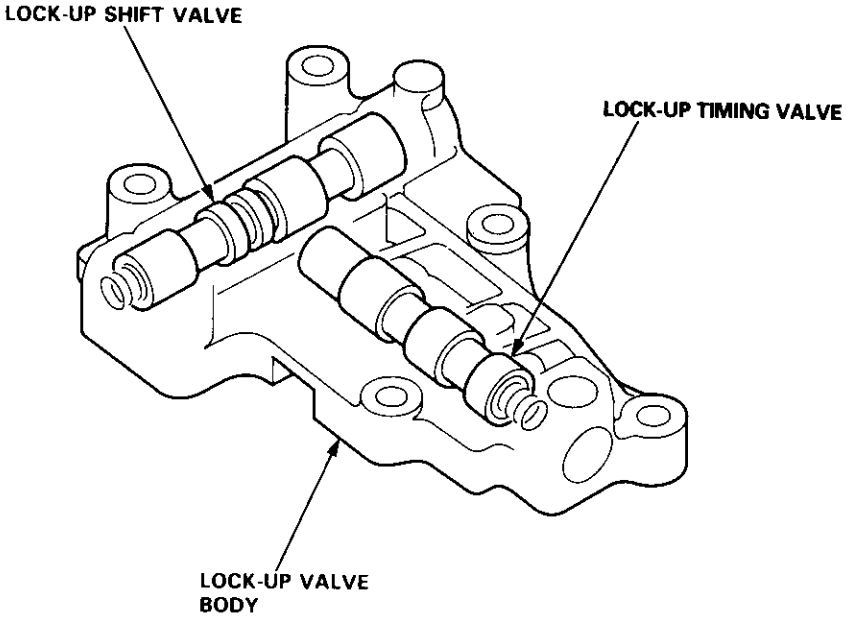
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Hydraulic Control (cont'd)

Regulator Valve Body
The regulator valve body is located on the main valve body. The regulator valve body consists of the regulator valve, the torque converter check valve, the cooler relief valve, and the lock-up control valve.



Lock-up Valve Body
The lock-up valve body, with lock-up shift valve and lock-up timing valve, is located on the regulator valve body.

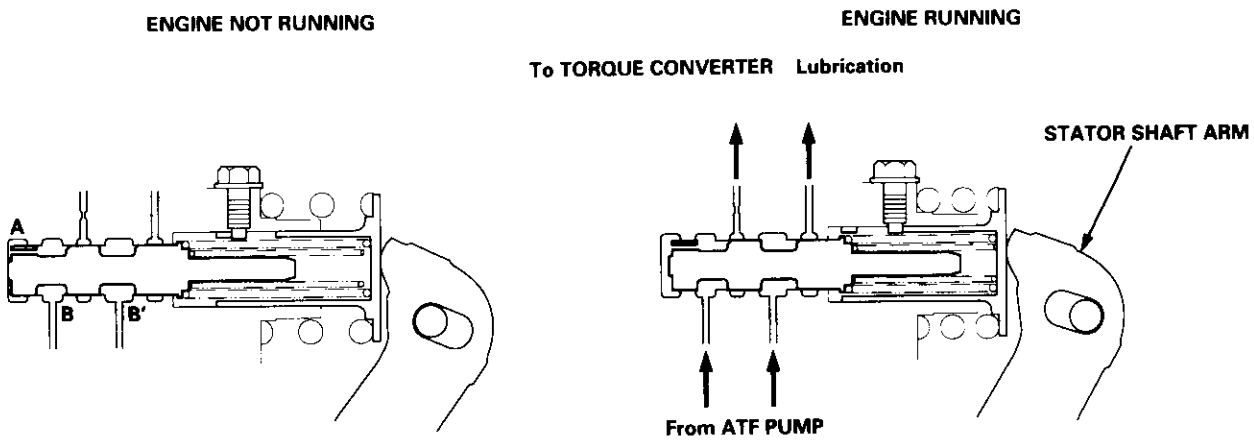


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Regulator Valve

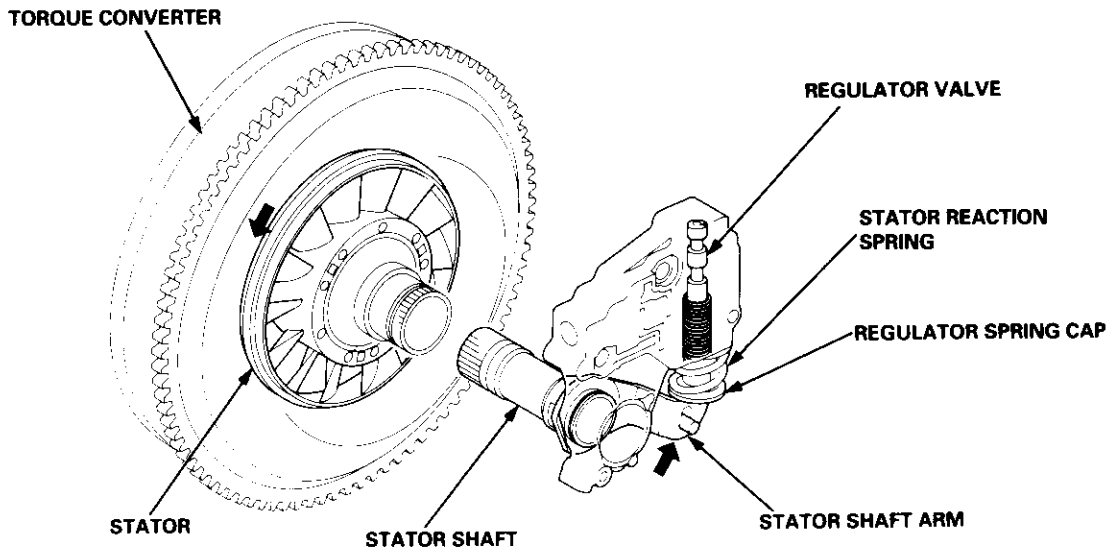
The regulator valve maintains constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter. Fluid from the ATF pump flows through B and B'. Fluid entering from B flows through the valve orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the right side, and this movement of the regulator valve uncovers the fluid port to the torque converter and the relief valve. The fluid flows out to the torque converter and the relief valve, and the regulator valve moves to the left side. According to the level of the hydraulic pressure through B, the position of the regulator valve changes and the amount of fluid from B' through the torque converter also changes. This operation is continued, maintaining the line pressure.

NOTE: When used, "left" or "right" indicates direction on the illustration below.



Stator Reaction Hydraulic Pressure Control

Increases in hydraulic pressure according to torque are performed by the regulator valve using stator torque reaction. The stator shaft is splined to the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the direction of the arrow in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the line pressure. Line pressure reaches its maximum when the stator torque reaction reaches its maximum.



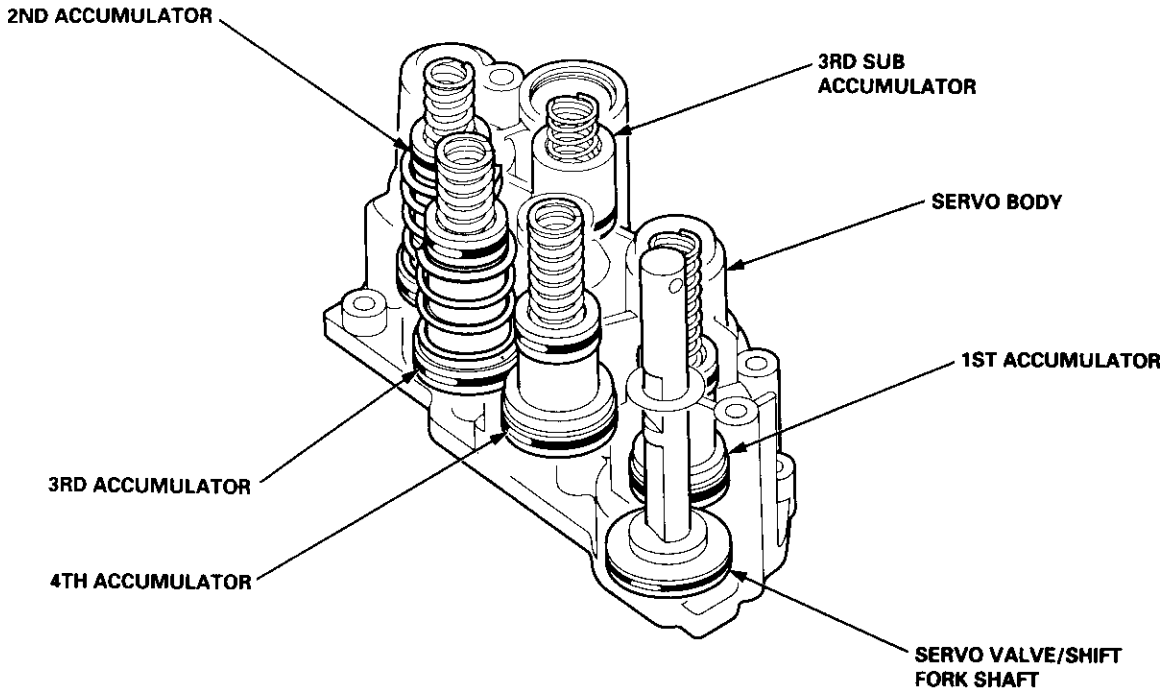
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Hydraulic Control (cont'd)

Servo Body

The servo body is located on the secondary valve body. The servo body contains the servo valve (which is integrated with the reverse shift fork), and the accumulators.



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Hydraulic Flow

General Chart of Hydraulic Pressure

ATF Pump → Regulator Valve → Line Pressure → Modulator Pressure → Linear Solenoid
Line Pressure → Clutch Pressure
Line Pressure → Torque Converter Pressure
Line Pressure → Lubrication Pressure

Distribution of Hydraulic Pressure

- Regulator Valve → Torque Converter Pressure
  Regulator Valve → Lubrication Pressure
  Regulator Valve → To regulate Line Pressure
- Manual Valve → To select Line Pressure → Clutch Pressure
- Modulator Valve → Modulator Pressure → Shift Control Solenoid Valves
  Modulator Pressure → Lock-up Control Solenoid Valves
  Modulator Pressure → Linear Solenoid
- 1-2 Shift Valve → Clutch Pressure
- 2-3 Shift Valve → Clutch Pressure
- 3-4 Shift Valve → Clutch Pressure

PORT NO.	DESCRIPTION OF PRESSURE	PORT NO.	DESCRIPTION OF PRESSURE
1	LINE	15	1ST-HOLD CLUTCH
1'	LINE	16	1ST-HOLD CLUTCH
1''	LINE	17	1ST-HOLD CLUTCH
2	LINE	18	1ST-HOLD CLUTCH
3	LINE	20	2ND CLUTCH
3'	LINE	20A	2ND ACCUMULATOR
3''	LINE	30	3RD CLUTCH
4	LINE	40	4TH CLUTCH
4'	LINE	41	4TH CLUTCH
4''	LINE	56	LINEAR SOLENOID
5	CPC	90	TORQUE CONVERTER
6	MODULATE	91	TORQUE CONVERTER
6A	MODULATE (SHIFT CONTROL SOLENOID VALVE A)	92	TORQUE CONVERTER
6B	MODULATE (SHIFT CONTROL SOLENOID VALVE B)	93	ATF COOLER
6C	MODULATE (LOCK-UP CONTROL SOLENOID VALVE A)	94	TORQUE CONVERTER
6D	MODULATE (LOCK-UP CONTROL SOLENOID VALVE B)	95	LUBRICATION
6D'	MODULATE (LOCK-UP CONTROL SOLENOID VALVE B)	96	TORQUE CONVERTER
7	LINE	97	TORQUE CONVERTER
8	LINE/CPC	99	SUCTION
9	LINE	X	DRAIN
10	1ST CLUTCH	HIX	HIGH POSITION DRAIN

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Description

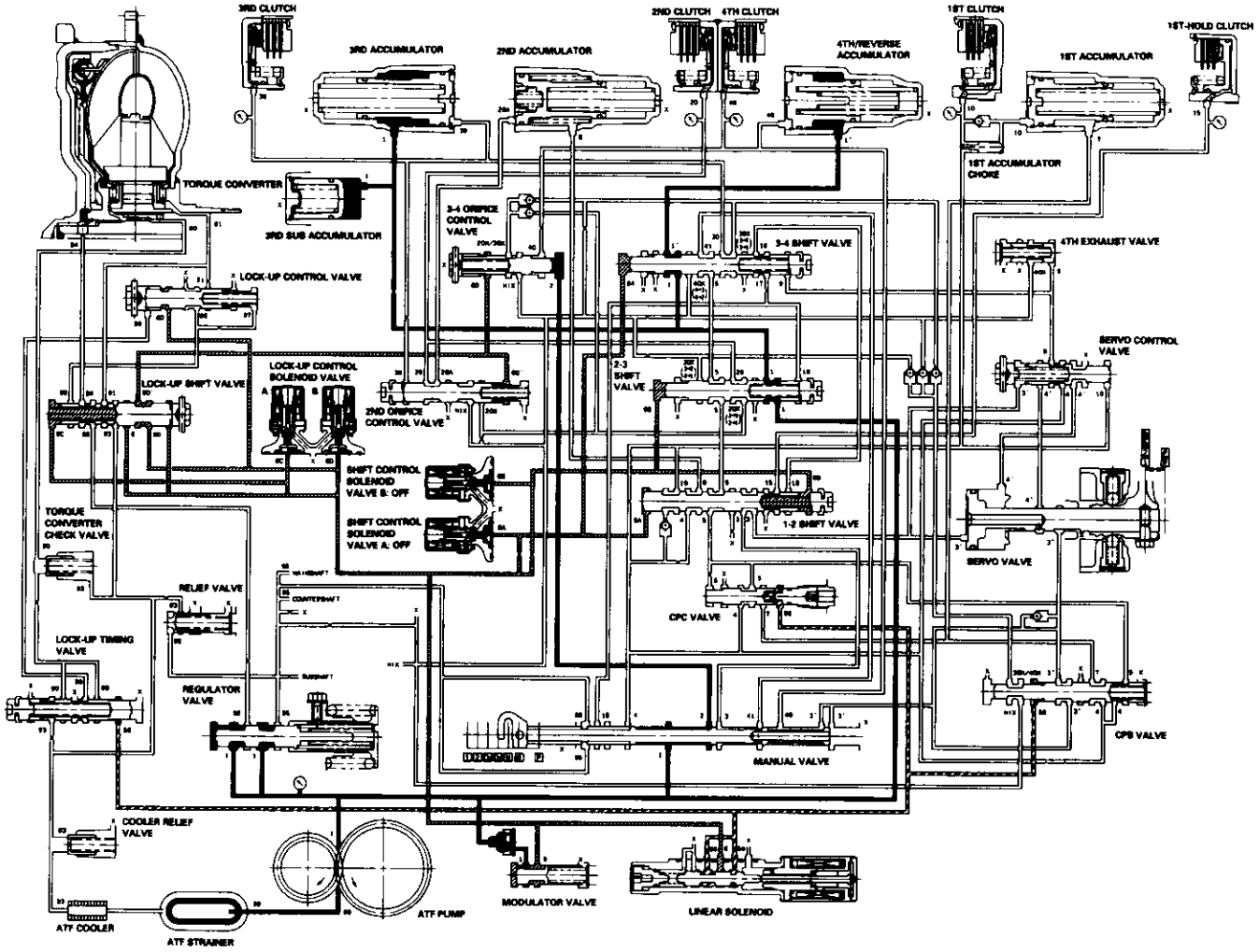
Hydraulic Flow (cont'd)

[N] Position

As the engine turns, the ATF pump starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF flowing from the ATF pump becomes line pressure (1). Line pressure (1) is regulated by the regulator valve. Torque converter inlet pressure (92) enters (94) of the torque converter through the lock-up shift valve and discharges into (90). The torque converter check valve prevents torque converter pressure from rising. Under this condition, hydraulic pressure is not applied to the clutches.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.

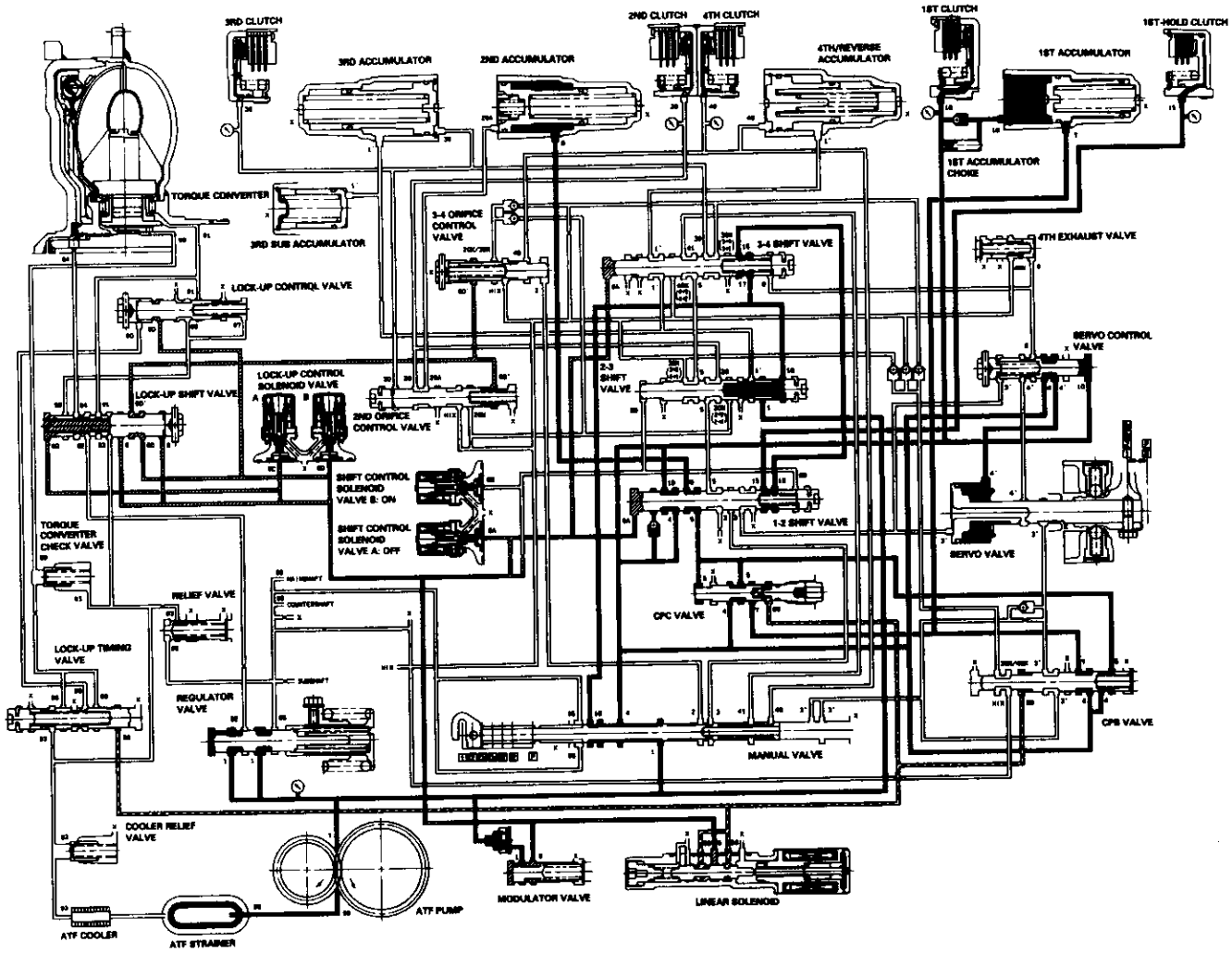


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1 Position

Line pressure (1) flows to the manual valve and the modulator valve. Line pressure (1) changes to line pressure (4) and 1st-hold clutch pressure at the manual valve, and changes to modulator pressure at the modulator valve. Modulator pressure (6) flows to the left ends of the 1-2 shift valve and 3-4 shift valve because shift control solenoid valve A is turned OFF by the PCM. The 1-2 shift valve and the 3-4 shift valve are moved to the right side. Line pressure (4) becomes 1st clutch pressure (10) at the 1-2 shift valve. 1st clutch pressure (10) is applied to the 1st clutch, and the 1st clutch is engaged. 1st-hold clutch pressure (18) flows to the 1st-hold clutch via the 3-4 shift valve and the 1-2 shift valve. Power is transmitted only during deceleration through the 1st-hold clutch.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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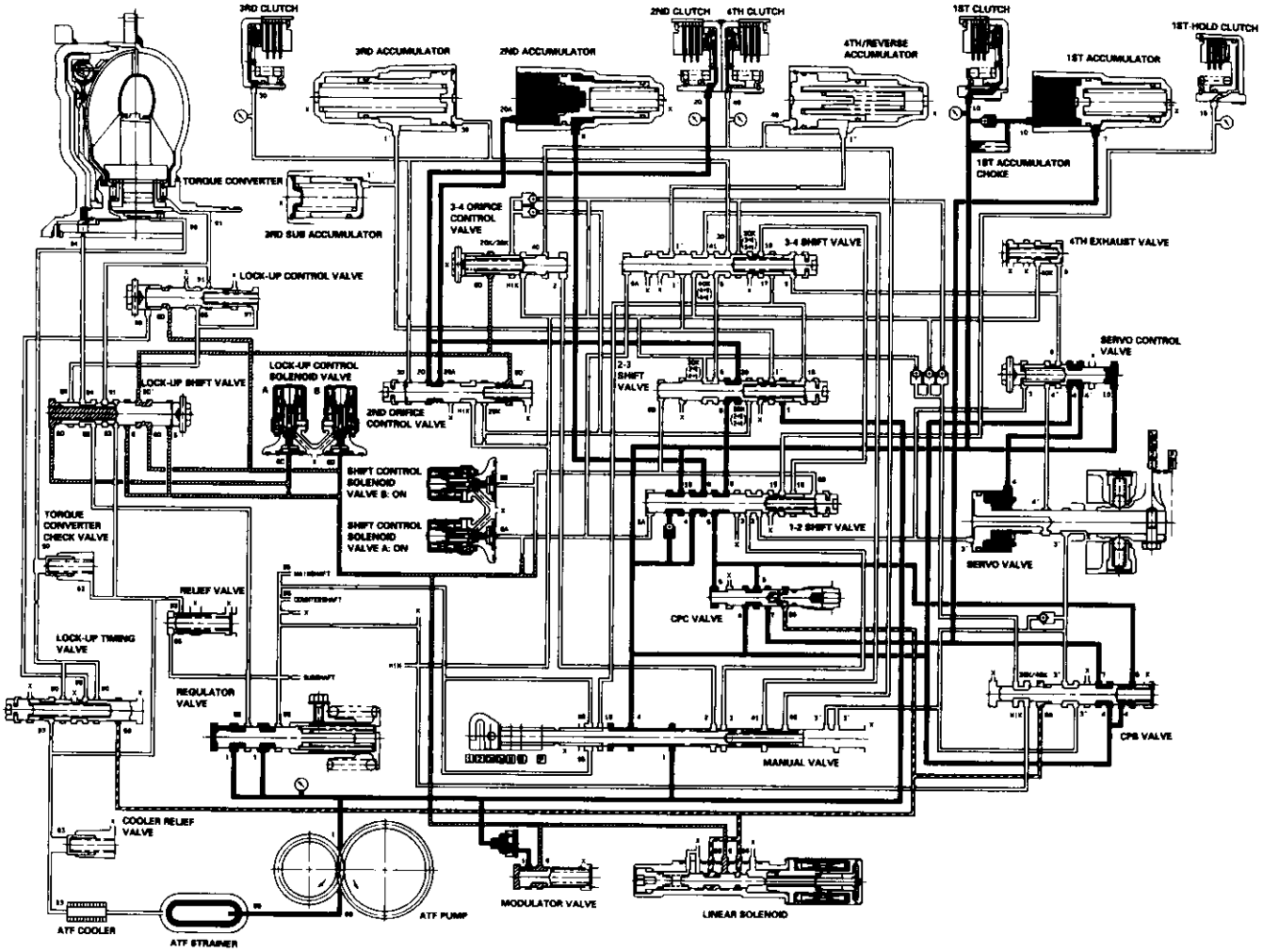
Hydraulic Flow (cont'd)

2 Position

Line pressure (1) flows to the manual valve and the modulator valve. Line pressure (1) changes to line pressure (4) at the manual valve, and changes to modulator pressure at the modulator valve. But modulator pressure (6) does not flow to each shift valve because shift control solenoid valves A and B are turned ON by the PCM. Line pressure (4) passes through the CPB valve and the CPC valve, and changes to line pressure (5), then flows to the 1-2 shift valve. Line pressure (5) from the 1-2 shift valve changes to 2nd clutch pressure (20) at the 2-3 shift valve. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged. Line pressure (4) passes through the 1-2 shift valve and the orifice, and changes to 1st clutch pressure. The 1st clutch pressure (10) also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



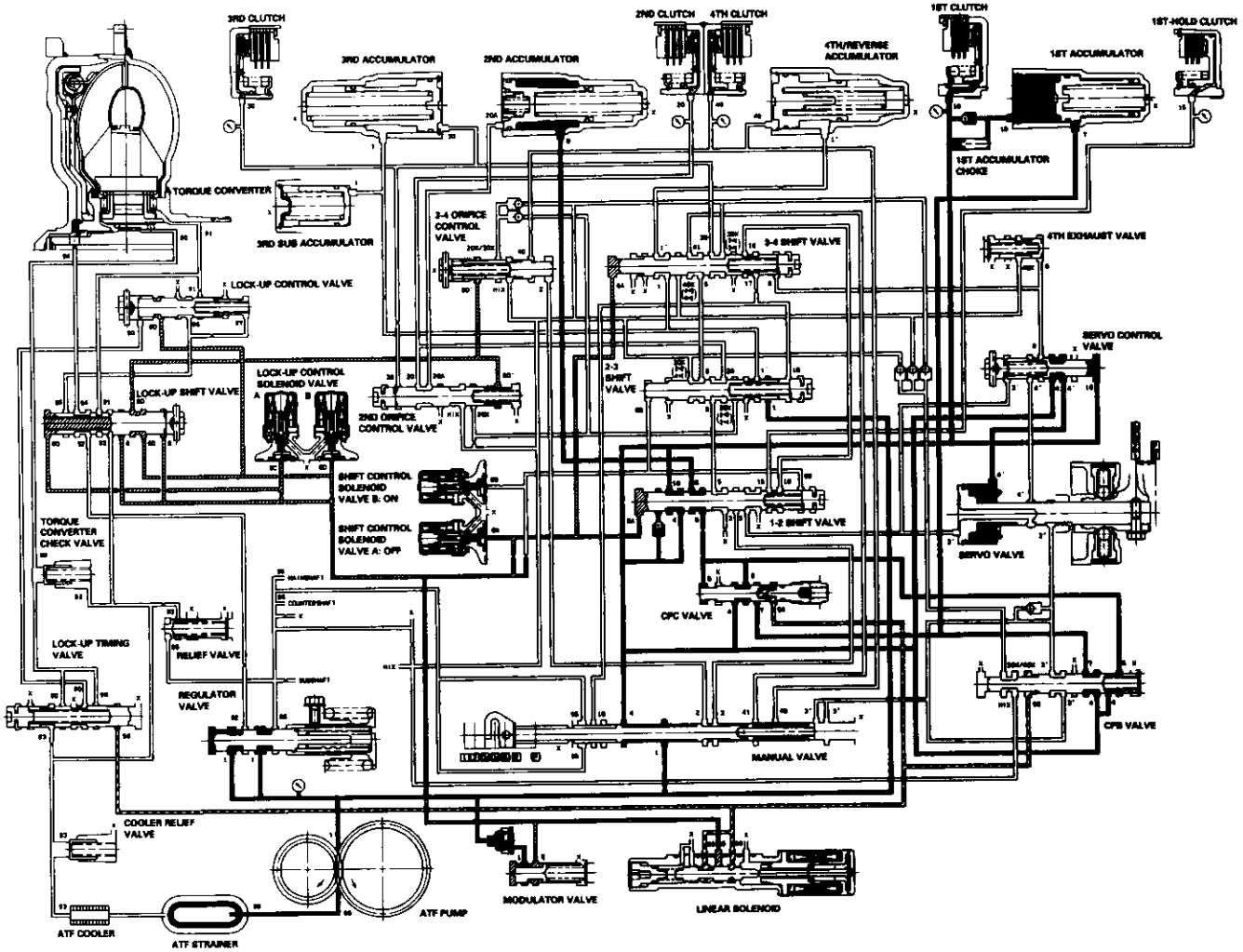
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D4 or D3 Position ('97 – 98 Models), and D Position ('99 – 00 Models)

1. 1st Gear

Fluid flow through the torque converter circuit is the same as in N position. Line pressure flows to the manual valve and the modulator valve. Line pressure changes to modulator pressure (6) at the modulator valve and to line pressure (4) at the manual valve. Modulator pressure (6) flows to the left end of the 1-2 shift valve and the 3-4 shift valve because shift control solenoid valve A is turned OFF and B is turned ON by the PCM. The 1-2 shift valve is moved to the right side. Line pressure (4) changes to 1st clutch pressure (10) at the 1-2 shift valve and the orifice. The 1st clutch pressure (10) is applied to the 1st clutch and the 1st accumulator; the vehicle will move as the engine power is transmitted.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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Hydraulic Flow (cont'd)

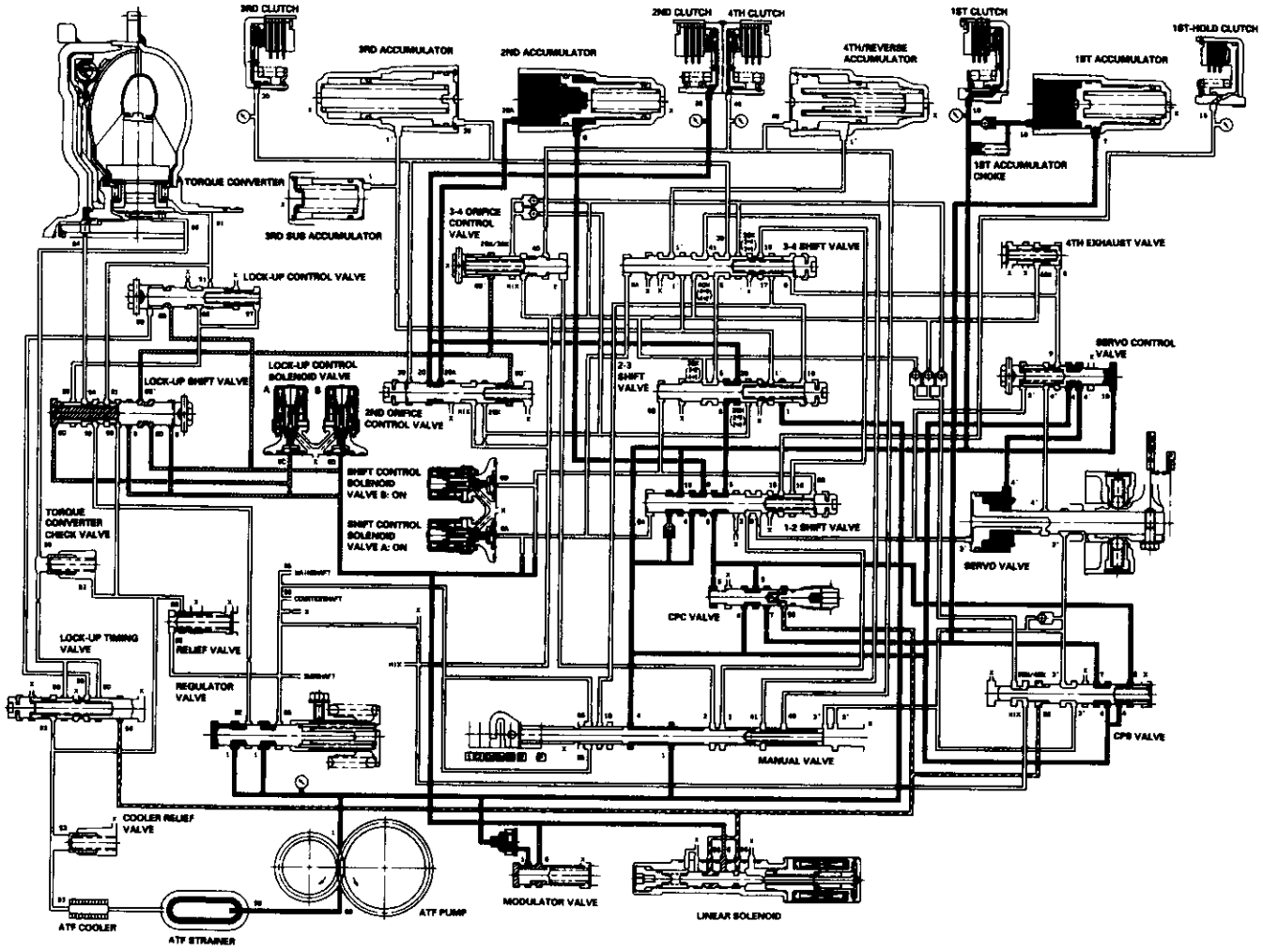
2. 2nd Gear

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned ON by the PCM. Modulator pressure (6A) in the left end of the 1-2 shift valve is released by turning shift control solenoid valve A ON. The 1-2 shift valve is moved to the left side and uncovers the port to allow line pressure (5) to the 2-3 shift valve. Line pressure (5) changes to 2nd clutch pressure (20) at the 2-3 shift valve. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.

Fluid flows by way of:
- Line Pressure (4) → CPB Valve – Line Pressure (5) → 1-2 Shift Valve – Line Pressure (5) → 2-3 Shift Valve
- 2nd Clutch Pressure (20) → 2nd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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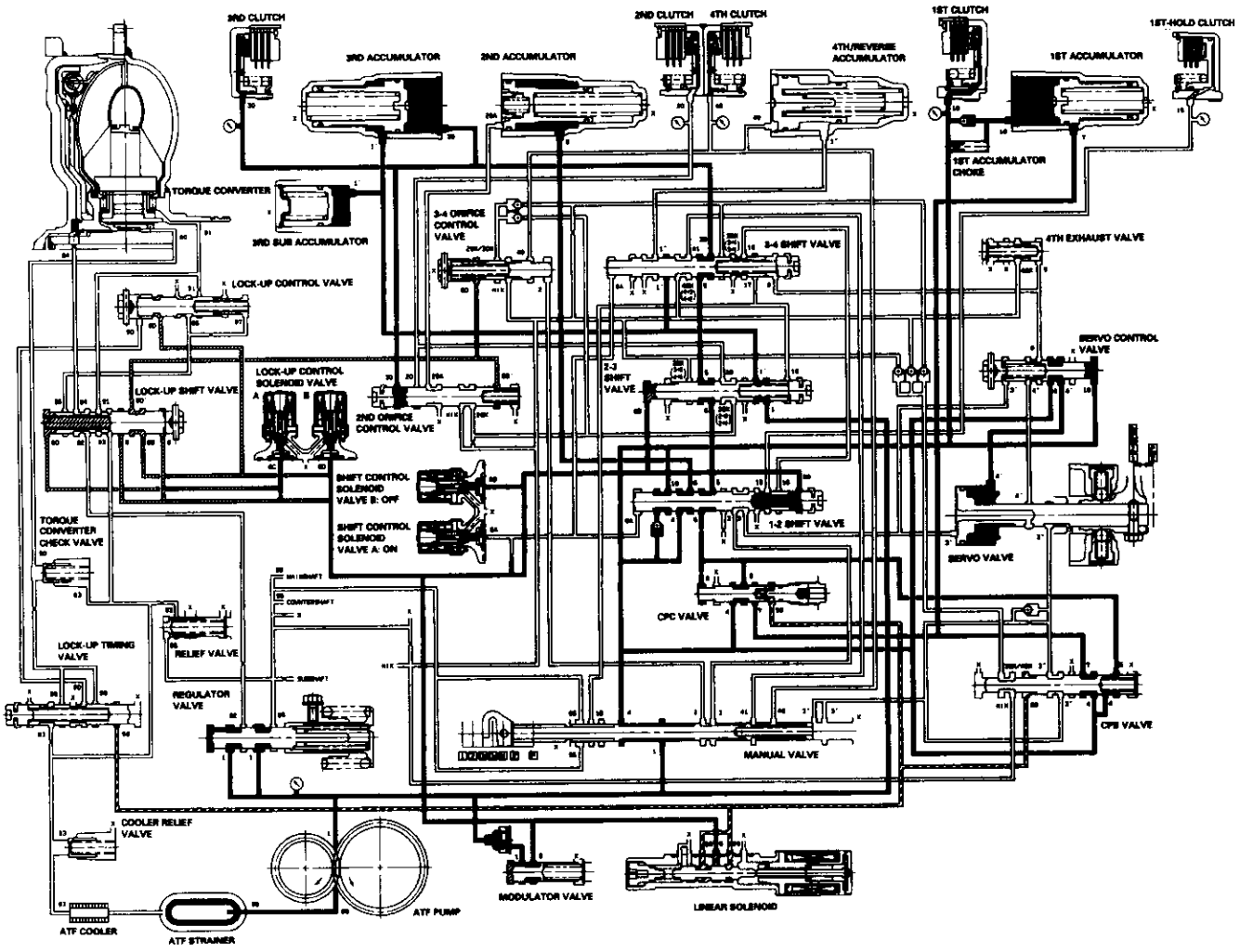
3. 3rd Gear

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve B is turned OFF by the PCM. Shift control solenoid valve A remains ON. Modulator pressure (6) flows to the right end of the 1-2 shift valve and the left end of the 2-3 shift valve. The 2-3 shift valve is moved to the right side by modulator pressure (6B). The 2-3 shift valve covers the port to stop line pressure (5) to the 2nd clutch, and uncovers the 3-4 shift valve as the 2-3 shift valve is moved to the right side. Line pressure (5) becomes 3rd clutch pressure (30) at the 3-4 shift valve. The 3rd clutch pressure (30) is applied to the 3rd clutch, and the 3rd clutch is engaged.

Fluid flows by way of:
- Line pressure (4) → CPB Valve – Line Pressure (5) → 1-2 Shift Valve – Line Pressure (5) → 2-3 Shift Valve
- Line Pressure (5) → 3-4 Shift Valve – 3rd Clutch Pressure (30) → 3rd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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Hydraulic Flow (cont'd)

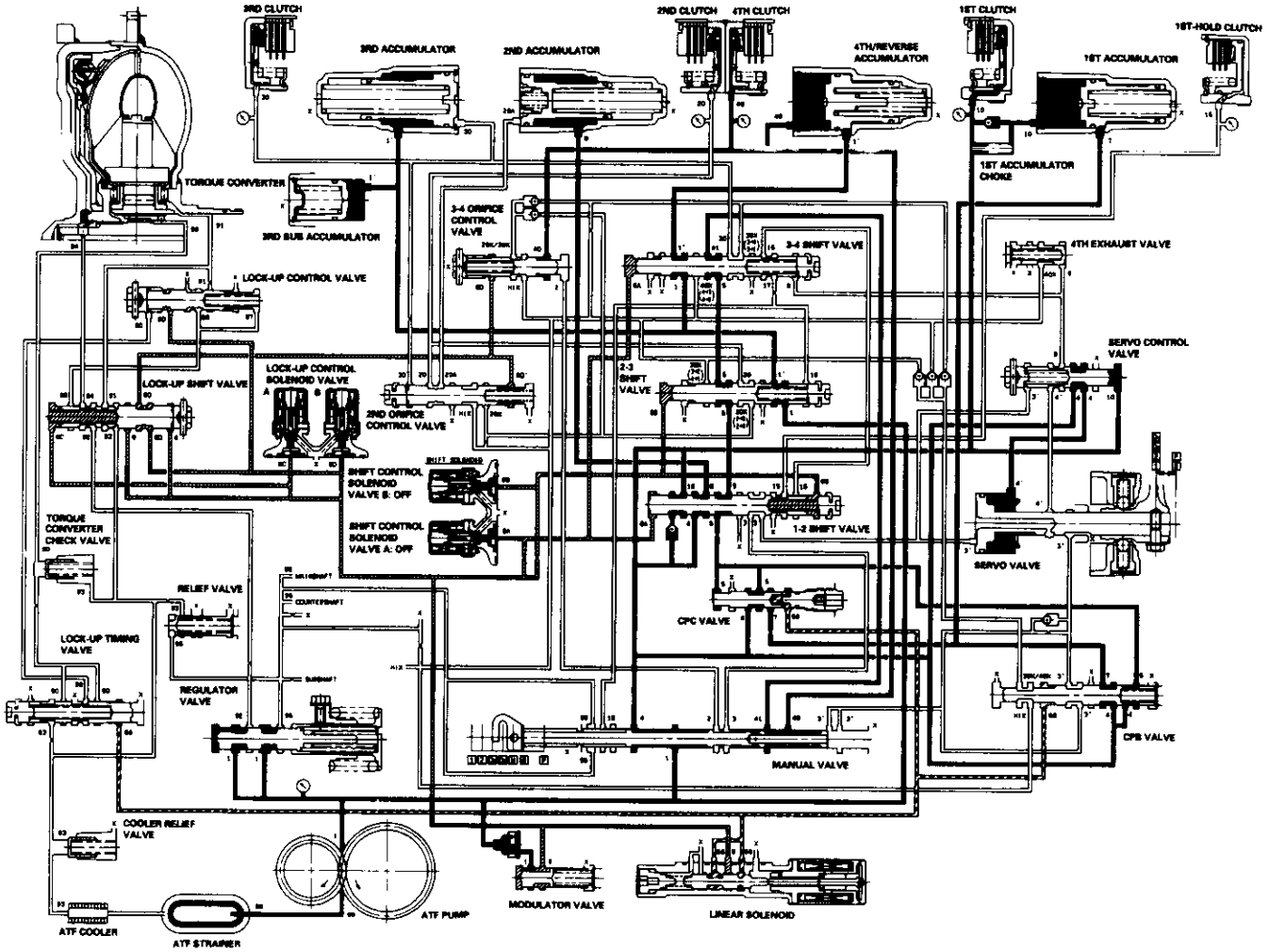
4. 4th Gear (D4 or D Position)

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned OFF by the PCM. Shift control solenoid valve B remains OFF. Modulator pressure (6) flows to the left end of the 1-2 shift valve and the left end of the 3-4 shift valve. Modulator pressure (6A) in the left end of the 1-2 shift valve equals modulator pressure (6B) in the right end of the 1-2 shift valve. The 1-2 shift valve remains at left side by the tension of the valve spring. The 3-4 shift valve is moved to the right side by modulator pressure (6A). The 3-4 shift valve covers the port to the 3rd clutch and uncovers the port to the 4th clutch as this valve is moved to the right side. The 4th clutch pressure (41) from the 3-4 shift valve becomes 4th clutch pressure (40) at the manual valve. The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Fluid flows by way of:
- Line pressure (4) → CPB Valve – Line Pressure (5) → 1-2 Shift Valve – Line Pressure (5) → 2-3 Shift Valve
- Line Pressure (5) → 3-4 Shift Valve – 4th Clutch Pressure (41) → Manual Valve – 4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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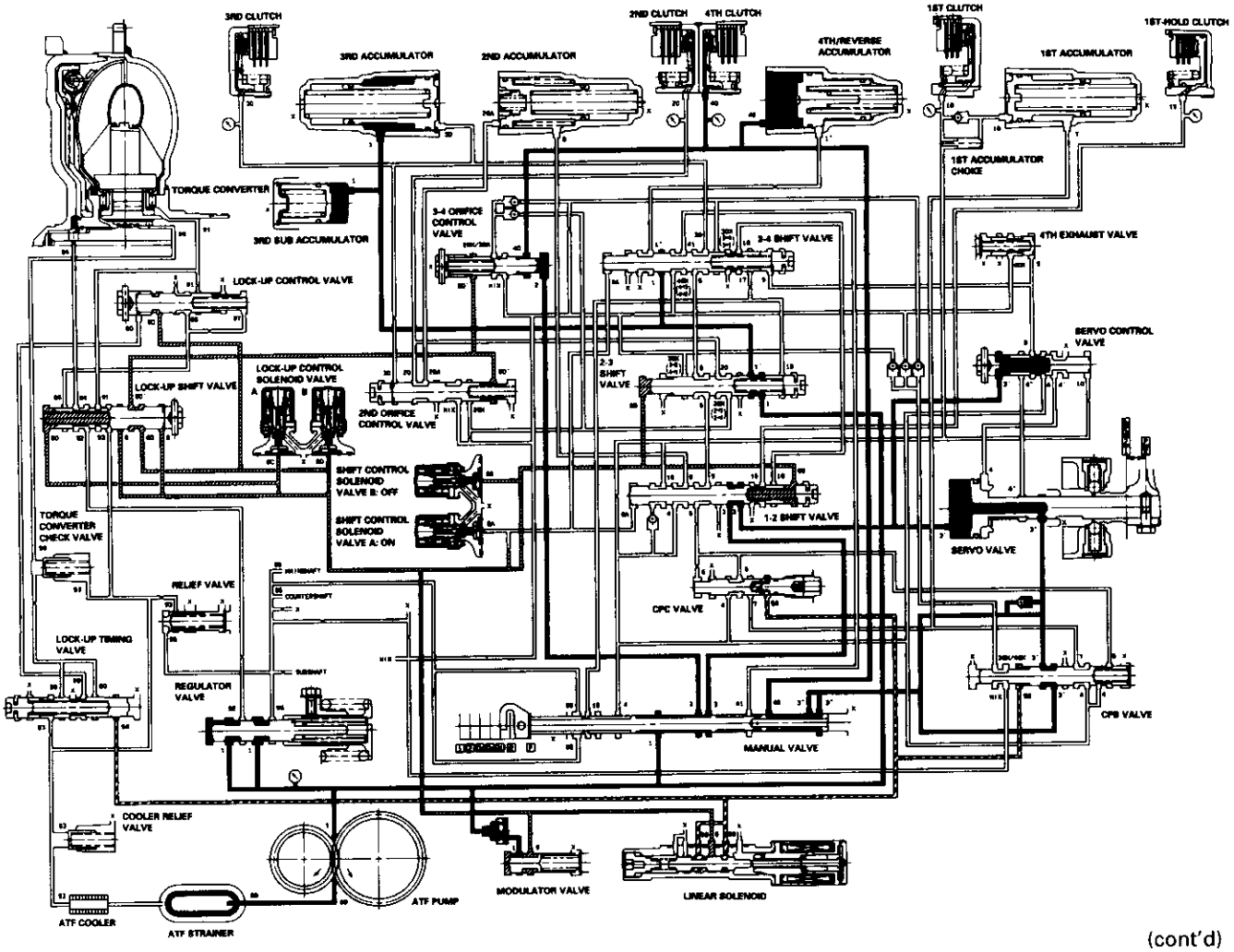
[R] Position

Fluid flow through the torque converter circuit is the same as in [N] position. Line pressure (1) changes to line pressure (3) and flows to the 1-2 shift valve. Line pressure (3) changes to line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3") to the manual valve. Line pressure (3') from the 1-2 shift valve flows through the servo valve to the manual valve and changes to 4th clutch pressure (40). The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Reverse Inhibitor Control

When the [R] position is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the PCM outputs the 1st speed signal to shift control solenoid valves A and B; shift control solenoid valve A is turned OFF, shift control solenoid valve B is turned ON. The 1-2 shift valve is moved to the right side and covers the port to stop line pressure (3') to the servo valve. Line pressure (3') is not applied to the servo valve, and 4th clutch pressure (40) is not applied to the 4th clutch, as a result, power is not transmitted to the reverse direction.

NOTE:
- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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Description

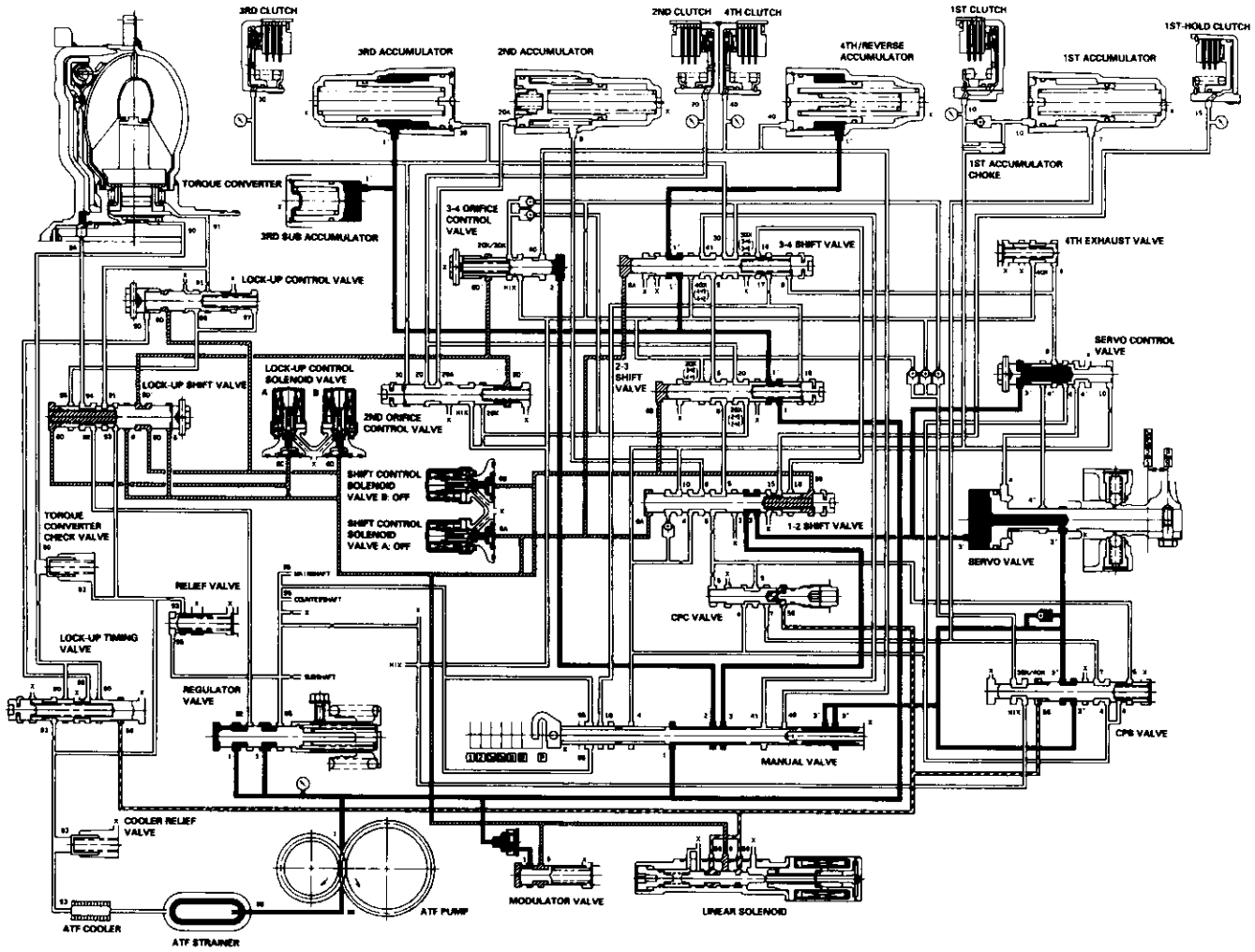
Hydraulic Flow (cont'd)

[P] Position

Fluid flow through the torque converter circuit is the same as in [N] position. Line pressure (1) changes to line pressure (3) and flows to the 1-2 shift valve. Line pressure (3) changes to line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3") to the manual valve as in [R] position. Line pressure (3") from the servo valve is intercepted by the manual valve. Hydraulic pressure is not supplied to the clutches, and power is not transmitted.

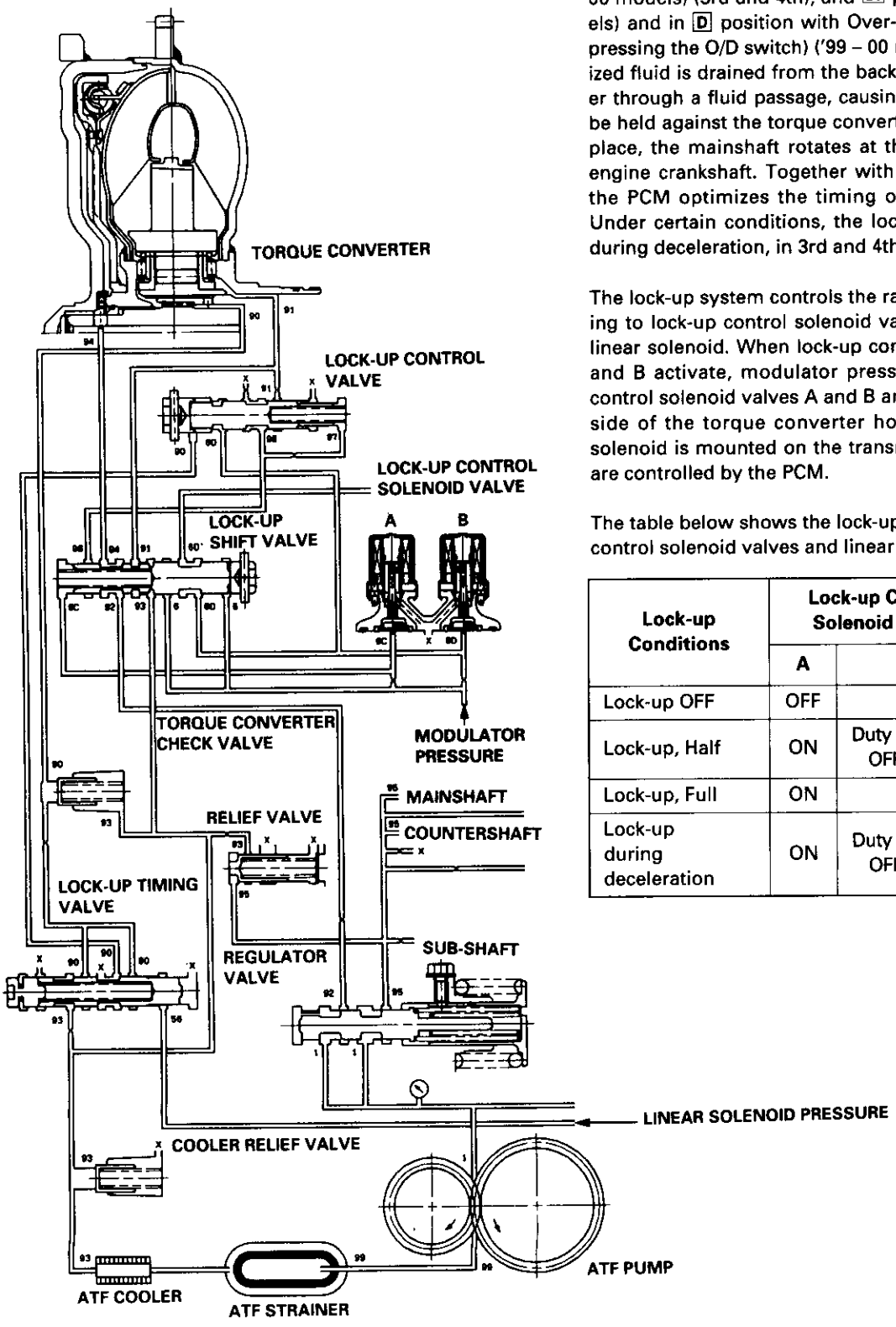
NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows the '97 – 98 models (7 positions); the '99 – 00 models (6 positions) is similar.



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Lock-up System



In D4 position ('97 – 98 models) and in D position ('99 – 00 models) (3rd and 4th), and D3 position ('97 – 98 models) and in D position with Over-Drive (O/D) is OFF (by pressing the O/D switch) ('99 – 00 models) (3rd), pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with the hydraulic control, the PCM optimizes the timing of the lock-up system. Under certain conditions, the lock-up clutch is applied during deceleration, in 3rd and 4th gear.

The lock-up system controls the range of lock-up according to lock-up control solenoid valves A and B, and the linear solenoid. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the outside of the torque converter housing, and the linear solenoid is mounted on the transmission housing. They are controlled by the PCM.

The table below shows the lock-up conditions for lock-up control solenoid valves and linear solenoid pressure.

Lock-up Conditions	Lock-up Control Solenoid Valve		Linear Solenoid Pressure
	A	B	
Lock-up OFF	OFF	OFF	High
Lock-up, Half	ON	Duty operation OFF ↔ ON	Low
Lock-up, Full	ON	ON	High
Lock-up during deceleration	ON	Duty operation OFF ↔ ON	Low

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Lock-up System (cont'd)

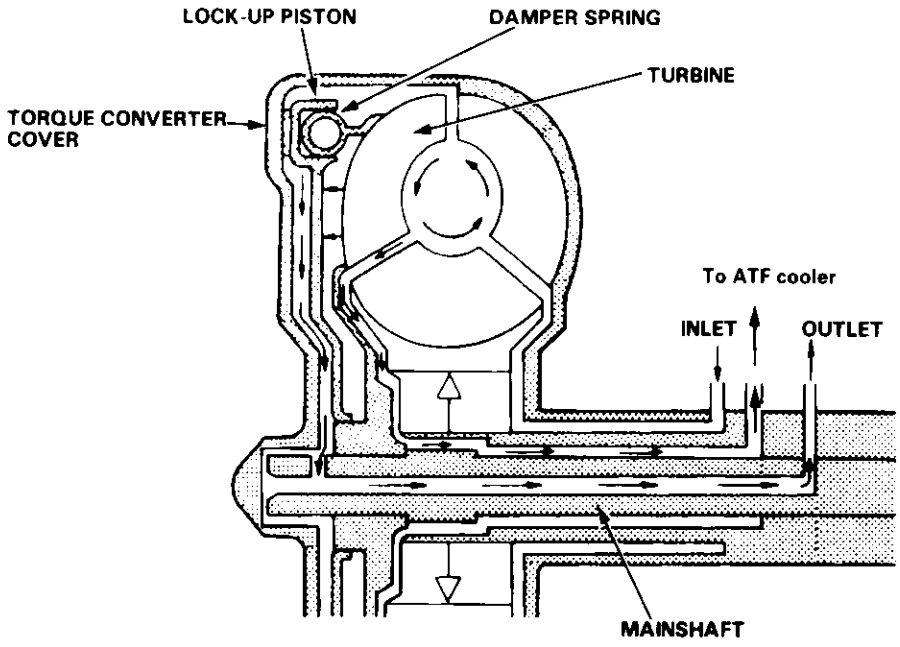
Lock-up Clutch

1. Operation (clutch on)
With the lock-up clutch on, the fluid in the chamber between the torque converter cover and the lock-up piston is drained off, and the converter fluid exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. This bypasses the converter, placing the vehicle in direct drive.

Power flow

The power flows by way of:

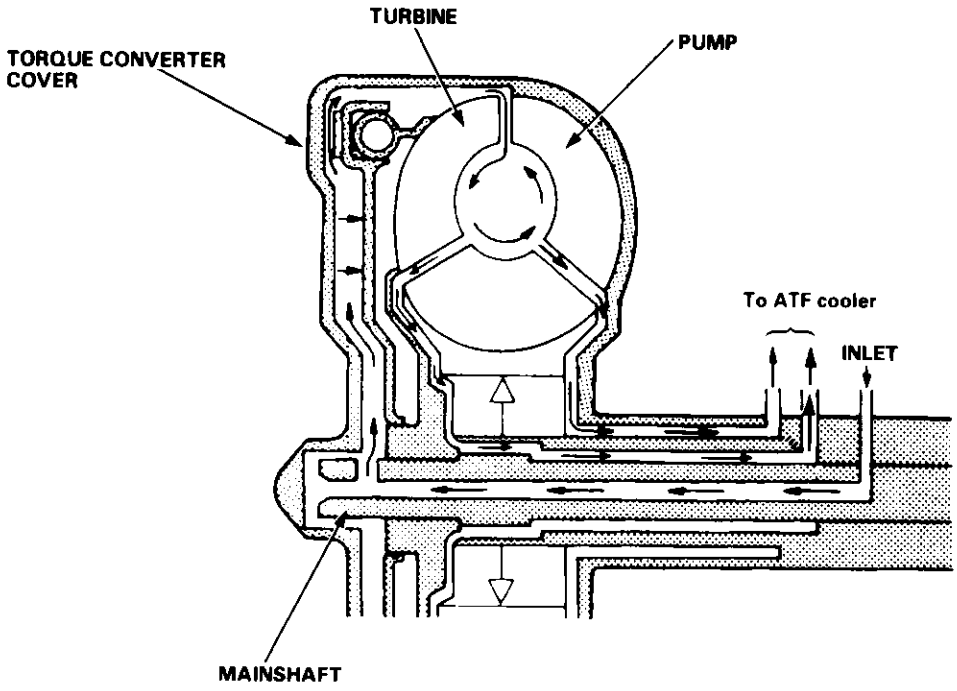
Engine
↓
Drive plate
↓
Torque converter cover
↓
Lock-up piston
↓
Damper spring
↓
Turbine
↓
Mainshaft



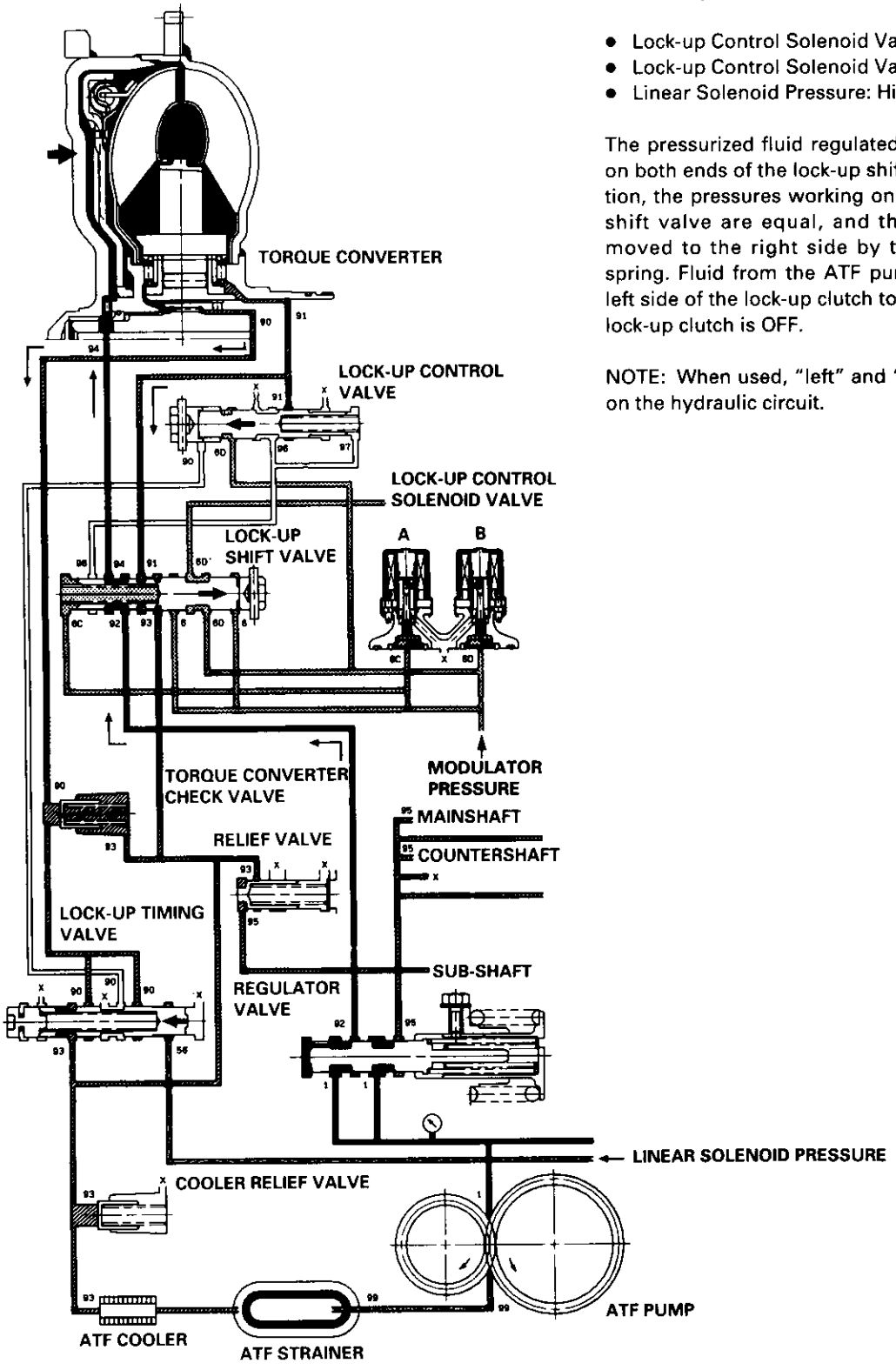
2. Operation (clutch off)
With the lock-up clutch off, the fluid flows in the reverse of "clutch on." As a result, the lock-up piston moves away from the converter cover, and the torque converter lock-up is released.

Power flow

Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft



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No Lock-up

- Lock-up Control Solenoid Valve A: OFF
- Lock-up Control Solenoid Valve B: OFF
- Linear Solenoid Pressure: High

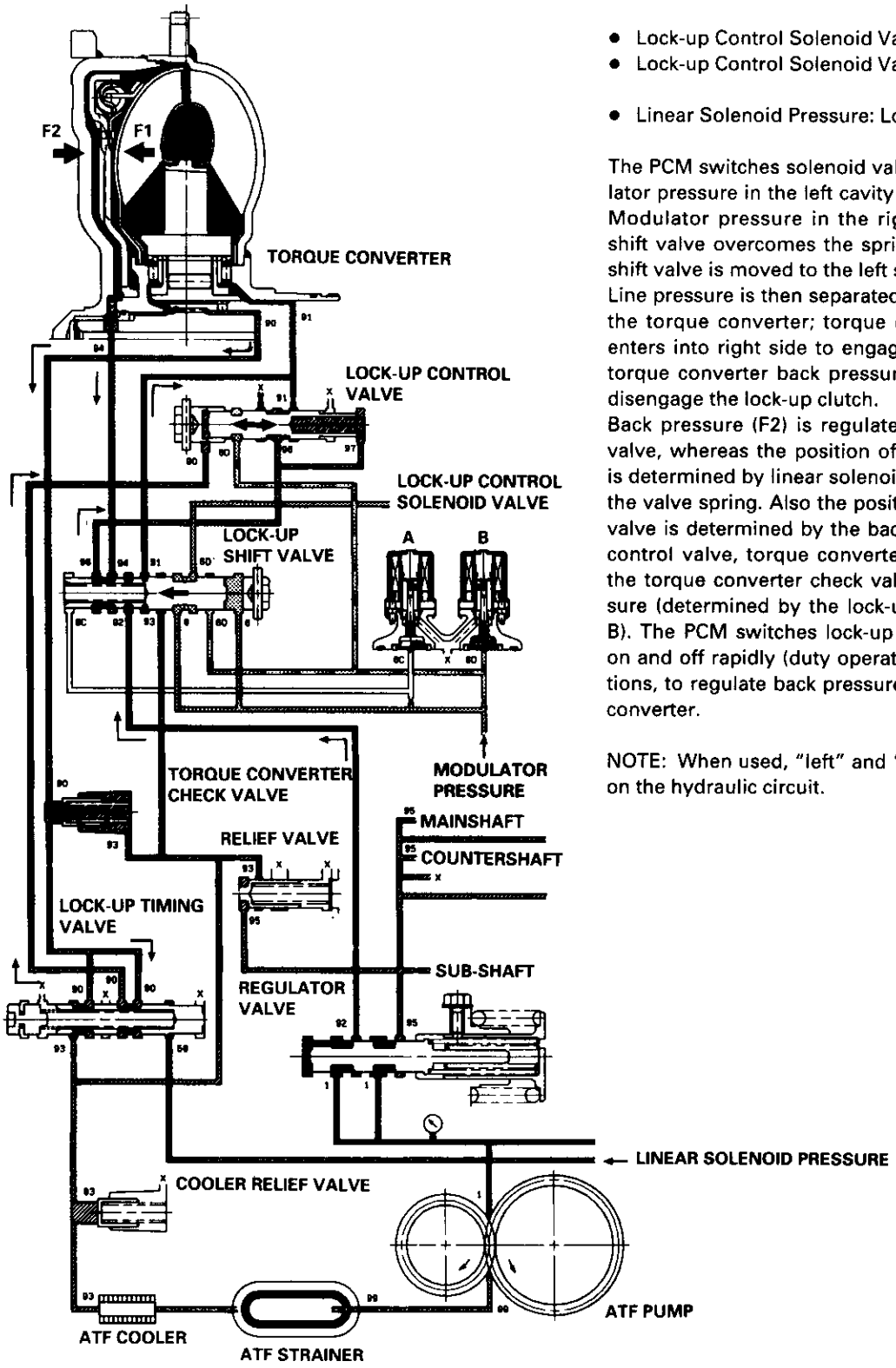
The pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve. Under this condition, the pressures working on both ends of the lock-up shift valve are equal, and the lock-up shift valve is moved to the right side by the tension of the valve spring. Fluid from the ATF pump will flow through the left side of the lock-up clutch to the torque converter; the lock-up clutch is OFF.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.

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Lock-up System (cont'd)



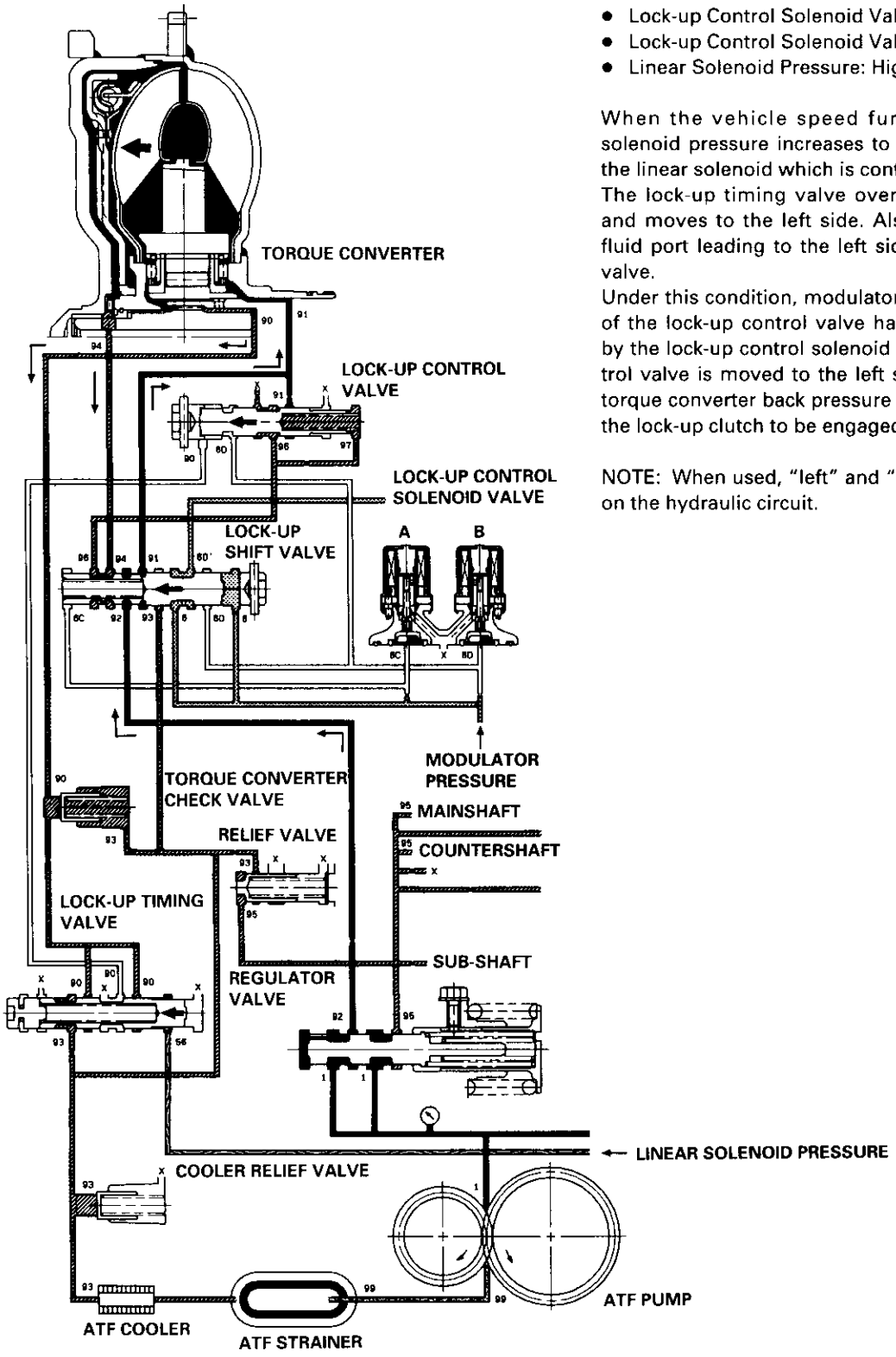
Half Lock-up

- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: Duty Operation
  OFF ↔ ON
- Linear Solenoid Pressure: Low

The PCM switches solenoid valve A on to release modulator pressure in the left cavity of the lock-up shift valve. Modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force, and the lock-up shift valve is moved to the left side.
Line pressure is then separated into the two passages to the torque converter; torque converter inner pressure enters into right side to engage the lock-up clutch, and torque converter back pressure enters into left side to disengage the lock-up clutch.
Back pressure (F2) is regulated by the lock-up control valve, whereas the position of the lock-up timing valve is determined by linear solenoid pressure and tension of the valve spring. Also the position of the lock-up control valve is determined by the back pressure of the lock-up control valve, torque converter pressure (regulated by the torque converter check valve), and modulator pressure (determined by the lock-up control solenoid valve B). The PCM switches lock-up control solenoid valve B on and off rapidly (duty operation), under certain conditions, to regulate back pressure (F2) and lock the torque converter.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.

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Full Lock-up

- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: ON
- Linear Solenoid Pressure: High

When the vehicle speed further increases, linear solenoid pressure increases to high in accordance with the linear solenoid which is controlled by the PCM.
The lock-up timing valve overcomes the spring force and moves to the left side. Also, this valve closes the fluid port leading to the left side of the lock-up control valve.
Under this condition, modulator pressure in the left side of the lock-up control valve had already been released by the lock-up control solenoid valve B; the lock-up control valve is moved to the left side. As this takes place, torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

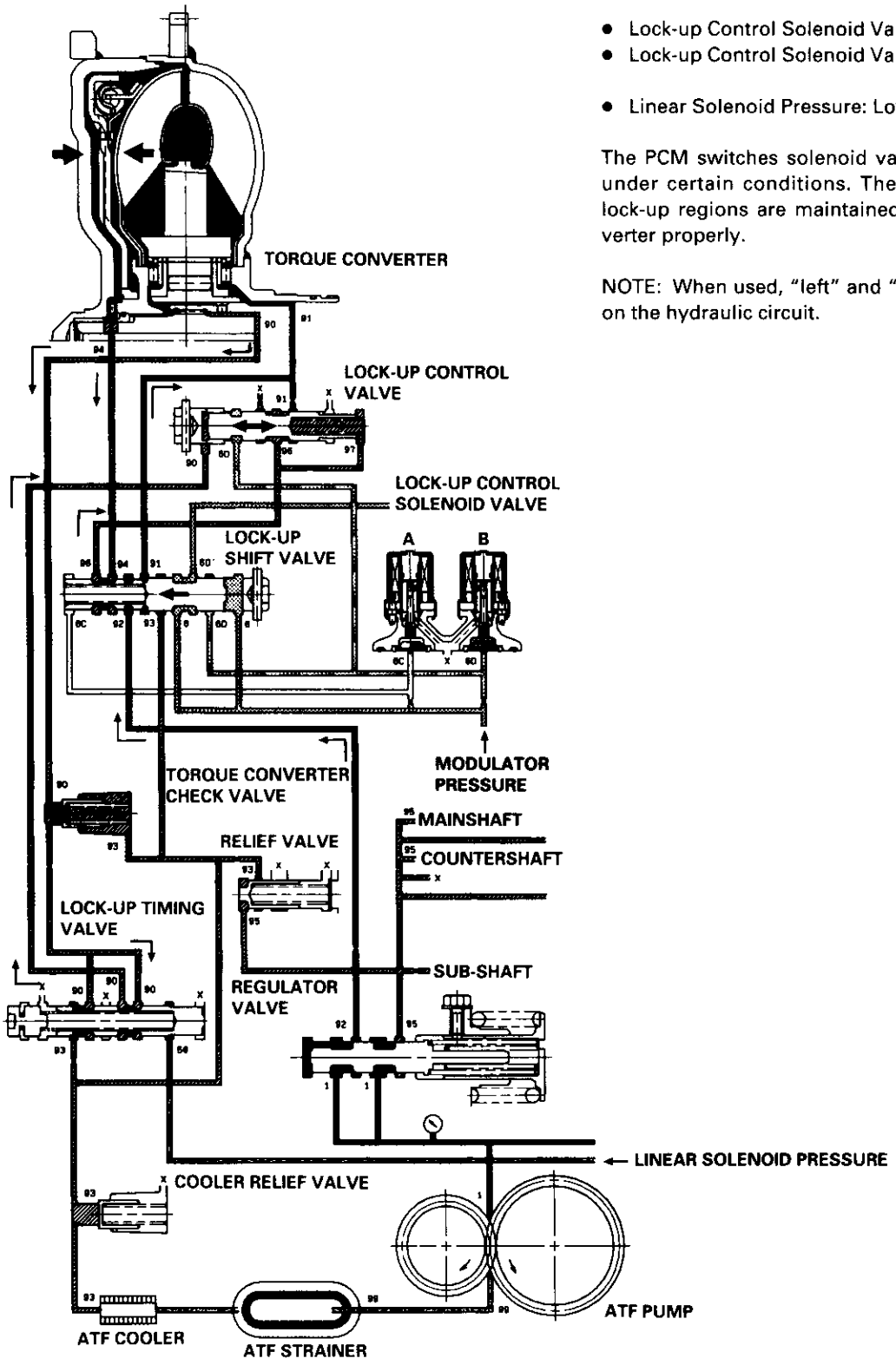
NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.

(cont'd)

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Description

Lock-up System (cont'd)



Deceleration Lock-up

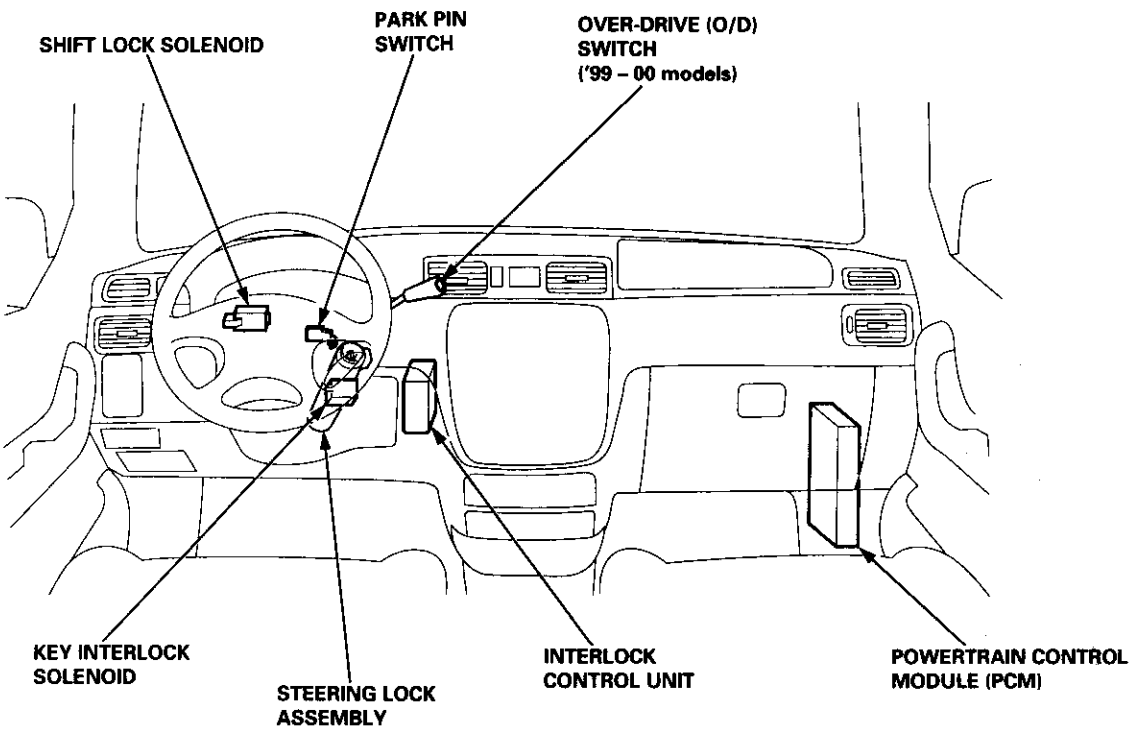
- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: Duty Operation
  OFF ↔ ON
- Linear Solenoid Pressure: Low

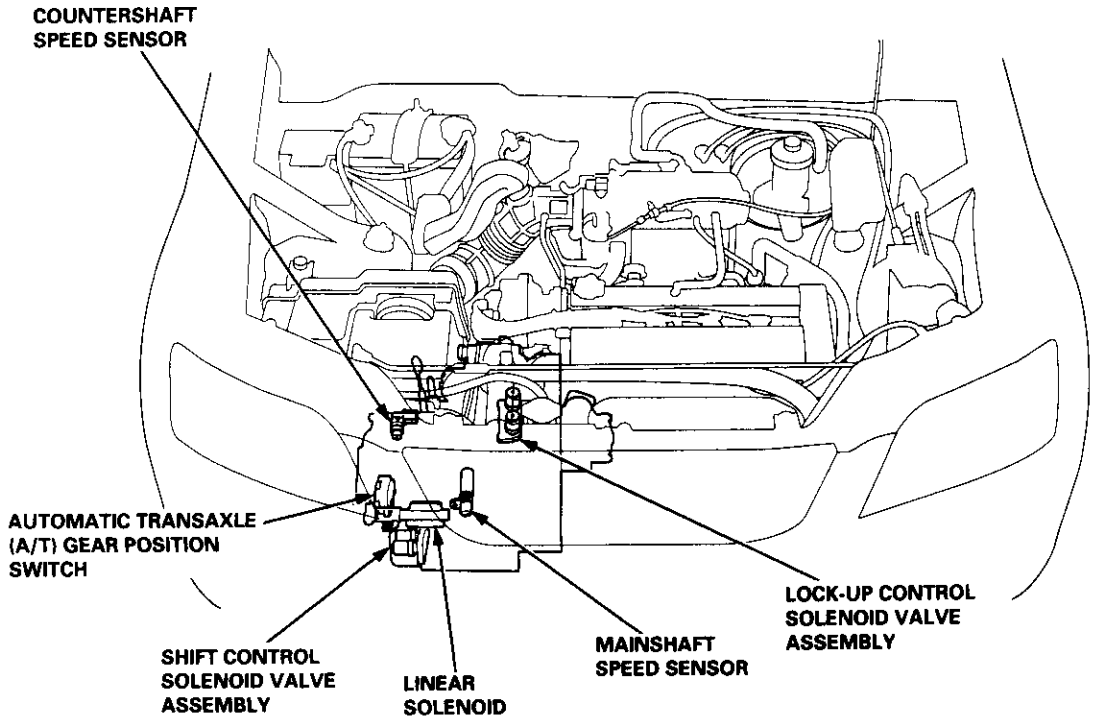
The PCM switches solenoid valve B on and off rapidly under certain conditions. The slight lock-up and half lock-up regions are maintained to lock the torque converter properly.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.

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Component Locations

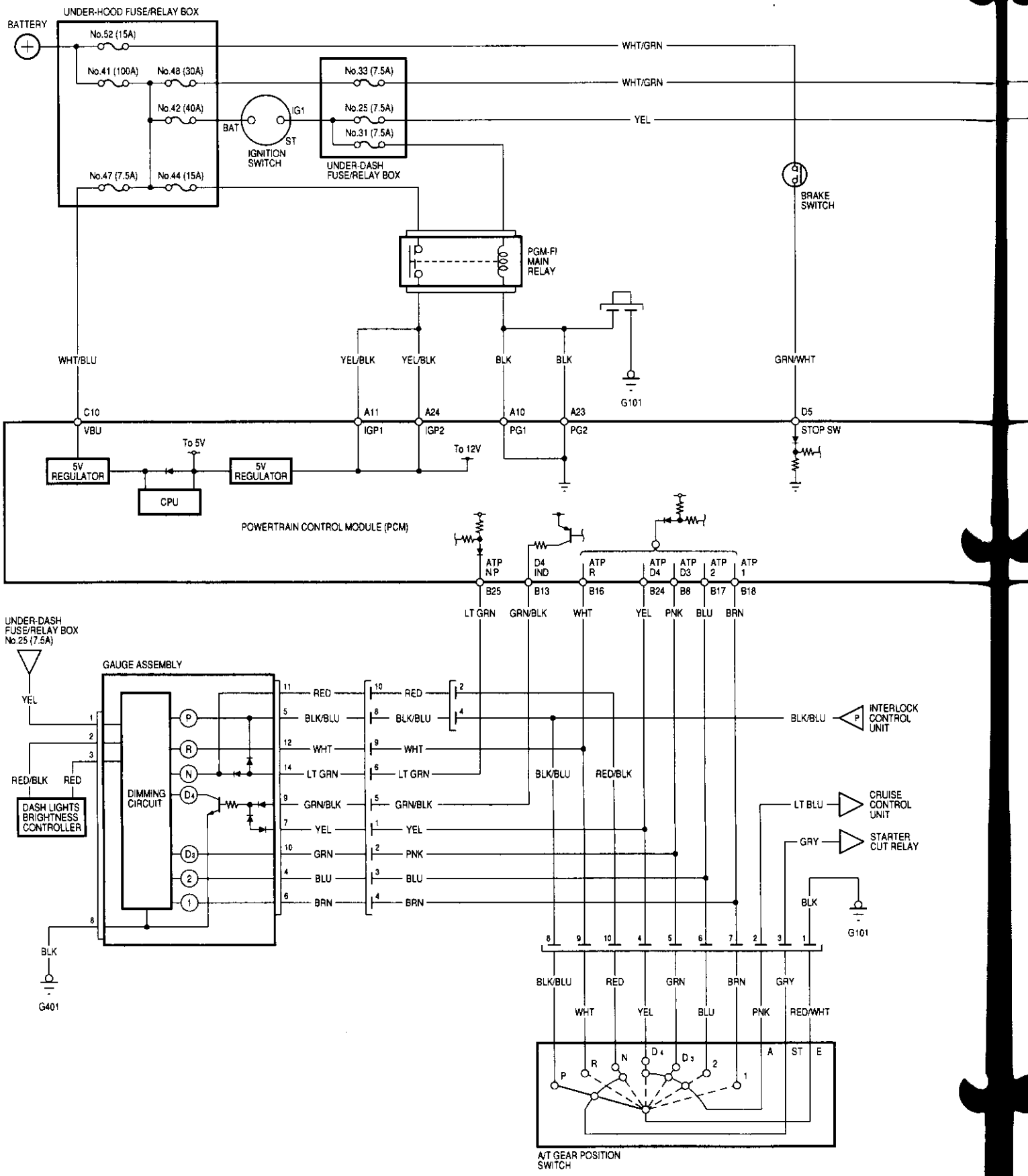




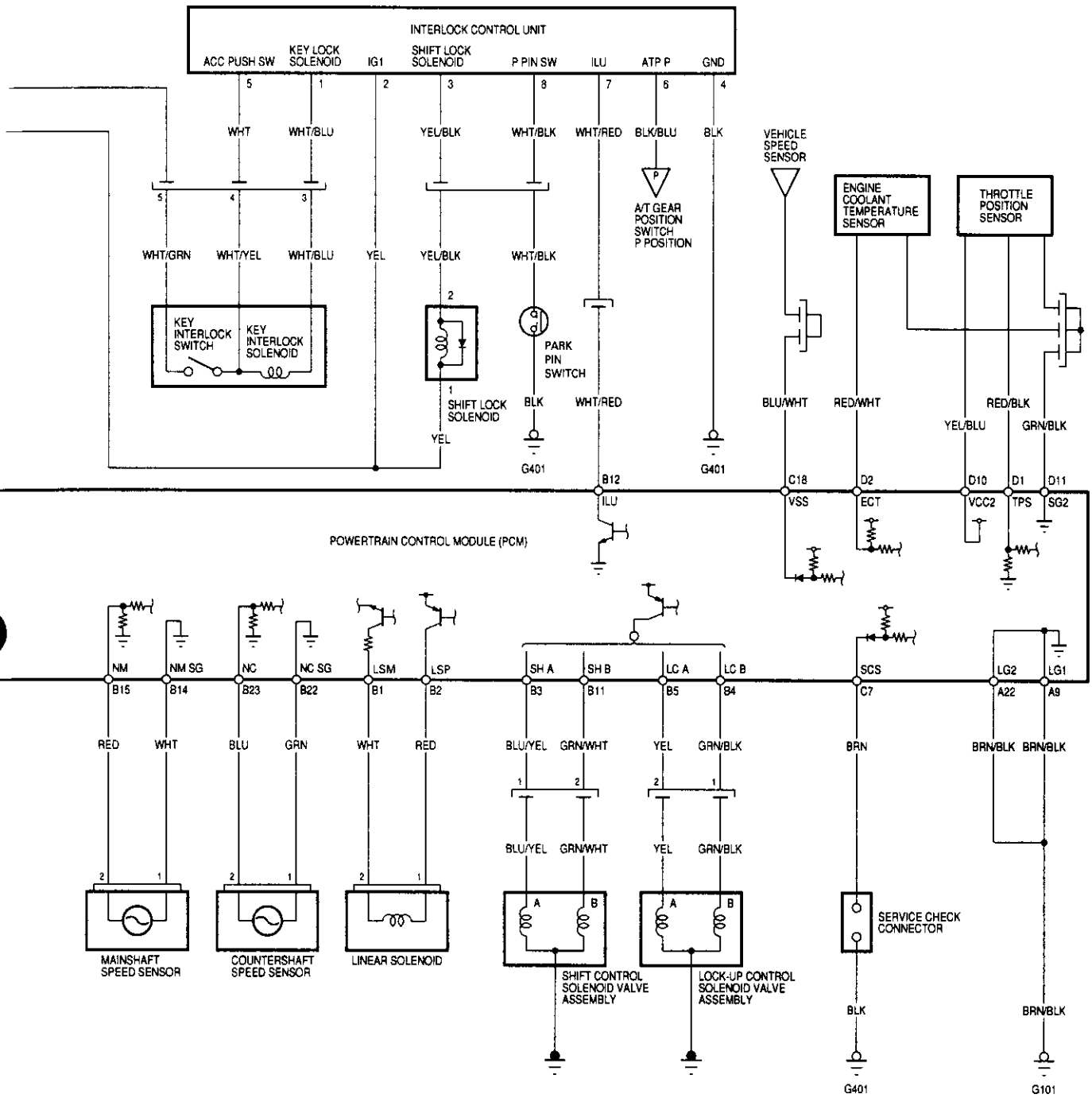
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PCM Circuit Diagram (A/T Control System)

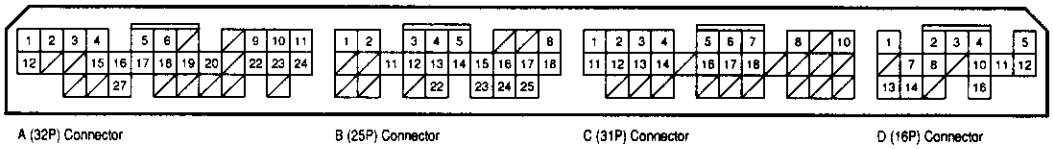
'97 Model



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PCM Terminal Locations



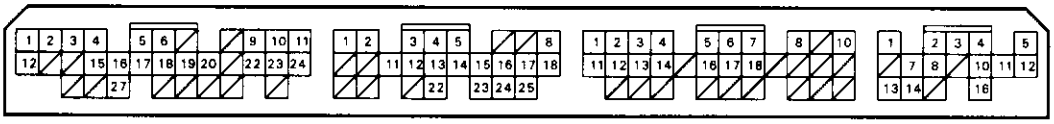
A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

PCM Terminal Voltage/Measuring Conditions

A/T Control System — '97 Model

The PCM terminal voltage and measuring conditions are shown for the connector terminals that are related to the A/T control system. The other PCM terminal voltage and measuring conditions are described in section 11.

PCM Terminal Locations



A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

PCM CONNECTOR A (32P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A9	LG1	Ground (G101)	
A10	PG1	Ground (G101)	
A11	IGP1	Power supply system (under-hood Fuse 44 via main relay)	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A22	LG2	Ground	
A23	PG2	Ground	
A24	IGP2	Power supply system (under-hood Fuse 44 via main relay)	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V

PCM CONNECTOR B (25P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	LSM	Linear solenoid power supply negative electrode	Ignition switch ON (II): Pulsing signal
B2	LSP	Linear solenoid power supply positive electrode	Ignition switch ON (II): Pulsing signal
B3	SHA	Shift control solenoid valve A control	In 2, R position, in 2nd and 3rd gear in D4, D3 position: Battery voltage In 1st gear in D4, D3 position, in 4th gear in D4 position: 0 V
B4	LCB	Lock-up control solenoid valve B control	With full lock-up: Battery voltage With half lock-up: Pulsing signal With no lock-up: 0 V
B5	LCA	Lock-up control solenoid valve A control	When lock-up is ON: Battery voltage With no lock-up: 0 V
B6 to B7	—	Not used	
B8	ATP D3	A/T gear position switch D3 position signal input	In D3 position: 0 V In other than D3 position: Battery voltage
B9 to B10	—	Not used	

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PCM CONNECTOR B (25P) (cont'd)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B11	SHB	Shift control solenoid valve B control	In [1], [2] position, in 1st and 2nd gear in [D4], [D3] position: Battery voltage In [R] position, in 3rd gear in [D4], [D3],in 4th gear in [D4] position: 0 V
B12	ILU	Interlock control	When ignition switch is ON (II), brake pedal depressed and accelerator pedal released: 0 V
B13	D4 IND	D4 Indicator light control	When ignition switch is first turned ON (II): 6 V or more for two seconds In [D4] position: 6V or more
B14	NMSG	Mainshaft speed sensor ground	
B15	NM	Mainshaft speed sensor signal input	Depending on engine speed: Pulsing signal When engine is stopped: 0 V
B16	ATP R	A/T gear position switch [R] position signal input	In [R] position: 0 V In other than [R] position: Battery voltage
B17	ATP 2	A/T gear position switch [2] position signal input	In [2] position: 0 V In other than [2] position: Battery voltage
B18	ATP 1	A/T gear position switch [1] position signal input	In [1] position: 0 V In other than [1] position: Battery voltage
B19 to B21	—	Not used	
B22	NCSG	Countershaft speed sensor ground	
B23	NC	Countershaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: 0 V
B24	ATP D4	A/T gear position switch [D4] position signal input	In [D4] position: 0 V In other than [D4] position: Battery voltage
B25	ATP NP	A/T gear position switch [P] and [N] position signals input	In [P] and [N] positions: 0 V In other than [P] and [N] positions: 5 V

PCM CONNECTOR C (31P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
C7	SCS	Service check signal	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
C10	VBU	Back-up power system (under-hood Fuse 47)	Always battery voltage

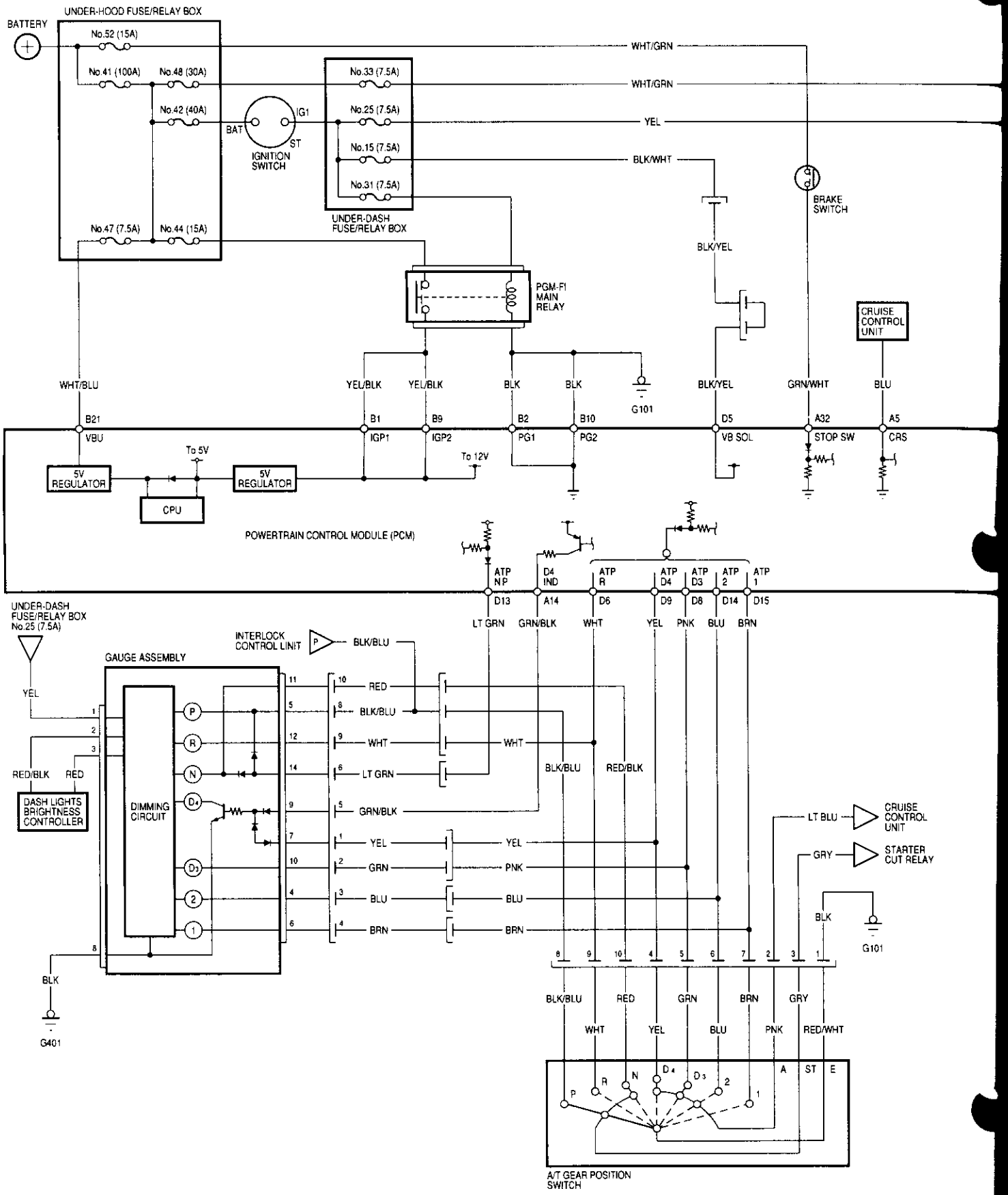
PCM CONNECTOR D (16P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D5	STOP SW	Brake switch signal input	Brake pedal pressed: Battery voltage Brake pedal released: 0 V

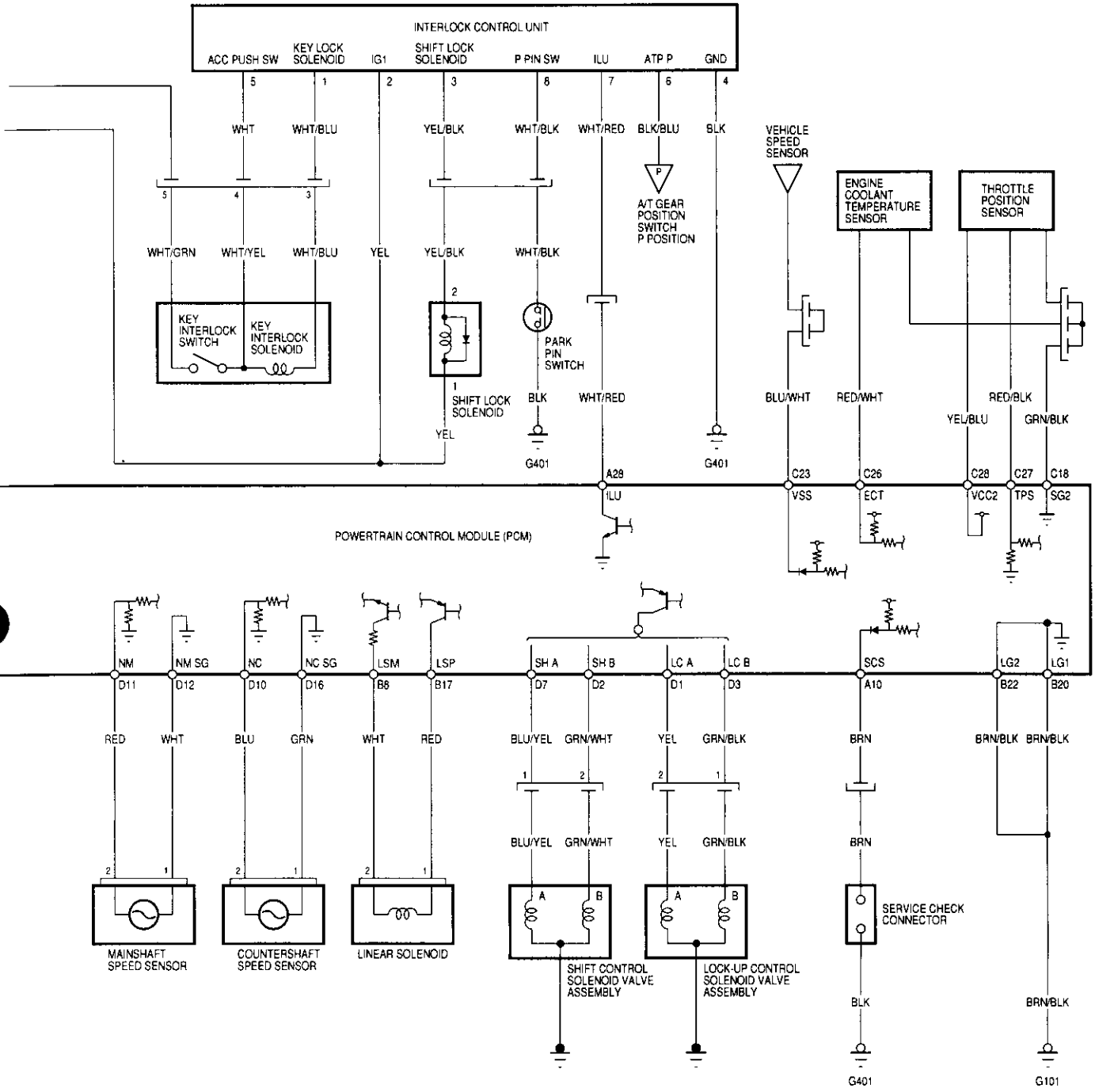
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PCM Circuit Diagram (A/T Control System)

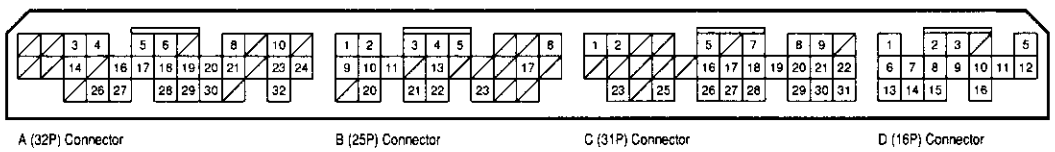
'98 Model



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PCM Terminal Locations

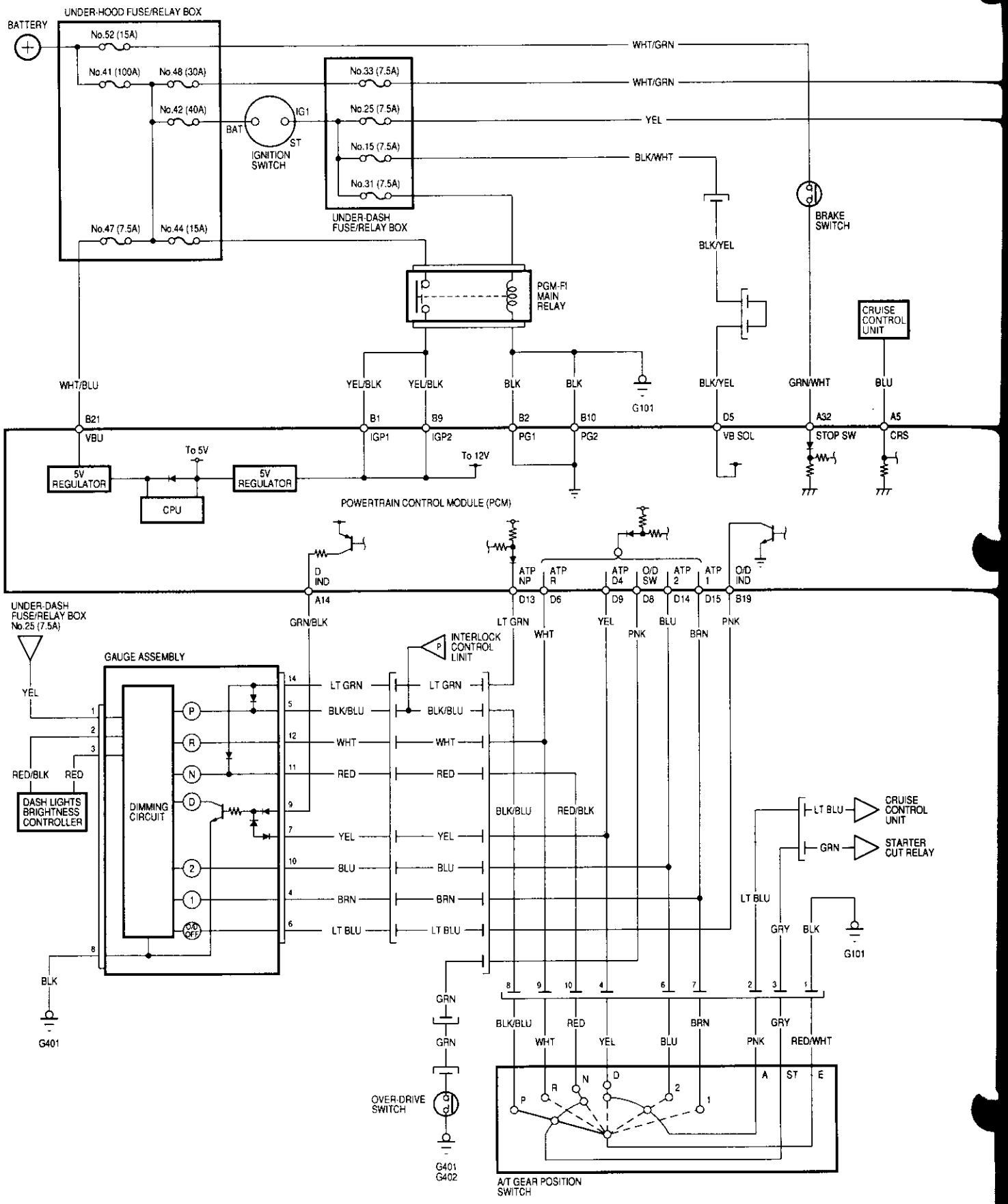


A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

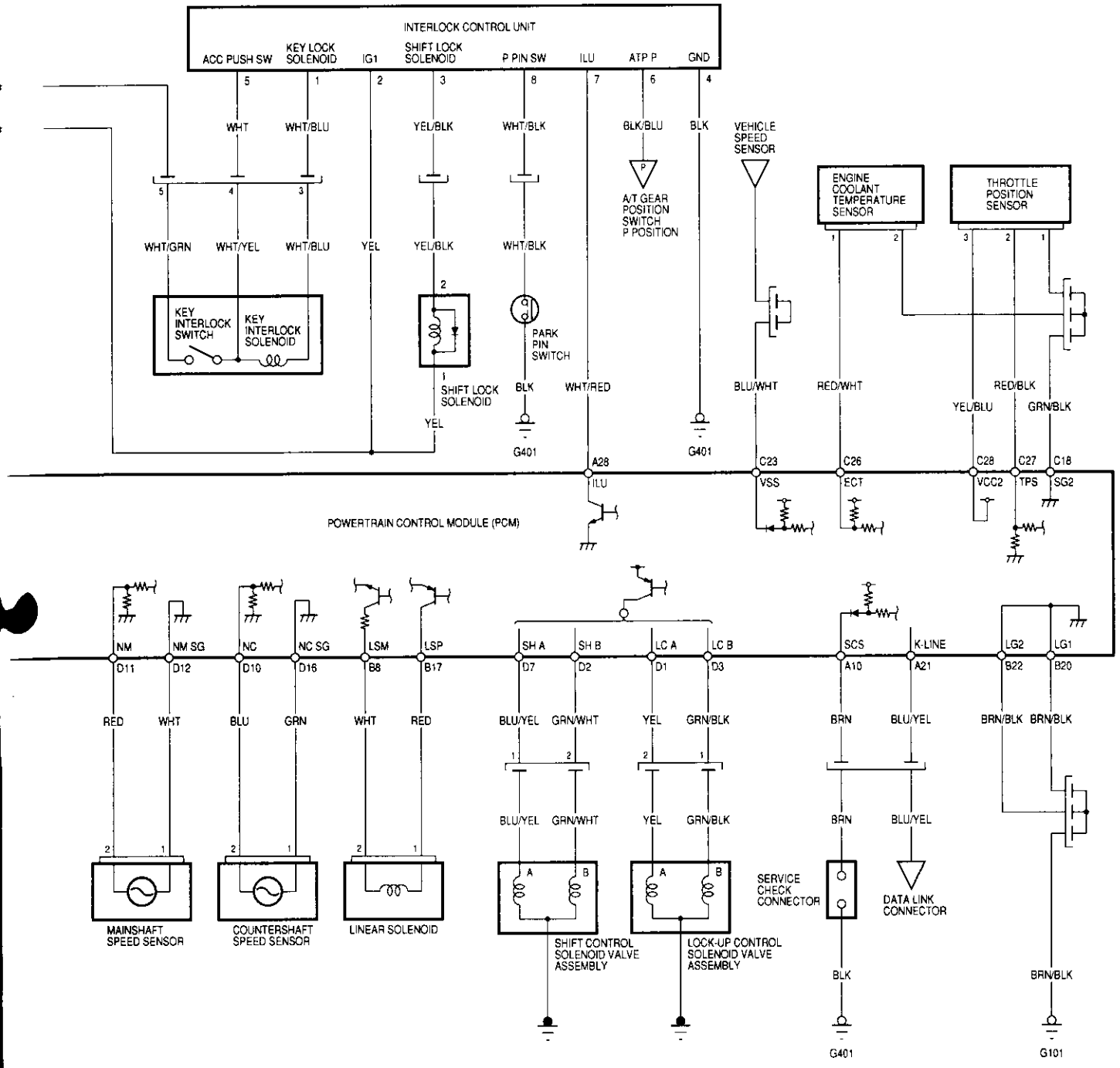
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PCM Circuit Diagram (A/T Control System)

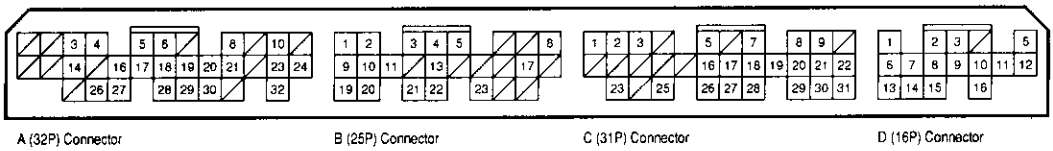
'99 – 00 Models



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PCM Connector Terminal Locations



A (32P) Connector B (25P) Connector C (31P) Connector D (16P) Connector

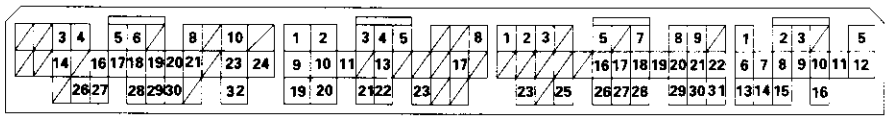
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PCM Terminal Voltage/Measuring Conditions

A/T Control System — '98 – 00 Models

The PCM terminal voltage and measuring conditions are shown for the connector terminals that are related to the A/T control system. The other PCM terminal voltage and measuring conditions are described in section 11.

PCM Connector Terminal Locations



NOTE: B19 and C3 terminals are applied to '99 – 00 models.

A (32P) B (25P) C (31P) D (16P)

PCM CONNECTOR A (32P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A5	CRS	Downshift signal input from cruise control unit	When cruise control is used: Pulsing signal
A10	SCS	Timing and adjustment service check signal (5 V from PCM)	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector jumped with special tool: 0 V
A14 ('98 model)	D4 IND	D4 indicator light control (Voltage from PCM turns D4 light ON)	When ignition switch is first turned ON (II): Battery voltage for two seconds In D4 position: Battery voltage
A14 ('99 – 00 models)	D IND	D indicator light control (Voltage from PCM turns D light ON)	When ignition switch is first turned ON (II): Battery voltage for two seconds In D position: Battery voltage
A28	ILU	Interlock control (Voltage from PCM)	When ignition switch ON (II), brake pedal depressed, and accelerator pedal released: Battery voltage
A32	STOP SW	Brake switch signal input	Brake pedal pressed: Battery voltage Brake pedal released: 0 V

PCM CONNECTOR B (25P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	IGP1	Power supply circuit from main relay via under-hood Fuse 44	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B2	PG1	Ground (G101)	
B8	LSM	Linear solenoid power supply negative electrode	
B9	IGP2	Power supply circuit from main relay	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B10	PG2	Ground (G101)	
B17	LSP	Linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal
B19 ('99 – 00 models)	O/D IND	Over-Drive (O/D) OFF indicator light control	When ignition switch is first turned ON (II): 0 V for two seconds O/D OFF indicator light ON: 0 V O/D OFF indicator light OFF: Battery voltage
B20	LG1	Ground (G101)	
B21	VBU	Back-up power supply (under-hood Fuse 47)	Always battery voltage
B22	LG2	Ground (G101)	

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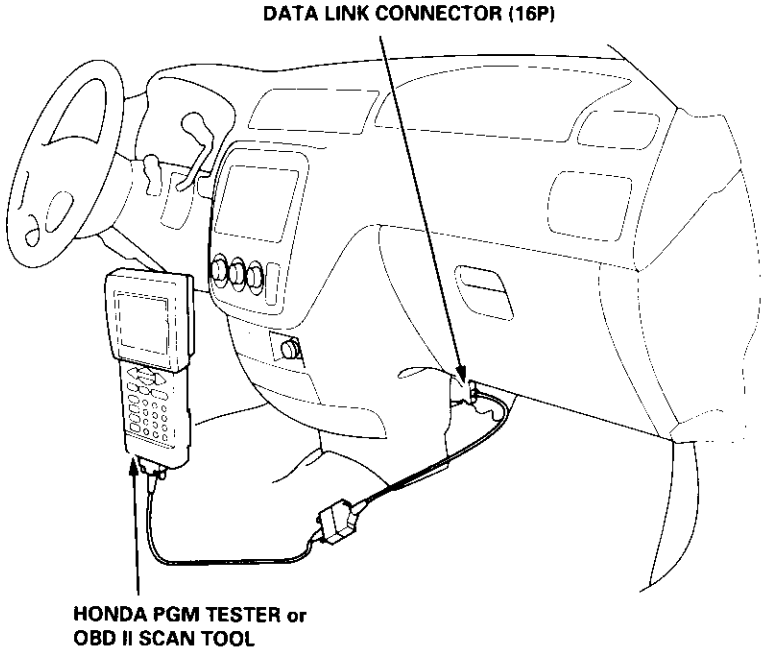
PCM CONNECTOR D (16P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D1	LC A	Lock-up control solenoid valve A control	During lock-up conditions: Battery voltage During no lock-up condition: 0 V
D2	SH B	Shift control solenoid valve B control	Battery voltage in following positions: • [1], [2] and positions • [D4], [D3], and [D] positions in 1st and 2nd gear 0 V in following positions: • [D4], [D3], and [D] positions in 3rd gear • [D4] and [D] positions in 4th gear • [P], [R], and [N] positions
D3	LC B	Lock-up control solenoid valve B control	During full lock-up conditions: Battery voltage During half lock-up conditions: Pulsing signal
D4	———	Not used	
D5	VB SOL	Power supply for solenoid valves (Under-hood Fuse 15)	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
D6	ATP R	A/T gear position switch [R] position input	In [R] position: 0 V In other than [R] position: Battery voltage
D7	SH A	Shift control solenoid valve A control	Battery voltage in following positions: • [2] position • [D4], [D3], and [D] positions in 2nd and 3rd gear • [R] position 0 V in following positions: • [1] position • [D4], [D3], and [D] positions in 1st gear • [D4] and [D] positions in 4th gear • [P] and [N] positions
D8 ('98 model)	ATP D3	A/T gear position switch [D3] position input	In [D3] position: 0 V In other than [D3] position: Battery voltage
D8 ('99 – 00 models)	O/D SW	Over-Drive (O/D) switch signal input	When Over-Drive (O/D) is OFF (O/D OFF indicator light is ON): 0 V When Over-Drive (O/D) is ON (O/D OFF indicator light is OFF): Battery voltage
D9	ATP D4	A/T gear position switch [D4] position input	In [D4] position: 0 V In other than [D4] position: 5 V
D10	NC	Countershaft speed sensor input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: Approx. 0 V
D11	NM	Mainshaft speed sensor input	Depending on vehicle speed: Pulsing signal When engine is stopped: Approx. 0 V
D12	NMSG	Mainshaft speed sensor ground	
D13	ATP NP	A/T gear position switch [P] and [N] positions input	In [P] and [N] positions: 0 V In other than [P] and [N] position: 5 V
D14	ATP 2	A/T gear position switch [2] position input	In [2] position: 0 V In other than [2] position: Battery voltage
D15	ATP 1	A/T gear position switch [1] position input	In [1] position: 0 V In other than [1] position: Battery voltage
D16	NCSG	Countershaft speed sensor ground	

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Checking the Diagnostic Trouble Code (DTC) with an OBD II Scan tool or Honda PGM Tester

When the PCM senses an abnormality in the input or output systems, the D4 ('97 – 98) or D ('99 – 00) indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located under the dash on the passenger's side) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON(II).



If the D4 or D indicator light or the MIL has been reported on, or if a driveability problem is suspected, follow this procedure:

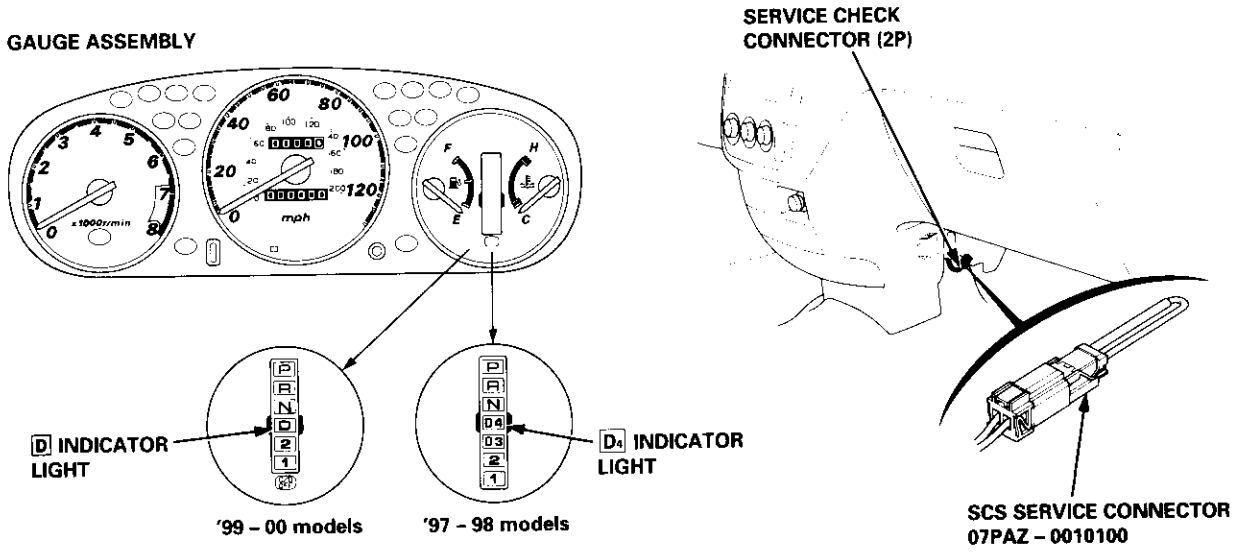
1. Connect the OBD II Scan Tool (conforming to SAE J1978) or Honda PGM Tester to the 16P DLC. (See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instructions. If you are using the Honda PGM Tester, make sure it is set to the SAE DTC type).
2. Turn the ignition switch ON (II), and observe the DTC on the screen.
3. Record all fuel and emission DTCs, A/T DTCs, and freeze data.
4. If there is a fuel and emissions DTC, first check the fuel and emissions system as indicated by the DTC (except for DTC P0700). DTC P0700 means there is one or more A/T DTC, and no problems were detected in the fuel and emissions circuit of the PCM.
5. Wire down the radio station presets.
6. Reset the memory with the PGM Tester or by removing the BACK UP fuse in the under-hood fuse/relay box for more than 10 seconds.
7. Drive the vehicle for several minutes at speeds over 30 mph (50 km/hr), and then recheck for DTCs. If the A/T DTC returns, go to the Symptom-to Component Chart on pages 14-60 and 14-61 for the '97 models, and pages 14-62 and 14-63 for '98 – 00 models. If the DTC does not return, there was an intermittent problem within the circuit. Make sure all pins and terminals in the circuit are tight, and then go to step 8.
8. Reset the radio preset stations, and set the clock.

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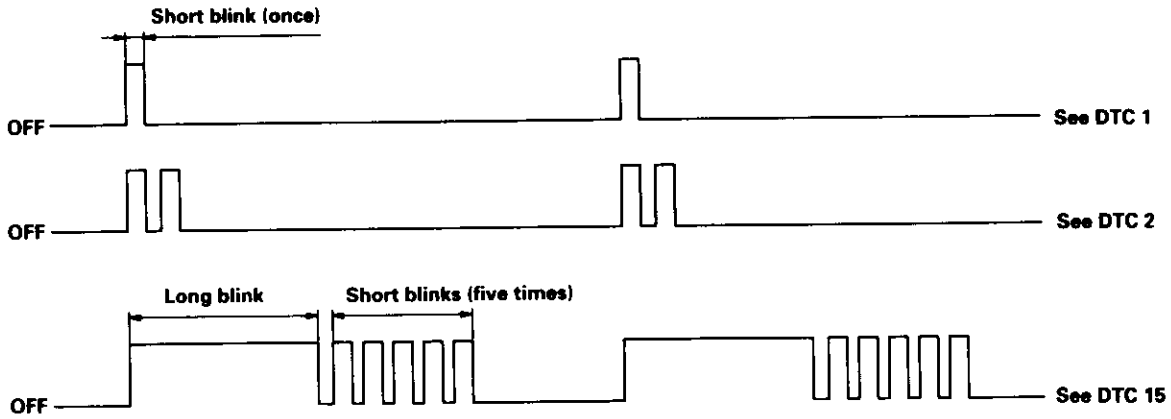
Checking the Diagnostic Trouble Code (DTC)
with the Service Check Connector and Special Tool

When the PCM senses an abnormality in the input or output systems, the D4 ('97 – 98) or D ('99 – 00) indicator light in the gauge assembly may blink.
When the Service Check Connector (2P) (located under the dash on the passenger side) is connected with the special tool as shown, the D4 or D indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON (II).

When the D4 or D indicator light has been reported on, connect the Service Check Connector (2P) to the special tool. Then turn ON (II) the ignition switch and observe the D4 or D indicator light.



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to-Component Chart on pages 14-60 and 14-61 for the '97 model, and pages 14-62 and 14-63 for the '98 – 00 models.

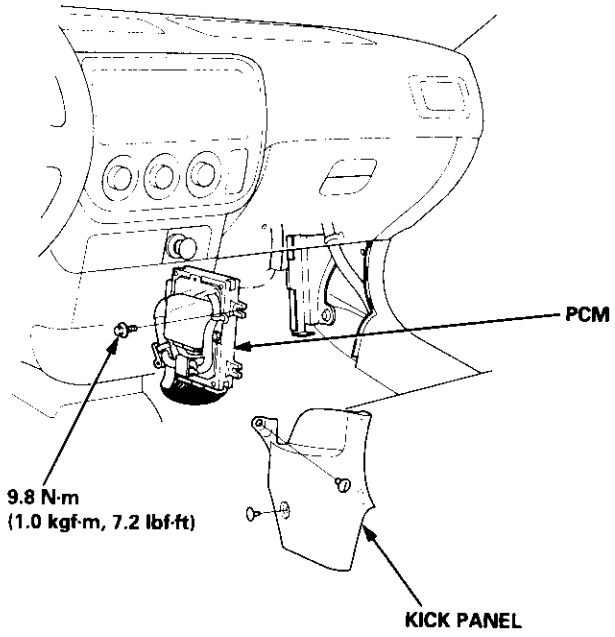


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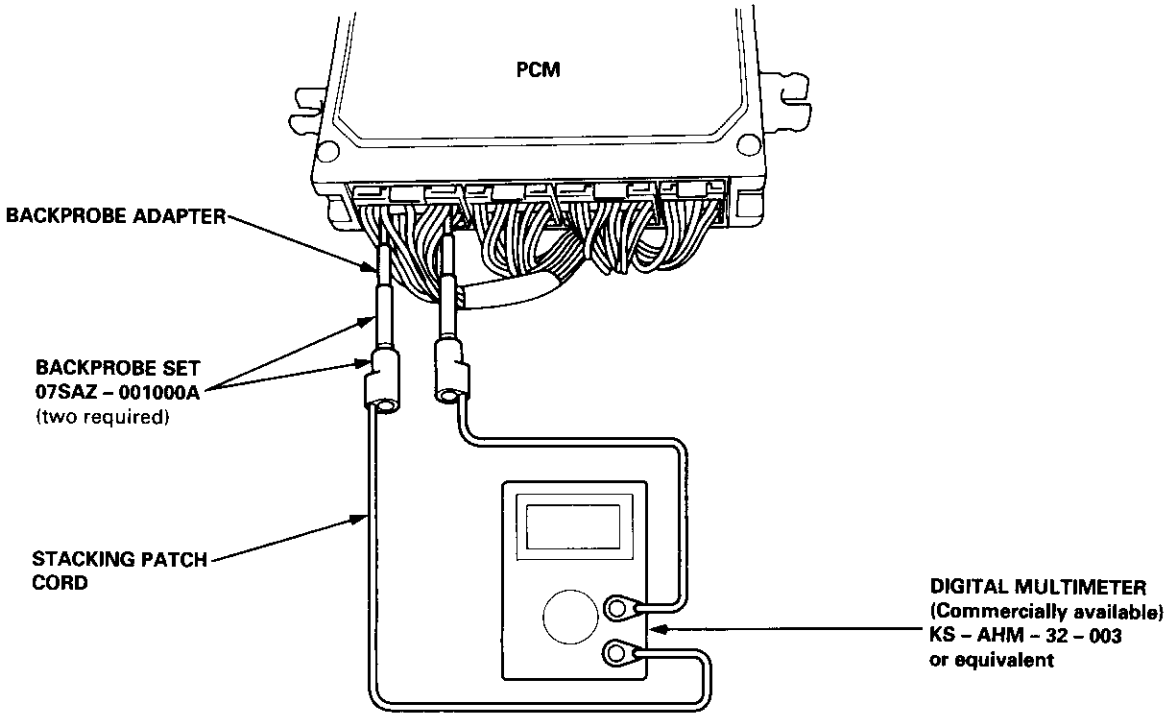
1. Remove the kick panel on the passenger's side (see section 20).
2. Remove the PCM, and turn it over.



3. Inspect the circuit on the PCM according to the troubleshooting flowchart with the special tools and a digital multimeter.

How to Use the Backprobe Set

Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.

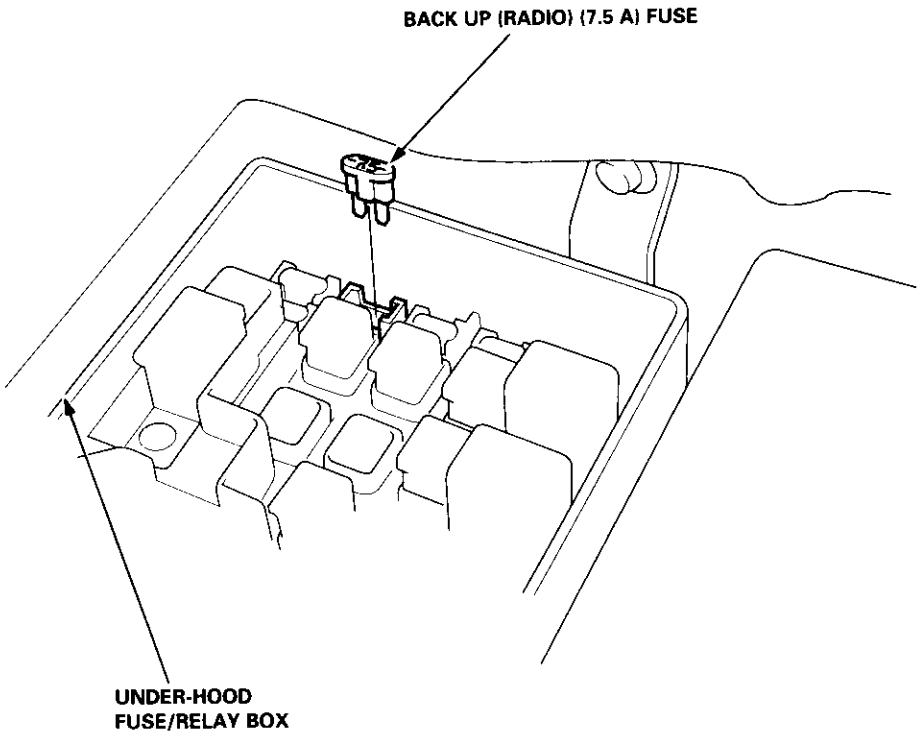


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PCM Reset Procedure

1. Turn the ignition switch off.
2. Remove the BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset the PCM.

   NOTE:
   - Disconnecting the BACK UP fuse also cancels the radio preset stations and clock setting. Make note of the radio presets before removing the fuse so you can reset them.
   - The PCM memory can also be cleared by using the OBD II Scan Tool or Honda PGM Tester.



Final Procedure

This procedure must be done after any troubleshooting.

1. Turn the ignition switch OFF.
2. Reset the PCM.
3. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector (16P), or remove the special tool from the Service Check Connector (2P).
4. Turn the ignition switch ON (II), and set the radio presets and clock setting.
5. To verify that the problem is repaired, test-drive the vehicle for several minutes at speeds over 30 mph (48 km/h).

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Symptom-to-Component Chart

Electrical System — '97 Model

DTC*	D4 Indicator Light	MIL	Detection Item	Page
P1753 (1)	Blinks	ON	Lock-up control solenoid valve A	(see page 14-64)
P1758 (2)	Blinks	ON	Lock-up control solenoid valve B	(see page 14-66)
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	(see page 14-68)
P1706 (6)	OFF	ON	A/T gear position switch (open)	(see page 14-70)
P0753 (7)	Blinks	ON	Shift control solenoid valve A	(see page 14-72)
P0758 (8)	Blinks	ON	Shift control solenoid valve B	(see page 14-74)
P0720 (9)	Blinks	ON	Countershaft speed sensor	(see page 14-76)
P0715 (15)	Blinks	ON	Mainshaft speed sensor	(see page 14-78)
P1768 (16)	Blinks	ON	Linear solenoid	(see page 14-80)
P0740 (40)	OFF	ON	Lock-up control system	(see page 14-82)
P0730 (41)	OFF	ON	Shift control system	(see page 14-84)

DTC*: The DTC in parentheses is the code the D4 indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.

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NOTE: When the OBD II Scan Tool or Honda PGM Tester indicate DTC(s) for the automatic transmission control system, the scan tool or tester indicates code P0700 simultaneously. Code P0700 means a detection of some automatic transmission problem in the PGM-FI control system.

If the self-diagnostic D4 indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
D4 indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).	———	14-86
D4 indicator light does not come on for two seconds after ignition switch is first turned ON (II).	———	14-87
Shift lever cannot be moved from P position with the brake pedal pressed.	Check shift lock system	14-89
Ignition key cannot be moved from ACC (I) position to LOCK (0) position with the shift lever in P position.	Check key interlock system	14-91

NOTE: If a customer describes the symptom for code P1706 (6), it will be necessary to recreate the symptom by test-driving, then recheck the DTC.

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Symptom-to-Component Chart

Electrical System — '98 – 00 Models

DTC*	[D4] Indicator Light ('98) [D] Indicator Light ('99 – 00)	MIL	Detection Item	Page
P1753 (1)	Blinks	ON	Lock-up control solenoid valve A	(see page 14-93)
P1758 (2)	Blinks	ON	Lock-up control solenoid valve B	(see page 14-96)
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	(see page 14-99)
P1706 (6)	OFF	ON	A/T gear position switch (open)	(see page 14-103)
P0753 (7)	Blinks	ON	Shift control solenoid valve A	(see page 14-106)
P0758 (8)	Blinks	ON	Shift control solenoid valve B	(see page 14-109)
P0720 (9)	Blinks	ON	Countershaft speed sensor	(see page 14-112)
P0715 (15)	Blinks	ON	Mainshaft speed sensor	(see page 14-114)
P1768 (16)	Blinks	ON	Linear solenoid	(see page 14-117)
P0740 (40)	OFF	ON	Lock-up control system	(see page 14-119)
P0730 (41)	OFF	ON	Shift control system	(see page 14-121)

DTC*: The DTC in the parentheses is the code the [D4] or [D] indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.

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NOTE: When the OBD II Scan Tool or Honda PGM Tester indicate DTC(s) for the automatic transmission control system, the scan tool or tester indicates code P0700 simultaneously. Code P0700 means a detection of some automatic transmission problem in the PGM-FI control system.

If the self-diagnostic D4 or D indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
D4 or D indicator light does not come on for two seconds after ignition switch is first turned ON (II).	———	14-123
D4 or D indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).	———	14-125
Shift lever cannot be moved from P position with the brake pedal pressed.	Check shift lock system	14-126
Ignition key cannot be moved from ACC (I) position to LOCK (0) position with the shift lever in P position.	Check key interlock system	14-129
O/D OFF indicator light does not come on for two seconds after ignition switch is first turned ON (II). ('99 – 00 models)	———	14-131
The O/D OFF indicator light is on constantly whenever the ignition switch is ON (II). ('99 – 00 models)	———	14-132
The O/D OFF indicator light does not come on even though the Over-Drive (O/D) switch is pressed in D position. ('99 – 00 models)	Check Over-Drive (O/D) switch circuit	14-133

NOTE: If a customer describes the symptom for code P1706 (6), it will be necessary to recreate the symptom by test-driving, then recheck the DTC.

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Troubleshooting Flowchart — Lock-up Control Solenoid Valve A

- **OBD II Scan Tool indicates Code P1753.**
- **Self-diagnosis D4 indicator light blinks once.**

Possible Cause
• Disconnected lock-up control solenoid valve A/B assembly connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A

Check and record the freeze data in case it is needed later for problem verification.

If the Honda PGM Tester is available:

Perform the lock-up control solenoid valve A test using the Honda PGM Tester.

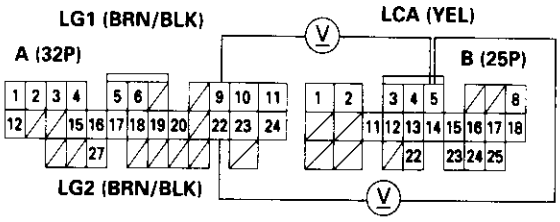
Did the solenoid pass the test?

YES → **The solenoid is OK at this time. Verify that all connectors in the circuit are making good contact.**

NO

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B5 and A9 or A22 terminals.

PCM CONNECTORS



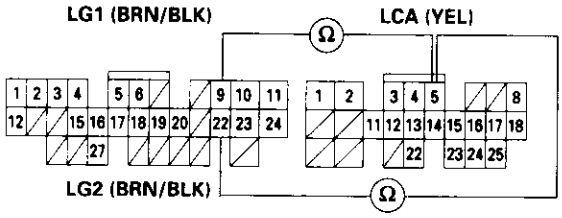
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the B5 terminal and the lock-up control solenoid valve A.**

NO

Measure Lock-up Control Solenoid Valve A Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the B5 and A9 or A22 terminals.



Is the resistance 12 – 25 Ω?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.**

NO

To page 14-65

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From page 14-64

Check Lock-up Control Solenoid Valve A for a Short Circuit:
1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Check for continuity between the B5 and A9 or A22 terminals.

Is there continuity?

YES → **Repair short to ground in the wire between the B5 terminal and the lock-up control solenoid valve A.**

NO

Measure Lock-up Control Solenoid Valve A Resistance at the Solenoid Valve Connector:
Measure the resistance between the No. 2 terminal of the connector and body ground.

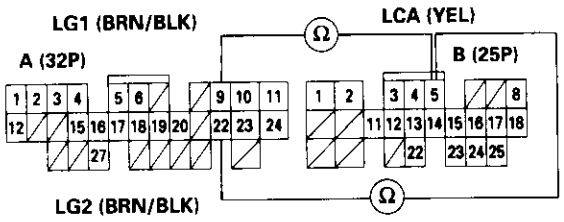
Is the resistance 12 – 25 Ω?

YES → **Check for open in the wire between the B5 terminal and the lock-up control solenoid valve A.**

NO

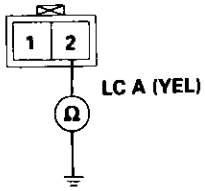
Replace the lock-up control solenoid valve A/B assembly.

PCM CONNECTORS



Wire side of female terminals

LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

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Troubleshooting Flowchart — Lock-up Control Solenoid Valve B

- **OBD II Scan Tool indicates Code P1758.**
- **Self-diagnosis D4 indicator light blinks twice.**

Possible Cause

- **Disconnected lock-up control solenoid valve A/B assembly connector**
- **Short or open in lock-up control solenoid valve B wire**
- **Faulty lock-up control solenoid valve B**

Check and record the freeze data in case it is needed later for problem verification.

Clear the PCM, and test-drive the vehicle.

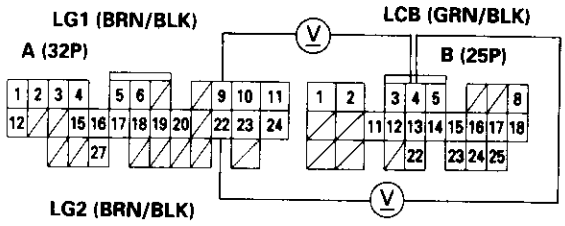
Did the code return?

NO → **The system is OK at this time. Verify that all connectors in the circuit are making good contact.**

YES

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B4 and A9 or A22 terminals.

PCM CONNECTORS



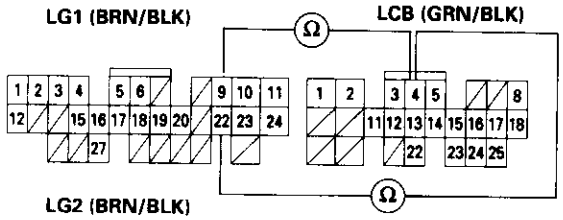
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the B4 terminal and the lock-up control solenoid valve B.**

NO

Measure Lock-up Control Solenoid Valve B Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the B4 and A9 or A22 terminals.



Is the resistance 12 – 25 Ω?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.**

NO

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From page 14-66

Check Lock-up Control Solenoid Valve B for a Short Circuit:
1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Check for continuity between the B4 and A9 or A22 terminals.

Is there continuity?

YES → **Repair short to ground in the wire between the B4 terminal and the lock-up control solenoid valve B.**

NO

Measure Lock-up Control Solenoid Valve B Resistance at the Solenoid Valve Connector:
Measure the resistance between the No. 1 terminal of the connector and body ground.

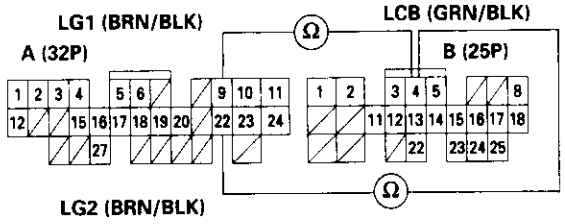
Is the resistance 12 – 25 Ω?

YES → **Check for open in the wire between the B4 terminal and the lock-up control solenoid valve B.**

NO

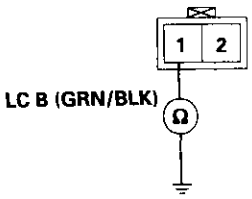
Replace the lock-up control solenoid valve A/B assembly.

PCM CONNECTORS



Wire side of female terminals

LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

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Troubleshooting Flowchart — A/T Gear Position Switch (Short)

- **OBD II Scan Tool indicates Code P1705.**
- **Self-diagnosis D4 indicator light blinks five times.**

Possible Cause
• Short in A/T gear position switch wire • Faulty A/T gear position switch

NOTE: Code P1705 (5) is caused when the PCM receives two gear position inputs at the same time.

Check and record the freeze data in case it is needed later for problem verification.

Observe the A/T Gear Position Indicator:
1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift to each position separately.

Does any indicator stay on when the shift lever is not in that position?

NO → **The system is OK at this time. Check the wire harness for damage.**

YES

Disconnect the A/T gear position switch connector.

Do all gear position indicators go out?

YES → **Replace the A/T gear position switch.**

NO

Connect the A/T gear position switch connector.

Measure ATP R Voltage:
1. Shift to all positions other than R.
2. Measure the voltage between the B16 and A9 or A22 terminals.

Is there battery voltage?

NO → **Check for short in the wire between the B16 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

YES

Measure ATP NP Voltage:
1. Shift to all positions other than N or P.
2. Measure the voltage between the B25 and A9 or A22 terminals.

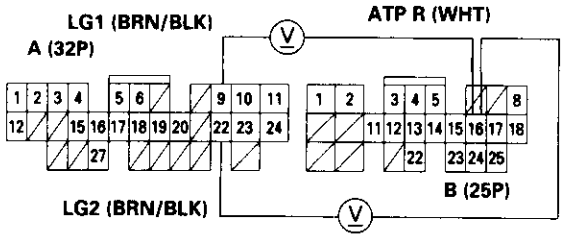
Is there battery voltage?

NO → **Check for short in the wire between the B25 terminal and the A/T gear position indicator, or a short in the wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

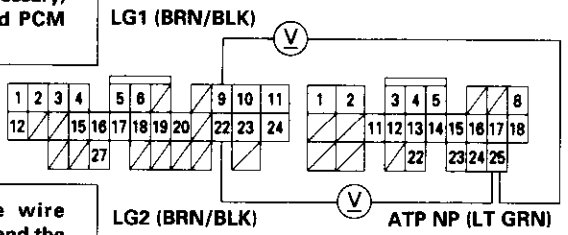
YES

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PCM CONNECTORS



Wire side of female terminals



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From page 14-68

Measure ATP D4 Voltage:
1. Shift to all positions other than D4.
2. Measure the voltage between the B24 and A9 or A22 terminals.

Is there approx. 5 V?

NO

Check for short in the wire between the B24 terminal and the A/T gear position indicator, or a short in the wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP D3 Voltage:
1. Shift to all positions other than D3.
2. Measure the voltage between the B8 and A9 or A22 terminals.

Is there battery voltage?

NO

Check for short in the wire between the B8 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP 2 Voltage:
1. Shift to all positions other than 2.
2. Measure the voltage between the B17 and A9 or A22 terminals.

Is there battery voltage?

NO

Check for short in the wire between the B17 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP 1 Voltage:
1. Shift to all positions other than 1.
2. Measure the voltage between the B18 terminal and A9 or A22 terminals.

Is there battery voltage?

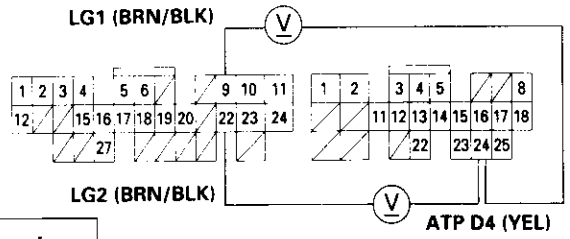
NO

Check for short in the wire between the B18 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

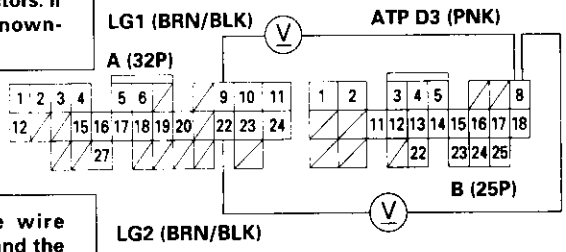
YES

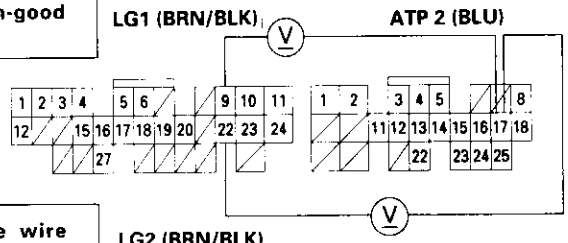
Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

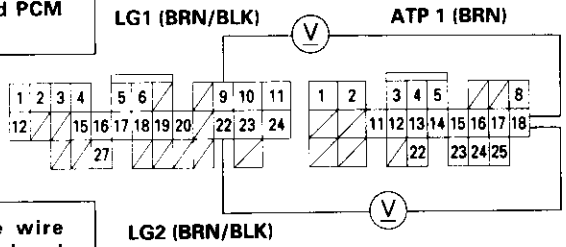
PCM CONNECTORS



Wire side of female terminals







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Troubleshooting Flowchart — A/T Gear Position Switch (Open)

- **OBD II Scan Tool indicates Code P1706.**
- **Self-diagnosis D4 indicator light blinks six times.**

Possible Cause
• Disconnected A/T gear position switch connector • Open in A/T gear position switch wire • Faulty A/T gear position switch

Check and record the freeze data in case it is needed later for problem verification.

Test the A/T gear position switch (see page 14-139).

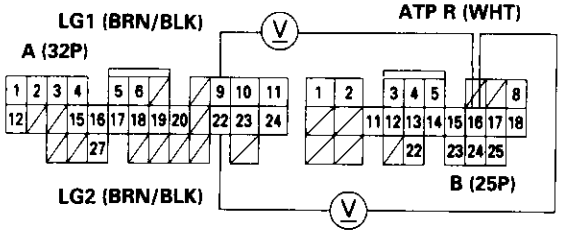
Is the switch OK?

NO → **Replace the A/T gear position switch.**

YES

Measure ATP R Voltage:
1. Turn the ignition switch ON (II).
2. Shift to R position.
3. Measure the voltage between the B16 and A9 or A22 terminals.

PCM CONNECTORS



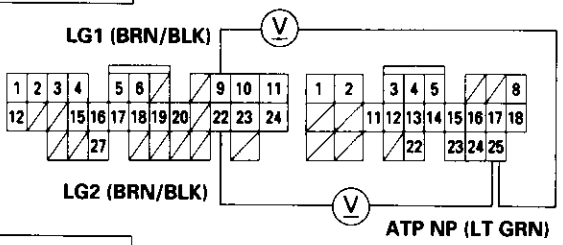
Wire side of female terminals

Is there voltage?

YES → **Repair open in the wire between the B16 terminal and the A/T gear position switch.**

NO

Measure ATP NP Voltage:
1. Shift to N or P position.
2. Measure the voltage between the B25 and A9 or A22 terminals.

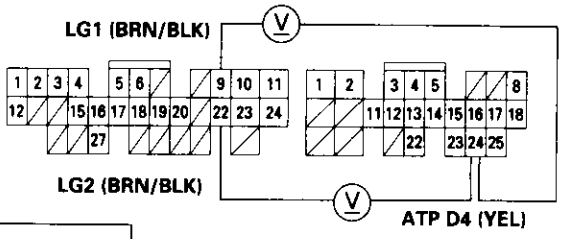


Is there voltage?

YES → **Repair open in the wire between the B25 terminal and the A/T gear position indicator or the A/T gear position switch.**

NO

Measure ATP D4 Voltage:
1. Shift to D4 position.
2. Measure the voltage between the B24 and A9 or A22 terminals.



Is there voltage?

YES → **Repair open in the wire between the B24 terminal and the A/T gear position switch.**

NO

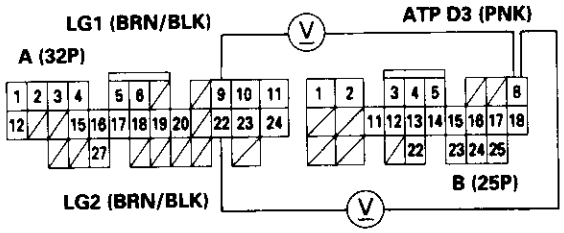
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Measure ATP D3 Voltage:
1. Shift to [D3] position.
2. Measure the voltage between the B8 and A9 or A22 terminals.

PCM CONNECTORS



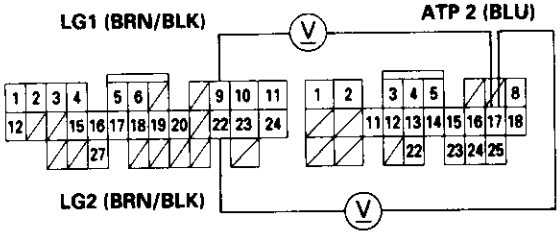
Wire side of female terminals

Is there voltage?

YES → **Repair open in the wire between the B8 terminal and the A/T gear position switch.**

NO

Measure ATP2 Voltage:
1. Shift to [2] position.
2. Measure the voltage between the B17 and A9 or A22 terminals.

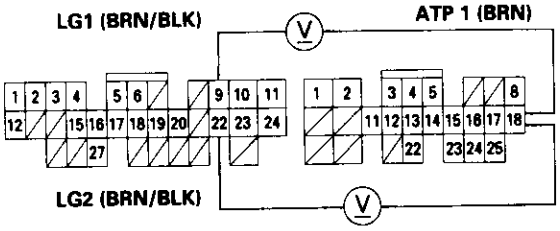


Is there voltage?

YES → **Repair open in the wire between the B17 terminal and the A/T gear position switch.**

NO

Measure ATP1 Voltage:
1. Shift to [1] position.
2. Measure the voltage between the B18 and A9 or A22 terminals.



Is there voltage?

YES → **Repair open in the wire between the B18 terminal and the A/T gear position switch.**

NO

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Shift Control Solenoid Valve A

- **OBD II Scan Tool indicates Code P0753.**
- **Self-diagnosis D4 indicator light blinks seven times.**

Possible Cause
• Disconnected shift control solenoid valve A/B assembly connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A

Check and record the freeze data in case it is needed later for problem verification.

If the Honda PGM Tester is available:

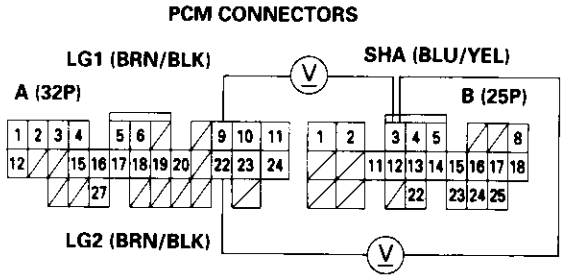
Perform the shift control solenoid valve A test using the Honda PGM Tester.

Did the solenoid pass the test?

YES → **The solenoid is OK at this time. Verify that all connectors in the circuit are making good contact.**

NO

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B3 and A9 or A22 terminals.

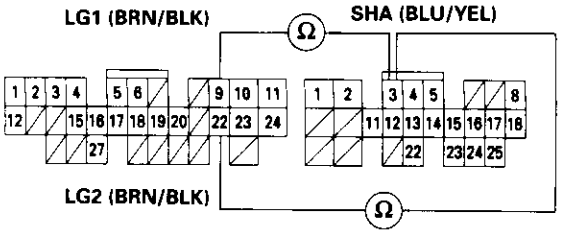


Is there voltage?

YES → **Repair short to power in the wire between the B3 terminal and the shift control solenoid valve A.**

NO

Measure Shift Control Solenoid Valve A Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the B3 and A9 or A22 terminals.



Is the resistance 12 – 25 Ω?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.**

NO

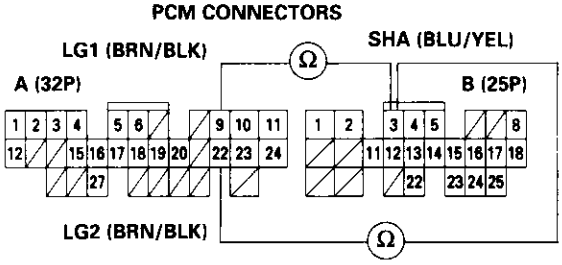
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Check Shift Control Solenoid Valve A for a Short Circuit:
1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.
2. Check for continuity between the B3 and A9 or A22 terminals.

PCM CONNECTORS



Wire side of female terminals

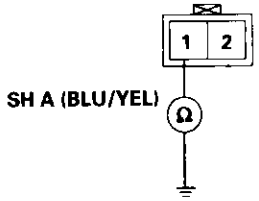
Is there continuity?

YES → **Repair short to ground in the wire between the B3 terminal and the shift control solenoid valve A.**

NO

Measure Shift Control Solenoid Valve A Resistance at the Solenoid Valve Connector:
Measure the resistance between the No. 1 terminal of the connector and body ground.

SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

Is the resistance 12 – 25 Ω?

YES → **Check for open in the wire between the B3 terminal and the shift control solenoid valve A.**

NO

Replace the shift control solenoid valve A/B assembly.

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Troubleshooting Flowchart — Shift Control Solenoid Valve B

- **OBD II Scan Tool indicates Code P0758.**
- **Self-diagnosis D4 indicator light blinks eight times.**

Possible Cause
• Disconnected shift control solenoid valve A/B assembly connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B

Check and record the freeze data in case it is needed later for problem verification.

If the Honda PGM Tester is available:

Test solenoid valve B with the Honda PGM Tester in the Function test mode.

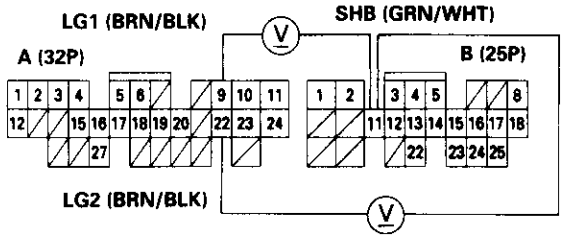
Did the solenoid pass the test?

YES → **The solenoid is OK at this time. Verify that all connectors in the circuit are making good contact.**

NO

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B11 and A9 or A22 terminals.

PCM CONNECTORS



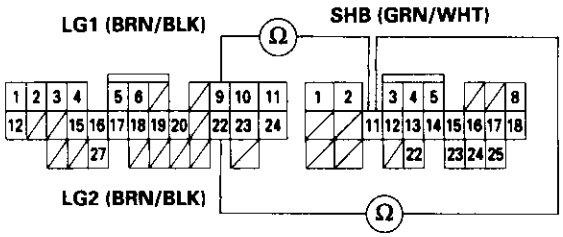
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the B11 terminal and the shift control solenoid valve B.**

NO

Measure Shift Control Solenoid Valve B Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the B11 and A9 or A22 terminals.



Is the resistance 12 – 25 Ω?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.**

NO

To page 14-75

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From page 14-74

Check Shift Control Solenoid Valve B for a Short Circuit:
1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.
2. Check for continuity between the B11 and A9 or A22 terminals.

Is there continuity?

YES → **Repair short to ground in the wire between the B11 terminal and the shift control solenoid valve B.**

NO

Measure Shift Control Solenoid Valve B Resistance at the Solenoid Valve Connector:
Measure the resistance between the No. 2 terminal of the connector and body ground.

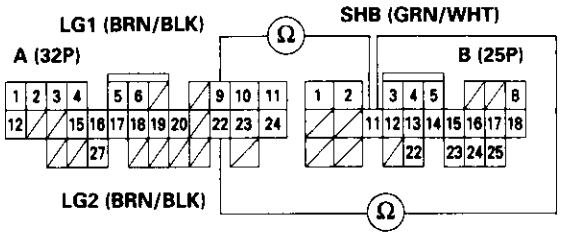
Is the resistance 12 – 25 Ω?

YES → **Check for open in the wire between the B11 terminal and the shift control solenoid valve B.**

NO

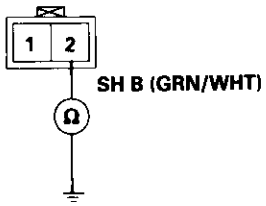
Replace the shift control solenoid valve A/B assembly.

PCM CONNECTORS



Wire side of female terminals

SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

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Troubleshooting Flowchart — Countershaft Speed Sensor

- **OBD II Scan Tool indicates Code P0720.**
- **Self-diagnosis D4 indicator light blinks nine times.**

Possible Cause
• Loose or faulty connection between the PCM and vehicle harness • Disconnected countershaft speed sensor connector • Short or open in countershaft speed sensor wire • Faulty countershaft speed sensor

Check and record the freeze data in case it is needed later for problem verification.

If the Honda PGM Tester is available:

Connect the Honda PGM Tester, and test-drive the vehicle with the tester in Data Link or Snap-Shot mode. Make sure the countershaft speed sensor reads the same as the vehicle speed sensor (VSS).

Do both sensors read the same speed?

YES → **The countershaft speed sensor is OK at this time. Verify that all connectors in the circuit are making good contact.**

NO

Check the countershaft speed sensor installation, and check it for damage.

Is the countershaft speed sensor installed properly, and not damaged?

NO → **Reinstall or replace and recheck.**

YES

Measure Countershaft Speed Sensor Resistance at the Sensor Connector:

1. Disconnect the 2P connector from the countershaft speed sensor connector.
2. Measure the resistance of the countershaft speed sensor.

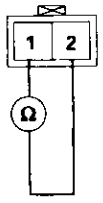
Is the resistance 400 – 600 Ω?

NO → **Replace the countershaft speed sensor.**

YES

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COUNTERSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

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From page 14-76

Check Countershaft Speed Sensor for a Short Circuit:
1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between the body ground and the B23 terminal and B22 terminal individually.

Is there continuity?

YES → **Repair short in the wires between the B23 and B22 terminals and the countershaft speed sensor.**

NO

Measure Countershaft Speed Sensor Circuit for an Open:
1. Connect the countershaft speed sensor 2P connector.
2. Measure the resistance between the B23 and B22 terminals.

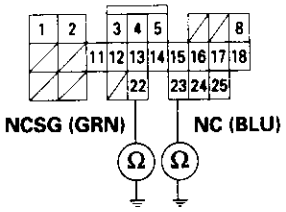
Is the resistance 400 – 600 Ω?

NO → **Repair loose terminal or open in the wires between the B23 and B22 terminals and the countershaft speed sensor.**

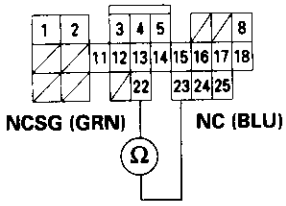
YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

PCM CONNECTOR B (25P)



Wire side of female terminals



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Troubleshooting Flowchart — Mainshaft Speed Sensor

- **OBD II Scan Tool indicates Code P0715.**
- **Self-diagnosis D4 indicator light indicates Code 15.**

Possible Cause
• **Disconnected mainshaft speed sensor connector** • **Short or open in mainshaft speed sensor wire** • **Faulty mainshaft speed sensor**

NOTE: Code P0715(15) on the PCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code P0715(15) may also indicate a mechanical problem in the transmission. Check the freeze data with a Honda PGM Tester. If the mainshaft speed sensor rpm was 0, proceed with this troubleshooting. If not, the probable cause is a mechanical problem within the transmission.

Check and record the freeze data in case it is needed later for problem verification.

Check the mainshaft and countershaft speed sensor installation, and check the sensors for damage.

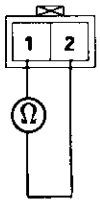
Are the mainshaft and countershaft speed sensors installed properly, and not damaged?

NO → **Reinstall or replace and recheck.**

YES

Measure Mainshaft Speed Sensor Resistance at the Sensor Connector:
1. Disconnect the 2P connector from the mainshaft speed sensor connector.
2. Measure the resistance of the mainshaft speed sensor.

MAINSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

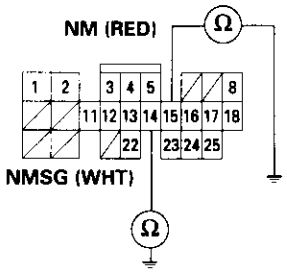
Is the resistance 400 – 600 Ω?

NO → **Replace the mainshaft speed sensor.**

YES

Check Mainshaft Speed Sensor for a Short Circuit:
1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between body ground and B15 terminal and the B14 terminal individually.

PCM CONNECTOR B (25P)



Wire side of female terminals

Is there continuity?

YES → **Repair short in the wires between the B15 and B14 terminals and the mainshaft speed sensor.**

NO

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From page 14-78

Measure Mainshaft Speed Sensor Resistance:
1. Connect the mainshaft speed sensor 2P connector.
2. Measure the resistance between the B15 and B14 terminals.

Is the resistance 400 – 600 Ω?

YES → **Run the Electrical Troubleshooting Flowchart for code P0720 (9). Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

NO

Check NM Wire Continuity:
1. Disconnect the 2P connector from the mainshaft speed sensor connector.
2. Check for continuity between the B15 terminal and the No. 2 terminal of the mainshaft speed sensor connector.

Is there continuity?

NO → **Repair open in the wire between the B15 terminal and the mainshaft speed sensor.**

YES

Check NMSG Wire Continuity:
Check for continuity between the B14 terminal and the No. 1 terminal of the mainshaft speed sensor connector.

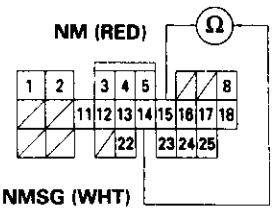
Is there continuity?

NO → **Repair open in the wire between the B14 terminal and the mainshaft speed sensor.**

YES

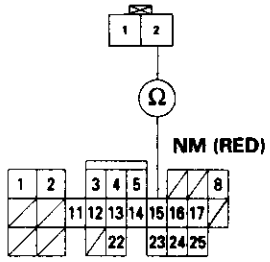
Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

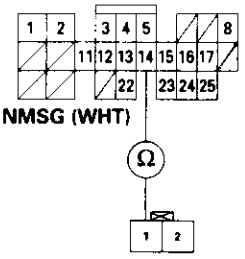
PCM CONNECTOR B (25P)



Wire side of female terminals

MAINSHAFT SPEED SENSOR CONNECTOR





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Troubleshooting Flowchart — Linear Solenoid

- **OBD II Scan Tool indicates Code P1768.**
- **Self-diagnosis D4 indicator light indicates Code 16.**

Possible Cause
• Disconnected linear solenoid connector • Short or open in linear solenoid wire • Faulty linear solenoid

Check and record the freeze data in case it is needed later for problem verification.

Measure Linear Solenoid Resistance at the Solenoid Connector:
1. Disconnect the 2P connector from the linear solenoid connector.
2. Measure the resistance of the linear solenoid.

Is the resistance about 5.0 Ω?

NO → **Replace the linear solenoid assembly.**

YES

Check Linear Solenoid for a Short Circuit:
1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between the body ground and the B1 terminal and B2 terminal individually.

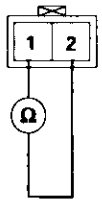
Is there continuity?

YES → **Repair short in the wires between the B1 and B2 terminals and the linear solenoid.**

NO

To page 14-81

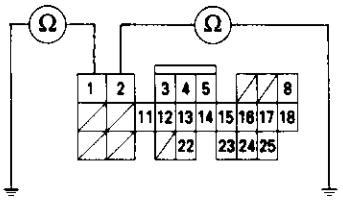
LINEAR SOLENOID CONNECTOR



Terminal side of male terminals

PCM CONNECTOR B (25P)

LSM (WHT) **LSP (RED)**



Wire side of female terminals

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From page 14-80

Check Ground Line:
1. Disconnect the A (32P) connector from the PCM.
2. Check for continuity between terminals A9 and A10 and between terminals A22 and A23.

Is there continuity?

NO → **Repair loose terminal or open in the wires between terminals A9, A10, A22 and A23 and ground, and repair poor ground (G101, G401).**

YES

Measure Linear Solenoid Resistance:
1. Connect the linear solenoid 2P connector.
2. Measure the resistance between the B1 and B2 terminals.

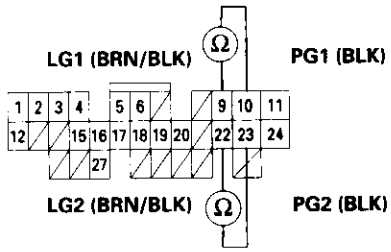
Is the resistance about 5.0 Ω?

NO → **Repair loose terminal or open in the wires between the B1 and B2 terminals and the linear solenoid.**

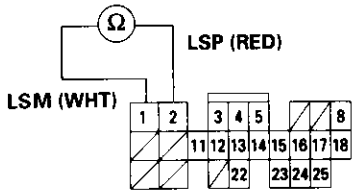
YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

PCM CONNECTOR A (32P)



Wire side of female terminals



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Troubleshooting Flowchart — Lock-up Control System

- **OBD II Scan Tool indicates Code P0740.**
- **Self-diagnosis D4 indicator light indicates Code 40.**

Possible Cause
Faulty Lock-up control system

Check and record the freeze data in case it is needed later for problem verification

Check for Another Code:
Check whether the OBD II scan tool or the D4 indicator light indicates another code.

Does the OBD II scan tool or the D4 indicator light indicate another code?

YES → **Perform the Troubleshooting Flowchart for the indicated Code(s). Recheck for code P0740 (40) after troubleshooting.**

NOTE: Do not continue with this troubleshooting until the causes of any other DTCs have been corrected.

NO*

Test Line Pressure:
Measure the line pressure (see page 14-161 and 14-162).

* Even if you cannot reproduce code P0740, test the line pressure, test the clutch pressures, and if necessary, replace the lock-up control solenoid valve assembly.

Is the line pressure within the service limit?

NO → **Repair the hydraulic system as necessary (see page 14-162).**

YES

Test 1st, 2nd, 3rd, and 4th Clutch Pressure:
Measure the 1st, 2nd, 3rd, and 4th clutch pressure (see page 14-161 thru 14-163).

Is each clutch pressure within the service limit?

NO → **Repair the hydraulic system as necessary (see page 14-162 and 14-163).**

YES

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From page 14-82

Replace the Lock-up Control Solenoid Valve Assembly and Recheck:

1. Replace the lock-up control solenoid valve A/B assembly (see page 14-135).
2. Turn the ignition switch OFF and reset the PCM by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Using the scan tool, check to be sure that the engine coolant temperature is 176°F (80°C) or above.
4. Drive the vehicle at 55 mph (88 km/h) constantly for more than one minute.
5. Recheck for code P0740 (40).

Does the OBD II scan tool indicate code P0740 or does the D4 indicator light indicate code 40?

NO → **The system is OK at this time.**

YES

Replace the Linear Solenoid Assembly and Recheck:

1. Replace the linear solenoid assembly (see page 14-138).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Using the scan tool, check to be sure that the engine coolant temperature is 176°F (80°C) or above.
4. Drive the vehicle at 55 mph (88 km/h) constantly for more than one minute.
5. Recheck for code P0740 (40).

Does the OBD II scan tool indicate code P0740 or does the D4 indicator light indicate code 40?

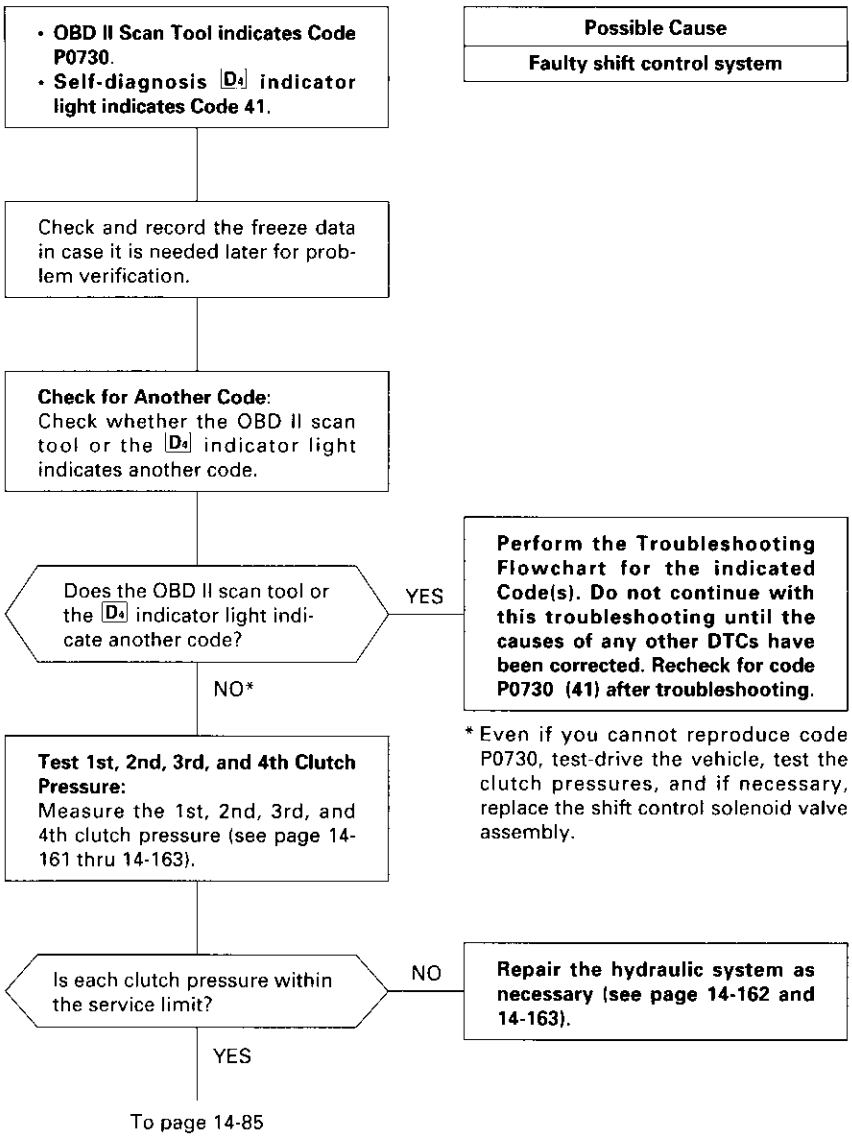
NO → **The system is OK at this time.**

YES

Replace the transmission and torque converter assembly.

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Troubleshooting Flowchart — Shift Control System



* Even if you cannot reproduce code P0730, test-drive the vehicle, test the clutch pressures, and if necessary, replace the shift control solenoid valve assembly.

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From page 14-84

Replace Shift Control Solenoid Valve Assembly and Recheck:

1. Replace the shift control solenoid valve A/B assembly (see page 14-136).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Drive the vehicle at over 12 mph (20 km/h) in 1st, 2nd, 3rd, and 4th gear for more than 30 seconds in D4 position.
4. Recheck for code P0730 (41).

Does the OBD II scan tool indicate code P0730 or does the D4 indicator light indicate code 41?

NO → **The system is OK at this time.**

YES

Replace Linear Solenoid Assembly and Recheck:

1. Replace the linear solenoid assembly (see page 14-138).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Drive the vehicle at over 12 mph (20 km/h) in 1st, 2nd, 3rd, and 4th gear for more than 30 seconds in D4 position.
4. Recheck for code P0730 (41).

Does the OBD II scan tool indicate code P0730 or does the D4 indicator light indicate code 41?

NO → **The system is OK at this time.**

YES

Replace the transmission.

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Troubleshooting Flowchart — D4 Indicator Light On Constantly

The D4 indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

Measure D4 IND Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B13 terminal and body ground.

Is there voltage?

YES → **Repair short to power in the wire between the B13 terminal and the gauge assembly.**

NO

Measure ATP D4 Voltage:
1. Turn the ignition switch OFF.
2. Connect the B (25P) connector to the PCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than D4.
5. Measure the voltage between the B24 terminal and body ground.

Is there voltage?

YES → **Replace the PCM.**

NO

Test the A/T gear position switch (see page 14-139).

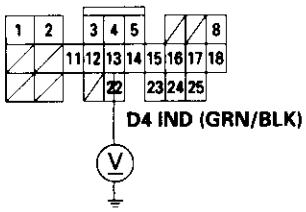
Is the switch OK?

NO → **Replace the A/T gear position switch.**

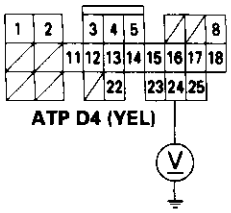
YES

Check for a short to ground in the wire between the B24 terminal and A/T gear position switch. If wire is OK, substitute a known-good PCM and recheck.

PCM CONNECTOR B (25P)



Wire side of female terminals



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Troubleshooting Flowchart — D4 Indicator Light Does Not Come On

The D4 indicator light does not come on when the ignition switch is first turned ON (II). (It should come on for about two seconds.)

Check the Service Check Connector:
Make sure the special tool (SCS Service Connector) is not connected to the service check connector.

Is the special tool (SCS Service Connector) connected to the service check connector?

YES → **Disconnect the special tool from the service check connector and recheck.**

NO

Check the D4 Indicator Light:
Shift to D4 position.

Does the D4 indicator light come on?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

NO

Check the Ground Circuit:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) connector from the PCM.
3. Check for continuity between the A9 terminal and body ground and the A22 terminal and body ground.

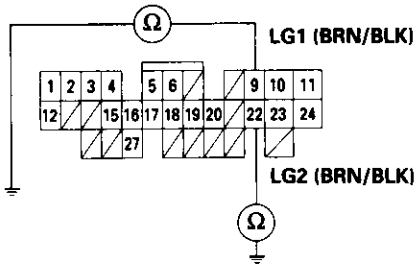
Is there continuity?

NO → **• Repair open in the wires between the A9 or A22 terminals and G101.**
• Repair the body ground (G101).

YES

To page 14-88

PCM CONNECTOR A (32P)



Wire side of female terminals

(cont'd)

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Troubleshooting Flowchart — D4 Indicator Light Does Not Come On (cont'd)

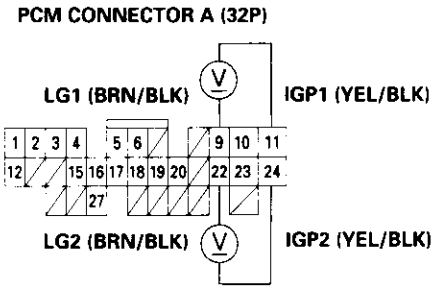
From page 14-87

Measure Power Supply Circuit Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between terminals A9 and A11 and between terminals A22 and A24.

Is there battery voltage?

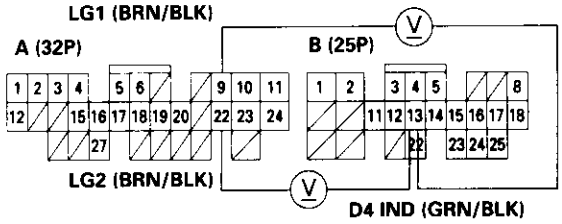
NO → **Repair open or short in the wire between the A11 and/or A24 terminals, the PGM-FI main relay, and the fuse box.**

YES



Wire side of female terminals

Measure D4 IND Voltage:
1. Turn the ignition switch OFF.
2. Connect the A (32P) connector to the PCM.
3. Connect a digital multimeter to the B13 and A9 or A22 terminals.
4. Turn the ignition switch ON (II), and make sure that voltage is available for two seconds.

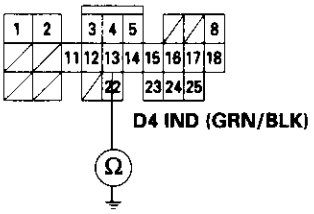


Is there voltage?

YES → **Check for an open in the wire between the B13 terminal and the gauge assembly. If wire is OK, check for a faulty D4 indicator light bulb or a faulty gauge assembly printed circuit board.**

NO

Check D4 IND for a Short Circuit: Check for continuity between the B13 terminal and body ground.



Is there continuity?

YES → **Repair short in the wire between the B13 terminal and the gauge assembly.**

NO

Check for loose terminal fit in the PCM connectors. Check the A/T gear position switch. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Interlock System – Shift Lock System

Shift lever cannot be moved from [P] position with the brake pedal pressed.

Check Brake Light Operation:
Press the brake pedal.

Are the brake lights ON?

NO → **Repair faulty brake switch circuit (see section 23).**

YES

Measure STOP SW Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and D (16P) connectors from the PCM.
3. Measure the voltage between the D5 and A9 or A22 terminals with the brake pedal pressed.

Is there battery voltage?

NO → **Repair open in the wire between the D5 terminal and the brake switch.**

YES

Measure ILU Voltage:
1. Connect the A (32P) and D (16P) connectors to the PCM.
2. Disconnect the 8P connector from the interlock control unit.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 7 terminal of the interlock control unit and body ground with the brake pedal pressed.

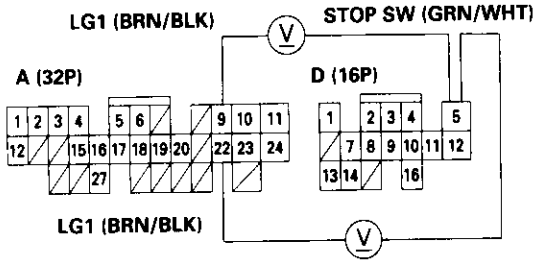
Is there battery voltage?

NO → **Check for an open or short in the wire between the No. 7 terminal of the interlock control unit and the B12 terminal of the PCM. If the wire is OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

YES

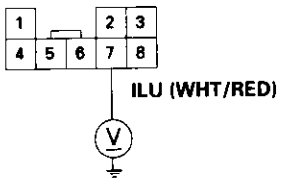
To page 14-90

PCM CONNECTORS



Wire side of female terminals

INTERLOCK CONTROL UNIT CONNECTOR (8P)



Wire side of female terminals

(cont'd)

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Troubleshooting Flowchart — Interlock System – Shift Lock System (cont'd)

From page 14-89

Measure ATP P Voltage:
Measure the voltage between the No. 6 terminal of the interlock control unit and body ground.

NOTE: Shift lever must be in [P].

Is there voltage?

YES → **Repair open in the wire between the No. 6 terminal of the interlock control unit and the A/T gear position switch.**

NO

Check Shift Lock Solenoid for an Open Circuit:
1. Turn the ignition switch OFF.
2. Disconnect the shift lock solenoid connector.
3. Check for continuity between the No. 3 terminal of the interlock control unit and the No. 2 terminal of the shift lock solenoid connector.

Is there continuity?

NO → **Repair open in the wire between the No. 3 terminal and the shift lock solenoid.**

YES

Check Shift Lock Solenoid Operation:
1. Connect the No. 1 terminal of the shift lock solenoid connector to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal.
2. Check the shift lock solenoid operation.

NOTE: Do not connect the No. 2 terminal to the battery positive terminal or you will damage the diode inside the shift lock solenoid.

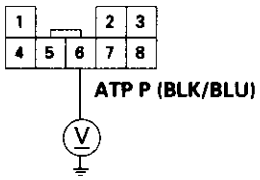
Does the shift lock solenoid operate properly?

NO → **Replace the shift lock solenoid.**

YES

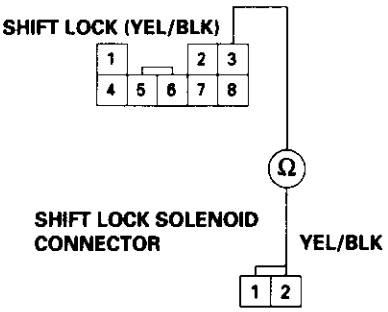
Check for loose terminal fit in the interlock control unit connectors. If necessary, substitute a known-good interlock control unit and recheck.

INTERLOCK CONTROL UNIT CONNECTOR (8P)



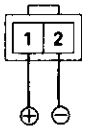
Wire side of female terminals

SHIFT LOCK (YEL/BLK)



Wire side of female terminals

SHIFT LOCK SOLENOID CONNECTOR (directly on solenoid)



Terminal side of male terminals

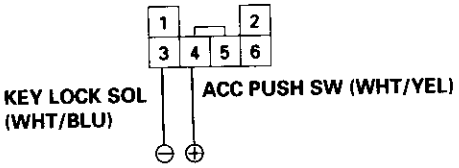
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Troubleshooting Flowchart — Interlock System – Key Interlock System

Ignition key cannot be moved from ACC (I) position to LOCK (0) position while pushing the ignition key with the shift lever in [P] position, and the shift lever button released.

Check Key Interlock Solenoid Operation:
1. Disconnect the ignition switch connector (6P).
2. Connect the No. 4 terminal of the ignition switch 6P connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal.
3. Check the key interlock solenoid operation. A clicking sound should be heard.

IGNITION SWITCH 6P CONNECTOR



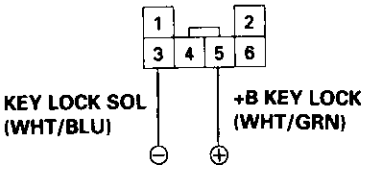
Wire side of female terminals

Does the key interlock solenoid operate properly?

NO → **Faulty key interlock solenoid. Replace the ignition key cylinder/ steering lock assembly.**

YES

Check Key Interlock Switch Operation:
1. Connect the No. 5 terminal of the ignition switch connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal.
2. Turn the ignition switch to ACC (I), then push it.
3. Check the key interlock solenoid operation. A clicking sound should be heard while pushing the ignition key.



Does the key interlock solenoid operate properly?

NO → **Faulty key interlock switch. Replace the ignition key cylinder/ steering lock assembly.**

YES

To page 14-92

(cont'd)

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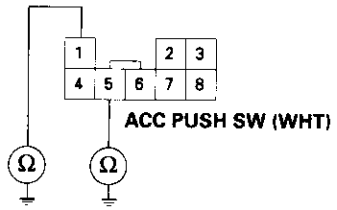
Troubleshooting Flowchart — Interlock System – Key Interlock System (cont'd)

From page 14-91

Check Key Interlock Solenoid for a Short Circuit:
1. Disconnect the interlock control unit connector.
2. Check for continuity between the No. 1 terminal and body ground and between the No. 5 terminal and body ground individually.

INTERLOCK CONTROL UNIT CONNECTOR (8P)

KEY LOCK SOL (WHT/BLU)



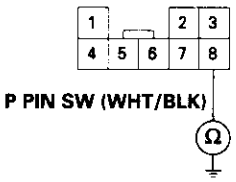
Wire side of female terminals

Is there continuity?

YES → **Repair short in the wire between the No. 1 or No. 5 terminal and the ignition switch 6P connector.**

NO

Check Park Pin Switch Operation: Check for continuity between the No. 8 terminal and body ground.



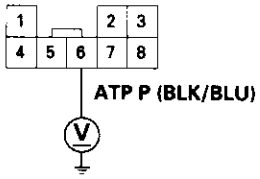
Is there continuity?

YES → **Check for short in the wire between the No. 8 terminal of the interlock control unit and the park pin switch. If wire is OK, check the park pin switch.**

NO

Measure ATP P Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the No. 6 terminal and body ground.

NOTE: Shift lever must be in [P].



Is there voltage?

YES → **Repair open in the wire between the No. 6 terminal and the A/T gear position switch.**

NO

Check for loose terminal fit in the interlock control unit connectors. If necessary, substitute a known-good interlock control unit and recheck.

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Troubleshooting Flowchart — Lock-up Control Solenoid Valve A

- **OBD II Scan Tool indicates Code P1753.**
- **Self-diagnosis D4 or D indicator light blinks once.**

Possible Cause
• Disconnected lock-up control solenoid valve A/B assembly connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A • Open in VB SOL wire

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

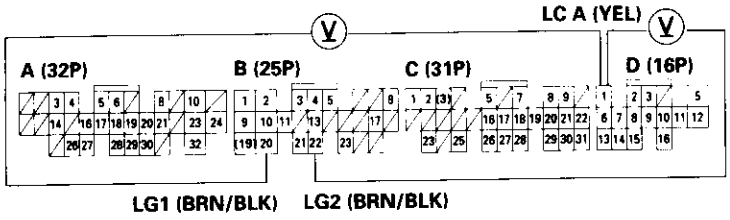
Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D1 and B20 or B22 terminals.

PCM CONNECTORS



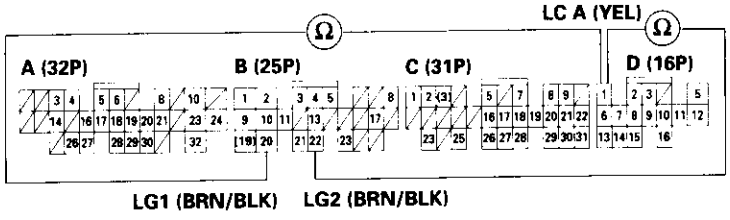
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the D1 terminal and the lock-up control solenoid valve A.**

NO

Measure Lock-up Control Solenoid Valve A Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the D1 and B20 or B22 terminals.



Is the resistance 12 – 25 Ω?

YES → To page 14-95

NO

To page 14-94

(cont'd)

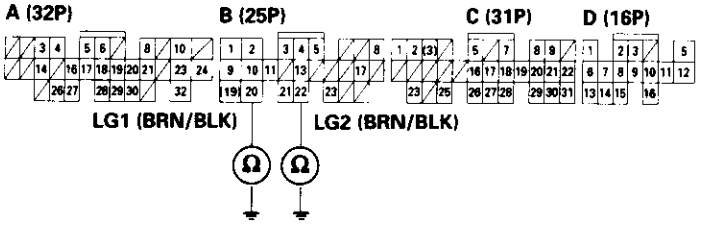
emanualpro.com

Troubleshooting Flowchart — Lock-up Control Solenoid Valve A (cont'd)

From page 14-93

Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

PCM CONNECTORS



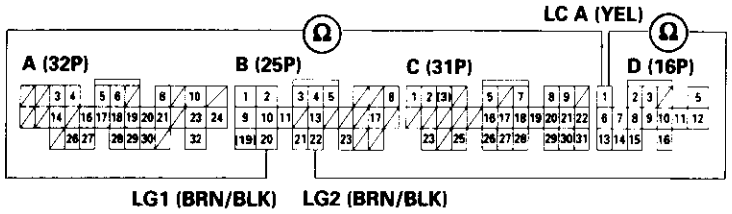
Wire side of female terminals

Is there continuity?

NO → **Repair open in the wires between the B20 and B22 terminals and ground (G101).**

YES

Check Lock-up Control Solenoid Valve A for a Short Circuit:
1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Check for continuity between the D1 and B20 or B22 terminals.



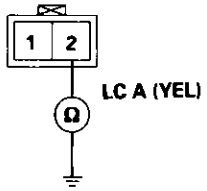
Is there continuity?

YES → **Repair short to ground in the wire between the D1 terminal and the lock-up control solenoid valve A.**

NO

Measure Lock-up Control Solenoid Valve A Resistance at the Solenoid Connector:
Measure the resistance between the No. 2 terminal of the lock-up control solenoid valve A/B assembly connector and body ground.

LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

Is the resistance 12 – 25 Ω?

NO → **Replace the lock-up control solenoid valve A/B assembly.**

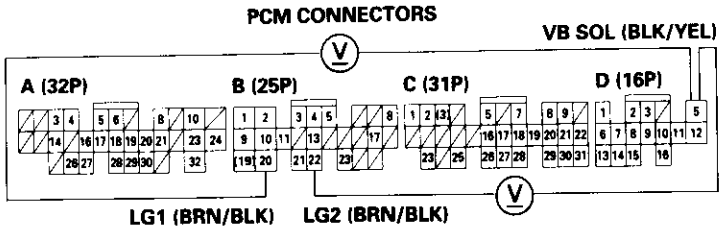
YES

Check for open in the wire between the D1 terminal and the lock-up control solenoid valve A.

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From page 14-93

Measure VB SOL Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.



Wire side of female terminals

Is there battery voltage?

NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Lock-up Control Solenoid Valve B

- **OBD II Scan Tool indicates Code P1758.**
- **Self-diagnosis D4 or D indicator light blinks twice.**

Possible Cause
• Disconnected lock-up control solenoid valve A/B assembly connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B • Open in VB SOL wire

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

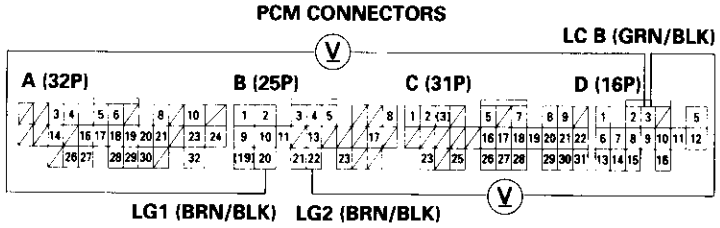
Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D3 and B20 or B22 terminals.



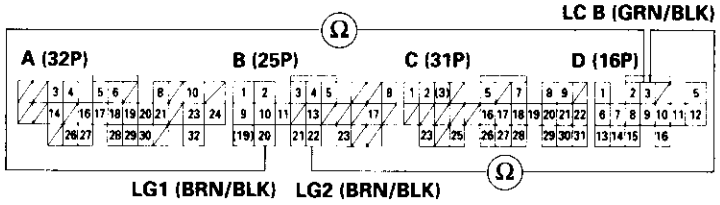
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the D3 terminal and the lock-up control solenoid valve B.**

NO

Measure Lock-up Control Solenoid Valve B Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the D3 and B20 or B22 terminals.



Is the resistance 12 - 25 Ω?

YES → To page 14-98

NO

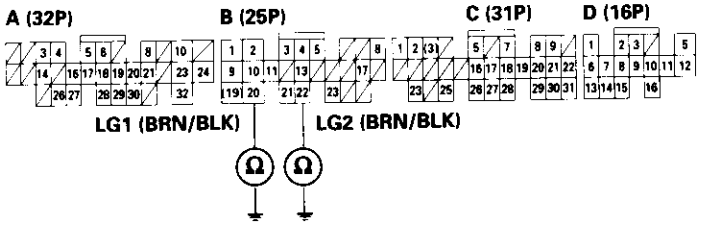
To page 14-97

www.emanualpro.com

From page 14-96

Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

PCM CONNECTORS



Wire side of female terminals

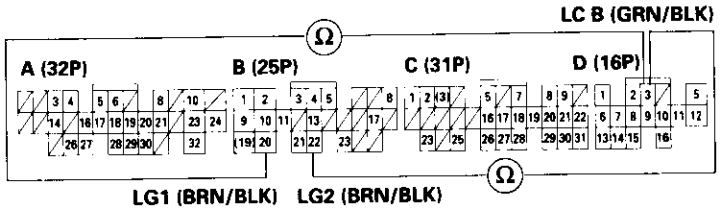
Is there continuity?

NO — **Repair open in the wires between the B20 and B22 terminals and ground (G101).**

YES

Check Lock-up Control Solenoid Valve B for a Short Circuit:

1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Check for continuity between the D3 and B20 or B22 terminals.



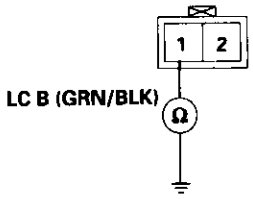
Is there continuity?

YES — **Repair short to ground in the wire between the D3 terminal and the lock-up control solenoid valve B.**

NO

Measure Lock-up Control Solenoid Valve B Resistance at the Solenoid Connector:
Measure the resistance between the No. 1 terminal of the lock-up control solenoid valve A/B assembly connector and body ground.

LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

Is the resistance 12 – 25 Ω?

NO — **Replace the lock-up control solenoid valve A/B assembly.**

YES

Check for open in the wire between the D3 terminal and the lock-up control solenoid valve B.

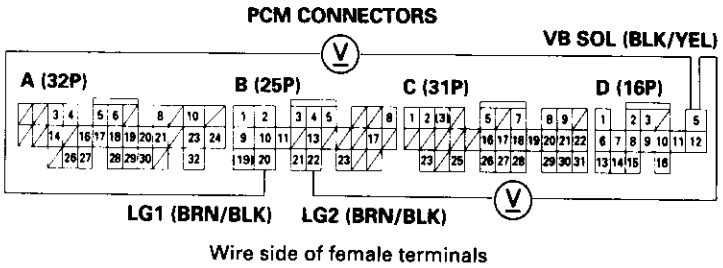
(cont'd)

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Troubleshooting Flowchart — Lock-up Control Solenoid Valve B (cont'd)

From page 14-96

Measure VB SOL Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.



Wire side of female terminals

Is there battery voltage?

NO → **Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — A/T Gear Position Switch (Short)

- **OBD II Scan Tool indicates Code P1705.**
- **Self-diagnosis D4 or D indicator light blinks five times.**

Possible Cause
• Short in A/T gear position switch wire • Faulty A/T gear position switch

NOTE: Code 1705 (5) is set when the PCM receives two gear position inputs at the same time.

Observe the A/T Gear Position Indicator:
1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift each position separately.

Does any indicator stay on when the shift lever is not in that position?

NO → **The system is OK at this time. Check the wire harness for damage.**

YES

Disconnect the A/T gear position switch connector.

Do all gear position indicators go out?

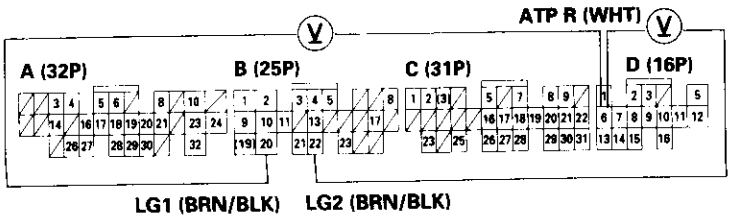
YES → **Replace the A/T gear position switch.**

NO

Connect the A/T gear position switch connector.

Measure ATP R Voltage:
1. Shift to all positions other than R.
2. Measure the voltage between the D6 and B20 or B22 terminals.

PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO → **Check for short in the wire between the D6 terminal and the A/T gear position switch or A/T gear position indicator, and check for open in the wires between the B20 and B22 terminals and body ground (G101). If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

YES

To page 14-100

(cont'd)

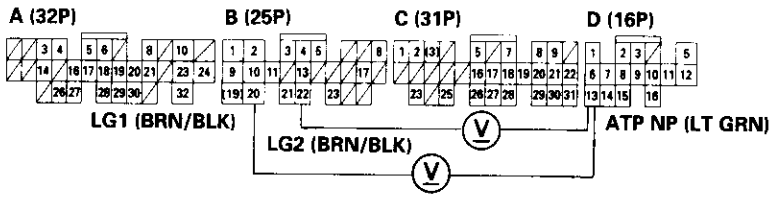
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Troubleshooting Flowchart — A/T Gear Position Switch (Short) (cont'd)

From page 14-99

Measure ATP NP Voltage:
1. Shift to all positions other than [P] or [N].
2. Measure the voltage between the D13 and B20 or B22 terminals.

PCM CONNECTORS



Wire side of female terminals

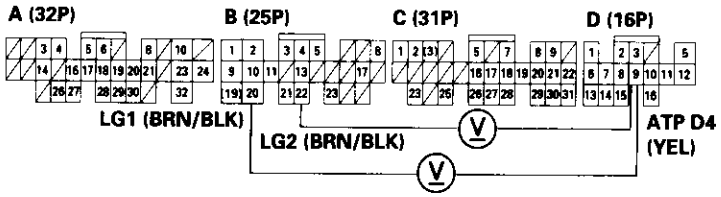
Is there 5 V?

NO

Check for short in the wire between the D13 terminal and the A/T gear position switch, and in the [P] and [N] position signal wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Measure ATP D4 Voltage:
1. Shift to all positions other than [D4] ('98) or [D] ('99 – 00).
2. Measure the voltage between the D9 and B20 or B22 terminals.



Is there 5 V?

NO

Check for short in the wire between the D9 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

To page 14-101

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From page 14-100

Measure ATP D3 Voltage ('98 model):
1. Shift to all positions other than D3.
2. Measure the voltage between the D8 and B20 or B22 terminals.

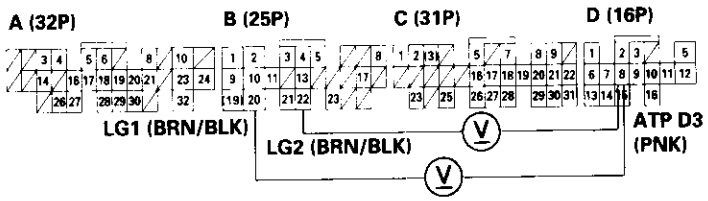
Is there battery voltage?

NO

Check for short in the wire between the D8 terminal and the A/T gear position switch or A/T gear position indicator ('98). If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

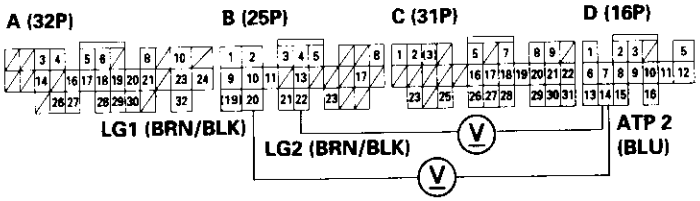
YES

PCM CONNECTORS



Wire side of female terminals

Measure ATP 2 Voltage:
1. Shift to all positions other than 2.
2. Measure the voltage between the D14 and B20 or B22 terminals.



Is there battery voltage?

NO

Check for short in the wire between the D14 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

To page 14-102

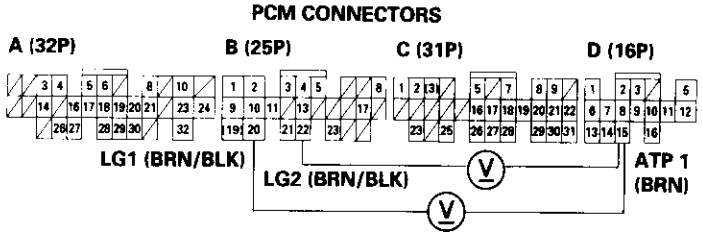
(cont'd)

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Troubleshooting Flowchart — A/T Gear Position Switch (Short) (cont'd)

From page 14-101

Measure ATP 1 Voltage:
1. Shift to all positions other than [1].
2. Measure the voltage between the D15 and B20 or B22 terminals.



Wire side of female terminals

Is there battery voltage?

NO

Check for short in the wire between the D15 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.
The system should be OK at this point. If any indicators stay on when the shift lever is not in the selected position, perform this troubleshooting flowchart again.

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Troubleshooting Flowchart — A/T Gear Position Switch (Open)

- **OBD II Scan Tool indicates Code P1706.**
- **Self-diagnosis D4 or D indicator light blinks six times.**

Possible Cause

- **Disconnected A/T gear position switch connector**
- **Open in A/T gear position switch wire**
- **Faulty A/T gear position switch**

Are any of the gear position indicators not working when you shift them?

NO → **The system is OK at this time. Check for other problems such as harness damage.**

YES

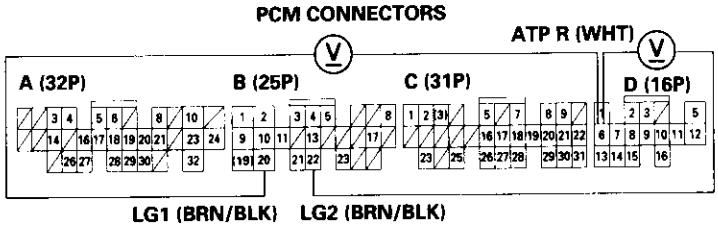
Test the A/T gear position switch (see page 14-139).

Is the switch OK?

NO → **Replace the A/T gear position switch.**

YES

Measure ATP R Voltage:
1. Turn the ignition switch ON (II).
2. Shift to R position.
3. Measure the voltage between the D6 and B20 or B22 terminals.



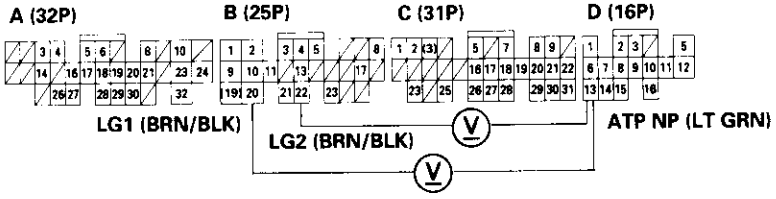
Wire side of female terminals

Is there voltage?

YES → **Repair open in the wire between the D6 terminal and the A/T gear position switch.**

NO

Measure ATP NP Voltage:
1. Shift to P or N position.
2. Measure the voltage between the D13 and B20 or B22 terminals.



Is there voltage?

YES → **Repair open in the wire between the D13 terminal and the A/T gear position switch.**

NO

To page 14-104

(cont'd)

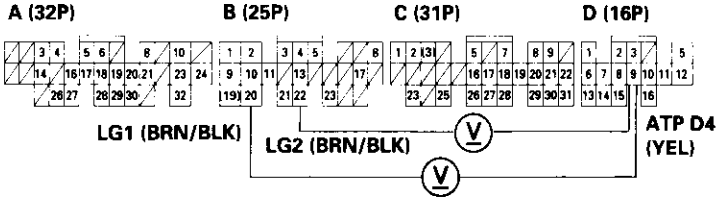
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Troubleshooting Flowchart — A/T Gear Position Switch (Open) (cont'd)

From page 14-103

Measure ATP D4 Voltage:
1. Shift to D4 ('98) or D ('99 – 00) position.
2. Measure the voltage between the D9 and B20 or B22 terminals.

PCM CONNECTORS



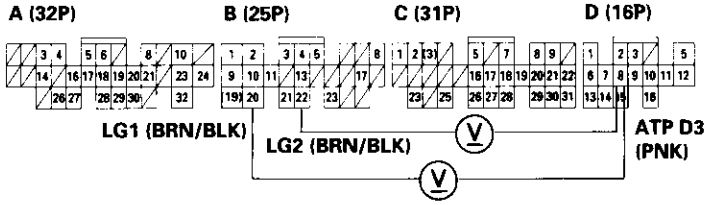
Wire side of female terminals

Is there voltage?

YES → **Repair open in the wire between the D9 terminal and the A/T gear position switch.**

NO

Measure ATP D3 Voltage ('98 model):
1. Shift to D3 position.
2. Measure the voltage between the D8 and B20 or B22 terminals.

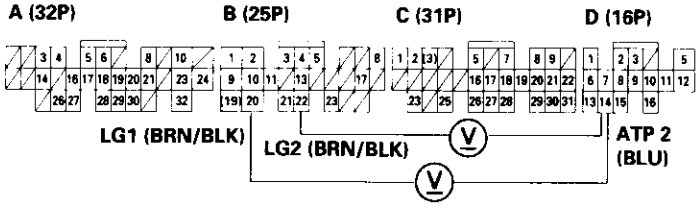


Is there voltage?

YES → **Repair open in the wire between the D8 terminal and the A/T gear position switch ('98).**

NO

Measure ATP 2 Voltage:
1. Shift to 2 position.
2. Measure the voltage between the D14 and B20 or B22 terminals.



Is there voltage?

YES → **Repair open in the wire between the D14 terminal and the A/T gear position switch.**

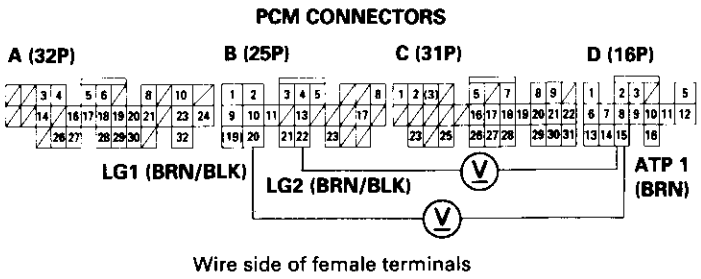
NO

To page 14-105

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From page 14-104

Measure ATP 1 Voltage:
1. Shift to [1] position.
2. Measure the voltage between the D15 and B20 or B22 terminals.



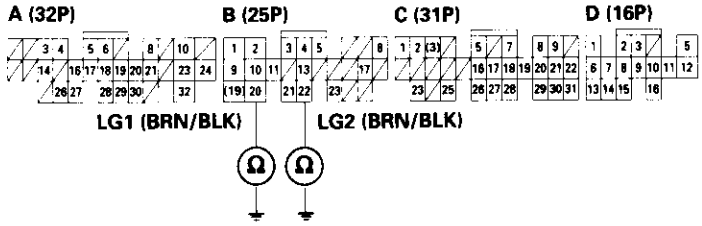
Wire side of female terminals

Is there voltage?

YES → **Repair open in the wire between the D15 terminal and the A/T gear position switch.**

NO

Check LG Wire for an Open Circuit:
1. Turn the ignition switch OFF.
2. Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.



Is there continuity?

NO → **Repair open in the wires between the B20 and B22 terminals and body ground, and repair poor ground (G101).**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Shift Control Solenoid Valve A

- **OBD II Scan Tool indicates Code P0753.**
- **Self-diagnosis D4 or D indicator light blinks seven times.**

Possible Cause
• Disconnected shift control solenoid valve A/B assembly connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A • Open in VB SOL wire

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

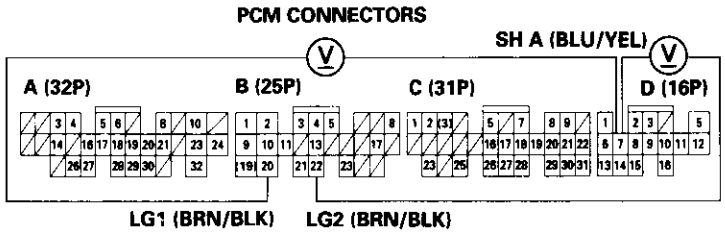
Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D7 and B20 or B22 terminals.



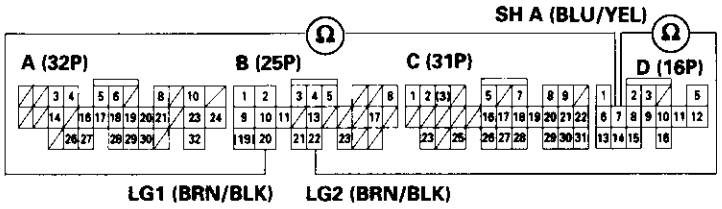
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the D7 terminal and the shift control solenoid valve A.**

NO

Measure Shift Control Solenoid Valve A Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the D7 and B20 or B22 terminals.



Is the resistance 12 – 25 Ω?

YES → To page 14-108

NO

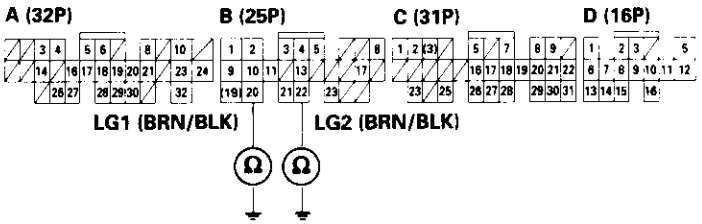
To page 14-107

www.emanualpro.com

From page 14-106

Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

PCM CONNECTORS



Wire side of female terminals

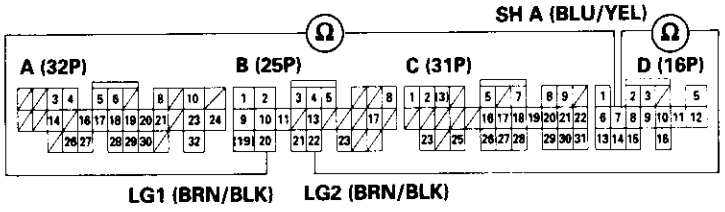
Is there continuity?

NO → **Repair open in the wires between the B20 and B22 terminals and ground (G101).**

YES

Check Shift Control Solenoid Valve A for a Short Circuit:

1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.
2. Check for continuity between the D7 and B20 or B22 terminals.



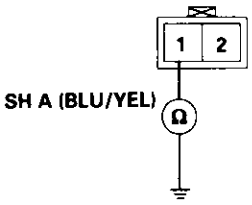
Is there continuity?

YES → **Repair short to ground in the wire between the D7 terminal and the shift control solenoid valve A.**

NO

Measure Shift Control Solenoid Valve A Resistance at the Solenoid Connector:
Measure the resistance between the No. 1 terminal of the shift control solenoid valve A/B assembly connector and body ground.

SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR



Terminal side of male terminals

Is the resistance 12 – 25 Ω?

NO → **Replace the shift control solenoid valve A/B assembly.**

YES

Check for open in the wire between the D7 terminal and the shift control solenoid valve A.

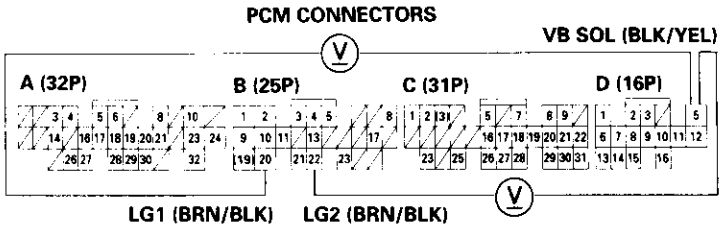
(cont'd)

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Troubleshooting Flowchart — Shift Control Solenoid Valve A (cont'd)

From page 14-106

Measure VB SOL Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.



Wire side of female terminals

Is there battery voltage?

NO → **Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Shift Control Solenoid Valve B

- **OBD II Scan Tool indicates Code P0758.**
- **Self-diagnosis D4 or D indicator light blinks eight times.**

Possible Cause

- **Disconnected shift control solenoid valve A/B assembly connector**
- **Short or open in shift control solenoid valve B wire**
- **Faulty shift control solenoid valve B**
- **Open in VB SOL wire**

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

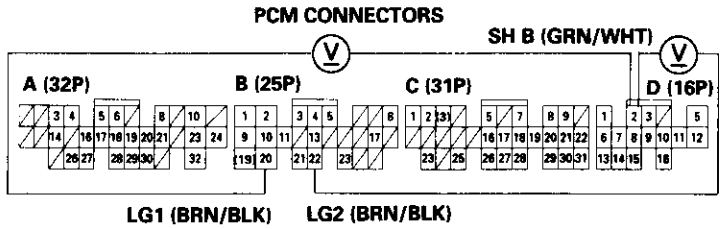
Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for a Short to Power:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D2 and B20 or B22 terminals.



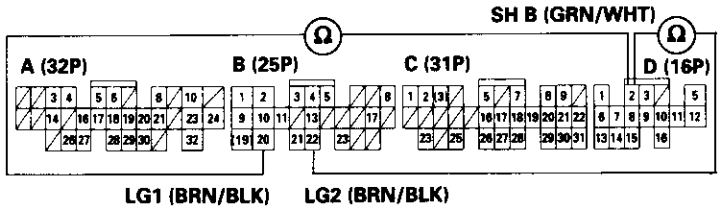
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the D2 terminal and the shift control solenoid valve B.**

NO

Measure Shift Control Solenoid Valve B Resistance:
1. Turn the ignition switch OFF.
2. Measure the resistance between the D2 and B20 or B22 terminals.



Is the resistance 12 – 25 Ω?

YES → To page 14-111

NO

To page 14-110

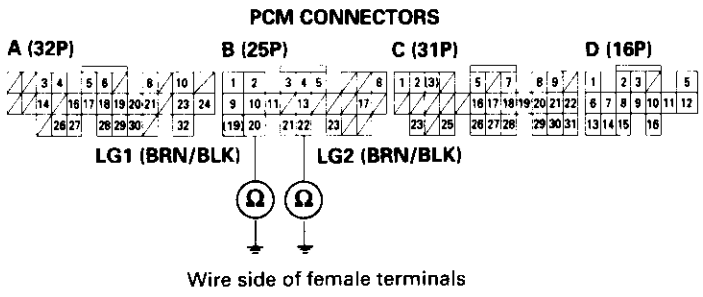
(cont'd)

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Troubleshooting Flowchart — Shift Control Solenoid Valve B (cont'd)

From page 14-109

Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.



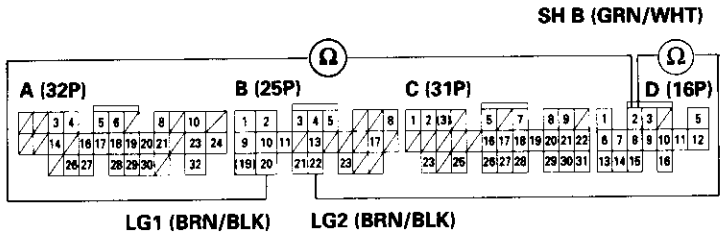
Is there continuity?

NO → **Repair open in the wires between the B20 and B22 terminals and ground (G101).**

YES

Check Shift Control Solenoid Valve B for a Short Circuit:

1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.
2. Check for continuity between the D2 and B20 or B22 terminals.

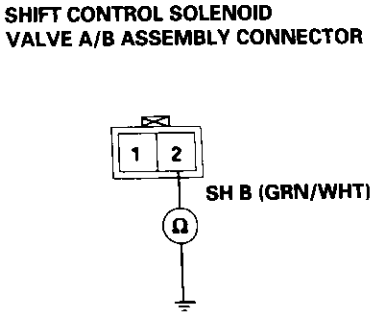


Is there continuity?

YES → **Repair short to ground in the wire between the D2 terminal and the shift control solenoid valve B.**

NO

Measure Shift Control Solenoid Valve B Resistance at the Solenoid Connector:
Measure the resistance between the No. 2 terminal of the shift control solenoid valve A/B assembly connector and body ground.



Is the resistance 12 – 25 Ω?

NO → **Replace the shift control solenoid valve A/B assembly.**

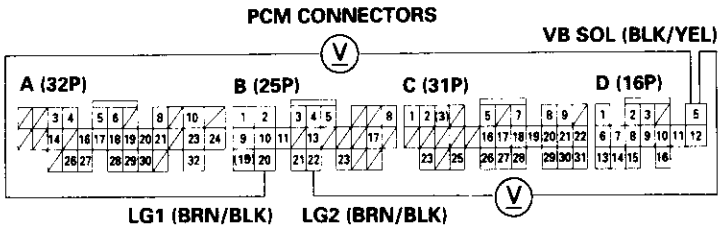
YES

Check for open in the wire between the D2 terminal and the shift control solenoid valve B.

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From page 14-109

Measure VB SOL Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.



Wire side of female terminals

Is there battery voltage?

NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Countershaft Speed Sensor

- **OBD II Scan Tool indicates Code P0720.**
- **Self-diagnosis D4 or D indicator light blinks nine times.**

Possible Cause
• Loose or faulty connection between the PCM and vehicle harness • Disconnected countershaft speed sensor connector • Short or open in countershaft speed sensor wire • Faulty countershaft speed sensor

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check the countershaft speed sensor installation, and check it for damage.

Is the countershaft speed sensor installed properly, and not damaged?

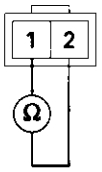
NO → **Reinstall or replace and recheck.**

YES

Measure Countershaft Speed Sensor Resistance at the Sensor Connector:

1. Disconnect the 2P connector from the countershaft speed sensor.
2. Measure countershaft speed sensor resistance at the sensor connector.

COUNTERSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

Is the resistance 400 – 600 Ω?

NO → **Replace the countershaft speed sensor.**

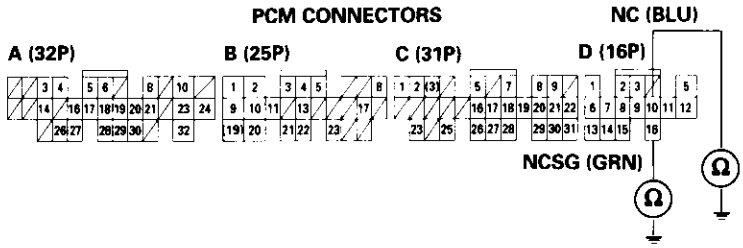
YES

To page 14-113

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From page 14-112

Check Countershaft Speed Sensor for a Short Circuit:
1. Disconnect the D (16P) connector from the PCM.
2. Check for continuity between body ground and the D10 terminal and D16 terminal individually.



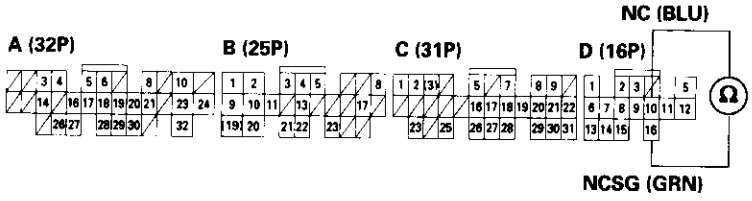
Wire side of female terminals

Is there continuity?

YES → **Repair short in the wires between the D10 and D16 terminals and the countershaft speed sensor.**

NO

Measure Countershaft Speed Sensor Circuit for an Open:
1. Connect the countershaft speed sensor connector.
2. Measure the resistance between the D10 and D16 terminals.



Is the resistance 400 - 600 Ω?

NO → **Repair loose terminal or open in the wires between the D10 and D16 terminals and the countershaft speed sensor.**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Mainshaft Speed Sensor

- **OBD II Scan Tool indicates Code P0715.**
- **Self-diagnosis D4 or D indicator light indicates Code 15.**

Possible Cause
• **Disconnected mainshaft speed sensor connector** • **Short or open in mainshaft speed sensor wire** • **Faulty mainshaft speed sensor**

NOTE: Code P0715 (15) on the PCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code P0715 (15) may also indicate a mechanical problem in the transmission. Any problem causing irregular countershaft to mainshaft speed difference can cause this code; this can sometimes be seen in A/T Freeze Data. Freeze Data can also indicate an electrical problem in the sensor circuits if one of the sensors reads 0 mph during a test-drive.

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check the mainshaft and countershaft speed sensors installation, and check them for damage.

Are the mainshaft and countershaft speed sensors installed properly, and not damaged?

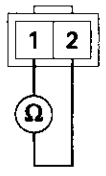
NO → **Reinstall or replace and recheck.**

YES

Measure Mainshaft Speed Sensor Resistance at the Sensor Connector:

1. Disconnect the 2P connector from the mainshaft speed sensor.
2. Measure mainshaft speed sensor resistance at the sensor connector.

MAINSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

Is the resistance 400 – 600 Ω?

NO → **Replace the mainshaft speed sensor.**

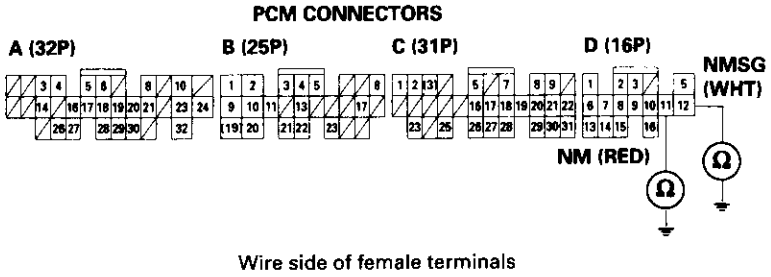
YES

To page 14-115

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From page 14-114

Check Mainshaft Speed Sensor for a Short Circuit:
1. Disconnect the D (16P) connector from the PCM.
2. Check for continuity between body ground and the D11 terminal and D12 terminal individually.



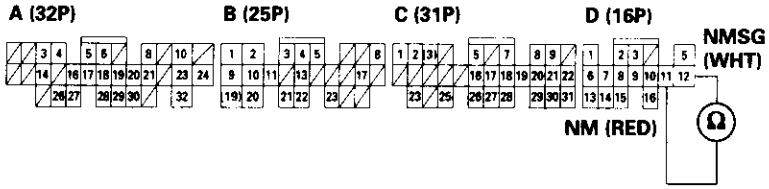
Wire side of female terminals

Is there continuity?

YES → **Repair short in the wires between the D11 and D12 terminals and the mainshaft speed sensor.**

NO

Measure Mainshaft Speed Sensor Resistance:
1. Connect the mainshaft speed sensor connector.
2. Measure the resistance between the D11 and D12 terminals.

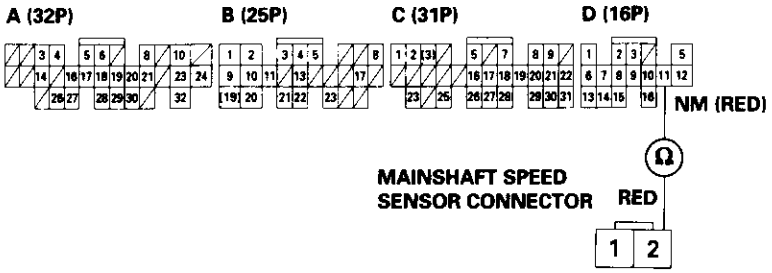


Is the resistance 400 – 600 Ω?

YES → **Run the Electrical Troubleshooting Flowchart for code P0720 (code 9). Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

NO

Check NM Wire Continuity:
1. Disconnect the 2P connector from the mainshaft speed sensor.
2. Check for continuity between the D11 terminal and the No. 2 terminal of the mainshaft speed sensor connector.



Wire side of female terminals

Is there continuity?

NO → **Repair open in the wire between the D11 terminal and the mainshaft speed sensor.**

YES

To page 14-116

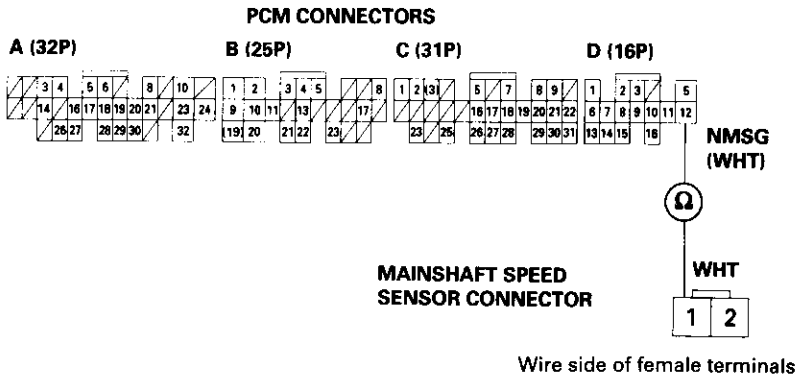
(cont'd)

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Troubleshooting Flowchart — Mainshaft Speed Sensor (cont'd)

From page 14-115

Check NMSG Wire Continuity: Check for continuity between the D12 terminal and the No. 1 terminal of the mainshaft speed sensor connector.



Is there continuity?

NO → **Repair open in the wire between the D12 terminal and the mainshaft speed sensor.**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Linear Solenoid

- **OBD II Scan Tool indicates Code P1768.**
- **Self-diagnosis D4 or D indicator light indicates Code 16.**

Possible Cause

- **Disconnected linear solenoid connector**
- **Short or open in linear solenoid wire**
- **Faulty linear solenoid**
- **Open in VB SOL wire**
- **Open in PG1 and PG2 wires or poor ground (G101).**

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

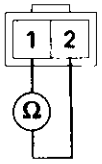
Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Measure Linear Solenoid Resistance at the Solenoid Connector:
1. Disconnect the 2P connector from the linear solenoid.
2. Measure linear solenoid resistance at the solenoid connector.

LINEAR SOLENOID CONNECTOR



Terminal side of male terminals

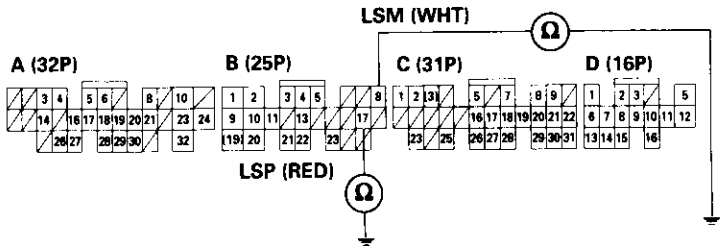
Is the resistance about 5 Ω?

NO → **Replace the linear solenoid assembly.**

YES

Check Linear Solenoid for a Short Circuit:
1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between body ground and the B8 terminal and the B17 terminal individually.

PCM CONNECTORS



Wire side of female terminals

Is there continuity?

YES → **Repair short to ground in the wires between the B8 and B17 terminals and the linear solenoid.**

NO

To page 14-118

(cont'd)

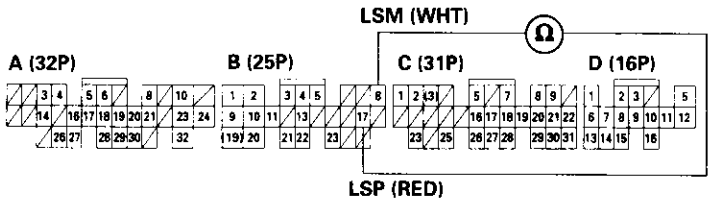
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Troubleshooting Flowchart — Linear Solenoid (cont'd)

From page 14-117

Measure Linear Solenoid Resistance:
1. Connect the linear solenoid connector.
2. Measure the resistance between the B8 and B17 terminals.

PCM CONNECTORS



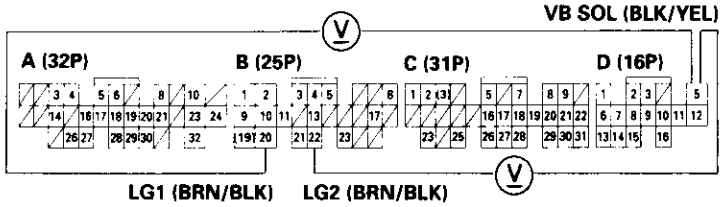
Wire side of female terminals

Is the resistance about 5 Ω?

NO → **Repair loose terminal or open in the wires between the B8 and B17 terminals and the linear solenoid.**

YES

Measure VB SOL Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the D (16P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

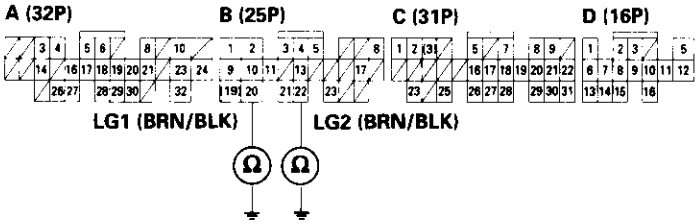


Is there battery voltage?

NO → **Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.**

YES

Check LG Wire for an Open Circuit:
1. Turn the ignition switch OFF.
2. Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.



Is there continuity?

NO → **Repair open in the wires between the B20 and B22 terminals and body ground, and repair poor ground (G101).**

YES

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Lock-up Control System

- **OBD II Scan Tool indicates Code P0740.**
- **Self-diagnosis D4 or D indicator light indicates Code 40.**

Possible Cause
Faulty lock-up control system

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for Another Code:
Check whether the OBD II scan tool or the D4 or D indicator light indicates another code.

Does the OBD II scan tool or the D4 or D indicator light indicate another code?

YES → **Perform the Troubleshooting Flowchart for the indicated Code(s). Recheck for code P0740 (40) after troubleshooting.**

NOTE: Do not continue this troubleshooting until the causes of any other DTCs have been corrected.

NO

Test Line Pressure:
Measure the line pressure (see page 14-161 and 14-162).

Is the line pressure within the service limit?

NO → **Repair the hydraulic system as necessary (see page 14-161 and 14-162).**

YES

To page 14-120

(cont'd)

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Troubleshooting Flowchart — Lock-up Control System (cont'd)

From page 14-119

Replace the Lock-up Control Solenoid Valve A/B Assembly and Recheck:

1. Replace the lock-up control solenoid valve A/B assembly (see page 14-135).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-dash fuse/relay box for more than 10 seconds.
3. Using the scan tool, check to be sure that the engine coolant temperature is 176°F (80°C) or above.
4. Drive the vehicle at 55 mph (88 km/h) constantly for more than one minute.
5. Recheck for code P0740 (40).

Does the OBD II scan tool indicate code P0740 or does the D4 or D indicator light indicate code 40?

NO → **The system is OK at this time.**

YES

Replace the transmission and torque converter.

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Troubleshooting Flowchart — Shift Control System

Possible Cause
Faulty shift control system

- **OBD II Scan Tool indicates Code P0730.**
- **Self-diagnosis D4 or D indicator light indicates Code 41.**

If the PGM Tester is available, retrieve the A/T Freeze Data, then clear the PCM.

Test-drive the vehicle under the same conditions the Freeze Data was recorded.

Did the code return?

NO → **Intermittent failure. The system is OK at this time. Check the fit of the pins in all connectors affected by this code.**

YES

Check for Another Code: Check whether the OBD II scan tool or the D4 or D indicator light indicates another code.

Does the OBD II scan tool or the D4 or D indicator light indicate another code?

YES → **Perform the Troubleshooting Flowchart for the indicated Code(s). Recheck for code P0730 (41) after troubleshooting.**

NOTE: Do not continue this troubleshooting until the causes of any other DTCs have been corrected.

NO

Measure Each Clutch Pressure: Measure the 1st, 2nd, 3rd, and 4th clutch pressure (see page 14-161 thru 14-163).

Is each clutch pressure within the service limit?

NO → **Repair the hydraulic system as necessary (see page 14-162 and 14-163).**

YES

To page 14-122

(cont'd)

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Troubleshooting Flowchart — Shift Control System (cont'd)

From page 14-121

Replace Shift Control Solenoid Valve Assembly and Recheck:

1. Replace the shift control solenoid valve A/B assembly (see page 14-136) and the linear solenoid assembly (see page 14-138).
2. Turn the ignition switch OFF and reset the PCM memory by removing the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for more than 10 seconds.
3. Drive the vehicle at over 12 mph (20 km/h) in 1st, 2nd, 3rd, and 4th gear for more than 30 seconds in D4 position.
4. Recheck for code P0730 (41).

Does the OBD II scan tool indicate code P0730 or does the D4 or D indicator light indicate code 41?

NO → **The system is OK at this time.**

YES

Replace the transmission.

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Troubleshooting Flowchart — D4 or D Indicator Light Does Not Come On

The D4 or D indicator light does not come on when the ignition switch is first turned ON (II). (It should come on for about two seconds and then go out.)

Check the Service Check Connector:
Make sure the special tool (SCS Service Connector) is not connected to the service check connector.

Is the special tool (SCS Service Connector) connected to the service check connector?

YES — **Disconnect the special tool from the service check connector and recheck.**

NO

Check the D4 or D Indicator Light:
Shift to D4 or D position.

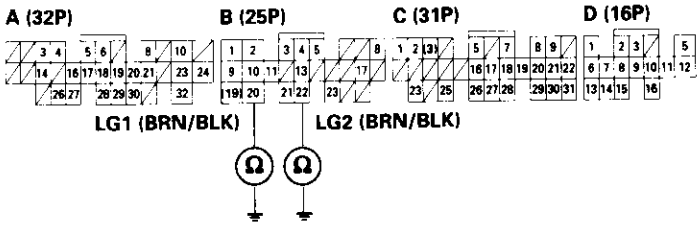
Does the D4 or D indicator light come on?

YES — **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

NO

Check the Ground Circuit:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) connector from the PCM.
3. Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

PCM CONNECTORS



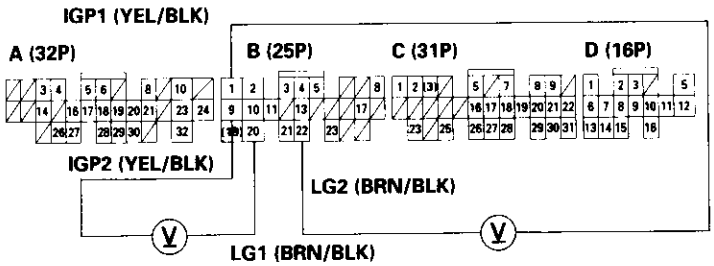
Wire side of female terminals

Is there continuity?

NO — **Repair open in the wires between the B20 and B22 terminals and ground (G101), and repair poor ground (G101).**

YES

Measure Power Supply Circuit Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between terminals B1 and B22 and between terminals B9 and B20.



Is there battery voltage?

NO — **Repair open or short in the wire between the B1 and/or B9 terminals and the PGM-FI main relay, and between the PGM-FI main relay and the under-hood fuse/relay box.**

YES

To page 14-124

(cont'd)

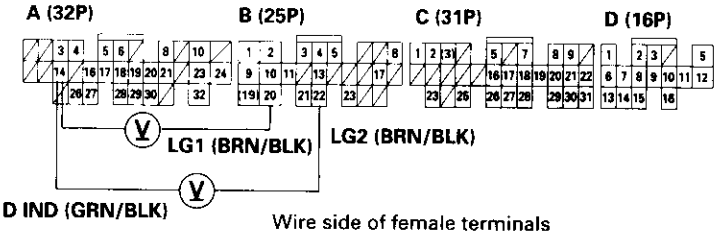
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Troubleshooting Flowchart — D4 or D Indicator Light Does Not Come On (cont'd)

From page 14-123

Measure D4 IND or D IND Voltage:
1. Turn the ignition switch OFF.
2. Connect the B (25P) connector to the PCM.
3. Connect a digital multimeter to the A14 and B20 or B22 terminals.
4. Turn the ignition switch ON (II), and make sure that voltage is available for two seconds.

PCM CONNECTORS



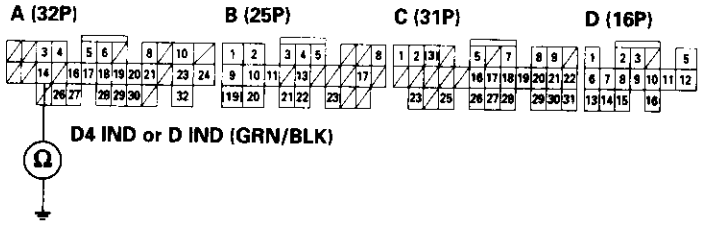
Wire side of female terminals

Is there voltage?

YES → **Check for open in the wire between the A14 terminal and the gauge assembly. If wire is OK, check for a faulty D4 or D indicator light bulb or a faulty gauge assembly printed circuit board.**

NO

Check D4 IND or D IND for a Short Circuit:
Check for continuity between the A14 terminal and body ground.



Is there continuity?

YES → **Repair short in the wire between the A14 terminal and the gauge assembly.**

NO

Check for loose terminal fit in the PCM connectors. Check the A/T gear position switch. If necessary, substitute a known-good PCM and recheck.

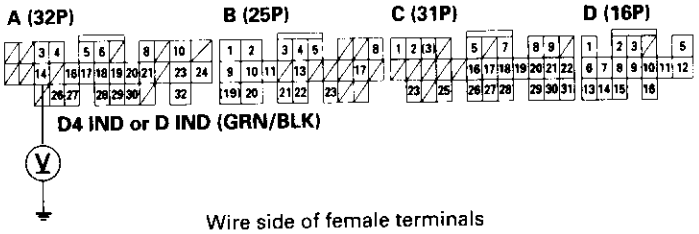
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Troubleshooting Flowchart — [D4] or [D] Indicator Light On Constantly

The [D4] or [D] indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

Measure D4 IND or D IND Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the A14 terminal and body ground.

PCM CONNECTORS



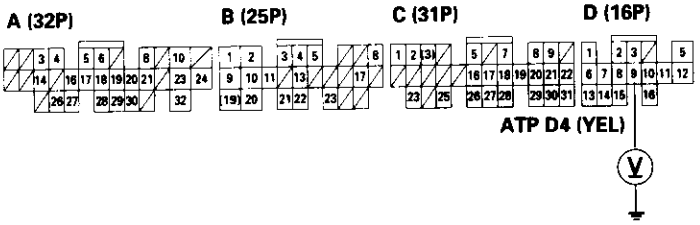
Wire side of female terminals

Is there voltage?

YES → **Repair short to power in the wire between the A14 terminal and the gauge assembly.**

NO

Measure ATP D4 Voltage:
1. Turn the ignition switch OFF.
2. Connect the A (32P) connector to the PCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than [D4] or [D].
5. Measure the voltage between the D9 terminal and body ground.



Is there approx. 5 V?

YES → **Test the A/T gear position indicator at the gauge assembly connectors (see page 14-139 for '98 model and 14-140 for '99 – 00 models). If the A/T gear position indicator is OK, replace the PCM.**

NO

Test the A/T gear position switch (see page 14-139).

Is the switch OK?

NO → **Replace the A/T gear position switch.**

YES

Check for a short to ground in the wire between the D9 terminal and A/T gear position switch. If wire is OK, substitute a known-good PCM and recheck.

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Troubleshooting Flowchart — Interlock System – Shift Lock System

Shift lever cannot be moved from the [P] position when the brake pedal is pressed.

NOTE: If the MIL is on, repair the PGM-FI control system (see section 11), and recheck.

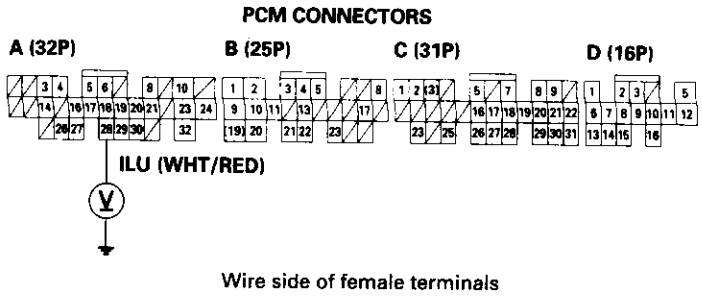
Check Brake Light Operation:
Press the brake pedal.

Are the brake lights ON?

NO → **Repair faulty brake switch circuit (see section 23).**

YES

Measure ILU Voltage:
1. Turn the ignition switch ON (II), and shift to [P] position.
2. Press the brake pedal, and release the accelerator pedal.
3. Measure the voltage between the A28 terminal and body ground.



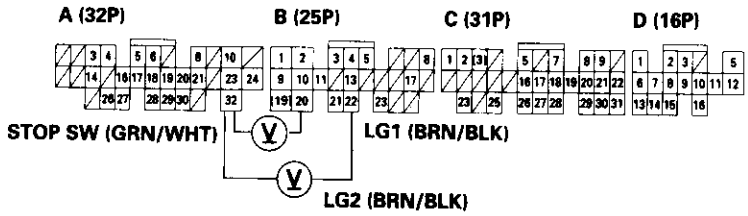
Wire side of female terminals

Is there battery voltage?

YES → **Check for an open or short in the wire between the A28 terminal and the interlock control unit, and check for loose terminal fit in the interlock control unit connector. If necessary, substitute a known-good interlock control unit and recheck.**

NO

Measure STOP SW Voltage:
1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Measure the voltage between the A32 and B20 or B22 terminals.



Is there battery voltage?

NO → **Repair open in the wire between the A32 terminal and the brake switch.**

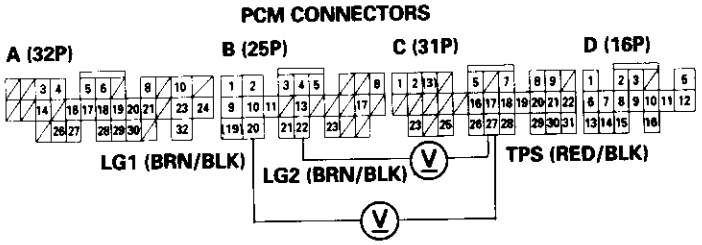
YES

To page 14-127

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From page 14-126

Measure TPS Voltage:
1. Reconnect the A (32P) and B (25P) connectors to the PCM.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the C27 and B20 or B22 terminals.



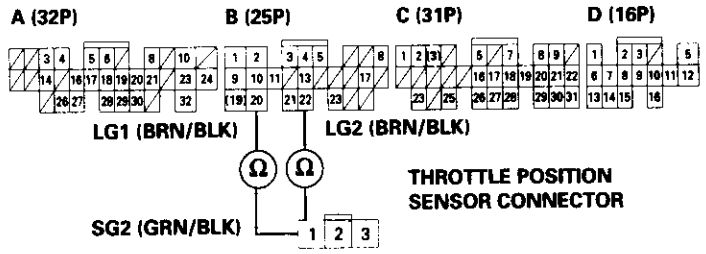
Wire side of female terminals

Is there approx. 0.5 V?

YES → To page 14-128

NO

Check Throttle Position Sensor Ground Line:
1. Turn the ignition switch OFF.
2. Disconnect the throttle position sensor connector.
3. Check for continuity between the No. 1 terminal of the throttle position sensor connector and the B20 and B22 terminal of the PCM.



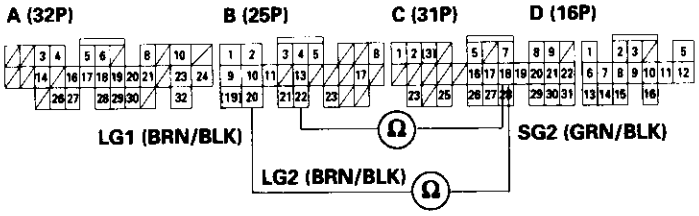
Wire side of female terminals

Is there continuity?

YES → **Reinstall the throttle position sensor correctly.**

NO

Check for continuity between the C18 and B20 or B22 terminals.



Is there continuity?

YES → **Repair open in the wire between the C18 terminal and the throttle position sensor.**

NO

Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

(cont'd)

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Troubleshooting Flowchart — Interlock System – Shift Lock System (cont'd)

From page 14-127

Check Shift Lock Solenoid for an Open Circuit:
1. Disconnect the shift lock solenoid connector.
2. Check for continuity between the No. 2 terminal of the shift lock solenoid connector and the No. 3 terminal of the interlock control unit connector.

Is there continuity?

NO → **Repair open in the wire between the No. 2 terminal of the interlock control unit and shift lock solenoid.**

YES

Measure Shift Lock Solenoid Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the No. 1 terminal and body ground.

Is there battery voltage?

NO → **Check for blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open or short in the wire between the No. 1 terminal of the shift lock solenoid connector and the under-dash fuse/relay box.**

YES

Check Shift Lock Solenoid Operation:
1. Connect the No. 1 terminal of the shift lock solenoid connector to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal.
2. Check that the shift lock solenoid operates.

NOTE: Do not connect the No. 2 terminal to the battery positive terminal, or you will damage the diode inside the shift lock solenoid.

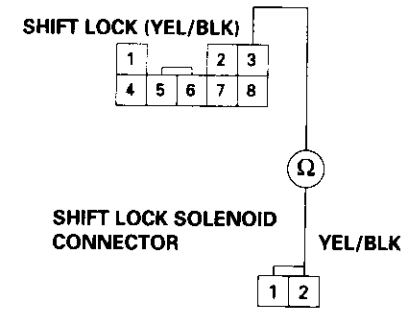
Does the shift lock solenoid operate properly?

NO → **Replace the shift lock solenoid.**

YES

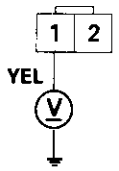
Check for loose terminal fit in the interlock control unit connector. If necessary, substitute a known-good interlock control unit and recheck.

INTERLOCK CONTROL UNIT CONNECTOR (8P)



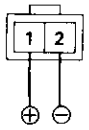
Wire side of female terminals

SHIFT LOCK SOLENOID CONNECTOR



Wire side of female terminals

SHIFT LOCK SOLENOID CONNECTOR (directly on solenoid)



Terminal side of male terminals

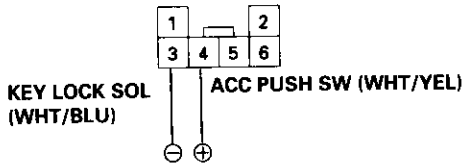
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Troubleshooting Flowchart — Interlock System – Key Interlock System

Ignition key cannot be moved from ACC (I) position to LOCK (0) position while pushing it with the shift lever in [P] position.

Check Key Interlock Solenoid Operation:
1. Disconnect the ignition switch connector (6P).
2. Connect the No. 4 terminal of the ignition switch 6P connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal.
3. Check the key interlock solenoid operation. A clicking sound should be heard.

IGNITION SWITCH 6P CONNECTOR



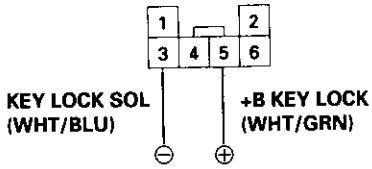
Wire side of female terminals

Does the key interlock solenoid operate properly?

NO → **Faulty key interlock solenoid. Replace the ignition key cylinder/ steering lock assembly.**

YES

Check Key Interlock Switch Operation:
1. Connect the No. 5 terminal of the ignition switch connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal.
2. Turn the ignition switch to ACC (I), then push it.
3. Check the key interlock solenoid operation. A clicking sound should be heard while pushing the ignition key.



Does the key interlock solenoid operate properly?

NO → **Faulty key interlock switch. Replace the ignition key cylinder/ steering lock assembly.**

YES

To page 14-130

(cont'd)

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Troubleshooting Flowchart — Interlock System – Key Interlock System (cont'd)

From page 14-129

Check Key Interlock Solenoid for a Short Circuit:
1. Disconnect the interlock control unit connector.
2. Check for continuity between the No. 1 terminal and body ground and between the No. 5 terminal and body ground individually.

Is there continuity?

YES → **Repair short in the wire between the No. 1 or No. 5 terminal and the ignition switch 6P connector.**

NO

Check Park Pin Switch Operation:
Check for continuity between the No. 8 terminal and body ground.

Is there continuity?

YES → **Check for short in the wire between the No. 8 terminal of the interlock control unit and the park pin switch. If wire is OK, check the park pin switch.**

NO

Measure ATP P Voltage:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the No. 6 terminal and body ground.

NOTE: Shift lever must be in [P].

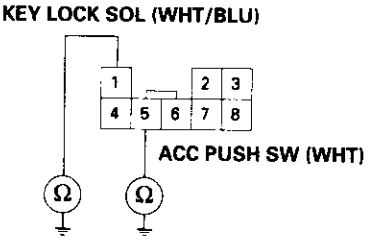
Is there voltage?

YES → **Repair open in the wire between the No. 6 terminal and the A/T gear position switch.**

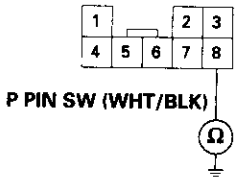
NO

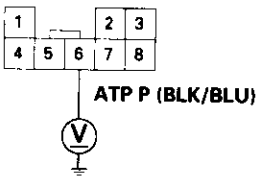
Check for loose terminal fit in the interlock control unit connectors. If necessary, substitute a known-good interlock control unit and recheck.

INTERLOCK CONTROL UNIT CONNECTOR (8P)



Wire side of female terminals





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Troubleshooting Flowchart — O/D OFF Indicator Light Does Not Come On

The O/D OFF indicator light does not come on when the ignition switch is first turned ON (II). (It should come on for about two seconds and then go out).

Check the O/D OFF Indicator Light:
1. Turn the ignition switch ON (II).
2. Shift to [D] position, and press the Over-Drive (O/D) switch.

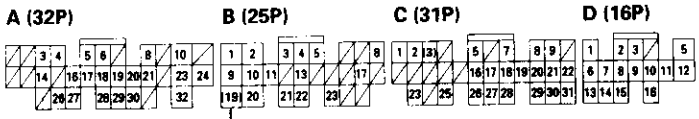
Does the O/D OFF indicator light come on?

YES → **Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.**

NO

Check O/D IND for an Open Circuit:
1. Turn the ignition switch OFF.
2. Disconnect the B (25P) connector from the PCM.
3. Disconnect the 14P connector from the gauge assembly.
4. Check for continuity between the B19 terminal and the No. 6 terminal of the gauge assembly 14P connector.

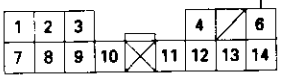
PCM CONNECTORS



O/D IND (LT BLU)

Ω

GAUGE ASSEMBLY CONNECTOR (14P)



O/D IND (LT BLU)

Wire side of female terminals

Is there continuity?

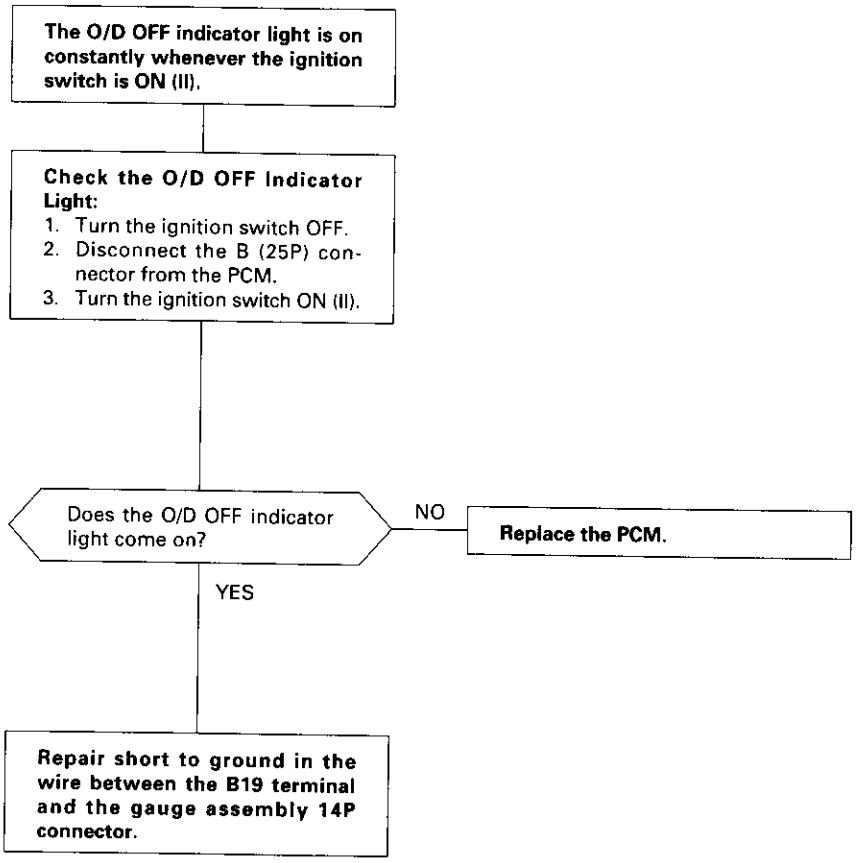
NO → **Repair open in the wire between the B19 terminal and gauge assembly 14P connector.**

YES

Check for a faulty O/D OFF indicator light bulb or a faulty gauge assembly printed circuit board.

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Troubleshooting Flowchart — O/D OFF Indicator Light On Constantly



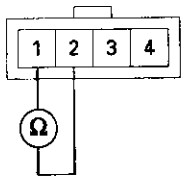
www.emanualpro.com

Troubleshooting Flowchart — O/D OFF Indicator Light Does Not Come On Even Though O/D Switch Is Pressed

The O/D OFF indicator light does not come on even though the Over-Drive (O/D) switch is pressed in [D] position. (The O/D OFF indicator light come on when the ignition switch is first turned on for two seconds, then go out.)

Check the Over-Drive (O/D) Switch at the Switch Connector:
1. Turn the ignition switch OFF.
2. Disconnect the park pin/O/D switch connector.
3. Check for continuity between the No. 1 and No. 2 terminals of the switch connector while pressing the switch, and when released it.

PARK PIN/O/D SWITCH CONNECTOR



Terminal side of male terminals

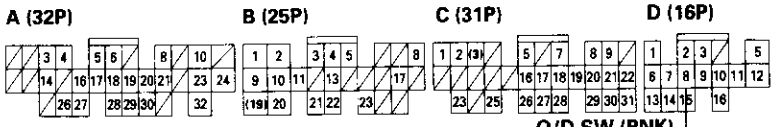
Is there continuity while pressing the switch, and no continuity when released it?

YES → **Check for loose terminal fit in the O/D switch connector. If terminals are OK, replace the O/D switch and park pin switch as a set (see page 14-151).**

NO

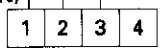
Check O/D Switch for an Open Circuit:
1. Disconnect the D (16P) connector from the PCM.
2. Check for continuity between the D8 terminal and the No. 1 terminal of the switch connector.

PCM CONNECTORS



O/D SW (PNK)

Ω PARK PIN/ O/D SWITCH CONNECTOR (GRN)



Wire side of female terminals

Is there continuity?

NO → **Repair open in the wire between the D8 terminal and the park pin/O/D switch connector.**

YES

To page 14-134

(cont'd)

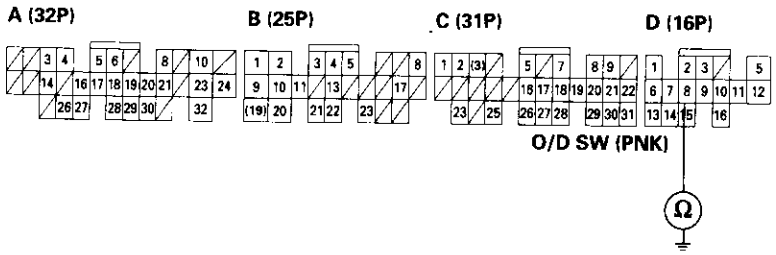
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Troubleshooting Flowchart — O/D OFF Indicator Light Does Not Come On Even Though O/D Switch Is Pressed (cont'd)

From page 14-133

Check O/D Switch for a Short Circuit:
Check for continuity between the D8 terminal and body ground.

PCM CONNECTORS



Wire side of female terminals

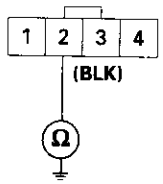
Is there continuity?

YES → **Repair short to ground in the wire between the D8 terminal and the park pin/O/D switch connector.**

NO

Check O/D Switch Ground Circuit:
Check for continuity between the No. 2 terminal of the switch connector and body ground.

PARK PIN/O/D SWITCH CONNECTOR



Wire side of female terminals

Is there continuity?

NO → **Repair open in the wire between the No. 2 terminal of the park pin/O/D switch connector and ground (G401, G402), or repair poor ground (G401, 402).**

YES

Replace the PCM.

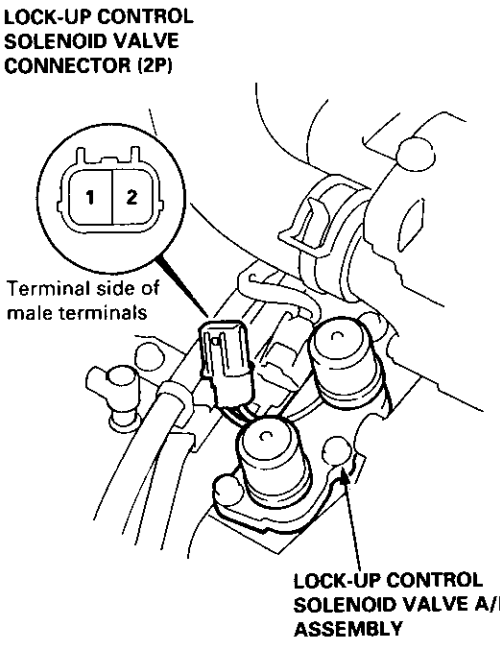
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Lock-up Control Solenoid Valve A/B Assembly

Test

1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Measure the resistance between the No. 2 terminal (solenoid valve A) of the connector and body ground, and between the No. 1 terminal (solenoid valve B) and body ground.

   STANDARD: 12 – 25 Ω

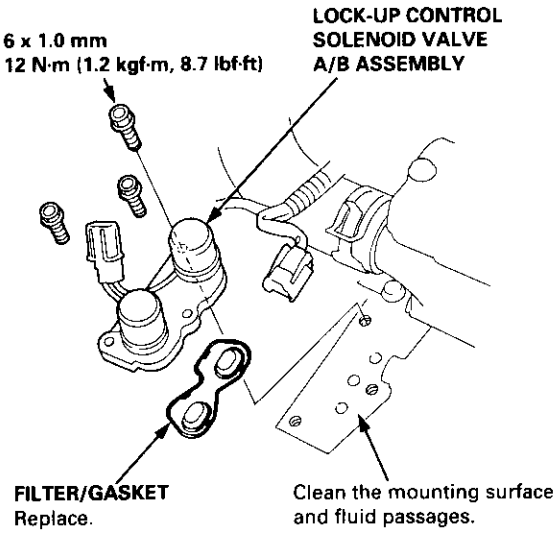


3. Replace the lock-up control solenoid valve A/B assembly if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 1 terminal of the connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve A/B assembly if no clicking sound is heard when either terminal is connected to the battery positive terminal.
5. Check the lock-up control solenoid valve fluid passages for dust or debris, and replace as an assembly, if necessary.

Replacement

NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Remove the mounting bolts and the lock-up control solenoid valve A/B assembly.



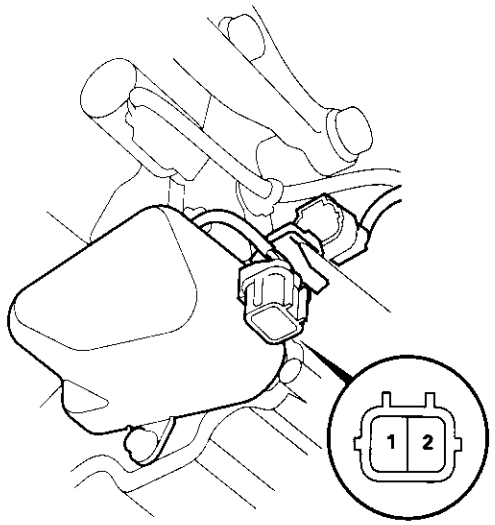
2. Clean the mounting surface and fluid passages, and install a new lock-up control solenoid valve A/B with a new filter/gasket.
3. Check the connector for rust, dirt, or oil, and reconnect it securely.

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Shift Control Solenoid Valve A/B Assembly

Test

1. Disconnect the 2P connector from the shift control solenoid valve A/B assembly.



Terminal side of male terminals

2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the shift control solenoid valve connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

   STANDARD: 12 – 25 Ω

3. Replace the shift control solenoid valve A/B assembly if the resistance is out of specification.

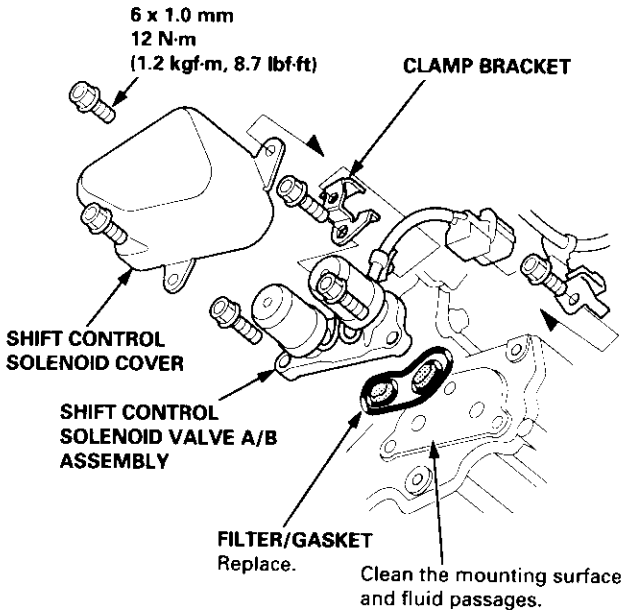
4. If the resistance is within the standard, connect the No. 1 terminal of the shift control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the shift control solenoid valve A/B assembly if no clicking sound is heard when either terminal is connected to the battery positive terminal.

Replacement

NOTE: Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Remove the shift control solenoid cover.

2. Remove the mounting bolts, the clamp and the shift control solenoid valve A/B assembly, then disconnect the connector.



3. Clean the mounting surface and fluid passages, and install a new shift control solenoid valve A/B assembly with the clamp and a new filter/gasket.

4. Install the shift control solenoid cover.

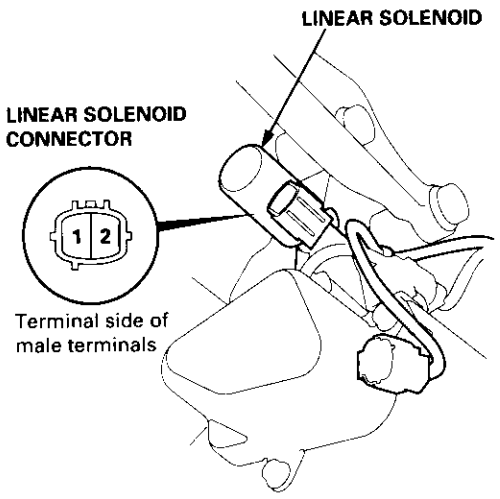
5. Check the connector for rust, dirt, or oil, and reconnect it securely.

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Linear Solenoid Assembly

Test

1. Disconnect the linear solenoid connector.



2. Measure the resistance between the No. 1 and the No. 2 terminals.

   STANDARD: About 5.0 Ω

3. If the resistance is out of specification, replace the linear solenoid assembly.

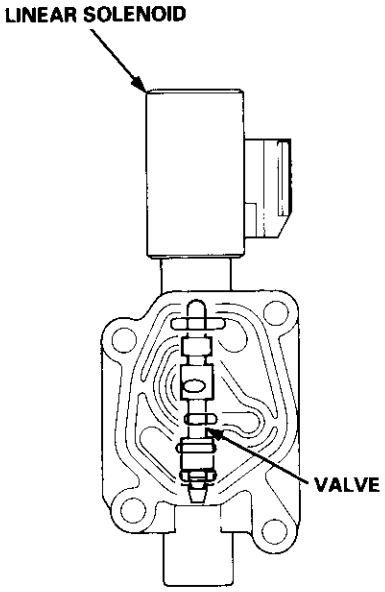
4. Connect the No. 1 terminal of the connector to the battery positive terminal and the No. 2 terminal to the battery negative terminal. A clicking sound should be heard.

5. If a clicking sound is not heard, remove the linear solenoid assembly.

6. Check the linear solenoid fluid passage for dust or dirt.

7. Connect the No. 1 terminal of the connector to the battery positive terminal and the No. 2 terminal to the battery negative terminal. Make sure that the valve moves.

8. Disconnect the negative battery terminal, and make sure the valve releases. You can see valve movement through the fluid passage in the mounting surface of the linear solenoid assembly.



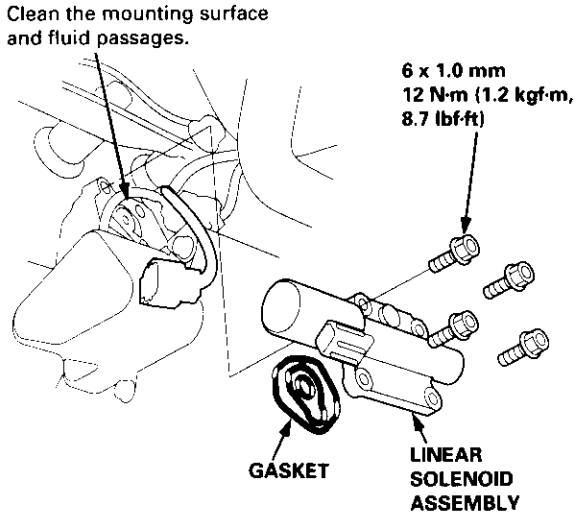
9. If the valve binds, or moves sluggishly, or if the linear solenoid does not operate, replace the linear solenoid assembly.

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Linear Solenoid Assembly

Replacement

1. Remove the mounting bolts and the linear solenoid assembly.

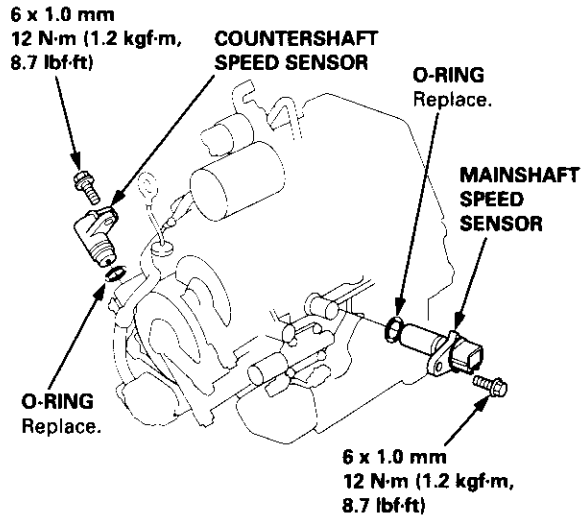


2. Clean the mounting surface and fluid passage of the linear solenoid assembly and transmission housing.
3. Install a new linear solenoid assembly with a new gasket. Do not pinch the gasket during installation, and make sure it is installed properly in the mounting groove of the linear solenoid.
4. Check the linear solenoid connector for rust, dirt, or oil, then connect it securely.

Mainshaft/Countershaft Speed Sensors

Replacement

1. Remove the 6 mm bolt and the countershaft speed sensor from the end cover.



2. Remove the 6 mm bolt and the mainshaft speed sensor from the transmission housing.
3. Replace the O-ring with a new one before installing the countershaft speed sensor or the mainshaft speed sensor.

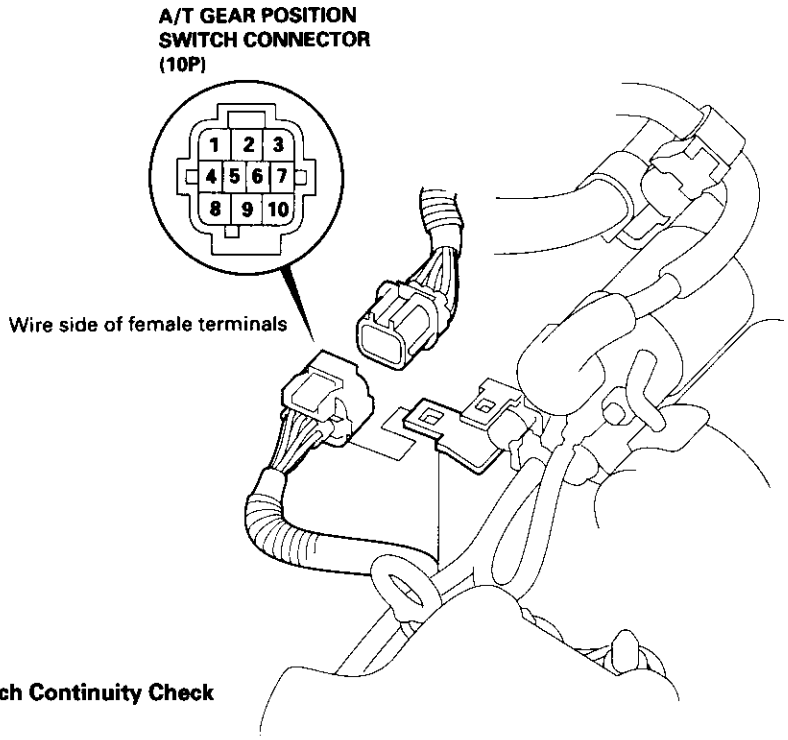
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A/T Gear Position Switch

Test

1. Remove the A/T gear position switch connector from the connector bracket, then disconnect the A/T gear position switch connector (10P).

2. Check for continuity between the terminals in each switch position according to the table below.



A/T Gear Position Switch Continuity Check
'97 – 98 Models

Position \ Terminal	1	2	3	4	5	6	7	8	9	10
1	○						○			
2	○	○				○				
D_3	○	○			○					
D_4	○	○		○						
N	○		○							○
R	○								○	
P	○		○					○		

'99 – 00 Models

Position \ Terminal	1	2	3	4	5	6	7	8	9	10
1	○						○			
2	○	○				○				
D	○	○		○						
N	○		○							○
R	○								○	
P	○		○					○		

NOTE: Terminal No. 3: Neutral position switch

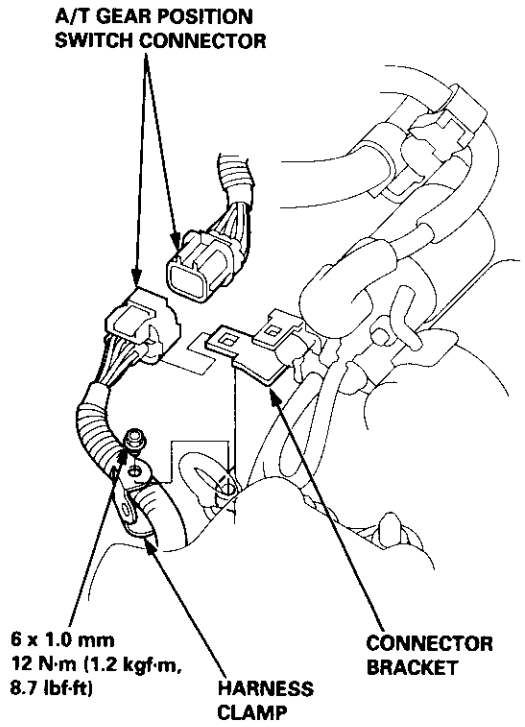
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A/T Gear Position Switch

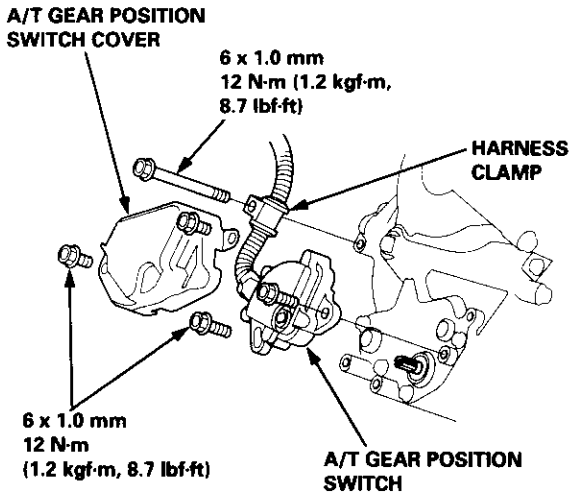
Replacement

⚠ WARNING Make sure lifts, jacks, and safety stands are placed properly (see section 1).

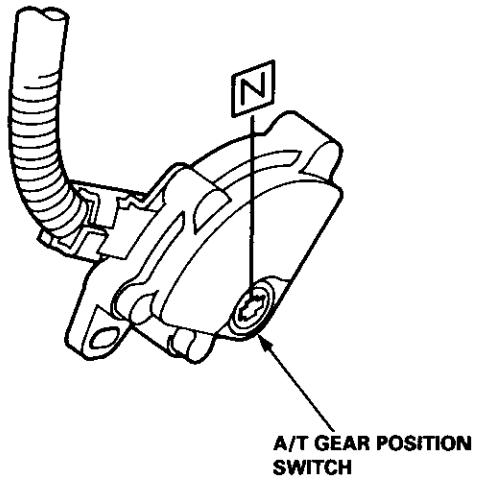
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift to [N] position.
4. Remove the A/T gear position switch connector from the connector bracket, then disconnect it.
5. Remove the A/T gear position switch harness clamp.



6. Remove the harness clamp from the end cover, then remove the A/T gear position switch cover and A/T gear position switch.

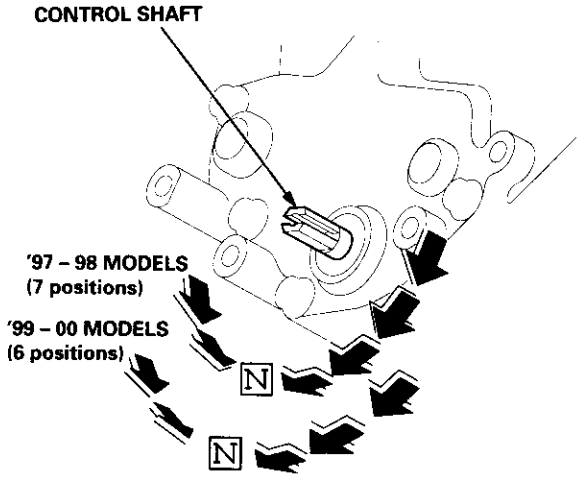


7. Set the A/T gear position switch to [N] position. The A/T gear position switch clicks in [N] position.



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8. Set the control shaft to [N] position, then install the A/T gear position switch on it.

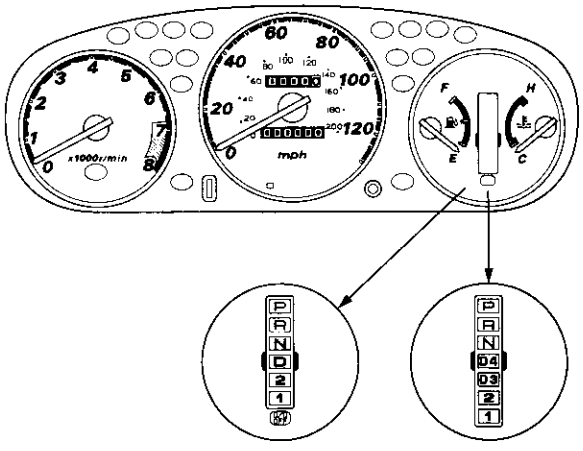


9. Install the A/T gear position switch cover and harness clamp on the end cover.

10. Connect the A/T gear position switch connector, then install it on the connector bracket.

11. Turn the ignition switch ON (II). Move the shift lever through all gears, and check the A/T gear position switch synchronization with the A/T gear position indicator.

GAUGE ASSEMBLY



A/T GEAR POSITION INDICATOR '99 – 00 MODELS

A/T GEAR POSITION INDICATOR '97 – 98 MODELS

12. Start the engine. Move the shift lever through all gears, and verify the following:

- The shift lever cannot be moved to [R] position from [N] position unless the shift lever is pulled.
- The engine will not start in any position other than [N] or [P].
- The back-up lights come on when the shift lever is in [R] position.

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A/T Gear Position Indicator

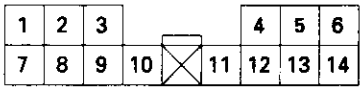
Input Test — '97 – 98 Models

1. Remove the gauge assembly from the dashboard (see section 20), and disconnect the 14P connector from the gauge assembly (see section 23).

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the 14P connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.

GAUGE ASSEMBLY 14P CONNECTOR



Wire side of female terminals

Cavity	Wire Color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
2	RED/BLK	Combination light switch ON and dash lights brightness control dial on full bright	Check for voltage between No. 2 and No. 3 terminals: There should be battery voltage.	• Blown No. 47 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • Faulty dash light brightness controller • An open in the wire
3	RED			
4	BLU	Shift lever in 2	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
6	BRN	Shift lever in 1		
7	YEL	Shift lever in D4		
8	BLK	Under all conditions	Check for continuity to ground: There should be continuity	• Poor ground (G401) • An open in the wire
9	GRN/BLK	Ignition switch ON (II) and shift lever in any position except D4	Check for voltage to ground: There should be battery voltage for two seconds after the ignition switch is turned ON (II), and less than 1 V two seconds later.	• Faulty PCM • An open in the wire
10	GRN	Shift lever in D3	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
11	RED	Shift lever in N		
12	WHT	Shift lever in R		
5	BLK/BLU	Shift lever in P NOTE: Do not push the brake pedal.		
14	LT GRN	Ignition switch ON (II) and shift lever in any position except P and N	Check for voltage to ground: There should be about 5 V.	• Faulty PCM • An open in the wire

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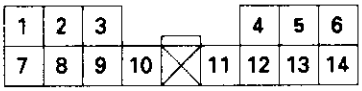
Input Test — '99 – 00 Models

1. Remove the gauge assembly from the dashboard (see section 20), and disconnect the 14P connector from the gauge assembly (see section 23).

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the 14P connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.

GAUGE ASSEMBLY 14P CONNECTOR



Wire side of female terminals

Cavity	Wire Color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
2	RED/BLK	Combination light switch ON and dash lights brightness control dial on full bright	Check for voltage between No. 2 and No. 3 terminals: There should be battery voltage.	• Blown No. 47 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • Faulty dash light brightness controller • An open in the wire
3	RED			
4	BRN	Shift lever in [1]	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
7	YEL	Shift lever in [D]		
10	BLU	Shift lever in [2]		
6	LT BLU	Ignition switch ON (II), shift lever in [D], and Over-Drive is OFF by pressing O/D switch.	Check for continuity to ground: There should be continuity.	• Faulty O/D switch • Faulty A/T gear position switch • Faulty PCM • An open in the wire
8	BLK	Under all conditions	Check for continuity to ground: There should be continuity	• Poor ground (G401) • An open in the wire
9	GRN/BLK	Ignition switch ON (II) and shift lever in any position except [D]	Check for voltage to ground: There should be battery voltage for two seconds after the ignition switch is turned ON (II), and less than 1 V two seconds later.	• Faulty PCM • An open in the wire
11	RED	Shift lever in [N]	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other shift lever position.	• Faulty A/T gear position switch • An open in the wire
12	WHT	Shift lever in [R]		
5	BLK/BLU	Shift lever in [P] NOTE: Do not push the brake pedal.		
14	LT GRN	Ignition switch ON (II) and shift lever in any position except [P] and [N]	Check for voltage to ground: There should be about 5 V.	• Faulty PCM • An open in the wire

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Interlock Control Unit Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).

2. Disconnect the 8P connector from the interlock control unit.

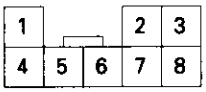
3. Inspect the connector and connector terminals to be sure they are all making good contact.

   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, substitute a known-good control unit, and recheck the system. If the check is OK, the control unit must be faulty; replace it.

   NOTE: If the shift lock solenoid clicks when the ignition switch is turned ON (II) while pressing the brake pedal with the shift lever in [P] position, the shift lock system is OK. If the shift lever cannot be shifted from [P] position, test the A/T gear position switch.

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INTERLOCK CONTROL UNIT CONNECTOR (8P)



Wire side of female terminals

Cavity	Wire Color	Test Condition	Test: Desired Result	Possible Cause (If result is not obtained)
1	WHT/BLU	Ignition switch turned to ACC (I), ignition key pushed all the way in	Check for voltage to ground: There should be battery voltage.	• Blown No. 48 (30 A) fuse in the under-hood fuse/relay box • Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
3	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Faulty shift lock solenoid • An open in the wire
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
5	WHT	Ignition switch turned to ACC (I), ignition key pushed all the way in	Check for voltage to ground: There should be battery voltage.	• Blown No. 48 (30 A) fuse in the under-hood fuse/relay box • Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Faulty steering lock assembly (key interlock switch) • An open in the wire
6	BLK/BLU	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground (G101) • An open in the wire
8	WHT/BLK	Shift lever in P and pulled toward steering wheel	Check for continuity to ground: There should be continuity.	• Faulty park pin switch • Short to ground
		Shift lever in P	Check for continuity to ground: There should be no continuity.	

Reconnect the interlock control unit 8P connector.

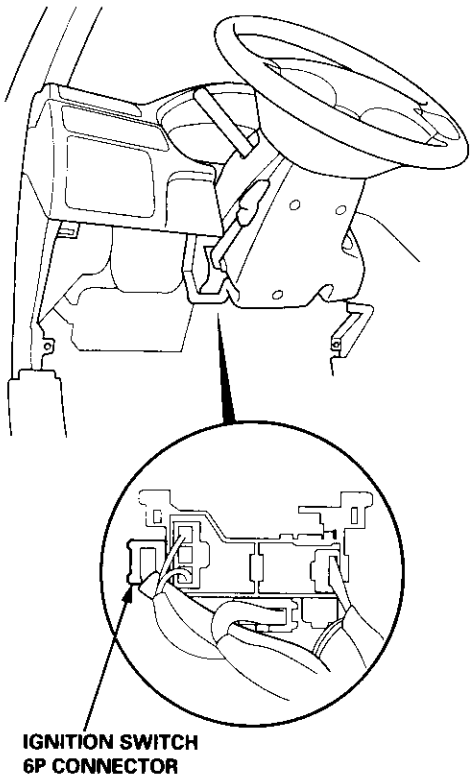
7	WHT/RED	Ignition switch ON (II) and brake pedal pressed	Check for voltage to ground: There should be 1 V or less.	• Faulty brake switch • Faulty throttle position (TP) sensor • Faulty PCM • An open in the wire • Faulty interlock control unit
		Ignition switch ON (II), brake pedal and accelerator pedal pressed at the same time	Check for voltage to ground: There should be battery voltage.	

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Key Interlock Solenoid Test

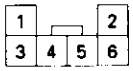
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).
2. Disconnect the ignition switch 6P connector at the connector holder.



3. Check for continuity between the terminals in each key position according to the table.

IGNITION SWITCH 6P CONNECTOR



Wire side of female terminals

Position \ Terminal		3	4	5
Ignition switch ACC (I)	Key pushed in	○	○	○
	Key released	○	○	

4. Check that the key cannot be removed with power connected to the No. 5 terminal and ground connected to the No. 3 terminal.
   - If the key cannot be removed, the key interlock solenoid is OK.
   - If the key can be removed, replace the steering lock assembly (the key interlock solenoid is not available separately).

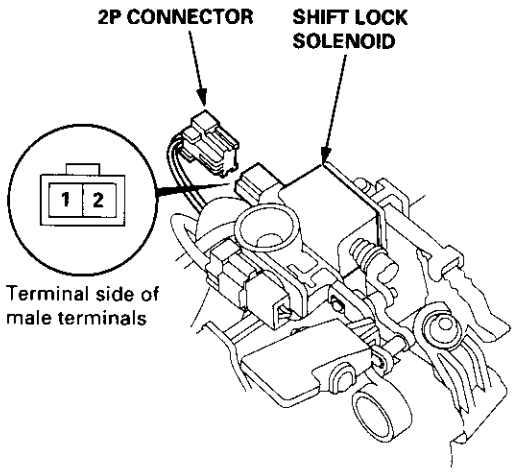
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Shift Lock Solenoid Test

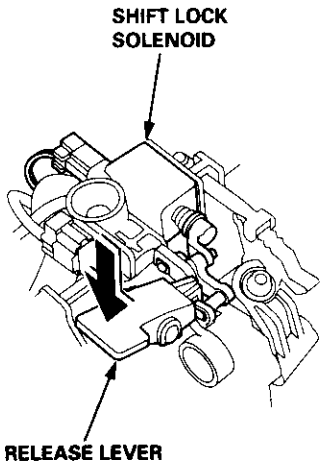
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).
2. Remove the steering column covers (see section 17).
3. Disconnect the shift lock solenoid 2P connector.
4. Connect the No. 1 terminal of the shift lock solenoid connector to the battery positive terminal, and connect the No. 2 terminal to the battery negative terminal.
5. Check that the shift lever can be moved from the [P] position. Release the battery terminals from the shift lock solenoid connector. Move the shift lever back to the [P] position, and make sure it locks.

   NOTE: Do not connect power to the No. 2 (–) terminal (reverse polarity) or you will damage the diode inside the solenoid.



6. Check that the shift lock releases when the release lever is pushed, and check that it locks when the release lever is released.



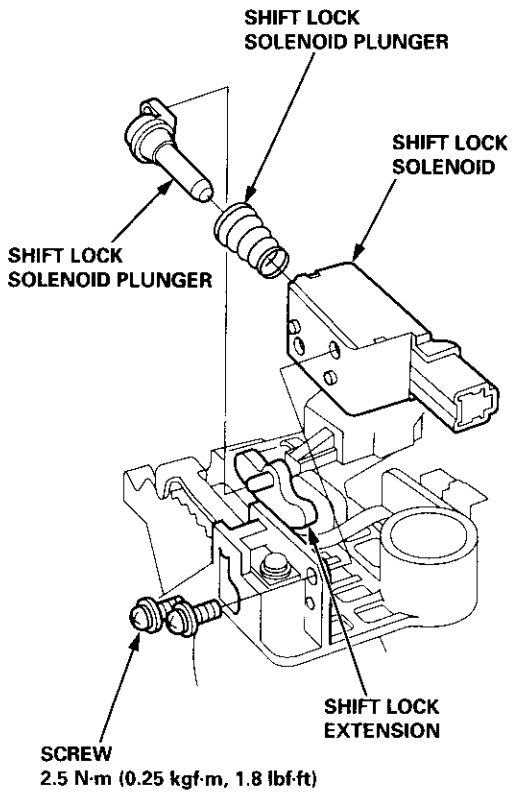
7. If the solenoid does not work, replace it.

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Shift Lock Solenoid Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).
2. Remove the upper and lower steering column covers (see section 17).
3. Remove the flange nuts and bolts securing the steering column, then lower the steering column.
4. Disconnect the shift lock solenoid and the park pin switch connectors.
5. Remove the bolts securing the shift lever assembly, then remove the shift lever assembly.
6. Remove the screws securing the shift lock solenoid, then remove the shift lock solenoid.



7. Install the new shift lock solenoid by aligning the joint of the shift lock solenoid plunger with the tip of the shift lock extension
8. Secure the shift lock solenoid with the screws.
9. Install the shift lever assembly in the reverse order of the removal.
10. Check the operation of the shift lever and the shift lock.

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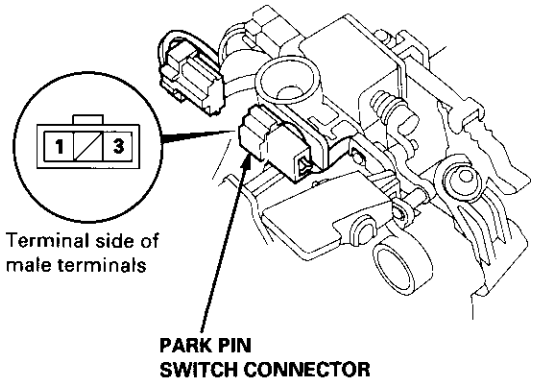
Park Pin Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

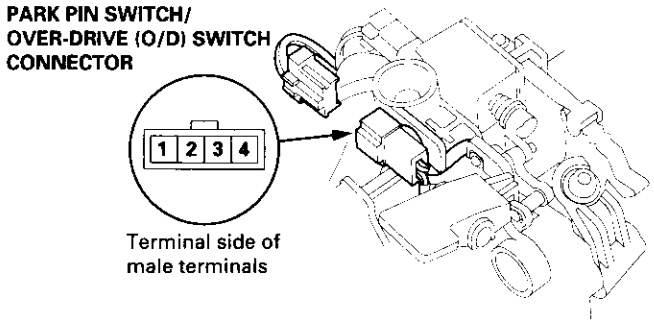
1. Remove the instrument panel lower cover (see section 20).
2. Remove the upper and lower steering column covers (see section 17).
3. Disconnect the park pin switch connector.
4. Shift the shift lever into [P] position, then check for continuity between these connector terminals:
   - '97 – 98 models: No. 1 and No. 3 terminals of the park pin switch connector.
   - '99 – 00 models: No. 3 and No. 4 terminals of the park pin switch/Over-Drive (O/D) switch connector.

   There should be continuity.

'97 – 98 MODELS:



'99 – 00 MODELS:



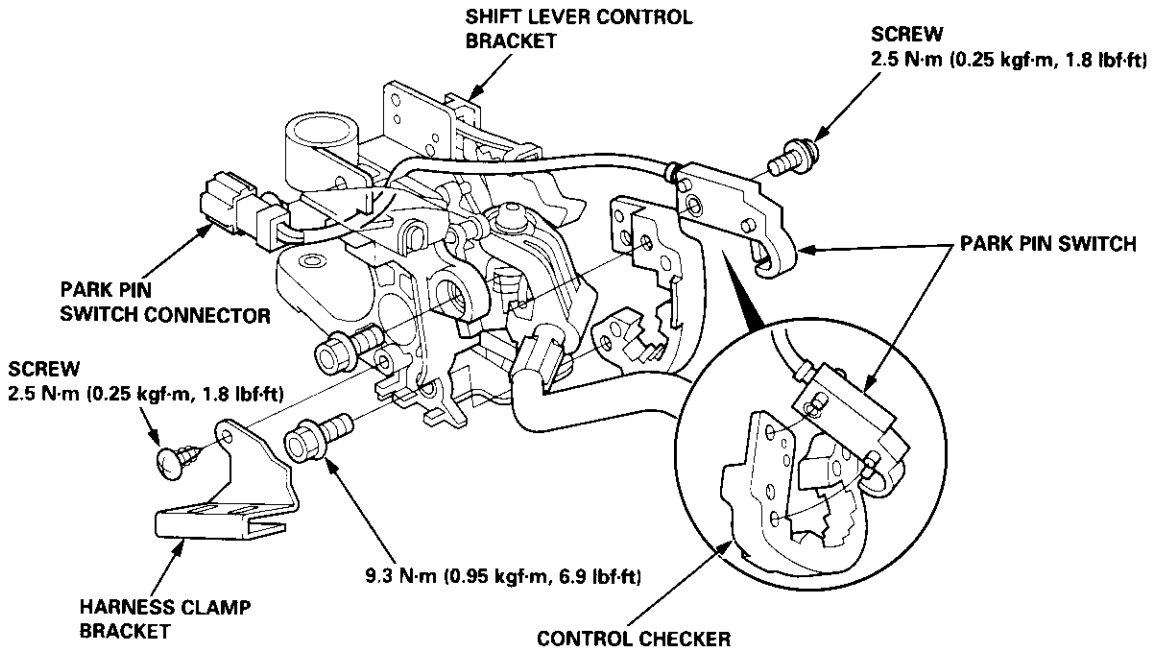
5. Shift the shift lever out of the [P] position, and check for continuity between the terminals as in step 4. There should be no continuity.
6. If the park pin switch is faulty, replace it.

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Park Pin Switch Replacement — '97 – 98 Models

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).
2. Remove the upper and lower steering column covers (see section 17).
3. Remove the flange nuts and bolts securing the steering column, then lower the steering column.
4. Disconnect the shift lock solenoid and the park pin switch connectors.
5. Remove the harness clamp bracket.
6. Remove the bolts securing the shift lever assembly, then remove the shift lever assembly.
7. Remove the screws securing the shift lock solenoid, then remove the shift lock solenoid.
8. Remove the park pin switch connector from the shift lever control bracket.
9. Remove the control checker from the shift lever control bracket.
10. Remove the park pin switch from the control checker.



11. Install the new park pin switch on the control checker.
12. Install the control checker on the shift lever control bracket.
13. Route the park pin switch harness through the cut out of the shift lever control bracket, then install the park pin switch connector on the bracket.
14. Install the shift lock solenoid by aligning the joint of the shift lock solenoid plunger with the tip of the shift lock extension.
15. Secure the shift lock solenoid with the screws.
16. Install the shift lever assembly in the reverse order of the removal.
17. Check the operation of the shift lever and the shift lock.

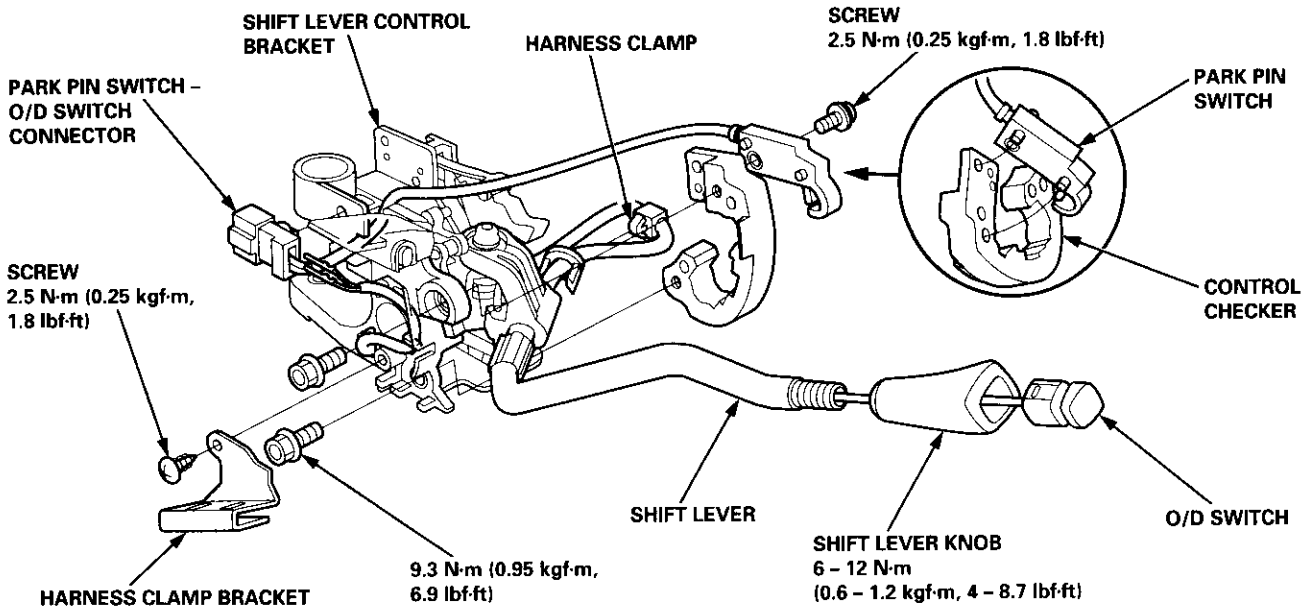
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Park Pin Switch – Over-Drive (O/D) Switch Replacement — '99 – 00 Models

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

NOTE: If replacement of the park pin switch or the O/D switch is required, replace them as a set.

1. Remove the instrument panel lower cover (see section 20).
2. Remove the upper and lower steering column covers (see section 17).
3. Remove the flange nuts securing the steering column, then lower the steering column.
4. Disconnect the shift lock solenoid and the park pin switch – O/D switch connectors.
5. Remove the harness clamp bracket.
6. Remove the bolts securing the shift lever assembly, then remove the shift lever assembly.
7. Remove the screws securing the shift lock solenoid, then remove the shift lock solenoid.
8. Cut the O/D switch wires (RED and BLK), then remove the connector from the shift lever control bracket.
9. Remove the control checker from the shift lever control bracket.
10. Remove the park pin switch from the control checker.
11. Remove the shift lever knob from the shift lever, then remove the O/D switch from the shift lever knob.



12. Route the new O/D switch wires through the shift lever knob, shift lever, and shift lever control bracket, then install the knob on the shift lever, and install the switch in the knob.
13. Install the new park pin switch on the control checker, then install the control checker on the shift lever control bracket.
14. Route the park pin switch harness through the cut out of the shift lever control bracket.
15. Install the O/D switch wire terminals in the connector cavities securely. The wire terminals can be installed in cavity No. 1 or No. 2.
16. Install the connector and the harness clamp on the bracket.
17. Install the shift lock solenoid by aligning the joint of the shift lock solenoid plunger with the tip of the shift lock extension, then secure the shift lock solenoid with the screws.
18. Install the shift lever assembly in the reverse order of removal.
19. Adjust the clearance between the O/D switch wires and the edge of the shift lever control bracket (see page 14-270).
20. Check the shift lever operation and shift lock operation.

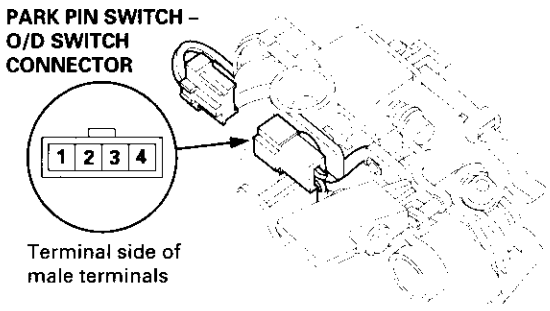
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Over-Drive (O/D) Switch ('99 – 00 Models)

Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover (see section 20).
2. Remove the upper and lower steering column covers (see section 17).
3. Disconnect the park pin switch – O/D switch connector.
4. Check for continuity between the No. 1 and No. 2 terminals while pressing and holding the O/D switch, and when it's released.
   There should be continuity while pressing and holding the switch, and no continuity when it's released.



5. If the O/D switch is faulty, replace it and the park pin switch as a set (see page 14-151).

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Hydraulic System

Before troubleshooting a problem on Hydraulic System, check the self-diagnosis D4 ('97 – 98) or D ('99 – 00) indicator light indication. If the D4 or D indicator light indicates a trouble code, perform the electrical troubleshooting according to the Electrical System-to-Component Chart. If the D4 or D indicator light does not indicate a trouble code and failure is not found on the electrical troubleshooting, perform the hydraulic troubleshooting following the chart.

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1, 2, 3, 5, 6, 7, 35, 37	K, L, R, S
Vehicle moves in 2, R, but not in D3, D4, D, or 1, position.	6, 8, 9, 10, 29, 52	C, M, O
Vehicle moves in D3, D4, D, 1, R, but not in 2 position.	6, 11, 12, 23	C, L
Vehicle moves in D3, D4, D, 2, 1, but not in R position.	4, 6, 14, 15	C, L, Q
Vehicle moves in N position.	10, 12, 13, 14, 16, 28, 32, 33, 34	C, D
Excessive idle vibration	1, 2, 18, 31, 35, 44, 46, 47	B, K, L
Poor acceleration; flares on starting off in D4, D3 position or D position		
Stall rpm high in D4, D3, D, 2, 1 position	1, 2, 3, 6, 37, 40	K, L, R
Stall rpm high in D4, D3, D, 1 position	6, 8, 10	C, D
Stall rpm high in 2 position	6, 12	C, D
Stall rpm high in R position	14	N
Stall rpm low	17, 31, 44, 46, 47	R
No shift	18, 19, 39, 47, 48	G, L
Fails to shift in D3, D4 position or D position; from 1st to 3rd gear	21, 48	
Fails to shift in D3, D4 position or D position; from 1st to 4th gear	21, 22, 47	
Erratic upshifting		
1-2 upshift, 2-3 upshift, 3-4 upshift	57	
1-2 upshift	20, 47	
2-3 upshift	21, 48	
3-4 upshift	22, 47	
Harsh upshift (1-2)	12, 18, 19, 28, 49, 50, 56, 57	C, D, E
Harsh upshift (2-3)	13, 18, 19, 23, 26, 28, 49, 50, 56, 57	C, D, E, H, L
Harsh upshift (3-4)	14, 18, 19, 24, 27, 28, 49, 50, 56, 57	C, D, E, I, L
Harsh downshift (2-1)	18, 19, 23, 42, 53, 56, 57	O
Harsh downshift (3-2)	12, 18, 19, 24, 41, 42, 54, 56, 57, 58	C, D, E, H
Harsh downshift (4-3)	13, 18, 19, 25, 41, 42, 55, 56, 57	C, D, E, I
Flares on 2-3 upshift	13, 18, 19, 23, 26, 50	E, L
Flares on 3-4 upshift	14, 18, 19, 24, 27, 50	E, L, N
Excessive shock on 2-3 upshift	13, 18, 19, 23, 26, 42, 49, 50, 57	E, L, N
Excessive shock on 3-4 upshift	14, 18, 19, 24, 27, 42, 49, 50, 57	E, L, N
Late shift from N position to D4 or D3 position, or to D position	10, 29	M
Late shift from N position to R position	4, 14, 20, 51	Q
Noise from transmission in all shift lever positions	2, 36	K, L, Q
Vehicle does not accelerate more than 31 mph (50 km/h).	17	

(cont'd)

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Symptom-to-Component Chart

Hydraulic System (cont'd)

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Shift lever does not operate smoothly.	6, 38	P
Fails to shift; stuck in 4th gear.	18, 47, 48	
Transmission will not shift into park in [P] position.	6, 38, 61	P
Stall rpm high; all clutch pressures are in specification.	40	D, K, O
Lock-up clutch does not disengage.	18, 43, 44, 45, 46, 49, 50, 57	E, L
Lock-up clutch does not operate smoothly.	18, 40, 43, 44, 45, 46, 49, 50, 57	L
Lock-up clutch does not engage.	18, 40, 43, 44, 45, 46, 49, 50, 56, 57	E, L
Vibration in all positions.	35	
No engine braking in [1] position.	59	
Shift position indicator does not indicate any position.	6, 38, 60	

PROBABLE CAUSE			
1	Low ATF	33	Thrust washer worn/damaged
2	ATF pump worn or binding	34	Clutch clearance incorrect
3	Regulator valve stuck or regulator valve spring worn	35	Drive plate defective or transmission misassembled
4	Servo valve stuck	36	Torque converter housing or transmission housing bearing worn/damaged
5	Mainshaft worn/damaged		
6	Shift cable broken/out of adjustment	37	ATF strainer clogged
7	Final gears worn/damaged	38	Shift cable is worn where it attaches to the transmission or at the body mounts
8	One-way (sprag) clutch worn/damaged		
9	1st gears worn/damaged (2 gears)	39	Modulator valve stuck
10	1st clutch defective	40	Torque converter check valve stuck
11	2nd gears worn/damaged (2 gears)	41	Foreign material in separator plate
12	2nd clutch defective	42	CPB valve stuck
13	3rd clutch defective	43	Lock-up timing valve stuck
14	4th clutch defective	44	Lock-up shift valve stuck
15	Reverse gears worn/damaged (3 gears)	45	Lock-up control valve stuck
16	Excessive ATF	46	Lock-up clutch piston defective
17	Torque converter one-way clutch defective	47	Shift control solenoid valve A defective
18	Linear solenoid assembly defective ('98 – 00 models)	48	Shift control solenoid valve B defective
		49	Lock-up control solenoid valve A defective
19	CPC valve stuck	50	Lock-up control solenoid valve B defective
20	1-2 shift valve stuck	51	Servo control valve stuck
21	2-3 shift valve stuck	52	1st accumulator defective
22	3-4 shift valve stuck	53	Foreign material in 2nd exhaust orifice
23	2nd accumulator defective	54	Foreign material in 3rd exhaust orifice
24	3rd accumulator defective	55	Foreign material in 4th exhaust orifice
25	4th accumulator defective	56	Mainshaft speed sensor defective
26	2nd orifice control valve stuck	57	Countershaft speed sensor defective
27	3-4 orifice control valve stuck	58	3rd sub accumulator defective
28	Foreign material in main orifice	59	1st-hold clutch defective
29	Foreign material in 1st orifice	60	A/T gear position switch defective or out of adjustment
30	Foreign material in reverse orifice		
31	Engine output low	61	Park gear mechanism defective
32	Needle bearing worn/damaged		

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The following symptom can be caused by improper repair or assembly	Check these items
Vehicle creeps in [N] position.	• Improper clutch clearance • Improper gear clearance
Vehicle does not move in [D3], [D4], or [D] position.	One-way (sprag) clutch installed upside down
Transmission locks up in [P] position.	• Park lever installed upside down • Shift fork bolt not installed
Excessive drag in transmission.	• ATF pump binding and seizure Use proper tools when replacing the ATF pump gears, and be careful not to damage the ATF pump when torque down the main valve body. • Check that the shift fork bolt is installed on the shift fork shaft.
Excessive vibration, rpm related.	Torque converter not fully seated in ATF pump
Noise only with wheels moving.	Reverse selector hub installed upside down
Mainshaft oil seal pops out.	• Mainshaft oil seal improperly installed • Install the mainshaft oil seal flush with the torque converter housing. If the mainshaft oil seal is installed into the torque converter housing until it bottoms, it will block the fluid return passage and result in damage.
Various shifting problems.	• Springs improperly installed • Valves improperly installed
Harsh upshift.	Check valve balls not installed

(cont'd)

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Symptom-to-Component Chart

Hydraulic System (cont'd)

NOTES	
A	See flushing procedure, page 14-264 and 265.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of this manual.
C	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear, and check the orifice control valves, CPC valve, and linear solenoid for free movement.
E	If the linear solenoid is stuck, inspect the clutches for wear.
G	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K	Improper alignment of main valve body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high-pitched squeak.
L	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M	If the 1st clutch feed pipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably worn.
N	• Replace the mainshaft if the bushing for the 4th feed pipe is loose or damaged. If the 4th feed pipe is damaged or out of round, replace the end cover. • Replace the mainshaft if the bushing for the 1st feed pipe is loose or damaged. If the 1st feed pipe is damaged or out of round, replace it.
O	A worn or damaged sprag clutch is mostly a result of shifting the transmission in D3, D4, or D position while the wheels rotate in reverse, such as rocking the vehicle in snow.
P	Inspect the frame for collision damage.
Q	Inspect for damage and wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 3rd clutch for swirl marks. Replace items 1, 2, 3, and 4 if worn or damaged. If transmission makes a clicking, grinding, or whirring noise, also replace mainshaft 4th gear, reverse idler gear, and countershaft 4th gear in addition to 1, 2, 3, or 4. If differential pinion shaft is worn, overhaul differential assembly, replace ATF strainer, and thoroughly clean transmission, flush torque converter, cooler, and lines. If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and final driven gear.
R	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the main valve body. This will result in ATF pump seizure if not detected. Use the proper tools.
S	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.

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NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

1. Before testing, check the transmission fluid level, see page 14-160.

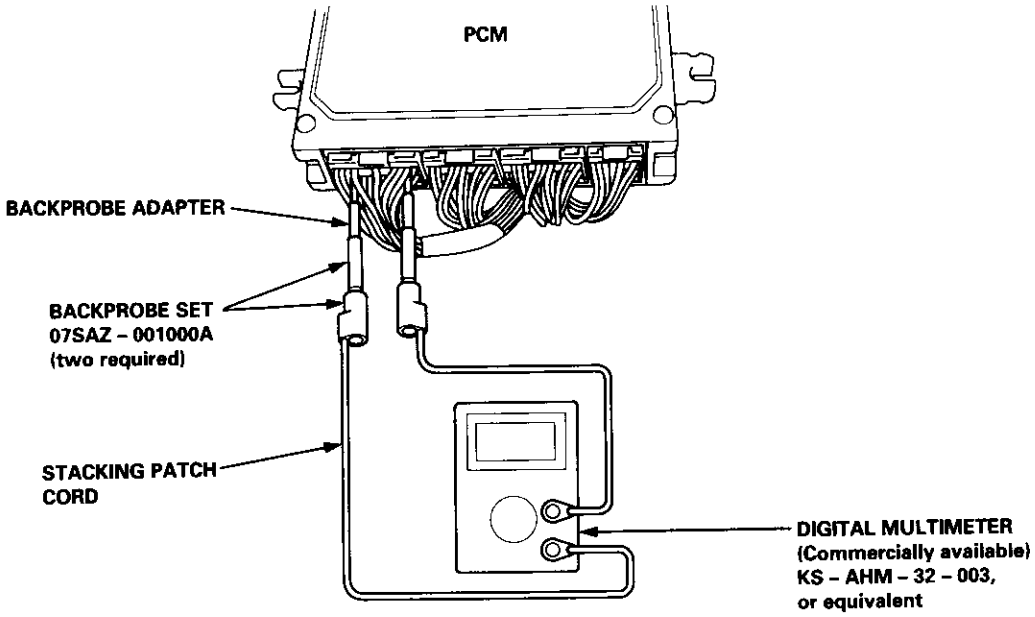
2. Apply the parking brake and block the wheels. Start the engine, then shift to D4 ('97 – 98) or D ('99 – 00) position while pressing the brake pedal. Press the accelerator pedal and release it suddenly. The engine should not stall.

3. Repeat same test in D3 position ('97 – 98 models).

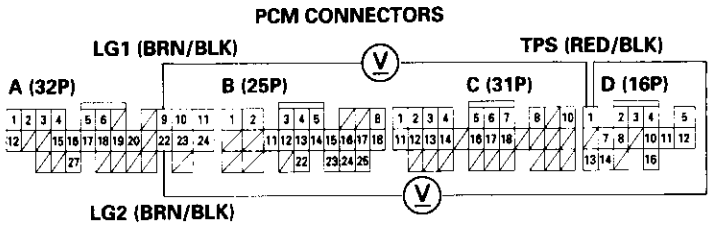
4. Test-drive the vehicle on a flat road in the D4 or D position. Check that the shift points occur at approximate speeds shown on a flat road. Also check for abnormal noise and clutch slippage.

   Throttle position sensor voltage represents the throttle opening. Monitor it with the Honda PGM Tester or as follows:

   a. Unbolt the PCM for road testing; refer to page 14-58.
   b. Set the digital multimeter to check throttle position sensor voltage between these terminals on the PCM:
      - '97 Model: Between terminals D1 (+) and A9 (–) or A22 (–)
      - '98 – 00 Models: Between terminals C27 (+) and B20 (–) or B22 (–)

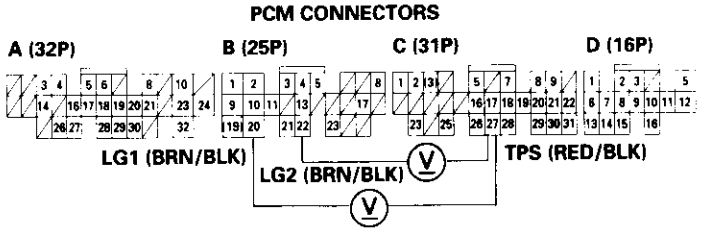


'97 Model:



Wire side of female terminals

'98 – 00 Models:



Wire side of female terminals

(cont'd)

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Road Test

(cont'd)

D4 or D Position:

Upshift

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up ON
Throttle position sensor voltage: 0.75 V	mph	9 – 12	20 – 23	28 – 33	21 – 25
	km/h	15 – 19	32 – 37	45 – 53	34 – 40
Throttle position sensor voltage: 2.25 V	mph	22 – 26	43 – 49	62 – 68	68 – 74
	km/h	35 – 41	69 – 79	99 – 108	109 – 118
Fully-opened throttle, Throttle position sensor voltage: 4.5 V	mph	37 – 43	69 – 77	101 – 111	90 – 101
	km/h	60 – 69	111 – 124	163 – 179	145 – 163

Downshift

Throttle Opening	Unit of speed	Lock-up OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle, Throttle position sensor voltage: 0.5 V	mph	19 – 23	18 – 21	6 – 10 (3rd → 1st)	
	km/h	31 – 36	29 – 34	10 – 15 (3rd → 1st)	
Fully-opened throttle, Throttle position sensor voltage: 4.5 V	mph	88 – 99	86 – 96	57 – 64	26 – 32
	km/h	142 – 159	138 – 154	92 – 103	42 – 51

NOTE:
- Lock-up ON: The lock-up control solenoid valve A turns ON.
- Lock-up OFF: The lock-up control solenoid valve A turns OFF.

4. Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from D4 or D position to 2 position. The vehicle should immediately begin slowing down from engine braking.

5. Check for abnormal noise and clutch slippage in the following positions.

   1 (1st Gear) Position
   Accelerate from a stop at full throttle. Make sure there is no abnormal noise or clutch slippage.
   Upshifts should not occur with the shift lever in this position.
   2 (2nd Gear) Position
   Accelerate from a stop at full throttle. Make sure there is no abnormal noise or clutch slippage.
   Upshifts and downshifts should not occur with the shift lever in this position.
   R (Reverse) Position
   Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

6. Test in P (Park) Position
   Park the vehicle on slope (approx. 16°), apply the parking brake, and shift into P position. Release the brake; the vehicle should not move.

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Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Before testing, check the transmission fluid level, see page 14-160.
2. Engage the parking brake and block all four wheels.
3. Connect the tachometer, and start the engine.
4. Make sure the A/C switch is OFF.
5. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into [2] position.
6. Fully press the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
7. Allow 2 minutes for cooling, then repeat the test in [1], [D4] ('97 – 98), [D] ('99 – 00), and [R] positions. Stall speed should be the same in [D4], [D], [2], [1], and [R] positions.

Stall Speed rpm:
Specification: 2,550 rpm
Service Limit: 2,400 – 2,700 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D4], [D], [2], [1] and [R] positions	• ATF pump output is low • Clogged ATF strainer • Pressure regulator valve stuck closed • Slipping clutch
Stall rpm high in [1] position	Slippage of 1st clutch, 1st-hold clutch, or 1st gear one-way clutch
Stall rpm high in [2] position	Slippage of 2nd clutch
Stall rpm high in [D4] or [D] position	Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm high in [R] position	Slippage of 4th clutch
Stall rpm low in [D4], [D], [2], [1], and [R] positions	• Engine output low • Torque converter one-way clutch slipping

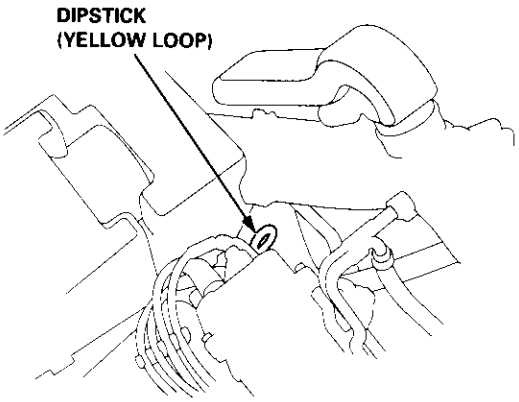
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Fluid Level

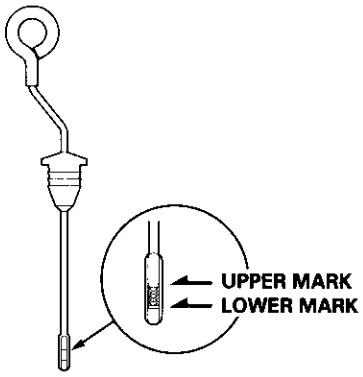
Checking

NOTE: Keep all foreign particles out of the transmission.

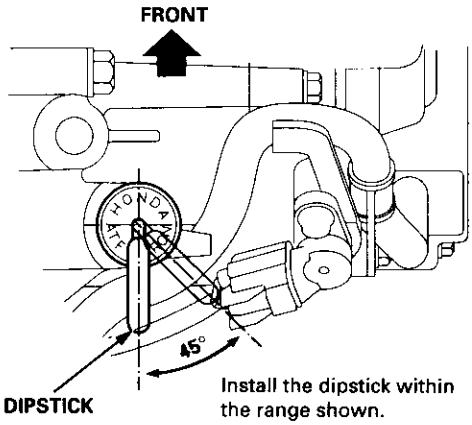
1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Park the vehicle on level ground. Turn off the engine.
3. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.
4. Insert the dipstick into the transmission.



5. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.



6. If the level is below the lower mark, pour the recommended fluid into the filler hole to bring it to the upper mark. Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.
7. Insert the dipstick back into the transmission in the direction shown.



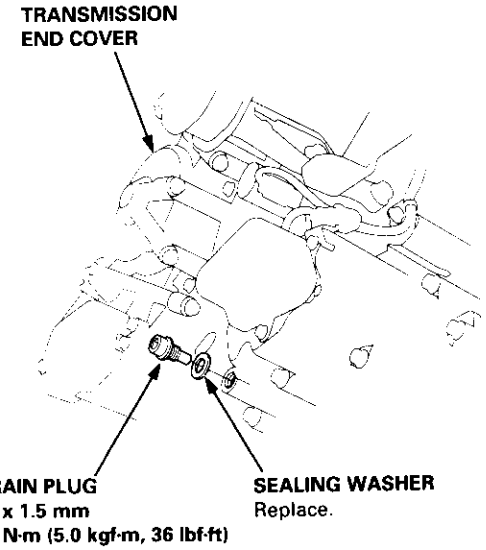
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Changing

NOTE: Keep all foreign particles out of the transmission.

1. Bring the transmission up to operating temperature (the radiator fan comes on) by driving the vehicle. Park the vehicle on level ground, turn the engine off, then remove the drain plug.

   NOTE: If a cooler flusher is to be used, see page 14-264 and 14-265.



2. Reinstall the drain plug with a new sealing washer, then refill the transmission with the recommended fluid to the upper mark on the dipstick. Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

   Automatic Transmission Fluid Capacity:
   4WD:
   2.9 ℓ (3.1 US qt, 2.6 Imp qt) at change
   6.8 ℓ (7.2 US qt, 6.0 Imp qt) at overhaul
   2WD:
   2.7 ℓ (2.9 US qt, 2.4 Imp qt) at change
   5.9 ℓ (6.2 US qt, 5.2 Imp qt) at overhaul

⚠ WARNING

- **While testing, be careful of the rotating wheels.**
- **Make sure lifts, jacks, and safety stands are placed properly (see section 1).**

1. Before testing, be sure the transmission fluid is filled to the proper level.

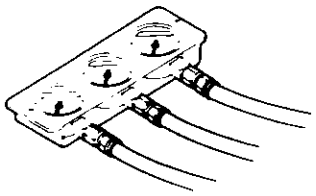
2. **4WD:**
   Raise the vehicle (see section 1).
   2WD:
   Raise the front of the vehicle, and make sure it is securely supported. Set the parking brake, and block both rear wheels securely.

3. Allow all four wheels (4WD) or front wheels (2WD) to rotate freely.

4. Warm up the engine (the radiator fan comes on), then stop it and connect the tachometer.

5. Connect the oil pressure gauges to each inspection hole securely, and do not allow dust or other foreign particles to enter the inspection holes.

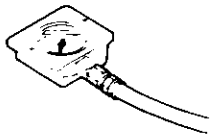
   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



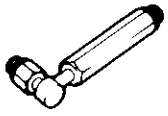
A/T OIL PRESSURE GAUGE SET W/PANEL
07406 – 0020400



A/T PRESSURE HOSE, 2210 mm
07MAJ – PY4011A
(4 Required)



A/T LOW PRESSURE GAUGE W/PANEL
07406 – 0070300



A/T PRESSURE HOSE ADAPTER
07MAJ – PY40120
(4 Required)

6. Measure the following pressure:
   - Line Pressure 14-162
   - 1st, 1st-hold Clutch Pressure 14-162
   - 2nd, 3rd and 4th Clutch Pressure 14-163

7. Install new sealing washers and the sealing bolts in the inspection holes, and tighten to the specified torque.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft) (cont'd)

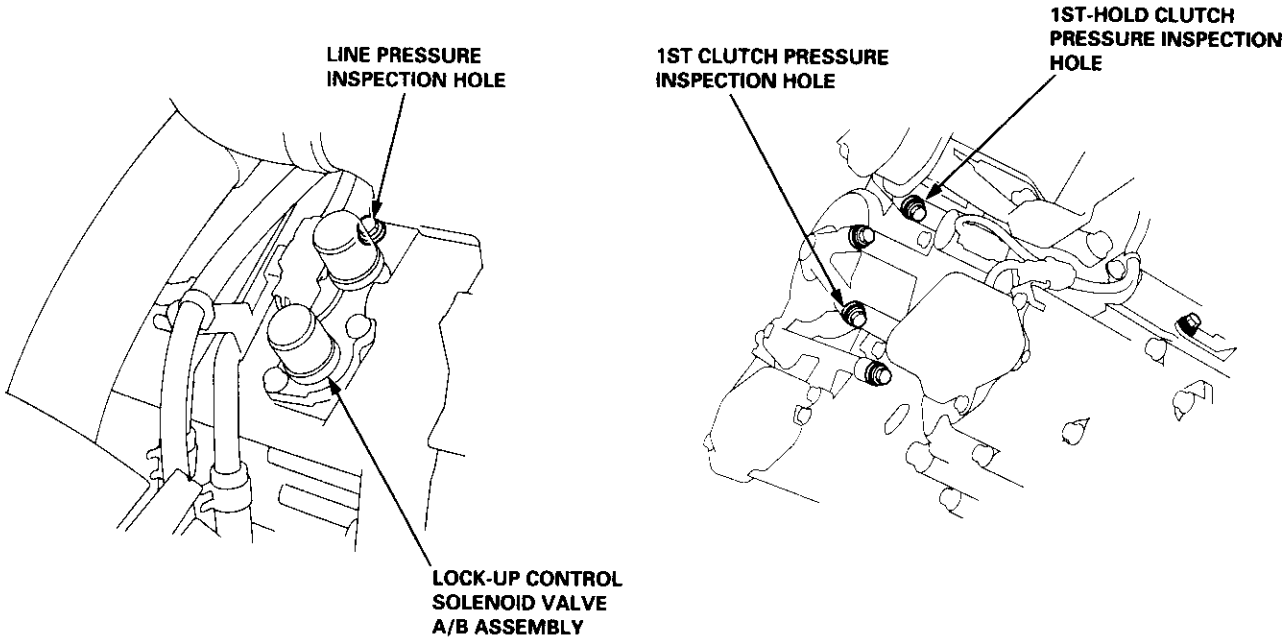
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Pressure Testing

(cont'd)

Line Pressure, 1st Clutch, 1st-hold Clutch Pressure Measurement

1. Start the engine, and shift to [N] or [P] position.
2. Run the engine at 2,000 rpm, then measure line pressure. Higher pressure may be indicated if measurements are made in shift lever positions other than [N] or [P] position.
3. Shift to [D4] ('97 – 98) or [D] ('99 – 00) position and hold the engine at 2,000 rpm, then measure 1st clutch pressure.
4. Shift to [1] position and hold the engine at 2,000 rpm, then measure 1st-hold clutch pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	[N] or [P]	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	830 – 880 kPa (8.5 – 9.0 kgf/cm², 120 – 130 psi)	780 kPa (8.0 kgf/cm², 110 psi)
1st Clutch	[D4] ('97 – 98) [D] ('99 – 00)	No or low 1st pressure	1st Clutch		
1st-hold Clutch	[1]	No or low 1st-hold pressure	1st-hold Clutch		

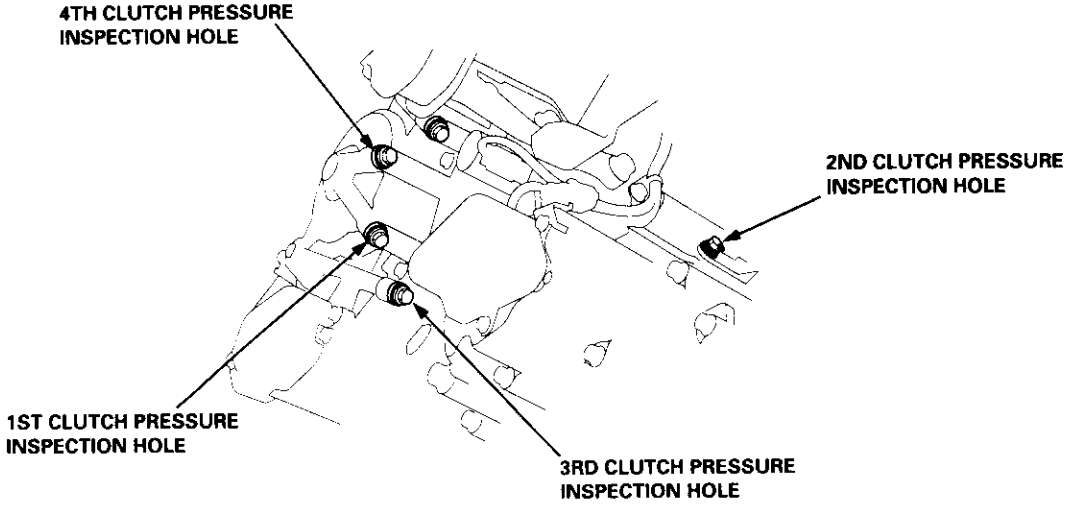
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2nd, 3rd, and 4th Clutch Pressure Measurement
'97 – 98 Models:

1. Start the engine, and shift to [2] position.
2. Run the engine at 2,000 rpm, then measure 2nd clutch pressure.
3. Shift to [D3] position, and hold the engine at 2,000 rpm, then measure 3rd clutch pressure.
4. Shift to [D4] position, and hold the engine at 2,000 rpm, then measure 4th clutch pressure.
5. Shift to [R] position, and hold the engine at 2,000 rpm, then measure 4th clutch pressure.

'99 – 00 Models:

1. Start the engine, and shift to [2] position.
2. Run the engine at 2,000 rpm, then measure 2nd clutch pressure.
3. Shift to [D] position, and turn the Over-Drive (O/D) OFF by pressing the O/D switch (O/D OFF indicator light comes on).
4. Hold the engine at 2,000 rpm, then measure 3rd clutch pressure.
5. Turn the Over-Drive ON by pressing the O/D switch (O/D OFF indicator light goes out), and hold the engine at 2,000 rpm, then measure 4th clutch pressure.
6. Shift to [R] position, and hold the engine at 2,000 rpm, then measure 4th clutch pressure.



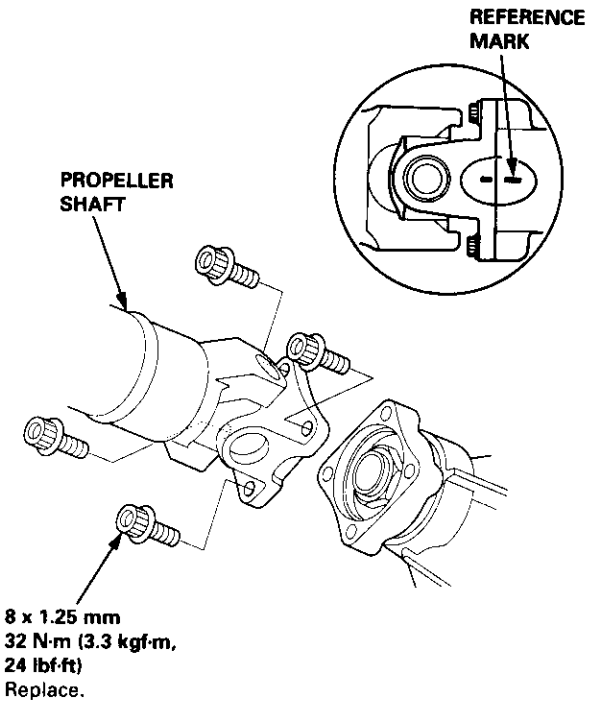
PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	[2]	No or low 2nd pressure	2nd Clutch	800 – 850 kPa (8.2 – 8.7 kgf/cm², 120 – 124 psi)	760 kPa (7.7 kgf/cm², 110 psi)
3rd Clutch	[D3] ('97 – 98) [D] with Over-Drive is OFF ('99 – 00)	No or low 3rd pressure	3rd Clutch		
4th Clutch	[D4] ('97 – 98) [D] ('99 – 00)	No or low 4th pressure	4th Clutch		
	[R]		Servo Valve or 4th Clutch		

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Inspection

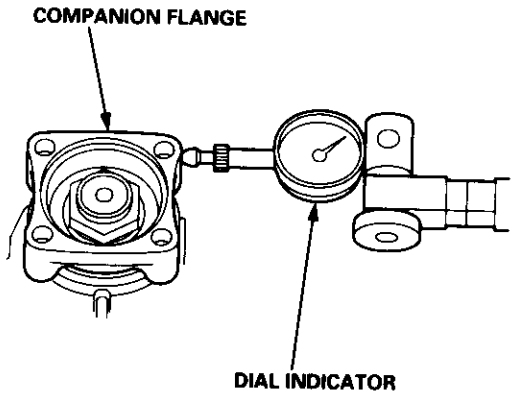
⚠ WARNING Make sure lifts, jacks, and safety stands are placed properly (see section 1).

1. Raise the front of the vehicle, and make sure it is supported securely.
2. Set the parking brake, and block both rear wheels securely.
3. Shift to [N] position.
4. Make a reference mark across the propeller shaft and the transfer assembly flanges.
5. Separate the propeller shaft from the transfer assembly.



6. Set a dial indicator on the transfer assembly flange, then measure the transfer gear backlash.

STANDARD: 0.06 – 0.16 mm (0.002 – 0.006 in)



7. If the measurement is out of standard, remove the transfer assembly and adjust transfer gear backlash (see page 14-232 thru 14-249).
8. Check for fluid leaks between the mating faces of transfer cover A and cover B.
9. If there is a fluid leak, remove the cover, and replace the O-ring.
10. Check for fluid leaks between the mating face of the transfer assembly and transmission.
11. If there is a fluid leak, remove the transfer assembly, and replace the O-ring.
12. Check the transfer oil seal for damage and fluid leaks.
13. If oil seal replacement is required, remove the transfer assembly, replace the oil seal, and adjust the total starting torque (see page 14-232 thru 14-249).

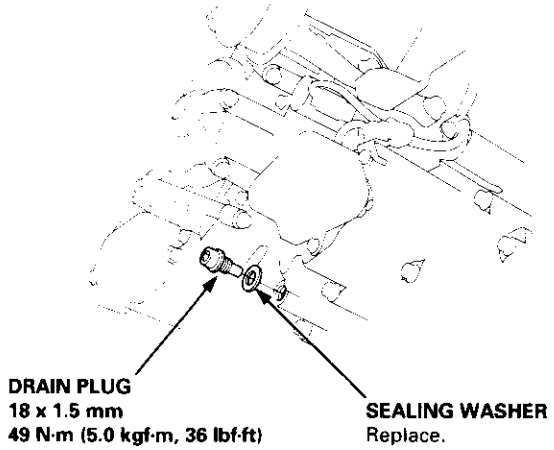
    NOTE: Do not replace the oil seal with the transfer assembly on the transmission.

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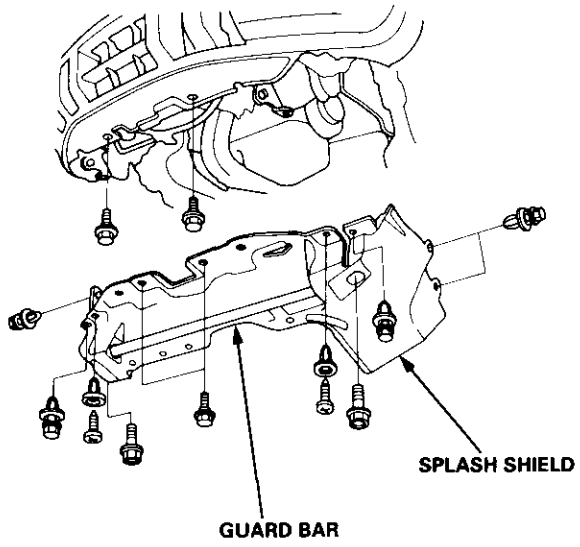
Removal

⚠ WARNING Make sure the lifts, jacks, and safety stands are placed properly (see section 1).

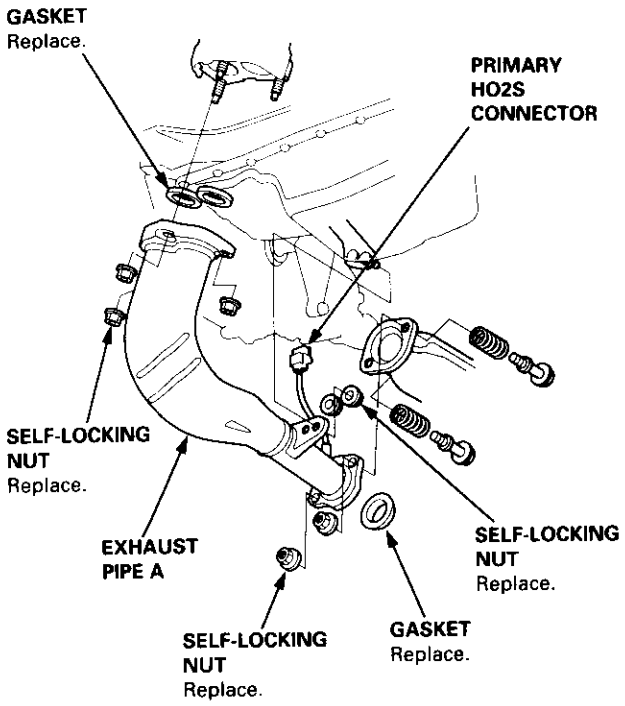
1. Raise the front of the vehicle, and make sure it is supported securely.
2. Set the parking brake, and block both rear wheels securely.
3 Drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



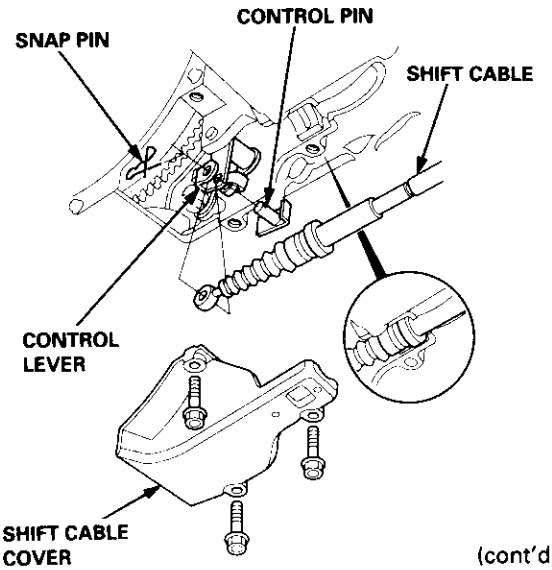
4. Remove the guard bar and the splash shield.



5. Disconnect the primary heated oxygen sensor (Primary HO2S) connector.
6. Remove exhaust pipe A.



7. Remove the shift cable cover.
8. Remove the snap pin and control pin, then separate the shift cable from the control lever. Do not bend the shift cable excessively.



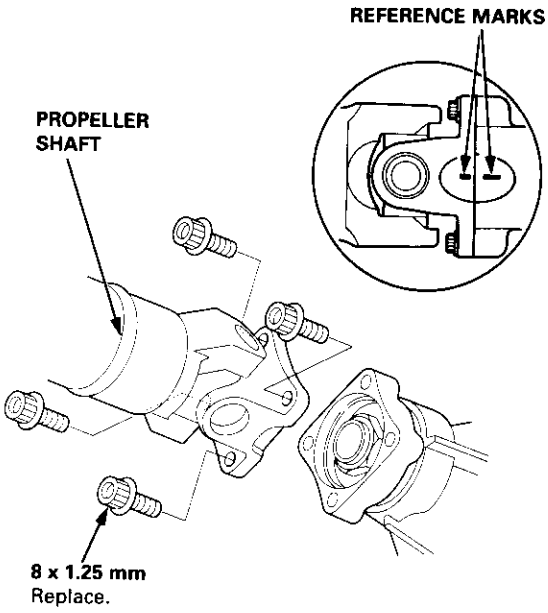
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Removal (cont'd)

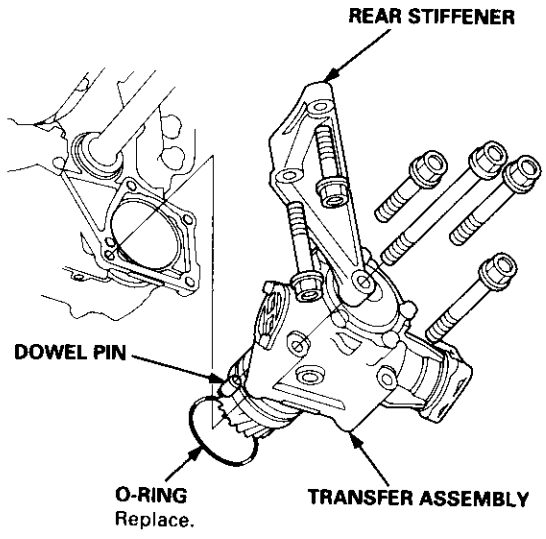
9. Make reference marks across the propeller shaft and the transfer assembly flanges.

10. Separate the propeller shaft from the transfer assembly flanges.



11. Remove the rear stiffener, then remove the transfer assembly.

NOTE: While servicing the transfer assembly, do not allow dust or other foreign particles to enter the transmission.

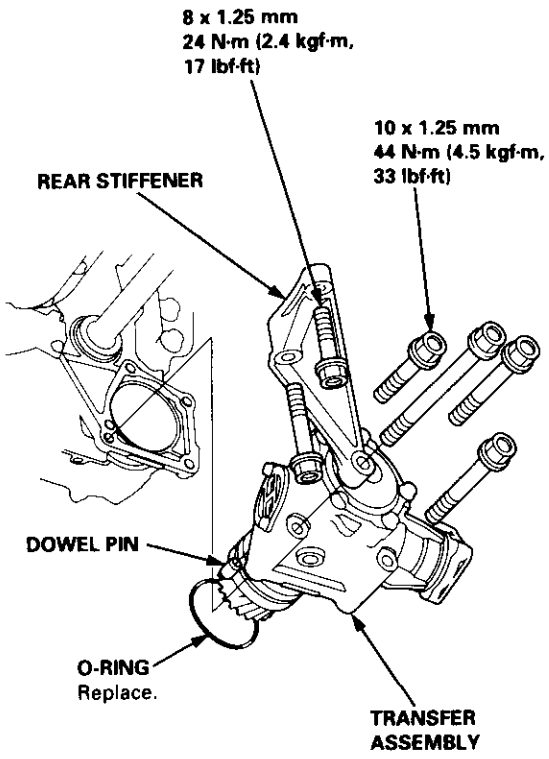


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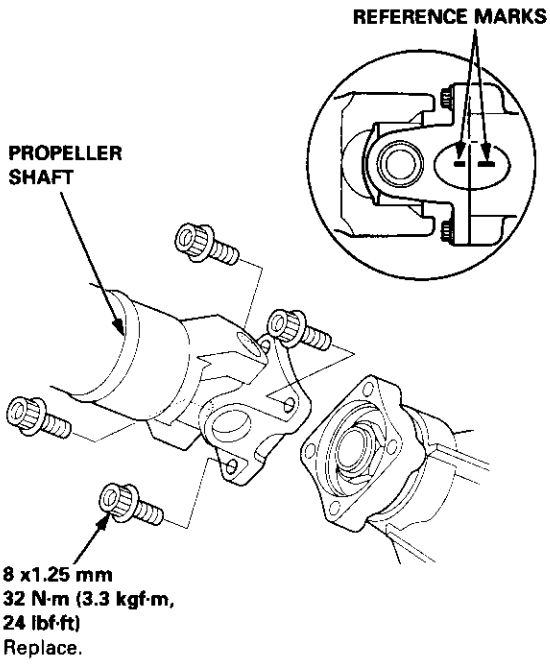
Installation

1. Install a new O-ring on the transfer assembly.
2. Clean the areas where the transfer assembly contacts the transmission with solvent or carburetor cleaner, and dry with compressed air. Then apply ATF to the contact areas.
3. Install the transfer assembly on the transmission.

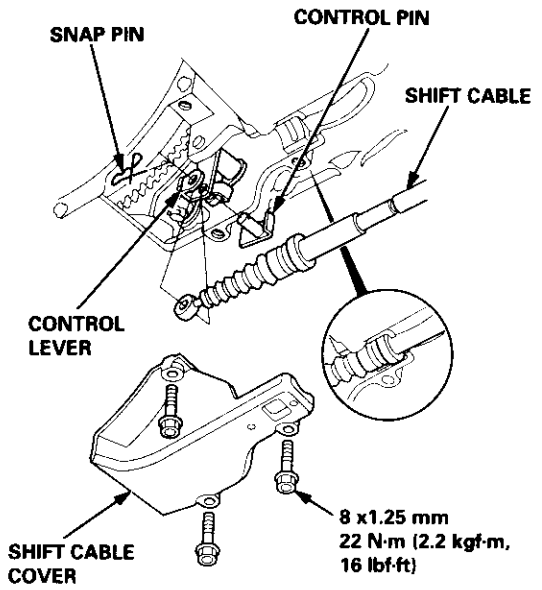
   NOTE: While installing the transfer assembly, do not allow dust or other foreign particles to enter the transmission.
4. Install the rear stiffener.



5. Install the propeller shaft to the transfer assembly by aligning the reference marks.



6. Install the shift cable with the control pin, then secure it with the snap pin. Do not bend the shift cable excessively.
7. Install the shift cable cover.



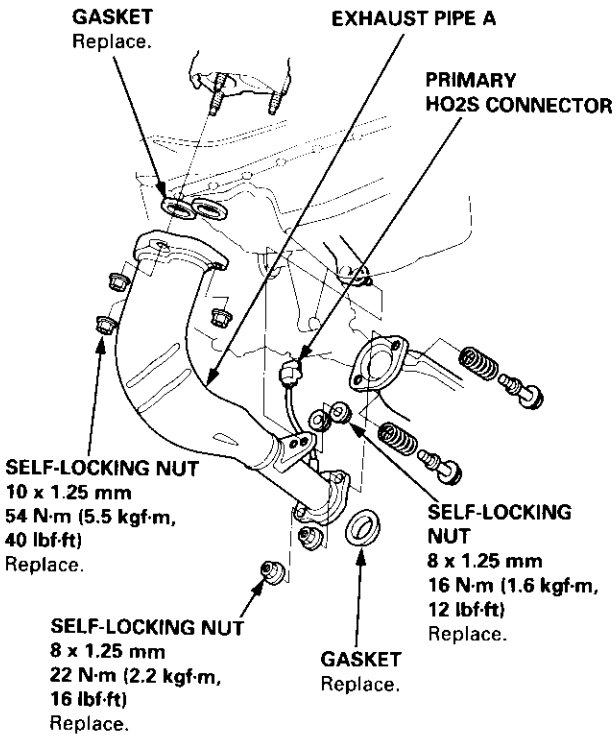
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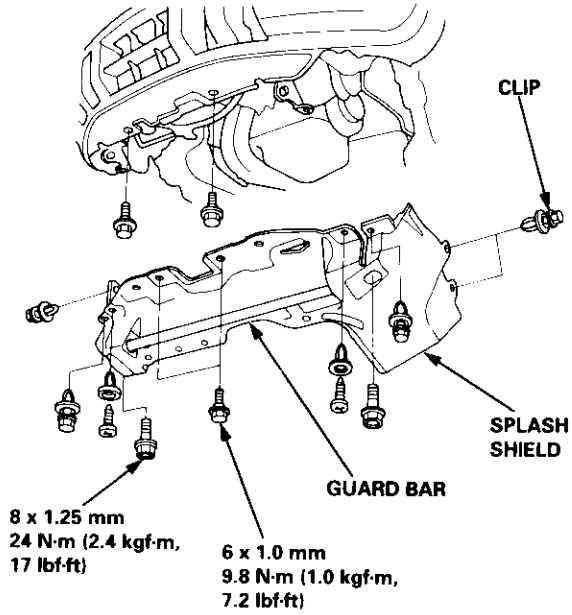
Installation (cont'd)

8. Install the exhaust pipe A.

9. Connect the primary heated oxygen sensor (Primary HO2S) connector.



10. Install the splash shield and the guard bar.



11. Refill the transmission with ATF (see page 14-161).

12. Start the engine, and run it to normal operating temperature (the radiator fan comes on). Turn the engine off and check ATF level.

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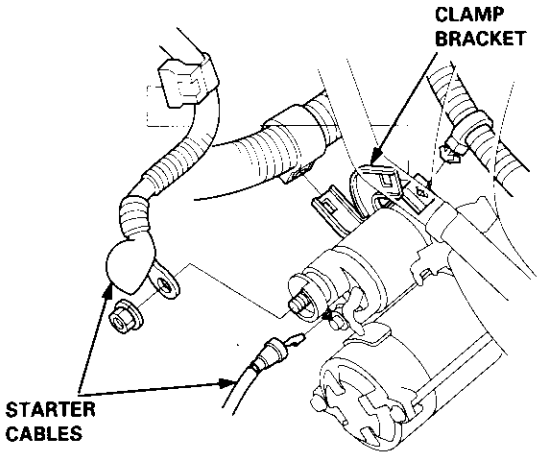
Removal

⚠ WARNING

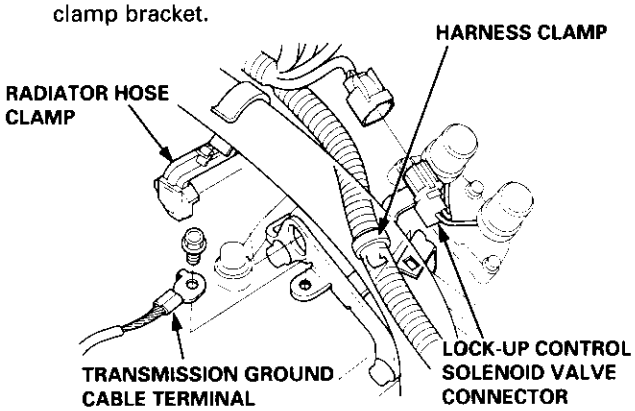
- **Make sure lifts, jacks, and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).**
- **Apply the parking brake and block the rear wheels, so vehicle will not roll off the stands and fall on you while working under it.**

NOTE: Use fender covers to avoid damaging painted surfaces.

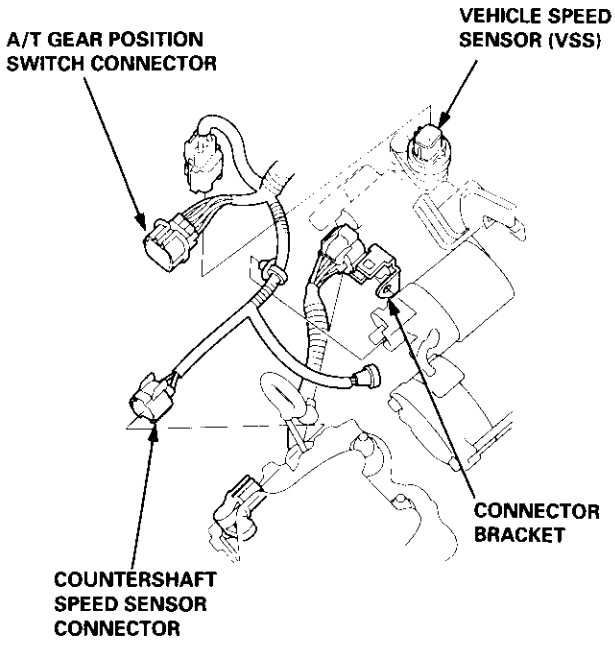
1. Disconnect the negative terminal, then disconnect the positive terminal from the battery.
2. Remove the intake air duct and the air cleaner housing assembly.
3. Remove the starter cables. Remove the harness clamp from the clamp bracket.



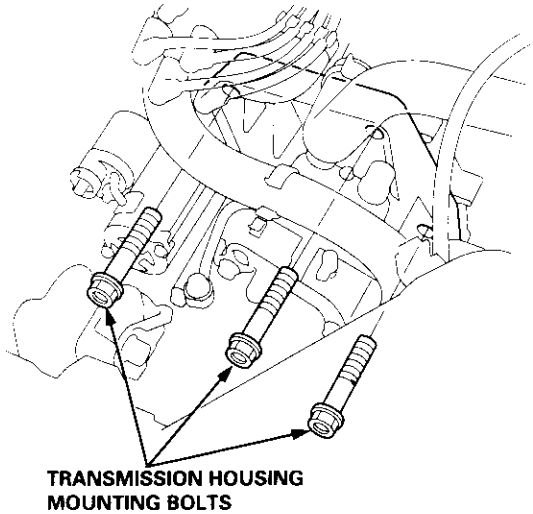
4. Remove the transmission ground cable terminal and the radiator hose clamp from the transmission hanger.
5. Disconnect the lock-up control solenoid valve connector, then remove the harness clamp from the clamp bracket.



6. Disconnect the vehicle speed sensor (VSS), the countershaft speed sensor, and the A/T gear position switch connectors.



7. Remove the transmission housing mounting bolts.

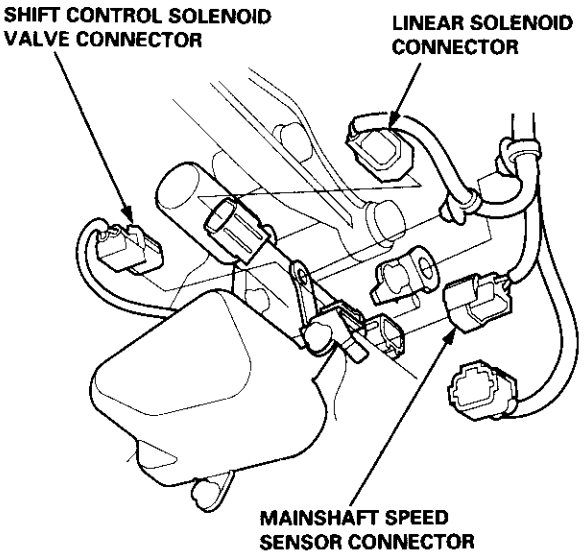


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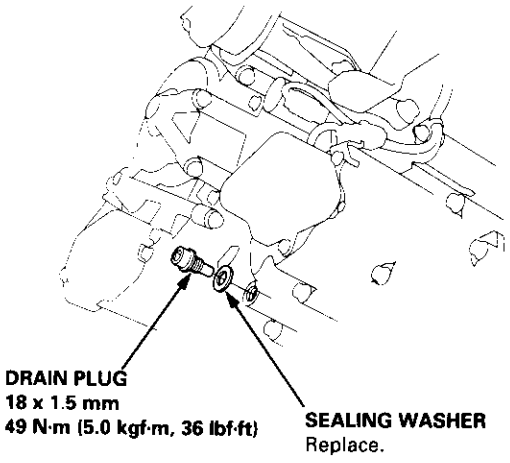
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Removal (cont'd)

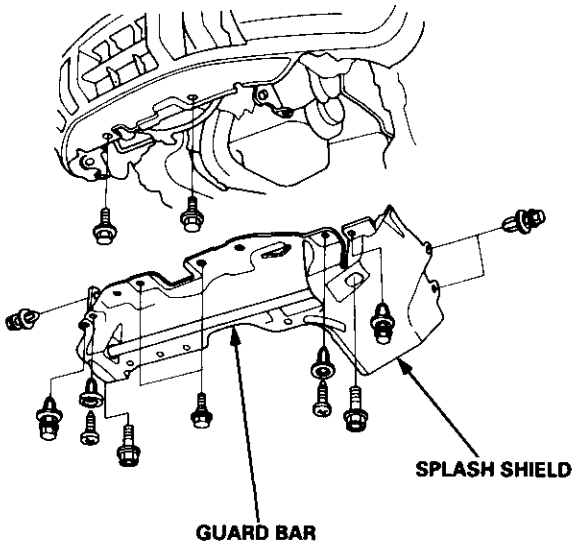
8. Disconnect the mainshaft speed sensor, the shift control solenoid valve, and the linear solenoid connectors.



9. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.

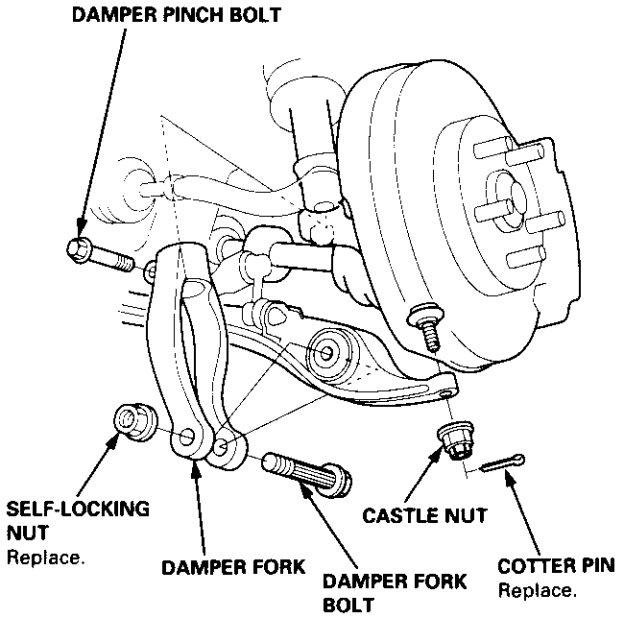


10. Remove the guard bar and the splash shield.



11. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arms (see section 18).

12. Remove the right damper fork bolt, then separate right damper fork and damper.

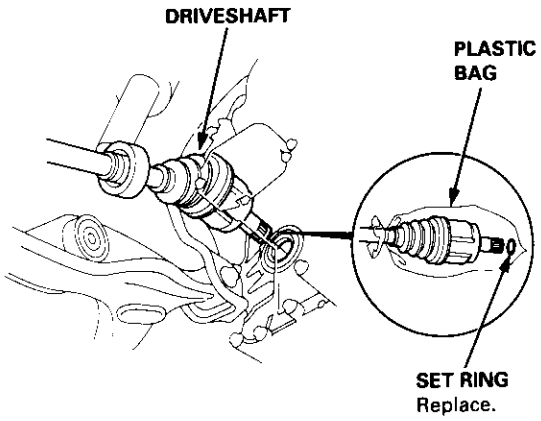


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13. Pry the right driveshaft out of the differential, and pry the left driveshaft out of the intermediate shaft (see section 16).

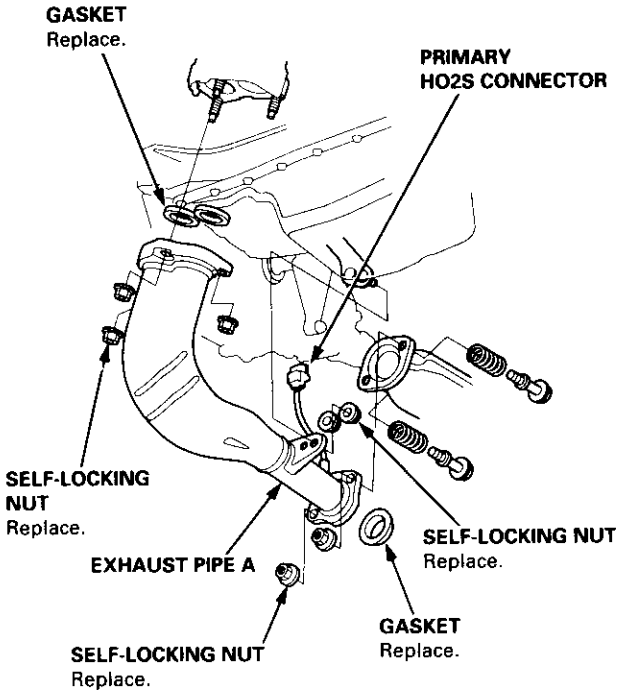
14. Pull out the inboard joint, and remove the right and left driveshaft (see section 18).

15. Tie plastic bags over the driveshaft ends. Coat all precision finished surfaces with clean engine oil.



16. Disconnect the primary heated oxygen sensor (Primary HO2S) connector.

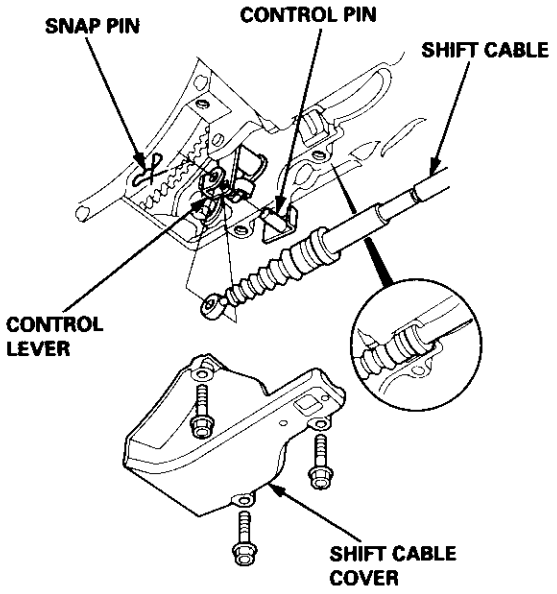
17. Remove exhaust pipe A.



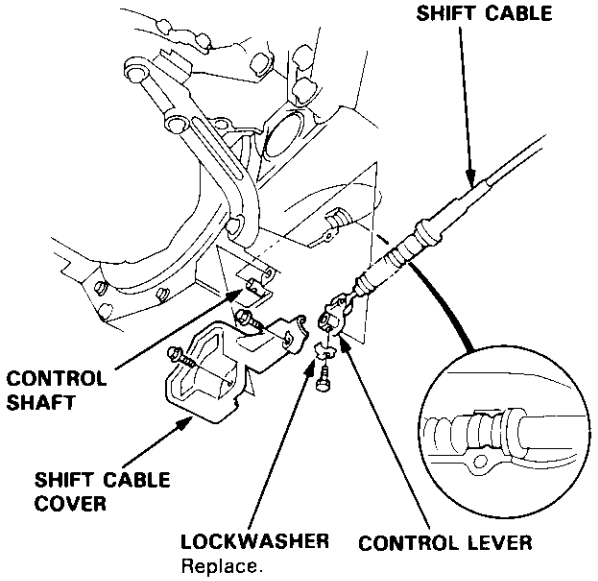
18. Remove the shift cable cover.

19. Remove the shift cable.

4WD:
Remove the snap pin and control pin, then separate the shift cable from the control lever. Do not bend the shift cable excessively.



2WD:
Remove the control lever, then separate the shift cable from the control shaft. Do not bend the shift cable excessively.



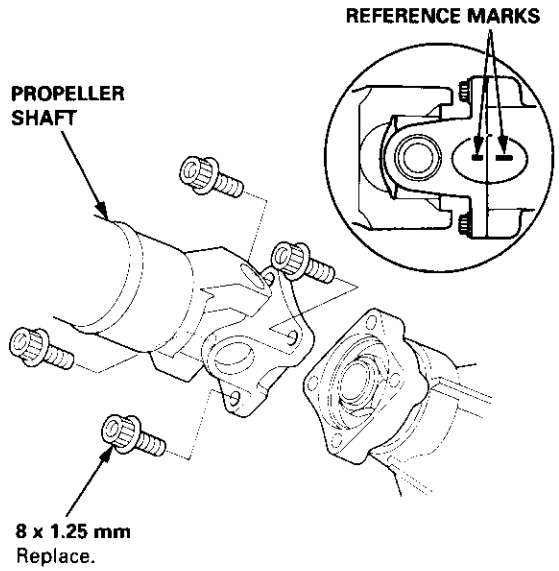
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Removal (cont'd)

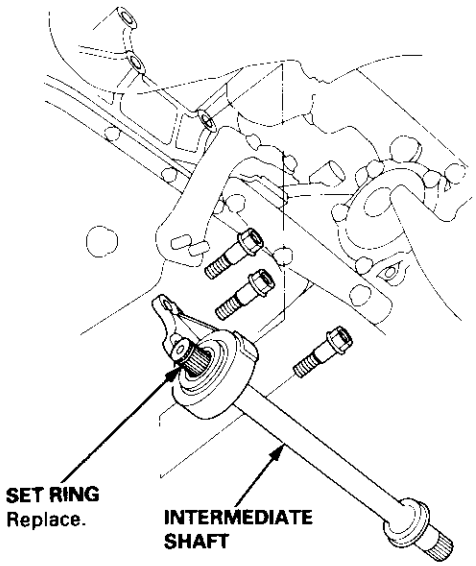
20. Make reference marks across the transfer assembly and propeller shaft flanges. (4WD)

21. Separate the propeller shaft from the transfer assembly. (4WD)



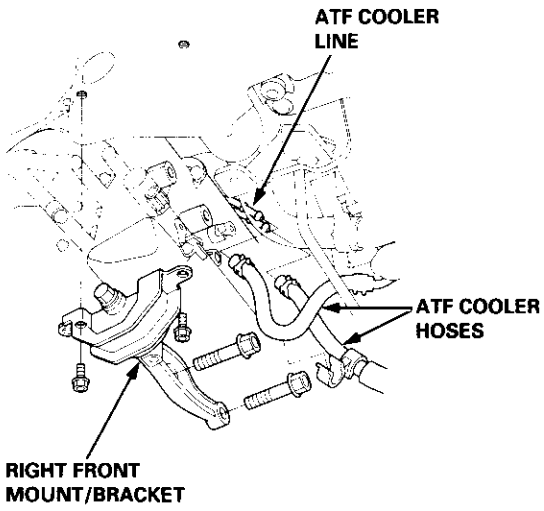
22. Remove the intermediate shaft.

23. Tie plastic bags over the both ends of the intermediate shaft. Coat all precision finished surfaces with clean engine oil.



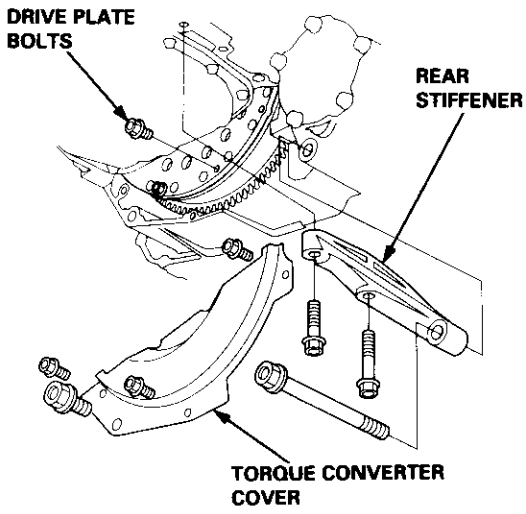
24. Remove the right front mount/bracket.

25. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the lines and hoses. Check for any sign of leakage at the hose joints.



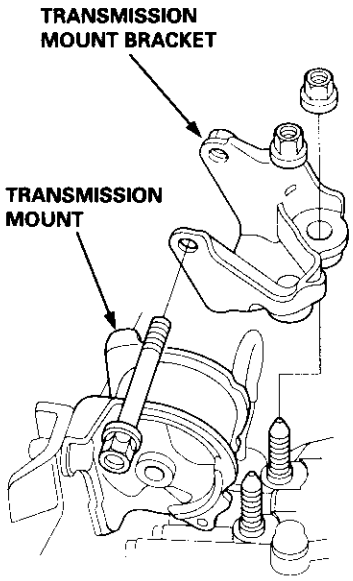
26. Remove the rear stiffener and torque converter cover.

27. Remove the eight drive plate bolts, one at a time, while rotating the crankshaft pulley.

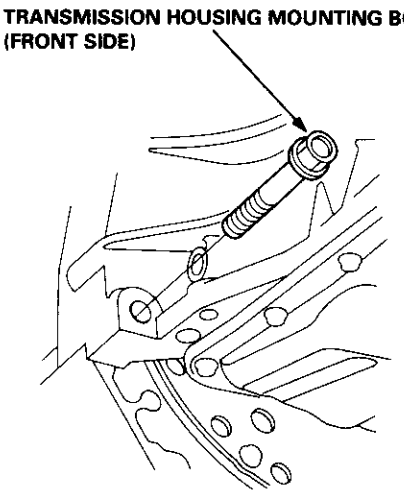


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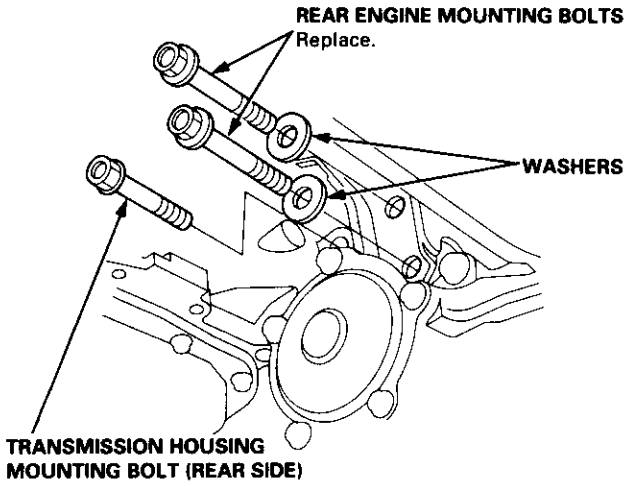
28. Place a jack under the transmission, raise it just enough to take it off of the mounts, then remove the transmission mount bracket.



29. Remove the front side transmission housing mounting bolt.



30. Remove the rear side transmission housing mounting bolt and the rear engine mounting bolts.



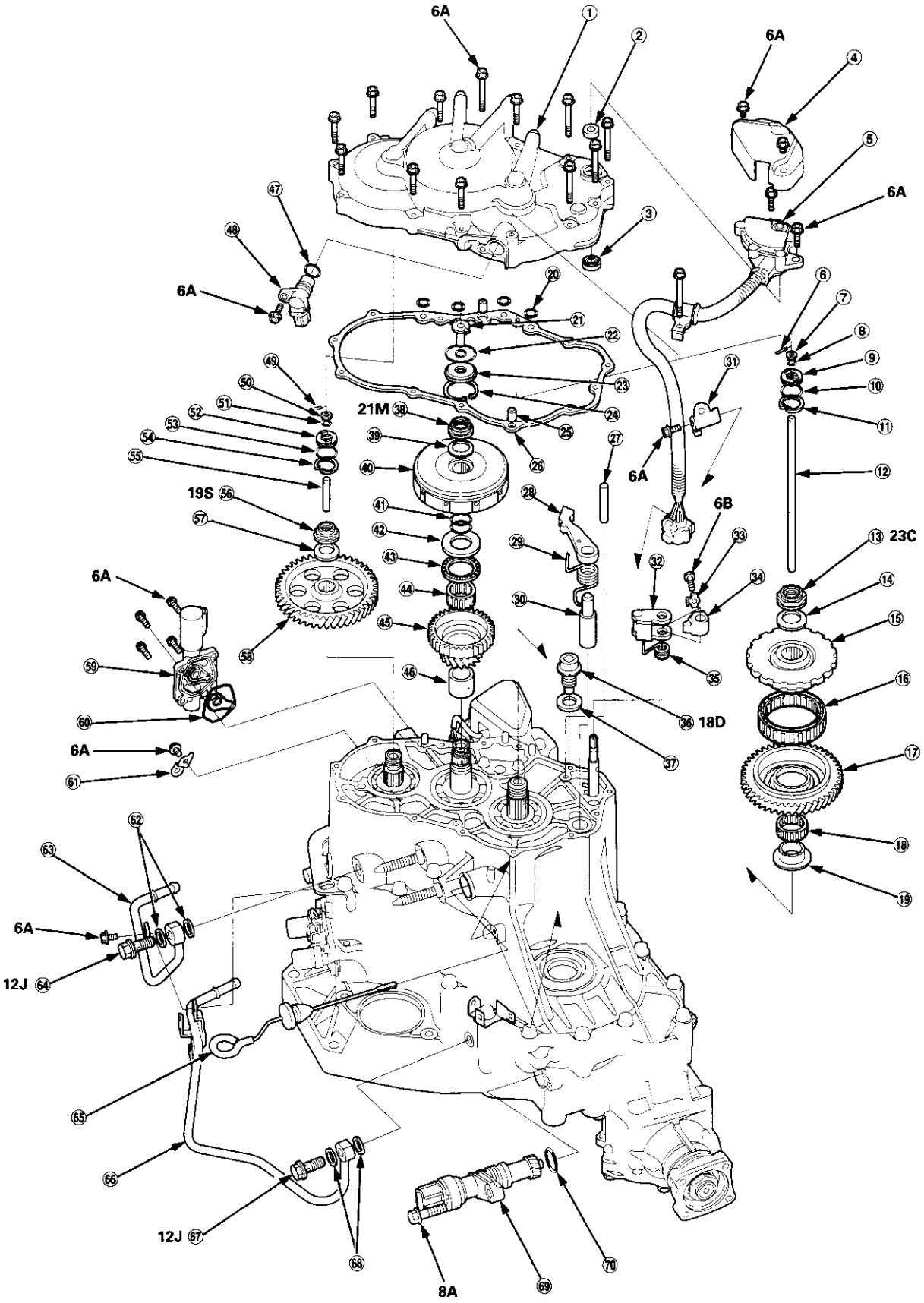
31. Pull the transmission away from the engine until it clears the dowel pins, then lower it on the transmission jack.

32. Remove the torque converter assembly from the transmission.

33. Remove the starter from the transmission housing.

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End Cover/Transmission



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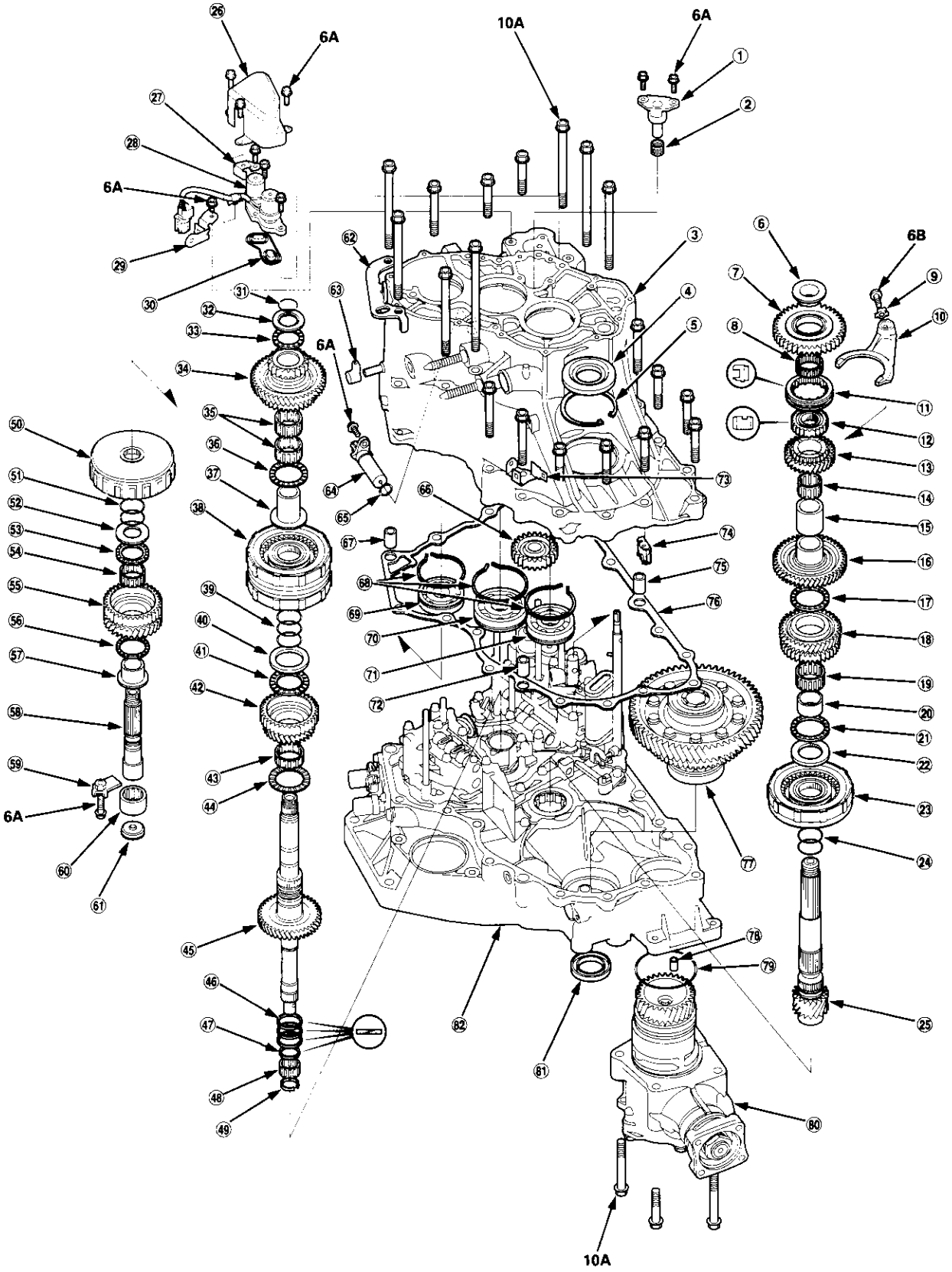
① **END COVER**
② **OIL SEAL** Replace.
③ **BALL BEARING**
④ **A/T GEAR POSITION SWITCH COVER**
⑤ **A/T GEAR POSITION SWITCH**
⑥ **ROLLER**
⑦ **COLLAR**
⑧ **O-RING** Replace.
⑨ **FEED PIPE FLANGE**
⑩ **O-RING** Replace.
⑪ **SNAP RING**
⑫ **3RD CLUTCH FEED PIPE**
⑬ **COUNTERSHAFT LOCKNUT 23 x 1.25 mm** Replace.
⑭ **CONICAL SPRING WASHER** Replace.
⑮ **PARK GEAR**
⑯ **ONE-WAY CLUTCH**
⑰ **COUNTERSHAFT 1ST GEAR**
⑱ **NEEDLE BEARING**
⑲ **COUNTERSHAFT 1ST GEAR COLLAR**
⑳ **O-RING** Replace.
㉑ **1ST CLUTCH FEED PIPE**
㉒ **O-RING** Replace.
㉓ **FEED PIPE FLANGE**
㉔ **SNAP RING**
㉕ **DOWEL PIN**
㉖ **END COVER GASKET** Replace.
㉗ **PARK PAWL STOP**
㉘ **PARK PAWL**
㉙ **PARK PAWL SPRING**
㉚ **PARK PAWL SHAFT**
㉛ **A/T GEAR POSITION SWITCH HARNESS CLAMP**
㉜ **PARK LEVER**
㉝ **LOCK WASHER** Replace.
㉞ **PARK STOP** Selective part
㉟ **PARK LEVER SPRING**
㊱ **DRAIN PLUG**
㊲ **SEALING WASHER** Replace.
㊳ **MAINSHAFT LOCKNUT 21 x 1.25 mm** Replace.
㊴ **CONICAL SPRING WASHER** Replace.
㊵ **1ST CLUTCH ASSEMBLY**
㊶ **O-RING** Replace.
㊷ **THRUST WASHER**
㊸ **THRUST NEEDLE BEARING**
㊹ **NEEDLE BEARING**
㊺ **MAINSHAFT 1ST GEAR**
㊻ **MAINSHAFT 1ST GEAR COLLAR**
㊼ **O-RING** Replace.
㊽ **COUNTERSHAFT SPEED SENSOR**
㊾ **ROLLER**
㊿ **COLLAR**
(51) **O-RING** Replace.
(52) **FEED PIPE FLANGE**
(53) **O-RING** Replace.
(54) **SNAP RING**
(55) **1ST-HOLD CLUTCH FEED PIPE**
(56) **SUB-SHAFT LOCKNUT 19 x 1.25 mm** Replace.
(57) **CONICAL SPRING WASHER** Replace.
(58) **SUB-SHAFT 1ST GEAR**
(59) **LINEAR SOLENOID ASSEMBLY**
(60) **LINEAR SOLENOID ASSEMBLY GASKET** Replace.
(61) **HARNESS BRACKET**
(62) **SEALING WASHERS** Replace.
(63) **ATF COOLER LINE**
(64) **LINE BOLT**
(65) **ATF DIPSTICK**
(66) **ATF COOLER LINE**
(67) **LINE BOLT**
(68) **SEALING WASHERS** Replace.
(69) **VEHICLE SPEED SENSOR (VSS)**
(70) **O-RING** Replace.

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
8A	22 N·m (2.2 kgf·m, 16 lbf·ft)	8 x 1.25 mm	
12J	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Line bolt
18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
19S	93 N·m (9.5 kgf·m, 69 lbf·ft)	19 x 1.25 mm	Sub-shaft locknut
21M	78 N·m (8.0 kgf·m, 58 lbf·ft)	21 x 1.25 mm	Mainshaft locknut: Left-hand threads
23C	103 → 0 → 103 N·m (10.5 → 0 → 10.5 kgf·m, 75.9 → 0 → 75.9 lbf·ft)	23 x 1.25 mm	Countershaft locknut: Left-hand threads

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Transmission Housing



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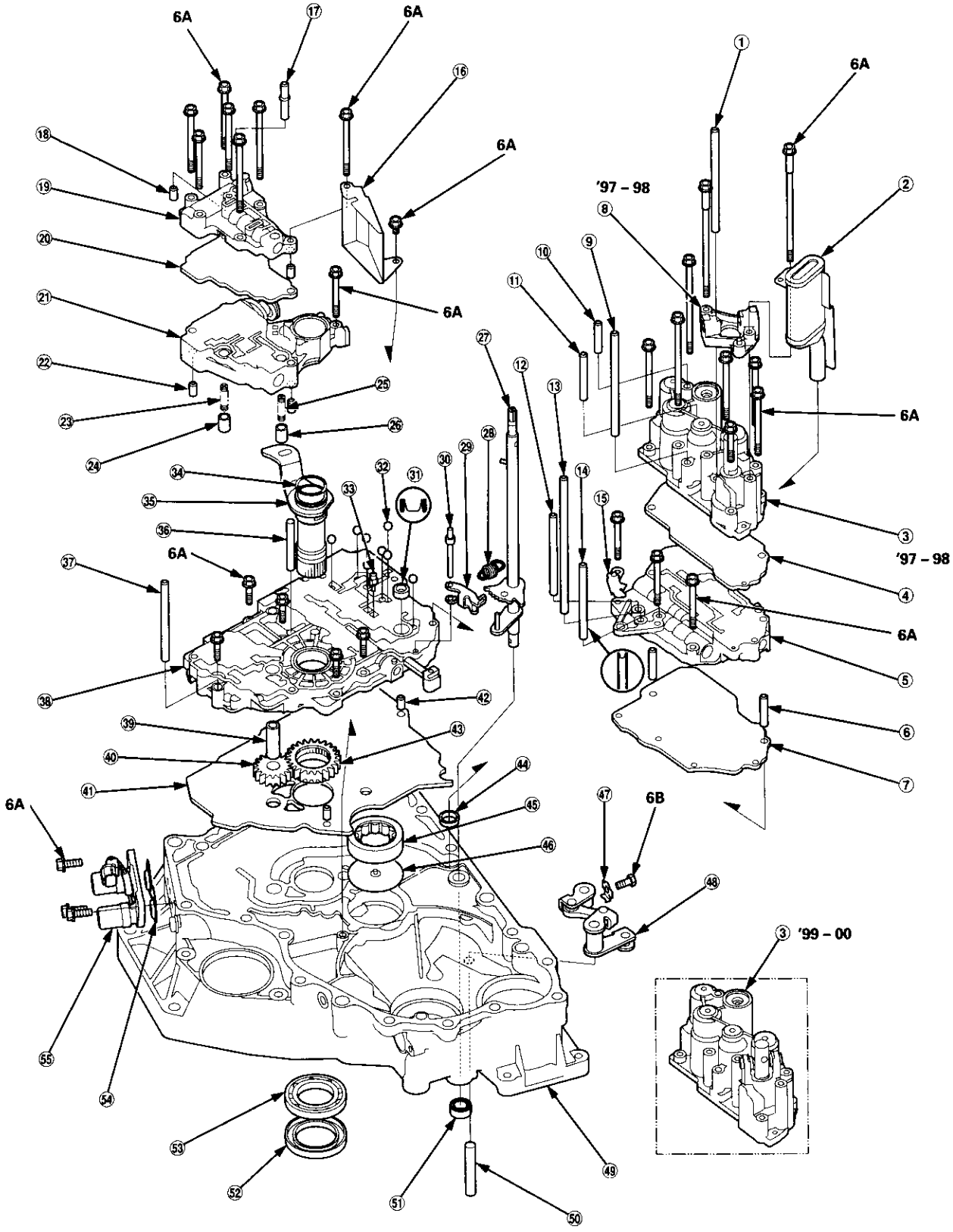
① **REVERSE IDLER GEAR SHAFT/HOLDER**
② **NEEDLE BEARING**
③ **TRANSMISSION HOUSING**
④ **TRANSMISSION HOUSING OIL SEAL** Replace.
⑤ **SET RING, 80 mm** Selective part
⑥ **REVERSE GEAR COLLAR**
⑦ **COUNTERSHAFT REVERSE GEAR**
⑧ **NEEDLE BEARING**
⑨ **LOCK WASHER** Replace.
⑩ **REVERSE SHIFT FORK**
⑪ **REVERSE SELECTOR**
⑫ **REVERSE SELECTOR HUB**
⑬ **COUNTERSHAFT 4TH GEAR**
⑭ **NEEDLE BEARING**
⑮ **DISTANCE COLLAR, 28 mm** Selective part
⑯ **COUNTERSHAFT 2ND GEAR**
⑰ **THRUST NEEDLE BEARING**
⑱ **COUNTERSHAFT 3RD GEAR**
⑲ **NEEDLE BEARING**
⑳ **COUNTERSHAFT 3RD GEAR COLLAR**
㉑ **THRUST NEEDLE BEARING**
㉒ **SPLINED WASHER**
㉓ **3RD CLUTCH ASSEMBLY**
㉔ **O-RING** Replace.
㉕ **COUNTERSHAFT**
㉖ **SHIFT CONTROL SOLENOID COVER**
㉗ **HARNESS CLAMP BRACKET**
㉘ **SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY**
㉙ **HARNESS CLAMP BRACKET**
㉚ **SHIFT CONTROL SOLENOID VALVE FILTER/GASKET** Replace.
㉛ **SNAP RING**
㉜ **THRUST WASHER**
㉝ **THRUST NEEDLE BEARING**
㉞ **MAINSHAFT 4TH GEAR**
㉟ **NEEDLE BEARINGS**
㊱ **THRUST NEEDLE BEARING**
㊲ **MAINSHAFT 4TH GEAR COLLAR**
㊳ **2ND/4TH CLUTCH ASSEMBLY**
㊴ **O-RING** Replace.
㊵ **THRUST WASHER, 36.5 x 55 mm** Selective part
㊶ **THRUST NEEDLE BEARING**
㊷ **MAINSHAFT 2ND GEAR**
㊸ **NEEDLE BEARING**
㊹ **THRUST NEEDLE BEARING**
㊺ **MAINSHAFT**
㊻ **SEALING RING, 35 mm**
㊼ **SEALING RING, 29 mm**
㊽ **NEEDLE BEARING**
㊾ **SET RING**
㊿ **1ST-HOLD CLUTCH ASSEMBLY**
(51) **O-RING** Replace.
(52) **THRUST WASHER**
(53) **THRUST NEEDLE BEARING**
(54) **NEEDLE BEARING**
(55) **SUB-SHAFT 4TH GEAR**
(56) **THRUST NEEDLE BEARING**
(57) **SUB-SHAFT 4TH GEAR COLLAR**
(58) **SUB-SHAFT**
(59) **NEEDLE BEARING STOP**
(60) **NEEDLE BEARING**
(61) **ATF GUIDE CAP** Replace.
(62) **TRANSMISSION HANGER**
(63) **BREATHER CAP**
(64) **MAINSHAFT SPEED SENSOR**
(65) **O-RING** Replace.
(66) **REVERSE IDLER GEAR**
(67) **DOWEL PIN, 14 x 25 mm**
(68) **SNAP RINGS**
(69) **SUB-SHAFT TRANSMISSION HOUSING BEARING**
(70) **MAINSHAFT TRANSMISSION HOUSING BEARING**
(71) **COUNTERSHAFT TRANSMISSION HOUSING BEARING**
(72) **DOWEL PIN, 14 x 25 mm**
(73) **CONNECTOR BRACKET**
(74) **ATF MAGNET**
(75) **DOWEL PIN, 14 x 20 mm**
(76) **TRANSMISSION HOUSING GASKET** Replace.
(77) **DIFFERENTIAL ASSEMBLY**
(78) **DOWEL PIN, 10 x 12 mm**
(79) **O-RING** Replace.
(80) **TRANSFER ASSEMBLY**
(81) **TORQUE CONVERTER HOUSING OIL SEAL** Replace.
(82) **TORQUE CONVERTER HOUSING**

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
10A	44 N·m (4.5 kgf·m, 33 lbf·ft)	10 x 1.25 mm	

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Torque Converter Housing/Valve Body



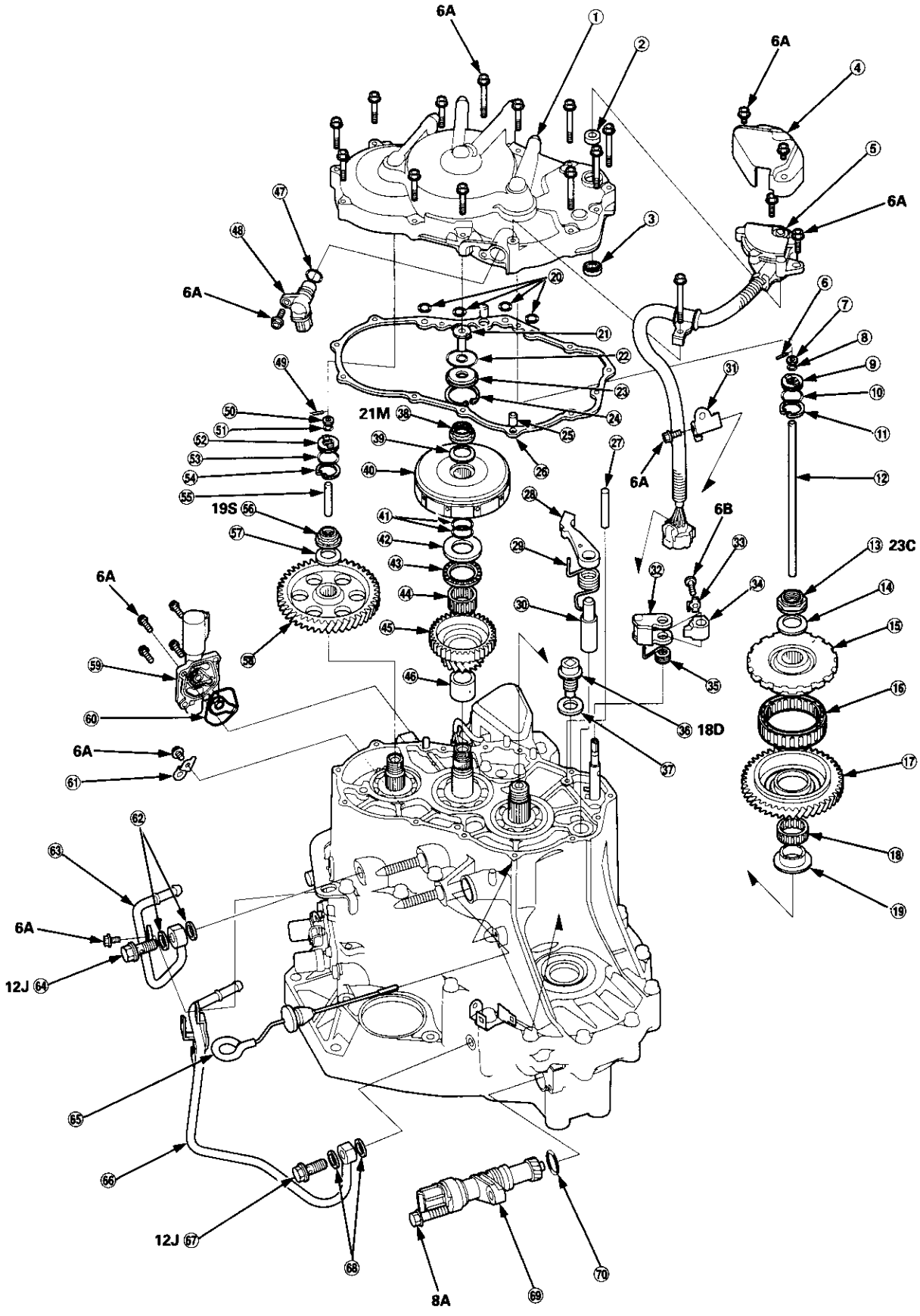
① ATF FEED PIPE, 8 x 145 mm
② ATF STRAINER
③ SERVO BODY
④ SERVO SEPARATOR PLATE
⑤ SECONDARY VALVE BODY
⑥ DOWEL PIN
⑦ SECONDARY SEPARATOR PLATE
⑧ SERVO DETENT BASE ('97 – 98 models only)
⑨ ATF FEED PIPE, 8 x 145 mm
⑩ ATF FEED PIPE, 8 x 40 mm
⑪ ATF FEED PIPE, 8 x 62 mm
⑫ ATF FEED PIPE, 8 x 112 mm
⑬ ATF FEED PIPE, 8 x 192.5 mm
⑭ ATF FEED PIPE, 8 x 105.8 mm
⑮ STOP SHAFT BRACKET
⑯ ATF LUBRICATION PLATE
⑰ ATF FEED PIPE
⑱ DOWEL PIN
⑲ LOCK-UP VALVE BODY
⑳ LOCK-UP SEPARATOR PLATE
㉑ REGULATOR VALVE BODY
㉒ DOWEL PIN
㉓ COOLER RELIEF VALVE SPRING
㉔ COOLER RELIEF VALVE
㉕ TORQUE CONVERTER CHECK VALVE SPRING
㉖ TORQUE CONVERTER CHECK VALVE
㉗ CONTROL SHAFT
㉘ DETENT ARM SPRING
㉙ DETENT ARM
㉚ DETENT ARM SHAFT
㉛ FILTER Replace.
㉜ CHECK BALLS
㉝ 1ST ACCUMULATOR CHOKE
㉞ O-RING Replace.
㉟ STATOR SHAFT
㊱ STOP SHAFT
㊲ ATF FEED PIPE, 8 x 112 mm
㊳ MAIN VALVE BODY
㊴ ATF PUMP DRIVEN GEAR SHAFT
㊵ ATF PUMP DRIVEN GEAR
㊶ MAIN SEPARATOR PLATE
㊷ DOWEL PIN
㊸ ATF PUMP DRIVE GEAR
㊹ SUCTION PIPE COLLAR
㊺ COUNTERSHAFT TORQUE CONVERTER HOUSING BEARING
㊻ ATF GUIDE PLATE
㊼ LOCK WASHER Replace.
㊽ CONTROL LEVER ASSEMBLY
㊾ TORQUE CONVERTER HOUSING
㊿ CHANGE SHAFT
(51) OIL SEAL Replace.
(52) MAINSHAFT OIL SEAL Replace.
(53) MAINSHAFT TORQUE CONVERTER HOUSING BEARING
(54) LOCK-UP CONTROL SOLENOID VALVE A/B FILTER/GASKET Replace.
(55) LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	

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End Cover/Transmission



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① **END COVER**
② **OIL SEAL** Replace.
③ **BALL BEARING**
④ **A/T GEAR POSITION SWITCH COVER**
⑤ **A/T GEAR POSITION SWITCH**
⑥ **ROLLER**
⑦ **COLLAR**
⑧ **O-RING** Replace.
⑨ **FEED PIPE FLANGE**
⑩ **O-RING** Replace.
⑪ **SNAP RING**
⑫ **3RD CLUTCH FEED PIPE**
⑬ **COUNTERSHAFT LOCKNUT 23 x 1.25 mm** Replace.
⑭ **CONICAL SPRING WASHER** Replace.
⑮ **PARK GEAR**
⑯ **ONE-WAY CLUTCH**
⑰ **COUNTERSHAFT 1ST GEAR**
⑱ **NEEDLE BEARING**
⑲ **COUNTERSHAFT 1ST GEAR COLLAR**
⑳ **O-RINGS** Replace.
㉑ **1ST CLUTCH FEED PIPE**
㉒ **O-RING** Replace.
㉓ **FEED PIPE FLANGE**
㉔ **SNAP RING**
㉕ **DOWEL PIN**
㉖ **END COVER GASKET** Replace.
㉗ **PARK PAWL STOP**
㉘ **PARK PAWL**
㉙ **PARK PAWL SPRING**
㉚ **PARK PAWL SHAFT**
㉛ **A/T GEAR POSITION SWITCH HARNESS CLAMP**
㉜ **PARK LEVER**
㉝ **LOCK WASHER** Replace.
㉞ **PARK STOP** Selective part
㉟ **PARK LEVER SPRING**
㊱ **DRAIN PLUG**
㊲ **SEALING WASHER** Replace.
㊳ **MAINSHAFT LOCKNUT 21 x 1.25 mm** Replace.
㊴ **CONICAL SPRING WASHER** Replace.
㊵ **1ST CLUTCH ASSEMBLY**
㊶ **O-RING** Replace.
㊷ **THRUST WASHER**
㊸ **THRUST NEEDLE BEARING**
㊹ **NEEDLE BEARING**
㊺ **MAINSHAFT 1ST GEAR**
㊻ **MAINSHAFT 1ST GEAR COLLAR**
㊼ **O-RING** Replace.
㊽ **COUNTERSHAFT SPEED SENSOR**
㊾ **ROLLER**
㊿ **COLLAR**
(51) **O-RING** Replace.
(52) **FEED PIPE FLANGE**
(53) **O-RING** Replace.
(54) **SNAP RING**
(55) **1ST-HOLD CLUTCH FEED PIPE**
(56) **SUB-SHAFT LOCKNUT 19 x 1.25 mm** Replace.
(57) **CONICAL SPRING WASHER** Replace.
(58) **SUB-SHAFT 1ST GEAR**
(59) **LINEAR SOLENOID ASSEMBLY**
(60) **LINEAR SOLENOID ASSEMBLY GASKET** Replace.
(61) **HARNESS BRACKET**
(62) **SEALING WASHERS** Replace.
(63) **ATF COOLER LINE**
(64) **LINE BOLT**
(65) **ATF DIPSTICK**
(66) **ATF COOLER LINE**
(67) **LINE BOLT**
(68) **SEALING WASHERS** Replace.
(69) **VEHICLE SPEED SENSOR (VSS)**
(70) **O-RING** Replace.

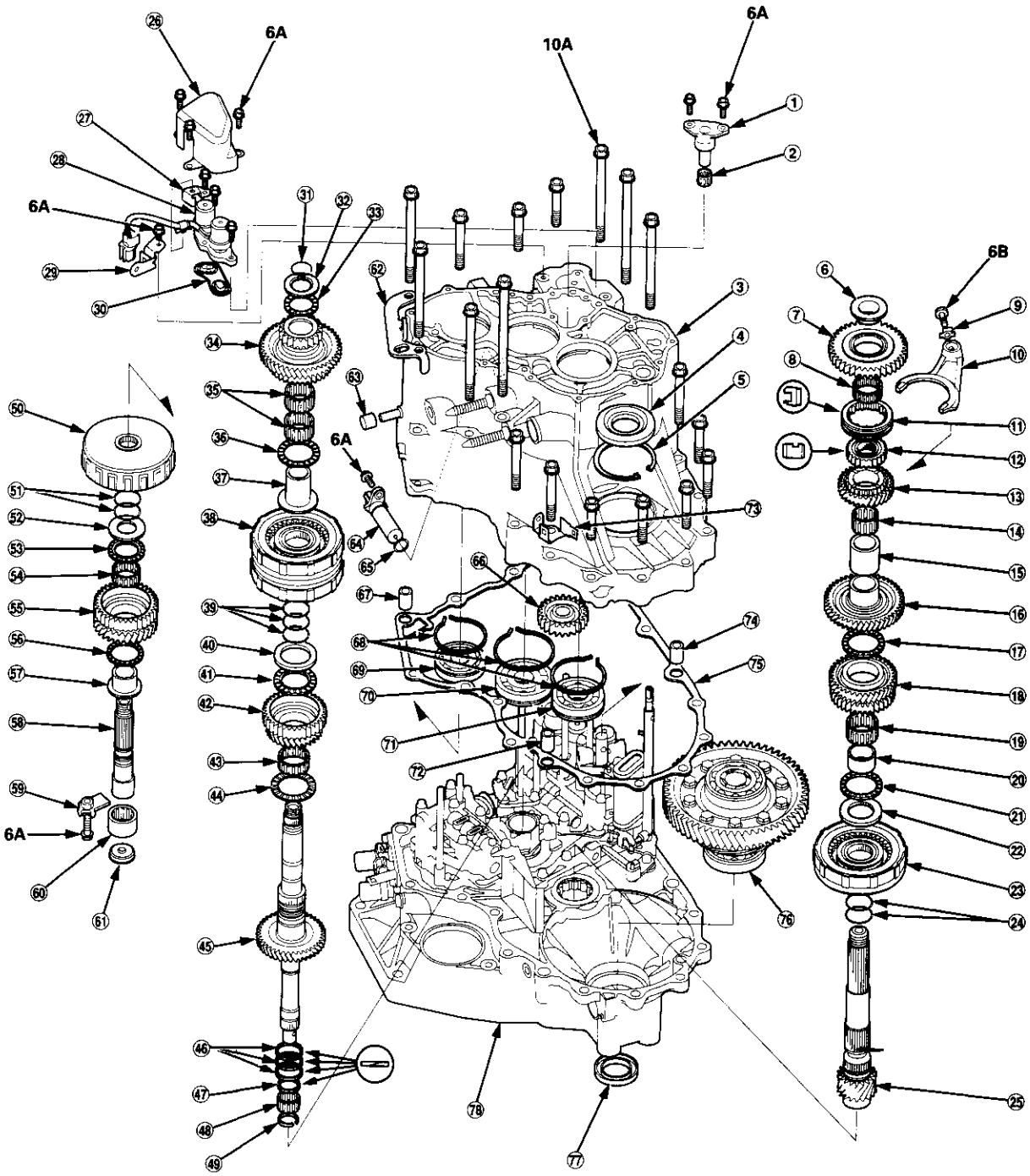
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Bolt/Nut No.	Torque Value	Size	Remarks
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18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
19S	93 N·m (9.5 kgf·m, 69 lbf·ft)	19 x 1.25 mm	Sub-shaft locknut
21M	78 N·m (8.0 kgf·m, 58 lbf·ft)	21 x 1.25 mm	Mainshaft locknut: Left-hand threads
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Illustrated Index (2WD)

Transmission Housing



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① **REVERSE IDLER GEAR SHAFT/HOLDER**
② **NEEDLE BEARING**
③ **TRANSMISSION HOUSING**
④ **TRANSMISSION HOUSING OIL SEAL** Replace.
⑤ **SET RING, 80 mm** Selective part
⑥ **REVERSE GEAR COLLAR**
⑦ **COUNTERSHAFT REVERSE GEAR**
⑧ **NEEDLE BEARING**
⑨ **LOCK WASHER** Replace.
⑩ **REVERSE SHIFT FORK**
⑪ **REVERSE SELECTOR**
⑫ **REVERSE SELECTOR HUB**
⑬ **COUNTERSHAFT 4TH GEAR**
⑭ **NEEDLE BEARING**
⑮ **DISTANCE COLLAR, 28 mm** Selective part
⑯ **COUNTERSHAFT 2ND GEAR**
⑰ **THRUST NEEDLE BEARING**
⑱ **COUNTERSHAFT 3RD GEAR**
⑲ **NEEDLE BEARING**
⑳ **COUNTERSHAFT 3RD GEAR COLLAR**
㉑ **THRUST NEEDLE BEARING**
㉒ **SPLINED WASHER**
㉓ **3RD CLUTCH ASSEMBLY**
㉔ **O-RINGS** Replace.
㉕ **COUNTERSHAFT**
㉖ **SHIFT CONTROL SOLENOID COVER**
㉗ **HARNESS CLAMP BRACKET**
㉘ **SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY**
㉙ **HARNESS CLAMP BRACKET**
㉚ **SHIFT CONTROL SOLENOID VALVE FILTER/GASKET** Replace.
㉛ **SNAP RING**
㉜ **THRUST WASHER**
㉝ **THRUST NEEDLE BEARING**
㉞ **MAINSHAFT 4TH GEAR**
㉟ **NEEDLE BEARINGS**
㊱ **THRUST NEEDLE BEARING**
㊲ **MAINSHAFT 4TH GEAR COLLAR**
㊳ **2ND/4TH CLUTCH ASSEMBLY**
㊴ **O-RINGS** Replace.
㊵ **THRUST WASHER, 36.5 x 55 mm** Selective part
㊶ **THRUST NEEDLE BEARING**
㊷ **MAINSHAFT 2ND GEAR**
㊸ **NEEDLE BEARING**
㊹ **THRUST NEEDLE BEARING**
㊺ **MAINSHAFT**
㊻ **SEALING RINGS, 35 mm**
㊼ **SEALING RING, 29 mm**
㊽ **NEEDLE BEARING**
㊾ **SET RING**
㊿ **1ST-HOLD CLUTCH ASSEMBLY**
(51) **O-RINGS** Replace.
(52) **THRUST WASHER**
(53) **THRUST NEEDLE BEARING**
(54) **NEEDLE BEARING**
(55) **SUB-SHAFT 4TH GEAR**
(56) **THRUST NEEDLE BEARING**
(57) **SUB-SHAFT 4TH GEAR COLLAR**
(58) **SUB-SHAFT**
(59) **NEEDLE BEARING STOP**
(60) **NEEDLE BEARING**
(61) **ATF GUIDE CAP** Replace.
(62) **TRANSMISSION HANGER**
(63) **BREATHER CAP**
(64) **MAINSHAFT SPEED SENSOR**
(65) **O-RING** Replace.
(66) **REVERSE IDLER GEAR**
(67) **DOWEL PIN, 14 x 25 mm**
(68) **SNAP RINGS**
(69) **SUB-SHAFT TRANSMISSION HOUSING BEARING**
(70) **MAINSHAFT TRANSMISSION HOUSING BEARING**
(71) **COUNTERSHAFT TRANSMISSION HOUSING BEARING**
(72) **DOWEL PIN, 14 x 25 mm**
(73) **CONNECTOR BRACKET**
(74) **DOWEL PIN, 14 x 20 mm**
(75) **TRANSMISSION HOUSING GASKET** Replace.
(76) **DIFFERENTIAL ASSEMBLY**
(77) **TORQUE CONVERTER HOUSING OIL SEAL** Replace.
(78) **TORQUE CONVERTER HOUSING**

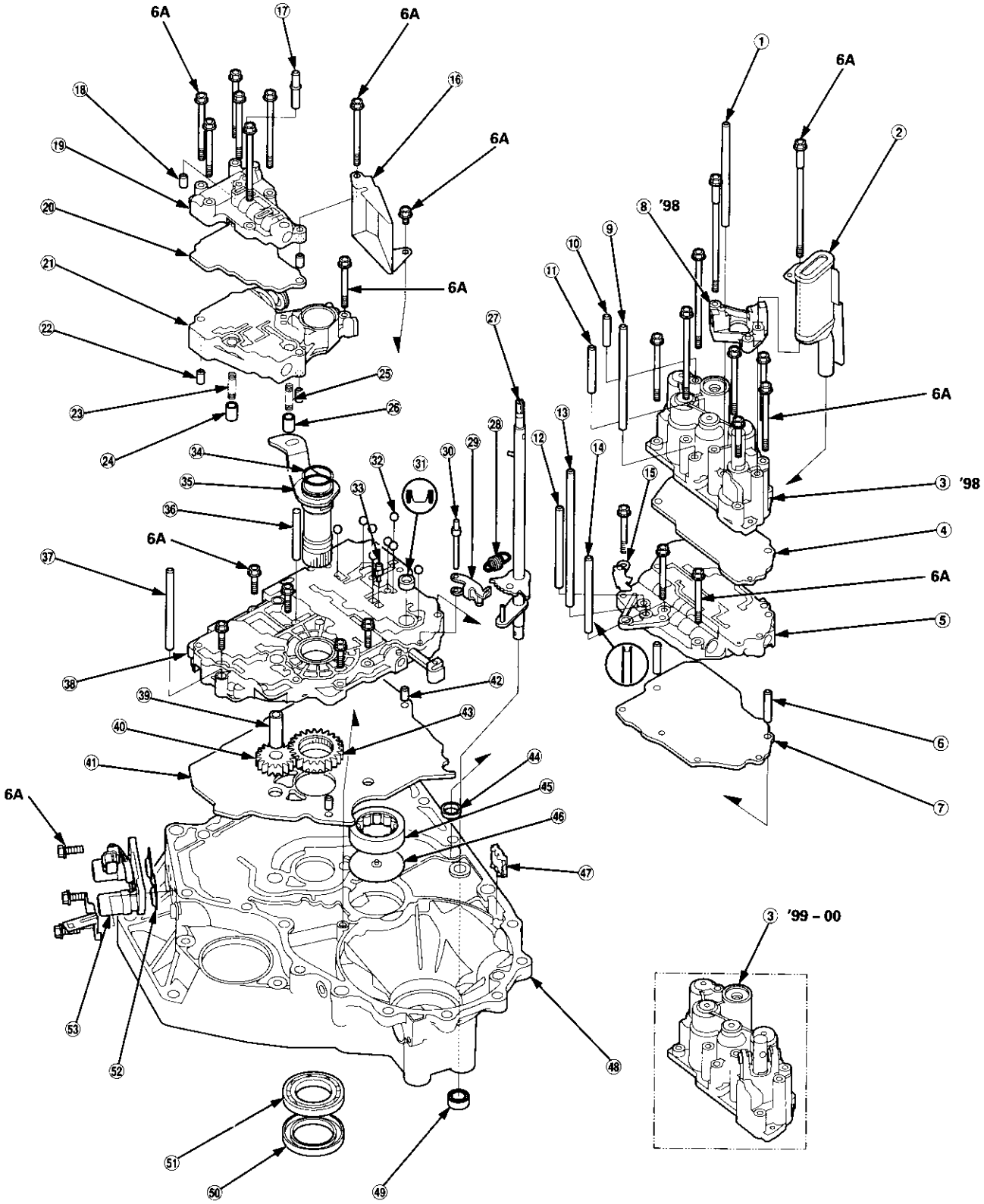
TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
10A	44 N·m (4.5 kgf·m, 33 lbf·ft)	10 x 1.25 mm	

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Illustrated Index (2WD)

Torque Converter Housing/Valve Body



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① ATF FEED PIPE, 8 x 145 mm
② ATF STRAINER
③ SERVO BODY
④ SERVO SEPARATOR PLATE
⑤ SECONDARY VALVE BODY
⑥ DOWEL PIN
⑦ SECONDARY SEPARATOR PLATE
⑧ SERVO DETENT BASE ('98 model only)
⑨ ATF FEED PIPE, 8 x 145 mm
⑩ ATF FEED PIPE, 8 x 40 mm
⑪ ATF FEED PIPE, 8 x 62 mm
⑫ ATF FEED PIPE, 8 x 112 mm
⑬ ATF FEED PIPE, 8 x 192.5 mm
⑭ ATF FEED PIPE, 8 x 105.8 mm
⑮ STOP SHAFT BRACKET
⑯ ATF LUBRICATION PLATE
⑰ ATF FEED PIPE
⑱ DOWEL PIN
⑲ LOCK-UP VALVE BODY
⑳ LOCK-UP SEPARATOR PLATE
㉑ REGULATOR VALVE BODY
㉒ DOWEL PIN
㉓ COOLER RELIEF VALVE SPRING
㉔ COOLER RELIEF VALVE
㉕ TORQUE CONVERTER CHECK VALVE SPRING
㉖ TORQUE CONVERTER CHECK VALVE
㉗ CONTROL SHAFT
㉘ DETENT ARM SPRING
㉙ DETENT ARM
㉚ DETENT ARM SHAFT
㉛ FILTER Replace.
㉜ CHECK BALLS
㉝ 1ST ACCUMULATOR CHOKE
㉞ O-RING Replace.
㉟ STATOR SHAFT
㊱ STOP SHAFT
㊲ ATF FEED PIPE, 8 x 112 mm
㊳ MAIN VALVE BODY
㊴ ATF PUMP DRIVEN GEAR SHAFT
㊵ ATF PUMP DRIVEN GEAR
㊶ MAIN SEPARATOR PLATE
㊷ DOWEL PIN
㊸ ATF PUMP DRIVE GEAR
㊹ SUCTION PIPE COLLAR
㊺ COUNTERSHAFT TORQUE CONVERTER HOUSING BEARING
㊻ ATF GUIDE PLATE
㊼ ATF MAGNET
㊽ TORQUE CONVERTER HOUSING
㊾ OIL SEAL Replace.
㊿ MAINSHAFT OIL SEAL Replace.
(51) MAINSHAFT TORQUE CONVERTER HOUSING BEARING
(52) LOCK-UP CONTROL SOLENOID VALVE A/B FILTER/GASKET Replace.
(53) LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	

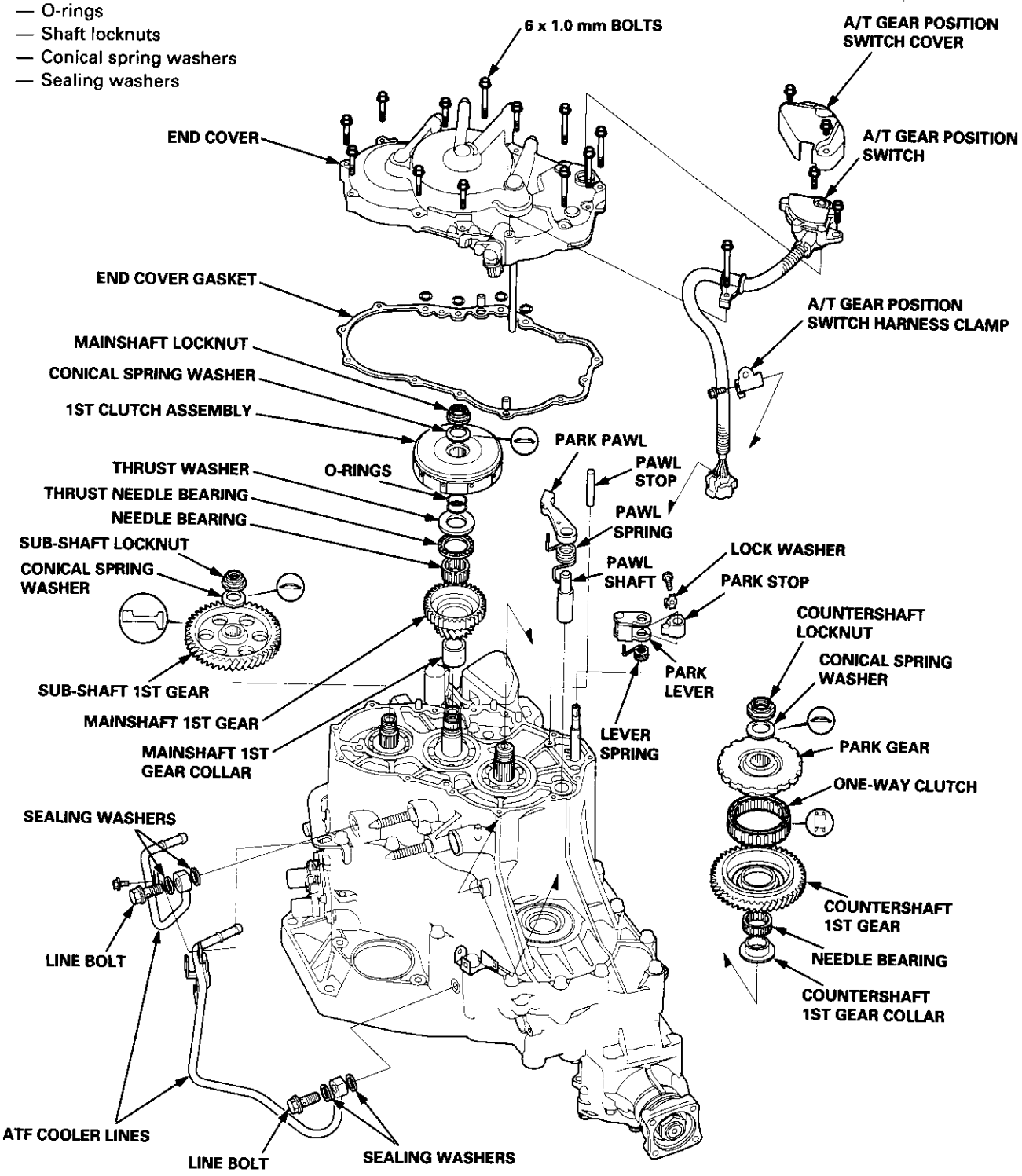
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End Cover

Removal

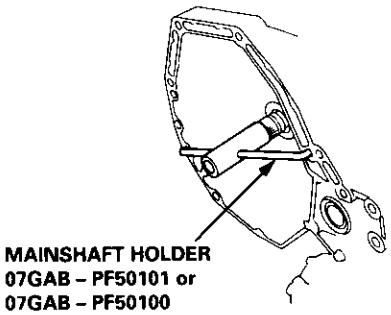
NOTE:

- The illustration shows the 4WD automatic transmission; the 2WD is similar.
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- When removing the transmission end cover, replace the following:
  - — End cover gasket
  - — Lock washer
  - — O-rings
  - — Shaft locknuts
  - — Conical spring washers
  - — Sealing washers

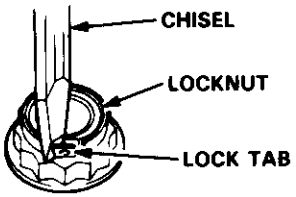


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1. Remove the A/T gear position switch harness clamp.
2. Remove the A/T gear position switch cover.
3. Remove the bolt securing the A/T gear position switch harness clamp on the end cover, then remove the A/T gear position switch.
4. Remove the 12 bolts securing the end cover, then remove the cover.
5. Slip the special tool onto the mainshaft as shown.

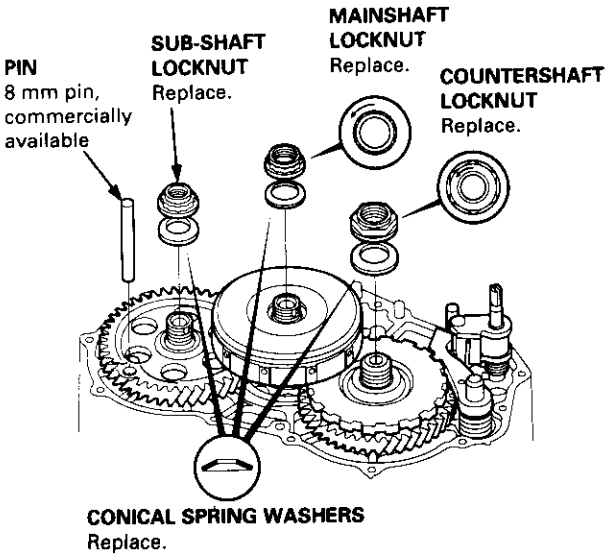


6. Engage the park pawl with the park gear.
7. Cut the lock tabs of each shaft locknut using a chisel as shown. Keep all chiseled particles out of the transmission.

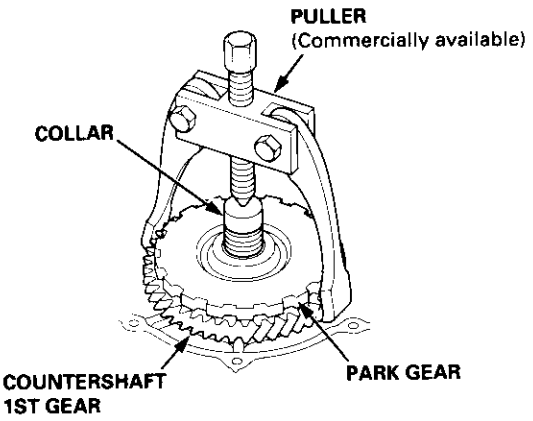


8. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to lock the sub-shaft while removing the sub-shaft locknut. Remove the locknuts and conical spring washers from each shaft.

NOTE:
- Mainshaft and countershaft locknuts have left-hand threads.
- Clean the old countershaft locknut. It is used to install the press fit park gear on the countershaft.



9. Remove the lock pin that was installed to hold the sub-shaft.
10. Remove the special tool from the mainshaft.
11. Remove the 1st clutch, mainshaft 1st gear assembly, and mainshaft 1st gear collar.
12. Remove the sub-shaft 1st gear.
13. Remove the park pawl, pawl spring, pawl shaft, and pawl stop.
14. Remove the park lever from the control shaft.
15. Using a universal two jaw puller, remove the park gear, one-way clutch, and countershaft 1st gear assembly.



16. Remove the needle bearing and countershaft 1st gear collar.
17. Remove the ATF cooler lines.

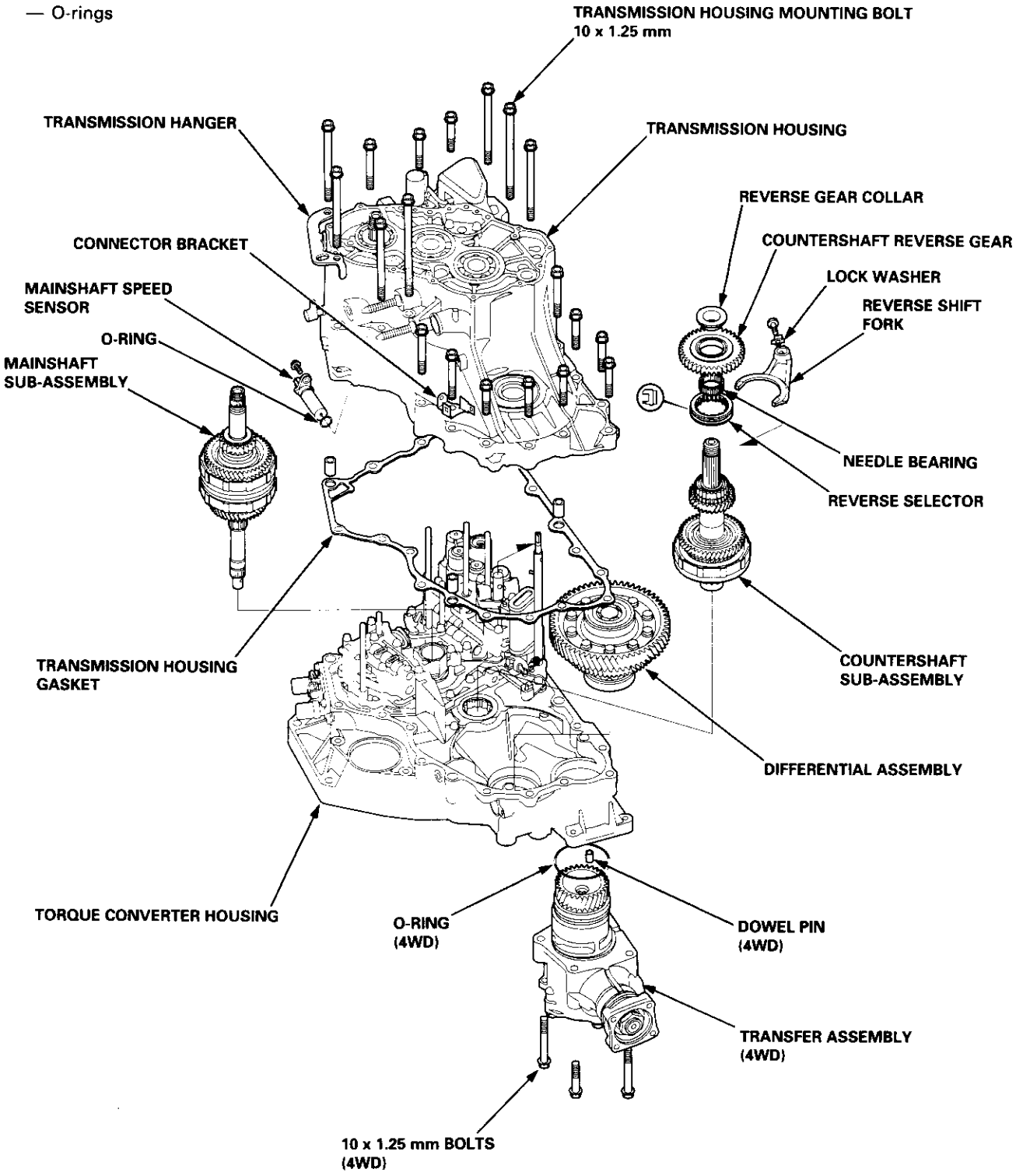
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Transmission Housing

Removal

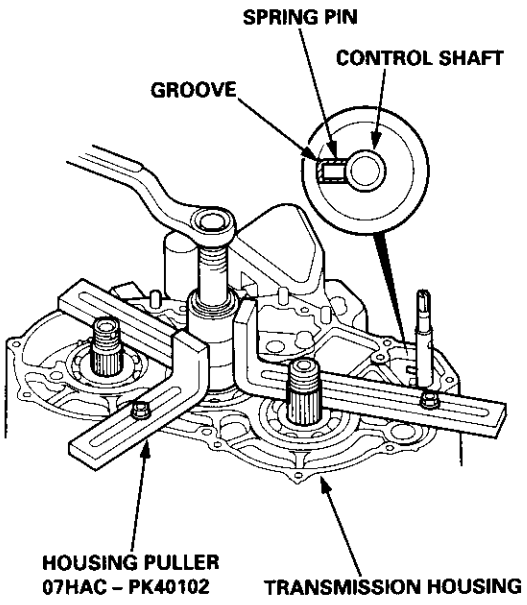
NOTE:

- The illustration shows the 4WD automatic transmission; the 2WD is similar.
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  — Transmission housing gasket
  — Lock washer
  — O-rings

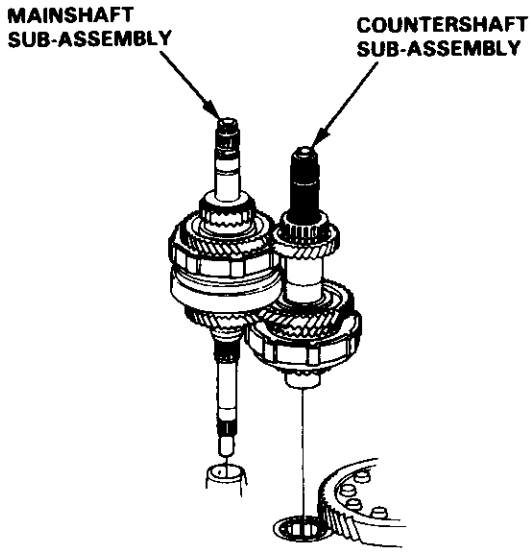


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1. Remove the transfer assembly from the torque converter housing. (4WD)
2. Remove the mainshaft speed sensor from the transmission housing.
3. Remove the transmission housing mounting bolts, transmission hanger, and connector bracket.
4. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.



5. Install the special tool over the mainshaft, then remove the transmission housing as shown.
6. Remove the countershaft reverse gear collar, needle bearing, and countershaft reverse gear from the countershaft.
7. Remove the lock bolt securing the reverse shift fork, then remove the reverse shift fork and reverse selector together.
8. Remove the countershaft sub-assembly and mainshaft sub-assembly together.



9. Remove the differential assembly.

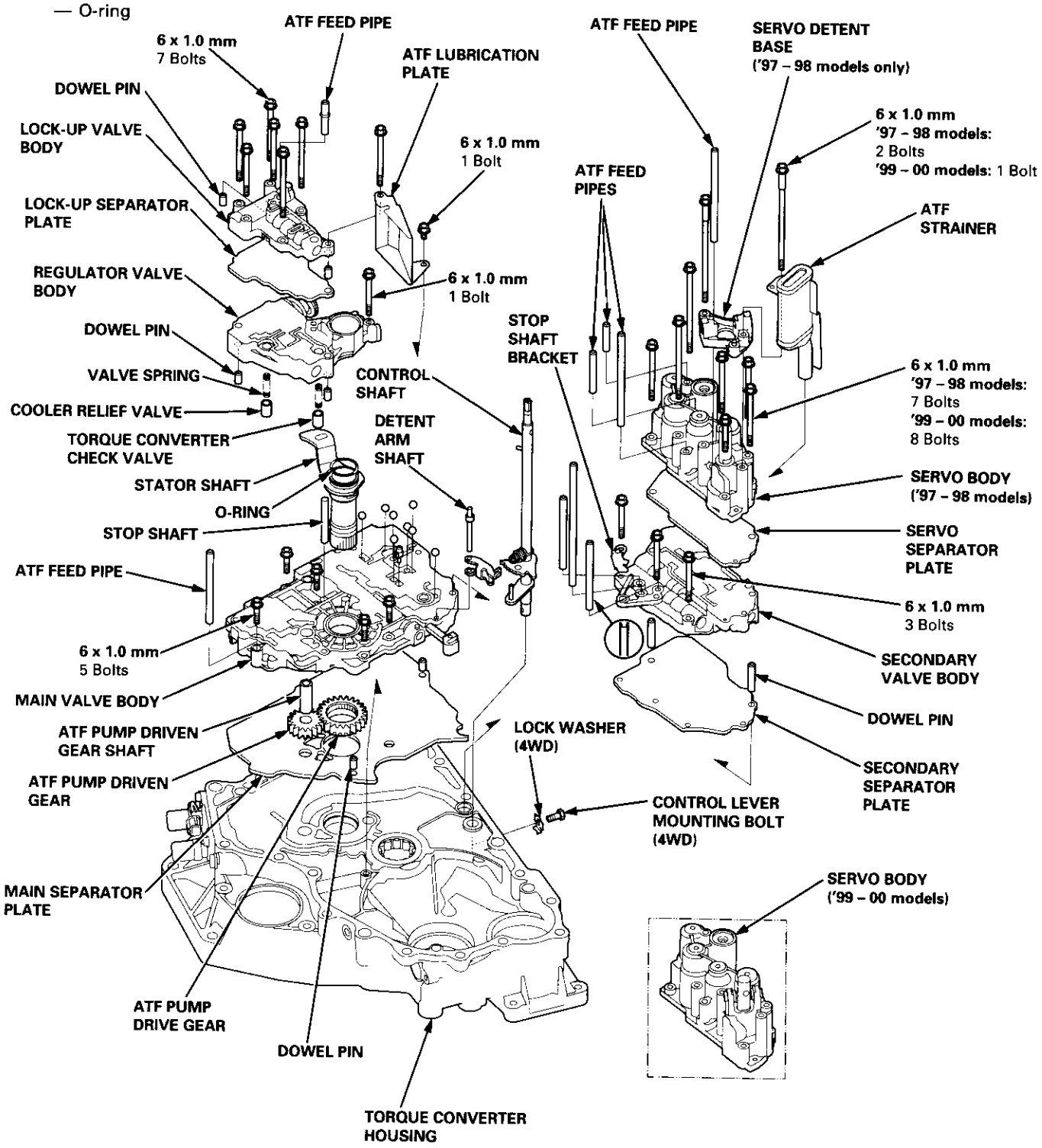
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Torque Converter Housing/Valve Body

Removal

NOTE:

- The illustration shows the 4WD automatic transmission; the 2WD is similar.
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- When removing the valve bodies, replace the following:
  — Lock washer
  — O-ring



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1. Remove the control lever mounting bolt from the torque converter side of the torque converter housing. (4WD)

2. Remove the ATF feed pipes from the servo body, secondary valve body, lock-up valve body, and main valve body.

3. For '97 – 98 models:
   Remove the two bolts securing the ATF strainer and servo detent base, then remove the strainer and the base.
   For '99 – 00 models:
   Remove the ATF strainer (one bolt).

4. For '97 – 98 models:
   Remove the seven bolts securing the servo body, then remove the servo body and separator plate.
   For '99 – 00 models:
   Remove the eight bolts securing the servo body, then remove the servo body and separator plate.

5. Remove the three bolts securing the secondary valve body, then remove the secondary valve body, stop shaft bracket, and separator plate.

6. Remove the eight bolts securing the ATF lubrication plate and lock-up valve body, then remove the ATF lubrication plate, lock-up valve body, and separator plate.

7. Remove the one bolt securing the regulator valve body, then remove the regulator valve body.

8. Remove the stator shaft and stop shaft.

9. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.

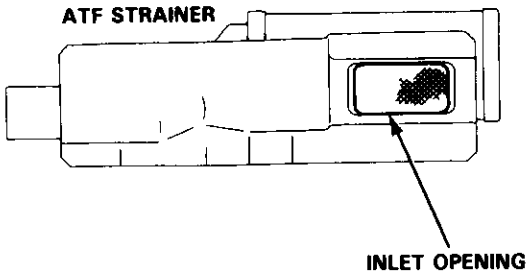
10. Remove the detent arm and detent arm shaft from the main valve body.

11. Remove the five bolts securing the main valve body, then remove the main valve body.
    When removing the main valve body, do not let the eight check balls fall out.

12. Remove the ATF pump driven gear shaft, then remove the ATF pump gears.

13. Remove the main separator plate with two dowel pins.

14. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged or damaged.



15. Test the ATF strainer by pouring clean ATF through the inlet opening, and replace it if it is clogged or damaged.

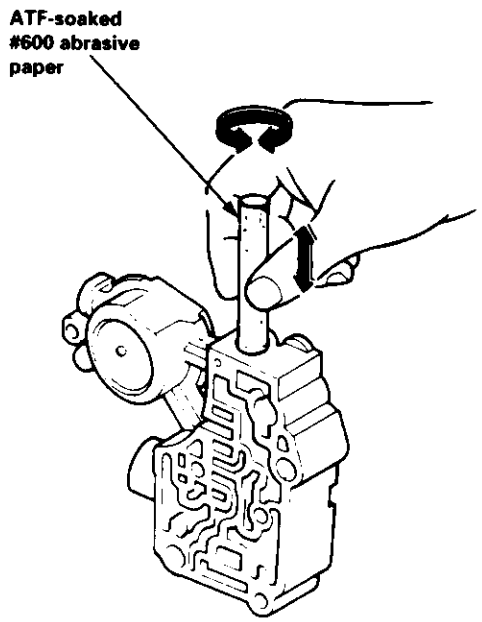
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Repair

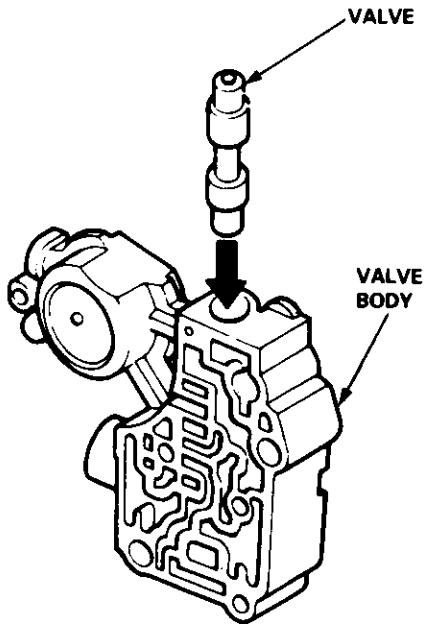
NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. Use this procedure to free the valves.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore. It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

   NOTE: The valve body is aluminum and doesn't require much polishing to remove any burrs.



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry it with compressed air.
6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest. If the valve still sticks, replace the valve body.



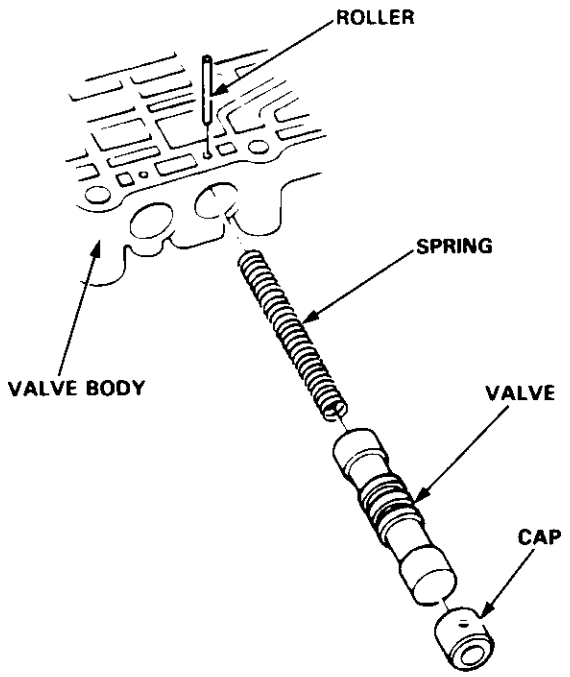
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

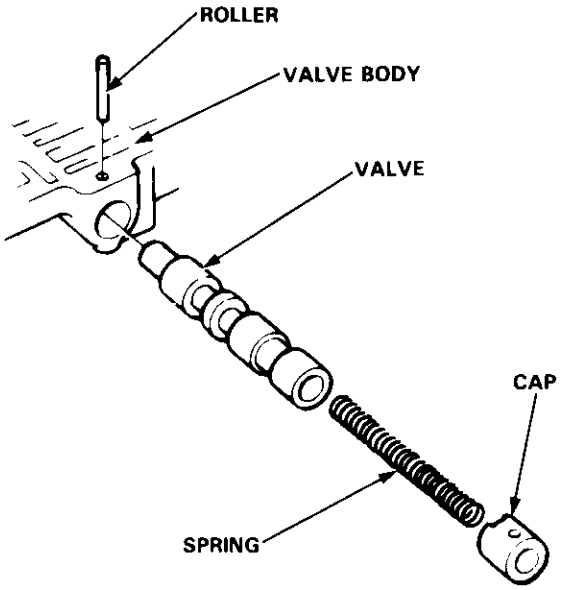
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Assembly

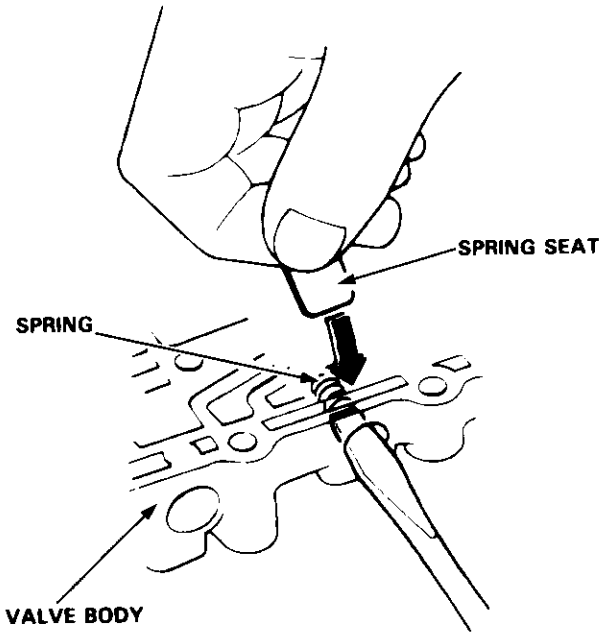
NOTE:
Coat all parts with ATF before assembly.

- Install the valve, valve spring, and cap in the valve body, and secure with the roller.

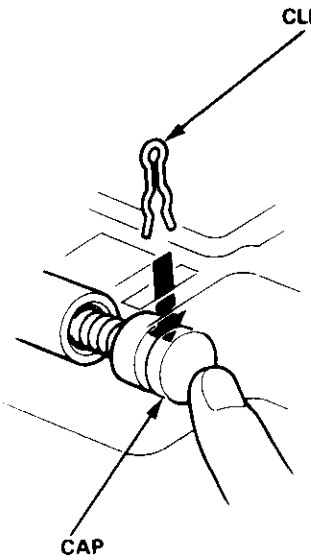




- Set the spring in the valve, and install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Install the valve, spring, and cap in the valve body. Push the cap, then install the clip.



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Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

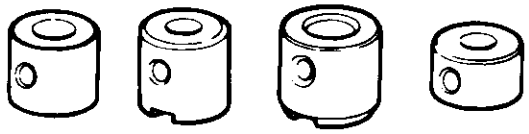
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and a hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.
- Caps with one projected tip and flat end are installed with the tip toward the inside of the valve body. The tip is a spring guide. The groove is a valve cap clip guide.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with flat ends and a groove around the cap are installed with the grooved side toward the outside of the valve body.

TOWARD OUTSIDE OF VALVE BODY

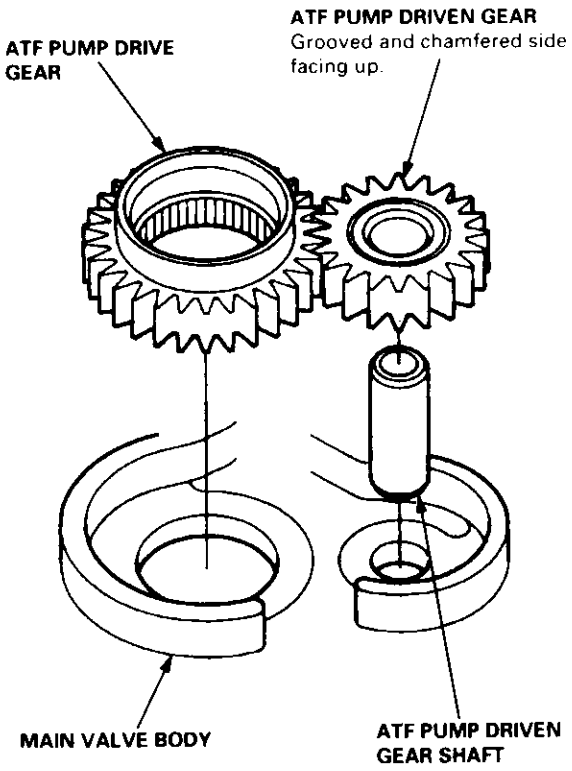


TOWARD INSIDE OF VALVE BODY

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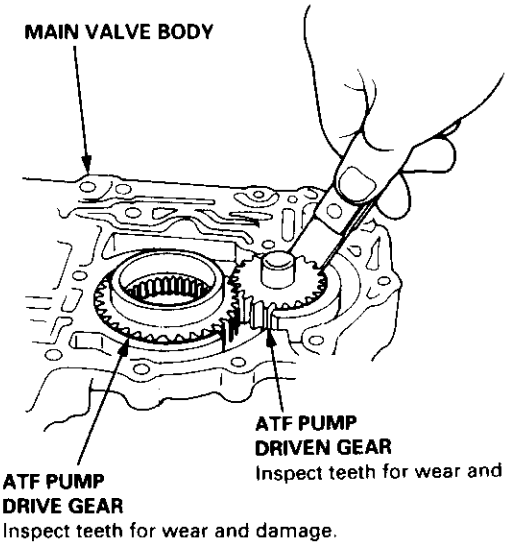
Inspection

1. Install the ATF pump gears and ATF pump driven gear shaft in the main valve body. Lubricate all parts with ATF, and install the ATF pump driven gear with its grooved and chamfered side facing up.



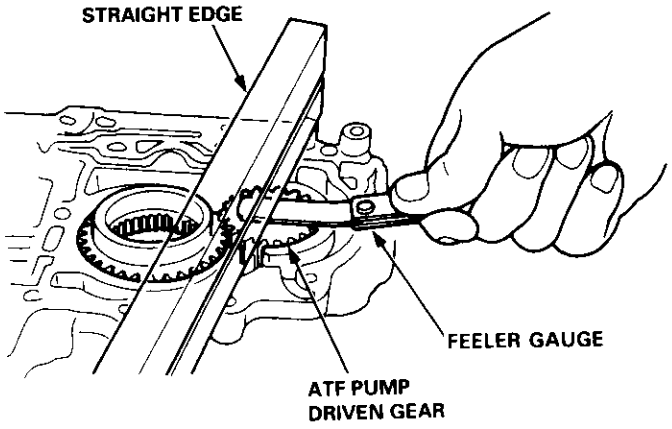
2. Measure the side clearance of the ATF pump drive and driven gears.

ATF Pump Gears Side (Radial) Clearance:
Standard (New):
ATF Pump Drive Gear
0.105 – 0.1325 mm (0.004 – 0.005 in)
ATF Pump Driven Gear
0.035 – 0.0625 mm (0.0014 – 0.0025 in)



3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body.

ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:
Standard (New): 0.03 – 0.05 mm (0.001 – 0.002 in)
Service Limit: 0.07 mm (0.003 in)



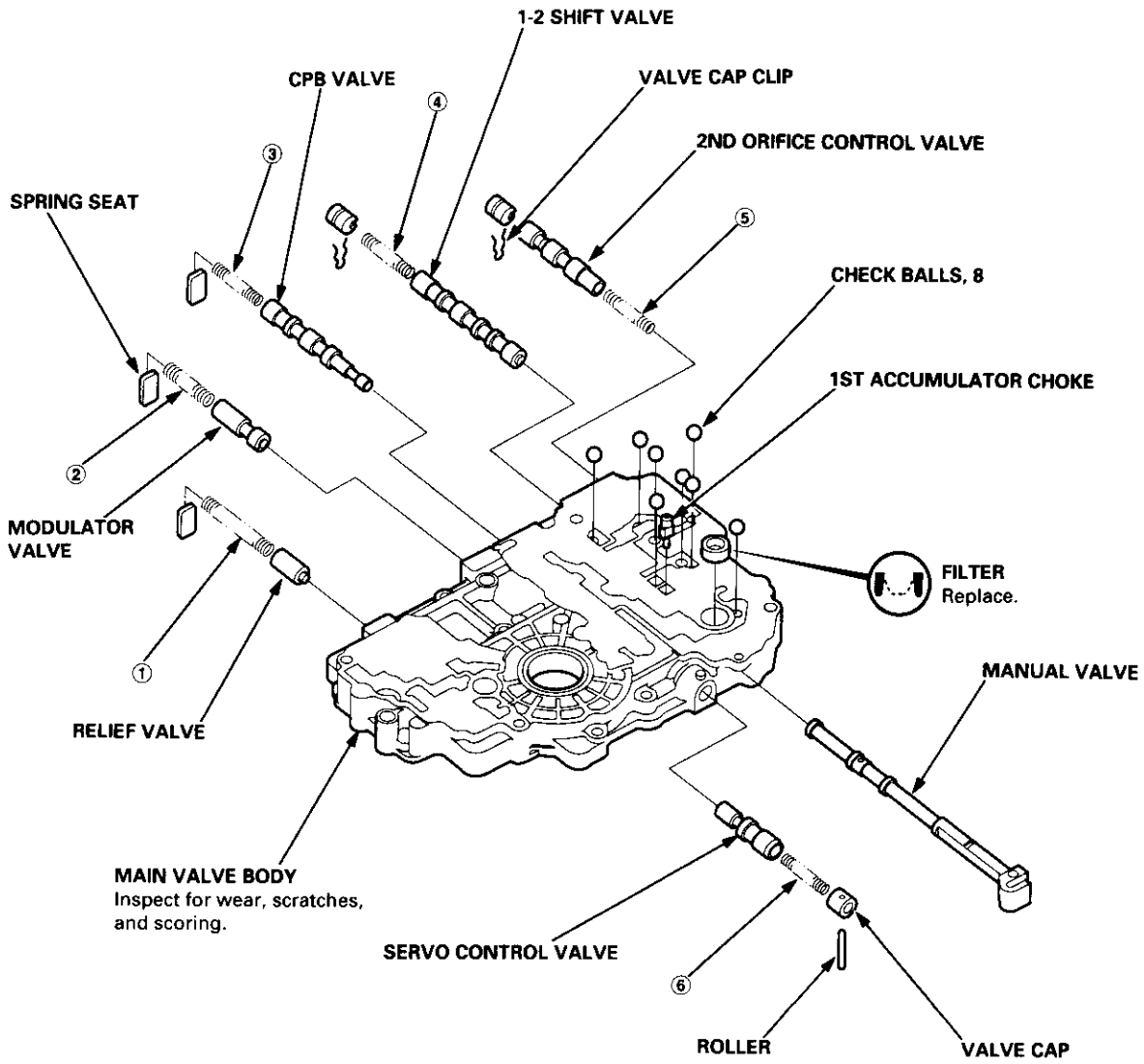
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Main Valve Body

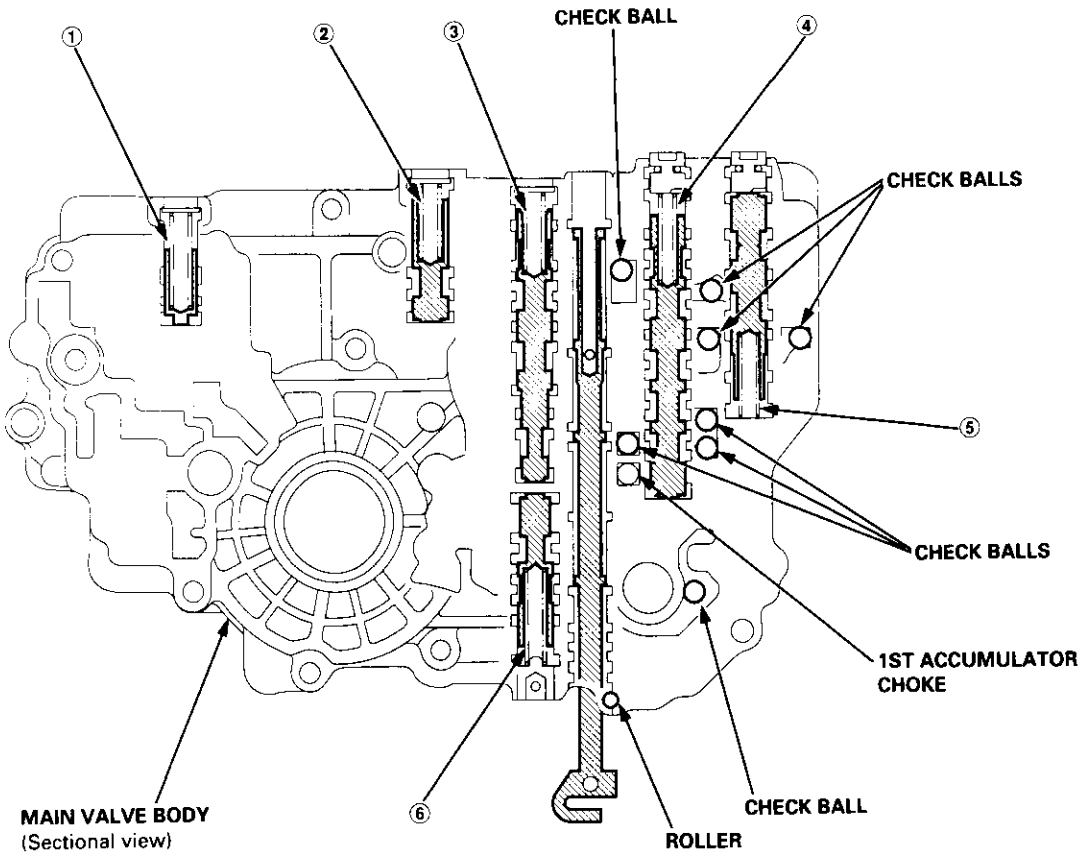
Disassembly/Inspection/Reassembly

NOTE:

- Do not use a magnet to remove the check balls; it may magnetize the balls.
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-192.
- Coat all parts with ATF during reassembly.



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SPRING SPECIFICATIONS

Unit: mm (in)

No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Relief valve spring	1.1 (0.043)	8.6 (0.339)	37.1 (1.461)	13.4
②	Modulator valve spring	1.4 (0.055)	9.4 (0.370)	35.0 (1.378)	10.9
③	CPB valve spring	0.9 (0.035)	8.1 (0.319)	47.2 (1.858)	18.3
④	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	41.3 (1.626)	16.3
⑤	2nd orifice control valve spring	0.7 (0.028)	6.6 (0.260)	34.8 (1.370)	22.0
⑥	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	52.1 (2.051)	20.8

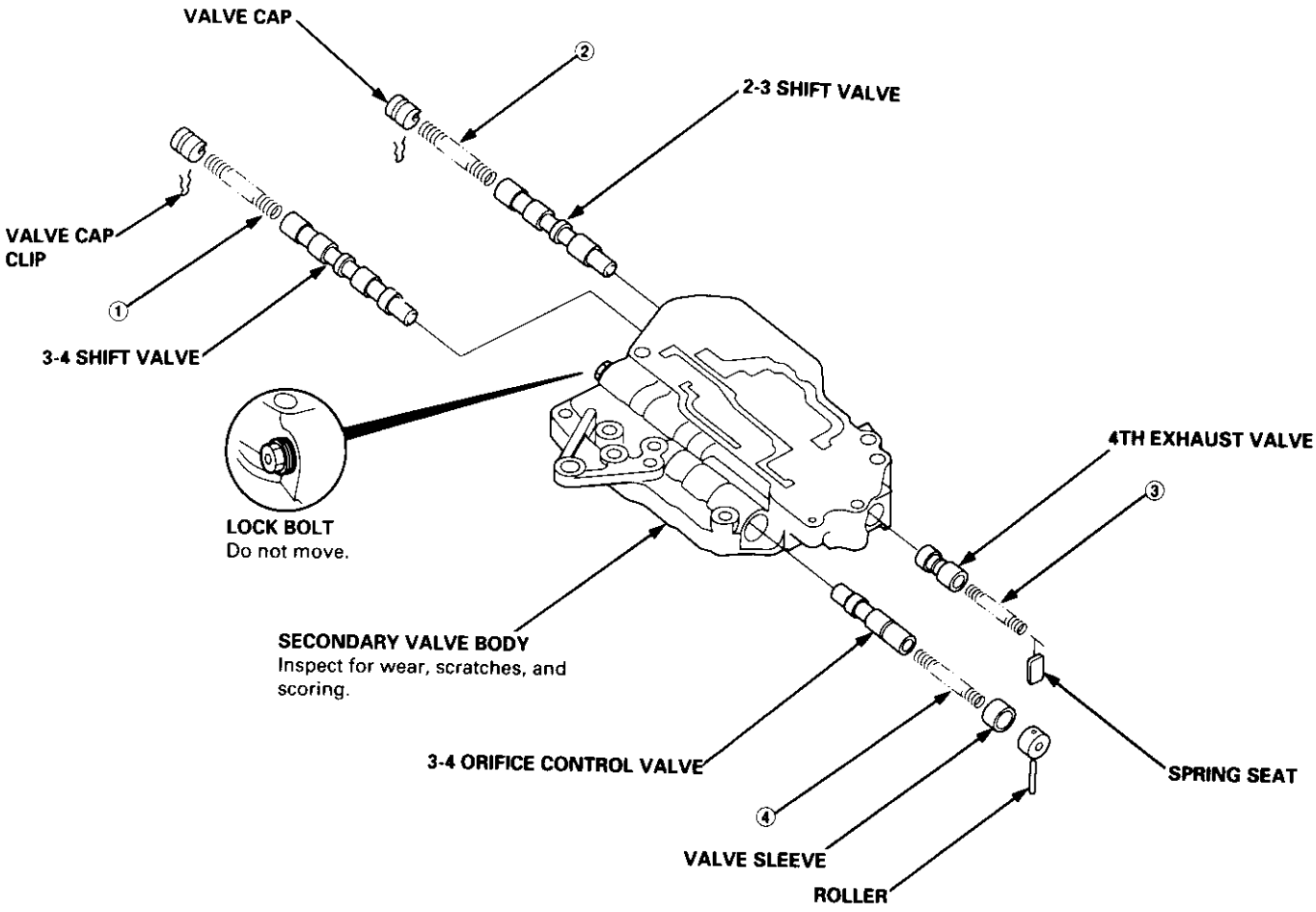
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Secondary Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-192.
- Coat all parts with ATF during reassembly.
- The CPC valve is installed in the secondary valve body, held in place by the lock bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-4 shift valve spring	0.9 (0.035)	7.6 (0.299)	57.0 (2.244)	26.8
②	2-3 shift valve spring	0.9 (0.035)	7.6 (0.299)	57.0 (2.244)	26.8
③	4th exhaust valve spring	0.9 (0.035)	6.1 (0.240)	36.4 (1.433)	19.5
④	3-4 orifice control valve spring	0.6 (0.024)	6.6 (0.260)	37.9 (1.492)	31.6

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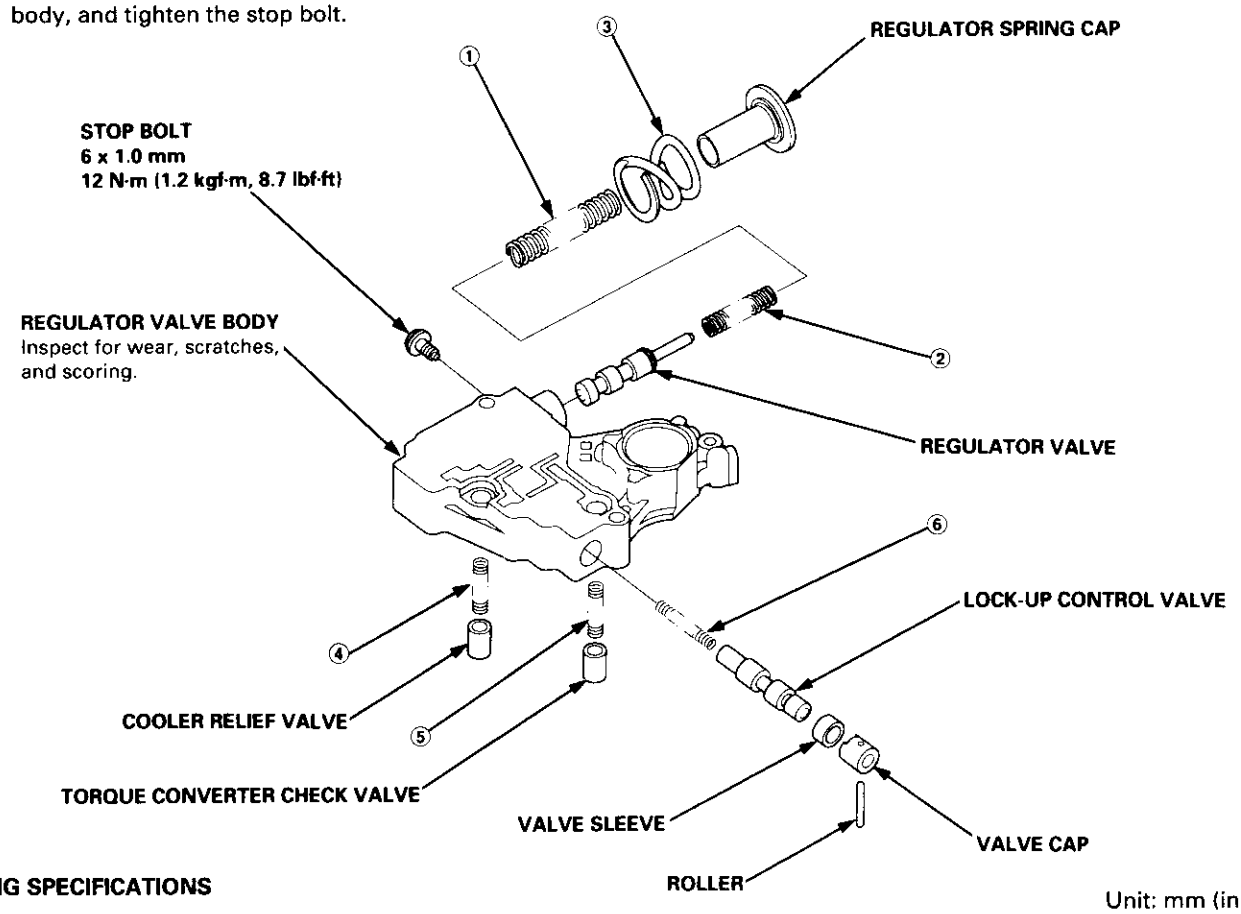
Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-192.

1. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.

2. Reassembly is the reverse order of disassembly.

   NOTE:
   - Coat all parts with ATF during reassembly.
   - Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stop bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

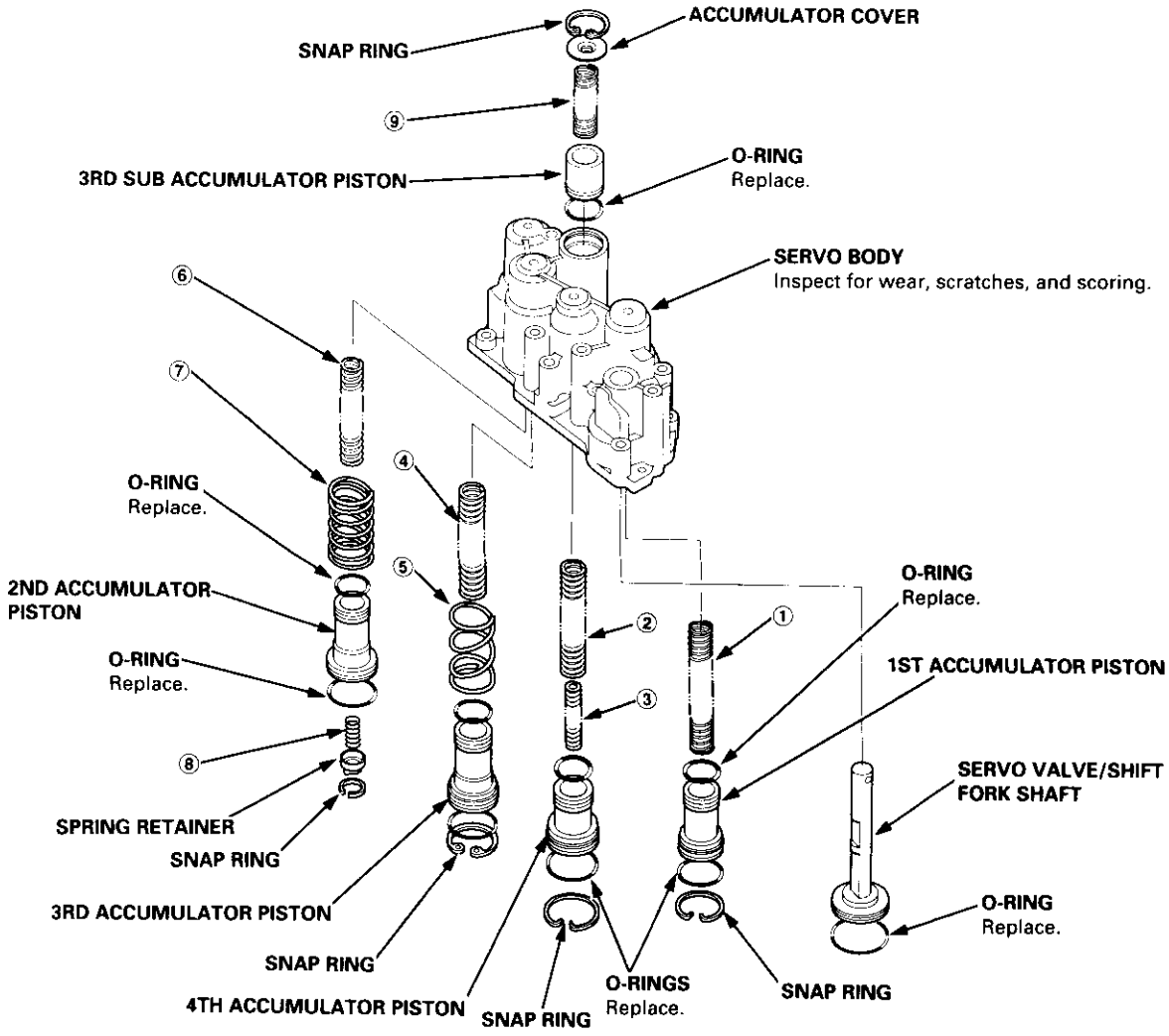
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	87.8 (3.457)	16.5
②	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	11.0
③	Stator reaction spring	4.5 (0.177)	35.4 (1.394)	30.3 (1.193)	1.9
④	Cooler relief valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
⑤	Torque converter check valve spring				
	'97 Model	1.1 (0.043)	8.4 (0.331)	36.4 (1.433)	12.0
	'98 – 00 Models	1.2 (0.047)	8.4 (0.331)	32.4 (1.276)	12.7
⑥	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.0 (1.496)	14.1

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Servo Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF during reassembly.



SPRING SPECIFICATIONS

Unit: mm (in)

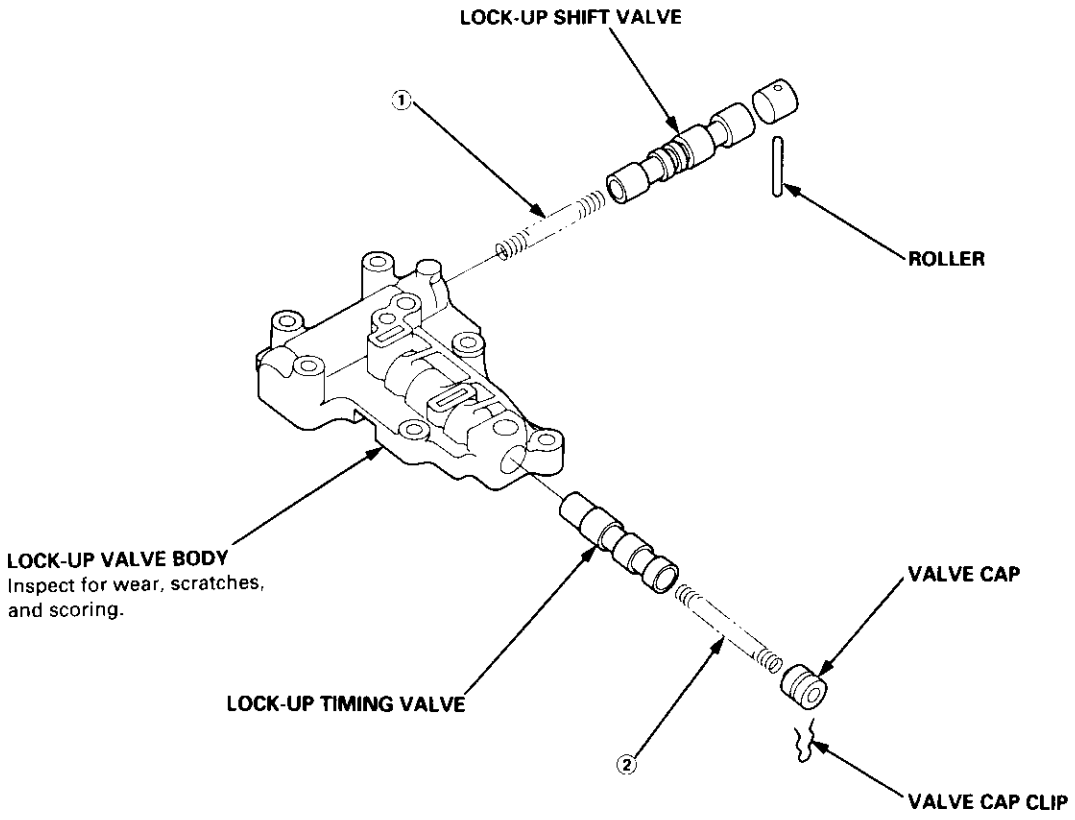
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring	2.1 (0.083)	16.0 (0.630)	89.1 (3.508)	16.2
②	4th accumulator spring A	2.6 (0.102)	17.0 (0.669)	88.4 (3.480)	14.2
③	4th accumulator spring B	2.3 (0.091)	10.2 (0.402)	51.6 (2.031)	13.8
④	3rd accumulator spring A	2.8 (0.110)	17.5 (0.689)	94.3 (3.713)	15.9
⑤	3rd accumulator spring B	2.1 (0.083)	31.0 (1.220)	38.2 (1.504)	2.6
⑥	2nd accumulator spring C	2.2 (0.087)	14.5 (0.571)	68.0 (2.677)	13.9
⑦	2nd accumulator spring A	2.4 (0.094)	29.0 (1.142)	39.0 (1.535)	2.9
⑧	2nd accumulator spring B	1.6 (0.063)	9.0 (0.354)	20.7 (0.815)	6.1
⑨	3rd sub accumulator spring	2.7 (0.106)	17.0 (0.669)	39.0 (1.535)	6.3

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Lock-up Valve Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-192.
- Coat all parts with ATF during reassembly.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
②	Lock-up timing valve spring	0.9 (0.035)	8.1 (0.319)	81.4 (3.205)	47.8

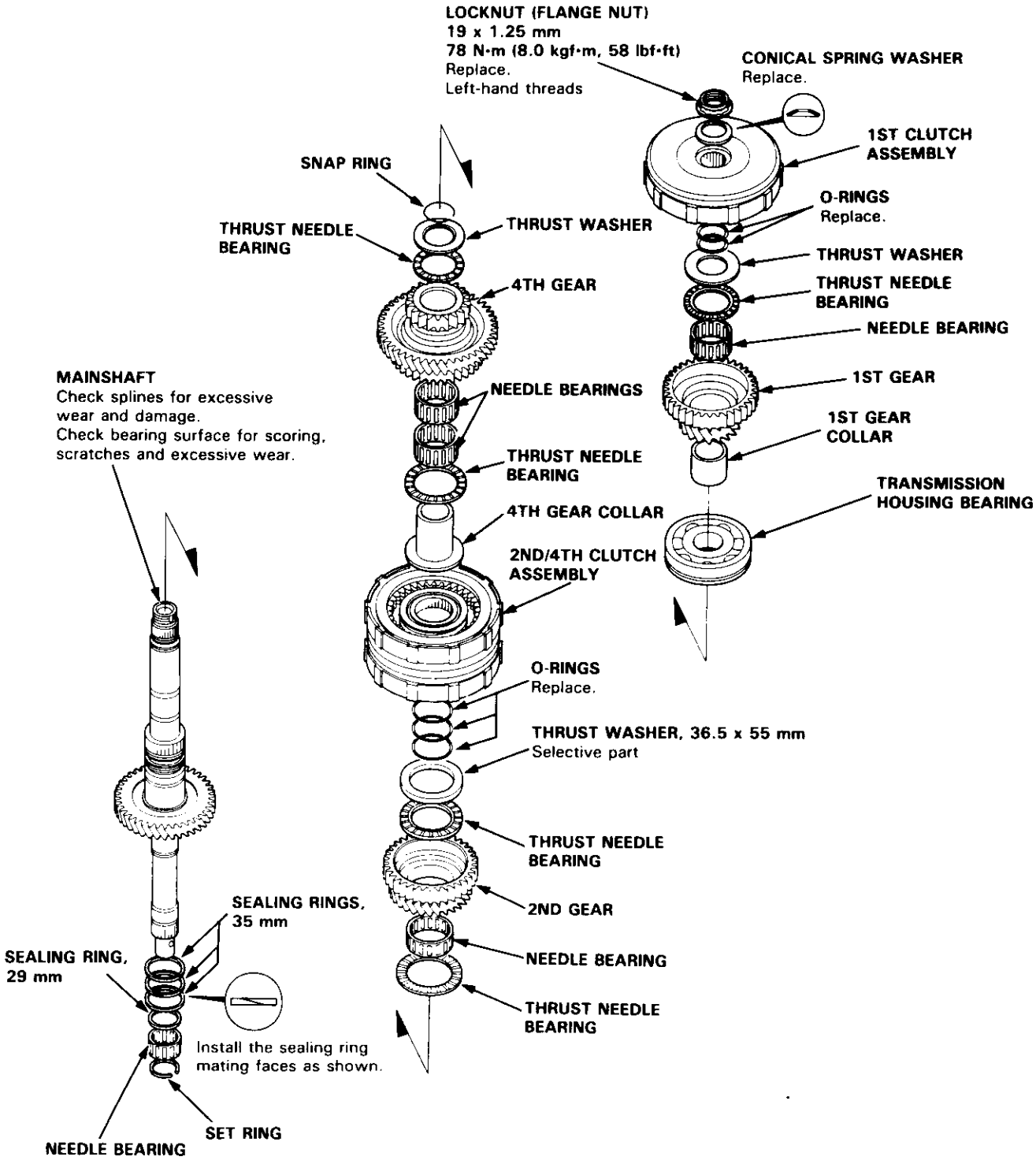
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Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.
- Install the conical spring washer in the direction shown.
- Inspect condition of the sealing rings. If the sealing rings are worn, distorted, or damaged, replace them (see page 14-204).



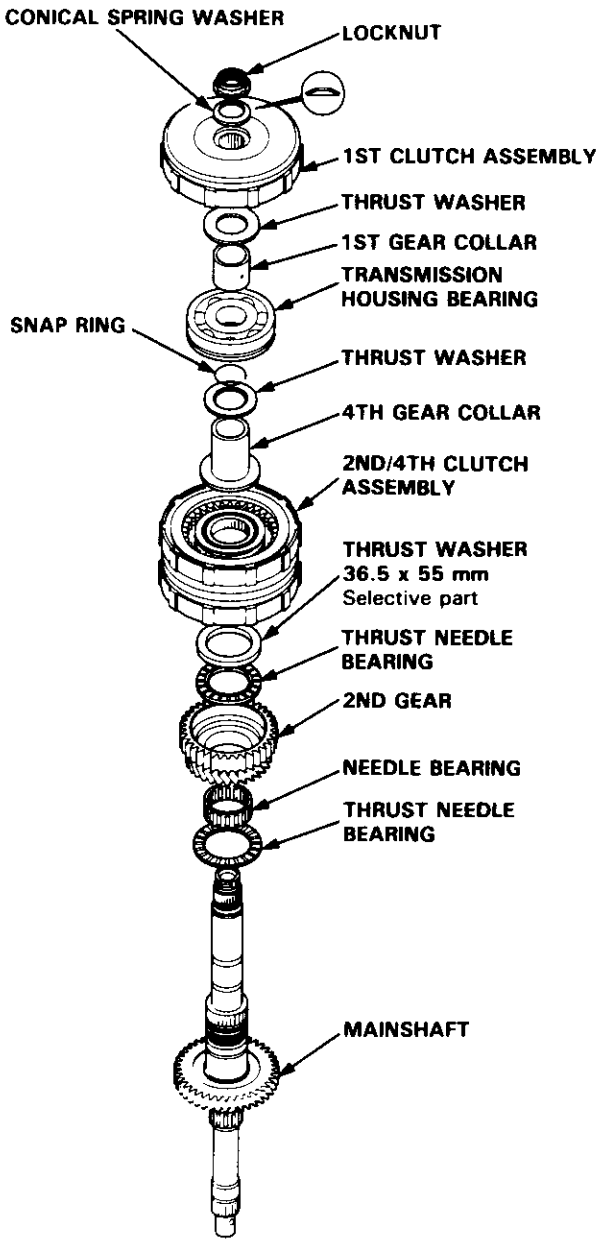
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Inspection

Clearance Measurement

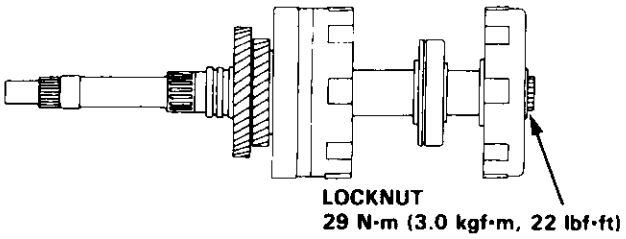
1. Remove the mainshaft bearing from the transmission housing (see page 14-227).

2. Assemble the mainshaft parts, but do not install the O-rings.



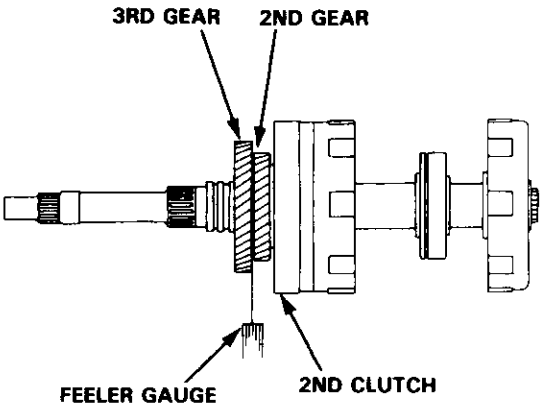
3. Tighten the mainshaft locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

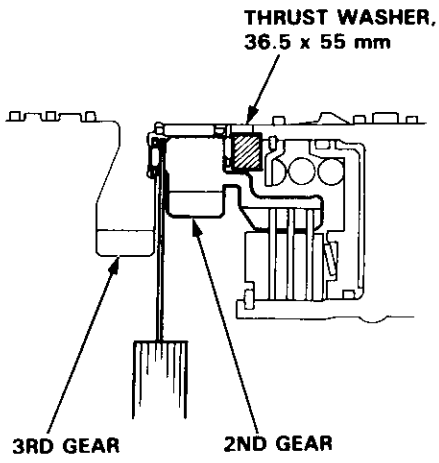
   The mainshaft locknut has left-hand threads.



4. Hold 2nd gear against the 2nd clutch, then measure the clearance between 2nd gear and 3rd gear with a feeler gauge. Take measurements in at least three places, and use the average as the actual clearance.

   STANDARD: 0.05 – 0.13 mm (0.002 – 0.005 in)



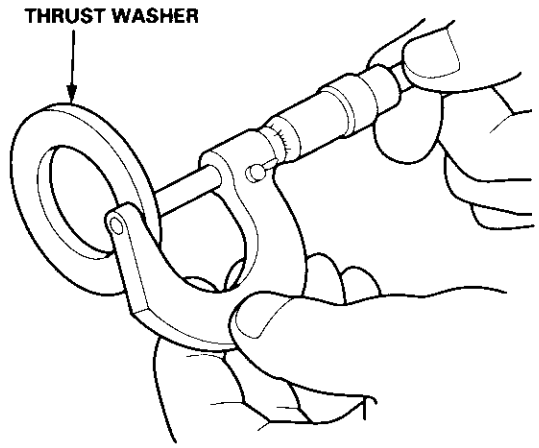


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Inspection (cont'd)

5. If the clearance is out of standard, remove the thrust washer and measure its thickness.



6. Select and install a new washer, then recheck the clearance, and make sure it is within standard.

THRUST WASHER 36.5 x 55 mm

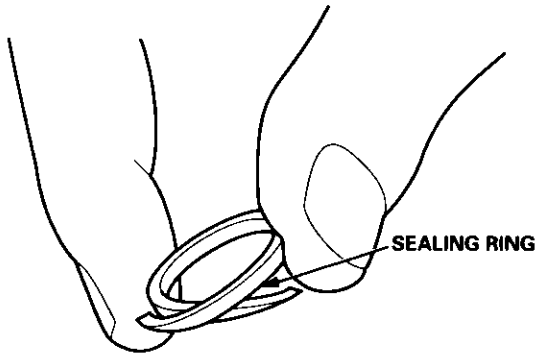
No.	Part Number	Thickness
1	90441 – PG4 – 010	4.00 mm (0.157 in)
2	90442 – PG4 – 010	4.05 mm (0.159 in)
3	90443 – PG4 – 010	4.10 mm (0.161 in)
4	90444 – PG4 – 010	4.15 mm (0.163 in)
5	90445 – PG4 – 010	4.20 mm (0.165 in)
6	90446 – PG4 – 010	4.25 mm (0.167 in)
7	90447 – PG4 – 010	4.30 mm (0.169 in)
8	90448 – PG4 – 010	4.35 mm (0.171 in)
9	90449 – PG4 – 010	4.40 mm (0.173 in)
10	90450 – PG4 – 000	4.45 mm (0.175 in)

Replacement

The sealing rings (35 mm and 29 mm) are synthetic resin with chamfered ends. Check the condition of the sealing rings, and replace them only if they are worn, distorted, or damaged.

NOTE: Apply ATF to all parts during assembly.

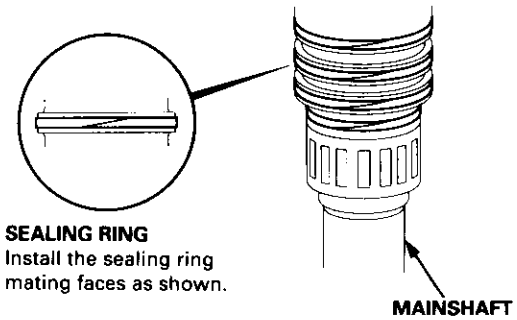
1. For a better fit, squeeze the sealing ring together slightly before installing them.



2. Install new sealing rings on the mainshaft.

3. After installing the sealing rings, verify the following:

   - The sealing rings are fully seated in the groove.
   - The sealing rings are not twisted.
   - The chamfered ends of the sealing rings are properly joined.

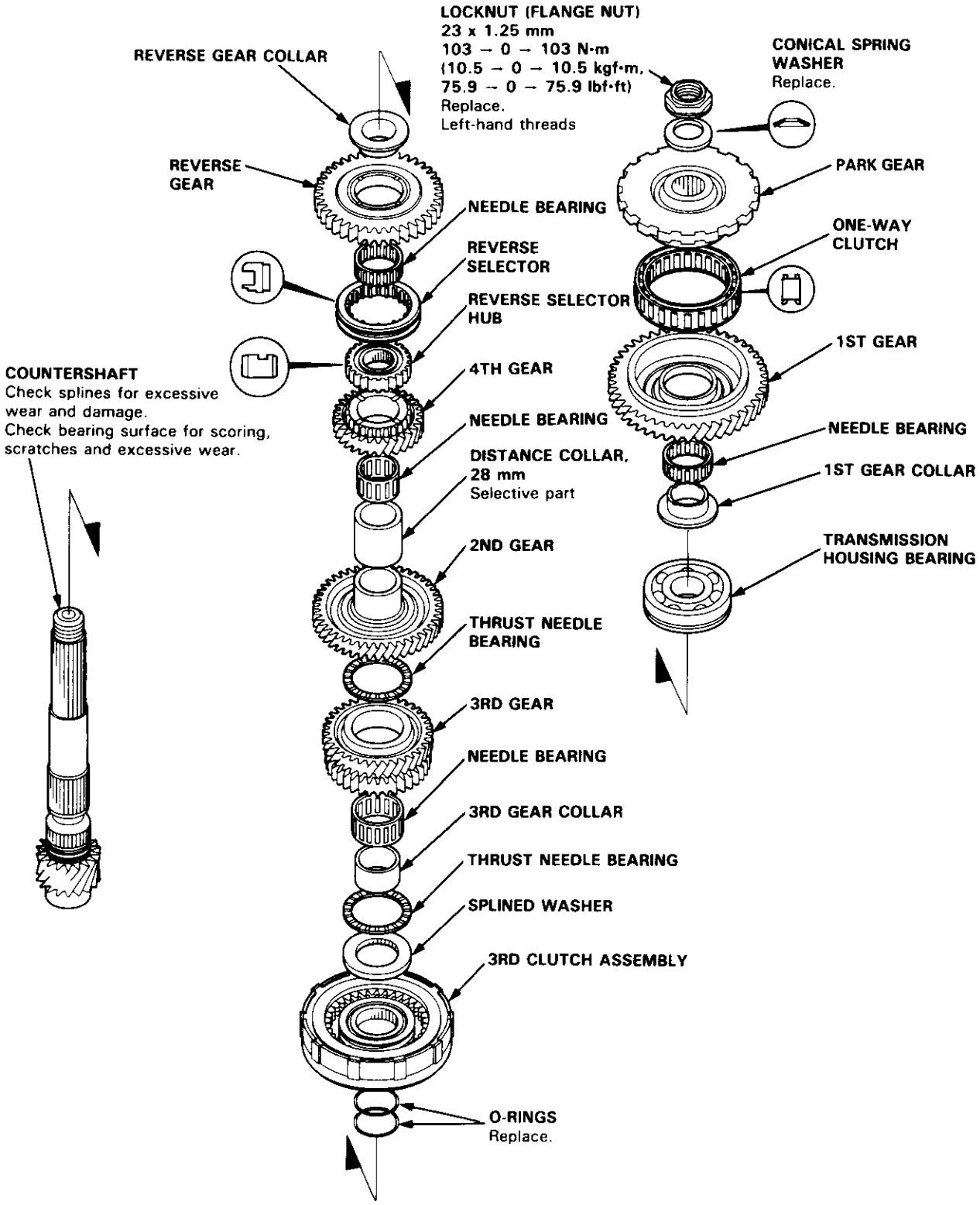


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Disassembly/Inspection/Reassembly

NOTE:

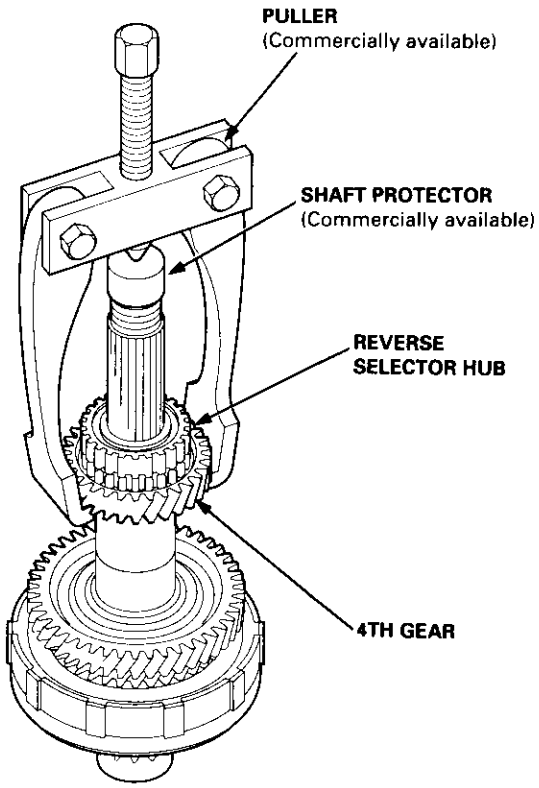
- Lubricate all parts with ATF before reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.
- Install the conical spring washer in the direction shown.



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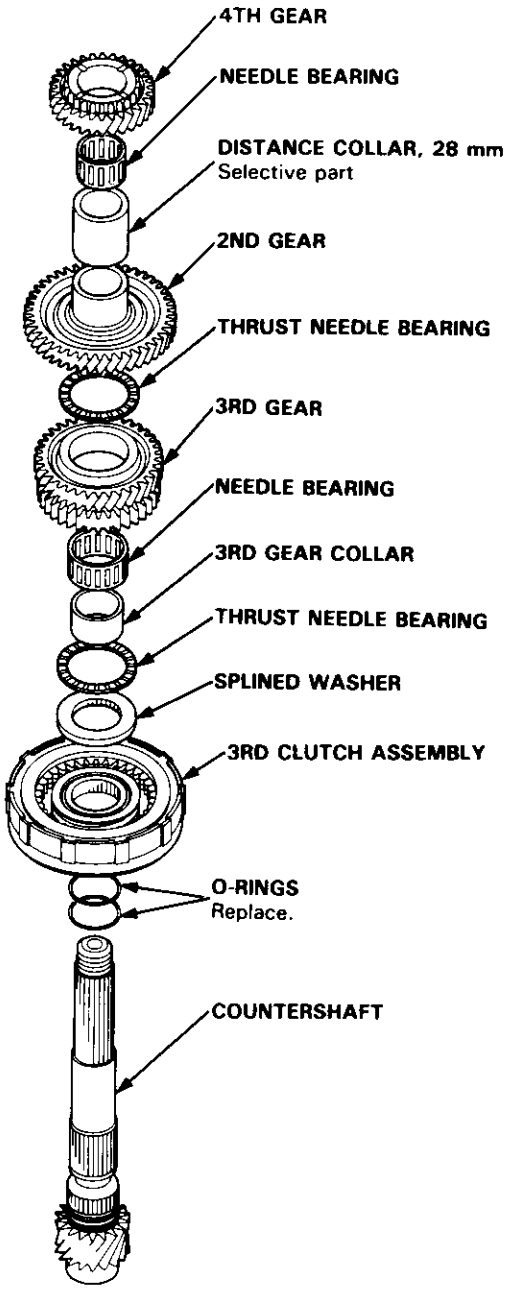
Disassembly/Reassembly

1. Remove the reverse selector hub and countershaft 4th gear using a universal two-jaw (or three-jaw) puller as shown. Place a shaft protector between the puller and countershaft to prevent damaging the countershaft.



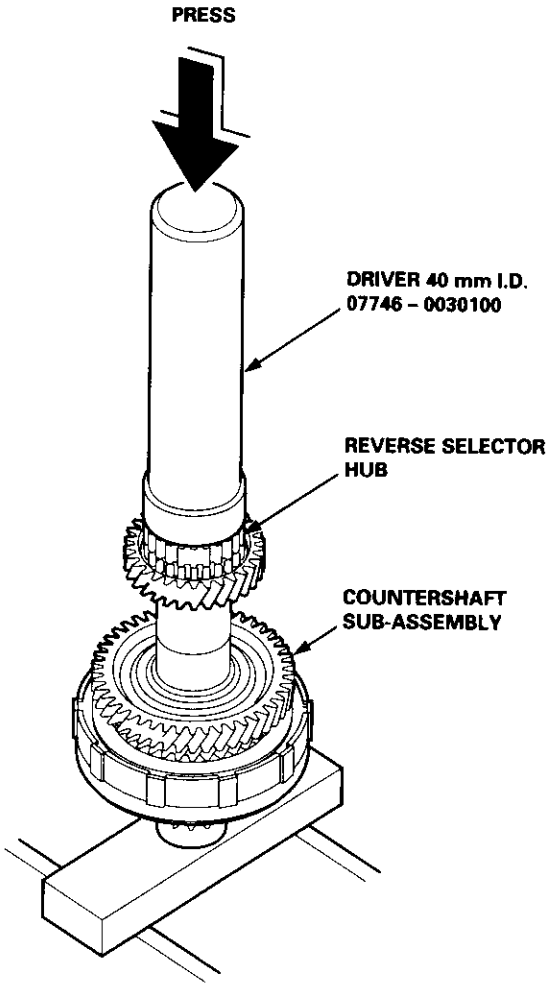
2. Assemble the parts on the countershaft as shown below.

NOTE:
- Lubricate all parts with ATF during reassembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.



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3. Install the reverse selector hub on the countershaft sub-assembly, and press the hub using the special tool and a press as shown.



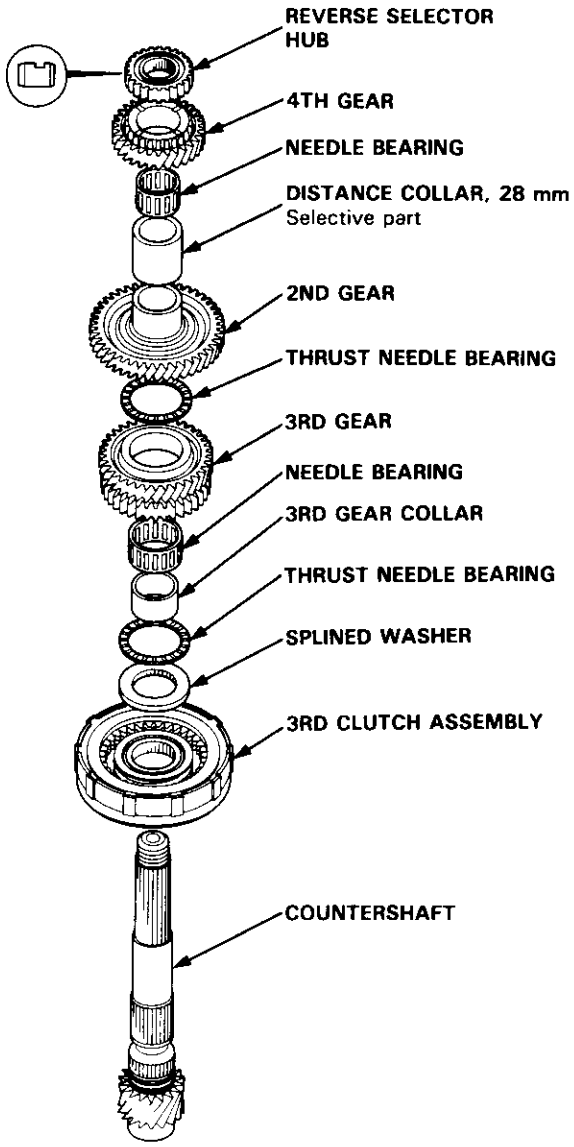
Inspection

Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the countershaft bearing from the transmission housing (see page 14-227).

2. Assemble the countershaft parts using the special tool and a press as described on this page. Do not install the O-rings during inspection.



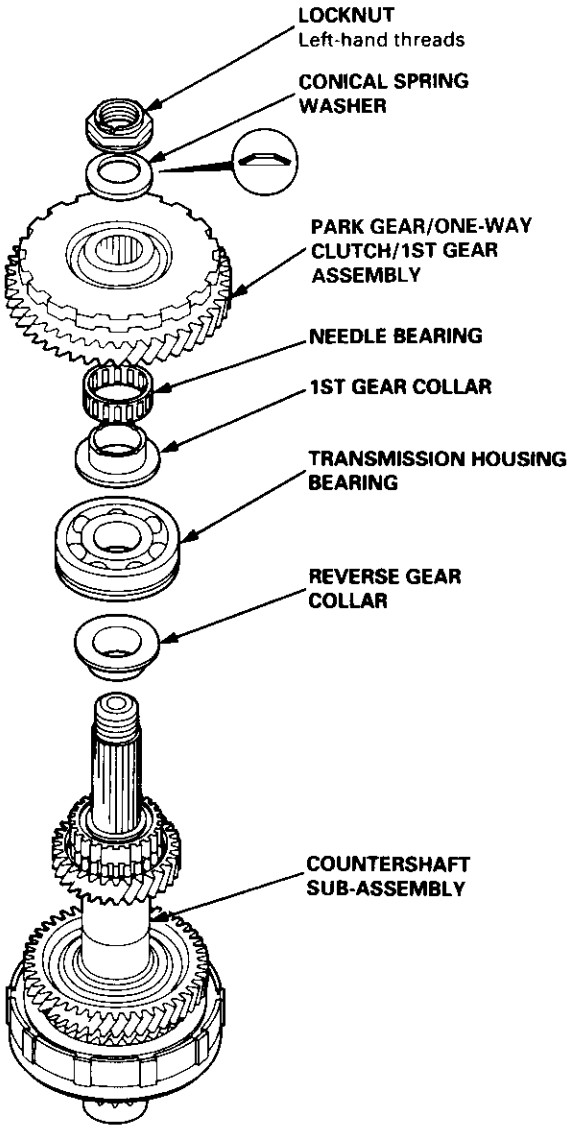
(cont'd)

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Inspection (cont'd)

3. Install the countershaft sub-assembly parts, then install the park gear using a press and a collar.

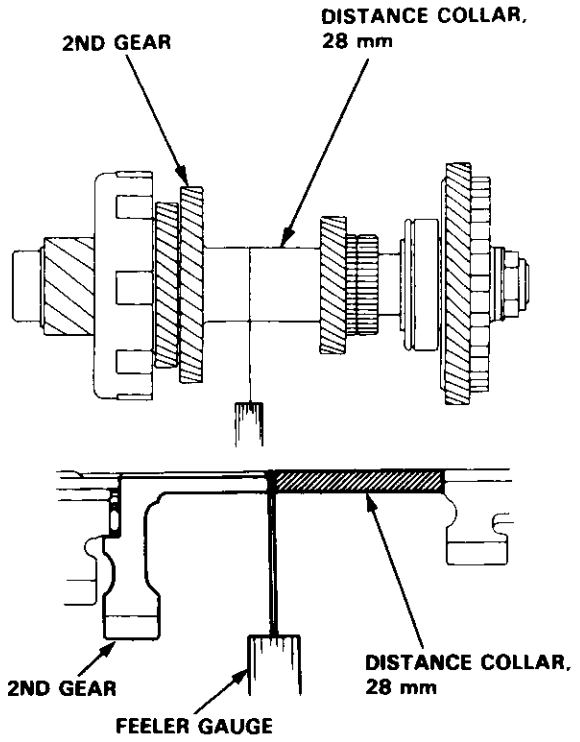
4. Tighten the locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft). The countershaft locknut has left-hand threads.



5. Measure the clearance between the 2nd gear and the 28 mm distance collar with a feeler gauge.

   NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.10 – 0.18 mm (0.004 – 0.007 in)



6. If the clearance is out of standard, remove the distance collar, and measure its width.

7. Select and install a new distance collar, then recheck.

DISTANCE COLLAR, 28 mm

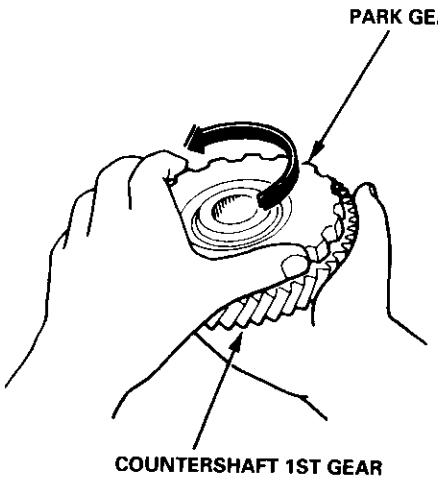
No.	Part Number	Width
1	90503 – PC9 – 000	39.00 mm (1.535 in)
2	90504 – PC9 – 000	39.10 mm (1.539 in)
3	90505 – PC9 – 000	39.20 mm (1.543 in)
4	90507 – PC9 – 000	39.30 mm (1.547 in)
5	90508 – PC9 – 000	39.05 mm (1.537 in)
6	90509 – PC9 – 000	39.15 mm (1.541 in)
7	90510 – PC9 – 000	39.25 mm (1.545 in)
8	90511 – PC9 – 000	38.90 mm (1.531 in)
9	90512 – PC9 – 000	38.95 mm (1.533 in)

8. After selecting a new distance collar, recheck the clearance and make sure it is within standard.

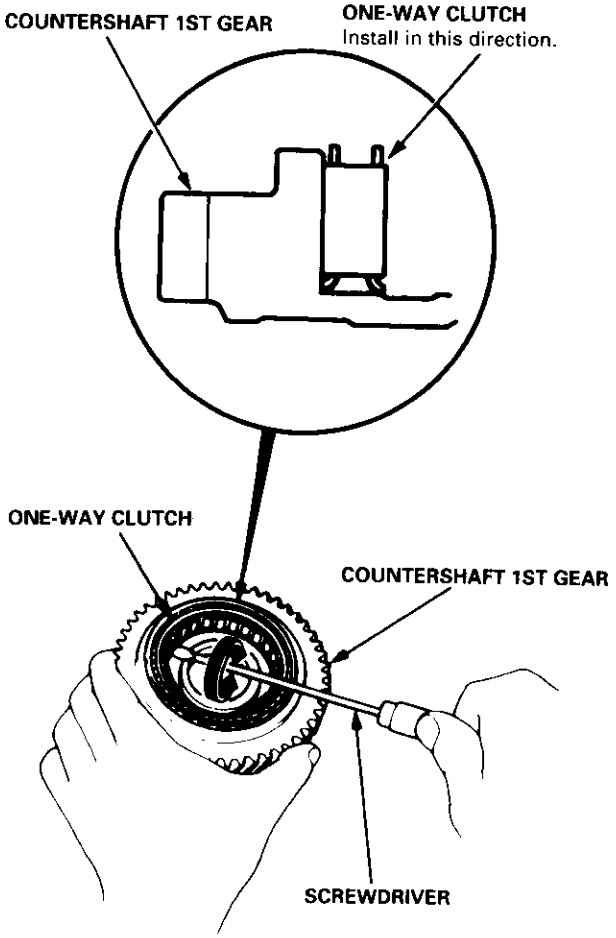
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Disassembly/Inspection/Reassembly

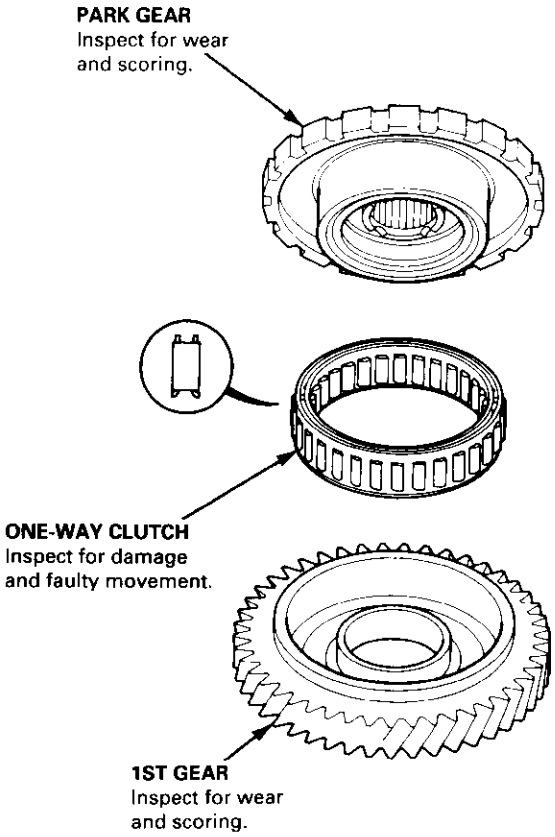
1. Separate countershaft 1st gear from the park gear by turning the park gear in the direction shown.



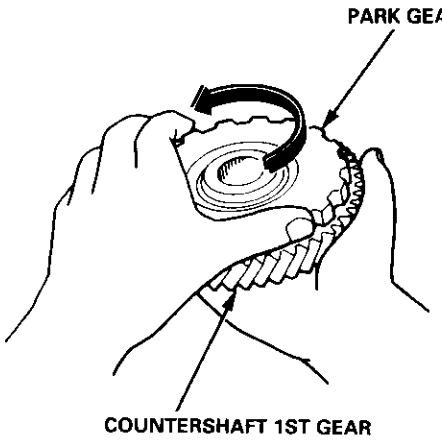
2. Remove the one-way clutch by prying it up with the tip of a screwdriver.



3. Inspect the parts as follows:



4. After the parts are assembled, hold countershaft 1st gear, and turn the park gear in the direction shown to be sure it turns freely. Also make sure the park gear does not turn in the opposite direction.



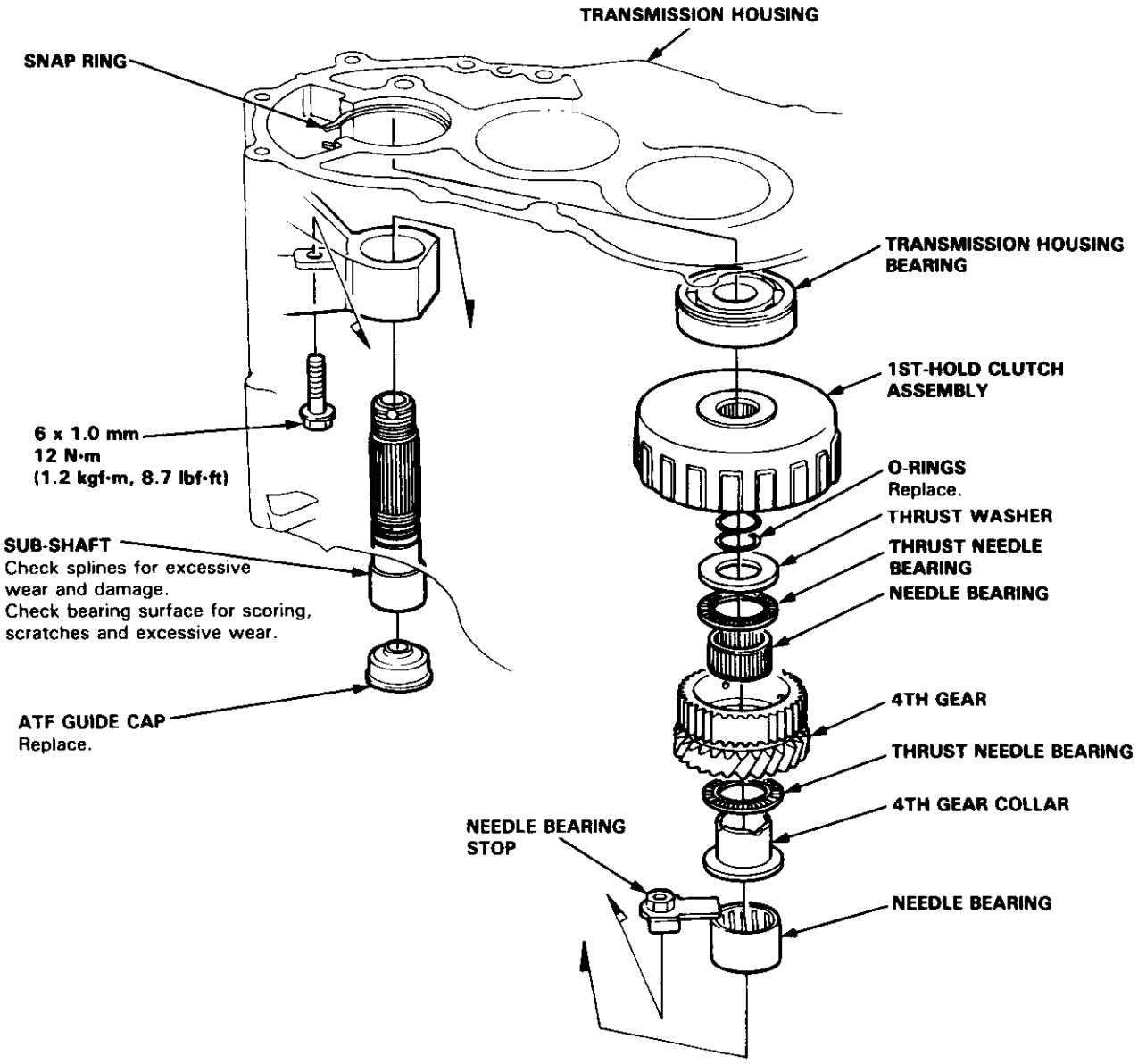
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Sub-shaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF before reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.

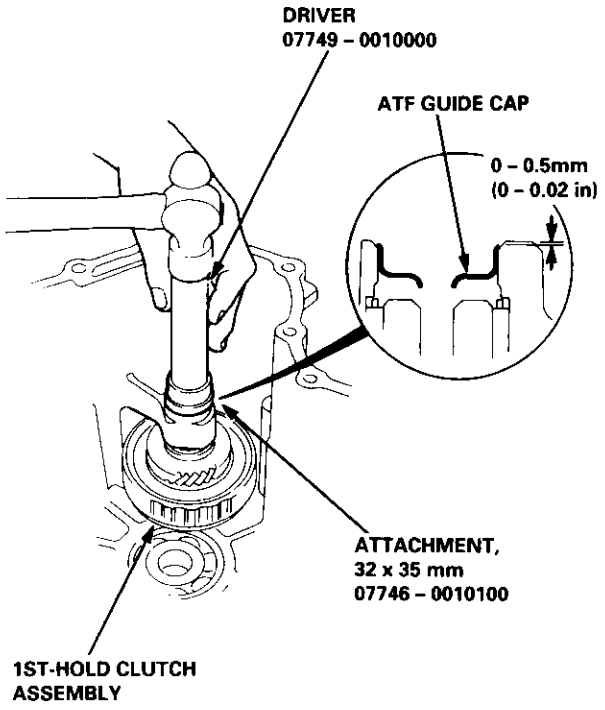


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Disassembly/Reassembly

1. Remove the ATF guide cap by pushing the sub-shaft inside the transmission housing.
2. Remove the 1st-hold clutch assembly by pulling, then removing the sub-shaft.
3. Install new O-rings on the sub-shaft.

   NOTE: Wrap the shaft splines with tape to prevent damaging the O-rings.
4. Place the sub-shaft in the transmission housing, and install the 1st-hold clutch assembly.
5. Install the new ATF guide cap using the special tools. Install it in the direction shown.



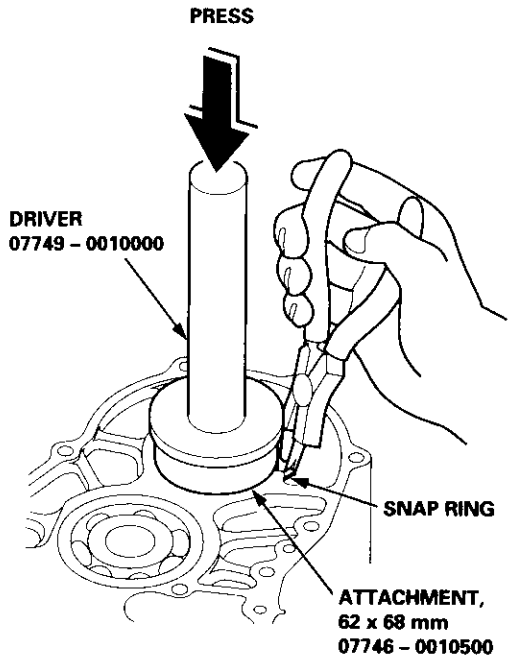
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Sub-shaft Bearings

Replacement

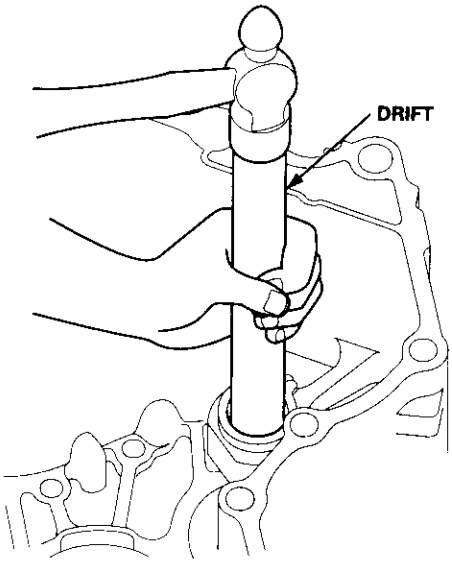
NOTE: Lubricate all parts with ATF before reassembly.

1. Expand the snap ring with snap ring pliers, then push the bearing out of the transmission housing using the special tools and a press as shown.

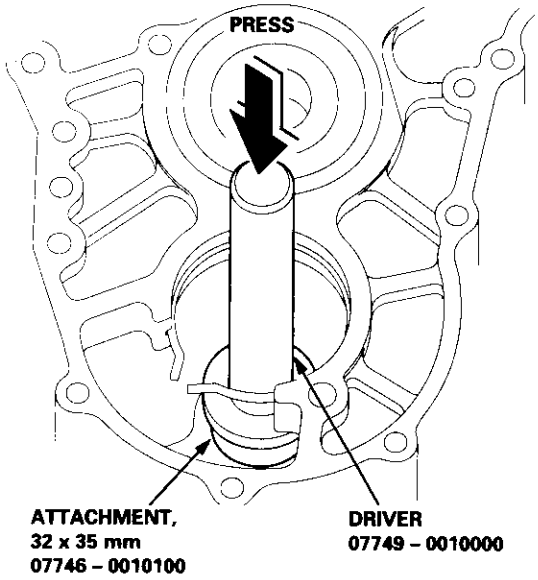


2. Remove the needle bearing stop.

3. Remove the needle bearing from the transmission housing using a drift.



4. Install a new needle bearing in the housing using the special tools and a press as shown.

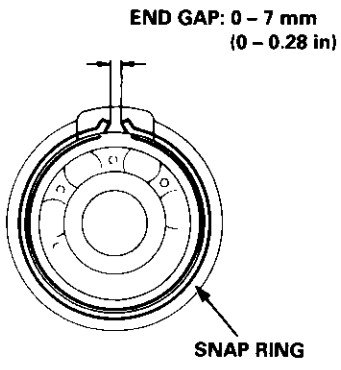


5. Expand the snap ring with snap ring pliers, then insert the ball bearing part-way into the housing using the special tools and a press as described in step 1. Install the bearing with the groove facing outside the housing.

6. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.

7. After installing the ball bearing verify the following:

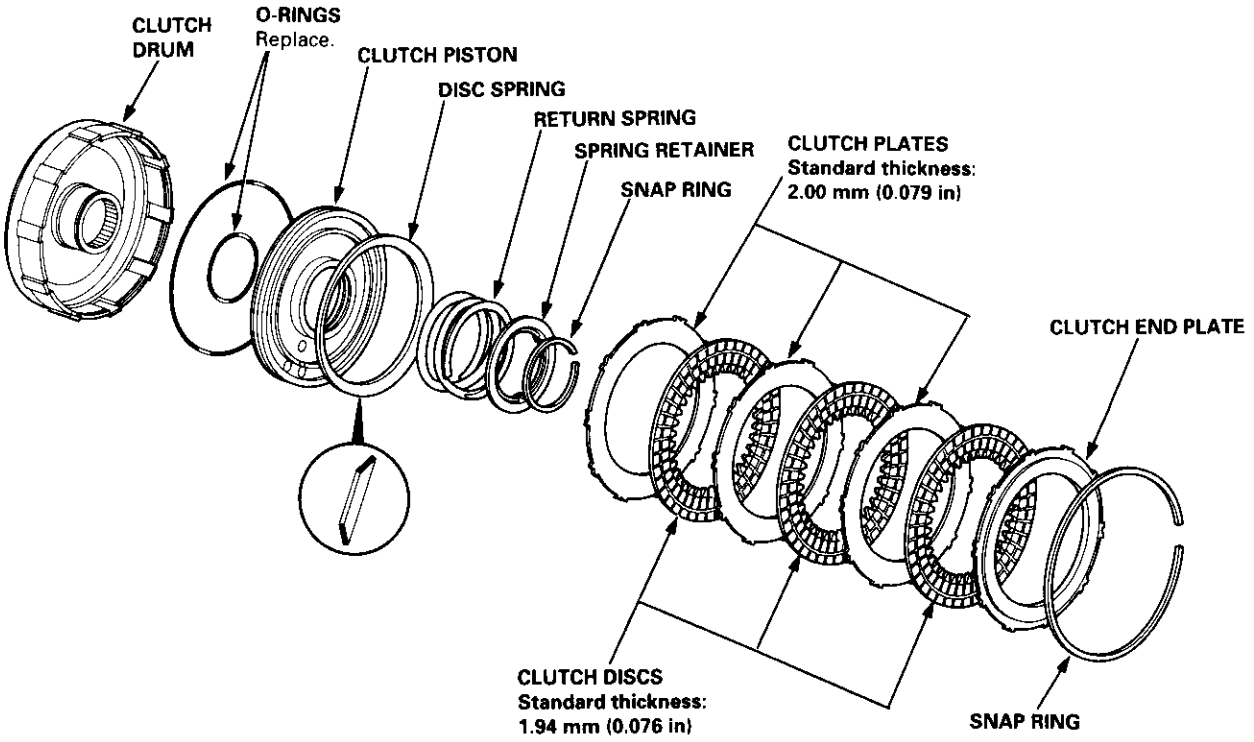
   - The snap ring is seated in the bearing and housing grooves.
   - The ring end gap is correct.



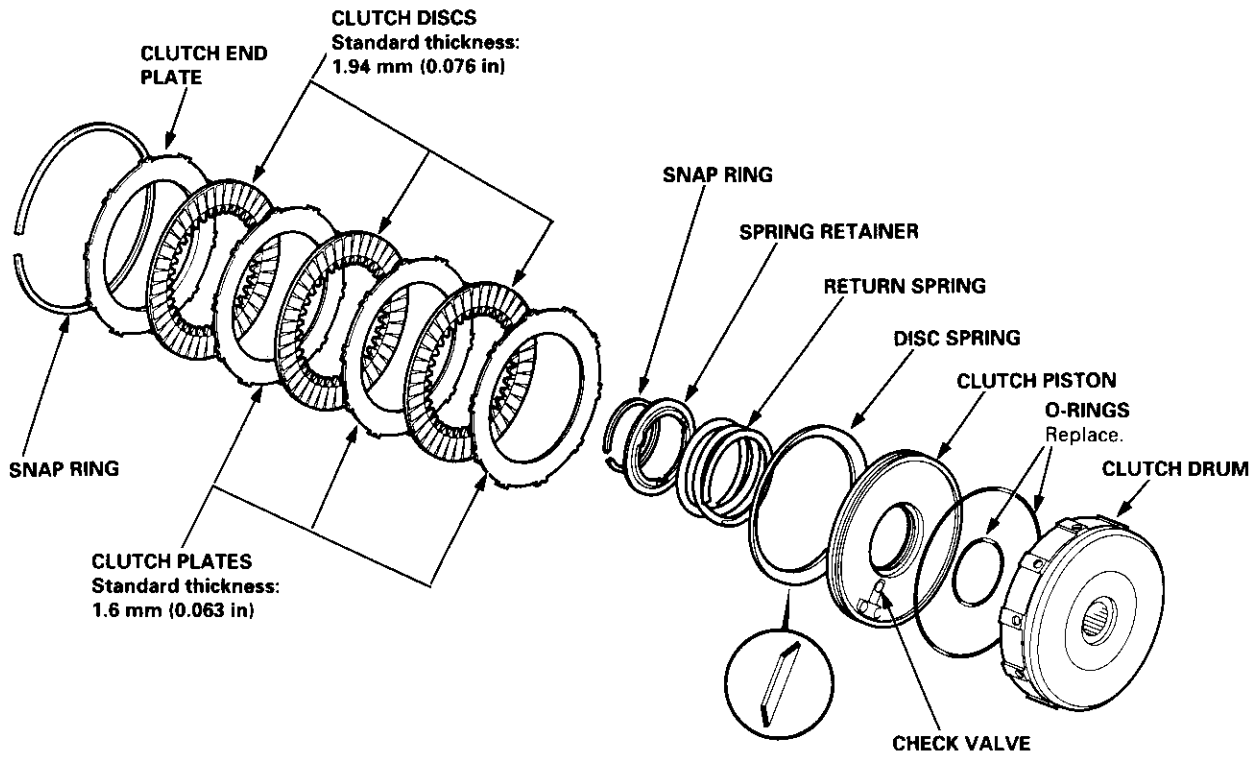
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Illustrated Index

3RD CLUTCH



1ST CLUTCH

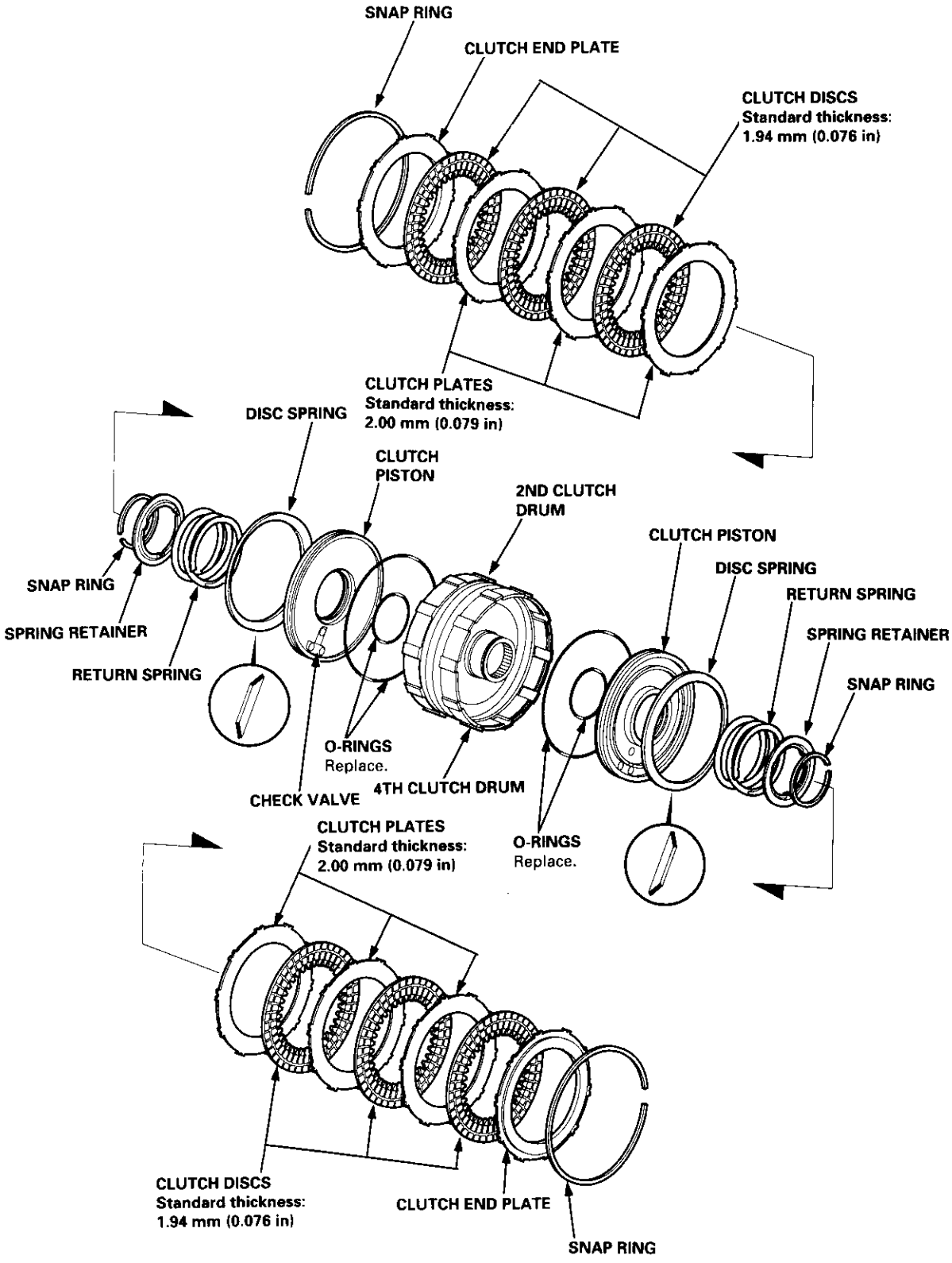


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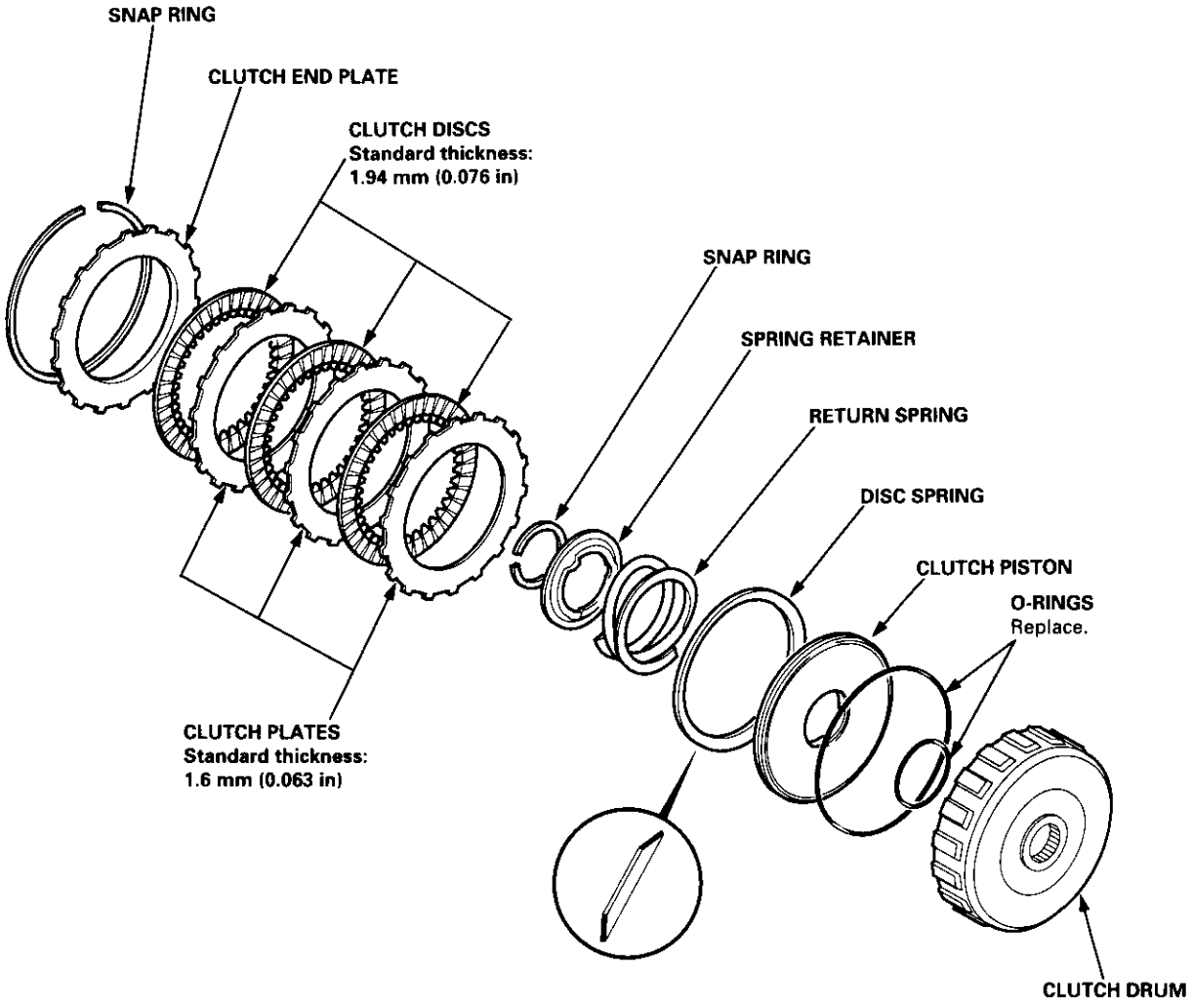
Illustrated Index (cont'd)

2ND/4TH CLUTCH



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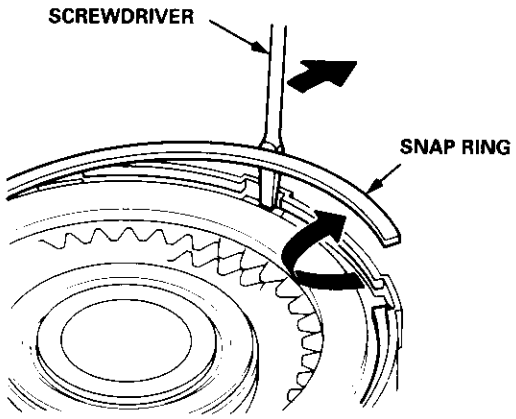
1ST-HOLD CLUTCH



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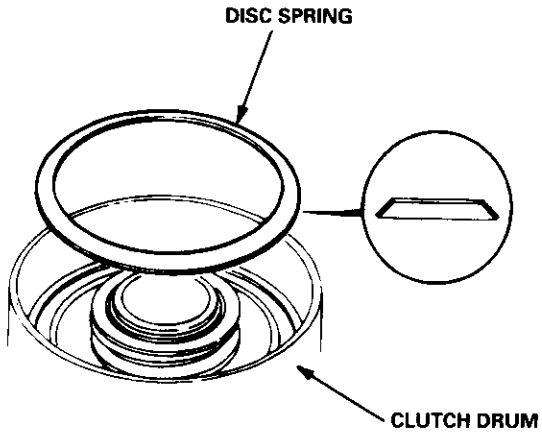
Disassembly

1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.

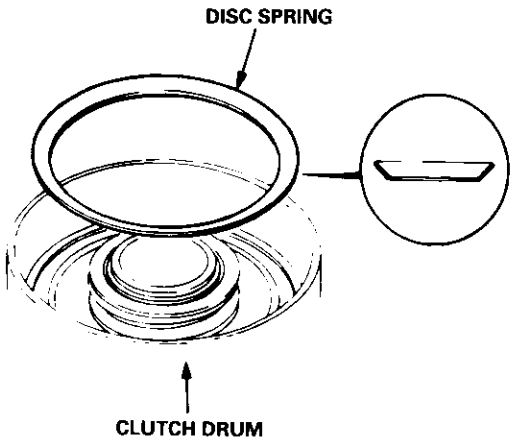


2. Remove the disc spring.

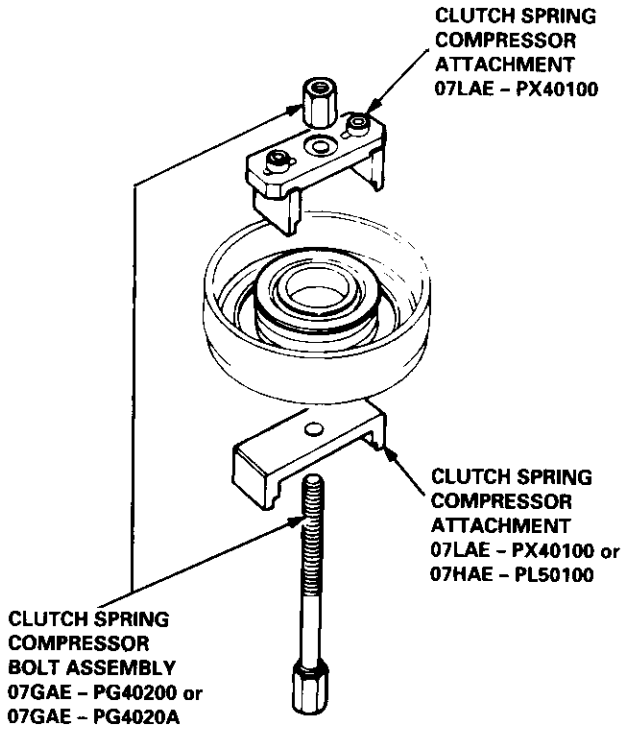
1ST, 2ND, 4TH 1ST-HOLD CLUTCH:

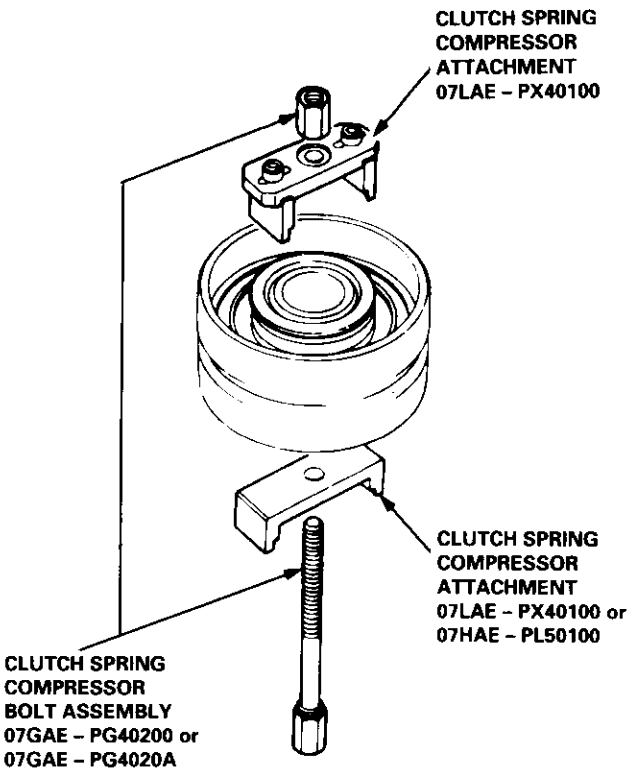


3RD CLUTCH:



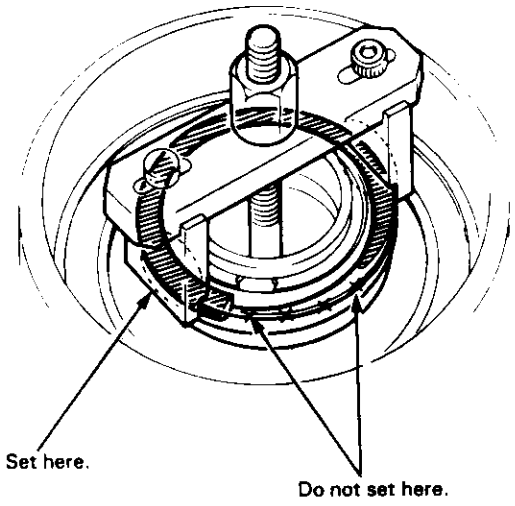
3. Install the special tools as shown.

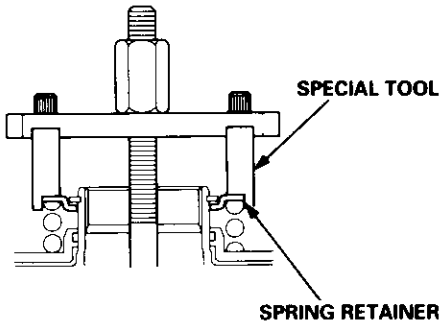




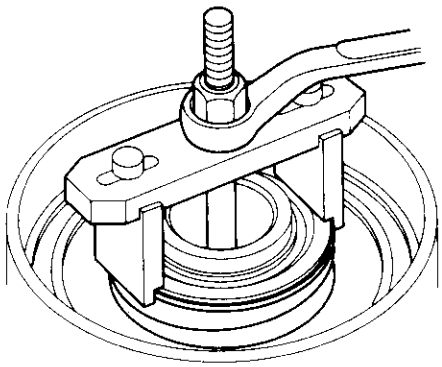
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CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

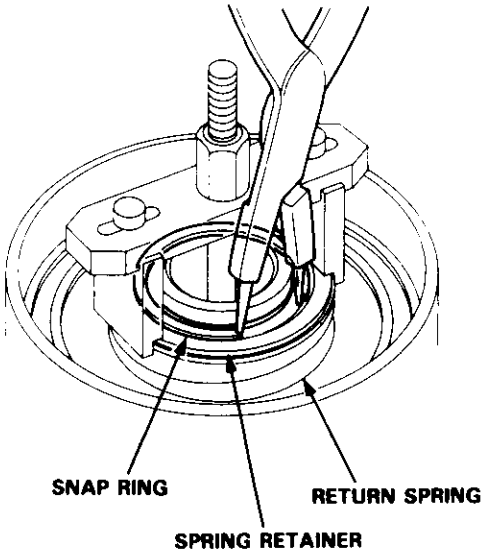




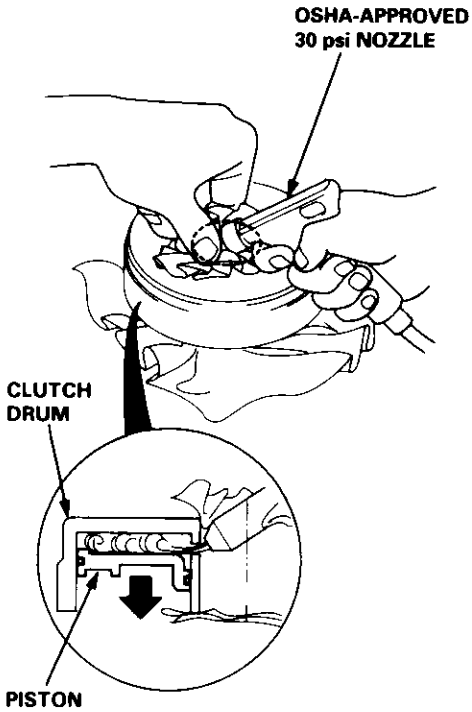
4. Compress the return spring.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



6. Wrap a shop rag around the clutch drum, and apply air pressure to the ATF passage to remove the piston.
   Place a finger tip on the other end while applying air pressure.

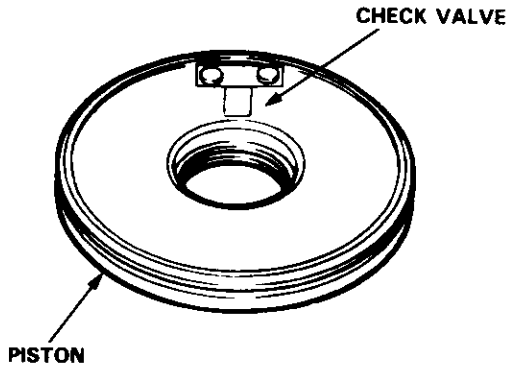


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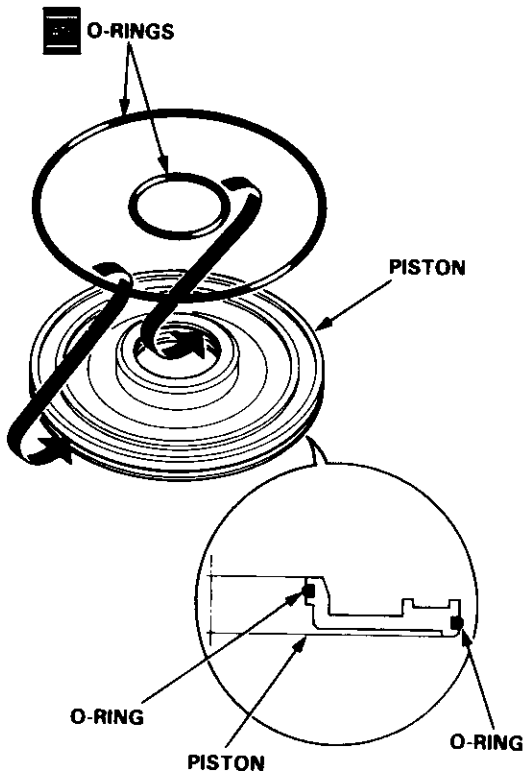
Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before reassembly.

1. Inspect the check valve; if it's loose, replace the piston.

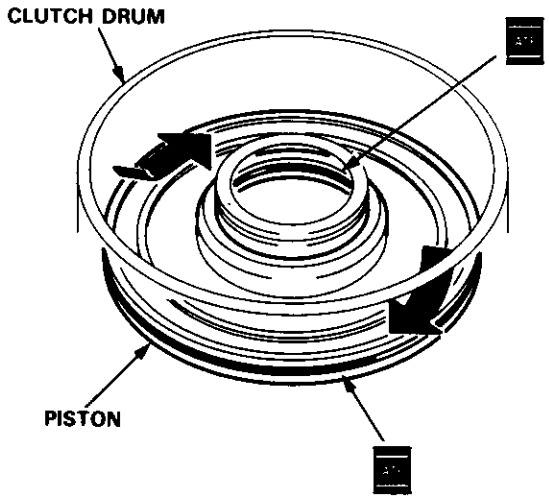


2. Install new O-rings on the clutch piston.

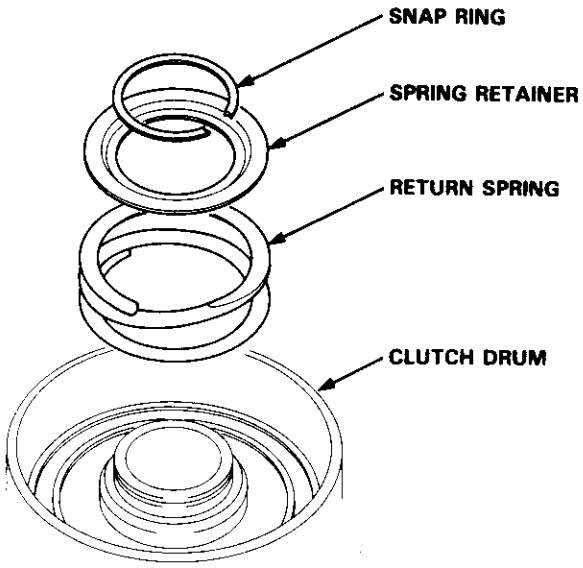


3. Install the piston in the clutch drum. Apply pressure and rotate it to ensure proper seating. Lubricate the piston O-ring with ATF before installing the piston.

   NOTE: Do not pinch the O-ring by installing the piston with too much force.

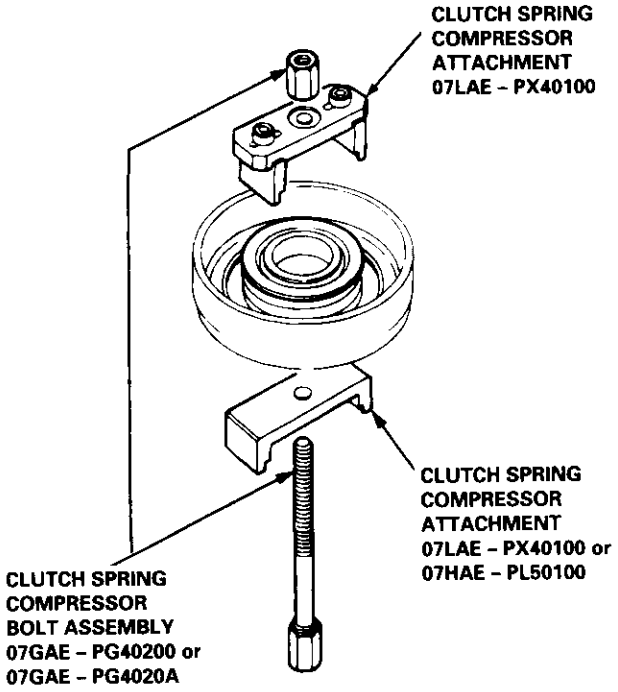


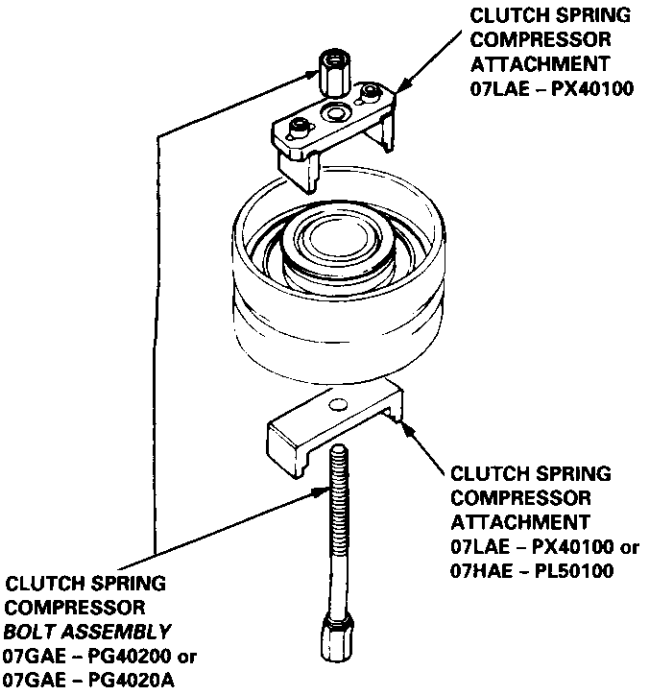
4. Install the return spring, and spring retainer, then position the snap ring on the retainer.



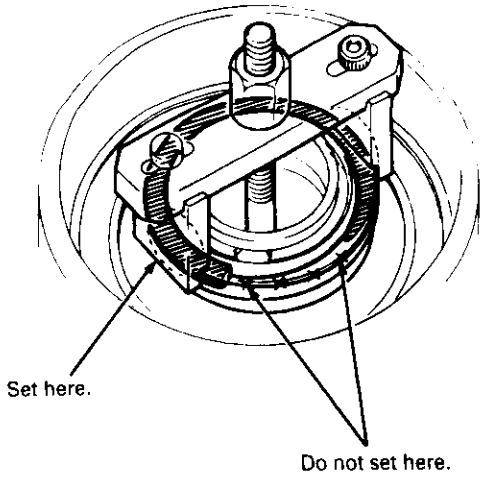
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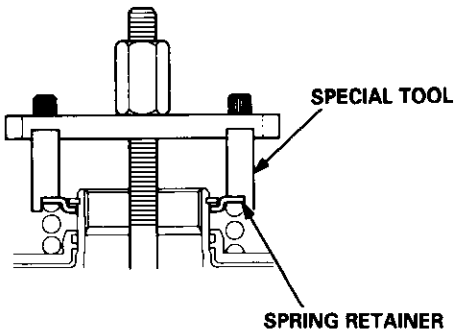
5. Install the special tools as shown.



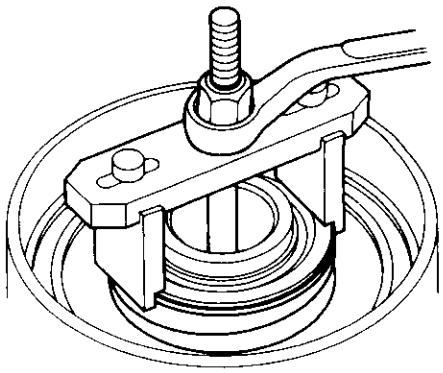


CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.





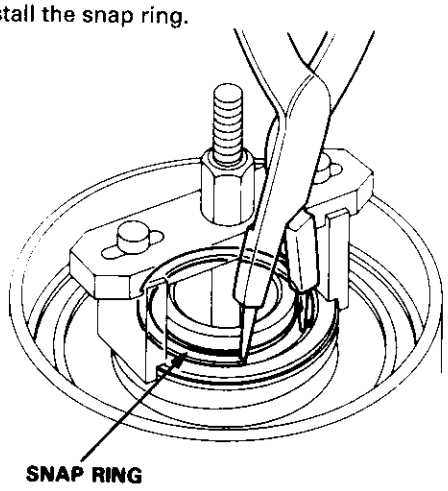
6. Compress the return spring.



(cont'd)

Reassembly (cont'd)

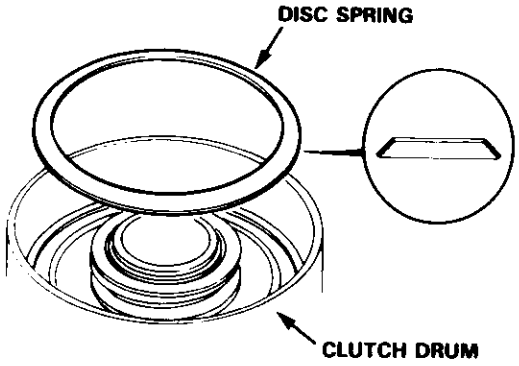
7. Install the snap ring.



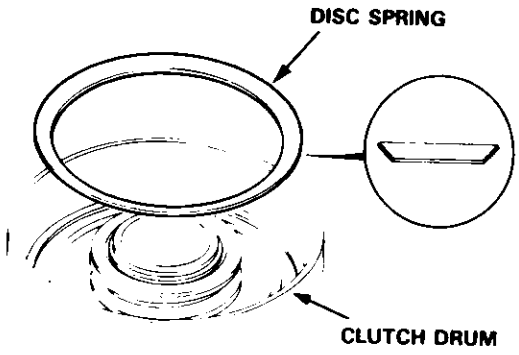
8. Remove the special tools.

9. Install the disc spring in the direction shown.

1ST, 2ND, 4TH, 1ST-HOLD CLUTCH:

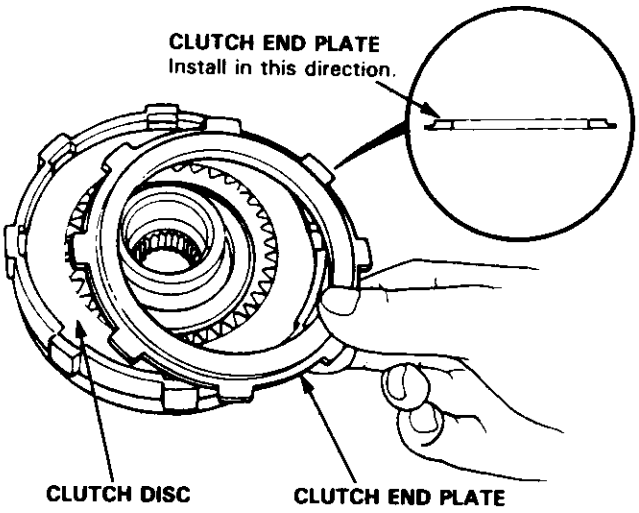


3RD CLUTCH:

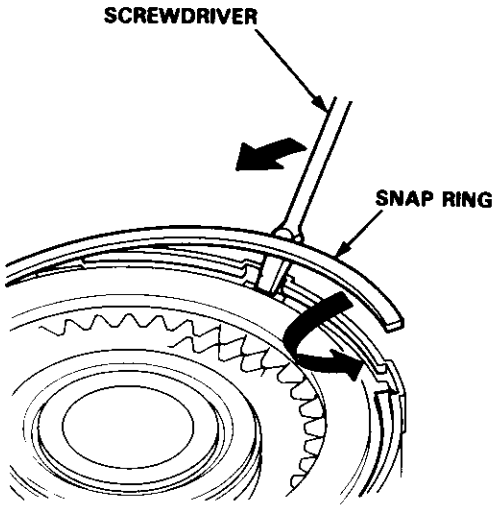


10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes. Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with its flat side toward the disc.



12. Install the snap ring.



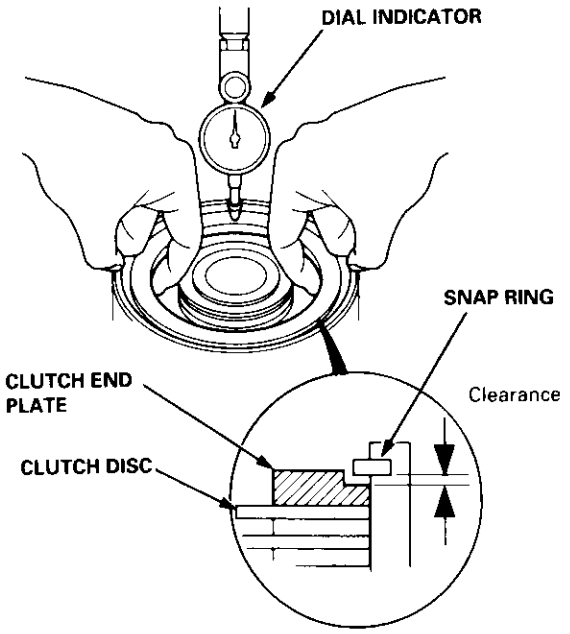
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13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between it and the top disc.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

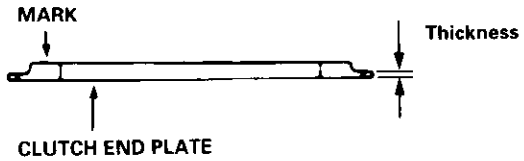
Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 – 0.85 mm (0.026 – 0.033 in)
2nd	0.40 – 0.60 mm (0.016 – 0.024 in)
3rd	0.40 – 0.60 mm (0.016 – 0.024 in)
4th	0.40 – 0.60 mm (0.016 – 0.024 in)
1st-hold	0.50 – 0.80 mm (0.020 – 0.031 in)



14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.



1ST CLUTCH END PLATES

Mark	Part Number	Thickness
1	22551 – P56 – N00	2.1 mm (0.083 in)
2	22552 – P56 – N00	2.2 mm (0.087 in)
3	22553 – P56 – N00	2.3 mm (0.091 in)
4	22554 – P56 – N00	2.4 mm (0.094 in)
5	22555 – P56 – N00	2.5 mm (0.098 in)
6	22556 – P56 – N00	2.6 mm (0.102 in)
7	22557 – P56 – N00	2.7 mm (0.106 in)
8	22558 – P56 – N00	2.8 mm (0.110 in)
9	22559 – P56 – N00	2.9 mm (0.114 in)
10	22560 – P56 – N00	3.0 mm (0.118 in)

2ND and 4TH CLUTCH END PLATES

Mark	Part Number	Thickness
6	22556 – P56 – N00	2.6 mm (0.102 in)
7	22557 – P56 – N00	2.7 mm (0.106 in)
8	22558 – P56 – N00	2.8 mm (0.110 in)
9	22559 – P56 – N00	2.9 mm (0.114 in)
10	22560 – P56 – N00	3.0 mm (0.118 in)
11	22561 – PDM – 000	3.1 mm (0.122 in)
12	22562 – PDM – 000	3.2 mm (0.126 in)
13	22563 – PDM – 000	3.3 mm (0.130 in)
14	22564 – PDM – 000	3.4 mm (0.134 in)
15	22565 – PDM – 000	3.5 mm (0.138 in)
16	22566 – PDM – 000	3.6 mm (0.142 in)
17	22567 – PDM – 000	3.7 mm (0.146 in)

3RD CLUTCH END PLATES

Mark	Part Number	Thickness
8	22558 – P56 – N00	2.8 mm (0.110 in)
9	22559 – P56 – N00	2.9 mm (0.114 in)
10	22560 – P56 – N00	3.0 mm (0.118 in)
11	22561 – PDM – 000	3.1 mm (0.122 in)
12	22562 – PDM – 000	3.2 mm (0.126 in)
13	22563 – PDM – 000	3.3 mm (0.130 in)
14	22564 – PDM – 000	3.4 mm (0.134 in)
15	22565 – PDM – 000	3.5 mm (0.138 in)
16	22566 – PDM – 000	3.6 mm (0.142 in)
17	22567 – PDM – 000	3.7 mm (0.146 in)

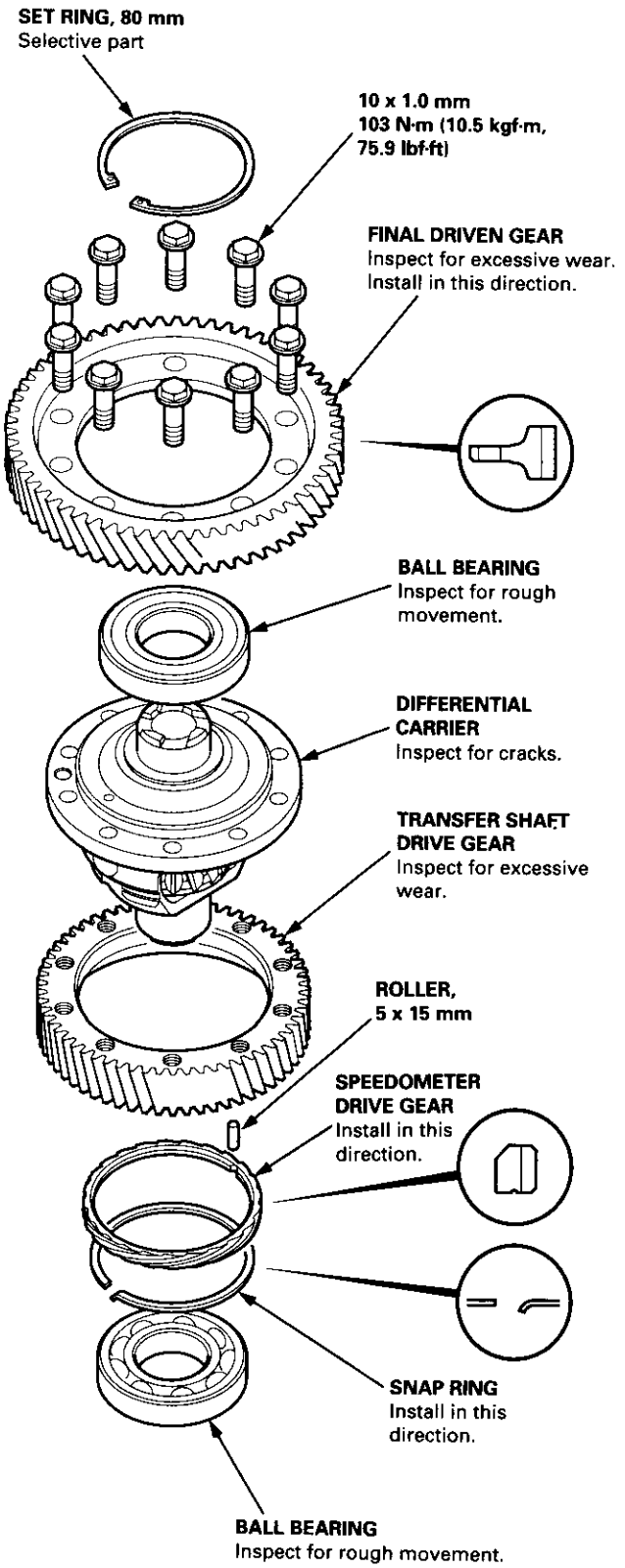
1ST-HOLD CLUTCH END PLATES

Mark	Part Number	Thickness
1	22551 – PS5 – 003	2.1 mm (0.083 in)
2	22552 – PS5 – 003	2.2 mm (0.087 in)
3	22553 – PS5 – 003	2.3 mm (0.091 in)
4	22554 – PS5 – 003	2.4 mm (0.094 in)
No mark	22555 – PS5 – 003	2.5 mm (0.098 in)
6	22556 – PS5 – 003	2.6 mm (0.102 in)
7	22557 – PS5 – 003	2.7 mm (0.106 in)

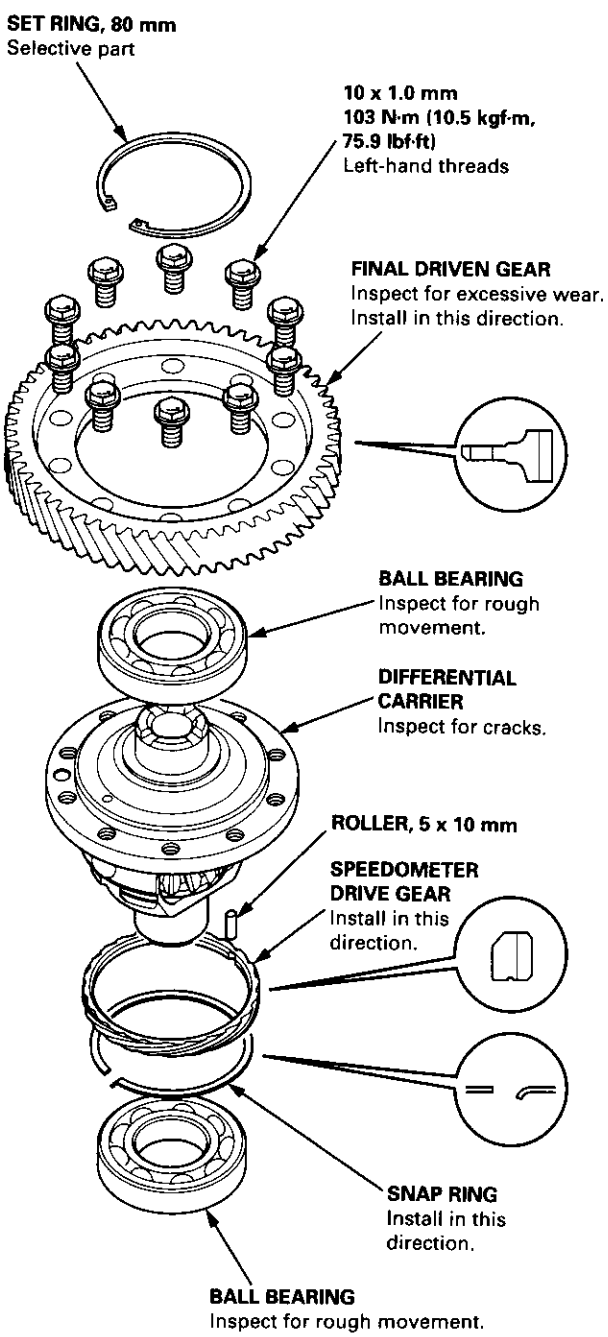
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Illustrated Index

4WD:



2WD:

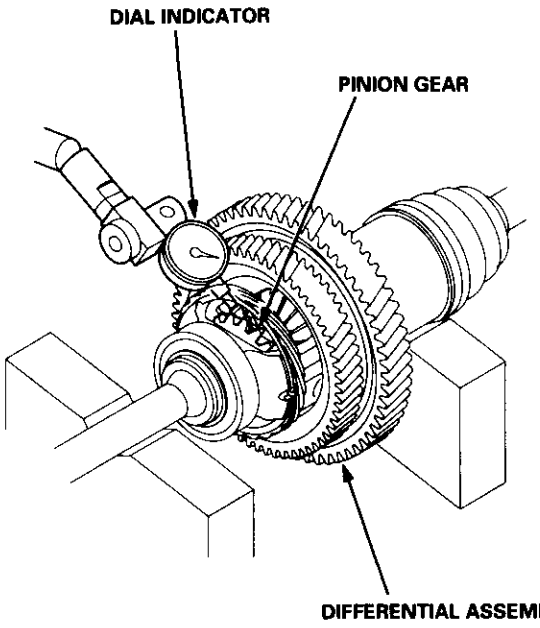


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Backlash Inspection

1. Place the differential assembly on V-blocks.
2. Install the driveshaft and intermediate shaft on the differential assembly.
3. Check the backlash of both pinion gears.

   STANDARD: 0.05 – 0.15 mm (0.002 – 0.006 in)

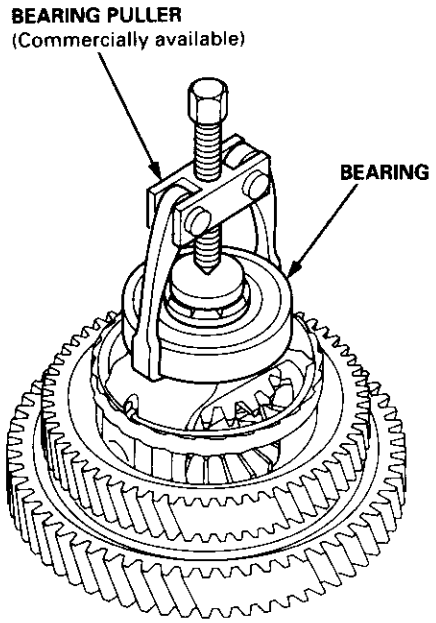


4. If the backlash is out of standard, replace the differential carrier.

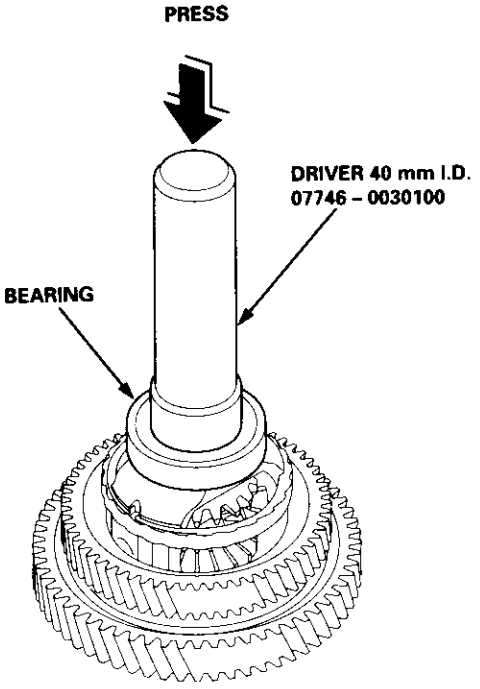
Bearing Replacement

NOTE: Check bearings for wear and rough movement. If bearings are OK, removal is not required.

1. Remove the bearings using a bearing puller.



2. Install new bearings using the special tool as shown.

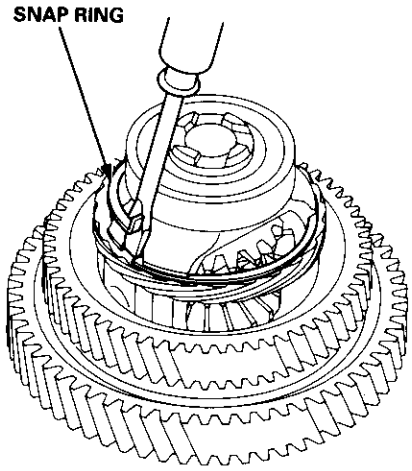


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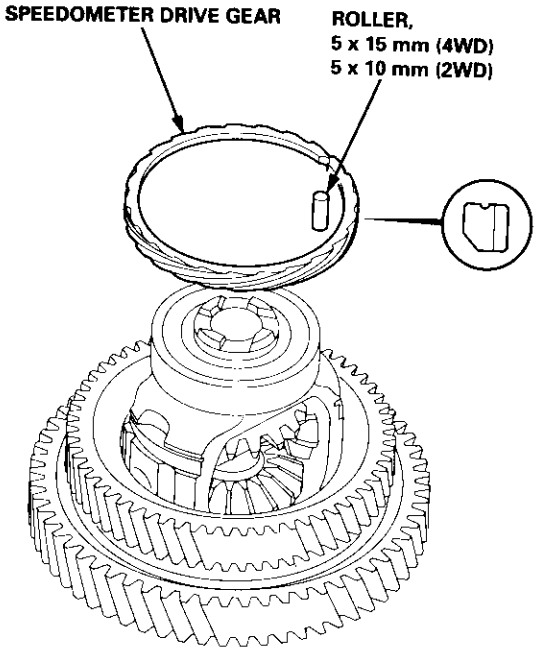
Differential Carrier Replacement

NOTE: The illustration shows the 4WD automatic transmission differential; the 2WD differential is similar.

1. Remove the snap ring from the differential carrier.



2. Remove the 5 x 15 mm roller (4WD) or 5 x 10 mm roller (2WD) and the speedometer drive gear.

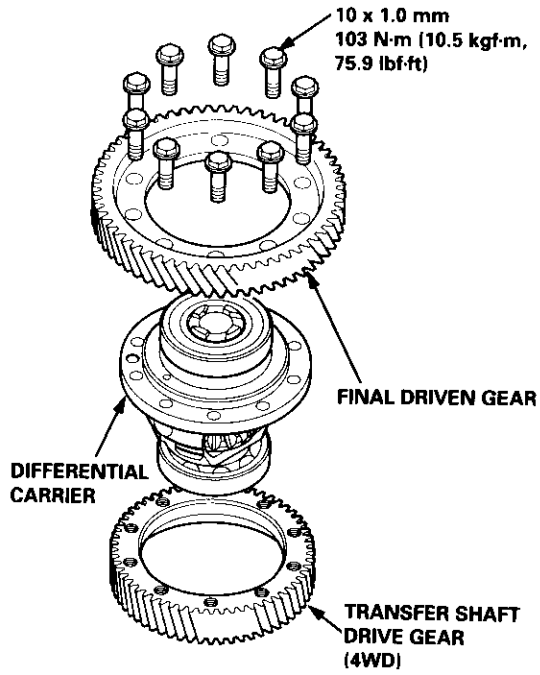


3. Remove the bolts securing the final driven gear and the transfer shaft drive gear (4WD), then replace the differential carrier.

4. Install the final driven gear on a new differential carrier with its chamfered side facing the carrier and the transfer drive gear (4WD).

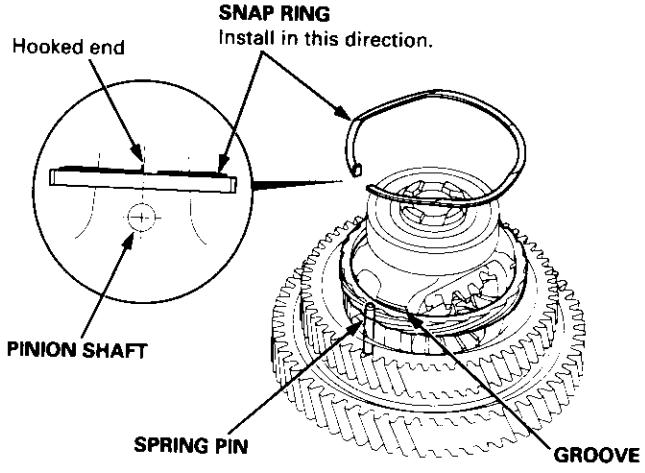
5. Tighten the bolts to the specified torque.

   NOTE: The 2WD differential bolt has left-hand threads.



6. Install the speedometer drive gear with its chamfered side facing the carrier. Align the cutout on the bore of the speedometer drive gear with the 5 x 15 mm roller (4WD) or 5 x 10 mm roller (2WD).

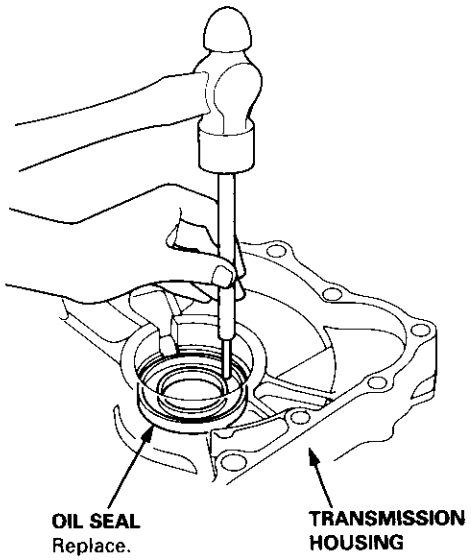
7. Align the hooked end of the snap ring with the spring pin in the pinion shaft, then install the snap ring in the differential carrier groove.



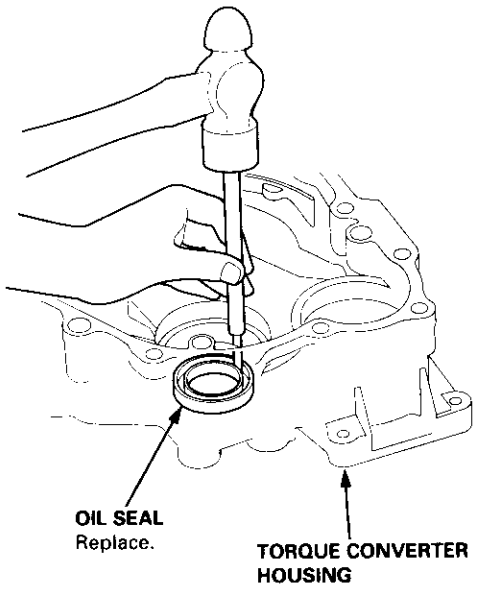
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Oil Seal Replacement

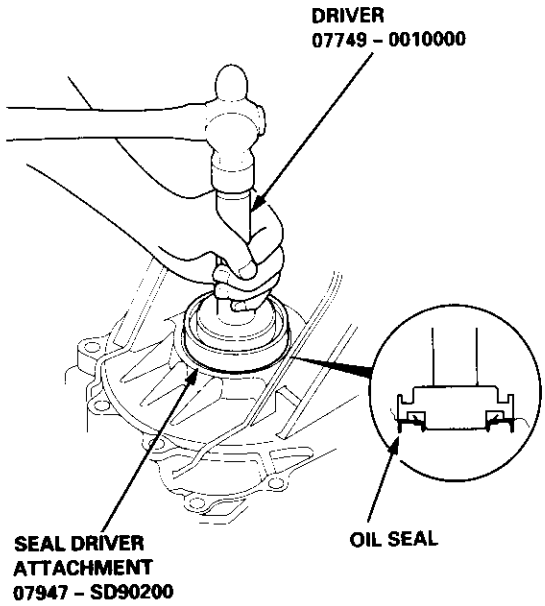
1. Remove the oil seal from the transmission housing.



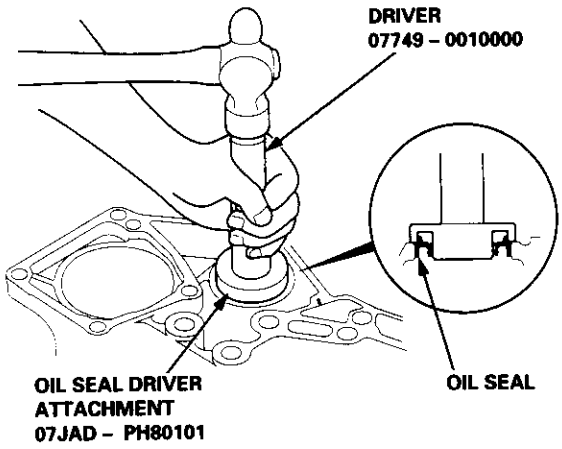
2. Remove the oil seal from the torque converter housing.



3. Install the oil seal in the transmission housing using the special tools as shown.



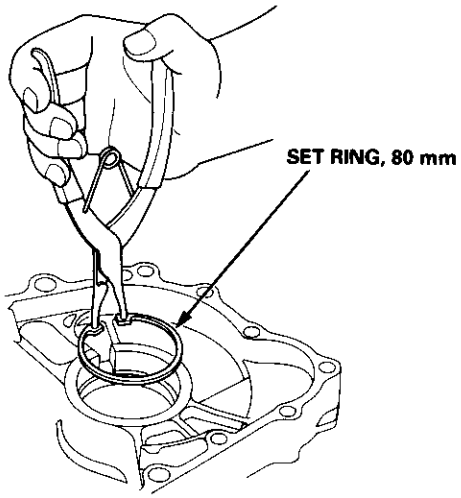
4. Install the oil seal in the torque converter housing using the special tools as shown.



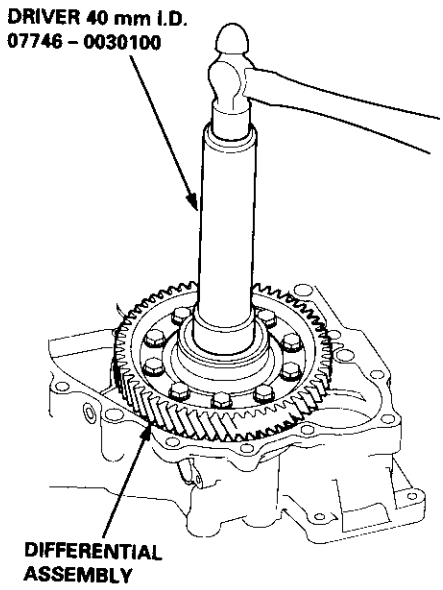
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Side Clearance Inspection

1. Install the 80 mm set ring in the transmission housing.



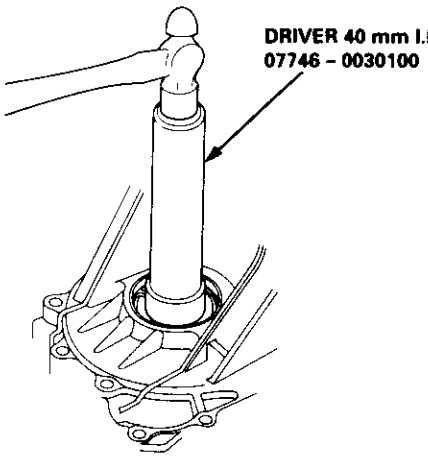
2. Install the differential assembly in the torque converter housing using the special tool.



3. Install the transmission housing on the torque converter housing, and tighten the transmission housing mounting bolts (see pages 14-252 and 14-253).

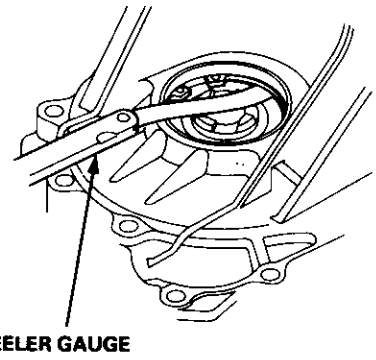
TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

4. Tap on the transmission housing side of the differential assembly with the special tool to seat the differential assembly.



5. Measure the clearance between the 80 mm set ring and the bearing outer race with a feeler gauge.

STANDARD: 0 - 0.15 mm (0 - 0.006 in)



6. If the clearance is out of standard, remove the set ring and measure its thickness.

7. Select and install a new 80 mm set ring.

SET RING, 80 mm

Part Number	Thickness
90414 - 689 - 000	2.50 mm (0.098 in)
90415 - 689 - 000	2.60 mm (0.102 in)
90416 - 689 - 000	2.70 mm (0.106 in)
90417 - 689 - 000	2.80 mm (0.110 in)
90418 - 689 - 000	2.90 mm (0.114 in)
90419 - PH8 - 000	3.00 mm (0.118 in)

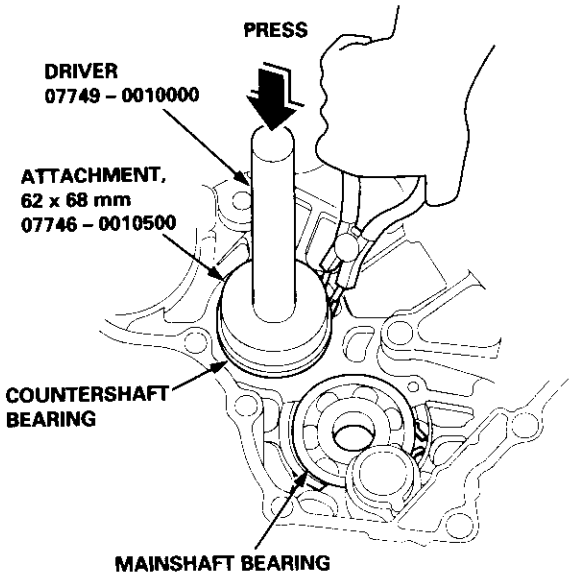
8. Recheck the clearance, and make sure it is within standard.

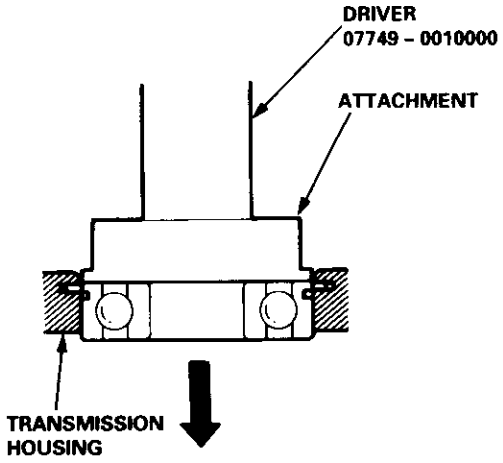
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Mainshaft/Countershaft Bearings Replacement

1. Expand each snap ring with snap ring pliers, then push the bearings out of the transmission housing using the special tools and a press as shown.

   Do not remove the snap rings unless it's necessary to clean the grooves in the housing.

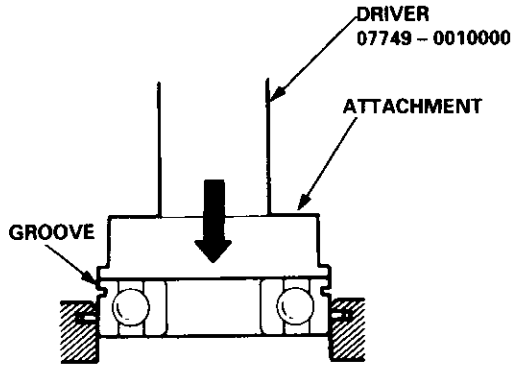




ATTACHMENT
- **Mainshaft Bearing Removal:**
  ATTACHMENT, 72 x 75 mm
  07746 - 0010600
- **Countershaft Bearing Removal:**
  ATTACHMENT, 62 x 68 mm
  07746 - 0010500

2. Expand each snap ring with snap ring pliers, then coat the new bearings with ATF and insert them part-way into the housing using the special tools and a press as shown. Install the bearings with the groove facing outside the housing.

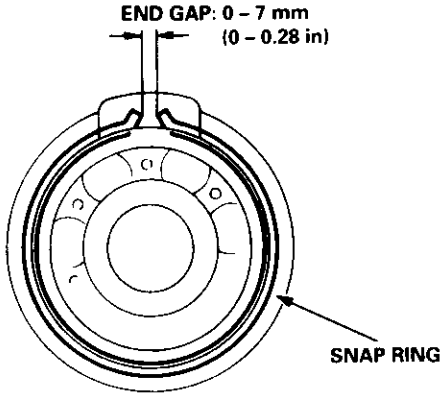
3. Release the pliers, then push the bearings down into the housing until the rings snap in place around them.



ATTACHMENT
- **Mainshaft Bearing Installation:**
  ATTACHMENT, 72 x 75 mm
  07746 - 0010600
- **Countershaft Bearing Installation:**
  ATTACHMENT, 62 x 68 mm
  07746 - 0010500

4. After installing the bearings, verify the following:

   - The snap rings are seated in the bearing and housing grooves.
   - The snap rings do not bind.
   - The ring end gaps are correct.



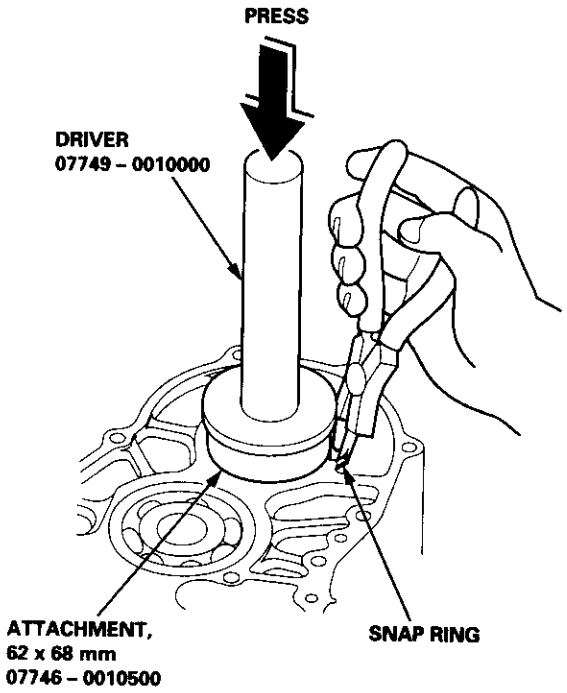
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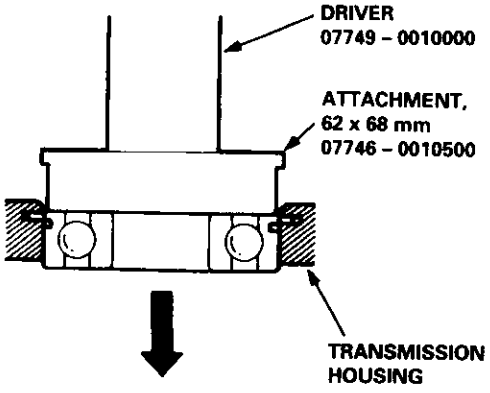
Transmission Housing Bearings

Sub-shaft Bearing Replacement

1. Expand the snap ring with snap ring pliers, then push the bearing out of the transmission housing using the special tools and a press as shown.

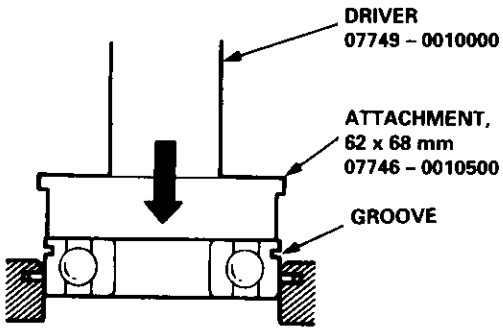
   Do not remove the snap ring unless it's necessary to clean the groove in the housing.





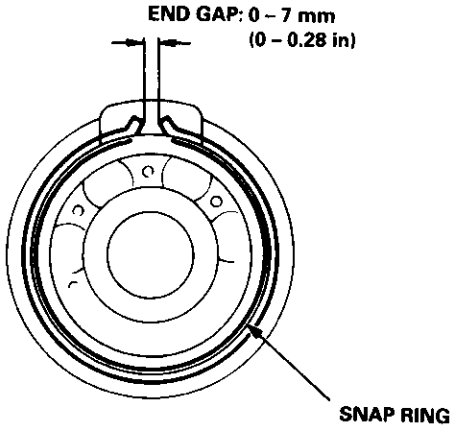
2. Expand the snap ring with snap ring pliers, then coat the new bearing with ATF and insert it partway into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it.



4. After installing the bearing, verify the following:

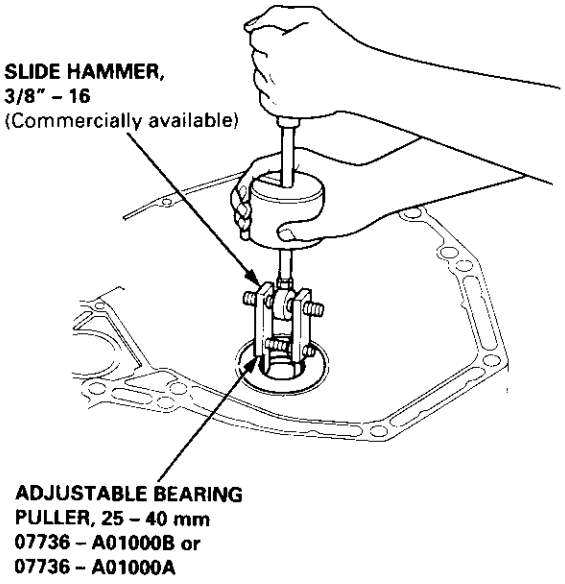
   - The snap ring is seated in the bearing and housing grooves.
   - The snap ring does not bind.
   - The ring end gap is correct.



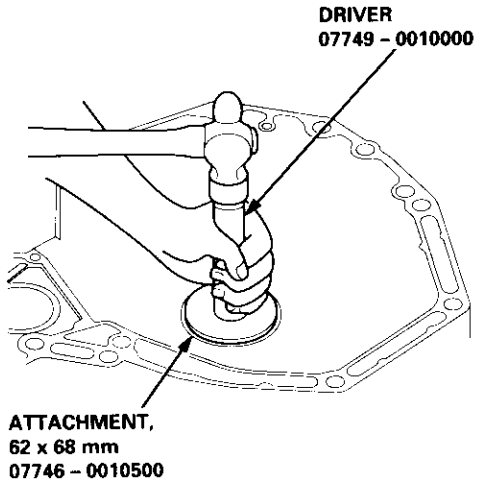
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Mainshaft Bearing/Oil Seal Replacement

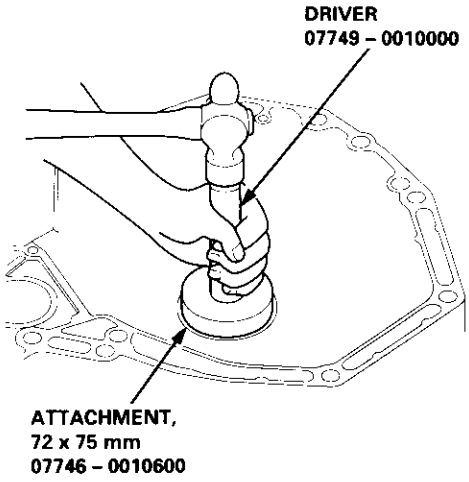
1. Remove the mainshaft bearing and oil seal using the special tool.



2. Install a new mainshaft bearing until it bottoms in the torque converter housing.



3. Install a new oil seal flush with the torque converter housing.

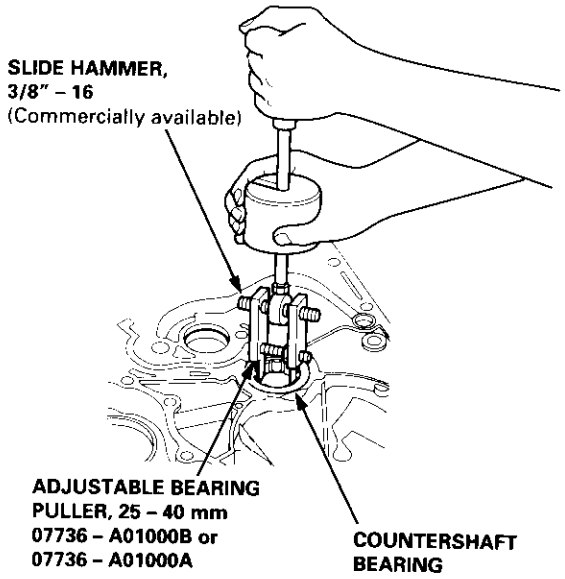


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Torque Converter Housing Bearings

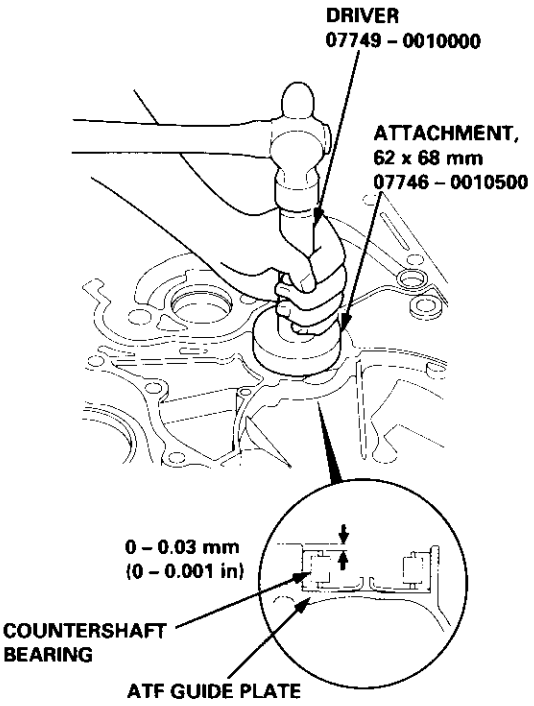
Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tool.



2. Install the ATF guide plate.

3. Install a new countershaft bearing in the torque converter housing.

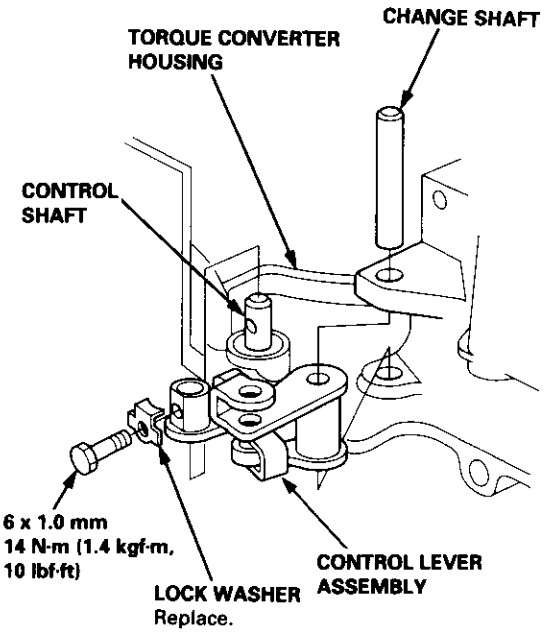


Control Lever Assembly

Replacement

Check the condition and movement of the control lever assembly. If the control lever assembly binds or does not move smoothly, replace it.

1. Remove the 6 x 1.0 mm bolt and lock washer.
2. Remove the change shaft from the torque converter housing.
3. Remove the control lever assembly from the control shaft.
4. Install the new control lever assembly in the reverse order of disassembly, until it bottoms in the torque converter housing.

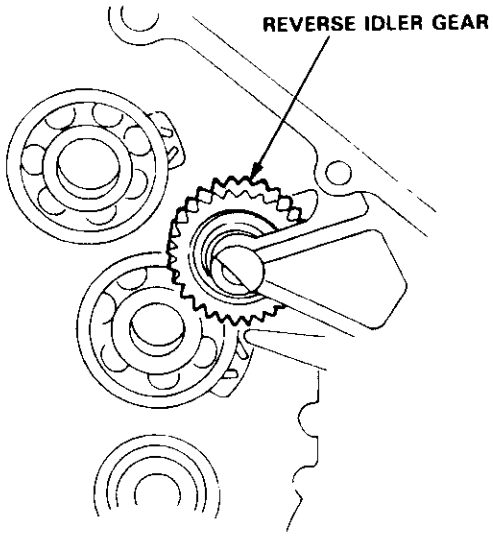


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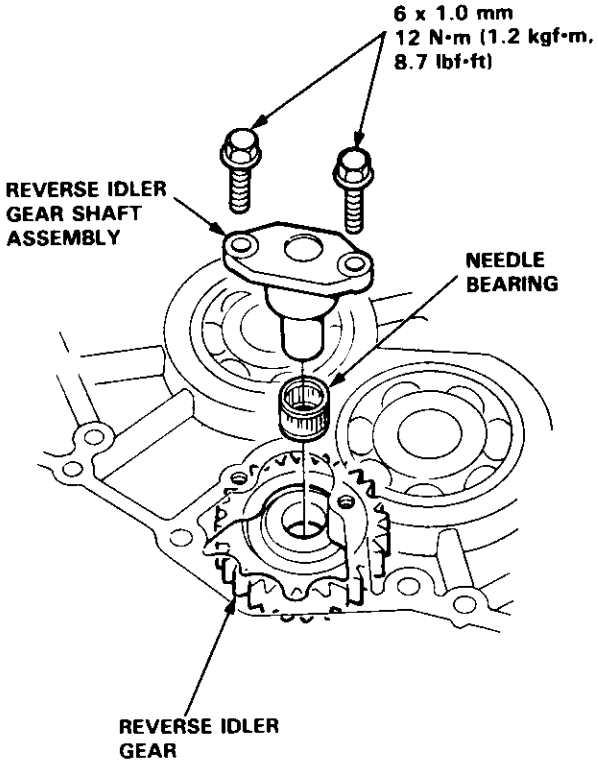
Park Stop

Installation

1. Install the reverse idler gear.



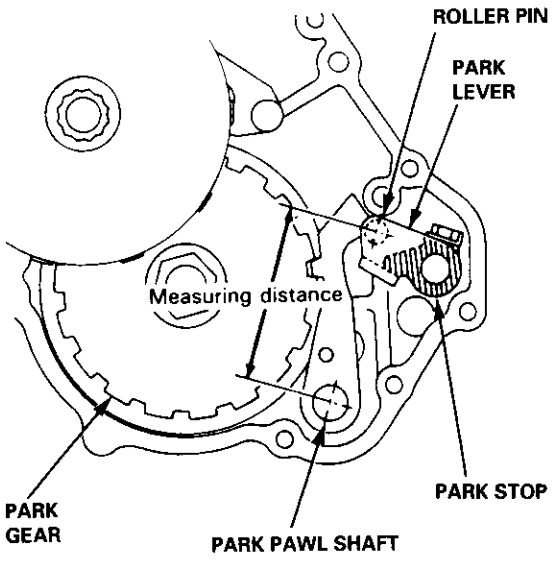
2. Install the reverse idler gear shaft holder and needle bearing into the transmission housing, then tighten the bolts.



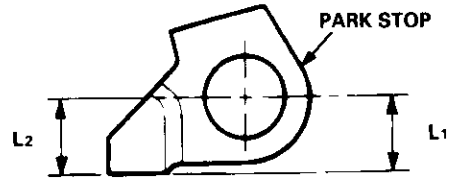
Inspection/Adjustment

1. Set the park lever in the [P] position.
2. Measure the distance between the park pawl shaft and the park lever roller pin as shown.

STANDARD: 72.9 – 73.9 mm (2.87 – 2.91 in)



3. If the measurement is out of standard, select and install the appropriate park stop from the table below.



PARK STOP

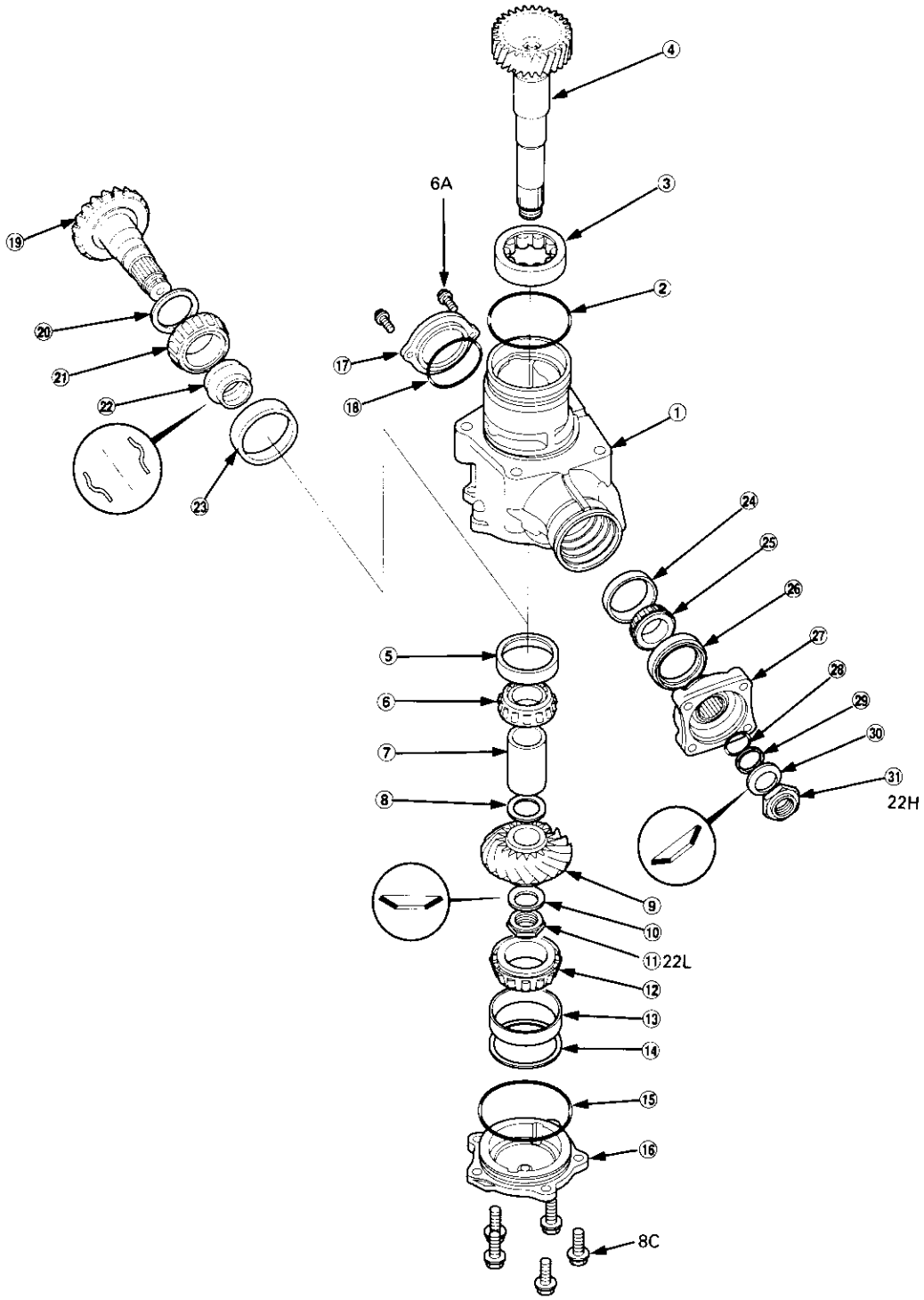
Mark	Part Number	L_1	L_2
1	24537 – PA9 – 003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538 – PA9 – 003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539 – PA9 – 003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the park stop, make sure the distance is within standard.

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Transfer Assembly

Illustrated Index



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① **TRANSFER HOUSING**
② **O-RING** Replace.
③ **TRANSFER HOUSING ROLLER BEARING**
④ **TRANSFER SHAFT**
⑤ **TAPERED ROLLER BEARING OUTER RACE**
⑥ **TAPERED ROLLER BEARING**
⑦ **TRANSFER SHAFT COLLAR**
⑧ **THRUST SHIM, 25 mm** Selective part
⑨ **TRANSFER DRIVE GEAR (HYPOID GEAR)**
⑩ **CONICAL SPRING WASHER** Replace.
⑪ **TRANSFER SHAFT LOCKNUT, 22 x 1.25 mm** Left-hand threads, replace.
⑫ **TAPERED ROLLER BEARING**
⑬ **TAPERED ROLLER BEARING OUTER RACE**
⑭ **THRUST SHIM, 68 mm** Selective part
⑮ **O-RING** Replace.
⑯ **TRANSFER COVER A**
⑰ **TRANSFER COVER B**
⑱ **O-RING** Replace.
⑲ **TRANSFER DRIVEN GEAR SHAFT (HYPOID GEAR)**
⑳ **THRUST SHIM, 35 mm** Selective part
㉑ **TAPERED ROLLER BEARING**
㉒ **TRANSFER SPACER** Replace.
㉓ **TAPERED ROLLER BEARING OUTER RACE**
㉔ **TAPERED ROLLER BEARING OUTER RACE**
㉕ **TAPERED ROLLER BEARING**
㉖ **OIL SEAL** Replace.
㉗ **COMPANION FLANGE**
㉘ **O-RING** Replace.
㉙ **BACK-UP RING**
㉚ **CONICAL SPRING WASHER** Replace.
㉛ **TRANSFER DRIVEN GEAR SHAFT LOCKNUT, 22 x 1.25 mm** Replace.

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
8C	24 N·m (2.4 kgf·m, 17 lbf·ft)	8 x 1.25 mm	
22L	118 N·m (12.0 kgf·m, 87 lbf·ft)	22 x 1.25 mm	Transfer shaft locknut: Left-hand threads
22H	132 – 216 N·m (13.5 – 22.0 kgf·m, 98 – 159 lbf·ft)	22 x 1.25 mm	Transfer driven gear shaft locknut Tightening torque: depending on Total Starting Torque value

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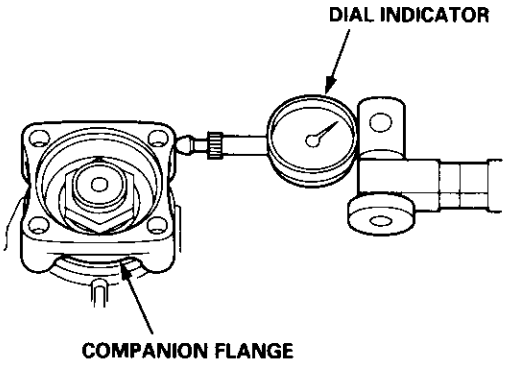
Inspection

NOTE: To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

Transfer Gear (Hypoid gear) Backlash Measurement

1. Set a dial indicator on the companion flange as shown.
2. Measure the transfer gear backlash.

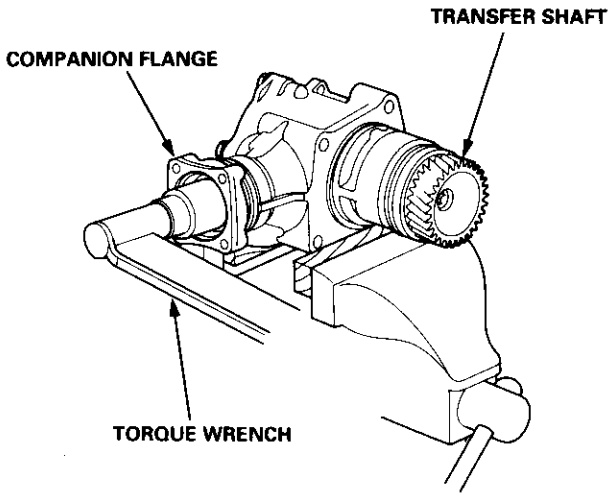
   STANDARD: 0.06 – 0.16 mm (0.02 – 0.06 in)



Total Starting Torque Measurement

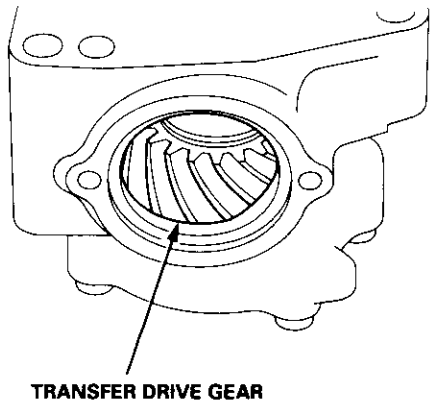
3. Rotate the companion flange several times to seat the tapered roller bearing.
4. Measure the starting torque (companion flange side) using a torque wrench as shown.

   STANDARD:
   2.68 – 3.47 N·m
   (27.3 – 35.4 kgf·cm, 23.7 – 30.7 lbf·in)

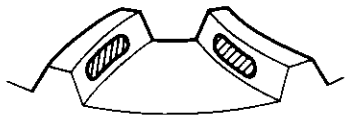


Transfer Gear (Hypoid gear) Tooth Contact Inspection

5. Remove transfer cover B, then apply Prussian Blue to both sides of the transfer gear teeth lightly and evenly.



6. Rotate the companion flange in both directions until the transfer gear rotates one full turn in both directions.
7. Check the transfer gear tooth contact pattern. The pattern should be centered on the gear teeth as shown.

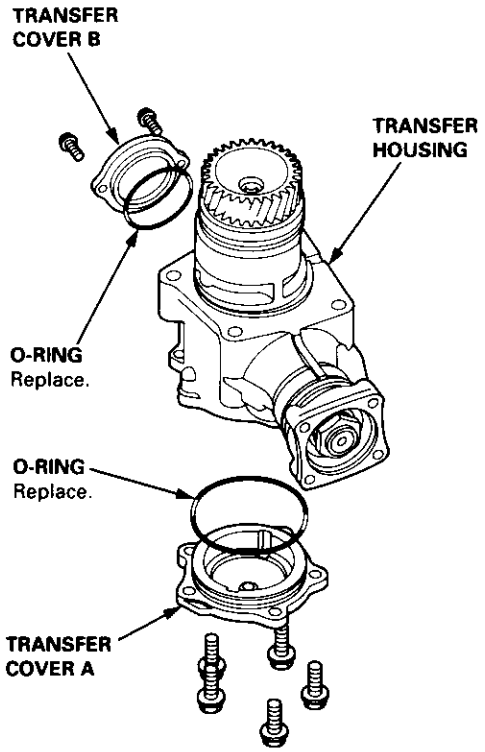


8. If the statrting torque measurement or the tooth contact pattern are not correct, disassemble the transfer assembly, replace worn or damaged parts, and reassemble it.

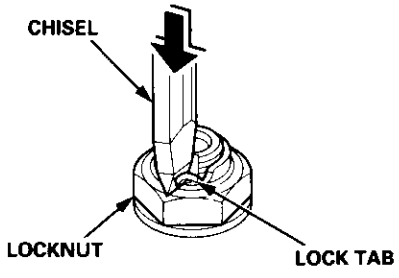
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Disassembly

1. Remove the transfer covers A and B.

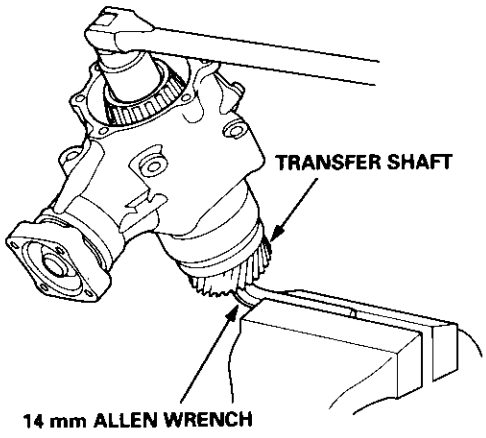


2. Cut the lock tabs of the locknut using a chisel.

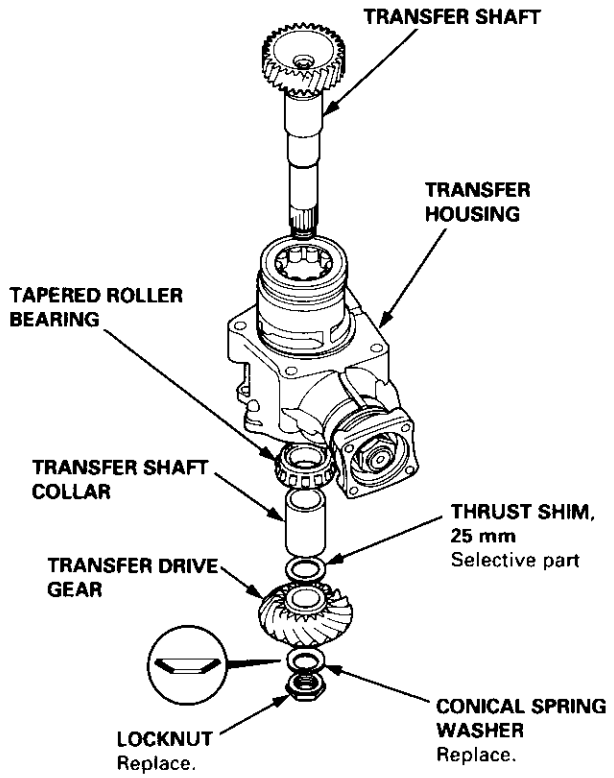


3. Put a 14 mm Allen wrench in the gear side of the transfer shaft, then secure the Allen wrench in a bench vise.

4. Remove the transfer shaft locknut and the conical spring washer. The transfer shaft locknut has left-hand threads.



5. Remove the transfer shaft, transfer drive gear, 25 mm thrust shim, transfer shaft collar, and tapered roller bearing from the transfer housing.



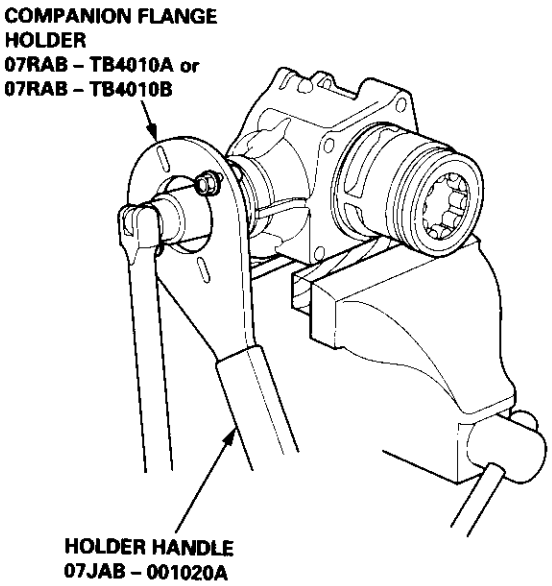
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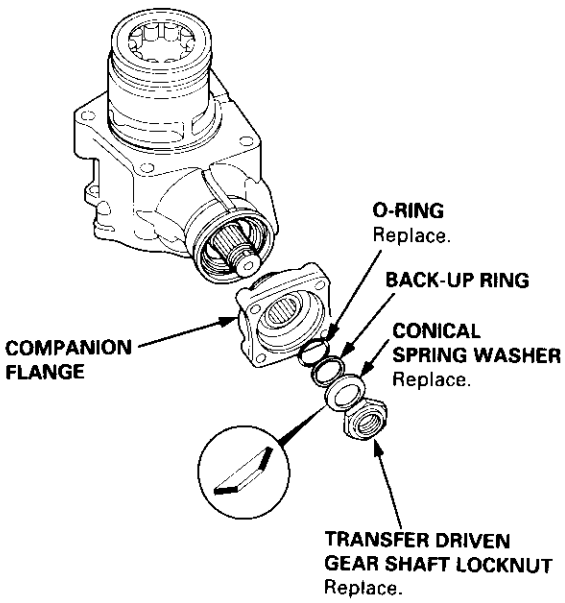
Disassembly (cont'd)

6. Secure the transfer housing in a bench vise with soft jaws. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

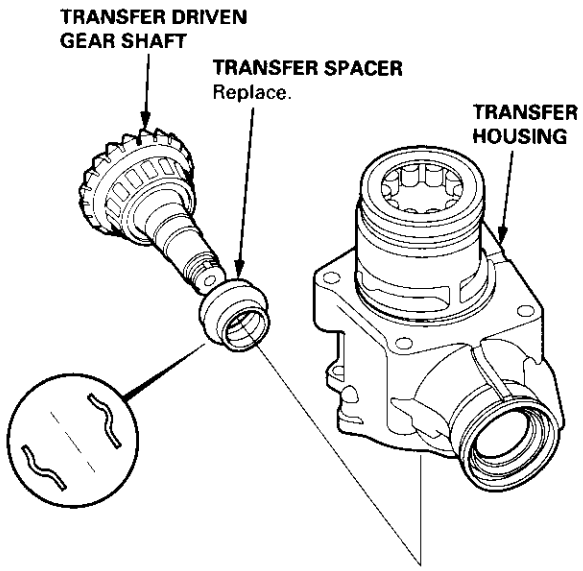
7. Install the special tool on the companion flange, then loosen the transfer driven gear shaft locknut.



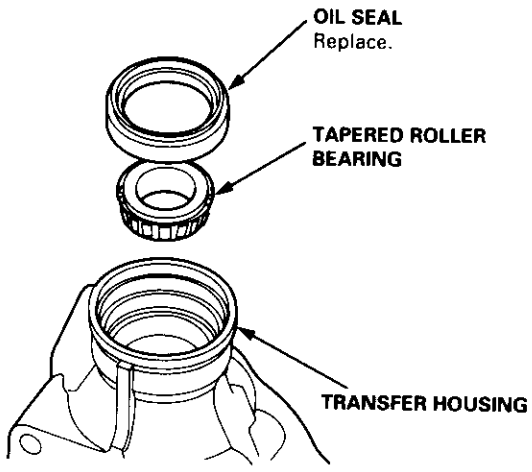
8. Remove the transfer driven gear shaft locknut, conical spring washer, back-up ring, O-ring, and companion flange.



9. Remove the transfer driven gear shaft, then remove the transfer spacer from the transfer driven gear shaft.



10. Remove the oil seal and the tapered roller bearing from the transfer housing.

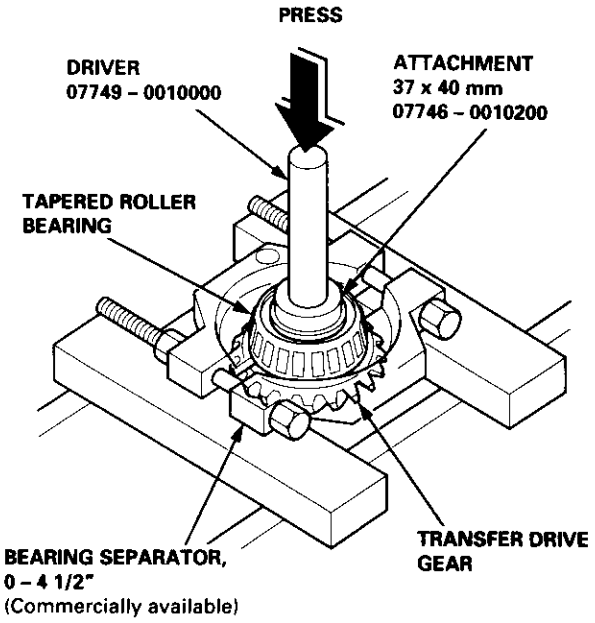


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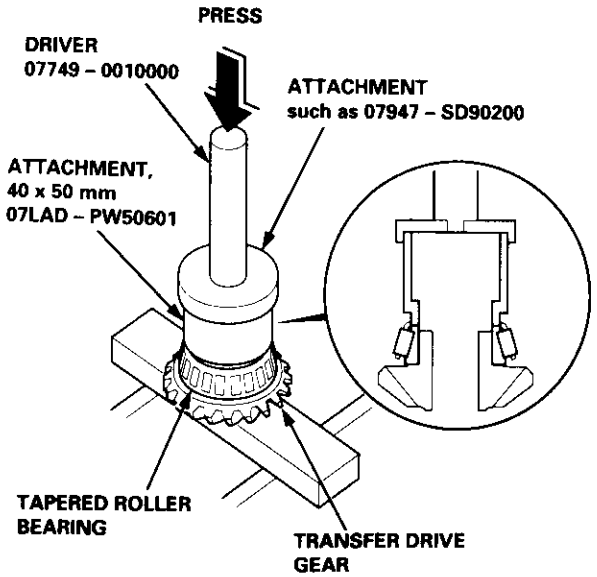
Transfer Drive Gear Bearing Replacement

NOTE: Coat all parts with ATF during reassembly.

1. Remove the tapered roller bearing from the transfer drive gear using the special tools and a press.



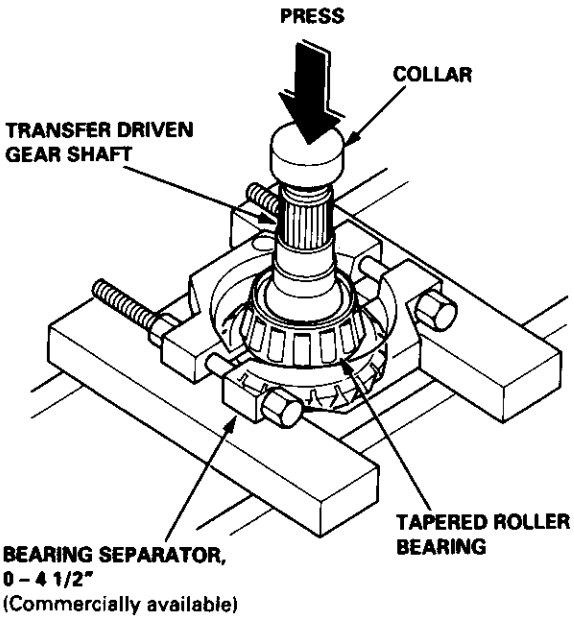
2. Install the new tapered roller bearing in the transfer drive gear using the special tools and a press.



Transfer Driven Gear Shaft Bearing Replacement

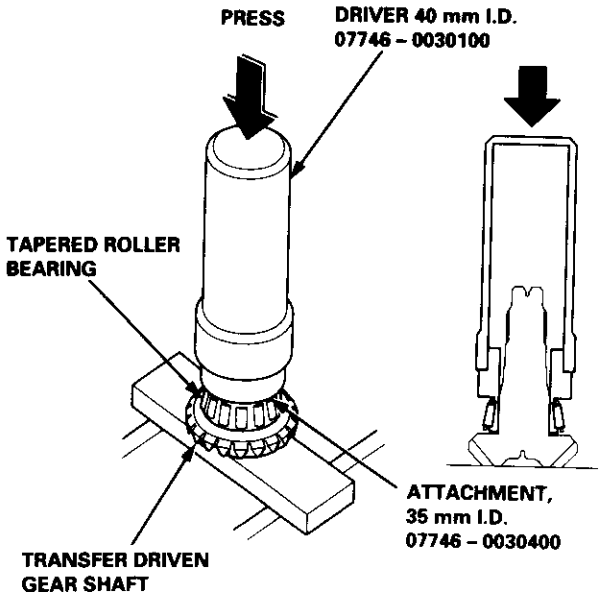
NOTE: Coat all parts with ATF during reassembly.

1. Remove the tapered roller bearing from the transfer driven gear shaft using a press and a collar.



2. Install the 35 mm thrust shim on the transfer driven gear shaft.

3. Install the new tapered roller bearing on the transfer driven gear shaft using the special tools and a press.

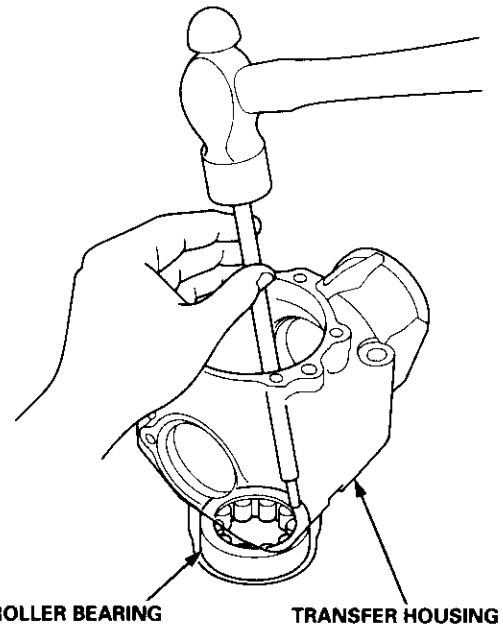


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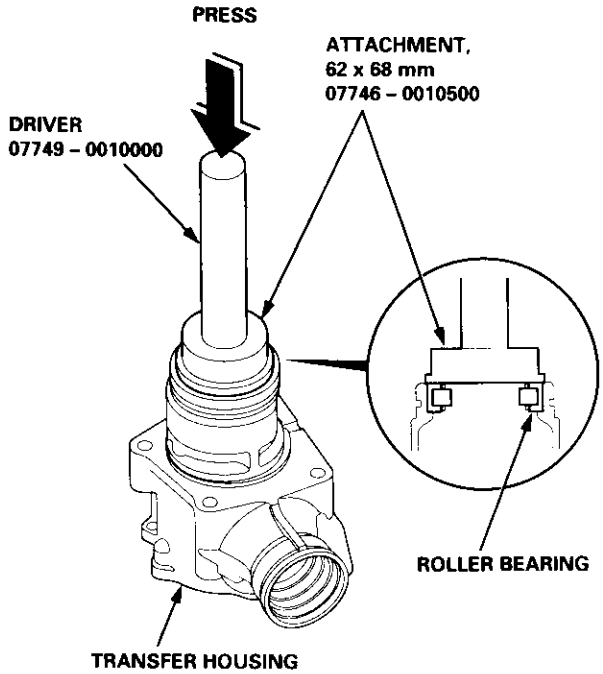
Transfer Housing Roller Bearing Replacement

NOTE: Coat all parts with ATF during reassembly.

1. Remove the roller bearing from the transfer housing.



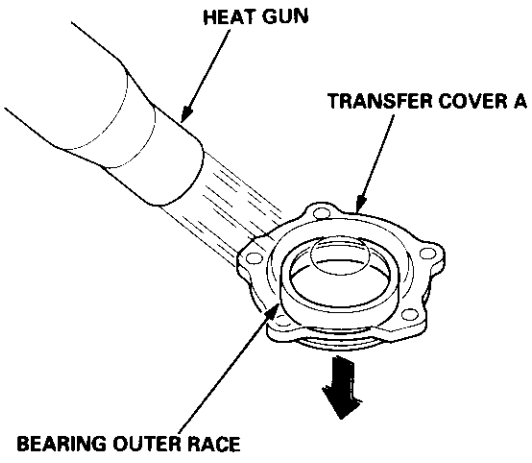
2. Install the new roller bearing using the special tools and a press.



Transfer Cover A Bearing Outer Race Replacement

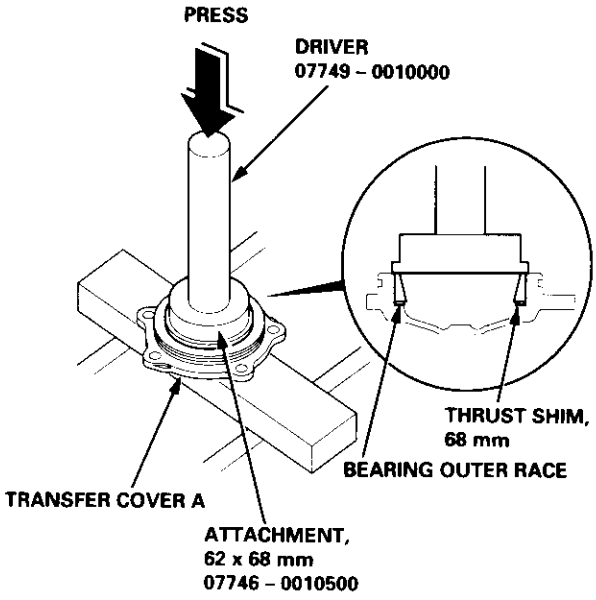
NOTE: Coat all parts with ATF during reassembly.

1. Remove the tapered roller bearing outer race from transfer cover A by heating the cover to almost 212°F (100°C) using a heat gun. Do not heat the cover over 212°F (100°C).



2. Install the 68 mm thrust shim in transfer cover A.

3. Install the tapered roller bearing outer race using the special tools and a press.

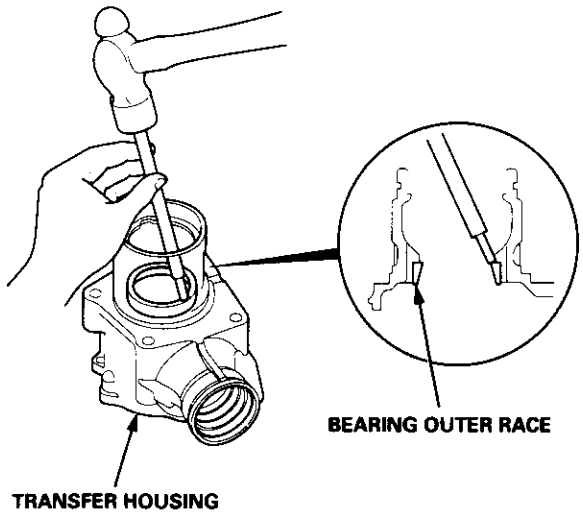


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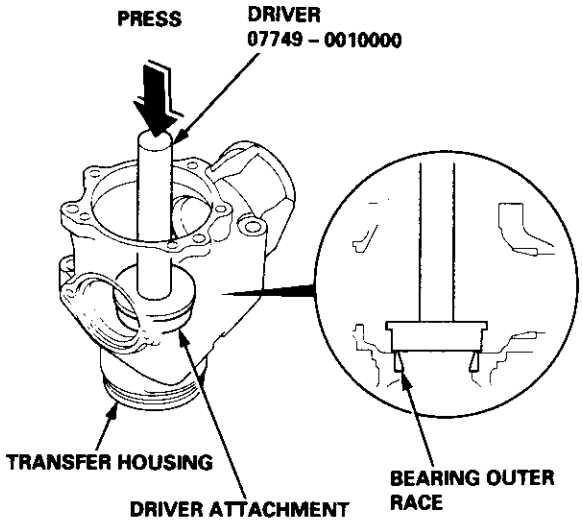
Transfer Housing Bearing Outer Race Replacement

NOTE: Coat all parts with ATF during reassembly.

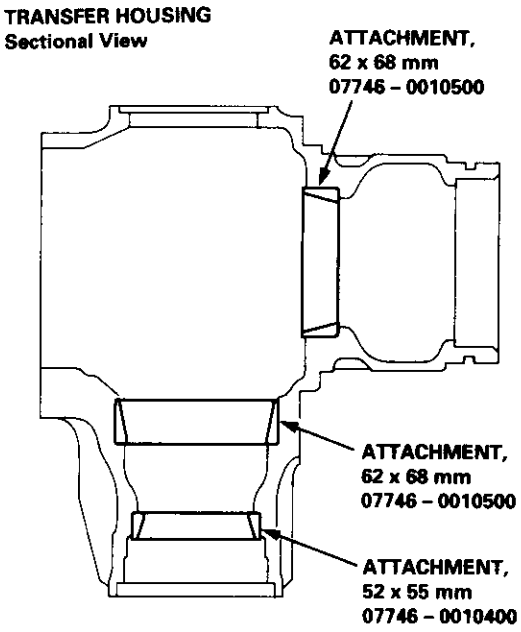
1. Remove the tapered roller bearing outer race from the transfer housing.



2. Install the new tapered roller bearing outer race using the special tools and a press.



Bearing Outer Race Locations and Special Tool Applications



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Transfer Assembly

Reassembly

NOTE:
- While reassembling the transfer assembly:
  - Check and adjust the transfer gear tooth contact.
  - Measure and adjust the transfer gear backlash.
  - Check and adjust the tapered roller bearing starting torque.
- Coat all parts with ATF during reassembly.
- Replace the tapered roller bearing and the bearing outer race as a set if either part is replaced.
- Replace the transfer drive gear and the transfer driven gear shaft as a set if either part is replaced.

Outline of Assembly

1. **Select the 35 mm thrust shim.**
   Perform this procedure if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.

2. **Preassemble the parts to check and adjust transfer gear backlash and transfer gear tooth contact.**

3. **Disassemble the parts, then assemble the transfer driven gear shaft and its related parts.**

4. **Measure and adjust the starting torque of the transfer driven gear shaft tapered roller bearing.**

5. **Assemble the transfer shaft and its related parts.**

6. **Measure and adjust the total starting torque.**

35 mm Thrust Shim Selection

1. Select the 35 mm thrust shim if the transfer driven gear shaft or the tapered roller bearing on the transfer driven gear shaft is replaced.

   Calculate the thickness of the 35 mm thrust shim using the formula below.

   FORMULA: $\frac{A}{100} - \frac{B}{100} + C = X$

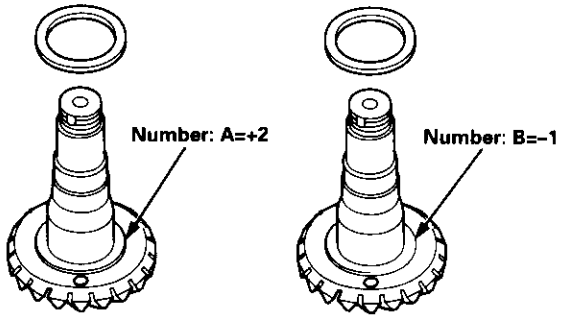
   A: Number on the existing transfer driven gear shaft
   B: Number on the replacement transfer driven gear shaft
   C: Thickness of the existing 35 mm thrust shim
   X: Thickness needed for the replacement 35 mm thrust shim

   NOTE: The number on the transfer driven gear shaft is shown in 1/100 mm.

EXAMPLE:

C: EXISTING 35 mm THRUST SHIM Thickness: C=1.05 mm

X: REPLACEMENT 35 mm THRUST SHIM Thickness: X=?? mm



A: EXISTING TRANSFER DRIVEN GEAR SHAFT

B: REPLACEMENT TRANSFER DRIVEN GEAR SHAFT

$$X = \frac{A}{100} - \frac{B}{100} + C$$
$$= \frac{2}{100} - \frac{-1}{100} + 1.05$$
$$= 0.02 + 0.01 + 1.05$$
$$= 1.08 \text{ (mm)}$$

Select 35 mm thrust shim thickness of 1.08 mm (0.043 in). If the tapered roller bearing on the transfer driven gear shaft is replaced.

Measure the thickness of the replacement bearing and the existing bearing, and calculate the difference of the bearing thickness. Adjust the thickness of the existing 35 mm thrust shim by the amount of difference in bearing thickness, and select the replacement 35 mm thrust shim.

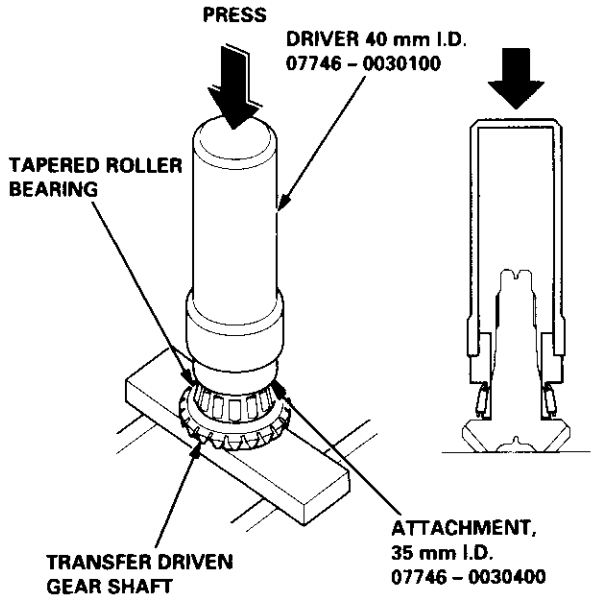
THRUST SHIM, 35 mm

Shim No.	Part Number	Thickness
A	41361 – PS3 – 000	0.72 mm (0.028 in)
B	41362 – PS3 – 000	0.75 mm (0.030 in)
C	41363 – PS3 – 000	0.78 mm (0.031 in)
D	41364 – PS3 – 000	0.81 mm (0.032 in)
E	41365 – PS3 – 000	0.84 mm (0.033 in)
F	41366 – PS3 – 000	0.87 mm (0.034 in)
G	41367 – PS3 – 000	0.90 mm (0.035 in)
H	41368 – PS3 – 000	0.93 mm (0.037 in)
I	41369 – PS3 – 000	0.96 mm (0.038 in)
J	41370 – PS3 – 000	0.99 mm (0.039 in)
K	41371 – PS3 – 000	1.02 mm (0.040 in)
L	41372 – PS3 – 000	1.05 mm (0.041 in)
M	41373 – PS3 – 000	1.08 mm (0.043 in)
N	41374 – PS3 – 000	1.11 mm (0.044 in)

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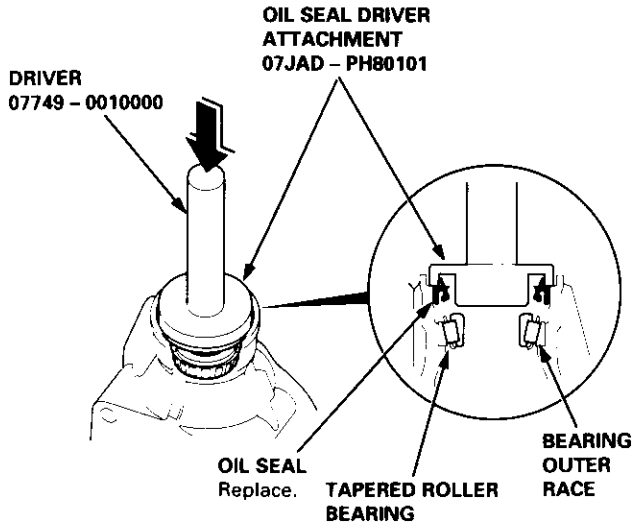
Transfer Gear Backlash Inspection and Transfer Gear Tooth Contact Inspection

2. Install the 35 mm thrust shim on the transfer driven gear shaft, then install the tapered roller bearing using the special tools and a press.

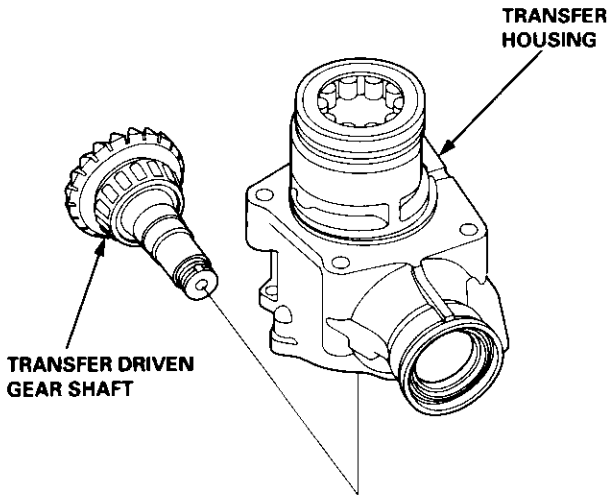


3. Place the tapered roller bearing on the bearing outer race of the companion flange side of the transfer housing.

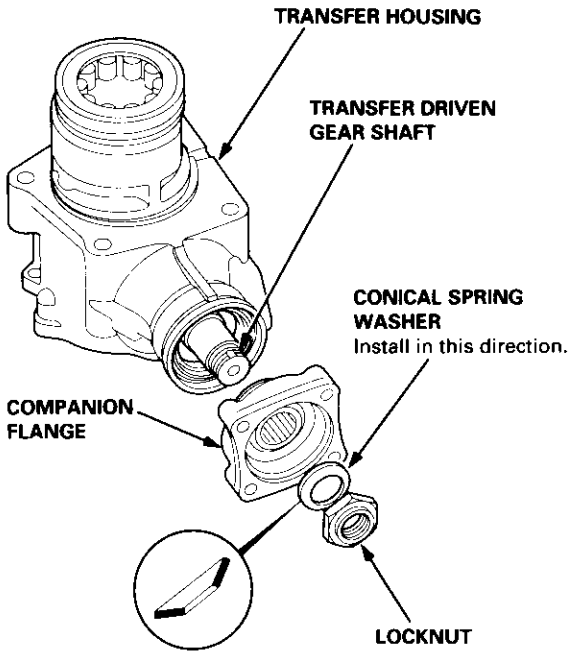
4. Install the new oil seal on the transfer housing using the special tools.



5. Install the transfer driven gear shaft in the transfer housing. Do not install the transfer spacer on the transfer driven gear shaft in this step.



6. Install the companion flange, conical spring washer, and locknut on the transfer driven gear shaft. Do not install the O-ring and the back-up ring on the transfer gear shaft in this step.



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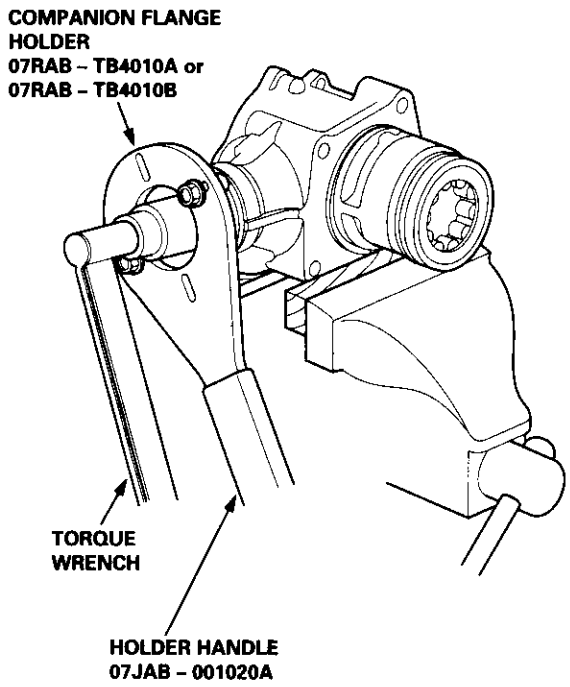
Reassembly (cont'd)

7. Secure the transfer housing in a bench vise with soft jaws, then install the special tool on the companion flange. To prevent damage to the transfer housing, always use soft jaws or equivalent materials between the transfer housing and the vise.

8. Tighten the locknut while measuring the starting torque so the starting torque is within 0.98 – 1.39 N·m (10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in).

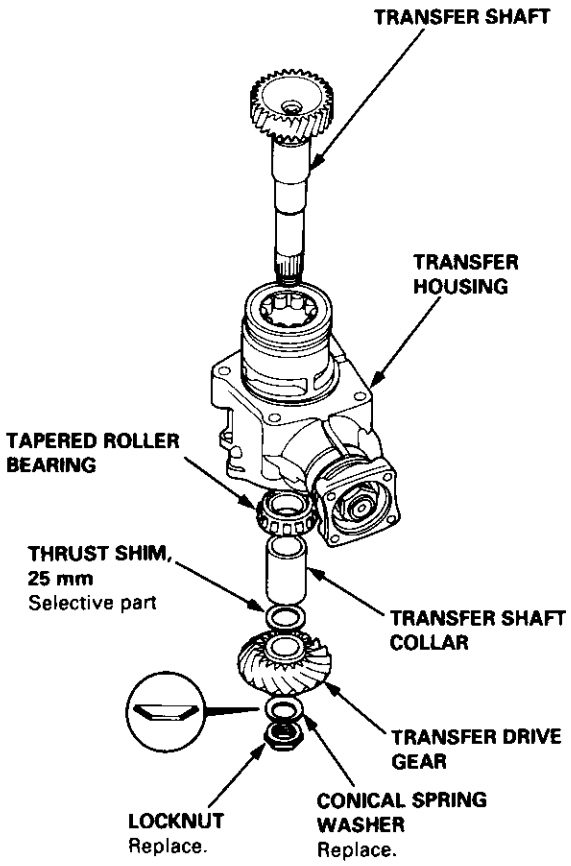
   NOTE:
   - Coat the threads of the locknut, and the shaft with ATF before installing the locknut.
   - Do not stake the locknut in this step.

   STARTING TORQUE:
   0.98 – 1.39 N·m
   (10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in)



9. Install the transfer shaft in the transfer housing, then install the tapered roller bearing, transfer shaft collar, 25 mm thrust shim, transfer drive gear, conical spring washer, and locknut on the transfer shaft.

   NOTE:
   - Coat the threads of the locknut, and the shaft with ATF before installing the locknut.
   - Do not stake the locknut in this step.



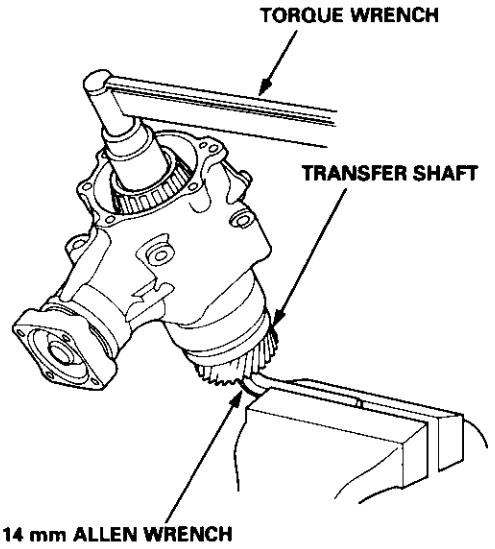
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10. Put a 14 mm Allen wrench in the gear side of the transfer shaft, then secure the Allen wrench in a bench vise.

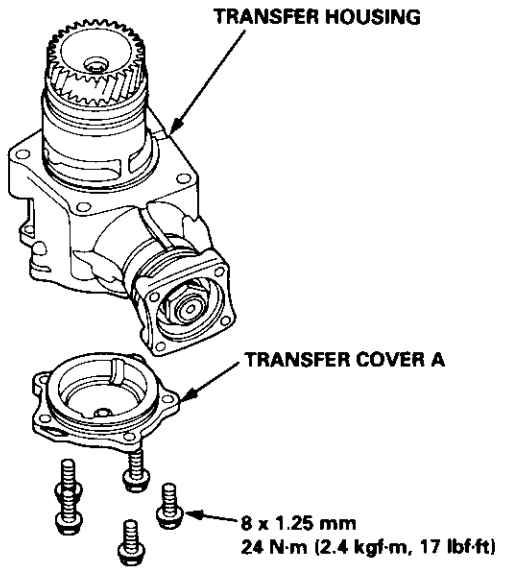
11. Tighten the transfer shaft locknut.

    NOTE:
    - The transfer shaft locknut has left-hand threads.
    - Do not stake the locknut in this step.

    TORQUE: 118 N·m (12.0 kgf·m, 87 lbf·ft)



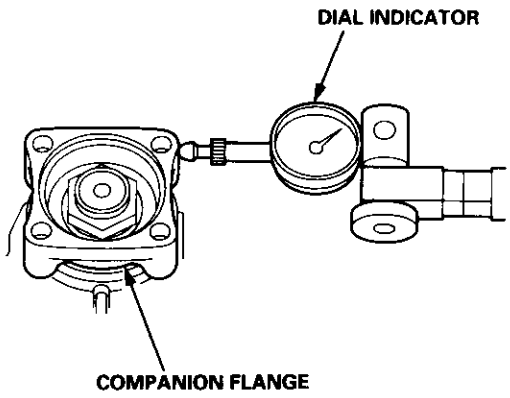
12. Temporarily install the transfer cover A without the O-ring.



13. Rotate the companion flange several times to seat the tapered roller bearing.

14. Set a dial indicator on the companion flange, then measure the transfer gear backlash.

    STANDARD: 0.06 – 0.16 mm (0.02 – 0.06 in)



15. If the measurement is not within the standard, remove the transfer shaft locknut and replace the 25 mm thrust shim. Select and install a new 25 mm thrust shim, then recheck the measurement. Do not use more than two 25 mm thrust shims to adjust the transfer gear backlash.

THRUST SHIM, 25 mm

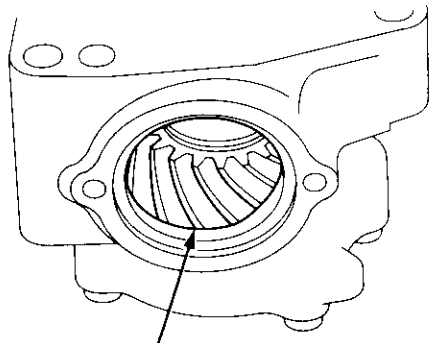
Shim No.	Part Number	Thickness
1	29411 – P1C – 000	1.70 mm (0.067 in)
2	29412 – P1C – 000	1.73 mm (0.068 in)
3	29413 – P1C – 000	1.76 mm (0.069 in)
4	29414 – P1C – 000	1.79 mm (0.070 in)
5	29415 – P1C – 000	1.82 mm (0.072 in)
6	29416 – P1C – 000	1.85 mm (0.073 in)
7	29417 – P1C – 000	1.88 mm (0.074 in)
8	29418 – P1C – 000	1.91 mm (0.075 in)
9	29419 – P1C – 000	1.94 mm (0.076 in)
10	29420 – P1C – 000	1.97 mm (0.078 in)
11	29421 – P1C – 000	2.00 mm (0.079 in)
12	29422 – P1C – 000	2.03 mm (0.080 in)
13	29423 – P1C – 000	2.06 mm (0.081 in)
14	29424 – P1C – 000	2.09 mm (0.082 in)
15	29425 – P1C – 000	2.12 mm (0.083 in)
16	29426 – P1C – 000	2.15 mm (0.085 in)
17	29427 – P1C – 000	2.18 mm (0.086 in)
18	29428 – P1C – 000	2.21 mm (0.087 in)
19	29429 – P1C – 000	2.24 mm (0.088 in)

(cont'd)

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Reassembly (cont'd)

16. Apply Prussian Blue to both sides of the transfer gear teeth lightly and evenly.

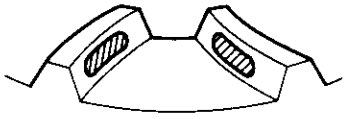


TRANSFER DRIVE GEAR

17. Rotate the companion flange in both directions until the transfer gear rotates one full turn in both directions.

18. Check the transfer gear tooth contact pattern.

CORRECT TOOTH CONTACT PATTERN



INCORRECT TOOTH CONTACT PATTERN



TOE CONTACT



HEEL CONTACT



FLANK CONTACT



FACE CONTACT

19. If the transfer gear tooth contact is incorrect, adjust the transfer gear tooth contact with a 35 mm or 25 mm thrust shim.

NOTE:
- To select a 35 mm thrust shim, refer to page 14-240.
- Do not use more than two 35 mm shims to adjust the transfer gear tooth contact.
- To select the 25 mm thrust shim, refer to page 14-243.
- Do not use more than two 25 mm shims to adjust the transfer gear tooth contact.

- **Toe Contact**
  Use a thicker 35 mm thrust shim to move the transfer driven gear shaft toward the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear away from the transfer driven gear shaft to adjust the transfer gear backlash as follows:
  - Increase the thickness of the 25 mm thrust shim.
  - Reduce the thickness of the 68 mm thrust shim by the amount of increased thickness of the 25 mm thrust shim.

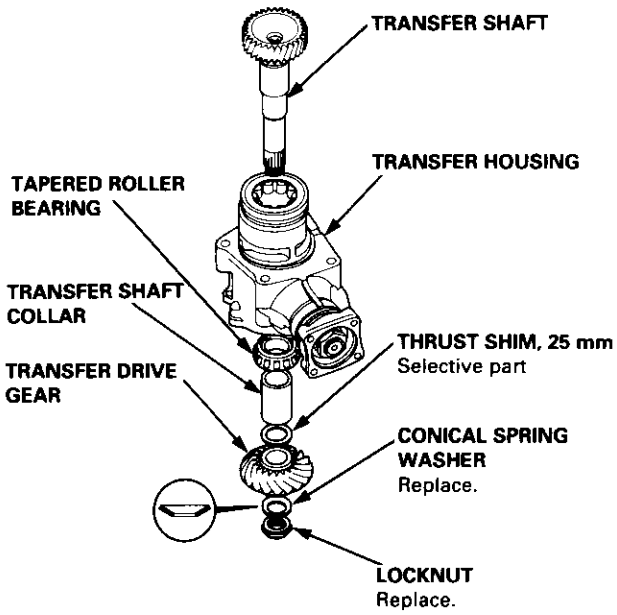
- **Heel Contact**
  Use a thinner 35 mm thrust shim to move the transfer driven gear shaft away from the transfer drive gear. Because this movement causes the transfer gear backlash to change, move the transfer drive gear toward the transfer driven gear shaft to adjust the transfer gear backlash as follows:
  - Reduce the thickness of the 25 mm thrust shim.
  - Increase the thickness of the 68 mm thrust shim by the amount of reduced thickness of the 25 mm thrust shim.

- **Flank Contact**
  Use a thinner thrust shim to move the transfer drive gear toward the transfer driven gear shaft. Flank contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Heel Contact.

- **Face Contact**
  Use a thicker thrust shim to move the transfer drive gear away from the transfer driven gear shaft. Face contact must be adjusted within the limits of the transfer gear backlash. If the backlash exceeds the limits, adjust as described under Toe Contact.

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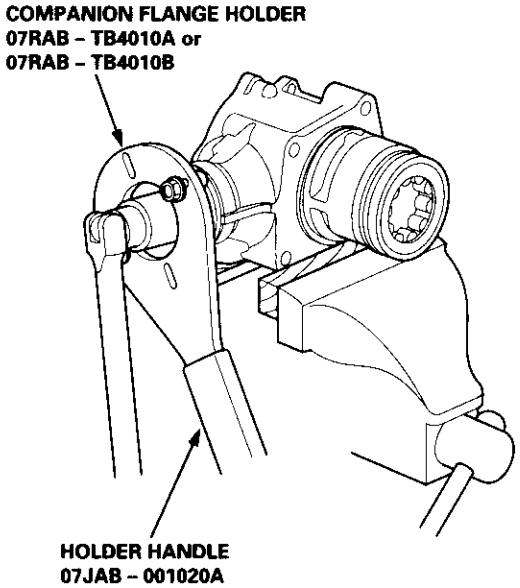
20. Remove the parts on the transfer shaft, and remove the transfer shaft from the transfer housing.



Transfer Driven Gear Shaft Starting Torque Inspection and Adjustment

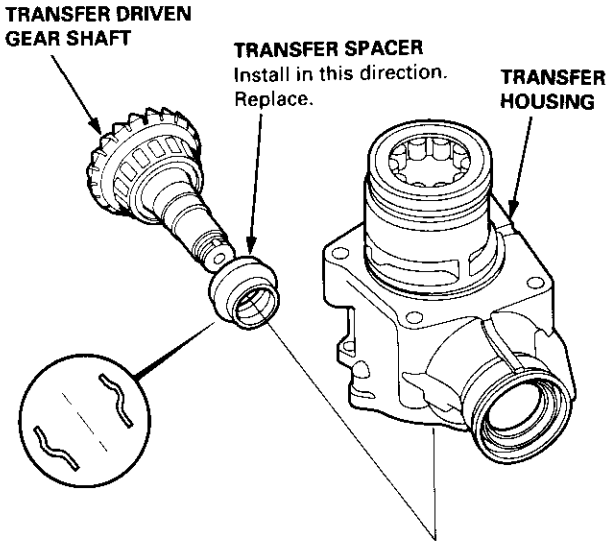
21. Secure the transfer housing in a bench vise with soft jaws. To prevent damage, always use soft jaws or equivalent materials between the transfer housing and the vise.

22. Install the special tool on the companion flange, then remove the transfer driven gear shaft locknut and the conical spring washer.



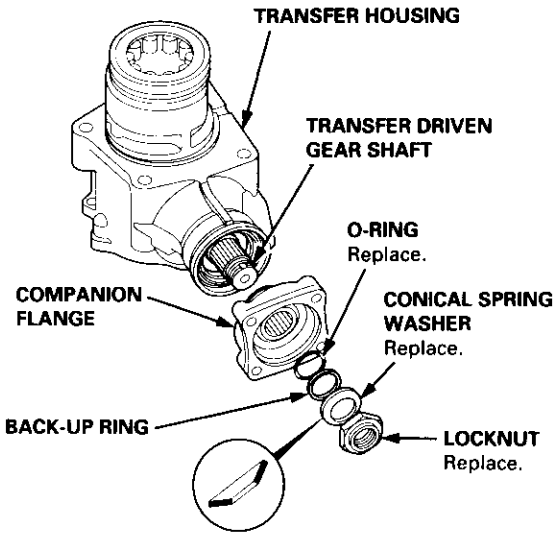
23. Remove the transfer driven gear shaft and the companion flange.

24. Install the new transfer spacer on the transfer driven gear shaft, then install them in the transfer housing.



25. Install the companion flange, O-ring, back-up ring, conical spring washer and locknut on the transfer driven gear shaft.

NOTE:
- Coat the threads of the locknut, and transfer shaft with ATF before installing the locknut.
- Install the conical spring washer in the direction shown.



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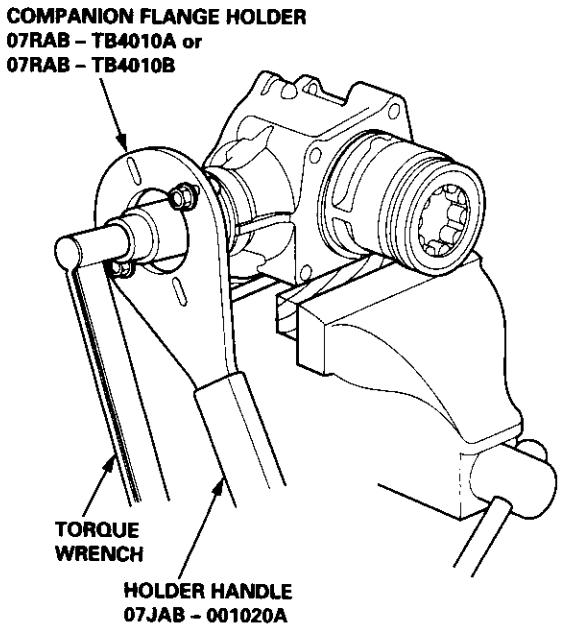
Reassembly (cont'd)

26. Secure the transfer housing in a bench vise with soft jaws. To prevent damage, always use soft jaws or equivalent materials between the transfer housing and the vise.

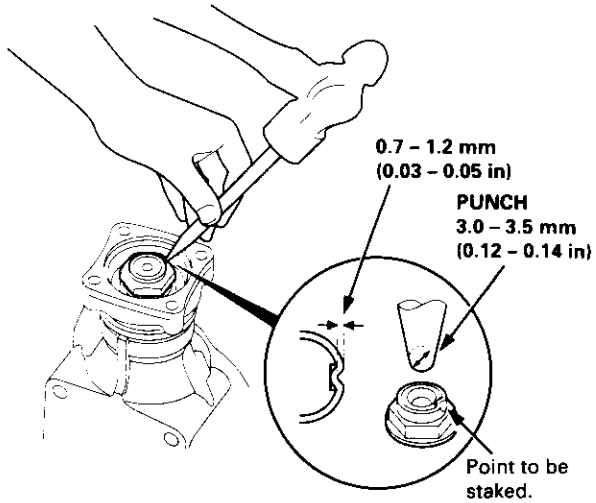
27. Install the special tool on the companion flange, then tighten the transfer driven gear shaft locknut while measuring the starting torque of the transfer driven gear shaft.

    STARTING TORQUE:
    0.98 – 1.39 N·m
    (10.0 – 14.2 kgf·cm, 8.68 – 12.3 lbf·in)
    TIGHTENING TORQUE:
    132 – 216 N·m
    (13.5 – 22.0 kgf·m, 98 – 159 lbf·ft)

    NOTE:
    - Rotate the companion flange several times to seat the tapered roller bearing, then measure the starting torque.
    - If the starting torque exceeds 1.39 N·m (14.2 kgf·cm, 12.3 lbf·in), replace the transfer spacer and reassemble the parts. Do not adjust the torque with the locknut loose.
    - If the tightening torque exceeds 216 N·m (22.0 kgf·m, 159 lbf·ft), replace the transfer spacer and reassemble the parts.
    - Write down the measurement of the starting torque: it is used to measure the total starting torque.

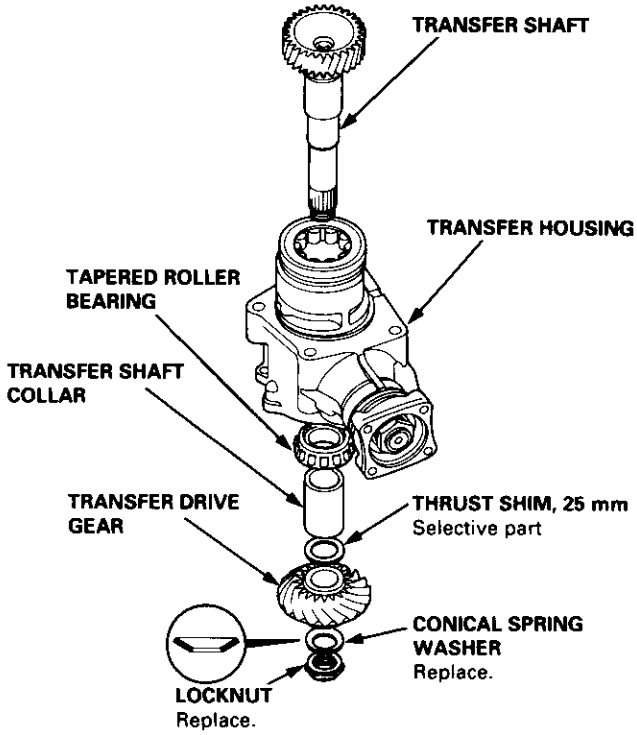


28. Stake the locknut into the transfer driven gear shaft using a 3.5 mm punch as shown.



29. Install the transfer shaft in the transfer housing, then install the tapered roller bearing, transfer shaft collar, 25 mm thrust shim, transfer drive gear, conical spring washer, and transfer shaft locknut on the transfer shaft.

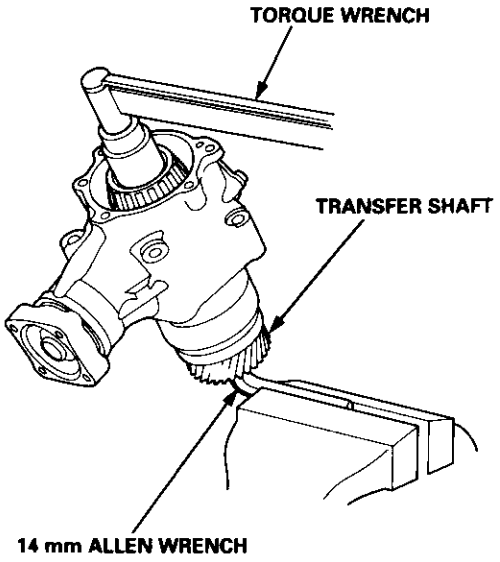
    NOTE:
    - Coat the threads of the locknut and transfer shaft with ATF before installing the locknut.
    - Install the conical spring washer in the direction shown.



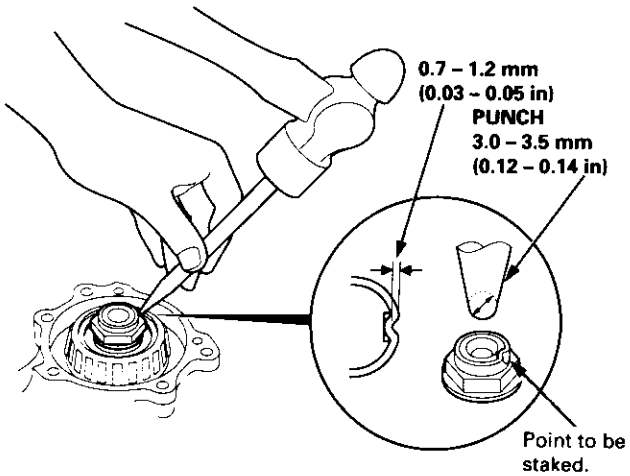
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30. Put a 14 mm Allen wrench in the gear side of the transfer shaft, then secure the Allen wrench in a bench vise. Tighten the transfer shaft locknut. (The locknut has left-hand threads.)

TORQUE: 118 N·m (12.0 kgf·m, 87 lbf·ft)

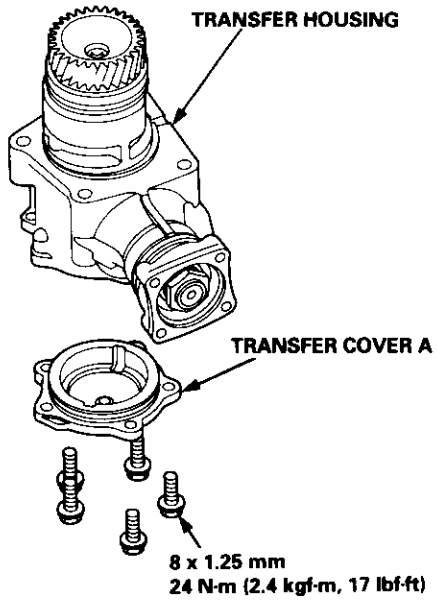


31. Stake the locknut on the transfer shaft using a 3.5 mm punch.



Total Starting Torque Inspection and Adjustment

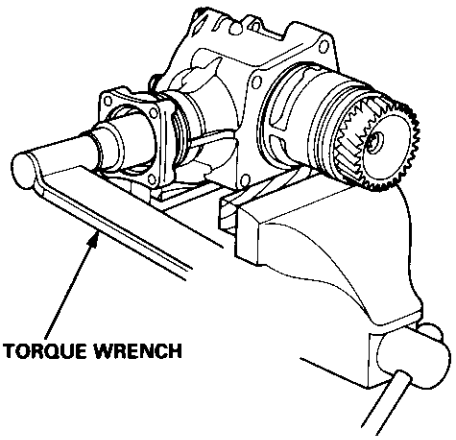
32. Temporarily install transfer cover A without the O-ring.



33. Secure the transfer housing in a bench vise with soft jaws, then rotate the companion flange several times to fit the tapered roller bearing. To prevent damage, always use soft jaws or equivalent materials between the transfer housing and the vise.

34. Measure the total starting torque.

TOTAL STARTING TORQUE:
1.70 – 2.08 N·m (17.3 – 21.2 kgf·cm, 15.0 – 18.4 lbf·in)
+ Transfer Driven Gear Shaft Starting Torque Value (wrote down in step 27).



(cont'd)

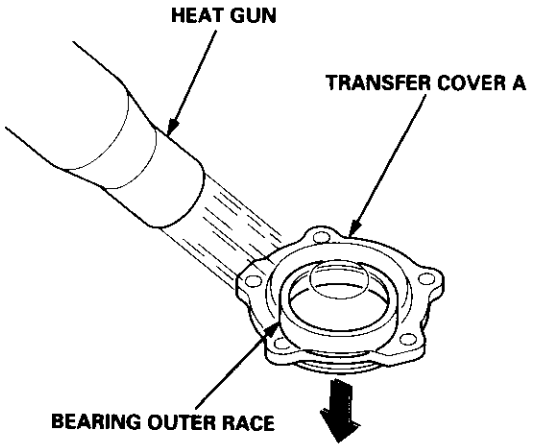
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Reassembly (cont'd)

35. Remove transfer cover A.

36. If the measurement is out of specification, remove the 68 mm thrust shim from transfer cover A by heating the cover to almost 212°F (100°C) using a heat gun. Do not heat the cover higher than 212°F (100°C). Let the cover cool to room temperature before adjusting the starting torque.

    If the measurement is within the specification, go to step 40.



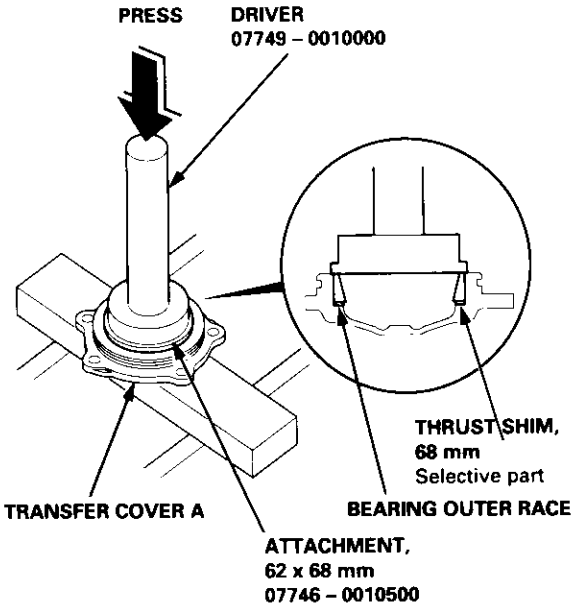
37. Select the 68 mm thrust shim.

THRUST SHIM, 68 mm

Shim No.	Part Number	Thickness
ZV	23974 – P1C – 020	1.41 mm (0.056 in)
ZW	23975 – P1C – 020	1.44 mm (0.057 in)
ZX	23976 – P1C – 020	1.47 mm (0.058 in)
ZY	23977 – P1C – 020	1.50 mm (0.059 in)
ZZ	23978 – P1C – 020	1.53 mm (0.060 in)
A	23941 – PW5 – 000	1.56 mm (0.061 in)
B	23942 – PW5 – 000	1.59 mm (0.063 in)
C	23943 – PW5 – 000	1.62 mm (0.064 in)
D	23944 – PW5 – 000	1.65 mm (0.065 in)
E	23945 – PW5 – 000	1.68 mm (0.066 in)
F	23946 – PW5 – 000	1.71 mm (0.067 in)
G	23947 – PW5 – 000	1.74 mm (0.069 in)
H	23948 – PW5 – 000	1.77 mm (0.070 in)
I	23949 – PW5 – 000	1.80 mm (0.071 in)
J	23950 – PW5 – 000	1.83 mm (0.072 in)
K	23951 – PW5 – 000	1.86 mm (0.073 in)
L	23952 – PW5 – 000	1.89 mm (0.074 in)
M	23953 – PW5 – 000	1.92 mm (0.076 in)
N	23954 – PW5 – 000	1.95 mm (0.077 in)
O	23955 – PW5 – 000	1.98 mm (0.078 in)
P	23956 – PW5 – 000	2.01 mm (0.079 in)
Q	23957 – PW5 – 000	2.04 mm (0.080 in)
R	23958 – PW5 – 000	2.07 mm (0.081 in)
S	23959 – PW5 – 000	2.10 mm (0.083 in)
T	23960 – PW5 – 000	2.13 mm (0.084 in)
U	23961 – PW5 – 000	2.16 mm (0.085 in)
V	23962 – PW5 – 000	2.19 mm (0.086 in)
W	23963 – PW5 – 000	2.22 mm (0.087 in)
X	23964 – PW5 – 000	2.25 mm (0.089 in)
Y	23965 – PW5 – 000	2.28 mm (0.090 in)
Z	23966 – PW5 – 000	2.31 mm (0.091 in)
AA	23967 – PW5 – 000	2.34 mm (0.092 in)
AB	23968 – PW5 – 000	2.37 mm (0.093 in)
AC	23969 – PW5 – 000	2.40 mm (0.094 in)
AD	23970 – PW5 – 000	2.43 mm (0.096 in)
AZ	23941 – PW8 – 000	2.46 mm (0.097 in)
BZ	23942 – PW8 – 000	2.49 mm (0.098 in)
CZ	23943 – PW8 – 000	2.52 mm (0.099 in)
DZ	23944 – PW8 – 000	2.55 mm (0.100 in)
EZ	23945 – PW8 – 000	2.58 mm (0.102 in)

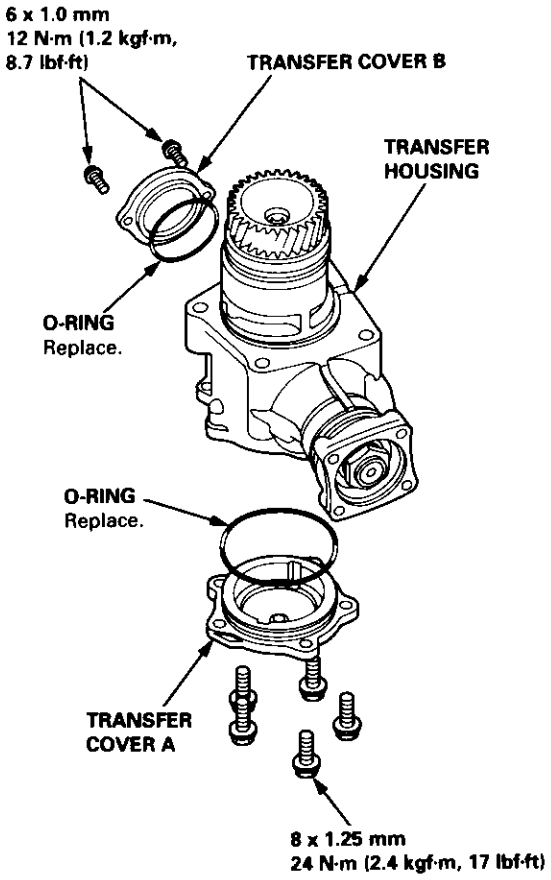
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38. Install the 68 mm thrust shim using the special tools.



39. After replacing the 68 mm thrust shim, recheck and make sure the total starting torque is within the specification.

40. Install the new O-rings on transfer covers A and B, then install the covers on the transfer housing.

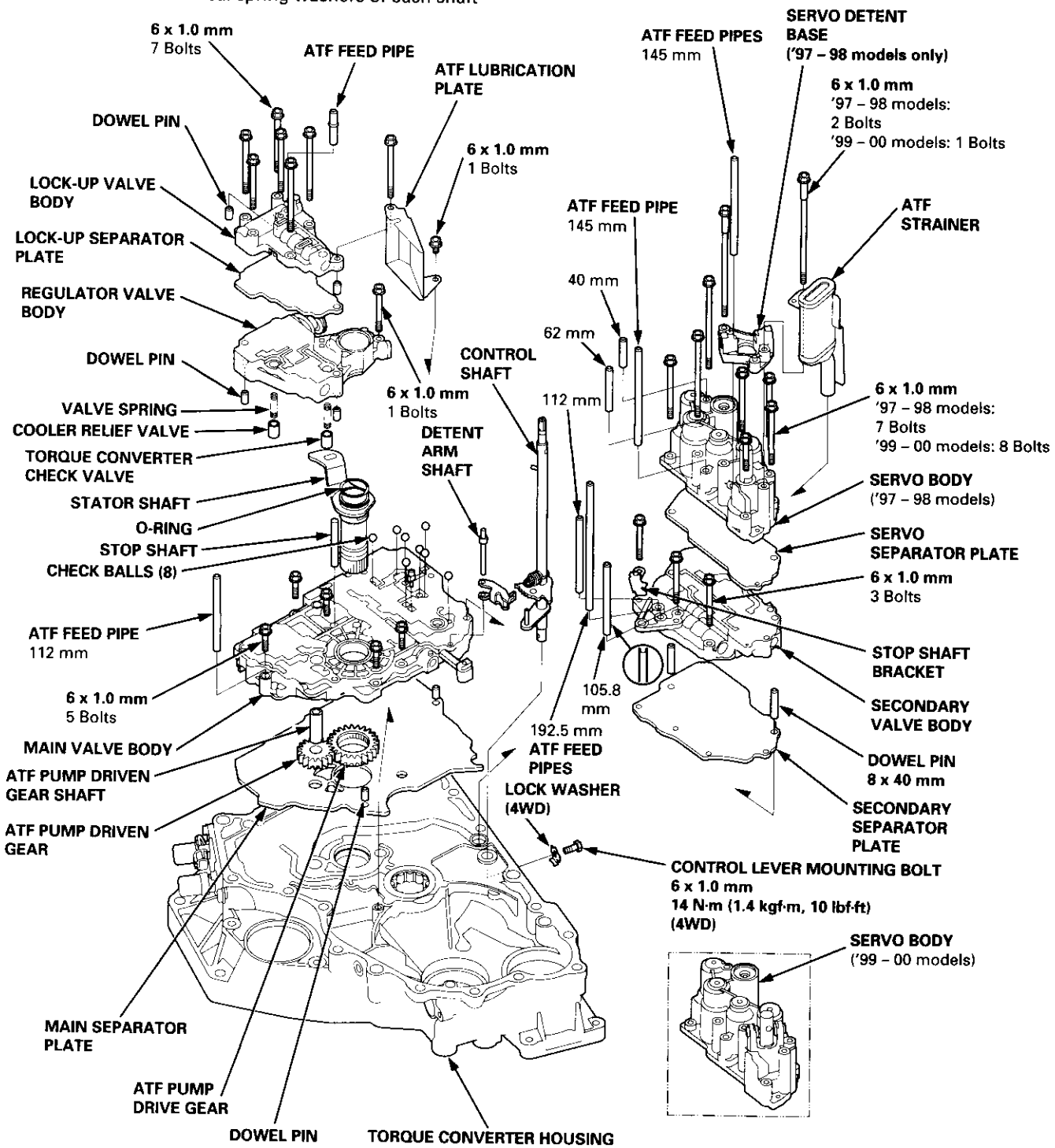


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Reassembly

NOTE:

- The illustration shows the 4WD automatic transmission; the 2WD is similar.
- Clean all parts with ATF.
- Replace the following parts:
  - — O-rings
  - — Lock washers
  - — Gaskets
  - — Sealing washers
  - — Locknuts and conical spring washers of each shaft

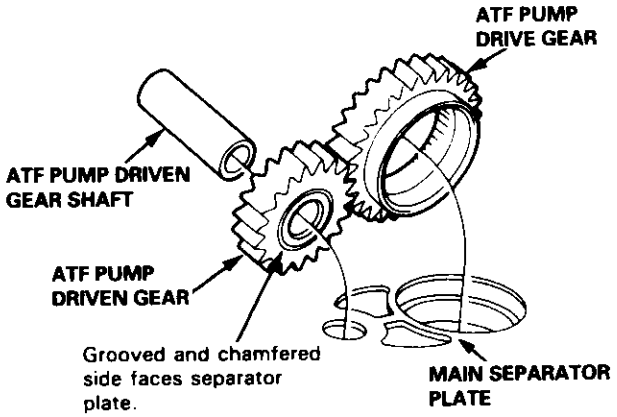


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1. Install the suction pipe collar and the ATF magnet (2WD) in the torque converter housing, if necessary.

2. Install the main separator plate and the two dowel pins on the torque converter housing.

3. Install the ATF pump drive gear, ATF pump driven gear, and ATF pump driven gear shaft on the torque converter housing. Install the ATF pump driven gear with its grooved and chamfered side facing down.

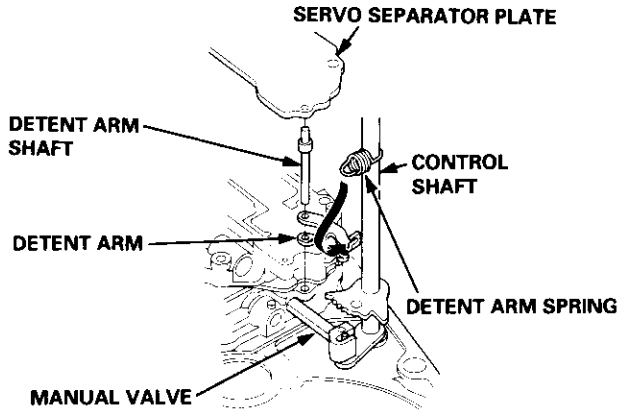


4. Loosely install the main valve body with five bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.

5. Install the secondary valve body, separator plate, and two dowel pins on the main valve body. Do not install the bolts.

6. Install the control shaft in the housing along with the manual valve.

7. Install the detent arm and arm shaft in the main valve body, then hook the detent arm spring to the detent arm.



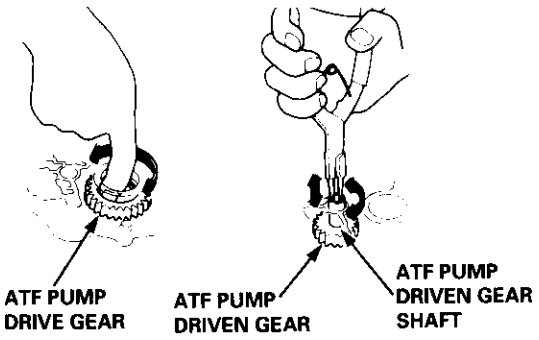
8. Install the servo body and separator plate on the secondary valve body ('97 – 98 models: seven bolts, '99 – 00 models: eight bolts).

9. Install the servo detent base ('97 – 98 models only) and the ATF strainer ('97 – 98 models: two bolts, '99 – 00 models: one bolt).

10. Tighten the five bolts on the main valve body to 12 N·m (1.2 kgf·m, 8.7 lbf·ft).

11. Make sure the ATF pump drive gear and ATF pump driven gear shaft move smoothly. If they don't, loosen the bolts on the main valve body, and disassemble the valve bodies. Realign the ATF pump driven gear shaft and reassemble the valve bodies, then retighten the bolts to 12 N·m (1.2 kgf·m, 8.7 lbf·ft).

CAUTION: Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.



12. Install the stator shaft and stop shaft.

13. Install the bolts and the stop shaft bracket on the secondary valve body, then tighten the bolts (three bolts).

14. Install the torque converter check valve, cooler relief valve, and valve springs in the regulator valve body, then install the regulator valve body on the main valve body (one bolt).

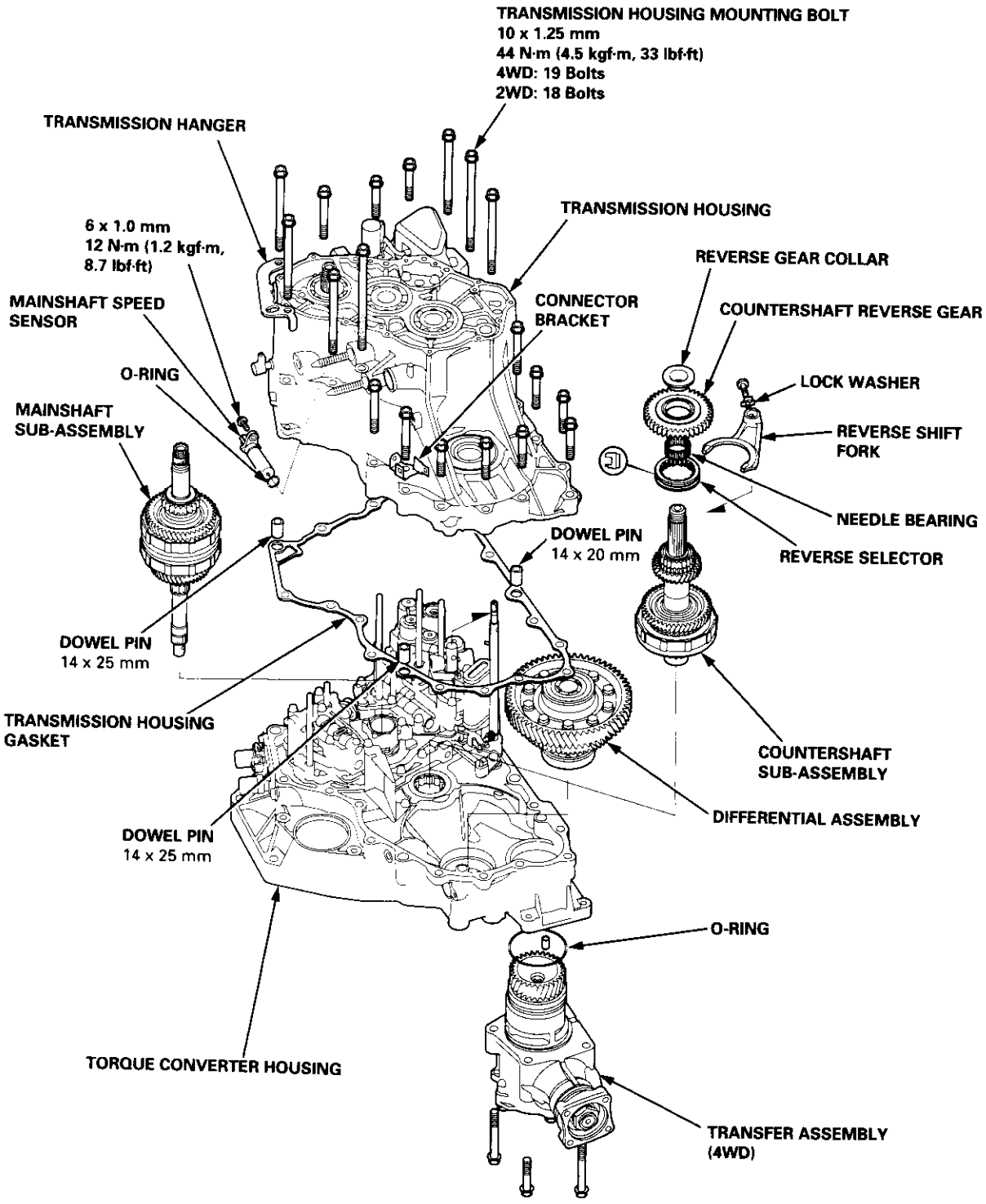
15. Install the lock-up valve body, separator plate, two dowel pins and lubrication plate (eight bolts).

16. Install the one ATF feed pipe in the main valve body, the three ATF feed pipes in the secondary valve, the three ATF feed pipes in the servo body and the one ATF feed pipe in the lock-up valve body.

NOTE: Install the 105.8 mm ATF feed pipe with its filter side away from the secondary valve body; the filter is on the 105.8 mm ATF feed pipe, which is only on the '98 – 00 models. (cont'd)

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Reassembly (cont'd)



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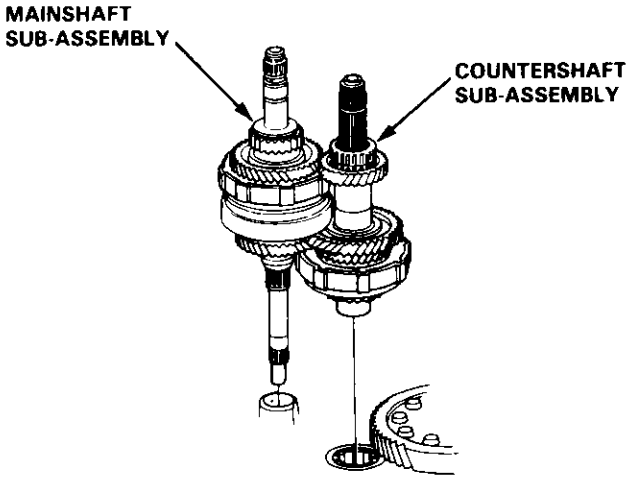
17. Install the sub-shaft assembly in the transmission housing (see page 14-210 and 14-211).

18. Install the ATF magnet (4WD) in the transmission housing, if necessary.

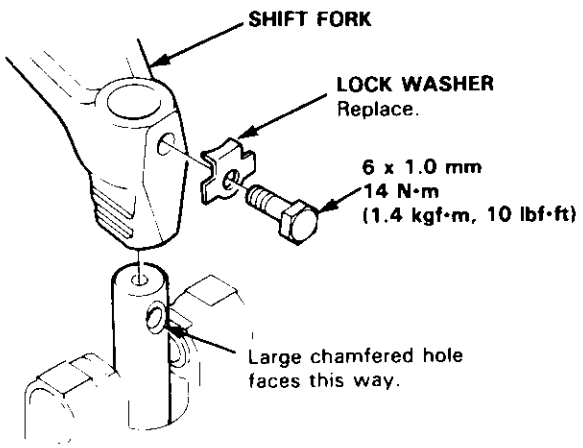
19. Install the reverse idler gear and gear shaft holder (see page 14-231).

20. Install the differential assembly in the torque converter housing.

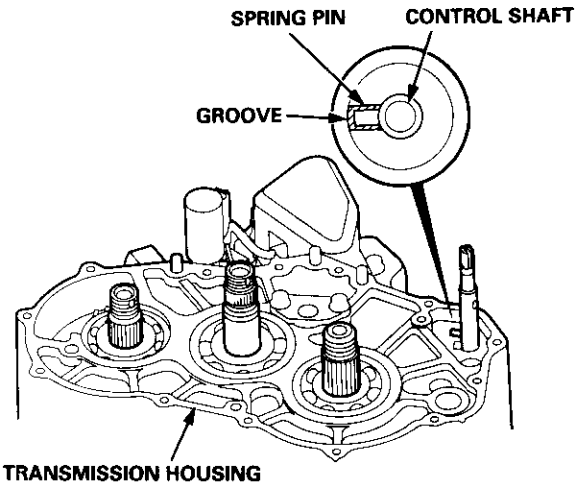
21. Assemble the mainshaft and countershaft sub-assembly (see page 14-206 and 14-207), then install them together in the torque converter housing.



22. Turn the shift fork so the large chamfered hole is facing the fork bolt hole, then install the shift fork with the reverse selector and torque the lock bolt. Bend the lock tab against the bolt head.



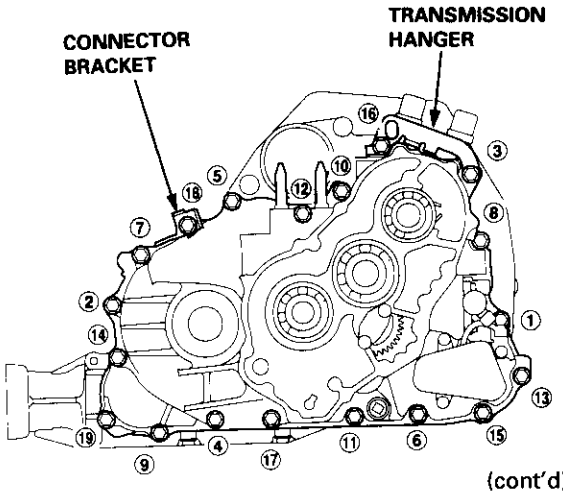
23. Install the reverse gear with the collar and needle bearing on the countershaft.
24. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.



25. Place the transmission housing on the torque converter housing with a new gasket and the three dowel pins.
    Make sure that the mainshaft speed sensor is not installed on the transmission housing before installing the transmission housing on the torque converter housing.
26. Install the transmission housing mounting bolts along with the transmission hanger and the connector bracket, then torque the bolts in two or more steps in the sequence shown.

    NOTE: The illustration shows the 4WD automatic transmission. The 4WD has 19 transmission housing mounting bolts; the 2WD has 18 bolts.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



(cont'd)

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Reassembly (cont'd)

27. Install the mainshaft speed sensor (with new O-ring) on the transmission housing.

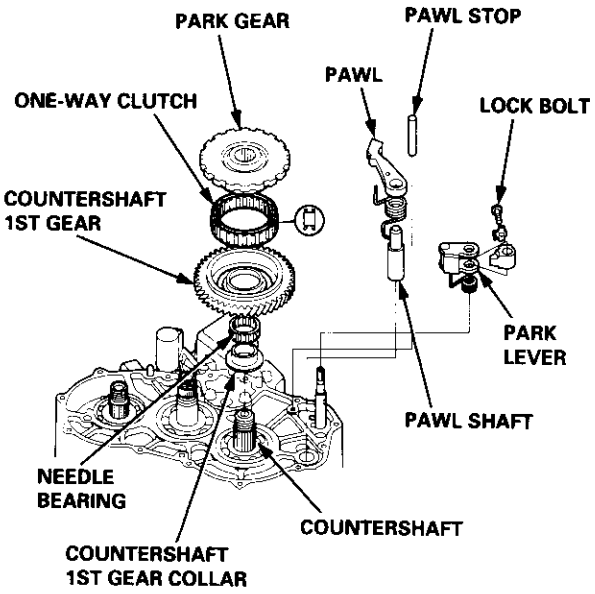
28. Install the park lever on the control shaft, then install the lock bolt with a new lock washer. Do not bend the lock tab of the lock washer in this step; bend it after checking the park pawl engagement in step 45.

29. Assemble the one-way clutch and the park gear on the countershaft 1st gear (see page 14-209).

30. Lubricate these parts with ATF:
    - Countershaft threads
    - Old locknut threads and flat end
    - Old conical spring washer
    - Park gear contact area with conical spring washer

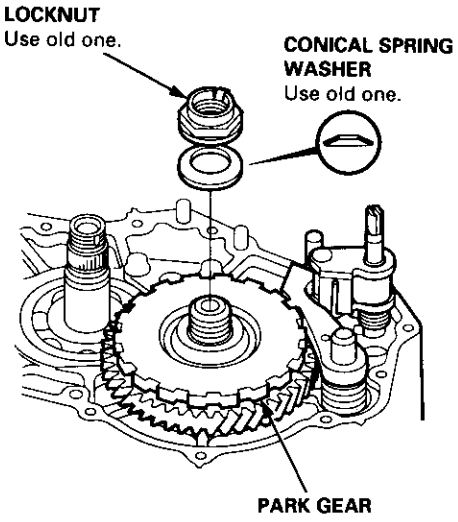
31. Install the countershaft 1st gear collar, needle bearing, and the countershaft 1st gear/park gear assembly on the countershaft.

32. Install the park pawl shaft, pawl spring, pawl, and pawl stop on the transmission housing, then engage the pawl with the park gear.

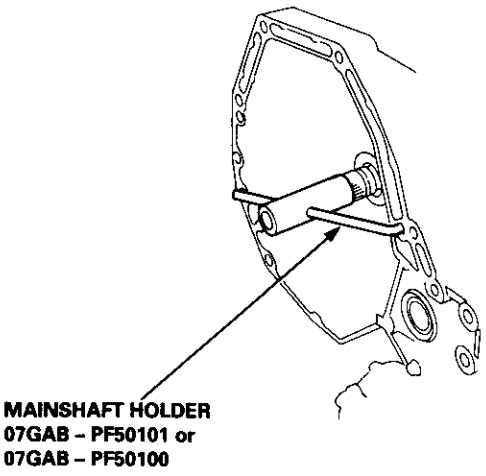


33. Install the old locknut and the old conical spring washer on the countershaft. Tighten the old locknut to seat the park gear to the specified torque, then remove the washer and locknut. The locknut has left-hand threads. Do not use an impact wrench. Always use a torque wrench to tighten the locknut.

TORQUE: 103 N·m (10.5 kgf·m, 75.9 lbf·ft)



34. Slip the special tool onto the mainshaft.



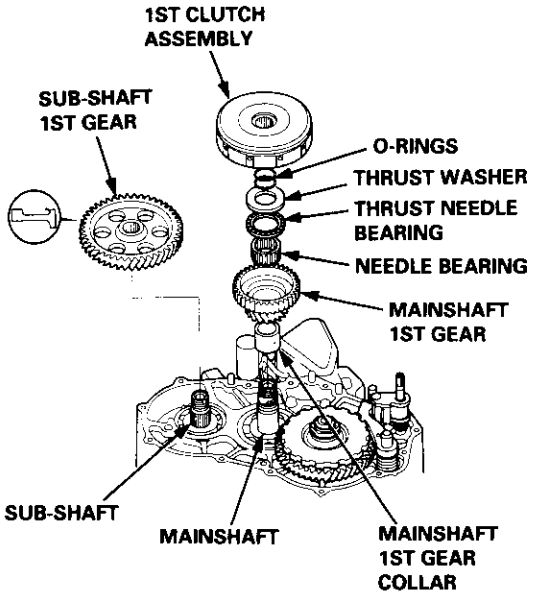
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35. Install the sub-shaft 1st gear on the sub-shaft.

36. Install the mainshaft 1st gear collar, mainshaft 1st gear, needle bearing, thrust needle bearing, and the thrust washer on the mainshaft.

37. Wrap the shaft splines with tape to prevent O-ring damage, then install new O-rings on the mainshaft.

38. Install the 1st clutch assembly on the mainshaft.

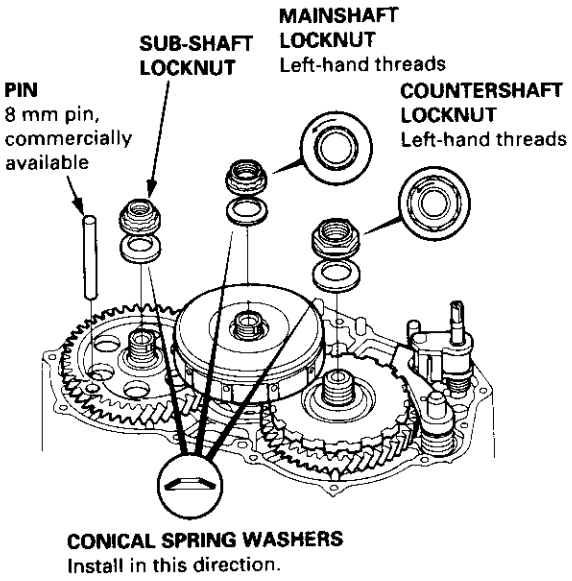


39. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert an 8 mm pin to hold the sub-shaft while tightening the sub-shaft locknut.

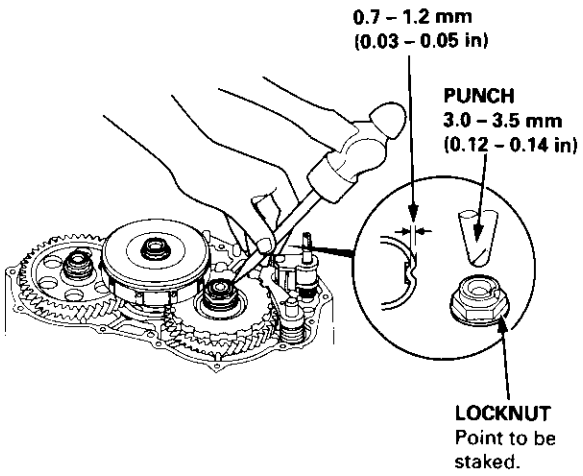
40. Install new conical spring washers and new locknuts on each shaft. Install the washers in the direction shown.

41. Tighten the locknuts to the specified torque. Mainshaft and countershaft locknuts have left-hand threads. Do not use an impact wrench. Always use a torque wrench to tighten the locknuts.

LOCKNUT TORQUE:
MAINSHAFT: 78 N·m (8.0 kgf·m, 58 lbf·ft)
COUNTERSHAFT: 103 N·m (10.5 kgf·m, 75.9 lbf·ft)
SUB-SHAFT: 93 N·m (9.5 kgf·m, 69 lbf·ft)



42. Stake each locknut using a 3.5 mm punch.



(cont'd)

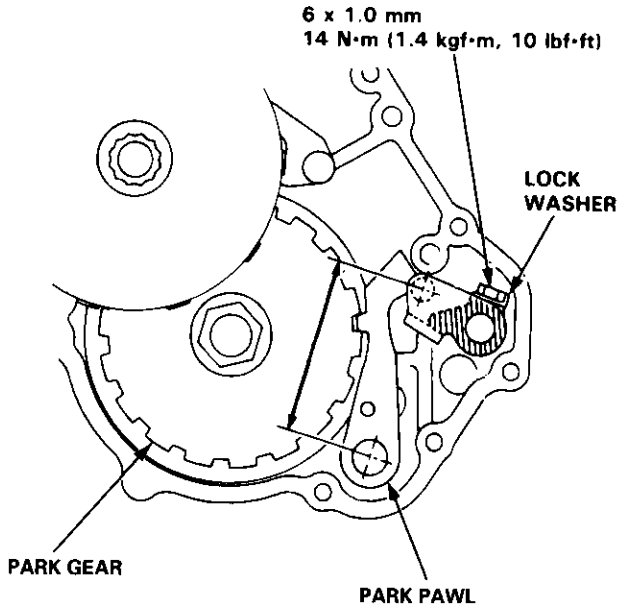
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Reassembly (cont'd)

43. Set the park lever in [P] position, then verify that the park pawl engages the park gear.

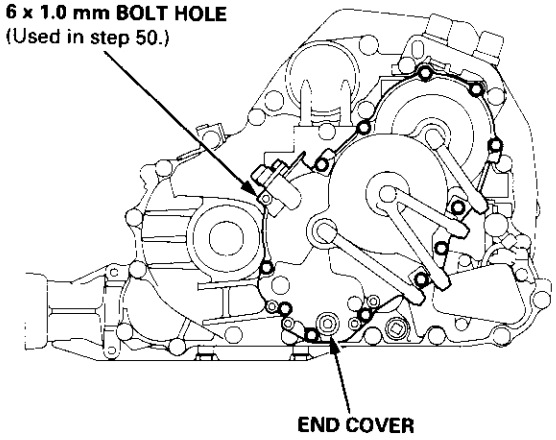
44. If the pawl does not engage fully, check the distance between the park pawl shaft and the park lever roller pin (see page 14-231).

45. Tighten the lock bolt and bend the lock tab.

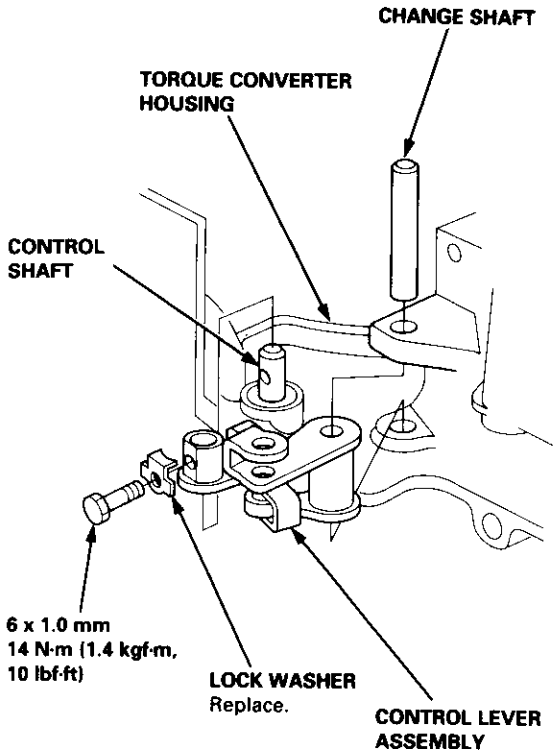


46. Install the end cover with two dowel pins and a new gasket (twelve bolts).

TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

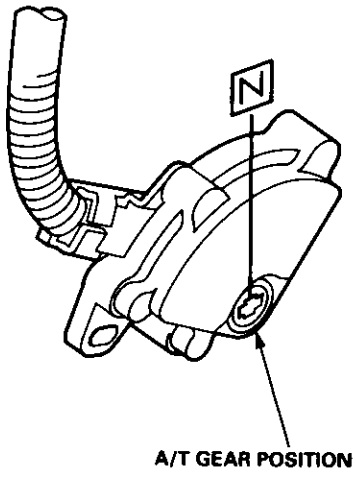


47. Install the control lever assembly on the control shaft. (4WD)



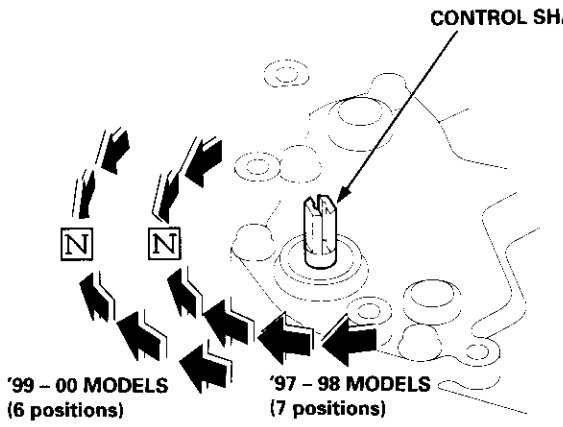
48. Set the A/T gear position switch to [N] position.

NOTE: The A/T gear position switch clicks in [N] position.

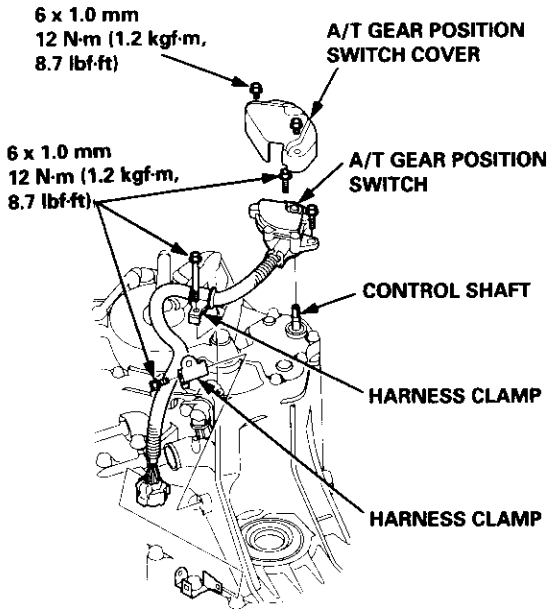


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49. Set the control shaft to [N] position, and install the A/T gear position switch on it.

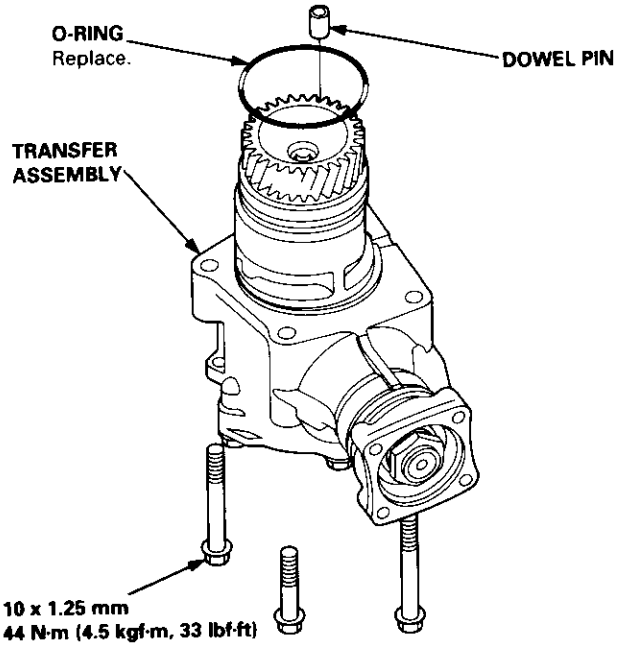


50. Install the A/T gear position switch cover, then install the harness clamps of the A/T gear position switch harness on the end cover and the transmission housing.



51. Clean the areas where the transfer assembly contacts the transmission with solvent or carburetor cleaner, dry with compressed air, then coat the contact areas with ATF. (4WD)

52. Install the transfer assembly with a new O-ring. Do not allow dust or other foreign particles to enter the transmission. (4WD)

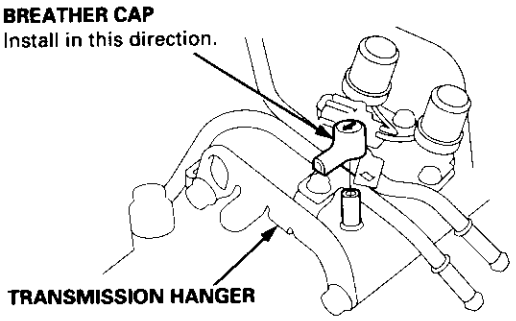


53. Install the cooler lines with the line bolts and new sealing washers.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

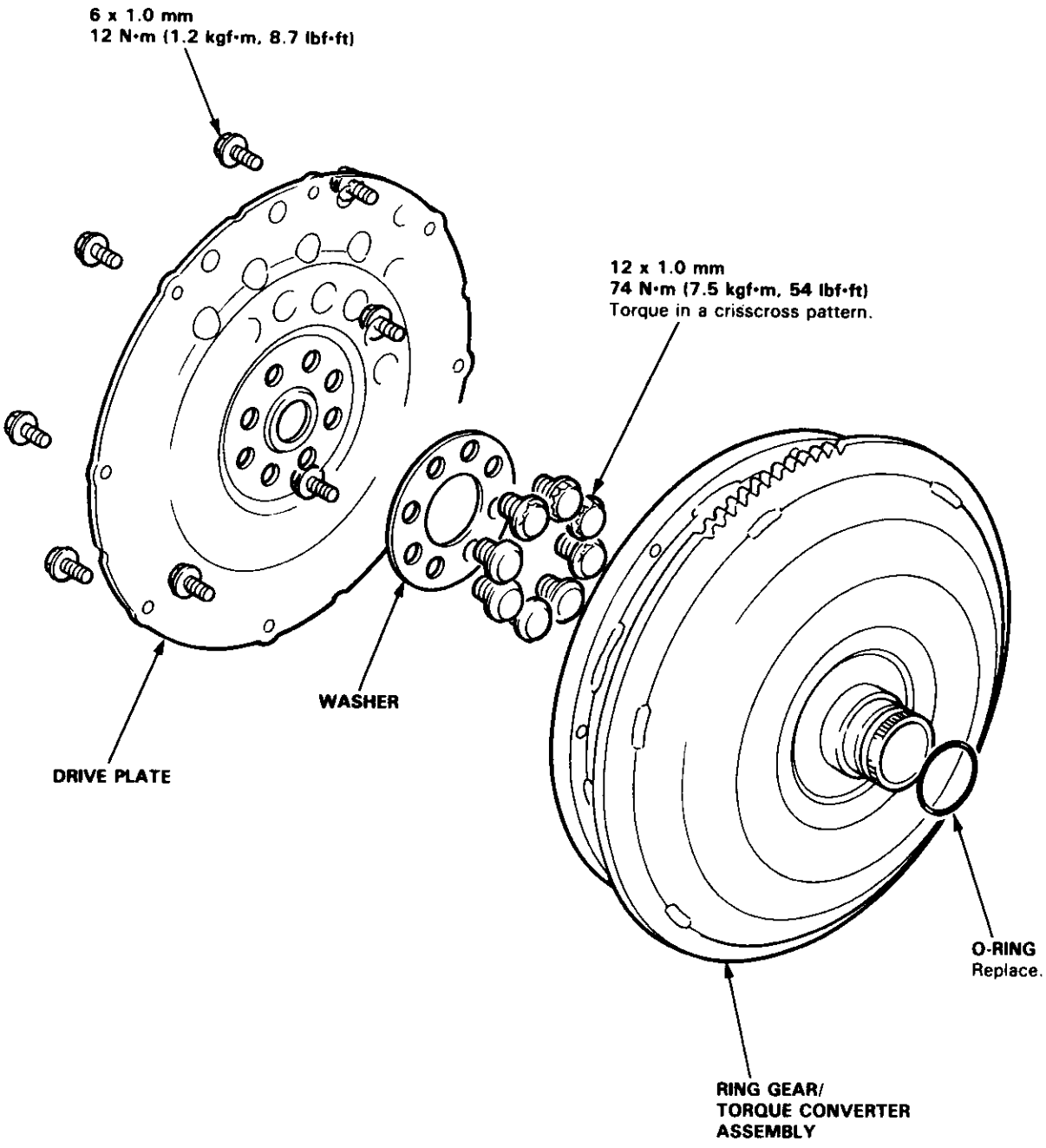
54. Install the ATF dipstick.

55. Install the breather cap on the breather pipe so its arrow points to the transmission hanger.



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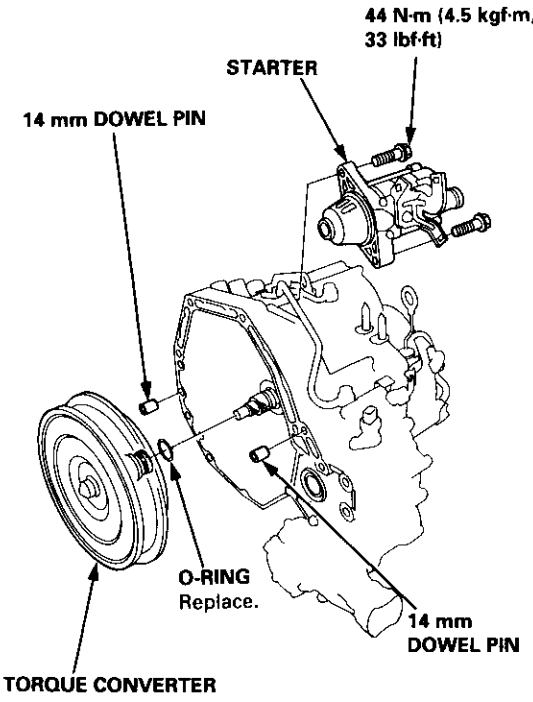
Torque Converter/Drive Plate



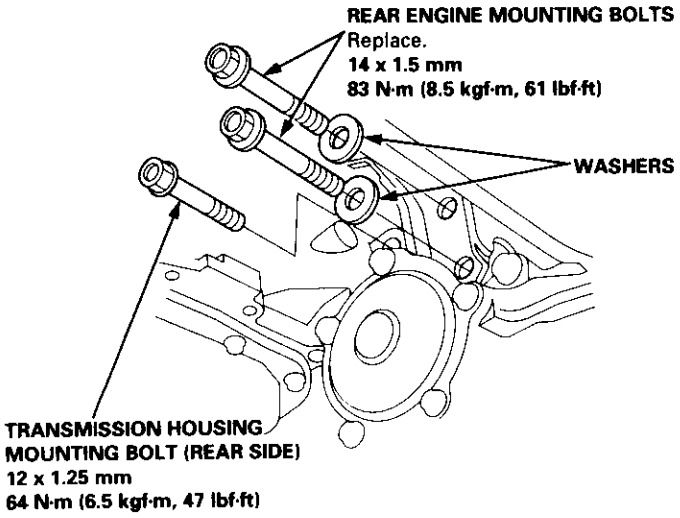
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Installation

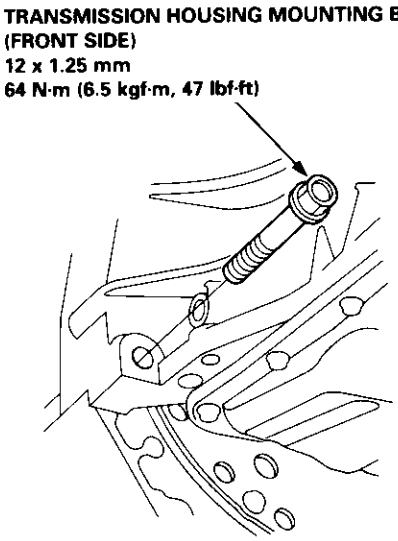
1. Flush the ATF cooler as described on page 14-264 and 14-265.
2. Install the torque converter assembly on the mainshaft with a new O-ring.
3. Install the starter on the transmission housing, and install the 14 mm dowel pins in the torque converter housing.



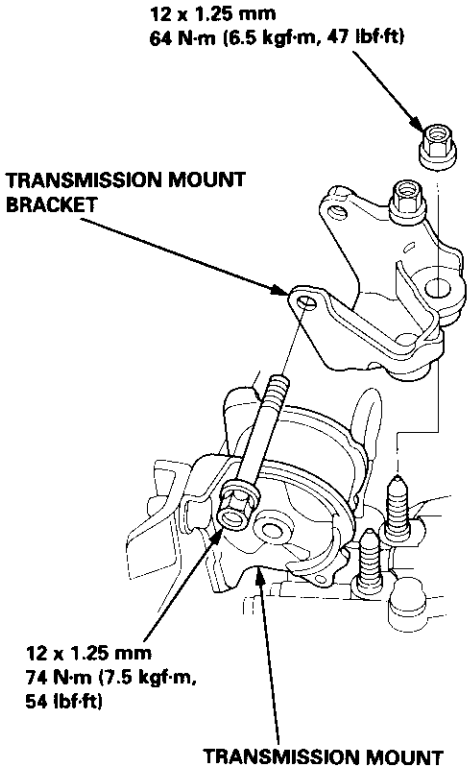
4. Place the transmission on a jack, and raise it to engine level.
5. Attach the transmission to the engine, then install the rear engine mounting bolts and the transmission housing mounting bolt (rear side).



6. Install the transmission housing mounting bolt (front side).



7. Install the transmission mount bracket. Tighten the bolt loosely, then tighten the nuts to the specified torque, and tighten the bolt to the specified torque.

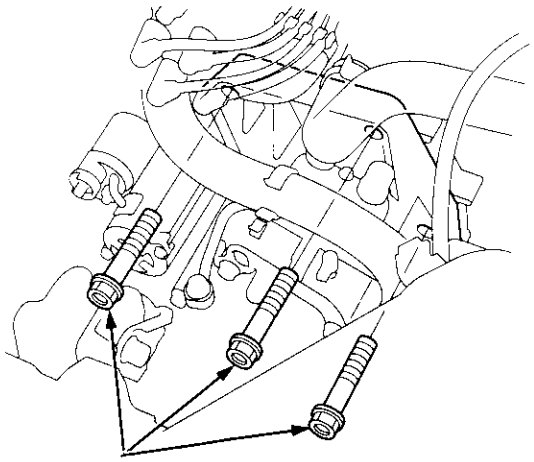


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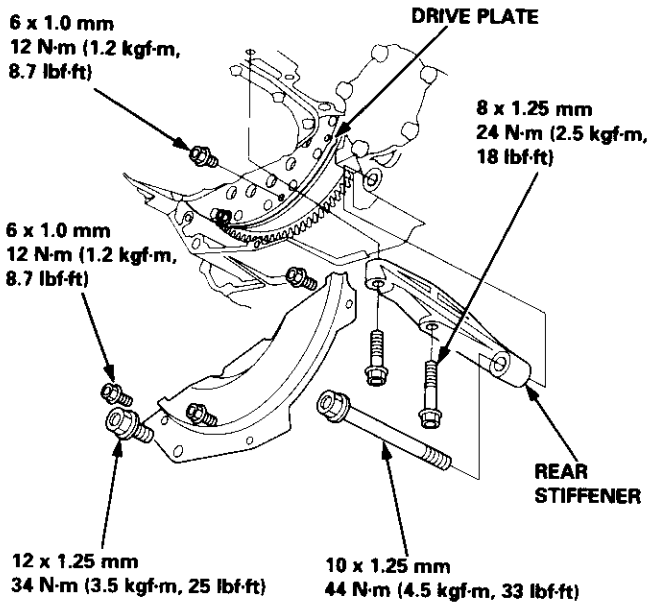
Installation (cont'd)

8. Install the transmission housing mounting bolts.



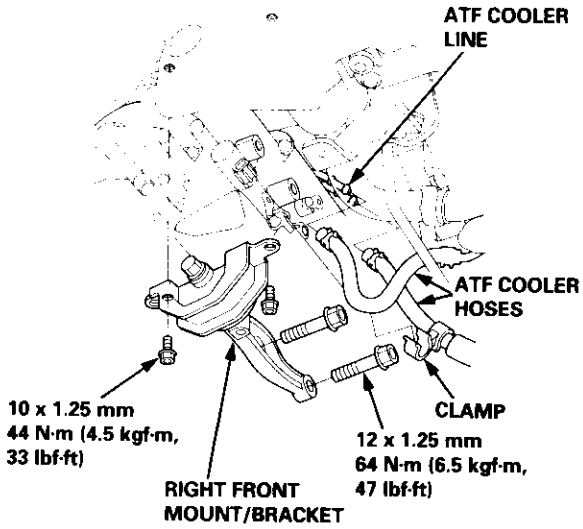
TRANSMISSION HOUSING MOUNTING BOLTS
12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)

9. Remove the transmission jack.
10. Attach the torque converter to the drive plate with eight bolts. Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.



11. Install the torque converter cover and the rear stiffener.
12. Tighten the crankshaft pulley bolt as necessary (see section 5).

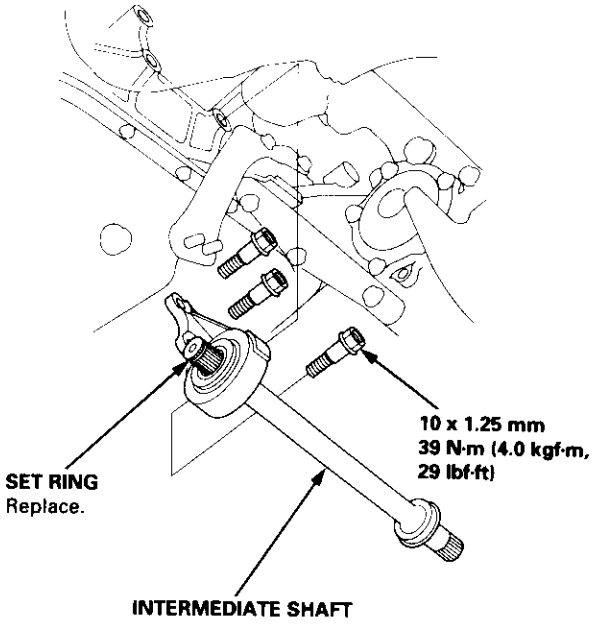
13. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-266).



14. Install the right front mount/bracket.

15. Install new set rings on the ends of the intermediate shaft and the driveshaft.

16. Clean the areas where the intermediate shaft contacts the transmission (differential) with solvent or carburetor cleaner, and dry with compressed air. Then install the intermediate shaft in the differential. While installing the intermediate shaft, be sure not to allow dust or other foreign particles to enter the transmission.

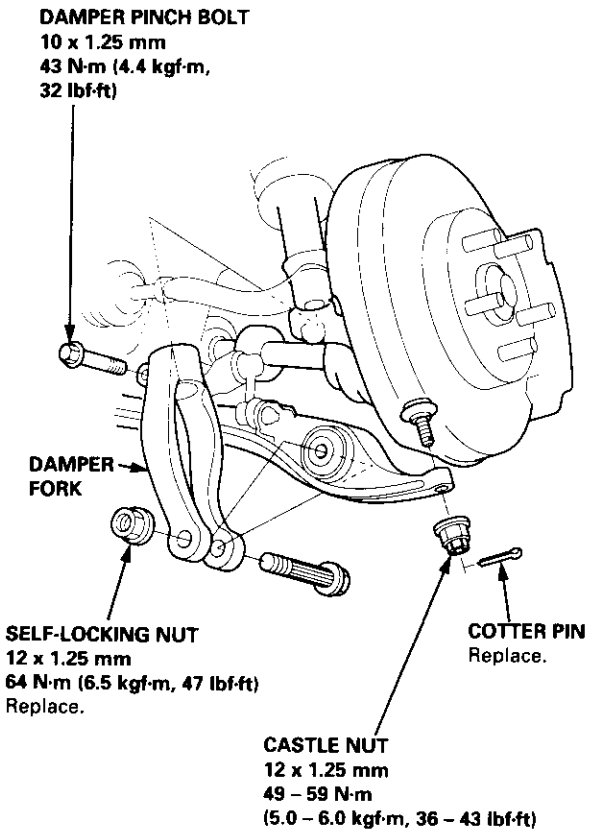


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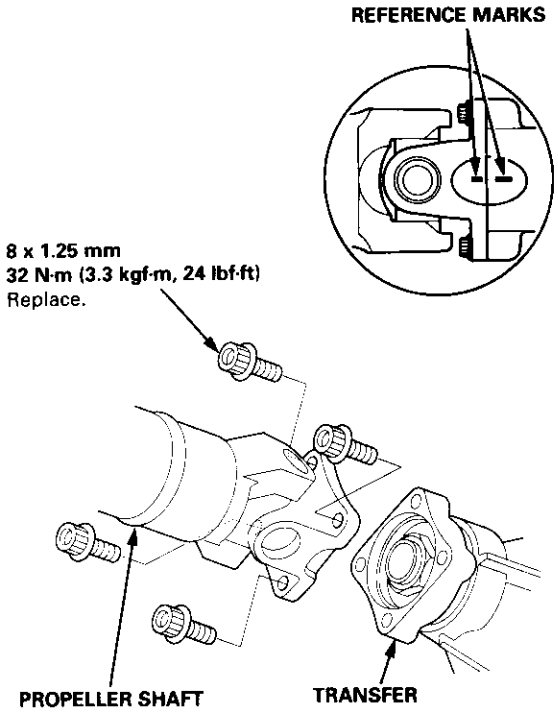
17. Install the right and left driveshafts (see section 18). While installing the right driveshaft in the differential, be sure not to allow dust or other foreign particles to enter the transmission.

    NOTE:
    - Clean the areas where the right driveshaft contacts the transmission (differential) with solvent or carburetor cleaner, and dry with compressed air.
    - Turn the right and left steering knuckle fully outward, and slide the right driveshaft into the differential until you feel its spring clip engage the side gear. Slide the left driveshaft into the intermediate shaft until you feel the spring clip of the intermediate shaft engage the left driveshaft.

18. Install right damper fork, then install the right and left ball joints on each lower arm with the castle nuts and new cotter pins (see section 18).

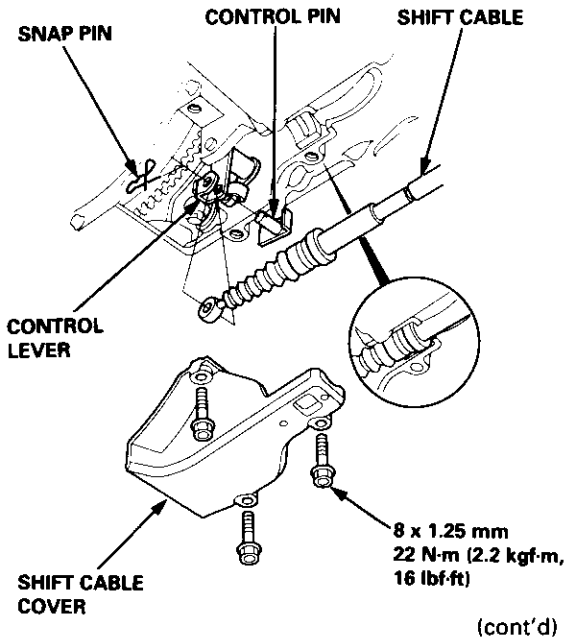


19. Install the propeller shaft to the transfer assembly by aligning the reference marks (4WD).



20. Install the shift cable.

    4WD:
    Install the shift cable with the control pin, then secure it with the snap pin. Do not bend the shift cable excessively.

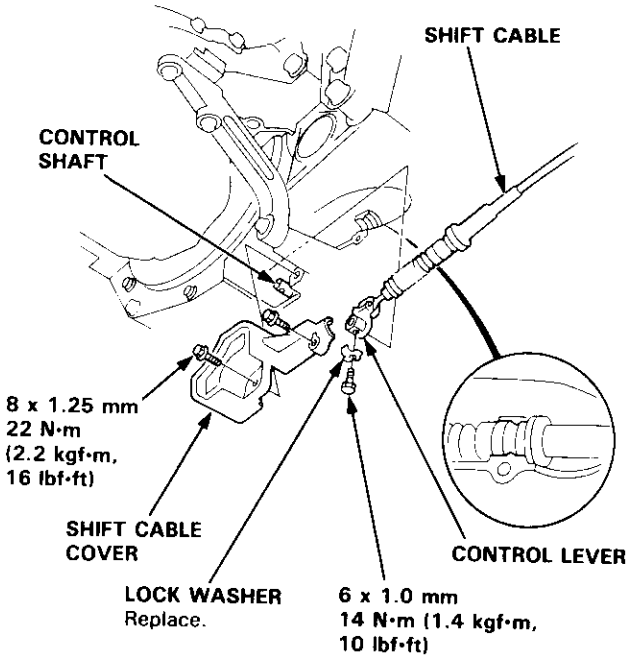


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Installation (cont'd)

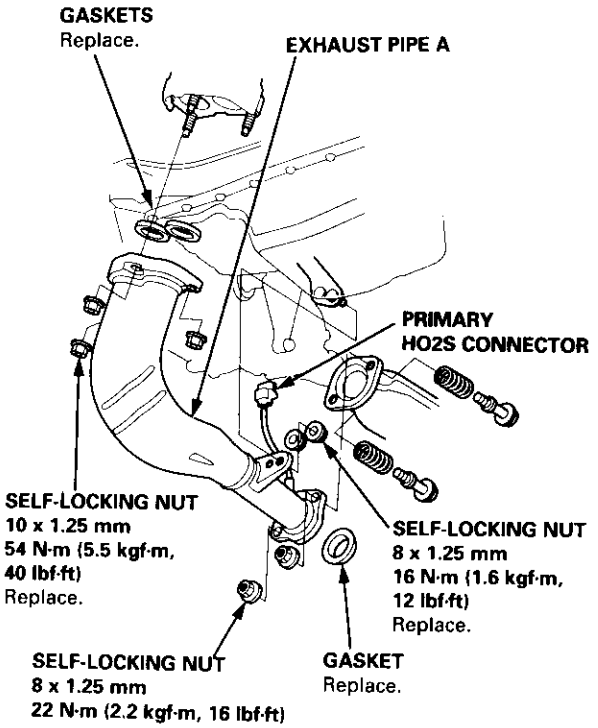
2WD:
Install the control lever with a new lock washer to the control shaft. Do not bend the shift cable excessively.



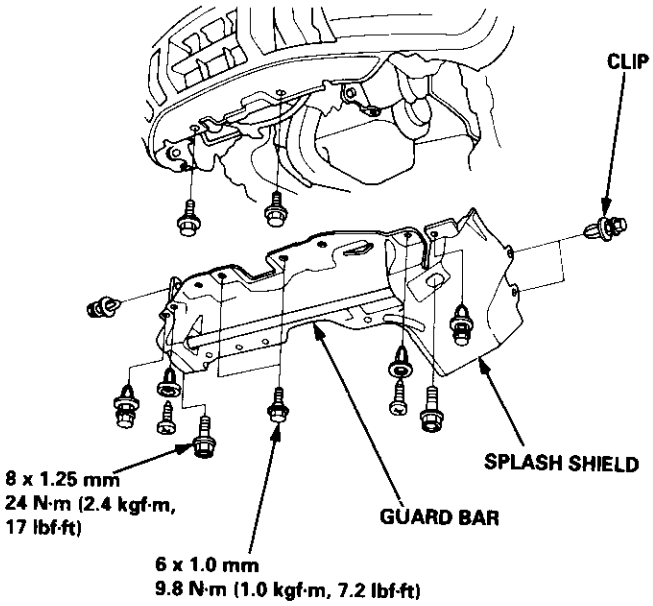
21. Install the shift cable cover.

22. Install exhaust pipe A.

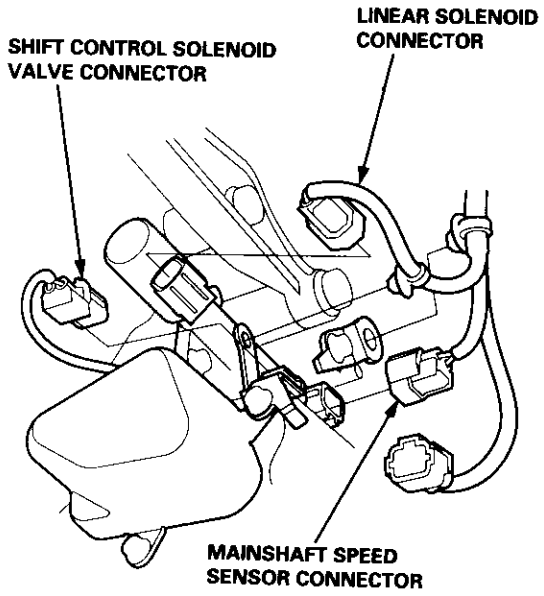
23. Connect the primary heated oxygen sensor (primary HO2S) connector.



24. Install the splash shield and guard bar.

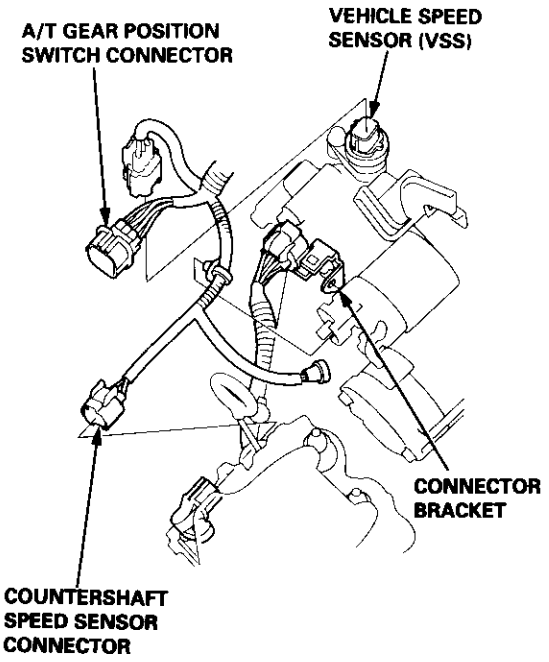


25. Connect the mainshaft speed sensor, the shift control solenoid valve, and the linear solenoid connectors.

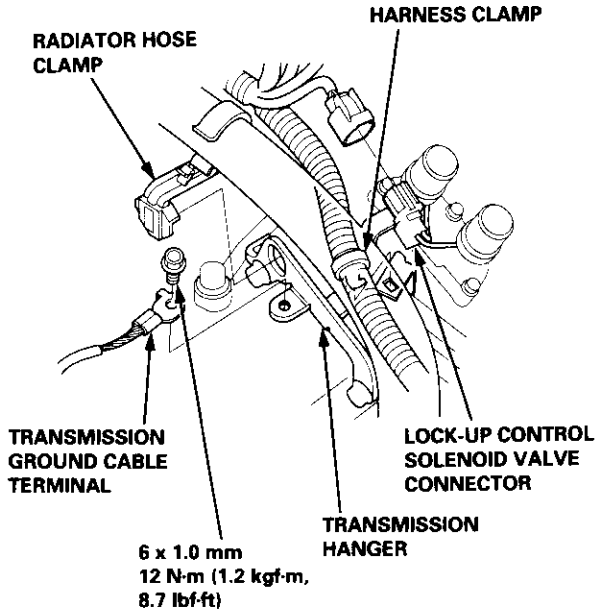


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26. Connect the vehicle speed sensor (VSS), the countershaft speed sensor, and the A/T gear position switch connectors.

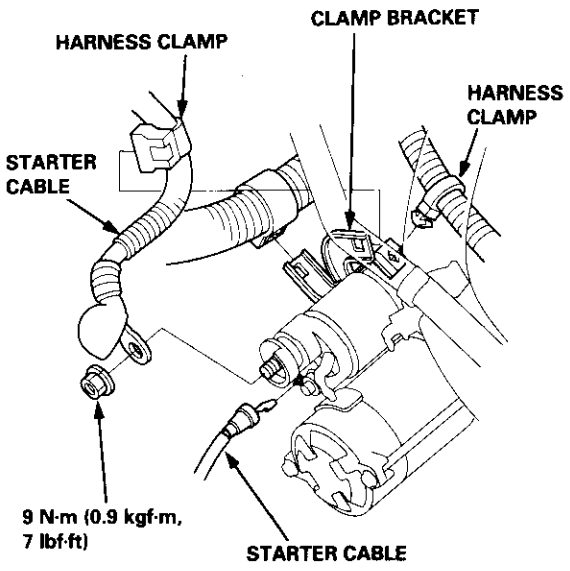


27. Connect the lock-up control solenoid valve connector, then install the harness clamp on the clamp bracket.



28. Install the transmission ground cable terminal on the transmission hanger, and install the radiator hose clamp on the transmission hanger.

29. Connect the starter cables to the starter, and install the harness clamp on the clamp bracket. Make sure the crimped side of the starter cable ring terminal is facing out.



30. Install the air cleaner housing assembly and the intake air duct.

31. Refill the transmission with ATF (see page 14-161).

32. Connect the battery positive terminal and negative terminal.

33. Set the parking brake. Start the engine, and shift the transmission through all gears three times.

34. Check the shift cable adjustment (see page 14-271).

35. Check the front wheel alignment and adjust it if needed (see section 18).

36. Let the engine reach normal operating temperature (the radiator fan comes on) with the transmission in [P] or [N] position, then turn it off and check the ATF level (see page 14-160).

37. Perform a road test (see page 14-157 and 14-158).

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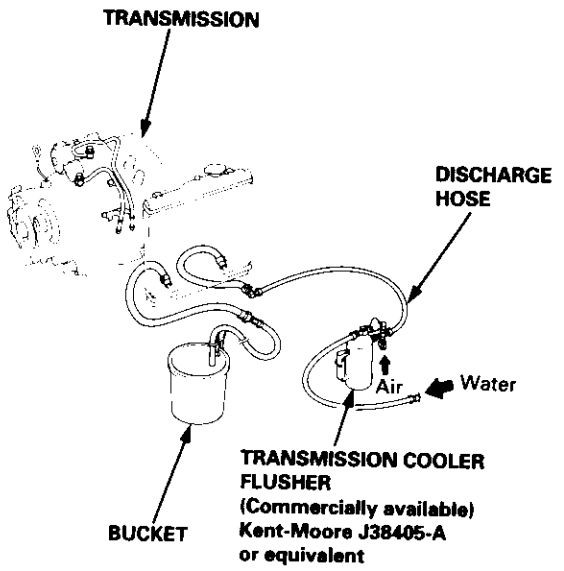
Cooler Flushing

⚠ WARNING To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

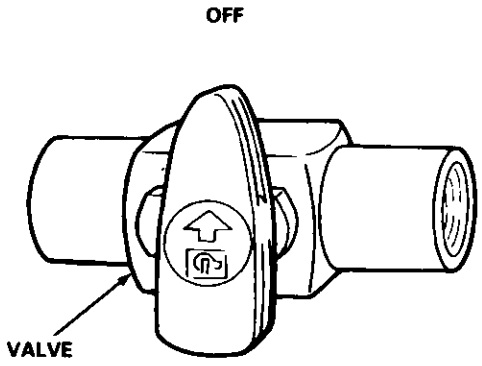
This procedure should be performed before reinstalling the transmission.

1. Check equipment for wear and cracks before using. Replace any worn or cracked components.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 – 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.
3. Secure the flusher filler cap, and pressurize the flusher with compressed air to 550 – 829 kpa (5.6 – 8.45 kgf/cm², 80 – 120psi). The air line should be equipped with a water trap to ensure a dry air system.
4. Hang the flusher under the vehicle.
5. Attach the flusher discharge hose to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line on the transmission cooler using a clamp.

   IMPORTANT:
   Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Hot water if available.)



8. Turn on the water valve for 10 seconds. If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.
9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. While flushing with the water and flushing fluid for two minutes, turn the air valve on for five seconds every 15 – 20 seconds to create a surging action.
    AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm², 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water for one minute.
13. Turn the water valve off, and the water supply off.
14. Turn the air valve on for two minutes, or until no moisture is visible leaving the drain hose. Residual moisture in the cooler or lines can damage the transmission.
15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.

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17. Make sure the transmission is in [P] position. Fill the transmission with ATF, and run the engine for 30 seconds or until approximately 0.95 ℓ (1.0 US qt., 0.8 Imp qt.) is discharged.

18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-266).

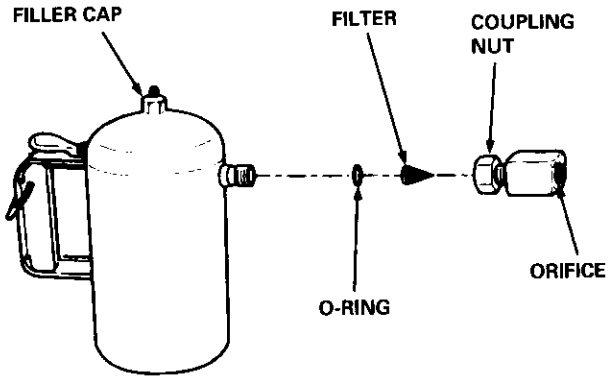
19. Refill the transmission with ATF to the proper level (see page 14-161).

TOOL MAINTENANCE

1. Empty and rinse the flusher after each use. Fill the flusher with water and pressurize it, then flush the discharge line to ensure that the unit is clean.

2. If discharge liquid does not foam, the orifice may be blocked.

3. To clean, disconnect the large coupling nut from the flusher.



4. Remove the in-line filter from the discharge side and clean it if necessary.

5. The fluid orifice is located behind the filter. Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air.

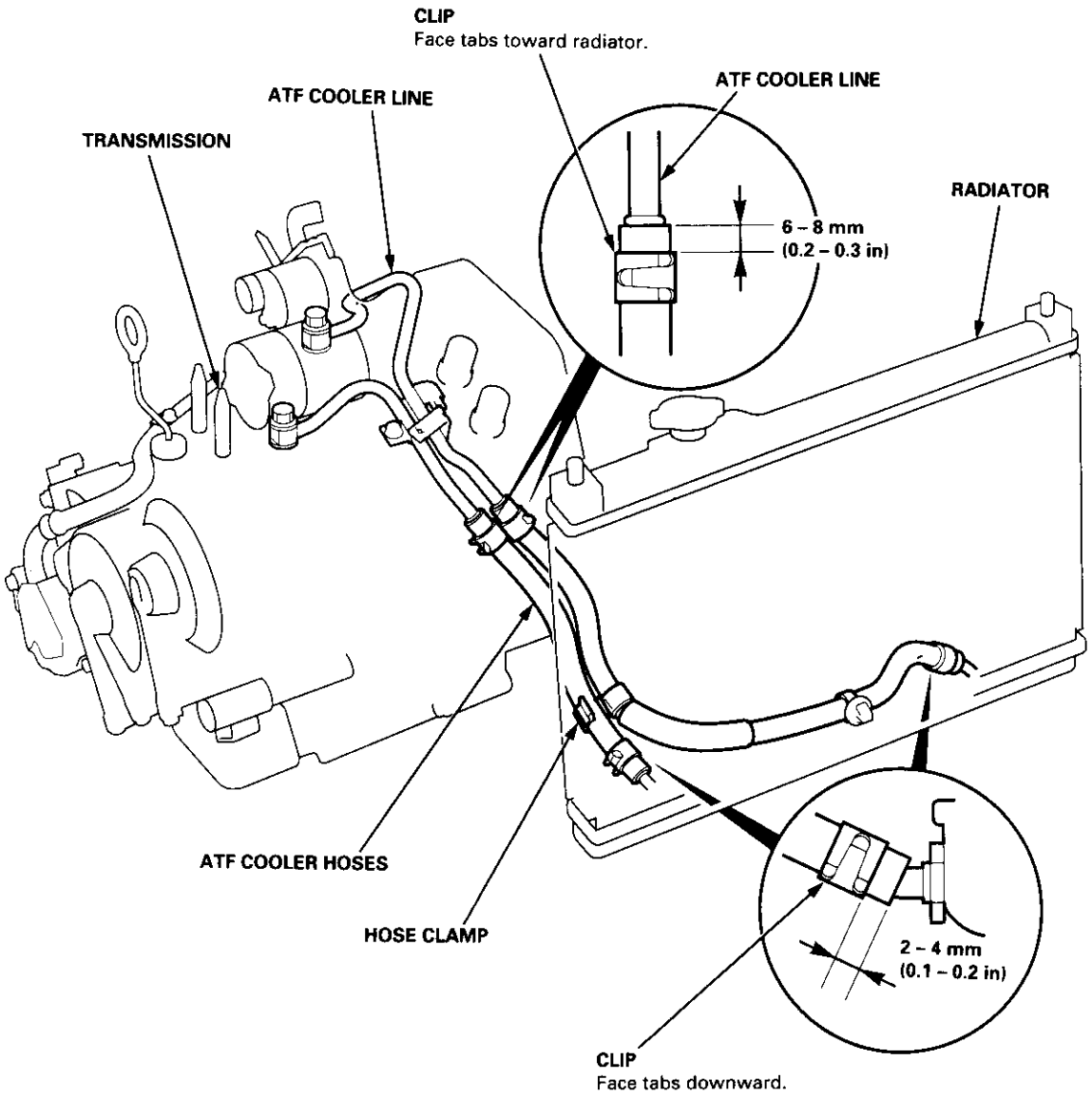
6. Reassemble all parts.

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ATF Cooler Hoses

Connection

1. Connect the ATF cooler hoses to the ATF cooler lines, then secure them with the clips.
2. Face the tabs of the clips of the transmission side toward the radiator, and face the tabs of the ATF cooler side downward.

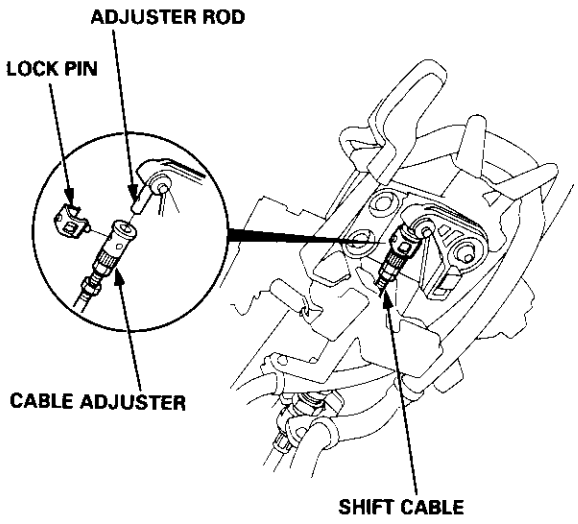


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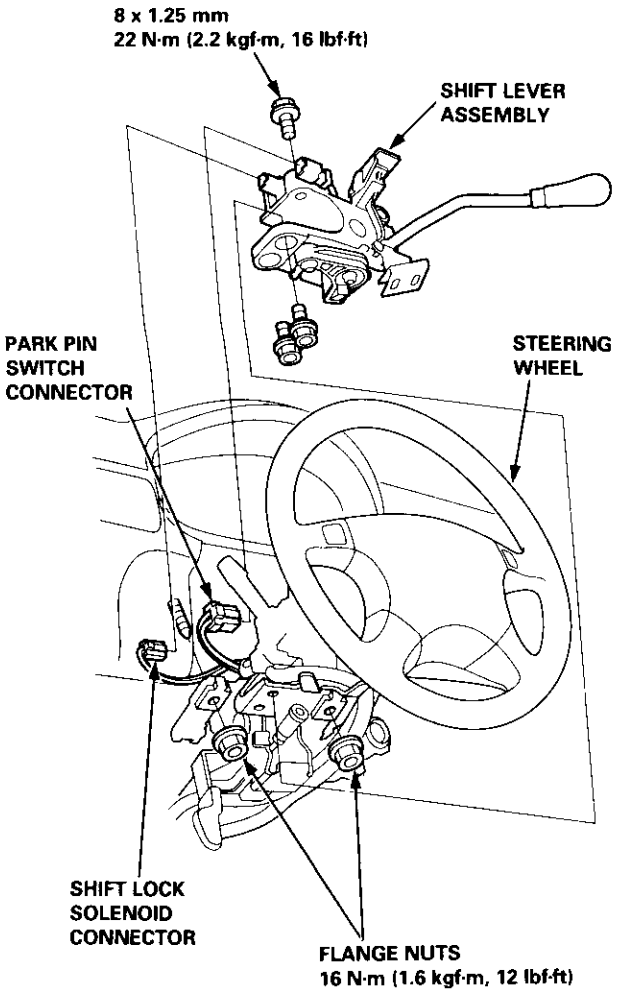
Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the instrument panel lower cover and the column covers (see section 17).
2. Shift to [N] position, then remove the lock pin from the cable adjuster.
3. Separate the shift cable from the cable adjuster. Do not bend the shift cable excessively.



4. Remove the flange nuts and bolts securing the steering column, then lower the steering column.



5. Disconnect the shift lock solenoid and the park pin switch connector.
6. Remove the bolts securing the shift lever assembly, then remove the shift lever assembly.
7. Install the shift lever assembly in the reverse order of removal.

   NOTE:
   - Make sure the lock pin is seated securely in the cable adjuster.
   - Replace the lock pin if it does not snap over the cable adjuster securely.

8. Check the cable adjustment after installing the shift lever (see page 14-271).

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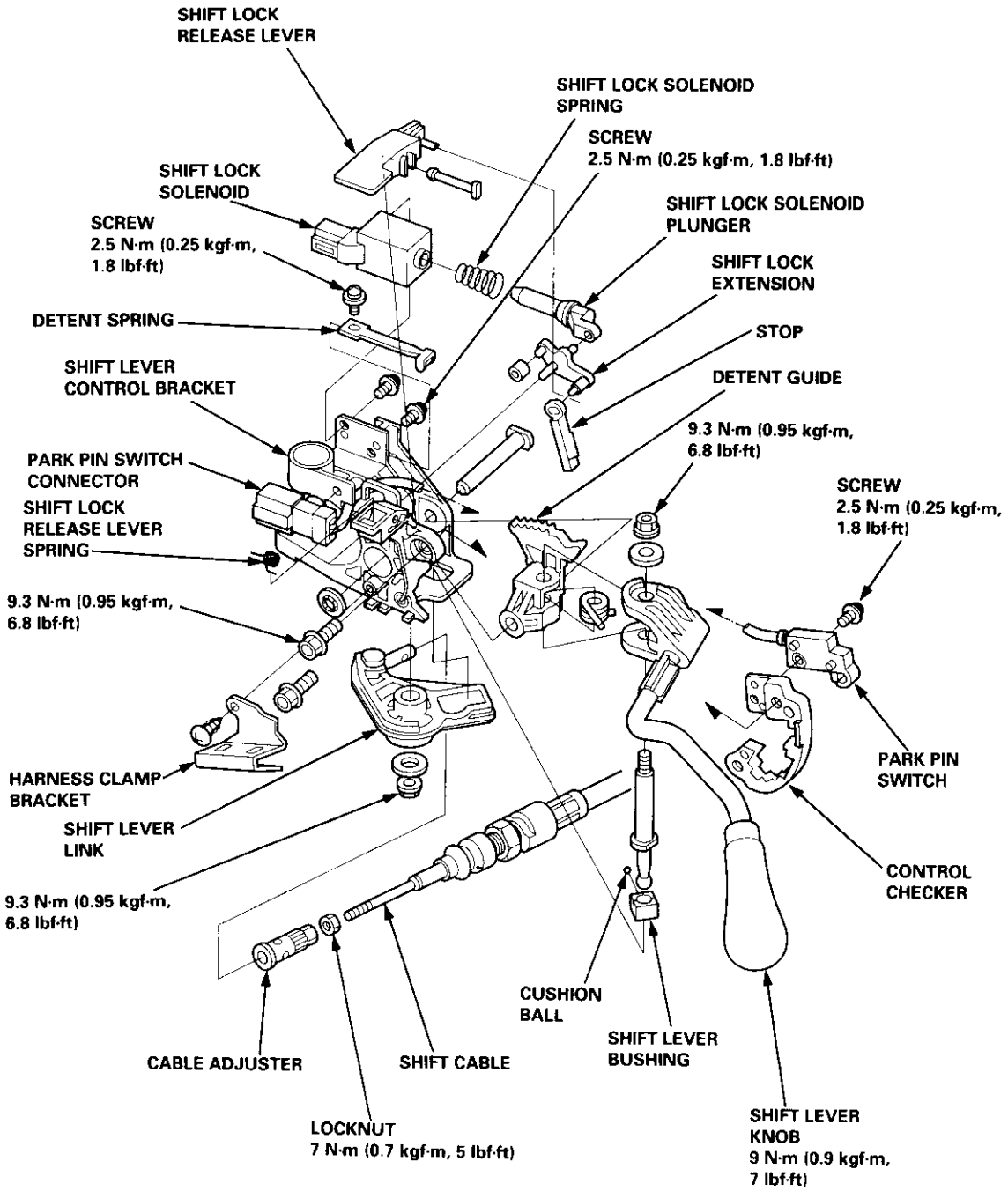
Shift Lever

Disassembly/Reassembly — '97 – 98 Models

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Apply silicone grease to these parts:

- Movable parts of the shift lever.
- Movable parts of the shift lock mechanism.
- Sliding surfaces on the detent of the control checker and detent guide.



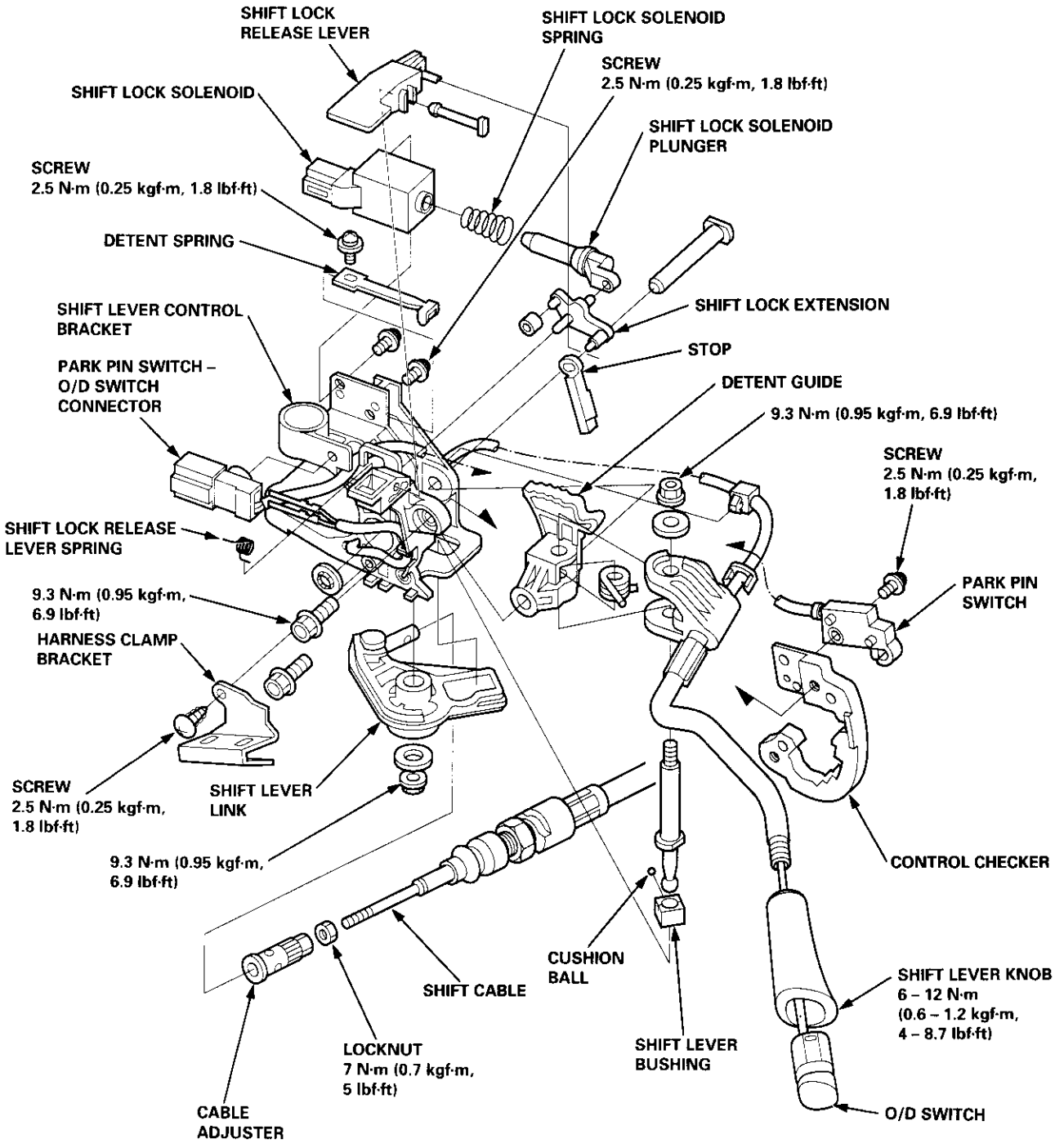
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Disassembly/Reassembly — '99 – 00 Models

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Apply silicone grease to these parts:
- Movable parts of the shift lever.
- Movable parts of the shift lock mechanism.
- Sliding surfaces on the detent of the control checker and detent guide.

NOTE: Adjust the clearance between the O/D switch wires and the edge of the shift lever control bracket after reassembly (see page 14-270).

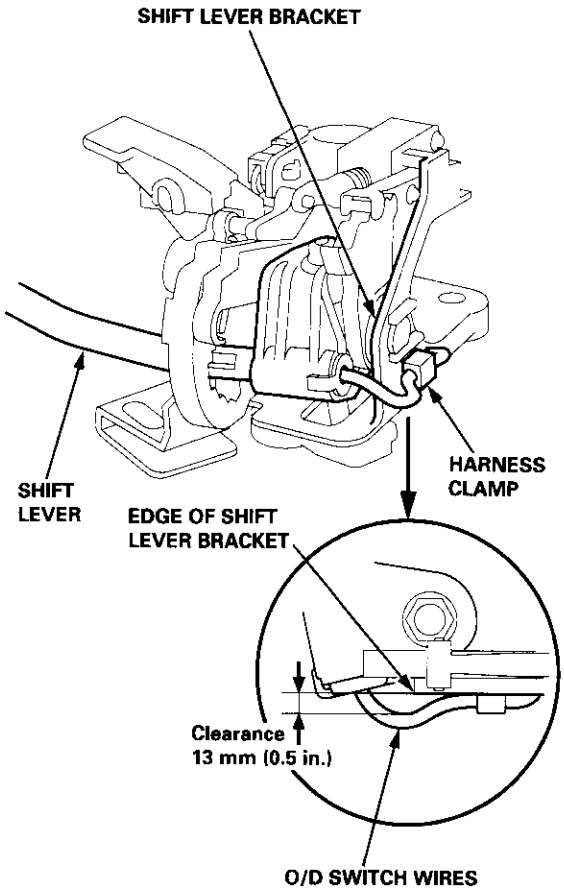


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Over-Drive (O/D) Switch Wire Clearance Adjustment — '99 – 00 Models

NOTE: Be sure to adjust the clearance between the O/D switch wires and the shift lever control bracket after replacing the O/D switch and park pin switch, and after reassembling the shift lever. If there is the slack in the wires or the wires are kept tight, the wires may have breaks.

1. Shift the shift lever into [N] position.
2. Pull or push the wires to adjust the clearance between the wires and the edge of the shift lever control bracket to 13 mm (0.5 in).

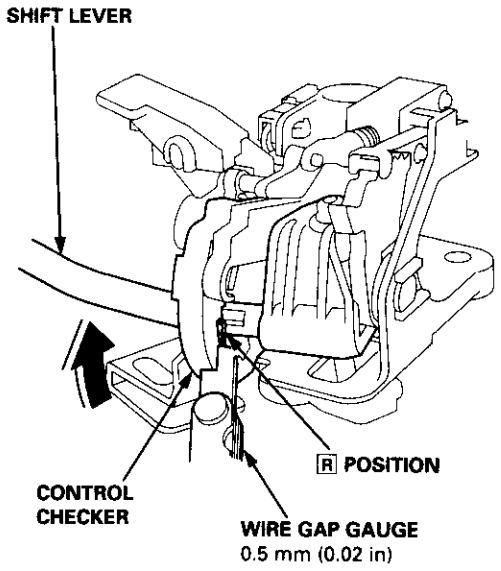


3. Secure the wires with the harness clamp.
4. Move the shift lever to each position, and verify that there is a clearance between the wires and bracket in each position.
5. If the wires are kept tight in any position, readjust the clearance.
6. Install the shift lever assembly on the steering column.
7. Move the shift lever to each position, and make sure that the wires are kept away from any parts such as the steering column.

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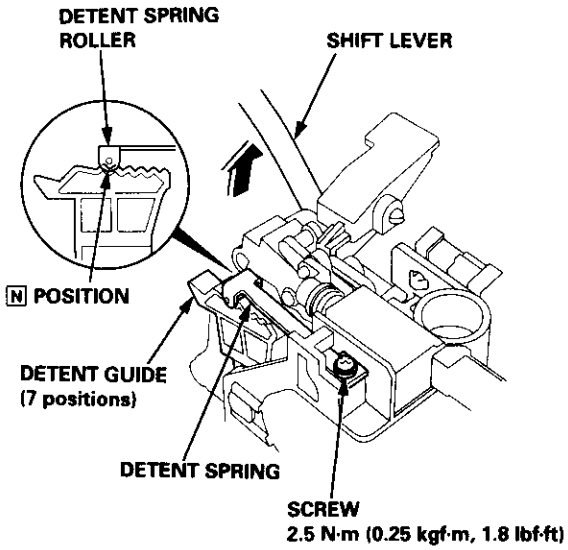
Detent Spring Replacement

1. Install the detent spring on the shift lever control bracket, and install the screw loosely.
2. Shift the shift lever to [N] position.
3. Insert a 0.5 mm (0.02 in) wire gap gauge between the control checker detent and the shift lever, then hold the shift lever against the [R] position in the control checker.

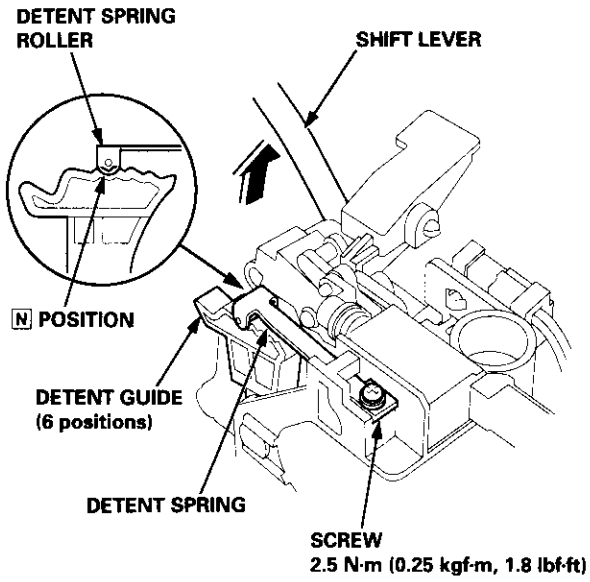


4. Put the detent spring roller in [N] position on the detent guide, then tighten the screw to the specified torque.

'97 – 98 Models:



'99 – 00 Models:



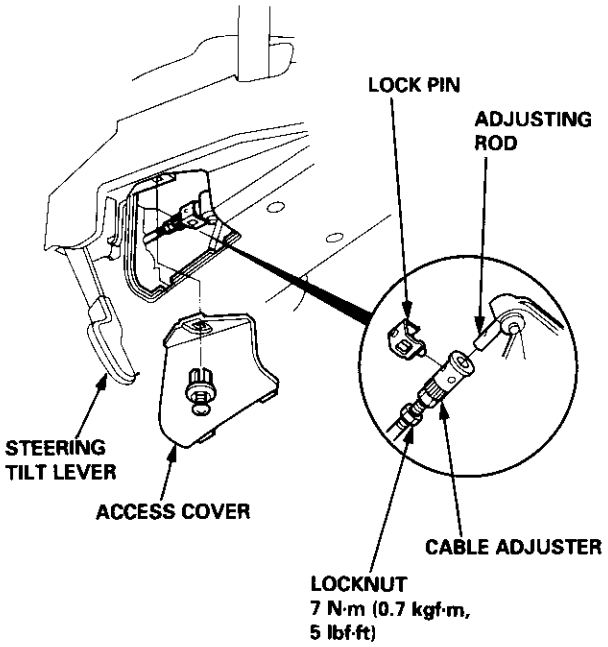
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Shift Cable

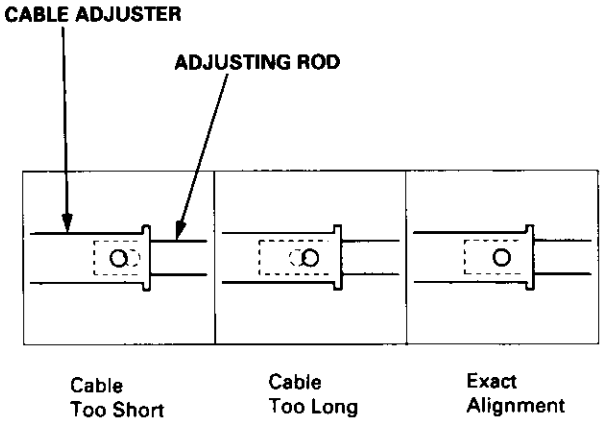
Adjustment

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Release the steering tilt lever.
2. Remove the access cover from the lower column cover.



3. Shift to [N] position, then remove the lock pin from the cable adjuster.
4. Check that the hole in the cable adjuster is aligned with the hole in the adjusting rod. There are two holes in the cable adjuster. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.



5. If not perfectly aligned, loosen the locknut on the shift cable, and adjust as required.
6. Tighten the locknut.
7. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
8. Make sure the lock pin is seated securely in the adjuster. Replace the lock pin if it does not snap over the cable adjuster securely.
9. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the A/T gear position switch.
10. Start the engine, and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 14-153 thru 14-156.
11. Insert the ignition key into the key cylinder on the upper column cover, and verify that the shift lock lever releases.

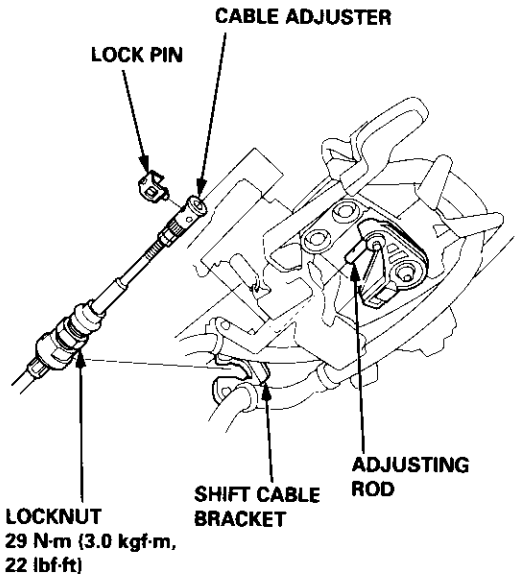
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Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

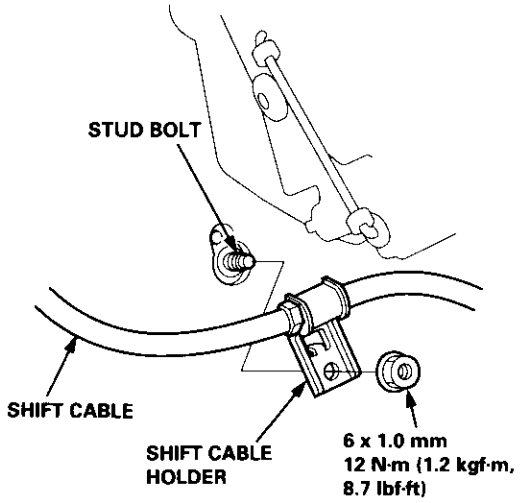
1. Remove the instrument panel lower cover and the column covers (see section 17).

2. Shift to [N] position, then remove the lock pin from the cable adjuster.



3. Loosen the locknut, then remove the shift cable from the shift cable bracket.

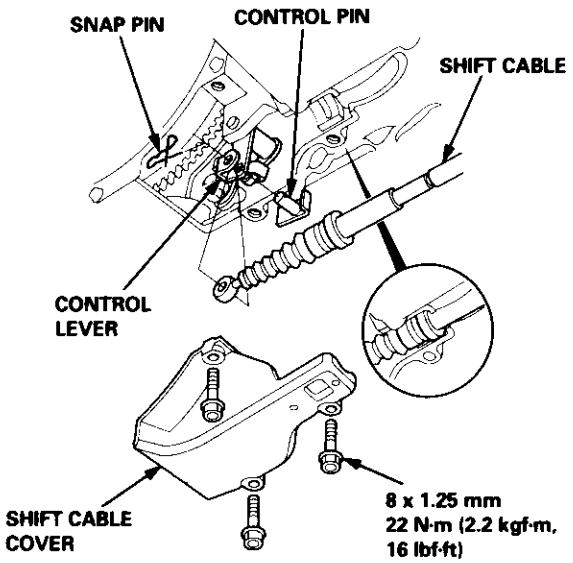
4. Remove the nut securing the shift cable holder, then remove the shift cable.



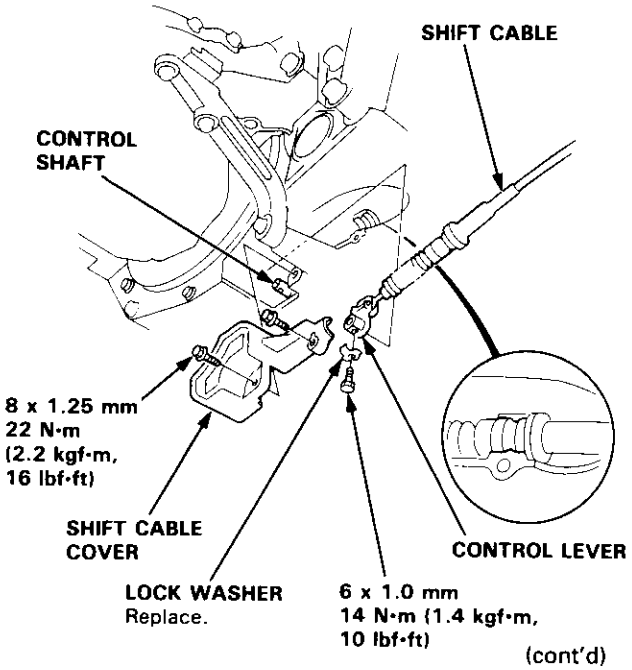
5. Remove the shift cable cover.

6. Remove the shift cable.

4WD:
Remove the snap pin and control pin, then separate the shift cable from the control lever.



2WD:
Remove the control lever, then separate the shift cable from the control shaft.

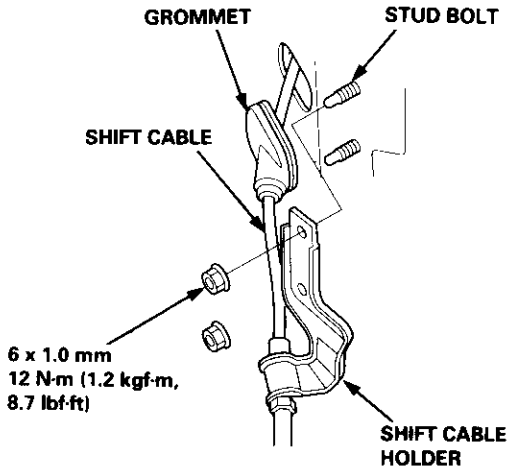


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Replacement (cont'd)

7. Remove the nuts securing the shift cable holder, then remove the shift cable.



8. Install the shift cable in the reverse order of the removal.

   NOTE:
   - Do not bent the shift cable excessively when installing it.
   - Make sure the lock pin is seated securely in the cable adjuster.
   - Replace the lock pin if it does not snap over the cable adjuster securely.

9. Check the cable adjustment after installing it.

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Differential

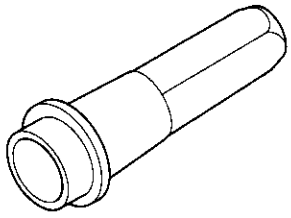
Rear Differential
Special Tools 15-2
Description
  Rear Differential 15-4
  Hydraulic Flow 15-6
Real-time 4WD-Dual Pump System
  Troubleshooting 15-10
Rear Differential Assembly
  Troubleshooting 15-13
Maintenance
  Differential Fluid 15-14
Rear Differential Assembly
  Illustrated Index 15-15
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  Leak Repair 15-18
Oil Seals
  Replacement 15-19
Rear Differential Assembly
  Disassembly 15-20
  Reassembly 15-23



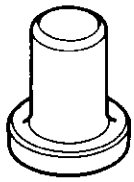
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Special Tools

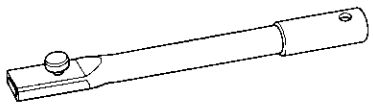
Ref. No.	Tool Number	Description	Qty	Page Reference
①	J – 38592	Transfer Case Oil Seal Installer	1	15-20
②	07GAD – PH70201	Seal Driver	1	15-19
③	07JAB – 001020A	Holder Handle	1	15-21, 25
④	07RAB – TB4010B	Flange Holder	1	15-21, 25
⑤	07749 – 0010000	Driver	1	15-19
⑥	07965 – 6920101	Hub Dis/Assembly Tool	1	15-19



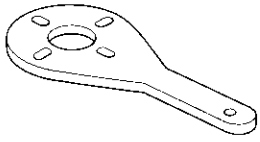
①



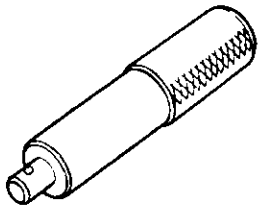
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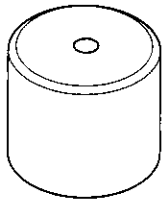
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④



⑤



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Description

Rear Differential

Outline

The Real-time 4WD-Dual Pump System model has a hydraulic clutch and a differential mechanism in the rear differential assembly. Under normal conditions, the vehicle is driven by the front wheels. However, depending on to the driving force of the front wheels and the road conditions, the system instantly transmits appropriate driving force to the rear wheels without requiring the driver to switch between 2WD (front wheel drive) and 4WD (four wheel drive). The switching mechanism between 2WD and 4WD is integrated into the rear differential assembly to make the system light and compact.
In addition, the dual-pump system switches off the rear-wheel-drive force when braking in a forward gear. This allows the braking system to work properly on models equipped with an Anti-lock Braking System (ABS).

Construction

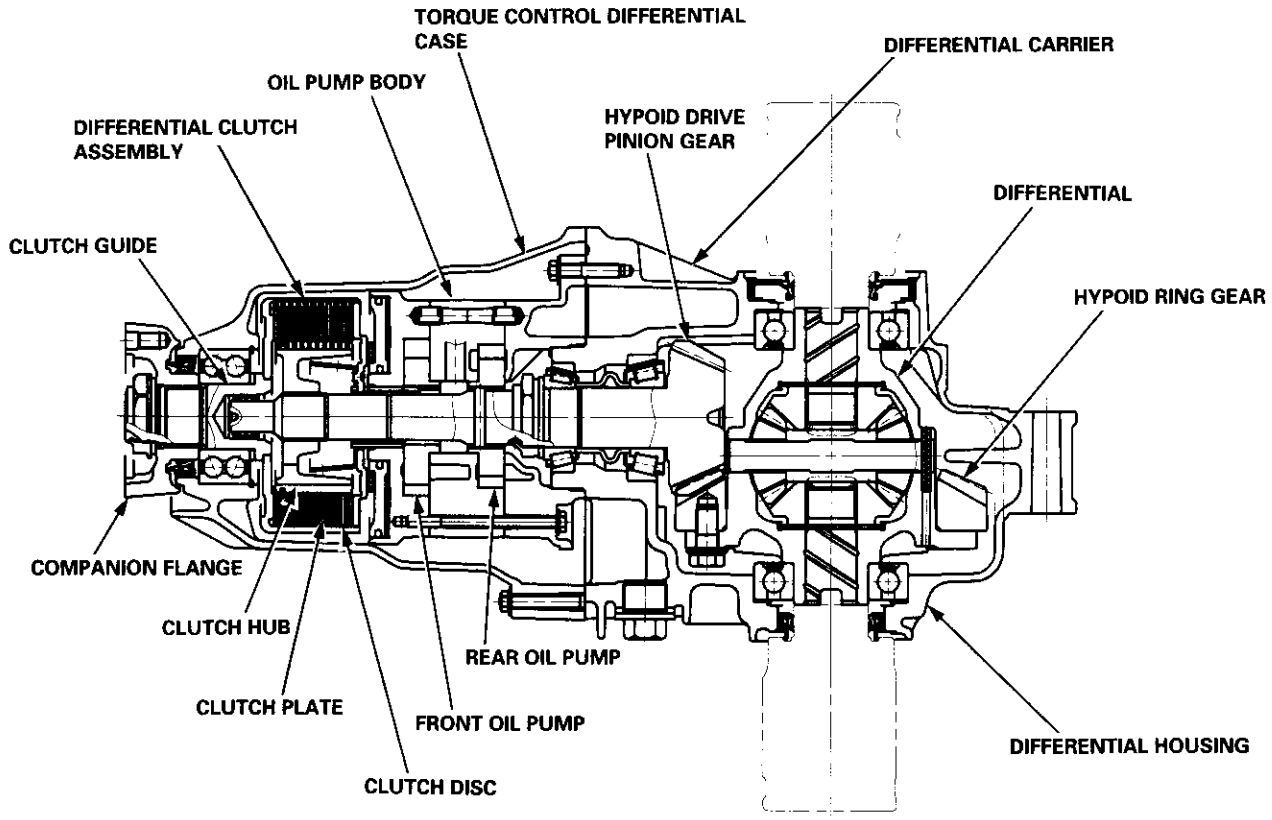
The rear differential assembly consists of the torque control differential case assembly and the rear differential carrier assembly. The torque control differential case assembly consists of the differential clutch assembly, the companion flange, and the oil pump body assembly. The rear differential carrier assembly consists of the differential mechanism. The differential drive and driven gears are hypoid gears.
The oil pump body assembly consists of the front oil pump, the rear oil pump, the hydraulic control mechanism, and the clutch piston. The clutch piston has a disc spring that constantly provides the differential clutch assembly with a preset torque to prevent abnormal sound.
The clutch guide in the differential clutch assembly is connected to the propeller shaft via the companion flange, and it receives the driving force from the transfer assembly. The clutch guide rotates the clutch plate and the front oil pump in the oil pump body.
The clutch hub in the differential clutch assembly has a clutch disc that is splined with the hypoid drive pinion gear. The hypoid drive gear drives the rear oil pump.
The front and rear oil pumps are trochoidal pumps. The rear oil pump capacity is 2.5 percent larger that the front oil pump to handle the rotation difference between the front and rear wheels caused by worn front tires and tight corner braking. The oil pumps are designed so the fluid intake works as a fluid discharge when the oil pumps rotate in reverse. Genuine Honda CVT fluid is used instead of differential fluid.

Operation

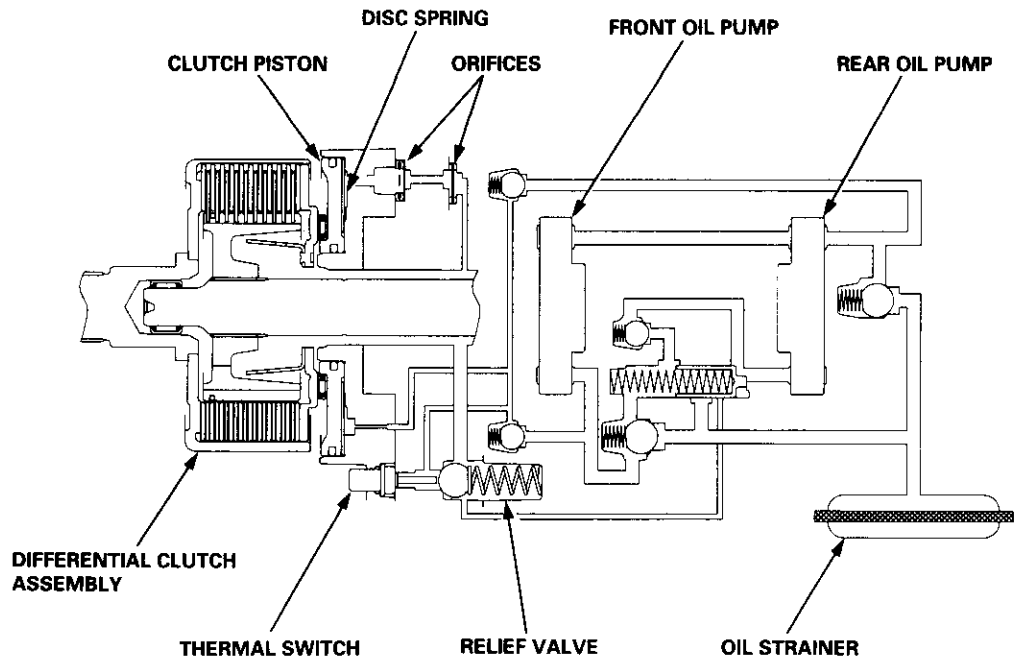
When there is a difference in rotation speed between the front wheels (clutch guide) and rear wheels (hypoid driven gear), hydraulic pressure from the front and rear oil pumps engages the differential clutch, and drive force from the transfer assembly is applied to the rear wheels.
The hydraulic pressure control mechanism in the oil pump body selects 4WD mode when the vehicle is started abruptly, or when accelerating in a forward or reverse gear (causing rotation difference between the front and rear wheels), or when braking in reverse gear (when decelerating). It switches to 2WD mode when the vehicle is driven at a constant speed in forward or reverse gear (when there is no rotation difference between the front and rear wheels), or when braking in a forward gear (when decelerating).
To protect the system, the differential clutch assembly is lubricated by hydraulic pressure generated by the oil pumps in both 4WD and 2WD modes. Also, the thermal switch relieves the hydraulic pressure on the clutch piston and cancels 4WD mode if the temperature of the differential fluid rises above normal.

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REAR DIFFERENTIAL ASSEMBLY



HYDRAULIC CONTROL SYSTEM



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Description

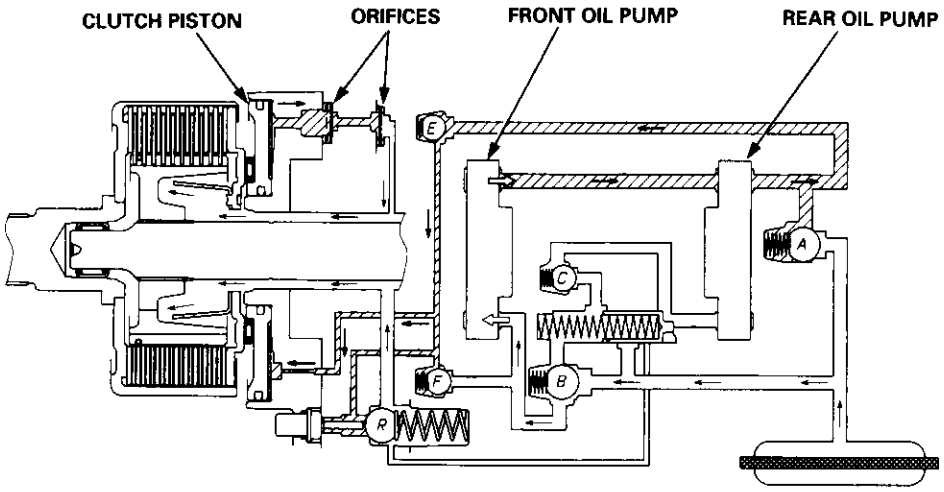
Hydraulic Flow

Forward Start and Acceleration (4WD)

During a forward start and forward acceleration, the dual pump system can engage four wheel drive.

If the front wheels spin faster than the rear wheels, the front oil pump spins faster than the rear oil pump. The front pump draws fluid through check valve B and discharges it. Some of the discharged fluid is drawn in the by the rear oil pump. The remaining fluid will pass through check valve E into the clutch piston. There, hydraulic pressure is regulated by two orifices.

The regulated hydraulic pressure at the clutch piston pushes the plates and discs of the clutch together to form a connection. The engaged clutch then passes driving force from the transfer assembly to the rear wheels, producing 4WD.

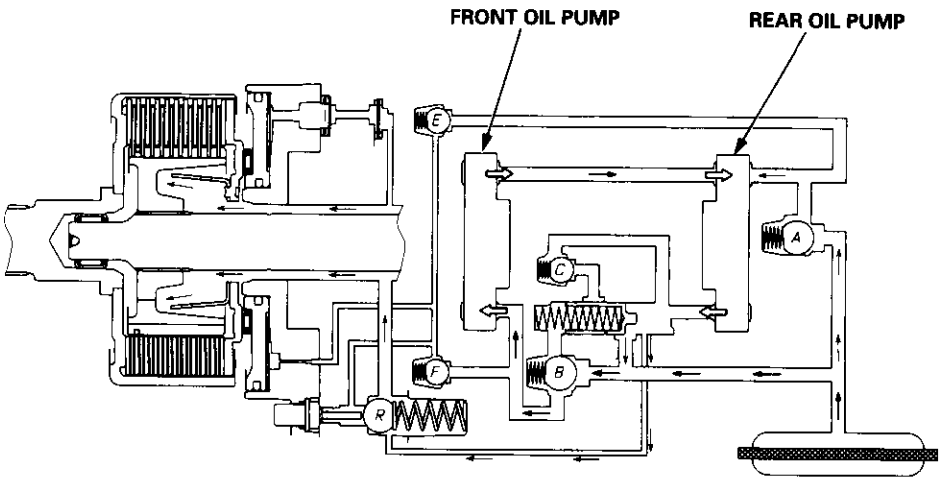


Forward Driving at Constant Speed (2WD)

When driving forward at a constant speed (cruising), the dual pump system functions in two wheel drive mode.

The rotation speed of the front and rear wheels is the same, so the speed of the front and rear pumps is also the same.

Fluid discharged by the front oil pump is drawn in by the rear oil pump and is circulated through the system. Because there is no pressure built up at the clutch piston, the clutch does not engage, and the vehicle remains in 2WD (front wheel drive).



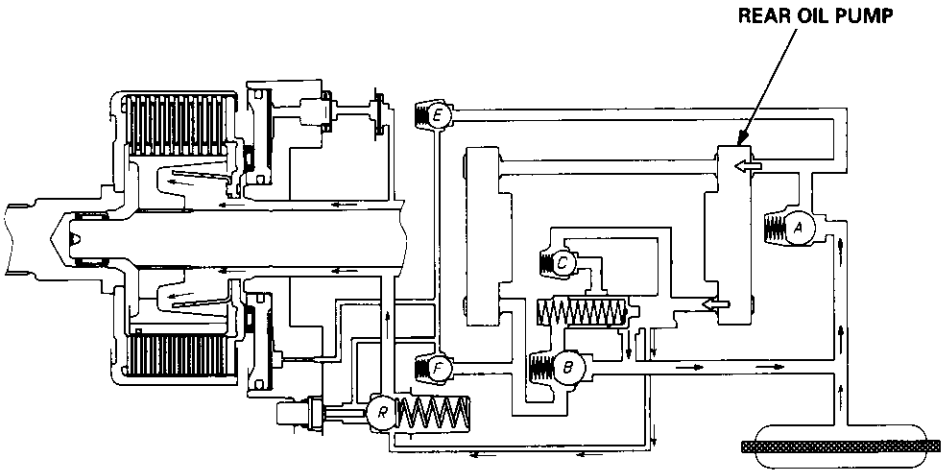
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Forward Deceleration (2WD)

During forward deceleration, the dual pump system functions in two wheel drive mode.

Because of braking characteristics, the speed of the rear wheels may exceed the speed of the front wheels during deceleration. If so, the rear oil pump spins faster than the front oil pump.

Fluid discharged by the rear oil pump is simply drawn in again by the rear pump and recirculated. Because there is no pressure built up at the clutch piston, the clutch piston does not engage, and the vehicle remains in 2WD (front wheel drive).



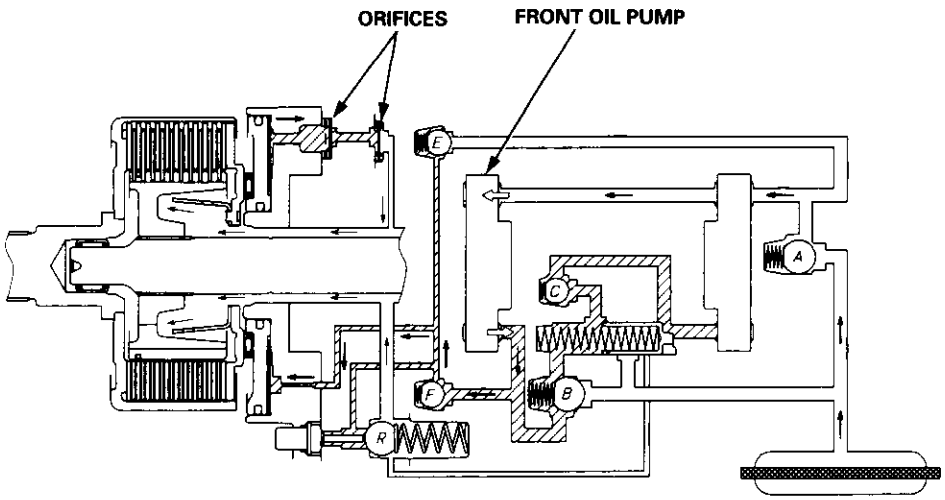
Reverse Start and Acceleration (4WD)

During reverse start and reverse acceleration, the dual pump system can engage four wheel drive.

If the front wheels spin faster than the rear wheels, the front oil pump spins faster than the rear oil pump. The front oil pump draws in fluid through check valve A and discharges it. (Note that in reverse, the direction of the pumps is the opposite of that during forward driving.)

Some of the fluid that is discharged by the front oil pump is drawn in by the rear oil pump. The remaining fluid passes through check valve F into the cylinder of the clutch piston, where it is regulated by two orifices.

The regulated hydraulic pressure at the clutch piston may force the plates and discs of the clutch together to form a connection. The engaged clutch passes driving force from the transfer assembly to the rear wheels, producing 4WD.



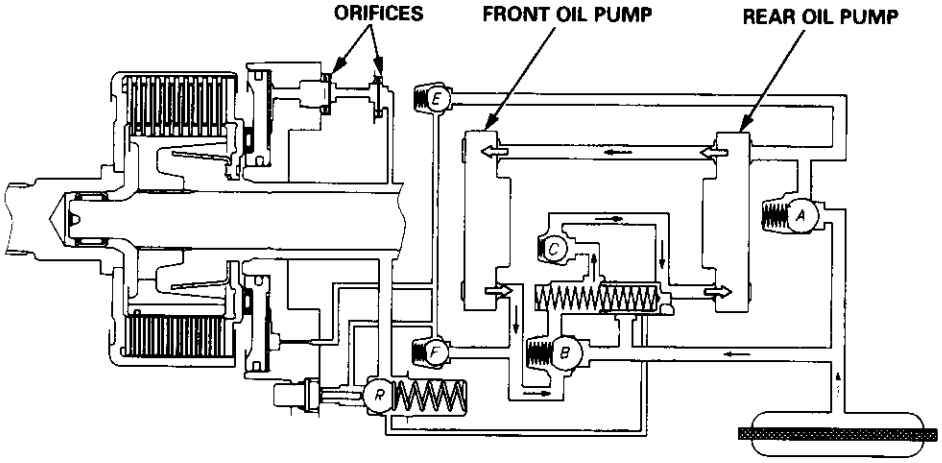
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Hydraulic Flow (cont'd)

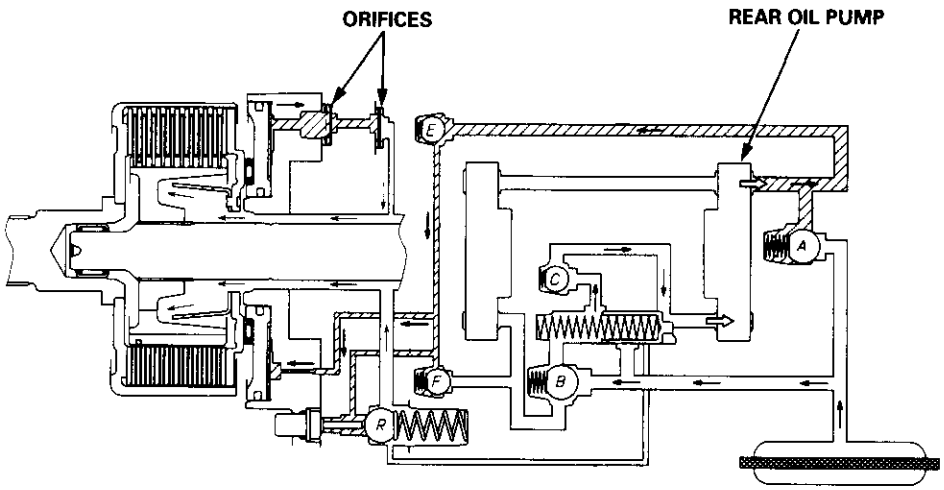
Reverse Driving at Constant Speed (2WD)

When driving in reverse at a constant speed, the dual pump system functions in two wheel drive mode.
The rotation speed of the front and rear wheels is the same, so the speed of the front and rear pumps is also the same.
Fluid discharged by the front oil pump is drawn in by the rear oil pump and is circulated through the system. But, because the there is a difference in the capacity between the two pumps, fluid flows through check valve E, and then through orifices. This fluid lubricates and cools the clutch assembly and bearings.
Is this condition, only a low pressure is built up at the clutch piston. Therefore the clutch does not engage, and the vehicle remains in 2WD (front wheel drive).



Reverse Deceleration (4WD)

During reverse deceleration, the dual pump system can engage four wheel drive.
When decelerating in reverse direction, the speed of the rear wheels may exceed the speed of the front wheels (due to engine braking). In this condition, the rear oil pump draws fluid through check valves B and C. Fluid discharged from the rear oil pump then flows through check valve E to the clutch piston. There, pressure is regulated by two orifices.
The regulated hydraulic pressure at the clutch piston may force the plates and discs of the clutch together to form a connection. The engaged clutch passes driving force from the transfer assembly to the rear wheels, producing 4WD.

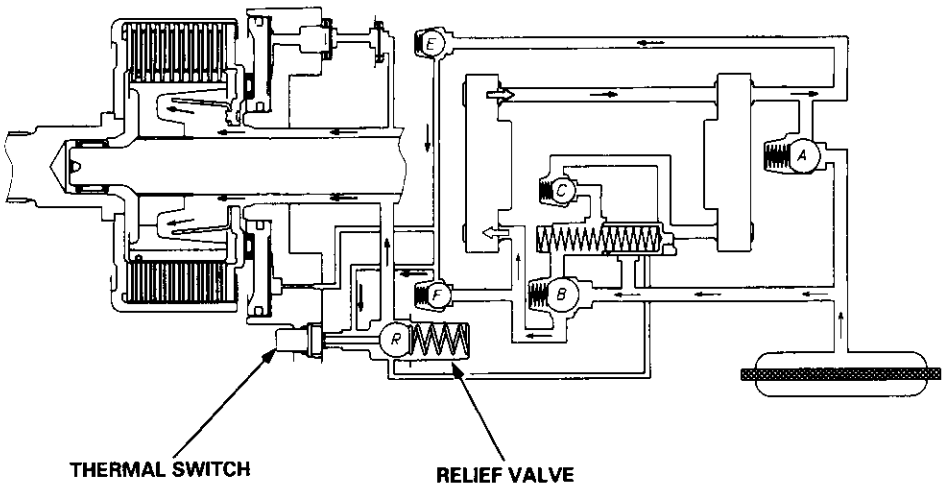


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Thermal Switch Operation (2WD)

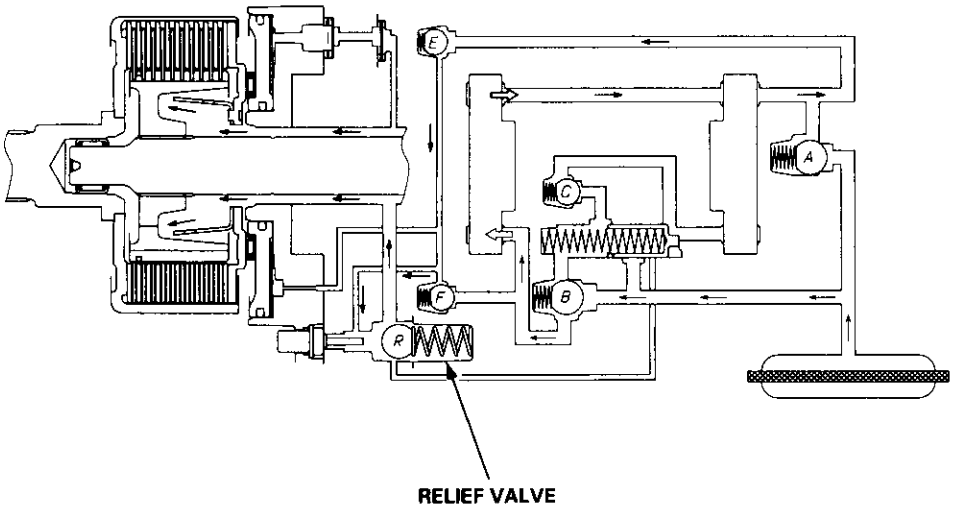
During 4WD operation, pressure-regulated fluid is in contact with the clutch piston and the thermal switch.

If the temperature of the fluid in the differential goes too high, the thermal switch pushes open the relief valve R. This causes the pressure in the clutch piston to drop, and 4WD mode is disengaged.



Relief Valve Operation

When the fluid pressure goes higher than the relief valve spring force, check valve R opens. Pressure applied at the clutch piston is held constant. This feature adds stability by preventing the rear wheel drive system from experiencing excessive torque.

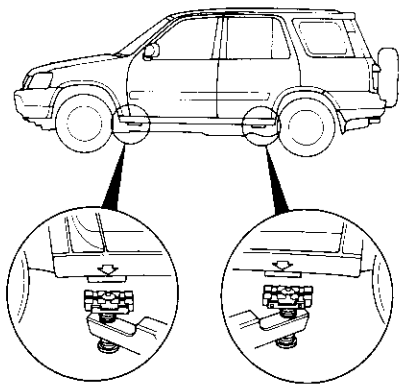


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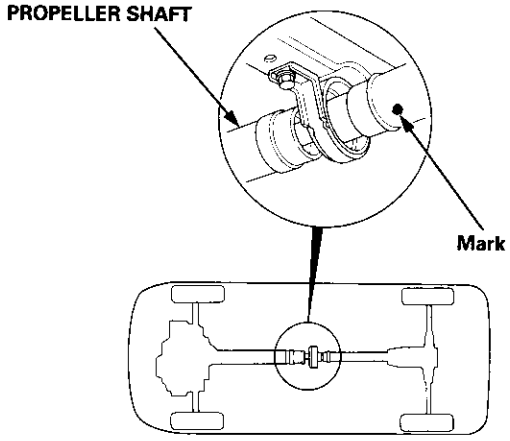
Troubleshooting (Automatic Transmission)

When starting and accelerating in forward gears (4WD mode)

1. Lift up the vehicle so all four wheels are off the ground (see section 1).



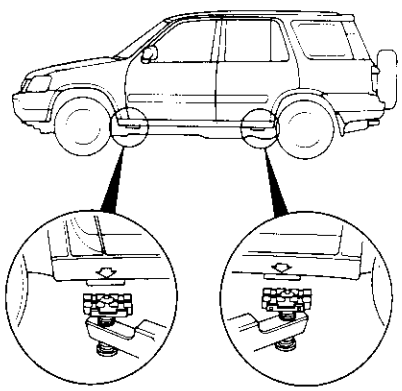
2. Make a mark on either No. 1 or No. 2 propeller shaft.



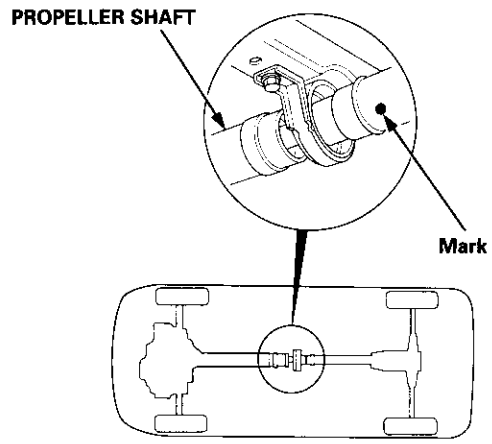
3. Start the engine, and let it run until it warms up (the radiator fan comes on at least twice).
4. With the engine at idle, shift to the [1] position.
5. Apply the parking brake firmly, and measure the time it takes the propeller shaft to rotate 10 times.
   - If the measured time is more than 10 seconds, the 4WD system is normal.
   - If the time is less than 10 seconds, there is a problem in 4WD system. Check the differential fluid. If the differential fluid is normal, replace the torque control differential case kit.

When starting and accelerating in reverse gear (4WD mode)

1. Lift up the vehicle so all four wheels are off the ground (see section 1).



2. Make a mark on either No. 1 or No. 2 propeller shaft.



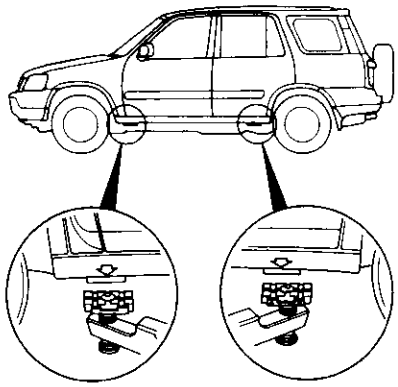
3. Start the engine, and let it run until it warms up (the radiator fan comes on at least twice).
4. With the engine at idle, shift to the [R] position.
5. Apply the parking brake firmly, and measure the time it takes the propeller shaft to rotate 10 times.
   - If the measured time is more than 10 seconds, the 4WD system is normal.
   - If the time is less than 10 seconds, there is a problem in 4WD system. Check the differential fluid. If the differential fluid is normal, replace the torque control differential case kit.

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Troubleshooting (Manual Transmission)

When starting and accelerating in forward gears (4WD mode)

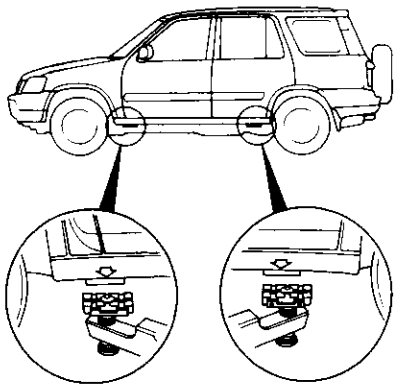
1. Lift up the vehicle so all four wheels are off the ground (see section 1).



2. Start the engine, and let it run until it warms up (the radiator fan comes on at least twice).
3. With the engine at idle, shift into 1st gear and release the clutch.
4. Apply the parking brake firmly.
   - If the engine stalls, the 4WD system is normal.
   - If the engine continues running, there is a problem in 4WD system. Check the differential fluid. If the differential fluid is normal, replace the torque control differential case kit.

When starting and accelerating in reverse gear (4WD mode)

1. Lift up the vehicle so all four wheels are off the ground (see section 1).



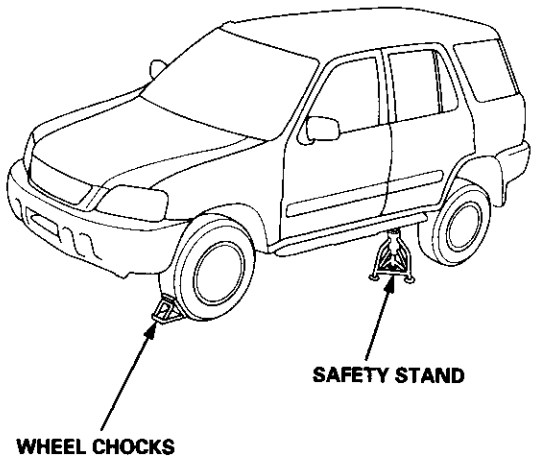
2. Start the engine, and let it run until it warms up (the radiator fan comes on at least twice).
3. With the engine at idle, shift into reverse gear and release the clutch.
4. Apply the parking brake firmly.
   - If the engine stalls, the 4WD system is normal.
   - If the engine continues running, there is a problem in 4WD system. Check the differential fluid. If the differential fluid is normal, replace the torque control differential case kit.

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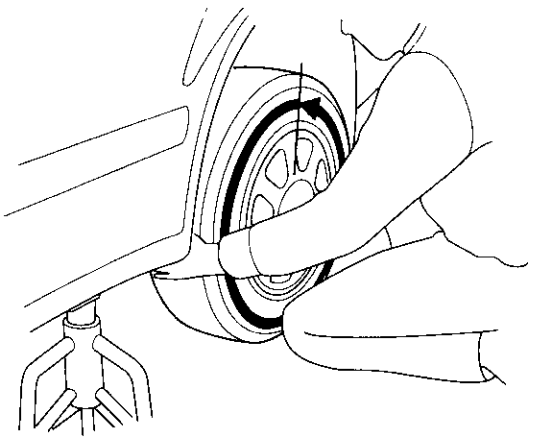
Troubleshooting (Automatic Transmission/Manual Transmission)

When decelerating in a forward gear (2WD mode)

1. Block the front wheels, raise the left rear wheel, and support it with a safety stand as shown.



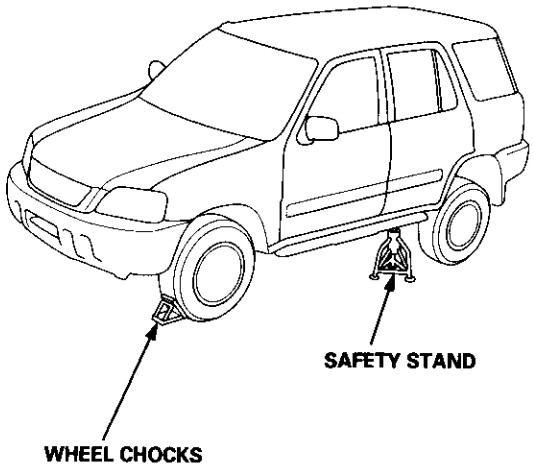
2. Hold the tire and turn it counterclockwise continuously for more than one rotation.



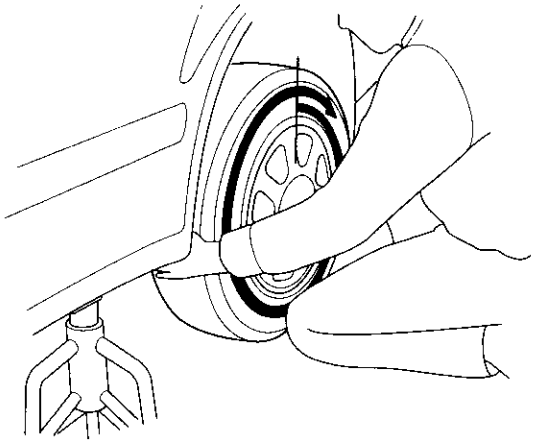
- If the rotation of the wheel does not gradually feel heavy while rotating, the 2WD system when decelerating in a forward gear is normal.
- If the rotation of the wheel gradually feels heavy, there is a problem in the system. Check the differential fluid. If the fluid is normal, replace the torque control differential case kit.

When decelerating in reverse gear (4WD mode)

1. Block the front wheels, raise the left rear wheel, and support it with a safety stand as shown.



2. Hold the tire and turn it clockwise continuously for more than one rotation.



- If the rotation of the wheel gradually feels heavy, the 4WD system when decelerating in reverse gear is normal.
- If the rotation of the wheel does not gradually feel heavy, there is a problem in the system. Check the differential fluid. If the fluid is normal, replace the torque control differential case kit.

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Troubleshooting

Most problems in the unit are to be diagnosed by identifying noises from the gears or bearings.
Care should be taken during diagnosis not to confuse differential noises with those from other drivetrain components.

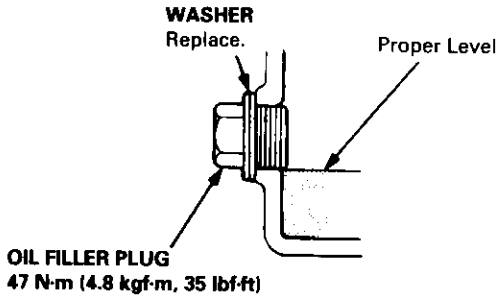
Symptom	Probable Cause	Remedy
Will not go into 4WD mode	• Fluid level too low • Incorrect fluid type	• Add fluid • Replace
Will not return to 2WD mode	Incorrect fluid type	Drain and fill the differential
Gear or bearing noises	• Fluid level too low • Incorrect fluid type • Damaged or chipped gears	• Add fluid • Drain and fill the differential • Replace the differential carrier assembly
Overheating	• Fluid level too low • Incorrect fluid type	• Add fluid • Drain and fill the differential
Fluid leak	• Fluid level too high • Clogged breather hose • Worn or damaged oil seal • Damaged sealing washer • Loose mounting bolts or inadequate sealing	• Lower to proper level • Clean or replace • Replace • Replace • Recheck torque or apply sealant

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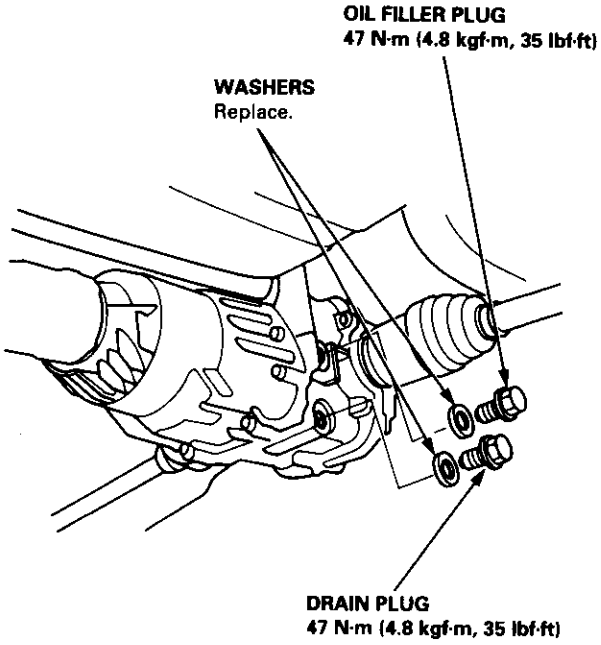
Differential Fluid

⚠ WARNING Make sure lifts are placed properly (see section 1).

1. With the vehicle on level ground, inspect differential fluid with engine OFF.
2. Remove the oil filler plug, then check the level and condition of the fluid.



3. The fluid level must be up to the fill hole. If it is below the hole, add the recommended fluid until it runs out, then reinstall the oil filler plug with a new washer.
4. If the differential fluid is dirty, remove the drain plug, and drain the fluid.



5. Clean the drain plug, then reinstall it with a new washer, and refill the differential with the recommended fluid to the proper level.

   NOTE: If you disassembly the differential, check the fluid level again after the 4WD system check is finished. Add fluid if necessary.

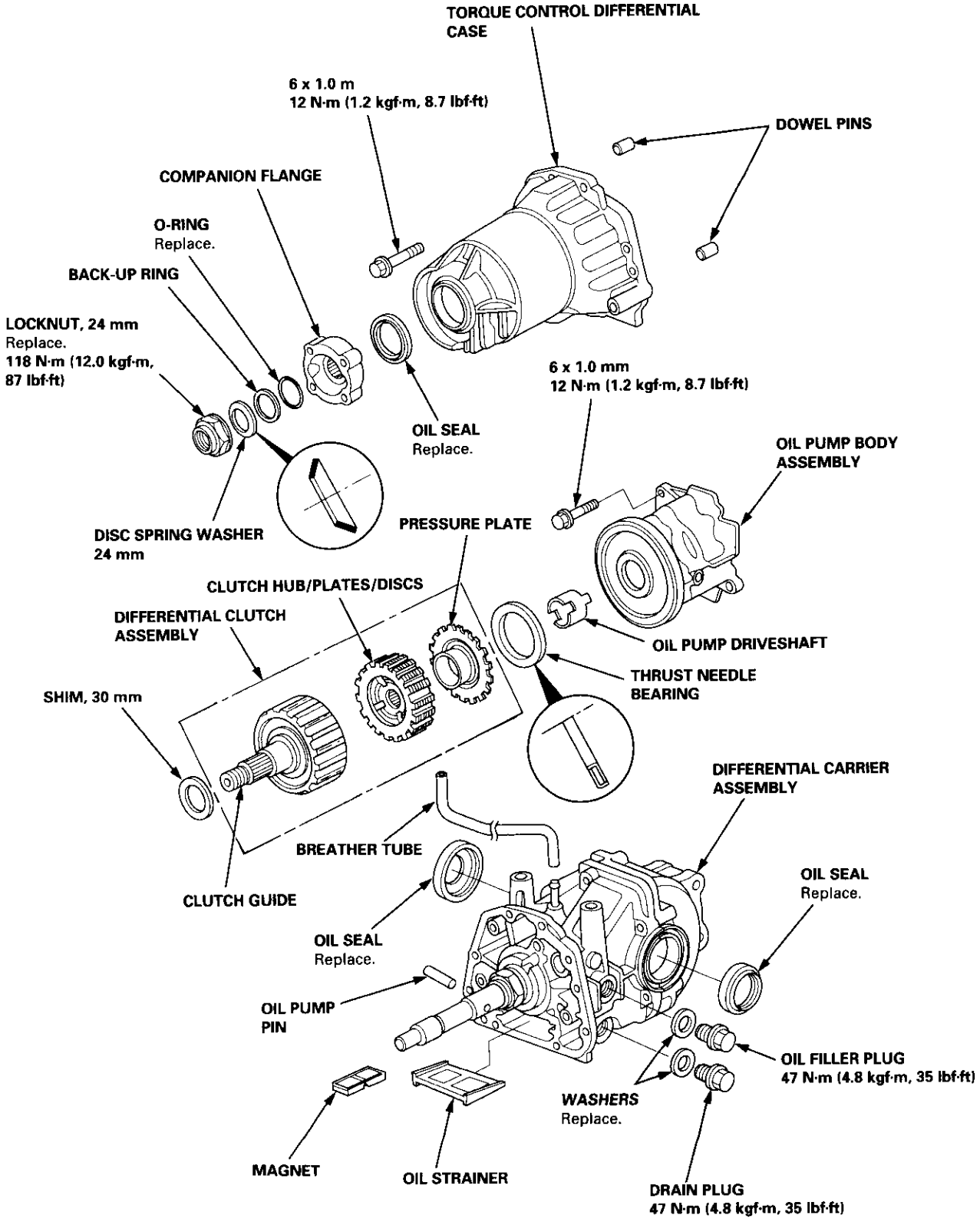
6. Reinstall the oil filler plug with a new washer.

Fluid Capacity
1.0 ℓ (1.1 US qt, 0.9 Imp qt) at fluid change
1.2 ℓ (1.3 US qt, 1.1 Imp qt) at overhaul

Recommended fluid:
Genuine Honda CVT Fluid

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Illustrated Index



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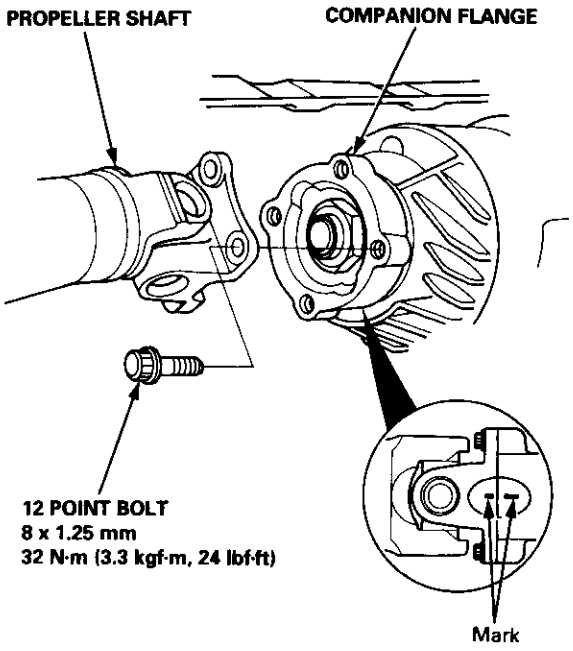
Rear Differential Assembly

Removal/Installation

⚠ WARNING Make sure lifts are placed properly (see section 1).

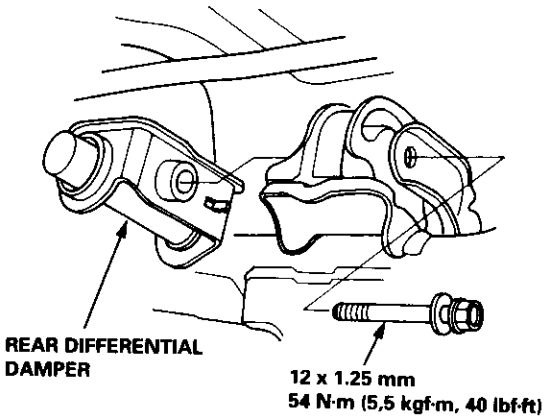
1. Drain the differential fluid (see page 15-14).

2. Mark the propeller shaft and companion flange of the rear differential assembly so they can be reinstalled in their original positions.

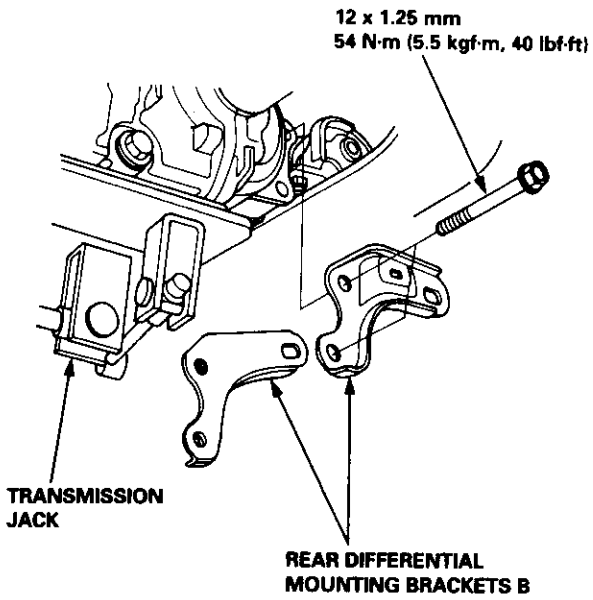


3. Remove the propeller shaft from the rear differential assembly.

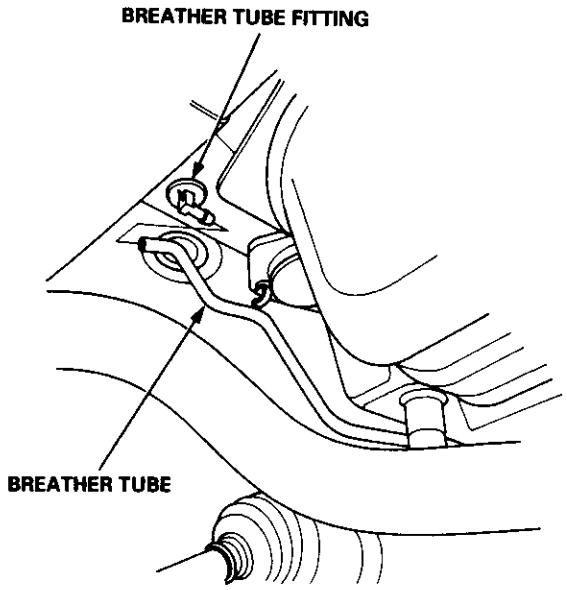
4. Remove the rear differential damper.



5. Place a transmission jack under the rear differential assembly, then remove the right mounting bracket B and the left mounting bracket B.



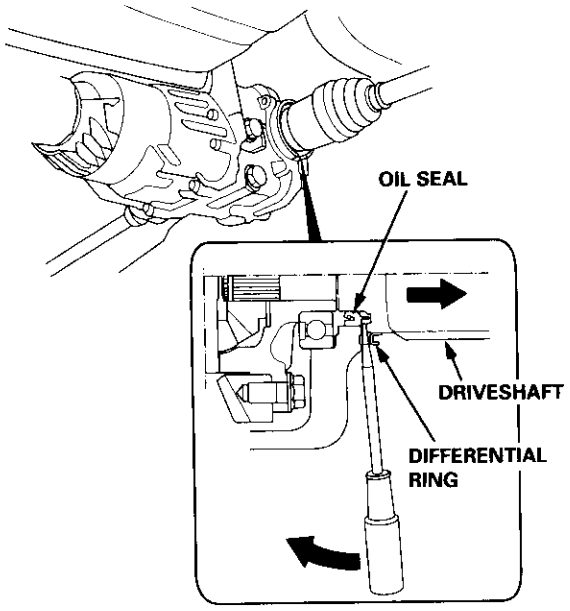
6. Remove the breather tube from the breather tube fitting.



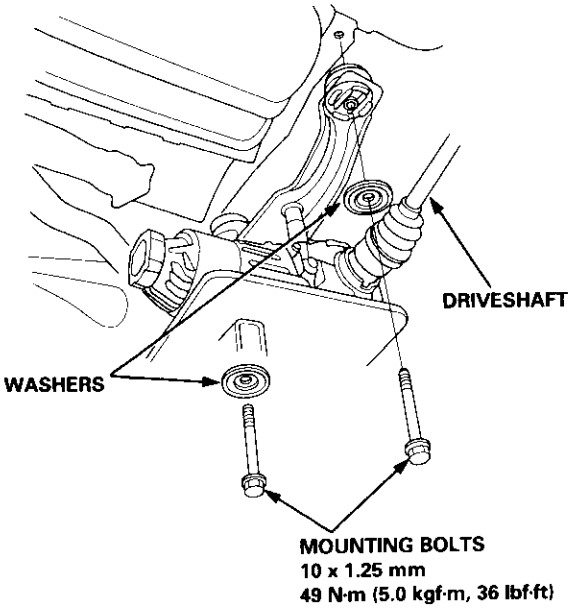
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7. Insert the edge of the screwdriver into the groove located under the differential housing. Pry out the driveshaft inboard joint with a screwdriver.

   NOTE: Take care not to damage the differential oil seal and differential ring when prying out the differential inboard joint.

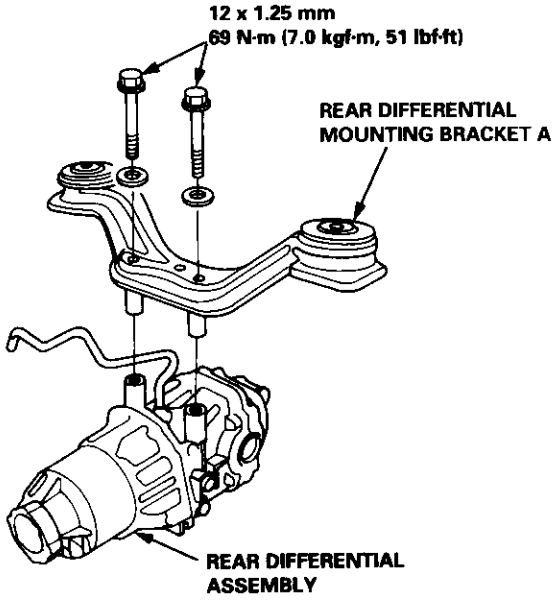


8. Remove the mounting bolts and the washers.



9. Lower the rear differential assembly on the transmission jack, then remove the rear driveshafts from the rear differential assembly.

10. Remove the rear differential mounting bracket A from the rear differential assembly.



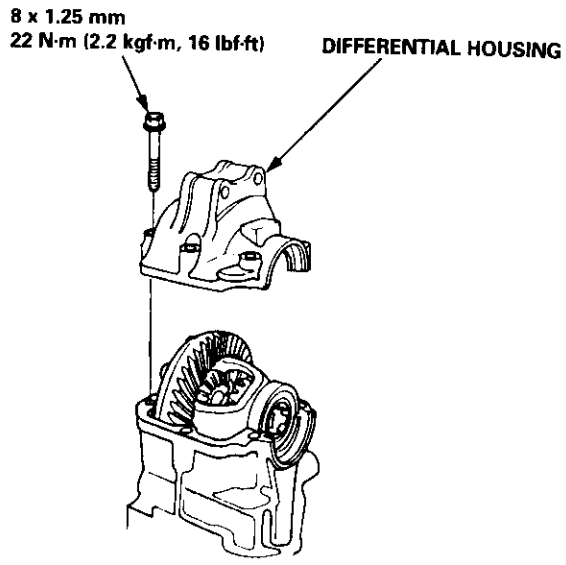
11. Install the rear differential assembly in the reverse order of removal.

    Note these items during reassembly:
    - Install the breather tube to the breather tube joint properly.
    - During the propeller shaft installation, align the marks on the propeller shaft and companion flange.
    - Refill the rear differential with the recommended fluid to the proper level (see page 15-14).

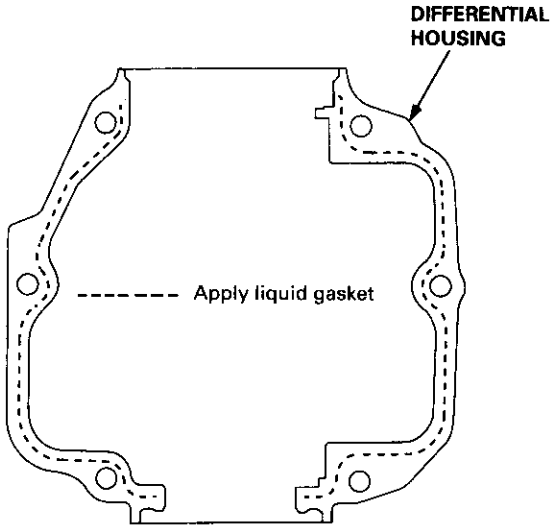
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Leak Repair

1. Remove the bolts in a crisscross pattern, then remove the differential housing.



2. Apply liquid gasket to the sealing surface of the differential housing, and note these items:
   - Use liquid gasket (P/N 08718 – 0001).
   - Remove any dirt or fluid from the sealing surface.
   - If 20 minutes have passed after applying liquid gasket, reapply it before you assemble the housings. Allow it to cure at least 30 minutes after assembly before filling differential with fluid.



3. Install the differential housing, then torque the bolts in a crisscross pattern in several steps.

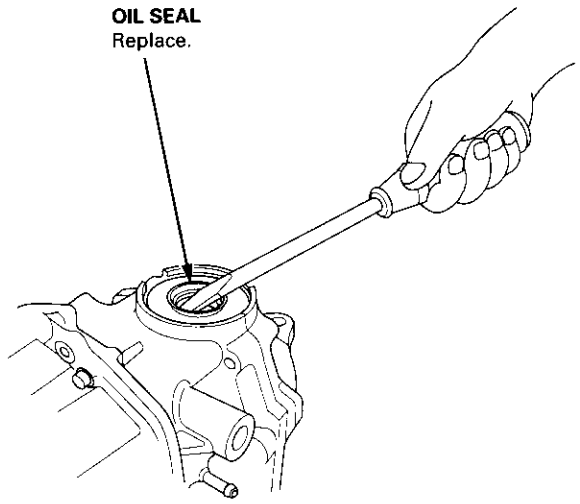
4. Install the oil seals (see page 15-19).

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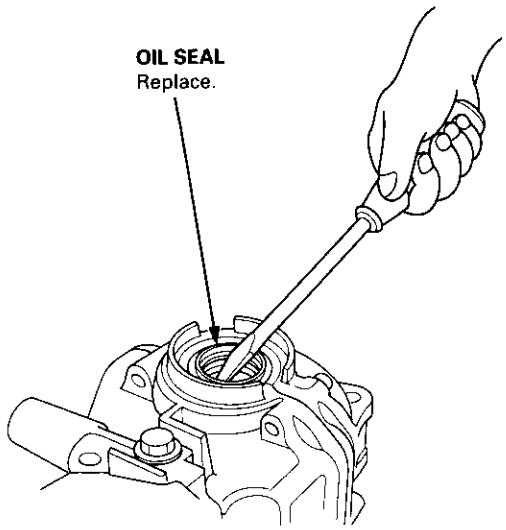
Replacement

1. Remove the oil seals from the differential housing.

Right side:

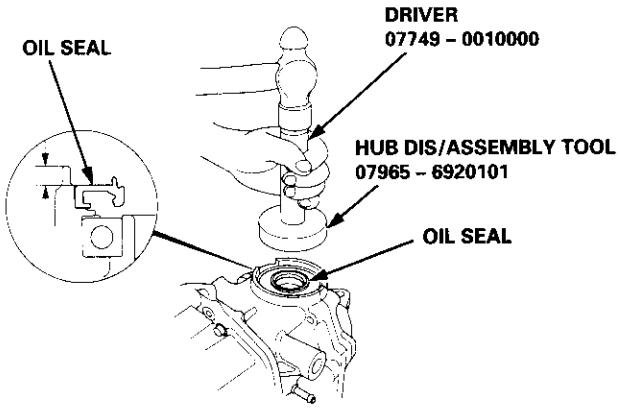


Left side:

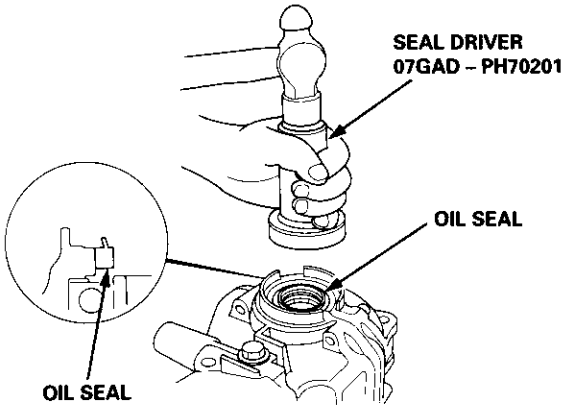


2. Install the oil seals squarely using the special tools. Be careful not to damage the lip of the oil seals.

Right side: Installation depth of the oil seal is 9 mm (0.35 in) below the edge of the differential housing.



Left side: Install the oil seal flush with the edge of the differential carrier assembly.

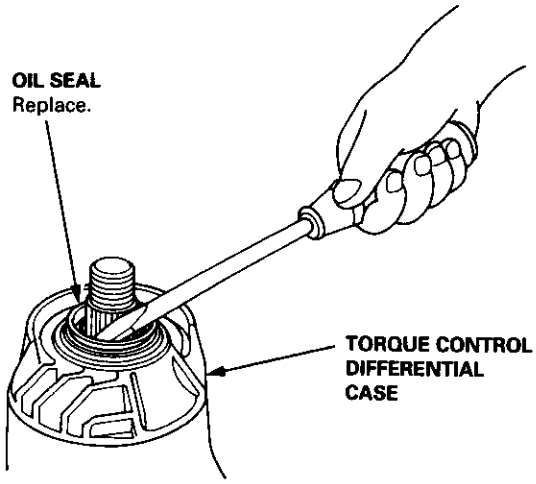


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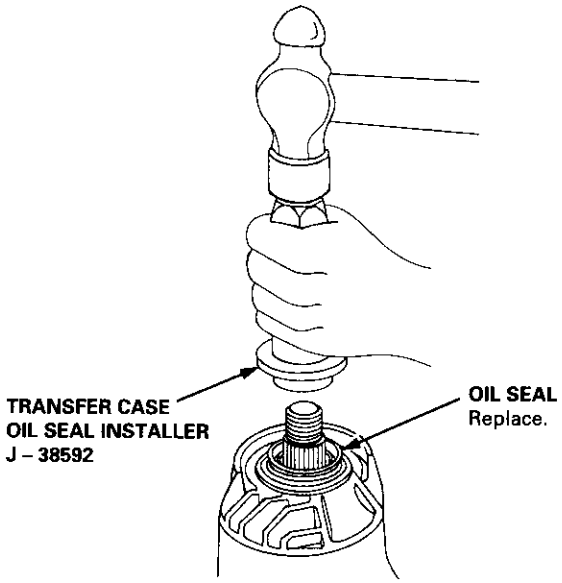
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Replacement (cont'd)

3. Remove the oil seal from the torque control differential case.

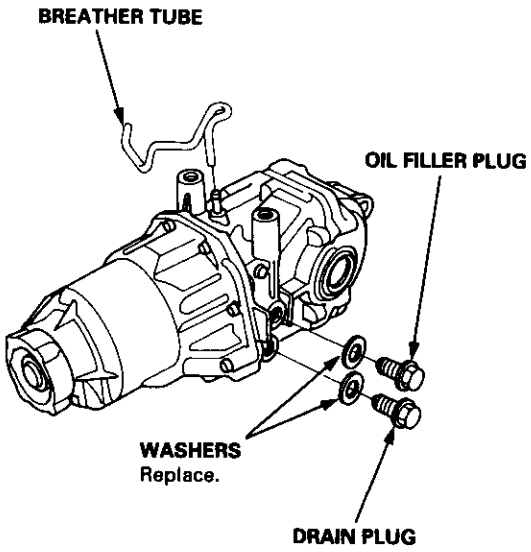


4. Install the oil seal squarely using the special tool. Be careful not to damage the lip of the oil seal.

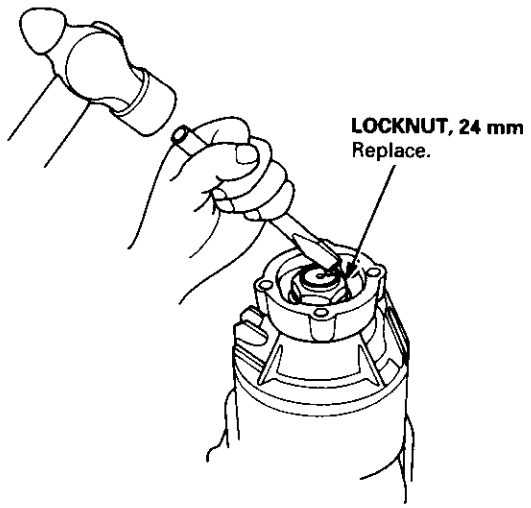


Disassembly

1. Remove the breather tube, the drain plug and the oil filler plug.

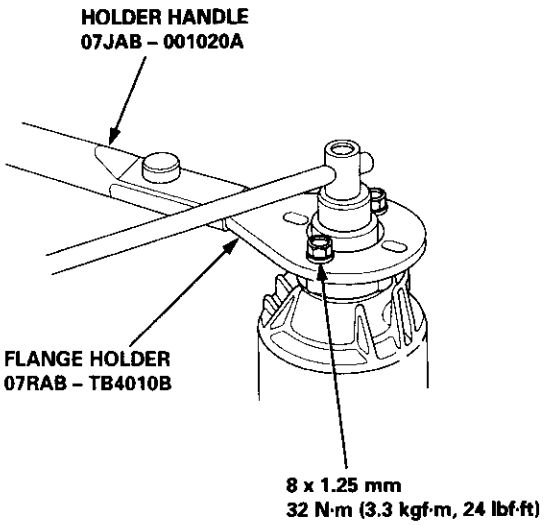


2. Raise the locknut tab from the groove of the clutch guide, making sure that the tab completely clears the groove to prevent damaging the clutch guide.

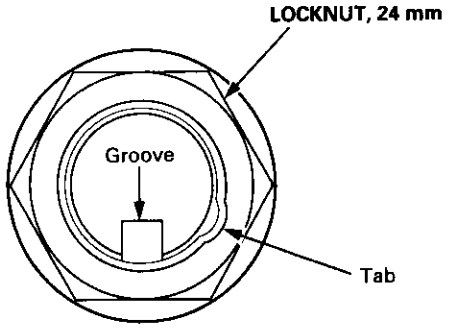


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3. Install the special tools on the companion flange.

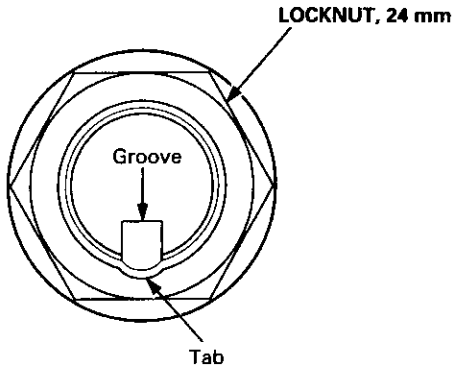


4. Loosen the locknut counterclockwise so that its tab comes out from the groove in the clutch guide.

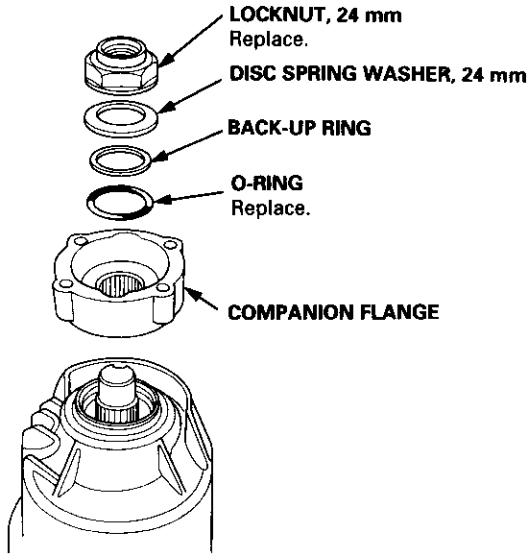


5. Tighten the locknut till its tab aligns with the groove.

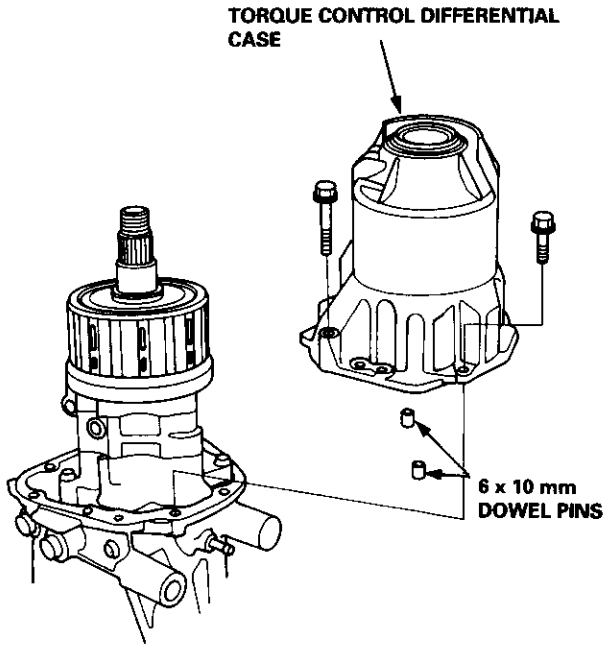
6. Remove any dirt from inside of the groove in the clutch guide, then loosen the locknut.



7. Remove the locknut, the disc spring washer, the back-up ring, the O-ring and the companion flange.



8. Remove the torque control differential case and the dowel pins.

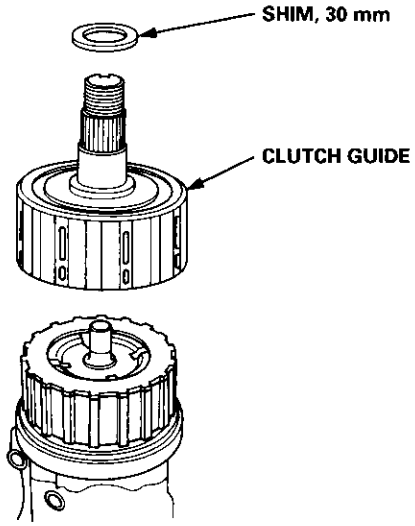


(cont'd)

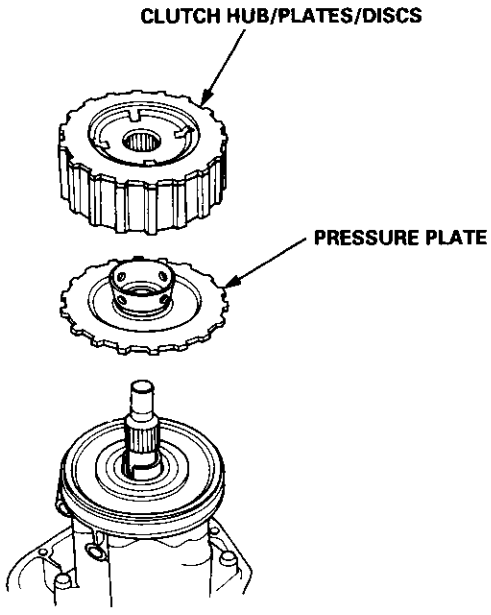
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Disassembly (cont'd)

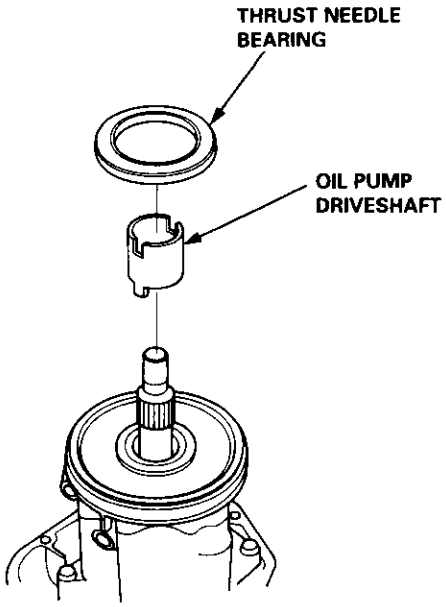
9. Remove the shim and the clutch guide.



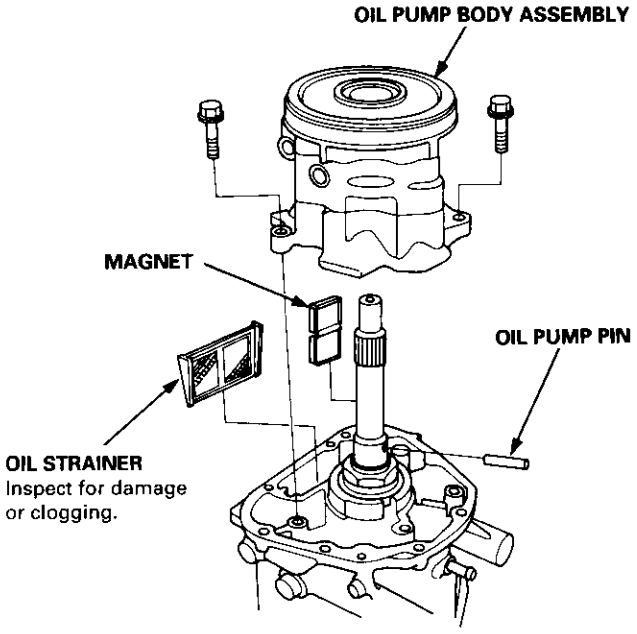
10. Remove the clutch hub/plates/discs and the pressure plate.



11. Remove the thrust needle bearing and the oil pump driveshaft.



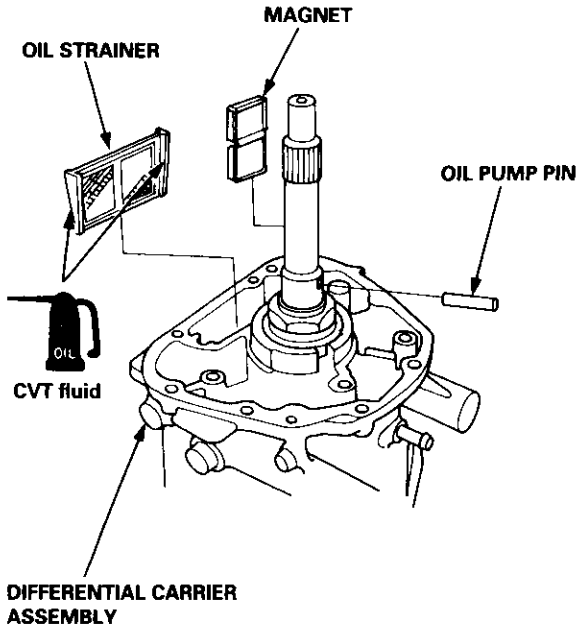
12. Remove the oil pump body assembly, the oil pump pin, the magnet, and the oil strainer.



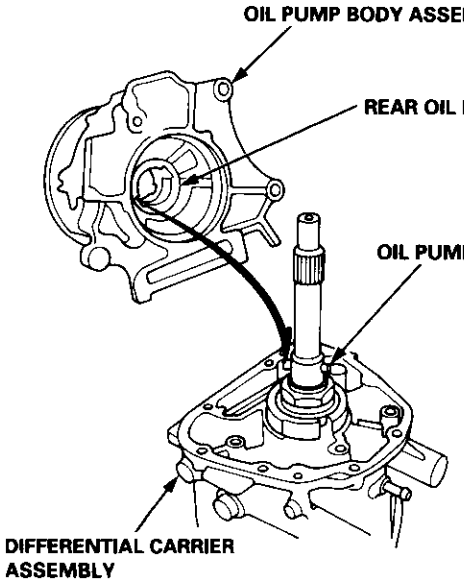
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Reassembly

1. Apply CVT fluid to the rubber of the oil strainer, then install the oil strainer, the magnet, and the oil pump pin to the differential carrier.

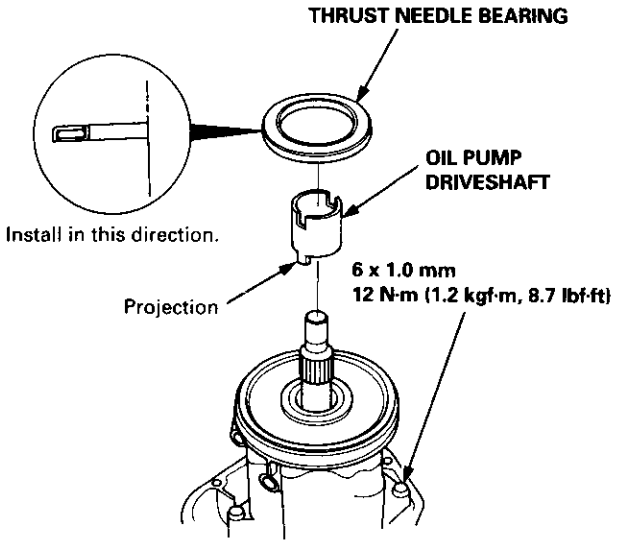


2. Align the oil pump pin with the groove of the rear oil pump in the pump body assembly, then install the oil pump body assembly to the differential carrier assembly.



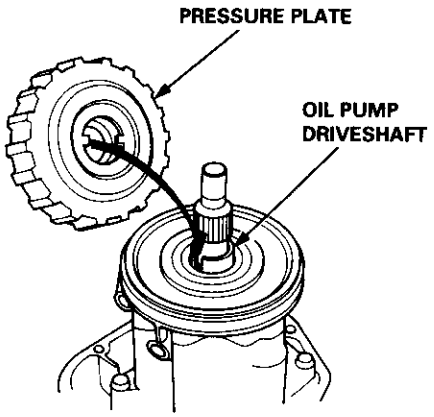
3. Tighten the oil pump body assembly mounting bolts.

4. Install the oil pump driveshaft by aligning the projection of the oil pump driveshaft with the groove of the front oil pump in the oil pump body assembly.



5. Install the thrust needle bearing.

6. Install the pressure plate assembly by aligning the projection of the pressure plate with the groove of the oil pump driveshaft.

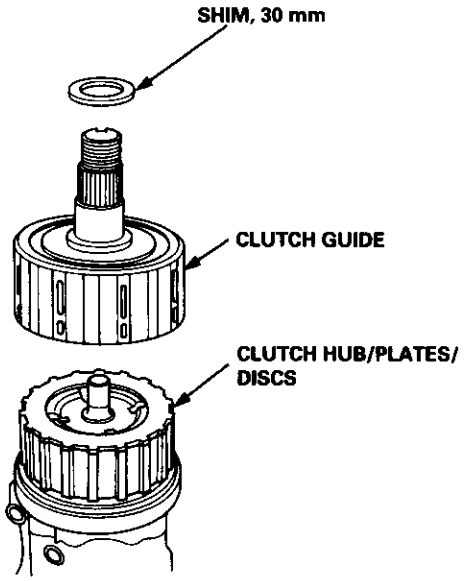


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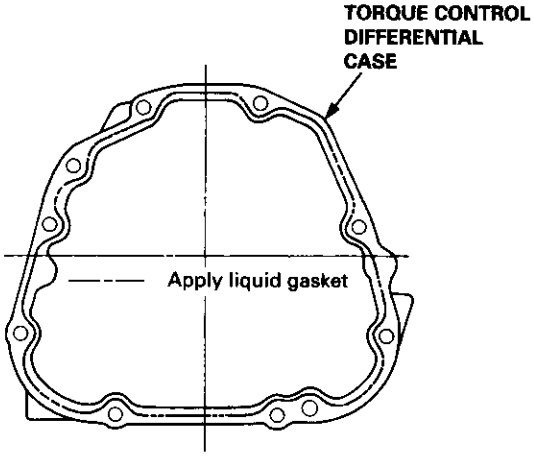
Reassembly (cont'd)

7. Install the clutch hub/plates/discs, then align the projection of the plates with the discs.

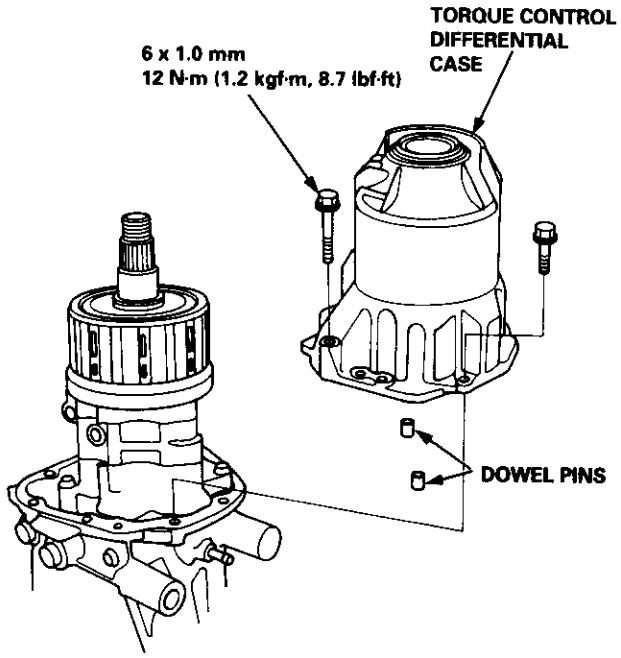


8. Install the clutch guide and the 30 mm shim.

9. Apply liquid gasket to the sealing surface of the torque control differential case, and note these items:
   - Use liquid gasket (P/N 08718 – 0001).
   - Remove any dirt or fluid from the sealing surface.
   - If 20 minutes have passed after applying liquid gasket, reapply it before you assemble the housings. Allow it to cure at least 30 minutes after assembly before filling differential with fluid.

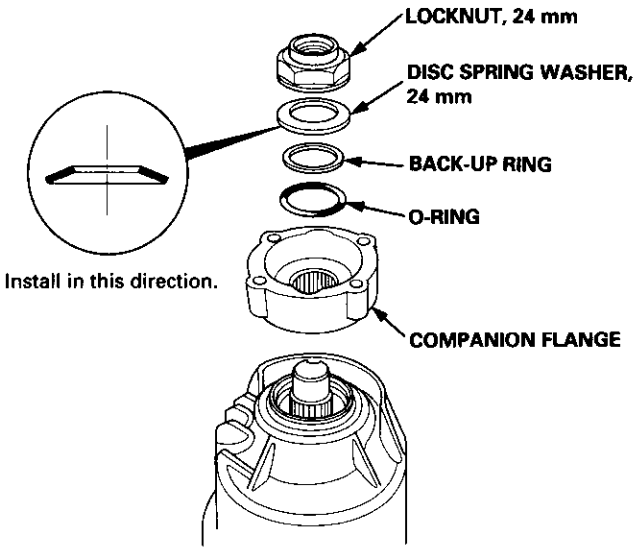


10. Install the dowel pins and torque control differential case.



11. Install the companion flange, O-ring, back-up ring, disc spring washer, and the locknut.

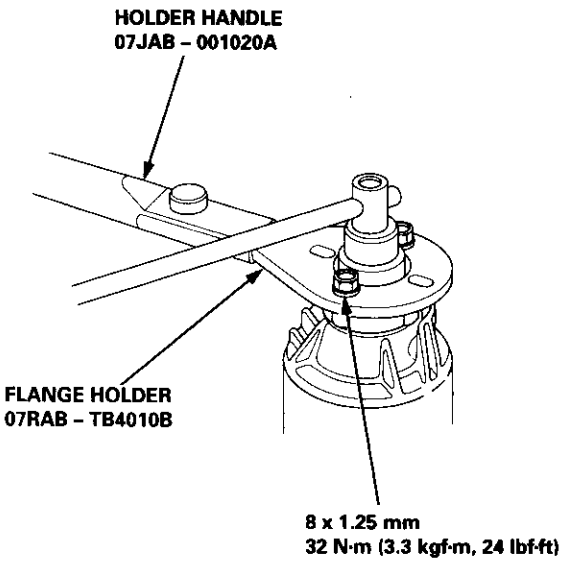
    NOTE: Apply CVT fluid to the O-ring.



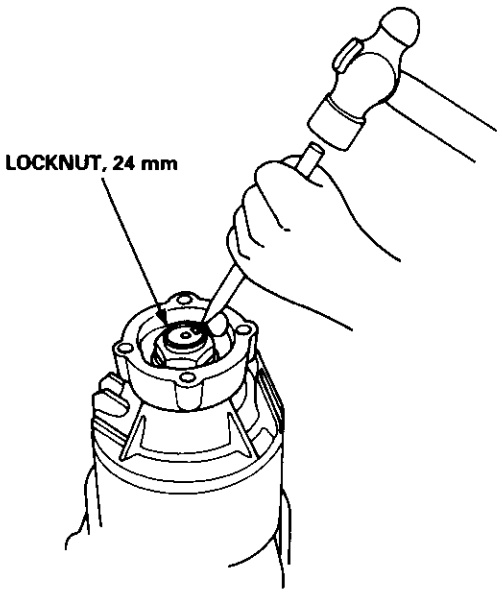
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12. Install the special tools to the companion flange, then tighten the locknut to specified torque.

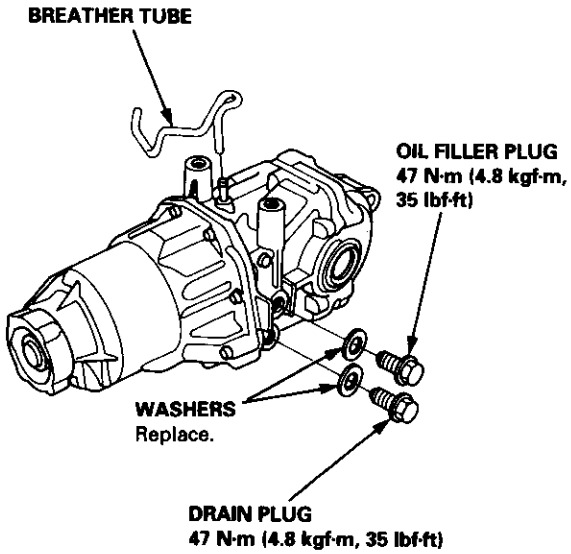
TORQUE: 118 N·m (12.0 kgf·m, 87 lbf·ft)



13. Stake the locknut tab into the groove in the clutch guide.



14. Install the breather tube.



15. Install the drain plug and the oil filler plug with new washers.

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Driveshafts

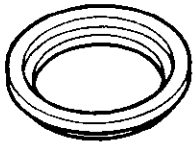
Special Tools 16-2
Driveshafts
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Front Driveshafts
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  Disassembly 16-5
  Reassembly 16-8
  Installation 16-17
Intermediate Shaft
  Removal 16-18
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  Reassembly 16-24
  Installation 16-28
Propeller Shaft
  Inspection 16-29
  Removal/Installation 16-30



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Special Tools

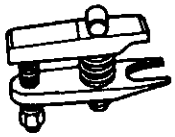
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAF – SH20400	Attachment	1	16-16
②	07LAD – PW50601	Attachment, 40 x 50 mm I.D.	1	16-18
③	07MAC – SL00200	Ball Joint Remover, 28 mm	1	16-4
④	07746 – 0010300	Attachment, 42 x 47 mm	1	16-16
⑤	07746 – 0010400	Attachment, 52 x 55 mm	1	16-17, 18
⑥	07746 – 0030400	Attachment, 35 mm I.D.	1	16-17
⑦	07749 – 0010000	Driver	1	16-16, 17, 18
⑧	07965 – SD90100	Support Base	1	16-16
⑨	07XAC – 0010200	Threaded Adapter, 24 x 1.5 mm	1	16-7



①



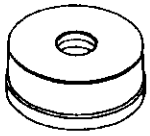
②



③



④



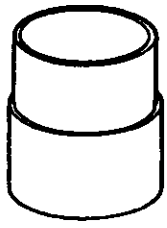
⑤



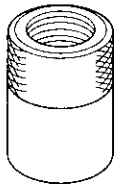
⑥



⑦



⑧



⑨

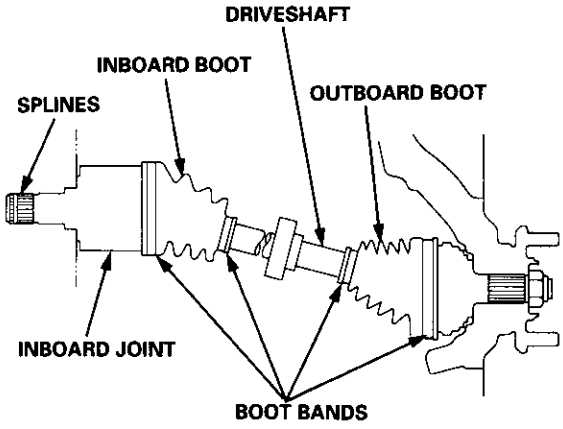
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Inspection

Boot Damage
Check the boots on the driveshaft for cracks, damage, leaking grease, and loose boot bands. If any damage is found, replace the boot and boot bands.

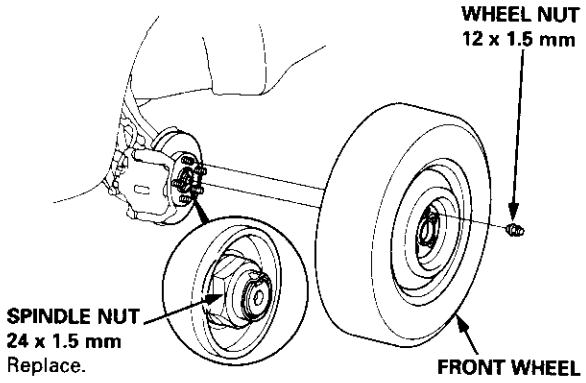
Loose Splines
Turn the driveshaft by hand, and make sure the splines and joint are not excessively loose. If damage is found, replace the inboard joint.

Twisting or Cracking
Make sure the driveshaft is not twisted or cracked. Replace it if necessary.

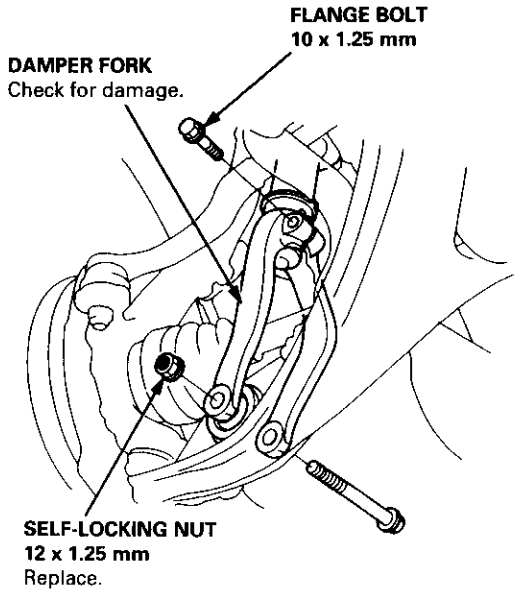


Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.



4. If the right driveshaft is to be removed, drain the transmission fluid (see section 13 or 14). It is not necessary to drain the transmission fluid when the left driveshaft is removed.
5. Lift up locking tab on the spindle nut, then remove the nut.
6. Remove the self-locking nut and flange bolt.



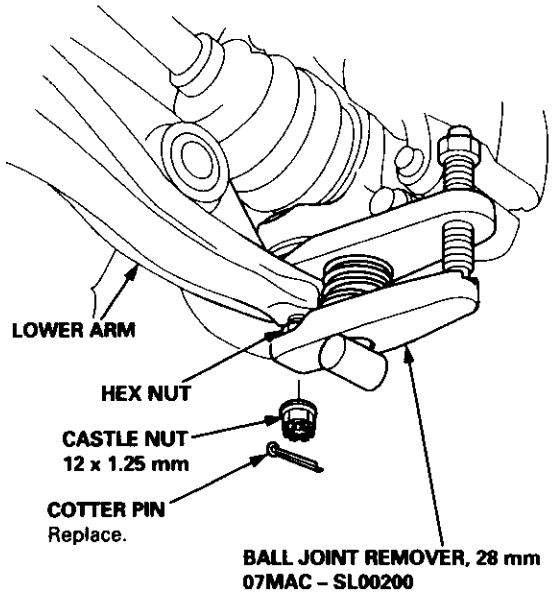
7. Remove the damper fork.

(cont'd)

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Removal (cont'd)

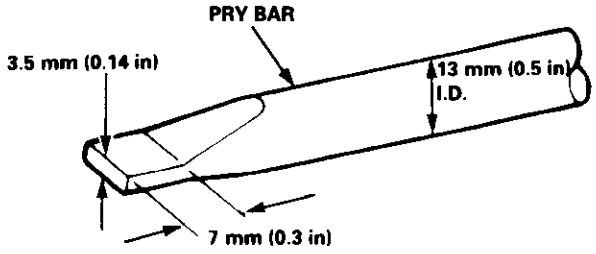
8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.



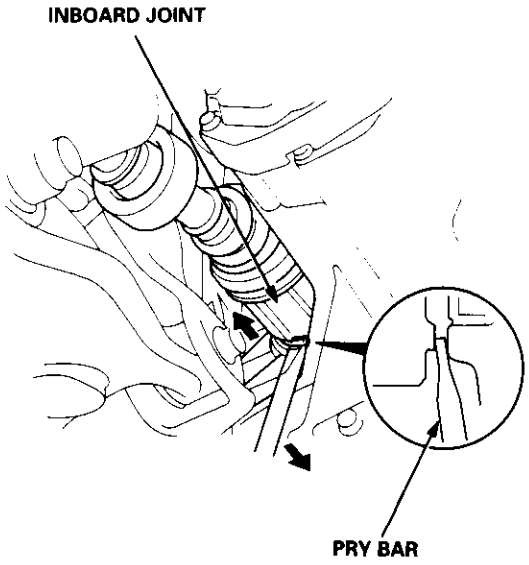
9. Install a 12 mm hex nut on the ball joint. Make sure the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.

10. Use the special tool as shown in section 18 to separate the ball joint and lower arm. Be careful not to damage the ball joint boot. If necessary, apply penetrating type lubricant to loosen the ball joint.

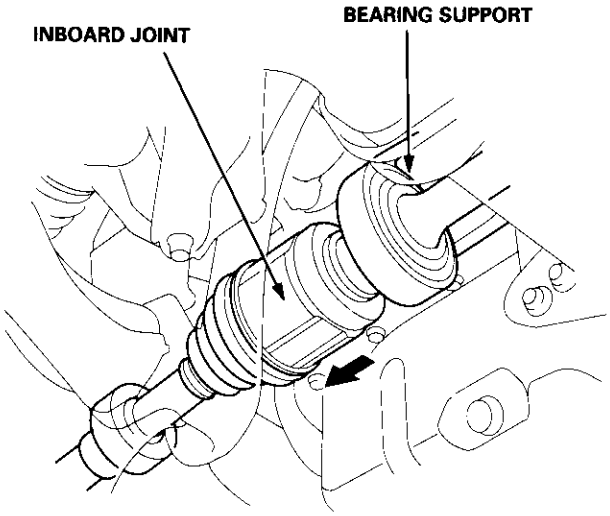
11. Pry out the driveshaft assembly with a pry bar, as shown, to force the set ring at the driveshaft end past the groove. Be careful not to damage the oil seals when prying.



12. Pull on the inboard joint, and remove the driveshaft from the differential case or bearing support as an assembly. Do not pull on the driveshaft, the inboard joint may come apart. Pull the driveshaft straight out to avoid damaging the differential oil seal or the intermediate shaft outer seal.

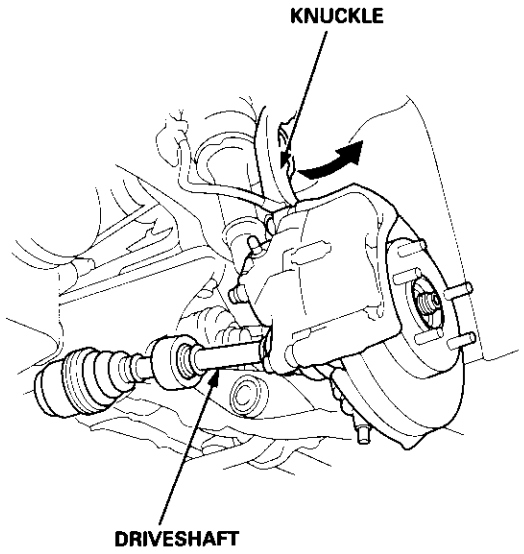


Left driveshaft:
Remove the left driveshaft from the bearing support by tapping on the inboard joint of the driveshaft with a plastic hammer.

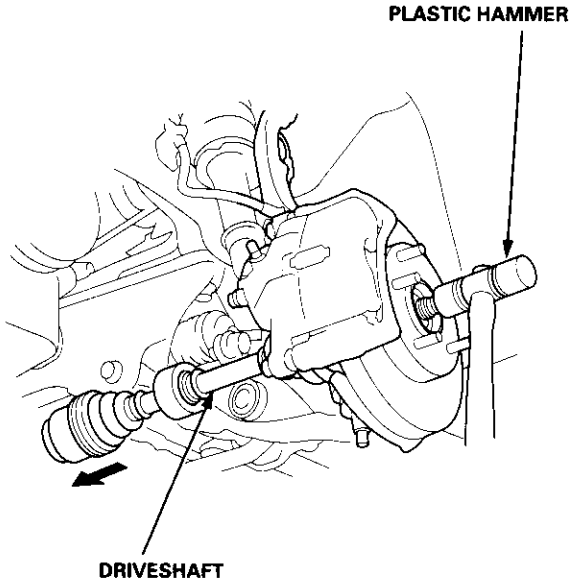


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13. Pull the knuckle outward, and remove the driveshaft inboard joint from the differential case or bearing support.



14. Remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



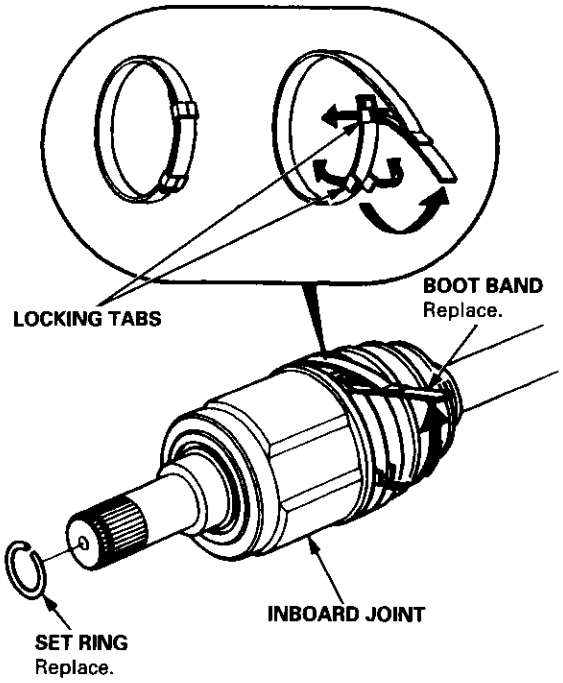
Disassembly

Inboard Joint Side:

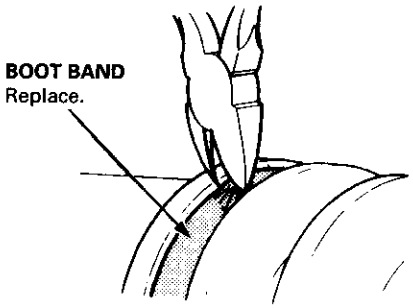
1. Carefully clamp the driveshaft in a vise with soft jaws, then remove the set ring from the inboard joint.

2. Remove the boot bands. Take care not to damage the boot.
   - If the boot band is a locking tab type, pry up the locking tabs with a screwdriver, and lift up the end of the band.
   - If the boot band is a welded type or a low profile type, carefully cut the boot band with a pair of diagonal cutters.
   - If the boot band is a double loop type, lift up the band bend.

Locking Tab



Welded

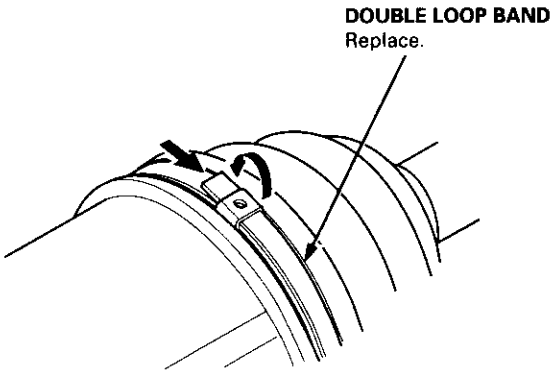


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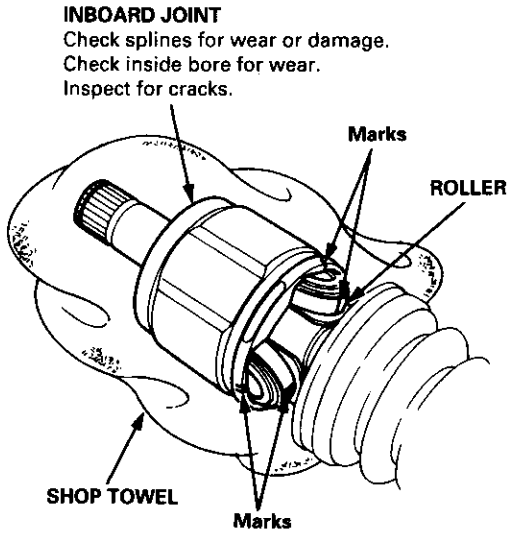
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Disassembly (cont'd)

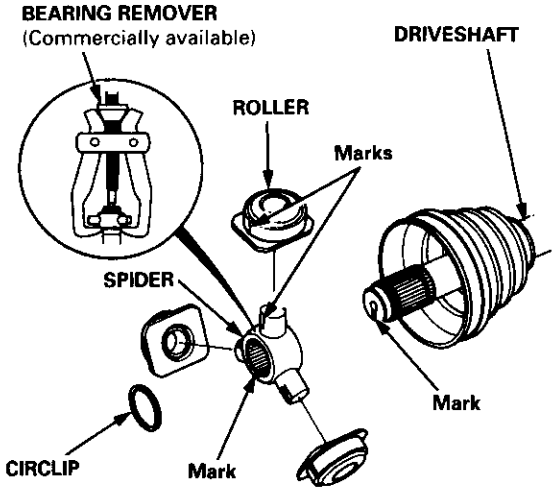
Double Loop



3. Mark each roller and inboard joint to identify the locations of the rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel. Be careful not to drop the rollers when separating them from the inboard joint.



4. Mark the rollers and spider to identify the locations of the rollers on the spider, then remove the rollers.

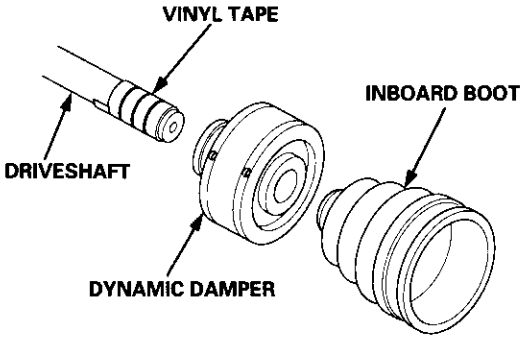


5. Remove the circlip.

6. Mark the spider and driveshaft to identify the position of the spider on the shaft.

7. Remove the spider using a bearing remover.

8. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots and dynamic damper.



9. Remove the inboard boot and dynamic damper. Take care not to damage the boot and dynamic damper.

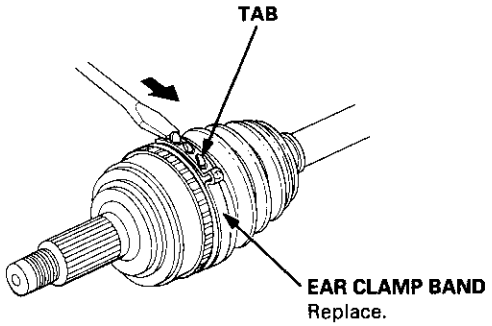
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Outboard Joint Side:

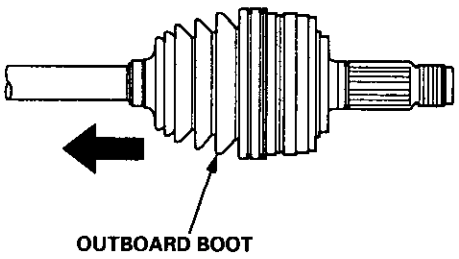
1. Lift up the three tabs with a screwdriver, then remove the boot bands. Take care not to damage the boot.

   NOTE:
   - If the boot band is a double loop type, lift up the band bend.
   - If the boot band is a welded type, cut the boot band.
   - If the boot band is a locking tabs type, pry up the tabs with a screwdriver, and lift up the end of the band.

   Ear Clamp

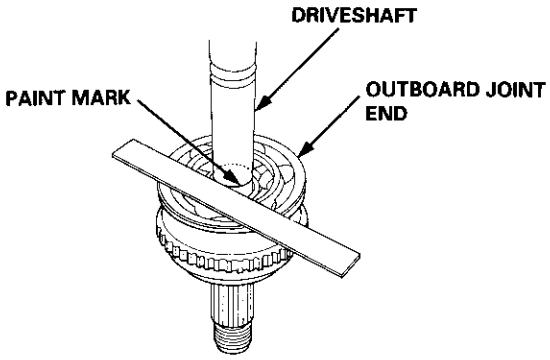


2. Slide the outboard boot to the inboard joint side.

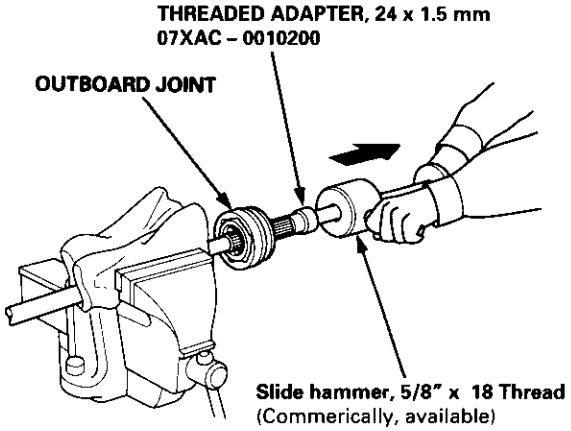


3. Wipe off the grease to expose the driveshaft and the outboard joint inner race.

4. Mark the driveshaft at the same position of the outboard joint end with paint.



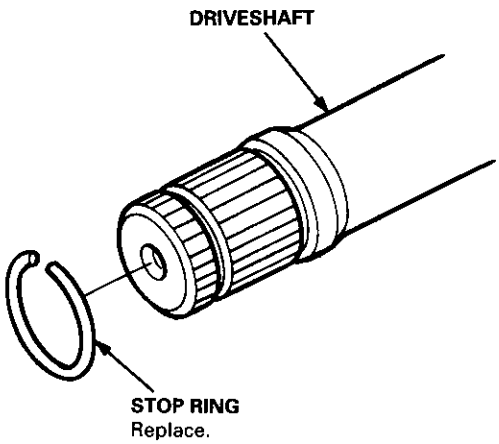
5. Carefully clamp the driveshaft in a vise.



6. Remove the outboard joint using a special tool as shown.

7. Remove the driveshaft from the vise.

8. Remove the stop ring from the driveshaft.



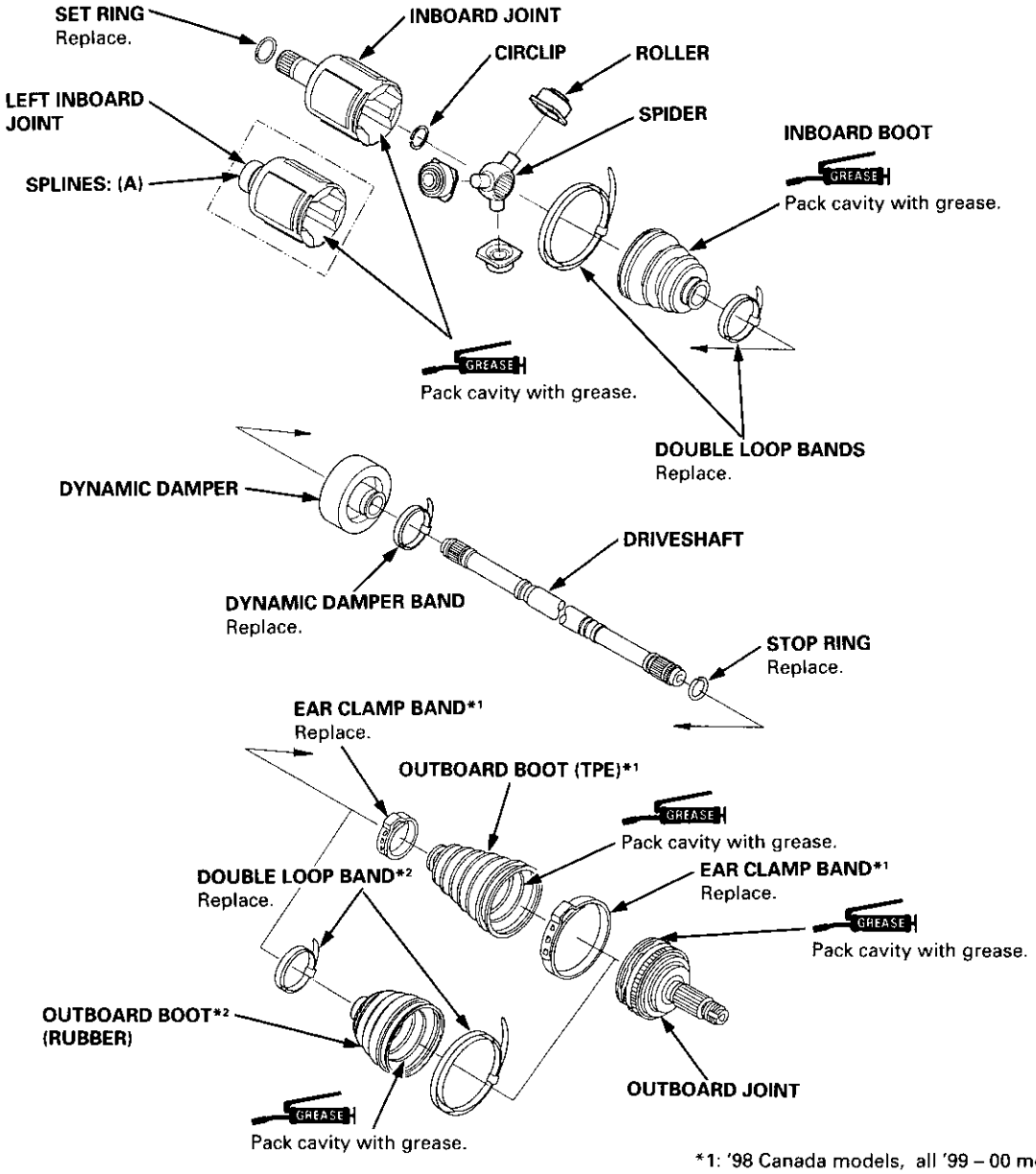
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Reassembly

Note these items during reassembly:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- GREASE : Thoroughly pack the inboard and outboard joints and both joint boots with the joint grease included in the new driveshaft set.
- The '98 Canada model and all '99 – 00 models use a TPE (Thermoplastic Polyester Elastomer) outboard joint boot. Use the ear clamp type boot band in the outboard boot set.

Grease quantity:
Inboard Joint: All models 120 – 130 g (4.2 – 4.6 oz)
Left inboard joint splines (A): 0.5 – 1.0 g (0.018 – 0.035 oz)
Outboard Joint: '97 model and '98 USA model 130 – 140 g (4.6 – 4.9 oz)
'98 Canada model and all '99 – 00 models 140 – 150 g (4.9 – 5.3 oz)

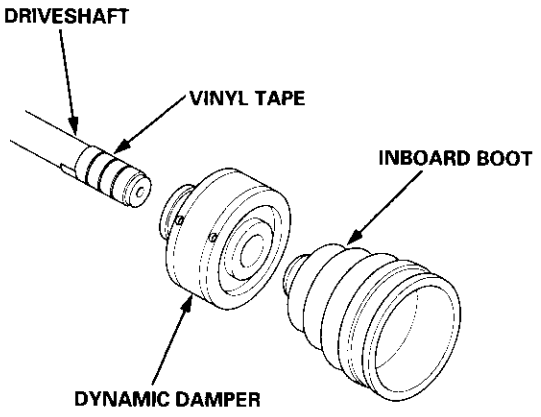


*1: '98 Canada models, all '99 – 00 models
*2: '97 – 98 models (except '98 Canada model)

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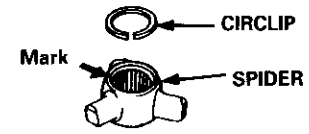
Inboard Joint Side:

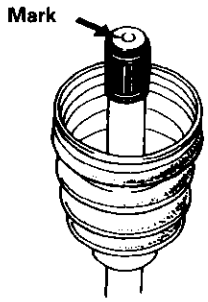
1. Wrap the splines with vinyl tape to prevent damage to the boot and dynamic damper.



2. Install the inboard boot to the driveshaft, then remove the vinyl tape. Take care not to damage the boot.

3. Install the spider onto the driveshaft by aligning the mark on the spider and the end of the driveshaft.

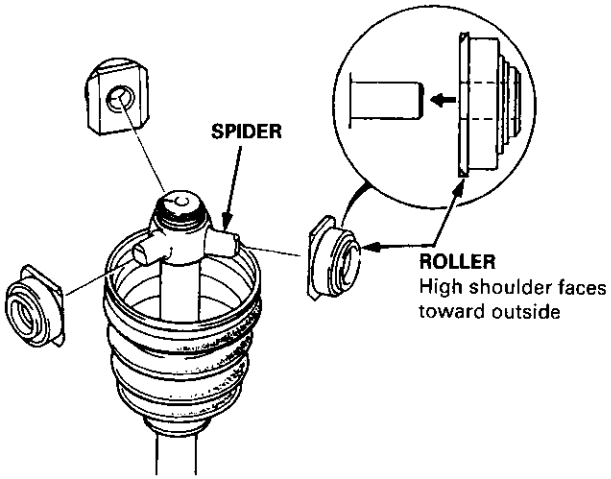




4. Fit the circlip into the driveshaft groove. Always rotate the circlip in its groove to make sure it is fully seated.

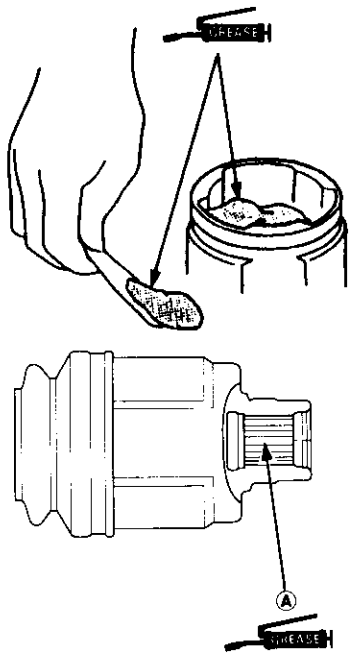
5. Fit the rollers to the spider.

   NOTE:
   - Reinstall the rollers to their original positions on the spider by aligning the marks.
   - Hold the driveshaft pointed up to prevent the rollers from falling off.



6. Pack the inboard joint with the joint grease included in the new driveshaft set.

   Grease quantity: 120 – 130 g (4.2 – 4.6 oz)
   Left inboard joint splines Ⓐ: 0.5 – 1.0 g (0.018 – 0.035 oz)



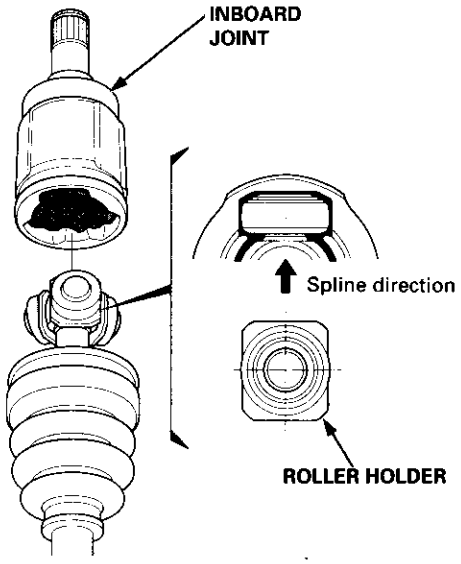
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Reassembly (cont'd)

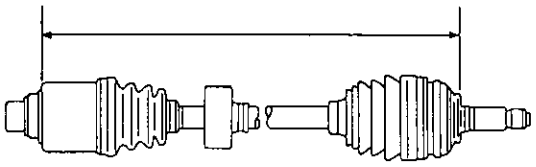
7. Fit the inboard joint onto the driveshaft, and note these items:

   - Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint with the marks on the rollers.
   - Hold the driveshaft so the inboard joint points up to prevent it from falling off.

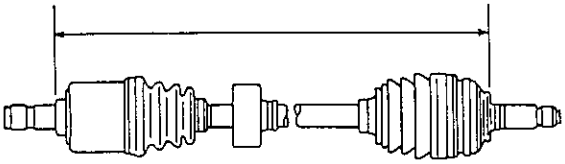


8. Adjust the length of the driveshafts to the specifications shown, then adjust the boots to halfway between full compression and full extension. Make sure the ends of the boots seat in the grooves of the driveshaft and joint.

Left: 508 – 513 mm (20 – 20.2 in)

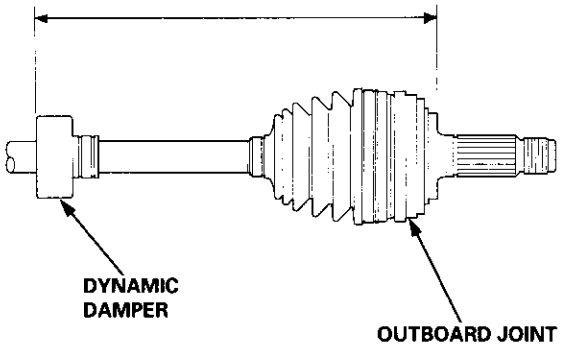


Right: AT model 520 – 525 mm (20.5 – 20.7 in)
MT model 515 – 520 mm (20.3 – 20.5 in)



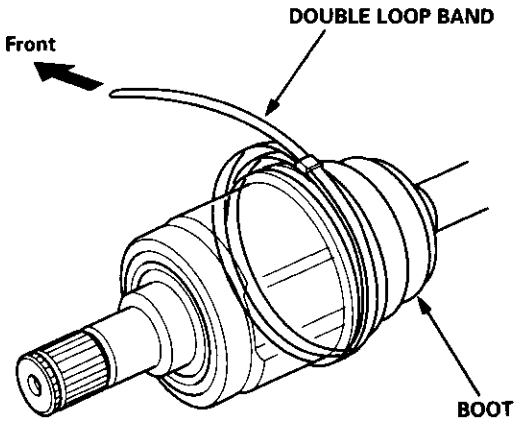
9. Position the dynamic damper to the specifications as shown.

Left: 299.5 ± 2 mm (11.8 ± 0.1 in)
Right: 299.5 ± 2 mm (11.8 ± 0.1 in)



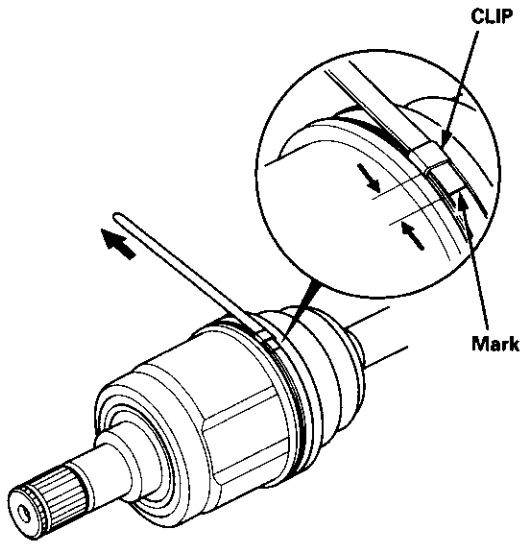
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10. Set the double loop band onto the boot or dynamic damper with the band end toward the front of the vehicle.



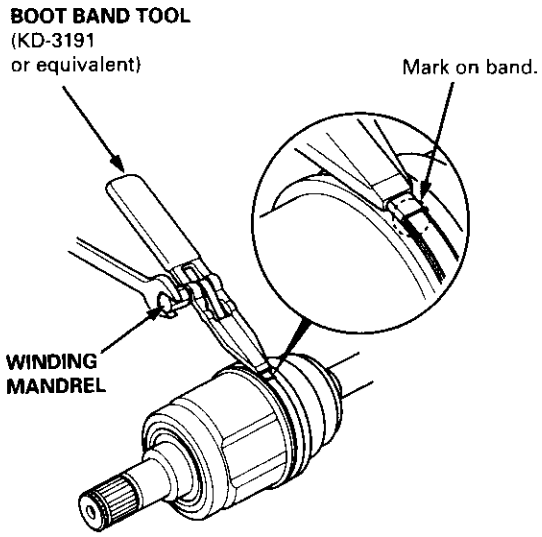
11. Pull up the slack in the band by hand.

12. Make a mark on the band 10 – 14 mm (0.4 – 0.6 in) from the clip.

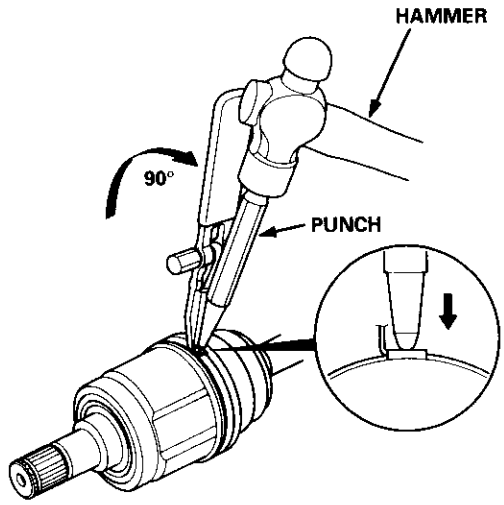


13. Thread the free end of the band through the nose section of a commercially available boot band tool (KD-3191 or equivalent), and into the slot on the winding mandrel.

14. Place a wrench on the winding mandrel of the boot band tool, and tighten the band until the marked spot on the band meets the edge of the clip.



15. Lift up the boot band tool to bend the free end of the band 90 degrees to the clip. Center-punch the clip, then fold over the remaining tail onto the clip.

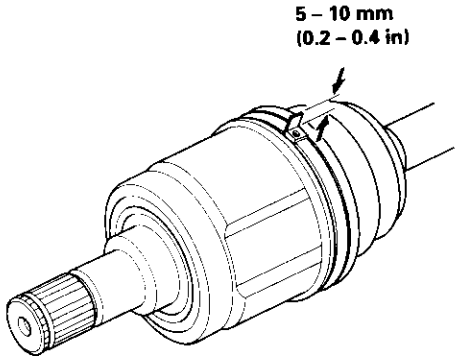


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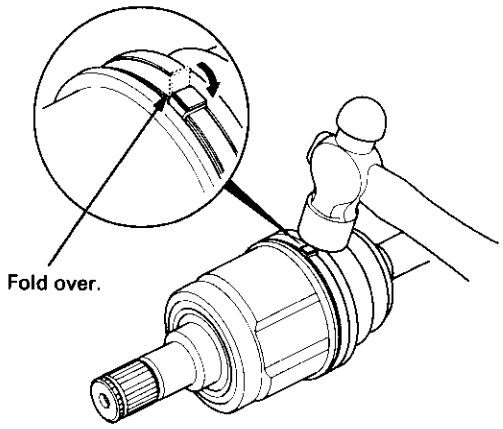
Reassembly (cont'd)

16. Unwind the boot band tool, and cut off the excess free end of the band to leave a 5 – 10 mm (0.2 – 0.4 in) tail protruding from the clip.

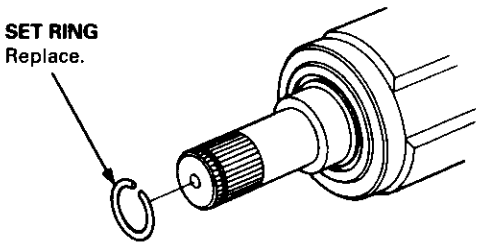


17. Bend the band end by tapping it down with a hammer.

NOTE:
- Make sure the band does not move.
- Remove any grease remaining on the surrounding surfaces.

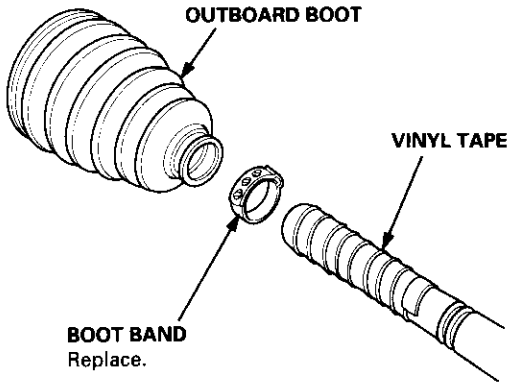


18. Install the new set ring.



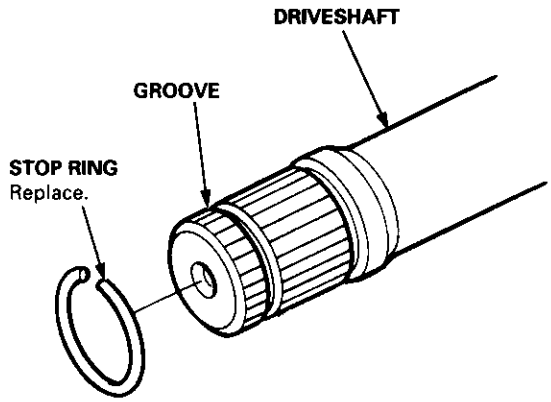
Outboard Joint Side:

1. Wrap the splines with vinyl tape to prevent damage to the boot.



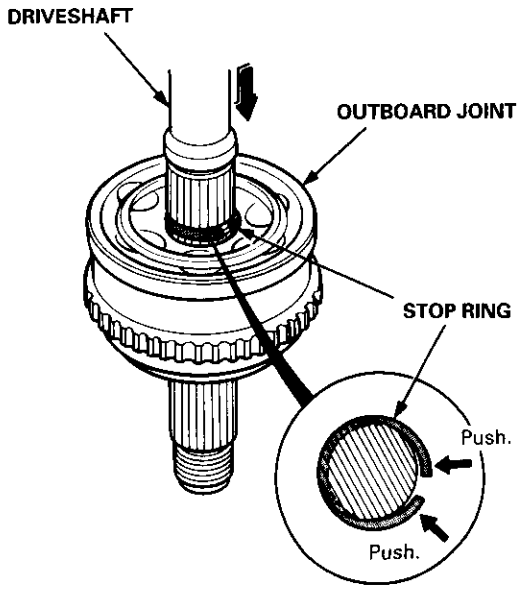
2. Install the boot band and outboard boot, then remove the vinyl tape. Take care not to damage the boot.

3. Install the stop ring into the driveshaft groove.

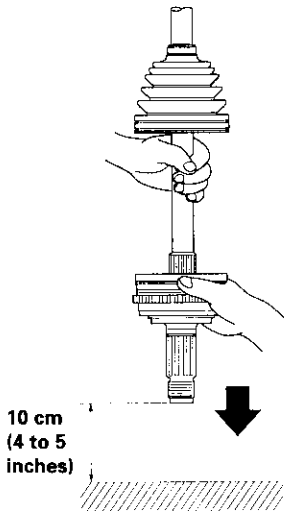


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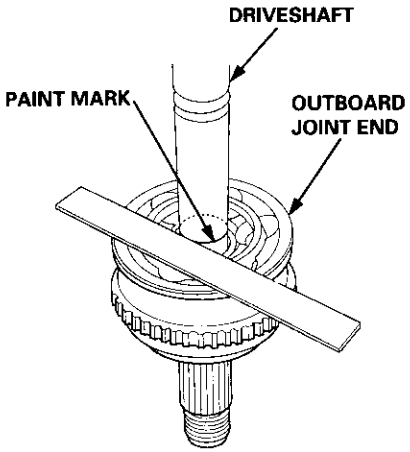
4. Insert the driveshaft into the outboard joint until the stop ring is close on the joint.



5. To completely seat the outboard joint, pick up the driveshaft and joint, and drop them from about 10 cm (4 to 5 inches) onto a hard surface. Do not use a hammer as excessive force may damage the driveshaft.

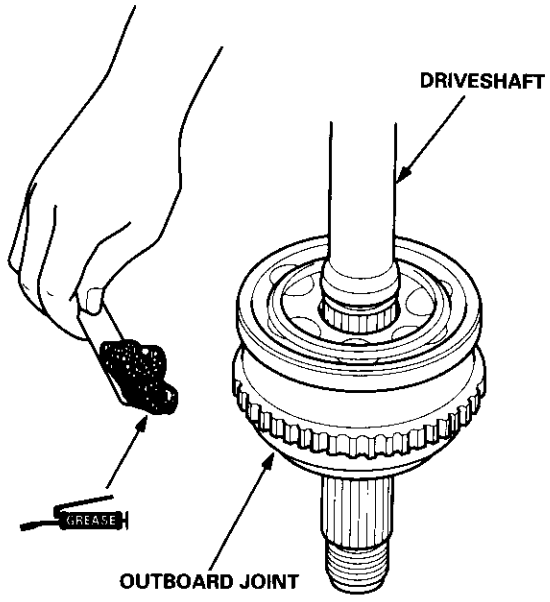


6. Check the alignment of the paint mark with the outboard joint end.



7. Pack the outboard joint with the joint grease included in the new joint boot set.

Grease quantity:
Outboard joint: '97 model and '98 USA model
130 – 140 g (4.6 – 4.9 oz)
'98 Canada model and all '99 – 00 models
140 – 150 g (4.9 – 5.3 oz)

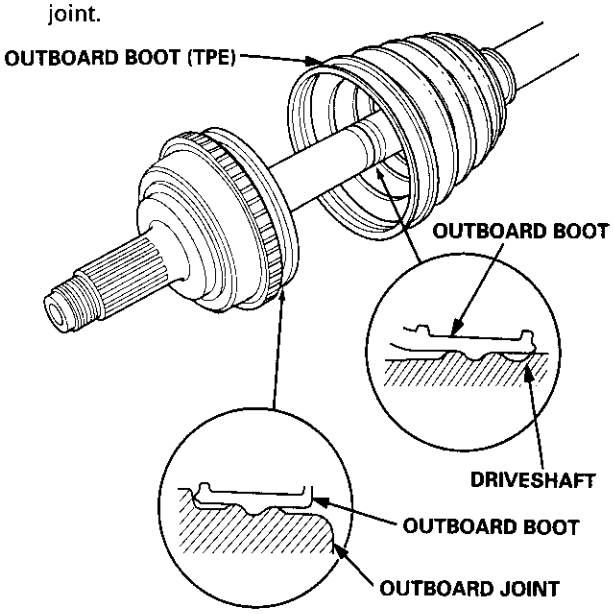


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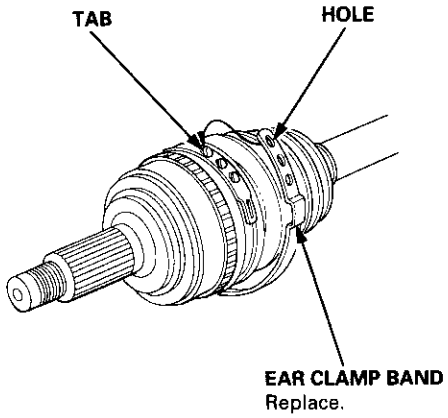
Reassembly (cont'd)

8. Fit the boot ends onto the driveshaft and outboard joint.

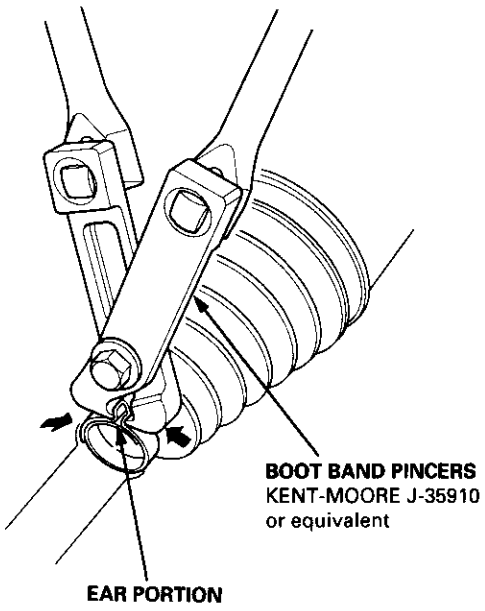


9. Install the boot bands.
   - For all '97 models and '98 USA models, go to step 13.
   - For '98 Canada models and all '99 – 00 models, go to step 10.

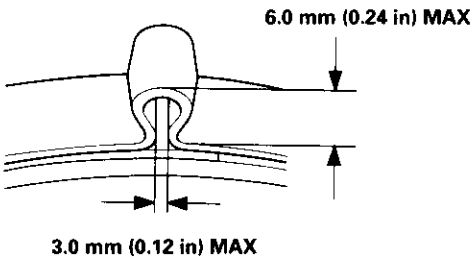
10. Set the ear clamp band by threading the tab into the holes of the band.



11. Close the ear portion of the band with a commercially available boot band pincers KENT-MOORE J-35910 or equivalent.

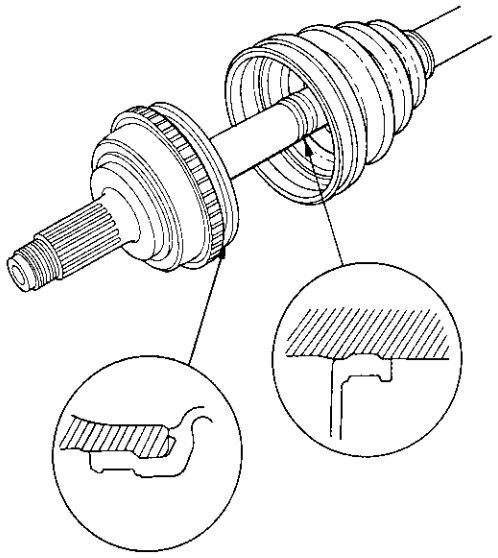


12. Check the clearance between the closed ear portion of the band. If the clearance is not within the standard, close the ear portion of the band further.

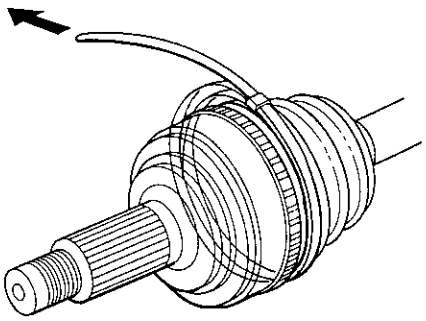


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13. Fit the boot ends onto the driveshaft and the outboard joint.

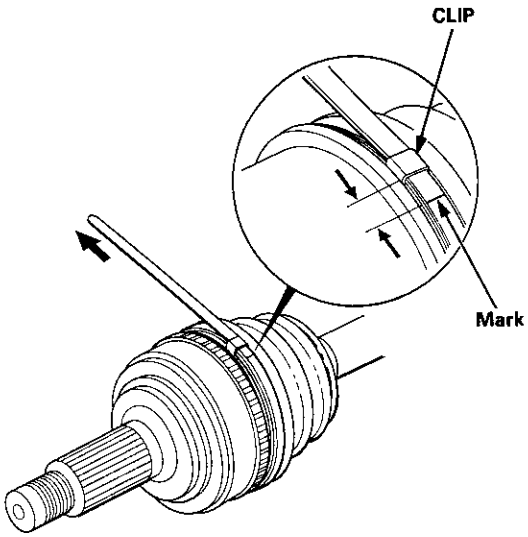


14. Fit the double loop boot bands onto the boot ends.

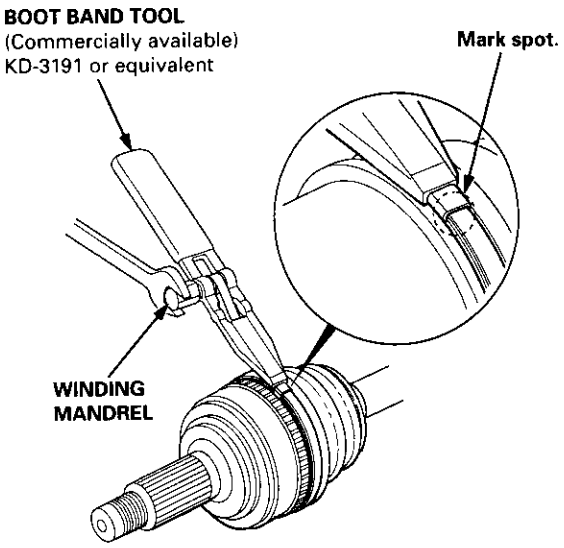


15. Pull up the slack in the band by hand.

16. Mark a position on the band 10 – 14 mm (0.4 – 0.6 in.) from the clip.



17. Thread the free end of the band through the nose section of a commercially available boot band tool (KD-3191 or equivalent), and into the slot on the winding mandrel.



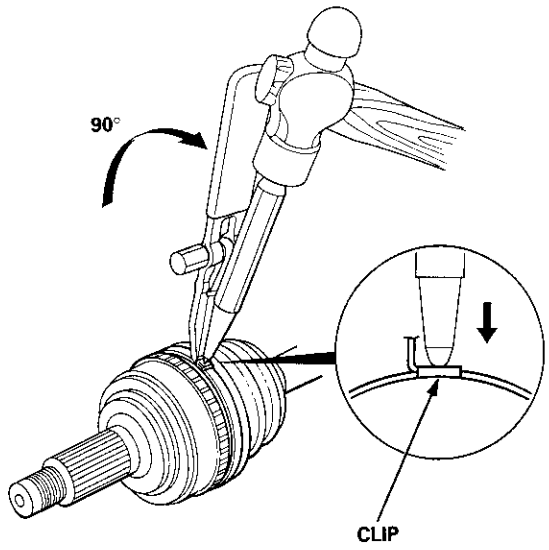
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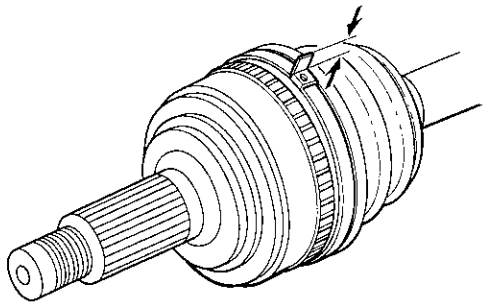
Reassembly (cont'd)

18. Place a wrench on the winding mandrel of the boot band tool, and tighten the band until the marked spot on the band meets the edge of the clip.

19. Lift up the boot band tool to bend the free end of the band 90° to the clip. Center-punch the clip, then fold over the remaining tail onto the clip.

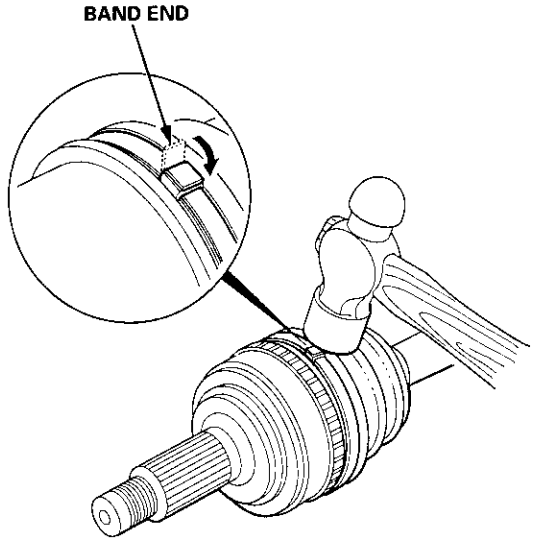


20. Unwind the boot band tool, and cut off the excess free end of the band to leave a 5 – 10 mm (0.2 – 0.4 in) tail protruding from the clip.



21. Bend the band by tapping it down with a hammer.

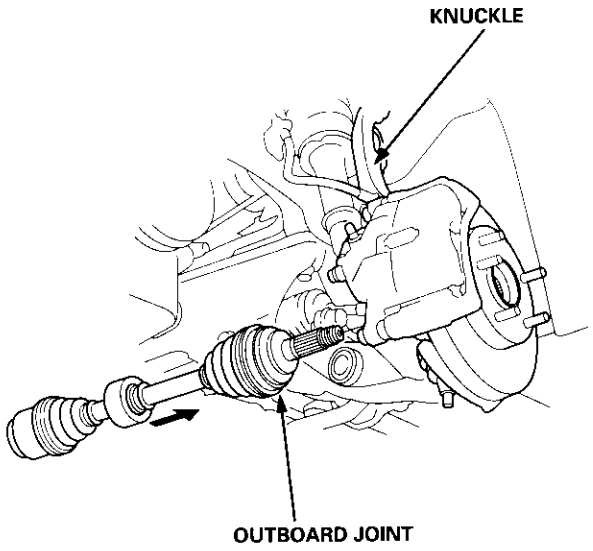
    NOTE: Make sure the band and the clip does not interfere with anything, and the band does not move. Remove any grease remaining on the surrounding surfaces.



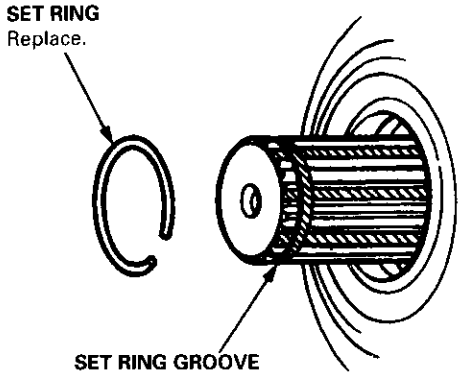
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Installation

1. Install the outboard joint into the knuckle.

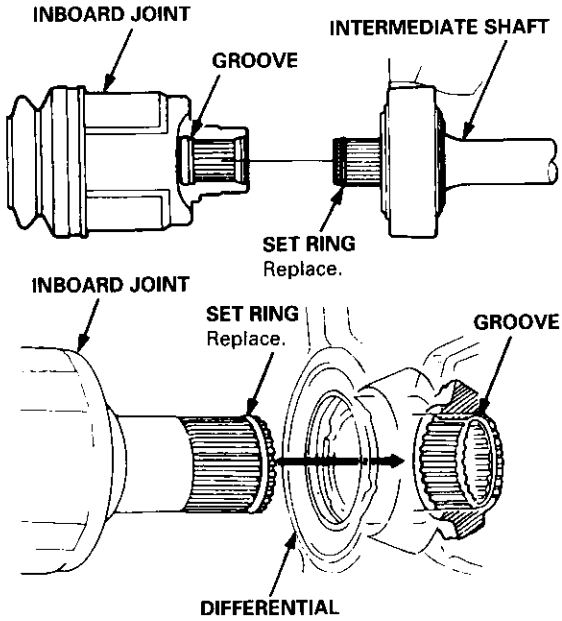


2. Apply 0.5 – 1.0 g (0.02 – 0.04 oz) of specified grease to the whole splined surface of the intermediate shaft. After applying grease, remove the grease from the splined grooves at intervals of 2 – 3 splines and from the set ring groove so air can bleed from the inboard joint.

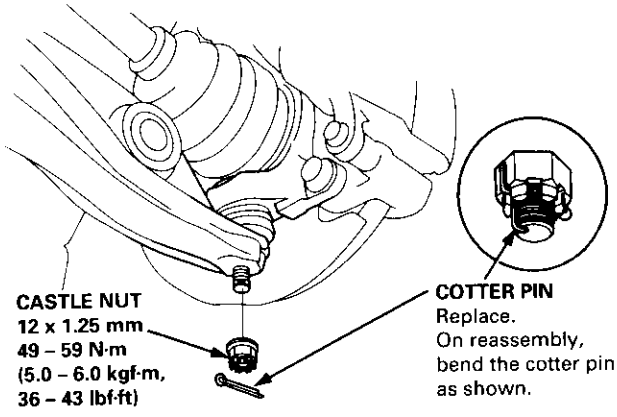


3. Install a new set ring onto the driveshaft or intermediate shaft groove.

4. Clean the areas where the driveshaft contacts the differential thoroughly with solvent or carburetor cleaner, and dry with compressed air. Insert the inboard end of the driveshaft into the differential or intermediate shaft until the set ring locks in the groove.



5. Install the knuckle on the lower arm. Be careful not to damage the ball joint boot. Wipe off the grease before tightening the nut at the ball joint. Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening. Install a new cotter pin.

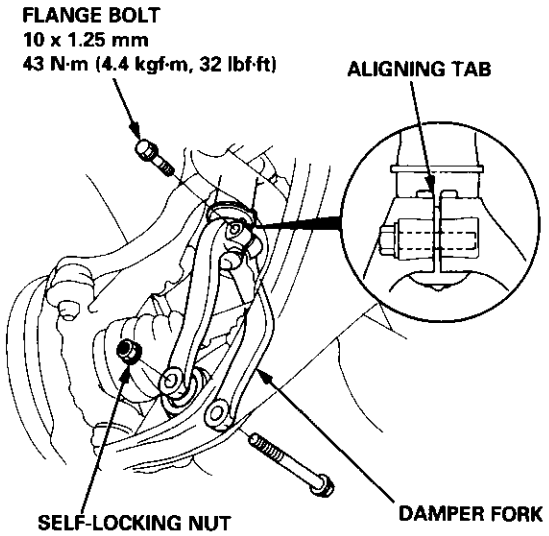


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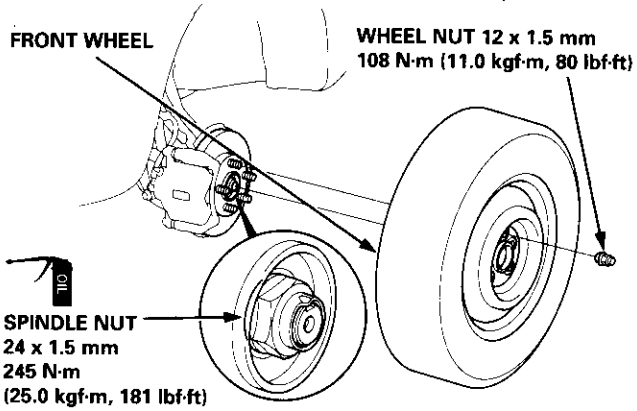
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Installation (cont'd)

6. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.



7. Loosely install the flange bolts and the new self-locking nut.
8. Apply oil to the seating surface of the new spindle nut.

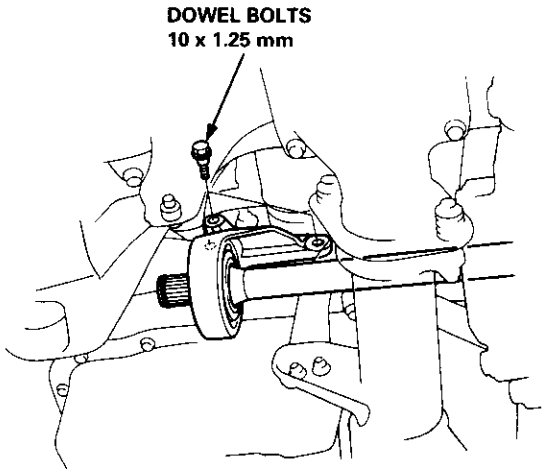


NOTE: After tightening, use a drift to stake the spindle nut shoulder against the driveshaft.

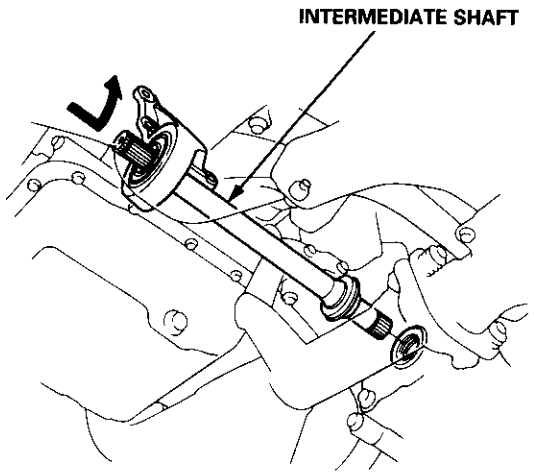
9. Install a new spindle nut, then tighten the nut.
10. Clean the mating surfaces of the brake disc and the wheel, then install the front wheel with the wheel nuts.
11. Tighten the flange bolts and the new self-locking nut with the vehicle's weight on the damper.
12. Refill the transmission with recommended fluid (see section 13 or 14).
13. Check the front wheel alignment, and adjust if necessary (see section 18).

Removal

1. Drain the transmission oil or fluid (see section 13 or 14).
2. Remove the left driveshaft (see page 16-3).
3. Remove the three dowel bolts.



4. Remove the intermediate shaft from the differential. Hold the intermediate shaft horizontal until it is clear of the differential to prevent damage to the differential oil seal.

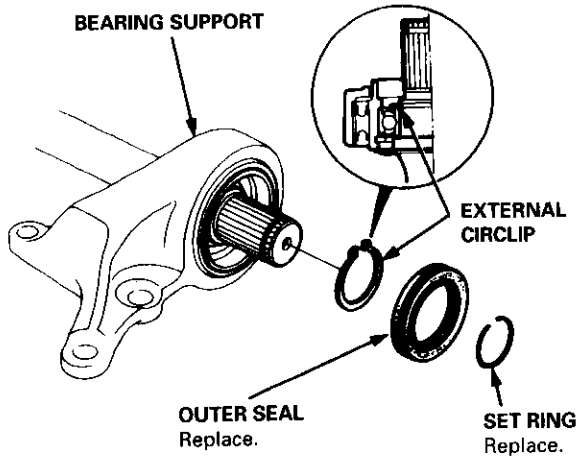


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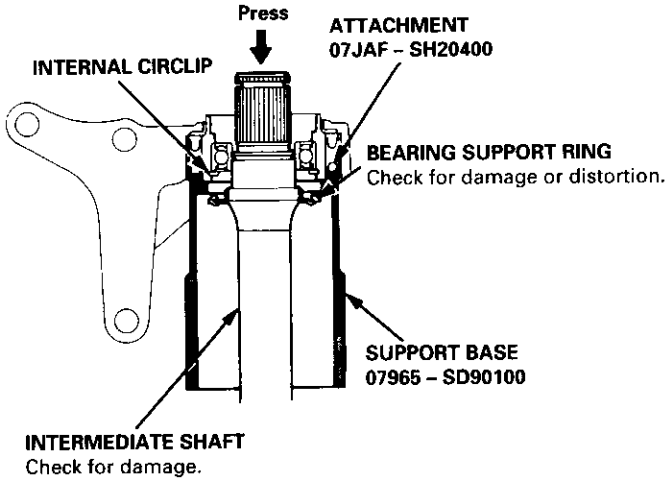
Disassembly

NOTE: Be careful not to damage the metal rings on the intermediate shaft during disassembly.

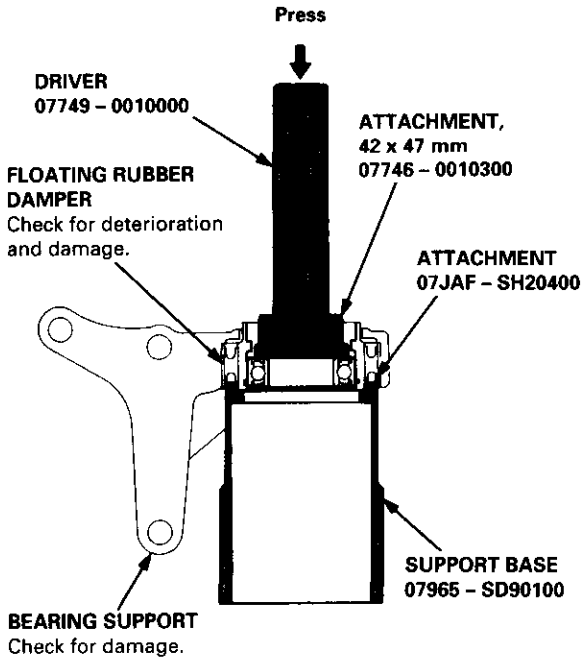
1. Remove the set ring.



2. Remove the intermediate shaft outer seal from the bearing support.
3. Remove the external circlip.
4. Press the intermediate shaft out of the shaft bearing using the special tools and a press.



5. Remove the internal circlip.
6. Press the intermediate shaft bearing out of the bearing support using the special tools and a press.

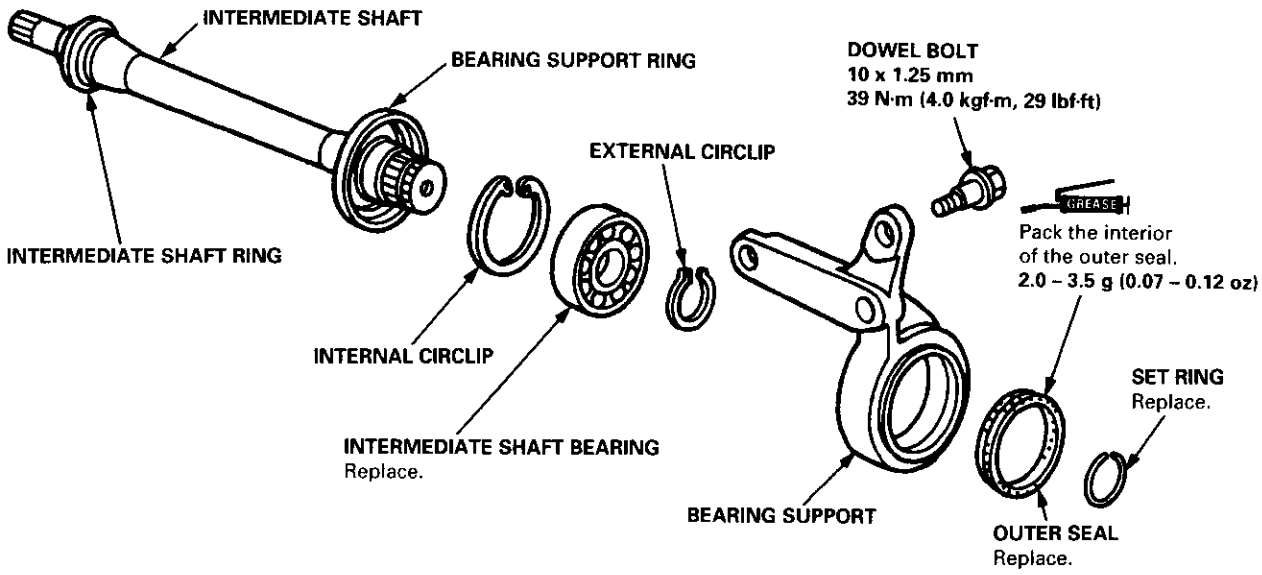


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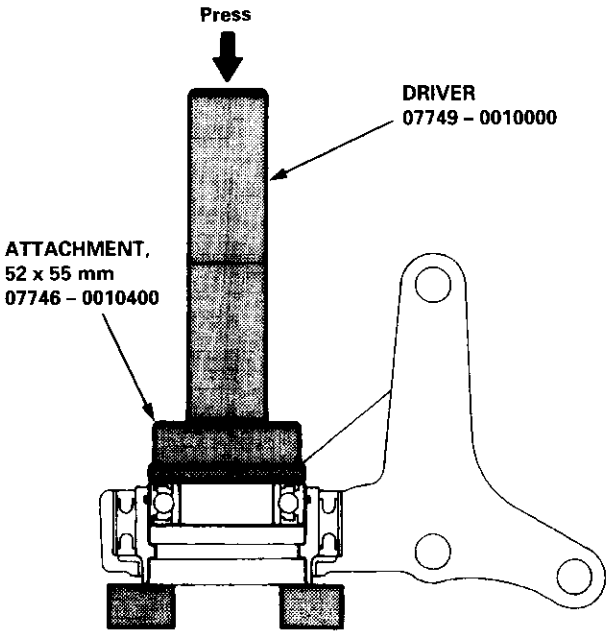
Reassembly

Note these items during reassembly:

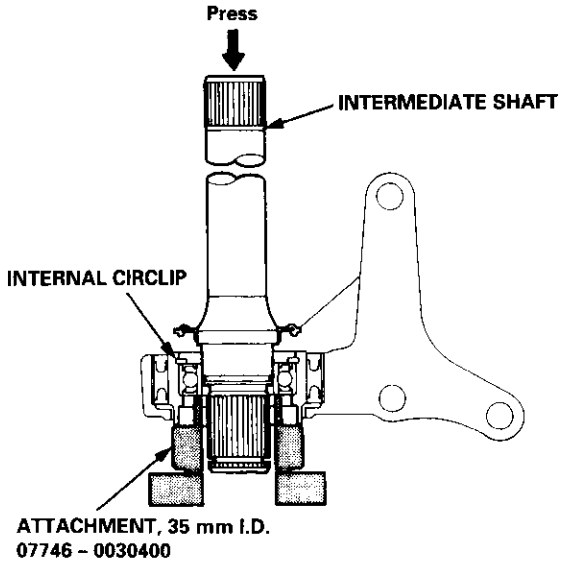
- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- Be careful not to damage the metal rings on the intermediate shaft during reassembly.



1. Press the intermediate shaft bearing into the bearing support using the special tools and a press.



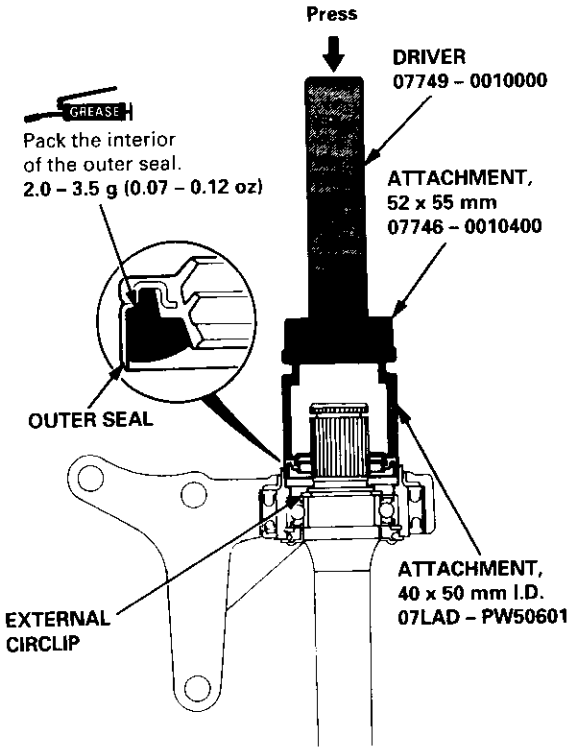
2. Seat the internal circlip in the groove of the bearing support.



3. Press the intermediate shaft into the shaft bearing using the special tools and a press.

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4. Seat the external circlip in the groove of the intermediate shaft.

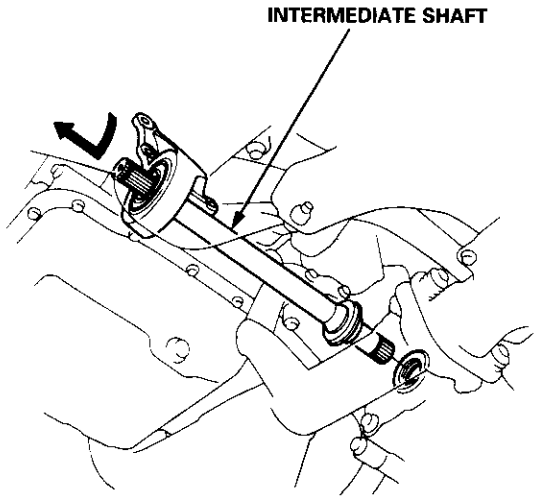


5. Install the outer seal into the bearing support using the special tools. The seal should be flush with the bearing support.

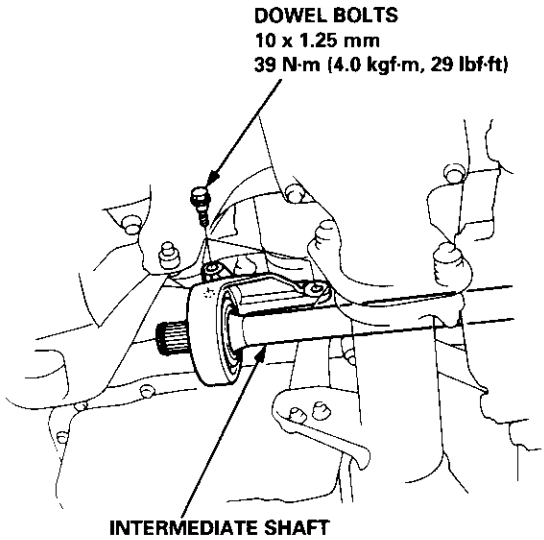
6. Install the new set ring in the intermediate shaft groove.

Installation

1. Clean the areas where the intermediate shaft contacts the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air. Insert the intermediate shaft assembly into the differential. Hold the intermediate shaft horizontal to prevent damage to the differential oil seal.



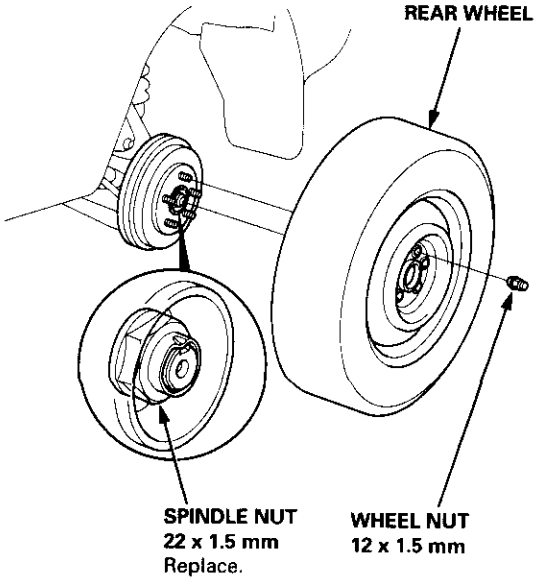
2. Install the three dowel bolts, then torque them.



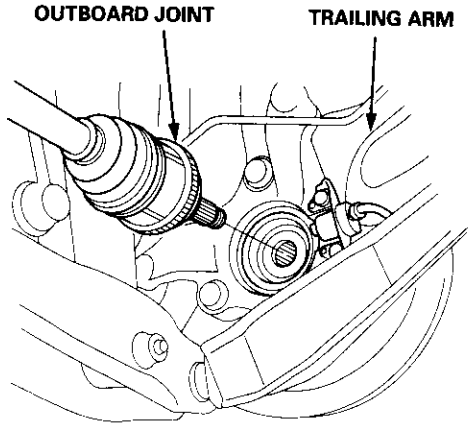
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Removal

1. Loosen the rear wheel nuts slightly.
2. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and rear wheels.



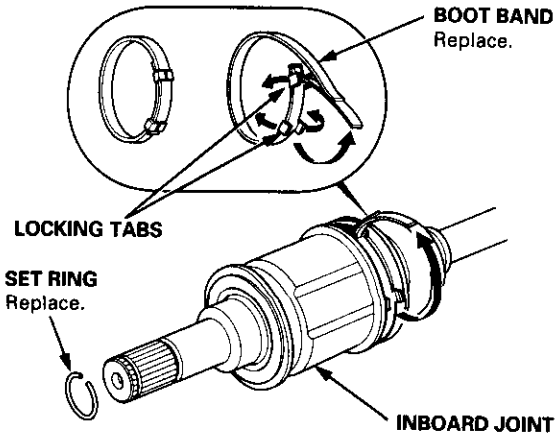
4. Lift up the locking tab on the spindle nut, then remove the nut.
5. Remove the rear driveshafts from the rear differential assembly (see section 15).
6. Remove the rear driveshaft outboard joint from the trailing arm and rear hub using a plastic hammer or a puller if necessary.



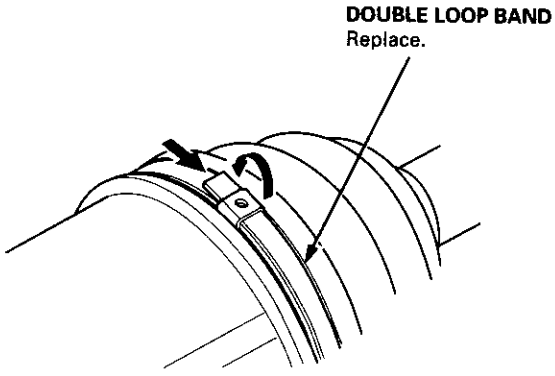
Disassembly

NOTE:
- Due to the amount of work required to replace one damaged boot, it is best to replace both boots at the same time.
- These instructions are for the inboard joint. The same procedure applies to the outboard joint.

1. Remove the set ring from the inboard joint.

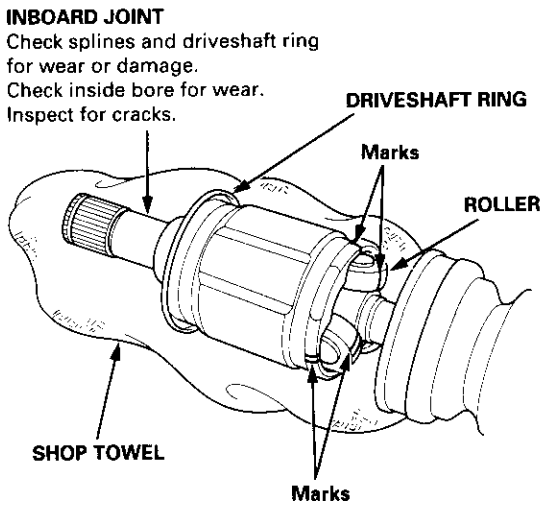


2. Remove the boot band.
   — If the boot band is a double loop type, raise the band bend as shown.

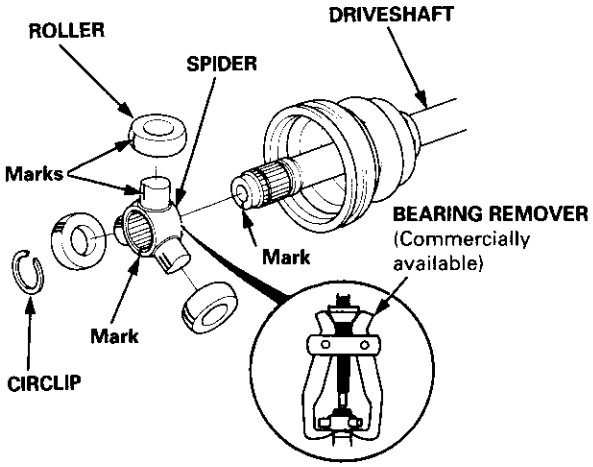


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3. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel.



4. Mark the rollers and spider to identify the locations of the rollers on the spider, then remove the rollers.

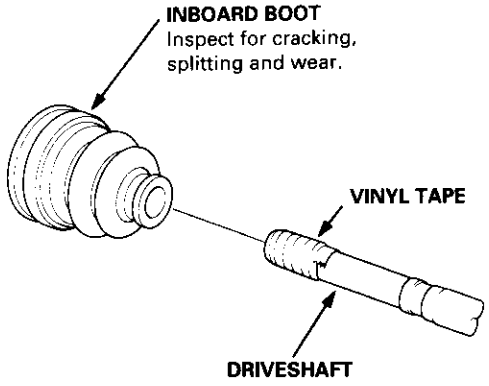


5. Remove the circlip.

6. Mark the spider and driveshaft to identify the position of the spider on the shaft.

7. Remove the spider using a bearing remover.

8. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots.



9. Remove the boot band and boot from the driveshaft. Take care not to damage the boot.

10. Remove the vinyl tape.

11. Inspect the driveshaft for damage and other faults.

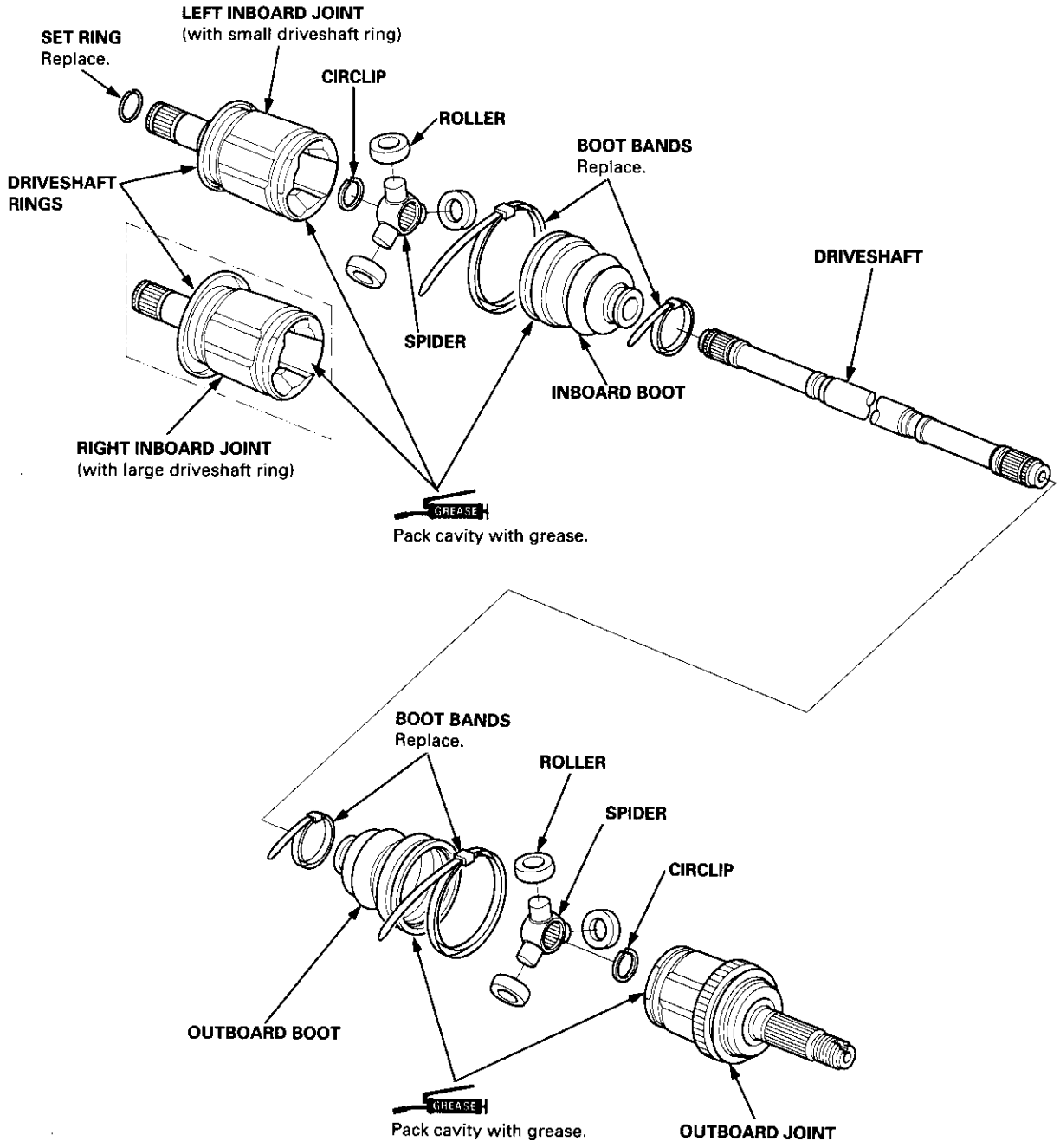
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Reassembly

Note these items during reassembly:

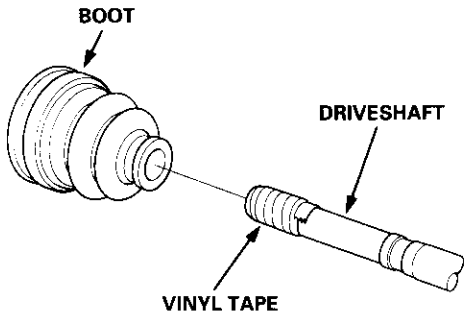
- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- GREASE: Thoroughly pack the inboard joint and both joint boots with the joint grease included in the new driveshaft set.

Grease quantity:
Inboard Joint/Outboard Joint: 80 – 90 g (2.8 – 3.2 oz)



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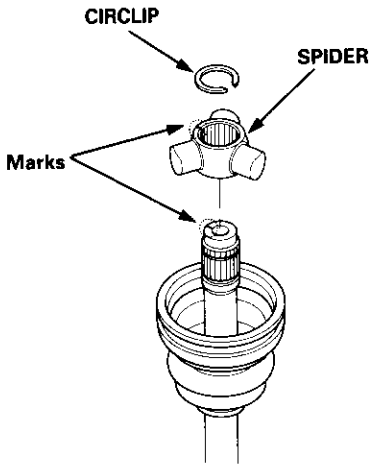
1. Wrap the splines with vinyl tape to prevent damage to the boots.



2. Install the boots onto the driveshaft, and seat the small end of the boots into the grooves on the driveshaft. If the small ends of the boots are not seated in the grooves, the boot length adjustment will be incorrect.

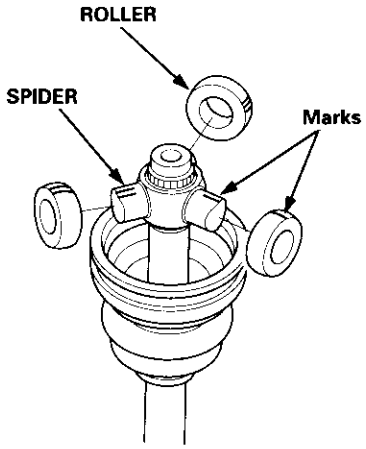
3. Remove the vinyl tape from the end of the driveshaft.

4. Install the spider onto the driveshaft by aligning the mark on the spider with the mark on the end of the driveshaft.



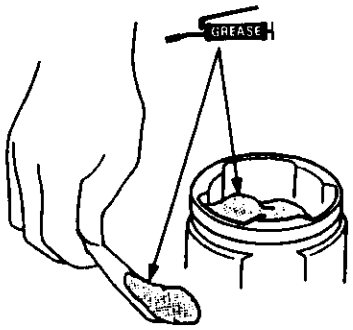
5. Install a new circlip into the end groove on the driveshaft. Rotate the circlip in its groove to make sure its fully seated.

6. Reinstall the rollers to their original positions on the spider by aligning the marks. After installation, make sure to hold the driveshaft pointed straight up to prevent the rollers from falling off.



7. Pack the joint and the boot with the joint grease included with the new boot.

Grease quantity: 80 – 90 g (2.8 – 3.2 oz)

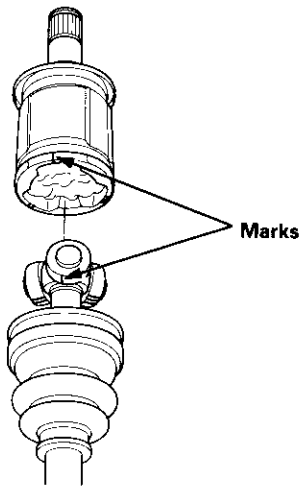


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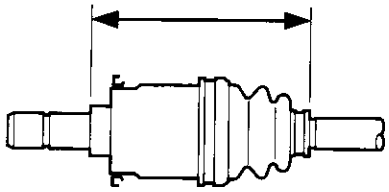
Reassembly (cont'd)

8. Install the joint by holding the driveshaft straight up and aligning the marks on the joint with the marks on the rollers.

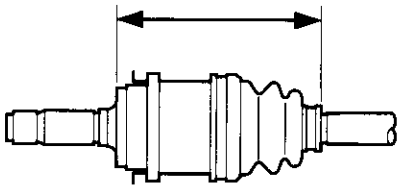


9. Adjust the position of the joints to the specifications shown, then adjust the boots halfway between full compression and full extension. Make sure the ends of the boots are seated in the grooves in the joints.

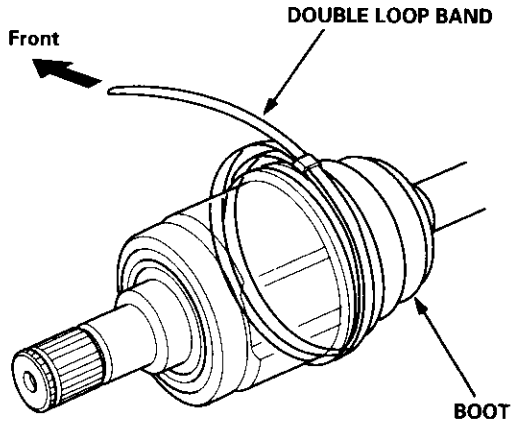
Inboard joint length:
153 – 157 mm (6.02 – 6.18 in)



Outboard joint length:
143 – 147 mm (5.63 – 5.37 in)

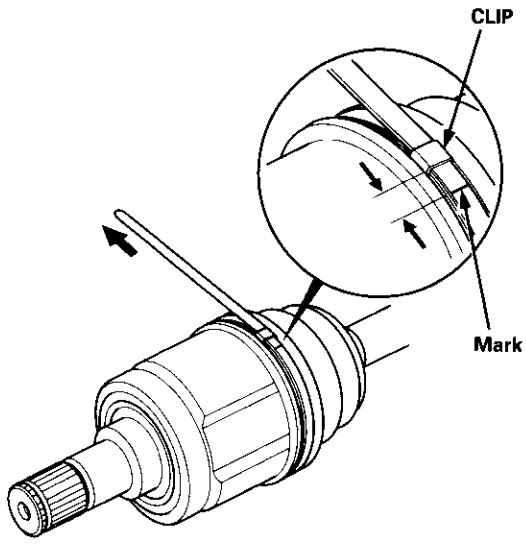


10. Set the double loop band onto the boot with the band end toward the front of the vehicle.



11. Pull up the slack in the band by hand.

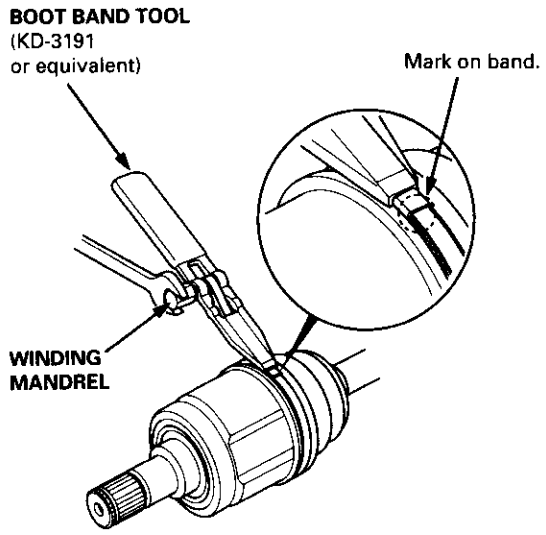
12. Make a mark on the band 10 – 14 mm (0.4 – 0.6 in) from the clip.



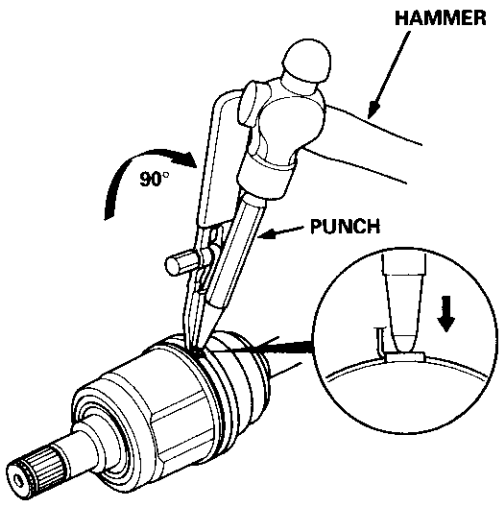
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13. Thread the free end of the band through the nose section of a commercially available boot band tool (KD-3191 or equivalent), and into the slot on the winding mandrel.

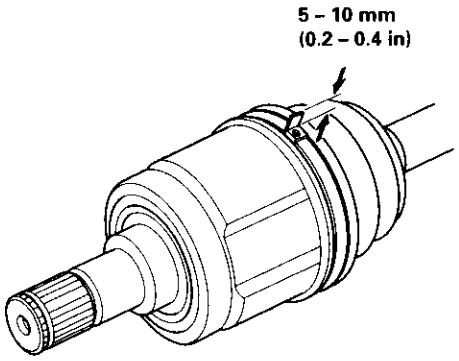
14. Place a wrench on the winding mandrel of the boot band tool, and tighten the band until the marked spot on the band meets the edge of the clip.



15. Lift up the boot band tool to bend the free end of the band 90 degrees to the clip. Center-punch the clip, then fold over the remaining tail onto the clip.

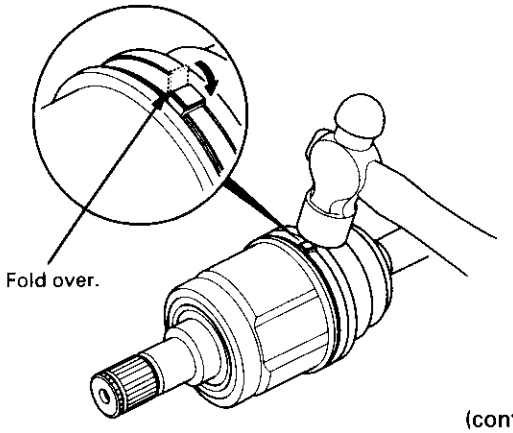


16. Unwind the boot band tool, and cut off the excess free end of the band to leave a 5 – 10 mm (0.2 – 0.4 in) tail protruding from the clip.



17. Bend the band end by tapping it down with a hammer.

NOTE:
- Make sure the band does not move.
- Remove any grease remaining on the surrounding surfaces.

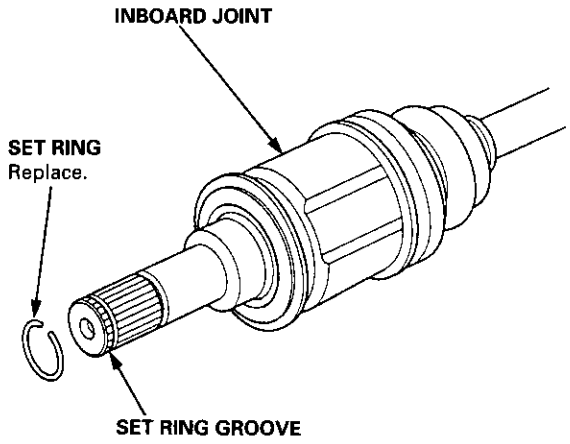


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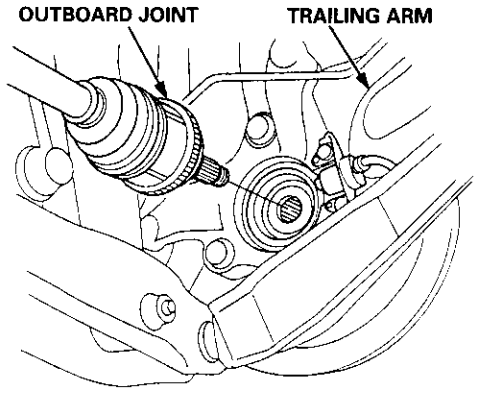
Reassembly (cont'd)

18. Install the new set ring into the driveshaft groove.



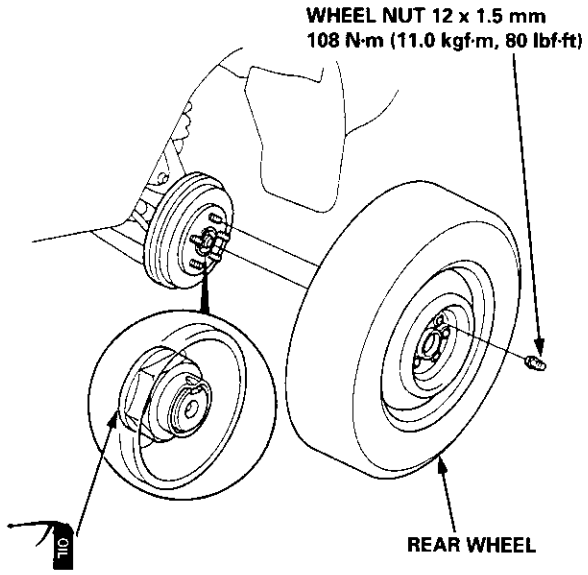
Installation

1. Install the outboard joint into the trailing arm.



2. Install the rear driveshafts into the rear differential assembly (see section 15).

3. Apply a small amount of engine oil to the seating surface of the new spindle nut.



SPINDLE NUT 22 x 1.5 mm
181 N·m (18.5 kgf·m, 134 lbf·ft) Replace.

4. Install a new spindle nut, then torque the nut. After tightening, use a drift to stake the spindle nut shoulder against the driveshaft.

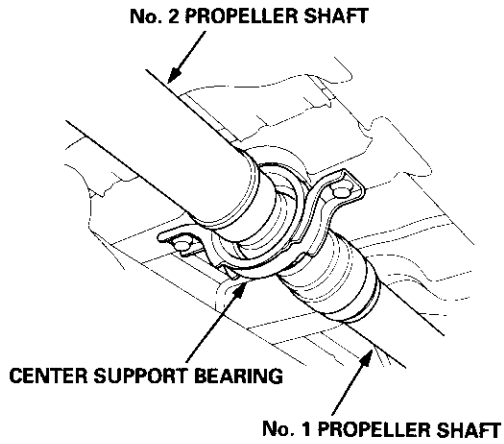
5. Clean the mating surfaces of the brake disc and the wheel, then install the rear wheel, and torque the wheel nuts.

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Inspection

Universal Joint and Boots

1. Shift the transmission to Neutral.
2. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
3. Check the center support bearing for excessive play or rattle. If the center support has excessive play or rattle, replace the propeller shaft assembly.

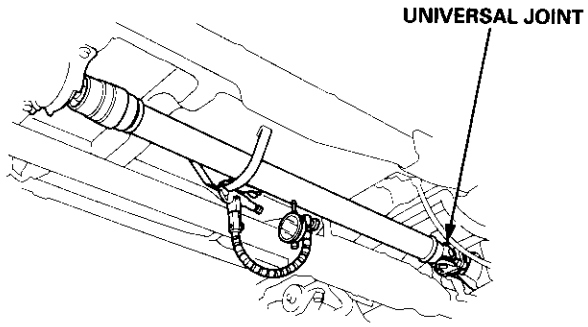


4. Check the universal joint boots for damage and deterioration. It the boots are damaged or deteriorated, replace the propeller shaft assembly.
5. Check the universal joints for excessive play or rattle. If the universal joints have excessive play or rattle, replace the propeller shaft assembly.

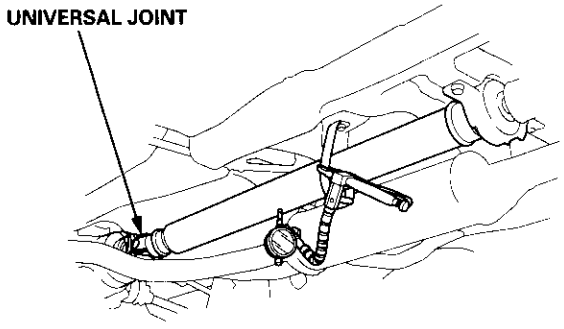
Propeller Shaft Runout

6. Install a dial indicator with its needle on the center of No. 1 or No. 2 propeller shaft.
7. Turn the other propeller shaft slowly and check the runout. Repeat this procedure for the other propeller shaft.

No. 1 Propeller Shaft Runout:
Service Limit: 1.5 mm (0.06 in)



No. 2 Propeller Shaft Runout:
Service Limit: 1.5 mm (0.06 in)



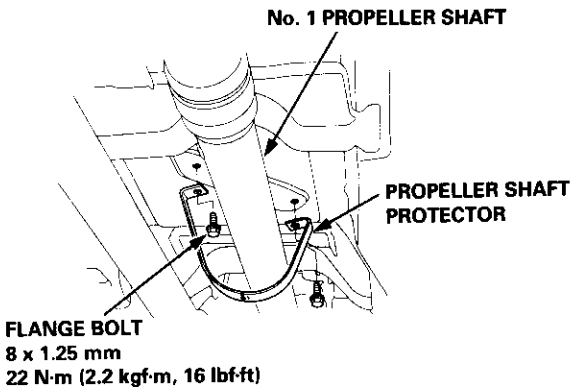
8. If the runout on either propeller shaft exceeds the service limit, replace the propeller shaft assembly.

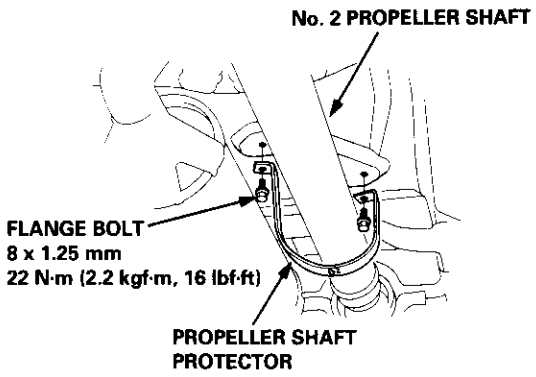
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Propeller Shaft

Removal/Installation

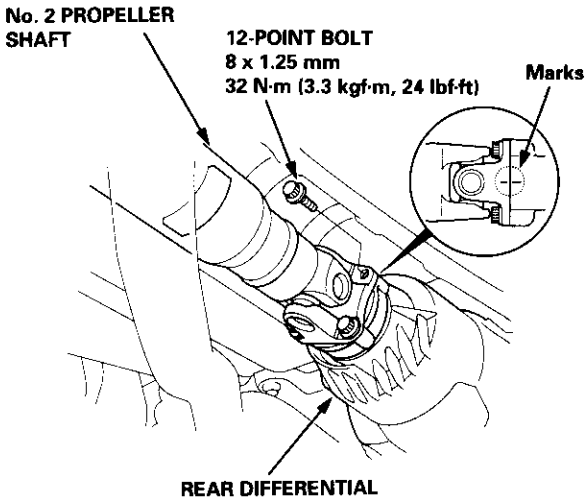
1. Remove the propeller shaft protectors.



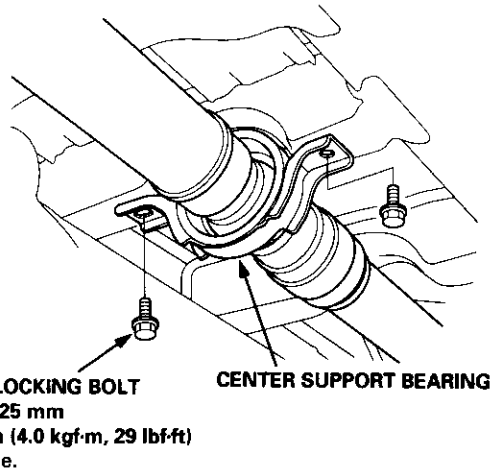


2. Mark the No. 2 propeller shaft and rear differential across their joints as shown.

3. Remove the four 12-point bolts, and remove the No. 2 propeller shaft from the rear differential.

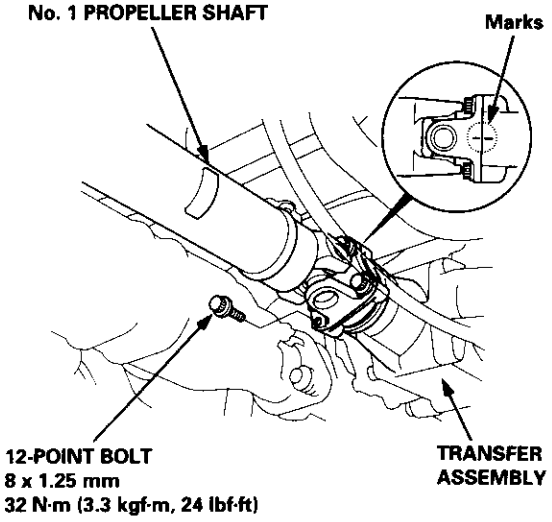


4. Remove the center support bearing mounting bolts.



5. Mark the No. 1 propeller shaft and transfer assembly across their joints as shown.

6. Remove the four 12-point bolts, and remove the No. 1 propeller shaft from the transfer assembly.



7. Install the propeller shafts in the reverse order of removal. Make sure to align the marks on the propeller shafts with the marks on the rear differential and the transfer assembly.

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Steering

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

This model has an SRS which includes a driver's airbag in the steering wheel hub, a passenger's airbag in the dashboard above the glove box ('97 – 00 models), and seat belt tensioners in the seat belt retractors ('98 – 00 models). Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should only be done by an authorized Honda dealer.

⚠ WARNING

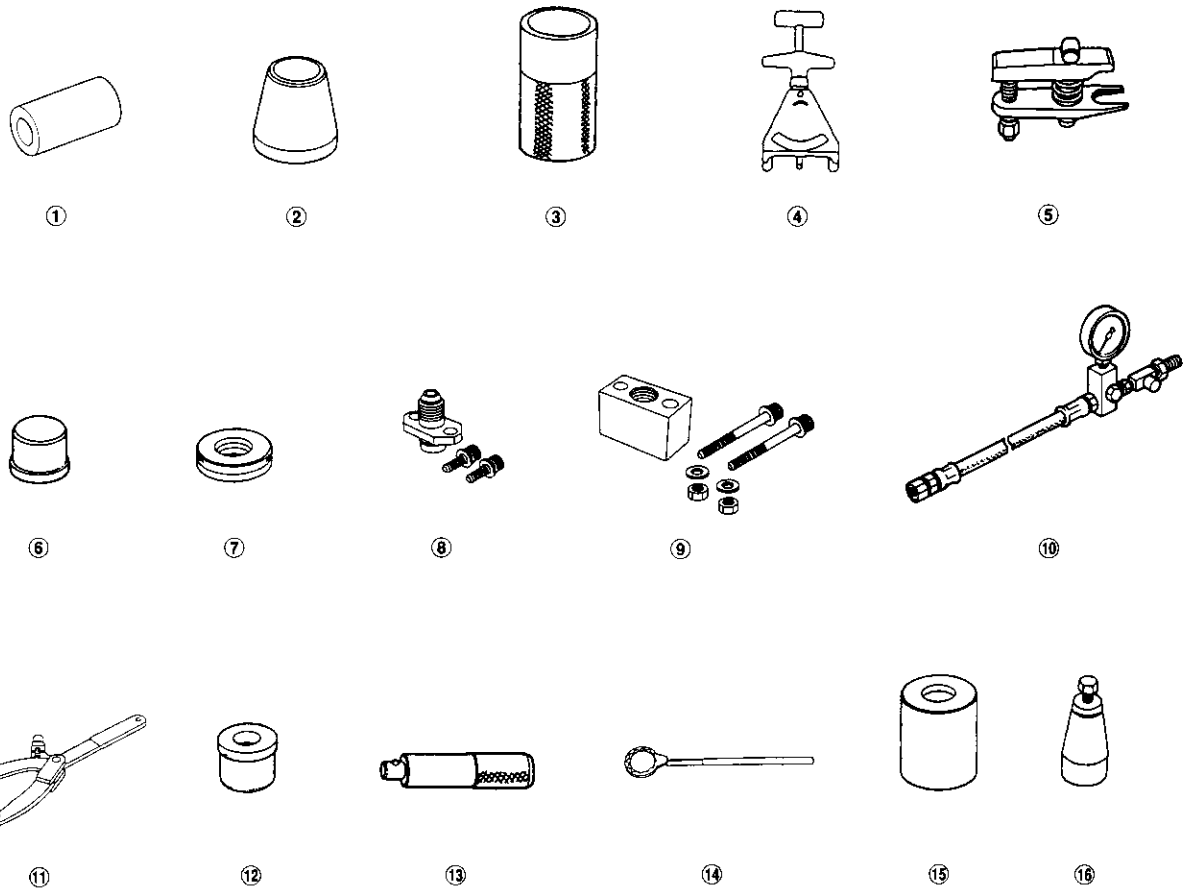
- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags ('97 – 00 models), and seat belt tensioners ('98 – 00 models).**
- **Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).**
- **SRS electrical wiring harnesses are identified by yellow color coding. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF – PH70100	Pilot Collar	1	17-39
②	07HAG – SF10100	Piston Seal Ring Guide	1	17-44
③	07GAG – SD40200 or 07GAG – SD4020A	Piston Seal Ring Sizing Tool	1	17-44
*④	07JGG – 001010A	Belt Tension Gauge	1	17-14
⑤	07MAC – SL00200	Ball Joint Remover, 28 mm	1	17-31
⑥	07NAD – SR3020A	Cylinder End Seal Remover Attachment	1	17-37
⑦	07NAG – SR30900 or 07NAG – SR3090A	Valve Seal Ring Sizing Tool	1	17-41
⑧	07RAK – S040110	P/S Joint Adaptor (Pump)	1	17-16, 17
⑨	07RAK – S040120	P/S Joint Adaptor (Hose)	1	17-16, 17
⑩	07406 – 0010001 or 07406 – 001000A	P/S Pressure Gauge	1	17-16, 17
⑪	07725 – 0030000	Universal Holder	1	17-26, 30
⑫	07746 – 0010100	Attachment, 32 x 35 mm	1	17-42, 43
⑬	07749 – 0010000	Driver	1	17-42, 43
⑭	07916 – SA50001	Locknut Wrench, 40 mm	1	17-15
⑮	07974 – SA50200 or 07974 – SA5050A	Sleeve Seal Ring Sizing Tool	1	17-42
⑯	07974 – SA50800	Ball Joint Boot Clip Guide	1	17-42, 50

* Included in the Belt Tension Gauge Set 07TGG – 001000A



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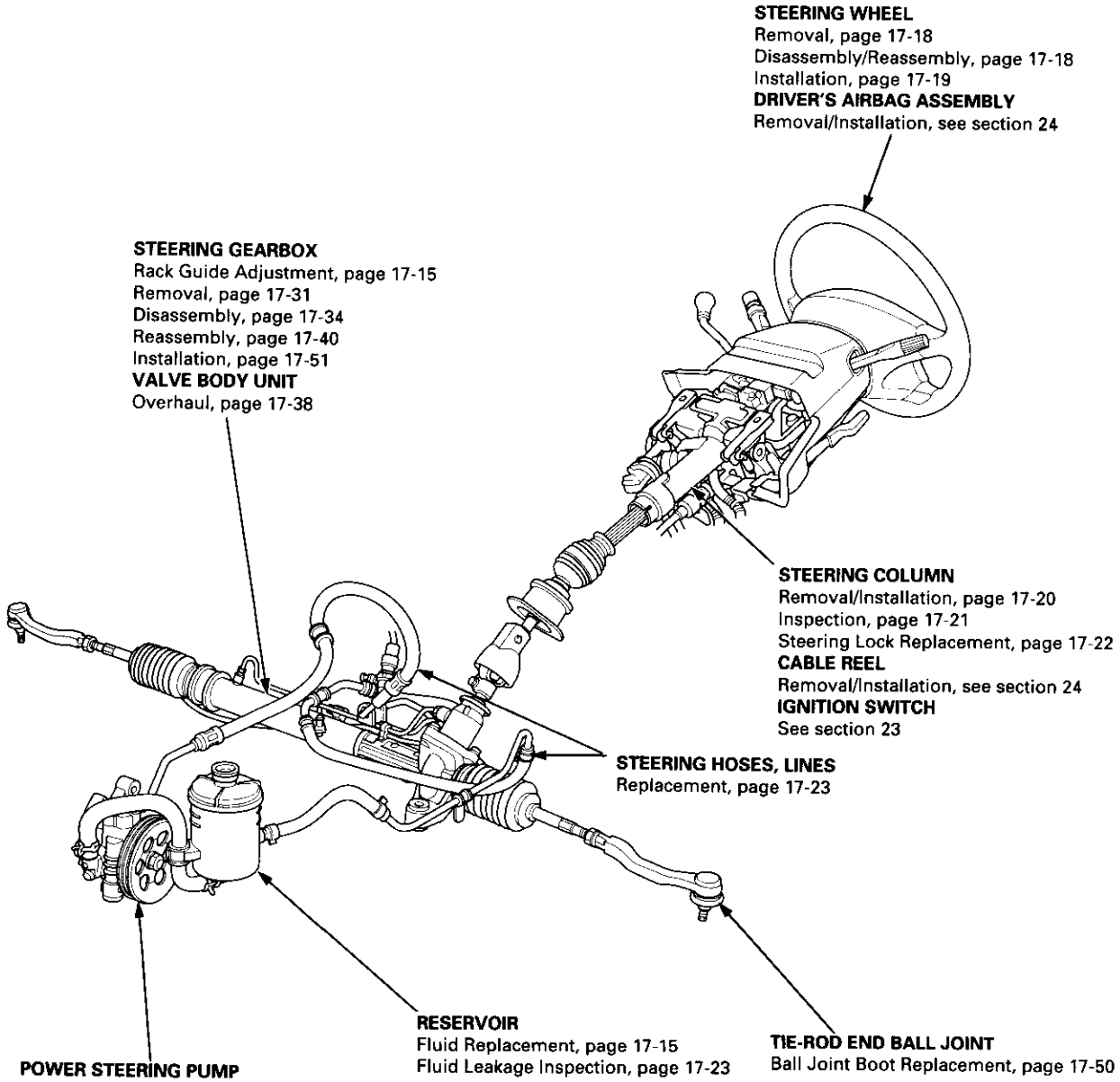
Component Locations

Index

Note these items during disassembly:

- If an intact airbag assembly has been removed from a scrapped vehicle or has been found defective or damaged during transit, storage or service, it should be deployed (see section 24).
- Before removing the gearbox, remove the driver's airbag assembly and steering wheel.
- After installing the gearbox, check the wheel alignment and adjust if necessary.

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



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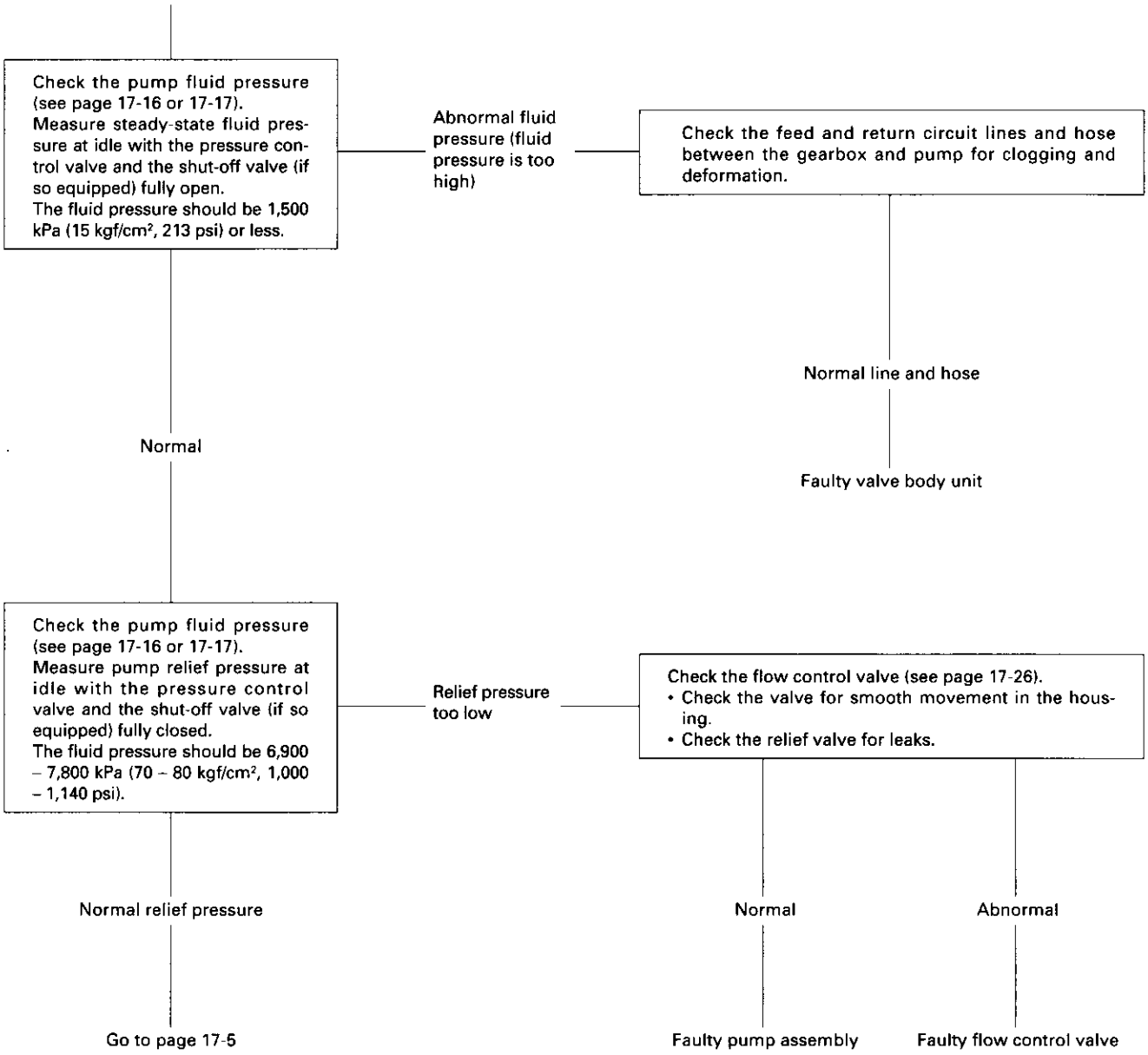
Troubleshooting

General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes, tire variety and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?

Hard Steering (Check the power assist, see page 17-12. If the force is over 29 N (3.0 kgf, 6.6 lbf), proceed with this troubleshooting.)



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From page 17-4

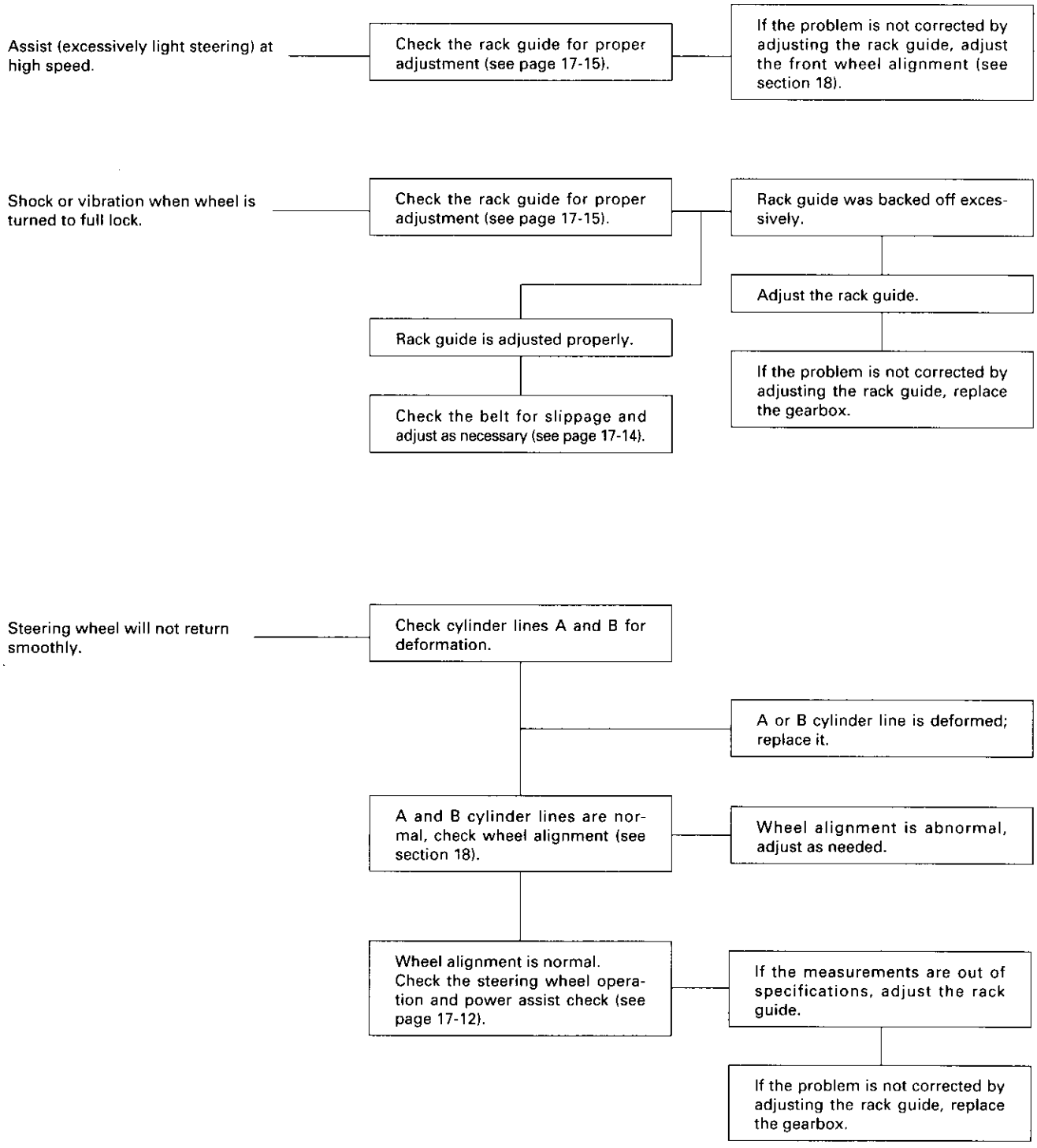
Check the force required to turn the wheel (see page 17-12).
Start the engine and measure the force required to turn the wheel to the right and left. Difference of the force required to turn the wheel to the right and to the left should be 2.9 N (0.3 kgf, 0.7 lbf) or less.

- Abnormal → Check cylinder lines A and B for deformation (see page 17-23).
  - Deformed → Faulty cylinder lines
  - Not deformed → Check rack guide adjustment (too tight).
    - Readjust the rack guide (see page 17-15)
    - Adjustment OK → Check for bent rack shaft.
      - Bent → Faulty steering gearbox
      - Not bent → Faulty valve body unit
- Normal → Compair the steering to another alike vehicle.

(cont'd)

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General Troubleshooting (cont'd)



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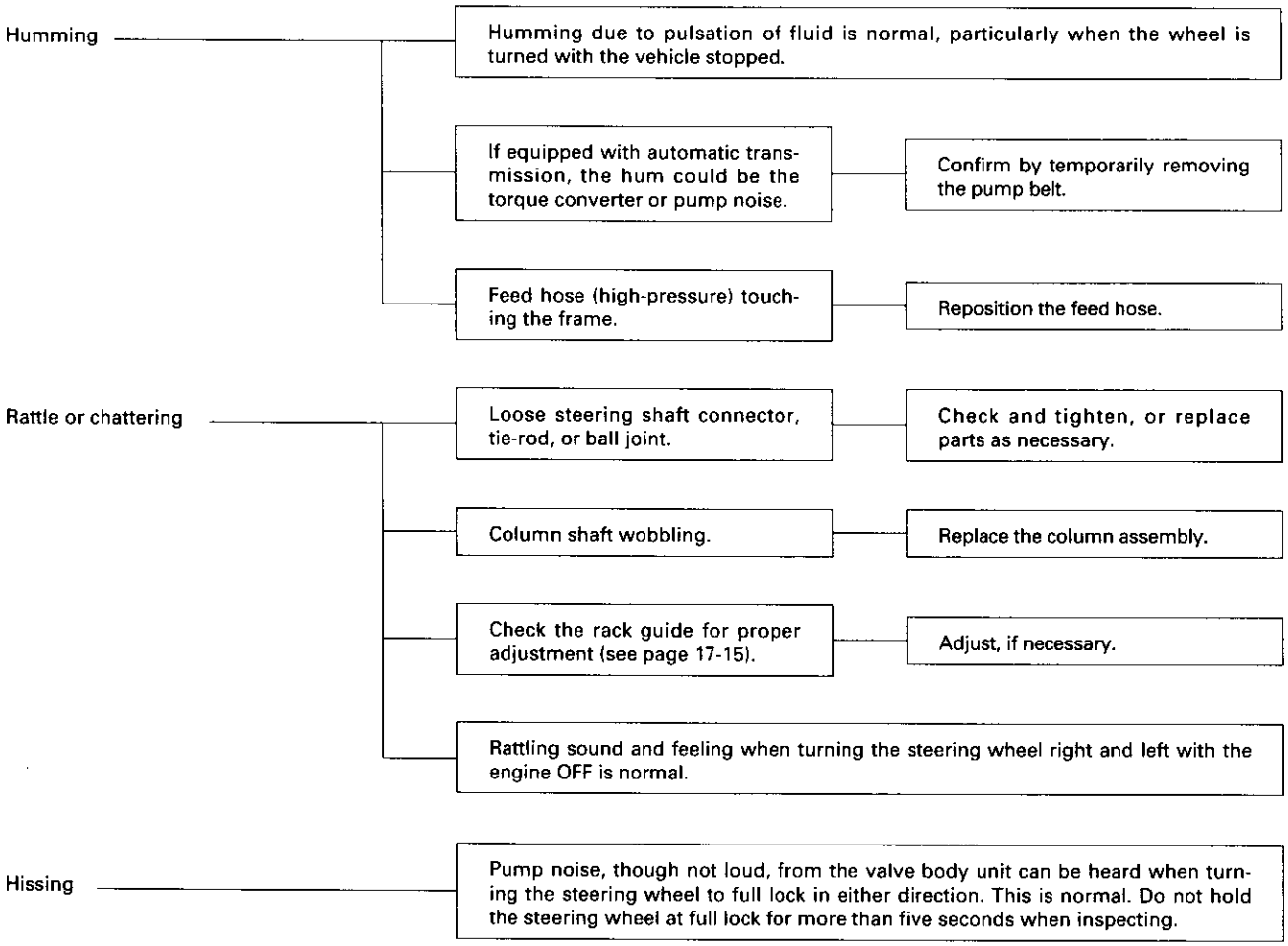


Uneven or rough steering.	Improperly adjusted rack guide.	Adjust the rack guide (see page 17-15).
		If the problem is not corrected by adjusting the rack guide, replace the gearbox.
	Belt slipping on pulley.	Adjust the belt tension. Replace the belt, if necessary (see page 17-14).
	Idle speed low or erratic.	If the engine stalls when the wheel is turned while the vehicle is stopped or moving at low speed, adjust the idle speed (see section 11).
	Air in reservoir, or check power steering fluid level.	Check power steering fluid level. If the level is excessively low, check for leaks in the system. Add fluid to the specified level.
		If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the P/S pump housing mating surfaces and drive shaft oil seal for suction leaks. Check the reservoir for cracks. Replace parts as necessary.
Steering wheel kicks back during wide turns.	Pump belt slipping on pulley (pump stops momentarily).	Adjust the belt tension (see page 17-14) or replace belt.
	Install the power steering pressure gauge. Close the pressure control valve and shut-off valve (if so equipped) fully and measure the pump pressure (see page 17-16 or 17-17).	Check if pump pressure is normal and the gauge needle travel is 500 kPa (5 kgf/cm², 71 psi) or less. Check the flow control valve if the needle travel exceeds 500 kPa (5 kgf/cm², 71 psi). If the flow control valve is normal, replace the pump as an assembly.

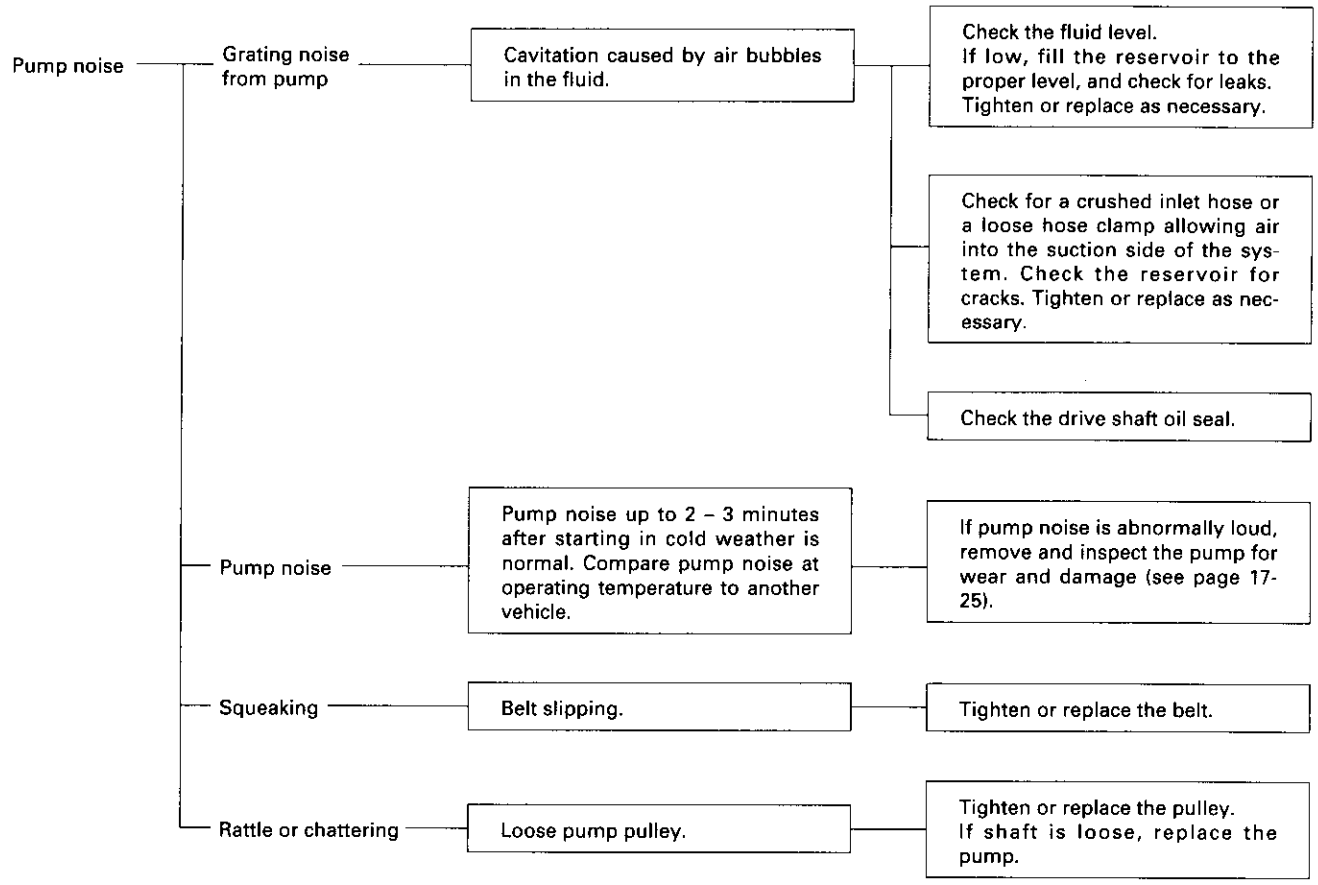
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Noise and Vibration

NOTE: Pump noise in first 2 – 3 minutes after starting in cold weather is normal.



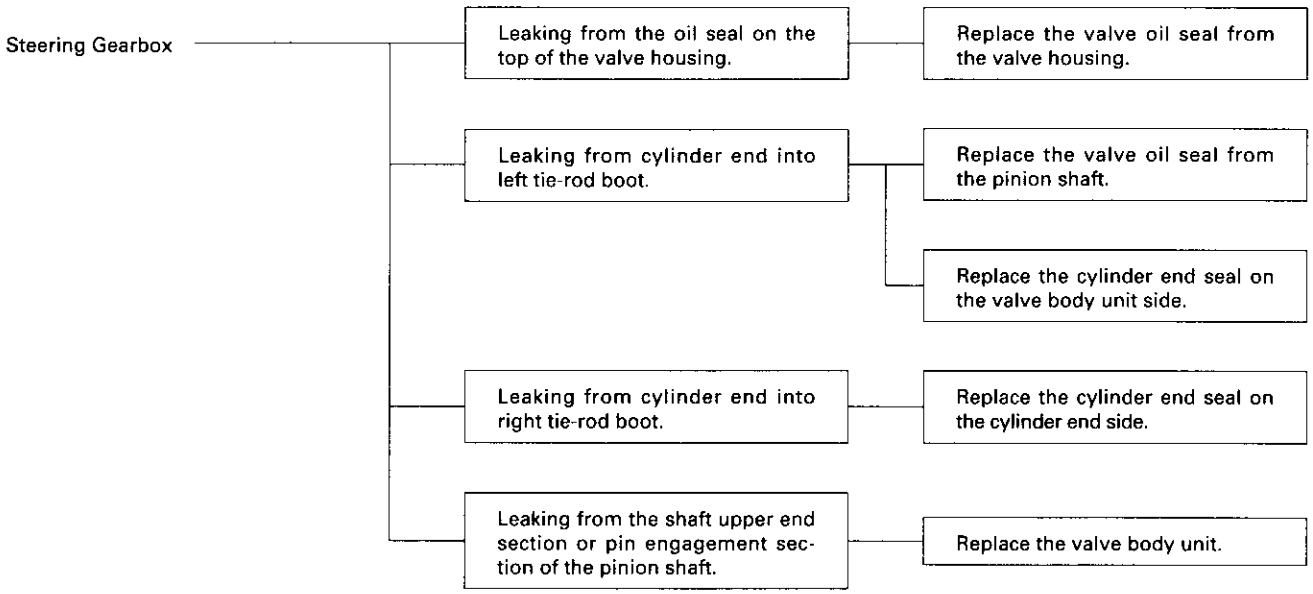
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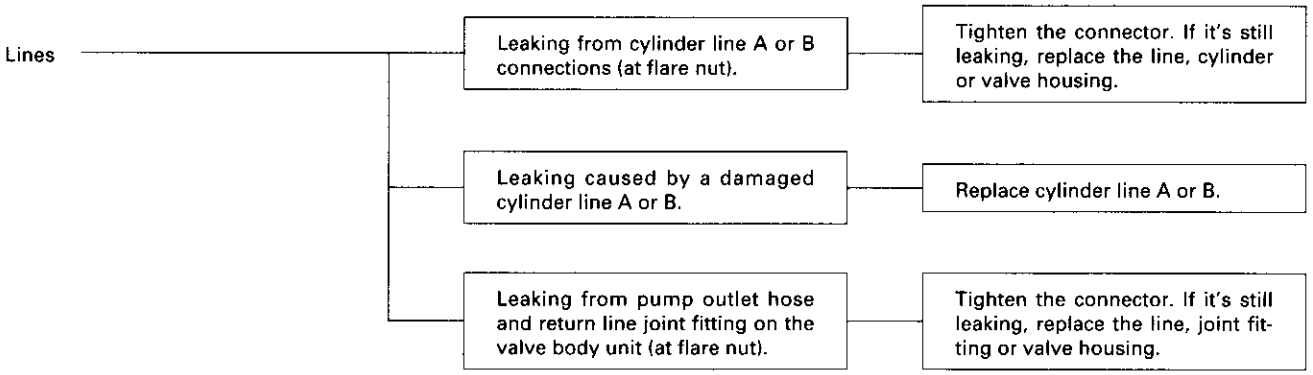


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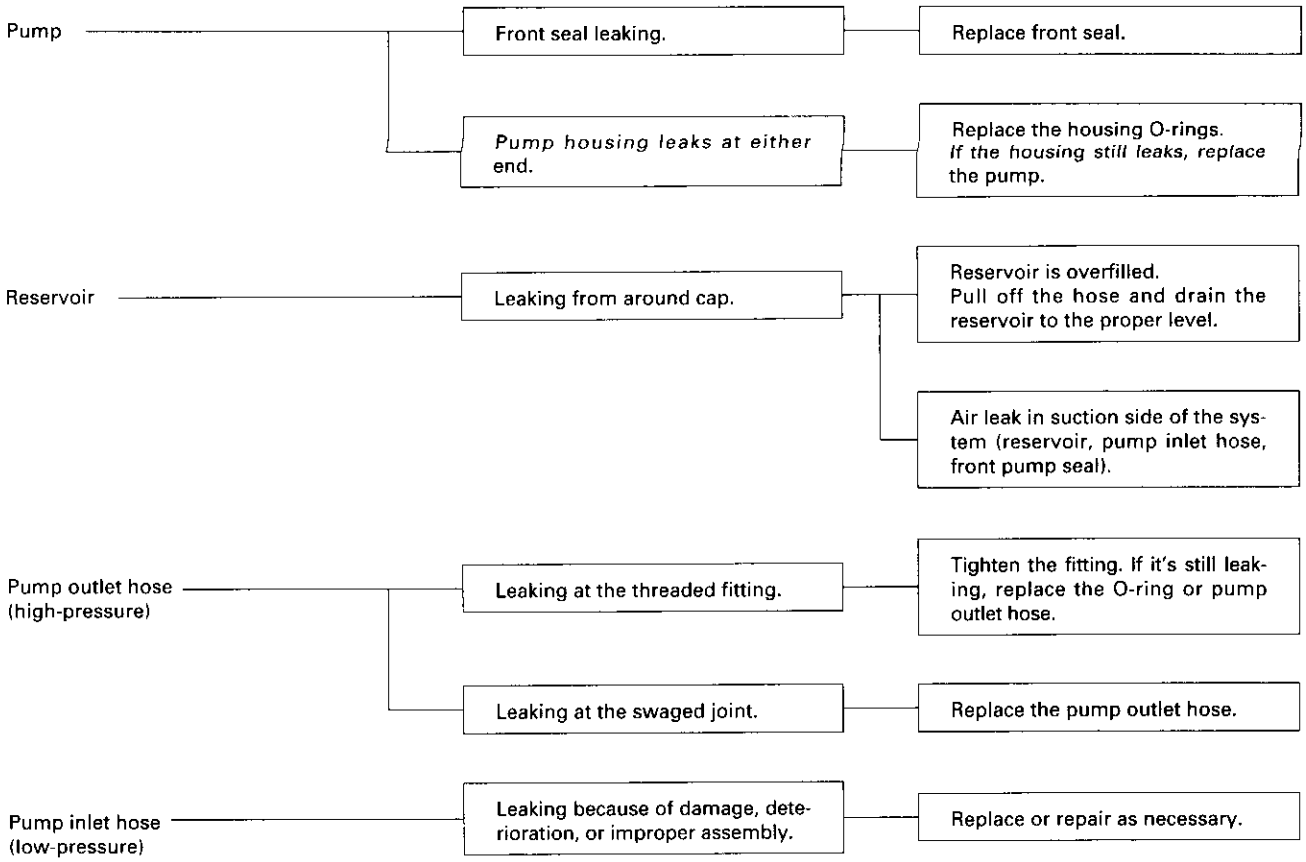
Fluid Leaks

Check the gearbox assembly for oil leaks carefully. Oil can leak out of various points, depending on location of the faulty oil seals/seal rings. Check the following before removing the gearbox from the frame.





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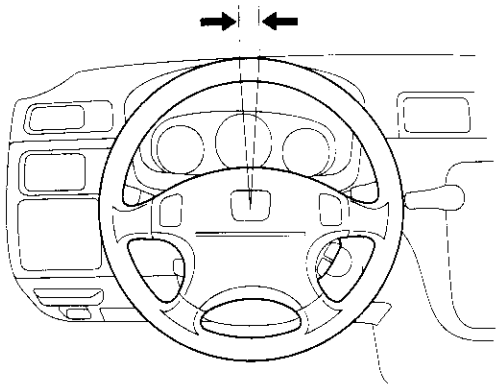
Steering Operation

Place the front wheels in the straight ahead position, and measure the distance the steering wheel can be turned without moving the front wheels.

ROTATIONAL PLAY: 0 – 10 mm (0 – 0.39 in)

If the play exceeds the limit, perform rack guide adjustment (see page 17-15).
If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox as described on the next page.

ROTATIONAL PLAY

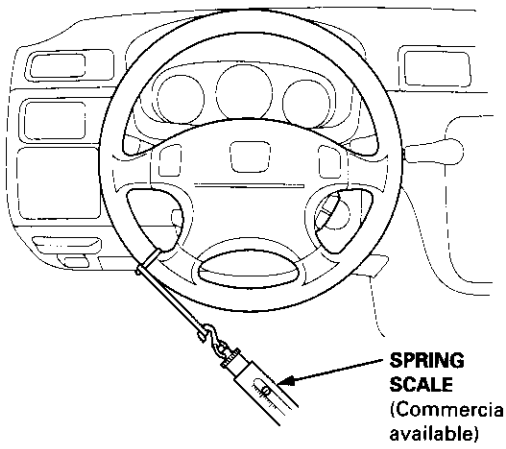


Power Assist Check with Vehicle Parked

1. Check the power steering fluid level (see page 17-15) and pump belt tension (see page 17-14).

2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.

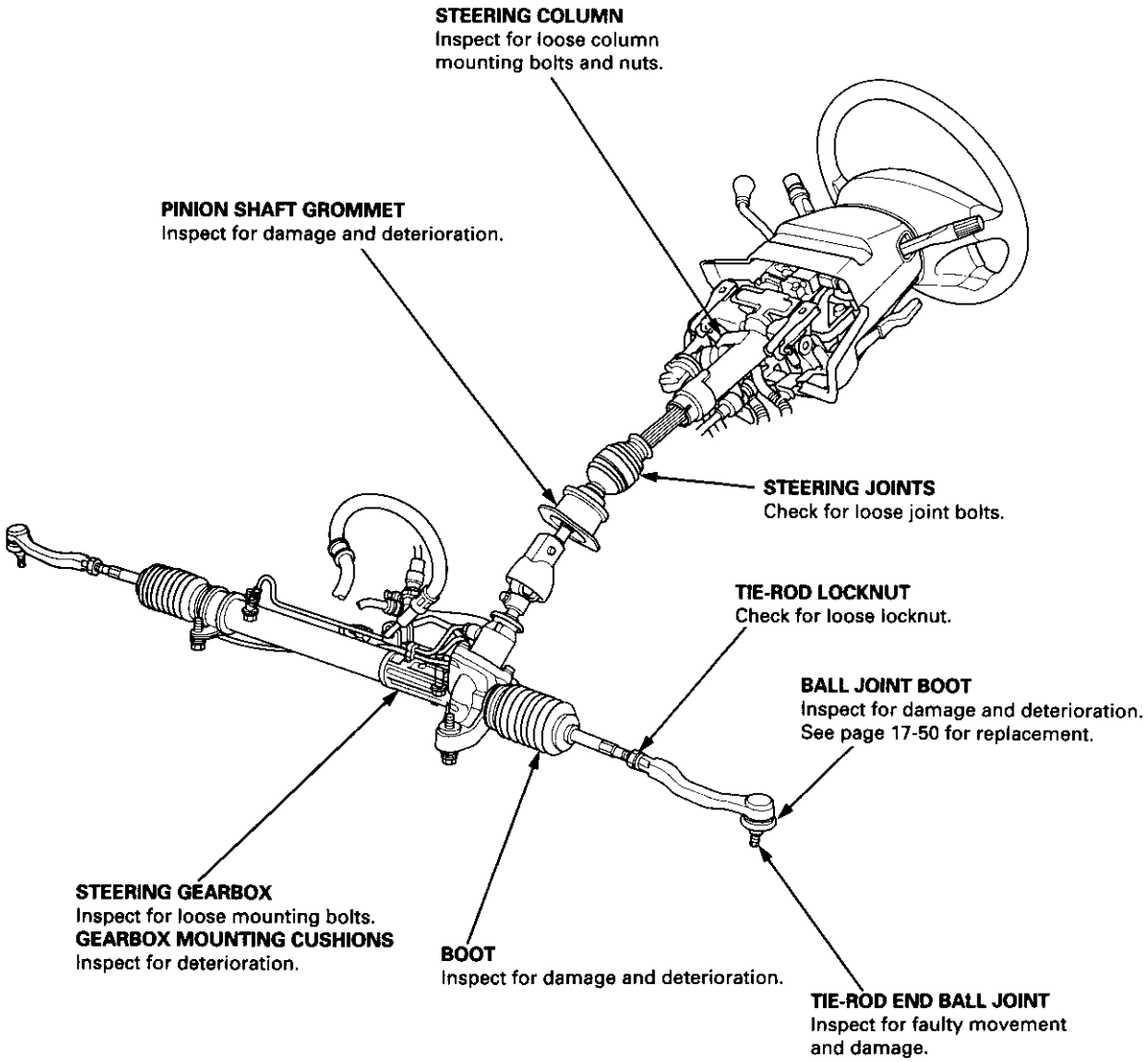
3. Attach a spring scale to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



4. The scale should read no more than 29 N (3.0 kgf, 6.6 lbf). If it reads more, check the gearbox and pump.

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Steering Linkage and Gearbox



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Pump Belt

When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Inspection

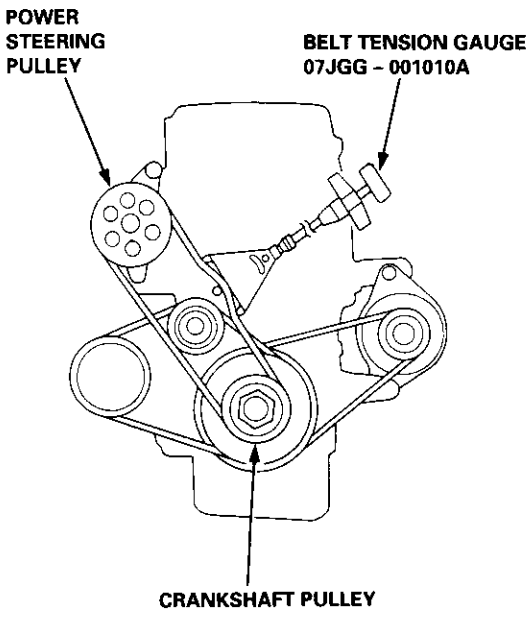
Note these items during inspection:
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.

1. Remove the P/S reservoir from the bracket, and set it aside.

2. Attach the belt tension gauge to the belt with the gauge face toward the engine, and measure the tension of the belt.

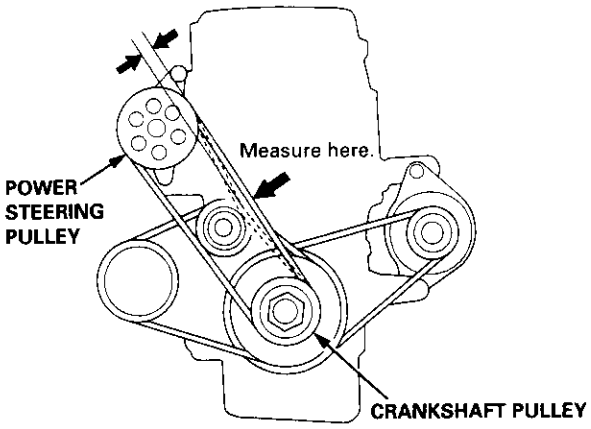
3. Remove the belt tension gauge carefully to avoid hitting the gauge reset lever.

Tension:
Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 121 lbf)
New Belt: 740 – 880 N (75 – 90 kgf, 165 – 198 lbf)



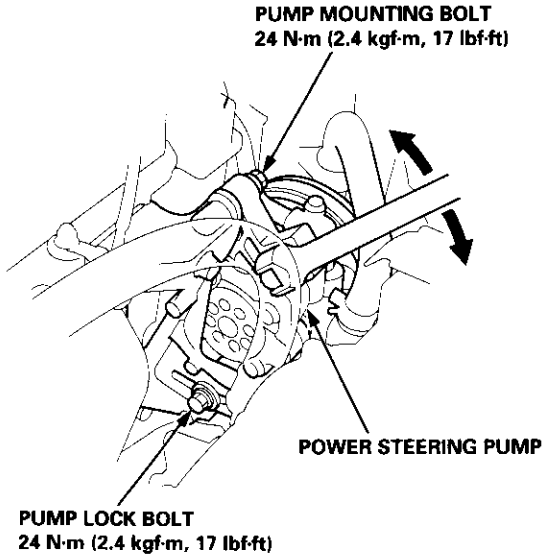
Measurement without Belt Tension Gauge:
Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:
Used Belt: 11.0 – 14.5 mm (0.43 – 0.57 in)
New Belt: 7.5 – 10.0 mm (0.30 – 0.39 in)



Adjustment

1. Loosen the power steering pump mounting bolt and pump lock bolt.



2. Adjust the belt tension by moving the power steering pump with a 1/2" drive breaker bar to obtain the proper belt tension, then retighten the mounting bolt and lock bolt.

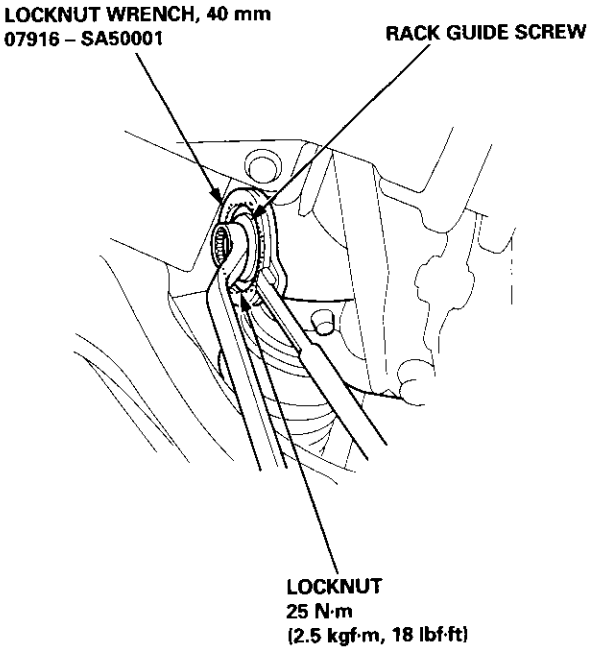
3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.

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Rack Guide Adjustment

1. Set the wheels in the straight ahead position.

2. Loosen the rack guide screw locknut with the special tool, then loosen the rack guide screw.
   For '98 – 00 models, remove the rack guide screw. Remove the old sealant from rack guide screw threaded section, and apply new sealant to the first three threads. Loosely install the rack guide screw on the steering gearbox.



3. Tighten the rack guide screw to 25 N·m (2.5 kgf·m, 18 lbf·ft), then loosen it.

4. Retighten the rack guide screw to 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft), then back it off to specified angle.

   Specified Return Angle:
   '97 model: 10 ± 5°
   '98 – 00 models: 20° Max

5. Tighten the locknut while holding the rack guide screw.

6. Check for tight or loose steering through the complete turning travel.

7. Perform following inspections:
   - Steering operation (see page 17-12).
   - Power assist with vehicle parked.

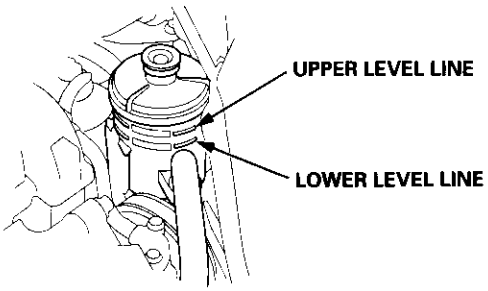
Fluid Replacement

Check the reservoir at regular intervals, and add the recommended fluid as necessary.

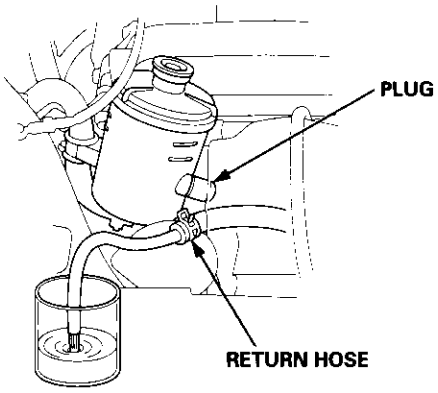
CAUTION: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear and poor steering in cold weather.

SYSTEM CAPACITY:
0.85 liter (0.90 US. qt, 0.75 Imp.qt) at disassembly

RESERVOIR CAPACITY:
0.4 liter (0.42 US. qt, 0.35 Imp.qt)



1. Raise the reservoir, then disconnect the return hose to drain the reservoir. Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.



2. Connect a hose of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.
3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.
4. Reinstall the return hose on the reservoir.
5. Fill the reservoir to the upper level line.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary. Do not fill the reservoir beyond the upper level line.

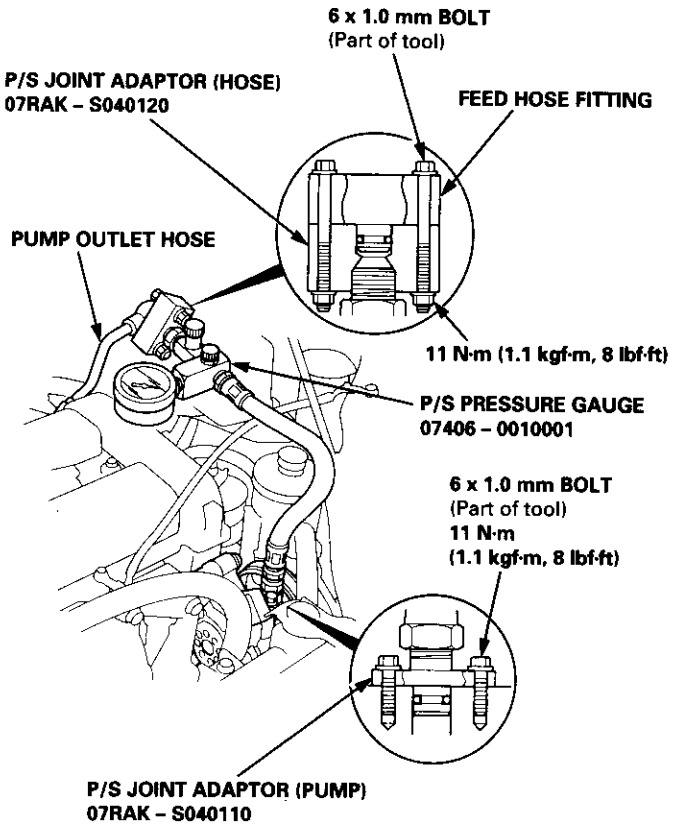
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Pump Pressure Check With T/N 07406 – 0010001

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

1. Check the power steering fluid level (see page 17-15), and pump belt tension (see page 17-14).

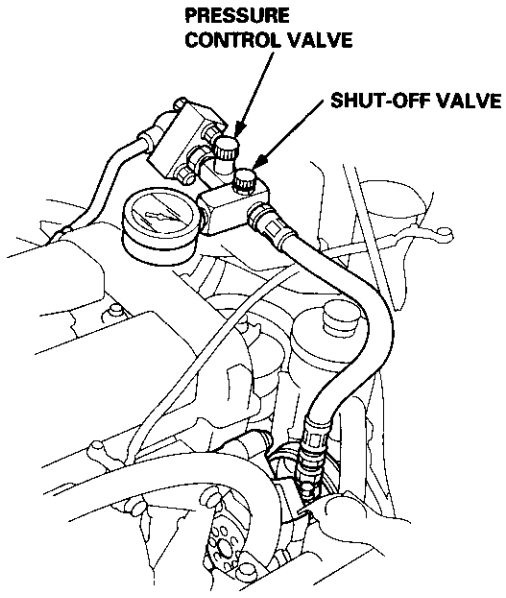
2. Disconnect the pump outlet hose from the pump outlet with care so as not to spill the power steering fluid on the frame and other parts, then install the P/S joint adapter (pump) on the pump outlet.



3. Connect the P/S joint adapter (hose) to the P/S pressure gauge, then connect the pump outlet hose to the P/S joint adapter (hose).

4. Install the P/S pressure gauge to the P/S joint adapter (pump).

5. Fully open the shut-off valve.



6. Fully open the pressure control valve.

7. Start the engine and let it idle.

8. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.

9. Measure steady-state fluid pressure while the engine is idling. If the pump is in good condition, the gauge should read less than 1,500 kPa (15 kgf/cm², 213 psi). If it reads high, check the outlet hose or valve body unit (see General Troubleshooting).

10. Close the pressure control valve, then close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

    CAUTION: Do not keep the pressure control valve closed more then 5 seconds or the pump could be damaged by over-heating.

11. Immediately open the pressure control valve fully.

    If the pump is in good condition, the gauge should read at least 6,900 – 7,800 kPa (70 – 80 kgf/cm², 1,000 – 1,140 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

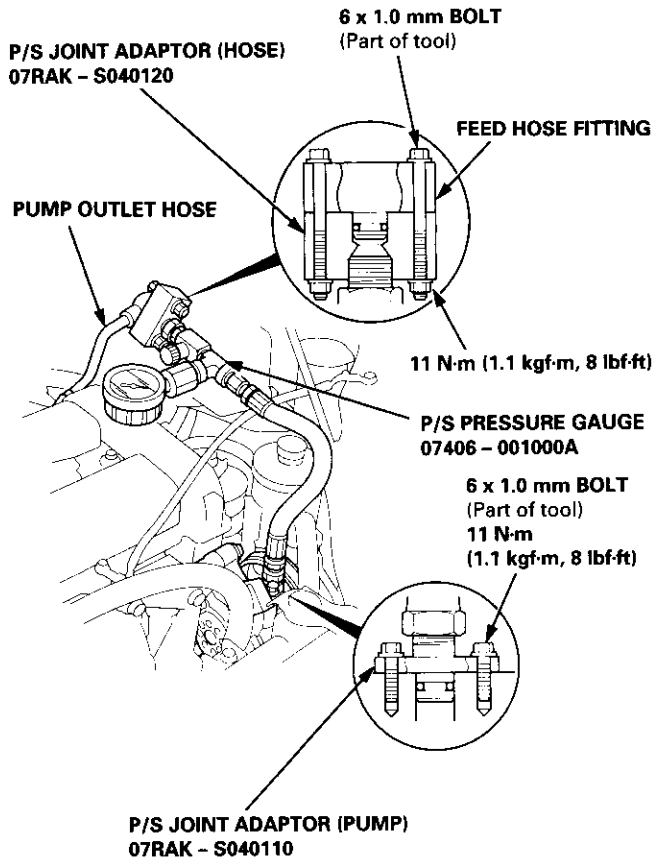
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Pump Pressure Check With T/N 07406 – 001000A

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

1. Check the power steering fluid level (see page 17-15), and pump belt tension (see page 17-14).

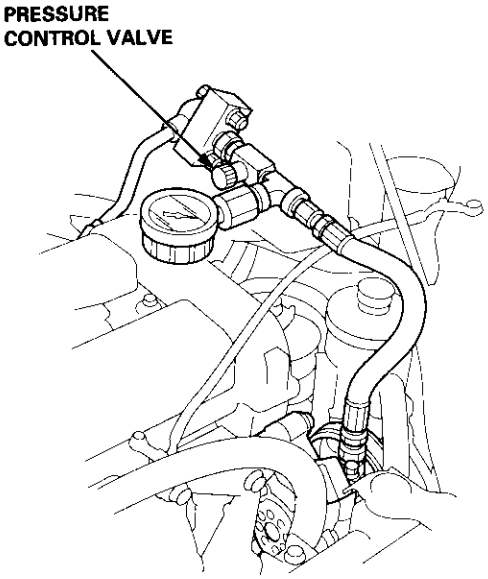
2. Disconnect the pump outlet hose from the pump outlet with care so as not to spill the power steering fluid on the frame and other parts, then install the P/S joint adapter (pump) on the pump outlet.



3. Connect the P/S joint adapter (hose) to the P/S pressure gauge, then connect the outlet hose to the P/S joint adapter (hose).

4. Install the P/S pressure gauge to the P/S joint adapter (pump).

5. Open the pressure control valve fully.



6. Start the engine and let it idle.

7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.

8. Measure steady-state fluid pressure while the engine is idling. If the pump is in good condition, the gauge should read 1,500 kPa (15 kgf/cm², 213 psi). If it reads high, check the outlet hose or valve body unit (see General Troubleshooting).

9. Close the pressure control valve gradually and read the pressure.

   CAUTION: Do not keep the pressure control valve closed more then 5 seconds or the pump could be damaged by overheating.

10. Immediately open the pressure control valve fully.

    If the pump is in good condition, the gauge should read at least 6,900 – 7,800 kPa (70 – 80 kgf/cm², 1,000 – 1,140 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

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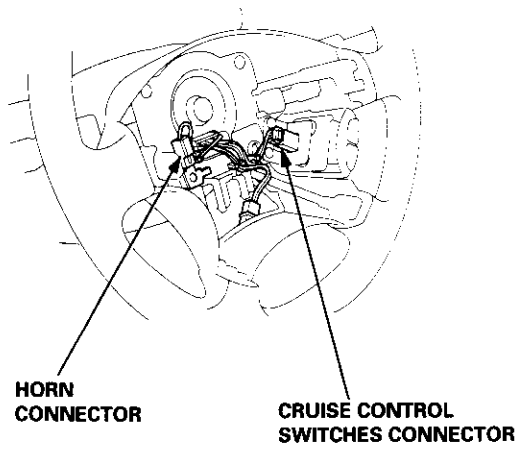
Steering Wheel

Removal

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

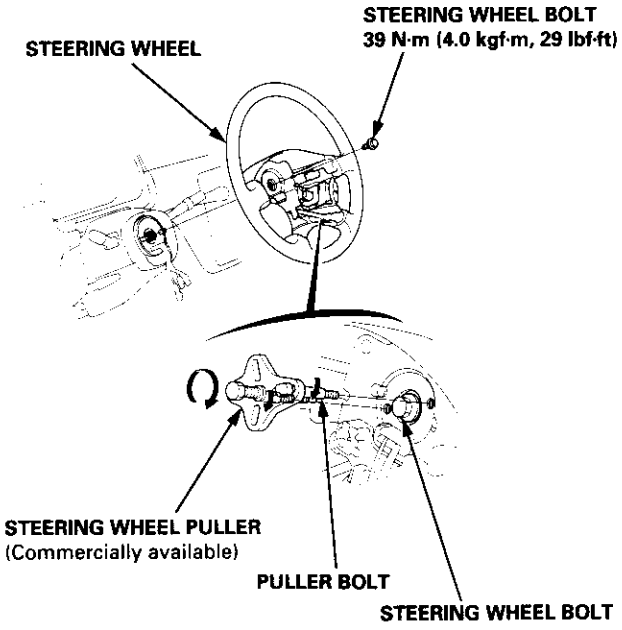
1. Align the front wheels straight ahead, then remove the driver's airbag assembly (see section 24) from the steering wheel.

2. Disconnect the horn connector and cruise control switch connectors.

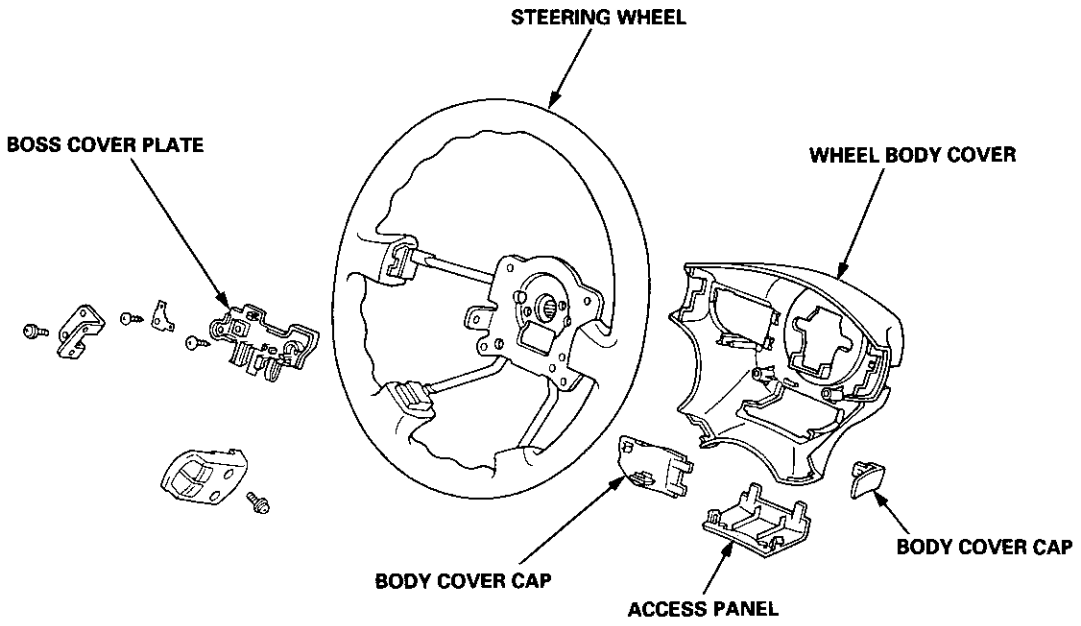


3. Loosen the steering wheel bolt, then install a steering wheel puller on the steering wheel and remove it.

   Note these items when removing the steering wheel:
   - Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
   - If you thread the puller bolts into the wheel hub more than five threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.



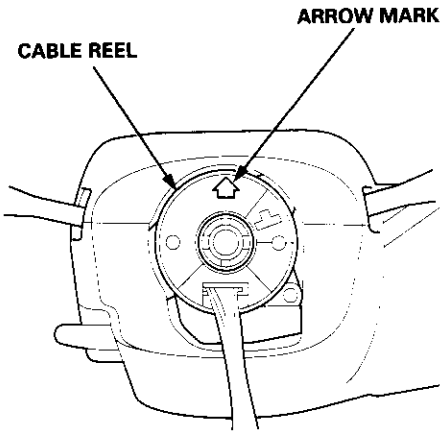
Disassembly/Reassembly



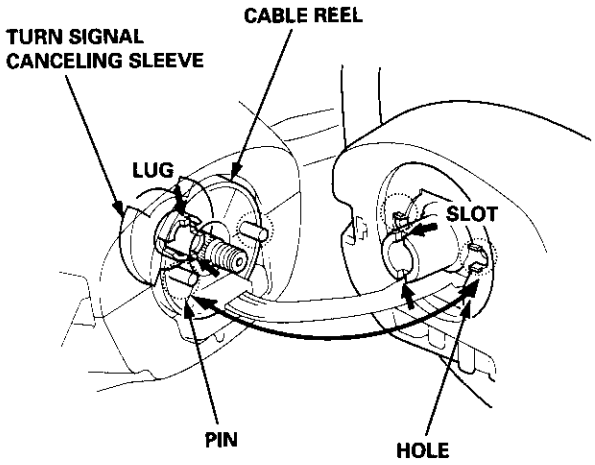
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Installation

1. Before installing the steering wheel, make sure the front wheels are aligned straight ahead, then center the cable reel. Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise approximately two turns. The arrow mark on the cable reel label should point straight up.



2. Install the steering wheel on to the steering column shaft, making sure the steering wheel shaft engages the cable reel and canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.



3. Install the steering wheel bolt, and tighten it to 39 N·m (4.0 kgf·m, 29 lbf·ft).

4. Connect the horn connector and the cruise control switch connectors.

5. Install the driver's airbag assembly, and confirm proper system operation (see section 24).

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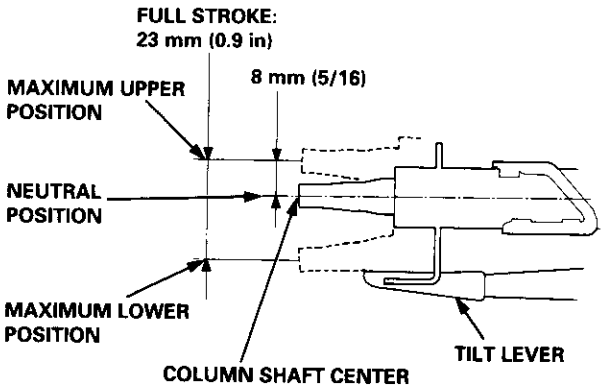
Steering Column

Removal/Installation

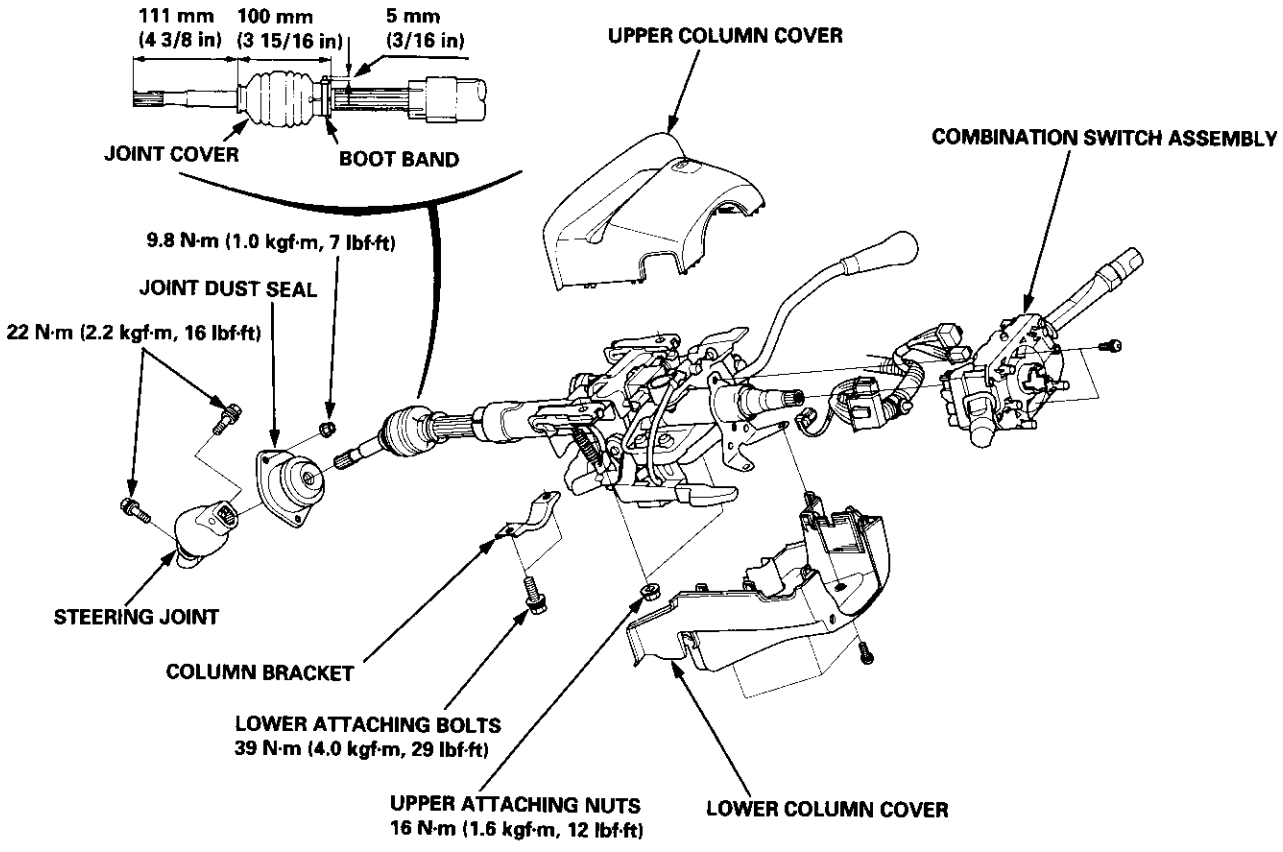
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Note these items when removing the steering column:

- Before removing the steering column, remove the driver's airbag assembly and cable reel (see section 24).
- Before removing or installing, set the column shaft in the neutral position by pulling up the steering column to uppermost position, then lower it 8 mm (5/16 in). Tighten tilt lever.



1. Remove the steering wheel (see page 17-18).
2. Remove the driver's side dashboard lower cover and knee bolster (see section 20).
3. Remove the column covers.
4. With A/T, move the shift lever to the [N] position, and remove the shift cable from the column, and set it aside (see section 14).
5. Remove the combination switch assembly from the steering column shaft by disconnecting the connectors, and removing the two screws.
6. Disconnect the steering joint from the engine compartment.
7. Remove the steering column by removing the attaching nuts and bolts.

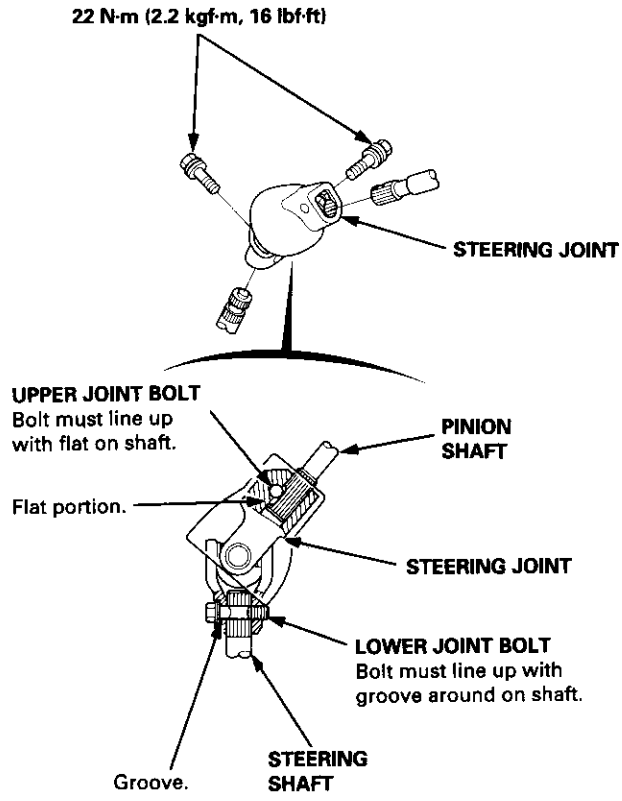


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8. Installation is the reverse of the removal procedure.

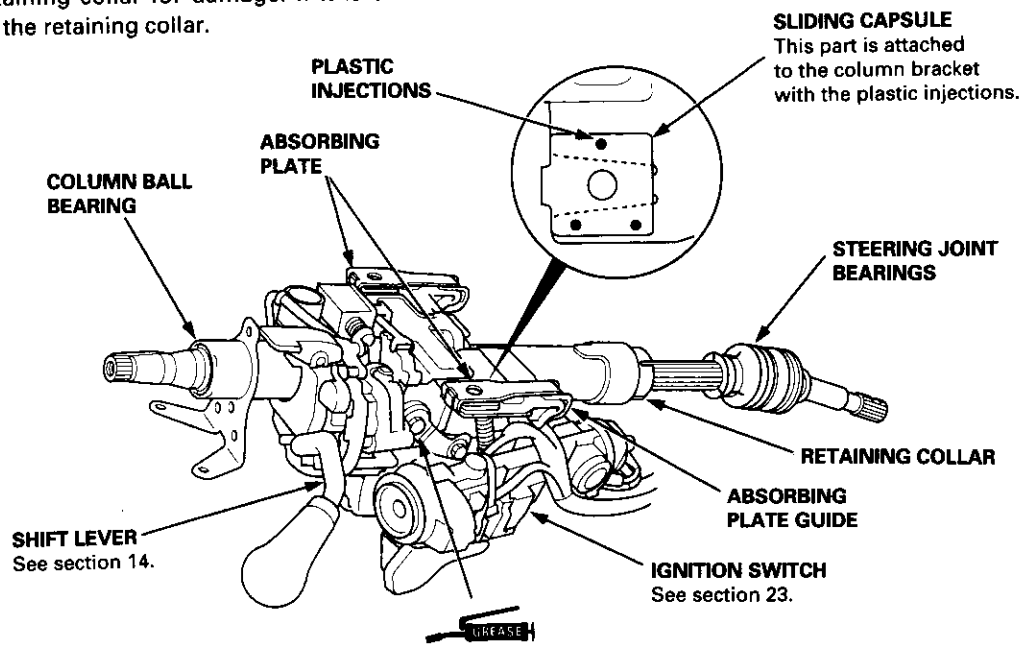
Note these items during installation:

- Be sure the wires are not caught or pinched by any parts when installing the column.
- Make sure the wire harness is routed and fastened properly.
- Make sure the connectors are properly connected.
- Make sure the steering joint is connected as follows:
  a. Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat of the shaft).
  b. Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
  c. Pull on the steering joint to make sure that the steering joint is fully seated.
  Then install the upper joint bolt and tighten it.



Inspection

- Check the steering column ball bearing and the steering joint bearings for play and proper movement. If there is noisy or if there is excessive play, replace the steering column as an assembly.
- Check the retaining collar for damage. If it is damaged, replace the retaining collar.
- Check the absorbing plates, absorbing plate guides and sliding capsules for distortion and breakage. Replace the column as an assembly if they are distorted or broken.



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Inspection (cont'd)

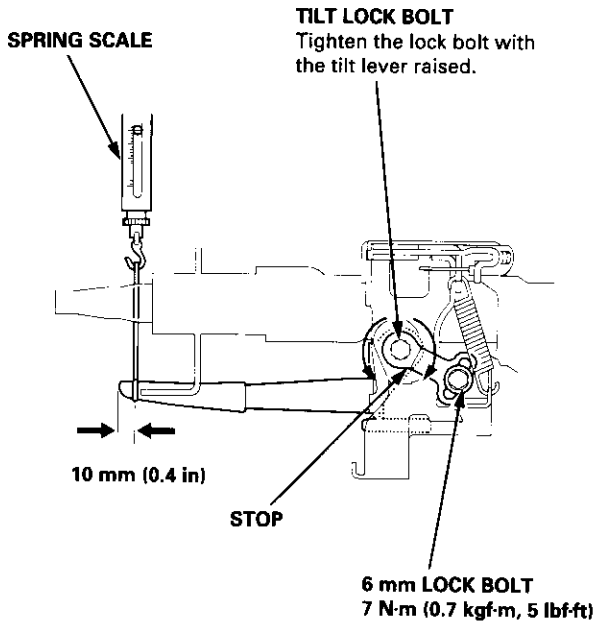
1. Move the tilt lever from the loose position to the lock position 3 to 5 times; then measure the tilt lever preload 10 mm (0.4 in) from the end of the tilt lever.

   Preload: 70 – 90 N (7 – 9 kgf, 15 – 20 lbf)

2. If the measurement is out of the specification, adjust the preload using the following procedures.

   a. Loosen the tilt lever, and set the steering column in the neutral position.

   b. Remove the 6 mm lock bolt, and remove the stop. Be careful not to loosen the tilt lever when installing the stop or tightening the 6 mm lock bolt.



   c. Adjust the preload by turning the tilt lock bolt left or right.

   d. Pull up the tilt lever to the uppermost position, and install the stop. Check the preload again. If the measurement is still out of specification, repeat the above procedures a. through c. to adjust.

Steering Lock Replacement

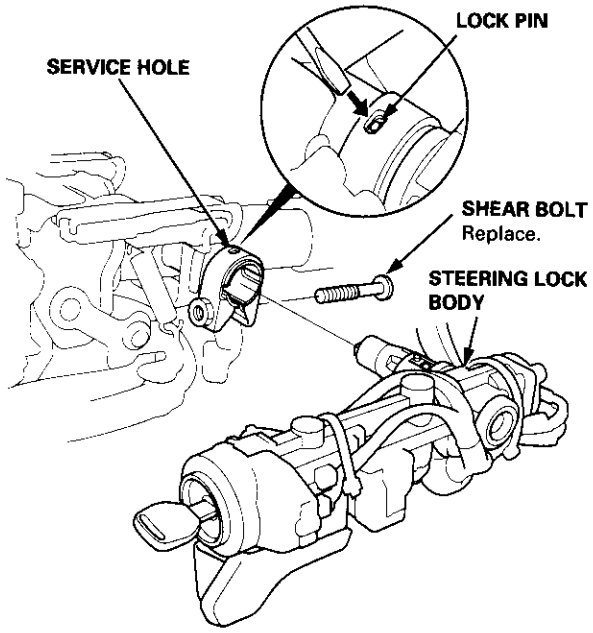
1. Remove the steering column (see page 17-20).

2. Center punch the shear bolt, and drill bolt head off with a 5 mm (3/16 in) drill bit.

3. Remove the shear bolt from the switch body. Be careful not to damage the switch body when removing the shear bolt.

4. Insert the ignition key and turn it to "I".

5. Push the lock pin down, and pull out the steering lock body from the steering column.



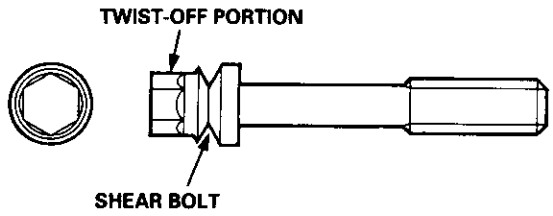
6. Insert the ignition key to the new steering lock body, and turn it to "I".

7. Push the lock pin down, and insert the steering lock body into the steering column until it clicks into place.

8. Loosely install the new shear bolt.

9. Check for proper operation of the steering wheel lock, and that the ignition key turns freely.

10. Tighten the shear bolt until the hex head twists off.

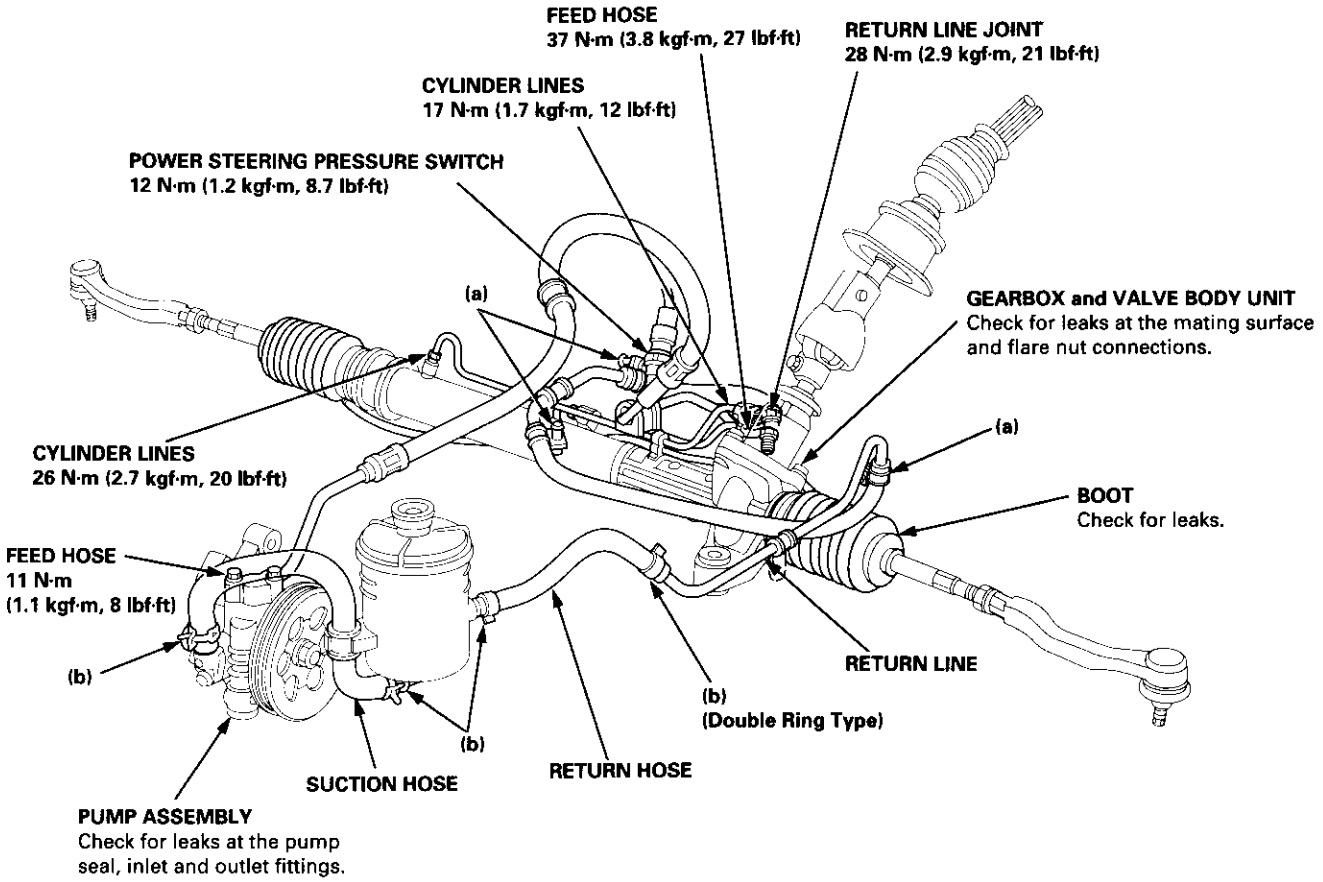


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Fluid Leakage Inspection

HOSES and LINES

- Inspect hoses for damage, leaks, interference and twisting.
- Inspect fluid lines for damage, rusting and leakage.
- Check for leaks at hose and line joints and connections.



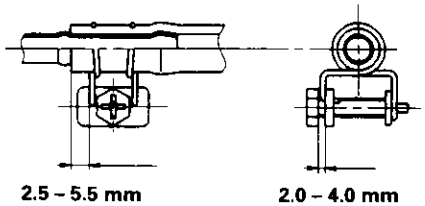
Replacement

Note these items during installation:

- Connect each hose to the corresponding line securely until it contacts the stop on the line. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Check all clamps for deterioration or deformation; replace with the clamps new ones if necessary.
- Add the recommended power steering fluid to the specified level on the reservoir and check for leaks.

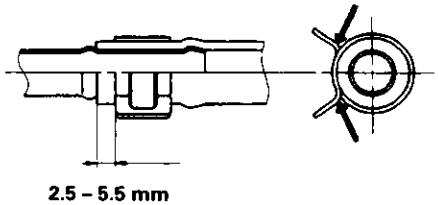
ADJUSTABLE HOSE CLAMP: (a)

- Position the adjustable hose clamps at the points indicated by (a) in the drawing above.
- Slide the hose over the line until it contacts the stop.



HOSE CLAMP: (b)

- Position the hose clamps at the points indicated by (b) in the drawing above.
- Slide the hose over the line until it contacts the stop.

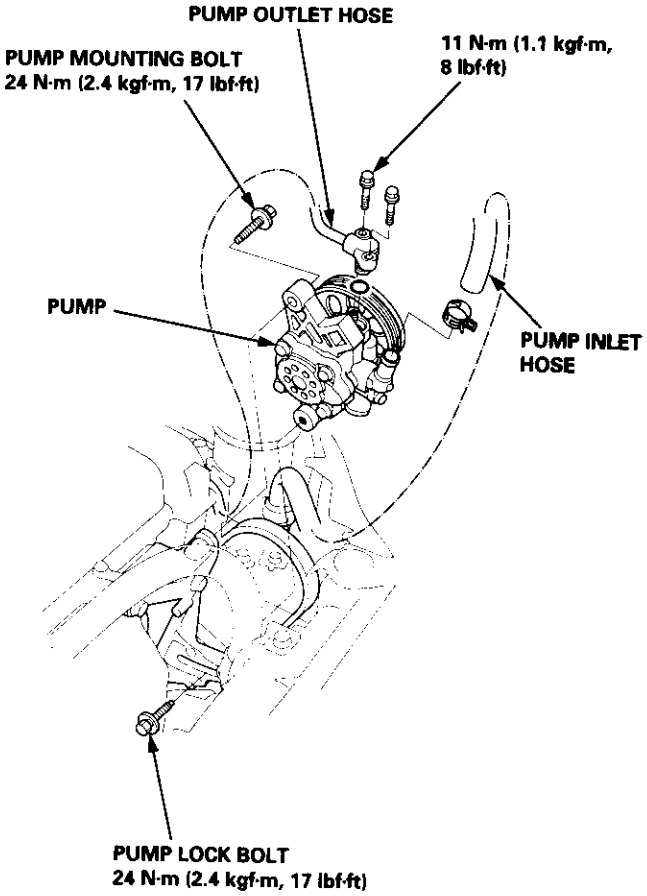


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Power Steering Pump

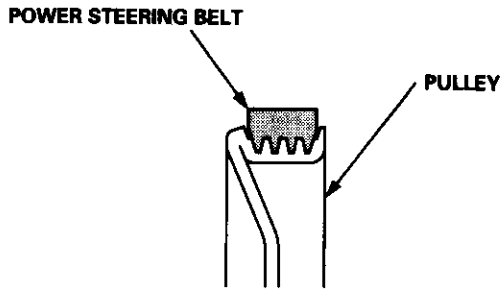
Replacement

1. Place a suitable container under the vehicle.
2. Drain the power steering fluid from the reservoir.
3. Remove the belt by loosening the pump mounting bolt and pump lock bolt.



4. Cover the A/C compressor with several shop towels to protect it from spilled power steering fluid. Disconnect the pump inlet hose and pump outlet hose from the pump, and plug them. Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.
5. Remove the pump mounting bolt and pump lock bolt, then remove the pump. Do not turn the steering wheel with the pump removed.
6. Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.
7. Connect the pump inlet hose and pump outlet hose. Tighten the pump fittings securely.
8. Loosely install the pump in the pump bracket with the mounting bolt and lock bolt.
9. Install the pump belt.

   Note these items during belt installation:
   - Make sure that the power steering belt is properly positioned on the pulleys.
   - Do not get power steering fluid or grease on the power steering belt or pulley faces. Clean off any fluid or grease before installation.



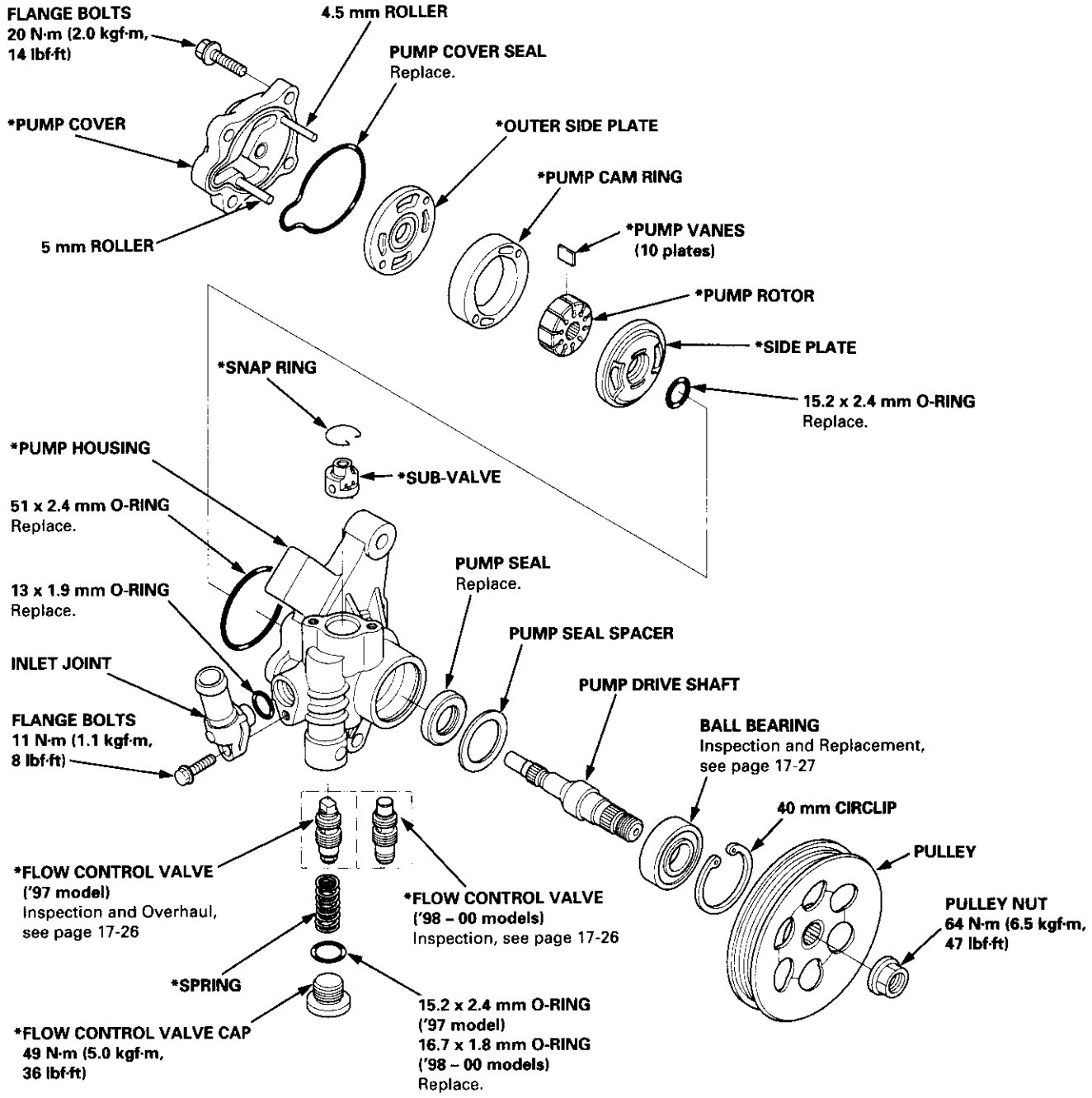
10. Adjust the pump belt (see page 17-14).
11. Fill the reservoir to the upper level line (see page 17-15).

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Disassembly

Note these items during disassembly:

- The power steering components are made of aluminum. Avoid damaging the components during assembly.
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Replace the pump as an assembly if the parts indicated with asterisk (*) are worn or damaged.

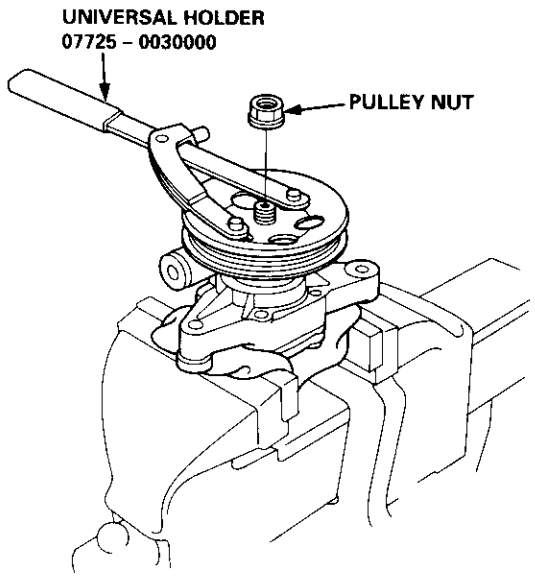


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Disassembly (cont'd)

1. Drain the fluid from the pump.
2. Hold the steering pump in a vise with soft jaws, hold the pulley with the special tool, and remove the pulley nut and pulley. Be careful not to damage the pump housing with the jaws of the vise.

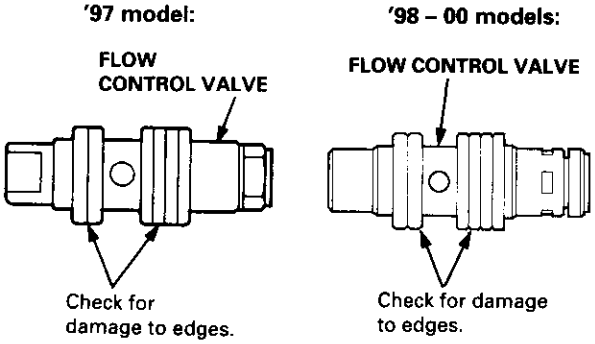


3. Loosen the flow control valve cap with a hex wrench, and remove it.
4. Remove the O-ring, flow control valve and spring.
5. Remove the inlet joint and O-ring.
6. Remove the pump cover and pump cover seal.
7. Remove the outer side plate, pump cam ring, pump rotor, pump vanes, side plate and O-rings.
8. Remove the snap ring, then remove the sub-valve from the pump housing.
9. Remove the circlip, then remove the pump drive shaft by tapping the shaft end with the plastic hammer.
10. Remove the pump seal spacer and pump seal.

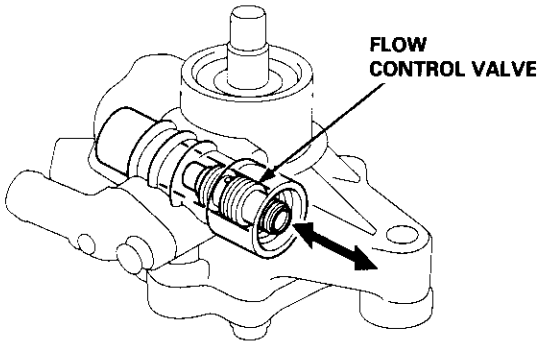
Inspection

Flow Control Valve

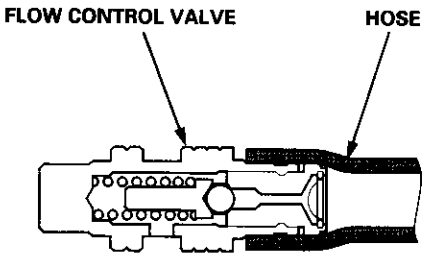
1. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.



2. Inspect the bore of the flow control valve for scratches or wear.
3. Slip the valve back in the pump, and check that it moves in and out smoothly. If OK, go to step 4; if not, replace the pump as an assembly. The flow control valve is not available separately.

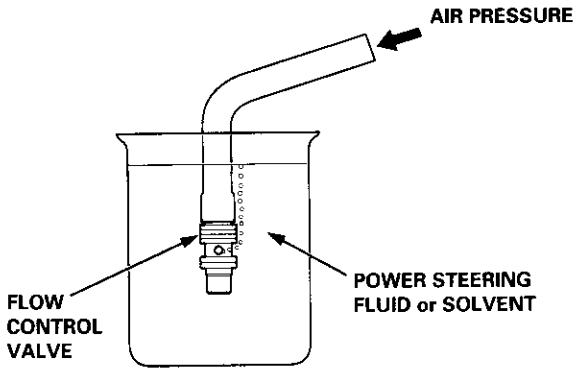


4. Attach a hose to the end of the valve as shown.

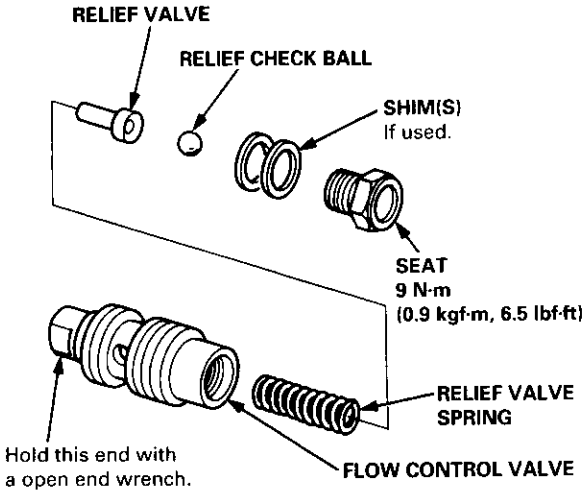


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5. Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm², 14.2 psi), repair it as follows ('97 model). For '98 – 00 models, the flow control valve cannot be disassembled; replace the pump as an assembly.



6. For '97 model only, hold the bottom end of the valve with a open end wrench. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.



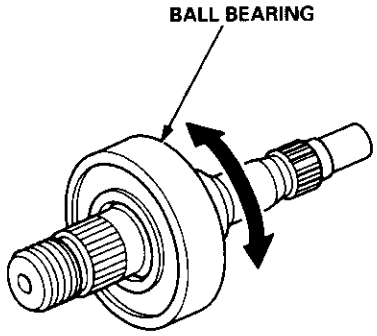
7. Clean all the parts in solvent, dry them off, then reassemble and retest the valve.

   The relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

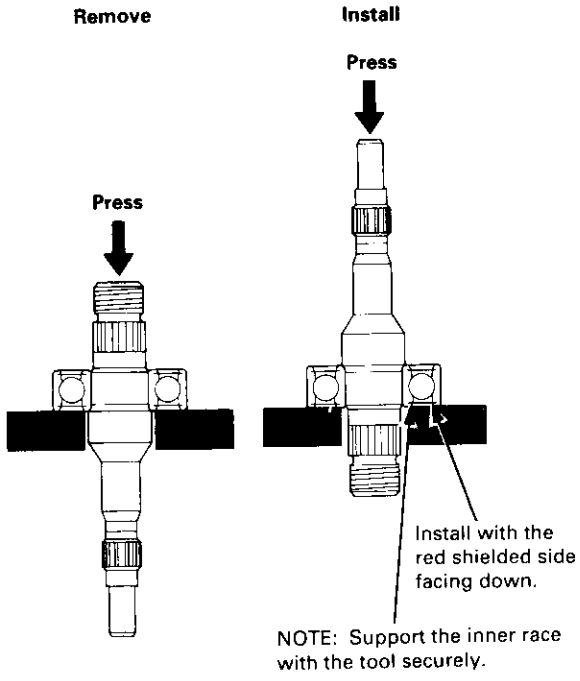
8. If the flow control valve tests OK, reinstall it in the pump. If the flow control valve still leaks air, replace the pump as an assembly. The flow control valve is not available separately.

Ball Bearing:

1. Inspect the ball bearing by rotating the outer race slowly. If any play or roughness is felt, replace the ball bearing.



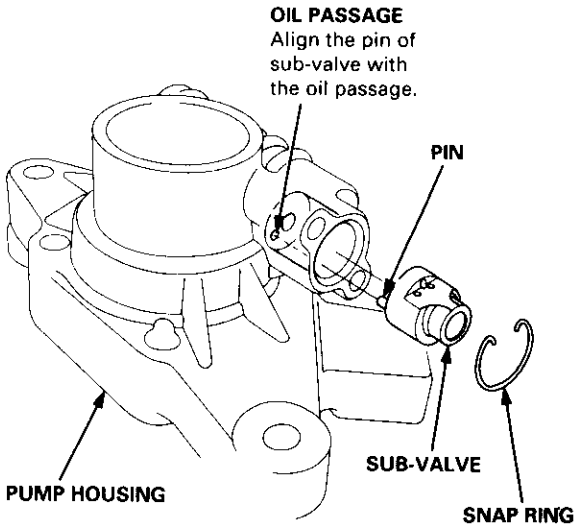
2. Replace the ball bearing using a press.



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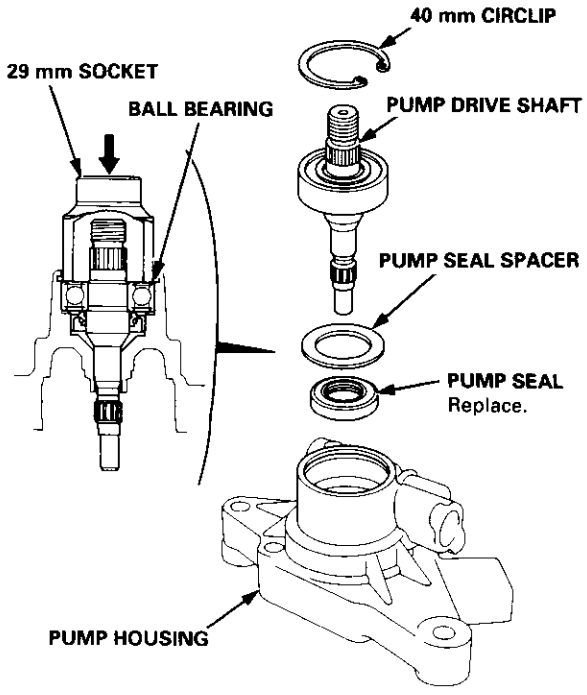
Reassembly

1. Align the pin of the sub-valve with the oil passage in pump housing, and push down the sub-valve. Install the snap ring properly.



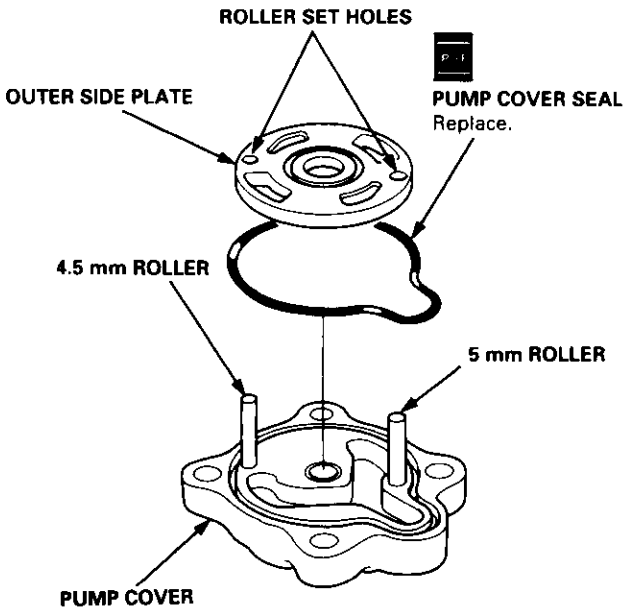
2. Install the new pump seal (with its grooved side facing in) into the pump housing by hand, then install the pump seal spacer.

3. Position the pump drive shaft in the pump housing, then drive it in using a 29 mm socket as shown.

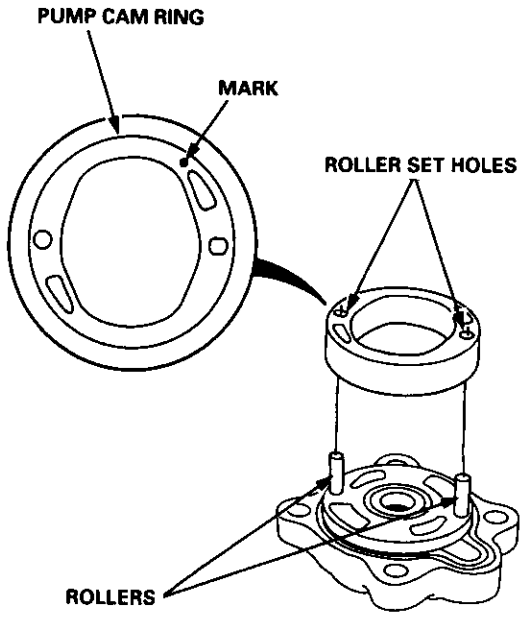


4. Install the 40 mm circlip with its radiused side facing out.

5. Coat the pump cover seal with power steering fluid, and install it into the groove in the pump cover.



6. Install the outer side plate over the two rollers.

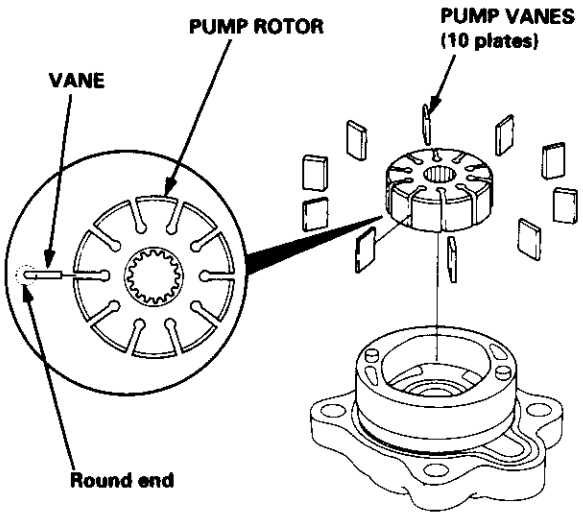


7. Set the pump cam ring over the two rollers with the " • " mark on the cam ring upward.

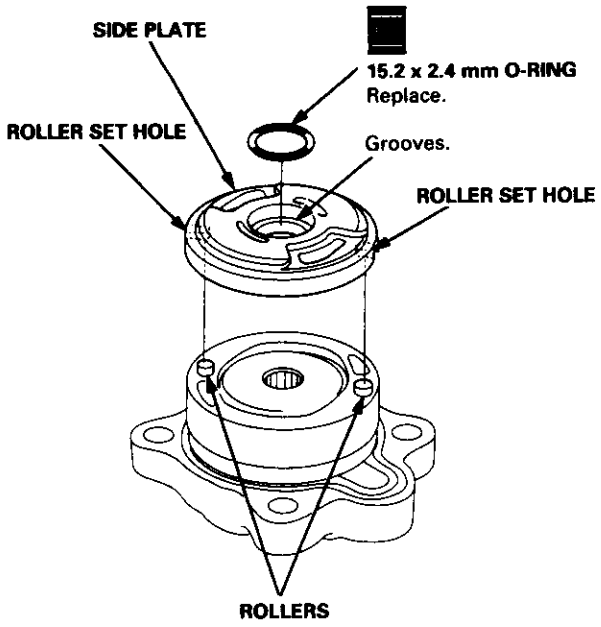
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8. Assemble pump rotor to the pump cover.

9. Set the 10 vanes in the grooves in the rotor. Make sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.

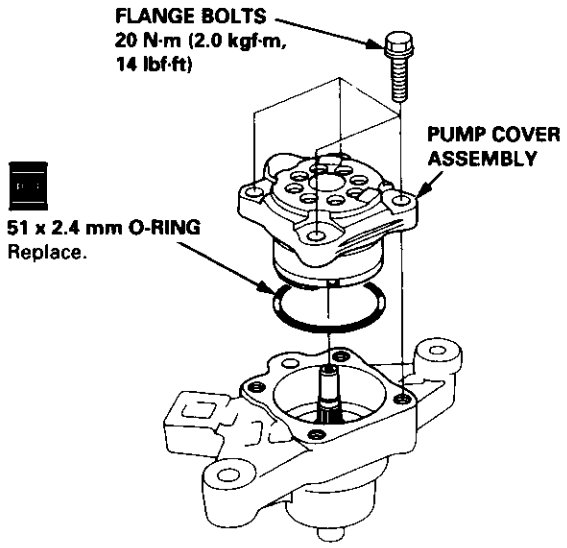


10. Coat the O-ring with power steering fluid, and install it into the grooves in the side plate.



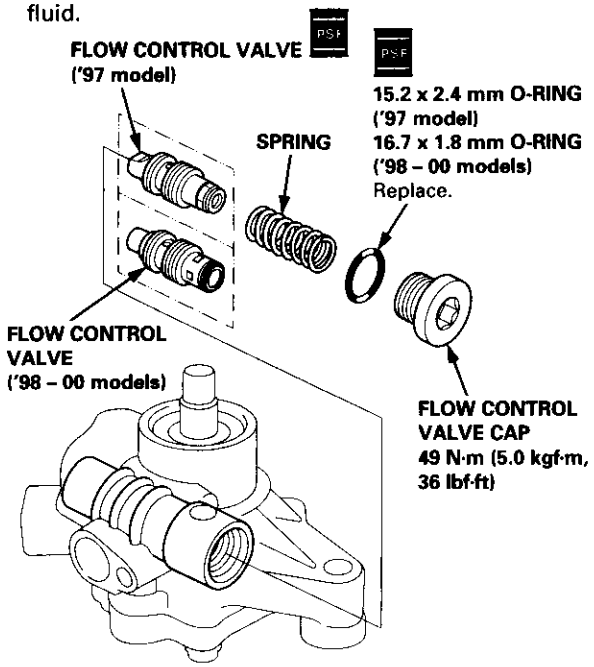
11. Install the side plate on the cam ring by aligning the roller set holes in the side plate with the rollers.

12. Coat the O-ring with power steering fluid, and position it into the pump housing.



13. Install the pump cover assembly in the pump housing.

14. Coat the flow control valve with power steering fluid.



15. Install the flow control valve and spring in the pump housing.

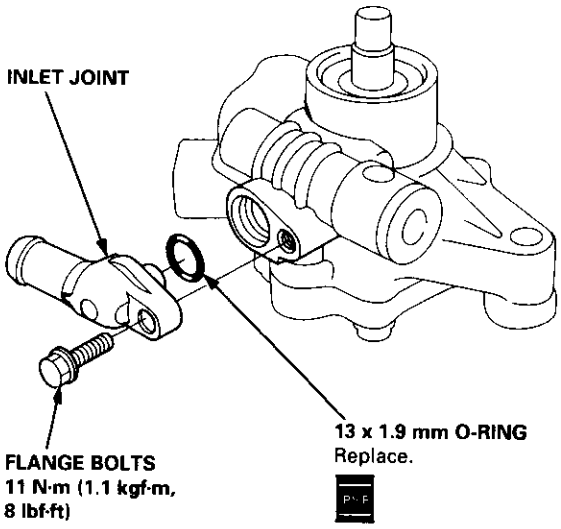
16. Coat the O-ring with power steering fluid, and install it on the flow control valve cap.

17. Install the flow control valve cap on the pump housing, and tighten it. (cont'd)

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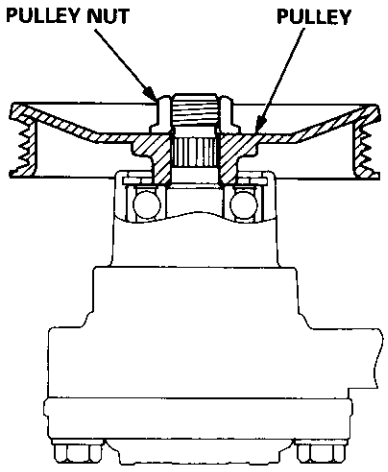
Reassembly (cont'd)

18. Coat the O-ring with power steering fluid, and install it into the grooves in the inlet joint.

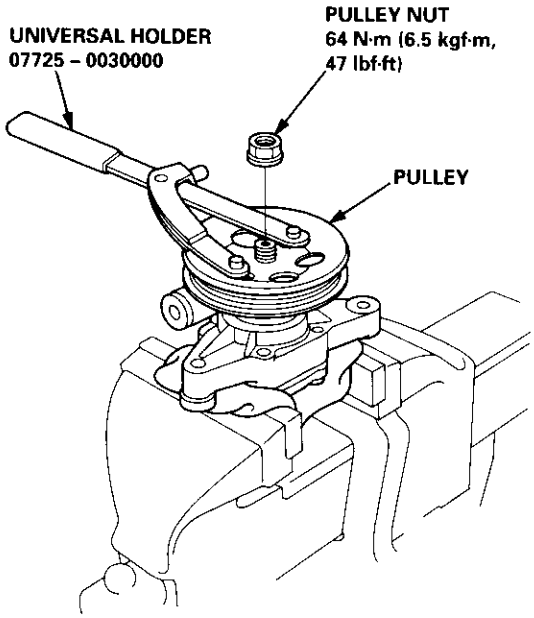


19. Install the inlet joint on the pump housing.

20. Install the pulley as shown below, then loosely install the pulley nut. Hold the steering pump in a vise with soft jaws. Be careful not to damage the pump housing with the jaws of the vise.



21. Hold the pulley with the special tool, and tighten the pulley nut.



22. Check that the pump turns smoothly by turning the pulley by hand.

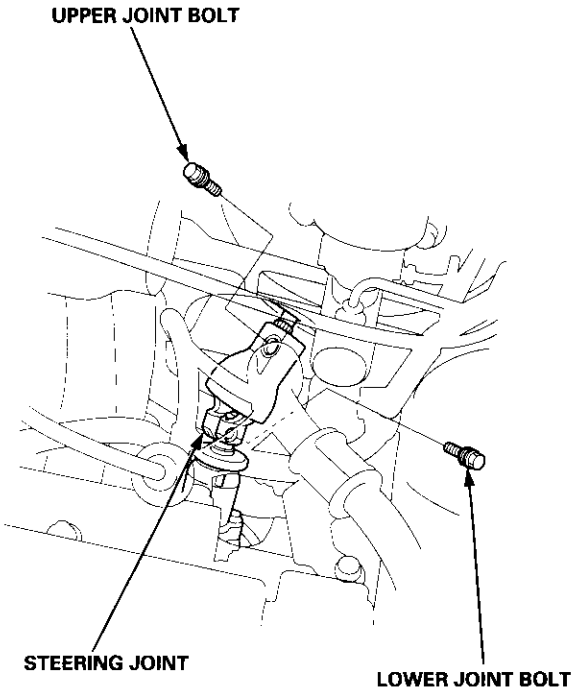
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Removal

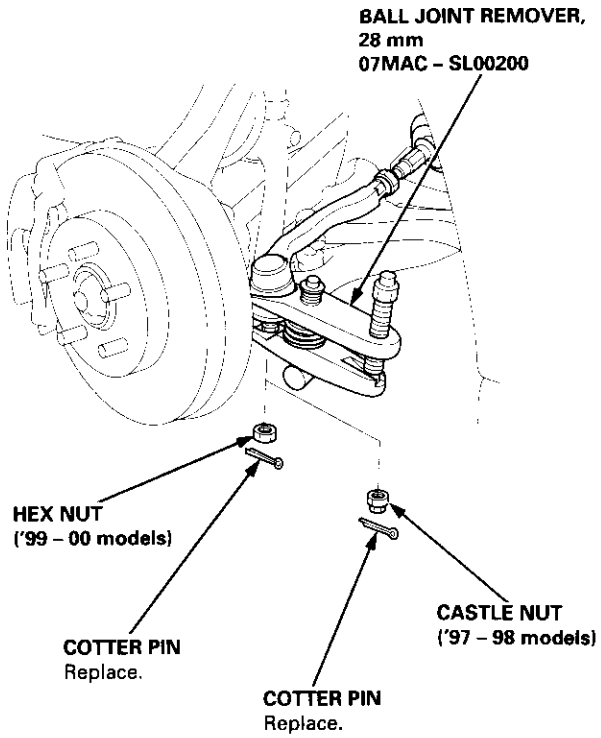
Note these items during removal:

- Using solvent and a brush, wash any oil and dirt off the valve body unit its lines, and the end if the gearbox. Blow dry with compressed air.
- Be sure to remove the steering wheel before disconnecting the steering joint. Damage to the cable reel can occur.
- With 4WD, tilt the engine with a jack to expand the clearance between the transfer assembly and rear beam when removing the steering gearbox from the rear beam.
  Do not remove the steering gearbox by removing the transfer assembly from the transmission.

1. Drain the power steering fluid as described on page 17-15.
2. Raise the vehicle, and support it on safety stands in the proper locations (see section 1).
3. Remove the front wheels.
4. Remove the driver's airbag assembly (see section 24).
5. Remove the steering wheel (see page 17-18).
6. Remove the steering joint bolts, then disconnect the steering joint by moving the joint toward the column.



7. Remove the cotter pin from the nut, and remove the castle nut ('97 – 98 models) or hex nut ('99 – 00 models).



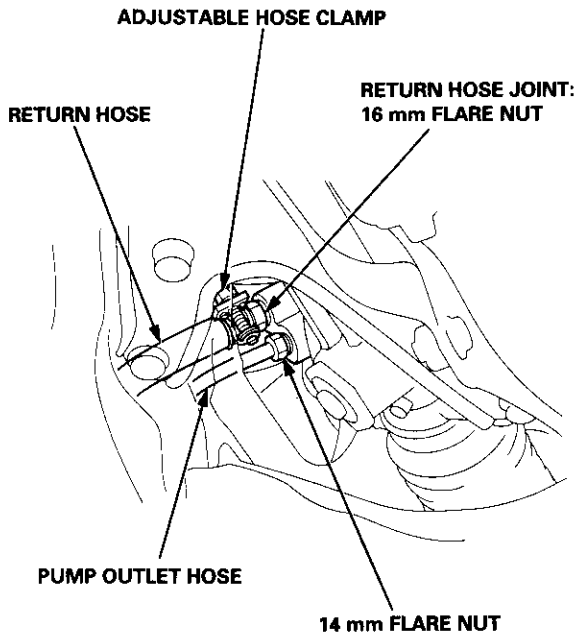
8. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool. Refer to section 18 for ball joint remover usage instruction. Be careful not to damaging the ball joint boot.
9. Separate the tie-rod ball joint and knuckle using the special tool.
10. Remove the right and left tie-rod ends, then extend the rack all the way to the right.
11. Remove the TWC (see section 9).
12. Disconnect the shift linkage from the transmission (M/T: see section 13, A/T: see section 14).
13. With 4WD, separate the propeller shaft and transfer assembly (see section 16).

(cont'd)

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Removal (cont'd)

14. Loosen the 14 mm flare nut, and disconnect the pump outlet hose.



15. Loosen the adjustable hose clamp and disconnect the return hose.

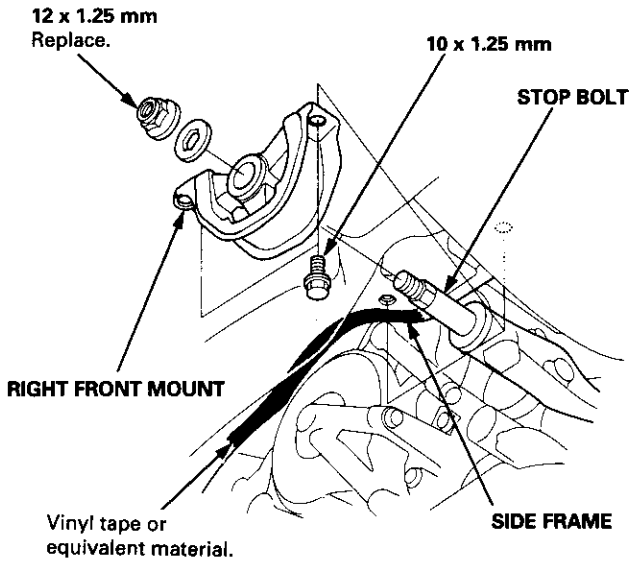
16. Loosen the 16 mm flare nut, and remove the return hose joint.

17. After disconnecting the hoses and lines, plug or seal them with a piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

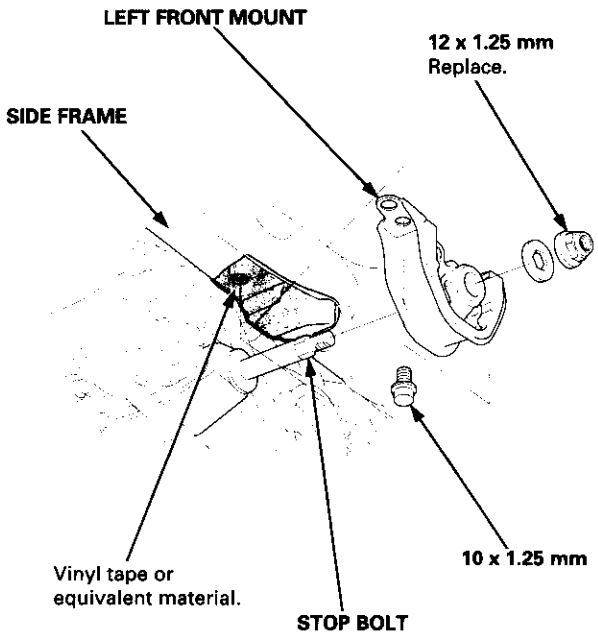
    NOTE:
    - Do not loosen the cylinder line A and B between the valve body unit and cylinder.
    - With 2WD, continue to step 23.

4WD: Steps 18-22

18. Remove the right front mount, then apply vinyl tape to the side frame to protect it from the transmission cover and stop bolt.

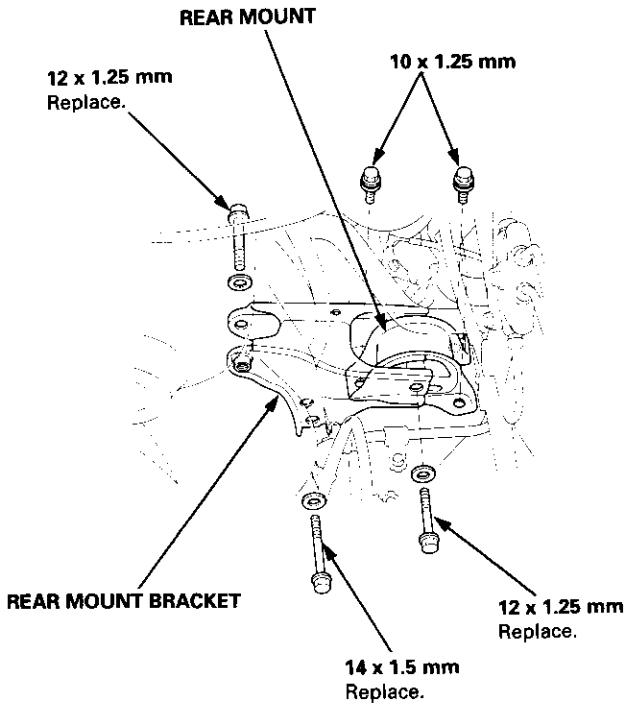


19. Remove the left front mount, then apply vinyl tape to the side frame to protect it from the stop bolt.

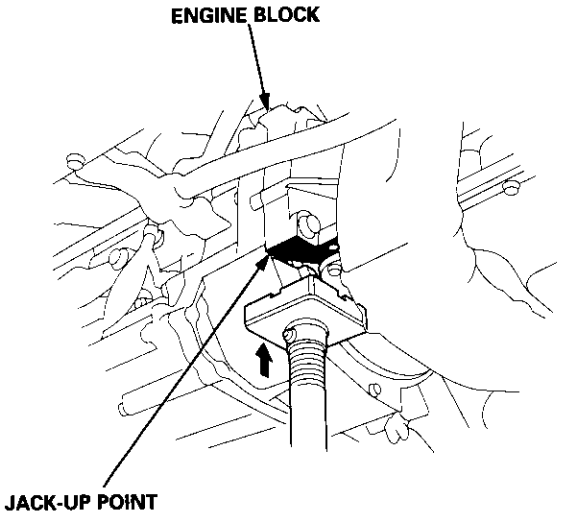


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20. Remove the rear mount bracket and rear mount.

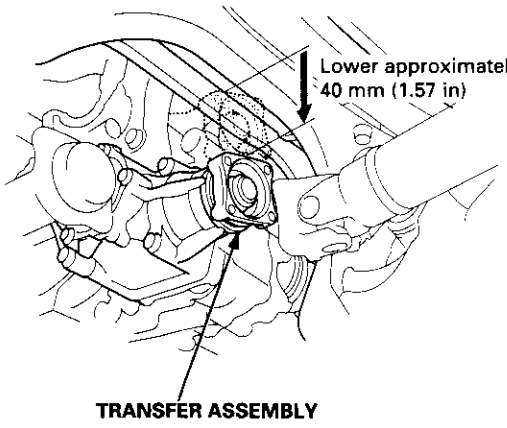


21. Place a jack under the engine block in the area shown.



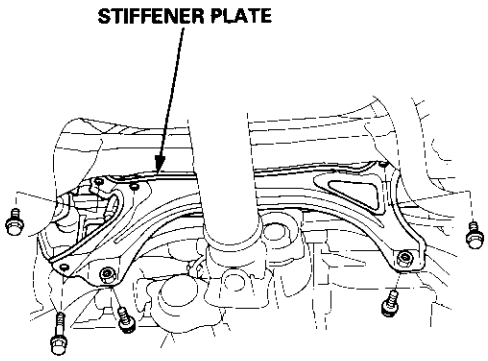
22. Jack up the engine and tilt the engine back until the transfer assembly is lowered approximately 40 mm (1.57 in).

    Note these items when tilting the engine:
    - Check that the wire harnesses, hoses and pipes are not caught by any surrounding parts.
    - Do not tilt the engine more than necessary.



23. Remove the stiffener plate.

    NOTE: Some stiffener plate mounting bolts are also used as gearbox mounting bolts. The gearbox will tilt to the side when these bolts are removed.

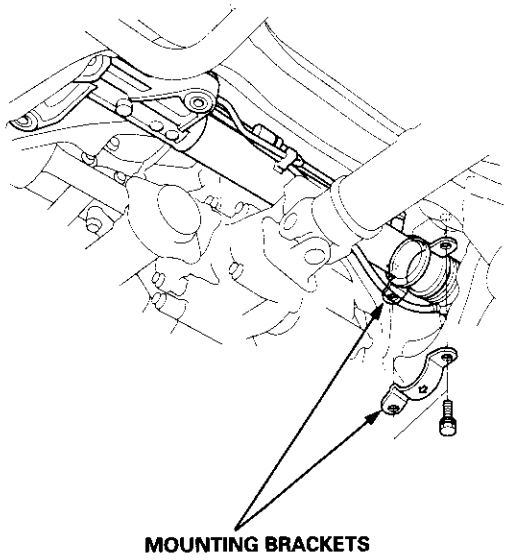


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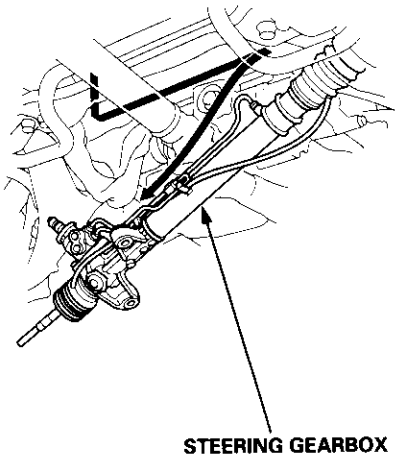
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Removal (cont'd)

24. Remove the mounting brackets.



25. Move the steering gearbox to the right so the left rack end clears the rear beam, then place the left rack end below the rear beam.



26. Move the steering gearbox to the left, and tilt the left side down to remove it.
With 4WD, remove the steering gearbox through the clearance between the transfer assembly and propeller shaft.

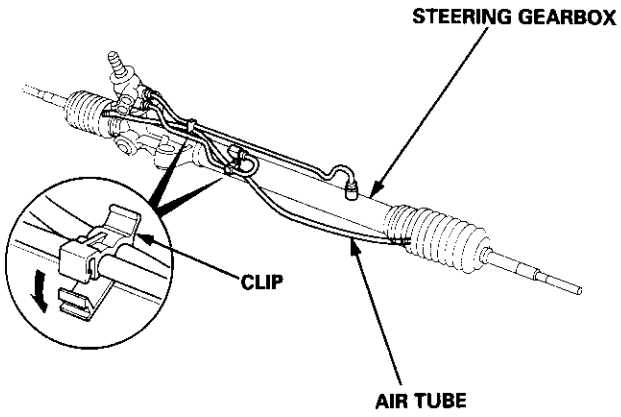
Disassembly

Steering Rack Disassembly

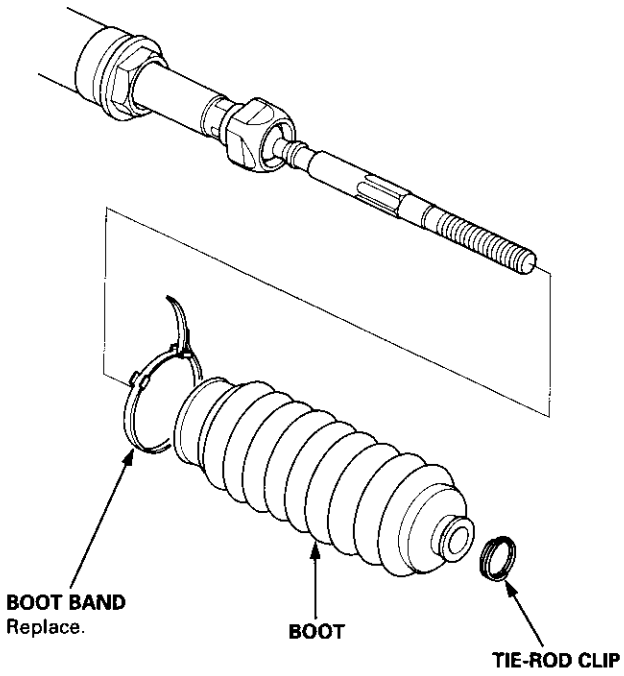
Note these items when disassembling:
- Before disassembling the gearbox, wash it off with solvent and a brush.
- Do not dip seals and O-rings in solvent.

1. Remove the steering gearbox (see page 17-31).

2. Remove air tube and clips.



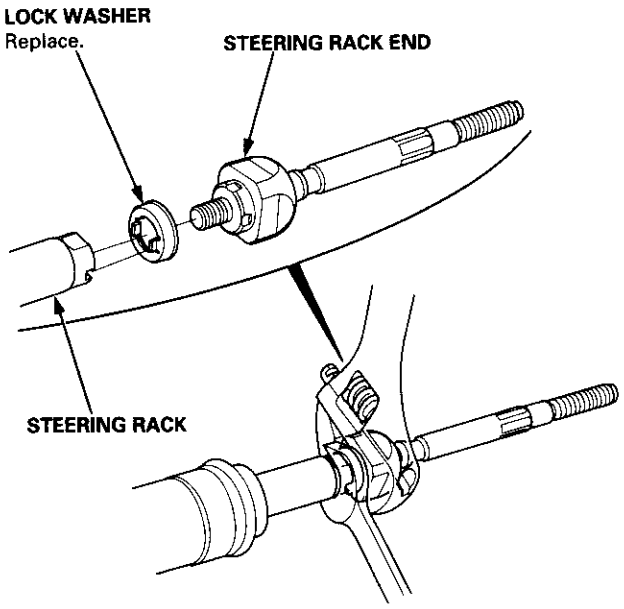
3. Remove the boot bands and tie-clips.



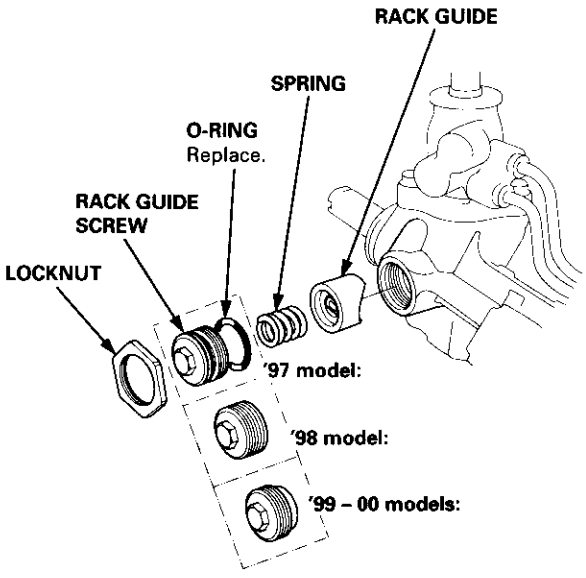
4. Pull the boots away from the ends of the gearbox.

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5. Hold the steering rack with a wrench ('98 – 00 models: left end only), and unscrew the rack end with another wrench. Be careful not to damage the rack surface with the wrench.

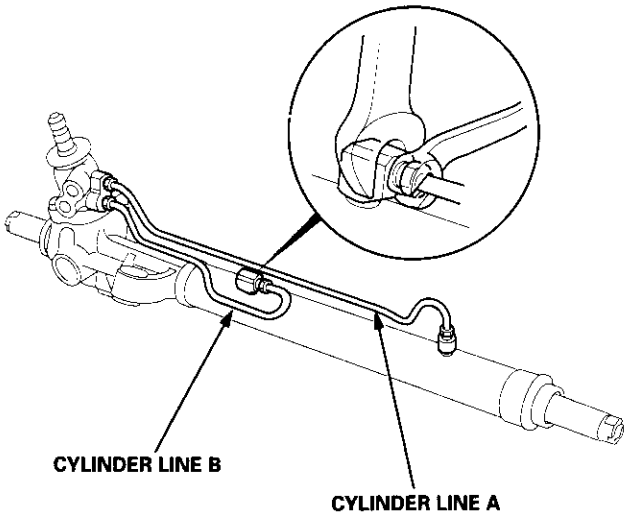


6. Loosen the locknut, then remove the rack guide screw and O-ring ('97 model).



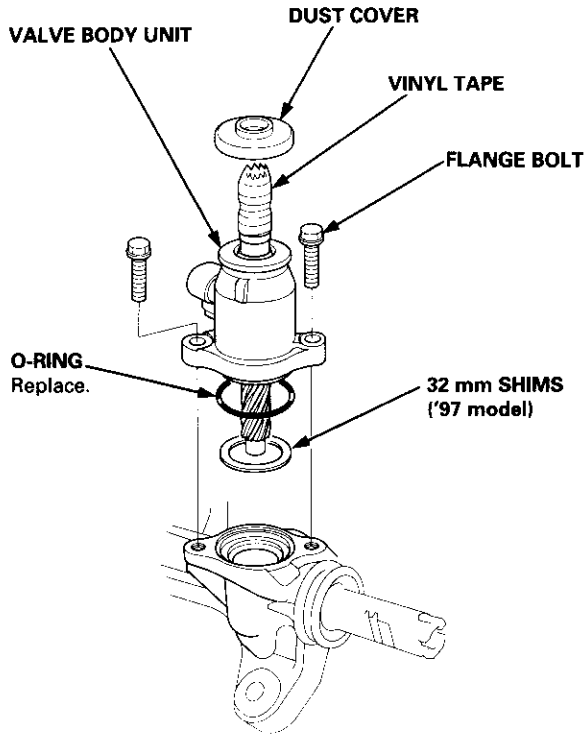
7. Remove the spring and the rack guide from the gearbox.

8. Remove cylinder lines A and B from the gearbox.



9. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.

10. Remove the two flange bolts, then remove the valve body unit from the gearbox. (See page 17-38 for valve body unit disassembly.)



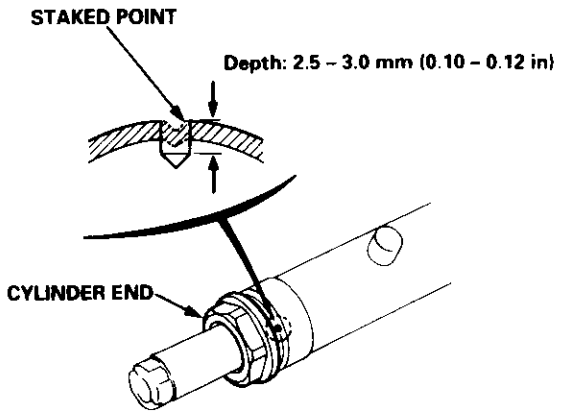
11. Apply vinyl tape to stepped portion of the pinion shaft, and remove the dust cover.

(cont'd)

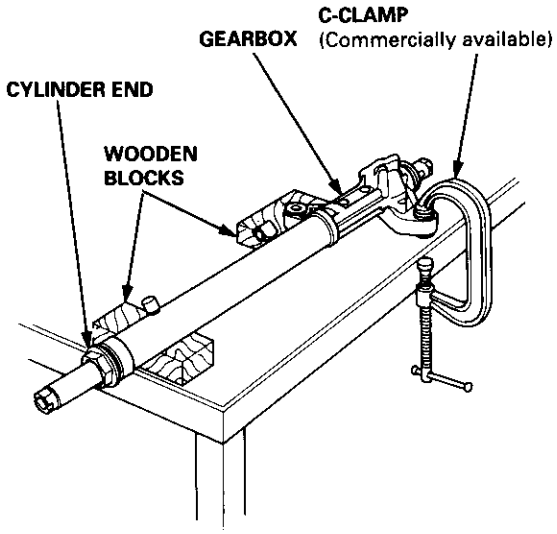
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Disassembly (cont'd)

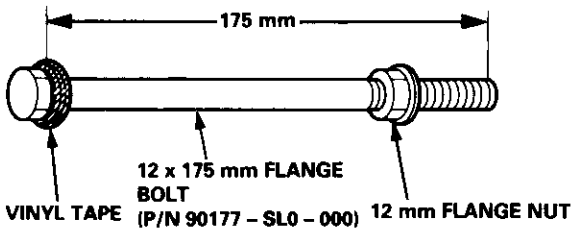
12. Drill a 3 mm (0.12 in) diameter hole approximately 2.5 – 3.0 mm (0.10 – 0.12 in) in depth in the staked point on the cylinder. Do not allow metal shavings to enter the cylinder housing. After removing the cylinder end, remove any burrs at the staked point.



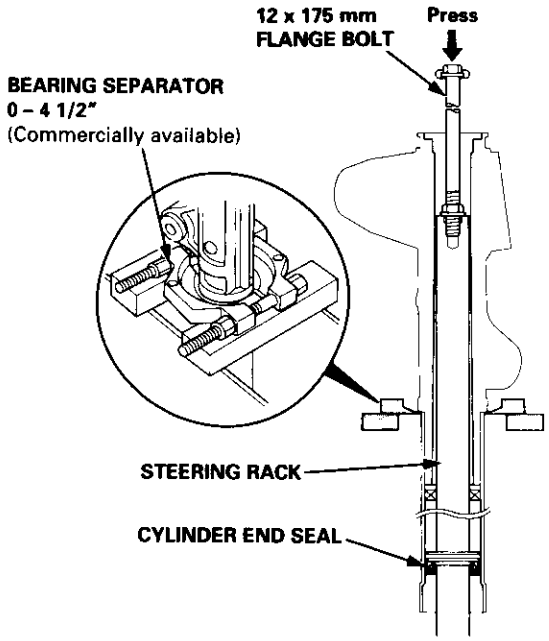
13. Hold the gearbox using using a C-clamp as shown. Loosen and remove the cylinder end.



14. Assemble a 12 x 1.25 mm flange nut onto a 12 x 175 mm grade 10 flange bolt as shown. Wrap the flange portion of the bolt with vinyl tape to protect the cylinder.



15. Install the flange bolt into the end of the steering rack until it bottoms in the hole, then back the flange bolt out 1/4 turn. Hold the flange bolt, and tighten the flange nut against the rack by hand.
16. Install the bearing separator on the gearbox housing as shown.

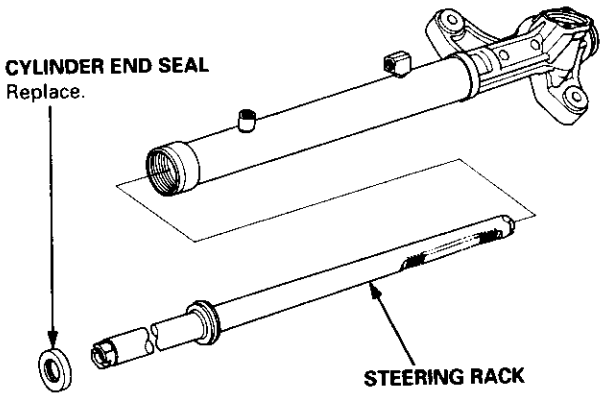


17. Set the gearbox in a press so the left side points upward, then press the cylinder end seal and steering rack out of the gearbox. Hold the steering rack to keep it from falling when pressed clear. Be careful not damage to inner surface of the cylinder housing with the flange bolt.

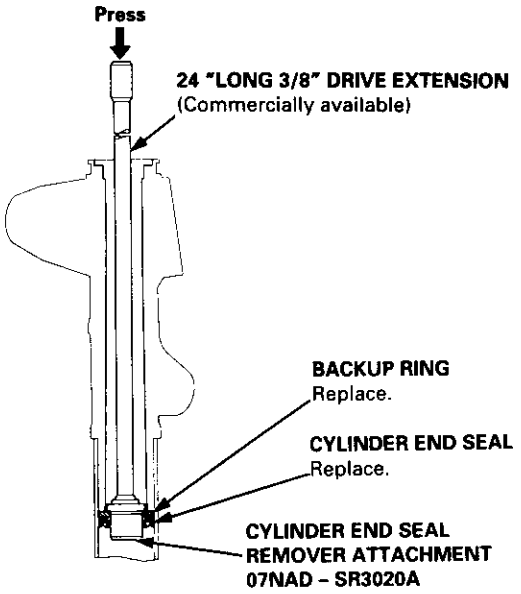
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18. Remove the 12 mm bolt and nut from the steering rack.

19. Remove the cylinder end seal from the steering rack.

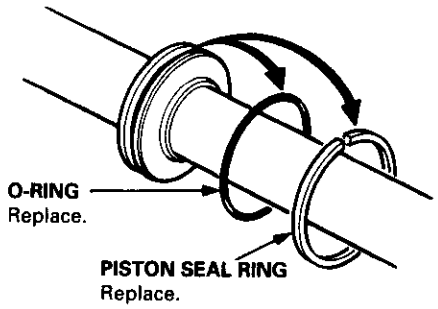


20. Insert a 24" long, 3/8" drive extension and the special tool into the cylinder from the left side. Make sure that the special tool is securely positioned on the backup ring edges. Be careful not damage to inner surface of the cylinder with the special tool.



21. Set the gearbox in a press, then press out the cylinder end seal and backup ring from the gearbox.
Note these items when pressing the cylinder end seal:
    - Keep the tool straight to avoid damaging the cylinder wall. Check the tool angle, and correct it if necessary, when removing the cylinder end seal.
    - Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the tool. It will break the backup ring, and the cylinder end seal will remain in the gearbox.

22. Carefully pry the piston seal ring and O-ring off the piston rack. Be careful not to damage the inside of seal ring groove and piston edges when removing the seal ring.



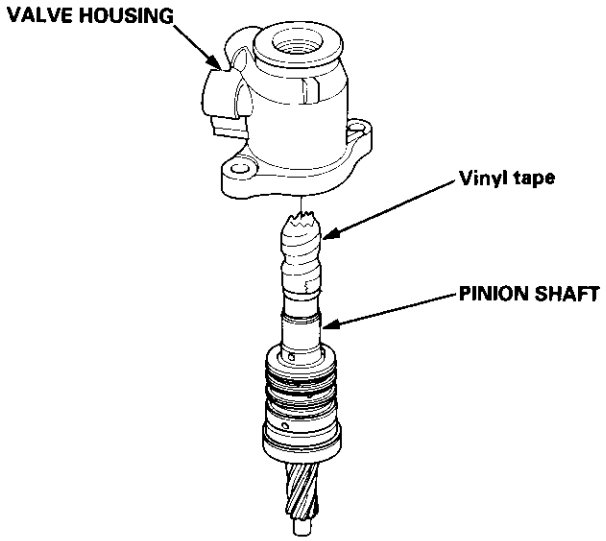
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Disassembly (cont'd)

Valve Body Unit Disassembly

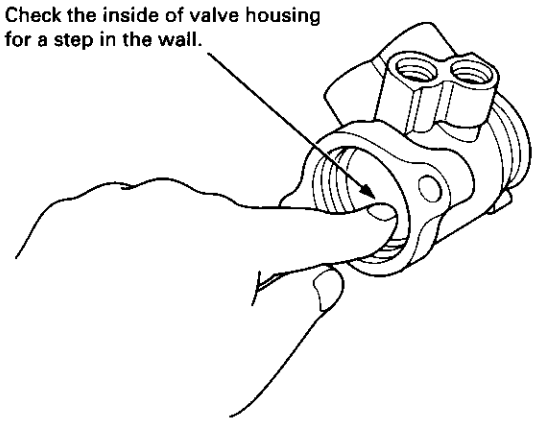
23. Before removing the valve housing, apply vinyl tape to splines of the pinion shaft.



24. Separate the valve housing from the pinion shaft/ valve using a press.

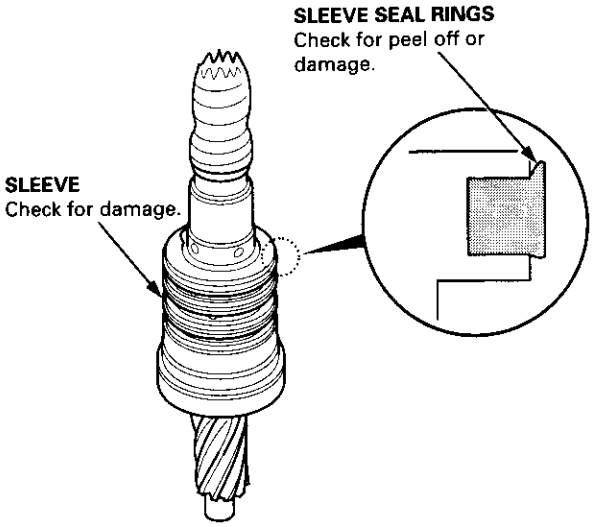
25. Check the inner wall of the valve housing where the seal ring slides with your finger. If there is a step in the wall, the valve housing is worn. Replace the valve housing.

    Note these items during inspection:
    - There may be the sliding marks from the seal ring on the wall of the valve housing. Replace the valve housing only if the wall is stepped.
    - When the valve housing is replaced, install new shim(s) on the bearing surface of the housing to adjust the thickness.

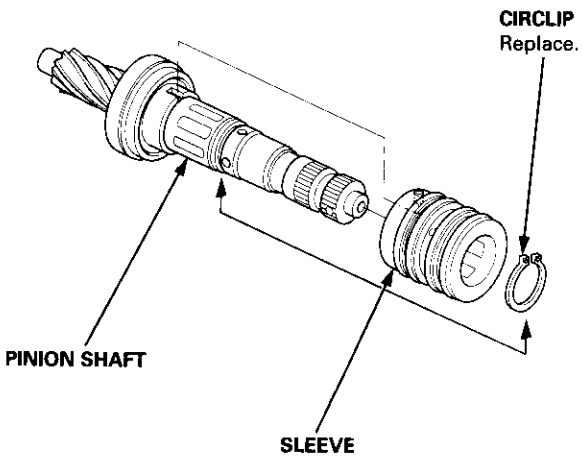


26. Check for wear, burrs and other damage to the edges of the grooves in the sleeve.

    NOTE: The pinion shaft and sleeve are a precision matched set. If either the pinion shaft or sleeve must be replaced, replace both parts as a set.

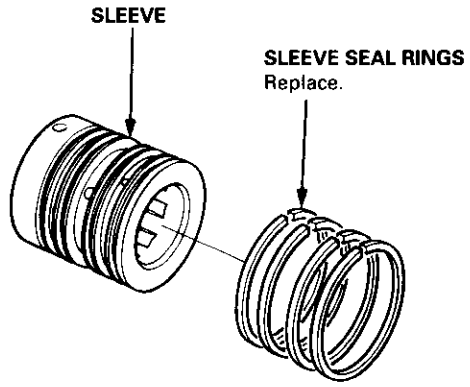


27. Remove the circlip and sleeve from the pinion shaft.

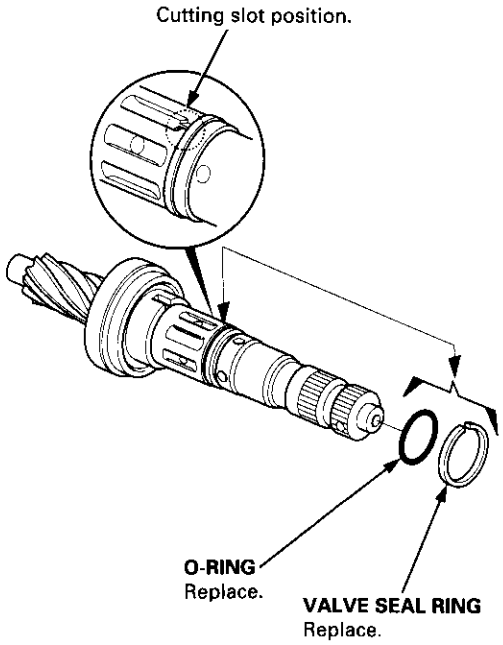


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28. Using a cutter or an equivalent tool, cut and remove the four seal rings from the sleeve. Be careful not to damage the edges of the sleeve grooves and outer surface when removing the seal rings.



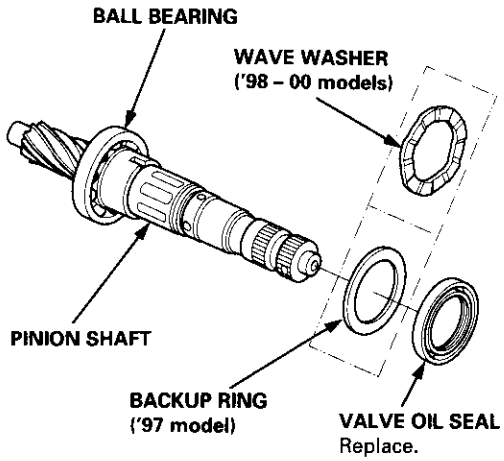
29. Using a cutter or an equivalent tool, cut the valve seal ring and O-ring at the groove in the pinion shaft. Remove the valve seal ring and O-ring. Be careful not to damage the edges of the pinion shaft groove and outer surface when removing the valve seal ring and O-ring.



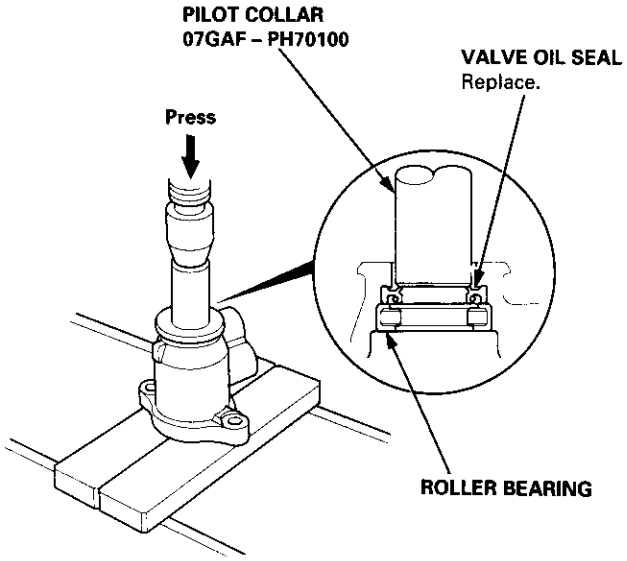
30. Remove the valve oil seal and backup ring ('97 model) or wave washer ('98 – 00 models) from the pinion shaft.

Note these items during disassembly:

- Inspect the ball bearing by rotating the outer race slowly. If there is any excessive play, replace the pinion shaft and sleeve as an assembly.
- The pinion shaft and sleeve are a precise fit; do not intermix old and new pinion shafts and sleeves.



31. Press the valve oil seal and roller bearing out of the valve housing using a hydraulic press and special tool shown below.



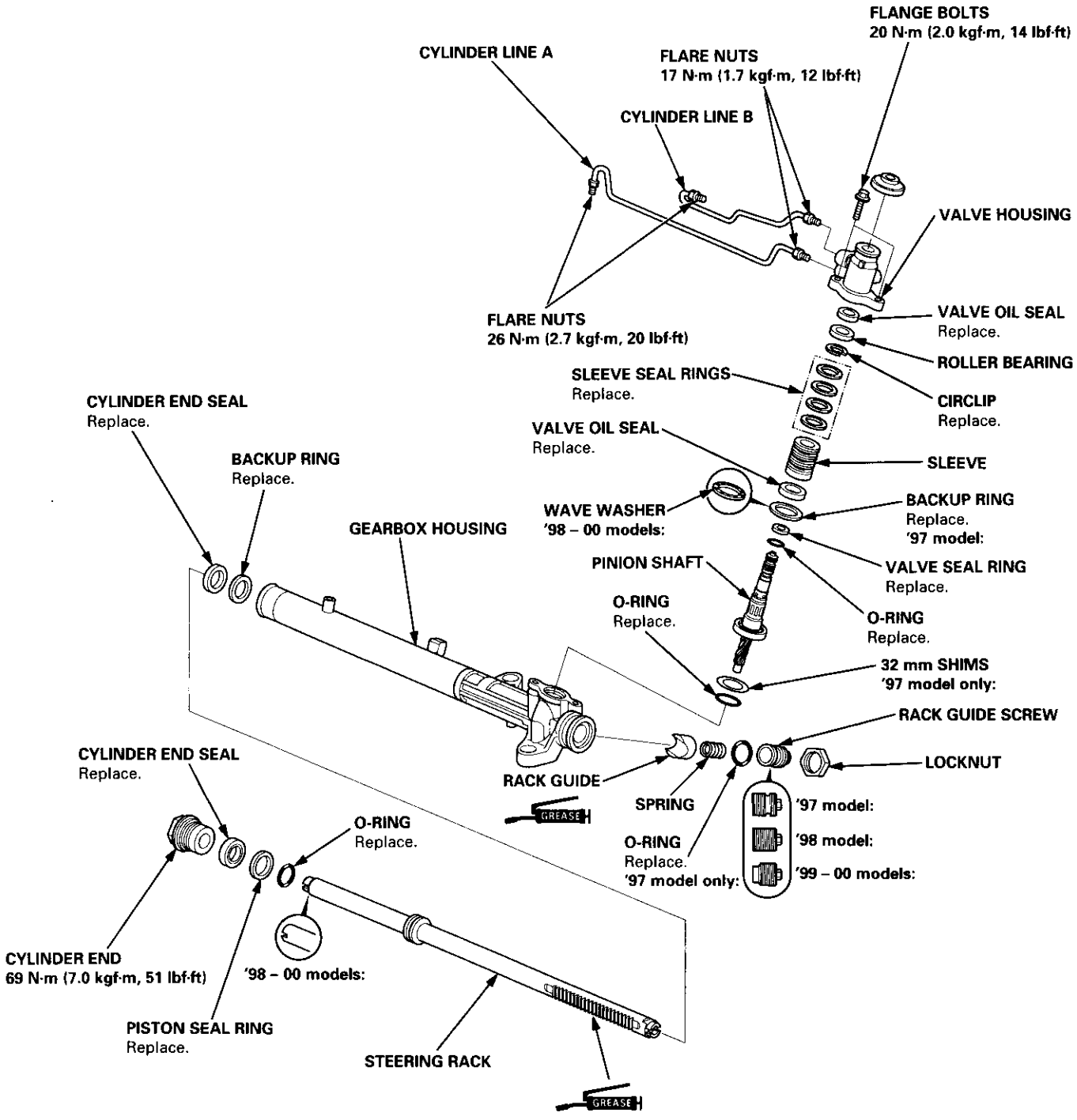
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Power Steering Gearbox

Reassembly

Note these items during reassembly:

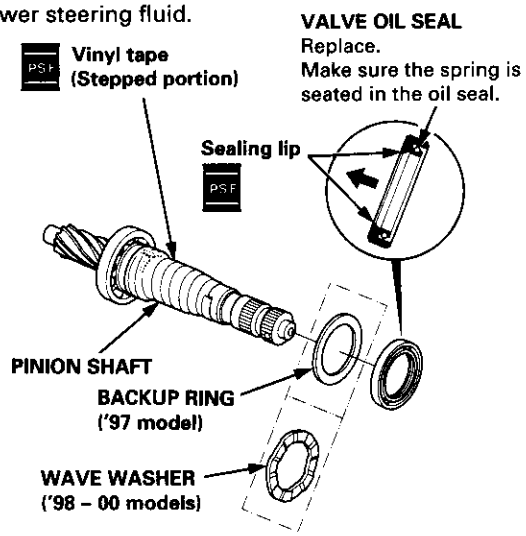
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply the recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Use the appropriate special tools where necessary.



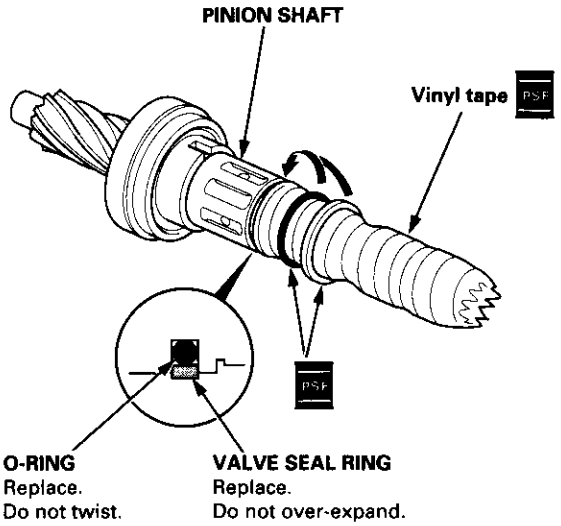
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Valve Body Unit Reassembly

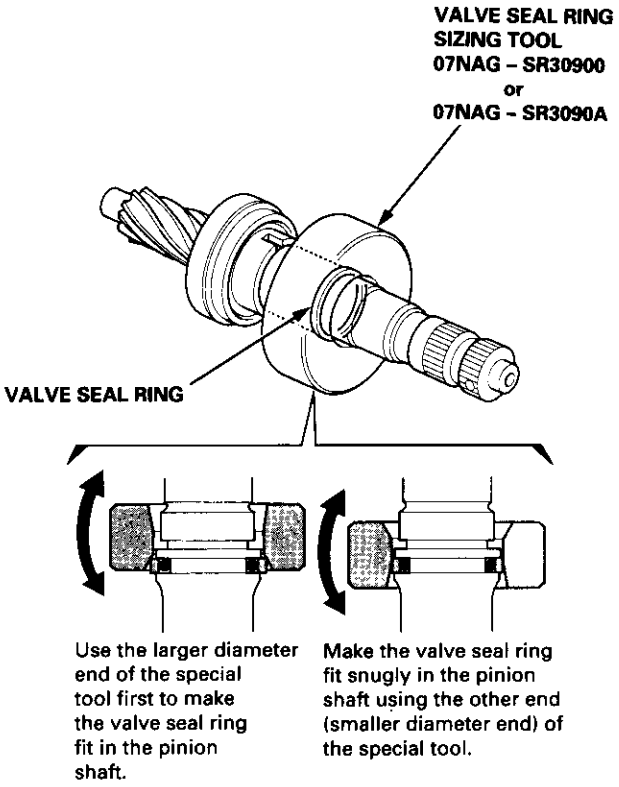
1. Apply vinyl tape to the stepped portion of the pinion shaft, and coat the surface of the vinyl tape with the power steering fluid.



2. Install the backup ring ('97 model) or wave washer ('98 – 00 models).
3. Coat the inside surface of the new valve oil seal with power steering fluid.
4. Install the valve oil seal with its grooved side facing opposite the bearing, then slide the valve oil seal over the pinion shaft, being careful not to damage the sealing lip.
5. Apply vinyl tape to the splines and stepped portion of the shaft, and coat the surface of the vinyl tape with the power steering fluid.



6. Fit the new O-ring in the groove of the pinion shaft. Then slide the new valve seal ring over the shaft and in the groove on the pinion shaft.
7. Remove the vinyl tape from the pinion shaft.
8. Apply power steering fluid to the surface of the valve seal ring that was installed on the pinion shaft.
9. Apply power steering fluid to the inside of the special tool. Set the larger diameter end of the special tool over the valve seal ring.



10. Move the special tool up and down several times to make the valve seal ring fit in the pinion shaft.
11. Remove the special tool.
12. Turn the special tool over, and set the smaller diameter end of the special tool over the valve seal ring. Move the special tool up and down several times to make the valve seal ring fit snugly in the pinion shaft.

(cont'd)

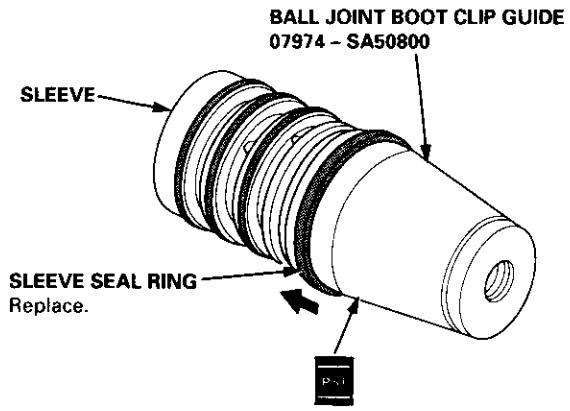
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Reassembly (cont'd)

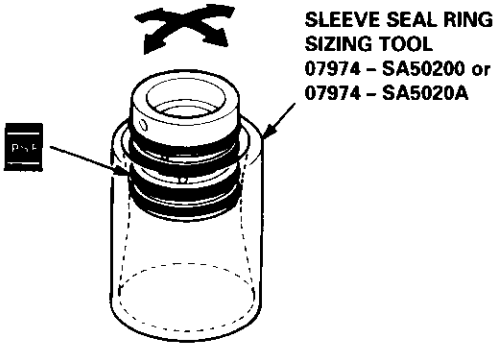
13. Apply power steering fluid to the surface of the special tool. Set the new seal rings over the special tool from the smaller diameter end of the tool, and expand the seal rings. Install two rings at a time from each end of the sleeve.

    Note these items when installing the seal ring:
    - Do not over-expand the seal ring. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal rings using the special tool (sizing tool).
    - There are two types of sleeve seal rings: black and brown. Do not mix the different types of sleeve seal rings as they are not compatible.

14. Align the special tool with each groove in the sleeve, and slide a sleeve seal ring into each groove. After installation, compress the seal rings with your fingers temporarily.



15. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the special tool.

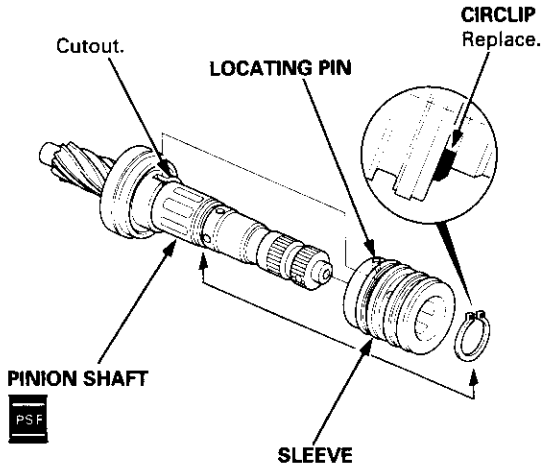


16. Insert the sleeve into the special tool slowly.

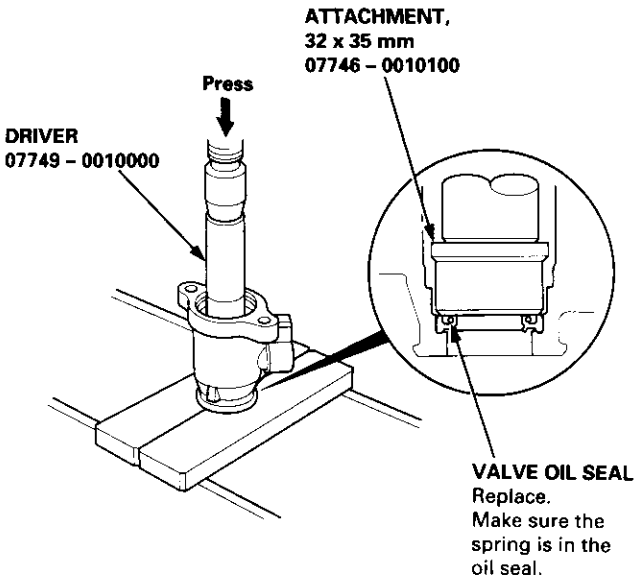
17. Move the sleeve each direction several times to make the seal rings snugly fit in the sleeve. Be sure that the seal rings are not turned up.

18. Apply power steering fluid to the surface of the pinion shaft. Assemble the sleeve over the pinion shaft by aligning the locating pin on the inside of the sleeve with the cutout in the shaft. Then install the new circlip securely in the pinion shaft groove.

    Note these items during reassembly:
    - Be careful not to damage the valve seal ring when inserting the sleeve.
    - Install the circlip with its radiused side facing out.

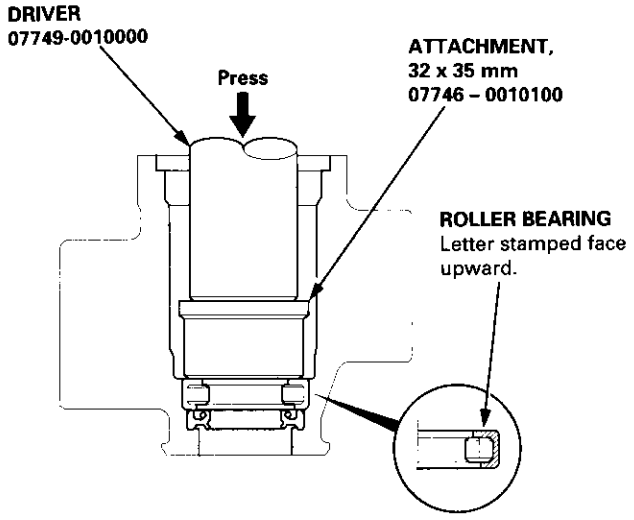


19. Apply power steering fluid to the seal ring lip of the valve oil seal, then install the seal in the valve housing using a hydraulic press and special tools. Install the valve oil seal with its grooved side facing the tool.

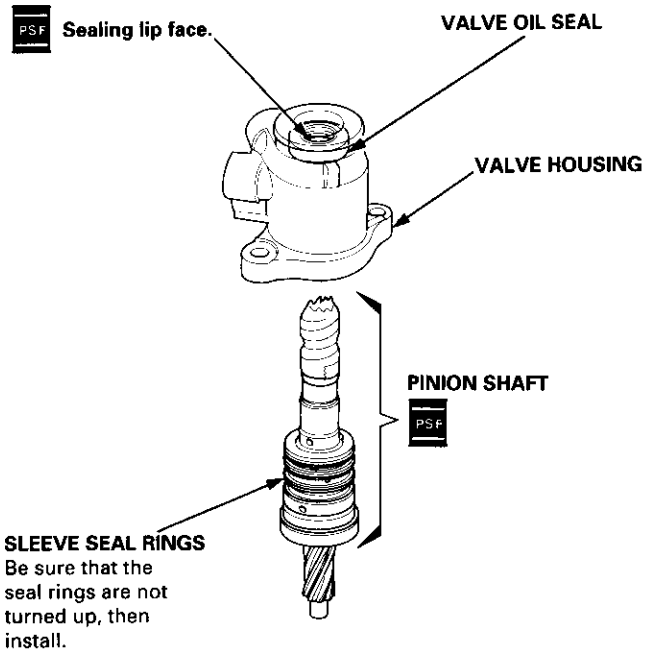


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20. Press the new bearing into the valve housing with the stamped letter facing up using a hydraulic press and special tool.



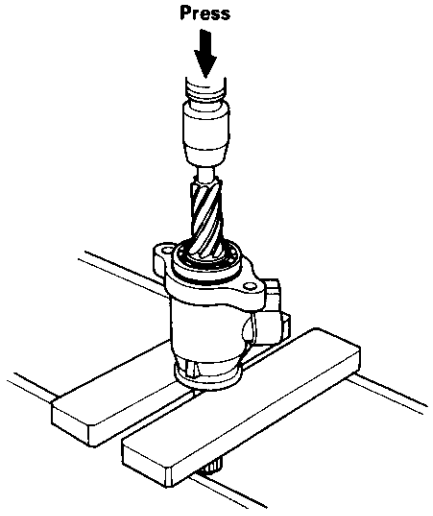
21. Apply vinyl tape to the pinion shaft, then coat the vinyl tape with power steering fluid.



22. Insert the pinion shaft into the valve housing. Be careful not to damage the valve seal rings.

23. Remove the vinyl tape from the pinion shaft, then remove any residue from the tape adhesive.

24. Press the pinion shaft/sleeve using a hydraulic press. Check that the pinion shaft/sleeve turns smoothly by turning the pinion shaft.



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Reassembly (cont'd)

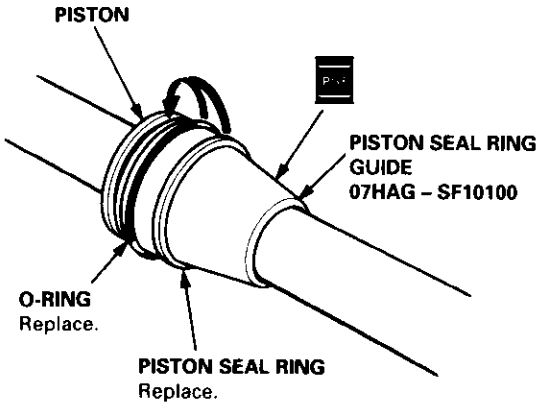
Steering Rack Reassembly

25. Coat the piston seal ring guide with power steering fluid, then slide it onto the rack, big end first.

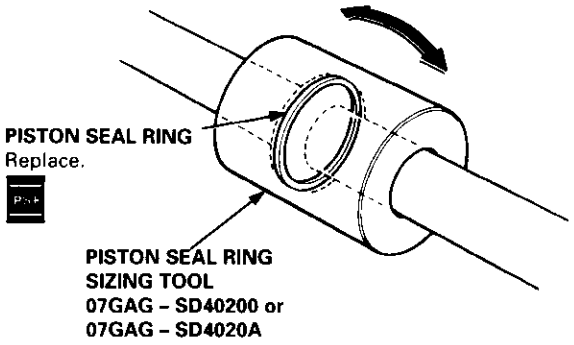
26. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

    Note these items during reassembly:
    - Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
    - Replace the piston's O-ring and seal ring as a set.

27. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.



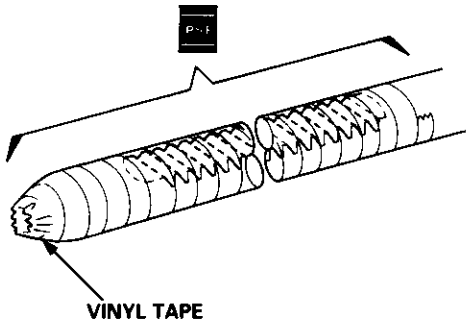
28. Coat the piston seal ring and the inside of the special tool with power steering fluid.



29. Carefully slide the tool onto the rack and over the piston seal ring.

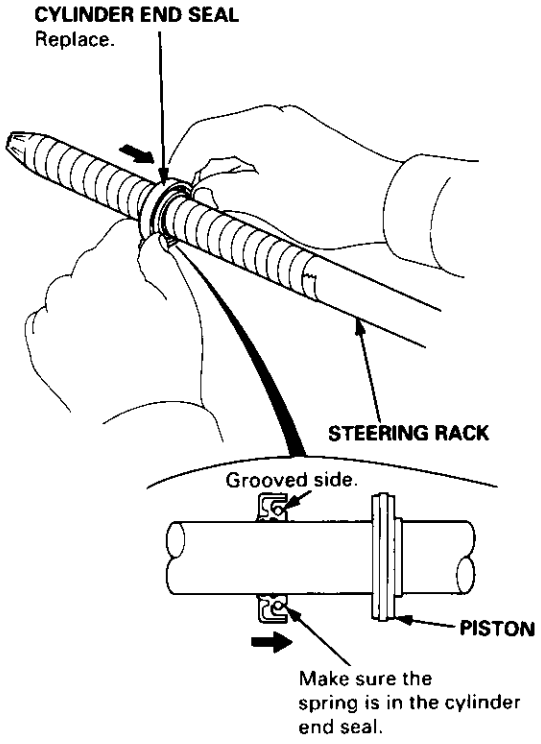
30. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.

31. Wrap vinyl tape around the rack teeth and rack end edges, then coat the surface of the tape with the power steering fluid. Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



32. Coat the inside surface of the new cylinder end seal with power steering fluid.

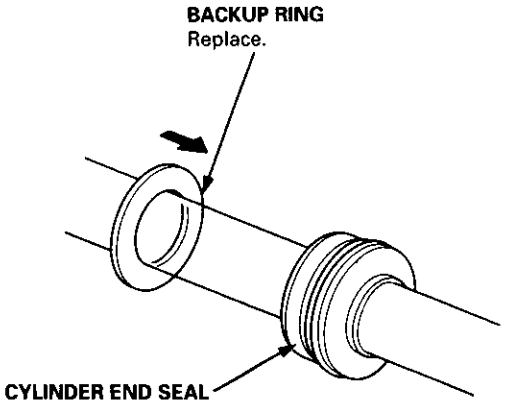
33. Install the cylinder end seal onto the steering rack with its grooved side toward the piston. When installing the cylinder end seal, be careful not damage the sealing lip face of the seal with the edges or teeth of the steering rack.



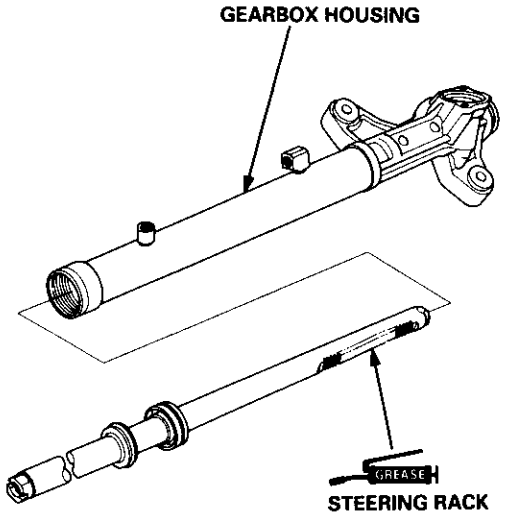
34. Remove the vinyl tape from the steering rack, then remove any residue from the tape adhesive.

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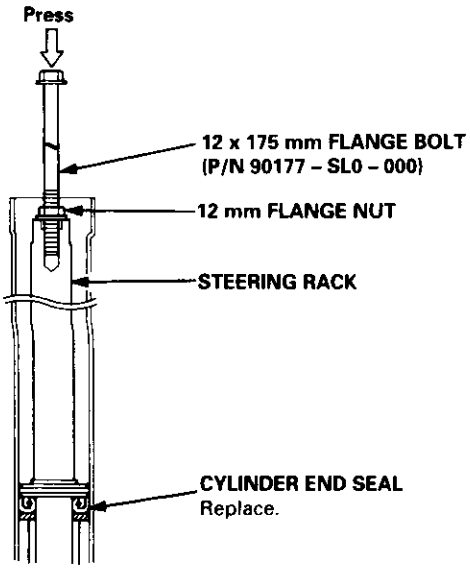
35. Install the new backup ring on the steering rack, then place the cylinder end seal against the piston.



36. Grease the steering rack teeth, then insert the steering rack into the gearbox housing. Be careful not to damage to inner surface of the cylinder wall with the rack edges.



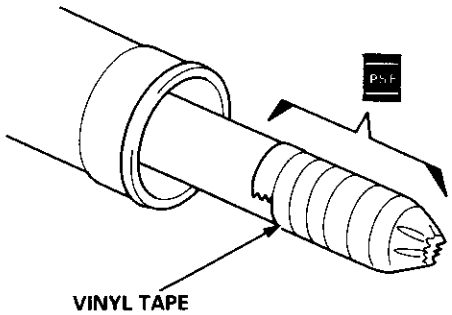
37. Install the flange bolt into the end of the steering rack until it bottoms in the hole, then back the flange bolt out 1/4 turn. Hold the flange bolt and tighten the flange nut against the rack by hand.



38. Install the cylinder end seal into the bottom of the cylinder by pressing on the bolt with a press. Do not push on the bolt with excessive force as it may damage the cylinder end seal.

39. Remove the flange bolt, and center the steering rack.

40. Wrap vinyl tape around the rack end edges, and coat the surface of the tape with the power steering fluid. Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.

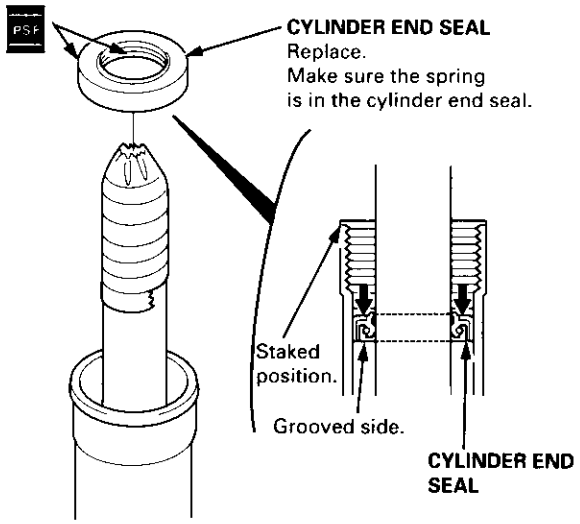


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Reassembly (cont'd)

41. Coat the inside surface of the new cylinder end seal with power steering fluid.

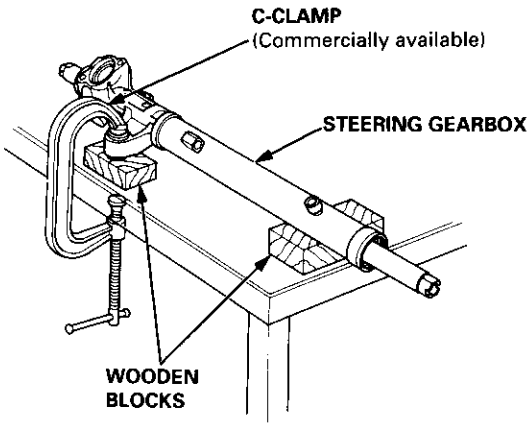


42. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

43. Push in the cylinder end seal with your finger. When installing the cylinder end seal, be careful not damage the sealing face of the seal with the threads and burrs at the staked position of the cylinder housing.

44. Remove the vinyl tape from the steering rack, then remove any residue from the tape adhesive.

45. Hold the gearbox using a C-clamp as shown.

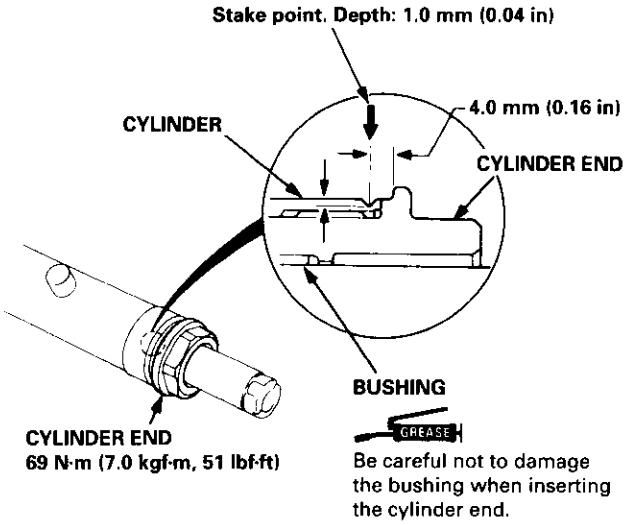


46. Grease the inside surface of the cylinder end, then install the cylinder end by screwing it into the cylinder.

47. Remove the C-clamp from the gearbox.

48. After tightening the cylinder end, stake the point of the cylinder shown below. Stake the cylinder in the position opposite from where the stake was removed during disassembly.

    NOTE: For '98 – 00 models, go to step 54.



49. Select the 32 mm shim(s) ('97 model only).

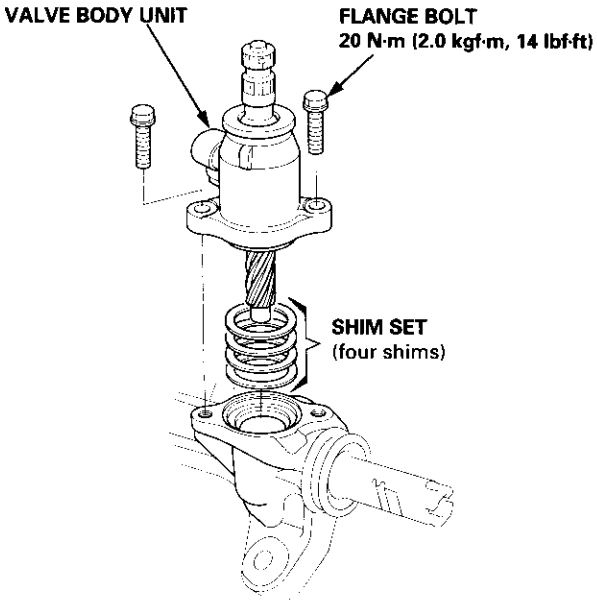
    NOTE: Only reinstall the original 32 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones.
    If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:
Set the four 32 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm.
Shim set: four 32 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

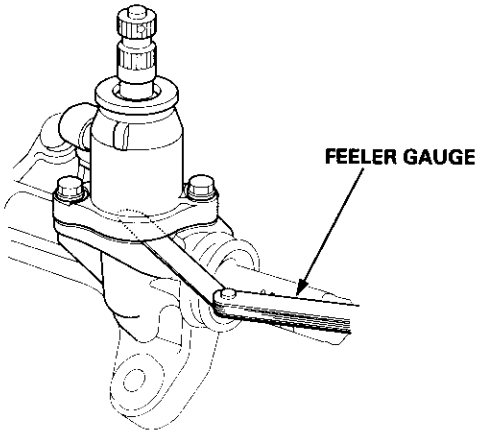
NOTE: The four 32 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification.

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50. Install the valve body unit on the gearbox, and tighten the flange bolts to the specified torque.



51. Measure the clearance between the gearbox and valve body unit using a feeler gauge. Measure the clearance at the point midway between the two mounting bolts.



52. Determine the required thickness of the 32 mm shims by subtracting the clearance obtained in the step "c" from the total thickness of the four shims.
(Total thickness of the 4 shims) – (Clearance) = Required thickness of the shims

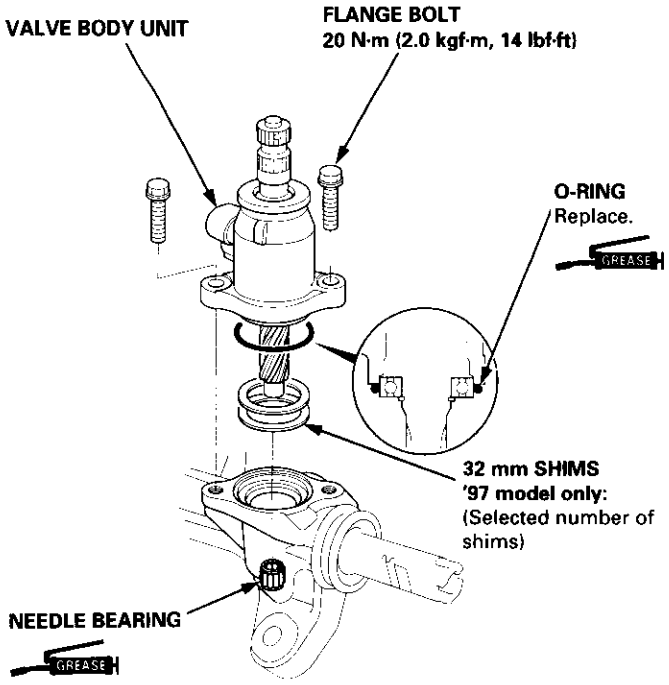
Select the shims so that the total thickness is close to, but less than, the required thickness.

Example:
Measurement is 0.28 mm (0.011 in):
0.70 – 0.28 = 0.42 mm (0.028 – 0.011 = 0.017 in)

The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

53. Set the selected 32 mm shims on the bearing surface of the gearbox housing.



54. Coat the new O-ring with grease, and carefully fit it on the valve housing.

55. Apply grease to the needle bearing in the gearbox housing.

56. Install the valve body unit on the gearbox housing by engaging the gears. Note the valve body unit installation position (direction of line connection).

57. Tighten the flange bolts to the specified torque.

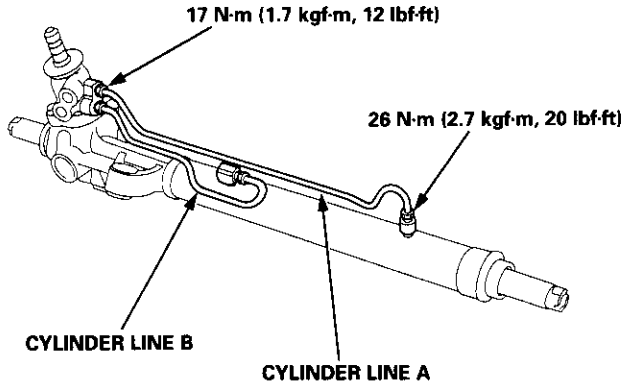
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Reassembly (cont'd)

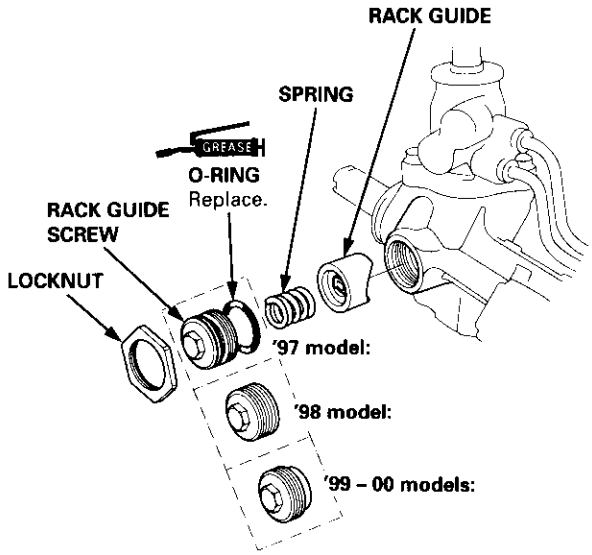
58. Install the cylinder lines A and B.

    Note these items during reassembly:
    - Clean the joints of the cylinder lines A and B thoroughly. The joints must be free of foreign material.
    - Install the cylinder lines A and B by tightening the flare nuts by hand first, then tighten the flare nuts to the specified torque.



59. Grease the sliding surface of the rack guide, and install it onto the gear housing.

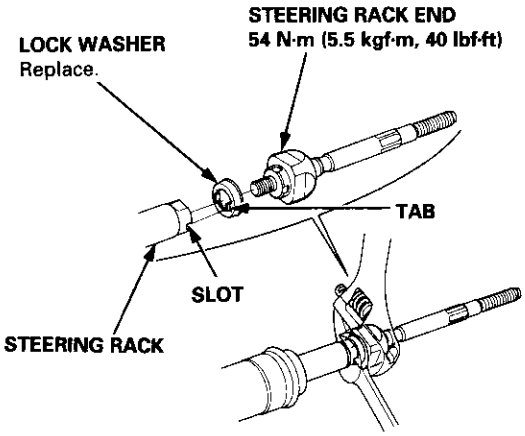
60. For '97 model, apply a thin coat of grease to the new O-ring, and install it on the rack guide screw.
    For '98 – 00 models, remove the old sealant from the threads of the rack guide screw, then apply new sealant to the first three threads.



61. Install the spring, rack guide screw and locknut on the gear housing.

62. Adjust the rack guide screw (see page 17-15). After adjusting, check that the rack moves smoothly by sliding the rack right and left.

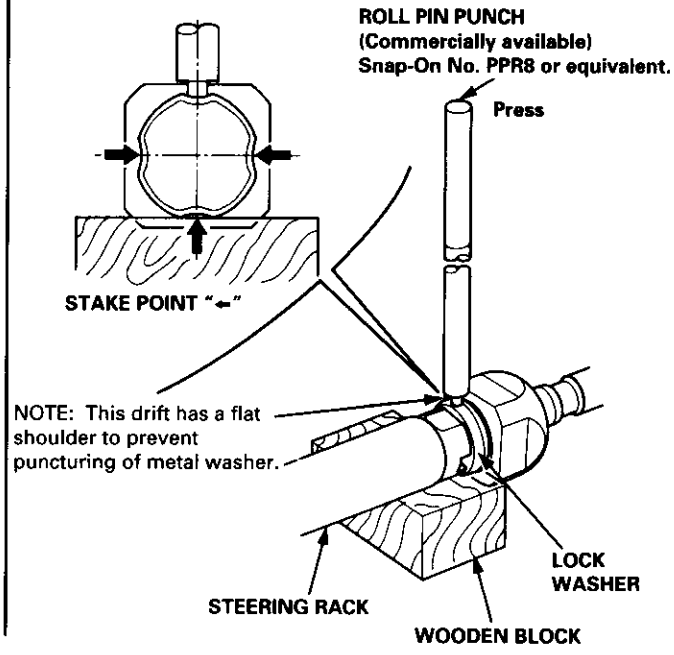
63. Install the new lockwasher in the groove in the steering rack.



64. Screw the rack ends into the rack.

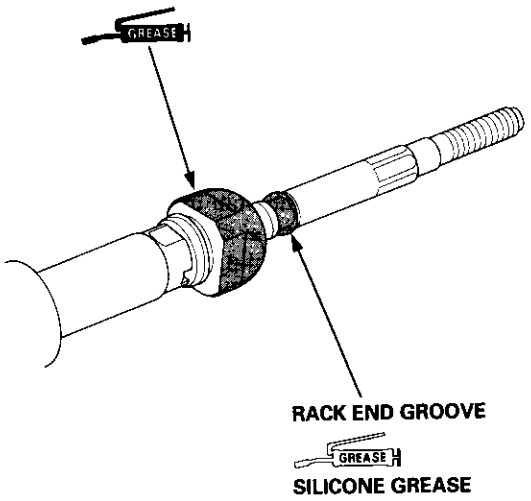
65. Hold the steering rack with a wrench ('98 – 00 models: left end only), and tighten the rack ends. Be careful not to damage the rack surface with the wrench.

66. After tightening the rack ends, stake the four sections of lock washer with a drift and a mallet.
    - Place the wood block on the press table, then set the lock washer section of the rack end on the wood block securely.
    - Be sure the tool is aligned with the flat sections of the steering rack end before pressing.
    - Stake the lock washer in the center of the flat section of the steering rack end.



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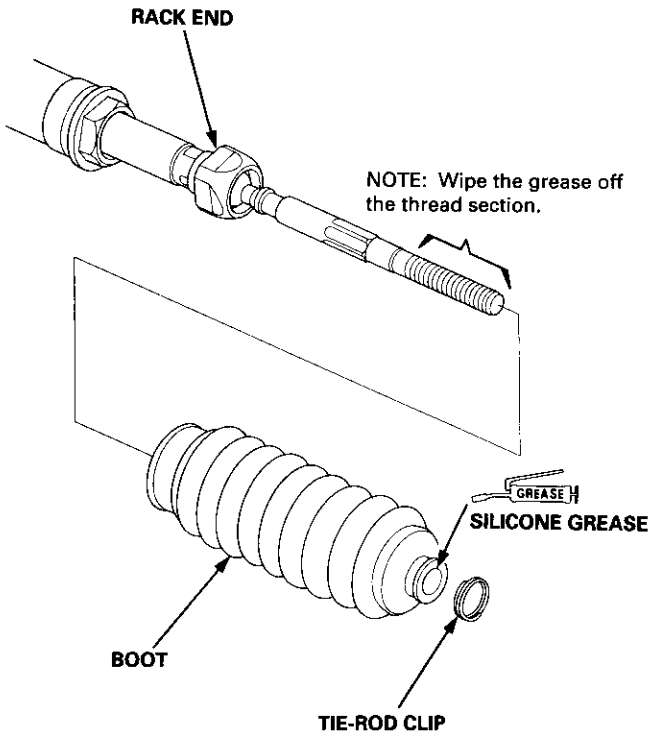
67. Apply grease to the circumference of the rack end housing.



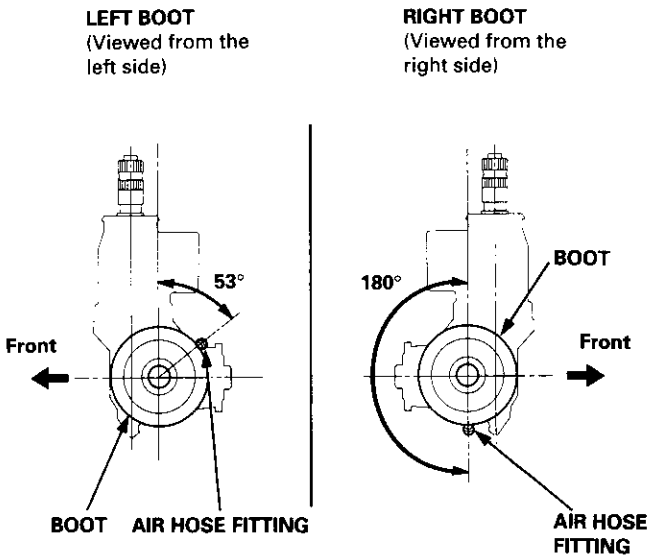
68. Apply a light coat of silicone grease to the boot grooves on the rack ends.

69. Install the boots in the rack end with the tie-rod clips.

NOTE: Install the boots with the rack in the straight ahead position (right and left tie-rods are equal in length).

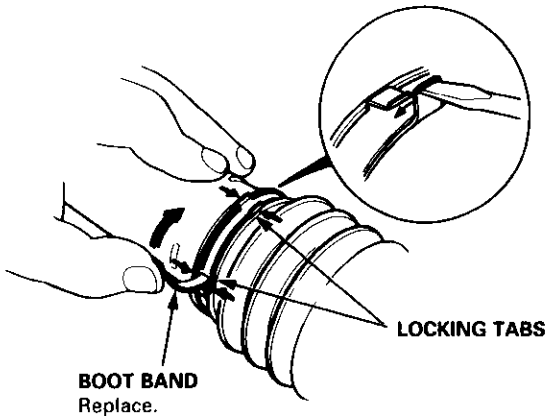


70. Adjust the air hose fitting position of the boots by turning it as shown below.



71. Install new boot bands on the boot, and bend both sets of locking tabs.

CAUTION: Stake the band locking tabs firmly.



72. Lightly tap on the doubled-over portions to reduce their height.

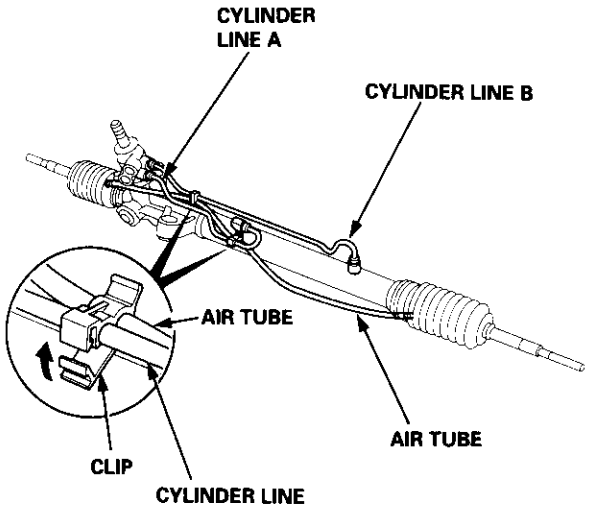
73. Slide the rack right and left to be certain that the boots are not deformed or twisted.

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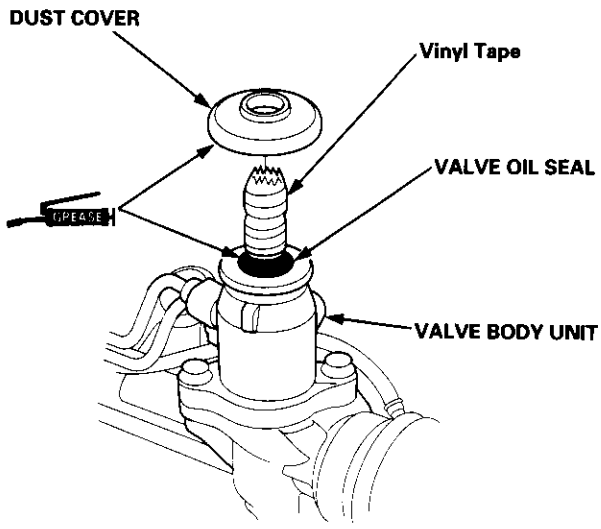
Reassembly (cont'd)

74. Connect the air tube between the right and left boot.



75. Install the clips on the cylinder lines, then clamp the air tube with the clips.

76. Apply vinyl tape to around the pinion shaft, and coat the surface of the tape with grease.



77. Pack the interior of the dust cover and lip with grease, then install dust cover on the valve body unit.

78. Remove the vinyl tape from the pinion shaft.

Ball Joint Boot Replacement

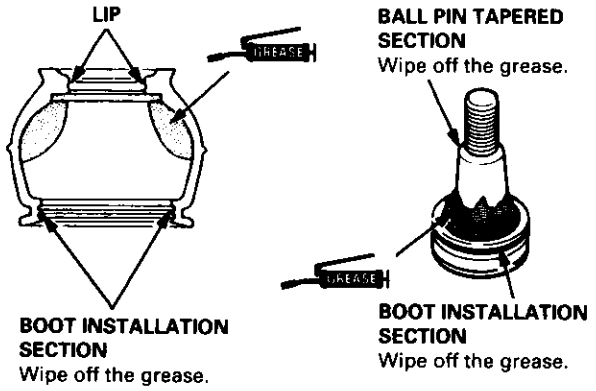
1. Remove the boot set ring and the boot.

   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.

3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

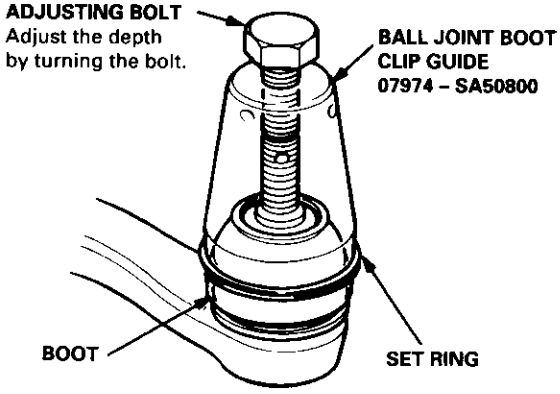
   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the boot in the groove of the boot installation section securely, then bleed air.

5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

   CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.



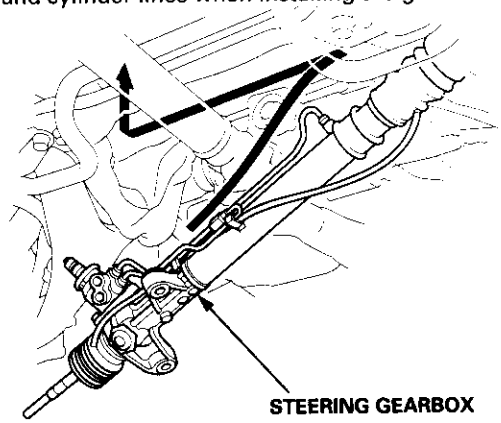
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Installation

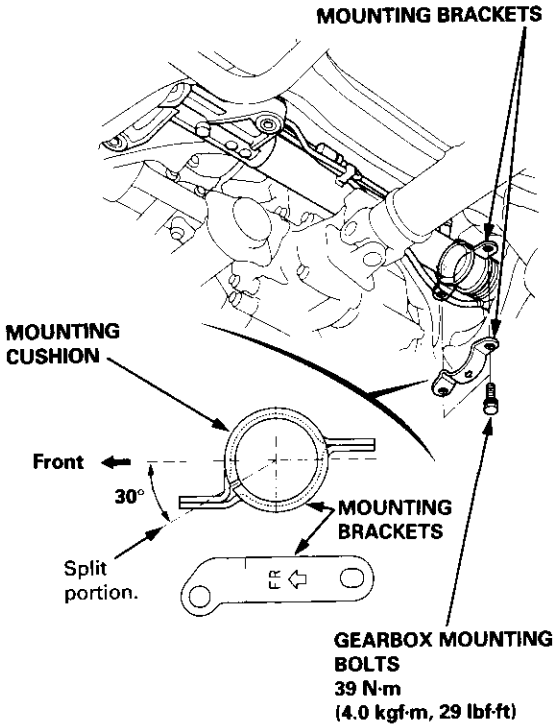
1. Before installing the gearbox, extend the rack all the way to right.

2. Install the mounting cushion on the steering gearbox.

3. Pass the right side of the steering gearbox above and through the right side of the rear beam. Be careful not to bend or damage the two power steering lines and cylinder lines when installing the gearbox.

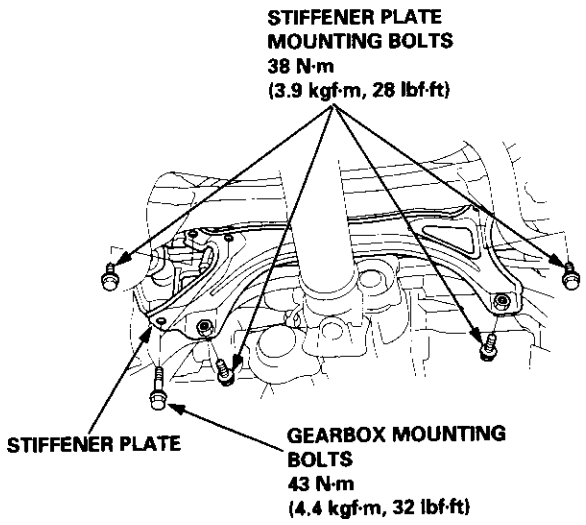


4. Install the mounting bracket over the mounting cushion, then install the two gearbox mounting bolts. Position the split portion of the mounting cushion as shown.



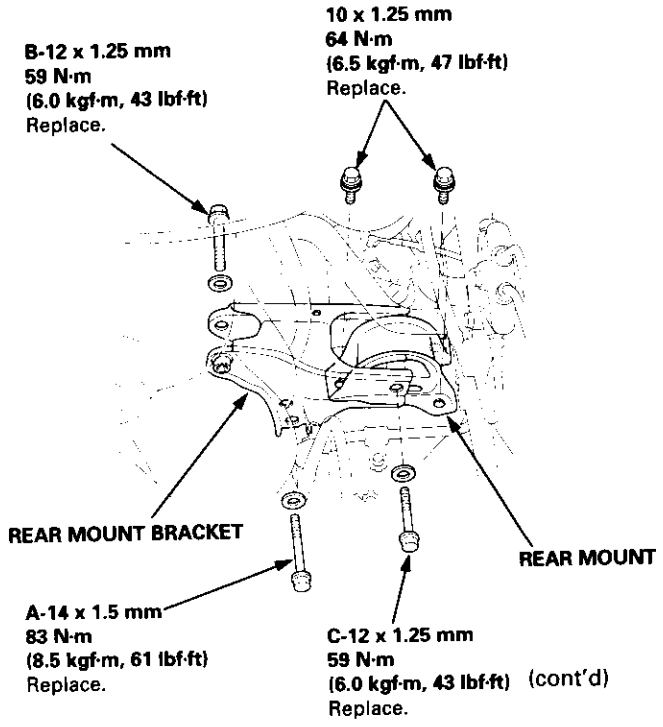
5. Install the stiffener plate with the two gearbox mounting bolts and stiffener plate attaching bolts. Be sure the air tube is not caught or pinched by stiffener plate. Install the bolts loosely first, then tighten them securely.

NOTE: With 2WD continue to step 11.



6. With 4WD, lower the jack, and return the engine to the original position.

7. Install the rear mount and rear mount bracket. Tighten the mounting bolts in order: A, B and C.

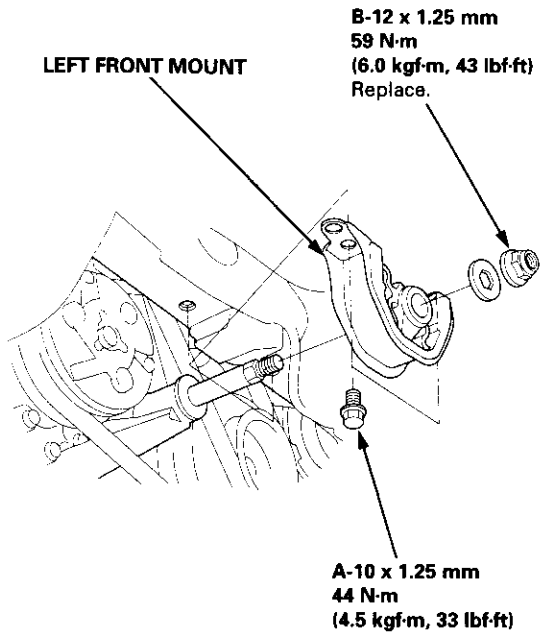


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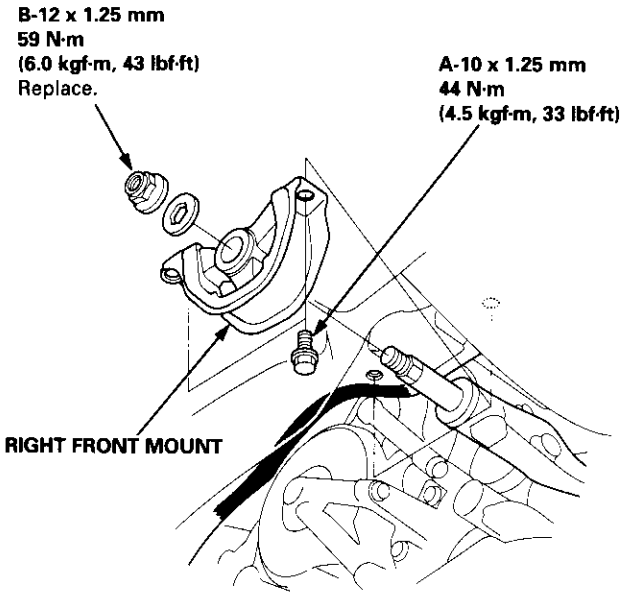
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Installation (cont'd)

8. Install the left front mount. Tighten the mounting bolts in order: A and B.

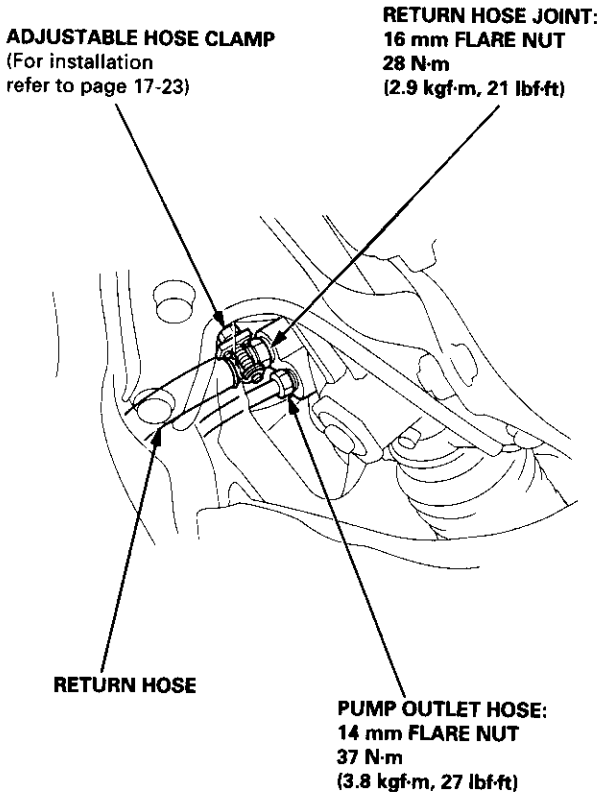


9. Install the right front mount. Tighten the mounting bolts in order: A and B.



10. Remove the vinyl type from the side frame (both sides).

11. Install the return hose joint by tightening the 16 mm flare nut.



12. Connect the return hose securely, and tighten the adjustable hose clamp.

13. Connect the pump outlet hose, and tighten the 14 mm flare nut.

NOTE: Make sure that there is no interference between the fluid lines, the rear beam or any other parts.

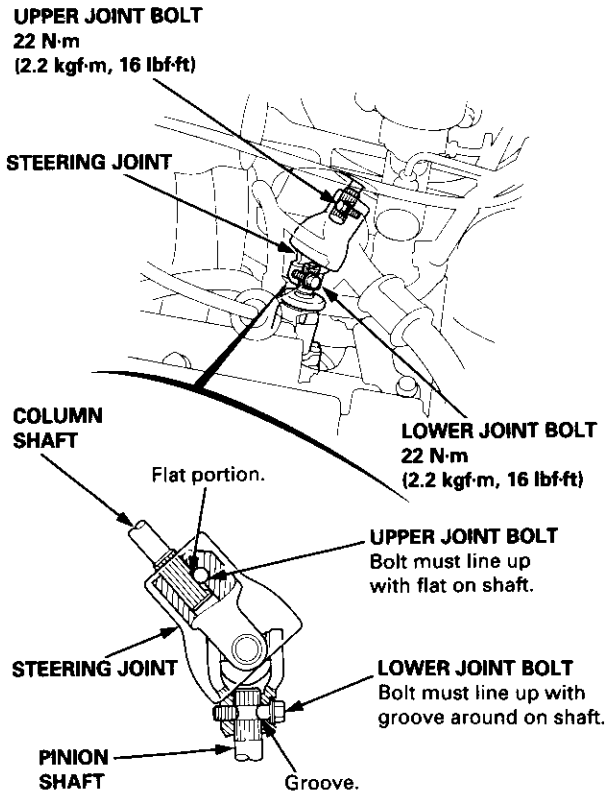
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14. Center the steering rack within its stroke.

15. Install the steering joint, and reconnect the steering shaft and pinion shaft.

    NOTE: Make sure the steering joint is connected as follows.

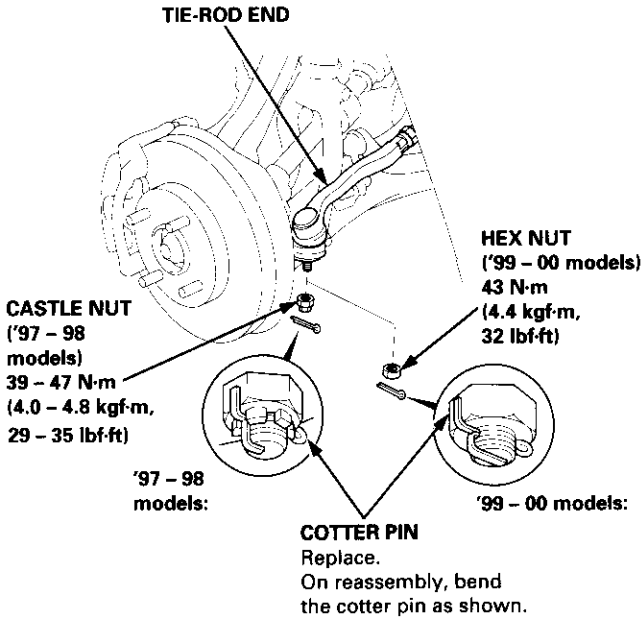
    a. Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat on the shaft).



    b. Slip the lower end of the steering joint onto the pinion shaft.
    c. Install the lower joint bolt (line up the bolt hole with the groove around the shaft). Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
    d. Pull on the steering joint to make sure that the steering joint is fully seated.
    e. Install the upper joint bolt.

16. Reinstall the steering wheel (see page 17-19).

17. Wipe off any grease contamination from the ball joint tapered section and threads then reconnect the tie-rod ends to the steering knuckles. For '97 – 98 models; torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening. Install new cotter pins.



18. With 4WD, connect the propeller shaft and transfer assembly (see section 16).

19. Connect the shift linkage to the transmission (M/T: see section 13, A/T: see section 14).

20. Install the TWC (see section 9).

21. Install the front wheels.

22. Fill the system with power steering fluid, and bleed air from the system (see page 17-15).

23. After installation, perform the following checks.
    - Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid. Check the gearbox for leaks (see page 17-23).
    - Adjust the front toe (see section 18).
    - Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods equally, if necessary.

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Suspension

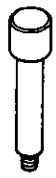
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Special Tools

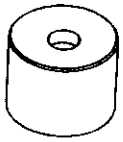
Ref. No.	Tool Number	Description	Qty	Page Reference
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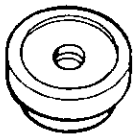
①, ⑨



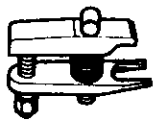
②, ⑭



③



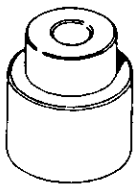
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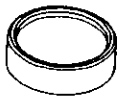
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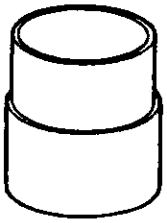
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⑪



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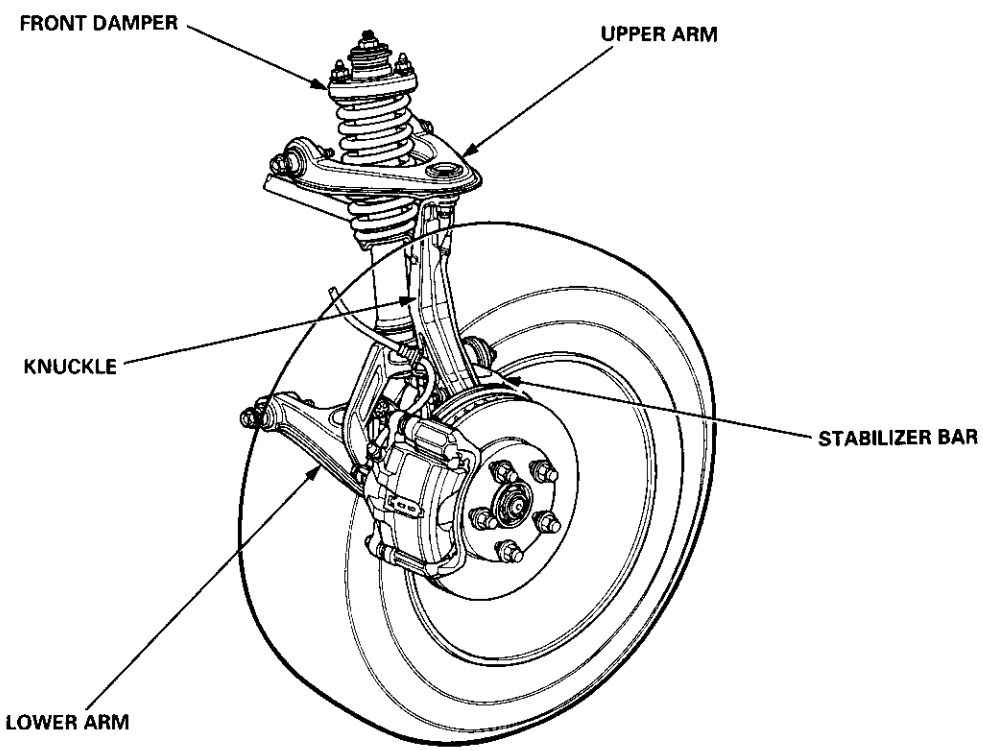
⑬

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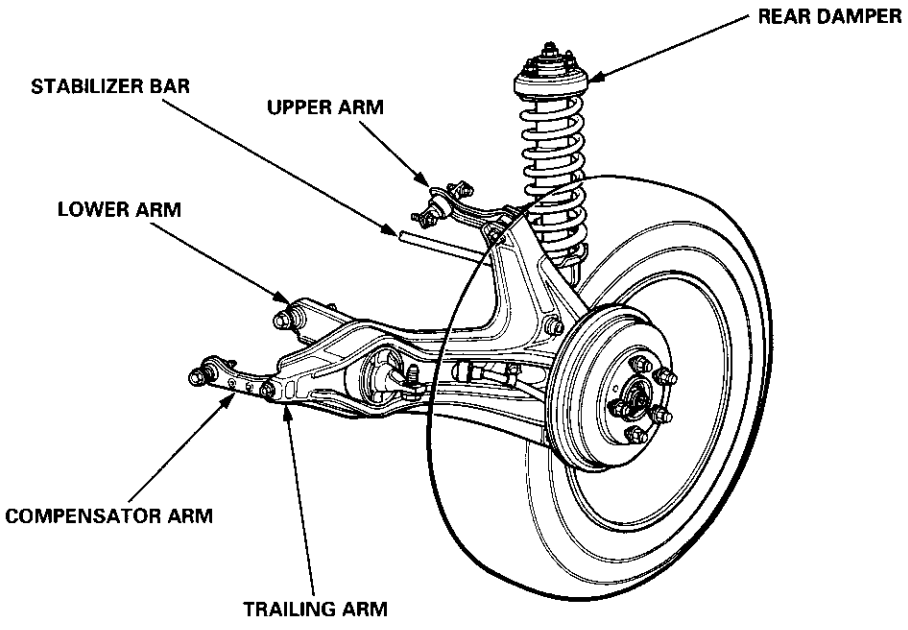
Component Locations

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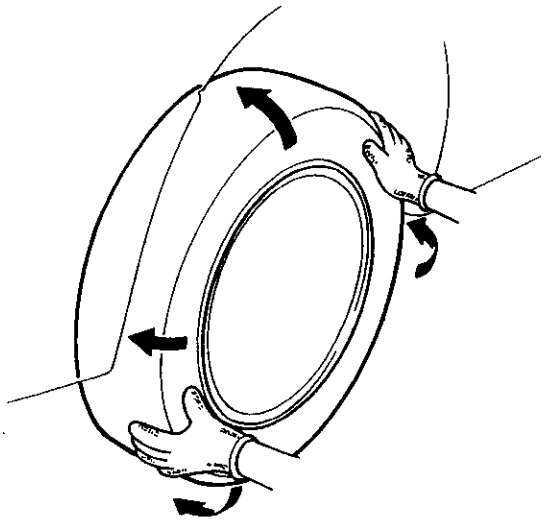
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Wheel Alignment

Caster

For proper inspection/adjustment of the wheel alignment, check and adjust these items before checking the alignment:

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold a wheel with your hands, and move it up and down and right and left to check for wobbling.)



Inspection

Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.

1. Check the caster angle.

   Caster angle: 2°10′ ± 1°

2. If out of specification, check for bent or damaged suspension components.

Camber

Inspection

Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.

1. Check the camber angle.

   Camber angle:
   Front: 0°00′ ± 1°
   Rear: – 1° ± 1°

2. If out of specification, check for bent or damaged suspension components.

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Front Toe Inspection/Adjustment

Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.

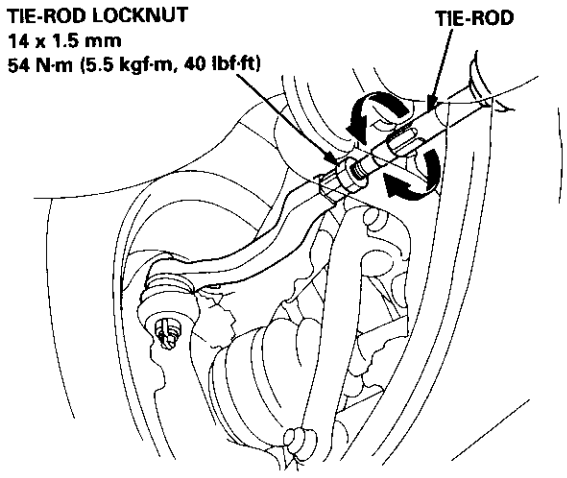
1. Check the tire pressure.
2. Center the steering wheel spokes.
3. Check the toe with the wheels pointed straight ahead.

   Front toe-in: 0 ± 3 mm (0 ± 1/8 in)

   — If adjustment is required, go on to step 4.

   — If no adjustment is required, remove alignment equipment.

4. Loosen the tie-rod locknuts, and turn both tie-rods in the same direction until the front wheels are pointing straight ahead.



5. Turn both tie-rods equally until the toe reading on the wheel alignment computer is correct.
6. After adjusting, tighten the tie-rod locknuts and reposition the tie-rod boots if they are twisted or displaced.

Rear Toe Inspection/Adjustment

Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.

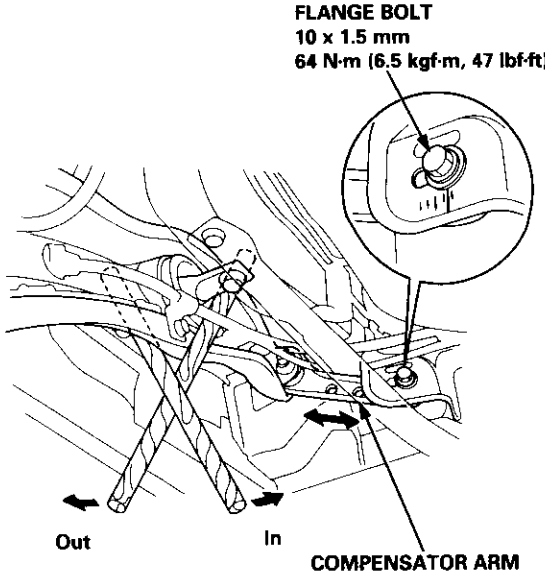
1. Release parking brake to avoid an incorrect measurement.
2. Check the toe.

   Rear toe-in: 2^{+2}_{-1} mm (IN 1/16 ± 1/16 in)

   — If adjustment is required, go to step 2.

   — If no adjustment is required, remove alignment equipment.

3. Before adjustment, note the locations of adjusting bolts on the right and left compensator arms.
4. Loosen the adjusting bolts, and slide the compensator arm in or out, as shown, to adjust the toe.



Example: After the rear toe inspection, the wheel is 2 mm (0.08 in) out of the specification.

— Move the arm so the adjusting bolt moves 2 mm (0.08 in) inward from the position recorded before the adjustment.

— The distance the adjusting bolt is moved should be equal to the amount out-of-specification.

5. Tighten the adjusting bolts.

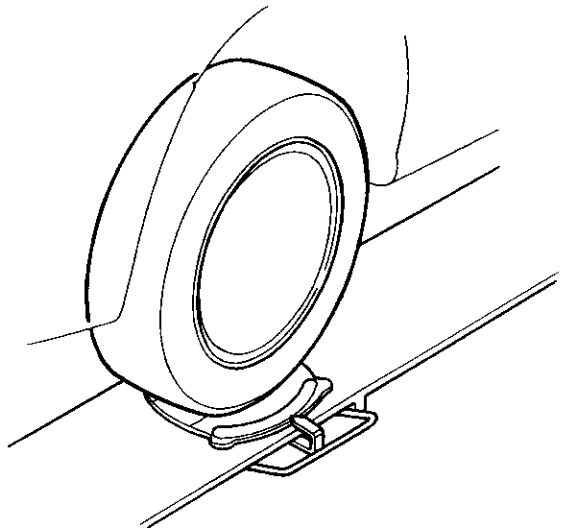
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Turning Angle Inspection

Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and turning angle). Follow the equipment manufacturer's instructions.

1. Turn the wheel right and left while applying the brake, and measure the turning angle of both wheels.

   Turning angle:
   Inward wheel: 37°00'
   Outward wheel (reference): 31°30'



2. If the turning angle is not within the specifications, check for bent or damaged suspension components.

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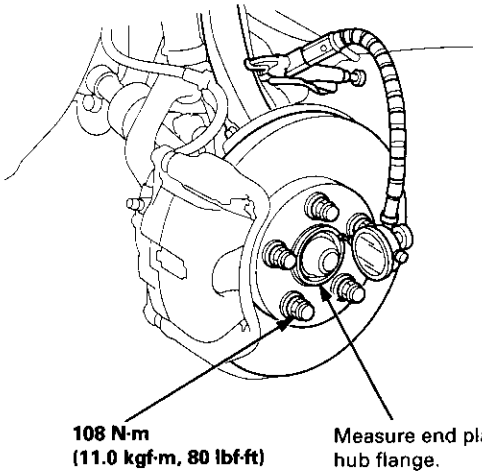
Wheel/Hub Inspection

Bearing End Play

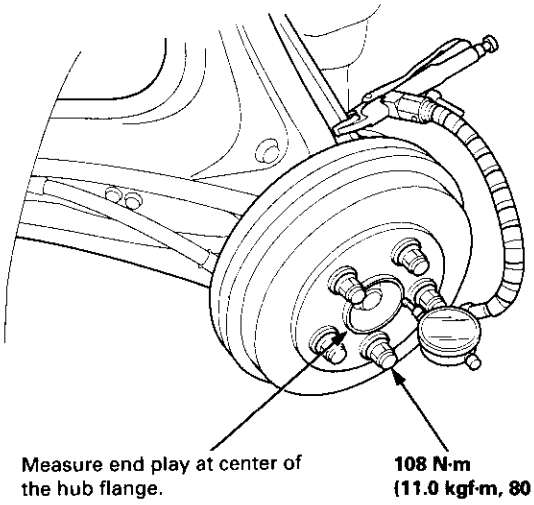
1. Raise the vehicle off the ground, and make sure it is securely supported.
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc or drum inward or outward.

Front/Rear:
Standard: 0 – 0.05 mm (0 – 0.002 in)

Front:



Rear:

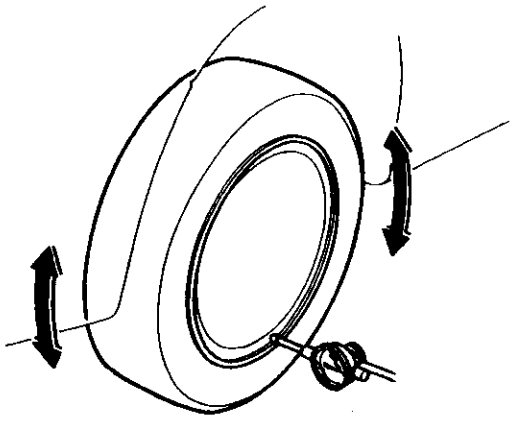


5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

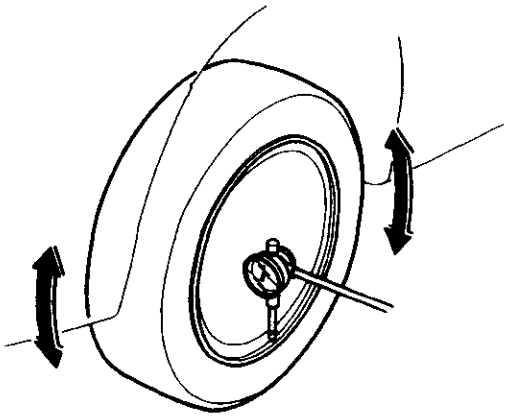
Wheel Runout

1. Raise the vehicle off the ground, and make sure it is securely supported.
2. Check for bent or deformed wheels.
3. Attach the dial gauge as shown.
4. Measure the wheel runout by turning the wheel.

Front and Rear Wheel Axial Runout:
Standard:
Steel Wheel: 0 – 1.0 mm (0 – 0.04 in)
Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)
Service Limit: 2.0 mm (0.08 in)



Front and Rear Wheel Radial Runout:
Standard:
Steel Wheel: 0 – 1.0 mm (0 – 0.04 in)
Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)
Service Limit: 1.5 mm (0.06 in)



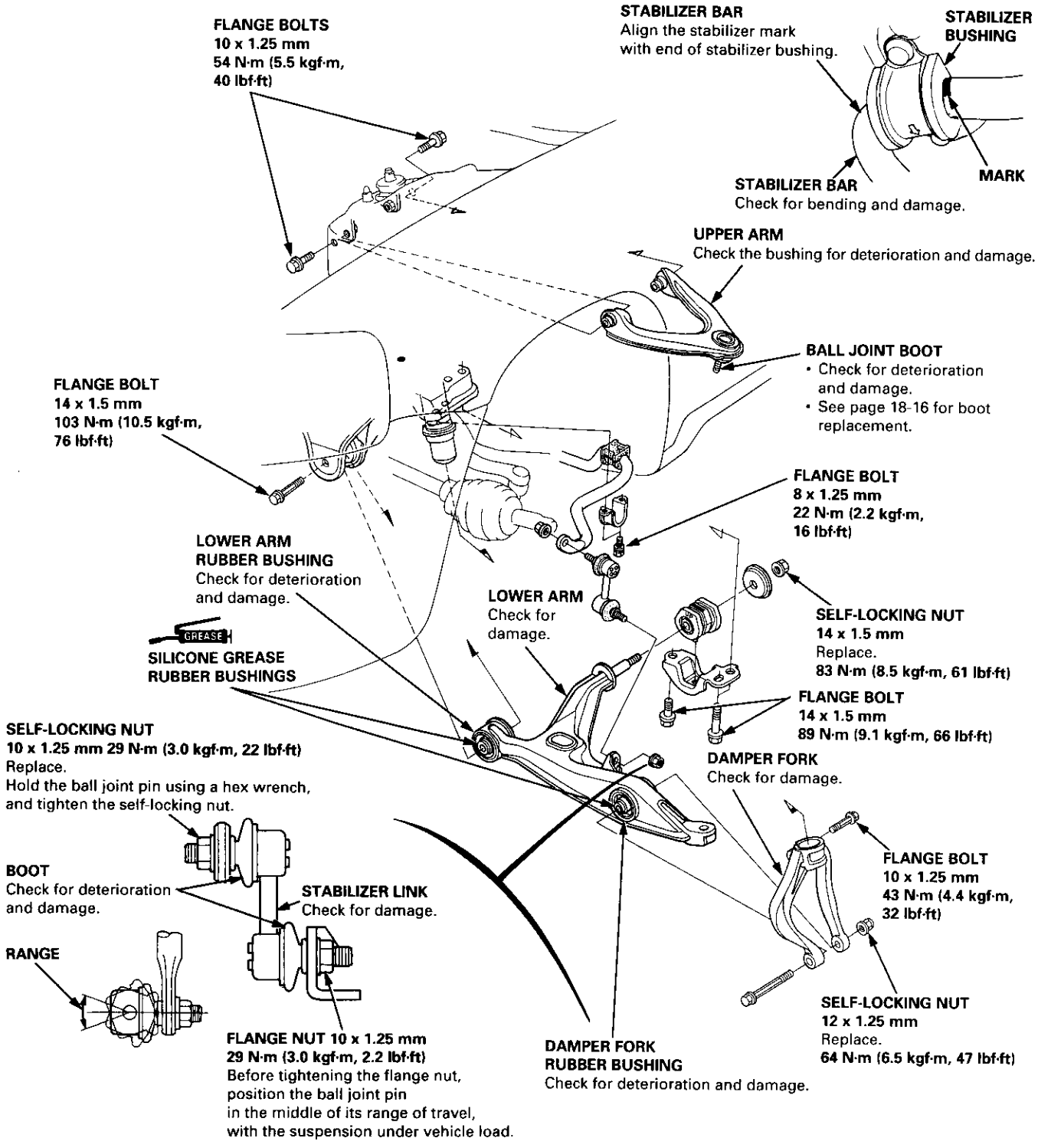
5. If the wheel runout is more than the service limit, replace the wheel.

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Suspension Arms Replacement

Note these items during replacement:

- Replace the self-locking nuts after removal.
- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.
- Before tightening the upper and lower mounting nuts on the stabilizer link, adjust the location of the link with the suspension under vehicle load.
- After installing the suspension arm, check the front wheel alignment, and adjust if necessary (see page 18-4).

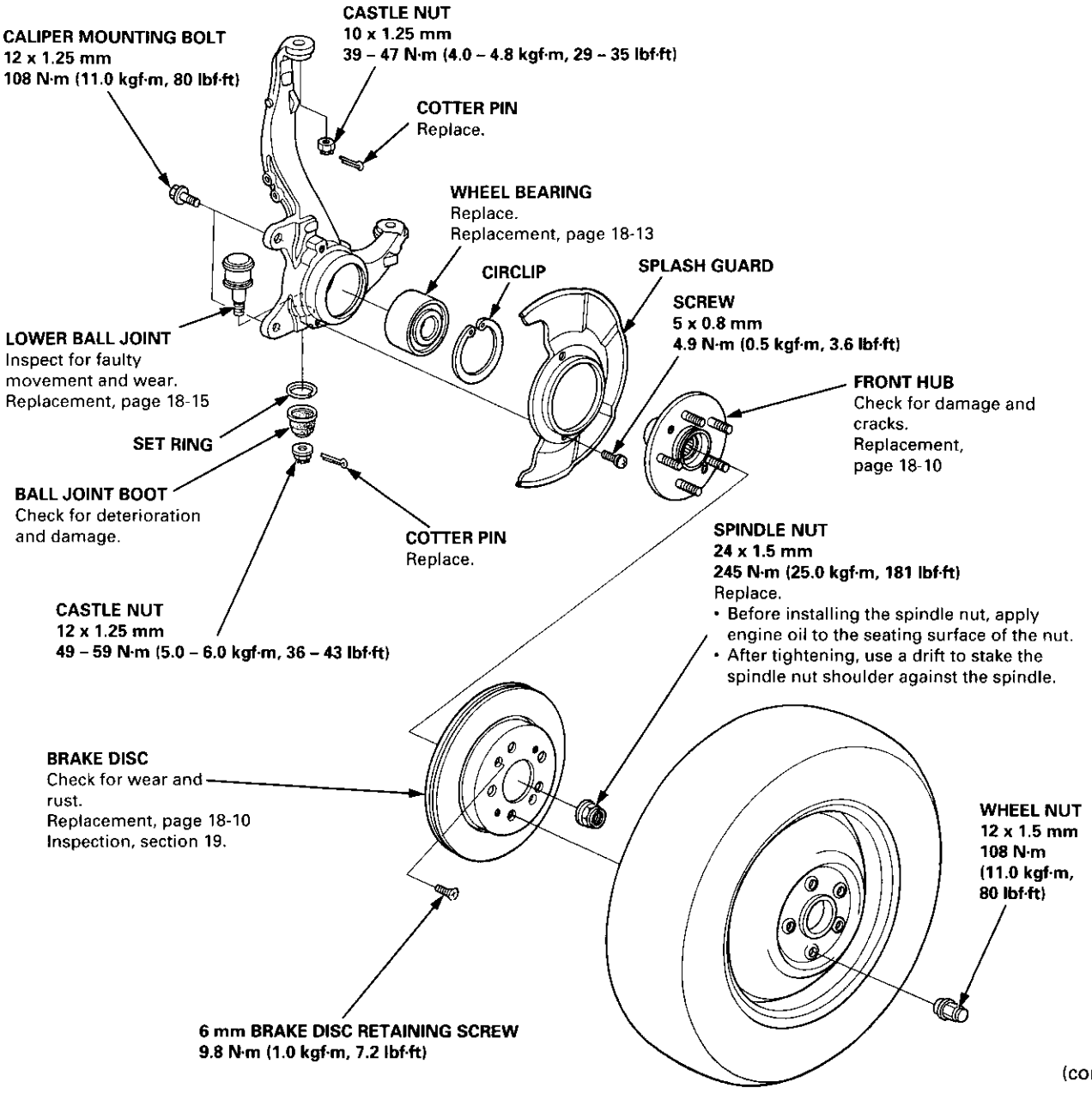


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Knuckle/Hub Replacement

Note these items during replacement:

- Replace the self-locking nuts after removal.
- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.
- Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slots with each pin hole. Do not align the nuts by loosening.
- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.
- Wipe off the grease before tightening the nuts at the ball joints.

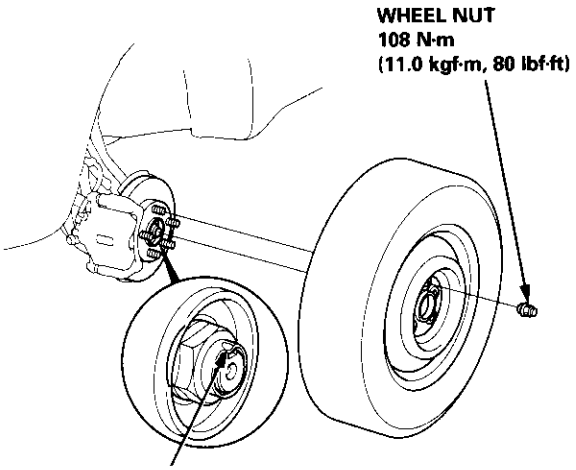


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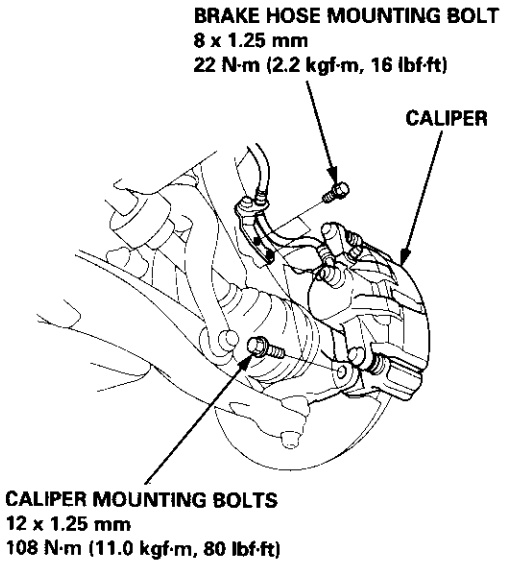
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Knuckle/Hub Replacement (cont'd)

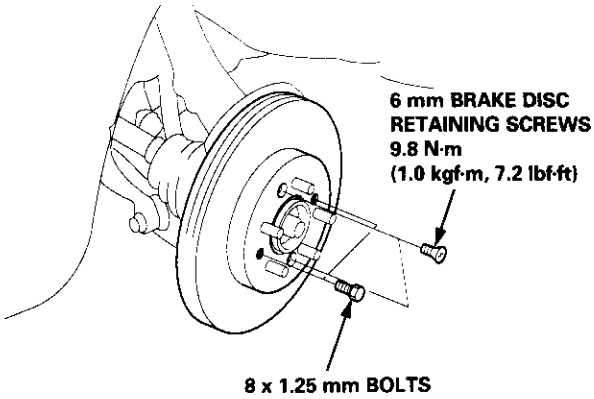
1. Loosen the wheel nuts slightly.
2. Raise the front of the vehicle, and make sure it is securely supported.
3. Remove the wheel nuts and wheel.



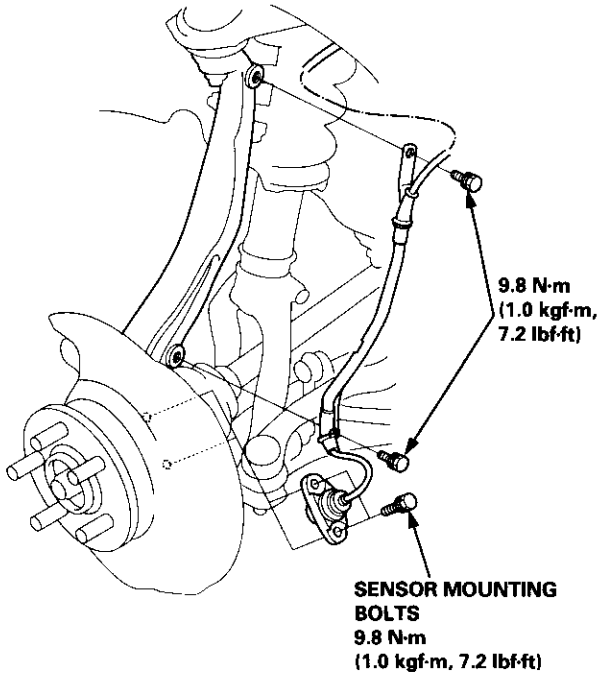
4. Raise the locking tab on the spindle nut, then remove the nut.
5. Remove the brake hose mounting bolts.



6. Remove the caliper mounting bolts, and hang the caliper assembly to one side. To prevent damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper from the undercarriage.
7. Remove the 6 mm brake disc retaining screws.



8. Screw two 8 x 1.25 mm bolts into the disc to push it away from the hub. Turn each bolt two turns at a time to prevent cocking the disc excessively.
9. Remove the brake disc from the knuckle.
10. Check the front hub for damage and cracks.
11. Remove the wheel sensor from the knuckle (for vehicles with ABS). Do not disconnect the wheel sensor connector.

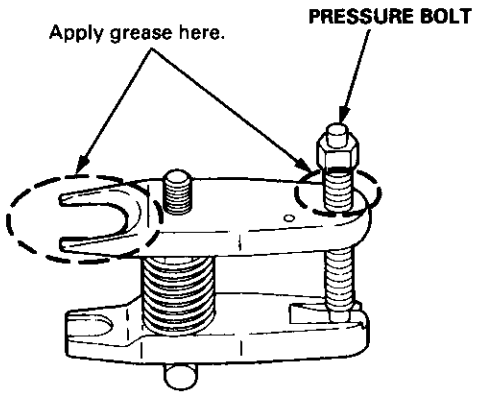


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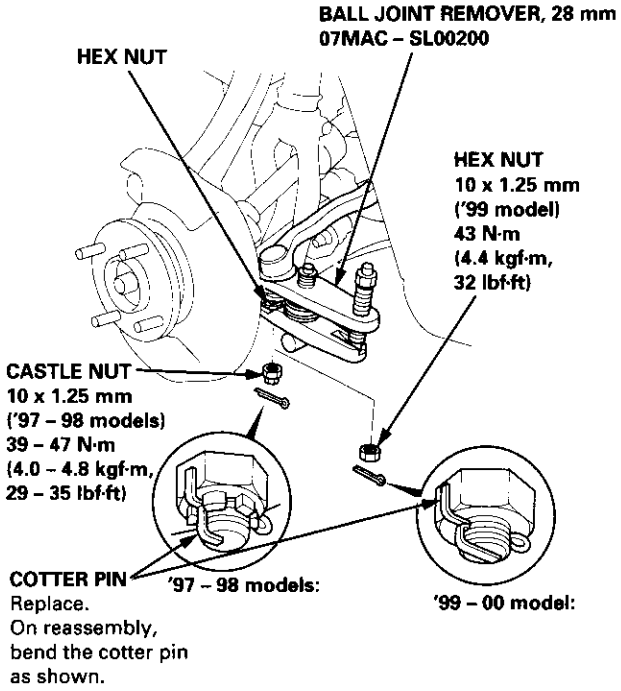
12. Clean any dirt or grease off the ball joint.

13. Remove the cotter pin from the steering arm, and remove the nut.

14. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

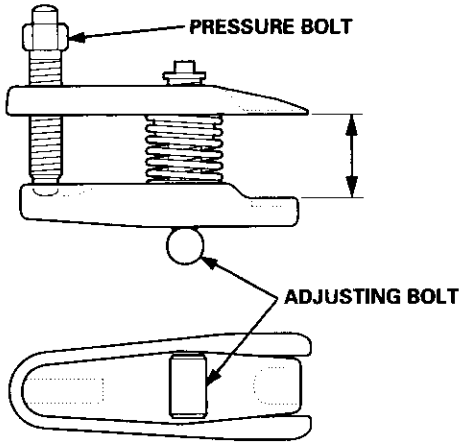


15. Install a 10 mm hex nut on the ball joint. Make sure the hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.



16. Install the special tool as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot. Adjust the jaw spacing by turning the pressure bolt. If necessary, apply penetrating type lubricant to loosen the ball joint.

17. Once the special tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt, and recheck the jaws to make sure they are still parallel.



After making the adjustment to the adjusting bolt, make sure the head of the adjusting bolt is in this position to allow the jaw to pivot.

18. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

⚠ WARNING Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

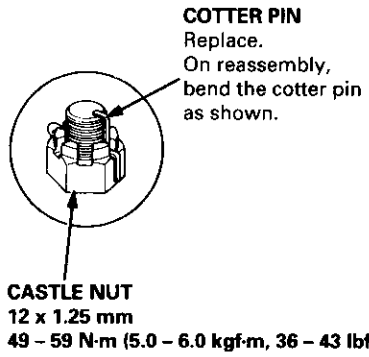
19. Remove the tool, then remove the nut from the end of the ball joint, and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot, and replace it if damaged.

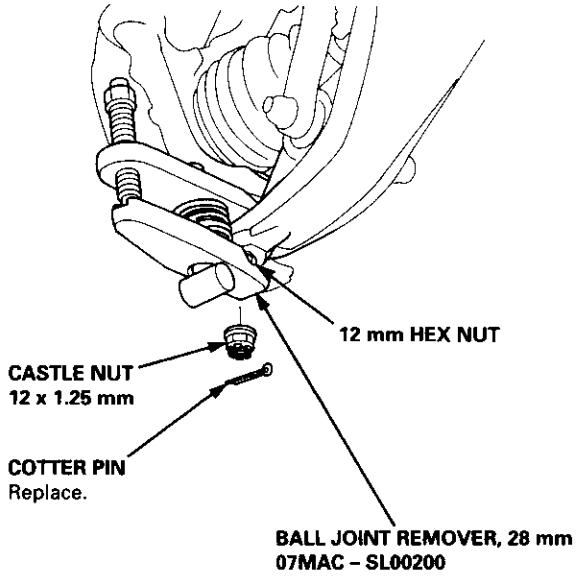
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Knuckle/Hub Replacement (cont'd)

20. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

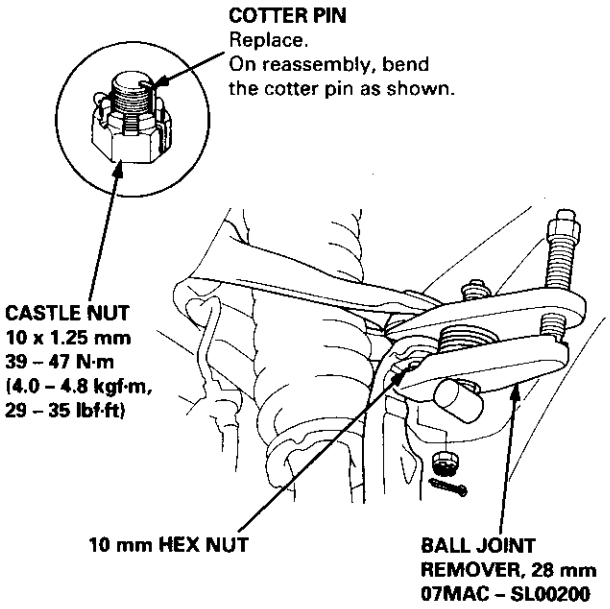




21. Install a 12 mm hex nut on the ball joint. Make sure the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

22. Use the special tool as shown on page 18-11 to separate the ball joint and lower arm. If necessary, apply penetrating type lubricant to loosen the ball joint.

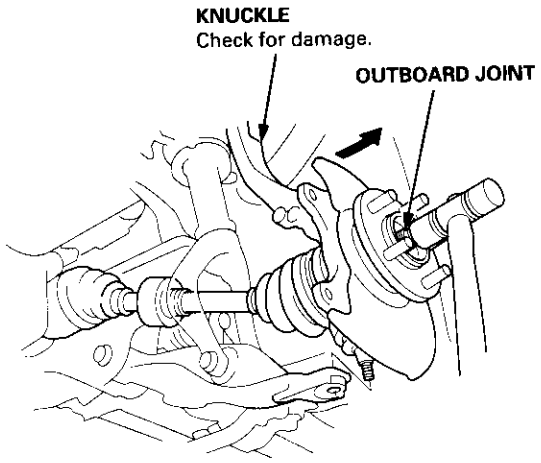
23. Remove the cotter pin from the upper ball joint castle nut, and remove the nut.



24. Install the 10 mm hex nut on the ball joint. Make sure the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

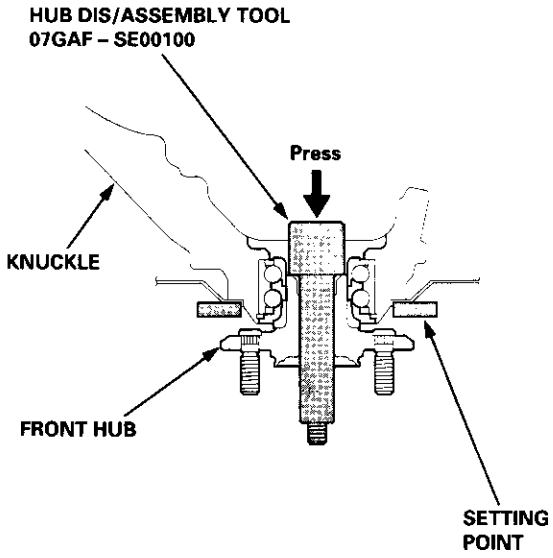
25. Use the special tool as shown on page 18-11 to separate the ball joint and knuckle. If necessary, apply penetrating type lubricant to loosen the ball joint.

26. Pull the knuckle outward, and remove the driveshaft outboard joint from the knuckle by tapping the driveshaft end with a plastic hammer, then remove the knuckle.

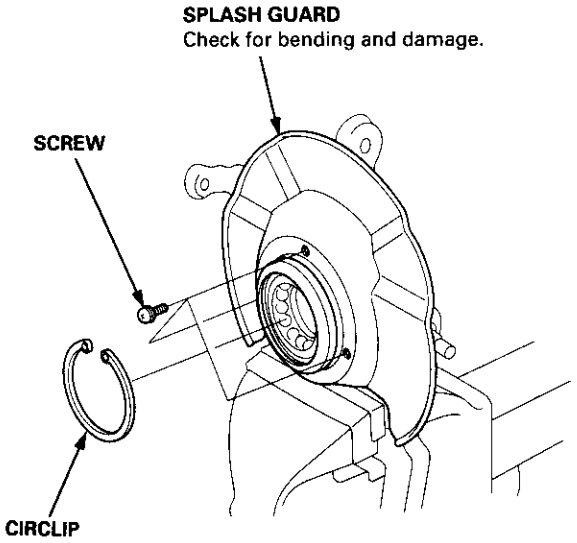


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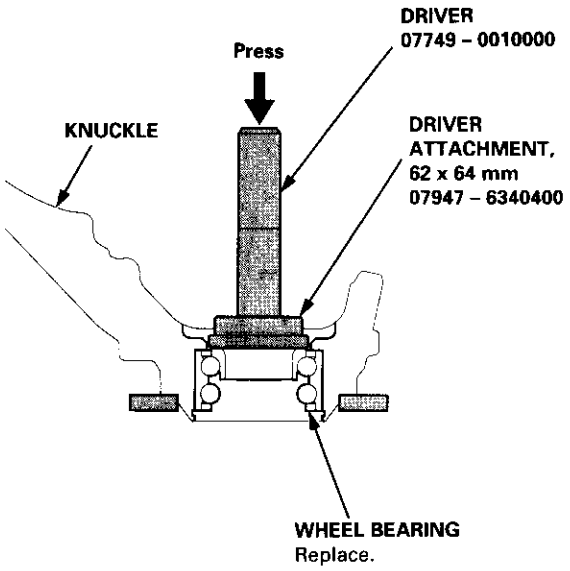
27. Separate the hub from the knuckle using the special tool and a hydraulic press. Take care not to distort the splash guard. Hold on to the hub to keep it from falling when pressed clear.



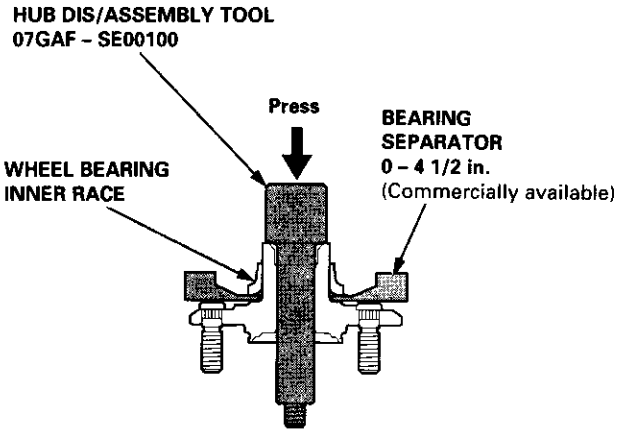
28. Remove the circlip and the splash guard from the knuckle.



29. Press the wheel bearing out of the knuckle using the special tools and a press.



30. Press the wheel bearing inner race from the hub using the special tool, a bearing separator, and a press.



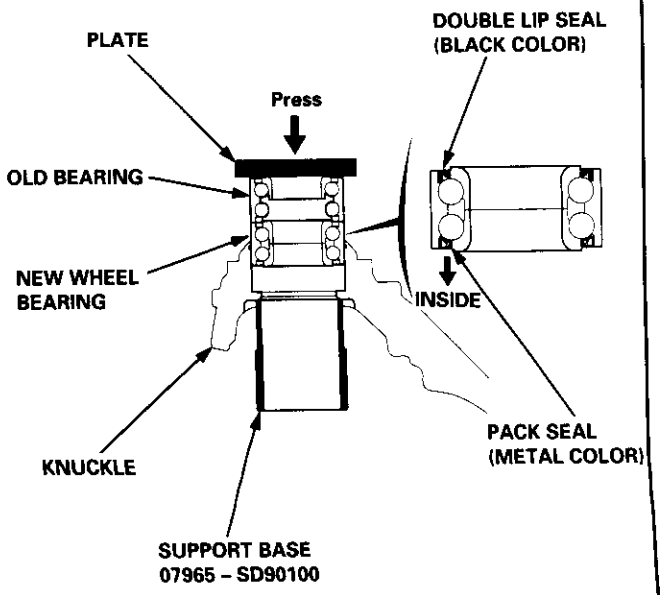
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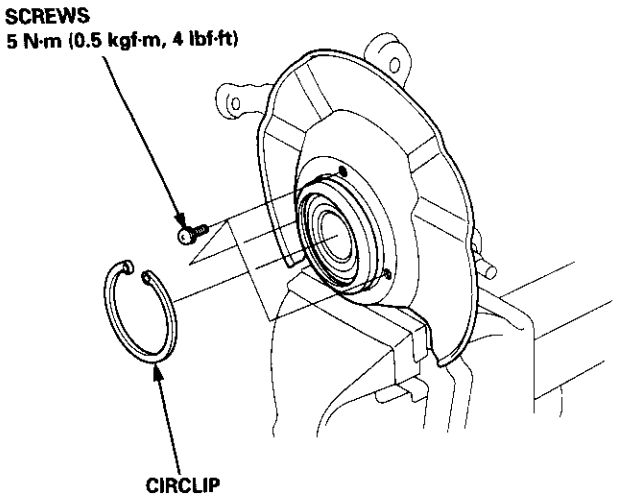
Knuckle/Hub Replacement (cont'd)

31. Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

32. Press a new wheel bearing into the knuckle using the old bearing, a plate, the special tool, and a press. Place the wheel bearing on the knuckle with the pack seal side facing (metal color) toward the inside. Be careful not to damage the sleeve of the pack seal.

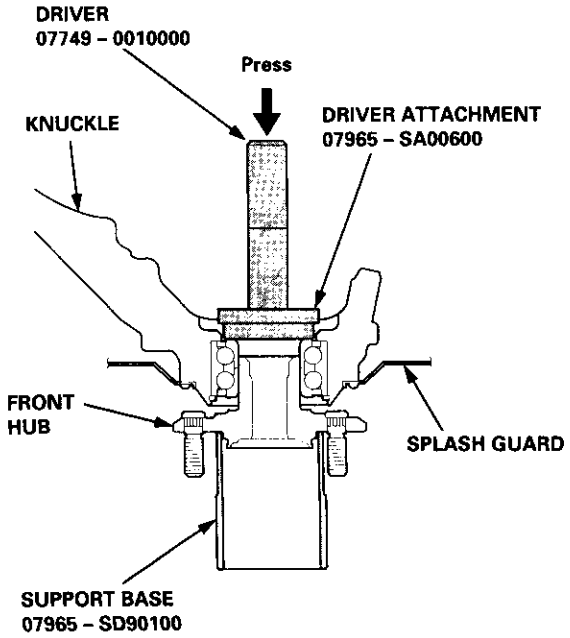


33. Install the circlip securely in the knuckle groove.



34. Install the splash guard and tighten the screws.

35. Install the hub on the knuckle using the special tools shown and a hydraulic press. Be careful not to distort the splash guard.



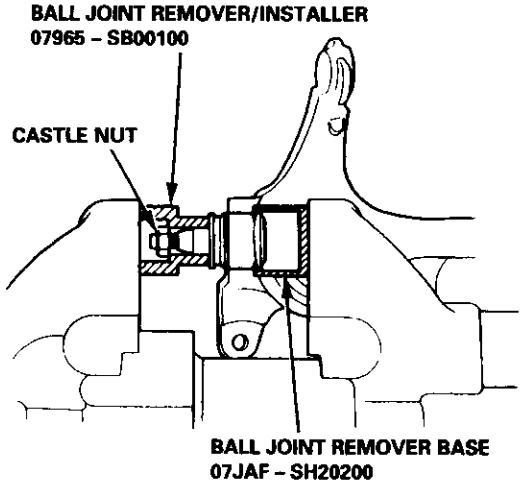
36. Install the knuckle in the reverse order of removal, and pay particular attention to the following items:

- Be careful not to damage the ball joint boots when installing the knuckle.
- Torque all mounting hardware to the specified torque values.
- Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slots with each pin hole. Do not align the castle nut by loosening.
- Install new cotter pins on the castle nuts or hex nut after torquing.
- Avoid twisting the sensor wires when installing the wheel sensor.
- Before installing the brake disc, clean the mating surfaces of the front hub and the inside of the brake disc.
- Before installing the spindle nut, apply a small amount of engine oil to the seating surface of the nut. After tightening, use a drift to stake the spindle nut shoulder against the driveshaft.
- Before installing the wheel, clean the mating surface of the brake disc and the inside of the wheel.
- Check the front wheel alignment, and adjust it if necessary (see page 18-4).

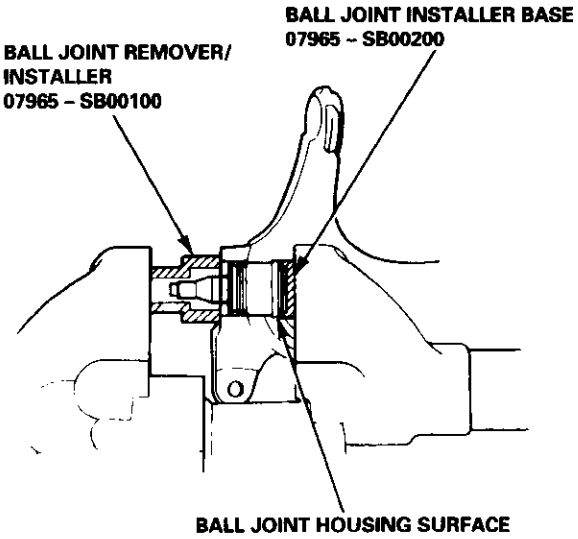
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Lower Ball Joint Replacement

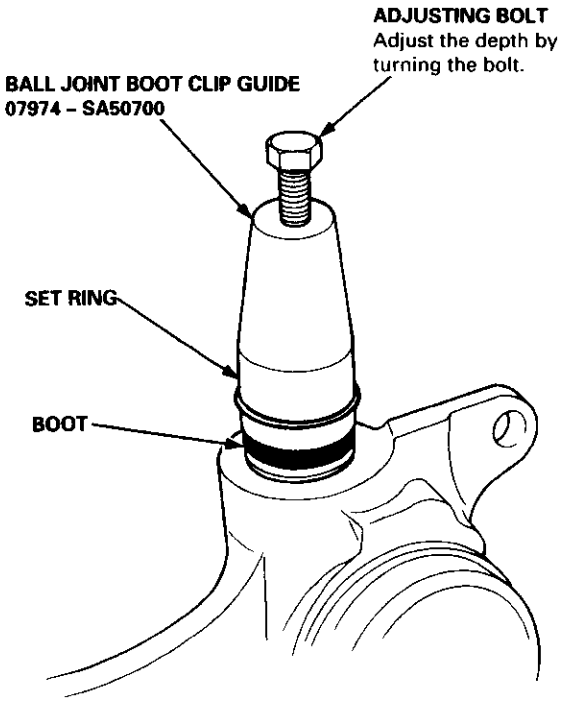
1. Remove the knuckle (see page 18-10).
2. Remove the boot by prying the set ring off.
3. Check the boot for deterioration and damage, and replace it if necessary.
4. Install the special tools on the ball joint, and tighten the castle nut.



5. Position the special tools over the ball joint as shown, then set the assembly in a vise. Press the ball joint out of the knuckle.
6. Place the ball joint in position by hand.
7. Install the special tools over the ball joint as shown, then press the ball joint in.



8. Install the ball joint boot and set ring using the special tool (see page 18-16).



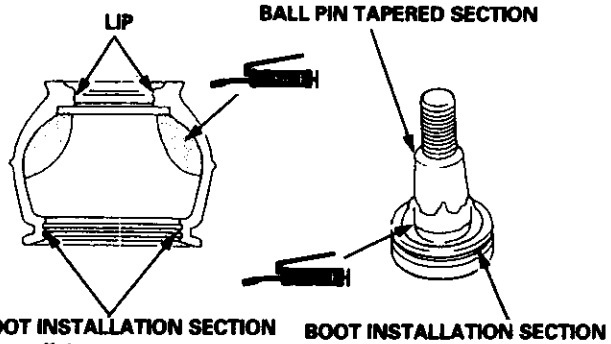
9. Install the knuckle in the reverse order of removal, and pay particular attention to the following items:
   - Be careful not to damage the ball joint boots when installing the knuckle.
   - Torque all mounting hardware to the specified torque values.
   - Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slot with the pin hole. Do not align the castle nut by loosening.
   - Install new cotter pins on the castle nuts after torquing.
   - Avoid twisting the sensor wires when installing the wheel sensor.
   - Before installing the brake disc, clean the mating surfaces of the front hub and the inside of the brake disc.
   - Before installing the wheel, clean the mating surface of the brake disc and the inside of the wheel.
   - Check the front wheel alignment, and adjust it if necessary (see page 18-4).

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Front Damper

Ball Joint Boot Replacement

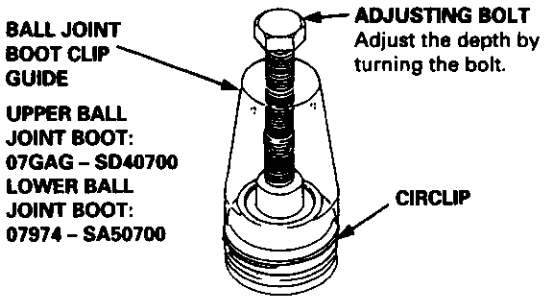
1. Remove the set ring and the boot.
2. Pack the interior of the boot and lip with grease. Do not contaminate the boot installation section with grease.



3. Wipe the grease off the sliding surface of the ball pin, and pack it with fresh grease. Keep grease off the boot installation section and the tapered section of the ball pin.
   Do not allow dust, dirt, or other foreign materials to enter the boot.
4. Install the boot in the groove of the boot installation section securely, then bleed air.
5. Install the upper and lower ball joint boot set rings using the special tools as follows:

   Lower ball joint: Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

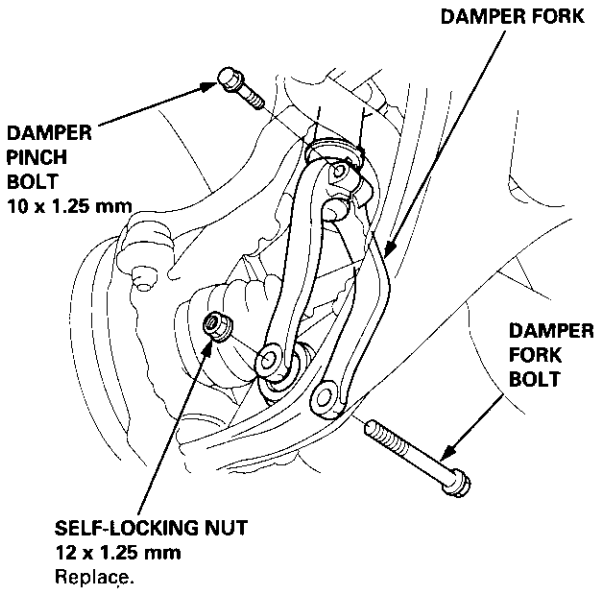
   Upper ball joint: Hold the tool over the ball joint, then slide the set ring over the tool and into position.



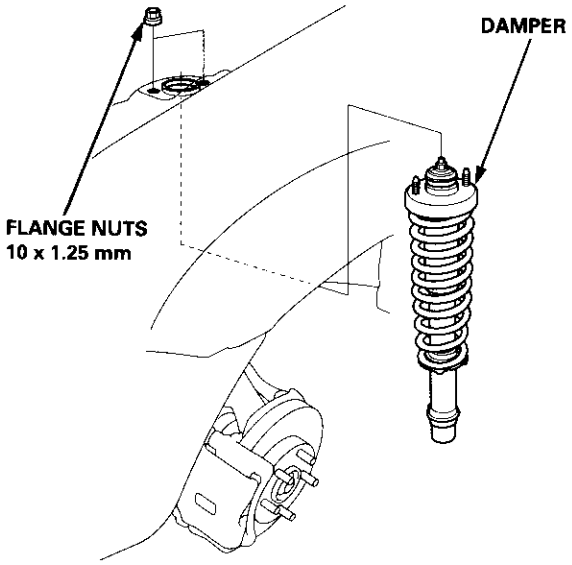
After installing the boot, check the ball pin tapered section for grease contamination, and wipe it if necessary.

Removal

1. Remove the front wheels (see page 18-10).
2. Remove the damper pinch bolt from the top of the damper fork.



3. Remove the damper fork bolt and self-locking nut from the bottom of the damper fork, then remove the damper fork.
4. Remove the damper by removing the two nuts.

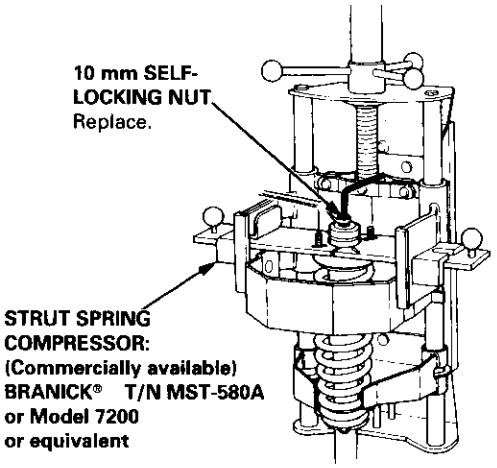


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Disassembly/Inspection

Disassembly

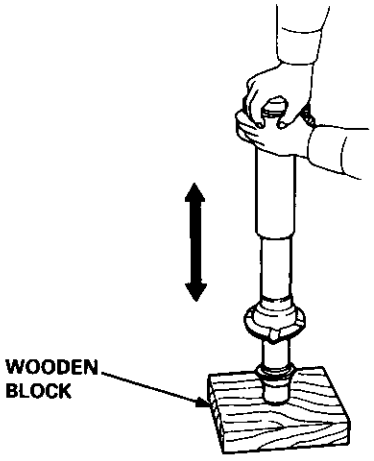
1. Compress the damper spring with a spring compressor according to the manufacturer's instructions, then remove the self-locking nut. Do not compress the spring more than necessary to remove the nut.



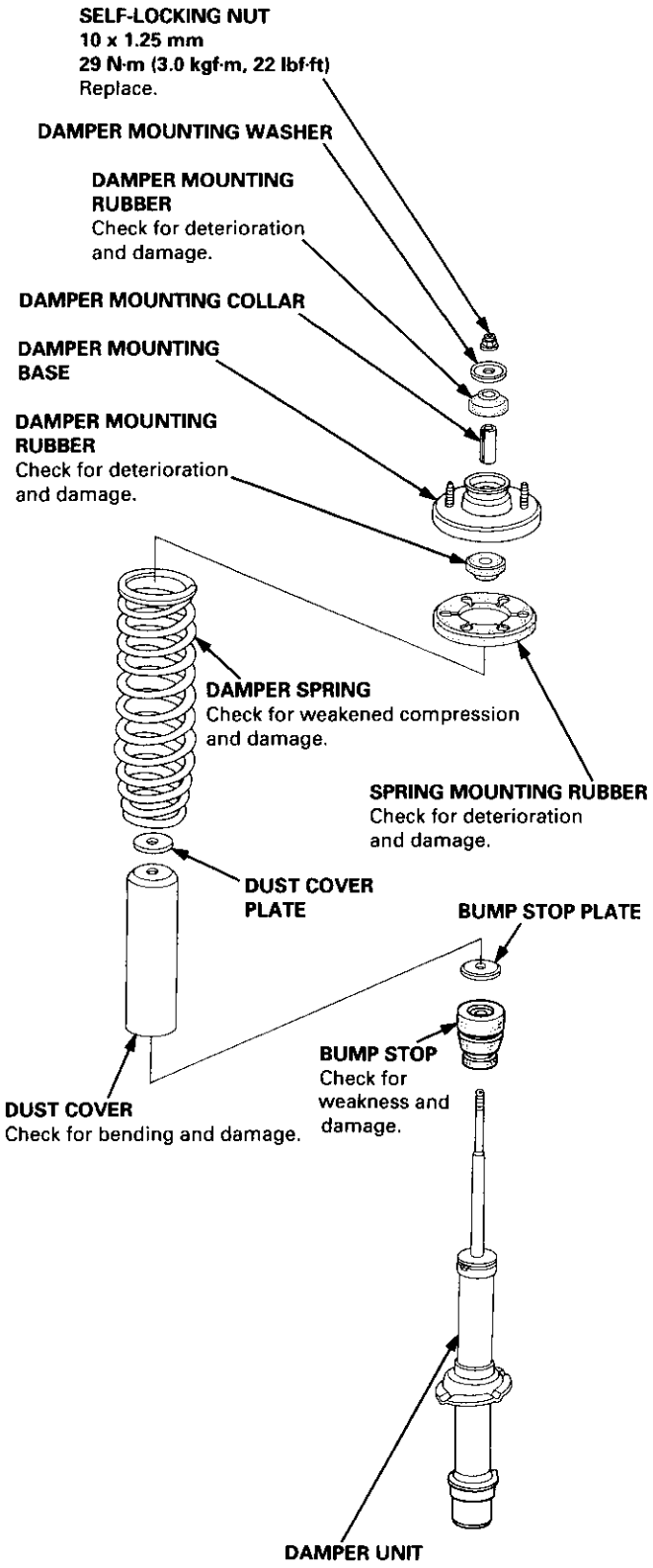
2. Release the pressure from the spring compressor, then disassemble the damper as shown in the next column.

Inspection

1. Reassemble all parts, except for the spring.
2. Push on the damper assembly as shown.



3. Check for smooth operation through a full stroke, both compression and extension. The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.
4. Check for oil leaks, abnormal noises, or binding during these tests.

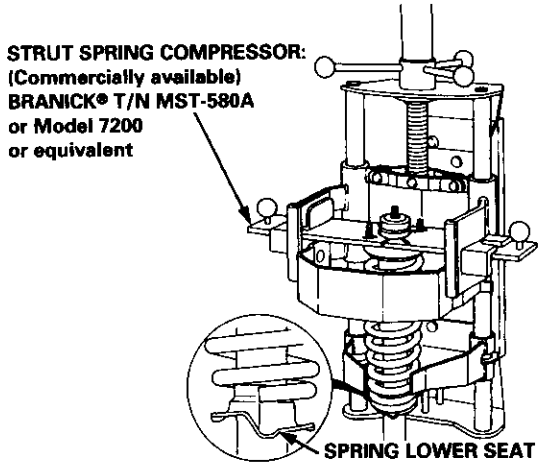


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Front Damper

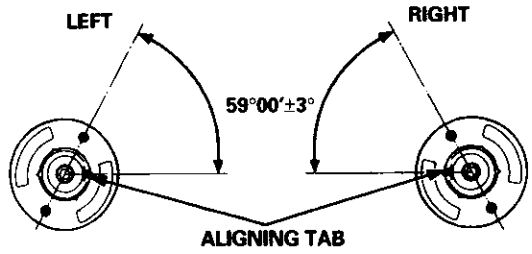
Reassembly

1. Install the damper unit on a spring compressor.



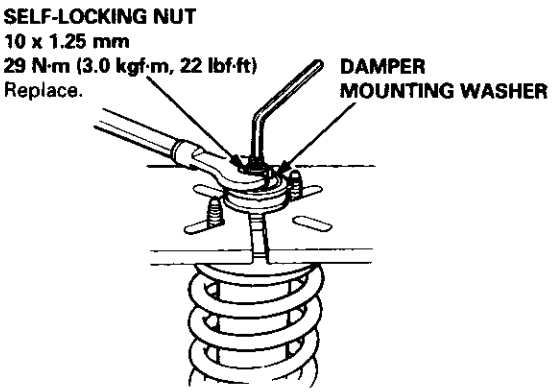
2. Assemble the damper in reverse order of removal except the damper mounting washer and self locking nut. Align the bottom of the damper spring and the spring lower seat as shown.

3. Position the damper mounting base on the damper unit as shown.



4. Compress the damper spring.

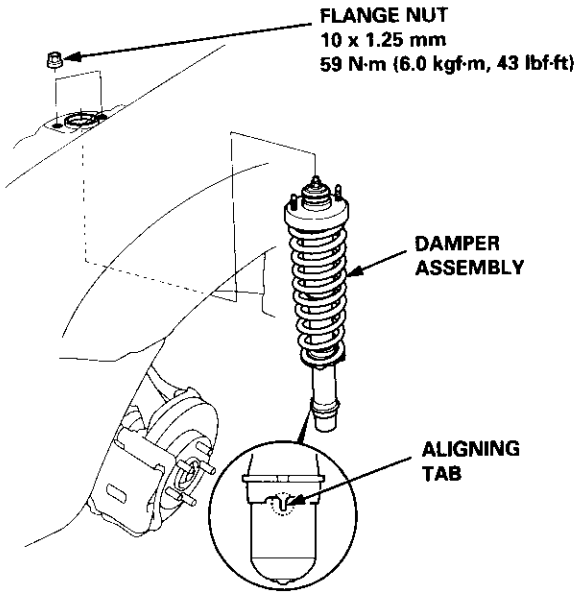
5. Install the damper mounting rubber, damper mounting washer, and a new 10 mm self-locking nut.



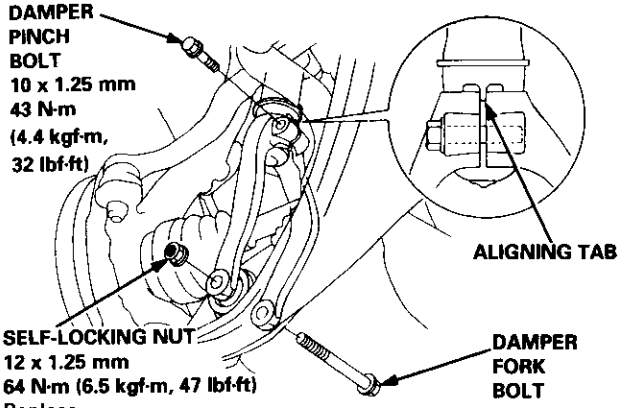
6. Hold the damper shaft, and tighten the 10 mm self-locking nut.

Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the two flange nuts.



2. Install the damper fork over the driveshaft and onto the lower arm. Install the front damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.



3. Loosely install the damper pinch bolt on the top of the damper fork.
4. Loosely install the damper fork bolt and a new self-locking nut on the bottom of the damper fork.
5. Raise the knuckle with a floor jack until the vehicle just lifts off the safety stand.

   ⚠ WARNING The floor jack must be securely positioned or personal injury may result.
6. Tighten the damper pinch bolt.
7. Tighten the damper fork bolt and self-locking nut.
8. Tighten the flange nuts on top of the damper.
9. Install the brake hose mounts with the brake hose mounting bolts.
10. Install the front wheel.

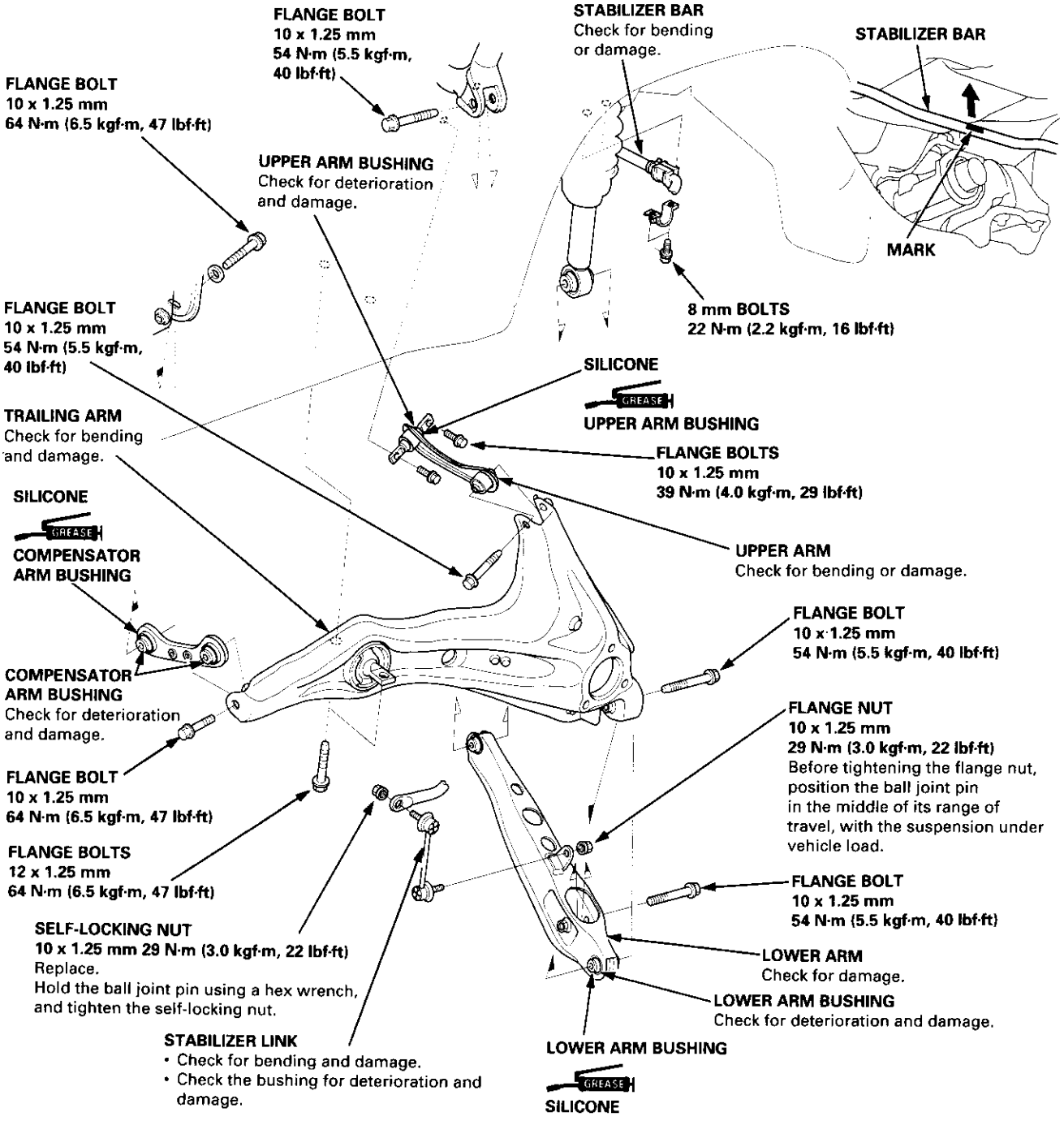
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Suspension Arms Replacement

⚠ WARNING When the suspension arms are to be removed, place additional weight in the trunk before hoisting. When substantial weight is removed from the rear of the vehicle, the center of gravity may change causing the vehicle to tip forward.

Note these items during replacement:

- Replace the self-locking nuts after removal.
- Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.
- Make sure the toe adjusting bolts on the compensator arm are installed in the same direction.
- After installing the suspension arm, check the rear wheel alignment, and adjust if necessary (see page 18-4).

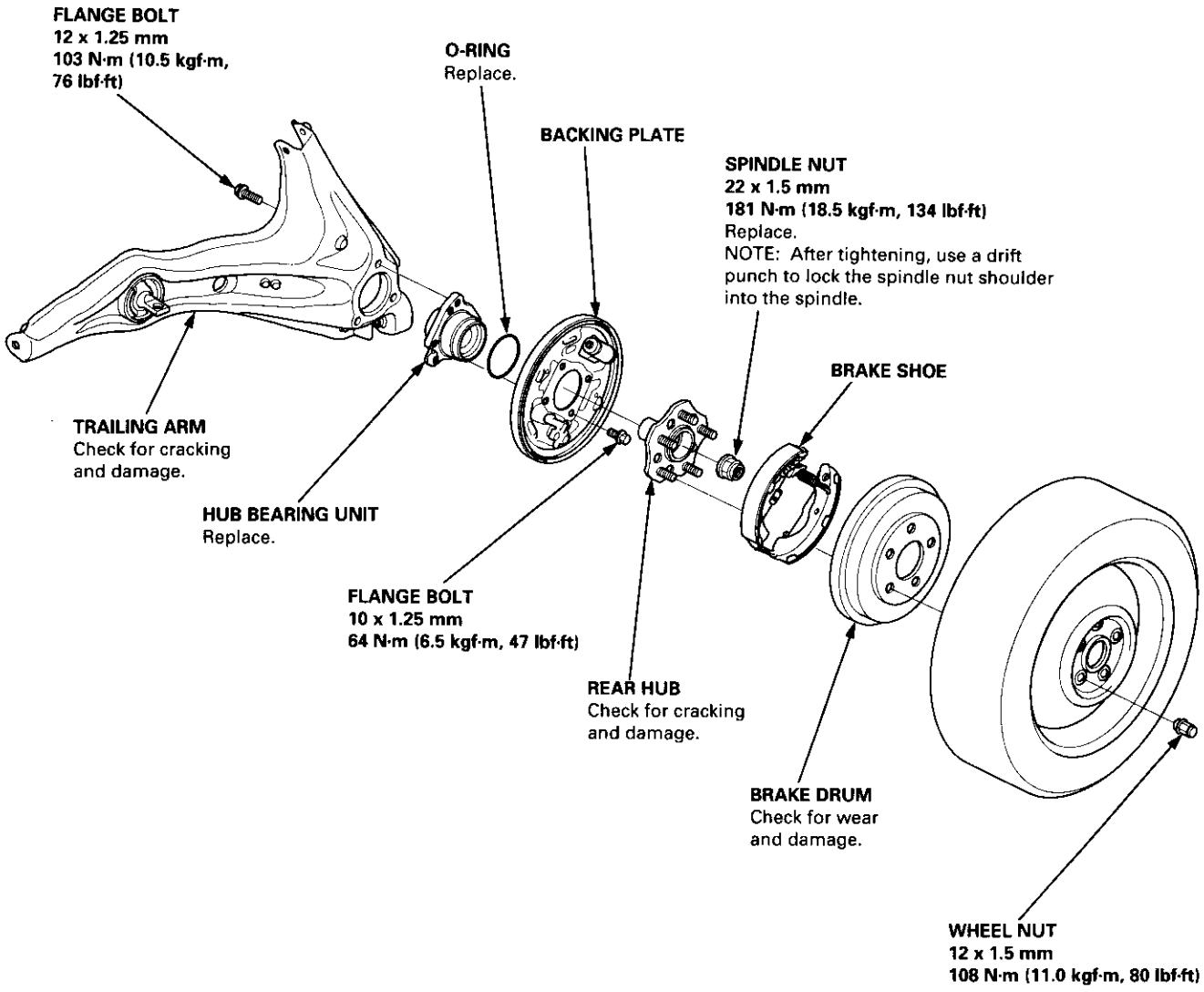


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Hub Bearing Unit Replacement

Note these items during replacement:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- Before installing the brake drum, clean the mating surfaces of the rear hub and the brake drum.
- Before installing the wheel, clean the mating surfaces of the brake drum and wheel.

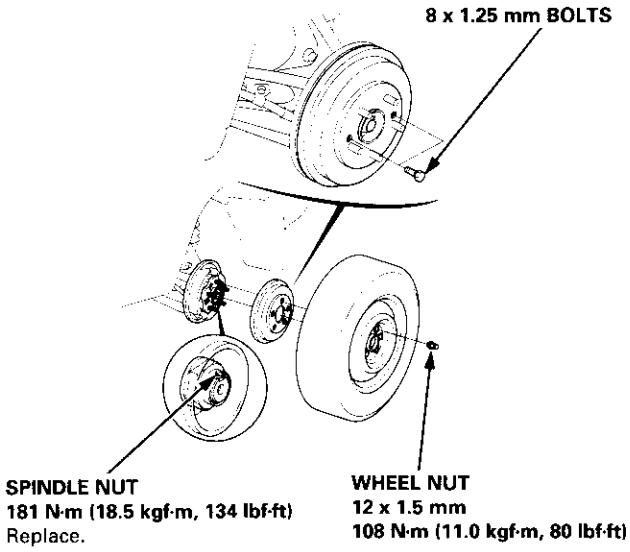


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1. Raise the rear of the vehicle, and make sure it is securely supported.

2. Remove the rear wheel.

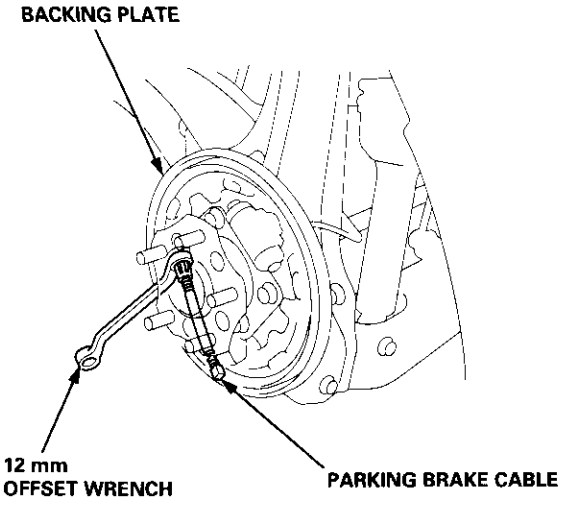
3. Remove the brake drum from the hub by threading 8 x 1.25 mm bolts into the drum to push it away from the hub bearing unit. Turn each bolt two turns at a time to prevent cocking the drum excessively.



4. Raise the locking tab on the spindle nut, then remove the nut.

5. Remove the brake shoes.

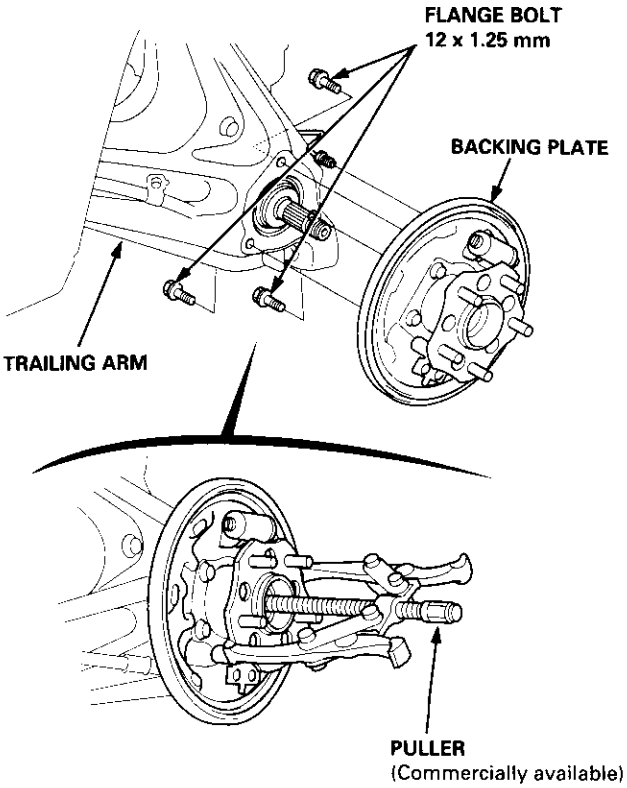
6. Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.



7. Disconnect the brake line from the wheel cylinder.

8. Remove the wheel sensor from the backing plate (for vehicles with ABS). Do not disconnect the wheel sensor connector.

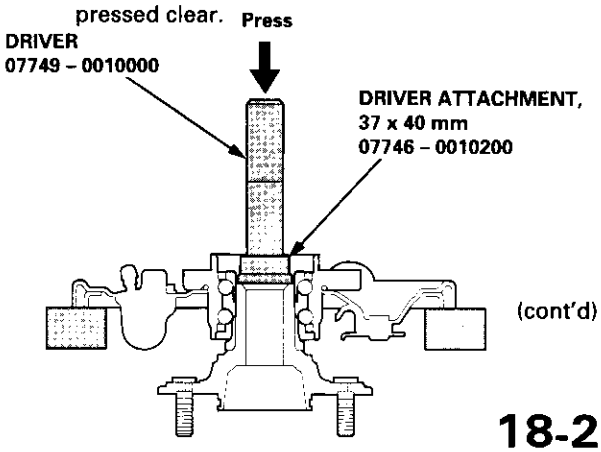
9. Remove the 12 mm flange bolts.



10. 4WD: Remove the backing plate/hub bearing unit from the rear axle with a puller if necessary.

11. Separate the rear hub from the hub bearing unit using the special tools and a press.

    Note the following items during disassembly:
    - Take care not to distort the backing plate.
    - Hold on to the hub to keep it from falling when pressed clear.

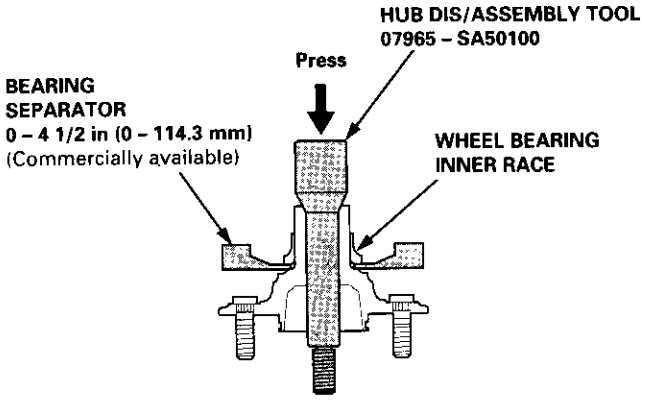


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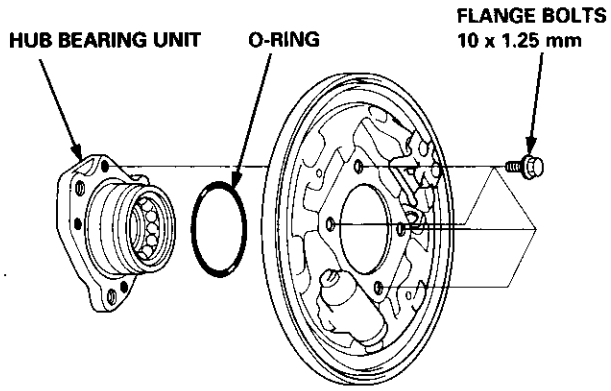
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Hub Bearing Unit Replacement (cont'd)

12. Press the wheel bearing inner race from the hub using the tools, a bearing separator, and a press.

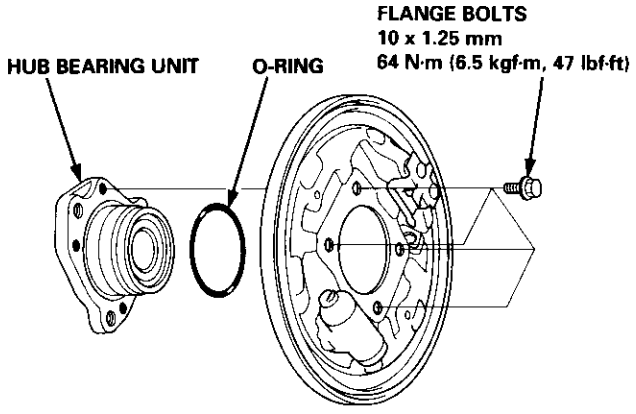


13. Remove the 12 mm flange bolts.



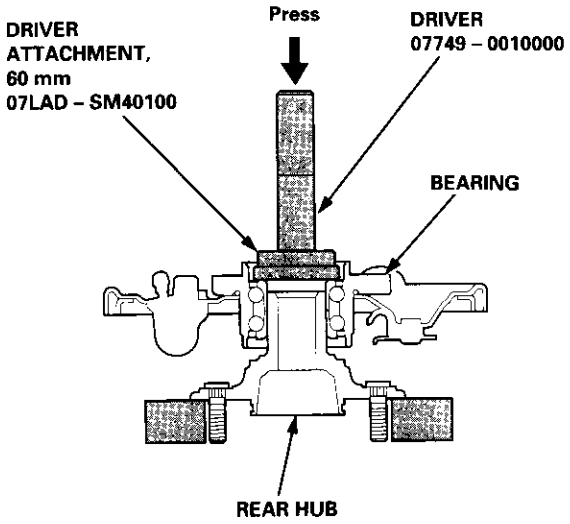
14. Remove the hub bearing unit from the backing plate.

15. Install a new O-ring on the hub bearing unit.

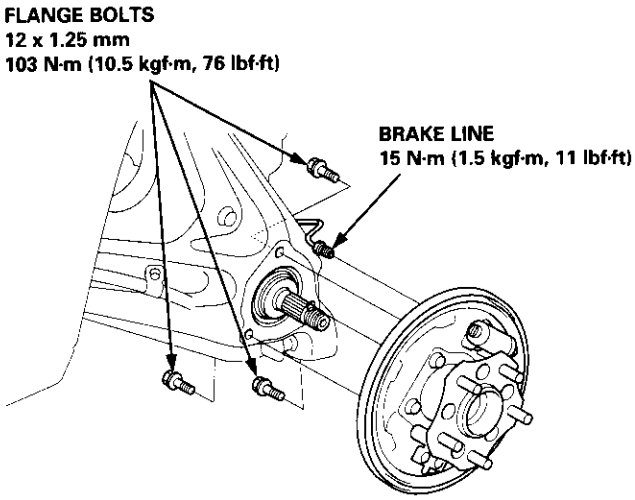


16. Install the hub bearing unit on the backing plate.

17. Install the hub bearing unit onto the rear hub using the special tools and a press.



18. Install the backing plate/hub bearing unit on the trailing arm.

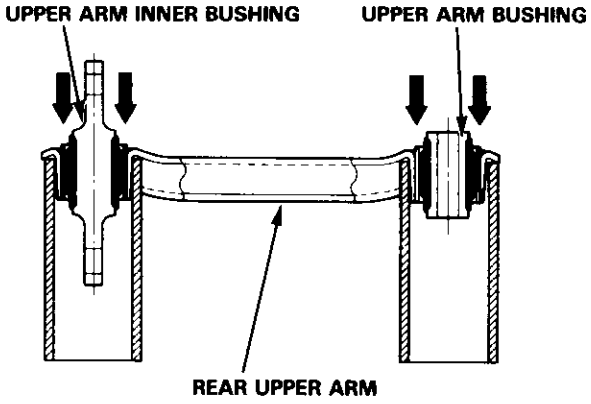


19. Install the hub bearing unit in the reverse order of removal, and pay particular attention to the following items:
    - Before installing the spindle nut, apply a small amount of engine oil to the seating surface of the nut. After tightening, use a drift to stake the spindle nut shoulder against the driveshaft.
    - Avoid twisting the sensor wires when installing the wheel sensor.
    - Fill the brake reservoir and bleed the brake system (see section 19).
    - Adjust the parking brake (see section 19).
    - Check the rear wheel alignment, and adjust it if necessary (see page 18-4).

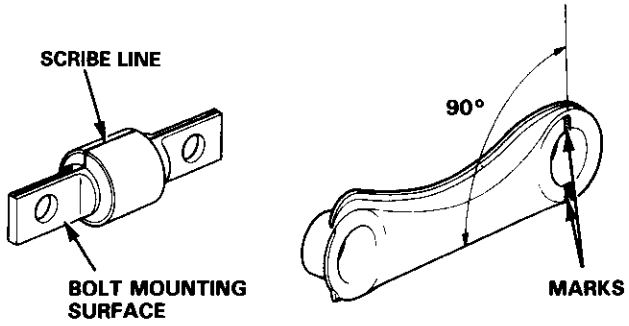
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Upper Arm Bushing Replacement

1. Remove the upper arm bushing and upper arm inner bushing as shown.

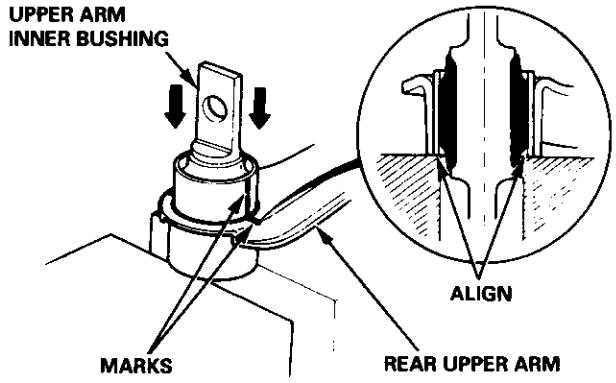


2. Mark a scribe line on the upper arm inner bushing so it is in line with the bolt mounting surface.



3. Make a mark on the upper arm at two points so the marks are in line and at a right angle with the arm as shown in the drawing.

4. Drive in the upper arm inner bushing with the marks aligned until the leading edge is flush with the upper arm.



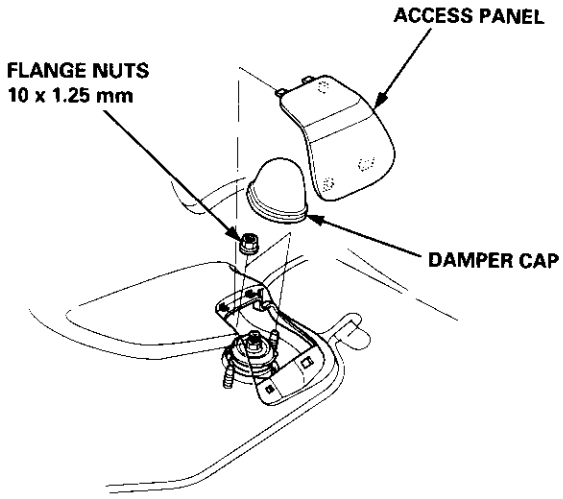
5. Drive the upper arm bushing into the upper arm until the leading edge is flush with the upper arm.

Removal

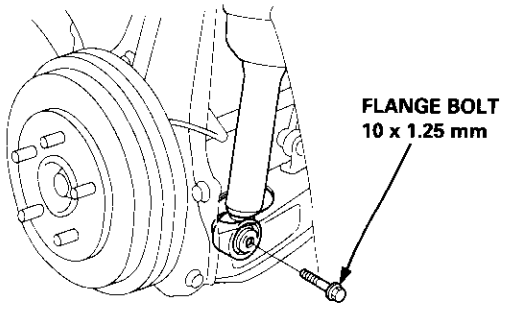
1. Remove the rear wheels (see page 18-21).

2. Remove the damper access panel and the damper cap.

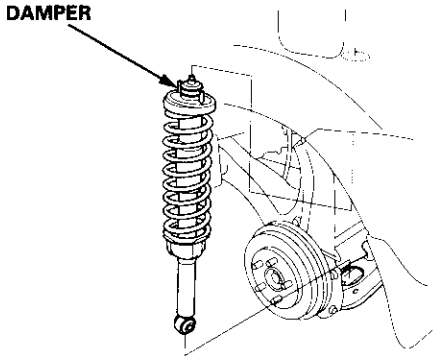
3. Remove the two flange nuts.



4. Remove the flange bolts.



5. Lower the rear suspension, and remove the damper.



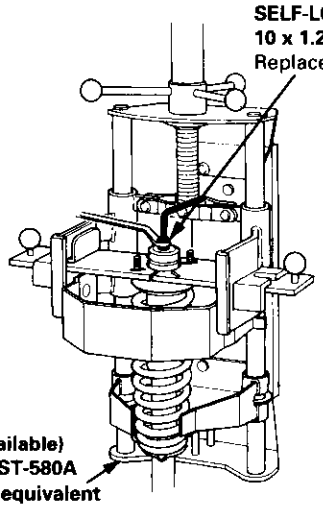
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Rear Damper

Disassembly/Inspection

Disassembly

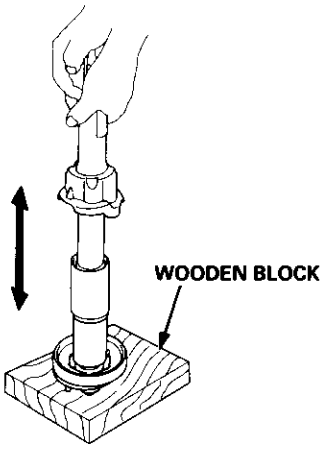
1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut. Do not compress the spring more than necessary to remove the self-locking nut.



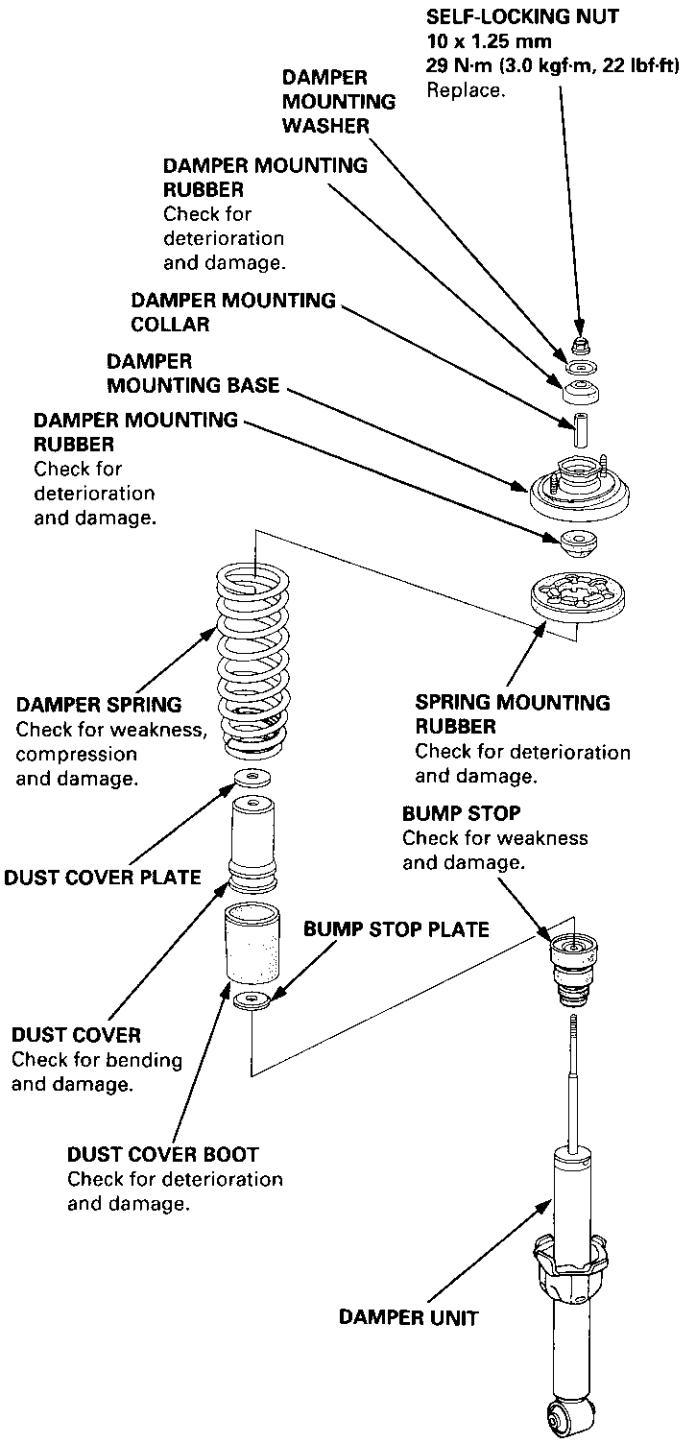
2. Release the pressure from the spring compressor, then disassemble the damper as shown on page 18-25.

Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper as shown.



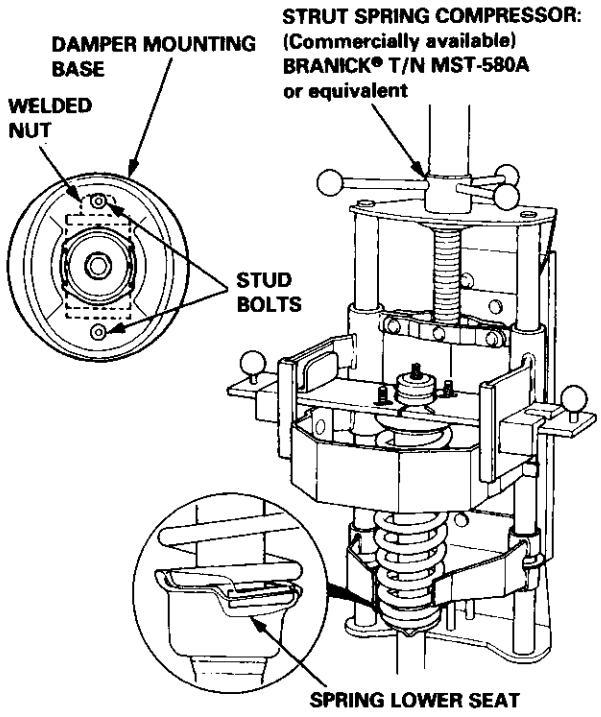
3. Check for smooth operation through a full stroke, both compression and extension. The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.
4. Check for oil leaks, abnormal noises, or binding during these tests.



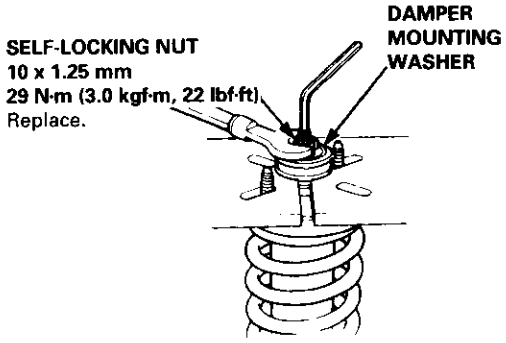
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Reassembly

1. Install the damper unit on a spring compressor.
2. Assemble the rear damper in reverse order of disassembly except the damper mounting washer and self-locking nut. Align the bottom of the damper spring and the spring lower seat as shown.



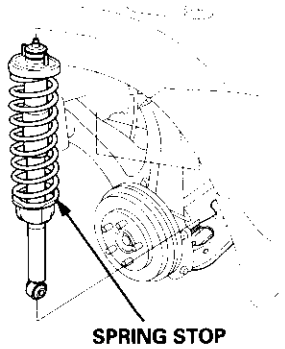
3. Position the damper mounting base on the damper unit as shown.
4. Compress the damper spring with the spring compressor.
5. Install the damper mounting washer, and loosely install a new self-locking nut.



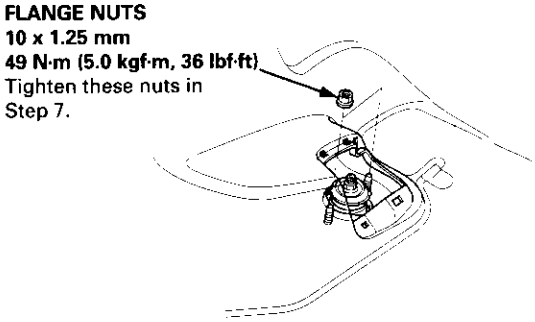
6. Hold the damper shaft with a hex wrench, and tighten the self-locking nut.

Installation

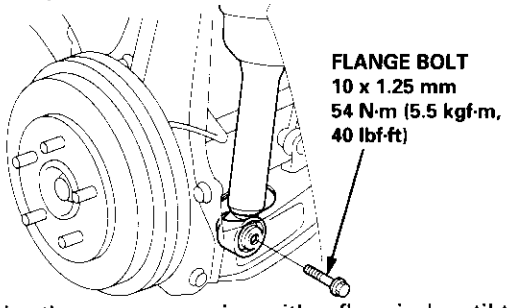
1. Lower the rear suspension, and position the damper. The spring stop on the right damper should face rearward, and the spring stop on the left damper should face forward.



2. Loosely install the two flange nuts.



3. Loosely install the flange bolt.



4. Raise the rear suspension with a floor jack until the vehicle just lifts off the safety stand.

⚠ WARNING The floor jack must be securely positioned or personal injury may result.

5. Tighten the flange bolt.
6. Tighten the two flange nuts on the top of the damper to the specified torque.
7. Install the damper cap and access panel.
8. Check the rear wheel alignment, and adjust if necessary (see page 18-4).

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Brakes **19-1**
Anti-lock Brake System (ABS) **19-25**



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Brakes

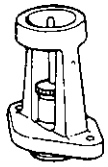
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAG – SD40100	Pushrod Adjustment Gauge	1	19-14

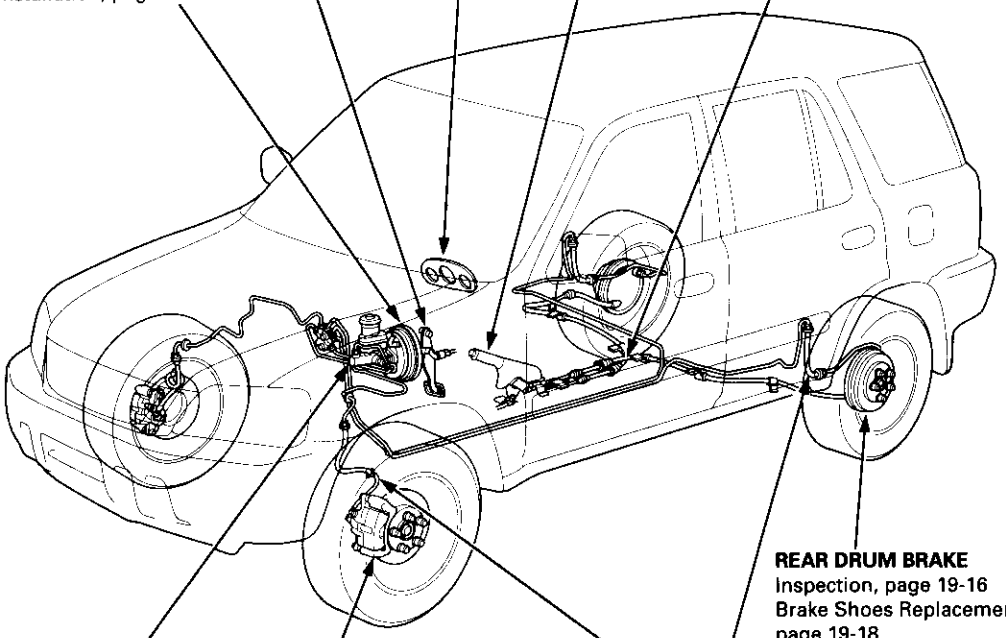


①

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Brake System Rubber Parts and Brake Booster

Ⓐ-Brake Booster

Check brake operation by applying the brakes.
If the brakes do not work properly, check the brake booster. Replace the brake booster as an assembly if it does not work properly or if there are signs of leakage.

Ⓑ-Piston Cup and Pressure Cup Inspection

- Check brake operation by applying the brakes.
  Visually check for damage or signs of fluid leakage. Replace the master cylinder as an assembly if the pedal does not work properly or if there is damage or signs of fluid leakage.

- Check for a difference in brake pedal stroke between quick and slow brake applications. Replace the master cylinder if there is a difference in pedal stroke.

Ⓒ-Brake Hoses

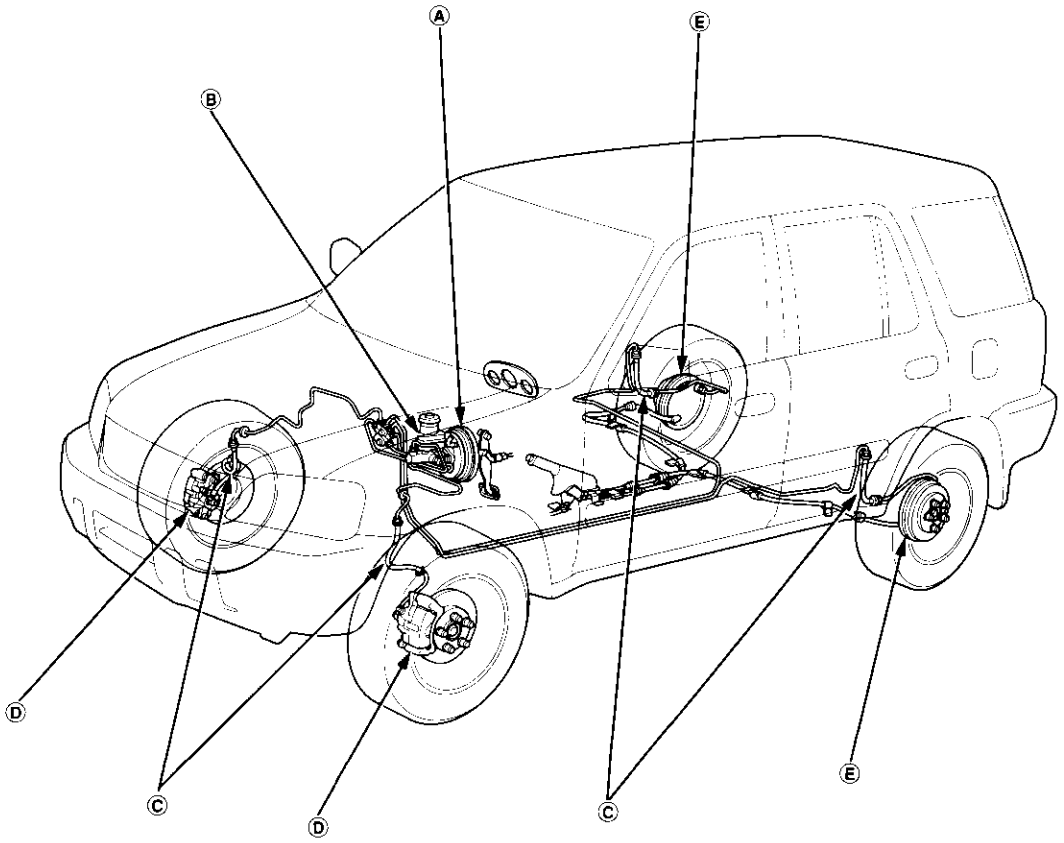
Visually check for damage or signs of fluid leakage. Replace the brake hose with a new one if it is damaged or leaking.

Ⓓ-Caliper Piston Seal and Piston Boots

Check brake operation by applying the brakes.
Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the brake caliper. Replace the boots and seals with new ones whenever the brake caliper is disassembled.

Ⓔ-Wheel Cylinder Piston Cup and Dust Cover

Check brake operation by applying the brakes.
Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, replace the wheel cylinder.



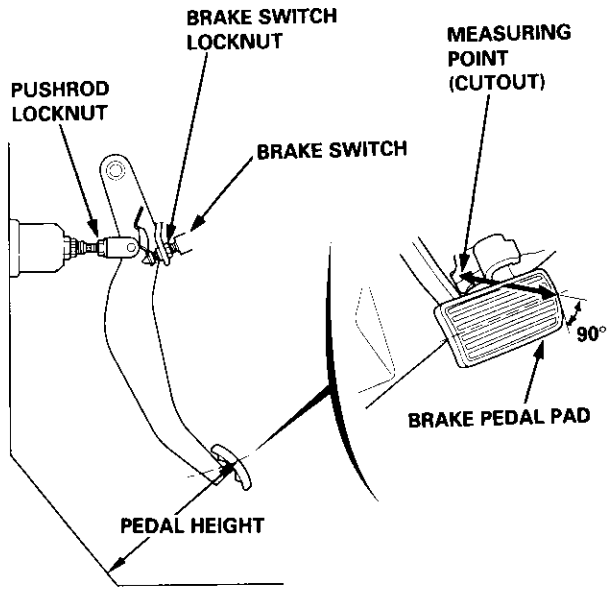
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Brake Pedal

Pedal Height

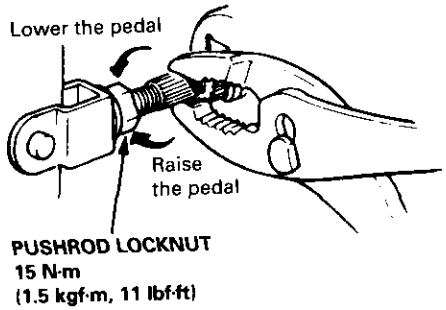
1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.

2. Lift up the carpet. At the insulator cutout, measure the pedal height from the middle of the right side of the pedal pad.

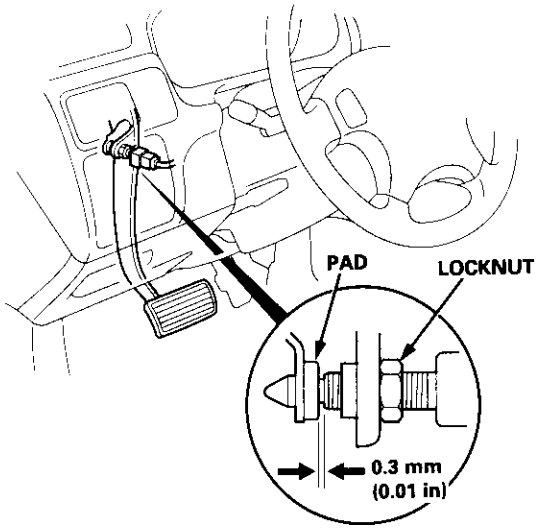


Standard Pedal Height (with floor mat removed):
A/T: 161 mm (6 5/16 in)
M/T: 155 mm (6 1/8 in)

3. Loosen the pushrod locknut, and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. Do not adjust the pedal height with the pushrod pressed. After adjustment, tighten the locknut firmly.



4. Screw in the brake switch until its plunger is fully pressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.01 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector. Make sure that the brake lights go off when the pedal is released.



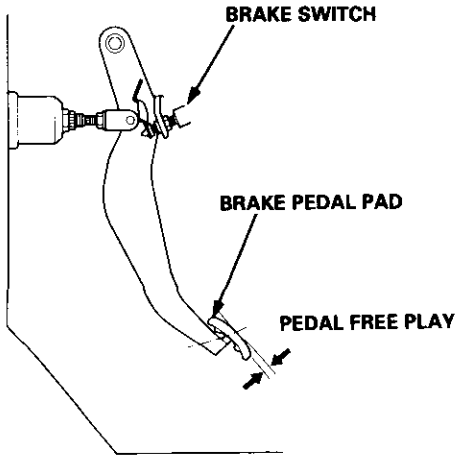
5. Check the brake pedal free play as described below.

Pedal Free Play

1. With the engine off, inspect the free play on the pedal pad by pushing the pedal by hand.

   Free Play: 1 – 5 mm (1/16 – 3/16 in)

2. If the pedal free play is out of specification, adjust the brake switch. If the pedal free play is insufficient, it may result in brake drag.



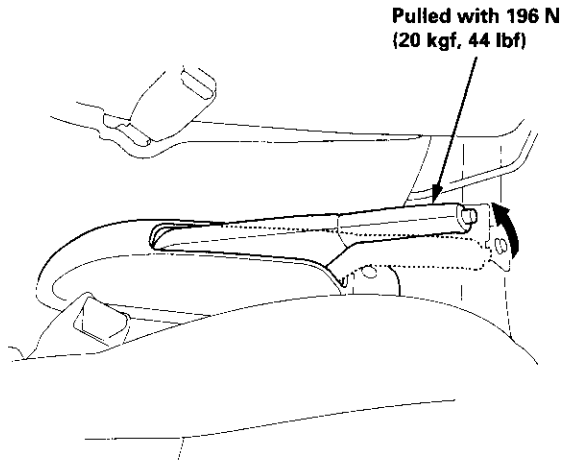
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Parking Brake

Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully apply the parking brake.
   The parking brake lever should be locked within the specified number of clicks.

   Lever Locked Clicks: 2 – 6



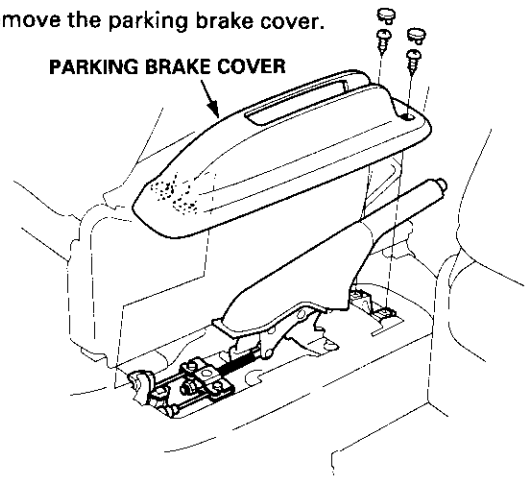
2. Adjust the parking brake if the lever clicks are out of specification.

Adjustment

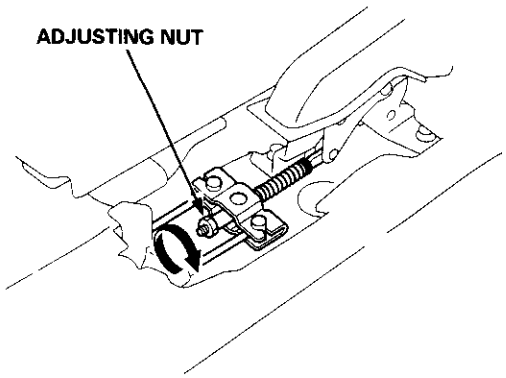
1. Raise the rear wheels off the ground, and support the vehicle on safety stands.

   ⚠ WARNING Block the front wheels before jacking up the rear of the vehicle.

2. Remove the parking brake cover.



3. Release the parking brake lever.



4. Adjust the parking brake by turning the adjusting nut.
5. Check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
6. Make sure the parking brakes are fully applied when the parking brake lever is pulled up fully.
7. Install the parking brake cover.

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Bleeding

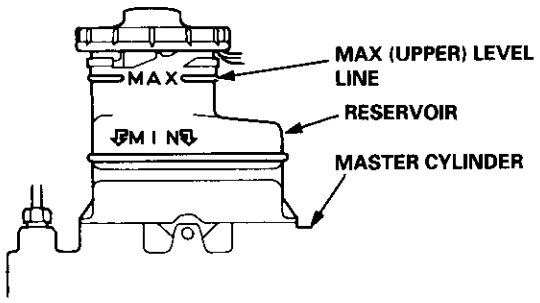
CAUTION:

- **Do not spill brake fluid on the vehicle, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**

NOTE:

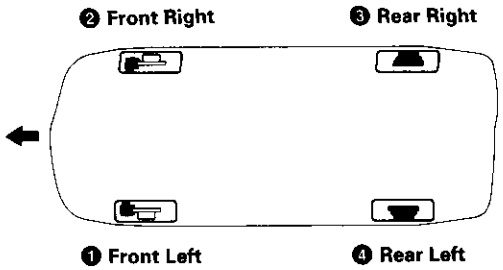
- Do not reuse the drained fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
- The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of bleeding procedure and checked after bleeding each brake caliper and wheel cylinder. Add fluid as required.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.



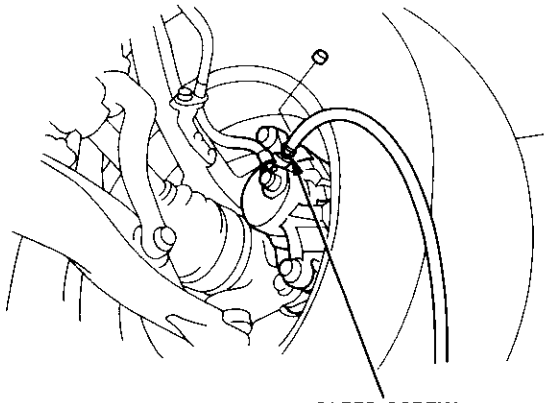
2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
4. Repeat the procedure for each wheel in the sequence shown below until air bubbles no longer appear in the fluid.
5. Refill the reservoir on the master cylinder to the MAX (upper) level line.

BLEEDING SEQUENCE:

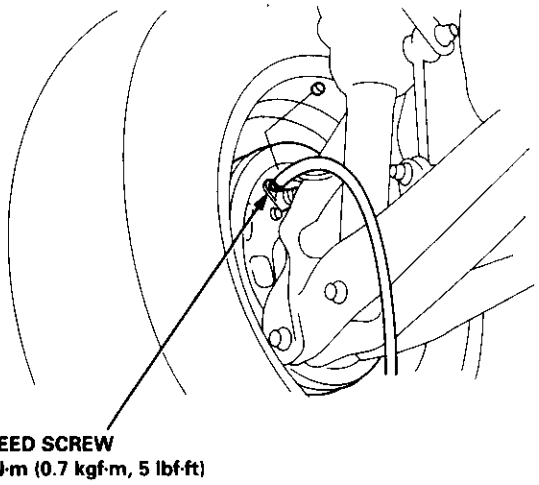


NOTE: Bleed the front calipers first in the bleeding procedure.

FRONT:



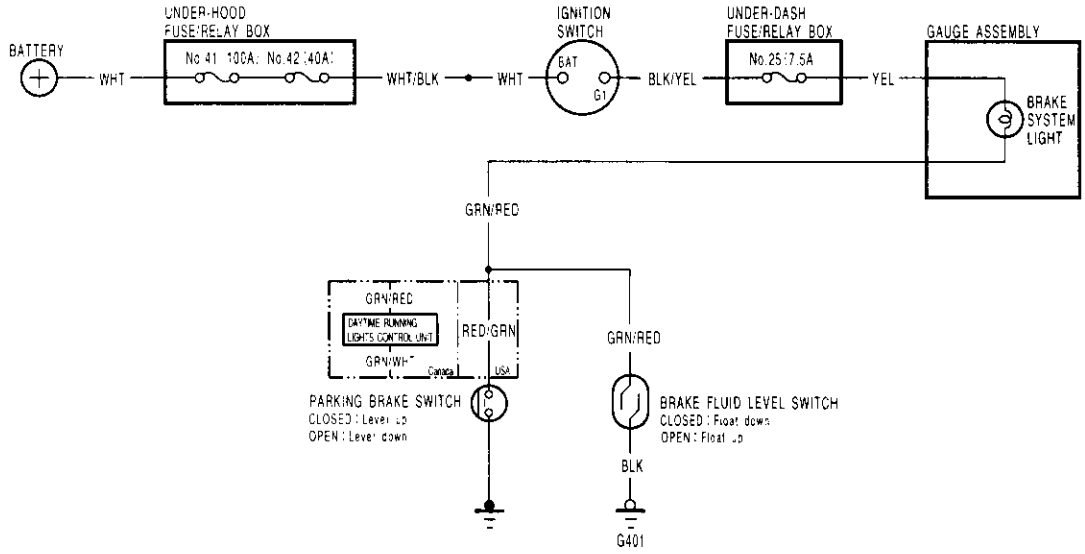
REAR:



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Brake System Indicator

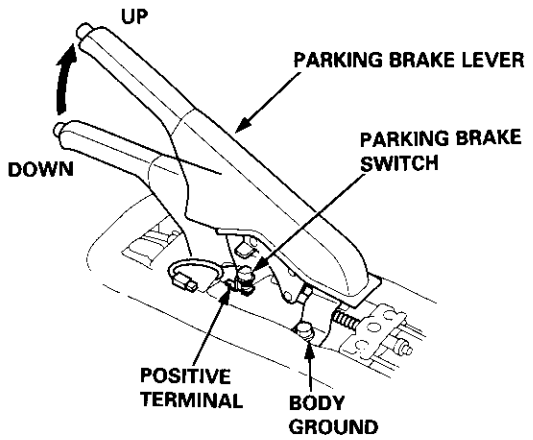
Circuit Diagram



Parking Brake Switch Test

1. Remove the parking brake cover.
2. Disconnect the connector from the parking brake switch.
3. Check for continuity between the terminal and body ground in each position according to the table.

Terminal / Lever Position	Positive Terminal	Body Ground
Lever Up	○	○
Lever Down		

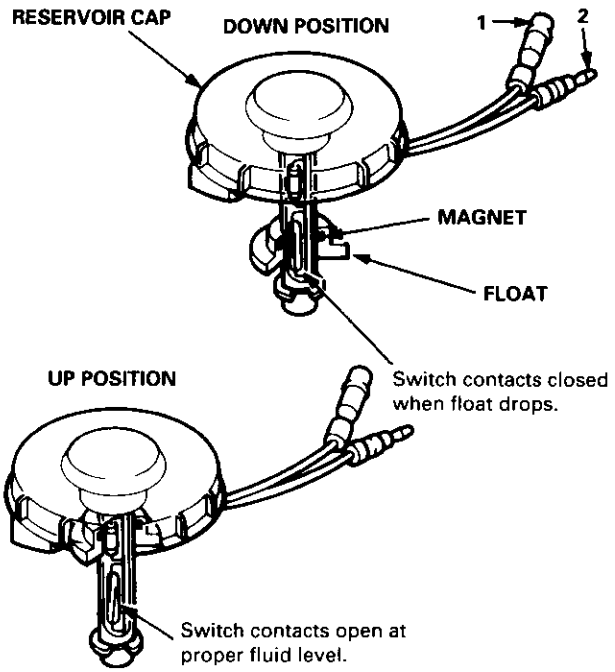


NOTE (Canada): If the parking brake switch is OK, but the brake system indicator does not function, perform the input test for the daytime running lights control unit (see section 23).

Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely; if it doesn't, replace the reservoir cap assembly.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2
FLOAT UP		
FLOAT DOWN	○	○



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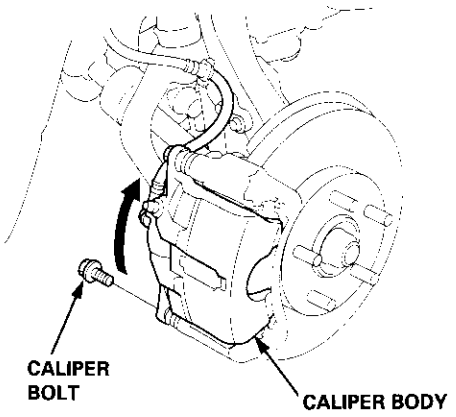
Inspection and Replacement

⚠ WARNING

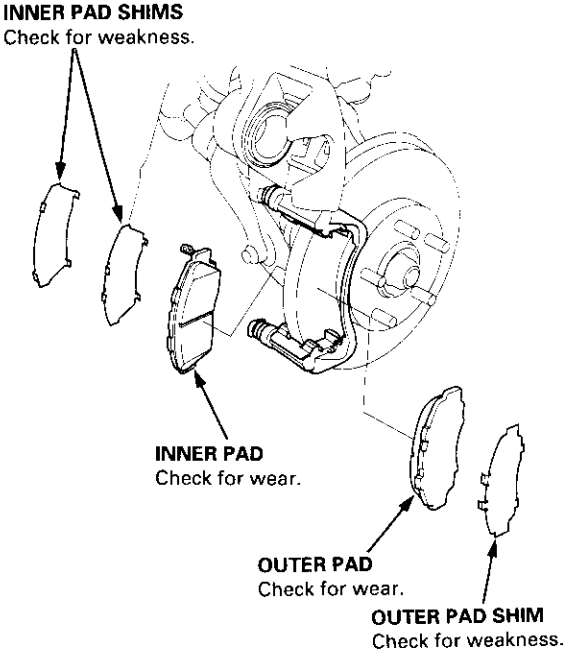
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA approved vacuum cleaner to avoid breathing brake dust.**

1. Loosen the front wheel nuts slightly, then raise the vehicle, and make sure it is securely supported. Remove the front wheels.

2. Remove the caliper bolt, and pivot the caliper up out of the way. Check the hoses and pin boots for damage and deterioration.



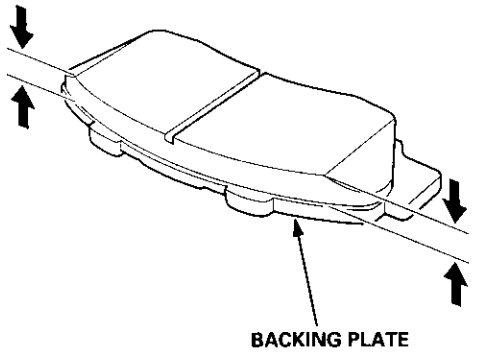
3. Remove the pads, pad shims, and pad retainers.



4. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

Brake Pad Thickness:

Standard: 10.5 – 11.5 mm (0.41 – 0.45 in)
Service Limit: 1.6 mm (0.06 in)

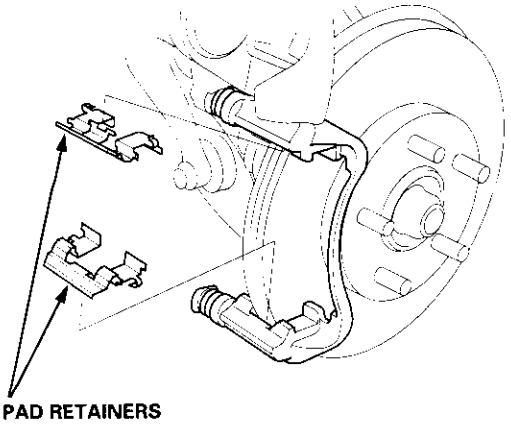


5. If the brake pad thickness is less than the service limit, replace the front pads and shims together as a set.

6. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.

7. Check the brake disc for damage and cracks.

8. Install the pad retainers.

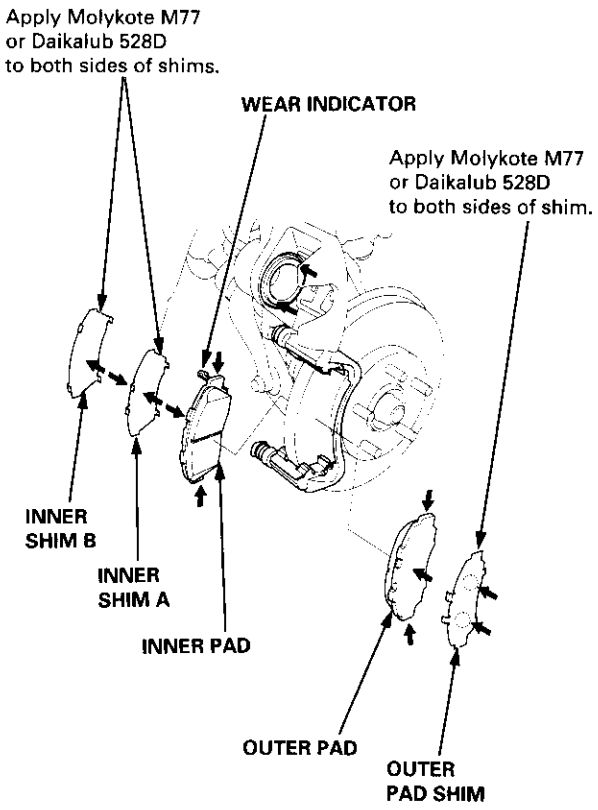


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Inspection and Replacement (cont'd)

9. Apply Molykote M77 grease or Daikalub 528D grease to both sides of the pad shims and the back of the pads. Wipe excess grease off the shims.

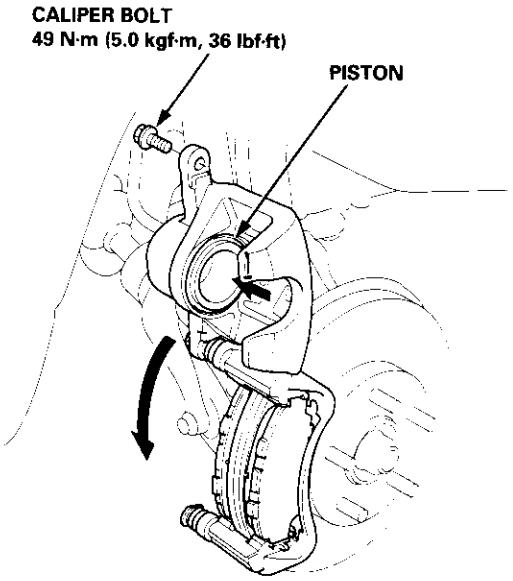


10. Install the brake pads and pad shims correctly. Install the pad with the wear indicator on the inside.

⚠ WARNING

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

11. Push in the piston so that the caliper will fit over the pads. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.



12. Pivot the caliper down into position, being careful not to damage the pin boot. Install the caliper bolt and tighten it.

13. Press the brake pedal several times to make sure the brakes work, then test-drive.

    NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

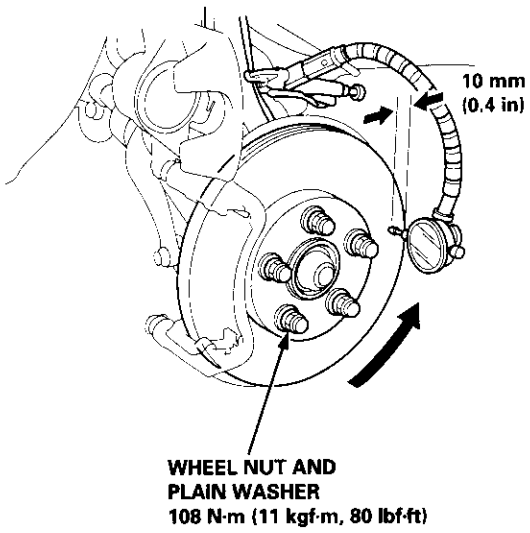
14. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.

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Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and make sure it is securely supported. Remove the front wheels.
2. Remove the brake pads (see page 19-9).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly, and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)



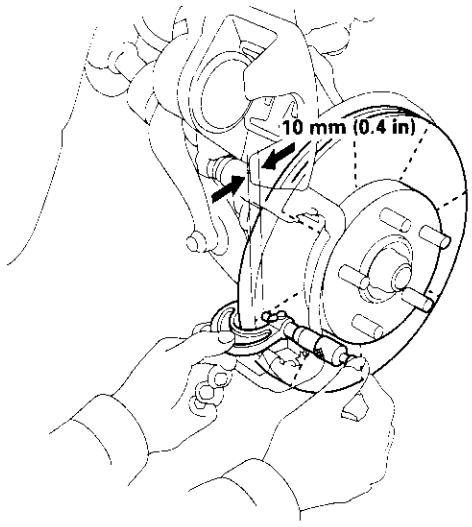
5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

   Max. Refinish Limit: 21.0 mm (0.83 in)

   NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and make sure it is securely supported. Remove the front wheels.
2. Remove the brake pads (see page 19-9).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



Brake Disc Thickness:

Standard:
'97 – 98 models:
22.9 – 23.1 mm (0.90 – 0.91 in)
'99 – 00 models:
23.6 – 23.8 mm (0.93 – 0.94 in)
Max. Refinishing Limit: 21.0 mm (0.83 in)

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

   NOTE: See section 18 for brake disc replacement.

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Front Brake Caliper

Disassembly/Reassembly

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA approved vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**
- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**

CAUTION:

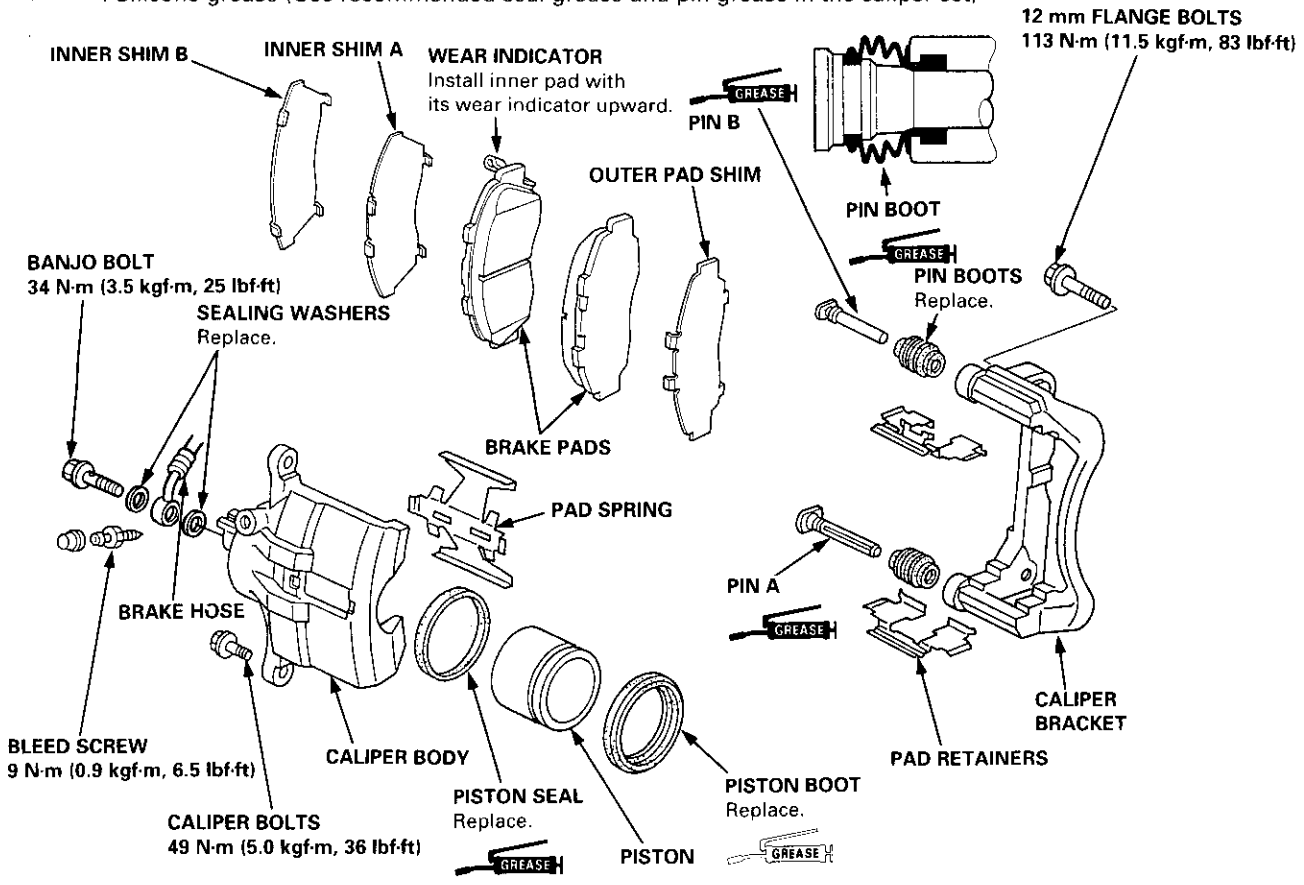
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

NOTE:

- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not reuse the drained fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
- Coat the piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the front brake caliper do the following.
  - — Check for leaks at hose and line joints and connections, and retighten if necessary.
  - — Check the brake hoses for interference and twisting.

GREASE: Rubber grease (Use recommended grease in the caliper set)

GREASE: Silicone grease (Use recommended seal grease and pin grease in the caliper set)



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Removal/Installation

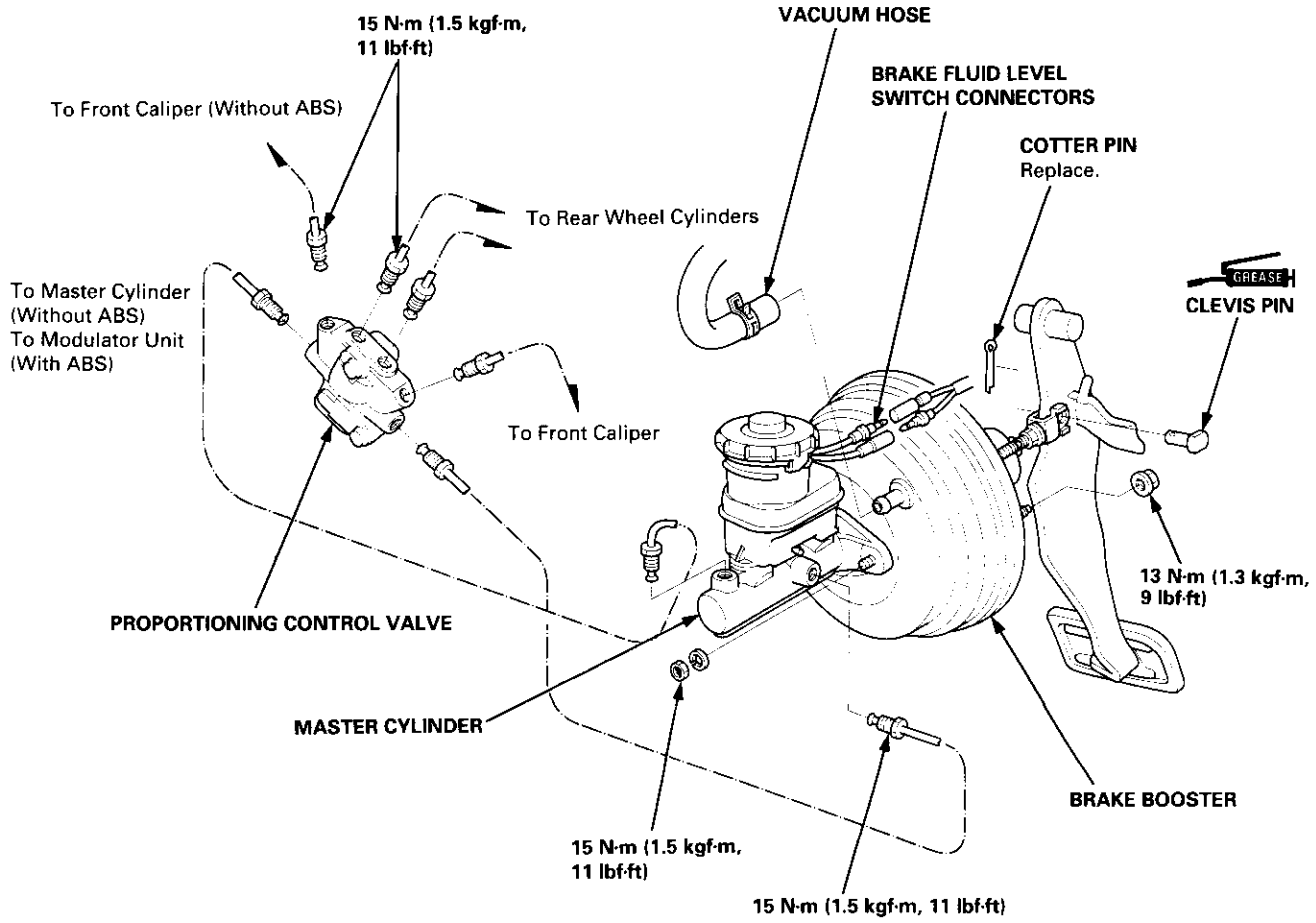
1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. Remove the brake fluid from the master cylinder reservoir with a syringe.
4. Disconnect the brake lines from the master cylinder. To prevent spills, cover the line joints with rags or shop towels.
5. Remove the master cylinder mounting nuts and washers.
6. Remove the master cylinder from the brake booster.

   CAUTION: Be careful not to bend or damage the brake lines when removing the master cylinder. Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

7. Disconnect the vacuum hose from the brake booster.
8. Remove the cotter pin and clevis pin from the clevis. Do not disconnect the clevis by removing it from the operating rod of the brake booster. If the clevis is loosened, adjust the pushrod length before installing the brake booster (see page 19-15).
9. Remove the four booster mounting nuts.
10. Pull the brake booster forward until the clevis is clear of the bulkhead.
11. Remove the brake booster from the engine compartment.
12. Install the brake booster and master cylinder in the reverse order of removal, and note these items:

    - When connecting the brake lines, make sure that there is no interference between the brake lines and other parts.
    - Be careful not to bend or damage the brake lines when installing the master cylinder.
    - If replacing the master cylinder or brake booster, check and adjust the pushrod clearance before installing the master cylinder (see page 19-14).

13. Fill the master cylinder reservoir, and bleed the brake system (see page 19-7).
14. After installation, check the brake pedal height and brake pedal free play (see page 19-5), and adjust if necessary.



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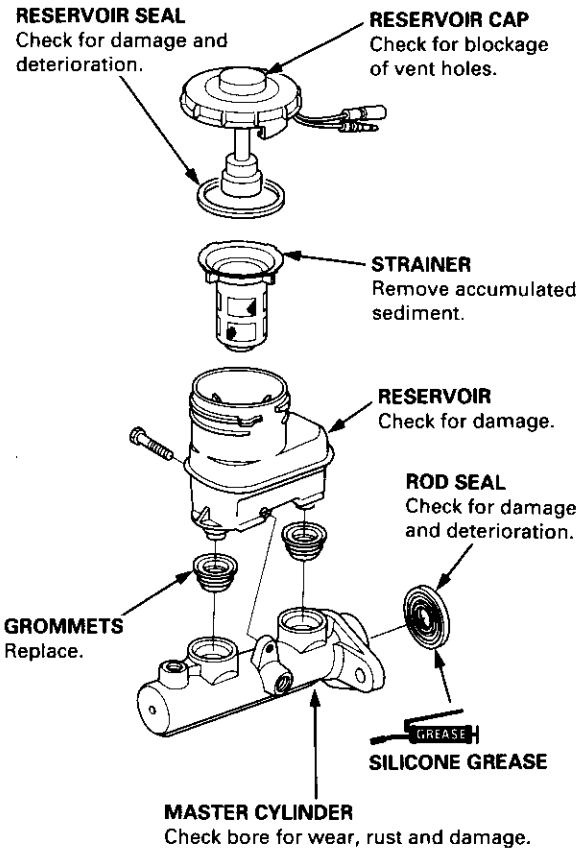
Master Cylinder

Inspection/Disassembly

CAUTION: Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

NOTE:

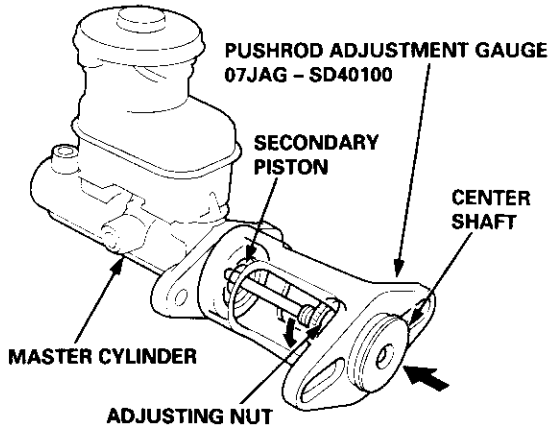
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.



Pushrod Clearance Adjustment

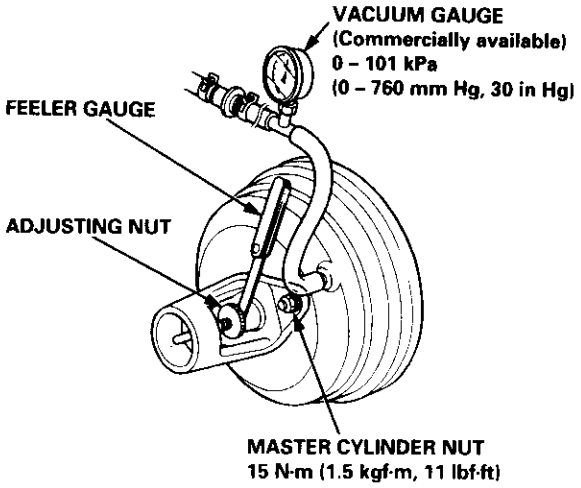
NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing the master cylinder.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.



2. Without disturbing the center shaft's position, install the special tool upside down on the booster.
3. Install the master cylinder nuts, and tighten them to the specified torque.
4. Connect the booster in-line with a vacuum gauge 0 – 101 kPa (0 – 760 mmHg, 30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in Hg) vacuum.
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

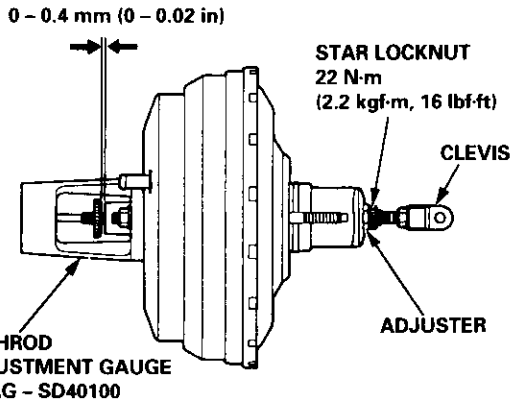
Clearance: 0 – 0.4 mm (0 – 0.02 in)



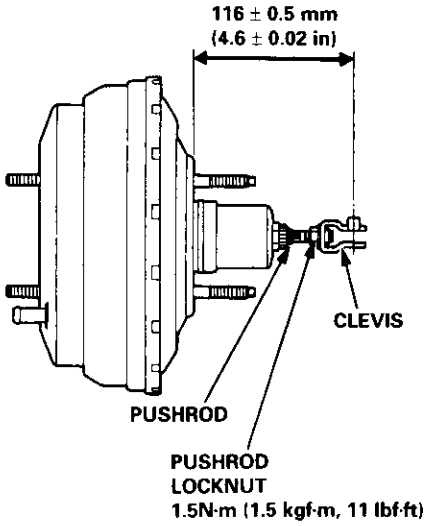
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If the clearance between the gauge body and adjusting nut is 0.4 mm (0.02 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.02 in) or more. Therefore it must be adjusted and rechecked.

6. If clearance is incorrect, loosen the star locknut, and turn the adjuster in or out to adjust.
   - Adjust the clearance while the specified vacuum is applied to the booster.
   - Hold the clevis while adjusting.
7. Tighten the star locknut securely.
8. Remove the special tool.



9. Adjust the pushrod length as shown if the booster is removed.



10. Install the master cylinder (see page 19-13).

Brake Booster Inspection

Functional Test

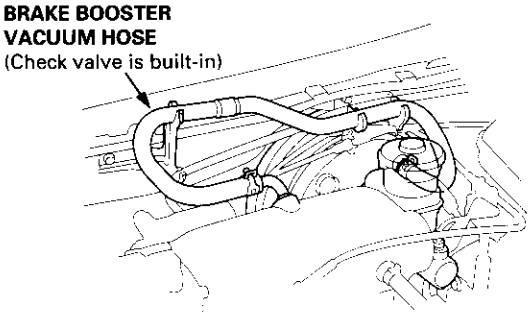
1. With the engine stopped, press the brake pedal several times to deplete the vacuum reservoir, then press the pedal hard, and hold it for 15 seconds. If the pedal sinks, either the master cylinder is bypassing internally, or the brake system (master cylinder, lines, modulator, proportioning valve, or caliper) is leaking.
2. Start the engine with the pedal pressed. If the pedal sinks slightly, the vacuum booster is operating normally. If the pedal height does not vary, the booster or check valve is faulty.
3. With the engine running, press the brake pedal lightly. Apply just enough pressure to hold back automatic transmission creep. If the brake pedal sinks more than 10 mm (3/8 in.) in three minutes, the master cylinder is faulty. A slight change in pedal height when the A/C compressor cycles on and off is normal. (The A/C compressor load changes the vacuum available to the booster.)

Leak Test

1. Press the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while pressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.
2. With the engine stopped, press the brake pedal several times using normal pressure. When the pedal is first pressed, it should be low. On consecutive applications, the pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Booster Check Valve Test

1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine, and let it idle. There should be vacuum. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve, and retest.



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Rear Drum Brakes

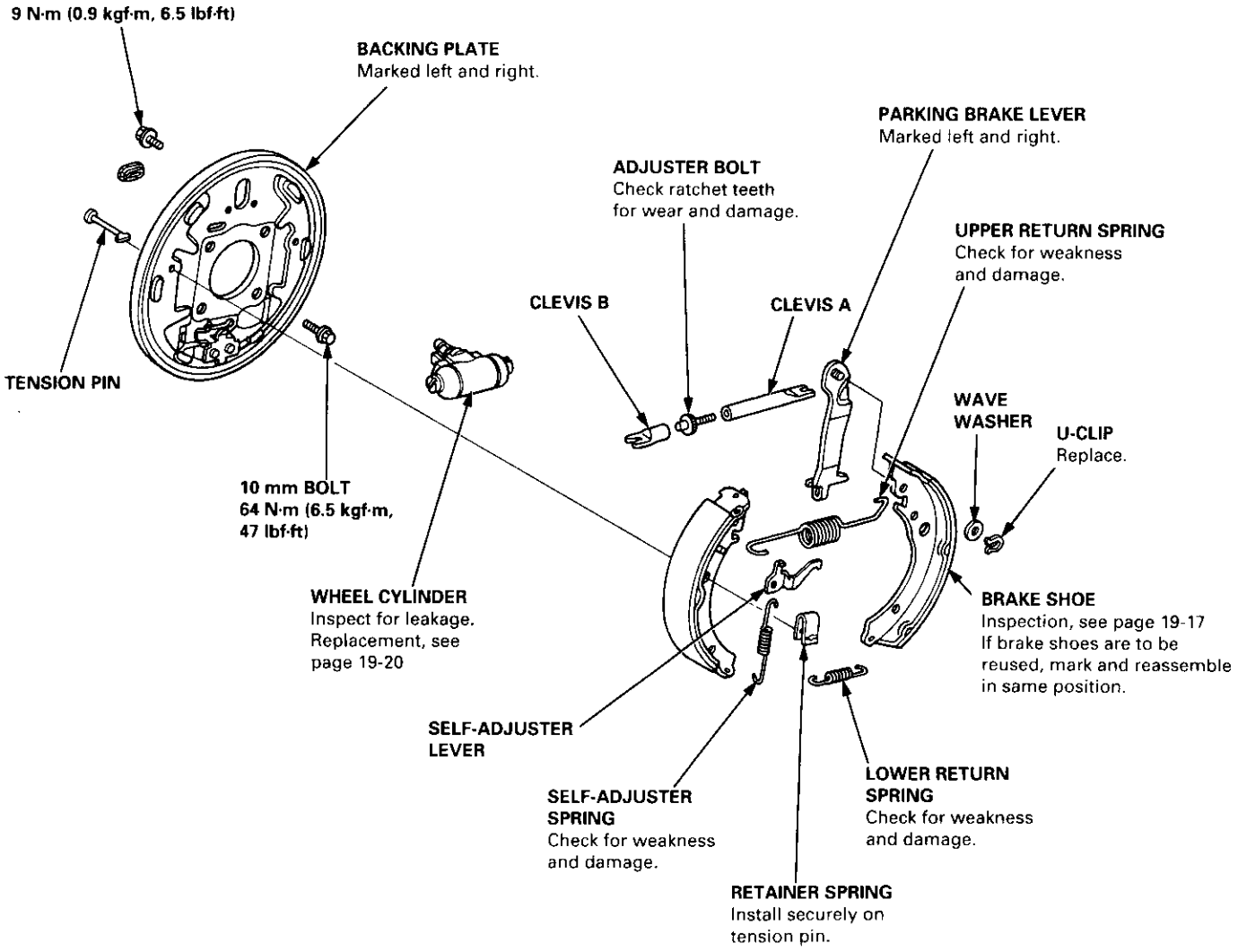
Inspection

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA approved vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake linings or drums reduce stopping ability.**
- **Block the front wheels before jacking up the rear of the vehicle.**

1. Block the front wheels, loosen the rear wheel nuts slightly, then raise the vehicle, and make sure it is securely supported. Remove the rear wheels.

2. Release the parking brake, and remove the rear brake drum.



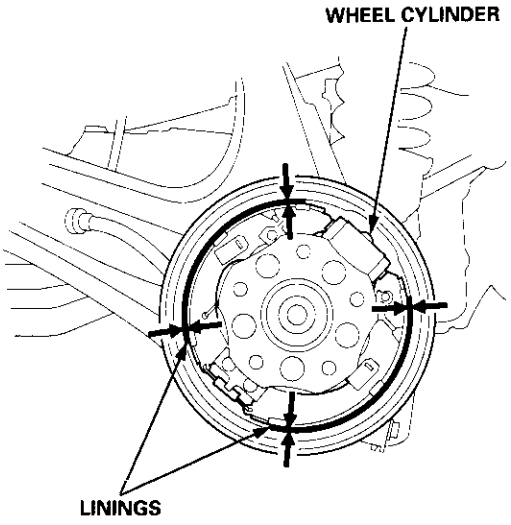
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3. Check the wheel cylinder for leakage.

4. Check the brake linings for cracking, glazing, wear, and contamination.

5. Measure the brake lining thickness. Measurement does not include brake shoe thickness.

   Brake Lining Thickness:
   Standard: 3.9 – 4.5 mm (0.15 – 0.18 in)
   Service Limit: 2.0 mm (0.08 in)

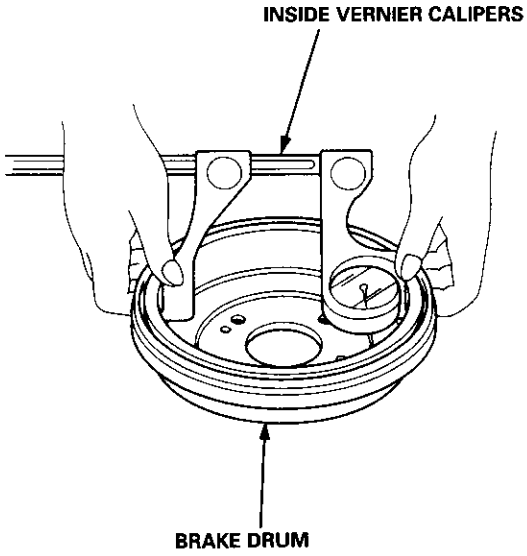


6. If the brake lining thickness is less than the service limit, replace the brake shoes as a set.

7. Check the bearings in the hub unit for smooth operation; if the bearing require servicing, refer to section 18.

8. Measure the inside diameter of the brake drum with inside vernier calipers.

   Drum Inside Diameter:
   Standard: 219.9 – 220.0 mm (8.657 – 8.661 in)
   Service Limit: 221.0 mm (8.700 in)



9. If the inside diameter of the brake drum is more than the service limit, replace the brake drum.

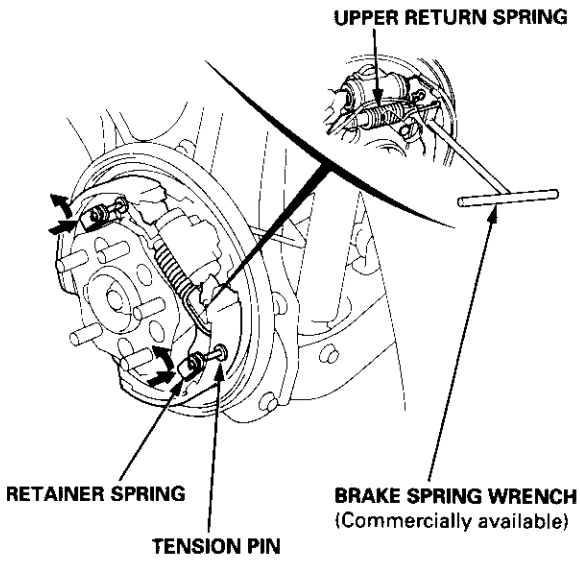
10. Check the brake drum for scoring, grooves, and cracks.

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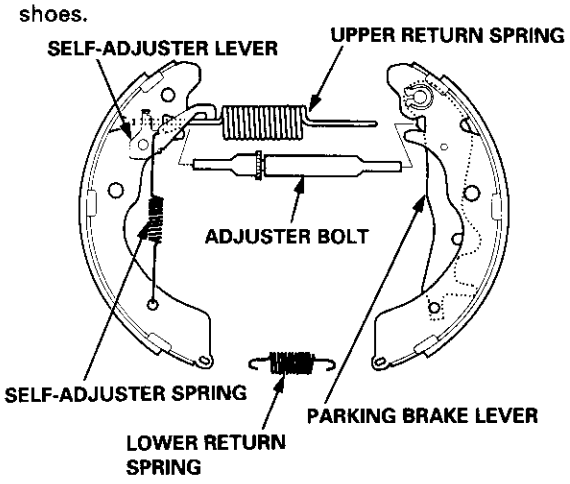
Brake Shoes Replacement

1. Remove the upper return spring with the tool.

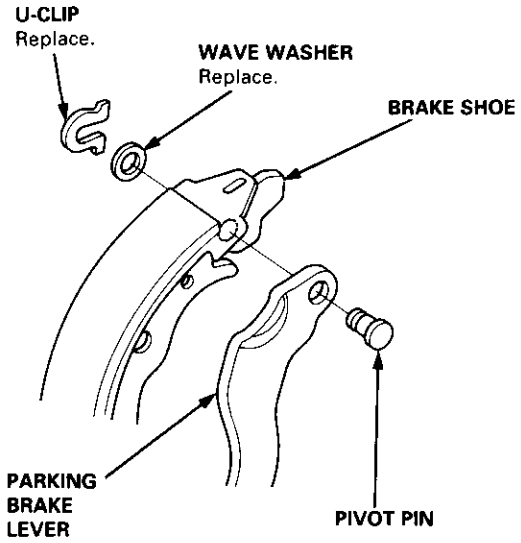
   ⚠ WARNING Wear eye protection when using the brake spring wrench.



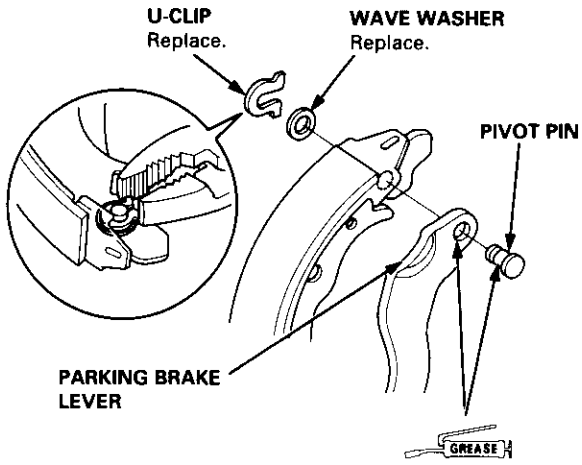
2. Remove the tension pins by pushing the retainer spring and turning them.
3. Lower the brake shoe assembly, and remove the lower return spring. Make sure not to damage the dust cover on the wheel cylinder.
4. Disconnect the parking brake cable from the parking brake lever.
5. Remove the brake shoe assembly.
6. Remove the upper return spring, self-adjuster lever, and self-adjuster spring, and separate the brake shoes.



7. Remove the wave washer, parking brake lever, and pivot pin from the brake shoe by removing the U-clip.



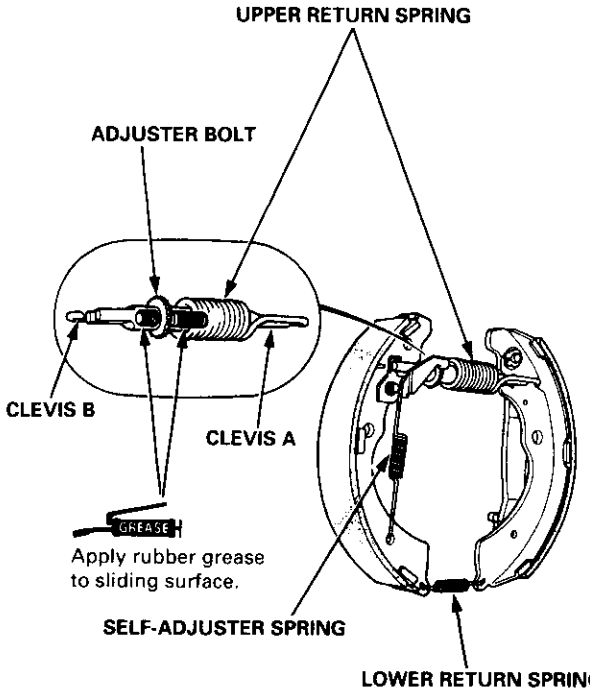
8. Apply brake cylinder grease (P/N: 08733 – B0202) or equivalent rubber grease to the sliding surface of the pivot pin, and insert the pin into the brake shoe.
9. Install the parking brake lever and wave washer on the pivot pin, and secure them with a new U-clip.
   - Install the wave washer with its convex side facing out.
   - Pinch the U-clip securely to prevent the pivot pin from coming out of the brake shoe.



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10. Connect the parking brake cable to the parking brake lever.

11. Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt.



12. Hook the self-adjuster spring to the self-adjuster lever first, then to the brake shoe.

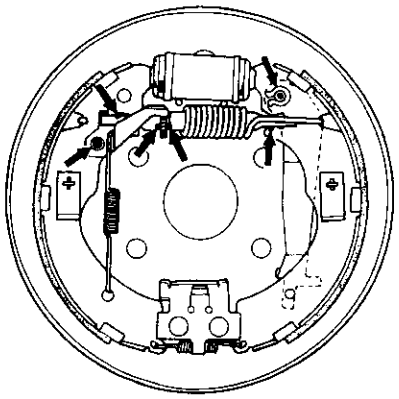
13. Install the clevises and upper return spring noting the installation direction. Be careful not to damage the wheel cylinder dust covers.

14. Install the lower return spring.

15. Apply grease on each sliding surface. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

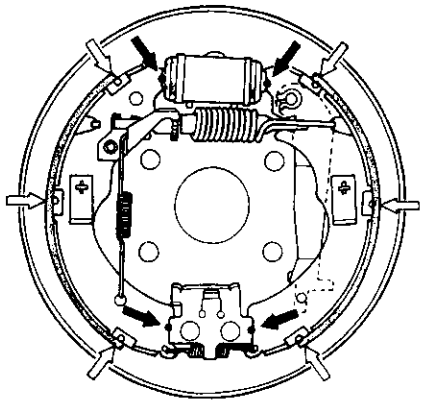
- Apply brake cylinder grease (P/N: 08733 – B020E) or equivalent rubber grease to the sliding surfaces as shown.

➡ ● Sliding surface



- Apply Molykote 44MA to the brake shoe ends and opposite edges of the shoes as shown.

➡ ● Opposite edge of the shoe
⇨ ○ Brake shoe ends
(Shoe side ends and backing plate contact surface)



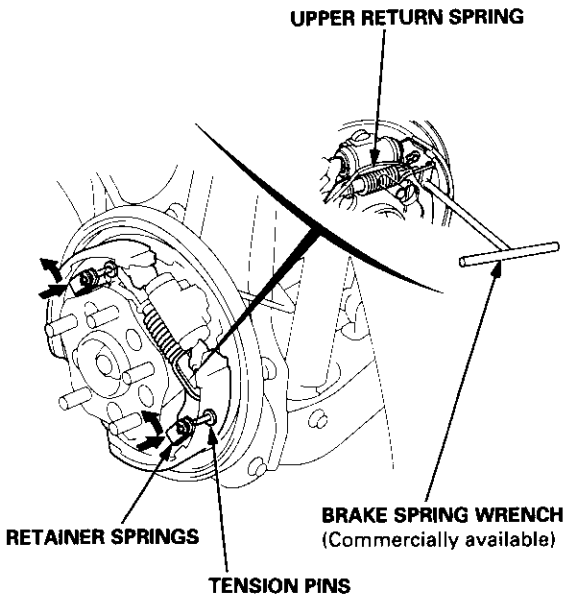
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Brake Shoes Replacement (cont'd)

16. Install the brake shoes onto the backing plate. Be careful not to damage the wheel cylinder dust covers.

17. Install the tension pins and the retainer springs.



18. Hook the upper return spring with the tool.

⚠ WARNING Wear eye protection when using the brake spring wrench.

19. Install the brake drum.

20. If the wheel cylinder has been removed, bleed the brake system (see page 19-7).

21. Press the brake pedal several times to set the self-adjusting brake.

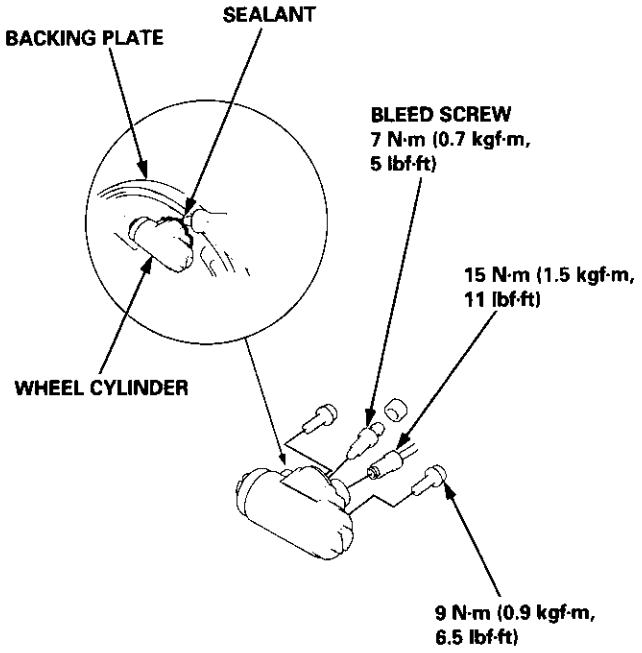
22. Adjust the parking brake (see page 19-6).

Wheel Cylinder Replacement

CAUTION:
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Use only a genuine Honda wheel cylinder special bolt.**

1. Remove the brake shoes (see page 19-18).

2. Disconnect the brake line.



3. Remove the bolt and the wheel cylinder from the backing plate.

4. Apply sealant between the wheel cylinder and backing plate, and install the wheel cylinder.

5. Install the removed parts in the reverse order of removal.

6. Fill the brake reservoir up, and bleed the brake system (see page 19-7).

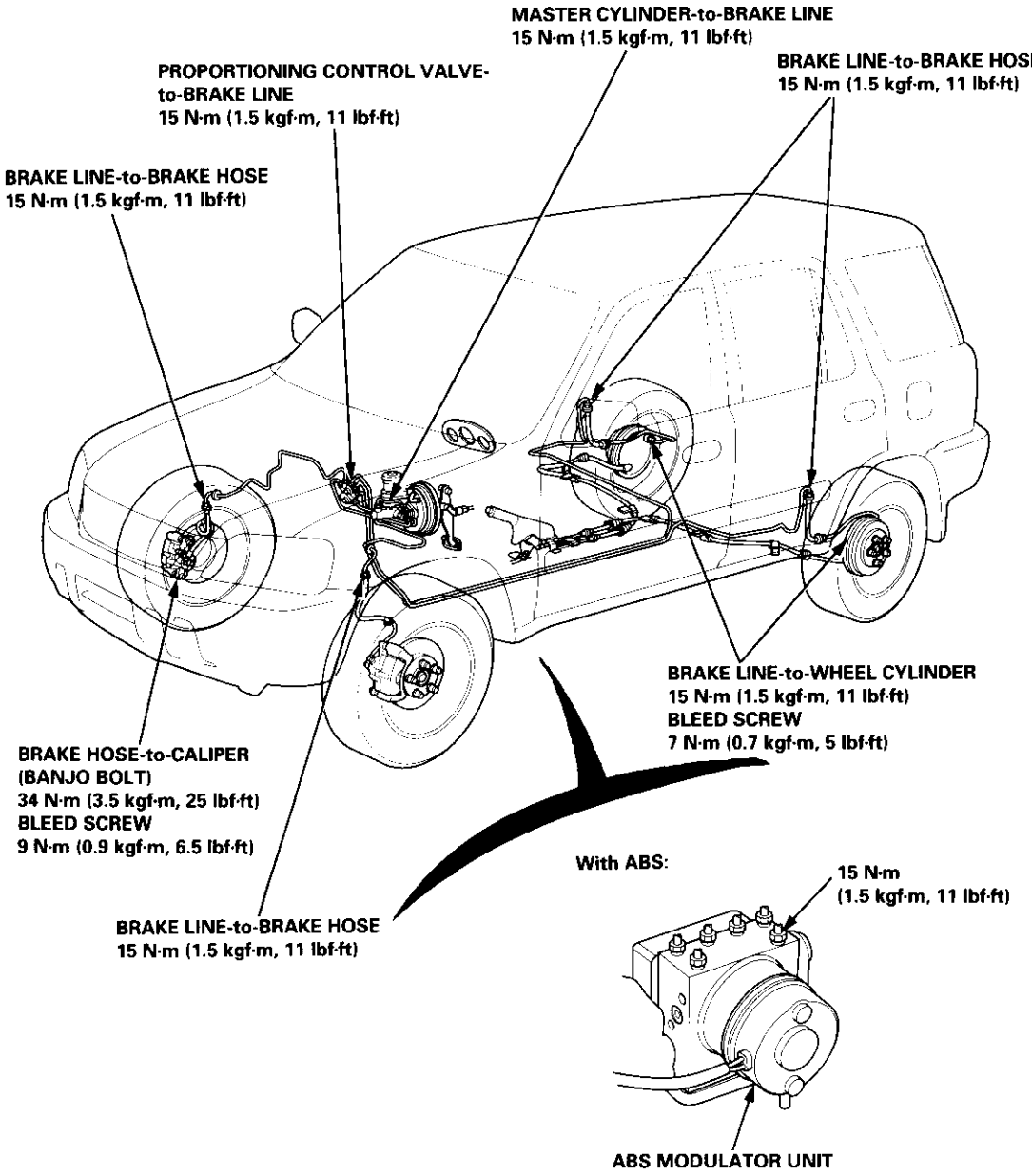
7. After installation, check for a leak at the line joint, and retighten if necessary.

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Inspection/Torque Specifications

1. Inspect the brake hoses for damage, deterioration, leaks, interference, and twisting.
2. Check the brake lines for damage, rusting, and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints and connections, and retighten if necessary.
4. Check the master cylinder, proportioning control valve, and ABS modulator unit for damage and leakage.

NOTE: Replace the brake hose clip whenever the brake hose is serviced.



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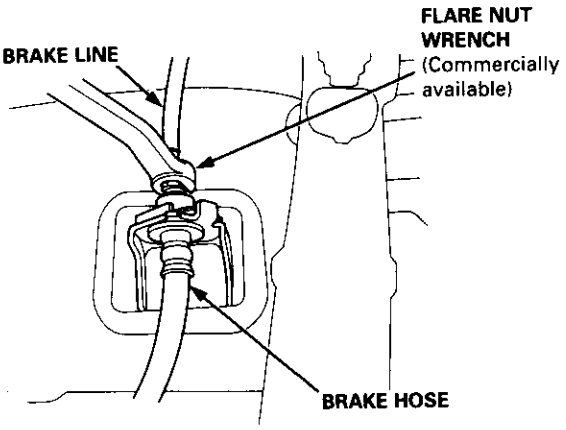
Hose Replacement

CAUTION: Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

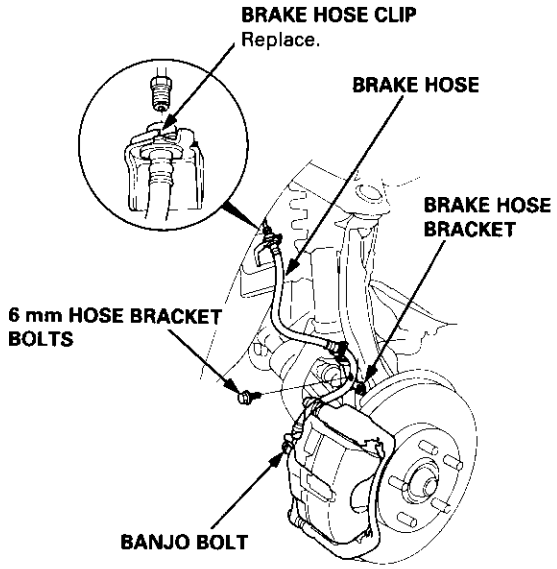
NOTE:
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.

1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.

2. Disconnect the brake hose from the brake line using a 10 mm flare nut wrench.



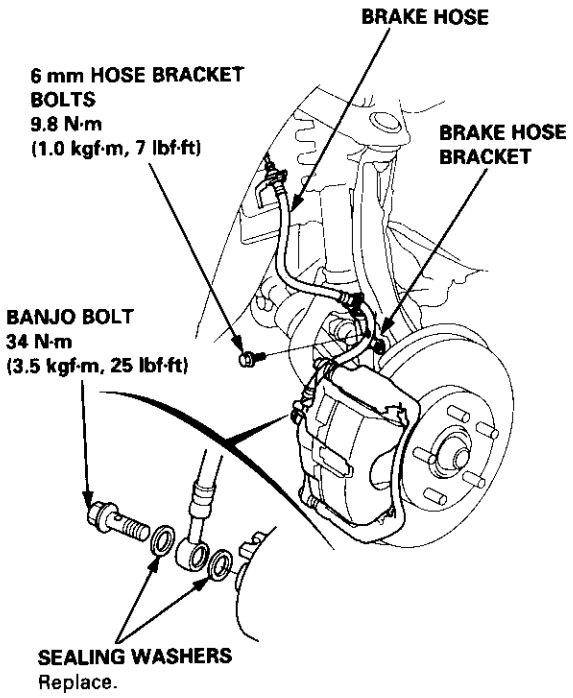
3. Remove and discard the brake hose clip from the brake hose.



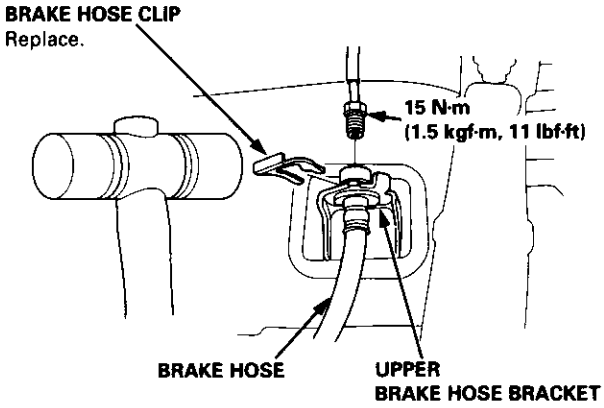
4. Remove the banjo bolt, and disconnect the brake hose from the caliper.

5. Remove the brake hose from the knuckle.

6. Install the brake hose on the knuckle first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



7. Install the brake hose on the upper brake hose bracket with a new brake hose clip.



8. Connect the brake line to the brake hose.

9. After installing the brake hose, bleed the brake system (see page 19-7).

10. Perform the following checks:
    - Check the brake hose and line joint for leaks, and tighten if necessary.
    - Check the brake hoses for interference and twisting.

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Parking Brake Cable

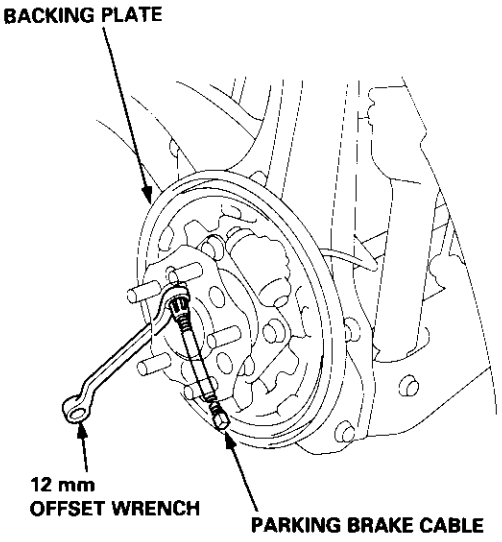
Inspection and Replacement

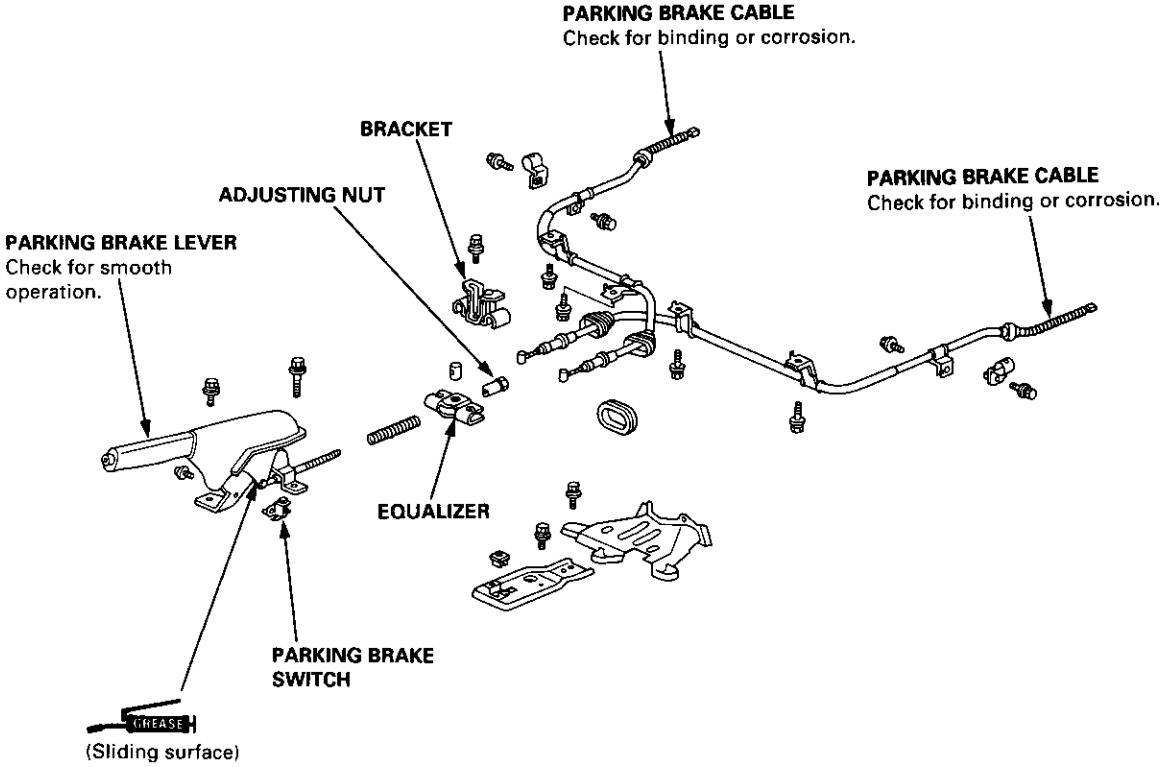
Inspection

The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.

Replacement

1. Disconnect the parking brake switch connector.
2. Release the parking brake lever, and disconnect the parking brake cable.
3. Remove the parking brake lever assembly.
4. Remove the parking brake shoes (see page 19-18).
5. Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.
6. Install the cable in the reverse order of removal.





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Anti-lock Brake System (ABS), '97 – 00 Models

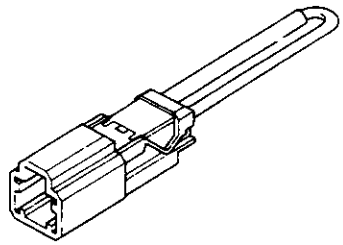
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ – 0010100	SCS Service Connector	1	19-38

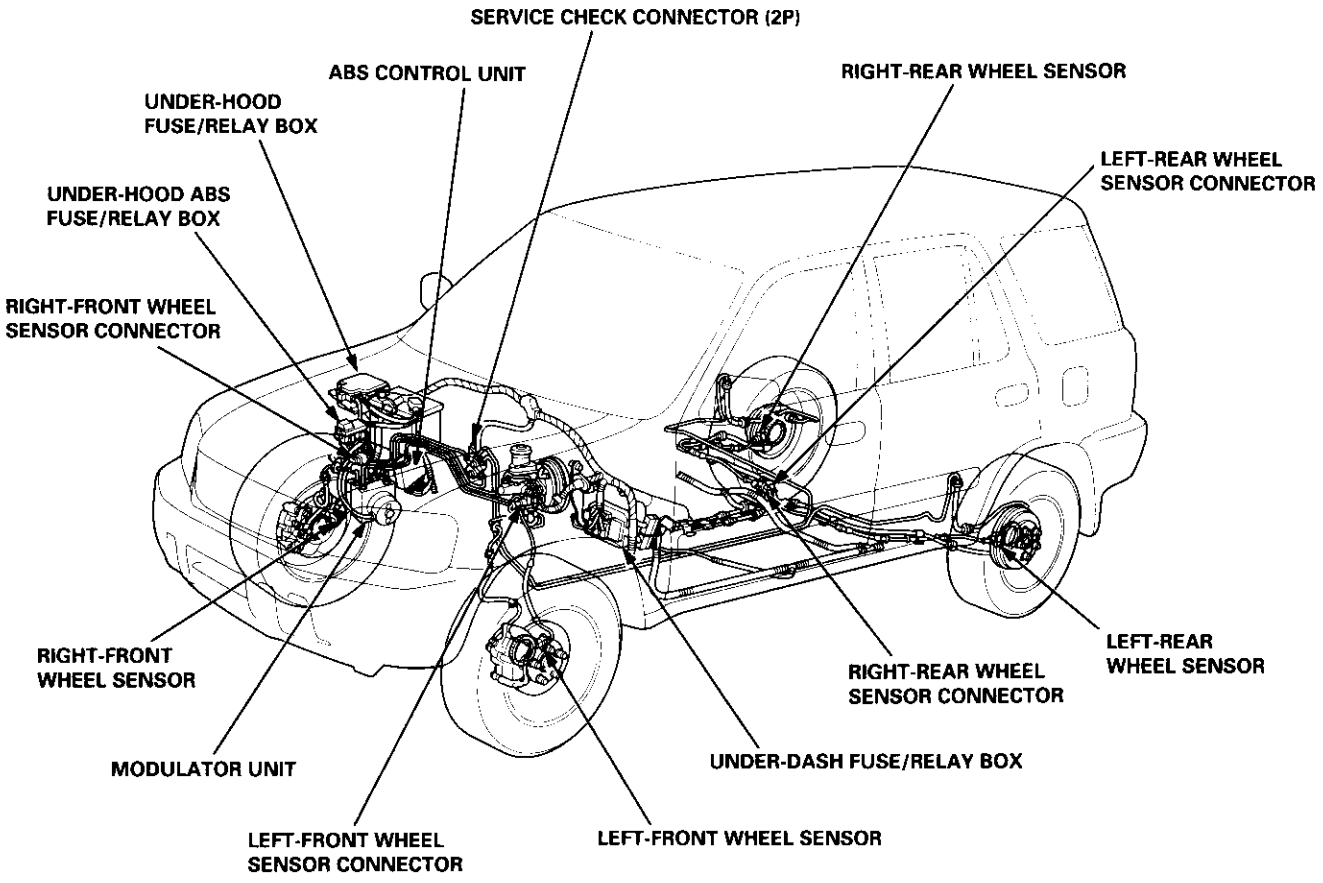


①

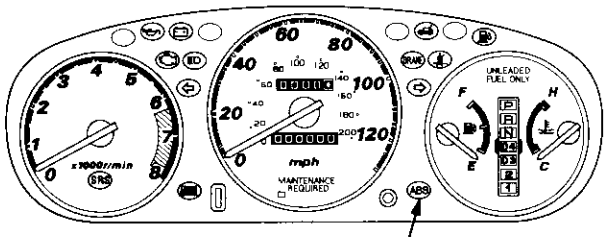
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Component Locations

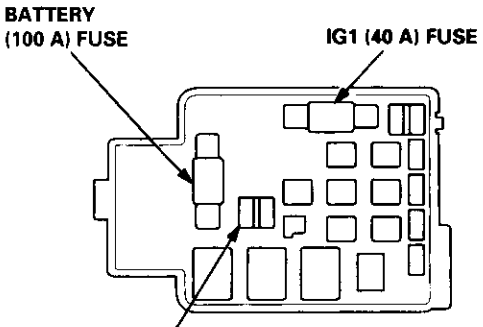
NOTE: The illustrations show the '97 – 98 models. The '99 – 00 models are similar.



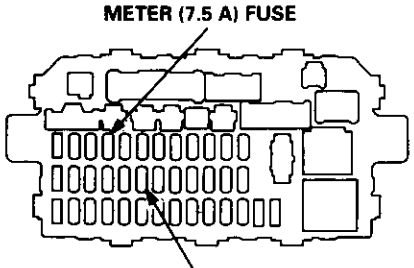
GAUGE ASSEMBLY



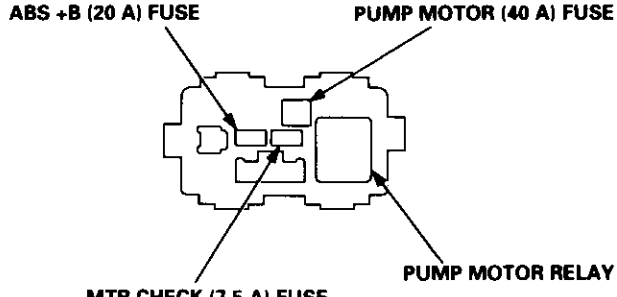
UNDER-HOOD FUSE/RELAY BOX



UNDER-DASH FUSE/RELAY BOX



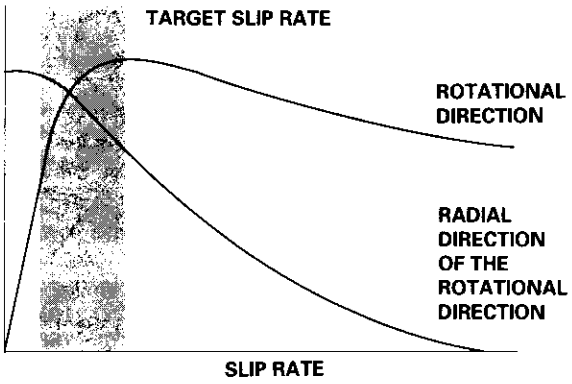
UNDER-HOOD ABS FUSE/RELAY BOX

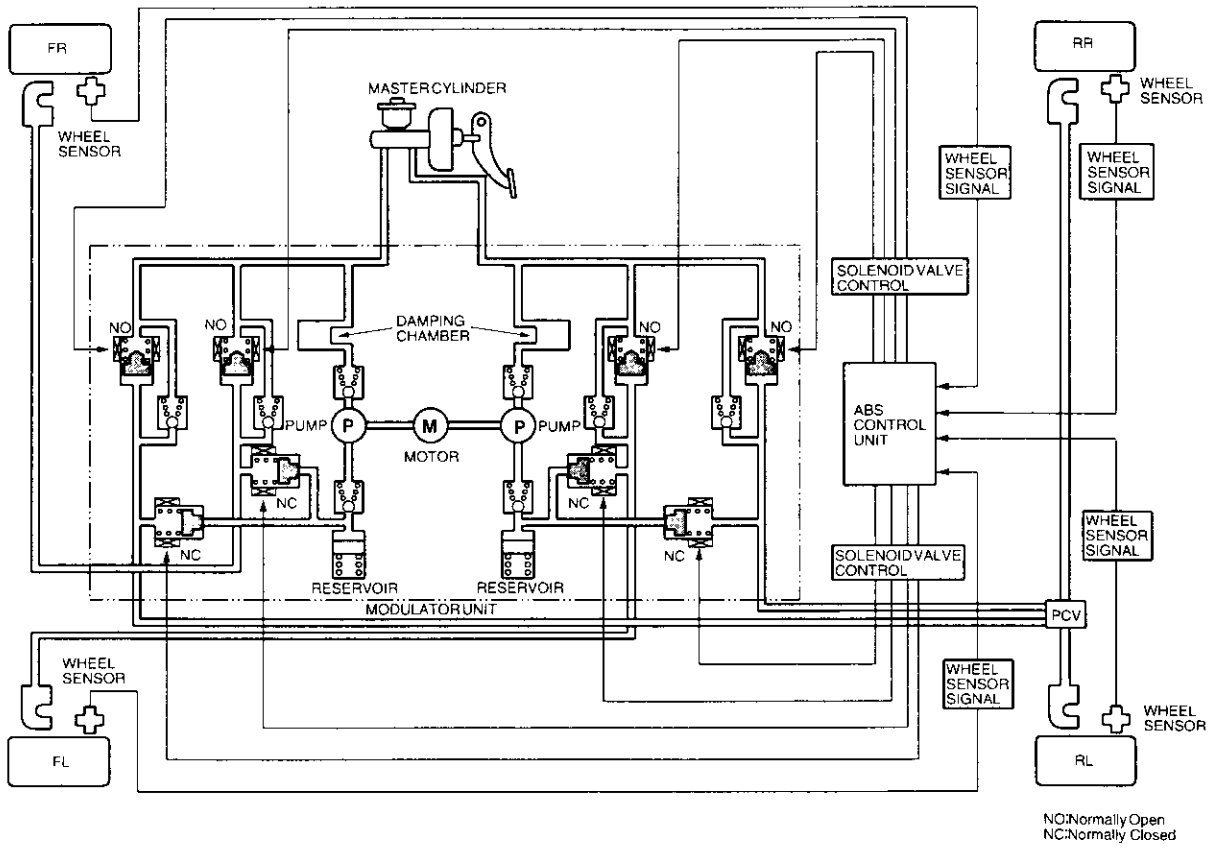


Features/Construction

When the brake pedal is pressed during driving, the wheels can lock before the vehicle comes to a stop. In such an event, the maneuverability of the vehicle is reduced if the front wheels are locked, and the stability of the vehicle is reduced if the rear wheels are locked, creating an extremely unstable condition. The ABS precisely controls the slip rate of the wheels to ensure maximum grip force from the tires, and it thereby ensures maneuverbility and stability of the vehicle.
The ABS calculates the slip rate of the wheels based on the vehicle speed and the wheel speed, then it controls the brake fluid pressure to attain the target slip rate.

Grip Force of Tire and Road Surface





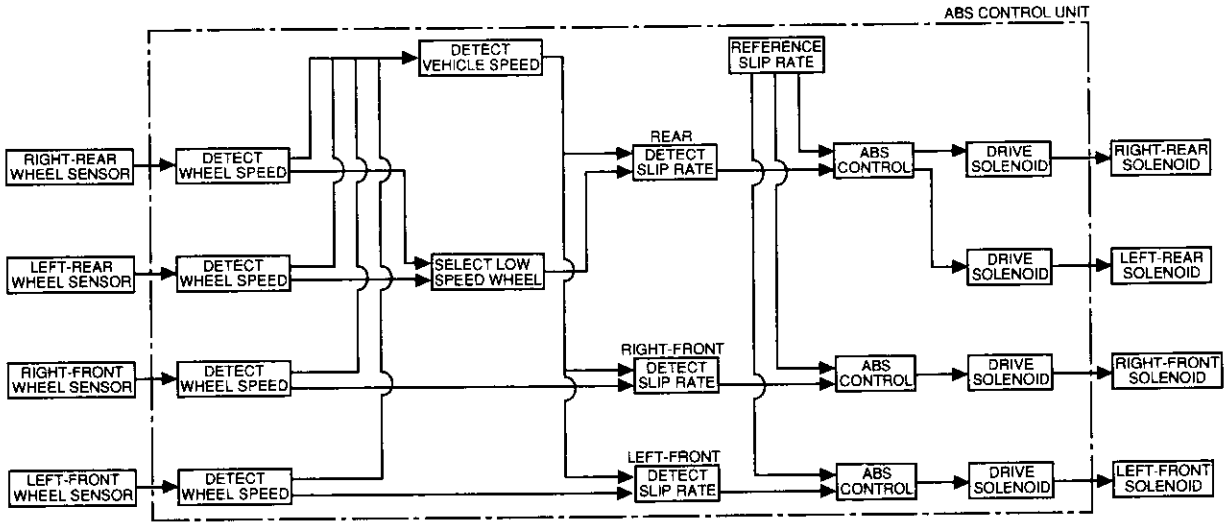
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ABS Control

The ABS control unit detects the wheel speed based on the wheel sensor signal it received, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed during deceleration based on the rate of deceleration.

The ABS control unit calculates the slip rate of each wheel, and it transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

The pressure reduction control has three modes: pressure reducing, pressure retaining, and pressure intensifying modes.



Self-diagnosis Function

The ABS control unit is equipped with a main CPU and a sub CPU, that check each other for problems.

The CPUs check the circuit of the system.

When the CPUs detect failure, they shift to the "system down mode" or the "control inhibition mode".

MODE	ABS INDICATOR LIGHT	MAIN RELAY	SOLENOID VALVE	CPU	Restart condition		DTC
SYSTEM DOWN	ON	No operation	Drive inhibition	Operation*1	Ignition switch	OFF → ON (II)	Memory
CONTROL INHIBITION	ON	No operation	Drive inhibition	Operation	Automatic		Memory

*1: Except CPU failure

The self-diagnosis can be classified into these four categories:

①: Initial diagnosis

②: Except ABS control

③: During ABS control

④: During warning

On-board Diagnosis Function

The ABS system can be diagnosed with the Honda PGM Tester.

The ALB Checker cannot be used with this system. For air bleeding, and checking wheel sensor signals, use the Honda PGM Tester. See the Honda PGM Tester user's manuals for specific operating instructions.

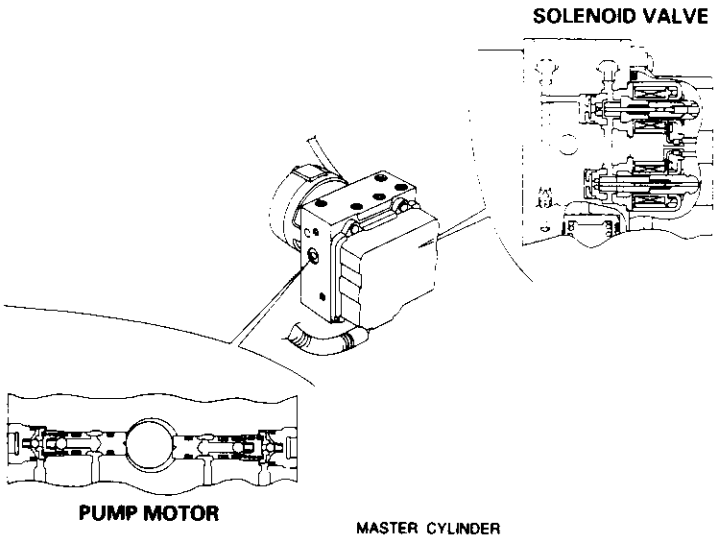
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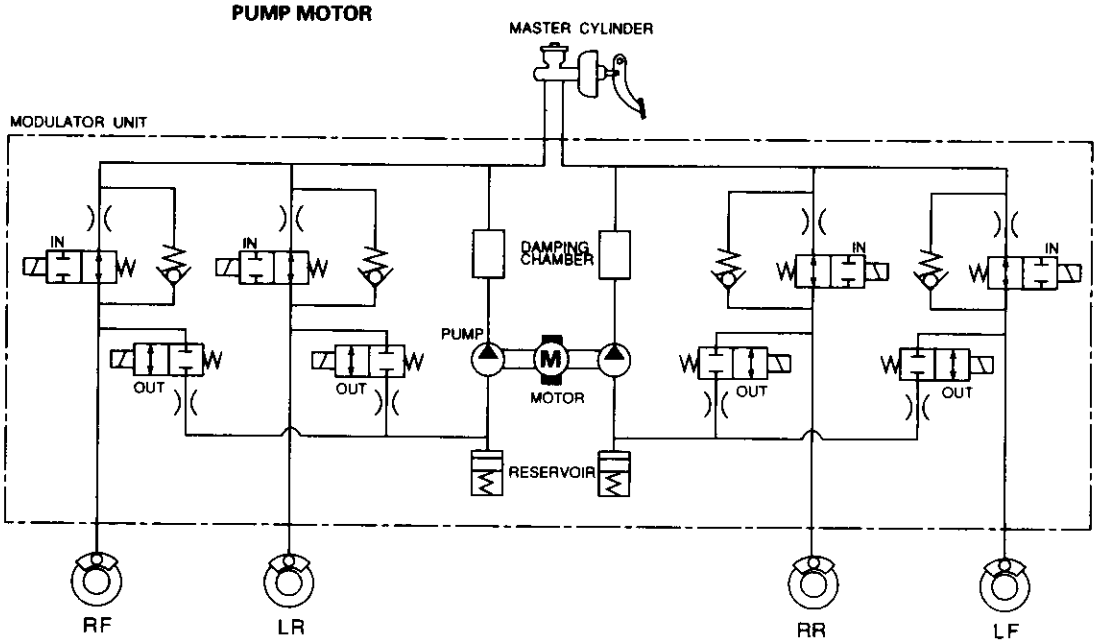
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Features/Construction (cont'd)

ABS Modulator

The ABS modulator consists of the inlet solenoid valve, outlet solenoid valve, reservoir, pump, pump motor and the damping chamber.
The modulator reduces the caliper fluid pressure directly. It is a circulating-type modulator because the brake fluid circulates through the caliper, reservoir and the master cylinder.
The hydraulic control has three modes: pressure reduction, pressure retaining and pressure intensifying modes.
The hydraulic circuit is the independent four channel-type, one channel for each wheel.





Pressure intensifying mode: Inlet valve open, outlet valve closed.
Master cylinder fluid is pumped out to the caliper.

Pressure retaining mode: Inlet valve closed, outlet valve closed.
Caliper fluid is retained by the inlet valve and outlet valve.

Pressure reduction mode: Inlet valve closed, outlet valve open.
Caliper fluid flows through the outlet valve to the reservoir.

Motor operation mode: When starting the pressure reduction mode, the pump motor is ON.
When stopping ABS operation, the pump motor is OFF.
The reservoir fluid is pumped out by the pump, through the damping chamber, to the master cylinder.

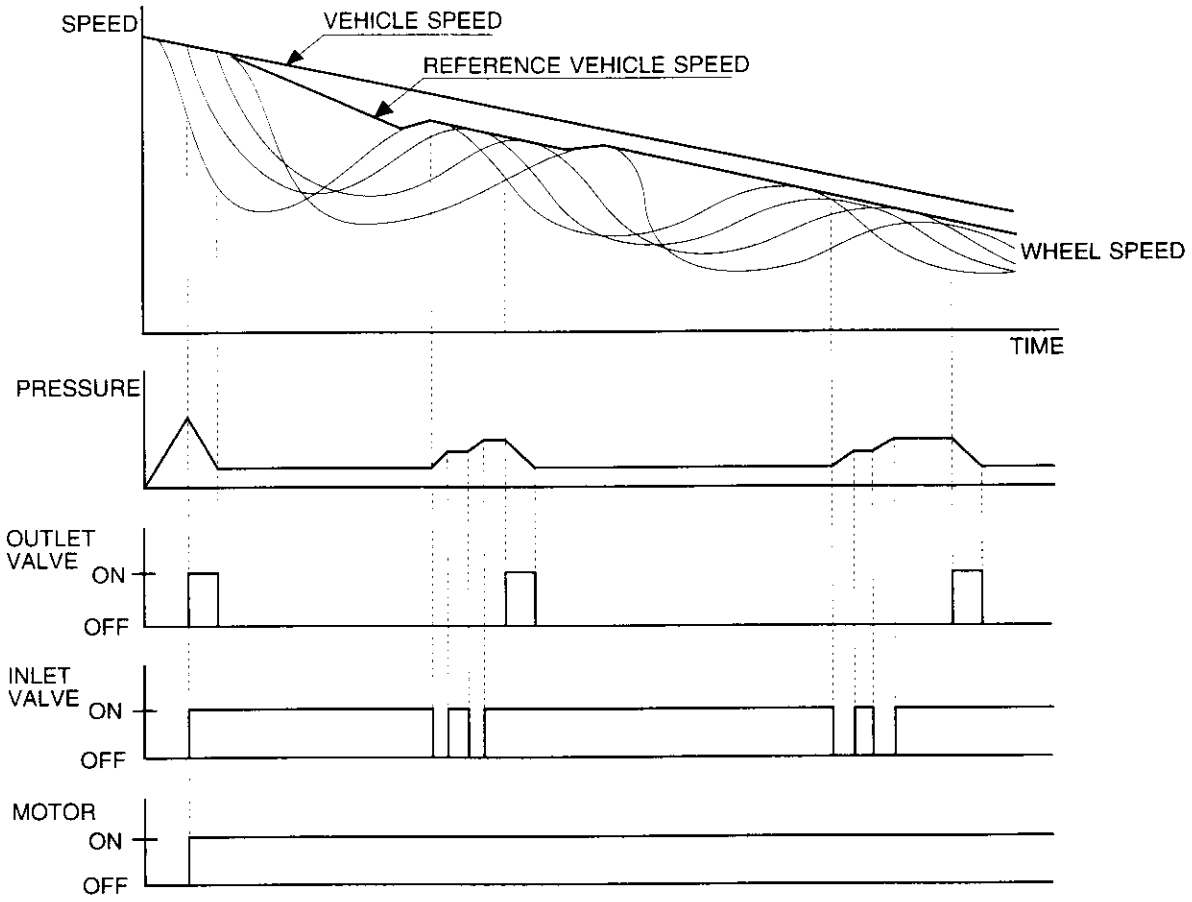
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Wheel Sensor

The wheel sensors are the magnetic contactless type. As the gear pulser teeth rotate past the wheel sensor's magnetic coil, AC current is generated. The AC frequency changes in accordance with the wheel speed. The ABS control unit detects the wheel sensor signal frequency and thereby detects the wheel speed.



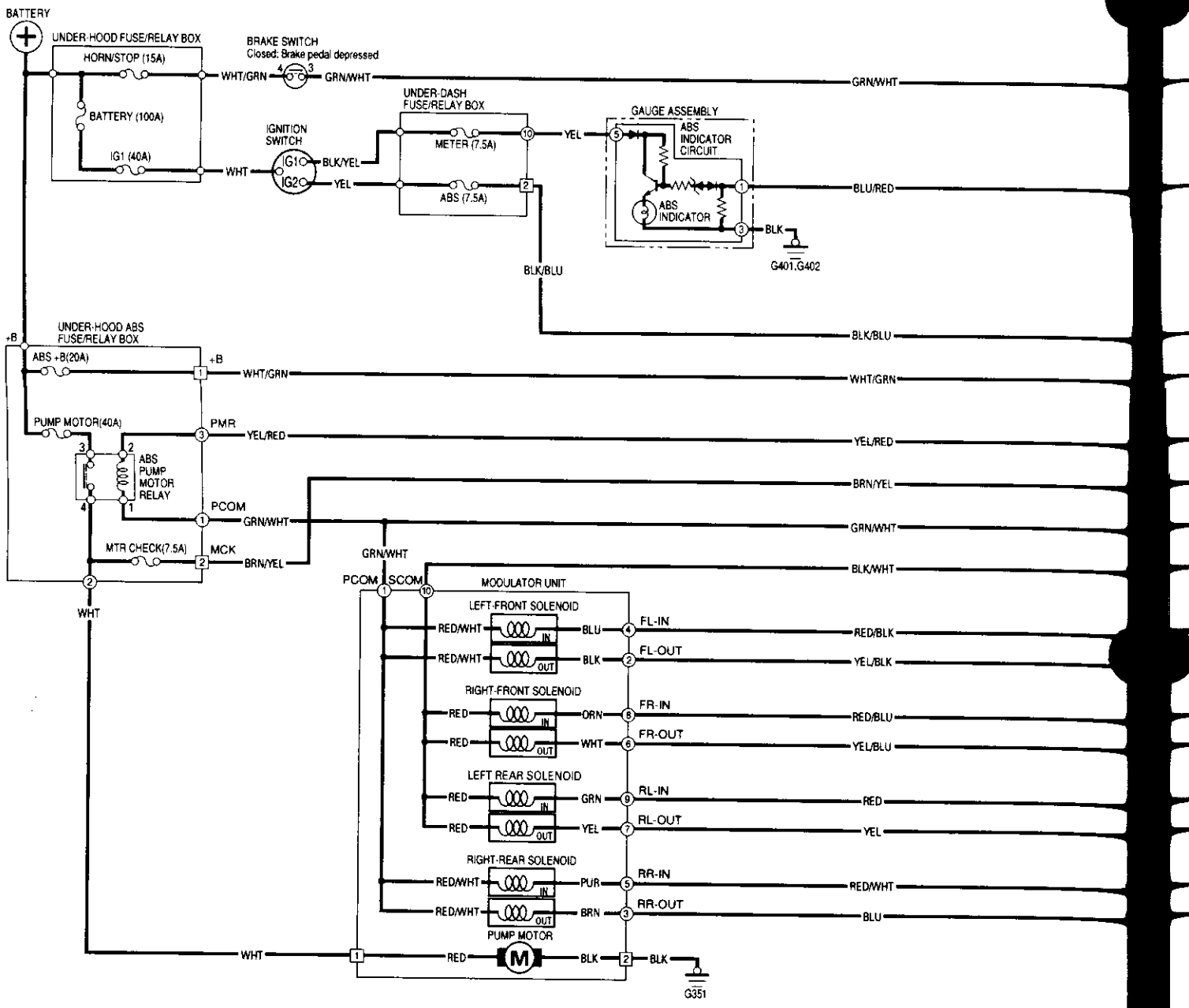
Wheel Speed and Modulator Control



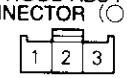
When the wheel speed drops sharply below the vehicle speed, the outlet valve opens momentarily to reduce the caliper fluid pressure. The pump motor starts at this time. As the wheel speed is restored, the inlet valve opens momentarily to increase the caliper fluid pressure.

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Circuit Diagram



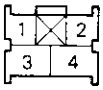
UNDER-HOOD ABS FUSE/RELAY BOX
3P CONNECTOR (○ number)



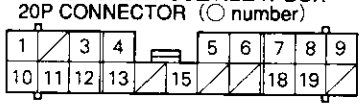
UNDER-HOOD ABS FUSE/RELAY BOX
2P CONNECTOR (□ number)



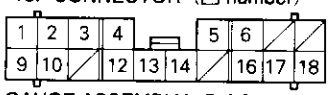
BRAKE SWITCH CONNECTOR



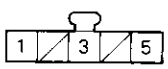
UNDER-DASH FUSE/RELAY BOX
20P CONNECTOR (○ number)



UNDER-DASH FUSE/RELAY BOX
18P CONNECTOR (□ number)

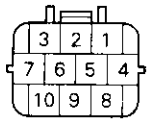


GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals

MODULATOR UNIT CONNECTOR
(○ number)

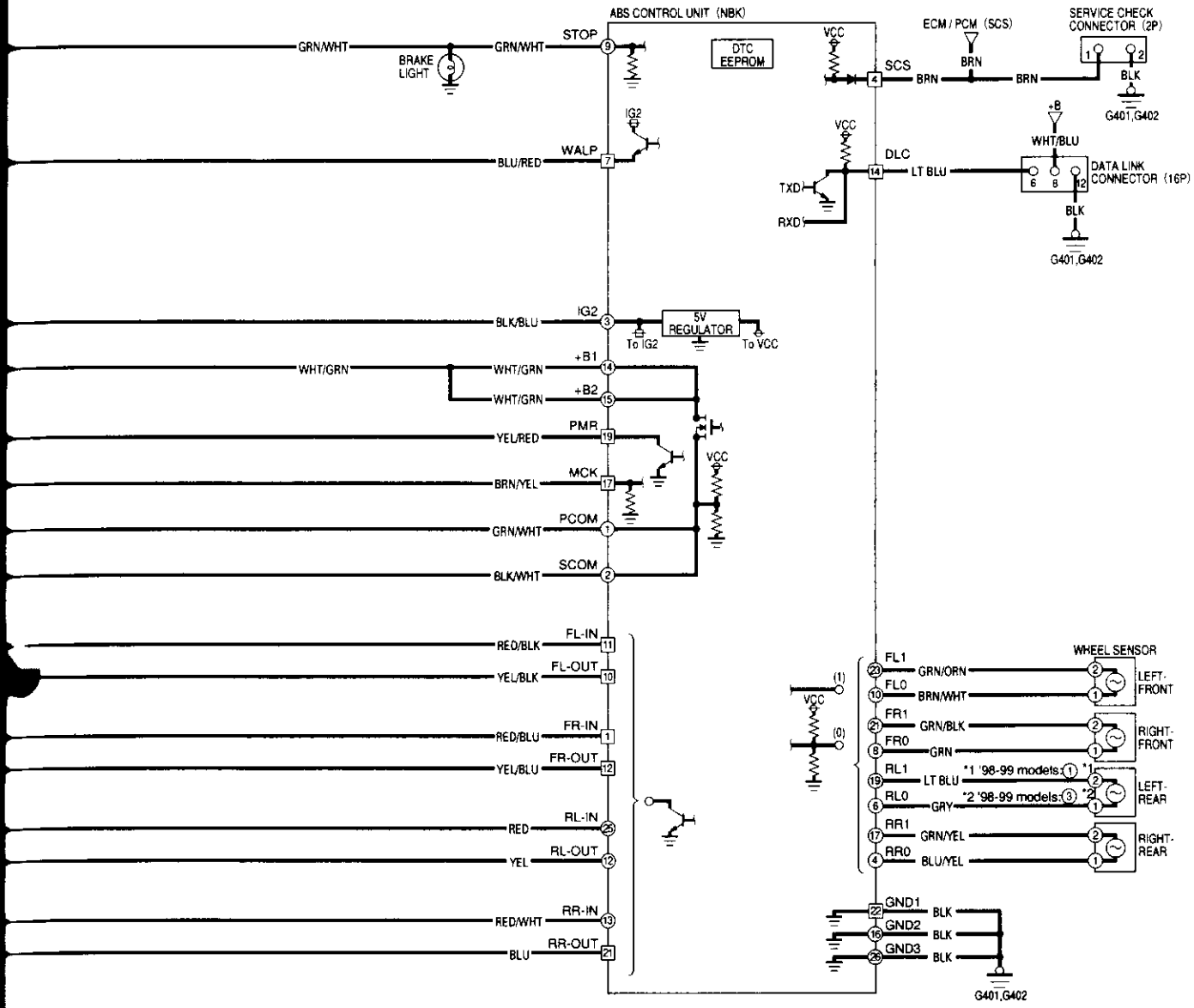


PUMP MOTOR CONNECTOR
(□ number)

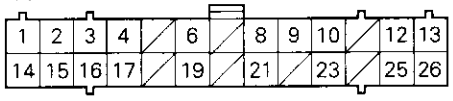


Terminal side of female terminals

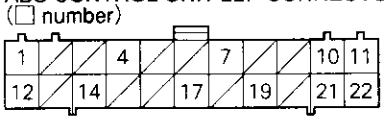
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ABS CONTROL UNIT 26P CONNECTOR
(○ number)



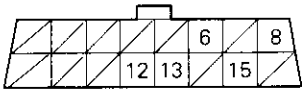
ABS CONTROL UNIT 22P CONNECTOR
(□ number)



SERVICE CHECK CONNECTOR (2P)



DATA LINK CONNECTOR (16P)



Wire side of female terminals

WHEEL SENSOR CONNECTOR

'97 model

FRONT / REAR



Terminal side of male terminals

'98-99 models

FRONT / RIGHT-REAR



Terminal side of male terminals

LEFT-REAR

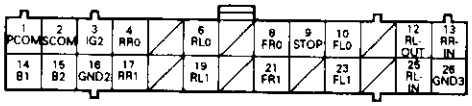


Terminal side of female terminals

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ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 26P CONNECTOR

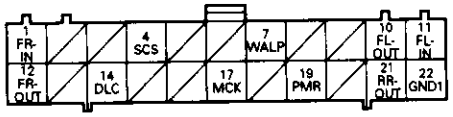


Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Voltage				
				Measurement terminals	Conditions (Ignition Switch ON (II))			Output voltage
1	GRN/WHT	PCOM (Primary common)	Power source for the solenoid valve and pump motor.	1-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
2	BLK/WHT	SCOM (Secondary common)	Power source for the solenoid valve.	2-GND	Engine	OFF (Connect the SCS service connector)		Approx. 3 V
3	BLK/BLU	IG2 (Ignition 2)	Detects ignition switch 2 signal. (System activate signal)	3-GND	———			Battery Voltage
4	BLU/YEL	RR0 (Rear-right 0)	Detects right-rear wheel sensor signal.	4-17	When the wheel is turned at 1 turn/second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope
6	GRY	RL0 (Rear-left 0)	Detects left-rear wheel sensor signal.	6-19				
8	GRN	FR0 (Front-right 0)	Detects right-front wheel sensor signal.	8-21				
					Stops			Approx. 2.5 V
9	GRN/WHT	STOP (Stop)	Detects brake switch signal. (Prevents unnecessary ABS operation)	9-GND	Brake pedal pressed.			Battery Voltage
					Brake pedal released.			0 V
10	BRN/WHT	FL0 (Front-left 0)	Detects left-front wheel sensor signal.	10-23	When the wheel is turned at 1 turn/ second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope
					Stops			Approx. 2.5 V
12	YEL	RL-OUT (Rear-left outlet)	Drives left-rear outlet solenoid valve.	12-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
13	RED/WHT	RR-IN (Rear-right inlet)	Drives right-rear inlet solenoid valve.	13-GND	Engine	OFF (Connect the SCS service connector)		Approx. 3 V
14	WHT/GRN	B1 (Battery 1)	Power source for the solenoid valve and pump motor.	14-GND	Every time			Battery Voltage
15	WHT/GRN	B2 (Battery 2)	Power source for the solenoid valve and pump motor.	15-GND				
16	BLK	GND2 (Ground 2)	Ground for the ABS control unit.	16-GND	———			Below 0.3 V
17	GRN/YEL	RR1 (Rear-right 1)	Detects right-rear wheel sensor signal.	17-4	When the wheel is turned at 1 turn/second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope
19	LT BLU	RL1 (Rear-left 1)	Detects left-rear wheel sensor signal.	19-6				
21	GRN/BLK	FR1 (Front-right 1)	Detects right-front wheel sensor signal.	21-8				
23	GRN/ORN	FL1 (Front-left 1)	Detects left-front wheel sensor signal.	23-10				
					Stops			Approx. 2.5 V
25	RED	RL-IN (Rear-left inlet)	Drives left-rear inlet solenoid valve.	25-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
					Engine	OFF (Connect the SCS service connector)		Approx. 3 V
26	BLK	GND3 (Ground 3)	Ground for the ABS control unit.	26-GND	———			Below 0.3 V

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ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Voltage				
				Measurement terminals	Conditions (Ignition Switch ON (II))			Output voltage
1	RED/BLU	FR-IN (Front-right inlet)	Drives right-front inlet solenoid valve.	1-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
						OFF (Connect the SCS service connector)		Approx. 3 V
4	BRN	SCS (Service check signal)	Detects service check signal (Diagnostic trouble code indication)	4-GND	SCS service connector connected.			0 V
					SCS service connector disconnected.			Approx. 5 V
7	BLU/RED	WALP (Warning lamp)	Drives ABS indicator (The indicator goes off when ABS control unit outputs battery voltage).	7-GND	Indicator ON			Approx. 2 V
					Indicator OFF			Battery Voltage
10	YEL/BLK	FL-OUT (Front-left outlet)	Drives left-front outlet solenoid valve.	10-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
11	RED/BLK	FL-IN (Front-left inlet)	Drives left-front inlet solenoid valve.	11-GND				
12	YEL/BLU	FR-OUT (Front-right outlet)	Drives right-front outlet solenoid valve.	12-GND		OFF (Connect the SCS service connector)		Approx. 3 V
14	LT BLU	DLC (Data link connector)	Communicates with Honda PGM Tester.	14-GND	———			Approx. 5 V
17	BRN/YEL	MCK (Motor check)	Detects pump motor drive signal.	17-GND	Pump motor relay	ON		Battery Voltage
						OFF		0 V
19	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay.	19-GND	Engine	ON	Solenoid: ON	0 V
							Solenoid: OFF	AC: 3 – 6 V
						OFF (Connect the SCS service connector)		Approx. 3 V
21	BLU	RR-OUT (Rear-right outlet)	Drives right-rear outlet solenoid valve.	21-GND	Engine	ON	Pump motor relay: ON	0 V
							Pump motor relay: OFF	AC: 3 – 6 V
						OFF (Connect the SCS service connector)		Approx. 3 V
22	BLK	GND2 (Ground 2)	Ground for the ABS control unit.	22-GND	———			Below 0.3 V

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Troubleshooting Precautions

ABS Indicator

1. If the system is OK, the ABS indicator goes off two seconds after turning the ignition switch ON (II) without starting the engine, and then comes on again and goes off after two seconds. This occurs because the ABS control unit is turned on by the IG2 power source.
2. The ABS indicator comes on when the ABS control unit detects a problem in the system. However, even though the system is operating properly, the ABS indicator will come on too, under the following conditions:
   - Signal disturbance
   - Wheel spin
   - Only drive wheels rotate
   - Battery voltage fluctuates

   To determine the actual cause of the problem, question the customer about the problem, taking these conditions into consideration:
3. When a problem is detected and the ABS indicator comes on, the indicator can stay on until the ignition switch is turned OFF, or it can automatically go off, depending on the mode.
   - Indicator stays on until the ignition switch is turned off: When the system is in the system down mode.
   - Indicator automatically goes off: When the system is in the control inhibition mode.
4. The ABS indicator stays on when the system is reactivated without erasing the DTC, but it goes off after starting the vehicle.
   When the wheel sensor system is faulty and the ABS indicator comes on, the algorithm of the system automatically turns off the ABS indicator after the wheel speed signal returns to the normal speed. Also, when the DTC is erased, the CPU is reset and the ABS indicator goes off when the system checked out normal by the initial diagnosis.
   Therefore, test-drive the vehicle after servicing the wheel sensor system, and be sure that the ABS indicator does not come on.
5. When the ABS control unit outputs battery voltage to the gauge assembly, the ABS indicator goes off.

Diagnostic Trouble Code (DTC)

1. The diagnostic trouble code (DTC) is memorized when a problem is detected and the ABS indicator does not go off, or when the ABS indicator comes on.
   The DTC is not memorized when the ABS indicator comes on unless the CPU is activated.
2. The memory can hold any number of DTCs. However, when the same DTC is detected twice or more, the later one is written over the old one.
   Therefore, when the same problem is detected repeatedly, it is recorded as one DTC.
3. The DTCs are indicated in the order of ascending number, not in the order they occur.
4. The DTCs are memorized in the EEPROM (non-volatile memory).
   Therefore, the memorized DTCs cannot be canceled by disconnecting the battery. Perform the specified procedures to erase the DTCs.

Self-diagnosis

1. Self-diagnosis can be classified into these four categories:
   - Initial diagnosis: Performed right after the engine starts and until the ABS indicator goes off.
   - Except ABS control: Performed when the ABS is not functioning.
   - During ABS control: Performed when the ABS is functioning.
   - During warning: Performed when the ABS indicator is ON.
2. The system performs the following controls when a problem is detected by the self-diagnosis:
   - ABS indicator ON
   - Memory of DTC
   - Mode change to the "system down mode" or the "control inhibition mode".

MODE	ABS INDICATOR	MAIN RELAY	SOLENOID VALVE	CPU	Restart condition		DTC
SYSTEM DOWN	ON	No operation	Drive inhibition	Operation*1	Ignition switch	OFF → ON (II)	Memory
CONTROL INHIBITION	ON	No operation	Drive inhibition	Operation	Automatic		Memory

*1: Except CPU failure

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Kickback

1. The motor operates when the ABS is functioning, and the fluid in the reservoir is forced out to the master cylinder, causing kickback at the brake pedal.

2. The ABS control unit operates the solenoid valve when the brake pedal is released after the initial diagnosis. You may hear the solenoid valve operate at this time, but it is normal.

Pump Motor

1. The pump motor operates when the ABS is functioning.

2. The ABS control unit checks the pump motor operation during acceleration. You may hear the motor operate at this time, but it is normal.

Brake Fluid Replacement/Air Bleeding

1. Brake fluid replacement and air bleeding procedures are the same as for vehicles without ABS. To ease bleeding, start with the front wheels.

Troubleshooting

1. The troubleshooting flowchart procedures assume that the cause of the problem is still present and the ABS indicator is still on. Following the flowchart when the ABS indicator does not come on can result in incorrect diagnosis.

2. Question the customer about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting.
   Self-diagnosis is made at various times such as the initial diagnosis, except ABS control, during ABS control, during acceleration, during the specified vehicle speed, etc. Therefore, the symptom cannot be checked unless the check conditions match with the problem conditions.

3. When the ABS indicator does not come on during the test-drive, but troubleshooting is performed based on the DTC, check for loose connectors, poor contact of the terminals, etc., before you start troubleshooting.

4. After troubleshooting, erase the DTC and test-drive the vehicle. Be sure the ABS indicator does not come on.

5. The connector illustrations show the female terminals with a single outline and the male terminals with a double outline.

ABS Function Test

To simulate ABS operation and activate the solenoid valves and pump, use the Honda PGM Tester.

Connect the PGM Tester to the 16P Data Link Connector (DLC). When the System Select menu is displayed, select the ABS Test Mode menu, and follow the tester's prompts.

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Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication

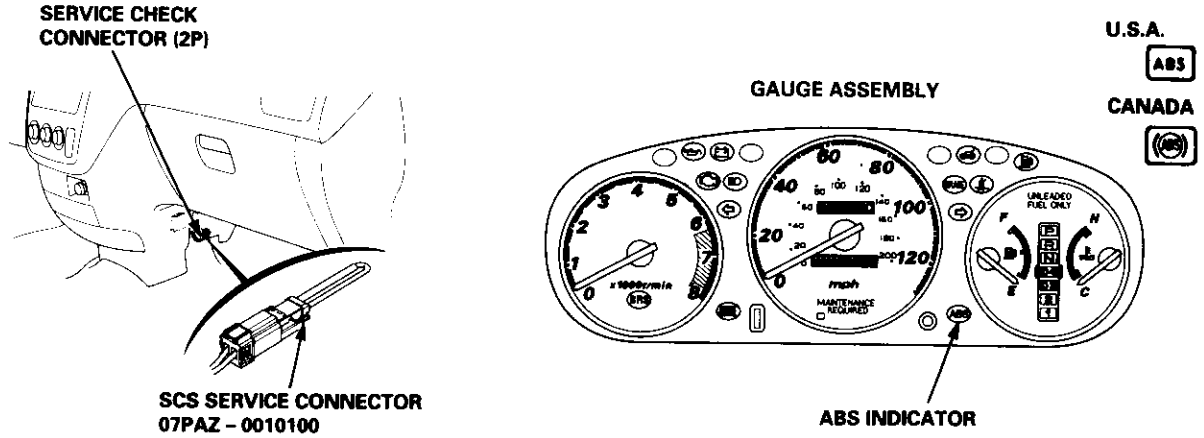
NOTE: This operation can also be done with the Honda PGM Tester.

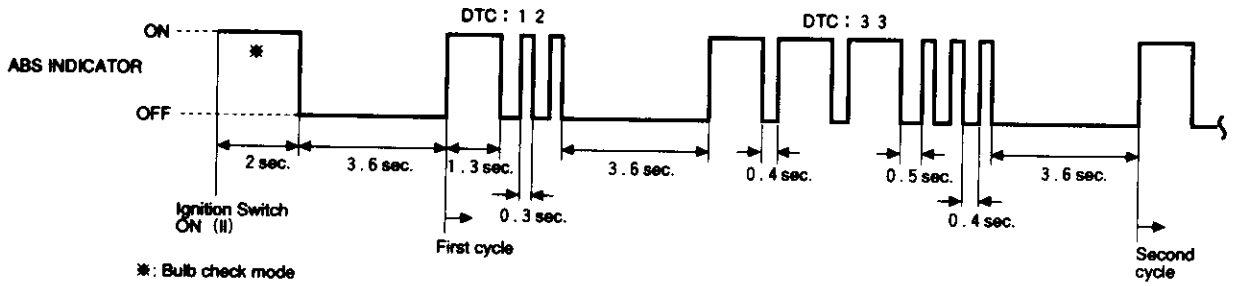
1. Connect the SCS service connector to the service check connector (2P) located on the passenger's side of the center console.
2. Turn the ignition switch ON (II).
   NOTE: Do not press the brake pedal when turning the ignition switch.
3. Record the blinking frequency of the ABS indicator. The blinking frequency indicates the DTC.
4. Turn the ignition switch OFF, and remove the SCS service connector.
   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.
5. Erase the DTC.

Conditions for DTC indication
- The vehicle is stopped.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is released.
- The SCS service connector remains connected during this procedure.

The DTC indication stops and the ABS control unit executes the software function if at least one of the following conditions is satisfied:
- The vehicle is not stopped.
- The ABS control unit receives the normal signal (which is for the ABS control unit) from a Honda PGM Tester.
- The SCS service connector is disconnected during this procedure.

NOTE: The illustration of gauge assembly shows the '97 – 98 models. The '99 – 00 models are similar.





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DTC Erasure

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) located on the passenger's side of the center console.
2. Press the brake pedal.
3. Turn the ignition switch ON (II) while keeping the brake pedal pressed. The ABS indicator goes off after two seconds.
4. After the indicator goes off, release the brake pedal. The indicator comes on after four seconds.
5. After the indicator comes on, press the brake pedal again. The indicator goes off again after four seconds. (the brake pedal is still pressed.)
6. After the indicator goes off, release the brake pedal again.
7. After four seconds, the indicator blinks twice for 0.3 second and the DTC is erased.
8. Confirm the DTC indication, and check that the DTC was erased.

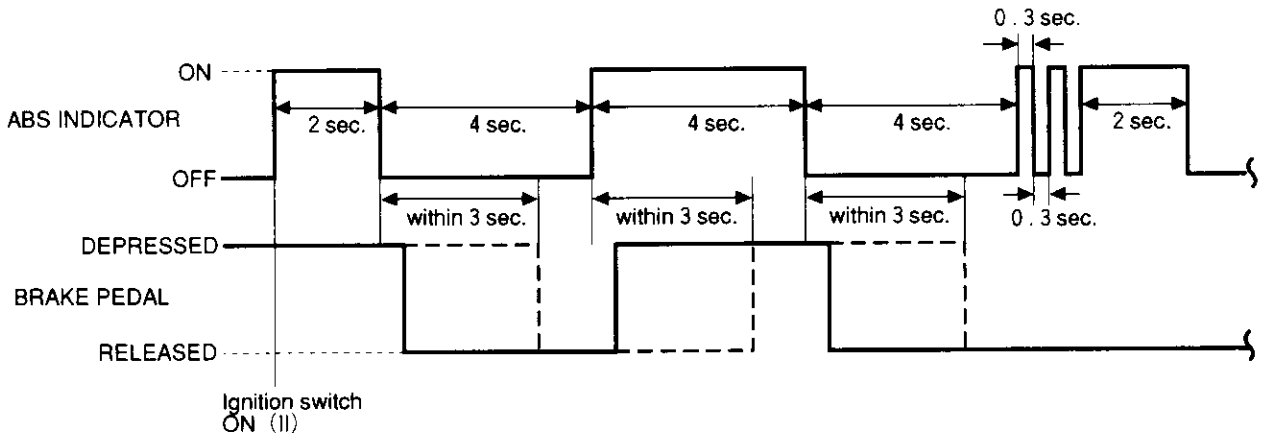
NOTE: Always maintain these steps. If you disconnect the SCS service connector and/or fail to operate the brake pedal according to the indicator indication, the DTC will not be erased.

Conditions for DTC erasure

- The vehicle is stopped.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is pressed before the ignition switch is turned ON (II).
- The SCS service connector remains connected during this procedure.

The DTC erasure stops and the ABS control unit executes the software function if at least one of the following conditions is satisfied:

- The vehicle is not stopped.
- The SCS service connector is disconnected during this service.
- The ABS control unit receives the normal signal (which is for the ABS control unit) from a Honda PGM Tester.
- The brake pedal is not operated according to the indicator indication.
- The DTC erasure is finished.



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Diagnostic Trouble Code (DTC)

Troubleshooting Index

NOTE: This operation can also be done with the Honda PGM Tester.

DTC	ABS INDICATOR	DIAGNOSIS/SYMPTOM	DETECTION TIMING				PROBLEM LOCATION	REFER TO PAGE
			INITIAL DIAGNOSIS	EXCEPT ABS CONTROL	DURING ABS CONTROL	DURING WARNING		
No DTC	OFF	ABS indicator does not come on.						19-41
	ON	ABS indicator does not go off. (No DTC)						19-43
11	ON*	Wheel sensor (open/short to body ground/short to power)	○	○	○	○	FR	19-45
13							FL	
15							RR	
17							RL	
12	ON*	Wheel sensor/Pulser (chipped pulser gear/electrical noise)		○	○	○	FR	19-45
14							FL	
16							RR	
18							RL	
31	ON	Solenoid (open/short to body ground/short to power/stuck)	○	○	○		FR-IN	19-47
32							FR-OUT	
33							FL-IN	
34							FL-OUT	
35							RR-IN	
36							RR-OUT	
37							RL-IN	
38							RL-OUT	
51	ON	Motor lock		○	○			19-49
52	ON	Motor stuck OFF		○	○			19-49
53	ON	Motor stuck ON		○				19-49
54	ON	Main relay stuck OFF	○	○	○			19-52
61	ON	Ignition voltage (low voltage/high voltage)	○	○	○	○		19-54
81	ON	CPU	○	○	○	○		19-55

*: If DTCs 11-18 (wheel sensor codes) were detected the last time the vehicle was driven, the ABS indicator will stay on until the ignition switch is turned ON (II), and the control unit confirms that the wheel sensors are OK.

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ABS Indicator Does Not Come On

The ABS indicator does not come on when ignition switch is turned ON (II).

Check the METER (7.5 A) fuse in the under-dash fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

Check for an open in the IG1 circuit:
1. Disconnect the gauge assembly 5P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the gauge assembly 5P connector terminal No. 5 and body ground.

Is there battery voltage?

NO → **• Repair open in the wire between the METER (7.5 A) fuse and the gauge assembly.**
• Replace the under-dash fuse/relay box. (Open circuit inside the box.)

YES

Check the ABS indicator bulb in the gauge assembly.

Is the bulb OK?

NO → **Replace the ABS indicator bulb.**

YES

Check for a short to power in the WALP circuit:
Measure the voltage between the gauge assembly 5P connector terminal No. 1 and body ground.

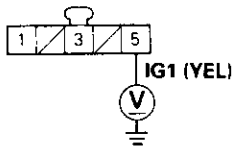
Is there battery voltage?

YES → **Repair short to power in the wire between the gauge assembly and the ABS control unit.**

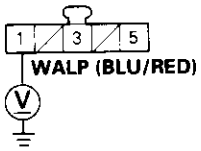
NO

(To page 19-42)

GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals



(cont'd)

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ABS Indicator Does Not Come On (cont'd)

(From page 19-41)

Check the gauge assembly:
1. Turn the ignition switch OFF.
2. Connect the gauge assembly 5P connector.
3. Connect the terminal No. 3 to body ground with a jumper wire.
4. Turn the ignition switch ON (II).

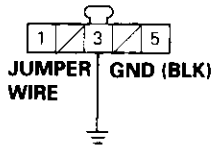
Does the ABS indicator come on?

NO → **Replace the ABS indicator drive circuit in the gauge assembly.**

YES

- **Repair open in the wire between the gauge assembly and body ground.**
- **Repair poor ground (G401, G402).**

GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals

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ABS Indicator Does Not Go Off (No DTC)

— With engine running, the ABS indicator is ON.
— With the SCS service connector connected (see page 19-38), no DTC is indicated.

Check the ABS (7.5 A) fuse in the under-dash fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK? NO → **Replace the fuse and recheck.**

YES

Check the ABS +B (20 A) fuse in the under-hood ABS fuse/relay box, and reinstall the fuse if it is OK.

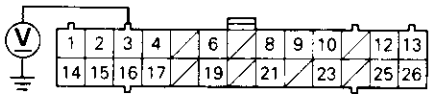
Is the fuse OK? NO → **Replace the fuse and recheck.**

YES

Check for an open in the IG2 circuit:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the ABS control unit 26P connector terminal No. 3 and body ground.

ABS CONTROL UNIT 26P CONNECTOR

IG2 (BLK/BLU)



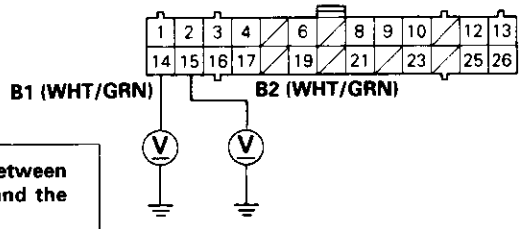
Wire side of female terminals

Is there battery voltage? NO → **Repair open in the wire between the ABS (7.5 A) fuse and the ABS control unit.**

YES

Check for an open in the B1 and B2 circuit:
Measure the voltage between body ground and terminals No. 14 and No. 15 individually.

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

Is there battery voltage? NO → **Repair open in the wire between the ABS +B (20 A) fuse and the ABS control unit.**

YES

(To page 19-44)

(cont'd)

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ABS Indicator Does Not Go Off (No DTC) (cont'd)

(From page 19-43)

Check for a short to body ground in the WALP circuit:
1. Turn the ignition switch OFF.
2. Disconnect the ABS control unit 22P and gauge assembly 5P connectors.
3. Check for continuity between the ABS control unit 22P connector terminal No. 7 and body ground.

Is there continuity?

YES → **Repair short to body ground in the wire between the ABS control unit and the gauge assembly.**

NO

Check the ABS control unit:
1. Connect the ABS control unit 22P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the ABS control unit 22P connector terminal No. 7 and body ground.

Is there battery voltage?

NO → **Check for an open in the GND2 circuit:**
1. Connect the ABS control unit 26P connector terminal No. 16 to body ground with a jumper wire.
2. Measure the voltage between the ABS control unit 22P connector terminal No. 7 and body ground.

Is there battery voltage?

YES → • **Repair open in the wire between the ABS control unit and body ground.**
• **Repair poor ground (G401, G402).**

NO → **Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.**

YES

Check for an open in the WALP circuit:
Measure the voltage between the gauge assembly 5P connector terminal No. 1 and body ground.

Is there battery voltage?

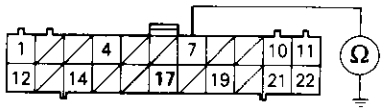
NO → **Repair open in the wire between the ABS control unit and the gauge assembly.**

YES

Replace the ABS indicator drive circuit in the gauge assembly.

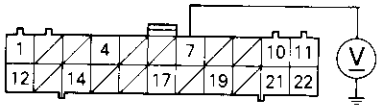
ABS CONTROL UNIT 22P CONNECTOR

WALP (BLU/RED)

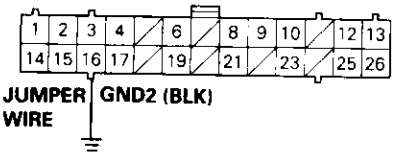


Wire side of female terminals

WALP (BLU/RED)

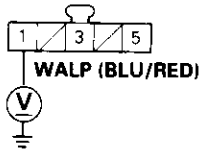


ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals

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DTC 11 – 18: Wheel Sensor

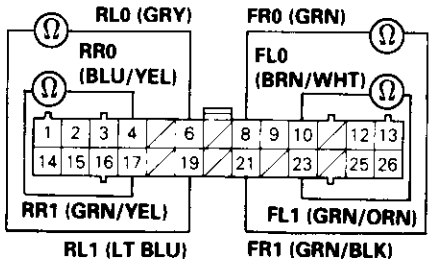
NOTE: The ABS indicator comes on only when the drive wheels are turning and signal disturbance is detected. Therefore, test-drive the car at a speed of 12 mph (20 km/h) or more after turning the ignition switch from OFF to ON (II), and if the ABS indicator does not come on, the system is OK.

— With the ignition switch ON (II), the ABS indicator does not go off.
— After driving, the ABS indicator comes on.
— With the SCS service connector connected (see page 19-38), DTCs 11 – 18 are indicated.

Check the wheel sensor circuit:
1. Disconnect the ABS control unit 26P connector.
2. Measure the resistance between the appropriate wheel sensor (0) and (1) circuit terminals (see table).

DTC	Appropriate Terminal	
	(0) SIDE	(1) SIDE
11, 12 (Right-front)	No. 8: FR0	No. 21: FR1
13, 14 (Left-front)	No. 10: FL0	No. 23: FL1
15, 16 (Right-rear)	No. 4: RR0	No. 17: RR1
17, 18 (Left-rear)	No. 6: RL0	No. 19: RL1

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

Is the resistance OK?
(Front: 750 – 1,050 Ω (20°C, 68°F)
Rear: 950 – 1,450 Ω (20°C, 68°F))

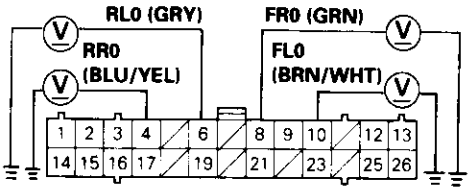
NO

• Repair open in the (0) or (1) circuit wire, or short to the (0) circuit wire in the (1) circuit wire between the ABS control unit and the appropriate wheel sensor.
• Replace the appropriate wheel sensor.

YES

Check for a short to power in the wheel sensor circuit:
1. Reconnect the ABS control unit 26P connector.
2. Start the engine.
3. Measure the voltage between the ABS control unit 26P connector appropriate wheel sensor (0) circuit terminal and body ground (see table).

NOTE: Judgement value for short to power is 4 V.



Is there 4 V or more?

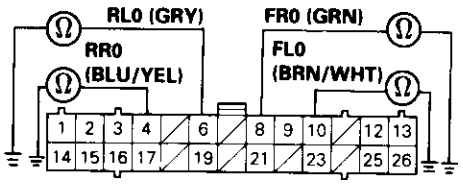
YES

Repair short to power in the (0) or (1) circuit wire between the ABS control unit and the appropriate wheel sensor.

NO

NOTE:
• Normal voltage: Approx. 2 V
• 0 V: Replace the ABS control unit.
• 4 V or more indicates a short to power.

Check for a short to body ground in the wheel sensor circuit:
1. Disconnect the ABS control unit 26P connector.
2. Check for continuity between the ABS control unit 26P connector appropriate wheel sensor (0) circuit terminal and body ground (see table).



Is there continuity?

YES

• Repair short to body ground in the (0) or (1) circuit wire between the ABS control unit and the appropriate wheel sensor.
• Replace the appropriate wheel sensor.

NO

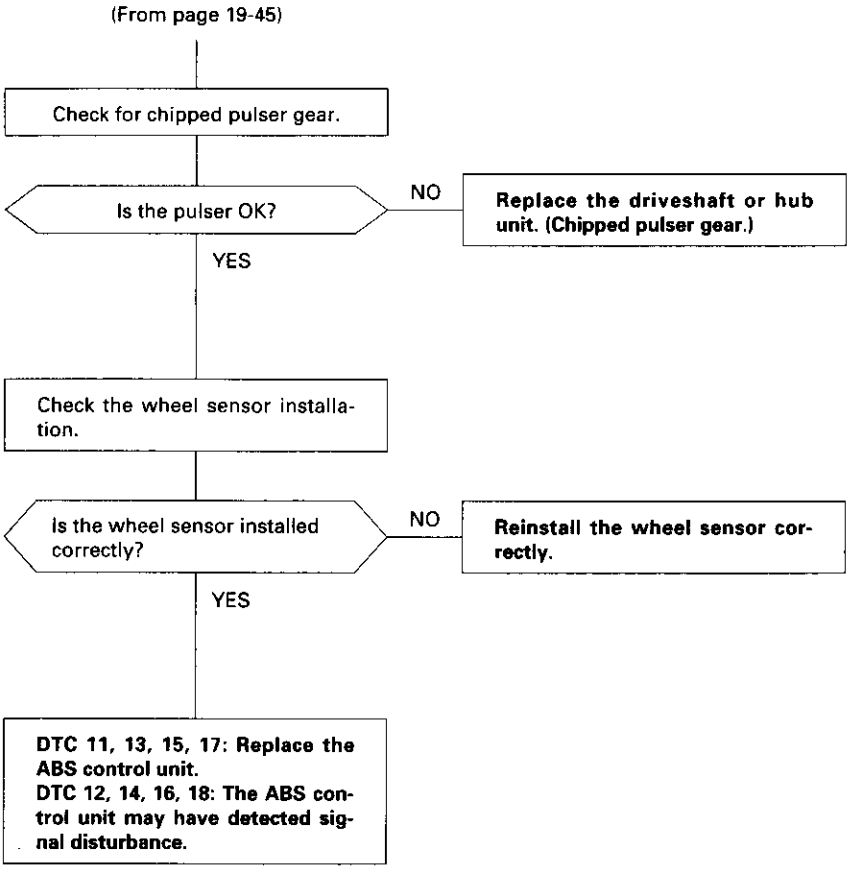
(To page 19-46)

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DTC 11 – 18: Wheel Sensor (cont'd)

(From page 19-45)



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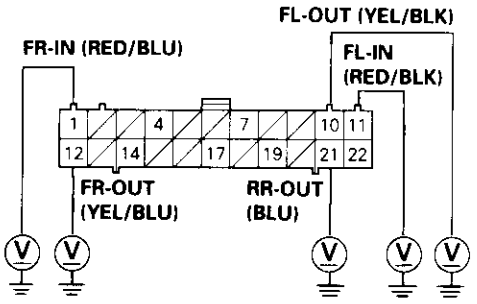
DTC 31 – 38: Solenoid

— With the ignition switch ON (II), the ABS indicator does not go off, or the ABS indicator comes on while ABS is functioning.
— With the SCS service connector connected (see page 19-38), DTCs 31 – 38 are indicated.

Check for a short to power in the solenoid circuit:
1. Disconnect the ABS control unit 22P and 26P connectors.
2. Start the engine.
3. Measure the voltage between the appropriate ABS control unit connector solenoid circuit terminal and body ground (see table).

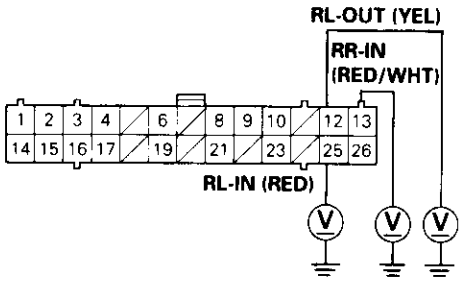
DTC	Appropriate Connector	Appropriate Terminal
31: FR-IN	22P	No. 1
32: FR-OUT	22P	No. 12
33: FL-IN	22P	No. 11
34: FL-OUT	22P	No. 10
35: RR-IN	26P	No. 13
36: RR-OUT	22P	No. 21
37: RL-IN	26P	No. 25
38: RL-OUT	26P	No. 12

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

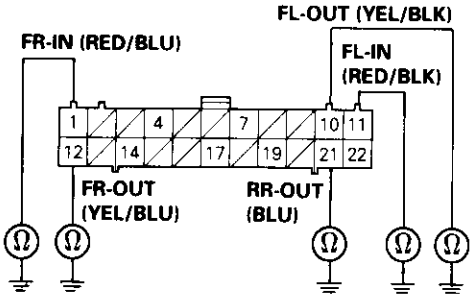
Is there battery voltage? YES → **Repair short to power in the appropriate solenoid circuit wire between the ABS control unit and the modulator unit.**

NO

Check for a short to body ground in the solenoid circuit:
Check for continuity between the appropriate solenoid circuit terminal and body ground (see table).

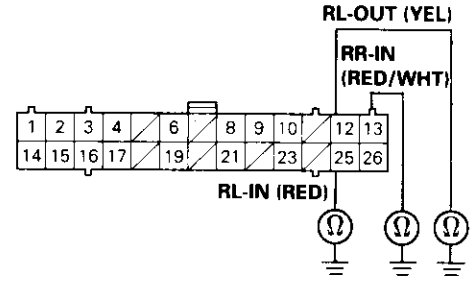
Is there continuity? YES → **• Repair short to body ground in the appropriate solenoid circuit wire between the ABS control unit and the modulator unit.**
• Replace the modulator unit.

NO



Check the ABS control unit:
1. Turn the ignition switch OFF.
2. Connect the ABS control unit 22P and 26P connectors.
3. Connect the SCS service connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between the appropriate ABS control unit 26P connector COM circuit terminal and body ground (see table).

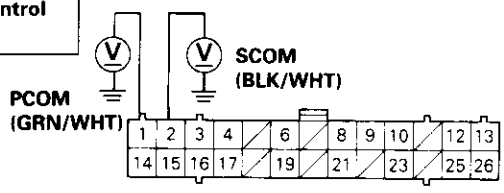
DTC	Appropriate Terminal
31: FR-IN	No. 2: SCOM
32: FR-OUT	No. 2: SCOM
33: FL-IN	No. 1: PCOM
34: FL-OUT	No. 1: PCOM
35: RR-IN	No. 1: PCOM
36: RR-OUT	No. 1: PCOM
37: RL-IN	No. 2: SCOM
38: RL-OUT	No. 2: SCOM



Is there approx. 3 V? NO → **Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.**

YES

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DTC 31 – 38: Solenoid (cont'd)

(From page 19-47)

Check for an open in the solenoid circuit:
Measure the voltage between the appropriate ABS control unit connector solenoid circuit terminal and body ground (see table).

Is there approx. 3 V?

NO

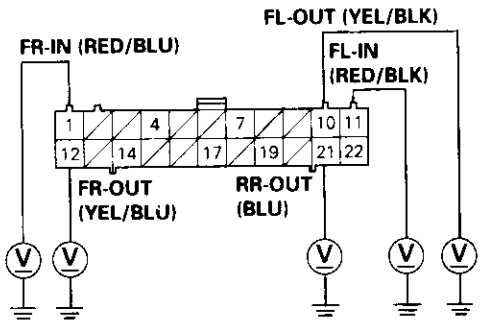
- **Repair open in the appropriate COM circuit wire between the ABS control unit and the modulator unit.**
- **Repair open in the appropriate solenoid circuit wire between the ABS control unit and the modulator unit.**
- **Replace the modulator unit.**

YES

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

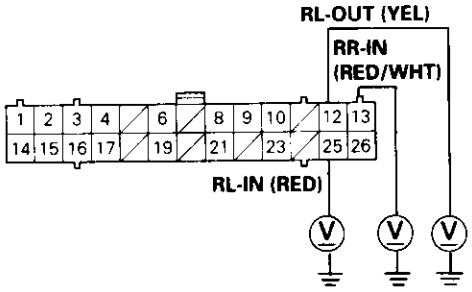
DTC	Appropriate Connector	Appropriate Terminal
31: FR-IN	22P	No. 1
32: FR-OUT	22P	No. 12
33: FL-IN	22P	No. 11
34: FL-OUT	22P	No. 10
35: RR-IN	26P	No. 13
36: RR-OUT	22P	No. 21
37: RL-IN	26P	No. 25
38: RL-OUT	26P	No. 12

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

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DTC 51 – 53: ABS Pump Motor

— With the ignition switch ON (II), the ABS indicator does not go off.
— With the SCS service connector connected (see page 19-38), DTCs 51 – 53 are indicated.

Check the MTR CHECK (7.5 A) fuse in the under-hood ABS fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

NOTE: Short the PMR terminal to body ground for a moment, and recheck the fuse. If the fuse is blown, check for a short to body ground in the MCK circuit.

Check the PUMP MOTOR (40 A) fuse in the under-hood ABS fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

NOTE: Short the PMR terminal to body ground for a moment, and recheck the fuse. If the fuse is blown, check for a short to body ground in the wire between the under-hood ABS fuse/relay box and the pump motor.

Check the pump motor relay (see section 23).

Is the relay OK?

NO → **Replace the pump motor relay.**

YES

Check the pump motor power source circuit:
Turn the ignition switch ON (II).

Does the pump motor operate?

YES → **Check for a short to power in the pump motor power source circuit:** Remove the pump motor relay.

Does the pump motor operate?

YES → **Repair short to power in the wire between the under-hood ABS fuse/relay box and the ABS pump motor.**

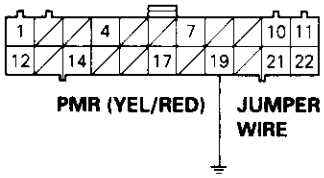
NO

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

NO

(To page 19-50)

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

(cont'd)

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DTC 51 – 53: ABS Pump Motor (cont'd)

(From page 19-49)

Check the pump motor circuit:
1. Remove the pump motor relay.
2. Turn the ignition switch ON (II).
3. Connect the pump motor relay connector +B and MOTOR terminals with a jumper wire for a moment.

Does the pump motor operate?

NO

Check for an open in the pump motor +B circuit:
1. Turn the ignition switch OFF.
2. Disconnect the pump motor connector.
3. Turn the ignition switch ON (II).
4. Connect the pump motor relay connector +B and MOTOR terminals with a jumper wire.
5. Measure the voltage between the pump motor connector terminal No. 1 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the under-hood ABS fuse/relay box and the pump motor.

YES

Check the pump motor operation:
Connect the battery (+) terminal to the pump motor connector terminal No. 1, and the (–) terminal to the terminal No. 2 for a moment.

Does the pump motor operate?

NO

Replace the modulator unit. (Faulty pump motor)

YES

Repair open in the wire between the pump motor and body ground, or poor ground (G351).

YES

Check for a short to body ground in the PMR circuit:
1. Turn the ignition switch OFF.
2. Disconnect the ABS control unit 22P connector.
3. Check for continuity between terminal No. 19 and body ground.

Is there continuity?

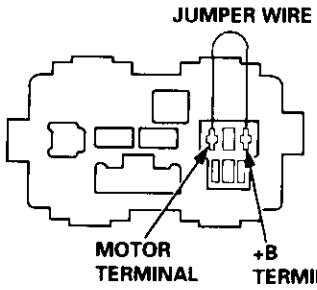
YES

Repair short to body ground in the wire between the under-hood ABS fuse/relay box and the ABS control unit.

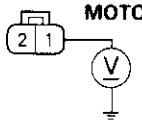
NO

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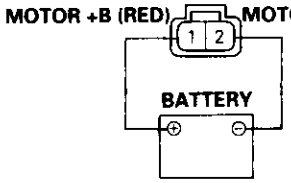
UNDER-HOOD ABS FUSE/RELAY BOX



PUMP MOTOR CONNECTOR

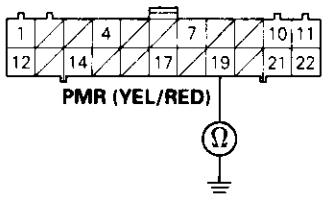


Terminal side of female terminals



Terminal side of male terminals

ABS CONTROL UNIT 22P CONNECTOR

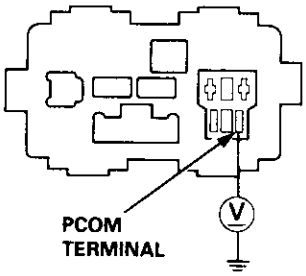


Wire side of female terminals

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(From page 19-50)

Check for an open in the PCOM circuit:
1. Turn the ignition switch OFF.
2. Reconnect the ABS control unit 22P connector.
3. Connect the SCS service connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between the pump motor relay connector PCOM terminal and body ground.



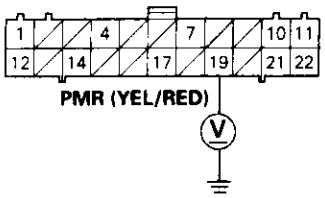
Is there approx. 3 V?

NO → **Repair open in the wire between the under-hood ABS fuse/relay box and the ABS control unit.**

YES

Check for an open in the PMR circuit:
Measure the voltage between the ABS control unit 22P connector terminal No. 19 and body ground.

ABS CONTROL UNIT 22P CONNECTOR



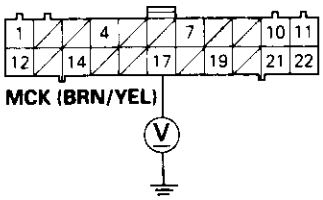
Wire side of female terminals

Is there approx. 3 V?

NO → **Repair open in the wire between the under-hood ABS fuse/relay box and the ABS control unit.**

YES

Check for an open in the MCK circuit:
1. Turn the ignition switch OFF.
2. Disconnect the SCS service connector.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the ABS control unit 22P connector terminal No. 17 and body ground while connecting the pump motor relay connector +B and MOTOR terminal with a jumper wire for moment.



Is there battery voltage?

NO → **Repair open in the wire between the under-hood ABS fuse/relay box and the ABS control unit.**

YES

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

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DTC 54: Main Relay

— With the ignition switch ON (II), the ABS indicator does not go off.
— With the SCS service connector connected (see page 19-38), DTC 54 is indicated.

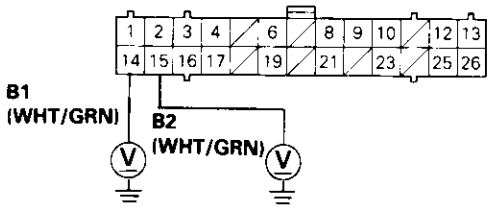
Check the ABS +B (20 A) fuse in the under-hood ABS fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK? — NO → **Replace the fuse and recheck.**

YES

Check for an open in the B1, B2 circuit:
Measure the voltage between body ground and the ABS control unit 26P connector terminal No. 14 and No. 15 individually.

ABS CONTROL UNIT 26P CONNECTOR



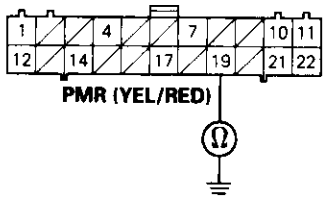
Wire side of female terminals

Is there battery voltage? — NO → **Repair open in the wire between the ABS control unit and the under-hood ABS fuse/relay box.**

YES

Check for a short to body ground in the PMR circuit:
1. Turn the ignition switch OFF.
2. Remove the pump motor relay.
3. Disconnect the ABS control unit 22P connector.
4. Check for continuity between terminal No. 19 and body ground.

ABS CONTROL UNIT 22P CONNECTOR

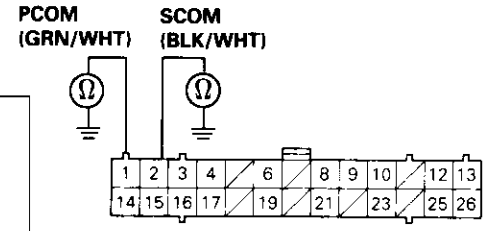


Wire side of female terminals

Is there continuity? — YES → **Repair short to body ground in the wire between the under-hood ABS fuse/relay box and the ABS control unit.**

NO

Check for a short to body ground in the PCOM, SCOM circuit:
1. Disconnect the ABS control unit 26P connector.
2. Check for continuity between body ground and the ABS control unit 26P terminals No. 1 and No. 2 individually.



Is there continuity? — YES →
- **Repair short to body ground in the PCOM circuit wire between the ABS control unit and the under-hood ABS fuse/relay box.**
- **Repair short to body ground in the PCOM or SCOM circuit wire between the ABS control unit and the modulator unit.**
- **Replace the modulator unit. (Short circuit inside the unit)**

NO

(To page 19-53)

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(From page 19-52)

Check for a short to power in the PCOM, SCOM circuit:
1. Start the engine.
2. Measure the voltage between body ground and ABS control unit 26P connector terminals No. 1 and No. 2 individually.

Is there 8 V or more?

YES

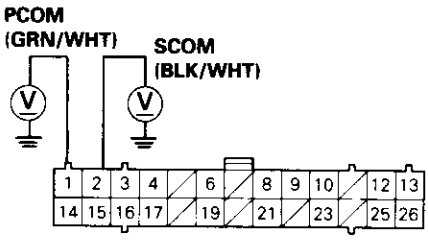
- **Repair short to power in the PCOM circuit wire between the ABS control unit and the underhood ABS fuse/relay box.**
- **Repair short to power in the PCOM or SCOM circuit wire between the ABS control unit and the modulator unit.**
- **Replace the modulator unit. (Short to power inside the unit)**

NOTE: 8 V or more indicates a short to power.

NO

Turn the ignition switch OFF and connect the SCS service connector. Then turn the ignition switch ON (II) and measure the voltage between the PCOM and SCOM terminals and body ground. If there is 0 V, replace the ABS control unit.

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

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DTC 61: Ignition Voltage

— With the engine running, the ABS indicator is ON.
— With the SCS service connector connected (see page 19-38), DTC 61 is indicated.

Problem verification:
1. Erase the DTC.
2. Start the engine.

Does the ABS indicator come on and is DTC 61 indicated?

NO → **The system is OK at this time.**

YES

Check the IG2 circuit:
Measure the voltage between the ABS control unit 26P connector terminal No. 3 and body ground.

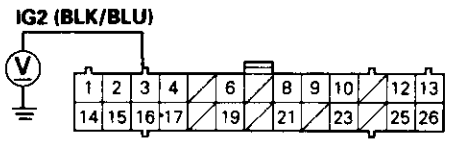
Is there 18 V or above?

YES → **Check the charging system.**

NO

If the voltage is 0 V, check for an open in the IG2 circuit.
If there is 12 – 17 V, substitute a known-good ABS control unit and recheck.

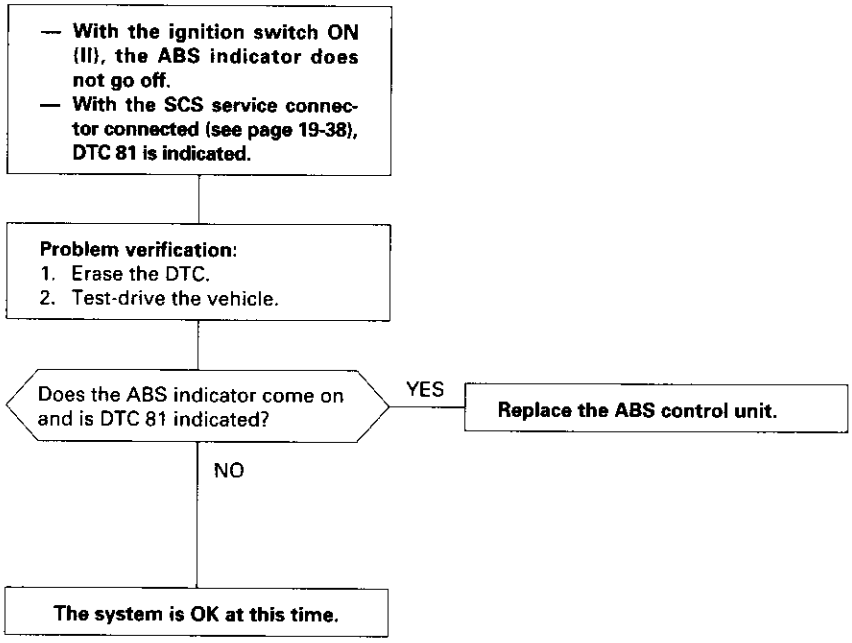
ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

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DTC 81: Central Processing Unit (CPU)



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Modulator Unit

Removal/Installation

NOTE:
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Take care not to damage or deform the brake lines during removal and installation.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.

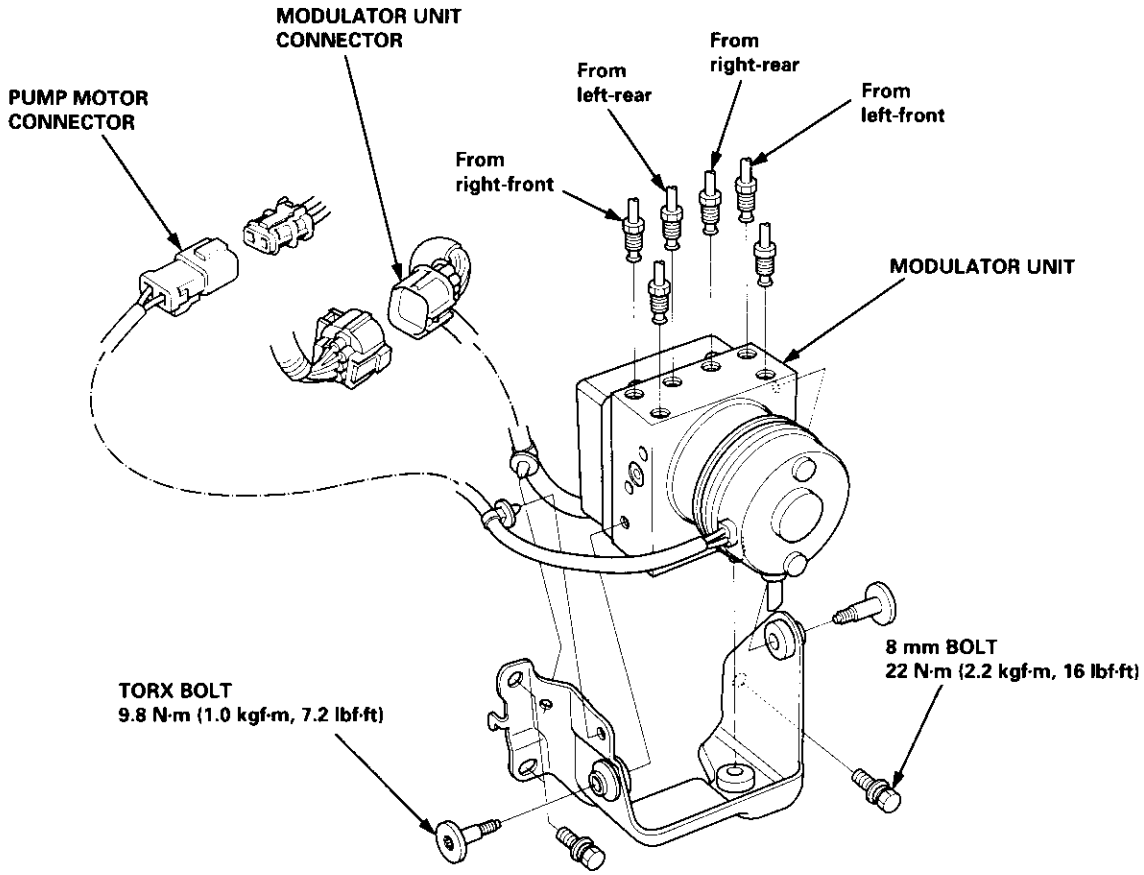
Removal

1. Disconnect the modulator unit and pump motor connectors.
2. Disconnect the brake lines, then remove the modulator unit.

Installation

1. Install the modulator unit, then connect the brake lines. Tighten the flare nuts to 15 N·m (1.5 kgf·m, 11 lbf·ft).
2. Connect the modulator unit and pump motor connectors.
3. Bleed the brake system, starting with the front wheels.
4. Start the engine, and check that the ABS indicator goes off.
5. Test-drive the vehicle, and check that the ABS indicator does not come on.

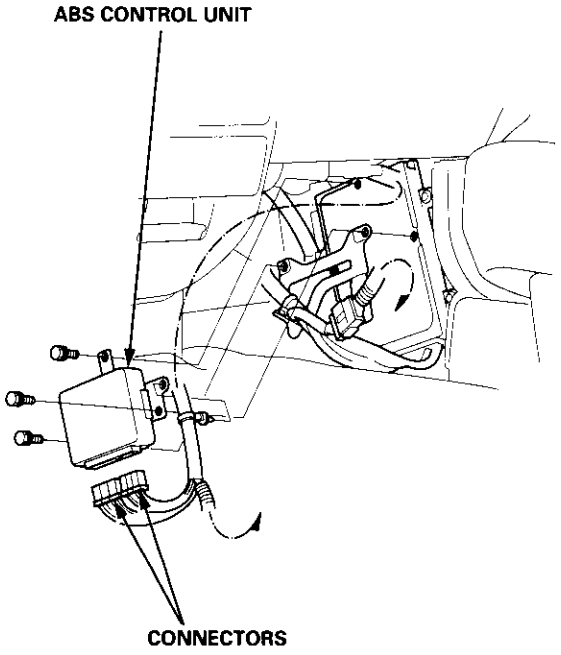
NOTE: This illustration shows the '97 – 98 models. The '99 – 00 models are similar.



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Replacement

1. Remove the passenger's side kick panel.
2. Disconnect the ABS control unit connectors.



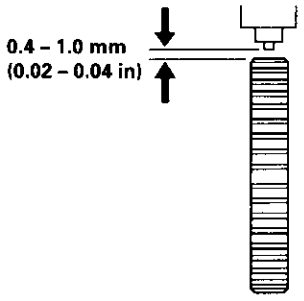
3. Remove the ABS control unit.
4. Install the ABS control unit in the reverse order of removal.

Inspection

1. Check the front and rear pulser for chipped or damaged teeth.
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the pulser. If the gap exceeds 1.0 mm (0.04 in), check for a bent suspension arm.

   Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)

Front/Rear
Remove the rear brake drum to inspect the rear wheel sensor air gap.

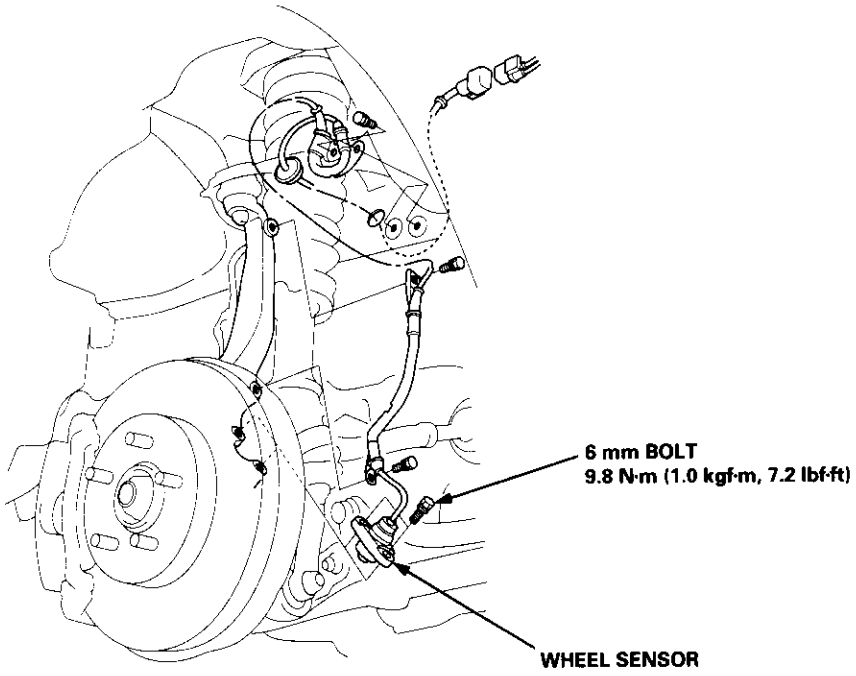


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Wheel Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- The torque value of the bolts is 9.8 N·m (1.0 kgf·m, 7 lbf·ft).

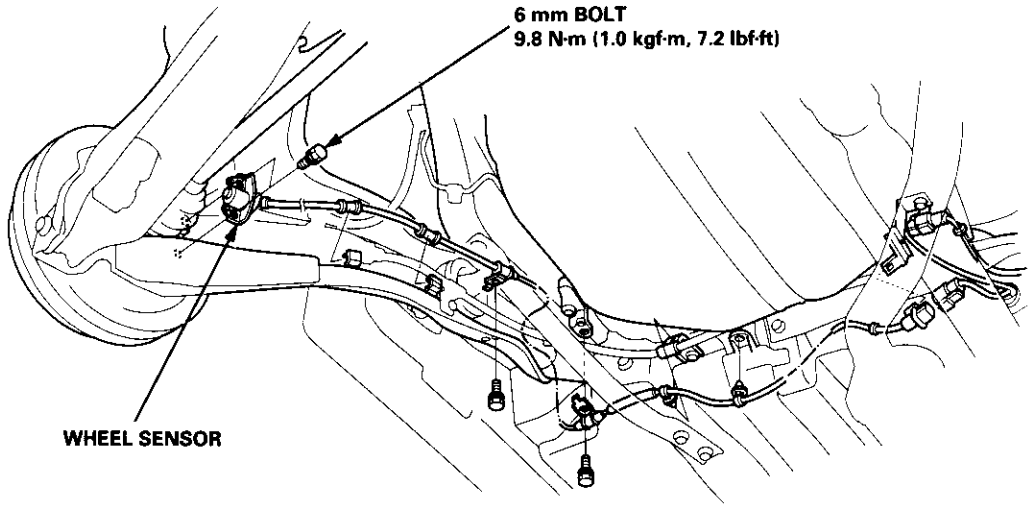
Front



Rear

1. Remove the hub bearing unit (see section 18).
2. Remove the four backing plate bolts.
3. Pull the backing plate away from the trailing arm, then remove the wheel sensor. It is not necessary to disconnect the brake line.

   NOTE: This illustration shows the '97 – 98 models. The '99 – 00 models are similar.



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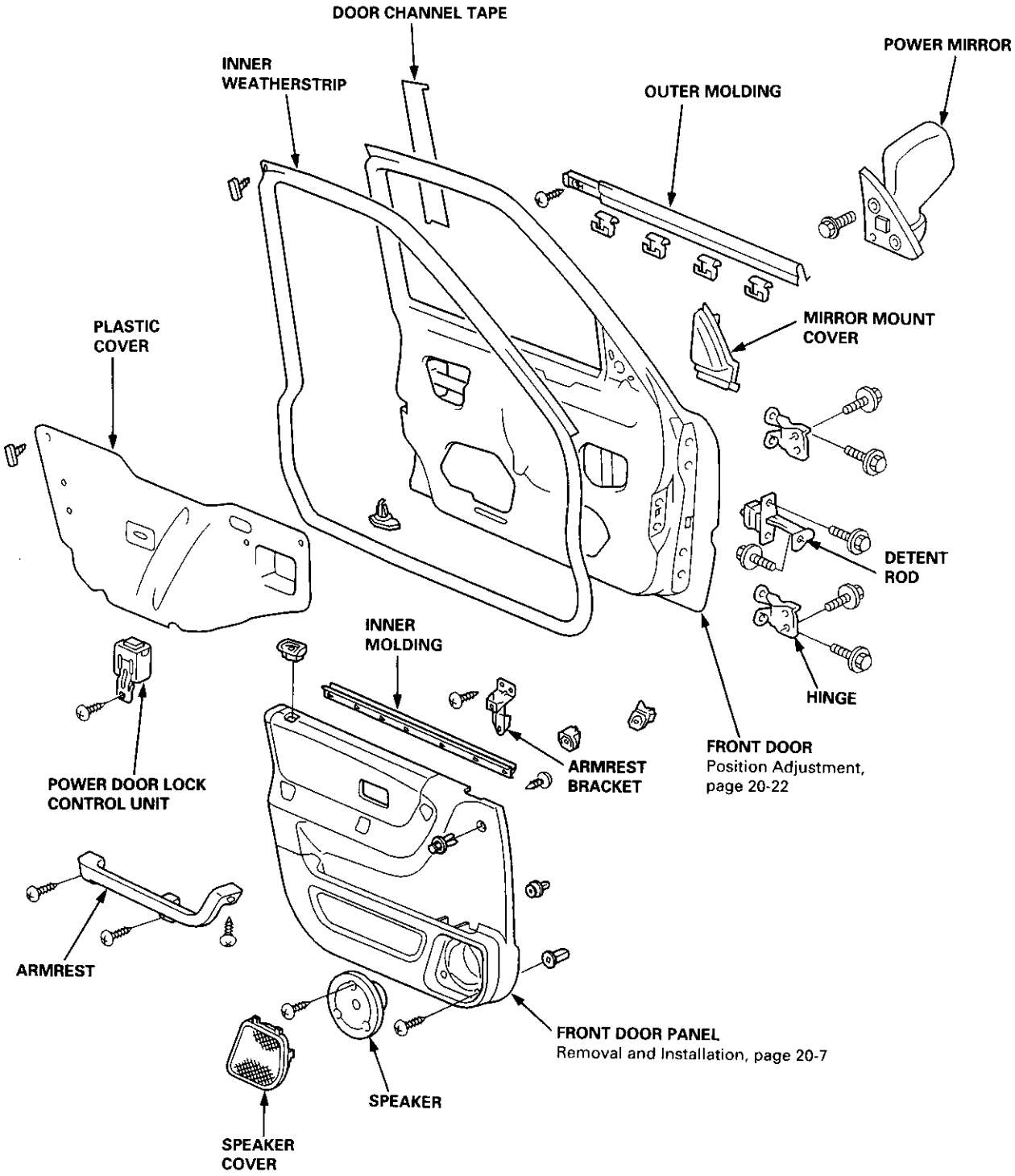


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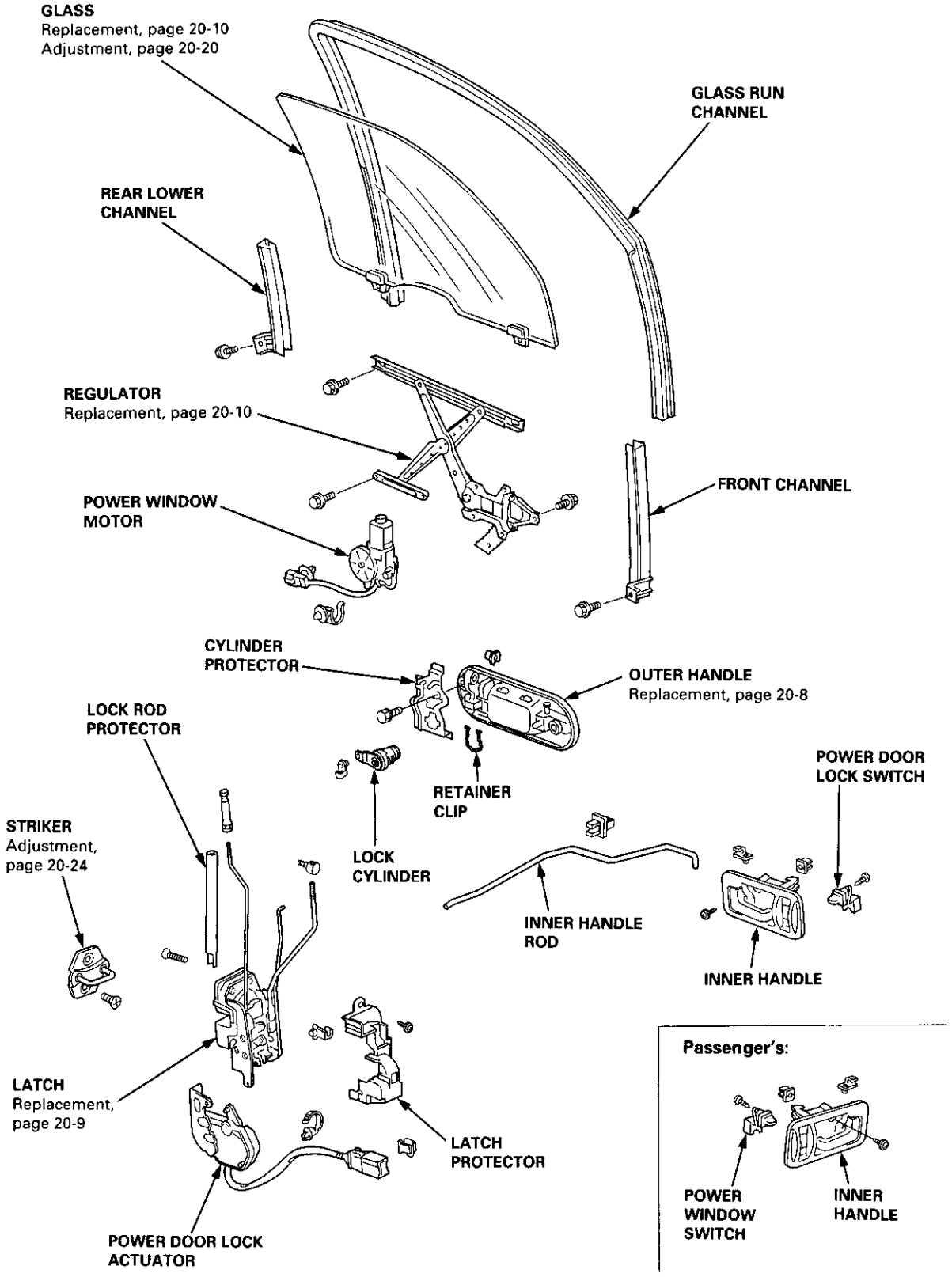
Component Location Index

Front Door:

NOTE: Refer to the 1997 Series Honda CR-V Body Repair Manual (P/N 61S1030) for front door removal.



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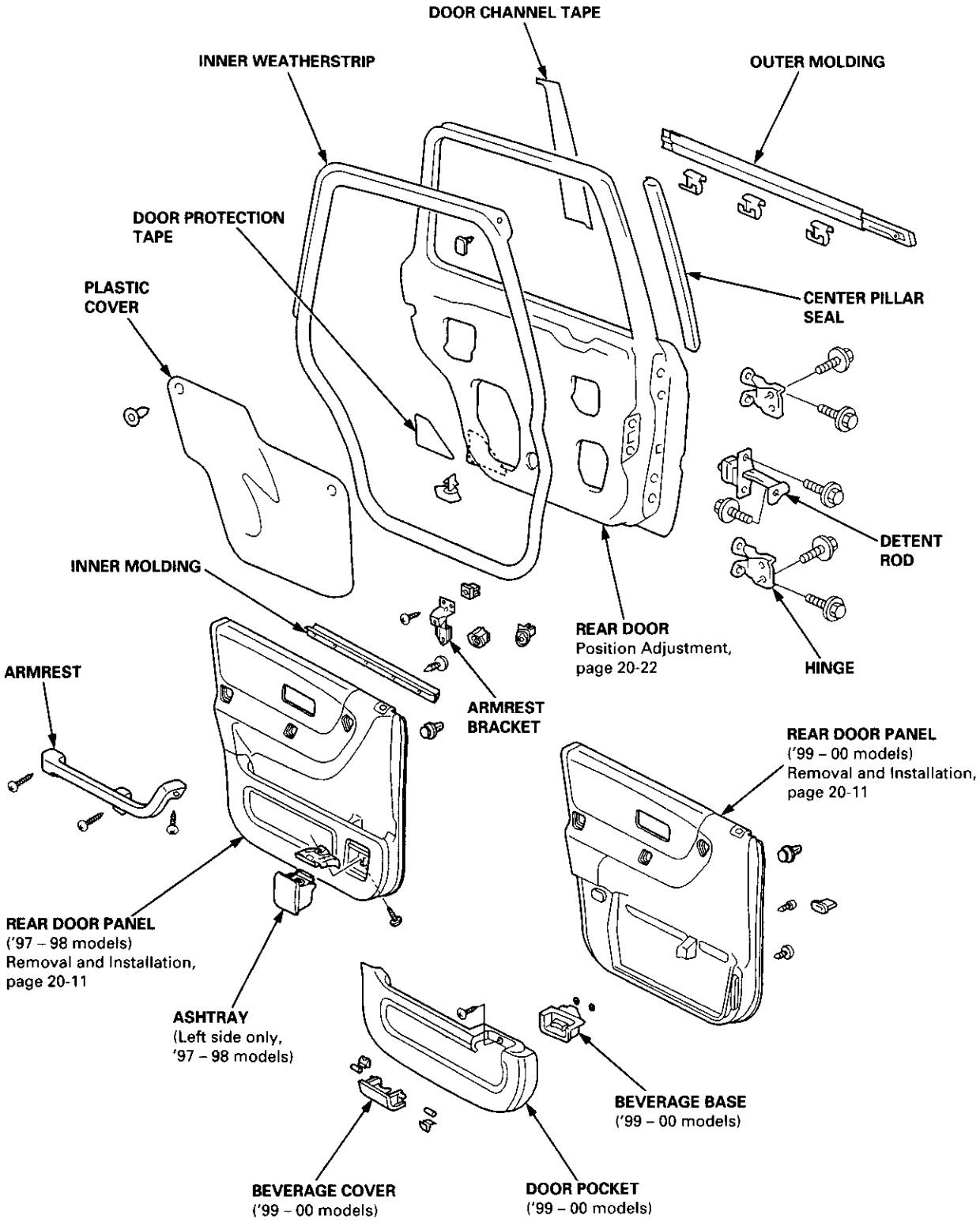
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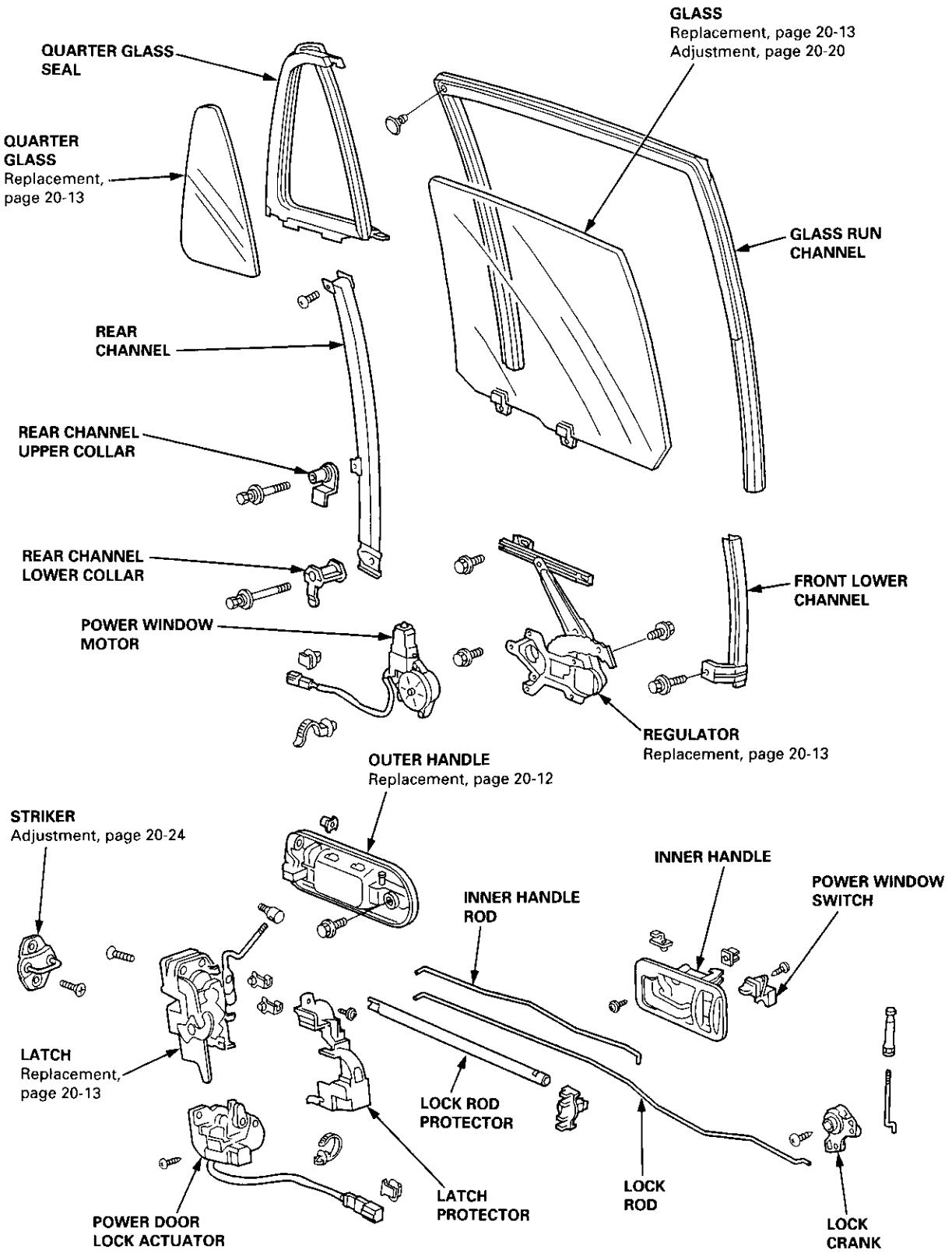
Component Location Index (cont'd)

Rear Door:

NOTE: Refer to the 1997 Series Honda CR-V Body Repair Manual (P/N 61S1030) for rear door removal.



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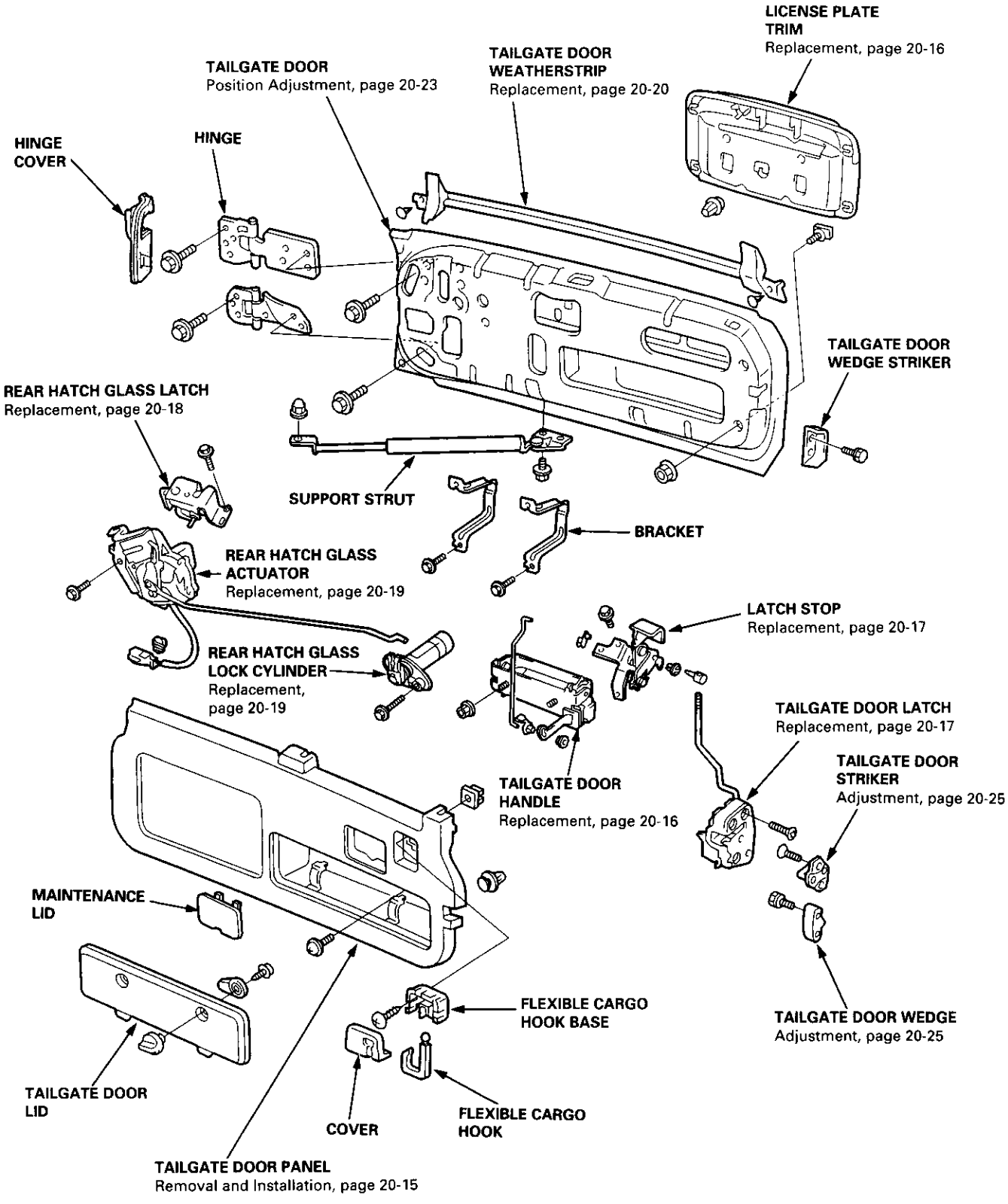
(cont'd)

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Component Location Index (cont'd)

Tailgate Door:

NOTE: Refer to the 1997 Series Honda CR-V Body Repair Manual (P/N 61S1030) for tailgate door removal.

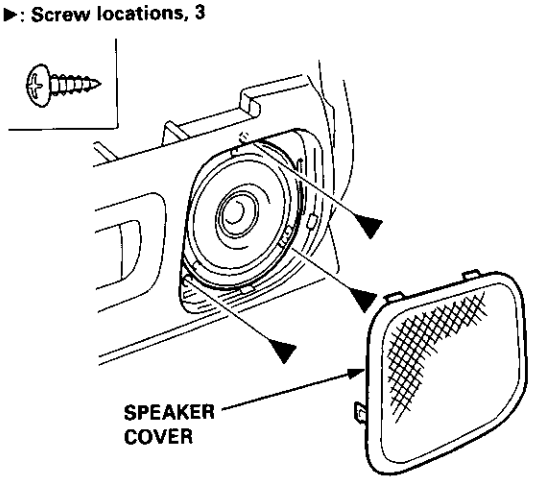


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Front Door Panel Removal and Installation

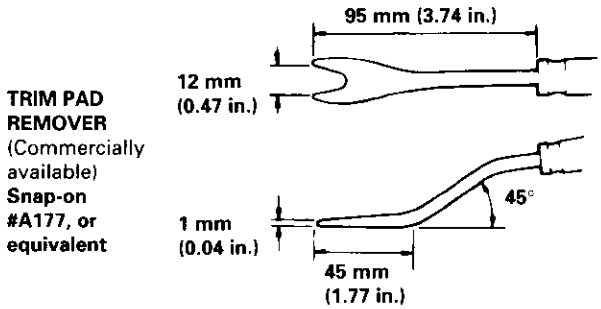
NOTE: Take care not to scratch the door panel and other parts.

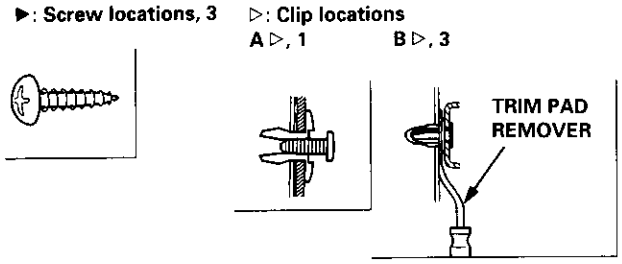
1. Remove the inner handle (see page 20-3).
2. Remove the speaker cover, then remove the screws.

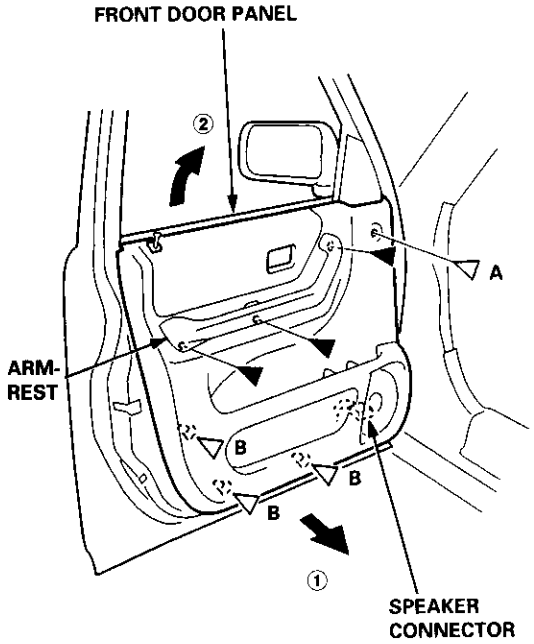


3. Remove the screws from the armrest. Release the clips that hold the door panel, then remove the door panel by pulling it upward. Disconnect the speaker connector.

   NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.







4. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connector is plugged in properly.

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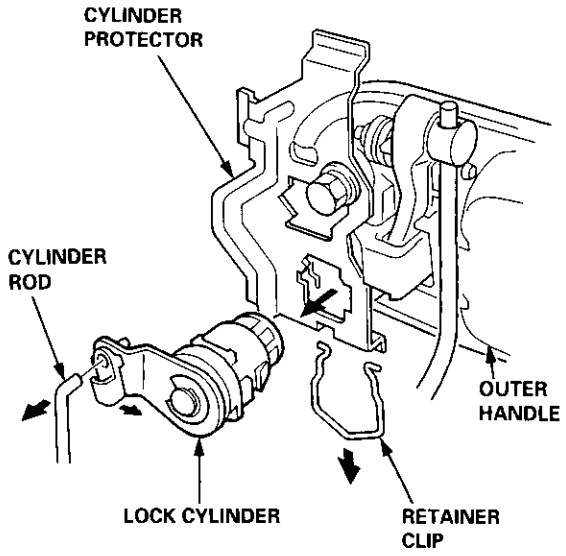
Front Door Outer Handle Replacement

CAUTION: Put on gloves to protect your hands.

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-7)
   - Plastic cover (see page 20-2)

2. Disconnect the cylinder rod. Remove the retainer clip, then remove the lock cylinder.

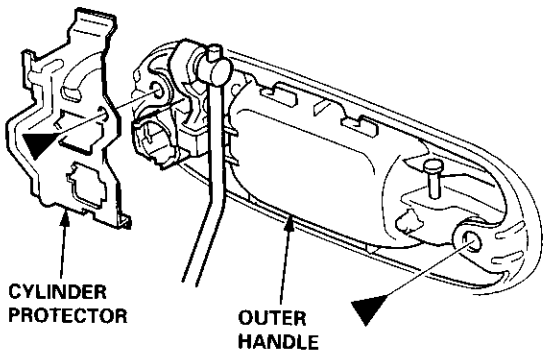


3. Remove the bolts securing the outer handle, then remove the cylinder protector.

►: Bolt locations, 2

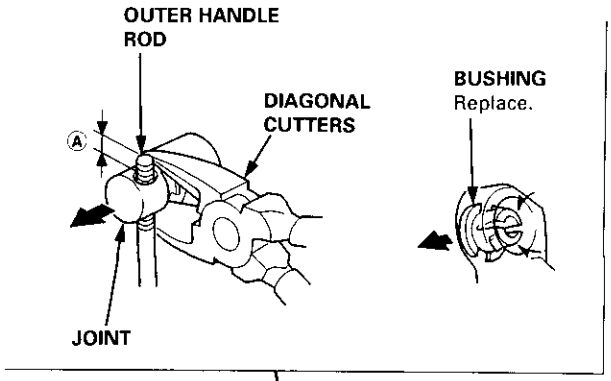


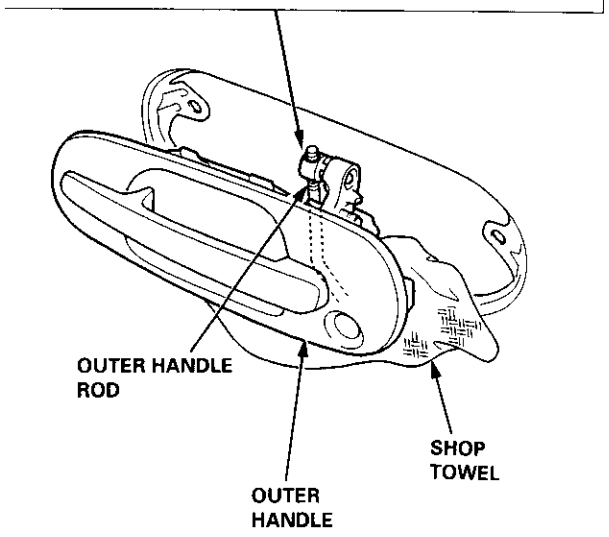
6 x 1.0 mm
9 N·m (0.9 kgf·m, 7 lbf·ft)



4. Pull out the outer handle. Pry the outer handle rod out of its joint using diagonal cutters.

NOTE:
- To ease reassembly, note location Ⓐ of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.





5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure each rod is connected securely.
- Make sure the door locks and opens properly.

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Front Door Latch Replacement

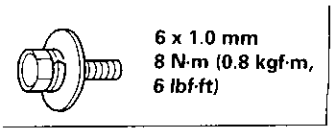
CAUTION: Put on gloves to protect your hands.

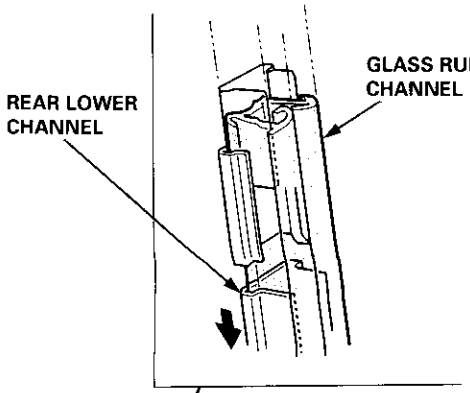
NOTE: Raise the glass fully.

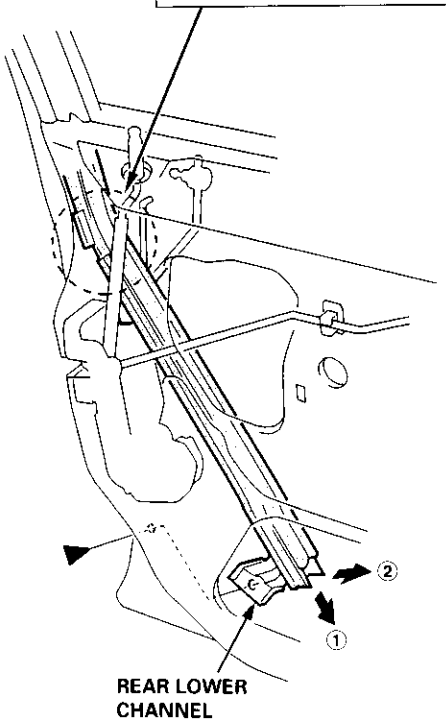
1. Remove:
   - Door panel (see page 20-7)
   - Plastic cover (see page 20-2)
   - Outer handle

2. Remove the bolt, then move the rear lower channel forward.

►: Bolt location, 1



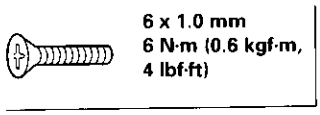


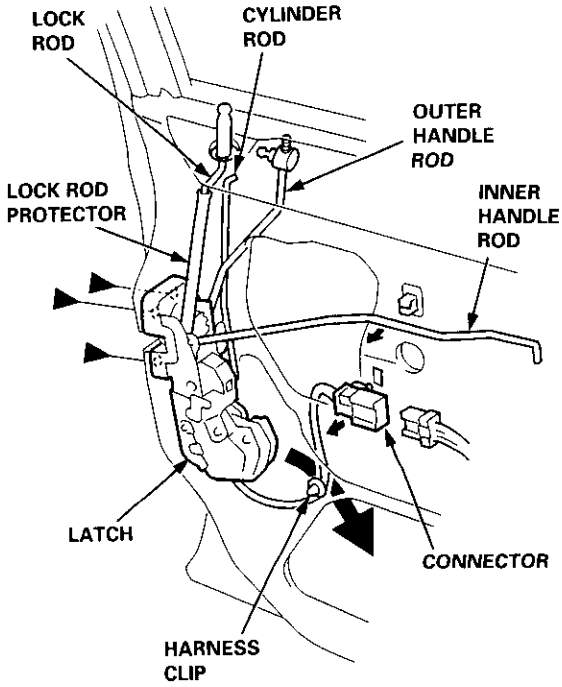


3. Disconnect the connector, and detach the harness clip from the door. Remove the screws, and remove the latch through the hole in the door.

NOTE: Take care not to bend any of the rods.

►: Screw locations, 3





4. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connector is plugged in properly, and each rod is connected securely.
- Make sure the door locks and opens properly.

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Front Door Glass and Regulator Replacement

CAUTION: Put on gloves to protect your hands.

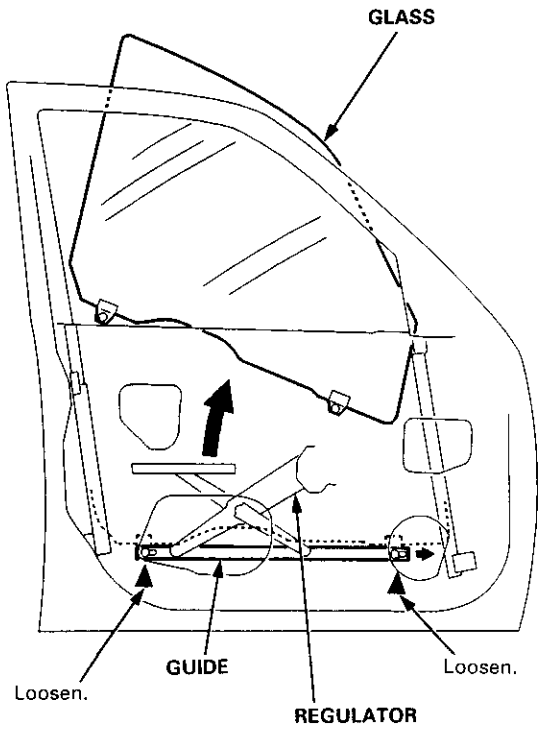
1. Remove:
   - Door panel (see page 20-7)
   - Plastic cover (see page 20-2)

2. Carefully move the glass until you can see the bolts, then loosen them. Slide the guide to the front, then remove the glass from the guide. Carefully pull the glass out through the window slot.

   NOTE: Take care not to drop the glass inside the door.

►: Bolt locations, 2

6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

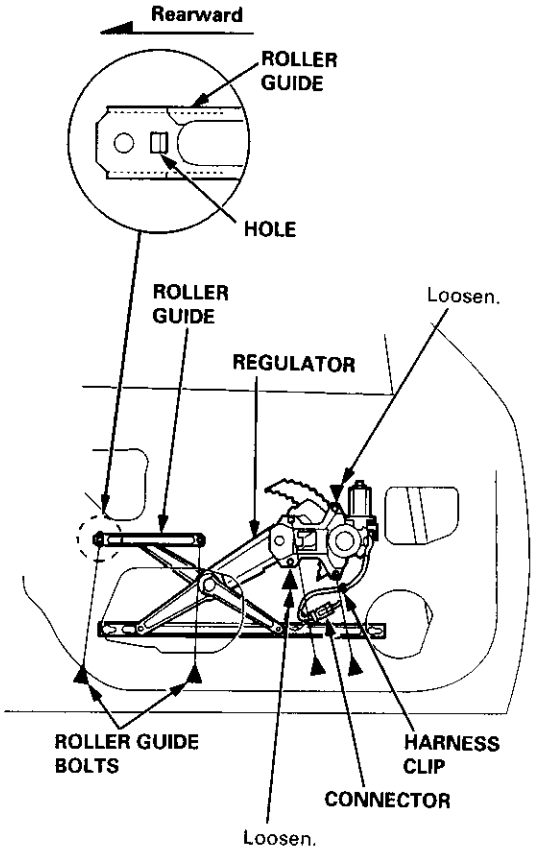


3. Disconnect the connector, and detach the harness clip, then remove the regulator through the hole in the door.

   NOTE:
   - Scribe a line around the rear roller guide bolt to show the original adjustment.
   - When installing the regulator, align the hole of the roller guide toward the rear.

►: Bolt locations, 6

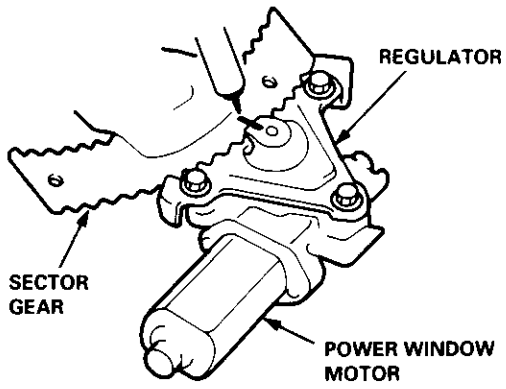
6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)



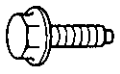
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4. Grease all the sliding surfaces of the regulator where shown.

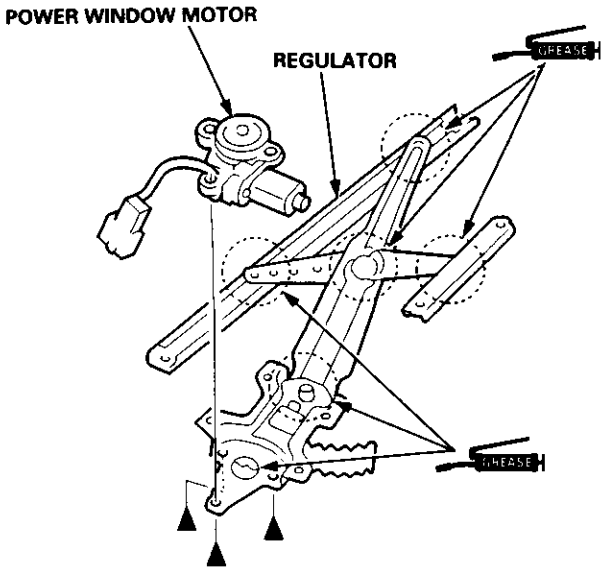
   NOTE: If it is necessary to remove the power window motor from the regulator, scribe a line across the sector gear and regulator before you remove the power window motor.



▶: Bolt locations, 3



6 x 1.0 mm
7 N·m (0.7 kgf·m, 5 lbf·ft)



5. Installation is the reverse of the removal procedure.

   NOTE: Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and glass run channel when the glass is closed. Adjust the position of the glass as necessary (see page 20-20).

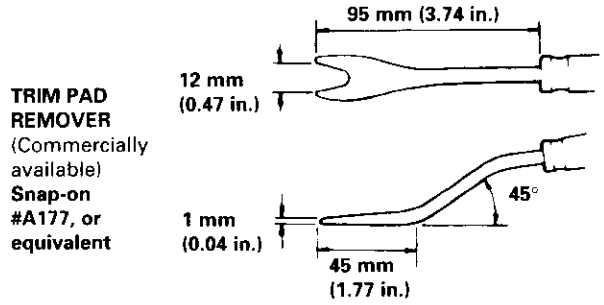
Rear Door Panel Removal and Installation

NOTE: Take care not to scratch the door panel and other parts.

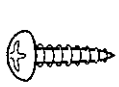
1. Remove the inner handle (see page 20-5).

2. Remove the screws from the armrest. On '99 – 00 models, remove the screw from the beverage portion. Release the clips that hold the door panel, then remove the door panel by pulling it upward.

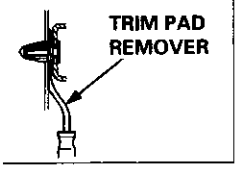
   NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.

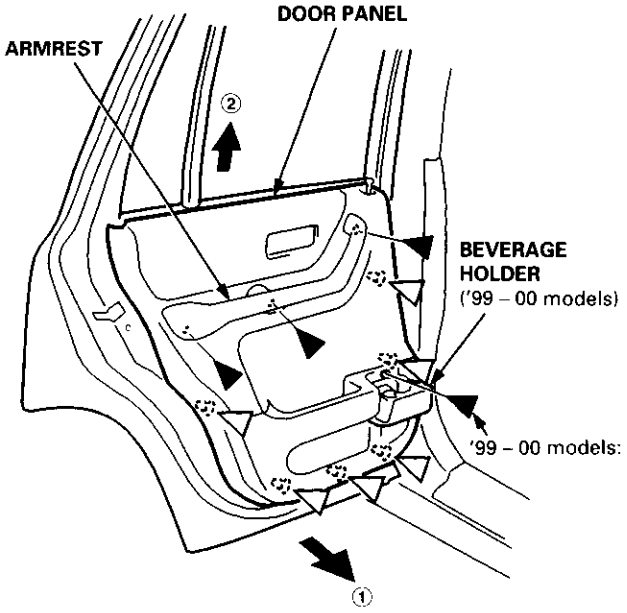


▶: Screw locations
'97 – 98 models, 3
'99 – 00 models, 4



▷: Clip locations, 6





3. Installation is the reverse of the removal procedure.

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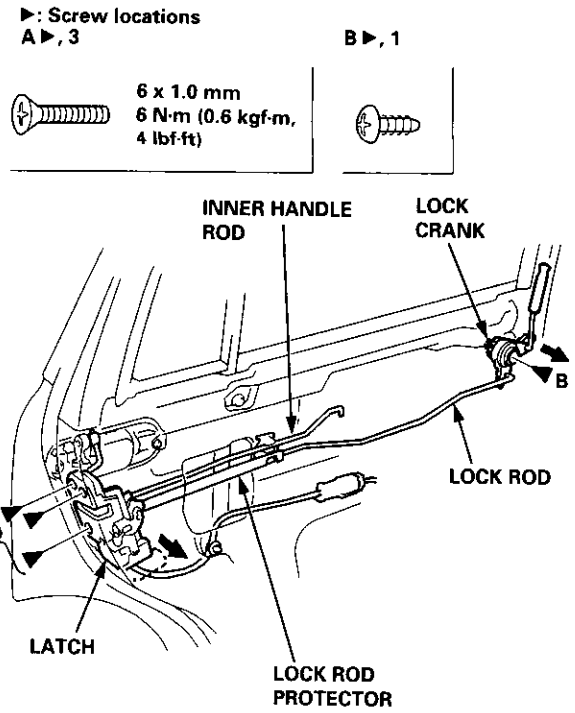
Rear Door Outer Handle Replacement

CAUTION: Put on gloves to protect your hands.

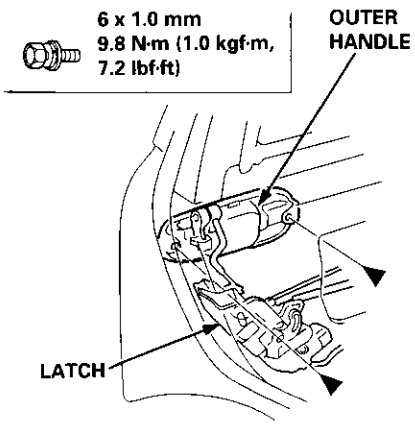
NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-11)
   - Plastic cover (see page 20-4)

2. Remove the lock crank, then remove the screws securing the latch.

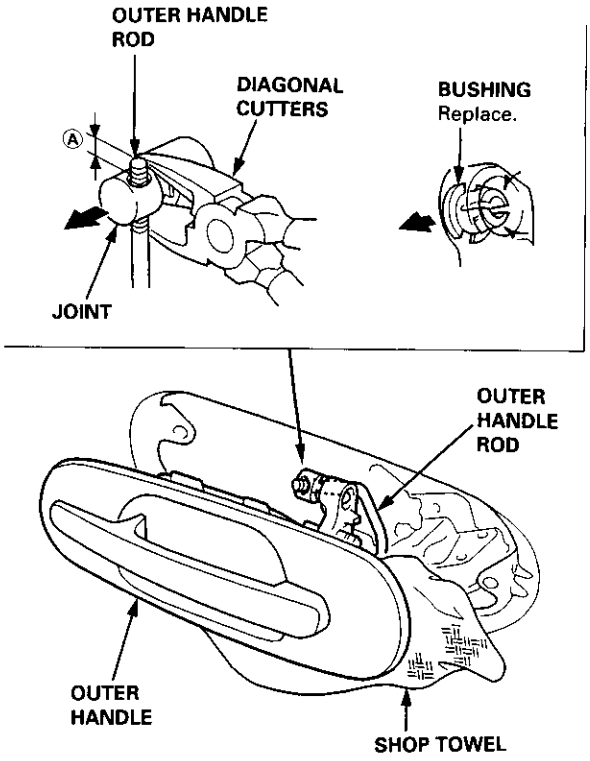


3. Move the latch down, and remove the bolts securing the outer handle.



4. Pull out the outer handle. Pry the outer handle rod out of its joint using diagonal cutters.

NOTE:
- To ease reassembly, note location Ⓐ of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.



5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the door locks and opens properly.
- Make sure the outer handle rod is connected properly.

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Rear Door Latch Replacement

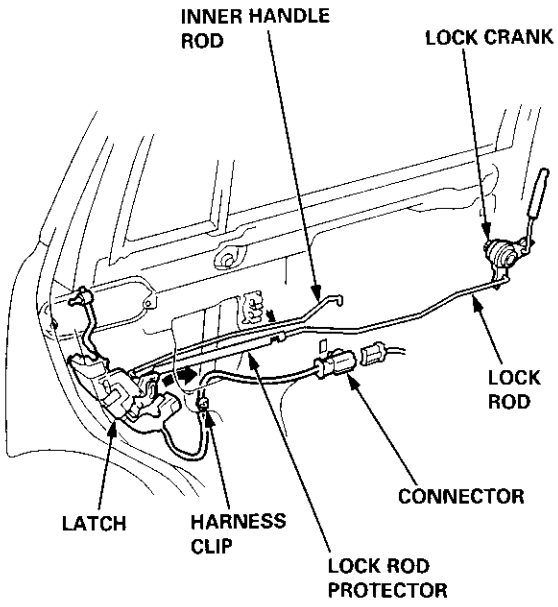
CAUTION: Put on gloves to protect your hands.

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-11)
   - Plastic cover (see page 20-4)
   - Outer handle (see page 20-12)

2. Disconnect the connector and harness clip, then remove the latch through the hole in the door.

   NOTE: Take care not to bend any of the rods.



3. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the outer handle rod and inner handle rod are connected properly.
   - Make sure the door locks and opens properly.

Rear Door Glass, Quarter Glass and Regulator Replacement

CAUTION: Put on gloves to protect your hands.

1. Remove:
   - Door panel (see page 20-11)
   - Plastic cover (see page 20-4)

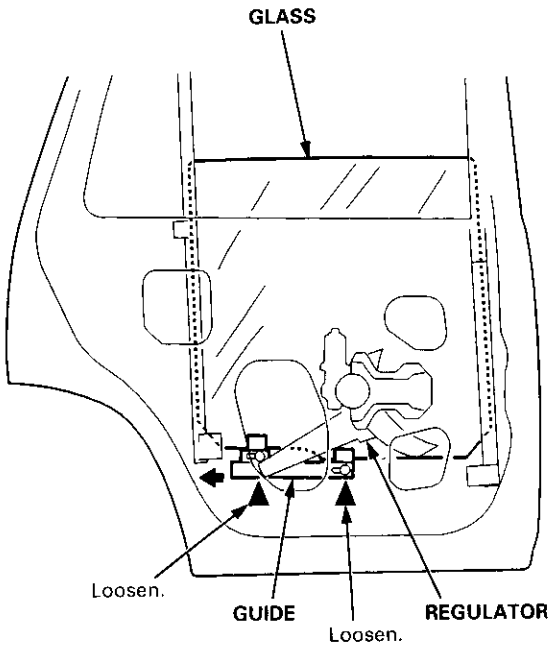
2. Carefully move the glass until you can see the bolts, then loosen them. Slide the guide to the rear, then remove the glass from the guide.

   NOTE: Take care not to drop the glass inside the door.

►: Bolt locations, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



(cont'd)

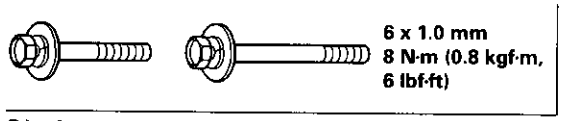
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Rear Door Glass, Quarter Glass and Regulator Replacement (cont'd)

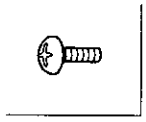
3. Carefully lower the glass. Remove the bolts and screw from the rear channel, then pull the rear channel up as shown. Remove the glass from the rear channel. Carefully pull the glass out through the window slot.

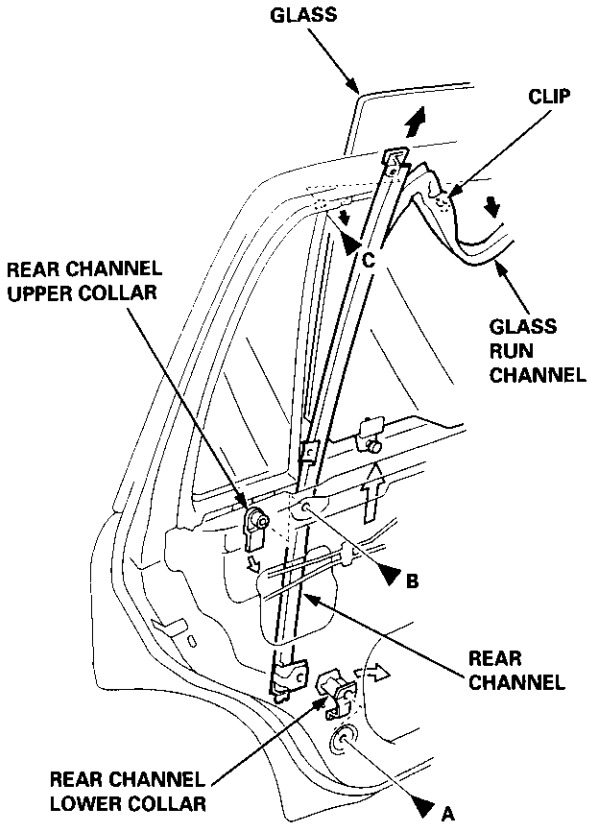
   NOTE: Take care not to drop the glass inside the door.

▶: Bolt, screw locations
A ▶, 1 B ▶, 1

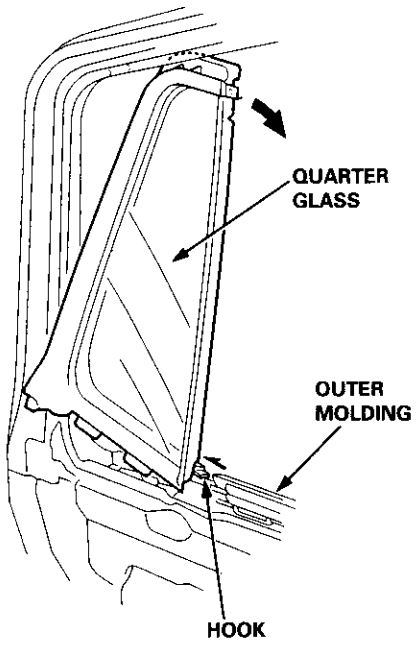


C ▶, 1



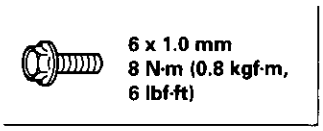


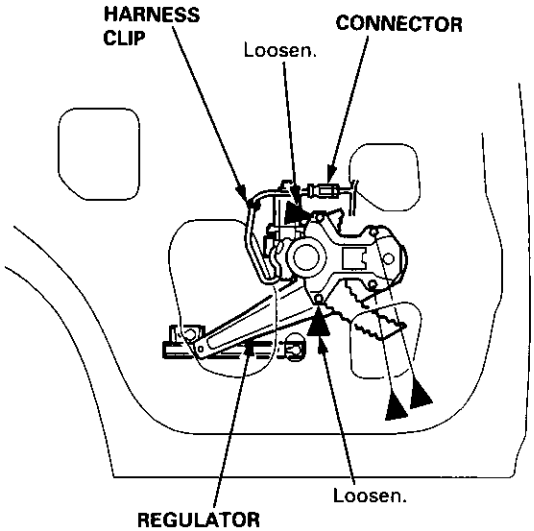
4. Remove the quarter glass.



5. Disconnect the connector, and detach the harness clip, then remove the regulator through the hole in the door.

▶: Bolt locations, 4

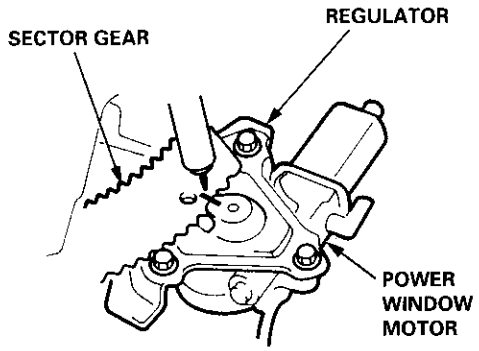




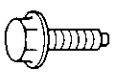
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6. Grease all the sliding surfaces of the regulator where shown.

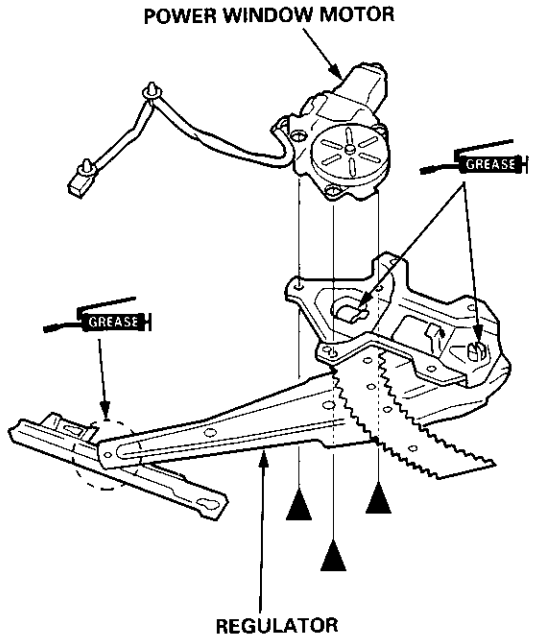
NOTE: If it is necessary to remove the power window motor from the regulator, scribe a line across the sector gear and regulator before you remove the power window motor.



▶: Bolt locations, 3



6 x 1.0 mm
7 N·m (0.7 kgf·m, 5 lbf·ft)



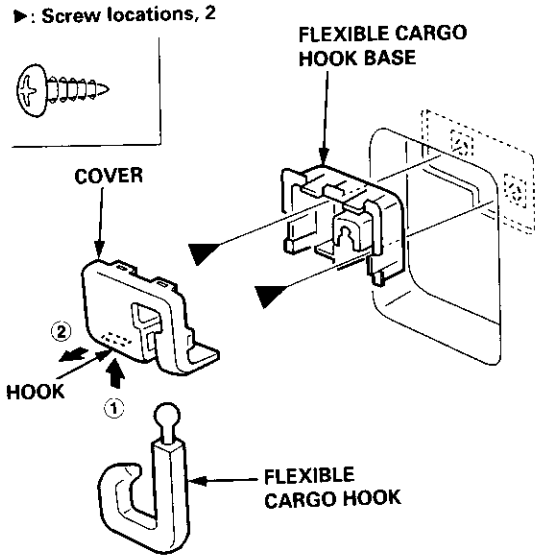
7. Installation is the reverse of the removal procedure.

NOTE: Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and glass run channel when the glass is closed. Adjust the position of the glass as necessary (see page 20-20).

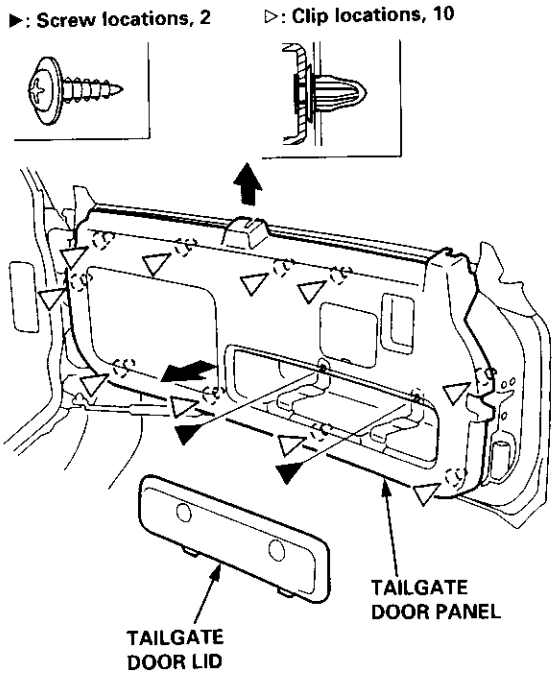
Tailgate Door Panel Removal and Installation

NOTE: Take care not to scratch the door panel and other parts.

1. Remove the cover, and remove the flexible cargo hook and base.



2. Remove the tailgate door lid, then remove the screws.



3. Release the clips that hold the tailgate door panel, then remove the tailgate door panel.

4. Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

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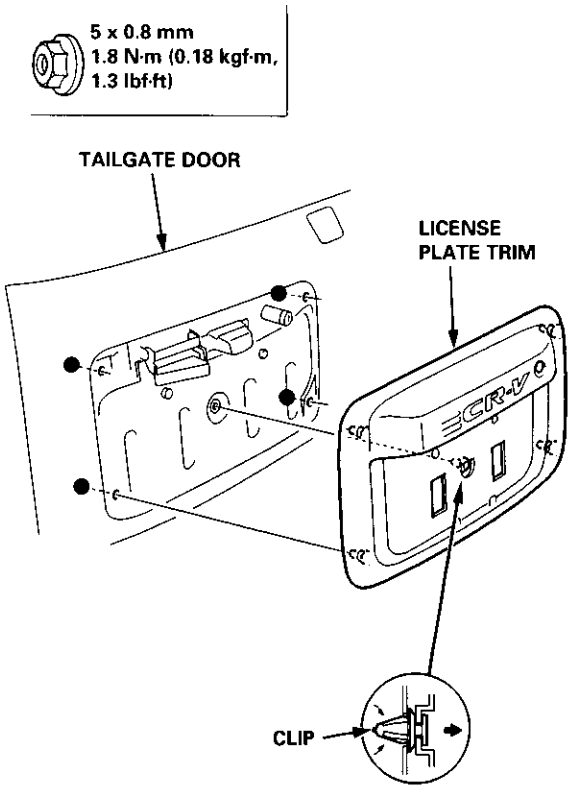
License Plate Trim Removal and Installation

CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to scratch the license plate trim and tailgate door.

1. Remove the license plate.
2. Remove the tailgate door panel (see page 20-15).
3. Remove the nuts, detach the clip, then remove the license plate trim.

   NOTE: Take care not to drop the nuts inside the tailgate door.



4. Installation is the reverse of the removal procedure.

   NOTE: If the clip is damaged, replace it.

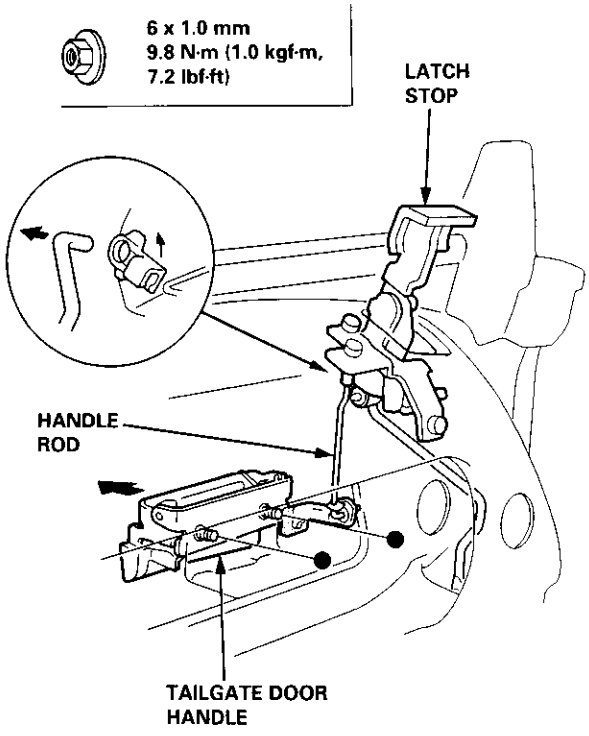
Tailgate Door Handle Replacement

CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to scratch the tailgate door.

1. Remove:
   - Tailgate door panel (see page 20-15)
   - License plate
   - License plate trim
2. Disconnect the handle rod. Remove the nuts securing the tailgate door handle, then remove the tailgate door handle by pulling it out.

   NOTE: Take care not to bend the handle rod.



3. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the handle rod is connected properly.
   - Make sure the tailgate door opens properly.

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Tailgate Door Latch and Latch Stop Replacement

CAUTION: Put on gloves to protect your hands.

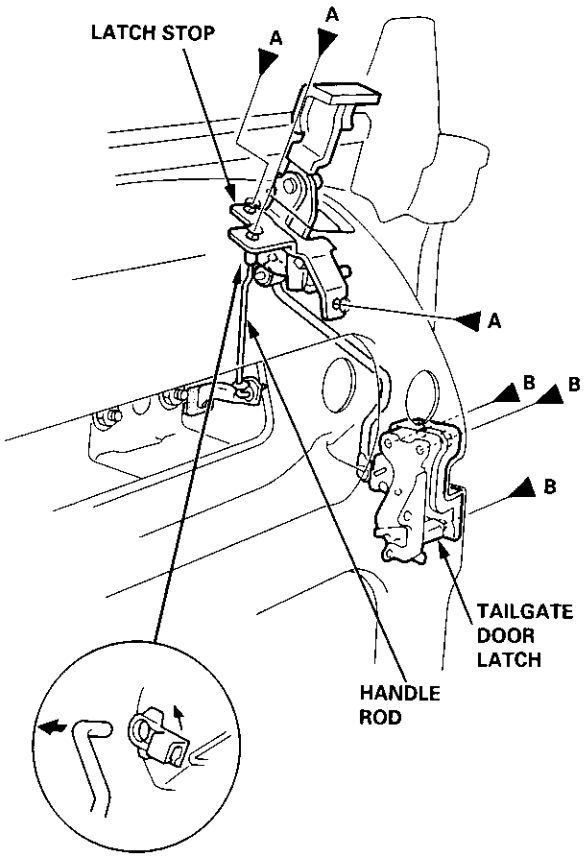
NOTE: Take care not to scratch the tailgate door.

1. Remove the tailgate door panel (see page 20-15).

2. Disconnect the handle rod. Remove the bolts securing the latch stop and screws securing the latch.

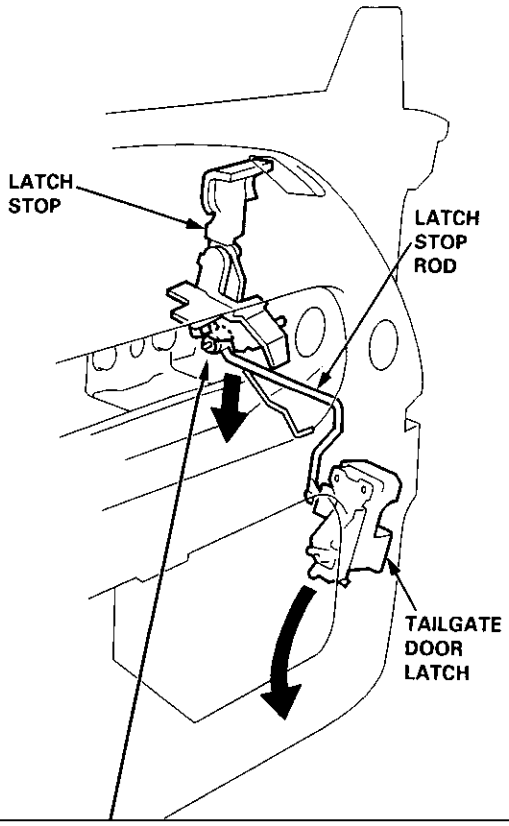
▶: Bolt, screw locations

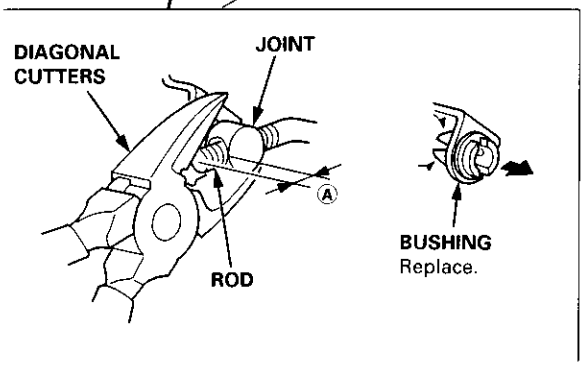
A ▶, 3	B ▶, 3
6 x 1.0 mm 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)	6 x 1.0 mm 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



3. Move the latch stop and latch down, then pry the latch stop rod out of its joint using diagonal cutters. Remove the latch stop and latch through the hole in the tailgate door.

NOTE:
- To ease reassembly, note location Ⓐ of the latch stop rod on the joint before disconnecting it.
- Take care not to bend the latch stop rod.





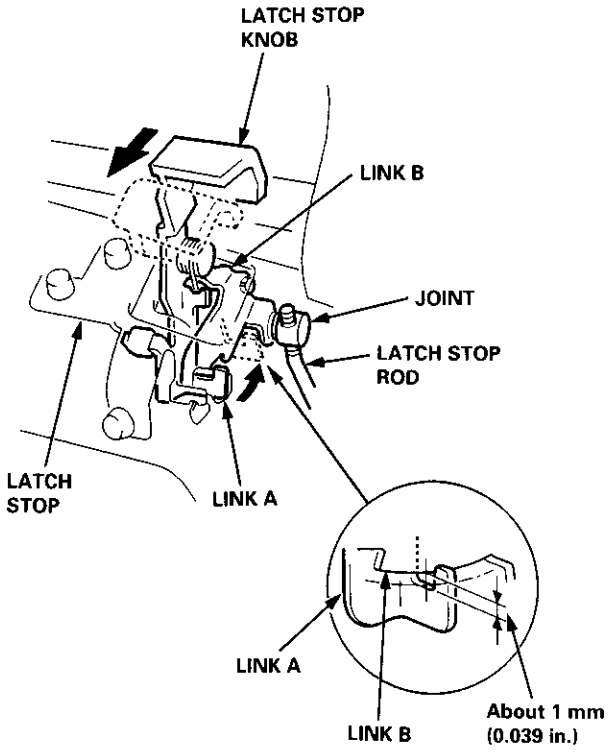
(cont'd)

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Tailgate Door Latch and Latch Stop Replacement (cont'd)

4. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the handle rod and latch stop rod are connected properly.
   - Make sure the tailgate door locks and opens properly.
   - After installing the latch stop and tailgate door latch, make sure that there is about 1 mm (0.039 in.) between the link A and link B of the latch stop. Adjust the joint position of the latch stop rod as needed, then check the latch stop operation. (Pull the tailgate door handle while you push on the latch stop knob; the tailgate door should not open.)

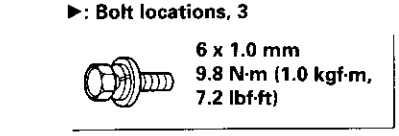


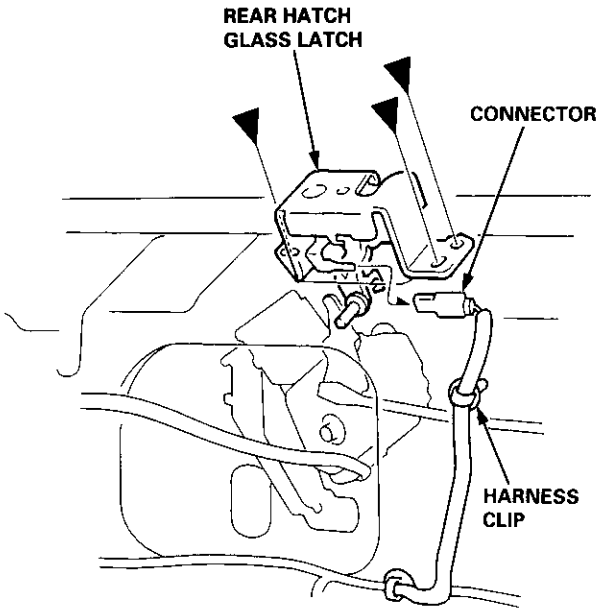
Rear Hatch Glass Latch Replacement

NOTE: Take care not to scratch the tailgate door.

1. Remove the tailgate door panel (see page 20-15).

2. Disconnect the connector. Remove the bolts securing the latch, then remove the latch.





3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the rear hatch glass locks and opens properly.

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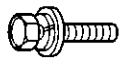
Rear Hatch Glass Lock Cylinder Replacement

NOTE: Take care not to scratch the tailgate door.

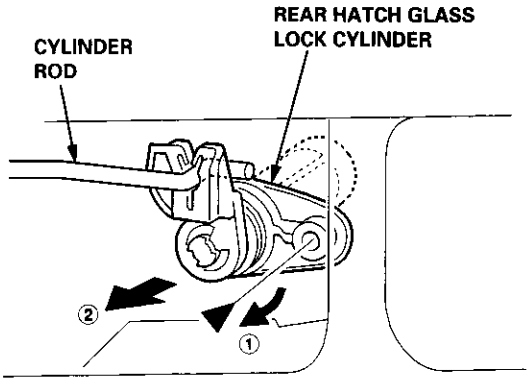
1. Remove the tailgate door panel (see page 20-15).
2. Remove the bolt securing the lock cylinder. Turn and pull out the lock cylinder, and disconnect the cylinder rod.

   NOTE: Take care not to bend the cylinder rod.

►: Bolt location, 1



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



3. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the cylinder rod is connected properly.
   - Make sure the rear hatch glass opens properly.

Rear Hatch Glass Actuator Replacement

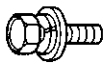
CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to scratch the tailgate door.

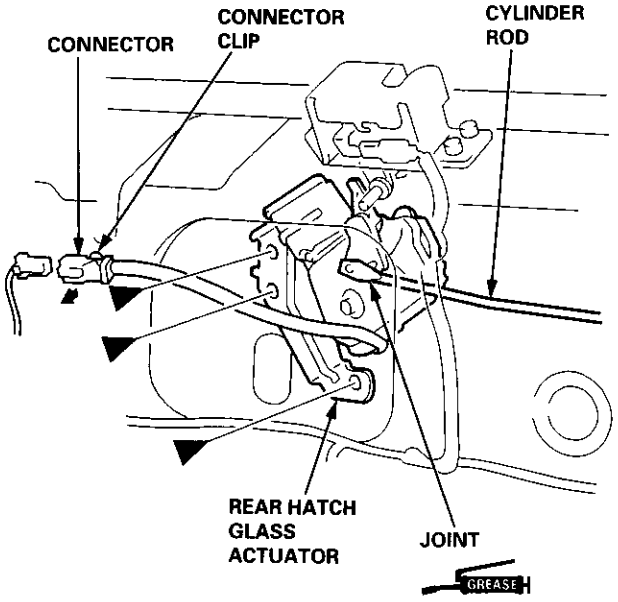
1. Remove:
   - Tailgate door panel (see page 20-15)
   - Rear hatch glass lock cylinder
2. Disconnect the connector and the connector clip. Remove the bolts securing the actuator, then remove the actuator.

   NOTE: Take care not to bend the cylinder rod or damage the joint.

►: Bolt locations, 3



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



3. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the cylinder rod and connector are connected properly.
   - Grease the joint of the cylinder rod.
   - Make sure the rear hatch glass opens properly.

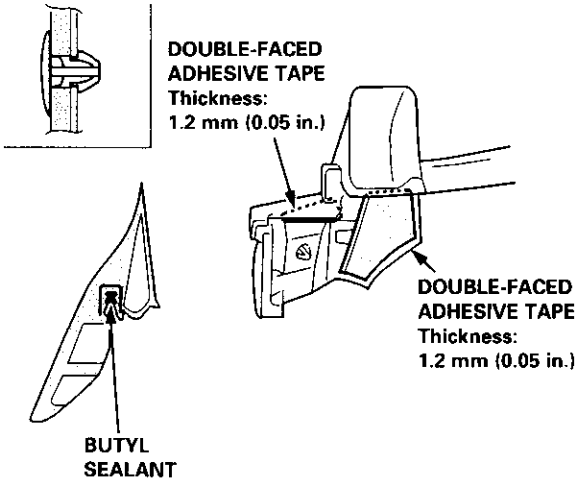
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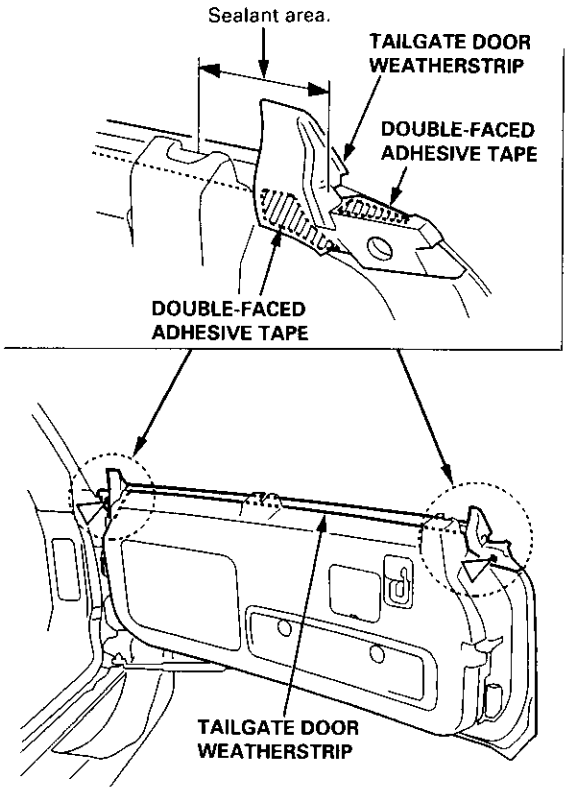
Tailgate Door Weatherstrip Replacement

Install the tailgate door weatherstrip as shown.

NOTE:
- Clean the tailgate door bonding surface with a sponge dampened in alcohol.
- Make sure there are no wrinkles in the weatherstrip.
- Check for water leaks.

▷: **Clip locations, 2**





Front and Rear Door Glass Adjustment

NOTE:
- Place the vehicle on a firm, level surface when adjusting the glass.
- Check the weatherstrips and glass run channel for damage or deterioration, and replace them if necessary.

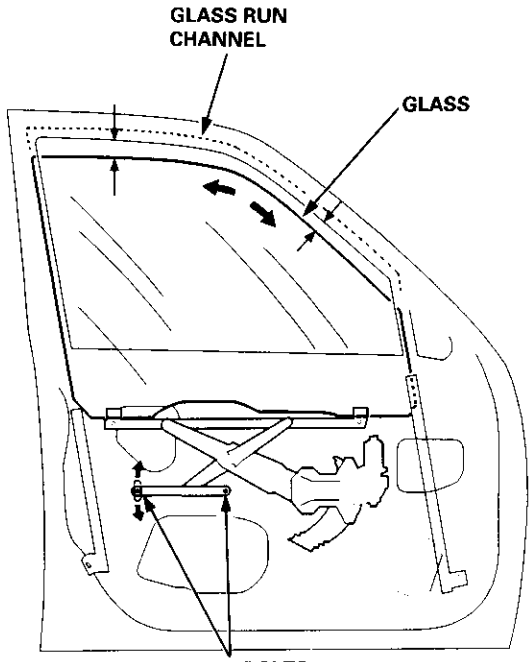
1. Remove:
   - Door panel (see pages 20-7, 11)
   - Plastic cover (see pages 20-2, 4)

2. Adjust the glass.

Front:

a. Raise the glass as far up as possible, and hold it against the glass run channel.

b. Loosen the roller guide bolts, and adjust the glass so it is parallel with the glass run channel.



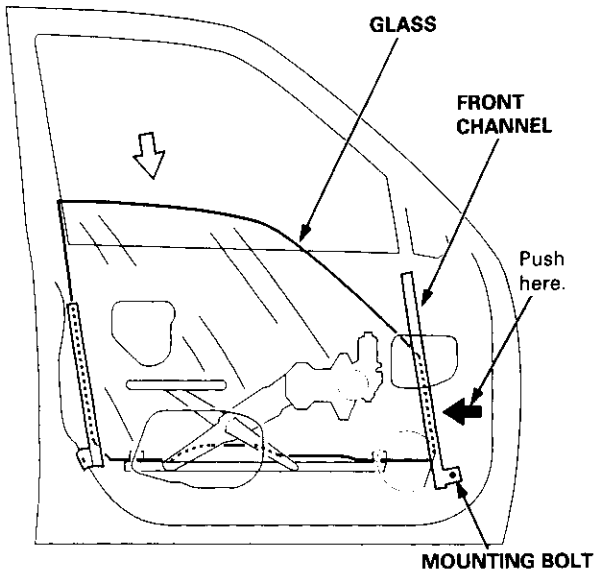
c. Tighten the roller guide bolts.

d. Loosen the front channel bolt.

e. Lower the glass.

f. Push the front channel against the glass, then tighten the front channel bolt.

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Rear:

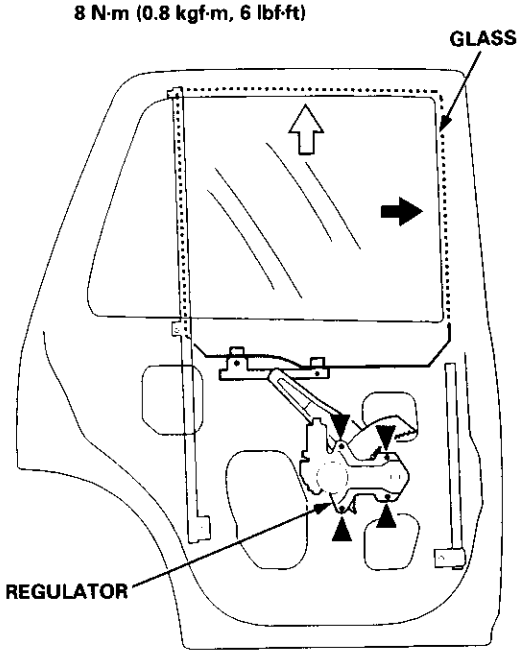
a. Raise the glass fully.

b. Loosen the regulator mounting bolts.

c. Push the glass forward.

d. Tighten the regulator mounting bolts.

►: Bolt locations, 4
6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)

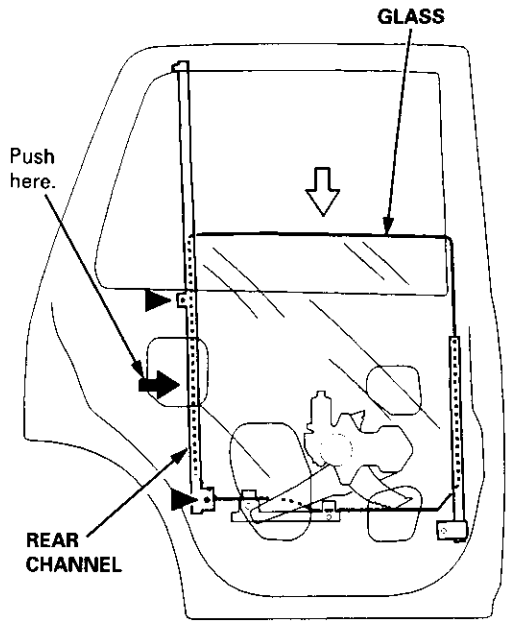


e. Loosen the rear channel mounting bolts.

f. Lower the glass.

g. Push the rear channel against the glass, then tighten the mounting bolts.

►: Bolt locations, 2
6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)

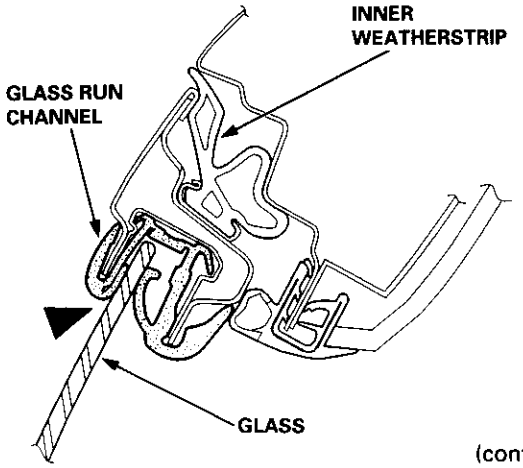


3. Check that the glass moves smoothly.

4. Raise the glass fully and check for gaps.

5. Check the glass operation.

NOTE: Check that the glass contacts the glass run channel evenly.



(cont'd)

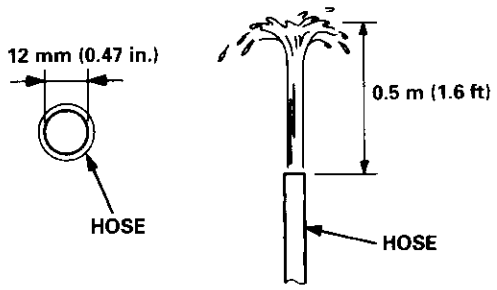
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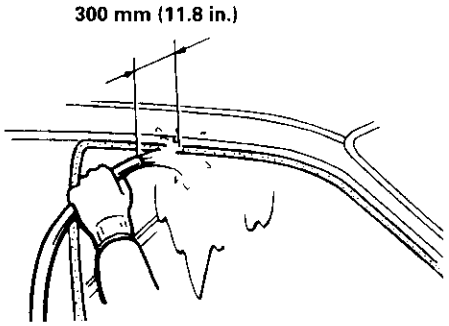
Front and Rear Door Glass Adjustment (cont'd)

6. Check for water leaks.

   Spray water over the roof and on the sealing area as shown.

   NOTE:
   - Adjust the water pressure as shown.
   - Do not squeeze the tip of the hose.





7. Attach the plastic cover, then install the door panel (see pages 20-7, 11).

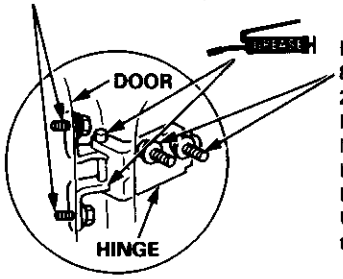
Front and Rear Door Position Adjustment

NOTE: Place the vehicle on a firm, level surface when adjusting the doors.

After installing the door, check for a flush fit with the body, then check for equal gaps between the front, rear, and bottom door edges and the body. The door and body edges should also be parallel. Adjust at the hinges as shown.

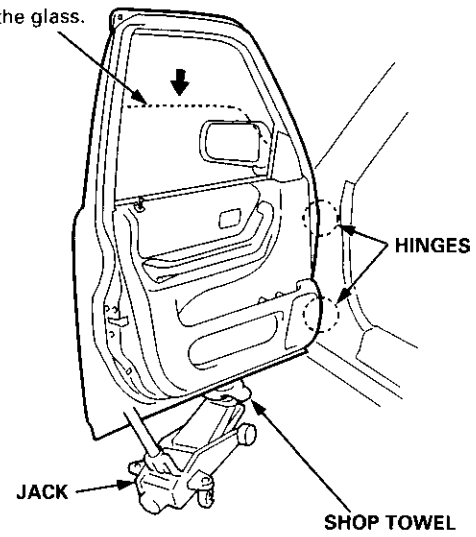
CAUTION: Place a shop towel on the jack to prevent damage to the door when loosening the door and hinge mounting bolts for adjustment.

DOOR MOUNTING BOLTS
8 x 1.25 mm
28 N·m (2.9 kgf·m, 21 lbf·ft)
Loosen the door mounting bolts slightly to move the door IN or OUT until it's flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.



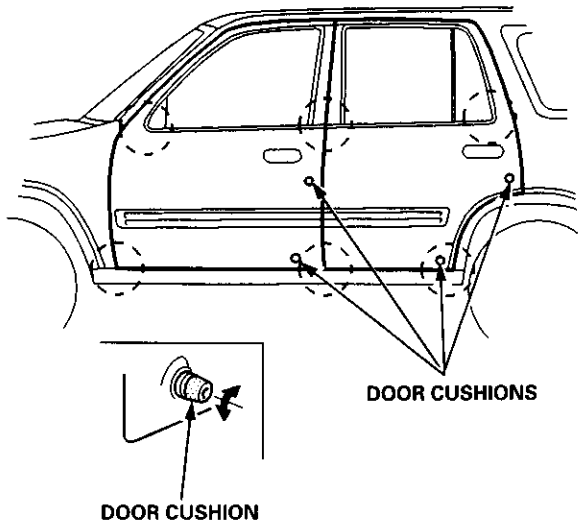
HINGE MOUNTING BOLTS
8 x 1.25 mm
28 N·m (2.9 kgf·m, 21 lbf·ft)
Remove the inner fender, loosen the hinge mounting bolts, and move the door BACKWARD or FORWARD, UP or DOWN as necessary to equalize the gaps.

Lower the glass.



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The door and body edges should be parallel. If necessary, adjust the door cushion.



Check for water leaks.

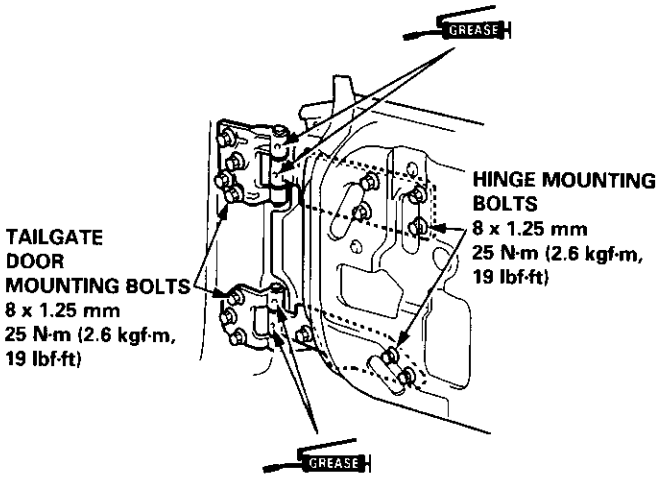
NOTE: Do not squeeze the tip of the hose.

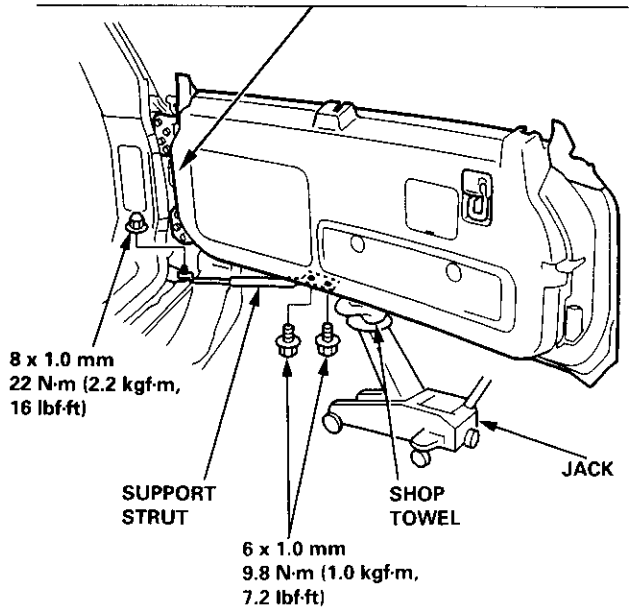
Tailgate Door Position Adjustment

NOTE: Place the vehicle on a firm, level surface when adjusting the tailgate door.

After installing the tailgate door, check for a flush fit with the body, then check for equal gaps between the tailgate door edges and the body. The tailgate door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the tailgate door when loosening the tailgate door and hinge mounting bolts for adjustment.



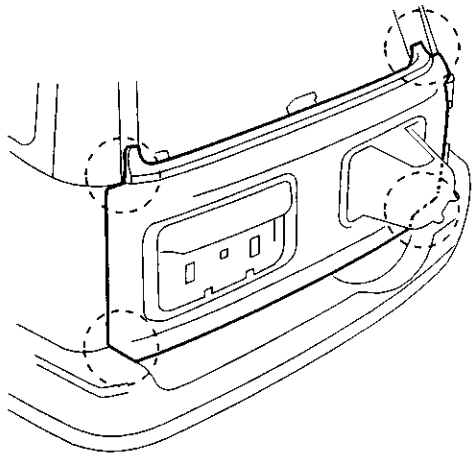


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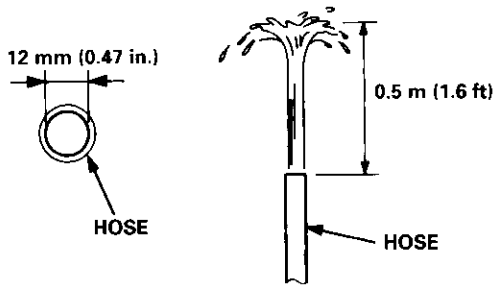
Tailgate Door Position Adjustment (cont'd)

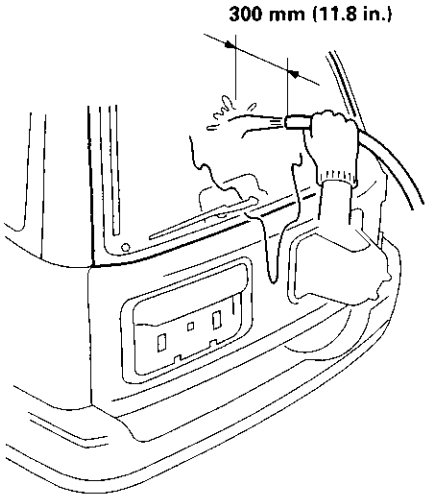
The door and body edges should be parallel.



Check for water leaks.
Spray water over the tailgate door and on the sealing area as shown.

NOTE:
- Adjust the water pressure as shown.
- Do not squeeze the tip of the hose.

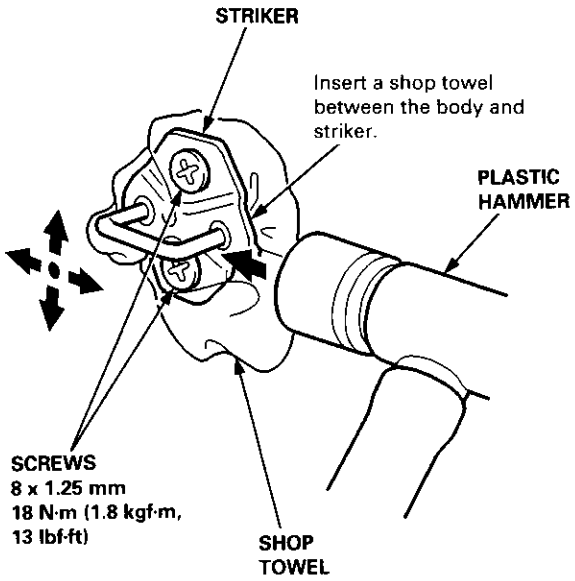




Front and Rear Door Striker Adjustment

Make sure the door latches securely without slamming it. If necessary, adjust the striker: The striker nuts are fixed. The striker can be adjusted slightly up or down, and in or out.

1. Loosen the screws, then insert a shop towel between the body and striker.



2. Lightly tighten the screws.
3. Wrap the striker with a shop towel, then adjust the striker by tapping it with a plastic hammer.

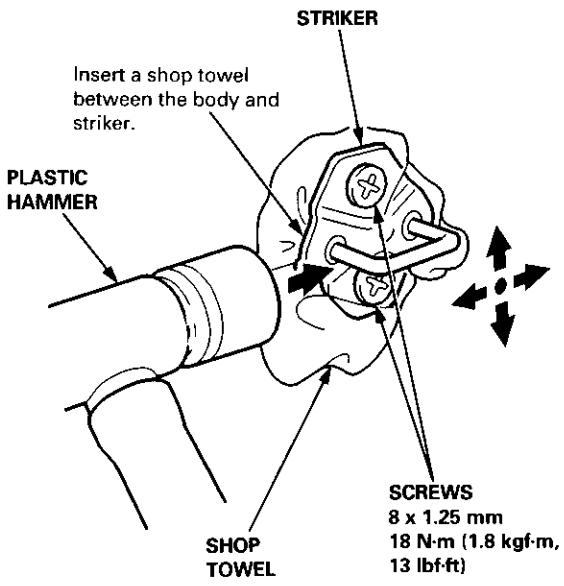
   CAUTION: Do not tap the striker too hard.
4. Loosen the screws, and remove the shop towel.
5. Lightly tighten the screws.
6. Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit, If the door latches properly, tighten the screws and recheck.

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Tailgate Door Striker Adjustment

Make sure the door latches securely without slamming it. If necessary, adjust the striker: The striker nuts are fixed. The striker can be adjusted slightly up or down, and in or out.

1. Remove the tailgate door wedge.
2. Loosen the screws, then insert a shop towel between the body and striker.



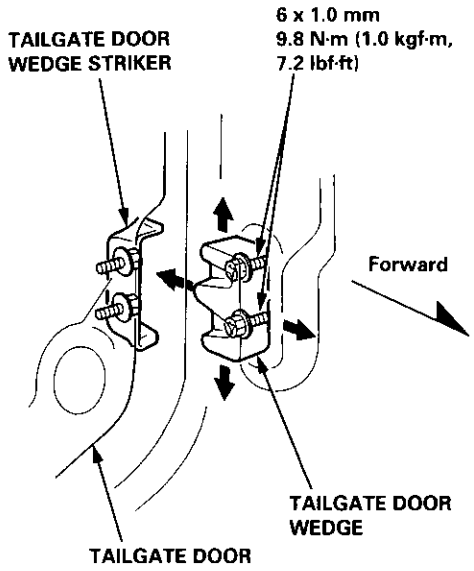
3. Lightly tighten the screws.
4. Wrap the striker with a shop towel, then adjust the striker by tapping it with a plastic hammer.

   CAUTION: Do not tap the striker too hard.

5. Loosen the screws, and remove the shop towel.
6. Lightly tighten the screws.
7. Hold the tailgate door outer handle out, and push the tailgate door against the body to be sure the striker allows a flush fit. If the tailgate door latches properly, tighten the screws and recheck.
8. Install the tailgate door wedge, and adjust it.

Tailgate Door Wedge Adjustment

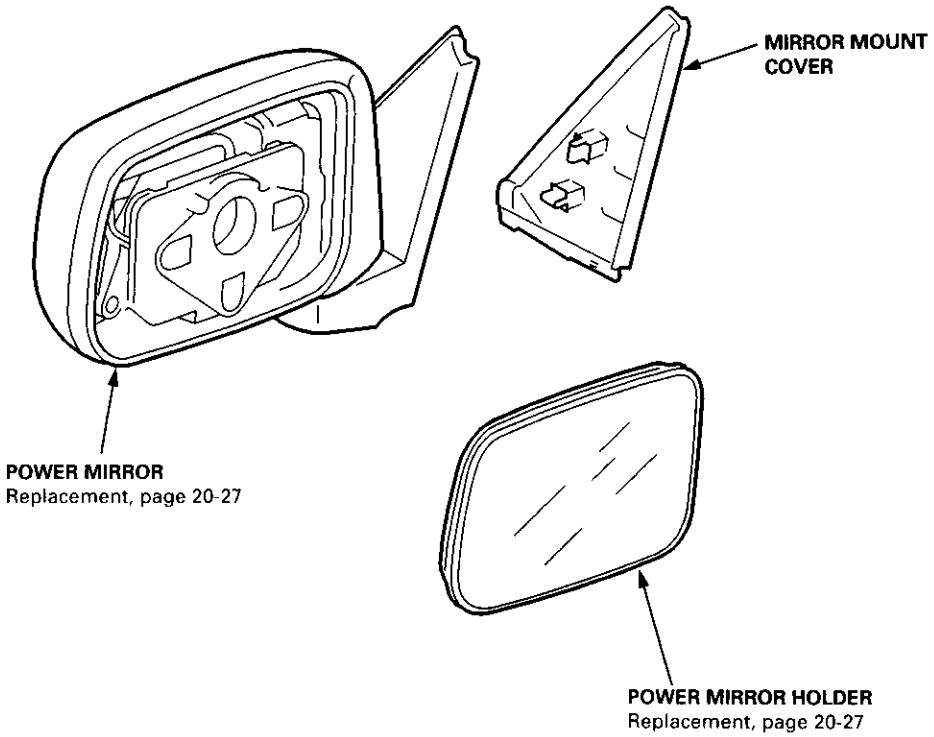
1. Loosen the bolts, and move the tailgate door wedge UP or DOWN to align it with the tailgate door wedge striker. Move the tailgate door wedge IN or OUT to center it. Then lightly tighten the bolts.

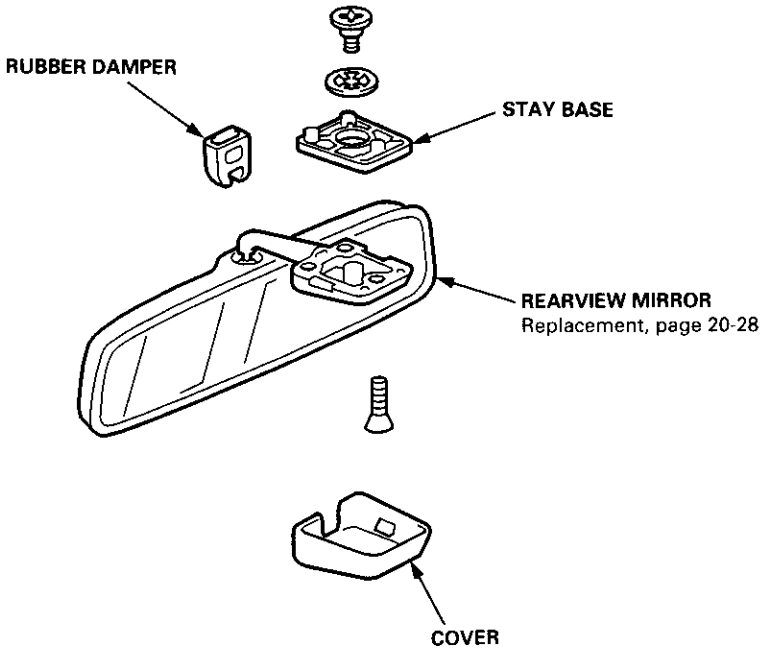


2. Hold the tailgate door handle out, and push the tailgate door against the body to be sure the tailgate door wedge allows a flush fit. If the tailgate door latches properly, tighten the bolts and recheck.

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Component Location Index



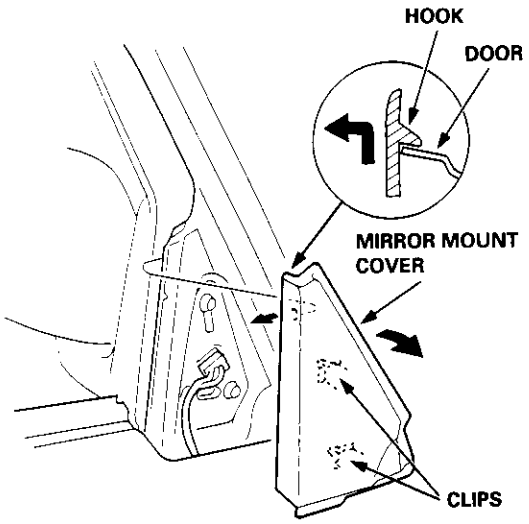


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Power Mirror Replacement

NOTE: Take care not to scratch the mirror, mirror mount cover and door.

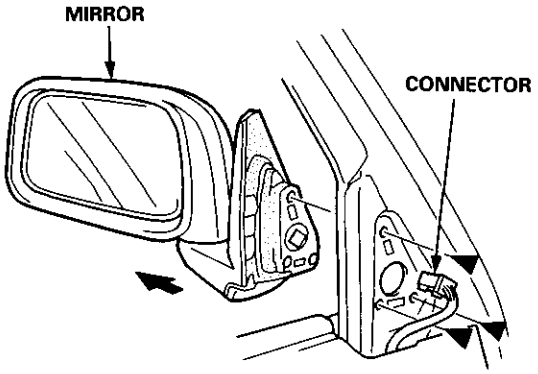
1. Lower the door glass fully.
2. Carefully pry out the mirror mount cover by hand.



3. Disconnect the connector, then remove the mirror mounting bolts while supporting the mirror.

►: Bolt locations, 3


5 x 0.8 mm
5 N·m (0.5 kgf·m, 4 lbf·ft)



4. Installation is the reverse of the removal procedure.

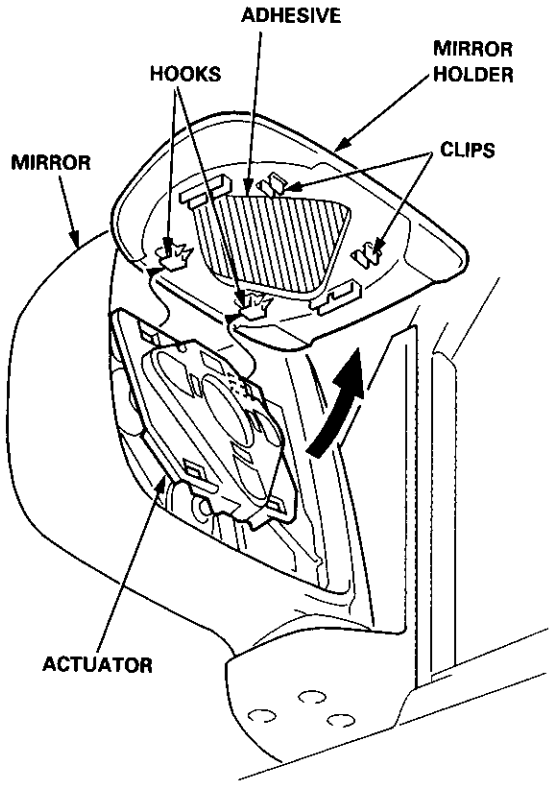
   NOTE: Make sure the connector is connected properly.

Power Mirror Holder Replacement

CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to scratch the mirror.

1. Carefully pull out the bottom edge of the mirror holder by hand.



2. Separate the mirror holder from the actuator by slowly pulling them apart.
3. Reattach the hooks of the mirror holder to the actuator, then position the mirror holder on the actuator. Carefully push the clip portions of the mirror holder until the mirror holder locks into place.
4. Check the actuator operation.

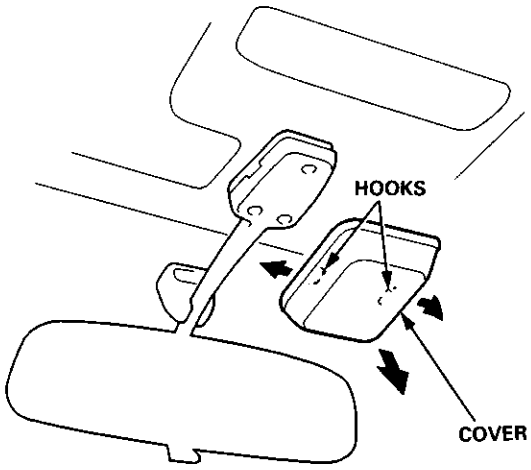
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Rearview Mirror Replacement

CAUTION: When prying with a flat-tip screwdriver, wrap it with a shop towel to prevent damage.

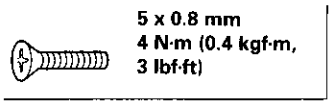
NOTE: Take care not to scratch the cover or tear the headliner.

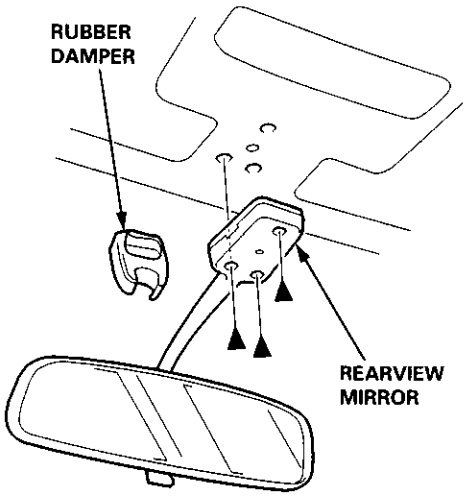
1. Remove the cover using the end of a flat-tip screwdriver.



2. Remove the rubber damper.

►: Screw locations, 3





3. Remove the screws, then remove the rearview mirror.

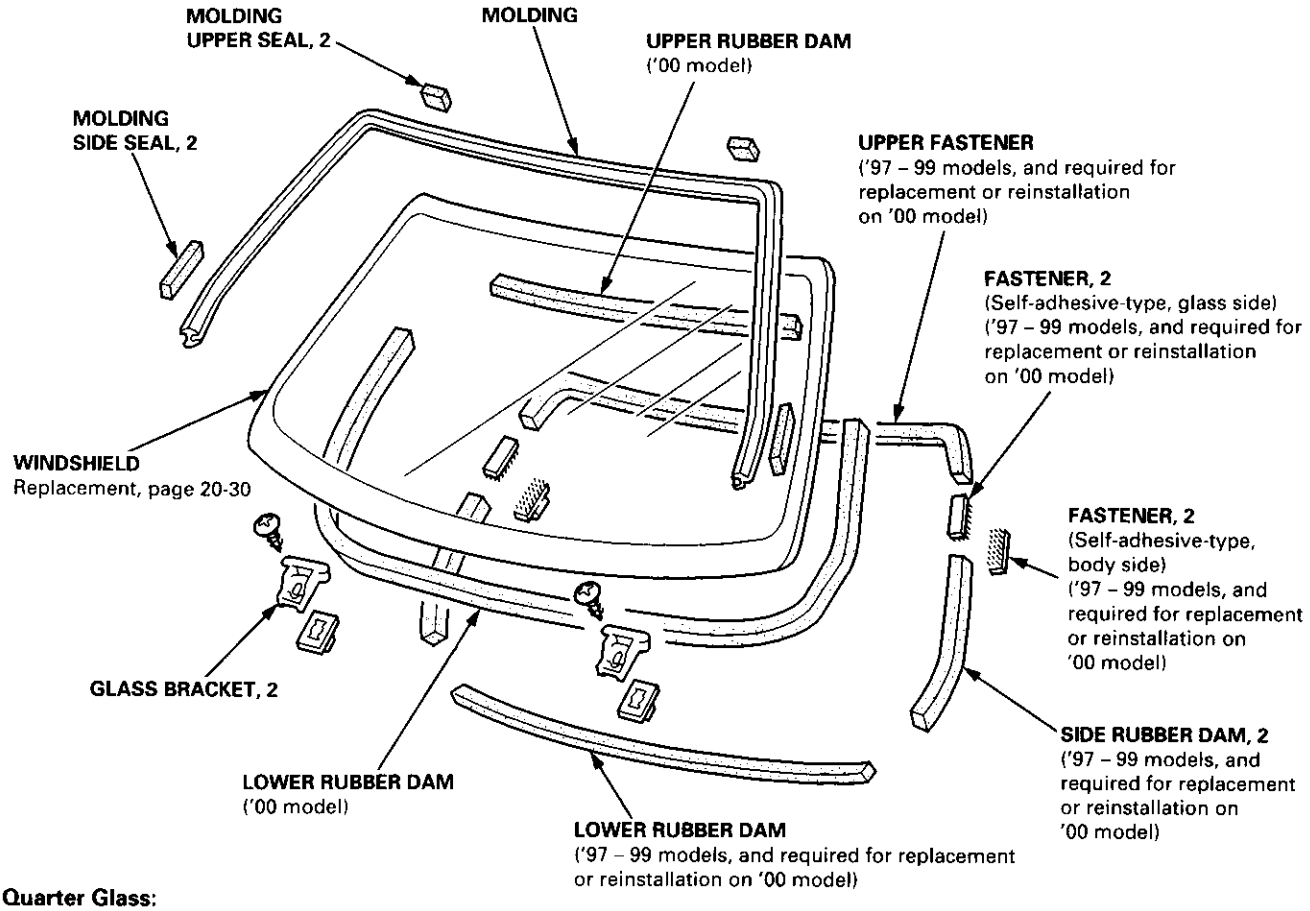
4. Installation is the reverse of the removal procedure.

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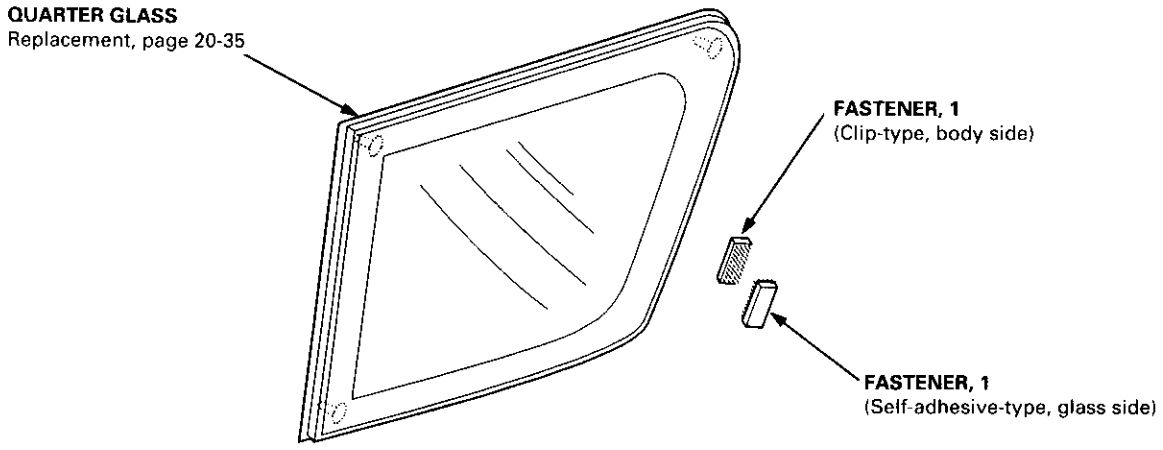
Component Location Index

NOTE: The numbers after the part names show the quantities of the parts used.

Windshield:



Quarter Glass:



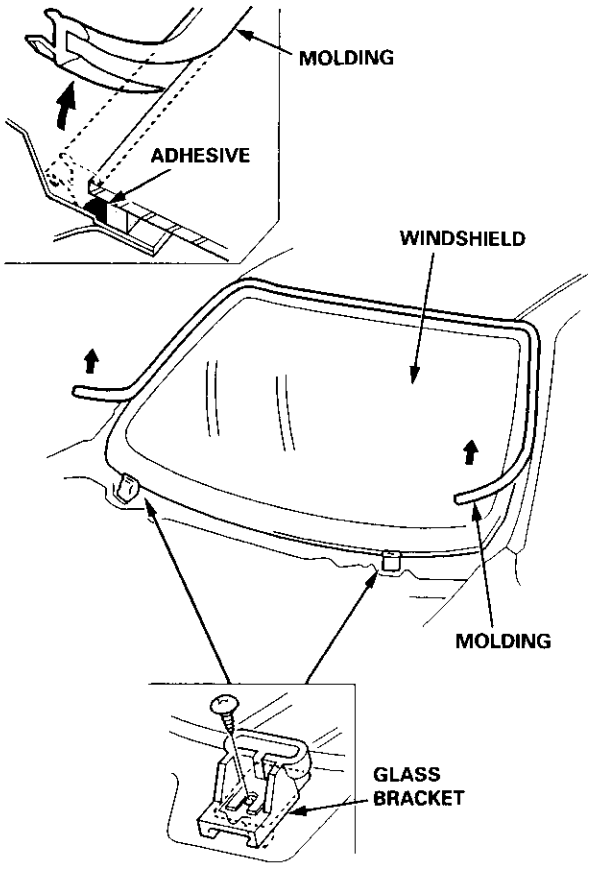
Windshield Replacement

CAUTION:
- **Put on gloves to protect your hands.**
- **Use seat covers to avoid damaging any surfaces.**

1. To remove the windshield, first remove the:
   - Rearview mirror (see page 20-28)
   - Sunvisors and holders (see page 20-44)
   - Ceiling light (see section 23)
   - Grab handle (see page 20-44)
   - Front door trim (see page 20-41)
   - Front pillar trim (see page 20-41)
   - Windshield wiper arms and cowl cover (see page 20-98)

2. Remove the molding and glass brackets.

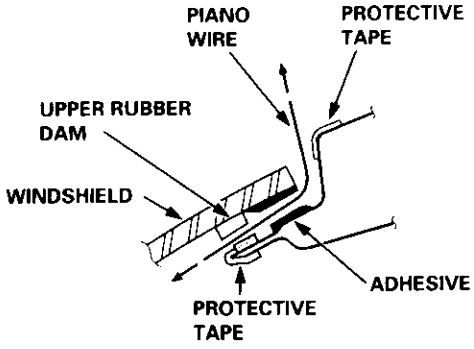
   NOTE: If removing the molding is difficult, cut the molding with a utility knife.

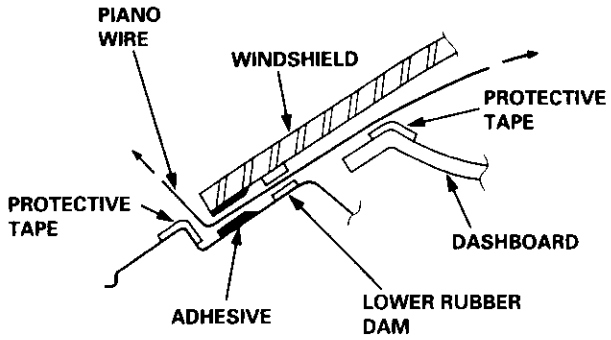


3. Pull down the front portion of the headliner (see page 20-44).

   CAUTION: Take care not to bend the headliner excessively, or you may break it.

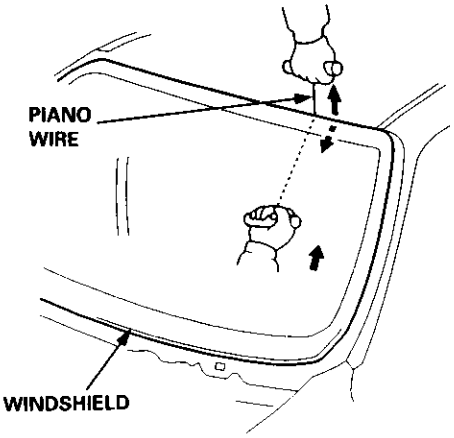
4. Apply protective tape along the edge of the dashboard and body as shown. Using an awl, make a hole through the rubber dam and adhesive from inside the vehicle. Push a piece of piano wire through the hole, and wrap each end around a piece of wood.





   CAUTION: Hold the piano wire as close to the windshield as possible to prevent damage to the body and dashboard.

5. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dams and adhesive around the entire windshield.



6. Carefully remove the windshield.

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7. Using a knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire windshield opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove the rubber dams and fasteners from the body.
   - Mask off surrounding surfaces before painting.

8. Clean the body bonding surface with a sponge dampened in alcohol.

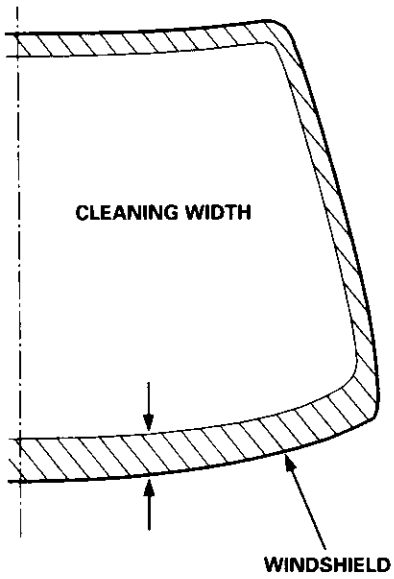
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

9. If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dams, then clean the windshield surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

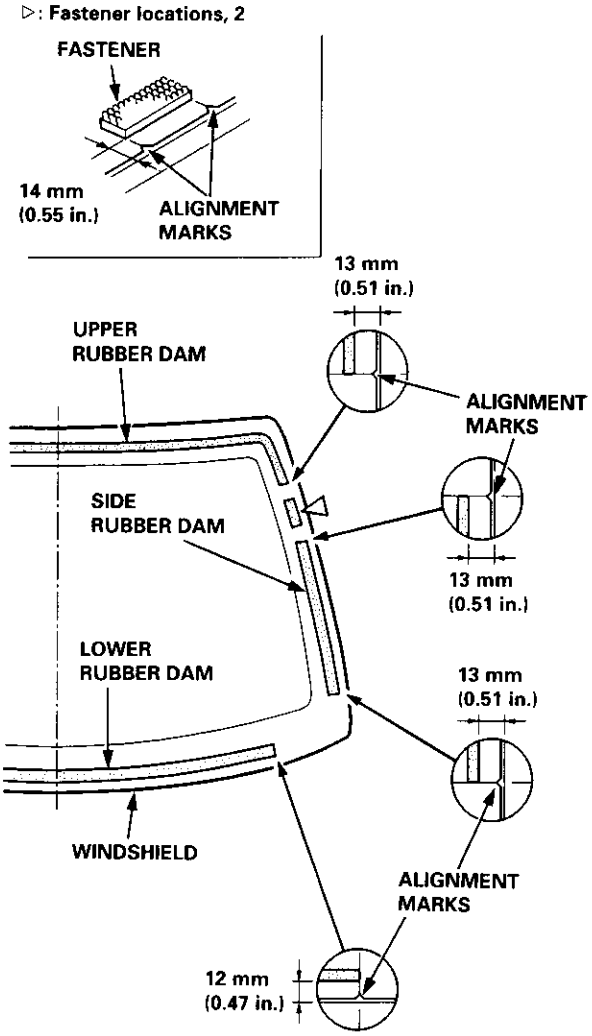
   CAUTION: Avoid setting the windshield on its edges; small chips may later develop into cracks.

   NOTE: Clean the shadowed area.



10. Glue the rubber dams and fasteners to the inside face of the windshield as shown.

    NOTE: Be careful not to touch the windshield where adhesive will be applied.

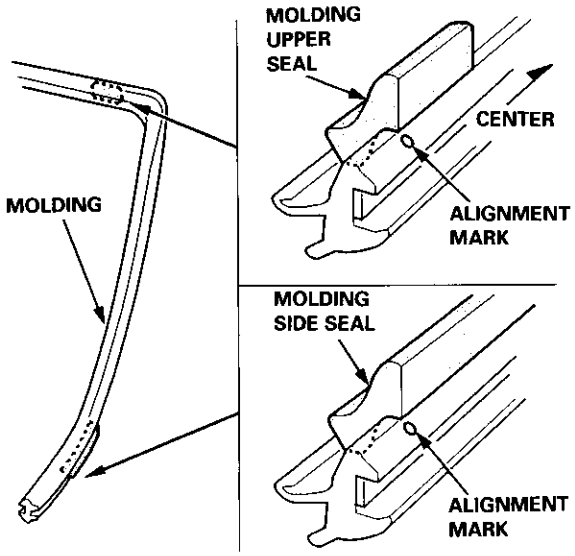


(cont'd)

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Windshield Replacement (cont'd)

11. Glue the molding side seal and molding upper seal to the molding on each side.

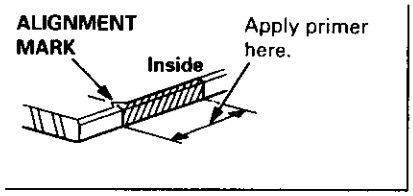


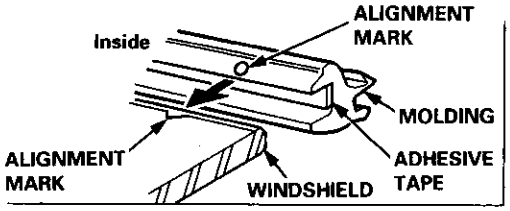
12. Align and glue the molding to the edge of the windshield.

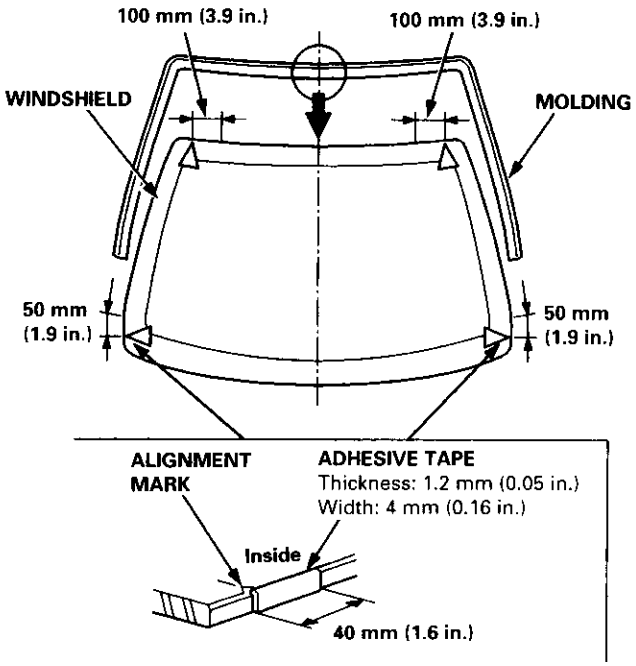
    NOTE: Be careful not to touch the windshield where adhesive will be applied.

    a. With a brush, apply a light coat of primer (3M N-200, or equivalent) to the edge of the windshield as shown.
    b. Glue the adhesive tapes (3M 4212, or equivalent) to both bottom edges of the windshield.
    c. Align the alignment mark on the molding to the alignment mark of the windshield.
    d. Glue the molding to the edge of the windshield.

▷: Alignment mark locations



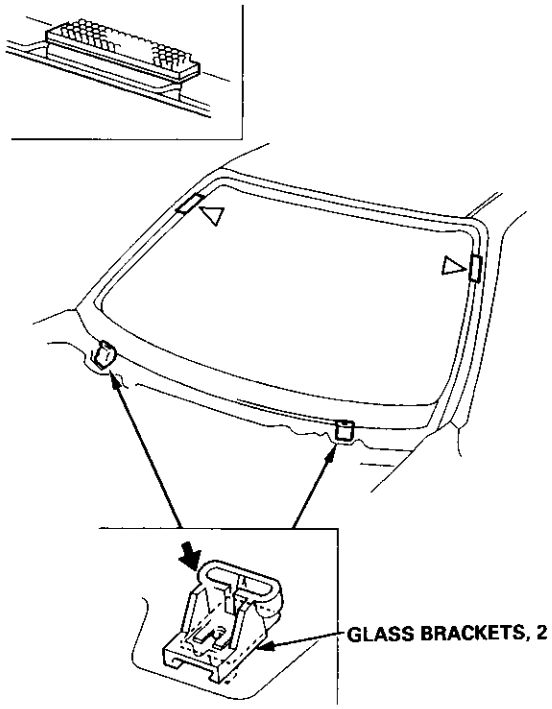




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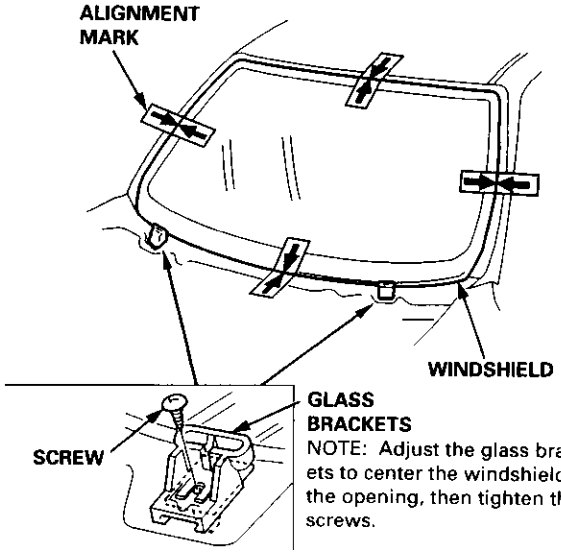
13. Install the glass brackets and fasteners to the body as shown.

▷: **Fastener locations, 2**



14. Set the windshield on the glass brackets, then center it in the opening. Make alignment marks across the windshield and body with a grease pencil at the four points shown.

NOTE: Be careful not to touch the windshield where adhesive will be applied.



NOTE: Adjust the glass brackets to center the windshield in the opening, then tighten the screws.

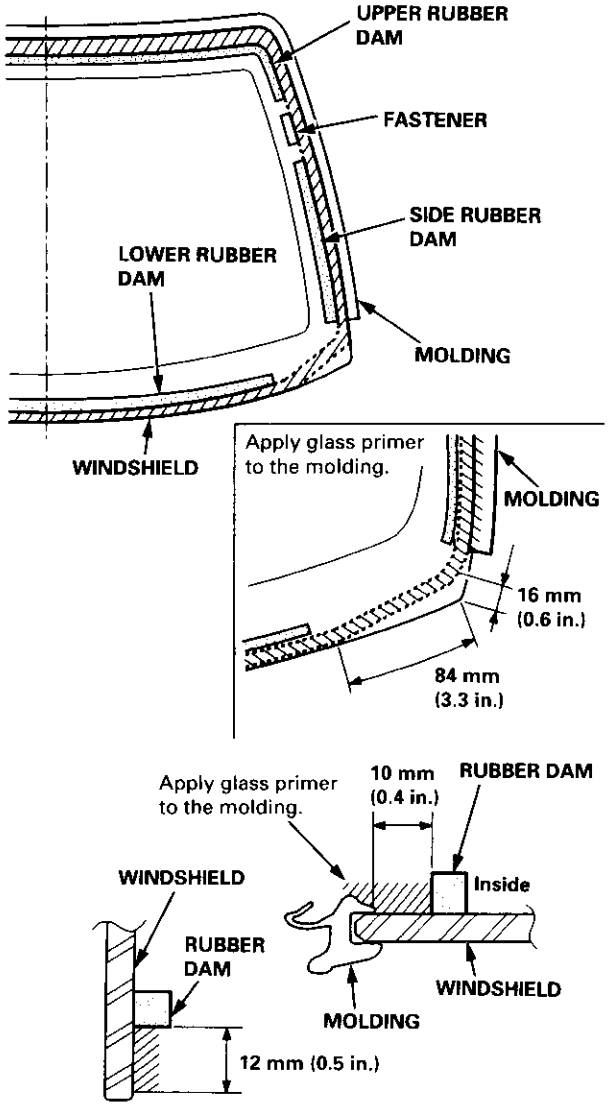
15. Remove the windshield.

16. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the windshield, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the windshield properly, causing a leak after the windshield is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

: **Apply glass primer here.**



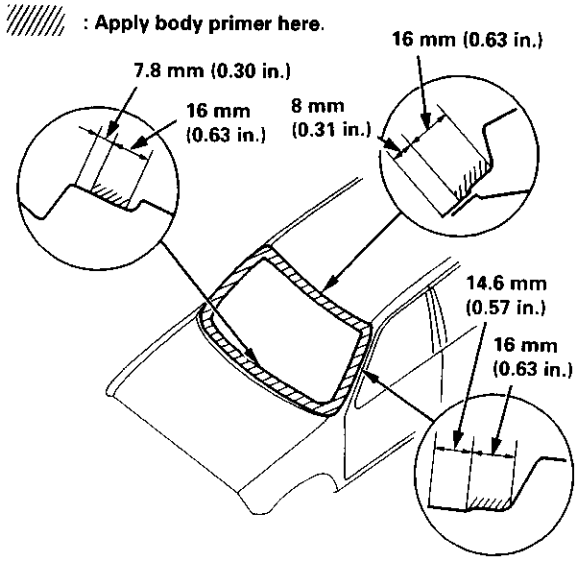
(cont'd)

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Windshield Replacement (cont'd)

17. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes.

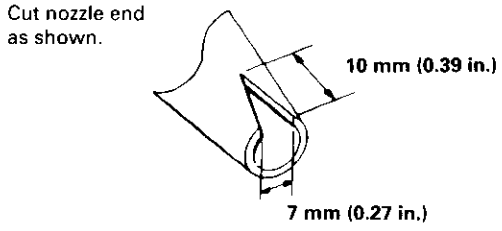
    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.
    - Mask off the dashboard before painting the flange.



18. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

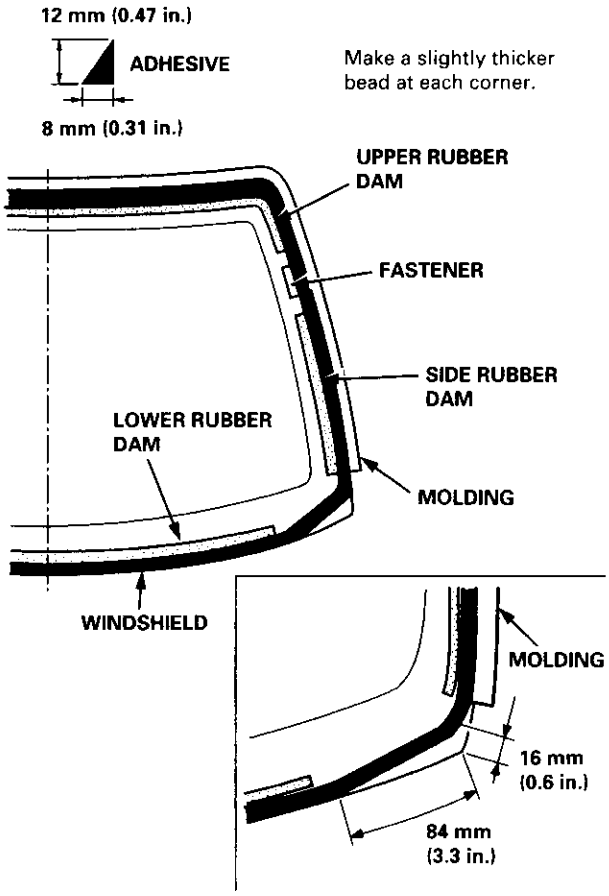
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that come with the adhesive.

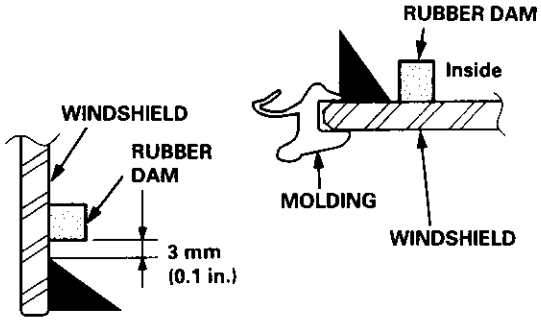
19. Before filling a cartridge, cut the end of the nozzle as shown.



20. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown.

    NOTE: Apply the adhesive within 30 minutes after applying the glass primer.

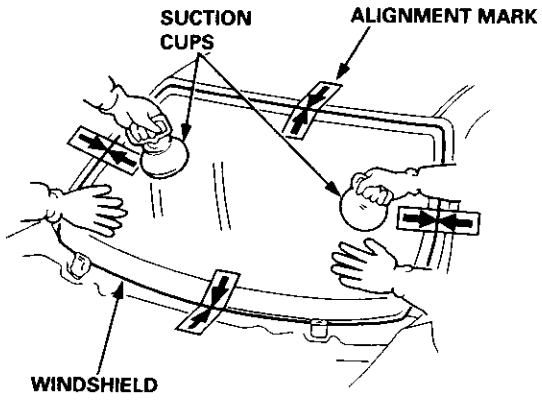




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21. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 14, and set it down on the adhesive. Lightly push on the windshield until its edge is fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors until adhesive is dry.



22. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

23. Let the adhesive dry for at least one hour, then spray water over the windshield and check for leaks. mark leaking areas, and let the windshield dry, then seal with sealant.

    NOTE:
    - Let the vehicle stand for at least four hours after windshield installation. If the vehicle has to be used within the first four hours, it must be driven slowly.
    - Keep the windshield dry for the first hour after installation.
    - Check that the ends of the side molding are set under the cowl cover.

24. Reinstall all remaining removed parts.

    NOTE:
    - Install the rearview mirror rubber damper after the adhesive has dried thoroughly.
    - Advise the customer not to do the following things for two to three days:
      — Slam the doors with all the windows rolled up.
      — Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Quarter Glass Replacement

CAUTION:
- **Put on gloves to protect your hands.**
- **Use seat covers to avoid damaging any surfaces.**

1. To remove the quarter glass, first remove the:
   - Rear seat (see page 20-63)
   - Cargo floor lid and cargo storage bin (see page 20-43)
   - Rear trim panel and rear side trim panel (see page 20-42)
   - Rear hatch glass support strut (see page 20-78)
   - Quarter pillar trim panel (see page 20-42)
   - Taillight (see section 23)

   NOTE: With the rear hatch glass support strut removed, you will need to support the rear hatch glass by hand.

2. From inside the vehicle, use a knife to cut through the quarter glass adhesive all the way around.

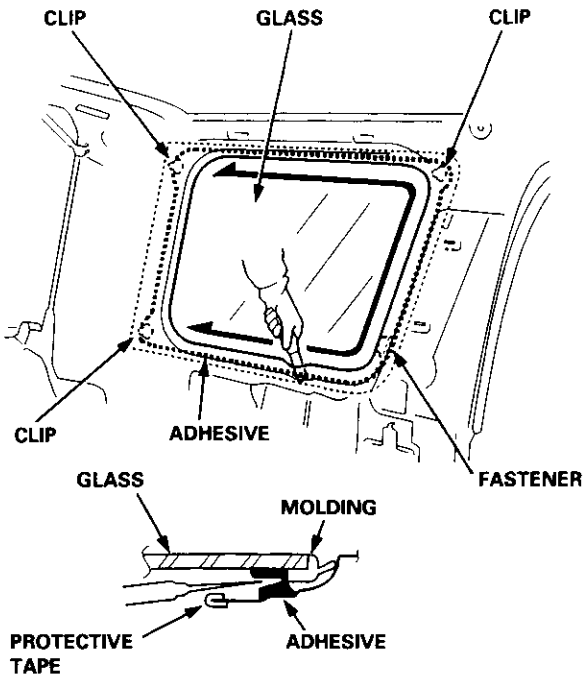
   NOTE:
   - If the quarter glass is to be reinstalled, take care not to damage the molding.
   - If the molding is damaged, replace the quarter glass, molding, and clips as an assembly.
   - The quarter glass can be reinstalled using butyl tape.

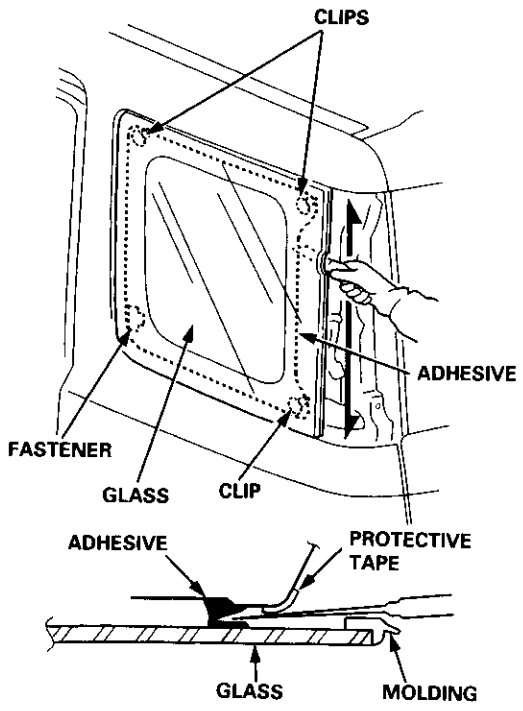
(cont'd)

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Quarter Glass Replacement (cont'd)

Inside:





3. Carefully remove the quarter glass.

   NOTE: Check the molding for damage, replace the quarter glass if necessary.

4. Using a knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire quarter glass opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - If any of the clips are broken, remove them from the body.
   - Mask off surrounding surfaces before applying primer.

5. Clean the body bonding surface with a sponge dampened in alcohol.

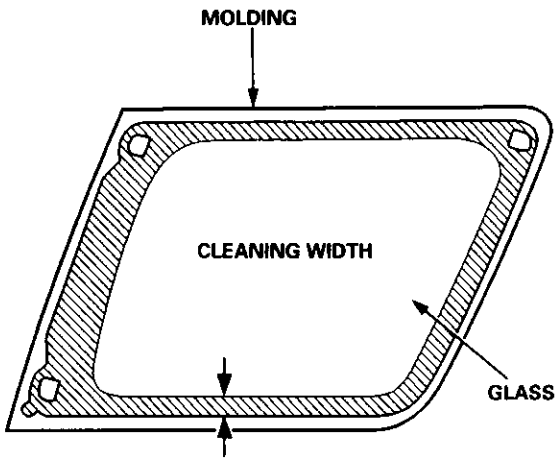
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

6. If the old quarter glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the quarter glass surface with alcohol where adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the quarter glass on its edges; the molding can be permanently deformed.

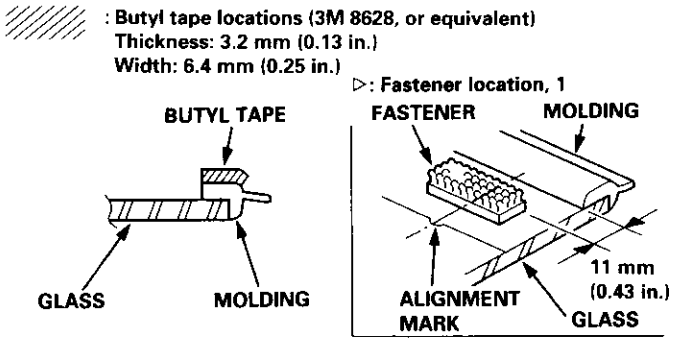
   NOTE: Clean the shadowed area.

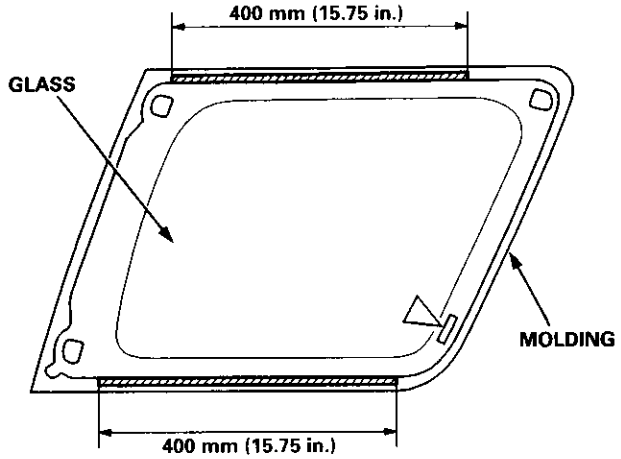


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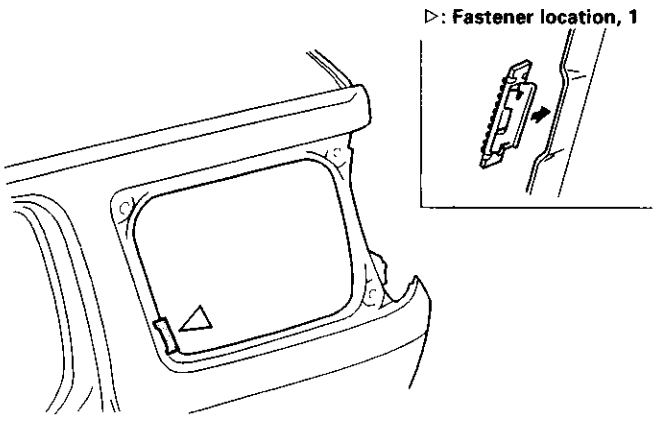
7. Glue the fastener to the inside face of quarter glass as shown. If the old quarter glass is to be reinstalled, apply a light coat of primer (3M C-100, or equivalent), then apply butyl tape to the quarter glass as shown.

   NOTE:
   - Be careful not to touch the quarter glass where adhesive will be applied.
   - Do not peel the separator off the butyl tape.

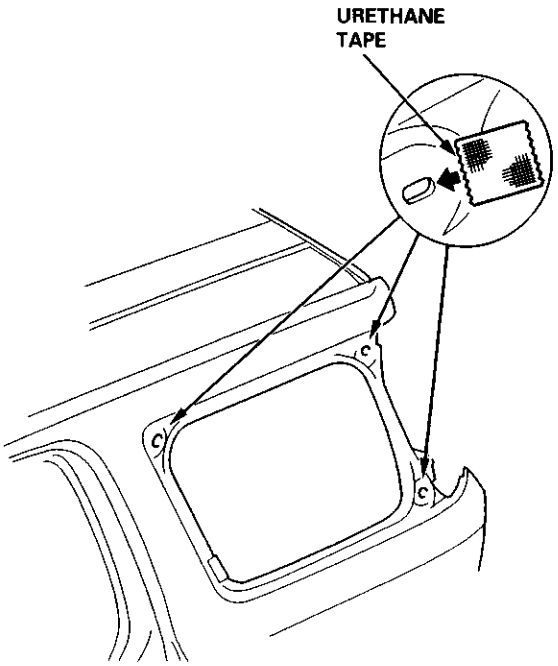


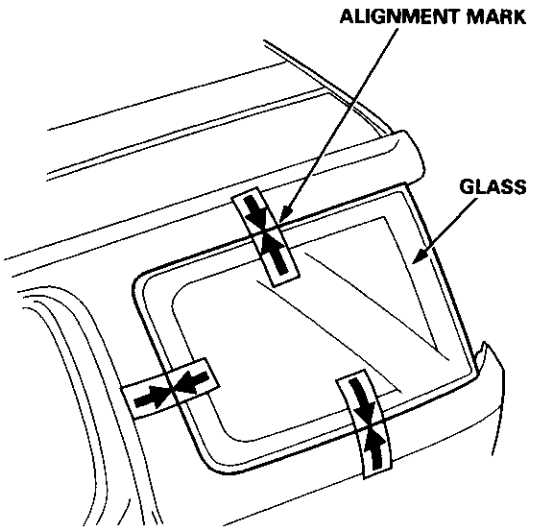


8. Install the fastener to the body as shown.



9. If the old quarter glass is to be reinstalled, seal the body hole with piece of urethane tape. Set the quarter glass upright in the opening and make alignment marks across the quarter glass and body with a grease pencil at the three points shown.





10. Remove the quarter glass.

(cont'd)

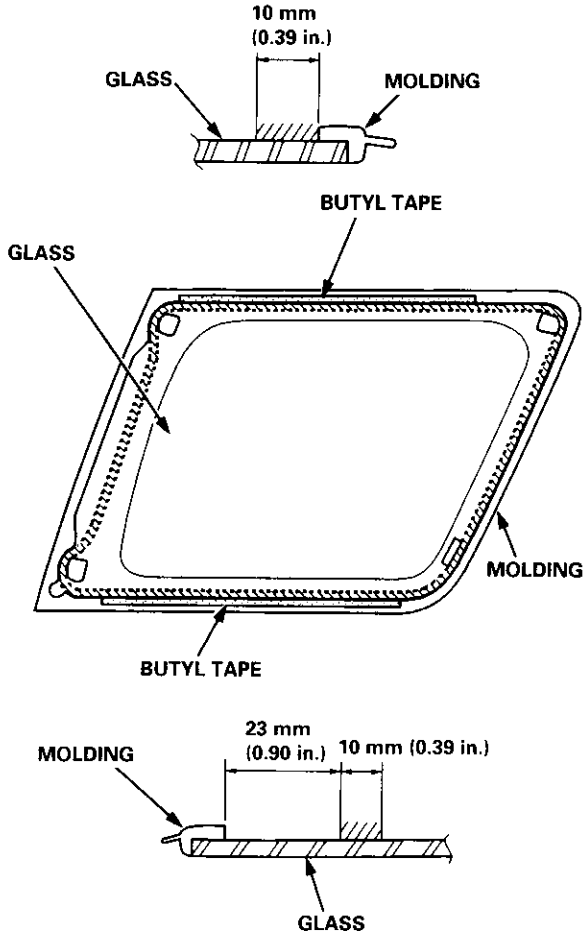
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Quarter Glass Replacement (cont'd)

11. With a sponge, apply a light coat of glass primer to the inside face of the quarter glass, as shown, then lightly wipe it off with gauze or cheesecloth.

    NOTE:
    - Do not apply body primer to the quarter glass, and do not get body and glass primer sponges mixed up.
    - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the quarter glass properly, causing a leak after the quarter glass is installed.
    - Keep water, dust, and abrasive materials away from the primed surface.

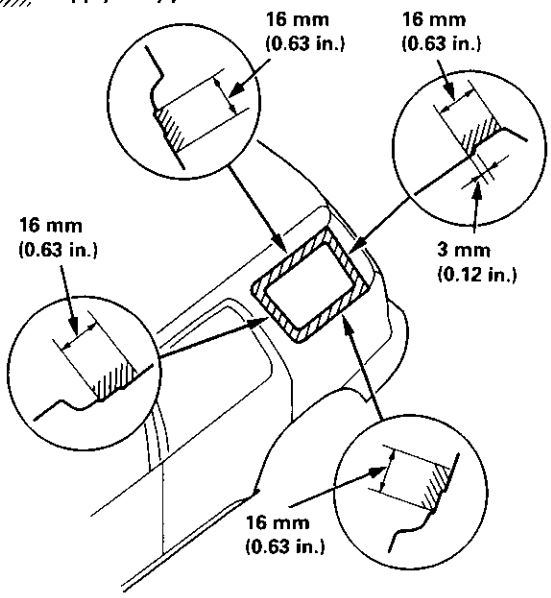
: **Apply glass primer here.**



12. With a sponge, apply a light coat of body primer to the original adhesive remaining around the quarter glass opening flange. Let the body primer dry for at least 10 minutes.

    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.

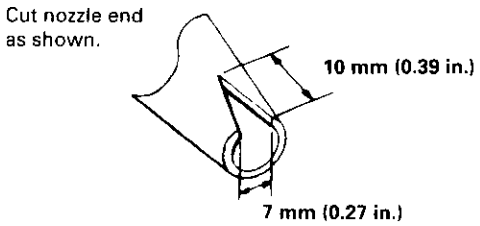
: **Apply body primer here.**



13. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that came with the adhesive.

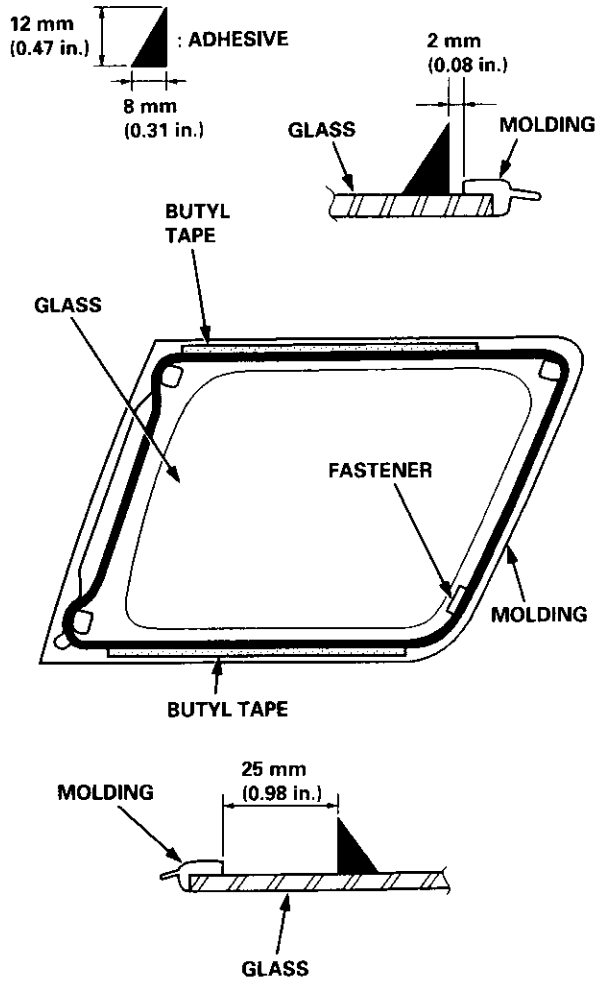
14. Before filling a cartridge, cut the end of the nozzle as shown.



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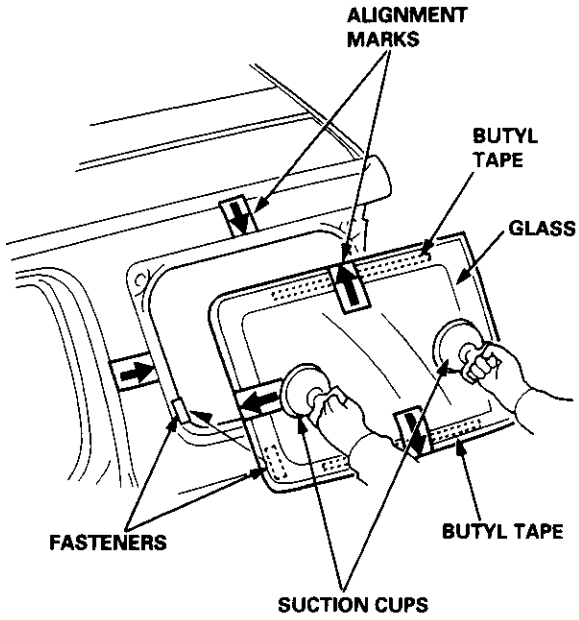
15. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the quarter glass as shown.

    NOTE:
    - If the old quarter glass is to be reinstalled, peel the separator off the butyl tape after applying the adhesive.
    - Apply the adhesive within 30 minutes after applying the glass primer.



16. Use suction cups to hold the quarter glass over the opening, align the clips or the alignment marks made in step 9, and set it down on the adhesive. Lightly push on the quarter glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not open or close the doors until the adhesive is dry.



17. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: To remove adhesive from a painted surface or the quarter glass, wipe with a soft shop towel dampened with alcohol.

18. Let the adhesive dry for at least one hour, then spray water over the quarter glass and check for leaks. Mark the leaking areas, let the quarter glass dry, then seal with sealant.

    NOTE: Let the vehicle stand for at least four hours after quarter glass installation. If the vehicle has to be used within the first four hours, it must be driven slowly.

19. Reinstall all remaining removed parts.

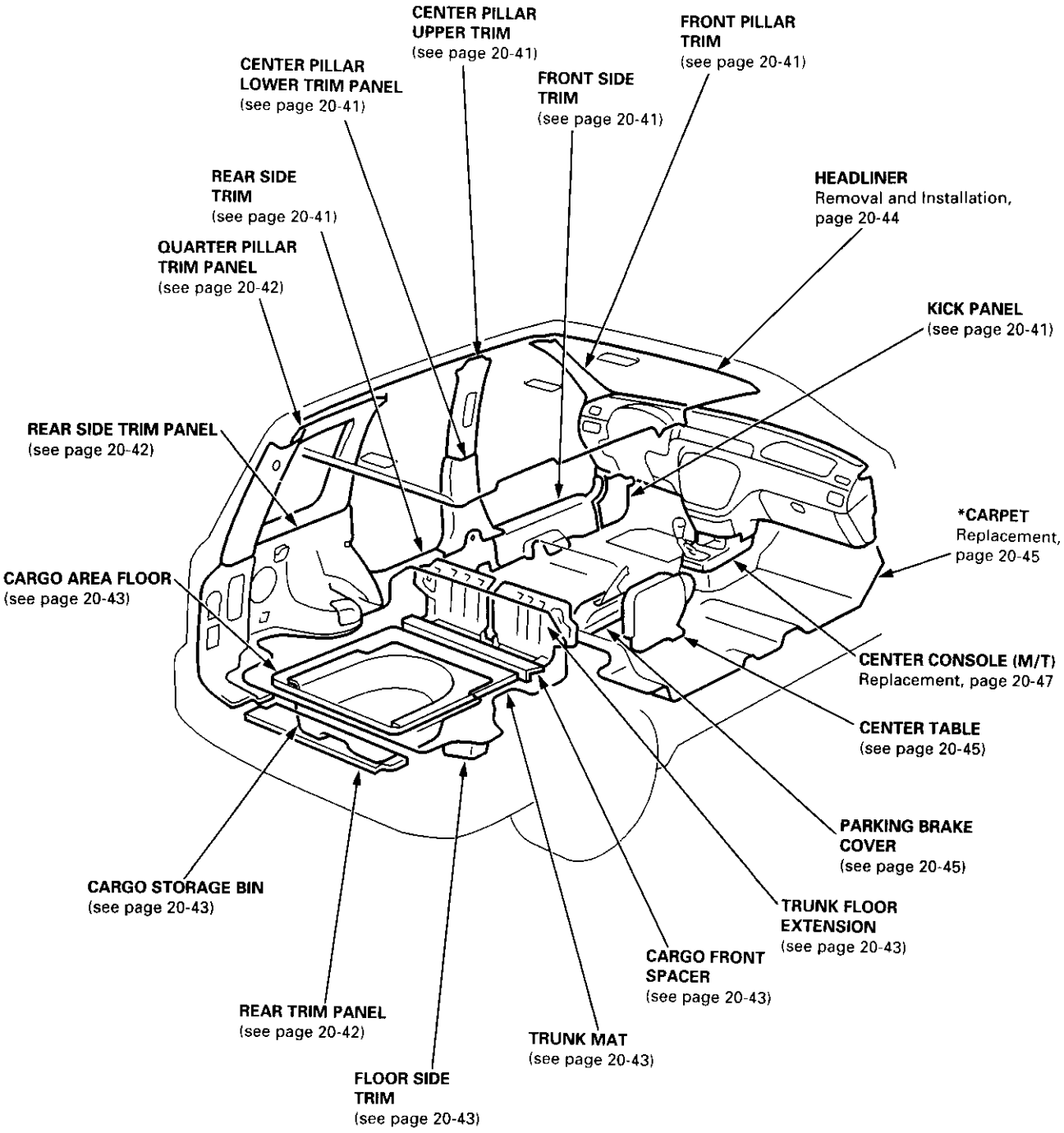
    NOTE: Advise the customer not to do the following things for two to three days:

    - Slam the doors with all the windows rolled up.
    - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

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Component Location Index

SRS components are located in the areas marked with an asterisk (*). Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



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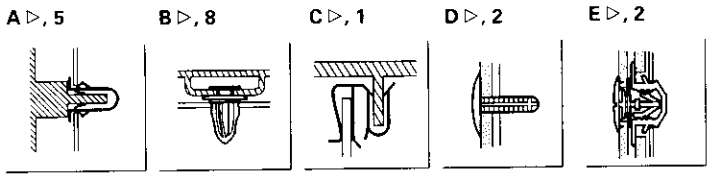
Removal and Installation

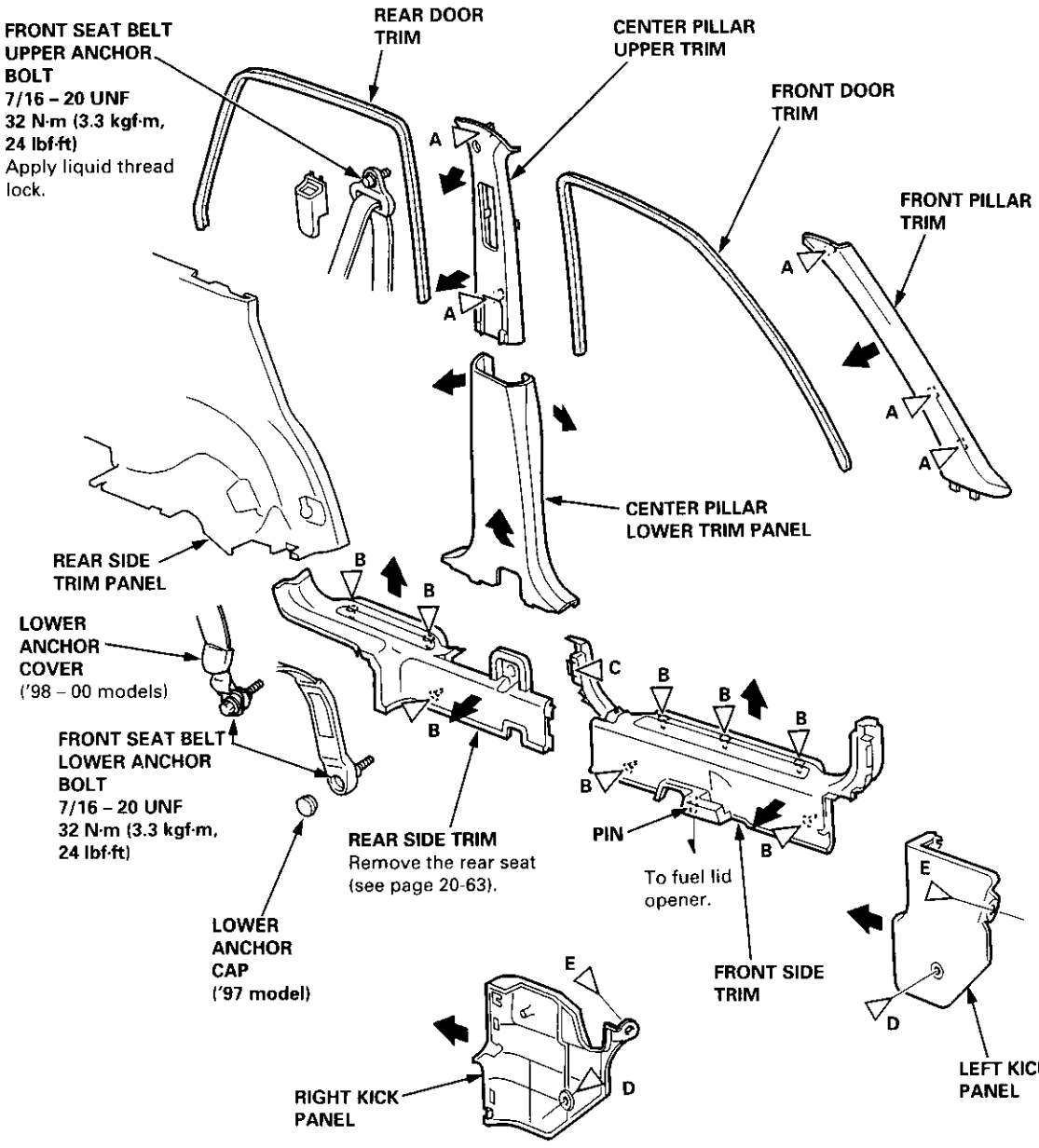
CAUTION:

- **Put on gloves to protect your hands.**
- **When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.**
- **When removing the support strut of the rear hatch glass, you will need to open or close the rear hatch glass by hand.**

NOTE: Take care not to bend or scratch the trim and panels.

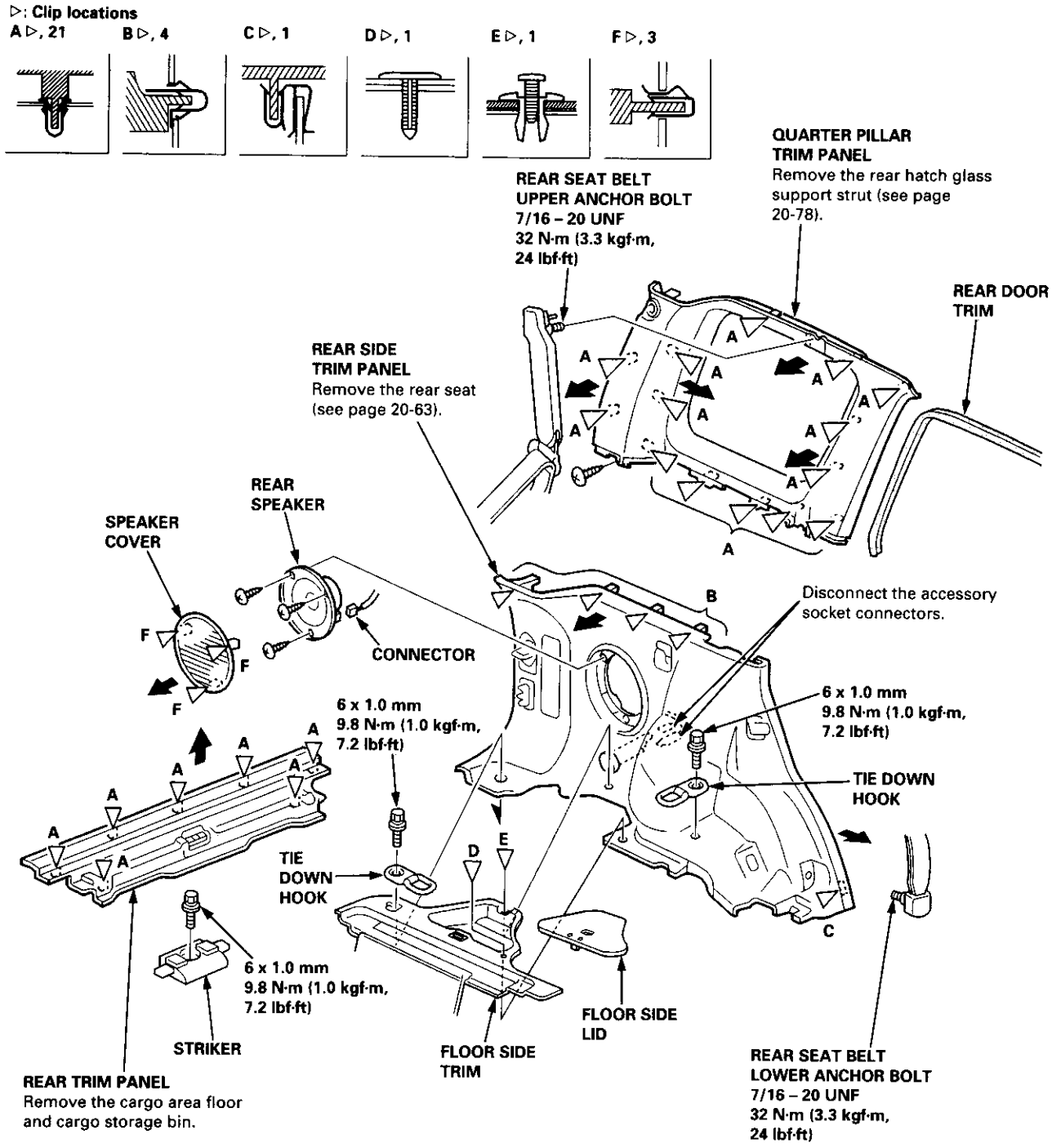
▷: **Clip locations**



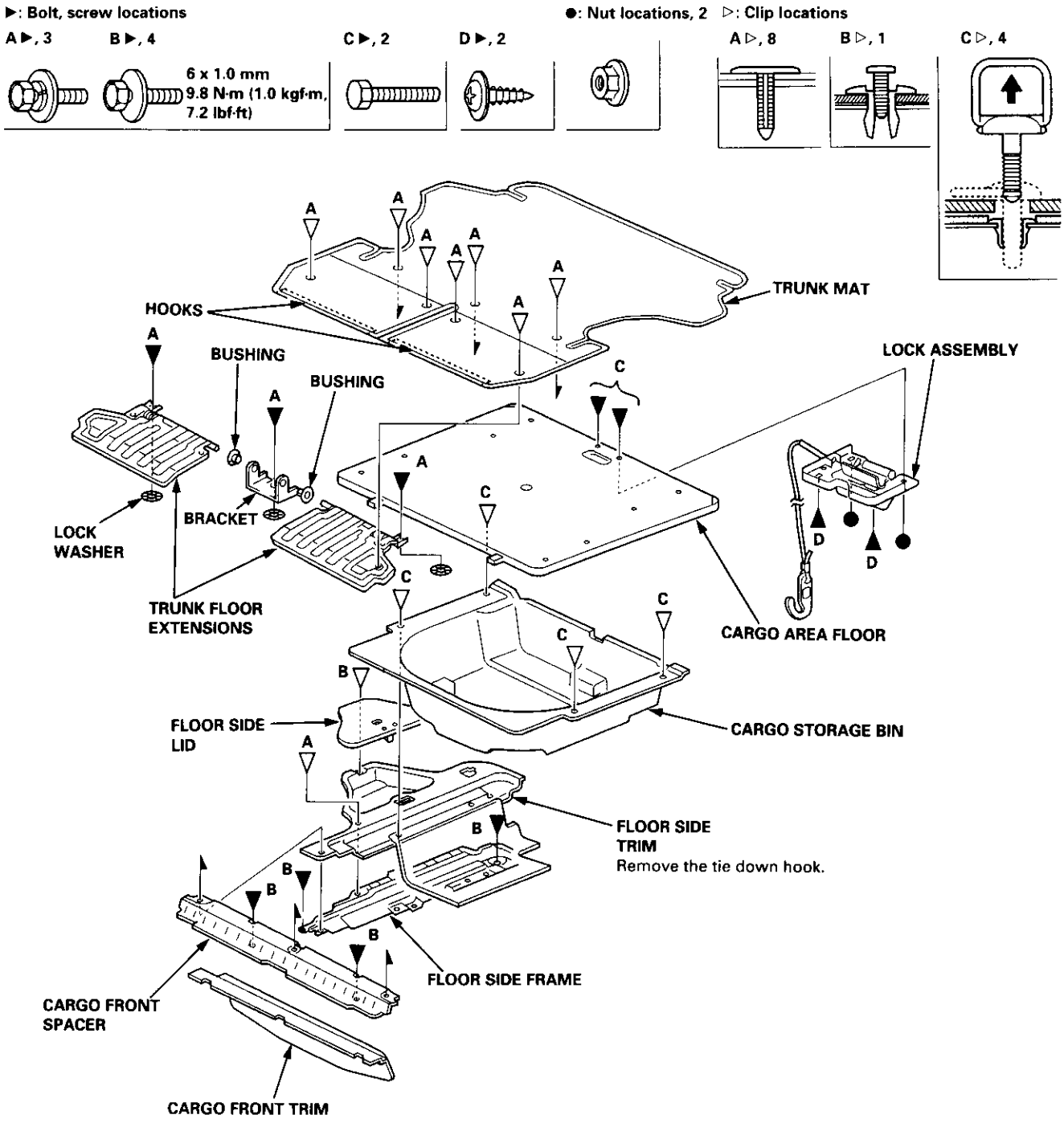


(cont'd)

Removal and Installation (cont'd)



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Installation is the reverse of the removal procedure.

NOTE:

- If necessary, replace any damaged clips.
- Before installing the anchor bolts, make sure there are no twists or kinks in the seat belts.

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Headliner Removal and Installation

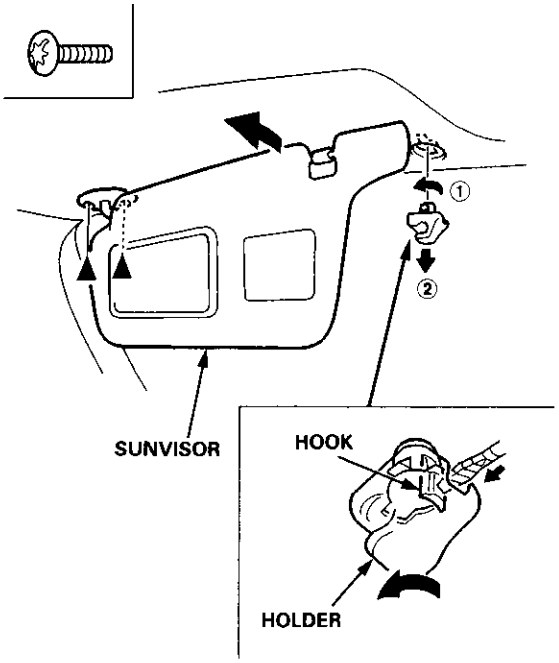
CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.

NOTE:
- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard and other interior trim.

1. Remove:
   - Front and rear door side trim (see page 20-41)
   - Front pillar trim (see page 20-41)
   - Center pillar lower trim panel (see page 20-41)
   - Center pillar upper trim (see page 20-41)
   - Rear seat (one side, see page 20-63)
   - Cargo area floor and cargo storage bin (see page 20-43)
   - Rear trim panel (see page 20-42)
   - Rear side trim panel (one side, see page 20-42)
   - Rear hatch glass support strut (one side, see page 20-78)
   - Quarter pillar trim panel (one side, see page 20-42)
   - Ceiling light, interior light and trunk light (see section 23)
   - Rearview mirror (see page 20-28)

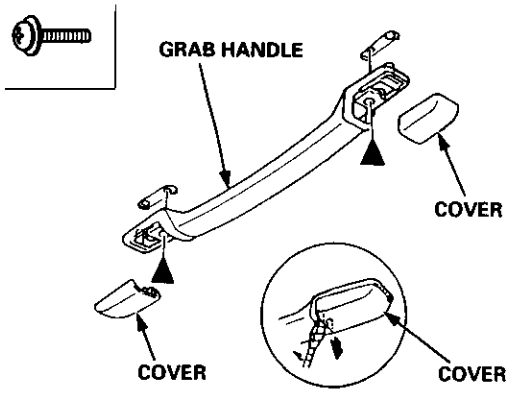
2. Remove the sunvisor and holder from each side.

▶: Screw locations, 4



3. Remove the grab handles from the front and rear passenger's sides.

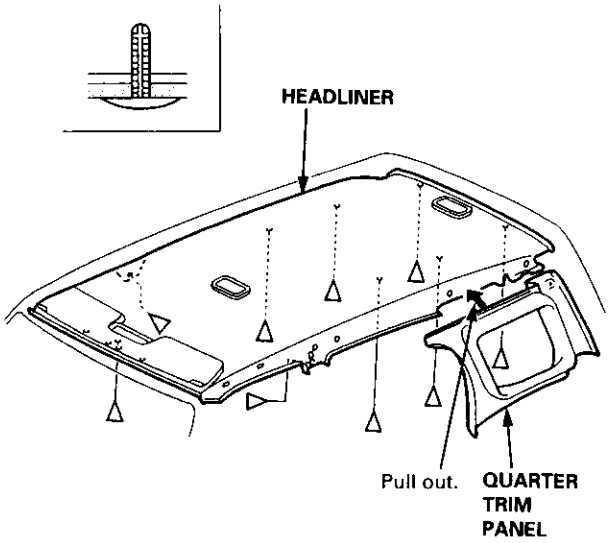
▶: Screw locations, 6



4. Remove the clips, then remove the headliner.

   NOTE: An assistant is helpful when removing the headliner.

▷: Clip locations, 9



5. Remove the headliner through the rear hatch glass opening.

6. Installation is the reverse of the removal procedure.

   NOTE:
   - When reinstalling the headliner through the rear hatch glass opening, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Check that both sides of the headliner are securely attached to the trim.

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Carpet Replacement

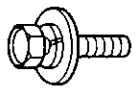
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

CAUTION: Put on gloves to protect your hands.

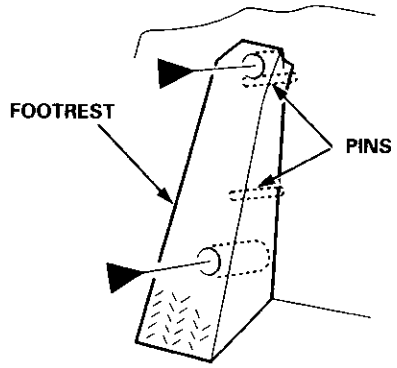
1. Remove:
   - Front seat (see page 20-57)
   - Rear seat (see page 20-63)
   - Kick panel (see page 20-41)
   - Center pillar lower trim panel (see page 20-41)
   - Front side trim (see page 20-41)
   - Lower console cover (A/T model, see page 20-49)
   - Center console (M/T model, see page 20-47)

2. Remove the footrest.

▶: Bolt locations, 2



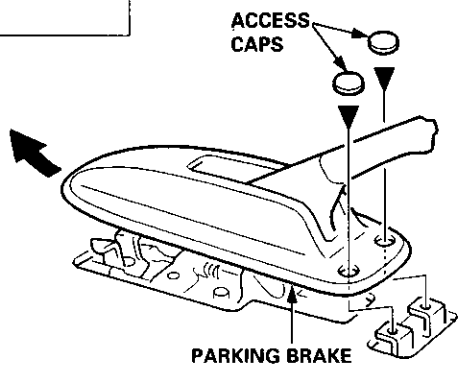
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



3. Remove the parking brake cover.

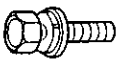
▶: Screw locations, 2





4. Remove the center table and table frame bracket.

▶: Bolt locations, 4



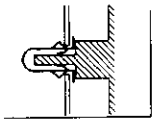
8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)

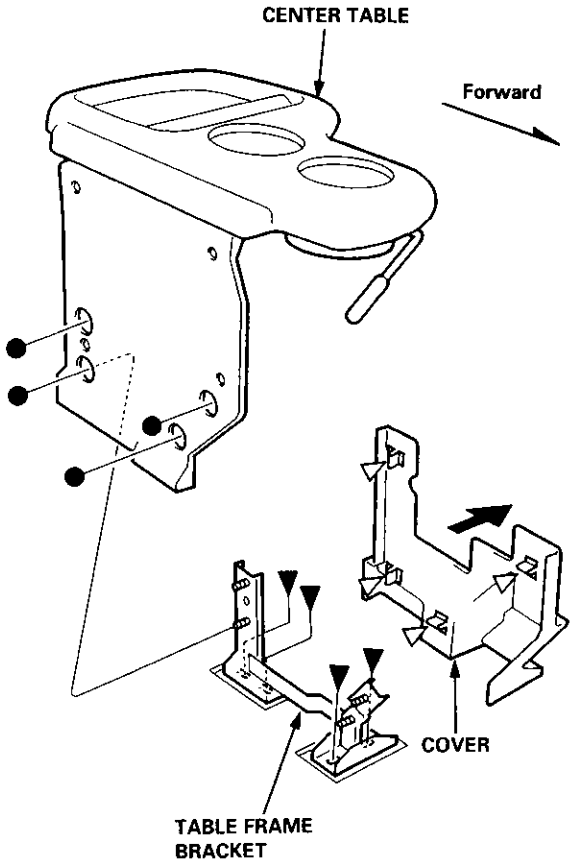
●: Nut locations, 4



8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)

▷: Clip locations, 4





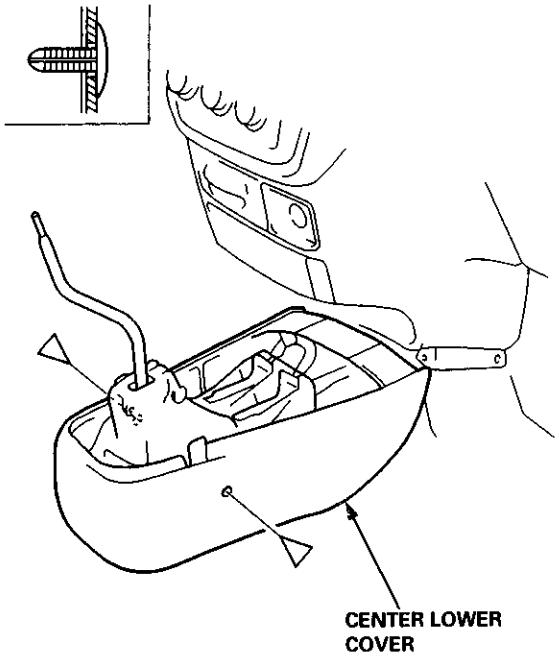
(cont'd)

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Carpet Replacement (cont'd)

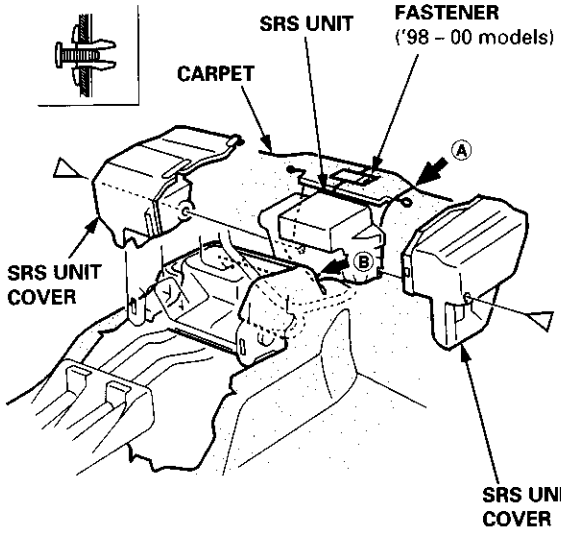
5. Remove the center lower cover (M/T model).

▷: **Clip locations, 2**



6. Remove the SRS unit covers.

▷: **Clip locations, 2**

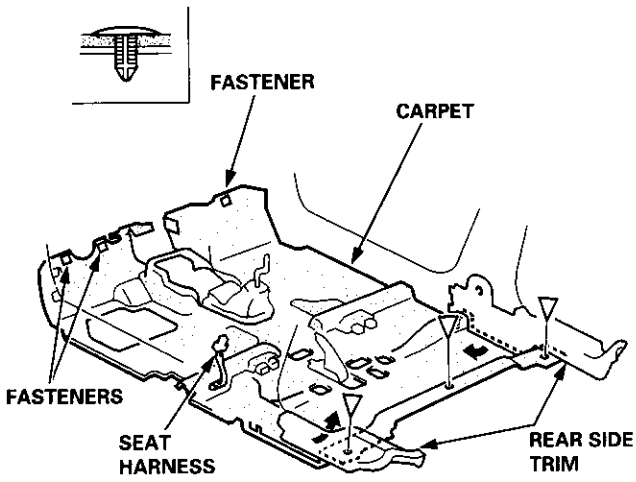


7. '97 model: Cut areas Ⓐ and Ⓑ in the carpet, then pull the carpet back.
'98 – 00 models: Release the fastener and cut area Ⓑ in the carpet, then pull the carpet back.

8. Remove the clips, and release the fasteners, then remove the carpet.

NOTE: Take care not to damage, wrinkle or twist the carpet.

▷: **Clip locations, 3**



9. Installation is the reverse of the removal procedure.

NOTE:
- Take care not to damage, wrinkle or twist the carpet.
- Make sure the seat harness is routed correctly.
- If necessary, replace any damaged clips.
- Reattach the cut areas Ⓐ and Ⓑ ('97 model) or cut area Ⓑ ('98 – 00 models) in the carpet with wire ties.

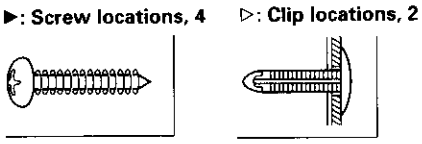
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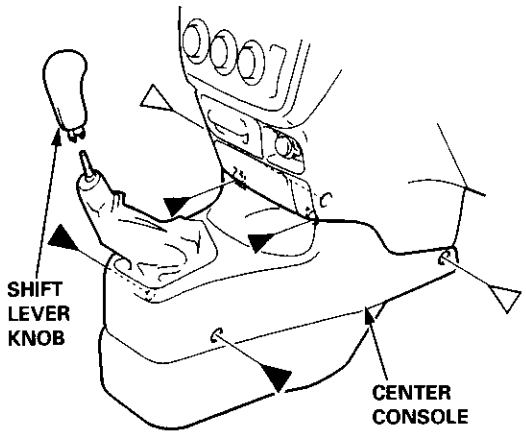
Center Console Replacement

M/T model:

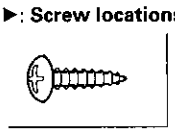
NOTE: Take care not to scratch the dashboard and related parts.

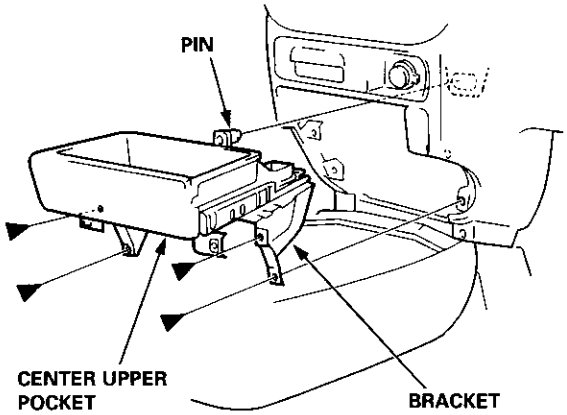
1. Remove the shift lever knob, screws and clips, then remove the center console.





2. Remove the screws, then remove the center upper pocket.





3. Installation is the reverse of the removal procedure.

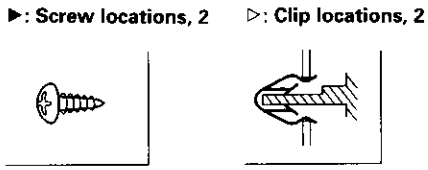
NOTE: If necessary, replace any damaged clips.

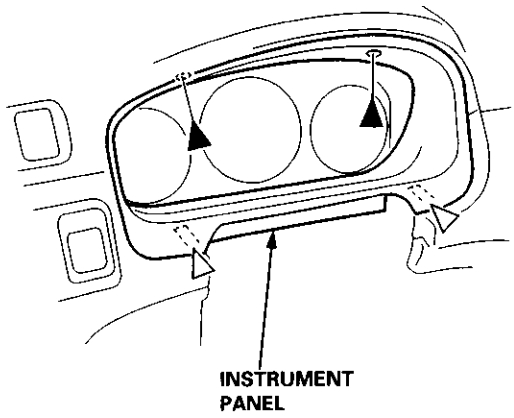
Instrument Panel Removal and Installation

CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE: Take care not to scratch the dashboard and related parts.

1. Tilt the steering column down.
2. Remove the screws, and detach the clips, then carefully remove the instrument panel.





3. Installation is the reverse of the removal procedure.

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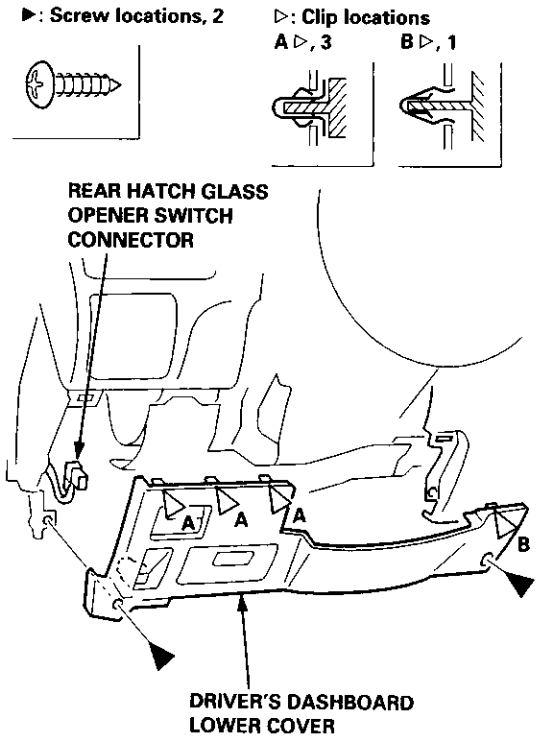
Driver's Dashboard Lower Cover and Knee Bolster Removal and Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

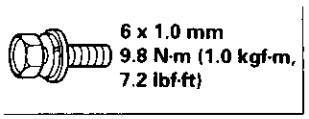
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.**
- **Put on gloves to protect your hands.**

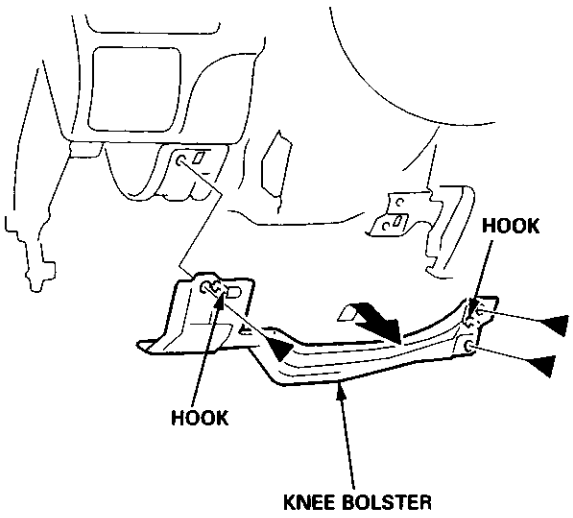
NOTE: Take care not to scratch the dashboard and related parts.

1. Remove the screws, and detach the clips, then remove the driver's dashboard lower cover. Disconnect the rear hatch glass opener switch connector.



2. Remove the bolts, then remove the knee bolster.





3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connector is connected properly.

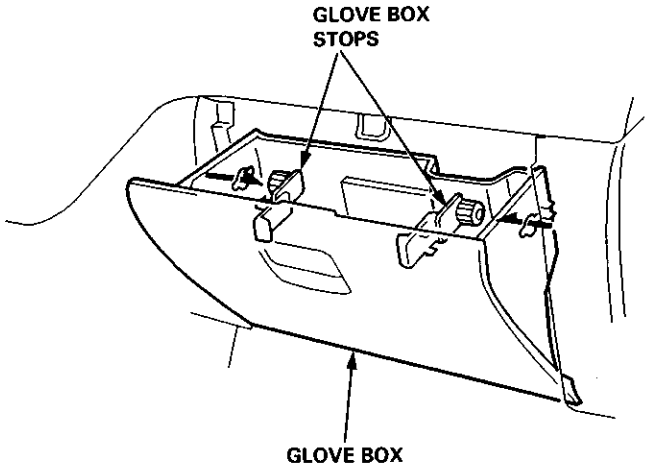
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Glove Box Removal and Installation

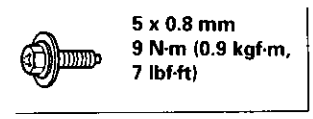
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.**
- **Put on gloves to protect your hands.**

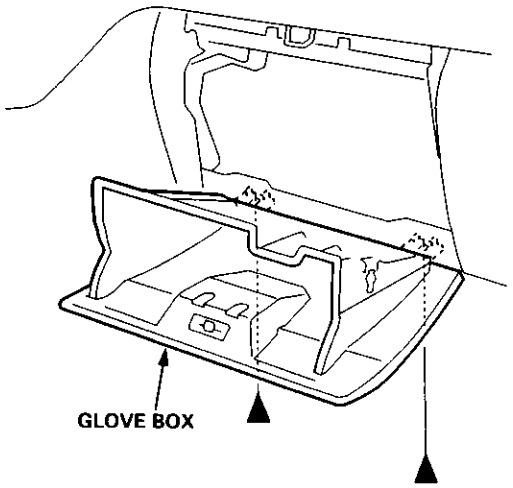
NOTE: Take care not to scratch the dashboard and related parts.

1. Remove the glove box stops from each side.



2. Remove the bolts, then remove the glove box.





3. Installation is the reverse of the removal procedure.

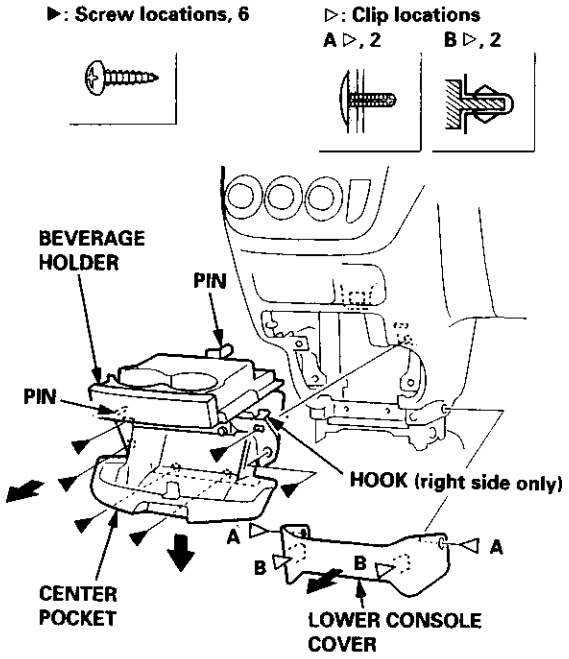
Center Pocket Removal and Installation

A/T model:

CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.

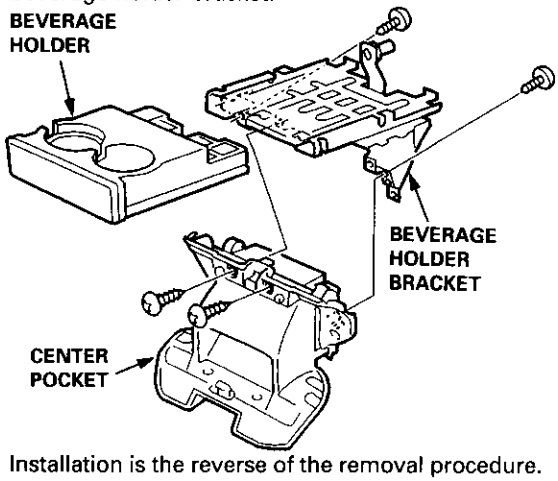
NOTE: Take care not to scratch the dashboard and related parts.

1. Remove the lower console cover.



2. Remove the screws, then carefully insert a flat-tip screwdriver and push down on the top of the hook. Remove the center pocket with the beverage holder.

3. Separate the center pocket, beverage holder and beverage holder bracket.



4. Installation is the reverse of the removal procedure.

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Center Dashboard Lower Cover Removal and Installation

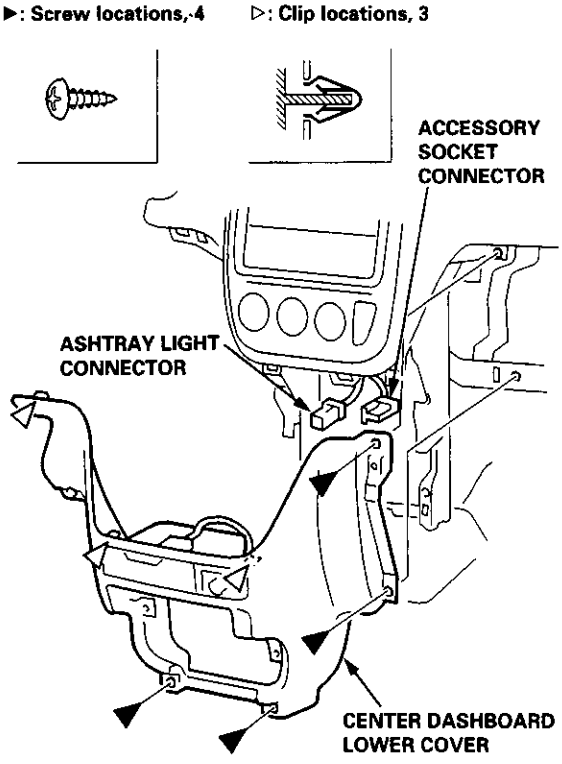
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE: Take care not to scratch the dashboard and related parts.

1. Remove:
   - Driver's dashboard lower cover (see page 20-48)
   - Glove box (see page 20-49)
   - Center pocket (A/T model, see page 20-49)
   - Center console (M/T model, see page 20-47)
   - Center upper pocket (M/T model, see page 20-47)

2. Remove the screws, and detach the clips, then remove the center dashboard lower cover. Disconnect the connectors.



3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connectors are connected properly.

Center Panel Removal and Installation

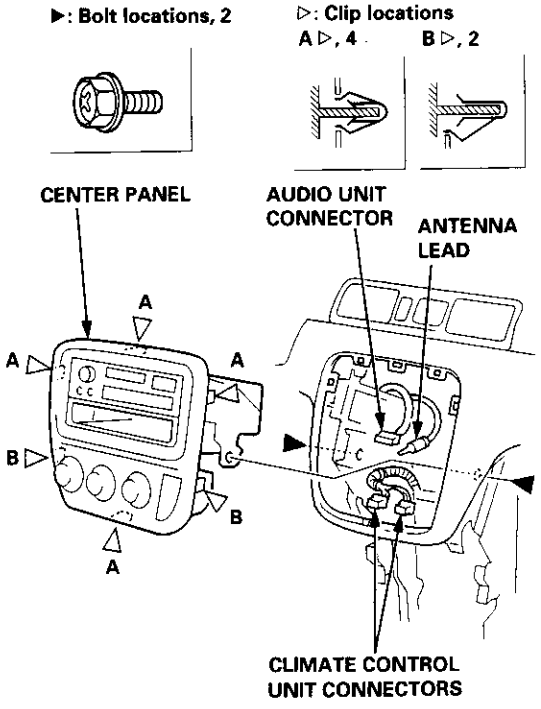
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE: Take care not to scratch the dashboard and related parts.

1. Remove:
   - Driver's dashboard lower cover (see page 20-48)
   - Glove box (see page 20-49)
   - Center pocket (A/T model, see page 20-49)
   - Center console (M/T model, see page 20-47)
   - Center upper pocket (M/T model, see page 20-47)
   - Center dashboard lower cover

2. Remove the bolts, and release the clips, then pull out the center panel. Disconnect the connectors and antenna lead, then remove the center panel.



3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connectors and antenna lead are connected properly.

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Power Window Switch Removal and Installation

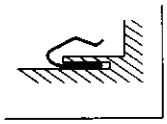
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

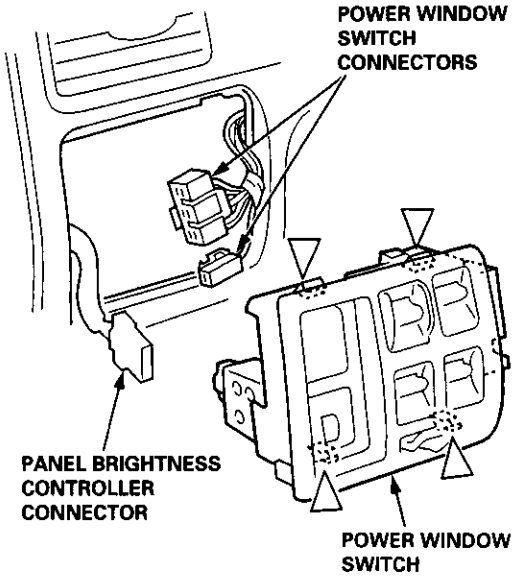
NOTE: Take care not to scratch the dashboard and related parts.

1. Remove the driver's dashboard lower cover (see page 20-48).

2. Gently push out the power window switch from the dashboard lower cover opening by hand. Disconnect the connectors.

   ▷: **Clip locations, 4**





3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connectors are connected properly.

Center Air Vent Removal and Installation

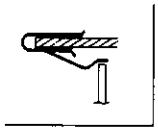
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

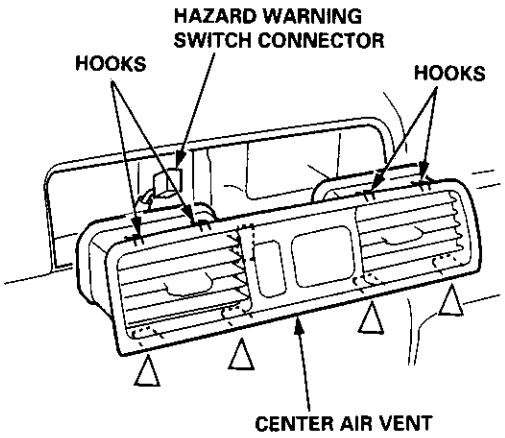
NOTE: Take care not to scratch the dashboard and related parts.

1. Remove the center air vent, then disconnect the connector.

   NOTE: Carefully insert a flat-tip screwdriver under the clips, then pull out the center air vent while prying up the clips.

   ▷:**Clip locations, 4**





2. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connector is connected properly.

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Side Air Vent Removal and Installation

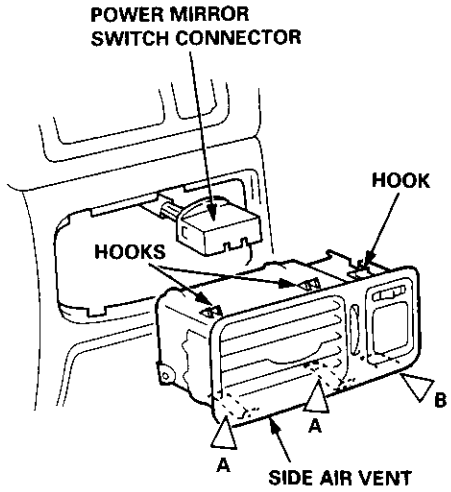
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE: Take care not to scratch the dashboard and related parts.

1. Driver's side: Remove the power window switch.
2. Driver's side: Close the vent, and gently push out the clips from the power window switch opening by hand, then pull out the side air vent. Disconnect the connector.
   Passenger's side: Carefully insert a flat-tip screwdriver under the clips, then pull out the side air vent while prying up the clips.

▷: Clip locations
A ▷, 2 **B ▷, 1**





3. Installation is the reverse of the removal procedure.

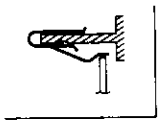
Side Defogger Trim Removal and Installation

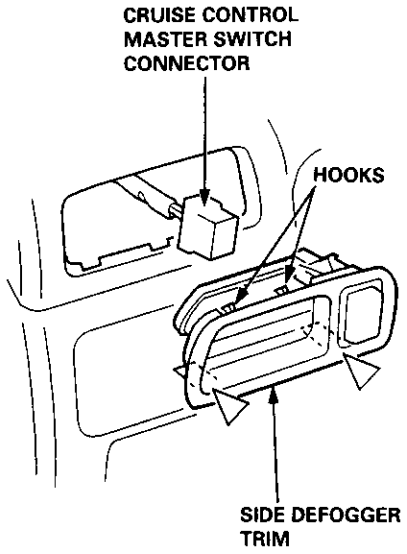
CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE: Take care not to scratch the dashboard and related parts.

1. Driver's side: Remove the side air vent.
2. Driver's side: Gently push out the clips from side air vent opening by hand, then pull out the side defogger trim. Disconnect the connector.
   Passenger's side: Carefully insert a flat-tip screwdriver under the clips, then pull out the side defogger trim while prying up the clips.

▷: Clip locations, 2





3. Installation is the reverse of the removal procedure.

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Dashboard Removal and Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before preforming repairs or service.

CAUTION:
- **When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.**
- **Put on gloves to protect your hands.**

NOTE:
- An assistant is helpful when removing and installing the dashboard.
- Take care not to scratch the dashboard, body and other related parts.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

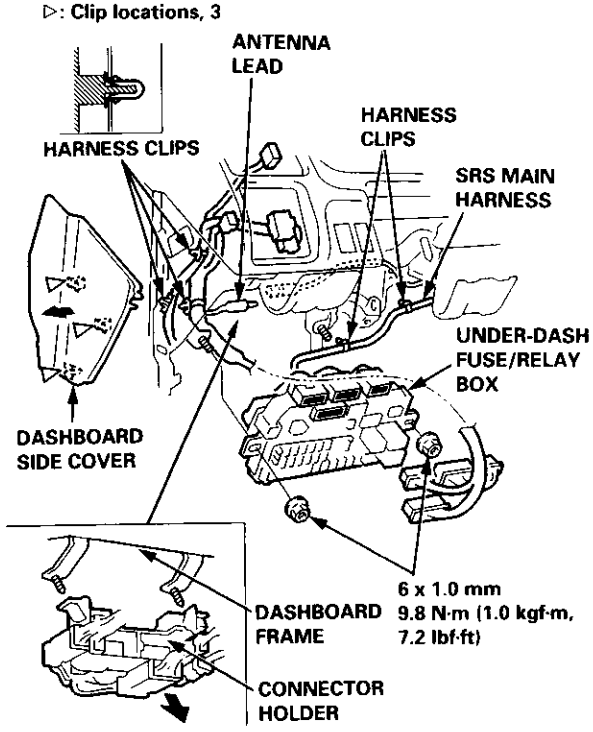
2. Disconnect the negative battery cable, and wait at least three minutes before beginning work.

3. Remove:
   - Driver's dashboard lower cover and knee bolster (see page 20-48)
   - Glove box (see page 20-49)
   - Lower console cover and center pocket (A/T model, see page 20-49)
   - Center console and center upper pocket (M/T model, see page 20-47)
   - Center dashboard lower cover (see page 20-50)
   - Power window switch (see page 20-51)
   - Driver's side air vent (see page 20-52)
   - Driver's side defogger trim (see page 20-52)

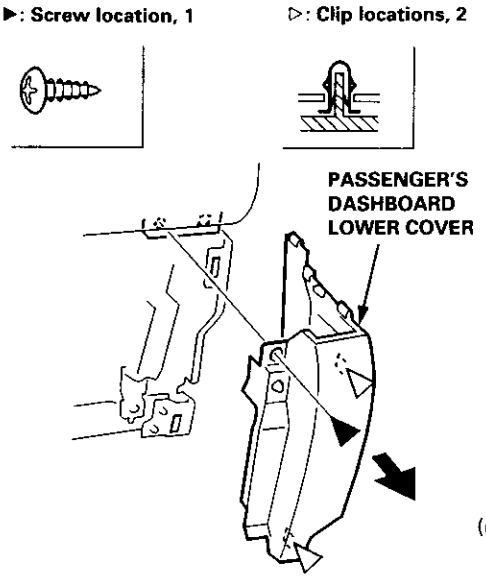
4. Disconnect the driver's airbag connector, and lower the steering column (see section 17).

   NOTE: To prevent damage to the steering column, wrap it with a shop towel.

5. Remove the dashboard side cover. Disconnect the dashboard wire harness connectors, remove the nuts, then move the under-dash fuse/relay box. Disconnect the antenna lead, and detach the harness clips. Remove the connector holder from the dashboard frame. Unbolt the control unit/relay bracket from behind the middle of the dashboard.



6. Remove the passenger's dashboard lower cover.

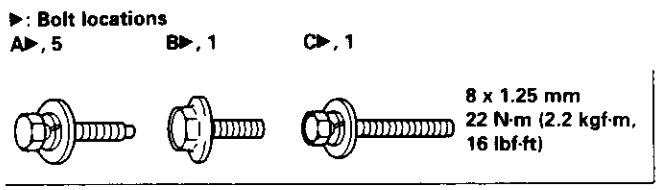


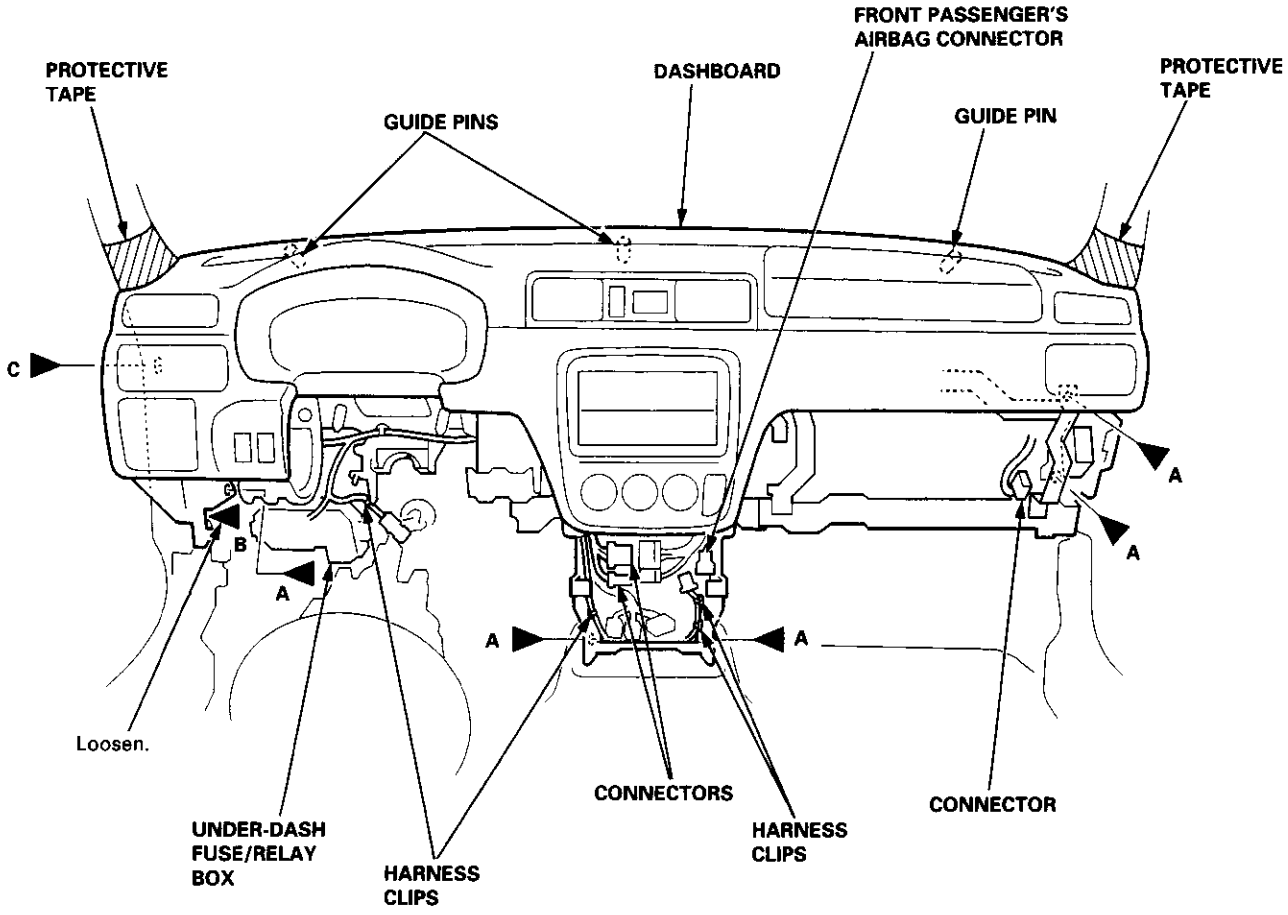
(cont'd)

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Dashboard Removal and Installation (cont'd)

7. Disconnect the connectors and harness clips.





8. Remove the bolts, then lift and remove the dashboard.

CAUTION: Use protective tape on the bottom of the front pillar trim.

9. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the dashboard fits onto the guide pins correctly.
- Before tightening the bolts, make sure the dashboard wire harnesses are not pinched.
- Make sure the connectors and antenna lead are connected properly.

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Dashboard Frame Replacement

CAUTION: Put on gloves to protect your hands.

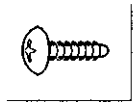
NOTE: Take care not to scratch the dashboard and related parts.

●: Nut locations, 3

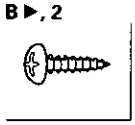


6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

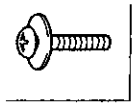
▶: Screw locations
A ▶, 16



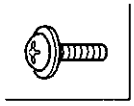
B ▶, 2



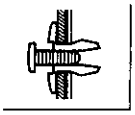
C ▶, 2

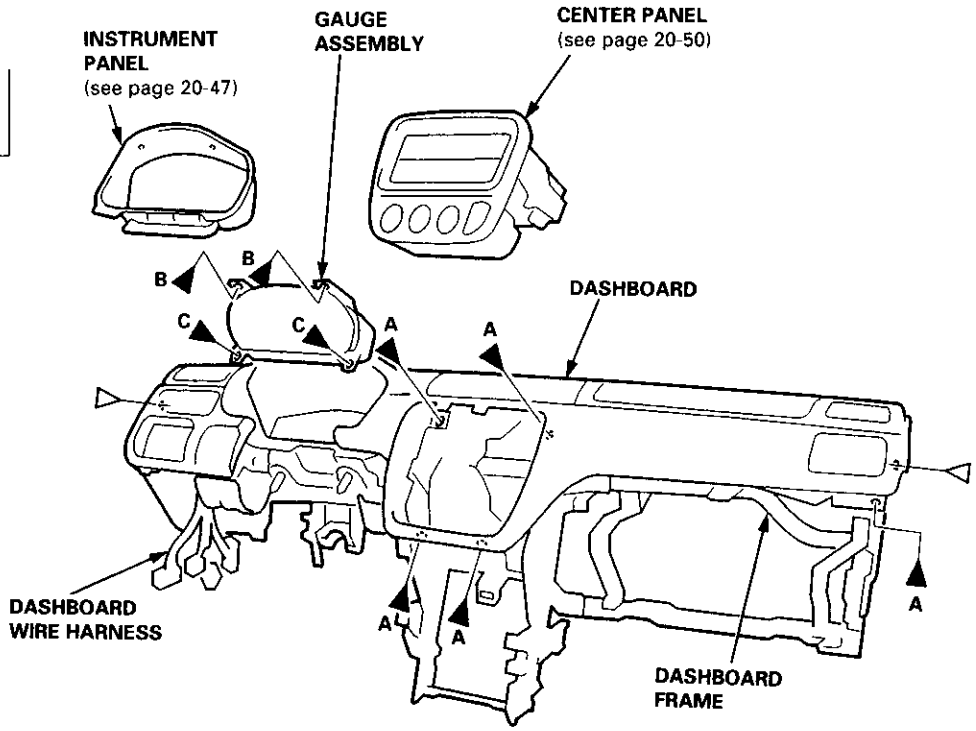


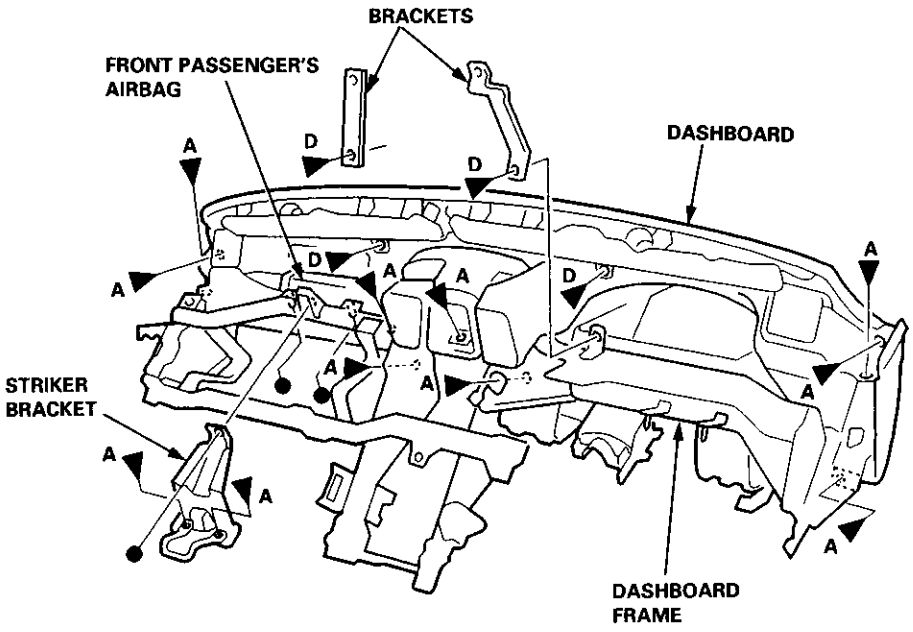
D ▶, 4



▷: Clip locations, 2







Installation is the reverse of the removal procedure.

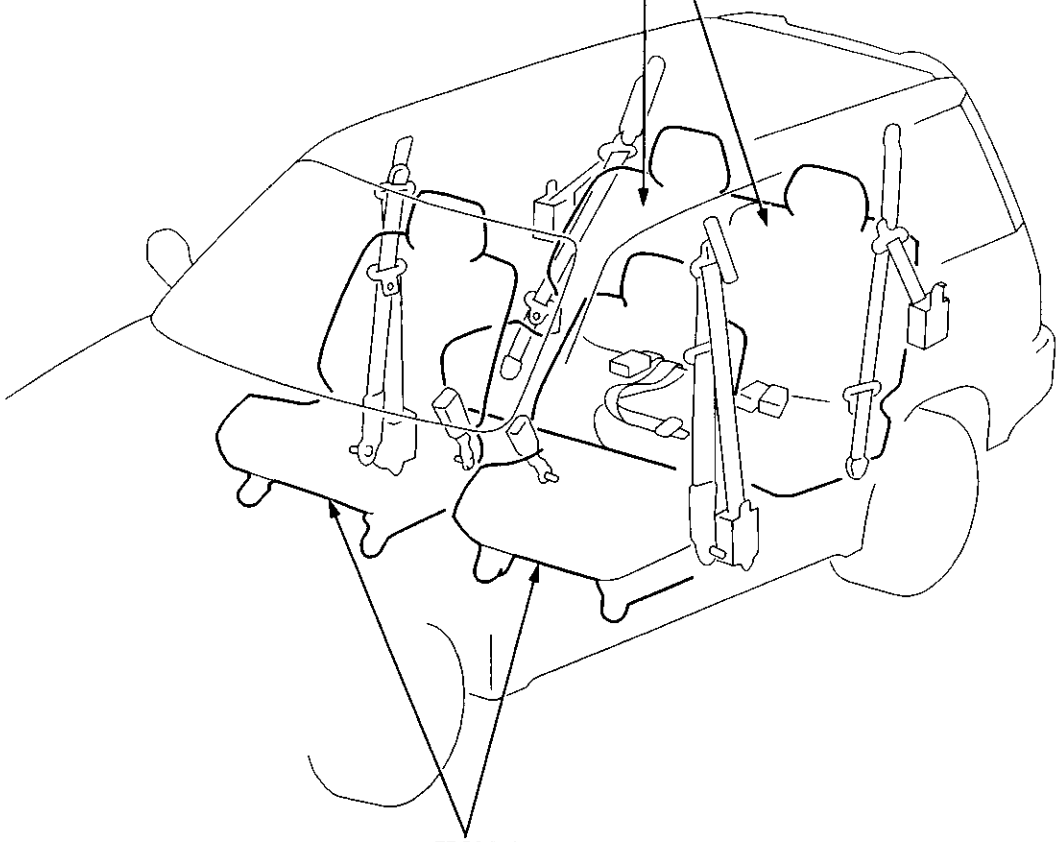
NOTE:

- Make sure the dashboard wire harnesses are not pinched.
- Make sure the connectors and antenna lead are connected properly.

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Component Location Index

REAR SEATS
Removal and Installation, page 20-63
Disassembly and Reassembly, page 20-65
Seat Linkage Disassembly and Reassembly, page 20-67
Armrest Replacement, page 20-69
Seat Cover Replacement, page 20-69



FRONT SEATS
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Disassembly and Reassembly, page 20-58
Seat Linkage Disassembly and Reassembly, page 20-60
Armrest Replacement, page 20-61
Seat Cover Replacement, page 20-61

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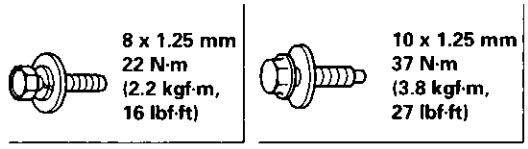
Front Seat Removal and Installation

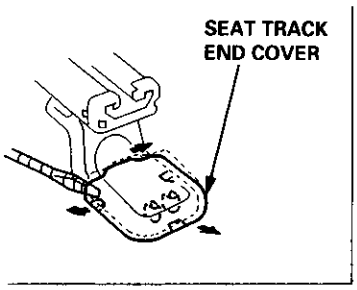
CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.

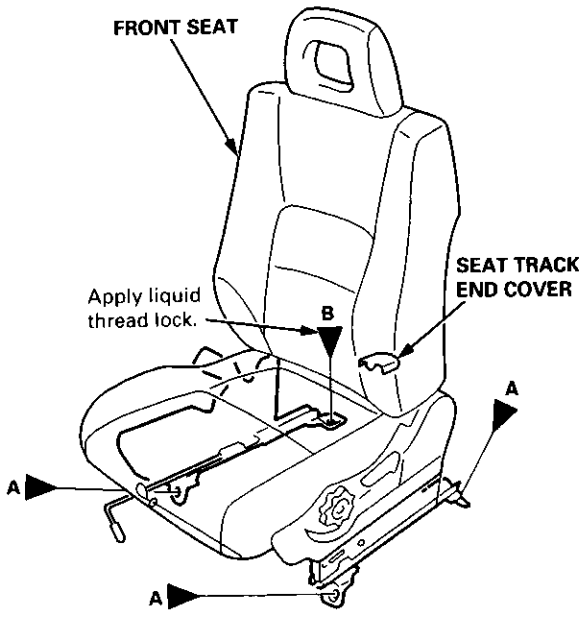
NOTE: Take care not to scratch the body or tear the seat covers.

1. Remove the seat track end cover, and remove the bolts.

▶: Bolt locations
A ▶, 3 **B ▶, 1**

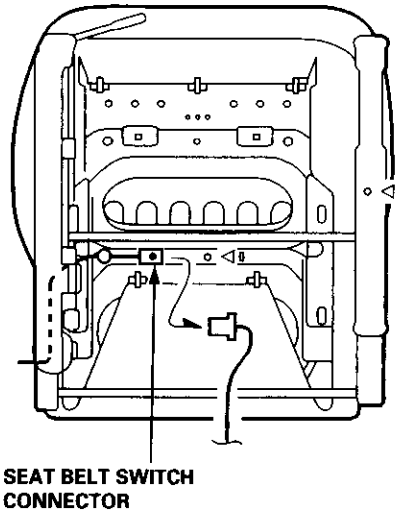






2. Lift up the driver's front seat, then disconnect the seat belt switch connector and harness clips.

▷: Harness clip locations



3. Carefully remove the front seat through the door opening.

   NOTE: An assistant is helpful when removing the front seat.

4. Installation is the reverse of the removal procedure.

   NOTE: Make sure the seat belt switch connector is connected properly (driver's front seat).

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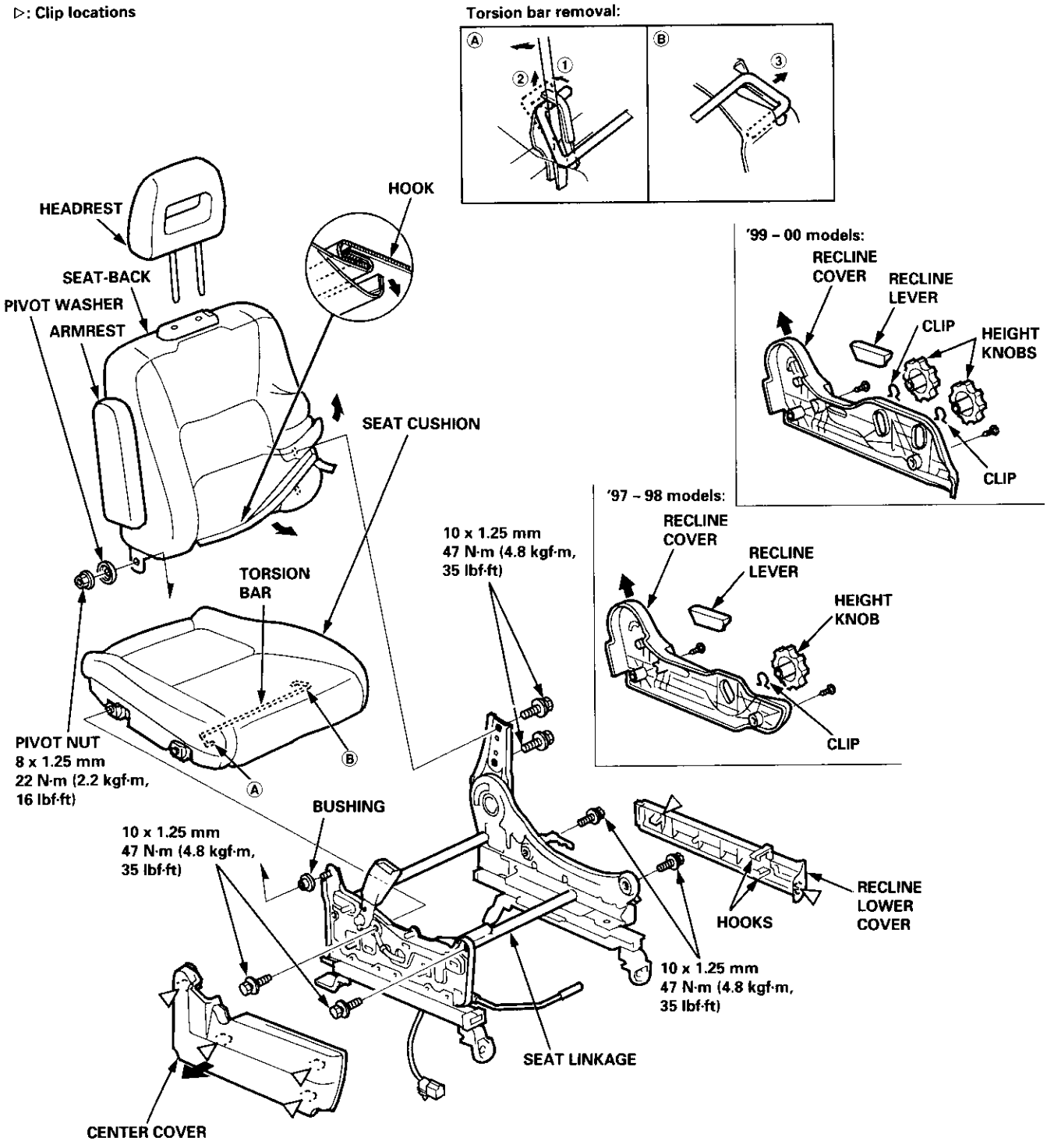
Front Seat Disassembly and Reassembly

CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the body or tear the seat covers.

Driver's seat (manually adjustable with manual height adjustment):

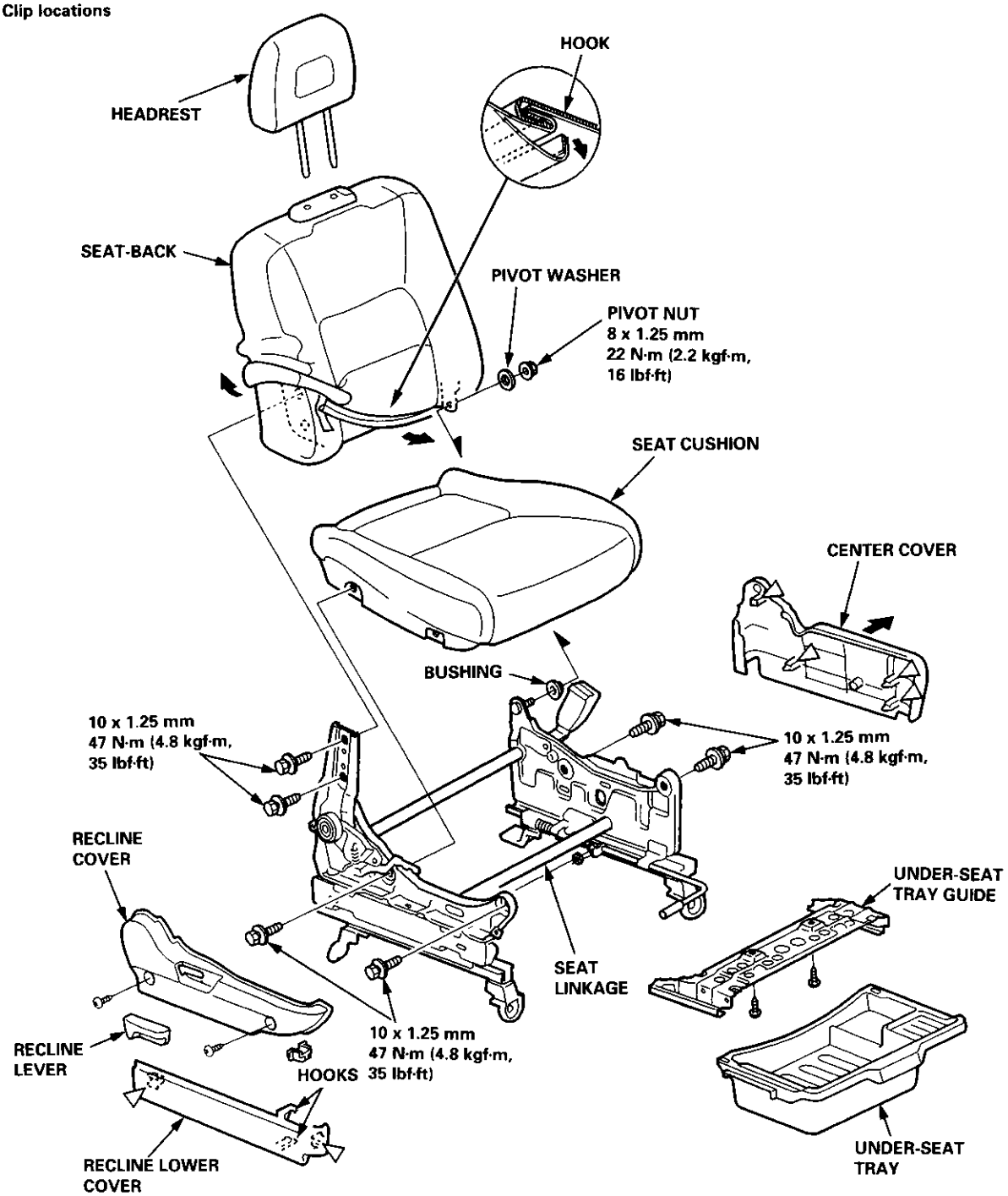
▷: Clip locations



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Passenger's seat (manually adjustable):

▷: Clip locations



Reassembly in the reverse order of disassembly.

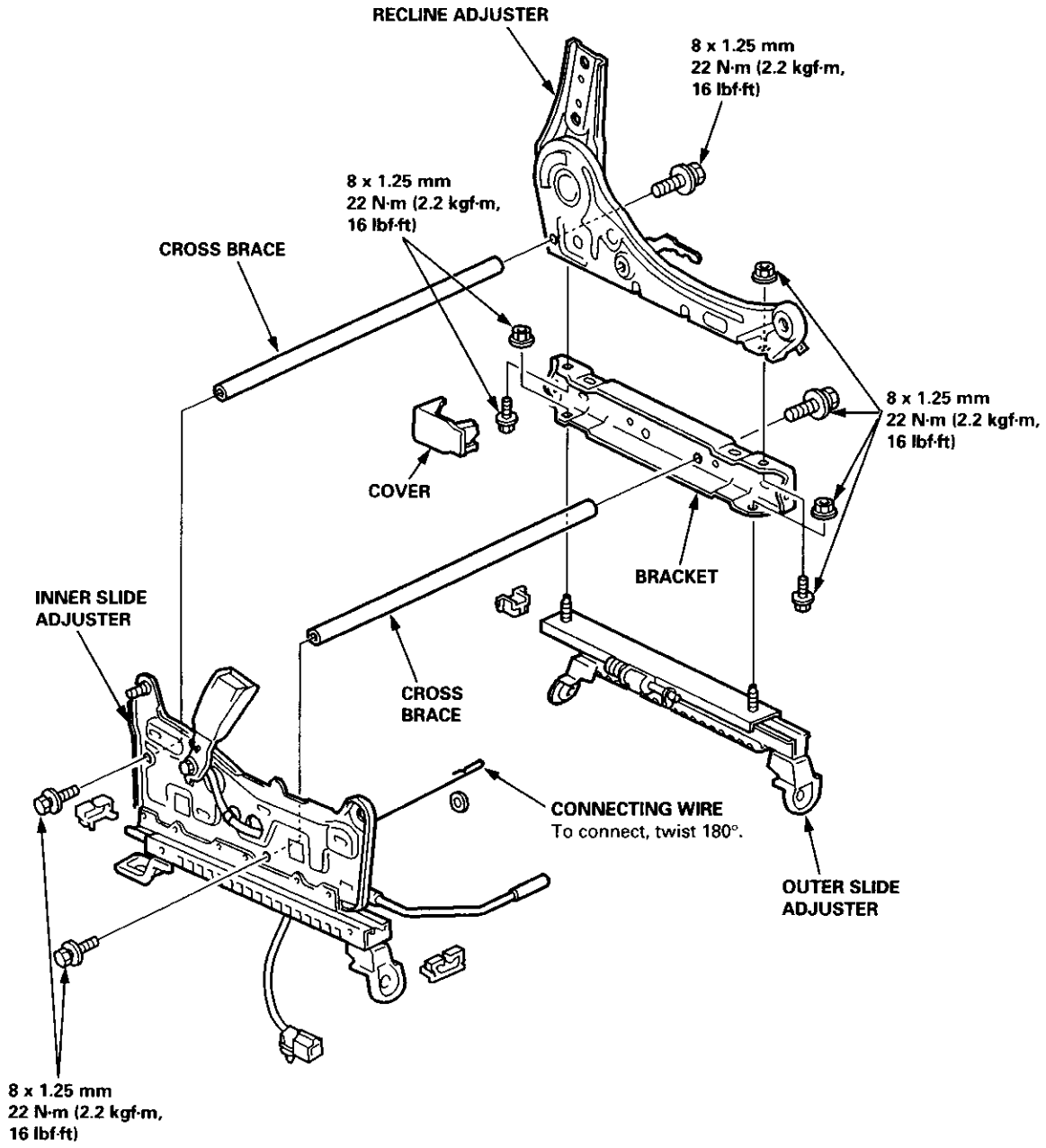
NOTE:

- Make sure the bushing and pivot washer are installed properly.
- To prevent wrinkles when installing the seat-back cover, make sure the material is stretched evenly over the pad.
- Grease the moving portion.

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Front Seat Linkage Disassembly and Reassembly

CAUTION: Put on gloves to protect your hands.



Reassembly in the reverse order of disassembly.

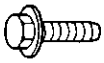
NOTE: Grease the moving portions.

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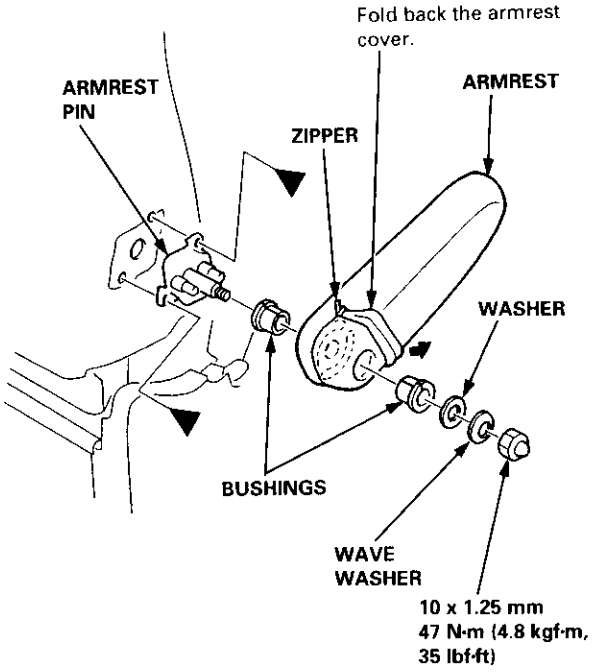
Front Seat Armrest Replacement

NOTE: Take care not to tear the seams or damage the seat covers.

▶: **Bolt locations, 2**



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



Installation is the reverse of the removal procedure.

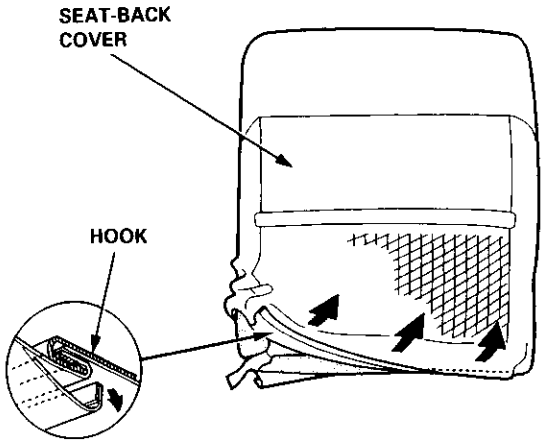
Front Seat Cover Replacement

CAUTION: Put on gloves to protect your hands.

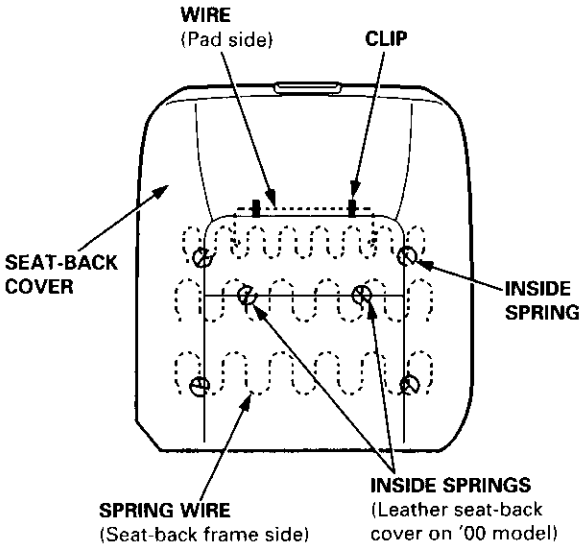
NOTE: Take care not to tear the seams or damage the seat covers.

Seat-back cover:

1. Slide the front seat forward, and fold the seat-back forward.
2. Remove the armrest from the driver's seat.
3. Release the hook, and fold back the seat-back cover.



4. Release all inside springs, then fold back the seat-back cover, and remove the clips.

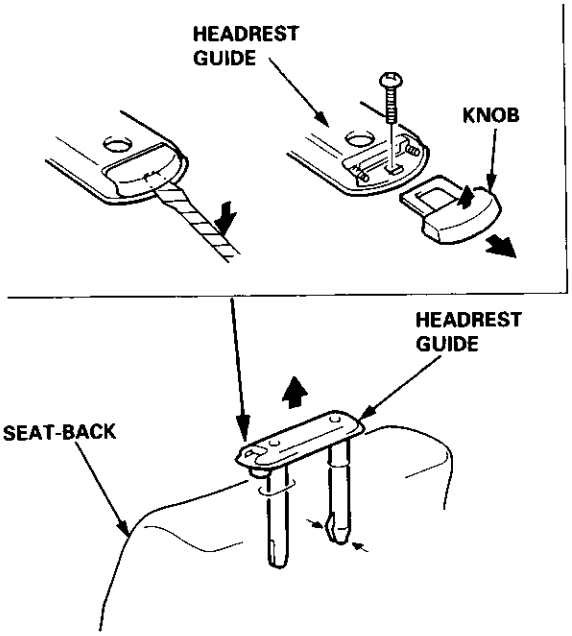


(cont'd)

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Front Seat Cover Replacement (cont'd)

5. Remove the headrest guide, then remove the seat-back cover.



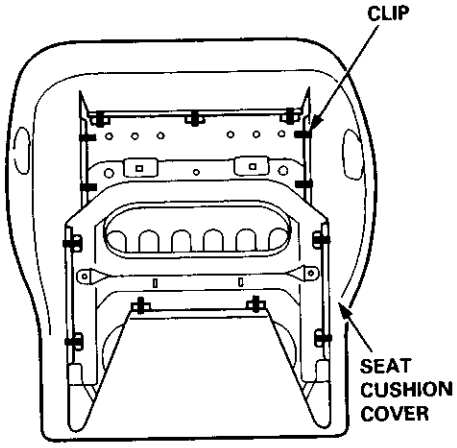
6. Installation is the reverse of the removal procedure.

   NOTE: To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the hook and inside springs.

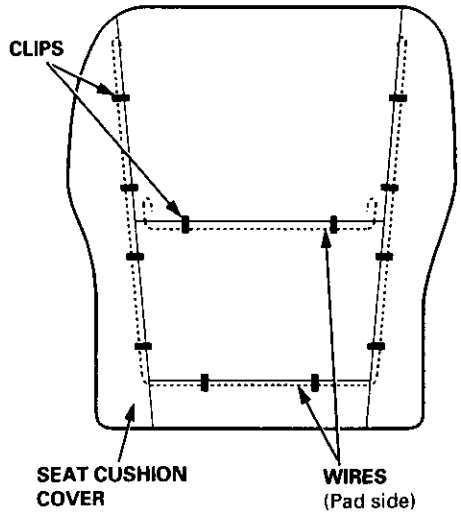
Seat cushion cover:

1. Remove the seat cushion (see pages 20-58, 59).

2. Remove the clips from under the seat cushion, then loosen the seat cushion cover.

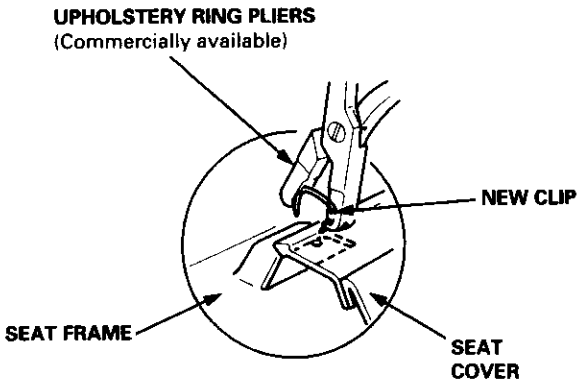


3. Pull back the edge of the seat cushion cover all the way around, then release the clips, and remove the seat cushion cover.



4. Installation is the reverse of the removal procedure.

   NOTE:
   - To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips.
   - Replace the released clips with new ones.



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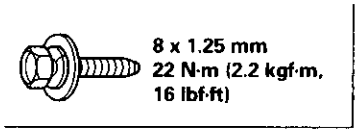
Rear Seat Removal and Installation

CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the seat covers and body.

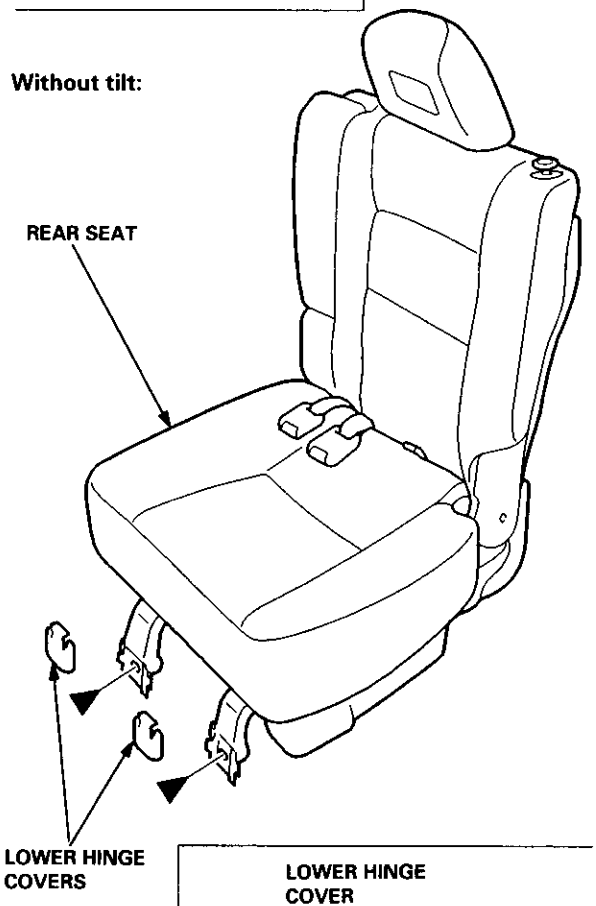
1. Remove the lower hinge covers, then remove the bolts.

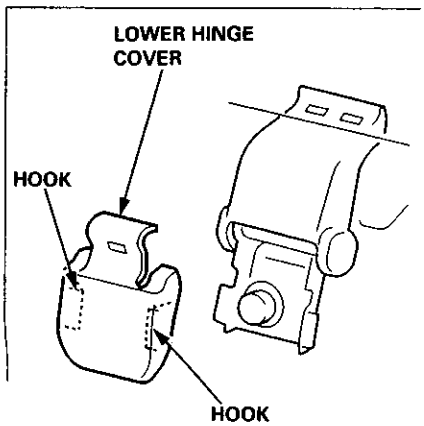
►: Bolt locations, 2



8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)

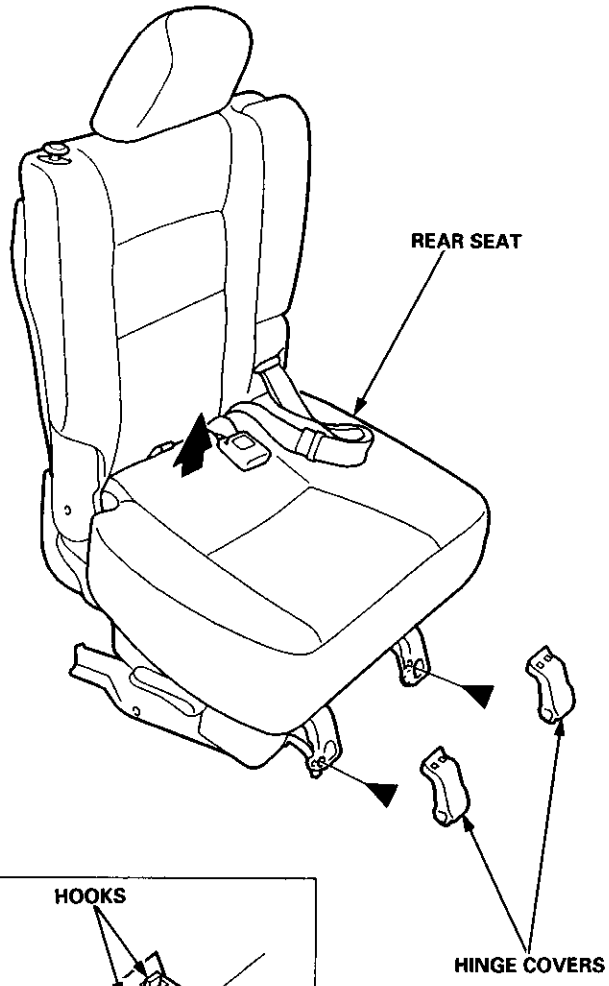
Without tilt:

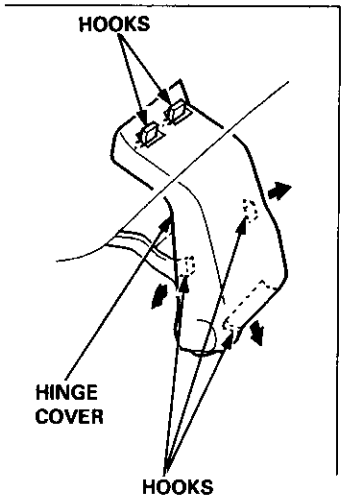




With tilt:

NOTE: Before removing the rear seat, tilt it.





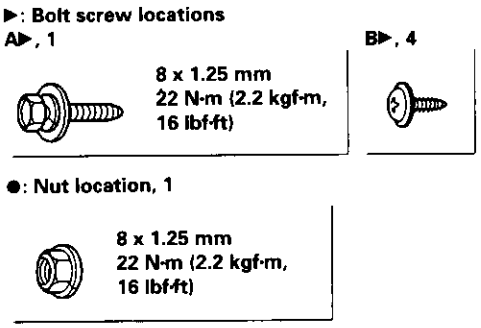
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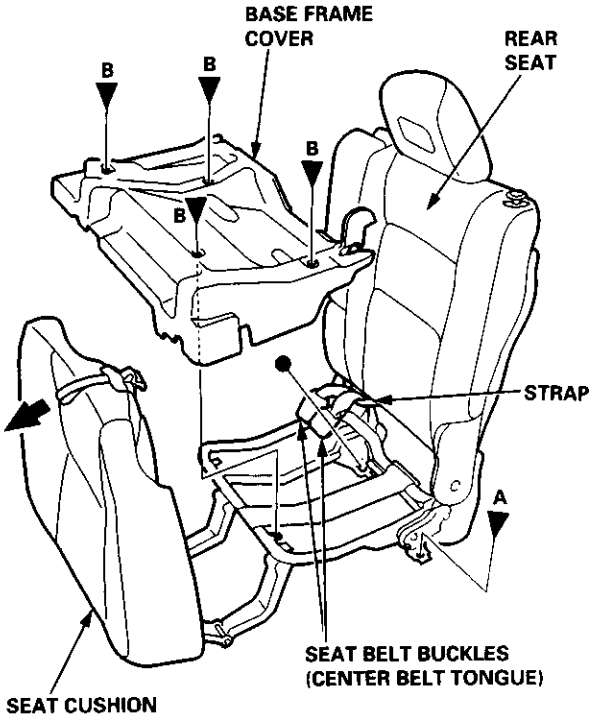
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Rear Seat Removal and Installation (cont'd)

2. Fold the seat cushion forward, and remove the base frame cover, then remove the bolts and nut.

   NOTE: The rear seat without tilt is shown, the rear seat with tilt is the same manner.



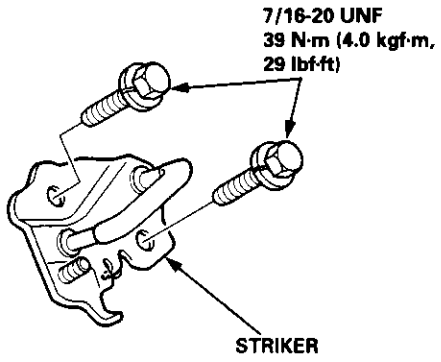


3. Remove the headrest.

4. Carefully remove the rear seat through the door opening.

   NOTE: An assistant is helpful when removing the rear seat.

5. With tilt: If necessary, remove the striker.



6. Installation is the reverse of the removal procedure.

   NOTE: Make sure the rear seat belt buckles and center belt tongue are routed properly (without tilt).

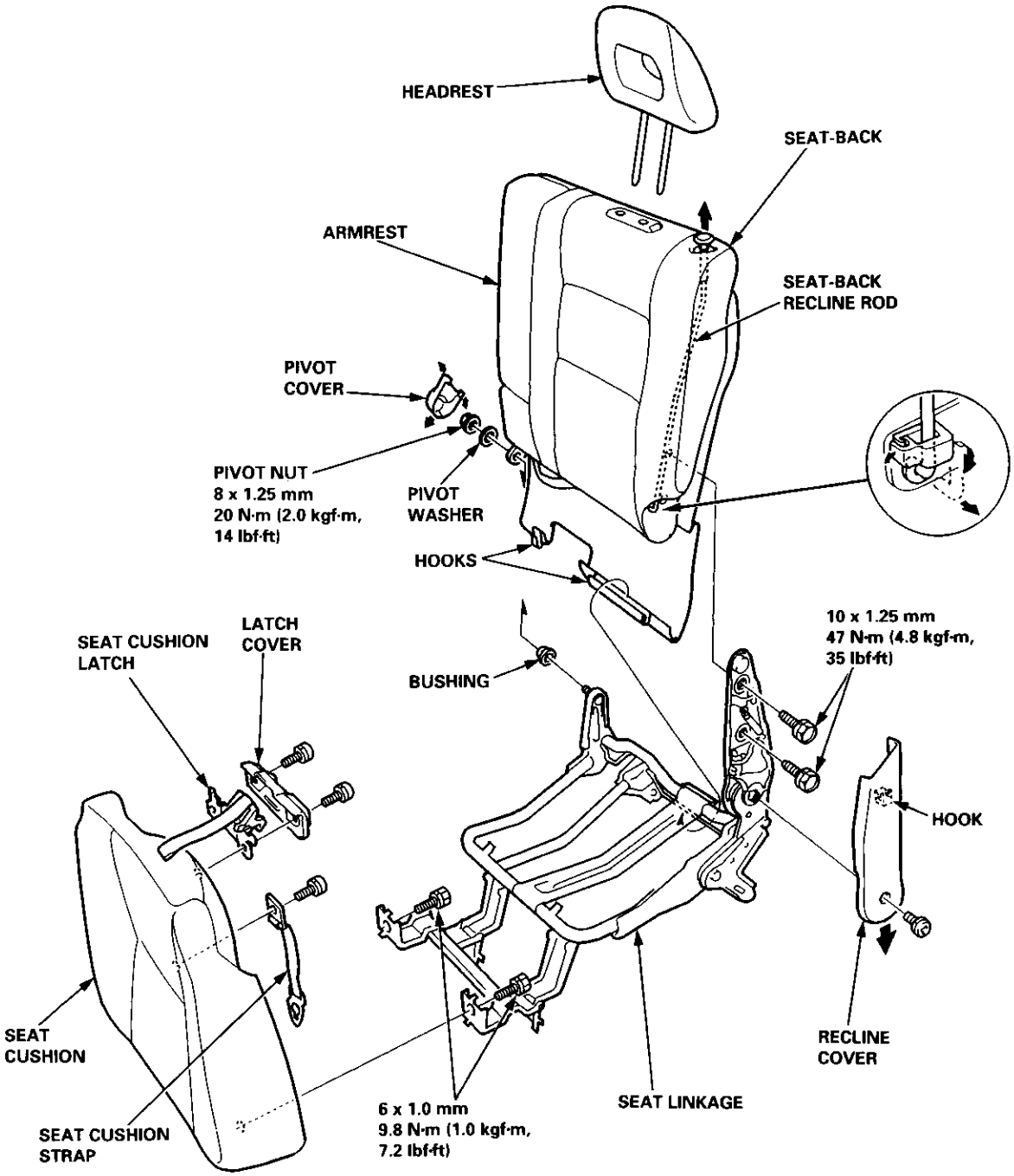
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Rear Seat Disassembly and Reassembly

CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the body or tear the seat covers.

Without tilt:

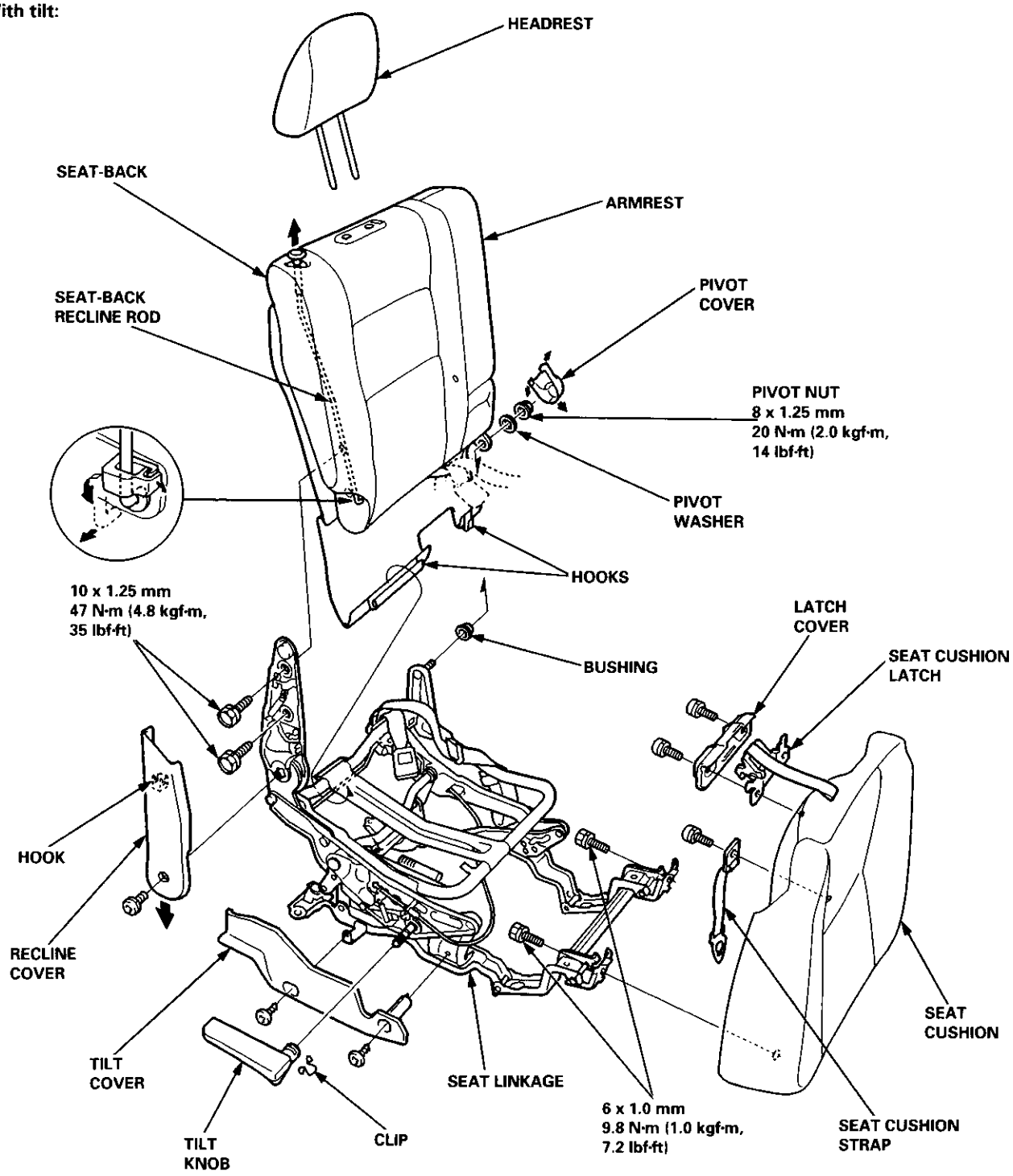


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Rear Seat Disassembly and Reassembly (cont'd)

With tilt:



Reassemble in the reverse order of disassembly.

NOTE:

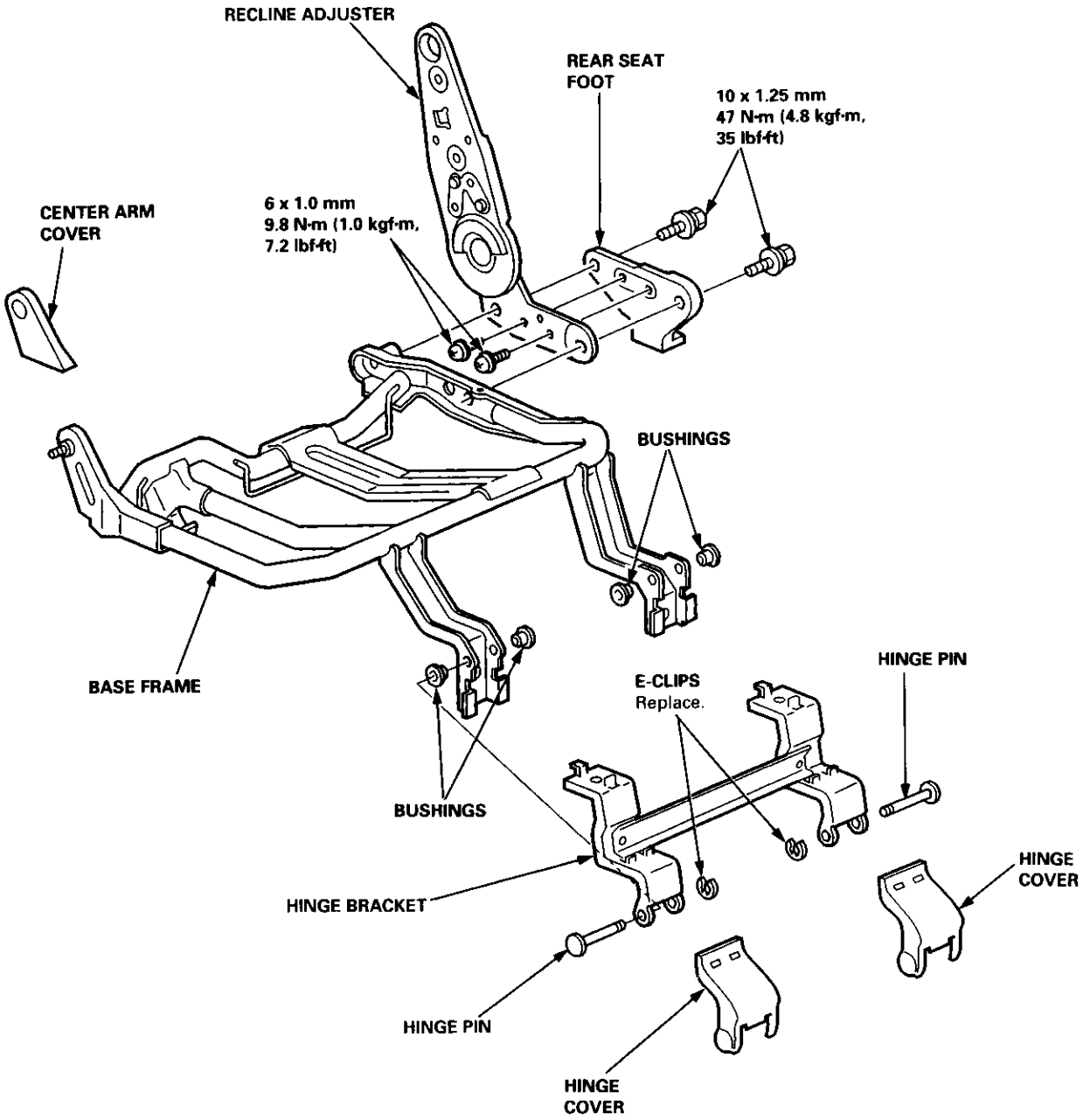
- Make sure the bushing and pivot washer are installed properly.
- Grease the moving portion.

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Rear Seat Linkage Disassembly and Reassembly

CAUTION: Put on gloves to protect your hands.

Without tilt:



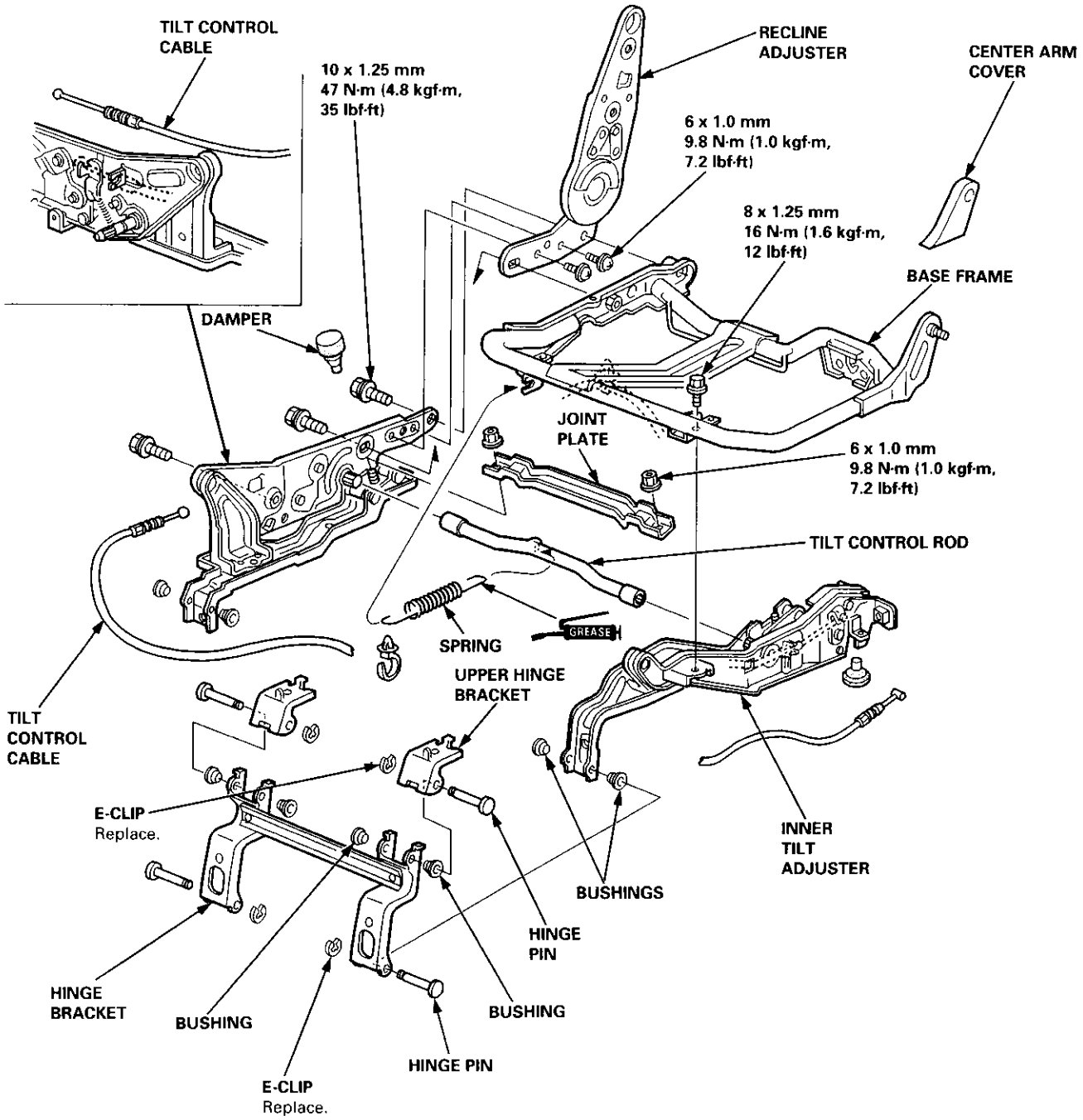
(cont'd)

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Rear Seat Linkage Disassembly and Reassembly (cont'd)

With tilt:

NOTE: Refer to section 24 for the rear seat belt buckles and center belt tongue removal.



Reassemble in the reverse order of disassembly.

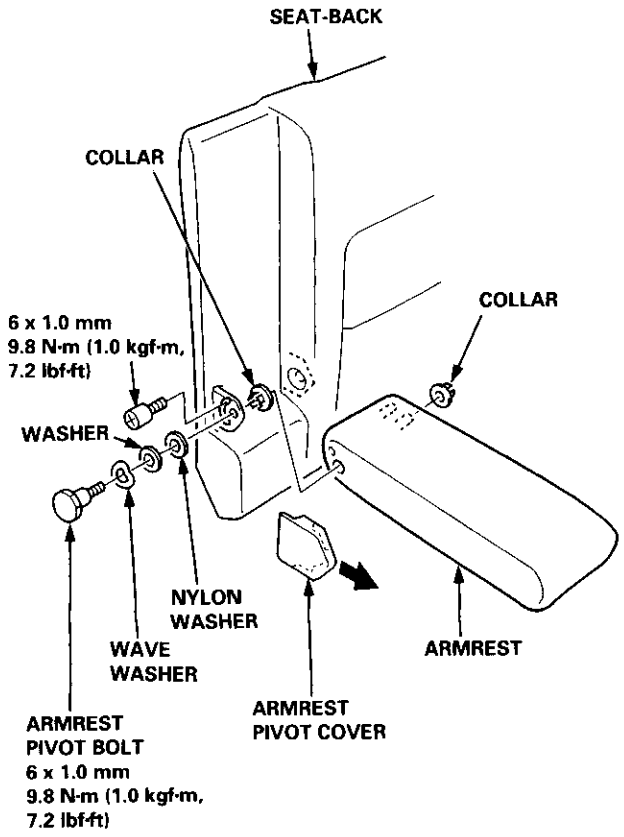
NOTE:

- Grease the moving portion.
- If necessary, adjust the tilt control cable.

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Rear Seat Armrest Replacement

NOTE: Take care not to tear the seams or damage the seat covers.



Installation is the reverse of the removal procedure.

Rear Seat Cover Replacement

CAUTION: Put on gloves to protect your hands.

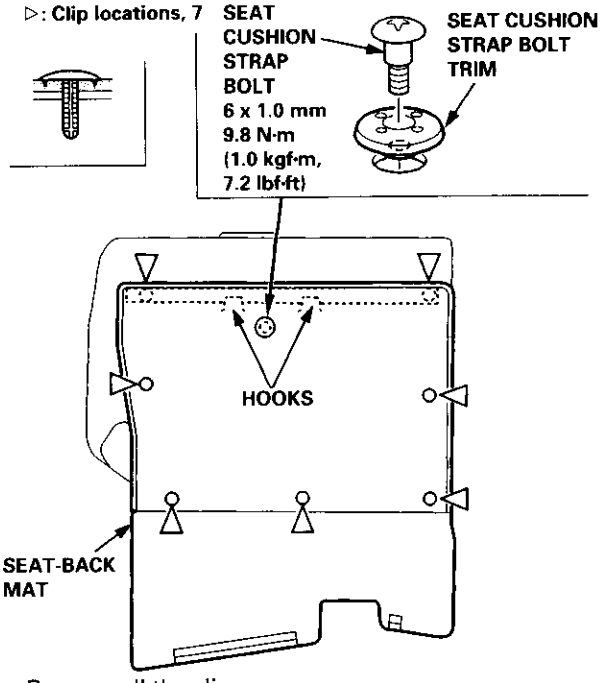
NOTE: Take care not to tear the seams or damage the seat covers.

Seat-back cover:

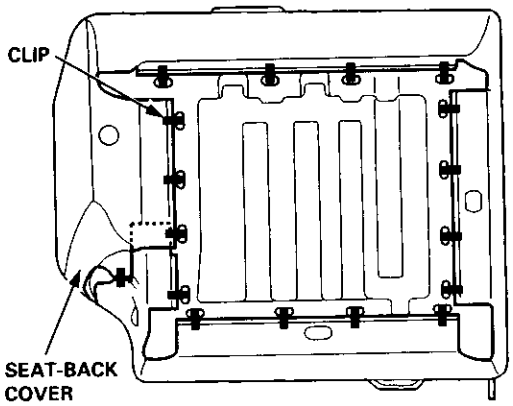
1. Remove the seat-back (see page 20-65).

2. Remove:
   - Armrest
   - Headrest
   - Seat-back recline rod (see page 20-65)

3. Remove the seat cushion strap bolt and strap bolt trim, then remove the seat-back mat.



4. Remove all the clips.

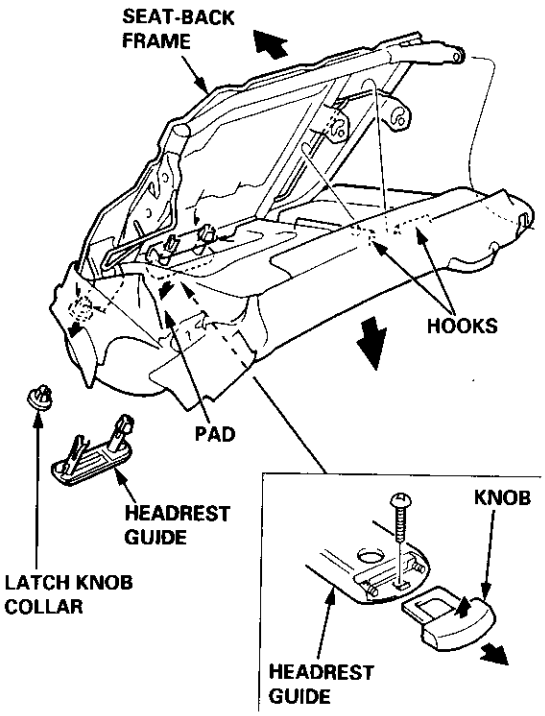


(cont'd)

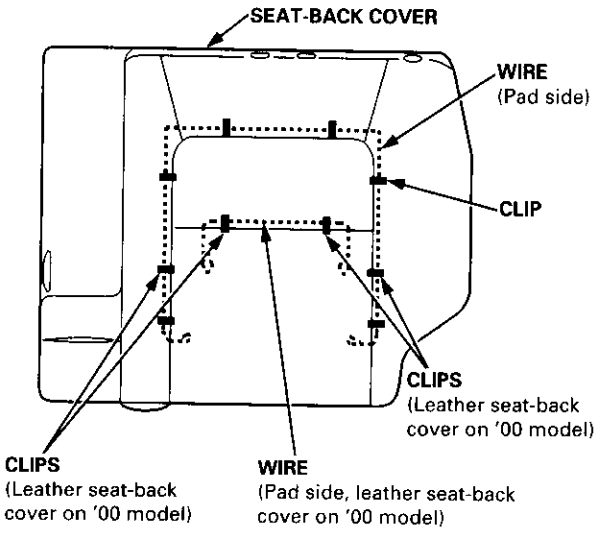
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Rear Seat Cover Replacement (cont'd)

5. Remove the headrest guide and latch knob collar, then remove the seat-back frame.



6. Pull back the edge of the seat-back cover all the way around, release the clips, and remove the seat-back cover.

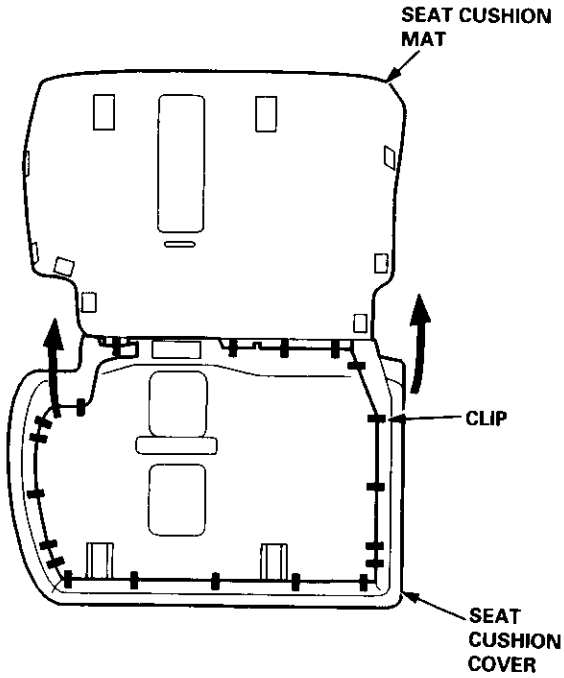


7. Installation is the reverse of the removal procedure.

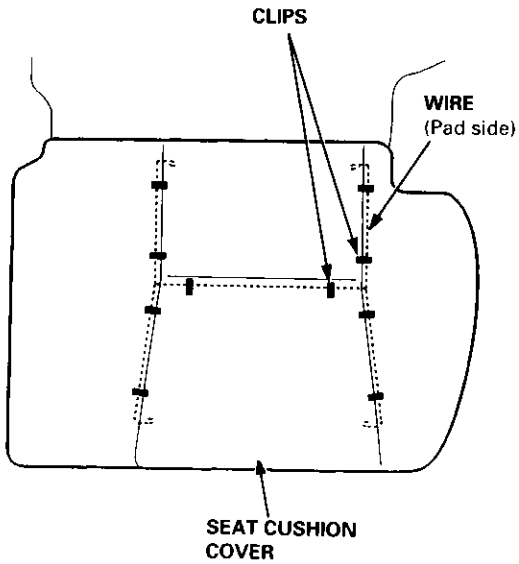
NOTE:
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the hook and clips.
- Replace the released clips with new ones.

Seat cushion cover:

1. Remove the seat cushion (see page 20-65).
2. Remove the seat cushion latch and seat cushion strap (see page 20-66).
3. Pull back the edge of the seat cushion mat, then release all of the clips.



4. Pull back the edge of the seat cushion cover all the way around, release the clips, and remove the seat cushion cover.

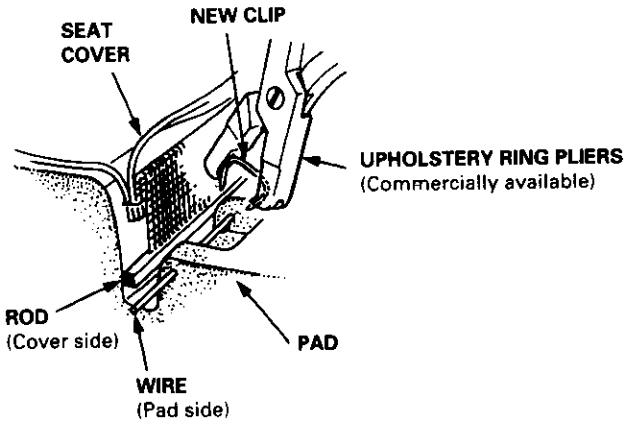


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5. Installation is the reverse of the removal procedure.

NOTE:

- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips.
- Replace the released clips with new ones.

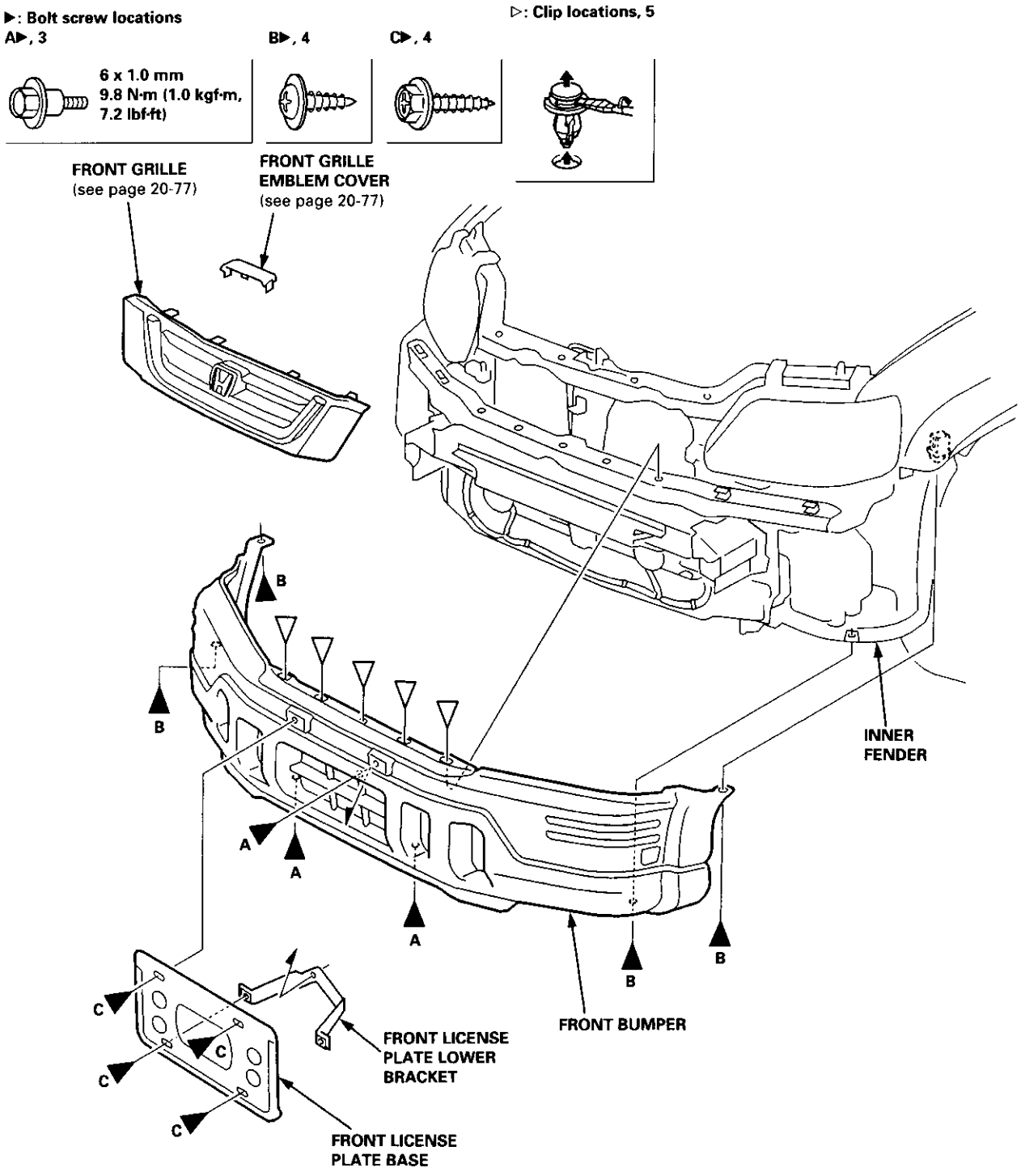


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Front Bumper Removal and Installation

CAUTION: Put on gloves to protect your hands.

NOTE:
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front grille, front bumper and body.
- First remove the front grille (see page 20-77).
- If necessary, remove the front license plate base and front license plate lower bracket.



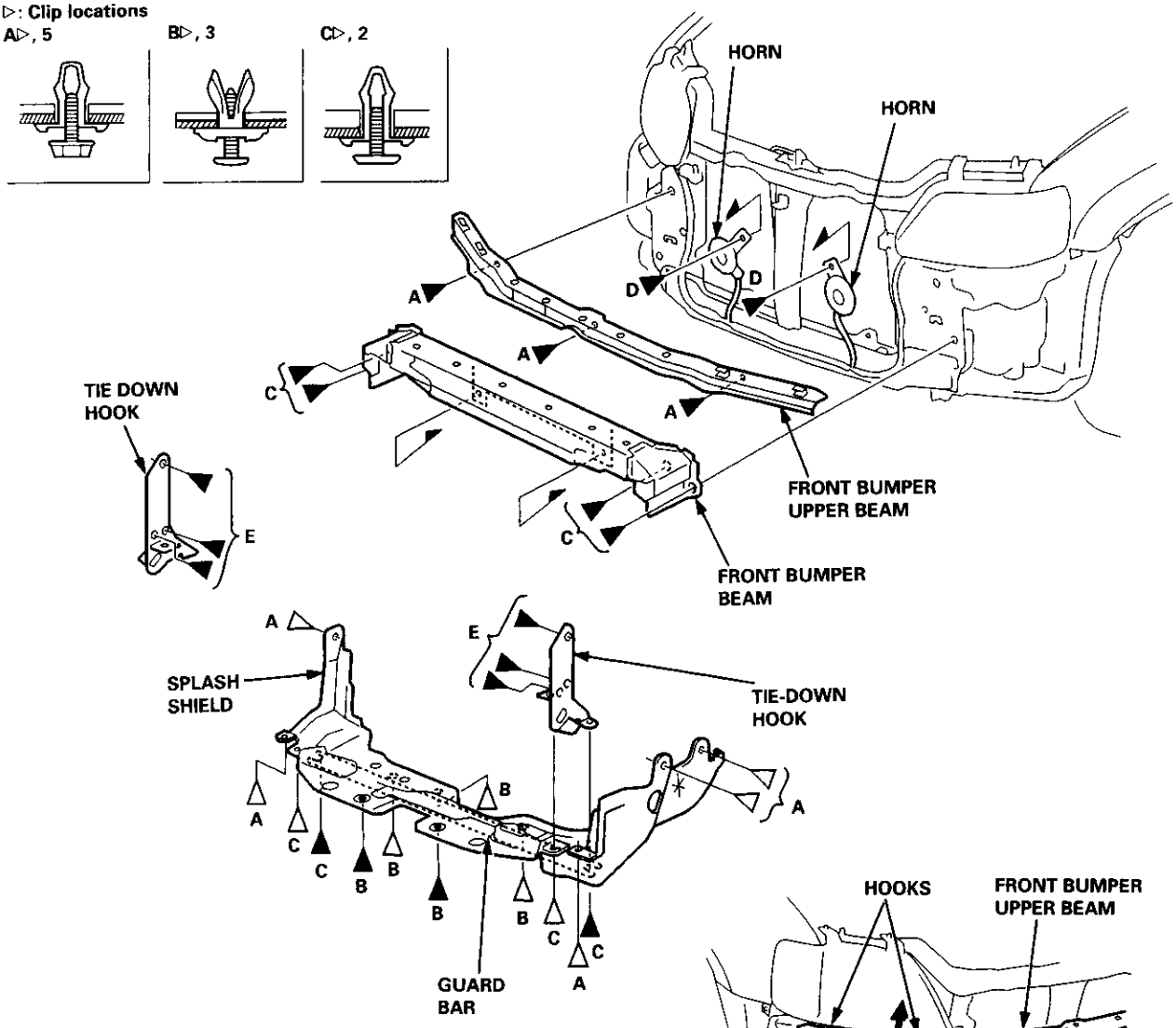
www.emanualpro.com

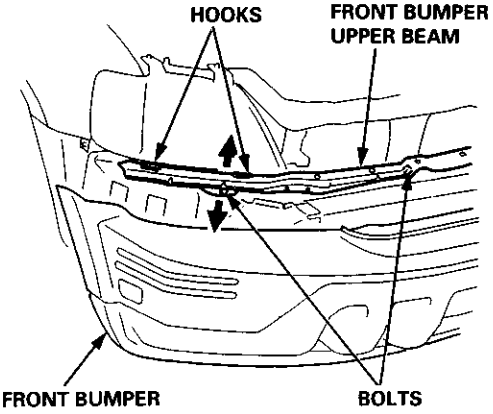
If necessary, remove the front bumper beam, front bumper upper beam and guard bar.

▶: Bolt locations
A▶, 5 B▶, 2 C▶, 6 D▶, 2 E▶, 6

6 x 1.0 mm 9.8 N·m (1.0 kgf-m, 7.2 lbf-ft)	8 x 1.25 mm 22 N·m (2.2 kgf-m, 16 lbf-ft)	10 x 1.25 mm 38 N·m (3.9 kgf-m, 28 lbf-ft)

▷: Clip locations
A▷, 5 B▷, 3 C▷, 2





Installation is the reverse of the removal procedure.

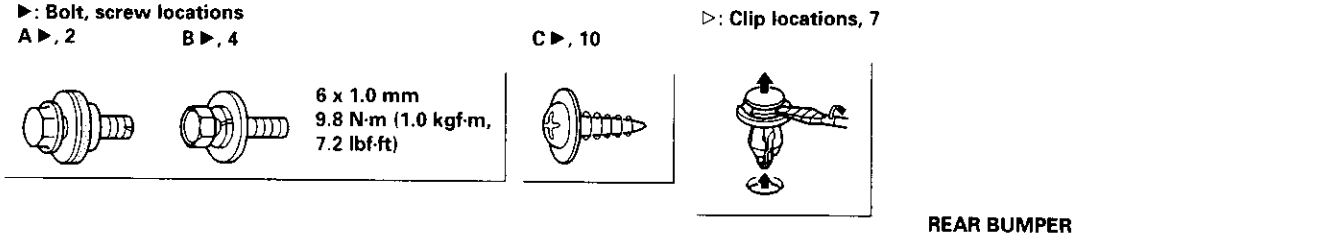
NOTE:
- Make sure the front bumper engages the front bumper upper beam securely.
- If necessary, adjust the front bumper upper beam to obtain the proper gap.
- If necessary, replace any damaged clips.

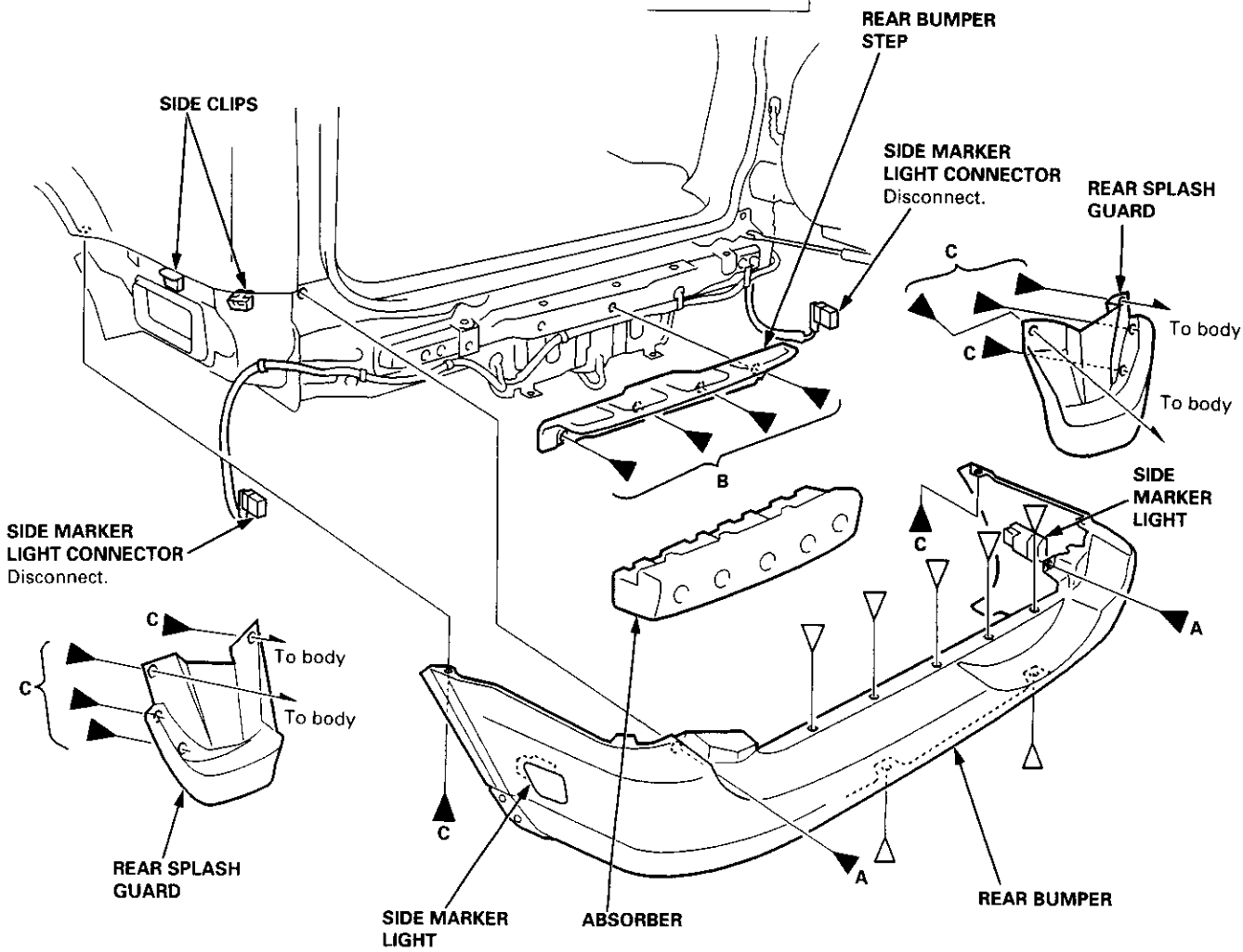
www.emanualpro.com

Rear Bumper Removal and Installation

CAUTION: Put on gloves to protect your hands.

NOTE:
- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the rear bumper and body.





Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Make sure the side marker light connectors are plugged in properly.
- Make sure the rear bumper engages the side clips on each side securely.

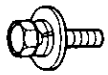
www.eManuals.com

Hood

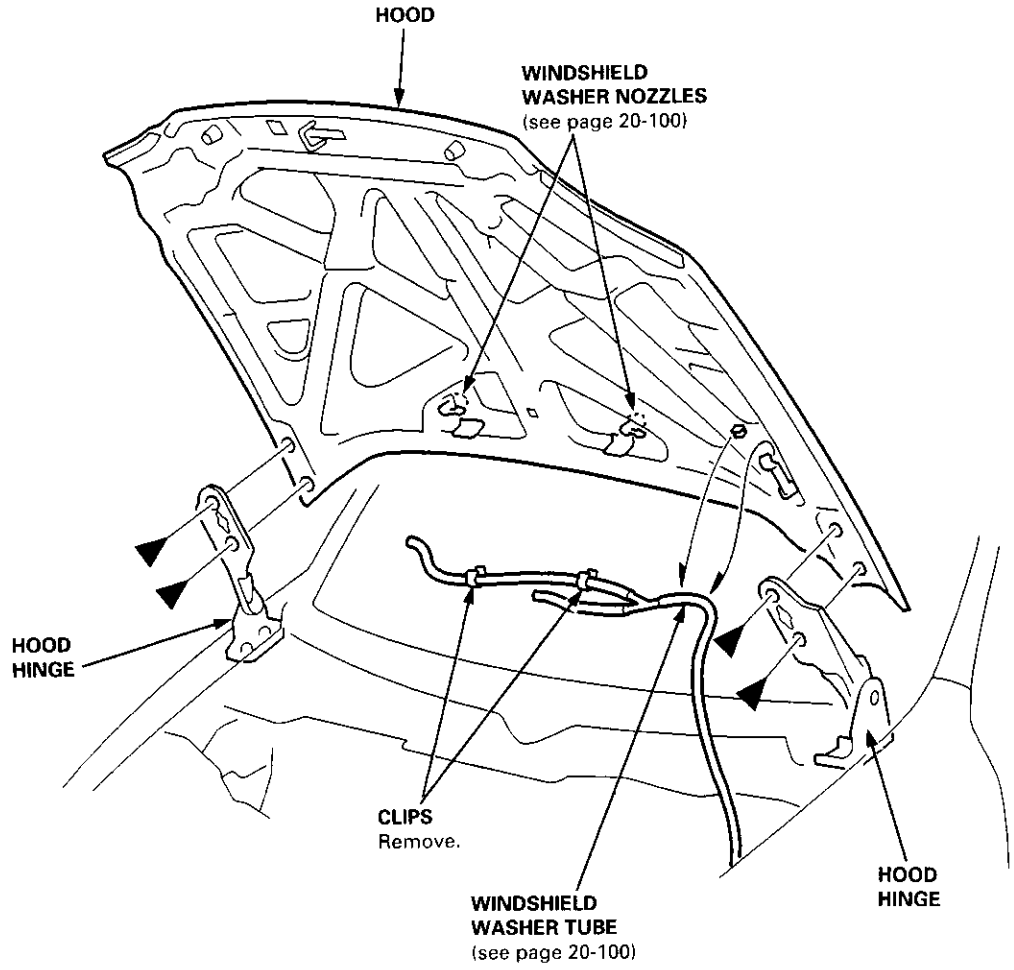
Replacement

NOTE:
- An assistant is helpful when removing and installing the hood.
- Take care not to damage the hood and body.
- When removing the clips, use a clip remover.

▶: Bolt locations, 4



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



Installation is the reverse of the removal procedure.

NOTE:
- Make sure the hood opens properly and locks securely.
- Adjust the hood alignment.
- Adjust the aim of the windshield washer nozzles (see page 20-102).

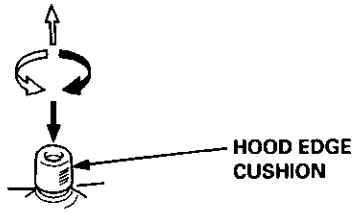
www.emanualpro.com

Hood

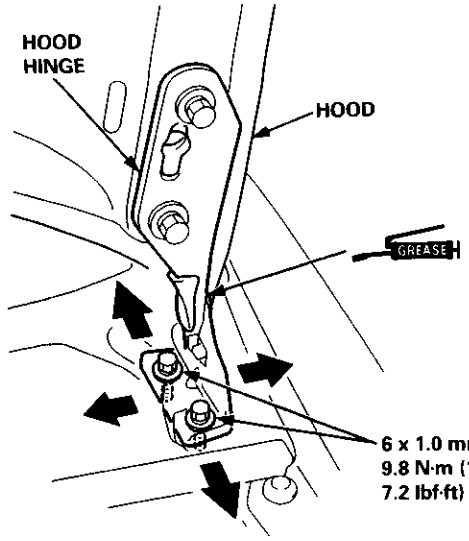
Adjustment

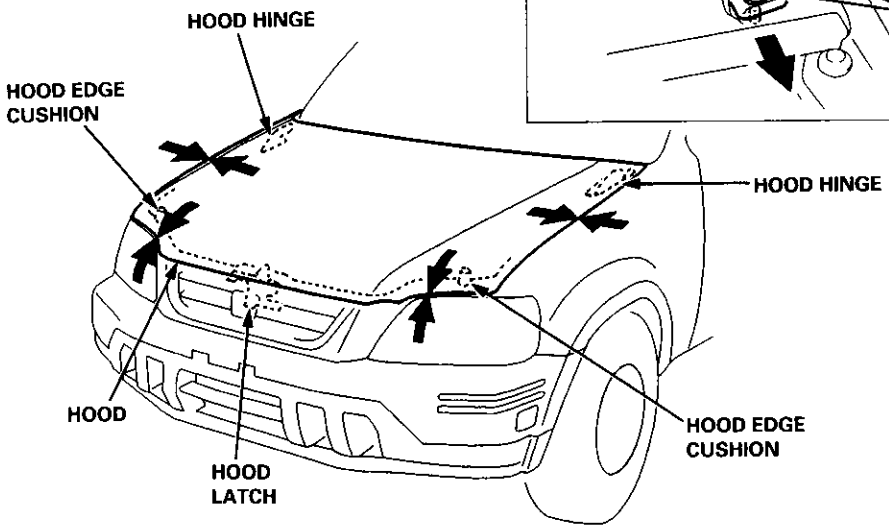
NOTE: Before adjusting the hood, loosen each bolt slightly.

Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.

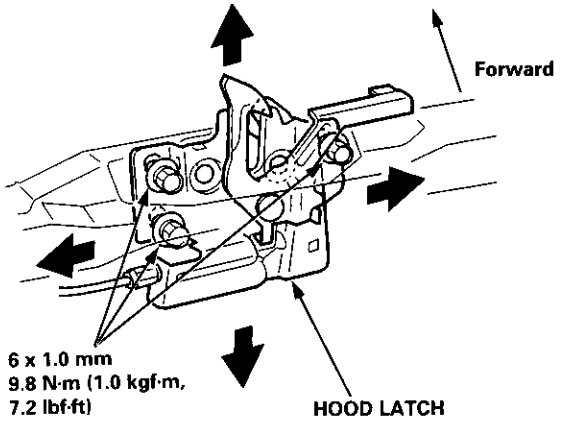


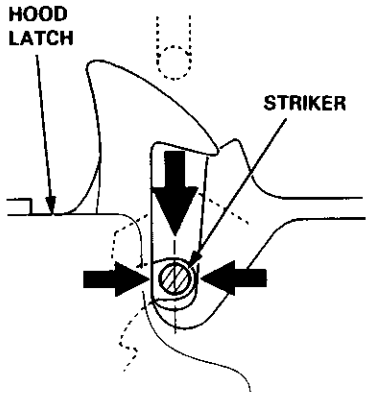
Adjust the hood right and left, as well as fore and aft, by using the elongated holes on the hood hinge.





Adjust the hood latch to obtain the proper height at the forward edge.
Move the hood latch right or left until the striker is centered in the hood latch as shown.





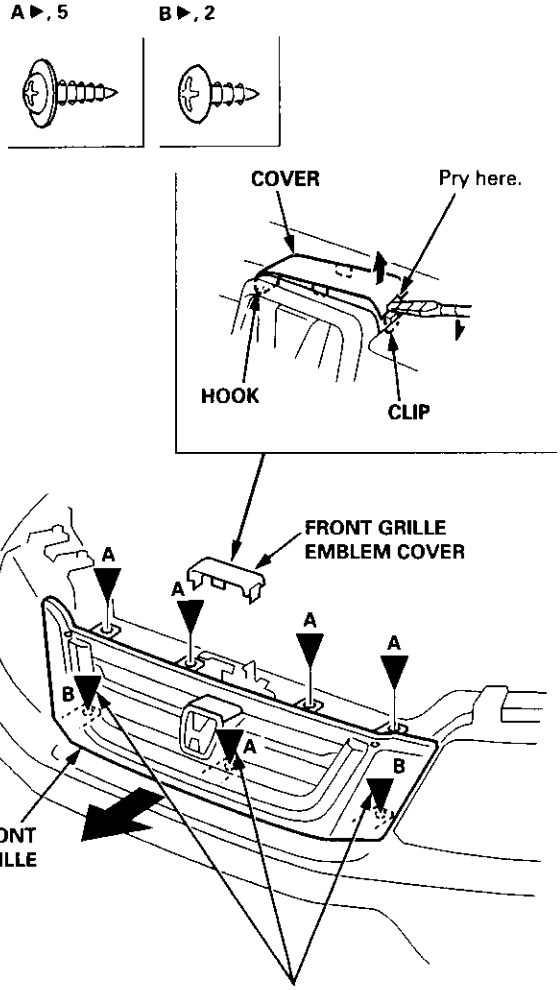
www.hondatech.com

Replacement

CAUTION: When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts to prevent damage.

NOTE: Take care not to scratch the front grille and front bumper.

1. Remove the front grille emblem cover. Loosen and remove the grille mounting screws, and remove the front grille by pulling it forward.



NOTE: Insert a Phillips screwdriver through the holes in the front grille, then loosen the screws.

2. Installation is the reverse of the removal procedure.

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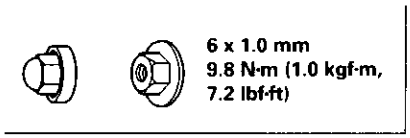
Rear Hatch Glass

Replacement

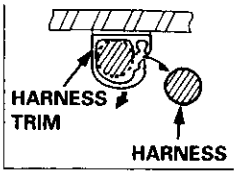
CAUTION:
- **Put on gloves to protect your hands.**
- **Use seat covers to avoid damaging any surfaces.**
- **Do not damage the rear window defogger grid lines and terminals.**

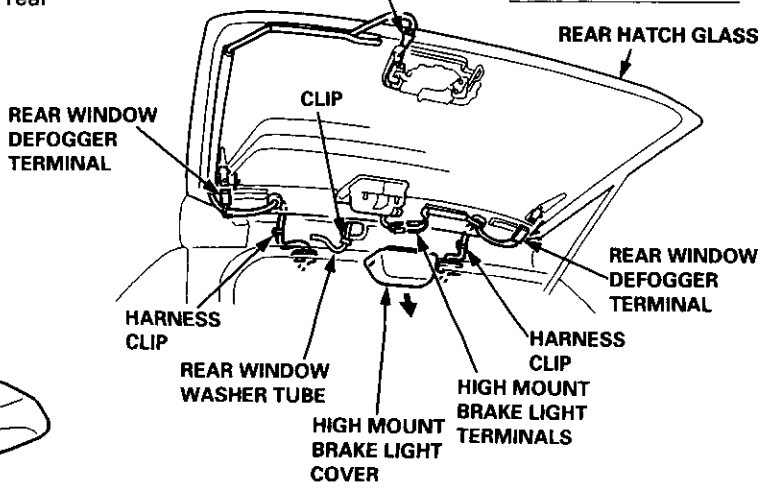
NOTE: An assistant is helpful when removing the rear hatch glass.

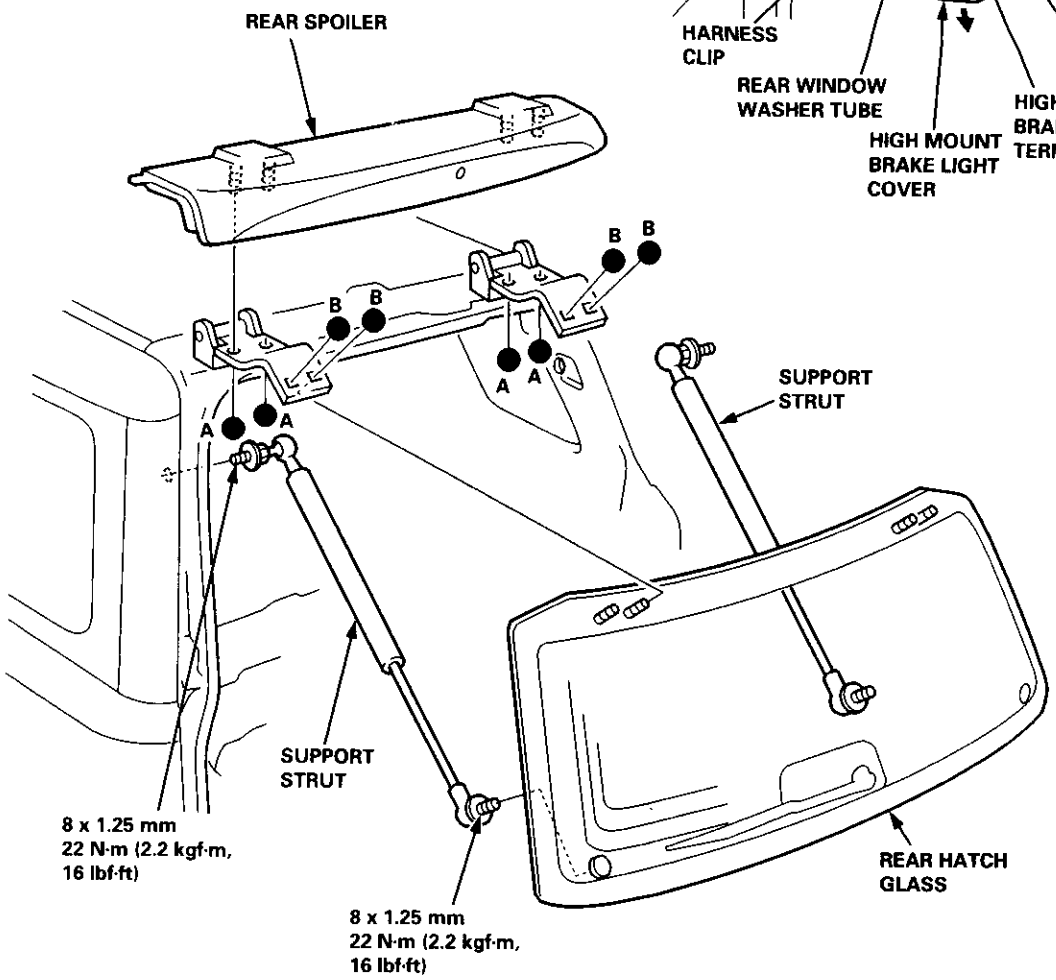
●: Nut locations
A●, 4 B●, 4



Harness wiring locations:







Installation is the reverse of the removal procedure.

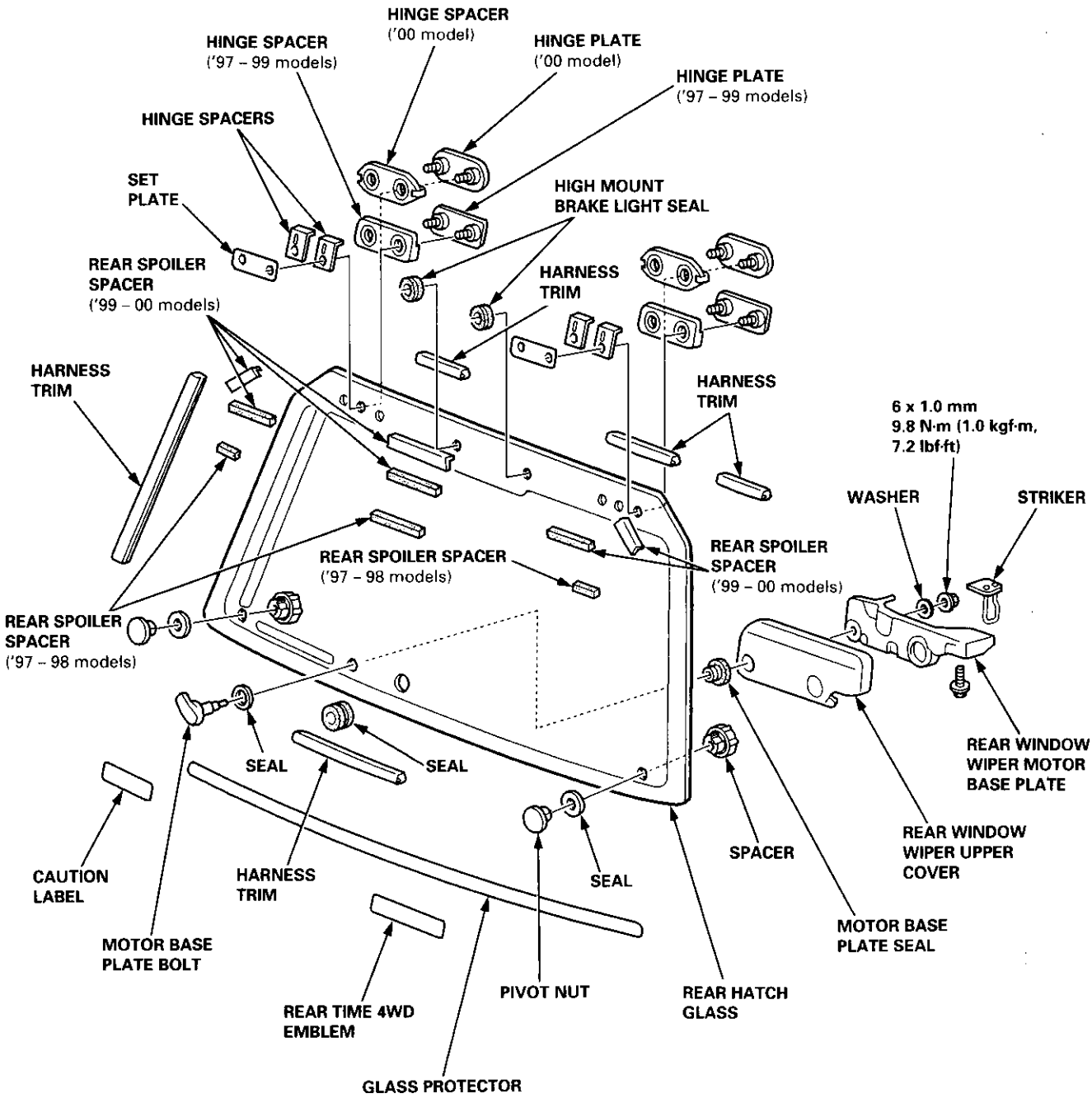
NOTE:
- Adjust the rear hatch glass alignment.
- Make sure the connector, terminals and washer tube are connected properly.
- Adjust the aim of the rear window washer nozzle (see page 20-103).

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Disassembly and Reassembly

NOTE:

- Take care not to scratch the rear hatch glass.
- If necessary, replace any damaged spacers and seals.
- Refer to page 20-99 for the rear window wiper motor removal and section 23 for the high mount brake light removal.



(cont'd)

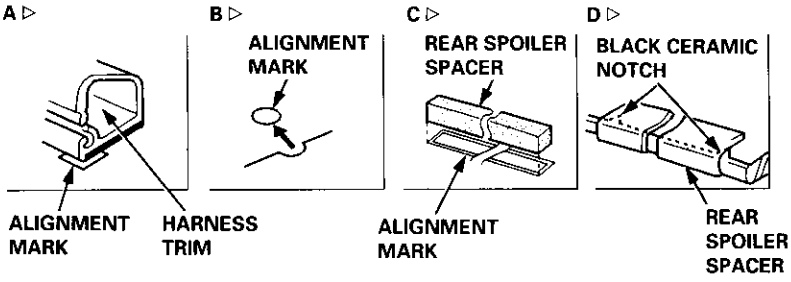
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Rear Hatch Glass

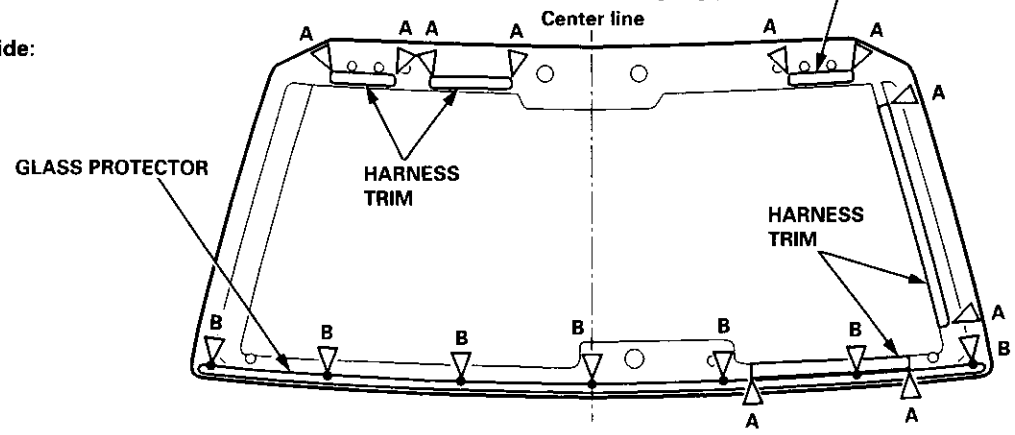
Disassembly and Reassembly (cont'd)

NOTE: Before installing the rear spoiler spacer, harness trim, caution label, real time 4WD emblem and glass protector, clean the rear hatch glass bonding surface with a sponge dampened in alcohol.

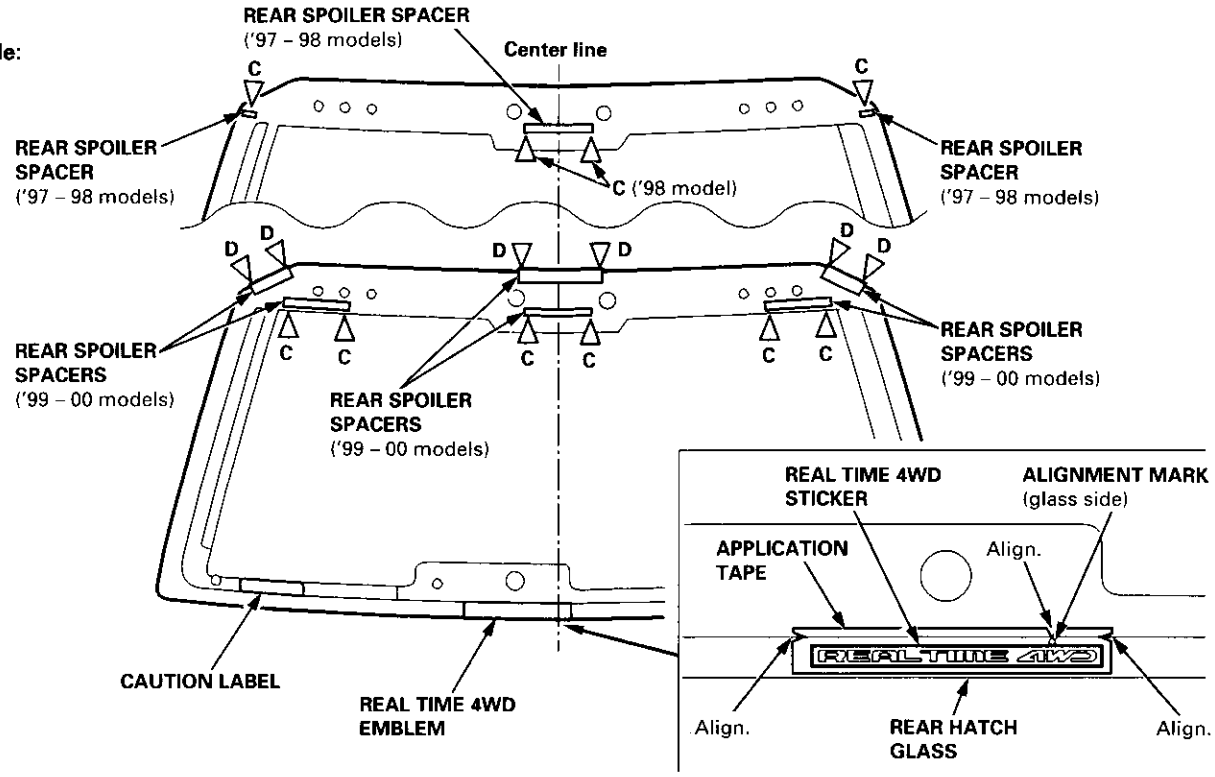
▷: Alignment mark locations



Inside:



Outside:



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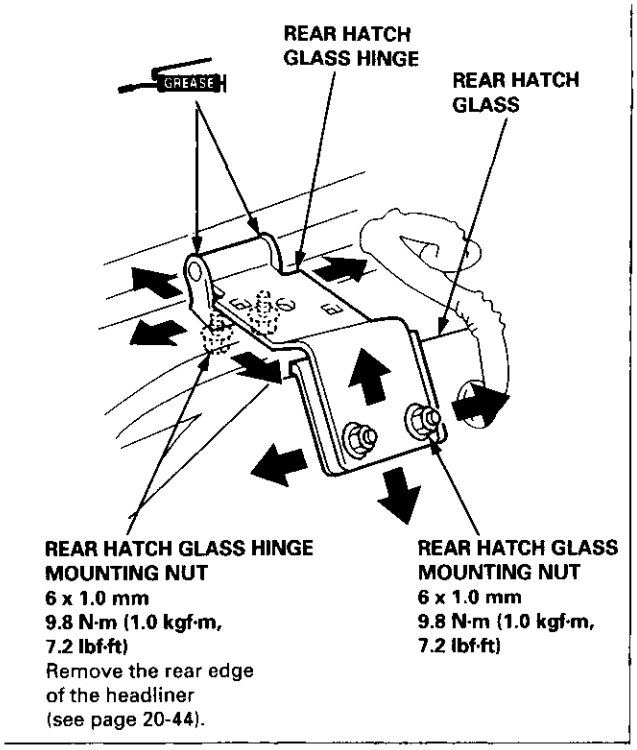
Adjustment

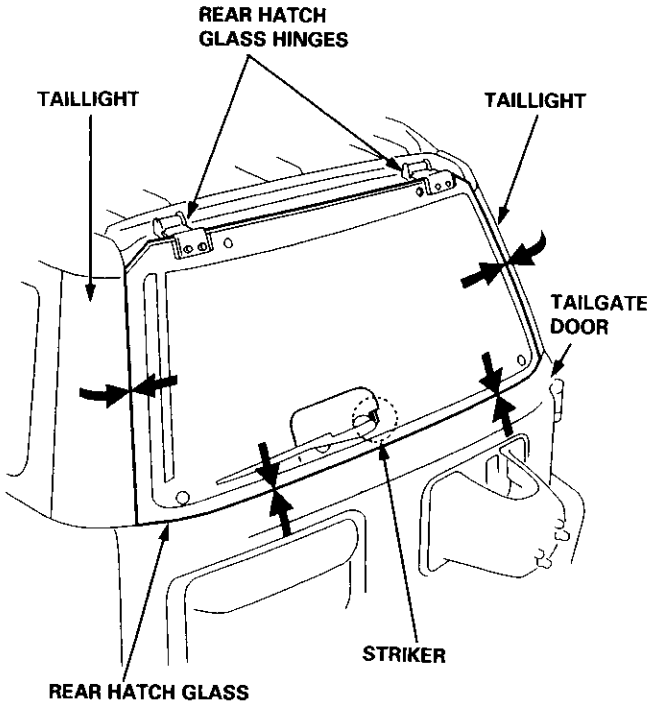
NOTE:
- After adjusting the tailgate door, adjust the rear hatch glass.
- Loosen the striker mounting bolts slightly.
- Remove the rear spoiler, and remove the support strut from body side.

1. Loosen the rear hatch glass mounting nuts.

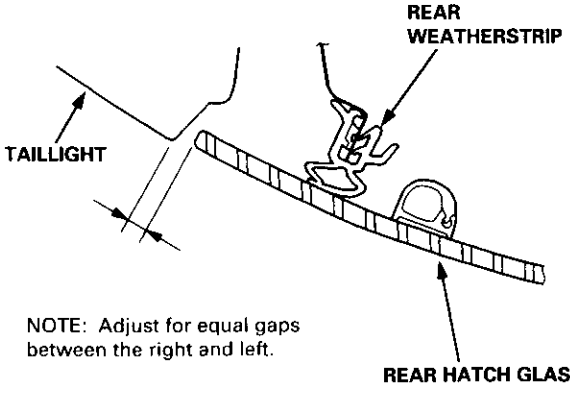
2. Adjust the rear hatch glass so there are equal gaps between the rear hatch glass, the taillights, and the tailgate door.

   NOTE: If necessary, loosen the rear hatch glass hinge mounting nuts and move the rear hatch glass backward or forward to fit the rear weatherstrip and tailgate door weatherstrip.



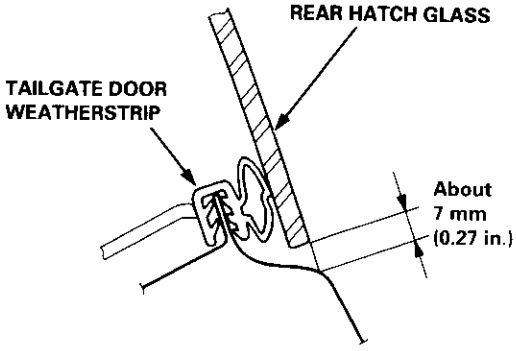


Taillight side:



NOTE: Adjust for equal gaps between the right and left.

Tailgate door side:



(cont'd)

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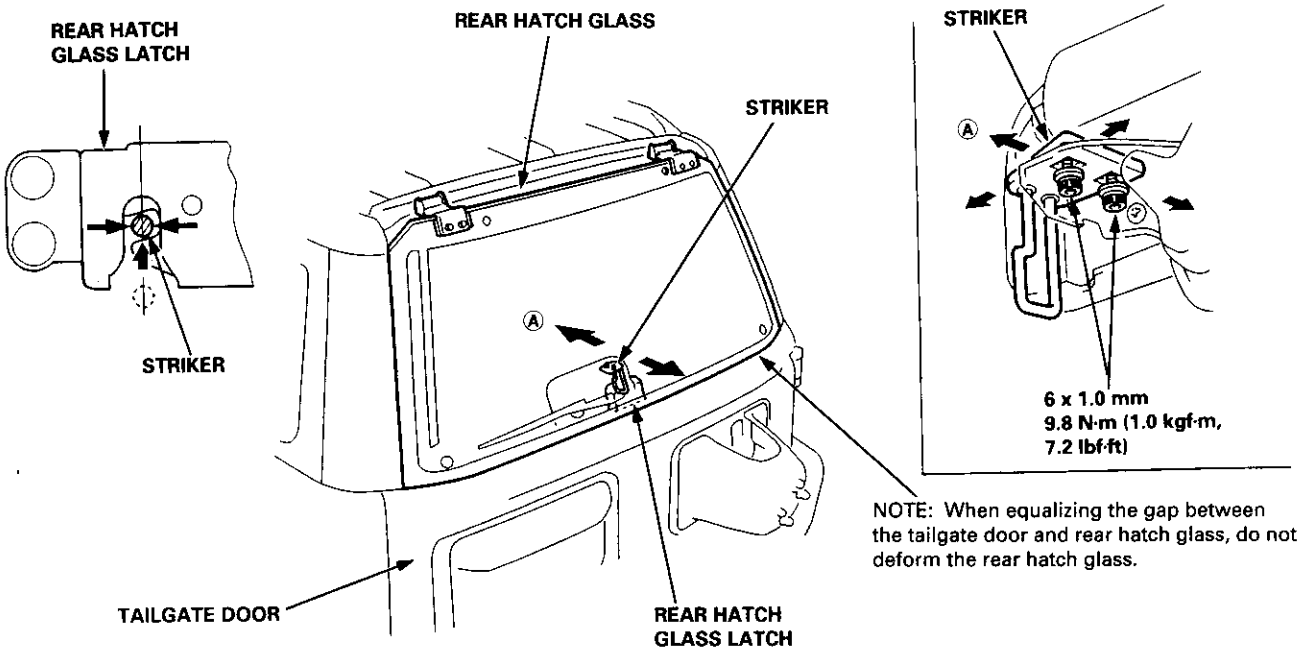
Rear Hatch Glass

Adjustment (cont'd)

3. After adjusting the rear hatch glass, tighten the rear hatch glass mounting nuts, and install the support strut.

4. Adjust the striker alignment.

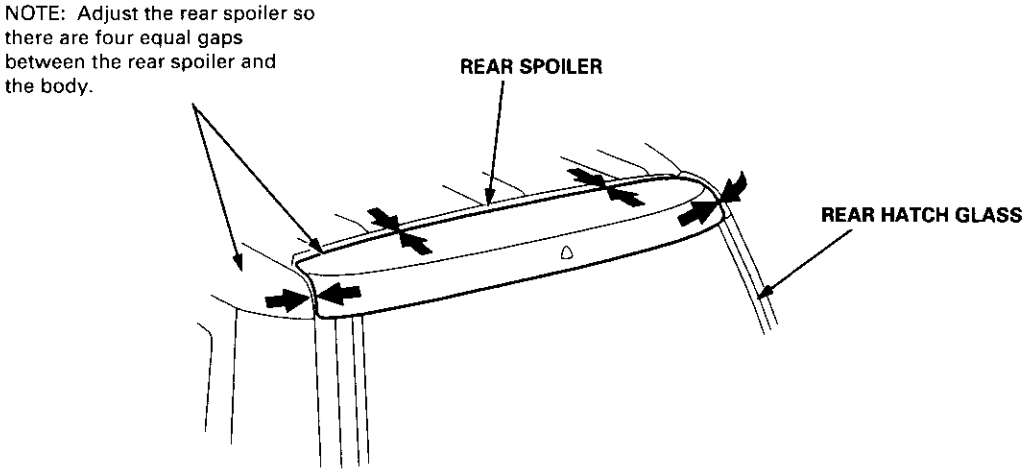
   NOTE:
   - Move the striker fore or aft to make the rear hatch glass fit flush with the tailgate door.
   - Move the striker right or left until it's centered in the rear hatch glass latch as shown.



5. Tighten the striker mounting bolts.

6. Recheck the rear hatch glass alignment, and make sure the glass opens properly, and locks securely.

7. Install the rear spoiler, and adjust it.



8. Check for water leaks.

   NOTE: Do not squeeze the tip of the hose.

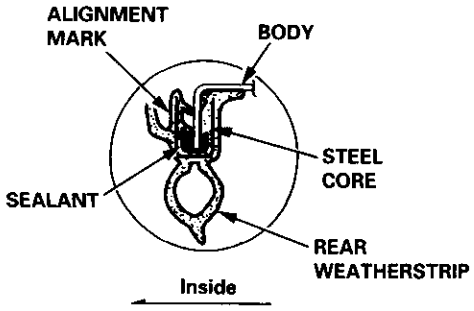
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Rear Weatherstrip Replacement

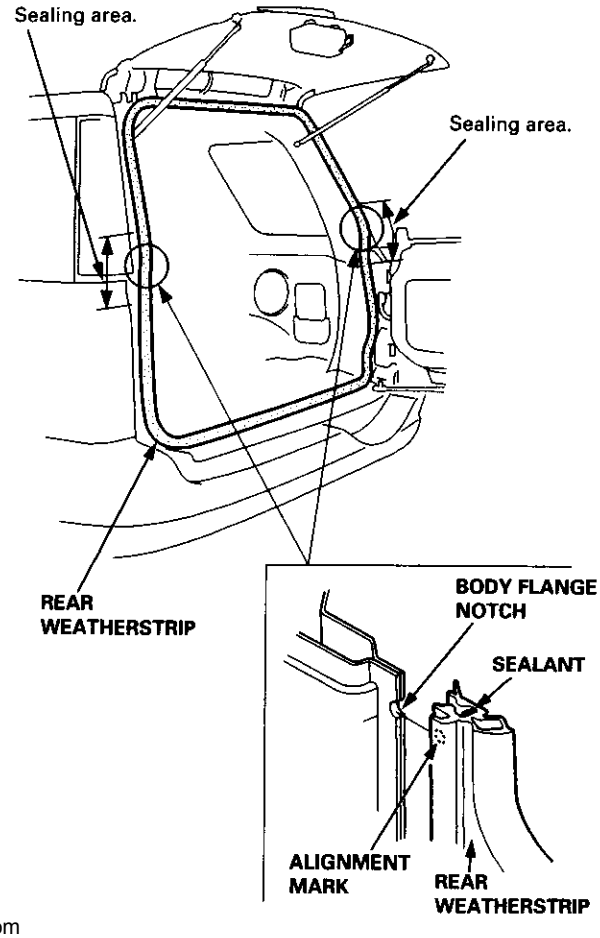
When installing the rear weatherstrip, align the alignment mark of the rear weatherstrip to the body flange notch.

NOTE:
- Make sure there are no wrinkles in the weatherstrip.
- The steel core in the rear weatherstrip cannot be restored to it original shape once it is bend. Replace the rear weatherstrip when the steel core is bent.
- Apply sealant to the areas indicated by arrows.
- Check for water leaks.

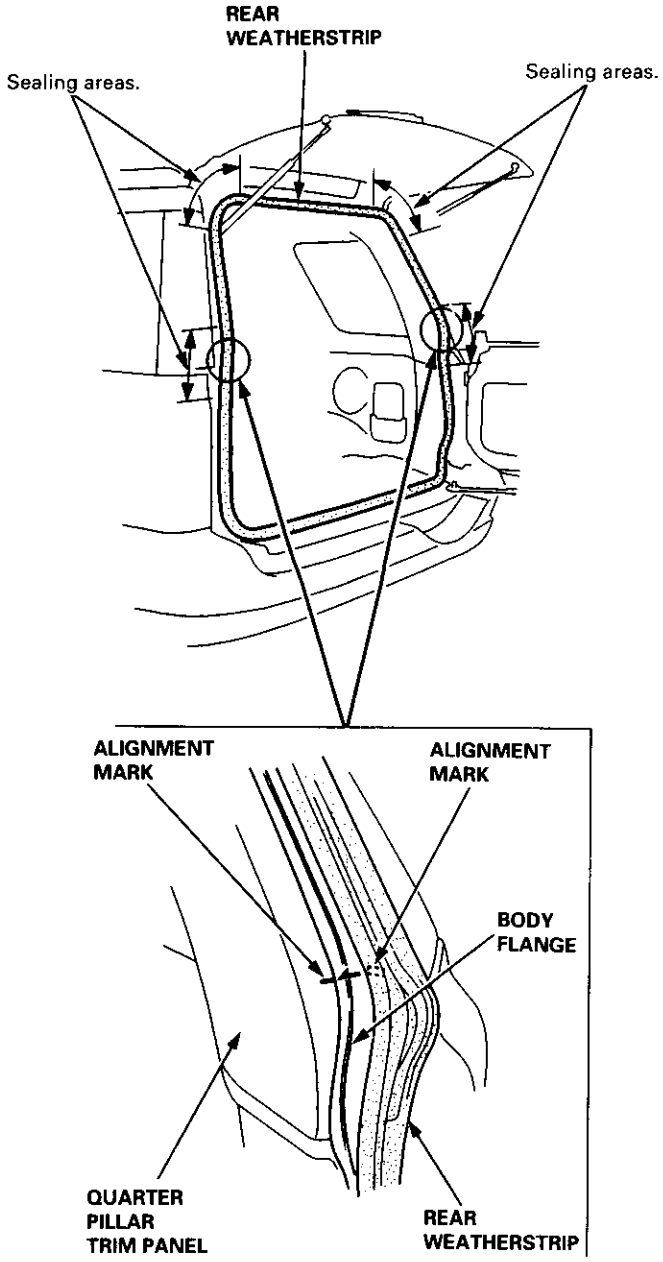
Sealant: Cemedine P/N 08712 – 0004, or equivalent



'97 model:



'98 – 00 models:

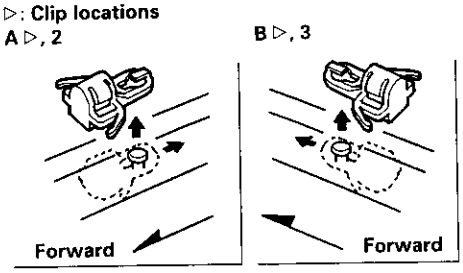


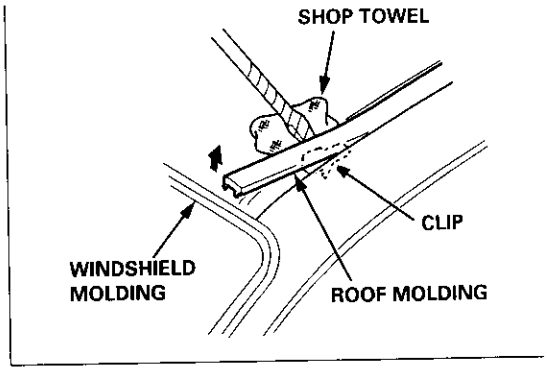
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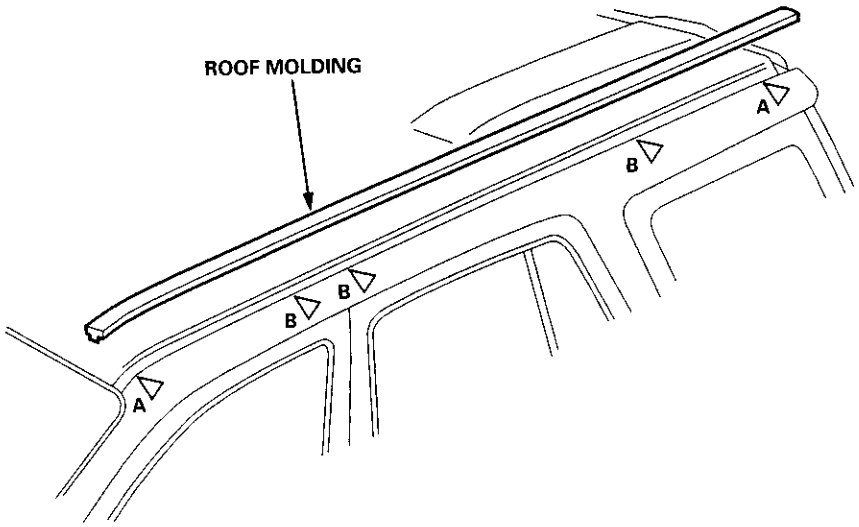
Roof Molding Replacement

CAUTION:
- **Put on gloves to protect your hands.**
- **When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.**

NOTE:
- Take care not to scratch the body.
- The steel core in the roof molding cannot be restored to it original shape once it is bend. Replace the roof molding when the steel core is bent.
- Starting at the front, carefully pry off the roof molding.

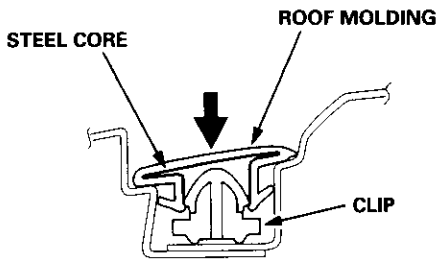






Installation is the reverse of the removal procedure.

NOTE:
- Take care not to damage the windshield molding.
- Make sure the roof molding is installed securely.

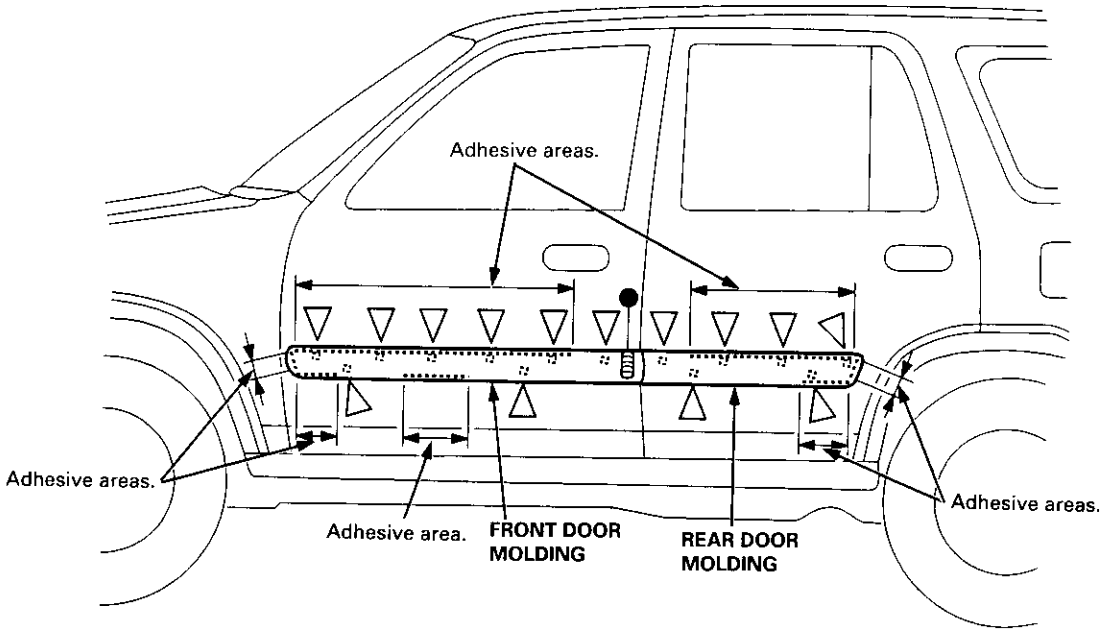


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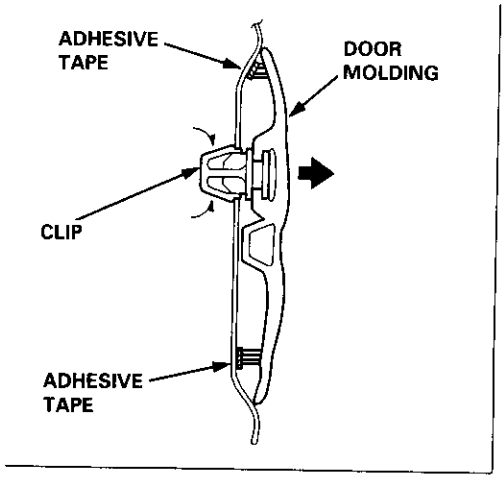
Door Moldings Replacement

CAUTION:
- **Put on gloves to protect your hands.**
- **When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.**

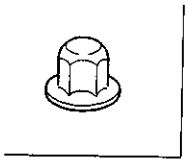
NOTE:
- Take care not to scratch the body.
- Be careful not to damage the front and rear door moldings.



▷: Clip locations, 14



●: Plastic nut location, 1



(cont'd)

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Door Moldings Replacement (cont'd)

If the old molding is to be reinstalled:

The following materials and tools are required to repair the molding.

NOTE: Follow the manufacturer's instructions.

Materials: (Reference)
- Stripe remover
  3M 08907
- Stripe adhesive remover
  3M 08908
- Adhesive tape
  3M Super Automotive Attachment Tape

Tools:
- Protective tape
- Knife or Cutter
- Sponge or Shop towel
- Infrared dryer
- Film
- Plastic putty knife
- Alcohol

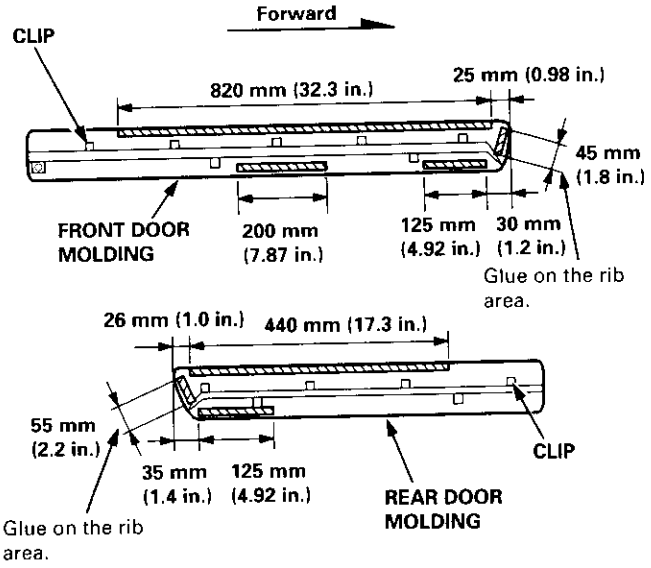
CAUTION: Put on gloves to protect your hands.

1. If necessary, replace any damaged clips on the molding.
2. Apply the stripe remover evenly to the bonding surface of the body and molding.
3. Cover the bonding surface of the body and molding with a film, then heat to 104 – 122°F (40 – 50°C) for 5 – 10 minutes with an infrared dryer.

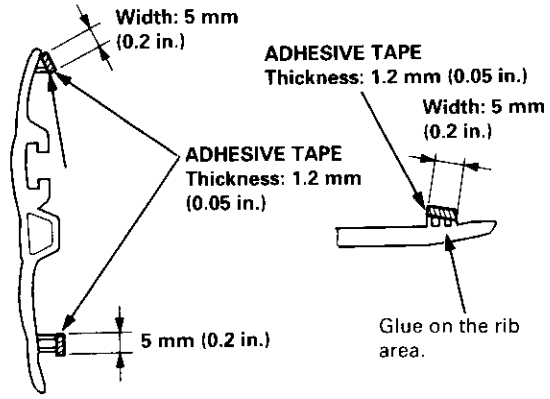
   NOTE: Use care when heating to prevent deformation of the body and molding.
4. Carefully scrape the adhesive tape with a plastic putty knife.
5. For removal of adhesive tape residue, follow-up with stripe adhesive remover, then scrape the adhesive tape with a plastic putty knife.
6. Remove the protective tape, then clean the bonding surface with a sponge dampened in alcohol.

   NOTE: Make sure the bonding surface is kept free or water, oil and grease.
7. Glue the new adhesive tape to the moldings as shown.

: Adhesive tape locations



〈Front/rear end〉



8. Heat the bonding surface of the door and molding with an infrared dryer.
   Door: 104 – 140°F (40 – 60°C)
   Molding: 68 – 86°F (20 – 30°C)

   NOTE: Use care when heating to prevent deformation of the molding.
9. Align the molding with the clip locations, and set the molding. Lightly push on the molding until its edge is fully seated on the adhesive tape.

   NOTE: Do not spray water on the molding within the first 24 hours after installation.
10. Reassemble all removed parts.

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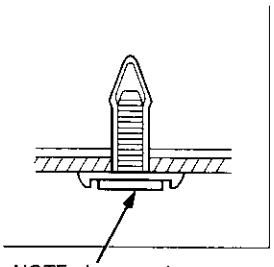
Side Sill Panel

Replacement

NOTE: Take care not to scratch the body.

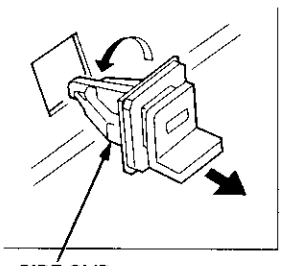
▷: **Clip locations**

A ▷, 7



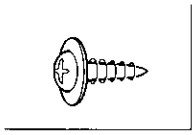
NOTE: Loosen the screw, then remove the lower clip using a clip remover.

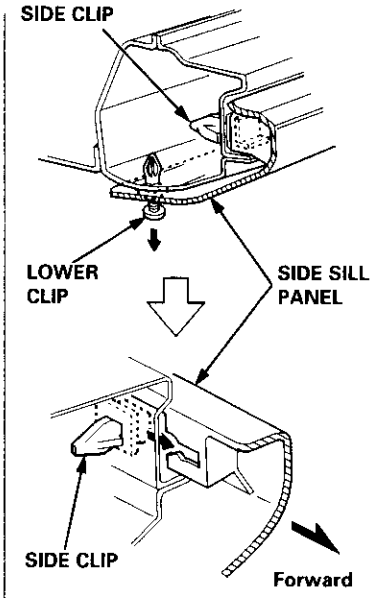
B ▷, 7



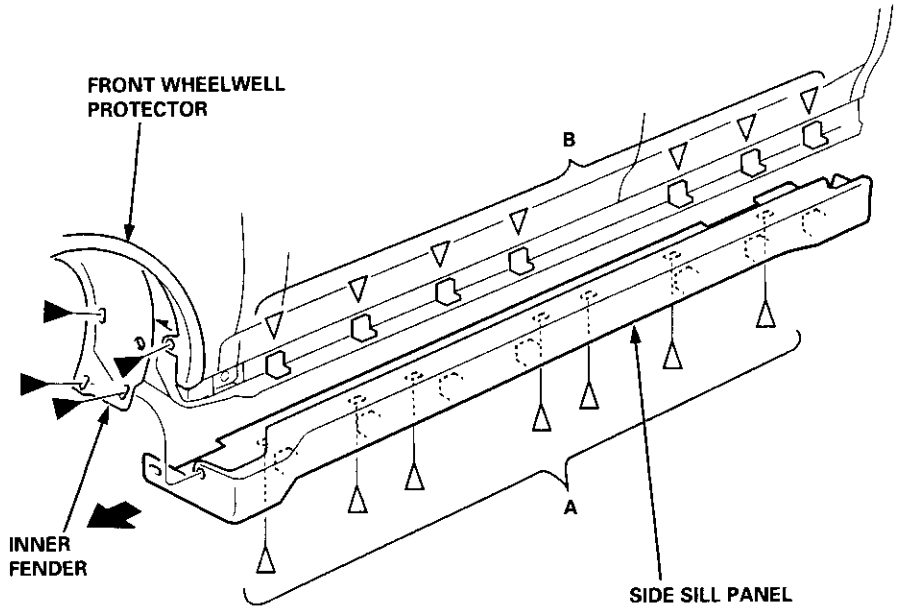
SIDE CLIP
Remove the side clips from the body by turning them 45°

▶: **Screw locations, 4**





NOTE: When removing the side sill panel, the side clips will stay in the body.



SIDE SILL PANEL
Remove the lower clips, then remove the side sill panel by sliding it forward.

To install the side sill panel, remove the side clips from the body, install them on the side sill panel, then install the side sill panel on the vehicle.

NOTE:
- Take care not to twist the side sill panel.
- If necessary, replace any damaged clips.

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Spare Tire Cover

Emblem Installation

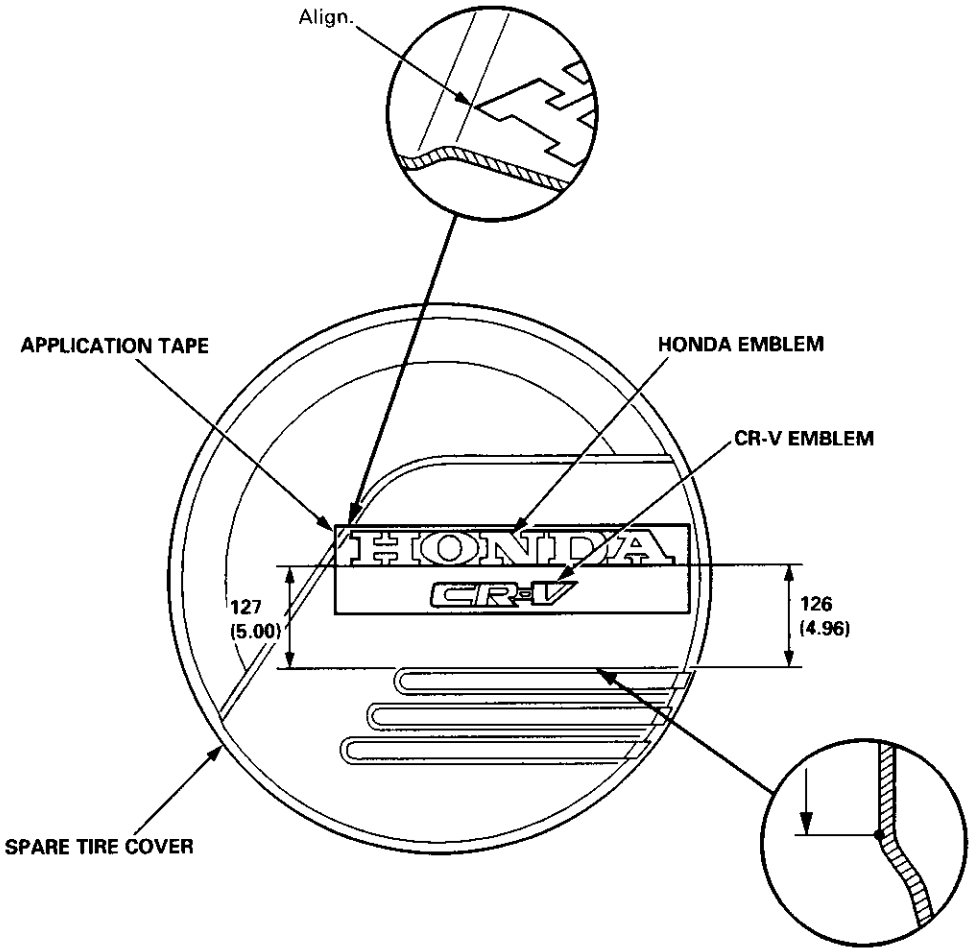
Hard spare tire cover (for some models):

Apply the emblem where shown.

NOTE:
- Before applying, clean the spare tire cover surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.

Attachment Point (Reference):
Unit: mm (in.)

Honda/CR-V emblem:

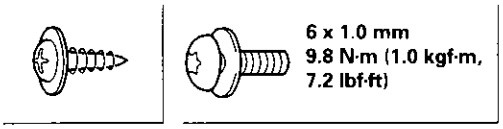


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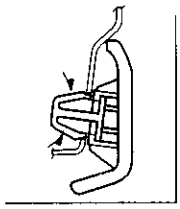
Front Wheelwell Protector Replacement

NOTE:
- Take care not to scratch the front wheelwell protector and body.
- Use a T30 Torx bit to remove the Torx screw.

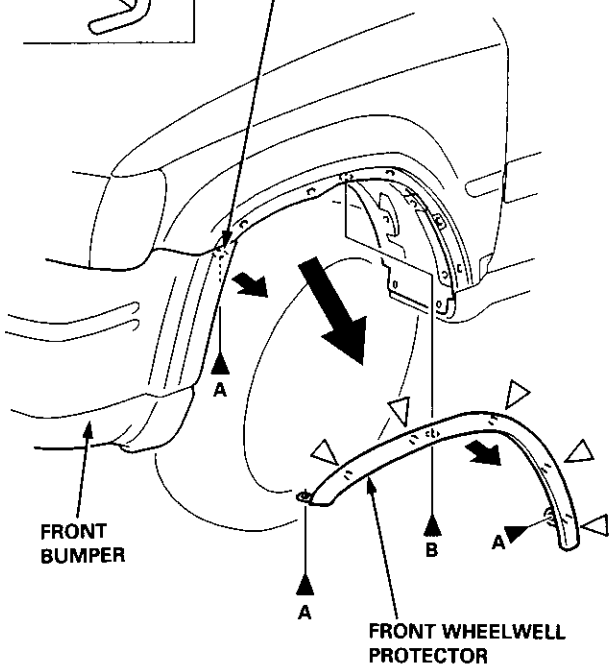
▶: Screw locations
A ▶, 3 B ▶, 1



▷: Clip locations, 5



NOTE: Before removing the front wheelwell protector, remove the screw from the front bumper and lower the front bumper.



Installation is the reverse of the removal procedure.

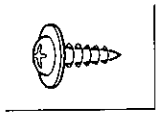
NOTE: If necessary, replace any damaged clips.

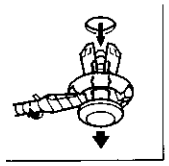
Inner Fender Replacement

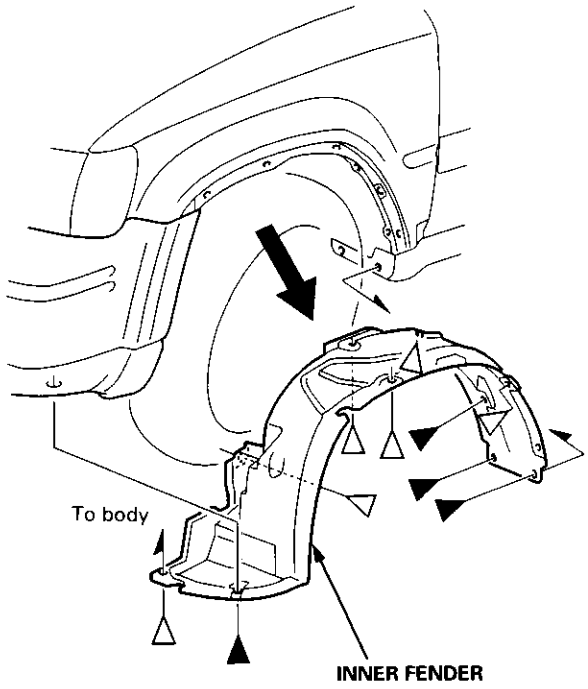
NOTE: Take care not to scratch the body.

Remove the front wheelwell protector.

▶: Screw locations, 4 **▷: Clip locations, 6**







Installation is the reverse of the removal procedure.

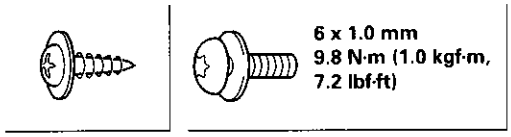
NOTE: If necessary, replace any damaged clips.

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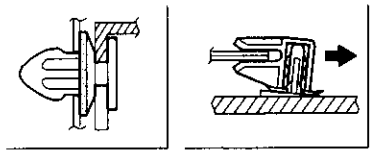
Rear Wheelwell Protector Replacement

NOTE:
- Take care not to scratch the rear wheelwell protector and body.
- Use a T30 Torx bit to remove the Torx screw.

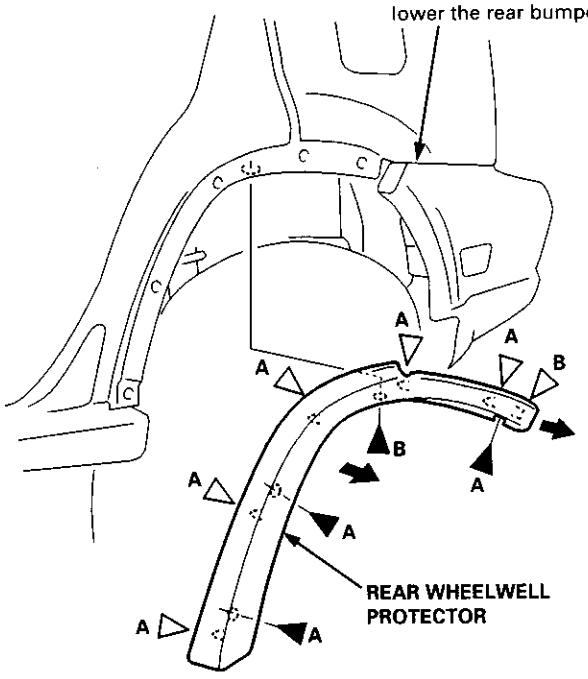
▶: Screw locations
A ▶, 3 **B ▶, 1**



▷: Clip locations
A ▷, 5 **B ▷, 1**



NOTE: Before removing the clip, remove the screw from the rear bumper and lower the rear bumper.



Installation is the reverse of the removal procedure.

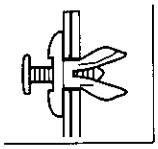
NOTE: If necessary, replace any damaged clips.

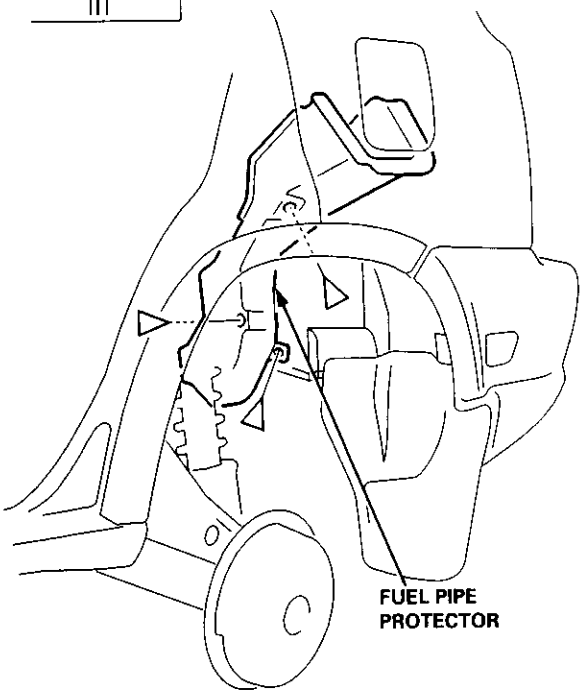
Fuel Pipe Protector Replacement

NOTE: Take care not to scratch the body.

Remove the rear wheel (see section 18).

▷: Clip locations, 3





Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

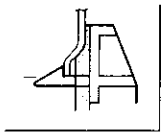
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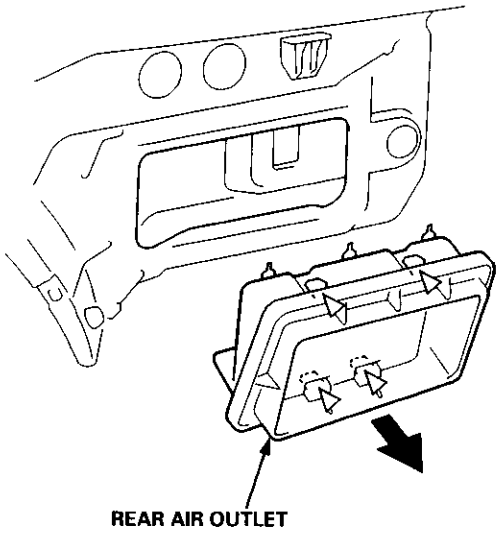
Rear Air Outlet Replacement

NOTE: Take care not to scratch the body.

Remove the rear bumper (see page 20-74).

▷: **Clip locations, 4**



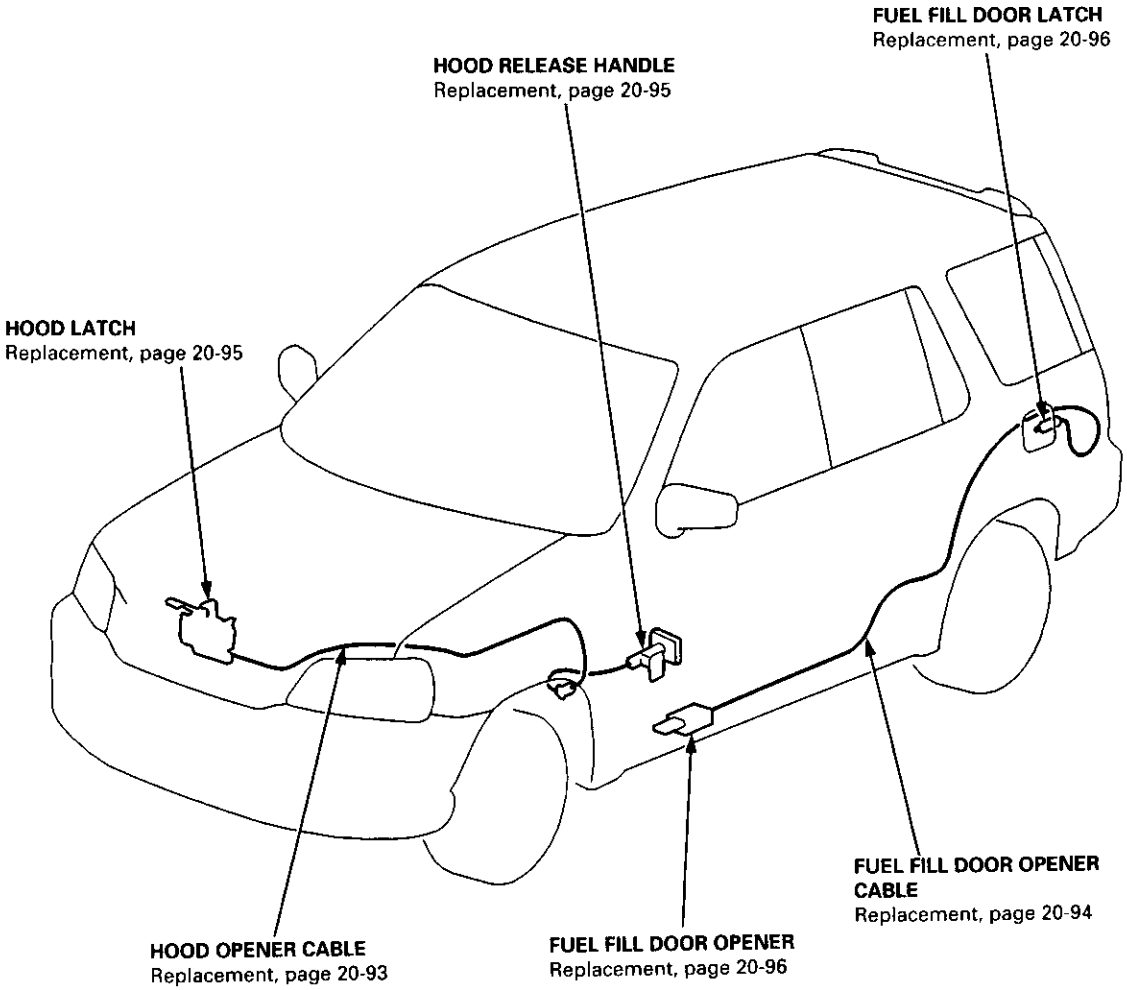


Installation is the reverse of the removal procedure.

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Openers

Component Location Index



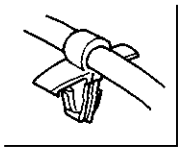
www.emanualpro.com

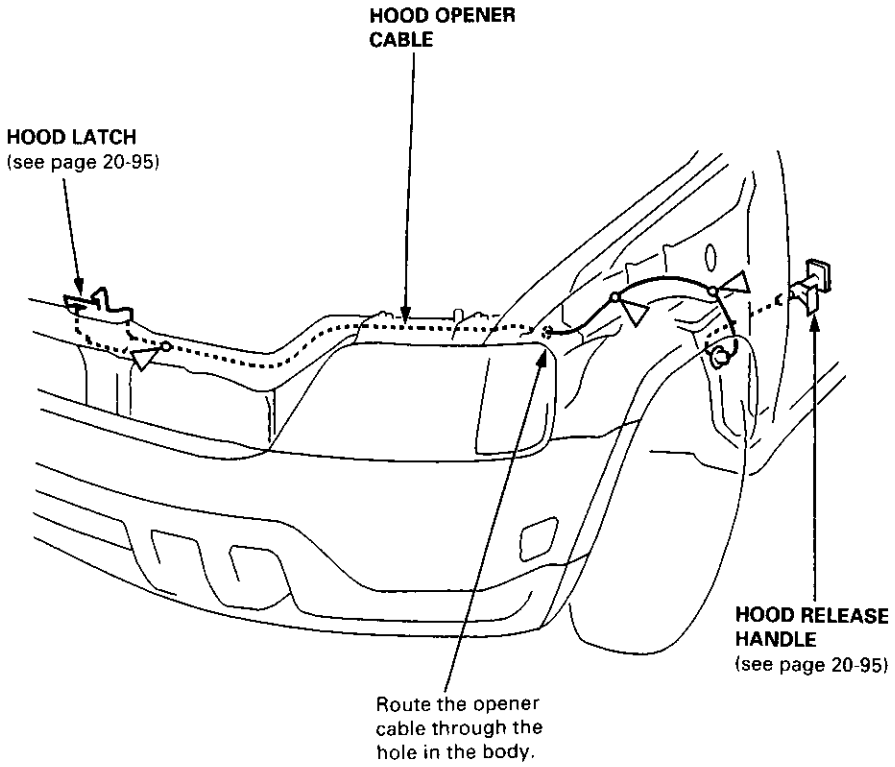
Hood Opener Cable Replacement

NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the opener cable.

Remove:
- Front wheelwell protector and inner fender (left side, see page 20-89)
- Front grille (see page 20-77)
- Kick panel (left side, see page 20-41)

▷: **Clip locations, 3**





Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Make sure the hood opener cable is routed and connected properly.
- Make sure the hood opens properly.

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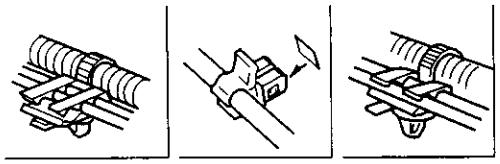
Fuel Fill Door Opener Cable Replacement

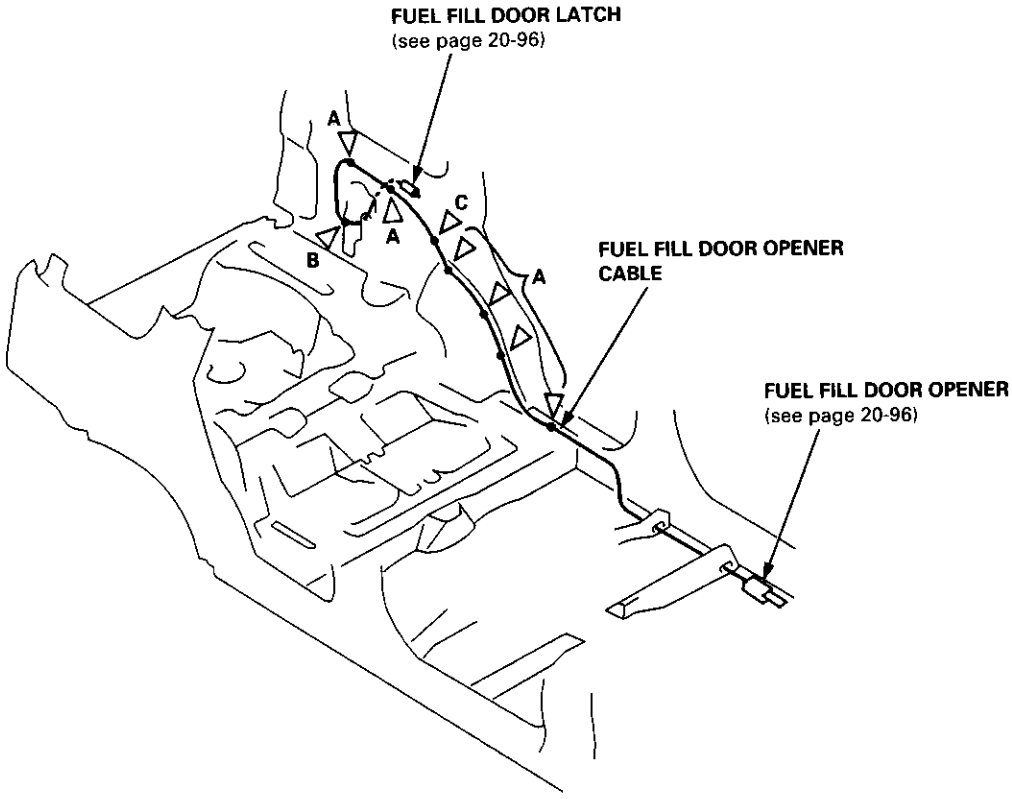
NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the opener cable.

Remove the following parts, then pull the carpet back, as necessary (see page 20-45).

- Kick panel (left side, see page 20-41)
- Center pillar lower trim panel (left side, see page 20-41)
- Front side trim (left side, see page 20-41)
- Rear seat (left side, see page 20-63)
- Cargo area floor and cargo storage bin (see page 20-43)
- Rear trim panel (see page 20-42)
- Rear side trim panel (left side, see page 20-42)
- Rear side trim (left side, see page 20-41)

▷: **Clip locations**
A▷, 6 **B▷, 1** **C▷, 1**





Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Make sure fuel fill door opener cable is routed and connected properly.
- Make sure the fuel fill door opens properly.

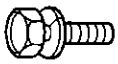
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Hood Release Handle Replacement

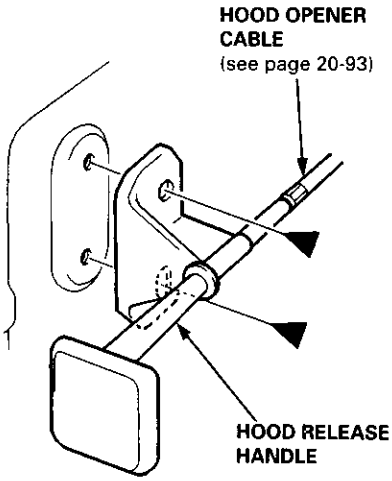
NOTE: Take care not to bend the opener cable.

Remove the left kick panel (see pages 20-41).

▶: Bolt locations, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



Installation is the reverse of the removal procedure.

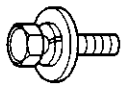
NOTE: Make sure the hood opens properly.

Hood Latch Replacement

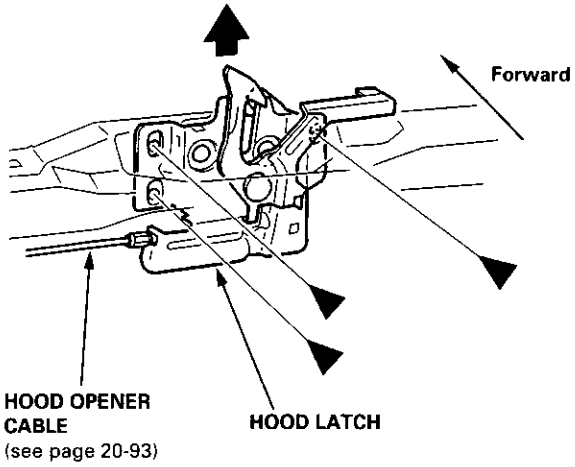
NOTE: Take care not to bend the opener cable.

Remove the front grille (see page 20-77).

▶: Bolt locations, 3



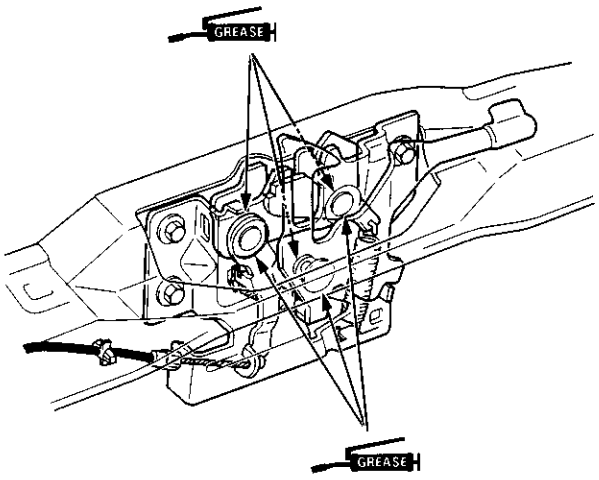
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



Installation is the reverse of the removal procedure.

NOTE:

- Grease each location of the hood latch as indicated by the arrows.
- Make sure the opener cable is connected properly.
- Make sure the hood locks properly.
- Adjust the hood latch alignment (see page 20-76).



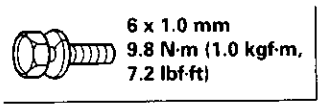
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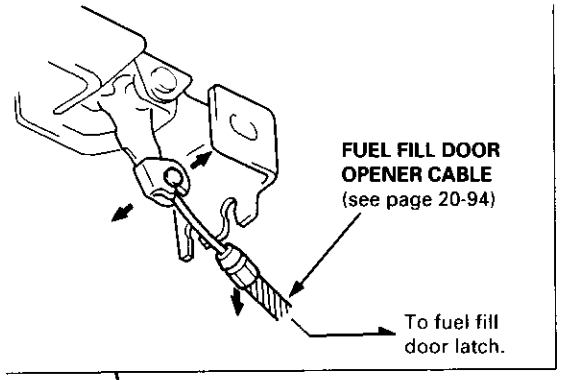
Fuel Fill Door Opener Replacement

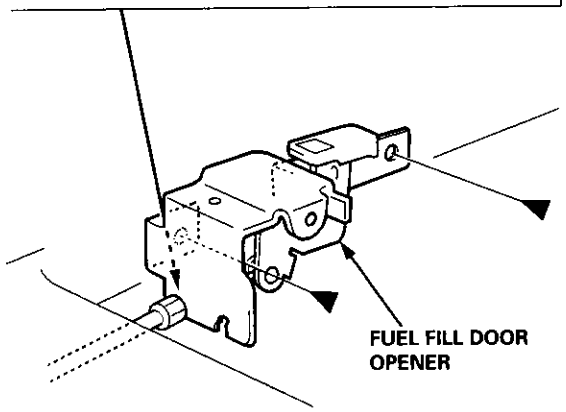
NOTE: Take care not to bend the opener cable.

Remove the left front side trim (see page 20-41).

►: Bolt locations, 2







Installation is the reverse of the removal procedure.

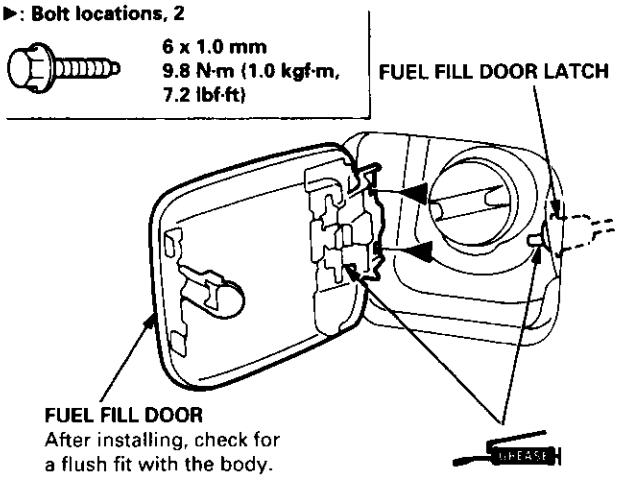
NOTE:
- Make sure the opener cable is connected properly.
- Make sure the fuel fill door opens properly.

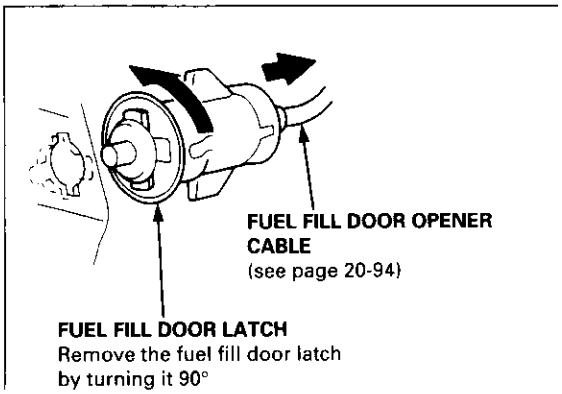
Fuel Fill Door Latch Replacement

NOTE: Take care not to bend the opener cable.

Remove the rear speaker cover and rear speaker from the left rear side trim panel (see page 20-42).

►: Bolt locations, 2



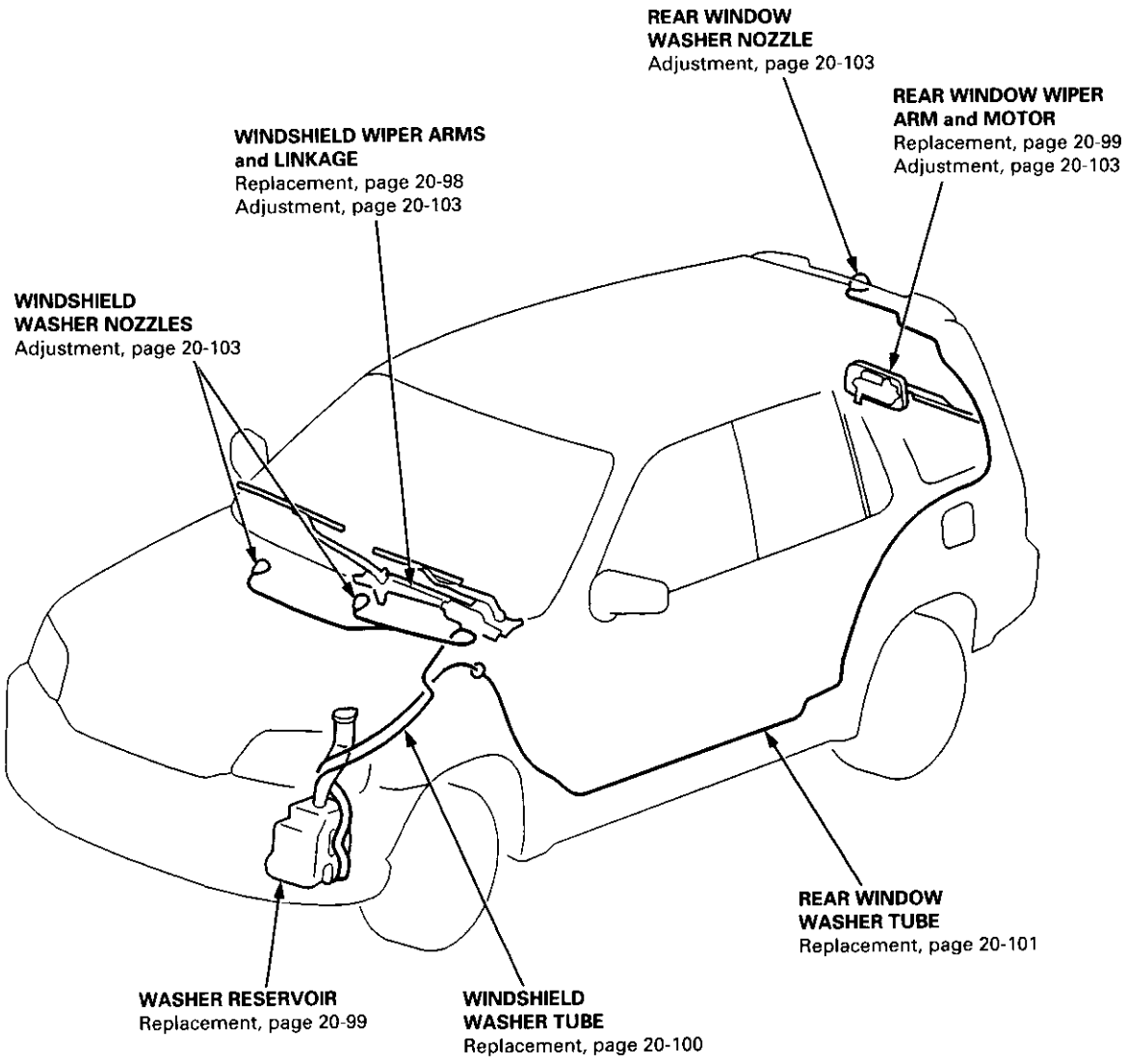


Installation is the reverse of the removal procedure.

NOTE: Make sure the fuel fill door opens properly and locks securely.

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Windshield Wiper Arms and Linkage Replacement

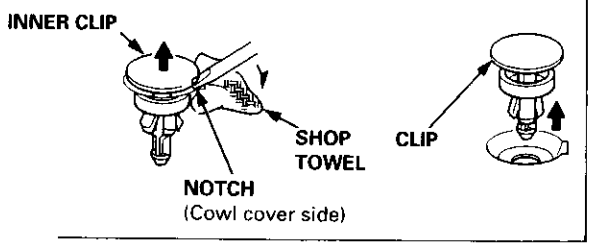
CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to scratch the hood and body.

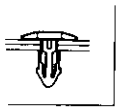
1. Remove the windshield wiper arms.
2. Remove the clips, then remove the cowl cover.

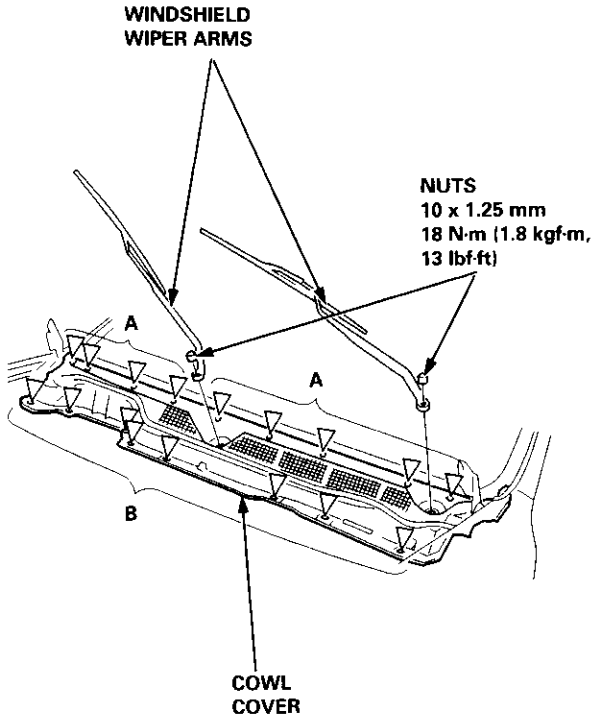
▷: **Clip locations**
A ▷, 9

a. Pry out the inner clip. b. Remove the clip.



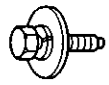
B ▷, 8

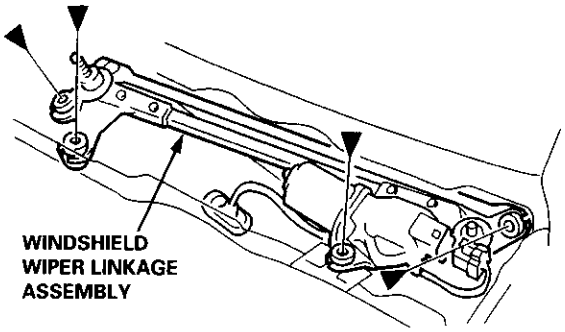




3. Disconnect the connector, remove the bolts, then remove the windshield wiper linkage assembly.

►: Bolt locations, 3

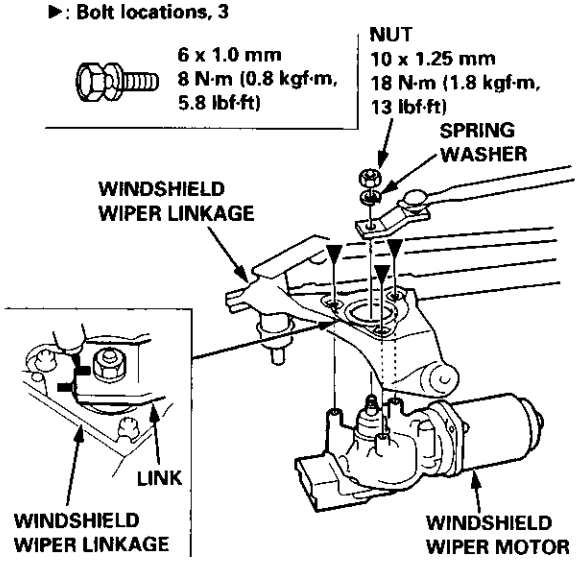




4. Separate the windshield wiper linkage and windshield wiper motor.

NOTE: Scribe a line across the link and windshield wiper linkage to show the original adjustment.

►: Bolt locations, 3



5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connector is connected properly.
- If necessary, replace any damaged clips.
- Install the windshield wiper arms as described on page 20-103.
- Check the windshield wiper motor operation.
- Grease the moving parts.

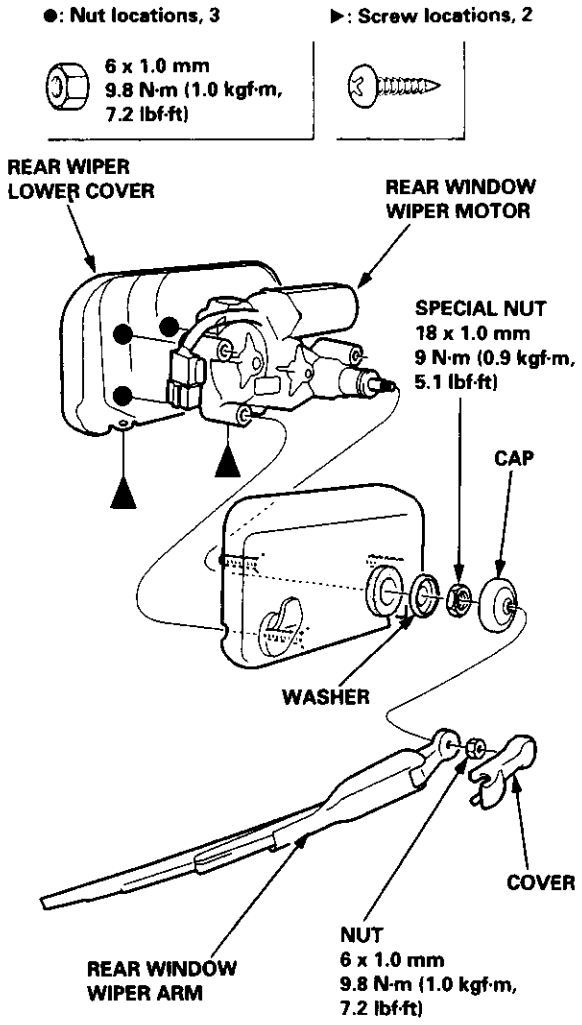
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Rear Window Wiper Arm and Motor Replacement

CAUTION: Put on gloves to protect your hands.

NOTE: Take care not to damage the rear hatch glass.

1. Remove the rear window wiper arm.



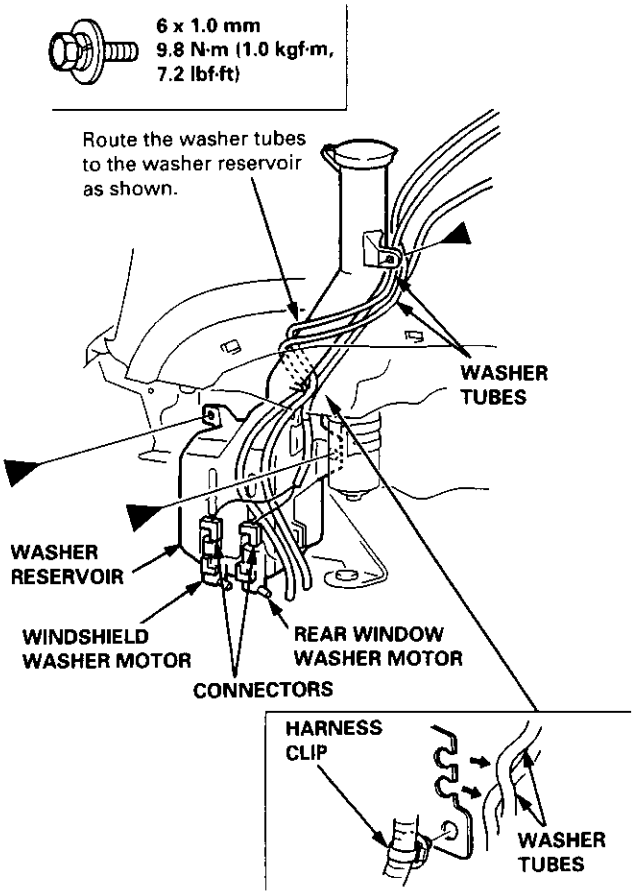
2. Remove the rear wiper lower cover.
3. Disconnect the connector, then remove the rear window wiper motor.
4. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connector is connected properly.
- Install the rear window wiper arm as described on page 20-103.
- Check the rear window wiper motor operation.
- Grease the moving parts.

Washer Reservoir Replacement

CAUTION: Put on gloves to protect your hands.

1. Remove:
   - Front grille (see page 20-77)
   - Front bumper (see page 20-72)
   - Front wheel (left side, see section 18)
   - Front wheelwell protector (left side, see page 20-89)
   - Inner fender (left side, see page 20-89)
   - Headlight (left side, see section 23)
2. Disconnect the washer tubes and washer motor connectors.



3. Remove the bolts, then remove the washer reservoir.
4. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the washer motor connectors and washer tubes are connected properly.
- Check the washer motor operation.

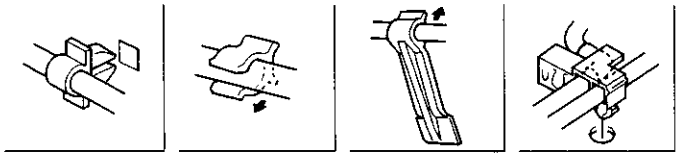
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Windshield Washer Tube Replacement

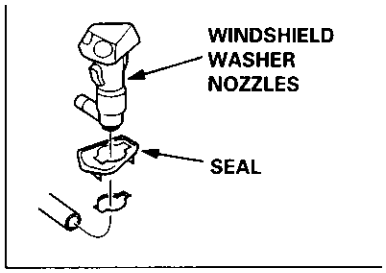
NOTE:
- Take care not to scratch the related parts and body.
- When removing the clips, use a clip remover.

Remove the following parts.
- Left front wheelwell protector (see page 20-89)
- Left inner fender (see page 20-89)

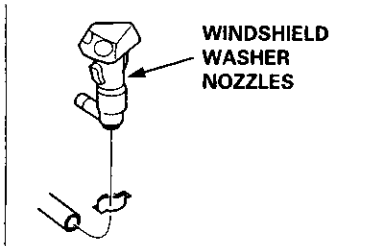
▷: Clip locations
A ▷, 2 B ▷, 1 C ▷, 1 D ▷, 1

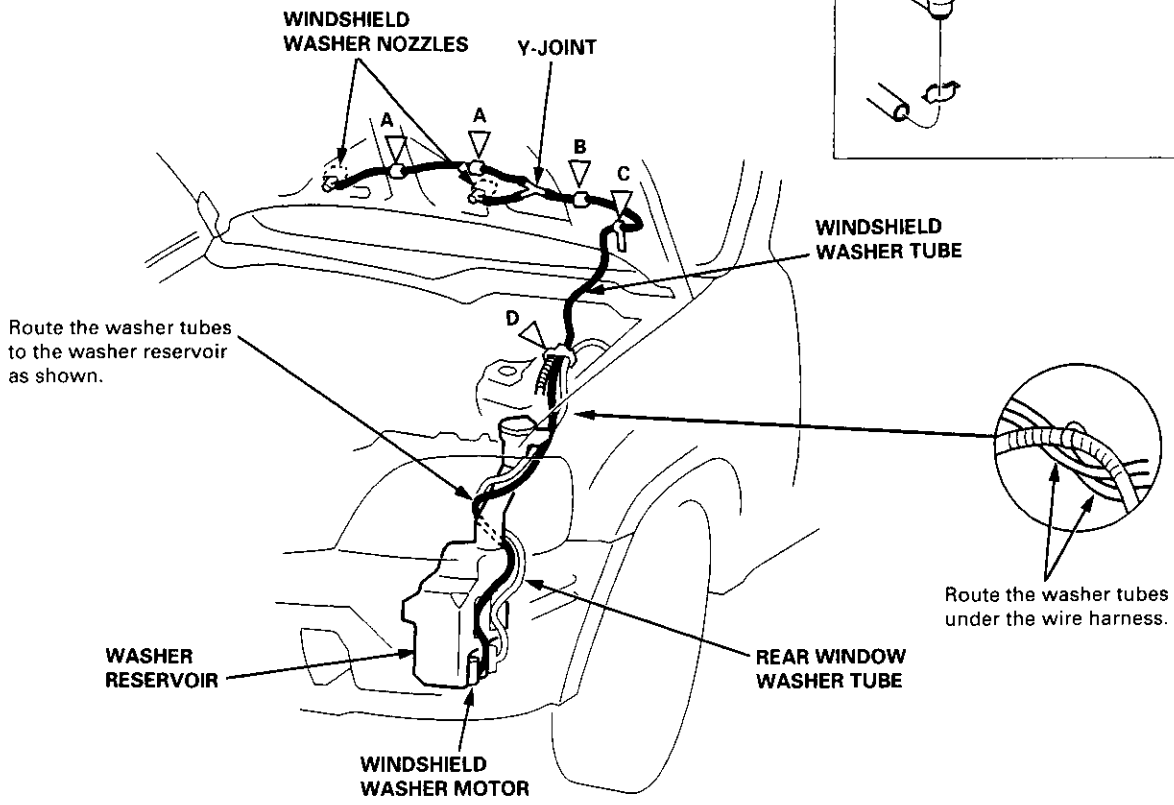


'97 model:



'98 – 00 models:





Installation is the reverse of the removal procedure.

NOTE:
- Take care not to pinch the washer tubes.
- If necessary, replace any damaged clips.
- After installing, adjust the aim of the washer nozzles (see page 20-103).

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Rear Window Washer Tube Replacement

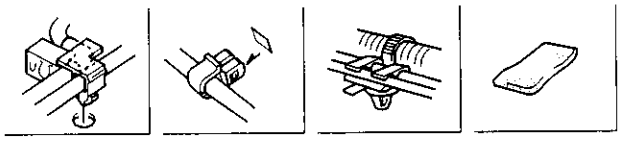
NOTE:
- Take care not to scratch the related parts and body.
- When removing the clips, use a clip remover.

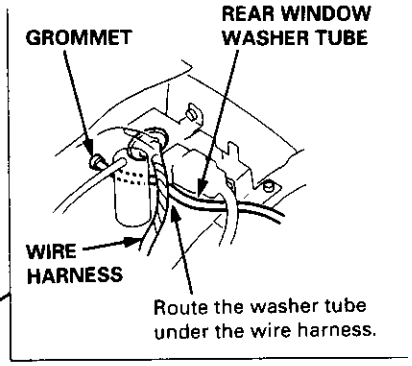
Remove the following parts from the left side of the vehicle, then pull the carpet back as necessary (see page 20-45).

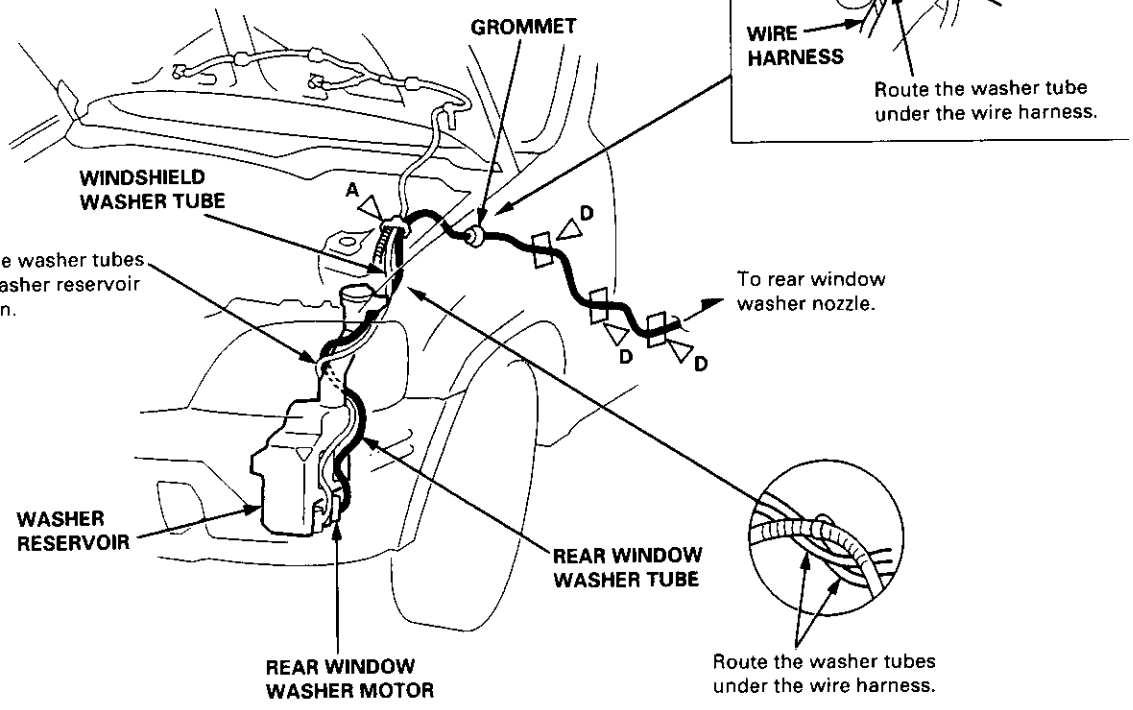
- Front wheelwell protector (see page 20-89)
- Inner fender (see page 20-89)
- Kick panel (see page 20-41)
- Center pillar lower trim panel (see page 20-41)
- Front side trim (see page 20-41)
- Rear seat (see page 20-63)
- Cargo area floor and cargo storage bin (see page 20-43)
- Rear trim panel and rear side trim panel (see page 20-42)
- Rear side trim (see page 20-41)
- Rear hatch glass support strut (body side, see page 20-78)
- Quarter pillar trim panel (see page 20-42)
- Cargo area light (see section 23)
- Headliner (rear edge, see page 20-44)

▷: **Clip, harness cushion locations**

A ▷, 1 **B ▷, 1** **C ▷, 3** **D ▷, 12**



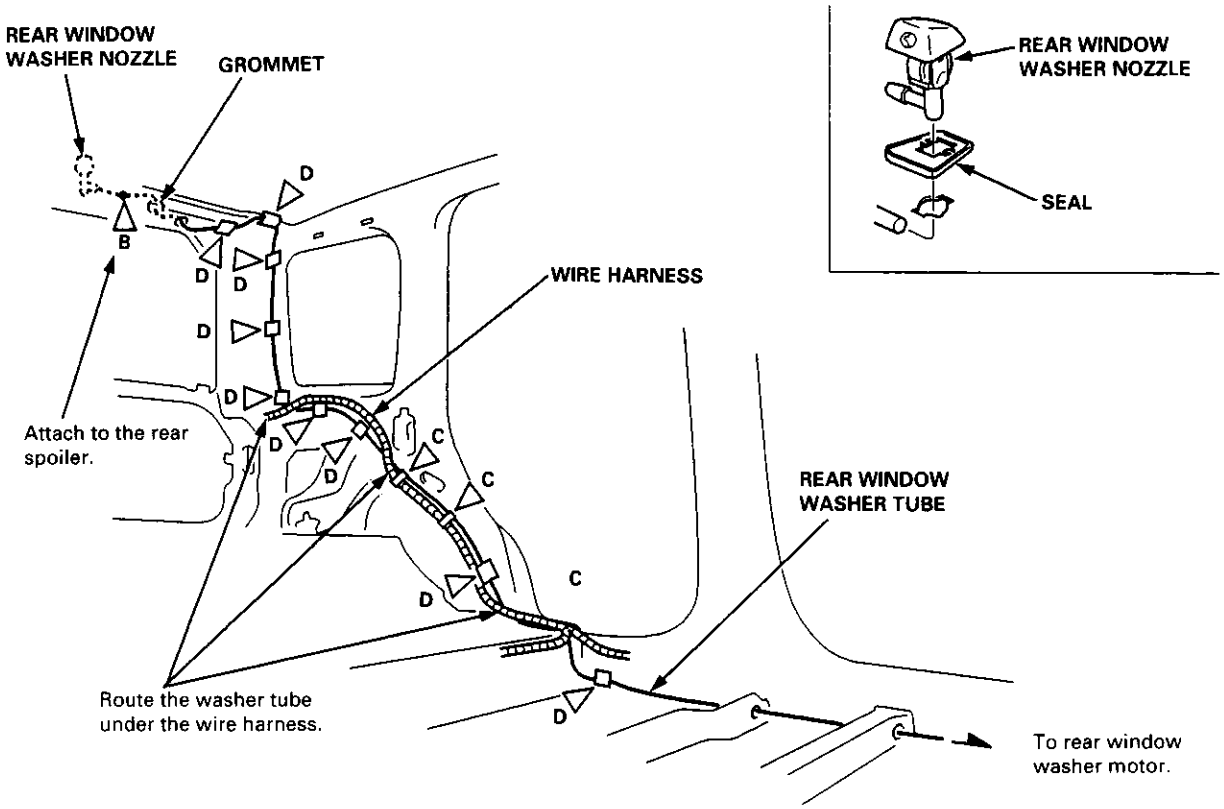




(cont'd)

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Rear Window Washer Tube Replacement (cont'd)



Installation is the reverse of the removal procedure.

NOTE:

- Take care not to pinch the washer tubes.
- If necessary, replace any damaged clips.
- After installing, adjust the aim of the washer nozzle (see page 20-103).

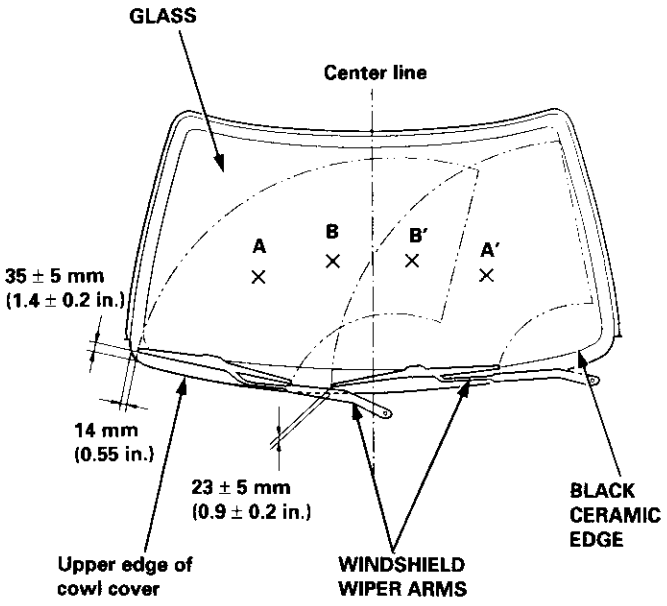
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Wiper Arms and Washer Nozzles Adjustment

Windshield Wiper/Washer:

1. Adjust the wiper arms so that their park positions match the illustration.

View from front to rear



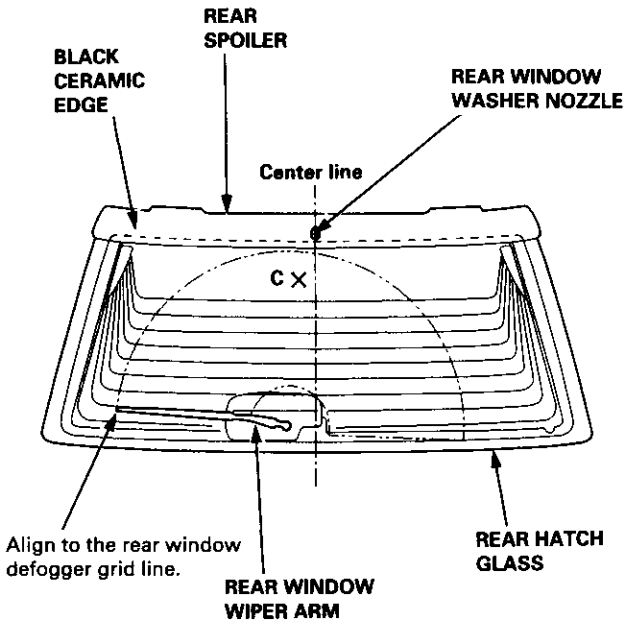
2. Insert a tack into the washer nozzles, and adjust them so that they aim at positions A, A', B, and B' shown in the illustration.

Distance / Nozzle aim	from center line	from black ceramic edge
A and A'	343 mm (13.5 in.)	287 mm (11.3 in.)
B and B'	122 mm (4.80 in.)	352 mm (13.9 in.)

Rear Window Wiper/Washer:

Distance / Nozzle aim	from center line	from black ceramic edge
C	27 mm (1.1 in.)	88 mm (3.5 in.)

View from rear to front

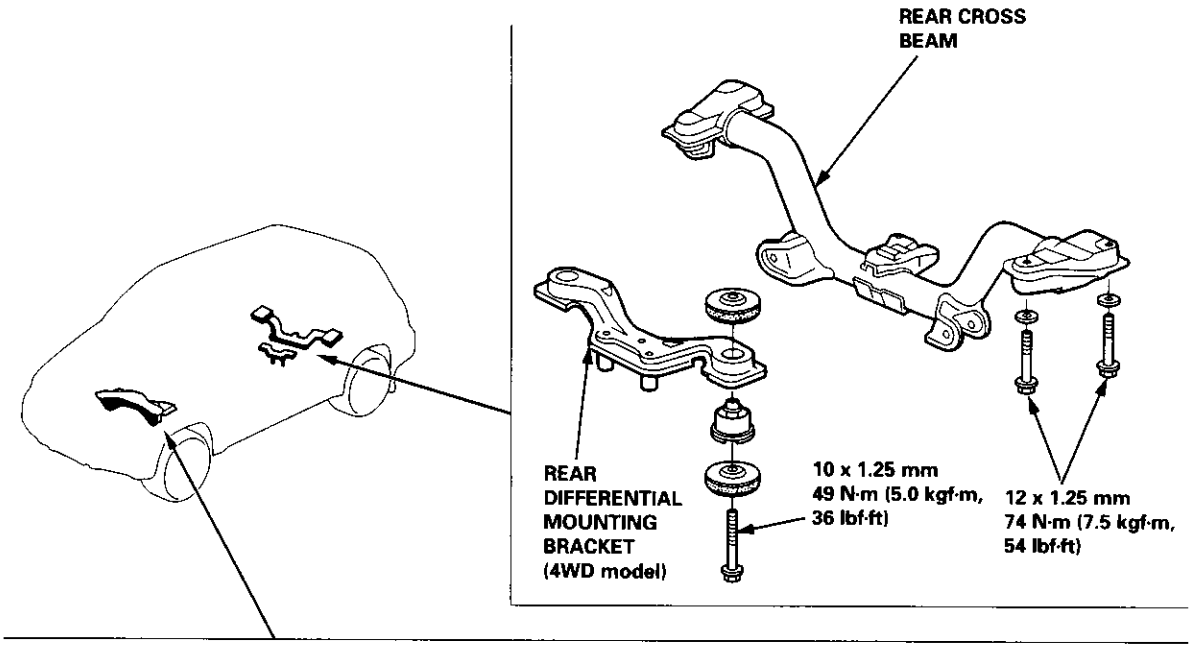


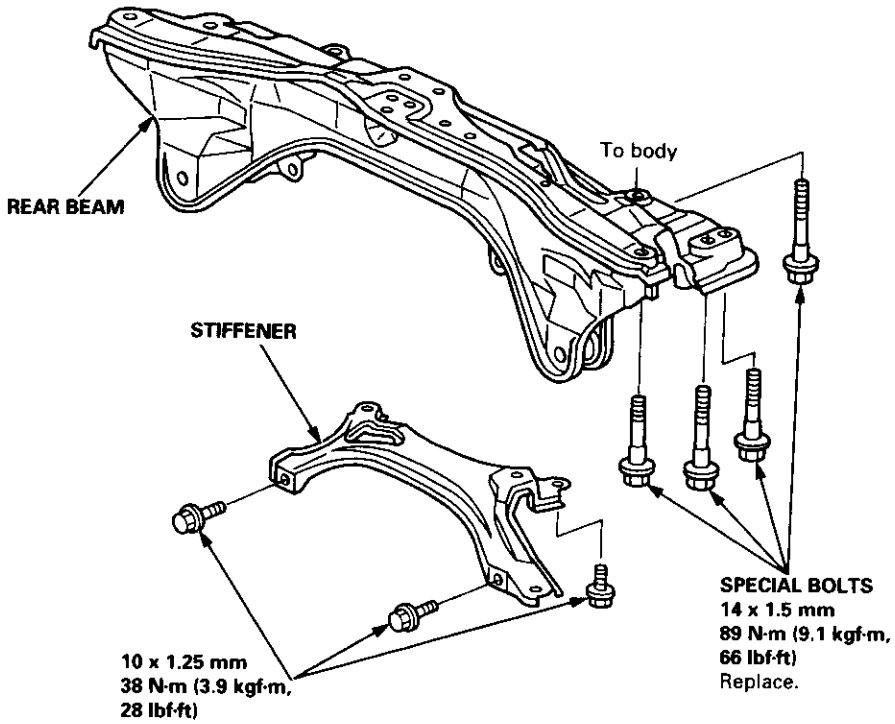
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Sub-frame

Sub-frame Torque Sequence:

CAUTION: After loosening the sub-frame mounting bolts, be sure to replace them with new ones.



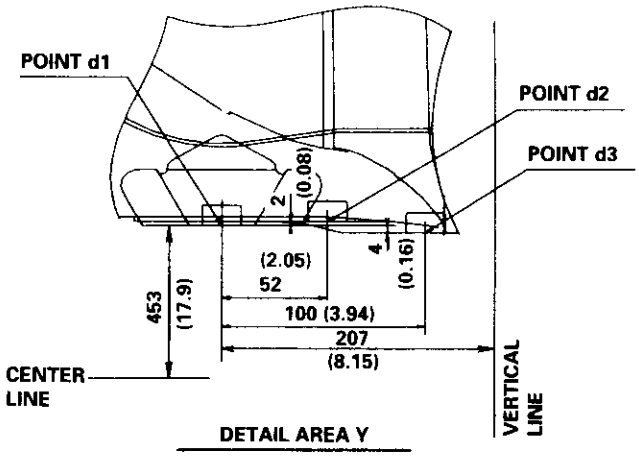


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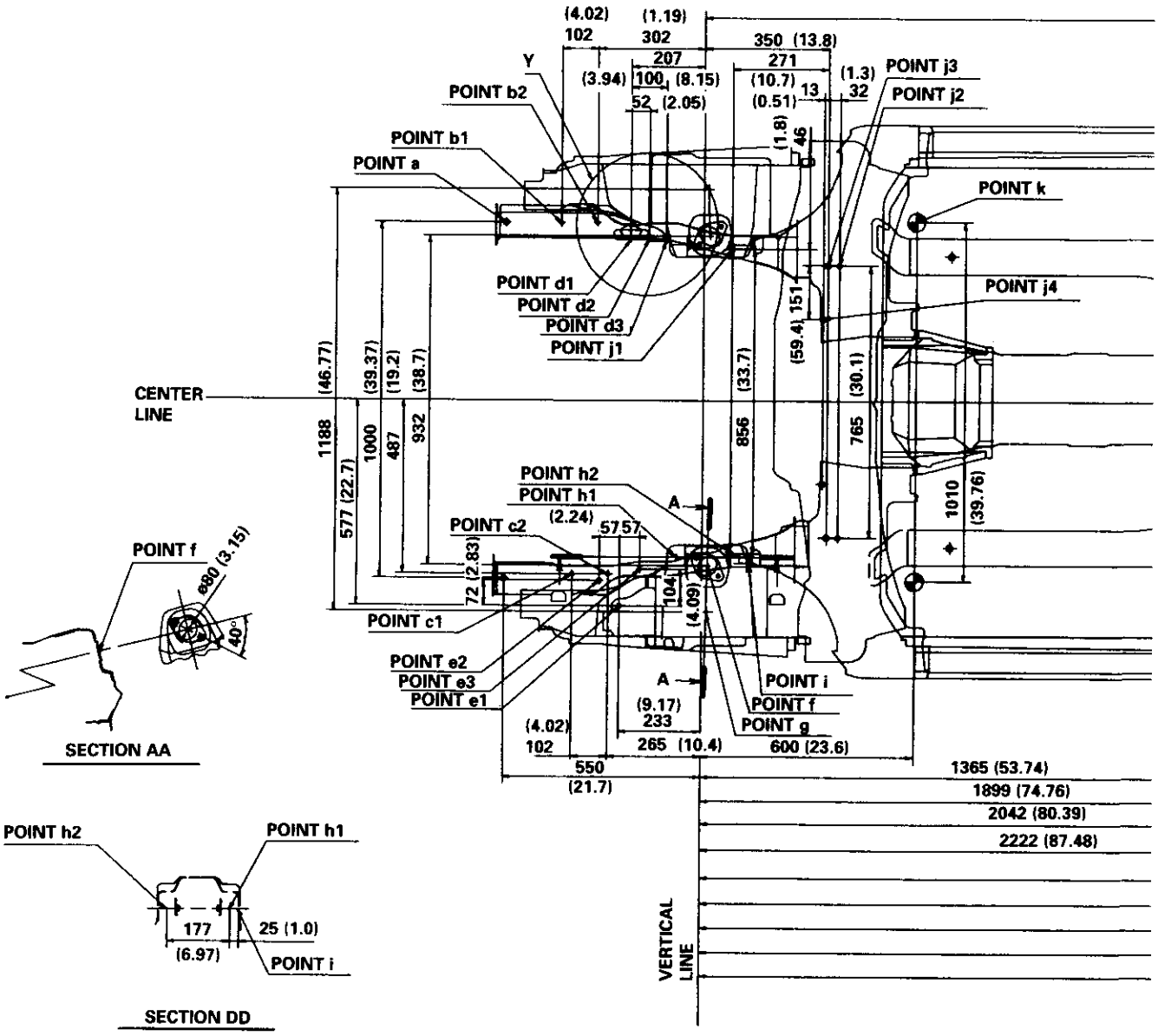
Frame Repair Chart

Top view:

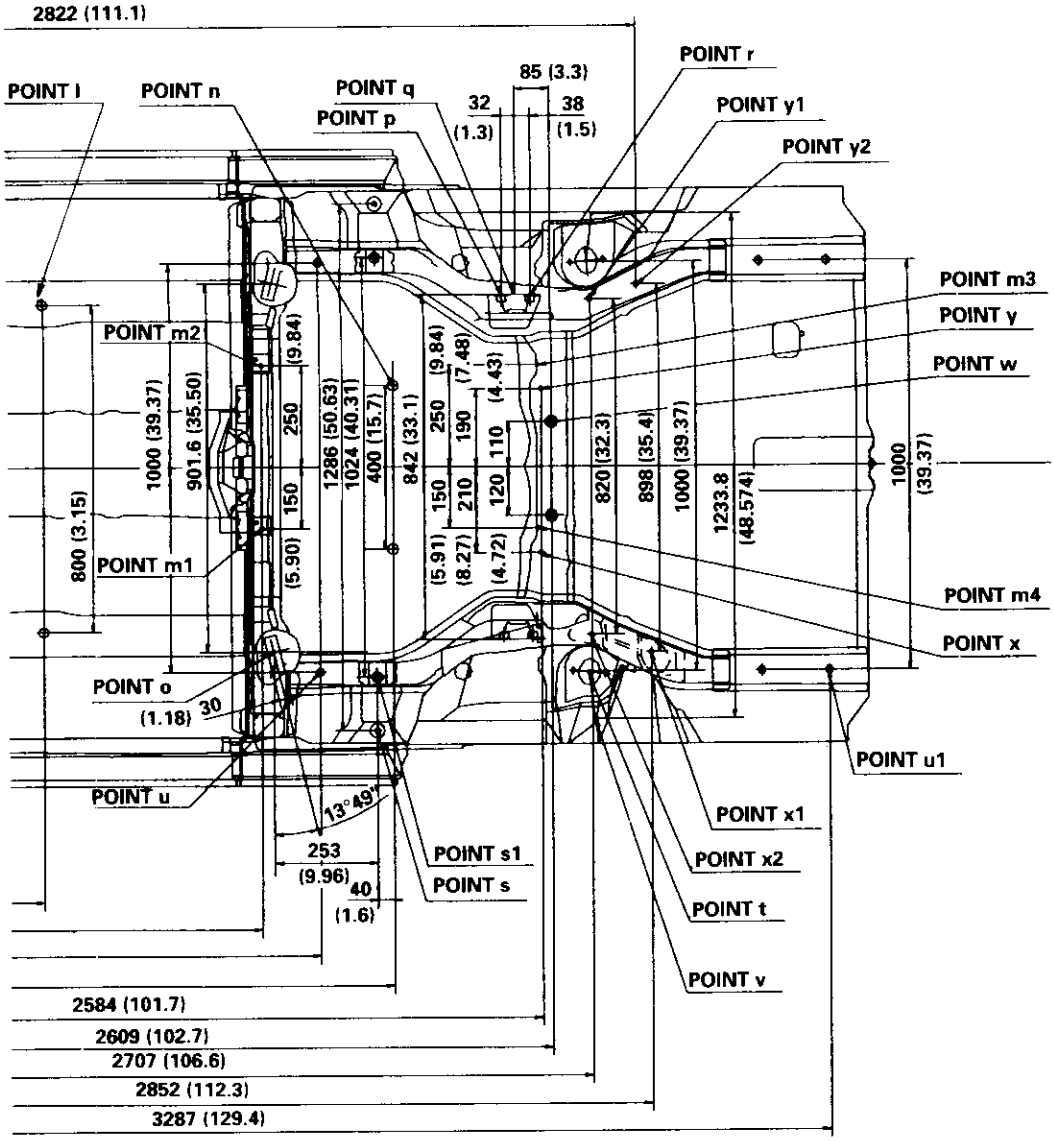
Unit: mm (in.)
ø: Inner diameter



DETAIL AREA Y



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2822 (111.1)
POINT l
POINT n
POINT q
POINT p
32
(1.3)
85 (3.3)
38
(1.5)
POINT r
POINT y1
POINT y2
POINT m3
POINT y
POINT w
POINT m2
1000 (39.37)
901.6 (35.50)
800 (3.15)
POINT m1
(9.84)
250
150
(5.90)
1286 (50.63)
1024 (40.31)
400 (15.7)
842 (33.1)
(9.84)
250
150
(5.91)
(7.48)
190
210
(8.27)
(4.43)
110
120
(4.72)
820 (32.3)
898 (35.4)
1000 (39.37)
1233.8
(48.574)
1000
(39.37)
POINT m4
POINT x
POINT o
(1.18)
30
POINT u
13° 49'
253
(9.96)
40
(1.6)
POINT s1
POINT s
POINT u1
POINT x1
POINT x2
POINT t
POINT v
2584 (101.7)
2609 (102.7)
2707 (106.6)
2852 (112.3)
3287 (129.4)

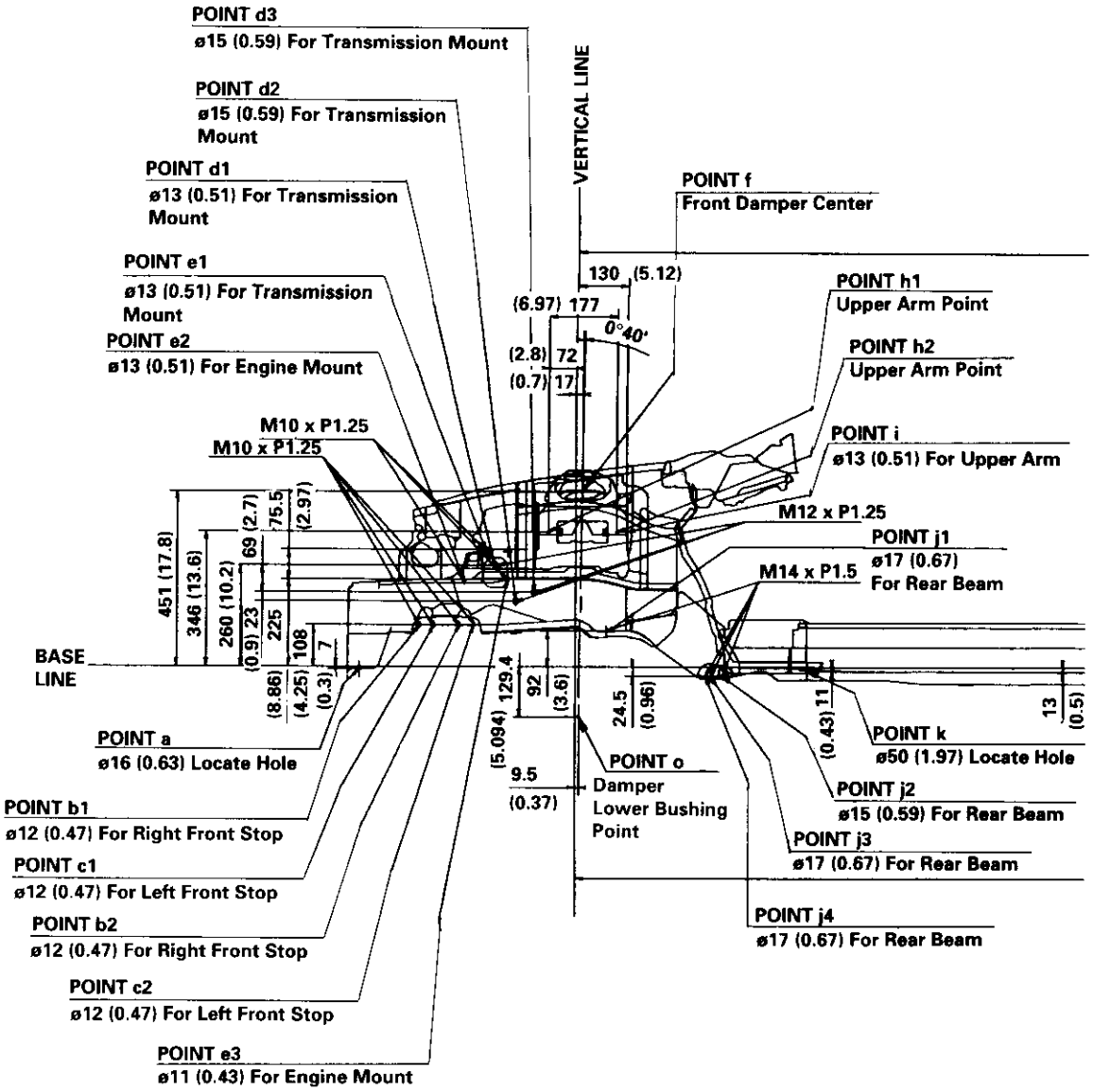
(cont'd)

Frame Repair Chart

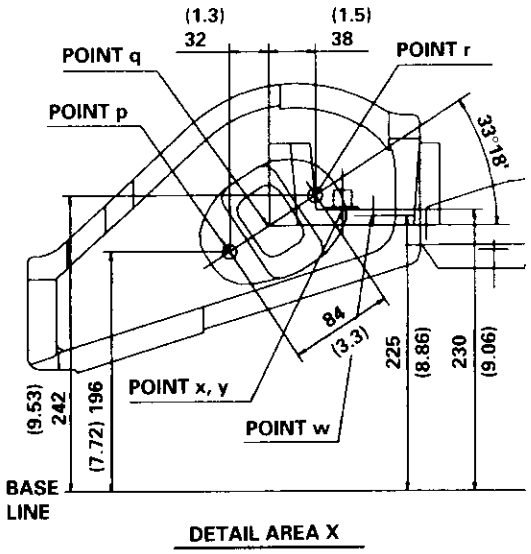
(cont'd)

Side view:

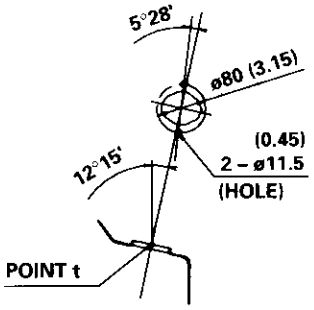
Unit: mm (in.)
ø: Inner diameter



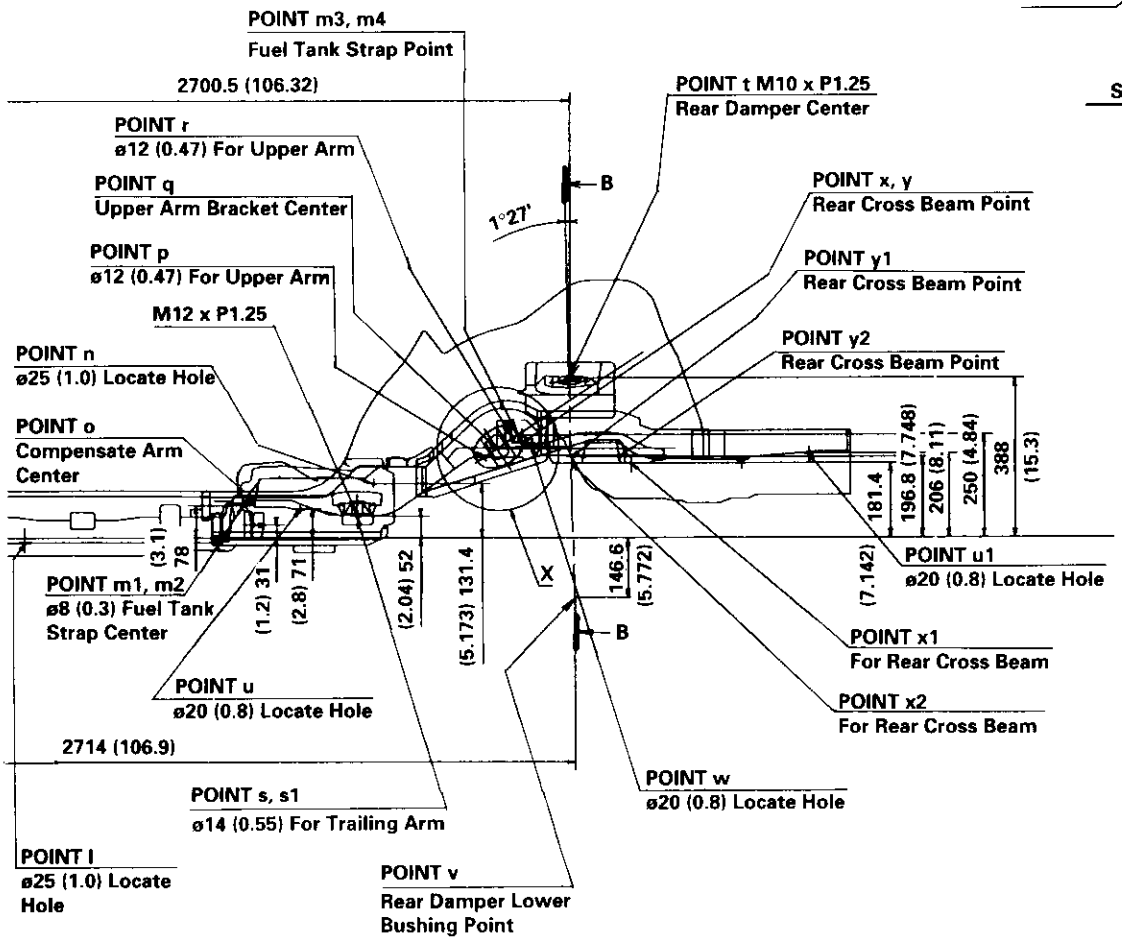
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DETAIL AREA X



SECTION BB



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Heater and Air Conditioning

Heater 21

NOTE: Section 21 ("Heater") is included in section 22.

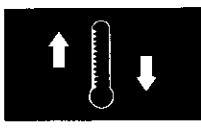
Air Conditioning 22-1

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

This model has an SRS which includes a driver's airbag in the steering wheel hub, a passenger's airbag in the dashboard above the glove box ('97 – 00 models), and seat belt tensioners in the seat belt retractors ('98 – 00 models). Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should only be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags ('97 – 00 models), and seat belt tensioners ('98 – 00 models).**
- **Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).**
- **SRS electrical wiring harnesses are identified by yellow color coding. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

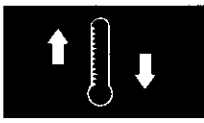


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Air Conditioning

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    Mode Control Motor 22-22
    Recirculation Control Motor 22-24
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  Test 22-44
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  Test 22-44
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  Test 22-45
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  Replacement 22-46
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  Replacement 22-48
  Overhaul 22-49
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*Heater Unit
  Replacement 22-50
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  Relief Valve Replacement 22-68
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  Adjustment 22-69
Condenser
  Replacement 22-70

*Read SRS precautions before working in this area.



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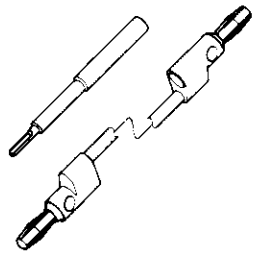
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
*①	07JGG – 001010A	Belt Tension Gauge	1	22-69
②	07SAZ – 001000A	Backprobe Set	2	22-33, 36, 37
③	07947 – 6340300	Driver Attachment	1	22-66
④	07965 – 6920500	Hub Assembly Guide Attachment	1	22-67

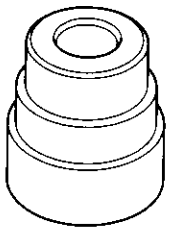
* Included in the Belt Tension Gauge Set, T/N 07TGG – 001000A



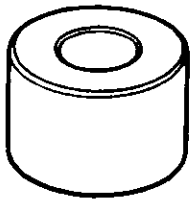
①



②



③

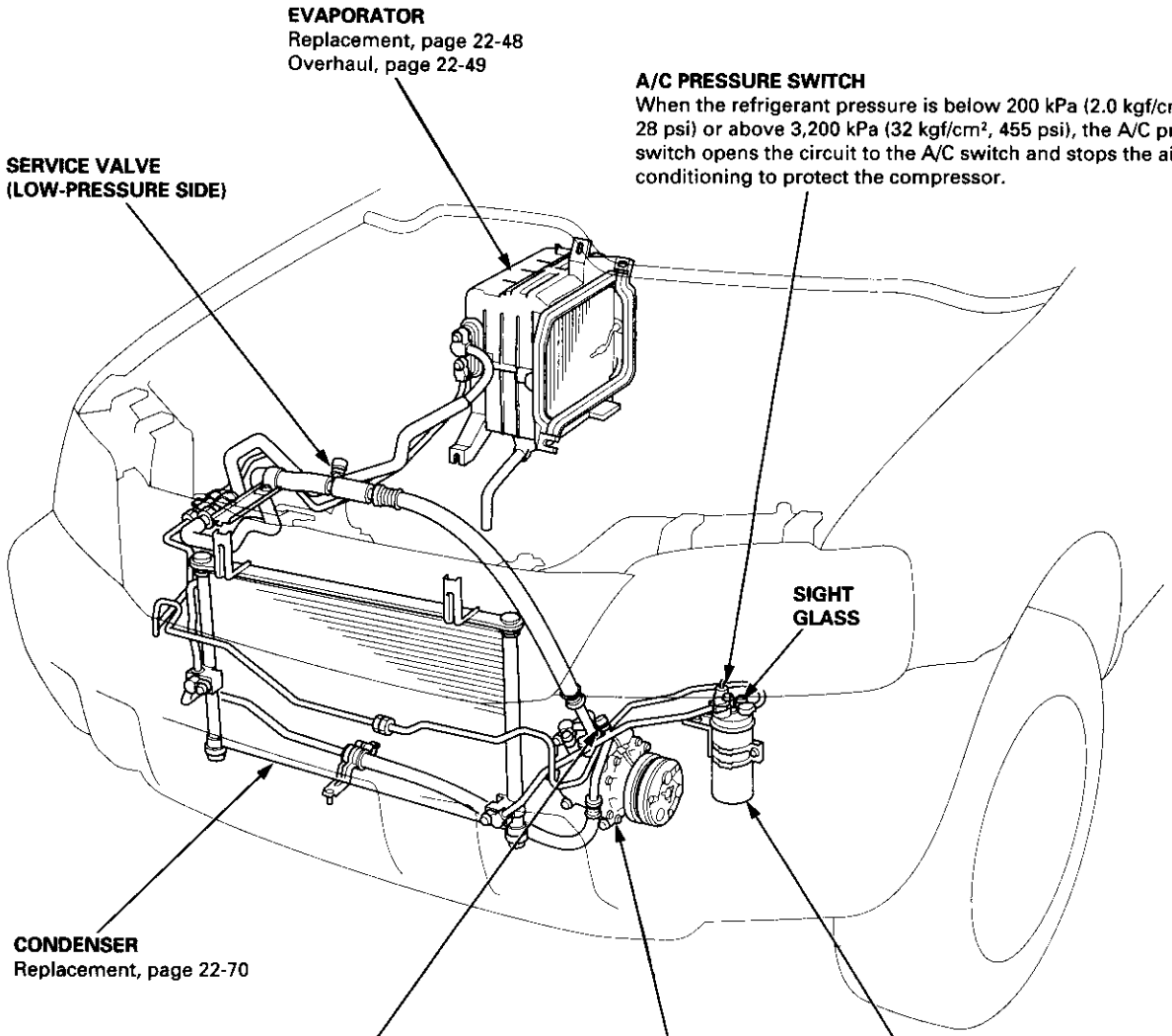


④

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Component Location

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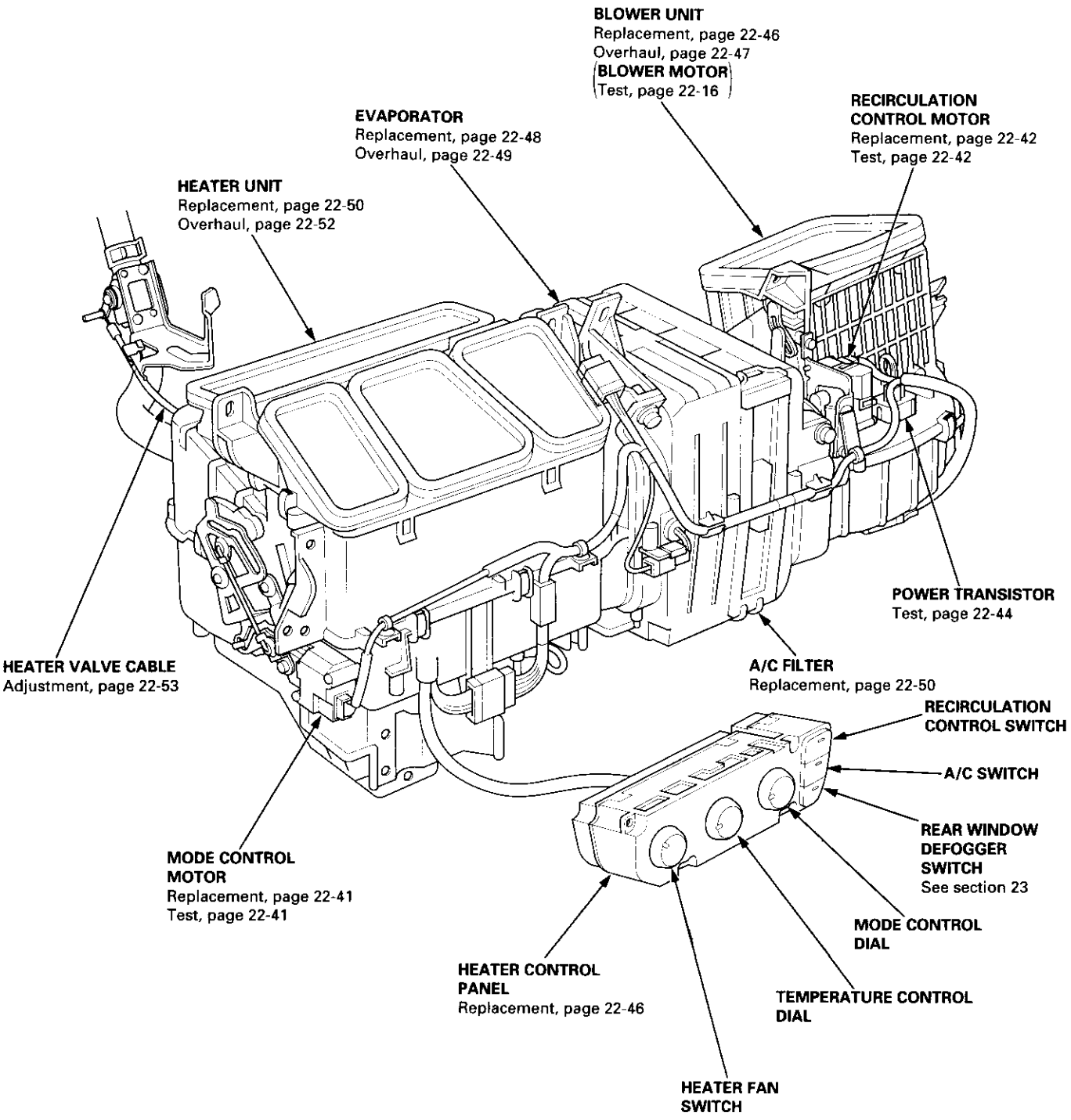
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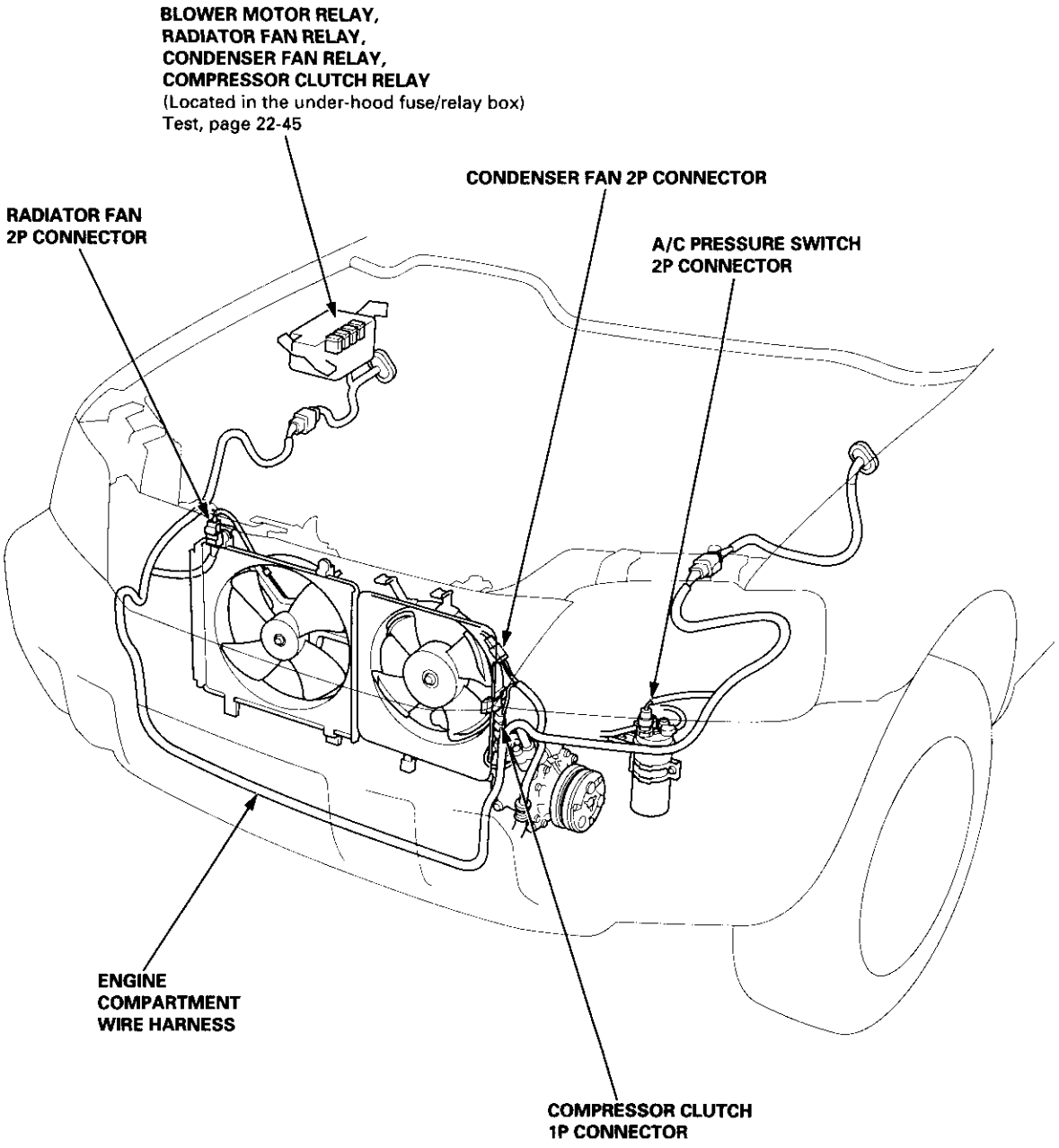
Component Location

Index (cont'd)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



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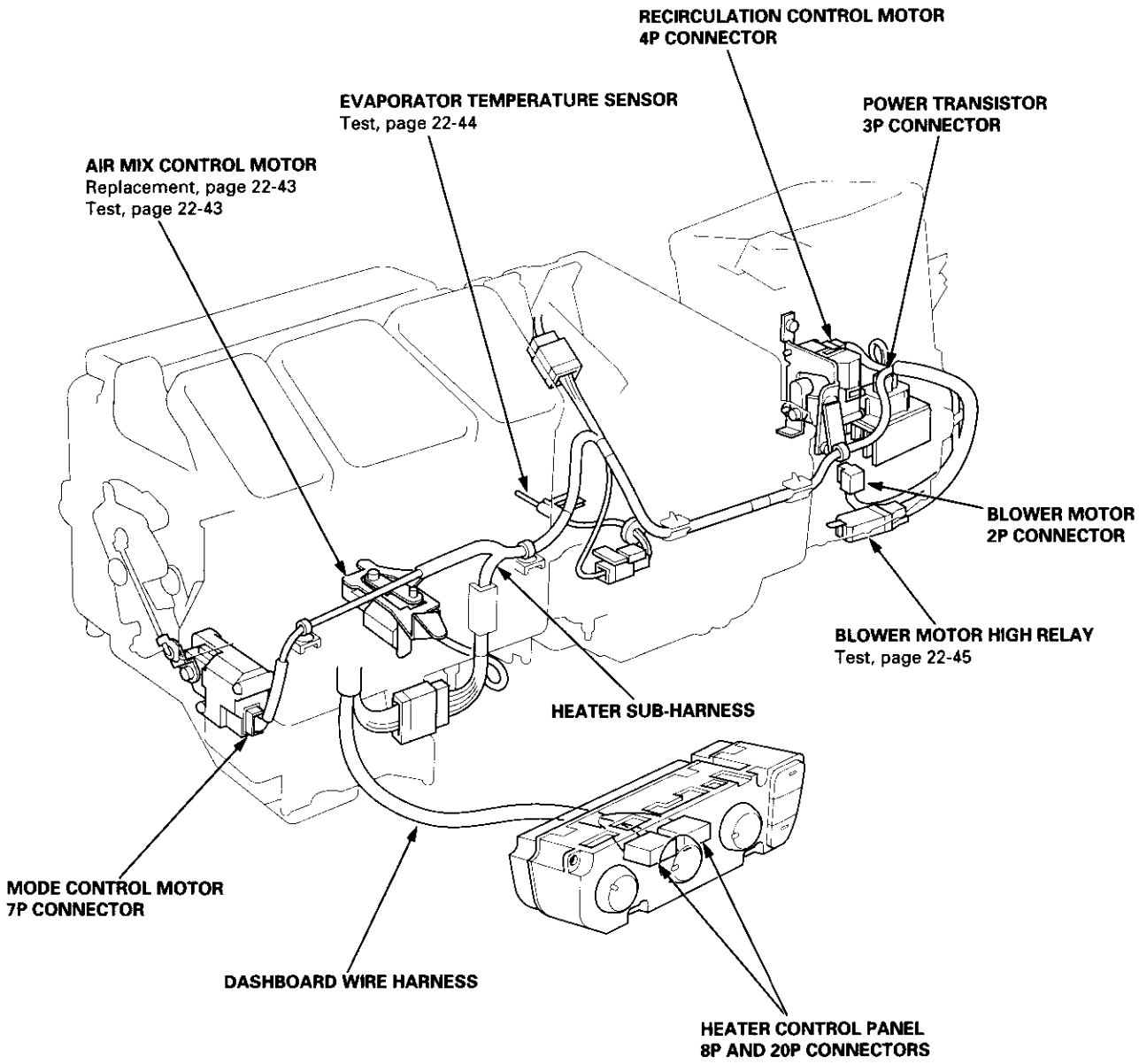

BLOWER MOTOR RELAY,
RADIATOR FAN RELAY,
CONDENSER FAN RELAY,
COMPRESSOR CLUTCH RELAY
(Located in the under-hood fuse/relay box)
Test, page 22-45
CONDENSER FAN 2P CONNECTOR
RADIATOR FAN
2P CONNECTOR
A/C PRESSURE SWITCH
2P CONNECTOR
ENGINE
COMPARTMENT
WIRE HARNESS
COMPRESSOR CLUTCH
1P CONNECTOR

(cont'd)

Component Location

Index (cont'd)

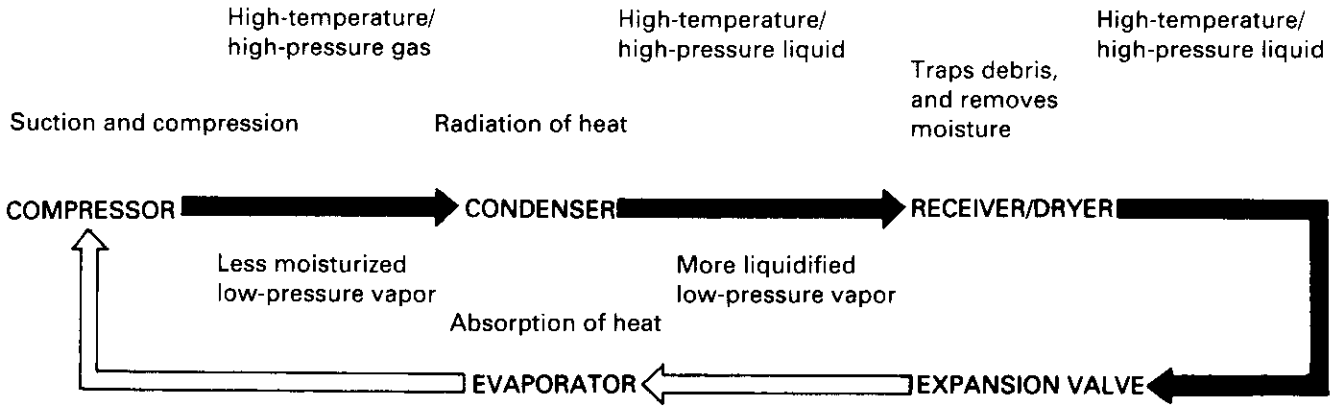
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

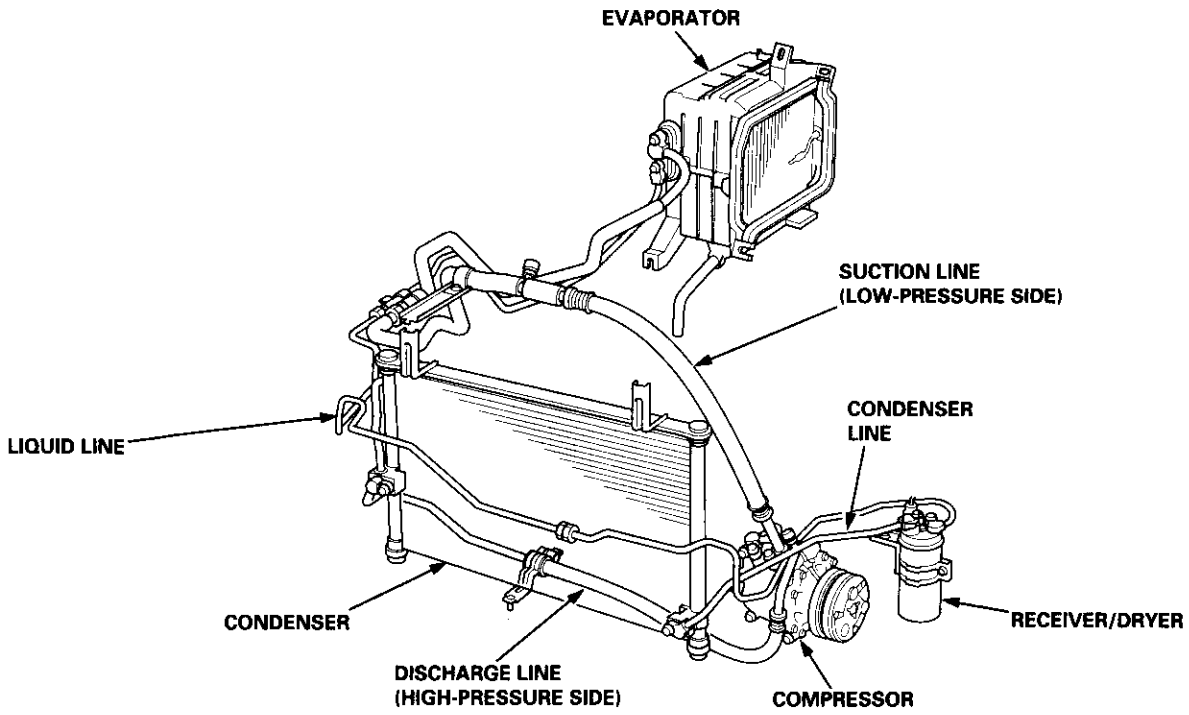


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Description

The air conditioner system removes heat from the passenger compartment by circulating refrigerant through the system as shown below.



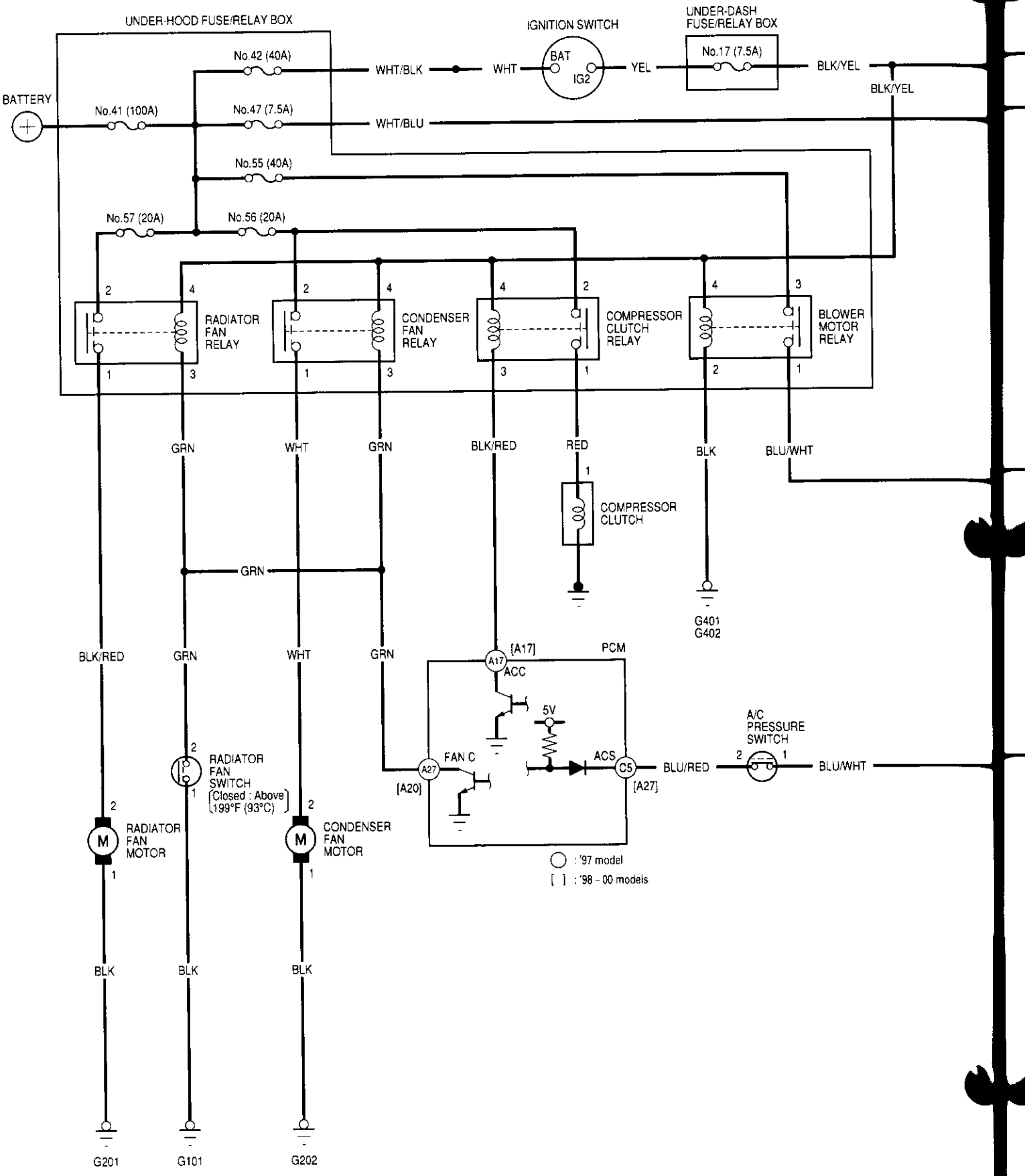


This vehicle uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

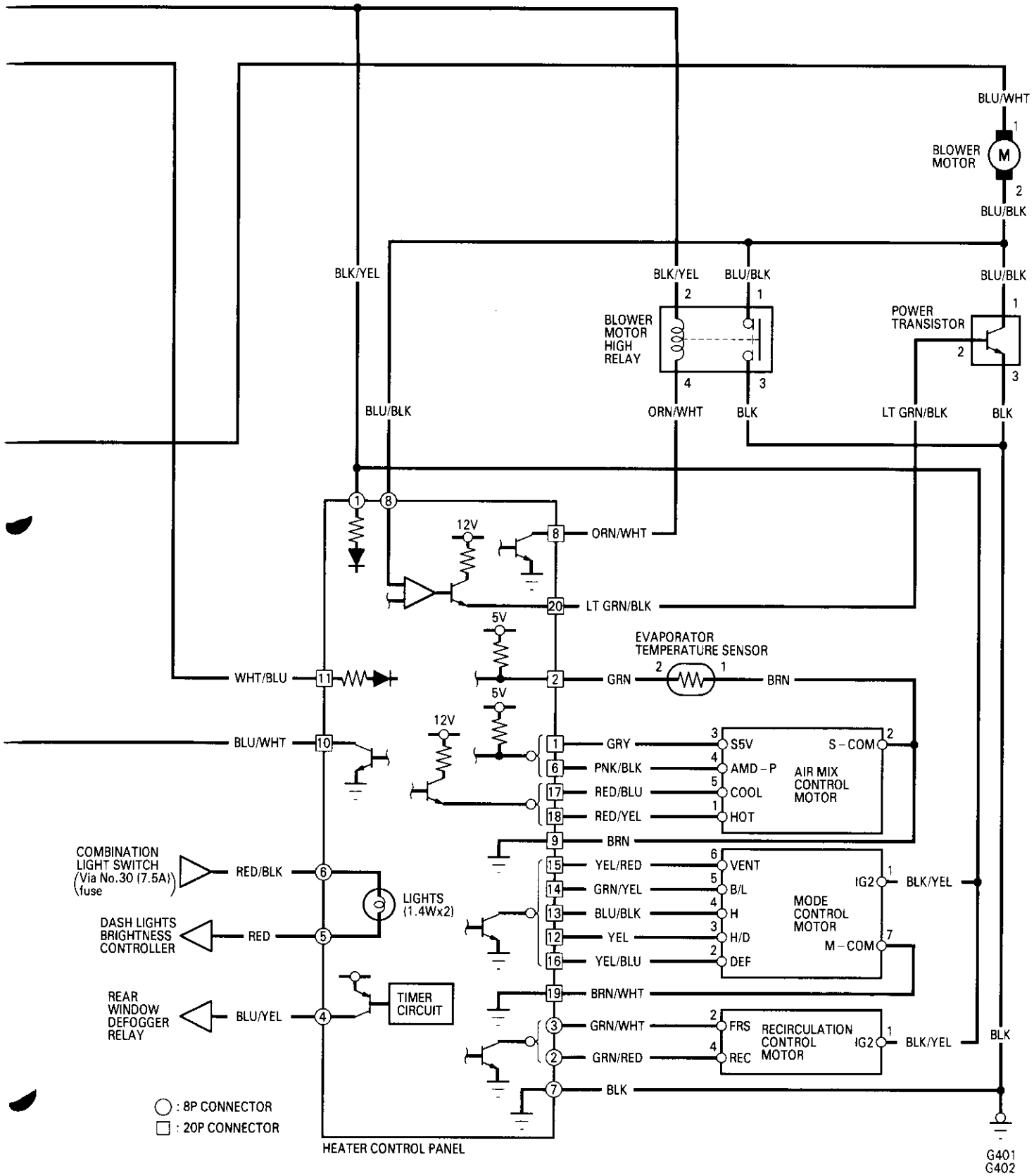
- Do not mix refrigerants CFC-12 (R-12) and HFC-134a (R-134a). They are not compatible.
- Use only the recommended polyalkyleneglycol (PAG) refrigerant oil (SP-10) designed for the R-134a compressor. Intermixing the recommended (PAG) refrigerant oil with any other refrigerant oil will result in compressor failure.
- All A/C system parts (compressor, discharge line, suction line, evaporator, condenser, receiver/dryer, expansion valve, O-rings for joints) have to be proper for refrigerant R-134a. Do not confuse with R-12 parts.
- Use a halogen gas leak detector designed for refrigerant R-134a.
- R-12 and R-134a refrigerant servicing equipment are not interchangeable. Use only a recovery/recycling/charging station that is U.L.-listed and is certified to meet the requirements of SAE J2210 to service R-134a air conditioning system.
- Always recover the refrigerant R-134a with an approved recovery/recycling/charging station before disconnecting any A/C fitting.

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Circuit Diagram



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Symptom Chart

For electrical malfunctions which are indicated by the self-diagnostic system, refer to self-diagnosis function (see next page).

Note these items before troubleshooting a symptom.

- Check the engine coolant level, and allow the engine to warm up before troubleshooting.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a digital multimeter with an output of 1 mA or less at the 20 kΩ range when testing.
- Before performing any troubleshooting procedures check:
  - — Fuses No. 47 (7.5 A), No. 55 (40 A), No. 56 (20 A), No. 57 (20 A) in the under-hood fuse/relay box, and No. 17 (7.5 A) in the under-dash fuse/relay box.
  - — Grounds No. G101, G201, G202, G401, G402
  - — Cleanliness and tightness of all connectors

Symptom	See page
Mode control motor does not run, or one or more modes are inoperative.	22-22
Recirculation control door does not change between Fresh and Recirculate.	22-24
Radiator fan does not run at all (but condenser fan runs with the A/C on).	22-26
Condenser fan does not run at all (but radiator fan runs with the A/C on).	22-29
Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.	22-32
Both fans do not run with the A/C on.	22-33
Compressor clutch does not engage.	22-34
A/C system does not come on (both fans and compressor).	22-37
Both heater and A/C do not work.	22-39

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Self-diagnosis Function

The heater control panel has a self-diagnosis function.

Running the Self-diagnosis Function

'97 model:

Turn the ignition switch ON (II), then set the mode control dial to the Vent position, and the recirculation control switch to Recirculate (recirculation indicator light comes on). Press and hold the recirculation control switch to Fresh (recirculation indicator light goes off). Continue to hold the switch; the recirculation indicator light will come on for two seconds, then it will blink the Diagnostic Trouble Code (DTC) to indicate a faulty component. If no DTC's are found, the indicator light will not blink after the initial two second light.

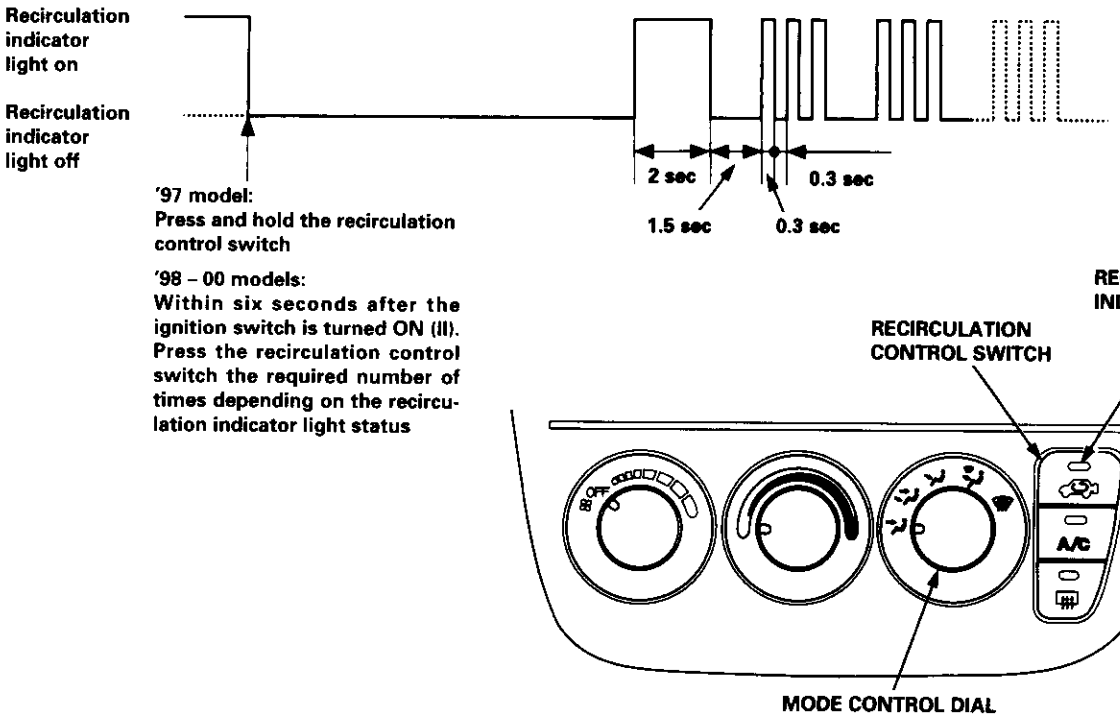
'98 – 00 models:

Set the mode control dial to the Vent position, and turn the ignition switch ON (II). Within six seconds after turning the ignition switch on, press the recirculation control switch the required number of times depending on the recirculation indicator light status:

- If the indicator light is ON, press the recirculation control switch five times.
- If the indicator light is OFF, press the recirculation control switch six times.

The recirculation indicator light will come on for two seconds, then blink the Diagnostic Trouble Code (DTC) to indicate a faulty component. If no DTC's are found, the indicator light will not blink after the initial two second light.

DTC Indication Pattern (See DTC 3):



Diagnostic trouble code (DTC)	Recirculation indicator light	Component with problem	Possible cause	See page
1	One blink	Air mix control motor	Open or short circuit, obstructed door, faulty motor	22-12
2	Two blinks	Blower motor	Open or short circuit, faulty motor	22-14, 16
3	Three blinks	Evaporator temperature sensor	Open or short circuit, faulty sensor	22-20

In case of multiple problems, the recirculation indicator light indicate only one DTC that is the least number of blinks.

Resetting the Self-diagnosis Function

Turning the ignition switch OFF will cancel the self-diagnosis function. After service work, run the self-diagnosis function once again to check that there is no other problem.

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Air Mix Control Motor

Recirculation indicator light indicates Diagnostic Trouble Code (DTC) 1: A problem in the air mix control motor circuit.

The air mix control motor regulates the mixture of cool/hot air according to outputs from the heater control panel.

Self-diagnosis circuit check indicates a problem in the air mix control motor circuit.

Check the air mix control motor:
1. Disconnect the air mix control motor 5P connector.
2. Test the air mix control motor (see page 22-43).

Is the air mix control motor OK?

NO

Check the air mix control linkage and doors:
1. Remove the air mix control motor (see page 22-43).
2. Check the air mix control linkage and doors for smooth movement.

Do the air mix control linkage and doors move smoothly?

NO

Repair the air mix control linkage or doors.

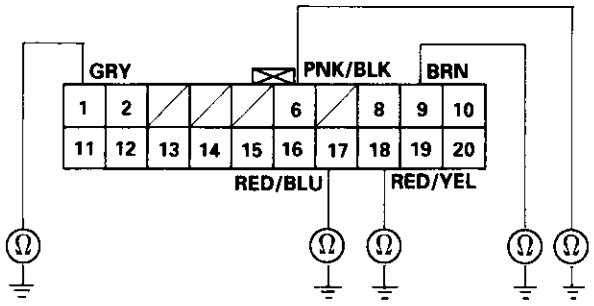
YES

Replace the air mix control motor.

YES

Check for a short in the wires:
1. Remove the heater control panel (see page 22-46).
2. Check for continuity between body ground and the heater control panel 20P connector terminals No. 1, 6, 9, 17 and 18 individually.

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

Is there continuity?

YES

Repair any short in the wire(s) between the heater control panel and the air mix control motor.

NO

To page 22-13

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From page 22-12

Check for a short to power:
Check the same terminals for voltage.

Is there any voltage?

YES → **Repair short to power in the wire between the heater control panel and the air mix control motor. (This damages the heater control panel.)**

NO

Check for an open in the wires:
Check for continuity between following terminals of the heater control panel 20P connector and the air mix control motor 5P connector.

20P:		5P:
No. 1	———	No. 3
No. 6	———	No. 4
No. 9	———	No. 2
No. 17	———	No. 5
No. 18	———	No. 1

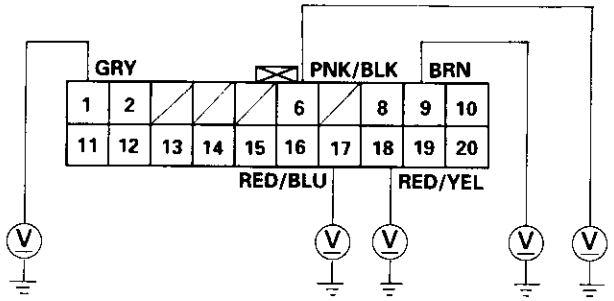
Is there continuity?

NO → **Repair any open in the wire(s) between the heater control panel and air mix control motor.**

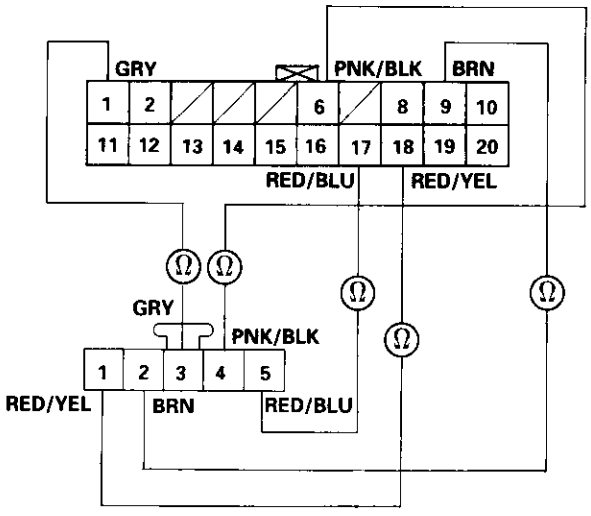
YES

Check for loose wires or poor connections at the heater control panel 20P connector and at the air mix control motor 5P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals



AIR MIX CONTROL MOTOR 5P CONNECTOR
Wire side of female terminals

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Blower Motor Speed

Recirculation indicator light indicates Diagnostic Trouble Code (DTC) 2: A problem in the blower motor circuit.

The speed of the blower motor is controlled by signals sent from the heater control panel.

Blower motor only runs on high speed position; it does not run in any other speed positions.

NOTE: If the blower motor does not run at all, refer to page 22-16.

Self-diagnosis circuit check indicates a problem in the blower motor circuit.

Check for an open in the wire:
1. Disconnect the power transistor 3P connector.
2. Check for continuity between the No. 3 terminal and body ground.

Is there continuity?

NO → **Check for an open in the wire between the power transistor and body ground. If the wire is OK, check for poor ground at G401 and G402.**

YES

Check for an open in the wire:
1. Connect the No. 1 and No. 3 terminals of the power transistor 3P connector with a jumper wire.
2. Turn the ignition switch ON (II).

Does the blower motor run at high speed?

NO → **Repair open in the wire between the power transistor and the blower motor.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Disconnect the jumper wire.
3. Remove the heater control panel (see page 22-46).
4. Check for continuity between the No. 20 terminal of the heater control panel 20P connector and the No. 2 terminal of the power transistor 3P connector.

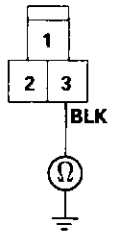
Is there continuity?

NO → **Repair open in the wire between the power transistor and the heater control panel.**

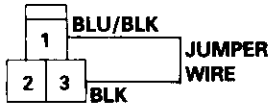
YES

To page 22-15

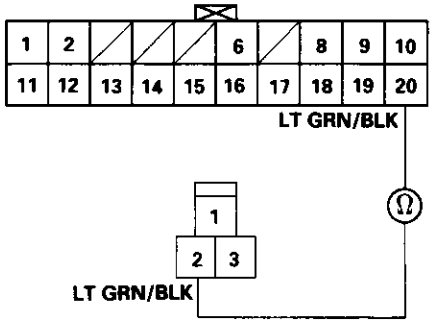
POWER TRANSISTOR 3P CONNECTOR



Wire side of female terminals



HEATER CONTROL PANEL 20P CONNECTOR
Wire side of female terminals



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From page 22-14

Check for a short in the wire:
Check for continuity between the No. 20 terminal of the heater control panel 20P connector and body ground.

Is there continuity?

YES → **Repair short in the wire between the heater control panel and the power transistor.**

NO

Check for an open in the wire:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the No. 8 terminal of the heater control panel 8P connector and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the heater control panel and the blower motor.**

YES

Check the power transistor:
1. Turn the ignition switch OFF.
2. Reconnect the heater control panel 8P and 20P connectors.
3. Test the power transistor (see page 22-44).

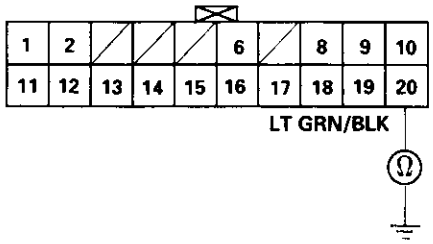
Is the power transistor OK?

NO → **Replace the power transistor.**

YES

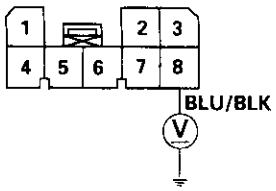
Check for loose wires or poor connections at the heater control panel 8P and 20P connectors and at the power transistor 3P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

HEATER CONTROL PANEL 8P CONNECTOR



Wire side of female terminals

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Blower Motor

Recirculation indicator light indicates Diagnostic Trouble Code (DTC) 2: A problem in the blower motor circuit.

The speed of the blower motor is controlled by signals sent from the heater control panel.

Blower motor does not run at all.

Self-diagnosis circuit check indicates a problem in the blower motor circuit.

Check the No. 55 (40 A) fuse in the under-hood fuse/relay box, and the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Are the fuses OK? NO → **Replace the fuse(s), and recheck.**

YES

Check the blower motor input and output circuit:
1. Connect the No. 2 terminal of the blower motor 2P connector to body ground with a jumper wire.
2. Turn the ignition switch ON (II).

Does the blower motor run? YES → To page 22-17

NO

Check the blower motor:
1. Disconnect the jumper wire and the blower motor 2P connector.
2. Measure the voltage between the No. 1 terminal and body ground.

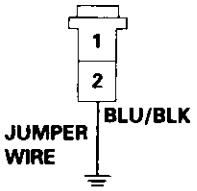
Is there battery voltage? YES → **Replace the blower motor.**

NO

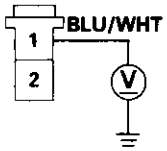
Check the blower motor relay:
1. Turn the ignition switch OFF.
2. Remove the blower motor relay from the under-hood fuse/relay box, and test it (see page 22-45).

To page 22-19

BLOWER MOTOR 2P CONNECTOR



Wire side of female terminals



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From page 22-16

Check the blower motor high relay:
1. Turn the ignition switch OFF, and disconnect the jumper wire.
2. Remove the blower motor high relay, and test it (see page 22-45).

Is the relay OK?

NO → **Replace the blower motor high relay.**

YES

Check for an open in the wire:
1. Connect the No. 1 terminal of the blower motor high relay 4P connector to body ground with a jumper wire.
2. Turn the ignition switch ON (II).

Does the blower motor run?

NO → **Repair open in the wire between the blower motor and the blower motor high relay.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF, and disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal of the blower motor high relay 4P connector and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the blower motor high relay.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 3 terminal of the blower motor high relay 4P connector and body ground.

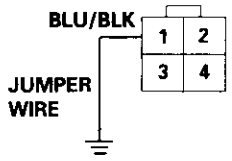
Is there continuity?

NO → **Check for an open in the wire between the blower motor high relay and body ground. If the wire is OK, check for poor ground at G401 and G402.**

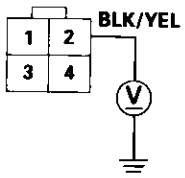
YES

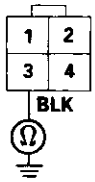
To page 22-18

BLOWER MOTOR HIGH RELAY 4P CONNECTOR



Wire side of female terminals





(cont'd)

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Blower Motor (cont'd)

From page 22-17

Check for an open in the wire:
1. Remove the heater control panel (see page 22-46).
2. Check for continuity between the No. 8 terminal of the heater control panel 8P connector and the No. 1 terminal of the blower motor high relay 4P connector.

Is there continuity?

NO → **Repair open in the wire between the heater control panel and the blower motor high relay.**

YES

Check for an open in the wire:
Check for continuity between the No. 8 terminal of the heater control panel 20P connector and the No. 4 terminal of the blower motor high relay 4P connector.

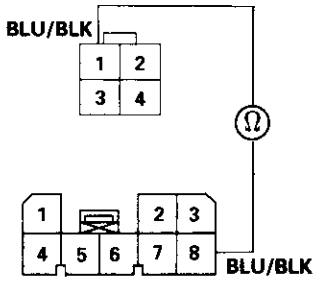
Is there continuity?

NO → **Repair open in the wire between the heater control panel and the blower motor high relay.**

YES

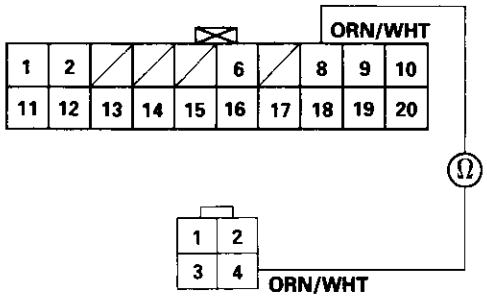
Check for loose wires or poor connections at the heater control panel 8P and 20P connectors and at the blower motor high relay 4P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

BLOWER MOTOR HIGH RELAY 4P CONNECTOR
Wire side of female terminals



HEATER CONTROL PANEL 8P CONNECTOR
Wire side of female terminals

HEATER CONTROL PANEL 20P CONNECTOR
Wire side of female terminals



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From page 22-16

Is the relay OK?

NO → **Replace the blower motor relay.**

YES

Check the under-hood fuse/relay box:
Measure the voltage between the No. 3 terminal of the blower motor relay 4P socket and body ground.

Is there battery voltage?

NO → **Replace the under-hood fuse/relay box.**

YES

Check for an open in the wire:
1. Turn the ignition switch ON (II).
2. Measure the voltage between the No. 4 terminal of the blower motor relay 4P socket and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the blower motor relay.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 2 terminal of the blower motor relay 4P socket and body ground.

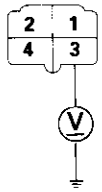
Is there continuity?

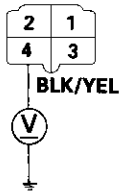
NO → **Check for an open in the wire between the blower motor relay and body ground. If the wire is OK, check for poor ground at G401 and G402.**

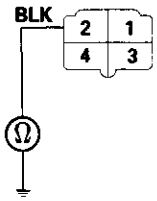
YES

Repair open in the BLU/WHT wire between the blower motor relay and the blower motor.

BLOWER MOTOR RELAY 4P SOCKET







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Evaporator Temperature Sensor

Recirculation indicator light indicates Diagnostic Trouble Code (DTC) 3: A problem in the evaporator temperature sensor circuit.

The evaporator temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the evaporator outlet air temperature increases.

Self-diagnosis circuit check indicates a problem in the evaporator temperature sensor circuit.

Check the evaporator temperature sensor:
1. Disconnect the evaporator temperature sensor 2P connector.
2. Measure the resistance between the No. 1 and No. 2 terminals of the evaporator temperature sensor.

Is the resistance within the specifications shown on the graph.

NO → **Replace the evaporator temperature sensor.**

YES

Check for a short in the wire:
1. Remove the heater control panel (see page 22-46).
2. Check for continuity between the No. 2 terminal of the heater control panel 20P connector and body ground.

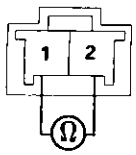
Is there continuity?

YES → **Repair short in the wire between the heater control panel and the evaporator temperature sensor.**

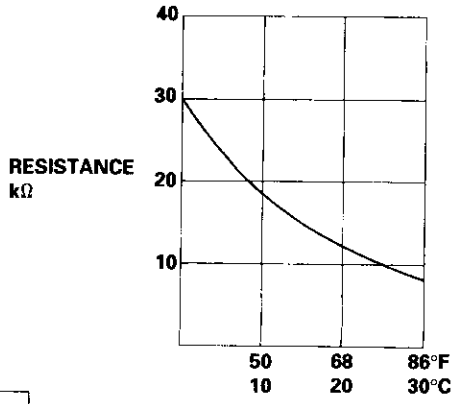
NO

To page 22-21

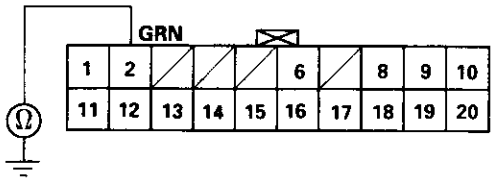
EVAPORATOR TEMPERATURE SENSOR



Terminal side of male terminals



HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

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From page 22-20

Check for an open in the wire: Check for continuity between the No. 2 terminal of the heater control panel 20P connector and the No. 2 terminal of the evaporator temperature sensor 2P connector.

Is there continuity?

NO → **Repair open in the wire between the heater control panel and the evaporator temperature sensor.**

YES

Check for an open in the wire: Check for continuity between the No. 9 terminal of the heater control panel 20P connector and the No. 1 terminal of the evaporator temperature sensor 2P connector.

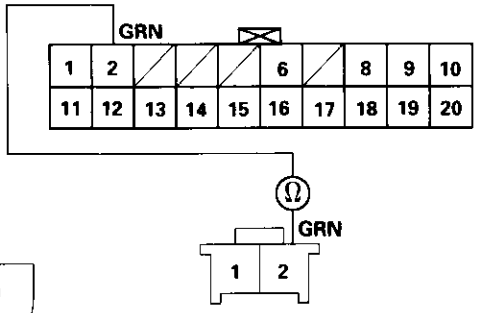
Is there continuity?

NO → **Repair open in the wire between the heater control panel and the evaporator temperature sensor.**

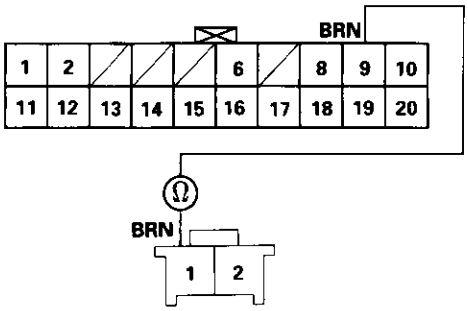
YES

Check for loose wires or poor connections at the heater control panel 20P connector and at the evaporator temperature sensor 2P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 20P CONNECTOR
Wire side of female terminals



EVAPORATOR TEMPERATURE SENSOR 2P CONNECTOR
Wire side of female terminals



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Mode Control Motor

Mode control motor does not run, or one or more modes are inoperative.

Check the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK? — NO → **Replace the fuse, and recheck.**

YES

Check for an open in the wire:
1. Disconnect the mode control motor 7P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 1 terminal and body ground.

Is there battery voltage? — NO → **Repair open in the wire between the No. 17 fuse and the mode control motor.**

YES

Check the mode control motor:
1. Turn the ignition switch OFF.
2. Test the mode control motor (see page 22-41).

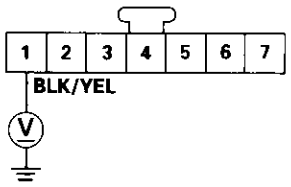
Is the mode control motor OK? — NO → **Check the mode control linkage and doors:**
1. Remove the mode control motor (see page 22-41).
2. Check the mode control linkage and doors for smooth movement.

Do the mode control linkage and doors move smoothly? — NO → **Repair the mode control linkage or doors.**

YES

Replace the mode control motor.

MODE CONTROL MOTOR 7P CONNECTOR



Wire side of female terminals

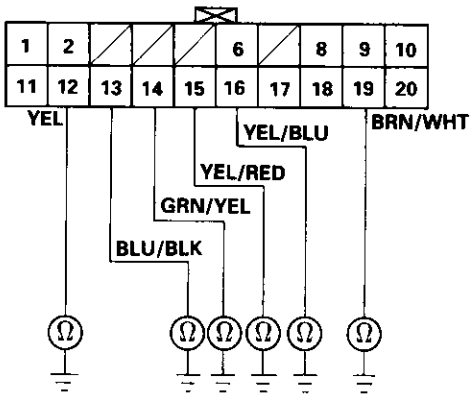
Check for a short in the wires:
1. Remove the heater control panel (see page 22-46).
2. Check for continuity between the No. 12, 13, 14, 15, 16 and 19 terminals of the heater control panel 20P connector and body ground individually.

Is there continuity? — YES → **Repair any short in the wire(s) between the mode control motor and the heater control panel.**

NO

To page 22-23

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

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From page 22-22

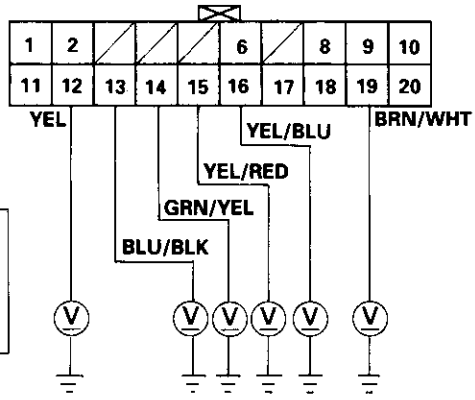
Check for a short to power:
Check the same wires for voltage.

Is there any voltage?

YES → **Repair short to power in the wire between the mode control motor and the heater control panel. (This damages the heater control panel.)**

NO

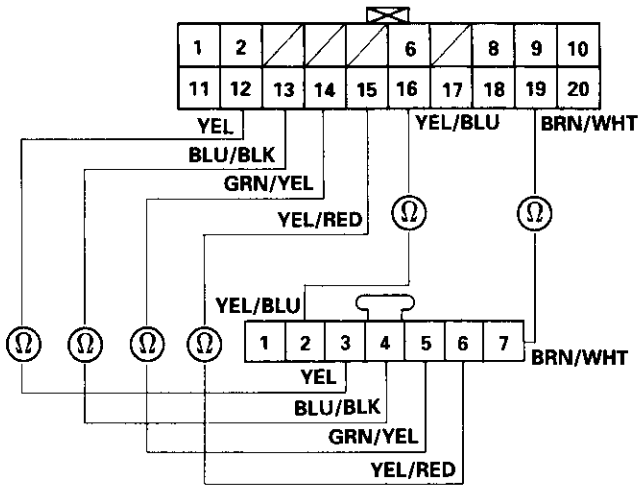
HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

Check for an open in the wires:
Check for continuity between the following terminals of the mode control motor 7P connector and the heater control panel 20P connector.

20P:	7P:
No. 12	No. 3
No. 13	No. 4
No. 14	No. 5
No. 15	No. 6
No. 16	No. 2
No. 19	No. 7



MODE CONTROL MOTOR 7P CONNECTOR
Wire side of female terminals

Is there continuity?

NO → **Repair any open in the wire(s) between the mode control motor and the heater control panel.**

YES

Check for loose wires or poor connections at the heater control panel 20P connector and at the mode control motor 7P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

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Recirculation Control Motor

Recirculation control door does not change between Fresh and Recirculate.

Check the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO → **Replace the fuse, and recheck.**

YES

Check for an open in the wire:
1. Disconnect the recirculation control motor 4P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 1 terminal and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the recirculation control motor.**

YES

Check the recirculation control motor:
1. Turn the ignition switch OFF.
2. Test the recirculation control motor (see page 22-42).

Is the recirculation control motor OK?

NO → **Check the recirculation control linkage and door:**
1. Remove the recirculation control motor (see page 22-42).
2. Check the recirculation control linkage and door for smooth movement.

YES

To page 22-25

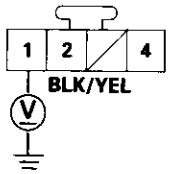
Do the recirculation control linkage and door move smoothly?

NO → **Repair the recirculation control linkage or door.**

YES

Replace the recirculation control motor.

RECIRCULATION CONTROL MOTOR 4P CONNECTOR



Wire side of female terminals

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From page 22-24

Check for a short in the wires:
1. Remove the heater control panel (see page 22-46).
2. Check for continuity between the No. 2 and No. 3 terminals of the heater control panel 8P connector and body ground individually.

Is there continuity?

YES → **Repair short in the wire(s) between the recirculation control motor and the heater control panel.**

NO

Check for a short to power:
Check the same wires for voltage.

Is there any voltage?

YES → **Repair short to power in the wire between the recirculation control motor and the heater control panel. (This damages the heater control panel.)**

NO

Check for an open in the wires:
Check for continuity between the following terminals of the recirculation control motor 4P connector and the heater control panel 8P connector.

8P:	4P:
No. 2	No. 4
No. 3	No. 2

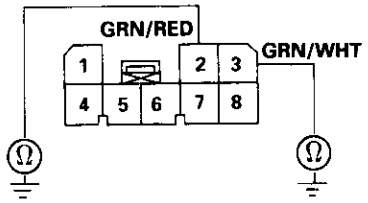
Is there continuity?

NO → **Repair open in the wire(s) between the recirculation control motor and the heater control panel.**

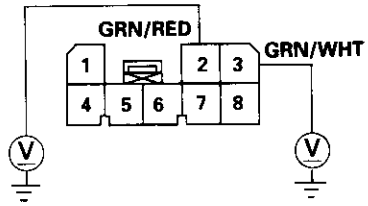
YES

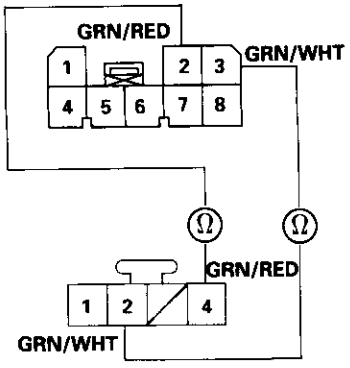
Check for loose wires or poor connections at the heater control panel 8P connector and at the recirculation control motor 4P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 8P CONNECTOR



Wire side of female terminals





RECIRCULATION CONTROL MOTOR 4P CONNECTOR
Wire side of female terminals

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Radiator Fan

Radiator fan does not run at all (but condenser fan runs with the A/C on).

Check the No. 57 (20 A) fuse in the under-hood fuse/relay box, and the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Are the fuses OK?

NO → **Replace the fuse(s), and recheck.**

YES

Remove the radiator fan relay, and test it (see page 22-45).

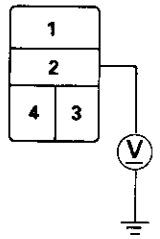
Is the relay OK?

NO → **Replace the radiator fan relay.**

YES

Check the under-hood fuse/relay box:
Measure the voltage between the No. 2 terminal of the radiator fan relay 4P socket and body ground.

RADIATOR FAN RELAY 4P SOCKET

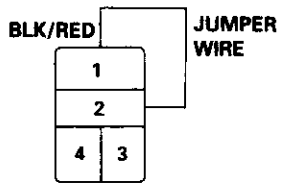


Is there battery voltage?

NO → **Replace the under-hood fuse/relay box.**

YES

Check the radiator fan:
Connect the No. 1 and No. 2 terminals of the radiator fan relay 4P socket with a jumper wire.



Does the radiator fan run?

NO → To page 22-27

YES

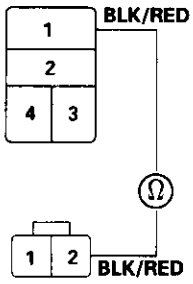
To page 22-28

www.emanuals.com

From page 22-26

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Disconnect the radiator fan 2P connector.
3. Check for continuity between the No. 1 terminal of the radiator fan relay 4P socket and the No. 2 terminal of the radiator fan 2P connector.

RADIATOR FAN RELAY 4P SOCKET



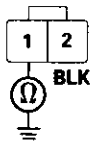
RADIATOR FAN 2P CONNECTOR
Wire side of female terminals

Is there continuity?

NO → **Repair open in the wire between the radiator fan relay and the radiator fan.**

YES

Check for an open in the wire:
Check for continuity between the No. 1 terminal of the radiator fan 2P connector and body ground.



Is there continuity?

NO → **Check for an open in the wire between the radiator fan and body ground. If the wire is OK, check for poor ground at G201.**

YES

Replace the radiator fan motor.

(cont'd)

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Radiator Fan (cont'd)

From page 22-26

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 4 terminal of the radiator fan relay 4P socket and body ground.

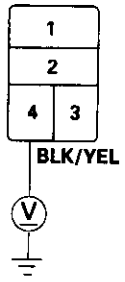
Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the radiator fan relay.**

YES

Repair open in the GRN wire between the radiator fan relay and the PCM/ECM.

RADIATOR FAN RELAY 4P SOCKET



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Condenser Fan

Condenser fan does not run at all (but radiator fan runs with the A/C on).

Check the No. 56 (20 A) fuse in the under-hood fuse/relay box, and the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Are the fuses OK?

NO → **Replace the fuse(s), and recheck.**

YES

Remove the condenser fan relay, and test it (see page 22-45).

Is the relay OK?

NO → **Replace the condenser fan relay.**

YES

Check the under-hood fuse/relay box:
Measure the voltage between the No. 2 terminal of the condenser fan relay 4P socket and body ground.

Is there battery voltage?

NO → **Replace the under-hood fuse/relay box.**

YES

Check the condenser fan:
Connect the No. 1 and No. 2 terminals of the condenser fan relay 4P socket with a jumper wire.

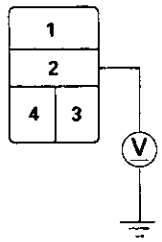
Does the condenser fan run?

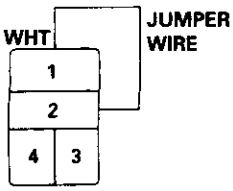
NO → To page 22-30

YES

To page 22-31

CONDENSER FAN RELAY 4P SOCKET





(cont'd)

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Condenser Fan (cont'd)

From page 22-29

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Disconnect the condenser fan 2P connector.
3. Check for continuity between the No. 1 terminal of the condenser fan relay 4P socket and the No. 2 terminal of the condenser fan 2P connector.

Is there continuity?

NO → **Repair open in the wire between the condenser fan relay and the condenser fan.**

YES

Check for an open in the wire:
Check for continuity between the No. 1 terminal of the condenser fan 2P connector and body ground.

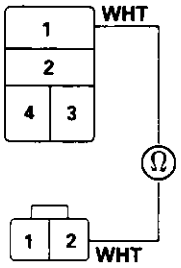
Is there continuity?

NO → **Check for an open in the wire between the condenser fan and body ground. If the wire is OK, check for poor ground at G202.**

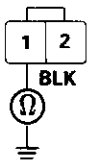
YES

Replace the condenser fan motor.

CONDENSER FAN RELAY 4P SOCKET



CONDENSER FAN 2P CONNECTOR
Wire side of female terminals



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From page 22-29

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 4 terminal of the condenser fan relay 4P socket and body ground.

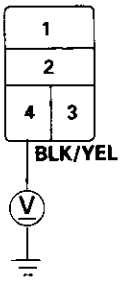
Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the condenser fan relay.**

YES

Repair open in the GRN wire between the condenser fan relay and the PCM/ECM.

CONDENSER FAN RELAY 4P SOCKET



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Radiator Fan Switch

Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.

Check for an open in the wire:
1. Disconnect the radiator fan switch 2P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 2 terminal and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the radiator fan relay, the condenser fan relay and the radiator fan switch.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 1 terminal of the radiator fan switch 2P connector and body ground.

Is there continuity?

NO → **Check for an open in the wire between the radiator fan switch and body ground. If the wire is OK, check for poor ground at G101.**

YES

Check the cooling system.

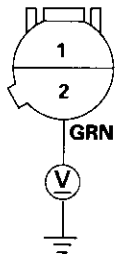
Is the cooling system OK?

NO → **Repair the cooling system.**

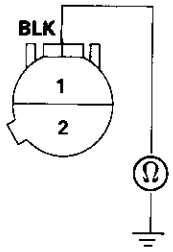
YES

Replace the radiator fan switch.

RADIATOR FAN SWITCH 2P CONNECTOR



Wire side of female terminals



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Both Fans

Both fans do not run with the A/C on.

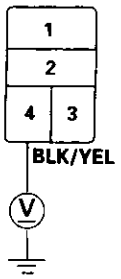
Check the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK? — NO → **Replace the fuse, and recheck.**

YES

Check for an open in the wire:
1. Remove the radiator fan relay.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 4 terminal of the radiator fan relay 4P socket and body ground.

RADIATOR FAN RELAY 4P SOCKET



Is there battery voltage? — NO → **Repair open in the wire between the No. 17 fuse and the radiator fan relay.**

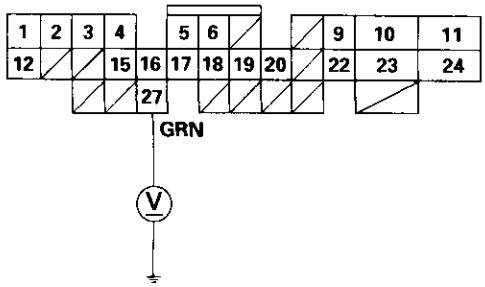
YES

Check for an open in the wire:
1. Make sure the A/C switch is OFF.
2. Using a *Backprobe Set (T/N 07SAZ – 001000A), measure the voltage between the No. 27 [20] terminal of the PCM/ECM connector A (32P) and body ground with the PCM/ECM connectors connected.

[ ]: '98 – 00 models

PCM CONNECTOR A (32P)

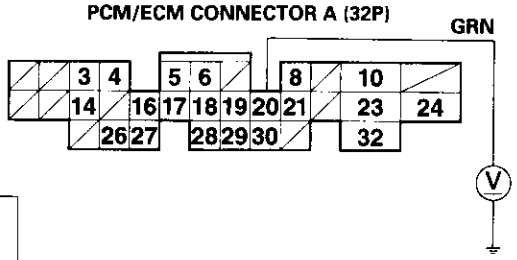
'97 model:



Wire side of female terminals

PCM/ECM CONNECTOR A (32P)

'98 – 00 models:



Wire side of female terminals

Is there battery voltage? — NO → **Repair open in the wire between the radiator fan relay, the condenser fan relay and the PCM/ECM.**

YES

Check for loose wires or poor connections at the PCM/ECM connector A (32P). If the connections are good, substitute a known-good PCM/ECM, and recheck. If the symptom/indication goes away, replace the original PCM/ECM.

*How to use the Backprobe Sets
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire (see section 11).

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Compressor

Compressor clutch does not engage.

Check the No. 56 (20 A) fuse in the under-hood fuse/relay box, and the No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

Are the fuses OK?

NO → **Replace the fuse(s), and recheck.**

YES

Remove the compressor clutch relay, and test it (see page 22-45).

Is the relay OK?

NO → **Replace the compressor clutch relay.**

YES

Check the under-hood fuse/relay box:
Measure the voltage between the No. 2 terminal of the compressor clutch relay 4P socket and body ground.

Is there battery voltage?

NO → **Replace the under-hood fuse/relay box.**

YES

Check the compressor clutch:
Connect the No. 1 and No. 2 terminals of the compressor clutch relay 4P socket with a jumper wire.

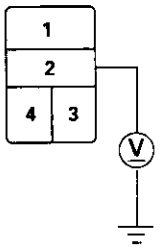
Does the compressor clutch click?

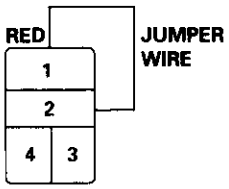
NO → To page 22-35

YES

To page 22-36

COMPRESSOR CLUTCH RELAY 4P SOCKET





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From page 22-34

Check for an open in the wire:
1. Disconnect the jumper wire.
2. Disconnect the compressor clutch 1P connector.
3. Check for continuity between the No. 1 terminal of the compressor clutch relay 4P socket and the terminal of the compressor clutch 1P connector.

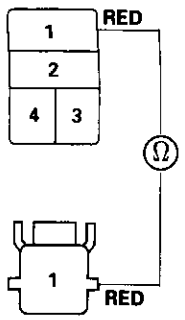
Is there continuity?

NO → **Repair open in the wire between the compressor clutch relay and the compressor clutch.**

YES

Inspect the compressor clutch clearance, the thermal protector, and the compressor clutch field coil (see page 22-65).

COMPRESSOR CLUTCH RELAY 4P SOCKET



COMPRESSOR CLUTCH 1P CONNECTOR
Wire side of female terminals

(cont'd)

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Compressor (cont'd)

From page 22-34

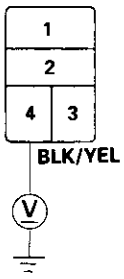
Check for an open in the wire:
1. Disconnect the jumper wire.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 4 terminal of the compressor clutch relay 4P socket and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the compressor clutch relay.**

YES

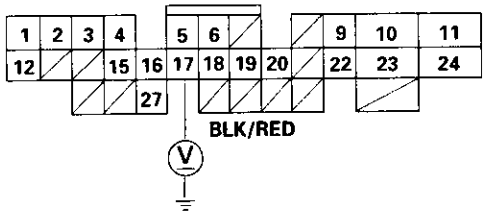
COMPRESSOR CLUTCH RELAY 4P SOCKET



Check for an open in the wire:
1. Turn the ignition switch OFF, then reinstall the compressor clutch relay.
2. Make sure the A/C switch is OFF, then turn the ignition switch ON (II).
3. Using a *Backprobe Set (T/N 07SAZ – 001000A), measure the voltage between the No. 17 terminal of the PCM/ECM connector A (32P) and body ground with the PCM/ECM connectors connected.

PCM CONNECTOR A (32P)

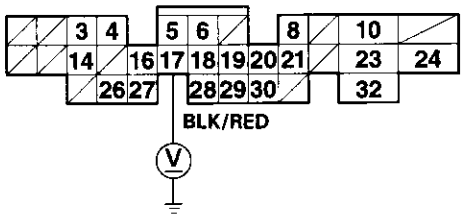
'97 model:



Wire side of female terminals

PCM/ECM CONNECTOR A (32P)

'98 – 00 models:



Wire side of female terminals

Is there battery voltage?

NO → **Repair open in the wire between the compressor clutch relay and the PCM/ECM.**

YES

Check for loose wires or poor connections at the PCM/ECM connector A (32P). If the connections are good, substitute a known-good PCM/ECM, and recheck. If the symptom/indication goes away, replace the original PCM/ECM.

*How to use the Backprobe Sets
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire (see section 11).

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A/C System

A/C system does not come on (both fans and compressor).

Check for an open in the wire:
1. Disconnect the A/C pressure switch 2P connector.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No.2 terminal and body ground.

Is there approx. 5 volts? — YES — To page 22-38

NO

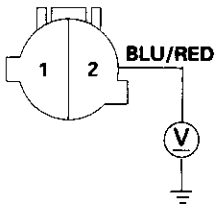
Check the PCM/ECM:
Using a *Backprobe Set (T/N 07SAZ – 001000A), measure the voltage between the No. 5 [27] terminal of the PCM/ECM connector C (31P) [A (32P)] and body ground with the PCM/ECM connectors connected.
[ ]: '98 – 00 models

Is there approx. 5 volts? — YES — **Repair open in the wire between the A/C pressure switch and the PCM/ECM.**

NO

Check for loose wires or poor connections at the PCM/ECM connector C (31P) [A (32P)]. If the connections are good, substitute a known-good PCM/ECM, and recheck. If the symptom/indication goes away, replace the original PCM/ECM.
[ ]: '98 – 00 models

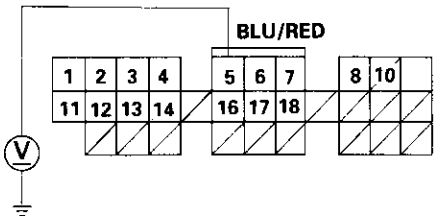
A/C PRESSURE SWITCH 2P CONNECTOR



Wire side of female terminals

PCM CONNECTOR C (31P)

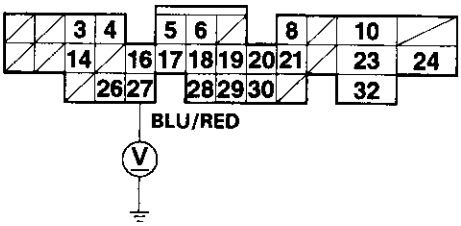
'97 model:



Wire side of female terminals

PCM/ECM CONNECTOR A (32P)

'98 – 00 models:



Wire side of female terminals

*How to use the Backprobe Sets
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire (see section 11).

(cont'd)

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A/C System (cont'd)

From page 22-37

Check the A/C pressure switch:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 1 and No. 2 terminals of the A/C pressure switch.

Is there continuity?

NO → Check for proper A/C system pressure.

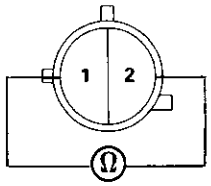
YES

Is the pressure within specifications?

NO → **Repair the A/C pressure problem.**

YES → **Replace the A/C pressure switch.**

A/C PRESSURE SWITCH



Check for an open in the wire:
1. Reconnect the A/C pressure switch 2P connector.
2. Remove the heater control panel (see page 22-46).
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 10 terminal of the heater control panel 20P connector and body ground.

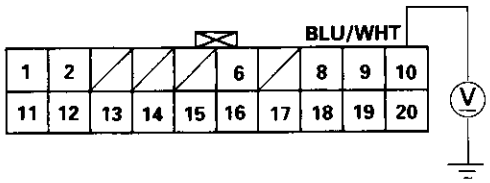
Is there approx. 5 volts?

NO → **Repair open in the wire between the A/C pressure switch and the heater control panel.**

YES

Check for loose wires or poor connections at the heater control panel 20P connector and at the A/C pressure switch 2P connector. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

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Heater Control panel

Both heater and A/C do not work.

Check the No. 17 (7.5 A) fuse in the under-dash fuse/relay box, and the No. 47 (7.5 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?

NO → **Replace the fuse(s), and recheck.**

YES

Check for an open in the wire:
1. Remove the heater control panel (see page 22-46).
2. Turn the ignition switch ON (II).
3. Measure the voltage between the No. 1 terminal of the heater control panel 8P connector and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 17 fuse and the heater control panel.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Measure the voltage between the No. 11 terminal of the heater control panel 20P connector and body ground.

Is there battery voltage?

NO → **Repair open in the wire between the No. 47 fuse and the heater control panel.**

YES

Check for an open in the wire: Check for continuity between the No. 7 terminal of the heater control panel 8P connector and body ground.

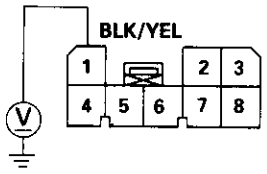
Is there continuity?

NO → **Check for an open in the wire between the heater control panel and body ground. If the wire is OK, check for poor ground at G401 and G402.**

YES

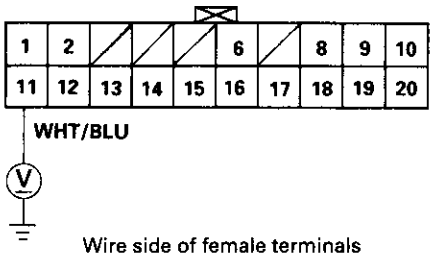
Check for loose wires or poor connections at the heater control panel 8P and 20P connectors. If the connections are good, substitute a known-good heater control panel, and recheck. If the symptom/indication goes away, replace the original heater control panel.

HEATER CONTROL PANEL 8P CONNECTOR

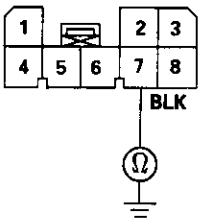


Wire side of female terminals

HEATER CONTROL PANEL 20P CONNECTOR



Wire side of female terminals

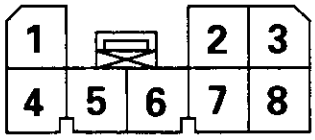


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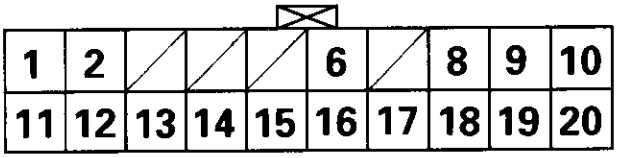
Heater Control Panel Input/Output Signals

HEATER CONTROL PANEL CONNECTORS

8P CONNECTOR



20P CONNECTOR



Wire side of female terminals

8P CONNECTOR

Cavity	Wire color	Signal		Cavity	Wire color	Signal	
1	BLK/YEL	IG2 (POWER)	INPUT	5	RED	DASH LIGHTS BRIGHTNESS CONTROLLER	OUTPUT
2	GRN/RED	RECIRCULATE	INPUT	6	RED/BLK	COMBINATION LIGHT SWITCH (Via No. 30 (7.5 A) fuse)	INPUT
3	GRN/WHT	FRESH	INPUT	7	BLK	GROUND	OUTPUT
4	BLU/YEL	REAR WINDOW DEFOGGER RELAY	OUTPUT	8	BLU/BLK	BLOWER FEEDBACK	INPUT

20P CONNECTOR

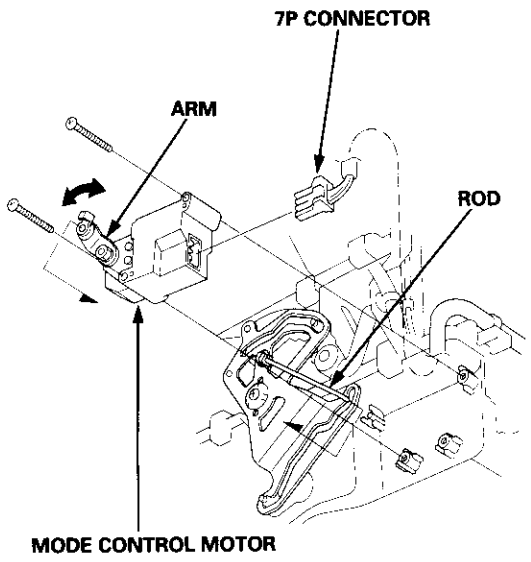
Cavity	Wire color	Signal		Cavity	Wire color	Signal	
1	GRY	AIR MIX POTENTIAL +5V	OUTPUT	11	WHT/BLU	BACK PU (POWER)	INPUT
2	GRN	EVAPORATOR TEMPERATURE SENSOR	OUTPUT	12	YEL	MODE HEAT/DEF	INPUT
3	———	———	———	13	BLU/BLK	MODE HEAT	INPUT
4	———	———	———	14	GRN/YEL	MODE HEAT/VENT	INPUT
5	———	———	———	15	YEL/RED	MODE VENT	INPUT
6	PNK/BLK	AIR MIX POTENTIAL	INPUT	16	YEL/BLU	MODE DEF	INPUT
7	———	———	———	17	RED/BLU	AIR MIX COOL	OUTPUT
8	ORN/WHT	BLOWER MOTOR HIGH RELAY	INPUT	18	RED/YEL	AIR MIX HOT	OUTPUT
9	BRN	SENSOR GROUND	INPUT	19	BRN/WHT	MODE MOTOR GROUND	INPUT
10	BLU/WHT	A/C PRESSURE SWITCH	INPUT	20	LT GRN/BLK	POWER TRANSISTOR BASE	OUTPUT

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Mode Control Motor

Replacement

1. Disconnect the 7P connector from the mode control motor. Remove the rod from the arm of the mode control motor. Remove the self-tapping screws and the mode control motor.



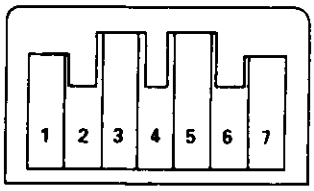
2. Install in the reverse order of removal. After installation, make sure the mode control motor runs smoothly.

Test

1. Disconnect the 7P connector from the mode control motor.

2. Connect battery power to the No. 1 terminal, and ground the No. 7 terminal. To avoid damaging the mode control motor, do not reverse power and ground.

MODE CONTROL MOTOR



3. Using a jumper wire, connect the No. 7 terminal individually to the No. 2, 3, 4, 5 and 6 terminals in that order. Each time the connection is made, the mode control motor should run smoothly and stop. If the mode control motor does not run when jumping the first terminal, jump that terminal again after jumping the other terminals. The mode control motor is OK if it runs when jumping the first terminal again.

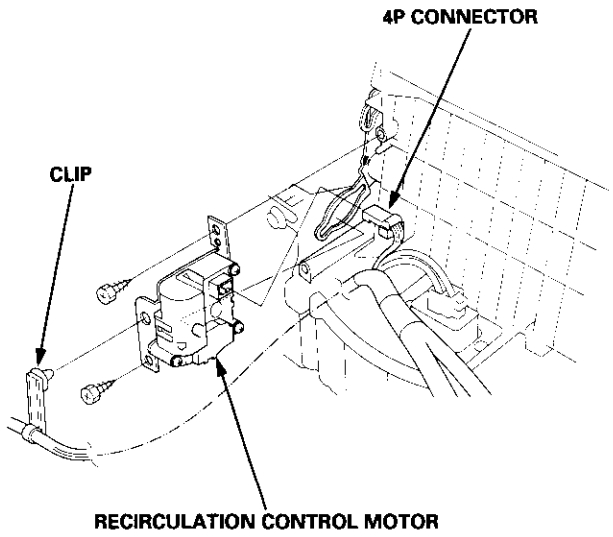
4. If the mode control motor does not run in step 3, remove it, then check the mode control linkage and doors for smooth movement. If they move smoothly, replace the mode control motor.

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Recirculation Control Motor

Replacement

1. Disconnect the 4P connector and the wire harness clip from the recirculation control motor. Remove the self-tapping screws and the recirculation control motor.



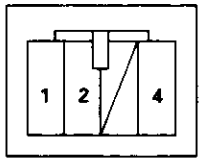
2. Install in the reverse order of removal. After installation, make sure the recirculation control motor runs smoothly.

Test

1. Disconnect the 4P connector from the recirculation control motor.

2. Connect battery power to the No. 1 terminal, and ground the No. 2 and No. 4 terminals; the recirculation control motor should run smoothly. To avoid damaging the recirculation control motor, do not reverse power and ground.

RECIRCULATION CONTROL MOTOR



3. Disconnect the No. 2 or No. 4 terminals from ground; the recirculation control motor should stop at Fresh or Recirculate. Don't cycle the recirculation control motor for a long time.

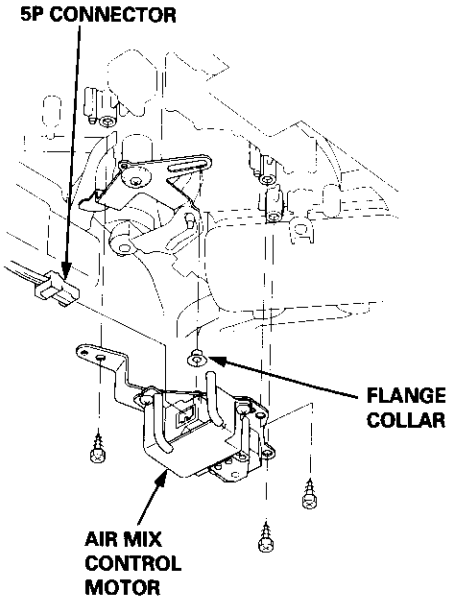
4. If the recirculation control motor does not run in step 2, remove it, then check the recirculation control linkage and door for smooth movement. If they move smoothly, replace the recirculation control motor.

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Air Mix Control Motor

Replacement

1. Disconnect the 5P connector from the air mix control motor. Remove the self-tapping screws, the air mix control motor and the flange collar.



2. Install in the reverse order of removal. After installation, make sure the air mix control motor runs smoothly.

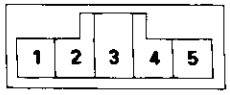
Test

1. Disconnect the 5P connector from the air mix control motor.

2. Connect battery power to the No. 1 terminal of the air mix control motor, and ground the No. 5 terminal; the air mix control motor should run, and stop at MAX HOT. If it doesn't, reverse the connections; the air mix control motor should run, and stop at MAX COOL.

   - If the air mix control motor does not run, remove it, then check the air mix control linkage and doors for smooth movement.
   - If they move smoothly, replace the air mix control motor.

AIR MIX CONTROL MOTOR



3. Measure the resistance between the No. 2 and No. 3 terminals. It should be approximately 6 kΩ ± 20%.

4. Measure the resistance between the No. 2 and No. 4 terminals. It should be approximately 4.8 kΩ ± 20% at MAX HOT and approximately 1.2 kΩ ± 20% at MAX COOL.

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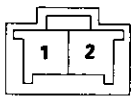
Evaporator Temperature Sensor

Test

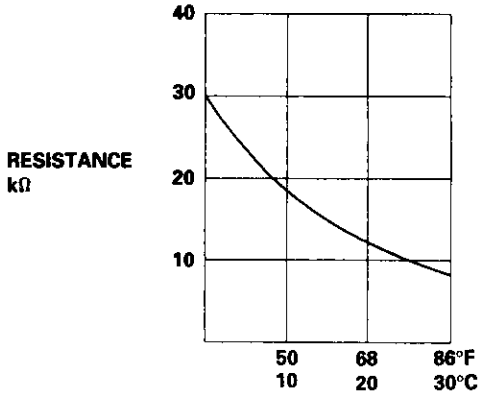
Dip the sensor in ice water, and measure the resistance with a digital multimeter. Then pour hot water on the sensor, and check for change in resistance.

Compare the resistance reading between the No. 1 and No. 2 terminals of the evaporator temperature sensor with the specifications shown in the following graph; resistance should be within the specifications.

EVAPORATOR TEMPERATURE SENSOR



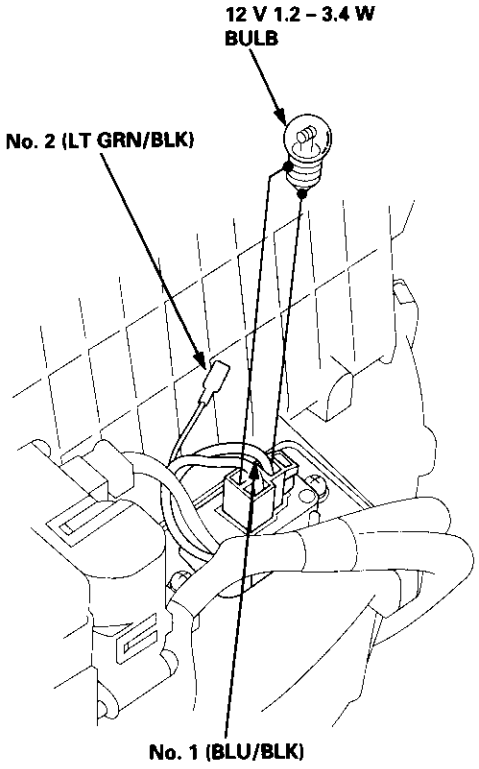
Terminal side of male terminals



Power Transistor

Test

1. Disconnect the 3P connector from the power transistor.
2. Carefully release the lock tab on the No. 2 terminal in the 3P connector, then remove the terminal and insulate it from body ground.

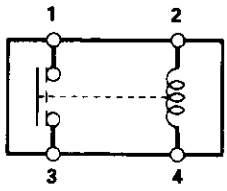


3. Connect a 1.2 – 3.4 W bulb between the No. 1 and the No. 2 cavity on the 3P connector.
4. Reconnect the 3P connector to the power transistor.
5. Turn the ignition switch ON (II), and check that the blower motor runs.
   - If the blower motor runs at half speed the power transistor is OK, replace the heater control panel.
   - If the blower motor does not run at half speed, replace the power transistor.

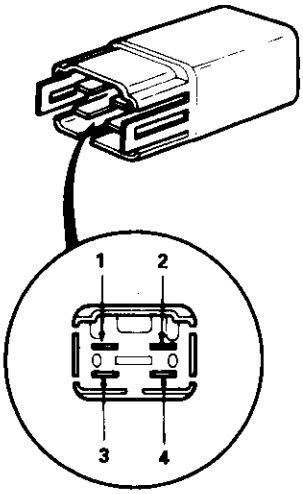
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Test

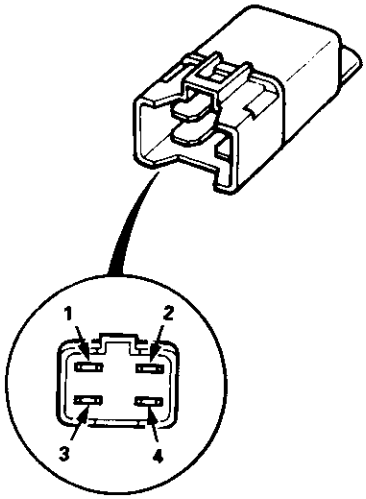
There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals, and there should be no continuity when power is disconnected.



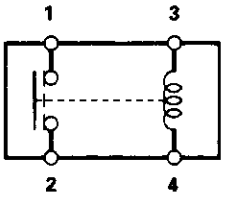
- Blower motor relay



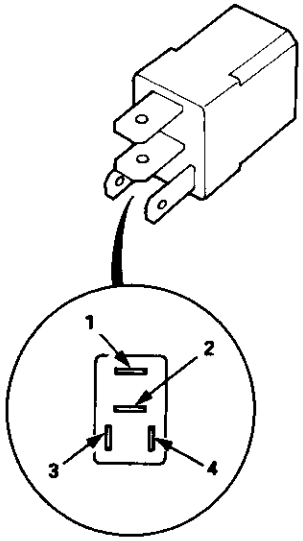
- Blower motor high relay



There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 4 terminals, and there should be no continuity when power is disconnected.



- Radiator fan relay
- Condenser fan relay
- Compressor clutch relay

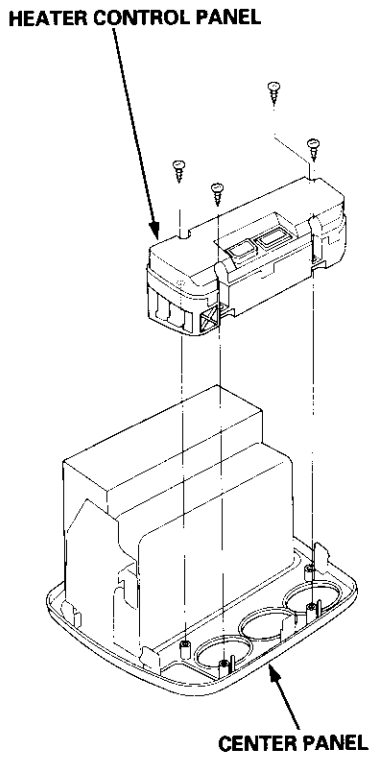


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Heater Control Panel

Replacement

1. Remove the center panel together with the heater control panel and the audio unit (see section 20).
2. Remove the self-tapping screws and the heater control panel from the center panel.

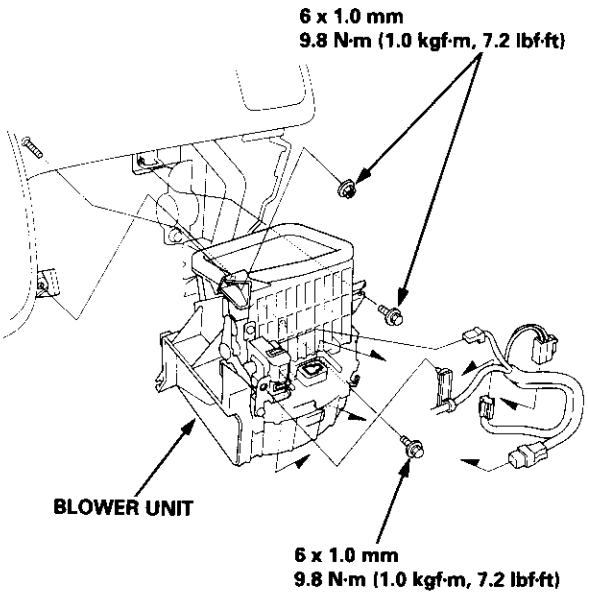


3. Install in the reverse order of removal.

Blower Unit

Replacement

1. Remove the evaporator (see page 22-48).
2. Disconnect the connectors from the blower motor, the blower motor high relay, the power transistor and the recirculation control motor. Remove the wire harness clip from the recirculation control motor, and release the wire harness from the clamp on the blower unit. Remove the mounting bolts, the mounting nut and the blower unit.



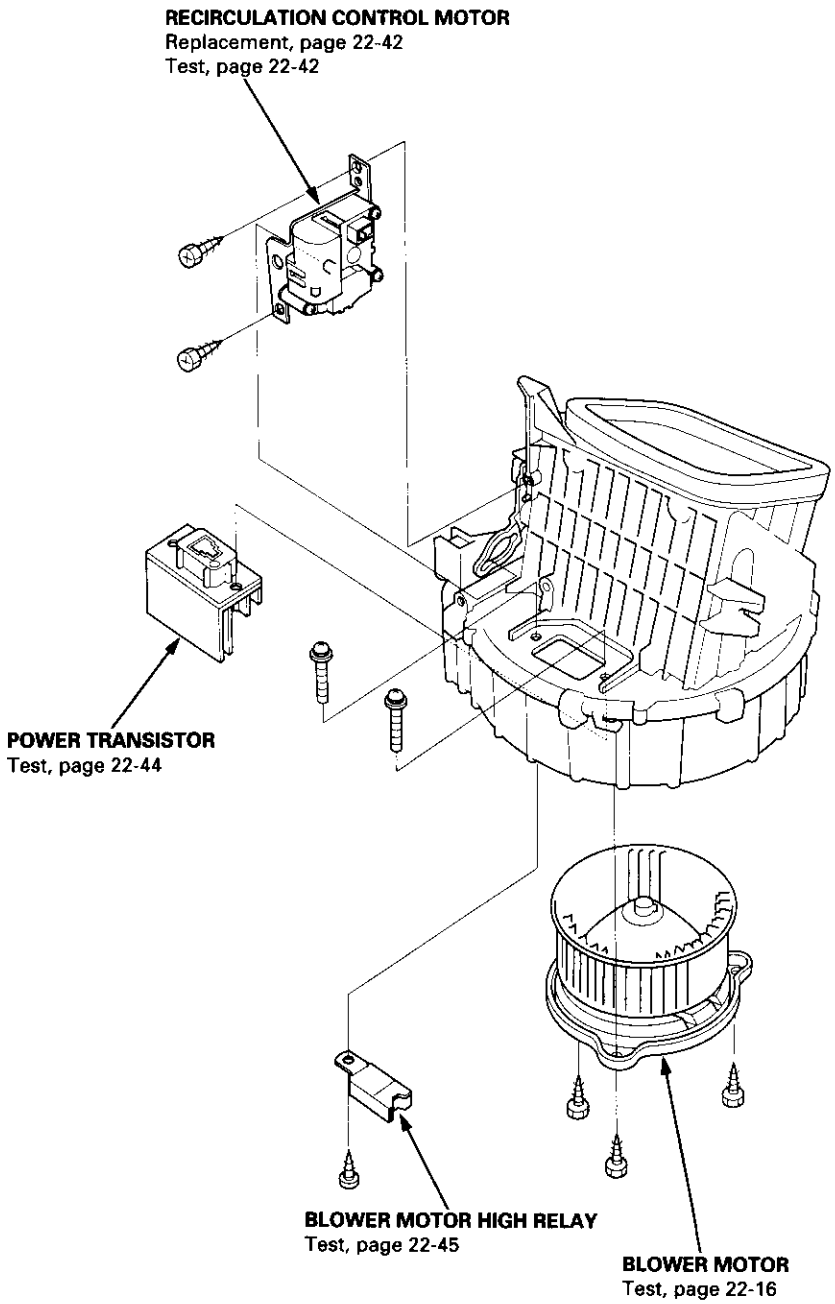
3. Install in the reverse order of removal. Make sure that there is no air leakage.

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Overhaul

Note these items when overhauling the blower unit.

- The recirculation control motor, the power transistor, the blower motor high relay, and the blower motor can be replaced without removing the blower unit.
- Before reassembly, make sure that the recirculation control door and linkage move smoothly without binding.
- After reassembly, make sure the recirculation control motor runs smoothly (see page 22-42).
- Make sure that there is no air leakage.



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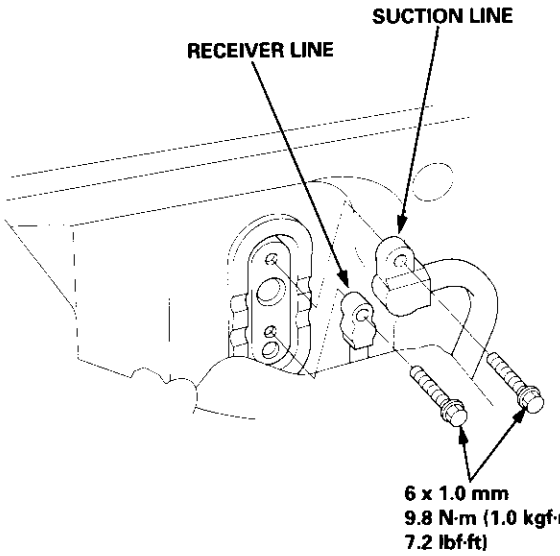
Evaporator

Replacement

1. Recover the refrigerant with a recovery/recycling/charging station (see page 22-59).

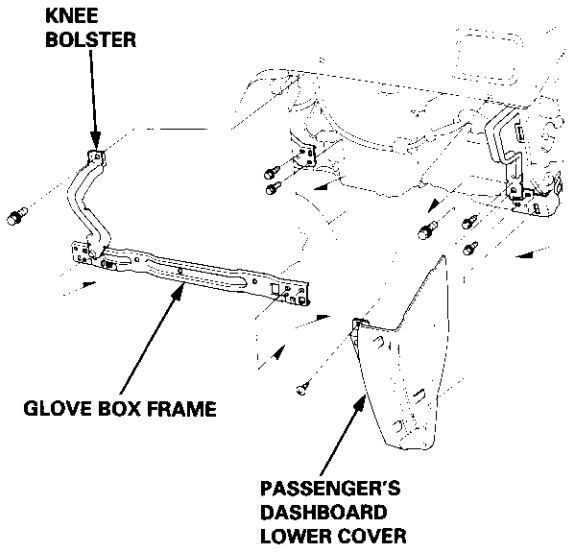
2. Remove the battery.

3. Remove each bolt, then disconnect the suction and receiver lines from the evaporator. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

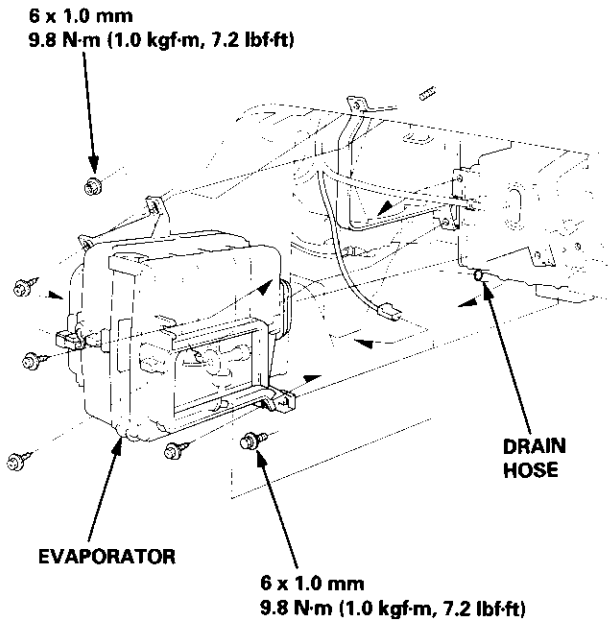


4. Remove the glove box (see section 20).

5. Remove the self-tapping screw and the passenger's dashboard lower cover, then remove the bolts and the glove box frame together with the knee bolster.



6. Disconnect the connector from the evaporator temperature sensor, and remove the wire harness from the evaporator. Remove the self-tapping screws, the mounting bolt and the mounting nut. Disconnect the drain hose, then remove the evaporator.



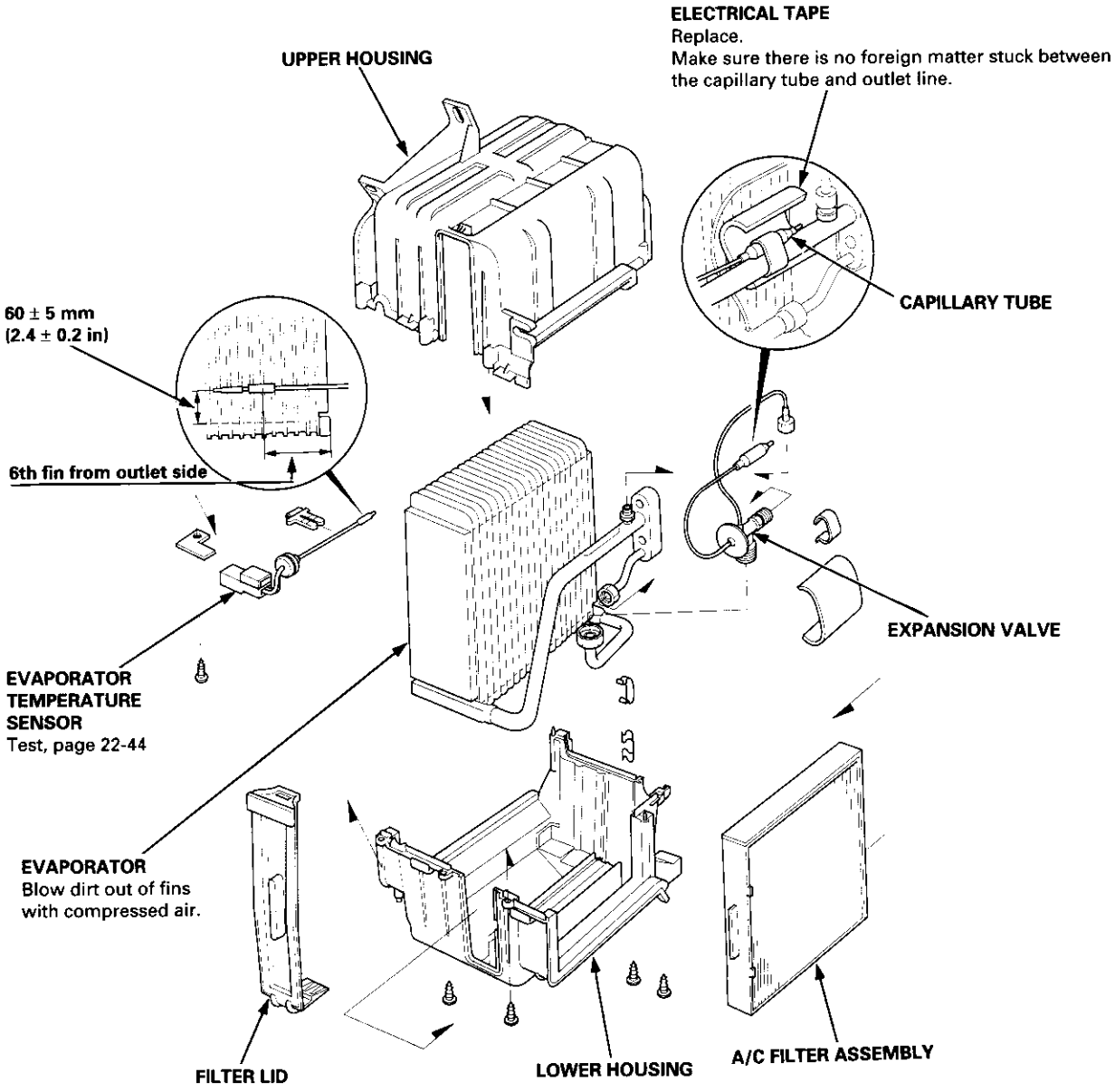
7. Install in the reverse order of removal, and note of these items.

- If you're installing a new evaporator, add refrigerant oil (SP-10) (see page 22-54).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Apply sealant to the grommets.
- Make sure that there is no air leakage.
- Charge the system (see page 22-61), and test its performance (see page 22-56).

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Overhaul

1. Remove the filter lid, then pull out the A/C filter assembly.
2. Pull out the evaporator temperature sensor from the evaporator fins.
3. Remove the self-tapping screws and the clamps from the housings.
4. Carefully separate the housings, then remove the evaporator.
5. If necessary, remove the expansion valve. When loosening the nuts of the expansion valve, use a second wrench to hold the expansion valve or the evaporator line. Otherwise, they can be damaged.
6. Reassemble the evaporator in the reverse order of disassembly. Make note of these items.
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Install the expansion valve capillary tube with the capillary tube in contact with the outlet line directly, and wrap it with electrical tape.
   - Reinstall the evaporator temperature sensor to its original location.
   - Make sure that there is no air leakage.

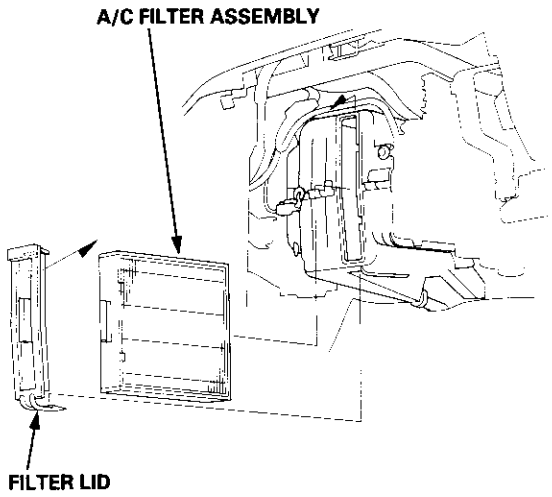


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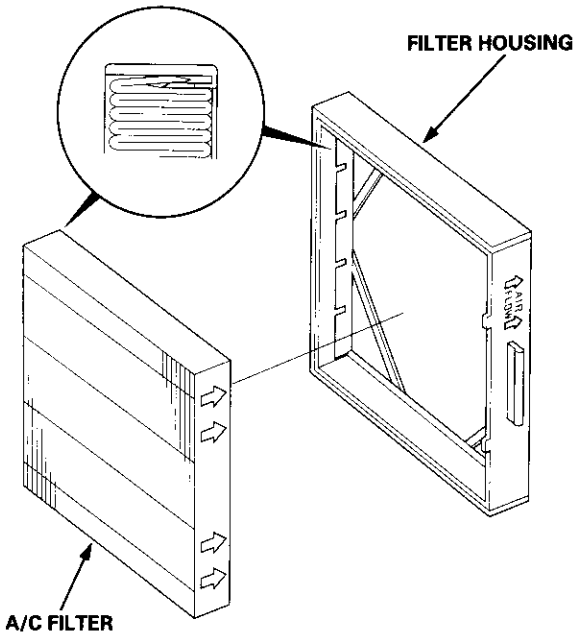
A/C Filter

Replacement

1. Remove the glove box (see section 20).
2. Remove the glove box frame (see page 22-48).
3. Release the wire harness from the clamps on the evaporator. Remove the filter lid, then pull out the A/C filter assembly from the evaporator housing.



4. Remove the A/C filter from the filter housing. Replace the A/C filter according to the maintenance schedule in the owner's manual.



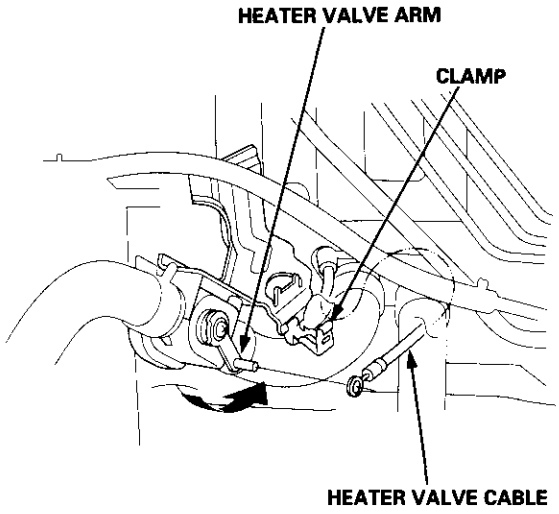
5. Install in the reverse order of removal. Make sure that there is no air leakage.

Heater Unit

Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect the negative cable from the battery.
2. From under the hood, open the cable clamp, then disconnect the heater valve cable from the heater valve arm. Turn the heater valve arm to the fully opened position as shown.



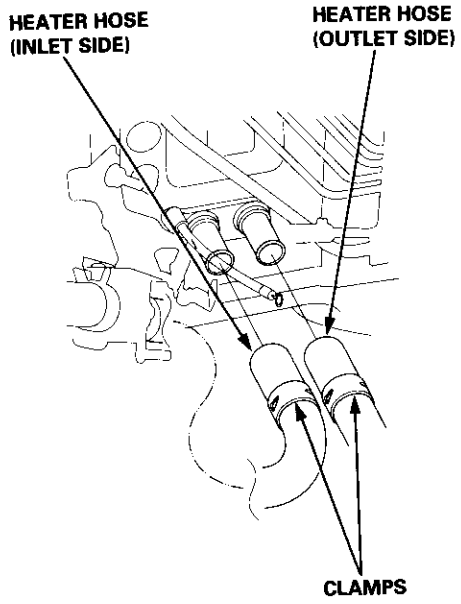
3. When the engine is cool, drain the engine coolant from the radiator (see section 10).

⚠ WARNING Do not remove the radiator cap when the engine is hot; the engine coolant is under pressure and could severely scald you.

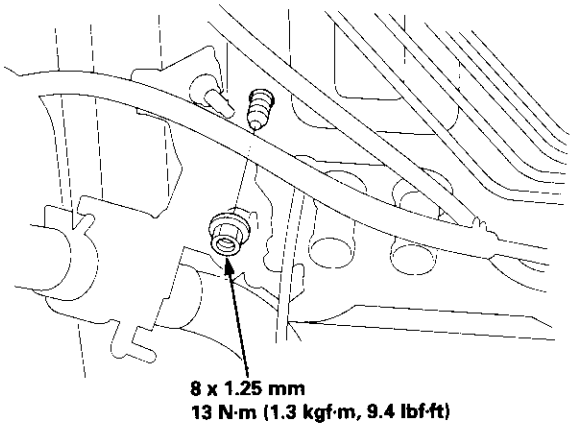
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4. Disconnect the heater hoses from the heater unit. Engine coolant will run out when the hoses are disconnected; drain in into a clean drip pan.

CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant from painted surfaces.



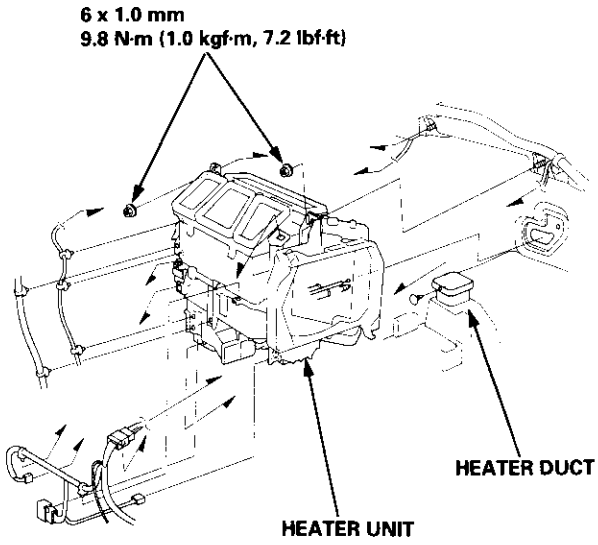
5. Remove the mounting nut from the heater unit. Take care not to damage or bend the fuel lines, the brake lines, etc.



6. Remove the dashboard (see section 20).

7. Remove the evaporator (see page 22-48).

8. Disconnect the connectors from the mode control motor and the air mix control motor, and remove the wire harness clips and wire harness from the heater unit. Remove the clip from the heater duct, then remove the mounting nuts and the heater unit.



9. Install in the reverse order of removal. Make note of the following items.

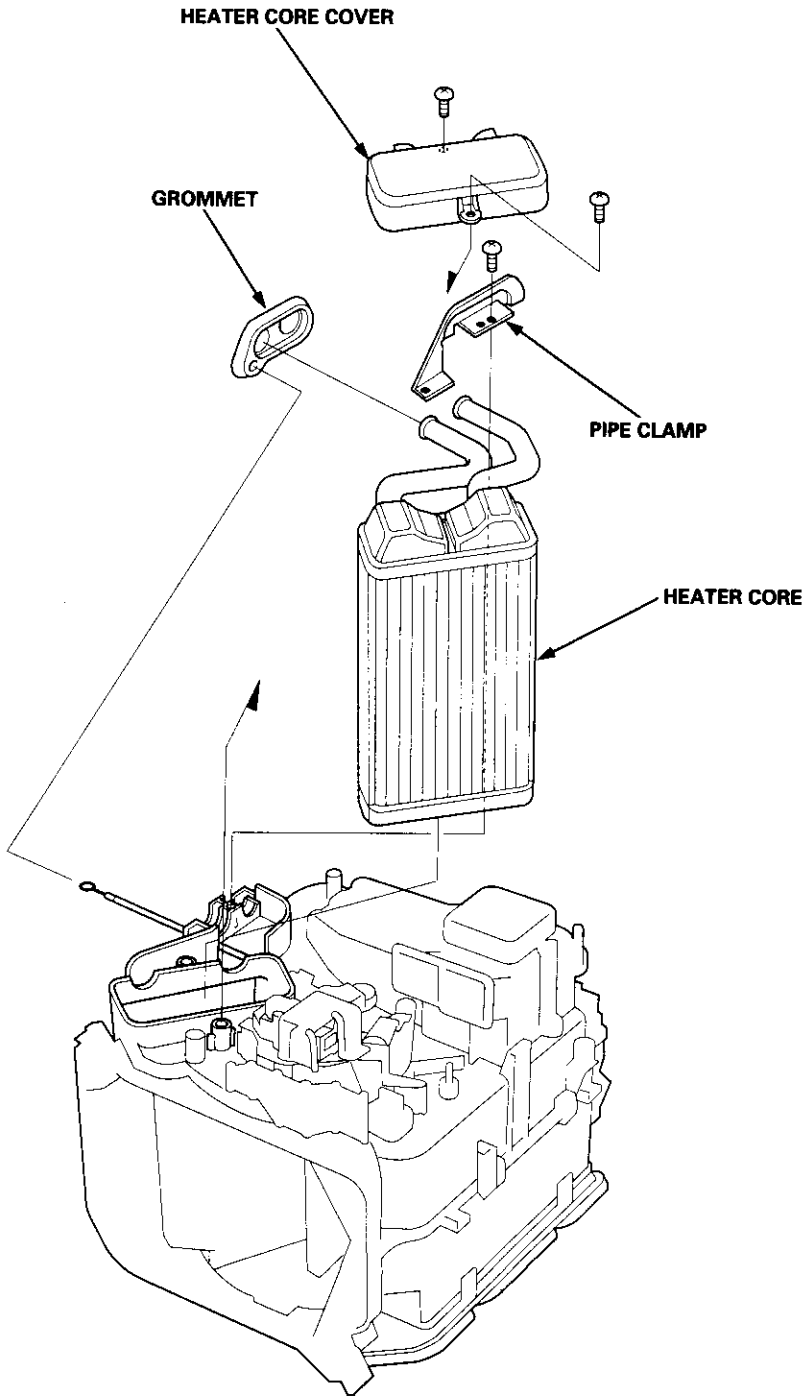
- Apply sealant to the grommets.
- Do not interchange the inlet and outlet heater hoses. Make sure that the clamps are secure.
- Refill the cooling system with engine coolant (see section 10).
- Adjust the heater valve cable (see page 22-53).
- Make sure that there is no air leakage.

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Heater Unit

Overhaul

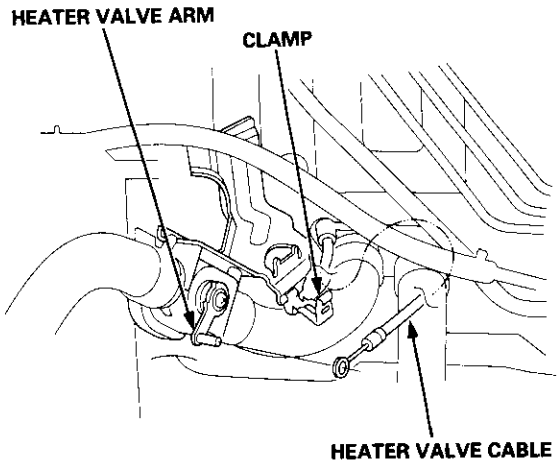
1. Remove the self-tapping screws and the heater core cover.
2. Pull out the grommet from the heater core pipes.
3. Remove the self-tapping screw and the pipe clamp.
4. Pull out the heater core. Be careful not to bend the inlet and outlet pipes during heater core removal.
5. Reassemble the heater unit in the reverse order of disassembly.



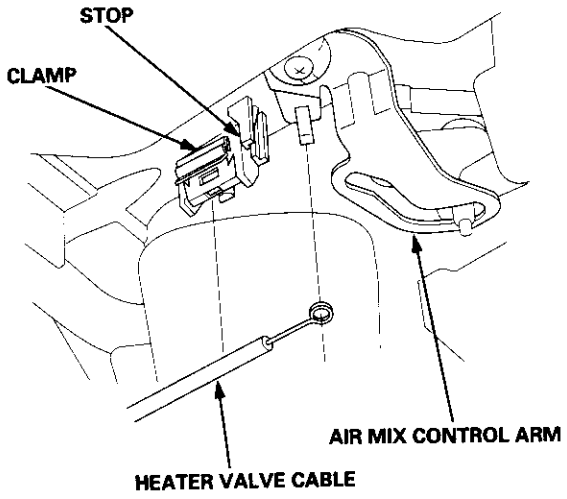
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Adjustment

1. From under the hood, open the cable clamp, then disconnect the heater valve cable from the heater valve arm.



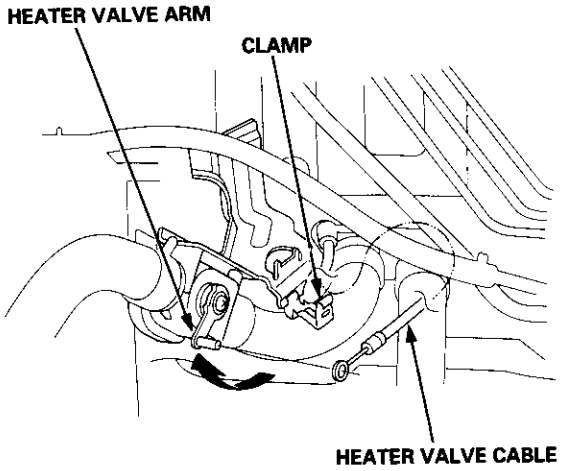
2. From under the dash, disconnect the heater valve cable housing from the cable clamp, and disconnect the heater valve cable from the air mix control arm.



3. Set the temperature control dial on MAX COOL with the ignition switch ON (II).

4. Attach the heater valve cable to the air mix control arm as shown above. Hold the end of the heater valve cable housing against the stop, then snap the heater valve cable housing into the cable clamp.

5. From under the hood, turn the heater valve arm to the fully closed position as shown, and hold it. Attach the heater valve cable to the heater valve arm, and gently pull on the heater valve cable housing to take up any slack, then install the heater valve cable housing into the cable clamp.



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A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil*, which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioner system or your servicing equipment will result.

***KEIHIN SP-10:**

- **P/N 38897 – P13 – A01AH: 120 mℓ (4 fl·oz, 4.2 Imp·oz)**
- **P/N 38899 – P13 – A01: 40 mℓ (1 1/3 fl·oz, 1.4 Imp·oz)**

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove R-134a from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

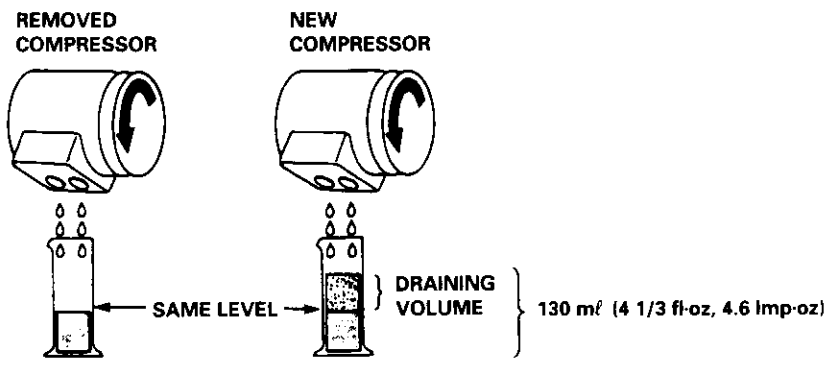
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, use a R-134a refrigerant recovery/recycling/charging station; don't release refrigerant into the atmosphere.
6. Add refrigerant oil after replacing the following parts.

   Note these items when handling refrigerant oil:
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

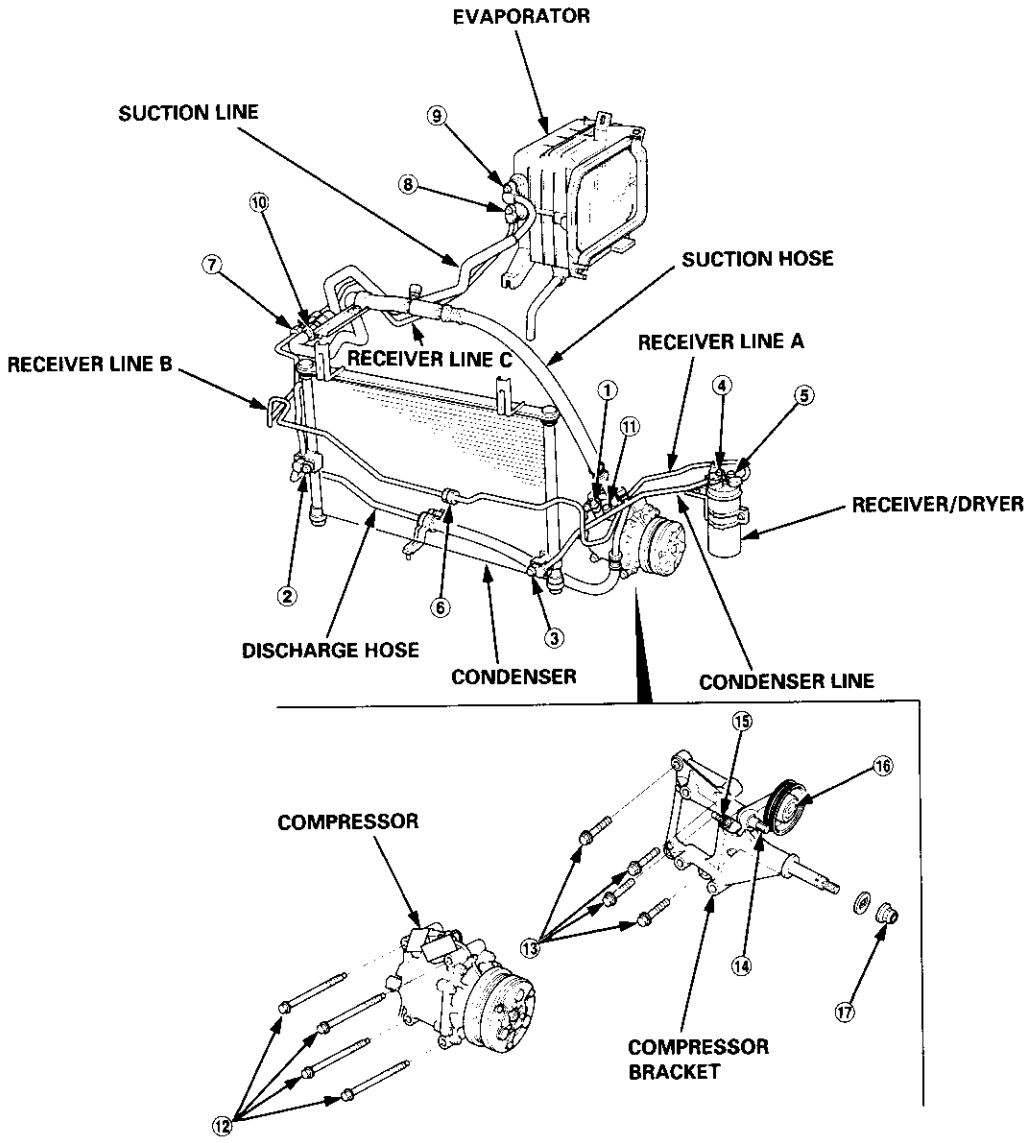
Condenser ..... **25 mℓ (5/6 fl·oz, 0.9 Imp·oz)**
Evaporator ..... **40 mℓ (1 1/3 fl·oz, 1.4 Imp·oz)**
Line or hose ..... **10 mℓ (1/3 fl·oz, 0.4 Imp·oz)**
Receiver/Dryer ..... **10 mℓ (1/3 fl·oz, 0.4 Imp·oz)**
Leakage repair ..... **25 mℓ (5/6 fl·oz, 0.9 Imp·oz)**
Compressor ..... **For compressor replacement, subtract the volume of oil drained from the removed compressor from 130 mℓ (4 1/3 fl·oz, 4.6 Imp·oz), and drain the calculated volume of oil from the new compressor: 130 mℓ (4 1/3 fl·oz, 4.6 Imp·oz) — Volume of removed compressor = Volume to drain from new compressor.**

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 mℓ (1 2/3 fl·oz, 1.8 Imp·oz) from the new compressor.



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A/C System Torque Specifications



① Discharge hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
② Discharge hose to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
③ Condenser line to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
④ Condenser line to the receiver/dryer (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑤ Receiver line A to the receiver/dryer (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑥ Receiver line B to the receiver line A	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑦ Receiver line C to the receiver line B	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑧ Receiver line C to the evaporator (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑨ Suction line to the evaporator (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑩ Suction line to the suction hose	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑪ Suction hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑫ Compressor to the compressor bracket (8 x 1.25 mm)	24 N·m (2.4 kgf·m, 17 lbf·ft)
⑬ Compressor bracket to the cylinder block (10 x 1.25 mm)	44 N·m (4.5 kgf·m, 33 lbf·ft)
⑭ Idler pulley bracket to the compressor bracket (10 x 1.25 mm)	44 N·m (4.5 kgf·m, 33 lbf·ft)
⑮ Lock nut of the adjusting bolt to the compressor bracket	24 N·m (2.4 kgf·m, 17 lbf·ft)
⑯ Idler pulley to the idler pulley bracket	44 N·m (4.5 kgf·m, 33 lbf·ft)
⑰ Compressor bracket to the left front mount (12 x 1.25 mm)	59 N·m (6.0 kgf·m, 43 lbf·ft)

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Performance Test

The performance test will help determine if the air conditioner system is operating within specifications.

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

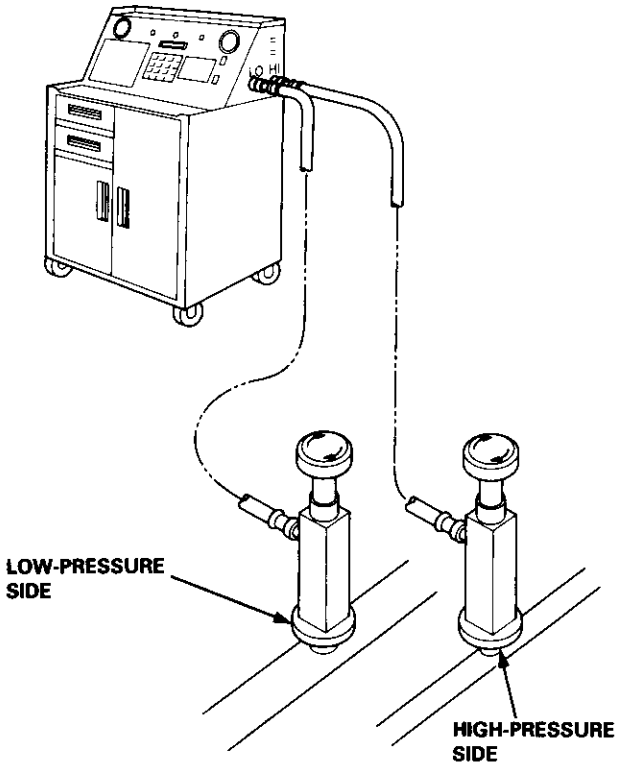
1. Connect a R-134a refrigerant recover/recycling/charging station to the vehicle, as shown, following the equipment manufacturer's instructions.

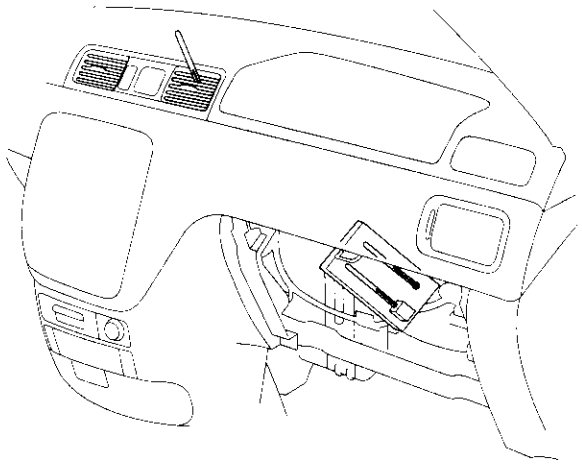
2. Insert a thermometer in the center air vent. Determine the relative humidity and air temperature.

3. Test conditions:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control dial on MAX COOL, the mode control dial on VENT and the recirculation control switch on RECIRCULATE.
   - Turn the A/C switch on and the fan switch on MAX.
   - Run the engine at 1,500 rpm.
   - No driver or passengers in vehicle

4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

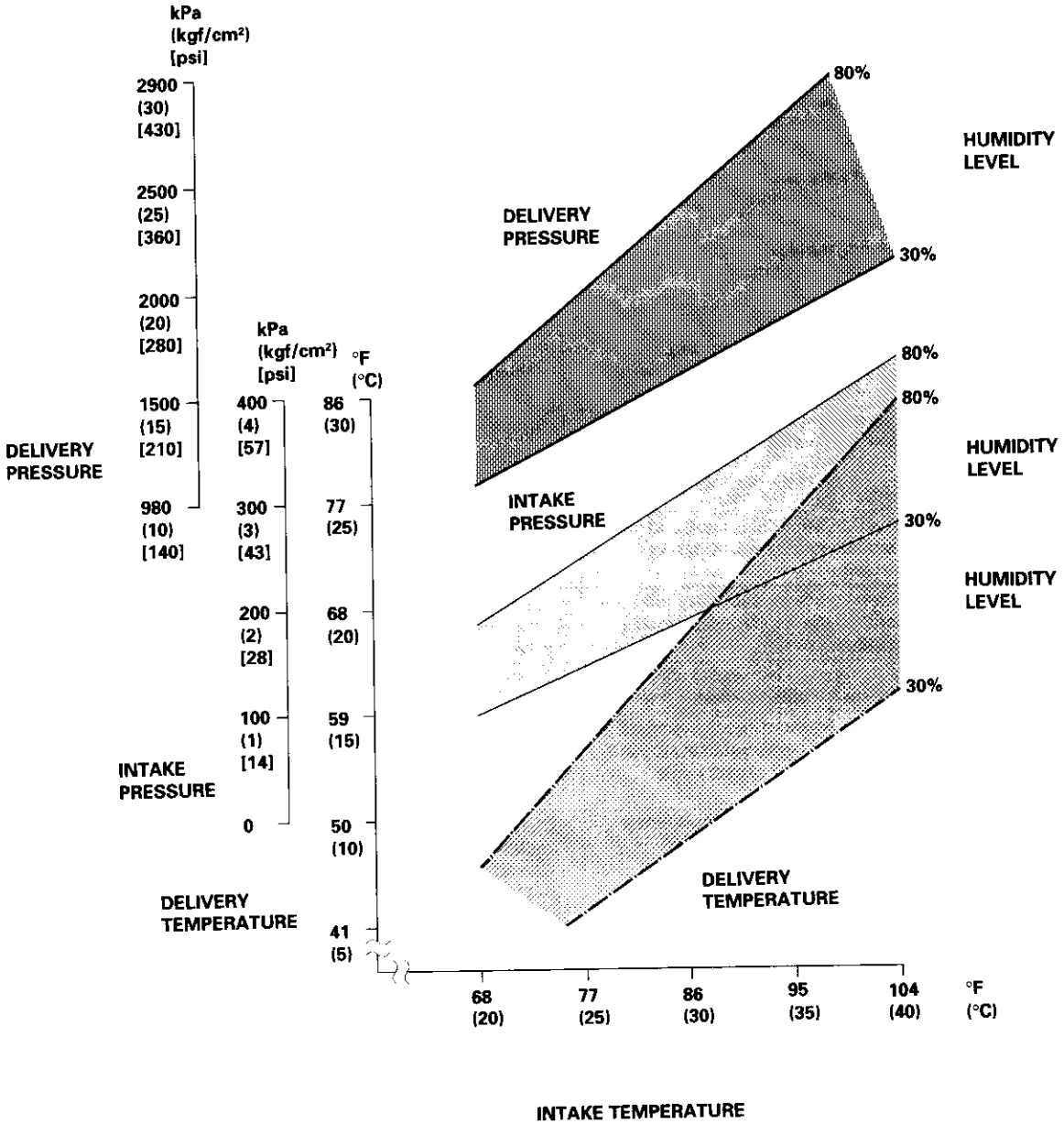
Recovery/Recycling/Charging Station





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5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point 10% above and 10% below the humidity level.
   - From each point, draw a horizontal line across the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low-side pressure test and high-side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



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Pressure Test Chart

NOTE: Performance Test is on page 22-56.

Test results	Related symptoms	Probable cause	Remedy
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kgf/cm², 28 psi) quickly, and then falls gradually.	Air in system	Discharge, evacuate, and recharge with specified amount. Evacuation: see page 22-60 Charging: see page 22-61
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
	Reduced or no air flow through condenser	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean • Check voltage and fan rpm. • Check fan direction.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Restricted lines
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	• Check for leak. • Charge system.
	High and low pressures are balanced soon after stopping compressor. Low side is higher than normal.	• Faulty compressor discharge valve • Faulty compressor seal	Replace the compressor.
	Outlet of expansion valve is not frosted, low-pressure gauge indicates vacuum.	• Faulty expansion valve • Moisture in system	• Replace • Discharge, evacuate, and recharge with specified amount.
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	• Repair the leaks. • Discharge, evacuate, and recharge with specified amount. • Charge as required.
	Expansion valve is not frosted, and low-pressure line is not cold. Low-pressure gauge indicates vacuum.	• Frozen expansion valve (Moisture in system) • Faulty expansion valve	• Discharge, evacuate, and recharge with specified amount. • Replace the expansion valve.
	Discharge temperature is low, and the air flow from vents is restricted.	Frozen evaporator	Run the fan with compressor off, then check evaporator temperature sensor.
	Expansion valve is frosted.	Clogged expansion valve	Clean or replace.
	Receiver/dryer outlet is cool, and inlet is warm (should be warm during operation).	Clogged receiver/dryer	Replace
Suction pressure abnormally high	Low-pressure hose and check joint are cooler than the temperature around evaporator.	• Expansion valve open too long • Loose expansion capillary tube	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
	High and low-pressure are equalized as soon as the compressor is stopped, and both gauges fluctuate while running.	• Faulty gasket • Faulty high-pressure valve • Foreign particle stuck in high-pressure valve	Replace the compressor.
Suction and discharge pressures abnormally high	Reduced air flow through condenser.	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean • Check voltage and fan rpm. • Check fan direction.
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
Suction and discharge pressure abnormally low	Low-pressure hose and metal end areas are cooler than evaporator.	Clogged or kinked low-pressure hose parts	Repair or replace.
	Temperature around expansion valve is too low compared with that around receiver/dryer.	Clogged high-pressure line	Repair or replace.
Refrigerant leaks	Compressor clutch is dirty.	Compressor shaft seal leaking	Replace the compressor.
	Compressor bolt(s) are dirty.	Leaking around bolt(s)	Tighten bolt(s) or replace compressor.
	Compressor gasket is wet with oil.	Gasket leaking	Replace the compressor.

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Recovery

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

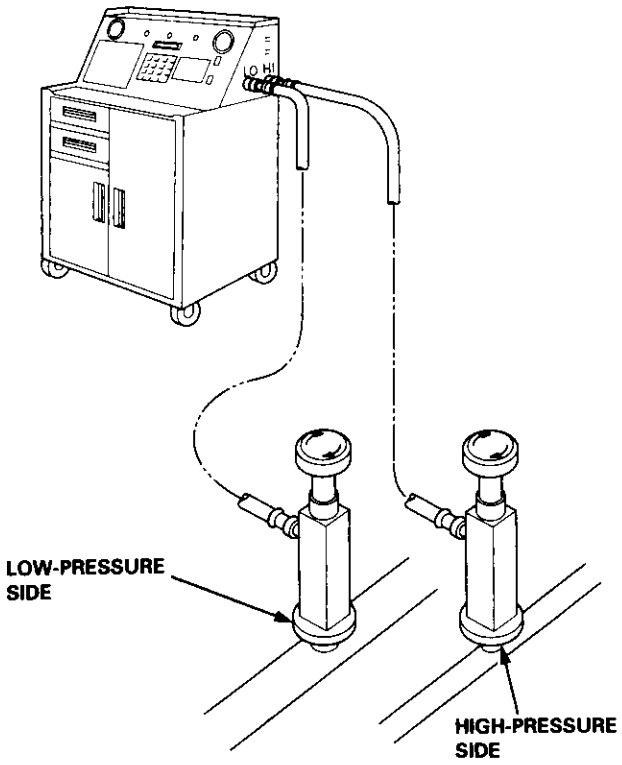
⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant recovery/recycling/charging station to the vehicle, as shown, following the equipment manufacturer's instructions.

2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

Recovery/Recycling/Charging Station



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Evacuation

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

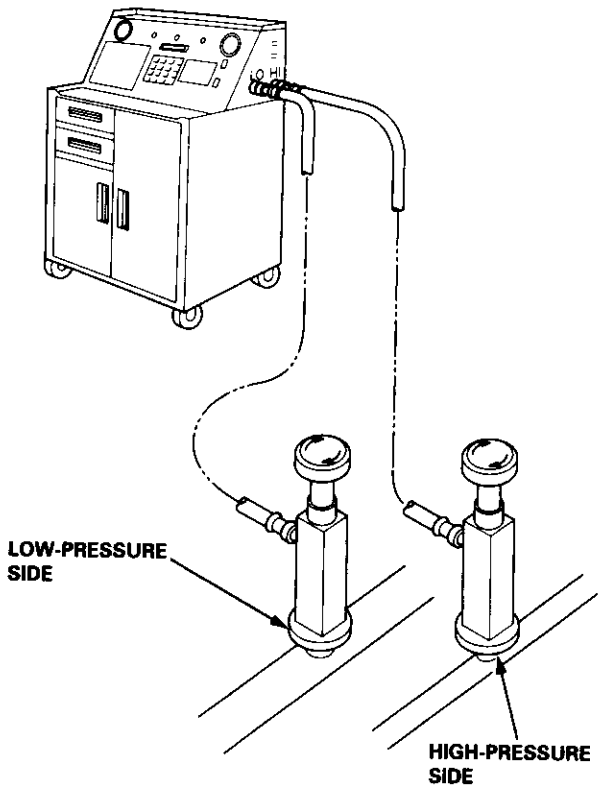
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant recovery/recycling/charging station. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)

2. Connect a R-134a refrigerant recovery/recycling/charging station to the vehicle, as shown, following the equipment manufacturer's instructions. Evacuate the system.

3. If the low-pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in.Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test).

Recovery/Recycling/Charging Station



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Charging

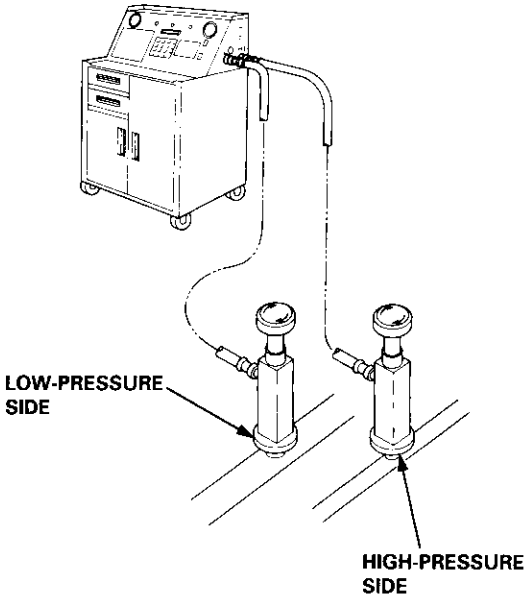
Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Connect a R-134a refrigerant recovery/recycling/charging station to the vehicle, as shown, following the equipment manufacturer's instructions.

Recovery/Recycling/Charging Station



Add the same amount of new refrigerant oil to system that was removed during recovery. Use only SP-10 refrigerant oil.

Charge the system with Required amount of R-134a refrigerant. Do not overcharge the system; the compressor will be damaged.

Select the appropriate unit of measure for your charging station.

Refrigerant capacity: 700 to 750 g
0.70 to 0.75 kg
1.5 to 1.6 lbs.
24.7 to 26.5 oz.

Leak Test

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant recovery/recycling/charging station to the vehicle, as shown in the previous column, following the equipment manufacturer's instructions.
2. Open the high-pressure valve to charge the system to the specified capacity, then close the supply valve, and remove the charging system couplers.

   Select the appropriate unit of measure for your charging station.

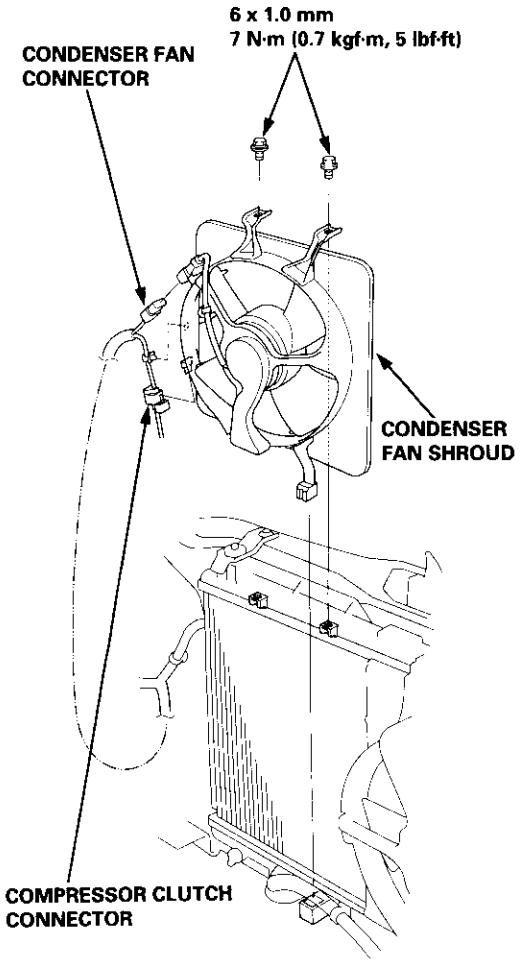
   Refrigerant capacity: 700 to 750 g
   0.70 to 0.75 kg
   1.5 to 1.6 lbs.
   24.7 to 26.5 oz.
3. Check the system for leaks using a R-134a refrigerant leak detector with an accuracy of 14 g (0.5 oz) per year or better.
4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), recover the system according to the Recovery Procedure on page 22-59.
5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-60).

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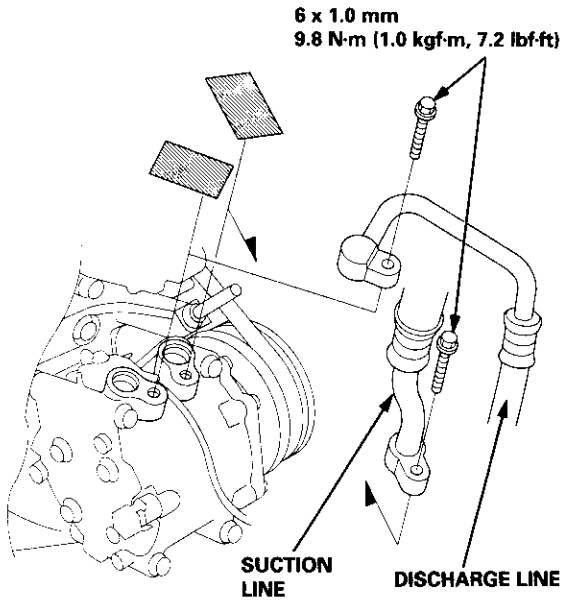
Compressor

Replacement

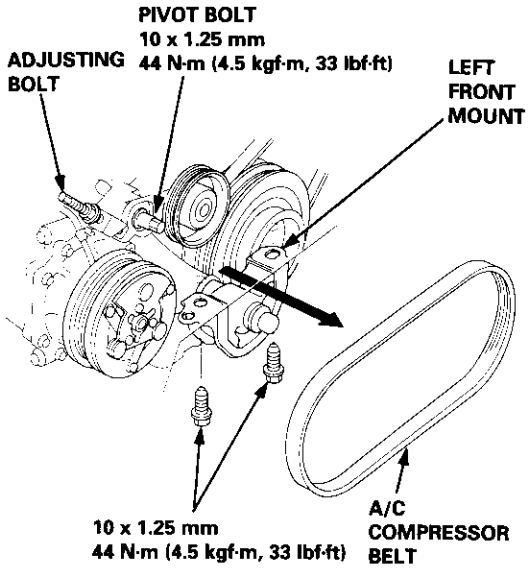
1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioner work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Recover the refrigerant with a recovery/recycling/charging station (see page 22-59).
4. Disconnect the condenser fan connector. Remove the compressor clutch connector and the wire harness clip from the condenser fan shroud, then disconnect the compressor clutch connector. Remove the mounting bolts and the condenser fan shroud.



5. Remove each bolt, then disconnect the suction and discharge lines from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

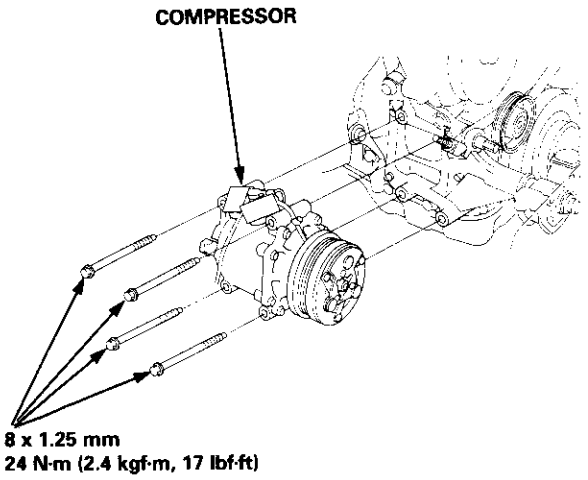


6. Remove the power steering pump belt (see section 17).
7. Loosen the pivot bolt of the idler pulley bracket and the adjusting bolt, then remove the A/C compressor belt from the pulleys. If necessary, remove the mounting bolts from the left front mount, then remove the A/C compressor belt through the gap between the body and the left front mount.



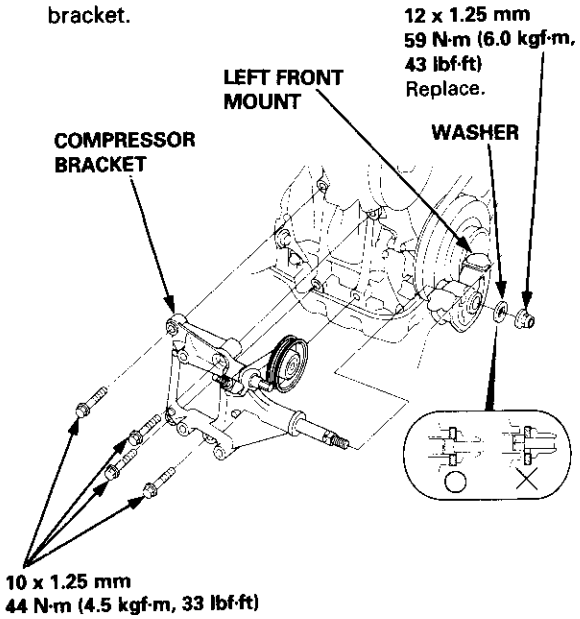
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8. Remove the mounting bolts and the compressor.

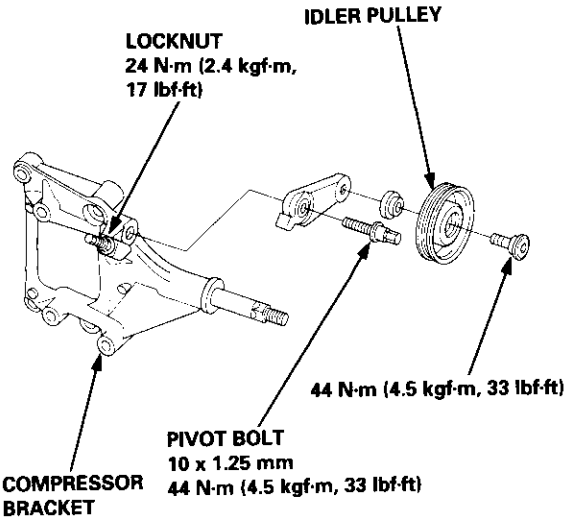


9. If necessary, remove the compressor bracket as follows.

   - Remove the nut and the washer from the left front mount. When tightening the nut to the left front mount, make sure the washer is set properly on the left front mount as shown.
   - Remove the mounting bolts and the compressor bracket.



10. Check the idler pulley bearing for play and drag, and replace it with a new one if it's noisy or has excessive play or drag.



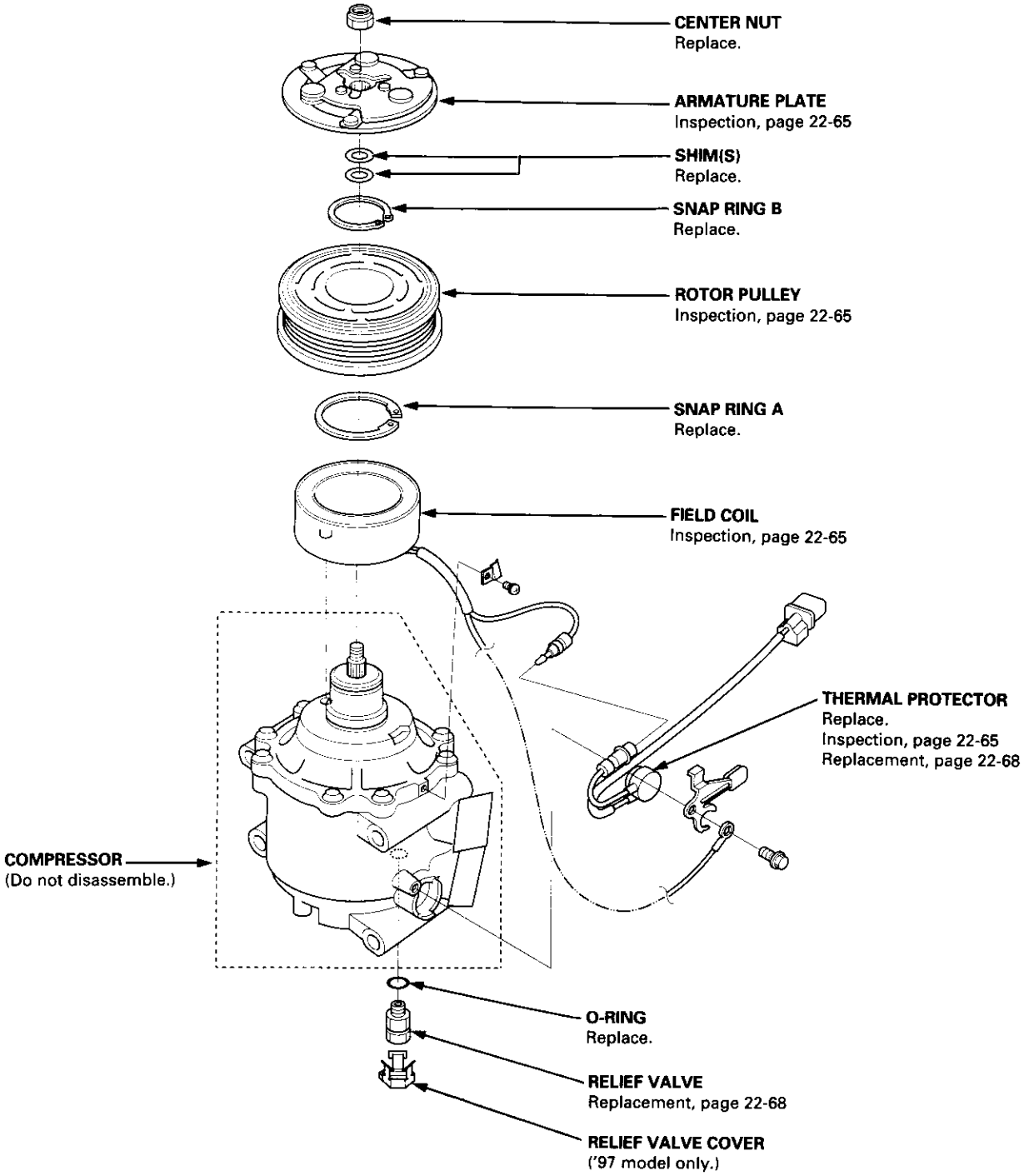
11. Install in the reverse order of removal. Make note of the following items.

   - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 130 mℓ (4 1/3 fl·oz, 4.6 Imp·oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Use refrigerant oil (SP-10) for R-134a KEIHIN spiral type compressors only.
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
   - Adjust the A/C compressor belt (see page 22-69) and the power steering pump belt (see section 17).
   - Charge the system (see page 22-61), and test its performance (see page 22-56).

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Compressor

Illustrated Index

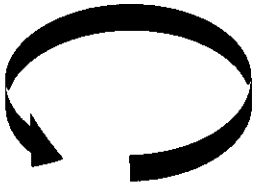


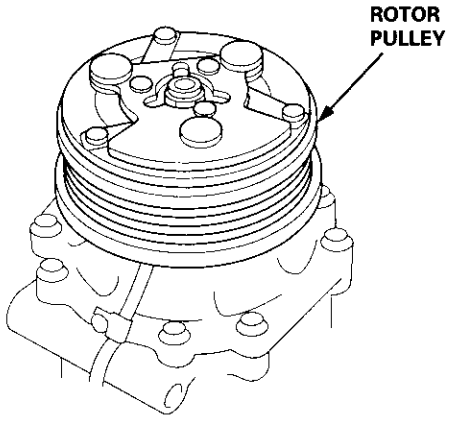
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Clutch Inspection

- Check the plated parts of the armature plate for color changes, peeling or other damage. If there is damage, replace the clutch set.

- Check the rotor pulley bearing play and drag by rotating the rotor pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.

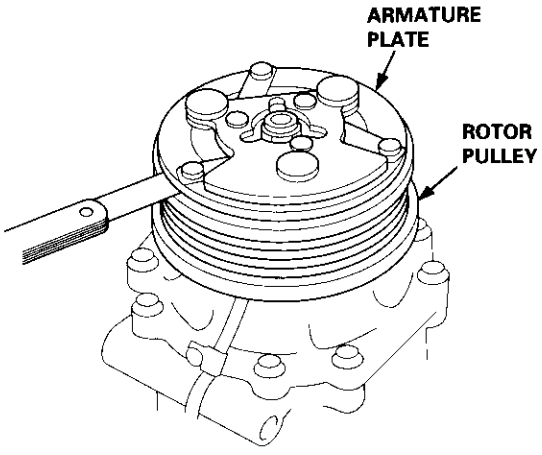




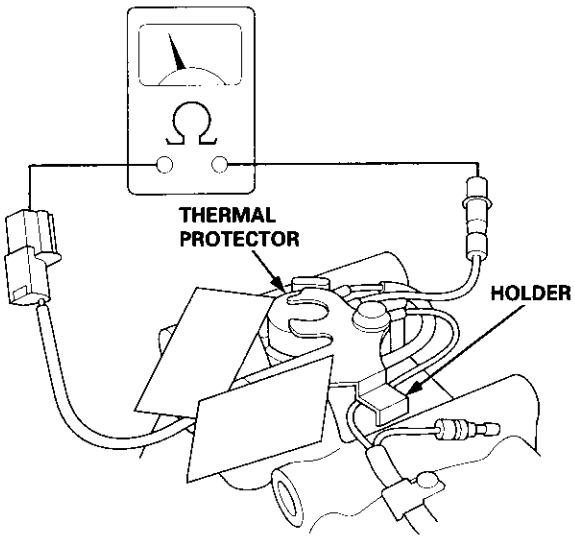
- Measure the clearance between the rotor pulley and the armature plate all the way around. If the clearance is not within specified limits, the armature plate must be removed and shims added or removed as required, following the procedure on page 22-66.

Clearance: 0.5 ± 0.15 mm (0.020 ± 0.006 in)

NOTE: The shims are available in four thicknesses: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm



- Release the field coil connector from the holder, then disconnect it. Check the thermal protector for continuity. If there is no continuity, replace the thermal protector.

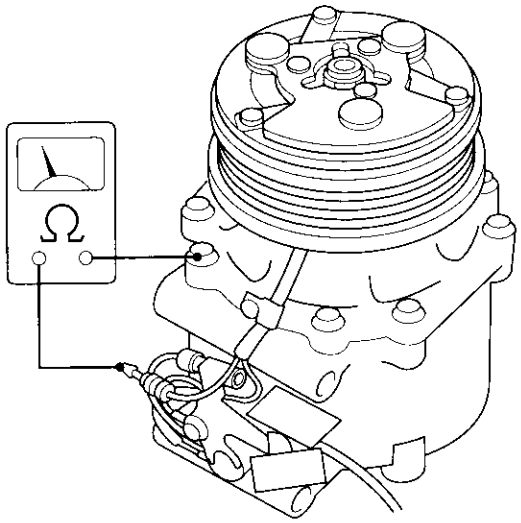


NOTE: The thermal protector will have no continuity above 251.6 to 262.4°F (122 to 128°C). When the temperature drops below 240.8 to 219.8°F (116 to 104°C), the thermal protector will have continuity.

- Check resistance of the field coil.

Field Coil Resistance: 3.2 ± 0.15 ohms at 68°F (20°C)

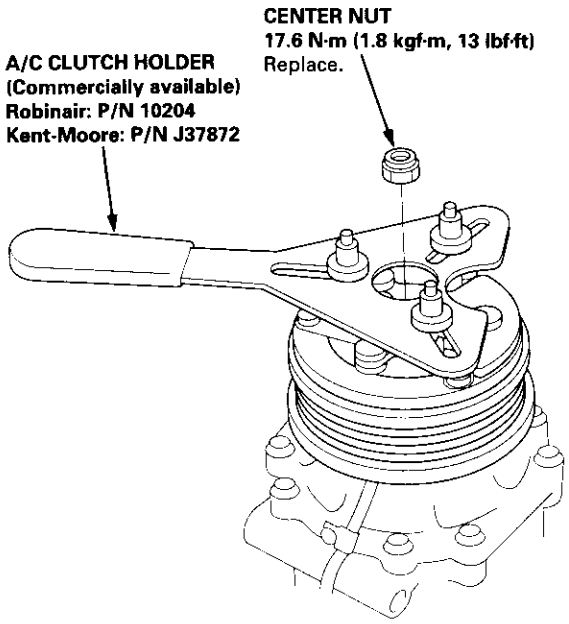
If resistance is not within specifications, replace the field coil.



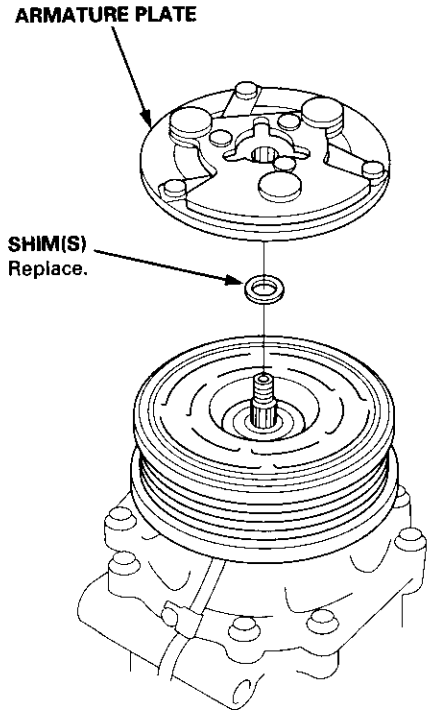
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Clutch Overhaul

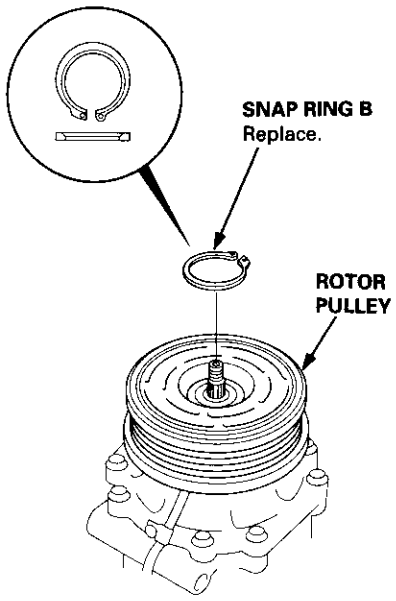
1. Remove the center nut while holding the armature plate with the tool.



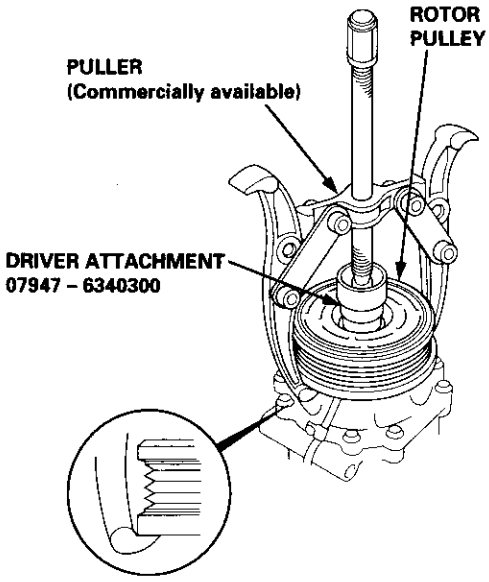
2. Remove the armature plate by pulling it up by hand.



3. Remove the snap ring B with snap ring pliers. Be careful not to damage the rotor pulley and compressor.

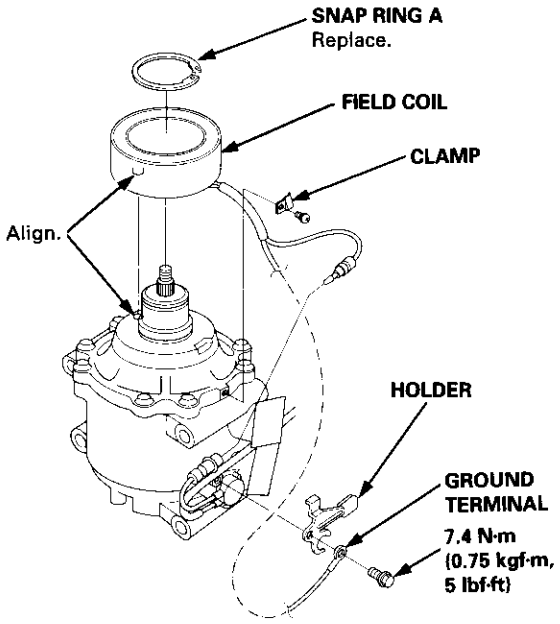


4. Remove the rotor pulley from the shaft with the tools. Be sure the claws of the puller are on the back of the rotor pulley, not on the back area; otherwise the rotor pulley can be damaged.



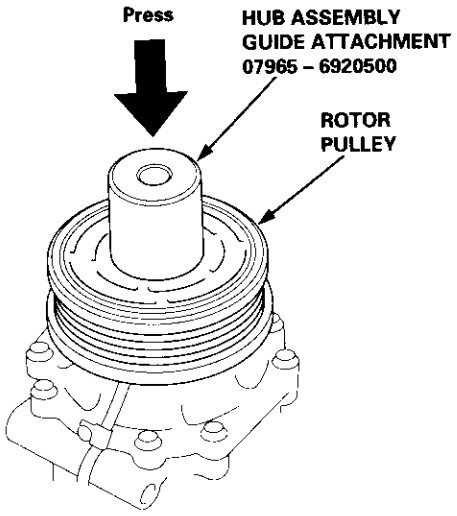
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5. Remove the bolt and holder, and screw and clamp, then disconnect the field coil connector. Remove the snap ring A with snap ring pliers, then remove the field coil. Be careful not to damage the field coil and compressor.



6. Position the rotor pulley squarely over the field coil. Press the rotor pulley onto the compressor boss with the special tool. If the rotor pulley does not press on straight, remove it, and check the rotor pulley and compressor boss for burrs or damage.

CAUTION: Maximum press load: 39,200 kPa (400 kgf/cm², 5,690 psi)



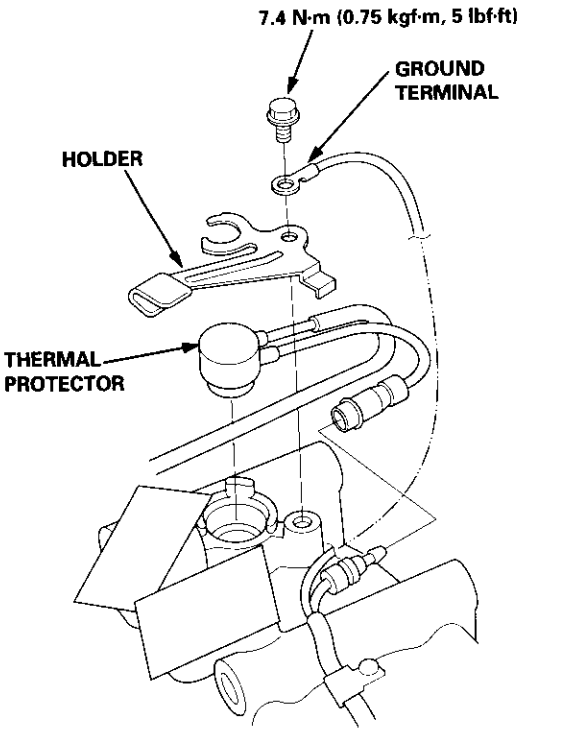
7. Reassemble the compressor clutch in the reverse order of disassembly. Make note of the following items.

- Install the field coil with the wire side facing down, and align the boss on the field coil with the hole in the compressor.
- Clean the rotor pulley and compressor sliding surfaces with non-petroleum solvent.
- Install new snap rings A and B.
- Make sure the snap rings are fully seated in the groove.
- Make sure that the rotor pulley turns smoothly after it's reassembled.
- Route and clamp the wires properly or they can be damaged by the rotor pulley.

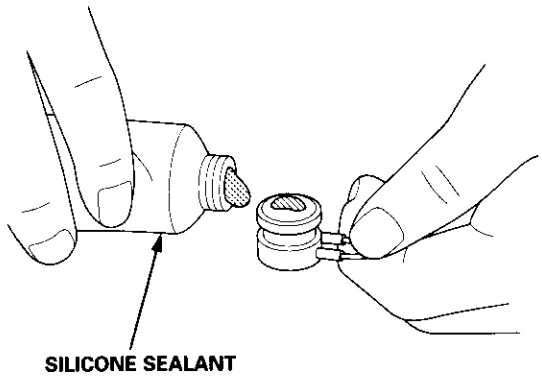
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Thermal Protector Replacement

1. Remove the bolt, the ground terminal and the holder. Disconnect the field coil connector, then remove the thermal protector.



2. Replace the thermal protector with a new one, and apply silicone sealant to the bottom of the thermal protector.

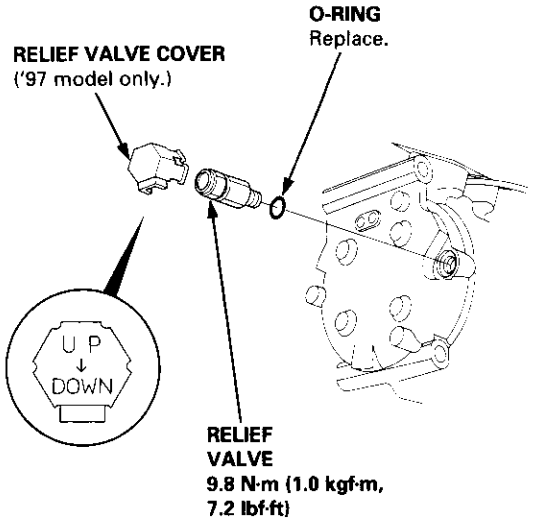


3. Install in the reverse order of removal.

Relief Valve Replacement

1. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-59).

2. Remove the relief valve cover ('97 model), the relief valve and the O-ring. Plug the opening to keep foreign matter from entering the system and the compressor oil from running out.



3. Clean the mating surfaces.

4. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil before installing it.

5. Remove the plug, and install and tighten the relief valve.

6. Put the cover on the relief valve so that the arrow directs downwards as shown in the illustration above ('97 model).

7. Charge the system (see page 22-61), and test its performance (see page 22-56).

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A/C Compressor Belt

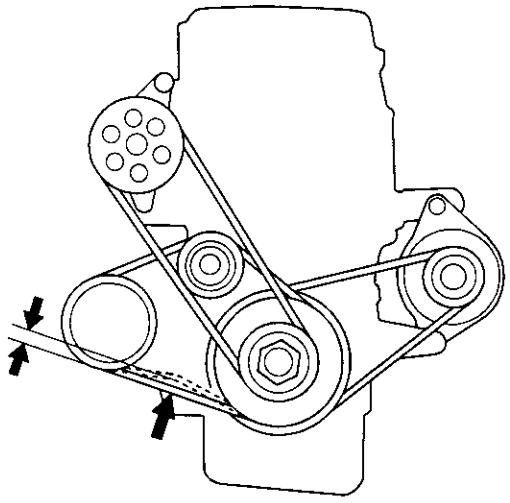
Adjustment

Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the A/C compressor and the crankshaft pulley.

   A/C Compressor Belt
   Used Belt: 7.5 – 10.5 mm (0.30 – 0.41 in)
   New Belt: 5.0 – 7.0 mm (0.20 – 0.28 in)

   Note these items when adjusting belt tension:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.



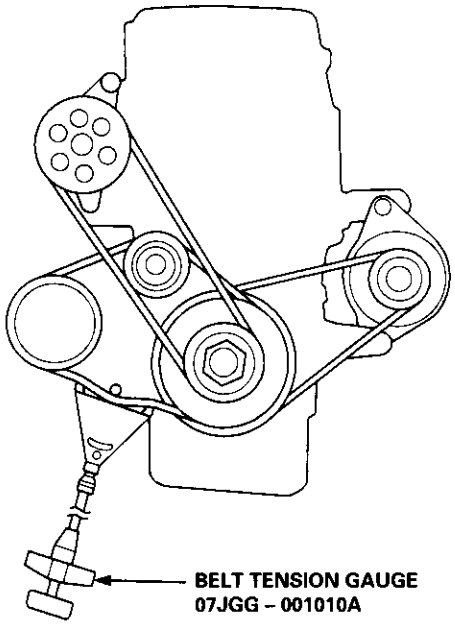
2. Loosen the pivot bolt of the idler pulley bracket and the locknut of the adjusting bolt.
3. Turn the adjusting bolt to get proper belt tension.
4. Retighten the pivot bolt of the idler pulley bracket and the locknut of the adjusting bolt.
5. Recheck the deflection of the A/C compressor belt.

Tension Gauge Method

1. Attach the special tool to the A/C compressor belt as shown below, and measure the tension of the belt.

   A/C Compressor Belt
   Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 120 lbf)
   New Belt: 740 – 880 N (75 – 90 kgf, 170 – 200 lbf)

   Note these items when adjusting belt tension:
   - Follow the manufacturer's instructions for the belt tension gauge.
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.



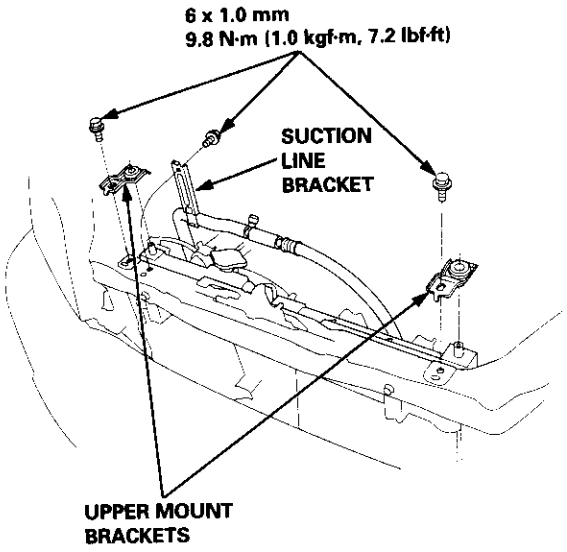
2. Loosen the pivot bolt of the idler pulley bracket and the locknut of the adjusting bolt.
3. Turn the adjusting bolt to get proper belt tension.
4. Retighten the pivot bolt of the idler pulley bracket and the locknut of the adjusting bolt.
5. Recheck the tension of the A/C compressor belt.

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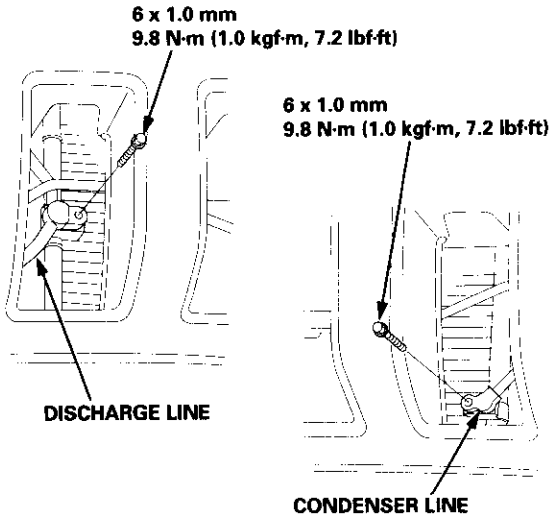
Condenser

Replacement

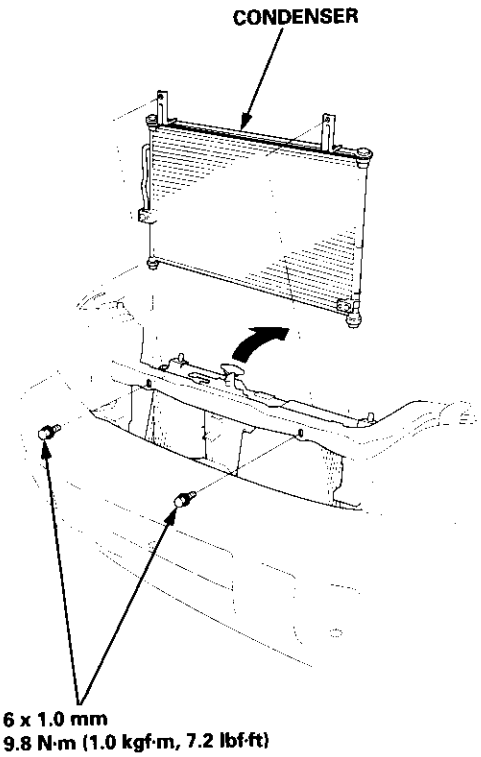
1. Recover the refrigerant with a recovery/recycling/charging station (see page 22-59)
2. Remove the front grille (see section 20).
3. Remove the coolant reservoir, but do not disconnect the reservoir hose from the coolant reservoir and the radiator.
4. Remove the bolts and the suction line bracket as shown. Remove the bolts and the upper mount brackets from the radiator.



5. Remove each bolt, then disconnect the discharge and condenser lines from the condenser. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



6. Remove the mounting bolts, then remove the condenser by lifting it up as shown. Be careful not to damage the radiator and condenser fins when removing the condenser.



7. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new condenser, add refrigerant oil (SP-10) (see page 22-54).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Be careful not to damage the radiator and condenser fins when installing the condenser.
- Be sure to install the lower mount cushions of condenser securely into the holes.
- Charge the system (see page 22-61), and test its performance (see page 22-56).

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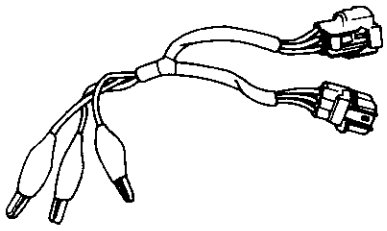
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAJ – PT3020A	Test Harness	1	23-62, 63



①

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Tips and Precautions

Before Troubleshooting

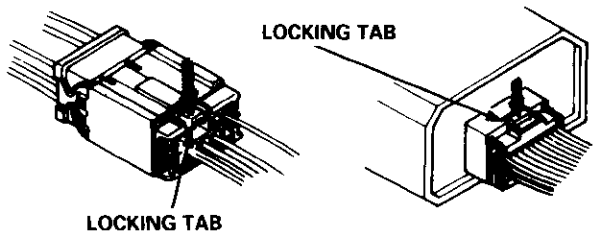
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean, and tight connections.
- Check the alternator belt tension.

CAUTION:

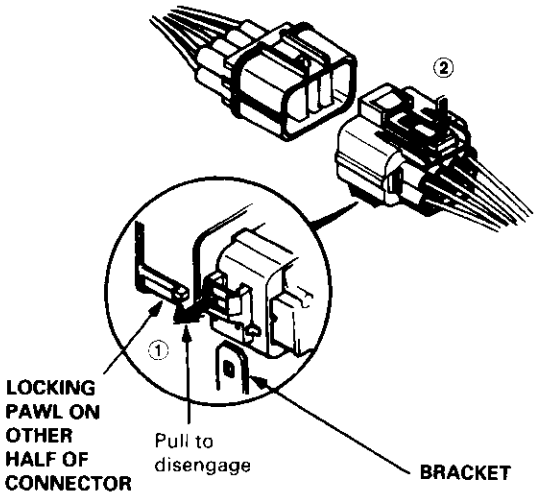
- **Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.**

Handling Connectors

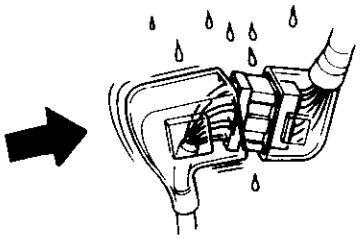
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except water-tight connectors).
- All connectors have push-down release type locks.



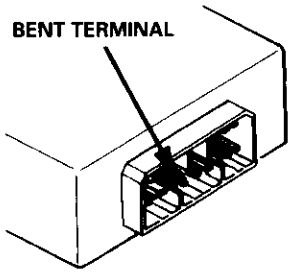
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



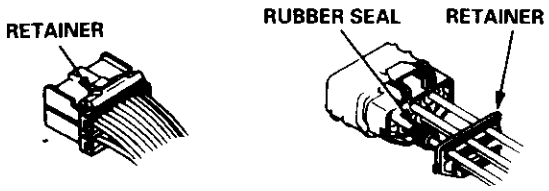
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



- Before connecting connectors, make sure the terminals are in place and not bent.



- Check for loose retainers and rubber seals.



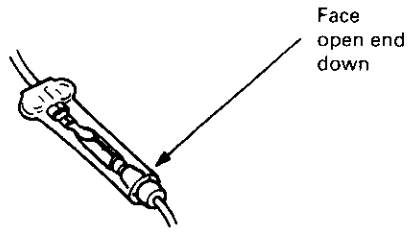
- The backs of some connectors are packed with grease. Add grease if necessary. If the grease is contaminated, replace it.

(cont'd)

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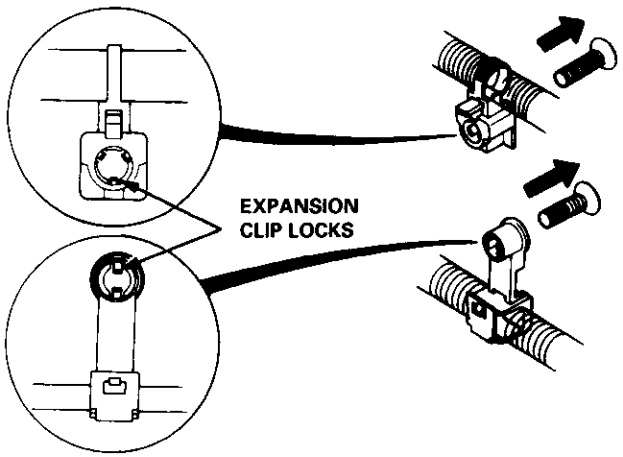
Tips and Precautions (cont'd)

- Insert the connector all the way and make sure it is securely locked.
- Position wires so that the open end of the cover faces down.

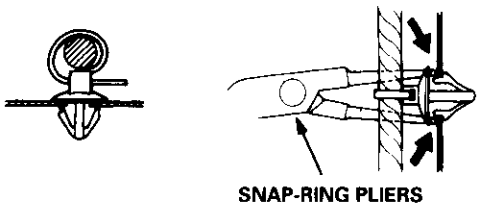


Handling Wires and Harnesses

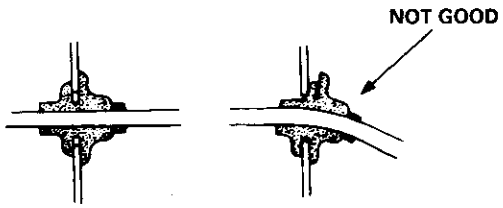
- Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
- Remove clips carefully; don't damage their locks.



Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.

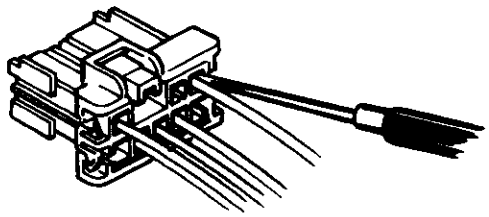


- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.
- Seat grommets in their grooves properly.

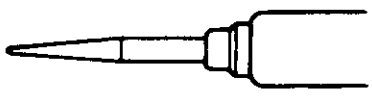


Testing and Repairs

- Do not use wires or harnesses with broken insulation. Replace them or repair them by wrapping the break with electrical tape.
- After installing parts, make sure that no wires are pinched under them.
- When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
- If possible, insert the probe of the tester from the wire side (except waterproof connector).



- Use a probe with a tapered tip.



- Refer to the instructions in the Honda Terminal Kit for identification and replacement of connector terminals.

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Five-step Troubleshooting

1. Verify The Complaint
   Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. Analyze The Schematic
   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. Isolate The Problem By Testing The Circuit
   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. Fix The Problem
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

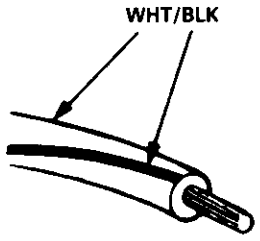
5. Make Sure The Circuit Works
   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Brown
GRY	Gray
PUR	Purple
LT BLU	Light Blue
LT GRN	Light Green

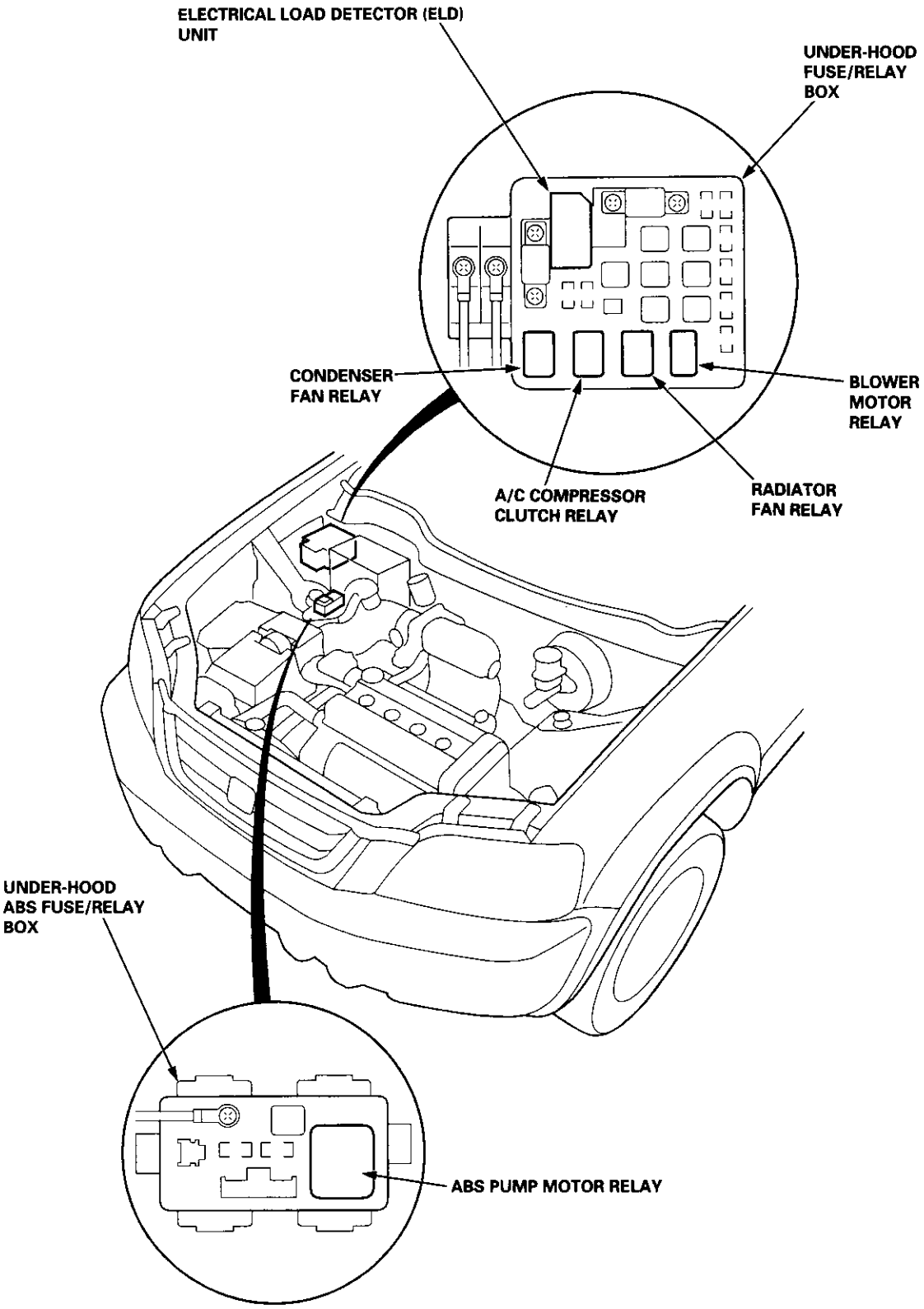
The wire insulation has one color or one color with another color stripe. The second color is the stripe.



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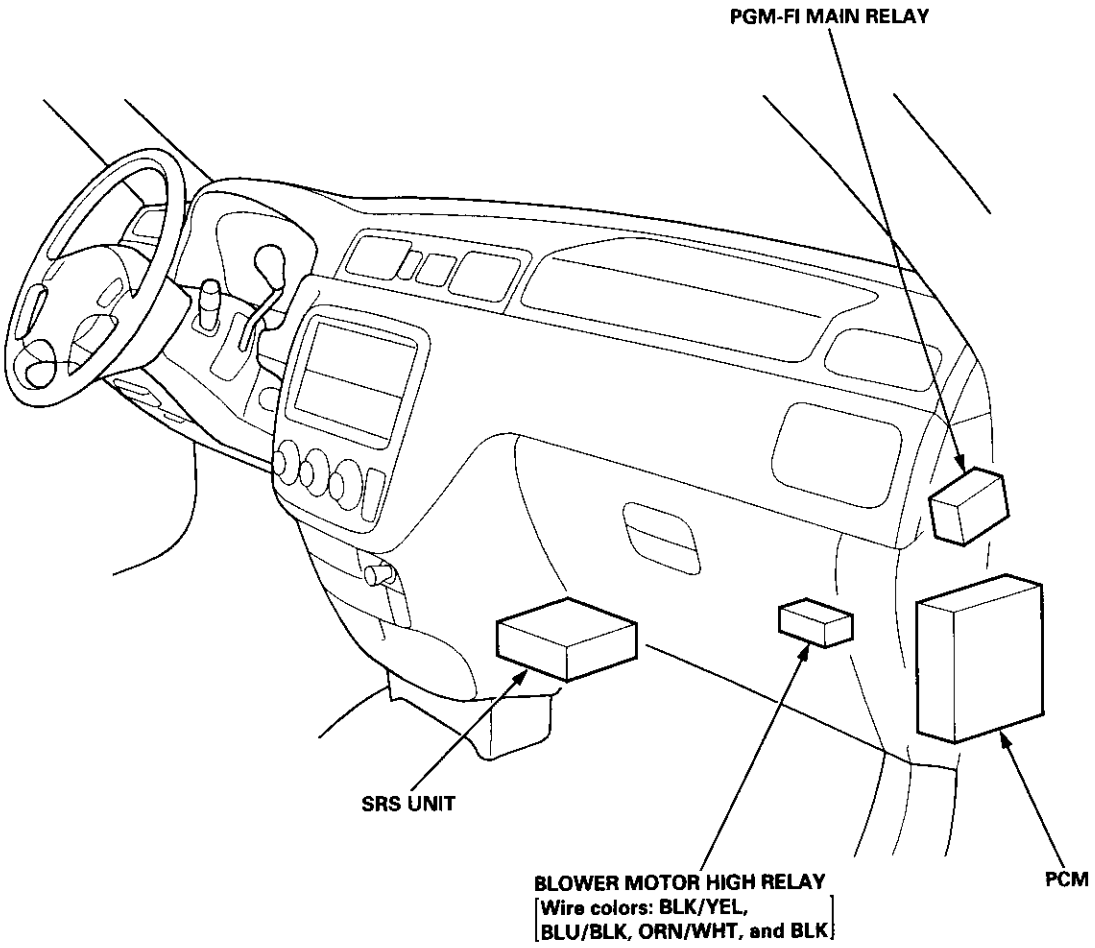
Relay and Control Unit Locations

Engine Compartment



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Dashboard

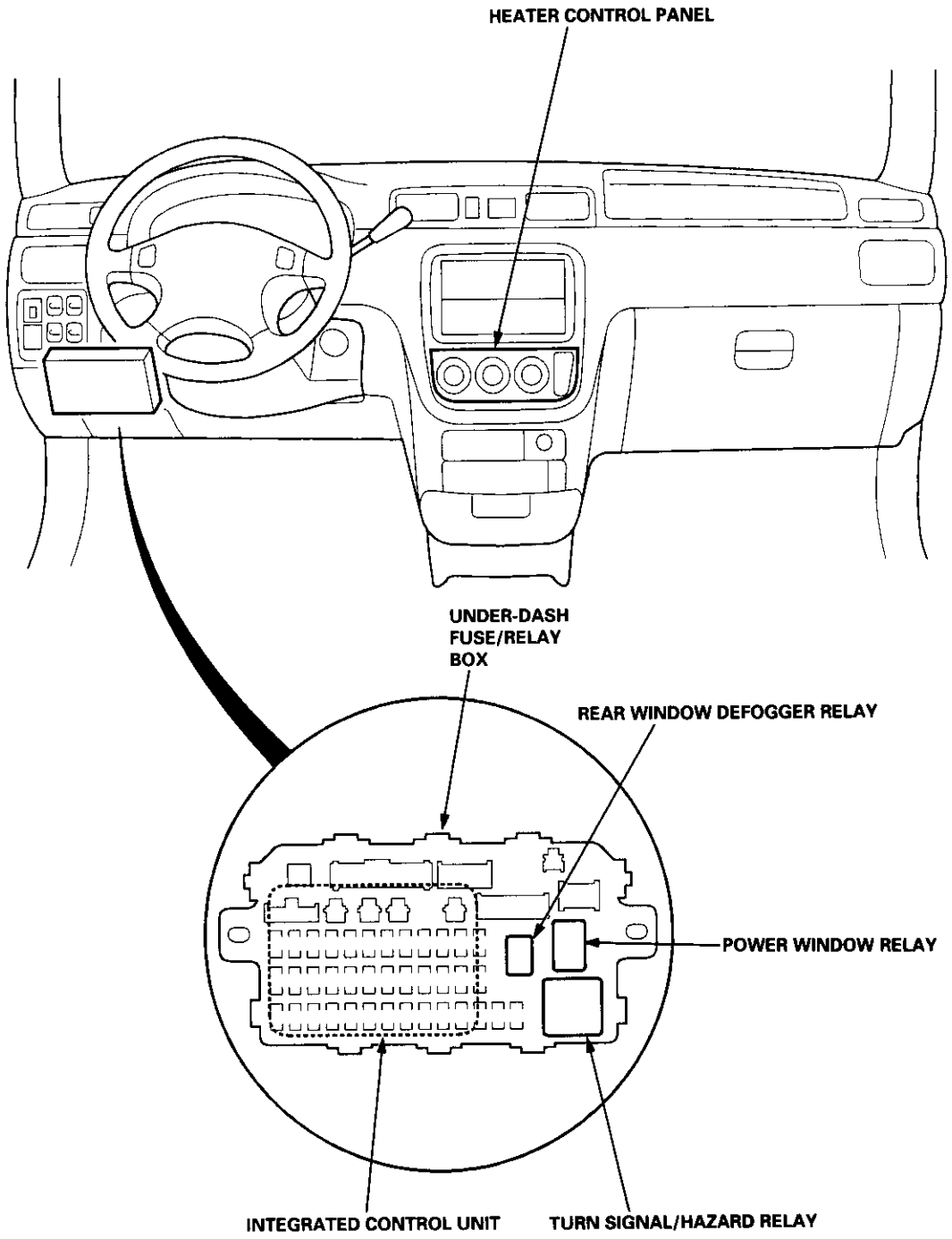


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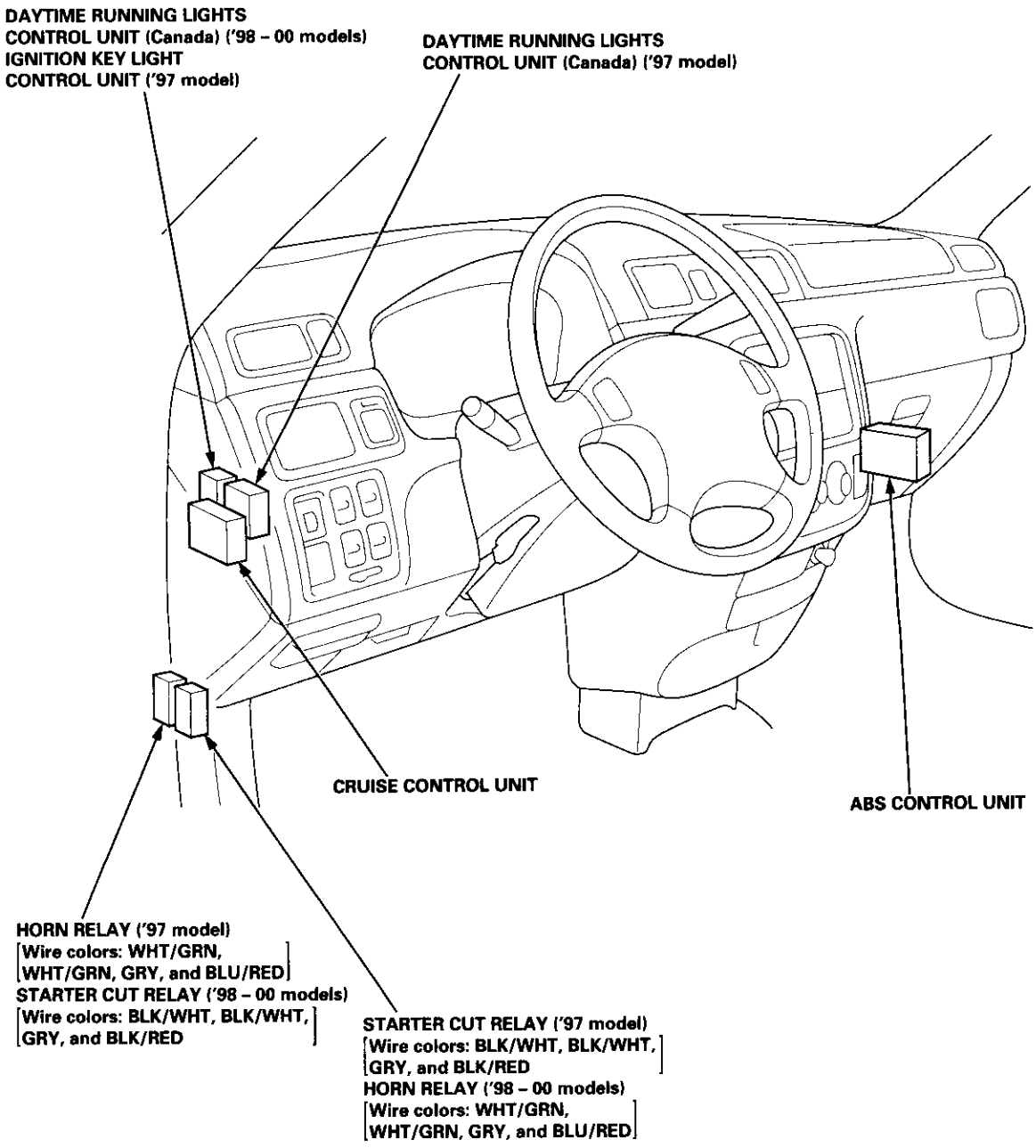
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Relay and Control Unit Locations

Dashboard (cont'd)



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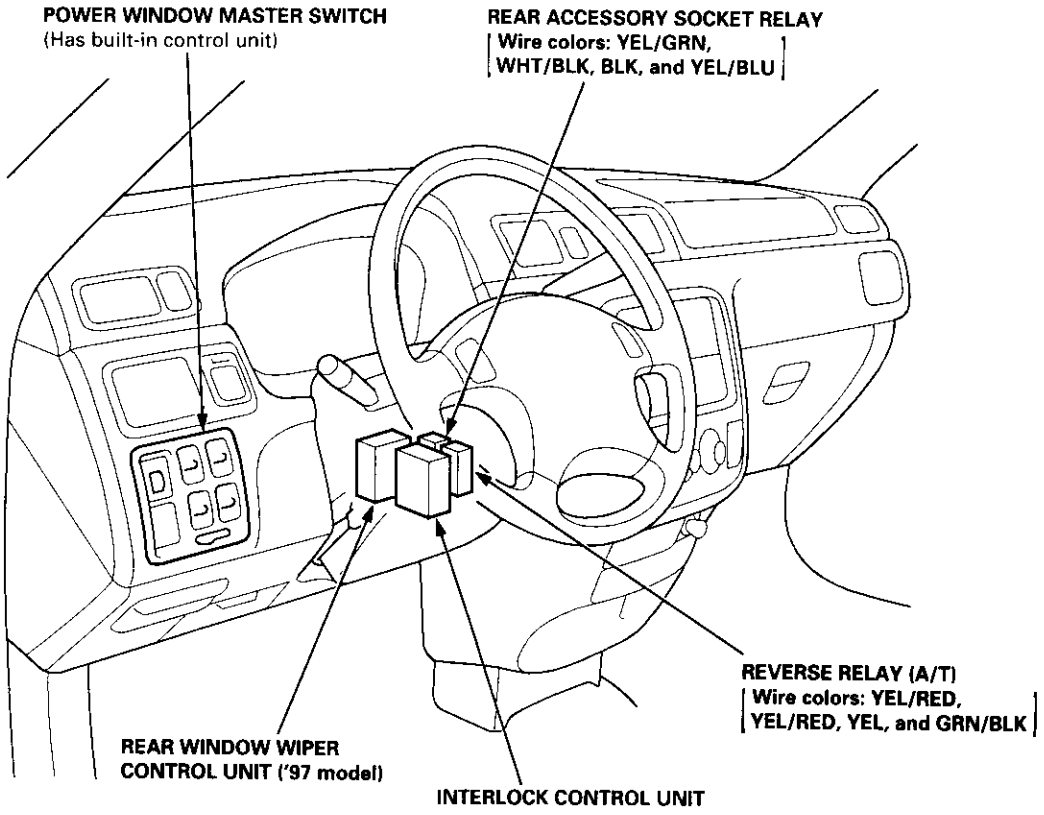


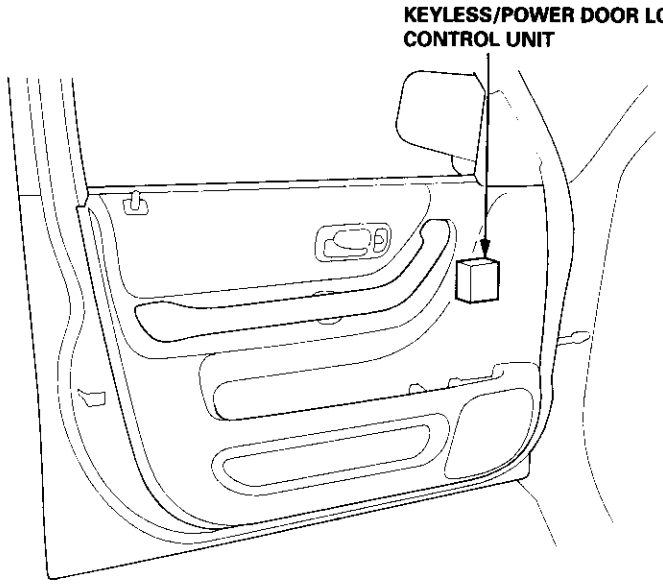
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Relay and Control Unit Locations

Dashboard (cont'd) and Door





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Connector Identification and Wire Harness Routing

How to Identify Connectors:
Identification numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors. "G" for ground terminals or "T" for non-ground terminals.

Location / Harness	Engine Compartment	Dashboard	Others (Floor, Door, Roof, Tailgate)
Starter cable	T1, T2 and ⊕		
Battery ground cable	G1 and ⊖		
Engine ground cable	T3 G2		
Transmission ground cable	T4 G3		
Engine wire harness	C101 through C137 T101 and T102 G101		
Engine compartment wire harness	C201 through C218 G201 and G202		
Under-hood ABS fuse/relay box wire harness	T5 and ⊕		
Main wire harness	C301 through C309 C351 through C361 G351	C401 through C447 G401 and G402	
Dashboard wire harness		C501 through C524 (C525) G501	
Left side wire harness			C551 through C581 G551, G552 and G553
Right side wire harness			C601 through C605
Interior wire harness			C701 through C703
Rear bumper wire harness			C641 through C643
Heater sub-harness		C731 through C740	
Secondary heated oxygen sensor sub-harness			C721 through C722
Combination switch sub-harness		C751 through C760	
Driver's door wire harness			C661 through C667
Front passenger's door wire harness			C671 through C676
Left rear door wire harness			C681 through C684
Right rear door wire harness			C691 through C694
Rear wire harness			C611 through C620 G611
Tailgate wire harness			C631 through C634 G631
SRS main harness		C801 through C808 G801	
High mount brake light sub-harness			C651 through C653
Fuel tank pressure sensor sub-harness			C645 through C647

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Starter Cables

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T1 T2		Right side of engine compartment Right side of engine compartment	Under-hood fuse/relay box Starter motor	
⊕		Battery	Battery positive terminal	

Battery Ground Cable

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
G1		Right front shock tower	Body ground, via battery ground cable	
⊖		Battery	Battery negative terminal	

Engine Ground Cable

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T3		Left side of engine	Power steering pump bracket	
G2		Left side of engine compartment	Body ground, via engine ground cable	

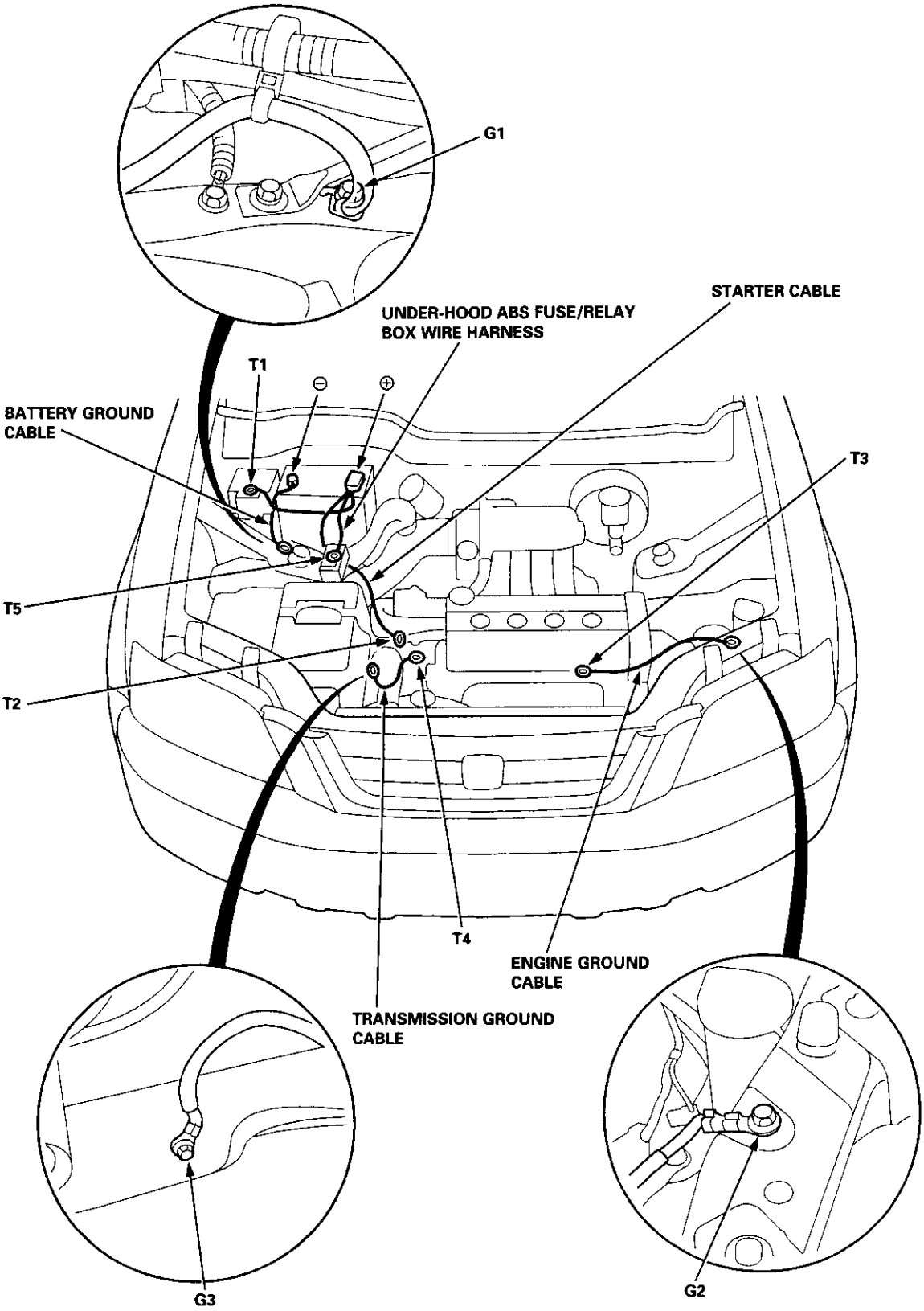
Transmission Ground Cable

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T4		Right side of engine compartment	Transmission	
G3		Right side of front frame	Body ground, via transmission ground cable	

Under-hood ABS Fuse/Relay Box Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
T5		Right side of engine compartment	Under-hood ABS fuse/relay box	
⊕		Battery	Battery positive terminal	

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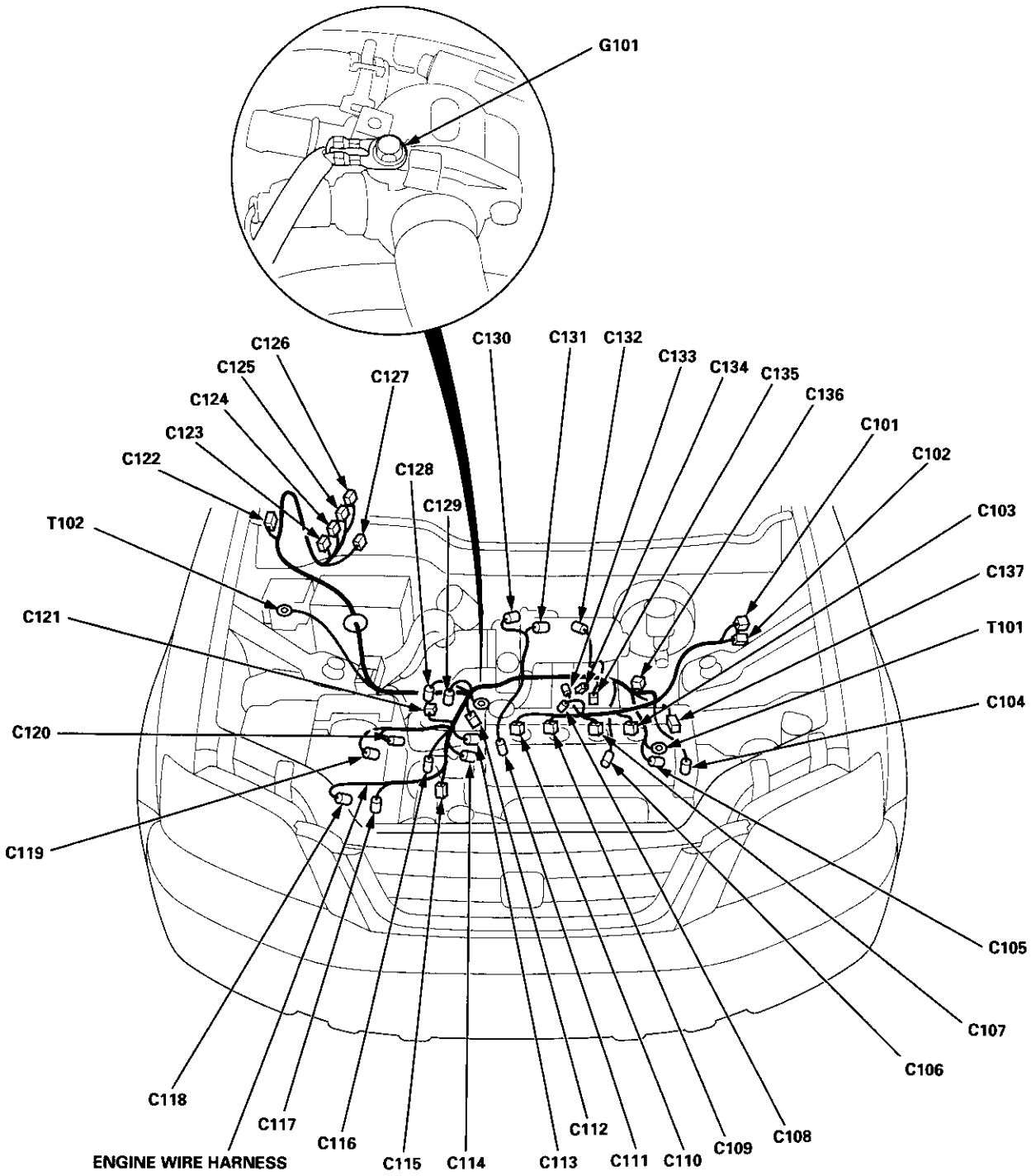


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Engine Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C101	10	Left side of engine compartment	Main wire harness (C304)	
C102	6	Left side of engine compartment	Main wire harness (C305): '97 – 98 models	A/T
C103	2	Middle of engine	No. 1 fuel injector	
C104	2	Middle of engine	Crankshaft speed fluctuation (CKF) sensor	
C105	4	Left side of engine compartment	Alternator	USA
C105	3	Left side of engine compartment	Alternator	Canada
C106	1	Middle of engine	Engine oil pressure switch	
C107	2	Middle of engine	No. 2 fuel injector	
C108	2	Middle of engine	Evaporative emission (EVAP) purge control solenoid valve	
C109	2	Middle of engine	No. 3 fuel injector	
C110	2	Middle of engine	No. 4 fuel injector	
C111	4	Middle of engine	Primary heated oxygen sensor (Primary HO2S) (sensor 1)	
C112	2	Middle of engine	Radiator fan switch	
C113	1	Middle of engine	Coolant temperature sending unit	
C114	2	Middle of engine	Engine coolant temperature (ECT) sensor	
C115	2	Middle of engine	Mainshaft speed sensor	A/T
C116	2	Middle of engine	Lock-up control solenoid valve	A/T
C116	2	Middle of engine	Back-up light switch	M/T
C117	2	Middle of engine	Shift control solenoid valve	A/T
C118	2	Middle of engine	Linear solenoid valve	A/T
C119	2	Middle of engine	Countershaft speed sesnsor	A/T
C120	1	Right side of engine	Starter solenoid	
C121	10	Middle of engine	Distributor	
C122	20	Behind right kick panel	Junction connector	
C123	32	Under right side of dash	PCM	'97 model
C124	25	Under right side of dash	ECM/PCM	
C125	31	Under right side of dash	ECM/PCM	
C126	16	Under right side of dash	ECM/PCM	A/T
C127	22	Under right side of dash	Main wire harness (C431)	
C128	10	Right side of engine	A/T gear position switch	A/T
C129	3	Right side of engine	Vehicle speed sensor (VSS)	
C130	3	Middle of engine	Throttle position (TP) sensor	
C131	3	Middle of engine	MAP sensor	
C132	2	Middle of engine	Idle air control (IAC) valve	
C133	2	Middle of engine	Intake air temperature (IAT) sensor	
C134	10	Middle of engine	Junction connector	'97 model
C134	14	Middle of engine	Junction connector	'98 – 00 models
C135	2	Left side of engine compartment	Power steering pressure (PSP) switch	
C136	14	Middle of engine	Junction connector	
C137	1	Middle of engine	Knock sensor (KS)	'99 – 00 models
T101		Left side of engine compartment	Alternator	
T102		Right side of engine compartment	Under-hood fuse/relay box	
G101		Middle of engine	Engine ground, via engine wire harness	

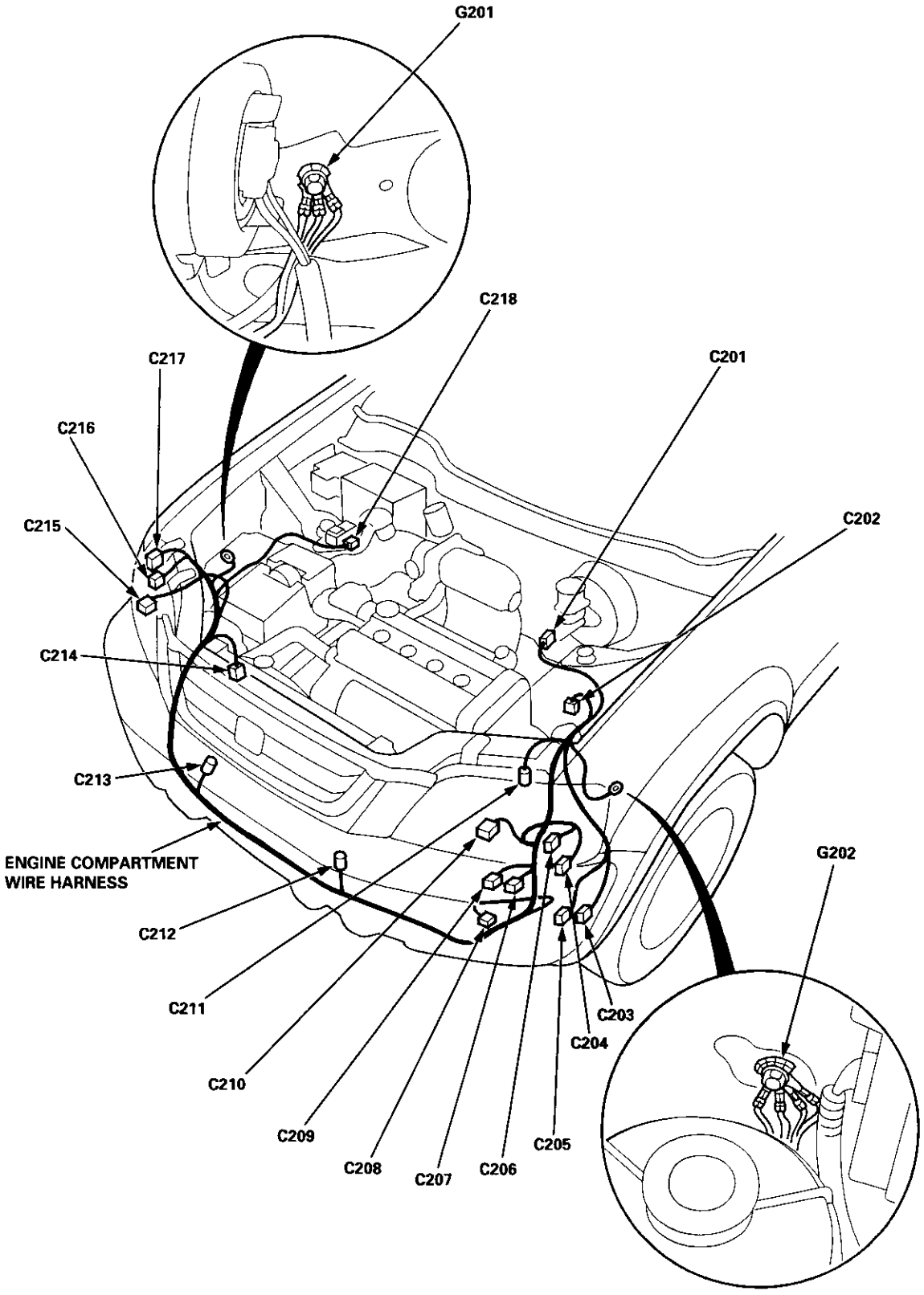
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G101
C126
C125
C124
C123
C122
C127
C128
C129
C130
C131
C132
C133
C134
C135
C136
C101
C102
C103
C137
T101
C104
C105
C107
C106
C108
C109
C110
C111
C112
C113
C114
C115
C116
C117
C118
C119
C120
C121
T102
ENGINE WIRE HARNESS

Engine Compartment Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C201	14	Left side of engine compartment	Main wire harness (C307)	
C202	4	Left side of engine compartment	Cruise actuator	
C203	2	Behind front bumper	Rear window washer motor	
C204	3	Behind right headlight	Left front turn signal/side marker lights	
C205	2	Behind front bumper	Windshield washer motor	
C206	2	Behind right headlight	Left front parking light	
C207	2	Left side of engine compartment	Condenser fan motor	
C208	1	Left side of engine compartment	Front fog lights	Optional
C209	1	Left side of engine compartment	A/C compressor clutch	
C210	3	Behind left headlight	Left headlight	
C211	2	Left side of engine compartment	A/C pressure switch	
C212	2	Behind front bumper	Left horn	
C213	2	Behind front bumper	Right horn	
C214	2	Right side of engine compartment	Radiator fan motor	
C215	3	Behind right headlight	Right headlight	
C216	3	Behind right headlight	Right front turn signal/side marker lights	
C217	2	Behind right headlight	Right front parking light	
C218	8	Right side of engine compartment	Main wire harness (C357)	'97 – 98 models
C218	10	Right side of engine compartment	Main wire harness (C357)	'99 – 00 models
G201		Right side of engine compartment	Body ground, via engine compartment wire harness	
G202		Left side of engine compartment	Body ground, via engine compartment wire harness	

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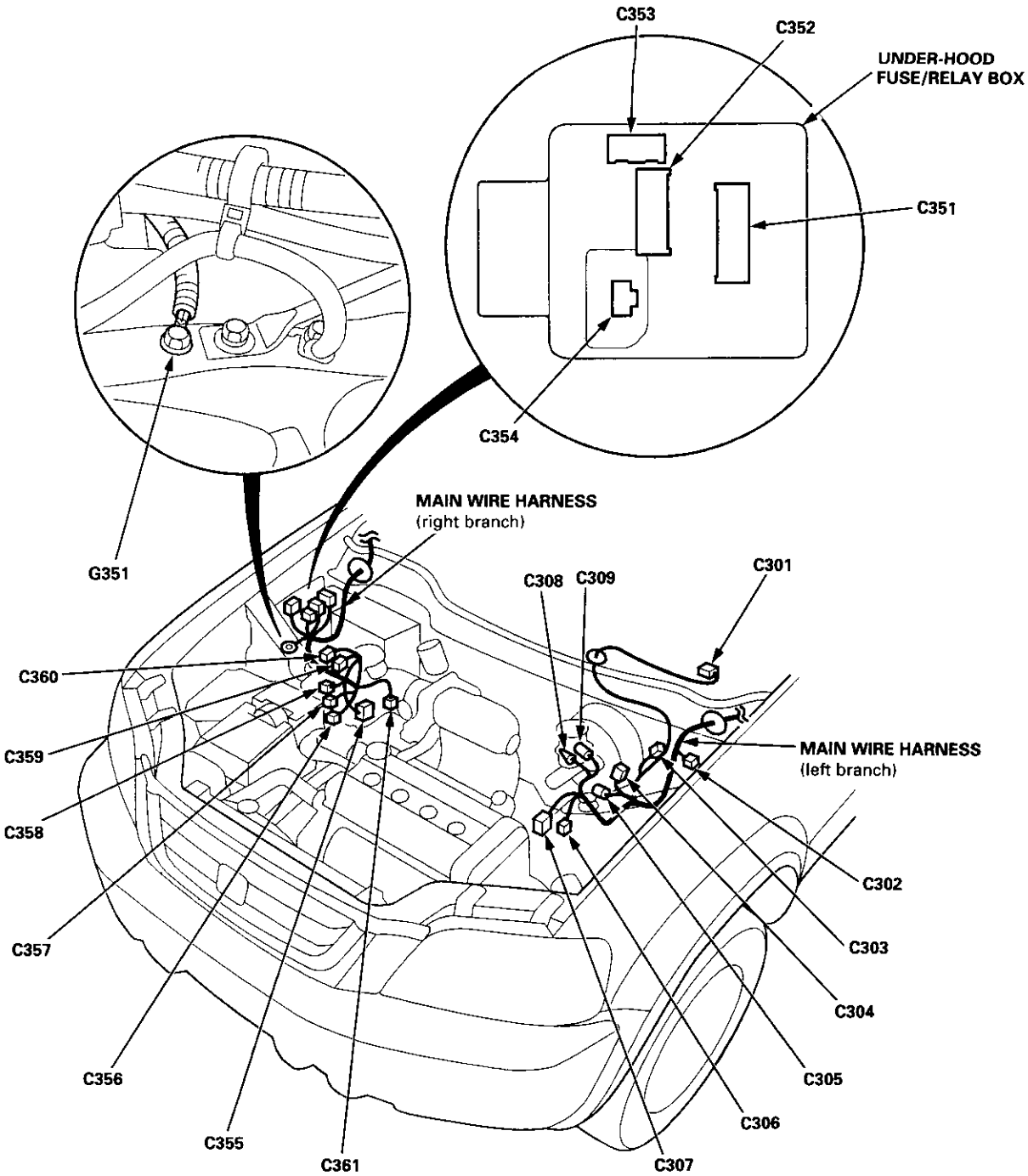


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Main Wire Harness (Engine compartment left and right branches)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C301	5	Left side of engine compartment	Windshield wiper motor	
C302	3	Left side of engine compartment	Daytime running lights resistor	Canada
C303	2	Left side of engine compartment	Test techometer connector	
C304	10	Left side of engine compartment	Engine wire harness (C101)	
C305	6	Left side of engine compartment	Engine wire harness (C102): '97 – 98 models	A/T
C306	2	Left side of engine compartment	Left front ABS wheel sensor	ABS
C307	14	Left side of engine compartment	Engine compartment wire harness (C201)	
C308	1	Left side of engine compartment	Brake fluid level switch (–)	
C309	1	Left side of engine compartment	Brake fluid level switch (+)	
C351	11	Right side of engine compartment	Under-hood fuse/relay box (C908)	
C352	9	Right side of engine compartment	Under-hood fuse/relay box (C906)	
C353	5	Right side of engine compartment	Under-hood fuse/relay box (C905)	
C354	3	Right side of engine compartment	Under-hood fuse/relay box (C907)	USA
C355	10	Right side of engine compartment	ABS modulator unit	ABS
C356	2	Right side of engine compartment	ABS pump motor	ABS
C357	8	Right side of engine compartment	Engine compartment wire harness (C218)	'97 – 98 models
C357	10	Right side of engine compartment	Engine compartment wire harness (C218)	'99 – 00 models
C358	2	Right side of engine compartment	Right front ABS wheel sensor	ABS
C359	2	Right side of engine compartment	Under-hood ABS fuse/relay box (C931)	ABS
C360	3	Right side of engine compartment	Under-hood ABS fuse/relay box (C932)	ABS
C361	2	Right side of engine compartment	Evaporative emission (EVAP) control canister vent shut valve	'98 – 00 models
G351		Right side of engine compartment	Body ground, via main wire harness	ABS

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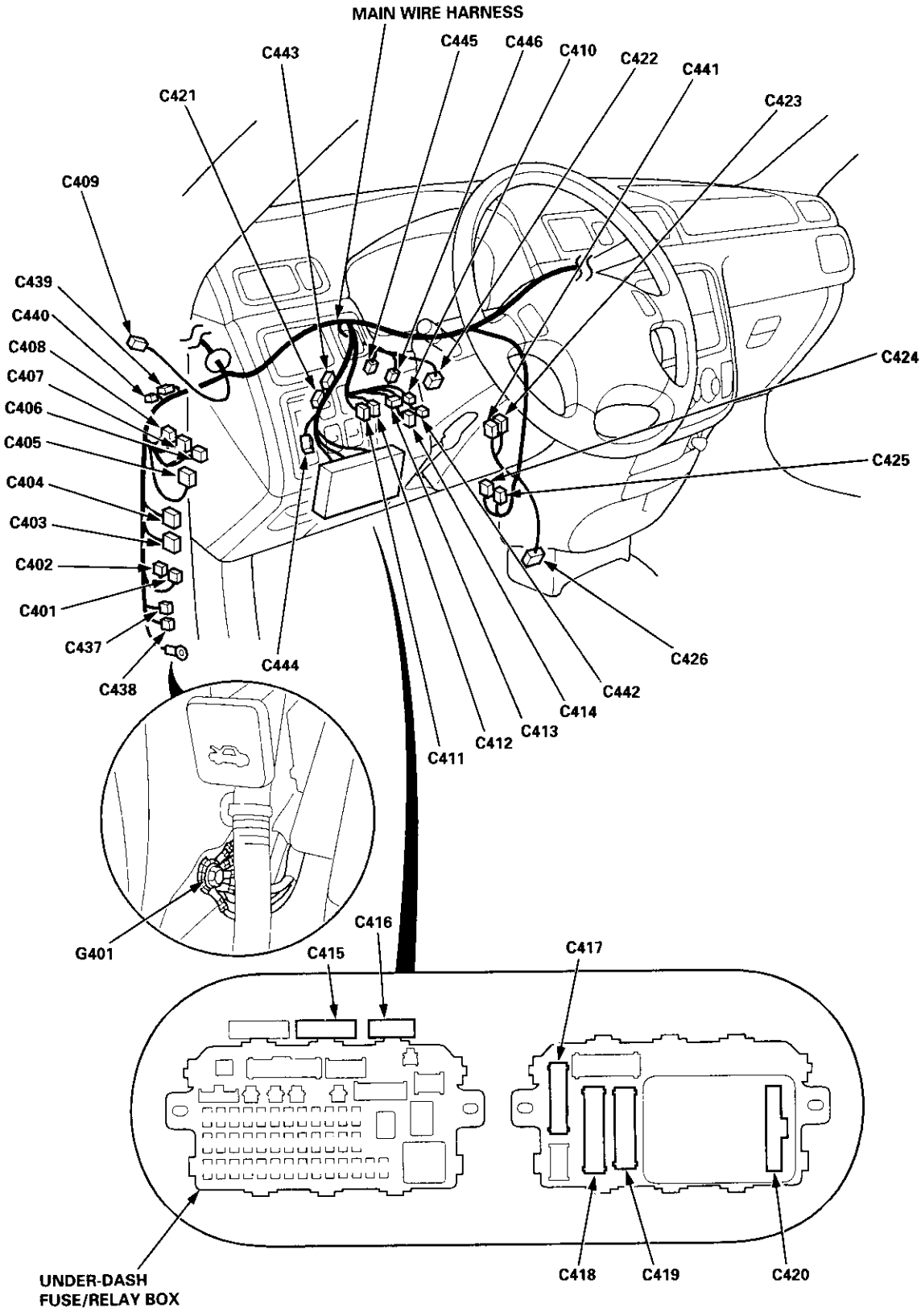


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Main Wire Harness (left side of dash and floor branches) (cont'd)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C401	5	Behind left kick panel	Starter cut relay	
C402	5	Behind left kick panel	Horn relay	
C403	20	Behind left kick panel	Left side wire harness (C558)	
C404	20	Behind left kick panel	Left side wire harness (C559)	'97 model
C404	24	Behind left kick panel	Left side wire harness (C559)	'98 – 00 models
C405	14	Under left side of dash	Cruise control unit	
C406	4	Under left side of dash	Daytime running lights control unit	Canada
C407	8	Under left side of dash	Daytime running lights control unit	Canada
C408	5	Under left side of dash	Ignition key light control unit	'97 model
C409	3	Under left side of dash	Interior wire harness (C701)	
C410	3	Under left side of dash	Cable reel	'97 model
C410	6	Under left side of dash	Cable reel	'98 – 00 models
C411	6	Under left side of dash	Ignition key switch	
C412	3	Under left side of dash	Ignition key switch	
C413	12	Under left side of dash	Combination switch sub-harness (C753)	'97 – 98 models
C413	10	Under left side of dash	Combination switch sub-harness (C753)	'99 – 00 models
C414	3	Under left side of dash	SRS main harness (C803)	
C415	24	Under left side of dash	Dashboard wire harness (C503)	A/T
C416	10	Under left side of dash	Dashboard wire harness (C501)	M/T
C416	1	Under left side of dash	Dashboard wire harness (C501)	
C417	18	Under left side of dash	Under-dash fuse/relay box (C922)	
C418	20	Under left side of dash	Under-dash fuse/relay box (C920)	
C419	18	Under left side of dash	Under-dash fuse/relay box (C919)	'97 model
C420	10	Under left side of dash	Integrated control unit	'98 – 00 models
C420	15	Under left side of dash	Integrated control unit	Optional
C421	1	Under left side of dash	Front fog lights switch	
C422	4	Under left side of dash	Brake switch	A/T
C423	8	Under middle of dash	Interlock control unit	A/T
C424	5	Under middle of dash	Reverse relay	A/T
C425	5	Under middle of dash	Rear accessory socket relay	M/T
C425	4	Under middle of dash	Rear accessory socket relay	
C426	4	Under middle of dash	Rear heated oxygen sensor sub-harness (C722)	Optional
C437	22	Under left side of dash	Security control unit	Optional
C438	6	Under left side of dash	Security starter cut relay (for security alarm system)	
C438	6	Under left side of dash	Junction connector (for interlock system)	Optional
C439	2	Under left side of dash	Security wire harness	Optional
C440	2	Under left side of dash	Security wire harness	'97 model
C441	8	Under left side of dash	Rear window wiper control unit	
C442	3	Under left side of dash	Combination switch sub-harness (C760)	'97 – 98 models
C442	5	Under left side of dash	Combination switch sub-harness (C760)	'99 – 00 models
C443	2	Under left side of dash	Security indicator	Optional
C444	3	Under left side of dash	Security valet switch	Optional
C445	2	Under left side of dash	Clutch interlock switch	M/T
C446	2	Under left side of dash	Clutch switch (for cruise control)	M/T
G401		Under left side of dash	Body ground, via main wire harness	

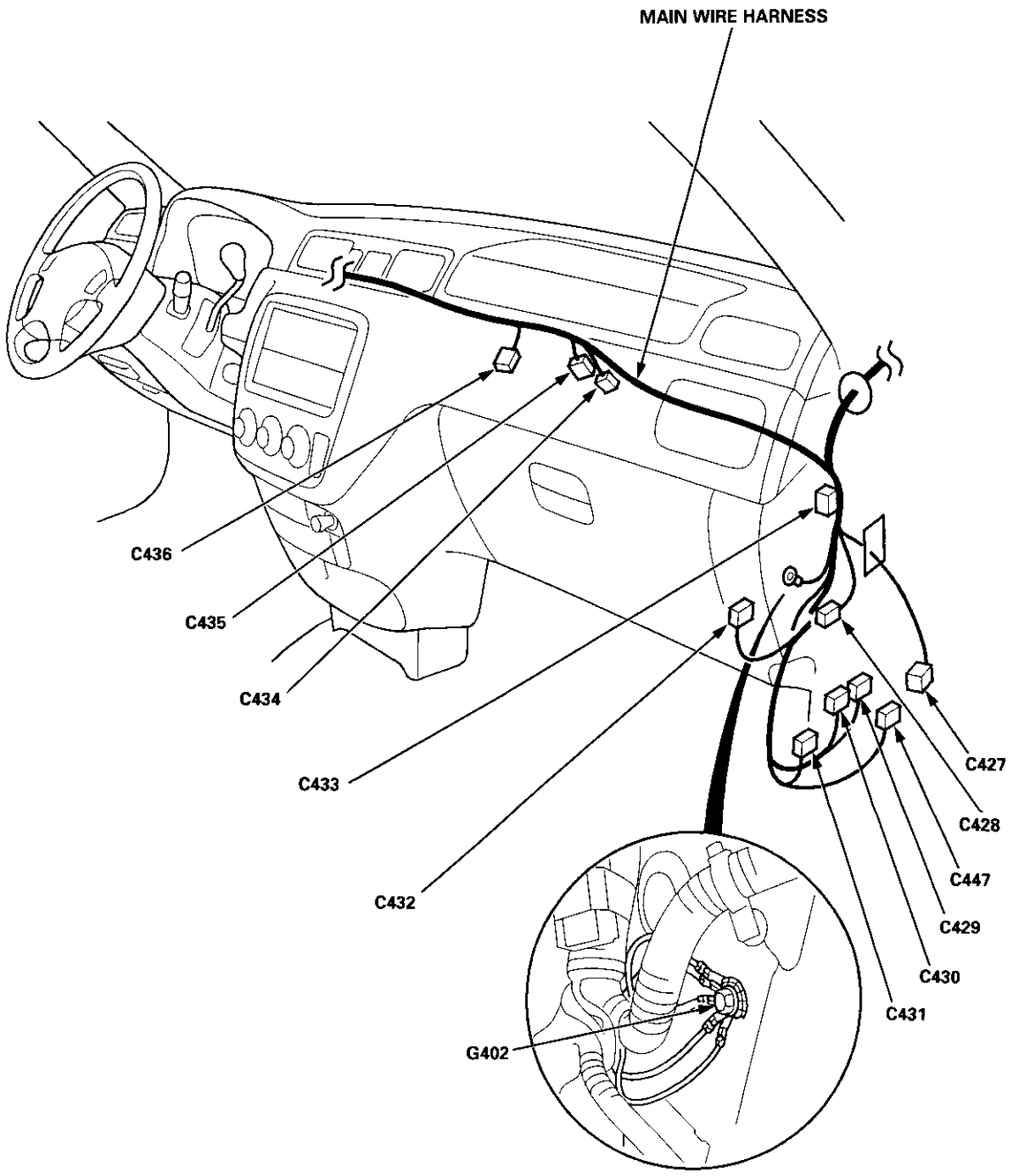
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MAIN WIRE HARNESS
C443
C445
C446
C410
C422
C441
C423
C421
C409
C439
C440
C408
C407
C406
C405
C404
C403
C402
C401
C437
C438
C444
C424
C425
C426
C442
C414
C413
C412
C411
G401
C416
C415
C417
C418
C419
C420
UNDER-DASH
FUSE/RELAY BOX

Main Wire Harness (Right side of dash and floor branches) (cont'd)

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C427	25	Front passenger's door	Front passenger's door wire harness (C671)	
C428	6	Behind right kick panel	Right side wire harness (C601)	
C429	22	Behind right kick panel	ABS control unit	ABS
C430	26	Behind right kick panel	ABS control unit	ABS
C431	22	Behind right kick panel	Engine wire harness (C127)	
C432	7	Under right side of dash	PGM-FI main relay	
C433	20	Under right side of dash	Junction connector	
C434	4	Under middle of dash	Tailgate open relay	Optional
C435	4	Under middle of dash	Headlights flasher relay	Optional
C436	5	Under middle of dash	Heater sub-harness (C731)	'97 model
C436	7	Under middle of dash	Heater sub-harness (C731)	'98 – 00 models
C447	32	Behind right kick panel	ECM/PCM	'98 – 00 models
G402		Under right side of dash	Body ground, via main wire harness	

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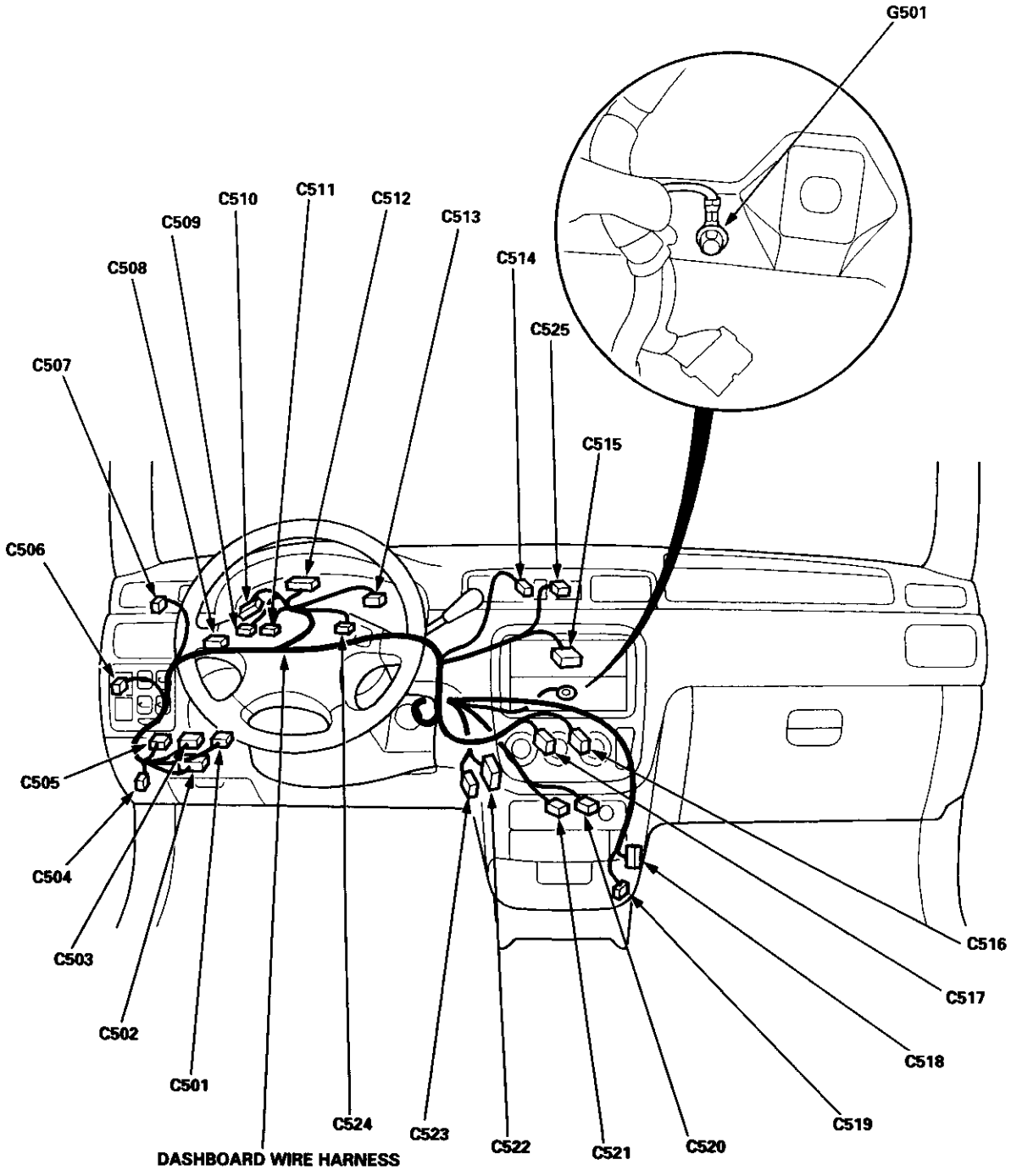


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Dashboard Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C501	10	Above under-dash fuse/relay box	Main wire harness (C416)	A/T
C501	1	Above under-dash fuse/relay box	Main wire harness (C416)	M/T
C502	20	Above under-dash fuse/relay box	Under-dash fuse/relay box (C912)	
C503	24	Above under-dash fuse/relay box	Main wire harness (C415)	
C504	2	Behind dashboard lower panel	Hatch glass opener switch	
C505	14	Above under-dash fuse/relay box	Left side wire harness (C556)	'97 – 98 models
C505	16	Above under-dash fuse/relay box	Left side wire harness (C556)	'99 – 00 models
C506	3	Left side of steering wheel	Dash lights brightness controller	
C507	6	Left side of steering wheel	Cruise main switch	
C508	20	Under left side of dash	Junction connector	
C509	5	Behind gauges	Gauge assembly	
C510	13	Behind gauges	Gauge assembly	
C511	5	Behind gauges	Gauge assembly	
C512	16	Behind gauges	Gauge assembly	
C513	14	Behind gauges	Gauge assembly	A/T
C514	10	Right side of gauges	Hazard warning switch	
C515	16	Behind middle of dash	Audio unit	
C516	8	Behind middle of dash	Heater control panel	
C517	20	Behind middle of dash	Heater control panel	
C518	16	Under middle of dash	Data link connector	
C519	2	Under middle of dash	Service check connector	
C520	2	Behind middle of dash	Front accessory socket connector	
C521	2	Behind middle of dash	Ashtray light	
C522	24	Behind middle of dash	Heater sub-harness (C733)	
C523	2	Behind middle of dash	Heater sub-harness (C740)	'97 model
C523	1	Behind middle of dash	Heater sub-harness (C740)	'98 – 00 models
C524	5	Behind gauges	Gauge assembly	
C525	4	Upper middle of dash	Clock	'98 – 00 models
G501		Behind middle of dash	Body ground, via dashboard wire harness	

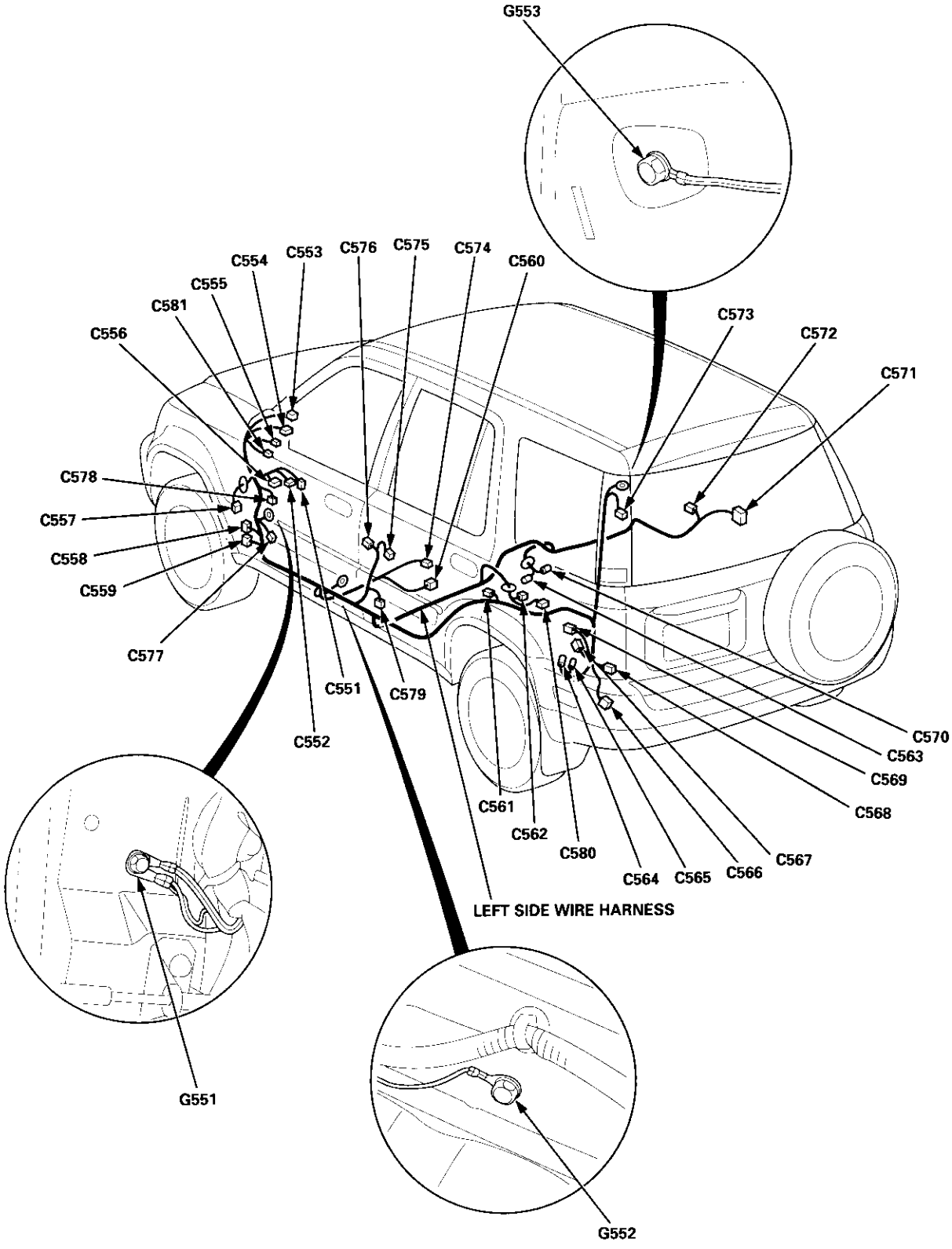
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G501
C510
C511
C512
C509
C513
C508
C514
C525
C507
C515
C506
C505
C504
C503
C502
C501
C524
C523
C522
C521
C520
C519
C518
C517
C516
DASHBOARD WIRE HARNESS

Left Side Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C551	8	Behind under-dash fuse/relay box	Under-dash fuse/relay box (C921)	
C552	16	Behind under-dash fuse/relay box	Under-dash fuse/relay box (C923)	
C553	10	Left side of steering wheel	Power mirror switch	
C554	14	Left side of steering wheel	Power window master switch	
C555	1	Left side of steering wheel	Power window master switch	
C556	14	Above under-dash fuse/relay box	Dashboard wire harness (C505)	'97 – 98 models
C556	16	Above under-dash fuse/relay box	Dashboard wire harness (C505)	'99 – 00 models
C557	25	Driver's door	Driver's door wire harness (C661)	
C558	20	Behind left kick panel	Main wire harness (C403)	
C559	20	Behind left kick panel	Main wire harness (C404)	'97 model
C559	24	Behind left kick panel	Main wire harness (C404)	'98 – 00 models
C560	2	Left side of floor	Driver's seat belt switch	
C561	1	Left quarter panel	Left rear door switch	
C562	5	Fuel tank	Fuel unit	
C563	2	On left half of rear cross beam	Left rear ABS wheel sensor	'97 model
C563	4	On left half of rear cross beam	Left rear ABS wheel sensor	'98 – 00 models
C564	1	Left quarter panel	Rear accessory socket connector (+)	
C565	1	Left quarter panel	Rear accessory socket connector (–)	
C566	4	Left quarter panel	Rear bumper wire harness (C641)	
C567	6	Left quarter panel	Trailer lighting connector	
C568	1	Left quarter panel	Tailgate door latch switch	
C569	2	Left quarter panel	Left rear speaker	
C570	2	On left half of rear cross beam	Right rear ABS wheel sensor	
C571	14	Right quarter panel	Rear wire harness (C611)	
C572	1	Right quarter panel	Right rear door switch	
C573	6	Left quarter pillar	Left taillight	
C574	1	Left side of floor	Parking brake switch	
C575	6	Left B-piller	Left rear door wire harness (C681)	
C576	1	Left B-piller	Driver's door switch	
C577	6	Behind left kick panel	Select unlock relay (for security alarm system)	Optional
C577	6	Behind left kick panel	Junction connector (for power door locks)	
C578	2	Under left side of dash	SRS main harness (C807)	'98 – 00 models
C579	2	Left B-piller	Driver's seat belt tensioner	'98 – 00 models
C580	6	Fuel tank	Fuel tank pressure sensor sub-harness (C645)	'98 – 00 models
C581	2	Left side of steering wheel	Power window master switch	'99 – 00 models
G551		Behind left kick panel	Body ground, via left side wire harness	
G552		Left side of floor	Body ground, via left side wire harness	
G553		Left quarter piller	Body ground, via left side wire harness	

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G553
C554
C553
C576
C575
C574
C560
C555
C581
C556
C573
C572
C571
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C558
C559
C577
C551
C579
C552
C570
C563
C569
C568
C561
C562
C580
C564
C565
C566
C567
LEFT SIDE WIRE HARNESS
G551
G552

Right Side Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C601	6	Behind right kick panel	Main wire harness (C428)	
C602	1	Right B-piller	Front passenger's door switch	
C603	6	Right rear door	Right rear door wire harness (C691)	
C604	2	Under middle of dash	SRS main harness (C808)	'98 – 00 models
C605	2	Right B-piller	Front passenger's seat belt tensioner	'98 – 00 models

Rear Bumper Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C641	4	Left quarter panel	Left side wire harness (C566)	
C642	2	Behind rear bumper	Left rear side marker light	
C643	2	Behind rear bumper	Right rear side marker light	

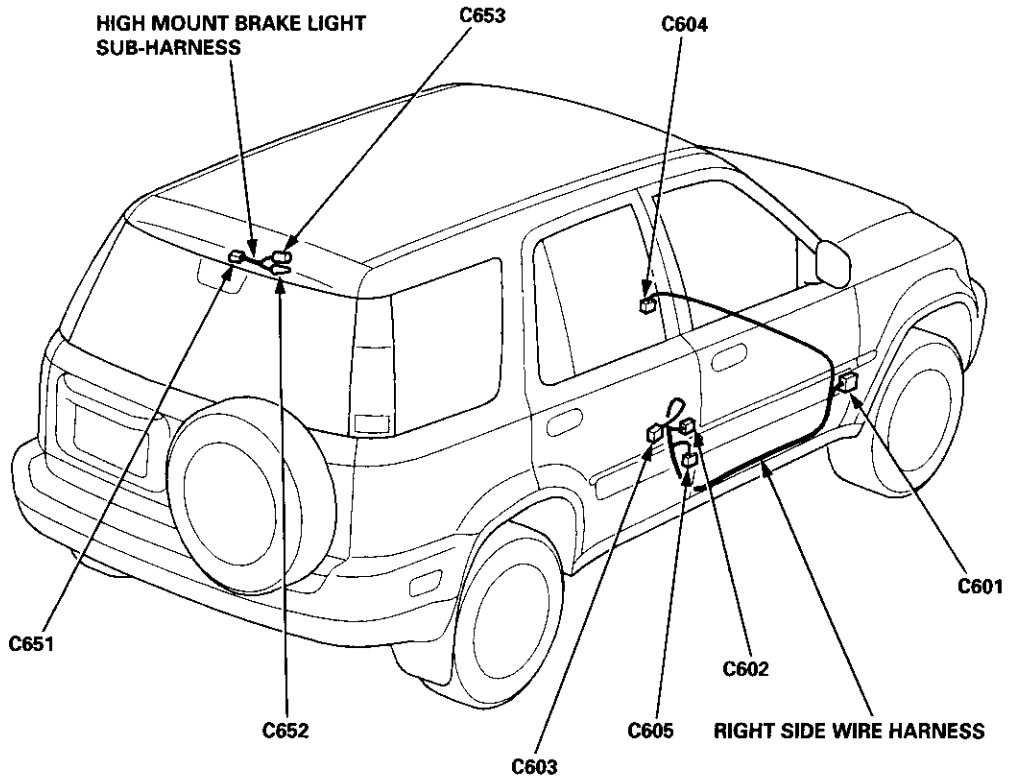
Fuel Tank Pressure Sensor Sub-harness – '98 Model

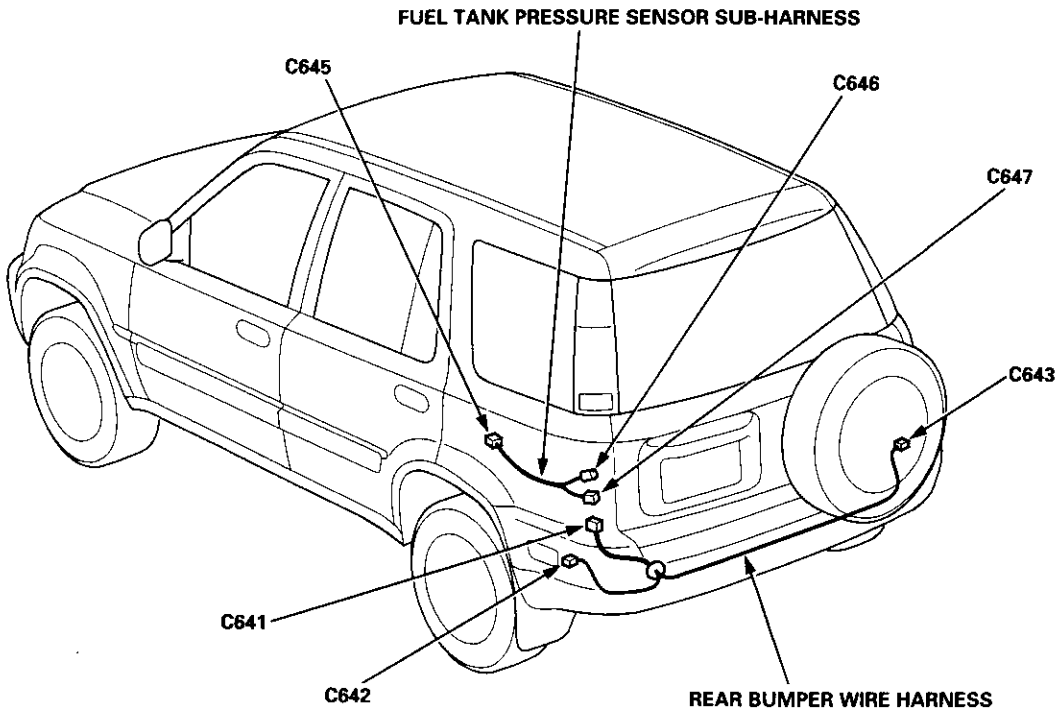
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C645	6	Fuel tank	Left side wire harness (C580)	
C646	3	Left side of fuel tank	Fuel tank pressure sensor	
C647	2	Left side of fuel tank	Evaporative emission (EVAP) bypass solenoid valve	

High Mount Brake Light Sub-harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C651	2	Top of hatch glass	High mount brake light	
C652	1	Top of hatch glass	Rear wire harness (C617)	
C653	1	Top of hatch glass	Rear wire harness (C618)	

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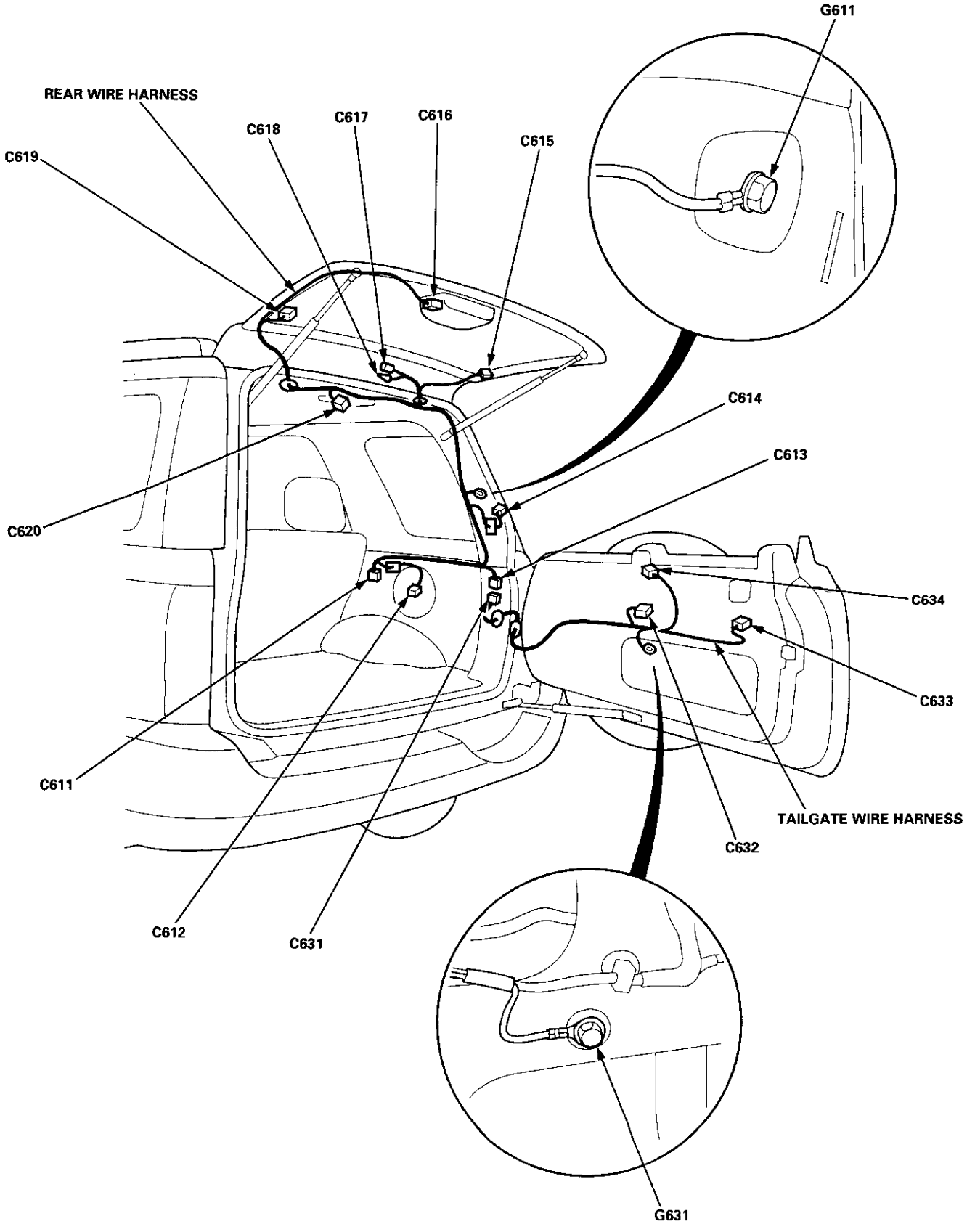
Rear Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C611	14	Right quarter panel	Left side wire harness (C571)	
C612	2	Right quarter panel	Right rear speaker	
C613	4	Right quarter panel	Tailgate wire harness (C631)	
C614	6	Right quarter piller	Right taillight	
C615	1	Right side of hatch glass	Rear window defogger (+)	
C616	4	Middle of hatch glass	Rear window wiper motor	
C617	1	Top of hatch glass	High mount brake light sub-harness (C652)	
C618	1	Top of hatch glass	High mount brake light sub-harness (C653)	
C619	1	Left side of hatch glass	Rear window defogger (–)	
C620	3	Roof area	Rear ceiling light	
G611		Right quarter piller	Body ground, via rear wire harness	

Tailgate Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C631	4	Right quarter panel	Rear wire harness (C613)	
C632	2	Middle of tailgate door	Hatch glass opener solenoid	
C633	2	Left side of tailgate door	License plate light	
C634	1	Middle of tailgate door	Hatch glass latch switch	
G631		Middle of tailgate door	Body ground, via tailgate wire harness	

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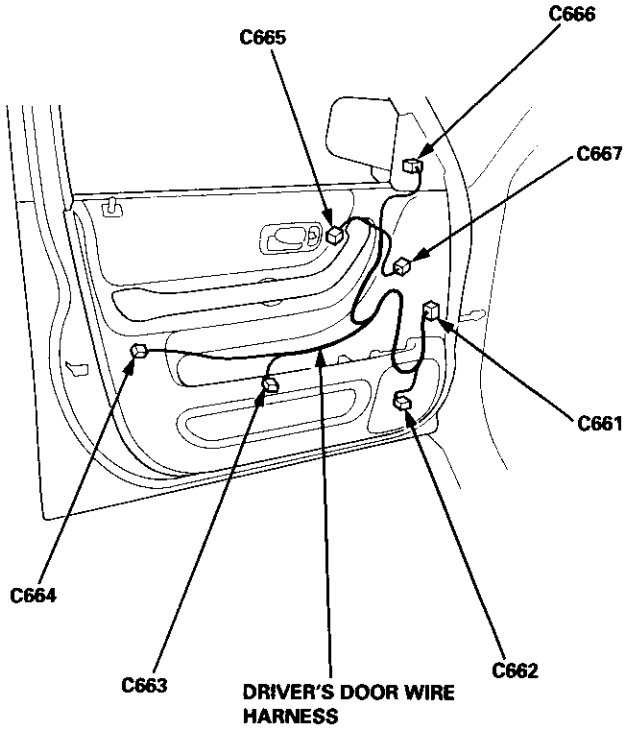
www.emanualpro.com

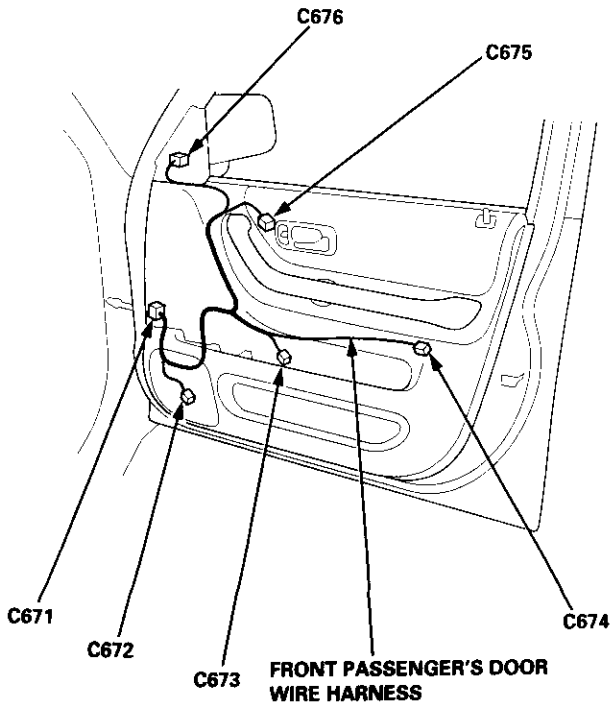
Driver's Door Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C661	25	Driver's door	Left side wire harness (C557)	
C662	2	Driver's door	Left front speaker	
C663	4	Driver's door	Driver's power window motor	
C664	6	Driver's door	Driver's door lock actuator	
C665	3	Driver's door	Driver's door lock switch	
C666	8	Driver's door	Driver's power mirror actuator	
C667	18	Driver's door	Keyless/power door lock control unit	

Front Passenger's Door Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C671	25	Front passenger's door	Main wire harness (C427)	
C672	2	Front passenger's door	Right front door speaker	
C673	2	Front passenger's door	Front passenger's power window motor	
C674	2	Front passenger's door	Front passenger's door lock actuator	
C675	5	Front passenger's door	Front passenger's power window switch	
C676	8	Front passenger's door	Front passenger's power mirror actuator	





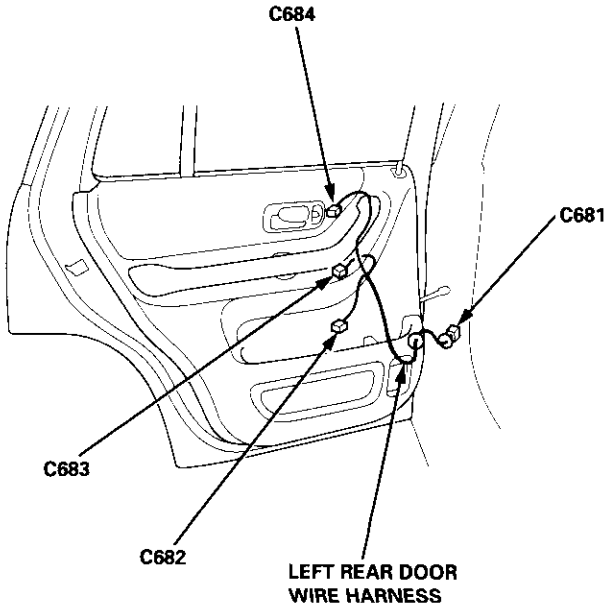
www.epcatalogs.com

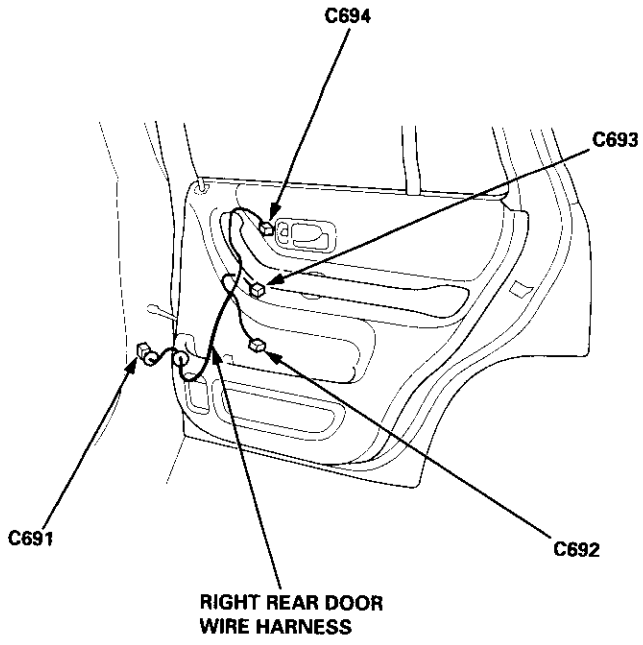
Left Rear Door Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C681	6	Left rear door	Left side wire harness (C575)	
C682	2	Left rear door	Left rear power window motor	
C683	2	Left rear door	Left rear door lock actuator	
C684	5	Left rear door	Left rear power window switch	

Right Rear Door Wire Harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C691	6	Right rear door	Right side wire harness (C603)	
C692	2	Right rear door	Right rear power window motor	
C693	2	Right rear door	Right rear door lock actuator	
C694	5	Right rear door	Right rear power window switch	





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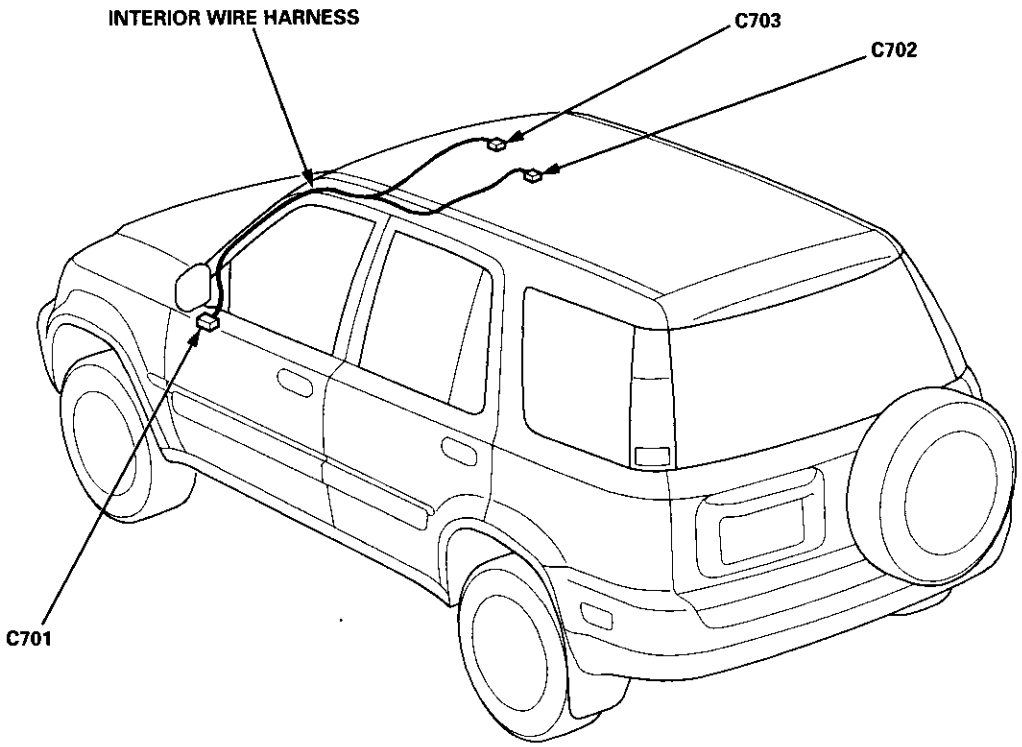
Interior Wire Harness

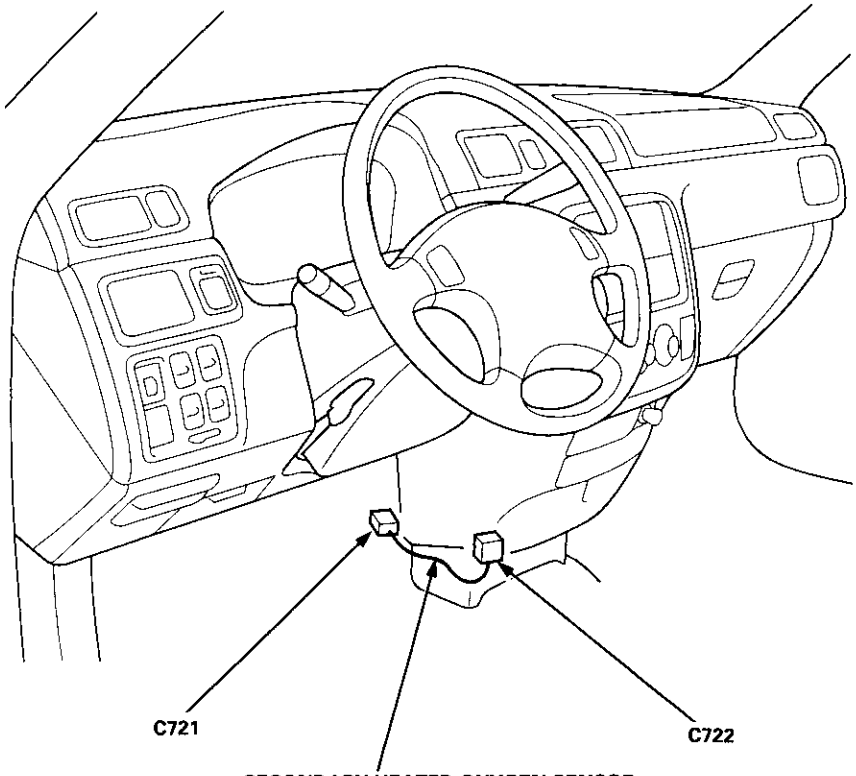
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C701	3	Under left side of dash	Main wire harness (C409)	
C702	3	Roof area	Front ceiling light	
C703	3	Roof area	Spotlights	

Secondary Heated Oxygen Sensor Sub-harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C721	4	Under middle of dash	Secondary heated oxygen sensor (Secondary HO2S) (Sensor 2)	
C722	4	Under middle of dash	Main wire harness (C426)	

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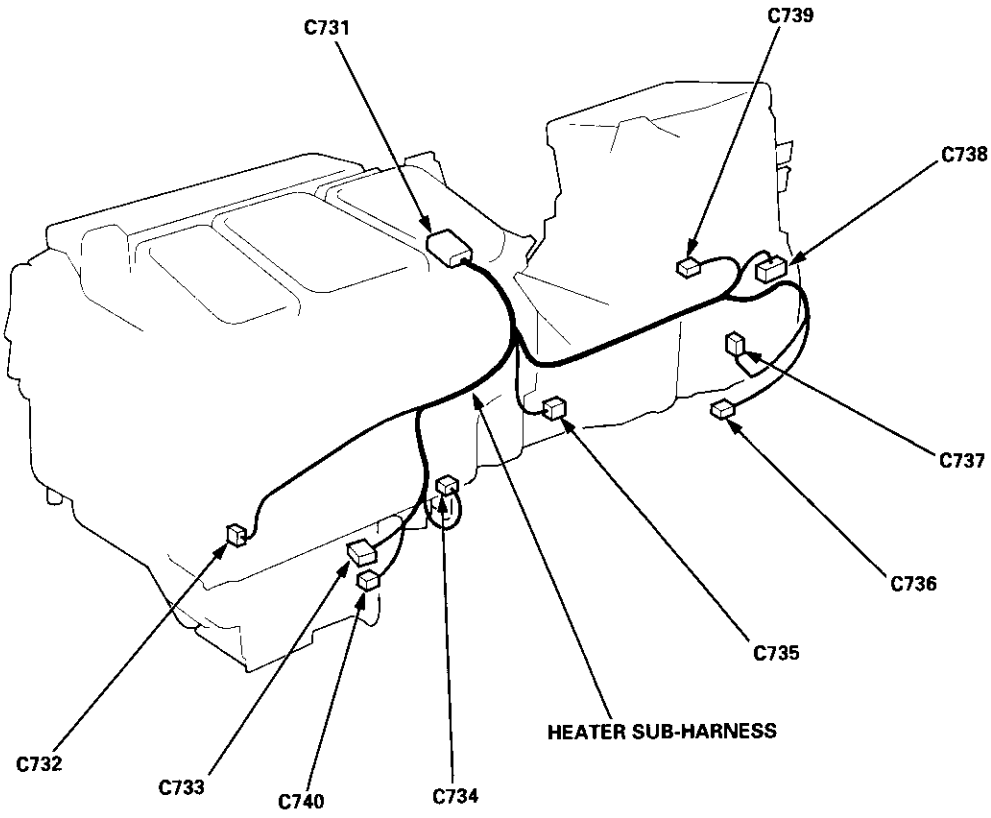
Heater Sub-harness

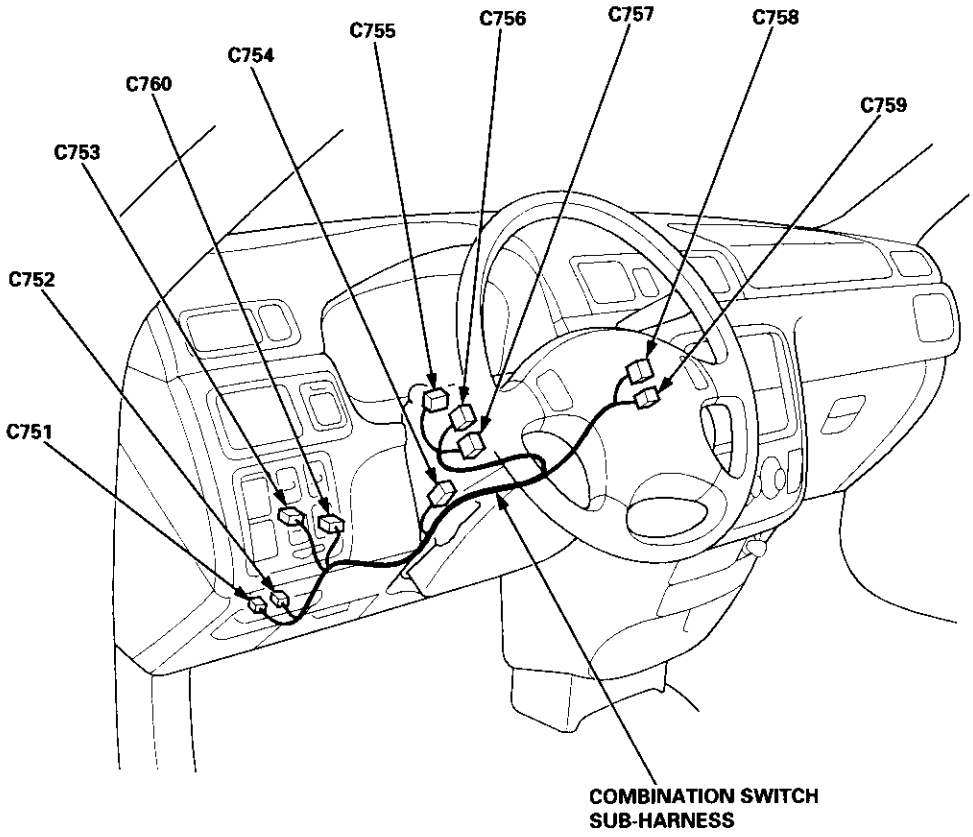
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C731	5	Under middle of dash	Main wire harness (C436)	'97 model
C731	7	Under middle of dash	Main wire harness (C436)	'98 – 00 models
C732	7	Behind middle of dash	Mode control motor	
C733	24	Behind middle of dash	Dashboard wire harness (C522)	
C734	5	Behind glove box	Air mix control motor	
C735	2	Behind glove box	Evaporator temperature sensor	
C736	4	Behind glove box	Blower motor high relay	
C737	2	Behind glove box	Blower motor	
C738	3	Behind glove box	Power transistor	
C739	4	Behind glove box	Recirculation control motor	'97 model
C740	2	Behind middle of dash	Dashboard wire harness (C523)	'98 – 00 models
C740	1	Behind middle of dash	Dashboard wire harness (C523)	

Combination Switch Sub-harness

Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C751	6	Above under-dash fuse/relay box	Under-dash fuse/relay box (C914)	
C752	7	Above under-dash fuse/relay box	Under-dash fuse/relay box (C915)	
C753	12	Under left side of dash	Main wire harness (C413)	'97 – 98 models
C753	10	Under left side of dash	Main wire harness (C413)	'99 – 00 models
C754	2	Behind steering column	Shift lock solenoid	
C755	3	Behind steering column	Parking pin switch	
C756	4	Behind steering column	Combination light switch	
C757	7	Behind steering column	Combination light switch	
C758	6	Behind steering column	Wiper/washer switch	
C759	8	Behind steering column	Wiper/washer switch	
C760	3	Under left side of dash	Main wire harness (C442)	'97 – 98 models
C760	5	Under left side of dash	Main wire harness (C442)	'99 – 00 models

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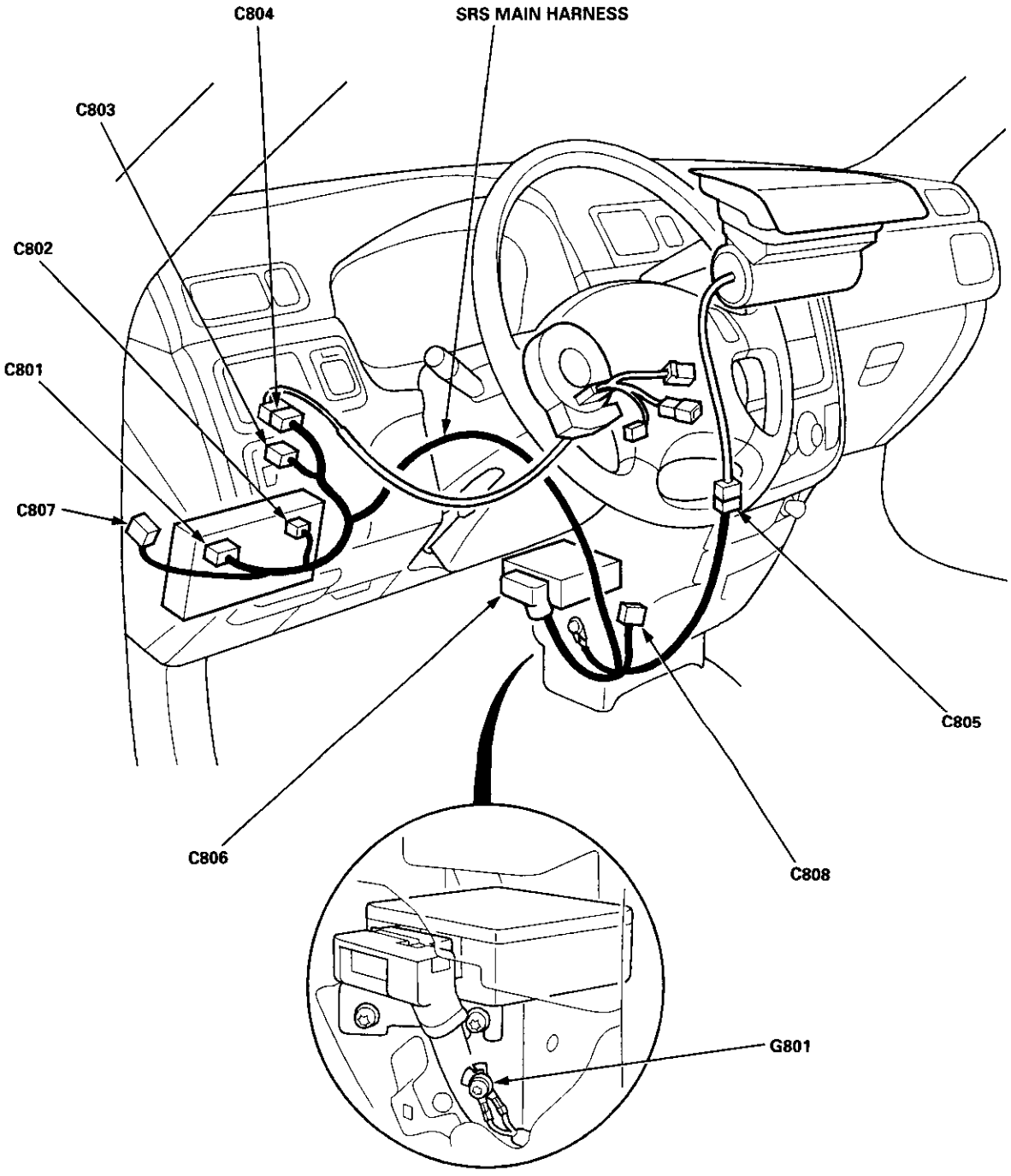


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SRS Main Harness

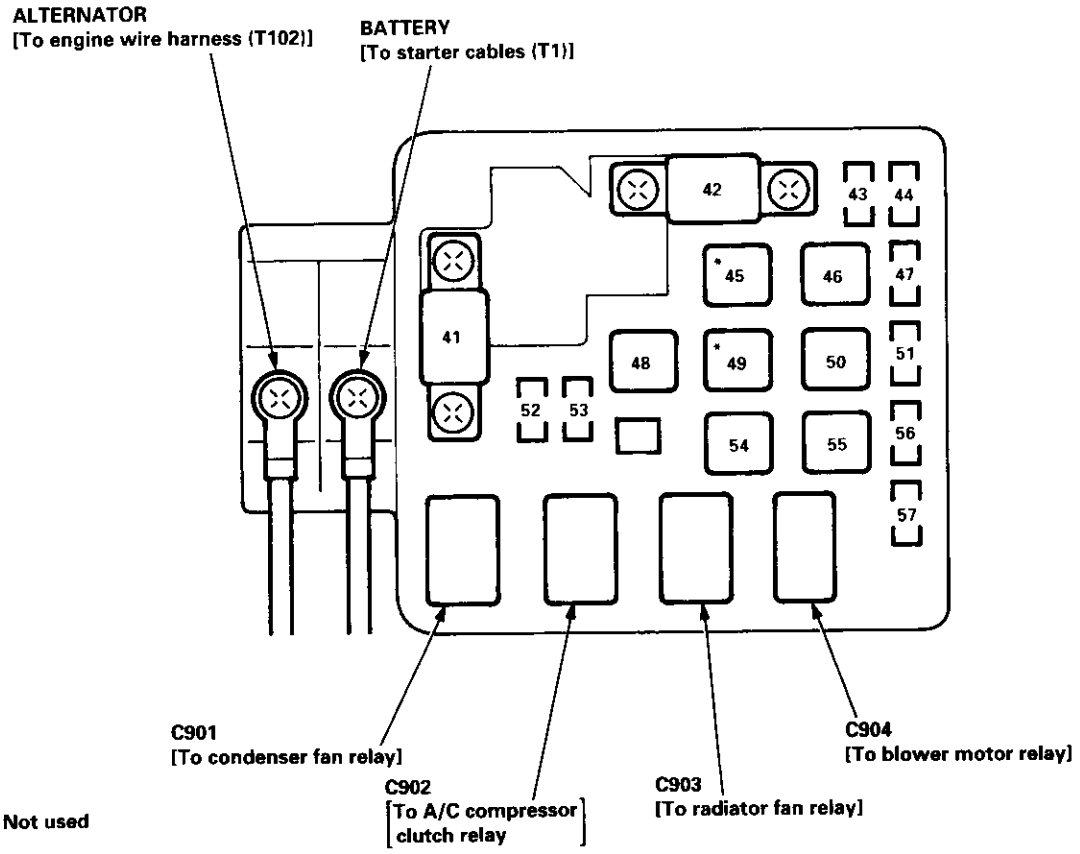
Connector or Terminal	Number of Cavities	Location	Connects to	Notes
C801	2	Left side of under-dash fuse/relay box	Under-dash fuse/relay box (C911)	
C802	2	Top of under-dash fuse/relay box	Memory erase signal (MES) connector	
C803	3	Under left side of dash	Main wire harness (C414)	
C804	2	Under left side of dash	Cable reel	
C805	2	Behind glove box	Front passenger's airbag	
C806	18	Middle of floor	SRS unit	
C807	2	Under left side of dash	Left side wire harness (C578)	'98 – 00 models
C808	2	Under middle of dash	Right side wire harness (C604)	'98 – 00 models
G801		Middle of floor	Body ground, via SRS main harness	

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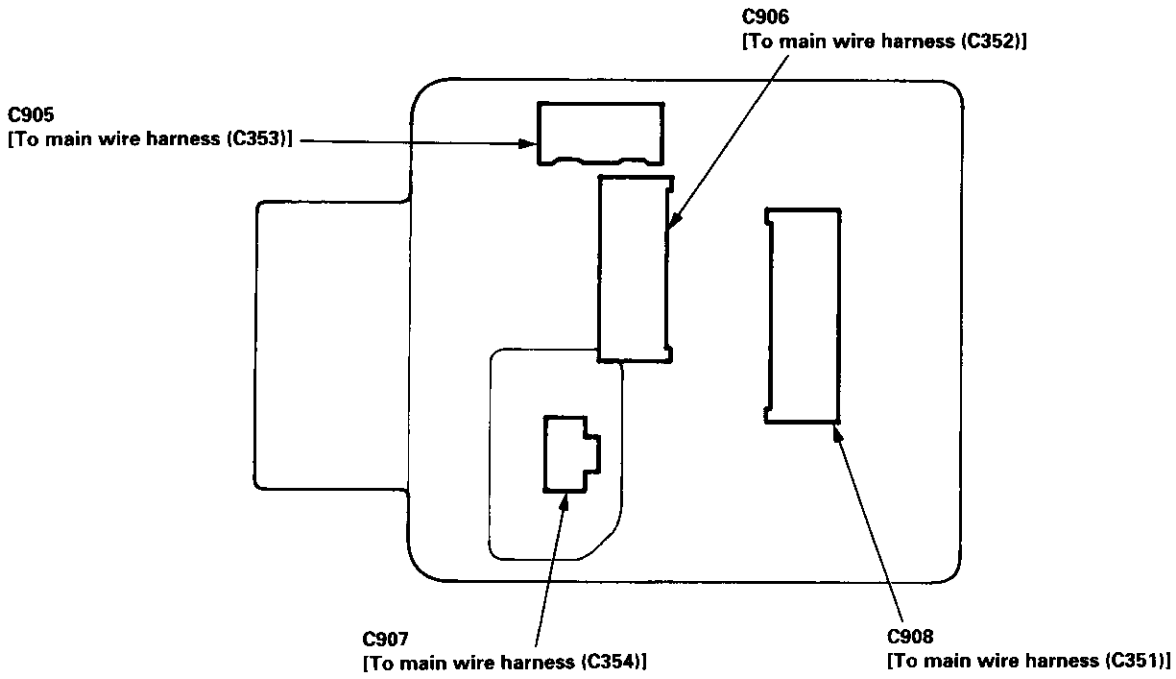

C804
SRS MAIN HARNESS
C803
C802
C801
C807
C805
C806
C808
G801

Fuses

Under-hood Fuse/Relay Box

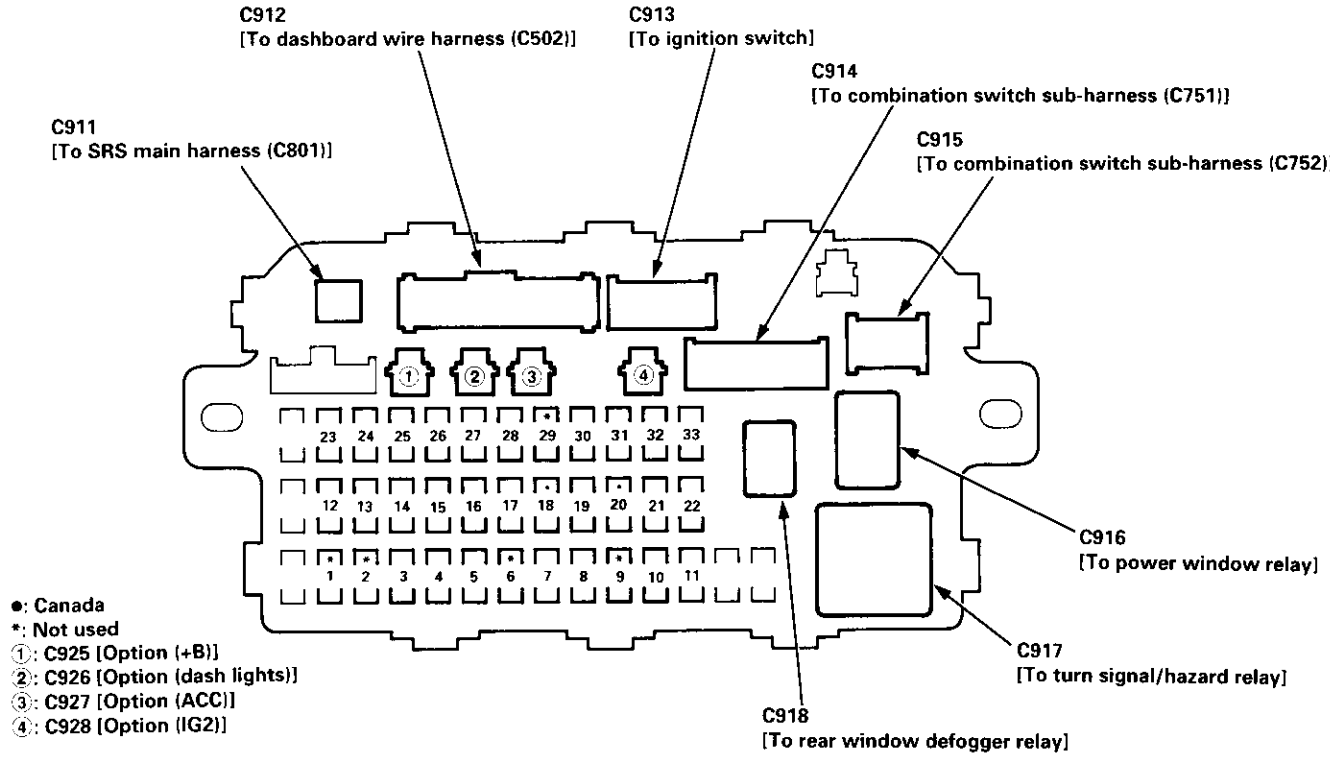


NOTE: View from the backside of the under-hood fuse/relay box.

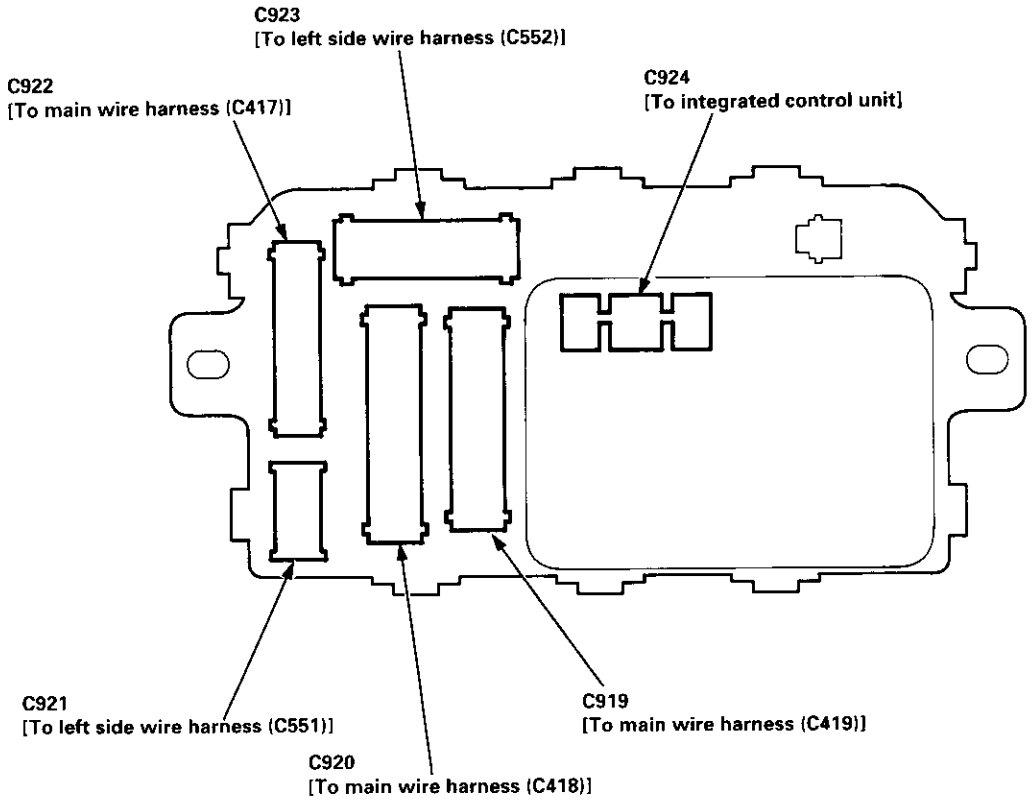


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Under-dash Fuse/Relay Box

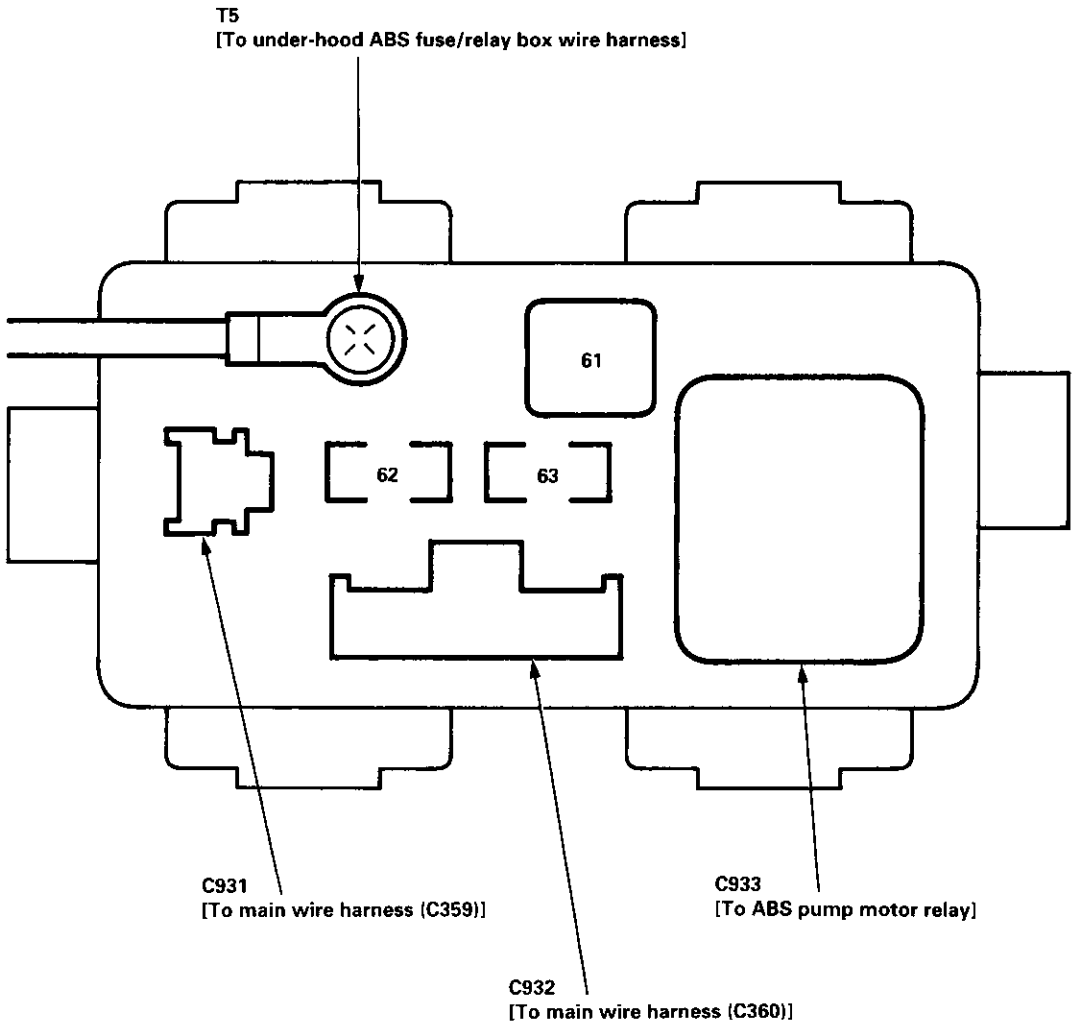


NOTE: View from the backside of the under-dash fuse/relay box.



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Under-hood ABS Fuse/Relay Box



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Power Distribution

Fuse-to-Component(s) Index (numerical sequence)

Under-hood Fuse/Relay Box:

Fuse	Capacity	Wire Color	Circuit(s) Protected
41	100 A	—	All
42	40 A	WHT/BLK	Ignition switch (BAT)
43	7.5 A	WHT/RED	Integrated control unit
			Ceiling lights
			Spotlights
44	15 A	WHT/BLK	PGM-FI main relay
45	—	—	Not used
46	40 A	WHT/BLU	No. 7, 8, 10, 11 fuse in the under-dash fuse/relay box
47	7.5 A	WHT/BLU	Audio unit
			Clock ('98 – 00 models)
			Data link connector ('98 – 00 models)
			ECM (VBU) ('98 – 00 models: M/T)
			Heater control panel
			PCM (VBU) (A/T)
48	30 A	WHT	Combination light switch (via under-dash fuse/relay box)
			No. 20, 33 fuse in the under-dash fuse/relay box
49	—	—	Not used
50	20 A	WHT/GRN	Rear window defogger (via relay)
51	20 A	WHT/GRN	Door lock control unit
			Hatch glass opener solenoid
			Keyless door lock control unit ('98 – 00 models)
52	15 A	WHT/GRN	Horn relay
			Horns (via relay)
			via brake switch:
			ABS control unit
			Brake lights
			Cruise control unit
			ECM ('98 – 00 models: M/T)
			High mount brake light
			PCM (A/T)
			Trailer lighting connector
53	10 A	WHT/BLK	Turn signal/hazard relay (via switch)
54	40 A	WHT/RED	Option connector (+B)
			No. 6 fuse in the under-dash fuse/relay box
55	40 A	BLU/WHT	Blower motor (via relay)
56	20 A	WHT	Condenser fan motor (via relay)
		RED	A/C compressor clutch (via relay)
57	20 A	BLK/RED	Radiator fan motor (via relay)

Under-hood ABS Fuse/Relay Box:

Fuse	Capacity	Wire Color	Circuit(s) Protect
61	40 A	WHT	ABS pump motor (via relay)
62	20 A	WHT/GRN	ABS control unit
63	7.5 A	BRN/YEL	ABS control unit

(cont'd)

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Fuse-to-Component(s) Index (numerical sequence) (cont'd)

Under-dash Fuse/Relay Box:

Fuse	Capacity	Wire Color	Circuit(s) Protected
1	—	—	Not used
2	—	—	Not used
3	10 A	GRN	Rear window washer motor (via switch)
			Rear window wiper control unit ('97 model)
			Rear window wiper motor
4	10 A	RED/BLU	Daytime running rights resister (Canada)
			Right headlight (High beam)
5	10 A	RED/GRN	Daytime running rights resister (Canada)
			High beam indicator light
			Left headlight (High beam)
6	10 A	WHT/BLK	Rear accessory socket (via relay)
7	20 A	RED/WHT	Left rear power window motor (via switch)
8	20 A	YEL/BLK	Right rear power window motor (via switch)
9	15 A	RED	Distributor (ignition control module)
10	20 A	GRN/BLK	Front passenger's power window motor (via switch)
11	20 A	BLU/BLK	Driver's power window motor (via switch)
			Power window master switch (power window control unit)
12	7.5 A	YEL/BLK	Turn signal/hazard relay (via switch)
13	15 A	YEL/GRN	PGM-FI main relay
		RED	SRS unit (VA)
14	7.5 A	BLK/YEL	Cruise control unit (via switch)
			Cruise main switch indicator light
15	7.5 A	BLK/WHT	Alternator
			Charging system light
			ELD unit (USA)
			EVAP bypass solenoid valve ('98 – 00 models)
			EVAP control canister vent shut valve ('98 – 00 models)
			EVAP purge control solenoid valve
			Primary HO2S
			Secondary HO2S
			VSS
16	7.5 A	BLK/BLU	ABS control unit
17	7.5 A	—	Option connector (IG2)
		BLK/YEL	A/C compressor clutch relay
			Blower motor high relay
			Blower motor relay
			Condenser fan relay
			Heater control panel
			Left power mirror actuators (via switch)
			Mode control motor
			Radiator fan relay
			Recirculation control motor
			Right power mirror actuators (via switch)
18	7.5 A	YEL/BLK	Daytime running lights control unit (Canada)
19	7.5 A	YEL/RED	Back-up lights
			Reverse relay (A/T)
20	7.5 A	BLK/WHT	Daytime running lights control unit (Canada)
21	10 A	RED/WHT	Right headlight (Low beam)
22	10 A	RED/YEL	Left headlight (Low beam)

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Under-dash Fuse/Relay Box:

Fuse	Capacity	Wire Color	Circuit(s) Protected
23	10 A	PNK	SRS unit (VB)
24	7.5 A	—	Power window relay
25	7.5 A	—	Integrated Control Unit
		YEL	ABS indicator light
			A/T gear position indicator light
			Clock ('98 – 00 models)
			Cruise indicator light
			Gauge assembly
			Interlock control unit (A/T)
			Keyless door lock control unit ('98 – 00 models)
			Power door lock control unit
			Shift lock solenoid (A/T)
			SRS indicator light
26	20 A	—	Integrated control unit ('98 – 00 models)
		GRN/BLK	Integrated control unit (via windshield wiper switch)
			Windshield washer motor (via switch)
			Windshield wiper motor
27	10 A	YEL/GRN	Front accessory socket
			Rear accessory socket relay
28	10 A	—	Option connector (ACC)
		YEL/RED	Audio unit
29	—	—	Not used
30	7.5 A	—	Option connector (dash lights)
		—	Integrated control unit
		RED/BLK	Ashtray light
			A/T gear position indicator light
			Audio unit/clock ('97 model)
			Audio unit ('98 – 00 models)
			Clock ('98 – 00 models)
			Cruise indicator light
			Cruise main switch light
			Dash lights brightness control unit
			Gauge lights
			Hazard warning switch light
			Heater control panel
			Power window master switch light ('99 – 00 models)
31	7.5 A	—	Integrated control unit
		BLU/WHT	ECM ('98 – 00 models: M/T)
			PCM (A/T)
			PGM-FI main relay
32	7.5 A	RED/GRN	Left front parking light
			Left front side marker light
			Left rear side marker light
			Left taillight
			License plate light
			Right front parking light
			Right front side marker light
			Right rear side marker light
			Right taillight
			Trailer lighting connector
33	7.5 A	WHT/GRN	Ignition key light
			Ignition key light control unit ('97 model)
			Interlock control unit (via ignition switch)
			Key interlock solenoid

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Ground Distribution

Ground-to-Component(s) Index

Ground	Wire Color	Component or Circuits Grounded
G1	BLK/RED	Battery
G2	BRN	Valve Cover
G3	BLK	Transmission housing
G101	BLK	A/T gear position switch
		ECM (PG1, PG2) ('98 – 00 models: M/T)
		PCM (PG1, PG2) (A/T)
		PGM-FI main relay
		Power steering pressure (PSP) switch
		Radiator fan switch
		VSS
	BRN/BLK	Data link connector
		ECM (LG1, LG2) ('98 – 00 models: M/T)
		PCM (LG1, LG2) (A/T)
		Shielding:
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and CKF sensor
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and CKP sensor
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and CYP sensor
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and TDC sensor
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and countershaft speed sensor (A/T)
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and mainshaft speed sensor (A/T)
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and primary HO2S
		between ECM ('98 – 00 models: M/T) or PCM (A/T) and secondary HO2S
G201	BLK	Horn (High)
		Horn (Low)
		Radiator fan motor
		Right headlight
		Right front parking light
		Right front side marker light
		Right front turn signal light
G202	BLK	Condenser fan motor
		Cruise actuator
		Left front parking light
		Left front side marker light
		Left front turn signal light
		Left headlight
		Rear window washer motor
		Windshield washer motor
G351	BLK	ABS pump motor

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Ground	Wire Color	Component or Circuits Grounded
G401	BLK	ABS indicator circuit
		ABS control unit
		Ashtray light
		A/T gear position indicator dimming circuit
		Brake fluid level switch
		Clock ('98 - 00 models)
		Clutch interlock switch (M/T)
		Clutch switch (M/T)
		Cruise main switch
		Cruise indicator circuit
		Cruise control unit
		Dash lights brightness controller
		Data link connector
		Daytime running rights control unit (Canada)
		Front accessary socket
		Gauge and indicators
		Heater control panel
		Ignition key light control unit ('97 model)
		Ignition key switch
		Integrated control unit
		Interlock control unit (A/T)
		Parking pin switch (A/T)
		Power window relay
		Rear accessary socket relay
		Rear window defogger relay
		Rear window wiper control unit ('97 model)
		Service check connector
		Spotlights
		SRS indicator circuit
		Turn signal/hazard relay
		Windshield wiper motor
		Windshield wiper/washer switch
		— plus everything grounded through G402
G402	BLK	ABS control unit
		Blower motor relay
		Blower motor high relay
		ELD unit (USA)
		Power transistor
		— plus everything grounded through G401

(cont'd)

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Ground Distribution

Ground-to-Component(s) Index (cont'd)

Ground	Wire Color	Component or Circuits Grounded
G501	BLK	Audio unit
G551	BLK	Driver's door lock actuator (door lock knob switch)
		Driver's door lock switch
		Driver's power window motor
		Keyless door lock control unit ('98 – 00 models)
		Power door lock control unit
		Power mirror switch
		Power window master switch
G552	BLK	Driver's seat belt switch
		Fuel gauge sending unit
G553	BLK	Fuel pump (FP)
		Left rear side marker light
		Left taillight
		Rear accessary socket
		Right rear side marker light
		Trailer lighting connector
G611	BLK	High mount brake light
		Rear window defogger
		Rear window wiper motor
		Right taillight
		— plus everything grounded through G631
G631	BLK	Hatch glass opener solenoid
		License plate light
		— plus everything grounded through G611
G801	BLK	SRS unit

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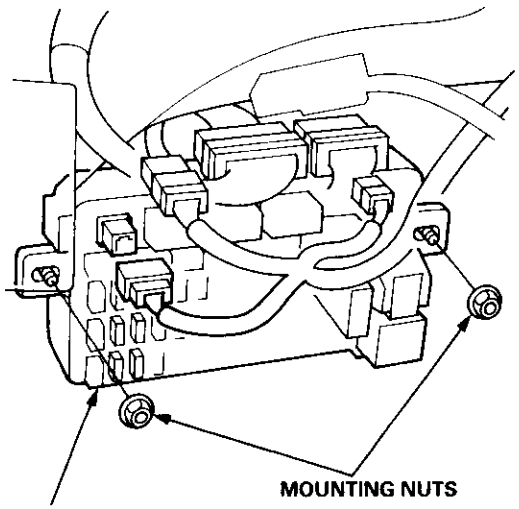
Under-dash Fuse/Relay Box

Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

Removal:

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons (with anti-theft feature).
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
4. Remove the two mounting nuts, and pull the under-dash fuse/relay box out from under the dash.



5. Disconnect the connectors from the under-dash fuse/relay box (see section 24 for the SRS main harness connector), and take out the under-dash fuse/relay box.

Installation:

1. Connect the connectors to the under-dash fuse/relay box (see section 24 for the SRS main harness connector), then install the under-dash fuse/relay box in the reverse order of removal.
2. Install the knee bolster and the driver's dashboard lower cover (see section 20).
3. Connect the battery positive cable, then connect the negative cable.
4. Enter the anti-theft code for the radio, then enter the customer's radio station presets (with anti-theft feature).
5. Confirm that all systems work properly.

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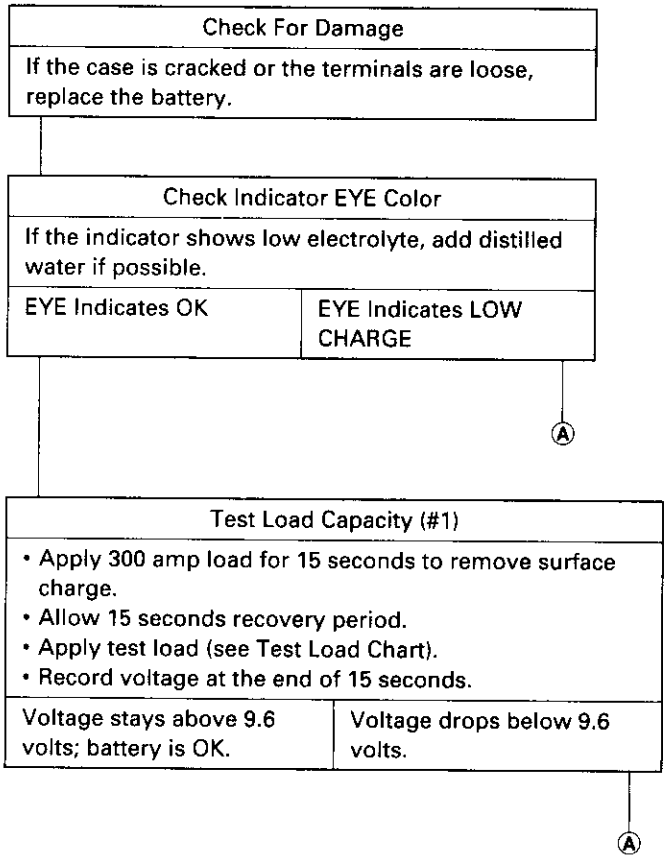
Battery

Test

⚠ WARNING

- **Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.**
  - **— If electrolyte gets on your skin or clothes, rinse it off with water immediately.**
  - **— If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.**
- **A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.**
- **Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.**

Use either a JCI or Bear ARBST tester, and follow the manufacturer's procedures. If you don't have one of these computerized testers, follow this conventional test procedure:
To get accurate results, the temperature of the electrolyte must be between 70°F (21°C) and 100°F (38°C).



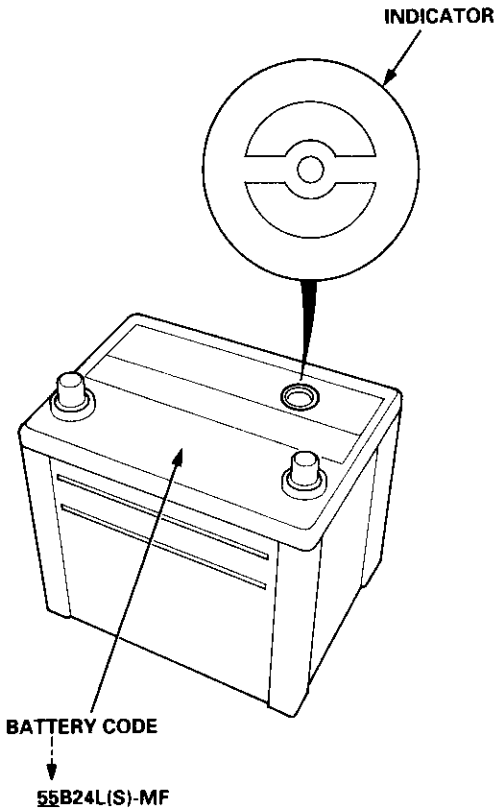
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Ⓐ

Charge on High Setting (40 amps)
Charge until EYE shows charge is OK, plus an additional 30 minutes to assure full charge. NOTE: If the battery charge is very low, it may be necessary to bypass the charger's polarity protection circuitry. If the EYE does not show charge is OK within three hours, the battery is no-good; replace it. Write down how long the battery was charged.

Test Load Capacity (#2)	
• Apply 300 amp load for 15 seconds to remove surface charge. • Allow 15 seconds recovery period. • Apply test load (see Test Load Chart). • Record voltage at the end of 15 seconds.	
Voltage stays above 9.6 volts; battery is OK.	Voltage drops below 9.6 volts; battery is no-good.

Replace the battery.



TEST LOAD CHART		
Use the test load or use 1/2 the cold cranking amps (CCA) printed on the label on the top of the battery. If neither is indicated, use the information below:		
BATTERY CODE	COLD CRANKING AMPS (CCA)	TEST LOAD (amps)
55	410	200

Power Relays

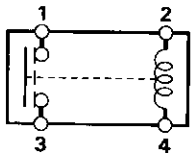
Relay Test

NOTE: See page 23-86 for turn signal/hazard relay input test.

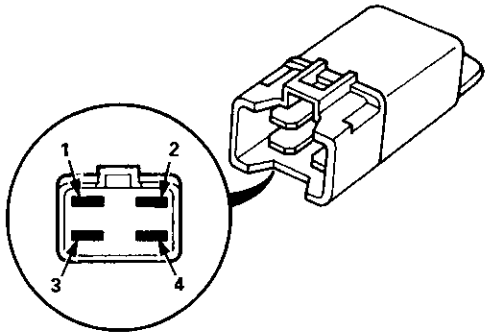
Normally-open type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
   - There should be no continuity between the No. 1 and No. 3 terminals when power is disconnected.

Terminal / Power (No.2 – No.4)	1	3
Disconnected		
Connected	○	○

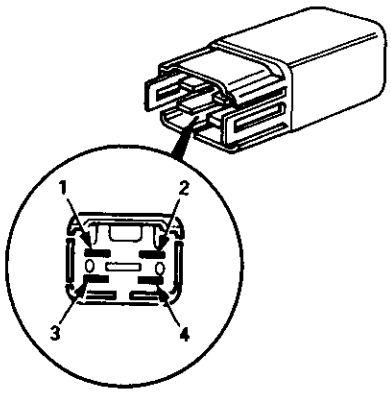


- Blower motor high relay
- Rear accessory socket relay (M/T)

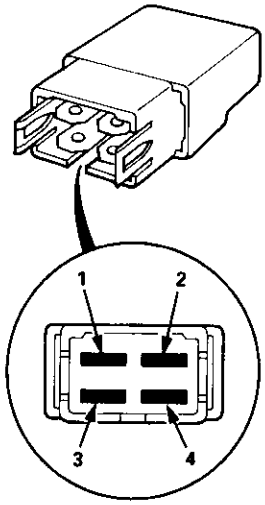


- Blower motor relay
- Rear window defogger relay

type 1:



type 2:

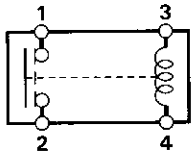


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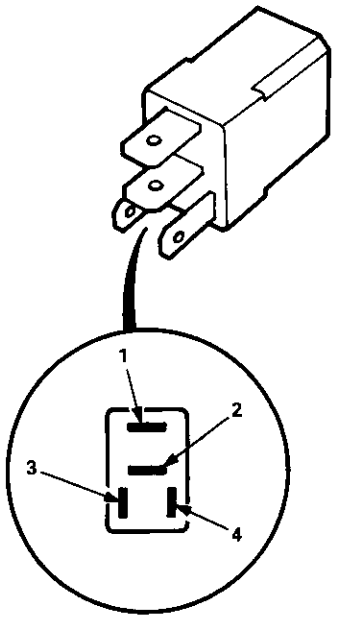
Normally-open type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 4 terminals.
   - There should be no continuity between the No. 1 and No. 2 terminals when power is disconnected.

Terminal / Power (No.3 – No.4)	1	2
Disconnected		
Connected	○	○



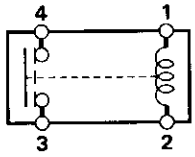
- Power window relay
- Radiator fan relay
- Condenser fan relay
- A/C compressor clutch relay
- Reverse relay (A/T)
- Horn relay
- Rear accessory socket relay (A/T)
- Starter cut relay



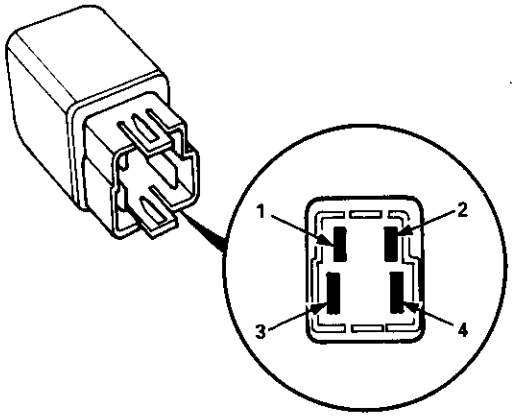
Normally-open type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 4 and No. 3 terminals when power and ground are connected to the No. 1 and No. 2 terminals.
   - There should be no continuity between the No. 4 and No. 3 terminals when power is disconnected.

Terminal / Power (No.1 – No.2)	4	3
Disconnected		
Connected	○	○



- ABS pump motor relay



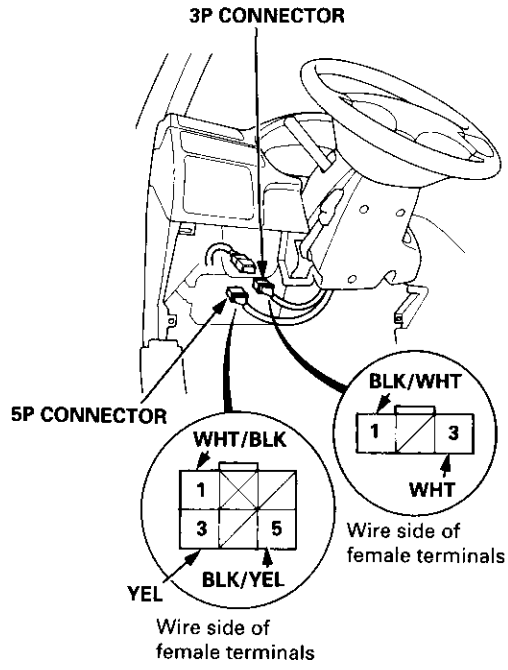
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Ignition Switch

Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons (with anti-theft feature).
2. Disconnect the battery negative cable.
3. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
4. Disconnect the 5P connector from the under-dash fuse/relay box and the 3P connector from the main wire harness.



5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1 (ACC)	[3] (BAT)	5 (IG1)	3 (IG2)	[1] (ST)
0 (LOCK)					
I (ACC)	○—○				
II (ON)	○—○	○—○			
III (START)		○—○			○

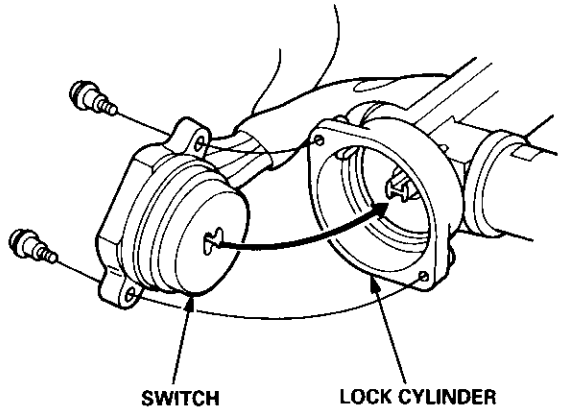
[ ]: 3P connector

6. If the continuity checks do not agree with the table, replace the electrical switch.
7. After reconnecting the battery, enter the anti-theft code for the radio, then enter the customer's radio station presets (with anti-theft feature).

Electrical Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons (with anti-theft feature).
2. Disconnect the battery negative cable.
3. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
4. Disconnect the 5P connector from the under-dash fuse/relay box and the 3P connector from the main wire harness (see left column).
5. Remove the steering column covers (see section 17).
6. Insert the ignition key, and turn it to "0".
7. Remove the two screws and the electrical switch from the steering lock.



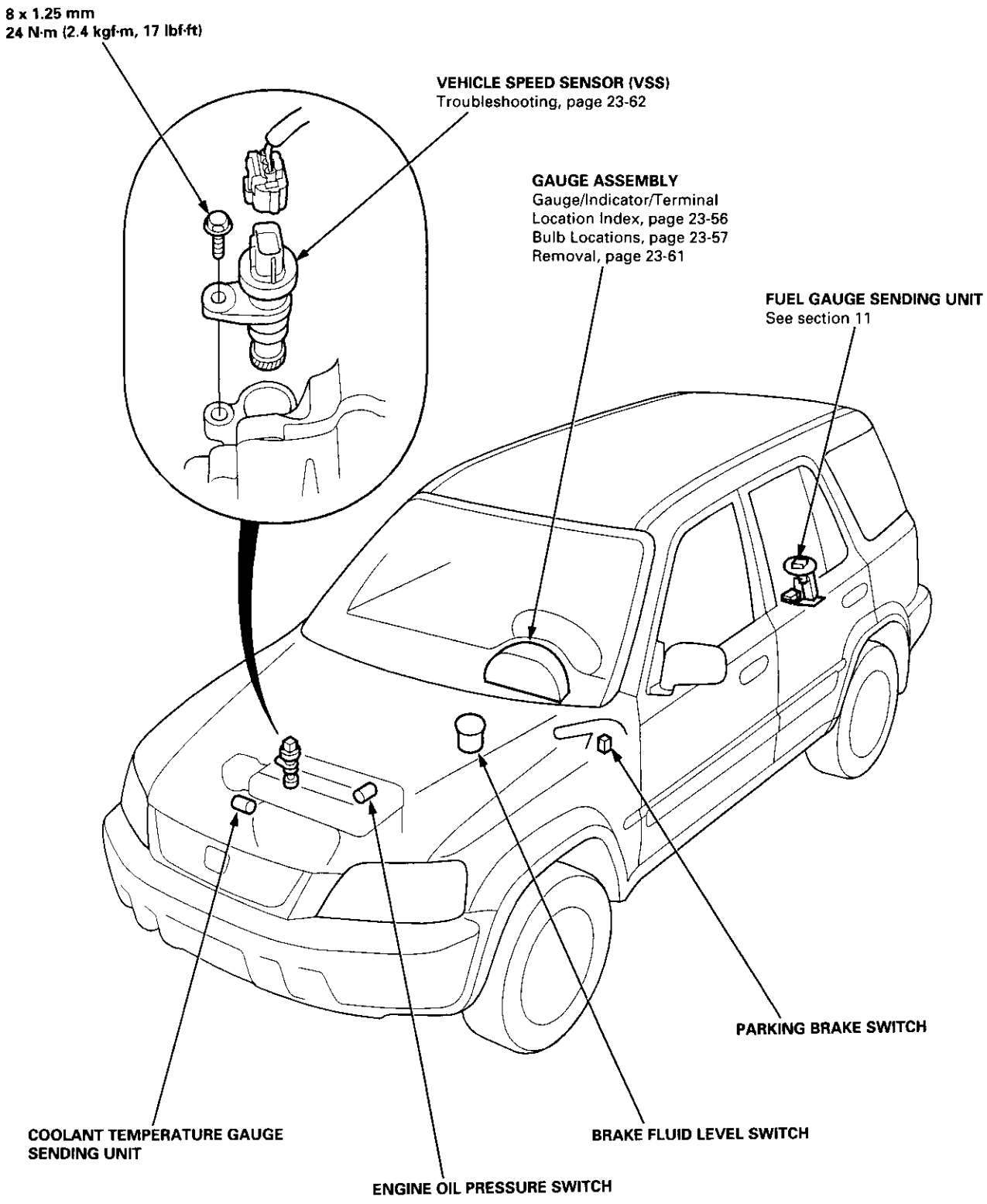
8. Install in the reverse order of removal.
9. After reconnecting the battery, enter the anti-theft code for the radio, then enter the customer's radio station presets (with anti-theft feature).

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Gauge Assembly

Component Location Index

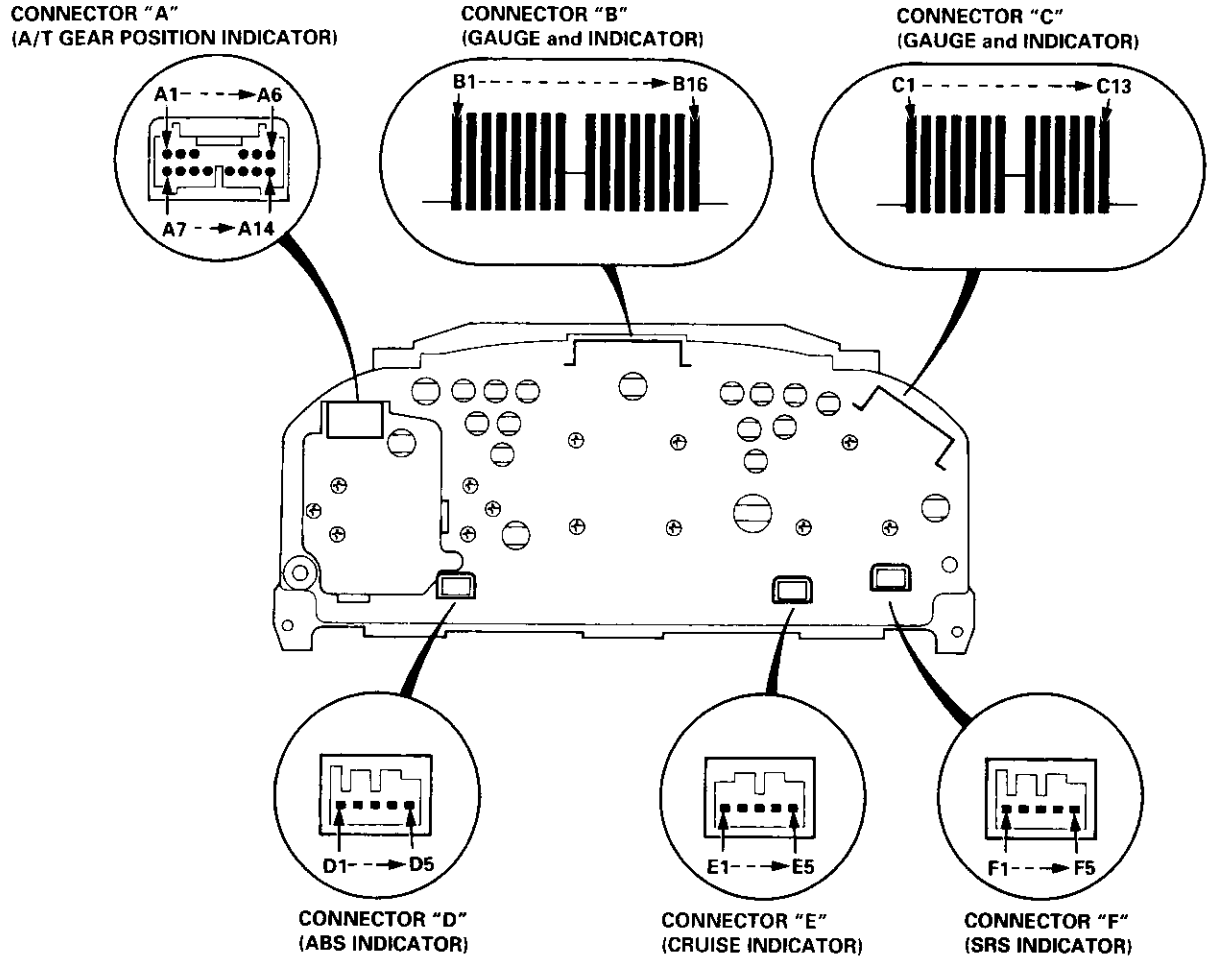
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

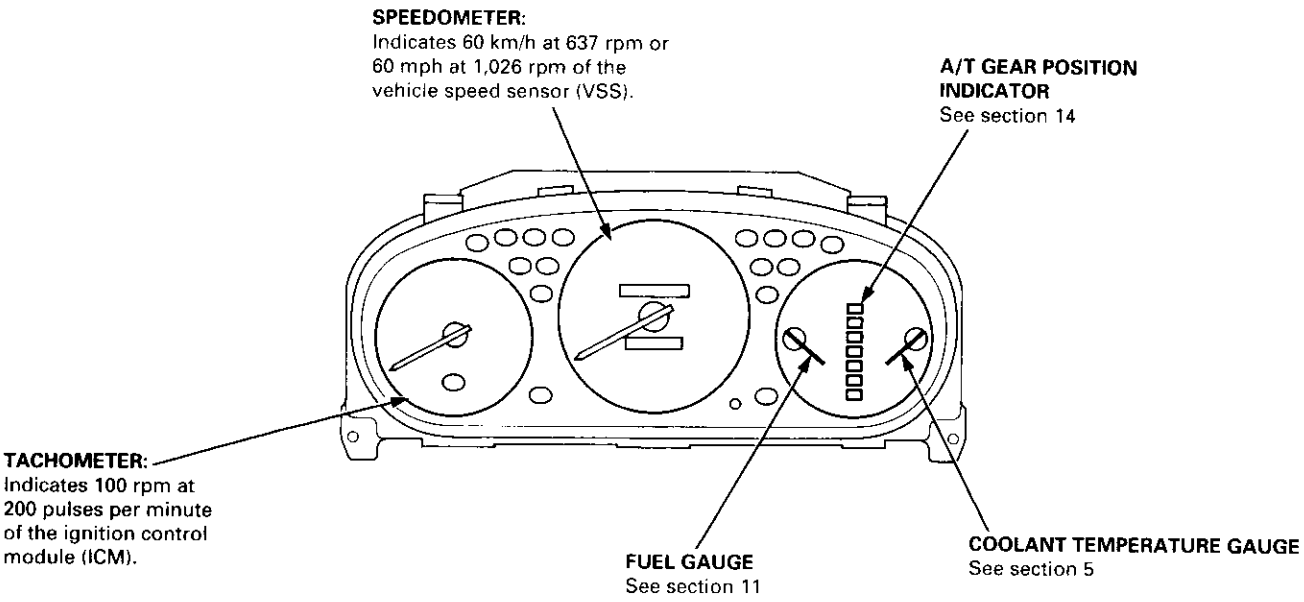


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Gauge Assembly

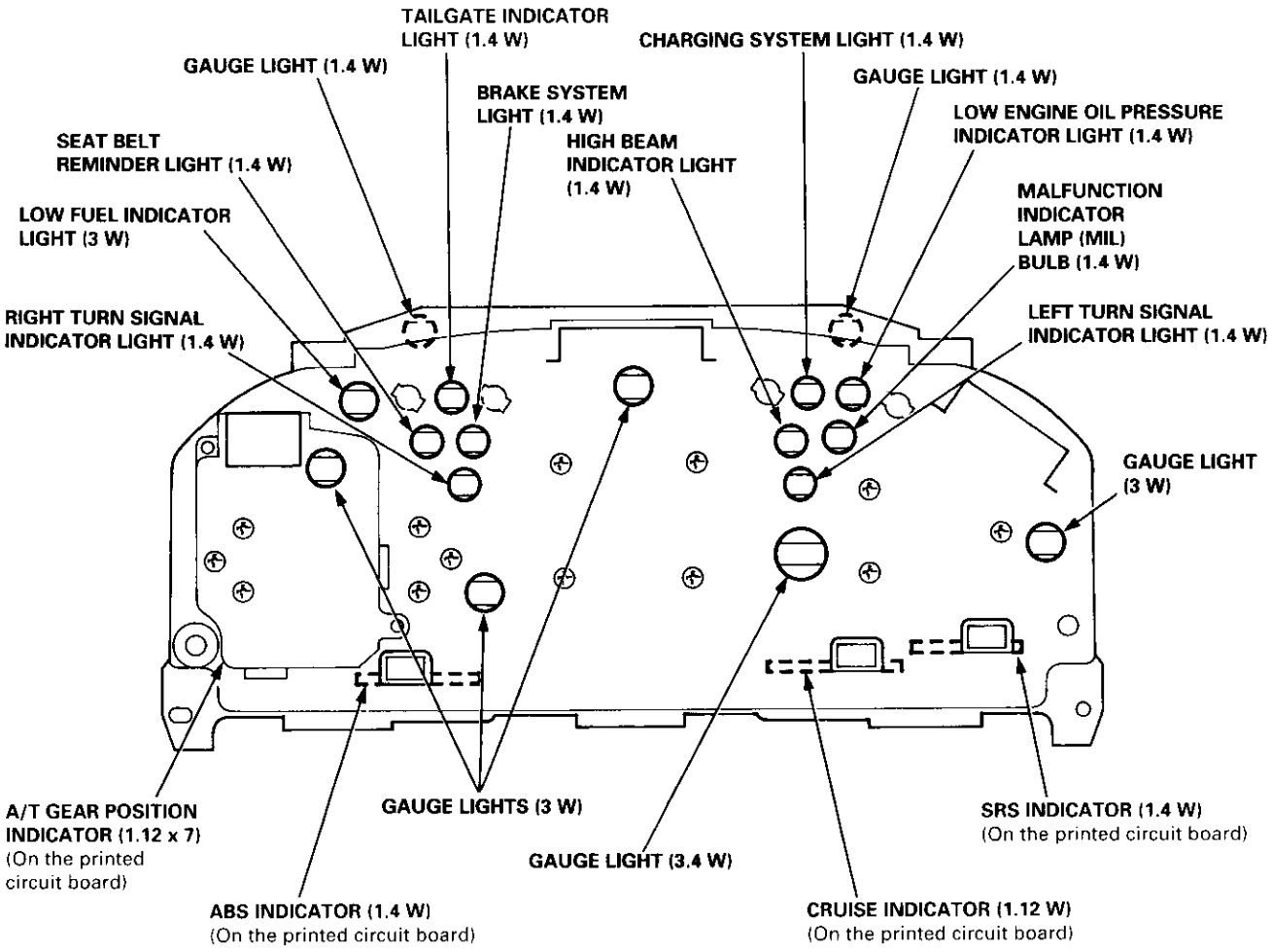
Gauge/Indicator/Terminal Location Index





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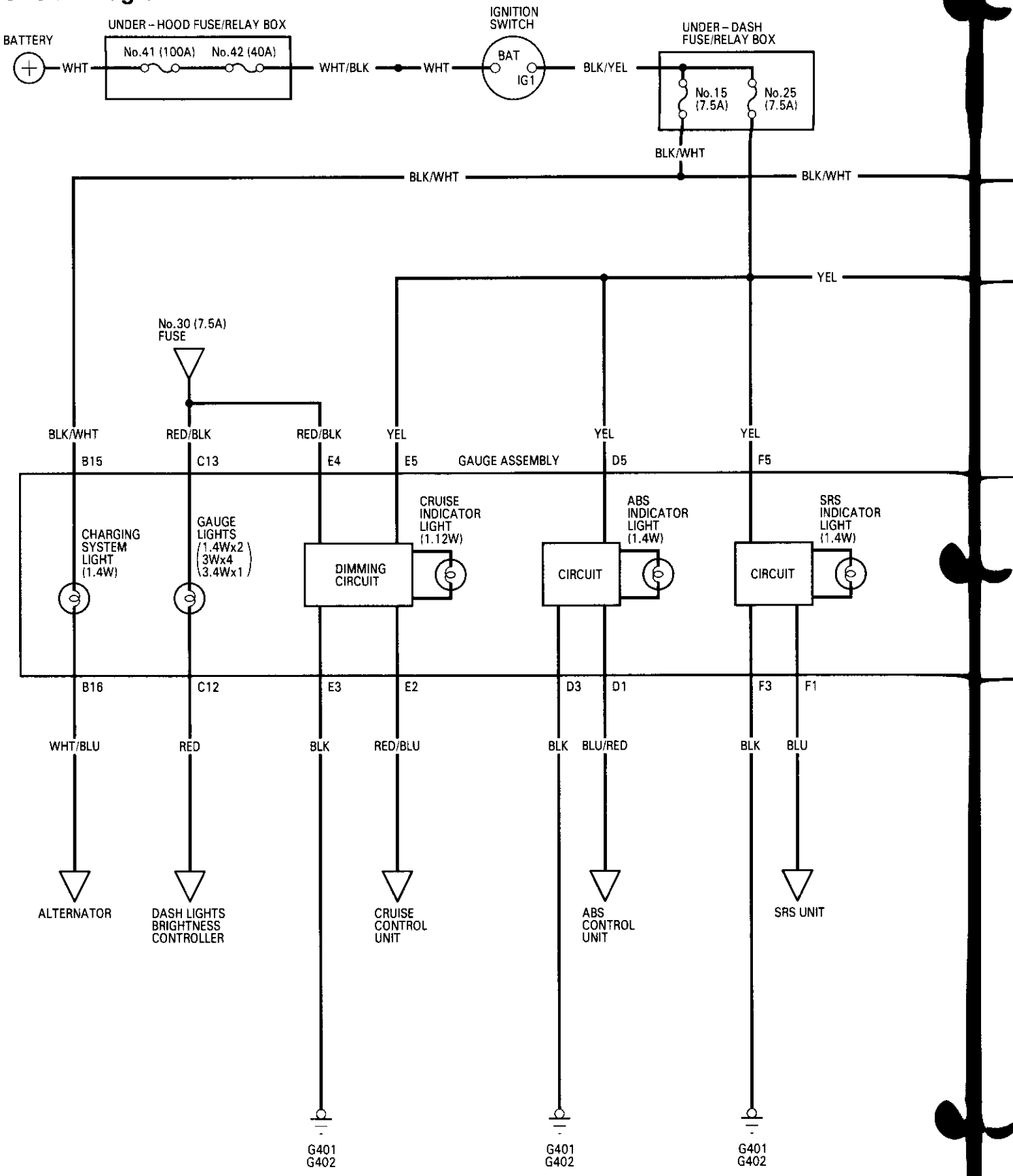
Bulb Locations



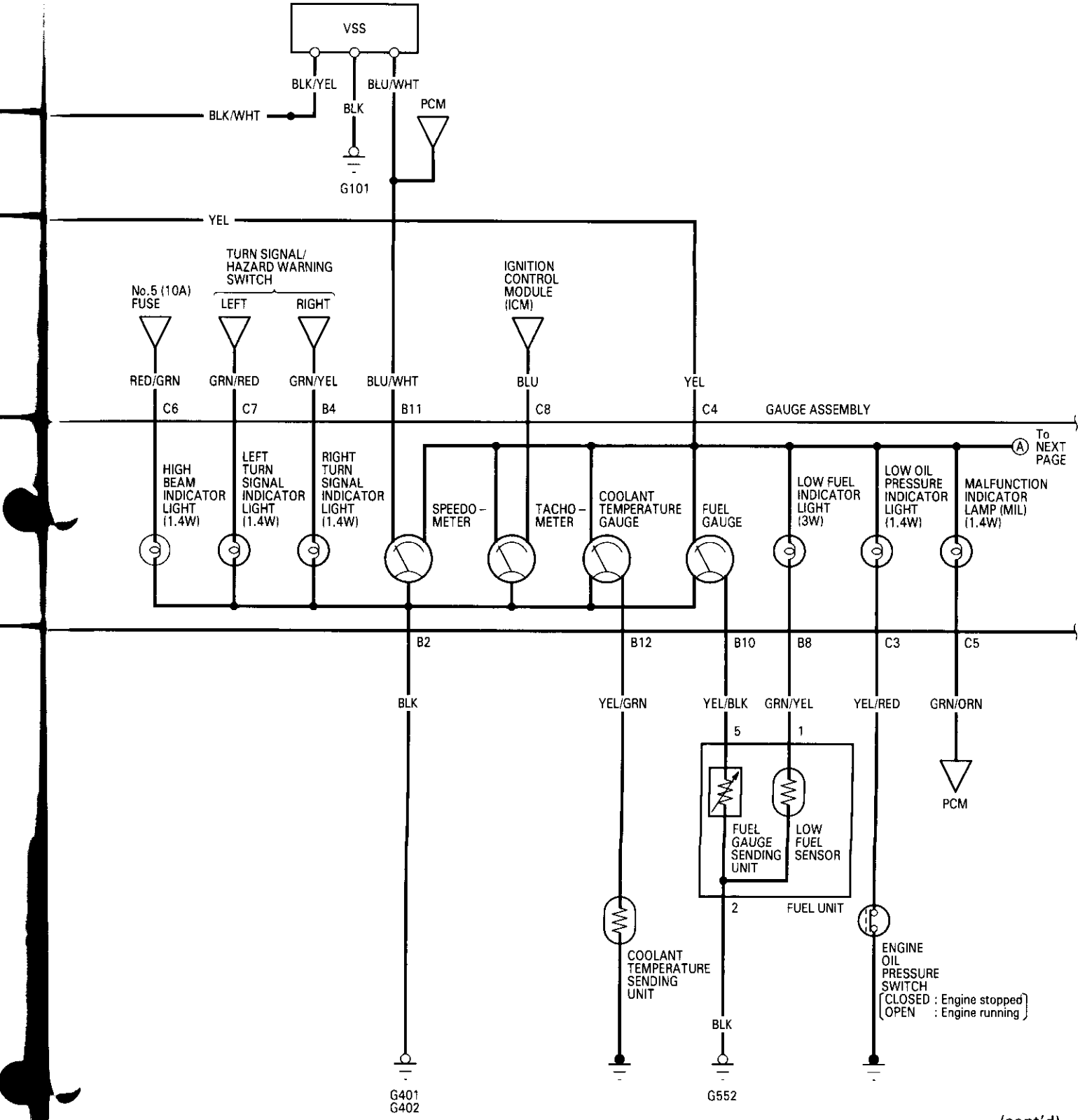
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Gauge Assembly

Circuit Diagram



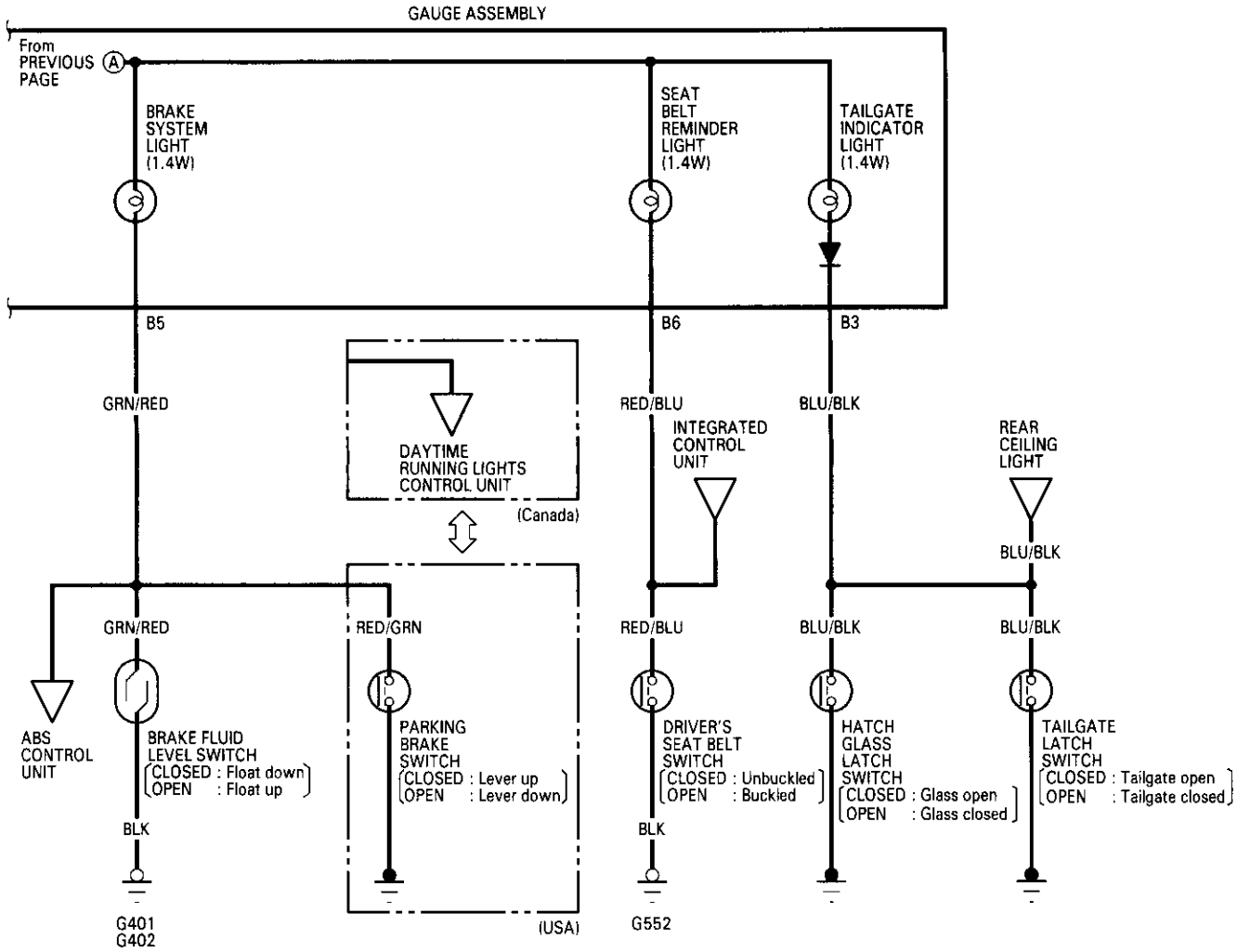
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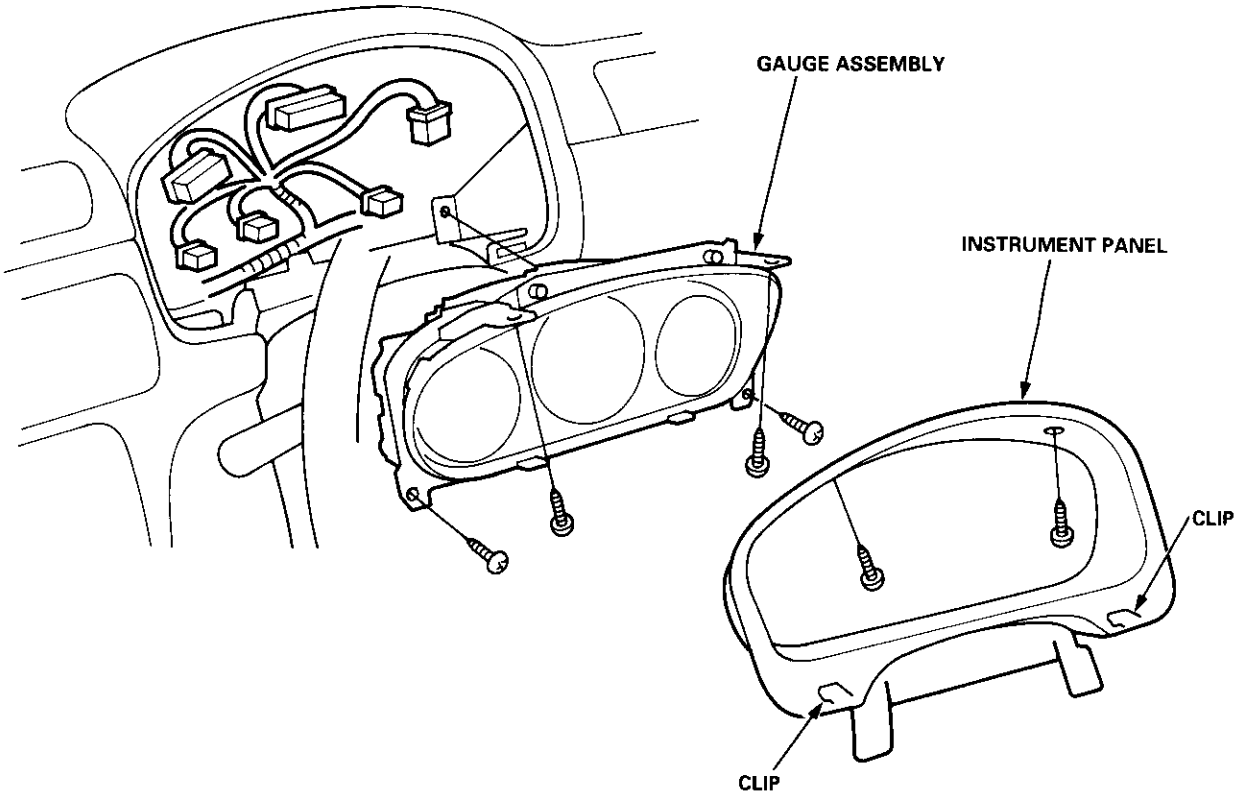
Circuit Diagram (cont'd)



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Removal

1. Remove the two screws from the instrument panel.
2. Remove the instrument panel carefully to avoid damaging the clips.
3. Tilt the steering wheel down with the tilt adjustment lever.
4. Spread a protective cloth over the steering column.
5. Remove the four mounting screws from the gauge assembly.
6. Pull the gauge assembly out, and disconnect all connectors from it.
7. Remove the gauge assembly.



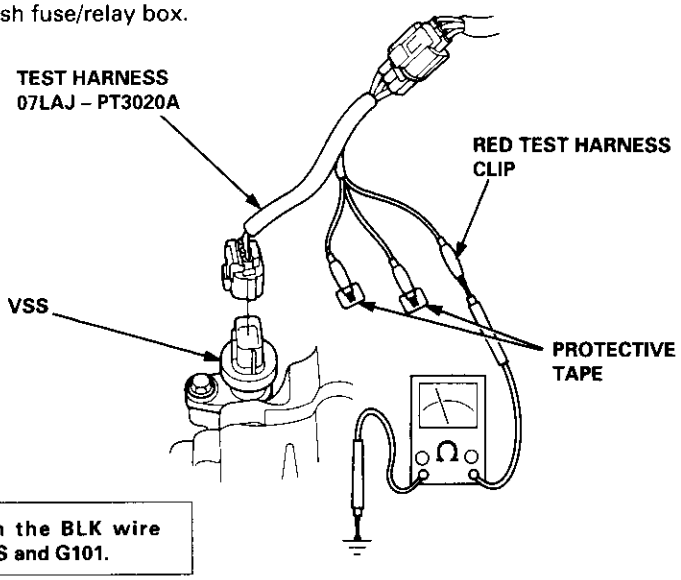
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Vehicle Speed Sensor (VSS)

Troubleshooting

Before testing, inspect the No. 15 (7.5 A) fuse in the under-dash fuse/relay box.

Test the BLK wire:
1. Disconnect the 3P connector from the vehicle speed sensor (VSS).
2. Connect the test harness (07LAJ – PT3020A) only to the engine wire harness.
3. Connect the RED test harness clip to the positive probe of an ohmmeter.
4. Check for continuity between the RED test harness clip and body ground.

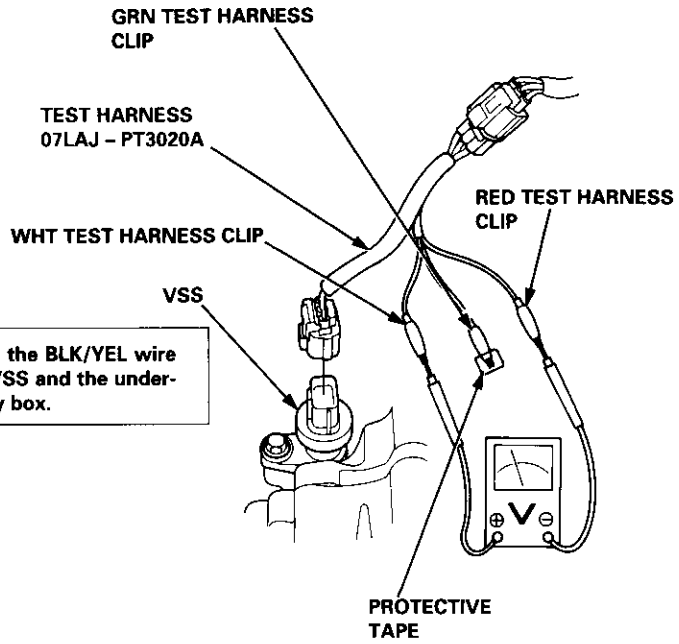


Is there continuity?

NO → **Repair open in the BLK wire between the VSS and G101.**

YES

Test the BLK/YEL wire:
1. Connect the WHT test harness clip to the positive probe of a voltmeter, and connect the RED test harness clip to the negative probe.
2. Turn the ignition switch ON (II).



Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the VSS and the under-dash fuse/relay box.**

YES

Test the BLU/WHT wire:
Connect the GRN test harness clip to the positive probe of a voltmeter, and connect the RED test harness clip to the negative probe.

Is there about 5 V or more?

NO → **Repair open in the BLU/WHT wire between the VSS and PCM.**

YES

A

(To next page)

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(From previous page)

A

Test the VSS:
1. Turn the ignition switch OFF.
2. Connect the other test harness connector to the VSS.
3. Raise the front and rear of the vehicle, and support it with safety stands.
4. Put the transmission in neutral with the ignition switch ON (II).
5. Slowly rotate one wheel with the other wheel blocked.

Does voltage pulse from 0 to approx. 5 V or more?

NO → **Replace the VSS.**

YES

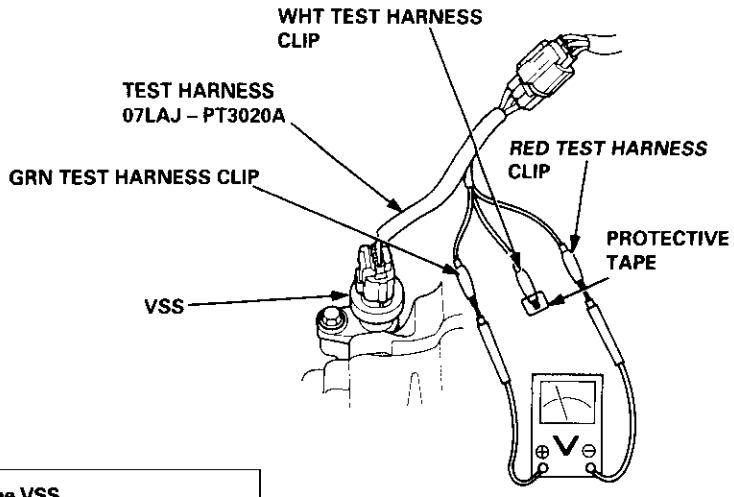
Speedometer Test:
1. Disconnect the 16P connector "B" from the gauge assembly.
2. Touch a probe to the BLU/WHT wire, and connect it to body ground through a voltmeter.
3. Slowly rotate one wheel with the other wheel blocked.

Does the meter indicate pulsing voltage?

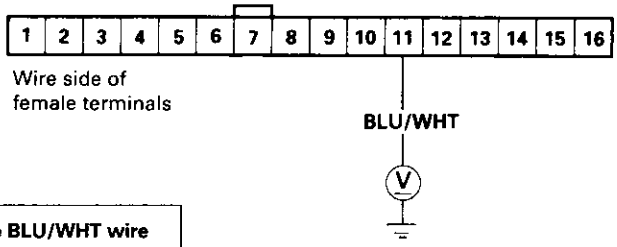
NO → **Repair open in the BLU/WHT wire between the VSS and the speedometer.**

YES

Replace the speedometer.



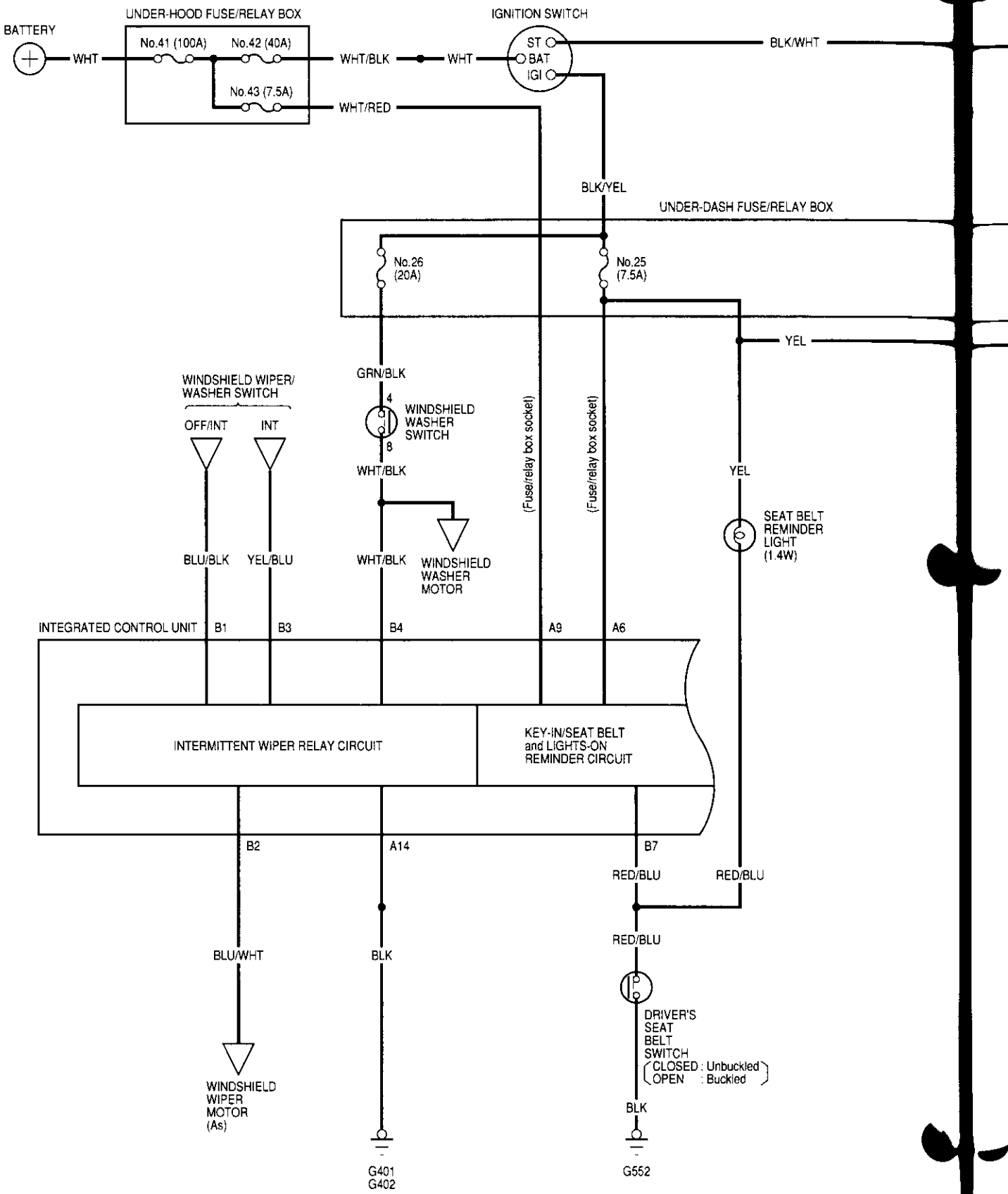
GAUGE ASSEMBLY 16P CONNECTOR "B"



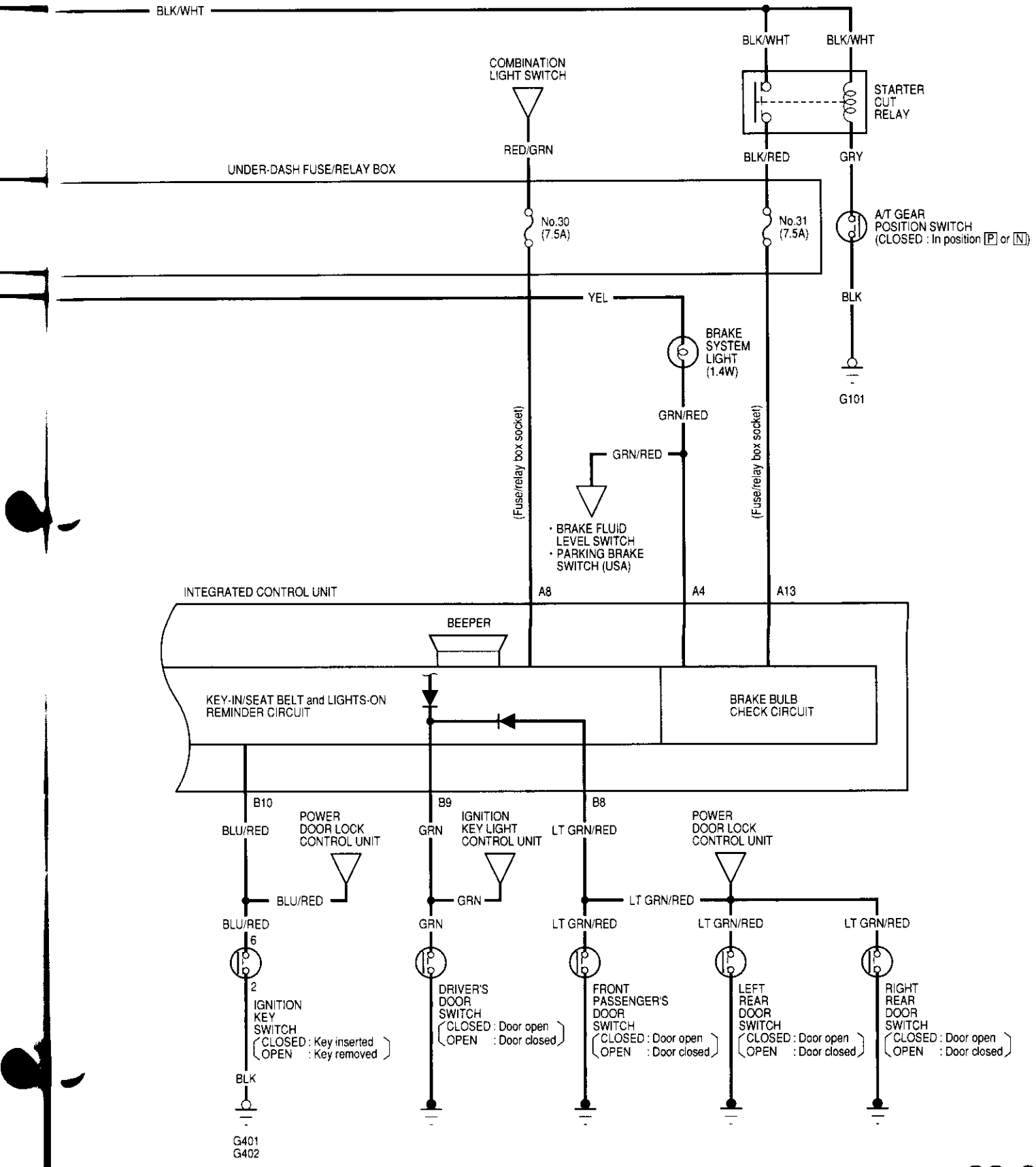
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Integrated Control Unit

Circuit Diagram — '97 Model



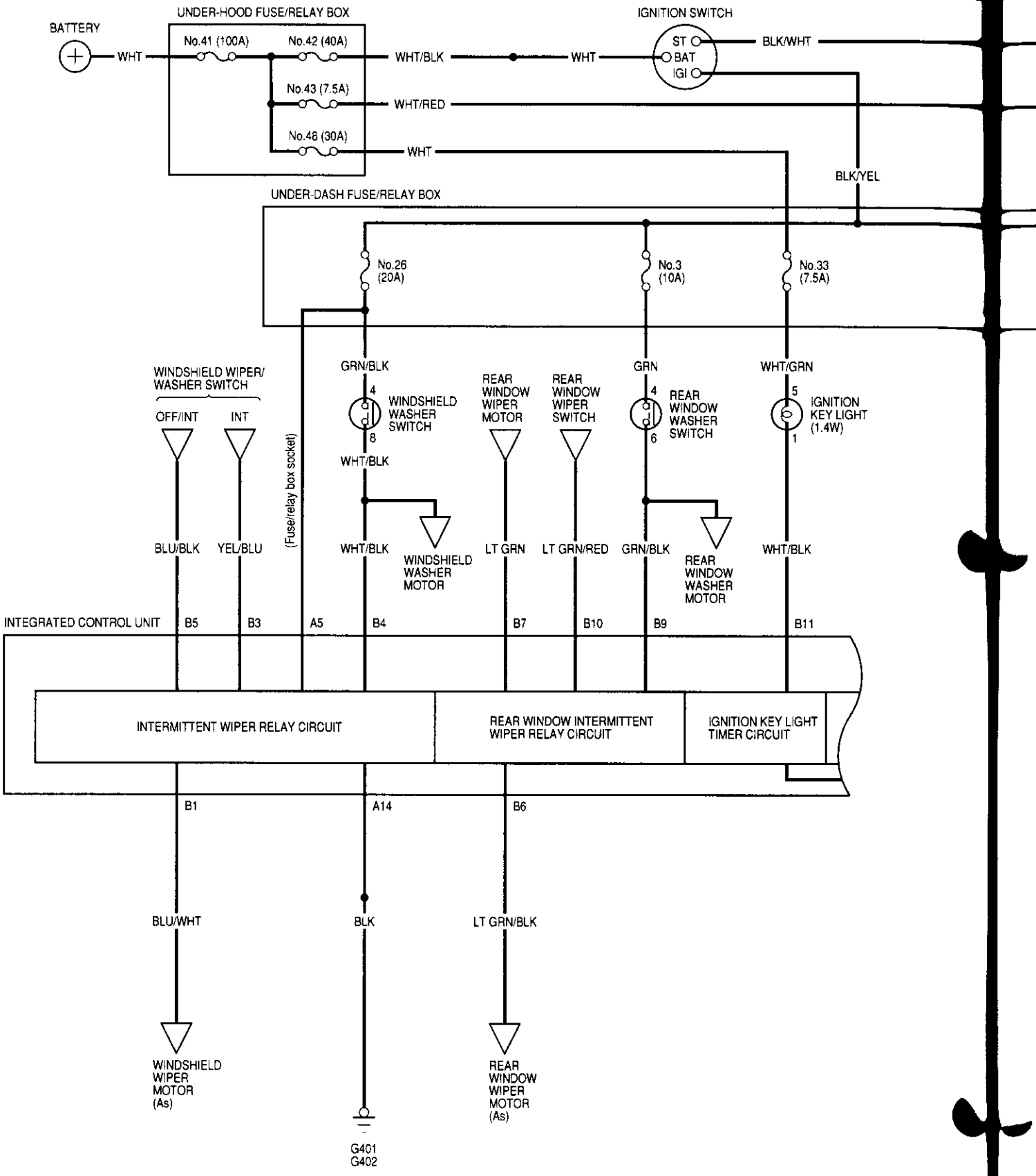
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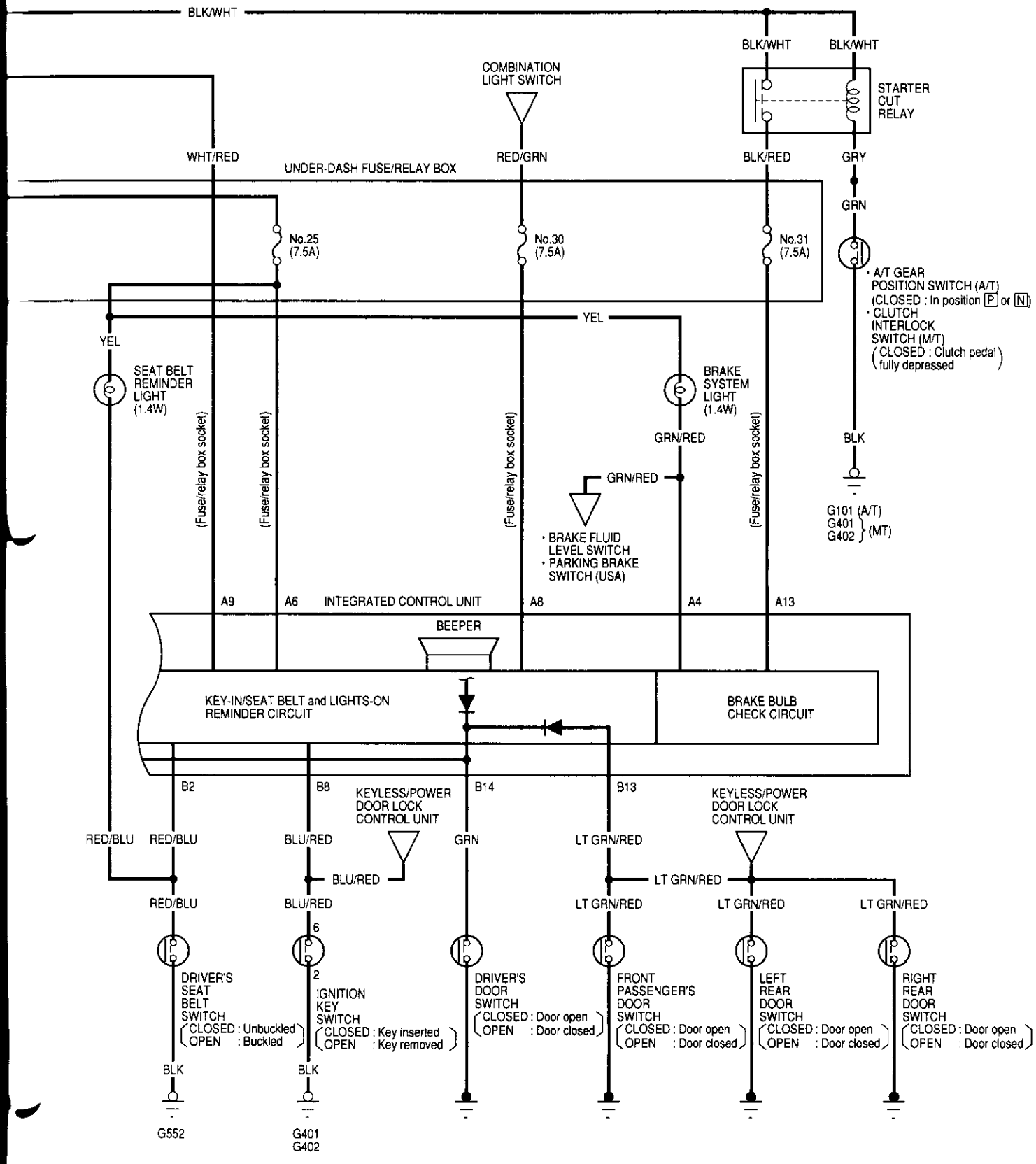
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Integrated Control Unit

Circuit Diagram — '98 – 00 Models



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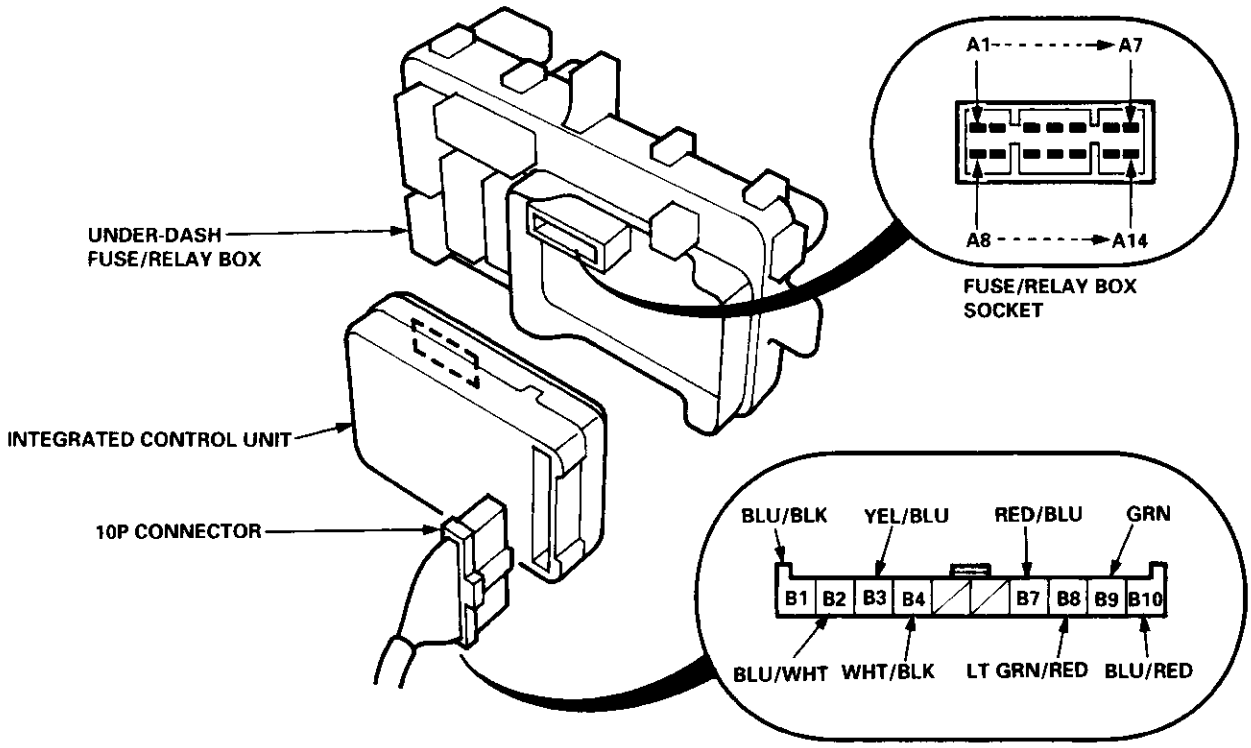
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Integrated Control Unit

Input Test – '97 Model

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Disconnect the 10P connector from the integrated control unit.
3. Remove the integrated control unit from the under-dash fuse/relay box.
4. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Wire side of female terminals

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All Systems:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A14	———	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
A9	———	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
A6	———	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire

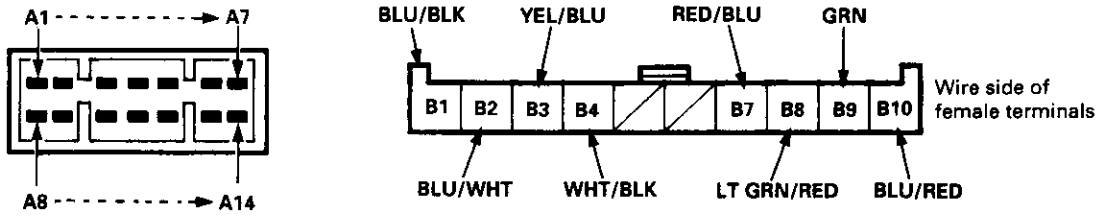
Intermittent Wiper System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B1	BLU/BLK	Ignition switch ON (II), and windshield wiper switch at OFF/INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • Faulty windshield wiper motor • An open in the wire
B2	BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • An open in the wire
B3	YEL/BLU	Ignition switch ON (II), and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • An open in the wire
B4	WHT/BLK	Ignition switch ON (II), and windshield washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield washer switch • An open in the wire

(cont'd)

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Input Test – '97 Model (cont'd)



Key-in/Seat Belt Reminder, Lights-on Reminder System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A8	———	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
B7	RED/BLU	Ignition switch ON (II), and driver's seat belt switch unbuckled	Check for voltage to ground: There should be 1 V or less.	• Poor ground (G552) • Faulty seat belt switch • Blown seat belt reminder light bulb • An open in the wire
		Ignition switch ON (II), and driver's seat belt switch buckled	Check for voltage to ground: There should be 4 V or more.	
B9	GRN	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
		Driver's door closed	Check for voltage to ground: There should be 4 V or more.	
B10	BLU/RED	Ignition key inserted into the ignition key switch	Check for voltage to ground: There should be 1 V or less.	• Poor ground (G401, G402) • Faulty ignition key switch • An open in the wire
		Ignition key removed from the ignition key switch	Check for voltage to ground: There should be 4 V or more.	

Bulb Check System (Brake System Light):

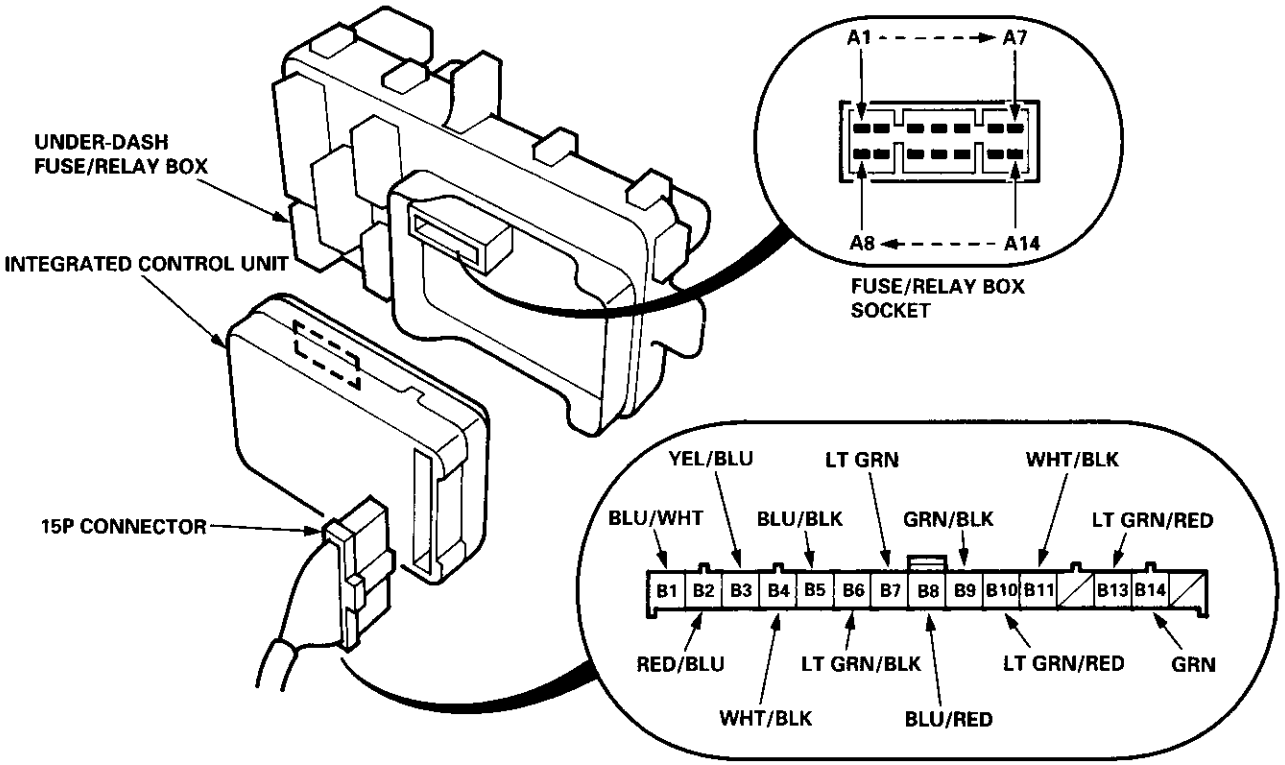
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A4	———	Ignition switch ON (II), brake fluid reservoir full, and parking brake lever down	Connect to ground: Brake system light should come on.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Blown brake system light bulb • An open in the wire
A13	———	Ignition switch at START (III), and A/T gear position switch P or N	Check for voltage to ground: There should be battery voltage.	• Blown No. 31 (7.5 A) fuse in the under-dash fuse/relay box • Faulty starter cut relay • Faulty A/T gear position switch • Poor ground (G101) • An open in the wire

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Input Test — '98 – 00 Models

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Disconnect the 15P connector from the integrated control unit.
3. Remove the integrated control unit from the under-dash fuse/relay box.
4. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



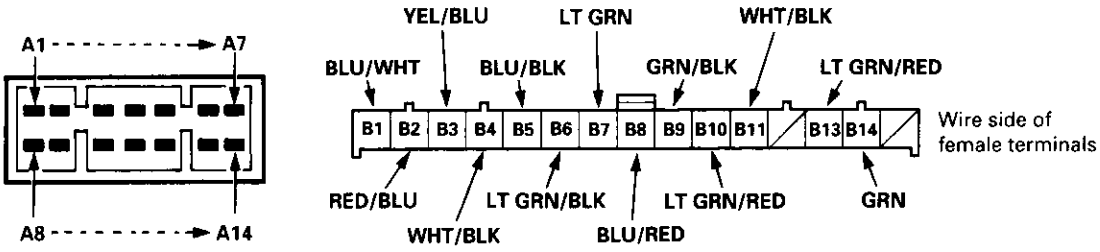
Wire side of
female terminals

(cont'd)

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Integrated Control Unit

Input Test — '98 – 00 Models (cont'd)



All Systems:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A14	———	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
A9	———	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 43 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
A6	———	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
A5	———	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • An open in the wire

Intermittent Wiper System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B5	BLU/BLK	Ignition switch ON (II), and windshield wiper switch at OFF/INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • Faulty windshieldwiper motor • An open in the wire
B1	BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • An open in the wire
B3	YEL/BLU	Ignition switch ON (II), and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • An open in the wire
B4	WHT/BLK	Ignition switch ON (II), and windshield washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield washer switch • An open in the wire

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Rear Window Intermittent Wiper System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B7	LT GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper motor • An open in the wire
B6	LT GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper motor • An open in the wire
B10	LT GRN/RED	Ignition switch ON (II), and rear window wiper/washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper/washer switch • An open in the wire
B9	GRN/BLK	Ignition switch ON (II), and rear window wiper/washer switch at washer position	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper/washer switch • An open in the wire

Ignition key Light Timer System:

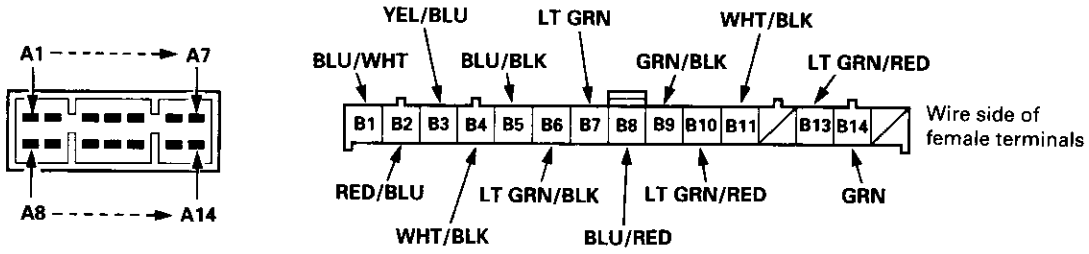
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B11	WHT/BLK	Under all conditions	Connect to ground: Ignition key light should come on.	• Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Blown ignition key light bulb • An open in the wire

(cont'd)

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Integrated Control Unit

Input Test — '98 – 00 Models (cont'd)



Key-in/Seat Belt Reminder, Lights-on Reminder System:

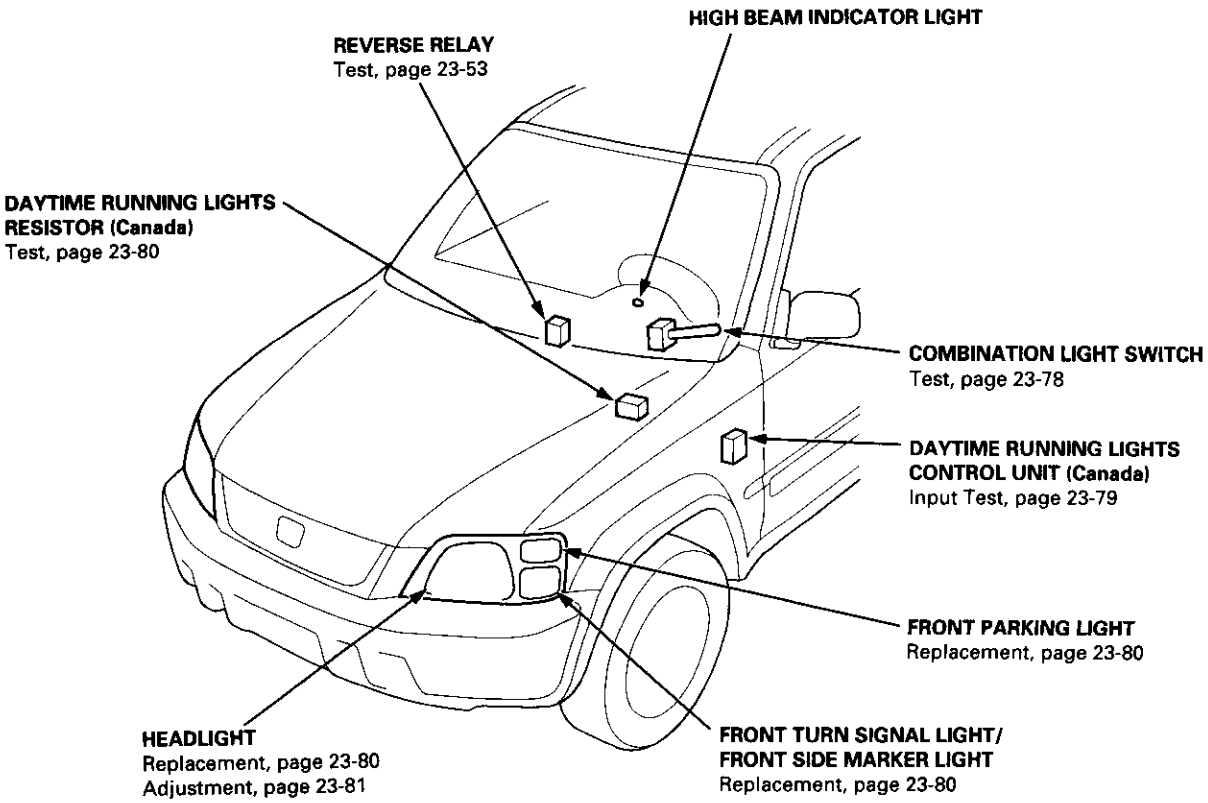
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A8	——	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
B2	RED/BLU	Ignition switch ON (II), and driver's seat belt switch unbuckled	Check for voltage to ground: There should be 1 V or less.	• Poor ground (G552) • Faulty seat belt switch • Blown seat belt reminder light bulb • An open in the wire
		Ignition switch ON (II), and driver's seat belt switch buckled	Check for voltage to ground: There should be 4 V or more.	
B14	GRN	Driver's door open	Check for continuity to ground: There should be continuity.	• Faulty driver's door switch • An open in the wire
		Driver's door closed	Check for continuity to ground: There should be no continuity.	
B8	BLU/RED	Ignition key inserted into the ignition key switch	Check for voltage to ground: There should be 1 V or less.	• Poor ground (G401, G402) • Faulty ignition key switch • An open in the wire
		Ignition key removed from the ignition key switch	Check for voltage to ground: There should be 4 V or more.	

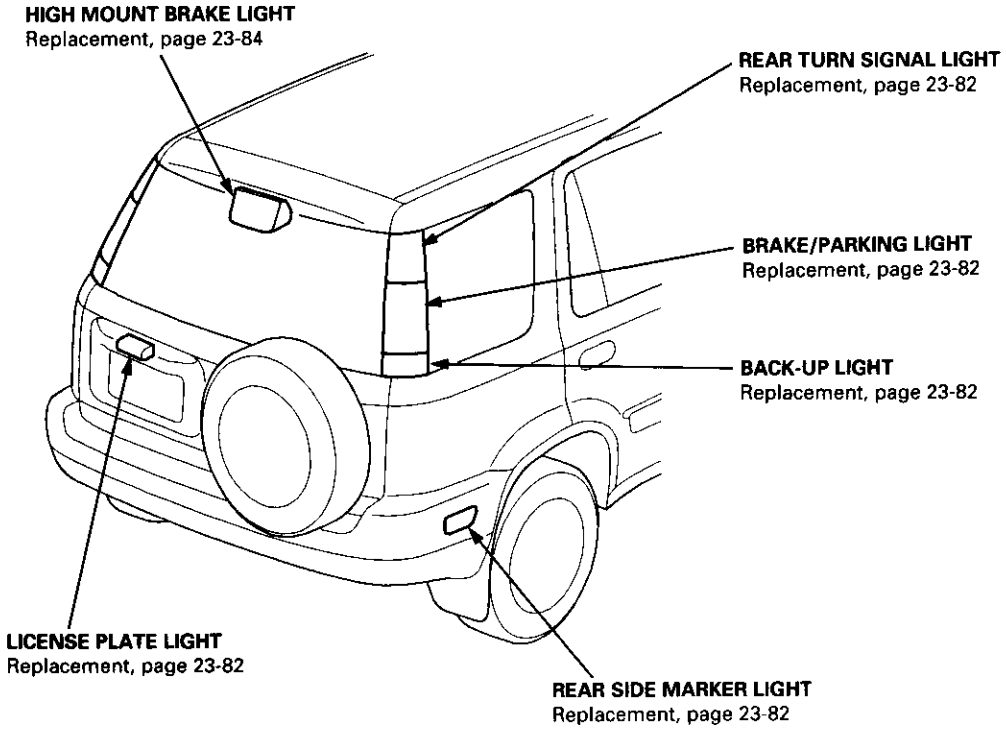
Bulb Check System (Brake System Light):

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A4	——	Ignition switch ON (II), brake fluid reservoir full, and parking brake lever down	Connect to ground: Brake system light should come on.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Blown brake system light bulb • An open in the wire
A13	——	Ignition switch at START (III), and A/T gear position switch [P] or [N]	Check for voltage to ground: There should be battery voltage.	• Blown No. 31 (7.5 A) fuse in the under-dash fuse/relay box • Faulty starter cut relay • Faulty A/T gear position switch (A/T) • Faulty clutch interlock switch (M/T) • Poor ground (G101: A/T, G401 and G402: M/T) • An open in the wire

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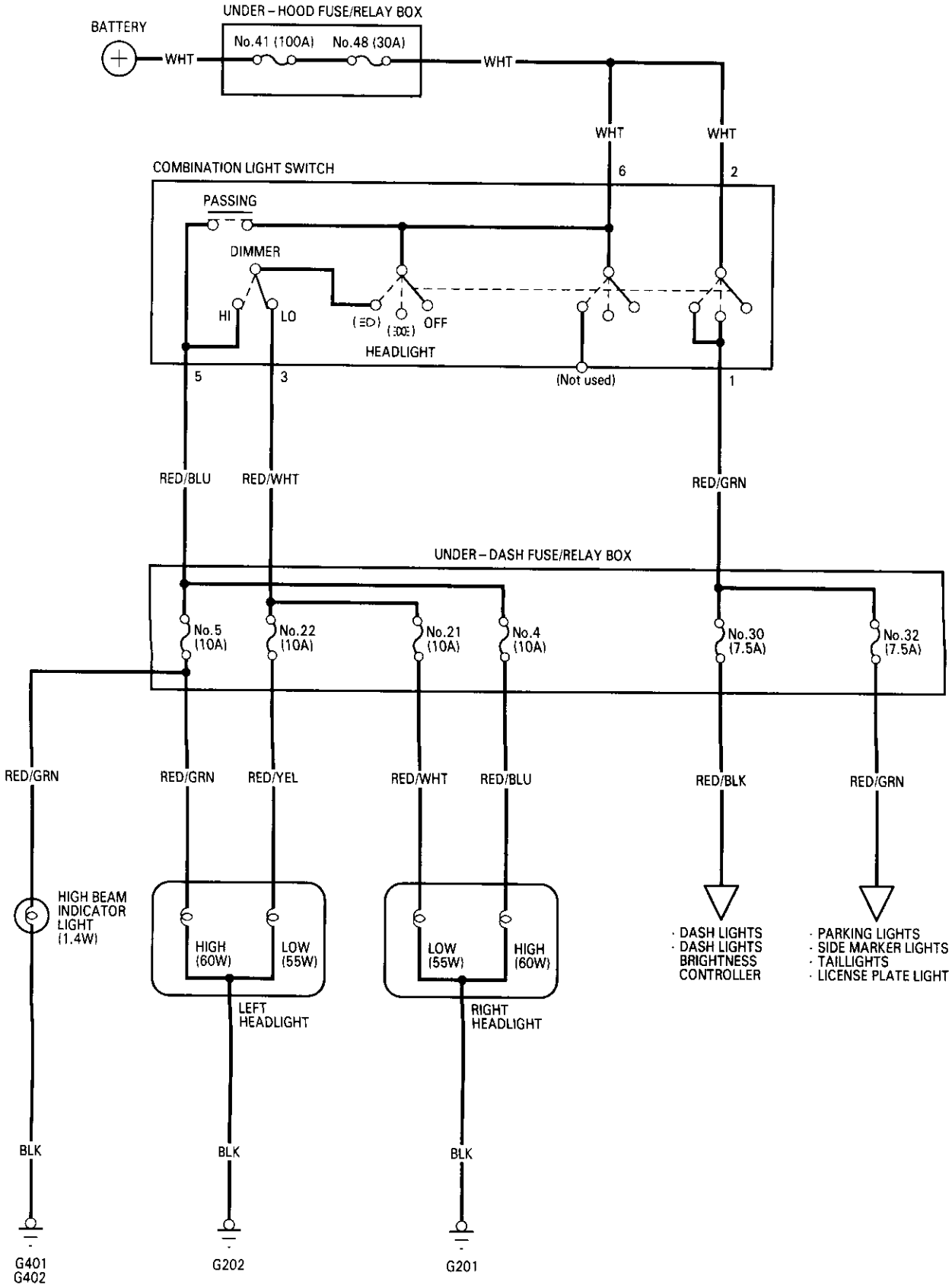
Component Location Index





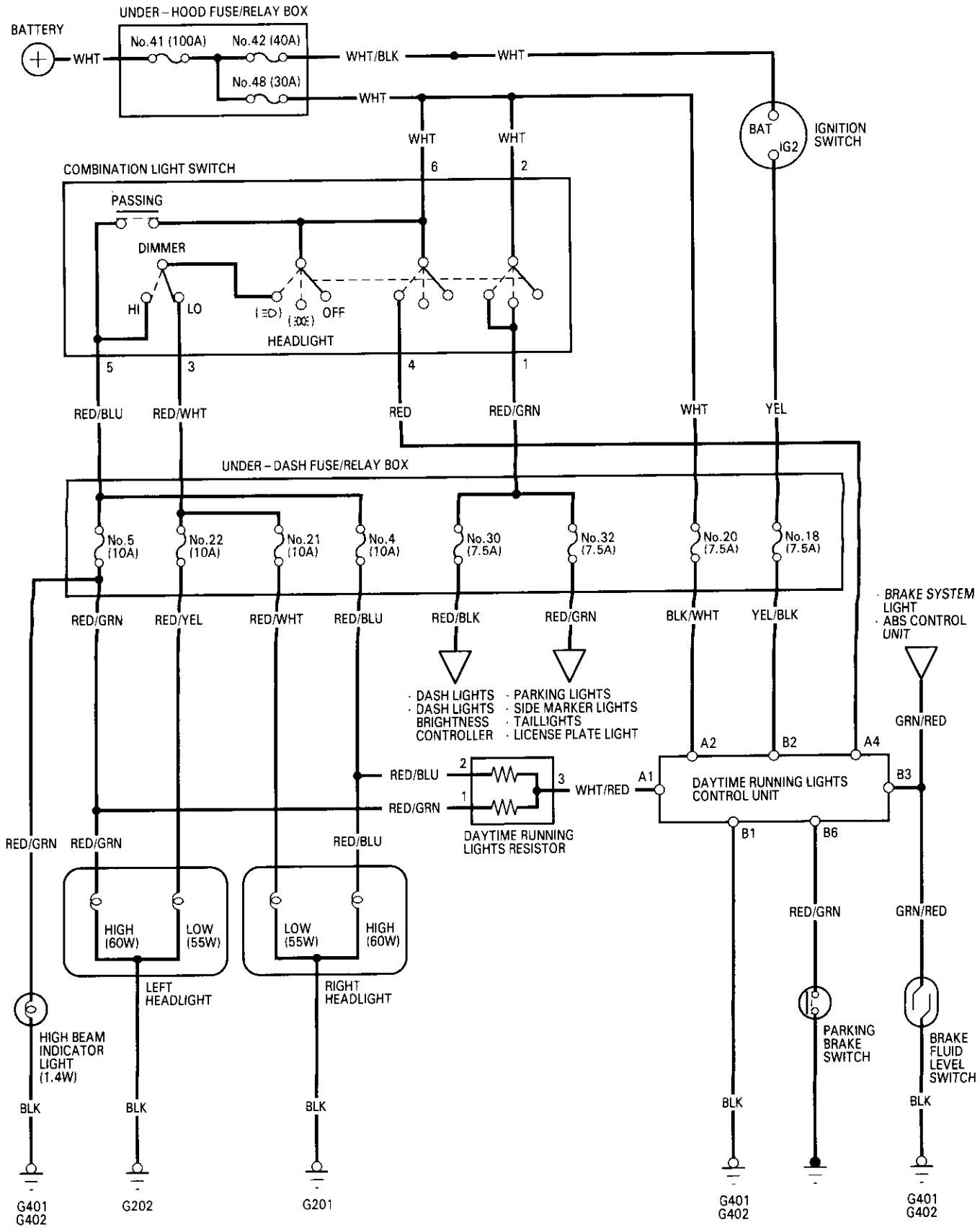
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Circuit Diagram (USA)



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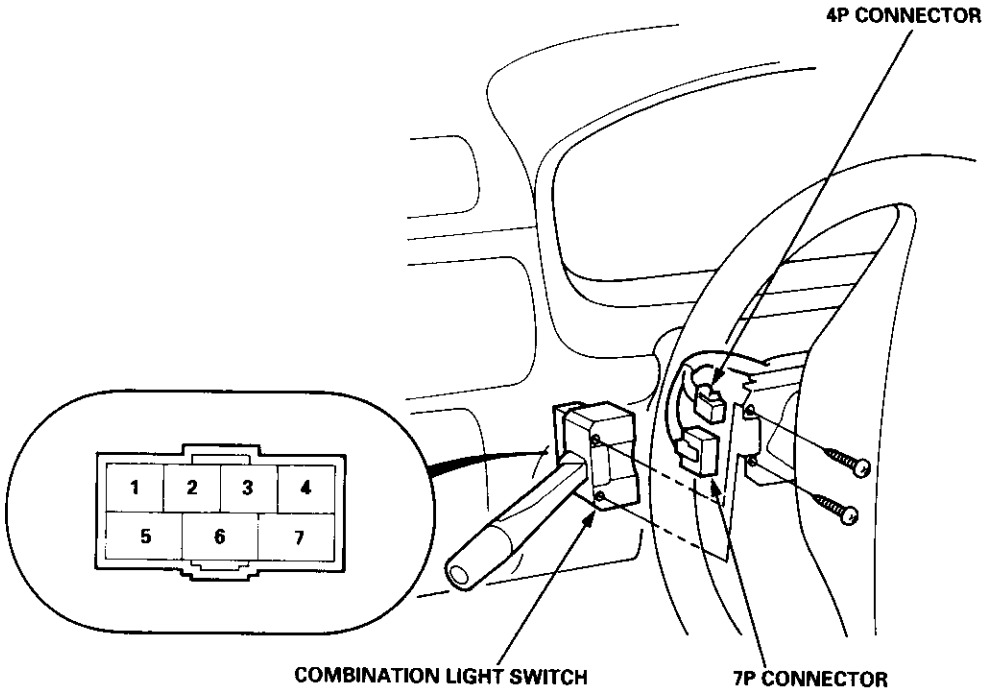
Circuit Diagram (Canada)



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Combination Light Switch Test

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Remove the steering column covers (see section 17).
3. Disconnect the 4P and 7P connector from the switch.
4. Remove the screws, and slide the switch toward the driver's door.
5. Inspect the connector and socket terminals to be sure they are all making good contact.



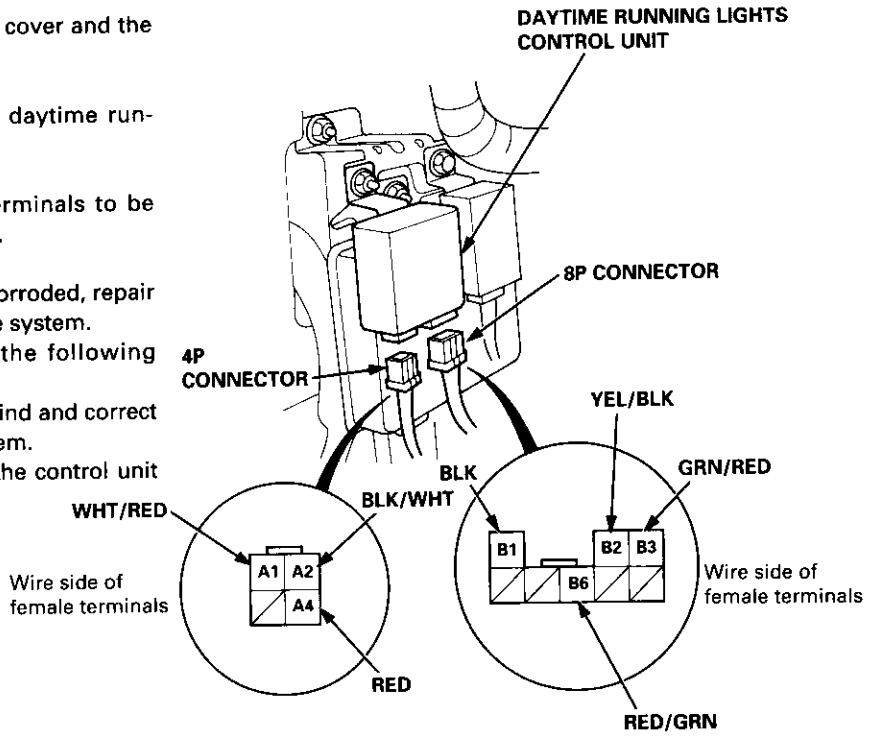
Position			Terminal 1	2	3	4*	5	6
Headlight switch	OFF							
	≡DC		○	○				
	≡D	LOW	○	○	○	○		○
		HIGH	○	○		○	○	○
Passing switch	OFF							
	ON						○	○

* : Canada

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Daytime Running Lights Control Unit Input Test (Canada)

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Disconnect the connectors from the daytime running lights control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



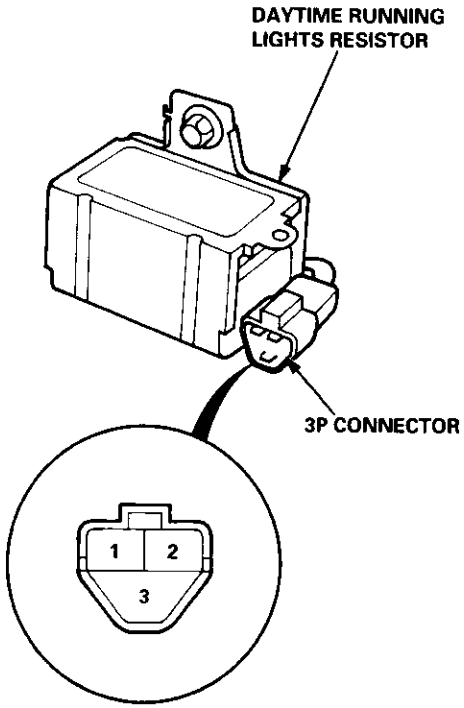
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
A2	BLK/WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 20 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
B2	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 18 (7.5 A) fuse in the under-dash fuse/relay box • Faulty ignition switch • An open in the wire
A4	RED	Combination light switch in " ≡D " position	Check for voltage to ground: There should be battery voltage.	• Blown No. 48 (30 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • An open in the wire
A1	WHT/RED	Combination light switch OFF; connect a jumper wire between the B2 and A1 terminals, then turn the ignition switch ON (II)	Headlights (high beam) should come on, (and high beam indicator should come on).	• Poor ground (G201, G202, G401, G402) • Blown headlight bulbs • Faulty daytime running lights resistor • An open in the wire
B3	GRN/RED	Ignition switch ON (II), brake fluid reservoir full, and parking brake lever down	Connect to ground: The brake system light should come on.	• Blown No. 25 (7.5 A) fuse in the under-dash fuse/relay box • Blown brake system light • An open in the wire
B6	RED/GRN	Parking brake lever up	Check for continuity to ground: There should be continuity.	• Faulty parking brake switch • An open in the wire

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Daytime Running Lights Resistor Test (Canada)

CAUTION: The daytime running lights resistor becomes very hot when the daytime running lights are on; do not touch it or the attaching hardware immediately after the lights have been turned off.

1. Disconnect the 3P connector from the resistor.



2. Measure the resistance between the resistor terminal No. 1 (or No. 2) and the power terminal No. 3.

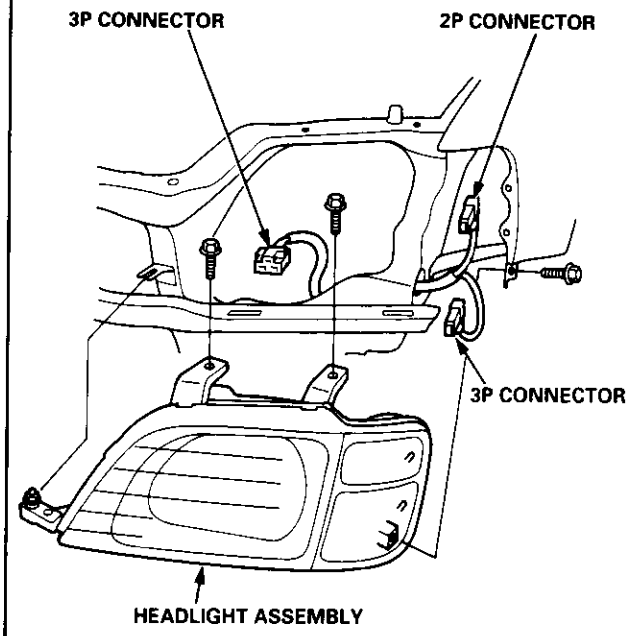
   Resistance: 1.0 – 2.0 Ω

3. Replace the resistor with a new one if any of the resistances are beyond specification.

Replacement

CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

1. Remove the front bumper (see section 20).
2. Remove the mounting bolts.
3. Disconnect each connector, then remove the headlight assembly.



HEADLIGHT: 60/55 W
TURN SIGNAL/SIDE MARKER LIGHT:
21/8 W ('97 model)
27/8 W ('98 – 00 models)
PARKING LIGHT: 5 W ('97 model)
3CP ('98 – 00 models)

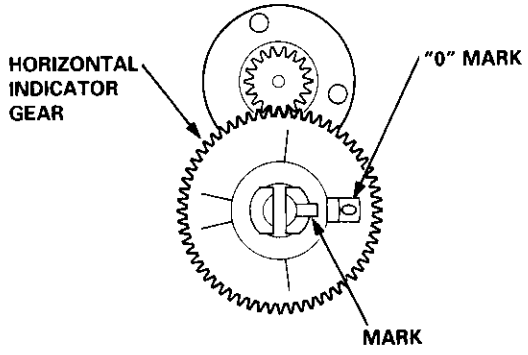
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Adjustment

Before adjusting the headlights:
- Park the vehicle on level ground.
- Make sure the fuel tank is full.
- The driver or someone who weighs the same should sit in the driver's seat.
- Load the trunk with the items you usually carry.
- Push down on the front and rear bumpers several times to make sure the vehicle is sitting normally.

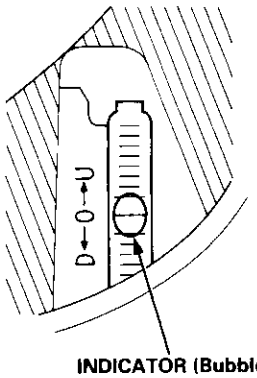
CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

1. Open the hood.
2. Remove the left inner fender (see section 20).
3. Check the horizontal adjustment indicator.
   The "0" mark on the horizontal indicator gear should be aligned with the mark.



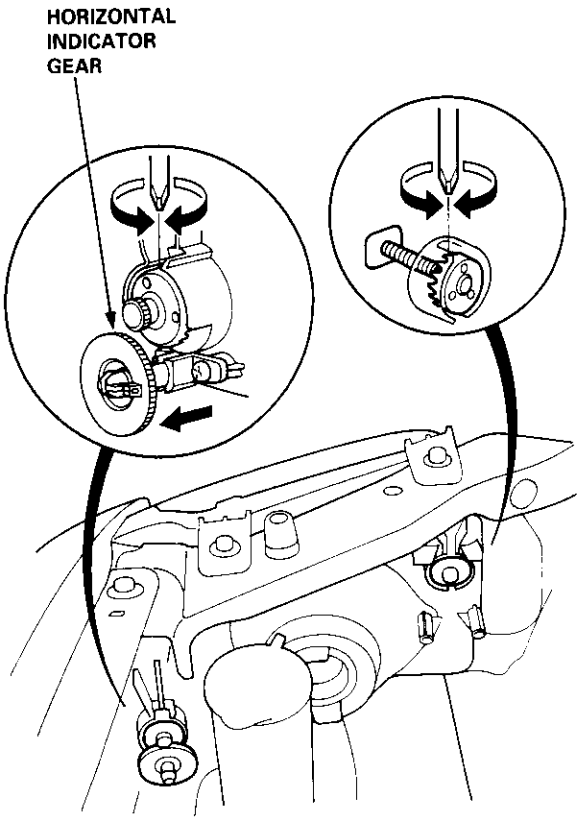
4. Check the vertical adjustment indicator. The bubble should be centered underneath the longest scribe mark on the gauge.

   VERTICAL INDICATOR:



5. If either indicator is not aligned with its "0" mark as described left column, an adjustment can be made by using a Phillips screwdriver.
6. Adjust the headlights to local requirements by turning the adjusters.

   NOTE:
   - As the outer lenses are made of an acrylicoated, polycarbonated material, do not cover the headlights when they are turned on.
   - When making horizontal adjustments, slide the horizontal indicator gear rearward.
     After horizontal adjustment, put back the horizontal indicator gear.

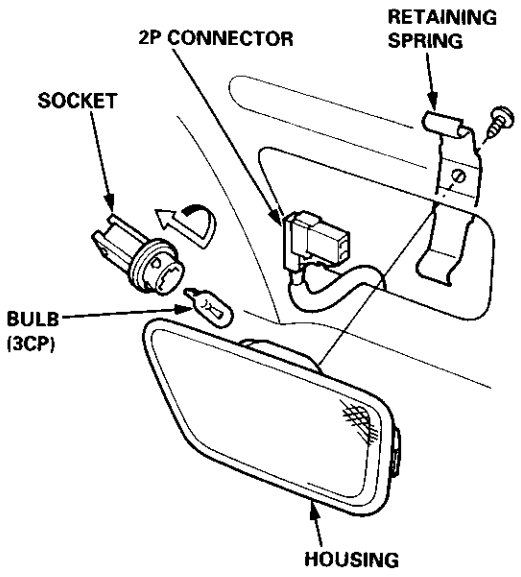


Rear Side Marker Lights/ License Plate Light

Replacement

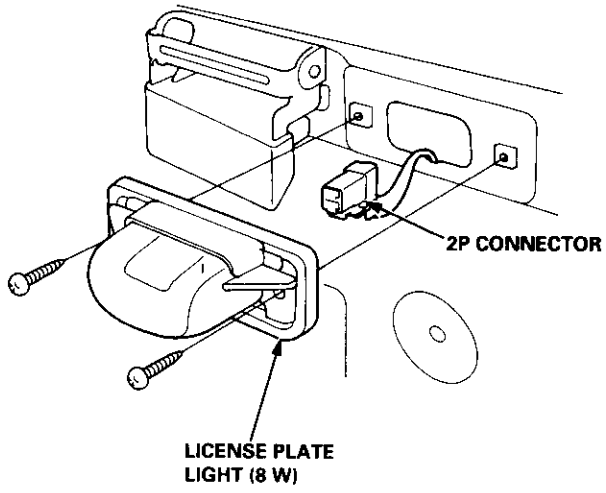
Rear Side Marker Light:

1. Remove the retaining spring, and remove the rear side marker light from the rear bumper.
2. Disconnect the 2P connector from the light.



License Plate Light:

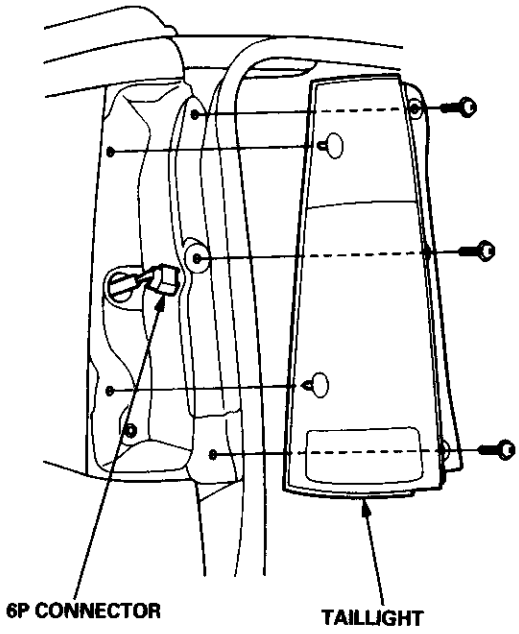
1. Remove the two screws from the license plate light, and pull the light out part of the way.
2. Disconnect the 2P connector from the light.



Taillights

Replacement

1. Open the hatch glass.
2. Disconnect the 6P connector from the taillight.
3. Remove the three screws, then pull out the outer taillight.



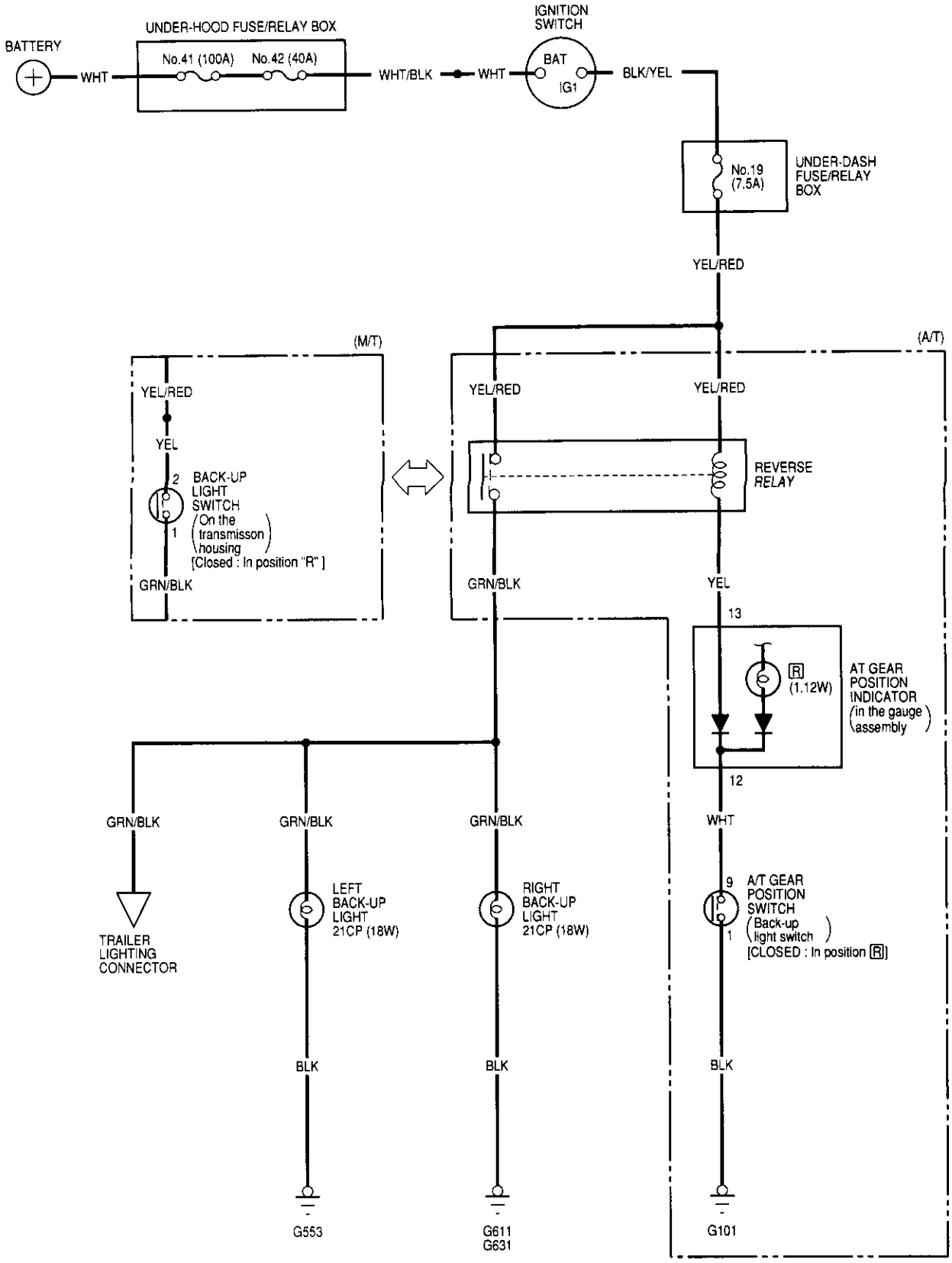
Brake/Parking light: 21/5 W
Back-up light: 21CP (18 W)
Turn signal light: 21 W

4. Inspect the gasket; replace it if it is distorted or stays compressed.
5. Install the taillight, and run water over it to make sure it does not leak.

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Back-up Lights

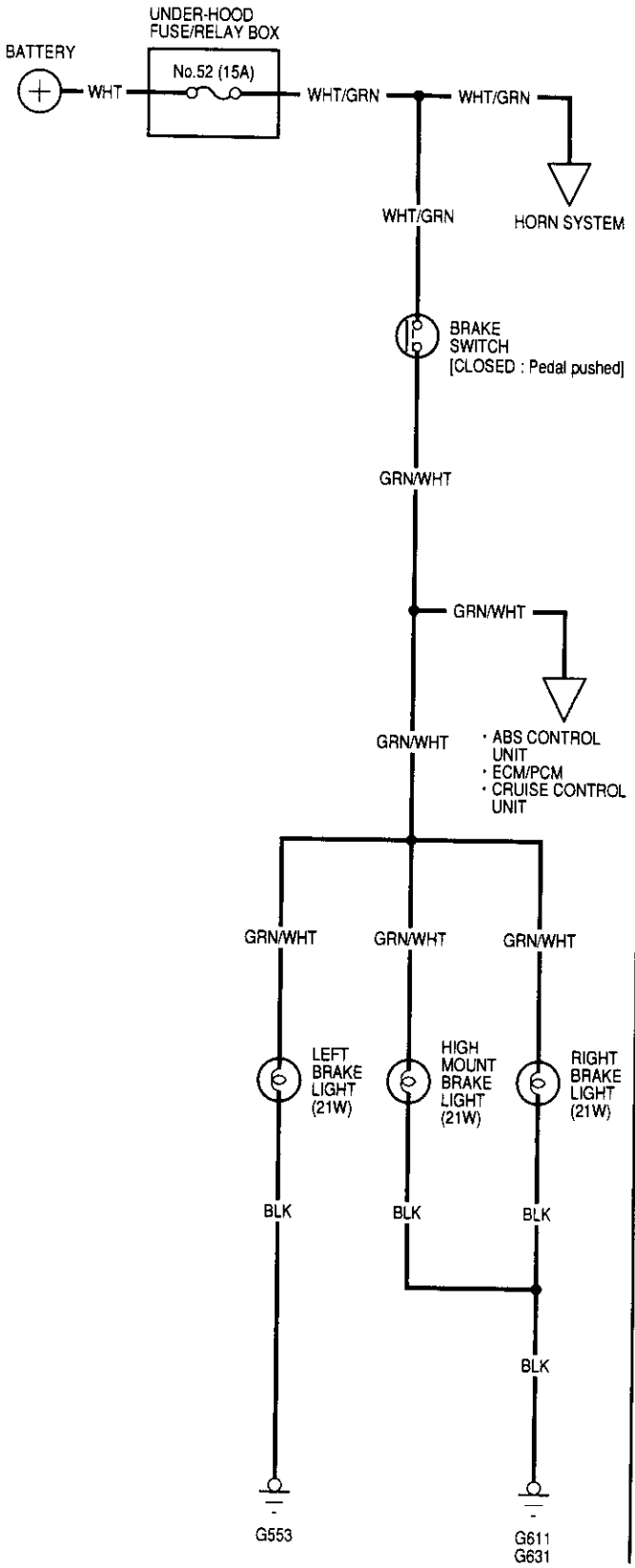
Circuit Diagram



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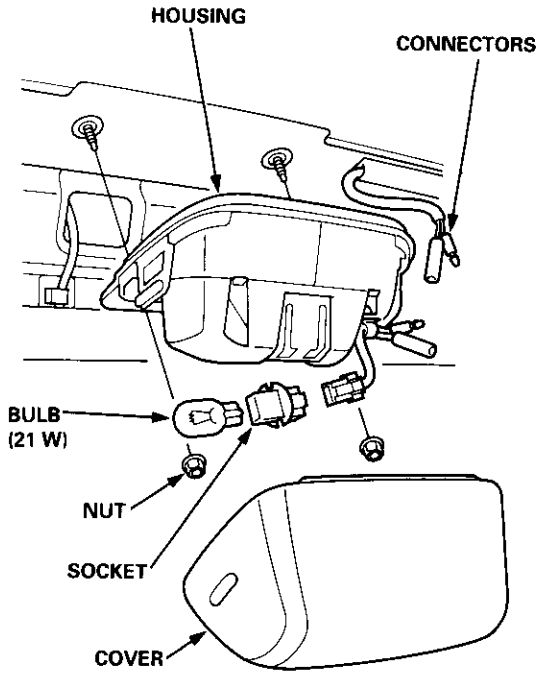
Brake Lights

Circuit Diagram



High Mount Brake Light Replacement

1. Push the clips, and remove the cover from the housing.

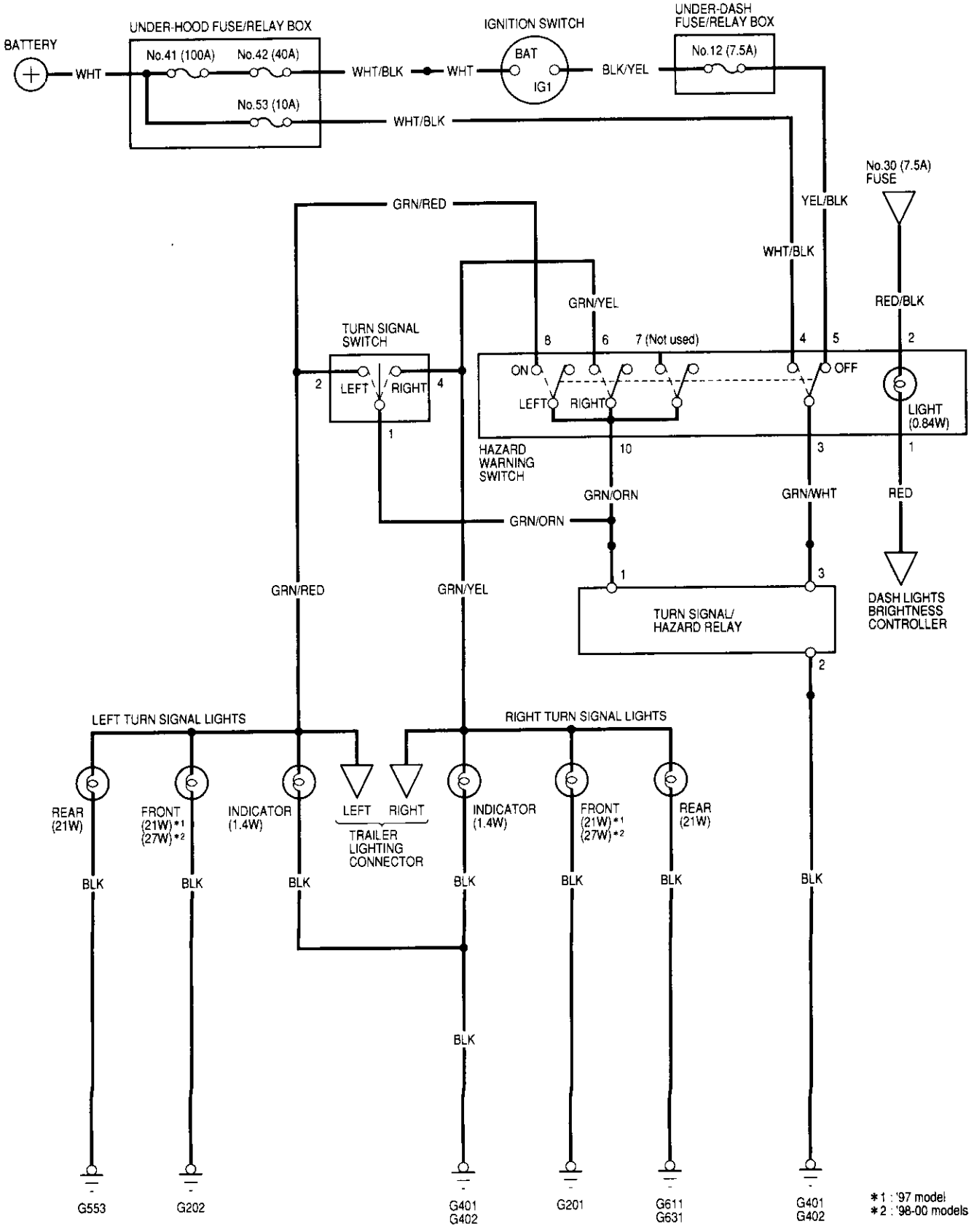


2. Disconnect the connectors.
3. Remove the two nuts and the housing.

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Turn Signal/Hazard Flasher System

Circuit Diagram

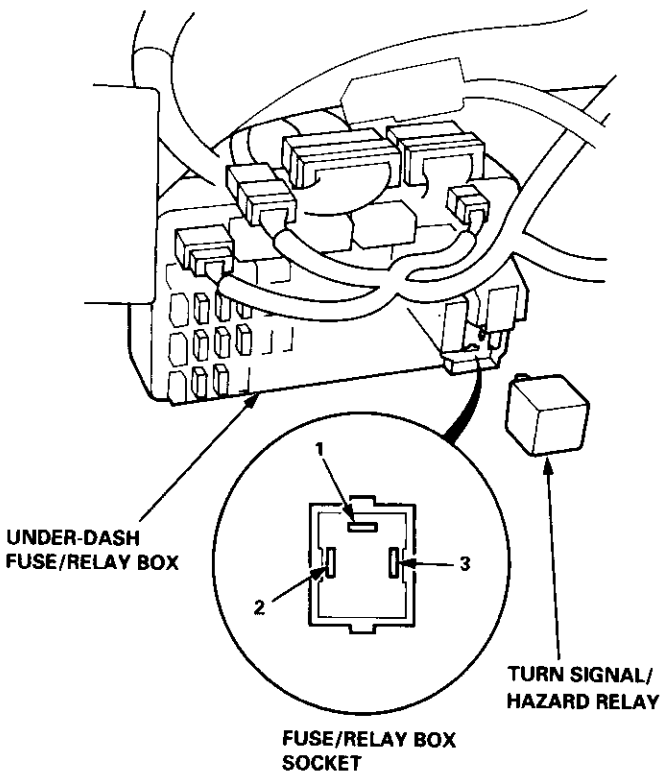


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Turn Signal/Hazard Relay Input Test

SRS components are located in this area. Review the *SRS component locations, precautions, and procedures* in the SRS section (24) before performing repairs or service.

1. Remove the turn signal/hazard relay from the under-dash fuse/relay box.
2. Inspect the relay and fuse/relay box socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the fuse/relay box socket.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the turn signal/hazard relay must be faulty; replace it.

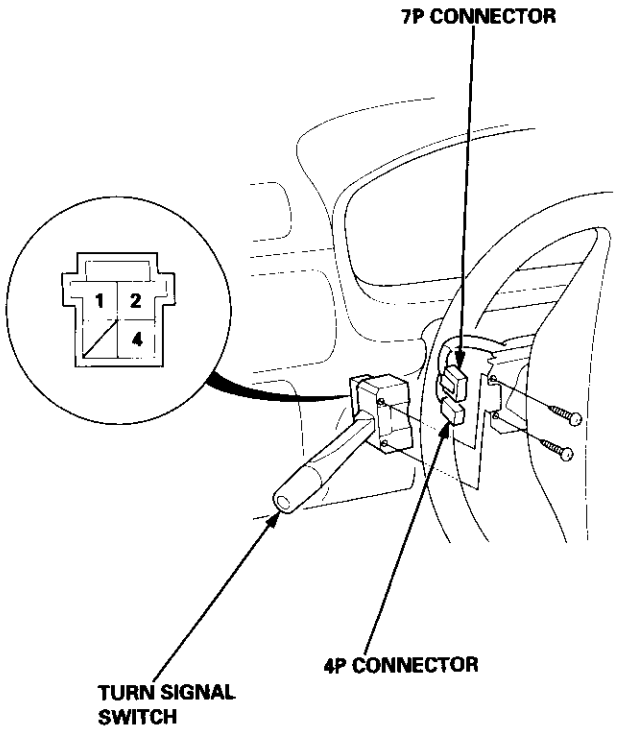


Cavity	Test condition	Test: Desired results	Possible cause if result is not obtained
2	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
3	Ignition switch ON (II)	Connect for voltage to ground: There should be battery voltage.	• Blown No. 12 (7.5 A) fuse in the under-dash fuse/relay box • Faulty hazard warning switch • An open in the wire
	Hazard warning switch ON	Connect for voltage to ground: There should be battery voltage.	• Blown No. 53 (10 A) fuse in the under-hood fuse/relay box • Faulty hazard warning switch • An open in the wire
1	Hazard warning switch ON; connect the No. 1 terminal to the No. 3 terminal.	Hazard lights should come on.	• Poor ground (G201, G202, G401, G402, G553, G611, G631) • Faulty hazard warning switch • An open in the wire
	Ignition switch ON (II) and turn signal switch in right or left; connect the No. 1 terminal to the No. 3 terminal.	Right or left turn signal lights should come on.	• Faulty turn signal switch

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Turn Signal Switch Test

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Remove the steering column covers (see section 17).
3. Disconnect the 4P and 7P connectors from the switch.
4. Remove the screws, and slide the switch toward the driver's door.

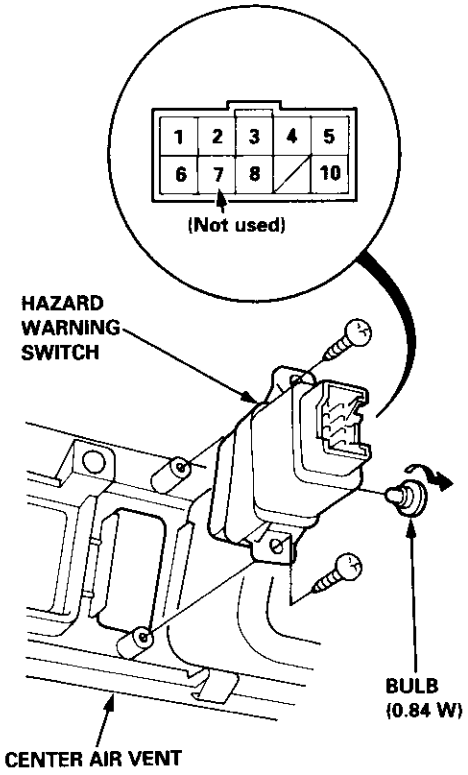


5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	4
RIGHT	○		○
Neutral			
LEFT	○	○	

Hazard Warning Switch Test

1. Remove the center panel (see section 20).
2. Remove the two screws, then remove the switch from the center air vent.



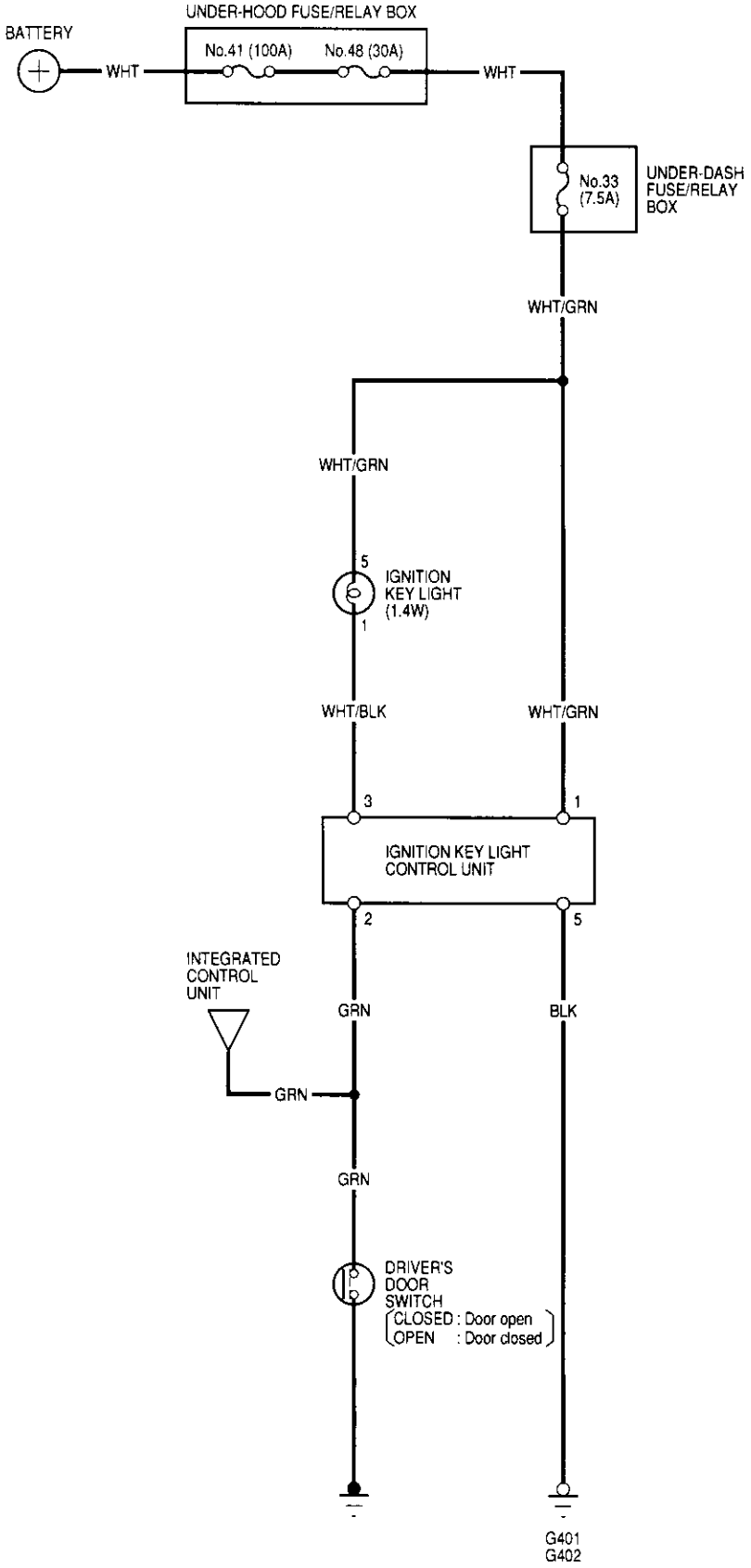
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1		2	3	4	5	6	7	8	10
OFF	○	○	○	○		○				
ON	○	○	○	○	○		○		○	○

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Ignition Key Light System — '97 Model

Circuit Diagram



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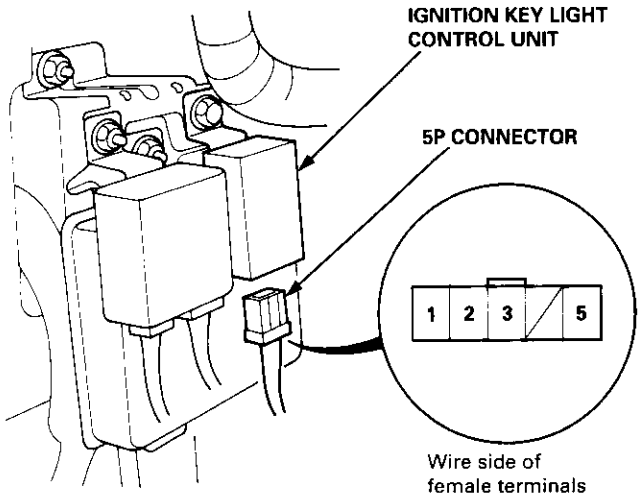
Control Unit Input Test

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).

2. Disconnect the 5P connector from the control unit.

3. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.

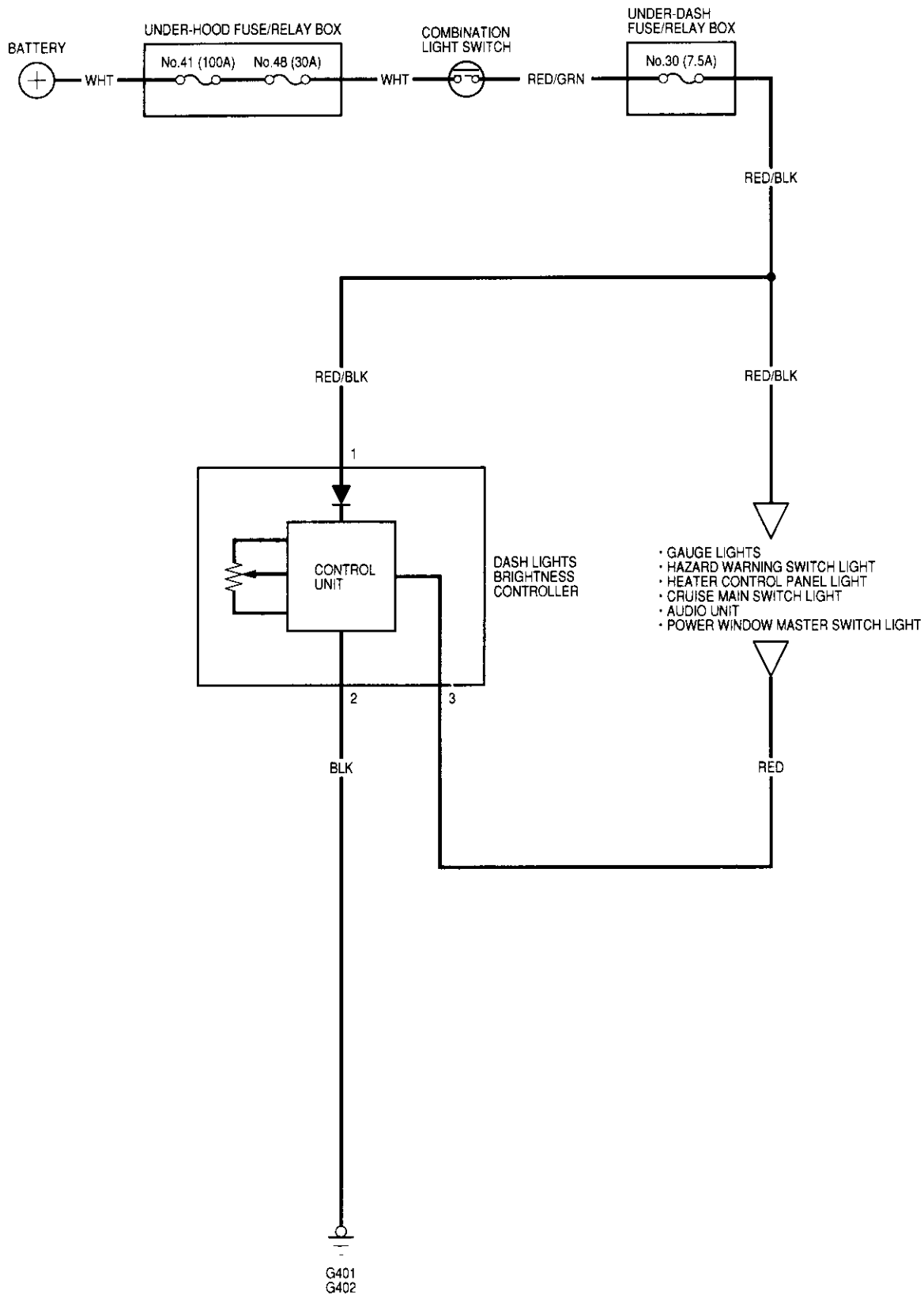


Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
1	WHT/GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
2	GRN	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
		Driver's door closed	Check for voltage to ground: There should be 4 V or more.	
3	WHT/BLK	Under all conditions	Connect to ground: Ignition key light should come on.	• Blown No. 33 (7.5 A) fuse in the under-dash fuse/relay box • Blown ignition key light bulb • An open in the wire

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Dash Lights Brightness Controller

Circuit Diagram

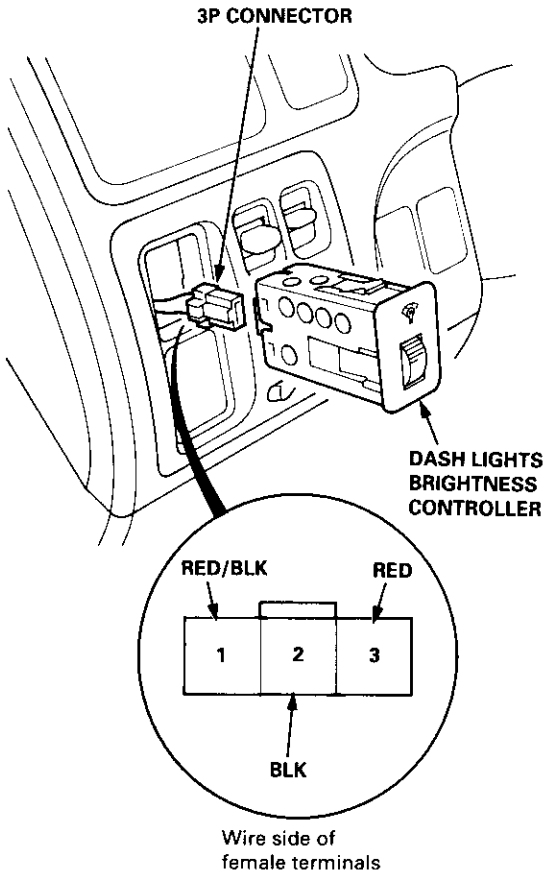


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Controller Input test

NOTE: The control unit is built into the dash lights brightness controller.

1. Carefully pry the controller out of the dashboard.
2. Disconnect the 3P connector from the controller.
3. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the controller must be faulty; replace it.

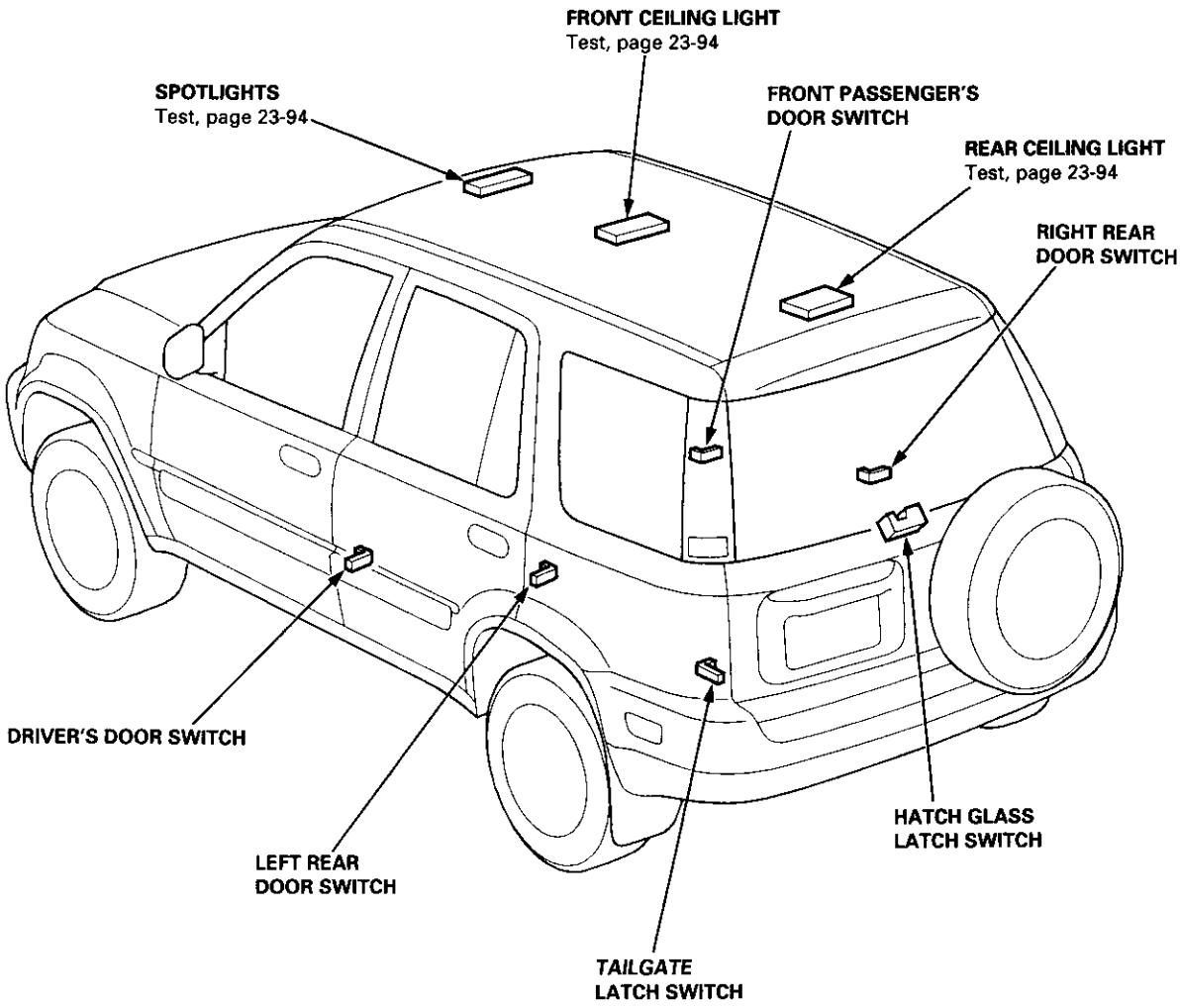


Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
2	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
3	RED	Combination light switch ON	Connect to ground: Dash lights should come on full bright.	• An open in the wire

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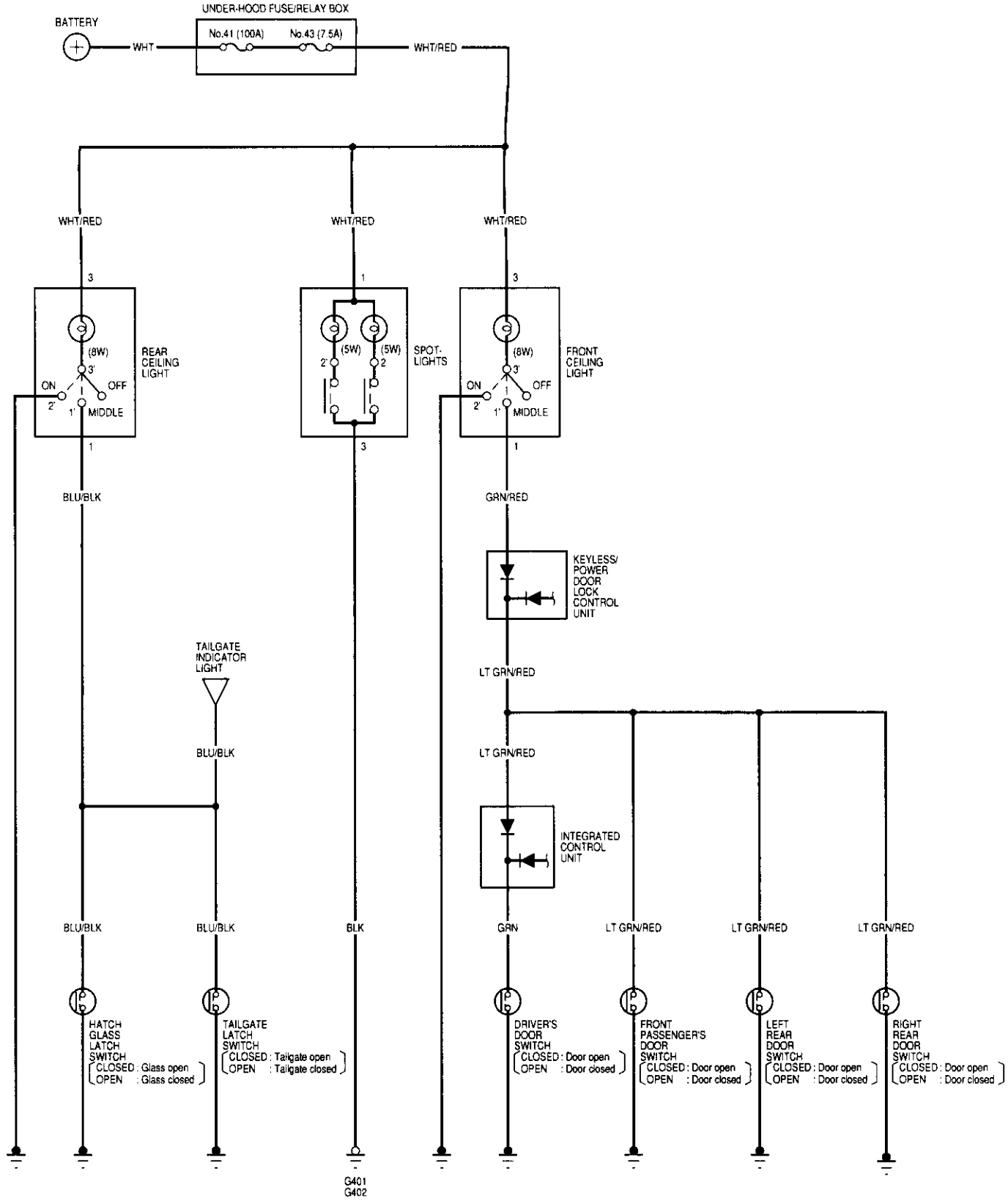
Interior Lights

Component Location Index



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Circuit Diagram

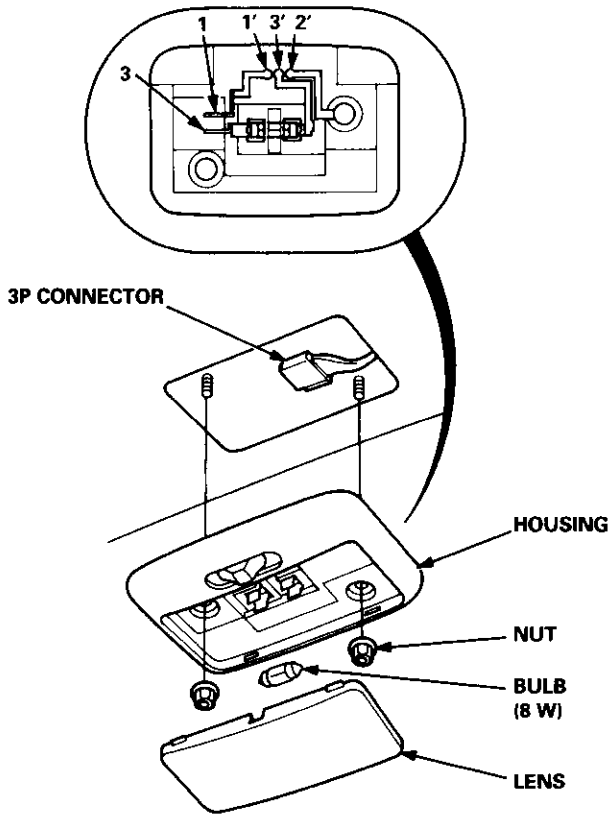


Interior Lights

Ceiling Light Test

Front and rear:

1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the two mounting nuts and the housing.
4. Disconnect the 3P connector from the housing.

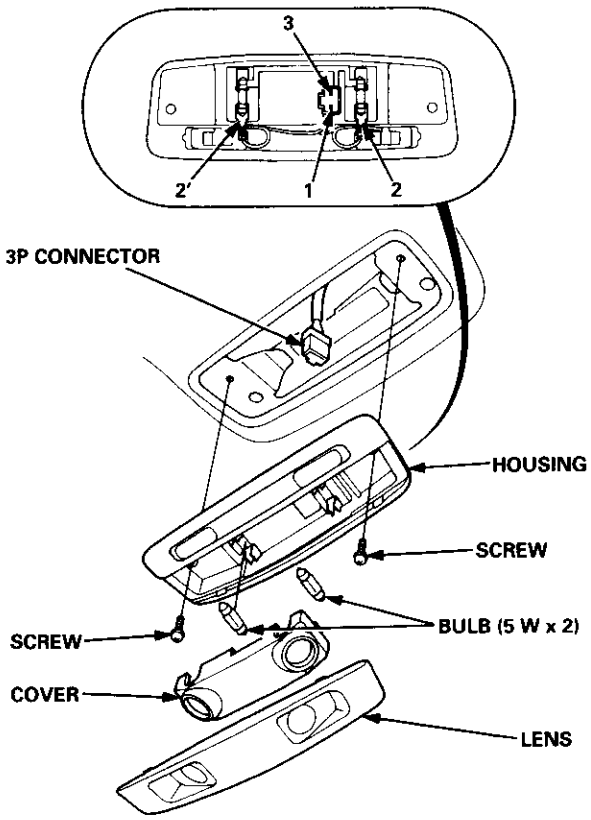


5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1 or 1'	2'	3'		3
OFF			○	⊙	○
MIDDLE	○		○	⊙	○
ON		○	○	⊙	○

Spotlight Test

1. Turn the spotlight switch OFF.
2. Pry off the lens.
3. Remove the two screws and the housing.
4. Disconnect the 3P connector from the housing.



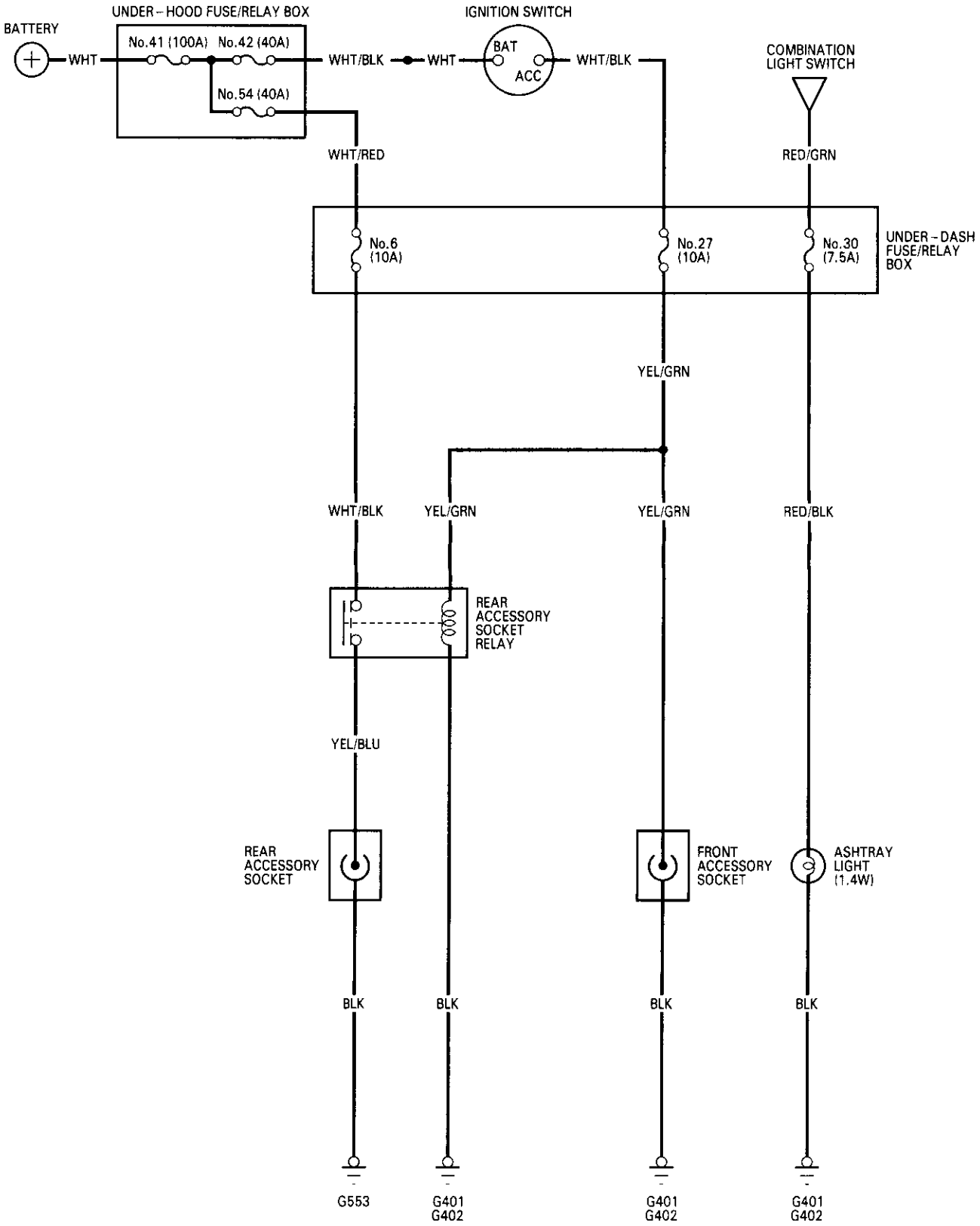
5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		1		2 or 2'	3
R	ON	○	⊙	○	○
	OFF	○	⊙	○	
L	ON	○	⊙	○	○
	OFF	○	⊙	○	

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Accessory Socket

Circuit Diagram

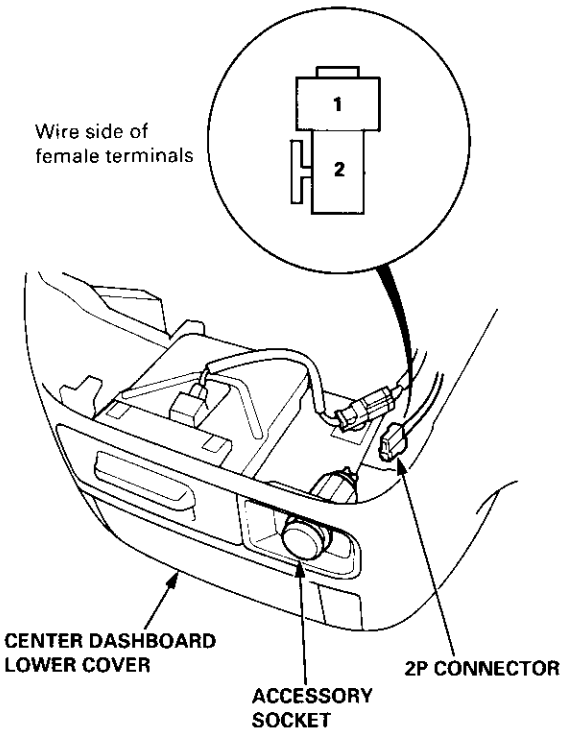


Accessory Socket

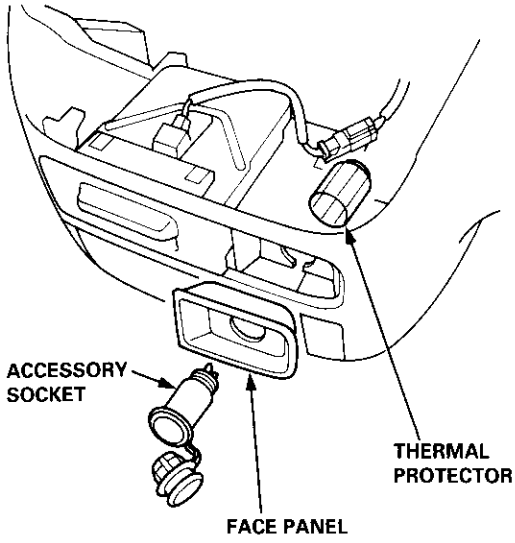
Accessory Socket Test/Replacement

Front Accessory Socket:

1. Remove the center dashboard lower cover (see section 20).
2. Disconnect the 2P connector from the front accessory socket.
3. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, go to step 4.



4. Turn the ignition switch to ACC (I), and check for voltage between the No. 1 and No. 2 terminals.
   - There should be battery voltage.
   - If there is no battery voltage, check for:
     — blown No. 27 (10 A) fuse in the under-dash fuse/relay box.
     — poor ground (G401, G402).
     — an open in the wire.
5. If all the tests prove OK, replace the front accessory socket.



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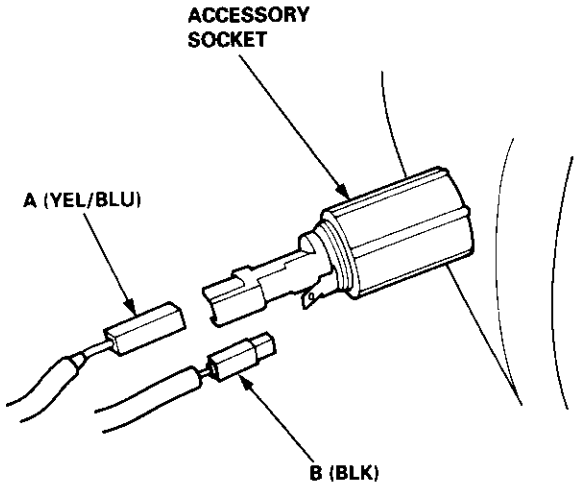
Rear Accessory Socket:

1. Remove the left rear side trim panel (see section 20).

2. Disconnect the connectors.

3. Inspect the connector terminals to be sure they are all making good contact.

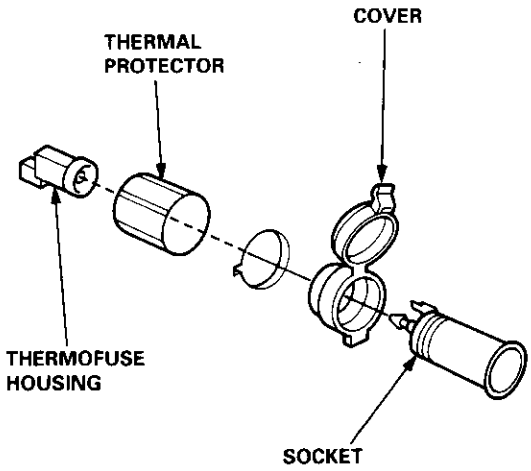
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, go to step 4.



4. Turn the ignition switch to ACC (I), and check for voltage between the A and B terminals.

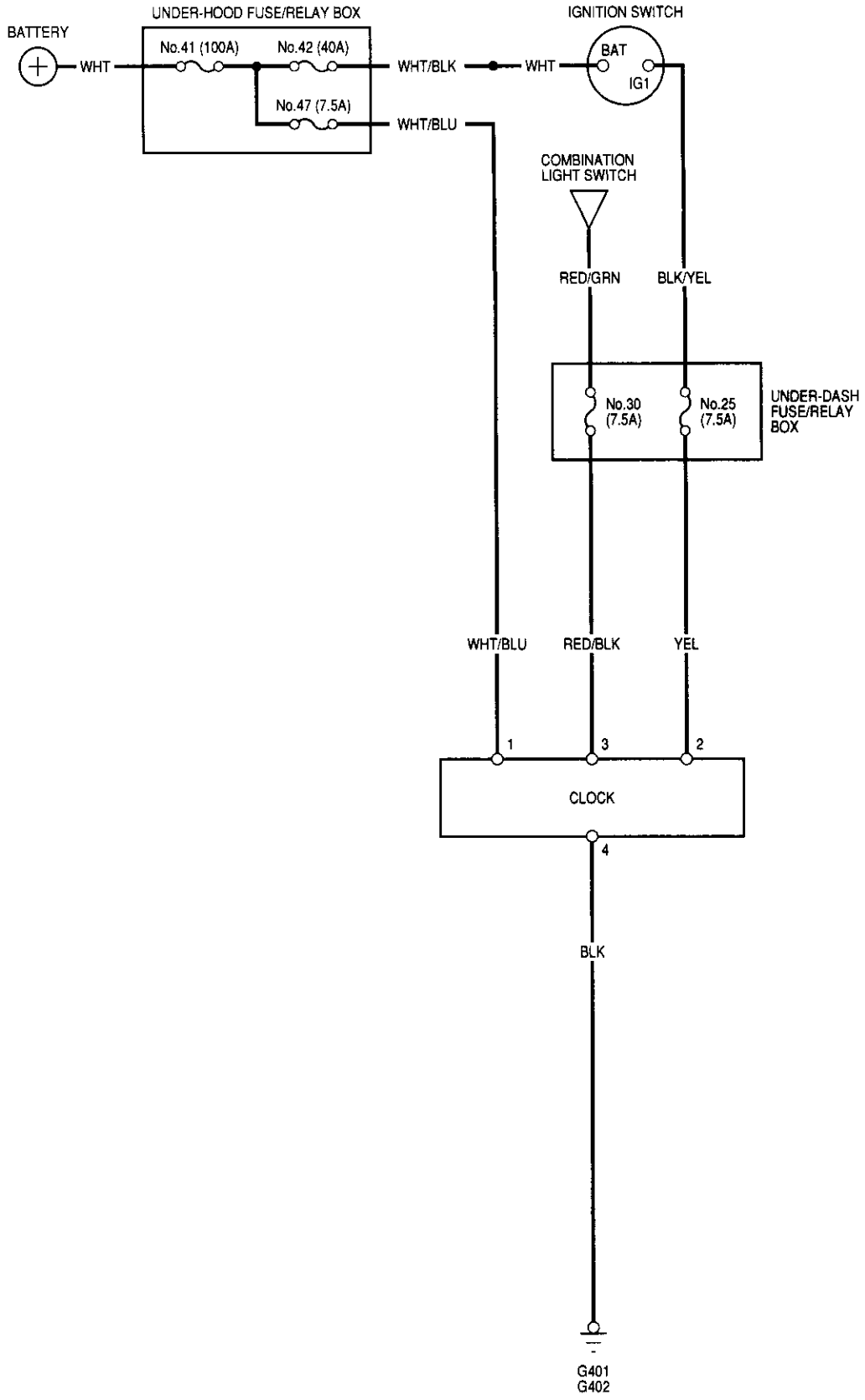
   - There should be battery voltage.
   - If there is no battery voltage, check for:
     — blown No. 6 (10 A) and No. 27 (10 A) fuses in the under-dash fuse/relay box.
     — faulty rear accessory socket relay (test, page 23-53).
     — poor ground (G401, G402, G553).
     — an open in the wire.

5. Remove the thermofuse housing and thermal protector, then remove the socket and cover.



Clock — '98 – 00 Models

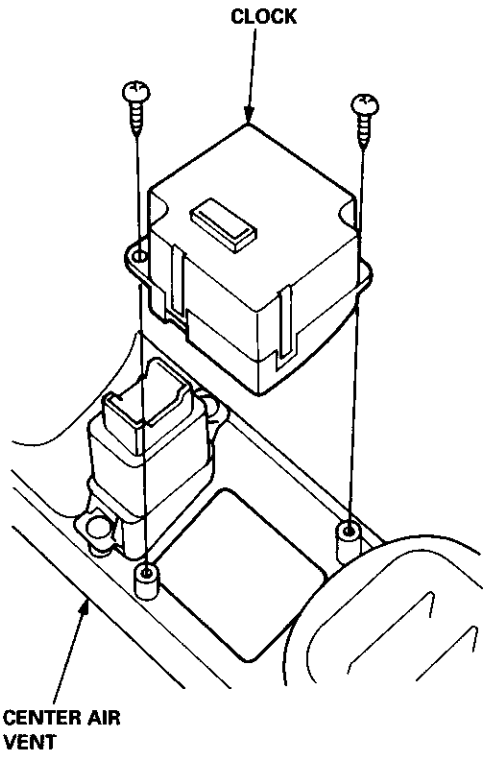
Circuit Diagram



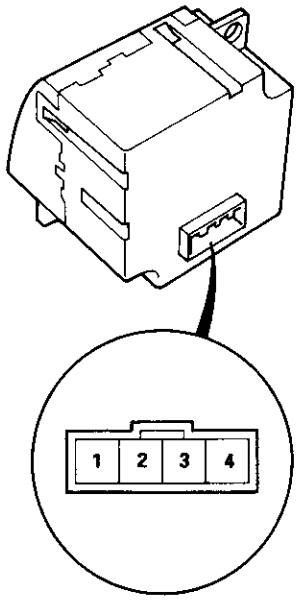
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Removal

1. Remove the center air vent (see section 20).
2. Disconnect the 4P connector.
3. Remove the two screws.



Terminals

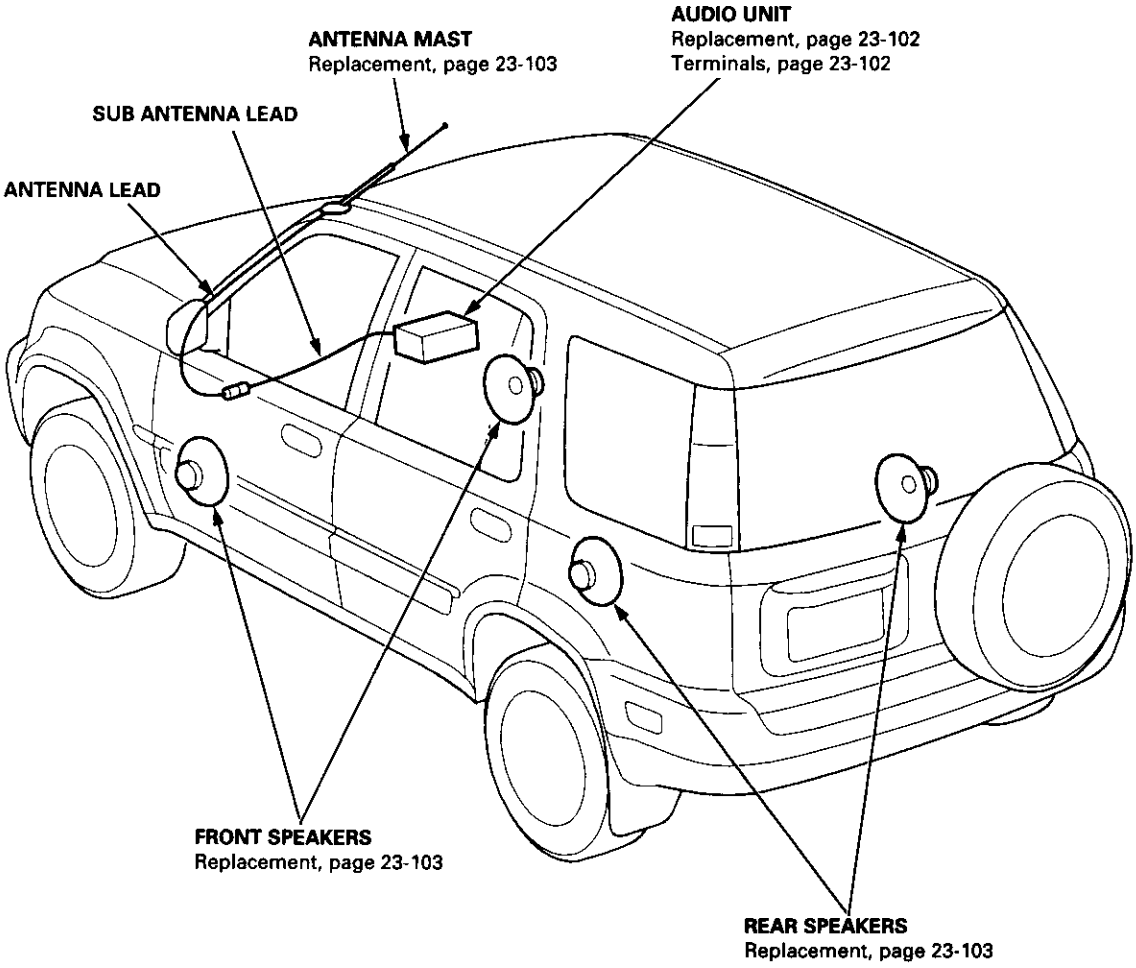


Cavity	Wire	Connects to
1	WHT/BLU	Constant power (time memory)
2	YEL	IG1 (main clock power supply)
3	RED/BLK	Lights-on signal
4	BLK	Ground (G401, G402)

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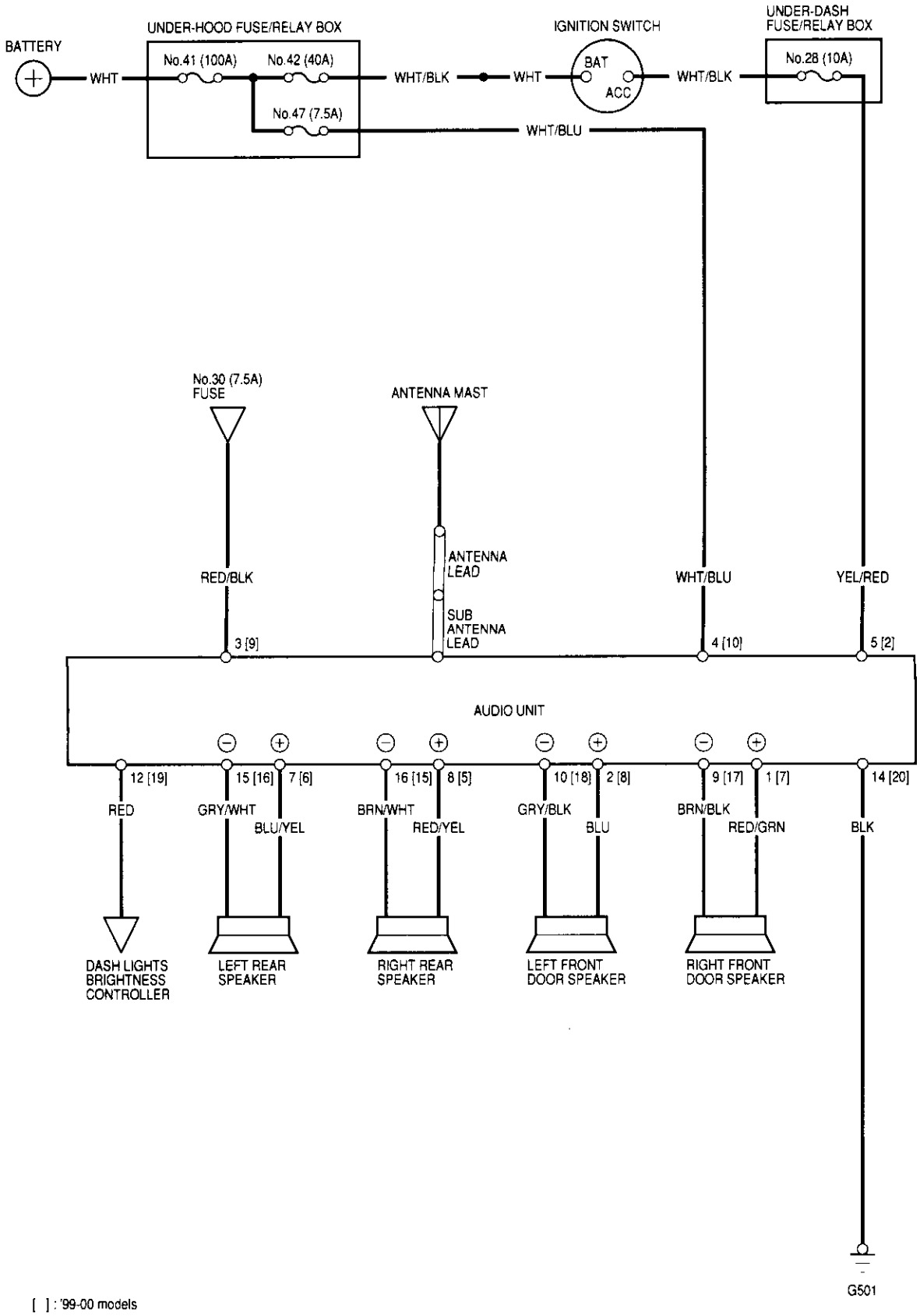
Stereo Sound System

Component Location Index



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Circuit Diagram

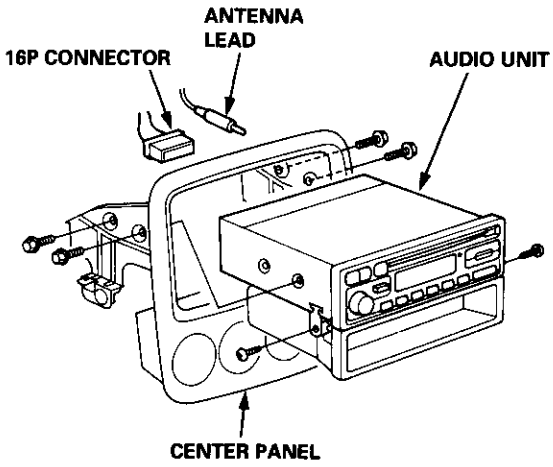


[ ] : '99-00 models

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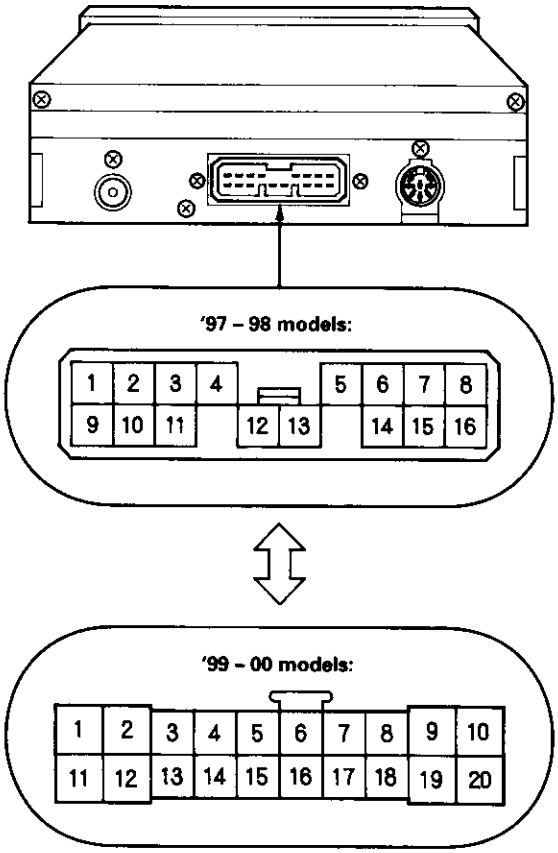
Audio Unit Removal

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons (with anti-theft feature).
2. Remove the center panel (see section 20).
3. Remove the four mounting bolts, and pull the audio unit out.
4. Disconnect the 16P connector and sub antenna lead, then remove the audio unit.



5. Install in the reverse order of removal.
6. After installing the audio unit, enter the anti-theft code for the radio, then enter the customer's radio station presets (with anti-theft feature).

Audio Unit Terminals



Cavity	Wire	Connects to
1 (7)	RED/GRN	Right front door speaker ⊕
2 (8)	BLU	Left front door speaker ⊕
3 (9)	RED/BLK	Lights-on signal
4 (10)	WHT/BLU	Constant power (tuning memory)
5 (2)	YEL/RED	ACC (main stereo power supply)
7 (6)	BLU/YEL	Left rear speaker ⊕
8 (5)	RED/YEL	Right rear speaker ⊕
9 (17)	BRN/BLK	Right front door speaker ⊖
10 (18)	GRY/BLK	Left front door speaker ⊖
12 (19)	RED	Dash lights brightness controller
14 (20)	BLK	Ground (G501)
15 (16)	GRY/WHT	Left rear speaker ⊖
16 (15)	BRN/WHT	Right rear speaker ⊖

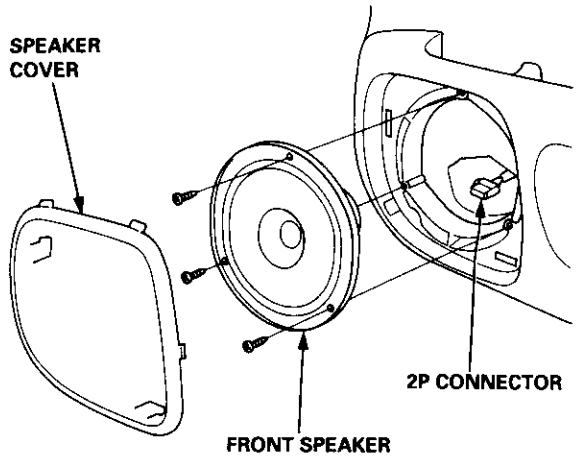
Terminal No. 6, 11, and 13: Not used
(Terminal No. 1, 3, 4, 11, 12, 13, and 14 Not used)
( ): '99 – 00 models

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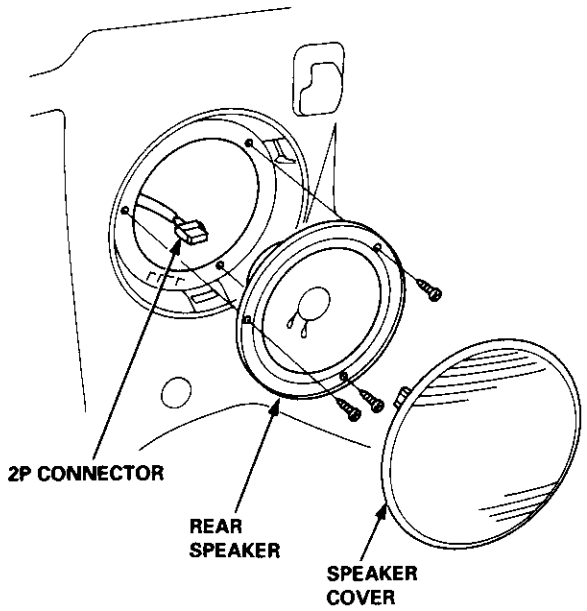
Speaker Replacement

1. Remove the speaker cover.
2. Remove the three screws from the speaker.
3. Disconnect the 2P connector, and remove the door speaker.

Front speaker:



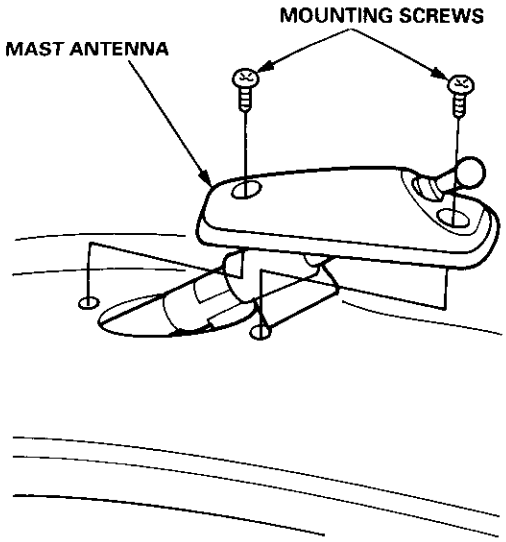
Rear speaker:



Mast Antenna Replacement

NOTE: To remove the antenna lead, it is necessary to remove the dashboard (see section 20).

1. Disconnect the antenna lead from the audio unit.
2. Remove the two mounting screws, then remove the mast antenna.



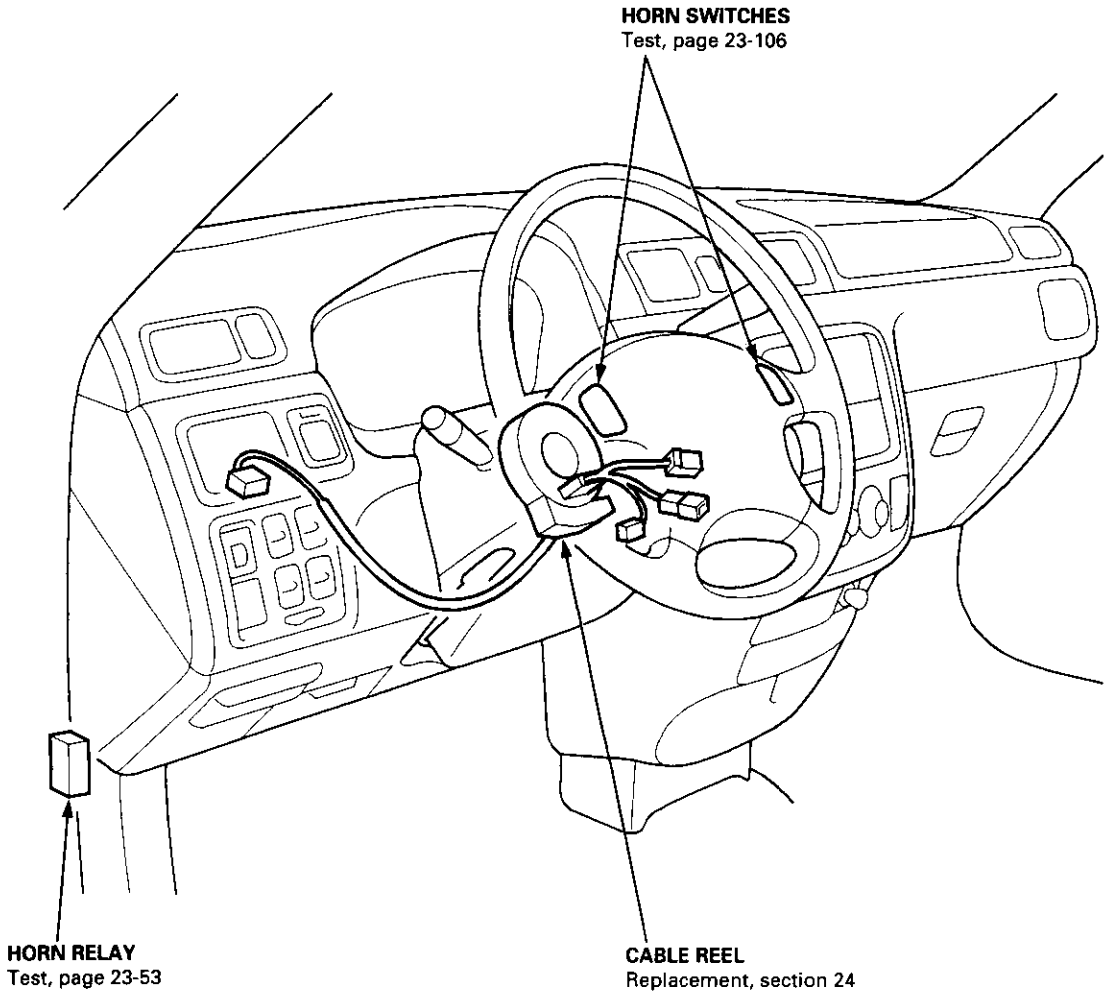
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Horns

Component Location Index

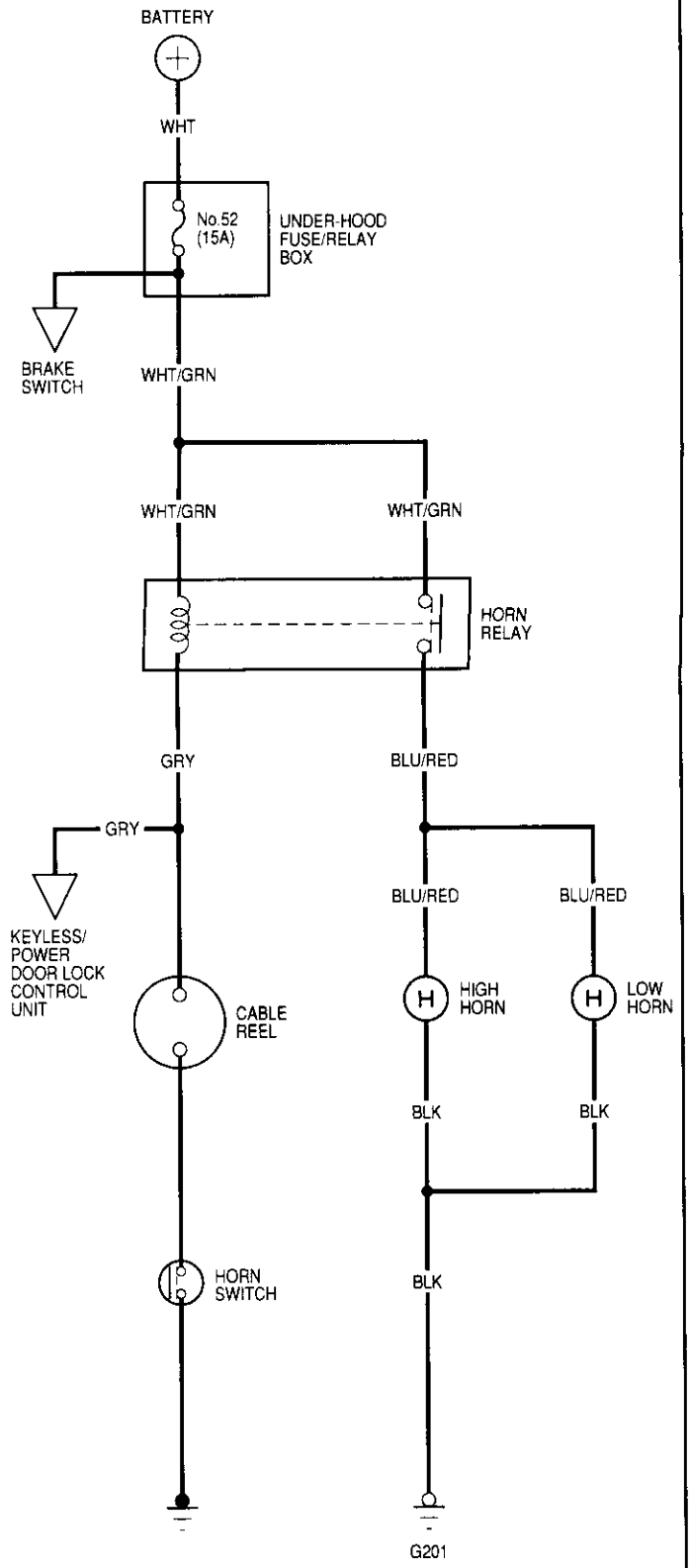
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

HORN
Test, page 23-105



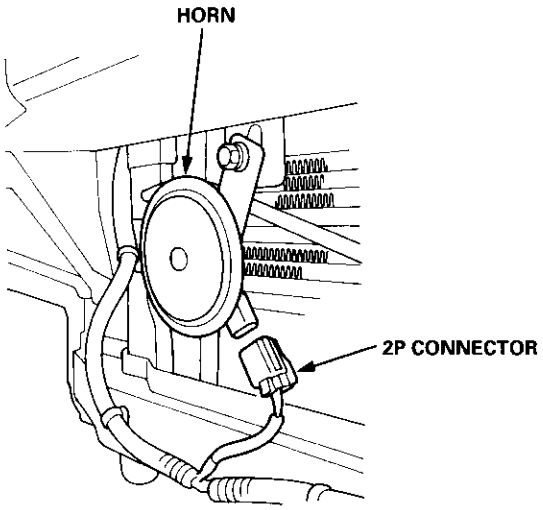
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Circuit Diagram

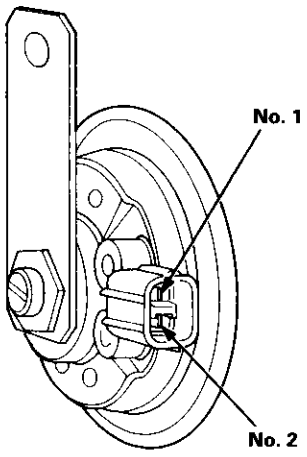


Horn Test

1. Remove the front bumper (see section 20).
2. Disconnect the 2P connector from the horn.
3. Remove the horn.



4. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.

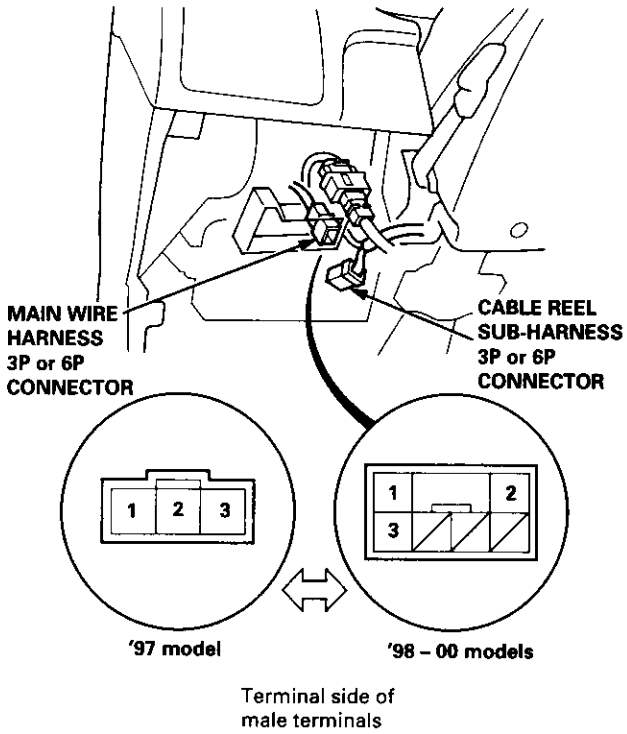


5. If the horn fails to sound, replace it.

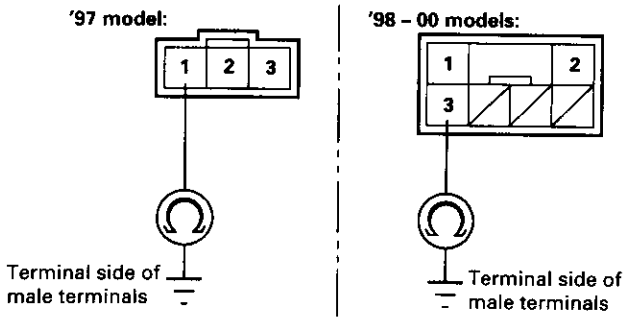
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Switch Test

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Disconnect the driver's airbag and front passenger's airbag connectors (see section 24).
3. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
4. Disconnect the cable reel sub-harness 3P or 6P connector from the main wire harness.

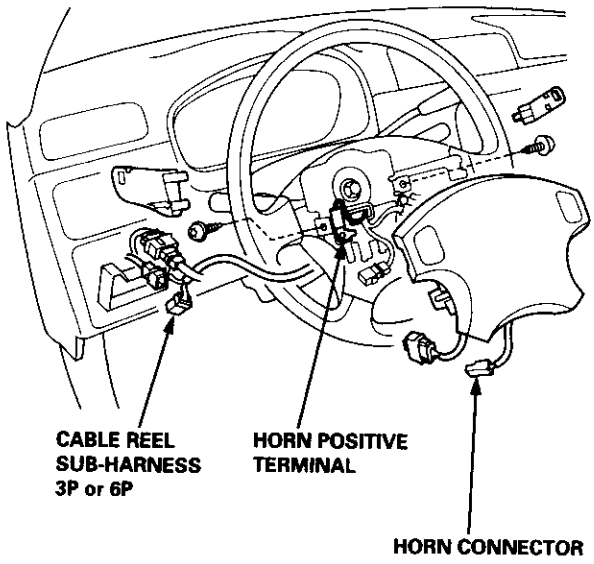


5. Check for continuity between the No. 2 or No. 3 terminal of the cable reel sub-harness and body ground with the horn switch pressed.



- If there is continuity, the horn switch is OK.
- If there is no continuity, go to step 6.

6. Remove the driver's airbag (see section 24), then disconnect the horn connector from the steering wheel.
7. Check for continuity between the No. 2 or No. 3 terminal of the cable reel sub-harness 3P or 6P connector and horn positive terminal.



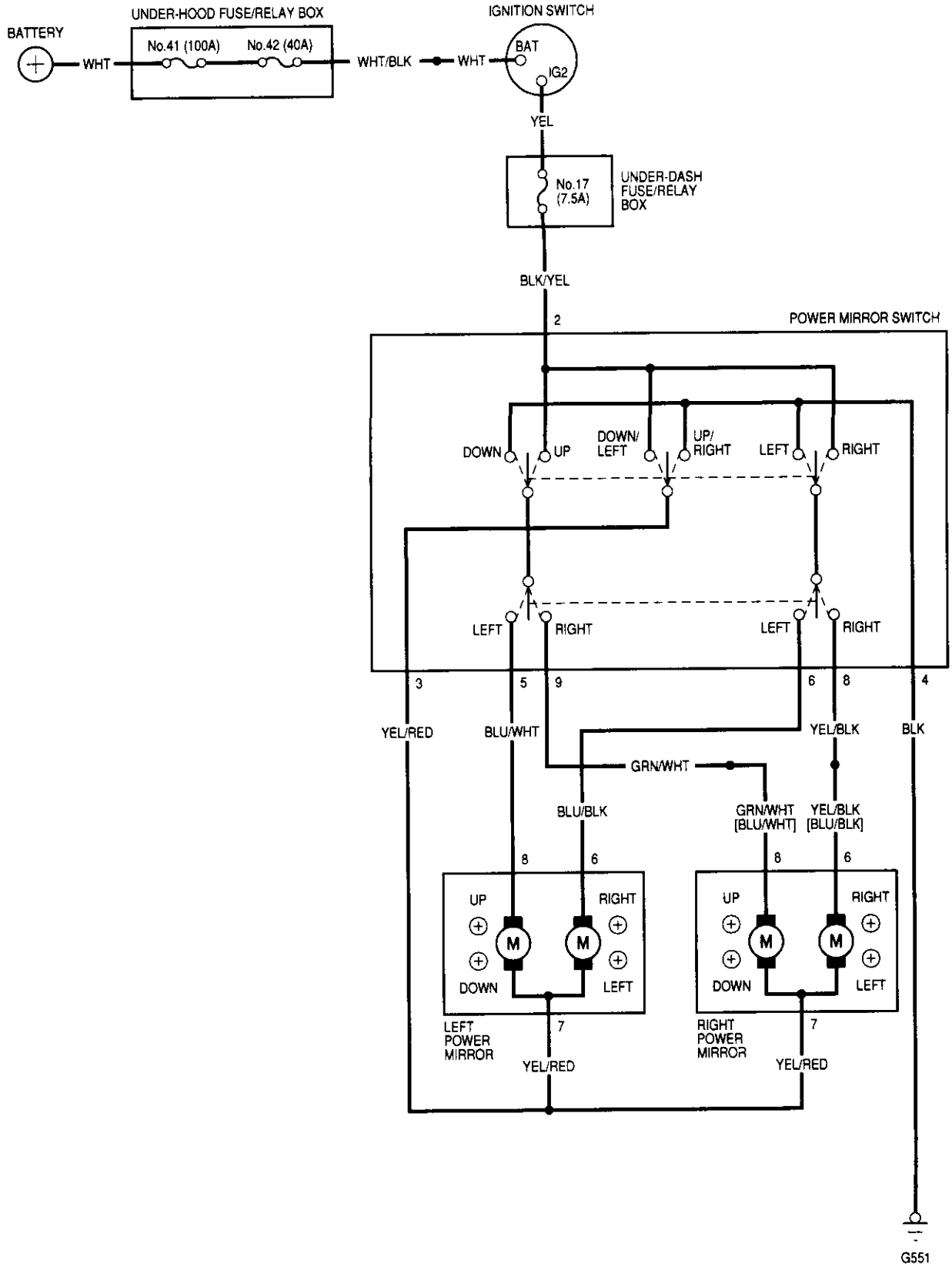
- If there is no continuity, replace the cable reel (see section 24).
- If there is continuity, repair or replace the horn switch.

8. If all tests prove OK, reinstall the driver's airbag (see section 24), and reconnect the cable reel sub-harness connector.
9. Reconnect the driver's and front passenger's airbag connectors, and reinstall the access panel on the steering wheel.
10. Reconnect the battery positive cable, then the negative cable.
11. After installing the airbags, confirm proper system operation:
    - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
    - Make sure both horn buttons work.

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Power Mirrors

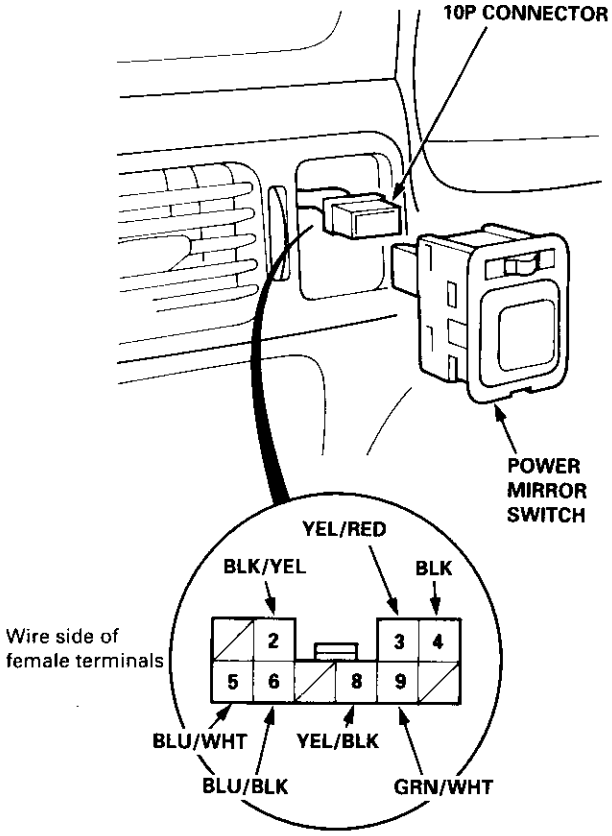
Circuit Diagram



[ ] : '98-00 models

Function Test

1. Pry the switch out of the dashboard. Be careful not to damage the mirror switch or the dashboard driver's lower cover when prying the switch out.
2. Disconnect the 10P connector from the switch.
3. Choose the appropriate test dased on the symptom:
   - Both mirrors don't work, go to step 4.
   - Left mirror doesn't work, go to step 6.
   - Right mirror doesn't work, go to step 7.



Both inoperative:

4. Check for voltage between the No. 2 (BLK/YEL) terminal and body ground with the ignition switch ON (II).
   There should be battery voltage.
   - If there is no voltage, check for:
     — blown No. 17 (7.5 A) fuse in the under-dash fuse/relay box.
     — an open in the BLK/YEL wire.
   - If there is battery voltage, go to step 2.
5. Check for continuity between the No. 4 (BLK) terminal and body ground.
   There should be continuity.
   If there is no continuity, check for:
   - an open in the BLK wire.
   - poor ground (G551).

Left mirror inoperative:

6. Connect the No. 2 (BLK/YEL) terminal of the 10P connector to the No. 3 (YEL/RED) terminal and the No. 5 (or No. 6) terminal to body ground with jumper wires. The left mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

   - If the mirror does not tilt down (or does not swing left), remove the left door panel, and check for an open in the BLU/WHT (or BLU/BLK) wire between the left power mirror and the switch. If the wire is OK, check the left power mirror actuator.
   - If the mirror neither tilts down nor swings left, repair the YEL/RED wire.
   - If the mirror operates properly, check the mirror switch.

Right mirror inoperative:

7. Connect the No. 2 (BLK/YEL) terminal of the 10P connector to the No. 3 (YEL/RED) terminal and the No. 9 (or No. 8) terminal to body ground with jumper wires. The right mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

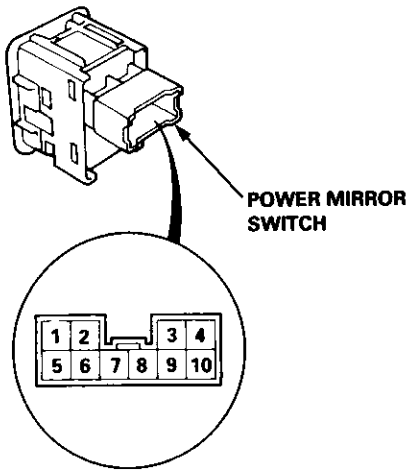
   - If the mirror does not tilt down (or does not swing left), remove the right door panel, and check for an open in the GRN/WHT (or YEL/BLK) wire between the right power mirror and the switch. If the wire is OK, check the right power mirror actuator.
   - If the mirror neither tilts down nor swings left, repair the YEL/RED wire.
   - If the mirror operates properly, check the mirror switch.

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Switch Test

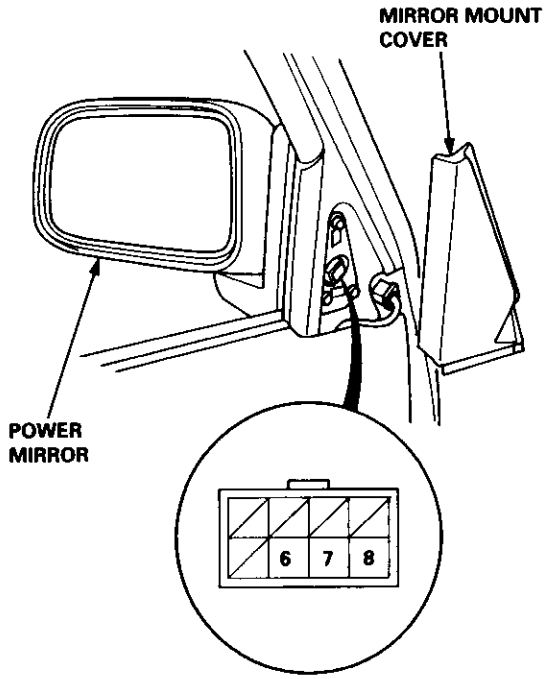
1. Remove the switch as described in Function Test (see page 23-108).
2. Check for continuity between the terminals in each switch position according to the table.

Position		Terminal 2	3	4	5	6	8	9
L	UP	○	○	○	○			
	DOWN	○	○	○	○			
	LEFT	○	○	○		○		
	RIGHT	○	○	○		○		
R	UP	○	○	○				○
	DOWN	○	○	○				○
	LEFT	○	○	○			○	
	RIGHT	○	○	○			○	



Actuator Test

1. Pry out the mirror mount cover (see section 20).
2. Disconnect the 8P connector from the power mirror.

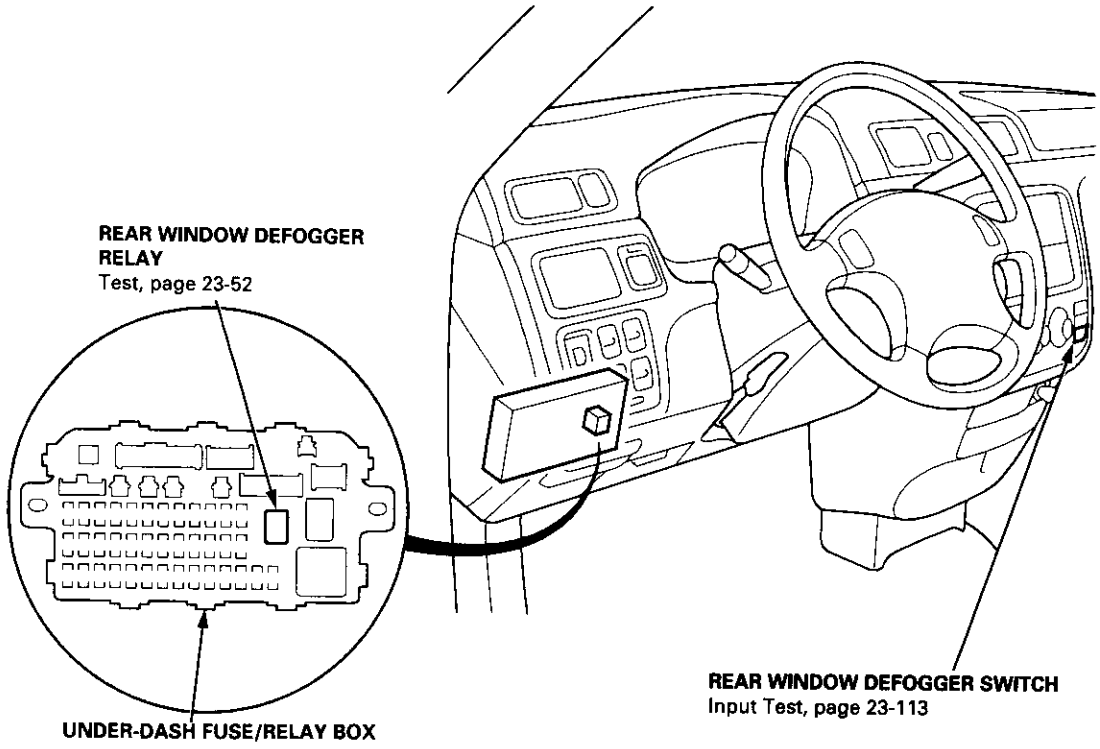


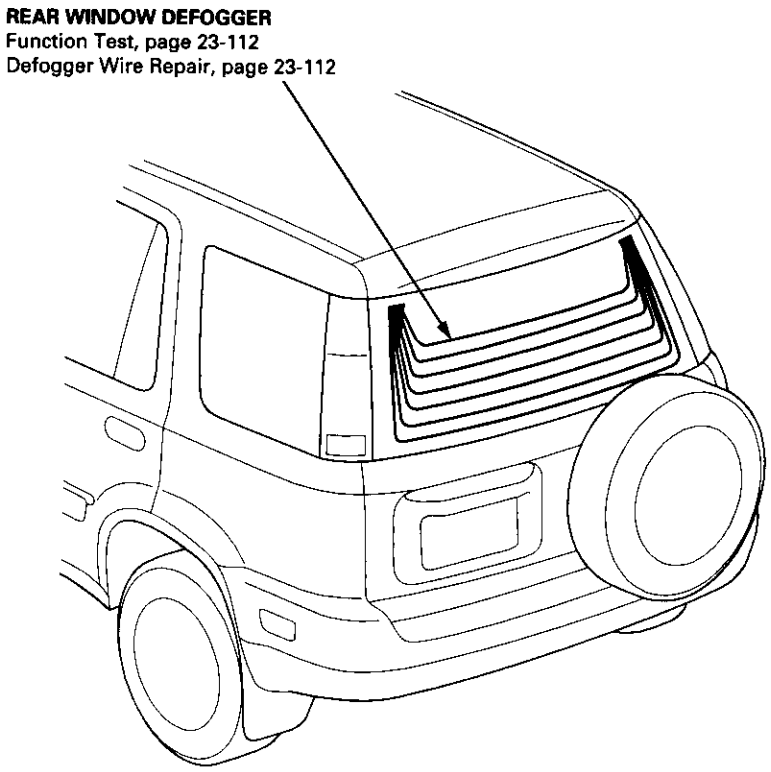
3. Check actuator operation by connecting power and ground according to the table.

Position \ Terminal	6	7	8
TILT UP		⊖	⊕
TILT DOWN		⊕	⊖
SWING LEFT	⊖	⊕	
SWING RIGHT	⊕	⊖	

Rear Window Defogger

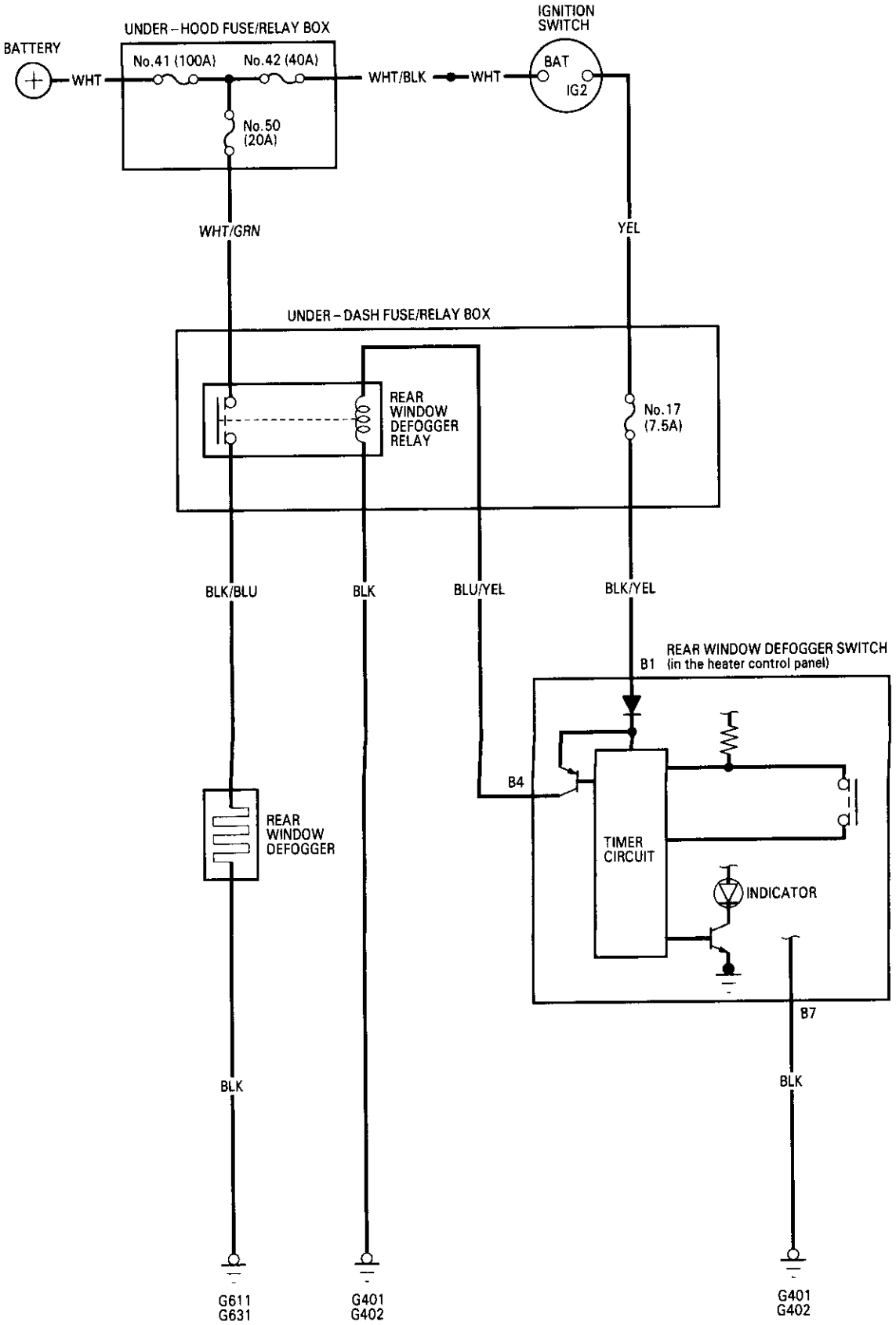
Component Location Index





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Circuit Diagram

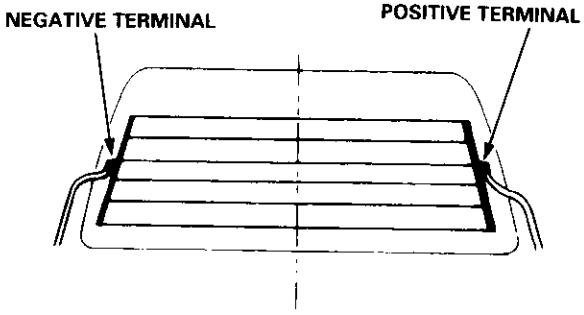


Rear Window Defogger

Function Test

1. Check for voltage between the positive terminal and body ground with the ignition switch and defogger switch ON.
   There should be battery voltage.

   - If there is no voltage, check for:
     — faulty defogger relay.
     — faulty defogger switch.
     — an open in the BLK/BLU, WHT/GRN, BLU/YEL, or BLK wire.
   - If there is battery voltage, go to step 2.



2. Check for continuity between the negative terminal and body ground.
   If there is no continuity, check for an open in the defogger ground wire.

3. Touch the voltmeter positive probe to the halfway point of each defogger wire, and the negative probe to the negative terminal. Be careful not to scratch or damage the defogger wires with the tester probe.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.

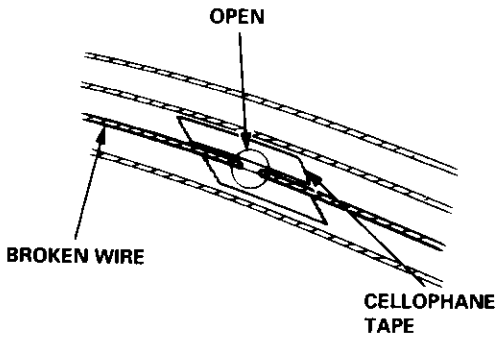
   - If the voltage is as specified, the defogger wire is OK.
   - If the voltage is not as specified, repair the defogger wire.
     — If it is more than 6 V, there is a break in the negative half of the wire.
     — If it is less than 6 V, there is a break in the positive half of the wire.

Defogger Wire Repair

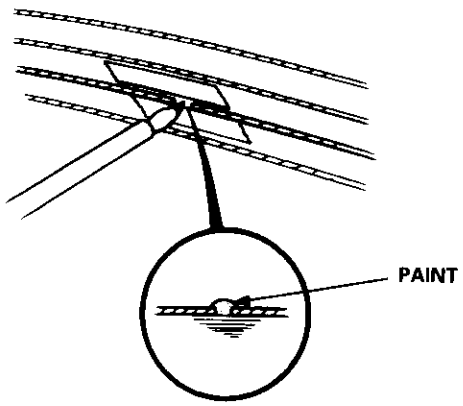
NOTE: To make an effective repair, the broken section must be no longer than one inch.

1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.

2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Mix the conductive paint thoroughly. Using a small brush, apply a heavy coat of the conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.



4. Check for continuity in the repaired wire.

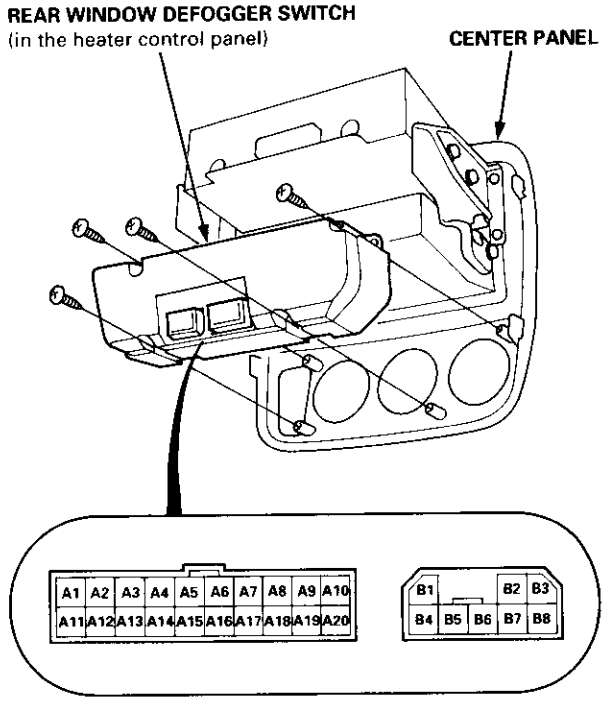
5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

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Switch Input Test

NOTE: Before testing, check for blown No. 17 (7.5 A) fuse in the under-dash fuse/relay box.

1. Remove the center panel (see section 20).



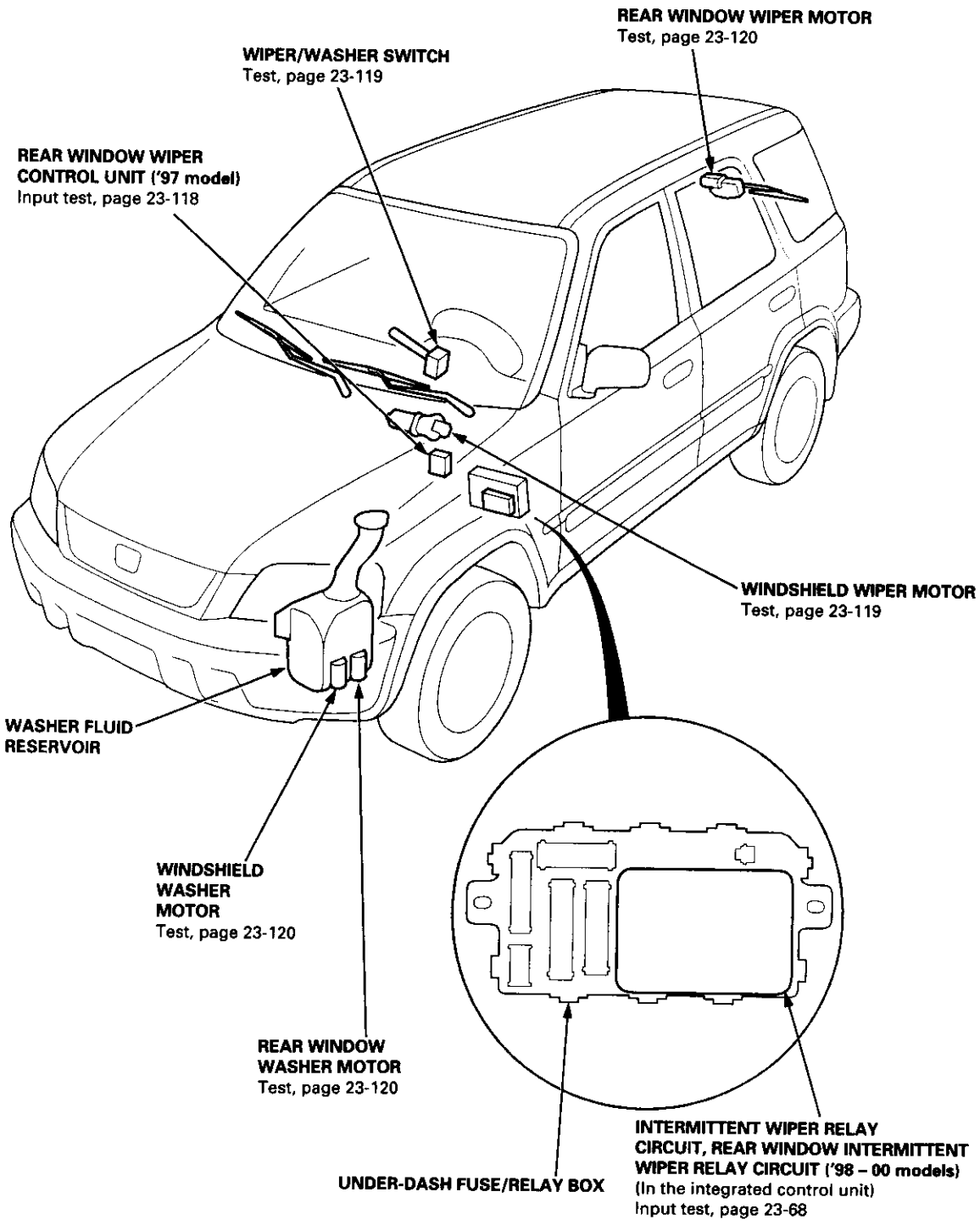
2. Check for voltage between the B4 and B7 terminals in each switch position when battery power is connected to the B1 terminal.

OFF	less than 0.4 V
ON	battery voltage

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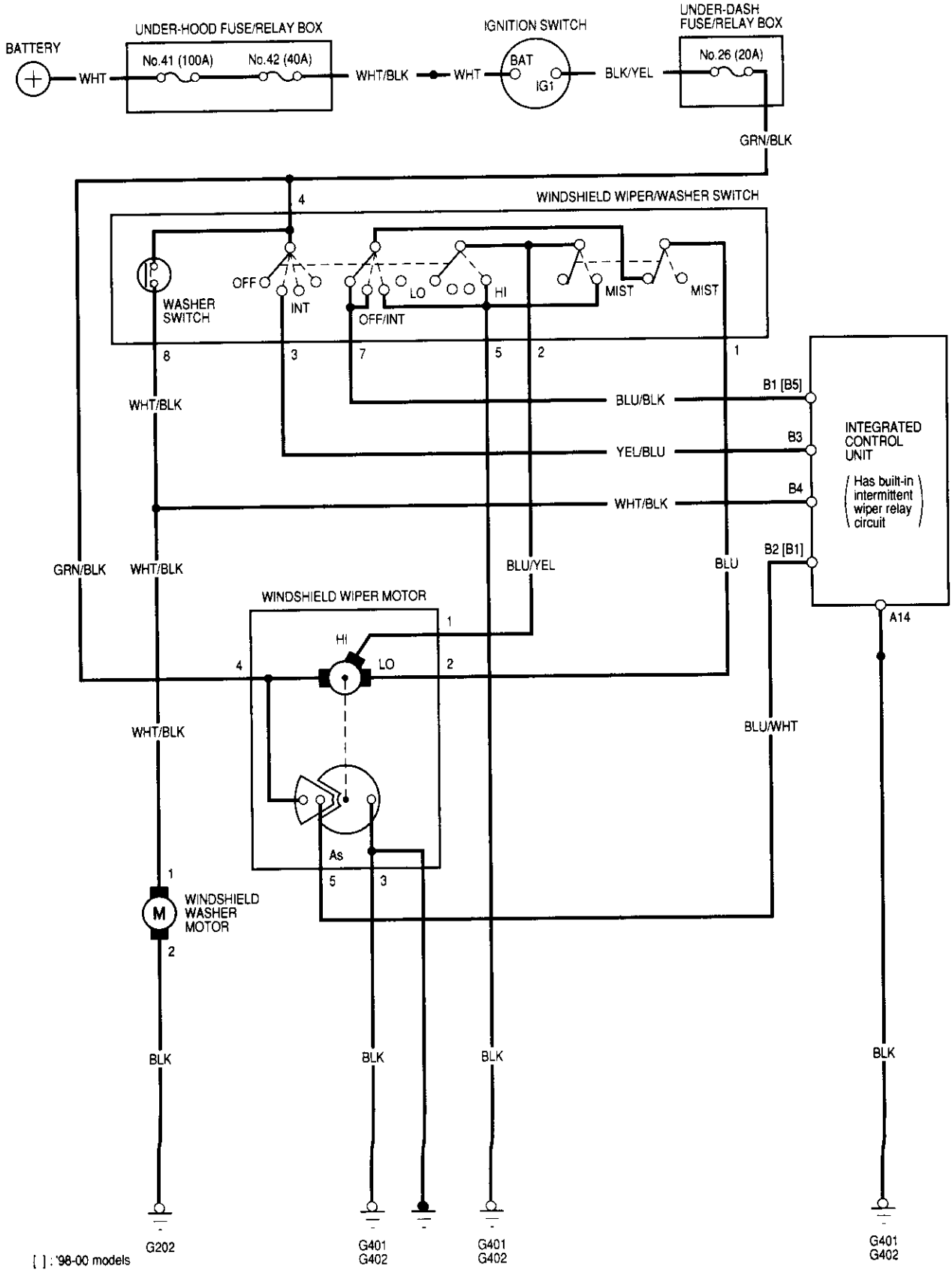
Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

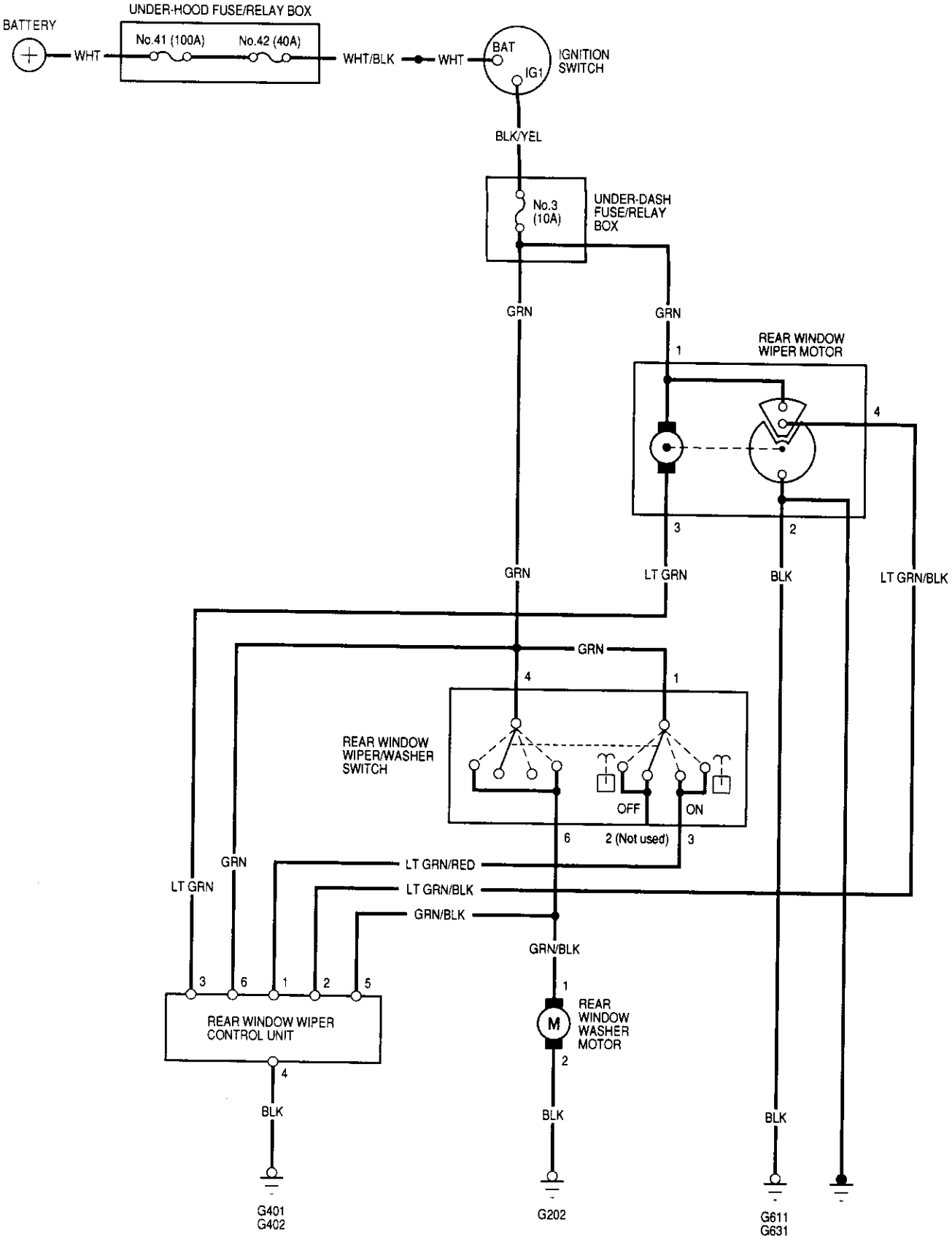


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Circuit Diagram (Windshield)

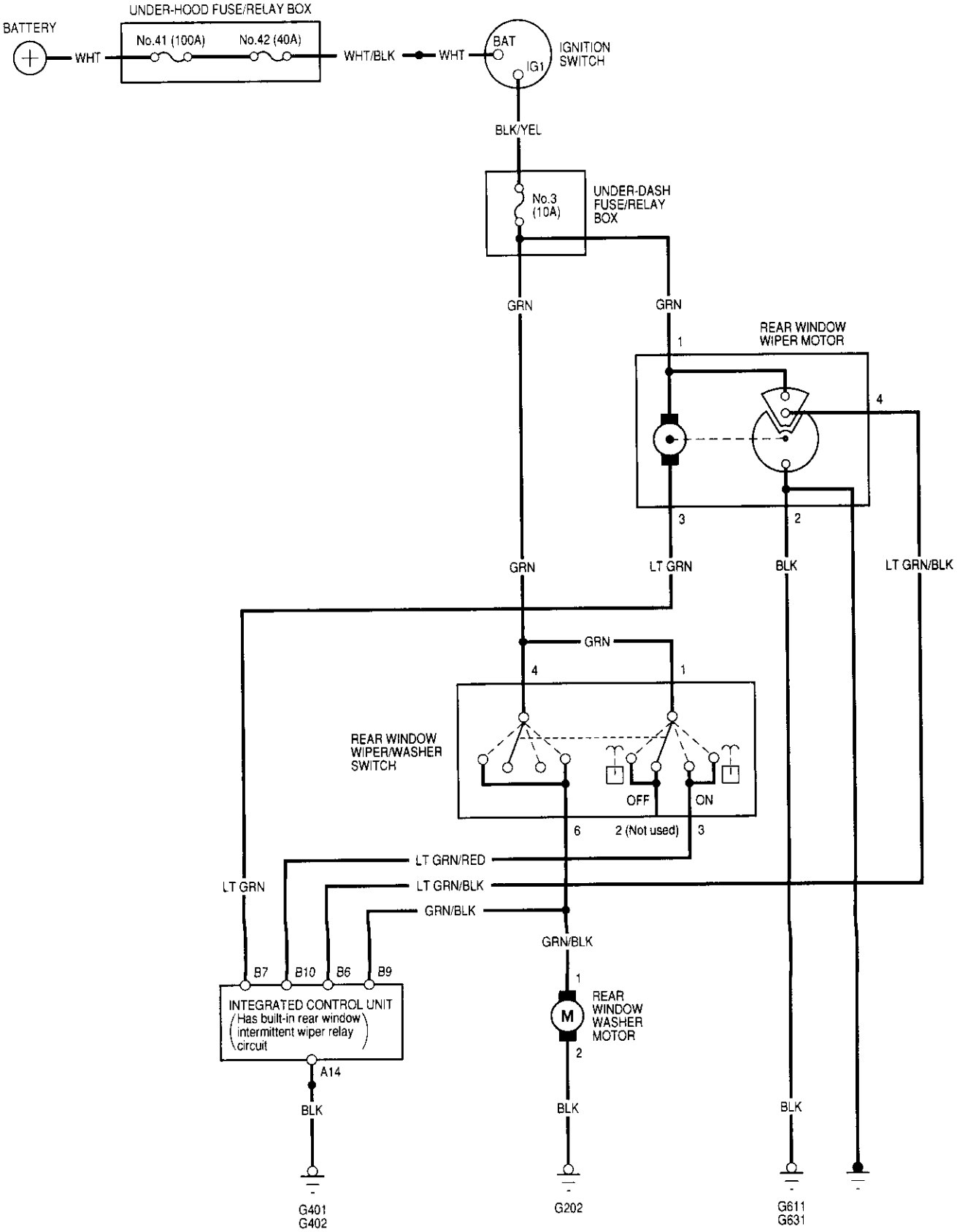


Circuit Diagram (Rear Window) — '97 Model



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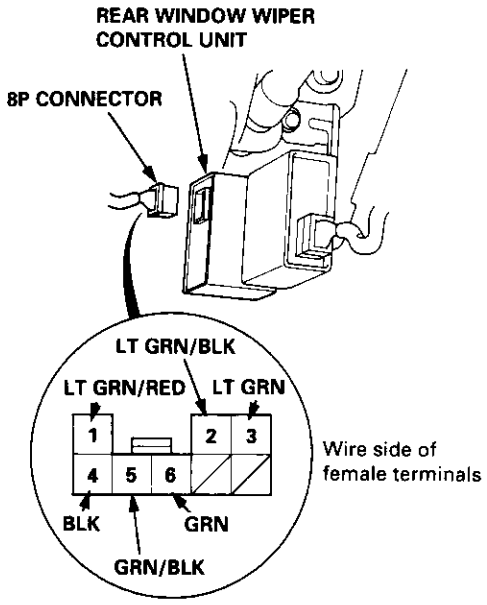
Circuit Diagram (Rear Window) — '98 – 00 Models



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Rear Window Wiper Control Unit Input Test – '97 Model

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Disconnect the 8P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests are OK, replace the control unit.



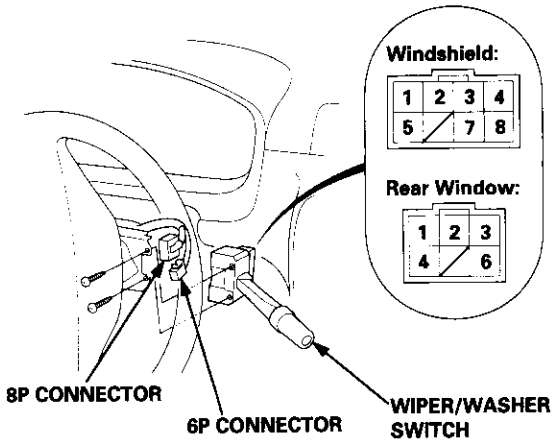
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G402) • An open in the wire
6	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
1	LT GRN/ RED	Ignition switch ON (II), and rear window wiper/washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper/washer switch • An open in the wire
2	LT GRN/ BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper motor • An open in the wire
3	LT GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper motor • An open in the wire
5	GRN/BLK	Ignition switch ON (II), and rear window wiper/washer switch at washer position	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (10 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper/washer switch • An open in the wire

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Wiper/Washer Switch Test

Windshield/Rear Window Wiper/Washer Switch:

1. Remove the driver's dashboard lower cover and the knee bolster (see section 20).
2. Remove the steering column covers (see section 17).
3. Disconnect the 8P and 6P connectors from the switch, remove the two screws, and pull out the switch.



4. Check for continuity between the terminals in each switch position according to the tables.

Windshield Wiper/Washer Switch:

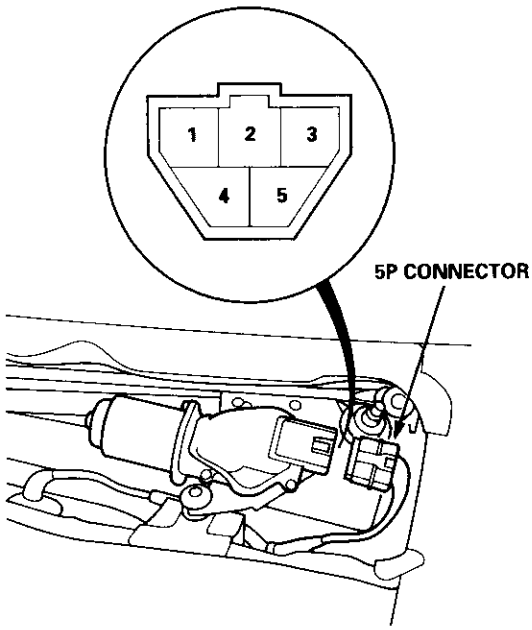
Position \ Terminal	4	3	2	1	8	7	5
OFF				○		○	
INT	○	○		○		○	
LO				○			○
HI			○				○
Mist switch "ON"			○				○
Washer switch "ON"	○				○		

Rear Window Wiper/Washer Switch:

Position \ Terminal	1	2	3	4	6
Washer switch "ON" (Wiper switch OFF)	○	○		○	○
OFF	○	○			
ON	○		○		
Washer switch "ON" (Wiper switch "ON")	○		○	○	○

Windshield Wiper Motor Test

1. Open the hood, remove the cap nuts, and carefully remove the wiper arms so that they do not touch the hood.
2. Remove the cowl cover (see section 20).
3. Disconnect the 5P connector from the windshield wiper motor.



4. Test the motor by connecting battery power and ground according to the table.

Position \ Terminal	1	2	4
LOW SPEED		⊖	⊕
HIGH SPEED	⊖		⊕

If the motor does not run or fails to run smoothly, replace it.

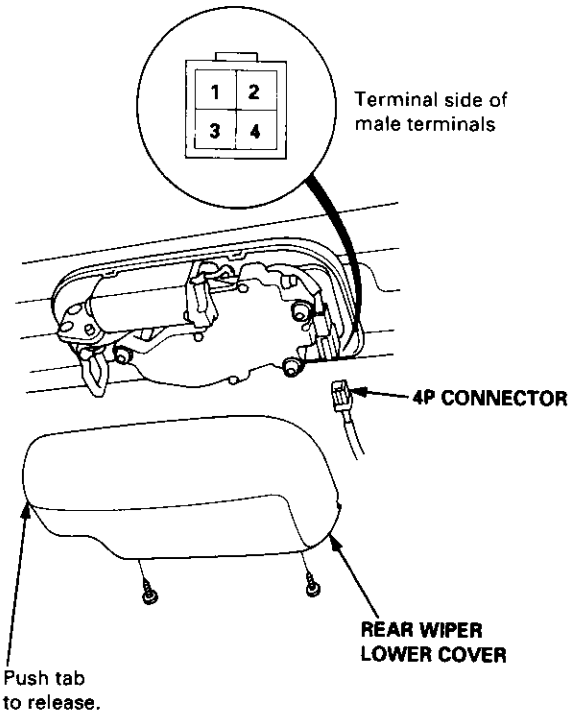
5. Connect an analog voltmeter between the No. 5 (+) and No. 3 (–) terminals, and run the motor at low or high speed.

The voltmeter should alternately indicate 0 V and 4 V or less.

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Rear Window Wiper Motor Test

1. Remove the tailgate trim panel (see section 20).
2. Disconnect the 4P connector from the wiper motor assembly.



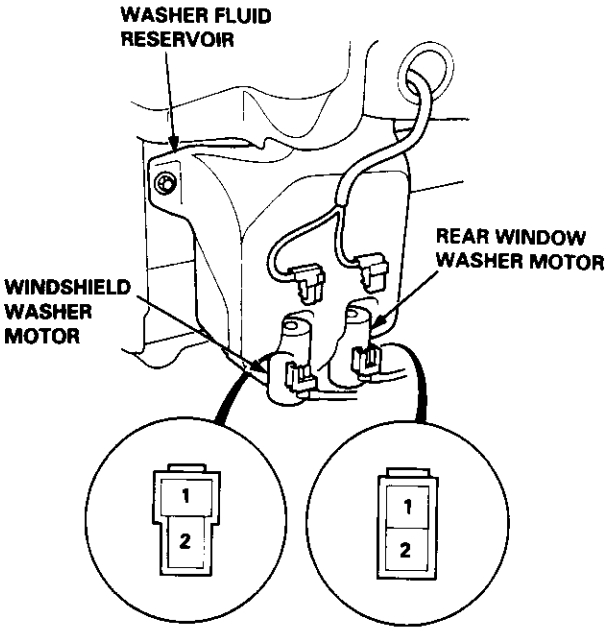
3. Test the motor by connecting battery power to the No. 1 terminal, and ground to the No. 3 terminal.

   If the motor does not run or fails to run smoothly, replace it.
4. Reconnect the 4P connector to the wiper motor.
5. Connect an analog voltmeter between the No. 4 (+) and No. 2 (–) terminals.
6. Run the motor by turning the wiper/washer switch ON.

   The voltmeter should alternately indicate 0 V and 11 V or less.

Washer Motor Test

1. Remove the front bumper (see section 20).
2. Disconnect the 2P connectors from the washer motors.



3. Test the washer motor by connecting battery power and ground according to the table.

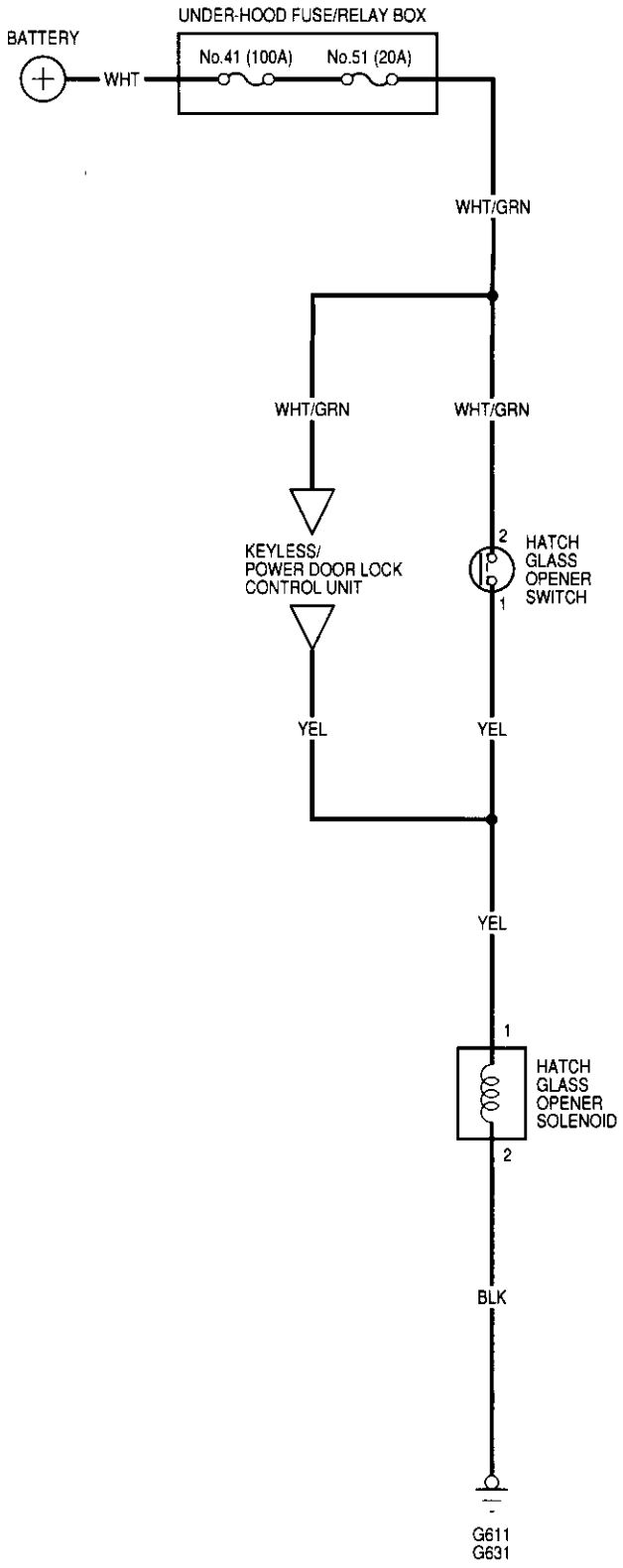
Terminal / Battery	1	2
Disconnected		
Connected	⊕	⊖

- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

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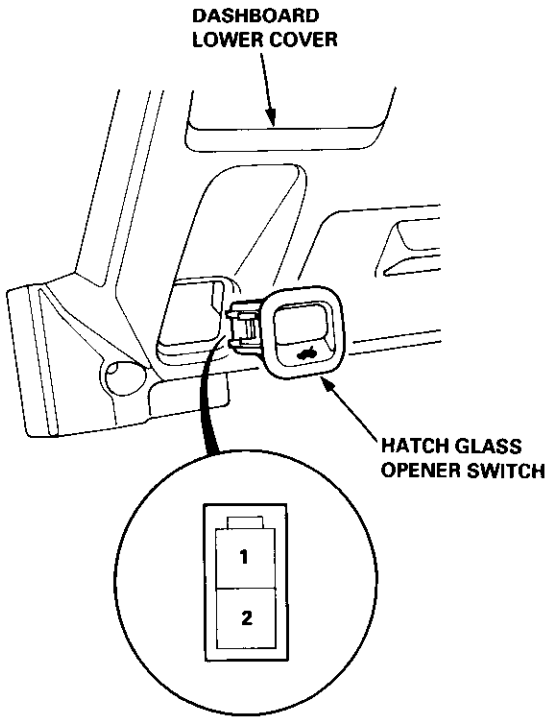
Hatch Glass Opener

Circuit Diagram



Switch Test

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 2P connector from the switch.
3. Remove the switch from the dashboard lower cover.



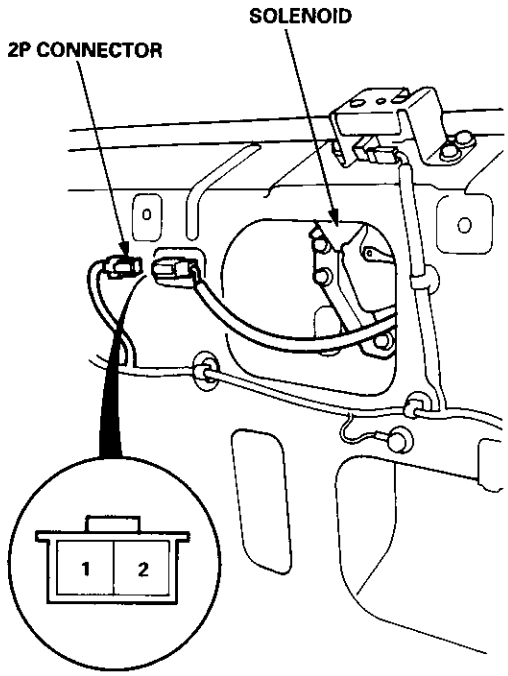
4. Check for continuity between the No. 1 and No. 2 terminals.
   - There should be continuity when the switch is pushed.
   - There should be no continuity when the switch is released.

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Hatch Glass Opener

Solenoid Test

1. Open the tailgate and remove the tailgate trim (see section 20).
2. Disconnect the 2P connector from the solenoid.

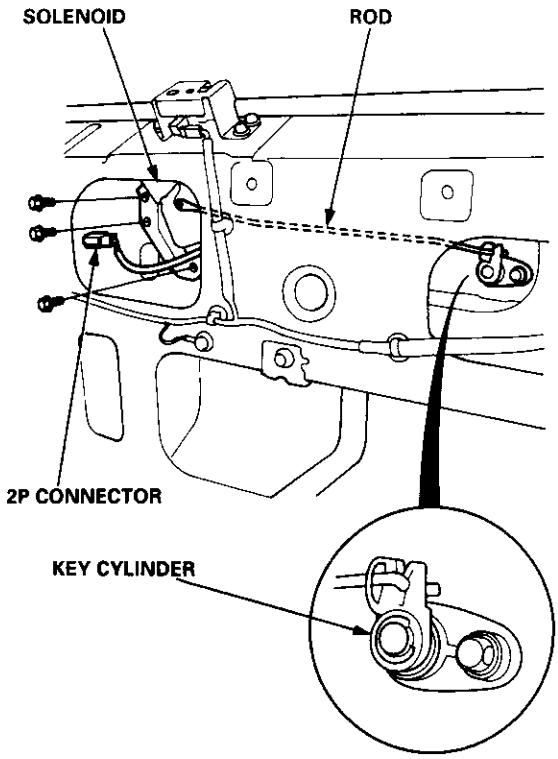


Terminal side of male terminals

3. Connect power to the No. 1 terminal and ground to the No. 2 terminals momentarily. The solenoid should operate.

Solenoid Replacement

1. Remove the tailgate trim (see section 20).
2. Disconnect the 2P connector.

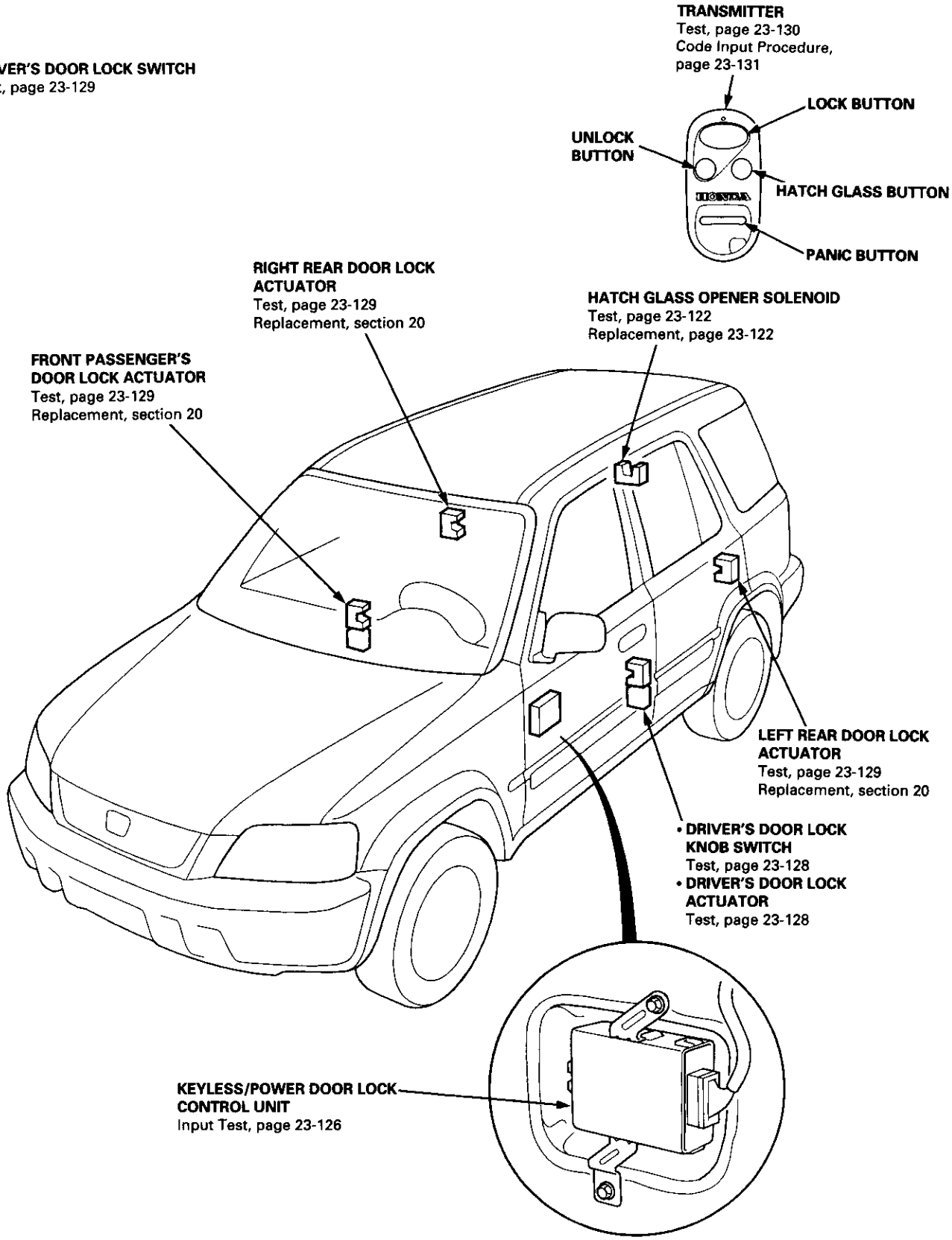


3. Remove the rod from the key cylinder.
4. Remove the three mounting bolts, then remove the solenoid.
5. Install the replacement solenoid in the reverse order of removal.

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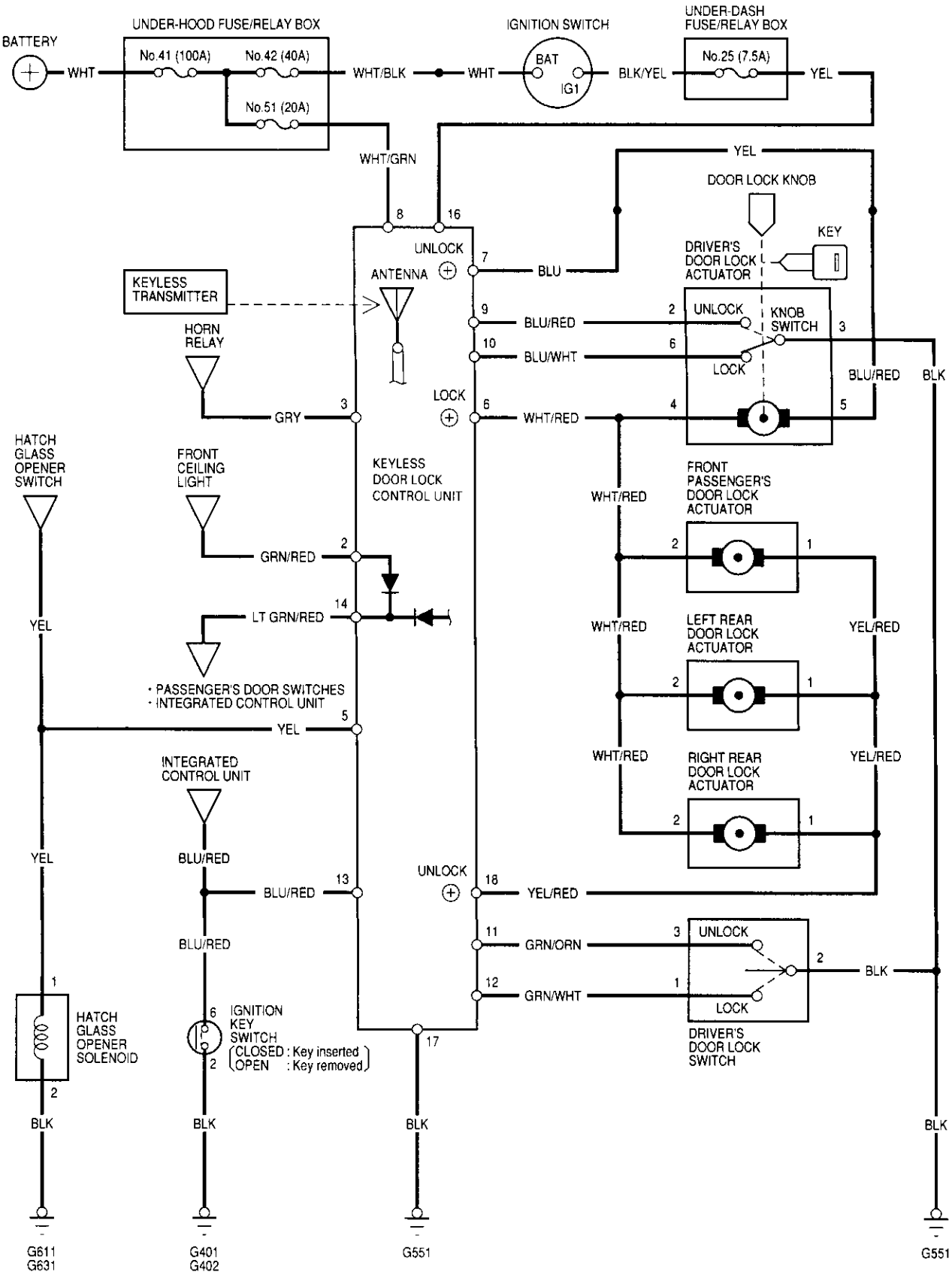
Power Door Locks

Component Location Index



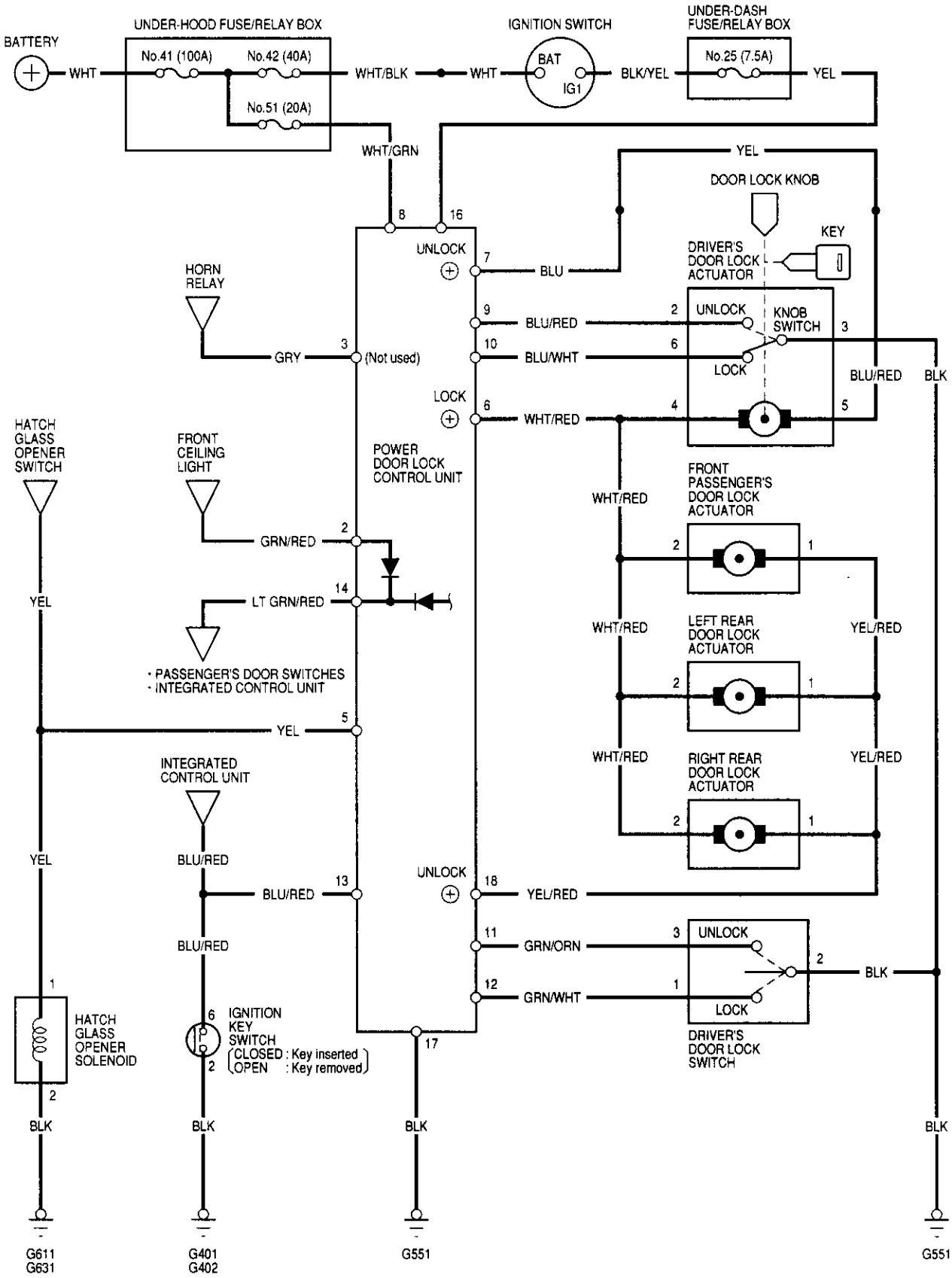
Power Door Locks

Circuit Diagram (With Keyless Entry System)



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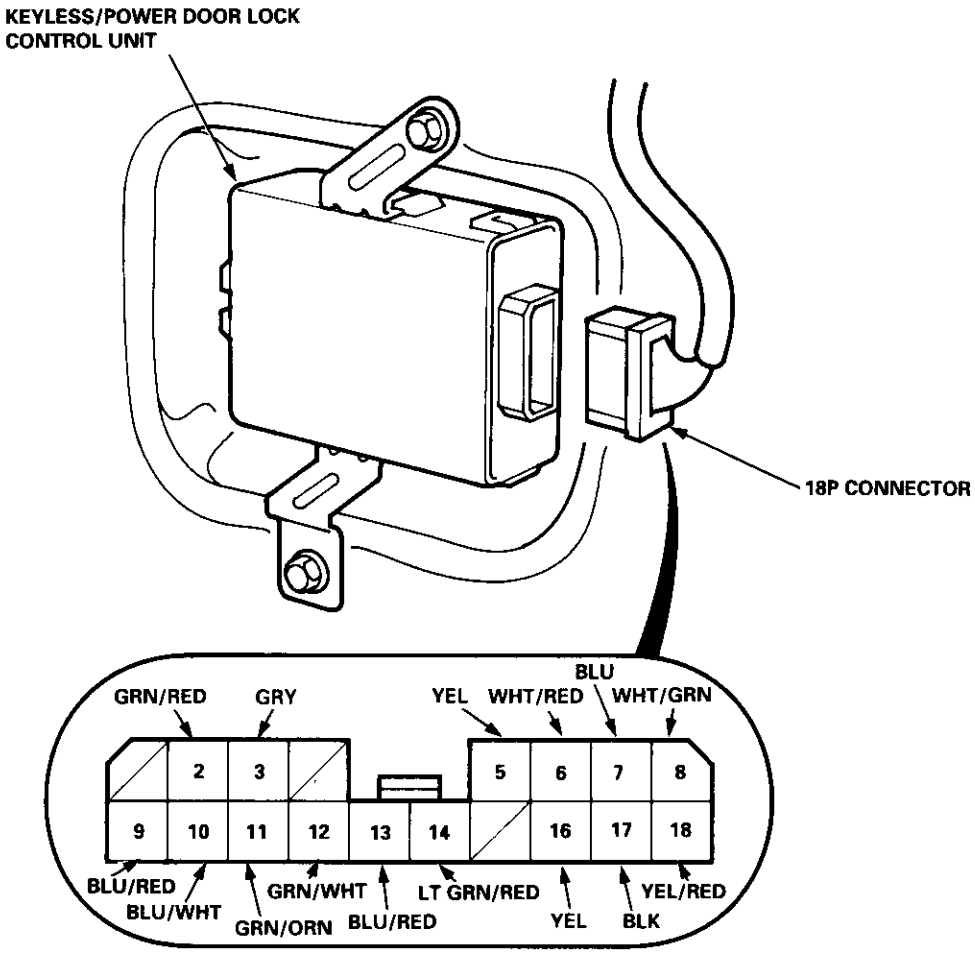
Circuit Diagram (Without Keyless Entry System)



Power Door Locks

Control Unit Input Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 18P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all marking good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Wire side of
female terminals

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Disconnect the 18P connector from the power door lock control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
17	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G551) • An open in the wire
7	BLU	Connect the No. 7 terminal to the No. 8 terminal, and the No. 6 terminal to the No. 17 terminal momentarily.	Check door lock operation: Driver's door should unlock.	• Faulty actuator • Faulty junction connector (C577) • An open in the wire • Blown No. 51 (20 A) fuse in the underhood fuse/relay box
*3	GRY	Under all conditions	Connect to ground: Horn should sound.	• Blown No. 52 (15 A) fuse in the underhood fuse/relay box • Faulty horn • Faulty horn relay • An open in the wire
18	YEL/RED	Connect the No. 18 terminal to the No. 8 terminal, and the No. 6 terminal to the No. 17 terminal momentarily.	Check door lock operation: Passenger's doors should unlock.	• Faulty actuator • An open in the wire • Blown No. 51 (20 A) fuse in the underhood fuse/relay box
6	WHT/RED	Connect the No. 6 terminal to the No. 8 terminal, and the No. 18 terminal to the No. 17 terminal momentarily.	Check door lock operation: All doors should lock.	• Faulty actuator • An open in the wire • Blown No. 51 (20 A) fuse in the underhood fuse/relay box
9	BLU/RED	Connect an ohmmeter between the No. 9 terminal and the No. 17 terminal. Driver's door lock knob in UNLOCK	Check for continuity: There should be continuity.	• Faulty driver's door lock actuator • An open in the wire

*: With keyless entry system

NOTE: To prevent damage to the motor, apply battery voltage only momentarily.

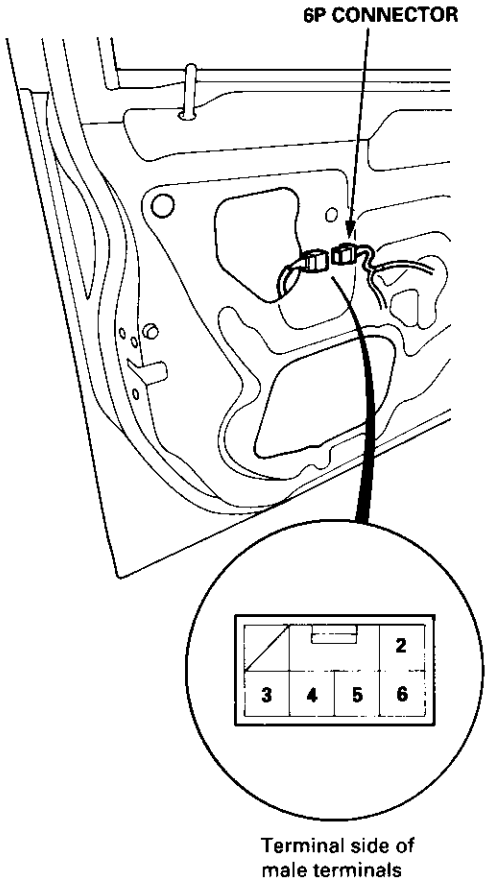
Reconnect the 18P connector to the power door lock control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
8	WHT/GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 51 (20 A) fuse in the underhood fuse/relay box • An open in the wire
10	BLU/WHT	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock actuator • Poor ground (G551) • An open in the wire
13	BLU/RED	Ignition key is in the ignition switch	Check for voltage to ground: There should be 1 V or less.	• Faulty ignition key switch • Poor ground (G401, G402) • An open in the wire
16	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 25 (7.5 A) fuse in the underdash fuse/relay box • An open in the wire
5	YEL	Connect the No. 5 terminal to the No. 8 terminal momentarily	Check hatch glass lock operation: Hatch glass should unlock.	• Faulty hatch glass opener solenoid • An open in the wire
14	LT GRN/RED	Passenger's door open	Check for continuity to ground: There should be continuity.	• Faulty door switch • An open in the wire
2	GRN/RED	Front ceiling light "MIDDLE" position	Check for voltage to ground: There should be battery voltage.	• Faulty front ceiling light • An open in the wire
12	GRN/WHT	Driver's door lock switch in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G551) • An open in the wire
11	GRN/ORN	Driver's door lock switch in UNLOCK		

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Driver's Door Lock Knob Switch Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P connector from the actuator.



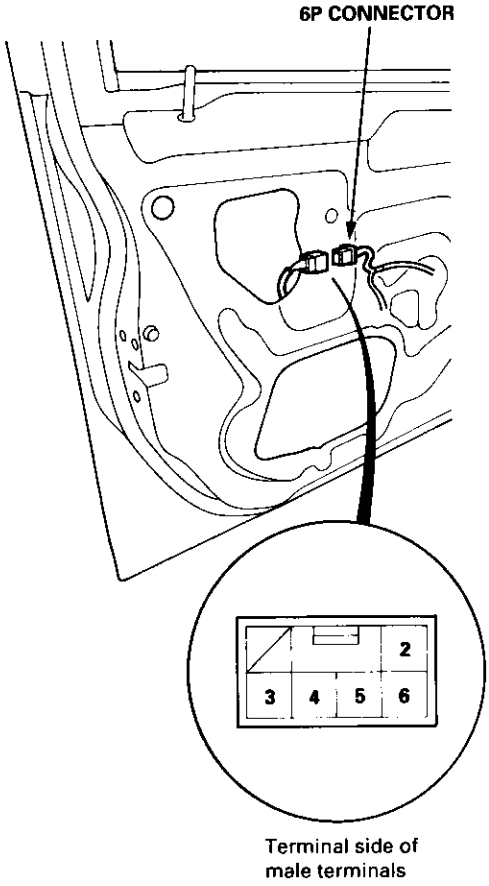
Terminal side of male terminals

3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	2	3	6
LOCK		○—○	
UNLOCK	○—○		

Driver's Door Lock Actuator Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P connector from the actuator.



Terminal side of male terminals

3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

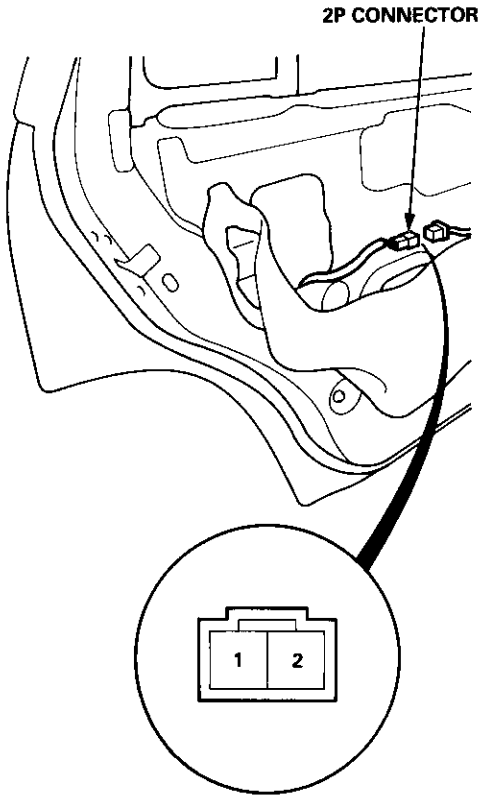
Position \ Terminal	4	5
LOCK	⊕	⊖
UNLOCK	⊖	⊕

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Passenger's Door Lock Actuator Test

1. Remove the passenger's door panel (see section 20).
2. Disconnect the 2P connector from the actuator.

   NOTE: The left rear door lock actuator is shown; the front passenger's and right rear door lock actuators are similar.



Terminal side of male terminals

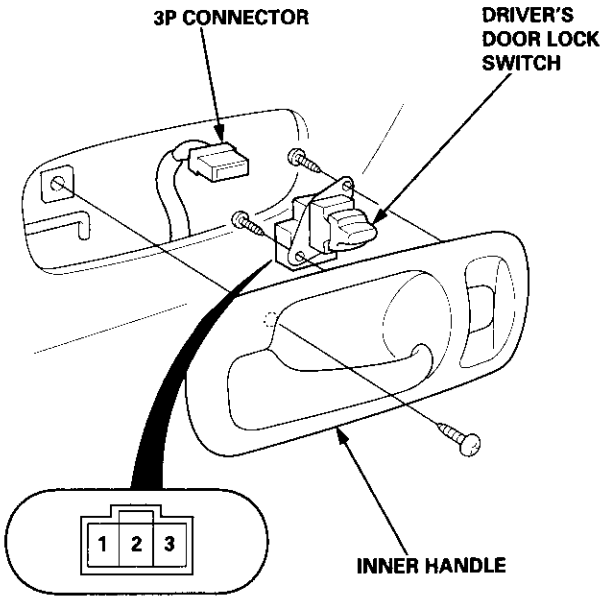
3. Check actuator operation by connecting power and ground according to the table. To prevent damage to the actuator, apply battery voltage only momentarily.

Position \ Terminal	1	2
LOCK	⊖	⊕
UNLOCK	⊕	⊖

4. If the actuator does not work properly, replace it.

Driver's Door Lock Switch Test

1. Remove the inner handle (see section 20).
2. Disconnect the 3P connector, then remove the two mounting screws and driver's door lock switch.



3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	3
LOCK	○—○		
OFF			
UNLOCK		○—○	

Transmitter Test (With Keyless Entry System)

NOTE:

- The ceiling light (in middle position) comes on within 30 seconds when you unlock the doors with the transmitter.
- The doors do not lock or unlock with the transmitter if the ignition key is in the ignition switch.
- If any door is open, you cannot lock the doors with the transmitter.
- If you unlock the doors with the transmitter, but do not open any of the doors within 30 seconds, the doors relock automatically.
- For hatch glass button operation, hold the button for more than two seconds.
- If you press the PANIC button for more than two seconds, the horn sounds for about 30 seconds, and the transmitter LED comes on. (The panic mode will not be activated if the ignition key is in the ignition switch.) The panic mode is cancelled by pressing any of the transmitter buttons.
- The horn sounds only the first time you press a transmitter button. (Pressing repeatedly does not activate the horn again.)

Doors cannot be locked or unlocked with the transmitter.

Check for water leakage into the transmitter.

Is there water leakage? YES → **Replace the transmitter.**

NO

Replace the battery (CR2025).

Lock/unlock the doors with the transmitter.

Do the doors lock/unlock? YES → **The transmitter is OK.**

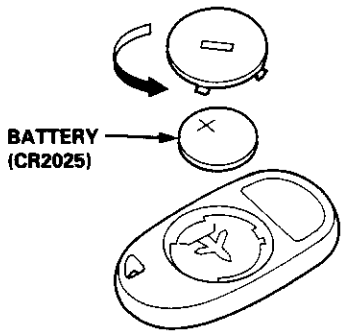
NO

Rewrite the transmitter code, then try to lock/unlock the doors (see page 23-131).

Do the doors lock/unlock? YES → **The transmitter is OK.**

NO

Replace the transmitter.



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Transmitter Programming

Storing transmitter codes:
The codes of up to three transmitters can be read into the keyless receiver unit memory. (If a fourth code is stored, the code which was input first will be erased.)

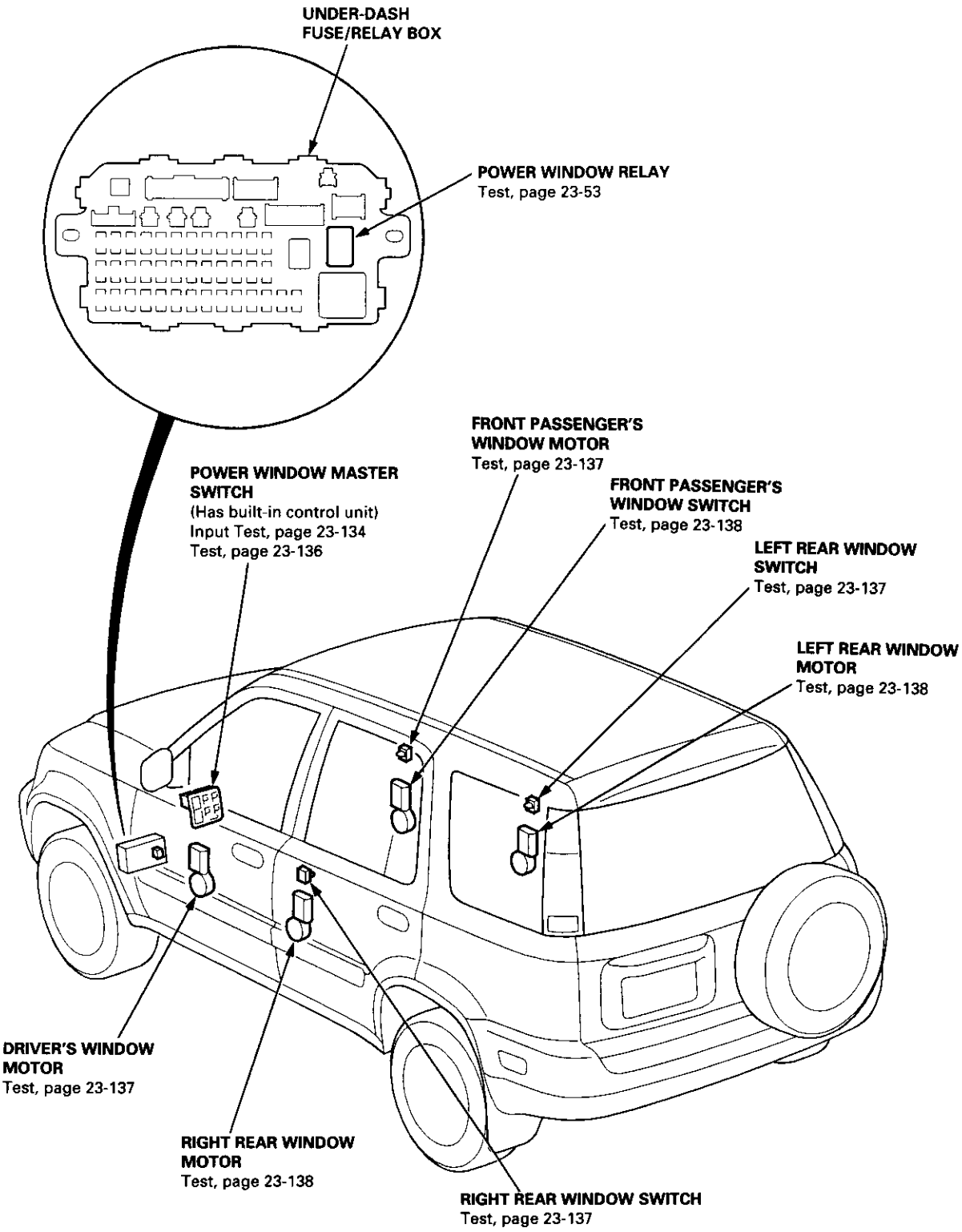
NOTE: It is important to maintain the time limits between the steps.

1. Turn the ignition switch ON (II).
2. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the vehicle.
3. Within 1 to 4 sec., turn the ignition switch OFF.
4. Within 1 to 4 sec., turn the ignition switch ON (II).
5. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the vehicle.
6. Within 1 to 4 sec., turn the ignition switch OFF.
7. Within 4 sec., turn the ignition switch ON (II).
8. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the vehicle.
9. Within 1 to 4 sec., turn the ignition switch OFF.
10. Within 4 sec., turn the ignition switch ON (II).
11. Within 1 to 4 sec., push the transmitter lock or unlock button with the transmitter aimed at the vehicle.
12. Confirm you can hear the sound of the door lock actuators.
13. Within 8 sec., aim the transmitters (up to three) whose codes you want to store at the receiver, and press the transmitter lock or unlock buttons.
    Confirm that you can hear the sound of the door lock actuators after each transmitter code is stored.
14. Turn the ignition switch OFF, and pull out the key.
15. Confirm proper operation with the new code(s).

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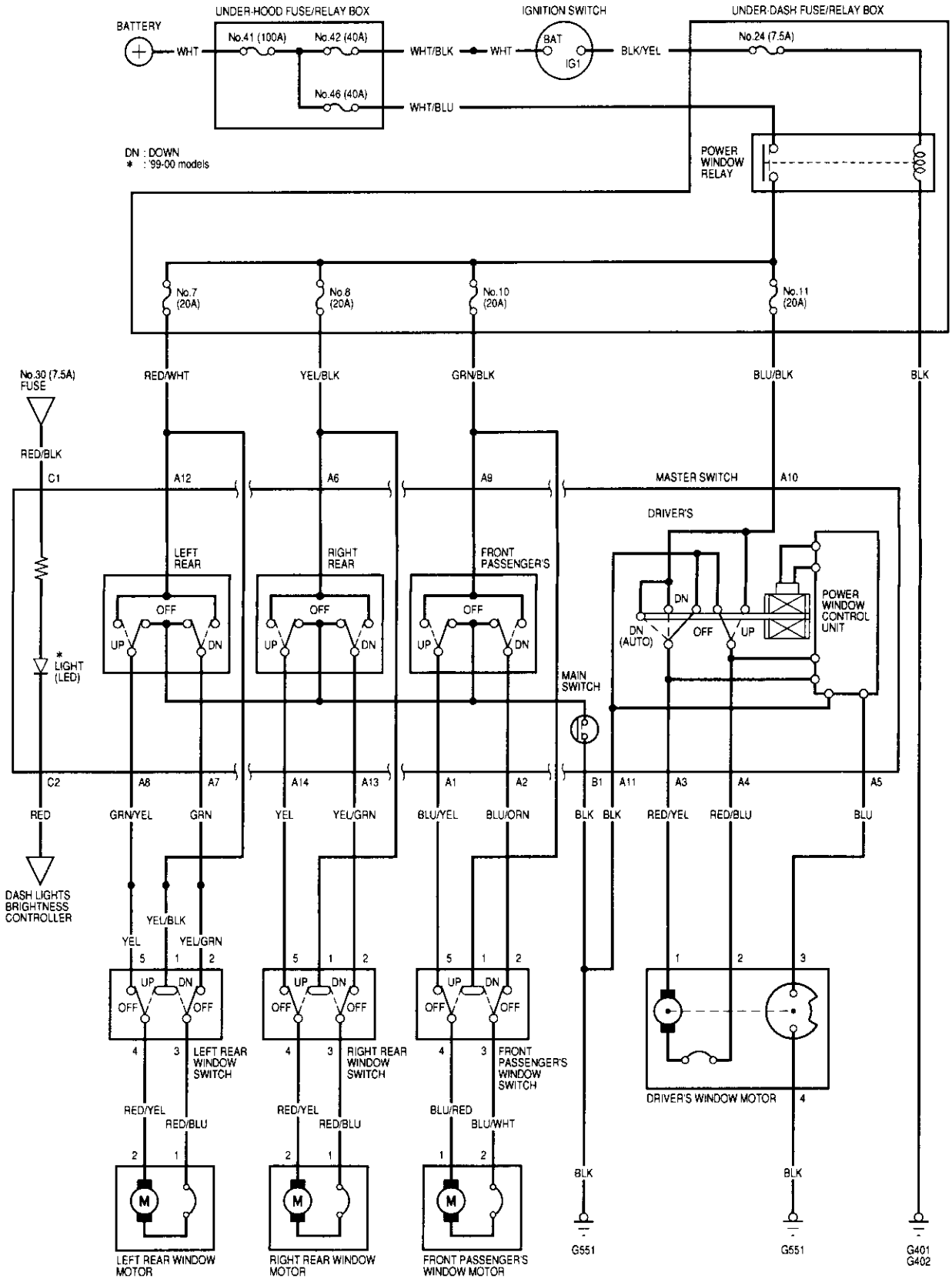
Power Windows

Component Location Index



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Circuit Diagram



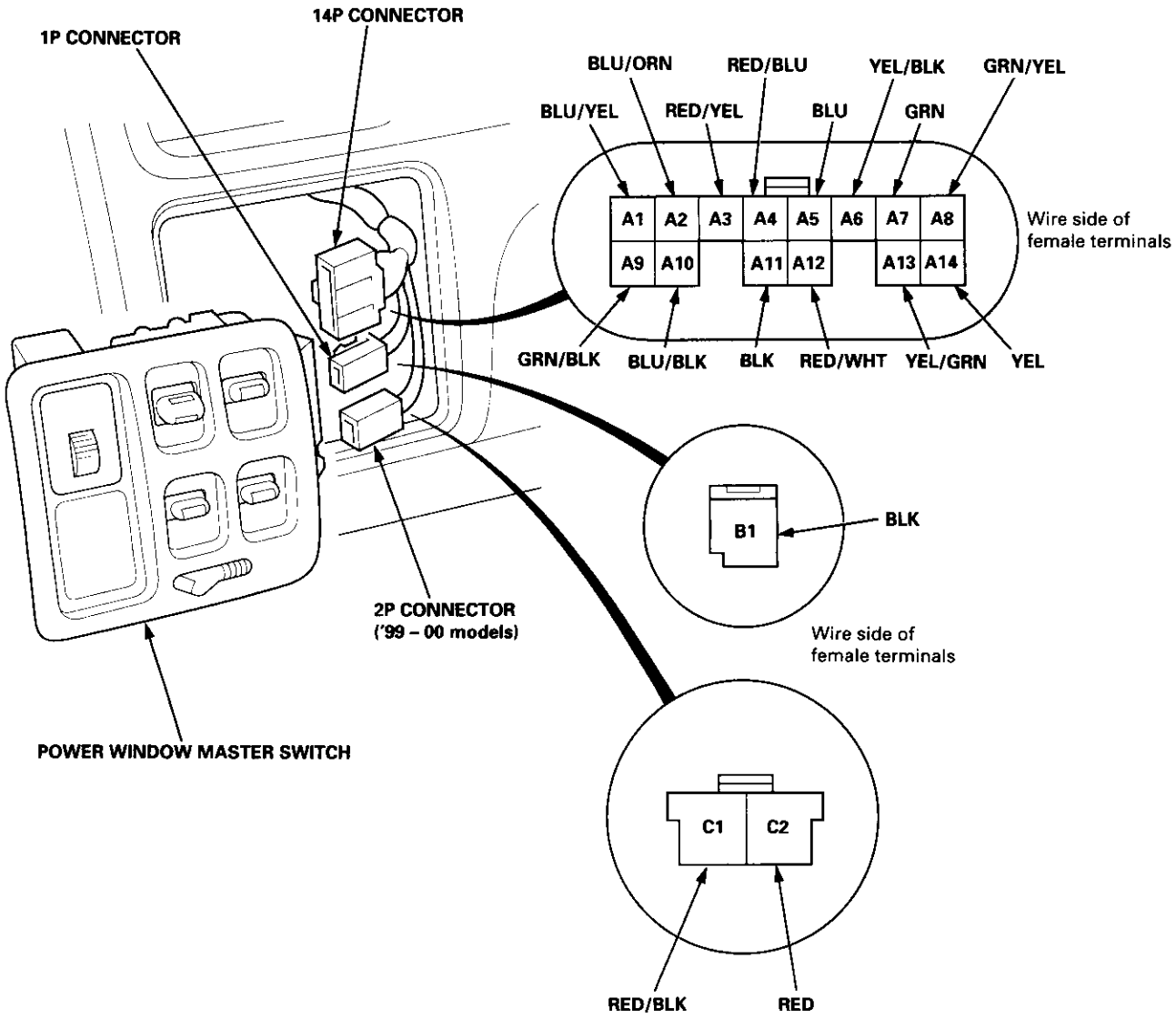
Master Switch Input Test

NOTE: The control unit is built into the power window master switch and only controls driver's door window operations.

1. Remove the master switch, and disconnect the 14P, 2P and 1P connectors from the master switch.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the power window maser switch must be faulty; replace it.



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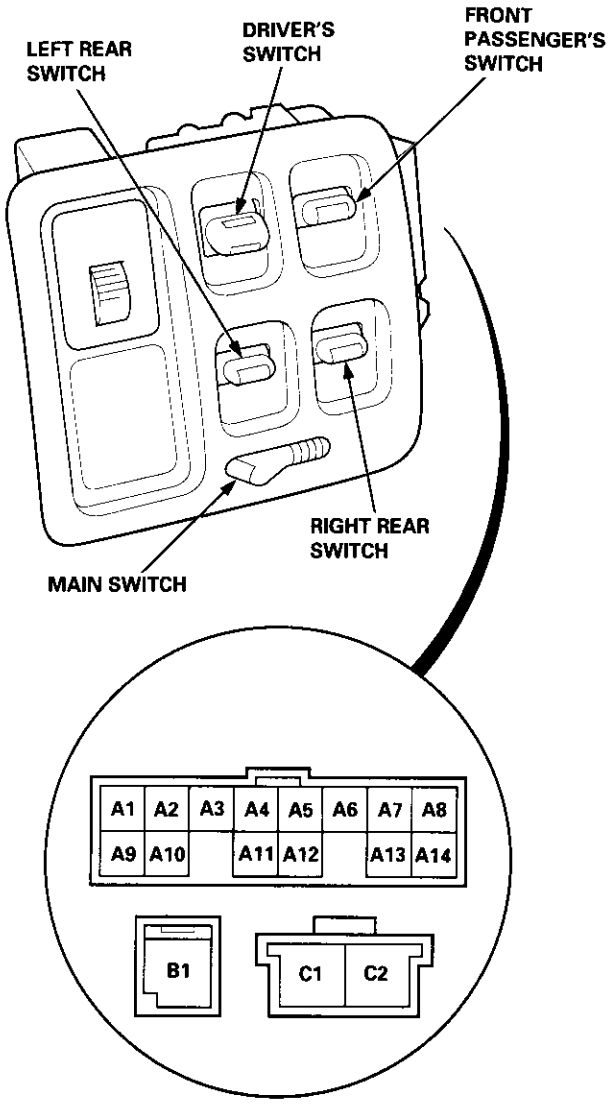
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A11 B1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G551) • An open in the wire
A10	BLU/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 7, 8, 10 or 11 (20 A) fuse in the under-dash fuse/relay box • Faulty power window relay • An open in the wire
A9	GRN/BLK			
A6	YEL/BLK			
A12	RED/WHT			
A4	RED/BLU	Connect the A10 terminal to the A3 terminal, and the A4 terminal to the A11 terminal, then turn the ignition switch ON (II).	Check the driver's window motor: It should run (the window moves down).	• Faulty driver's window motor • An open in the wire
A3	RED/YEL			
A1	BLU/YEL	Connect the A9 terminal to the A2 terminal, and the A1 terminal to the A11 terminal, then turn the ignition switch ON (II).	Check the front passenger's window motor: It should run (the window moves down).	• Faulty front passenger's window motor • Faulty front passenger's window switch • An open in the wire
A2	BLU/ORN			
A14	YEL	Connect the A6 terminal to the A13 terminal, and the A14 terminal to the A11 terminal, then turn the ignition switch ON (II).	Check the right rear motor: It should run (the window moves down).	• Faulty right rear window motor • Faulty right window switch • An open in the wire
A13	YEL/GRN			
A8	GRN/YEL	Connect the A12 terminal to the A7 terminal, and the A8 terminal to the A11 terminal, then turn the ignition switch ON (II).	Check the left rear motor: It should run (the window moves down).	• Faulty left rear window motor • Faulty left rear window switch • An open in the wire
A7	GRN			
A5	BLU	Connect the A10 terminal to the A3 terminal, and the A11 terminal to the A4 terminal, then turn the ignition switch ON (II).	Check for voltage between the A5 and A11 terminals: Approx. 6 V should be indicated as the driver's window motor runs.	• Faulty pulser • Faulty driver's window motor • An open in the wire
*C1	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (7.5 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
*C2	RED	Combination light switch ON	Connect to ground: Dash lights should come on full bright.	• An open in the wire

*: '99 – 00 models

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Master Switch Test

1. Remove the switch (see section 20).
2. Disconnect the 14P, 2P and 1P connectors from the power window master switch.
3. Check for continuity between the terminals in each switch position according to the tables.



Driver's Switch:

The driver's switch is combined with the control unit so you cannot isolate the switch to test it. Instead, run the master switch input test procedures on page 23-134. If the tests are normal, the driver's switch is faulty.

Front Passenger's Switch:

Position \ Terminal / Main Switch		A2	A1	A9	B1
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

Right Rear Switch:

Position \ Terminal / Main Switch		A14	A13	A6	B1
OFF	ON	○	○		○
	OFF	○	○		
UP	ON	○		○	
	OFF	○		○	
DOWN	ON		○	○	
	OFF		○	○	

Left Rear Switch:

Position \ Terminal / Main Switch		A12	A8	A7	B1
OFF	ON		○	○	○
	OFF		○	○	
UP	ON	○	○		
	OFF	○	○		
DOWN	ON	○		○	
	OFF	○		○	

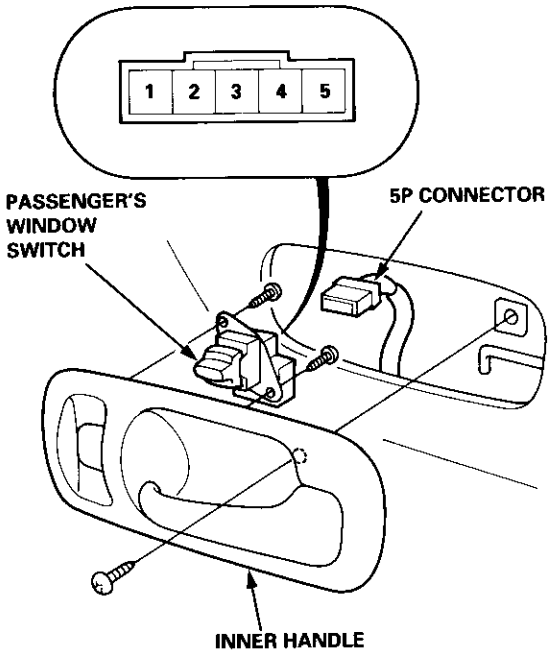
Switch Light: '99 – 00 models

Position \ Terminal	C1		C2
Under all conditions	○	⏦ ▷| (LED)	○

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Passenger's Window Switch Test

1. Remove the inner handle (see section 20).
2. Disconnect the 5P connector then remove the two mounting screws from the passenger's switch.



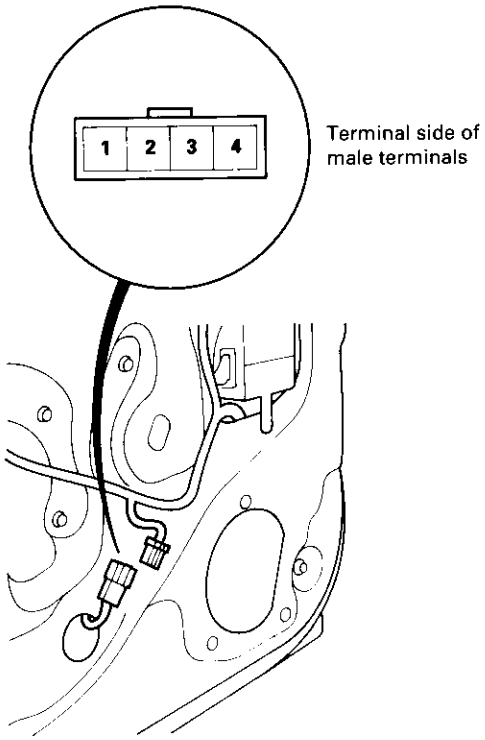
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	3	4	5
UP	○			○	
OFF		○	○	○	○
DOWN	○		○		

Driver's Window Motor Test

Motor Test:

1. Remove the driver's door panel, and disconnect all connectors (see section 20).
2. Disconnect the 4P connector from the window motor.



3. Test the motor in each direction by connecting battery power and ground according to the table. When the motor stops running, disconnect one lead immediately.

Direction \ Terminal	1	2
UP	⊖	⊕
DOWN	⊕	⊖

4. If the motor does not run at all or does not run smoothly, replace it.

Pulser Test:

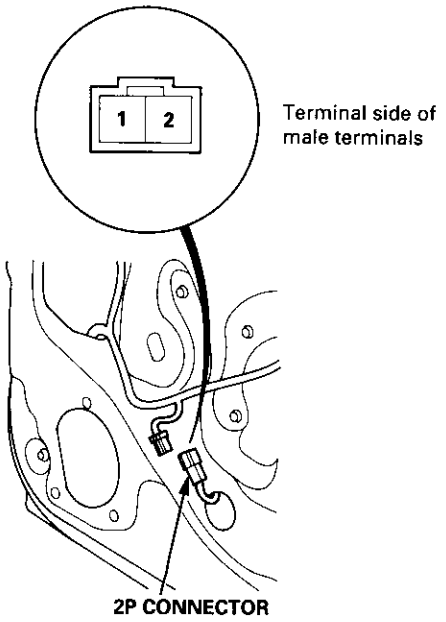
5. Connect the test leads of an analog ohmmeter to the No. 3 and No. 4 terminals.
6. Run the motor by connecting power and ground to the No. 1 and No. 2 terminals. The ohmmeter needle should move back and forth alternately.

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Passenger's Window Motor Test

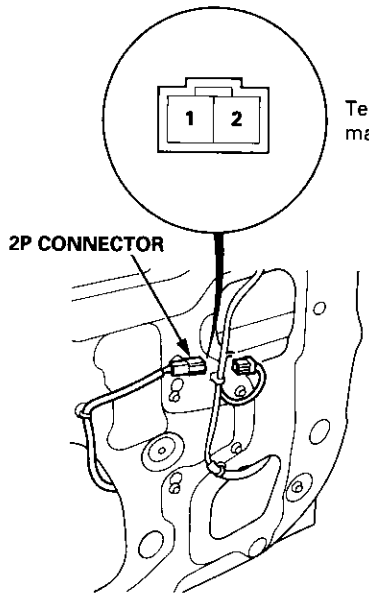
Front:

1. Remove the passenger's door panel, and disconnect all the connectors (see section 20).
2. Disconnect the 2P connector from the window motor.



Rear:

1. Remove the passenger's door panel, and disconnect all the connectors (see section 20).
2. Disconnect the 2P connector from the window motor.



3. Check window motor operation by connecting power and ground according to the table. When the motor *stops running, disconnect one lead immediately.*

Front:

Terminal / Direction	1	2
UP	⊕	⊖
DOWN	⊖	⊕

Rear:

Terminal / Direction	1	2
UP	⊖	⊕
DOWN	⊕	⊖

4. If the motor does not run at all or does not run smoothly, replace it.

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Restraints

Seat Belts 24-1
Supplemental Restraint System (SRS) 24-13

Seat Belts

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Rear Seat Belt Replacement 24-6
Inspection 24-9
Child Seat Tether Anchor Installation — '97 – 99 Models 24-10
Child Seat Tether Anchor Removal/Installation — '00 Model 24-11

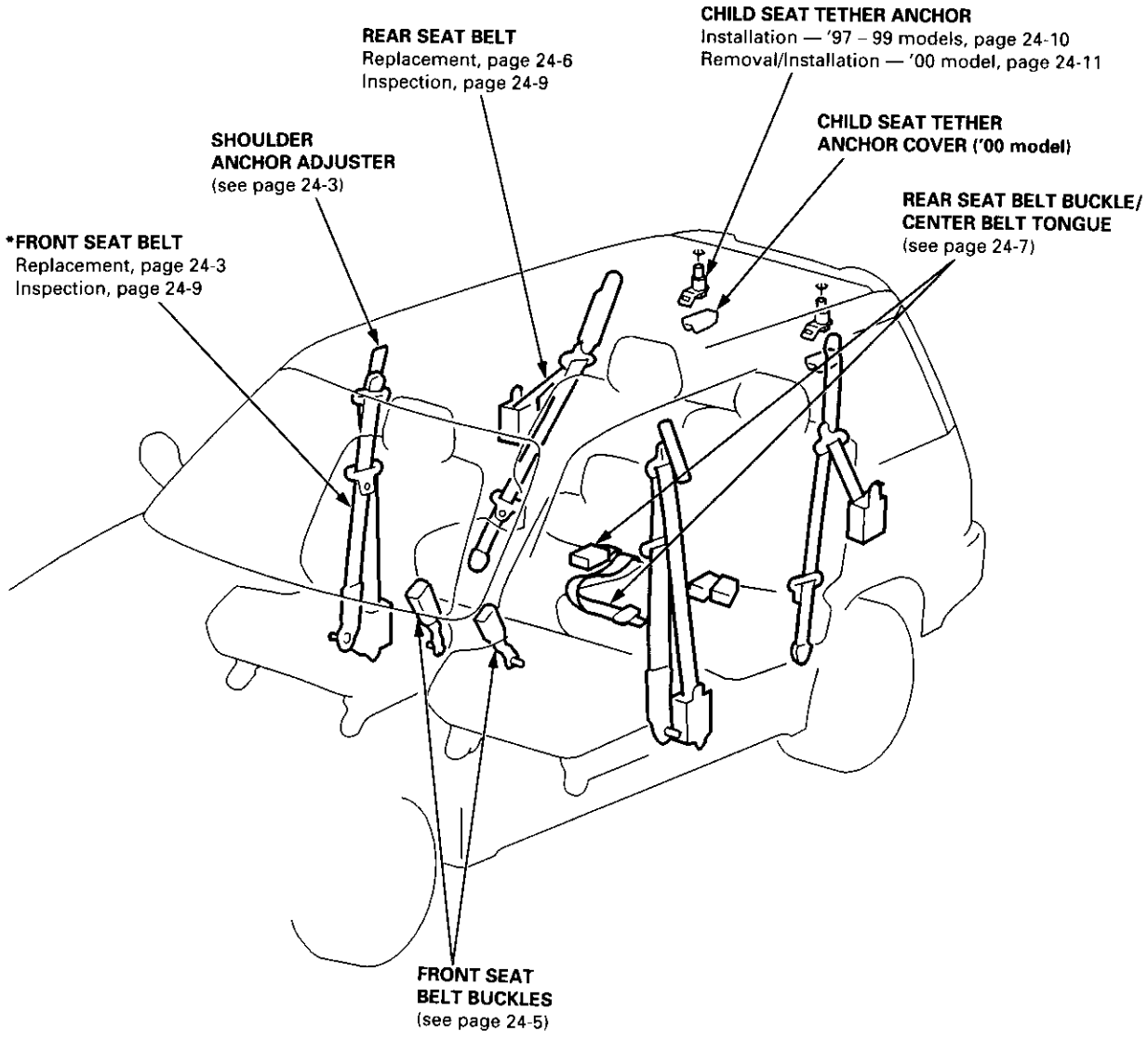


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Seat Belts

Component Location Index

SRS components are located in the parts areas marked with an asterisk (*). Review the SRS component locations, precautions, and procedures in this section (24) before performing repairs or service ('98 – 00 models).



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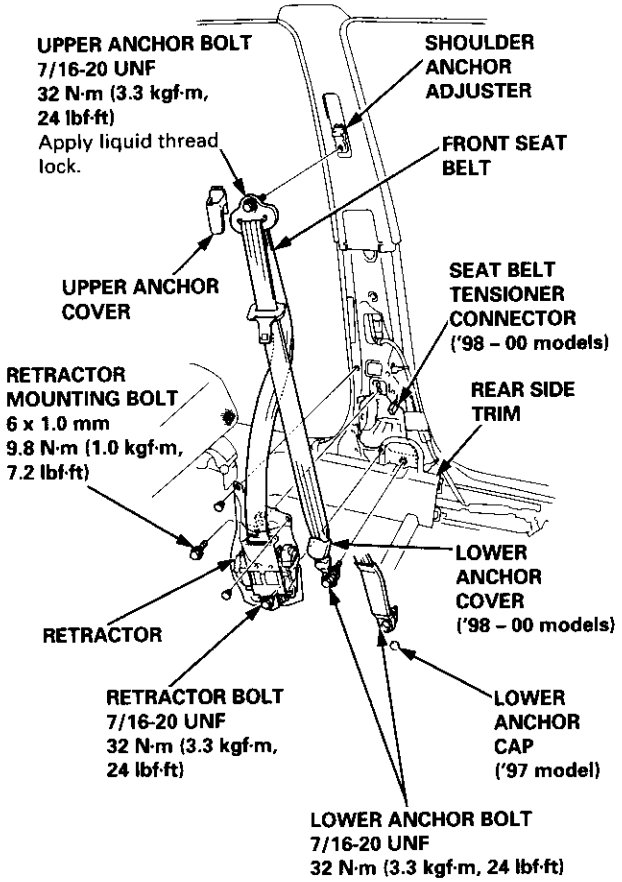
Front Seat Belt Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in this section (24) before performing repairs or service ('98 – 00 models).

CAUTION: Check the front seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

Front seat belt:

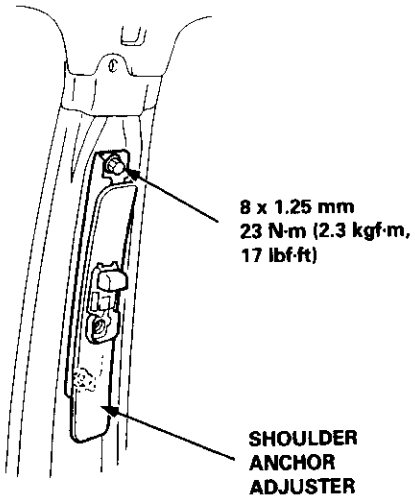
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the preset buttons.
2. Disconnect the negative battery cable, and wait at least three minutes before beginning work.
3. Slide the front seat forward fully.
4. Remove (see section 20):
   - Center pillar lower trim panel
   - Kick panel
   - Front side trim
5. '97 model: Remove the upper anchor cover and the lower anchor cap.
   '98 – 00 models: Remove the upper anchor cover and pull the lower anchor cover back.



6. Disconnect the seat belt tensioner connector.

⚠ WARNING To avoid accidental deployment and possible injury, always disconnect the seat belt tensioner connector before removing the retractor ('98 – 00 models, see page 24-23).

7. Remove the upper and lower anchor bolts, the retractor bolt, the retractor mounting bolt, and remove the front seat belt and retractor.
8. Remove the center pillar upper trim (see section 20).
9. Remove the shoulder anchor adjuster.



10. Installation is the reverse of the removal procedure.

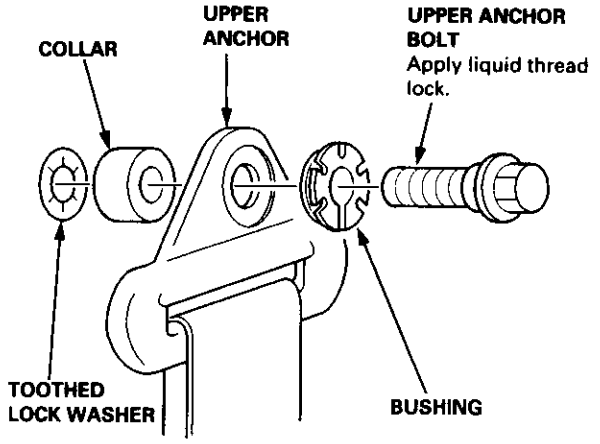
NOTE:
- Check that the retractor locking mechanism functions as described on page 24-9.
- Assemble the washers, collar and bushing on the upper and lower anchor bolts as shown.
- Before installing the anchor bolts, make sure there are no twists or kinks in the front seat belt.
- Make sure the seat belt tensioner connector is connected securely.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

(cont'd)

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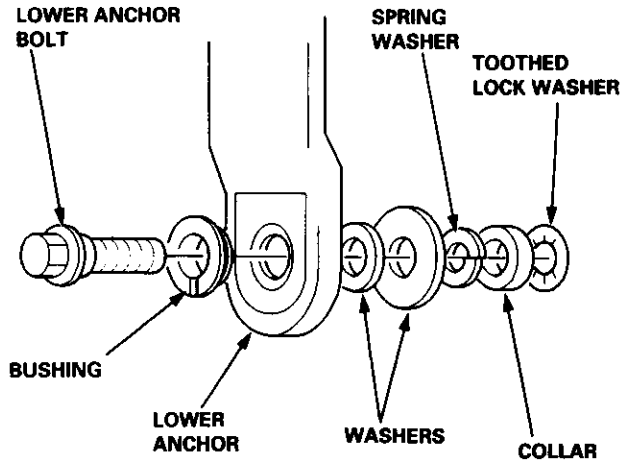
Front Seat Belt Replacement (cont'd)

Upper anchor bolt construction:

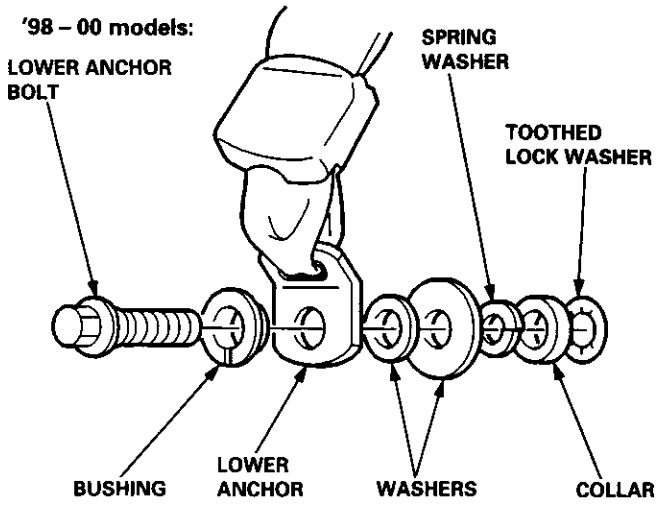


Lower anchor bolt construction:

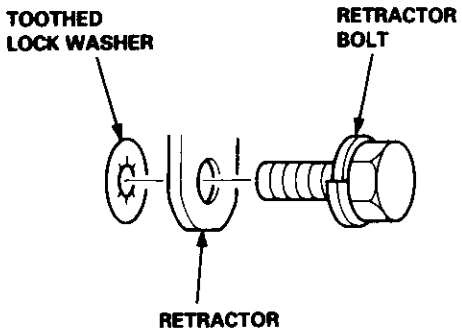
'97 model:



'98 – 00 models:



Retractor bolt construction:

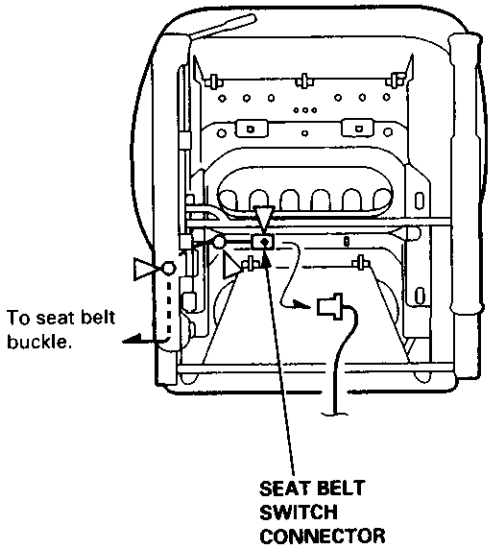


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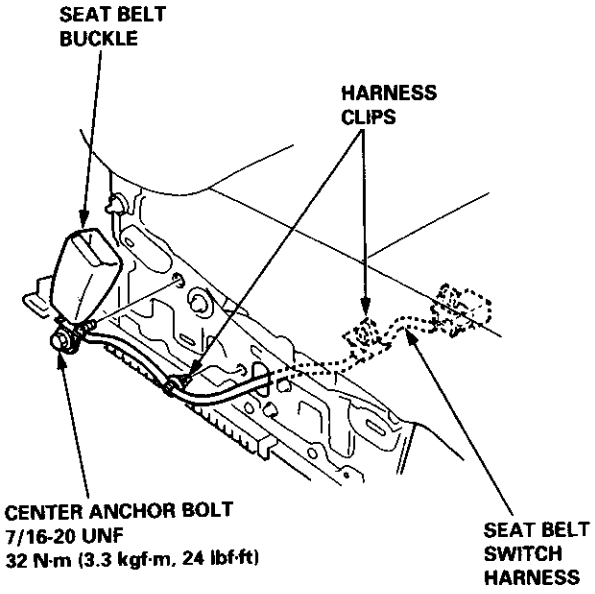
Seat belt buckle:

1. Slide the front seat forward fully.
2. Remove the center cover (see section 20).
3. Driver's: Disconnect the seat belt switch connector, and detach the harness clips from the seat cushion frame.

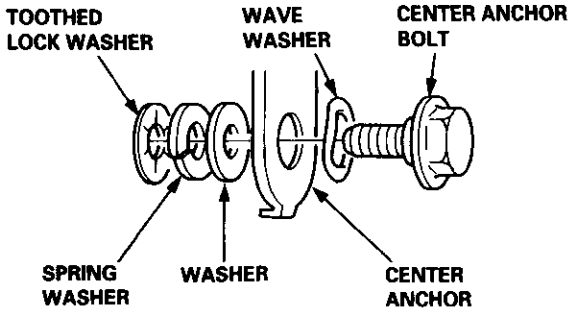
   ▷: **Clip locations**



4. Remove the center anchor bolt, then remove the seat belt buckle. Pull out the seat belt switch harness (with seat belt switch).



Center anchor bolt construction:



5. Installation is the reverse of the removal procedure.

   NOTE: Assemble the washers on the center anchor bolt as shown.

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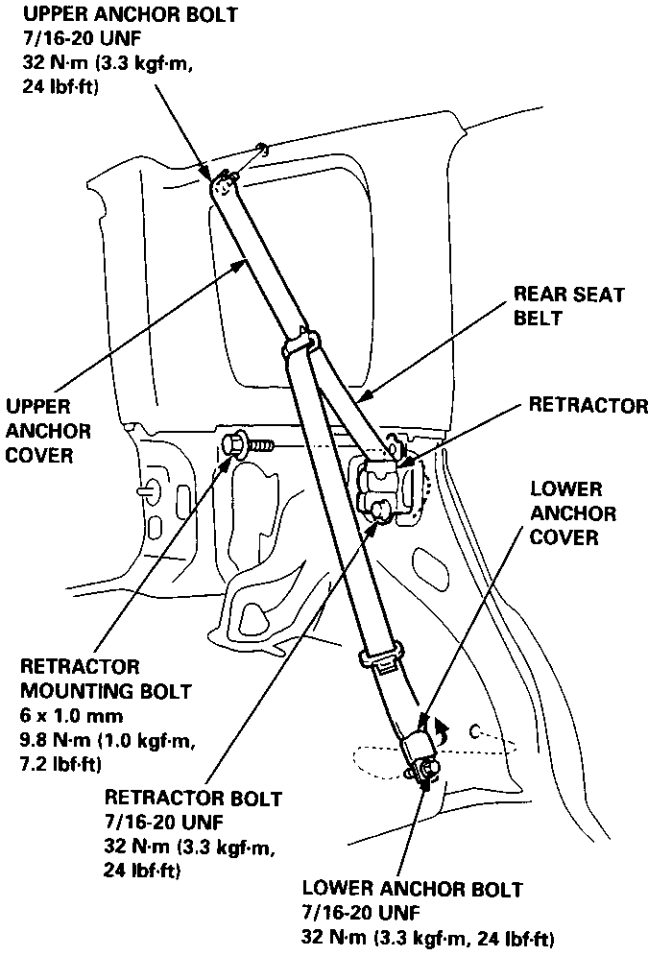
Rear Seat Belt Replacement

CAUTION: Check the rear seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

Rear seat belt:

1. Remove the rear seat (see section 20).

2. Carefully pull on the upper anchor cover and lower anchor cover to remove them.



3. Remove the lower anchor bolt.

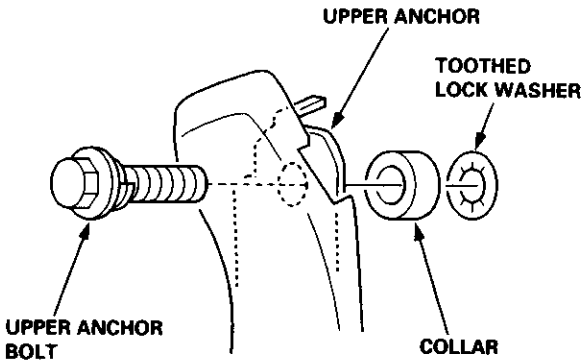
4. Remove (see section 20):
   - Cargo area floor and cargo storage bin
   - Rear trim panel and rear side trim panel

5. Remove the upper anchor bolt, the retractor bolt, the retractor mounting bolt, and remove the rear seat belt and retractor.

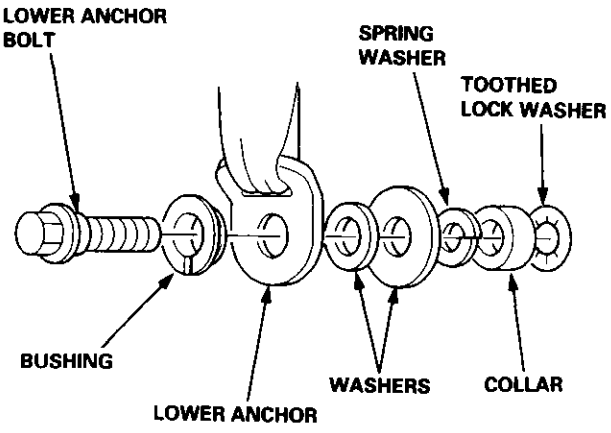
6. Installation is the reverse of the removal procedure.

   NOTE:
   - Check that the retractor locking mechanism functions as described on page 24-9.
   - Assemble the washers, collar and bushing on the lower anchor bolt as shown.
   - Before installing the anchor bolt, make sure there are no twists or kinks in the rear seat belt.

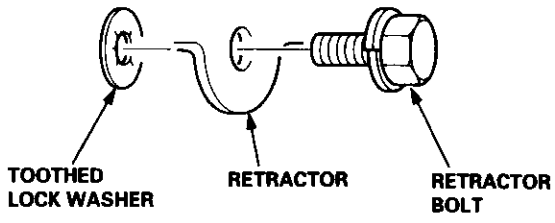
Upper anchor bolt construction:



Lower anchor bolt construction:



Retractor bolt construction:

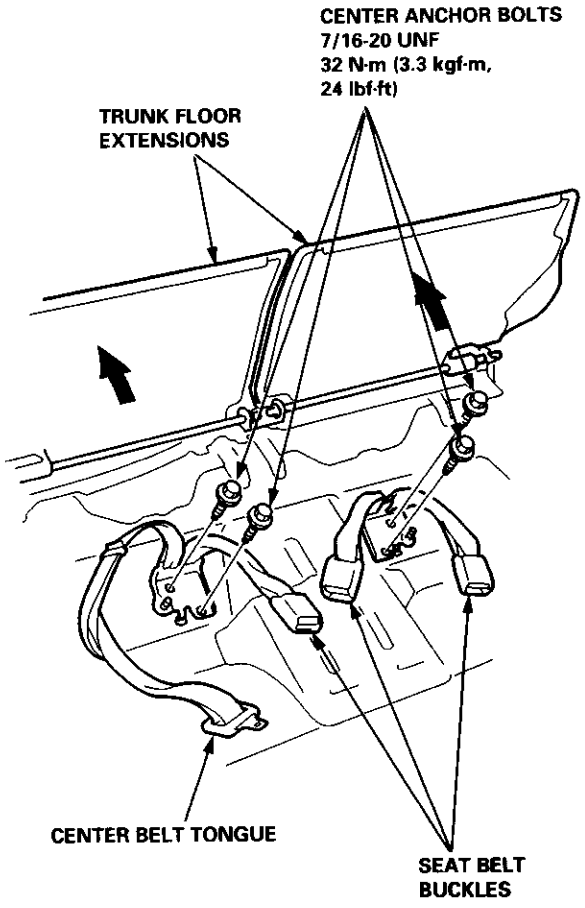


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Seat belt buckles/Center belt tongue:

without tilt:

1. Remove the rear seat on each side.
2. Raise the trunk floor extensions, remove the center anchor bolts, then remove the seat belt buckles and center belt tongue.

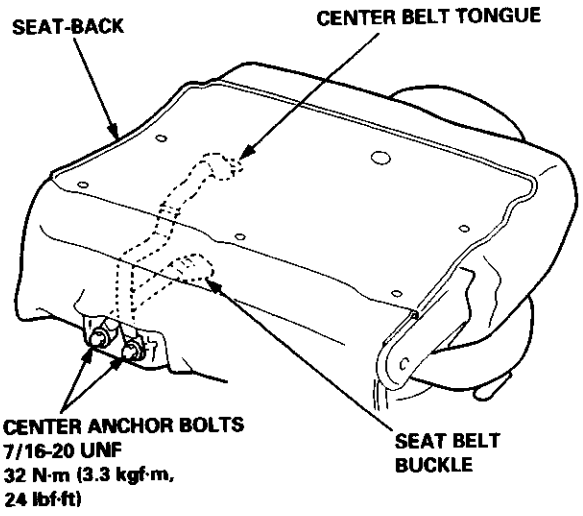


3. Installation is the reverse of the removal procedure.

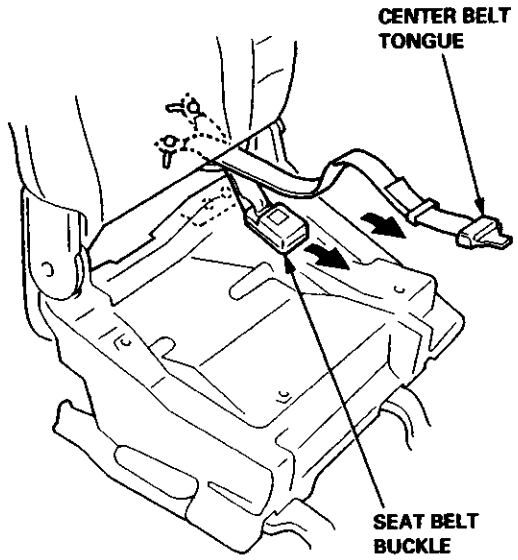
   NOTE: When reinstalling the rear seats, make sure there are no twists or kinks in the center belt tongue and seat belt buckle.

with tilt:

1. Fold the seat-back forward, and tilt the rear seat up.
2. While holding the trunk floor extension up, remove the center anchor bolts.



3. Raise the seat-back, and return the seat to its original position.
4. Remove the center anchor bolts, then remove the center belt tongue and seat belt buckle.



(cont'd)

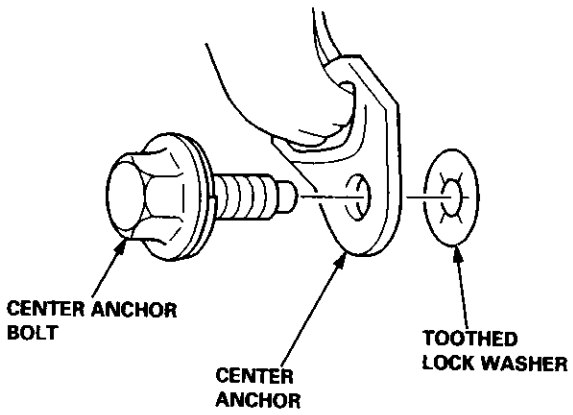
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Rear Seat Belt Replacement (cont'd)

5. Installation is the reverse of the removal procedure.

   NOTE: Make sure there are no twists or kinks in the center belt tongue and seat belt buckle.

Center anchor bolt construction:



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Inspection

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in this section (24) before preforming repairs or service ('98 – 00 models).

⚠ WARNING To avoid accidental deployment and possible injury, always disconnect the seat belt tensioner connector before removing the retractor ('98 – 00 models, see page 24-23).

Retractor Inspection

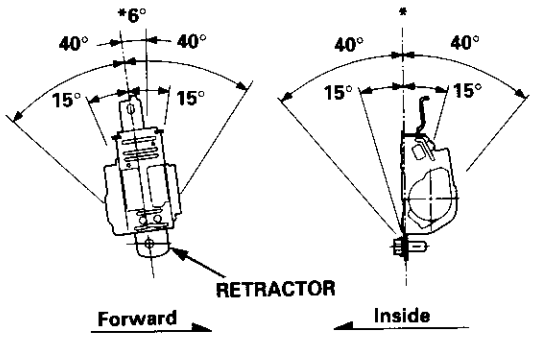
1. Before installing the retractor, check that the seat belt can be pulled out freely.
2. Make sure that the seat belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The seat belt should lock when the retractor is leaned over 40°.

   CAUTION: Do not attempt to disassemble the retractor.

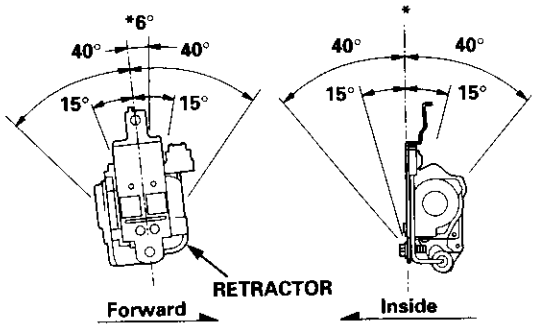
   Front:

   '97 model:

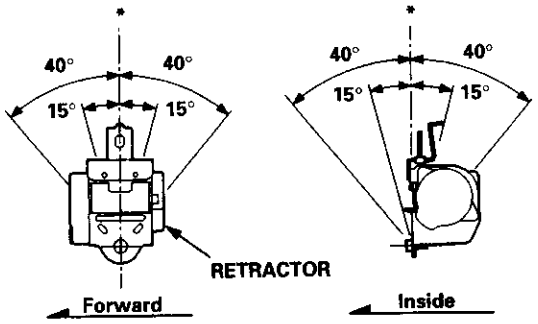
   ***: Mounted Position**



   '98 – 00 models:



   Rear:



3. Replace the seat belt with a new assembly if there is any abnormality. Do not disassemble any part of the seat belt for any reason.

In-vehicle Seat Belt Inspection

1. Check that the seat belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on the anchor bolts. If necessary, remove the anchor bolts, and check that the washers and other parts are not damaged or improperly installed.
3. Check the seat belts for damage or discoloration. Clean with a shop towel if necessary.

   CAUTION: Use only soap and water to clean.

   NOTE: Dirt build-up in the metal loops of the upper anchors can cause the seat belts to retract slowly. Wipe the inside of the loops with a clean cloth dampened in isopropyl alcohol.

4. Check that the seat belt does not lock when pulled out slowly. The seat belt is designed to lock only during a sudden stop or impact.
5. Make sure that the seat belt will retract automatically when released.
6. For each passenger's seat belt, make sure that the locking mechanism in the seat belt retractor will engage when the seat belt is pulled all the way out.
7. Replace the seat belt with a new assembly if there is any abnormality. Do not disassemble any part of the seat belt for any reason.

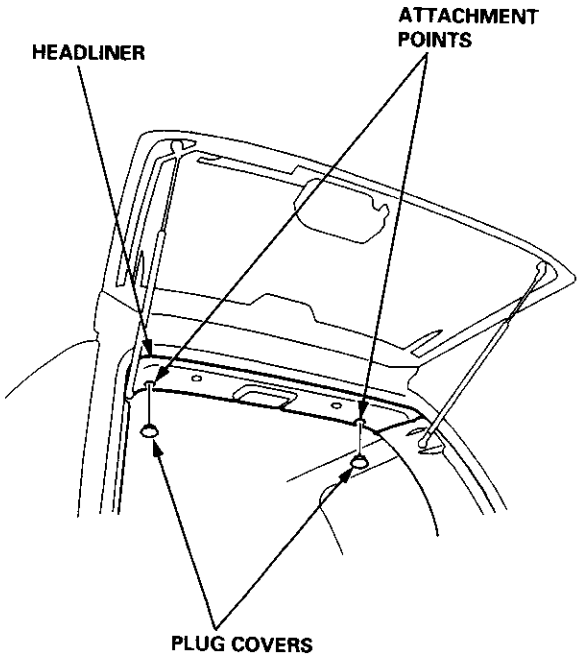
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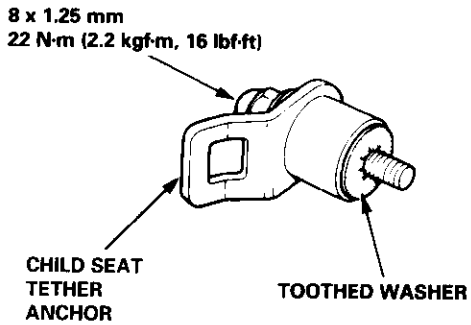
Child Seat Tether Anchor Installation — '97 – 99 Models

Canada model:

Attachment points are provided for a rear seat mounted child restraint system which uses a top tether. The attachment points are located on both rear corners of the headliner, just behind the rear seat-back. When using a child seat with a top tether, install the child seat tether anchor securely.

NOTE: To install a child seat on the rear seat, select the attachment point you want to use, and remove the plug cover from the attachment point of the headliner. Install the child seat tether anchor securely.





NOTE:

- Do not remove the toothed washer from the child seat tether anchor. Use the seat anchor with the toothed washer attached to it.
- When installing a child seat on the rear seat, follow the instructions of the manufacturer of the child seat.
- Additional anchors are available.

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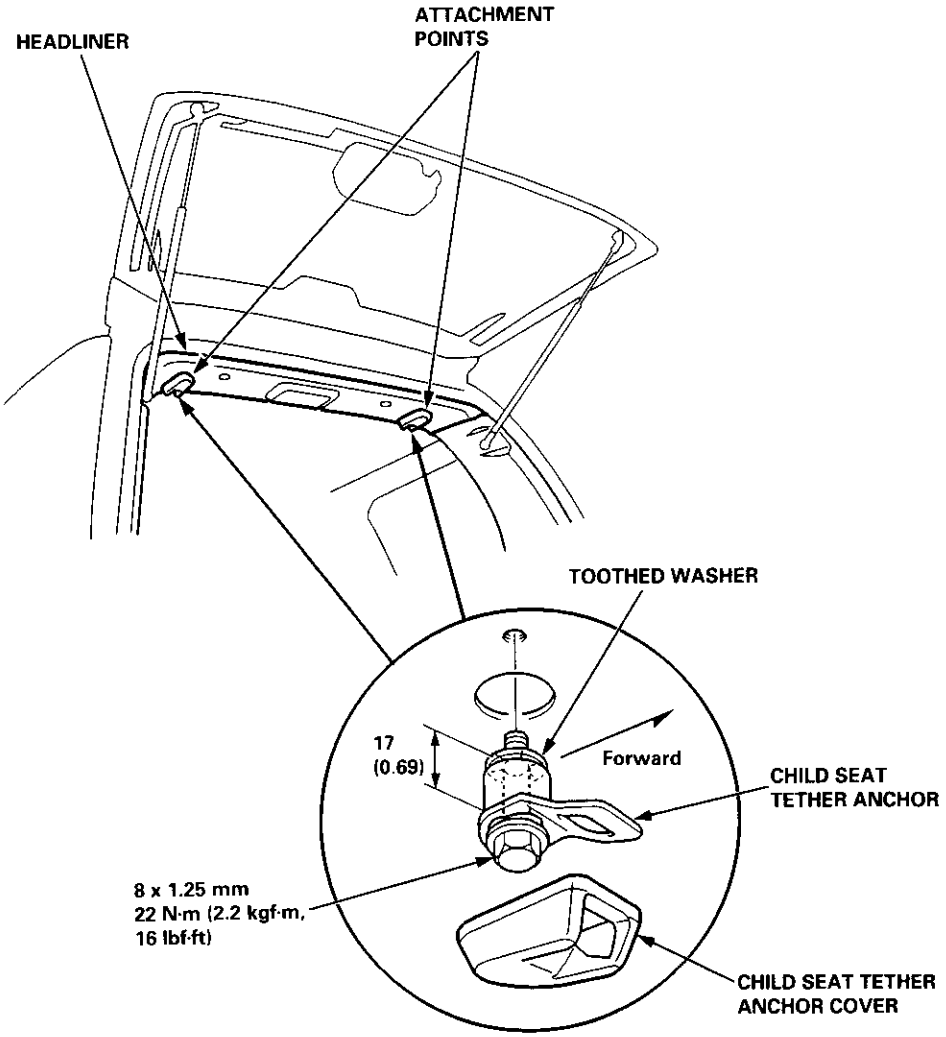
Child Seat Tether Anchor Removal/Installation — '00 Model

Attachment points are provided for a rear seat mounted child restraint system which uses a top tether. The attachment points are located on both rear corners of the headliner, just behind the rear seat-back. The child seat tether anchors are installed into each attachment point. Each child seat tether anchor is covered with a child seat tether anchor cover.

NOTE:

- Do not remove the toothed washer from the child seat tether anchor. Use the anchor with the toothed washer attached to it.
- When installing a child seat on the rear seat, follow the instructions of the manufacturer of the child seat.

Unit: mm (in.)



Supplemental Restraint System (SRS)

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- Disposal 24-97

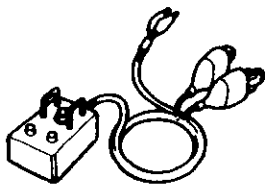


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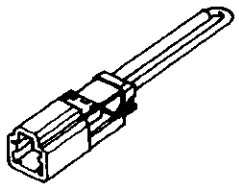
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①*1	07HAZ – SG00500	Deployment Tool	1	24-97
②*1	07PAZ – 0010100	SCS Service Connector	1	24-27
③	07SAZ – TB4011A	SRS Inflator Simulator	1	24-50
④	07TAZ – SZ5011A	SRS Simulator Lead C	1	24-50
⑤*2	07TAZ – 001020A	Backprobe Adapter, 17 mm	2	24-43

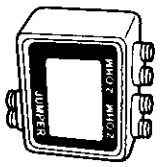
*1: Included in SRS Tool Set 07MAZ – SM5000B
*2: Use with the stacking patch cords from T/N 07SAZ – 001000A, Backprobe Set.



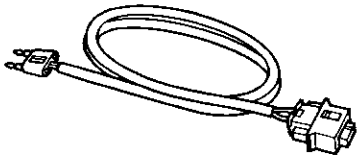
①



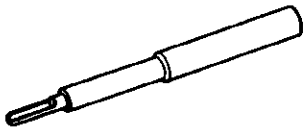
②



③

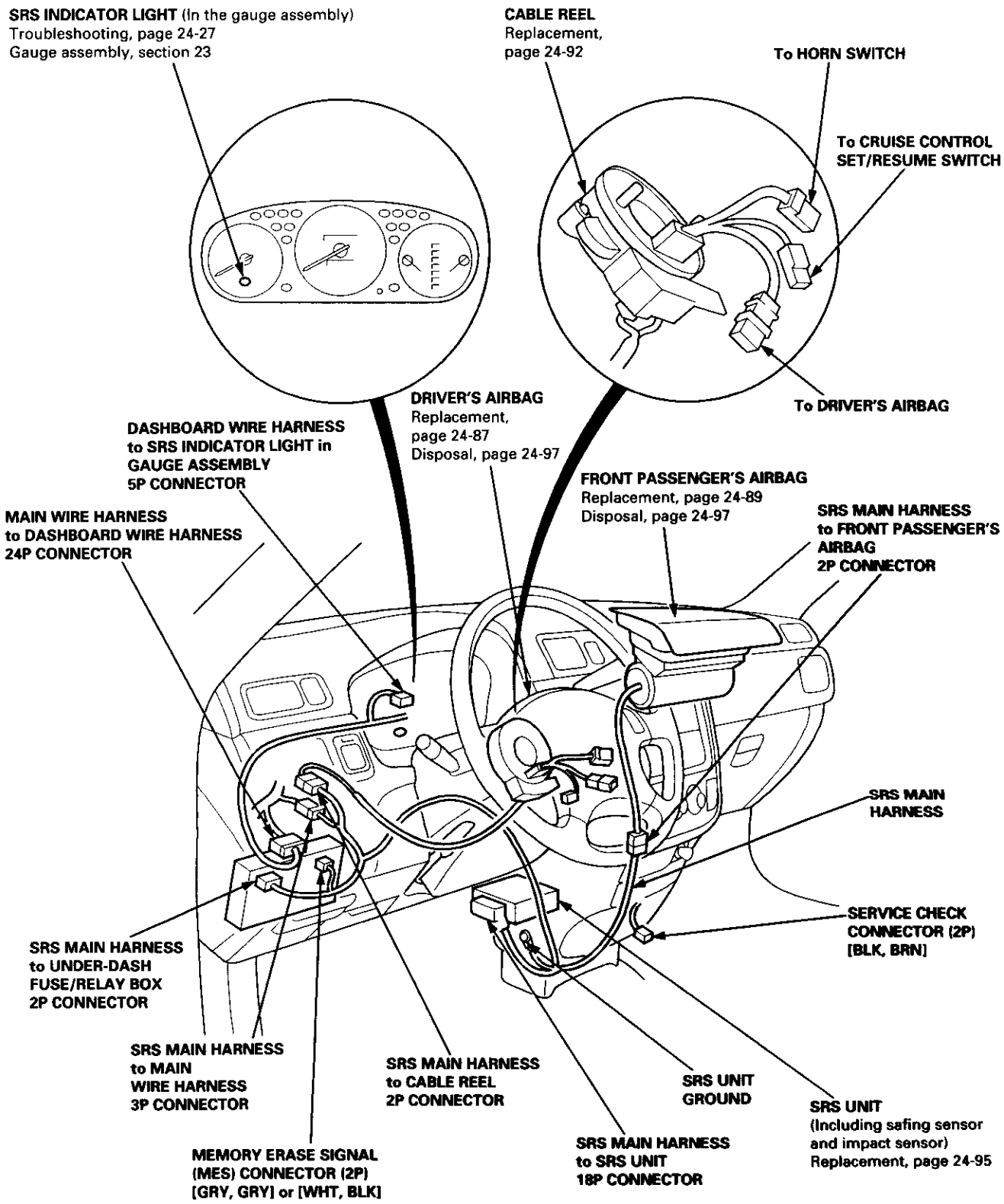


④

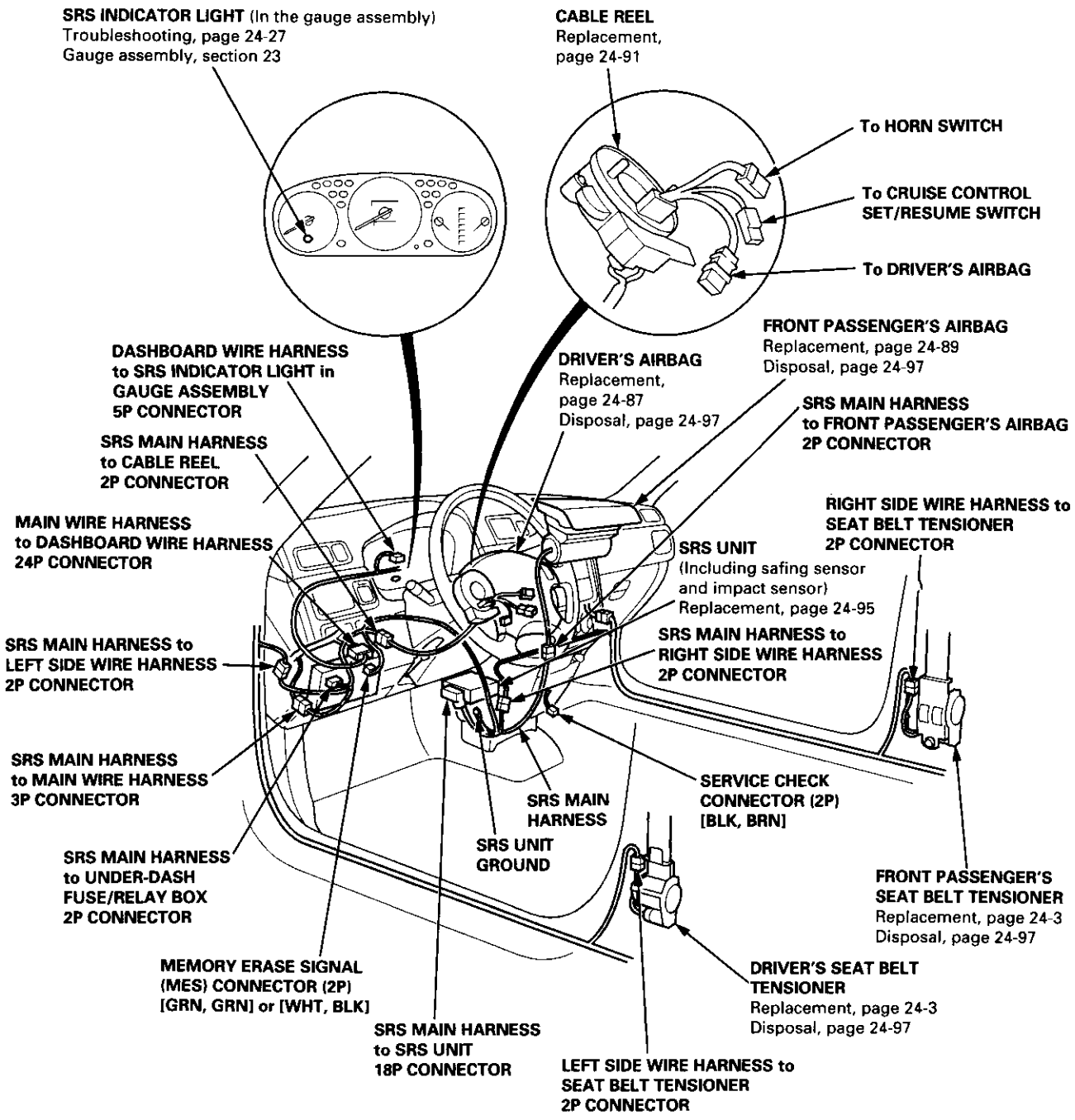


⑤

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SRS INDICATOR LIGHT (In the gauge assembly)
Troubleshooting, page 24-27
Gauge assembly, section 23
CABLE REEL
Replacement, page 24-92
To HORN SWITCH
To CRUISE CONTROL SET/RESUME SWITCH
To DRIVER'S AIRBAG
DRIVER'S AIRBAG
Replacement, page 24-87
Disposal, page 24-97
DASHBOARD WIRE HARNESS to SRS INDICATOR LIGHT in GAUGE ASSEMBLY 5P CONNECTOR
MAIN WIRE HARNESS to DASHBOARD WIRE HARNESS 24P CONNECTOR
FRONT PASSENGER'S AIRBAG
Replacement, page 24-89
Disposal, page 24-97
SRS MAIN HARNESS to FRONT PASSENGER'S AIRBAG 2P CONNECTOR
SRS MAIN HARNESS
SERVICE CHECK CONNECTOR (2P) [BLK, BRN]
SRS MAIN HARNESS to UNDER-DASH FUSE/RELAY BOX 2P CONNECTOR
SRS MAIN HARNESS to MAIN WIRE HARNESS 3P CONNECTOR
SRS MAIN HARNESS to CABLE REEL 2P CONNECTOR
SRS UNIT GROUND
SRS UNIT (Including safing sensor and impact sensor) Replacement, page 24-95
MEMORY ERASE SIGNAL (MES) CONNECTOR (2P) [GRY, GRY] or [WHT, BLK]
SRS MAIN HARNESS to SRS UNIT 18P CONNECTOR

Component/Wiring Locations Index — '98 – 00 models

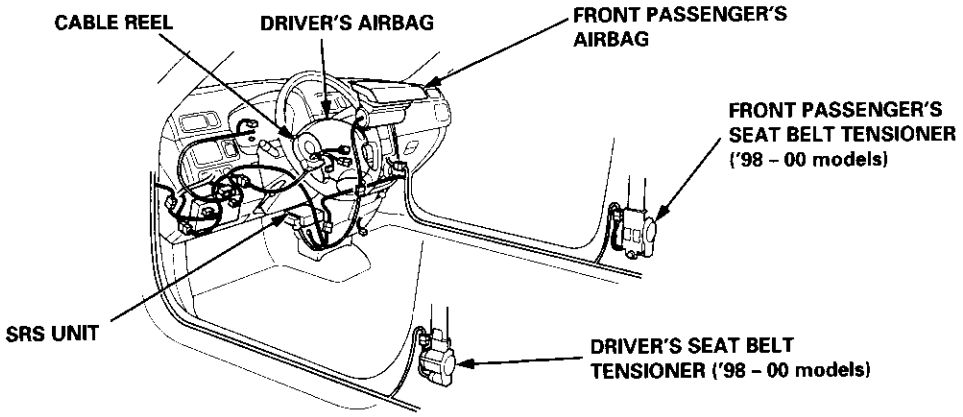


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Description

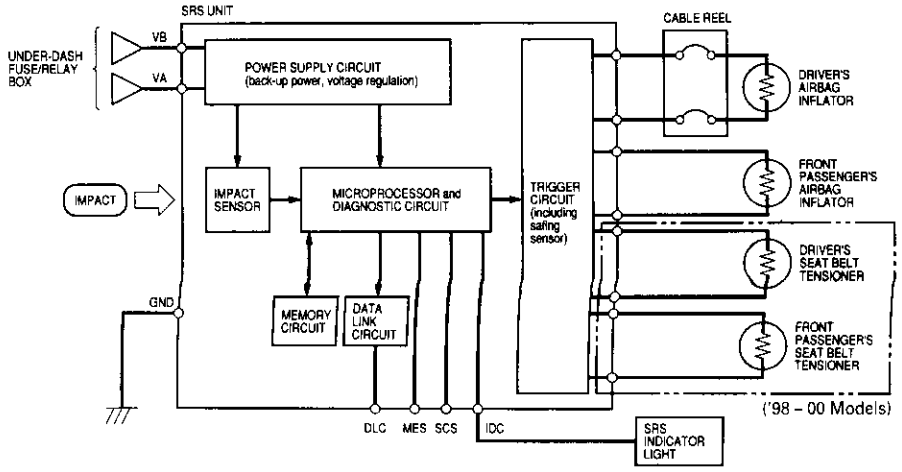
The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of the SRS unit (including safing sensor and impact sensor), the cable reel, the driver's airbag and front passenger's airbag.

Seat Belt Tensioner ('98 – 00 models)
The seat belt tensioner is linked with the SRS airbags to further increase the effectiveness of the seat belt. In a front-end collision, the tensioner instantly retracts the belt firmly to secure the occupants in their seats.



Operation
The main circuit in the SRS unit senses and judges the force of impact and, if necessary, ignites the inflator charges. If battery voltage is too low or power is disconnected due to the impact, the voltage regulator and the back-up power circuit respectively will keep voltage at a constant level.

For the SRS to operate:
(1) The impact sensor must activate, and send electric signals to the microprocessor.
(2) The microprocessor must compute the signals, and send them to the airbag inflators (and seat belt tensioners).
(3) The inflators must ignite and deploy the airbags (and activate the tensioners).



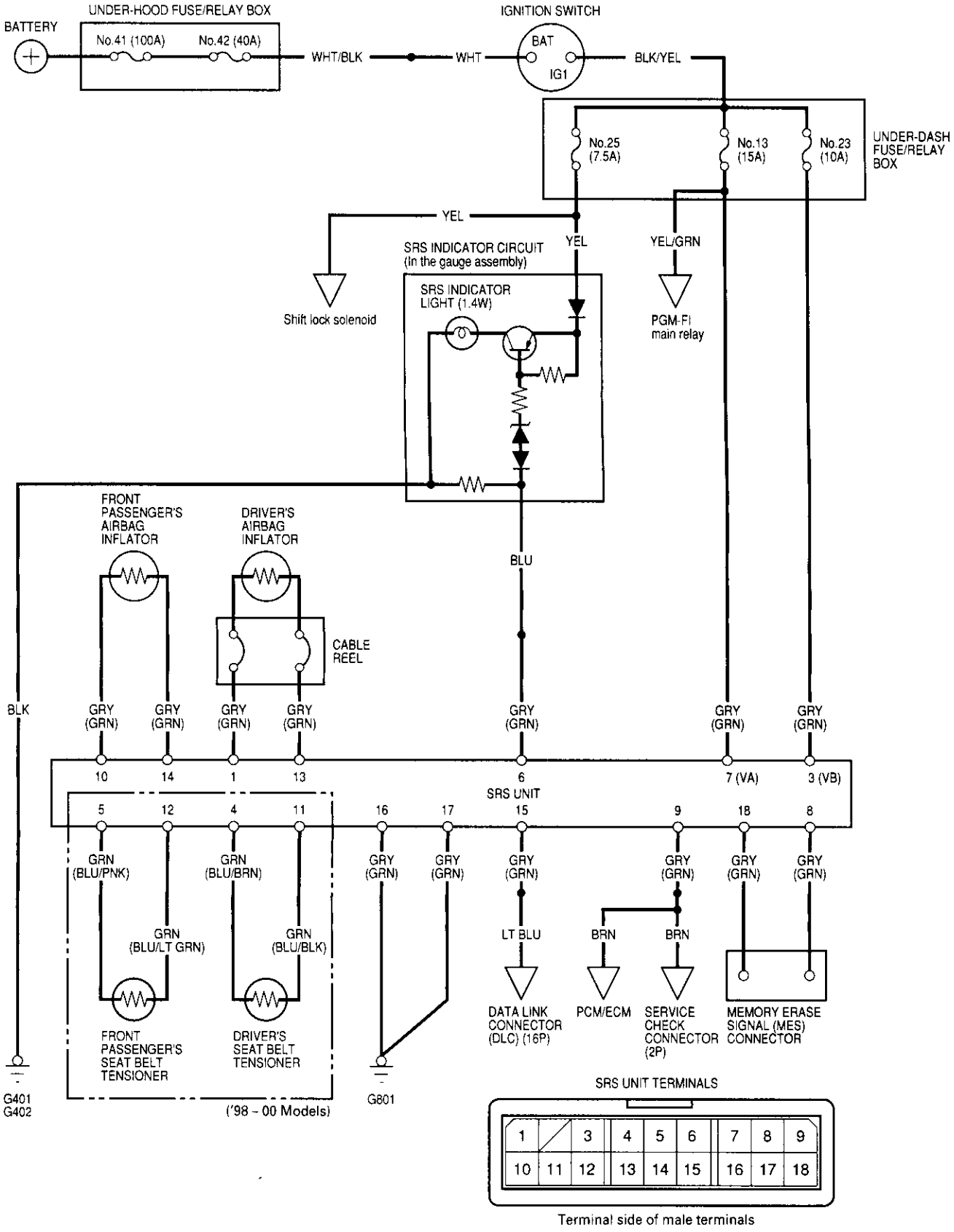
Self-diagnosis System
A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON (II), the SRS indicator light comes on and goes off after about six seconds if the system is operating normally.
If the light does not come on, does not go off after six seconds, or it comes on while driving, it indicates an abnormality in the system. The system must be inspected and repaired as soon as possible.

For battery serviceability, the memory will store the cause of the malfunction, and the data link circuit passes on the information from the memory to the data link connector (DLC). This information can be read with the Honda PGM Tester connected to the DLC (16P).

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Circuit Diagram

NOTE: The SRS main harness uses all GRY ('97 model) or GRN ('98 – 00 models) wires.

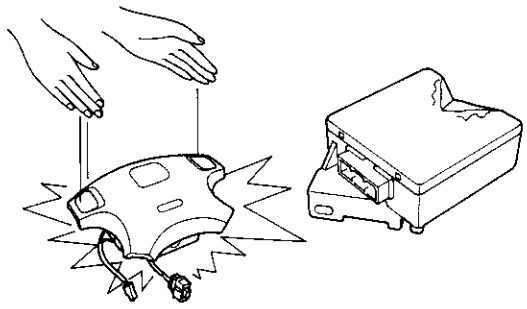


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General Precautions

- Carefully inspect any SRS part before you install it. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:

  — Airbags
  — Cable reel
  — SRS unit
  — Seat belt tensioners



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.

- Do not install used SRS parts from another vehicle. When making SRS repairs, use only new parts.

- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery, and wait at least three minutes before beginning work.

- Replacement of the combination light and wiper/washer switches and cruise control switch can be done without removing the steering wheel:

  — Combination light and wiper/washer switch replacement (see section 23).
  — Cruise control set/resume switch replacement (see section 4).

- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

- Whenever the airbag has been activated, replace the SRS unit.

- The original radio has a coded theft protection circuit. Be sure to get the customer's code number before disconnecting the battery cables.

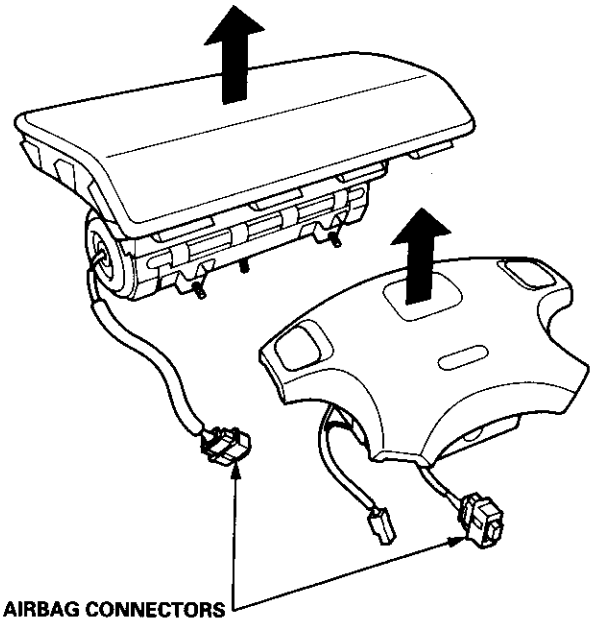
Airbag/Seat Belt Tensioner Handling and Storage

Do not try to disassemble an airbag or a seat belt tensioner. They have no serviceable parts. Once an airbag or a seat belt tensioner have been deployed, they cannot be repaired or reused.

For temporary storage of an airbag or a seat belt tensioner during service, please observe the following precautions:

- Store the removed airbag with the pad surface up. The driver's/front passenger's airbag connectors and seat belt tensioner connectors have a built-in short contact (see page 24-21).

⚠ WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.



AIRBAG CONNECTORS
(With built-in short contact)

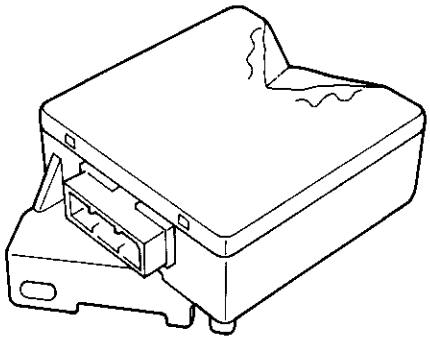
- Store the removed on a secure flat surface away from any high heat source (exceeding 212°F/100°C) and free of any oil, grease, detergent or water.

- Improper handling or storage can internally damage the airbag and seat belt tensioner, making them inoperative.
  If you suspect the airbag and seat belt tensioner have been damaged, install new units and refer to the Deployment/Disposal Procedures for disposing of the damaged units.

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SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding, or spraying equipment.
- Disconnect the driver's/front passenger's airbag connectors and seat belt tensioner connectors before working below the dashboard near the SRS unit.
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 104°F/40°C) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it away from dust.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbags could accidentally deploy and cause damage or injury.

Inspection After Deployment

After a collision in which the airbags were deployed, replace the SRS unit, and inspect the following:

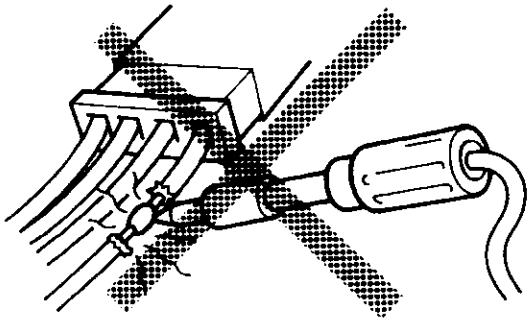
1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the vehicle is completely repaired, turn the ignition switch on. If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.

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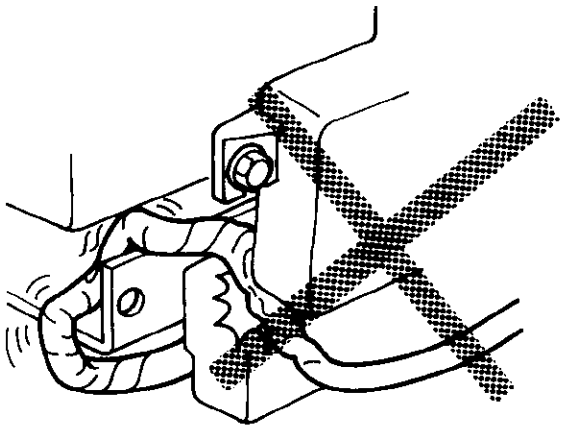
Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring.

  NOTE: SRS wiring can be identified by special yellow outer covering.



- Be sure to install the harness wires so that they are not pinched or interfering with other parts.

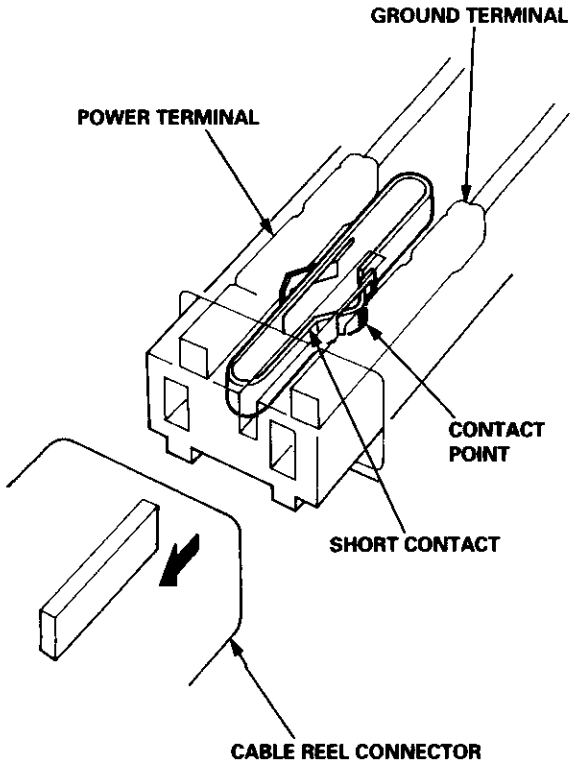


- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

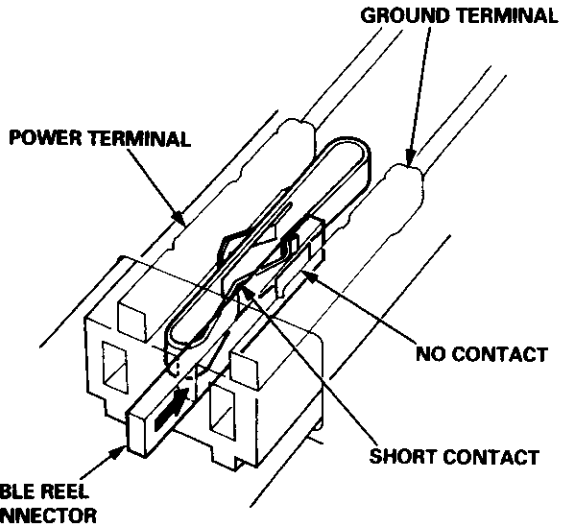
Spring-loaded Lock Connector with Built-in Short Contact

The driver's airbag/front passenger's airbag and seat belt tensioners have a spring-loaded lock connector with a built-in short contact. When this connector is disconnected, the power terminal and the ground terminal in the airbag connector are automatically shorted.

Connector halves disconnected:



Connector halves connected:



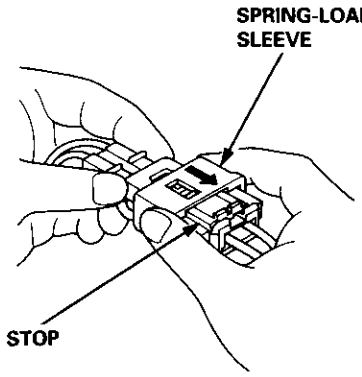
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Spring-loaded Lock Connectors

Some SRS system connectors have a spring-loaded lock.

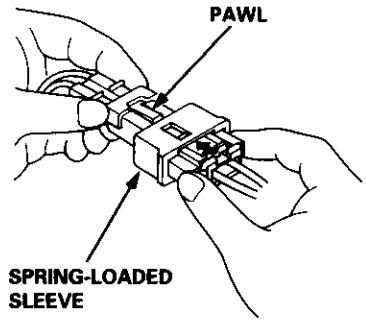
Disconnecting

To release the lock, pull the spring-loaded sleeve toward the stop while holding the opposite half of the connector. Then pull the connector halves apart. Be sure to pull on the sleeve and not on the connector half.

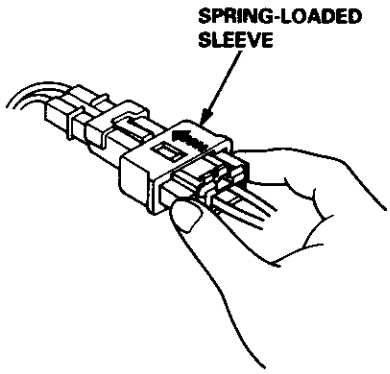


Connecting

1. Hold the pawl-side connector half, and press on the back of the sleeve-side connector half in the direction shown. As the two connector halves are pressed together, the sleeve is pushed back by the pawl. Do not touch the sleeve.

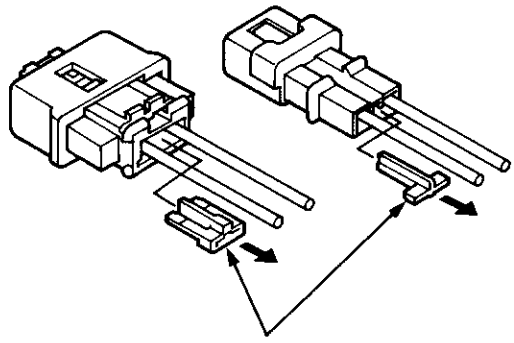


2. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.

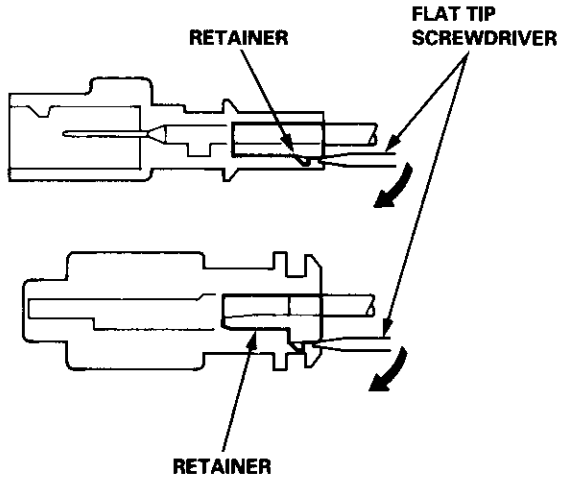


Backprobing Spring-loaded Lock Connectors

- When checking voltage or resistance on this type of connector the first time, it is necessary to remove the retainer to insert the tester probe from the wire side. It is not necessary to reinstall the removed retainer; the terminals will stay locked in the connector housing.



- To remove the retainer, insert a flat-tip screwdriver between the connector body and the retainer, then carefully pry out the retainer. Take care not to break the connector.



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Disconnecting the Airbag Connectors and the Seat Belt Tensioner Connectors

Before removing the airbag or SRS related devices (the SRS unit, the cable reel and the seat belt tensioner connector), disconnecting connectors from related devices, or removing the dashboard or the steering column, disconnect the airbag connectors and seat belt tensioner connectors to prevent accidental deployment.

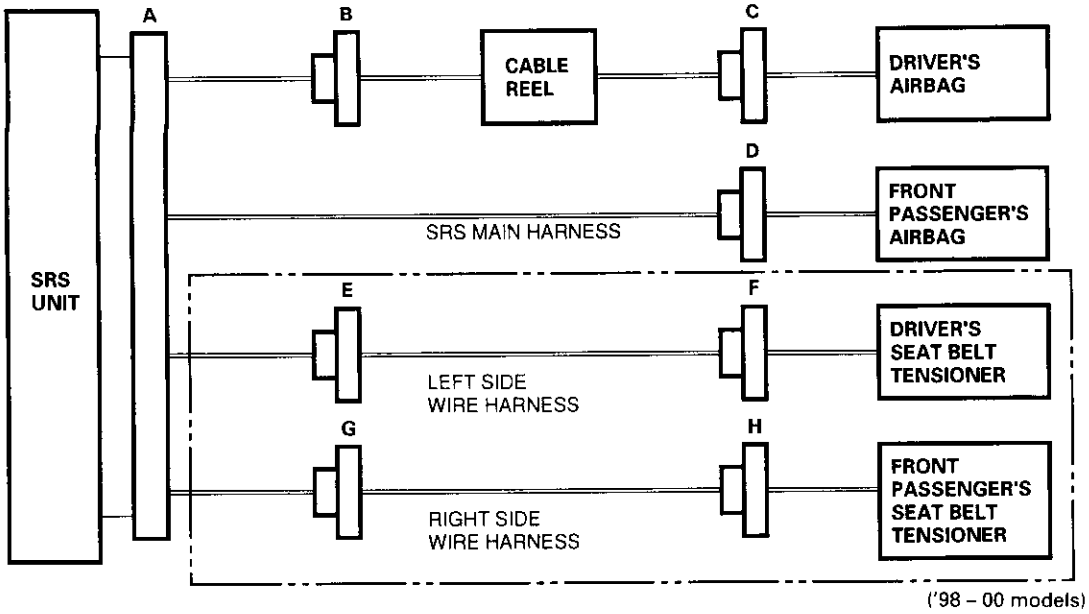
⚠ WARNING Turn the ignition switch OFF and disconnect the negative cable from the battery, and wait at least three minutes before beginning the following procedures A and B. (procedure B follows the procedure A.)

Before disconnecting the SRS main harness from the SRS unit, disconnect both airbags (C, D) and both seat belt tensioners (F, H) ('98 – 00 models).

Before disconnecting the cable reel 2P connector (B), disconnect the driver's airbag connector (C).

Before disconnecting the left side wire harness 2P connector (E), disconnect the driver's seat belt tensioner 2P connector (F) ('98 – 00 models).

Before disconnecting the right side wire harness 2P connector (G), disconnect the front passenger's seat belt tensioner 2P connector (H) ('98 – 00 models).



('98 – 00 models)

(cont'd)

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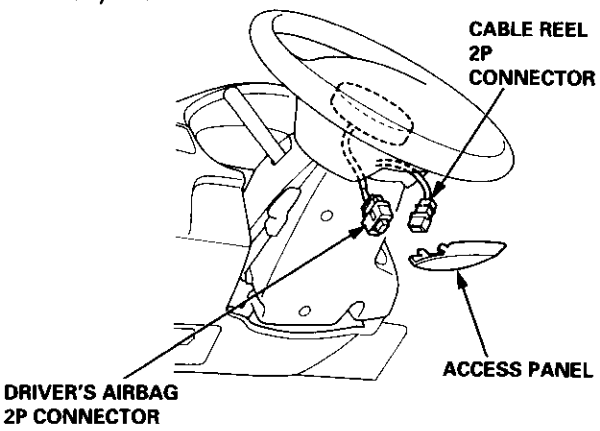
Disconnecting the Airbag Connectors and the Seat Belt Tensioner Connectors (cont'd)

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

2. Disconnect the airbag and tensioner connectors (see page 24-22).

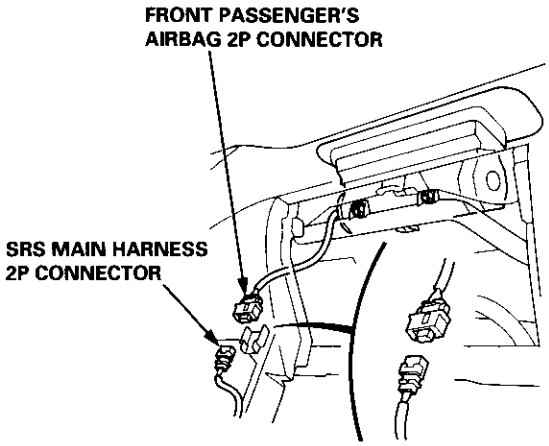
Driver's Airbag:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.



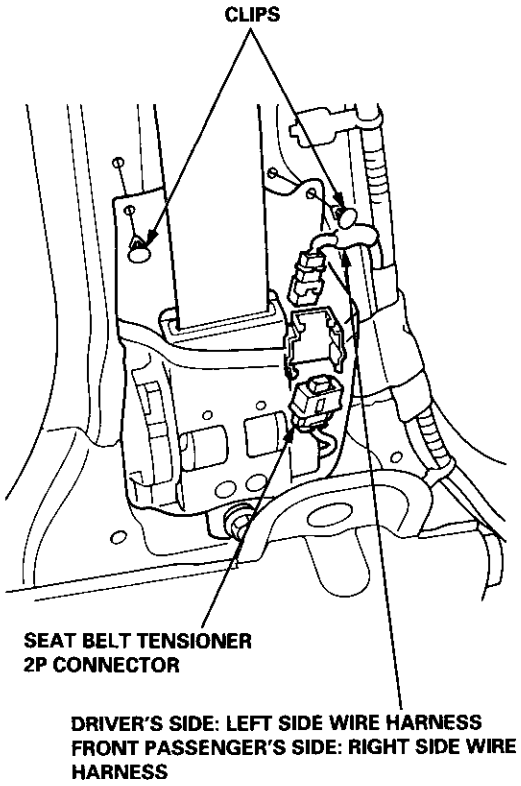
Front Passenger's Airbag:

- Disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.



Seat Belt Tensioner ('98 – 00 models):

- Remove the left and (or) right center pillar lower trim panels (see section 20).
- Disconnect the seat belt tensioner 2P connectors from the left side wire harness (driver's side) and (or) the right side wire harness (front passenger's side). When disconnected, the seat belt tensioner is automatically shorted.

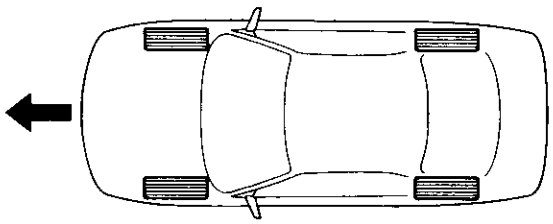


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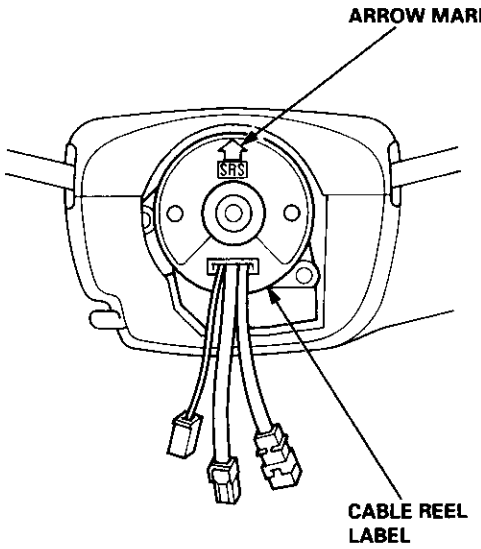
Steering-related Precautions

Steering Wheel and Cable Reel Alignment

To avoid misalignment of the steering wheel on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



To center the cable reel, rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



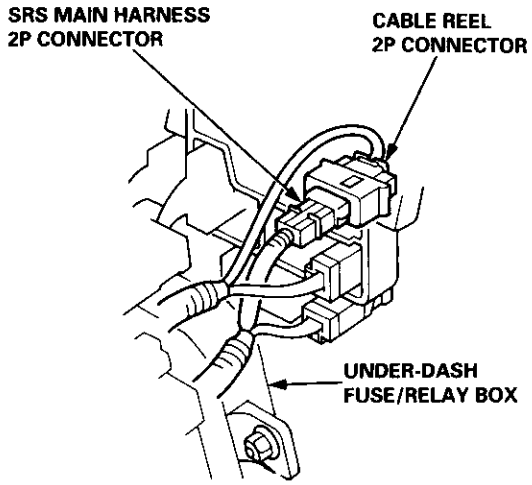
Steering Column Removal

CAUTION: Before removing the steering column, first disconnect the connector between the cable reel and the SRS main harness.
If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to 0-LOCK position, or remove the key from the ignition so that the steering wheel will not turn.

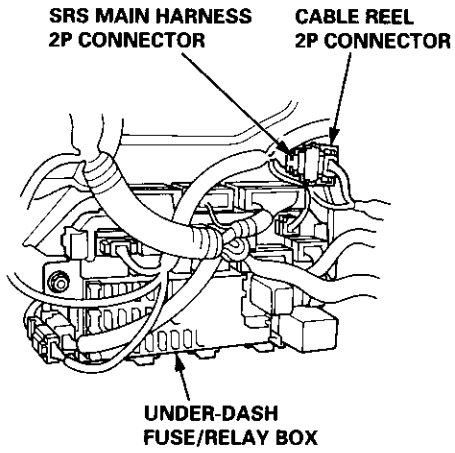
NOTE:

- When the airbag and cable reel are disconnected, and the battery is reconnected and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will come on. In such a case, make sure to confirm the DTC, then clear the SRS unit memory.
- For disconnecting the spring-loaded lock type connector, refer to page 24-22.

'97 model:



'98 – 00 models:



Do not replace the original steering wheel with any other design because it will make it impossible to properly install the airbag (use only genuine Honda replacement parts).

After reassembly, confirm the wheels are still turned straight ahead and that the steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

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Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on. The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.
- When you connect the SCS service connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

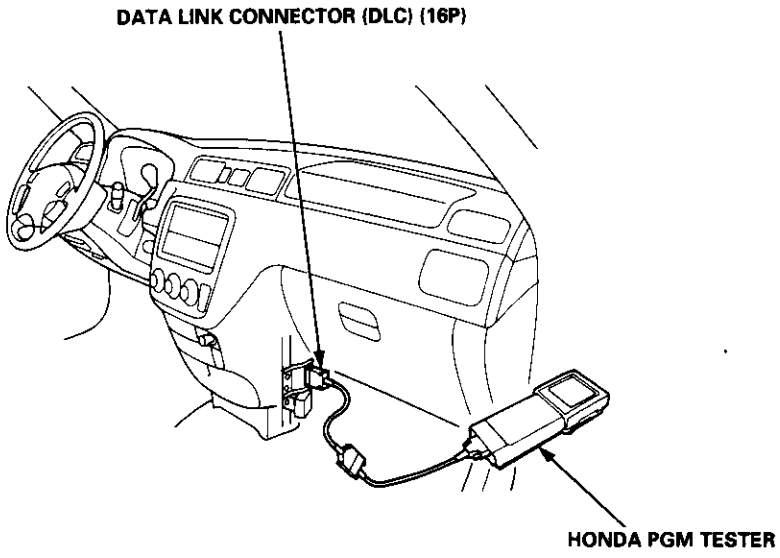
Precautions

- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the airbag and tensioner connectors (see page 24-23).
- Make sure the battery is sufficiently charged (see section 23). If the battery is dead or low, measuring values won't be correct.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the backprobe set and the SCS service connector.
  For backprobing spring-loaded lock type connectors, refer to page 24-22.

Reading the DTC

When the SRS indicator light is on, read the DTC using one of these methods:

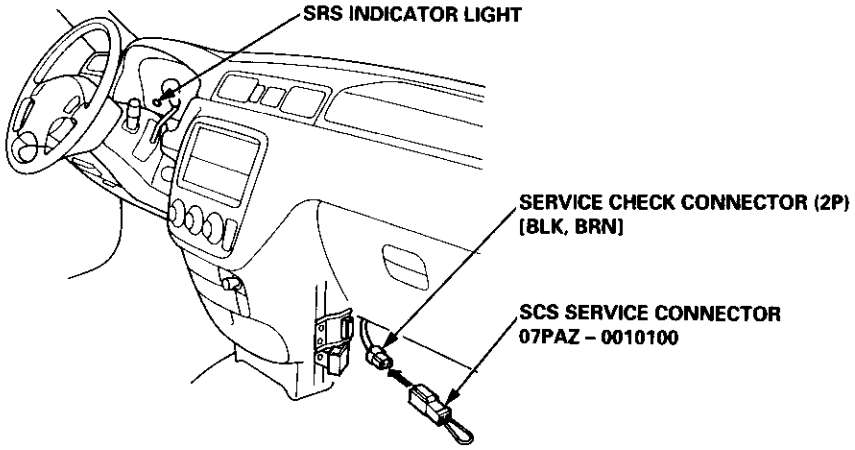
A. Connect the Honda PGM Tester to the 16P Data Link Connector (DLC), and follow the tester's prompts. If the tester indicates no DTC, DTC 9-1 and DTC 9-2, double-check by jumping the service check connector (2P) and watching the SRS indicator light (see next page).



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B. The SRS indicator light can also indicate the DTC by the number of blinks when the SCS service connector is connected to the service check connector (2P).

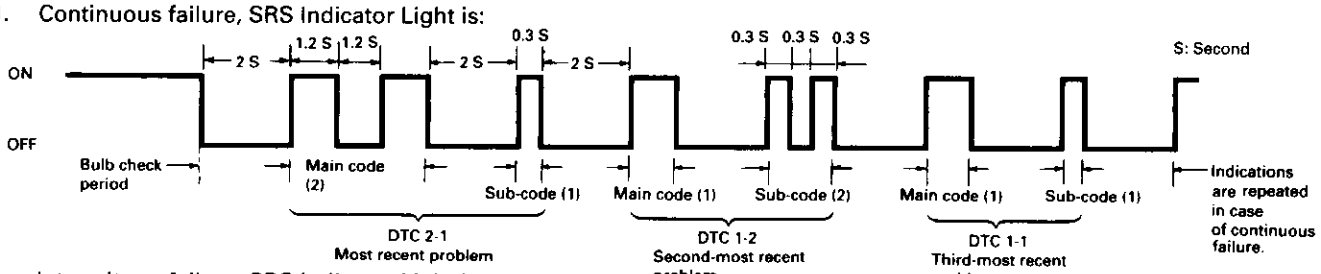
1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS service connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.



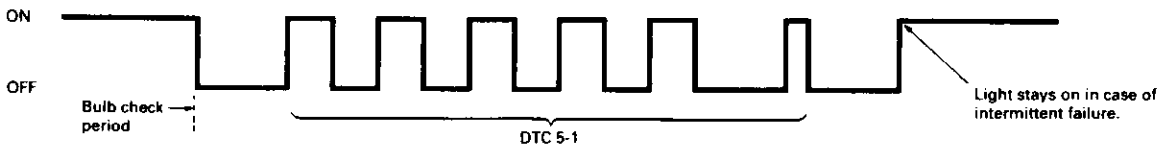
2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six seconds and then goes off. Then it will indicate the DTC:
   — The DTC consists of a main code and a sub-code.
   — Including the most recent problem, up to three different malfunctions can be indicated.
   — In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
   — In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
   — If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
   — In case the system is normal (no DTC), the SRS indicator light will stay on (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS service connector from the service check connector (2P).

Examples of DTC Indications:

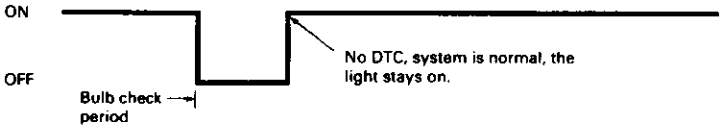
1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



3. Normal (no failure), SRS Indicator Light is:

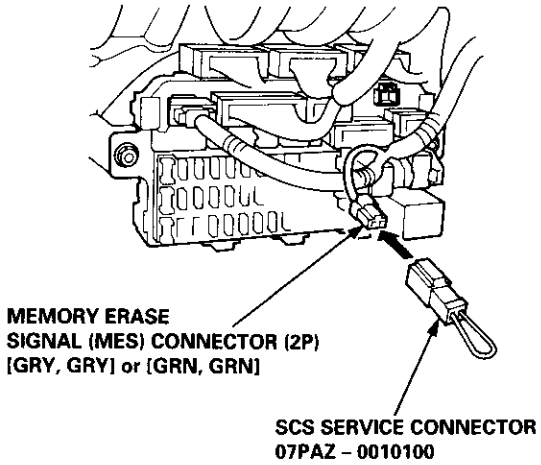


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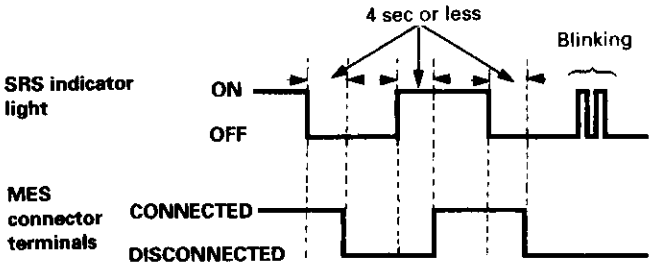
Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS Vehicle System Supplement) or the following procedure.

1. Make sure the ignition switch is OFF.
2. Connect the SCS service connector to the MES connector (2P). Do not use a jumper wire.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and then goes off. Remove the SCS service connector from the MES connector (2P) within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS service connector to the MES connector (2P) within four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS service connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.

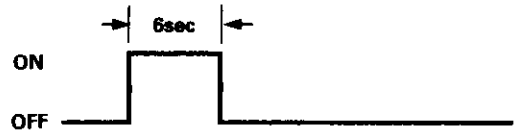


Troubleshooting Intermittent Failures

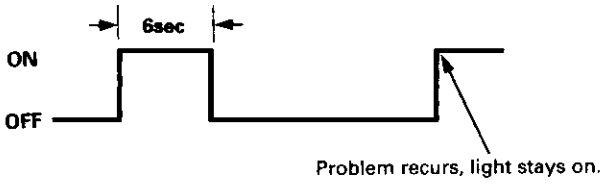
If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. The SRS indicator light comes on for about six seconds and then goes off.



5. Shake the wire harness and the connector, take a test drive (quick acceleration, quick braking, cornering), and turn the steering wheel fully left and right, and hold it there for five to ten seconds to find the cause of the intermittent failure.
   If the problem recurs, the SRS indicator light will stay on.



6. If you can't duplicate the intermittent failure, the system is OK at this time.

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Diagnostic Trouble Code (DTC) Chart — '97 model

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none (doesn't come on)	Faulty SRS indicator light circuit	Troubleshooting	24-34
doesn't go off	none*2 (doesn't go off)	Faulty SRS indicator light circuit, internal failure of SRS unit, faulty SRS power supply	Troubleshooting	24-37
	1-1	Open in the driver's airbag inflator	Troubleshooting	24-50
	1-2	Increased resistance in the driver's airbag inflator		24-50
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-52
	1-4	Short to power in the driver's airbag inflator		24-54
	1-5	Short to ground in the driver's airbag inflator		24-56
	2-1	Open in the passenger's airbag inflator	Troubleshooting	24-58
	2-2	Increased resistance in the passenger's airbag inflator		24-58
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance		24-60
	2-4	Short to power in the passenger's airbag inflator		24-62
	2-5	Short to ground in the passenger's airbag inflator		24-64

(cont'd)

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Diagnostic Trouble Code (DTC) Chart — '97 model (cont'd)

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't go off	5-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	5-2			
	5-3			
	5-4			
	5-5			
	6-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	6-2			
	6-3			
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	8-2			
	8-5			
	8-6	Internal failure of the SRS unit or two failures at a time	Troubleshooting	24-82
	9-1*1*2	Internal failure of the SRS unit	SRS unit replacement	24-96
	9-2	Faulty SRS power supply (VB line)	Troubleshooting	24-84
	10-1	SRS airbags deployed (SRS unit must be replaced)	SRS unit replacement	24-96

*1: In case of an intermittent failure DTC 9-1, it means there was an internal failure of the SRS unit or a faulty SRS indicator light circuit. Do the troubleshooting for intermittent failures (see page 24-28).

*2: DTC cannot be read with a Honda PGM Tester; check by jumping the SCS service connector.

NOTE: Before troubleshooting DTCs 5–1 through 8–5, check battery/system voltage. If voltage is low, repair the charging system before troubleshooting the SRS system.

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Diagnostic Trouble Code (DTC) Chart — '98 – 00 models

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none (doesn't come on)	Faulty SRS indicator light circuit	Troubleshooting	24-34
doesn't go off	none*3 (doesn't go off)	Faulty SRS indicator light circuit, internal failure of SRS unit, faulty SRS power supply (VB line)	Troubleshooting	24-42
	No DTC (light comes on after self-diagnosis)	Faulty SRS power supply (VA line)	Troubleshooting	24-47
	1-1	Open in the driver's airbag inflator	Troubleshooting	24-50
	1-2	Increased resistance in the driver's airbag inflator		24-50
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-52
	1-4	Short to power in the driver's airbag inflator		24-54
	1-5	Short to ground in the driver's airbag inflator		24-56
	2-1	Open in the passenger's airbag inflator	Troubleshooting	24-58
	2-2	Increased resistance in the passenger's airbag inflator		24-58
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance		24-60
	2-4	Short to power in the passenger's airbag inflator		24-62
	2-5	Short to ground in the passenger's airbag inflator		24-64
	3-1	Open in the driver's seat belt tensioner	Troubleshooting	24-66
	3-2	Increased resistance in the driver's seat belt tensioner		24-66
	3-3	Short to another wire in the driver's seat belt tensioner		24-68
	3-4	Short to power in the driver's seat belt tensioner		24-70
	3-5	Short to ground in the driver's seat belt tensioner		24-72
	4-1	Open in the passenger's seat belt tensioner	Troubleshooting	24-74
	4-2	Increased resistance in the passenger's seat belt tensioner		24-74
	4-3	Short to another wire in the passenger's seat belt tensioner		24-76
	4-4	Short to power in the passenger's seat belt tensioner		24-78
	4-5	Short to ground in the passenger's seat belt tensioner		24-80

(cont'd)

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Diagnostic Trouble Code (DTC) Chart — '98 – 00 models (cont'd)

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't go off	5-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	5-3			
	5-4			
	6-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	6-2			
	6-3			
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-96
	8-2			
	8-3			
	8-4			
	8-6			
	9-1*1*3	Internal failure of the SRS unit	SRS unit replacement	24-96
	9-2*2*3			
	10-1	SRS unit replacement code (SRS unit must not be used any longer)	SRS unit replacement	24-96

NOTE:

*1: In case of an intermittent failure DTC 9-1, it means there was an internal failure of the SRS unit or a faulty SRS indicator light circuit. Do the troubleshooting for intermittent failures (see page 24-28).

*2: In case of an intermittent failure DTC 9-2, it means there was an internal failure of the power supply (VB line). Do the troubleshooting for intermittent failures (see page 24-28).

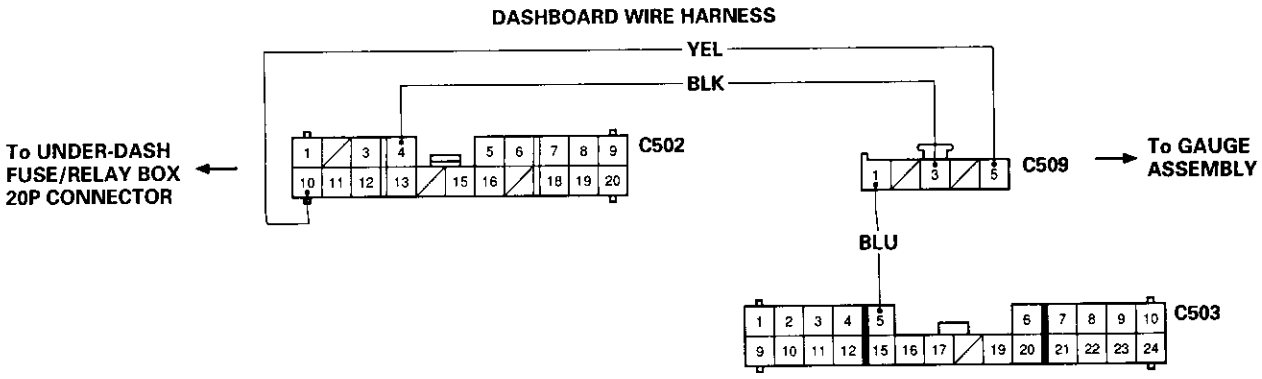
*3: DTC cannot be read with a Honda PGM Tester; check by jumping the SCS service connector.

NOTE: Before troubleshooting DTCs 5-1 through 8-6, check battery/system voltage. If voltage is low, repair the charging system before troubleshooting the SRS system.

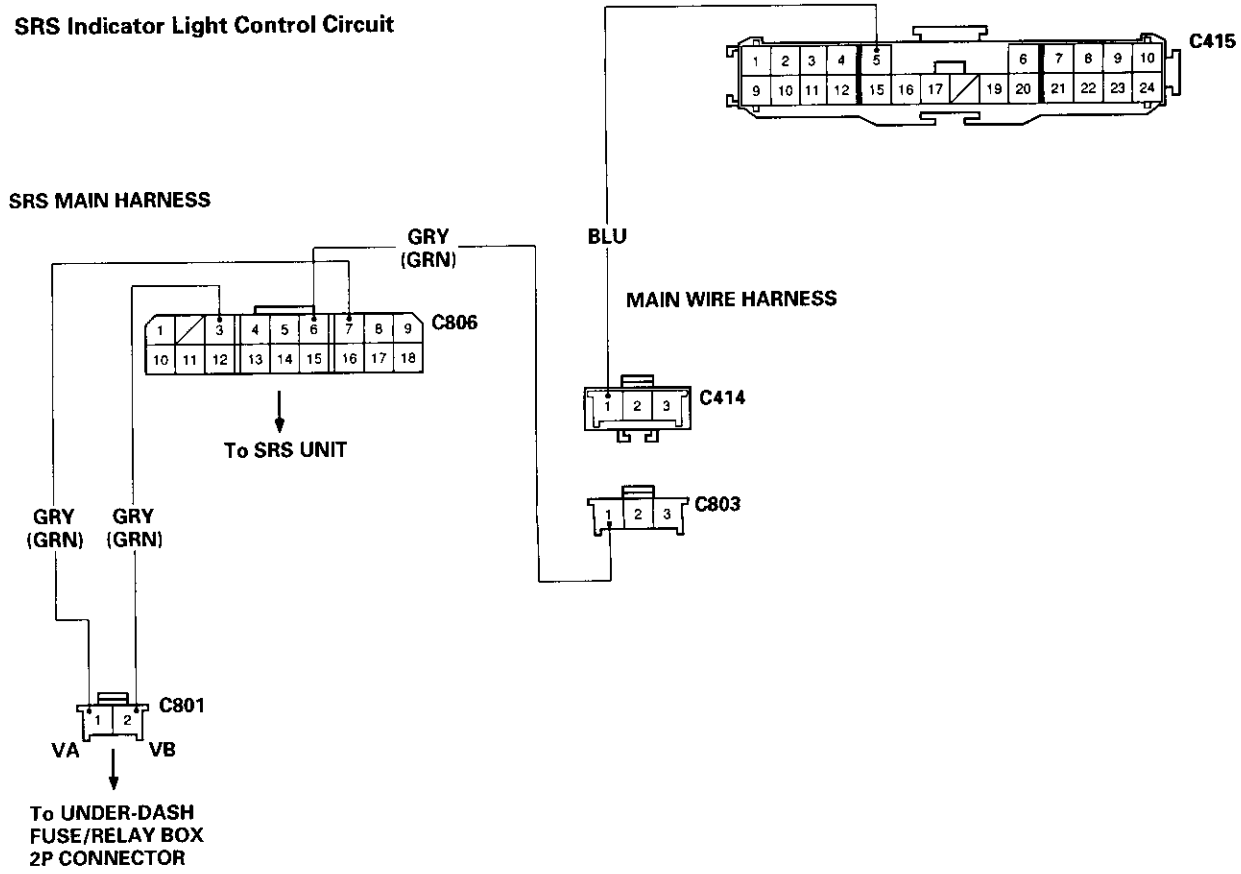
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SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



C414	MAIN WIRE HARNESS 3P CONNECTOR	Terminal side of male terminals
C415	MAIN WIRE HARNESS 24P CONNECTOR	Terminal side of male terminals
C502	DASHBOARD WIRE HARNESS 20P CONNECTOR	Wire side of female terminals
C503	DASHBOARD WIRE HARNESS 24P CONNECTOR	Wire side of female terminals
C509	DASHBOARD WIRE HARNESS 5P CONNECTOR	Wire side of female terminals
C801	SRS MAIN HARNESS 2P CONNECTOR	Wire side of female terminals
C803	SRS MAIN HARNESS 3P CONNECTOR	Wire side of female terminals
C806	SRS MAIN HARNESS 18P CONNECTOR	Wire side of female terminals

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The SRS Indicator Light Doesn't Come On

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the power supply (fuse):
Turn the ignition switch ON (II), and check whether the other indicator lights come on (brake system, etc.).

Do the other indicator lights come on?

YES — NO

Check the fuse:
Check the No. 25 (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES — NO

Check the bulb:
Replace the No. 25 (7.5 A) fuse, and check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES — NO

END

Check the wire harness between fuse and gauge assembly:
Check for an open in the wire harness between fuse No. 25 (7.5 A) and the gauge assembly, and repair. Check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES — NO

END

Check the SRS indicator light bulb:
1. Turn the ignition switch OFF.
2. Remove the gauge assembly.
3. Check for blown SRS indicator light bulb.

Is the SRS indicator light bulb OK?

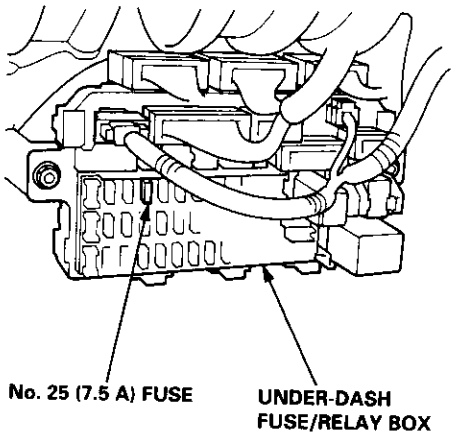
YES — NO

Check the SRS indicator light circuit:
Replace the bulb, and reconnect the gauge assembly connectors. Then turn the ignition switch ON (II).

Does the SRS indicator light come on?

YES — NO

END



(A) To page 24-35

(B) To page 24-35

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From page 24-34
(A)

From page 24-34
(B)

Check the SRS indicator light circuit:
1. Disconnect the dashboard wire harness 5P connector from the gauge assembly.
2. Connect a voltmeter between the No. 1 terminal (+) of the 5P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES

NO

Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.

Check the wire harness of the SRS indicator light circuit (1):
1. Turn the ignition switch OFF.
2. Disconnect the main wire harness 24P connector from the dashboard wire harness.
3. Connect a voltmeter between the No. 5 terminal (+) of the main wire harness 24P connector and ground.
4. Turn the ignition ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

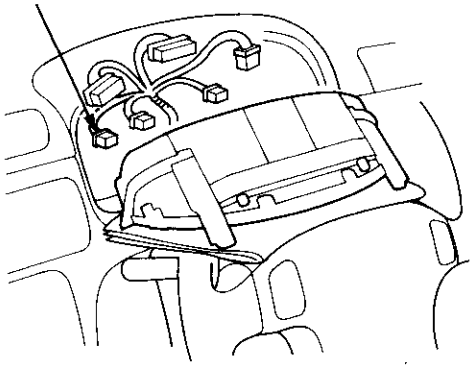
YES

NO

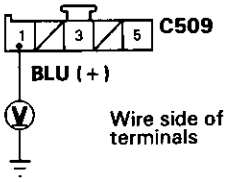
Short to power in the BLU wire of the dashboard wire harness; repair the harness.

To page 24-36

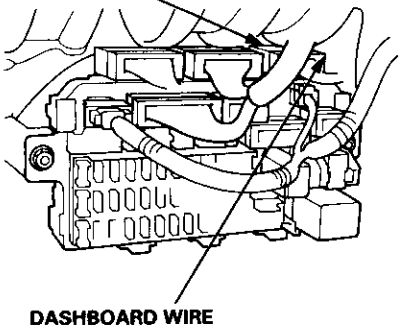
DASHBOARD WIRE HARNESS 5P CONNECTOR



DASHBOARD WIRE HARNESS 5P CONNECTOR

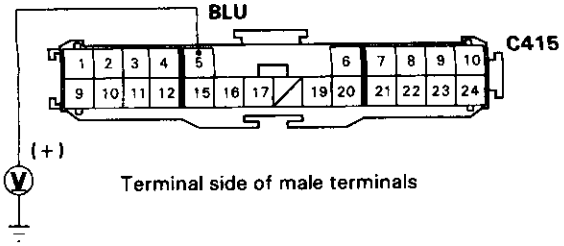


MAIN WIRE HARNESS 24P CONNECTOR



DASHBOARD WIRE HARNESS 24P CONNECTOR

MAIN WIRE HARNESS 24P CONNECTOR



(cont'd)

The SRS Indicator Light Doesn't Come On (cont'd)

From page 24-35

Check the wire harness of the SRS indicator light circuit (2):
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 3P connector from the main wire harness.
3. Connect a voltmeter between the No. 1 terminal (+) of the SRS main harness 3P connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES

NO

Short to power in the BLU wire of the main wire harness; repair the harness.

Check the wire harness of the SRS indicator circuit (3):
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then the positive cable, and wait three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (and disconnect the seat belt tensioner connectors) (see page 24-23).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 6 terminal (+) of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.

Is voltage as specified?

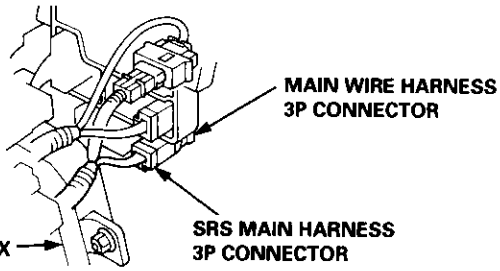
YES

NO

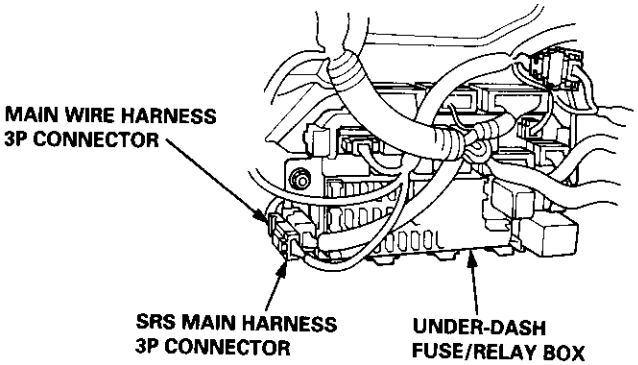
Faulty SRS unit; replace the unit (see page 24-95).

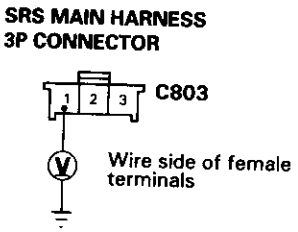
Short to power in the BLU wire of the SRS main harness; replace the harness.

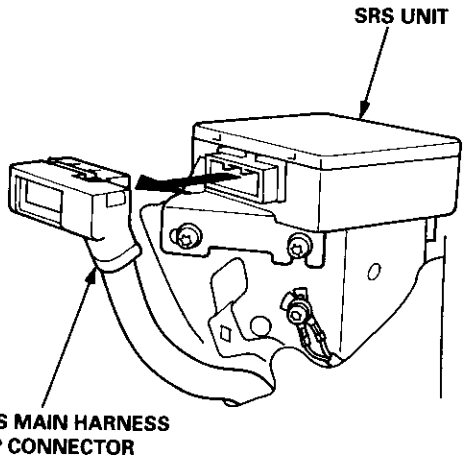
'97 model:

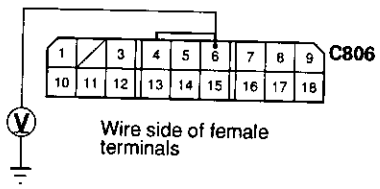


'98 – 00 models:









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The SRS Indicator Light Doesn't Go Off — '97 model

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check the No. 13 (15 A) fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 13 (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES — NO

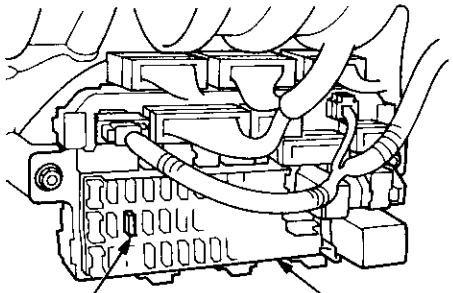
Replace the fuse, and erase the memory
1. Replace the No. 13 (15 A) fuse.
2. Erase the DTC memory (see page 24-28).
3. Turn the ignition switch ON (II).

Does the SRS indicator light go off after six seconds?

YES — NO

END

Confirm the DTC, and continue troubleshooting.

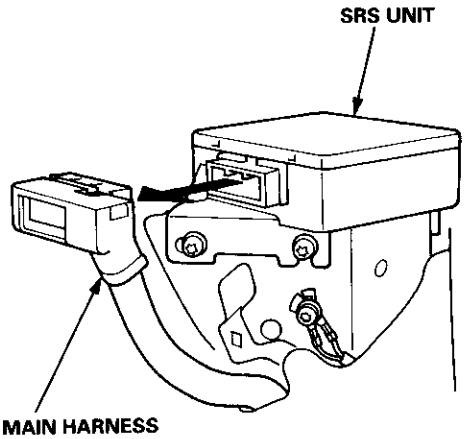


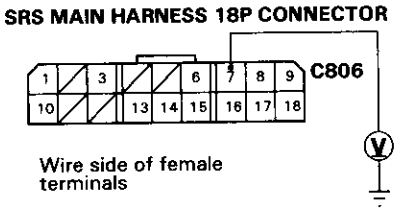
Check for an open in the SRS main harness (VA line):
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbag connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the battery positive cable, then reconnect the negative cable.
5. Connect a voltmeter between the No. 7 terminal (+) of the SRS main harness 18P connector and ground.
6. Turn the ignition switch ON (II).

Is there battery voltage?

YES — NO

Open in the SRS main harness (VA line); replace the harness.





(cont'd)

(A)
To page 24-38

The SRS Indicator Light Doesn't Go Off — '97 model (cont'd)

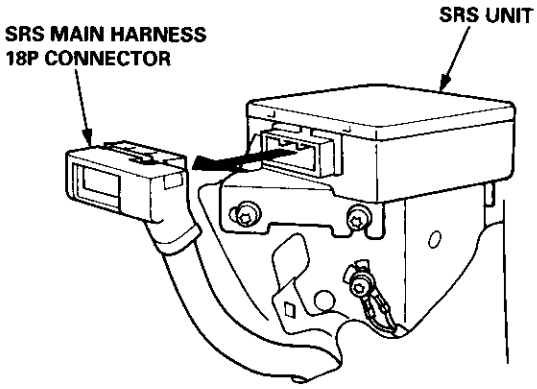
From page 24-37
(A)

Check the SRS unit:
Connect the SRS main harness 18P connector terminals No. 6 and No. 7 with a jumper wire and backprobe adapters.

Does the SRS indicator light go off?

YES — NO

Faulty SRS unit or poor contact at the SRS main harness 18P connector; check the connector.
If the connector is OK, replace the SRS unit.

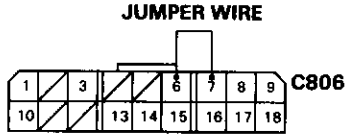


SRS MAIN HARNESS 18P CONNECTOR

Did fuse No. 13 (15 A) blow?

YES — NO

(B)
To page 24-39



Wire side of female terminals

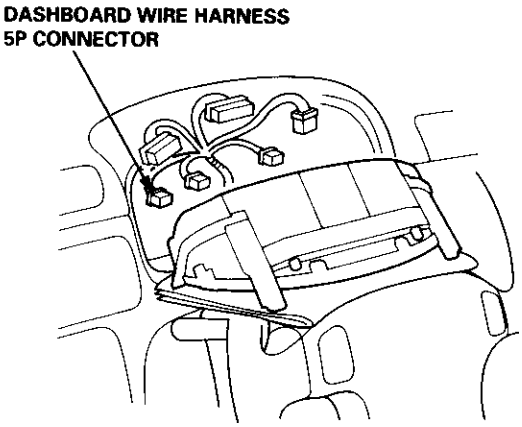
Check for a short to ground in the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Check resistance between the No. 1 terminal of the dashboard wire harness 5P connector and ground. There should be 1 MΩ or more.

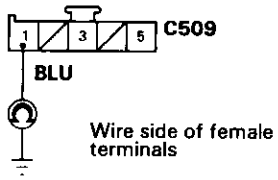
Is the resistance as specified?

YES — NO

(C)
To page 24-40

Short to ground in the gauge assembly; replace the gauge assembly.





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From page 24-38
(B)

Check the SRS indicator circuit:
1. Turn the ignition switch OFF.
2. Remove the gauge assembly. Do not disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Turn the ignition switch ON (II).
4. Connect the dashboard wire harness 5P connector terminals No. 1 and No. 5 with a jumper wire.

Does the SRS indicator light go off?

YES

Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.

NO

Check for an open in the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 1 terminal of the dashboard wire harness 5P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

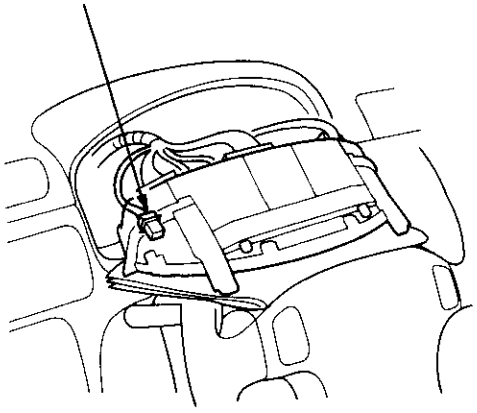
YES

(D)
To page 24-41

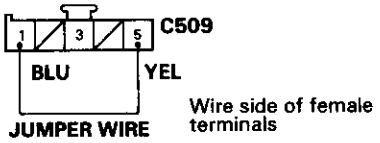
NO

(E)
To page 24-41

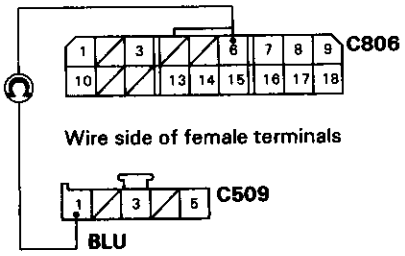
DASHBOARD WIRE HARNESS 5P CONNECTOR



DASHBOARD WIRE HARNESS 5P CONNECTOR



SRS MAIN HARNESS 18P CONNECTOR



DASHBOARD WIRE HARNESS 5P CONNECTOR

(cont'd)

The SRS Indicator Light Doesn't Go Off — '97 model (cont'd)

From page 24-38 (C)

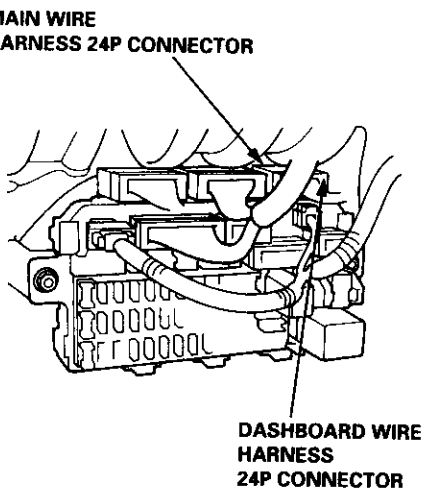
Check for a short to ground in the main wire harness:
1. Disconnect the dashboard wire harness 24P connector from the main wire harness.
2. Check resistance between the No. 5 terminal of the dashboard wire harness 24P connector and ground. There should be 1 MΩ or more.

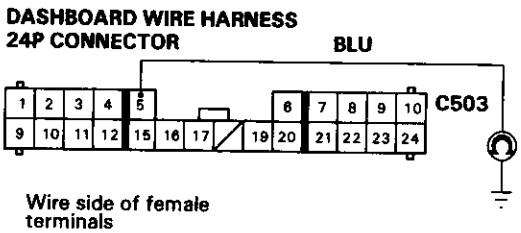
Is the resistance as specified?

YES

NO

Short to ground in the dashboard wire harness; repair the dashboard wire harness.





Check for a short to ground in the SRS main harness:
1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 1 terminal of the SRS main harness 3P connector and ground. There should be 1 MΩ or more.

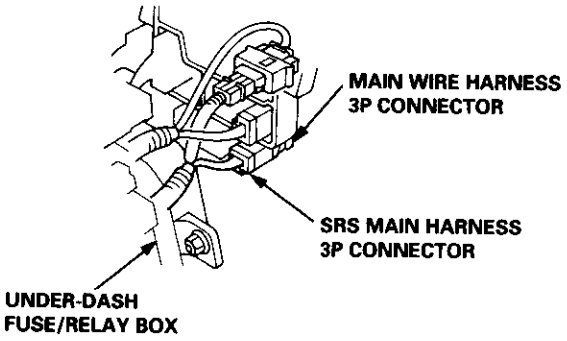
Is the resistance as specified?

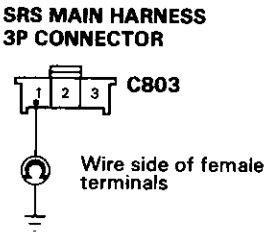
YES

NO

Short to ground in the main wire harness; repair the main wire harness.

Short to ground in the SRS main harness; replace the SRS main harness.





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From page 24-39
(D)

Check the SRS indicator circuit input voltage:
1. Reconnect the SRS main harness 18P connector to the SRS unit.
2. Connect a voltmeter between the No. 1 terminal (+) of the dashboard 5P connector and ground.
3. Turn the ignition switch ON (II), wait for six seconds, then measure voltage.

Is there 8.5 V or more?

YES — NO

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting Intermittent Failures on page 24-28).

Poor contact at the SRS main harness 18P connector; check the connector.
- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

From page 24-39
(E)

Check for an open in the dashboard wire harness:
1. Disconnect the main wire harness 24P connector from the dashboard wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 5 terminal of the main wire harness 24P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

YES — NO

Open in the BLU wire of the dashboard wire harness; repair the dashboard wire harness.

Check for an open in the main wire harness:
1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 1 terminal of the SRS main harness 3P connector; there should be 0 – 1.0 Ω.

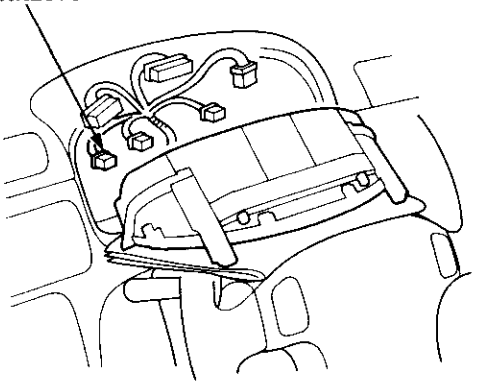
Is the resistance as specified?

YES — NO

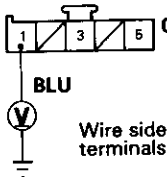
Open in the BLU wire of the main wire harness; repair the main wire harness.

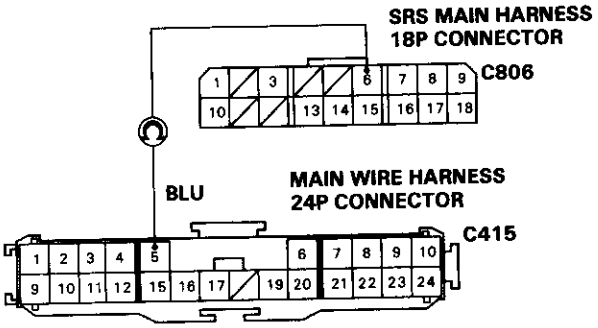
Open in the SRS main harness; replace the SRS main harness.

DASHBOARD WIRE HARNESS 5P CONNECTOR

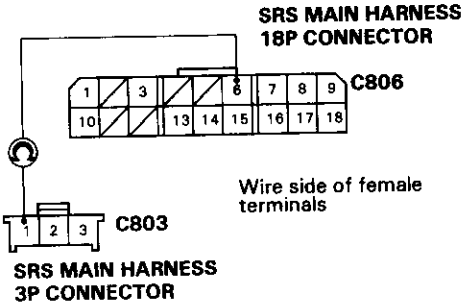


DASHBOARD WIRE HARNESS 5P CONNECTOR





Terminal side of male terminals



The SRS Indicator Light Doesn't Go Off — '98 – 00 models

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check the No. 23 (10 A) fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 23 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES — NO

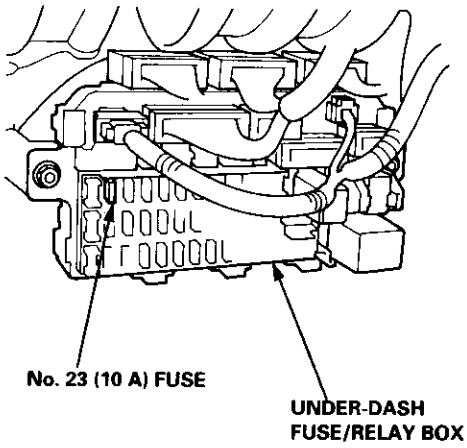
Replace the fuse, and erase the memory
1. Replace the No. 23 (10 A) fuse.
2. Erase the DTC memory (see page 24-28).
3. Turn the ignition switch ON (II).

Does the SRS indicator light go off after six seconds?

YES — NO

END

Confirm the DTC, and continue troubleshooting.

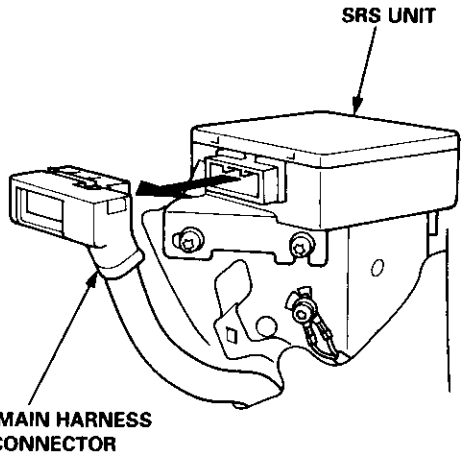


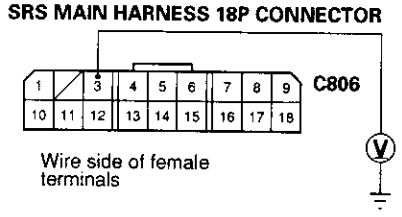
Check for an open in the SRS main harness (VB line):
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbag connectors, and disconnect the seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the battery positive cable, then reconnect the negative cable.
5. Connect a voltmeter between the No. 3 terminal (+) of the SRS main harness 18P connector and ground.
6. Turn the ignition switch ON (II).

Is there battery voltage?

YES — NO

Open in the SRS main harness (VB line); replace the harness.





(A)
To page 24-43

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From page 24-42
(A)

Check the SRS unit:
Connect the SRS main harness 18P connector terminals No. 3 and No. 6 with a jumper wire and backprobe adapters.

Does the SRS indicator light go off?

YES

Faulty SRS unit or poor contact at the SRS main harness 18P connector; check the connector.
If the connector is OK, replace the SRS unit.

NO

Did fuse No. 23 (10 A) blow?

YES

Short to ground in the gauge assembly; replace the gauge assembly.

NO

(B)
To page 24-44

Check for a short to ground in the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Check resistance between the No. 1 terminal of the dashboard wire harness 5P connector and ground. There should be 1 MΩ or more.

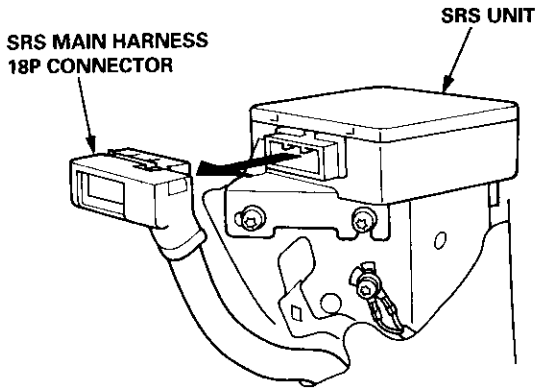
Is the resistance as specified?

YES

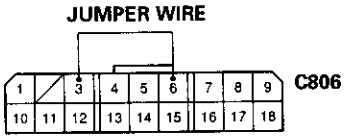
(C)
To page 24-45

NO

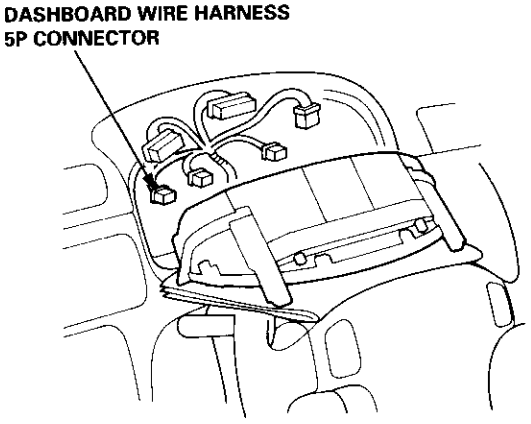
Open in the wire between the SRS unit and the gauge assembly; repair the open.



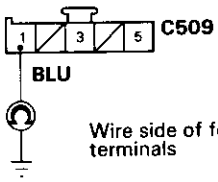
SRS MAIN HARNESS 18P CONNECTOR



Wire side of female terminals



DASHBOARD WIRE HARNESS 5P CONNECTOR



Wire side of female terminals

(cont'd)

The SRS Indicator Light Doesn't Go Off — '98 – 00 models (cont'd)

From page 24-43
(B)

Check the SRS indicator circuit:
1. Turn the ignition switch OFF.
2. Remove the gauge assembly. Do not disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Turn the ignition switch ON (II).
4. Connect the dashboard wire harness 5P connector terminals No. 1 and No. 5 with a jumper wire.

Does the SRS indicator light go off?

YES

Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.

NO

Check for an open in the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 5P connector from the gauge assembly.
3. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and the No. 1 terminal of the dashboard wire harness 5P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

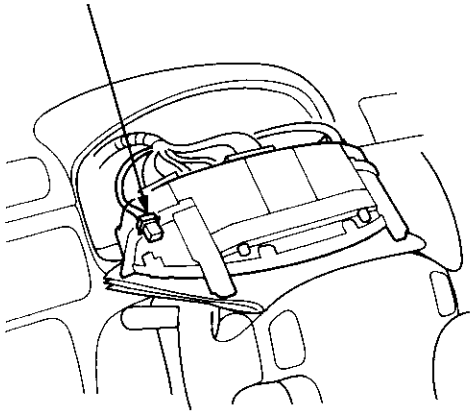
YES

(D)
To page 24-46

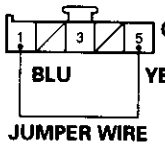
NO

(E)
To page 24-46

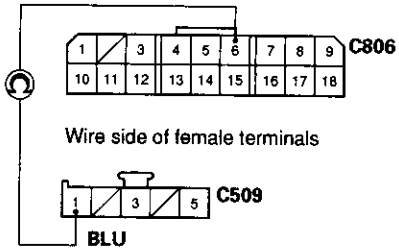
DASHBOARD WIRE HARNESS 5P CONNECTOR



DASHBOARD WIRE HARNESS 5P CONNECTOR



SRS MAIN HARNESS 18P CONNECTOR



DASHBOARD WIRE HARNESS 5P CONNECTOR

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From page 24-43
(C)

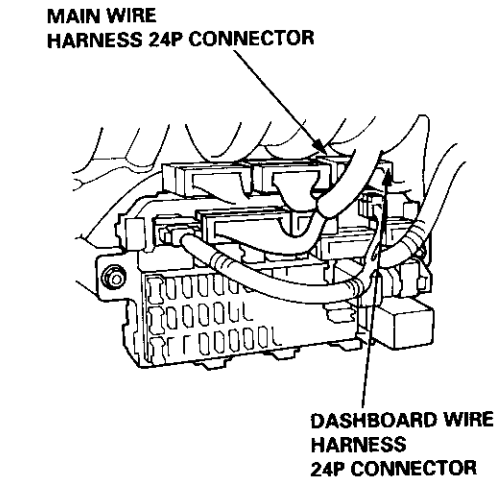
Check for a short to ground in the main wire harness:
1. Disconnect the dashboard wire harness 24P connector from the main wire harness.
2. Check resistance between the No. 5 terminal of the dashboard wire harness 24P connector and ground. There should be 1 MΩ or more.

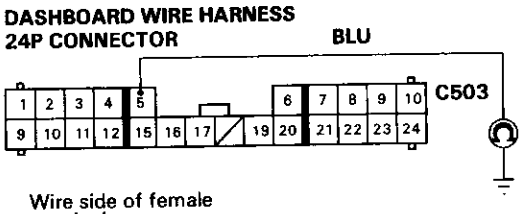
Is the resistance as specified?

YES

NO

Short to ground in the dashboard wire harness; repair the dashboard wire harness.





Check for a short to ground in the SRS main harness:
1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 1 terminal of the SRS main harness 3P connector and ground. There should be 1 MΩ or more.

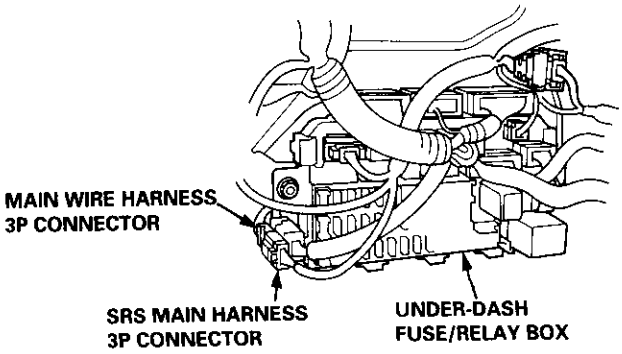
Is the resistance as specified?

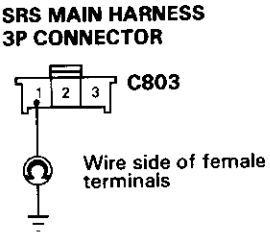
YES

NO

Short to ground in the main wire harness; repair the main wire harness.

Short to ground in the SRS main harness; replace the SRS main harness.





(cont'd)

The SRS Indicator Light Doesn't Go Off — '98 – 00 models (cont'd)

From page 24-44
(D)

Check the SRS indicator circuit input voltage:
1. Reconnect the SRS main harness 18P connector to the SRS unit.
2. Connect a voltmeter between the No. 1 terminal (+) of the dashboard 5P connector and ground.
3. Turn the ignition switch ON (II), wait for six seconds, then measure voltage.

Is there 8.5 V or more?

YES — NO

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting Intermittent Failures on page 24-28).

Poor contact at the SRS main harness 18P connector; check the connector.
- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

From page 24-44
(E)

Check for an open in the dashboard wire harness:
1. Disconnect the main wire harness 24P connector from the dashboard wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 5 terminal of the main wire harness 24P connector; there should be 0 – 1.0 Ω.

Is the resistance as specified?

YES — NO

Open in the BLU wire of the dashboard wire harness; repair the dashboard wire harness.

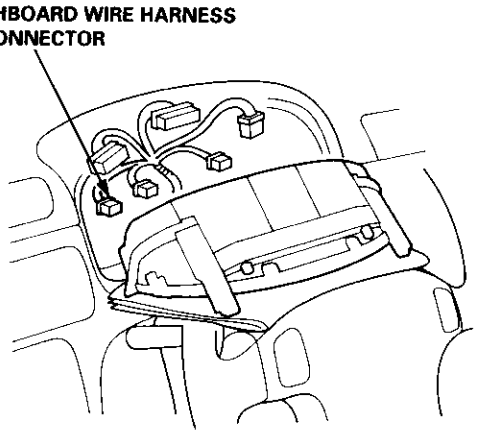
Check for an open in the main wire harness:
1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 1 terminal of the SRS main harness 3P connector; there should be 0 – 1.0 Ω.

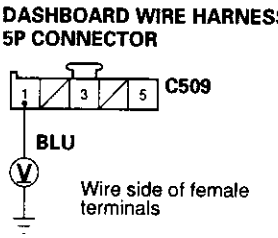
Is the resistance as specified?

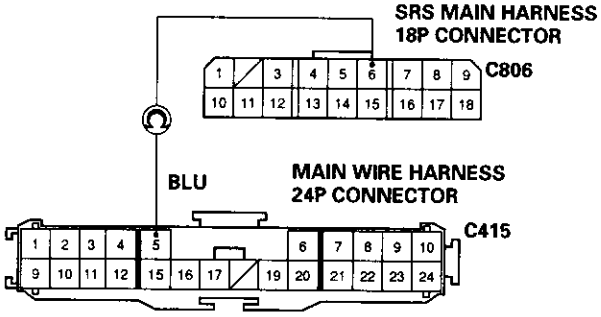
YES — NO

Open in the BLU wire of the main wire harness; repair the main wire harness.

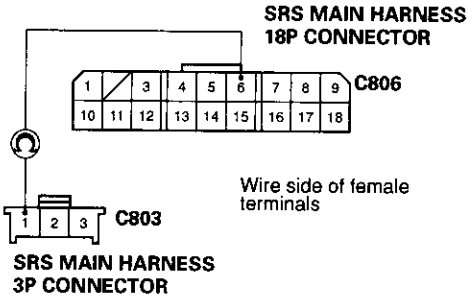
Open in the SRS main harness; replace the SRS main harness.







Terminal side of male terminal



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No DTC

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 13 (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES

(A) To page 24-48

NO

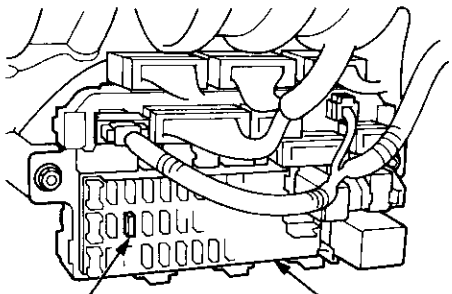
Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

Is the fuse OK?

YES

The problem has disappeared. Test-drive the vehicle and see Troubleshooting Intermittent Failures on page 24-28.

NO



No. 13 (15 A) FUSE

UNDER-DASH FUSE/RELAY BOX

Check for short to ground between the under-dash fuse/relay box and the SRS unit.
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors, and disconnect the seat belt tensioner connectors (see page 24-23).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 7 terminal of the SRS main harness 18P connector and ground.
   There should be 1 MΩ or more.

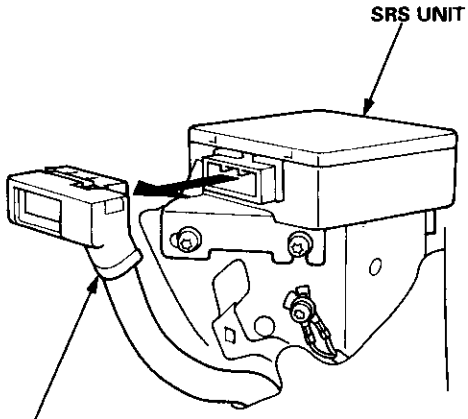
Is the resistance as specified?

YES

Faulty SRS unit; replace the SRS unit (see page 24-95).

NO

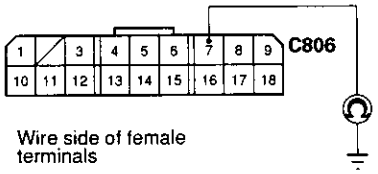
(B)
To page 24-48



SRS UNIT

SRS MAIN HARNESS 18P CONNECTOR

SRS MAIN HARNESS 18P CONNECTOR



Wire side of female terminals

(cont'd)

No DTC (cont'd)

from page 24-47
(B)

Check for short to ground in the SRS main harness:
1. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
2. Check resistance between the No. 7 terminal of the SRS main harness 18P connector and ground. There should be 1.0 MΩ or more.

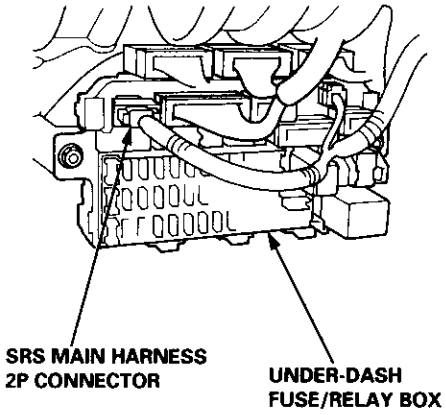
Is the resistance as specified?

YES

Short to ground in the under-dash fuse/relay box; replace the under-dash fuse/relay box.

NO

Short to ground in the SRS main harness; replace the SRS main harness.



(A) From page 24-47

Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors, and disconnect the seat belt tensioner connectors (see page 24-23).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 7 terminal of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II) , and measure voltage.

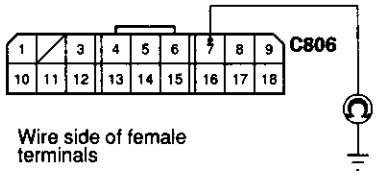
Is there battery voltage?

YES

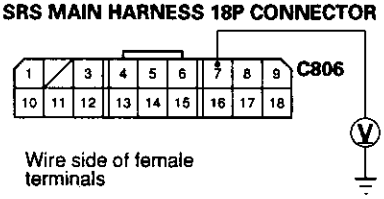
Poor contact at the SRS main harness 18P connector; check the connector.
- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

NO

SRS MAIN HARNESS 18P CONNECTOR



SRS MAIN HARNESS 18P CONNECTOR



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From page 24-48

Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
3. Check resistance between the No. 1 terminal of the SRS main harness 2P connector and the No. 7 terminal of the SRS main harness 18P connector.
   There should be 0 – 0.5 Ω.

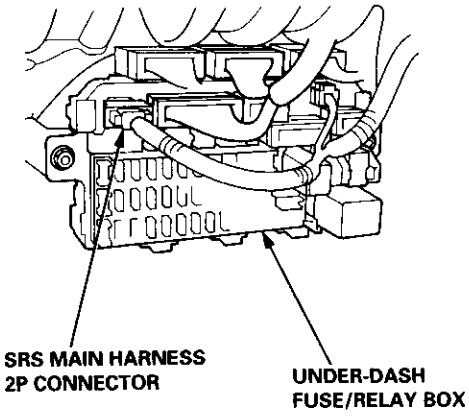
Is the resistance as specified?

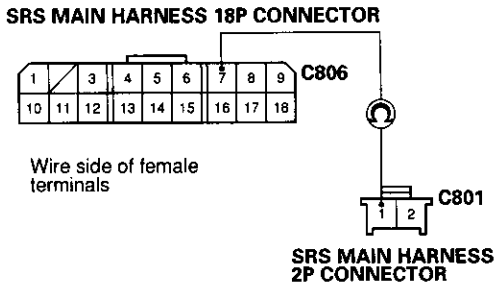
YES

Poor contact at the SRS main harness 2P connector; check the connector.
- **If the connector is OK, substitute a known-good under-dash fuse/relay box, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

NO

Open in the SRS main harness; replace the SRS main harness.





DTC 1-1 and DTC 1-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check for an open in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

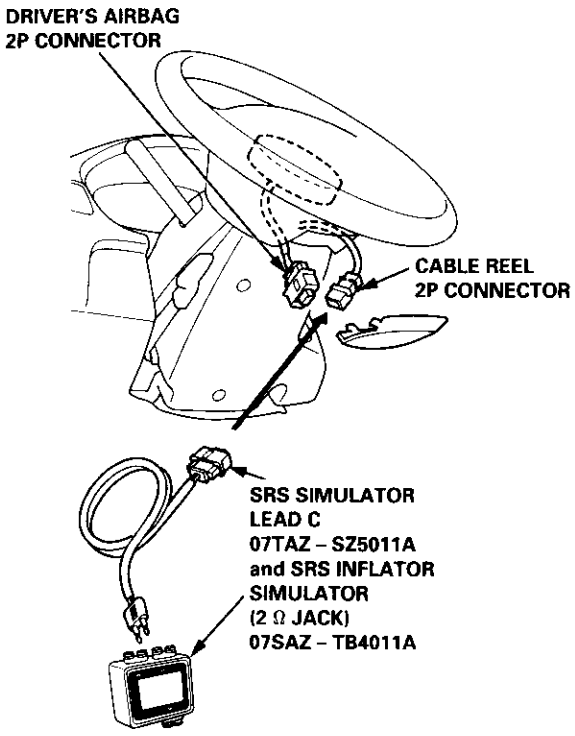
Is DTC 1-1 or DTC 1-2 indicated?

YES — NO

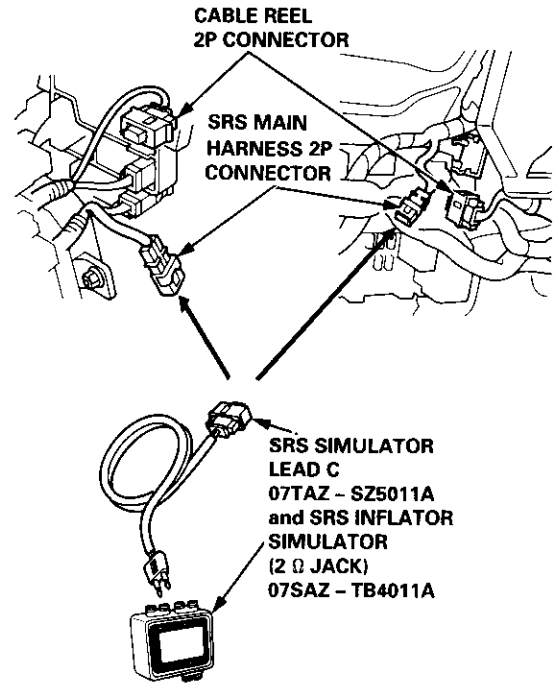
Open or increased resistance in the driver's airbag inflator; replace the driver's airbag (see page 24-87).

Check for an open in the cable reel:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

To page 24-51



'97 model: '98 – 00 models:



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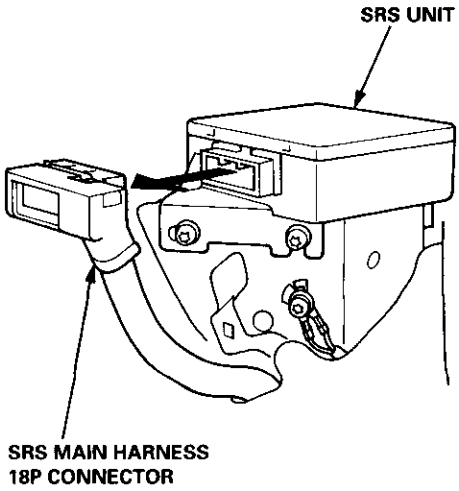
From page 24-50

Check for an open in the cable reel (cont'd):
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 1-1 or DTC 1-2 indicated?

YES — **NO**

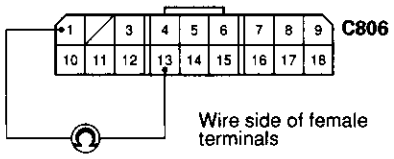
Open or increased resistance in the cable reel; replace the cable reel (see page 24-91).



Check for an open in the SRS main harness:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector (and disconnect both seat belt tensioner connectors).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness.
4. Check resistance between terminals No. 1 and No. 13 of the SRS main harness 18P connector.
   There should be approx. 2.0 – 3.0 Ω.

Is the resistance as specified?

YES — **NO**



Poor contact at the SRS main harness 18P connector; check the connector.
- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

Open or increased resistance in the SRS main harness; replace the harness.

DTC 1-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check for a short to another wire in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

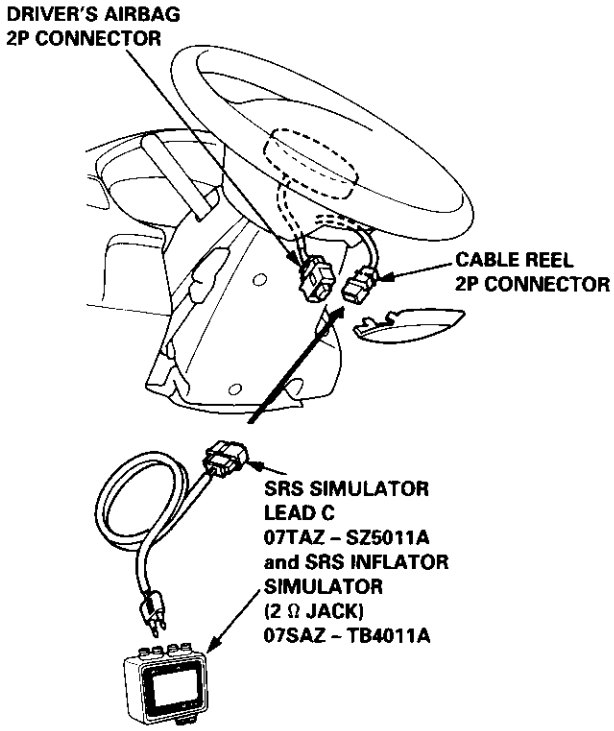
Is DTC 1-3 indicated?

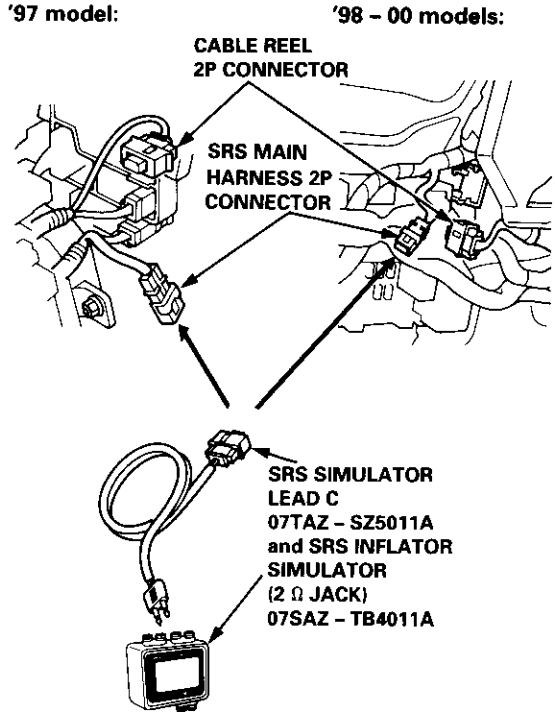
YES — NO

Short in the driver's airbag inflator; replace the driver's airbag (see page 24-87).

Check for a short in the cable reel:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

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Check for a short in the cable reel (cont'd):
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 1-3 indicated?

YES — **NO**

Short in the cable reel; replace the cable reel (see page 24-91).

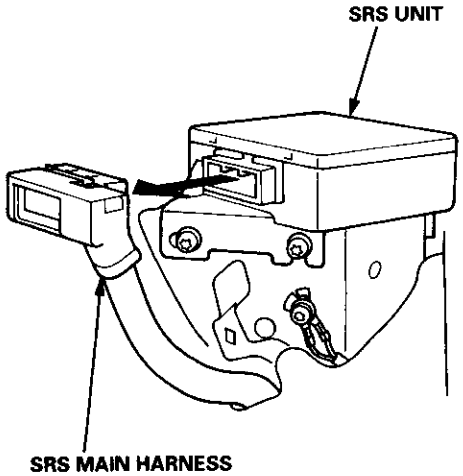
Check for a short in the SRS main harness:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector (and disconnect both seat belt tensioner connectors).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
4. Check the resistance between terminals No. 1 and No. 13 of SRS main harness 18P connector.
   There should be approx. 2.0 – 3.0 Ω.

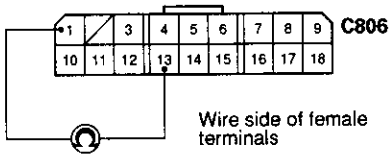
Is the resistance as specified?

YES — **NO**

Faulty SRS unit; replace the SRS unit (see page 24-95).

Short in the SRS main harness; replace the SRS main harness.





DTC 1-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

Check for a short to power in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 1-4 indicated?

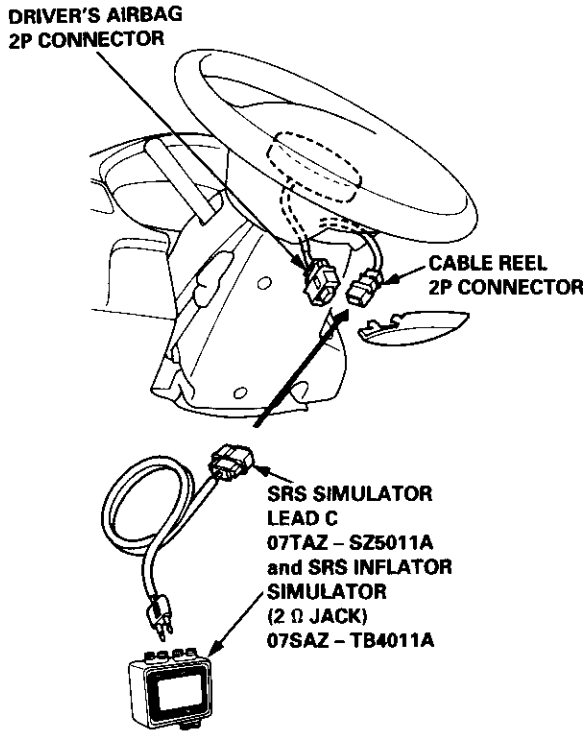
YES

Short to power in the driver's airbag inflator; replace the driver's airbag (see page 24-87).

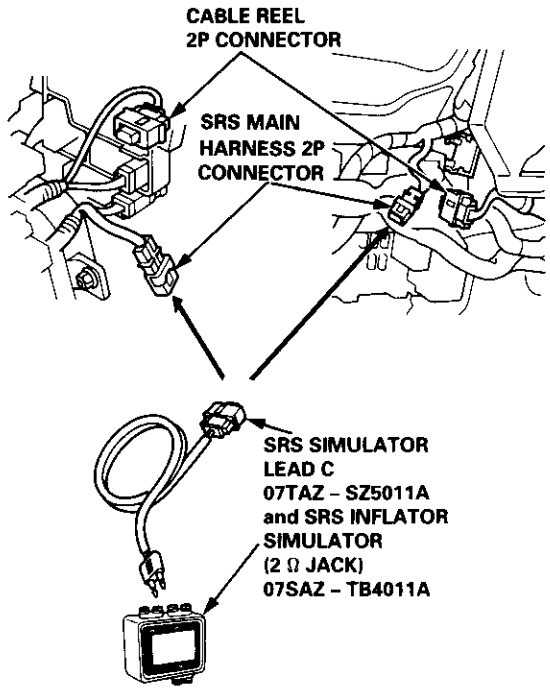
NO

Check for a short to power in the cable reel:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

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'97 model: '98 – 00 models:



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Check for a short power in the cable reel (cont'd):
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 1-4 indicated?

YES — **Short to power in the cable reel; replace the cable reel (see page 24-91).**

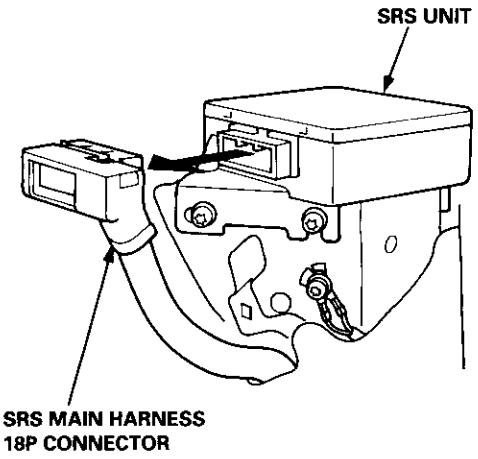
NO

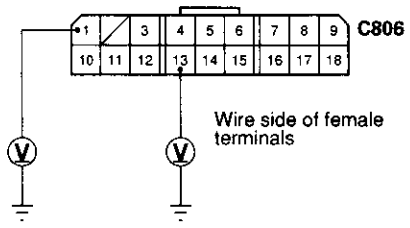
Check for a short to power in the SRS main harness:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector (and disconnect both seat belt tensioner connectors).
3. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 1 (+) terminal of the SRS main harness 18P connector and body ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Turn the ignition switch OFF.
9. Connect a voltmeter between the No. 13 (+) terminal of the SRS main harness 18P connector and body ground.
10. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.

Are voltages as specified?

YES — **Faulty SRS unit; replace the SRS unit (see page 24-95).**

NO — **Short to power in the SRS main harness; replace the SRS main harness.**





DTC 1-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check for a short to ground in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector. Do not disconnect the passenger's airbag connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

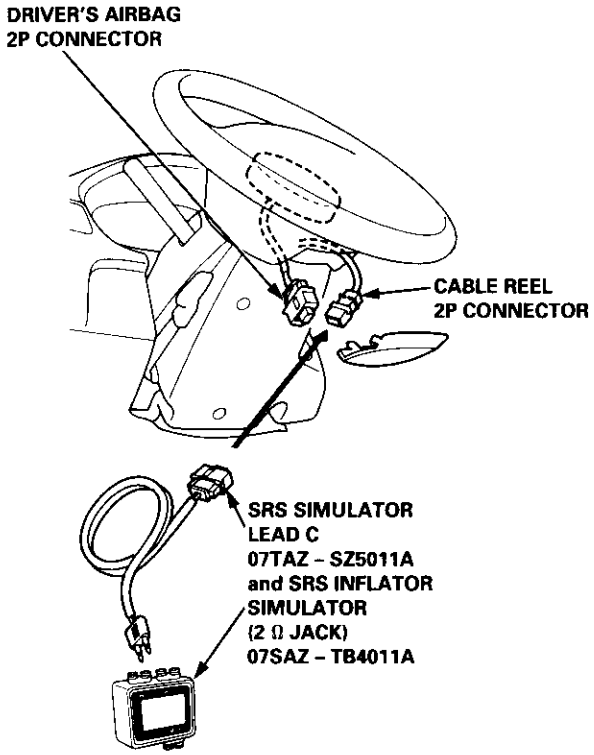
Is DTC 1-5 indicated?

YES — NO

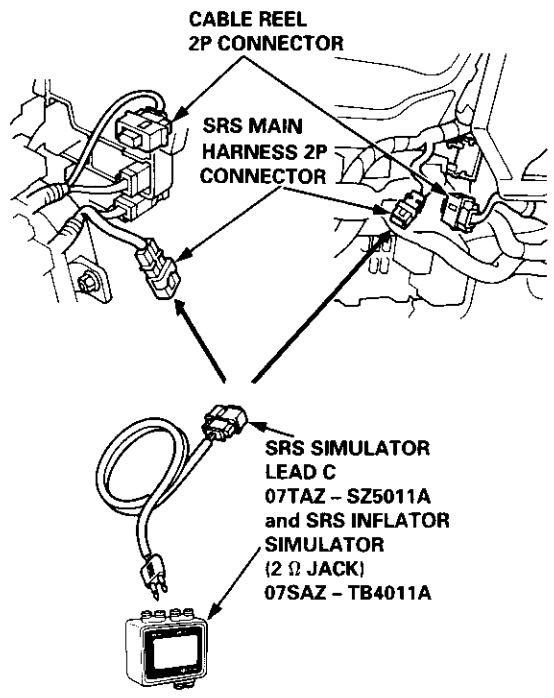
Short to ground in the driver's airbag inflator; replace the driver's airbag (see page 24-87).

Check for a short to ground in the cable reel:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

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'97 model: '98 – 00 models:



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Check for a short to ground in the cable reel (cont'd):
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 1-5 indicated?

YES — **NO**

Short to ground in the cable reel; replace the cable reel (see page 24-91).

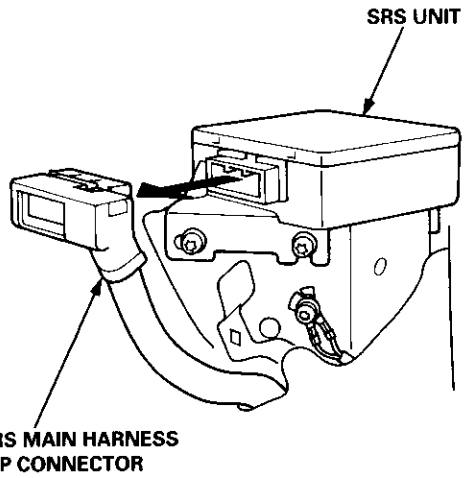
Check for a short to ground in the SRS main harness:
1. Disconnect the battery negative cable, the disconnect the positive cable, and wait for three minutes.
2. Disconnect the front passenger's airbag 2P connector (and disconnect both seat belt tensioner connectors).
3. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal of the SRS main harness 18P connector and ground.
   There should be 1 MΩ or more.

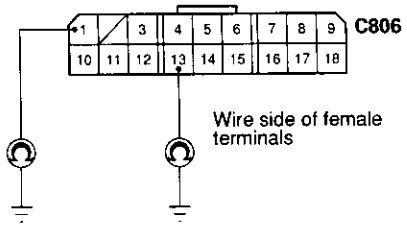
Is the resistance as specified?

YES — **NO**

Faulty SRS unit; replace the SRS unit (see page 24-95).

Short to ground in the SRS main harness; replace the SRS main harness.





DTC 2-1 and DTC 2-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

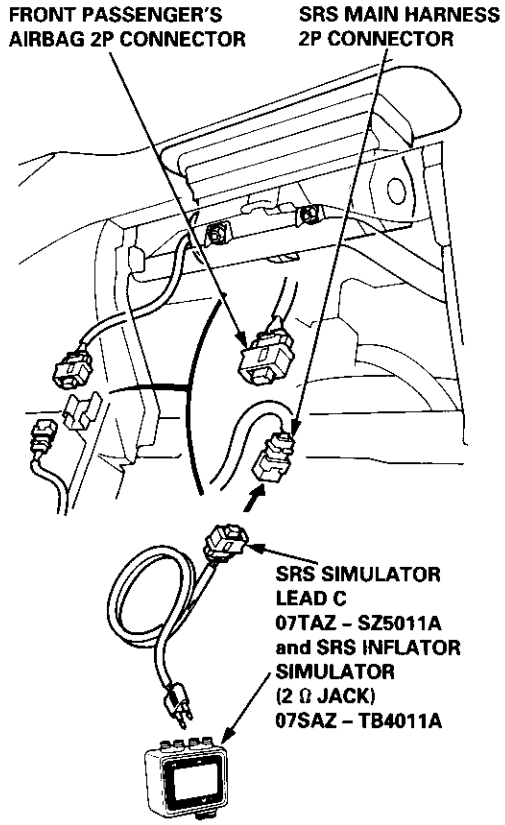
Check for an open in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag connector from the SRS main harness (see page 24-23).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 2-1 or DTC 2-2 indicated?

YES

Open or increased resistance in the passenger's airbag inflator; replace the passenger's airbag (see page 24-89).

NO



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Check for an open in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector (and disconnect both seat belt tensioner connectors) (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness.
4. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0 Ω.

Is the resistance as specified?

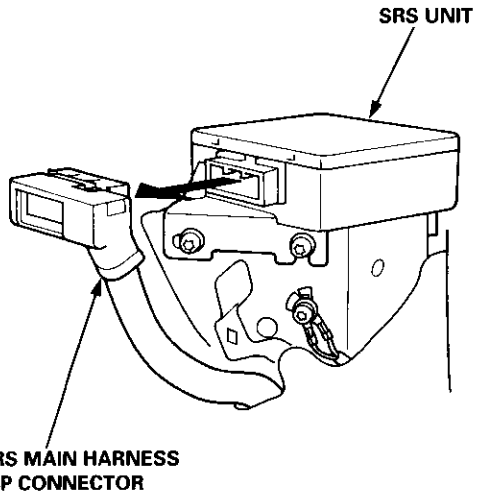
YES

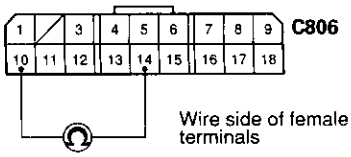
Poor contact at the SRS main harness 18P connector; check the connector.

- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

NO

Open or increased resistance in the SRS main harness; replace the harness.





DTC 2-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

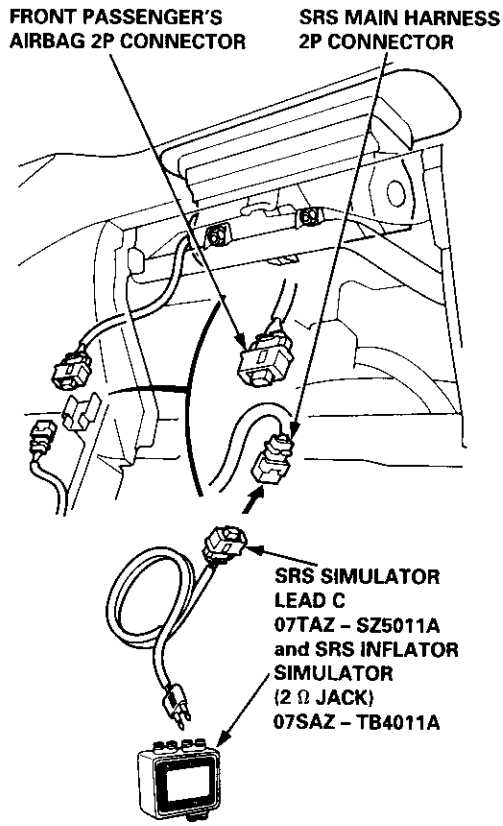
Check for a short to another wire or decreased resistance in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-23).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 2-3 indicated?

YES

NO

Short to another wire or decreased resistance in the passenger's airbag inflator; replace the passenger's airbag (see page 24-89).



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Check for a short to another wire or decreased resistance in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector (and disconnect both seat belt tensioner connectors).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω).
4. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0 Ω.

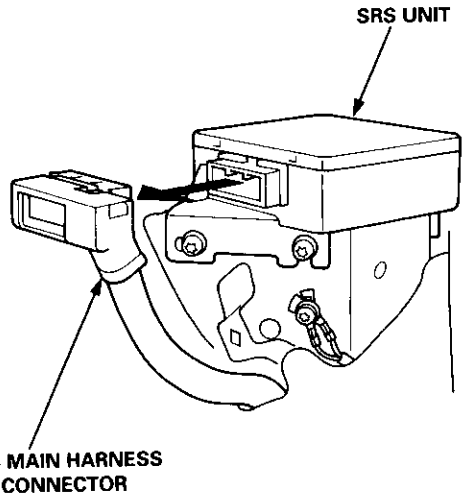
Is the resistance as specified?

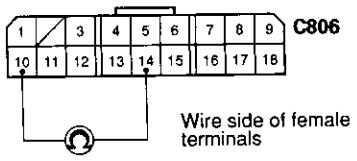
YES

Faulty SRS unit; replace the SRS unit (see page 24-95).

NO

Short to another wire or decreased resistance in the SRS main harness; replace the SRS main harness.





DTC 2-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

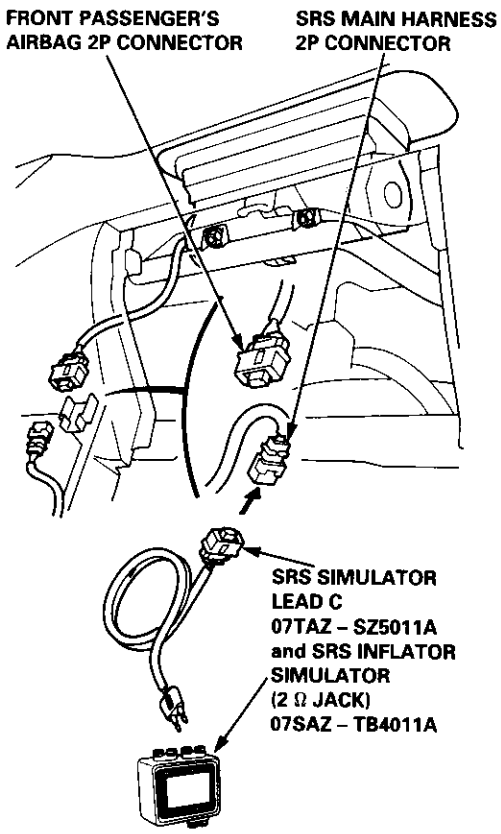
Check for a short to power in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-23).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 2-4 indicated?

YES

Short power in the passenger's airbag inflator; replace the passenger's airbag (see page 24-89).

NO



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Check for a short to power in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector (and disconnect both seat belt tensioner connectors).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 10 (+) terminal of SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Connect a voltmeter between the No. 14 (+) terminal of the SRS main harness 18P connector and ground, and measure voltage. There should be 0.5 V or less.

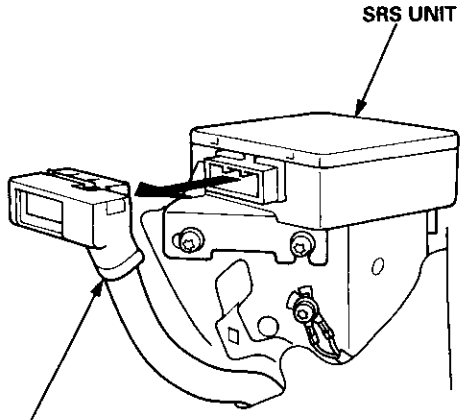
Are voltages as specified?

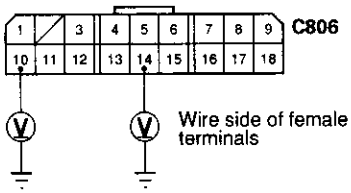
YES

Faulty SRS unit; replace the SRS unit (see page 24-95).

NO

Short to power in the SRS main harness; replace the SRS main harness.





DTC 2-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

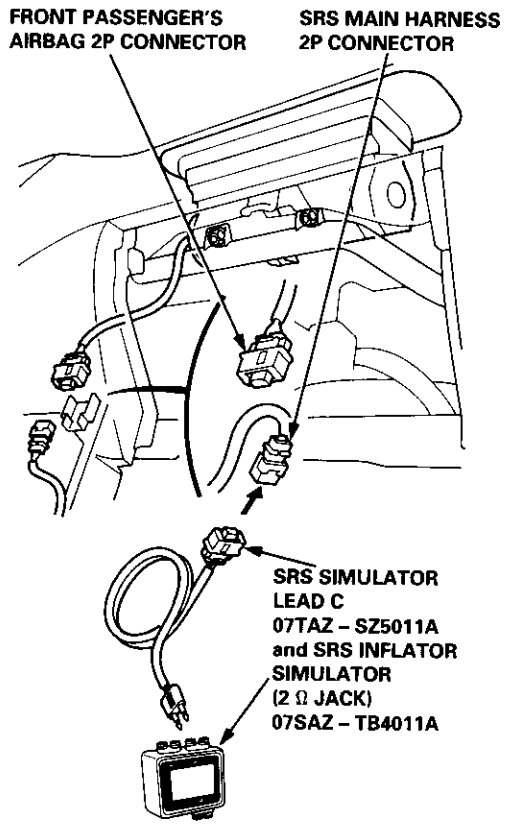
Check for a short to ground in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-23).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. Do not disconnect the driver's airbag connector.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Erase the DTC memory (see page 24-28).
7. Read the DTC (see page 24-26).

Is DTC 2-5 indicated?

YES

Short to ground in the passenger's airbag inflator; replace the passenger's airbag (see page 24-89).

NO



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Check for a short to ground in the SRS main harness:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector (and disconnect both seat belt tensioner connectors).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
5. Check resistance between the No. 10 terminal of the SRS main harness 18P connector and ground, and between the No. 14 terminal of the SRS main harness 18P connector and ground. There should be 1 MΩ or more.

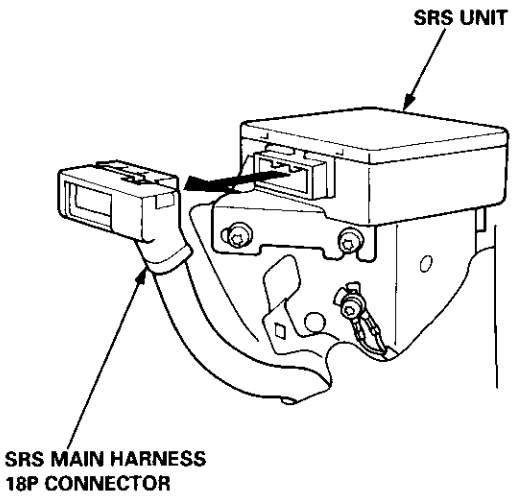
Is the resistance as specified?

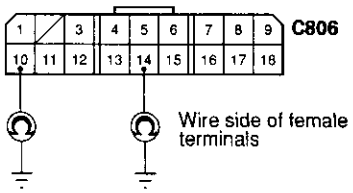
YES

Faulty SRS unit; replace the SRS unit (see page 24-95).

NO

Short to ground in the SRS main harness; replace the SRS main harness.





DTC 3-1 and DTC 3-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

Check for an open in the driver's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's seat belt tensioner 2P connector from the left side wire harness 2P connector (see page 24-23). Do not disconnect the front passenger's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the left side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

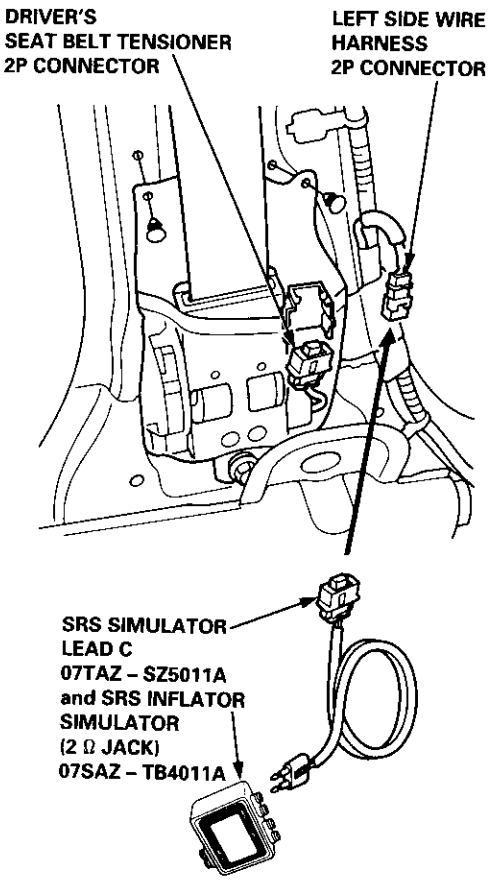
Is DTC 3-1or DTC 3-2 indicated?

YES

Open or increased resistance in the driver's seat belt tensioner; replace the driver's seat belt (see page 24-91).

NO

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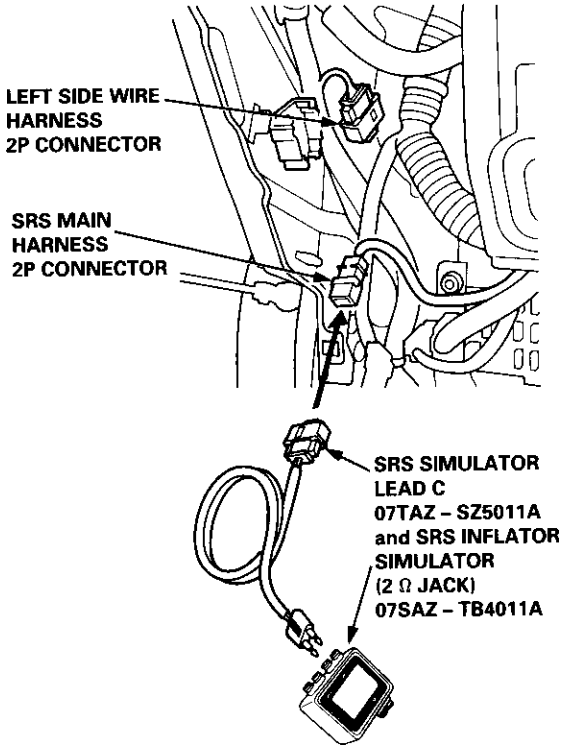
From page 24-66

Check for an open in the side wire harness:
1. Disconnect the left side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 3-1 or DTC 3-2 indicated?

YES — **NO**

Open or increased resistance in the left side wire harness; replace the harness.



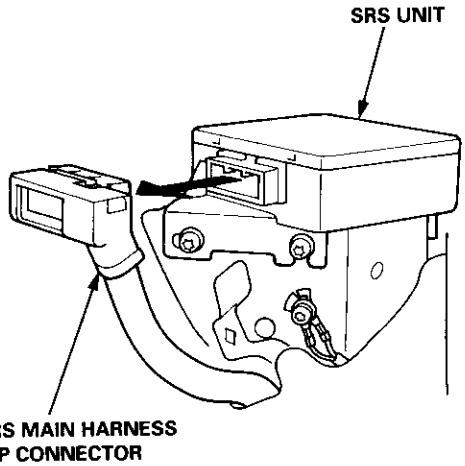
Check for an open in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and front passenger's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
4. Check resistance between the No. 4 and No. 11 terminals of the SRS main harness 18P connector. There should be 2.0 – 3.0 Ω.

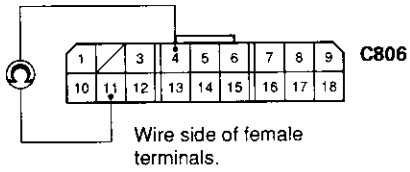
Is the resistance as specified?

YES — **NO**

Faulty SRS unit or poor contact at the SRS main harness 18P connector and the SRS unit, check the connection between the SRS main harness 18P connector and the SRS unit. If the connector is OK, replace the SRS unit (see page 24-95).

Open or increased resistance in the SRS main harness; replace the SRS main harness.





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DTC 3-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES — NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

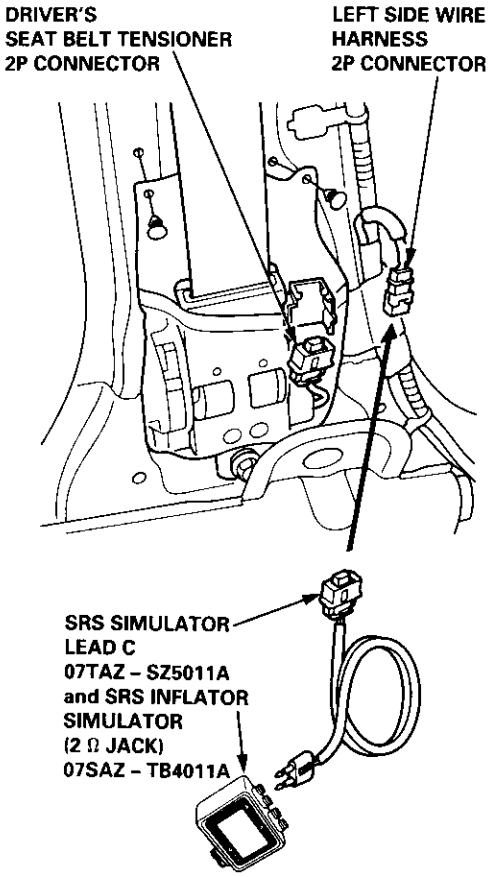
Check for a short to another wire or decreased resistance in the driver's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's seat belt tensioner 2P connector from the left side wire harness 2P connector (see page 24-23). Do not disconnect the front passenger's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the left side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

Is DTC 3-3 indicated?

YES — NO

Short to another wire or decreased resistance in the driver's seat belt tensioner; replace the driver's seat belt (see page 24-91).

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From page 24-68

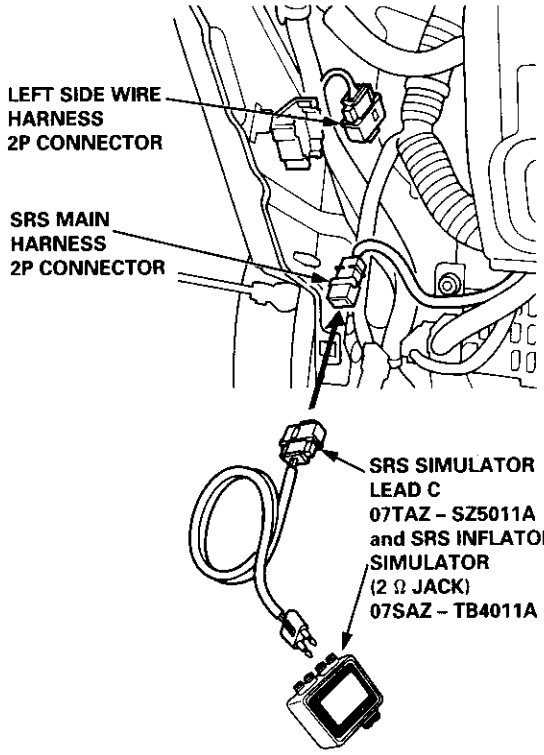
Check for a short to another wire or decreased resistance in the side wire harness:

1. Disconnect the left side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 3-3 indicated?

YES — **Short to another wire or decreased resistance in the left side wire harness; replace the harness.**

NO



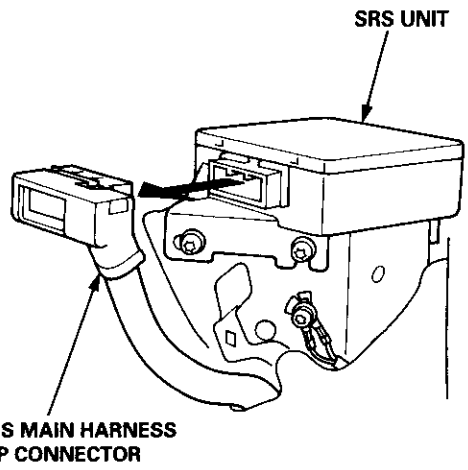
Check for a short to another wire or decreased resistance in the SRS main harness:

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and front passenger's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
5. Check resistance between the No. 4 and No. 11 terminals of the SRS main harness 18P connector. There should be 1 MΩ or more.

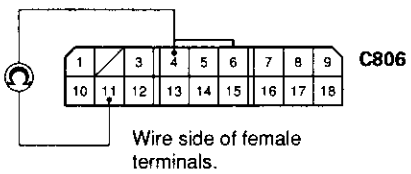
Is the resistance as specified?

YES — **Faulty SRS unit; replace the SRS unit (see page 24-95).**

NO



Short to another wire or decreased resistance in the SRS main harness; replace the SRS main harness.



DTC 3-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

Check for a short to power in the driver's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's seat belt tensioner 2P connector from the left side wire harness 2P connector (see page 24-23). Do not disconnect the front passenger's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the left side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

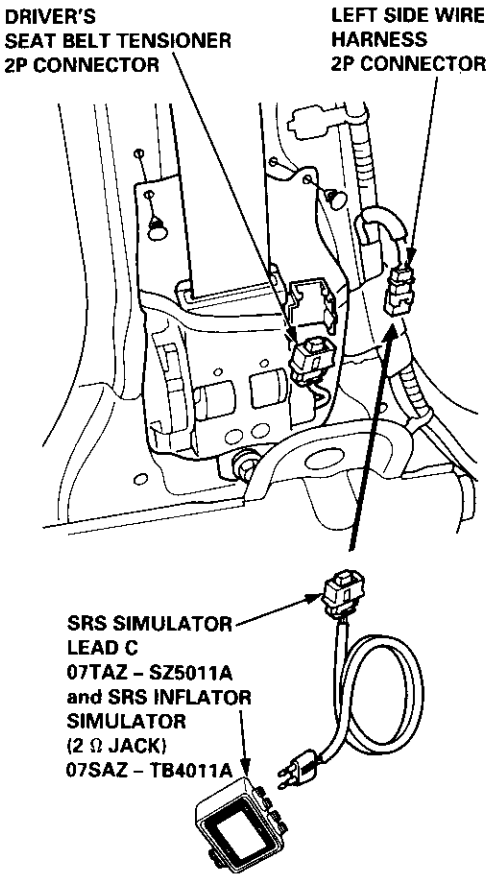
Is DTC 3-4 indicated?

YES

Short to power in the driver's seat belt tensioner; replace the driver's seat belt tensioner (see page 24-3).

NO

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From page 24-70

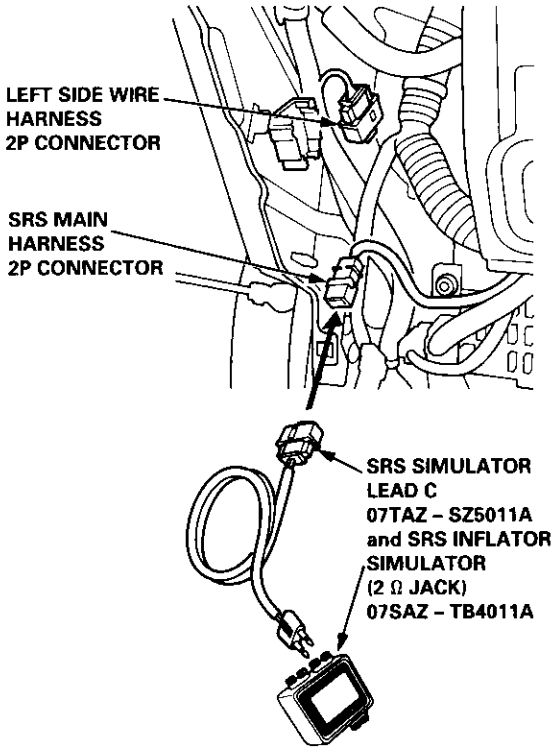
Check for a short to power in the side wire harness:
1. Disconnect the left side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 3-4 indicated?

YES

Short to power in the left side wire harness; replace the harness.

NO



Check for a short to power in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and front passenger's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Disconnect the special tool (2 Ω) from the SRS main harness 2P connector, then reconnect the negative battery cable.
5. Turn the ignition switch ON (II).
6. Check for voltage between the No. 4 terminal of the SRS main harness 18P connector and body ground. There should be 0.5 V or less. Check for voltage between the No. 11 terminals of the SRS main harness 18P connector. There should be 0.5 V or less.

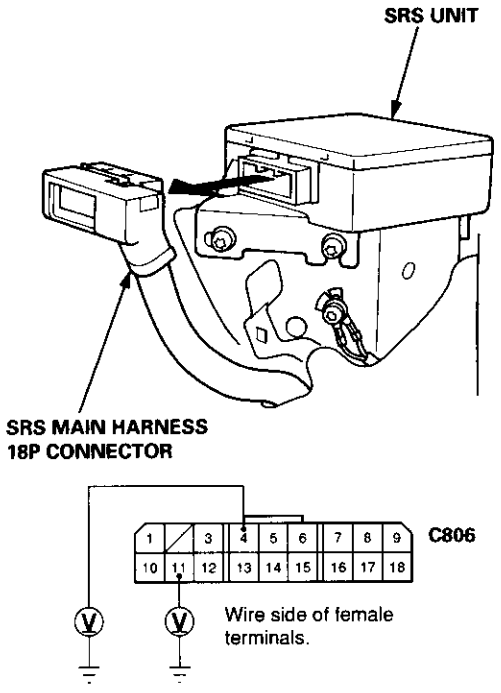
Is the voltage as specified?

YES

Faulty SRS unit; replace the SRS unit (see page 24-95).

NO

Short to power in the SRS main harness; replace the SRS main harness.



DTC 3-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds, and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

Check for a short to ground in the driver's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's seat belt tensioner 2P connector from the left side wire harness 2P connector (see page 24-23). Do not disconnect the front passenger's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the left side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

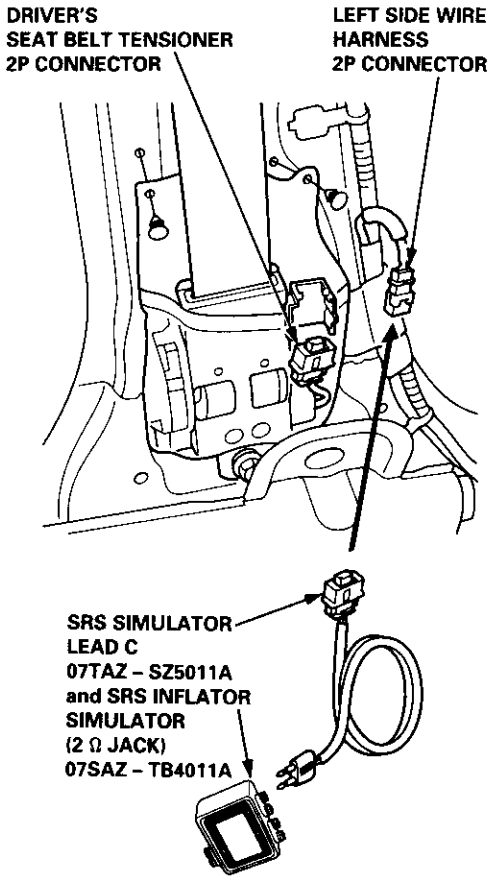
Is DTC 3-5 indicated?

YES

Short to ground in the driver's seat belt tensioner; replace the driver's seat belt (see page 24-3).

NO

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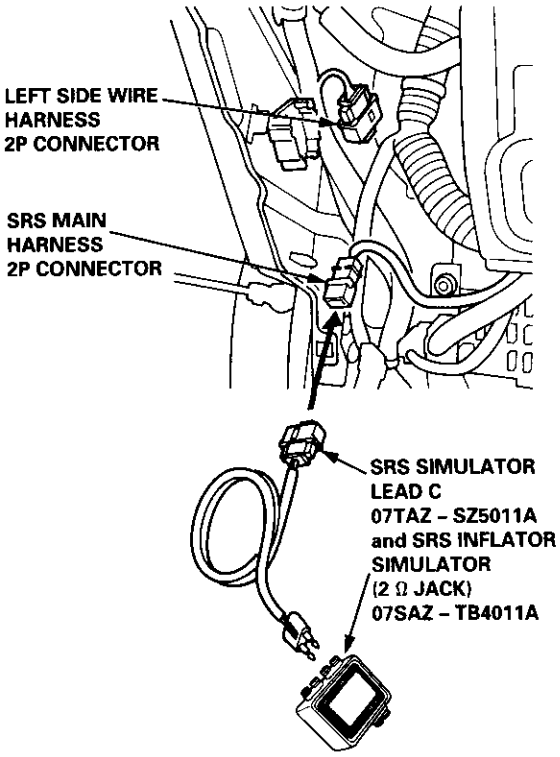
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Check for a short to ground in the side wire harness:
1. Disconnect the left side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 3-5 indicated?

YES — **NO**

Short to ground in the left side wire harness; replace the harness.



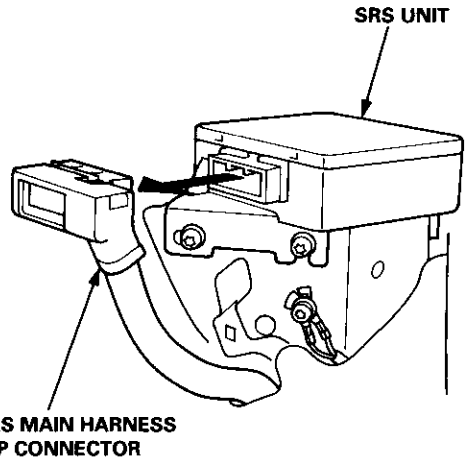
Check for a short to ground in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and front passenger's seat belt tensioner 2P connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool (2 Ω) from the SRS main harness 2P connector.
5. Check resistance between the No. 4 terminal of the SRS main harness 18P connector and body ground, and between the No. 11 terminals of the SRS main harness 18P connector and body ground. There should be 1 MΩ or more.

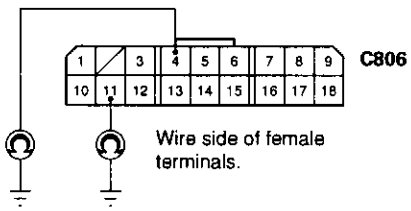
Is the resistance as specified?

YES — **NO**

Faulty SRS unit; replace the SRS unit (see page 24-95).

Short to ground in the SRS main harness; replace the SRS main harness.





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DTC 4-1 and DTC 4-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds, and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

Check for an open in the front passenger's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's seat belt tensioner 2P connector from the right side wire harness 2P connector (see page 24-23). Do not disconnect the driver's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the right side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

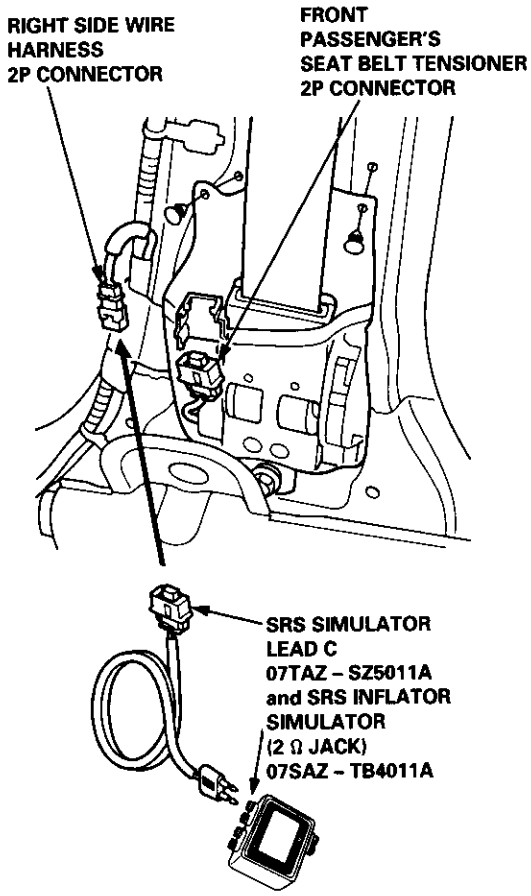
Is DTC 4-1 or DTC 4-2 indicated?

YES

Open or increased resistance in the front passenger's seat belt tensioner; replace the front passenger's seat belt (see page 24-3).

NO

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From page 24-74

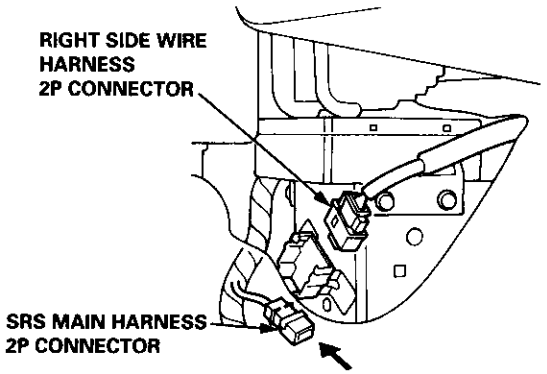
Check for an open in the side wire harness:
1. Disconnect the right side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

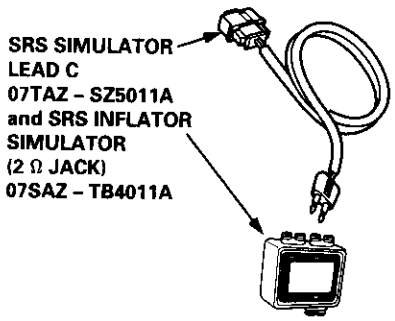
Is DTC 4-1 or DTC 4-2 indicated?

YES

Open or increased resistance in the right side wire harness; replace the harness.

NO





Check for an open in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and driver's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
4. Check resistance between the No. 5 and No. 12 terminals of the SRS main harness 18P connector. There should be 2.0 - 3.0 Ω.

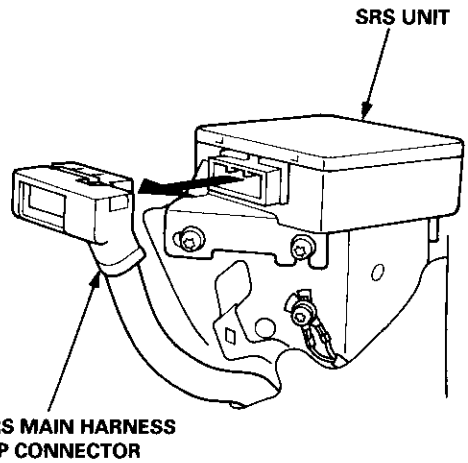
Is the resistance as specified?

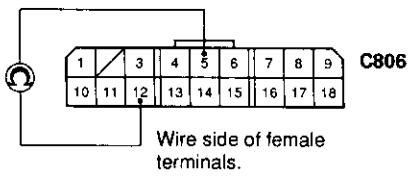
YES

Faulty SRS unit or poor contact at the SRS main harness 18P connector and the SRS unit, check the connection between the SRS main harness 18P connector and the SRS unit. If the connector is OK, replace the SRS unit (see page 24-95).

NO

Open or increased resistance in the SRS main harness; replace the SRS main harness.





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DTC 4-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds, and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

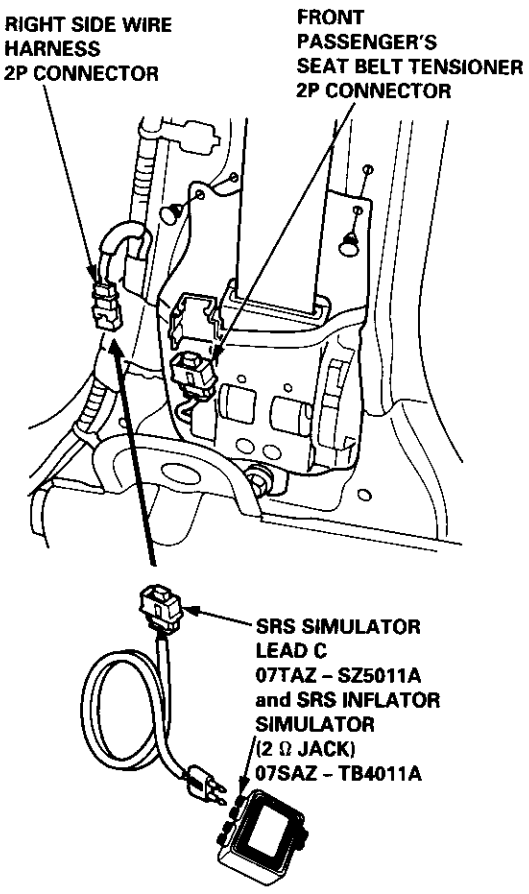
Check for a short to another wire or decreased resistance in the front passenger's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's seat belt tensioner 2P connector from the right side wire harness 2P connector (see page 24-23). Do not disconnect the driver's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the right side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

Is DTC 4-3 indicated?

YES

Short to another wire or decreased resistance in the front passenger's seat belt tensioner; replace the front passenger's seat belt (see page 24-3).

NO



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Check for a short to another wire or decreased resistance in the side wire harness:

1. Disconnect the right side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 4-3 indicated?

YES

Short to another wire or decreased resistance in the right side wire harness; replace the harness.

NO

Check for a short to another wire or decreased resistance in the SRS main harness:

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and driver's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
5. Check resistance between the No. 5 and No. 12 terminals of the SRS main harness 18P connector. There should be 1 MΩ or more.

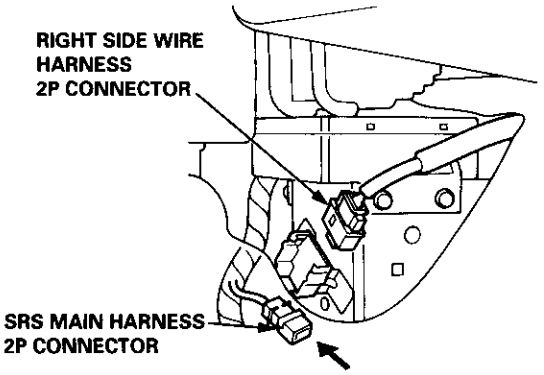
Is the resistance as specified?

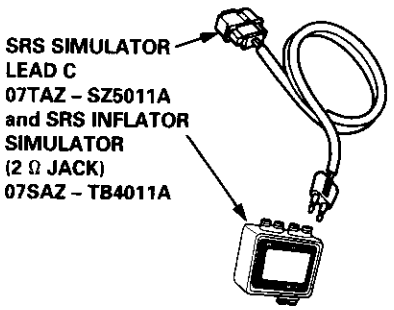
YES

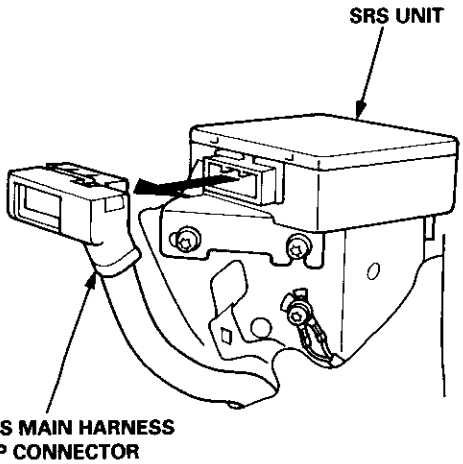
Faulty SRS unit; replace the SRS unit (see page 24-95).

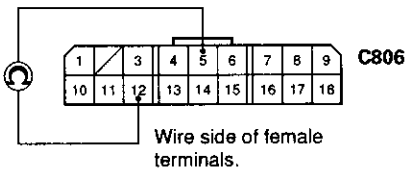
NO

Short to another wire or decreased resistance in the SRS main harness; replace the SRS main harness.









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DTC 4-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds, and then goes off.

Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

Check for a short to power in the front passenger's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's seat belt tensioner 2P connector from the right side wire harness 2P connector (see page 24-23). Do not disconnect the driver's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the right side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

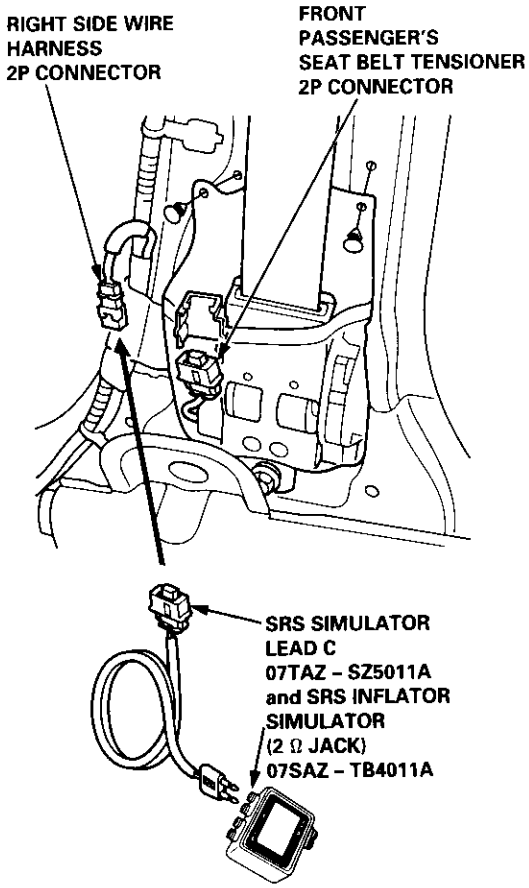
Is DTC 4-4 indicated?

YES

NO

Short to power in the front passenger's seat belt tensioner; replace the front passenger's seat belt (see page 24-3).

To page 24-79



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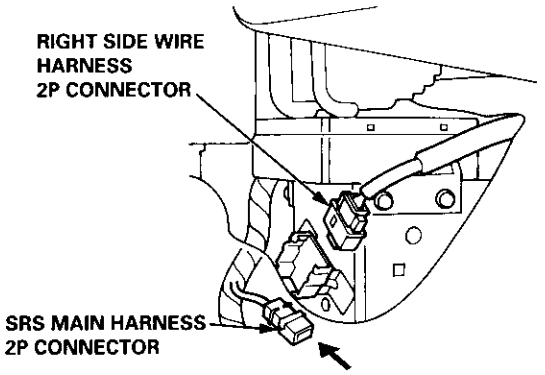
From page 24-78

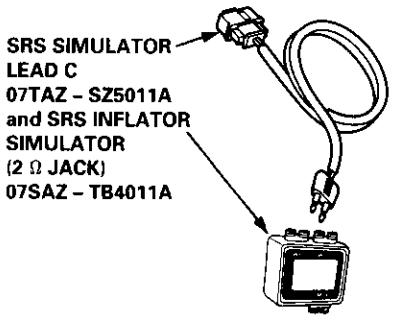
Check for a short to power in the side wire harness:
1. Disconnect the right side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 4-4 indicated?

YES — **NO**

Short to power in the right side wire harness; replace the harness.





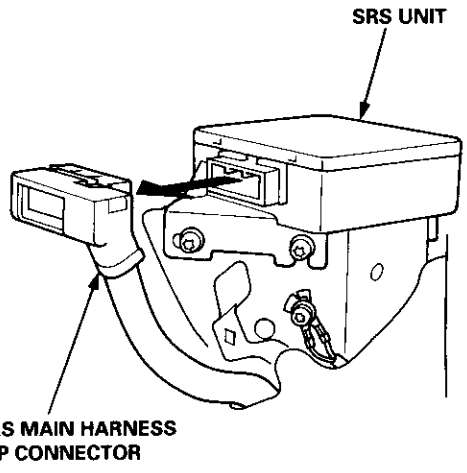
Check for a short to power in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and driver's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Disconnect the special tool (2 Ω) from the SRS main harness 2P connector, then reconnect the negative battery cable.
5. Turn the ignition switch ON (II).
6. Check for voltage between the No. 5 terminal of the SRS main harness 18P connector and body ground. There should be 0.5 V or less. Check for voltage between the No. 12 terminals of the SRS main harness 18P connector. There should be 0.5 V or less.

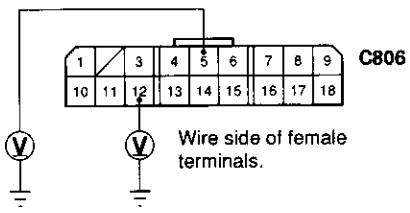
Is the voltage as specified?

YES — **NO**

Faulty SRS unit; replace the SRS unit (see page 24-95).

Short to power in the SRS main harness; replace the SRS main harness.





DTC 4-5

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Try to reproduce the SRS indicator light:
1. Erase the DTC memory (see page 24-28).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds, and then goes off.

Does the SRS indicator light stay on?

YES

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-28.

NO

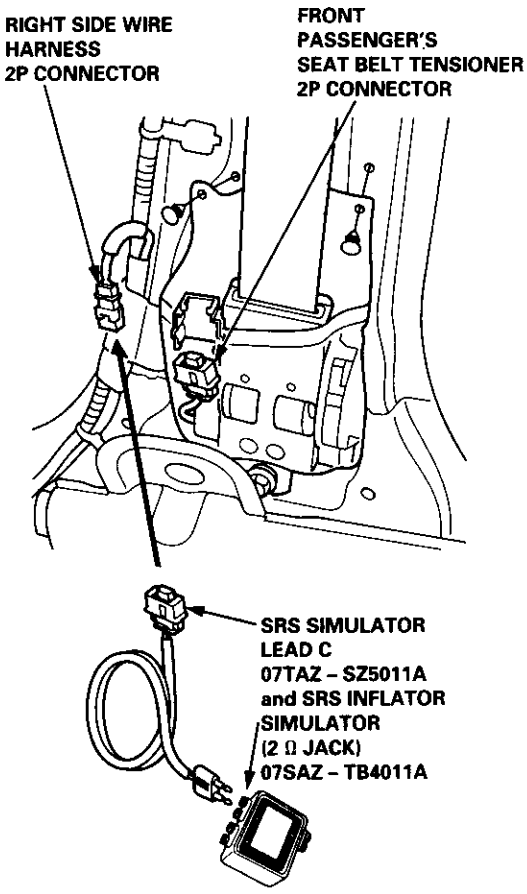
Check for a short to ground in the front passenger's seat belt tensioner:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's seat belt tensioner 2P connector from the right side wire harness 2P connector (see page 24-23). Do not disconnect the driver's seat belt tensioner 2P connector.
3. Connect the special tool (2 Ω) to the right side wire harness 2P connector.
4. Reconnect the negative battery cable.
5. Erase the DTC memory (see page 24-28).
6. Read the DTC (see page 24-26).

Is DTC 4-5 indicated?

YES

Short to ground in the front passenger's seat belt tensioner; replace the front passenger's seat belt (see page 24-3).

NO



To page 24-81

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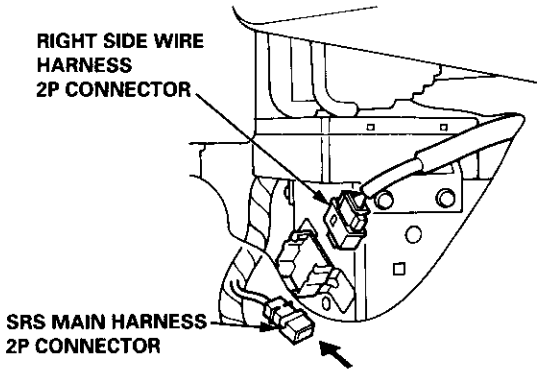
From page 24-80

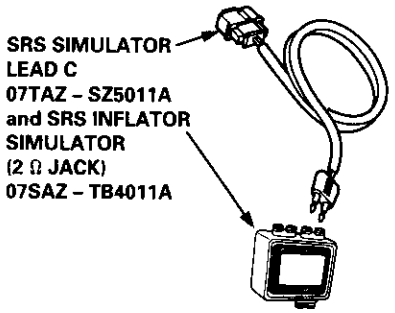
Check for a short to ground in the side wire harness:
1. Disconnect the right side wire harness 2P connector from the SRS main harness 2P connector.
2. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
3. Erase the DTC memory.
4. Read the DTC.

Is DTC 4-5 indicated?

YES — **NO**

Short to ground in the right side wire harness; replace the harness.





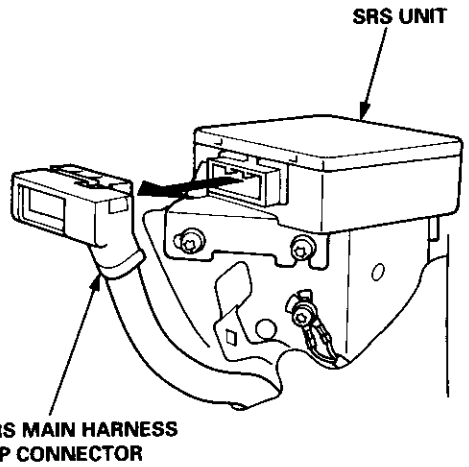
Check for a short to ground in the SRS main harness:
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbags, and driver's seat belt tensioner connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Disconnect the special tool (2 Ω) from the SRS main harness 2P connector.
5. Check resistance between the No. 5 terminal of the SRS main harness 18P connector and body ground, and between the No. 12 terminal of the SRS main harness 18P connector and body ground. There should be 1 MΩ or more.

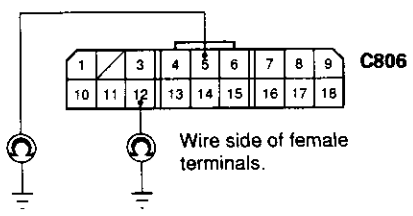
Is the resistance as specified?

YES — **NO**

Faulty SRS unit; replace the SRS unit (see page 24-95).

Short to ground in the SRS main harness; replace the SRS main harness.





DTC 8-6 — '97 model

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Besides indicating an abnormality in the SRS unit, DTC 8-6 may also indicate that two problems equivalent to DTC 1-1 and 2-4, 1-4 and 2-1, or 1-4 and 2-4 occurred at the same time. Proceed in the order shown below.

Check the SRS main harness:
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
2. Disconnect the driver's airbag and front passenger's airbag connectors (see page 24-23).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the battery positive cable, then reconnect the negative cable.
5. Turn the ignition switch ON (II).
6. Connect a voltmeter and measure voltage between the No. 10 terminal of the SRS main harness 18P connector and ground, and between the No. 14 terminal and ground. There should be approx. 0 – 0.5 V.

Are voltages as specified?

YES

NO

Short to power in the SRS main harness; replace the SRS main harness.

Check the SRS main harness and the cable reel:
Connect a voltmeter and measure voltage between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal and ground. There should be approx. 0 – 0.5 V.

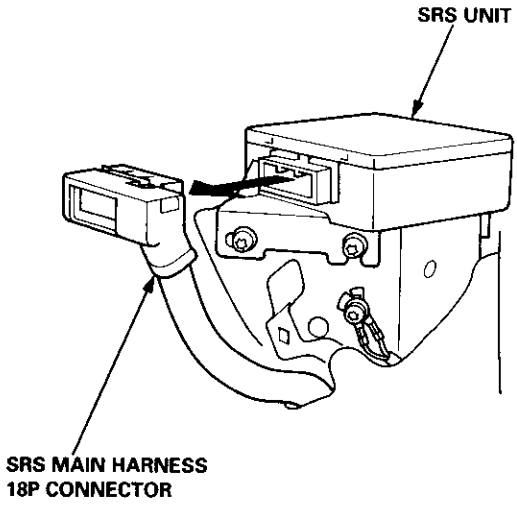
Are voltages as specified?

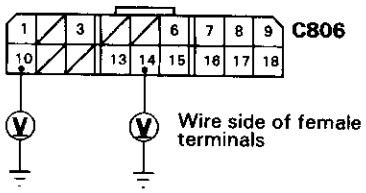
YES

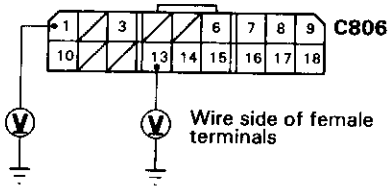
NO

Faulty SRS unit; replace the SRS unit (see page 24-95).

To page 24-83 (A)







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From page 24-82 (A)

Check the cable reel:
1. Turn the ignition switch OFF.
2. Disconnect the cable reel 2P connector from the SRS main harness.
3. Turn the ignition switch ON (II).
4. Connect a voltmeter and measure voltage between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal and ground. There should be approx. 0 – 0.5 V.

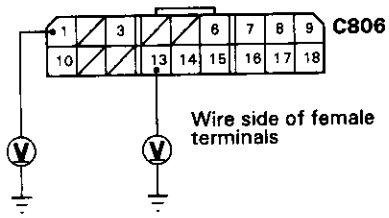
Are voltages as specified?

YES

Short to power in the cable reel; replace the cable reel (see page 24-92).

NO

Short to power in the SRS main harness; replace the SRS main harness.



DTC 9-2 — '97 model

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 23 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES — (A) To page 24-85

NO — Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

Is the fuse OK?

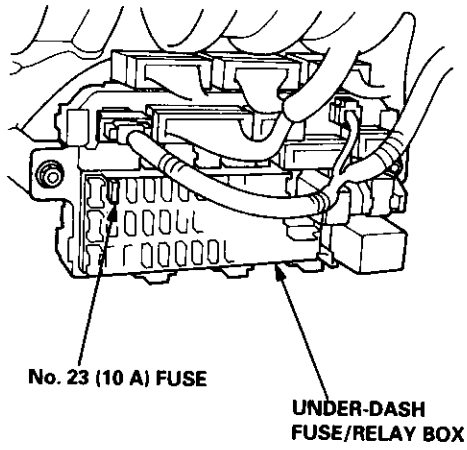
YES — **The problem has disappeared. Test-drive the vehicle and see Troubleshooting Intermittent Failures on page 24-28.**

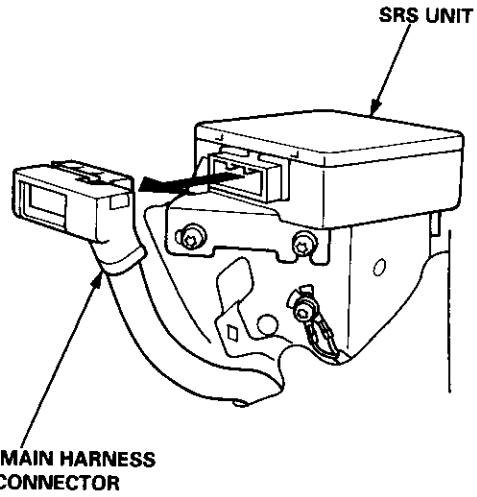
NO — **Check for short to ground between the under-dash fuse/relay box and the SRS unit.**
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (see page 24-23).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be 1 MΩ or more.

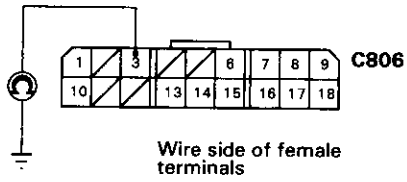
Is the resistance as specified?

YES — **Faulty SRS unit; replace the SRS unit (see page 24-95).**

NO — (B) To page 24-85







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from page 24-84
(B)

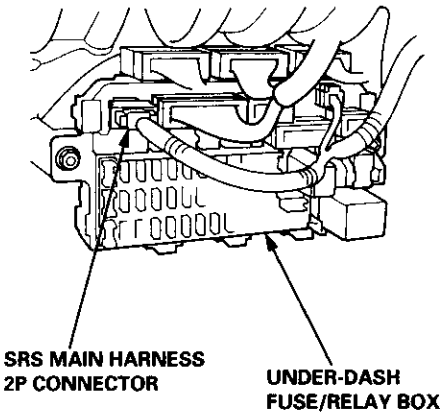
Check for short to ground in the SRS main harness:
1. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
2. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be 1.0 MΩ or more.

Is the resistance as specified?

YES — **NO**

Short to ground in the under-dash fuse/relay box; replace the under-dash fuse/relay box.

Short to ground in the SRS main harness; replace the SRS main harness.



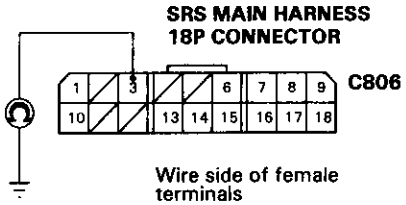
(A) From page 24-84

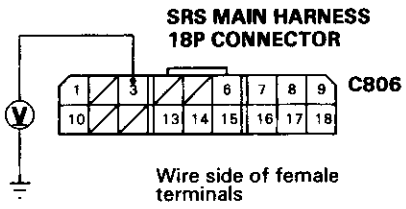
Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (see page 24-23).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the battery positive cable, then reconnect the negative cable.
6. Connect a voltmeter between the No. 3 terminal of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II) , and measure voltage.

Is there battery voltage?

YES — **NO**

Poor contact at the SRS main harness 18P connector; check the connector.
- **If the connector is OK, substitute a known-good SRS unit, and recheck.**
- **If the problem is still present, replace the SRS main harness.**





To page 24-86

(cont'd)

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DTC 9-2 — '97 model (cont'd)

From page 24-85

Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
3. Check resistance between the No. 2 terminal of the SRS main harness 2P connector and the No. 3 terminal of the SRS main harness 18P connector.
   There should be 0 – 0.5 Ω.

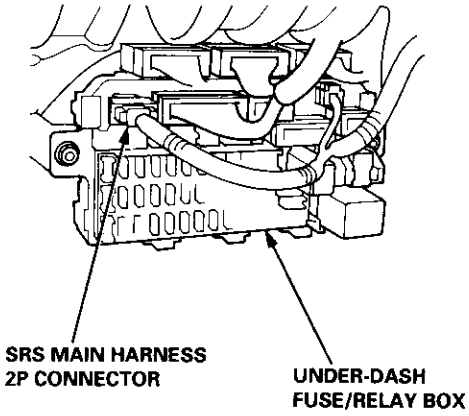
Is the resistance as specified?

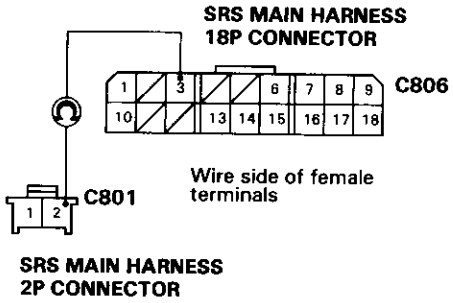
YES

Poor contact at the SRS main harness 2P connector; check the connector.
- **If the connector is OK, substitute a known-good under-dash fuse/relay box, and recheck.**
- **If the problem is still present, replace the SRS main harness.**

NO

Open in the SRS main harness; replace the SRS main harness.





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Replacement

After a collision in which the airbags were deployed, the airbags, the seat belt tensioners (if so equipped), and the SRS unit must be replaced.

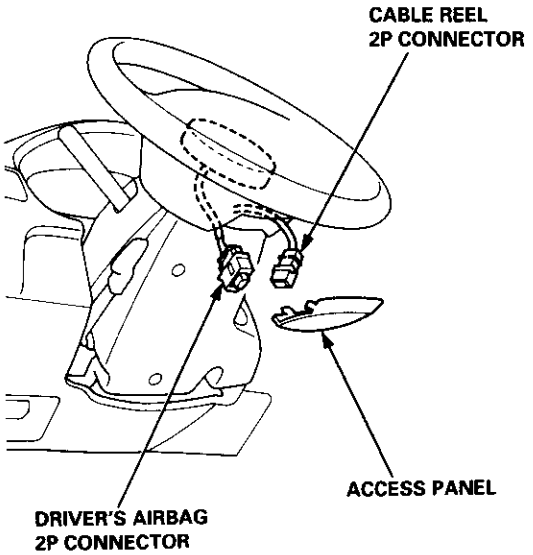
⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- **Always disconnect the driver's airbag connector when the SRS main harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

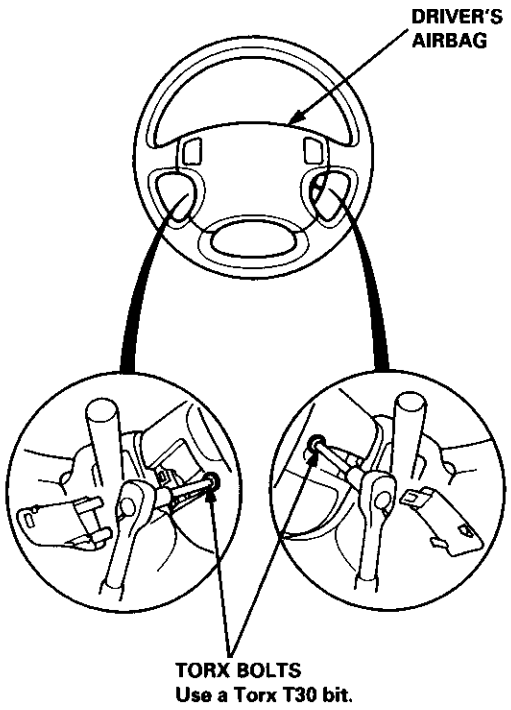
NOTE:
- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
- Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.



3. Remove the two Torx bolts from the steering wheel, and disconnect the horn connector. Remove the driver's airbag.

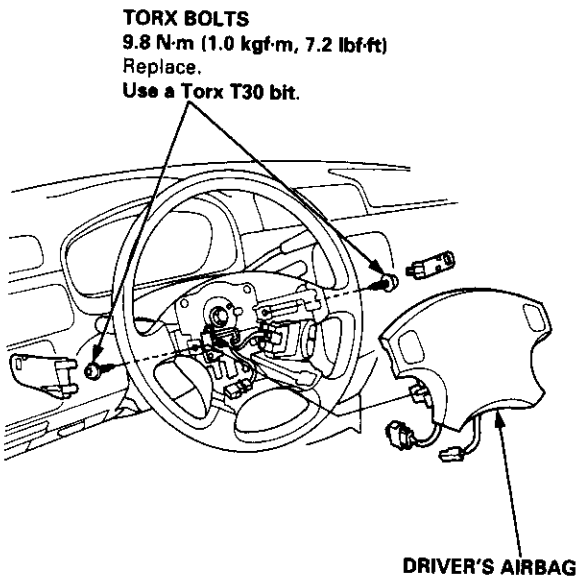


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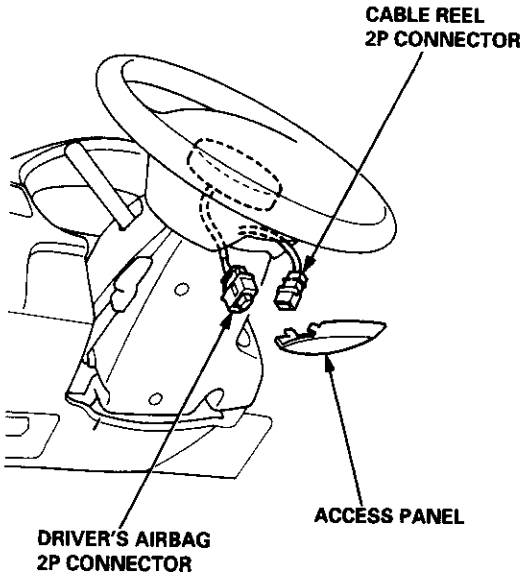
Replacement (cont'd)

CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other parts.

4. Place the new driver's airbag into the steering wheel, and secure it with new Torx bolts.



5. Connect the driver's airbag 2P connector to the cable reel 2P connector, then install the access panel on the steering wheel.



6. Connect the battery positive cable, then connect the negative cable.

7. After installing the airbag assembly, confirm proper system operation:
   - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
   - Make sure both horn buttons work.
   - Take a test-drive, and make sure the cruise control switches work.

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Replacement

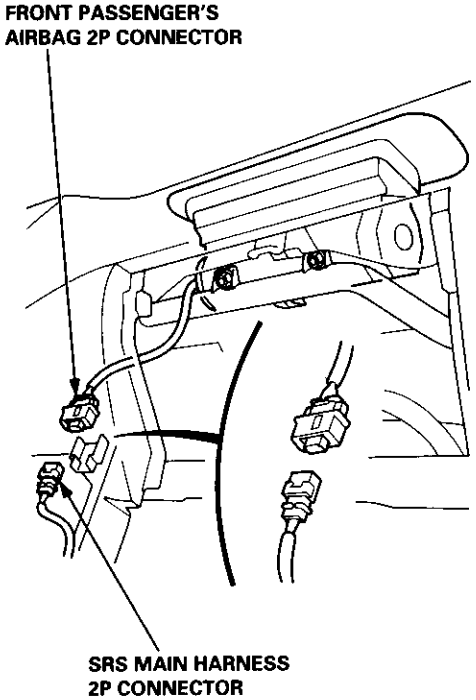
After a collision in which the airbags were deployed, the airbags, the seat belt tensioners (if so equipped), and the SRS unit must be replaced.

⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- **Always disconnect the front passenger's airbag connector when the SRS main harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

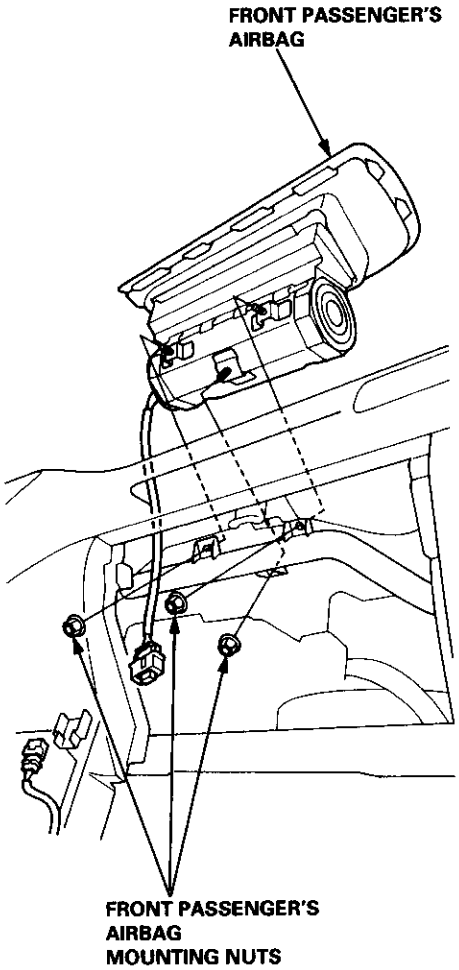
NOTE:
- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
- Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
2. Remove the glove box (see section 20).
3. Disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.



4. Remove the three mounting nuts from the bracket.
5. Lift the front passenger's airbag out of the dashboard.

NOTE: The airbag lid has pawls on its side which attach it to the dashboard. To remove the airbag, cover the lid and dashboard with a cloth, and pry carefully with a flat tip screwdriver.



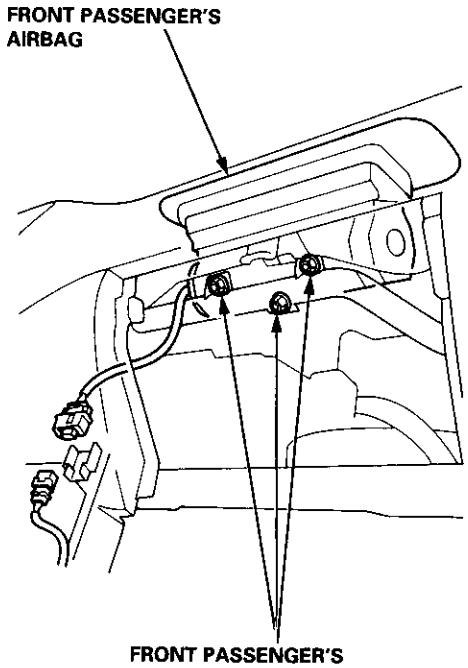
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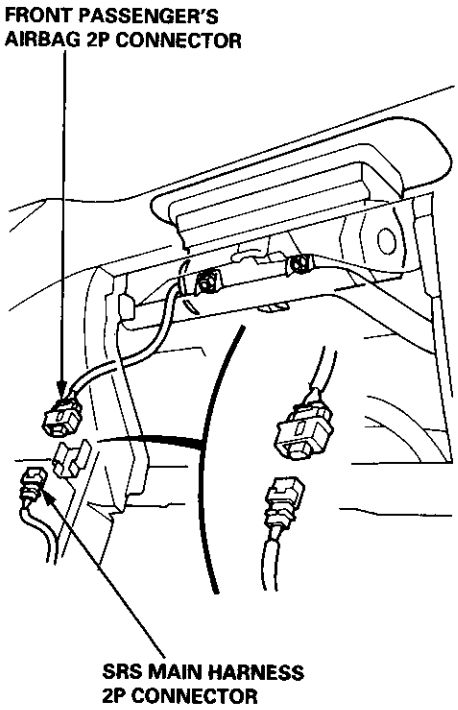
Replacement (cont'd)

CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other parts.

6. Place the new front passenger's airbag into the dashboard. Tighten the front passenger's airbag mounting nuts.



7. Attach the airbag connector to the connector holder, then reinstall the glove box.



8. Connect the battery positive cable, then connect the negative cable.

9. After installing the airbag, confirm proper system operation:
   Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

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Replacement

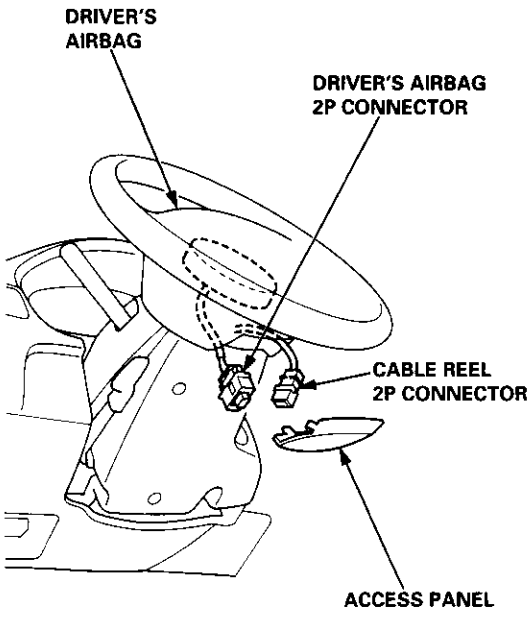
⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- **Always disconnect the airbag connector when the SRS main harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

NOTE: Carefully inspect the airbag before installing it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

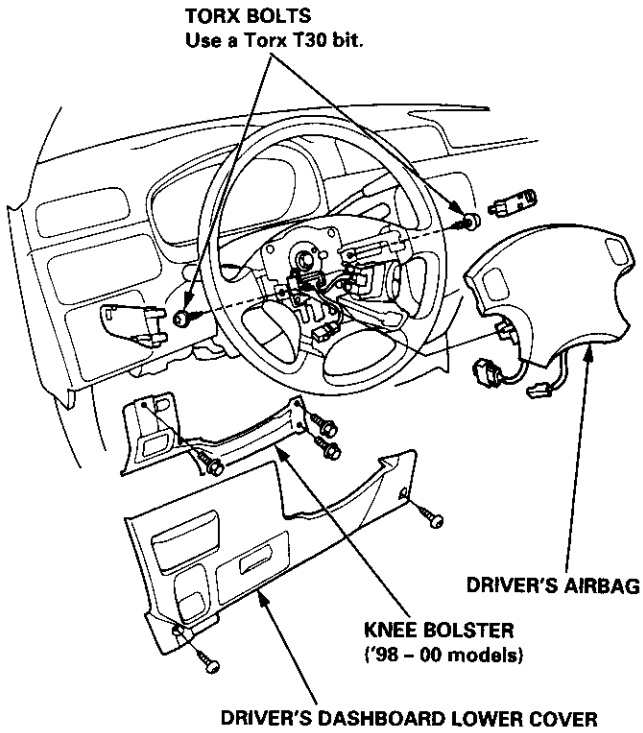
1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



3. Make sure the wheels are aligned straight ahead.

4. Remove the two Torx bolts from the steering wheel, and disconnect the horn connector. Remove the driver's airbag.

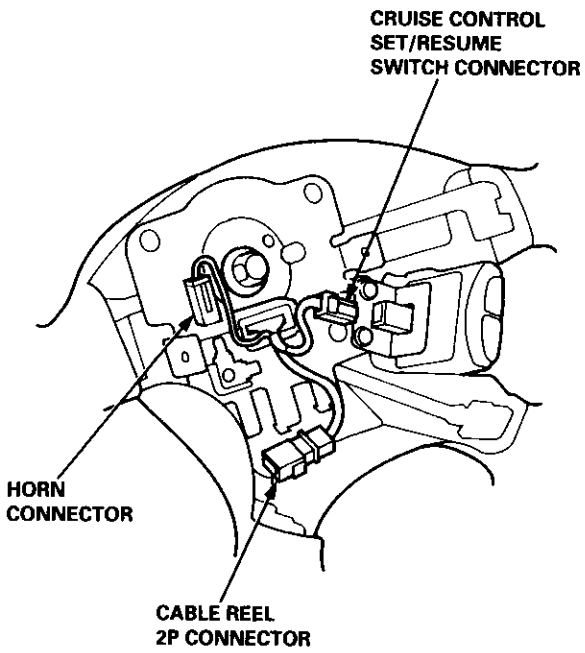


5. Remove the driver's dashboard lower cover (and the knee bolster).

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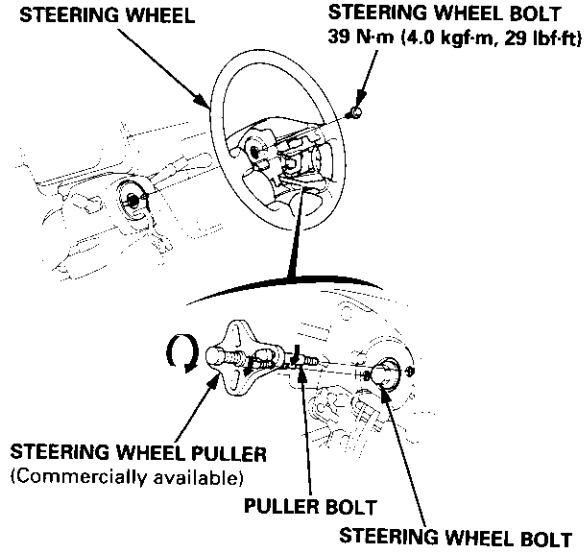
Replacement (cont'd)

6. Disconnect the connectors from the horn and cruise control set/resume switches.

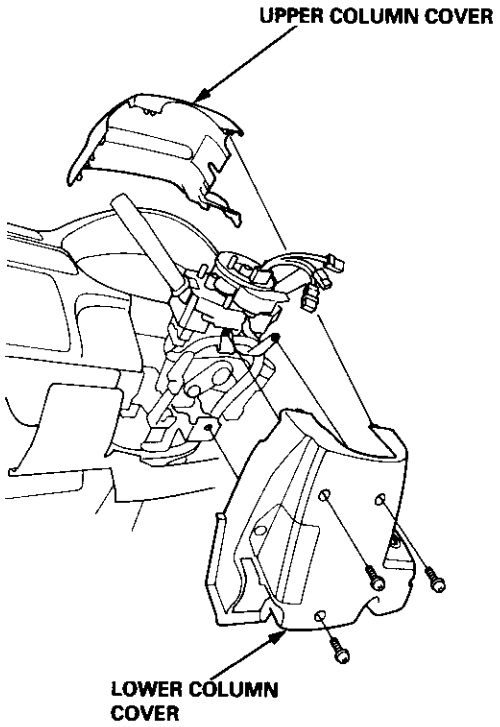


7. Loosen the steering wheel bolt, then install a steering wheel puller on the steering wheel and remove it.

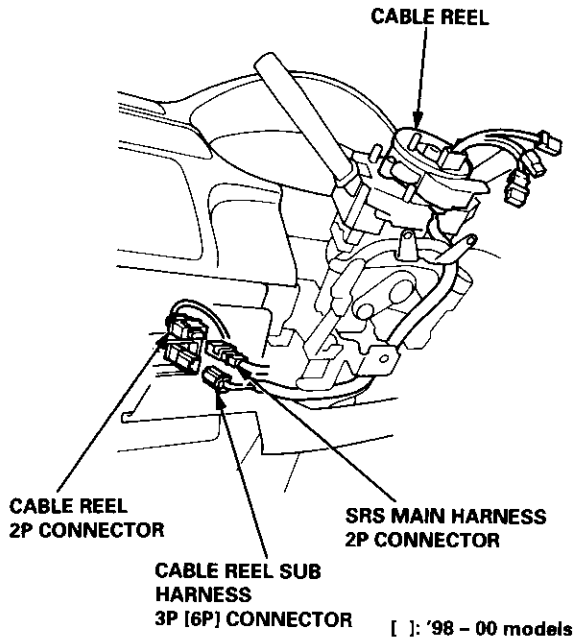
   Note these items when removing the steering wheel:
   - Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
   - If you thread the puller bolts into the wheel hub more than five threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.



8. Remove the column covers.



9. Disconnect the 3P [6P] connector between the main wire harness and cable reel sub-harness, and the 2P connector between the cable reel and SRS main harness.



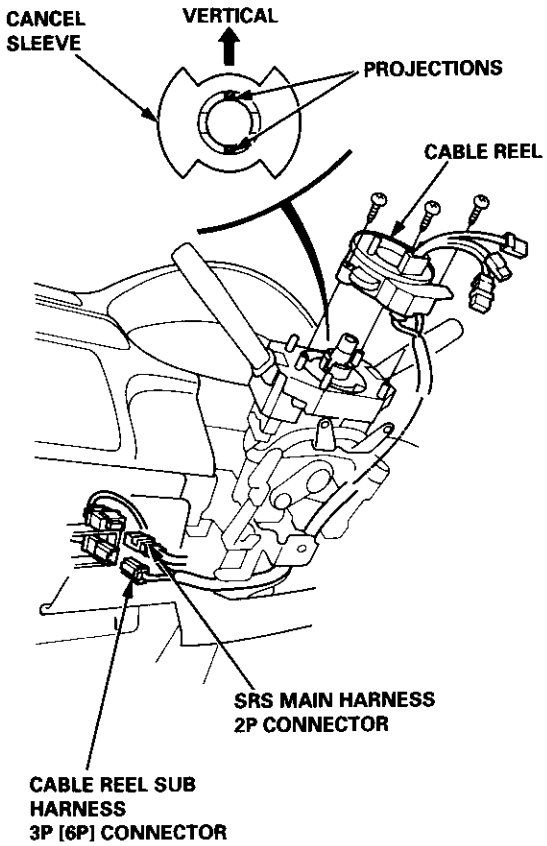
10. Remove the cable reel from the column.

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NOTE:

- Before installing the steering wheel, the front wheels should be aligned straight ahead.
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.
- After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct (road test). If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

11. Set the cancel sleeve so that the projections are aligned as shown.

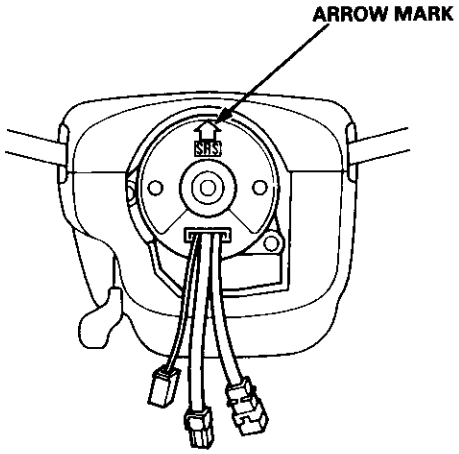


[ ]: '98 – 00 models

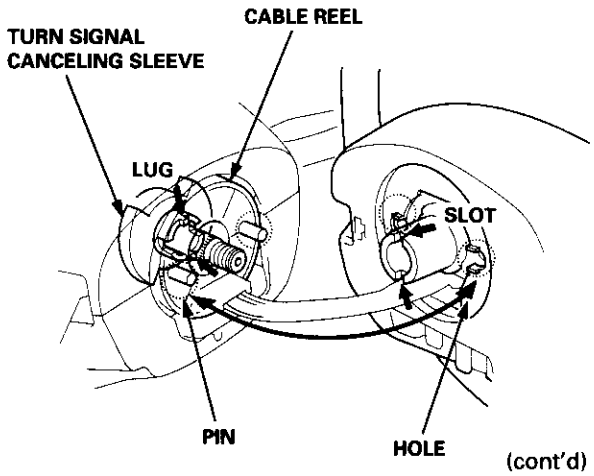
12. Carefully install the cable reel on the steering column shaft. Then connect the 3P [6P] connector to the cable reel sub harness, and connect the 2P connector to the SRS main harness.

13. Install the steering column covers.

14. If necessary, center the cable reel. (New replacement cable reels come centered.) Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



15. Install the steering wheel on to the steering column shaft, making sure the steering wheel shaft engages the cable reel and canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.

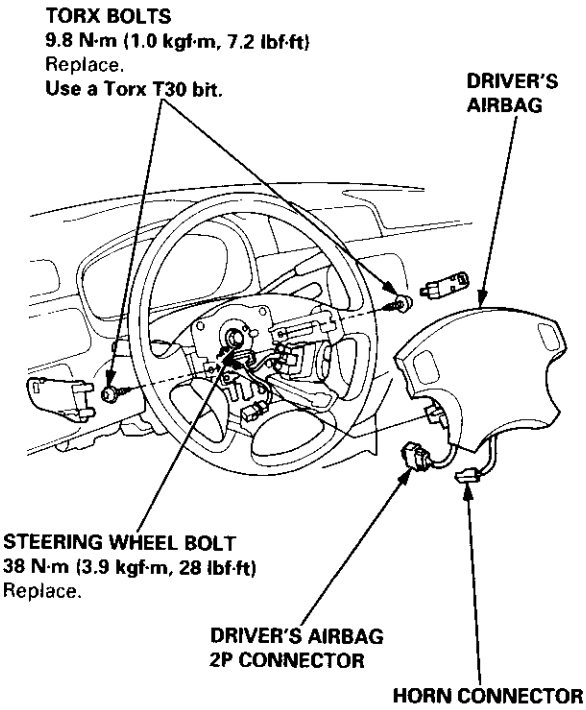


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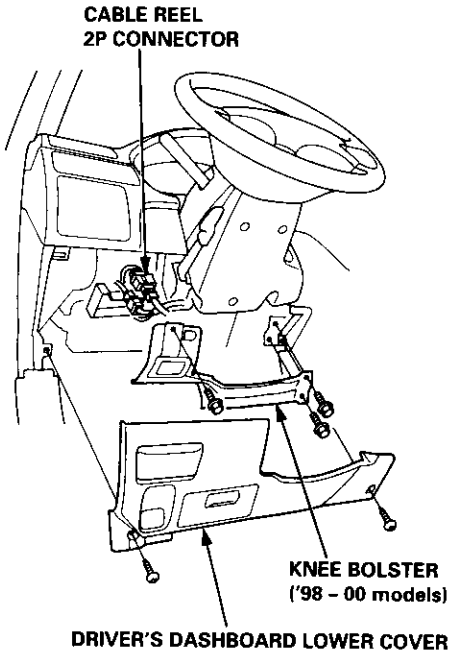
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Replacement (cont'd)

16. Tighten the steering wheel bolt to the specified torque, and connect the horn connector to the steering wheel. Then install the driver's airbag.



17. Attach the cable reel 2P connector to the connector holder. Then install (the knee bolster and) the driver's dashboard lower cover.



18. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

19. Reconnect the battery positive cable, then the negative cable.

20. After installing the cable reel, confirm proper system operation:

    - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
    - Make sure both horn buttons work.
    - Go for a test drive, and make sure the cruise control switches work.

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Replacement

CAUTION:

- **Before disconnecting any part of the SRS wire harness, disconnect the airbag connectors (and seat belt tensioner connectors).**
- **During installation or replacement, do not bump (impact wrench, hammer etc.) the area near the SRS unit.**
- **Do not damage the SRS unit terminals or connectors.**
- **Do not disassemble the SRS unit; it has no serviceable parts.**
- **Store the SRS unit in a clean, dry area.**
- **Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**

1. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

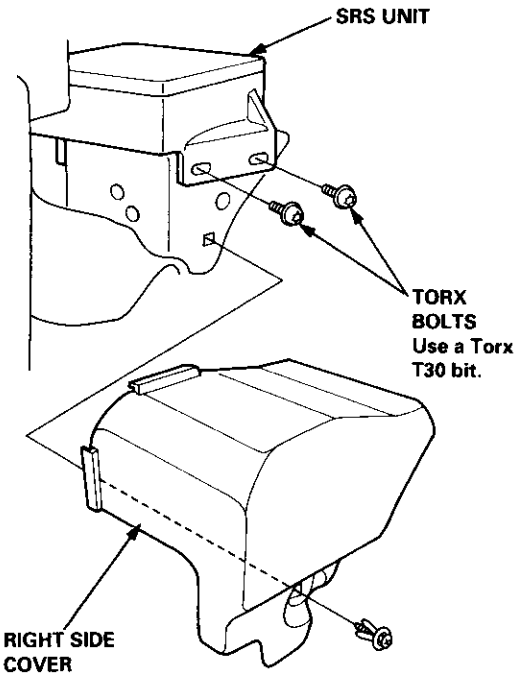
2. Disconnect the airbag connectors (and seat belt tensioner connectors). (When disconnected, the airbag and seat belt tensioner connectors are automatically shorted.)

   Driver's Side:
   - Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel (see page 24-23).

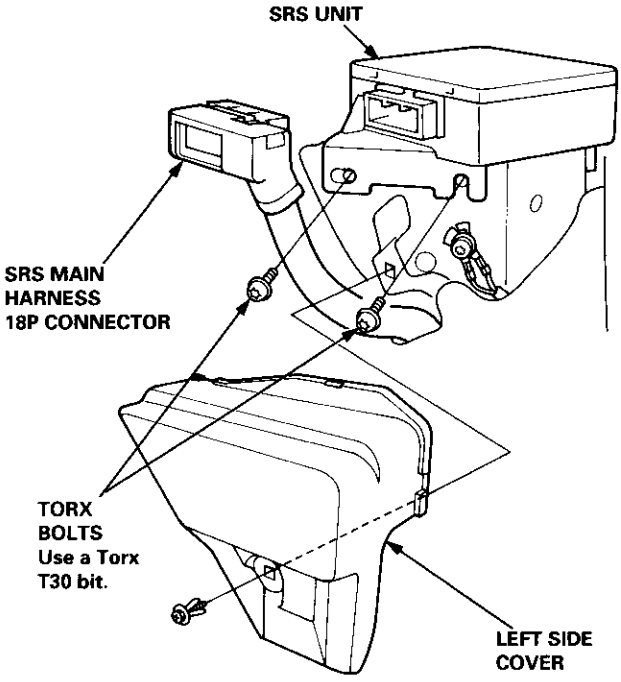
   Front Passenger's Side:
   - Disconnect the 2P connector between the front passenger's airbag and SRS main harness (see page 24-23).

   Seat Belt Tensioner ('98 – 00 models):
   - Remove the left and right center pillar lower trim panels (see section 20).
   - Disconnect the seat belt tensioner 2P connectors from the left side wire harness (driver's side) and the right wire harness (front passenger's side) (see page 24-23).

3. Remove the right side cover from the SRS unit.



4. Remove the left side cover from the SRS unit, then disconnect the SRS main harness 18P connector from the SRS unit.



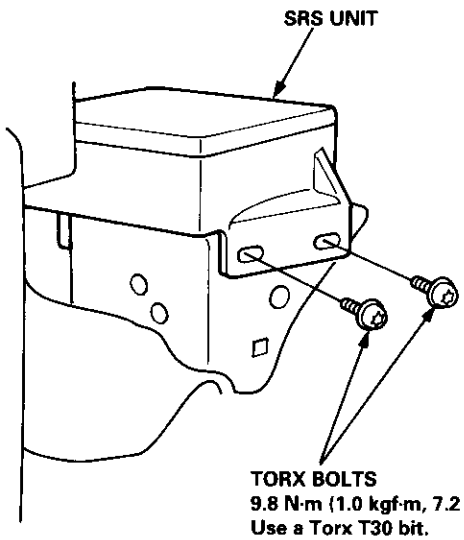
5. Remove the four Torx bolts from the SRS unit, then pull out the SRS unit from the driver's side.

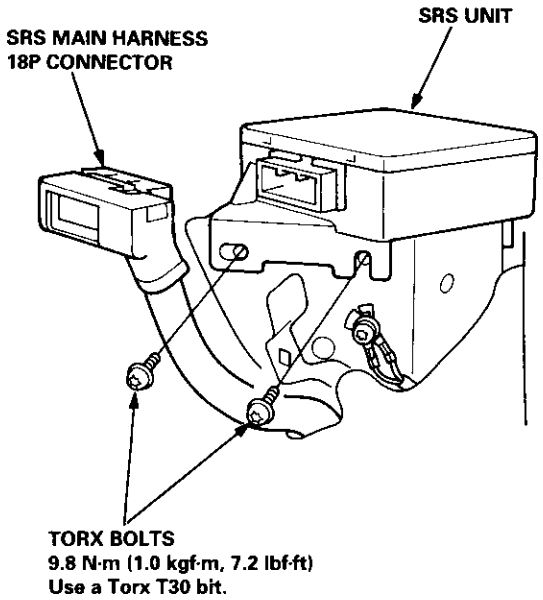
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Replacement (cont'd)

6. Install the new SRS unit. If the Torx bolts you removed in the previous step have red threads, replace the Torx bolts.





7. Connect the SRS main harness 18P connector to the SRS unit; push it into position until it clicks.

8. Install the SRS unit covers (right and left). Make sure the covers snap together in the middle.

9. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, then reinstall the access panel on the steering wheel.

10. Reconnect the front passenger's airbag connector to the SRS main harness.

11. Reconnect the left side wire harness 2P connector to the driver's seat belt tensioner and the right side wire harness 2P connector to the front passenger's seat belt tensioner ('98 – 00 models).

12. Reinstall the center pillar lower trim panels ('98 – 99 models).

13. Reconnect the battery positive cable, then the negative cable.

14. After installing the SRS unit, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

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Disposal

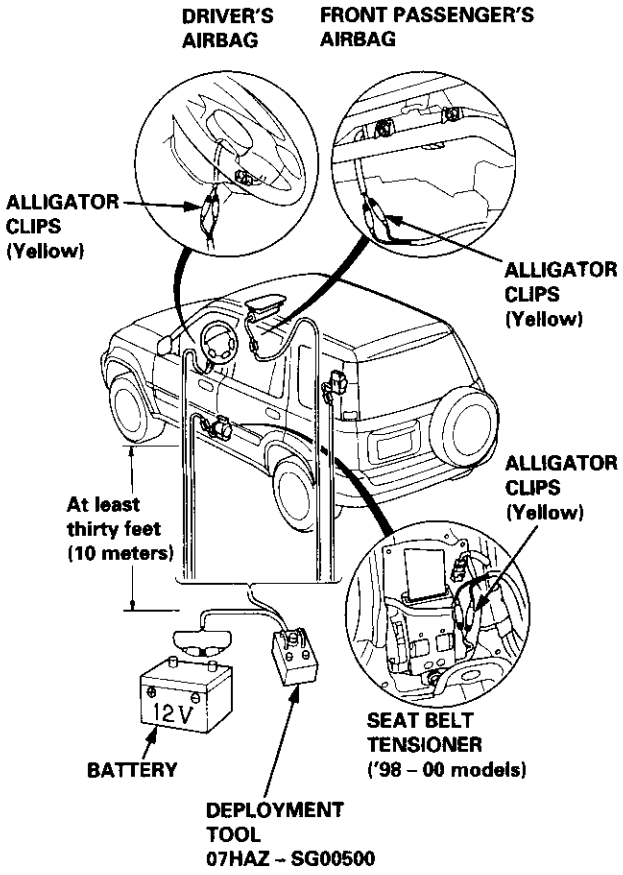
Before scrapping any airbags (and seat belt tensioners) (including those in a whole vehicle to be scrapped), the airbags (and seat belt tensioners) must be deployed. If the vehicle is still within the warranty period the Honda District Service Manager must give approval and/or special instructions, before you deploy the airbags (and seat belt tensioners). Only after the airbags (and seat belt tensioners) have been deployed (as the result of vehicle collision, for example), can they be scrapped.
If the airbags (and seat belt tensioners) appear intact (not deployed), treat them with extreme caution.
Follow this procedure:

Deploying the Airbags (and Seat Belt Tensioners): In-vehicle

If an SRS vehicle is to be entirely scrapped, its airbags (and seat belt tensioners) should be deployed while still in the vehicle. The airbags (and seat belt tensioners) should not be considered as salvageable parts and should never be installed in another vehicle.

⚠ WARNING Confirm that each airbag (and seat belt tensioner) is securely mounted; otherwise, severe personal injury could result from deployment.

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Confirm that the special tool is functioning properly by following the check procedure on the tool label or on page 24-98.
3. Remove the access panel, then disconnect the 2P connector between the driver's airbag and the cable reel (see page 24-23).
4. Remove the glove box, then disconnect the 2P connector between the front passenger's airbag and SRS main harness (see page 24-23).
5. Remove the center pillar lower trim panel, then disconnect the 2P connector between the seat belt tensioner and side wire harness ('98 – 00 models) (see page 24-23).
6. Cut off the airbag (and seat belt tensioner) connectors. Strip the ends of the airbag (and seat belt tensioner) wires, and connect the deployment tool alligator clips to the airbag (and seat belt tensioner). Place the deployment tool at least thirty feet (10 meters) away from the airbag (and seat belt tensioner).

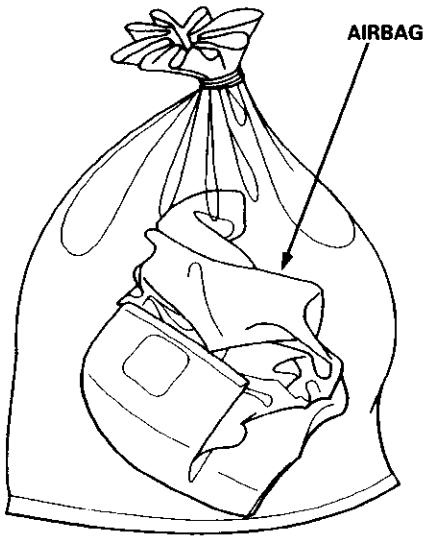


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Disposal (cont'd)

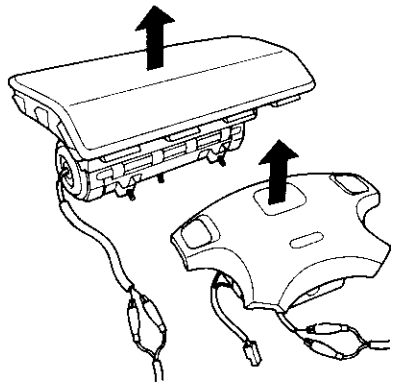
7. Connect a 12 volt battery to the tool:
   - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. Go to Damaged Airbag Special Procedure.
   - If the red light on the tool comes on, the airbag is ready to be deployed.
8. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible; a loud noise and rapid inflation of the bag, followed by slow deflation).
   - If the airbags deploy and the green light on the tool comes on, continue with this procedure.
   - If an airbag doesn't deploy, yet the green light comes ON, its igniter is defective. Go to Damaged Airbag Special Procedure.
   - During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.
9. Dispose of the complete airbag. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

CAUTION:
- **Wear a face shield and gloves when handling a deployed airbag.**
- **Wash your hands and rinse them well with water after handling a deployed airbag.**



Deploying the Airbag: Out-of-vehicle

If an intact airbag has been removed from a scrapped vehicle, or has been found defective or damaged during transit, storage or service, it should be deployed as follows:



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool label.
2. Position the airbag face up, outdoors on flat ground at least thirty feet (10 m) from any obstacles or people.
3. Follow steps 6, 7, 8, and 9 of the in-vehicle deployment procedure.

Damaged Airbag (or Seat Belt Tensioner) Special Procedure

⚠ WARNING If an airbag (or Seat Belt Tensioner) cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-3 and 24-87 through 90.
2. In all cases, make a short circuit by twisting together the two airbag inflator wires.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG (or TENSIONER) NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your Honda District Service Manager for how and where to return it for disposal.

Deployment Tool: Check Procedure

1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. Disconnect the battery and the yellow clips.

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