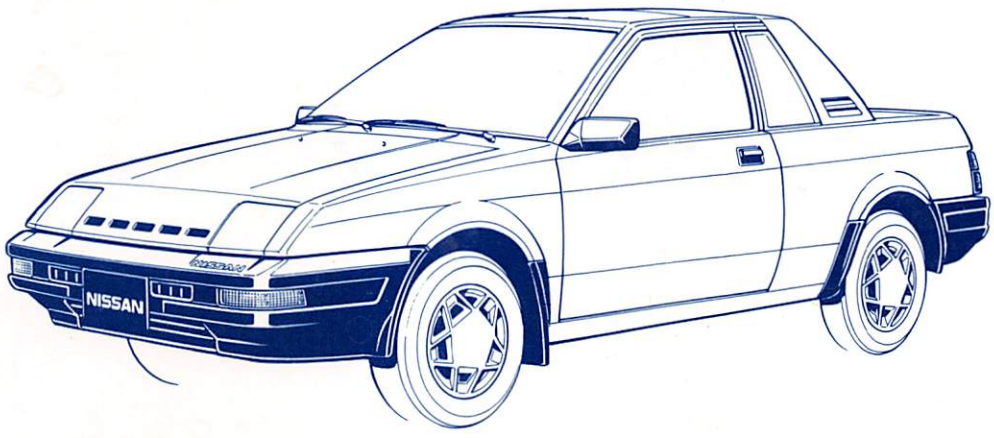
NISSAN
PULSAR NX

1986



SERVICE MANUAL

R. CURTIS

NISSAN PULSAR NX

Model N12 Series

FOREWORD

This service manual has been prepared primarily for the purpose of assisting service personnel in providing effective service and maintenance of the 1986 NISSAN PULSAR NX.

This manual includes procedures for maintenance, adjustments, removal and installation, disassembly and assembly of components, and trouble-shooting.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your NISSAN model differs from the specifications contained in this manual, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

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HOW TO USE THIS MANUAL

- This Service Manual is designed as a guide for servicing vehicles.
- This manual deals with the engine, chassis, body and the electrical system.
- **A QUICK REFERENCE INDEX** is provided on the first page. Refer to this index along with the index of the particular section you wish to consult.
- The first page of each section lists the contents and gives the page numbers for the respective topics.
- **SERVICE DATA AND SPECIFICATIONS** are contained in each section.
- **TROUBLE DIAGNOSES AND CORRECTIONS** are also included in each section. This feature of the manual lists the likely causes of trouble and recommends the appropriate corrective actions to be taken.
- A list of **SPECIAL SERVICE TOOLS** is included in each section. The special service tools are designed to assist you in performing repair safely, accurately and quickly. For information concerning how to obtain special service tools, write to the following address:

  Kent-Moore Corporation
  29784 Little Mack
  Roseville, Michigan 48066

  Kent-Moore of Canada, Ltd.
  5466 Timberlea Blvd., Unit 2
  Mississauga, Ontario
  Canada L4W 2T7

- The measurements given in this manual are primarily expressed with the SI unit (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.
- The back cover of the manual provides maintenance data for quick reference.
- In the text, the following abbreviations are used:

S.D.S.:	Service Data and Specifications	L.H., R.H.:	Left Hand, Right Hand
Ⓣ:	Tightening Torque	M/T, A/T:	Manual Transaxle, Automatic Transaxle

- The captions **CAUTION** and **WARNING** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the car.
- Illustrations in this manual should be used in reference to the service affairs only. When ordering service parts, please refer to the appropriate PARTS CATALOG.



IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the car.
The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.
Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the car's safety will be jeopardized by the service method selected.

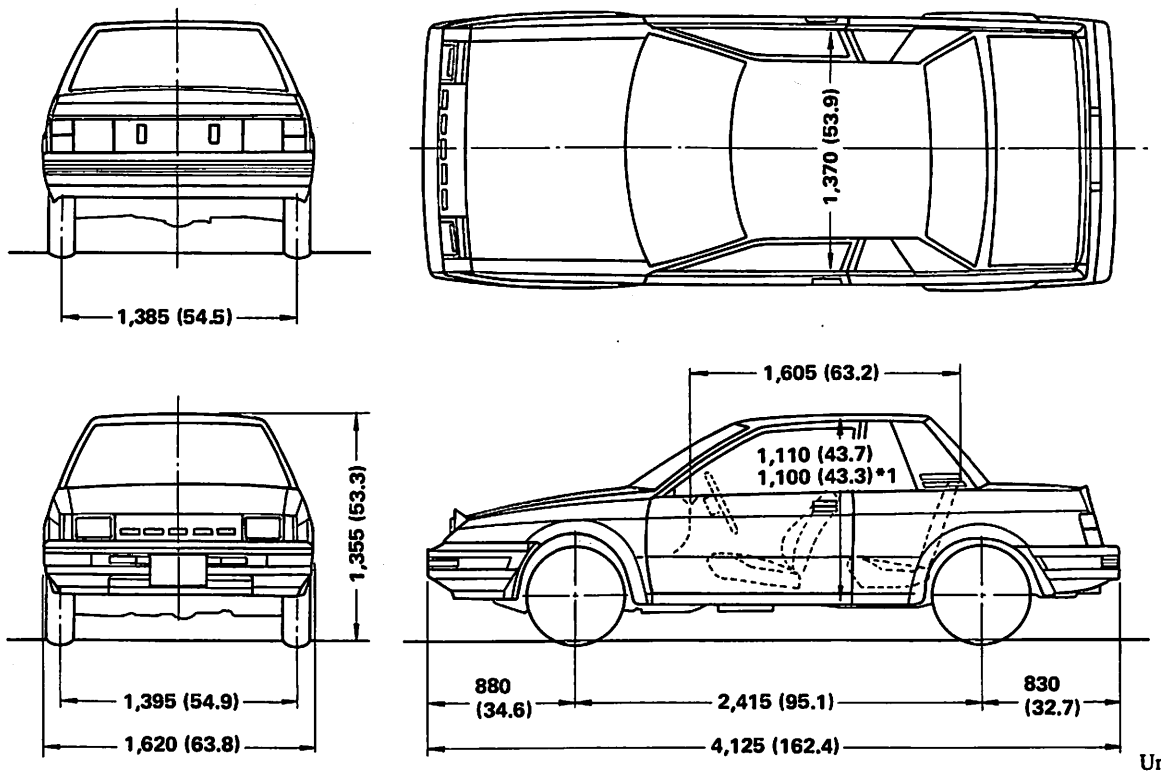
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GENERAL VIEWS

Coupe



Unit: mm (in)

*1: Sun roof equipped models

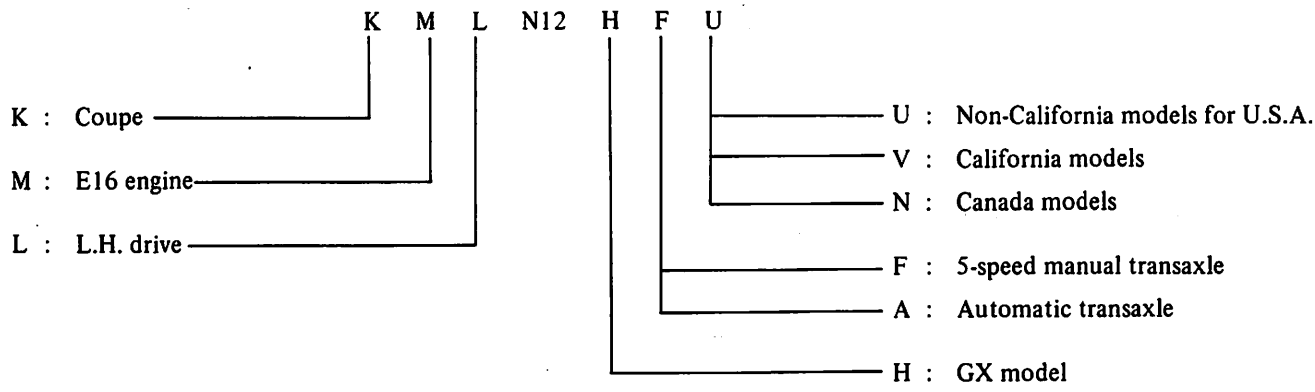
SGI211

MODEL VARIATION

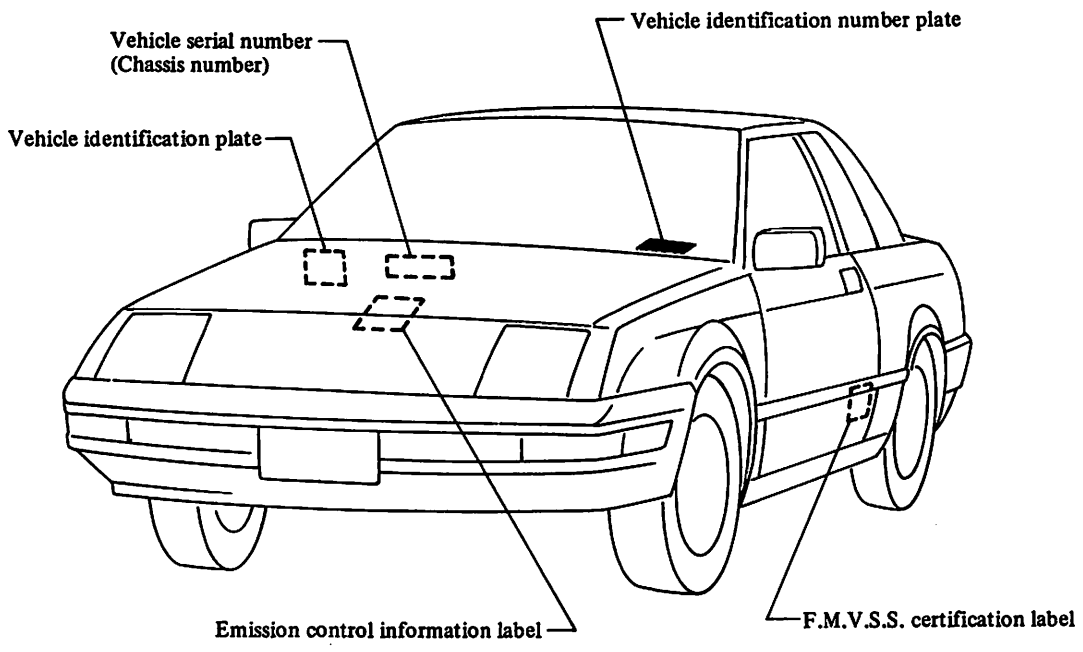
Destination	Body	Class	Model	Engine	Transaxle	Road wheel size*1 ... offset mm (in)	Tire size
California	Coupe	GX	KMLN12HFV	E16	RS5F30A	5J x 13 ... 40 (1.57)	175/70SR13
			KMLN12HAV		RL3F01A		
Non-California			KMLN12HFU		RS5F30A		P155/80D13 (For spare tire)
			KMLN12HAU		RL3F01A		
Canada			KMLN12HFN		RS5F30A		
			KMLN12HAN		RL3F01A		

*1 Pitch circle diameter is 114.3 mm (4.50 in).

Prefix and suffix designations



IDENTIFICATION NUMBERS



VEHICLE IDENTIFICATION NUMBER

JN1 M N 2 4 S * G M 000001

Manufacturer
JN1: Nissan, Passenger vehicle

Engine type
M: E16S

Vehicle line
N: Nissan PULSAR

Model change (0 to 9)

Body type
4: 2-door Coupe

Vehicle serial number
(Chassis number)

Manufacture plant
M: Tochigi

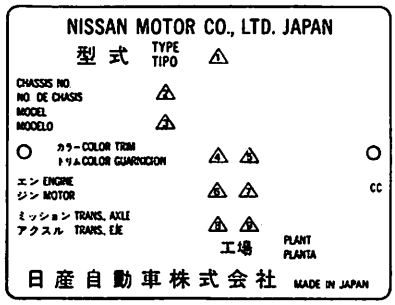
Model year
G: 1986 year model

Check digit (0 to 9 or X)
The code for the Check digit is determined by mathematical computation.

Restraint system
S: Standard

The 1986 models start production with the following vehicle identification numbers (chassis numbers).
JN1MN24S*GM000016

IDENTIFICATION PLATE

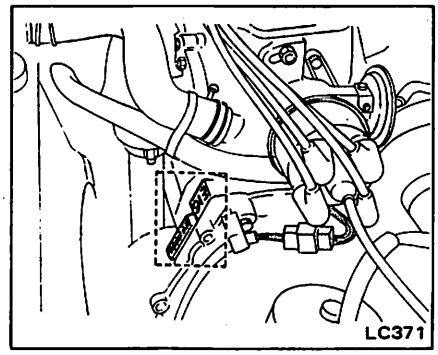


SGI315

1 Type
2 Vehicle identification number (Chassis number)
3 Model
4 Body color code
5 Trim color code
6 Engine model
7 Engine displacement
8 Transaxle model
9 Axle model

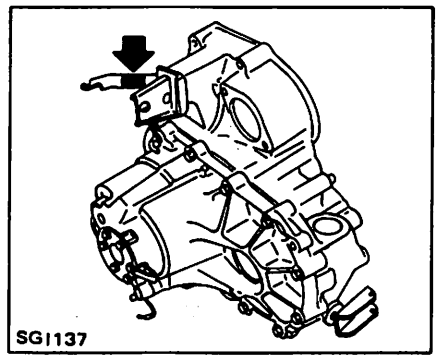
ENGINE SERIAL NUMBER

The engine serial number is stamped as shown in the illustration.



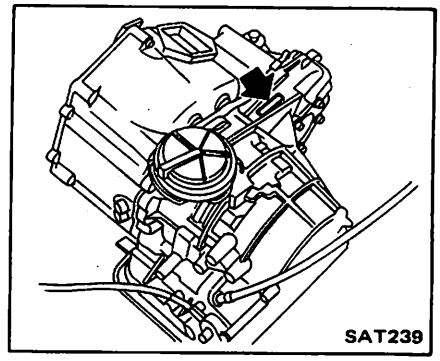
MANUAL TRANSAXLE NUMBER

The manual transaxle serial number label is attached on the clutch withdrawal lever.



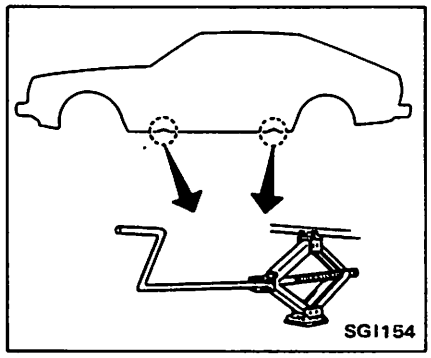
AUTOMATIC TRANSAXLE NUMBER

The automatic transaxle serial number label is attached on the upper face of the transmission case.



LIFTING POINTS AND TOWING

PANTOGRAPH JACK



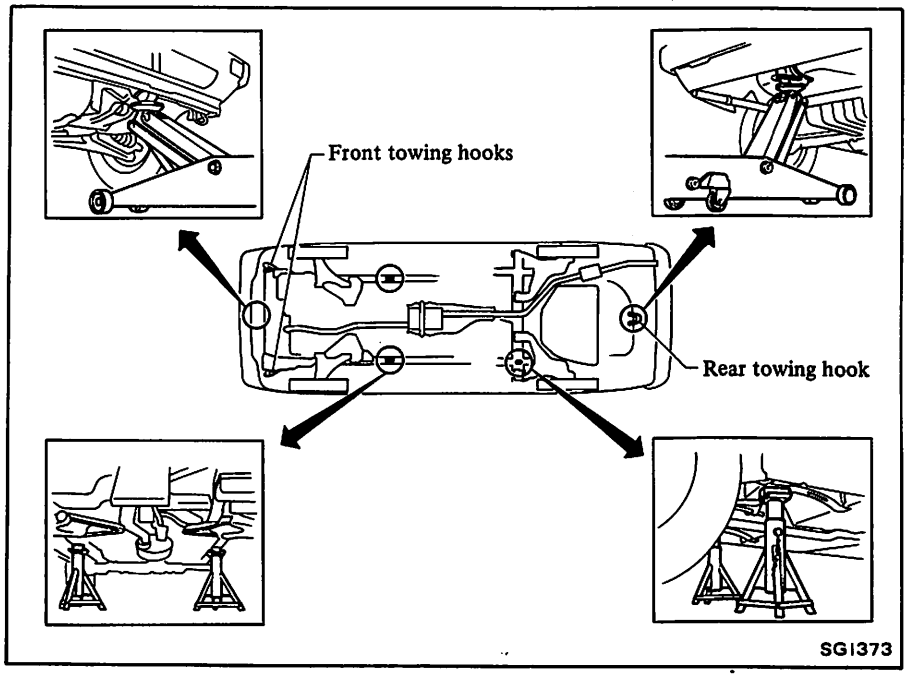
WARNING:

a. Never get under the vehicle while it is supported only by the jack. Always use safety stands to support frame when you have to get under the vehicle.

b. Place wheel chocks at both front and back of the wheel diagonally opposite the jack position.

Apply the pantograph jack furnished with the vehicle to the position indicated in the figure in a safe manner.

GARAGE JACK AND SAFETY STAND



WARNING:

a. When carrying out operations with the garage jack, be sure to support the vehicle with safety stands.

b. When jacking up the rear (front) of the vehicle, place the chocks at the front (rear) of the front (rear) wheels to hold them.

CAUTION:

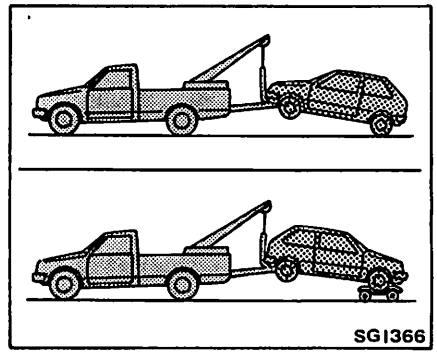
Always place a wood block between safety stand and vehicle body when supporting body with safety stand.

Apply the garage jack and safety stand to the position indicated in the figure in a safe manner.

TOWING

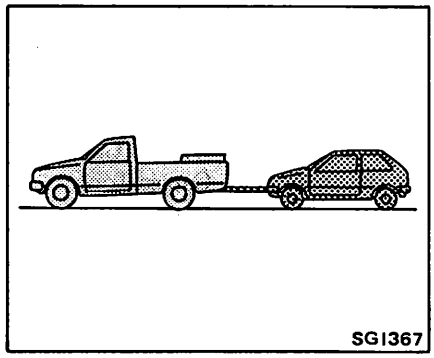
CAUTION:

- **All applicable State or Provincial (in Canada) laws and local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during a towing operation.**
  Towing is in accordance with Towing Procedure Manual at dealer side.
- **Before towing, make sure that the transaxle, steering system and power train are in good order. If any unit is damaged, a dolly must be used or the vehicle must be towed with the front wheels off the ground.**
- **Always observe posted speed limits when towing.**
- **When towing with the front wheels on the ground:**
  Turn the ignition key to the "OFF" position and secure the steering wheel in a straight-ahead position with a rope or similar device. Never place the ignition key in the "LOCK" position. This will result in damage to the steering lock mechanism.
  Move the gearshift lever to the neutral ("N" position).
- **When towing with the rear wheels on the ground, release the parking brake.**



We recommend that vehicle be towed with the driving (front) wheels off the ground as illustrated.

TOWING WITH FOUR WHEELS ON GROUND

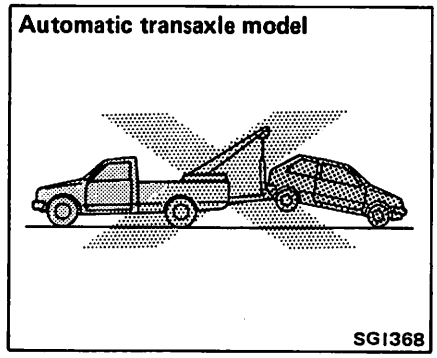


Automatic transaxle models

When towing with four wheels on the ground, observe the following restricted towing speeds and distances.

Speed MPH (km/h)	Below 30 (50)
Distance miles (km)	Less than 40 (65)

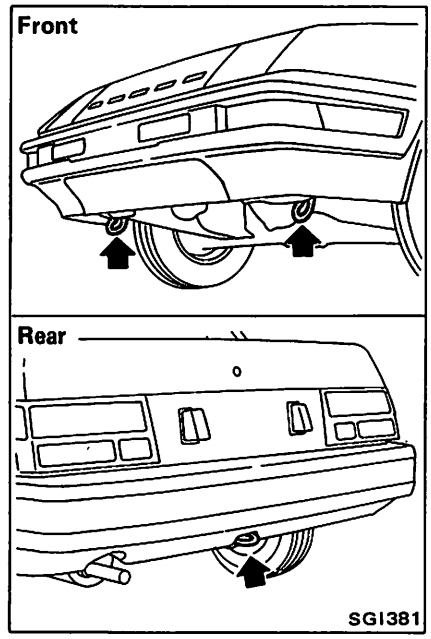
TOWING WITH REAR WHEELS RAISED (With front wheels on ground)



Automatic transaxle models

Never tow an automatic transaxle model with rear wheels raised (with front wheels on ground) as this may cause serious and expensive damage to the transaxle. If it is necessary to tow it with rear wheels raised, always use a towing dolly under the front wheels.

TOWING POINT



- Use only towing hooks. Otherwise, the vehicle body will be damaged.
- **Do not apply force to the towing hook in a lateral direction.**
  Keep the tow rope or similar device straight ahead, in line with the vehicle.

SPECIAL SERVICE TOOLS

Special Service Tools play very important role in the maintenance of cars. These are essential to the safe, accurate and speedy servicing.
The working times listed in the column under FLAT RATE TIME in FLAT RATE SCHEDULE are computed based on the use of Special Service Tools.
The identification code of maintenance tools is made up of 2 alphabetical letters and 8-digital figures.
The heading two letters roughly classify tools or equipment as:

ST00000000:	Special Service Tool
KV00000000:	Special Service Tool
EM00000000:	Engine Overhauling Machine
GG00000000:	General Gauge
LM00000000:	Garage Tool
HT00000000:	Hand Tool

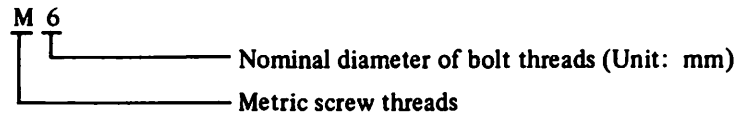
TIGHTENING TORQUE OF STANDARD BOLT

Grade	Bolt or nut size	Bolt or nut diameter* mm	Pitch mm	Tightening torque		
				N·m	kg-m	ft-lb
4T	M6	6.0	1.0	3 - 4	0.3 - 0.4	2.2 - 2.9
	M8	8.0	1.25	8 - 11	0.8 - 1.1	5.8 - 8.0
			1.0	8 - 11	0.8 - 1.1	5.8 - 8.0
	M10	10.0	1.5	16 - 22	1.6 - 2.2	12 - 16
			1.25	16 - 22	1.6 - 2.2	12 - 16
	M12	12.0	1.75	26 - 36	2.7 - 3.7	20 - 27
			1.25	30 - 40	3.1 - 4.1	22 - 30
	M14	14.0	1.5	46 - 62	4.7 - 6.3	34 - 46
7T	M6	6.0	1.0	6 - 7	0.6 - 0.7	4.3 - 5.1
	M8	8.0	1.25	14 - 18	1.4 - 1.8	10 - 13
			1.0	14 - 18	1.4 - 1.8	10 - 13
	M10	10.0	1.5	25 - 35	2.6 - 3.6	19 - 26
			1.25	26 - 36	2.7 - 3.7	20 - 27
	M12	12.0	1.75	45 - 61	4.6 - 6.2	33 - 45
			1.25	50 - 68	5.1 - 6.9	37 - 50
	M14	14.0	1.5	76 - 103	7.7 - 10.5	56 - 76
9T	M6	6.0	1.0	8 - 11	0.8 - 1.1	5.8 - 8.0
	M8	8.0	1.25	19 - 25	1.9 - 2.5	14 - 18
			1.0	20 - 27	2.0 - 2.8	14 - 20
	M10	10.0	1.5	36 - 50	3.7 - 5.1	27 - 37
			1.25	39 - 51	4.0 - 5.2	29 - 38
	M12	12.0	1.75	65 - 88	6.6 - 9.0	48 - 65
			1.25	72 - 97	7.3 - 9.9	53 - 72
	M14	14.0	1.5	109 - 147	11.1 - 15.0	80 - 108

1. Special parts are excluded.
2. This standard is applicable to bolts having the following marks embossed on the bolt head.

Grade	Mark
4T	4
7T	7
9T	9

*: Nominal diameter



MAINTENANCE

SECTION MA

MA

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PERIODIC MAINTENANCE

The following charts show the normal maintenance schedule. Under severe driving conditions, additional or more frequent maintenance will be required. Refer to "Maintenance under severe driving conditions".

The periodic maintenance schedule is repeated beyond the last mileage and period shown by returning to the first 15,000 miles (24,000 km) or 12 months.

U.S.A. MODELS EXCEPT FOR CALIFORNIA

Emission control system maintenance

MAINTENANCE OPERATION Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (Kilometers x 1,000) / Months	MAINTENANCE INTERVAL					Reference page
		7.5 (12) 6	15 (24) 12	30 (48) 24	45 (72) 36	60 (96) 48	
Drive belts				I		I	MA-12
Air cleaner filter		Replace every 30,000 miles (48,000 km).					MA-12
Idle speed control actuator filter		Replace every 30,000 miles (48,000 km).					MA-12
Vacuum control modulator valve filter		Replace every 30,000 miles (48,000 km).					MA-12
Positive crankcase ventilation (P.C.V.) filter		See NOTE (1)*.					MA-13
Vapor lines				I*		I*	MA-13
Fuel lines (hoses, piping, connections, etc.)				I*		I*	MA-13
Fuel filter		See NOTE (1)*.					MA-13
Engine coolant				R		R	MA-13, 14
Engine oil		R	Then replace every 7,500 miles (12,000 km) or 6 months.				MA-14
Engine oil filter		R	Then replace every second oil change.				MA-14
Spark plugs		Replace every 30,000 miles (48,000 km).					MA-15
Ignition wires		Inspect every 2 years*.					MA-15
Intake & exhaust valve clearance				A	A	A	MA-15, 16
Idle rpm				I*	I*	I*	MA-16, 17
Automatic temperature control air cleaner		Inspect every 30,000 miles (48,000 km)*.					MA-15
Exhaust gas sensor		Inspect every 30,000 miles (48,000 km).					MA-21, 22

Chassis and body maintenance

MAINTENANCE OPERATION Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (Kilometers x 1,000) / Months	MAINTENANCE INTERVAL				Reference page
		15 (24) 12	30 (48) 24	45 (72) 36	60 (96) 48	
Brake lines & hoses		I	I	I	I	MA-35
Brake pads, discs, drums & linings		Inspect every 15,000 miles (24,000 km).				MA-35
Manual and automatic transaxle gear oil		Inspect every 15,000 miles (24,000 km).				MA-30, 31
Power steering lines & hoses		I	I	I	I	MA-41
Steering gear & linkage, axle & suspension parts & front drive shaft boots		I	I	I	I	MA-31, 32, 41
Locks, hinges & hood latch		L	L	L	L	MA-42
Front wheel bearing grease			I		I	MA-32
Exhaust system		I	I	I	I	MA-30
Seat belts, buckles, retractors, anchors & adjuster		I	I	I	I	MA-42

NOTE:

(1) If vehicle is operated under extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the filters might become clogged. In such an event, replace them immediately.

(2) Maintenance items and intervals with "*" are recommended by NISSAN. Other maintenance items and intervals are required.

Abbreviations: A = Adjust, R = Replace, L = Lubricate, I = Inspect. Correct or replace if necessary.

U.S.A. MODELS FOR CALIFORNIA

Emission control system maintenance

MAINTENANCE OPERATION Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (Kilometers x 1,000) Months	MAINTENANCE INTERVAL 7.5 (12) 6	15 (24) 12	30 (48) 24	45 (72) 36	60 (96) 48	Reference page
Drive belts				I		I	MA-12
Air cleaner filter		Replace every 30,000 miles (48,000 km).					MA-12
Choke mechanism (choke valve and linkage)				I		I	MA-13
Positive crankcase ventilation (P.C.V.) filter		See NOTE (1)*.					MA-13
Vapor lines				I*		I*	MA-13
Fuel lines (hoses, piping, connections, etc.)				I*		I*	MA-13
Fuel filter		See NOTE (1)*.					MA-13
Engine coolant				R		R	MA-13, 14
Engine oil & oil filter		R	Then replace every 7,500 miles (12,000 km) or 6 months.				MA-14
Spark plugs		Replace every 30,000 miles (48,000 km).					MA-15
Ignition wires		Inspect every 2 years*.					MA-15
Intake & exhaust valve clearance				A	A	A	MA-15, 16
Idle rpm				I*	I*	I*	MA-16, 18
Automatic temperature control air cleaner		Inspect every 30,000 miles (48,000 km)*.					MA-15
Exhaust gas sensor		Inspect every 30,000 miles (48,000 km).					MA-21

Chassis and body maintenance

MAINTENANCE OPERATION Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (Kilometers x 1,000) Months	MAINTENANCE INTERVAL 15 (24) 12	30 (48) 24	45 (72) 36	60 (96) 48	Reference page
Brake lines & hoses		I	I	I	I	MA-35
Brake pads, discs, drums & linings		Inspect every 15,000 miles (24,000 km).				MA-35
Manual and automatic transaxle gear oil		Inspect every 15,000 miles (24,000 km).				MA-30, 31
Power steering lines & hoses		I	I	I	I	MA-41
Steering gear & linkage, axle & suspension parts & front drive shaft boots		I	I	I	I	MA-31, 32, 41
Locks, hinges & hood latch		L	L	L	L	MA-42
Front wheel bearing grease			I		I	MA-32
Exhaust system		I	I	I	I	MA-30
Seat belts, buckles, retractors, anchors & adjuster		I	I	I	I	MA-42

NOTE:

(1) If vehicle is operated under extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the filters might become clogged. In such an event, replace them immediately.

(2) Maintenance items and intervals with "*" are recommended by NISSAN. Other maintenance items and intervals are required.

Abbreviations: A = Adjust
R = Replace
L = Lubricate
I = Inspect. Correct or replace if necessary.

CANADA MODELS

Emission control system maintenance

MAINTENANCE OPERATION		MAINTENANCE INTERVAL					Reference page
Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000	7.5	15	30	45	60	
	(Kilometers x 1,000)	(12)	(24)	(48)	(72)	(96)	
	Months	6	12	24	36	48	
Drive belts				I		I	MA-12
Air cleaner filter		Replace every 30,000 miles (48,000 km).					MA-12
Choke mechanism (choke valve and linkage)			I	I	I	I	MA-13
Positive crankcase ventilation (P.C.V.) filter		See NOTE (1)*.					MA-13
Vapor lines				I*		I*	MA-13
Fuel lines (hoses, piping, connections, etc.)				I*		I*	MA-13
Fuel filter		See NOTE (1)*.					MA-13
Engine coolant				R		R	MA-13, 14
Engine oil & oil filter		R	Then replace every 7,500 miles (12,000 km) or 6 months.				MA-14
Spark plugs		Replace every 15,000 miles (24,000 km).					MA-15
Ignition wires		Inspect every 2 years*.					MA-15
Intake & exhaust valve clearance			A	A	A	A	MA-15, 16
Ignition timing			A	A	A	A	MA-19, 20
Idle rpm and mixture ratio	Idle rpm		A	A	A	A	MA-19, 20
	Mixture ratio		I	I	I	I	
Automatic temperature control air cleaner		Inspect every 15,000 miles (24,000 km).					MA-15
Fuel tank vacuum relief valve				I		I	EF & EC-141

Chassis and body maintenance

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Periodic maintenance should be performed at number of miles, kilometers or months, whichever comes first.	Miles x 1,000	15	30	45	60	
	(Kilometers x 1,000)	(24)	(48)	(72)	(96)	
	Months	12	24	36	48	
Brake lines & hoses		I	I	I	I	MA-35
Brake pads, discs, drums & linings		Inspect every 15,000 miles (24,000 km).				MA-35
Manual and automatic transaxle gear oil		Inspect every 15,000 miles (24,000 km).				MA-30, 31
Power steering lines & hoses		I	I	I	I	MA-41
Steering gear & linkage, axle & suspension parts & front drive shaft boots		I	I	I	I	MA-31, 32, 41
Locks, hinges & hood latch		L	L	L	L	MA-42
Front wheel bearing grease			I		I	MA-32
Exhaust system		I	I	I	I	MA-30
Seat belts, buckles, retractors, anchors & adjuster		I	I	I	I	MA-42

NOTE:

(1) If vehicle is operated under extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the filters might become clogged. In such an event, replace them immediately.

(2) Maintenance items and intervals with "*" are recommended by NISSAN. Other maintenance items and intervals are required.

Abbreviations: A = Adjust
R = Replace
L = Lubricate
I = Inspect. Correct or replace if necessary.

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is operated under severe driving conditions as shown below, more frequent maintenance is required to be performed on the following items as shown in the table.

Severe driving conditions

A – Repeated short distance driving
B – Extensive idling
C – Driving in dusty conditions
D – Driving in extremely low or high ambient temperatures
E – Towing a trailer
F – Driving in areas using road salt or other corrosive materials
G – Driving on rough and/or muddy roads

Driving condition	Maintenance item	Maintenance operation	Maintenance interval	Reference page
. . C	Air cleaner filter, idle speed control actuator filter, vacuum control modulator filter	R	More frequently	MA-12
A B C . E . . .	Engine oil & oil filter	R	Every 3,000 miles (5,000 km) or 3 months	MA-14
A . C . E F G . .	Brake pads, discs, drums & lining	I	Every 7,500 miles (12,000 km)	MA-35
. . . . E . G . .	Manual and automatic trans-axle gear oil	R	Every 30,000 miles (48,000 km) or 24 months	MA-30, 31
. . . . . G . .	Steering gear & linkage, and axle & suspension parts	I	Every 7,500 miles (12,000 km) or 6 months	MA-31, 32, 41
. . . D . F G . .	Front drive shaft boots	I	Every 7,500 miles (12,000 km) or 6 months	MA-32
. . C D . F G . .	Steering linkage ball joints & front suspension ball joints	I	Every 7,500 miles (12,000 km) or 6 months	MA-32
. . . . . F . . .	Locks, hinges & hood latch	L	Every 7,500 miles (12,000 km) or 6 months	MA-42
A . . . E F G . .	Exhaust system	I	Every 7,500 miles (12,000 km) or 6 months	MA-30

Maintenance operations: I = Inspect. Correct or replace if necessary R = Replace L = Lubricate

GENERAL MAINTENANCE

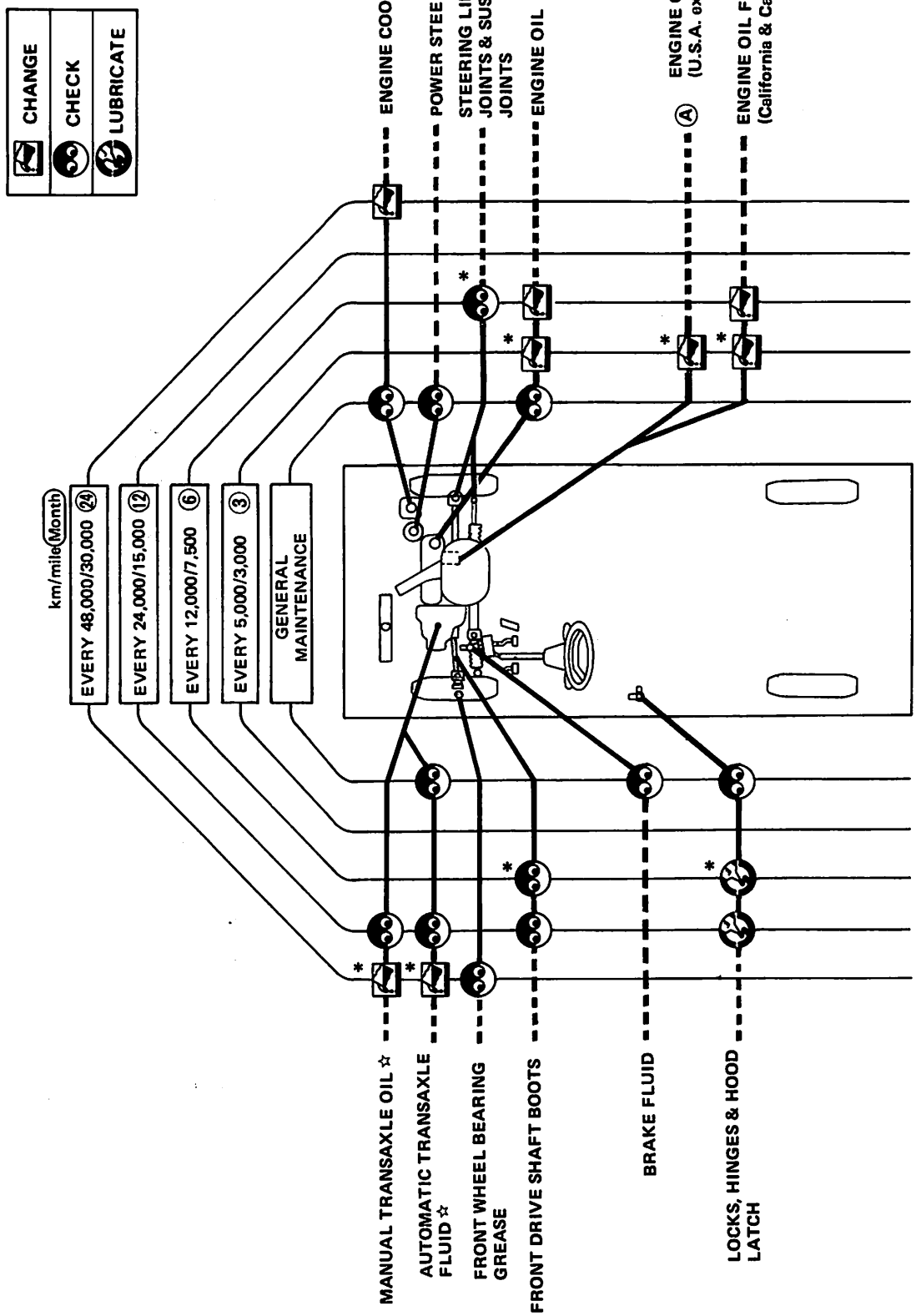
General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform the checks and inspections themselves or they can have their NISSAN/DATSUN dealers do them for a nominal charge.

Item	Reference item in MA section
OUTSIDE THE VEHICLE	
Tires Check the pressure with a gauge periodically when at a service station, including the spare, and adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	• **CHECKING TIRE CONDITION**
Wheel nuts When checking the tires, make sure no nuts are missing, and check for any loose nuts. Tighten if necessary.	• **TIRE REPLACEMENT** **Wheel nut.**
Tire rotation Tires should be rotated every 24,000 km (15,000 miles).	• **TIRE ROTATION**
Wheel alignment and balance If the vehicle should pull to either side while driving on a straight and level road, or if you detect uneven or abnormal tire wear, there may be a need for wheel alignment. If the steering wheel or seat vibrates at normal highway speeds, wheel balancing may be needed.	• **CHECKING TIRE CONDITION** **Abnormal tire wear** • **CHECKING WHEEL ALIGNMENT** • **WHEEL INSPECTION**
Windshield glass Check for abrasions or scratches.	–
Windshield wiper blades Check for cracks or wear if they do not wipe properly.	–
Doors and engine hood Check that all doors and the engine hood operate smoothly as well as the trunk lid and back hatch. Also ensure, that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released.	• **LUBRICATING LOCKS, HINGES AND HOOD LATCH**
INSIDE THE VEHICLE	
The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.	
Lights Make sure that the headlights, stop lights, tail lights, turn signal lights, and other lights are all operating properly and installed securely. Also check headlight aim.	–
Warning lights and buzzers/chimes Make sure that all warning lights and buzzers/chimes are operating properly.	–
Horn Make sure it operates properly.	–
Windshield wiper and washer Check that the wipers and washer operate properly and that the wipers do not streak.	–

Item	Reference item in MA section
Windshield defroster Check that the air comes out of the defroster outlets properly and in sufficient quantity when operating the heater or air conditioner.	–
Rear view mirror Make sure that it is secure.	–
Sun visors Make sure that they can be moved freely and are secure.	–
Steering wheel Check that it has the specified free play. Be sure to check for changes in the steering condition, such as excessive free play, hard steering or strange noises.	**Specification** **Free play: Less than 35 mm (1.38 in)**
Seats Check seat position controls such as seat adjusters, seatback recliner, etc. to ensure they operate smoothly and that all latches lock securely in every position. Check that the head restraints move up and down smoothly and that the locks (if so equipped) hold securely in all latched positions. Check that the latches lock securely for folding-down rear seatbacks.	–
Seat belts Check that all parts of the seat belt system e.g. buckles, anchors and retractors operate properly and smoothly. Check the belt webbing for cuts, fraying, wear or damage.	• **INSPECTING SEAT BELTS, BUCKLES, ANCHORS, RETRACTORS AND ADJUSTER**
Accelerator pedal Check the pedal for smooth operation and make sure the pedal does not catch or require uneven effort.	–
Clutch pedal Make sure the pedal operates smoothly and check that it has the proper free travel.	• **ADJUSTING CLUTCH PEDAL HEIGHT AND FREE PLAY**
Brakes Check that the brake does not pull the vehicle to one side when applied.	–
Brake pedal Check the pedal for smooth operation and make sure it has the proper distance under it when depressed fully. Check the brake booster function.	• **CHECKING BRAKE PEDAL DEPRESSED HEIGHT** • **CHECKING BRAKE BOOSTER FUNCTION**
Parking brake Check that the lever has the proper travel and confirm that your vehicle is held securely on a fairly steep hill with only the parking brake applied.	• **CHECKING PARKING BRAKE**
Automatic transaxle "Park" mechanism Check that the lock release button on the selector lever operates properly and smoothly. On a fairly steep hill check that your vehicle is held securely with the selector lever in the "P" position without applying any brakes.	–

Item	Reference Item in MA section
UNDER THE HOOD AND VEHICLE The maintenance items listed here should be checked periodically e.g. each time you check the engine oil or refuel.	
Windshield washer fluid Check that there is adequate fluid in the tank.	–
Engine coolant level Check the coolant level when the engine is cold.	–
Radiator and hoses Check the front of the radiator and clean off any dirt, insects, leaves, etc., that may have accumulated. Make sure the hoses have no cracks, deformation, rot or loose connections.	–
Brake fluid levels Make sure that the brake fluid levels are between the "MAX" and "MIN" lines on the reservoir.	–
Engine drive belts Make sure that no belt is frayed, worn, cracked or oily.	• CHECKING DRIVE BELT
Engine oil level Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	• CHANGING ENGINE OIL AND OIL FILTER
Power steering fluid level Check the level when the fluid is cold and the engine is turned off.	• CHECKING POWER STEERING FLUID LEVEL
Automatic transaxle fluid level Check the level on the dipstick after putting the selector lever in "P" with the engine idling.	• CHECKING AUTOMATIC TRANSAXLE FLUID LEVEL
Exhaust system Make sure there are no loose supports, cracks or holes. If the sound of the exhaust seems unusual or there is a smell of exhaust fumes, immediately locate the trouble and correct it.	• INSPECTING EXHAUST SYSTEM
Underbody The underbody is frequently exposed to corrosive substances such as those used on icy roads or to control dust. It is very important to remove these substances, otherwise rust will form on the floor pan, frame, fuel lines and around the exhaust system. At the end of winter, the underbody should be thoroughly flushed with plain water, being careful to clean those areas where mud and dirt can easily accumulate.	–
Fluid leaks Check under the vehicle for fuel, oil, water or other fluid leaks after the vehicle has been parked for a while. Water dripping from the air conditioner after use is normal. If you should notice any leaks or gasoline fumes are evident, check for the cause and correct it immediately.	• INSPECTING MANUAL TRANSAXLE OIL • INSPECTING AUTOMATIC TRANSAXLE FLUID • INSPECTING FRONT AXLE AND SUSPENSION PARTS • INSPECTING REAR AXLE AND SUSPENSION PARTS • INSPECTING BRAKE LINES & HOSES • CHECKING POWER STEERING LINE & HOSES

LUBRICATION CHART



Ⓐ Replace at the first oil change and then every second oil change.

☆: At the specified mileage (km/mile) only
*: Maintenance under severe driving conditions

SMA333B

RECOMMENDED FUEL AND LUBRICANTS

FUEL

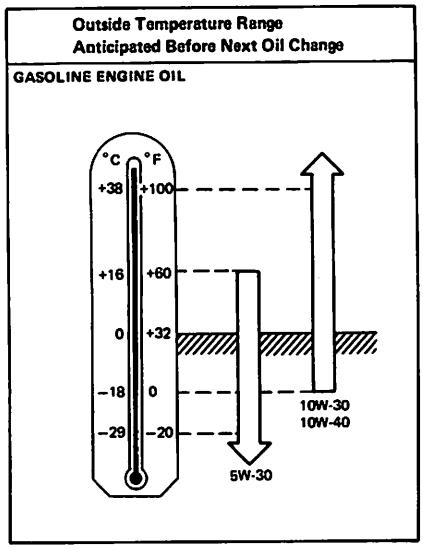
	Gasoline	Gasoline octane number (minimum)	
		AKI (Anti-Knock Index) number	Research octane number
		(R + M)/2	RON
U.S.A. models	Unleaded	87	91
Canada models	Unleaded or leaded		

LUBRICANTS

Lubricant	Specifications	Remarks
Engine oil	API SF (Energy Conserving Oils)*1	For further details, refer to the recommended SAE viscosity chart.
Manual transaxle gear oil	API GL-4	
Automatic transaxle and power steering gear fluid	Type DEXRON®	–
Multi-purpose grease	NLGI No. 2	Lithium soap base
Brake fluid	DOT 3	US FMVSS No. 116
Anti-freeze	–	Ethylene glycol base

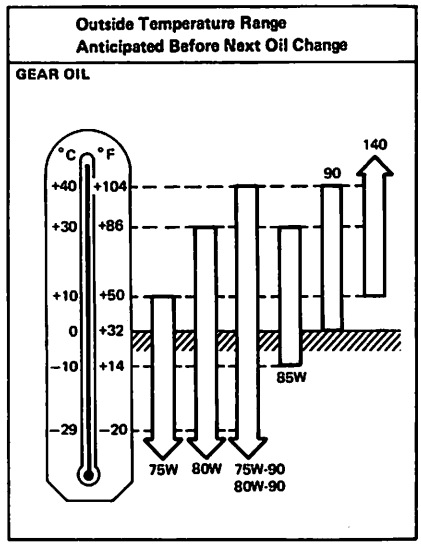
*1: ENERGY CONSERVING OILS
In order to improve fuel economy and conserve energy new, lower friction engine oils have been developed. These oils are readily available and can be identified by such labels as energy conserving, energy saving, improved fuel economy, etc.

SAE VISCOSITY NUMBER



TI0002

10W-30 is preferable if the ambient temperature is above −18°C (0°F). 20W-40 and 20W-50 are usable if the ambient temperature is above 10°C (50°F) for all seasons.



TI0003

80W-90 is preferable if the ambient temperature is below 40°C (104°F).

APPROXIMATE REFILL CAPACITIES

CAPACITIES

	Liter	US measure	Imp measure
Fuel tank	50	13-1/4 gal	11 gal
Coolant			
With heater			
M/T	4.7	5 qt	4-1/8 qt
A/T	5.3	5-5/8 qt	4-5/8 qt
Without heater			
M/T	4.1	4-3/8 qt	3-5/8 qt
A/T	4.7	5 qt	4-1/8 qt
Reservoir tank	0.7	3/4 qt	5/8 qt
Engine (Refill capacity)			
With oil filter	3.2	3-3/8 qt	2-7/8 qt
Without oil filter	2.8	3 qt	2-1/2 qt
Manual transaxle	2.7	5-3/4 pt	4-3/4 pt
Automatic transaxle	6.0	6-3/8 qt	5-1/4 qt
Power steering system	0.9	1 qt	3/4 qt
Windshield/Rear window washer reservoir tank	3.0	3-1/8 qt	2-5/8 qt
Air conditioner system			
Compressor oil	0.15	5.1 fl oz	5.3 fl oz
Refrigerant	0.8 to 1.0 kg	1.8 to 2.2 lb	1.8 to 2.2 lb

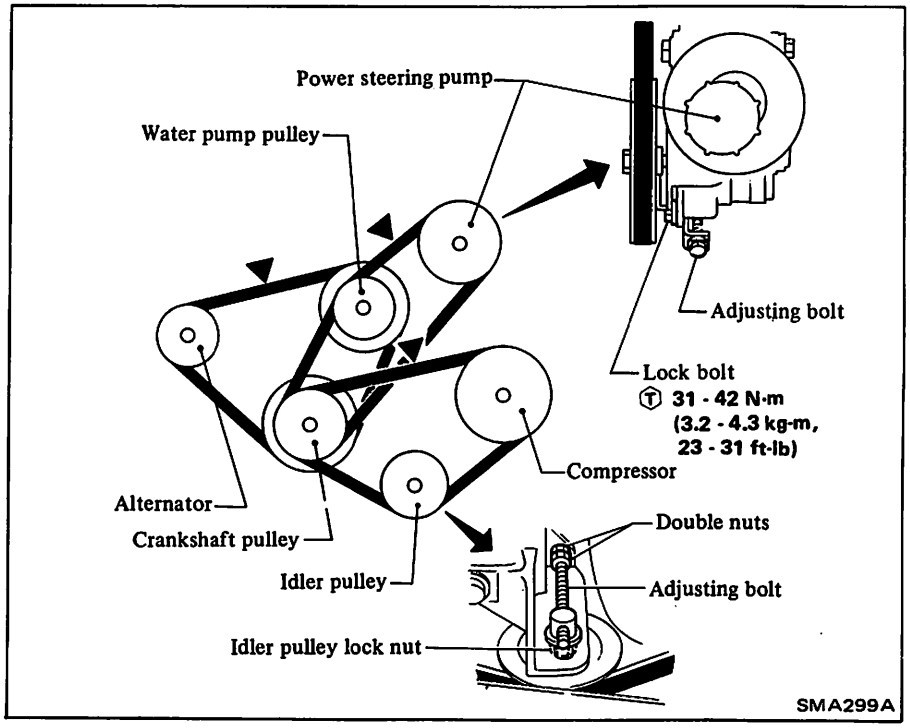
ENGINE MAINTENANCE (E16)

BEFORE ENGINE START

CHECKING DRIVE BELTS

1. Inspect for cracks and wear. Replace if necessary.
2. Check drive belt deflections by pushing on the belt midway between the pulleys when it is cold (30 minutes or more after engine stop).
   Adjust if necessary.

Drive belt deflection mm (in)	Used belt		Set deflection of new belt
	Limit	Adjust deflection	
Alternator	19 (0.748)	13 - 17 (0.51 - 0.67)	10 - 14 (0.39 - 0.55)
Air conditioner	12.5 (0.492)	9 - 11 (0.35 - 0.43)	7 - 9 (0.28 - 0.35)
Power steering	10.5 (0.413)	7 - 9 (0.28 - 0.35)	6.5 - 8.5 (0.256 - 0.335)
Applied pushing force N (kg, lb)	98 (10, 22)		



Alternator belt

1. Loosen the upper and lower alternator securing bolts until the alternator can be moved slightly.
2. Move the alternator with a prying bar until the belt deflection is within the specified range. Then tighten the bolts securely.

Air conditioner belt

1. Loosen the idler pulley lock nut and adjusting bolt double nuts for the belt being adjusted.
2. Adjust the adjusting bolt until the belt deflection is within the specified range.
3. Tighten the adjusting bolt double nuts and idler pulley lock nut securely.

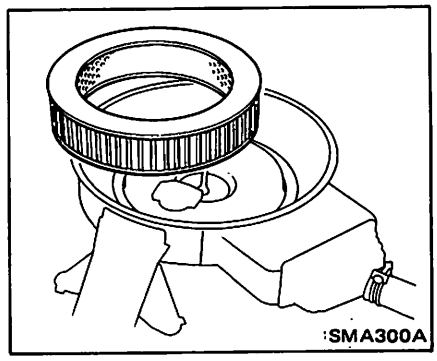
Power steering belt

1. Loosen the power steering oil pump adjusting lock bolt and its securing bolt for the belt being adjusted.
2. Adjust the adjusting bolt until the belt deflection is within the specified range.
3. Tighten the adjusting bolt lock bolt and oil pump securing bolt securely.

REPLACING AIR CLEANER FILTER

Air cleaner filter is a viscous paper type and does not require cleaning.

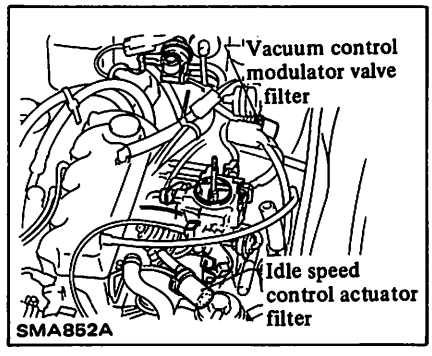
1. Remove air cleaner cover and remove air cleaner filter.



2. Install new air cleaner filter and install air cleaner cover.

REPLACING IDLE SPEED CONTROL ACTUATOR AND VACUUM CONTROL MODULATOR VALVE FILTERS

Stop engine and replace each filter.



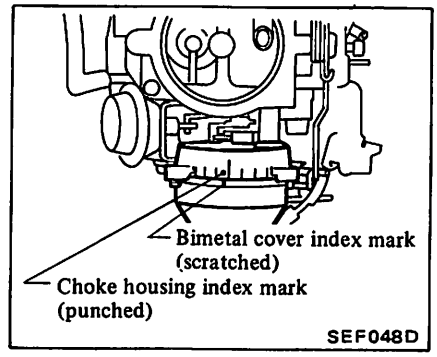
CHECKING CHOKE MECHANISM (Lubrication and cleaning of choke plate and linkage) (California model)

1. Check choke valve and linkage for free operation, and clean choke valve or lubricate choke linkage if necessary.
2. Before starting engine, fully open throttle valve and ensure that choke valve closes properly.

CHECKING CHOKE MECHANISM (Choke plate and linkage) (Canada)

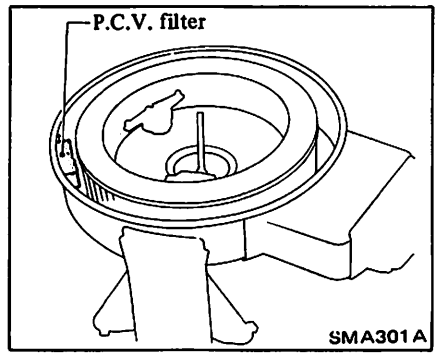
1. Check choke valve and mechanism for free operation, and clean or replace if necessary. Binding can result from petroleum gum formation on choke shaft or from damage.
2. Before starting engine, fully open throttle valve and make sure that choke valve closes properly.
3. Push choke valve with your finger, and check for binding.
4. Check to be sure that the punched index mark on the bimetal cover meets the scratched index mark on the choke housing, as shown below.

Do not set the bimetal cover index mark at any other positions except the punched mark on the choke housing.



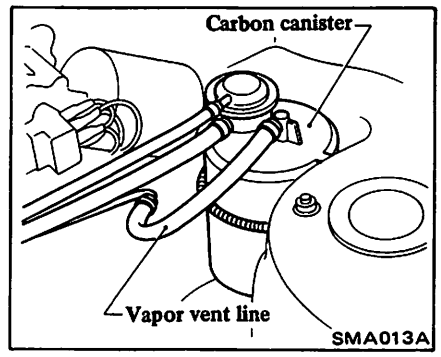
REPLACING P.C.V. FILTER

Remove air cleaner cover, and replace filter.



CHECKING VAPOR LINES

1. Visually inspect vapor lines for proper attachment, cracks, damage, loose connections, chafing and deterioration.
2. Check fuel tank vacuum relief valve for clogging, sticking, etc.



CHECKING FUEL LINES (Hoses, piping, connections, etc.)

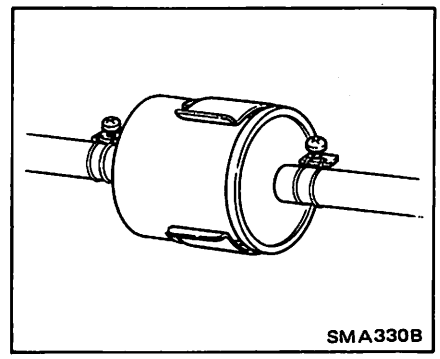
Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or deformed parts.

REPLACING FUEL FILTER

Disconnect battery cable.

1. Disconnect fuel hoses from fuel filter and replace it.
2. Check filter for contamination and water deposit.

Plug open end of fuel hose immediately after fuel hose has been removed from fuel filter.

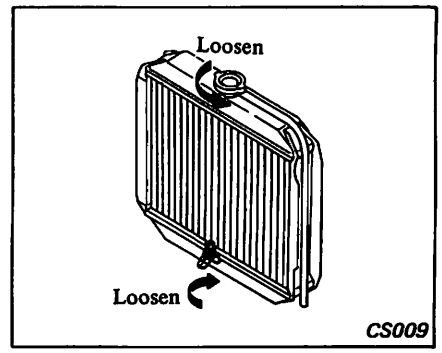


CHANGING ENGINE COOLANT

WARNING:
To avoid being scalded, never change the coolant when the engine is hot.

- **When replacing engine coolant, set heater "TEMP" control lever to fully "HOT" position.**

1. To flush system, open drain cock at bottom of radiator. Then thoroughly flush until clear water comes out.

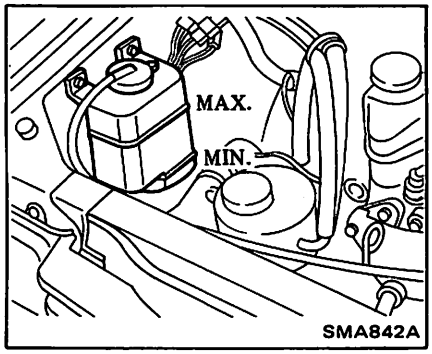


2. Close drain cock.
3. Fill radiator with coolant up to specified level. Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

Coolant capacity:

Liter (US qt, Imp qt)

	M/T	A/T
With heater	4.7 (5, 4-1/8)	5.3 (5-5/8, 4-5/8)
Without heater	4.1 (4-3/8, 3-5/8)	4.7 (5, 4-1/8)
Reservoir tank	0.7 (3/4, 5/8)	

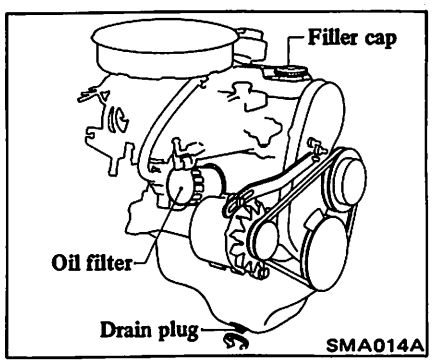


4. Install filler cap and fill reservoir tank with coolant up to "MAX" level.
5. Start engine and warm up engine until water temperature indicator points to the middle of gauge.
6. Stop engine and cool engine off completely.
7. Refill radiator with coolant up to filler opening if the coolant level is lower than the specified level.
8. Also, refill reservoir tank with coolant up to "MAX" level.

CHANGING ENGINE OIL AND REPLACING OIL FILTER

1. Start engine and warm it up until water temperature indicator points to middle of gauge, then turn off engine.
2. Remove oil filler cap and oil pan drain plug, and allow oil to drain.

WARNING:
Use care as the engine oil is hot.

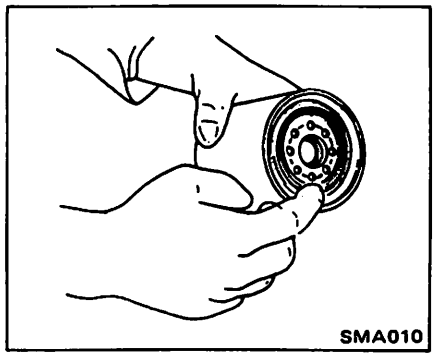


- **A milky oil indicates the presence of cooling water. Isolate the cause and take corrective measure.**
- **An oil with extremely low viscosity indicates dilution with gasoline.**

3. Using oil filter wrench, remove oil filter.
4. After draining engine oil, wipe oil pan drain hole with a clean rag.
5. Clean and install oil pan drain plug with washer.

Ⓣ : **Oil pan drain plug**
29 - 39 N·m
(3.0 - 4.0 kg-m, 22 - 29 ft-lb)

6. Wipe oil filter mounting surface with a clean rag.
7. Smear a little engine oil on rubber seal of new oil filter.

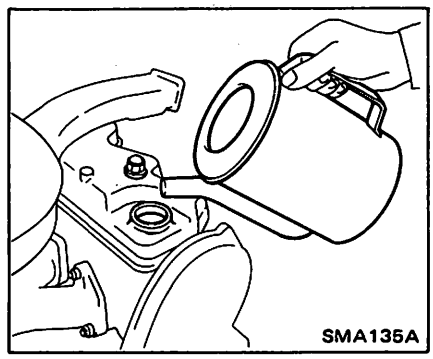


8. Install new oil filter.

Screw on oil filter until a slight resistance is felt, then tighten and additional 2/3 of a turn.

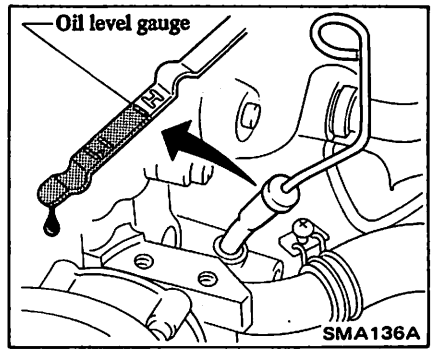
9. Refill engine with the appropriate new engine oil by referring to Recommended Lubricants.
Check oil level with dipstick.

Oil capacity (Refill):
With oil filter change
3.2 liters
(3-3/8 US qt, 2-7/8 Imp qt)
Without oil filter change
2.8 liters
(3 US qt, 2-1/2 Imp qt)



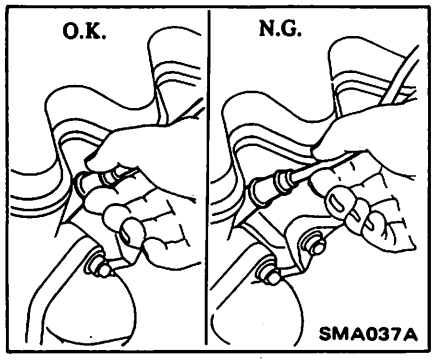
10. Install oil filler cap and start engine.
11. Check area around drain plug and oil filter for any sign of oil leakage.
If leakage is evident, retighten or replace.
12. Run engine until water temperature indicator points to middle of gauge. Then turn off engine and wait several minutes. Check oil level with oil level gauge. If necessary, add engine oil.

When checking oil level, park car on a level surface.

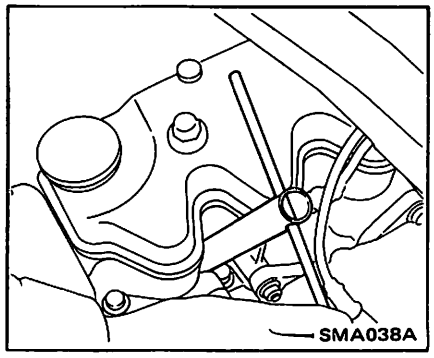


REPLACING SPARK PLUG

1. Remove air cleaner.
2. Disconnect ignition wire from spark plug by pulling on the boot. **Do not pull on the wires.**



3. Remove spark plugs with spark plug wrench.



4. Install new spark plugs and reconnect ignition wires.

Spark plug type:

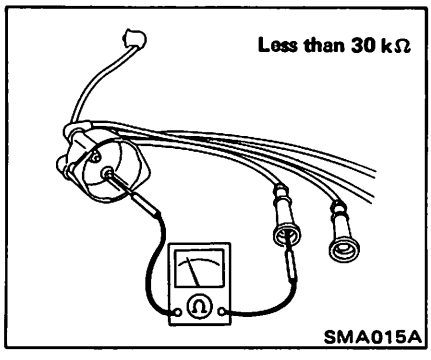
	California	Non-California		Canada
Standard	BPR5ES-11	BPR5ES-11	–	BPR5ES
Hot type	BPR4ES-11	BPR4ES-11	BPR4ES	BPR4ES
Cold type	BPR6ES-11	BPR6ES-11	–	BPR6ES
Plug gap mm (in)	1.0 - 1.1 (0.039 - 0.043)		0.8 - 0.9 (0.031 - 0.035)	

Ⓣ : **Spark plug**
20 - 29 N·m
(2.0 - 3.0 kg-m,
14 - 22 ft-lb)

CHECKING IGNITION WIRES

1. Visually check wiring for cracks, and damaged and burned terminals.
2. Using an ohmmeter, measure the resistance between wire terminal on the spark plug side and corresponding electrode inside cap.

- **Shake the wire while measuring resistance to ckeck for intermittent brakes.**

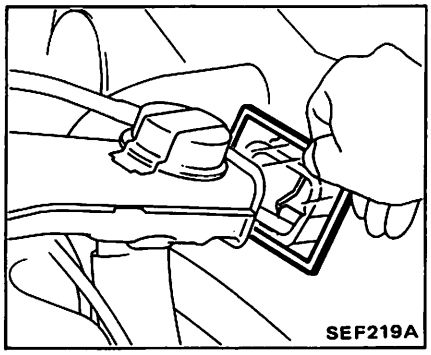


CHECKING AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

1. Check that vacuum hoses (Intake manifold to temperature sensor, idle compensator and vacuum motor) are securely connected in correct position.
2. Check each hose for cracks or distortion.
3. Check A.T.C. system for function by proceeding as follows:

Confirm that engine is cold before starting test.

With engine turned off, check position of air control valve by hand or mirror.



Air control valve is in correct position if its cold air inlet is open and hot air inlet is closed.

4. Start engine and keep idling.

Immediately after starting engine,. air control valve is in correct position if its cold air inlet is closed and hot air inlet is open.

5. Check that air control valve gradually opens to cold air inlet side as engine warms up. When environmental temperature around. temperature sensor is low, allow more time for engine warming up to facilitate smooth operation of air control valve.

If the above test reveals any problem in the operation of air control valve, carry out the further inspection described in section EF & EC.

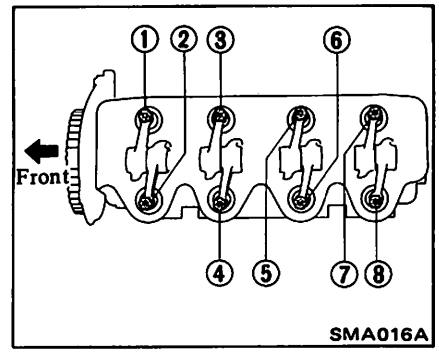
AFTER ENGINE WARM-UP

ADJUSTING INTAKE AND EXHAUST VALVE CLEARANCE

Adjustment should be made while engine is warm but not running.

1. Start engine and warm it up until water temperature indicator points to middle of gauge. Then turn off engine.
2. Remove air cleaner securing bolts.
3. Remove valve rocker cover.
4. Rotate crankshaft.
5. Set No. 1 cylinder in top dead center on its compression stroke, and adjust valve clearance ①, ②, ③ and ⑥.
6. Set No. 4 cylinder in top dead center on its compression stroke and adjust valve clearance ④, ⑤, ⑦ and ⑧.

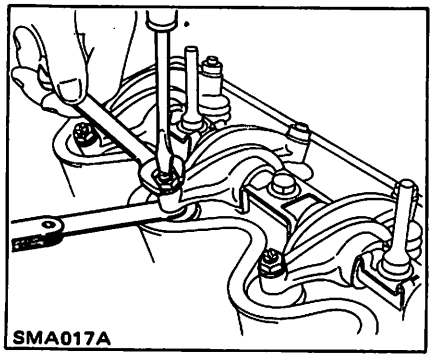
Valve clearance (Hot):
Intake and exhaust
0.28 mm (0.011 in)



(1) Loosen valve rocker adjusting screw lock nut and turn adjusting screw until specified clearance is obtained.

(2) After adjustment, tighten lock nut and recheck clearance.

Ⓣ : **Adjusting screw lock nut**
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)


SMA017A

ADJUSTING IDLE RPM (U.S.A.)

Preparation

1. Connect engine tachometer in its proper position.
2. On air conditioner equipped models, the air conditioner system should be "OFF".
3. Apply parking brake and block both front and rear wheels with chocks.
4. Insure that these switches and units are in the following positions:
   - Headlamp switch: OFF
   - Heater blower: OFF
   - Air conditioning switch: OFF (if equipped)
   - Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)
5. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

After adjusting

After adjusting idle speed, be sure to check items below, and if necessary, adjust them.

- Fast idle speed (Except for Non-California)
- Dash pot touch speed
- Throttle valve operating speed
- Fast idle speed for air conditioner (Except for Non-California)

Refer to CARBURETOR – Inspection and Adjustment of EF & EC section, and for air conditioner, HA section.

WARNING:

a. Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.

b. On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.

c. After adjustment has been made, shift the lever to "N" or "P" position.

Maintenance procedure (Non-California model)

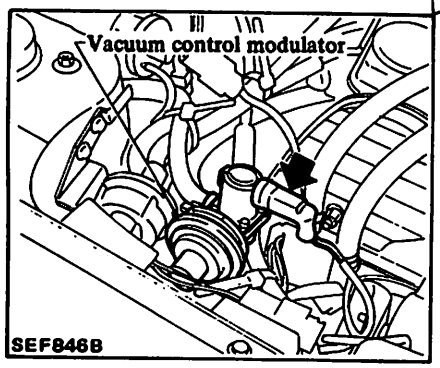
START

Warm up engine until water temperature indicator points to middle of gauge.

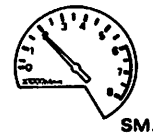
Open engine hood.

Run it at idle speed for 2 minutes.

Turn off engine, and disconnect vacuum control modulator harness connector.



Start engine.


SMA845A

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Check idle speed.

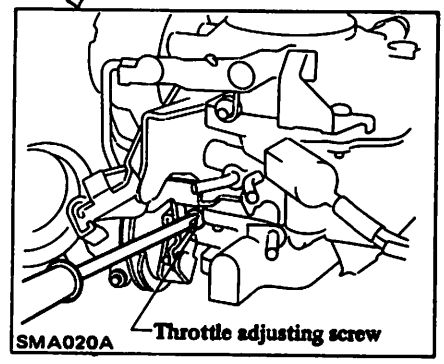
IDLE SPEED
M/T: 725±50 rpm
A/T: 575±50 rpm (in "D" position)

O.K.

N.G.

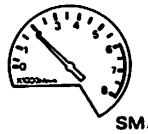
Adjust idle speed by turning throttle adjusting screw.

M/T: 725±25 rpm
A/T: 575±25 rpm (in "D" position)



Turn off engine, and connect vacuum control modulator harness connector.

Start engine.


SMA845A

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.

Check idle speed.

IDLE SPEED
M/T: 800±100 rpm
A/T: 650±100 rpm (in "D" position)

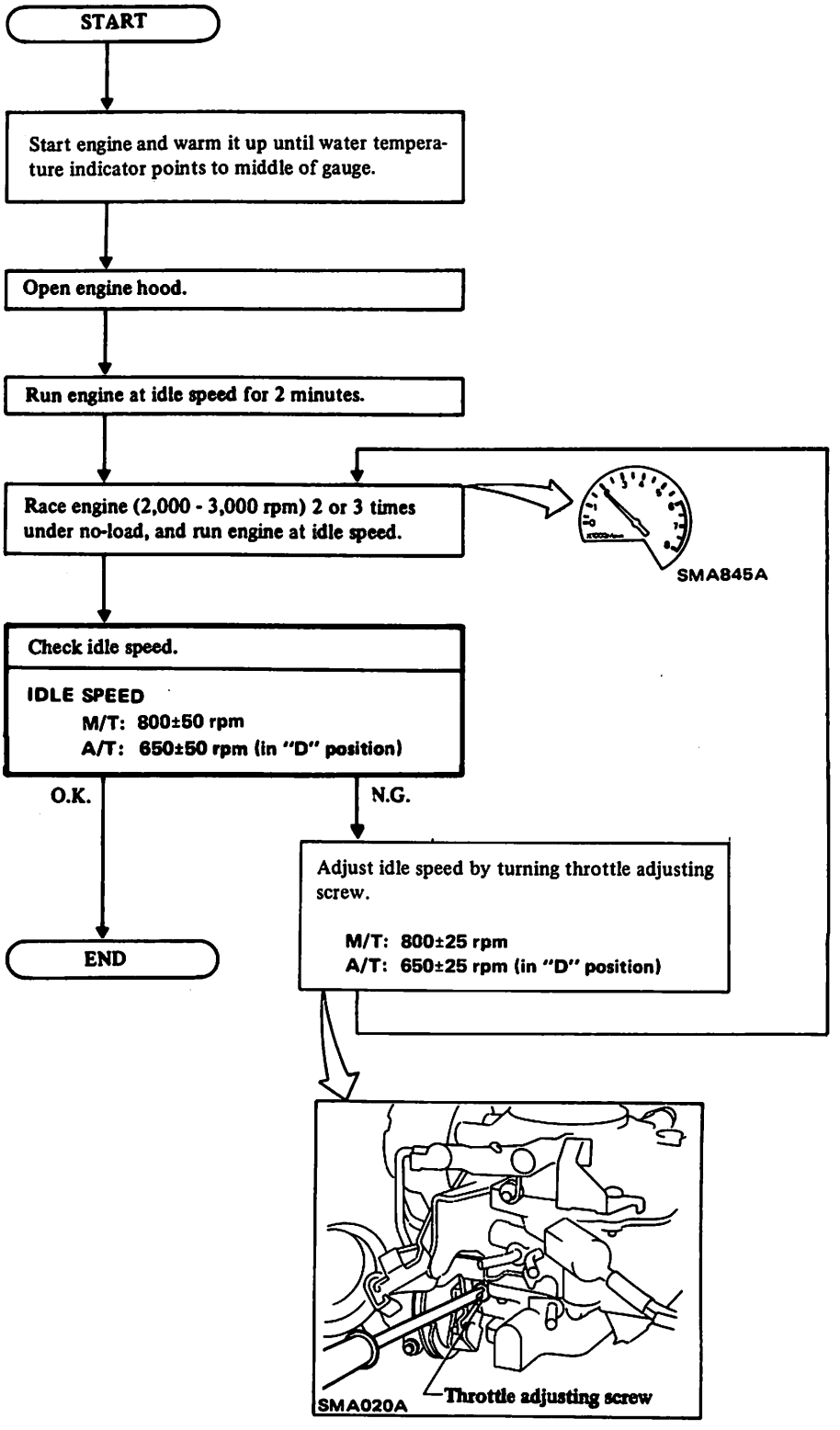
O.K.

N.G.

Correct or replace control unit, carburetor and/or vacuum control modulator.

END

Maintenance procedure (California model)



ADJUSTING IDLE RPM, ADJUSTING IGNITION TIMING AND CHECKING MIXTURE RATIO
(Canada)

Preparation

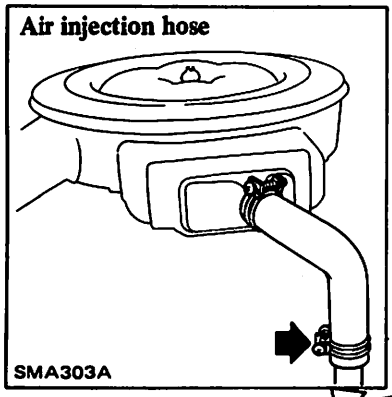
1. Make sure that the following parts are in good order.
- Ignition system
- Engine oil and coolant levels
- Valve clearance

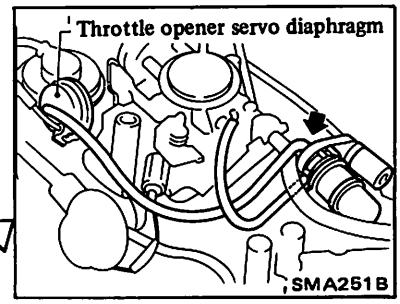
2. Connect engine tachometer and timing light in their proper positions.
3. Ensure that these switches and units are in the following positions:
- Headlamp switch: OFF
- Heater blower: OFF
- Air conditioning switch: OFF (if equipped)
- Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)

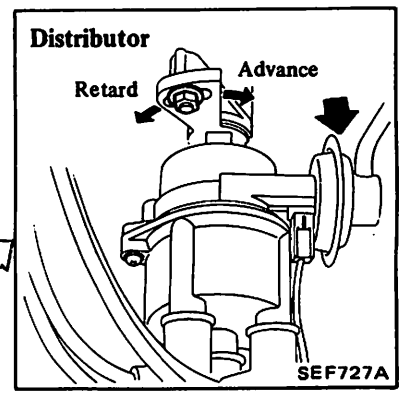
4. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.
5. Apply parking brake and block both front and rear wheels with chocks.
6. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

WARNING:
a. Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.
b. On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.
c. After adjustment has been made, shift the lever to "N" or "P" position.

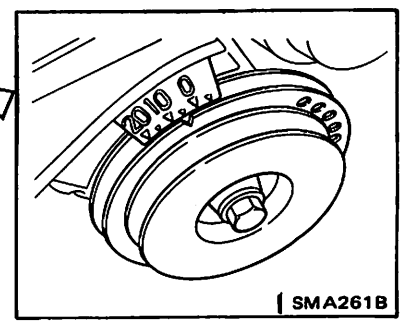
Maintenance procedure











START

Start engine and warm it up until water temperature indicator points to middle of gauge.

Turn off engine and open engine hood.

Disconnect air injection hose from air pipe, install cap on air pipe. Disconnect throttle opener control valve vacuum hose on throttle opener control valve side. Then install blind plug to hose.

Start engine and run it at idle speed for 2 minutes.

Is this maintenance interval 1,600 km (1,000 miles)?

Yes → Ⓐ

No

Disconnect distributor vacuum hose on distributor diaphragm side and install blind plug to hose.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Check ignition timing.

IGNITION TIMING (A.T.D.C.)
M/T: 5±2°
A/T: 5±2° (in "D" position)

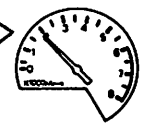
O.K. → Ⓑ

N.G. → Adjust ignition timing by turning distributor after loosening distributor securing bolt.

Ⓐ Ⓑ

Connect distributor vacuum hose to distributor diaphragm.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.

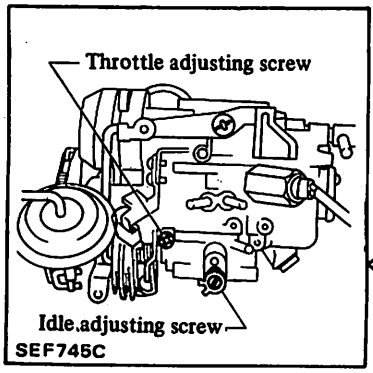


SMA845A

Check idle speed.

IDLE SPEED
M/T: 800±50 rpm
A/T: 650±50 rpm (in "D" position)

O.K. N.G.

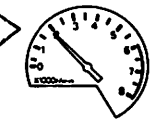


SEF745C

Adjust idle speed by turning throttle adjusting screw.

M/T: 800±25 rpm
A/T: 650±25 rpm (in "D" position)

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.



SMA845A

Check idle "CO"%.

IDLE "CO"%
M/T: 2±1
A/T: 2±1 (in "D" position)

O.K. N.G.

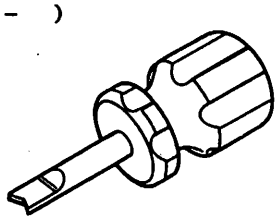
Adjust idle "CO"% by turning idle adjusting screw. Refer to NOTE for idle limiter cap

Note

Idle limiter cap

A metal idle limiter cap has been adopted, so adjust idle adjusting screw with idle adjusting screwdriver.

KV10108300
(–)

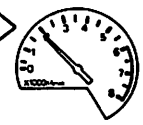


SMA199A

Turn off engine and connect air injection hose to air pipe and connect throttle opener control valve hose to throttle opener control valve.

Start engine.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.



SMA845A

Check idle speed.

IDLE SPEED
M/T: 800±50 rpm
A/T: 650±50 rpm (in "D" position)

O.K. N.G.

Adjust idle speed by turning throttle adjusting screw.

M/T: 800±25 rpm
A/T: 650±25 rpm

END

CAUTION:

After adjusting idle speed and mixture ratio, be sure to check items below, and if necessary, adjust them.

- **Fast idle speed**
- **Dash pot touch speed**
- **Throttle valve switch operating speed**
- **Fast idle speed (if equipped; refer to HA section.)**

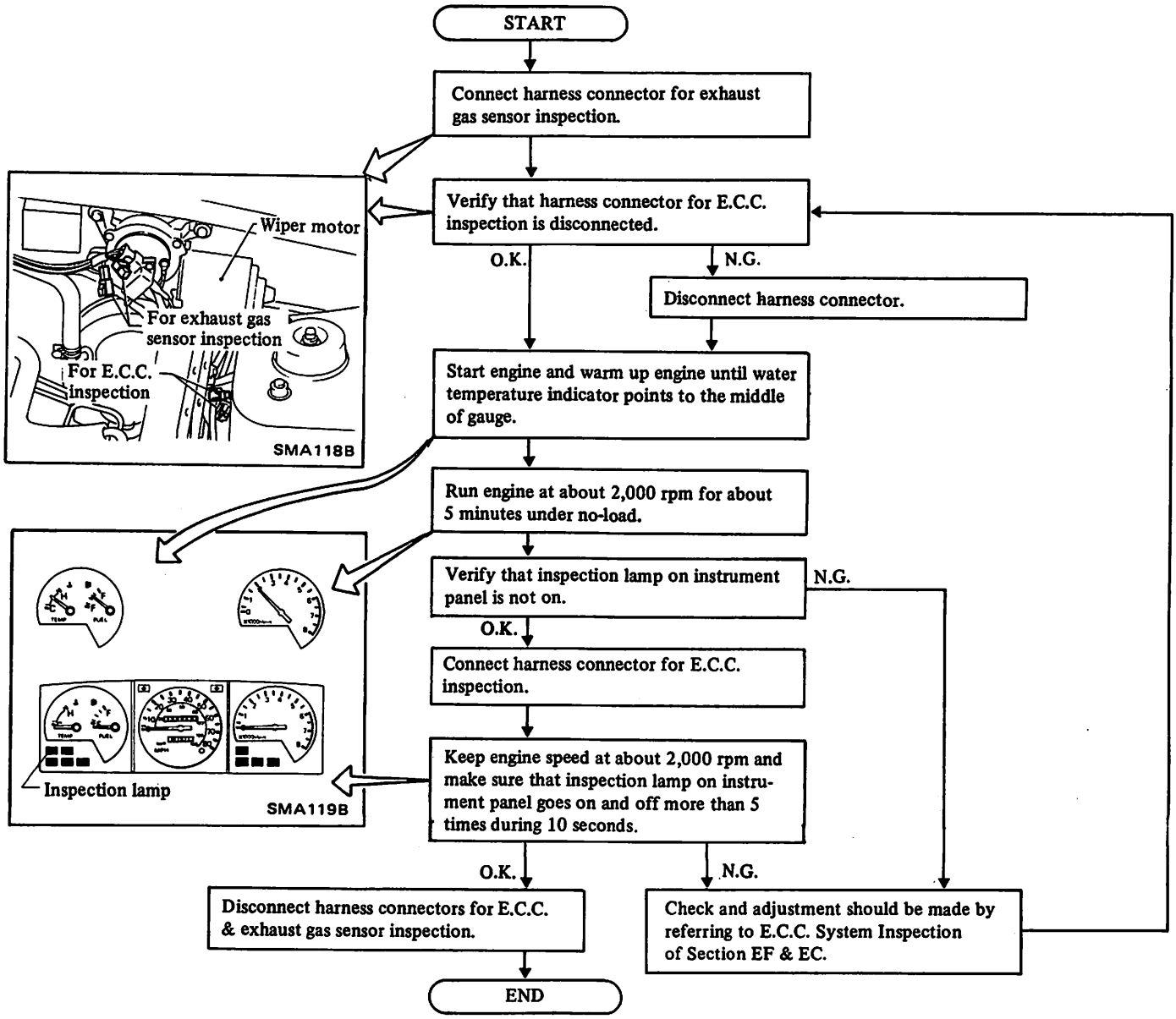
CHECKING EXHAUST GAS SENSOR (U.S.A.)

Preparation

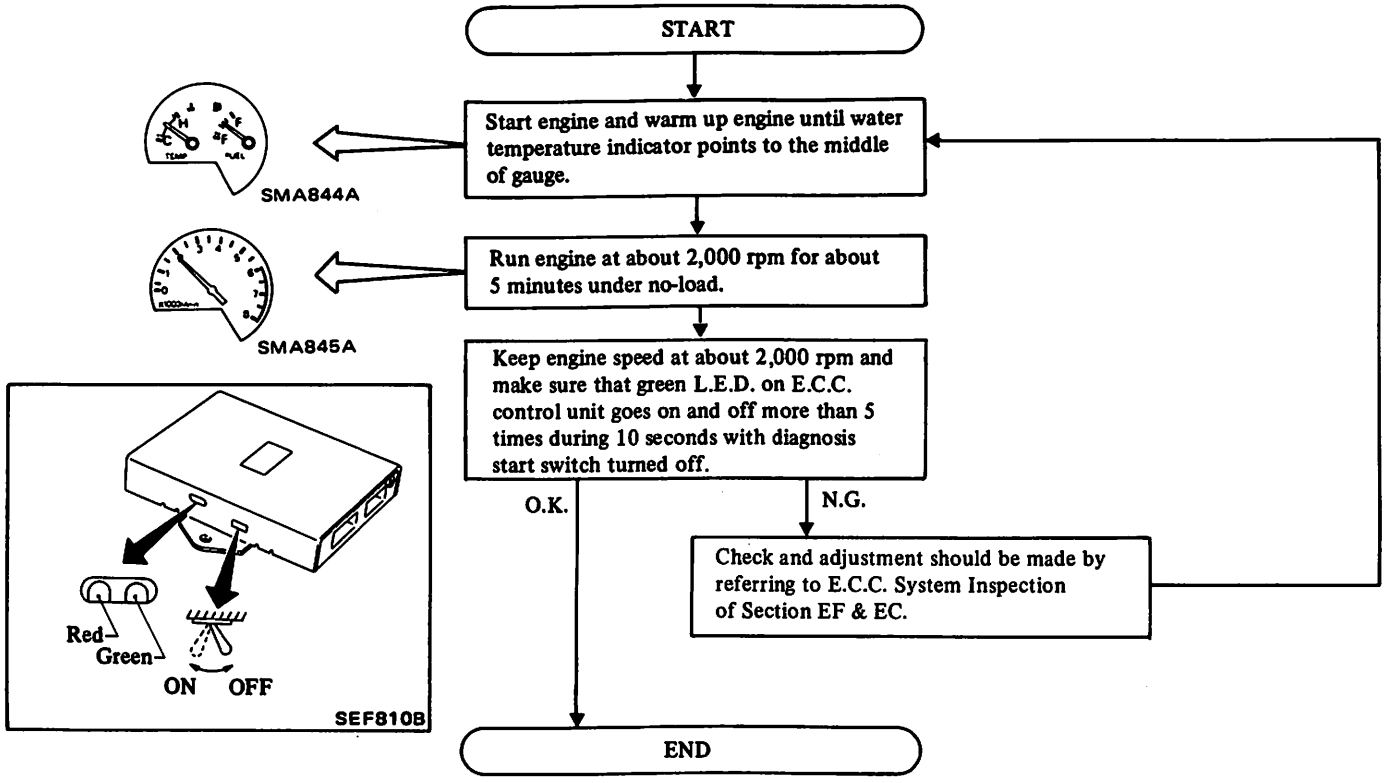
When checking exhaust gas sensor, make sure that the following parts are in good order.

- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- E.C.C. component parts
- Main harness connectors
- Hoses
- Oil filler cap and oil level gauge
- Valve clearance, engine compression

Maintenance procedure (California model)



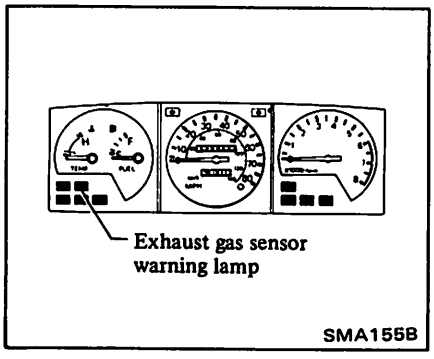
Maintenance procedure (Non-California model)



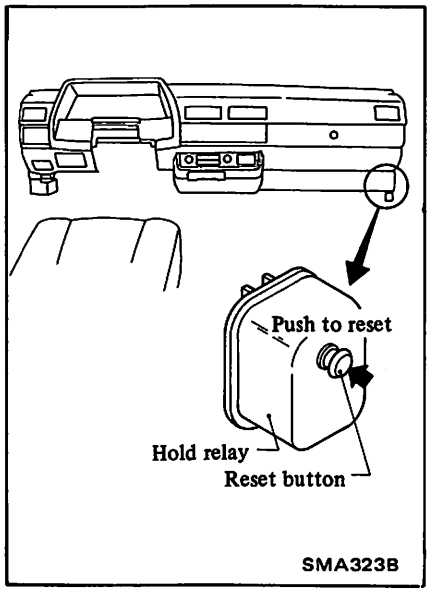
U.S.A. models

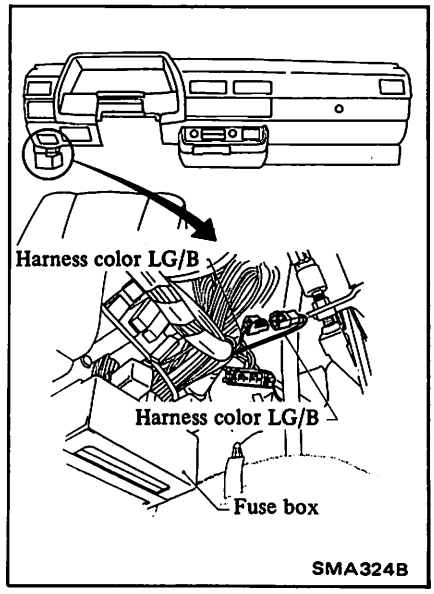
Every 48,000 km (30,000 miles) service

Exhaust gas sensor should be checked after every 48,000 km (30,000 miles) of operation. After vehicle has been operated for 48,000 km (30,000 miles) and for 96,000 km (60,000 miles), exhaust gas sensor warning lamp will come on to indicate that sensor should be inspected.



After inspection, reset warning lamp hold relay so that warning lamp may come on after the next 48,000 km (30,000 miles). If sensor should be checked at 144,000 km (90,000 miles) of operation (after the third inspection), disconnect warning lamp harness connector.

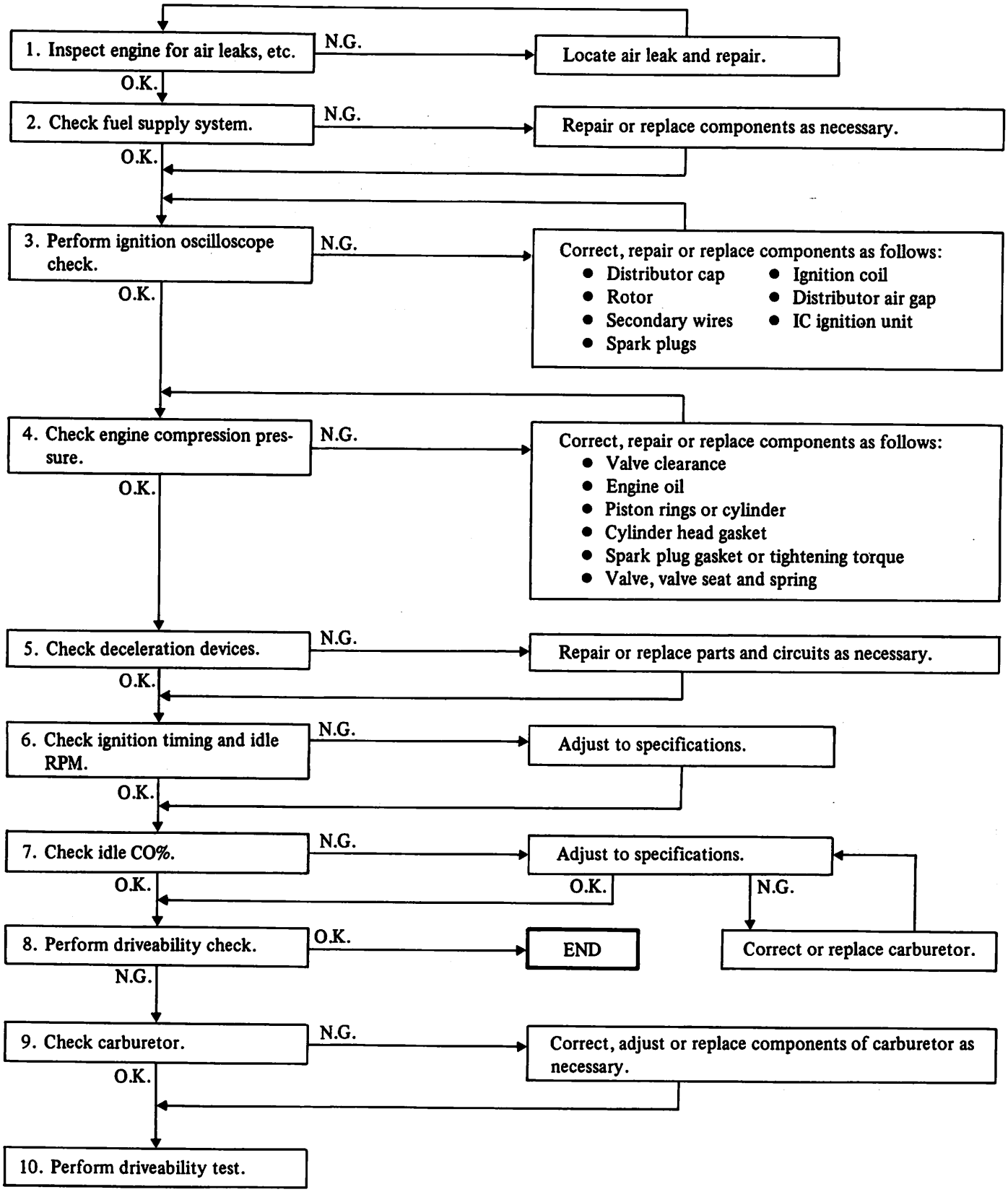




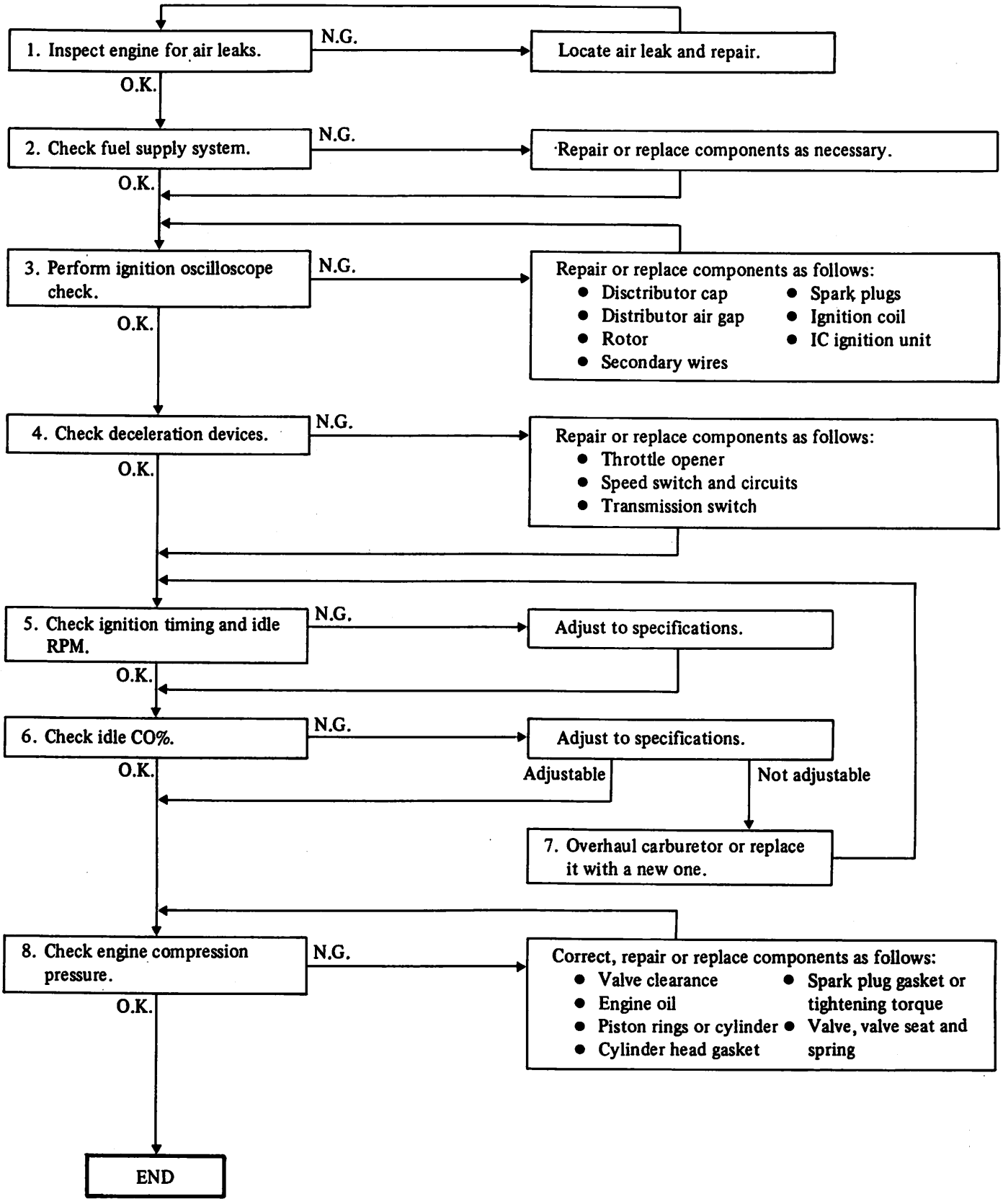
DIAGNOSTIC PROCEDURE FOR PROBLEMS

DIAGNOSTIC PROCEDURE FOR CARBURETOR ENGINES

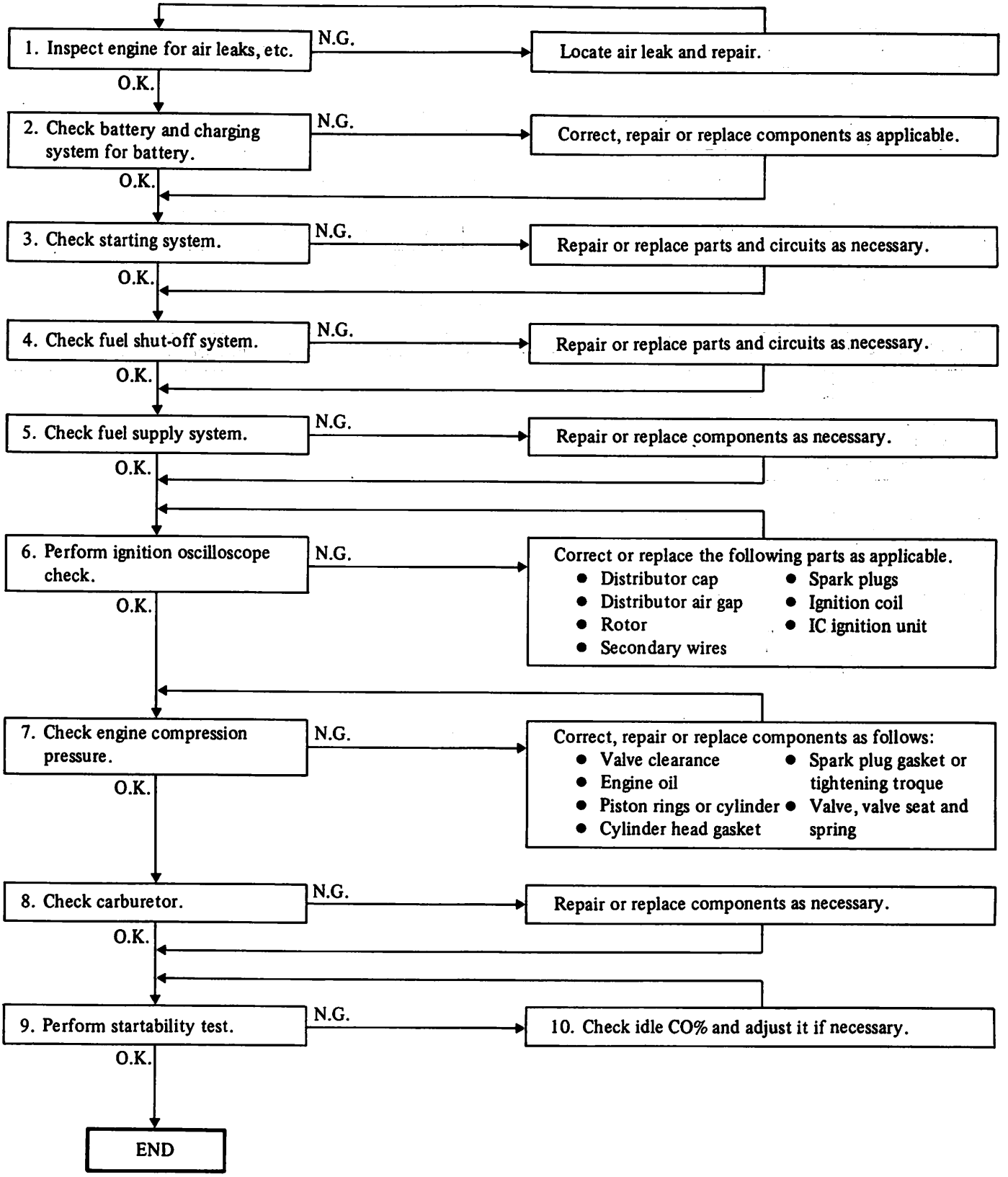
DRIVEABILITY (Hesitation, surging, flat spot, backfire, afterfire, lack of power, run-on, excessive fuel consumption, etc.)



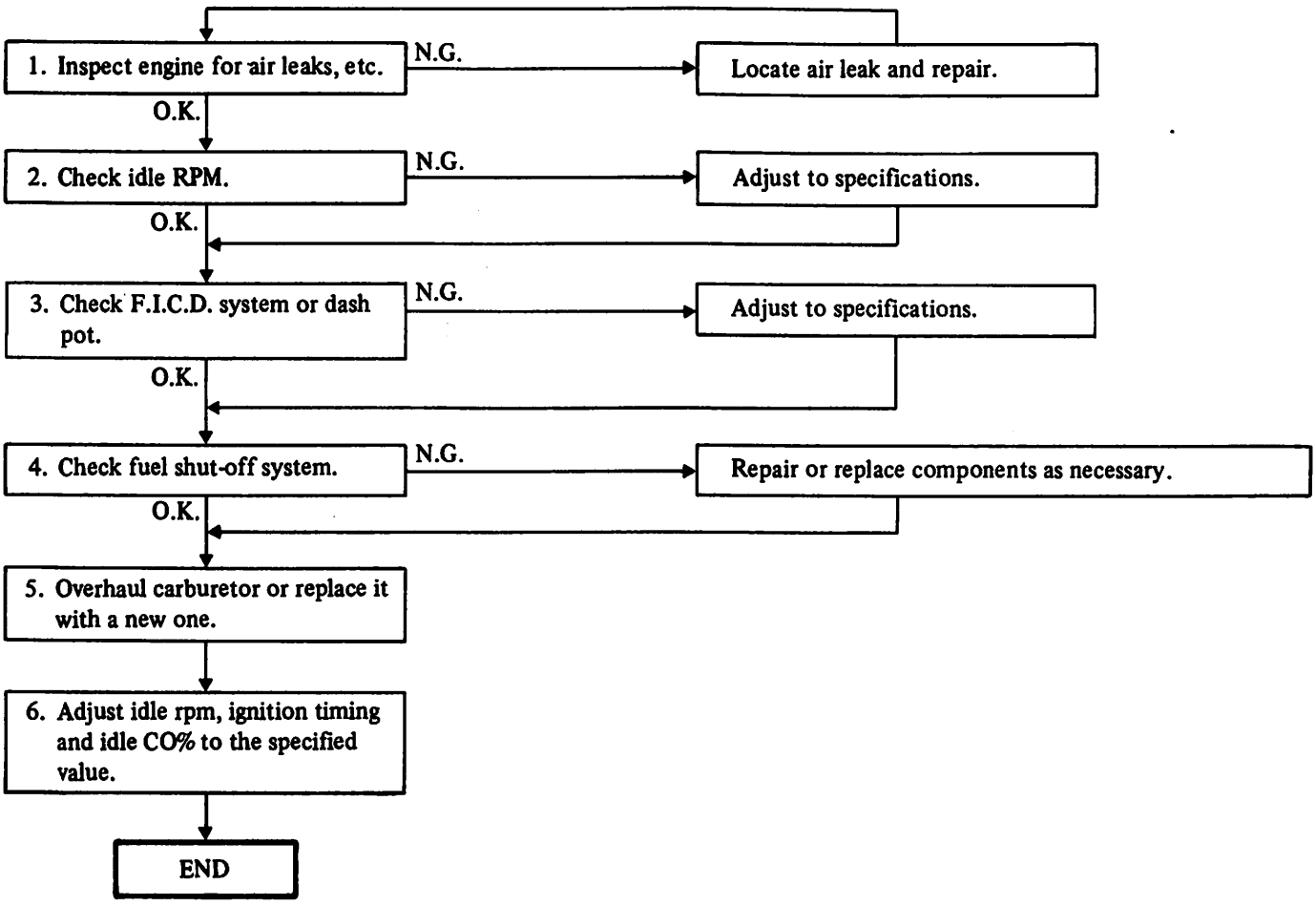
IMPROPER IDLING (Rough idle, no return to idle, high idle, etc.)



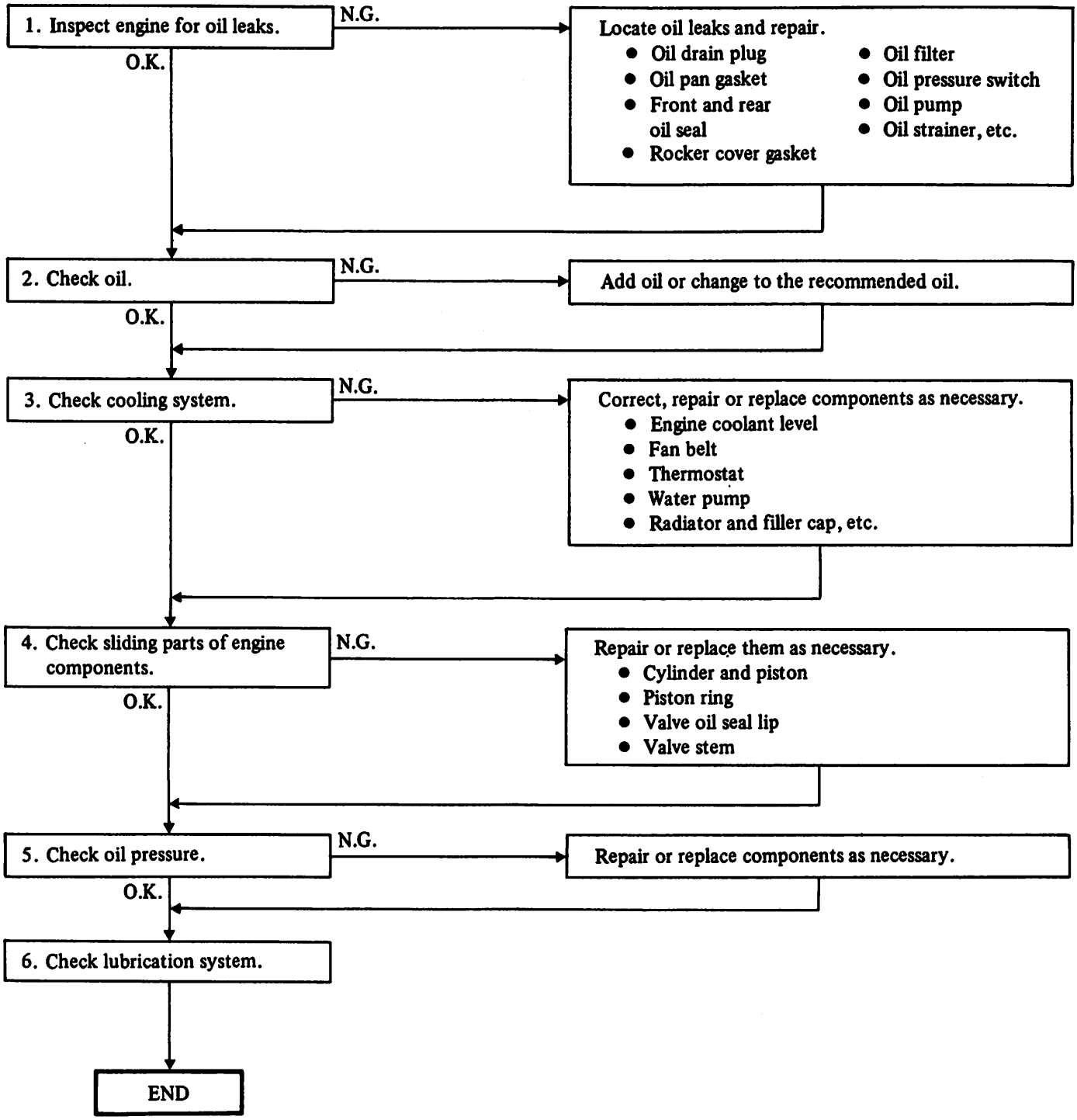
ENGINE STARTABILITY (Hard start, no start, hard restart, no restart, etc.)



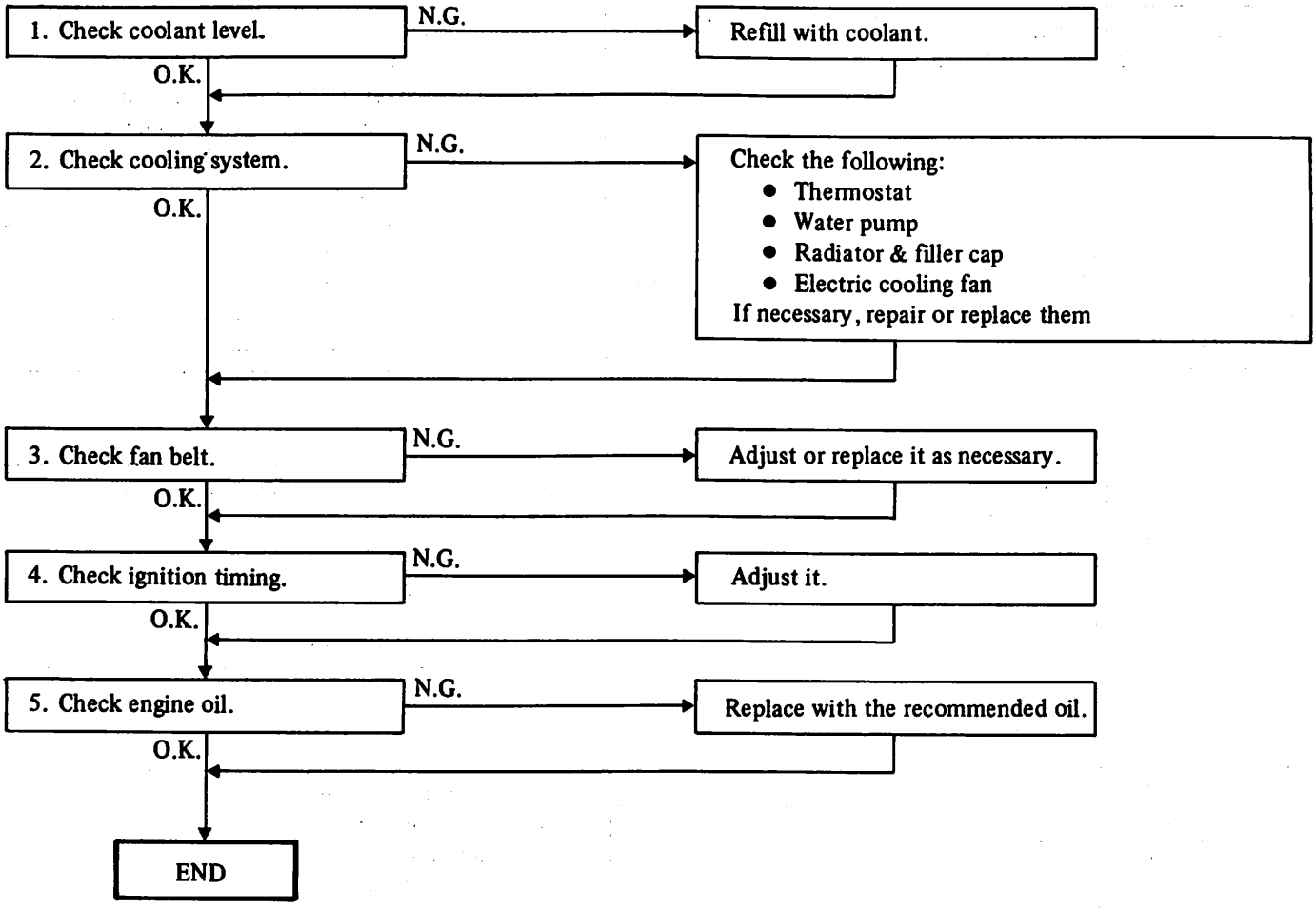
ENGINE STALL



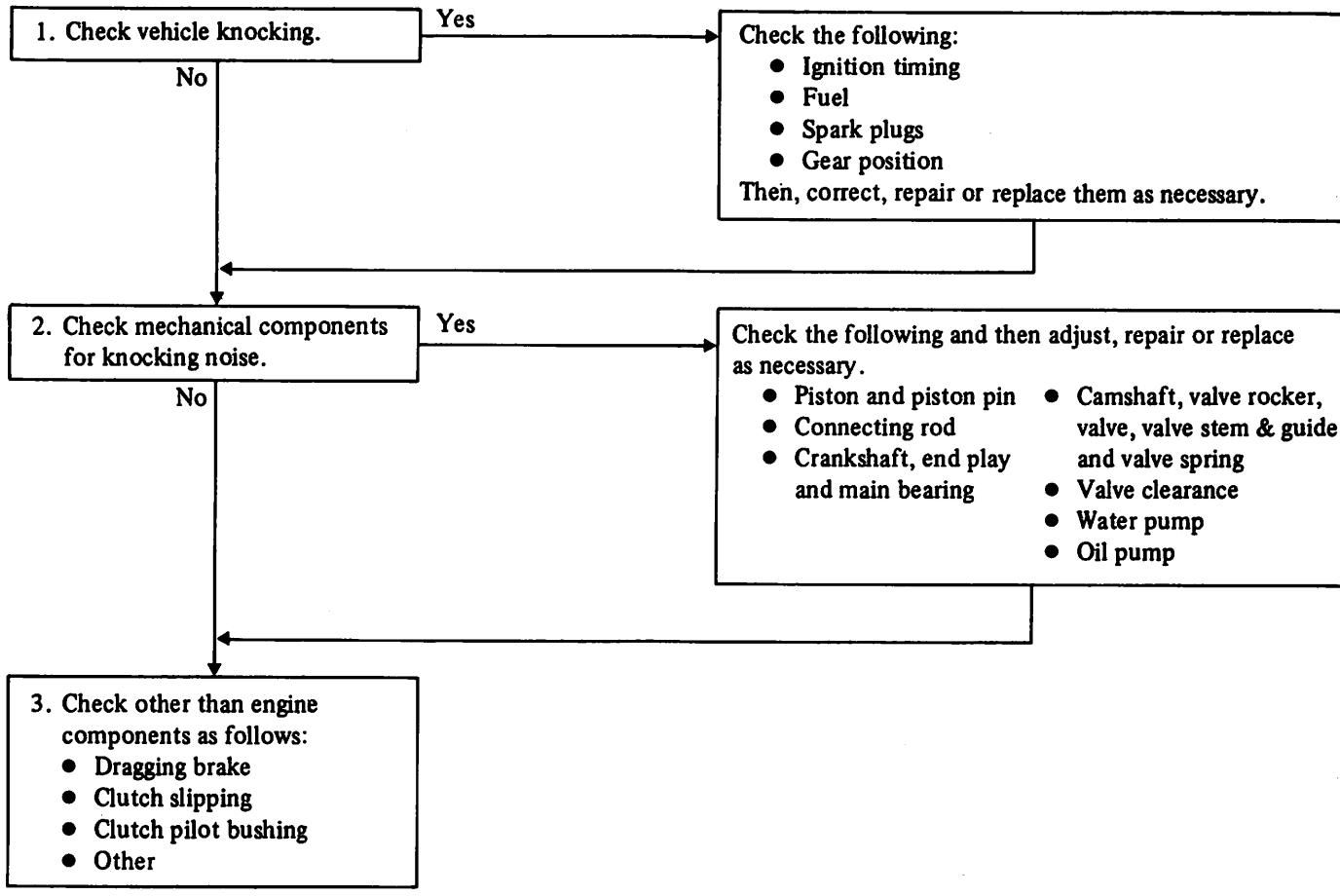
EXCESSIVE OIL CONSUMPTION



OVERHEATING



NOISY ENGINE

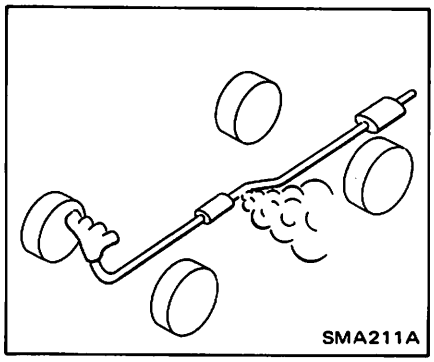


CHASSIS AND BODY MAINTENANCE

EXHAUST SYSTEMS

INSPECTING EXHAUST SYSTEMS

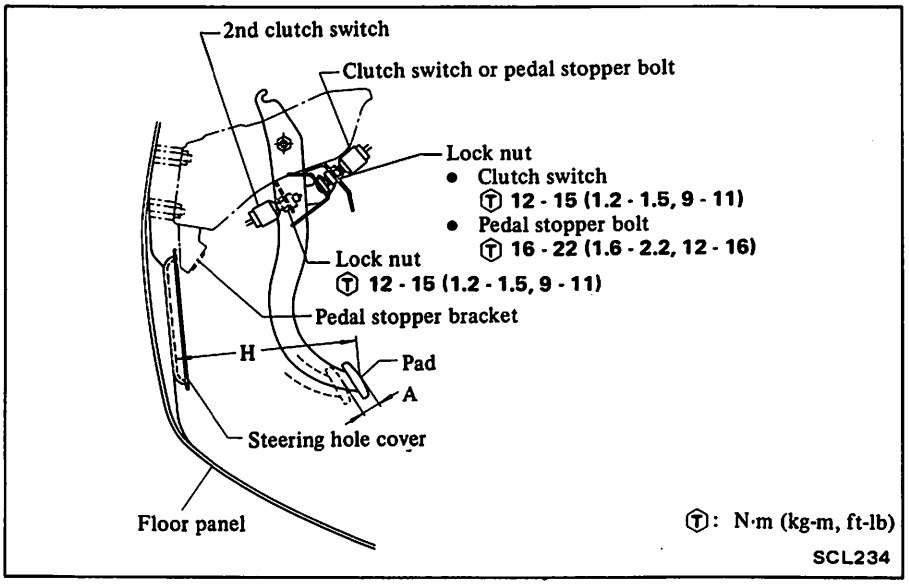
Visually check the exhaust pipes, muffler, and hangers for proper attachment, leaks, cracks, chafing, abrasion, deterioration, etc.



CLUTCH

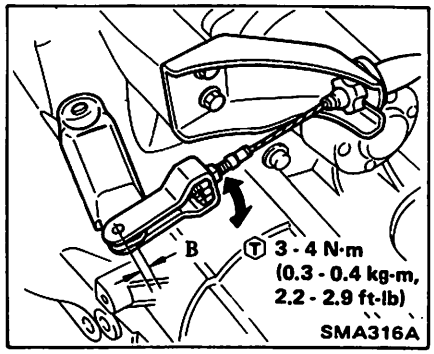
ADJUSTING CLUTCH PEDAL HEIGHT AND FREE TRAVEL

1. Adjust pedal height with pedal stopper bolt or clutch switch. Then tighten lock nut.



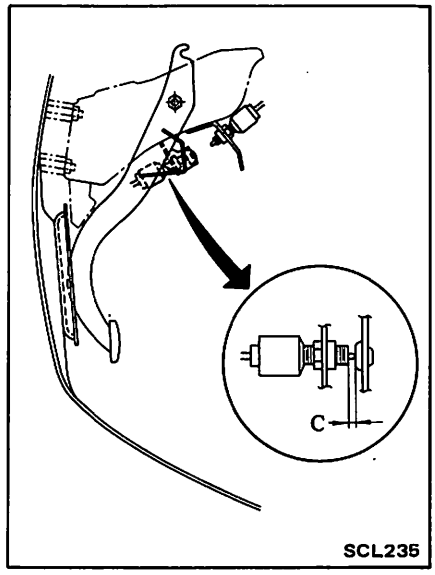
Pedal free height "H":
197 - 207 mm (7.76 - 8.15 in)
Pedal free play "A":
– reference data
12.5 - 17.5 mm (0.492 - 0.689 in)

2. Adjust withdrawal lever play "B" with adjuster or lock nuts.



Withdrawal lever play "B":
2.5 - 3.5 mm
(0.098 - 0.138 in)

3. As a check, measure pedal free play "A" at center of pedal pad.
4. Adjust clearance "C" between pedal stopper rubber and threaded end of 2nd clutch switch (models equipped with 2nd clutch switch).



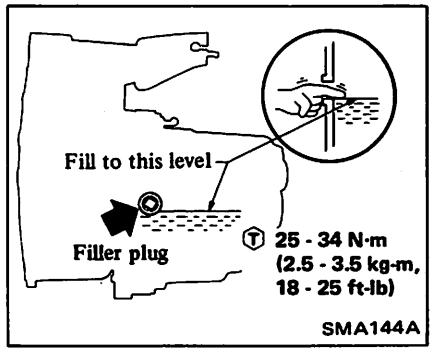
Clearance "C" between pedal stopper bracket and threaded end of clutch switch
(When depressing clutch pedal fully):
0.3 - 1.0 mm (0.012 - 0.039 in)

Depress and release clutch pedal over its entire stroke to ensure that the clutch linkage operates smoothly without squeak noise, interference and binding.

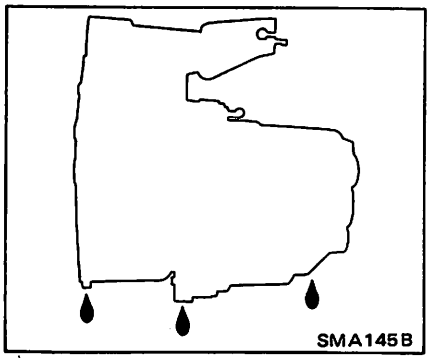
MANUAL TRANSAXLE

INSPECTING MANUAL TRANSAXLE OIL LEVEL

CAUTION:
Never start engine while checking oil level.

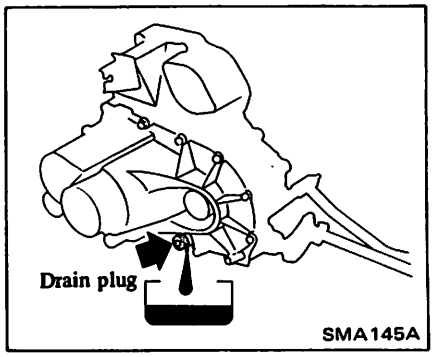


Visually inspect for signs of leakage.

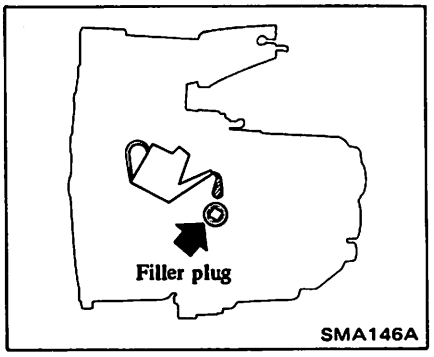


REPLACING MANUAL TRANSAXLE OIL

1. Drain oil completely.



2. Refill transaxle and check oil level.



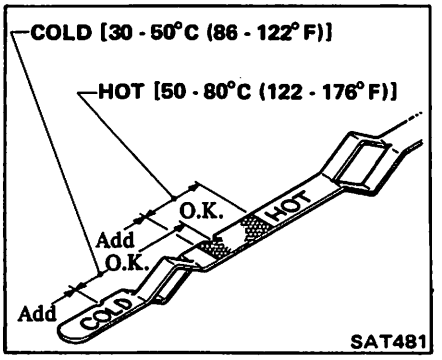
Oil capacity:
2.7 liters
(5-3/4 US pt,
4-3/4 Imp pt)

AUTOMATIC TRANSAXLE

INSPECTING AUTOMATIC TRANSAXLE FLUID LEVEL

The dipstick can check the fluid level at "HOT" fluid temperatures [50 to 80°C (122 to 176°F)] after the vehicle has been driven approximately 10 minutes. It can also check the fluid level at "COLD" fluid temperatures [30 to 50°C (86 to 122°F)].

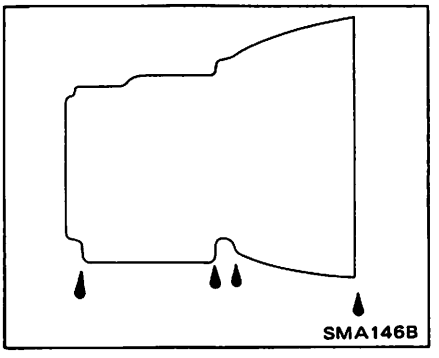
1. Park the vehicle on a level surface and set the parking brake.
2. Start the engine and then move the selector lever through each gear range, ending in "P".
3. Check the fluid level with the engine idling. (If the vehicle has not been driven for some time and the outside temperature is below 30°C (86°F), a "COLD" fluid temperature can be obtained by warming up the engine completely.)
4. Remove the dipstick and clean it with lint-free paper. Reinsert it into the charging pipe as far as it will go.
5. Remove the dipstick and note the reading. If the fluid temperature is "HOT", the level should be in the hot range (in the shaded area). If it is "COLD", the level should be in the cold range (within the cutout portion).



Keep the fluid at the proper level.

- **Overfilling may blow off the fluid or damage the transaxle.**
- **Underfilling may cause the clutches to slip, and finally damage them.**

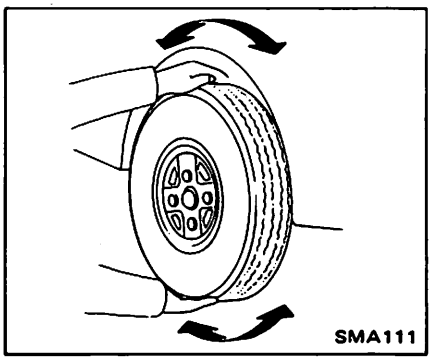
6. Visually inspect for leakage.



FRONT AXLE AND FRONT SUSPENSION

INSPECTING FRONT AXLE AND SUSPENSION PARTS

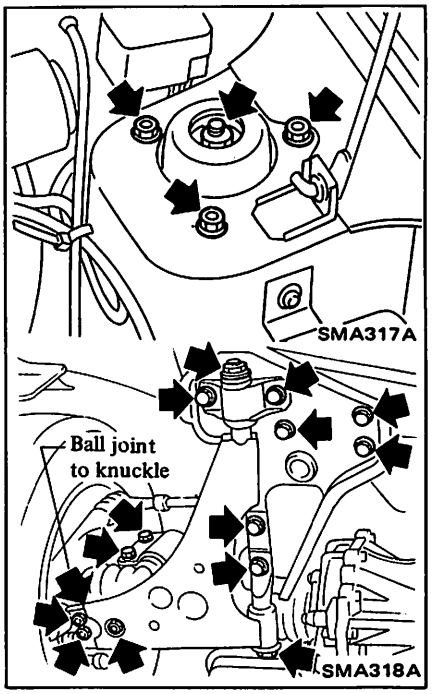
1. Block rear wheels with chocks and raise front of vehicle, and then support it with safety stand. Refer to Section GI.
2. Shake each front wheel by holding upper and lower surfaces of tires as shown below.



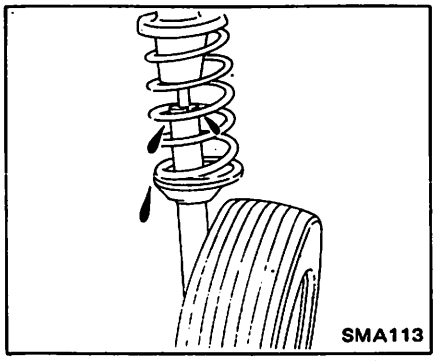
Check suspension parts for looseness, wear, or damage.

Retighten all loose nuts and bolts to the specified torque. Refer to Section FA for tightening torque.

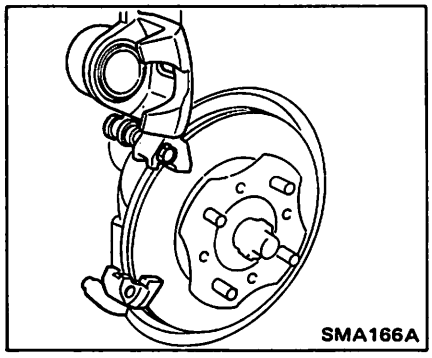
Replace all worn parts as described under Front Suspension (Section FA).



3. Check strut (Shock absorber) for oil leakage or damage.



4. Remove wheel and tire assembly.
5. Check front axle parts for crack or damage.
   Replace worn parts.
   Refer to Front Axle (Section FA).
6. Remove brake pads.
   Refer to section BR.
7. Check wheel bearing.
   If there is any axial end play or if wheel bearing does not smoothly turn, adjust bearing to specifications.
   Replace worn or damaged bearings.
   Refer to Front Axle (Section FA).



CHECKING DRIVE SHAFT BOOTS

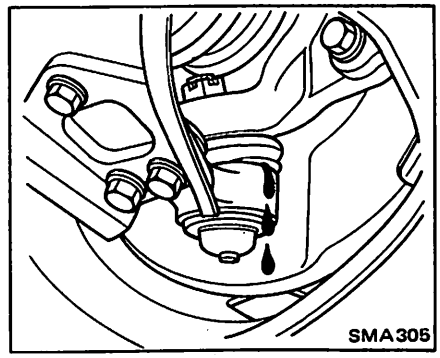
Check for damage, looseness and leakage of grease.

INSPECTING FRONT WHEEL BEARING GREASE

1. Block rear wheel with chocks and raise front of car, and then support it with safety stands. Refer to Lifting Points and Towing (Section GI).
2. Remove wheel and tire.
3. Check for grease leakage from front wheel bearing grease seals by observing the area around them. Replace worn or damaged grease seal. Refer to Front Axle (Section FA).
4. Check wheel bearing.
   If there is any axial end play or if wheel bearing does not turn smoothly, adjust bearing to specifications.
   Replace worn or damaged bearings.
   Refer to Front Axle (Section FA).

INSPECTING STEERING LINKAGE BALL JOINT & SUSPENSION BALL JOINT

Check the ball joints for damage, looseness and grease leakage.



CHECKING FRONT WHEEL ALIGNMENT

Before checking front wheel alignment, be sure to make a preliminary inspection of all front end parts.

- **Tire pressure**
- **Wheel bearing axial play**
- **Suspension ball joint**
- **Steering gear housing looseness at frame**
- **Steering linkage and connections**
- **Shock absorber operation**
- **Tighten front axle and suspension parts.**
- **Measure vehicle height (when not loaded)**
- **Repair or replace the damaged portion or parts.**

Camber and caster

Camber and caster are preset at factory and cannot be adjusted.

The vehicle requires only toe-in and vehicle posture adjustment.

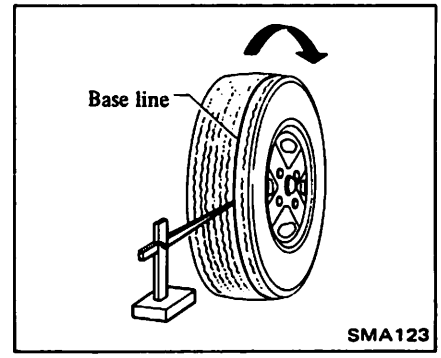
If camber or caster alignment is not within specifications, check associated parts. Repair or replace as necessary.

Camber, caster and kingpin inclination:
Refer to S.D.S.

Toe-in

Measure toe-in, and make necessary adjustment. Use the following procedure when making adjustments.

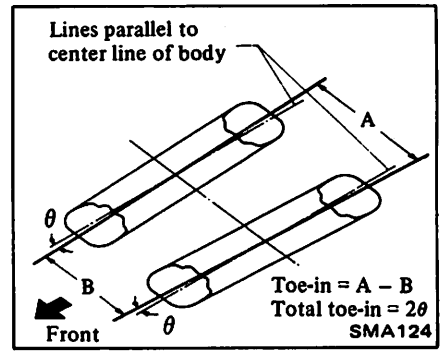
1. Raise front of vehicle and mark a base line across the tread of left and right wheels.



2. Set wheels in a straight-ahead position, and then lower front of vehicle.

After lowering front of vehicle, move it up and down to eliminate friction.

3. Measure toe-in and make necessary adjustments.



Toe-in (Unladen) and Side slip:
Refer to S.D.S.

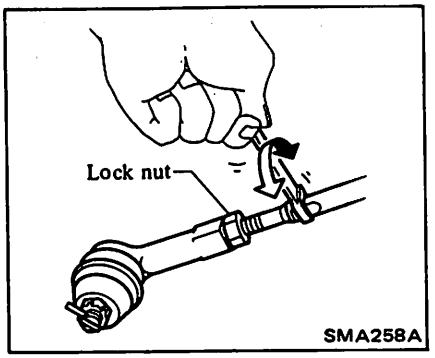
"Unladen"

- Fuel tank, radiator and engine oil pan are all filled.

- Spare tire, jack, hand tools, mats in position.
- All tires inflated to specified pressure.
- All accumulation of mud, dirt and road deposits removed from chassis and underbody.

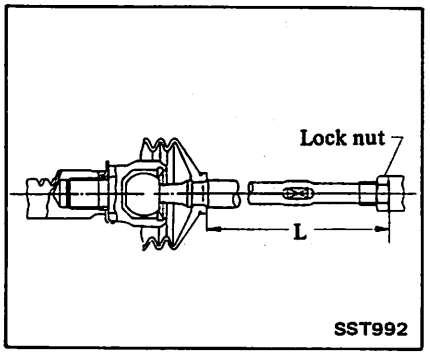
Toe-in can be adjusted by varying the length of steering tie rods.

Loosen lock nuts, and turn left and right adjusting bars equally.



If tie rods have been disassembled, set the distance between lock nuts to the specified value "L" prior to reasembling.

"L" dimension:
R22S
175.9 mm (6.93 in)
PR22S
175.9 mm (6.93 in)



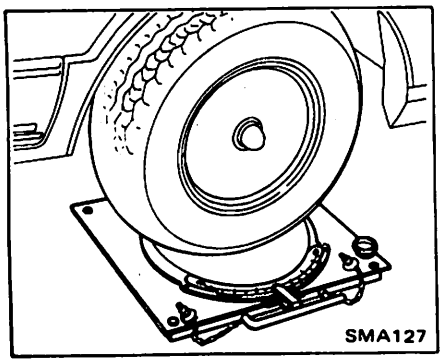
After correct toe-in has been obtained, tighten tie rod lock nuts.

Ⓣ : **Tie rod outer socket lock nuts**
35 - 47 N·m
(3.6 - 4.8 kg-m,
26 - 35 ft-lb)

Tie rod inner socket lock nuts
78 - 98 N·m
(8 - 10 kg-m,
58 - 72 ft-lb)

Front wheel turning angle

1. Set wheels in straight ahead position and then move vehicle forward until front wheels rest on turning radius gauge properly.



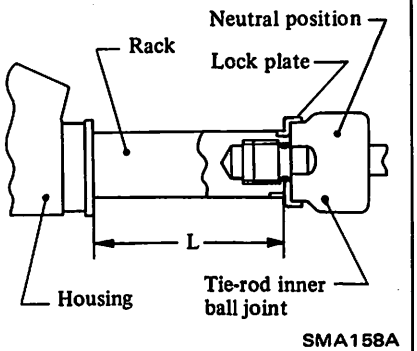
2. Rotate steering wheel all the way right and left; measure turning angle on inner wheel.

If it is not within specification, check rack stroke.

Turning angle:
Refer to S.D.S.

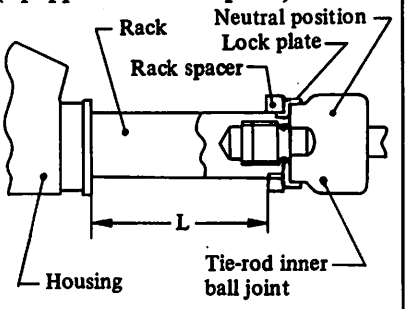
Rack stroke

R22S with M/T



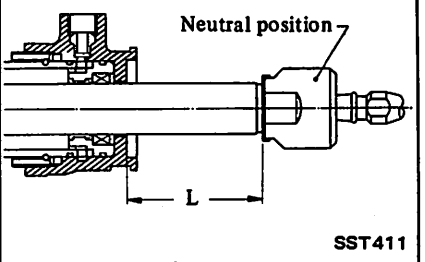
Measure length "L" (both sides):
73.5 mm (2.894 in)

R22S with A/T
(equipped with rack spacer)



Measure length "L" (both sides):
70 mm (2.76 in)

PR22S



Measure length "L":
Pinion gear side
60.0 mm (2.362 in)
Opposite pinion gear side
73.5 mm (2.894 in)

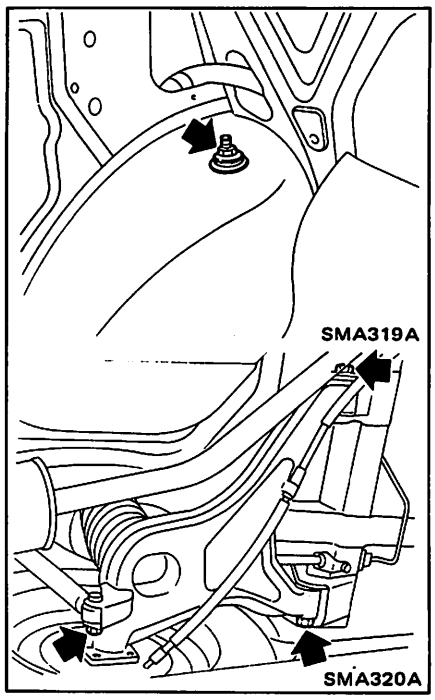
REAR AXLE AND REAR SUSPENSION

CHECKING REAR AXLE AND SUSPENSION PARTS

Check for damage looseness and leakage of oil or grease.

Retighten all loose nuts and bolts to the specified torque. Refer to Section RA for tightening torque.

Replace all worn parts as instructed under Rear Suspension (Section RA).

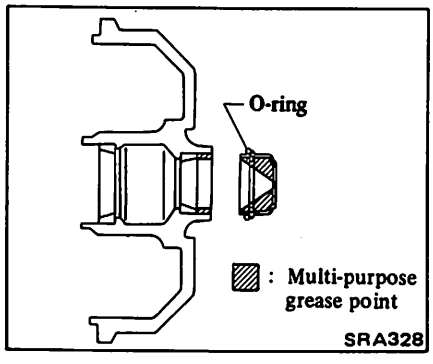


ADJUSTING WHEEL BEARING PRELOAD

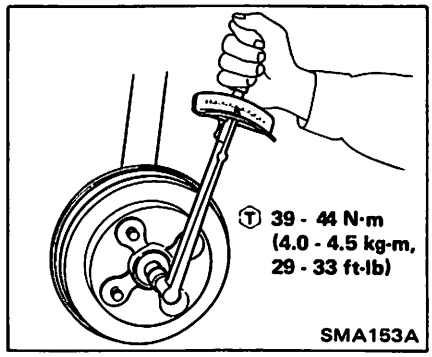
After wheel bearing has been replaced or rear axle has been reassembled, be sure to adjust wheel bearing preload as described below.

1. Before adjustment, thoroughly clean all parts to prevent possible entry of dirt.
2. Apply recommended multi-purpose grease sparingly to the following parts.

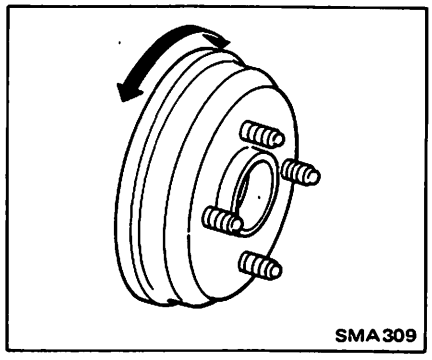
- Threaded portion of spindle.
- Contact surface between wheel bearing washer and outer wheel bearing.
- Hub cap and O-ring.
- Grease seal lip.



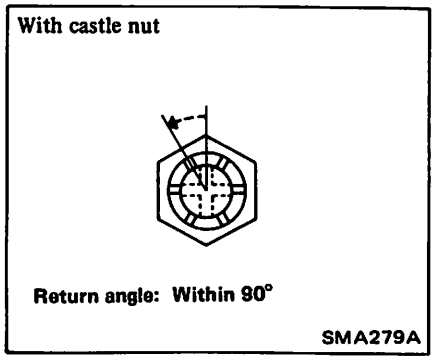
3. Tighten wheel bearing nut.



4. Turn wheel hub several times in both directions to seat wheel bearing correctly.



5. Again tighten wheel bearing nut.
6. Turn back wheel bearing nut within 90°.

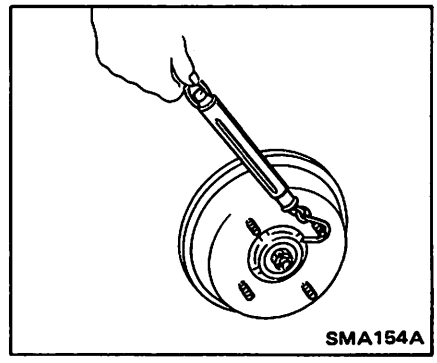


Install adjusting cap and align any of its slots with hole in spindle. If the above procedure fails to align hole and slot together, then tighten lock nut as much as 15 degrees until hole in spindle is aligned with any slot.

CAUTION:
Do not overtighten wheel bearing nuts, as this can cause wheel bearing seizure.

7. Turn hub in both directions two or three times, measuring its turning torque and axial play to see if they are within the specified ranges. If they are not, adjust.

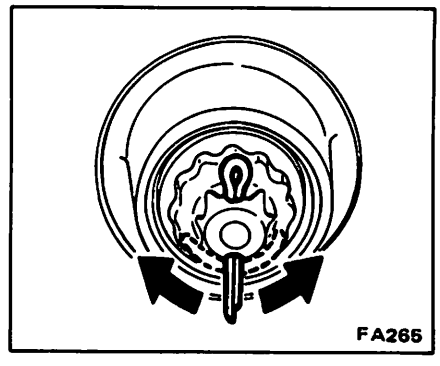
Axial play: 0 mm (0 in)
Wheel bearing starting torque:
With new grease seal
Less than
0.8 N·m (8 kg-cm, 6.9 in-lb)
As measured at wheel hub bolt
Less than
13.7 N (1.4 kg, 3.1 lb)
With used grease seal
Less than
0.4 N·m (4 kg-cm, 3.5 in-lb)
As measured at wheel hub bolt
Less than
6.9 N (0.7 kg, 1.5 lb)



Repeat above procedures until correct starting torque is obtained.

a. Correctly measure rotation starting force toward tangential direction against hub bolt.
b. Above figures do not include "dragging" resistance. When measuring wheel bearing starting torque, be sure to confirm that no "dragging" resistance exists.
c. Any slightest wheel bearing axial play cannot be tolerated.

8. Spread cotter pin.

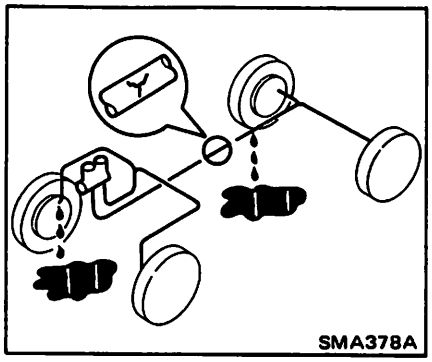


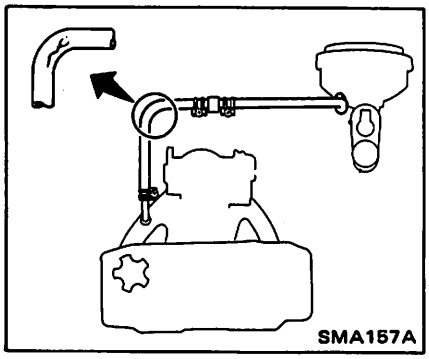
9. Install hub cap with new O-ring.

BRAKE SYSTEM

INSPECTING BRAKE LINES & HOSES

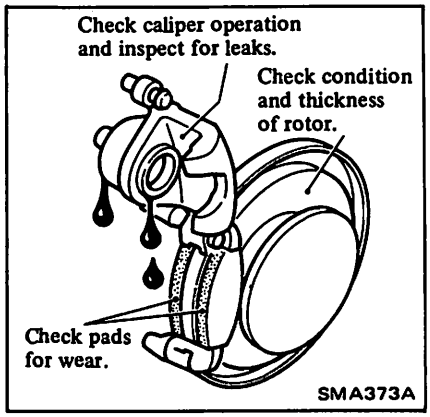
Check the brake lines and hoses (including brake booster vacuum hoses, connections & check valve) for proper attachment, leaks, cracks, chafing, abrasion, deterioration, etc.


SMA378A


SMA157A

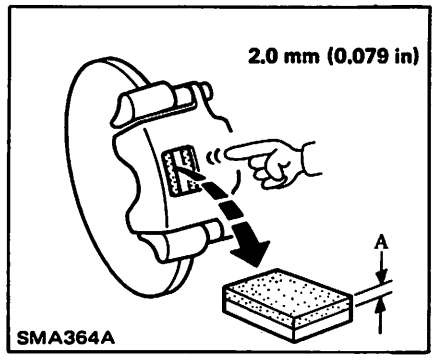
INSPECTING BRAKE PADS & DISCS

Check condition of disc brake components.



SMA373A

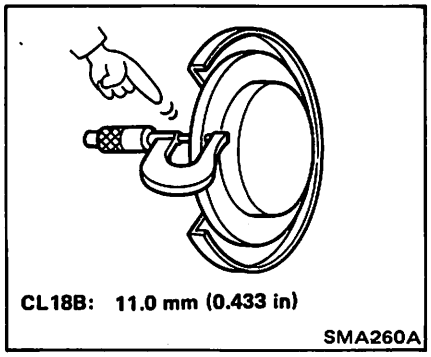
Pad wear limit



SMA364A

Refer to Section BR for pad replacement.

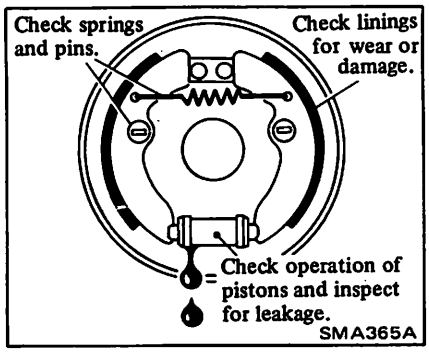
Rotor repair limit



SMA260A

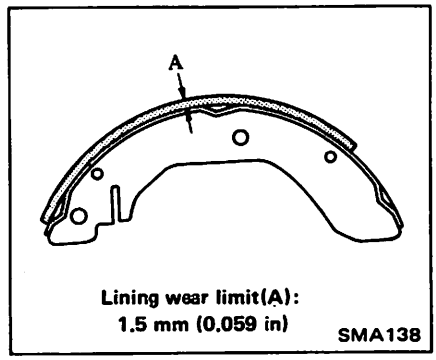
INSPECTING BRAKE DRUMS & LININGS

Check the brake lines and hoses (including brake booster vacuum hoses, connections & check valve) for proper attachment, leaks, cracks, chafing, abrasion, deterioration, etc.



SMA365A

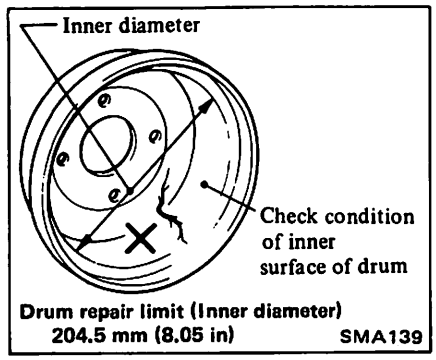
Lining wear limit



SMA138

Refer to Section BR for shoe replacement.

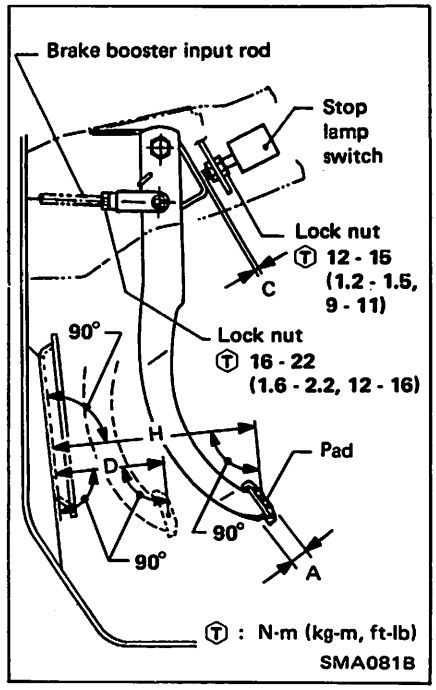
Drum repair limit



SMA139

CHECKING FOOT BRAKE

- Check brake pedal free height as shown below.
  Adjust if necessary.

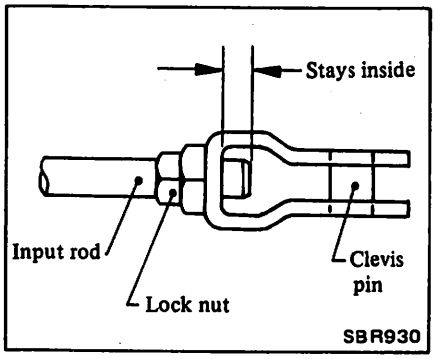


SMA081B

Pedal free height "H":
Refer to S.D.S.
Clearance "C" between pedal stopper rubber and threaded end of brake lamp switch:
0 - 1 mm (0 - 0.04 in)

(1) Adjust pedal free height with brake booster input rod. Then tighten lock nut.

Be sure that the top of input rod stays inside.



(2) Adjust clearance "C" with brake lamp switch. Then tighten lock nut.

Make sure that no depressing force is on brake booster input rod and that brake lamp is off when pedal is released.

- Check brake pedal depressed height "D" with engine running.

Depressed height "D"
[Under force of 490 N (50 kg, 110 lb) with engine running]:
Refer to S.D.S.

If depressed height is below the specified value, check brake system for leaks, accumulation of air or any abnormality regarding component parts (master cylinder, adjuster, etc.), and make the necessary repairs.

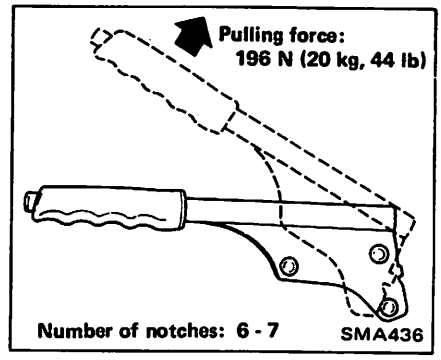
CHECKING BRAKE BOOSTER FUNCTION

Check the brake booster function in accordance with the following procedures.

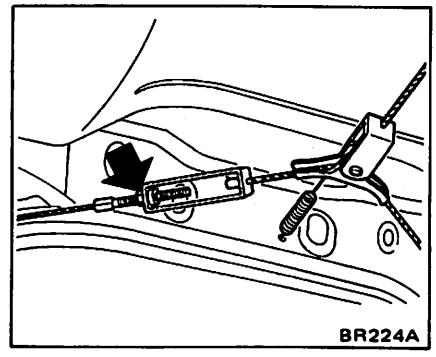
1. Park the vehicle on a level surface and set the parking brake.
2. With the engine stopped, depress the brake pedal several times to make sure that the pedal travel distance does not change. Then, while depressing the brake pedal, start the engine. At this time, the pedal should go down a little.
3. Depress the brake pedal while running the engine. With the brake pedal depressed, stop the engine. Keeping the pedal depressed for about 30 seconds, make sure that the depressed pedal height does not change.
4. Run the engine for a minute and then stop it. Depress the brake pedal several times and make sure that the pedal travel distance decreases gradually with each depression.

CHECKING PARKING BRAKE

1. Pull lever with specified amount of force.
   Measure lever stroke.



2. Use adjuster to adjust lever stroke.



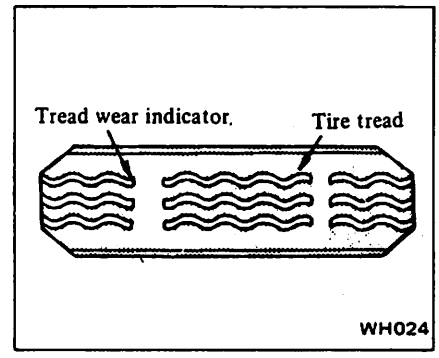
3. Bend hand brake warning lamp switch plate down so that brake warning light comes on when ratchet at hand brake lever is moved back one notch and goes out when returned to its original position.

WHEEL AND TIRE

CHECKING TIRE CONDITION

Tire condition

1. Tires are provided with "tread wear indicator" at six places around tire circumference, indicating 1.6 mm (1/16 in) tread depth. When tires wear and marks appear, replace tires with new ones.

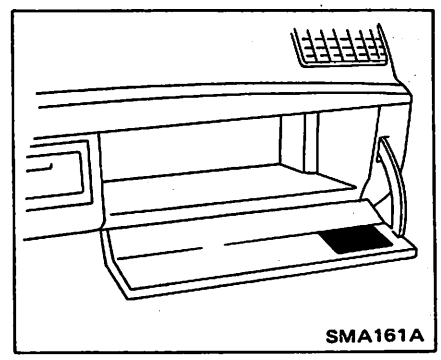


2. Remove pebbles, glass or any other foreign material embedded in tire treads.
3. Check tread and side walls for cracks, holes, separation or damage.
4. Check tire valves for air leakage.

Tire inflation

1. Check tire pressure. If necessary, adjust it to the specified value indicated on the placard affixed to the vehicle.

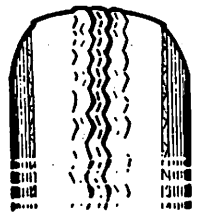
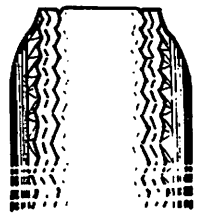
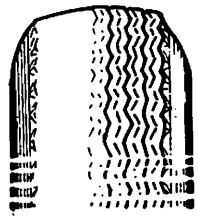
Tire pressure should be measured when tire is cold.



2. After inflating tires, valves should be checked for leakage. Whenever tire pressure is checked, be sure to tighten valve caps firmly by hand to keep dust and water out.

Abnormal tire wear

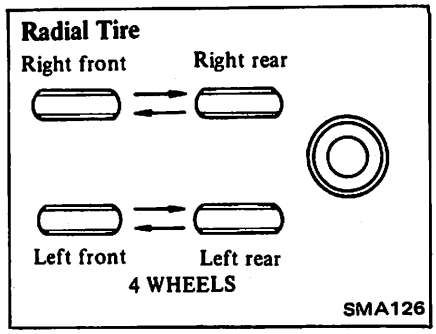
Correct abnormal tire wear according to the chart shown below.

Condition	Probable cause	Corrective action
 Shoulder wear	• Underinflation (both sides wear) • Incorrect wheel camber (one side wear) • Hard cornering • Lack of rotation	• Measure and adjust pressure. • Repair, or replace axle and suspension parts. • Reduce speed • Rotate tires.
 Center wear	• Overinflation • Lack of rotation	• Measure and adjust pressure. • Rotate tires.
Feathered edge  Toe-in or toe-out wear	• Incorrect toe	• Adjust toe-in.
 Uneven wear	• Incorrect camber or caster • Malfunctioning suspension • Unbalanced wheel • Out-of-round brake drum • Other mechanical conditions • Lack of rotation	• Repair, or replace axle and suspension parts. • Repair, replace or, if necessary, reinstall. • Balance or replace. • Correct or replace. • Correct or replace. • Rotate tires.

SMA068

TIRE ROTATION

1. Tires tend to wear unevenly and become unbalanced after a certain running distance. Uneven tire wear often results in tire noise which is attributed to rear axle gears, bearing, etc. Front tires also tend to wear unevenly because of improperly aligned front wheels.
2. Accordingly, to equalize tire wear, it is necessary to **rotate tires periodically.**



TIRE REPLACEMENT

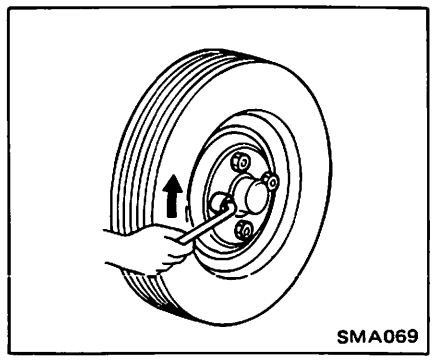
CAUTION:
Different types of tires, such as bias, bias belted and radial tires, must not be mixed under any circumstances. Mixed use of different types of tires can adversely affect vehicle handling and may cause driver to lose control.

a. When replacing a worn or damaged tire, use a replacement tire of the same size and load carrying capacity as that with which the car was equipped when manufactured. The use of different size and/or load capacity tires will not only shorten tire service life but may also result in a serious accident.
b. Do not use tires and wheels other than those recommended, and do not mix tires of different brands or tread patterns.
   The use of tires and wheels other than those recommended or the mixed use of tires of different brands, tread patterns or type (Bias, Belted or Radial) can adversely affect the ride, braking, handling, ground clearance, body-to-tire clearance and speedometer calibration.
c. It is recommended that new tires be installed in pairs on the same axle. When replacing only one tire, it should be paired with the most tread, to equalize braking traction.
d. When replacing original tires with those tires of an optional recommended size and of different diameter, the speedometer must be re-calibrated.
e. When tire is installed, refer to the procedure 7 described in TIRE REPAIR.

1. To replace a tire with a jack in a safe manner, refer to Lifting Points (Section GI) for jacking up.

WARNING:
Never get under vehicle while it is supported only by jack.
Always use safety stands to support side member of body construction when you must get under vehicle.

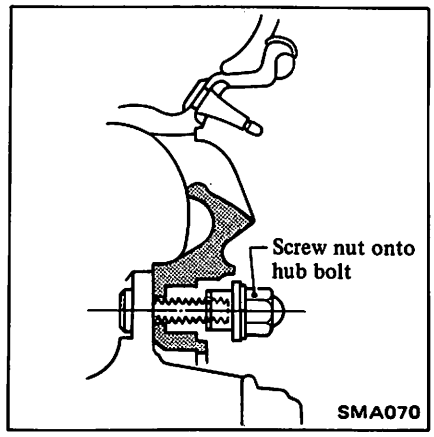
2. To install wheel, tighten wheel nuts in criss-cross fashion.


SMA069

Aluminum wheel

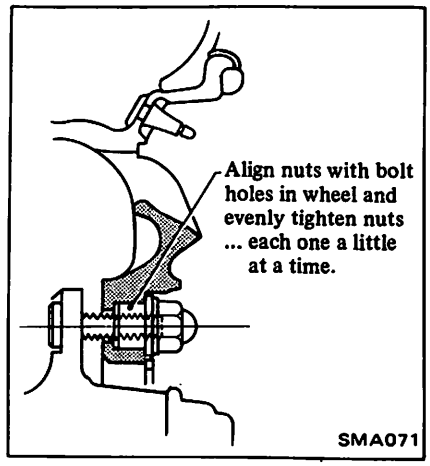
To install an aluminum wheel, proceed as follows:

1. Snugly tighten four nuts after the wheel is positioned.



SMA070

2. Pull the wheel back slightly to properly align the nuts with bolt holes in the wheel, and tighten the nuts as much as possible with your fingers.



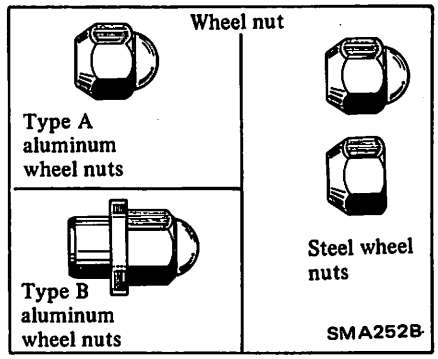
SMA071

3. Tighten wheel nuts evenly with a wheel wrench in criss-cross fashion.

Be sure to check the wheel nuts for tightness, after the aluminum wheel has been run for the first 1,000 km (600 miles) (also in case of repairing flat tires, tire rotation, etc.).
Replace if necessary.

Wheel nut

CAUTION:
Three types of wheel nuts are used; one is designed for use with the steel wheel and the other two are designed for use with aluminum wheels. The type A aluminum wheel nuts and the steel wheel nuts are interchangeable. The two aluminum wheel nuts are for different types of aluminum wheels and should never be mixed.



Be careful not to smear threaded portion of bolt and nut, and seat of nut with oil or grease.

LIGHT WEIGHT SPARE TIRE (Size P155/80D13)

The light weight spare tire is designed for emergency use only.
The spare tire can be used repeatedly for emergency situations.

Precautions when using light weight spare tire

- **Periodically check tire inflation pressure, and always keep it at 35 psi (240 kPa).**
- **Do not drive vehicle at speed faster than 80 km/h (50 MPH).**
- **The light weight spare tire is designed only for temporary use as a spare. Dismount it and keep it as a spare as soon as the standard tire repair has been completed.**
- **Do not use tire chains on a light weight spare tire.**

- **Do not use the light weight spare tire on other vehicles.**
- **Do not make a sharp turn, or apply the brake suddenly while driving.**
- **As soon as the tread wear indicator becomes visible, replace the tire with a new one.**
- **Mounting and dismounting to and from the road wheel can be carried out in the same manner as any ordinary tire.**
- **Use of wheel balance is unnecessary.**

CAUTION:
If the vehicle is equipped with aluminum wheels, be sure to use the proper wheel nuts for the spare tire wheel. Type A aluminum wheel nuts can be used with the spare tire wheel. Type B aluminum wheel nuts should never be used with the spare tire wheel.
The spare tire wheel may come off the axle and cause personal injury if the Type B aluminum wheel nuts are used on the spare tire wheel.

TIRE REPAIR

Inspect tire, following the procedure shown below. If any defect is present, repair or replace as necessary.

1. Apply soapy solution or submerge tire and wheel or tube in water after inflating it to specified pressure.
2. Inspect for leaks.
3. Especially inspect for leaks around valve or wheel rim and along tread.
4. Note bead and rim where leakage occurs. Wipe water away from any area which leaks air bubbles and then mark place with chalk.
5. Remove object which caused puncture and seal the point.

a. **When repairing a puncture, use a tire repair kit furnished by any tire dealer, following instructions provided with kit.**
b. **If a puncture is too large or there is some damage to tire fabric, repair should be carried out by authorized tire dealer.**

6. Replace tire when any of the following conditions exist:

- Broken or damaged bead wire.
- Ply or tread separation.
- Worn fabric damage on tubeless tire.
- Cracked or damaged side wall.
- Tires with tread wear indicator showing, etc.

CAUTION:
When replacing tire, take extra care not to damage tire bead, rim-flange and bead seat.

Do not use tire irons to force beads away from wheel rim-flange; that is, always use tire replacement device whenever tire is removed.

7. When installing tire, note the following items:

a. **Install valve core and inflate to proper pressure. Check the locating rings of the tire to be sure they show around the rim flanges on both sides.**
b. **Check valves for leakage after inflating tires.**
c. **Be sure to tighten valve caps firmly by hand.**

WARNING:
When, while tire is being inflated, bead snaps over safety hump, it might break. Thus, to avoid serious personal injury, never stand over tire when inflating it. Never inflate to a pressure greater than 40 psi (275 kPa). If beads fail to seat at that pressure, deflate the tire, lubricate it again, and then reinflate it. If the tire is overinflated, the bead might break possibly resulting in serious personal injury.

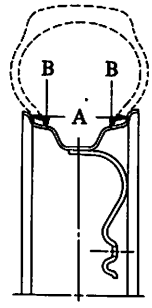
WHEEL INSPECTION

Inspect wheel, taking care of the following points, in order to ensure satisfactory steering condition as well as maximum tire life. If any defect is present, repair or replace as necessary.

1. Check wheel rim, especially rim flange and bead seat, for rust, distortion, cracks or other faults which might cause air leaks. Function of tubeless tire depends on a good seal between tire bead and wheel rim.
2. Thoroughly remove rust, dust, oxidized rubber or sand from wheel rim.

Rim bead seats should be cleaned with the following.
Steel wheel:
Wire brush, coarse steel wool, etc.
Aluminum wheel:
Neutral detergent, cloth, etc.

3. Examine wheel rim for lateral and radial runout, using dial gauge.



SMA140B

Lateral runout (A) and radial runout (B):
Steel wheel ... Less than 1.0 mm (0.039 in)
Aluminum wheel ... Less then 0.5 mm (0.020 in)
Mechanical average between right and left radial runout:
Steel wheel
Less than 0.5 mm (0.020 in)
Aluminum wheel
Less than 0.2 mm (0.008 in)

4. Replace wheel when any of the following conditions occur.

- Bent, dented or heavily rusted
- Elongated bolt holes
- Excessive lateral or radial runout
- Air leaks through welds
- Wheel nuts will not stay tight

Wheel balance

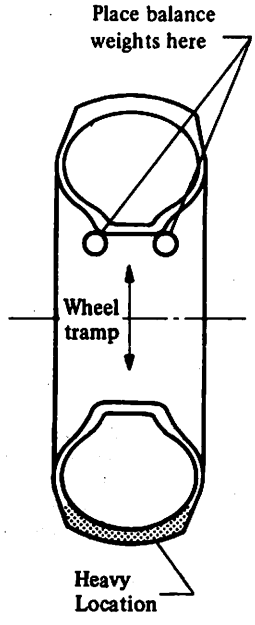
Inspect wheel and tire for proper wheel balance and correct it if unbalance is present, taking the following points into consideration.

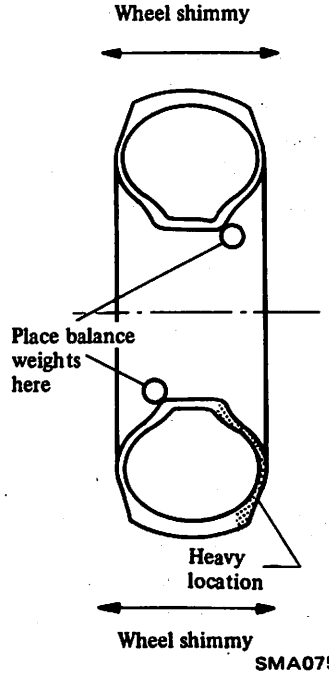
1. Correct unbalance when the symptom of unbalance appears as wheel tramps and wheel shimmy.
2. Balance wheel and tire both **statically and dynamically.**

Balancing wheels

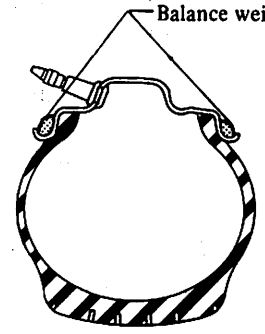
CAUTION:
Do not spin balance front wheels on the vehicle.
Transaxle damage will result.

Cause	Wheel static unbalance	Wheel dynamic unbalance
Symptom of unbalance	Wheel tramp Wheel shimmy	Wheel shimmy
Corrective action	Balance statically	Balance dynamically





SMA075



Maximum allowable unbalance at rim flange:
10 g (0.35 oz)
Balance weight:
5 - 60 g (0.18 - 2.12 oz)
at 5 g (0.18 oz) interval

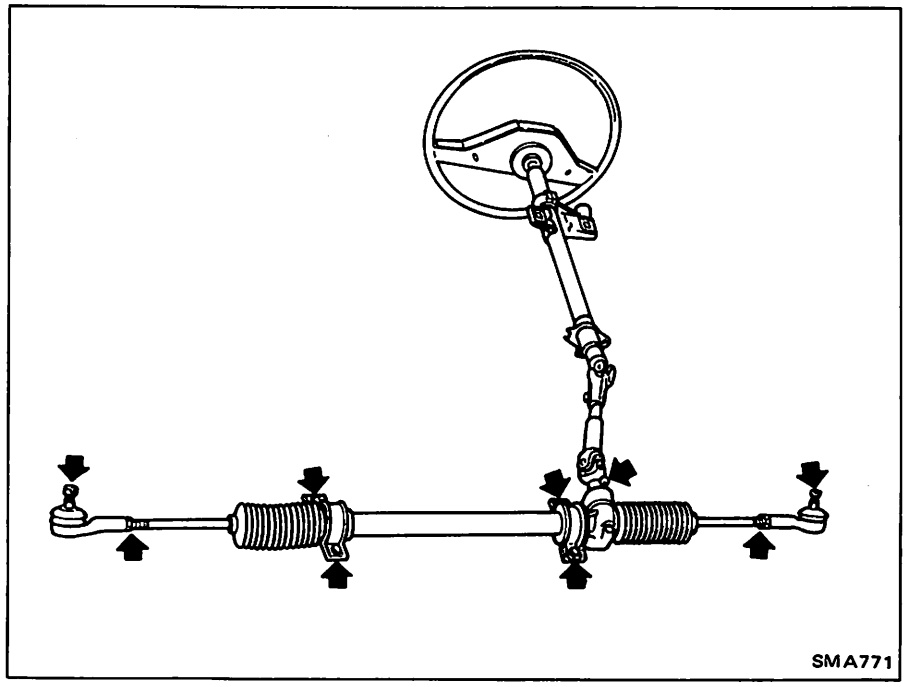
SMA076

a. **Be sure to place correct balance weights on inner edge of rim.**
b. **Do not put more than two weights on each side.**
c. **Two types of balance weights are used; one is designed for use with steel wheel and the other for use with aluminum wheel. Do not mix different types of balance weights.**
d. **Properly rebalance the wheel and tire whenever puncture is repaired.**

STEERING SYSTEM

INSPECTING STEERING GEAR AND LINKAGE

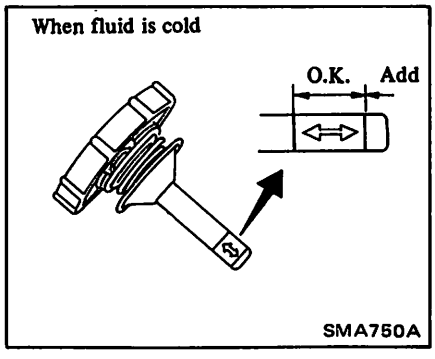
Check for damage, looseness and leakage of oil or grease.



CHECKING POWER STEERING FLUID LEVEL

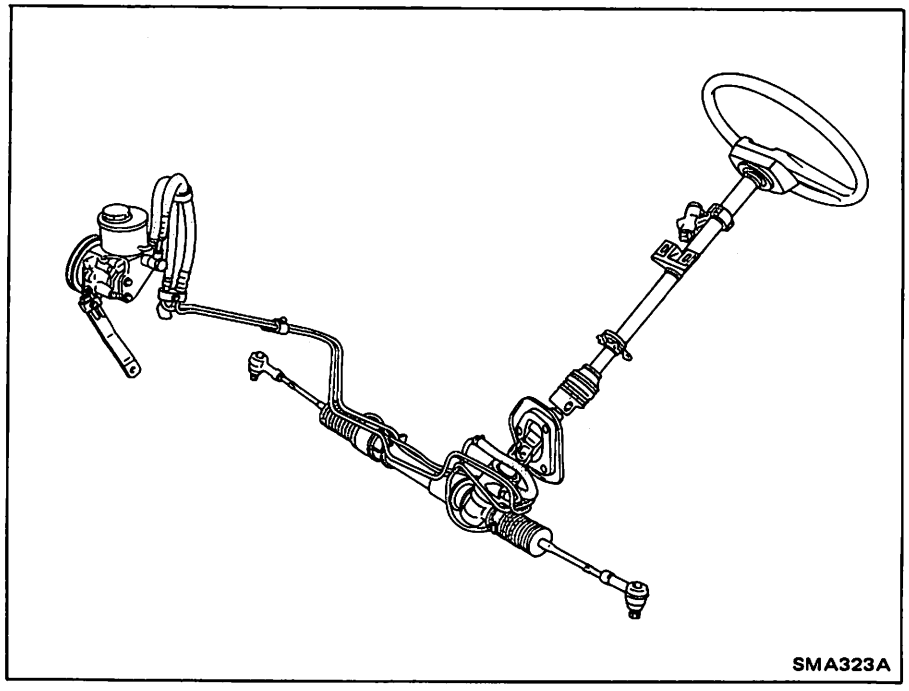
Check the fluid level in reservoir by observing the dipstick when the fluid is cold. Add fluid as necessary to bring the level into the proper range on dipstick.

CAUTION:
Do not overfill.



INSPECTING POWER STEERING LINES & HOSES

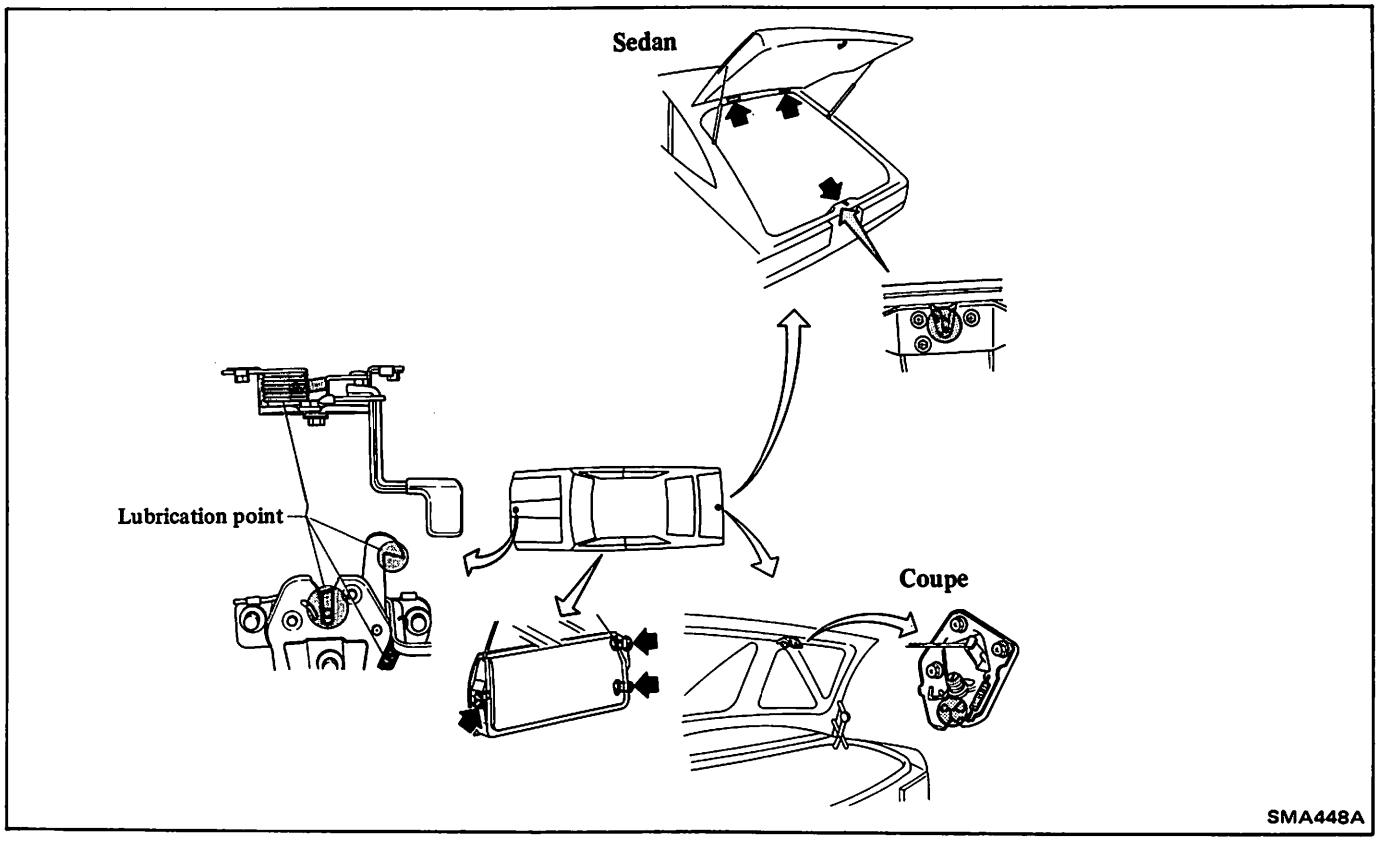
Check the lines & hoses for proper attachment, leaks, cracks, chafing, abrasion, deterioration, etc.



BODY

LUBRICATING LOCKS, HINGES AND HOOD LATCH

Lubricate all locks and hinges on all doors including trunk lid, back hatch and hood latch. When driving in areas using road salt or other corrosive materials, inspection should be performed more frequently.

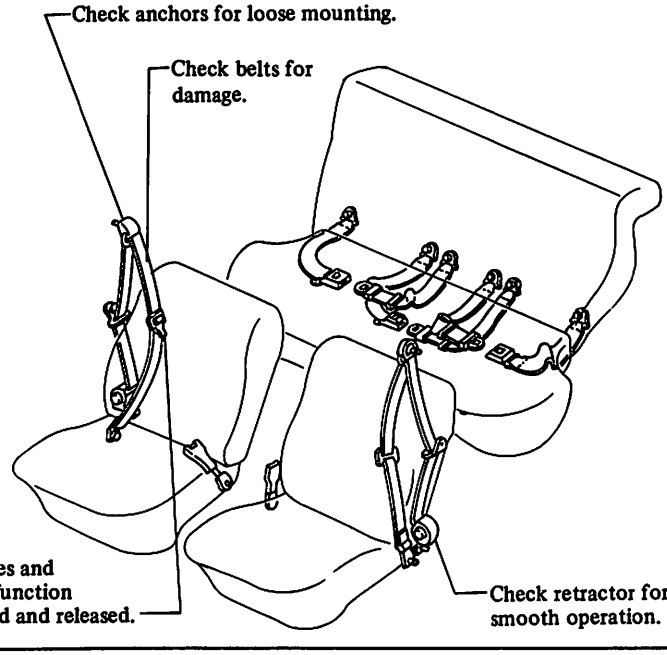


CHECKING SEAT BELTS, BUCKLES, RETRACTORS, ANCHORS AND ADJUSTER

Check for damage, deterioration, proper functioning, smooth operation and loose mounting.

CAUTION:
1. If the vehicle is collided or overturned, replace the entire belt assembly, regardless of nature of accident.
2. If the condition of any component of a seat belt is questionable, do not have seat belt repaired, but replaced as a belt assembly.
3. If webbing is cut, frayed, or damaged, replace belt assembly.
4. Do not spill drinks, oil etc. on inner lap belt buckle. Never oil tongue and buckle.
5. Use a NISSAN genuine seat belt assembly.

Ⓣ **Anchor bolt**
24 - 31 N·m
(2.4 - 3.2 kg-m, 17 - 23 ft-lb)



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

ENGINE MAINTENANCE

INSPECTION AND ADJUSTMENT

Basic mechanical system

Valve clearance mm (in) Hot	Intake	0.28 (0.011)		
	Exhaust	0.28 (0.011)		
Cold*	Intake	0.22 (0.009)		
	Exhaust	0.22 (0.009)		
Drive belt deflection (Cold)		Used belt		Set deflection of new belt
		Limit	Adjust deflection	
Alternator mm (in)		19 (0.748)	13 - 17 (0.51 - 0.67)	10 - 14 (0.39 - 0.55)
Air conditioner mm (in)		12.5 (0.492)	9 - 11 (0.35 - 0.43)	7 - 9 (0.28 - 0.35)
Power steering mm (in)		10.5 (0.413)	7 - 9 (0.28 - 0.35)	6.5 - 8.5 (0.256 - 0.335)
Pushing force N (kg, lb)		98 (10, 22)		

*After checking valve clearance while engine is cold also check it when engine is hot to see if it remains within the specific range. If it does not readjust it.

Ignition and fuel system

Spark plug	California	Non-California		Canada
Standard	BPR5ES-11	BPR5ES-11	–	BPR5ES
Hot type	BPR4ES-11	BPR4ES-11	BPR4ES	BPR4ES
Cold type	BPR6ES-11	BPR6ES-11	–	BPR6ES
Plug gap mm (in)	1.0 - 1.1 (0.039 - 0.043)		0.8 - 0.9 (0.031 - 0.035)	
High tension cable resistance ohm	Less than 30,000			

Ignition timing, idle speed and idle "CO"%

	Non-California		California	
	Manual	Automatic	Manual	Automatic
Ignition timing/ idle speed	10±2°/ 800±100*1 (B.T.D.C. degree/rpm)	10±2°/ 650±100*1 (in "D" position) (B.T.D.C. degree/rpm)	5±2°*2/ 800±50 (A.T.D.C. degree/rpm)	5±2°*2/ 650±50 (in "D" position) (A.T.D.C. degree/rpm)
"CO"% at idle speed	Idle mixture screw is preset and sealed at factory.			

	Canada	
	Manual	Automatic
Ignition timing/idle speed (A.T.D.C. degree/rpm)	5±2° *2/800±50	5±2° *2/650±50 (in "D" position)
"CO"% at idle speed	2±1	

*1 First, adjust idle rpm to the specification below, with harness connector for V.C.M. (vacuum control modulator) valve disconnected.
Then check with harness connector for V.C.M. valve connected that idle rpm is within the specification shown above.

	Manual	Automatic
Idle rpm (V.C.M. valve is OFF)	725±50	575±50 (in "D" position)

*2 Measure with distributor vacuum hose disconnected and vacuum hose plugged up.

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Valve rocker adjusting nut	16 - 21	1.6 - 2.1	12 - 15
Oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Spark plug	20 - 29	2.0 - 3.0	14 - 22

CHASSIS AND BODY MAINTENANCE

INSPECTION AND ADJUSTMENT

Clutch

Unit: mm (in)

Pedal height "H"	197 - 207 (7.76 - 8.15)
Pedal free play "A"	12.5 - 17.5 (0.492 - 0.689)
Withdrawal lever play	2.5 - 3.5 (0.098 - 0.138)

Front axle and front suspension

Wheel alignment (Unladen*)			
Camber	degree	–25' to 1°05'	
Caster	degree	45' - 2°15'	
Kingpin inclination	degree	12°10' - 13°40'	
Toe-in	mm (in)	3 - 5 (0.12 - 0.20)	
	degree (Total toe-in)	19' - 32'	
Side slip	mm/m (in/ft)	OUT 3 - IN 3 (Out 0.036 - In 0.036)	
Standard tie-rod length	mm (in)	175.9 (6.93)	
Front wheel turning angle			
Toe-out turns (Inside/Outside)	degree	22°30'/20°	
Full turn (Inside/Outside)	degree	M/T: 40°30' - 43°30'/31°30' - 34°30'	A/T (Power steering): 40°30' - 43°30'/31°30' - 34°30'
			A/T (Manual steering): 37°30' - 40°30'/29°30' - 32°30'

*Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designated positions.

Rear axle and rear suspension

Wheel alignment (Unladen*)		
Camber	degree	–1°45' to –15'
Toe-in	mm (in)	–6.5 to 6.5 (–0.256 to 0.256)
	degree (Total toe-in)	–42' to 42'
Axial play	mm (in)	0 (0)
Wheel bearing nut		
Tightening torque	N·m (kg-m, ft-lb)	39 - 44 (4.0 - 4.5, 29 - 33)
Return angle	degree	90°
Wheel bearing starting torque		
With new grease seal	N·m (kg-cm, in-lb)	Less than 0.8 (8, 6.9)
As measured at hub bolt	N (kg, lb)	Less than 13.7 (1.4, 3.1)
With used grease seal	N·m (kg-cm, in-lb)	Less than 0.4 (4, 3.5)
As measured at hub bolt	N (kg, lb)	Less than 6.9 (0.7, 1.5)

* Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designated positions.

Brake

Unit: mm (in)

Disc brake	
Pad minimum thickness	2.0 (0.079)
Rotor minimum thickness	
CL18B	11.0 (0.433)
Drum brake	
Lining minimum thickness	1.5 (0.059)
Drum maximum inner dia.	204.5 (8.05)
Pedal	
Free height "H"	
MT	194 - 204 (7.64 - 8.03)
AT	197 - 207 (7.76 - 8.15)
Depressed height "D" [Under force of 490 N (50 kg, 110 lb) with engine running]	E16S: More than 85 (3.35)
Parking brake	
Number of notches [at pulling force 196 N (20 kg, 44 lb)]	6 - 7 notches

Wheel and tire

Tire inflation

Proper tire pressures are shown on the tire placard affixed to the glove box of vehicle.

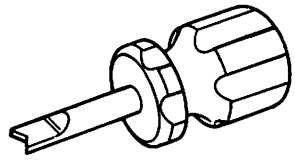
Tire pressure should be checked when tires are COLD.

Wheel rim lateral and radial runout		
Steel wheel	mm (in)	Less than 1.0 (0.039)
Aluminum wheel	mm (in)	Less than 0.5 (0.020)
Mechanical average between right and left radial runout		
Steel wheel	mm (in)	Less than 0.5 (0.020)
Aluminum wheel	mm (in)	Less than 0.2 (0.008)
Wheel balance (Maximum allowable unbalance at rim flange)	gr (oz)	10 (0.35)
Tire balance weight	gr (oz)	5 - 60 (0.18 - 2.12) Spacing 5 (0.18)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Clutch			
Clutch switch lock nut (U.S.A. models)	12 - 15	1.2 - 1.5	9 - 11
2nd clutch switch lock nut (U.S.A. models)	12 - 15	1.2 - 1.5	9 - 11
Pedal stopper lock nut (Canada models)	16 - 22	1.6 - 2.2	12 - 16
Cable adjuster lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Manual transaxle			
Drain and filler plugs	25 - 34	2.5 - 3.5	18 - 25
Front axle and front suspension			
Tie-rod lock nut	35 - 47	3.6 - 4.8	26 - 35
Tie-rod to gear	78 - 98	8 - 10	58 - 72
Brake system			
Air bleed valve	7 - 9	0.7 - 0.9	5.1 - 6.5
Brake lamp switch lock nut	12 - 15	1.2 - 1.5	9 - 11
Brake booster input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Wheel and tire			
Wheel nut	78 - 98	8.0 - 10.0	58 - 72

SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.)	Tool name	Engine application
		E16
KV10108300 (–)	Idle adjusting screwdriver 	X (Canada models only)

ENGINE MECHANICAL

SECTION EM

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- Cylinder head ..... EM- 8

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- Cylinder block EM-11
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- Connecting rod EM-13
- Crankshaft EM-13
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- Jack shaft and jack shaft bushing EM-14
- Miscellaneous components EM-14

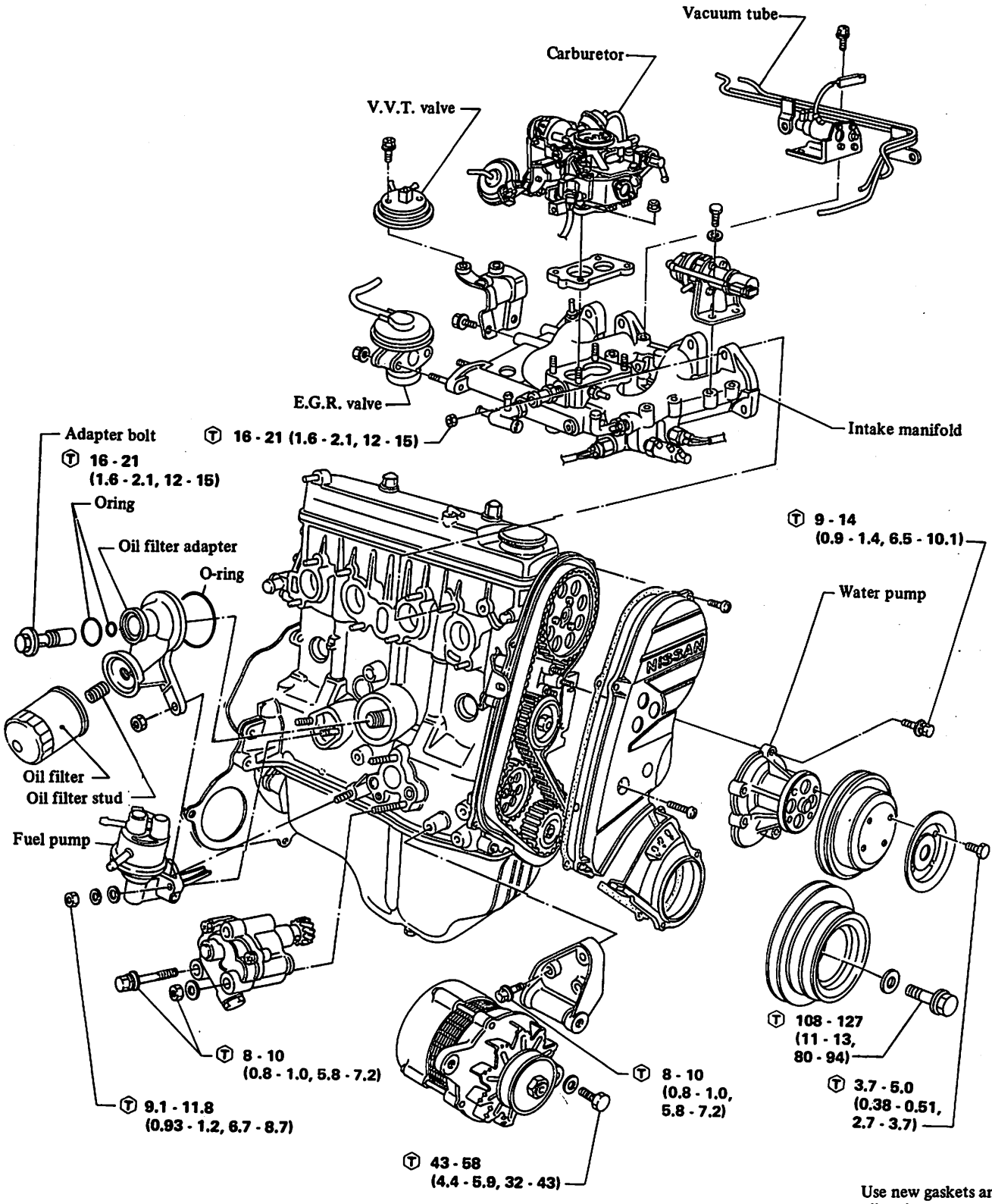
ENGINE ASSEMBLY EM-16
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- Inspection and adjustment EM-22
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SPECIAL SERVICE TOOLS EM-28

ENGINE COMPONENTS (Outer parts)

E16 engine

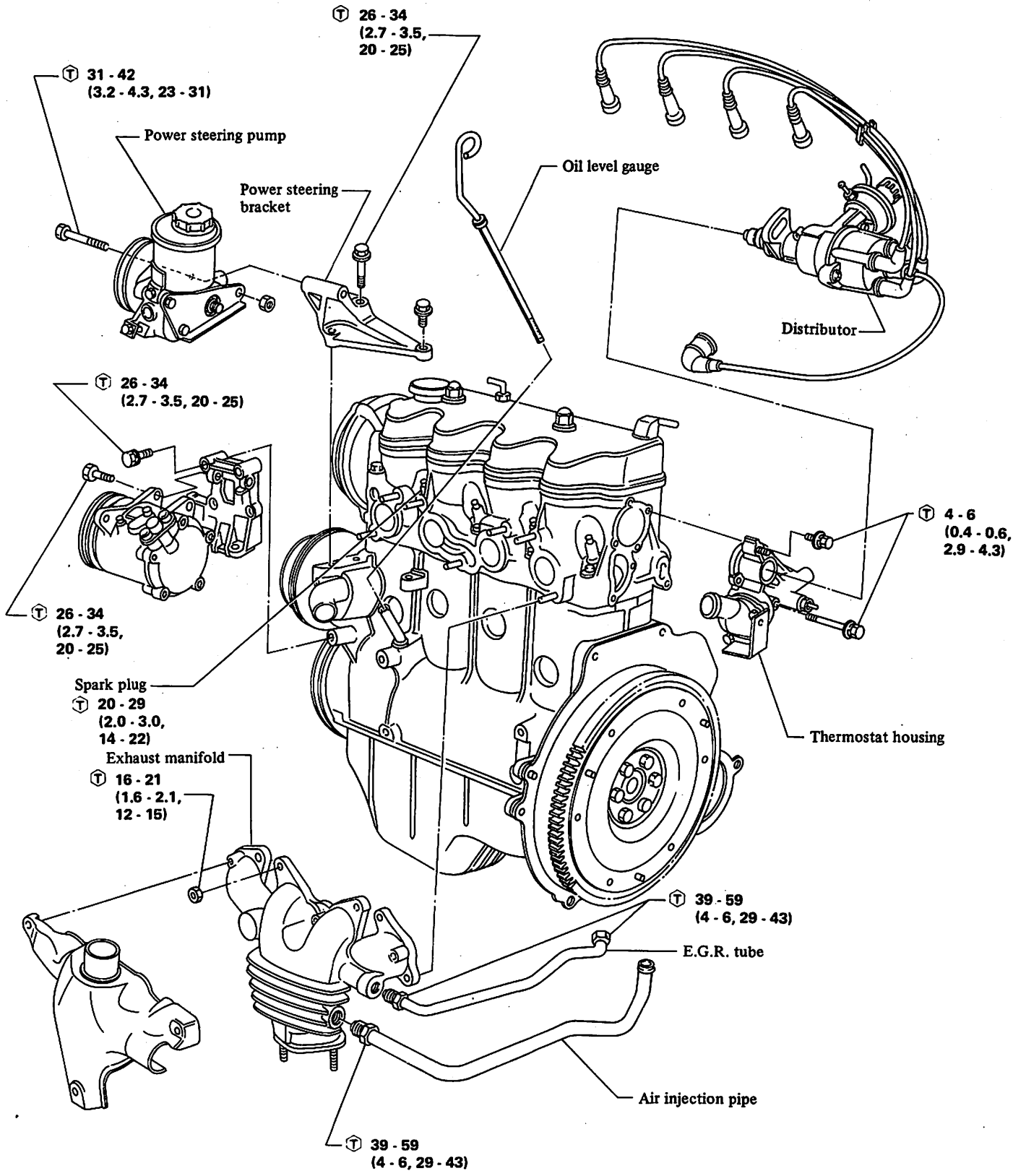


Use new gaskets and oil seals.

Ⓣ : N·m (kg-m, ft-lb)

SEM019B

E16 engine

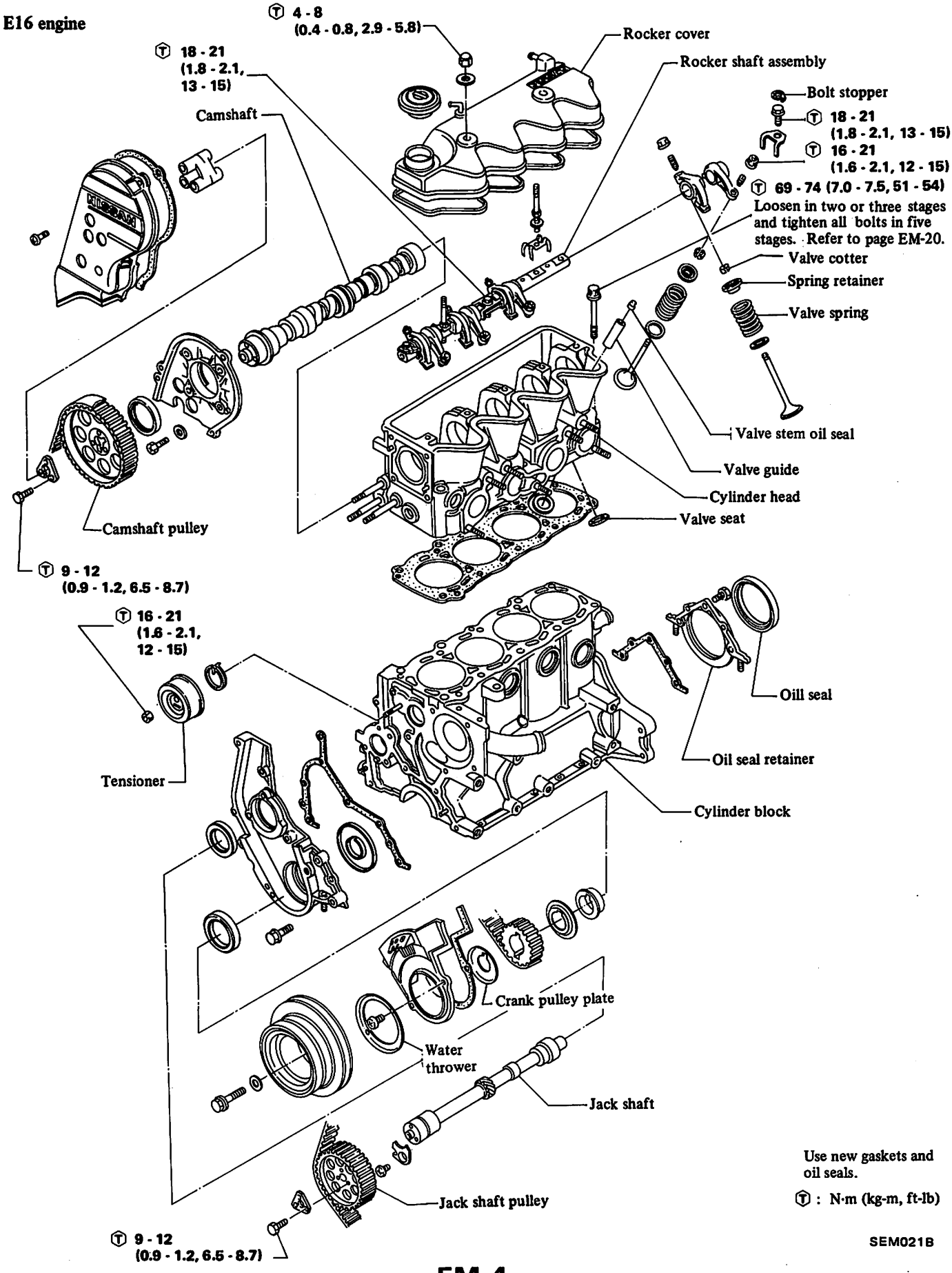


Use new gaskets.

Ⓣ : N·m (kg-m, ft-lb)

SEM820A

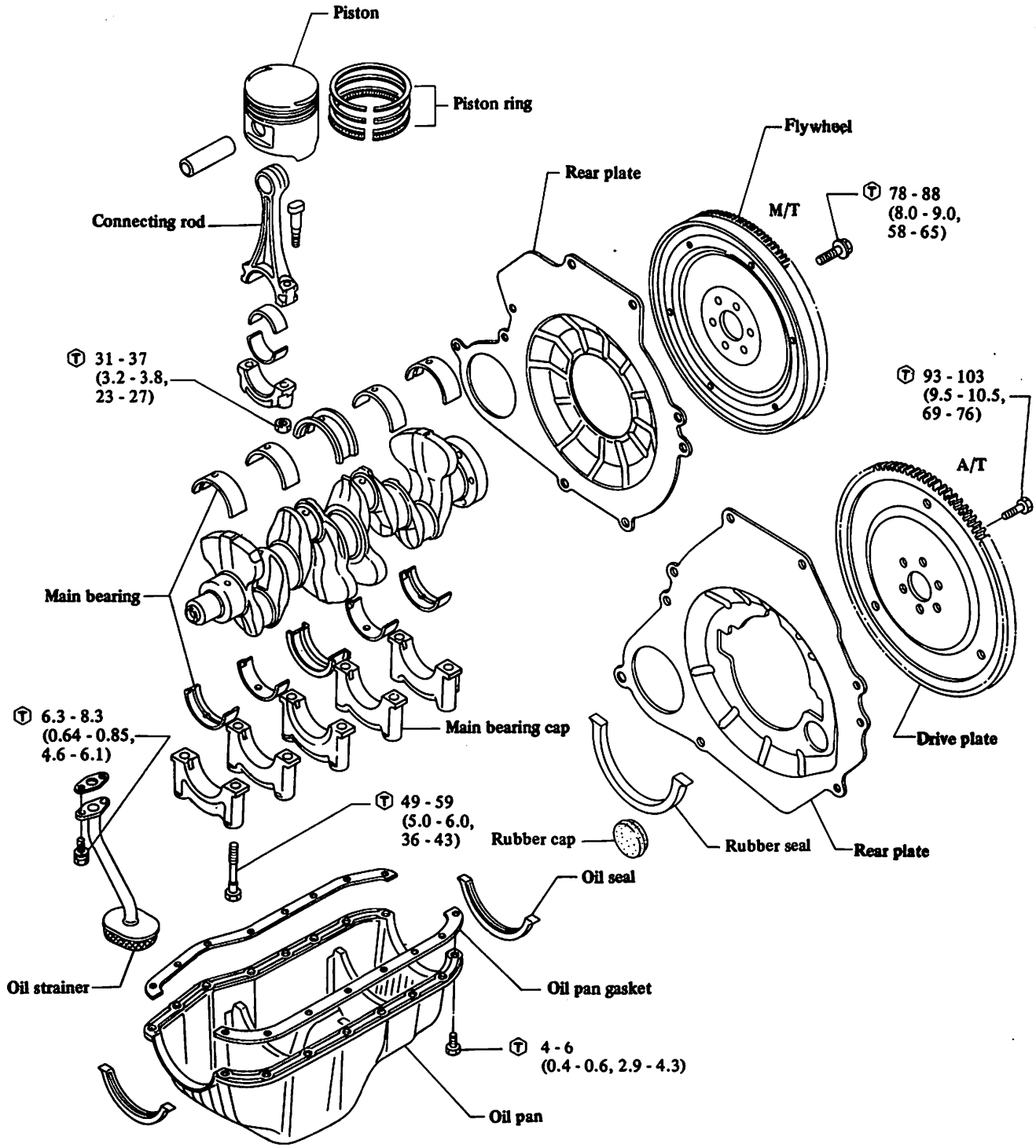
ENGINE COMPONENTS (Internal parts)



Use new gaskets and oil seals.

Ⓣ : N·m (kg-m, ft-lb)

SEM021B



Use new gaskets and oil seals.

Ⓣ : N·m (kg-m, ft-lb)

SEM041B

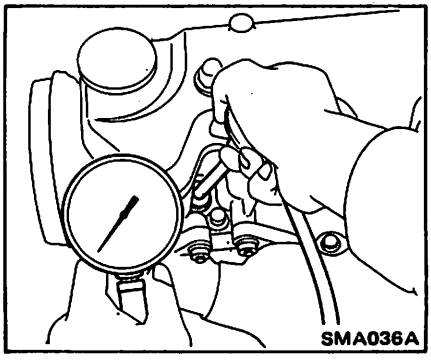
ENGINE DISASSEMBLY

PRECAUTIONS

Arrange the disassembled parts on the parts stand in accordance with their assembled locations, sequence, etc., so that the parts will be reassembled in their original locations. Place mating marks on the parts if necessary.

COMPRESSION PRESSURE

1. Warm up engine until water temperature indicator points to middle of gauge.
2. Remove air cleaner and all spark plugs.
3. Disconnect anti-dieseling solenoid valve connector.
4. Properly attach a compression tester to spark plug hole in cylinder being tested.



5. Depress accelerator pedal to fully open throttle and choke valve.
6. Crank engine and read gauge indication.
- Run engine at about 350 rpm.
- Engine compression measurement should be made as quickly as possible.

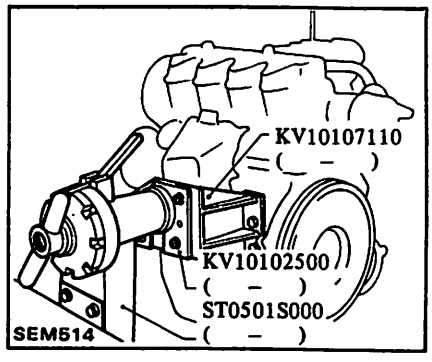
Compression pressure:
kPa (kg/cm², psi)/at rpm
Standard
1,245 (12.7, 181)/350
Minimum
981 (10.0, 142)/350
Differential limit between cylinders
98 (1.0, 14)/350

7. If cylinder compression in one or more cylinders is low, pour a small amount of engine oil into cylinders through the spark plug holes and retest compression.
- **If adding oil helps the compression pressure,** chances are that piston rings are worn or damaged.
- **If pressure stays low,** valve may be sticking or seating improperly.
- **If cylinder compression in any two adjacent cylinders is low, and if adding oil does not help the compression,** there is leakage past the gasketed surface.
  Oil and water in combustion chambers can result from this problem.

ENGINE OVERALL

MOUNTING ENGINE ON ENGINE STAND

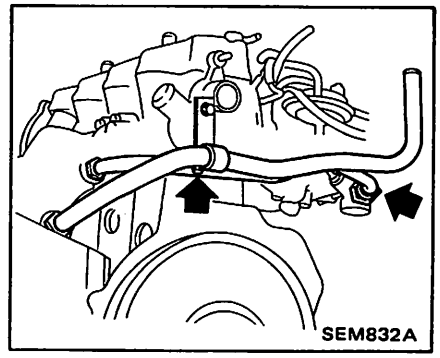
1. Remove parts at the rear of the engine.
- Transaxle assembly with starter motor
- Clutch unit
2. Install engine attachment on the engine.
3. Place engine on work stand.



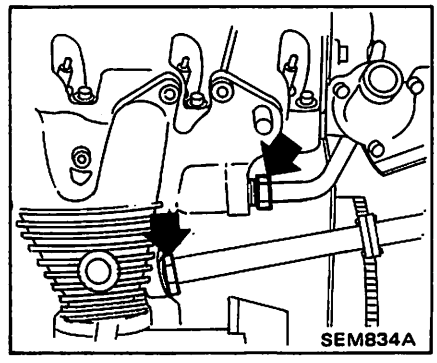
4. Drain engine oil and coolant.

OUTER PARTS

1. Parts at the rear of the engine
(1) Remove distributor together with high tension cables.
(2) Remove air injection pipe bracket and E.G.R. tube at E.G.R. valve side.

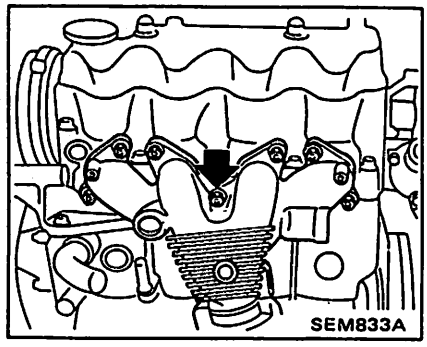


2. Parts on the left side of the engine
(1) Disconnect E.G.R. and air injection pipe.



(2) Remove exhaust manifold cover.
(3) Remove air injection pipe.
(4) Remove exhaust manifold.

Exhaust manifold center nut has a different diameter from the other nut.

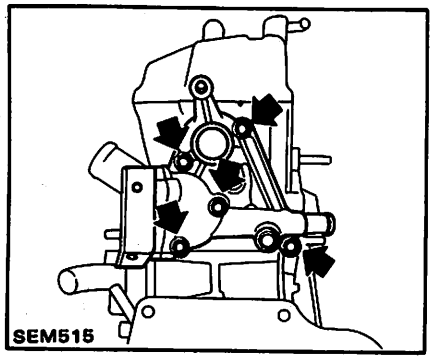


(5) Remove cooler compressor bracket and power steering pump bracket.

3. Parts on the right side of the engine
(1) Remove intake manifold with carburetor.
(2) Loosen water pump pulley bolts.
(3) Remove alternator, alternator bracket and drive belt.
(4) Remove oil filter.
(5) Remove oil pump assembly with gasket.
(6) Remove fuel pump assembly with spacer.

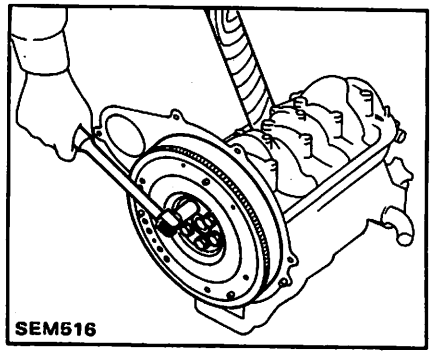
INTERNAL PARTS

1. Bottom parts
(1) Remove oil pan, gasket and oil seal.
(2) Remove oil strainer.
2. Rear side parts
(1) Remove thermostat housing.

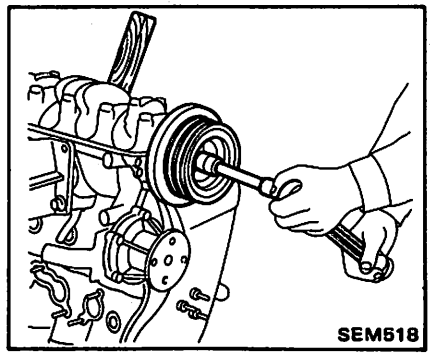


(2) Remove flywheel or drive plate, then remove rear plate.

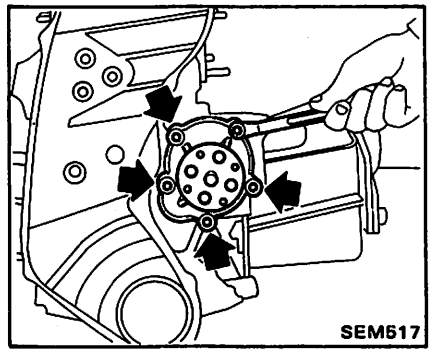
WARNING:
When removing flywheel, be careful not to drop it.



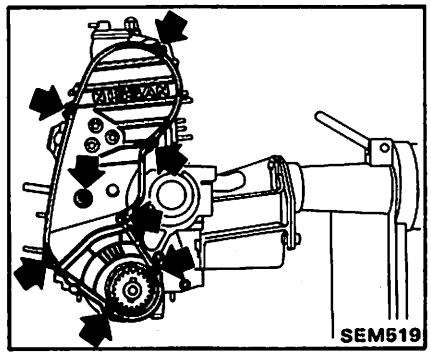
3. Front side parts
(1) Remove water pump pulley.
(2) Remove crankshaft pulley.



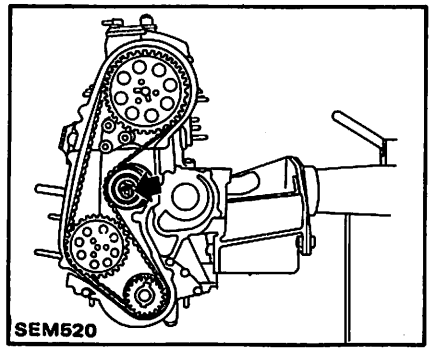
(3) Remove water pump assembly with gasket.



(4) Remove upper and lower dust cover.



(5) Remove tensioner pulley.

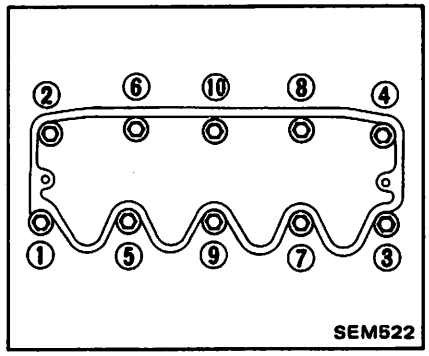


(6) Remove timing belt.

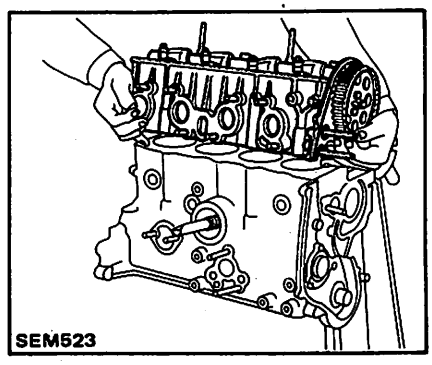
Mark rotating direction mark on timing belt.

(7) Remove jack shaft pulley.
(8) Remove crankshaft timing pulley with spacer.
4. Separate cylinder head from cylinder block.
(1) Remove spark plugs.
(2) Remove valve rocker cover.
(3) Remove cylinder head bolts.

The bolts should be loosened in two or three stages.



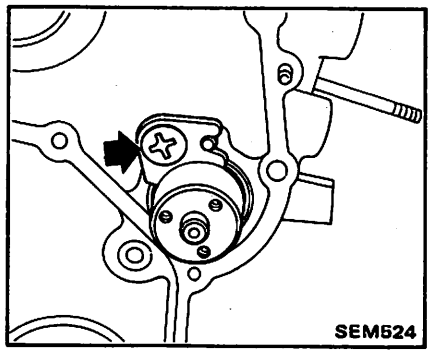
(4) Remove cylinder head assembly.



5. Jack shaft
(1) Remove front cover.

Be careful not to damage oil seal lip.

(2) Remove jack shaft locating plate.

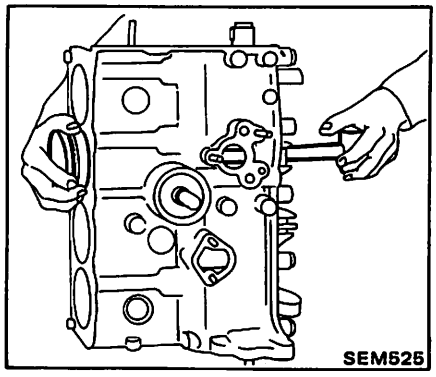


(3) Take out jack shaft.

6. Piston and connecting rod assembly

(1) Remove connecting rod caps and bearings.

(2) Take out pistons together with connecting rods toward cylinder head side.

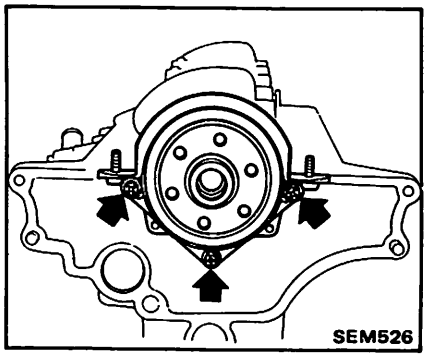


a. **Piston can be easily removed by scraping carbon off top face of cylinder with a scraper.**

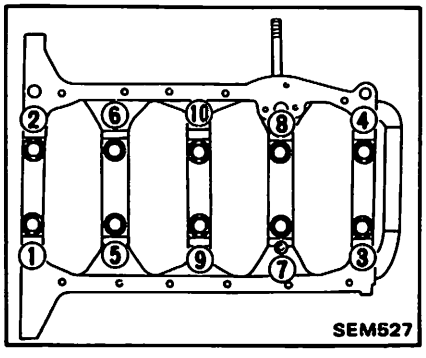
b. **Numbers are stamped on the connecting rod and cap corresponding to each cylinder. Care should be taken to avoid a wrong combination including bearing.**

7. Crankshaft

(1) Remove oil seal retainer.



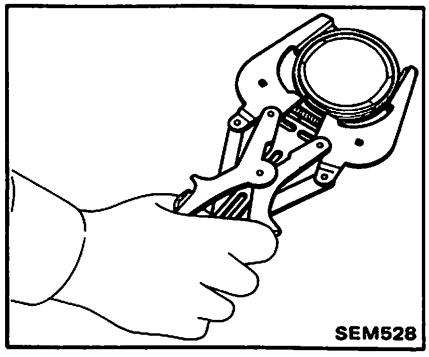
(2) Remove main bearing cap together with bearing.



(3) Remove crankshaft and bearings.

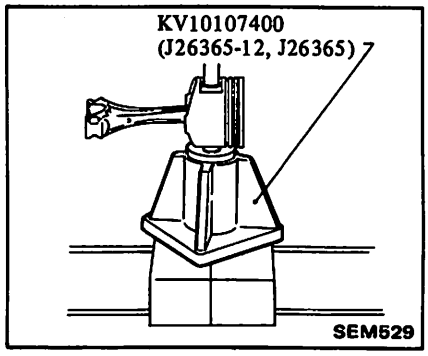
PISTON AND CONNECTING ROD

1. Remove piston rings.



Be careful not to scratch piston.

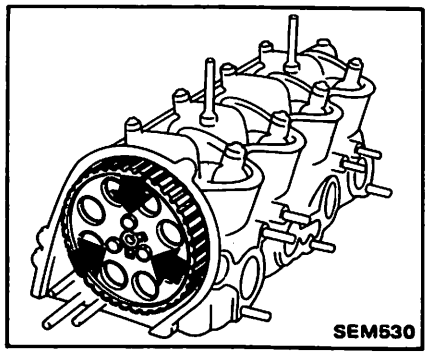
2. Press out piston pin.



Keep disassembled parts in order.

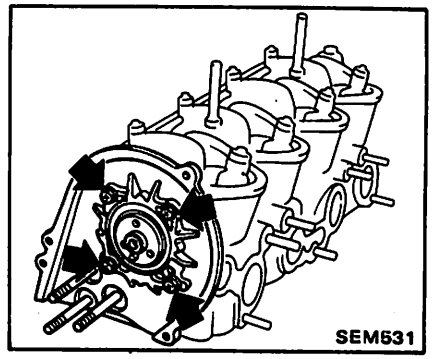
CYLINDER HEAD

1. Remove camshaft pulley.

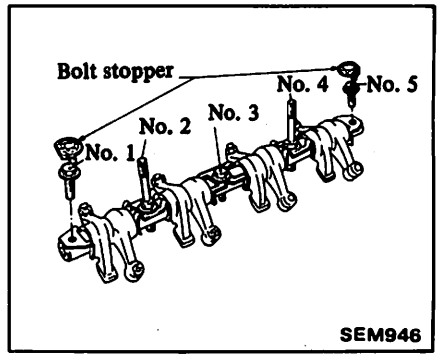


2. Remove cylinder head cover.

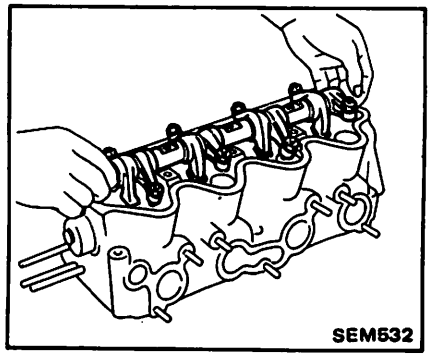
Be careful not to damage oil seal lip.



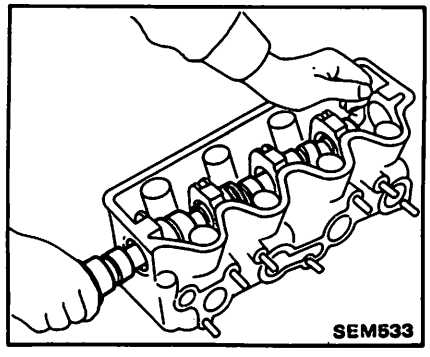
3. Remove bolt stopper on Nos. 1 and 5 bolts.



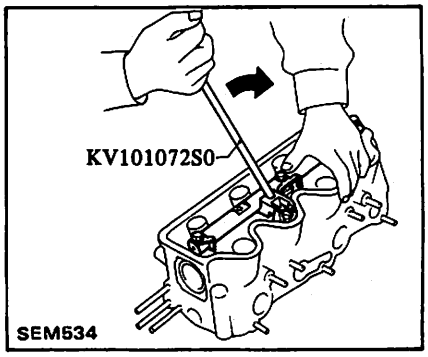
4. Remove rocker shaft assembly.



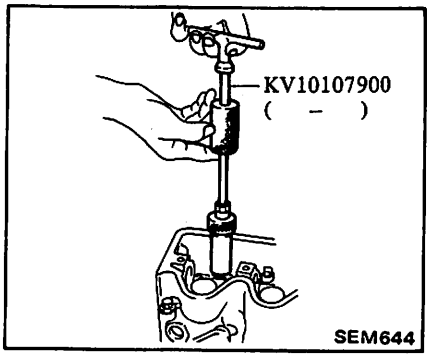
5. Take out camshaft.



6. Temporarily install rocker shaft and remove valve component parts.

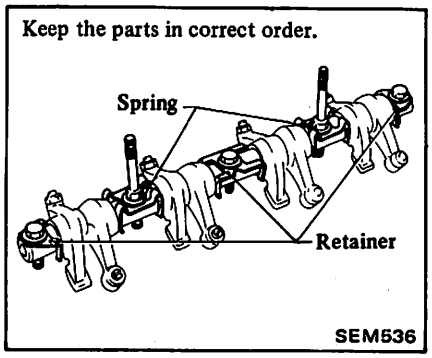


7. Remove valve oil seals.



ROCKER SHAFT ASSEMBLY

Remove rocker shaft springs and retainers.



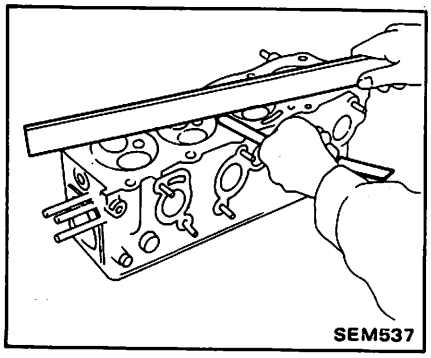
Keep them in correct order.

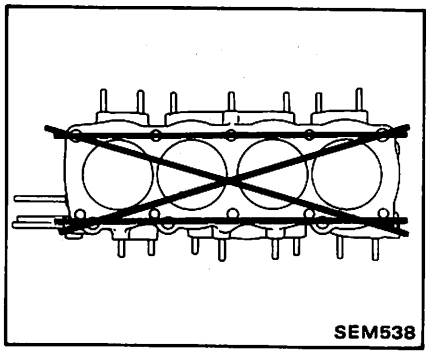
INSPECTION AND REPAIR

CYLINDER HEAD

CHECKING CYLINDER HEAD MATING FACE

1. Make a visual check for cracks and flaws.
2. Measure the surface of cylinder head (on cylinder block side) for warpage.





Warpage of surface:
Less than
0.1 mm (0.004 in)

If beyond the specified limit, correct with a surface grinder.

Surface grinding limit:
The grinding limit of cylinder head is determined by the cylinder block grinding in an engine.
Depth of cylinder head grinding is "A"
Depth of cylinder block grinding is "B"
The limit is as follows:
A + B = 0.2 mm (0.008 in)
Cylinder head height (nominal):
120±0.1 mm (4.724±0.004 in)

VALVE GUIDE

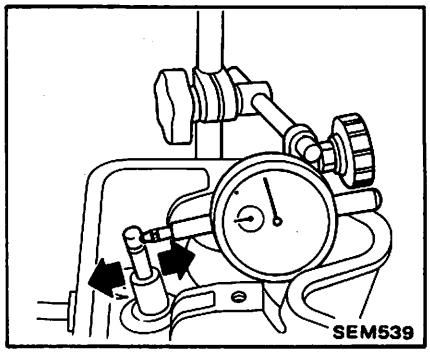
Measure the clearance between valve guide and valve stem. If the clearance exceeds the specified limit, replace the worn parts or both valve and valve guide. In this case, it is essential to determine if such a clearance has been caused by a worn or bent valve stem or by a worn valve guide.

Determining clearance

1. Precise method:
(1) Measure the diameter of valve stem with a micrometer in three places; top, center and bottom.
(2) Measure valve guide bore at center using telescope hole gauge.
(3) Subtract the highest reading of valve stem diameter from valve guide bore to obtain the stem to guide clearance.

Stem to guide clearance:
Maximum Limit
0.10 mm (0.0039 in)

2. Expedient method
Pry the valve in a lateral direction, and measure the deflection at stem tip with dial gauge.



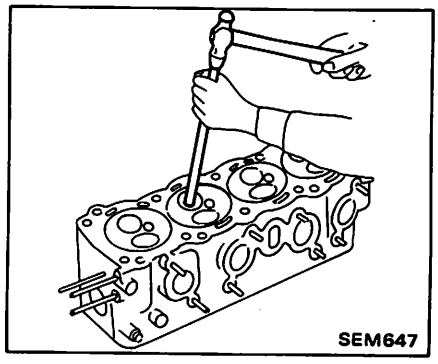
Max. allowable deflection:
(Dial indicator reading)
0.2 mm (0.008 in)

Valve should be moved in parallel with rocker arm. (Generally, a large amount of wear occurs in this direction.)

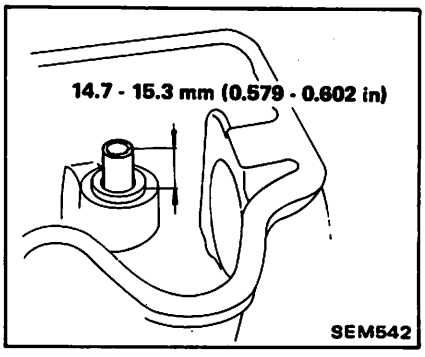
Replacement of valve guide

To remove old guides, use a press [under a 20 kN (2 t, 2.2 US ton, 2.0 Imp ton) pressure] or a hammer, and suitable tool.

1. Drive them out toward rocker cover side using suitable tool. Heating the cylinder head will facilitate the operation.

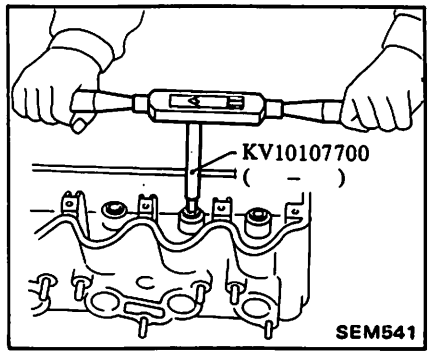


2. Ream cylinder head valve guide hole using Reamer ST11081000 [12.2 mm (0.480 in) dia.] at room temperature.
3. Install a service valve guide on cylinder head so that it protrudes about 15 mm (0.59 in) above the cylinder head surface. Heat cylinder head to 150 to 160°C (302 to 320°F) and press the guide onto cylinder head.



4. Ream the bore using Tool KV10107700.

Reaming bore:
7.005 - 7.020 mm
(0.2758 - 0.2764 in)

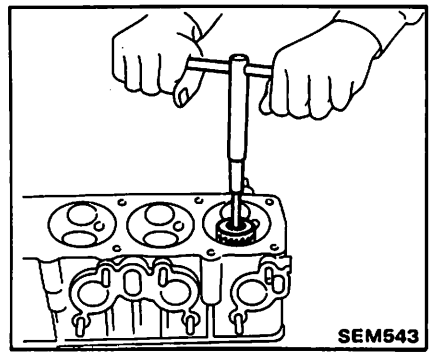


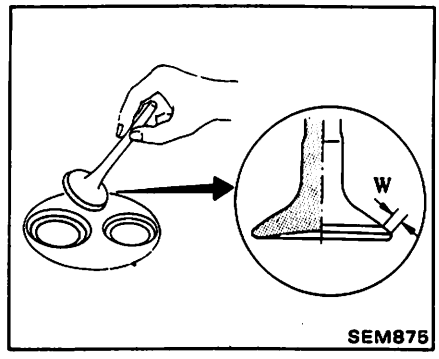
5. Correct valve seat surface with new valve guide as the axis.

VALVE SEAT INSERTS

Check valve seat inserts for any evidence of pitting at valve contact surface, and reseat or replace if worn out excessively.

Correct valve seat surface with suitable cutter or grinder and grind with a grinding compound.





Valve seat contact W:
Intake
1.5 mm (0.059 in)
Exhaust
1.8 mm (0.071 in)

a. When repairing valve seat, check valve and valve guide for wear beforehand. If worn, replace them. Then correct valve seat.
b. The cutting should be done with both hands for uniform cutting.

Replacement

1. Old insert can be removed by heating cylinder head 150 to 160°C (302 to 320°F) in oil.
Then tap the valve insert and remove the valve insert.

Do not damage the cylinder head surface.

2. Select a suitable valve seat insert and check its outside diameter.
3. Ream the cylinder head recess at room temperature.
4. Heat cylinder head 150 to 160°C (302 to 320°F) in oil.
5. Install valve insert.

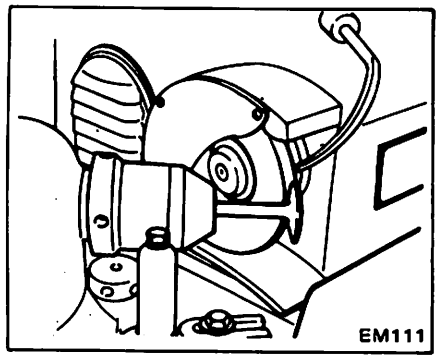
When replacing valve insert, valve should also be replaced.

VALVE

1. Check each of the intake and exhaust valves for worn, damaged or deformed valve head or stem. Correct or replace the valve that is faulty.
2. Valve face or valve stem end surface should be refaced by using a valve grinder.

When valve head has been worn down to 0.5 mm (0.020 in) in-margin-thickness, replace the valve.

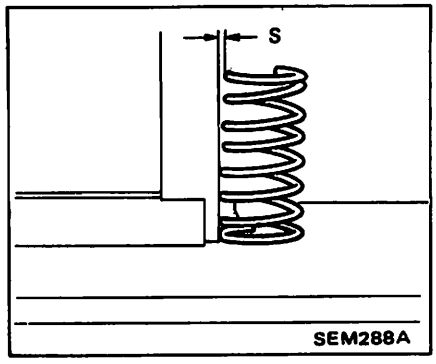
Grinding allowance for valve stem end surface is 0.2 mm (0.008 in) or less.



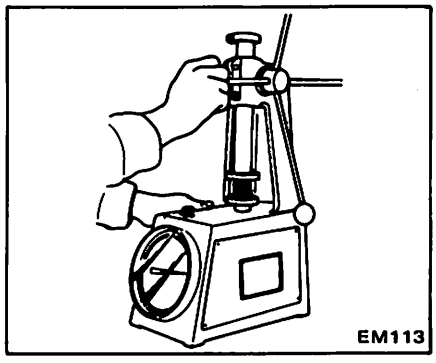
VALVE SPRING

1. Check valve spring for squareness using a steel square and surface plate. If spring is out of square "S" more than specified limit, replace with a new one.

Squareness limit:
2.0 mm (0.079 in)



2. Measure the free length and the tension of each spring. If the measured value exceeds the specified limit, replace spring.
Refer to S.D.S.



VALVE ROCKER ARM AND SHAFT

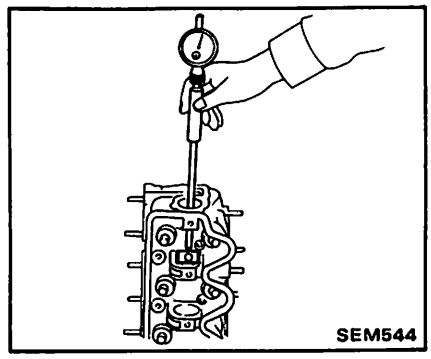
1. Check rocker arm bore and shaft for scores or scuffs.
2. Check valve end contact surface of rocker arm for abnormal wear or scuffs.

CAMSHAFT AND CAMSHAFT BEARING

CAMSHAFT BEARING CLEARANCE

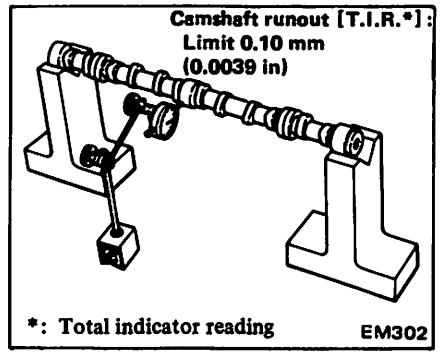
Measure the inside diameter of camshaft bearing with an inside dial gauge and the outside diameter of camshaft journal with a micrometer. If any malfunction is found, replace camshaft or cylinder head assembly.

Max. tolerance of camshaft bearing clearance:
No. 1, 3, 5
0.15 mm (0.0059 in)
No. 2, 4
0.20 mm (0.0079 in)



CAMSHAFT RUNOUT

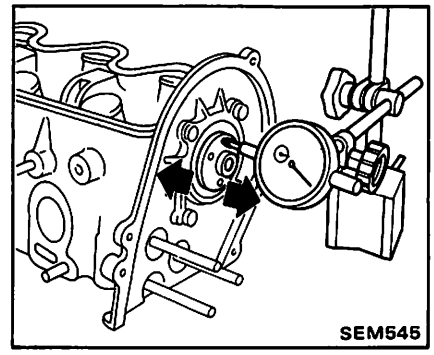
1. Check camshaft, camshaft journal and cam surface for bend, wear or damage. If beyond specified limits, replace them.
2. Camshaft can be checked for bend by placing it on V-blocks and using a dial gauge with its indicating finger resting on center journal.



3. Measure camshaft cam height. If beyond the specified limit, replace camshaft.

Wear limit of cam height:
0.20 mm (0.0079 in)

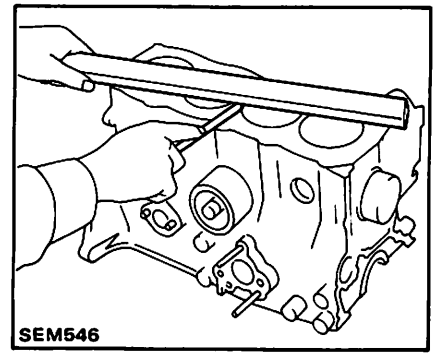
4. Measure camshaft end play. If beyond the specified limit, check camshaft contact surface part and replace faulty parts.

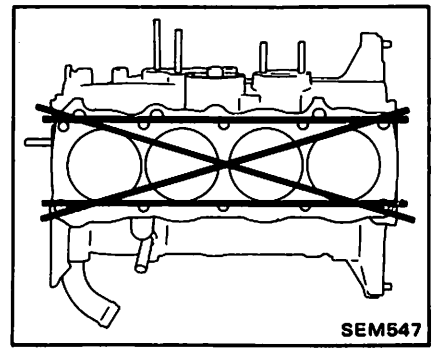


End play limit:
0.4 mm (0.016 in)

CYLINDER BLOCK

1. Visually check cylinder block for cracks or flaws.
2. Measure the top of cylinder block (cylinder head mating face) for warpage. If warpage exceeds the specified limit, correct with a grinder.





Warpage of surface:
Less than
0.1 mm (0.004 in)

Surface grinding limit;

The grinding limit of cylinder block is determined by the cylinder head grinding in an engine.

Depth of cylinder head grinding is "A"

Depth of cylinder block grinding is "B"

The limit is as follows:

A + B = 0.2 mm (0.008 in)

Cylinder block height (nominal):

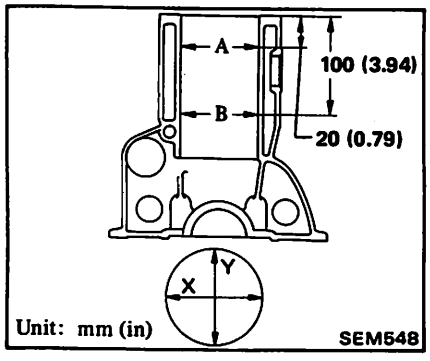
214±0.05 mm (8.4252±0.0020 in)

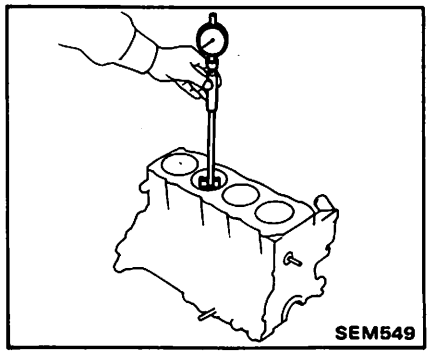
3. Using a bore gauge, measure cylinder bore for wear, out-of-round or taper. If they are excessive, rebore the cylinder walls with a boring machine. Measurement should be taken along bores for taper and around bores for out-of-round.

Refer to S.D.S.

Out-of-round ..... X-Y

Taper ..... A-B





4. When wear, taper or out-of-round is minor and within the limit, remove the step at the topmost portion of cylinder using a ridge reamer or other similar tool.

When installing service cylinder liner, interference fit of cylinder liner in cylinder block should be 0.080 to 0.090 mm (0.0031 to 0.0035 in).

CYLINDER BORING

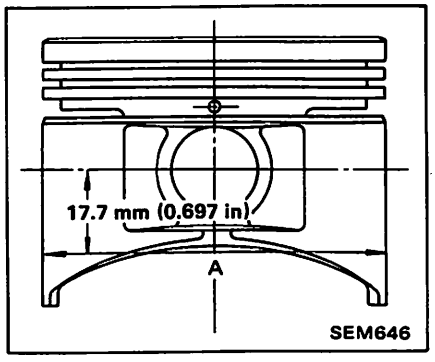
When any cylinder needs boring, all other cylinders must also be bored at the same time.

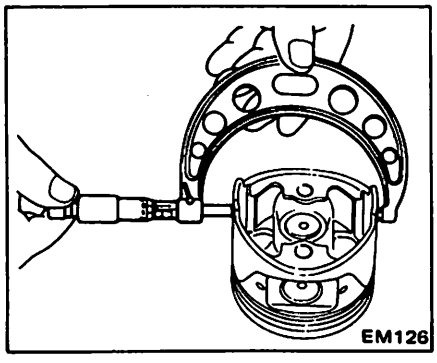
Determining bore size

1. Determine piston oversize according to amount of cylinder wear.

Refer to S.D.S.

2. The size to which cylinders must be honed is determined by adding piston-to-cylinder clearance to the piston skirt diameter.





Rebored size calculation

D = A + B – C = A + [0.005 to 0.025 mm (0.0002 to 0.0010 in)]

where,

D : Honed diameter

A : Skirt diameter as measured

B : Piston-to-wall clearance

C : Honing allowance 0.02 mm (0.0008 in)

Boring

1. Install main bearing caps in place, and tighten to the specified torque to prevent distortion of the cylinder bores in final assembly.

2. Cut cylinder bores.

- **Do not cut too much out of the cylinder bore at a time. Cut only 0.05 mm (0.0020 in) or so in diameter at a time.**
- **Bore the cylinders in the order of 2-4-1-3 to prevent heat strain due to cutting.**

3. Hone the cylinders to the required size referring to S.D.S.

- **Use clean sharp stones of proper grade.**
- **Cross-hatch pattern should be approximately 45°.**

4. Measure the finished cylinder bore for out-of-round and taper.

Measuring piston-to-cylinder clearance

Measure the extracting force, and pull feeler gauge straight upward.

It is recommended that piston and cylinder be heated to 20°C (68°F).

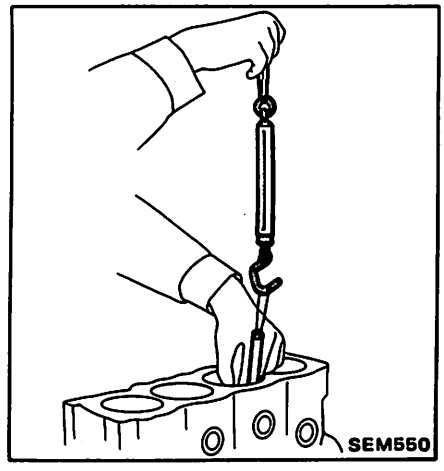
Feeler gauge thickness:

0.04 mm (0.0016 in)

Extracting force:

4.9 - 14.7 N

(0.5 - 1.5 kg, 1.1 - 3.3 lb)



PISTON, PISTON PIN AND PISTON RING

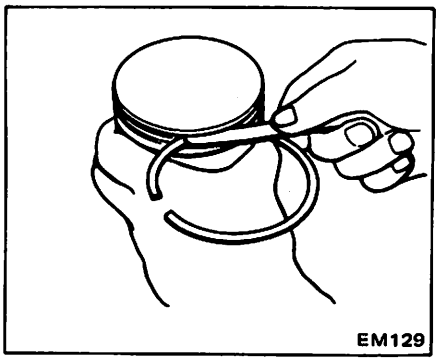
PISTON

1. Scrape carbon off piston and ring grooves with a carbon scraper and a curved steel wire. Clean out oil slots in bottom land of oil ring groove.

2. Check for damage, scratches and wear. Replace if such a fault is detected.

3. Measure the side clearance of rings in ring grooves as each ring is installed.

Max. tolerance of side clearance:
0.2 mm (0.008 in)



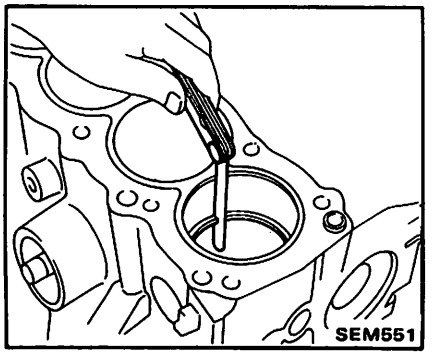
If side clearance exceeds the specified limit, replace piston together with piston ring.

PISTON RING

Measure ring gap with a feeler gauge, placing ring squarely in cylinder using piston.

Ring should be placed to diameter at upper or lower limit of ring travel.

Max. tolerance of ring gap:
1.0 mm (0.039 in)



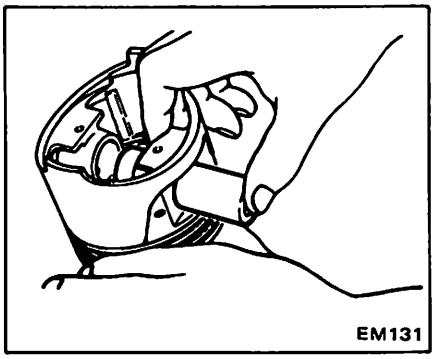
a. When only piston ring is to be replaced, without cylinder bore being corrected, measure the gap at the bottom of cylinder where the wear is minor.
b. Oversize piston rings are available for service.

PISTON PIN

1. Check piston pin and piston pin hole for signs of sticking and other abnormalities.
2. Measure piston pin hole in relation to the outer diameter of pin. If wear exceeds the limit, replace such piston pin together with piston on which it is installed.

Piston pin to piston clearance:
0.008 - 0.012 mm
(0.0003 - 0.0005 in)

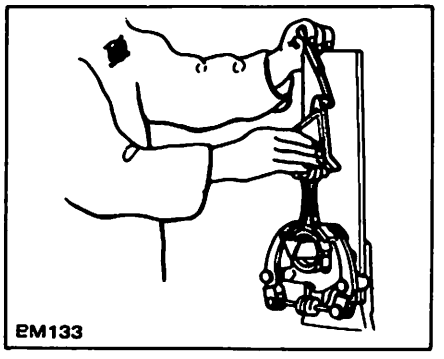
Determine the fitting of piston pin into piston pin hole to such an extent that it can be pressed smoothly by finger at room temperature.



CONNECTING ROD

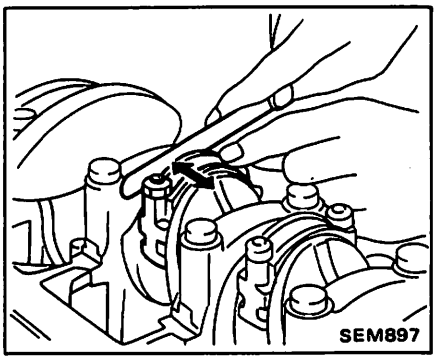
1. If a connecting rod has any flaw on both sides of the thrust face and the large end, correct or replace it.
2. Check connecting rod for bend or torsion using a connecting rod aligner. If bend or torsion exceeds the limit, correct or replace.

Bend and torsion
[per 100 mm (3.94 in) length]:
Less than
0.05 mm (0.0020 in)



3. Install connecting rods with bearings on to corresponding crank pins and measure the thrust clearance. If the measured value exceeds the limit, replace such connecting rod.

End play limit:
0.5 mm (0.020 in)



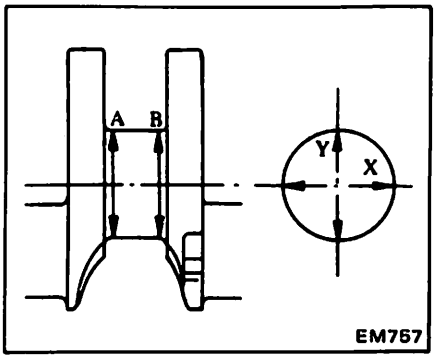
CRANKSHAFT

CRANK JOURNAL AND PIN

1. Repair or replace as required. If faults are minor, correct with fine crocus cloth.
2. Check journals and crank pins with a micrometer for taper and out-of-round. Measurement should be taken along journals for taper and around journals for out-of-round.

If out-of-round or taper exceeds the specified limit, replace or repair.

Out-of-round (X-Y) and
Taper (A-B):
Less than 0.01 mm (0.0004 in)



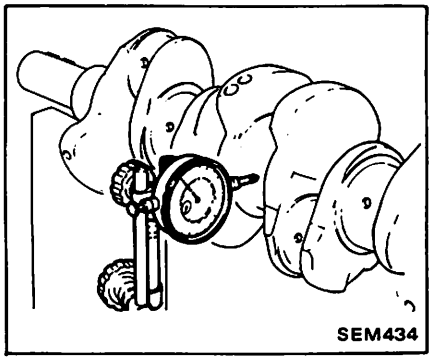
3. After regrinding crankshaft, finish it to the necessary size indicated in the chart under S.D.S. by using an adequate undersize bearing according to the extent of required repair.

RUNOUT AND END PLAY

1. Crankshaft can be checked for runout by placing it on V-blocks and using a dial gauge with its indicating finger resting on the center journal.

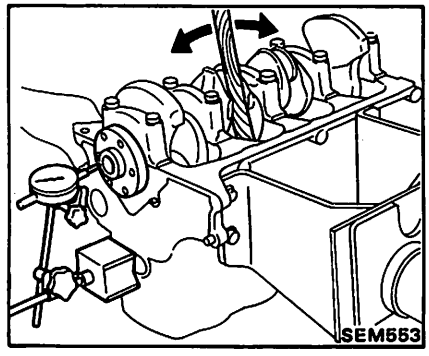
If bend exceeds the specified limit, replace or repair.

Runout [T.I.R.]:
Limit 0.08 mm (0.0031 in)



2. Install crankshaft in cylinder block and measure crankshaft free end play at the center bearing.

End play limit:
0.30 mm (0.0118 in)



MAIN BEARING AND CONNECTING ROD BEARING

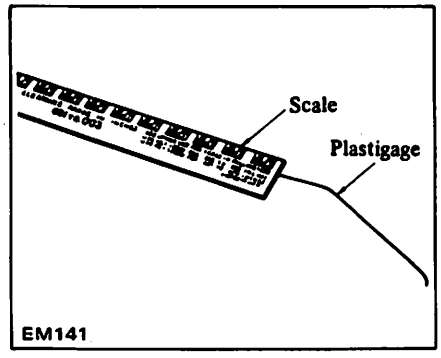
MAIN BEARING

1. Thoroughly clean all bearings and check for scratches, melt, score or wear.

Replace bearings, if any fault is detected.

2. Measure bearing clearance as follows:

(1) Cut a plastigage to the width of bearing and place it in parallel with crank journal, getting clear of the oil hole.



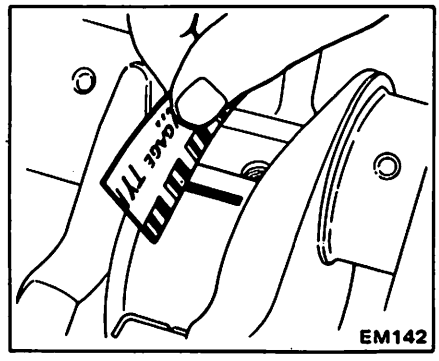
(2) Install crankshaft, bearings and bearing cap, with the bolts tightened to the specified torque.

Ⓣ : Main bearing cap
49 - 59 N·m
(5.0 - 6.0 kg-m,
36 - 43 ft-lb)

Do not turn crankshaft while the plastigage is being inserted.

(3) Remove cap, and compare width of the plastigage at its widest part with the scale printed in the plastigage envelope.

Max. tolerance of main bearing clearance:
0.10 mm (0.0039 in)



3. If clearance exceeds the specified value, replace bearing with an undersize bearing and grind crankshaft journal adequately.

Refer to S.D.S.

CONNECTING ROD BEARING

1. Measure connecting rod bearing clearance in the same manner as above.

Ⓣ : Connecting rod bearing cap
31 - 37 N·m
(3.2 - 3.8 kg-m,
23 - 27 ft-lb)

Max. tolerance of connecting rod bearing clearance:
0.10 mm (0.0039 in)

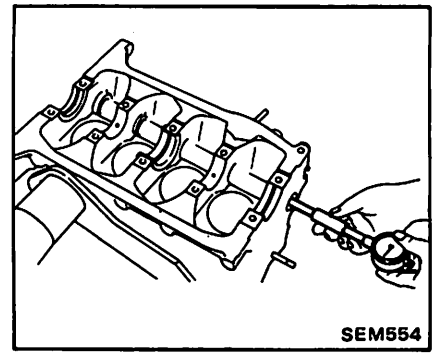
2. If clearance exceeds the specified value, replace bearing with an undersize bearing and grind the crankshaft journal adequately.

Refer to S.D.S.

JACK SHAFT AND JACK SHAFT BUSHING

JACK SHAFT BEARING CLEARANCE

Journal diameters should be checked with a micrometer, and bearings with an inside dial gauge. Measurements should then be compared to determine whether bearings are worn.

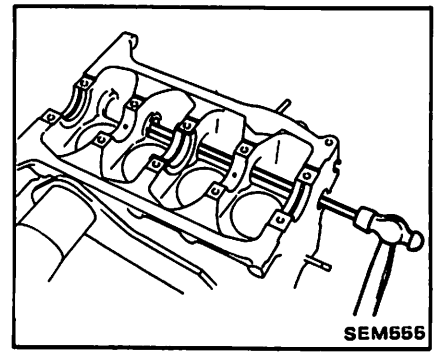


Max. tolerance of jack shaft bearing clearance:
0.15 mm (0.0059 in)

Replacing jack shaft bushing

1. Remove jack shaft bushings with suitable tool.
2. Install new bushings with suitable tool.

a. Align cylinder block oil hole and bushing oil hole.
b. Check bushing clearance.
c. Install welch plug into cylinder block, applying sealant.



MISCELLANEOUS COMPONENTS

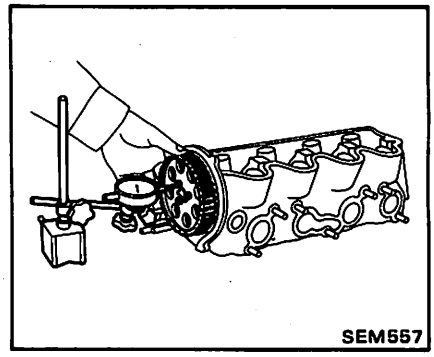
CAMSHAFT PULLEY

1. Check tooth surface for flaws or wear. Replace pulley if any fault is found.

2. Install camshaft pulley in position and check for runout.

If runout exceeds the specified limit, replace camshaft pulley.

Runout:
(Total indicator reading)
Less than 0.1 mm (0.004 in)

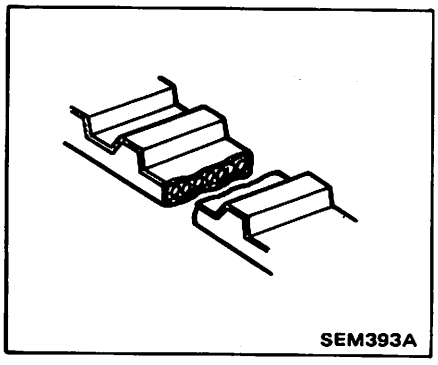

SEM557

TIMING BELT

Visually check the condition of the timing belt. Replace if any abnormality is found.

Problem 1

Belt is broken.

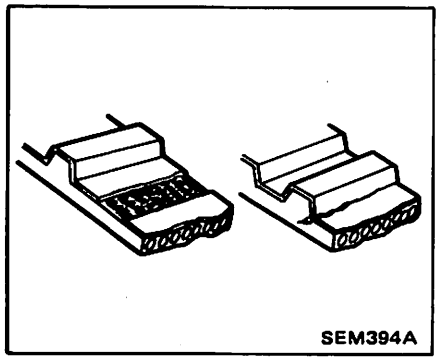

SEM393A

Cause:

- Improper handling
- Poor belt cover sealing
- Coolant leakage at water pump

Problem 2

Tooth is broken or tooth root is cracked.

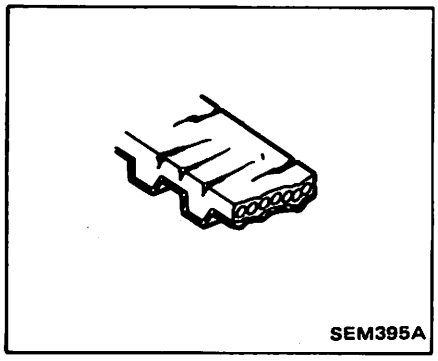

SEM394A

Cause:

- Camshaft jamming
- Distributor jamming
- Damaged camshaft/crankshaft oil seal

Problem 3

Back surface is cracked/worn.

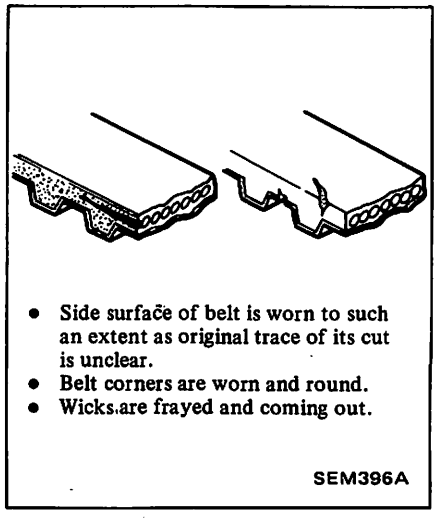

SEM395A

Cause:

- Tensioner jamming
- Overheated engine
- Interference with belt cover

Problem 4

Side surface is worn.



- Side surface of belt is worn to such an extent as original trace of its cut is unclear.
- Belt corners are worn and round.
- Wicks are frayed and coming out.

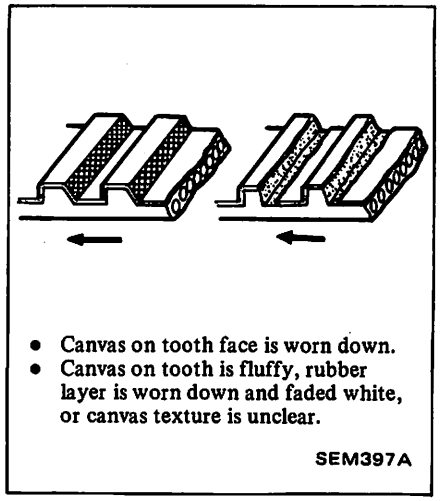
SEM396A

Cause:

- Improper installation of belt
- Malfunctioning crank pulley plate/ timing belt plate

Problem 5

Teeth are worn.



- Canvas on tooth face is worn down.
- Canvas on tooth is fluffy, rubber layer is worn down and faded white, or canvas texture is unclear.

SEM397A

Cause:

- Poor belt cover sealing
- Coolant leakage at water pump
- Camshaft not functioning properly
- Distributor not functioning properly
- Excessive belt tension

Problem 6

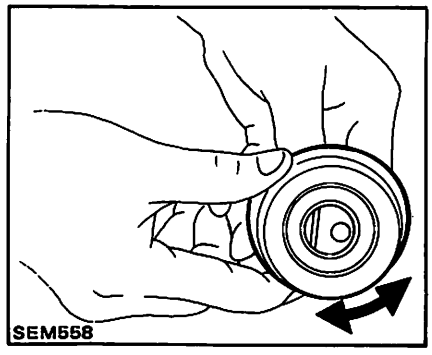
Oil/Coolant or water is stuck to belt.

Cause:

- Poor oil sealing of each oil seal
- Coolant leakage at water pump
- Poor belt cover sealing

TENSIONER

1. Check to see that it turns smoothly. If it binds, replace assembly.


SEM558

2. Check tensioner surface. If necessary, clean it.

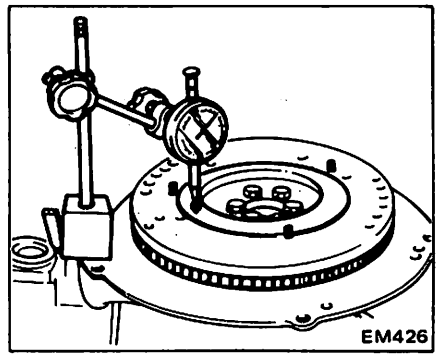
Do not use oil or grease.

3. Check for spring wear. If worn, replace it.

FLYWHEEL

1. Check the clutch disc contact surface on flywheel for damage or wear. Repair or replace if necessary.
2. Measure runout of the clutch disc contact surface with a dial gauge. If it exceeds the specified limit, replace it.

Runout:
(Total indicator reading)
Less than 0.15 mm (0.0059 in)



3. Check tooth surfaces of ring gear for flaws or wear.

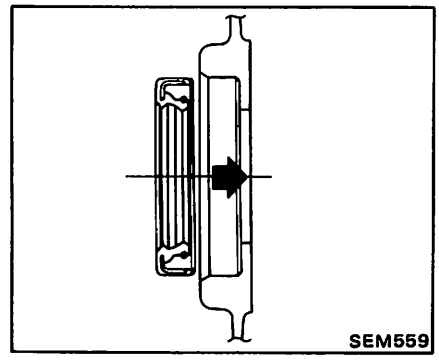
Replace if necessary.

Install ring gear on fly wheel, heating ring gear to about 180 to 220°C (356 to 428°F)

OIL SEAL

Check front, and rear oil seals for worn or folded over sealing lip and oil leakage. If necessary, replace with a new seal. When installing a new front or rear seal, pay attention to its mounting direction.

It is good practice to renew oil seal whenever engine is overhauled.



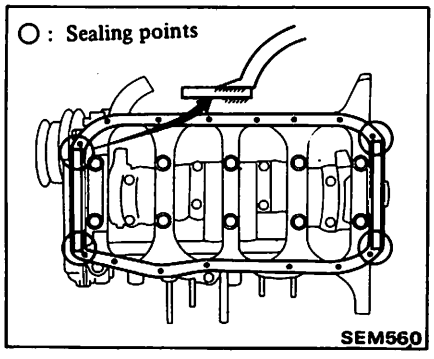
ENGINE ASSEMBLY

PRECAUTIONS

1. When installing sliding parts such as bearings, be sure to apply engine oil on the sliding surfaces.
2. Use new packings and oil seals.
3. Be sure to follow the specified order and tightening torque.
4. Applying sealant

Use sealant to eliminate water and oil leaks. **Do not apply too much sealant. Part requiring sealant is:**

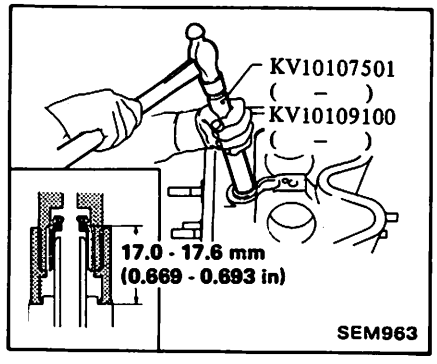
Mating surface of oil pan gasket and oil seals.



CYLINDER HEAD

CYLINDER HEAD

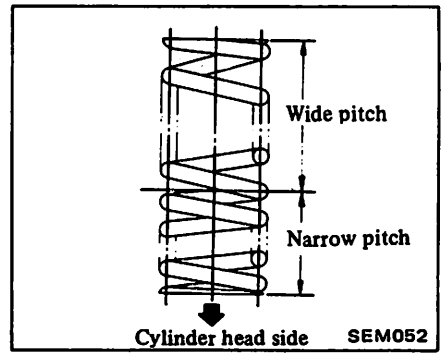
1. Install valve oil seal.



2. Install valve component parts.

a. When installing valve, apply engine oil to the valve stem and lip of valve oil seal.

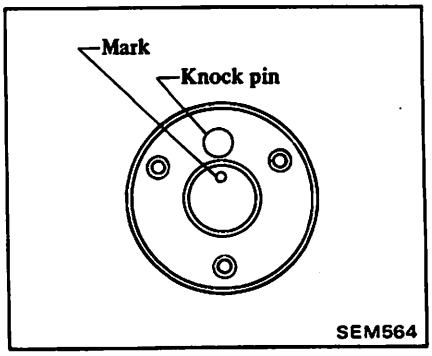
b. Install valve spring (uneven pitch type) with its narrow pitch side toward cylinder head side.



c. Make sure the valve face is free from foreign matter.

3. Install camshaft assembly.

a. Apply engine oil to camshaft and bearing interior.
b. Be careful not to damage the bearing interior.
c. When No. 1 cylinder is set at its compression stroke, the camshaft front face is as follows.



4. Install valve rocker shaft assembly.
5. Install cylinder head cover.

a. Be careful not to damage oil seal lip.
b. Apply engine oil to camshaft surface and oil seal lip.

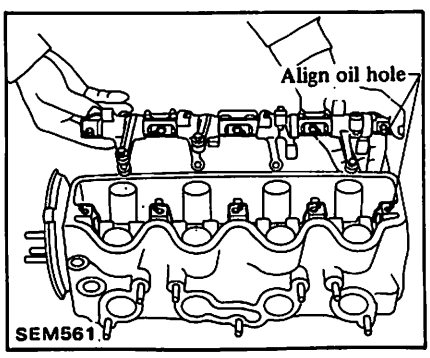
6. Install camshaft pulley.

Ⓣ : Camshaft pulley bolt
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)

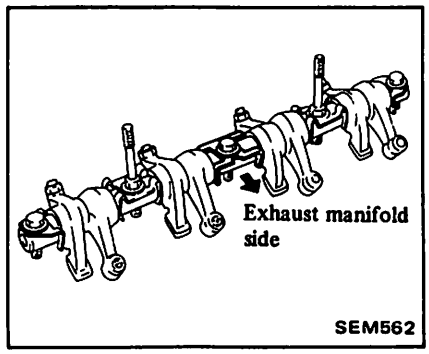
ROCKER SHAFT

Assemble rocker shaft in the reverse order of removal, noting the following:

1. Apply engine oil to rocker shaft and interior of valve rocker.
2. Ensure that oil hole in rocker shaft faces downward when rocker shaft is installed.

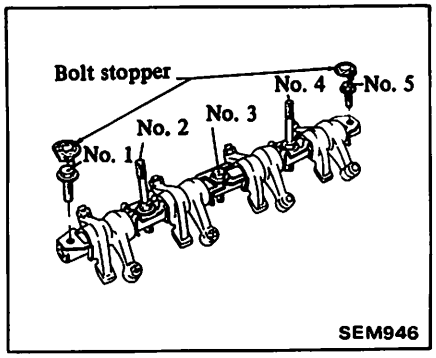


3. Also ensure that cutout in center retainer of rocker shaft faces toward exhaust manifold.



Ⓣ : Rocker shaft bolt
18 - 21 N·m
(1.8 - 2.1 kg-m,
13 - 15 ft-lb)

4. Install new bolt stopper on Nos. 1 and 5 bolts.



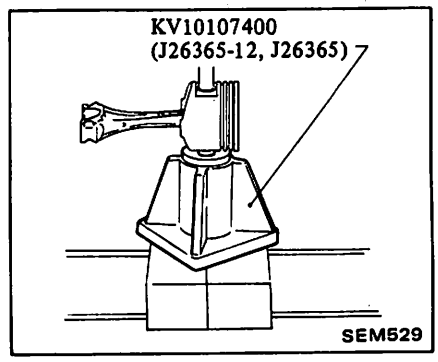
PISTON AND CONNECTING ROD

1. Assemble pistons, piston pins and connecting rods of the designated cylinders.

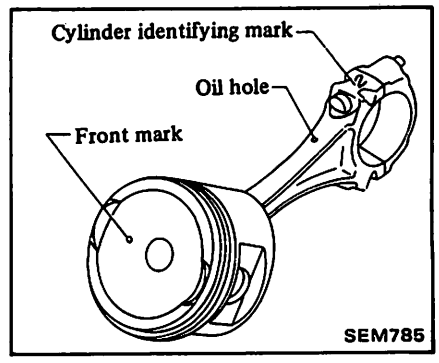
a. Piston pin is pressed into connecting rod, and fitting force should be within the specified limit.

Piston pin fitting force:
4.9 - 14.7 kN
(0.5 - 1.5 t, 0.6 - 1.7 US ton,
0.49 - 1.48 Imp ton)

When pressing piston pin in connecting rod, apply engine oil to pin and small end of connecting rod.



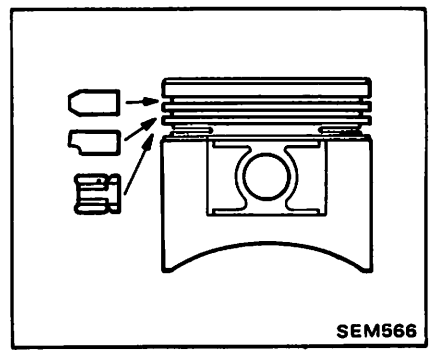
b. Arrange so that oil hole of connecting rod big end is directed toward the right side of cylinder block.



c. Connecting rods are marked at side of big end for identifying the designated cylinder.
d. Connecting rod with same weight tolerance is available only as a set of four.

2. Install piston rings.

Install so that stamped mark on ring faces upward.



ENGINE OVERALL

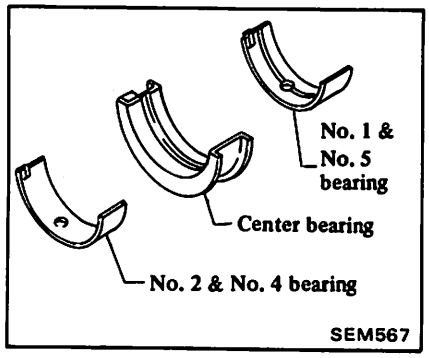
INTERNAL PARTS

First, mount cylinder block on engine stand (refer to Engine Disassembly).

1. Crankshaft

(1) Set upper main bearings at the proper portion of cylinder block.

a. Only center bearing (No. 3) is a flange type.
b. Front bearing (No. 1) is also the same type as rear bearing (No. 5).
c. Other inter bearings, except center bearing, are the same type.

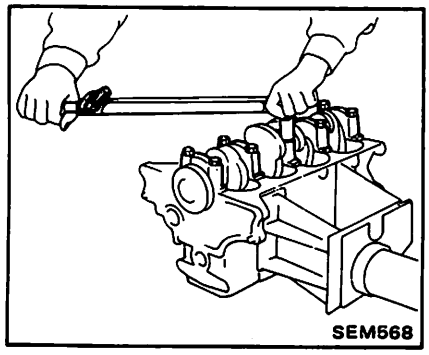


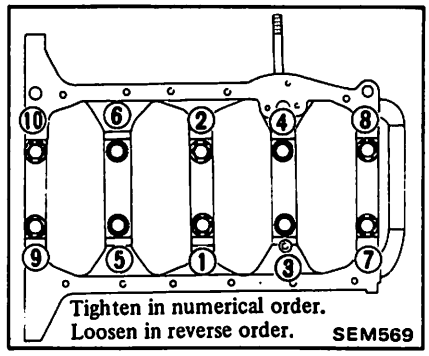
(2) Apply engine oil to main bearing surfaces on both sides of cylinder block and cap.

(3) Install crankshaft.

(4) Install main bearing cap and tighten bolts to specified torque.

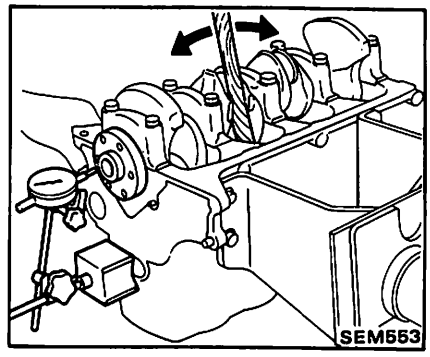
Ⓣ : Main bearing cap bolts
49 - 59 N·m
(5.0 - 6.0 kg-m,
36 - 43 ft-lb)



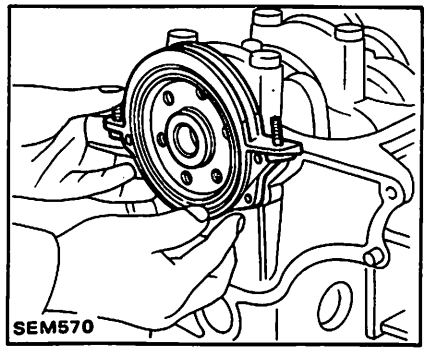


a. Arrange the parts so that the figure on bearing cap faces toward the water pump.
b. Prior to tightening bearing cap bolts, place bearing cap in proper position by shifting crankshaft in the axial direction.
c. Tighten bearing cap bolts gradually in two to three stages and in sequence outwardly from center bearing.
d. After securing bearing cap bolts, make sure that crankshaft turns smoothly by hand.

(5) Make sure that proper end play at crankshaft exists.



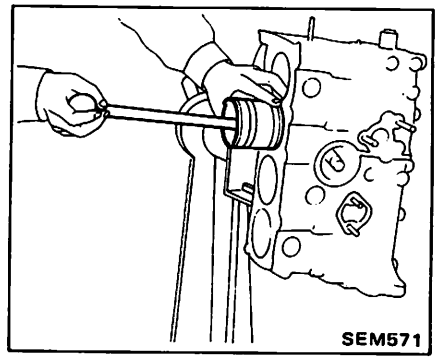
(6) Install oil seal retainer.



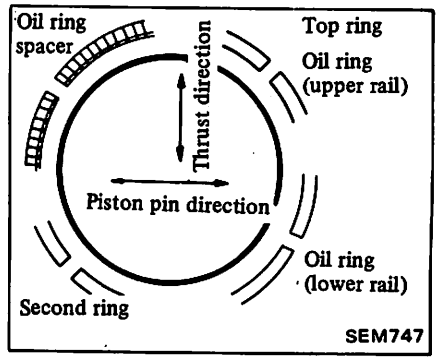
a. When installing oil seal retainer, apply a coating of engine oil to mating shaft to prevent scratches and folded lip. Also apply coating of oil to periphery of oil seal.
b. Install oil seal in the direction that dust seal lip faces to the outside of crankcase.

2. Piston with connecting rod.

(1) Install them into corresponding cylinders.

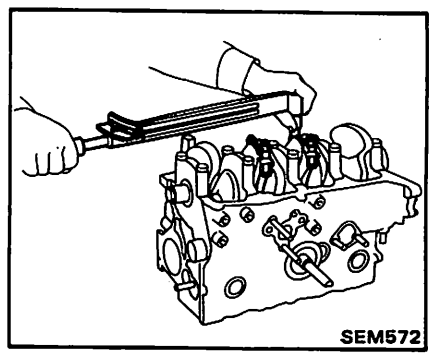


a. Apply engine oil to sliding parts.
b. Arrange so that the front mark on piston head faces to the front of engine.
c. Set piston rings as shown below.



(2) Install connecting rod caps.

Ⓣ : Connecting rod cap nuts
31 - 37 N·m
(3.2 - 3.8 kg-m,
23 - 27 ft-lb)

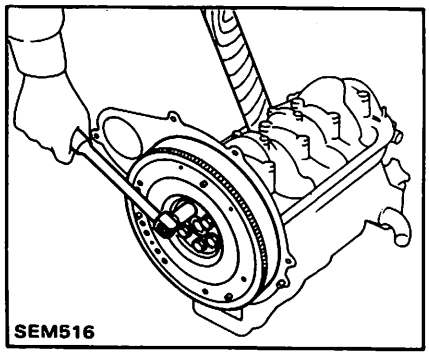


Arrange connecting rods and connecting rod caps so that the cylinder numbers face in the same direction.

(3) Make sure that proper end play at connecting rod big end exists. Refer to Inspection and Repair.

3. Rear plate and flywheel or drive plate

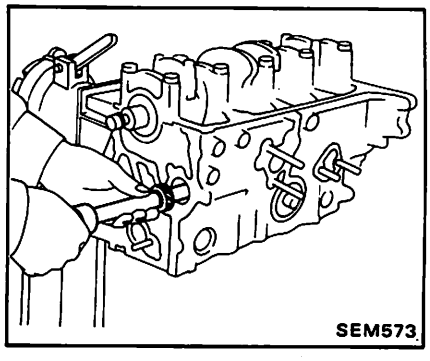
Ⓣ : Flywheel fixing bolts
78 - 88 N·m
(8.0 - 9.0 kg-m,
58 - 65 ft-lb)
Drive plate fixing bolts
93 - 103 N·m
(9.5 - 10.5 kg-m,
69 - 76 ft-lb)


SEM516

Do not lock at ring gear.

4. Install jack shaft.

Be careful not to damage the inner surface of jack shaft bushing.

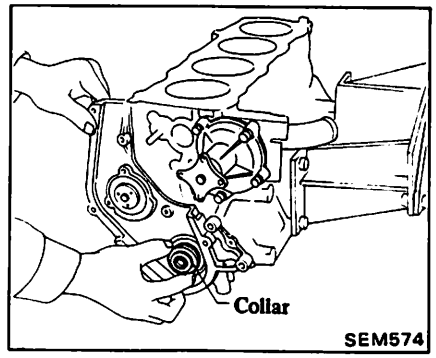

SEM573

5. Install jack shaft locating plate.
6. Install water pump assembly with new gasket.
7. Install oil pan.

Ⓣ : Oil pan fixing bolts
4 - 6 N·m
(0.4 - 0.6 kg-m,
2.9 - 4.3 ft-lb)

8. Install crank oil thrower, then install cylinder block cover together with oil seal collar.

Be careful not to damage the oil seal lip.



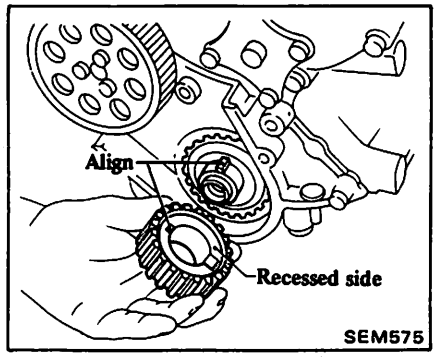
SEM574

9. Install jack shaft pulley.

Tighten jack shaft pulley bolt by holding pulley with hand.

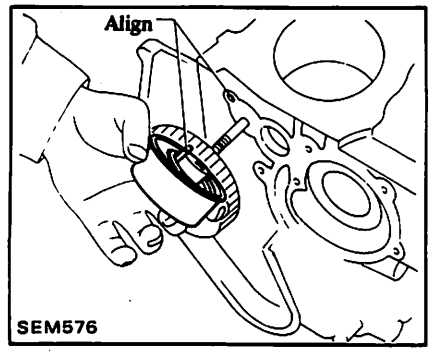
Ⓣ : Jack shaft pulley fixing bolt
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)

10. Install crank plate, crankshaft timing pulley and crank pulley plate.



SEM575

11. Temporarily install tensioner.



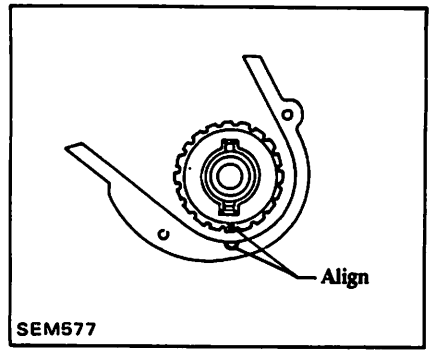
SEM576

12. Install cylinder head assembly and gasket by accommodating knock pin of cylinder block as follows:

(1) Thoroughly clean cylinder block and head surface.

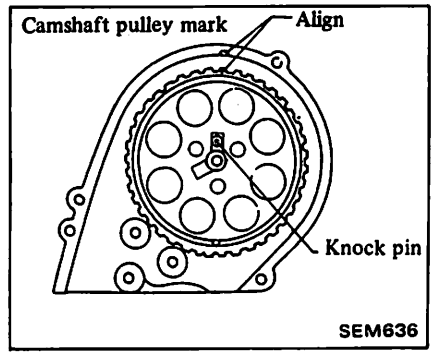
Do not apply sealant to any other part of cylinder block and head surface.

(2) Turn crankshaft and set No. 1 cylinder at top dead center on its compression stroke. This causes crankshaft timing pulley mark to be aligned with cylinder block cover mark.

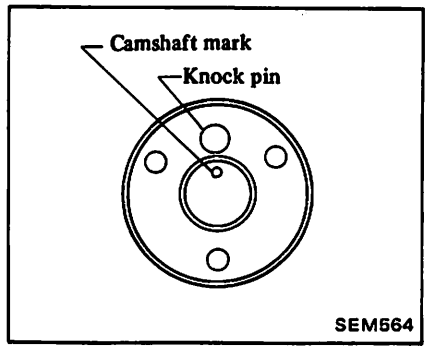


SEM577

(3) Align camshaft pulley mark with cylinder head cover mark. This causes valves for No. 1 cylinder to position at top dead center on compression stroke.



SEM636

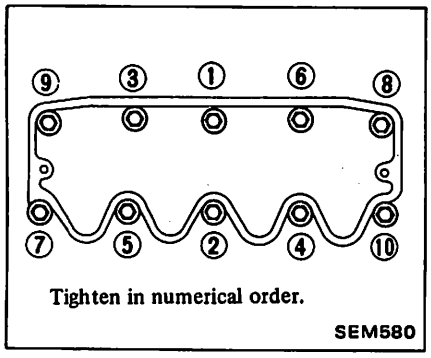


SEM564

(4) Install cylinder gasket and cylinder head assembly.
(5) Tighten cylinder head bolts.

a. Do not rotate crankshaft and camshaft separately, because valves will hit piston heads.
b. Always use new cylinder head gasket.
c. There are three kinds of cylinder head bolts with different lengths.
d. Be sure to install washers between cylinder head and bolts.

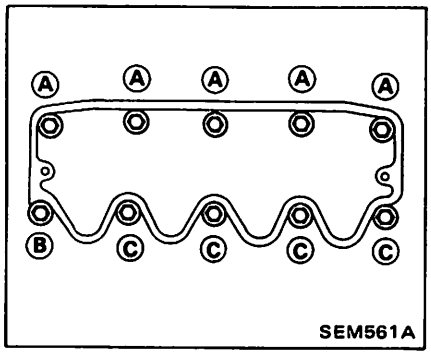
- **Tightening order**



Tighten in numerical order.
SEM580

- **Tightening procedures**

(1) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb).
(2) Tighten all bolts to 69 N·m (7.0 kg-m, 51 ft-lb).
(3) Loosen all bolts completely.
(4) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb).
(5) Tighten all bolts to 69 to 74 N·m (7.0 to 7.5 kg-m, 51 to 54 ft-lb) or if you have an angle wrench, turn each bolt clockwise the specified number of degrees.



SEM561A

Specified number of degrees:

Ⓐ	45
Ⓑ	55
Ⓒ	40

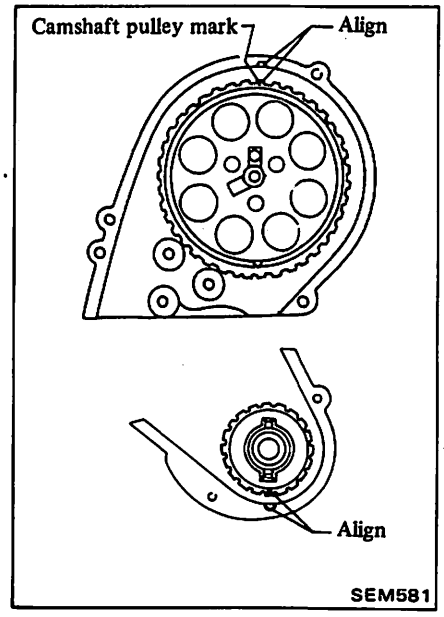
- **When performing normal maintenance and inspection, first loosen each cylinder head bolt slightly, then tighten to a torque of 69 to 74 N·m (7.0 to 7.5 kg-m, 51 to 54 ft-lb). (This should be done when engine is cold).**

(6) Install spark plugs.

Ⓣ : 20 - 29 N·m (2.0 - 3.0 kg-m, 14 - 22 ft-lb)

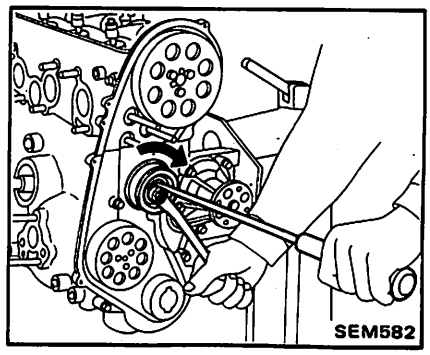
TIMING BELT

1. Ensure that marks on camshaft pulley and cylinder head cover and marks on crankshaft timing pulley and cylinder block cover are properly aligned.



SEM581

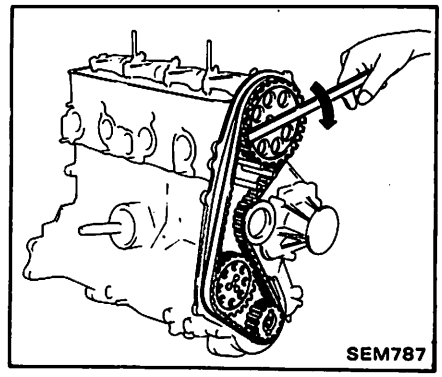
2. Rotate tensioner clockwise about 70 to 80° and temporarily tighten lock nut.


SEM582

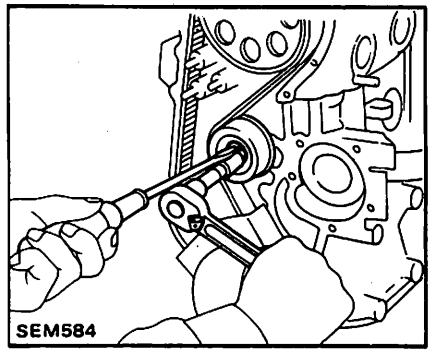
3. Place timing belt on pulleys.

a. When using used belt, be sure to install it with rotating direction mark facing engine rotating direction.
b. Ensure that belt is not loose around jack shaft and camshaft pulleys.

4. Loosen tensioner lock nut so that tensioner pushes on timing belt.
5. Turn camshaft pulley about 20° (2 cogs) clockwise.


SEM787

6. Tighten nut while preventing tensioner from turning in "free" direction.


SEM584

Ⓣ : Tensioner lock nut 16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)

FRONT SIDE PARTS

1. Install water pump pulley.
2. Install spacer and upper and lower dust cover.
3. Install crankshaft pulley.

Ⓣ : Crankshaft pulley bolt 108 - 127 N·m (11 - 13 kg-m, 80 - 94 ft-lb)

LEFT SIDE PARTS

1. Install exhaust manifold.

Ⓣ : **Exhaust manifold fixing nut**
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

2. Install cooler compressor bracket and power steering bracket.

RIGHT SIDE PARTS

1. Install oil pump assembly with new gasket.

Ⓣ : **Oil pump bolt & nuts**
8 - 10 N·m
(0.8 - 1.0 kg-m,
5.8 - 7.2 ft-lb)

2. Install fuel pump assembly with insulator.

Ⓣ : **Fuel pump nuts**
9.1 - 11.8 N·m
(0.93 - 1.2 kg-m,
6.7 - 8.7 ft-lb)

Always replace gaskets.

3. Install oil filter.
4. Install alternator bracket and alternator.

Ⓣ : **Alternator bracket fixing bolt**
8 - 10 N·m
(0.8 - 1.0 kg-m,
5.8 - 7.2 ft-lb)

Alternator to bracket bolt
44 - 59 N·m
(4.5 - 6.0 kg-m,
33 - 43 ft-lb)

5. Install intake manifold with carburetor.

Ⓣ : **Intake manifold fixing nuts**
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

REAR SIDE PARTS

1. Install thermostat housing with distributor.

Ⓣ : **Thermostat housing fixing bolt**
4 - 6 N·m
(0.4 - 0.6 kg-m,
2.9 - 4.3 ft-lb)

2. Install clutch unit using Tool KV30101000.

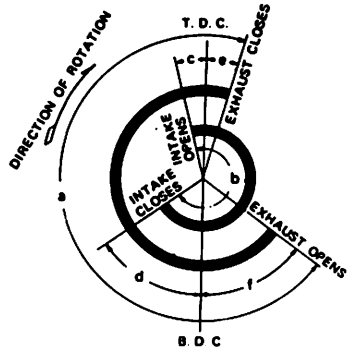
Ⓣ : **Clutch unit fixing bolt**
22 - 29 N·m
(2.2 - 3.0 kg-m,
16 - 22 ft-lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Engine model	E16
Classification	Gasoline
Cylinder arrangement	4, In-line
Displacement cm³ (cu in)	1,597 (97.45)
Bore x stroke mm (in)	76.0 x 88.0 (2.992 x 3.465)
Valve arrangement	O.H.C.
Firing order	1-3-4-2
Number of piston rings Compression	2
Oil	1
Number of main bearings	5
Compression ratio	9.4

Valve timing



EM120

Unit: degree

	a	b	c	d	e	f
E16	232	232	17	45	11	51

INSPECTION AND ADJUSTMENT

ENGINE COMPRESSION PRESSURE

Standard	kPa (kg/cm², psi)/rpm	1,245 (12.7, 181)/350
Minimum	kPa (kg/cm², psi)/rpm	981 (10.0, 142)/350

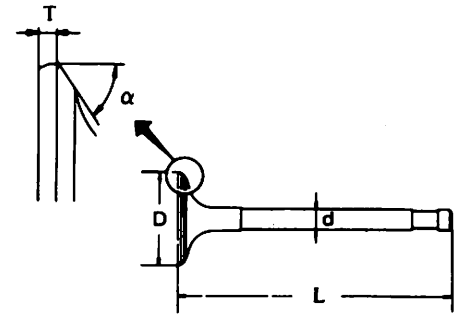
CYLINDER HEAD

Unit: mm (in)

	Standard	Limit
Head surface flatness	Less than 0.05 (0.0020)	0.1 (0.004)
Height	119.9 - 120.1 (4.720 - 4.728)	–

VALVE

Unit: mm (in)



SEM188

Valve head diameter "D"	Intake	37.0 (1.457)
	Exhaust	30.0 (1.181)
Valve length "L"	Intake	116.4 - 117.0 (4.583 - 4.606)
	Exhaust	115.75 - 116.35 (4.5571 - 4.5807)
Valve stem diameter "d"	Intake	6.970 - 6.985 (0.2744 - 0.2750)
	Exhaust	6.945 - 6.960 (0.2734 - 0.2740)
Valve face angle "α"		45°15' - 45°45'
Valve margin "T" Limit		0.5 (0.020)
Valve stem end surface grinding limit		0.2 (0.008)

Valve spring

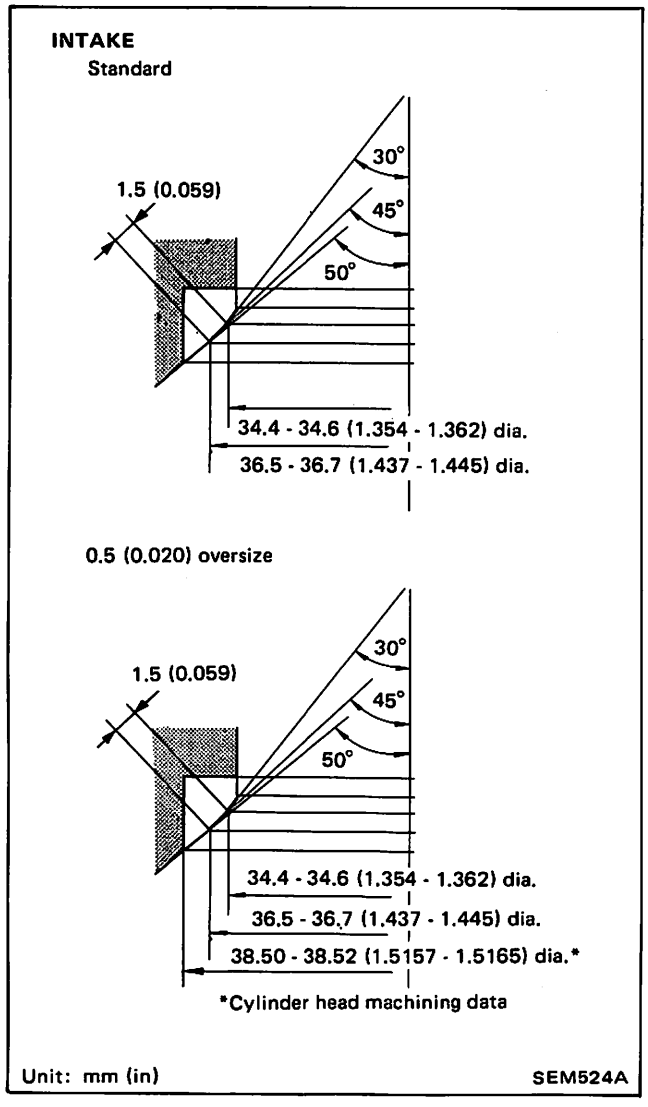
Free height mm (in)	46.70 (1.8386)
Assembled height mm/N (mm/kg, in/lb)	39.2/229.78 (39.2/23.43, 1.543/51.66)
Out of square "S" mm (in)	2.0 (0.079)

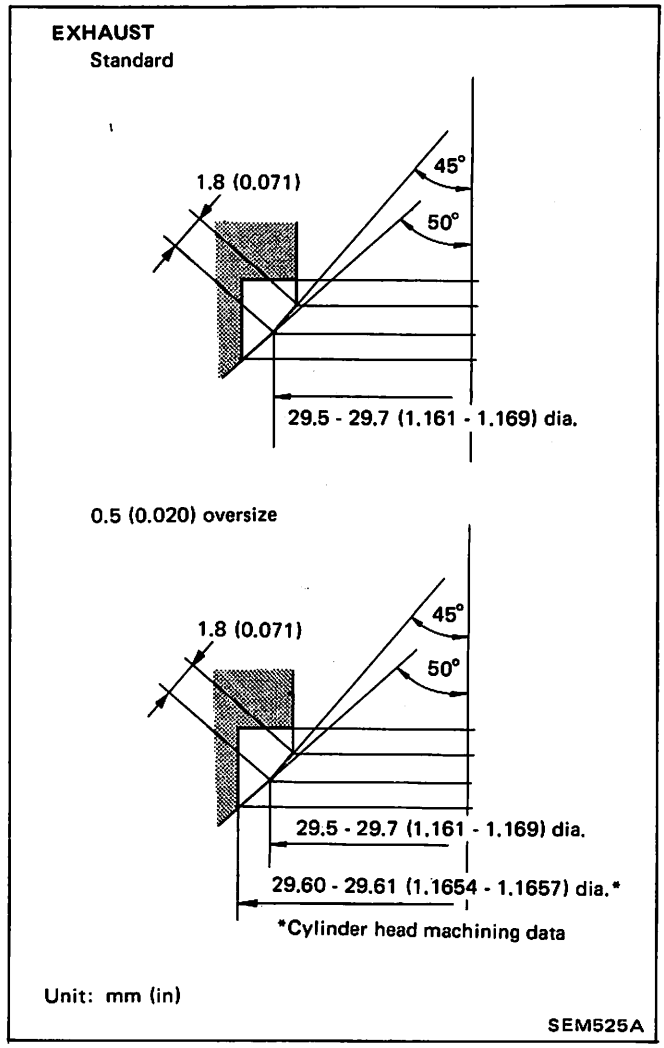
Valve guide

Unit: mm (in)

		Standard	Service
Valve guide Outer diameter		12.033 - 12.044 (0.4737 - 0.4742)	12.256 - 12.274 (0.4825 - 0.4832)
Valve guide Inner diameter [Finished size]		7.005 - 7.020 (0.2758 - 0.2764)	
Cylinder head valve guide hole diameter		11.970 - 11.988 (0.4713 - 0.4720)	12.200 - 12.211 (0.4803 - 0.4807)
Interference fit of valve guide		0.045 - 0.074 (0.0018 - 0.0029)	
		Standard	Max. tolerance
Stem to guide clearance	Intake	0.02 - 0.05 (0.0008 - 0.0020)	0.10 (0.0039)
	Exhaust	0.045 - 0.075 (0.0018 - 0.0030)	
Valve deflection limit		0.2 (0.008)	

Valve seat

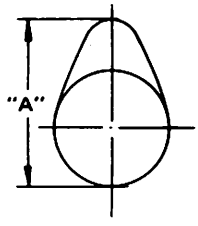




CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

		Standard	Max. tolerance
Camshaft journal to bearing clearance	No. 1,3,5	0.035 - 0.076 (0.0014 - 0.0030)	0.15 (0.0059)
	No. 2, 4	0.078 - 0.119 (0.0031 - 0.0047)	0.20 (0.0079)
Inner diameter of camshaft bearing		42.000 - 42.025 (1.6535 - 1.6545)	–
Outer diameter of camshaft journal	No. 1,3,5	41.949 - 41.965 (1.6515 - 1.6522)	–
	No. 2, 4	41.906 - 41.922 (1.6498 - 1.6505)	
Camshaft bend [T.I.R*]		Less than 0.02 (0.0008)	0.1 (0.004)
Camshaft end play		0.15 - 0.29 (0.0059 - 0.0114)	0.4 (0.016)



EM671

Cam height "A"	Intake	35.884 - 36.134 (1.4128 - 1.4226)
	Exhaust	35.64 - 35.89 (1.4031 - 1.4130)
Wear limit of cam height		0.20 (0.0079)

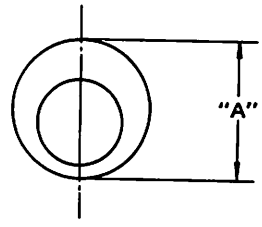
* Total indicator reading

JACK SHAFT AND JACK SHAFT BUSHING

Unit: mm (in)

		Standard	Max. tolerance
Jack shaft journal to bushing clearance	FR	0.020 - 0.098 (0.0008 - 0.0039)	0.15 (0.0059)
	RR		
Inner diameter of jack shaft bushing	FR	32.020 - 32.085 (1.2606 - 1.2632)	
	RR	28.620 - 28.685 (1.1268 - 1.1293)	
Outer diameter of jack shaft journal	FR	31.987 - 32.000 (1.2593 - 1.2598)	
	RR	28.587 - 28.600 (1.1255 - 1.1260)	
Jack shaft end play		0.045 - 0.105 (0.0018 - 0.0041)	

Fuel pump cam

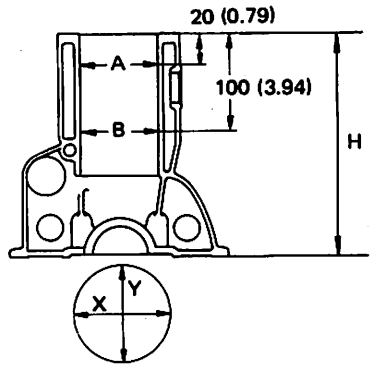


SEM734

Cam height "A"	27.8 - 27.9 (1.094 - 1.098)	–

CYLINDER BLOCK

Unit: mm (in)



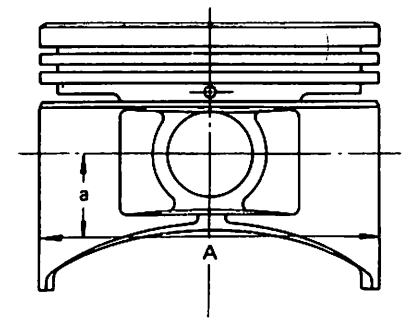
SEM754A

		Standard	Wear limit
Surface flatness		Less than 0.05 (0.0020)	0.10 (0.0039)
Height H		213.95 - 214.05 (8.4232 - 8.4271)	–
Cylinder bore	Inner diameter	76.00 - 76.05 (2.9921 - 2.9941)	–
	Out-of-round (X-Y)	Less than 0.015 (0.0006)	–
	Taper (A-B)	Less than 0.02 (0.0008)	–
Difference in inner diameter between cylinders		Less than 0.05 (0.0020)	–
Piston clearance to cylinder block		0.023 - 0.043 (0.0009 - 0.0017)	–

PISTON, PISTON RING AND PISTON PIN

Piston

Unit: mm (in)



SEM646

Piston skirt diameter "A"	Standard		75.967 - 76.017 (2.9908 - 2.9928)
	Oversize	0.02 (0.0008)	75.987 - 76.037 (2.9916 - 2.9936)
		0.50 (0.0197)	76.467 - 76.517 (3.0105 - 3.0125)
"a" dimension			17.7 (0.697)
Piston pin hole diameter			19.003 - 19.012 (0.7481 - 0.7485)

Piston ring

Unit: mm (in)

		Standard	Limit
Side clearance	Top	0.040 - 0.073 (0.0016 - 0.0029)	0.2 (0.008)
	2nd	0.030 - 0.063 (0.0012 - 0.0025)	
	Oil	0.050 - 0.145 (0.0020 - 0.0057)	–
Ring gap	Top	0.20 - 0.35 (0.0079 - 0.0138)	1.0 (0.039)
	2nd	0.15 - 0.30 (0.0059 - 0.0118)	
	Oil (rail ring)	0.30 - 0.90 (0.0118 - 0.0354)	

Piston pin

Unit: mm (in)

Piston pin outer diameter	18.995 - 19.000 (0.7478 - 0.7480)
Piston pin to piston clearance	0.008 - 0.012 (0.0003 - 0.0005)
Interference fit of piston pin to connecting rod	0.017 - 0.038 (0.0007 - 0.0015)

CONNECTING ROD

Unit: mm (in)

Bend, torsion [per 100 mm (3.94 in)]	Limit	0.05 (0.0020)
Piston pin bore dia.		18.962 - 18.978 (0.7465 - 0.7472)
Big end play	Standard	0.1 - 0.37 (0.004 - 0.0146)
	Limit	0.5 (0.020)

CRANKSHAFT

Unit: mm (in)

Main journal dia. "Dm"		49.943 - 49.964 (1.9663 - 1.9671)
Pin journal dia. "Dp"		39.954 - 39.974 (1.5730 - 1.5738)
Out-of-round (X-Y) and taper (A-B)	Standard	Less than 0.01 (0.0004)
	Limit	0.03 (0.0012)
Runout [T.I.R.]	Standard	Less than 0.04 (0.0016)
	Limit	0.08 (0.0031)
Free end play	Standard	0.05 - 0.18 (0.0020 - 0.0071)
	Limit	0.30 (0.0118)

BEARING

Bearing clearance

Unit: mm (in)

	Standard	Limit
Main bearing clearance No. 1, 3 and 5	0.031 - 0.056 (0.0012 - 0.0022)	0.10 (0.0039)
No. 2 and 4	0.031 - 0.092 (0.0012 - 0.0036)	
Connecting rod bearing clearance	0.010 - 0.044 (0.0004 - 0.0017)	0.10 (0.0039)

Main bearing undersize

Unit: mm (in)

		Crank main journal diameter "Dm"
Standard		49.943 - 49.964 (1.9663 - 1.9671)
Undersize	0.25 (0.0098)	49.701 - 49.714 (1.9567 - 1.9572)

Connecting rod bearing undersize

Unit: mm (in)

		Crank pin journal diameter "Dp"
Standard		39.954 - 39.974 (1.5730 - 1.5738)
Undersize	0.25 (0.0098)	39.704 - 39.724 (1.5631 - 1.5639)

MISCELLANEOUS COMPONENTS

Unit: mm (in)

Camshaft pulley Runout [T.I.R.]	Less than 0.1 (0.004)
Flywheel Runout [T.I.R.]	Less than 0.15 (0.0059)

TIGHTENING TORQUE

Engine outer parts

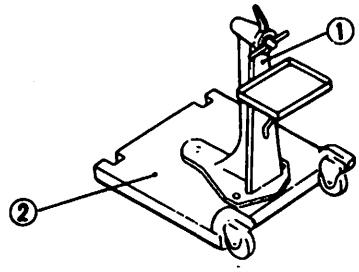
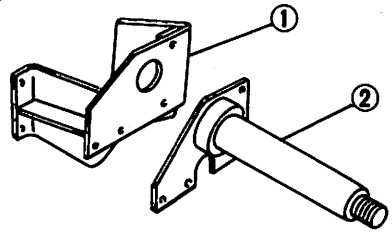
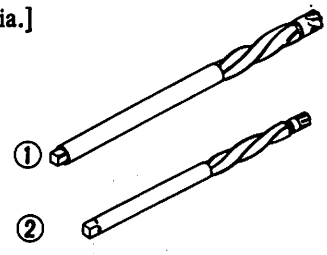
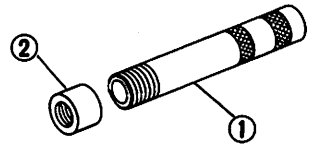
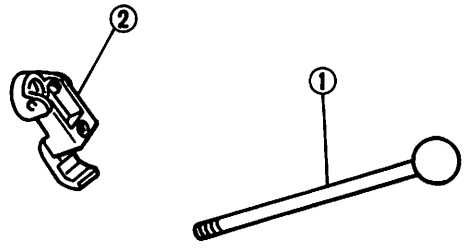
Unit	N·m	kg-m	ft-lb
Alternator bracket bolt	8 - 10	0.8 - 1.0	5.8 - 7.2
Alternator to adjusting bar bolt	16 - 21	1.6 - 2.1	12 - 15
Clutch cover fixing bolt	22 - 29	2.2 - 3.0	16 - 22
Engine mounting bracket to cylinder block	29 - 39	3.0 - 4.0	22 - 29
Engine mounting bracket to cylinder head	16 - 21	1.6 - 2.1	12 - 15
Fuel pump attaching nut	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Intake & exhaust manifold nut	16 - 21	1.6 - 2.1	12 - 15
Oil pump securing nut	8 - 10	0.8 - 1.0	5.8 - 7.2
Oil pump securing bolt	8 - 10	0.8 - 1.0	5.8 - 7.2
Power steering pump bracket	26 - 34	2.7 - 3.5	20 - 25
Power steering pump fixing bolt	31 - 42	3.2 - 4.3	23 - 31
Spark plug	20 - 29	2.0 - 3.0	14 - 22
Water pump pulley bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Water pump bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Compressor bracket bolt	26 - 34	2.7 - 3.5	20 - 25
Compressor to bracket	26 - 34	2.7 - 3.5	20 - 25
Crank pulley bolt	108 - 127	11 - 13	80 - 94
Dust cover screw	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
E.G.R. valve to E.G.R. tube	39 - 59	4 - 6	29 - 43
Air injection pipe nut	39 - 59	4 - 6	29 - 43
Thermostat housing bolt	4 - 6	0.4 - 0.6	2.9 - 4.3

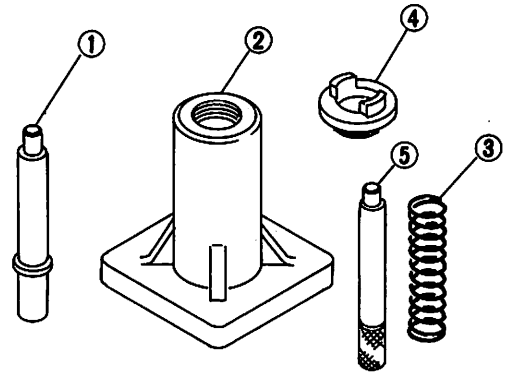
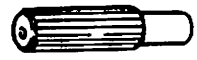
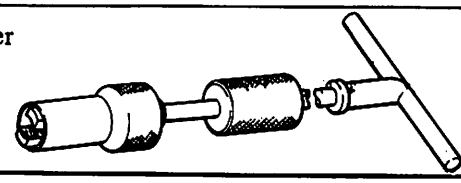
Engine internal parts

Unit	N·m	kg-m	ft-lb
Camshaft pulley bolt	9 - 12	0.9 - 1.2	6.5 - 8.7
Connecting rod nut	31 - 37	3.2 - 3.8	23 - 27
*Cylinder head bolt	69 - 74	7.0 - 7.5	51 - 54
Cylinder head front cover	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Flywheel bolt	78 - 88	8.0 - 9.0	58 - 65
Drive plate bolt	93 - 103	9.5 - 10.5	69 - 76
Front cover bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Jack shaft pulley bolt	9 - 12	0.9 - 1.2	6.5 - 8.7
Main bearing cap bolt	49 - 59	5.0 - 6.0	36 - 43
Oil pan bolt & nut	4 - 6	0.4 - 0.6	2.9 - 4.3
Oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Oil strainer bolt	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Rocker shaft bolt	18 - 21	1.8 - 2.1	13 - 15
Tensioner lock nut	16 - 21	1.6 - 2.1	12 - 15
Rocker cover nut	4 - 8	0.4 - 0.8	2.9 - 5.8
Rocker arm lock nut	16 - 21	1.6 - 2.1	12 - 15

*Tighten all bolts in five stages. Refer to page EM-20.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
ST0501S000 (–) ① ST05011000 (–) ② ST05012000 (–)	Engine stand assembly Engine stand Base 
① KV10107110 (–) ② KV10102500 (–)	Engine attachment assembly Engine attachment Sub attachment 
① ST11081000 (J25618-3) ② KV10107700 (–)	Reamer [12.2 mm (0.480 in) dia.] [7 mm (0.28 in) dia.] 
① KV10107501 (–) ② KV10109100 (–)	① Valve lip seal drift ② Valve oil seal drift attachment 
KV101072S0 (–) ① KV10107210 (–) ② KV10107220 (–)	Valve spring compressor Handle Head 

Tool number (Kent-Moore No.)	Tool name
KV10107400 (J26365–12, J26365) ① KV10107310 (–) ② ST13040020 (–) ③ ST13040030 (–) ④ KV10107320 (–) ⑤ ST13040050 (–)	Piston pin press stand Center shaft Stand Spring Cap Drift 
KV30101000 (J33213)	Clutch aligning bar 
KV10107900 (–)	Valve lip seal puller 

ENGINE LUBRICATION & COOLING SYSTEMS

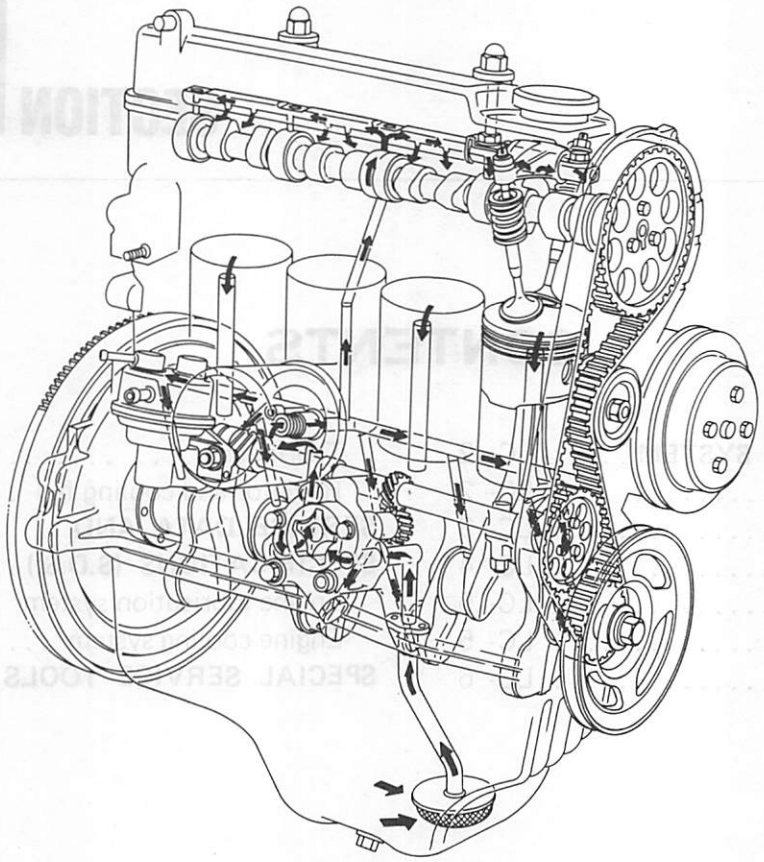
SECTION LC

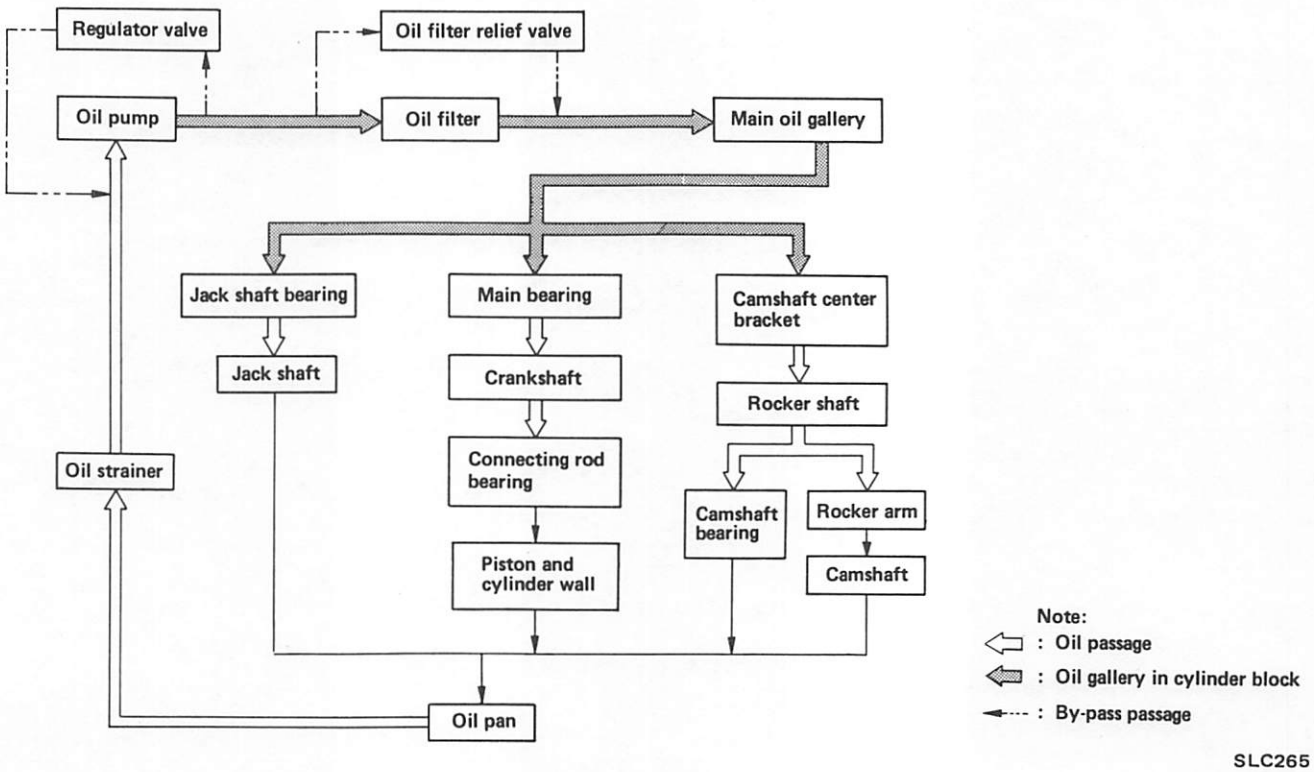
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COOLING SYSTEM ..... LC- 5
Cooling circuit ..... LC- 5
Water pump ..... LC- 6
Thermostat ..... LC- 7
Radiator and cooling fan ..... LC- 8
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Engine lubrication system LC-11
Engine cooling system LC-11
SPECIAL SERVICE TOOLS LC-12

ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT



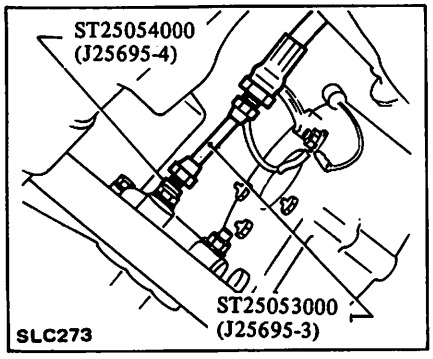


SLC265

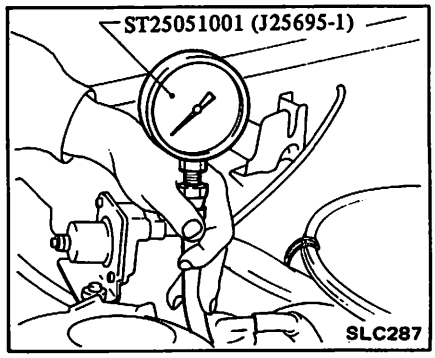
OIL PUMP

OIL PRESSURE CHECK

1. Warm up engine.
2. Remove oil pressure switch.
3. Install pressure gauge and gauge adapter to oil pressure switch hole.



4. Start engine and check oil pressure.



Engine rpm	Discharge pressure kPa (kg/cm^2, psi)
1,050	196 (2, 28)
1,700	294 (3, 43)
5,150	392 (4, 57)

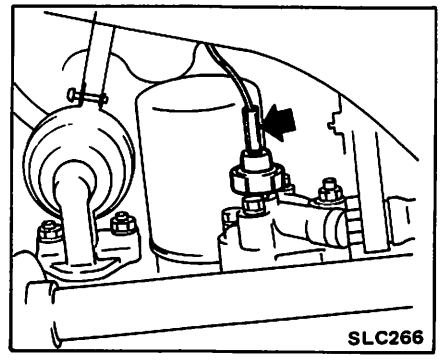
The above table shows data tested when SAE 20W-20 oil is used and oil temperature is between 73 and 83°C (163 and 181°F). Slight difference will be found because of oil grade or oil temperature. If difference is extreme, check oil passage, oil pump, and for oil leaks.

5. Remove pressure gauge and gauge adapter.
6. Install oil pressure switch.

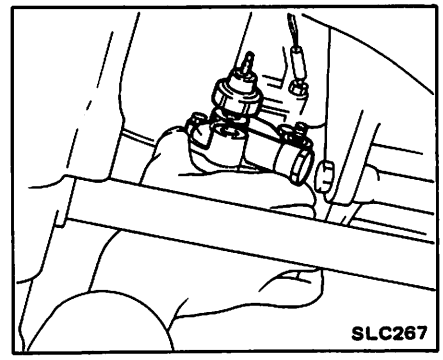
If oil pressure is outside the specifications, check pump for clogged oil passage, leaks, etc.

REMOVAL

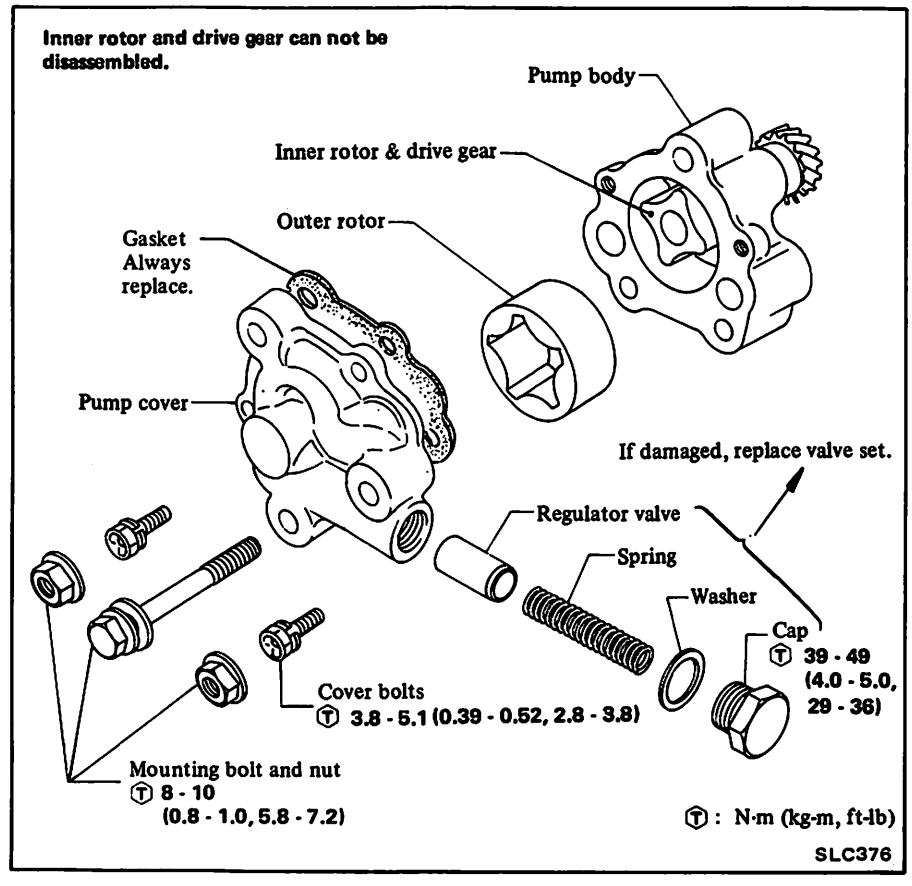
1. Loosen alternator lower bolts.
2. Remove alternator belt and adjusting bar bolt. Move alternator aside so there is ample room to work.
3. Disconnect oil pressure gauge harness.



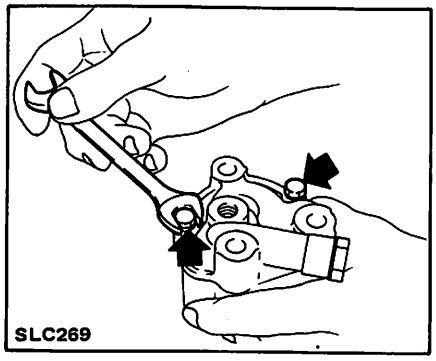
4. Remove oil pump assembly.



DISASSEMBLY AND ASSEMBLY



1. Remove pump cover bolts.

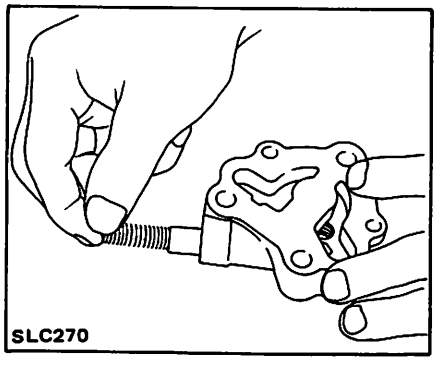


2. Take out outer rotor.

Inner rotor and drive gear cannot be disassembled.

3. Remove regulator valve.

When placing oil pump in a vise, use extreme care not to distort pump body and cover in the jaws.



4. Assemble oil pump in the reverse order of removal.

Use new gasket.

Ⓣ : **Regulator valve cap nut:**
39 - 49 N·m
(4.0 - 5.0 kg-m,
29 - 36 ft-lb)
Oil pump cover bolt:
3.8 - 5.1 N·m
(0.39 - 0.52 kg-m,
2.8 - 3.8 ft-lb)

INSPECTION

1. Inspect pump body and cover for cracks or excessive wear.
2. Inspect pump rotors for excessive wear.
3. Check inner rotor shaft for looseness in pump body.

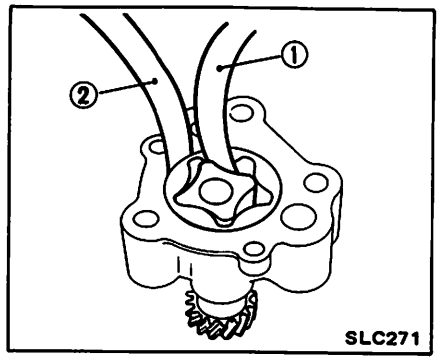
If pump rotors or body are damaged or worn, replacement of the entire oil pump assembly is necessary.

4. Check oil pressure regulator valve sliding surface and valve spring.

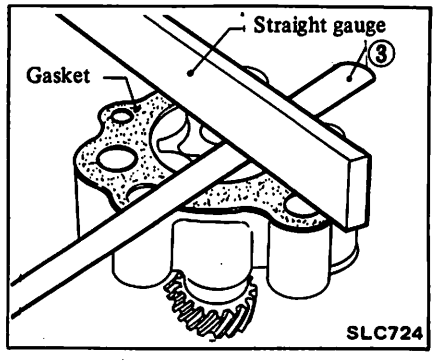
If damaged, replace valve set.

5. Using a feeler gauge, check the following clearances.

Rotor tip clearance ① :
Less than
0.12 mm (0.0047 in)
Outer rotor to body clearance ② :
0.15 - 0.20 mm
(0.0059 - 0.0079 in)



Rotor to straight gauge
(Side clearance with gasket) ③ :
0.05 - 0.12 mm
(0.0020 - 0.0047 in)



INSTALLATION

1. Apply engine oil to pump drive gear and shaft.
2. Charge engine oil into pump and turn pump drive gear several times.
3. Using a new gasket, install oil pump assembly.

Ⓣ : **Oil pump mounting bolt & nuts**
8 - 10 N·m
(0.8 - 1.0 kg-m,
5.8 - 7.2 ft-lb)

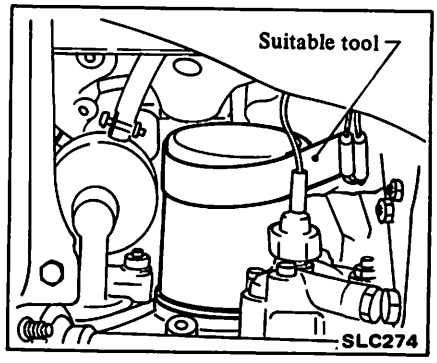
4. Refill engine with oil.

After installation, run engine for a few minutes, and check for leaks.

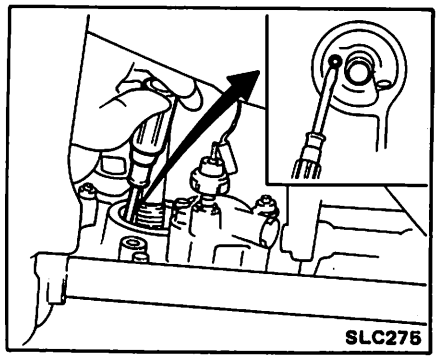
OIL FILTER

REPLACEMENT

1. Remove oil filter.



2. Check oil pressure relief valve for a cracked or broken valve. If necessary remove valve by prying it out with a screwdriver. Install a new valve by tapping it in place.



3. Install oil filter:

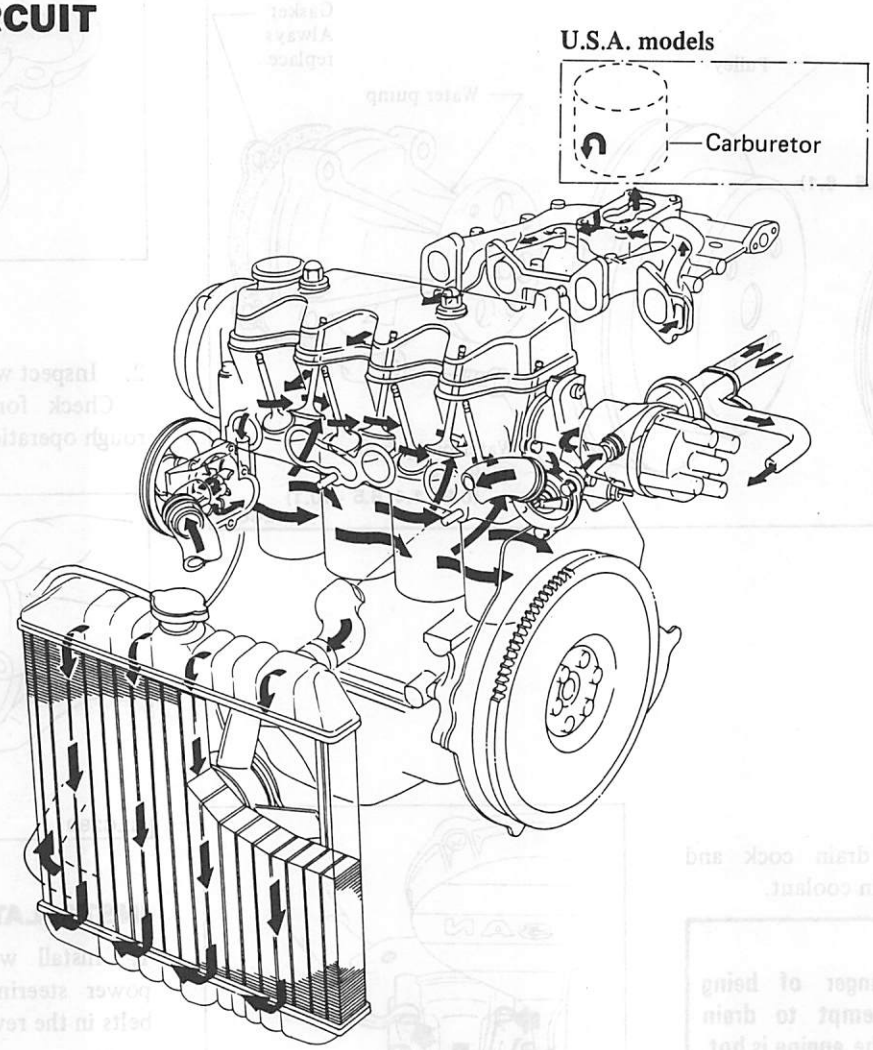
Screw oil filter in additional 2/3 turn after oil seal is slightly seated.

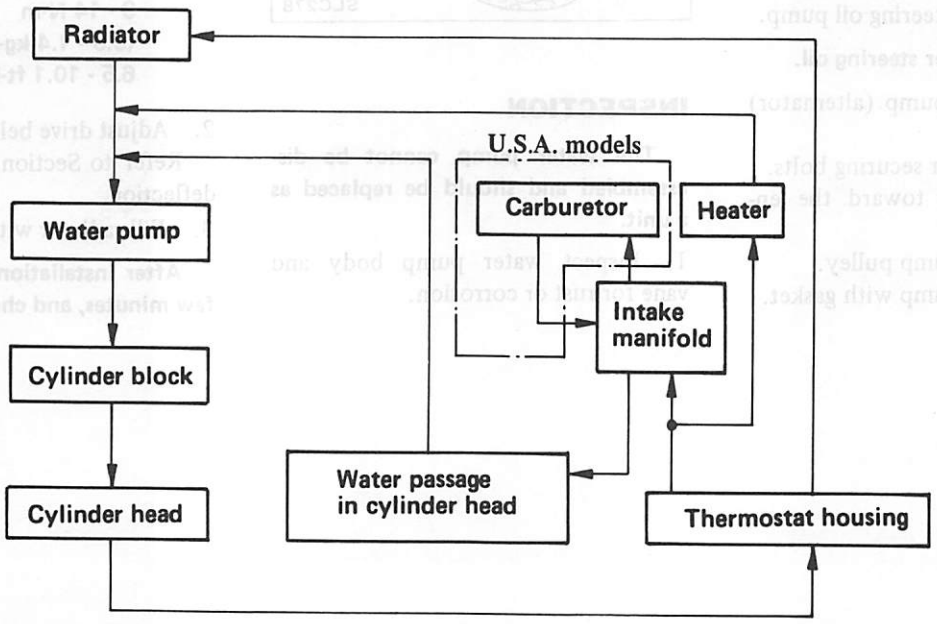
4. Refill with the specified quantity of engine oil.

After installation, run engine for a few minutes, and check for leaks.

COOLING SYSTEM

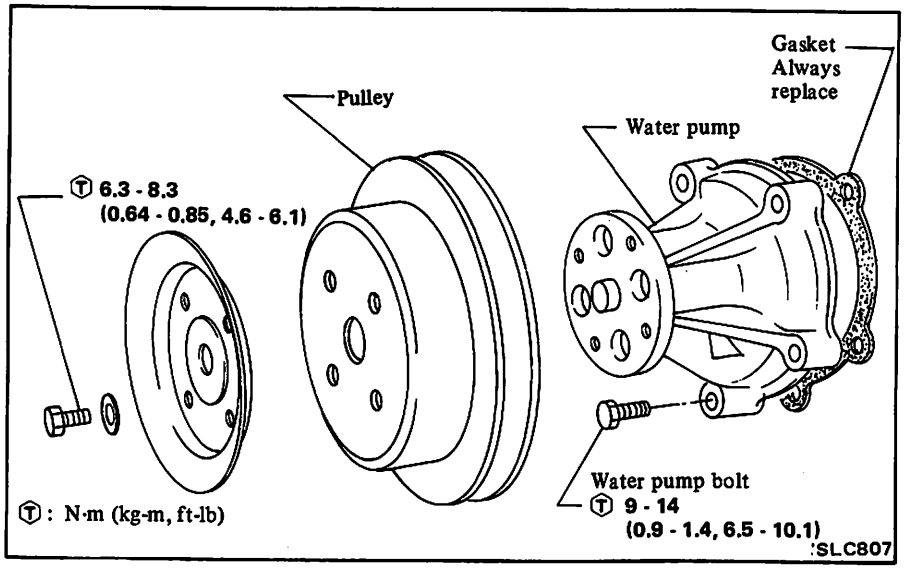
COOLING CIRCUIT





SLC802

WATER PUMP



REMOVAL

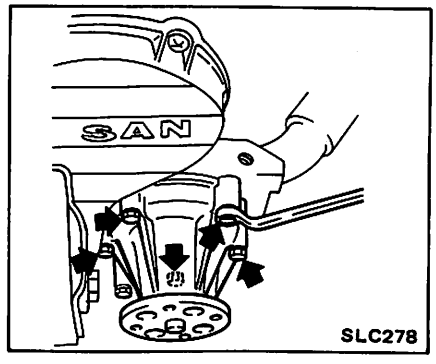
1. Open radiator drain cock and radiator cap, and drain coolant.

WARNING:
To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove power steering drive belt.
3. Remove power steering oil pump.

Do not drain power steering oil.

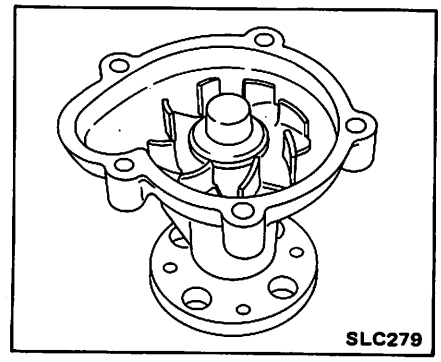
4. Remove water pump (alternator) drive belt.
(1) Loosen alternator securing bolts.
(2) Move alternator toward the engine.
5. Remove water pump pulley.
6. Remove water pump with gasket.



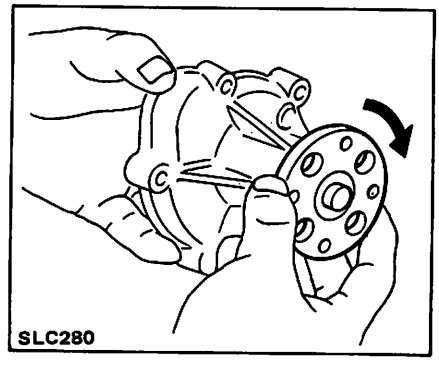
INSPECTION

The water pump cannot be disassembled and should be replaced as a unit.

1. Inspect water pump body and vane for rust or corrosion.



2. Inspect water pump bearing.
Check for excessive end play or rough operation.



INSTALLATION

1. Install water pump, alternator, power steering oil pump and drive belts in the reverse order of removal.

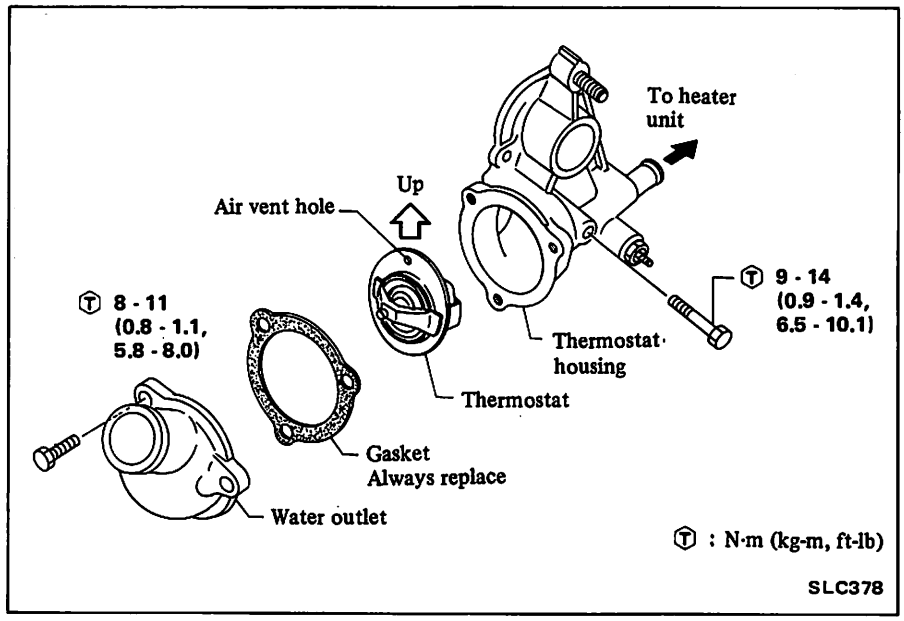
Always use new gasket.

Ⓣ : Water pump bolt
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

2. Adjust drive belt deflection.
Refer to Section MA for drive belt deflection.
3. Fill radiator with coolant.

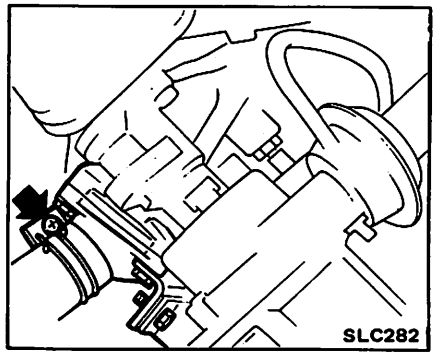
After installation, run engine for a few minutes, and check for leaks.

THERMOSTAT

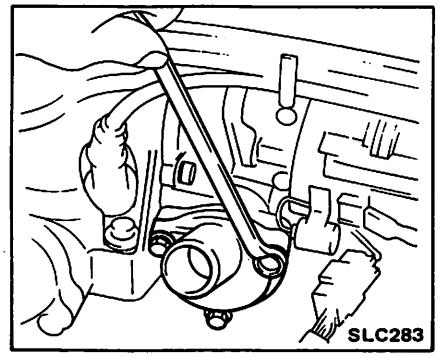


REMOVAL

1. Drain coolant so that its level is below the thermostat housing.
2. Disconnect radiator upper hose on water outlet side.



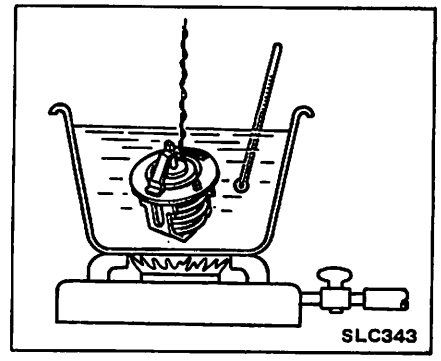
3. Remove E.A.I. tube clamp bolts.
4. Remove water outlet, then remove thermostat with gasket.



INSPECTION

Inspect thermostat for the following and replace if necessary.

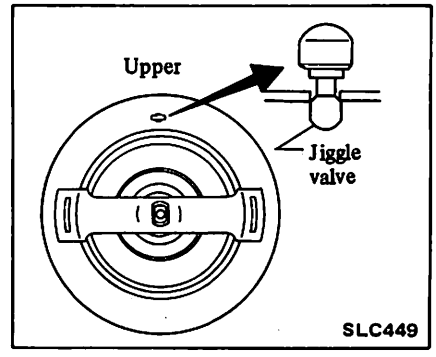
1. Valve seating condition at ordinary temperature. It should seat tightly.
2. Valve opening temperature and maximum valve lift (Refer to S.D.S.)



3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

INSTALLATION

1. Install thermostat to thermostat housing with jiggle valve or air vent facing upward.



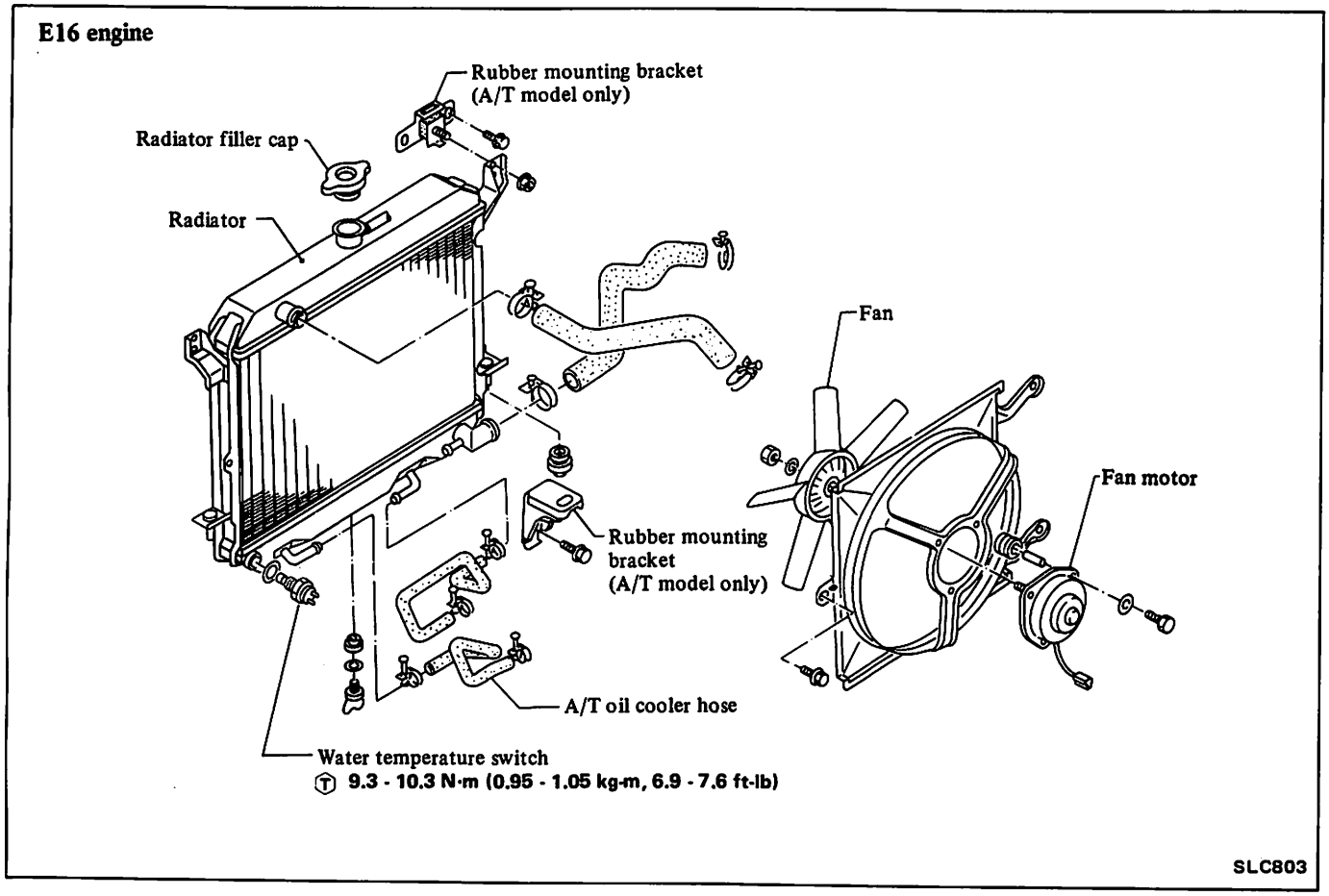
2. Install water outlet together with new gasket.

Ⓣ : Attaching bolt
8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)

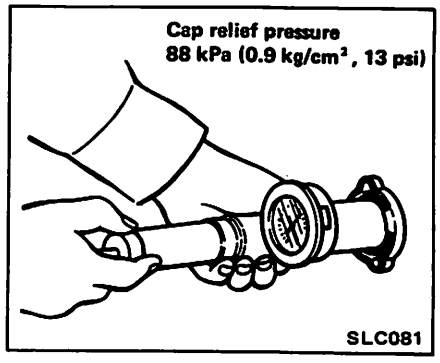
3. Connect radiator upper hose.
4. Fill radiator with coolant.

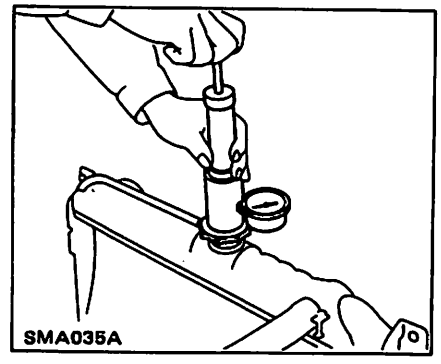
After installation, run engine for a few minutes, and check for leaks.

RADIATOR AND COOLING FAN



WARNING:
Never remove the radiator cap when the engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.





INSPECTION

Checking radiator cap

Using cap tester, check the radiator cap relief pressure.

If the pressure gauge drops rapidly and excessively, replace the radiator cap.

Checking cooling system for leaks

Attach pressure tester. Then pump the tester to the specified pressure.

Check for drop in pressure.

If the pressure drops, check for leaks from hoses, radiator or water pump.

Leakage test pressure:
157 kPa (1.6 kg/cm², 23 psi)

If no external leaks are found, check heater core, block and head.

ELECTRICAL COOLING FAN

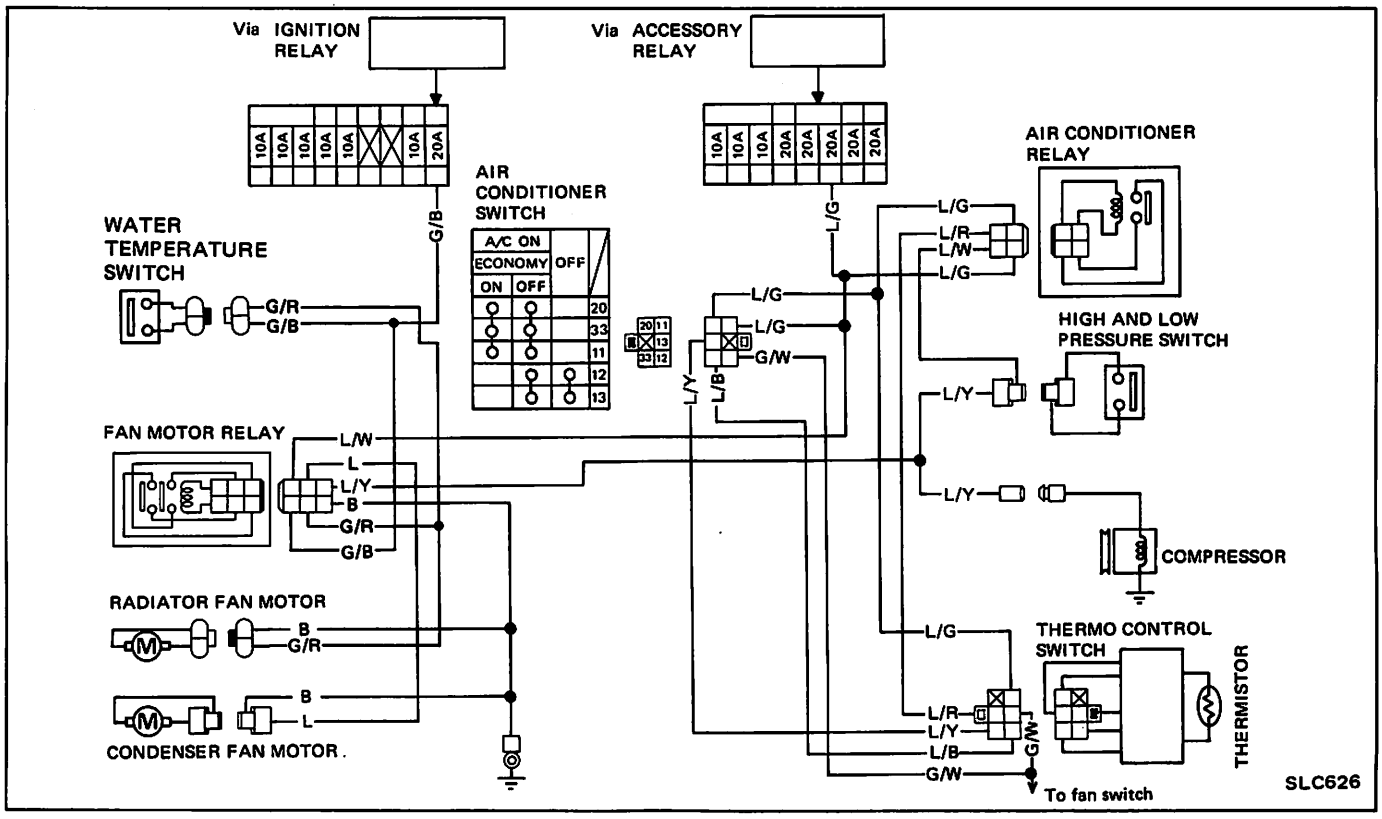
The cooling fan is driven by an electric fan motor which monitors the temperature of coolant and the operation of air conditioner compressor.

Operation

Water temperature °C (°F)	Air conditioner compressor	Fan motor
Below 90 (194)	Does not operate	Does not operate
	Operates	Operates
Above 90 (194)	Does not operate	
	Operates	

On models not equipped with air conditioner, a fan motor does not operate below a water temperature of 90°C (194°F).

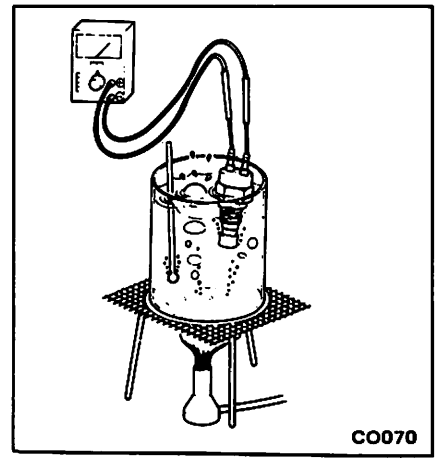
ELECTRIC CIRCUIT



INSPECTION

1. Disconnect fan motor connector, water temperature switch and high and low pressure switch. Then, check voltage between their harness terminals to see if it is 12 volts.
2. If it is not, check switch and relay harnesses for loose connections. If necessary, retighten loose connections.
3. If connections are not tight and secure, check condition of the following switches and relay.

- Water temperature switch
  Check water temperature switch for proper operation. If switch does not operate properly at specified temperature, replace it.



- High and low pressure switch
- Air conditioner switch
- Fan switch

} Refer to HA section.

- Motor relay
- Air conditioner relay

} Refer to EL section.

REMOVAL AND INSTALLATION

1. Open radiator drain cock and allow coolant to drain into a suitable container.

WARNING:
To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Disconnect radiator upper hose and lower hose.
3. Remove lower hose adapter.

On a car with automatic transaxle, disconnect cooler inlet and outlet hoses from radiator.

4. Disconnect fan motor wire and water temperature switch wire and remove radiator.
5. Install radiator in the reverse order of removal.
6. Fill radiator with the specified quantity of coolant.

After installation, run engine for a few minutes, and check for leaks.

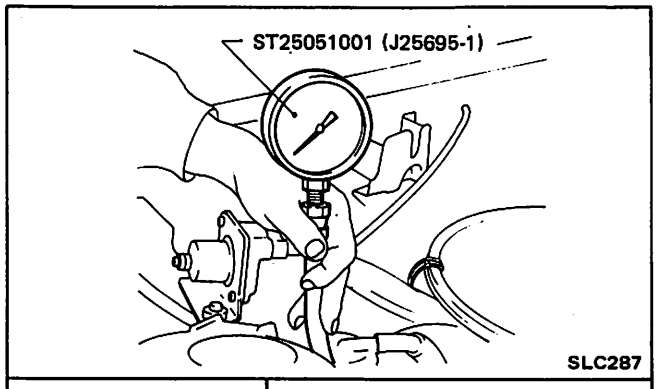
SERVICE DATA AND SPECIFICATIONS (S.D.S.)

ENGINE LUBRICATION SYSTEM

INSPECTION AND ADJUSTMENT

Oil pump

Oil pressure



Engine rpm	Discharge pressure kPa (kg/cm², psi)
1,050	196 (2, 28)
1,700	294 (3, 43)
5,150	392 (4, 57)

Pump unit

Unit: mm (in)

Rotor tip clearance ①	Less than 0.12 (0.0047)
Outer rotor to body clearance ②	0.15 - 0.20 (0.0059 - 0.0079)
Side clearance with gasket ③	0.05 - 0.12 (0.0020 - 0.0047)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Oil pump mounting bolt & nuts	8 - 10	0.8 - 1.0	5.8 - 7.2
Oil pump cover bolt	3.8 - 5.1	0.39 - 0.52	2.8 - 3.8
Regulator valve cap nut	39 - 49	4.0 - 5.0	29 - 36

ENGINE COOLING SYSTEM

INSPECTION AND ADJUSTMENT

Thermostat

	Frigid type	Standard type	Tropical type
Valve opening temperature °C (°F)	88 (190)	82 (180)	76.5 (170)
Max. valve lift mm/°C (in/°F)	8/100 (0.31/212)	8/95 (0.31/203)	8/90 (0.31/194)

Radiator

Cap relief pressure	kPa (kg/cm², psi)	88 (0.9, 13)
Leakage test pressure	kPa (kg/cm², psi)	157 (1.6, 23)

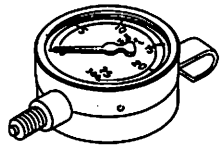
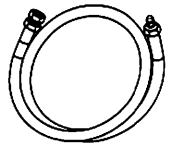
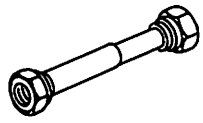
Water temperature switch

Operating temperature OFF → ON °C (°F)	90 (194)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Lubrication system			
Oil pump mounting bolt and nut	8 - 10	0.8 - 1.0	5.8 - 7.2
Oil pressure regulator cap	39 - 49	4.0 - 5.0	29 - 36
Oil pump cover bolt	3.8 - 5.1	0.39 - 0.52	2.8 - 3.8
Cooling system			
Thermostat housing fixing bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Water outlet bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Water pump pulley bolt	4 - 5	0.4 - 0.5	2.9 - 3.6
Water pump fixing bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Water temperature switch	9.3 - 10.3	0.95 - 1.05	6.9 - 7.6

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
ST25051001 (J25695-1)	Oil pressure gauge 
ST25052000 (J25695-2)	Hose 
ST25053000 (J25695-3)	Joint pipe 
ST25054000 (J25695-4) or 11025-61501 (Part No.)	Adapter 

ENGINE FUEL & EMISSION CONTROL SYSTEM

SECTION EF & EC

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PRECAUTIONS (U.S.A. models) ..... EF & EC- 4

E16 for California

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ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM ..... EF & EC- 6
ENGINE AND EMISSION CONTROL VACUUM DIAGRAM ..... EF & EC- 7
E.C.C. CIRCUIT DIAGRAM ..... EF & EC- 8
ENGINE WIRING DIAGRAM ..... EF & EC- 9
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E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION ..... EF & EC- 66
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CARBURETOR ..... EF & EC- 89
CARBURETOR – Inspection and Adjustment ..... EF & EC- 92
CARBURETOR – Replacing Air-fuel Ratio Solenoid ..... EF & EC-100
EXHAUST EMISSION CONTROL SYSTEM ..... EF & EC-102
EVAPORATIVE EMISSION CONTROL SYSTEM ..... EF & EC-115

Contents (Cont'd)

E16 for Canada

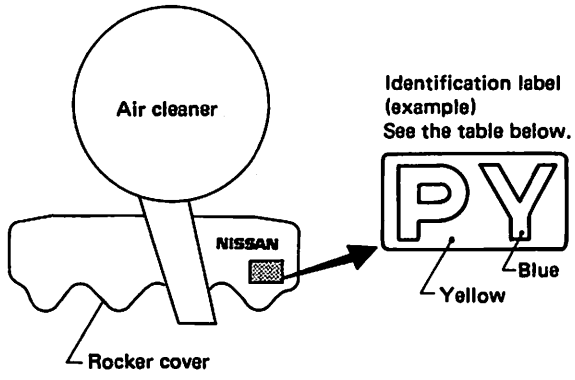
ENGINE AND EMISSION CONTROL SYSTEM TABLE ..... EF & EC-118
ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM ..... EF & EC-119
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EXHAUST EMISSION CONTROL SYSTEM ..... EF & EC-162
SERVICE DATA AND SPECIFICATIONS (S.D.S.) ..... EF & EC-164

ENGINE IDENTIFICATION LABEL

An identification label has been attached on the engine rocker cover to facilitate identification between destinations.

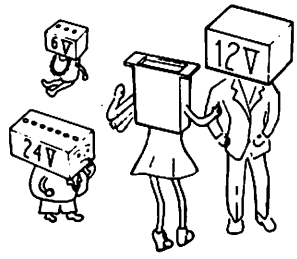


SGI351

Alphabetic symbol on the label

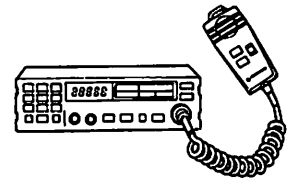
Engine	Destination	Transaxle	Alphabetic symbol
E16S	Non-California	M/T	PY
		A/T	PZ
	California	M/T	PG
		A/T	PQ
	Canada	M/T	PC
		A/T	PF

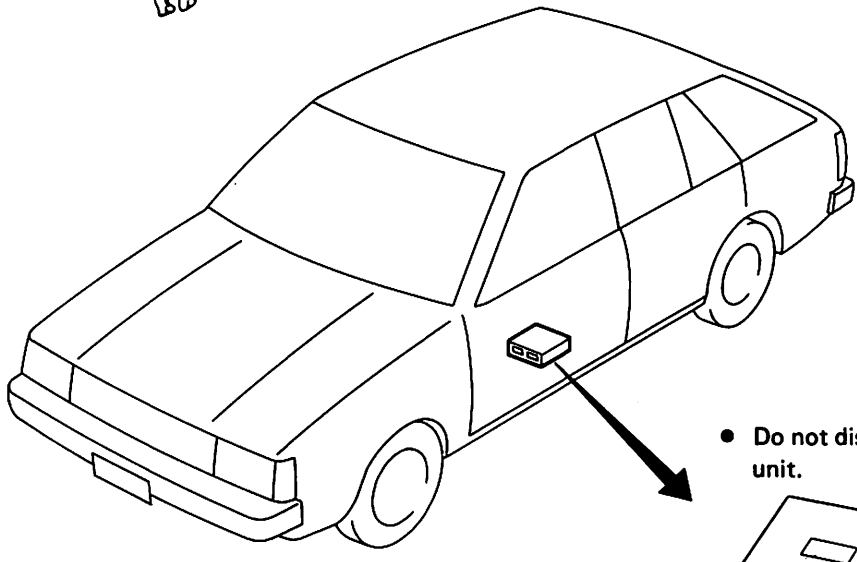
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.



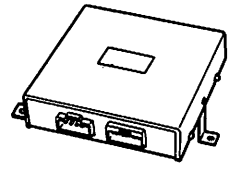
- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on its installation location.

1) Keep the antenna as far as possible away from the electronic control units.
2) Also keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls.
   Do not let them run parallel for a long distance.
3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
4) Connect the ground wire from the radio chassis to the body.

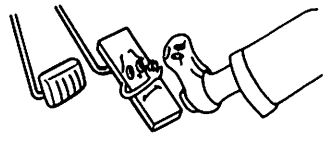




- Do not disassemble E.C.C. control unit.



- Securely connect E.C.C. harness connectors.
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to IC circuit.
- Keep E.C.C. harness at least 10 cm (3.9 in) away from adjacent harnesses, to prevent an E.C.C. system malfunction due to reception of external noise, degraded operation of IC circuit, etc.
- Keep E.C.C. parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

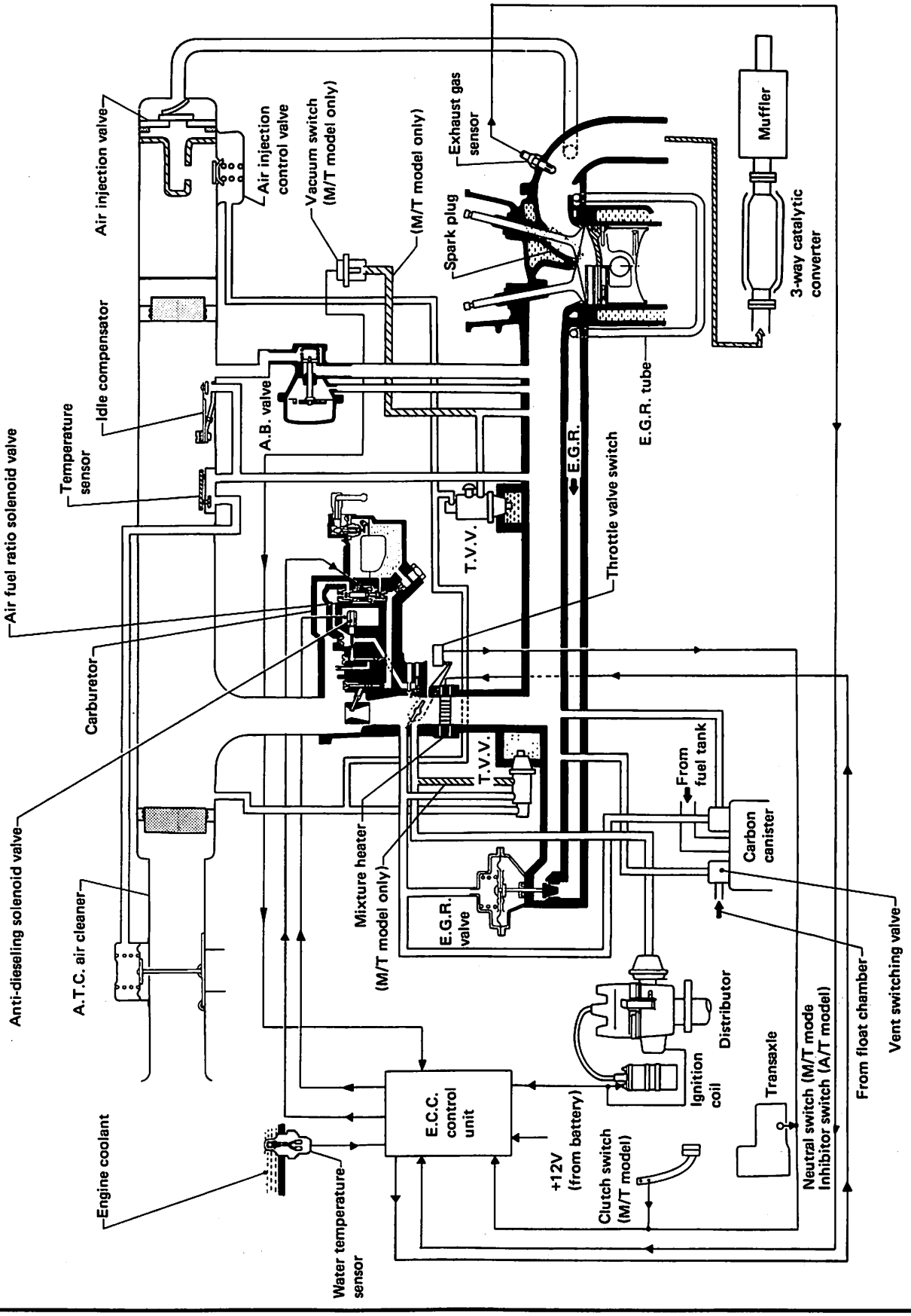


- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

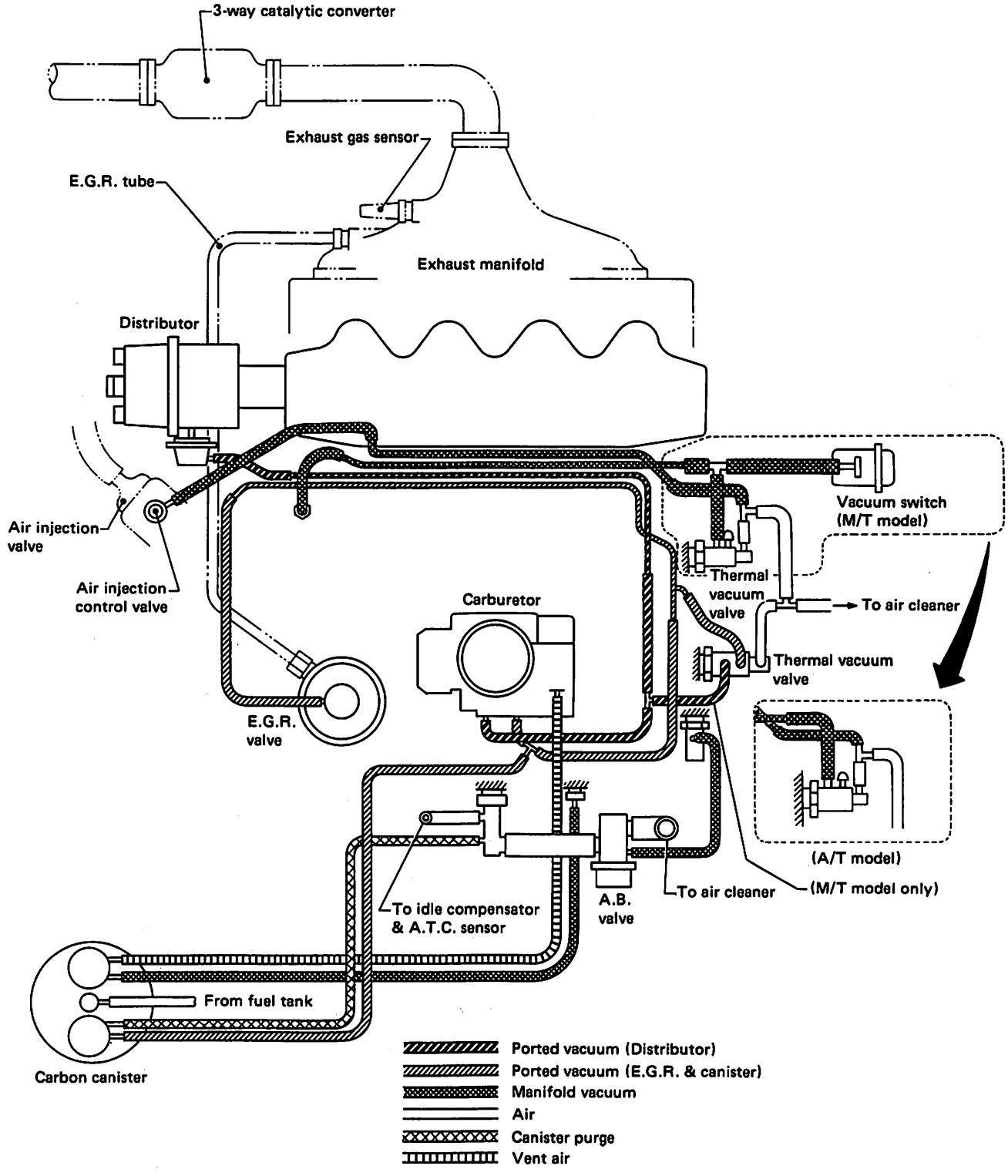
SEF021D

<table>
<tr><td>Electronic Controlled Carburetor (E.C.C.) system</td><td>
Sensors & switches
① Water temperature sensor
② Exhaust gas sensor
③ Throttle valve switch
④ Ignition coil
⑤ Clutch switch (M/T)
⑥ Neutral switch (M/T)
⑦ Vacuum switch (M/T)
⑧ Inhibitor switch (A/T)
⑨ Battery voltage
Input → E.C.C. control unit (E.C.U.) → Output
<table>
<tr><th>Controlled items</th><th>Actuators</th><th>Related sensors & switches</th></tr>
<tr><td>Air-fuel ratio feedback control system</td><td>Air-fuel ratio solenoid valve</td><td>① ② ③ ④ ⑦ ⑨</td></tr>
<tr><td>Fuel shut-off system</td><td>Anti-dieseling solenoid valve</td><td>① ③ ④ ⑤ ⑥ ⑧</td></tr>
<tr><td>Mixture heating system</td><td>Mixture heater</td><td>①</td></tr>
</table>
</td></tr>
<tr><td>Fuel flow system</td><td>Fuel tank ⇨ Fuel filter ⇨ Fuel pump ⇨ Float chamber ⇨ Main jet / Solenoid controlled fuel orifice ⇨ Throttle chamber ⇨ Intake manifold</td></tr>
<tr><td>Air flow system</td><td>Air cleaner ⇨ Choke chamber ⇨ Venturis / Air bleeds ⇨ Throttle chamber ⇨ Intake manifold</td></tr>
<tr><td>Air injection valve control system</td><td>• Air injection control valve
• Air injection valve
• Thermal vacuum valve (3-port wax type)</td></tr>
<tr><td>E.G.R. control system</td><td>• E.G.R. control valve
• Thermal vacuum valve (3-port wax type)</td></tr>
<tr><td>Spark timing control system</td><td>• Thermal vacuum valve (3-port wax type)</td></tr>
<tr><td>Catalytic converter</td><td>• 3-way catalytic converter</td></tr>
<tr><td>Evaporative emission control system</td><td>• Carbon canister
• Thermal vacuum valve (3-port wax type)</td></tr>
<tr><td>Crankcase ventilation control system</td><td>• P.C.V. valve</td></tr>
</table>

ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM

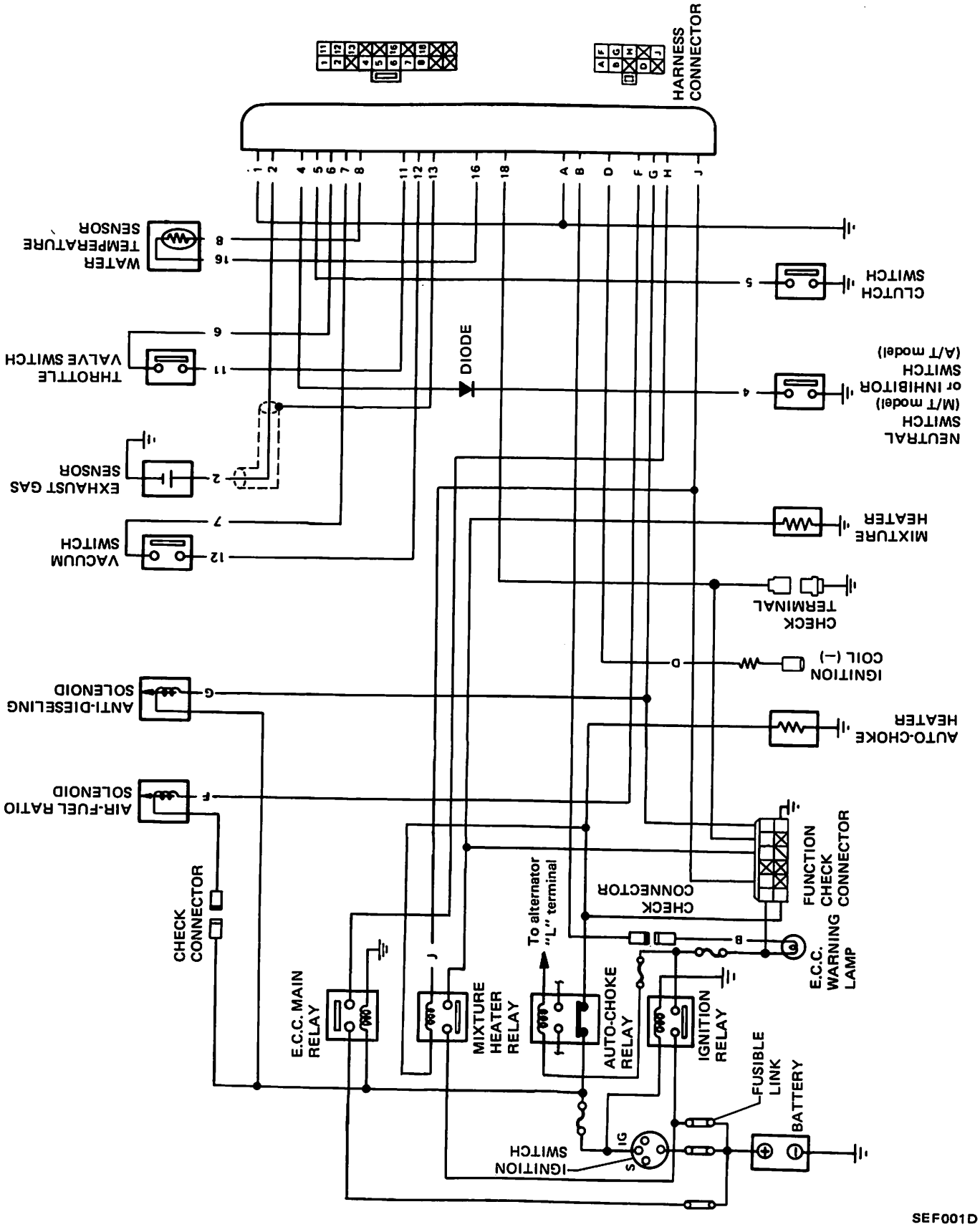


ENGINE AND EMISSION CONTROL VACUUM DIAGRAM

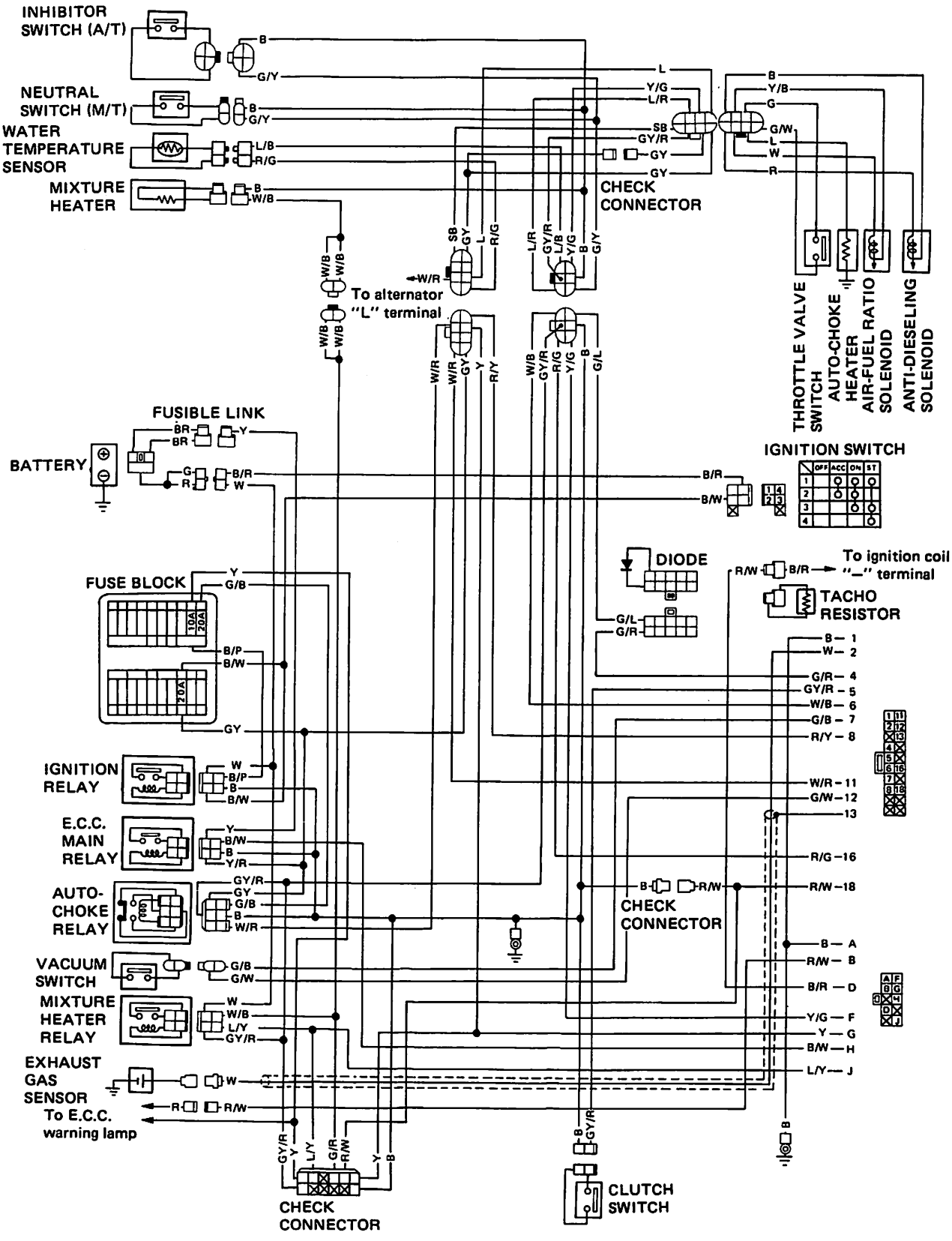


SEF700C

E.C.C. CIRCUIT DIAGRAM



ENGINE WIRING DIAGRAM



SEF002D

DIAGNOSTIC PROCEDURES

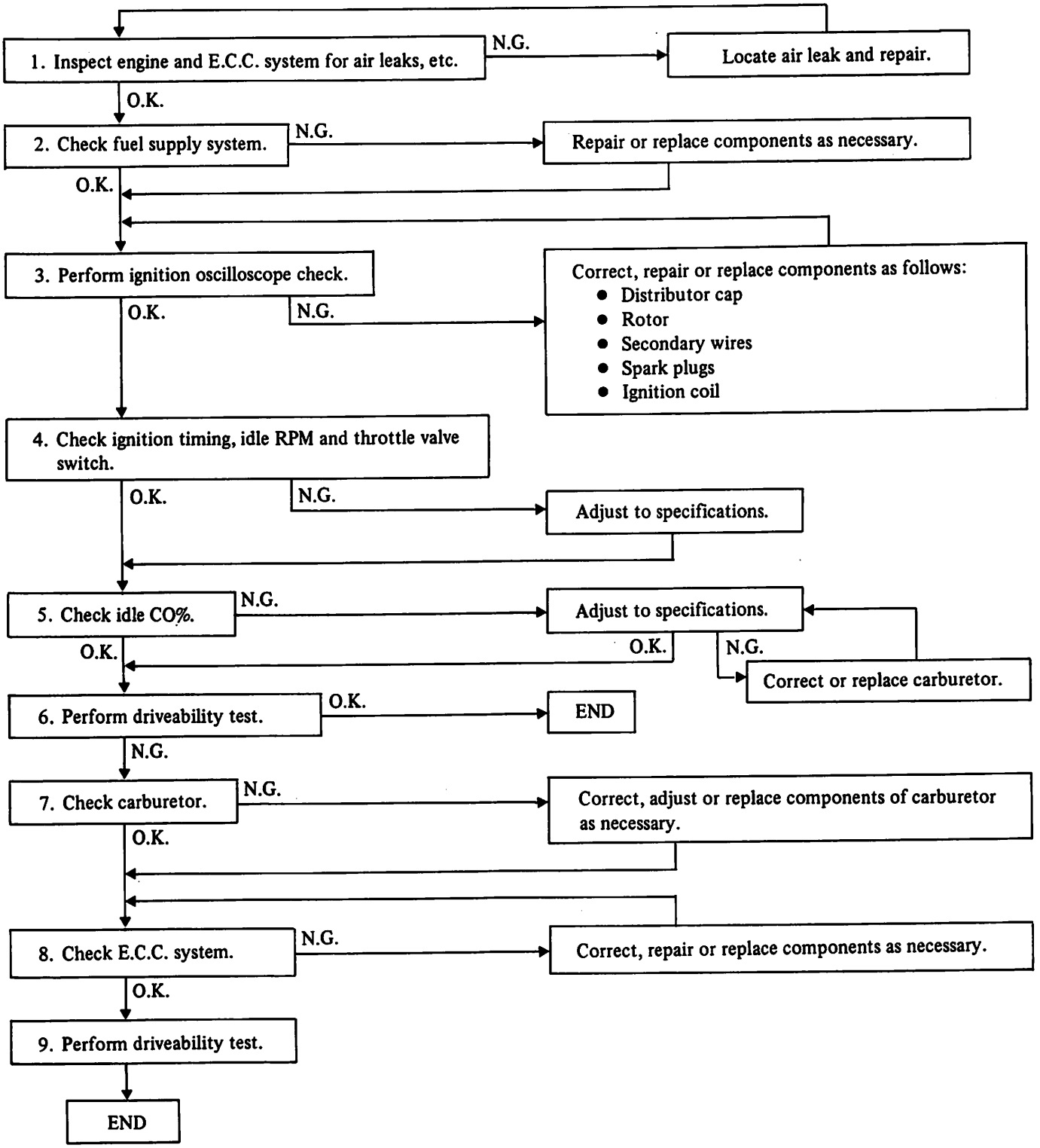
CAUTION:
When connecting or disconnecting E.C.C. harness connector to or from any E.C.C. unit, ensure that the ignition switch is in the "OFF" position and that the negative battery terminal is disconnected. Removing and installing these connectors with the ignition switch left in the "ON" position will damage control unit.

Intermittent Problem

DIAGNOSTIC CHARTS CANNOT BE USED TO DIAGNOSE INTERMITTENT FAILURES. This is because many intermittent problems are caused at electrical connections, and if intermittent problems are not corrected, unnecessary component replacement will be indicated and the problems may remain. Therefore, DIAGNOSIS OF INTERMITTENT PROBLEMS SHOULD START WITH A VISUAL AND PHYSICAL INSPECTION OF THE CONNECTORS involved in the circuit, especially control unit, water temperature sensor and exhaust gas sensor connectors.

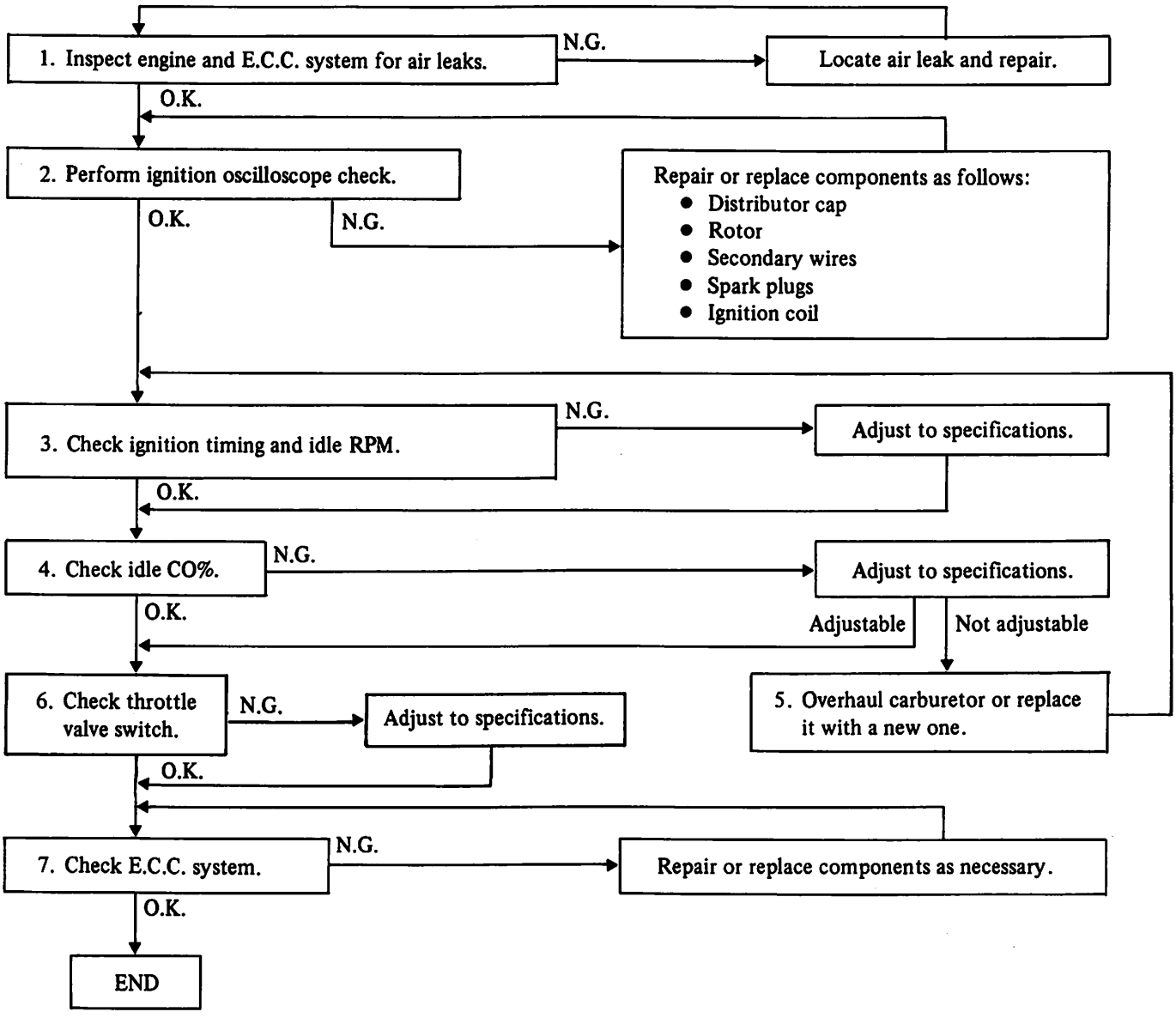
DIAGNOSTIC PROCEDURES

Driveability



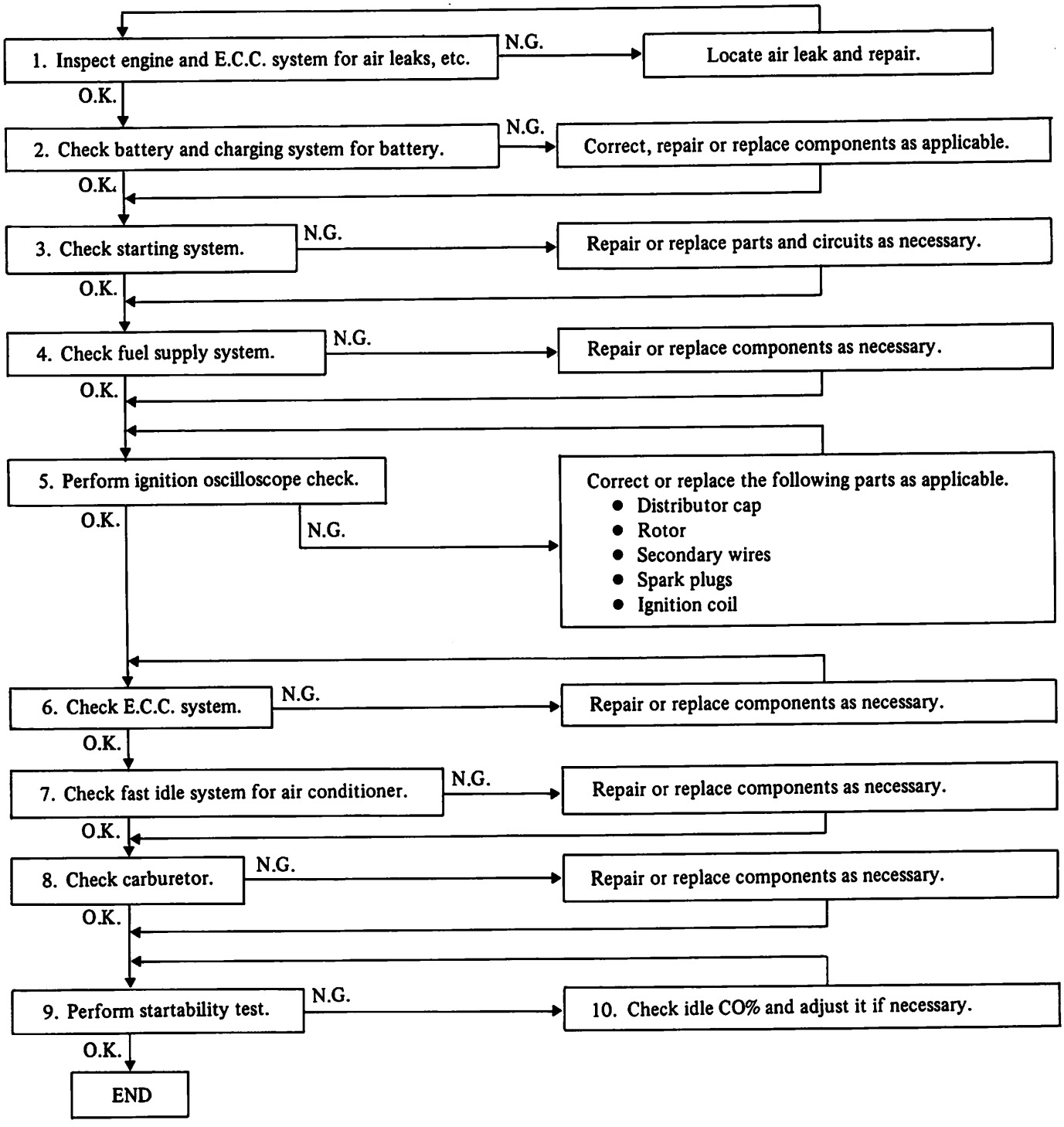
DIAGNOSTIC PROCEDURES

Improper Idling



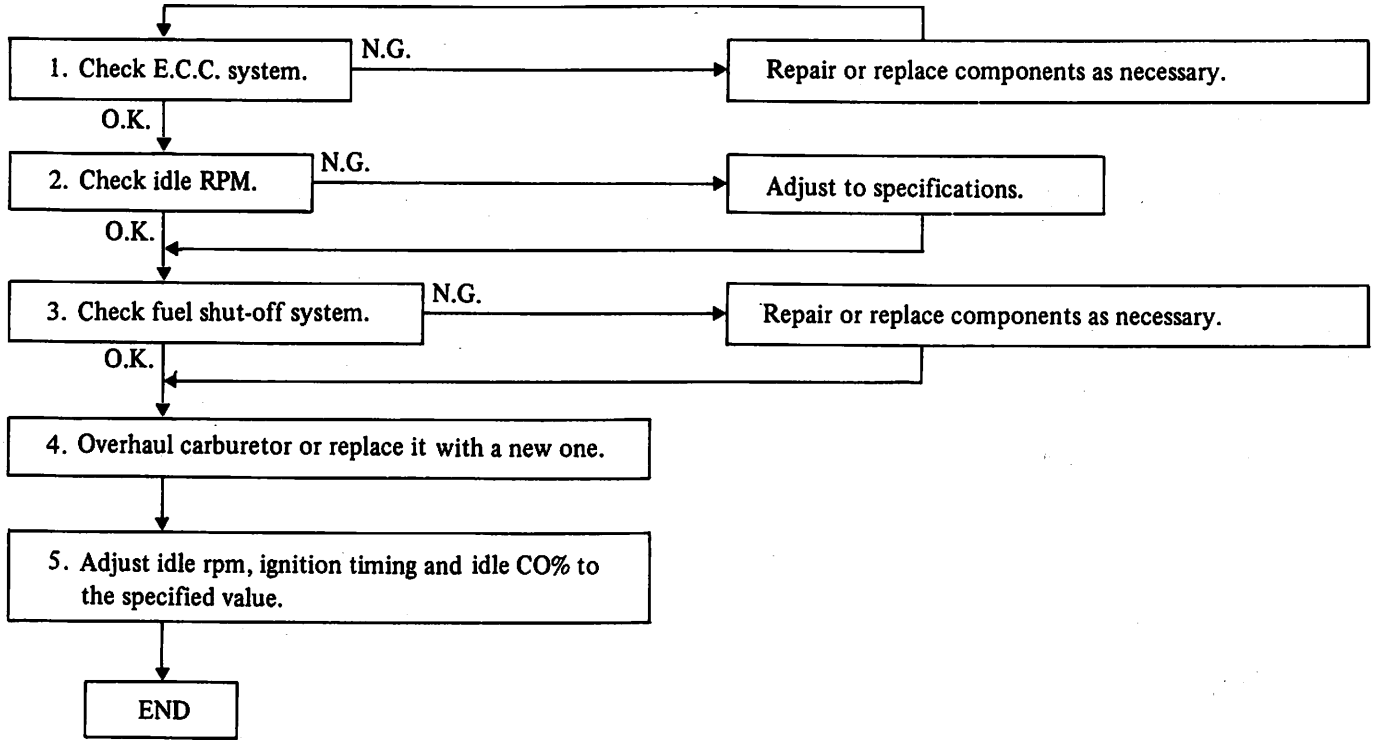
DIAGNOSTIC PROCEDURES

Engine Startability



DIAGNOSTIC PROCEDURES

Engine Stall



DIAGNOSTIC STEPS

Driveability

1. **Inspect engine and E.C.C. system for leaks.**
(1) Check clamps at all air intake components.
(2) Check vacuum hoses for leakage.
(3) Check air cleaner filter for clogging.
(4) Visually inspect for leaks at the following:
- Dipstick
- A.B. valve hose
- Air injection hose
- Intake manifold gasket
- Valve rocker cover
- E.G.R. valve gasket
- Oil filler cap

(5) Check E.G.R. valve seat and operation.
(6) Check A.B. valve operation.
(7) Check air injection control valve operation.
2. **Check fuel supply system.**
(1) Make sure proper fuel is used.
(2) Visually check fuel filter for clogging.
(3) Visually check fuel lines for leaks.
(4) With engine idling, visually check fuel level.
If not correct, adjust.
Refer to CARBURETOR — Inspection and Adjustment.
3. **Perform ignition oscilloscope test.**
(1) Warm up engine sufficiently.
(2) Check ignition system for unusually high or low firing voltage.
(3) If firing voltage is abnormal, determine cause and repair.
4. **Check ignition timing, idle rpm and throttle valve switch.**
Refer to CARBURETOR — Inspection and Adjustment.
5. **Check idle "CO"%.**
Refer to CARBURETOR — Inspection and Adjustment.
6. **Perform driveability test.**
(1) Evaluate effectiveness of adjustments by driving vehicle.
(2) If unsatisfactory, proceed to step 7.
7. **Check carburetor.**
Refer to CARBURETOR — Inspection and Adjustment.
8. **Check E.C.C. system.**
Refer to E.C.C. SYSTEM INSPECTION.
9. **Perform driveability test. Re-evaluate vehicle performance.**

Improper Idling

1. **Inspect engine and E.C.C. system for leaks.**
2. **Perform ignition oscilloscope test.**
3. **Check ignition timing and idle rpm.**
4. **Check idle CO%.**
5. **Overhaul carburetor or replace it with a new one.**
6. **Check throttle valve switch.**
7. **Check E.C.C. system.**
Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY on the inspection procedure of each item.

DIAGNOSTIC STEPS

Engine Startability

1. **Inspect engine and E.C.C. system for leaks.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
2. **Check battery and charging system for battery.**

(1) Check battery voltage.
(2) If poor battery voltage, check charging system for battery.

- Alternator
- Voltage regulator
- Others
  Refer to EL section.

3. **Check starting system.**

(1) Check starter operation.
(2) If it does not operate,check the following:

- Starter
- Ignition relay
- Ignition switch
- Others
  Refer to EL section.

4. **Check fuel supply system.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
5. **Perform ignition oscilloscope test.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
6. **Check E.C.C. system.**
   Refer to E.C.C. SYSTEM INSPECTION.
7. **Check fast idle system for air conditioner.**
   Refer to HA section.
8. **Check carburetor.**
   Refer to CARBURETOR — Inspection and Adjustment.
9. **Perform startability test.**

(1) Start engine with the recommended starting procedure.
(2) If engine does not start, proceed to step 10.

10. **Check and adjust idle "CO"%.**
    Refer to CARBURETOR — Inspection and Adjustment.

Engine Stall

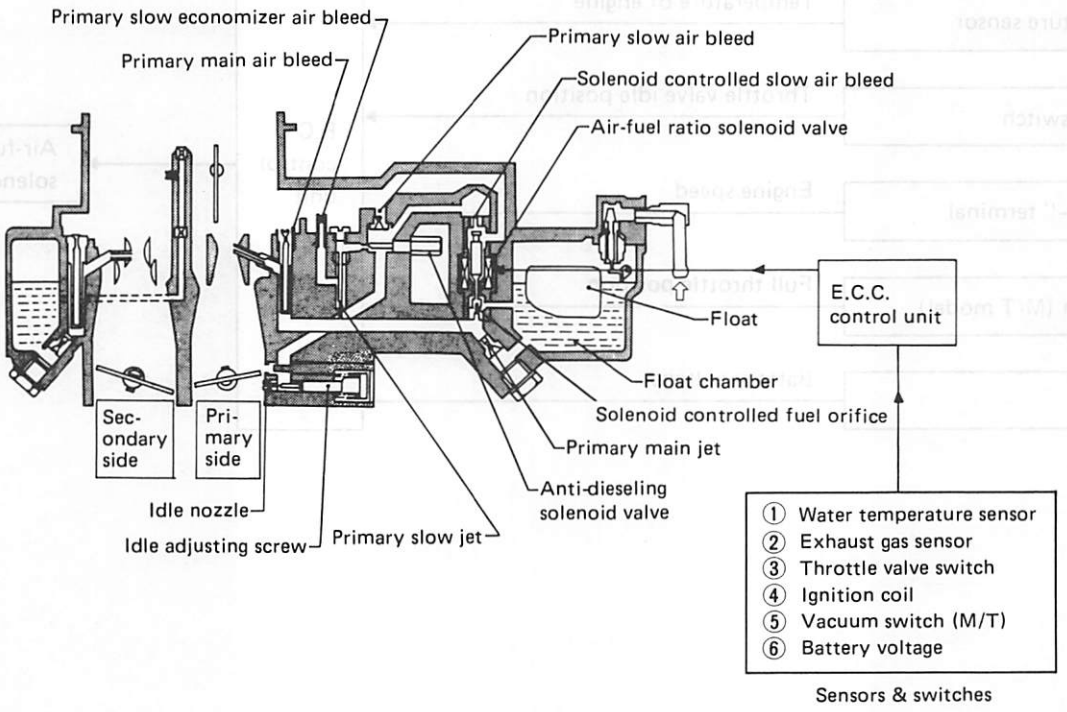
1. **Check E.C.C. system.**
   Refer to E.C.C. SYSTEM INSPECTION.
2. **Check idle rpm.**
   Refer to CARBURETOR — Inspection and Adjustment.
3. **Check fuel shut-off system.**
   Refer to Fuel Shut-off System of EXHAUST EMISSION CONTROL SYSTEM.
4. **Overhaul carburetor or replace it with a new one.**
5. **Adjust idle rpm, ignition timing and idle "CO"% to the specified values.**
   Refer to CARBURETOR — Inspection and Adjustment.

E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for California

General Description

The carburetor is equipped with an air-fuel ratio control on-off valve instead of a power valve. This on-off valve opens or closes the compensating air bleed and main jet to compensate for rich/lean air-fuel ratio, depending on varying conditions, such as acceleration, deceleration, low coolant temperature, low voltage, etc. These varying conditions are detected by various sensors which transmit corresponding signals to provide air-fuel ratio compensation.



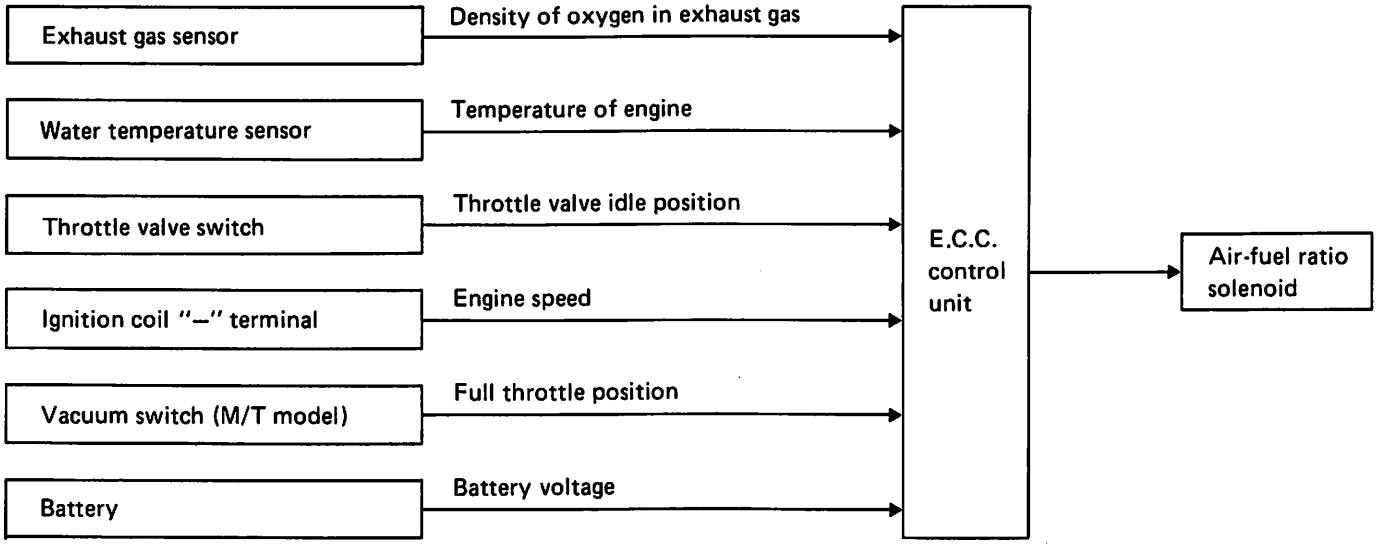
SEF341C

E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for California

Air-fuel Ratio Control System

There are two ways to control the air-fuel ratio. These are open loop control and closed loop control, which are switched back and forth by the signal of water temperature, engine rpm, battery voltage, exhaust gas sensor signal and manifold vacuum.



E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for California

Air-fuel Ratio Control System (Cont'd)

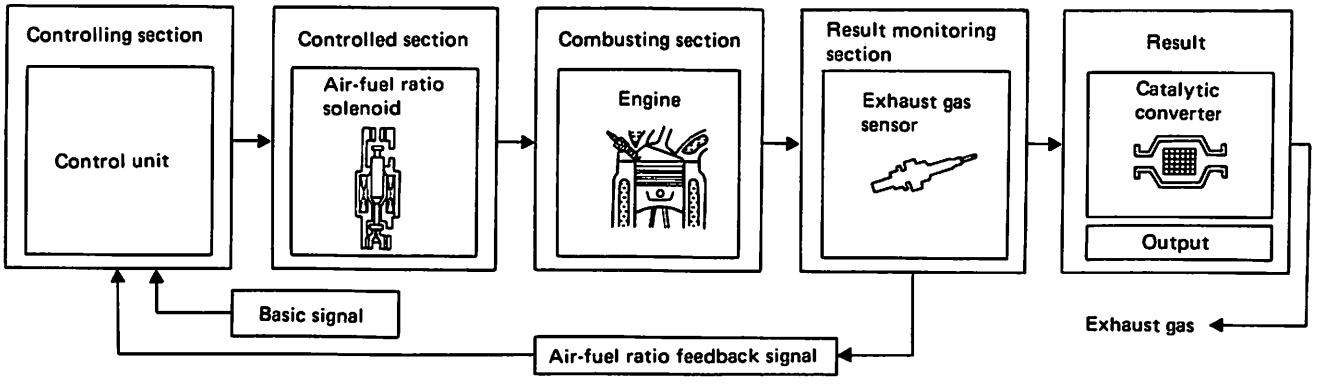
OPEN-LOOP CONTROL

For improved driveability, air-fuel ratio solenoid is controlled by open-loop control under the following conditions:
With open-loop control, the air-fuel ratio is determined by the E.C.C. control unit, corresponding to the condition of engine rpm, engine warm-up, battery voltage, exhaust gas sensor signal and manifold vacuum.

a	When battery voltage is too low	Battery voltage $\leqq$ 10 [V]
b	When starting engine	Engine speed $\leqq$ 400 rpm
c	When engine is cold	Water temperature $<$ M/T 50°C (122°F) $<$ A/T 60°C (140°F)
d	When hot-restarting	Exhaust gas sensor output voltage $<$ 250±50 [mV] Water temperature $\geqq$ M/T 50°C (122°F) $\geqq$ A/T 60°C (140°F)
e	During deceleration	Fuel shut-off system is in operation
f	When driving at high speeds	Engine speed $\geqq$ 3,425 rpm
g	At full throttle	Vacuum switch: ON (M/T only)

CLOSED-LOOP CONTROL
(Air-fuel ratio feedback control)

This system is designed to control the air-fuel ratio precisely to the stoichiometric point so that the three-way catalyst can minimize CO, HC and NOx emissions simultaneously. The system uses the exhaust gas sensor located in the exhaust manifold to give an indication of whether the air-fuel ratio is richer or leaner than the stoichiometric point. The sensor transmits a nonlinear voltage to the E.C.C. control unit. The control unit adjusts the feedback pulse width according to the sensor voltage so the mixture ratio will be within the narrow window of the three-way catalyst. During engine warm-up period, however, this system remains open until the sensor reaches the operating temperature.



SEC935

Air-fuel Ratio Control System (Cont'd)

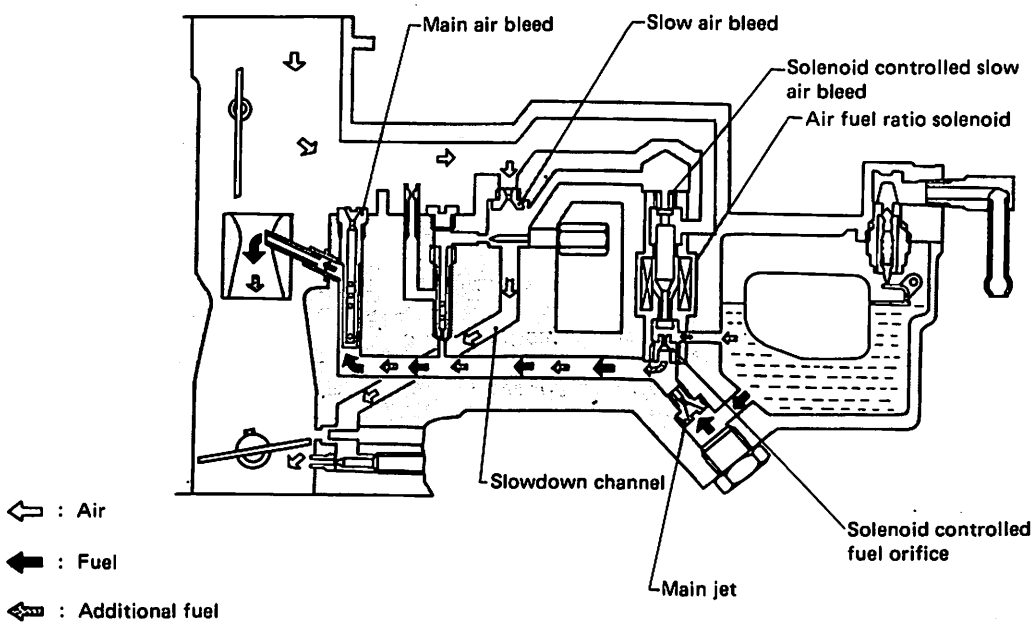
AIR-FUEL RATIO CONTROL SOLENOID

This solenoid valve is opened or closed repeatedly every 65 msec.

Under closed loop control, the percentage of opening time and closing time is feedback controlled in E.C.C. control unit by the signal from exhaust gas sensor.

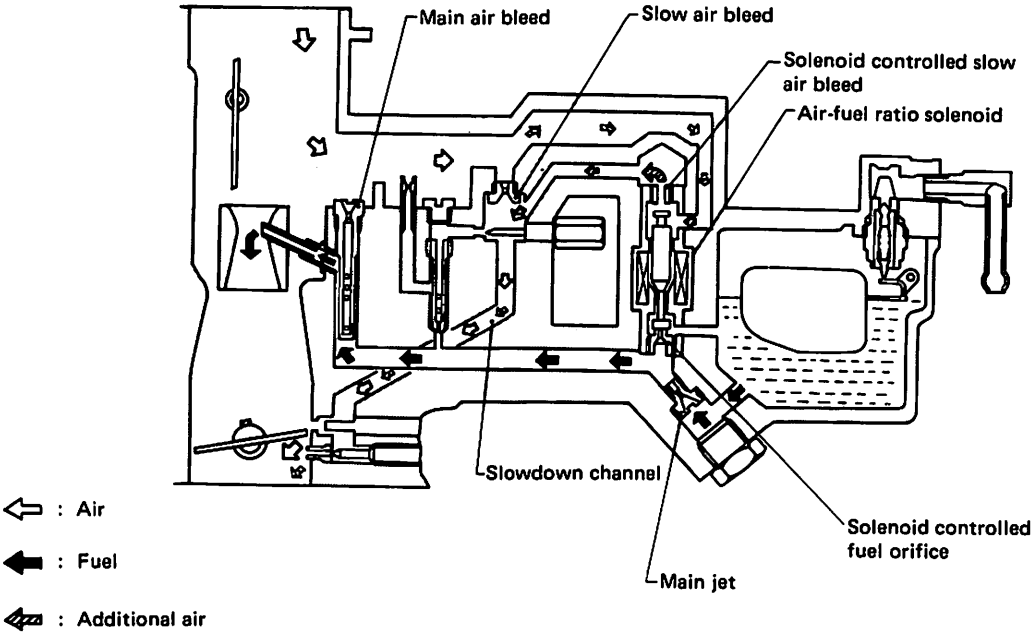
Under the open loop control, the percentage of opening time and closing time is kept at the specified level according to condition of engine.

Air fuel ratio solenoid valve: ON



SEF342C

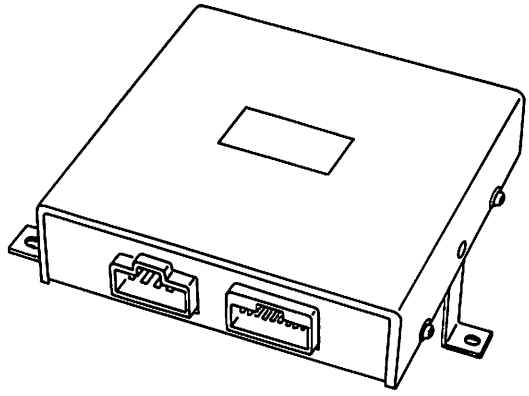
Air fuel ratio solenoid valve: OFF



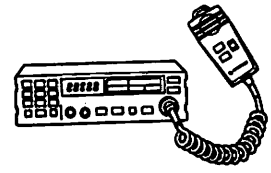
SEF343C

E.C.C. CONTROL UNIT

The E.C.C. control unit consists of a micro-computer, connectors for signal input and output and power supply, and an exhaust gas sensor monitor lamp. The control unit controls the feedback pulse width and fuel shut-off operation, etc.



SEC185A



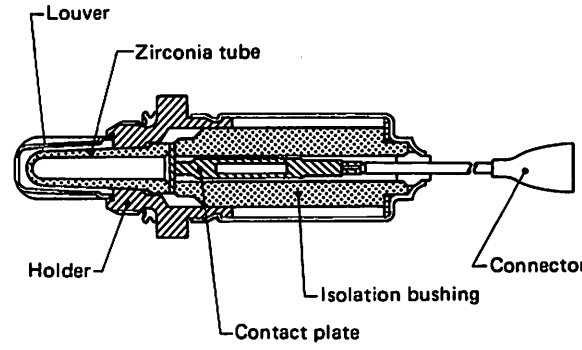
WARNING:

- **When installing CB ham radio equipment or a vehicle phone, be sure to observe the following as it may adversely affect electronic control systems depending on its installation location.**

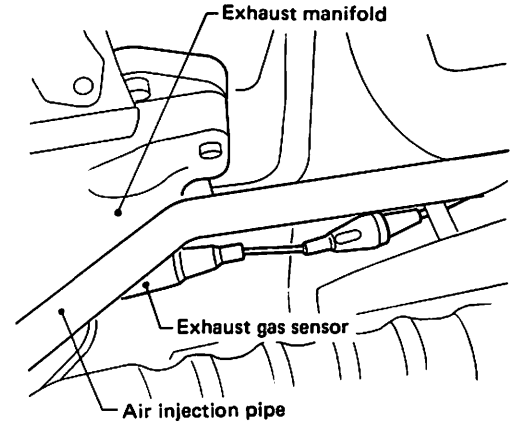
1) **Keep the antenna as far as possible away from the electronic control units.**
2) **Also keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.**
3) **Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.**

EXHAUST GAS SENSOR

The exhaust gas sensor, which is built into the exhaust manifold, monitors the density of oxygen in the exhaust gas. It consists of a closed-end tube made of ceramic zirconia and other components. Porous platinum electrodes cover the tubes inner and outer surfaces. The closed-end of the tube is exposed to the exhaust gas in the exhaust manifold. The tubes outer surface contacts the exhaust gas while the inner surface contacts the air.



SEC336A



SEC938

E.C.C. (Electronic Controlled Carburetor) SYSTEM
INSPECTION

E16 for California

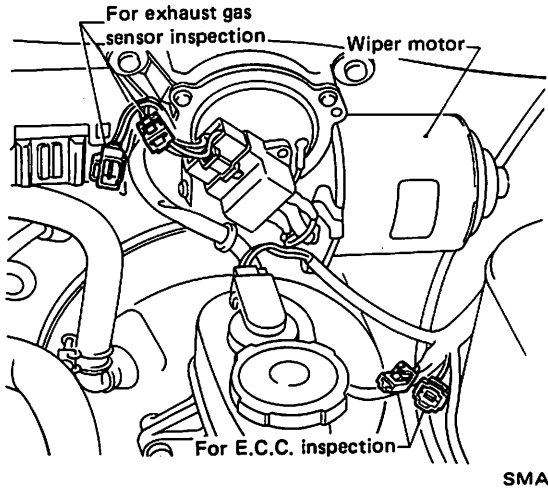
CAUTION:

a. **Before disconnecting electrical connectors and E.C.C. harness connectors, ensure that ignition switch is in the "OFF" position.**
b. **Be extremely careful not to break or bend 10-pin or 20-pin connectors when disconnecting. Do not touch the circuit tester probe to any unnecessary pin on the 10-pin and 20-pin connectors. Doing so could cause damage to the circuit tester.**
c. **After inspection or replacement, securely connect E.C.C. harness connector with control unit, and then test it to make sure.**

- Disconnect battery ground cable.
- Disconnect E.C.C. 10-pin and 20-pin harness connectors from control unit.

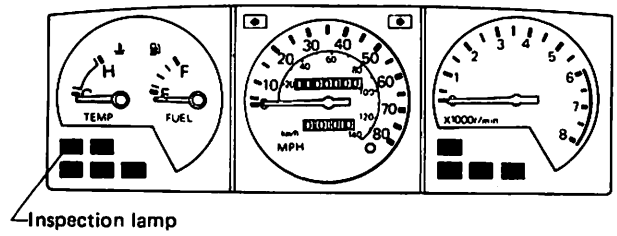
Engine should be off.

1. Verify that harness connector for E.C.C. inspection is disconnected.



SMA840A

2. Connect harness connector for exhaust gas sensor inspection.
3. Turn ignition switch "ON" and check E.C.C. inspection lamp on instrument panel.



SEF346C

"ON":
Proceed on operation 4.
"OFF":
Replace bulb of inspection lamp.

4. Start engine and warm to operating temperature.

When engine speed increases to more than 200 rpm, inspection lamp turns "OFF".

5. After warming up engine, run it at 2,000 rpm for about 5 minutes.
6. Then, recheck inspection lamp.

"OFF":
No trouble exists. Proceed to step 9.
"ON":
Perform operation 7.

7. Turn off engine and connect harness connector for E.C.C. inspection and check inspection lamp for lighting interval.

Leave exhaust gas sensor inspection connector connected.

8. Run engine at idle to receive lighting interval. If no light exists check for an opening in the exhaust gas sensor circuit. If light comes on, check lighting interval.

	Lighting interval	Faulty part or circuit	Next step
Case 1	ON / OFF	• Air-fuel ratio solenoid • Anti-dieseling solenoid	Proceed to step 9.
Case 2	ON / OFF	• Exhaust gas sensor • Water temperature sensor	Proceed to step 10.

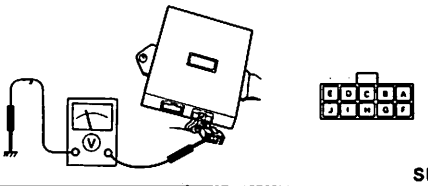
9. Case 1: Check each solenoid.
a) Turn ignition switch "OFF".
b) Verify that each harness connector is connected securely. If not, correct and return to operation 4.
c) Disconnect each harness connector.
d) Measure the resistance of each solenoid. If air-fuel ratio solenoid resistance is out of specification, replace air-fuel ratio solenoid valve. Refer to CARBURETOR — Replacing Air-fuel Ratio Solenoid.
If anti-dieseling solenoid resistance is out of specification, replace solenoid valve. Return to operation 4.

Solenoid	Resistance (Ω)
Air-fuel ratio solenoid	30 - 50
Anti-dieseling solenoid	25 - 45

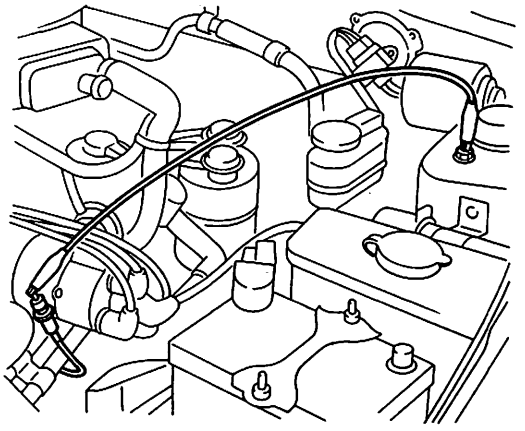
e) Reconnect harness connectors.
f) Disconnect E.C.C. 10-pin connector from control unit.
g) Disconnect alternator "L" terminal.
h) Turn ignition switch "ON".
i) Measure the voltage between each terminal and ground.

N.G.: Repair or replace harness.
O.K.: Replace control unit and return to operation 1.

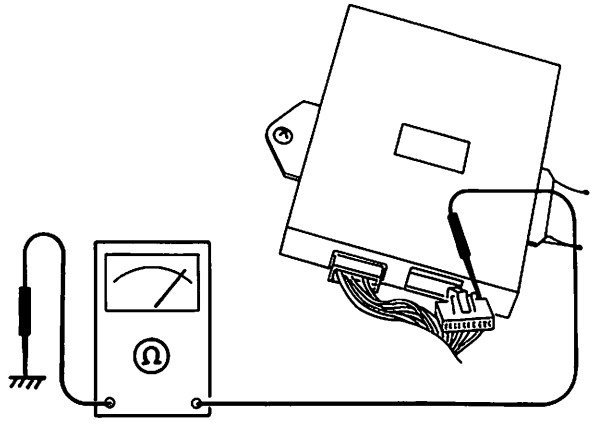
Solenoid	Check terminals		Voltage [V]
Air-fuel ratio solenoid	F	Body ground	12 - 14
Anti-dieseling solenoid	G		


SEF807B

10. Case 2: Check each sensor.
a) Turn ignition switch "OFF".
b) Verify that each harness connector is connected securely. If not, correct and return to operation 4.
c) Disconnect E.C.C. 20-pin connector from control unit.
d) Disconnect exhaust gas sensor harness connector and connect terminal for exhaust gas sensor harness connector to ground with a jumper wire.


SEF542A

e) Check for continuity between terminal No. 2 of E.C.C. 20-pin connector and ground metal on car body.



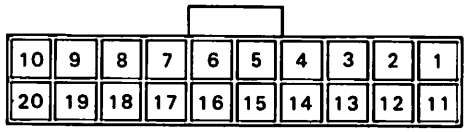
SEF808B

Continuity exists:
Replace exhaust gas sensor.
Continuity does not exist:
Repair or replace E.C.C. harness.

f) If inspection lamp still indicates lighting interval of case 2 during operation 6, proceed to g).

g) Measure the water temperature sensor resistance between terminal No. 8 and No. 16 of E.C.C. 20-pin connector.

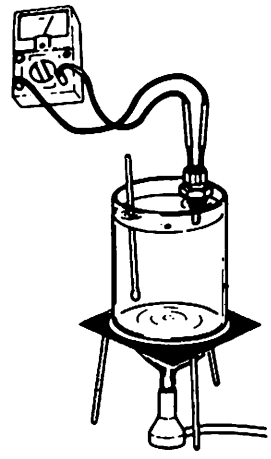
Circuit tester	Check terminals		Condition	Standard value
	+	−		
Ω	8	16	20°C (68°F) or above	Below 2.9 kΩ
			Below 20°C (68°F)	2.1 kΩ or above



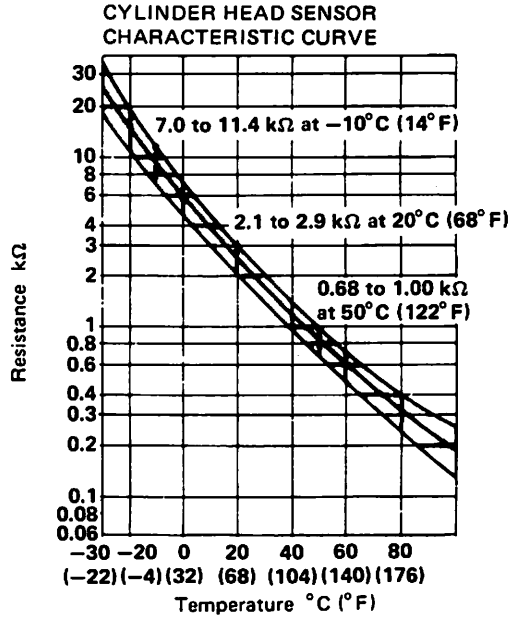
SEF545A

O.K.: Replace control unit and return to operation 1.
N.G.: Perform water temperature sensor check as follows.

h) Dip the water temperature sensor into water maintained at a temperature of 20°C (68°F), 80°C (176°F), etc., and read its resistance.



EF329A



EF334A

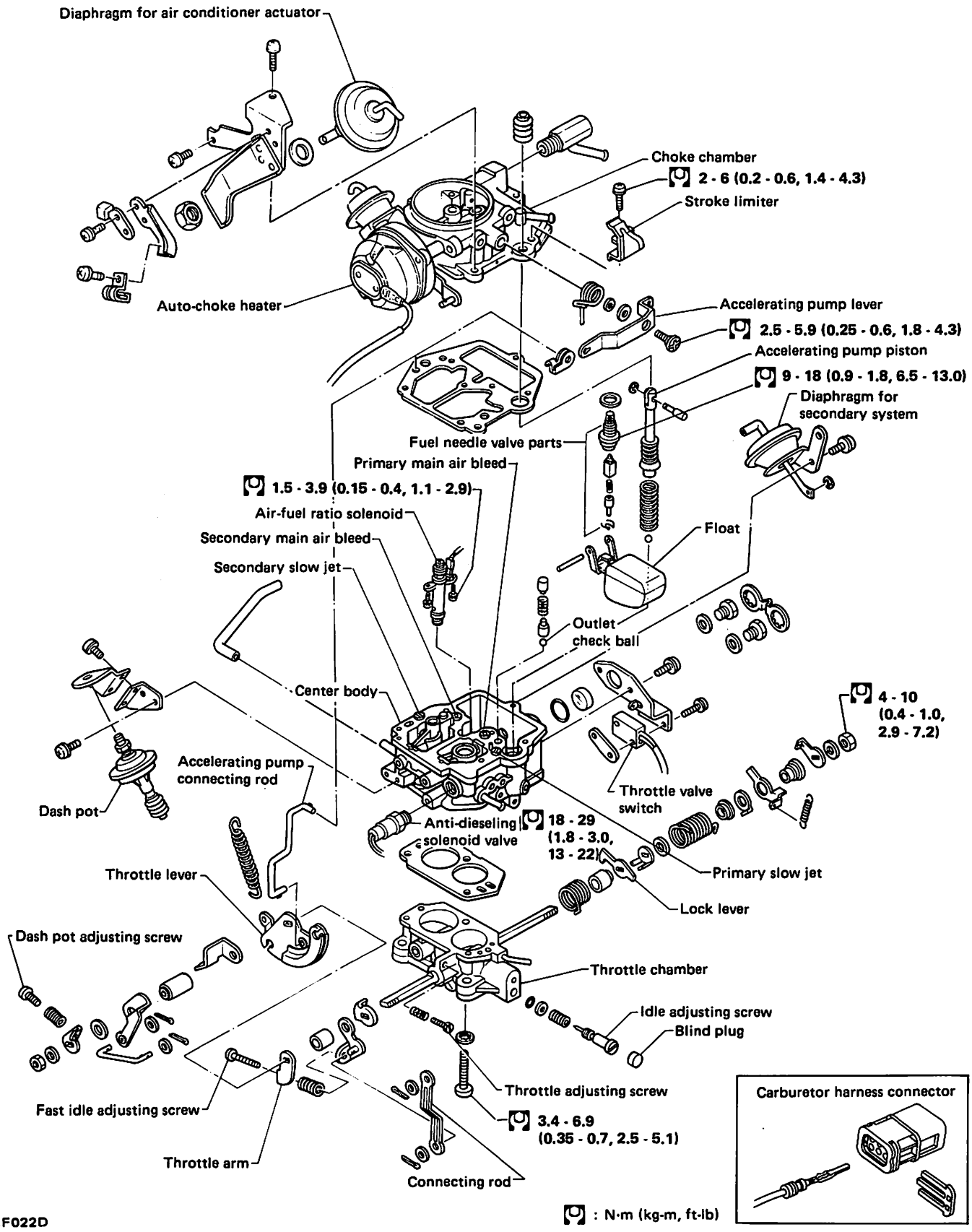
O.K.: Correct or replace E.C.C. harness.
N.G.: Replace water temperature sensor.

Then, return to operation 1.

11. Check vacuum switch.

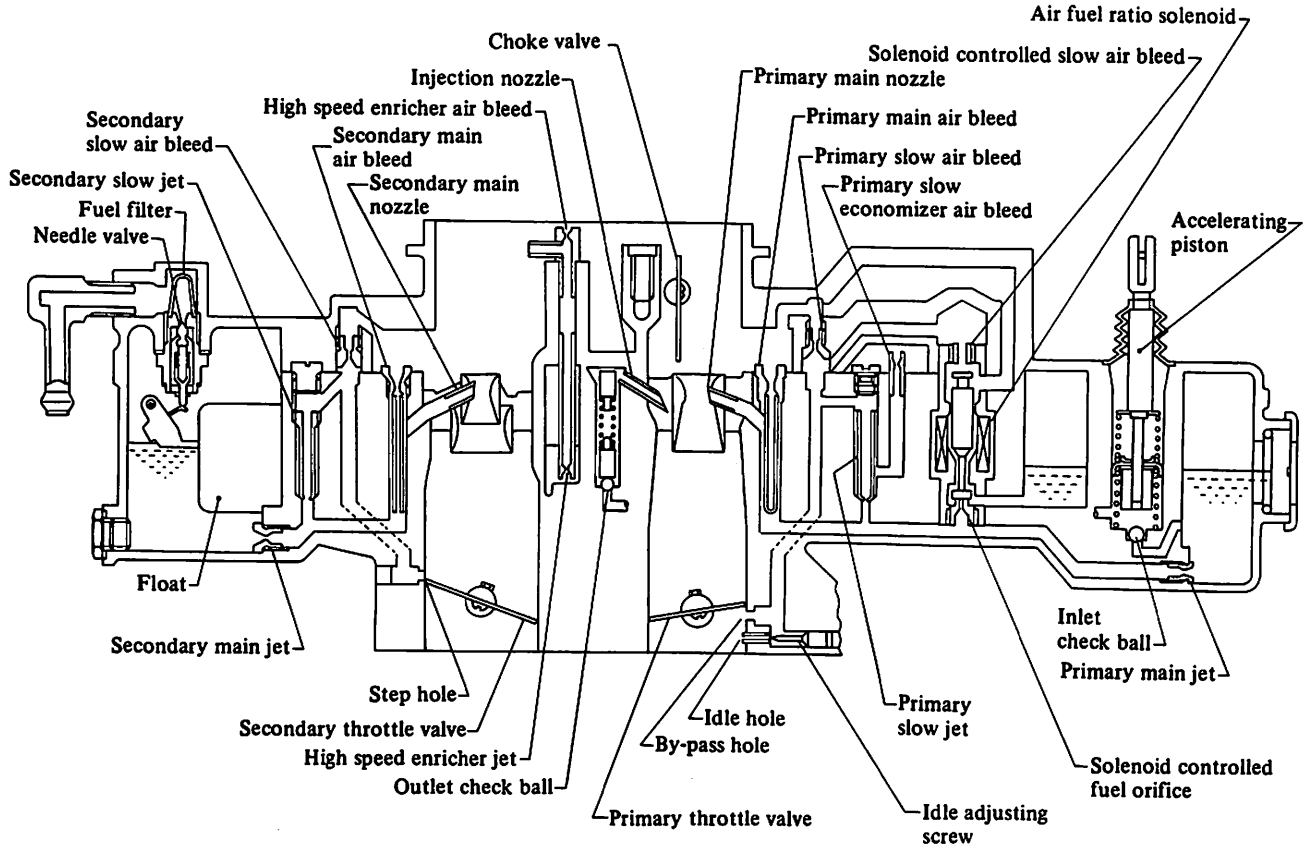
Intake manifold vacuum kPa (mmHg, inHg)	Switch
Above 10.7 - 11.7 (80 - 88, 3.15 - 3.46)	ON
Below 8.9 - 11.1 (67 - 83, 2.64 - 3.27)	OFF

CARBURETOR



SEF022D

CARBURETOR



SEF821B

CARBURETOR

Major Service Operation

The perfectly adjusted carburetor delivers the proper fuel and air ratios at all speeds for the particular engine for which it was designed.
The carburetor should be maintained in its original condition and will continue to deliver the proper ratios.
To maintain accurate carbureting through passages and discharge holes, extreme care must be taken in cleaning.
Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean or carburetor calibration will be affected.

REMOVAL

Remove carburetor from engine, taking sufficient care to the following:

PRECAUTIONS:

a. **When disconnecting fuel lines, do not spill fuel from fuel pipe.**
b. **When removing carburetor, do not drop any nut or bolt into intake manifold.**
c. **Be careful not to bend or scratch any part.**

CLEANING AND INSPECTION

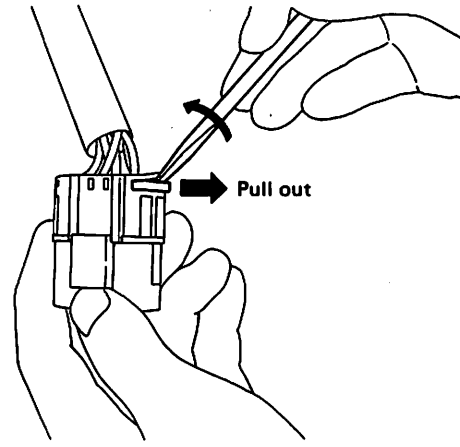
Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor often results in unsatisfactory performance. For this reason, efficient carbureting depends upon careful cleaning and inspection while servicing.
Before assembling and installing the carburetor, blow all passages and castings with compressed air and blow off all parts until dry.

Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

Disassembling Carburetor Harness Connector

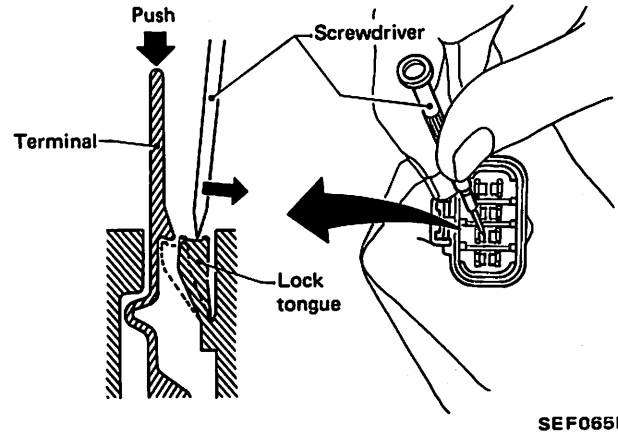
When replacing anti-dieseling solenoid, throttle valve switch, auto choke heater (choke chamber assembly) or air-fuel ratio solenoid, it will be necessary to disassemble carburetor harness connector.

1. Remove rear clip.



SEF064D

2. With a small screwdriver, tilt lock tongue and, at the same time, push out terminal.



SEF065D

CAUTION:

- **When extracting terminal, do not pull wire harness. Always push the top of terminal.**
- **Take care not to damage seal boot at the bottom of terminal.**
- **Do not let oil or gasoline adhere to seal boot.**

CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture Ratio

The idle mixture adjusting screw which has been preset at the factory should be adjusted only in the event of a major carburetor overhaul, throttle body replacement or to lower exhaust emissions as directed by official inspections.
The plug which seals this screw should not be removed during routine maintenance.
Adjusting mixture using other than the method below may violate Federal, or other state and Provincial laws.

- **After adjusting idle speed and mixture ratio, be sure to check items below, and if necessary, adjust them.**
  - **(1) Fast idle speed**
  - **(2) Dash pot touch speed**
  - **(3) Throttle valve switch operating speed**
  - **(4) Fast idle speed for air conditioner. (If equipped, refer to HA section.)**

Preparation

1. Make sure that the following parts are in good order.
- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- E.C.C. component parts
- Main harness connector
- Hoses
- Oil filler cap and oil level gauge
- Valve clearance

2. Connect engine tachometer and timing light in their proper positions.
3. Apply parking brake and block both front and rear wheels with chocks.
4. Ensure that these switches and units are in the following positions:
- Headlamp switch: OFF
- Heater blower: OFF
- Air conditioning switch: OFF (if equipped)
- Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)

5. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.
6. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

WARNING:

- **a. Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.**
- **b. On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.**
- **c. After adjustment has been made, shift the lever to "N" or "P" position.**

CARBURETOR — Inspection and Adjustment

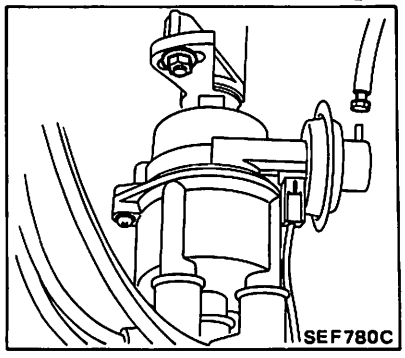
Idle Speed and Mixture Ratio (Cont'd)

START

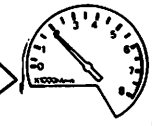
Start engine and warm it up until water temperature indicator points to middle of gauge. Ensure that engine speed is below 1,000 rpm.

Open engine hood.

Run engine at idle speed for 2 minutes.


SEF780C

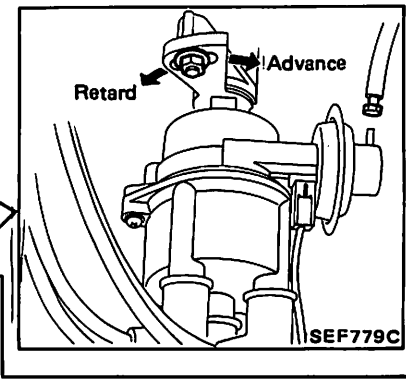
Disconnect distributor vacuum hoses at distributor diaphragm side and install blind plugs to hoses.


SMA845A

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

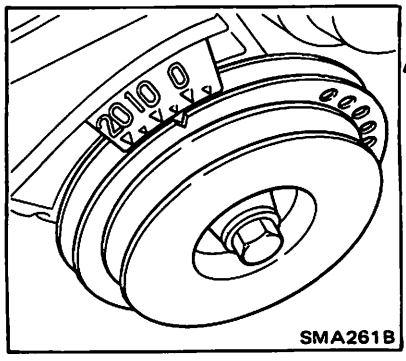
Check ignition timing.

IGNITION TIMING:
M/T 5°±2° A.T.D.C.
A/T 5°±2° A.T.D.C. (in "D" position)



SEF779C

O.K. / N.G.


SMA261B

Adjust ignition timing by turning distributor, loosening distributor securing bolt.

Connect distributor vacuum hoses to distributor diaphragm.

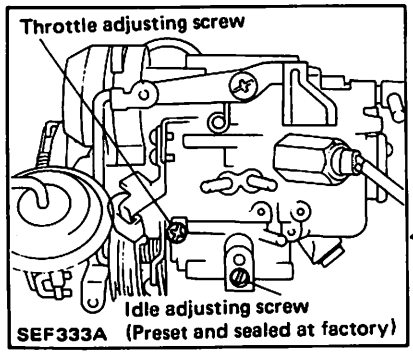
Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.


SMA845A

* Check idle speed.

IDLE SPEED:
M/T 800±50 rpm
A/T 650±50 rpm (in "D" position)

O.K. / N.G.



SEF333A (Preset and sealed at factory)

* Adjust idle speed by turning throttle adjusting screw.

IDLE SPEED:
M/T 800±25 rpm
A/T 650±25 rpm (in "D" position)

O.K. / N.G.

Correct or replace control unit and carburetor. → Ⓒ

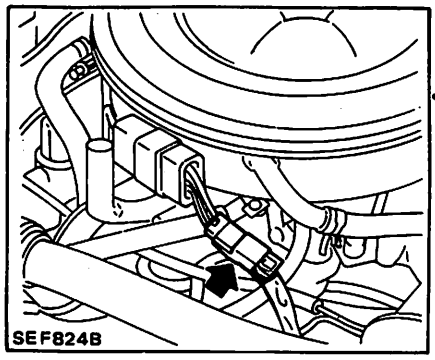
Ⓐ Ⓑ

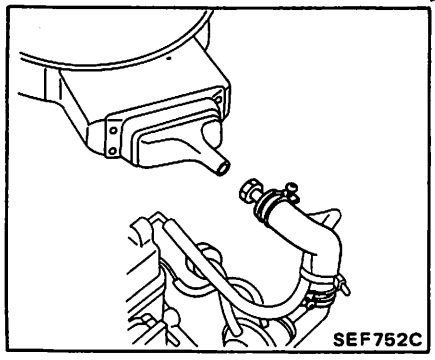
***a. This check or adjustment should be performed under the following conditions:**
- **Headlamp switch: OFF**
- **Heater blower: OFF**
- **Air conditioning switch: OFF (if equipped)**
- **Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)**

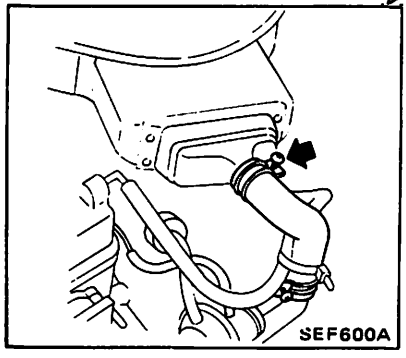
b. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture Ratio (Cont'd)


SEF824B


SEF752C

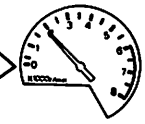

SEF600A

Ⓐ Ⓓ

Turn off engine and disconnect air-fuel ratio solenoid harness connector, and disconnect air induction hose from air pipe and install caps on air pipe.

Start engine.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.


SMA845A

* Check idle "CO"%.

IDLE "CO"%:
1 - 5%

O.K. / N.G.

Does engine run smoothly? — NO → Check the following.
- Vacuum hoses for proper connections
- Air leaks at carburetor mounting and intake manifold

YES

O.K. / N.G.

Correct or replace malfunctioning parts.

* Adjust idle mixture ratio until idle "CO" 3.0±1.0% is obtained and install idle mixture seal plug. (Refer to IDLE MIXTURE ADJUSTING PROCEDURE.)

O.K. / N.G.

Correct or replace carburetor.

Turn off engine and connect air-fuel ratio solenoid harness connector, and connect air induction hose to air pipe.

Start engine.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load, and run engine at idle speed.


SMA845A

* Check idle speed.

IDLE SPEED:
M/T 800±50 rpm
A/T 650±50 rpm (in "D" position)

O.K. / N.G.

END

Adjust idle speed by turning throttle adjusting screw.

IDLE SPEED:
M/T 800±25 rpm
A/T 650±25 rpm (in "D" position)

→ Ⓓ

Ⓑ

***a. This check or adjustment should be performed under the following conditions:**
- **Headlamp switch: OFF**
- **Heater blower: OFF**
- **Air conditioning switch: OFF (if equipped)**
- **Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)**

b. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

c. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

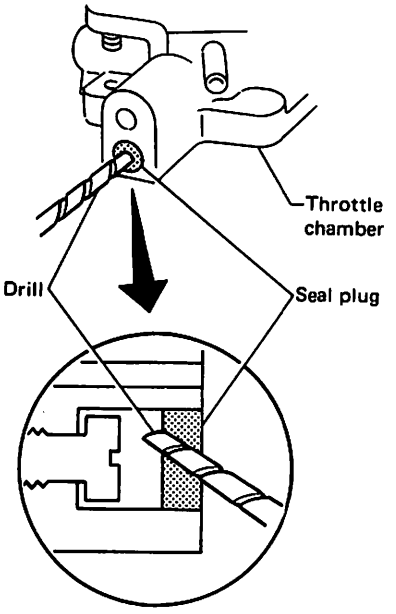
CARBURETOR — Inspection and Adjustment

Idle Mixture Adjusting Procedure

CAUTION:

a. **Removal of idle adjusting screw seal plug should be performed only when idle mixture adjustment or carburetor overhaul is necessary.**
b. **When installing carburetor, be sure to tighten nuts to specified torque.**

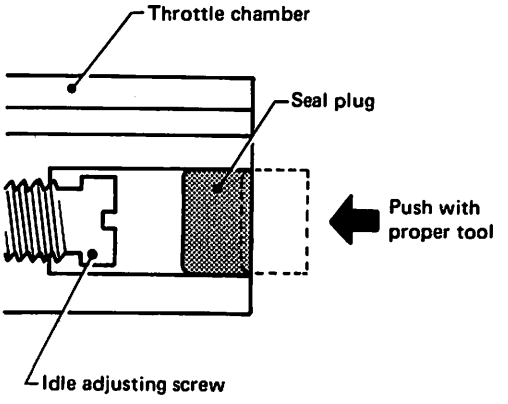
1. Remove carburetor from engine.
2. Carefully drill idle adjusting screw seal plug and remove it from plug hole with suitable tool.



SEF212A

a. **Be careful to prevent metal chips from entering carburetor, and be sure that sliding surface of link and shaft are not scratched.**
b. **When drilling seal plug, be careful not to damage head of idle adjusting screw.**

3. After performing step 2, mount carburetor on engine.
4. Start engine, adjust idle RPM and adjust idle "CO"% by turning idle adjusting screw.
5. If proper idle "CO"% is not obtained by adjustment, turn off engine and overhaul carburetor or replace it with a new one. Then adjust idle "CO"% by turning idle adjusting screw.
6. After adjusting carburetor idle-rpm and mixture ratio, turn off engine and install new seal plug on carburetor.



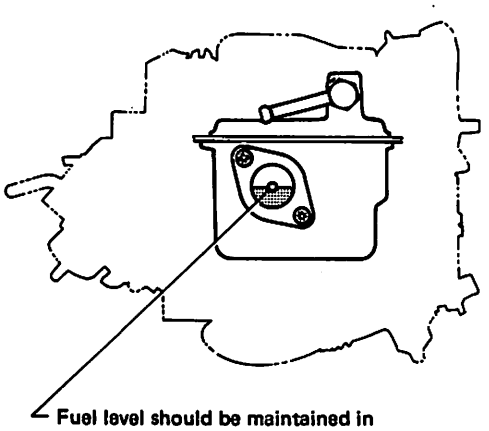
SEF213A

7. Finally, check idle "CO"% again. If idle "CO"% is abnormal, readjust it by starting from step 4.

CARBURETOR — Inspection and Adjustment

Fuel Level

Place vehicle on a level surface and with engine idling, visually check fuel level through sight glass.



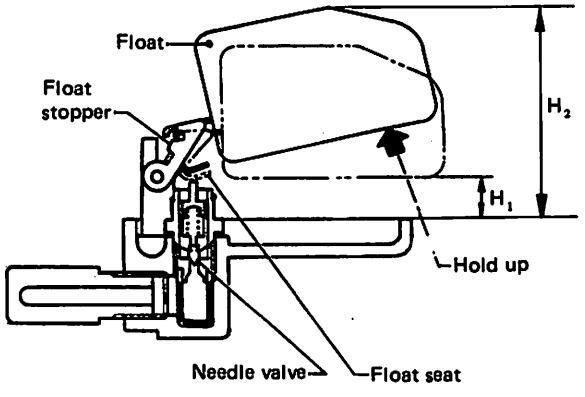
SEF602

If not correct, adjust as follows.

1. Turn off engine and remove choke chamber.
2. Turn choke chamber upside down, raise float, then lower it until float seat contacts with needle valve and in that position, check clearance H_1.

   H_1: 16.5 - 17.5 mm (0.650 - 0.689 in)

   If out of specification, adjust by bending float seat.



SEF073D

3. Raise float until float stopper touches the choke chamber and check height H_2.

   H_2: 46.5 - 47.5 mm (1.831 - 1.870 in)

   If out of specification, adjust by bending float stopper.
4. Install choke chamber and recheck fuel level with engine idling.

CARBURETOR — Inspection and Adjustment

Automatic Choke

AUTOMATIC CHOKE MECHANISM

1. Before starting engine, fully open throttle valve and ensure that choke valve closes properly.
2. Push choke valve with a finger, and check for smooth rotation.
3. Check to be sure that bimetal cover index mark is set at the center of choke housing index mark. If not, replace choke chamber assembly.
4. Check automatic choke heater source wiring for proper connection, then start engine.
5. After warming up the engine, ensure that choke valve is fully open.
6. If automatic choke heater source wiring is normal and choke valve does not operate after warm-up, check choke heater circuit, choke heater and choke relay.

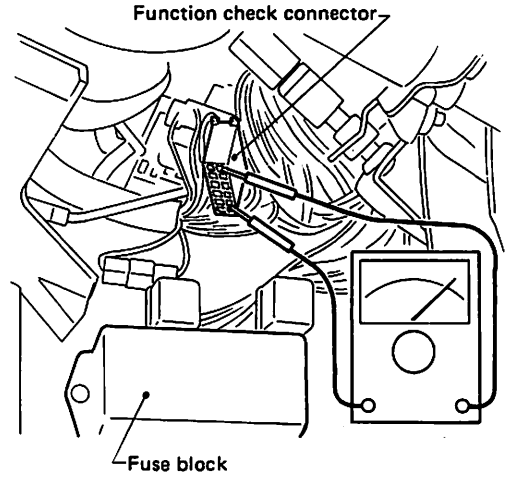
AUTOMATIC CHOKE HEATER CIRCUIT

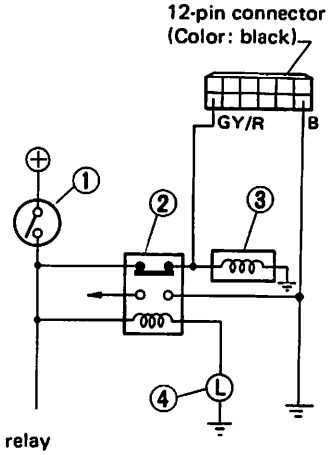
Checking heater circuit with function connector

CAUTION:

Do not attach test leads of a circuit tester to those other than designated.

1. With engine not running, check for continuity between GY/R and B.
- If continuity exists, heater is functioning properly.
- If continuity does not exist, check for disconnected connector or open P.T.C. heater circuit.
2. With engine running at idle, check for presence of voltage across GY/R and B.
- If voltmeter reading is 12 volts, heater circuit is functioning properly.
- If voltmeter reading is zero, check for disconnected connector, open circuit, or faulty automatic choke relay.
3. Replace faulty parts.





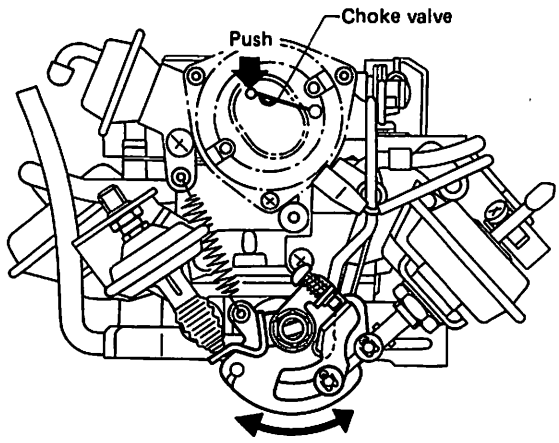
1 Ignition relay
2 Automatic choke relay
3 Automatic choke heater
4 Alternator "L" terminal

SEF745A

CARBURETOR — Inspection and Adjustment

Fast Idle

1. Warm up engine sufficiently and set fast idle arm on 2nd step of fast idle cam.
   While moving choke valve with your finger in the direction that closes it, rotate throttle arm fully counterclockwise and then clockwise.



SEF008D

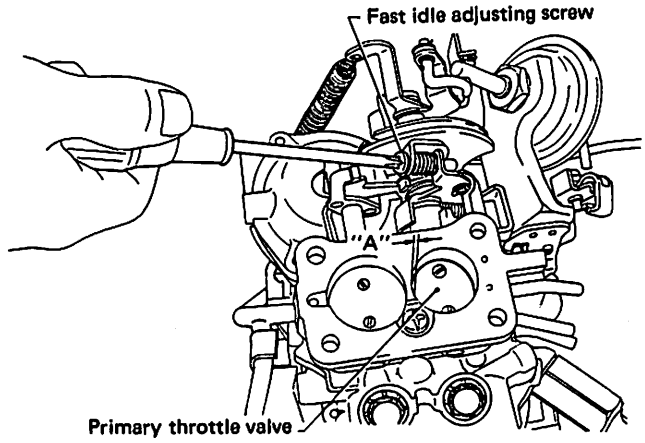
2. Read engine speed.

   Fast idle speed (at 2nd cam step):
   1,800 - 2,600 rpm (M/T)
   2,300 - 3,100 rpm (A/T)

3. If out of specifications, adjust it by turning fast idle adjusting screw.
4. If necessary, remove carburetor from engine and make fast idle adjustments as follows.
   (1) Place fast idle arm on 2nd step of fast idle cam, in the same manner as in step 1 above.
   (2) Adjust clearance "A" between primary throttle valve and inner carburetor wall by turning fast idle adjusting screw.

   Clearance "A":
   0.68±0.10 mm
   (0.0268±0.0039 in) (M/T)
   0.96±0.10 mm
   (0.0378±0.0039 in) (A/T)

5. After adjusting clearance "A", install carburetor on engine.



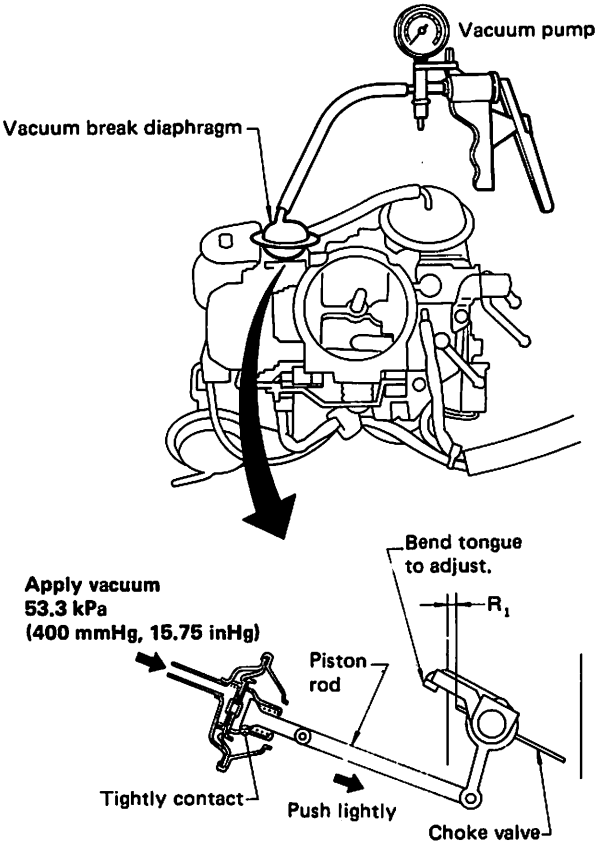
SEF243A

CARBURETOR — Inspection and Adjustment

Vacuum Break

1. With engine cold, visually check that choke valve is fully closed.
2. Using a vacuum pump, move vacuum break diaphragm to the end of its full stroke.
3. Lightly move piston rod in the direction that closes choke valve and check clearance "R_1".

   Clearance "R_1":
   1.53±0.20 mm (0.0602±0.0079 in)

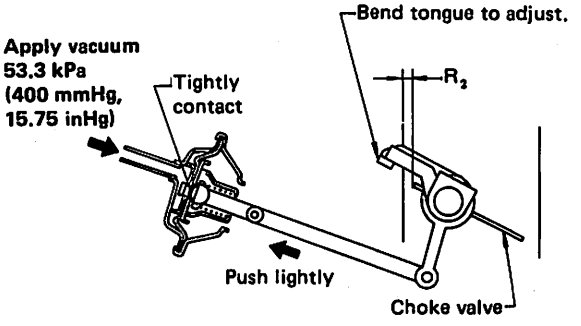


SEF009D

If out of specification, adjust "R_1" by bending tongue.

4. Move piston toward diaphragm and check clearance "R_2".

   Clearance R_2:
   2.60±0.20 mm (0.1024±0.0079 in)



SEF010D

If out of specification, recheck and adjust clearance "R_1".

CARBURETOR — Inspection and Adjustment

Accelerating Pump

1. With engine stopped, turn the throttle lever and ensure that the fuel is injected smoothly through the injector located in primary port.

A pump stroke limiter serves to inject fuel slightly right after throttle lever movement.

2. If accelerating pump is out of order, check link, lever pump piston, limiter, etc.

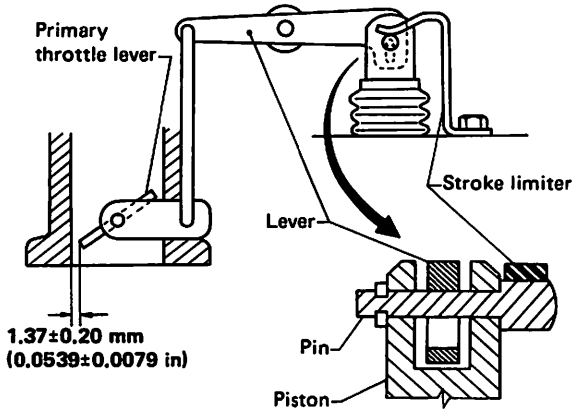
Do not bend stroke limiter.

3. If necessary, check the injection quantity and the pump stroke limiter as follows:

(1) Remove carburetor from engine.

(2) Check the gap between primary throttle valve and inner carburetor wall when pump lever comes in contact with piston pin.

Stroke limiter gap:
1.37±0.20 mm (0.0539±0.0079 in)



SEF616

(3) If out of specifications, adjust it by bending stroke limiter.

CARBURETOR — Inspection and Adjustment

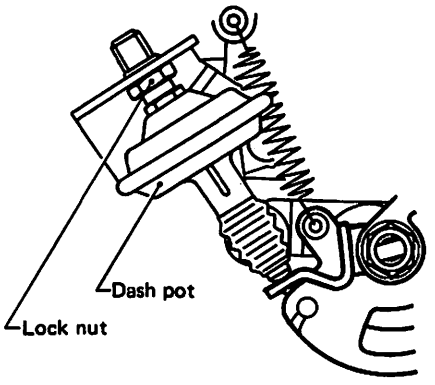
Dash Pot

1. Idle speed of engine and mixture must be well tuned up and engine sufficiently warm.
2. Turn throttle valve by hand, and read engine speed when dash pot just touches stopper lever.

   Dash pot touch speed:
   1,600 - 2,400 rpm
3. If out of specifications, adjust as follows.

(1) Remove carburetor from engine.
(2) Adjust gap between primary throttle valve and inner carburetor wall when dash pot stem comes in contact with throttle arm.

Dash pot gap:
0.56±0.10 mm
(0.0220±0.0039 in)



SEF558C

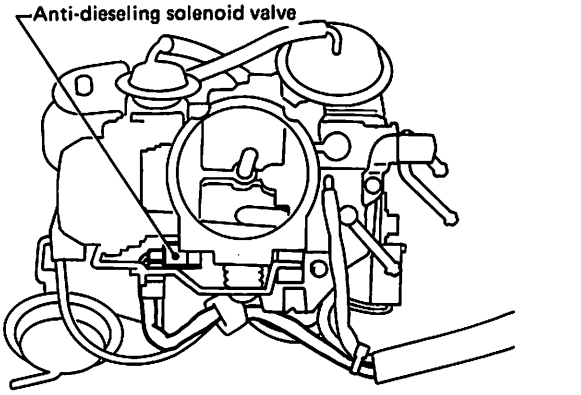
(3) Tighten dash pot lock nut.
(4) After reinstalling carburetor on engine, ensure dash pot touching engine speed is within the specifications.

Anti-dieseling Solenoid Valve

Start the engine and keep at idle speed.
If the engine does not stop when the lead wire is disconnected, the solenoid is stuck.
If the engine does not stop when the ignition switch is turned off, this indicates that the striking solenoid valve is stuck or short-circuited.
If the harness is in good condition, replace the solenoid valve as a unit.

: **Anti-dieseling solenoid**
18 - 29 N·m
(1.8 - 3.0 kg-m, 13 - 22 ft-lb)

After replacement, start engine and check to be sure that fuel is not leaking, and that anti-dieseling solenoid is in good condition.

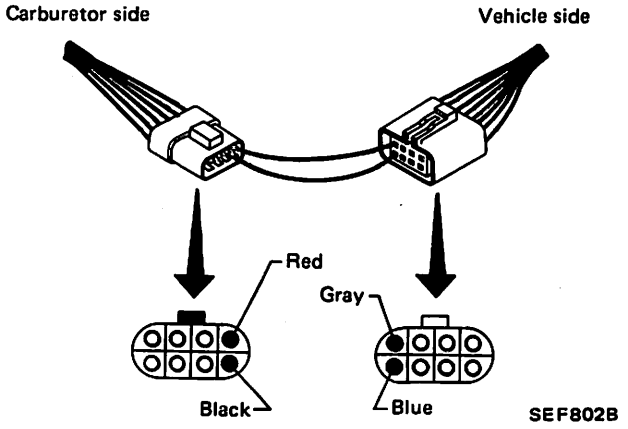


SEF738A

CARBURETOR — Inspection and Adjustment

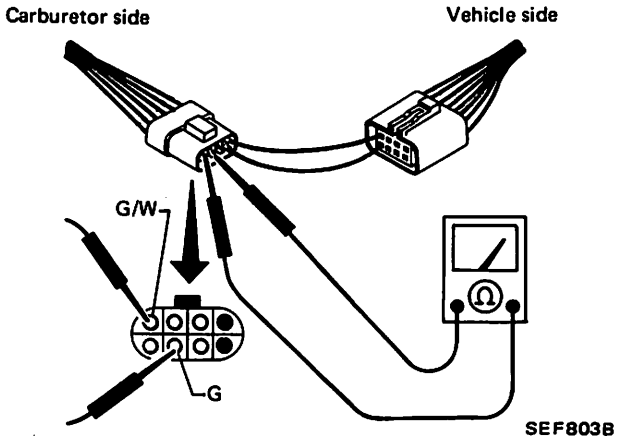
Throttle Valve Switch

1. Turn off engine and disconnect harness connector on carburetor.
2. Connect proper wires between the anti-dieseling solenoid harness terminals.



SEF802B

3. Verify that continuity does not exist between the throttle valve switch harness terminals.



SEF803B

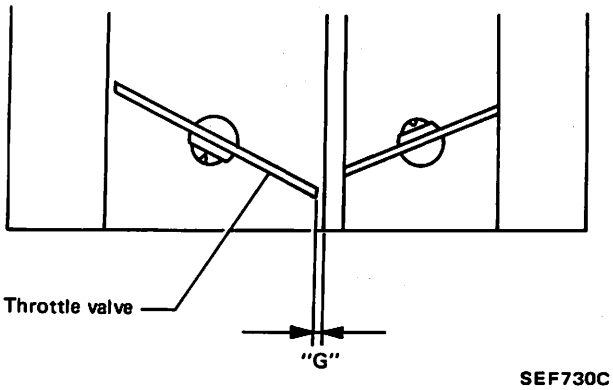
4. Start engine and increase engine speed to about 2,000 rpm.
5. At this time, verify that continuity exists between the throttle valve harness terminals.
6. Then, decrease engine speed gradually to below.

Engine speed:
M/T: 1,350±350 rpm
A/T: 1,250±350 rpm

At that point, the circuit should break and cause the ohmmeter to indicate an open circuit.

If incorrect, adjust as follows.

1) Remove carburetor from engine.
2) Open the throttle manually.
3) Then, close the throttle opening manually until the ohmmeter indicates an open circuit.
4) At that point, check clearance "G".

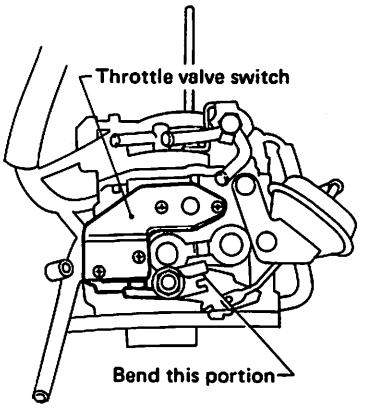


SEF730C

Check clearance "G":
0.37±0.07 mm (0.0146±0.0028 in)

5) If out of specification, adjust clearance "G" by bending plate until the ohmmeter indicates an open circuit.

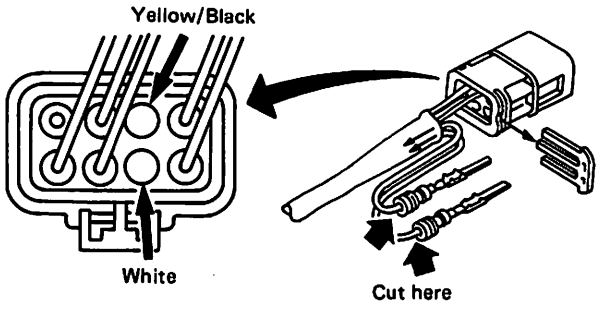
Adjust clearance "G":
0.37 mm (0.0146 in)



SEF743A

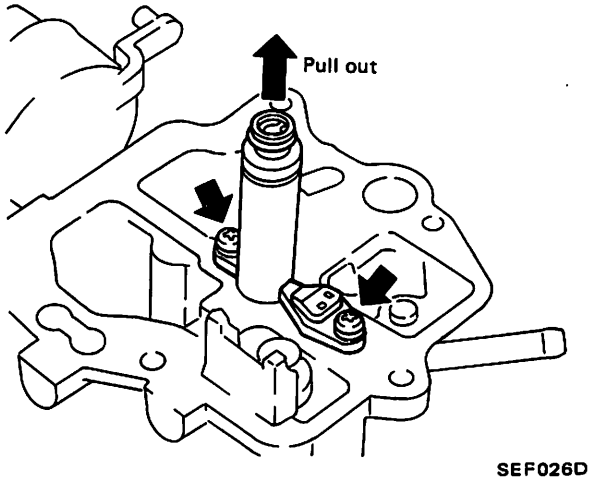
CARBURETOR — Replacing Air-fuel Ratio Solenoid

1. Remove carburetor from engine.
2. Disconnect harness from harness connector and cut at the terminals.



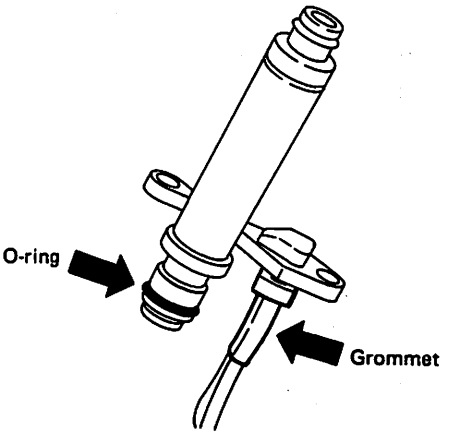
SEF025D

3. Remove choke chamber assembly from carburetor.
4. Remove air-fuel ratio solenoid from choke chamber.



SEF026D

5. Install new air-fuel ratio solenoid valve to choke chamber.
- Apply silicon grease to O-ring.
- Always use new grommet.

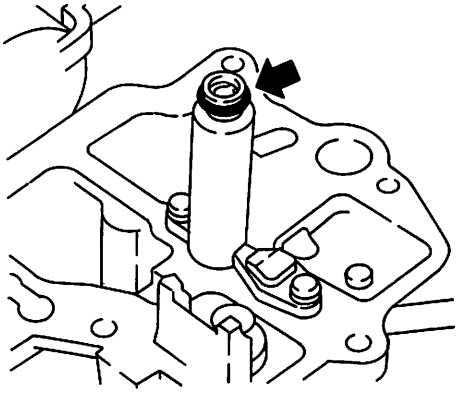


SEF027D

- Take care not to damage O-ring when installing.
- If mounting bolts are damaged, replace with new ones.

: 1.5 - 3.9 N·m (0.15 - 0.40 kg-m, 1.1 - 2.9 ft-lb)

6. Install choke chamber assembly.
- Apply silicon grease to O-ring.

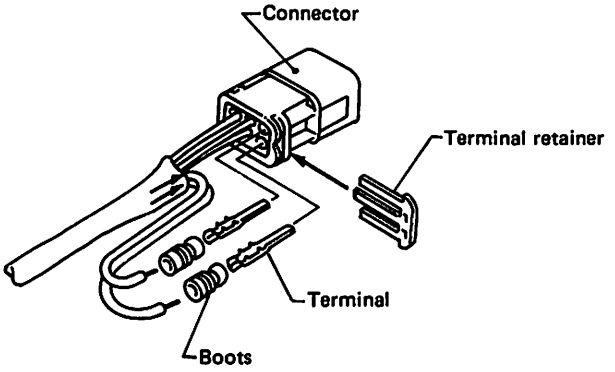


SEF028D

- Take care not to damage O-ring.
- Always use new choke chamber gasket.

CARBURETOR — Replacing Air-fuel Ratio Solenoid

7. Fix new boots and terminal ends to harness with terminal pliers, and then place terminals in connector.

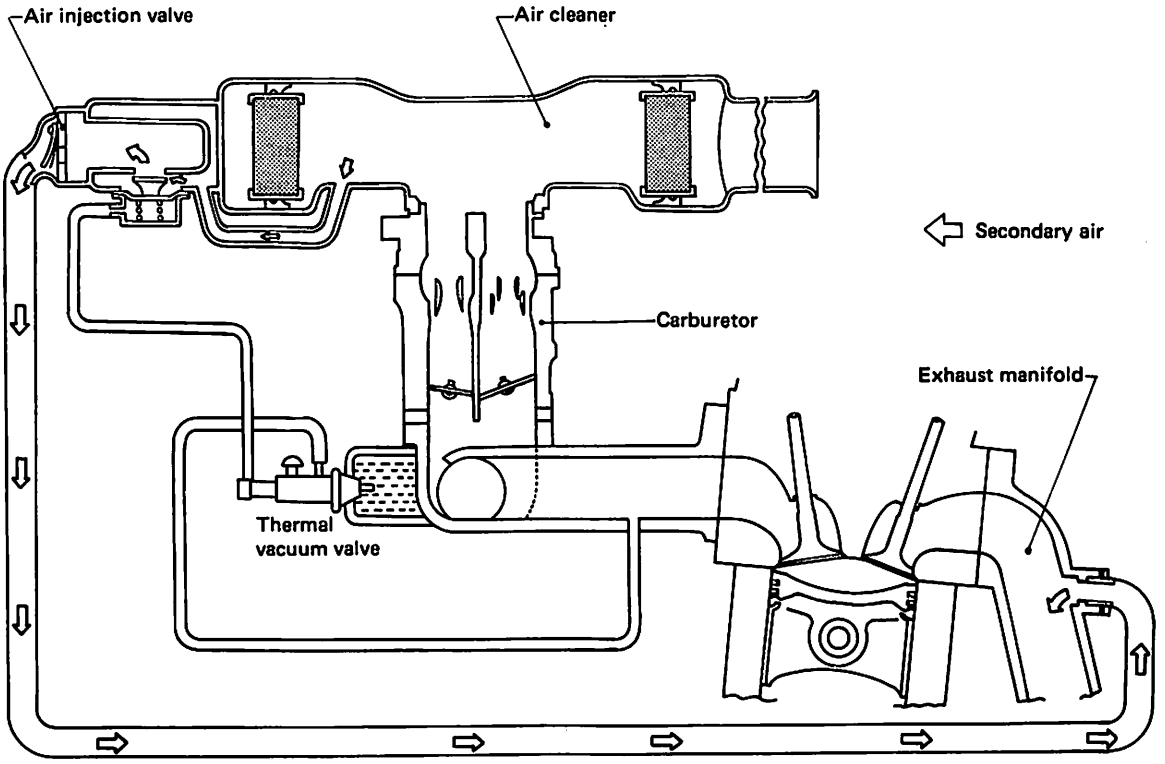


SEF029D

EXHAUST EMISSION CONTROL SYSTEM

Air Injection Valve (A.I.V.) System

The air injection valve (A.I.V.) system for California models is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the exhaust manifold.
However, it is not necessary to operate this system under normal engine conditions because a 3-way catalytic converter is adopted.
Therefore, this system is designed to send secondary air to the exhaust manifold when engine is cold.



SEF687C

OPERATION

Water temperature °C (°F)	Thermal vacuum valve	Air injection control valve	Air injection system
Between 15 (59) and 60 (140)	Open*	Open	Operated
Below 15 (59), above 60 (140)	Closed*	Closed	Not operated

*To intake manifold vacuum

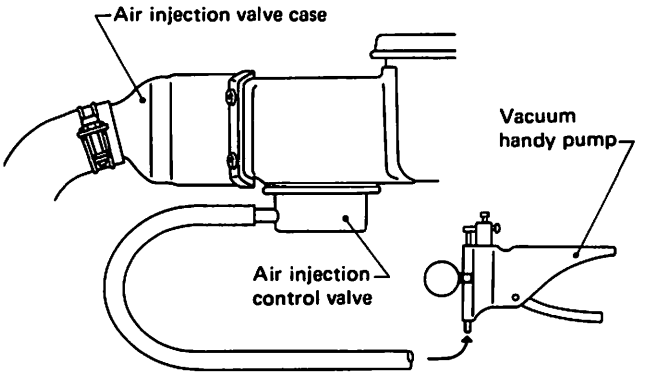
EXHAUST EMISSION CONTROL SYSTEM

Air Injection Valve (A.I.V.) System (Cont'd)

INSPECTION

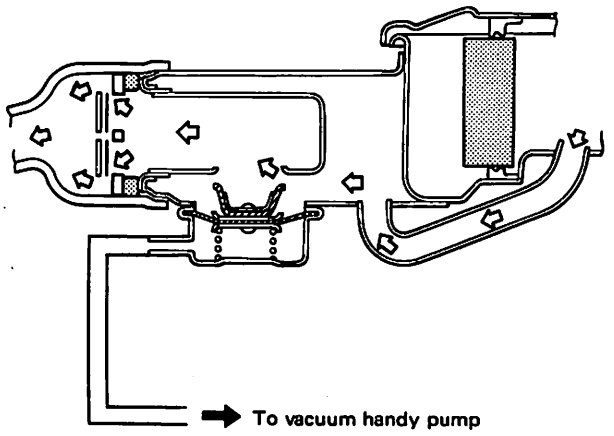
Air injection valve and air injection control valve

1. Disconnect air injection hose at air injection pipe side. Suck or blow hose to make sure that air flow does not exist.
2. Set a vacuum handy pump to the air injection control valve.



SEC931

3. Suck or blow air injection hose to make sure that air flows only on the air injection pipe side while control valve is operated.



SEC932

4. Check air injection valve and air injection control valve for binding or damage. If necessary, replace.

A.B. valve

Refer to Air Injection System (Canada models).

THERMAL VACUUM VALVE

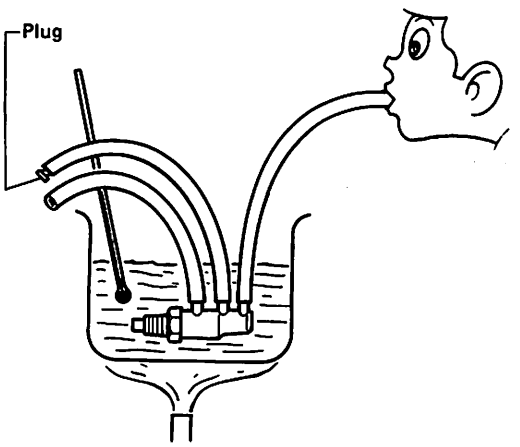
Remove thermal vacuum valve from engine. Inhale air from port of air cleaner side and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before dismounting, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:

Do not allow water to get inside the thermal vacuum valve.

Water temperature °C (°F)	Valve
Between 15 (59) and 60 (140)	Open
Below 15 (59), Above 60 (140)	Closed

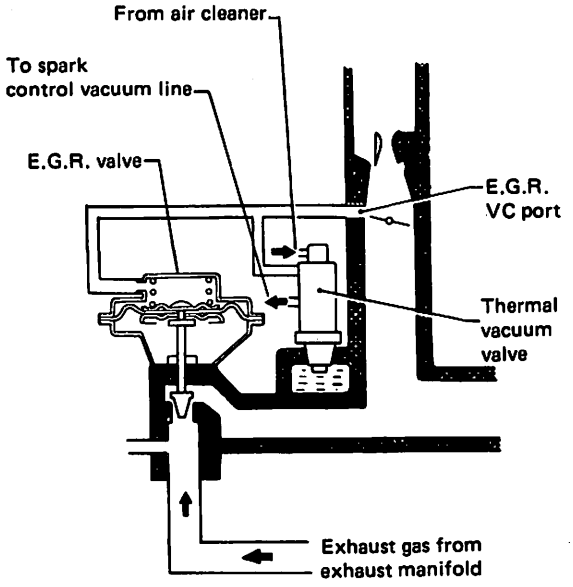


SEF721C

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System

In the exhaust gas recirculation system, a part of the exhaust gas is returned to the combustion chamber to lower the spark flame temperature during combustion. This results in a reduction of nitrogen oxide (NOx) content in the exhaust gas.



SEC485A

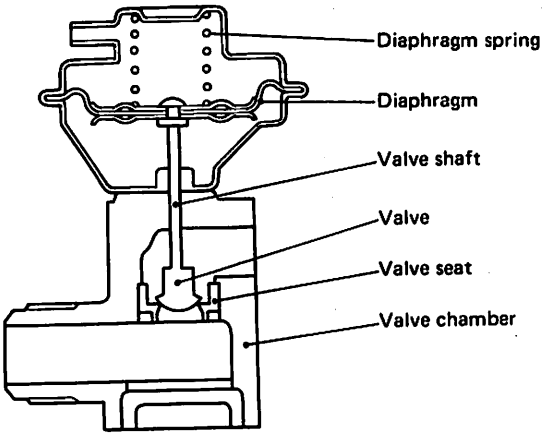
OPERATION

Water temperature °C (°F)	T.V.V.	E.G.R. system
Below 50 (122)	Open*	Not actuated
Above 50 (122)	Closed	Actuated

*To atmospheric pressure

E.G.R. control valve

The E.G.R. control valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the valve connected to the diaphragm, to which vacuum is applied in response to the opening of the carburetor throttle valve.

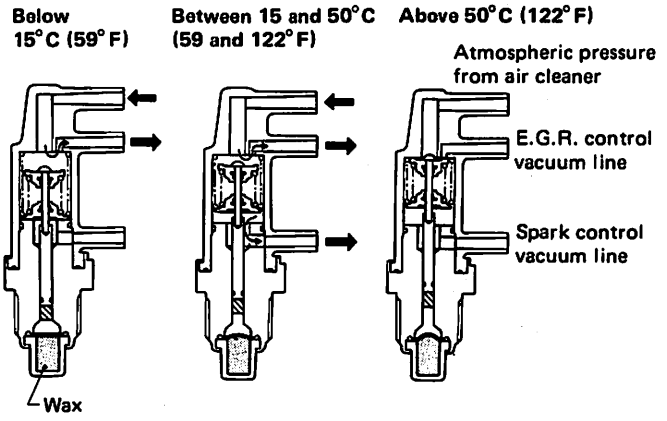


SEC019

Thermal vacuum valve (3-port wax type)

It detects engine coolant temperature by means of wax expansion and opens or closes the air passage from the air cleaner.

When the air passage is closed, the carburetor vacuum signal is applied to the diaphragm of the E.G.R. control valve to actuate the taper valve connected to the diaphragm. This valve is also co-used as a component for the Spark Timing Control System & Evaporative Emission Control System.



SEC348

INSPECTION

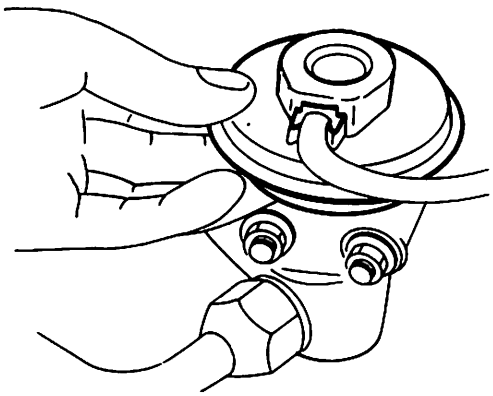
Entire system

1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System (Cont'd)

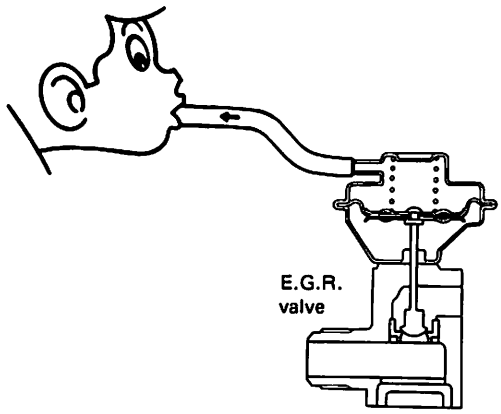
2. With engine stopped, inspect E.G.R. control valve for any indication of binding or sticking by moving diaphragm of control valve upwards with a finger.
3. With engine running, inspect E.G.R. control system operation when engine is cold and hot.
   When judging, place a finger on the diaphragm of E.G.R. control valve to check for valve operation.



SEC711

E.G.R. control valve

1. Apply vacuum to E.G.R. control valve, referring to the following figure. If the valve moves to full position, it is normal.
   E.G.R. control valve will remain open for more than 30 seconds after vacuum has cut off.



SEC078

2. Visually check E.G.R. control valve for damage, wrinkle or deformation.

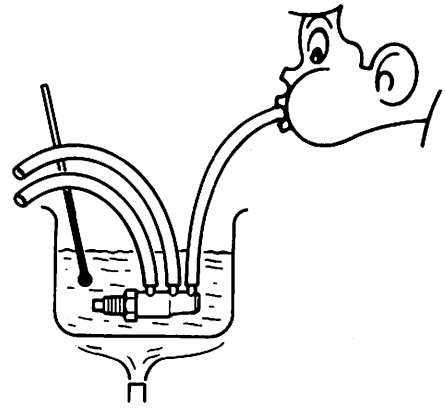
Thermal vacuum valve

Remove thermal vacuum valve from engine. Inhale air from port of E.G.R. system and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before dismounting, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:
Do not allow water to get inside the thermal vacuum valve.

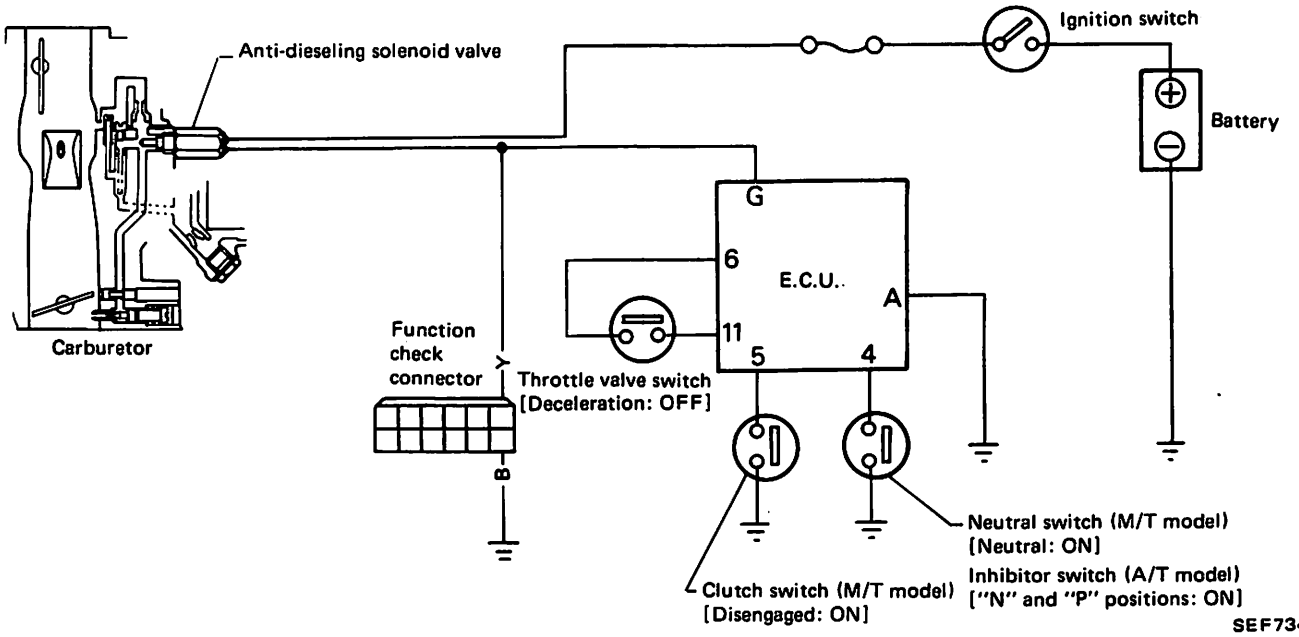
Water temperature °C (°F)	Valve
Below 50 (122)	Open
Above 50 (122)	Closed



SEC132

EXHAUST EMISSION CONTROL SYSTEM

Fuel Shut-off System



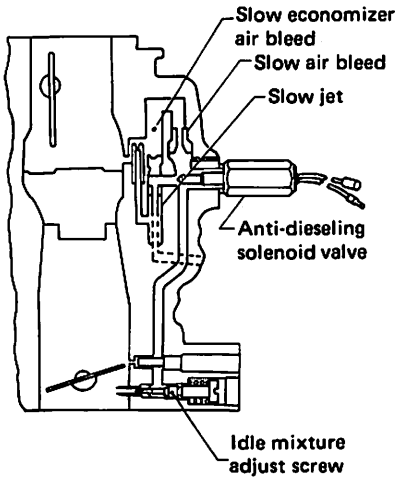
SEF734A

OPERATION

Water temperature °C (°F)	Engine speed rpm	Throttle valve	Transaxle		Fuel shut-off system
			Gear position	Clutch	
M/T: Below 50 (122) A/T: Below 60 (140)	Any conditions				Not operated
M/T: Above 50 (122) A/T: Above 60 (140)	Any conditions			Disengaged	Not operated
	Any conditions		Neutral		Not operated
	Below 2,000	Open	Any conditions		Not operated
	Above 2,000	Closed	Others	Engaged	Operated

Anti-dieseling solenoid valve

The anti-dieseling solenoid valve is attached to the carburetor with its needle valve facing the fuel passage of the primary slow system. When current flows through the anti-dieseling solenoid valve, the needle valve retracts, allowing the current to flow through the primary slow system. When current does not flow through this system, the fuel will be shut off:



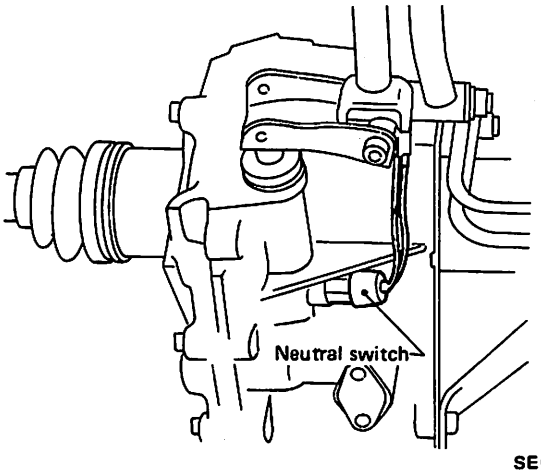
SEC715

EXHAUST EMISSION CONTROL SYSTEM

Fuel Shut-off System (Cont'd)

Neutral switch

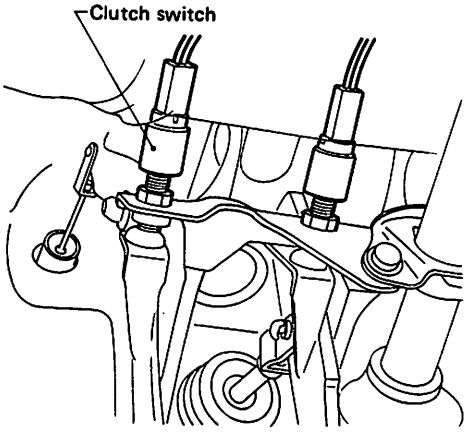
When transaxle gears are in Neutral, this switch causes an electric current to flow through the vacuum switch.



SEC716

Clutch switch

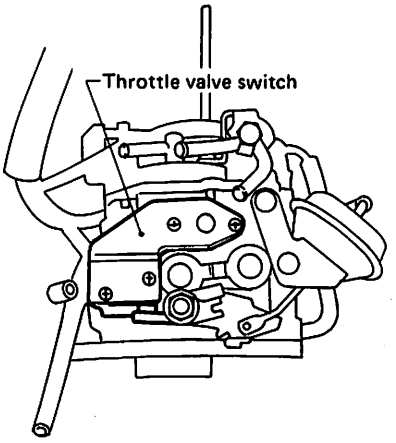
The clutch switch is attached to the clutch bracket. When the clutch is disengaged, this switch causes an electric current to flow through the vacuum switch.



SEC942

Throttle valve switch

The throttle valve switch is attached to the E.C.C. and actuates in response to the throttle valve movement.



SEF735A

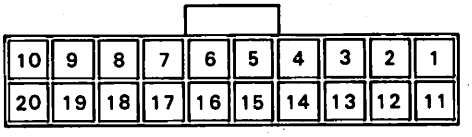
INSPECTION

Entire system

1. Check clutch switch and neutral switch circuits for continuity.

a) Turn ignition switch "OFF".
b) Disconnect E.C.C. 20-pin connector.
c) Turn ignition switch "ON" and check for continuity.

Check circuit	Check terminals		Note
	+	−	
Clutch switch (M/T)	5	Body ground	With clutch disengaged
Neutral switch (M/T) Inhibitor switch (A/T)	4		In neutral position



SEF545A

d) If continuity does not exist, check harness or component.

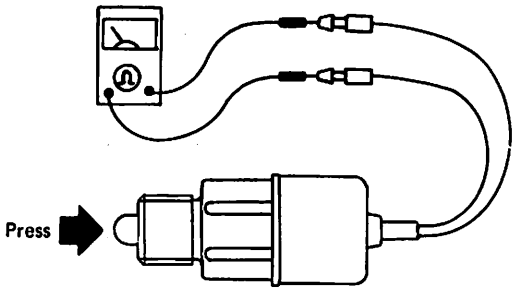
2. Check throttle valve switch adjustment.
   Refer to CARBURETOR — Inspection and Adjustment.

EXHAUST EMISSION CONTROL SYSTEM

Fuel Shut-off System (Cont'd)

Neutral switch

For ON-OFF characteristics, see schematic diagram. If operation is questionable, remove switches.



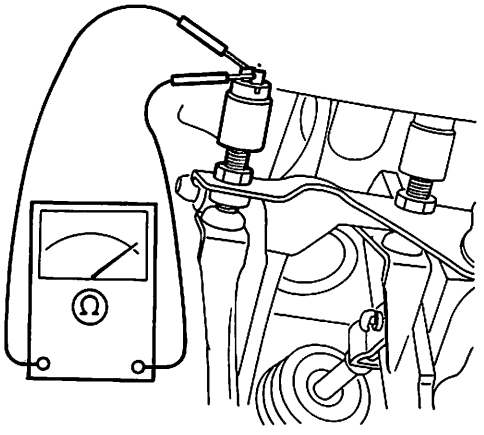
Free (Neutral)... 0Ω
Press (Others) ... ∞Ω

SEC764

: **20 - 29 N·m**
(2.0 - 3.0 kg-m, 14 - 22 ft-lb)
With locking sealant

Clutch switch

Clutch	Continuity
Disengaged	0Ω
Engaged	∞Ω



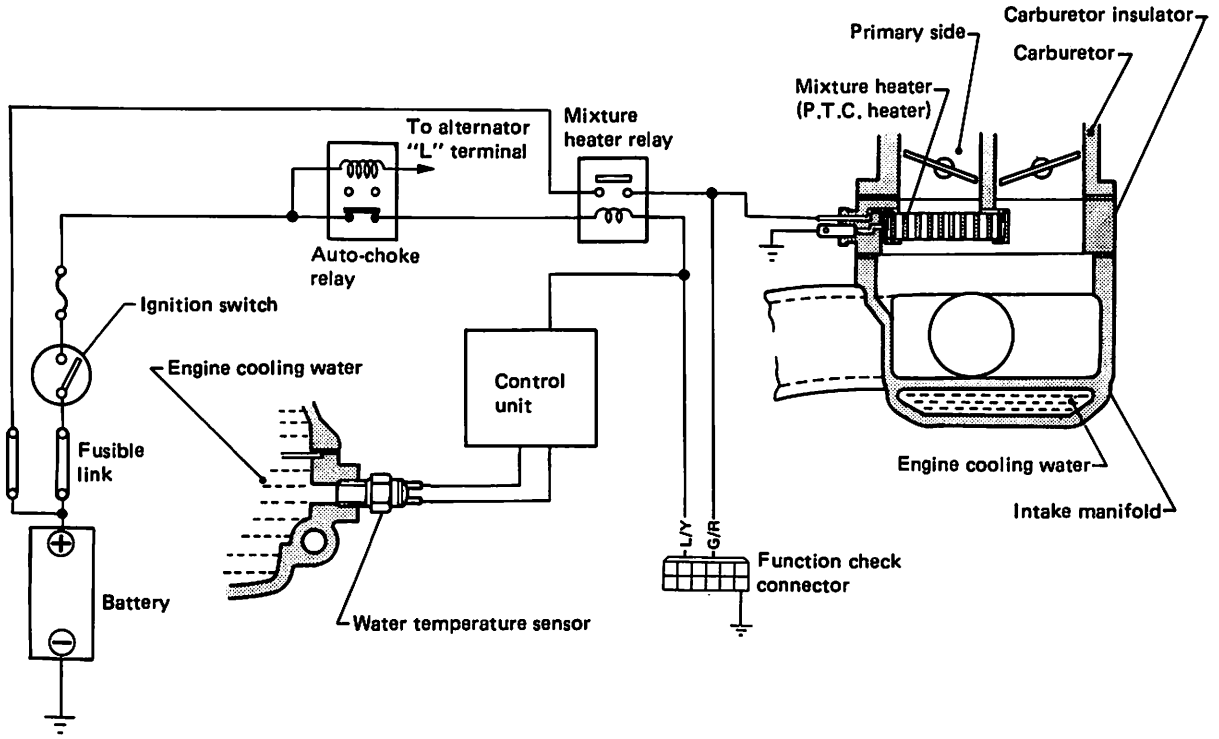
SEC941

EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System

In order to reduce emissions and improve driveability during engine warm-up, the positive temperature coefficient (P.T.C.) heater is installed between carburetor and intake manifold.

When engine starts, P.T.C. heater is electrically energized and the air-fuel mixture which passes through this heater is heated.
When engine warm-up is completed, the heater current is cut off by the E.C.C. control unit.



SEF566C

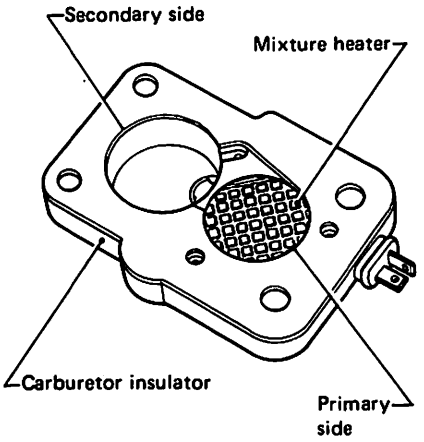
EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System (Cont'd)

OPERATION

Water temperature °C (°F)	Mixture heating system
M/T: Below 50 (122) A/T: Below 60 (140)	Activated
M/T: Above 50 (122) A/T: Above 60 (140)	Deactivated

Mixture heater



SEC611

The mixture heater uses a honeycomb P.T.C. heater design and is situated in the primary side of the carburetor insulator. With this design, resistance to current flow increases as the temperature increases, and vice versa. As a result, the current flow is maintained constant.

INSPECTION

1. Check continuity between terminals of mixture heater. If resistance is too large, replace carburetor insulator.
2. Entire system

(1) When ignition switch is turned "ON" while engine is "OFF", confirm the presence of battery voltage at mixture heater harness connector. If no battery voltage is present, check water temperature sensor and mixture heater relay.

(2) Check continuity between terminals of water temperature sensor at connector.

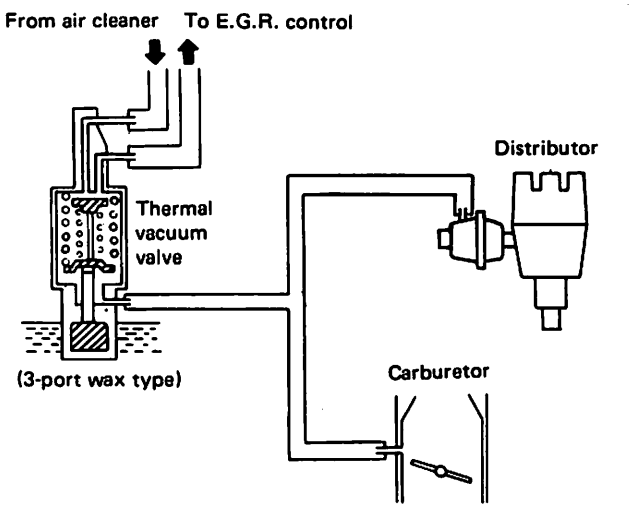
(3) Check mixture heater relay and automatic choke relay.

If necessary, check wiring harness and relays.

EXHAUST EMISSION CONTROL SYSTEM

Spark Timing Control System (M/T model only)

The spark timing control system is designed to control the distributor vacuum advance under varying driving conditions in order to reduce HC and NOx emissions.



SEF839B

OPERATION

Water temperature °C (°F)	Thermal vacuum valve	Spark timing control system
Below 15 (59)	Closed	Actuated
15 - 50 (59 - 122)	Open	Not actuated
Above 50 (122)	Closed	Actuated

Thermal vacuum valve

Refer to "Thermal Vacuum Valve" of E.G.R. control system for description.

INSPECTION

Entire system

1. Ensure that vacuum hoses are properly connected in position.
2. Ensure that distributor vacuum controller functions properly.
3. Set timing light and start engine when it is cold.
4. Check the spark timing referring to "Operation table".
5. If the spark timing does not change, check thermal vacuum valve.

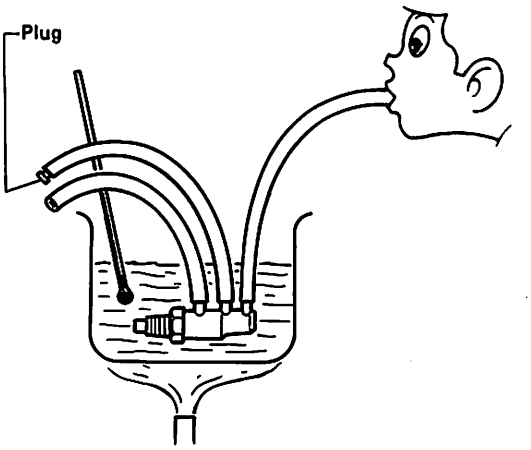
Thermal vacuum valve

Remove thermal vacuum valve from engine. Inhale air from port of spark timing control system and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before removing valve, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:
Do not allow water to get inside the thermal vacuum valve.

Water temperature °C (°F)	Valve
Above 50 (122)	Closed
15 - 50 (59 - 122)	Open
Below 15 (59)	Closed

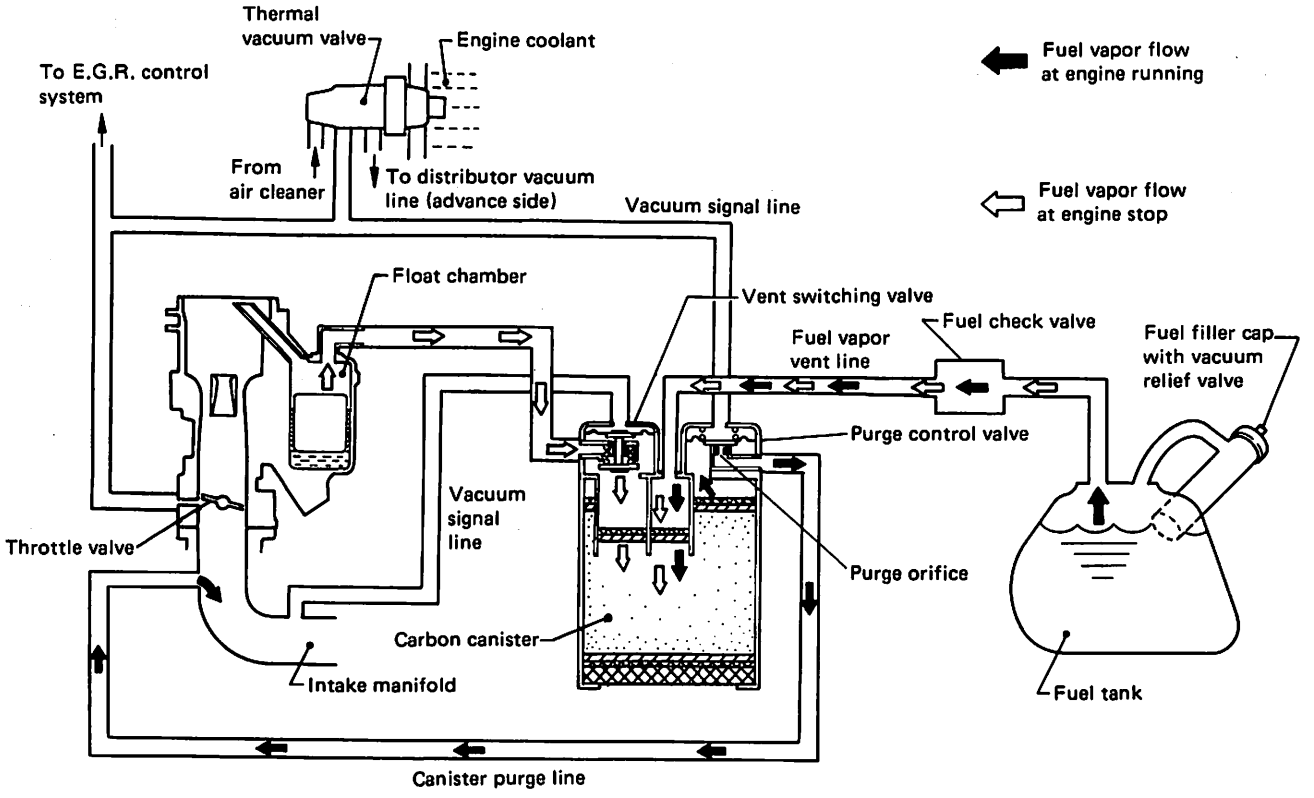


SEF721C

EVAPORATIVE EMISSION CONTROL SYSTEM

Description

The evaporative emission control system is used to reduce hydrocarbons emitted to the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.



SEF350C

Operation

AT ENGINE STOP

Fuel vapor from the sealed fuel tank is led into the carbon canister which is filled with activated carbon and stored there.

The vapor in the carburetor float chamber is also led into the canister through the outer vent pipe because the vent switching valve is normally open.

DURING ENGINE OPERATION

The canister retains the vapor until the canister is cleaned by air drawn through the purge line to the intake manifold.

As engine speed increases, the ported vacuum rises and purge control valve opens the orifice allowing the vapor to travel through the purge line to the intake manifold.

When the engine coolant temperature is lower than 50°C (122°F), the purge control valve closes by the movement of the thermal vacuum valve. This prevents vapor from flowing into the intake manifold.

Evaporative purge control valve is installed in the purge line in place of purge orifice. The purge control valve controls the flow of purge air in proportion to intake air quantity.

EVAPORATIVE EMISSION CONTROL SYSTEM

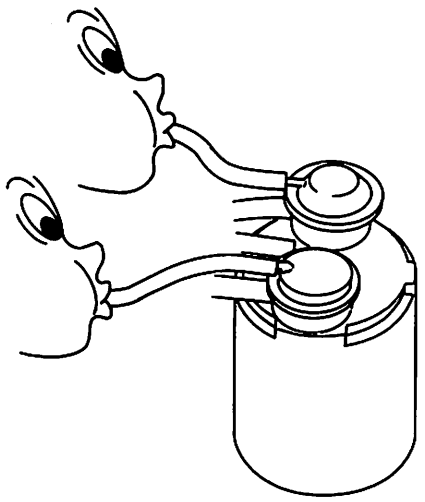
Inspection

FUEL TANK AND VAPOR VENT LINE

Refer to MA section for inspection of fuel tank and vapor vent line.

CARBON CANISTER PURGE CONTROL VALVE

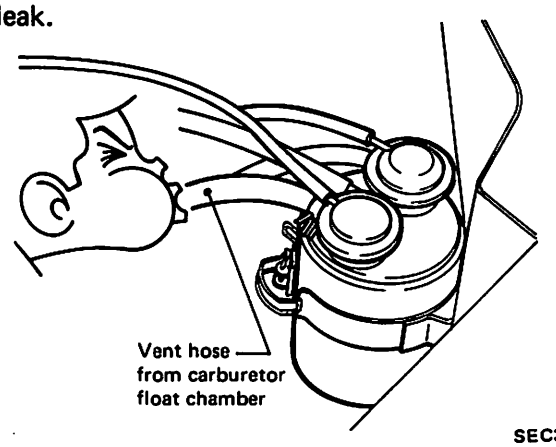
1. Disconnect rubber hose, in the line, between T-connector and carbon canister at T-connector.
2. Inhale air from the opening of the rubber hose running to the vacuum hole in the carbon canister and ensure that there is no leak.
   If there is a leak, replace canister.



SEF351C

VENT SWITCHING VALVE

1. Disconnect vent line hose from carburetor float chamber.
2. With engine running, inhale on the vent line of the carbon canister and ensure there is no leak.



SEC376

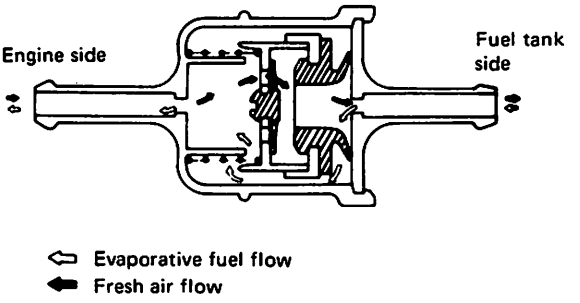
3. With engine off, make sure there is a leak.

THERMAL VACUUM VALVE

The thermal vacuum valve is used with the E.G.R. control system. Refer to page EF & EC-39.

FUEL CHECK VALVE

1. Blow air through connector on fuel tank side.
   A considerable resistance should be felt at the mouth and a portion of air flow be directed toward the engine.
2. Blow air through connector on engine side.
   Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not being properly functioning in steps 1 and 2 above, replace.



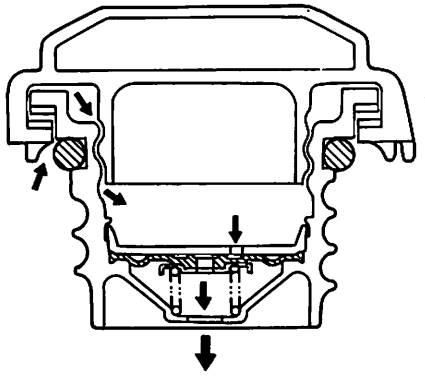
EC090A

Inspection (Cont'd)

FUEL TANK VACUUM RELIEF VALVE

Remove fuel filler cap and make sure it functions properly.

1. Wipe clean valve housing and place it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should disappear with valve clicks.
3. If valve is clogged, or if no resistance is felt, replace cap as an assembled unit.



SEC961

Electronic Controlled Carburetor (E.C.C.) system

Sensors & switches

① Crank angle sensor
② Water temperature sensor
③ Vehicle speed sensor
④ Throttle valve switch
⑤ Air temperature sensor
⑥ Exhaust gas sensor
⑦ Clutch switch (M/T)
⑧ Neutral switch (M/T)
⑨ Inhibitor switch (A/T)
⑩ Battery voltage
⑪ Air conditioner switch
⑫ Starter switch
⑬ Barometric pressure sensor
⑭ Vacuum sensor
⑮ Power steering switch

Input → E.C.C. control unit (E.C.U.) → Output

Controlled items	Actuators	Related sensors & switches
Air-fuel ratio feedback control system	Air fuel ratio solenoid valve	① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑫ ⑬ ⑭
Fuel shut-off system	Anti-dieseling solenoid valve	① ② ④ ⑦ ⑧ ⑨
Spark timing control system	Ignition coil [Power transistor]	① ② ⑩ ⑫ ⑬ ⑭ ⑤
A.I.V. (Air injection valve) control system	Solenoid valve	② ⑤
Mixture heating control system	Mixture heater	① ②
Cold enrichment system	Richer solenoid valve	① ② ⑫ ⑬ ⑭ ⑤
Idle speed control system	Vacuum control modulator	① ② ③ ⑦ ⑧ ⑨ ⑪ ⑫ ⑮
E.G.R. control	Solenoid valve	② ③ ⑤ ⑦ ⑧ ⑨
Evaporative emission control system	Solenoid valve	② ③ ⑤ ⑦ ⑧ ⑨

Fuel flow system

Fuel tank ⇨ Fuel filter ⇨ Fuel pump ⇨ Float chamber ⇨ Main jet / Solenoid controlled fuel orifice / Richer solenoid part ⇨ Throttle chamber ⇨ Intake manifold

Air flow system

Air cleaner ⇨ Venturis / Air bleeds ⇨ Throttle chamber ⇨ Intake manifold

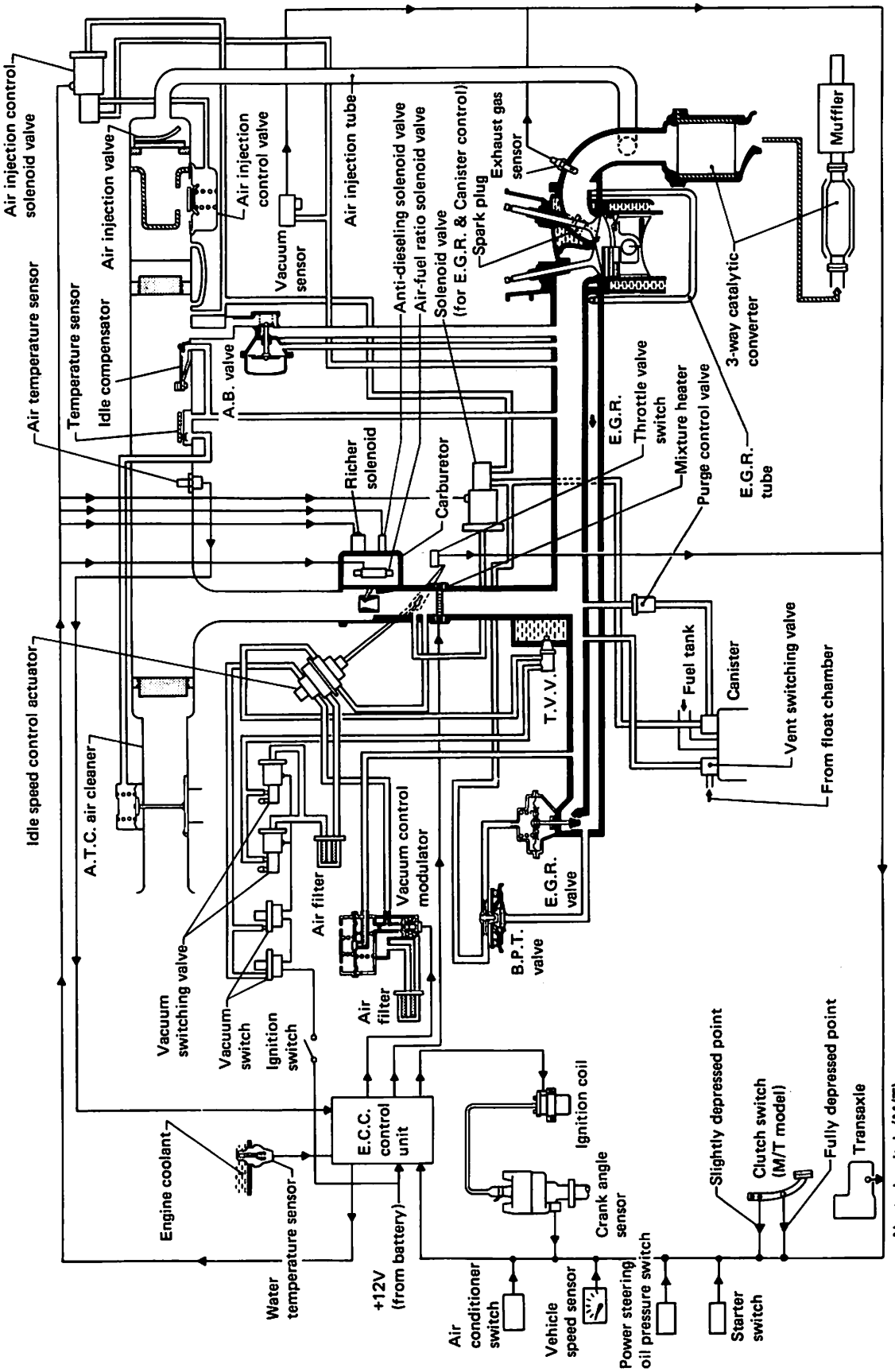
Catalytic converter

- 3-way catalytic converter

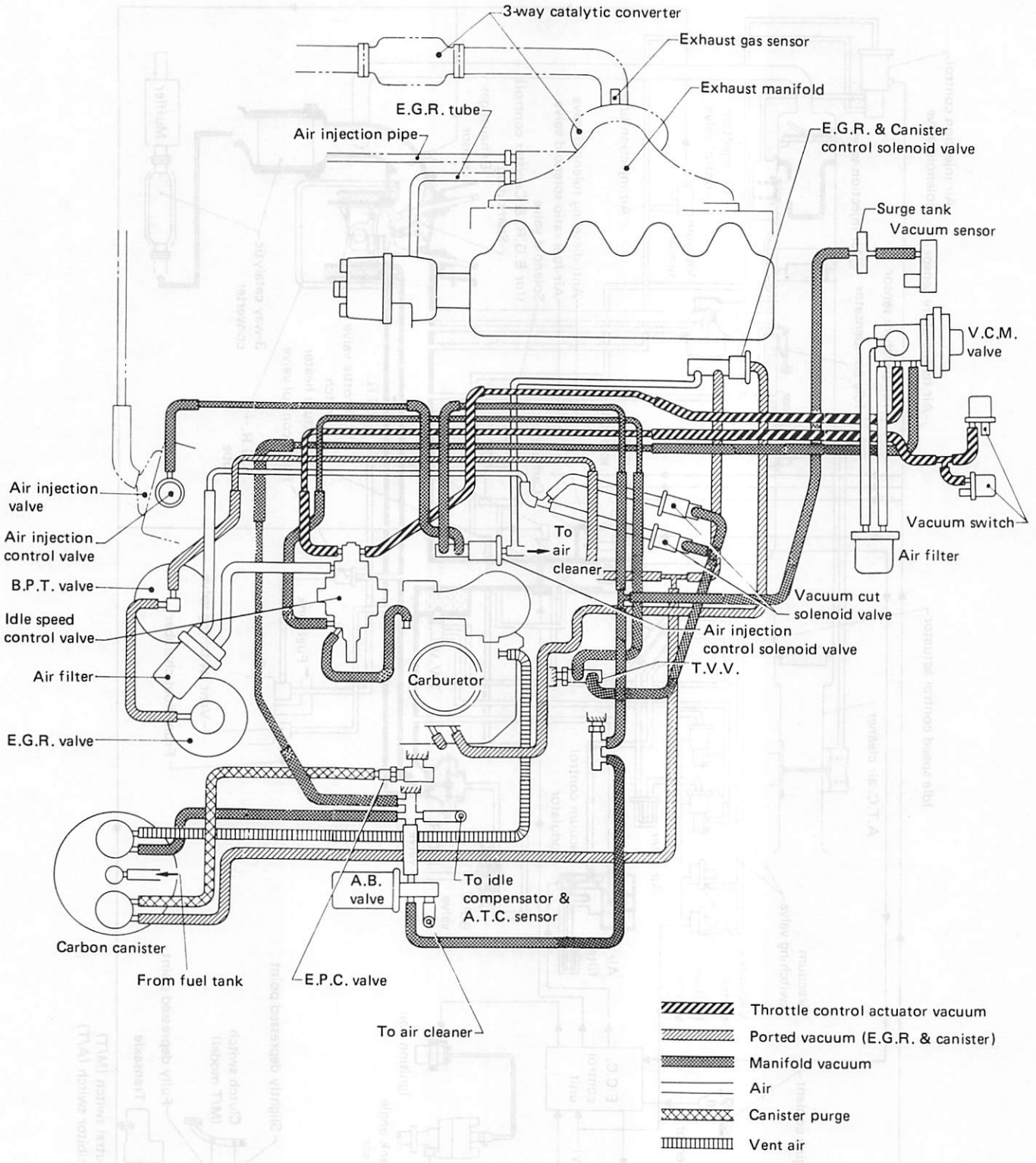
Crankcase ventilation control system

- P.C.V. valve

ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM

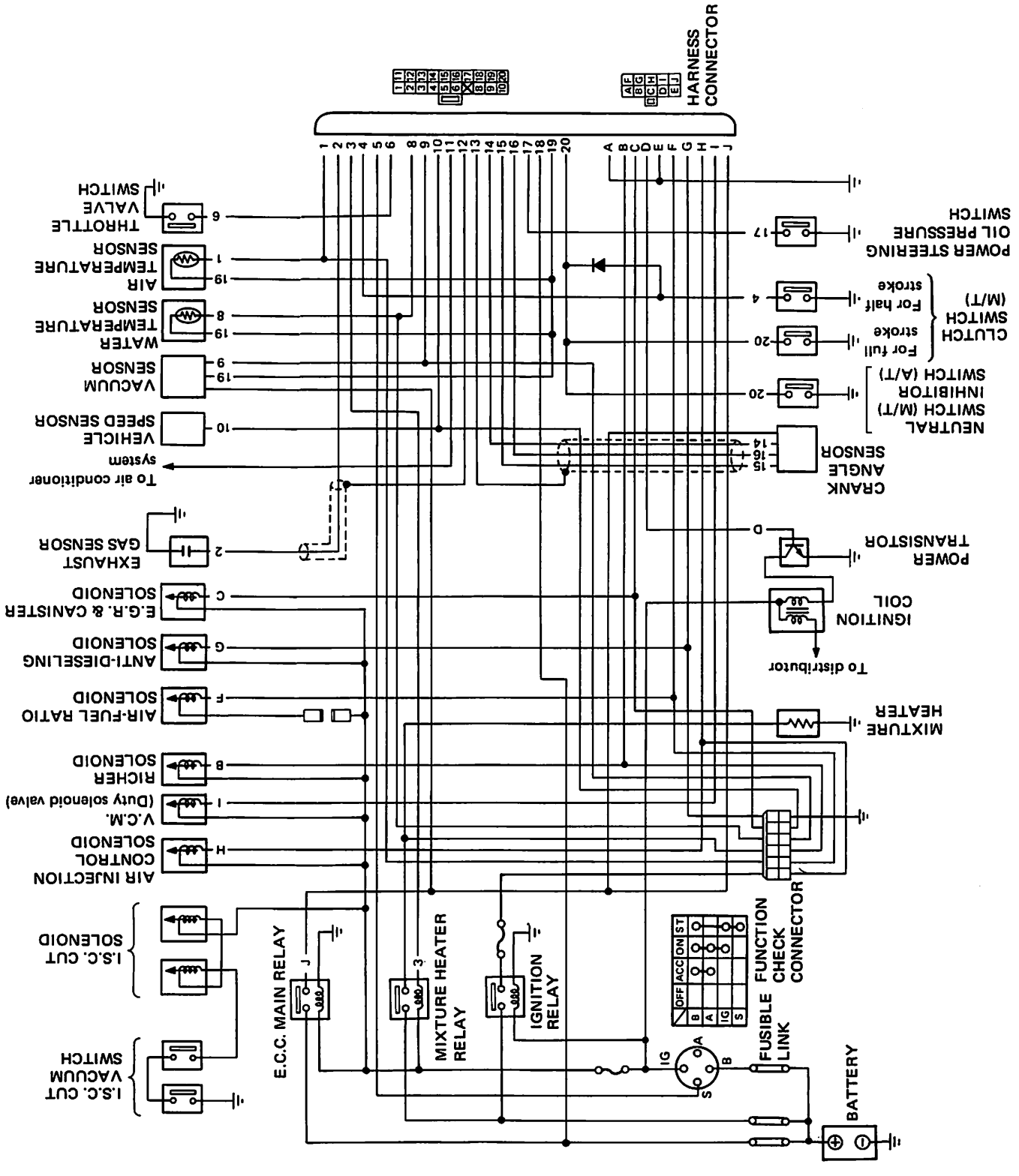


ENGINE AND EMISSION CONTROL VACUUM DIAGRAM



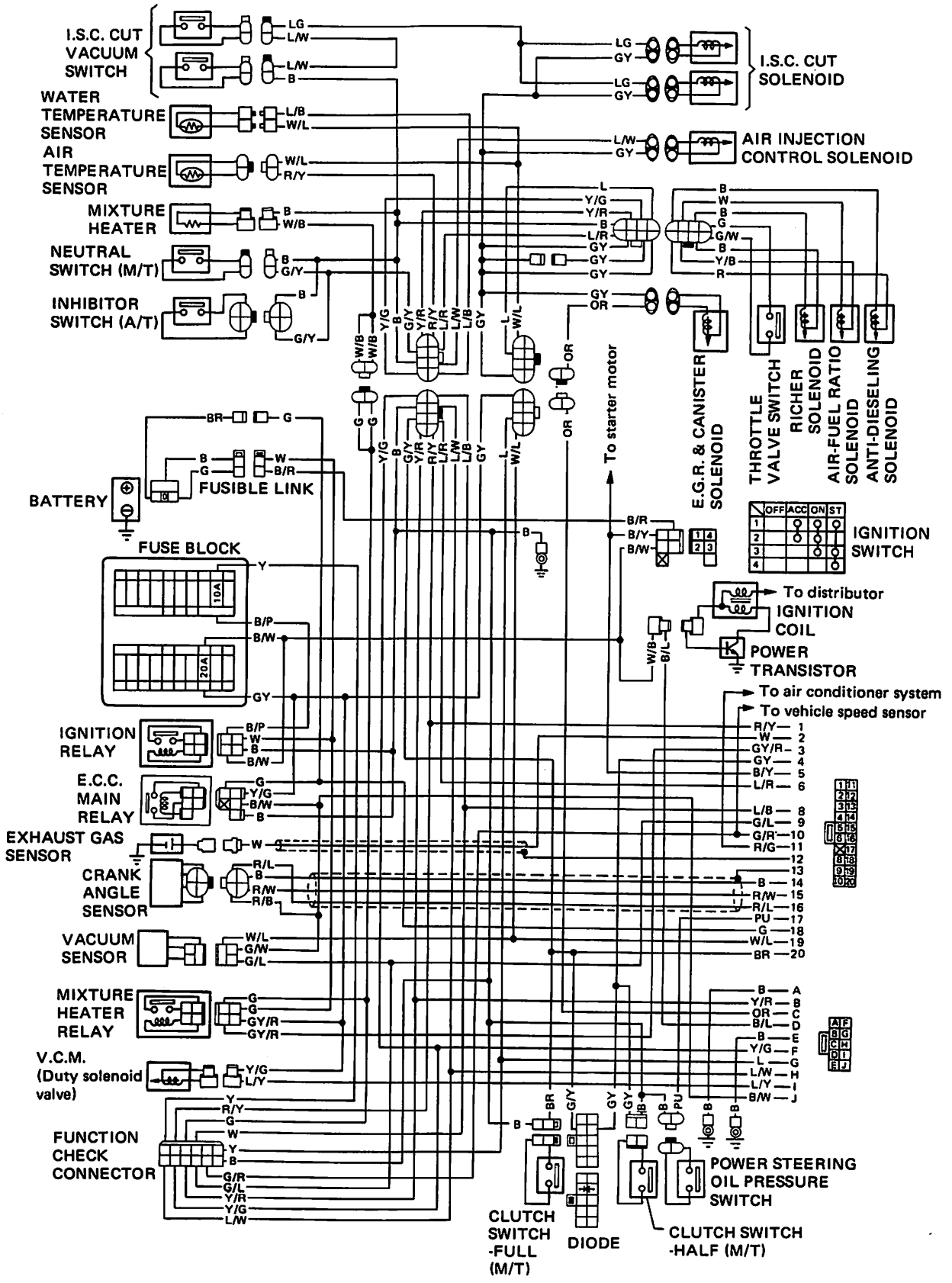
SEF012D

E.C.C. CIRCUIT DIAGRAM



SEF161D

E.C.C. WIRING DIAGRAM



SEF162D

DIAGNOSTIC PROCEDURES

Intermittent Problem

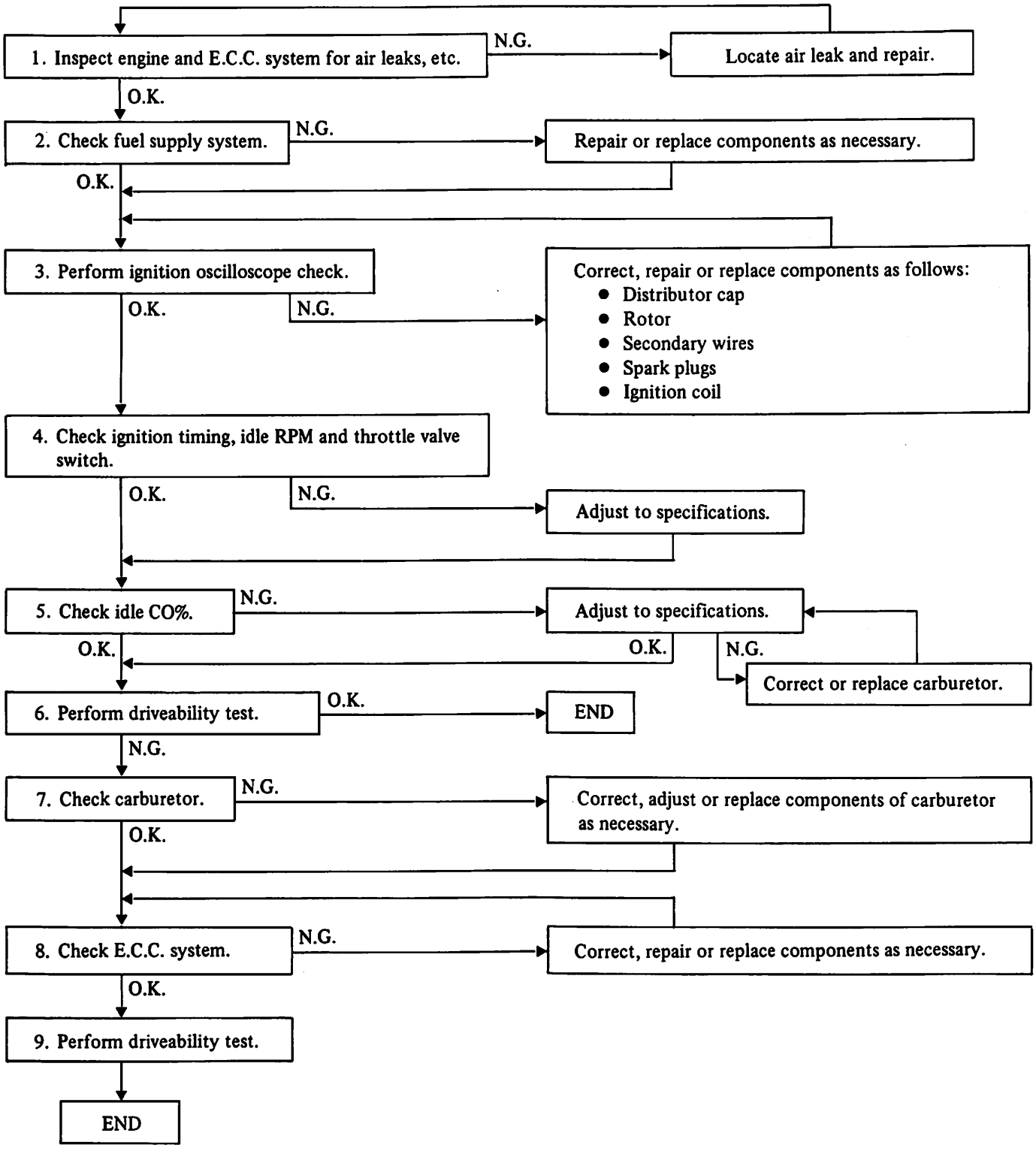
DIAGNOSTIC CHARTS CANNOT BE USED TO DIAGNOSE INTERMITTENT FAILURES. This is because many intermittent problems are caused at electrical connections, and if intermittent problems are not corrected, unnecessary component replacement will be indicated and the problems may remain. Therefore, DIAGNOSIS OF INTERMITTENT PROBLEMS SHOULD START WITH A VISUAL AND PHYSICAL INSPECTION OF THE CONNECTORS involved in the circuit, especially control unit, water temperature sensor and exhaust gas sensor connectors.

CAUTION:

When connecting or disconnecting E.C.C. harness connector to or from any E.C.C. unit, ensure that the ignition switch is in the "OFF" position and that the negative battery terminal is disconnected. Removing and installing these connectors with the ignition switch left in the "ON" position will damage control unit.

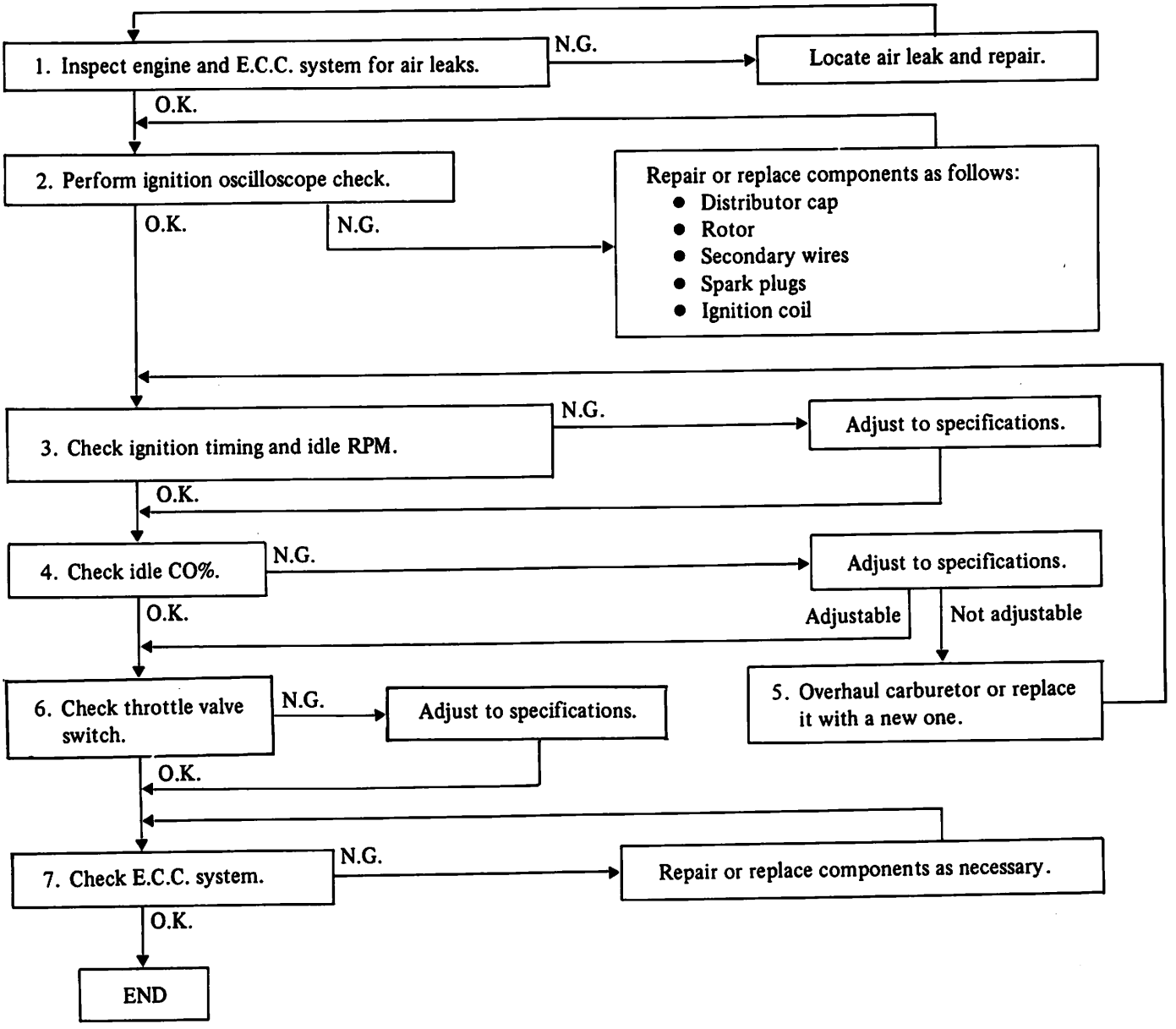
DIAGNOSTIC PROCEDURES

Driveability



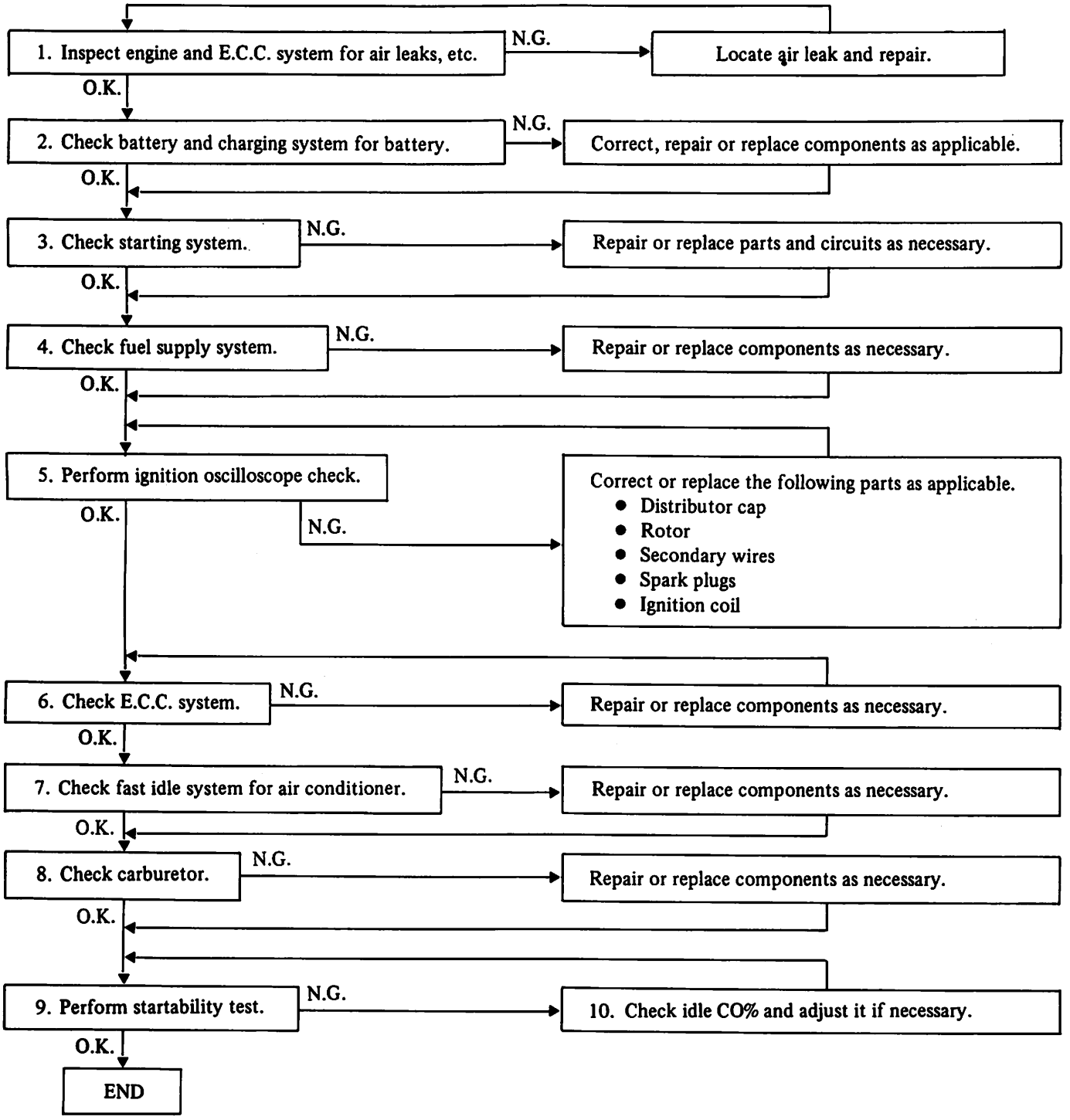
DIAGNOSTIC PROCEDURES

Improper Idling



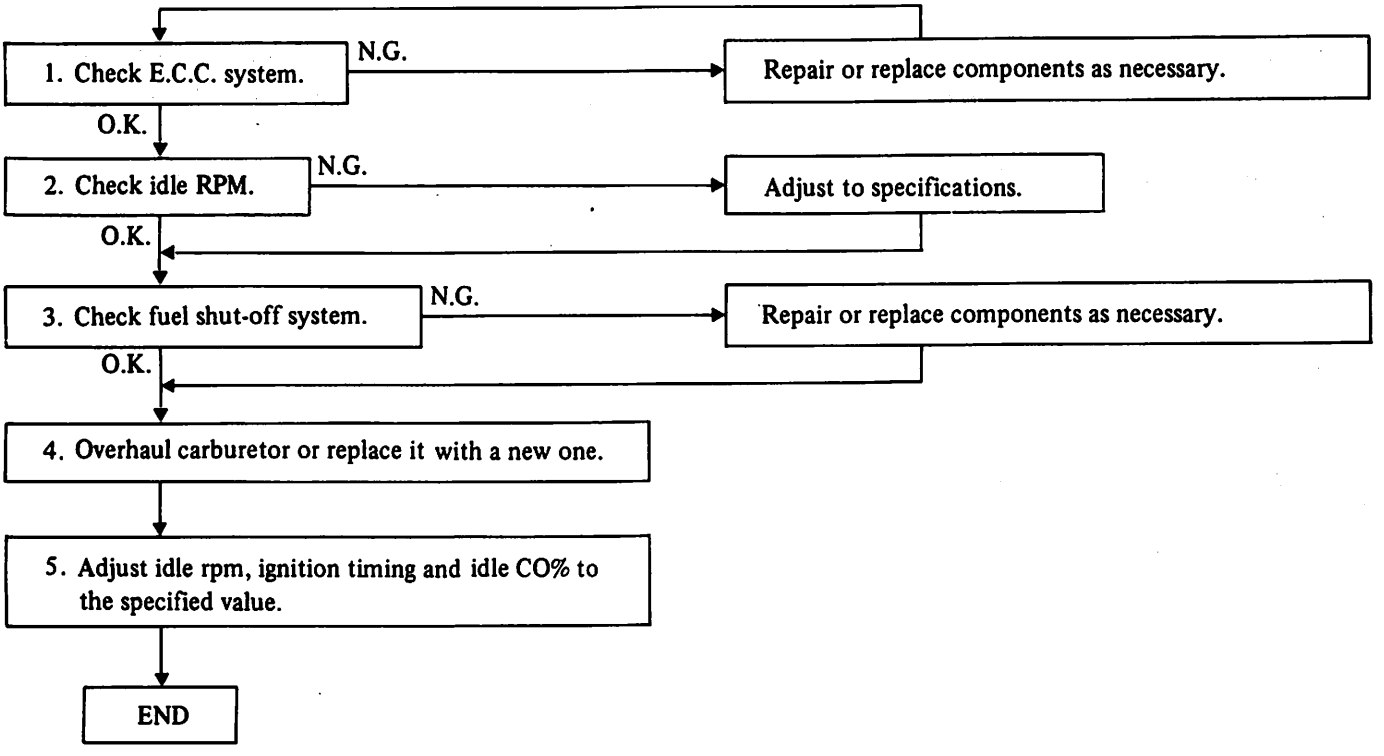
DIAGNOSTIC PROCEDURES

Engine Startability



DIAGNOSTIC PROCEDURES

Engine Stall



DIAGNOSTIC STEPS

Driveability

1. **Inspect engine and E.C.C. system for leaks.**
(1) Check clamps at all air intake components.
(2) Check vacuum hoses for leakage.
(3) Check air cleaner filter for clogging.
(4) Visually inspect for leaks at the following:
- Dipstick
- A.B. valve hose
- Air injection hose
- Intake manifold gasket
- Valve rocker cover
- E.G.R. valve gasket
- Oil filler cap

(5) Check E.G.R. valve seat and operation.
(6) Check air injection control valve operation.
(7) Check A.B. valve operation.
2. **Check fuel supply system.**
(1) Make sure proper fuel is used.
(2) Visually check fuel filter for clogging.
(3) Visually check fuel lines for leaks.
(4) With engine idling, visually check fuel level.
If not correct, adjust.
Refer to CARBURETOR — Inspection and Adjustment.
3. **Perform ignition oscilloscope test.**
(1) Warm up engine sufficiently.
(2) Check ignition system for unusually high or low firing voltage.
(3) If firing voltage is abnormal, determine cause and repair.
4. **Check ignition timing, idle rpm and throttle valve switch.**
Refer to CARBURETOR — Inspection and Adjustment.
5. **Check idle "CO"%.**
Refer to CARBURETOR — Inspection and Adjustment.
6. **Perform driveability test.**
(1) Evaluate effectiveness of adjustments by driving vehicle.
(2) If unsatisfactory, proceed to step 7.
7. **Check carburetor.**
Refer to CARBURETOR — Inspection and Adjustment.

CAUTION:
Before removing carburetor, drain about one liter (1-1/8 US qt, 7/8 Imp qt) of engine coolant.

8. **Check E.C.C. system.**
Refer to E.C.C. SYSTEM INSPECTION.

DIAGNOSTIC STEPS

Improper Idling

1. **Inspect engine and E.C.C. system for leaks.**
2. **Perform ignition oscilloscope test.**
3. **Check ignition timing and idle rpm.**
4. **Check idle CO%.**
5. **Overhaul carburetor or replace it with a new one.**
6. **Check throttle valve switch.**
7. **Check E.C.C. system.**
   Refer to DIAGNOSTIC STEPS FOR DRIVE-ABILITY on the inspection procedure of each item.

Engine Startability

1. **Inspect engine and E.C.C. system for leaks.**
   Refer to DIAGNOSTIC STEPS FOR DRIVE-ABILITY.
2. **Check battery and charging system for battery.**

(1) Check battery voltage.
(2) If poor battery voltage, check charging system for battery.

- Alternator
- Voltage regulator
- Others
  Refer to EL section.

3. **Check starting system.**

(1) Check starter operation.
(2) If it does not operate, check the following:

- Starter
- Ignition relay
- Ignition switch
- Others
  Refer to EL section.

4. **Check fuel supply system.**
   Refer to DIAGNOSTIC STEPS FOR DRIVE-ABILITY.
5. **Perform ignition oscilloscope test.**
   Refer to DIAGNOSTIC STEPS FOR DRIVE-ABILITY.
6. **Check E.C.C. system.**
   Refer to E.C.C. SYSTEM INSPECTION.

Engine Stall

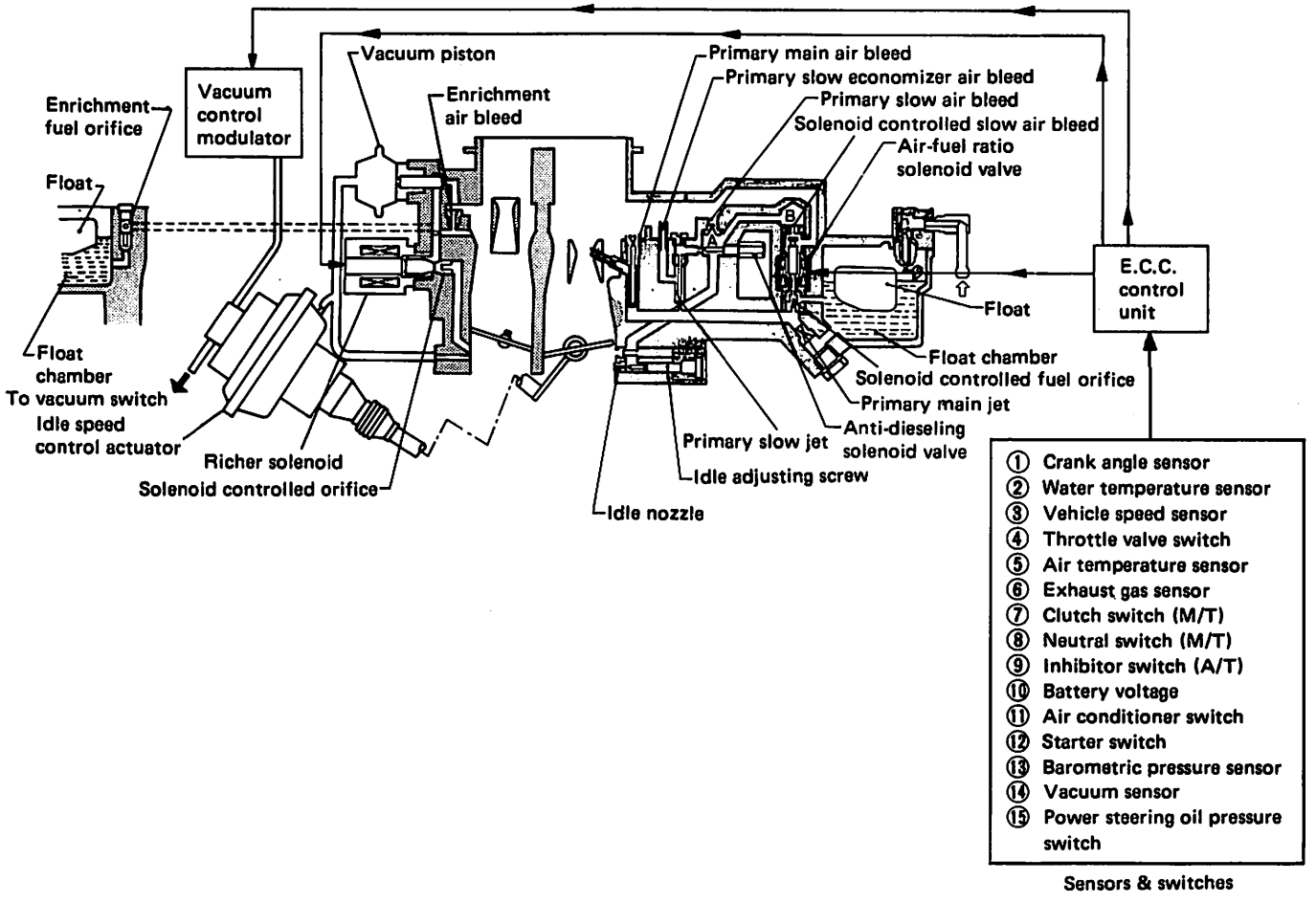
1. **Check E.C.C. system.**
   Refer to E.C.C. SYSTEM INSPECTION.
2. **Check idle rpm.**
   Refer to CARBURETOR – Inspection and Adjustment.
3. **Check fuel shut-off system.**
   Refer to Fuel Shut-off System of EXHAUST EMISSION CONTROL SYSTEM.
4. **Overhaul carburetor or replace it with a new one.**
5. **Adjust idle rpm, ignition timing and idle "CO"% to the specified values.**
   Refer to CARBURETOR – Inspection and Adjustment.

E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for non-California

General Description

Instead of the choke valve and fast idle cam (FIC) of a conventional carburetor, this carburetor system utilizes a duty-controlled solenoid valve for fuel enrichment and an idle speed control actuator (ISCA) as the basic controls. These devices are controlled according to the engine speed, amount of intake air, and objective engine speed. Furthermore, the air-fuel ratio and ignition timing are controlled according to the engine water temperature, atmospheric pressure, vehicle speed, and transaxle gear position. In addition, this system controls the ignition timing and the idle speed according to applied electric loads such as a cooler, thereby achieving better emission control, fuel economy, driveability and practicality.



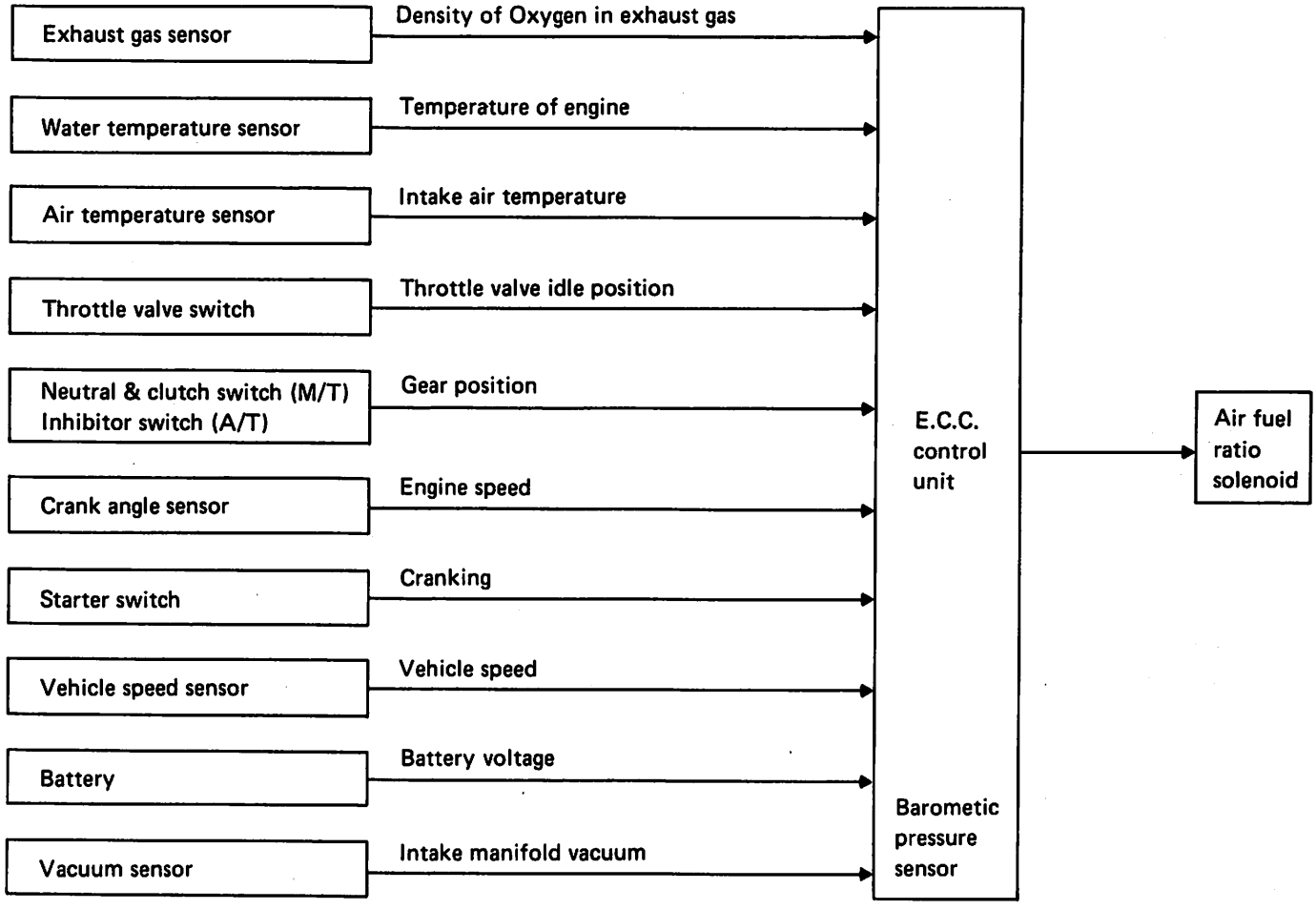
SEF013D

E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for non-California

Air-fuel Ratio Control System

There are two ways to control the air-fuel ratio. These are open loop control and closed loop control, which are switched back and forth by the signal of water temperature, engine rpm, battery voltage, exhaust gas sensor signal and manifold vacuum.



Air-fuel Ratio Control System (Cont'd)

OPEN-LOOP CONTROL

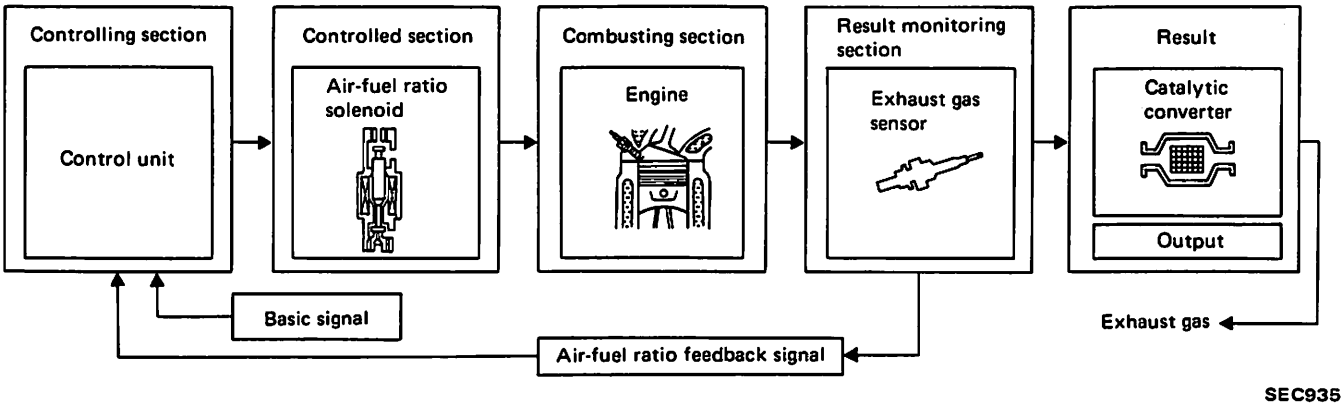
For improved driveability, air-fuel ratio solenoid is controlled by open-loop control under the following conditions:

a	When starting engine	Engine speed $\leqq$ 400 rpm
b	When engine is cold	Water temperature $<$ 60°C (140°F)
c	When hot-restarting	Exhaust gas sensor output voltage $<$ 250±50 [mV] Water temperature $\geqq$ 60°C (140°F)
d	During deceleration	Fuel shut-off system is in operation
e	When driving at high speeds	Engine speed $\geqq$ 4,150 rpm
f	At full throttle	Intake manifold vacuum $<$ 10.7 kPa (80 mmHg, 3.15 inHg) (M/T only)

With open-loop control, the air-fuel ratio is determined by the E.C.C. control unit, corresponding to the condition of engine rpm, engine warm-up, battery voltage, exhaust gas sensor signal and manifold vacuum.

CLOSED-LOOP CONTROL
(Air-fuel ratio feedback control)

This system is designed to control the air-fuel ratio precisely to the stoichiometric point so that the three-way catalyst can minimize CO, HC and NOx emissions simultaneously. The system uses the exhaust gas sensor located in the exhaust manifold to give an indication of whether the air-fuel ratio is richer or leaner than the stoichiometric point. The sensor transmits a nonlinear voltage to the E.C.C. control unit. The control unit adjusts the feedback pulse width according to the sensor voltage so the mixture ratio will be within the narrow window of the three-way catalyst. During engine warm-up period, however, this system remains open until the sensor reaches the operating temperature.



SEC935

Air-fuel Ratio Control System (Cont'd)

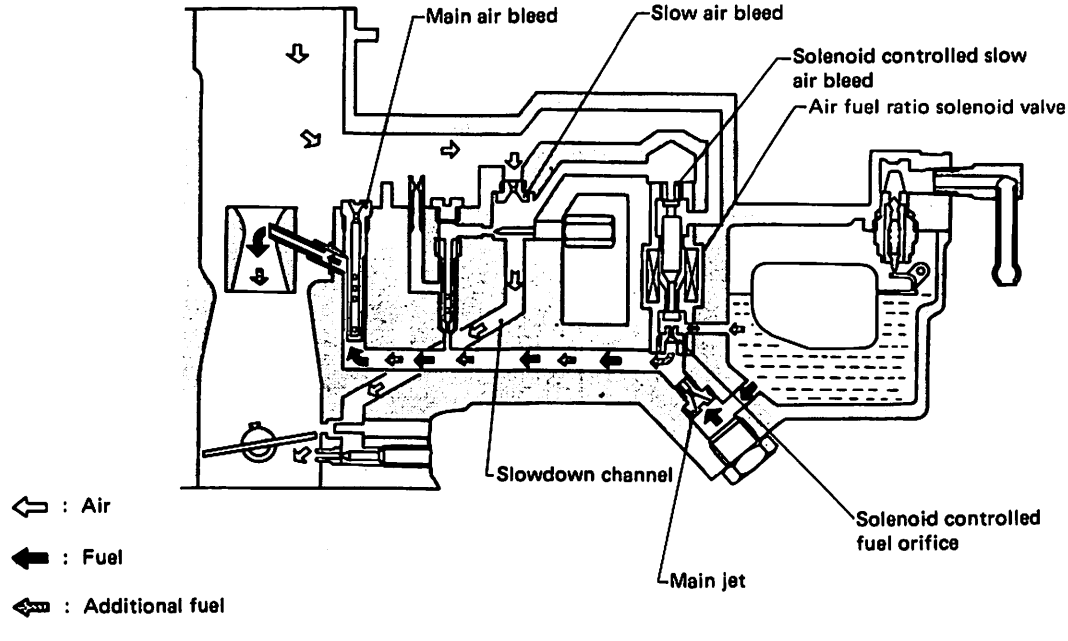
AIR-FUEL RATIO CONTROL SOLENOID VALVE

This solenoid valve is opened or closed repeatedly every 65 msec.

Under closed loop control, the percentage of opening time and closing time is feedback controlled in E.C.C. control unit by the signal from exhaust gas sensor.

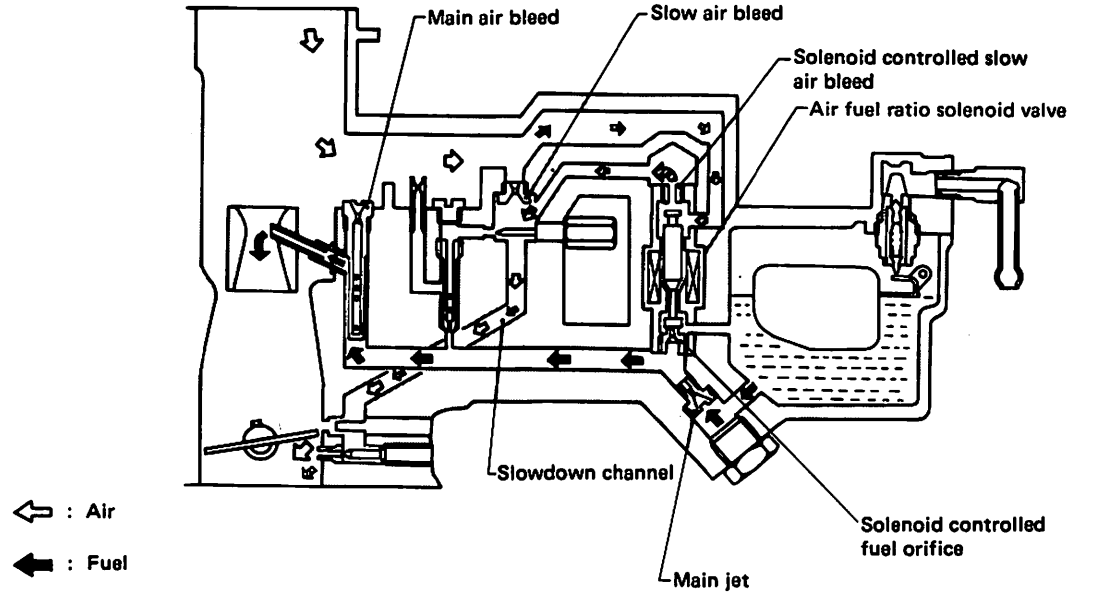
Under the open loop control, the percentage of opening time and closing time is kept at the specified level according to condition of engine.

Air fuel ratio solenoid valve: ON



SEF074D

Air fuel ratio solenoid valve: OFF

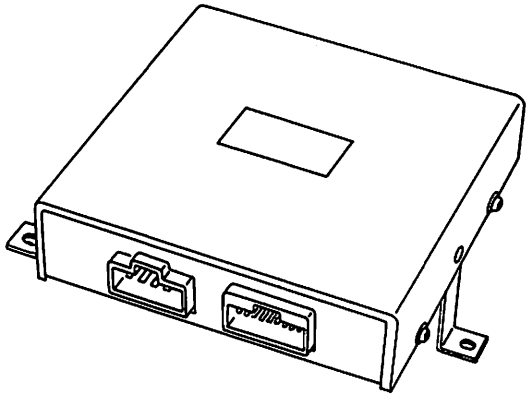


SEF075D

E.C.C. CONTROL UNIT

The E.C.C. control unit consists of a micro-computer, connectors for signal input and output and power supply, and an exhaust gas sensor monitor lamp. The control unit controls the feedback pulse width and fuel shutoff operation, etc.

A barometric pressure sensor is installed in order to correct the mixture ratio according to the elevation.



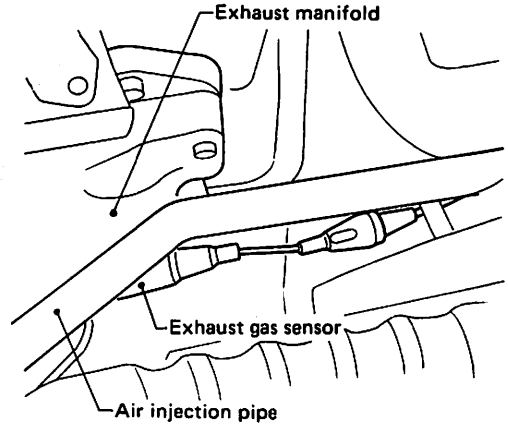
SEC185A

WARNING:

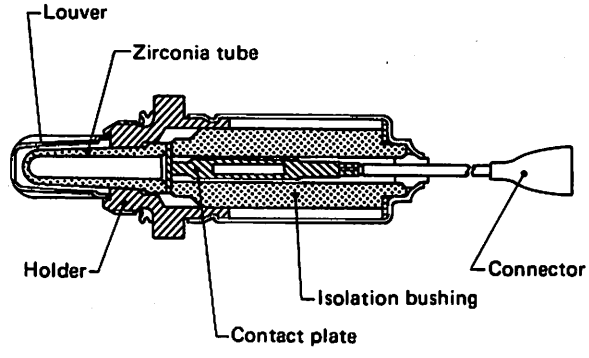
If your vehicle is equipped with electronic controls, use of a transmitter, such as a radio transmitter (but not a receiver, such as a radio) may interfere with unshielded electronic controls and cause them to malfunction. Vehicle manufacturers do not necessarily use electronic controls in the same ways or for the same operations. Examples of vehicle functions which may involve electronic controls include fuel delivery systems, engine timing, brakes, emission control and cruise control. Definite information regarding the type of electronic controls in your vehicle can only be obtained from the manufacturer. Consult your NISSAN/DATSUN dealer regarding the need for modifications to your vehicle's electronic controls before installation or use of a transmitter.

EXHAUST GAS SENSOR

The exhaust gas sensor, which is built into the exhaust manifold, monitors the density of oxygen in the exhaust gas. It consists of a closed-end tube made of ceramic zirconia and other components. Porous platinum electrodes cover the tubes inner and outer surfaces. The closed-end of the tube is exposed to the exhaust gas in the exhaust manifold. The tubes outer surface contacts the exhaust gas while the inner surface contacts the air.



SEC938



SEC336A

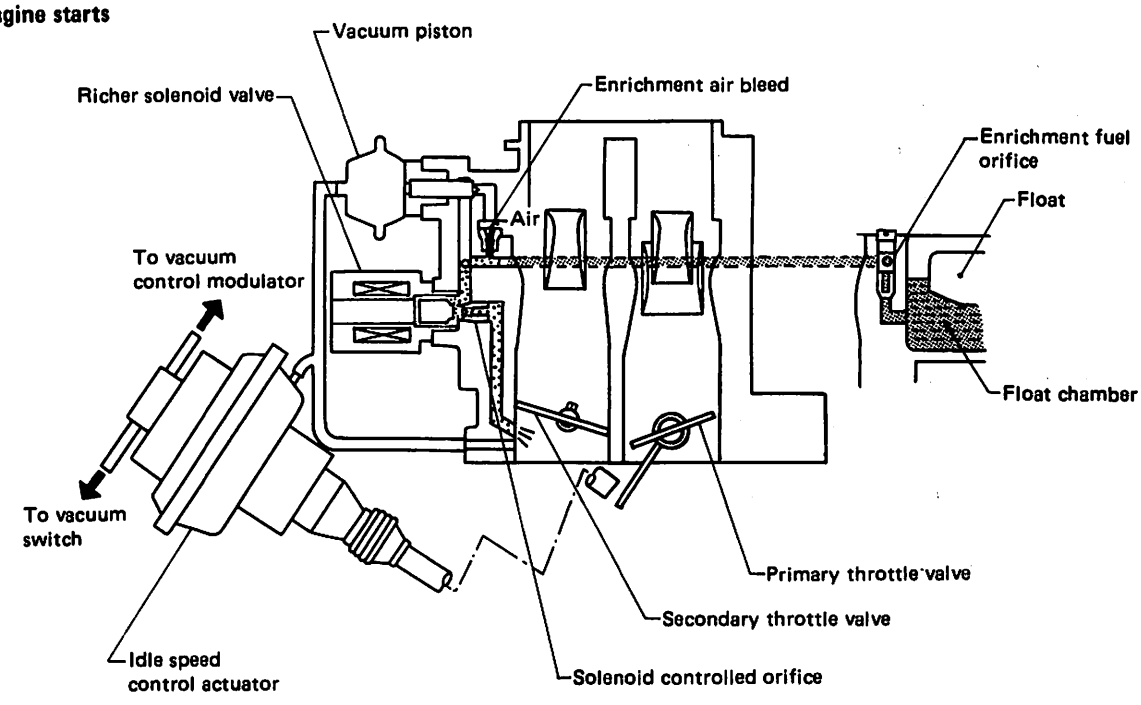
E.C.C. (Electronic Controlled Carburetor) SYSTEM DESCRIPTION

E16 for non-California

Cold Enrichment System

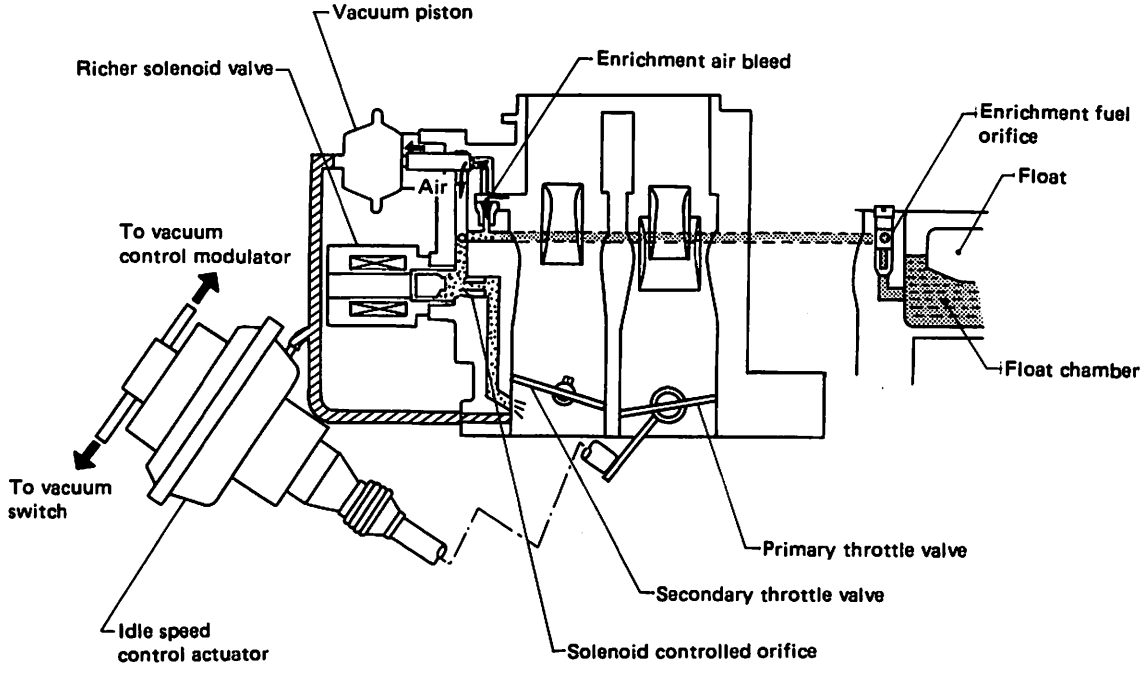
While the engine is cranking, the air-fuel ratio is controlled mainly by the cold enrichment solenoid valve. From first fire to start, the air-fuel ratio is controlled by the vacuum piston and richer solenoid valve. After the engine starts, in accordance with the time elapsed and warm-up condition of the engine, the air-fuel ratio is controlled by richer solenoid valve, and engine speed is controlled by idle speed control actuator.

Before engine starts



SEF014D

After engine starts



SEF015D

Cold Enrichment System (Cont'd)

RICHER SOLENOID VALVE

The richer solenoid valve controls the fuel led under the secondary throttle valve, and then air-fuel ratio during the engine warm-up. This valve is controlled by E.C.C. unit.

VACUUM PISTON

After the engine starts, the vacuum piston controls the air which is thinning down the fuel provided to richer solenoid, and regulates the air-fuel ratio.

IDLE SPEED CONTROL ACTUATOR

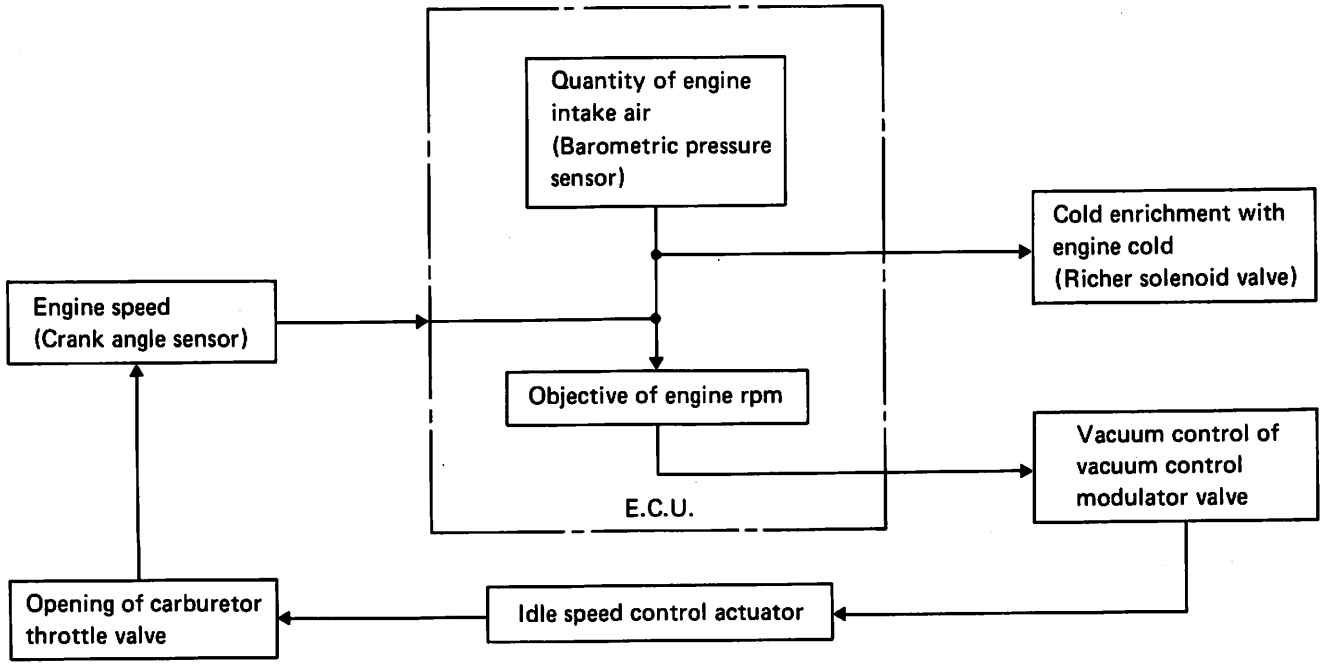
The idle speed control actuator is controlled by the vacuum control modulator, and controls the throttle valve opening in accordance with engine warm-up condition.
For operation, refer to Idle Speed Control System.

Idle Speed Control System

BASIC SYSTEM OPERATION

The idle speed is controlled by the E.C.C. control unit adjusting to the engine conditions. The E.C.C. control unit senses the idle condition, and determines the appropriate idle speed according to gear position, water temperature and connection of air-conditioner switch and so on, and provides the electric signal corresponding to the difference of best idle speed and actual idle speed to the vacuum control modulator.

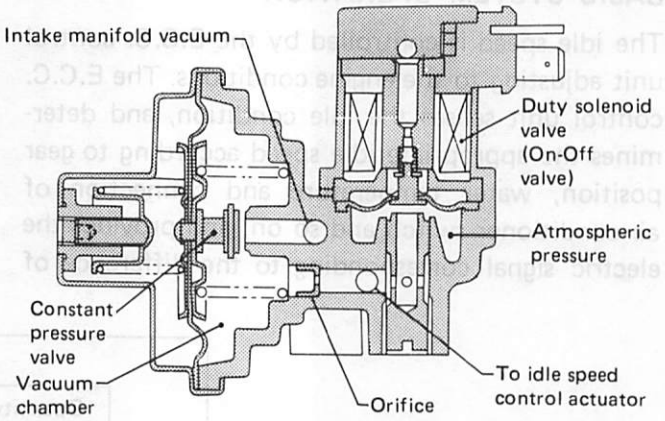
The vacuum control modulator transforms the electrical signal to the vacuum signal. The Idle Speed Control Actuator controls the idle speed by the vacuum signal from the vacuum control modulator.



Idle Speed Control System (Cont'd)

VACUUM CONTROL MODULATOR VALVE

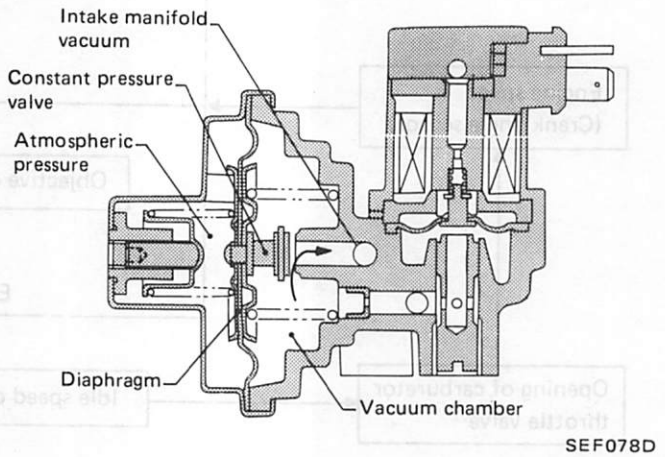
The vacuum control modulator valve consists of a constant pressure valve and a duty solenoid valve. The constant pressure valve controls the intake manifold vacuum at a constant level. The duty solenoid valve produces a control vacuum which is necessary to operate the idle speed control actuator leaking the vacuum produced in the constant pressure valve.



SEF077D

The manifold vacuum is directed to the right side of the diaphragm (that is the vacuum chamber), and the atmospheric pressure is directed to the left side of the diaphragm.

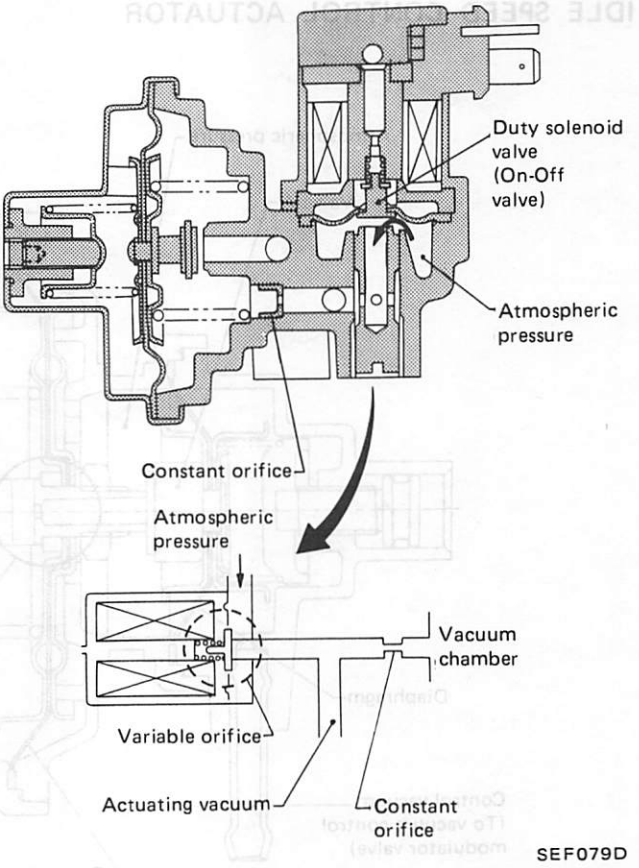
If the intake manifold vacuum increases, the constant pressure valve is moved to the right to block the passage. Then the pressure in the vacuum chamber does not decrease further, the constant pressure valve is opened by the return force of the spring and higher vacuum is produced in the vacuum chamber. Consequently, the vacuum in the vacuum chamber is regulated by the repeated above actions to a certain level.



SEF078D

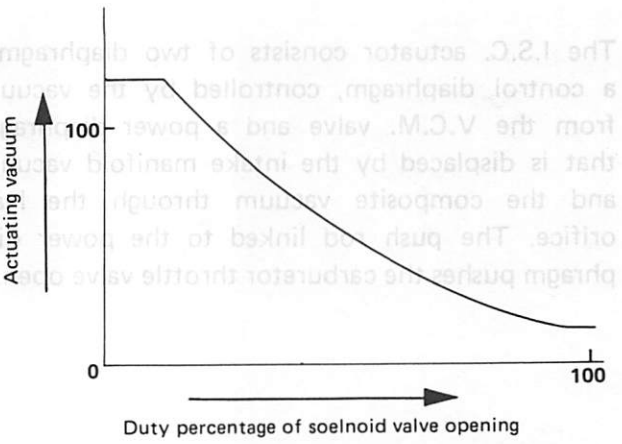
Idle Speed Control System (Cont'd)

The regulated vacuum passes through the constant orifice and is led to the duty solenoid valve. At this time, the duty solenoid valve is opened and closed repeatedly by the electrical signal from the E.C.C. control unit like the air-fuel ratio solenoid valve.



SEF079D

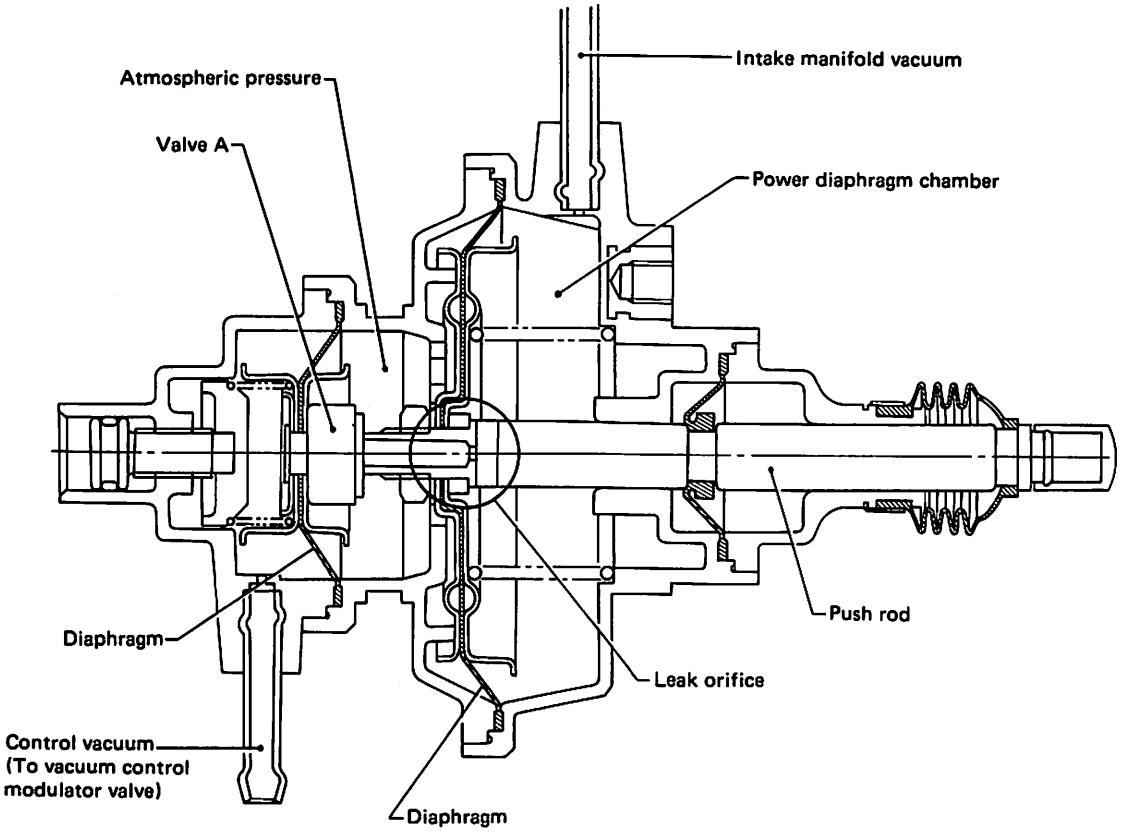
When the duty percentage of the duty solenoid valve opening is high, the diameter of the variable orifice increases and the control vacuum, which determines the position of push rod of idle speed control actuator and the opening of the throttle valve, is low. On the contrary, when the duty percentage is low, the diameter decreases and the control vacuum is high.



SEF363C

Idle Speed Control System (Cont'd)

IDLE SPEED CONTROL ACTUATOR

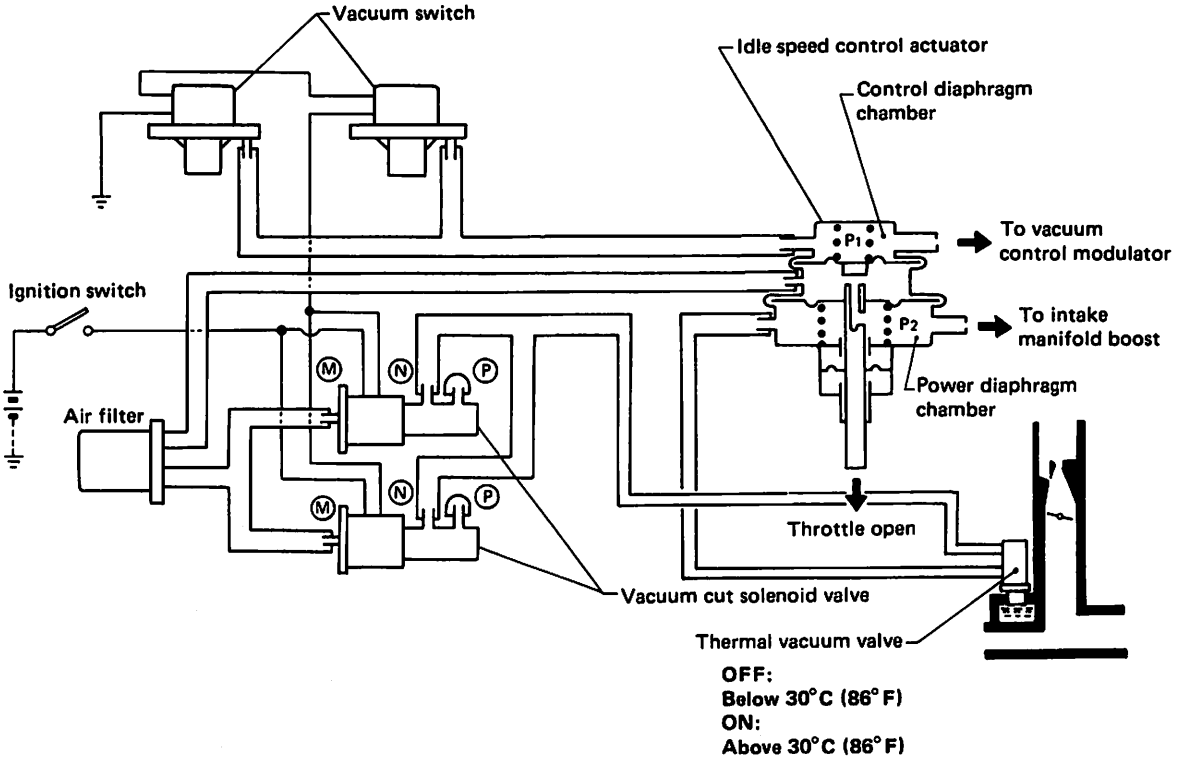


SEF364C

The I.S.C. actuator consists of two diaphragms: a control diaphragm, controlled by the vacuum from the V.C.M. valve and a power diaphragm that is displaced by the intake manifold vacuum and the composite vacuum through the leak orifice. The push rod linked to the power diaphragm pushes the carburetor throttle valve open.

Idle Speed Control System (Cont'd)

(1) When the engine is stopped.
The leak orifice is closed by the return springs of the power diaphragm chamber and control diaphragm chamber.

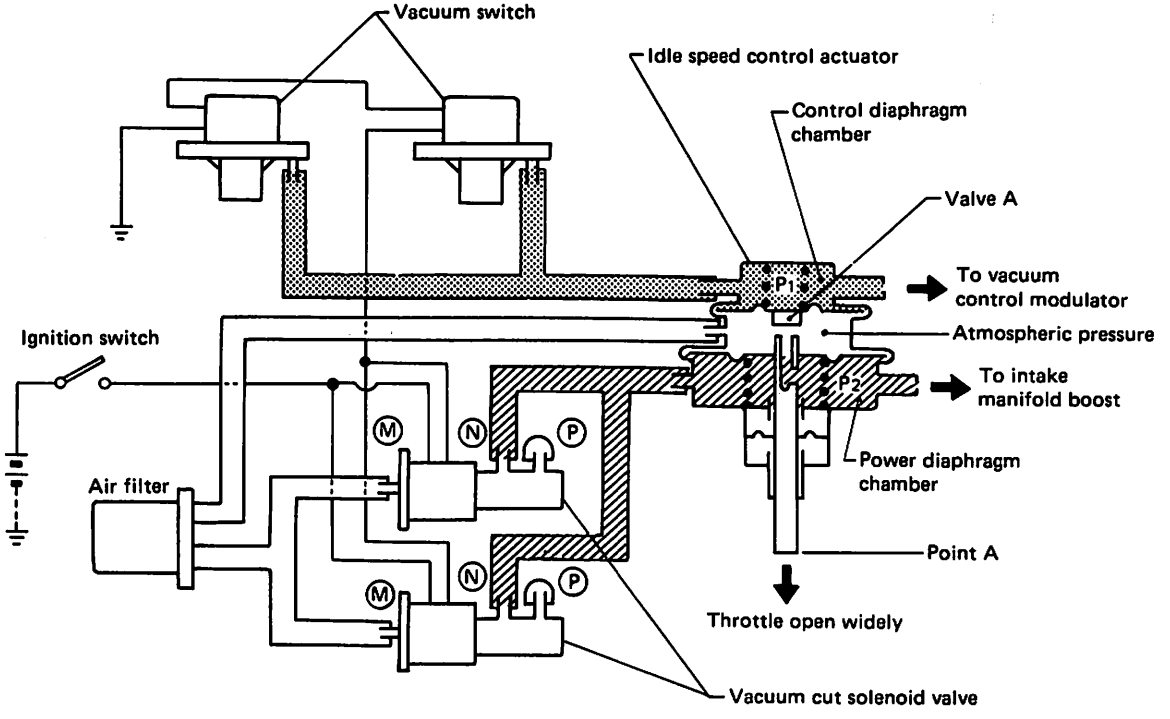


SEF354C

Idle Speed Control System (Cont'd)

(2) Soon after the engine is started.
The control vacuum produced in the vacuum control modulator valve goes to the control diaphragm chamber. Therefore the position of the valve A is determined by the strength of the control vacuum.
On the other hand, the power diaphragm chamber is moved downward by the intake manifold vacuum. However, the leak orifice is opened and the intake manifold vacuum in the power diaphragm chamber is weakened because the atmospheric pressure goes to the power diaphragm chamber. Then, the power diaphragm is moved upward until the tip of the push rod contacts the valve A.

(3) When the engine is cold
It is necessary to run the engine at fast idle speed to warm it rapidly. Lower control vacuum is made in the vacuum control modulator valve by the signal from the E.C.C. control unit and the position of valve A is determined by the lower control vacuum. The push rod is set at point A. Consequently, the throttle valve is opened wide to run engine at high idle speed.

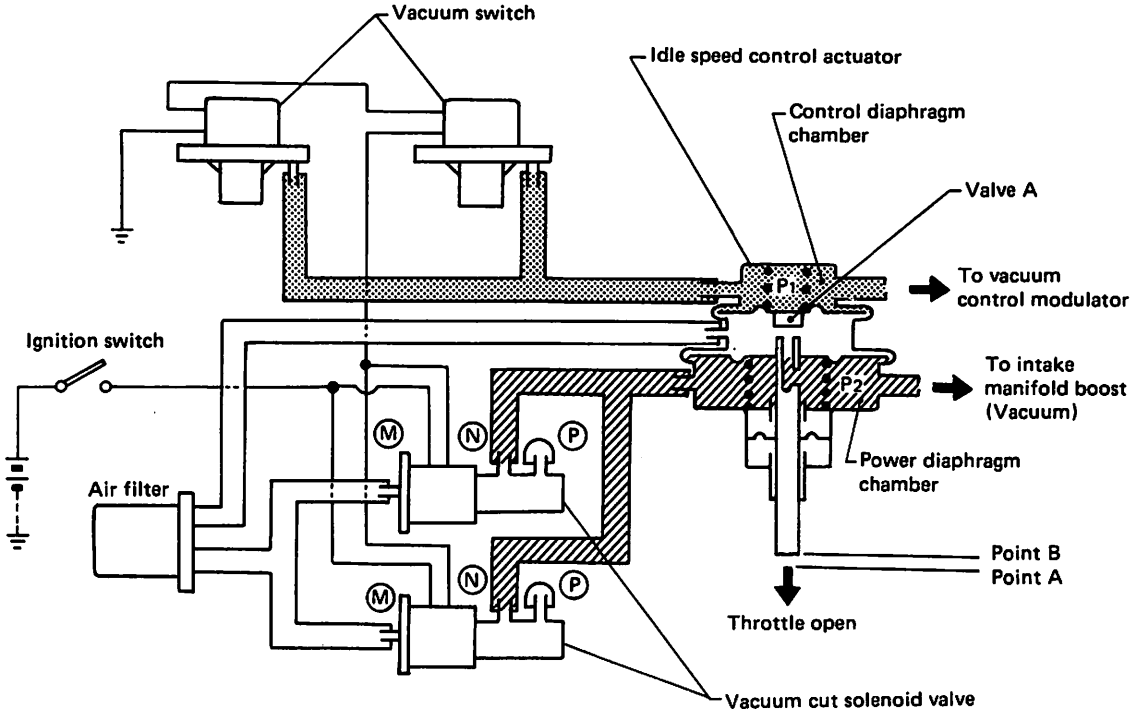


SEF365C

Idle Speed Control System (Cont'd)

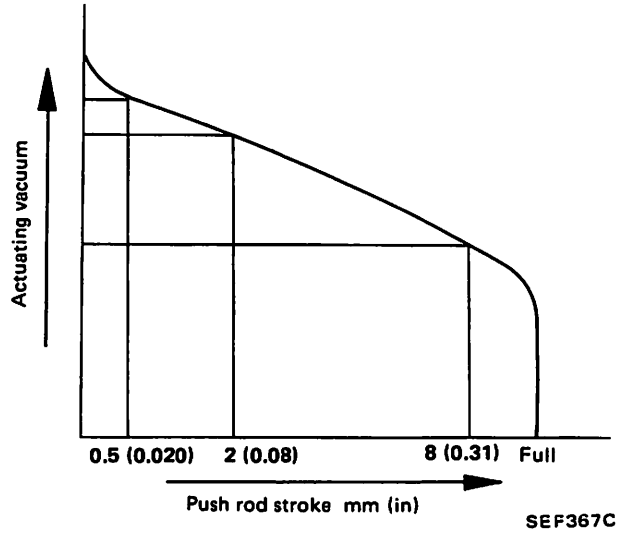
(4) When the engine is hot

Higher actuating vacuum is made in the vacuum control modulator valve by the signal from the E.C.C. control unit and the push rod is set at point B. The throttle valve is closed to decrease the idle speed.



SEF366C

- Relationship between the control vacuum and push rod stroke.



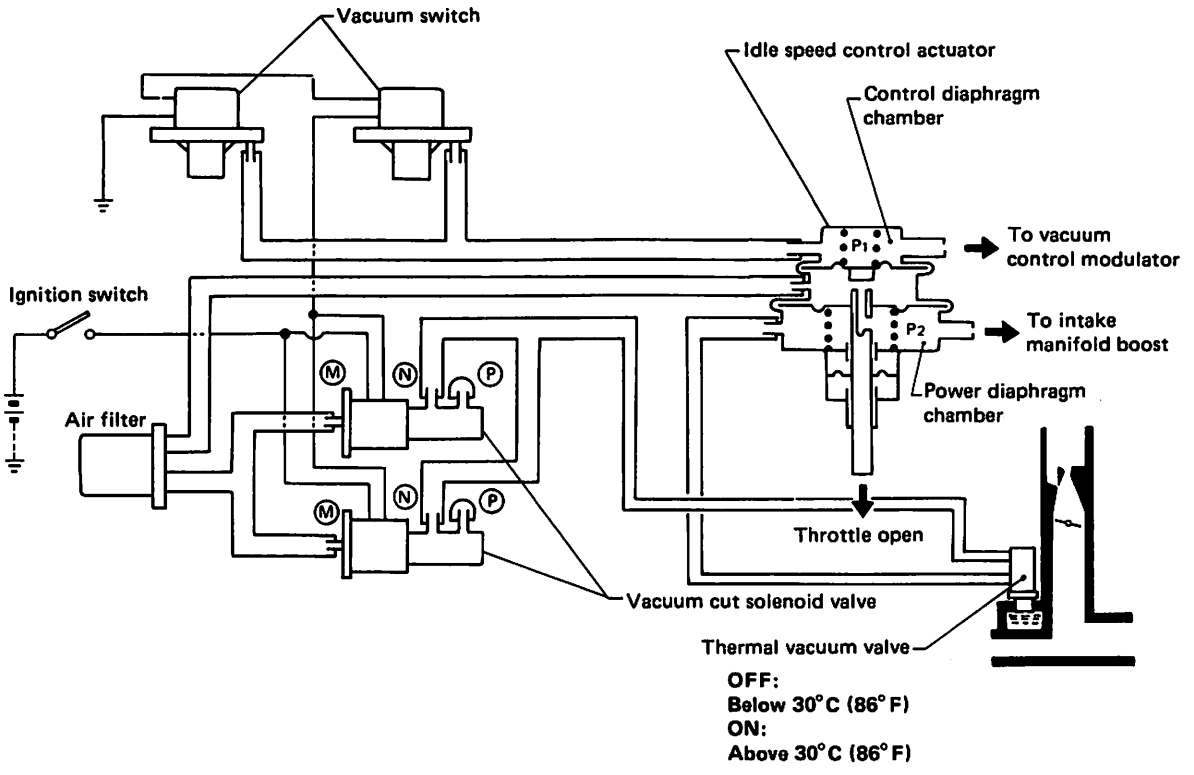
SEF367C

Idle Speed Control System (Cont'd)

FAIL-SAFE SYSTEM

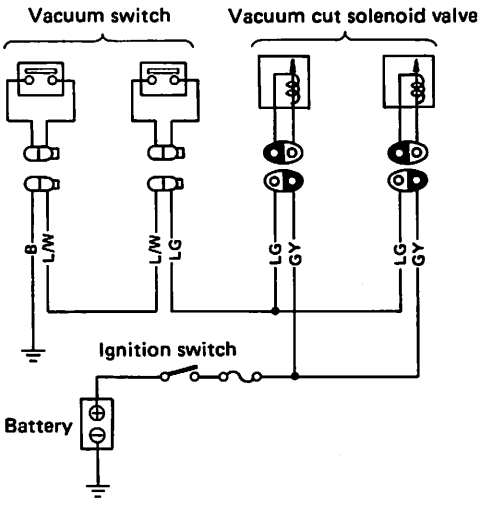
A fail-safe system is operated when any of the vacuum hoses connecting idle speed control actuator with vacuum control modulator is disconnected or cut off due to an accident.

This system is a "Double fail-safe system". There are two vacuum switches and two vacuum cut solenoid valves for extra security.



SEF354C

If vacuum hose between idle speed control actuator and vacuum control modulator is disconnected, vacuum switches detect atmospheric pressure and cut off electric supply to vacuum cut solenoid valves. The air passages between Ⓜ and Ⓝ become open, thus atmospheric pressure through air filter is led to power diaphragm chamber to stop idle speed control actuator from opening throttle valve.



SEF362C

Idle Speed Control System Checking Procedure

START

Does the engine start?

No

Yes

Start the engine.

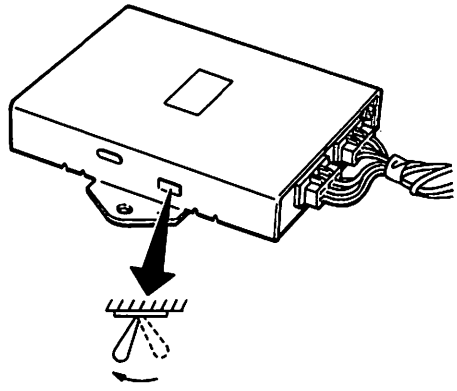
Does vacuum control modulator operate? (Can you hear it operating?)

No

Replace vacuum control modulator.

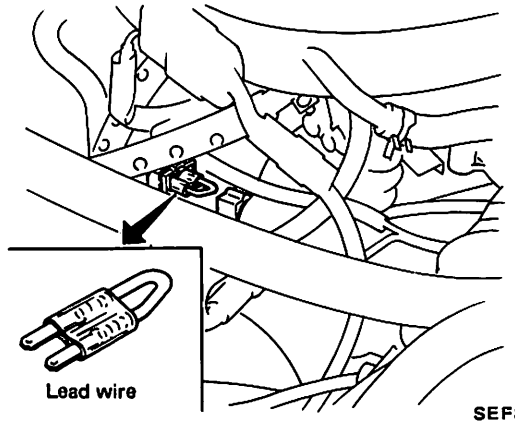
Yes

1. Warm up the engine and let it run at idle in "N" position.
2. Turn diagnosis start switch "ON".



SEF829B

3. Disconnect water temperature sensor harness connector and connect a lead wire between two terminals of the connector.



SEF830B

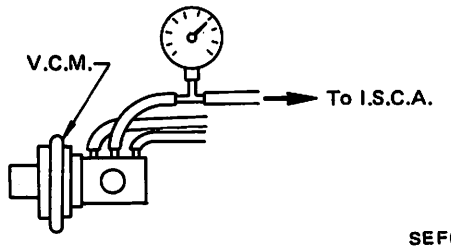
(B)

(A) (C)

Idle Speed Control System Checking Procedure (Cont'd)

Ⓑ

Check the vacuum between vacuum control modulator and idle speed control actuator:
Between 8.7 and 14.0 kPa
(65 and 105 mmHg, 2.56 and 4.13 inHg)



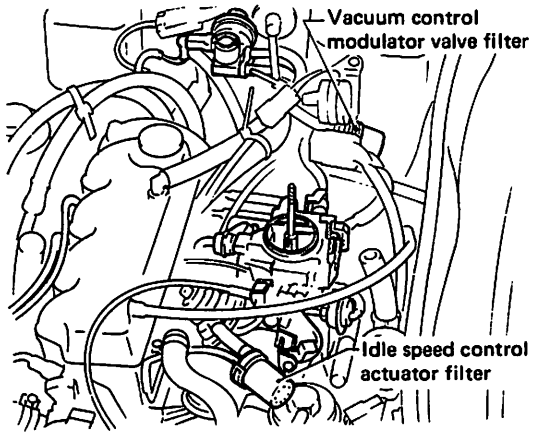
SEF016D

After checking, stop engine, turn diagnosis switch "OFF" and reconnect water temperature sensor connector.

N.G.

O.K. → Perform diagnosis.
Refer to:
DIAGNOSTIC PROCEDURES
- Improper idling
- Engine startability
- Engine stall

Check the air filters and vacuum piping for clogging.



SMA852A

N.G. → Replace faulty air filter or vacuum hose.

O.K. → Replace vacuum control modulator.

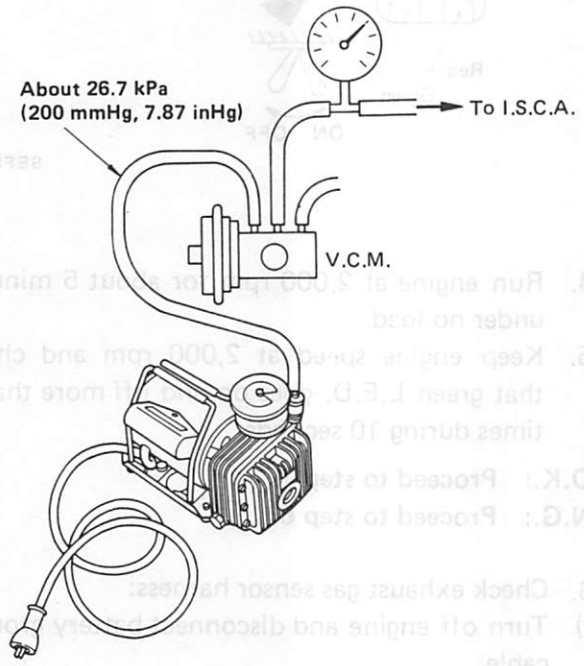
Ⓒ

Ⓓ Ⓒ

Idle Speed Control System Checking Procedure (Cont'd)

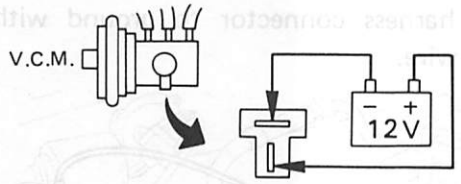
Ⓐ

1. Apply vacuum of about 26.7 kPa (200 mmHg, 7.87 inHg) to vacuum control modulator input connector.
2. Set vacuum gauge between vacuum control modulator and idle speed control actuator.



SEF017D

3. Apply voltage of about 12V to terminals of vacuum control modulator.



SEF018D

Read vacuum:
Between 3.3 and 6.7 kPa (25 and 50 mmHg, 0.98 and 1.97 inHg)

N.G.

O.K. → Ⓓ Ⓒ

Replace vacuum control modulator.

E.C.C. (Electronic Controlled Carburetor) SYSTEM INSPECTION

E16 for non-California

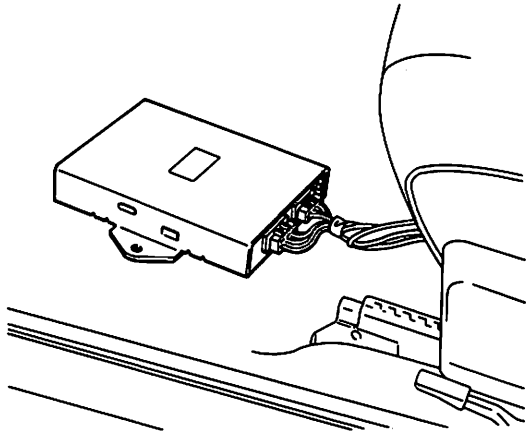
CAUTION:

a. **Before disconnecting electrical connectors and E.C.C. harness connectors, ensure that ignition switch is in the "OFF" position.**
b. **Be extremely careful not to break or bend 10-pin or 20-pin connectors when disconnecting. Do not touch the circuit tester probe to any unnecessary pin on the 10-pin and 20-pin connectors. Doing so could cause damage to the circuit tester.**
c. **After inspection or replacement, securely connect E.C.C. harness connector with control unit, and then test it to make sure.**

- Disconnect battery ground cable.
- Disconnect E.C.C. 10-pin and 20-pin harness connectors from control unit.

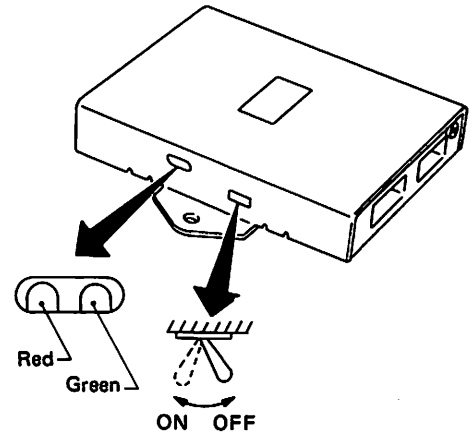
Engine should be off.

1. Position E.C.C. control unit so that red and green L.E.D.s (inspection lamps) can be easily looked at.



SEF809B

2. Start engine and warm it up sufficiently.
3. Verify that diagnosis start switch on E.C.C. control unit is "OFF".



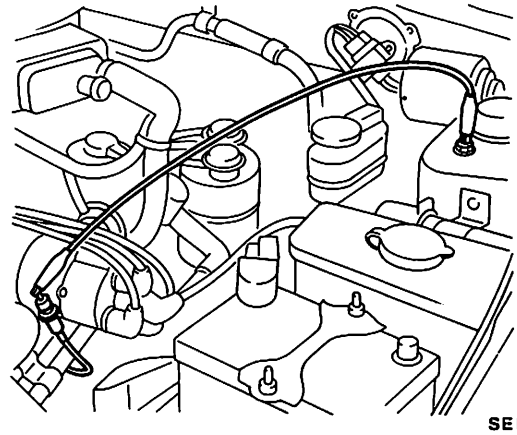
SEF810B

4. Run engine at 2,000 rpm for about 5 minutes under no-load.
5. Keep engine speed at 2,000 rpm and check that green L.E.D. goes on and off more than 5 times during 10 seconds.

O.K.: Proceed to step 7.
N.G.: Proceed to step 6.

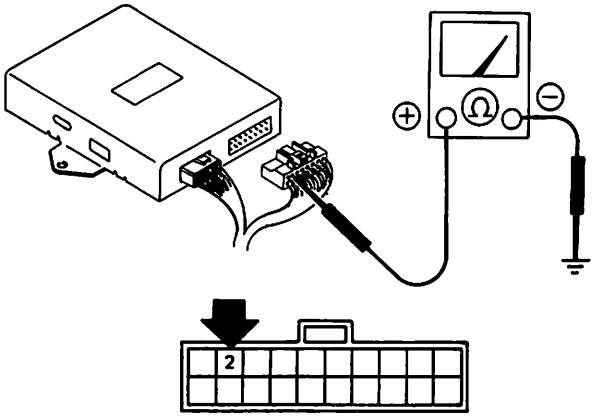
6. Check exhaust gas sensor harness:

a) Turn off engine and disconnect battery ground cable.
b) Disconnect 20-pin connector from control unit.
c) Disconnect exhaust gas sensor harness connector and connect terminal for exhaust gas sensor harness connector to ground with a jumper wire.



SEF542A

d) Check for continuity between terminal No. 2 for 20-pin connector and ground metal on vehicle body.



View from harness side

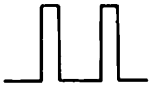
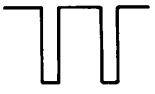
SEF813B

Continuity exists:
Replace exhaust gas sensor.
Continuity does not exist:
Repair or replace E.C.C. harness.

e) Return to operation 2.

7. Turn off engine and turn the diagnosis start switch on E.C.C. control unit "ON".
8. Turn ignition switch "ON" and check red and green L.E.D. on E.C.C. control unit for lighting interval.

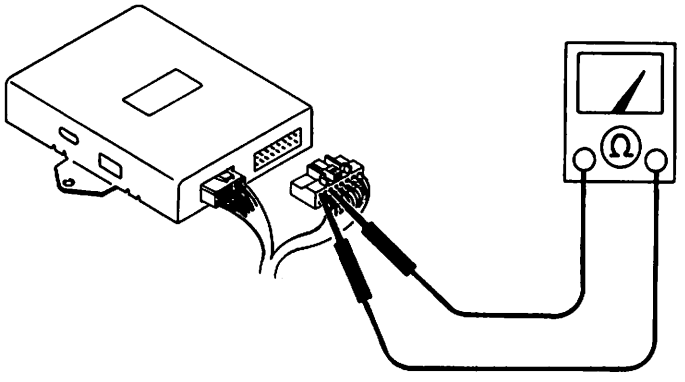
Do not start engine.

	Red L.E.D.	Green L.E.D.	Faulty part or circuit	Next step
Case 1	ON	ON / OFF 	• Vacuum sensor • Barometric pressure sensor • Water temperature sensor • Air temperature sensor	Proceed to step 9.
Case 2	ON	ON / OFF 	• Mixture heater relay • Air-fuel ratio solenoid valve • Richer solenoid valve • Anti-dieseling solenoid valve • Air injection control solenoid valve • Duty solenoid valve (V.C.M.) • E.G.R. & Canister control solenoid valve	Proceed to step 10.
Case 3	OFF	ON	No problem	END.

9. Case 1: Check each sensor.
a) Turn ignition switch "OFF".
b) Verify that each harness connector is connected securely. If not, correct and return to operation 8.
c) Disconnect E.C.C. 20-pin connector from control unit.
d) Measure resistance or voltage of each sensor referring to TABLE A.

TABLE A

Sensor	Circuit tester	Check terminals		Condition	Standard value
		+	–		
Water temperature sensor	Ω	8	19	20°C (68°F) or above	Below 2.9 kΩ
				Below 20°C (68°F)	2.1 kΩ or above
Air temperature sensor		1		20°C (68°F) or above	Below 2.9 kΩ
				Below 20°C (68°F)	2.1 kΩ or above

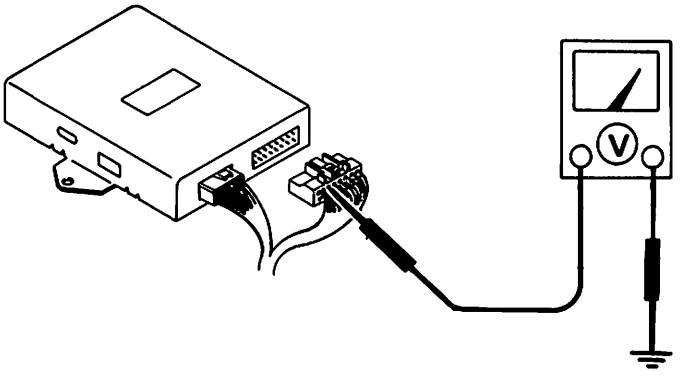




View from harness side

SEF816B

Sensor	Circuit tester	Check terminals		Condition	Standard value
		+	–		
Vacuum sensor*	V	9	Ground	0 kPa (0 mmHg, 0 inHg)	4.0V
				–88.0 kPa (–660 mmHg, –25.98 inHg)	0.5V



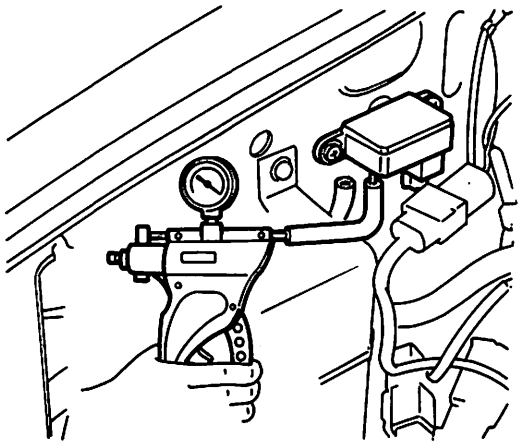


View from harness side

SEF751C

*When measuring vacuum sensor output voltage, the following preparation is necessary:

1) Disconnect vacuum hose for vacuum sensor and connect vacuum pump to vacuum sensor.



SEF815B

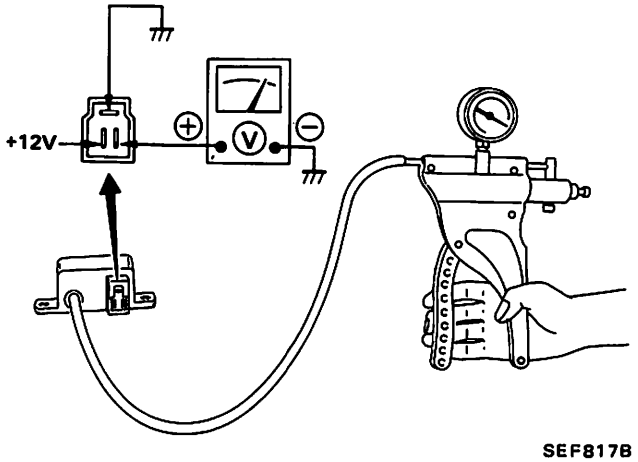
O.K.: Replace control unit and return to operation 8.

N.G.: Proceed to e).

2) Turn ignition switch "ON".

e) Disconnect each sensor harness connector.

f) Connect vacuum sensor terminals to battery (+) and (—) terminals with jumper wires and check output voltage (see TABLE A for standard value).



SEF817B

O.K.: Proceed to i).

N.G.: Replace vacuum sensor and return to operation 8.

g) Measure the resistance of water temperature sensor and intake air temperature sensor at the terminals of each sensor (see TABLE A for standard value).

O.K.: Correct or replace E.C.C. harness.

N.G.: Replace malfunctioning sensor.

Then, reconnect each harness connector and return to operation 8.

10. Case 2: Check each solenoid valve and relay.

a) Turn ignition switch "OFF".

b) Verify that each harness connector is connected securely. If not, correct and return to operation 8.

c) Disconnect each harness connector.

d) Measure the resistance of each solenoid valve referring to Table B.

TABLE B

Solenoid	Resistance (Ω)
Mixture heater relay	60 - 85
Air-fuel ratio solenoid valve	30 - 50
Richer solenoid valve	20 - 40
Anti-dieseling solenoid valve	25 - 45
Air injection control solenoid valve	
Duty solenoid valve (V.C.M.)	
E.G.R. & Canister control solenoid valve	

If idle speed control solenoid resistance is out of specification, replace vacuum control modulator.

If resistance of other solenoid valves or relay is out of specification, replace malfunctioning solenoid valve or relay.

Then, return to operation 8.

If O.K., proceed to e).

e) Reconnect harness connectors.

f) Disconnect E.C.C. 10-pin connector and 20-pin connector from control unit.

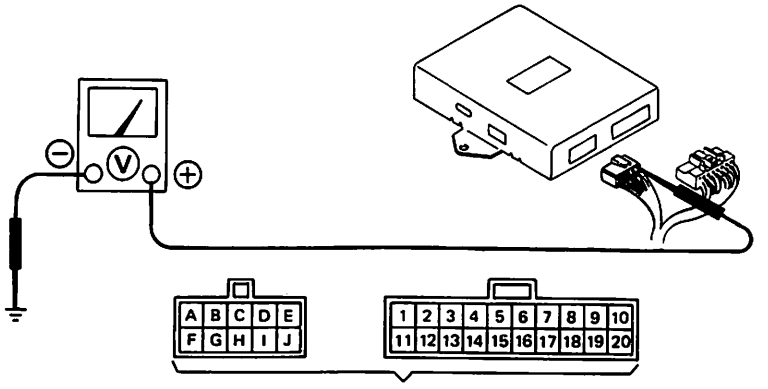
g) Turn ignition switch "ON".

h) Measure the voltage between each terminal and ground.

E.C.C. (Electronic Controlled Carburetor) SYSTEM INSPECTION

E16 for non-California

Solenoid	Check terminals		Voltage (V)
Mixture heater relay	3	Body ground	12 - 14
Air fuel ratio solenoid valve	F		
Richer solenoid valve	B		
Anti-dieseling solenoid valve	G		
Air injection control solenoid valve	H		
Duty solenoid valve (V.C.M.)	I		
E.G.R. & Canister control solenoid valve	C		



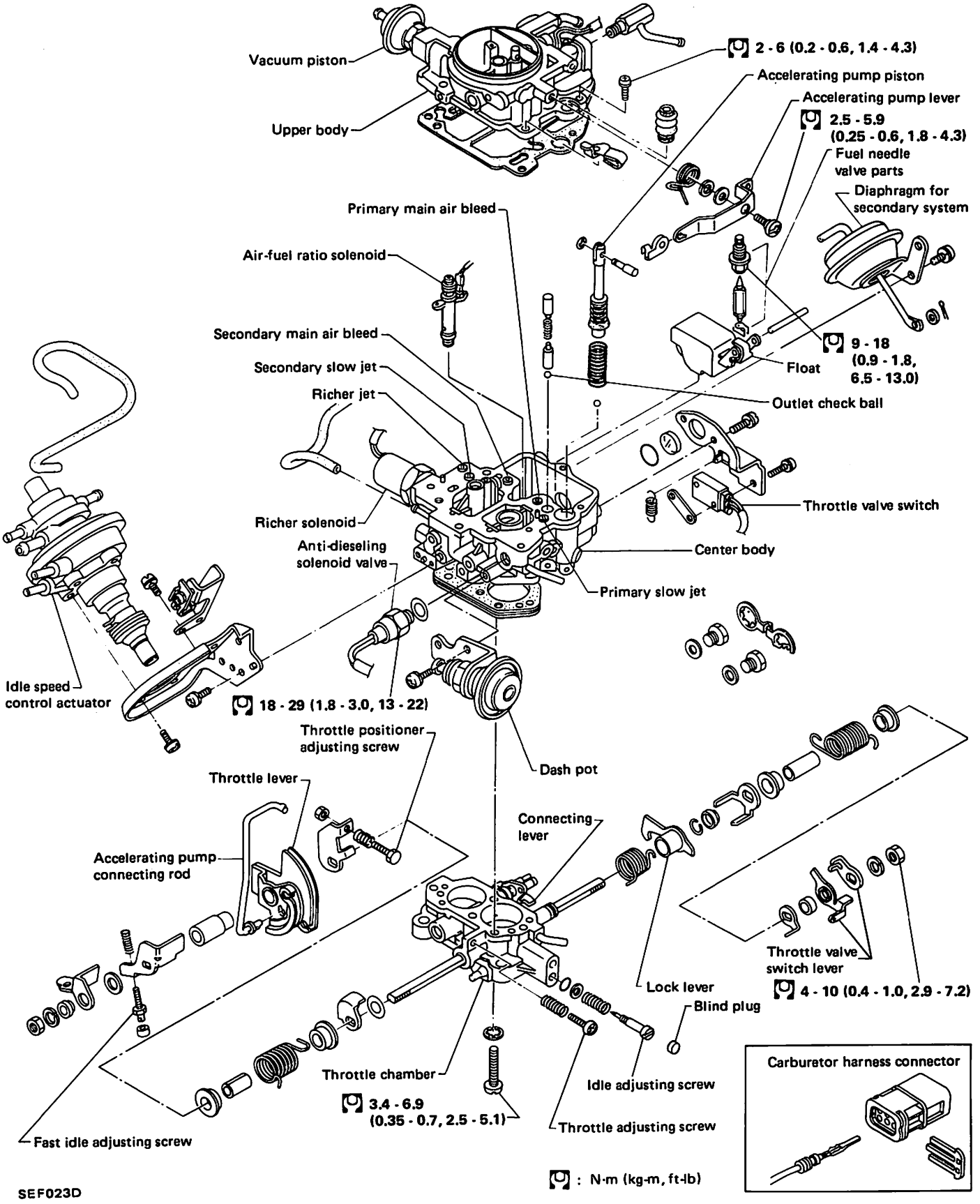
View from harness side

SEF701C

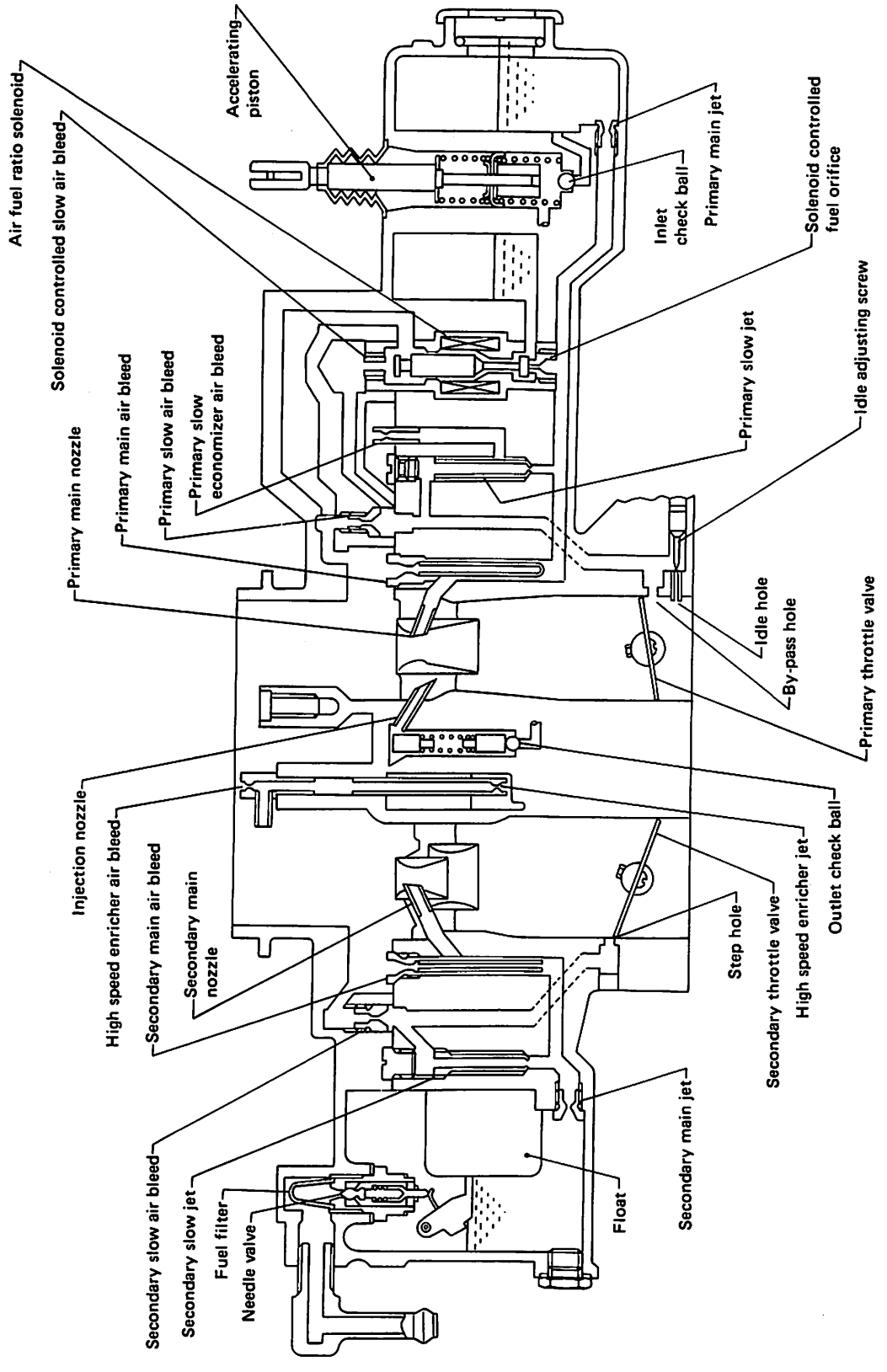
O.K.: Replace control unit and return to operation 8.

N.G.: Repair or replace harness.

CARBURETOR


Vacuum piston
Upper body
2 - 6 (0.2 - 0.6, 1.4 - 4.3)
Accelerating pump piston
Accelerating pump lever
2.5 - 5.9 (0.25 - 0.6, 1.8 - 4.3)
Fuel needle valve parts
Diaphragm for secondary system
Primary main air bleed
Air-fuel ratio solenoid
Secondary main air bleed
Secondary slow jet
Richer jet
9 - 18 (0.9 - 1.8, 6.5 - 13.0)
Float
Outlet check ball
Throttle valve switch
Richer solenoid
Anti-dieseling solenoid valve
Center body
Primary slow jet
Idle speed control actuator
18 - 29 (1.8 - 3.0, 13 - 22)
Throttle positioner adjusting screw
Dash pot
Throttle lever
Connecting lever
Accelerating pump connecting rod
Throttle valve switch lever
4 - 10 (0.4 - 1.0, 2.9 - 7.2)
Lock lever
Blind plug
Throttle chamber
3.4 - 6.9 (0.35 - 0.7, 2.5 - 5.1)
Idle adjusting screw
Throttle adjusting screw
Fast idle adjusting screw
Carburetor harness connector
: N·m (kg-m, ft-lb)
SEF023D

CARBURETOR



SEF371C

CARBURETOR

Major Service Operation

The perfectly adjusted carburetor delivers the proper fuel and air ratios at all speeds for the particular engine for which it was designed.
The carburetor should be maintained in its original condition and will continue to deliver the proper ratios.
To maintain accurate carbureting through passages and discharge holes, extreme care must be taken in cleaning.
Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean or carburetor calibration will be affected.

REMOVAL

Remove carburetor from engine, taking sufficient care to the following:

PRECAUTIONS:

a. **When disconnecting fuel lines, do not spill fuel from fuel pipe.**
b. **When removing carburetor, do not drop any nut or bolt into intake manifold.**
c. **Be careful not to bend or scratch any part.**
d. **Before removing carburetor, drain about one liter (1-1/8 US qt, 7/8 Imp qt) of engine coolant.**

CLEANING AND INSPECTION

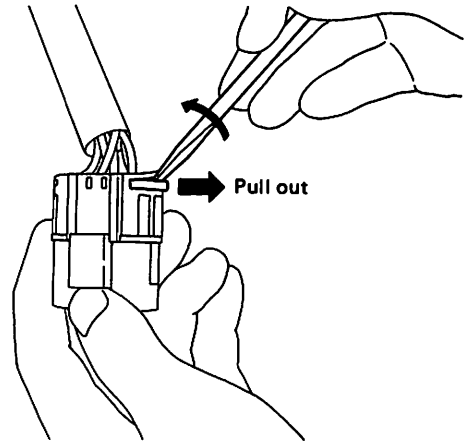
Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor often results in unsatisfactory performance. For this reason, efficient carbureting depends upon careful cleaning and inspection while servicing.
Before assembling and installing the carburetor, blow all passages and castings with compressed air and blow off all parts until dry.

Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

Disassembling Carburetor Harness Connector

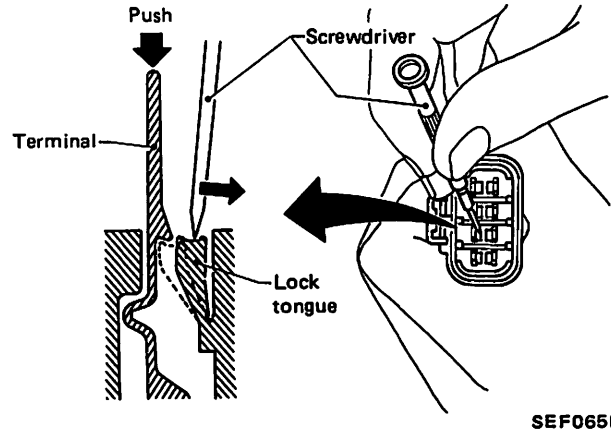
When replacing anti-dieseling solenoid, throttle valve switch, auto choke heater (choke chamber assembly) or air-fuel ratio solenoid, it will be necessary to disassemble carburetor harness connector.

1. Remove rear clip.



SEF064D

2. With a small screwdriver, tilt lock tongue and, at the same time, push out terminal.



SEF065D

CAUTION:

- **When extracting terminal, do not pull wire harness. Always push the top of terminal.**
- **Take care not to damage seal boot at the bottom of terminal.**
- **Do not let oil or gasoline adhere to seal boot.**

CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture Ratio

The idle mixture adjusting screw which has been preset at the factory should be adjusted only in the event of a major carburetor overhaul, throttle body replacement or to lower exhaust emissions as directed by official inspections.
The plug which seals this screw should not be removed during routine maintenance.
Adjusting mixture using other than the method below may violate Federal, or other state and Provincial laws.

- **After adjusting idle speed and mixture ratio, be sure to check items below, and if necessary, adjust them.**
  (1) Dash pot touch speed
  (2) Throttle valve switch operating speed

Preparation

1. Make sure that the following parts are in good order.
- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- E.C.C. component parts
- Main harness connector
- Hoses
- Oil filler cap and oil level gauge
- Valve clearance

2. Connect engine tachometer and timing light in their proper positions.
3. Apply parking brake and block both front and rear wheels with chocks.
4. Ensure that these switches and units are in the following positions:
- Headlamp switch: OFF
- Heater blower: OFF
- Air conditioning switch: OFF (if equipped)
- Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)

5. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.
6. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

WARNING:

a. **Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.**
b. **On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.**
c. **After adjustment has been made, shift the lever to "N" or "P" position.**

CARBURETOR — Inspection and Adjustment

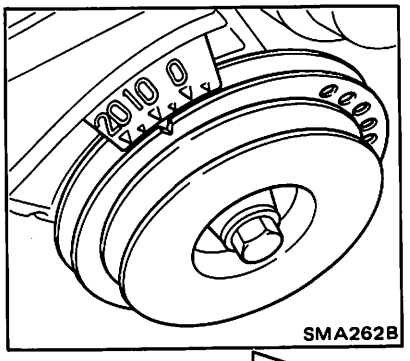
Idle Speed and Mixture Ratio

START

Start engine and warm it up until water temperature indicator points to middle of gauge. Ensure that engine speed is below 1,000 rpm.

Open engine hood.

Run engine at idle speed for 2 minutes.


SMA262B

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.


SMA845A

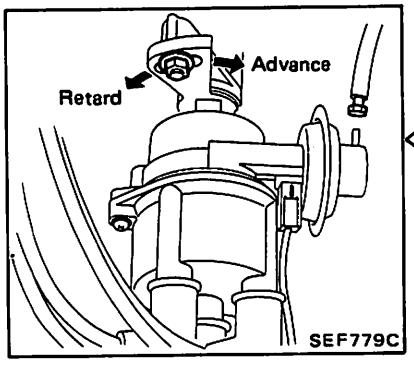
Check ignition timing.

IGNITION TIMING:
M/T 10°±2° B.T.D.C.
A/T 10°±2° B.T.D.C. (in "D" position)

O.K.

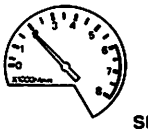
N.G.

Adjust ignition timing by turning distributor, loosening distributor securing bolt.



SEF779C

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.


SMA845A

* Check idle speed.

IDLE SPEED:
M/T 800±100 rpm
A/T 650±100 rpm (in "D" position)

O.K.

N.G.

Correct or replace control unit, carburetor, or vacuum control modulator.

Ⓐ Ⓓ Ⓑ

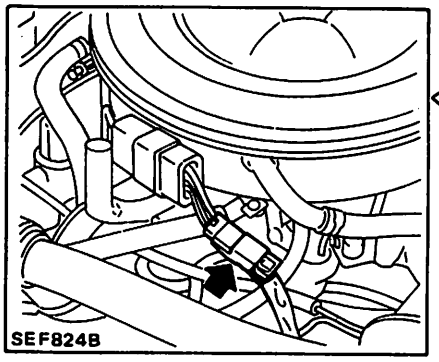
***a. This check or adjustment should be performed under the following conditions:**

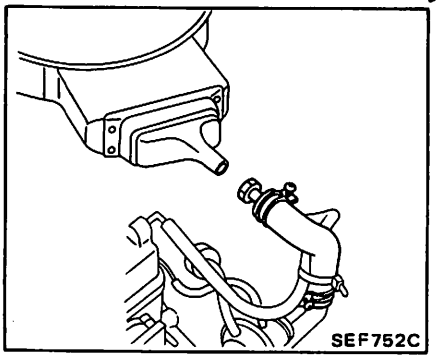
- **Headlamp switch: OFF**
- **Heater blower: OFF**
- **Air conditioning switch: OFF (if equipped)**
- **Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)**

b. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture Ratio (Cont'd)


SEF824B


SEF752C

Ⓐ Ⓔ

Turn off engine and disconnect air-fuel ratio solenoid harness connector, and disconnect air induction hose from air pipe and install caps on air pipe.

Start engine.

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.


SMA845A

*Check idle "CO"%.

IDLE "CO"%: 1 - 5%

O.K. / N.G.

Does engine run smoothly? NO → Check the following.
- Vacuum hoses for proper connections
- Air leaks at carburetor mounting and intake manifold

YES

O.K. / N.G. → Correct or replace malfunctioning parts. → Ⓑ

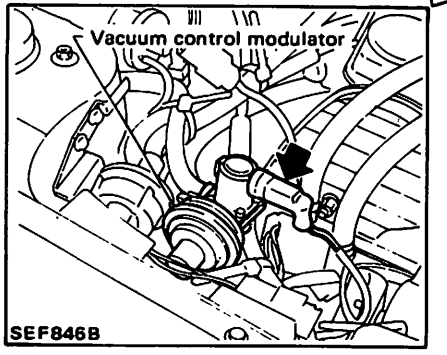
*Adjust idle mixture ratio until idle "CO" 3.0±1.0% is obtained and install idle mixture seal plug. (Refer to IDLE MIXTURE ADJUSTING PROCEDURE.)

O.K. / N.G. → Correct or replace carburetor.

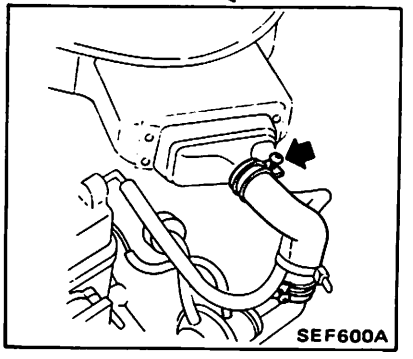
Turn off engine and connect air-fuel ratio solenoid harness connector, and connect air induction hose to air pipe.

Disconnect vacuum control modulator harness connector.

Start engine.



SEF846B


SEF600A

Ⓒ

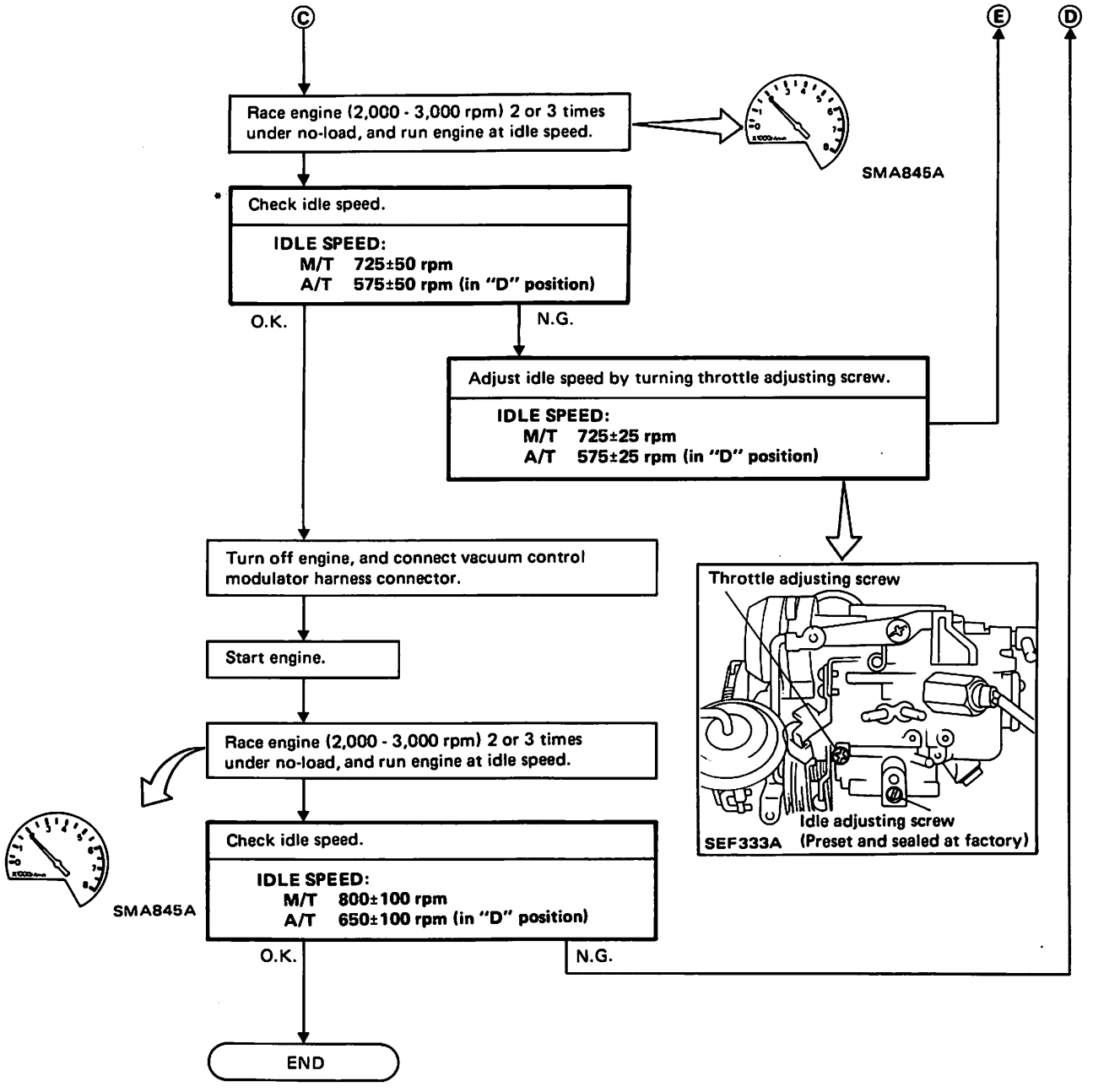
***a. This check or adjustment should be performed under the following conditions:**
- **Headlamp switch: OFF**
- **Heater blower: OFF**
- **Air conditioning switch: OFF (if equipped)**
- **Steering: KEEP WHEELS STRAIGHT AHEAD (if equipped with power steering)**

b. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

c. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture Ratio (Cont'd)



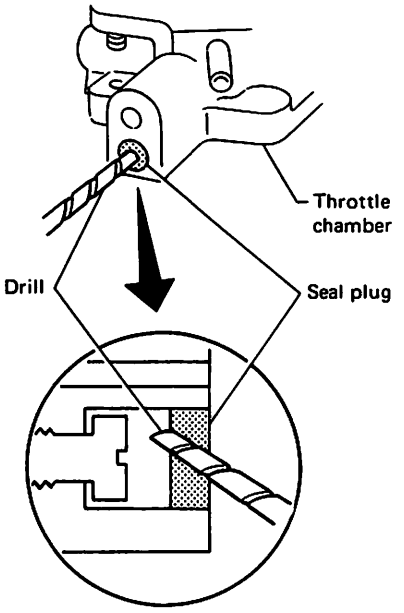
CARBURETOR — Inspection and Adjustment

Idle Mixture Adjusting Procedure

CAUTION:

a. **Removal of idle adjusting screw seal plug should be performed only when idle mixture adjustment or carburetor overhaul is necessary.**
b. **When installing carburetor, be sure to tighten nuts to specified torque.**

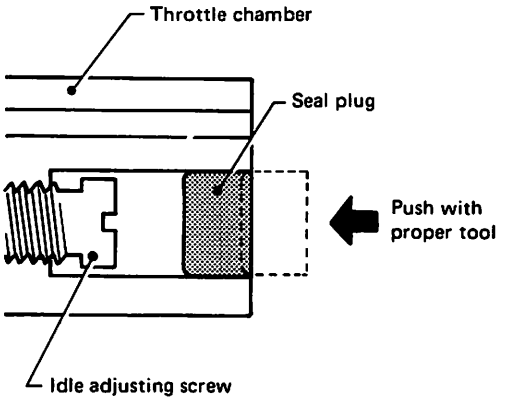
1. Remove carburetor from engine.
2. Carefully drill idle adjusting screw seal plug and remove it from plug hole with suitable tool.



SEF212A

a. **Be careful to prevent metal chips from entering carburetor, and be sure that sliding surface of link and shaft are not scratched.**
b. **When drilling seal plug, be careful not to damage head of idle adjusting screw.**

3. After performing step 2, mount carburetor on engine.
4. Start engine, adjust idle RPM and adjust idle "CO"% by turning idle adjusting screw.
5. If proper idle "CO"% is not obtained by adjustment, turn off engine and overhaul carburetor or replace it with a new one. Then adjust idle "CO"% by turning idle adjusting screw.
6. After adjusting carburetor idle-rpm and mixture ratio, turn off engine and install new seal plug on carburetor.



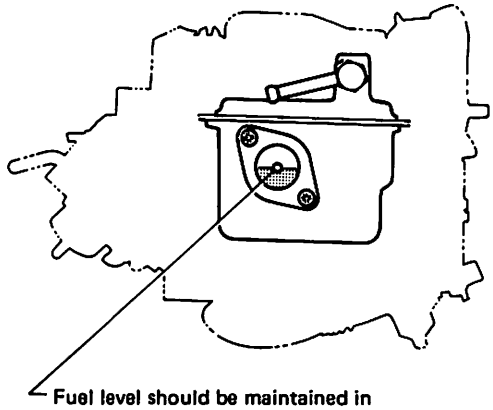
SEF213A

7. Finally, check idle "CO"% again. If idle "CO"% becomes abnormal, readjust it by starting from step 4.

CARBURETOR — Inspection and Adjustment

Fuel Level

Place vehicle on a level surface and with engine idling, visually check fuel level through sight glass.



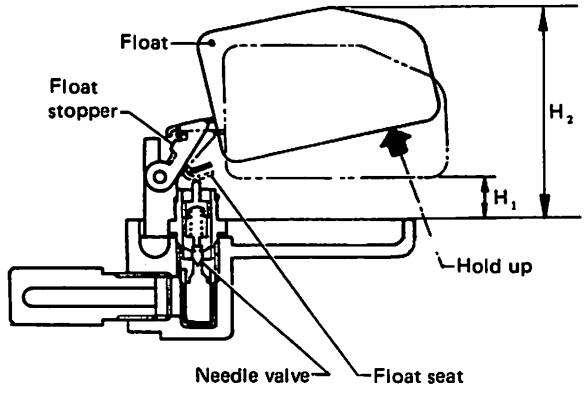
SEF602

If not correct, adjust as follows.

1. Turn off engine and remove choke chamber.
2. Turn choke chamber upside down, raise float, then lower it until float seat contacts with needle valve and in that position, check clearance H_1.

   H_1: 16.5 - 17.5 mm (0.650 - 0.689 in)

   If out of specification, adjust by bending float seat.



SEF073D

3. Raise float until float stopper touches the choke chamber and check height H_2.

   H_2: 46.5 - 47.5 mm (1.831 - 1.870 in)

   If out of specification, adjust by bending float stopper.
4. Install choke chamber and recheck fuel level with engine idling.

Accelerating Pump

1. With engine stopped, turn the throttle lever and ensure that the fuel is injected smoothly through the injector located in primary port.
2. If accelerating pump is out of order, check link, lever pump piston, etc.

CARBURETOR — Inspection and Adjustment

Dash Pot

1. Idle speed of engine and mixture must be well tuned up and engine sufficiently warm.
2. Turn throttle valve by hand, and read engine speed when dash pot just touches stopper lever.

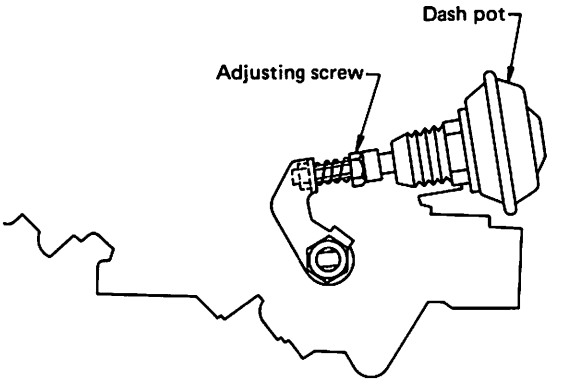
   Dash pot touch speed: 1,600 - 2,400 rpm

3. If out of specifications, adjust as follows.

(1) Remove carburetor from engine.

(2) Adjust gap between primary throttle valve and inner carburetor wall when dash pot stem comes in contact with throttle arm.

Dash pot gap:
0.55±0.10 mm (0.0217±0.0039 in)



SEF020D

(3) Tighten dash pot lock nut.

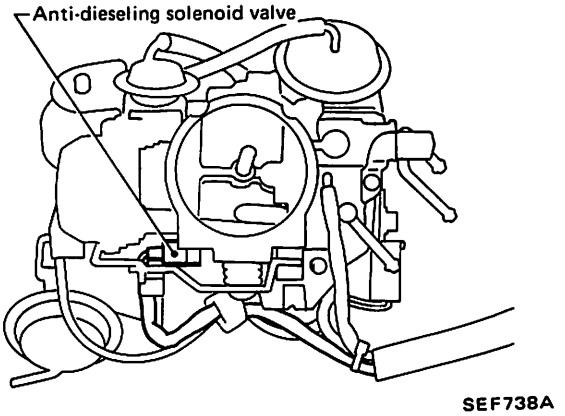
(4) After reinstalling carburetor on engine, ensure dash pot touching engine speed is within the specifications.

Anti-dieseling Solenoid Valve

Start the engine and keep at idle speed.
If the engine does not stop when the lead wire is disconnected, the solenoid is stuck.
If the engine does not stop when the ignition switch is turned off, this indicates that the striking solenoid valve is stuck or short-circuited.
If the harness is in good condition, replace the solenoid valve as a unit.

: **Anti-dieseling solenoid**
18 - 29 N·m
(1.8 - 3.0 kg-m, 13 - 22 ft-lb)

After replacement, start engine and check to be sure that fuel is not leaking, and that anti-dieseling solenoid is in good condition.

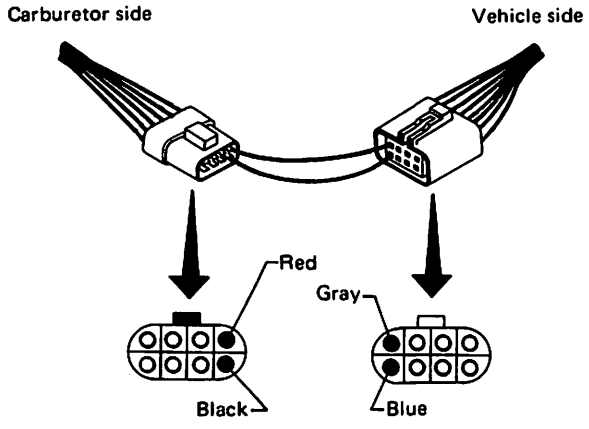


SEF738A

CARBURETOR — Inspection and Adjustment

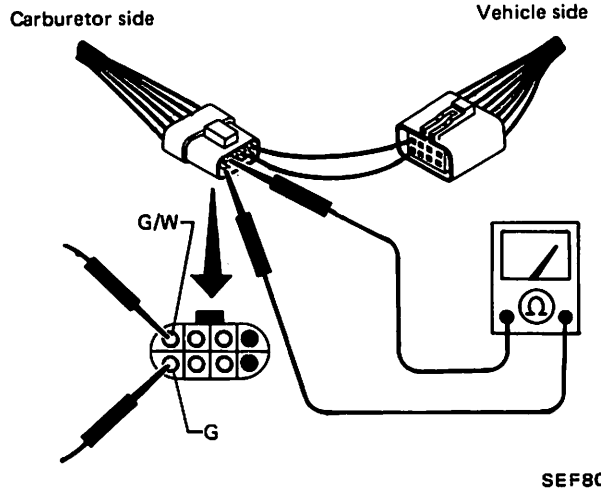
Throttle Valve Switch

1. Turn off engine and disconnect harness connector on carburetor.
2. Connect proper wires between the anti-dieseling solenoid valve harness terminals.



SEF802B

3. Verify that continuity does not exist between the throttle valve switch harness terminals.



SEF804B

4. Start engine and increase engine speed to about 2,000 rpm.
5. At this time, verify that continuity exists between the throttle valve harness terminals.
6. Then, decrease engine speed gradually to below.

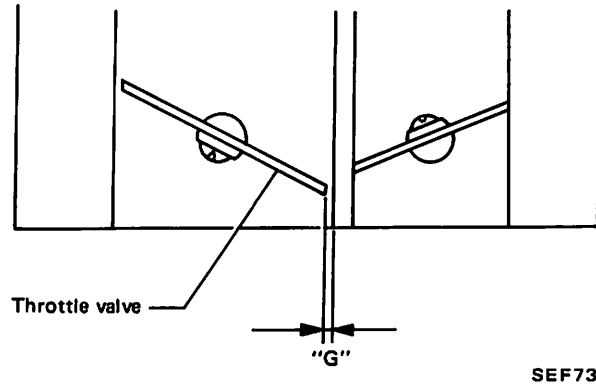
Engine speed:
M/T: 1,350±350 rpm
A/T: 1,250±350 rpm

At that point, the circuit should break and cause the ohmmeter to indicate an open circuit.
If incorrect, adjust as follows.

1) Remove carburetor from engine.

CAUTION:
Before removing carburetor, drain about one liter (1-1/8 US qt, 7/8 Imp qt) of engine coolant.

2) Open the throttle manually.
3) Then, close the throttle opening manually until the ohmmeter indicates an open circuit.
4) At that point, check clearance "G".

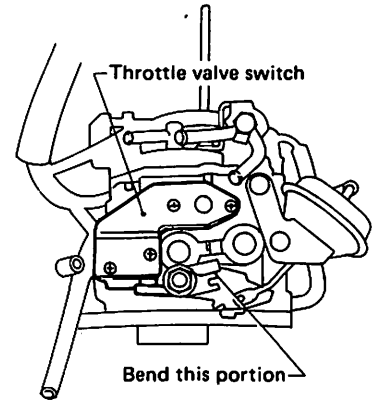


SEF730C

Check clearance "G":
0.30±0.07 mm (0.0118±0.0028 in)

5) If out of specification, adjust clearance "G" by bending plate until the ohmmeter indicates an open circuit.

Adjust clearance "G":
0.30 mm (0.0118 in)



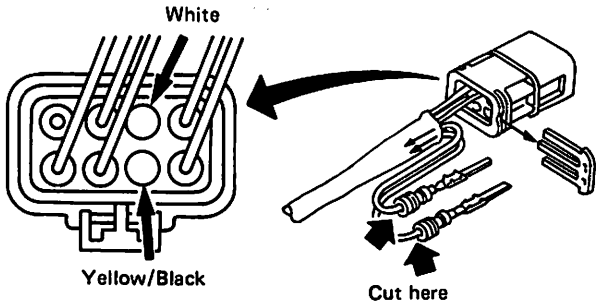
SEF743A

CARBURETOR — Replacing Air-fuel Ratio Solenoid

1. Remove carburetor from engine.

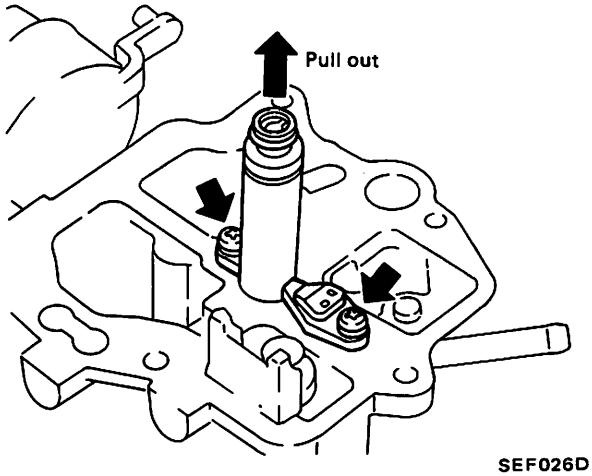
CAUTION:
Before removing carburetor, drain about one liter (1-1/8 US qt, 7/8 Imp qt) of engine coolant.

2. Disconnect harness from harness connector and cut at the terminals.



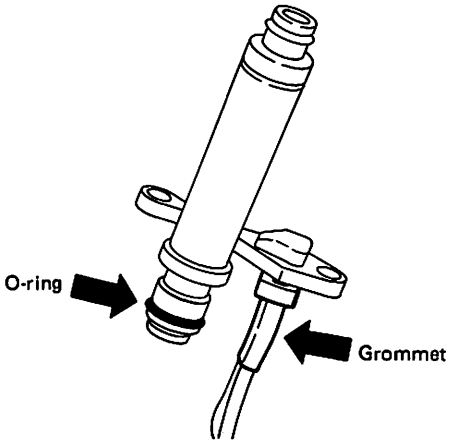
SEF025D

3. Remove choke chamber assembly from carburetor.
4. Remove air-fuel ratio solenoid from choke chamber.



SEF026D

5. Install new air-fuel ratio solenoid valve to choke chamber.
- Apply silicon grease to O-ring.
- Always use new grommet.

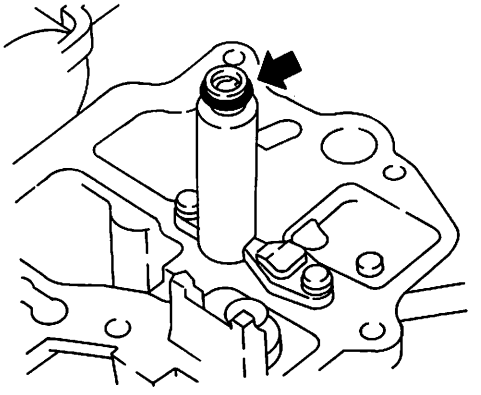


SEF027D

- Take care not to damage O-ring when installing.
- If mounting bolts are damaged, replace with new ones.

: 1.5 - 3.9 N·m (0.15 - 0.40 kg-m, 1.1 - 2.9 ft-lb)

6. Install choke chamber assembly.
- Apply silicon grease to O-ring.

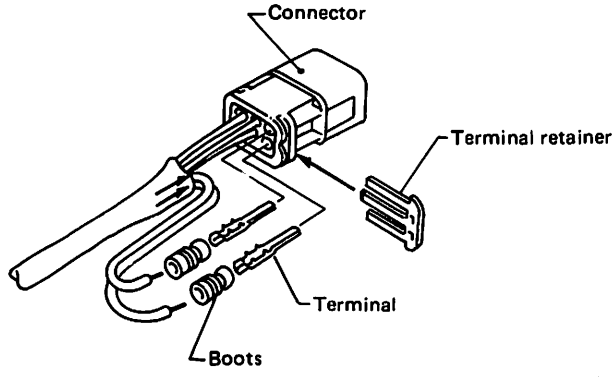


SEF028D

- Take care not to damage O-ring.
- Always use new choke chamber gasket.

CARBURETOR — Replacing Air-fuel Ratio Solenoid

7. Fix new boots and terminal ends to harness with terminal pliers, and then place terminals in connector.

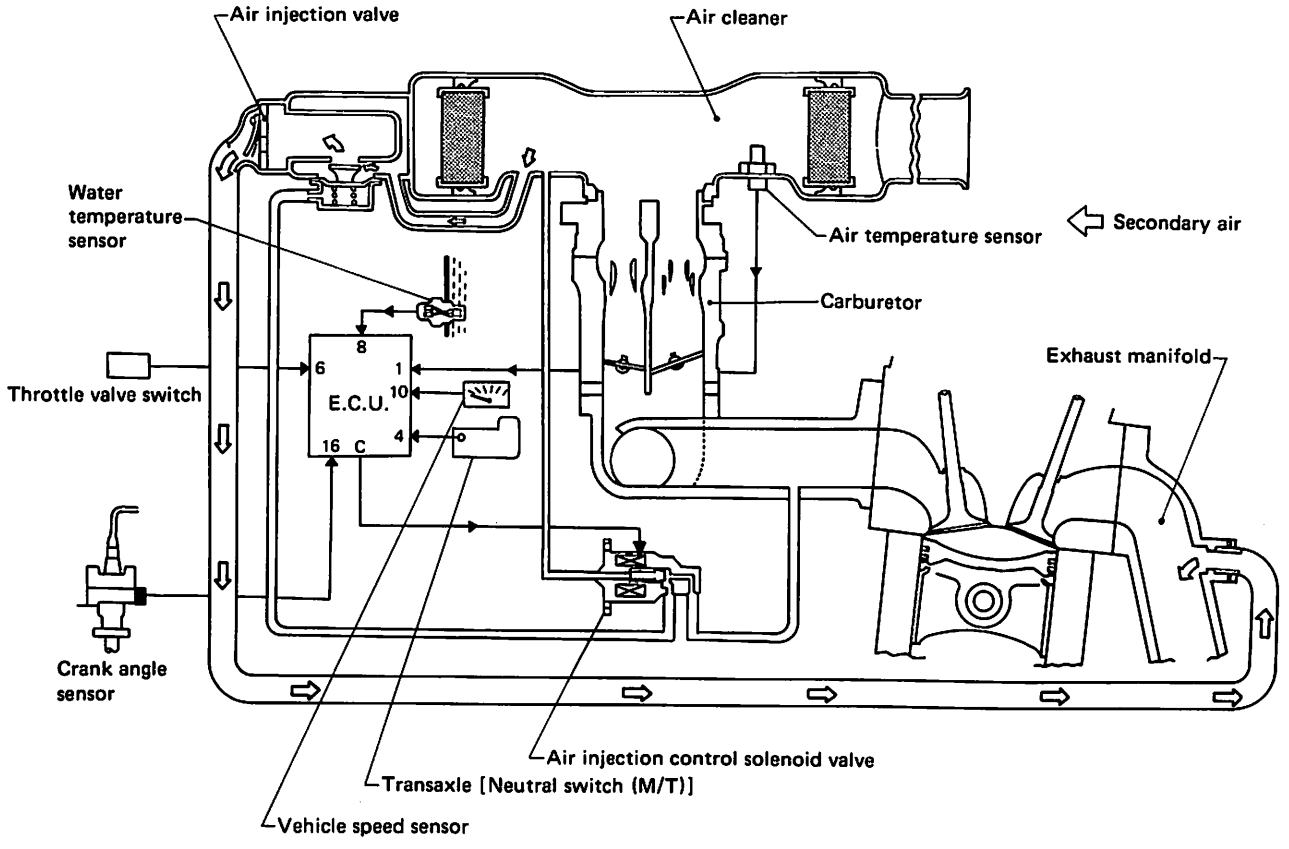


SEF029D

EXHAUST EMISSION CONTROL SYSTEM

Air Injection Valve (A.I.V.) System

The air injection valve (A.I.V.) system for Non-California models is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the exhaust manifold.
However, it is not necessary to operate this system under normal engine conditions because a 3-way catalytic converter is adopted.
Therefore, this system is designed to send secondary air to the exhaust manifold when engine is cold and hot idle condition.



SEF693C

OPERATION

i) Cold condition

Water temperature °C (°F)	Air temperature °C (°F)	Air injection control solenoid valve	Air injection control valve	Air injection system
Between 15 (59) and 70 (158)	Above 15 (59)	ON	Open	Operated
	Below 15 (59)	OFF	Closed	Not operated
Below 15 (59), above 70 (158)	Above 15 (59)			
	Below 15 (59)			

EXHAUST EMISSION CONTROL SYSTEM

Air Injection Valve (A.I.V.) System (Cont'd)

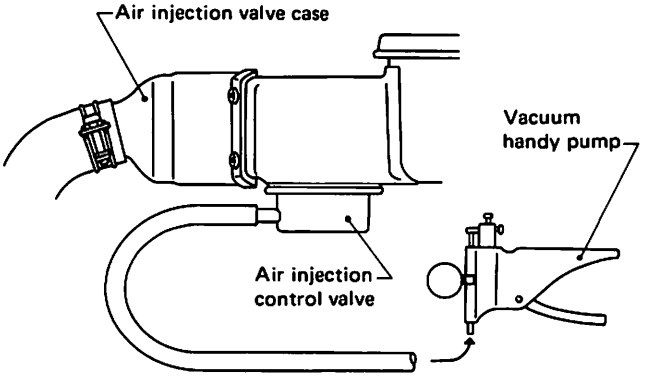
ii) Hot idle condition

Water temperature °C (°F)	Vehicle condition					Air injection control solenoid valve	Air injection control valve	Air injection system
		Throttle valve switch	Engine revolution (rpm)	Vehicle speed km/h (MPH)	Neutral switch (M/T)			
Above 70 (158)	Idle	OFF	< 1,000	≦ 4 (2)	ON	ON	Open	Operated
	Not idle	ON	≧ 1,000	> 4 (2)	OFF	OFF	Closed	Not operated

INSPECTION

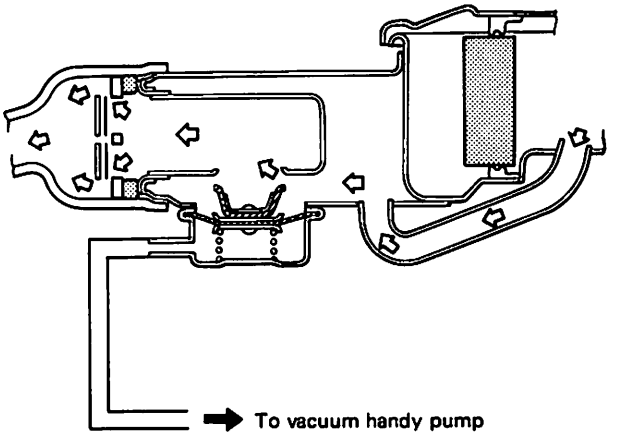
Air injection valve and air injection control valve

1. Disconnect air injection hose at air injection pipe side. Suck or blow hose to make sure that air flow does not exist.
2. Connect a vacuum handy pump to the air injection control valve.



SEC931

3. Suck or blow air injection hose to make sure that air flows only on the air injection pipe side while control valve is operated.



SEC932

4. Check air injection valve and air injection control valve for binding or damage. If necessary, replace.

A.B. valve

Refer to Air Injection System (Canada models).

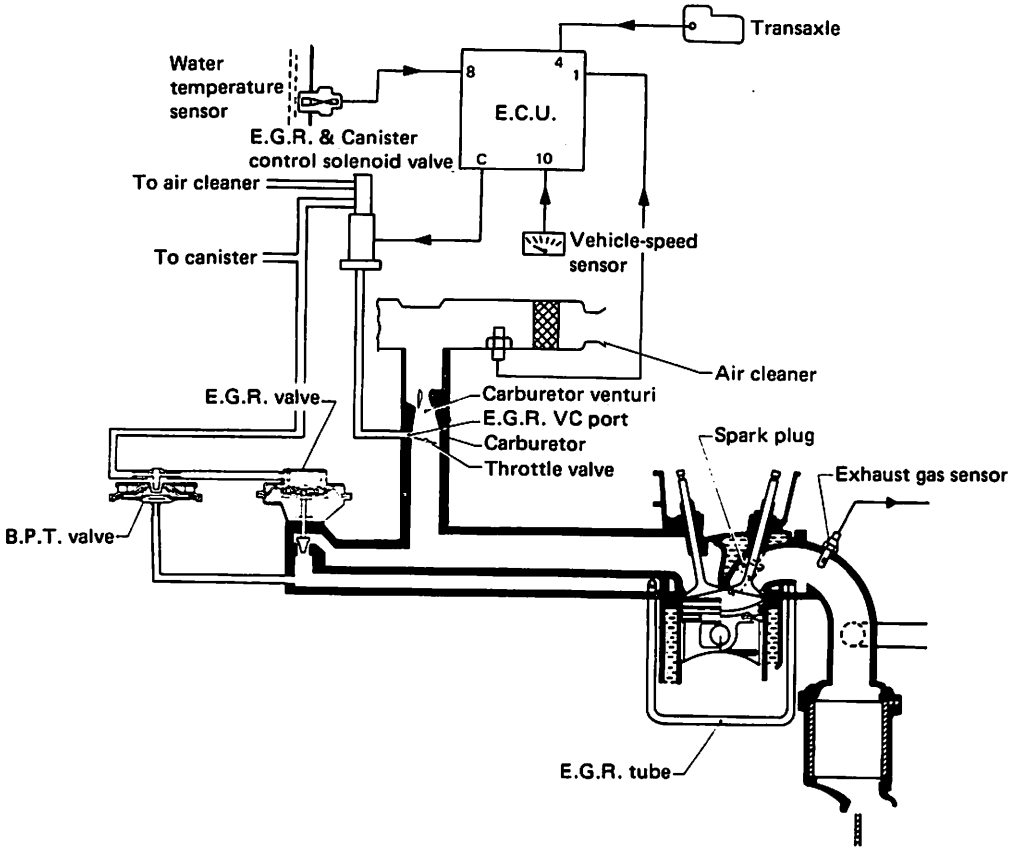
Air temperature sensor & air injection control solenoid valve

Refer to E.C.C. SYSTEM INSPECTION.

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System

In the exhaust gas recirculation system, a part of the exhaust gas is returned to the combustion chamber to lower the spark flame temperature during combustion. This results in a reduction of nitrogen oxide (NOx) content in the exhaust gas.



SEF694C

OPERATION

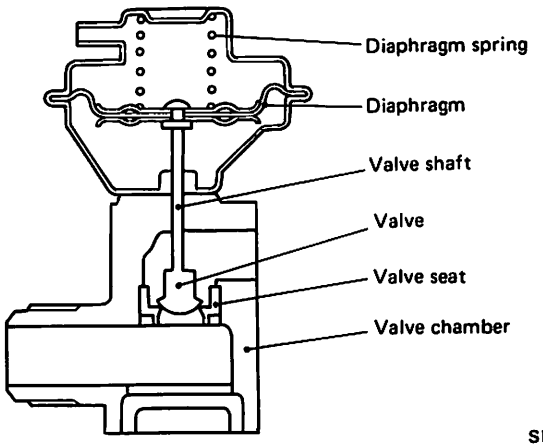
Air temperature °C (°F)	Water temperature °C (°F)	Vehicle speed km/h (MPH)	Gear position	E.G.R. solenoid valve	E.G.R. valve vacuum line	B.P.T. valve		E.G.R. system
						Exhaust gas pressure	Operation	
Below 15 (59) (at starting)	Below 75 (167)	Any speed	Any position	ON	Closed	Any condition		Not actuated
	Above 75 (167)			OFF	Open	Low	Open*	Not actuated
						High	Closed*	Actuated
Above 15 (59) (at starting)	Below 60 (140)			ON	Closed	Any condition		Not actuated
	Above 60 (140)			OFF	Open	Low	Open*	Not actuated
						High	Closed*	Actuated
Above 60 (140) (M/T) 65 (149) (A/T)	Above 105 (221)	Below 48 (30)	Neutral	ON	Closed	Any condition		Not actuated
		Above 48 (30)	Except Neutral	OFF	Open	Low	Open*	Not actuated
						High	Closed*	Actuated

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System (Cont'd)

E.G.R. control valve

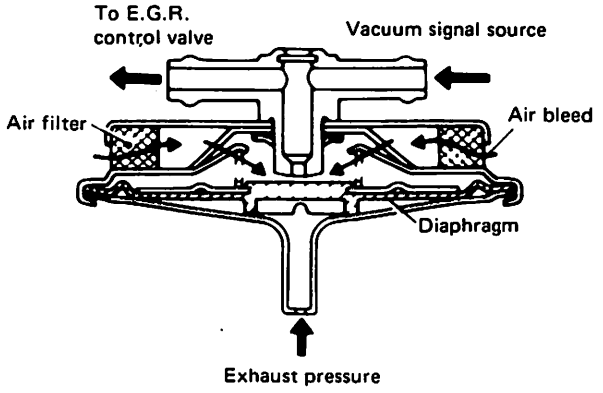
The E.G.R. control valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the valve connected to the diaphragm, to which vacuum is applied in response to the opening of the carburetor throttle valve.



SEC019

B.P.T. valve

The B.P.T. valve monitors exhaust pressure to activate the diaphragm, controlling throttle chamber vacuum applied to the E.G.R. control valve. In other words, recirculated exhaust gas is controlled in response to positioning of the E.G.R. control valve or to engine operation.

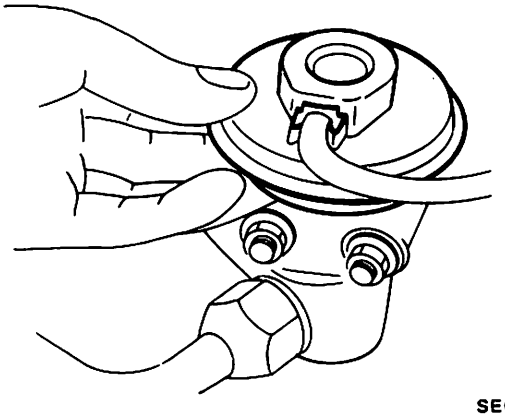


EC344A

INSPECTION

Entire system

1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.
2. With engine stopped, inspect E.G.R. control valve for any indication of binding or sticking by moving diaphragm of control valve upwards with a finger.
3. With engine running, inspect E.G.R. control system operation referring to the table of OPERATION.
   When checking E.G.R. control valve operation, place a finger on the diaphragm of the valve.



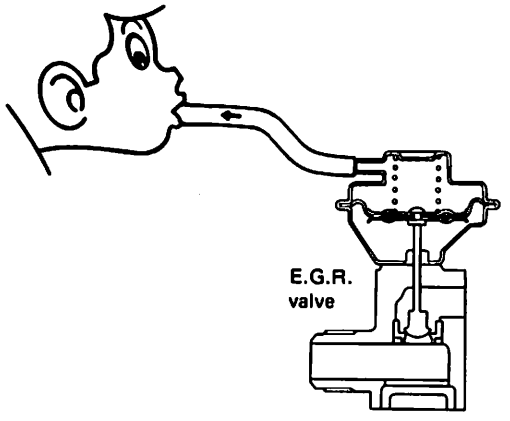
SEC711

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System (Cont'd)

E.G.R. control valve

1. Apply vacuum to E.G.R. control valve, referring to the following figure. If the valve moves to full position, it is normal.
   E.G.R. control valve will remain open for more than 30 seconds after vacuum has cut off.

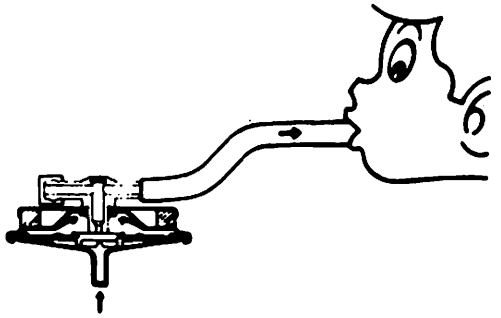


SEC078

2. Visually check E.G.R. control valve for damage, wrinkle or deformation.

B.P.T. valve

Disconnect B.P.T. valve from engine. Apply a pressure above 0.490 kPa (50 mmH_2O, 1.97 inH_2O) to B.P.T. valve and orally suck port back, as shown, to check for leakage. If a leak is noted, replace valve.



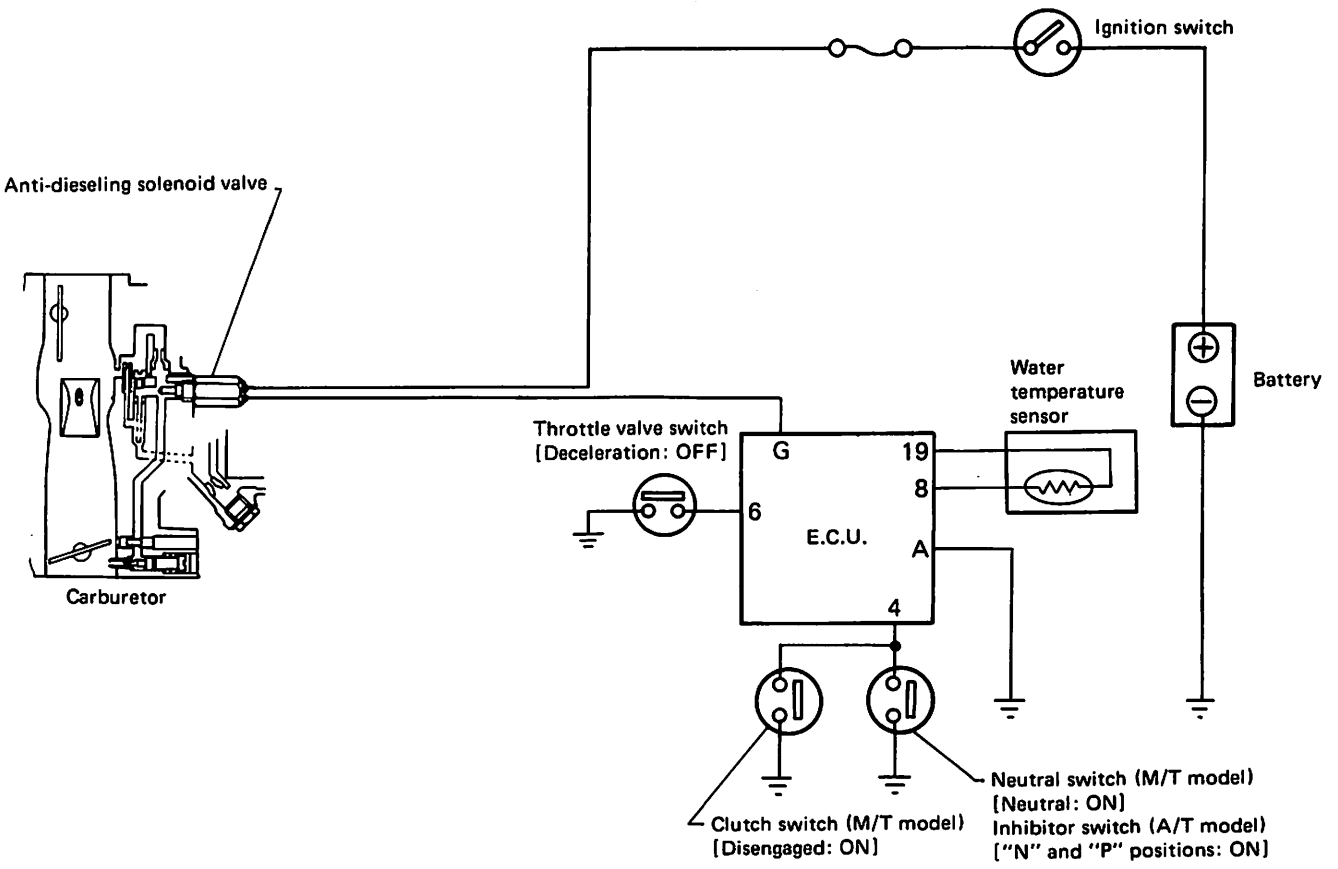
EC347A

E.G.R. & CANISTER CONTROL SOLENOID VALVE

Refer to E.C.C. SYSTEM INSPECTION.

EXHAUST EMISSION CONTROL SYSTEM

Fuel Shut-off System



SEF567C

OPERATION

Water temperature °C (°F)	Engine speed rpm	Throttle valve	Transaxle		Fuel shut-off system
			Gear position	Clutch	
Below 60 (140)	Any conditions				Not operated
Above 60 (140)				Disengaged	
			Neutral		
		Open	Any conditions		
	Below 2,000				
	Above 2,000	Closed	Others	Engaged	Operated

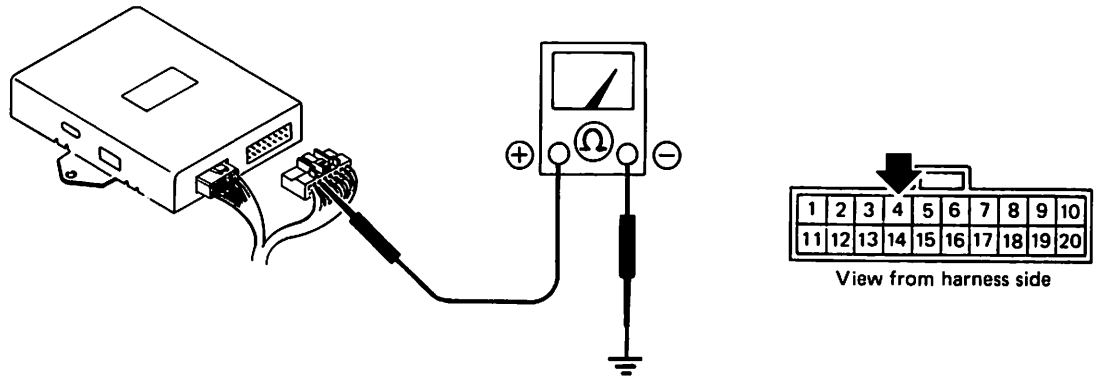
EXHAUST EMISSION CONTROL SYSTEM

Fuel Shut-off System (Cont'd)

INSPECTION

1. Check clutch switch and neutral switch circuits for continuity.
   a) Turn ignition switch "OFF".
   b) Disconnect E.C.C. 20-pin connector.
   c) Check for continuity.

Condition		Check terminals		Continuity
Gear position	Clutch	+	−	
Neutral	Disengaged	4	Body ground	0Ω
	Engaged			
Other than Neutral	Disengaged			
	Engaged			∞Ω



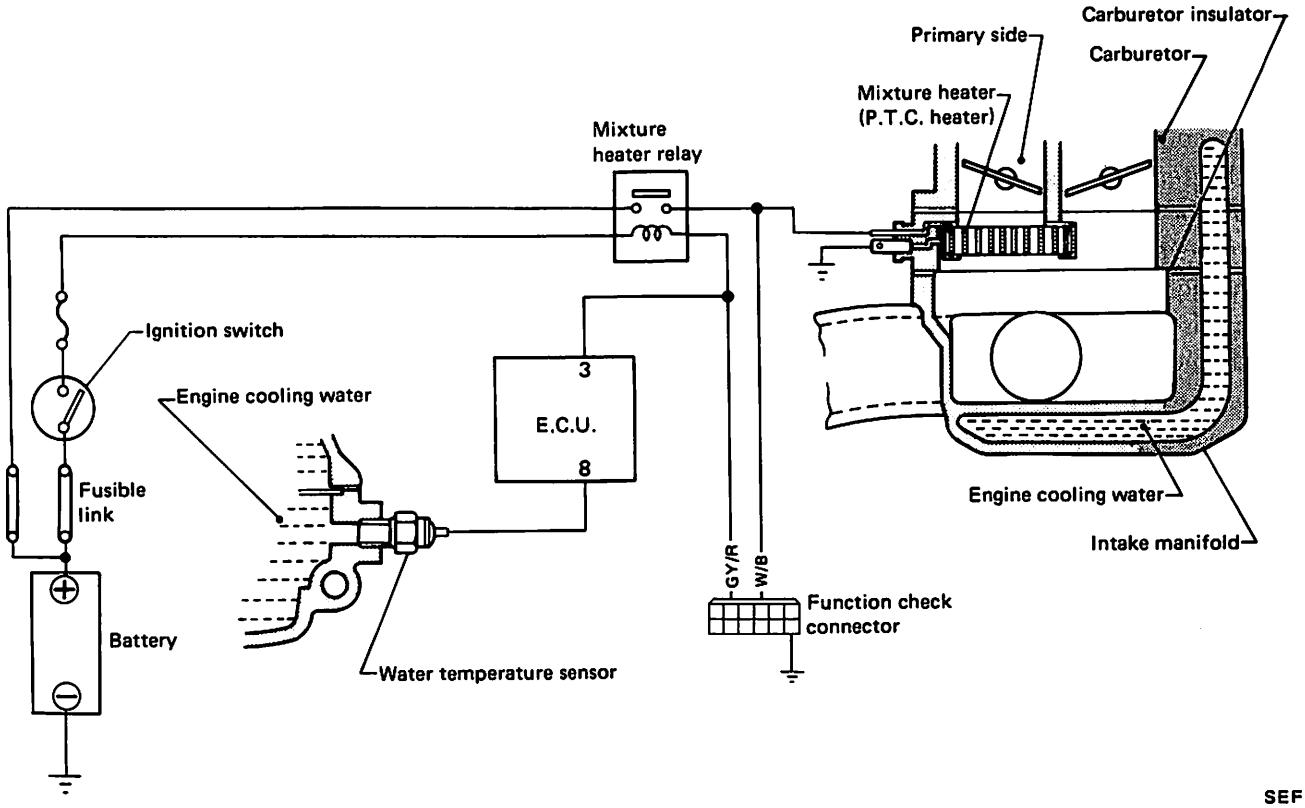
   d) If continuity does not exist, check harness or component.
2. Check throttle valve switch adjustment.
   Refer to CARBURETOR — Inspection and Adjustment.

EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System

In order to reduce emissions and improve driveability during engine warm-up, the positive temperature coefficient (P.T.C.) heater is installed between carburetor and intake manifold.

When engine starts, P.T.C. heater is electrically energized and the air-fuel mixture which passes through this heater is heated.
When engine warm-up is completed, the heater current is cut off by the E.C.C. control unit.

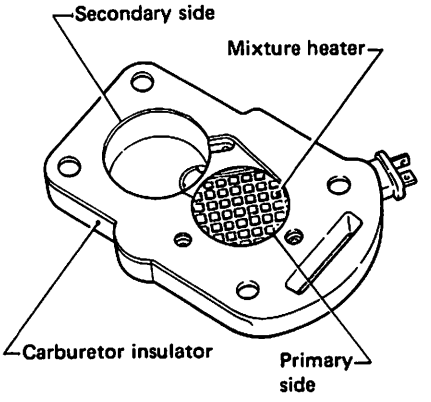


SEF684C

OPERATION

Water temperature °C (°F)	Mixture heating system
Below 50 (122)	Activated
Above 50 (122)	Deactivated

Mixture heater



SEF703C

EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System (Cont'd)

The mixture heater uses a honeycomb P.T.C. heater design and is situated in the primary side of the carburetor insulator. With this design, resistance to current flow increases as the temperature increases, and vice versa. As a result, the current flow is maintained constant.

INSPECTION

1. Check continuity between terminals of mixture heater. If resistance is too large, replace carburetor insulator.
2. Entire system

(1) When ignition switch is turned "ON" while engine is "OFF", conform the presence of battery voltage at mixture heater harness connector. If no battery voltage is present, check water temperature sensor and mixture heater relay.

(2) Check continuity between terminals of water temperature sensor at connector.

(3) Check mixture heater relay and automatic choke relay.

If necessary, check wiring harness and relays.

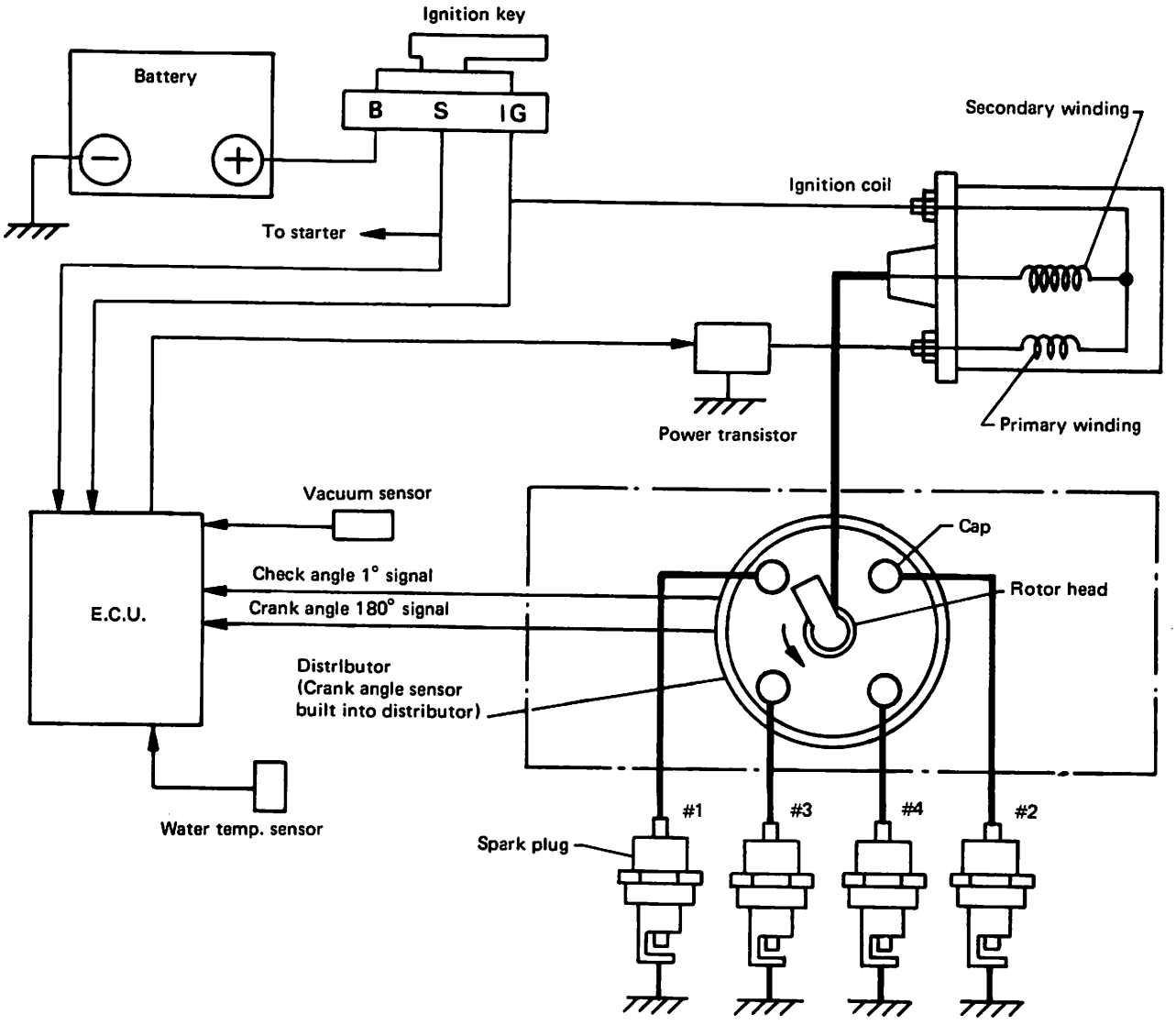
EXHAUST EMISSION CONTROL SYSTEM

Spark Timing Control System

The ignition timing is controlled by the central electronic control unit adjusting to the engine operating conditions: that is, as the best ignition timing in each driving condition has been memorized in the unit, the ignition timing is determined by the electric signal calculated in the unit.

The signals used for the determination of ignition timing are water temperature, engine rpm, engine load, etc.

Then, the signal from the central electronic control unit is transmitted to the power transistor of the ignition coil, and controls the ignition timing.

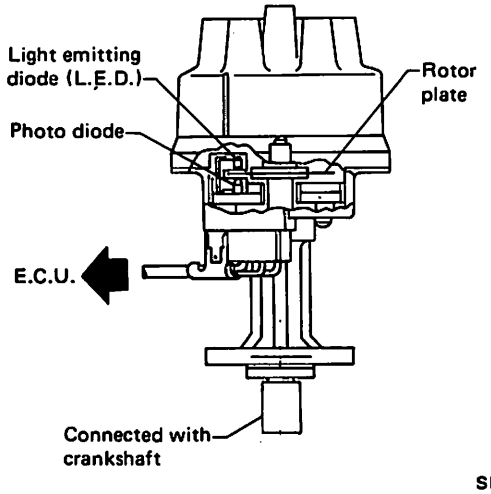


SEF559C

OPERATION

Crank angle sensor

The crank angle sensor detects engine rpms and the crank angle (piston position). It also sends a signal to the control unit to control various operations. This sensor is built into the distributor.

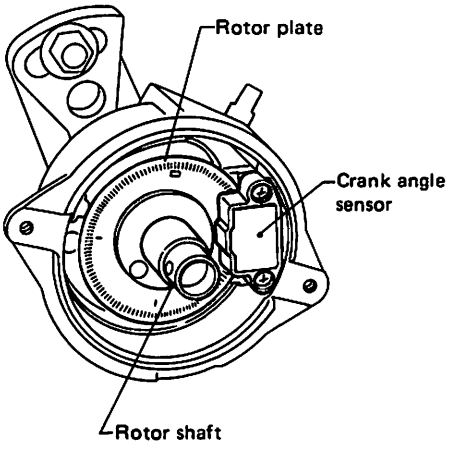


SEF488A

Signal rotor plate

The signal rotor plate has 360 slits at 1° intervals on its outer periphery. It also has four slits at 90° intervals.

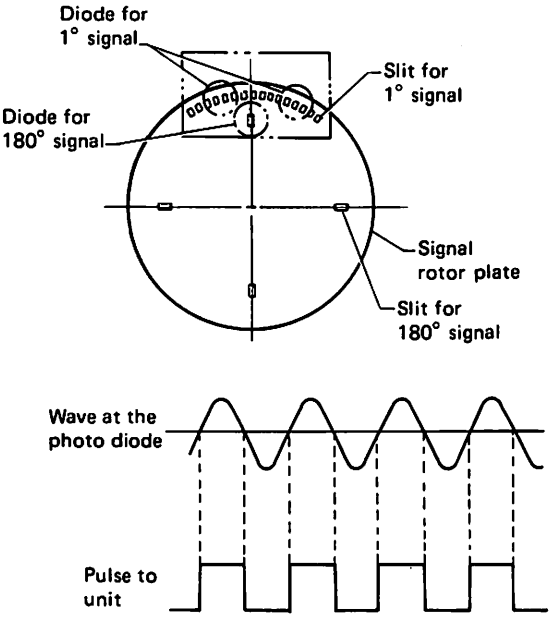
These four slits are used to detect the crank angle, that is, the position of each piston. The teeth are used to provide the 1° signal that is necessary to control engine rpms and ignition timing.



SEF008B

Crank angle sensor operation

The crank angle sensor has two diodes and a wave forming circuit. When a signal rotor plate passes the space between the Light Emitting Diode (L.E.D.) and Photo Diode, the slit of the signal rotor plate alternately cuts the light which is sent to the photo diode from the L.E.D. This causes an alternative voltage and it is then converted into an on-off pulse by the wave forming circuit, which is sent to the control unit.



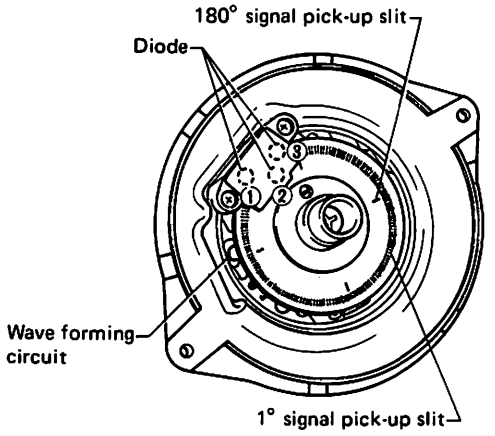
SEF009B

EXHAUST EMISSION CONTROL SYSTEM

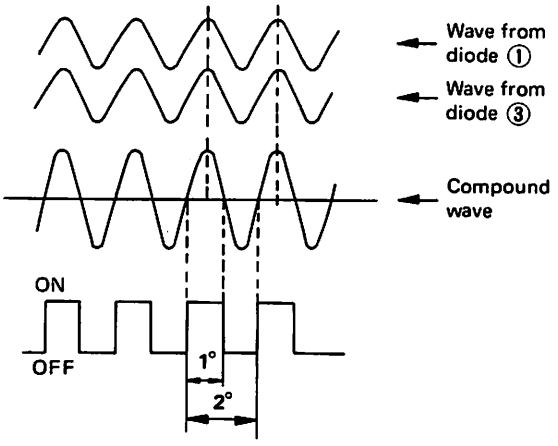
Spark Timing Control System (Cont'd)

Detection of 1° signal (For detecting of engine rpms and ignition timing control)

Diodes ① and ③ are used to detect the 1° signal which is created by 360 slits on the rotor plate. When a slit reaches the space between the L.E.D. and photo diode, the photo diode receives the light from the L.E.D. and this causes an alternative voltage. Thus, each wave from each diode is compounded. Then, the compound wave is converted into an on-off pulse. This 1° on-off signal is sent to the control unit.



SEF010B



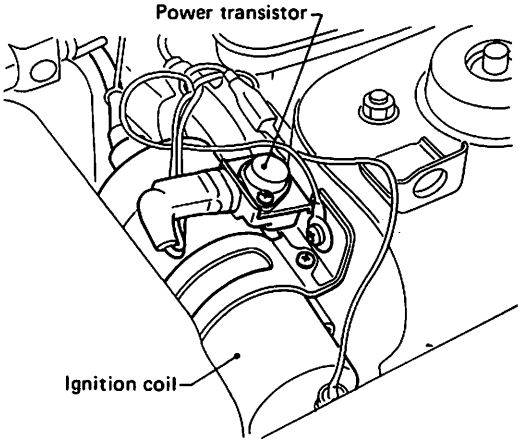
SEF492A

Detection of 180° signal (For detecting piston T.D.C.)

Diode ② is used to detect the 180° signal which is created by 90° slits on the rotor plate. When a slit reaches the space between the L.E.D. and photo diode, the photo diode catches the light from the L.E.D. and this causes an alternative voltage. At this time, a signal on-off pulse is generated. Since engine rpm is twice that of the distributor, the rotor plate has four slits at 90° intervals.

Ignition coil

The ignition coil has a built-in power transistor. The signal from the control unit is amplified by the power transistor. This amplified signal is used to connect and disconnect the ignition coil's primary current to generate high voltage across the secondary coil, and thereby create a spark in the spark plug.



SEF047B

ADJUSTMENT

Ignition timing is automatically controlled by the control unit, and it is usually unnecessary to adjust it.

EXHAUST EMISSION CONTROL SYSTEM

Spark Timing Control System (Cont'd)

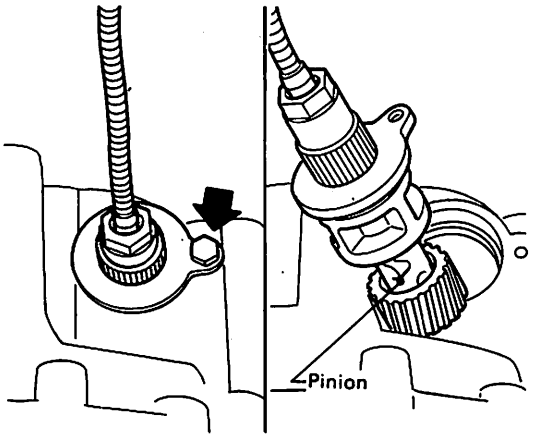
INSPECTION

Entire system

Refer to E.C.C. SYSTEM INSPECTION.

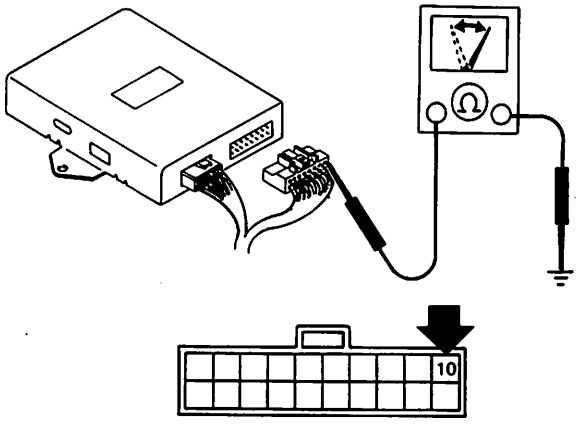
Vehicle speed sensor

1. Remove speedometer cable at transaxle.



SER193

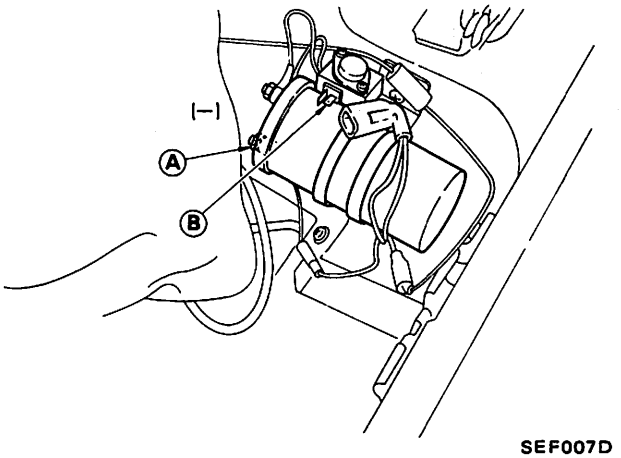
2. Disconnect E.C.C. 20-pin harness.
3. Turn ignition switch "ON", rotate speedometer pinion and check that resistance value between No. 10 terminal and body ground alternates between 0 and ∞Ω twice during 1 rotation.



SEF841B

Power transistor

Check resistance values between power transistor terminal (E.C.C. unit side), body ground and ignition coil (–) terminal.
If N.G., replace power transistor.



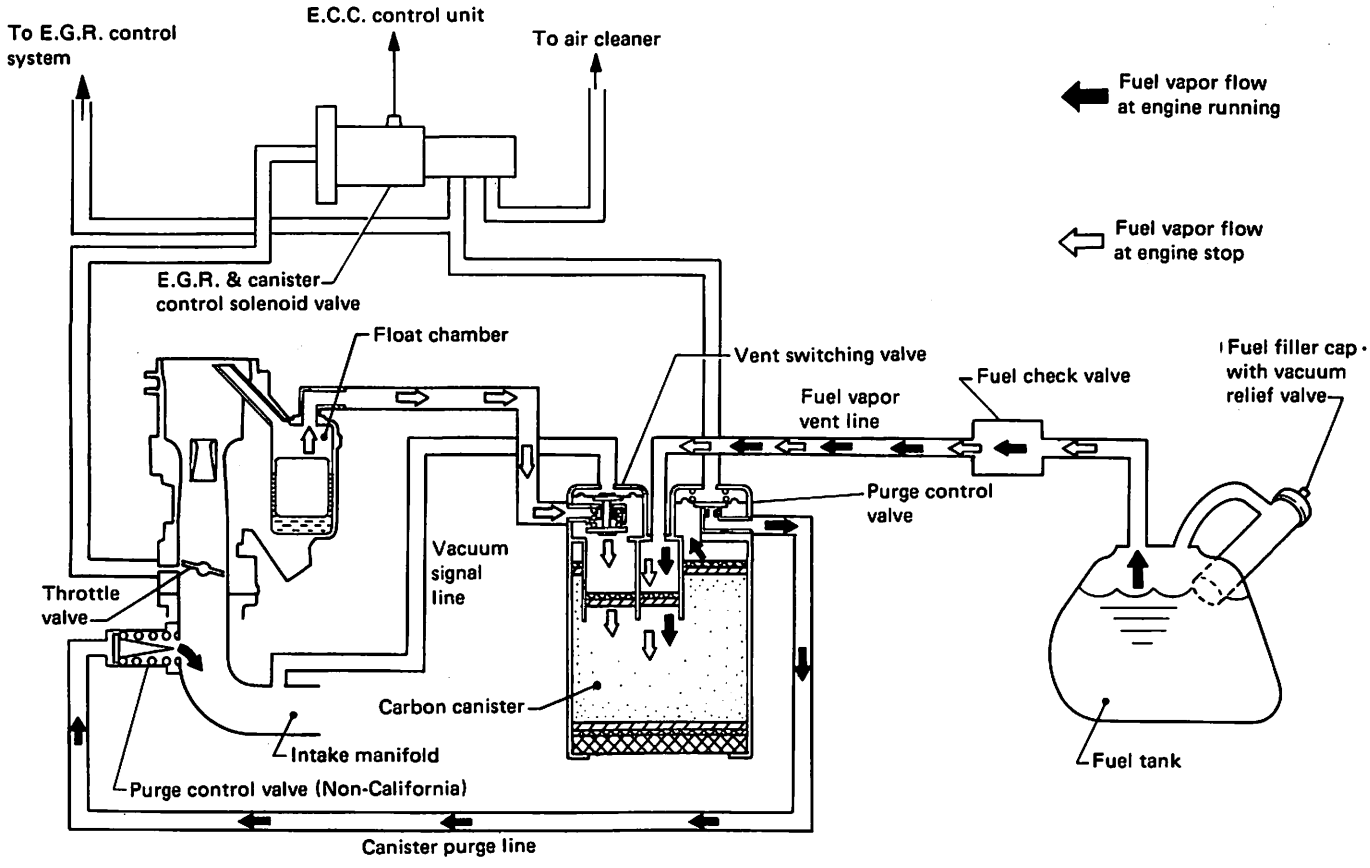
SEF007D

Ohmmeter Leads to Pins		Should Read
(+)	(–)	
⏚	A	Approx. 0Ω
A	⏚	Approx. ∞ Ω
A	B	Approx. ∞ Ω
B	A	Approx. 0Ω
⏚	B	Approx. 0Ω
B	⏚	Approx. 0Ω

EVAPORATIVE EMISSION CONTROL SYSTEM

Description

The evaporative emission control system is used to reduce hydrocarbons emitted to the atmosphere from the fuel system. The reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.



SEF706C

OPERATION

At engine stop

Fuel vapor from the sealed fuel tank is led into the carbon canister which is filled with activated carbon and stored there.

The vapor in the carburetor float chamber is also led into the canister through the outer vent pipe because the vent switching valve is normally open.

During engine operation

The canister retains the vapor until the canister is cleaned by air drawn through the purge line to the intake manifold.

As engine speed increases, the ported vacuum rises and purge control valve opens the orifice allowing the vapor to travel through the purge line to the intake manifold.

When the engine coolant temperature is lower than 60°C (140°F), the purge control valve closes by the movement of the solenoid valve. This prevents vapor from flowing into the intake manifold.

Evaporative purge control valve is installed in the purge line in place of purge orifice. The purge control valve controls the flow of purge air in proportion to intake air quantity.

EVAPORATIVE EMISSION CONTROL SYSTEM

Inspection

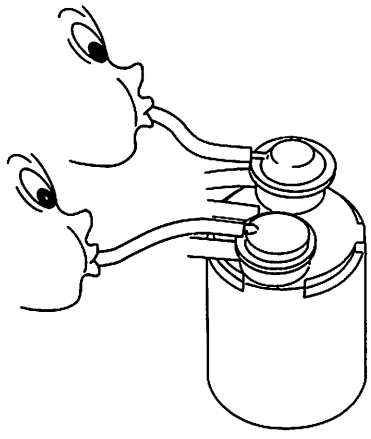
FUEL TANK AND VAPOR VENT LINE

Refer to MA section for inspection of fuel tank and vapor vent line.

CARBON CANISTER PURGE CONTROL VALVE

1. Disconnect rubber hose, in the line, between T-connector and carbon canister at T-connector.
2. Inhale air from the opening of the rubber hose running to the vacuum hole in the carbon canister and ensure that there is no leak.

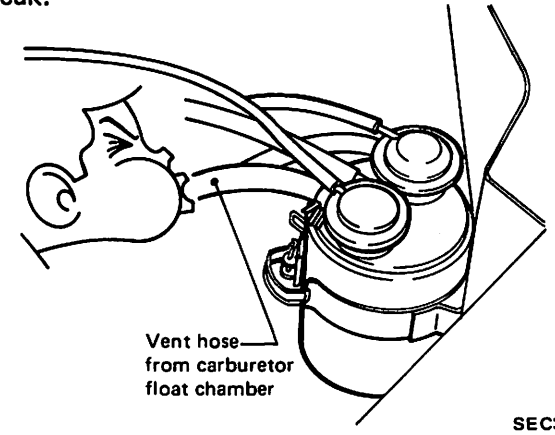
If there is a leak, replace canister.



SEF351C

VENT SWITCHING VALVE

1. Disconnect vent line hose from carburetor float chamber.
2. With engine running, inhale on the vent line of the carbon canister and ensure there is no leak.



SEC376

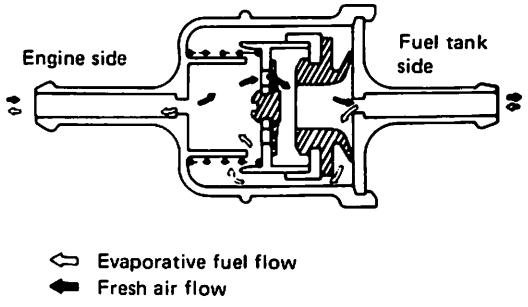
3. With engine off, make sure there is a leak.

THERMAL VACUUM VALVE

The thermal vacuum valve is used with the E.G.R. control system. Inspection procedures are the same for both valves. Refer to page EF & EC-98.

FUEL CHECK VALVE

1. Blow air through connector on fuel tank side. A considerable resistance should be felt at the mouth and a portion of air flow be directed toward the engine.
2. Blow air through connector on engine side. Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not being properly functioning in steps 1 and 2 above, replace.



EC090A

PURGE CONTROL VALVE

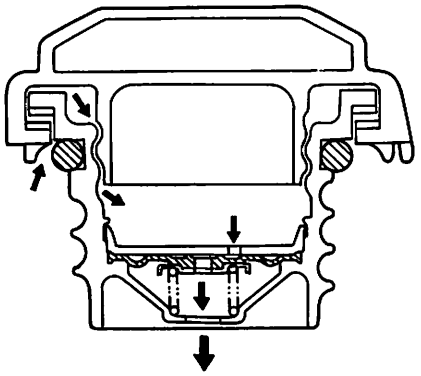
Blow or suck on purge control valve. The valve is in good condition if air flows through the valve. If not, replace.

Inspection (Cont'd)

FUEL TANK VACUUM RELIEF VALVE

Remove fuel filler cap and make sure it functions properly.

1. Wipe clean valve housing and place it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should disappear with valve clicks.
3. If valve is clogged, or if no resistance is felt, replace cap as an assembled unit.

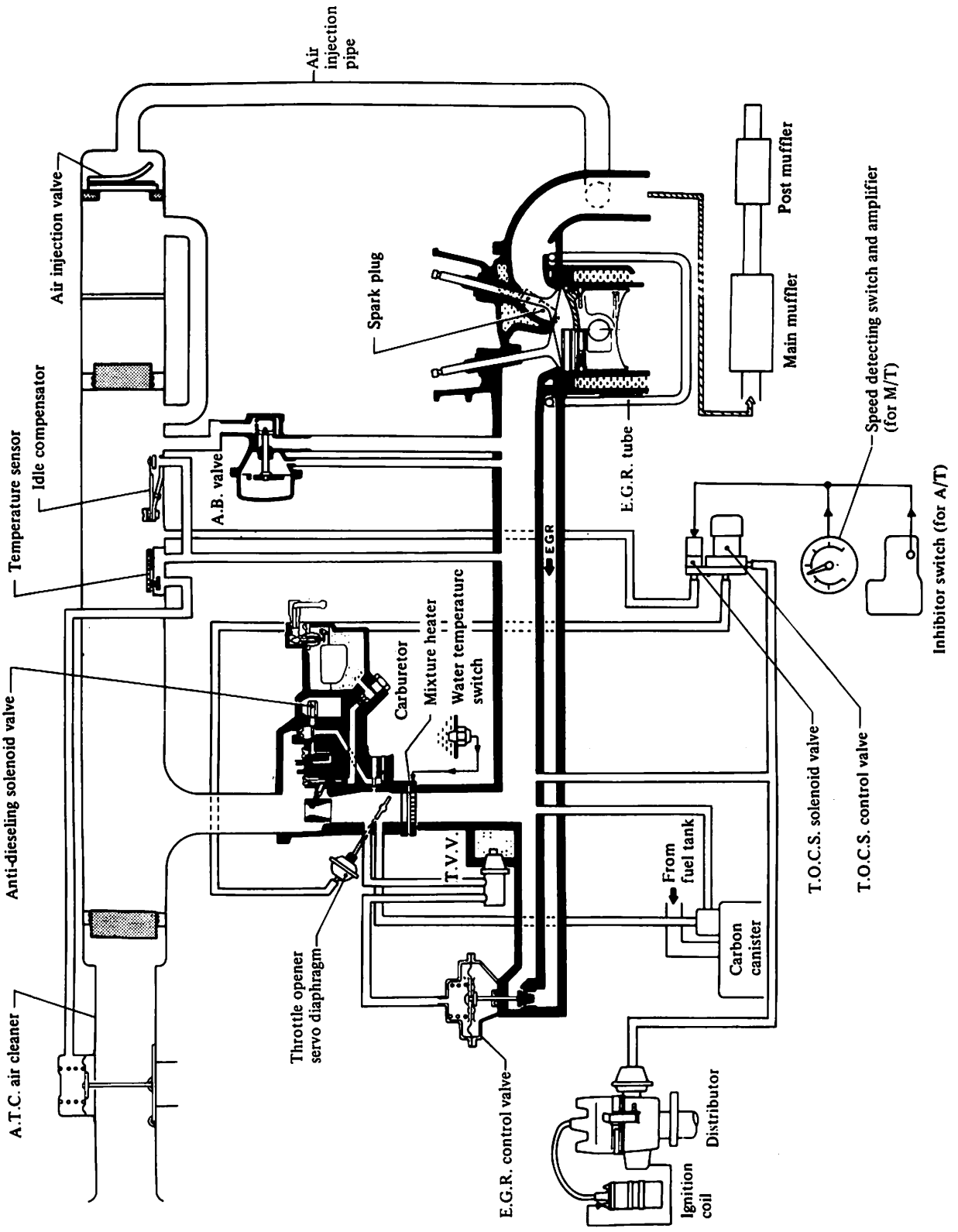


SEC961

ENGINE AND EMISSION CONTROL SYSTEM TABLE

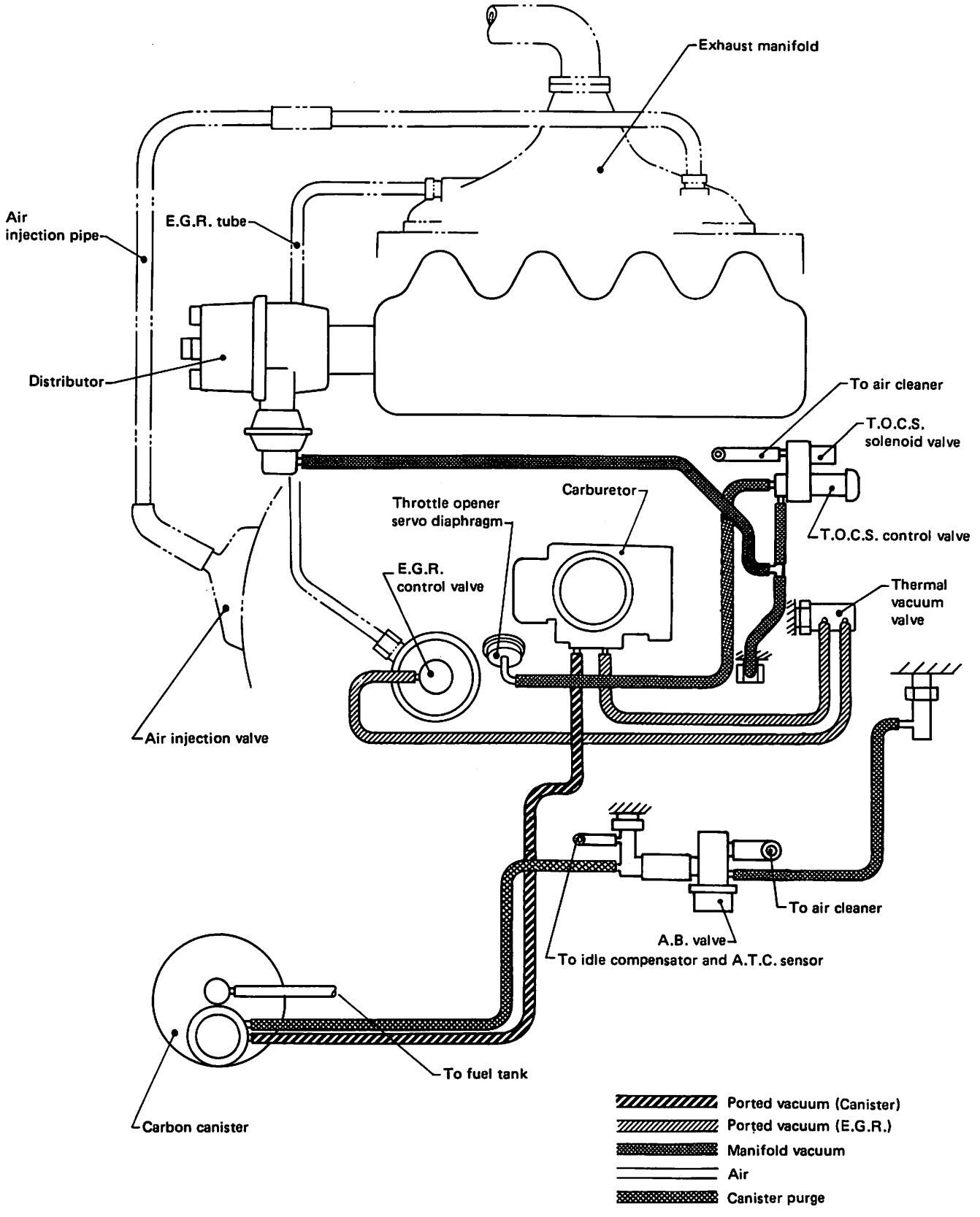
Crankcase emission control system		• P.C.V. valve
Exhaust emission control system	Air injection valve (A.I.V.) system	• Air injection valve (1 valve) • Air injection pipe (1 pipe) • A.B. valve
	E.G.R. control system	• E.G.R. control valve • Thermal vacuum valve (2-port bimetal type)
	Mixture heating system	• Mixture heater • Water temperature switch
	Throttle opener control system	• Throttle opener servo diaphragm • Throttle opener control valve • Vacuum control valve • Speed detecting switch and amplifier (M/T) • Inhibitor switch (A/T)
Evaporative emission control system		• Carbon canister

ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM



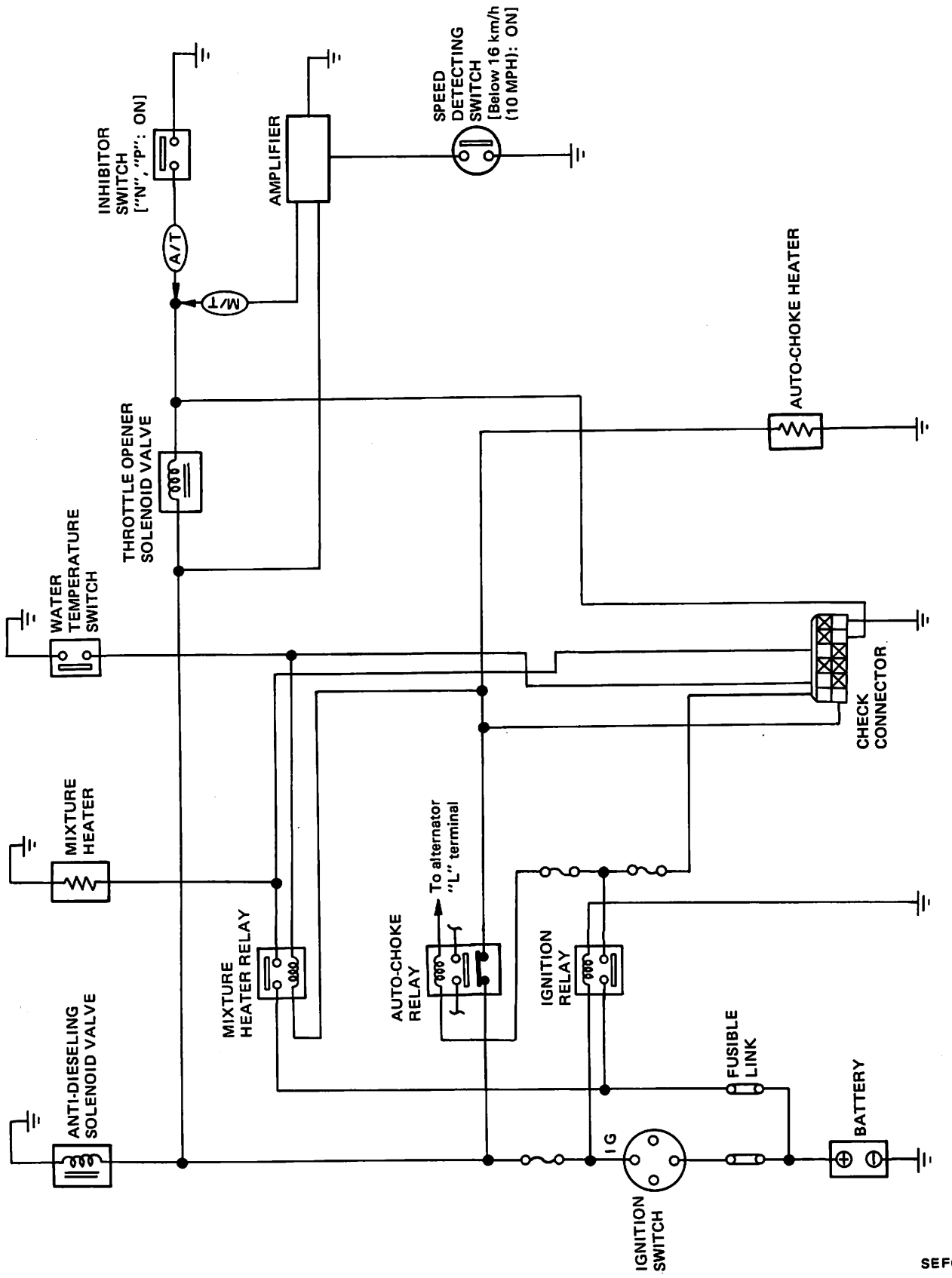
SEF947B

ENGINE AND EMISSION CONTROL VACUUM DIAGRAM

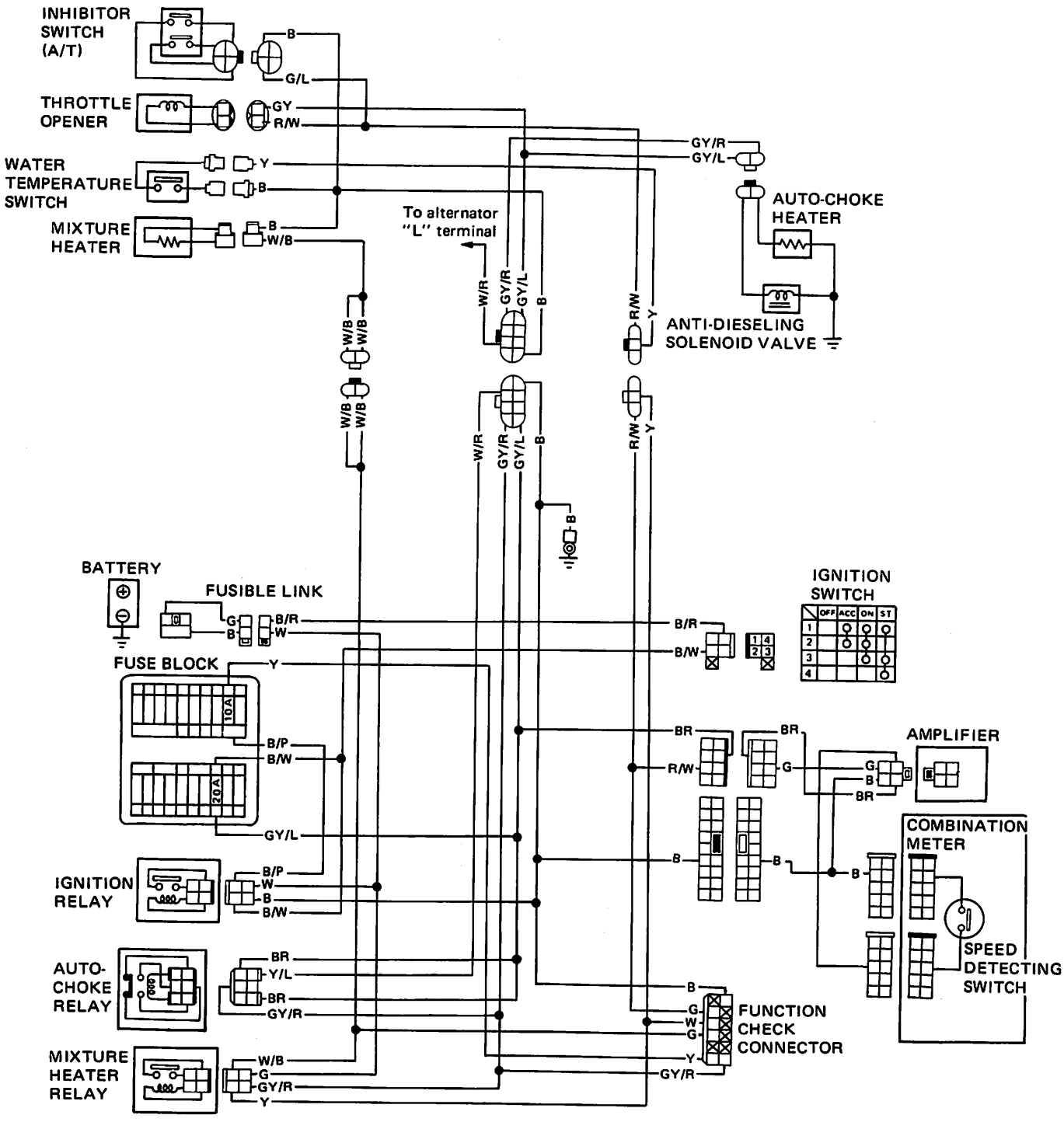


SEF076D

ENGINE CIRCUIT DIAGRAM



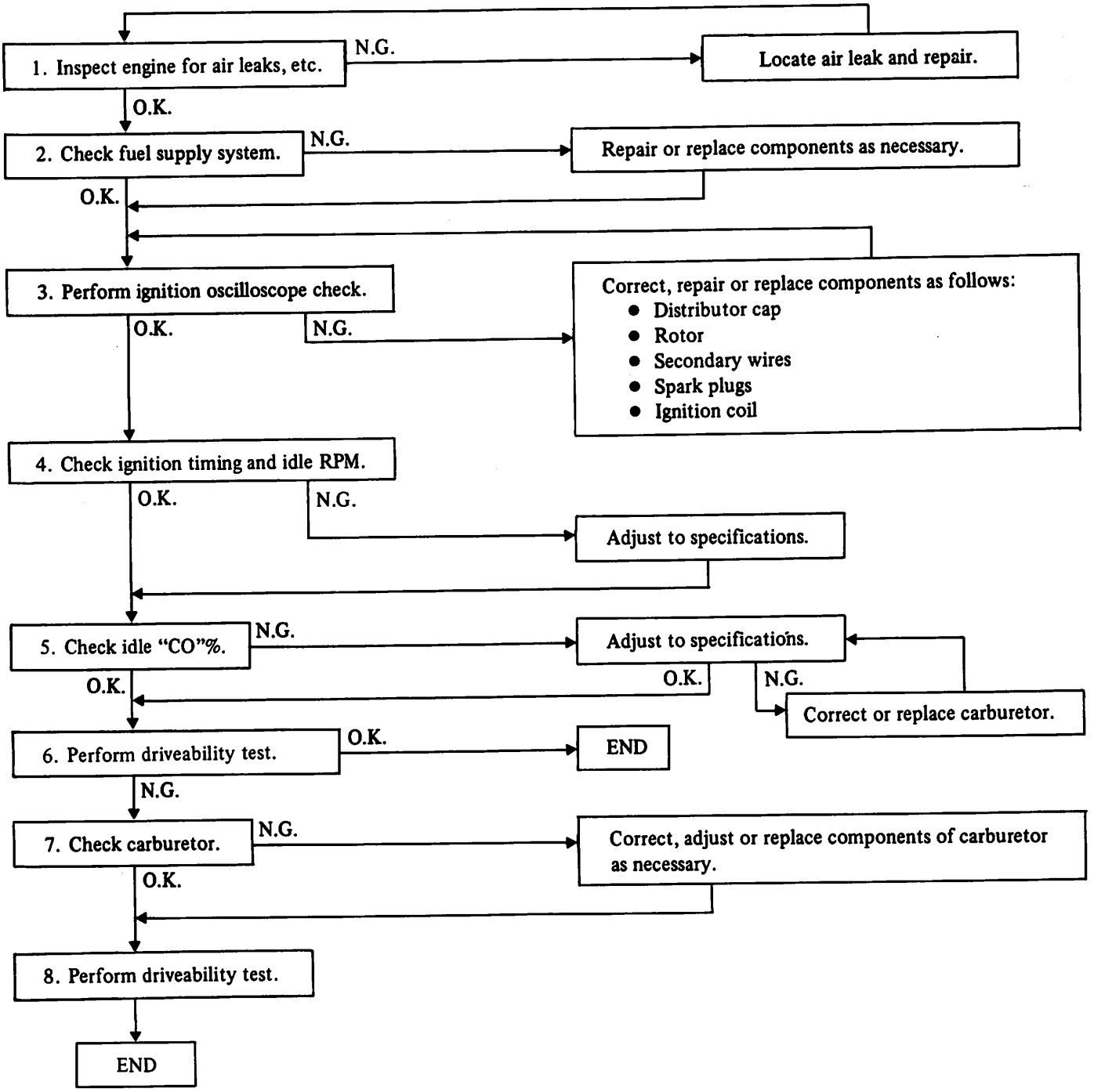
ENGINE WIRING DIAGRAM



SEF163D

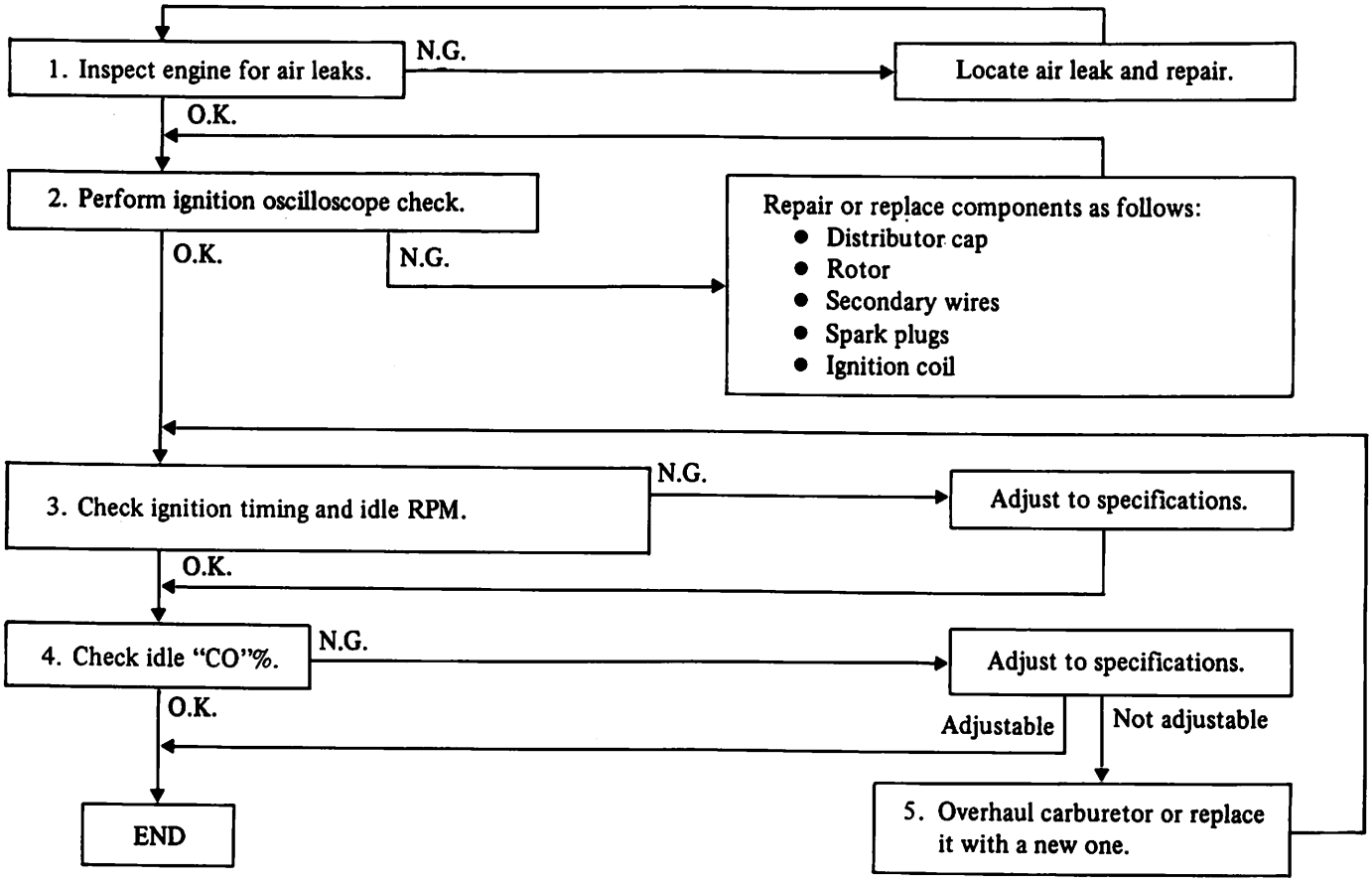
DIAGNOSTIC PROCEDURES

Driveability



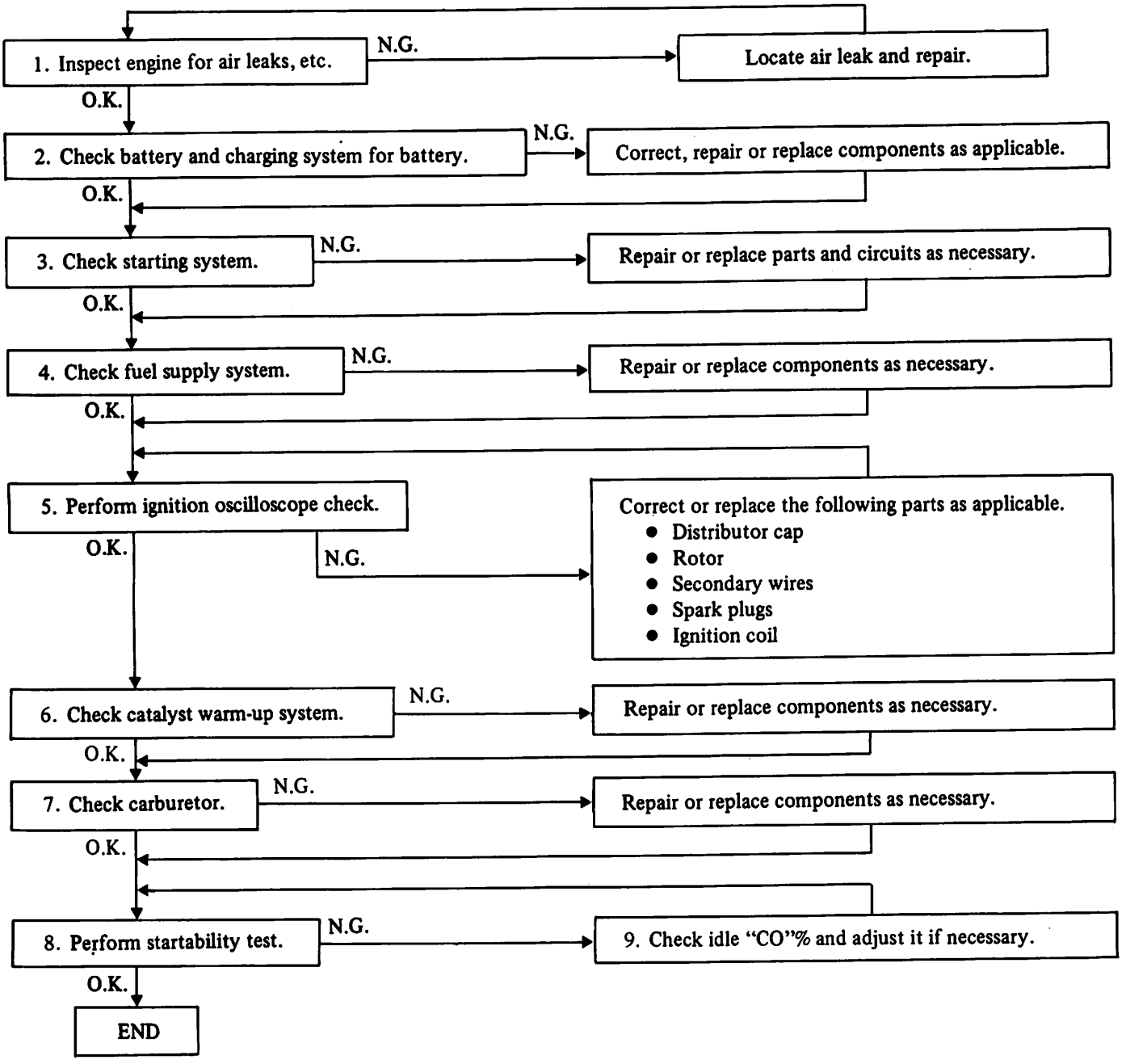
DIAGNOSTIC PROCEDURES

Improper Idling



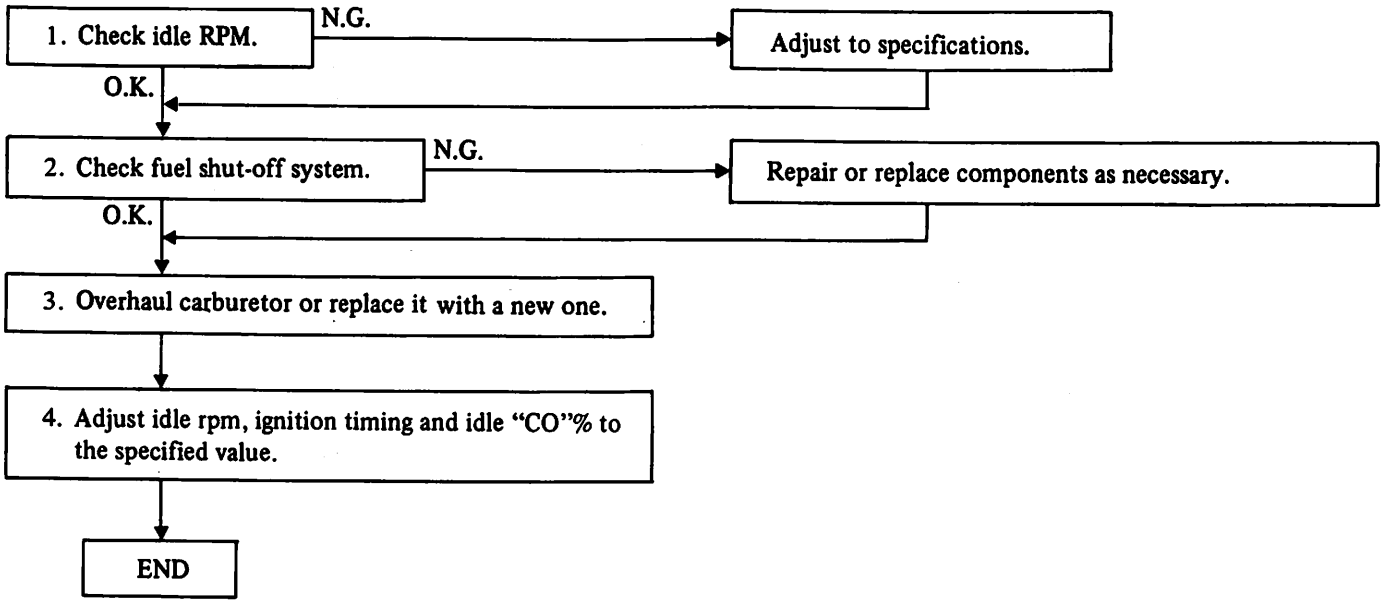
DIAGNOSTIC PROCEDURES

Engine Startability



DIAGNOSTIC PROCEDURES

Engine Stall



DIAGNOSTIC STEPS

Driveability

1. **Inspect engine for leaks.**
(1) Check clamps at all air intake components.
(2) Check vacuum hoses for leakage.
(3) Check air cleaner filter for clogging.
(4) Visually inspect for leaks at the following:
- Dipstick
- A.B. valve hose
- Air injection hose
- Intake manifold gasket
- Valve rocker cover
- E.G.R. valve gasket
- Oil filler cap

(5) Check E.G.R. valve seat and operation.
(6) Check A.B. valve operation.
2. **Check fuel supply system.**
(1) Make sure proper fuel is used.
(2) Visually check fuel filter for clogging.
(3) Visually check fuel lines for leaks.
(4) With engine idling, visually check fuel level.
If not correct, adjust.
Refer to CARBURETOR — Inspection and Adjustment.
3. **Perform ignition oscilloscope test.**
(1) Warm up engine sufficiently.
(2) Check ignition system for unusually high or low firing voltage.
(3) If firing voltage is abnormal, determine cause and repair.
4. **Check ignition timing and idle rpm.**
Refer to CARBURETOR — Inspection and Adjustment.
5. **Check idle "CO"%.**
Refer to CARBURETOR — Inspection and Adjustment.
6. **Perform driveability test.**
(1) Evaluate effectiveness of adjustments by driving vehicle.
(2) If unsatisfactory, proceed to step 7.
7. **Check carburetor.**
Refer to CARBURETOR — Inspection and Adjustment.
8. **Perform driveability test. Re-evaluate vehicle performance.**

Improper Idling

1. **Inspect engine for leaks.**
2. **Perform ignition oscilloscope test.**
3. **Check ignition timing and idle rpm.**
4. **Check idle "CO"%.**
5. **Overhaul carburetor or replace it with a new one.**
Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY on the inspection procedure of each item.

DIAGNOSTIC STEPS

Engine Startability

1. **Inspect engine for leaks.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
2. **Check battery and charging system for battery.**

(1) Check battery voltage.
(2) If poor battery voltage, check charging system for battery.

- Alternator
- Voltage regulator
- Others

   Refer to EL section.

3. **Check starting system.**

(1) Check starter operation.
(2) If it does not operate, check the following:

- Starter
- Ignition relay
- Ignition switch
- Others

   Refer to EL section.

4. **Check fuel supply system.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
5. **Perform ignition oscilloscope test.**
   Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
6. **Check fast idle system.** (Air conditioner equipped model)
   Refer to HA section.
7. **Check carburetor.**
   Refer to CARBURETOR – Inspection and Adjustment.
8. **Perform startability test.**

(1) Start engine with the recommended starting procedure.
(2) If engine does not start, proceed to step 9.

9. **Check and adjust idle "CO"%.**
   Refer to CARBURETOR – Inspection and Adjustment.

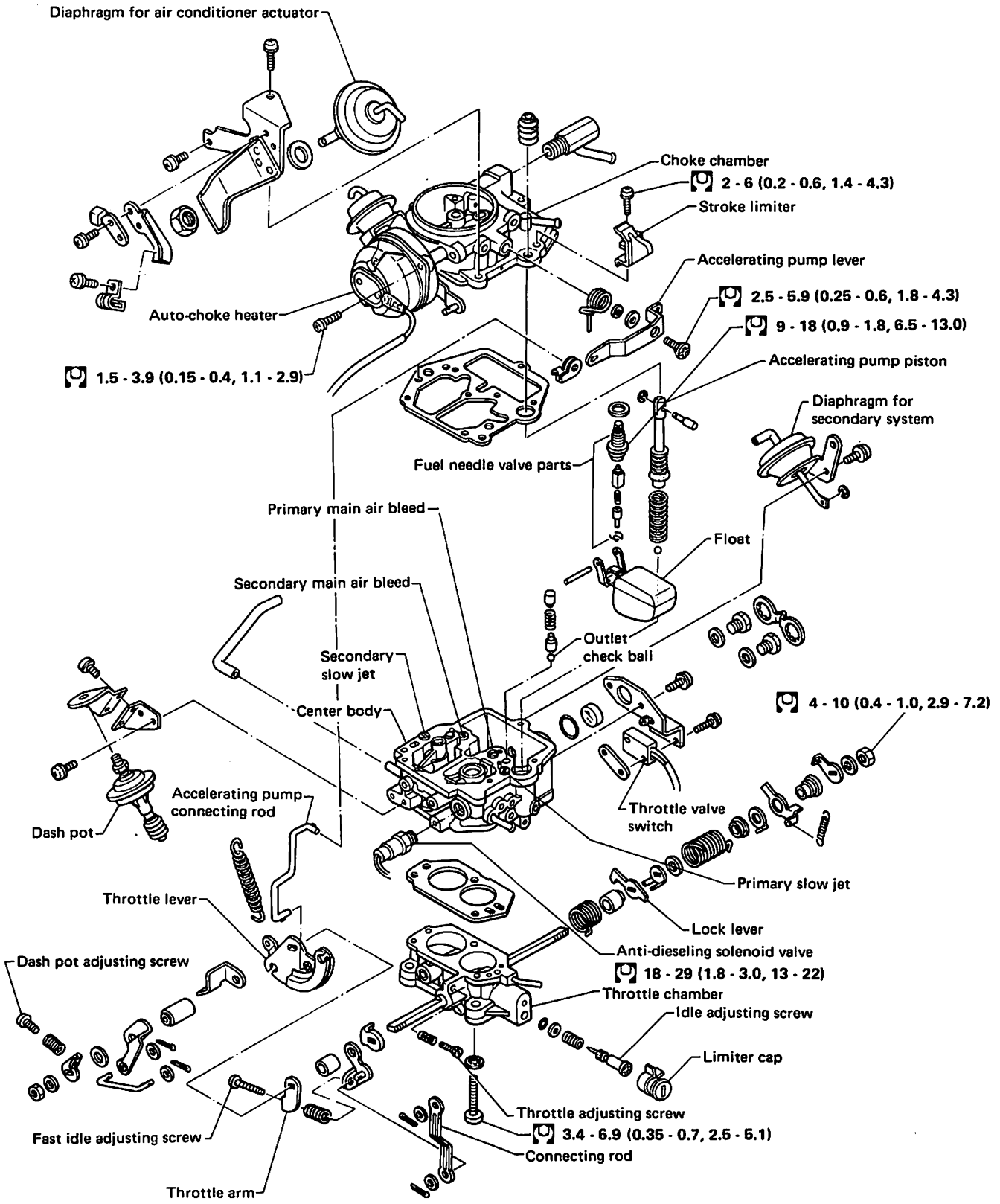
Engine Stall

1. **Check idle rpm.**
   Check idle rpm. Refer to CARBURETOR – Inspection and Adjustment.
2. **Check fuel shut-off system.**

a) Turn ignition switch "ON" and check operating sound of anti-dieseling solenoid valve.
b) If N.G., repair or replace solenoid valve or harness.

3. **Overhaul carburetor or replace it with a new one.**
4. **Adjust idle rpm, ignition timing and idle "CO"% to the specified value.**
   Refer to CARBURETOR – Inspection and Adjustment.

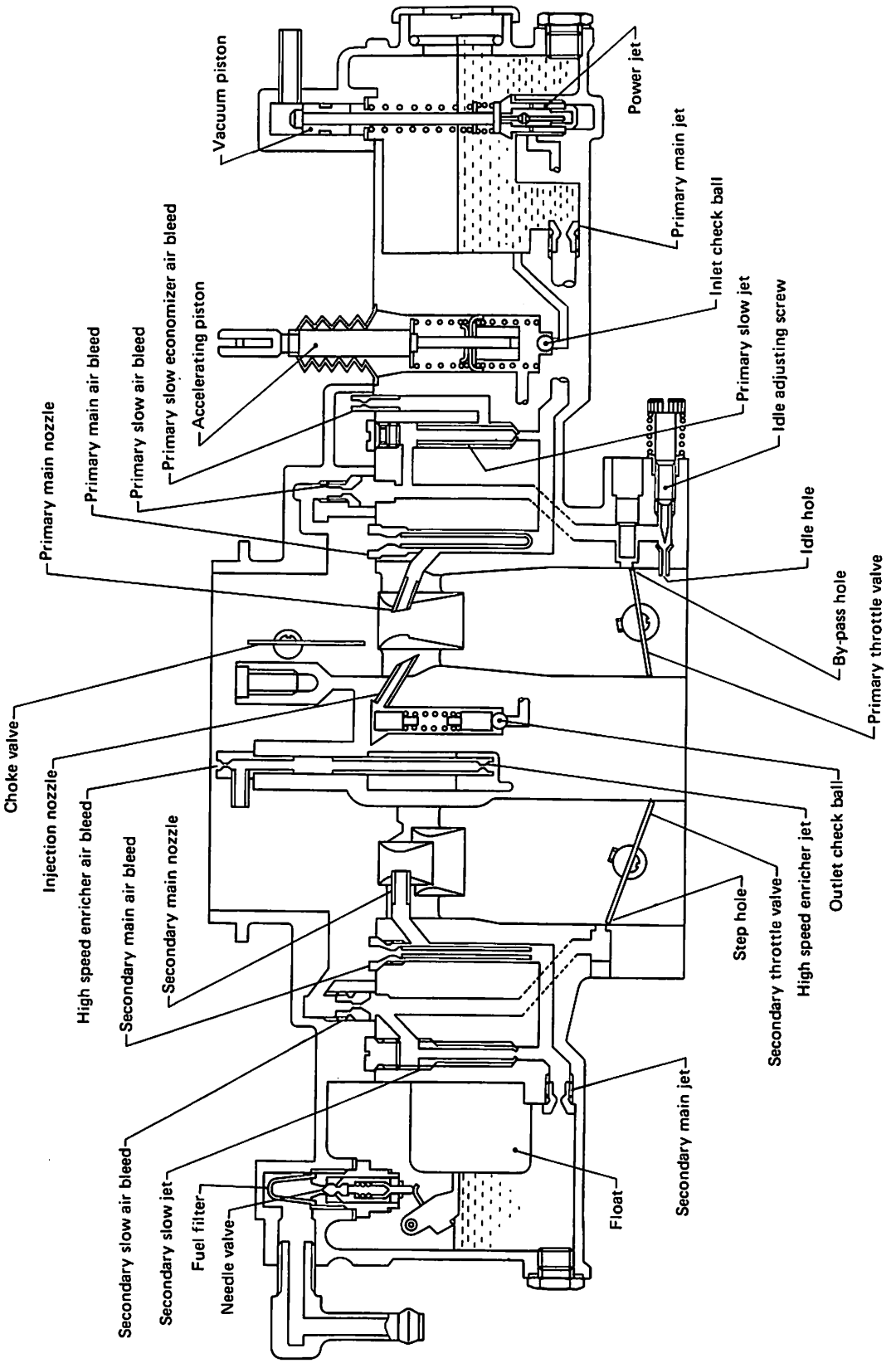
CARBURETOR



: N·m (kg-m, ft-lb)

SEF024D

CARBURETOR



SEF762A

CARBURETOR

Major Service Operation

The perfectly adjusted carburetor delivers the proper fuel and air ratios at all speeds for the particular engine for which it was designed.
The carburetor should be maintained in its original condition and will continue to deliver the proper ratios.
To maintain accurate carbureting through passages and discharge holes, extreme care must be taken in cleaning.
Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean or carburetor calibration will be affected.

REMOVAL

Remove carburetor from engine, taking sufficient care to the following:

PRECAUTIONS:

a. **When disconnecting fuel lines, do not spill fuel from fuel pipe.**
b. **When removing carburetor, do not drop any nut or bolt into intake manifold.**
c. **Be careful not to bend or scratch any part.**

CLEANING AND INSPECTION

Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor often results in unsatisfactory performance. For this reason, efficient carbureting depends upon careful cleaning and inspection while servicing.
Before assembling and installing the carburetor, blow all passages and castings with compressed air and blow off all parts until dry.

Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

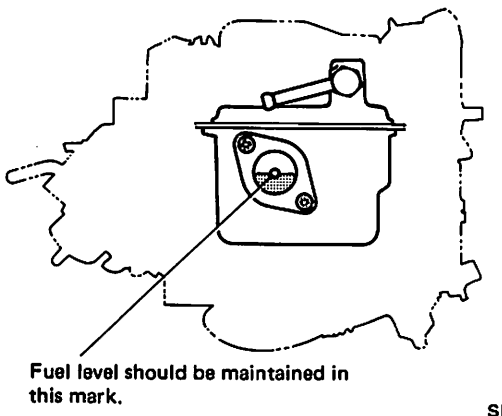
CARBURETOR — Inspection and Adjustment

Idle Speed and Mixture

Refer to section MA for ADJUSTING IDLE RPM, ADJUSTING IGNITION TIMING AND CHECKING MIXTURE RATIO (Canada).

Fuel Level

Place vehicle on a level surface and with engine idling, visually check fuel level.



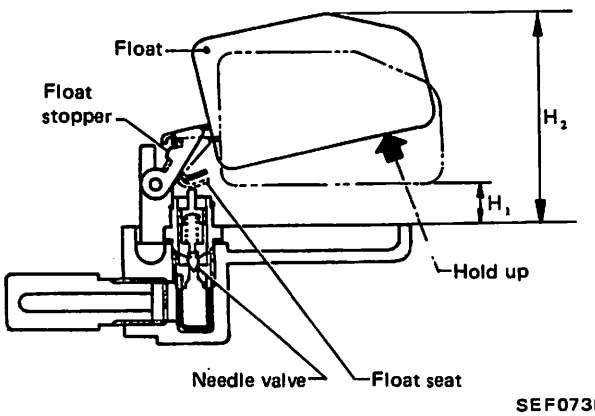
SEF602

If not correct, adjust as follows.

1. Turn off engine and remove choke chamber.
2. Turn choke chamber upside down, raise float, then lower it until float seat contacts with needle valve and in that position, check clearance H_1.

   H_1: 16.5 - 17.5 mm (0.650 - 0.689 in)

   If out of specification, adjust by bending float seat.



SEF073D

3. Raise float until float stopper touches the choke chamber and check height H_2.

   H_2: 46.5 - 47.5 mm (1.831 - 1.870 in)

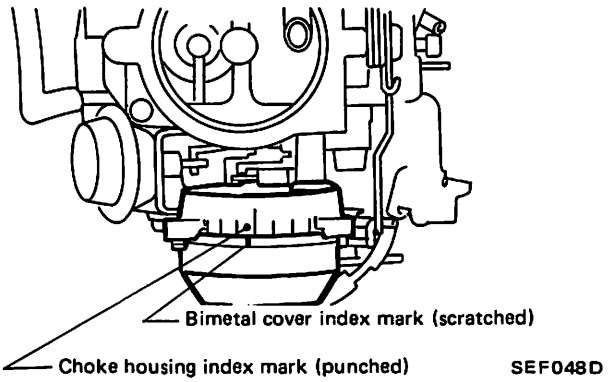
   If out of specification, adjust by bending float stopper.
4. Install choke chamber and recheck fuel level with engine idling.

Automatic Choke

CHECKING CHOKE MECHANISM
(Choke plate and linkage)

1. Check choke valve and mechanism for free operation, and clean or replace if necessary. Binding can result from petroleum gum formation on choke shaft or from damage.
2. Before starting engine, fully open throttle valve and make sure that choke valve closes properly.
3. Push choke valve with your finger, and check for binding.
4. Check to be sure that the punched index mark on the bimetal cover meets the scratched index mark on the choke housing, as shown below.

Do not set the bimetal cover index mark at any other positions except the punched mark on the choke housing.



SEF048D

4. Check automatic choke heater source wiring for proper connection, then start engine.
5. After warming up the engine, ensure that choke valve is fully open.
6. If automatic choke heater source wiring is normal and choke valve does not operate after warm-up, check choke heater circuit, choke heater and choke relay.

CARBURETOR — Inspection and Adjustment

Automatic Choke (Cont'd)

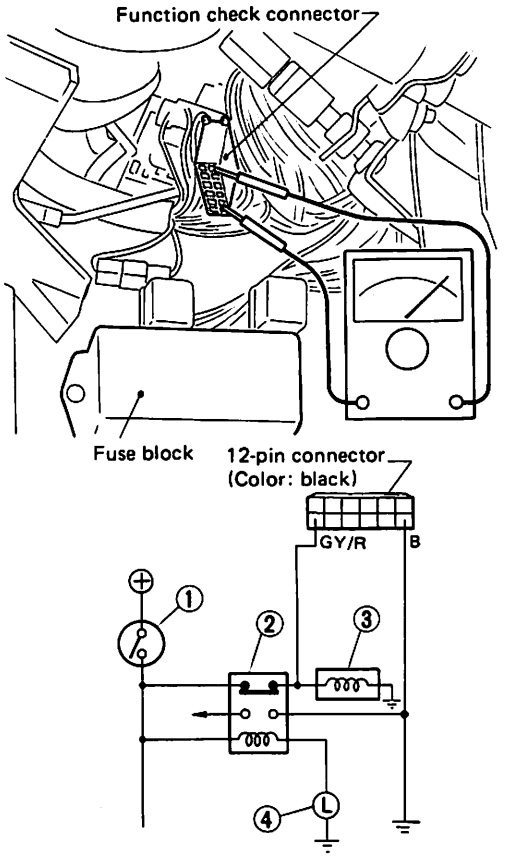
AUTOMATIC CHOKE HEATER CIRCUIT

Checking heater circuit with function connector

CAUTION:

Do not attach test leads of a circuit tester to those other than designated.

1. With engine not running, check for continuity between GY/R and B.
- If continuity exists, heater is functioning properly.
- If continuity does not exist, check for disconnected connector or open P.T.C. heater circuit.
2. With engine running at idle, check for presence of voltage across GY/R and B.
- If voltmeter reading is 12 volts, heater circuit is functioning properly.
- If voltmeter reading is zero, check for disconnected connector, open circuit, or faulty automatic choke relay.
3. Replace faulty parts.



1 Ignition relay
2 Automatic choke relay
3 Automatic choke heater
4 Alternator "L" terminal

SEF745A

Fast Idle

1. Warm up engine sufficiently and set fast idle arm on 2nd step of fast idle cam.

Remove bimetal cover and then set fast idle arm.

2. Read engine speed.

   Fast idle speed (at 2nd cam step):
   1,800 - 2,600 rpm (M/T)
   2,300 - 3,100 rpm (A/T)

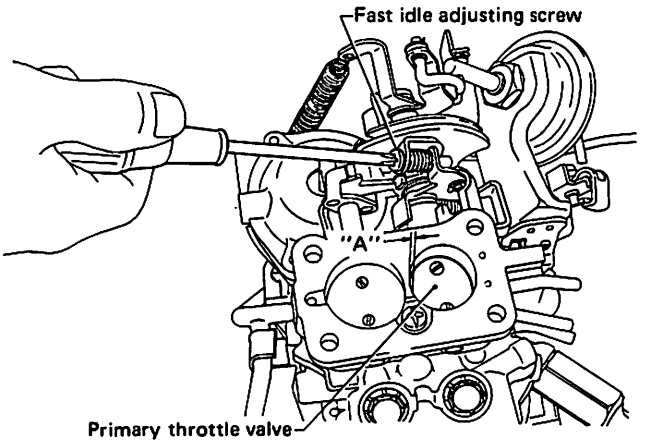
3. If out of specifications, adjust it by turning fast idle adjusting screw.
4. If necessary, remove carburetor from engine and make fast idle adjustments as follows.

(1) Place fast idle arm on 2nd step of fast idle cam, in the same manner as in step 1 above.

(2) Adjust clearance "A" between primary throttle valve and inner carburetor wall by turning fast idle adjusting screw.

   Clearance "A":
   0.68±0.10 mm
   (0.0268±0.0039 in) (M/T)
   0.96±0.10 mm
   (0.0378±0.0039 in) (A/T)

5. After adjusting clearance "A", install carburetor on engine and check engine speed.
6. Install automatic heater bimetal cover.



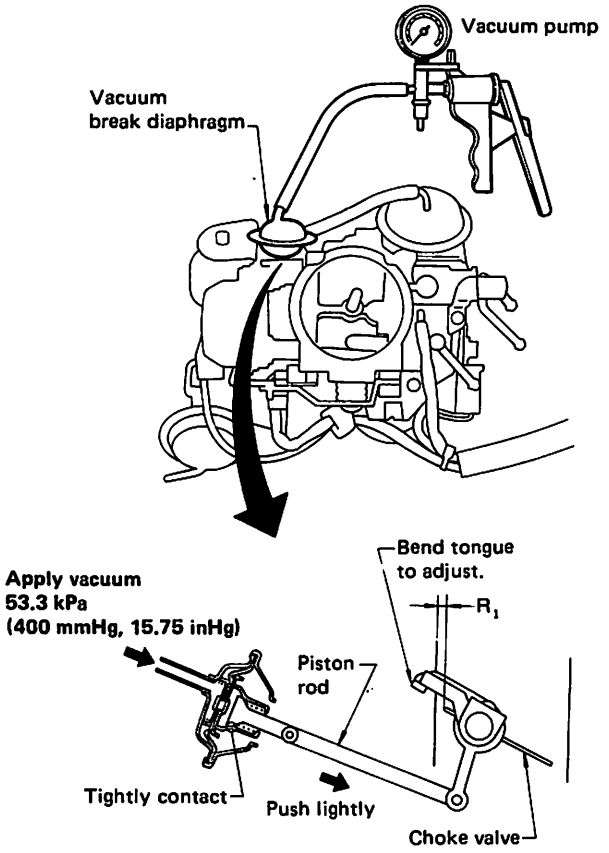
SEF243A

CARBURETOR — Inspection and Adjustment

Vacuum Break

1. With engine cold, visually check that choke valve is fully closed.
2. Using a vacuum pump, move vacuum break diaphragm to the end of its full stroke.
3. Lightly move piston rod in the direction that closes choke valve and check clearance "R_1".

   Clearance "R_1":
   1.53±0.20 mm (0.0602±0.0079 in)

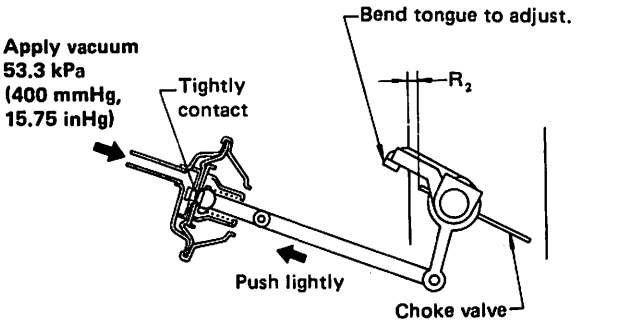


SEF009D

If out of specification, adjust "R_1" by bending tongue.

4. Move piston rod toward diaphragm and check clearance "R_2".

   Clearance R_2:
   2.60±0.20 mm (0.1024±0.0079 in)



SEF010D

If out of specification, recheck and adjust clearance "R_1".

CARBURETOR — Inspection and Adjustment

Accelerating Pump

1. With engine stopped, turn the throttle lever and ensure that the fuel is injected smoothly through the injector located in primary port.

A pump stroke limiter serves to inject fuel slightly right after throttle lever movement.

2. If accelerating pump is out of order, check link, lever pump piston, limiter, etc.

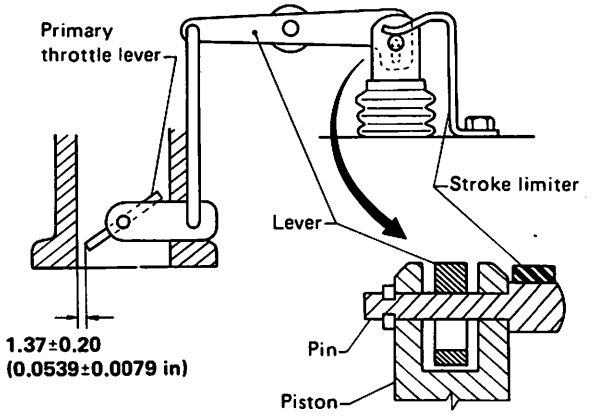
Do not bend stroke limiter.

3. If necessary, check the injection quantity and the pump stroke limiter as follows:

(1) Remove carburetor from engine.

(2) Check the gap between primary throttle valve and inner carburetor wall when pump lever comes in contact with piston pin.

Stroke limiter gap:
1.37±0.20 mm (0.0539±0.0079 in)



SEF616

(3) If out of specifications, adjust it by bending stroke limiter.

Dash Pot

1. Idle speed of engine and mixture must be well tuned up and engine sufficiently warm.
2. Turn throttle valve by hand, and read engine speed when dash pot just touches stopper lever.

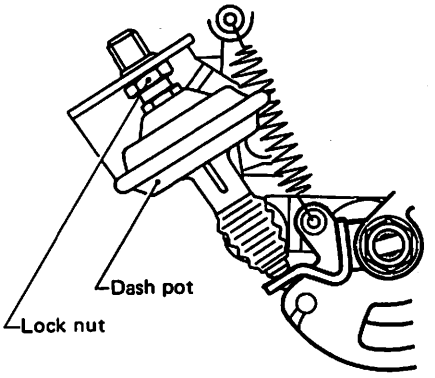
Dash pot touch speed:
M/T
2,250 - 2,450 rpm
A/T
1,900 - 2,100 rpm

3. If out of specifications, adjust as follows.

(1) Remove carburetor from engine.

(2) Adjust gap between primary throttle valve and inner carburetor wall when dash pot stem comes in contact with throttle arm.

Dash pot gap:
0.72±0.10 mm (0.0283±0.0039 in) (M/T)
0.56±0.10 mm (0.0220±0.0039 in) (A/T)



SEF558C

(3) Tighten dash pot lock nut.

(4) After reinstalling carburetor on engine, ensure dash pot touching engine speed is within the specifications.

4. Tighten lock nut and make sure that engine speed drops smoothly and slowly from 2,000 to 1,000 rpm.

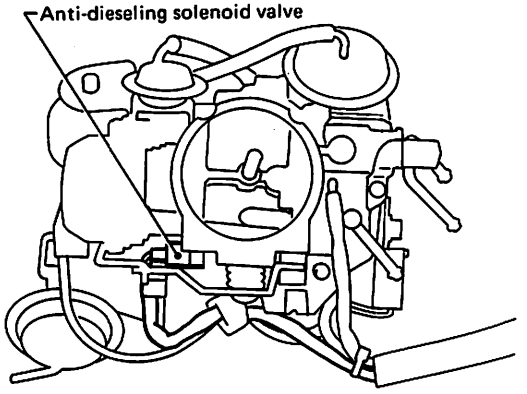
CARBURETOR — Inspection and Adjustment

Anti-dieseling Solenoid Valve

Start the engine and keep at idle speed.
If the engine does not stop when the lead wire is disconnected, the solenoid is stuck.
If the engine does not stop when the ignition switch is turned off, this indicates that the striking solenoid valve is stuck or short-circuited.
If the harness is in good condition, replace the solenoid valve as a unit.

: Anti-dieseling solenoid
18 - 29 N·m
(1.8 - 3.0 kg-m, 13 - 22 ft-lb)

After replacement, start engine and check to be sure that fuel is not leaking, and that anti-dieseling solenoid is in good condition.



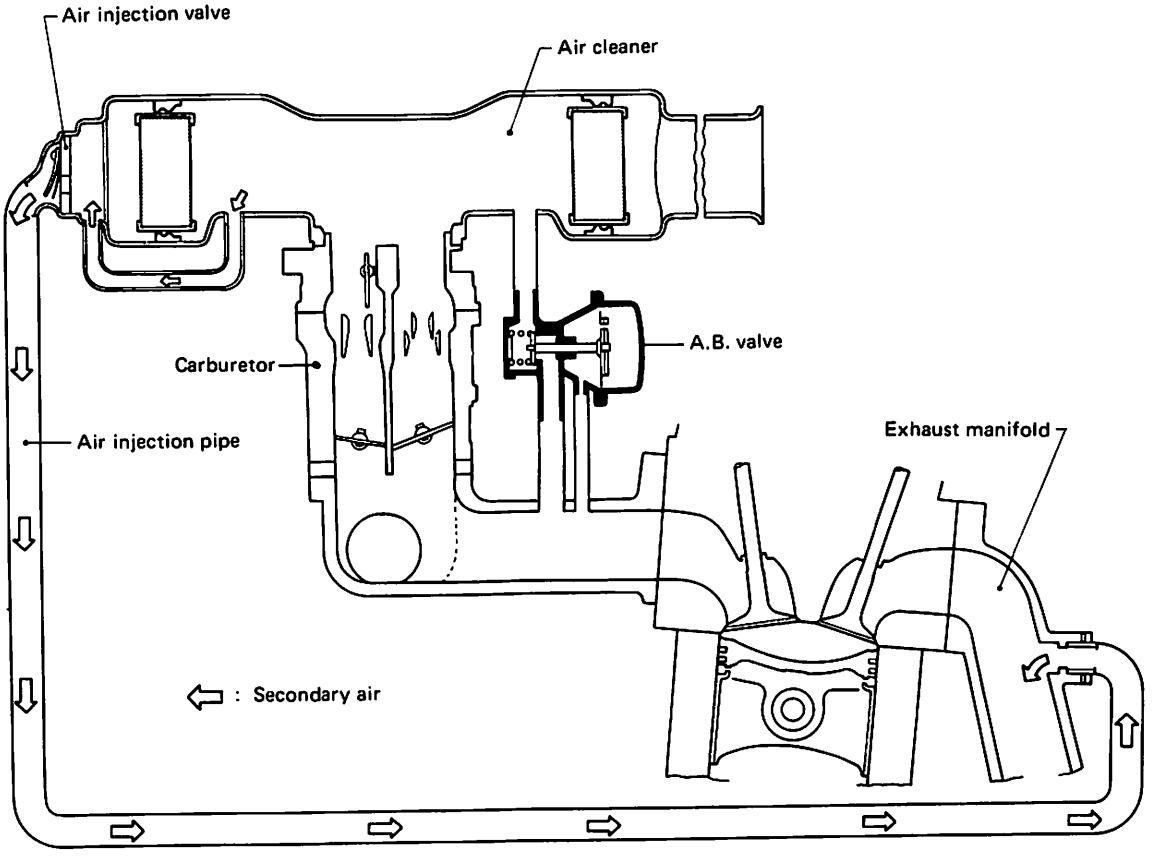
SEF738A

EXHAUST EMISSION CONTROL SYSTEM

Air Injection Valve (A.I.V.) System

The air injection valve (A.I.V.) system is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the exhaust manifold.
The exhaust pressure in the exhaust manifold usually pulsates in response to the opening and closing of the exhaust valve and it decreases below atmospheric pressure periodically.

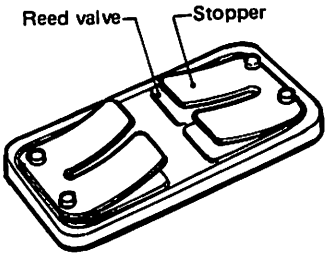
If a secondary air intake is opened to the atmosphere under vacuum conditions, secondary air can be drawn into the exhaust manifold in proportion to the vacuum.
Therefore, the air injection valve (A.I.V.) system reduces CO and HC emissions in exhaust gases.



SEF899B

Air injection valve

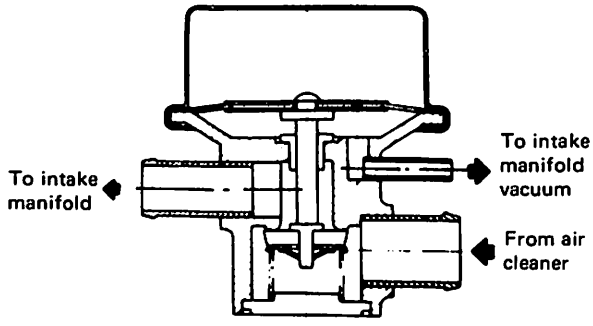
When the exhaust pressure is below atmospheric pressure (negative pressure), secondary air is sent to the exhaust manifold.
When the exhaust pressure is above atmospheric pressure, the reed valve prevents secondary air from being sent back to the air cleaner.



SEC344

A.B. valve

This valve is actuated by intake manifold vacuum to prevent after burning in the exhaust system at the initial period of deceleration.
At this period, the mixture in the intake manifold becomes too rich to ignite and burn in the combustion chamber and burns easily in the exhaust system with injected air in the exhaust manifold.



EC069

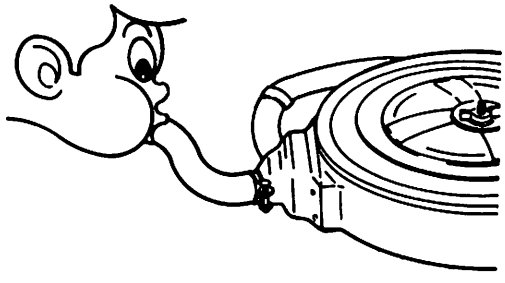
INSPECTION

Preliminary inspection

Check hose for looseness, flatting, damage or faulty connections, and each part for proper installation. If necessary, replace.

Air injection valve

1. Disconnect air injection hose at air injection pipe side. Suck or blow hose to make sure that air flows only on the air injection pipe side.

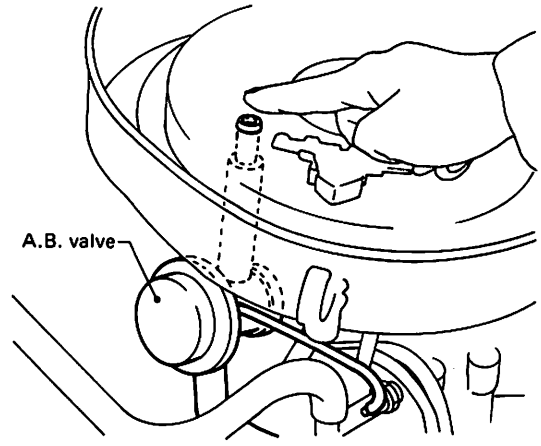


SEC282

2. Check air injection valve for binding or damage. If necessary, replace.

A.B. valve

1. Warm up engine thoroughly.
2. Disconnect hose from air cleaner, and place a finger near the outlet.
3. Run engine at about 3,000 rpm under no load, then quickly return it to idling. If you feel a pull or suction force on your finger, the A.B. valve is functioning normally. If no suction is felt, replace the A.B. valve.

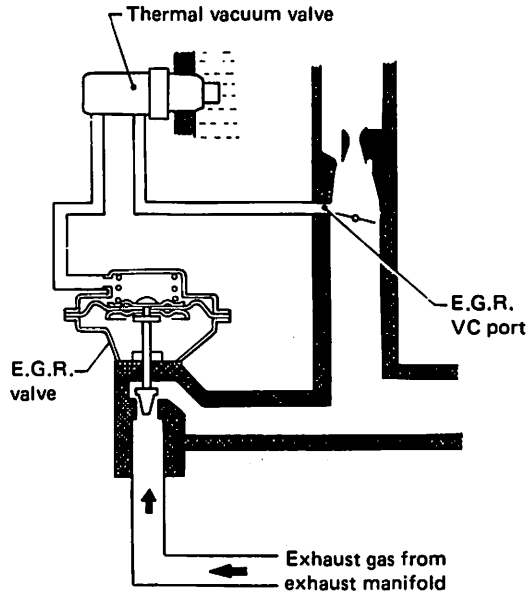


SEC707

EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System

In the exhaust gas recirculation system, a part of the exhaust gas is returned to the combustion chamber to lower the spark flame temperature during combustion. This results in a reduction of nitrogen oxide (NOx) content in the exhaust gas.



SEC487A

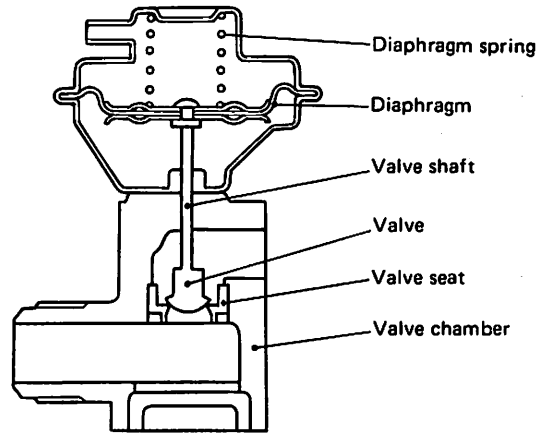
OPERATION

Water temperature °C (°F)	T.V.V.	E.G.R. system
Below 50 (122)	Closed*	Not actuated
Above 50 (122)	Open	Actuated

*For E.G.R. valve vacuum line

E.G.R. control valve

The E.G.R. control valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the valve connected to the diaphragm, to which vacuum is applied in response to the opening of the carburetor throttle valve.

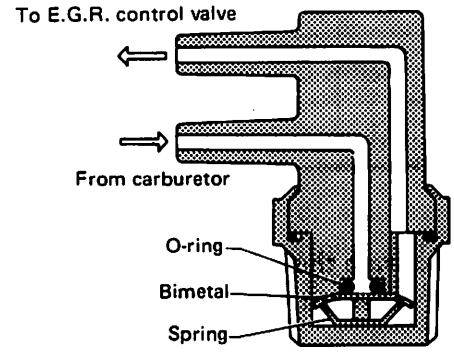


SEC019

Thermal vacuum valve (2-port bimetal type)

This thermal vacuum valve is mounted on the front side of the intake manifold. It detects engine coolant temperature by means of a built-in bimetal, and opens or closes the vacuum passage in the thermal vacuum valve.

When the vacuum passage is open, the carburetor vacuum signal is applied to the diaphragm of the E.G.R. control valve to actuate the taper valve connected to the diaphragm.



EC232

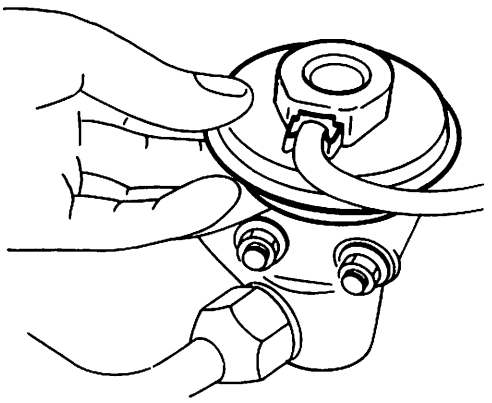
EXHAUST EMISSION CONTROL SYSTEM

Exhaust Gas Recirculation (E.G.R.) Control System (Cont'd)

INSPECTION

Entire system

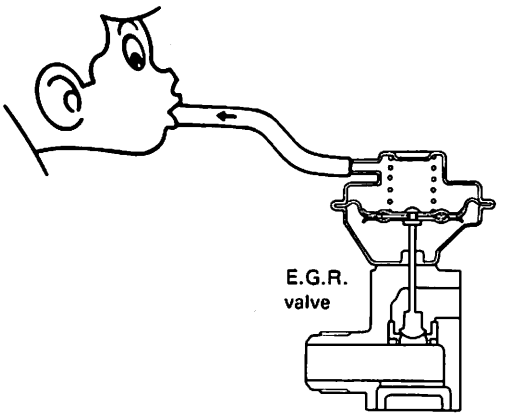
1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.
2. With engine stopped, inspect E.G.R. control valve for any indication of binding or sticking by moving diaphragm of control valve upwards with a finger.
3. With engine running, inspect E.G.R. control system operation when engine is cold and hot.
   When checking E.G.R. control valve operation, place a finger on the diaphragm of the valve.



SEC711

E.G.R. control valve

1. Apply vacuum to E.G.R. control valve, referring to the following figure. If the valve moves to full position, it is normal.
   E.G.R. control valve will remain open for more than 30 seconds after vacuum has cut off.



SEC078

2. Visually check E.G.R. control valve for damage, wrinkle or deformation.

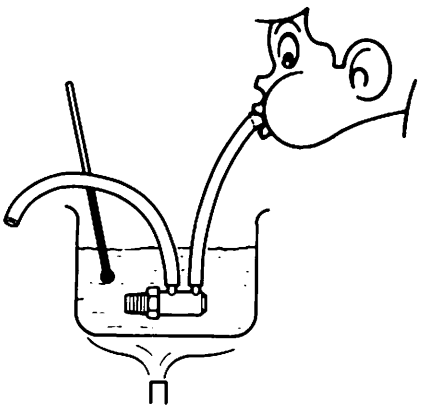
Thermal vacuum valve

Remove thermal vacuum valve from engine. Inhale air from port of E.G.R. system and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before dismounting, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:
Do not allow water to get inside the thermal vacuum valve.

Water temperature °C (°F)	Valve
Above 50 (122)	Open
Below 50 (122)	Closed

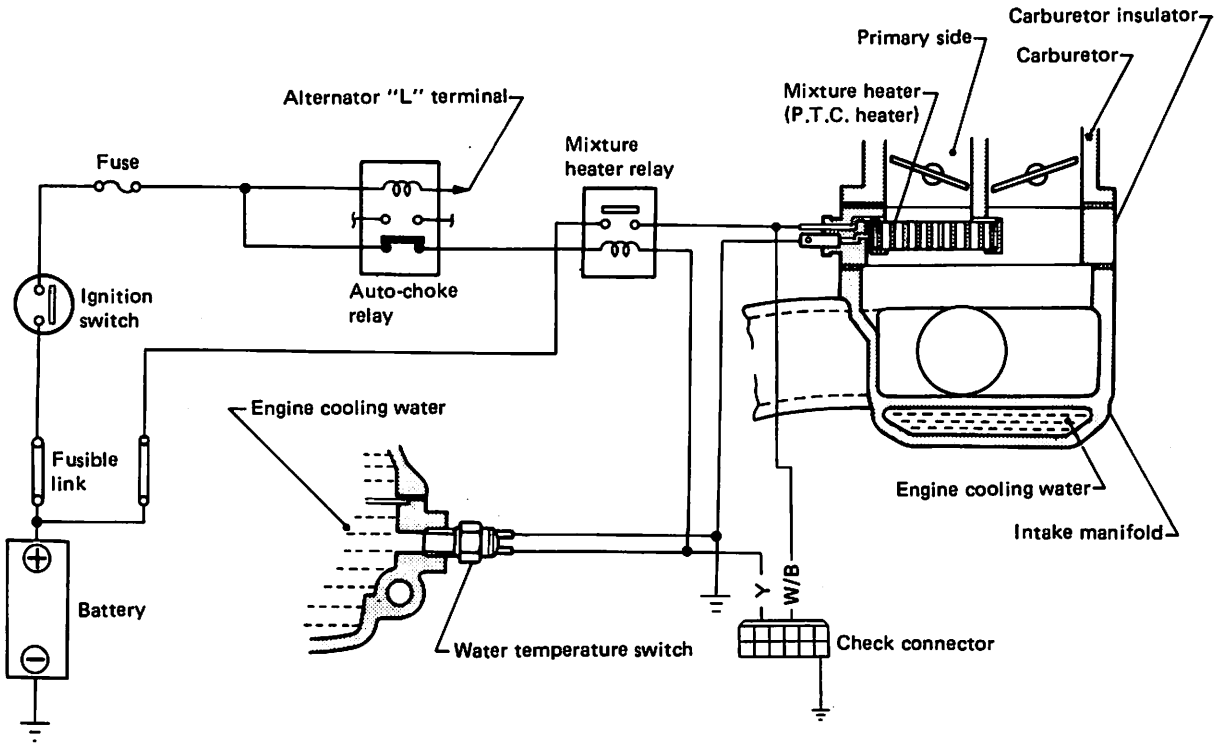


SEC133

EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System

In order to reduce emissions and improve driveability during engine warm-up, the positive temperature coefficient (P.T.C.) heater is installed between carburetor and intake manifold.
When engine starts, P.T.C. heater is electrically energized and the air-fuel mixture which passes through this heater is heated.
When engine warm-up is completed, the heater current is cut off by the water temperature switch.

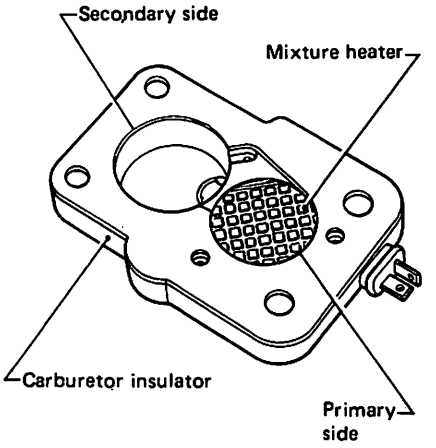


SEF570C

OPERATION

Water temperature °C (°F)	Mixture heating system
Below 37 (99)	Activated
Above 37 (99)	Deactivated

Mixture heater



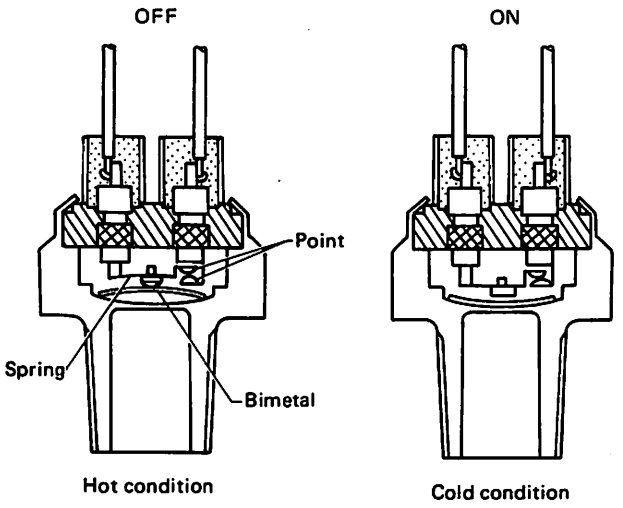
SEC611

EXHAUST EMISSION CONTROL SYSTEM

Mixture Heating System (Cont'd)

The mixture heater uses a honeycomb P.T.C. heater design and is situated in the primary side of the carburetor insulator. With this design, resistance to current flow increases as the temperature increases, and vice versa. As a result, the current flow is maintained constant.

Water temperature switch



SEC136

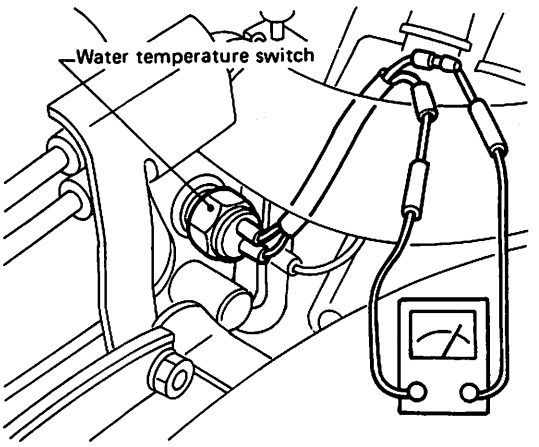
Water temperature switch is installed on thermostat housing.

INSPECTION

1. Check continuity between terminals of mixture heater. If resistance is too large, replace carburetor insulator.
2. Entire system

(1) When ignition switch is turned "ON" while engine is "OFF", confirm the presence of battery voltage at mixture heater harness connector. If no battery voltage is present, check water temperature switch and mixture heater relay.

(2) Check continuity between terminals of water temperature switch at connector.



SEC613

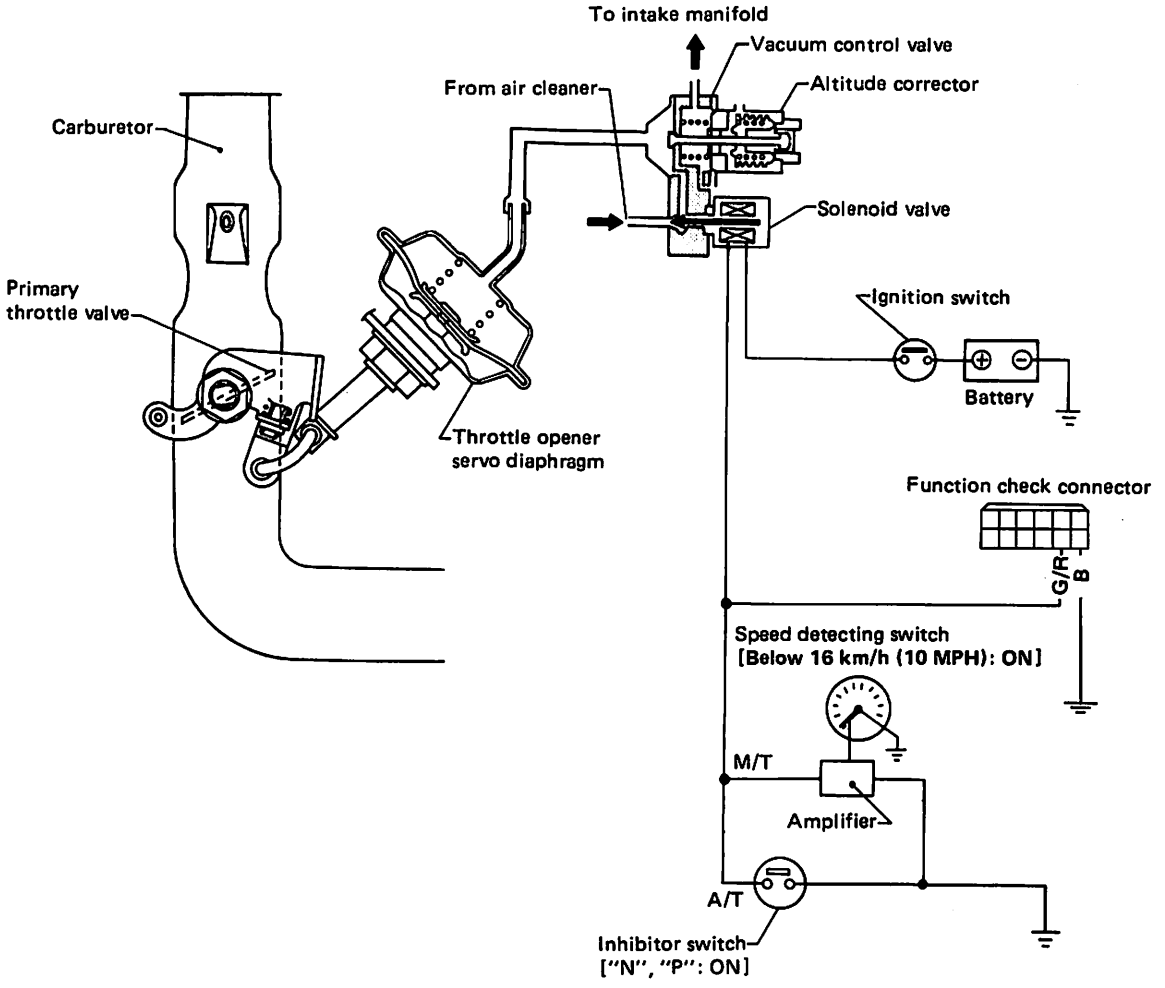
(3) Check mixture heater relay.
If necessary, check wiring harness and automatic choke relay which is "1M·1B" standardized relay.
Refer to Idle Mixture Adjusting Procedure for automatic choke relay.

EXHAUST EMISSION CONTROL SYSTEM

Throttle Opener Control System (T.O.C.S.)

The function of the throttle opener is to open the throttle valve of the carburetor slightly while the car decelerating. During deceleration, the manifold vacuum rises and the quantity of mixture in the engine is not sufficient for normal combustion to continue; consequently, a great amount of unburned HC is emitted.

Carburetors equipped with the throttle opener supply the engine with an adequate charge of combustible mixture to maintain proper combustion during deceleration, resulting in a dramatic reduction in HC emission.



SEF569C

OPERATION

Transaxle	Gear position	Vehicle speed km/h (MPH)	Solenoid valve	T.O.C.S. operation
Manual	Any position	Below 16 (10)	ON	Not operated
		Above 16 (10)	OFF	Operated
Automatic	"N" or "P"	Any speed	ON	Not operated
	Others		OFF	Operated

INSPECTION AND ADJUSTMENT

Entire system

When idling speed is too high and does not drop to idling speed, the throttle opener control system should be checked.

1. Check for continuity between "G/R" and "B" terminals specified in function check connector with ignition switch OFF.
   If continuity does not exist, solenoid may be faulty. Replace throttle opener control valve assembly.
2. Turn on ignition switch and check voltage across terminals "G/R" and "B".

M/T models

Remove speedometer cable from combination meter. Then spin speedometer in combination meter with fingers and confirm that the speedometer pointer indicates more than 16 km/h (10 MPH) temporarily. Voltage between "G/R" and "B" terminals should be changed as follows:

Above 16 km/h (10 MPH)	12V
Below 16 km/h (10 MPH)	0V

If not, amplifier or speed detecting switch may be faulty; replace parts with new ones.

A/T models

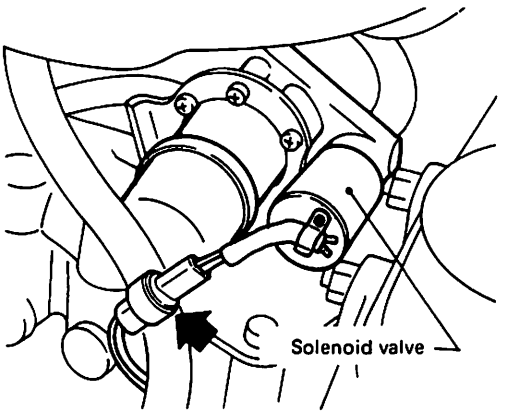
Voltage between two terminals should be changed as follows:

"N" or "P" position	0V
Other position	12V

If not, replace inhibitor switch.

Throttle opener operating pressure

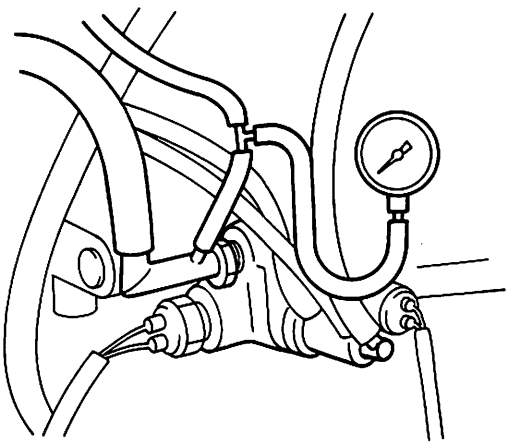
1. Remove harness of solenoid valve.



SEC721

2. Connect rubber hose between vacuum gauge and intake manifold.

A quick-response type boost gauge such as Bourdon's type is recommended; a mercury-type manometer should not be used.



SEC718

3. Warm up engine until it reaches operating temperature. Then confirm that engine idling speed is specified value.

   Engine idling speed:

   M/T

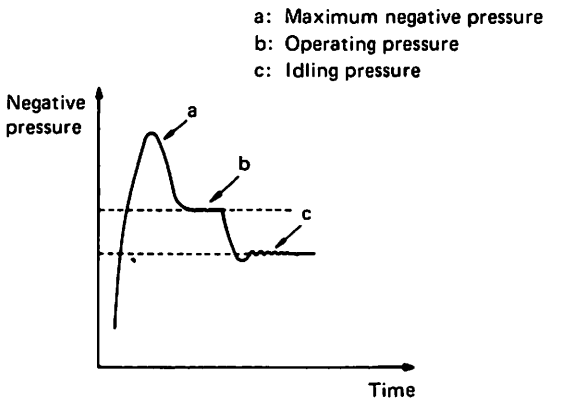
   800 rpm

   A/T

   650 rpm (in "D" position)

4. Run engine under no load. Increase engine speed to 3,000 or 3,500 rpm, then quickly close throttle valve.

5. At that time, manifold vacuum pressure increase abruptly to −80.0 kPa (−600 mmHg, −23.62 inHg) or above and then decreases to the level set at idling.



EC502

6. Check that the T.O.C.S. operating pressure is within the specified pressure.

   Specified pressure [0 m (0 ft), sea level and 101.3 kPa (760 mmHg, 29.92 inHg), atmospheric pressure] :
   −69.3±2.7 kPa
   (−520±20 mmHg, −20.47±0.79 inHg)

7.

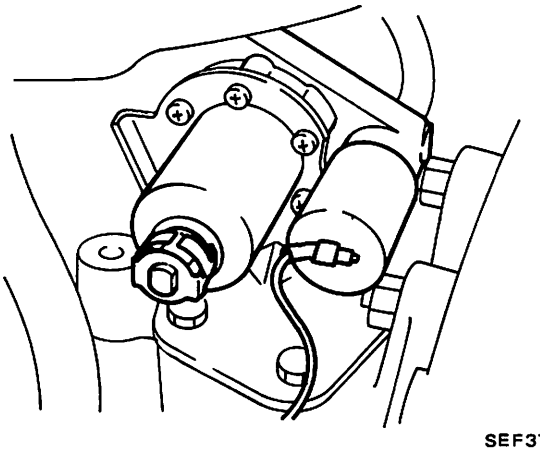
(1) If it is lower than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.

   Adjusting nut:
   Clockwise

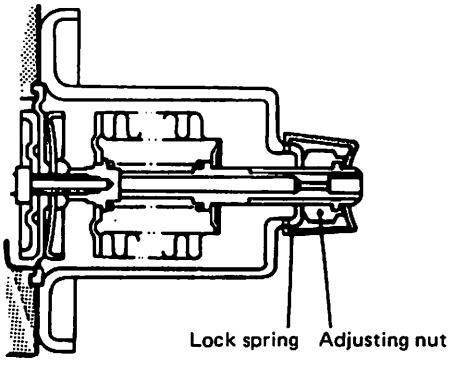
(2) If it is higher than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.

   Adjusting nut:
   Counterclockwise

When adjusting T.O.C.S., turn adjusting nut in or out without lock spring. Always set lock spring properly to prevent changes in set pressure.



SEF378C



SEC168

The operating pressure varies in proportion to altitude.
When atmospheric pressure is known, operating pressure will be found by tracing the arrow line "A". When altitude is known, operating pressure will be found by tracing the arrow line "B".

8. Race engine and check for adjustment.
9. If engine speed does not drop to idling speed when checking throttle opener operating pressure, proceed as follows:

(1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side, 3.3 kPa (25 mmHg, 0.98 inHg) above the specified value.

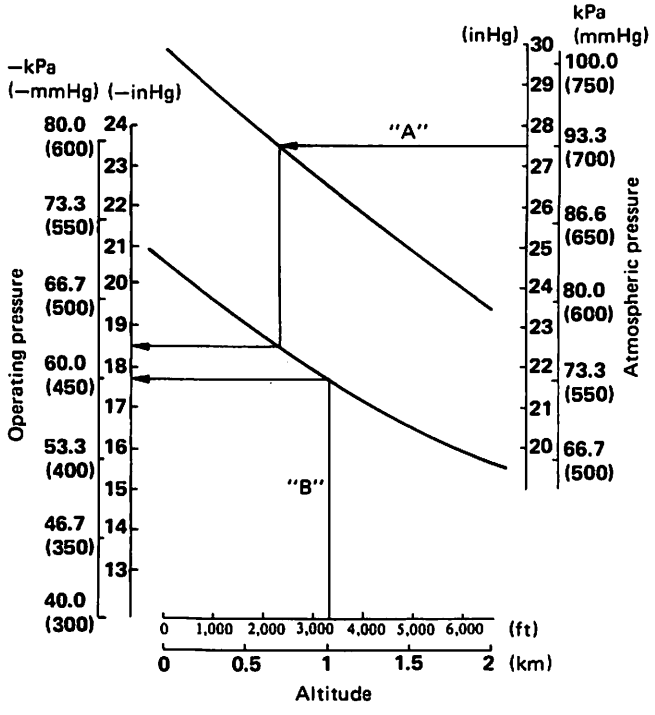
(2) Turn adjusting screw 1/4 of a turn clockwise so that throttle opener operating pressure drops by 3.3 kPa (25 mmHg, 0.98 inHg).

EXHAUST EMISSION CONTROL SYSTEM

Throttle Opener Control System (T.O.C.S.) (Cont'd)

10. If throttle opener operating pressure cannot be observed clearly even in step 9, proceed as follows.
(1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side 6.7 kPa (50 mmHg, 1.97 inHg) above the mid-point of the specified range.
(2) Turn adjusting screw 1/2 of a turn clockwise.

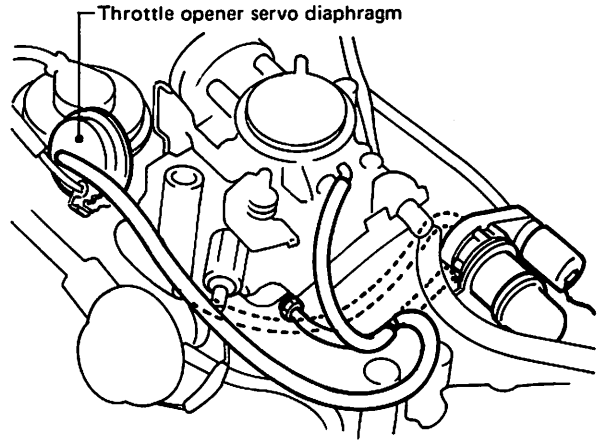
The throttle opener operating pressure should be correctly set within the specified range after the above adjustments, even if the engine speed cannot be decreased to idling.



SEC370

Servo diaphragm stroke

1. Connect engine tachometer.
2. Warm up engine until it reaches operating temperature.
3. Disconnect rubber hose between servo-diaphragm and vacuum control valve.
Then, connect rubber hose to intake manifold.

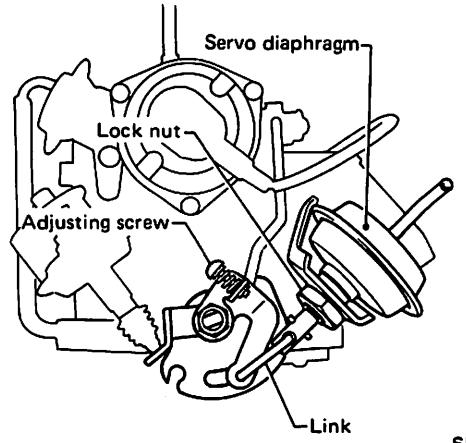


SEC724

4. Servo-diaphragm is functioning properly, if engine speed comes into the specified range.

Specified engine speed:
1,700 - 2,000 rpm

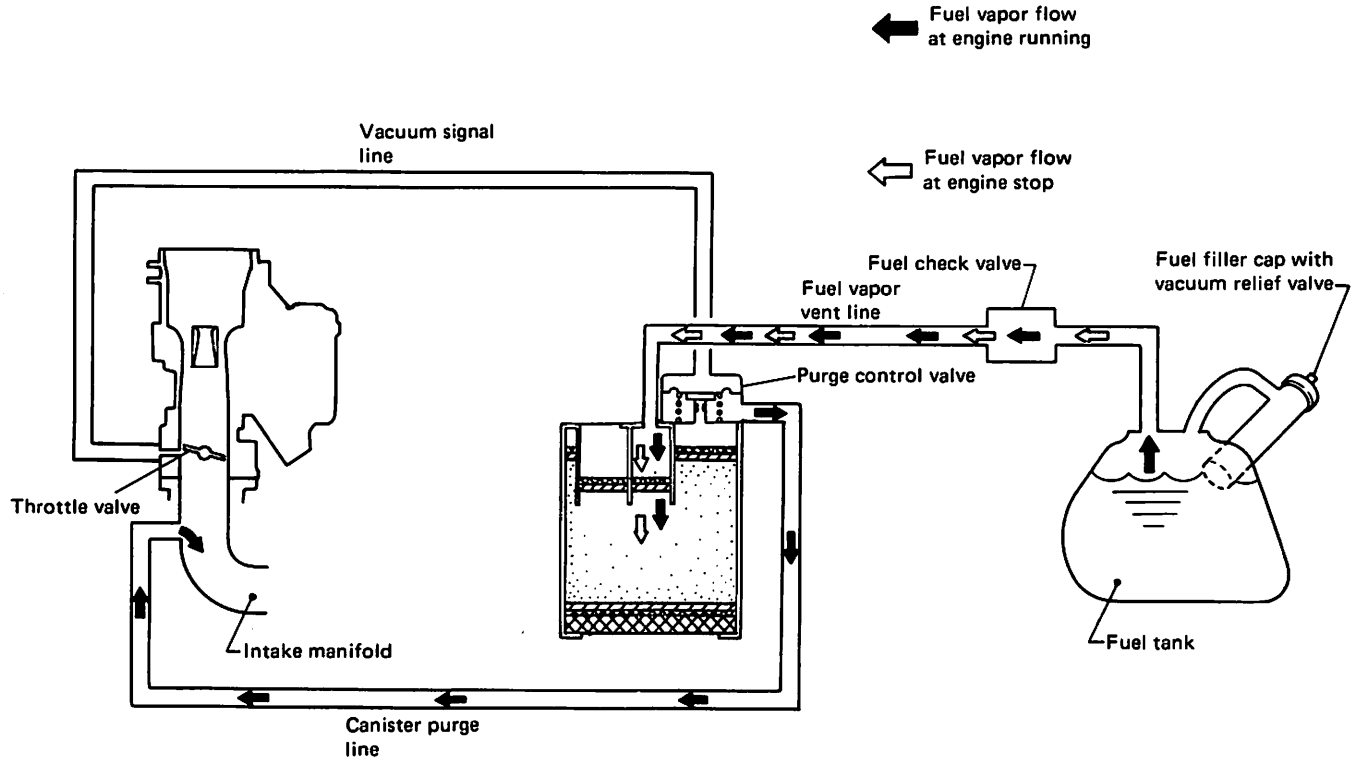
5. If necessary, adjust engine speed until it is in the specified range, using servo-diaphragm adjusting screw.
When engine speed is lower than the prescribed range:
Turn adjusting screw clockwise.
When engine speed is higher than the prescribed range:
Turn adjusting screw counterclockwise.



SEF737A

EVAPORATIVE EMISSION CONTROL SYSTEM

The evaporative emission control system is used to reduce hydrocarbons emitted to the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.



SEF379C

Operation

AT ENGINE STOP

Fuel vapor from the sealed fuel tank is led into the carbon canister which is filled with activated carbon and stored there.

DURING ENGINE OPERATION

The canister retains the vapor until the canister is cleaned by air drawn through the purge line to the intake manifold.

As engine speed increases, the ported vacuum rises and purge control valve opens the orifice allowing the vapor to travel through the purge line to the intake manifold.

EVAPORATIVE EMISSION CONTROL SYSTEM

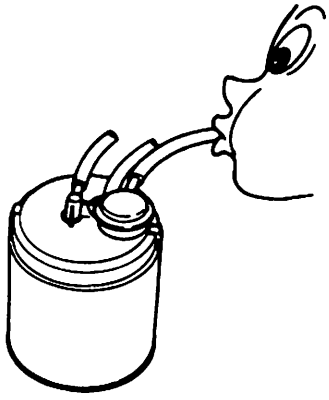
Inspection

FUEL TANK AND VAPOR VENT LINE

Refer to MA section for inspection of fuel tank and vapor vent line.

CARBON CANISTER PURGE CONTROL VALVE

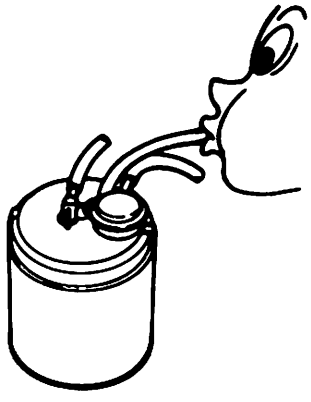
1. Disconnect rubber hose, in the line, between T-connector and carbon canister at T-connector.
2. Inhale air from the opening of the rubber hose running to the vacuum hole in the carbon canister and ensure that there is no leak.
   If there is a leak, replace canister.



ET349

VENT SWITCHING VALVE

1. Disconnect vent line' hose from carburetor float chamber.
2. With engine running, inhale on the vent line of the carbon canister and ensure there is no leak.

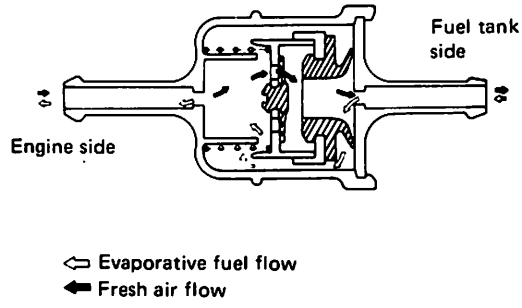


SEC052

3. With engine off, make sure there is a leak.

FUEL CHECK VALVE

1. Blow air through connector on fuel tank side.
   A considerable resistance should be felt at the mouth and a portion of air flow be directed toward the engine.
2. Blow air through connector on engine side.
   Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not being properly functioning in steps 1 and 2 above, replace.



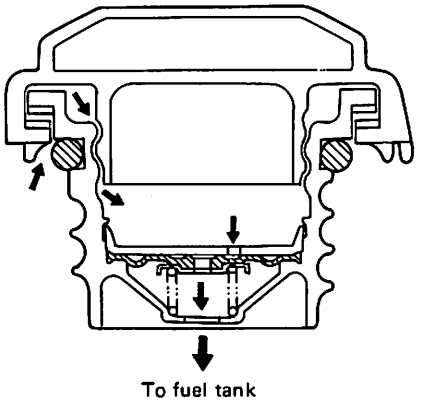
EC090A

Inspection (Cont'd)

FUEL TANK VACUUM RELIEF VALVE

Remove fuel filler cap and see it functions properly.

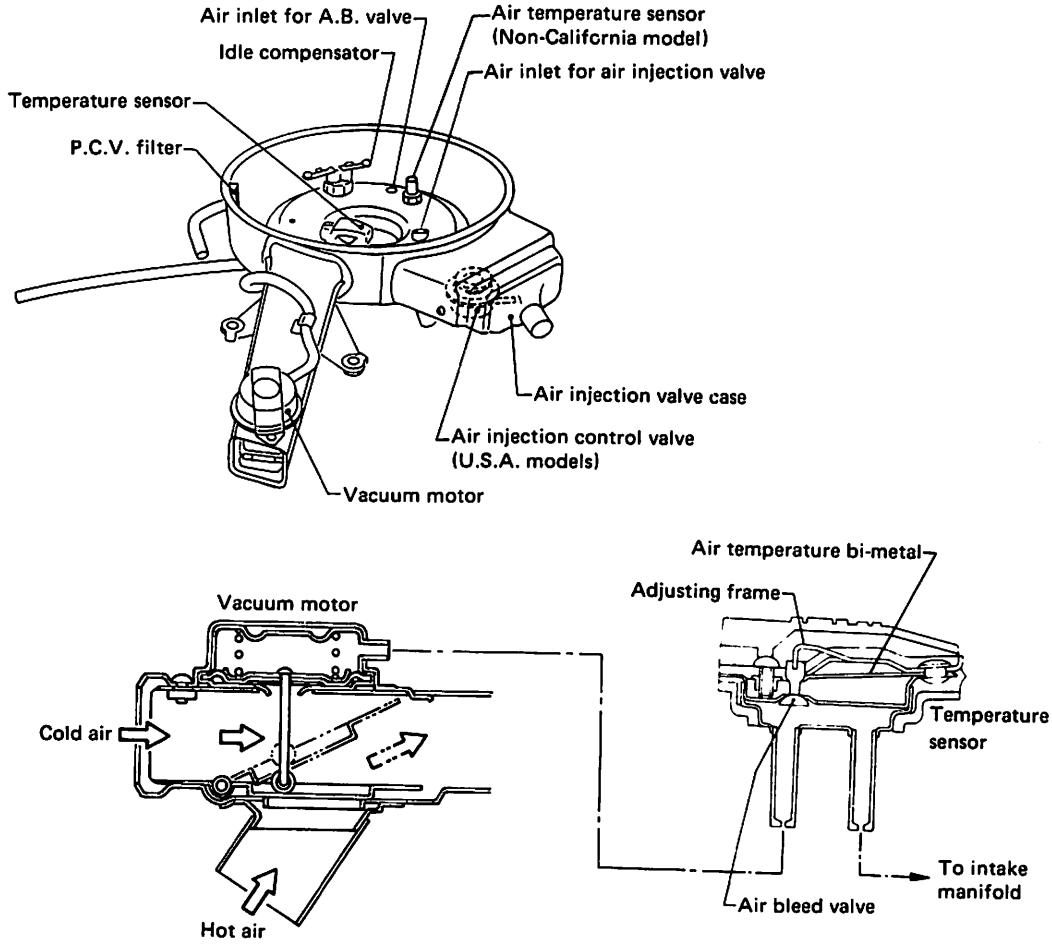
1. Wipe clean valve housing and have it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should be disappeared with valve clicks.
3. If valve is clogged, or if no resistance is felt, replace cap as an assembled unit.



SEC961

AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

E16 for All



SEF695C

Operation

The automatic temperature control system of the air cleaner is controlled by the inlet air temperature and the load condition of the engine. The inlet air temperature is detected by the sensor, and the vacuum motor is actuated by the engine intake vacuum.

Temperature sensor		Vacuum motor		Inlet air
Ambient temperature around sensor °C (°F)	Operation	Intake manifold vacuum kPa (mmHg, inHg)	Operation	
Below 38 (100)	Close	Above 21.3 (160, 6.30)	Raise	Hot
		5.3 - 21.3 (40 - 160, 1.57 - 6.30)	Partially raise	Cold + Hot
		Below 5.3 (40, 1.57)	Down	Cold
Above 53 (127)	Open	Any value	Down	

The temperature sensor begins to open between 38°C and 53°C (100°F and 127°F) so that the intake manifold vacuum will be reduced. This causes the motor to deactivate, which in turn opens the cold air passage wide, for cold air to be taken in.

AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

Inspection

AIR CLEANER FILTER (Viscous paper type)

Viscous paper type air cleaner filter does not require any cleaning operation until it is replaced periodically. Brushing or blasting operation will cause clogging and result in enrichment of carburetor mixture, and should never be conducted.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

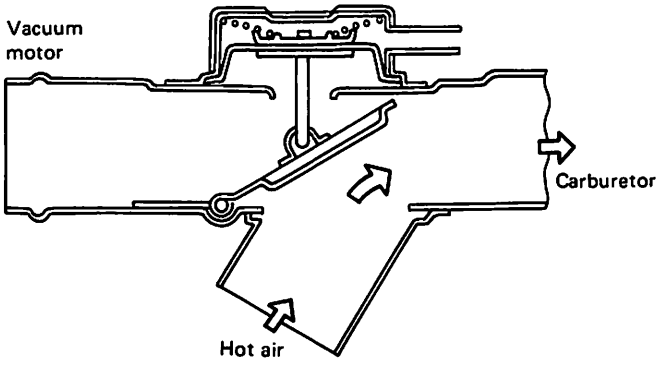
- Engine stall or hesitation
- Increase in fuel consumption
- Lack of power

If these phenomena should occur, check A.T.C. system before carrying out inspection of carburetor.

1. Check hoses for cracks, distortion and improper position.
2. Check A.T.C. system for proper function, while engine is cold. Check air control valve position.

Air control valve is correct if it is in lower position.

3. Start engine and immediately check air control valve position. If it rises, it is correct.



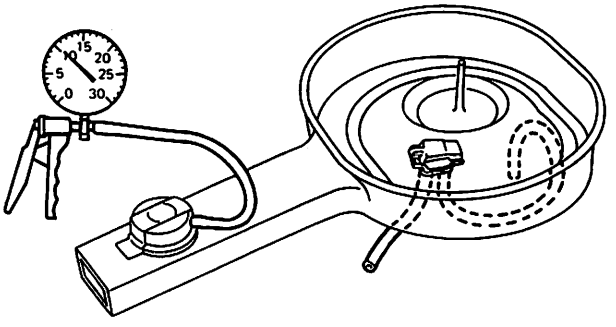
SEF913B

4. Make sure that air control valve rises and lowers when engine speed is quickly increased and decreased.
5. Make sure that air control valve partially rises when engine warm-up advances.

If the above test reveals any problem in the operation of air control valve, carry out the following test:

VACUUM MOTOR

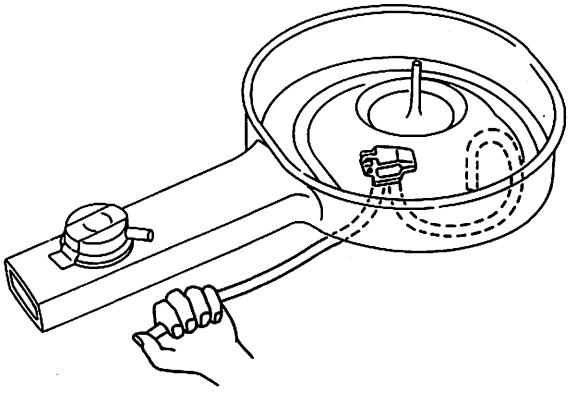
Disconnect vacuum motor inlet vacuum hose, and connect another hose to the inlet to apply vacuum to vacuum motor. Then, confirm that the air control valve moves.



SEF933B

TEMPERATURE SENSOR

While engine is cold and idling, disconnect vacuum motor inlet vacuum hose and make sure that intake vacuum is present at end of vacuum hose. If vacuum is weak or is not present at all, check vacuum hoses for leakage. Replace temperature sensor if vacuum hoses are in good order.



SEF099C

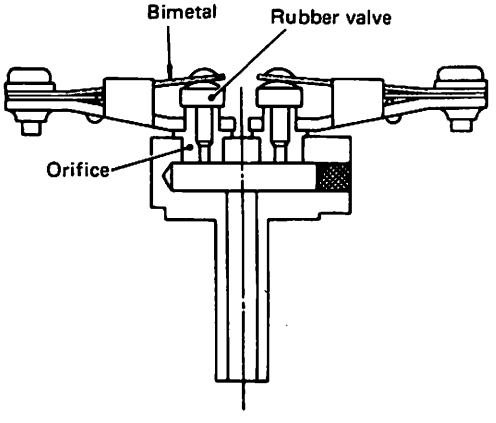
IDLE COMPENSATOR

Description

The idle compensator is basically a thermostatic valve which functions to introduce the air directly from the air cleaner to the intake manifold to compensate for abnormal enrichment of mixture in high idle temperature.
The bi-metal attached to the idle compensator detects the temperature of intake air, and opens or closes the valve. Two idle compensators having different temperature characteristics are installed.

Idle compensator opening temperature

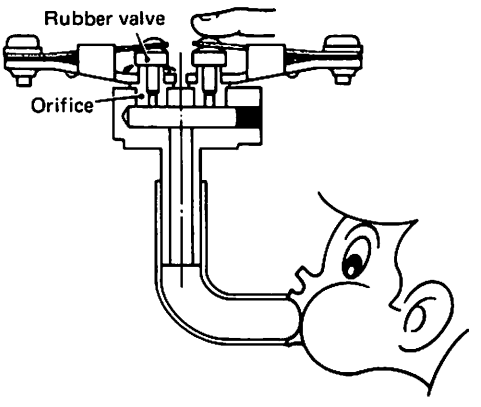
No. 1	60 - 70°C (140 - 158°F)
No. 2	70 - 80°C (158 - 176°F)



EF222

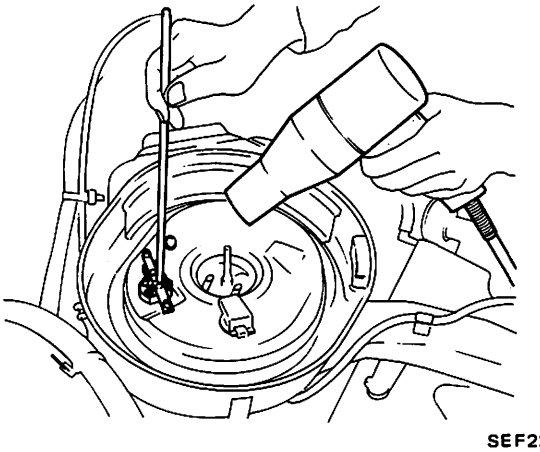
Inspection

1. Check that valve is in closed position when bimetal temperature is lower than operating temperature. To check, breathe air into tube or suck air. If excessive air leakage is found at the valve, replace idle compensator as an assembly. Note that two idle compensators are mounted to air cleaner, and that it is necessary to plug the valve of one of these idle compensators so as to prevent air leak while checking the other one.



EF225

2. Warm up engine completely.
3. Open engine hood and remove air cleaner cover.
4. Direct warm air to idle compensator with a heat gun.
   And measure operating temperature of idle compensator.



SEF221A

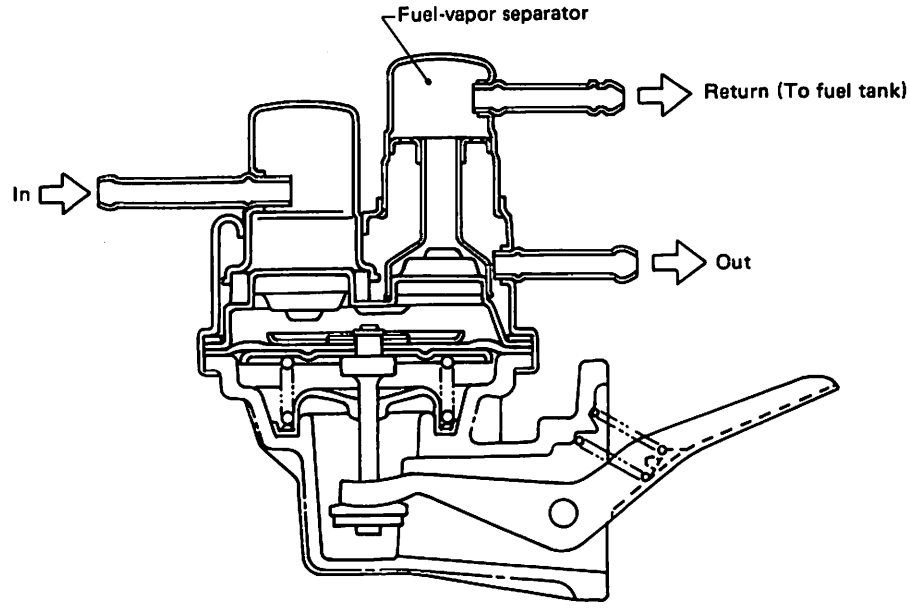
Place thermometer as close as possible to idle compensator sensor.

5. Idle compensator is in good order if a "hissing" sound is heard when its temperature reaches operating temperature.
   If not, replace idle compensator.

Take care not to bend or damage bimetals of idle compensator.

FUEL PUMP

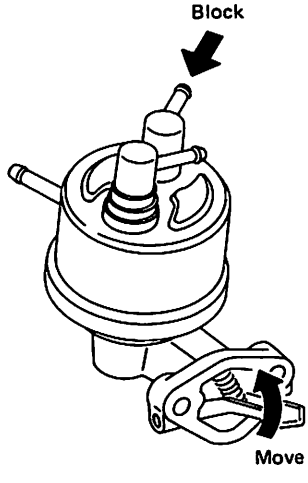
The fuel pump can not be disassembled.



SEF696C

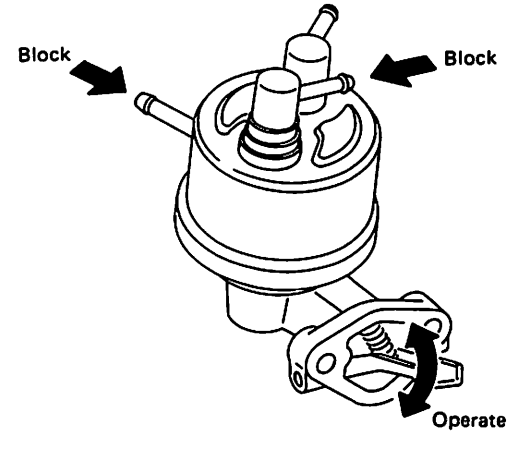
Inspection

1. Flush pump by immersing it in a fuel bath and operating rocker arm a number of times.
2. Drain fuel from fuel pump. Then block off the inlet port and check that pump arm does not move.



SEF507C

3. Remove your finger from the inlet port and listen for a suction sound which will confirm that a sufficient suction was produced.
4. Block off outlet port (for Non-California: outlet port and return port) and once again operate the rocker arm. After air pressure has been built up, confirm that the pressure remains for two or three seconds after.



SEF508C

5. Put a finger over the outlet port and again build up pressure in the pump. Then submerse the pump in a fuel bath and check for air leaks.

FUEL PUMP

Inspection (Cont'd)

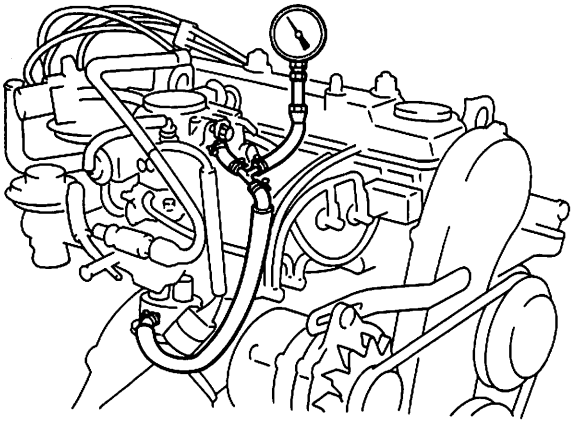
WARNING:
Before starting to work on any part of fuel system, disconnect ground cable from battery. When disconnecting fuel hoses, use a container to catch fuel remaining in the hoses.

Static Pressure Test

1. Connect T-connector and a suitable pressure gauge.
2. Check static fuel pressure with engine running at various speeds.

   Fuel pump static pressure:
   19.6 - 26.5 kPa
   (0.20 - 0.27 kg/cm^2, 2.8 - 3.8 psi)

If out of specification, replace fuel pump.



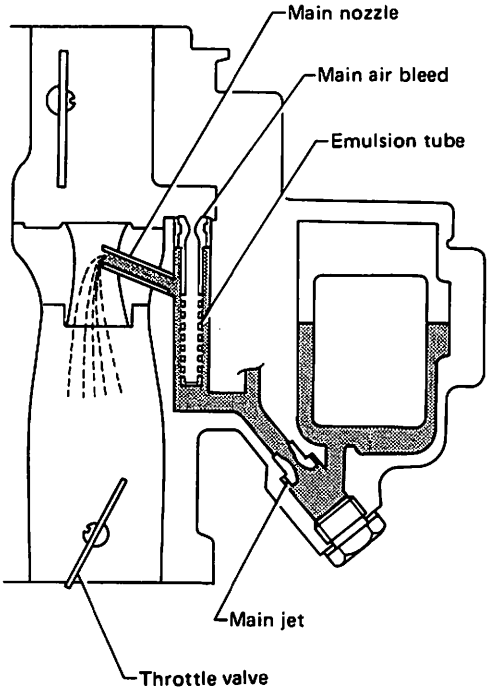
SEF509C

CARBURETOR — Structure and Operation

Primary System

PRIMARY MAIN SYSTEM

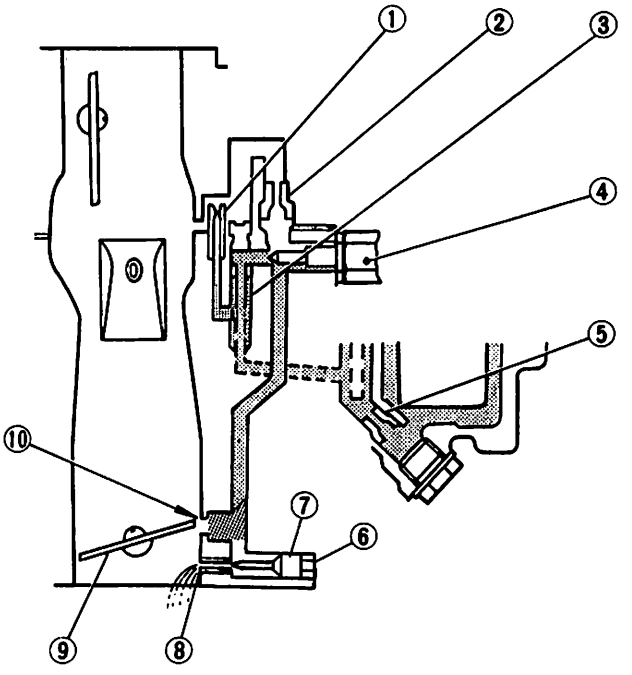
The fuel flowing out of the passages at bottom of float chamber passes through the primary main jet, and is mixed with air coming from main air bleed. The gas mixture is pulled out into the venturi through the main nozzle.
When throttle valve is wide open and engine requires dense mixture gas, power valve opens, and fuel also flows into main system.



SEF589

IDLING AND SLOW SYSTEM

Passing through the main jet, the fuel passage is separated from main line, fuel flows through the slow jet, primary slow air bleed is ejected from the by-pass hole and idle nozzle.



1 Slow economizer air bleed
2 Slow air bleed
3 Slow jet
4 Anti-dieseling solenoid valve
5 Main metering jet
6 Idle adjusting screw plug
7 Idle adjusting screw
8 Idle nozzle
9 Throttle valve
10 By-pass hole

SEF228A

CARBURETOR — Structure and Operation

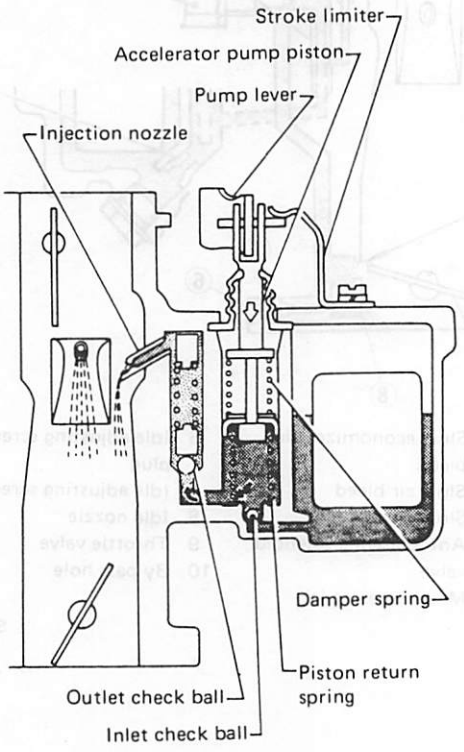
Primary System (Cont'd)

ACCELERATING MECHANISM

A mechanical accelerating pump synchronized with the throttle valve is used.

When throttle valve is closed, piston rod is pushed up with linkage, which pushes up piston through piston return spring.

When piston comes down, inlet check ball closes, outlet check ball opens, and fuel within the pump is blown out from the pump jet by compressed piston return spring. The fuel hits against side wall of small venturi, becoming minute drops and compensating transient spareness of fuel.



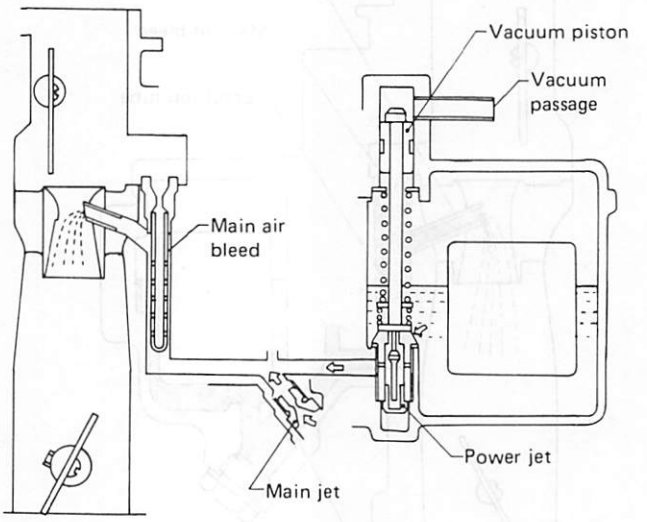
SEF590

POWER VALVE MECHANISM (Canada models)

The vacuum actuated boost type power valve mechanism makes use of the downward pulling force of the air stream below throttle valve.

When throttle valve is slightly opened during light load running, a vacuum piston upward against the spring, leaving power valve closed.

When vacuum is lowered during full load or acceleration, the spring pushes vacuum piston downward, opening power valve to furnish fuel.



SEF659

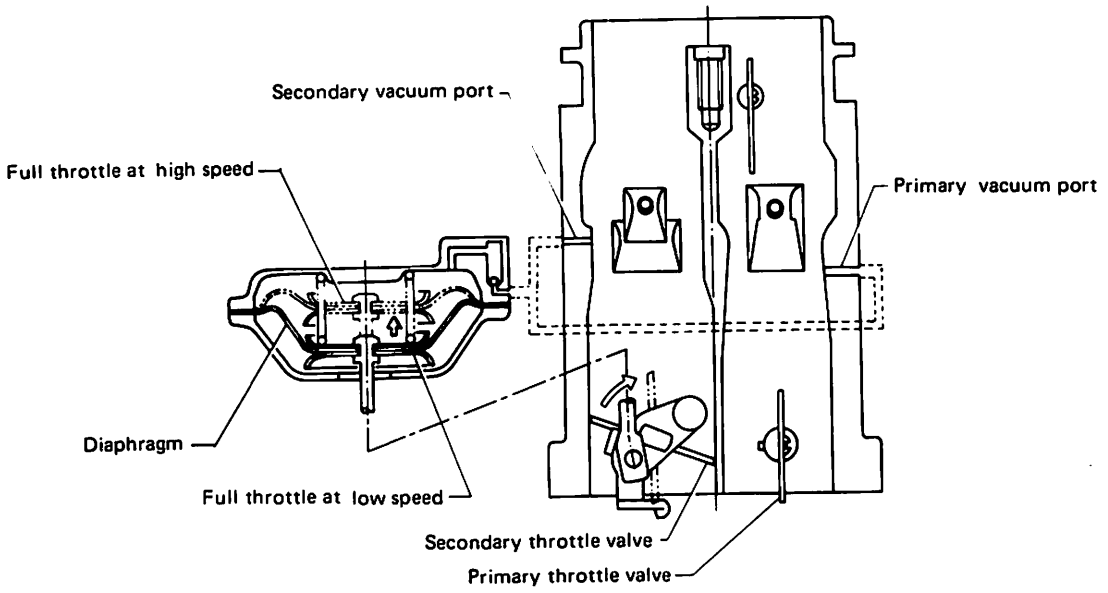
CARBURETOR — Structure and Operation

Secondary System

SECONDARY MAIN SYSTEM

When the primary throttle valve is wide open and engine produces high power, the secondary throttle valve begins to open by the diaphragm.
Fuel-air mixture produced by the functions of the main jet, main air bleed and emulsion tube, in the same manner as in the primary system, is pulled out through the main nozzle into the venturi.
The structure is almost the same as the primary main system.

Secondary switchover mechanism



SEF592

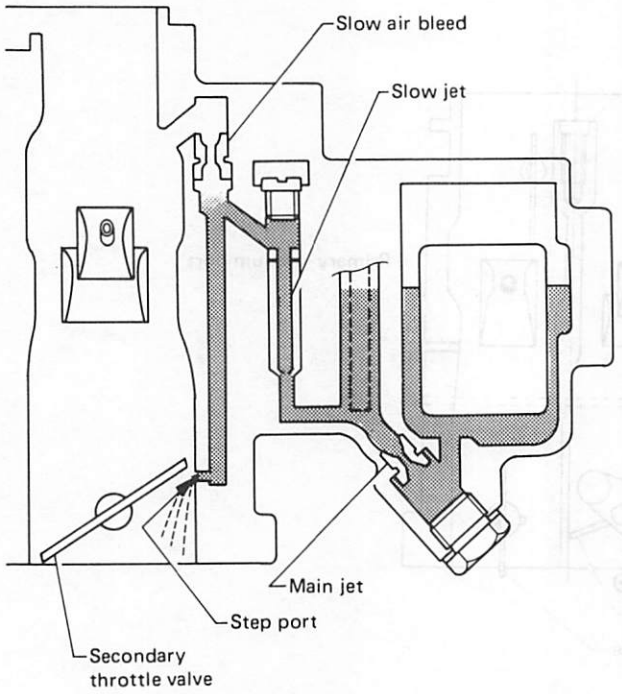
The secondary throttle valve is linked to the diaphragm which is actuated by the vacuum created in the venturi. A vacuum port is provided at each of the primary and secondary venturis, and the composite vacuum of these ports actuates the diaphragm.
As the linkage causes the secondary throttle valve to close until the primary throttle valve opening reaches approximately 48°, fuel consumption during normal operation is not excessive.
During high speed running, as the vacuum at the venturi is increased, the diaphragm is pulled against the diaphragm spring force, and then secondary throttle valve is opened.
The other side, during low speed running (as the primary throttle valve opening does not reach 48°), the secondary throttle valve is locked to close completely by the locking arm which is interlocked with primary throttle arm by linkage.
When the primary throttle valve opening reaches wider position than 48°, the secondary throttle valve is ready to open, because the locking arm revolves and leaves from the secondary throttle arm.

CARBURETOR — Structure and Operation

Secondary System (Cont'd)

SECONDARY SLOW SYSTEM (STEP SYSTEM)

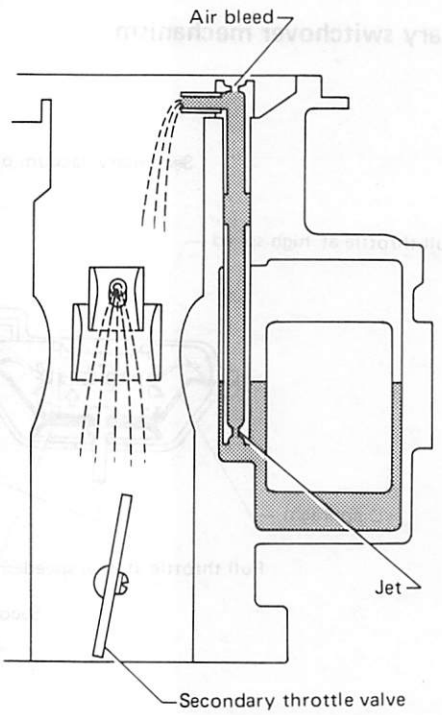
This system aims at the power filling up of the gap when fuel supply is transferred from the primary system to the secondary system.



SEF593

HIGH SPEED ENRICHER

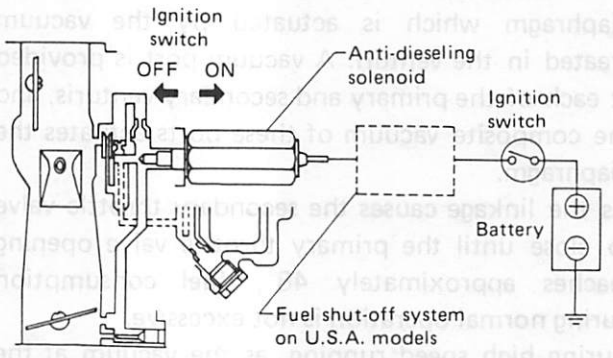
The high speed enricher improves high engine output performance during high speed driving.
When the velocity of suction air flowing through the carburetor secondary bore increases, additional fuel is drawn out of the enricher nozzle.



SEF594

Anti-dieseling System

As the ignition switch is turned off, the valve is brought into operation, shutting off the supply of fuel to the slow circuit.
On U.S.A. models, refer to the Fuel Shut-off System (California and Non-California models).



SEF229A

CARBURETOR — Structure and Operation

Float System

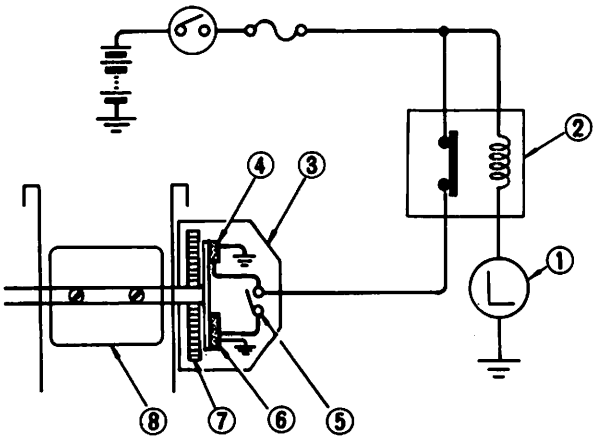
There is only one float chamber, while two carburetor systems, primary and secondary, are provided.
Fuel fed from the fuel pump flows through the filter and needle valve into the float chamber. A constant fuel level is maintained by the float and needle valve.

Because of the inner air vent type float chamber ventilation, fuel consumption is not affected by dirt accumulated in the air cleaner.
The top of needle valve is made of special hard steel and will not wear for all its considerably long use.
Besides, the insertion of a spring will prevent the flooding at rough road running.

Electric Auto Choke (Canada and California)

An electric heater warms a bimetal interconnected to the choke valve, and controls the position of choke valve and throttle valve in accordance with the time elapsed, the warm-up condition of the engine, and the outside ambient temperature.

1. Electric heater in thermostat cover.
   The double stage heating system is provided to obtain an optimum heating capacity. This system consists of first and second stage heater. The first stage heater (A) always operates to heat the bimetal during the time when electric current flows through the auto-choke circuit, and in addition to the first stage operation, the second stage heater (B) begins to operate when the bimetal temperature reaches to the level of about 15°C (59°F) so that the choke valve opens more early. This operation of the second stage heater is controlled by a thermo switch attached to the bimetal.

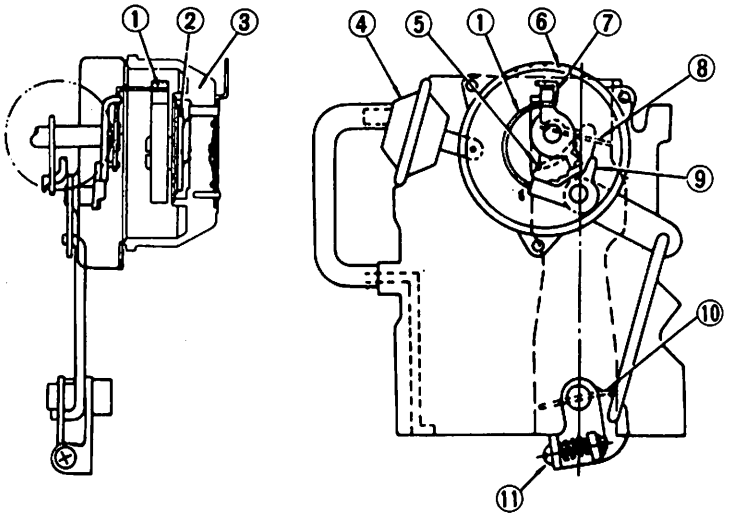


1 Alternator "L" terminal
2 Automatic-choke relay
3 Automatic-choke cover
4 P.T.C. heater (A)
5 Bimetal switch
6 P.T.C. heater (B)
7 Bimetal
8 Choke valve

EC058A

CARBURETOR — Structure and Operation

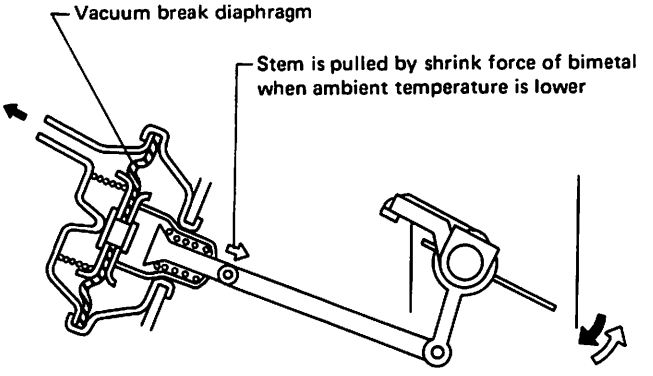
Electric Auto Choke (Cont'd)



1 Bimetal
2 P.T.C. heater
3 Thermostat cover
4 Vacuum diaphragm
5 Fast idle cam
6 Bimetal cover index mark (Canada)
7 Choke shaft lever
8 Choke valve
9 Unloader tongue
10 Throttle valve
11 Fast idle adjusting screw

EF243

2. Bimetal
   Electric current flows through the heater as the engine starts, and warms the bimetal. The deflection of the bimetal is transmitted to the choke valve through the choke valve lever.
3. Fast idle cam
   The fast idle cam determines the opening of the throttle valve so that the proper amount of mixture corresponding to the opening of the choke valve will be obtained. The opening of the choke valve is dependent upon the warm-up condition of the engine.
4. Choke unloader
   When accelerating the engine during the warm-up period, that is, before the choke valve opens sufficiently, this unloader forces the choke valve open a little so as to obtain an adequate air-fuel mixture.
5. Vacuum break diaphragm
   After the engine has been started by cranking, this diaphragm forces the choke valve open to the predetermined extent so as to provide the proper air-fuel ratio.
   A two stage-acting type vacuum diaphragm is employed.



SEF599A

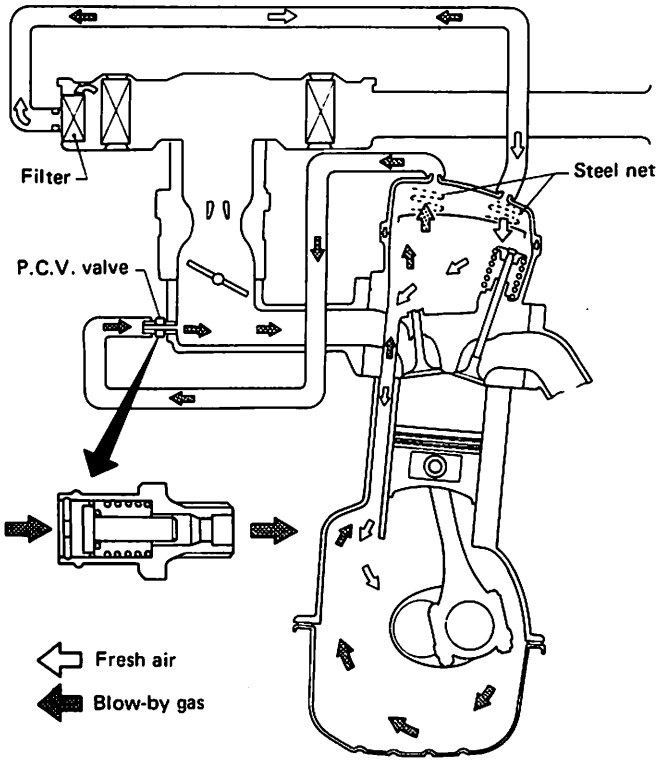
Dash Pot System

In automatic transmission models, a dash pot prevents engine stall resulting from quick application of the brake or from quick release of the accelerator pedal after it has been tread upon slightly.

CRANKCASE EMISSION CONTROL SYSTEM

Description

This system is designed to return the blow-by gas to the intake manifold and to charge fresh air into the crankcase. The positive crankcase ventilation (P.C.V.) valve is provided.

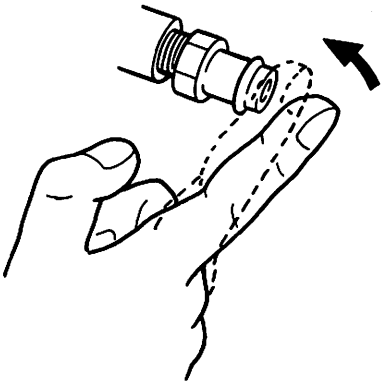


SEC657

Inspection

P.C.V. VALVE

With engine running at idle, remove ventilation hose from P.C.V. valve; if valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.



SEC137A

VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.

EXHAUST EMISSION CONTROL SYSTEM

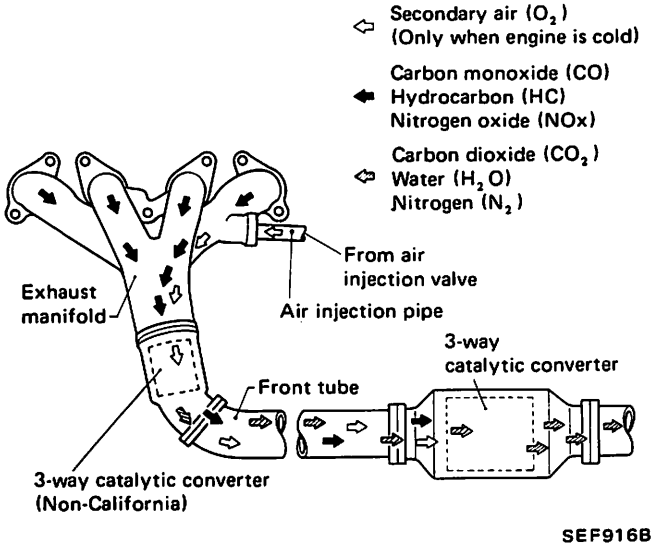
Catalytic Converter System (U.S.A. models)

DESCRIPTION

The three-way catalytic converter utilizes a catalyst to accelerate the recombustion of HC and CO and reduce NOx in the exhaust gas, changing them into harmless CO_2, H_2O and N_2.
To accomplish the oxidization and reduction of such harmful contents, the exhaust gas sensor monitors O_2 level, feeds it back to the E.C.C. control unit and maintains the mixture ratio to the stoichiometric point at all times.

OPERATION

The exhaust gas from the engine contains unburned, harmful components. The mixture ratio feedback system reduces such harmful components in the exhaust gas. In this system, an exhaust gas sensor monitors the contents of O_2 density to determine the combustion condition and maintains the mixture ratio to the stoichiometric point. While the mixture ratio is so maintained, the three-way catalytic converter activates to change the harmful components (HC, CO, and NOx) into harmless CO_2, H_2O and N_2. In this way, the catalytic converter cleans the exhaust gas and discharges H_2O, CO_2 and N_2 into the atmosphere.



SEF916B

INSPECTION

Preliminary inspection

Visually check condition of all component parts including hoses, tubes, and wires, replace if necessary. Refer to Mixture Ratio Feedback System for inspection.

Catalytic converter

Check whether catalytic converter is normal or not by observing variation in CO percentage. The checking procedure is as follows:
Apply parking brake. Shift gears into "Neutral" (for manual transaxle) and 'N" or "P" (for automatic transaxle) position.

1. Visually check catalytic converter for damage or cracks.
2. Adjust engine idle speed. Refer to Adjusting Idle RPM for adjustment.
3. Race engine (2,000 to 3,000 rpm) two or three times under no-load.
4. If idle speed increases, readjust it to specified speed with throttle adjusting screw.
5. Warm up engine for about four minutes at 2,000 rpm under no-load.
6. After step 5, wait for one minute and then measure CO percentage.
7. If CO percentage measured in step 6 is less than 0.3%, the catalytic converter is normal.
8. If CO percentage measured in step 6 is over 0.3%, check mixture ratio feedback system to see if it is functioning properly. Then, perform inspection steps 5 and 6 again.
9. If CO percentage is still over 0.3% in step 8, catalytic converter is malfunctioning. Replace catalytic converter.

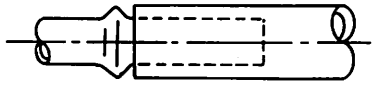
EXHAUST EMISSION CONTROL SYSTEM

Vacuum Hoses of Emission Control System

The following show the various conditions for connecting emission control vacuum hoses and air hoses. Pay careful attention to the remarks below.

1. Hoses are colored according to their function and purpose as shown below.
   Yellow: Vacuum line to distributor
   White: Vacuum line for E.G.R. system
   Green: Manifold vacuum line
   Pink: Atmospheric pressure
   Blue: Others
2. Insert hose into pipe as shown below.

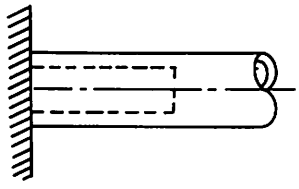
a. When inserting tolerance is not limited.



Insert hose up to bulge.

SEC522

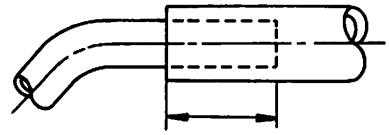
b. When stopper is equipped.
If connector length is under 20 mm (0.79 in).



Insert pipe until it stops.

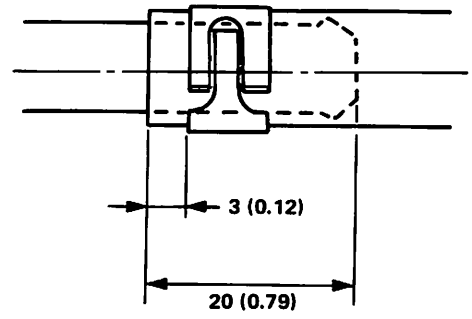
SEC523

c. When pipe has a bulge.



SEC521

d. Idle speed control actuator vacuum line.



Unit: mm (in)

SEF844B

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

CARBURETOR

Item \ Destination			California		Non-California		Canada	
Engine			E16		E16		E16	
Transaxle			M/T	A/T	M/T	A/T	M/T	A/T
Carburetor model			DFC328-3	DFC328-4	DFE2832-11	DFE2832-12	DCZ328-11	DCZ328-12
Air outlet diameter	mm (in)	P	28 (1.10)		32 (1.26)		28 (1.10)	
		S	32 (1.26)		28 (1.10)		32 (1.26)	
Venturi diameter	mm (in)	P	24 (0.94)		24 (0.94)		24 (0.94)	
		S	27 (1.06)		25 (0.98)		27 (1.06)	
Main jet		P	#91		#90	#82	#100	
		S	#130		#115	#115	#135	
Main air bleed		P	#110		#80	#110	#110	
		S	#60		#70	#70	#60	
Slow jet		P	#43		#43	#45	#43	
		S	#80		#65	#65	#80	
Slow air bleed		P	#150		#150	#160	#180	
		S	#80		#90	#90	#100	
Power jet			–		–		#35	
Solenoid controlled slow air bleed			#220		#250		–	
Solenoid controlled fuel orifice			#90		#100			

P: Primary S: Secondary

Inspection and Adjustment

A.T.C. AIR CLEANER		
Air control valve partially opens	°C (°F)	38 - 53 (100 - 127)
Air control valve fully opens	°C (°F)	Above 53 (127)
IDLE COMPENSATOR		
Idle compensator partially opens		
Bimetal No. 1	°C (°F)	60 - 70 (140 - 158)
Bimetal No. 2	°C (°F)	70 - 80 (158 - 176)
Idle compensator fully opens		
Bimetal No. 1	°C (°F)	Above 70 (158)
Bimetal No. 2	°C (°F)	Above 80 (176)
FUEL PUMP		
Fuel pressure	kPa (kg/cm², psi)	19.6 - 26.5 (0.20 - 0.27, 2.8 - 3.8)
Fuel pump capacity	mℓ (US fl oz, Imp fl oz)/min. at rpm	More than 1,300 (44.0, 45.8)/600

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Inspection and Adjustment (Cont'd)

Item	Destination	California		Non-California		Canada	
	Engine	E16		E16		E16	
	Transaxle	M/T	A/T	M/T	A/T	M/T	A/T
Carburetor model		DFC328-3	DFC328-4	DFE2832-11	DFE2832-12	DCZ328-11	DCZ328-12
Choke type		Automatic		Cold enricher system		Automatic	
Fuel level adjustment Clearance H_1	mm (in)	16.5 - 17.5 (0.650 - 0.689)					
Height H_2		46.5 - 47.5 (1.831 - 1.870)					
Fast idle adjustment Clearance "A" (At 2nd cam step)	mm (in)	0.68±0.10 (0.0268 ±0.0039)	0.96±0.10 (0.0378 ±0.0039)			0.68±0.10 (0.0268 ±0.0039)	0.96±0.10 (0.0378 ±0.0039)
Fast idle speed	rpm	1,800 - 2,600	2,300 - 3,100			1,800 - 2,600	2,300 - 3,100
Vacuum break adjustment [at temperature °C (°F)] Clearance "R"	mm (in)	R_1: 1.53±0.20 (0.0602±0.0079) R_2: 2.60±0.20 (0.1024±0.0079)				R_1: 1.29±0.20 (0.0508±0.0079) R_2: 2.08±0.20 (0.0819±0.0079)	
Dash pot adjustment Gap between throttle valve carburetor body	mm (in)	0.56±0.10 (0.0220±0.0039)		0.55±0.10 (0.0217±0.0039)		0.72±0.10 (0.0283 ±0.0039)	0.56±0.10 (0.0220 ±0.0039)
Dash pot touch speed	rpm	1,600 - 2,400		1,600 - 2,400		2,250 - 2,450	1,900 - 2,100
Throttle opener adjustment Gap between throttle valve carburetor body	mm (in)					0.52 (0.0205)	
Thtottle opener touch speed	rpm					1,700 - 2,000	

*: in "N" position

ENGINE REMOVAL & INSTALLATION

SECTION ER

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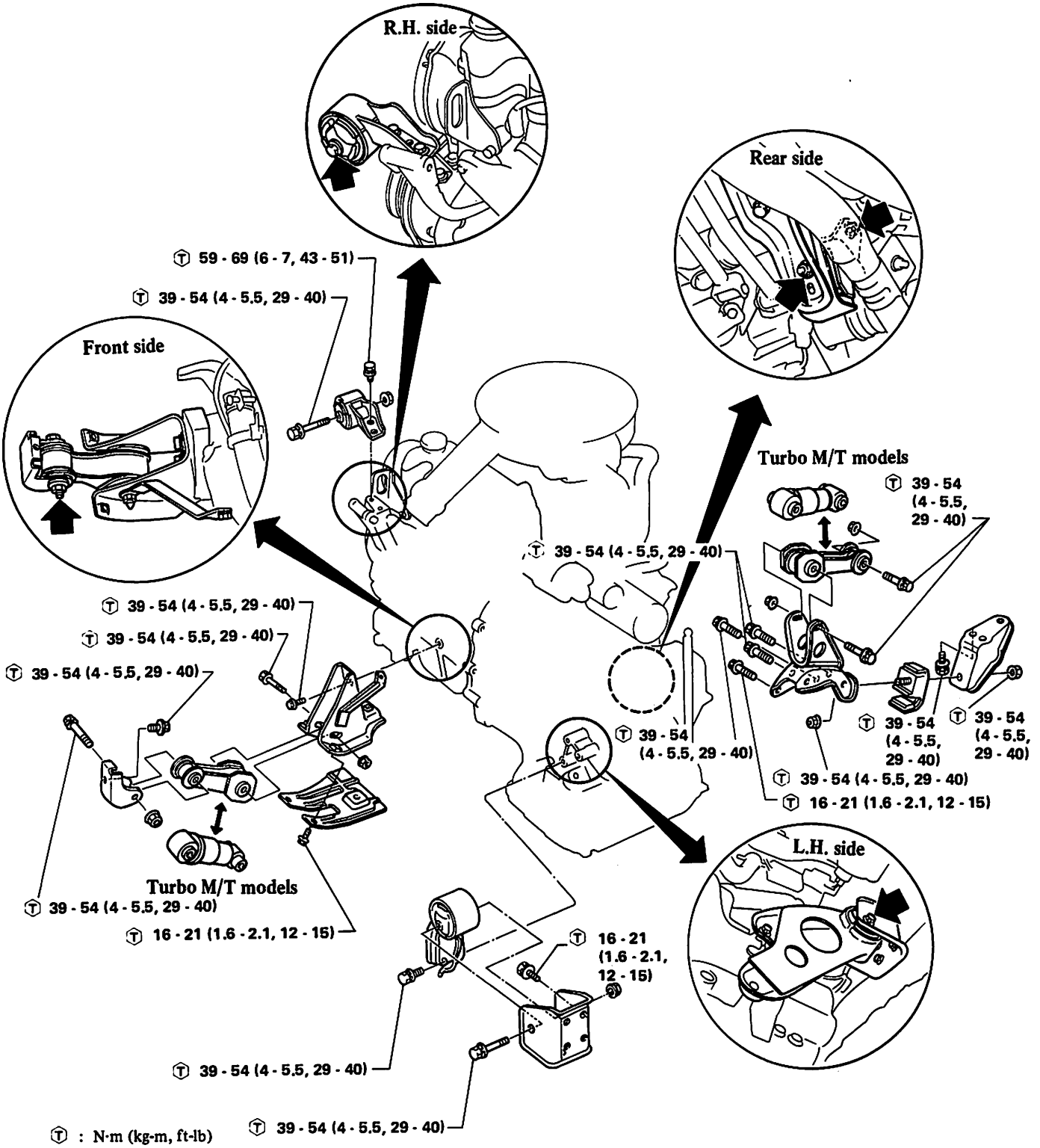
ENGINE REMOVAL AND INSTALLATION ER-2

Removal ER-2
Installation ER-5

ENGINE REMOVAL AND INSTALLATION

REMOVAL

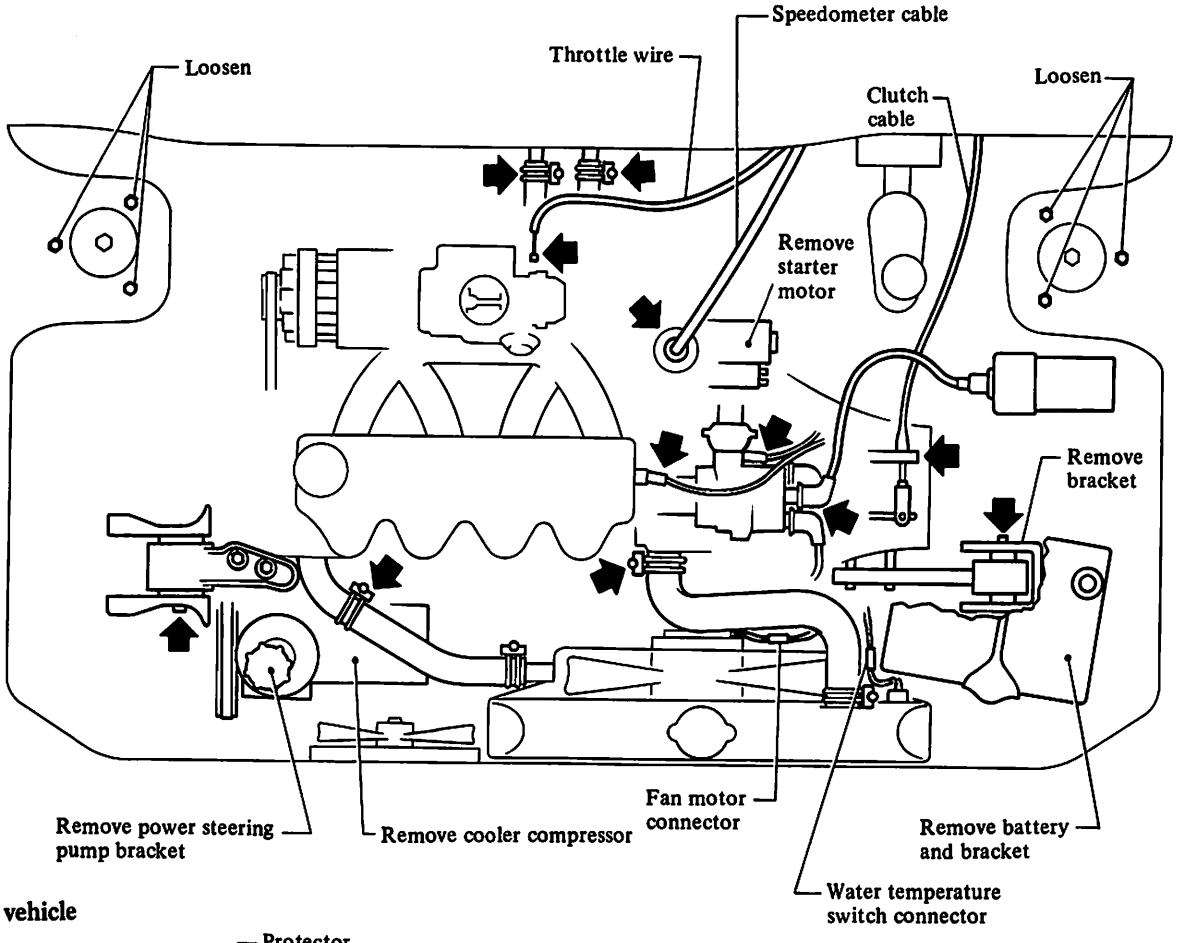
ENGINE BRACKET FITTING



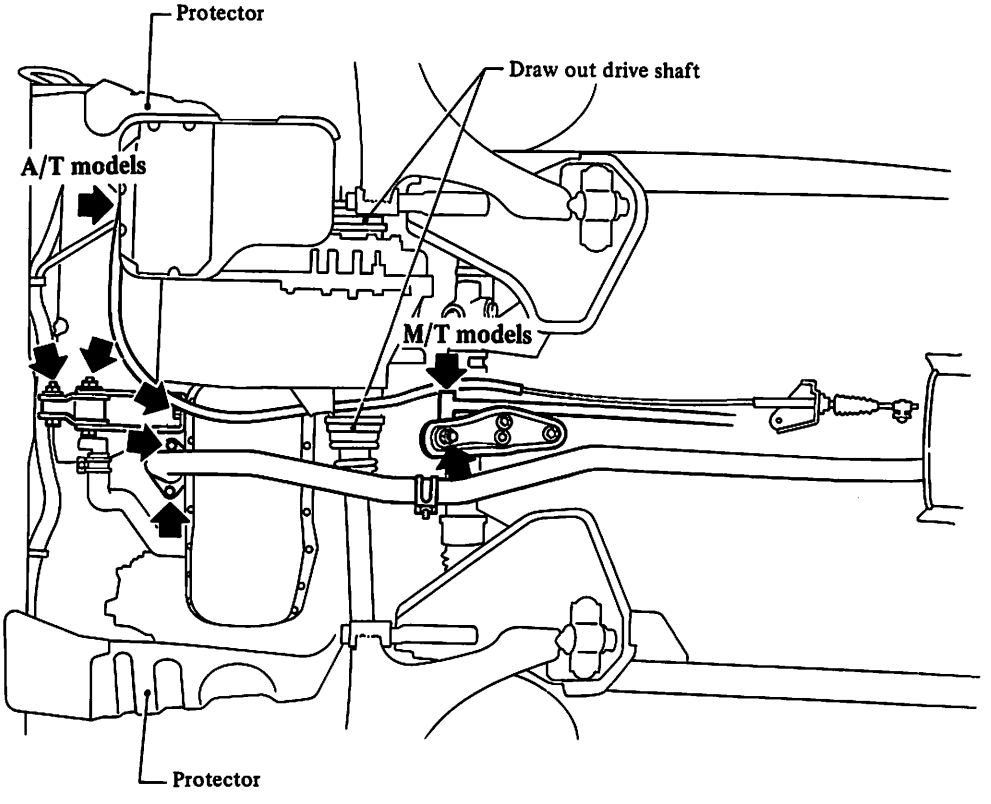
SER343

SEPARATING POSITIONS

Engine room



Under vehicle



SER304

When it is necessary to remove engine from vehicle, engine and transaxle should be dismounted as a unit.

WARNING:

- **a. Situate vehicle on as flat and solid a surface as possible.**
- **b. Place chocks at front and rear of rear wheels.**
- **c. Before removing front axle from transaxle unit, place safety stands under designated front supporting points. Refer to GI section for lifting points and towing.**
- **d. Be sure to hoist engine and transaxle in a safe manner.**
- **e. You should not remove engine until exhaust system has completely cooled off.**
  Otherwise, you may burn yourself and/or fire may break out in the fuel line.

1. Remove hood (See BF section).

Mark hood hinge locations on hood to facilitate proper reinstallation.

CAUTION:

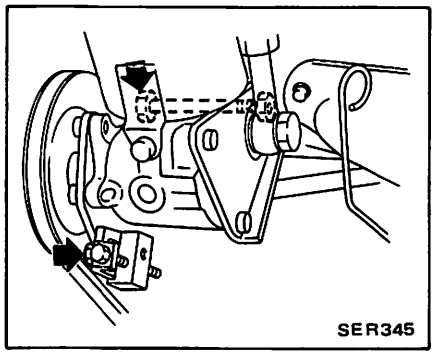
Have an assistant help you so as to prevent damage to the body.

2. Remove battery and battery support bracket.
3. Remove air cleaner.

Plug air horn of carburetor with clean rag to prevent entry of foreign matter.

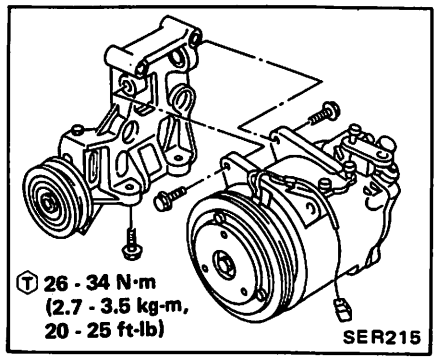
4. Drain engine coolant and remove radiator with radiator cooling fan (See LC section).
5. Remove power steering oil pump (See ST section).

Oil must not be drained from power steering oil circuit.



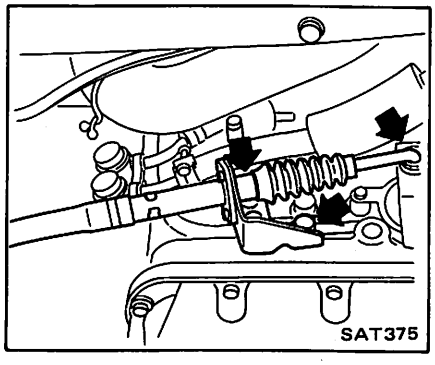
6. Remove cooler compressor and idler pulley (See HA section).

Gas must not be discharged from air conditioner circuit.



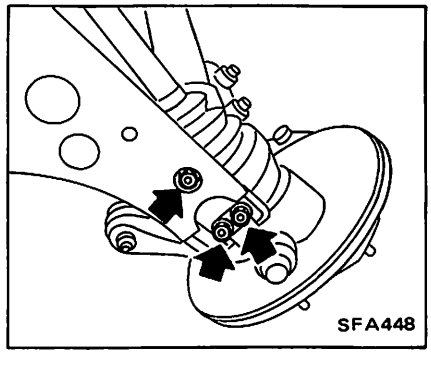
While removing engine, support compressor with a suitable rope to prevent it from dropping.

7. Disconnect exhaust front tube from exhaust manifold (See FE section).
8. Disconnect manual transaxle control rod link support rod from transaxle (See MT section).
9. Disconnect automatic transaxle control wire front transaxle (See AT section).



10. Remove lower ball joint.

Do not reuse nut once it has been removed.

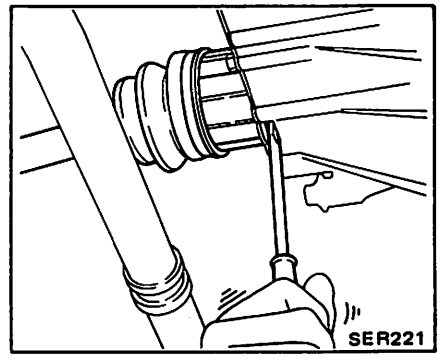


11. Drain gear oil.
12. Disconnect right and left drive shafts from transaxle (See FA section).

When drawing out drive shaft, it is necessary to loosen strut head bolts.

CAUTION:

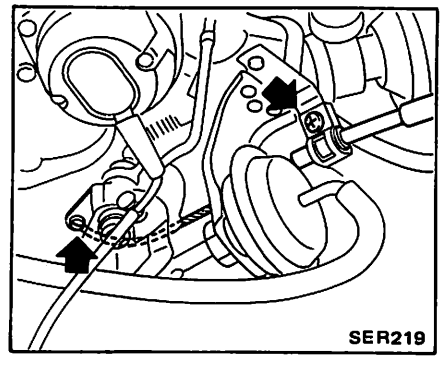
In removing drive shaft, be careful not to damage grease seal of transaxle side.



13. Disconnect clutch wire.
14. Remove speedometer cable with pinion from transaxle.

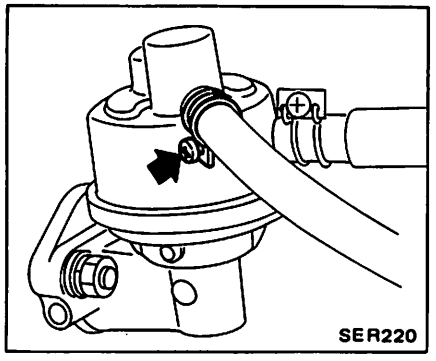
Plug hole from which pinion gear was removed with clean rag to prevent entry of foreign matter.

15. Disconnect accelerator wire.

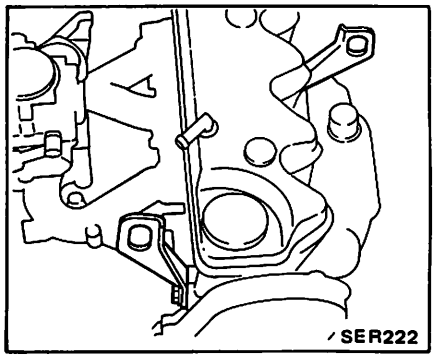


16. Remove vacuum and air hoses between engine and vehicle body.
17. Disconnect all cables, wires and harness connectors.

18. Disconnect fuel hoses from fuel pump.



19. Attach front engine slinger 10005 01M00 and rear engine slinger 10006 33M10 to cylinder head.

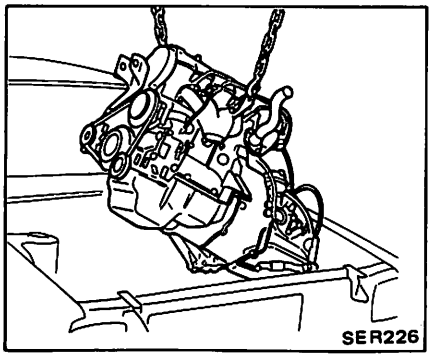


20. Connect suitable wires or chains between overhead hoist and engine slingers.

WARNING:
For safety during subsequent steps, the tension of wires or chains should be slackened against the engine.

21. Disconnect engine mounting insulators (See Engine Bracket Fitting).
22. Lift engine up and away from vehicle.

CAUTION:
In lifting engine, be careful not to hit it against adjacent parts, especially against brake tube and brake master cylinder.



23. Separate engine and transaxle.

INSTALLATION

1. Install engine with transaxle on vehicle.

a. When installing, ensure that brake tubes, brake master cylinder, etc. do not interfere with engine and transaxle.
b. Ensure that cooler compressor and power steering oil pump are in their proper positions when lowering engine.

2. Tighten engine mounting insulator bolts, and ensure rubber insulator clearance.

Tighten front and rear buffer rod mounting bolts only after all other parts are installed. Be sure that rubber insulator is not loose.

3. For subsequent steps, refer to instructions under heading "Removal".

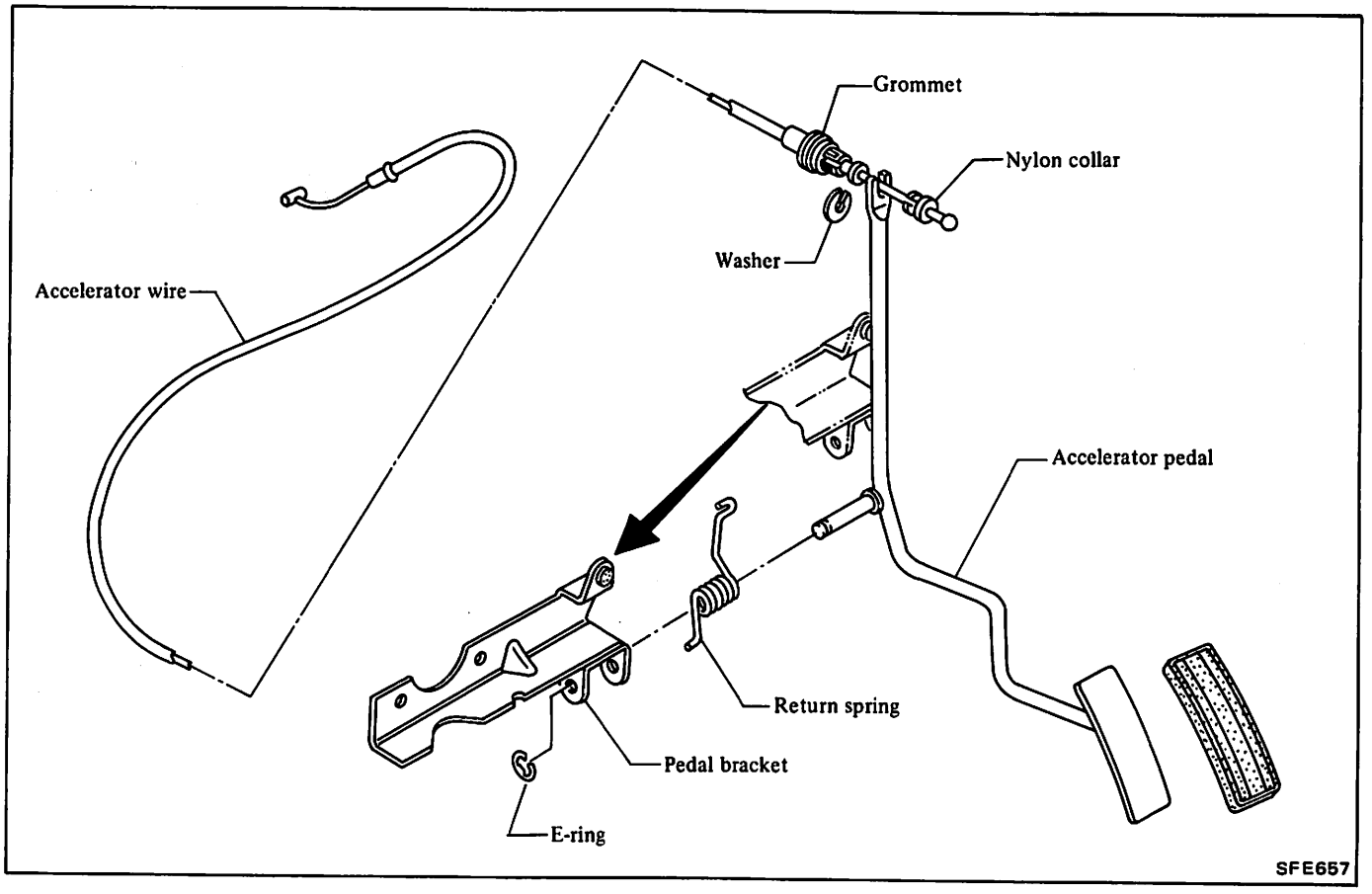
ENGINE CONTROL, FUEL & EXHAUST SYSTEMS

SECTION FE

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ENGINE CONTROL SYSTEM

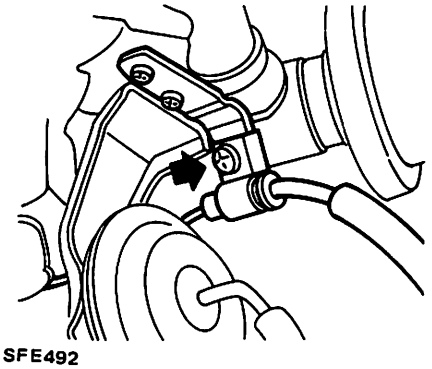


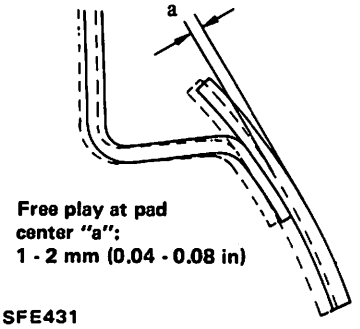
ACCELERATOR SYSTEM

ACCELERATOR WIRE

Adjustment

1. Disconnect battery ground cable.
2. Remove air cleaner.
3. • California and Canada models:
   To release fast idle cam, pull throttle lever while opening choke valve by hand.
   • Non-California models:
   To pull in throttle positioner rod, apply vacuum to throttle positioner using vacuum handy pump.
4. Adjust wire length so that the specified pedal free play exists.


SFE492



SFE431

Make sure that accelerator operates smoothly and throttle valve fully closes when accelerator is released.

Removal and installation

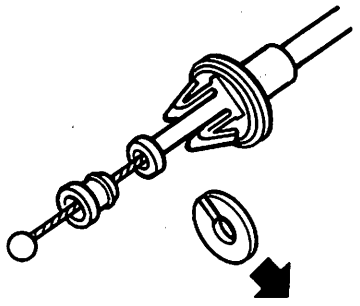
- Remove accelerator wire in the order of 1 to 5.
- Install in the reverse order of removal.

1. Disconnect battery ground cable.
2. Disconnect wire at pedal arm.



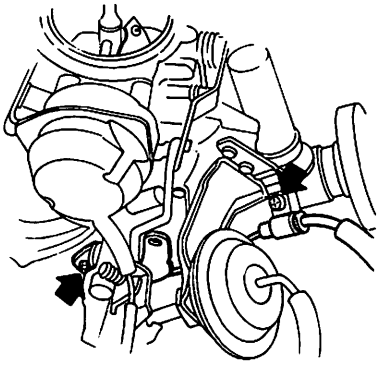
SFE397

3. Remove plastic washer.



SFE435

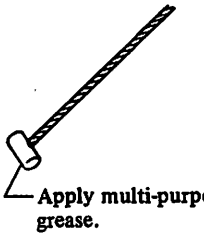
4. Disconnect wire from carburetor.



5. Take wire out from engine compartment.

a. **Be careful not to damage or bend wire.**

b.



SFE658

Inspection

Check accelerator wire, case and fastening locations for rust, damage or looseness.
If necessary, replace.

ACCELERATOR PEDAL

Removal and installation

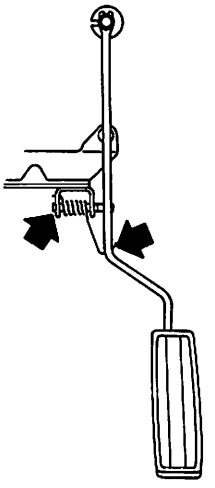
- Remove accelerator pedal in the order of 1 to 2.
- Install in the reverse order of removal.

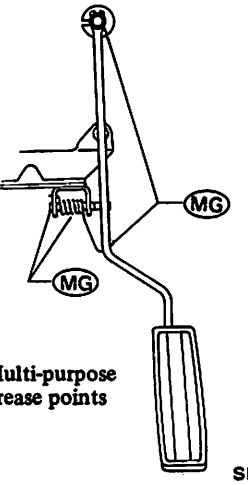
1. Disconnect wire at pedal arm.



SFE397

2. Remove E-ring, disengage return spring, and then remove accelerator pedal.



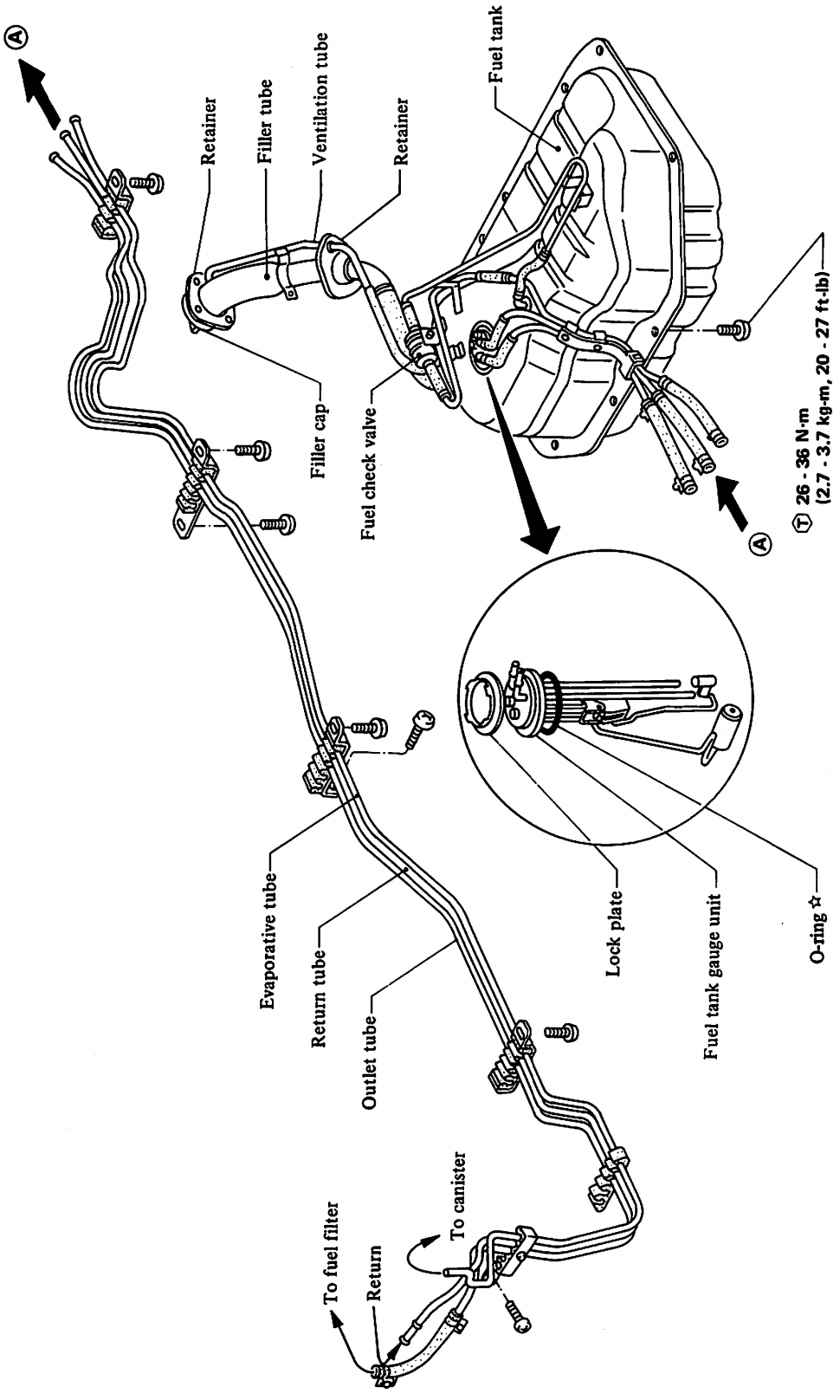


SFE659

Inspection

Check accelerator pedal return spring for rust, fatigue or damage.
Replace if necessary.

FUEL SYSTEM



☆: Always replace when disassembled.

SFE814

PRECAUTIONS

WARNING:

When replacing fuel line parts, be sure to observe the following:

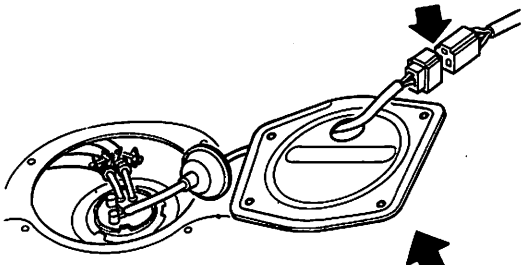
a. Put a "CAUTION: INFLAMMABLE" sign in workshop.
b. Be sure to furnish workshop with a CO_2 fire extinguisher.
c. Be sure to disconnect battery ground cable before starting work.
d. Put drained fuel in an explosionproof container and put on lid securely.

FUEL TANK

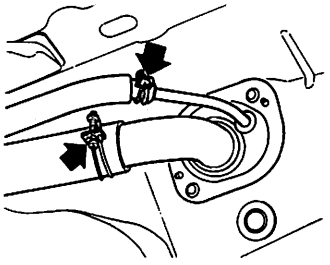
REMOVAL AND INSTALLATION

- Remove fuel tank in the order of 1 to 5.
- Install in the reverse order of removal.

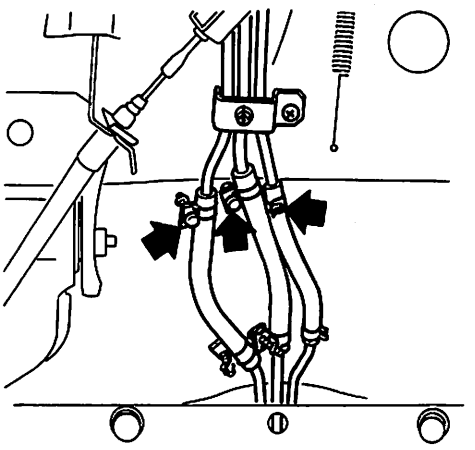
1. Drain fuel.
2. Remove inspection cover and disconnect fuel tank gauge unit harness connector.



3. Disconnect fuel filler and ventilation tubes.

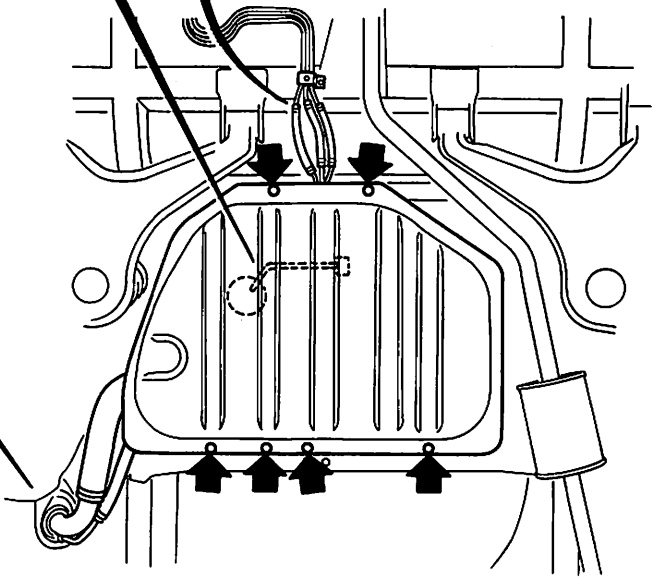


4. Disconnect fuel outlet, return and evaporation hoses.



5. Remove six bolts attaching fuel tank and then take out fuel tank.

Ⓣ : 26 - 36 N·m
(2.7 - 3.7 kg-m, 20 - 27 ft-lb)



Plug hose and pipe openings to prevent entry of dust or dirt.

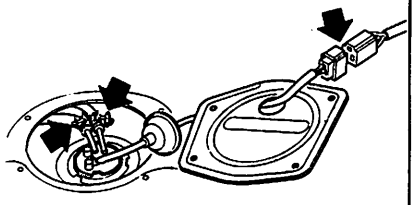
SFE811

FUEL TANK GAUGE UNIT

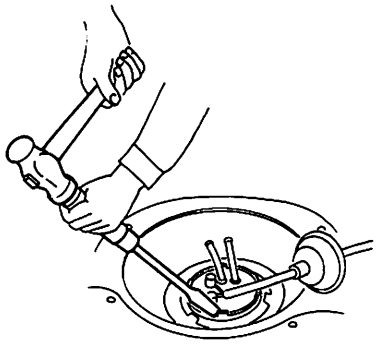
REMOVAL AND INSTALLATION

- Remove fuel tank gauge unit in the order of 1 to 3.
- Install in the reverse order of removal.

1. Remove inspection cover and disconnect fuel tank gauge unit harness connector.
2. Disconnect fuel outlet and return hoses.

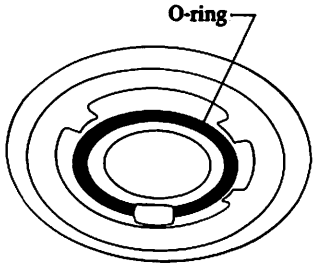


3. Remove lock plate and take out fuel tank gauge unit.



a. When taking out fuel tank gauge unit, be careful not to damage or deform.

b. Install new O-ring.



c. Plug the opening to prevent entry of dust or dirt.

SFE662

INSPECTION

Refer to Fuel Tank Guage Unit for inspection (section EL).

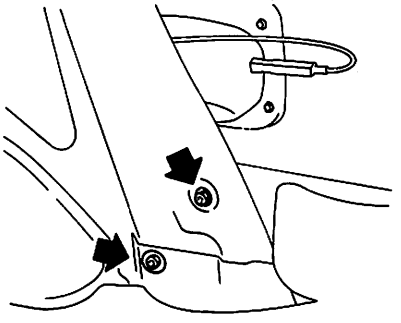
FUEL FILLER HOSE AND TUBE

REMOVAL AND INSTALLATION

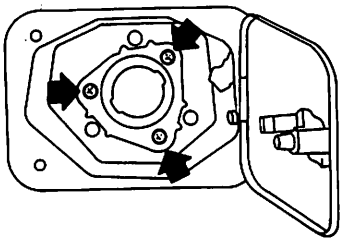
- Remove fuel filler hose and tube in the order of 1 to 5.
- Install in the reverse order of removal.

1. Drain fuel.
2. Remove screws attaching filler tube stay from inside luggage compartment.

Luggage compartment right side

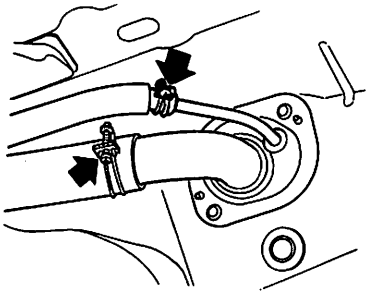


3. Remove filler cap and filler neck retainer.



SFE450

4. Remove filler hose and ventilation hose clamps.
5. Remove lower retainer, and then take out filler tube in a downward direction.



Plug hose and pipe openings to prevent entry of dust or dirt.

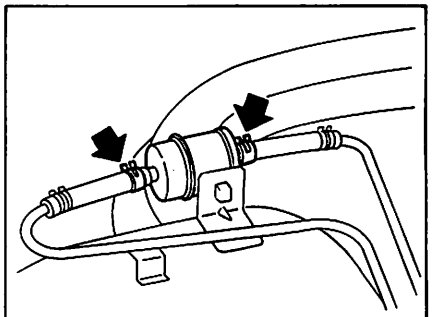
SFE663

INSPECTION

Inspect all hoses and tubes for cracks, fatigue, sweating or deterioration. Replace any hose or tube that is damaged.

FUEL CHECK VALVE

REMOVAL AND INSTALLATION



SFE664

FUEL TUBE

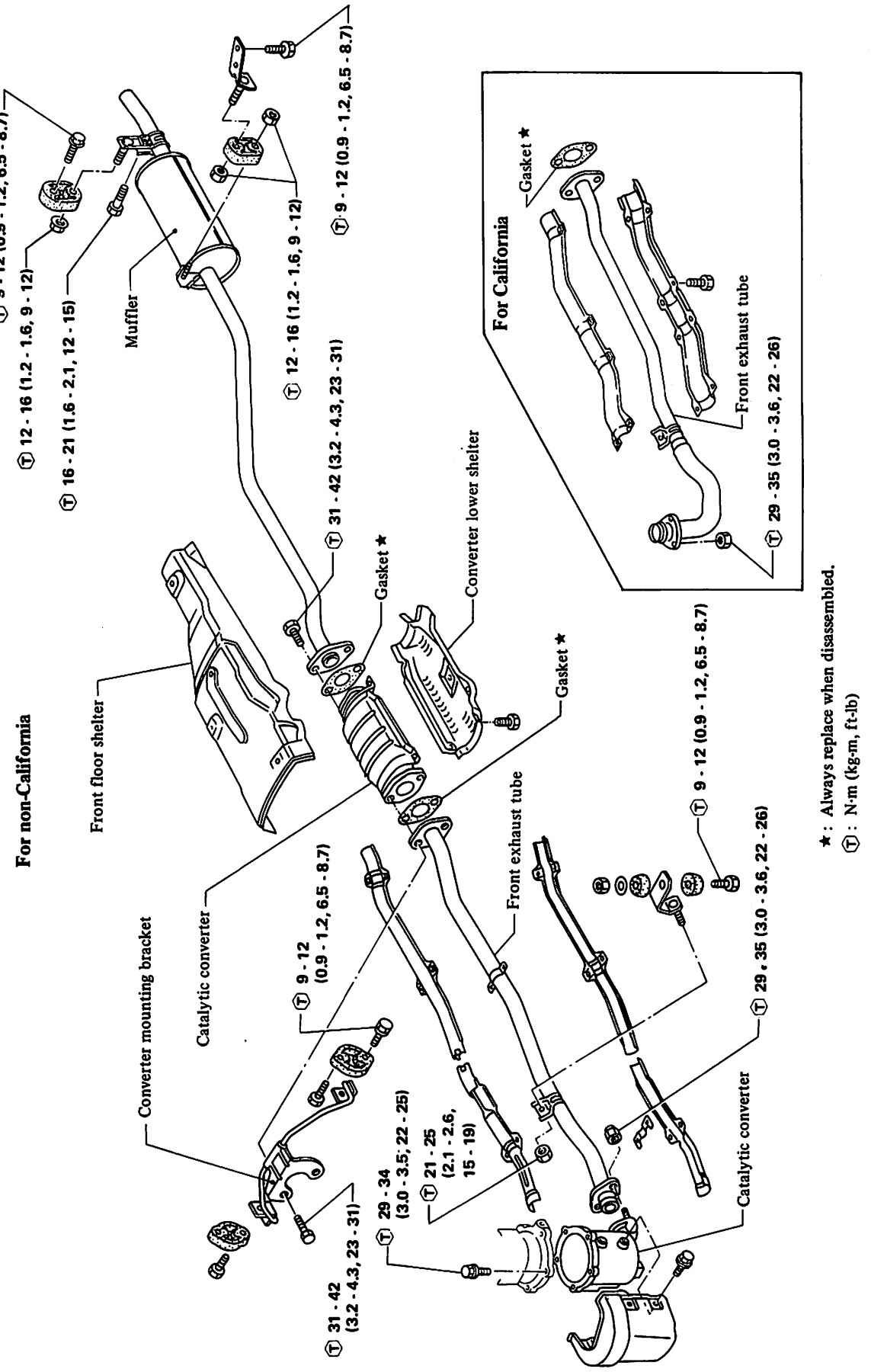
REMOVAL AND INSTALLATION

a. Fuel tubes are serviced as an assembly. Do not disconnect any fuel line unless absolutely necessary.

b. Plug hose and tube opening to prevent entry of dust or dirt.

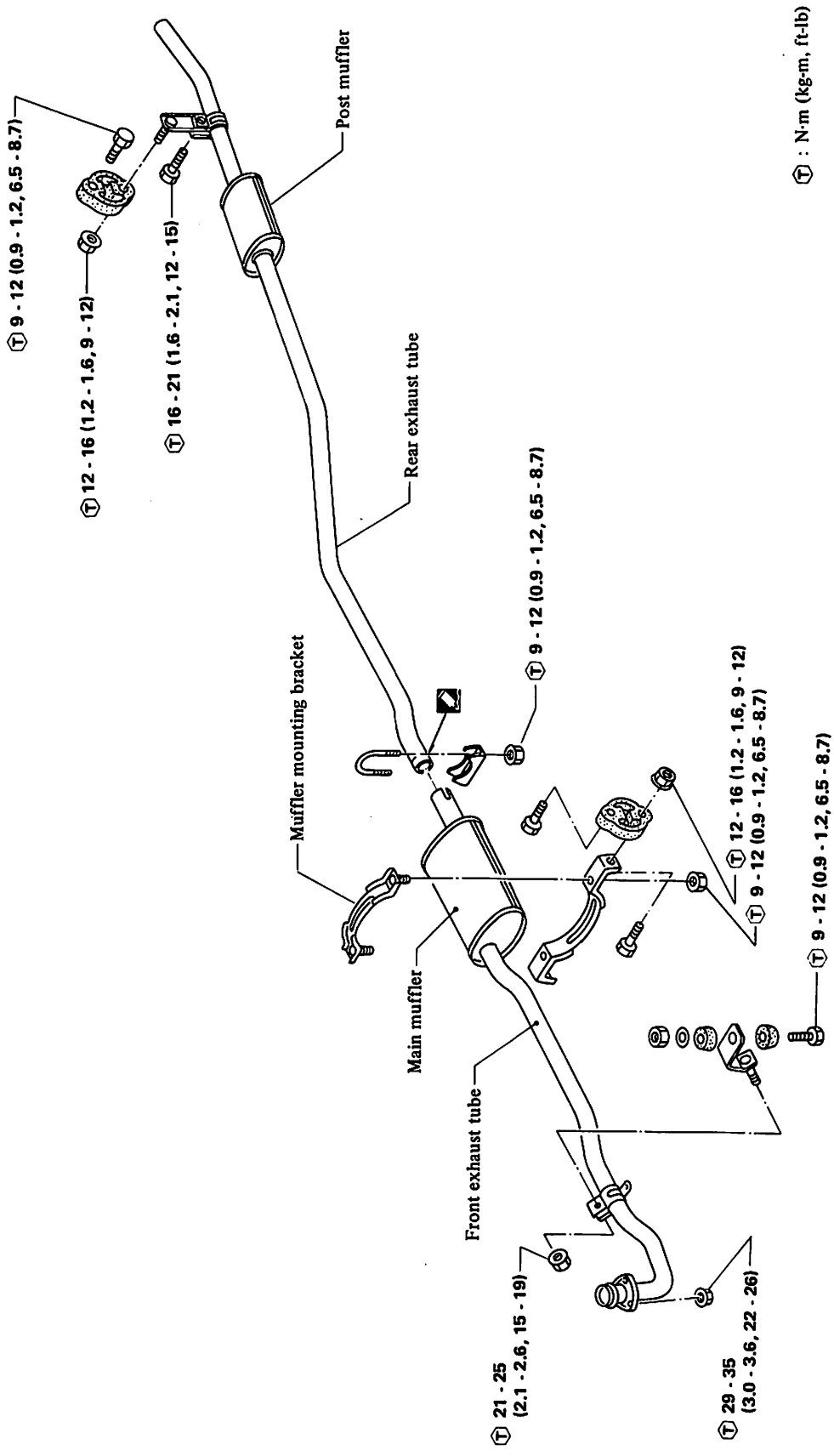
EXHAUST SYSTEM

For U.S.A.



SFE851

For Canada



SFE813

EXHAUST TUBE AND MUFFLER ASSEMBLY

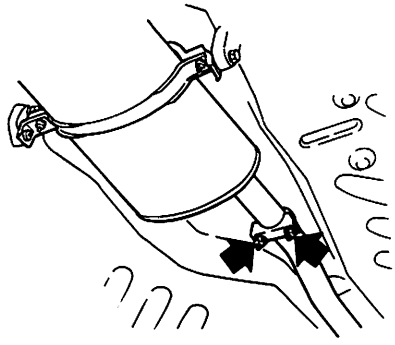
REMOVAL AND INSTALLATION

a. Be careful not to deform mounting rubbers.
b. Install new converter gasket.
c. Keep sufficient clearance between exhaust system parts and adjacent parts.

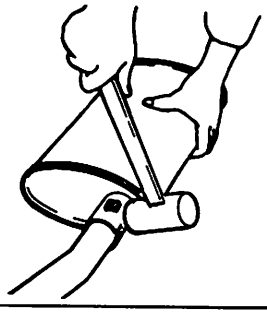
DISASSEMBLY AND ASSEMBLY

Canada models

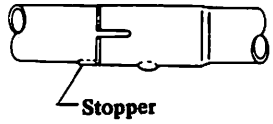
1. Remove U-bolt nuts.



2. Break sealant and separate rear exhaust tube and main muffler.

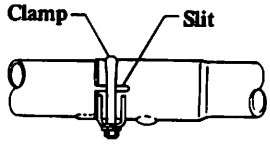


a.



Insert muffler as far as stopper.

b.



Clamp should be centered over slit.

c. When injecting sealant, refer to SEALING.

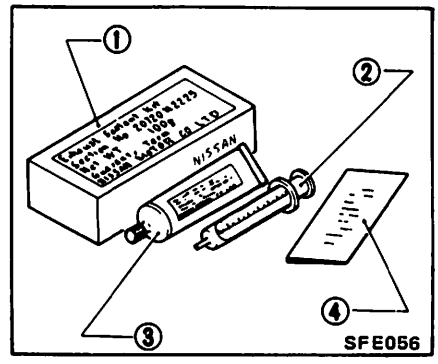
SFE669

INSPECTION

1. Check exhaust tube and muffler for cracks or damage. Replace any part that is damaged beyond repair.
2. Replace any bracket, hanger or rubber part that is cracked, fatigued or sweated.

SEALING

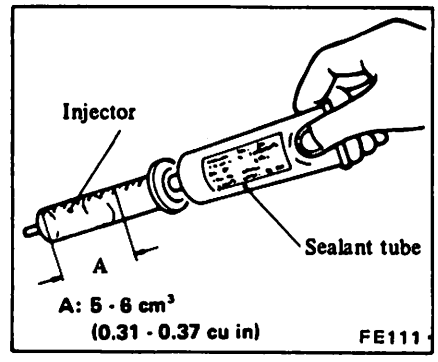
After installing exhaust parts, use the genuine Nissan Sealant "Exhaust Kit 20720-N2225" to eliminate gas leakage at the joint. Be sure to observe the following procedures.



SFE056

1 Case
2 Injector
3 Sealant tube (Polyethylene)
4 Instruction sheet

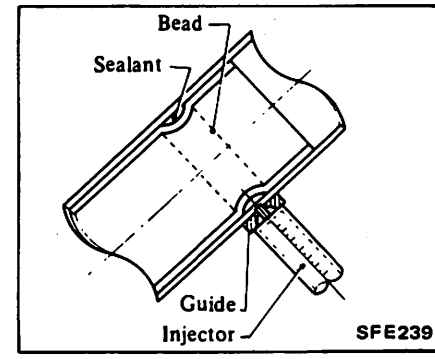
1. Squeeze 5 to 6 cm^3 (0.31 to 0.37 cu in) of sealant into injector from the sealant tube.
Be sure to place the cap back to the sealant tube since sealant will dry.



FE111

2. Position the nozzle of injector to the guide and press it there firmly. Inject sealant slowly until sealant begins to flow out of the slit of the tube. This indicates that the bead requires no further sealant. Excessive sealant can cause a clogged tube.

After injecting, wash injector thoroughly in clean water to remove all traces of sealant.



SFE239

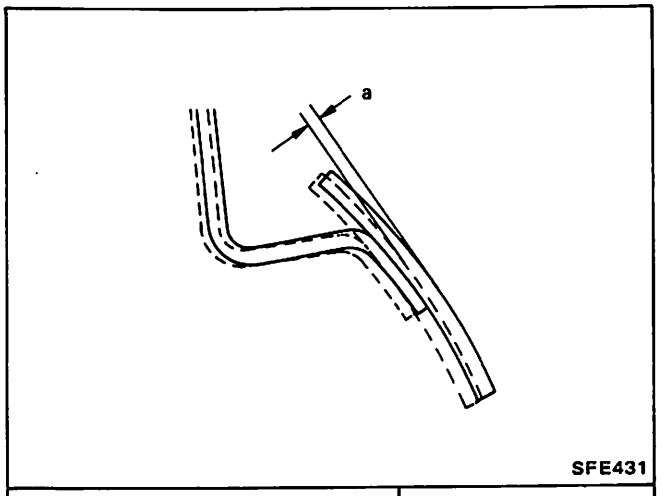
3. Start the engine and let it idle slowly for ten minutes (minimum) to harden sealant with the heat of exhaust gas.
4. Check the condition of sealant before driving the car. It is also essential that the vehicle should not be accelerated sharply for 20 to 30 minutes after this operation.

a. The sealant should be used within guaranty term indicated on the kit case.
b. Exposure of the skin to sealant may cause a rash. Wash sealant off the skin with water.
c. Do not keep the sealant tube in a place where the ambient temperature is 40°C (104°F) or above. A sealant hardened at 40°C (104°F) or above cannot be used. The most suitable storage temperature is from 15 to 35°C (59 to 95°F). If sealant becomes hardened because of low temperatures, warm the sealant tube with lukewarm water until the sealant is softened. Do not warm the tube at a temperature of over 40°C (104°F) for a long period of time.
d. Thoroughly read the instruction sheet furnished with the kit before using the sealant.
e. Check all tube connections for exhaust gas leaks, and entire system for unusual noise, with engine running.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

INSPECTION AND ADJUSTMENT

ACCELERATOR SYSTEM



Free play at pedal pad center "a"	mm (in)	1 - 2 (0.04 - 0.08)

TIGHTENING TORQUE

FUEL SYSTEM

Unit	N·m	kg-m	ft-lb
Fuel tank mounting bolt	26 - 36	2.7 - 3.7	20 - 27

EXHAUST SYSTEM

Refer to illustration for exhaust system.

SECTION CL

CONTENTS

MECHANICAL CLUTCH CONTROL ..... CL- 2
CLUTCH PEDAL AND CONTROL CABLE .. CL- 2
CLUTCH UNIT ..... CL- 3
CLUTCH DISC AND COVER ..... CL- 3
RELEASE BEARING ..... CL- 5
SERVICE DATA AND SPECIFICATIONS (S.D.S.) ..... CL- 7
GENERAL SPECIFICATIONS ..... CL- 7
INSPECTION AND ADJUSTMENT ..... CL- 7
TIGHTENING TORQUE ..... CL- 7
TROUBLE DIAGNOSES AND CORRECTIONS ..... CL- 8
SPECIAL SERVICE TOOLS CL-10

CL

Refer to Section MA (Clutch) for:

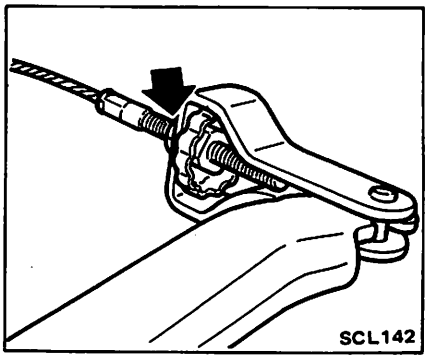
- CHECKING CLUTCH PEDAL HEIGHT AND FREE TRAVEL

MECHANICAL CLUTCH CONTROL

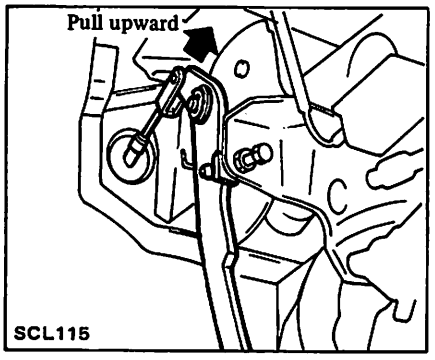
CLUTCH PEDAL AND CONTROL CABLE

REMOVAL

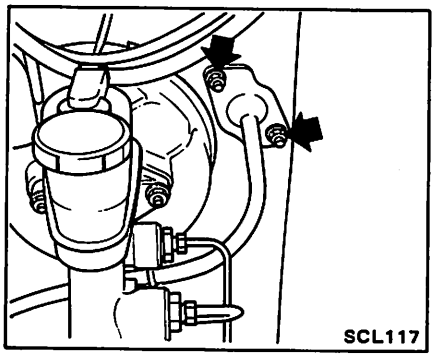
1. Remove instrument lower cover.
2. Loosen lock nut and disconnect control cable from withdrawal lever.



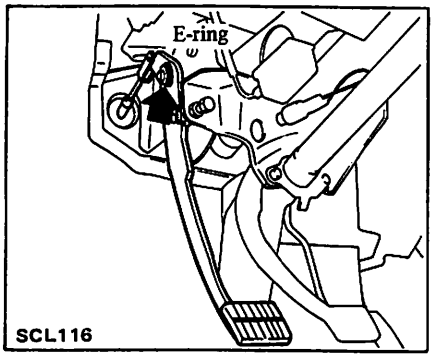
3. Disconnect other end of control cable from clutch pedal.



4. Remove control cable.



5. Remove E-ring retaining fulcrum pin.



6. Take out clutch pedal and return spring.

INSPECTION

Check pedal parts for the following, correcting as necessary.

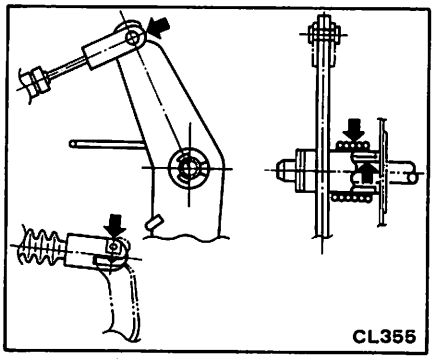
1. Bent pedal.
2. Weakened return spring.
3. Worn or deformed fulcrum bushings.
4. Cracks at welded parts.
5. Worn or damaged control cable ends.
6. Cracked outer case.

CAUTION:
If clutch pedal drags or does not operate smoothly, replace control cable.

INSTALLATION

To install clutch pedal and control cable, reverse the order of removal. Observe the following:

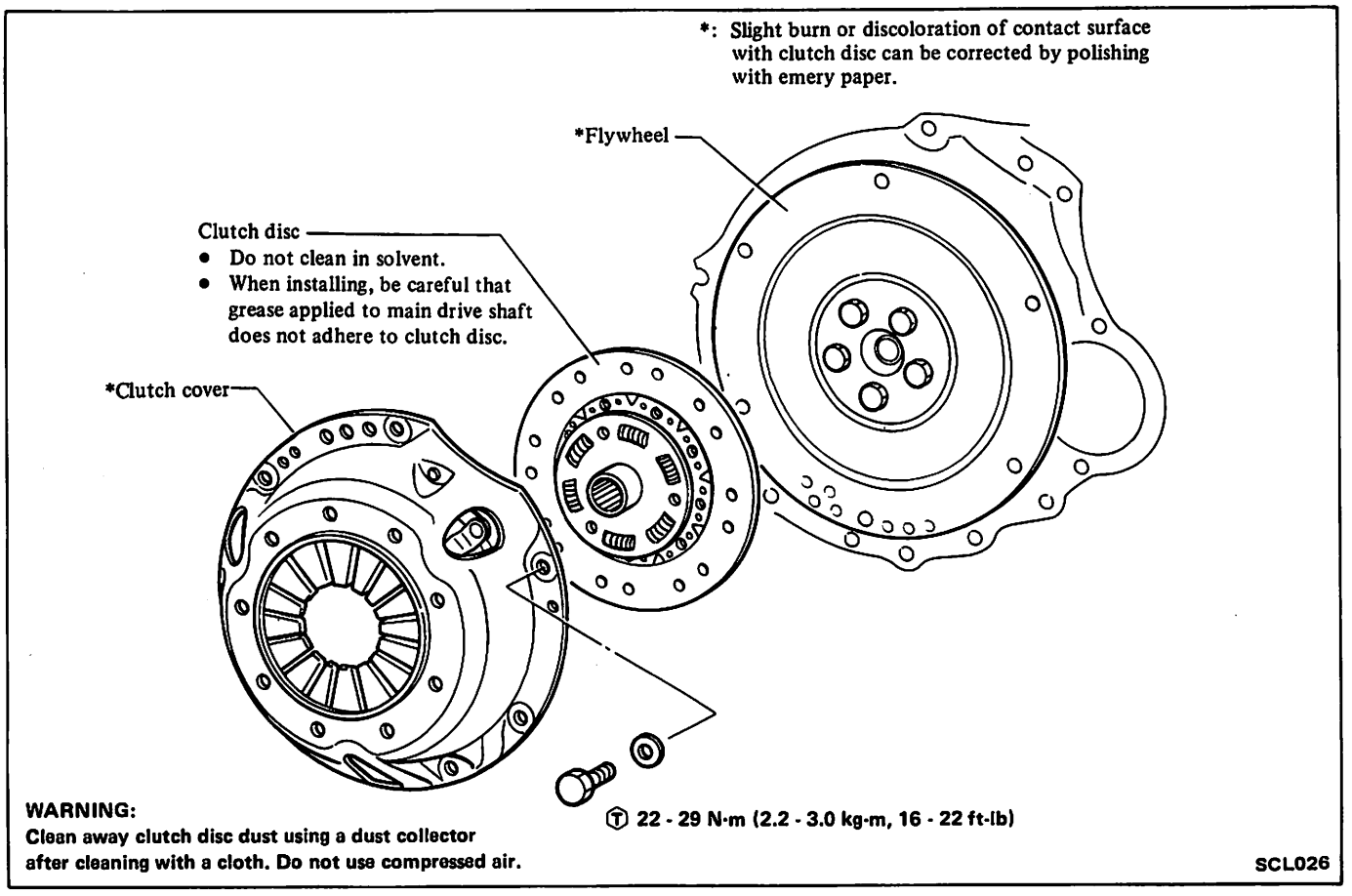
1. Apply coating of recommended multi-purpose grease to sliding portions and return spring.



2. Check the clutch pedal height. Adjust if necessary. Refer to Section MA for Checking Clutch Pedal Height.
3. Adjust the clutch pedal free travel. Refer to Section MA for Clutch Pedal Height and Free Travel.

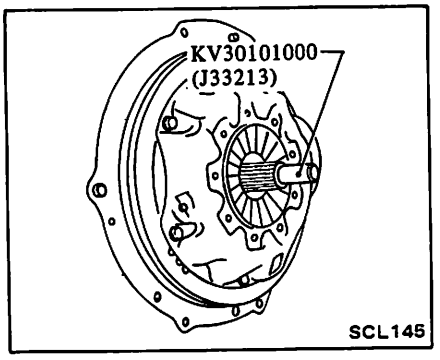
CLUTCH UNIT

CLUTCH DISC AND COVER

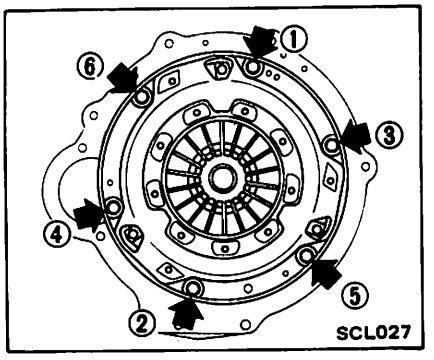


REMOVAL

1. Remove transaxle from engine. Refer to Removal (Section MT).
2. Insert Tool into clutch disc hub.



3. Loosen bolts attaching clutch cover to flywheel, one turn each at a time, until spring pressure is released. Be sure to remove them in a crisscross fashion.



4. Remove clutch disc and cover assembly.

INSPECTION

Wash all disassembled parts except disc assembly in suitable cleaning solvent to remove dirt and grease before making inspection and adjustment.

Flywheel and pressure plate

Check friction surface of flywheel and pressure plate for scoring or roughness. Slight roughness may be smoothed by using fine emery cloth. If surface is deeply scored or grooved, the part should be replaced.

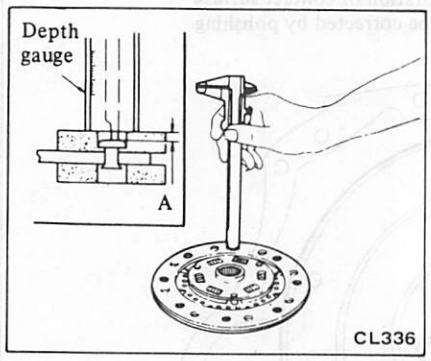
Clutch disc assembly

Inspect clutch disc for worn or oily facings, loose rivets and broken or loose torsional springs.

1. If facings are oily, disc should be replaced. In this case, inspect transaxle input shaft oil seal, engine rear oil seals and other points for oil leakage.

2. The disc should also be replaced when facings are worn locally or worn down to the specified limit.

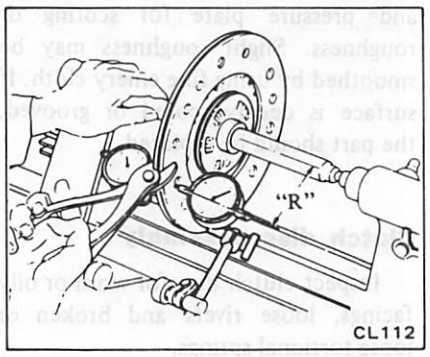
Wear limit of facing "A":
0.3 mm (0.012 in)



3. Check disc plate for runout whenever the old disc or a new one is installed.
4. If runout exceeds the specified value at outer circumference of facing, replace or repair disc.

Runout limit:
(total indicator reading)
1.0 mm (0.039 in)
"R" (from hub center):
85 mm (3.35 in)

CAUTION:
When repairing disc plate, never hold it forcibly with pliers or bend it excessively; otherwise facing will be damaged.



5. Check fit of disc hub on transaxle input shaft splines for smooth sliding.

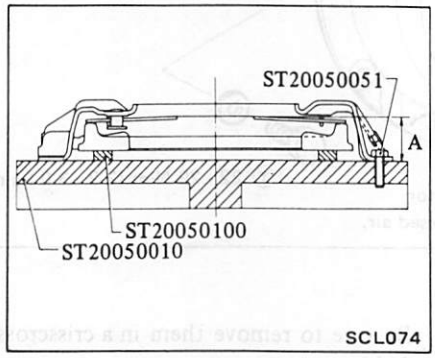
If splines are worn, clutch disc or input shaft should be replaced; that is, backlash exceeds the specified value at outer edge of clutch disc.

Maximum backlash of spline:
0.7 mm (0.028 in)

Clutch cover assembly

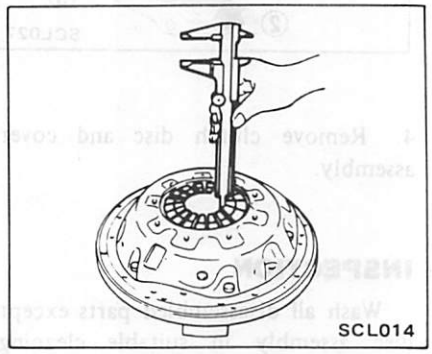
1. Check end surface of diaphragm spring for wear. If excessive wear is found, replace clutch cover assembly.
2. Measure height of diaphragm springs as outlined below:

(1) Place Tool ST20050100 on Tool ST20050010 and then tighten clutch cover assembly on base plate by using Tool ST20050051.

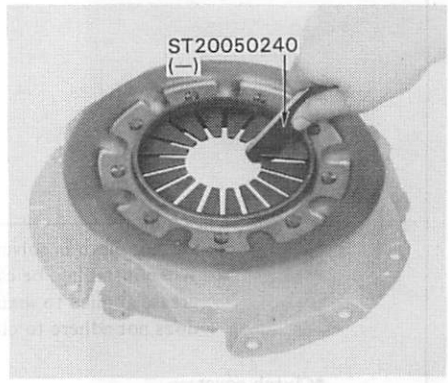


(2) Measure height "A" at several points with a vernier caliper depth gauge.

Diaphragm spring height "A":
29.0 - 31.0 mm
(1.142 - 1.220 in)



If height "A" of spring end is beyond specified value, adjust spring height with Tool ST20050240. If necessary, replace clutch cover assembly.



Also, unevenness of diaphragm spring toe height should be within the specified limit.

Uneven limit of diaphragm spring toe height:
0.5 mm (0.020 in)

If unevenness of diaphragm spring toe height is beyond specified value, adjust spring height with Tool ST20050240.

3. Inspect thrust rings for wear or damage. As these parts are invisible from outside, shake cover assembly up and down to listen for chattering noise, or lightly hammer on rivets for a slightly cracked noise. Any of these noises indicates need of replacement as a complete assembly.

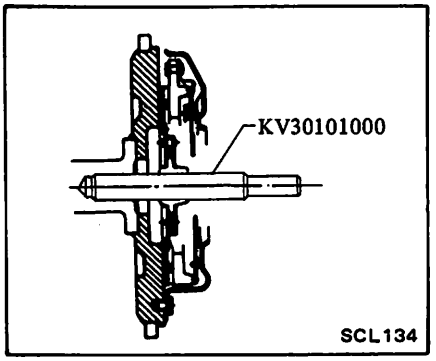
INSTALLATION

1. Apply a light coat of lithium-based grease (including molybdenum disulphide) to transaxle input shaft gear splines. Slide clutch disc on input shaft several times. Remove clutch disc and wipe off excess lubricant pushed off by disc hub.

Take special care to prevent grease or oil from getting on clutch facing.

2. Reinstall clutch disc and clutch cover assembly. Support clutch disc and cover assemblies with Tool KV30101000.

Be sure to keep disc facings, flywheel and pressure plate clean and dry.



3. Install clutch cover assembly. Each bolt should be tightened one turn at a time in a crisscross fashion.

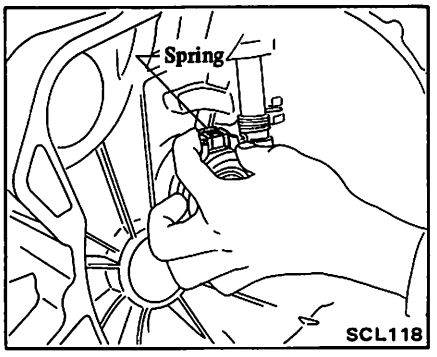
Ⓣ : **Clutch cover bolt**
22 - 29 N·m
(2.2 - 3.0 kg-m)
16 - 22 ft-lb)

4. Remove clutch aligning bar.
5. Reinstall transaxle. Refer to Installation (Section MT).

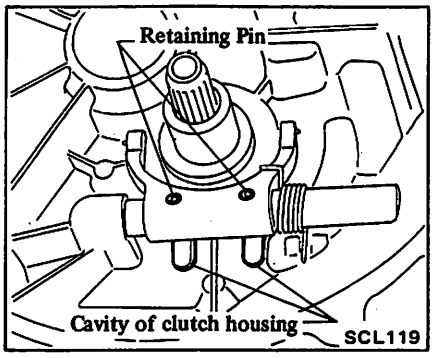
RELEASE BEARING

REMOVAL

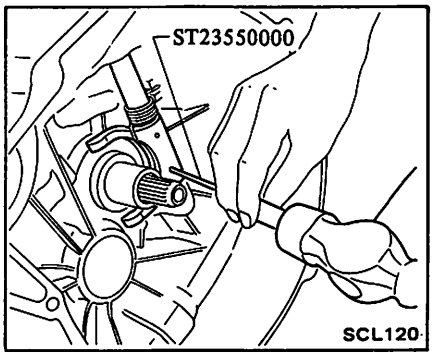
1. Remove transaxle from engine. Refer to Removal (Section MT).
2. Disconnect spring from release bearing.



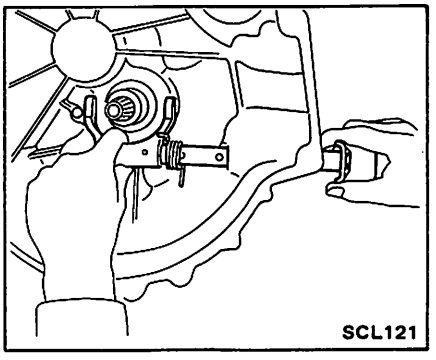
3. Remove release bearing from clutch housing front cover.
4. Align retaining pin with cavity of clutch housing.



5. Drive out retaining pins.



6. Pull out clutch control shaft. Then withdrawal lever and spring can be taken out.



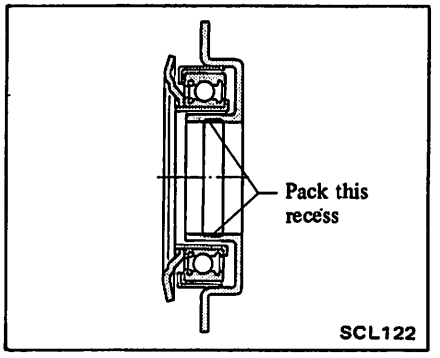
INSPECTION

Check for abnormal wear on contact surface of withdrawal lever, release bearing spring and release bearing.

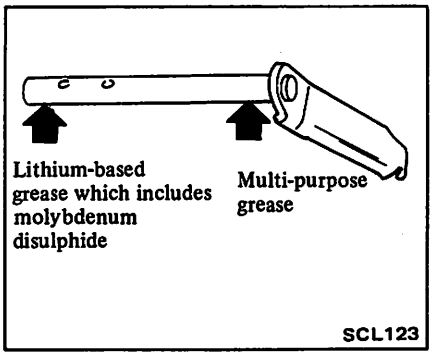
Hold bearing inner race and rotate outer race while applying pressure to it. If the bearing rotation is rough or noisy, replace bearing.

INSTALLATION

1. Lubricate the following points with a light coat of lithium-based grease which includes molybdenum desulphide.
(1) Inner groove of release bearing sleeve.

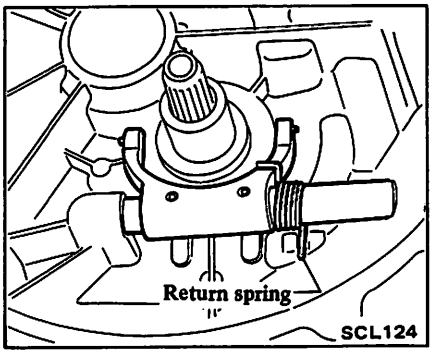


(2) Contact surfaces of withdrawal lever, and release bearing.
2. Apply recommended grease to clutch control shaft.

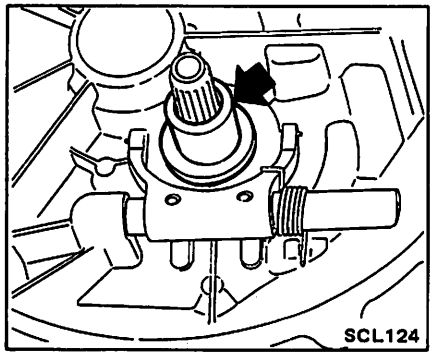


3. Install withdrawal lever, return spring and clutch control shaft on clutch housing.

Be sure to hook return spring as shown below.



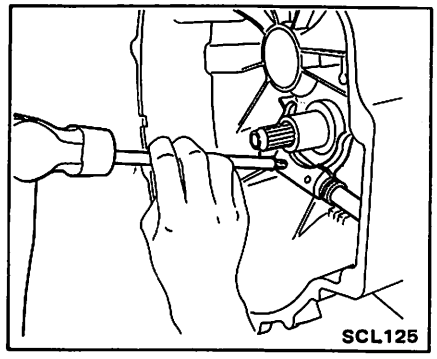
4. Lubricate the following points with lithium-based grease which includes molybdenum disulphide.
(1) Release bearing sliding surface of clutch housing front cover.



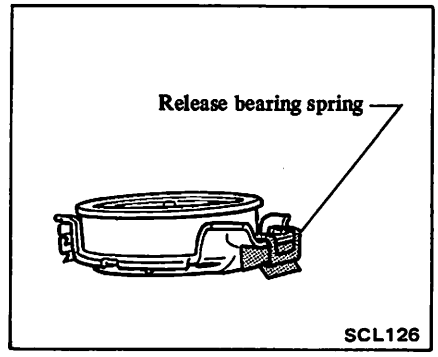
(2) Transaxle splines.

A small amount of grease should be coated to the above points. If too much lubricant is applied, it will run out on the friction plates when hot, resulting in damaged clutch disc facings.

5. Install withdrawal lever retaining pins.



6. Install release bearing springs to release bearing.



7. Install release bearing by pushing release bearing spring and clutch control lever by hand.

Be sure "click" is heard when pushing.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

CLUTCH CONTROL SYSTEM

Type of clutch control	Mechanical

CLUTCH DISC

Engine	E16
Type	180CBL
Facing size Outer dia. x Inner dia. x Thickness mm (in)	180 x 125 x 3.5 (7.09 x 4.92 x 0.138)
Thickness of disc assembly At load 3,923 N (400 kg, 882 lb) mm (in)	8.0 - 8.4 (0.315 - 0.331)

CLUTCH COVER

Engine	E16
Model	C180S
Full load N (kg, lb)	3,236 (330, 728)

INSPECTION AND ADJUSTMENT

CLUTCH DISC

Unit: mm (in)

Model	180CBL
Wear limit of facing surface to rivet head	0.3 (0.012)
Runout limit	1.0 (0.039)
Distance of runout checking point (from the hub center)	85 (3.35)
Maximum backlash of spline (at outer edge of disc)	0.7 (0.028)

CLUTCH COVER

Unit: mm (in)

Model	C180S
Diaphragm spring height	29.0 - 31.0 (1.142 - 1.220)
Uneven limit of diaphragm spring toe height	0.5 (0.020)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Clutch switch lock nut (U.S.A. models)	12 - 15	1.2 - 1.5	9 - 11
2nd clutch switch lock nut (U.S.A. models)	12 - 15	1.2 - 1.5	9 - 11
Pedal stopper bolt lock nut (Canada models)	16 - 22	1.6 - 2.2	12 - 16
Clutch cable lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Clutch cable bracket securing bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Clutch cover securing bolt	22 - 29	2.2 - 3.0	16 - 22

TROUBLE DIAGNOSES AND CORRECTIONS

CLUTCH SLIP

Slipping of clutch may be noticeable when any of the following symptoms is encountered during operation.
(1) Car will not respond to engine speed during acceleration.
(2) Insufficient car speed.
(3) Lack of power during uphill driving.
(4) Increase of fuel consumption.

Some of the above conditions may also be attributable to engine problem. First determine whether engine or clutch is causing the problem.

If slipping clutch is left unheeded, wear and/or overheating will occur on clutch facing to such an extent that it is no longer serviceable.

TO TEST FOR SLIPPING CLUTCH, proceed as follows:

Inspection

Ensure that parking brake is engaged. Disengage clutch and shift transaxle gears into 4th. Gradually increase engine speed while simultaneously engaging clutch. If engine stops while clutch is being engaged, clutch is functioning properly. If car does not move and the engine does not stop, clutch is slipping.

Probable cause	Corrective action
• Clutch facing hardened or wet with oil	Repair or replace
• Clutch facing excessively worn	Replace (Replace if engine/transaxle oil seal is faulty)
• Diaphragm spring weak or damaged	Replace
• Flywheel or pressure plate warped	Repair or replace

CLUTCH DRAGS

Dragging clutch is particularly noticeable when shifting gears, especially into low gear.

TO TEST FOR DRAGGING CLUTCH, proceed to inspection.

Inspection

The clutch will not disengage properly if the clutch pedal height is not correct. Before inspecting, be sure to correct the clutch pedal height, pedal stroke and extra allowance for disengagement. [There should be sufficient clearance below the pedal stroke (extra allowance for disengagement).]
(1) Clutch pedal height from the floor is outside the specifications. It indicates that the stopper bolt location is not correct.
(2) The adjustment of control cable (withdrawal lever play) is outside the specifications.
(3) Extra disengagement allowance is insufficient because of the interference of floor mats, etc.

Disengage clutch and shift gears into Reverse. Shift gears into Neutral, gradually increasing engine speed. After a short intermission, shift gears into Reverse. If noise is heard while gears are being shifted, clutch is dragging.

Probable cause	Corrective action
• Clutch disc hub splines worn or rusted	Replace (or remove rust) and coat with grease
• Insufficient pedal stroke	Adjust
• Clutch disc runout or warped	Replace
• Diaphragm spring fatigued	Replace
• Clutch facing wet with oil	Replace (Replace if engine/ transaxle oil seal is faulty)

CLUTCH CHATTERS

Clutch chattering is usually noticeable when car is just rolled off with clutch partially engaged.

Probable cause	Corrective action
• Oil on clutch facing	Replace
• Diaphragm spring fatigued	Replace
• Clutch facing hardened	Replace
• Clutch facing warped	Repair or replace
• Pressure plate worn or warped	Replace
• Engine mounting loose or rubber deteriorated	Tighten or replace
• Clutch facing rivets loose	Replace

NOISY CLUTCH

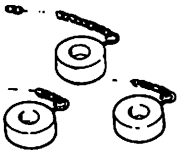
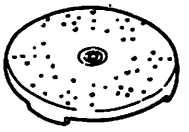
Probable cause	Corrective action
• Release bearing/sleeve damaged or improperly lubricated	Replace
• Pilot bushing worn, jammed or damaged	Replace
• Clutch facing rivets loose	Replace
• Disc plate cracked	Replace
• Clutch disc torsion springs fatigued	Replace

RABBIT-HOPPING CLUTCH

When "rabbit-hopping" of clutch occurs, car will not roll off smoothly from a standing start or clutch will be engaged before clutch pedal is fully depressed.

Probable cause	Corrective action
• Oil on clutch facing	Replace
• Clutch facing worn or rivets loose	Replace
• Flywheel/pressure plate warped or worn	Replace
• Mounting bolts on engine or power train loose	Tighten
• Diaphragm spring fatigued	Replace

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV30101000 (J33213)	Clutch aligning bar 
ST20050100 (–)	Distance piece 
ST20050010 (–)	Base plate 
ST20050051 (–)	Set bolt 
ST20050240 (–)	Diaphragm spring adjusting wrench 

MANUAL TRANSAXLE

SECTION MT

CONTENTS

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MANUAL TRANSAXLE
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REMOVAL AND INSTALLATION

MANUAL TRANSAXLE

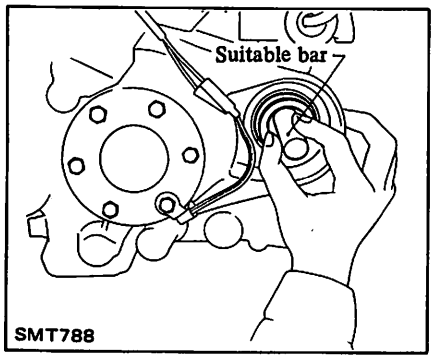
REMOVAL

1. Drain gear oil.
2. Draw out drive shafts from transaxle.

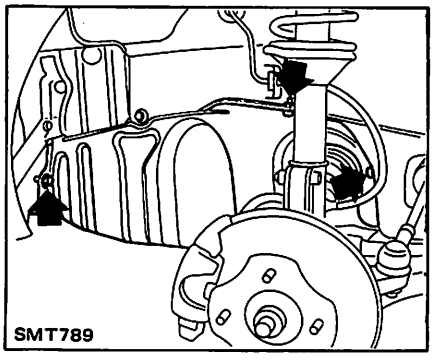
Refer to Drive Shaft (Section FA) for removal.

a. When drawing out drive shafts, use care not to damage lip of oil seal.

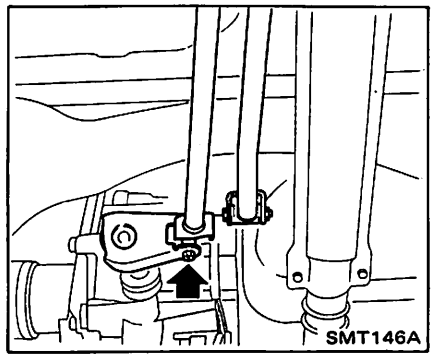
b. After drawing out drive shafts, insert suitable bar to prevent side gears from rotating and falling into differential case.



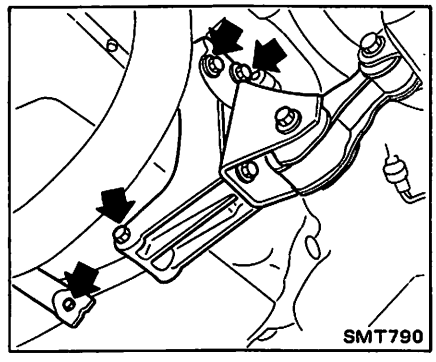
3. Remove wheel house protector.



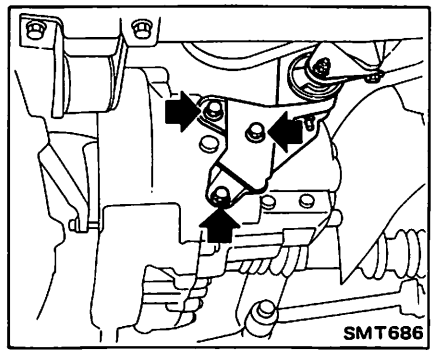
4. Separate control rod and support rod from transaxle.



5. Remove engine gusset securing bolt and engine mounting.

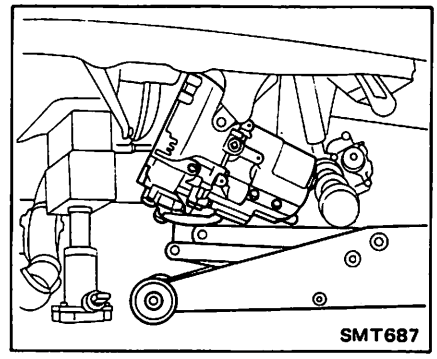


6. Remove clutch control cable from withdrawal lever.
7. Disconnect speedometer cable.
8. Disconnect wires from reverse (back-up) and neutral switches.
9. Support engine by placing a jack under oil pan with a wooden block used between oil pan and jack.
10. Support transaxle with a jack.
11. Remove engine mounting securing bolts.



12. Remove bolts securing transaxle to engine.

Then support engine and transaxle with jacks, and slide transaxle away from engine and remove it from vehicle.



CAUTION:
Take care not to strike any adjacent parts or input shaft when dismounting transaxle.

INSTALLATION

Install transaxle in the reverse order of removal, paying attention to the following points.

1. Before installing, clean mating surfaces of engine rear plate and clutch housing.
2. Before installing, apply a light coat of lithium-based grease which includes molybdenum disulphide to spline parts of clutch disc and input shaft.
3. Remove filler plug and fill transaxle with recommended gear oil up to the level of the plug hole.

Oil capacity:
FS5F30A
2.7 liters
(5-3/4 US pt,
4-3/4 Imp pt)

4. Apply sealant to threads of filler plug, and install filler plug to transmission case.

Ⓣ: **Filler plug**
25 - 34 N·m
(2.5 - 3.5 kg-m,
18 - 25 ft-lb)

5. Tighten bolts securing transaxle to engine.

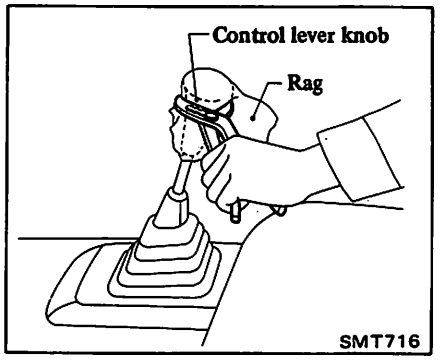
Ⓣ: **16 - 21 N·m**
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

For tightening torques of other related parts, refer to sections ER, FA, BR and CL.

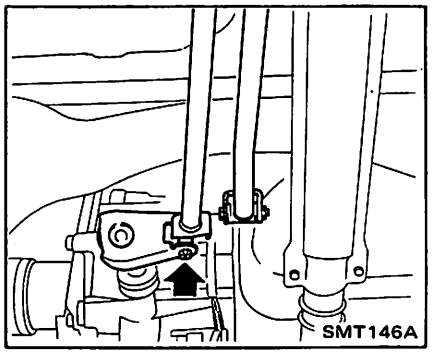
TRANSMISSION GEAR CONTROL

REMOVAL

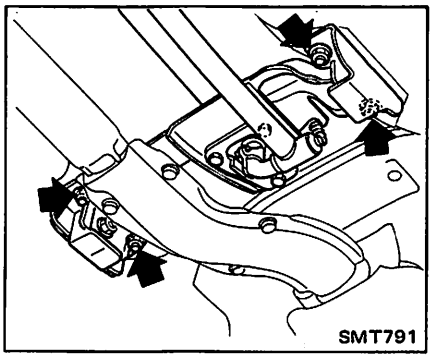
1. Remove control lever knob.



2. Separate control rod and support rod from transaxle.



3. Remove control bracket securing bolts, then remove transmission gear control assembly.



INSTALLATION

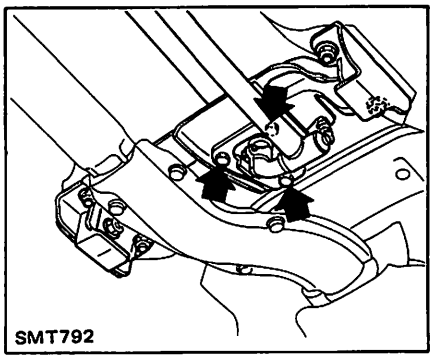
Install transmission gear control in the reverse order of removal.

Apply locking sealer to control lever knob.

Ⓣ : **Rubber holder to body**
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)
Control rod to transaxle
6.3 - 8.3 N·m
(0.64 - 0.85 kg-m,
4.6 - 6.1 ft-lb)
Support rod to transaxle
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)

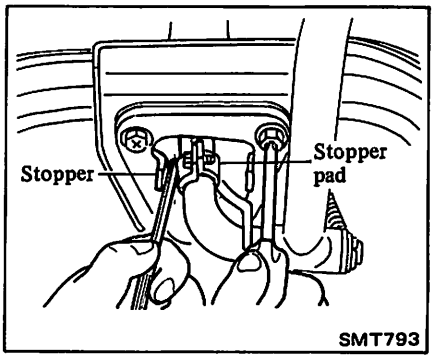
After installing transmission gear control, adjustment for select stopper should be perfomed.

1. Loosen select stopper securing bolts.



2. Shift to 1st gear.
3. Adjust the clearance between control lever and select stopper by sliding the select stopper so that the clearance is the specified value.

Clearance: 1.0 mm (0.039 in)



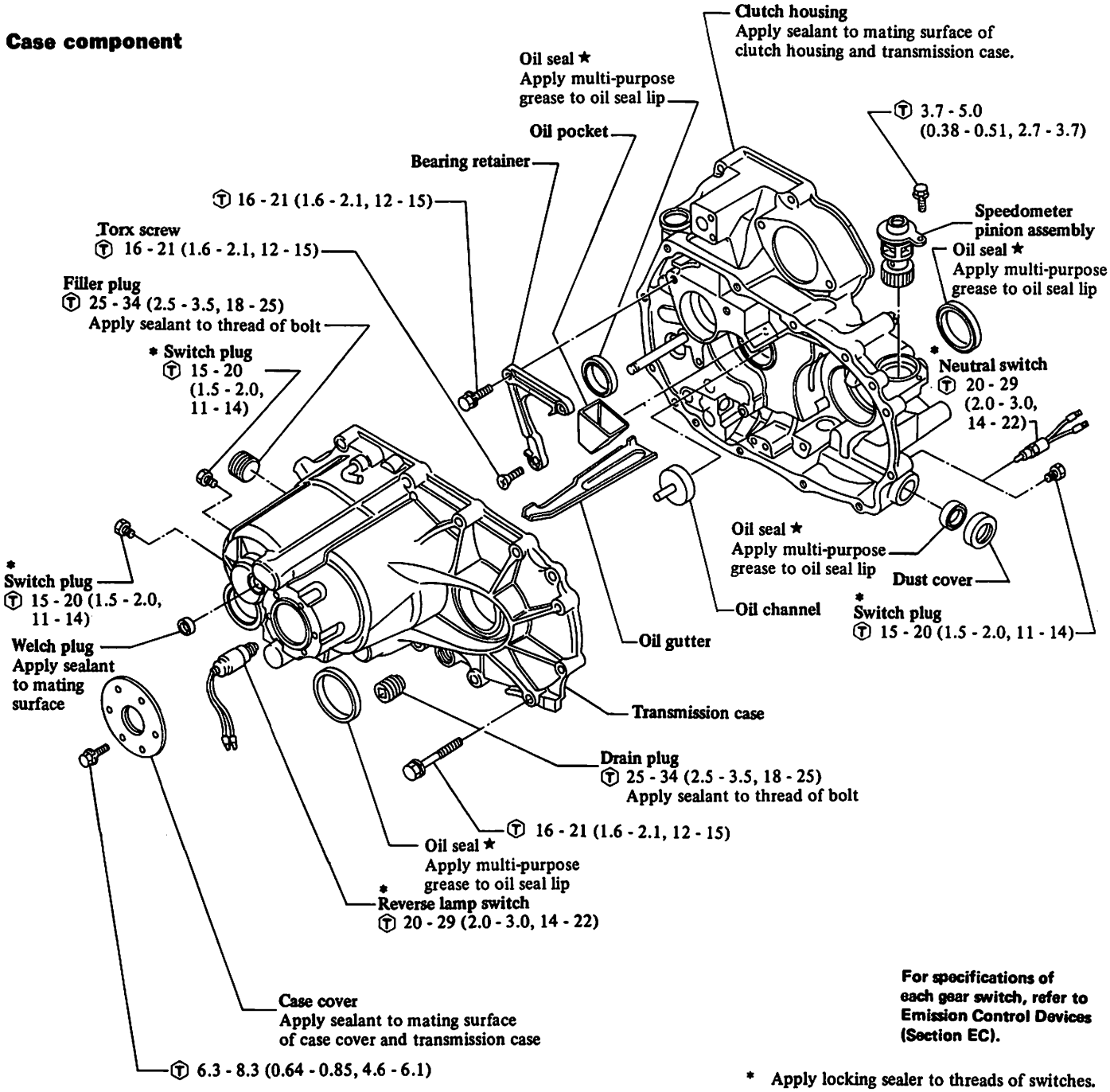
4. Tighten select stopper securing bolts.

Ⓣ : **Select stopper bolt**
3.1 - 5.0 N·m
(0.32 - 0.51 kg-m,
2.3 - 3.7 ft-lb)

5. After adjustment, be sure to check that control lever can be shifted to all positions without binding or dragging.

MANUAL TRANSAXLE [Model: RS5F30A (5-speed)]

Case component



For specifications of each gear switch, refer to Emission Control Devices (Section EC).

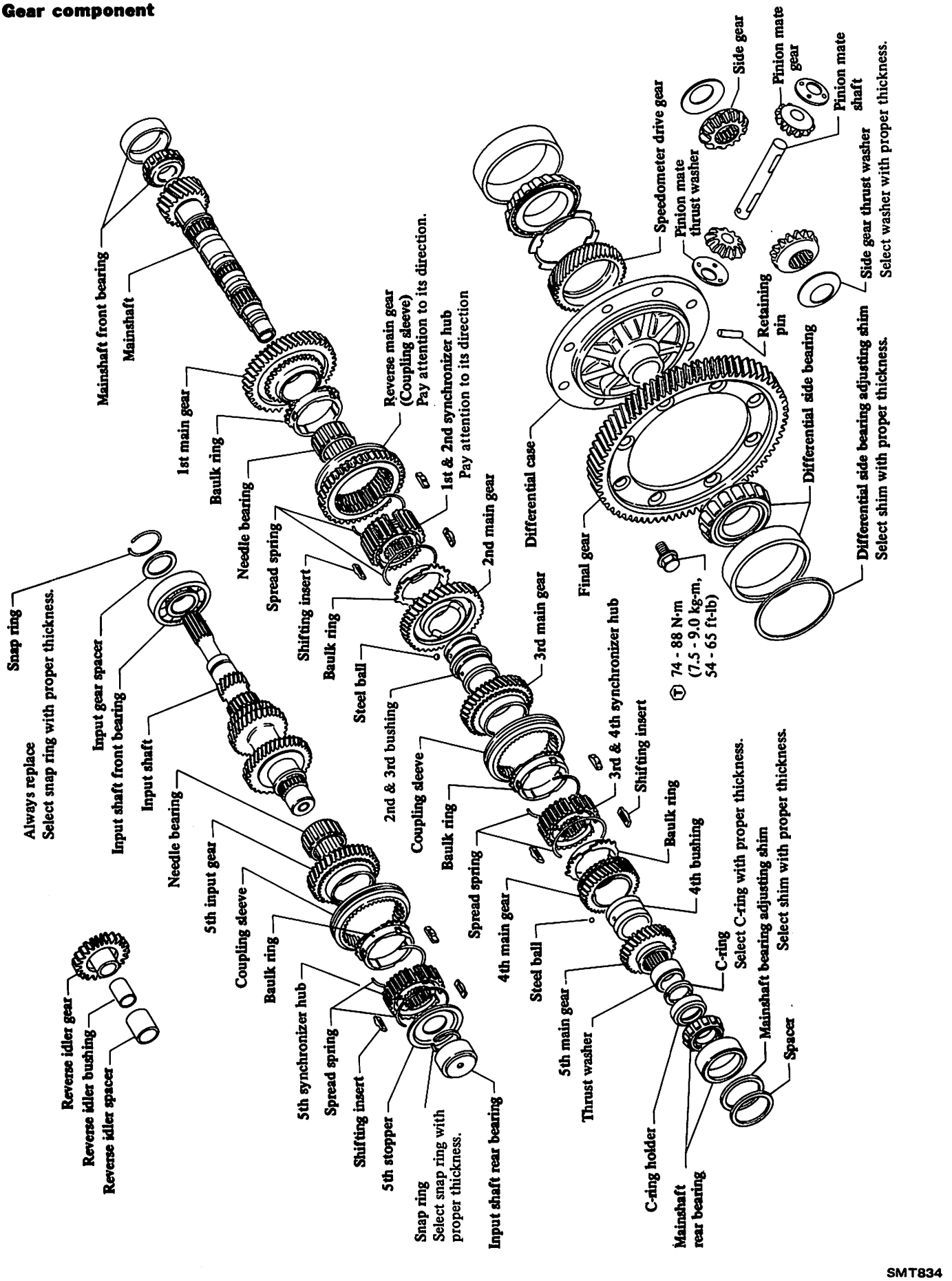
* Apply locking sealer to threads of switches.

★: Always replace when disassembled.

Ⓣ: N·m (kg-m, ft-lb)

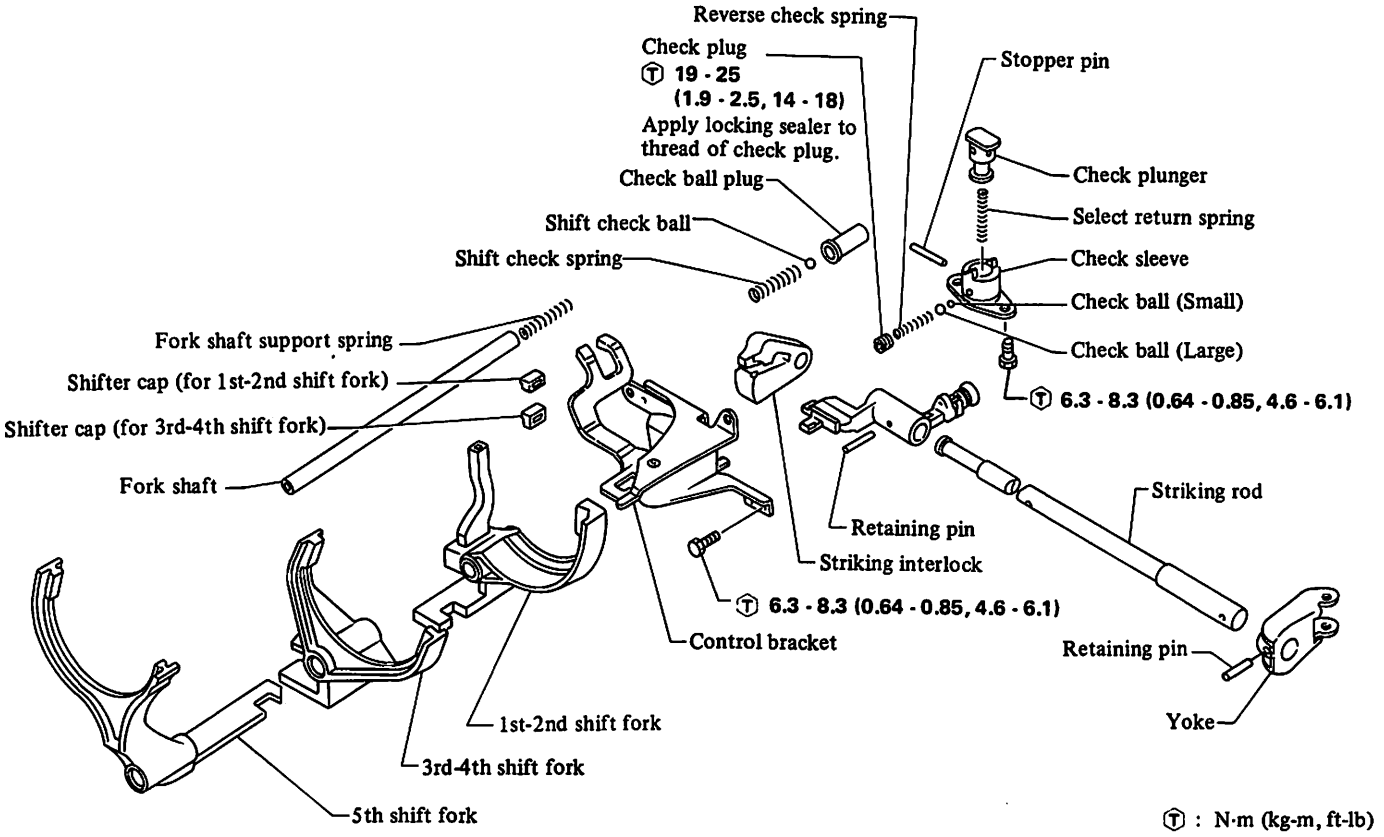
SMT734

Gear component



SMT834

Shift control component



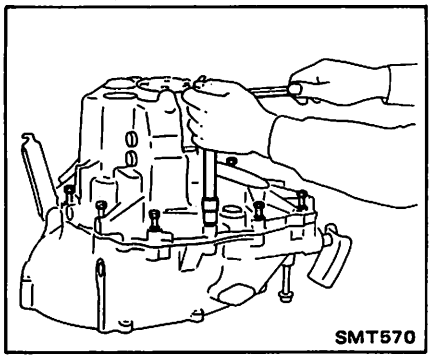
Ⓣ : N·m (kg-m, ft-lb)

SMT187A

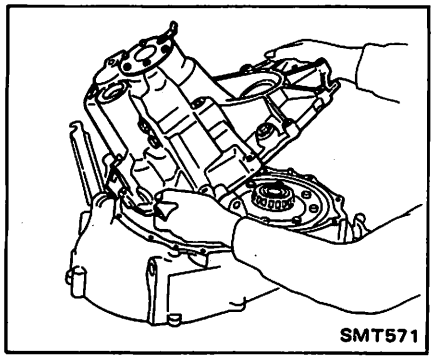
TRANSMISSION CASE

DISASSEMBLY

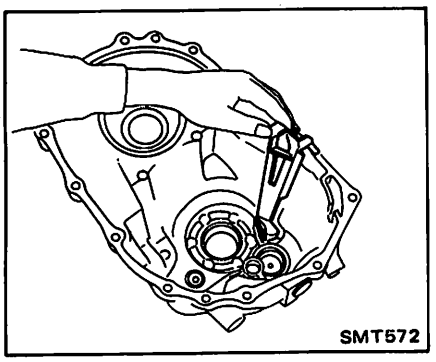
1. Wipe off dirt and grease.
2. Drain oil from transmission case.
3. Remove transmission case fixing bolts.



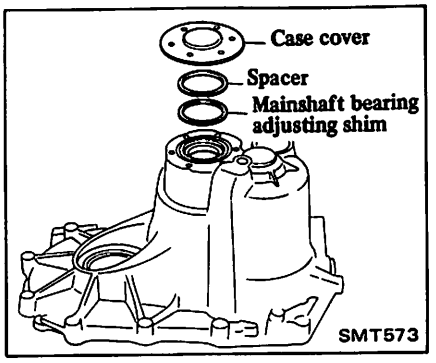
4. With a plastic hammer, tap the case, then carefully lift transmission case while slightly tilting it to prevent 5th shift fork from interfering with the case.



5. Remove reverse lamp (back-up) switch.
6. Remove oil gutter.



7. Remove input shaft rear bearing.
   Refer to "Replacement of Bearings".
8. Remove case cover and mainshaft bearing adjusting shim and spacer.



9. Remove mainshaft rear bearing outer race and differential side bearing outer race.
   Refer to "Replacement of Bearings".

INSPECTION

1. Clean with solvent and check for cracks or cavities by using dyeing test.
2. Check mating surface of transmission case for small nicks, projections or sealant.

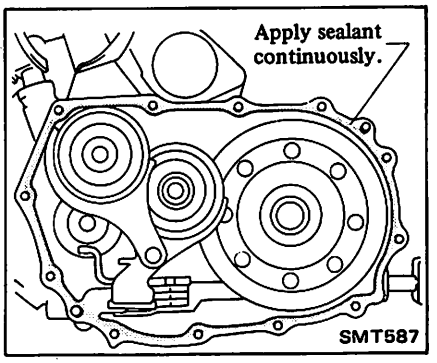
ASSEMBLY

1. Press fit differential side bearing outer race and mainshaft bearing outer race.
   Refer to "Replacement of Bearings".
2. Install input shaft rear bearing and apply sealant to welch plug, then install it on transmission case.
   Refer to "Replacement of Bearings".
3. Install oil gutter and apply locking sealer to reverse lamp (back-up) switch, then install them.
4. If transmission case is replaced, adjust differential side bearing and mainshaft rotary frictional force by selecting suitable shims.

   Before installing a new transmission case, determine appropriate thickness of differential side bearing adjusting shim with both main and input shafts withdrawn from the case.

   For removal of input shaft and mainshaft and for adjustment of bearing rotary frictional force, refer to instructions under "Disassembly of Clutch Housing" and "Adjustment of Gears and Shafts (except final drive)", respectively.
5. Clean mating surface of transmission case and clutch housing, and apply sealant to clutch housing.

Apply an even coat of sealant to mating surfaces of transmission case and clutch housing continuously. Uneven coating could lead to oil leakage.



6. Assemble transmission case on clutch housing.

12 bolts are used to secure transmission case and clutch housing. Only one of these bolts is longer than the others.

Ⓣ: 16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)

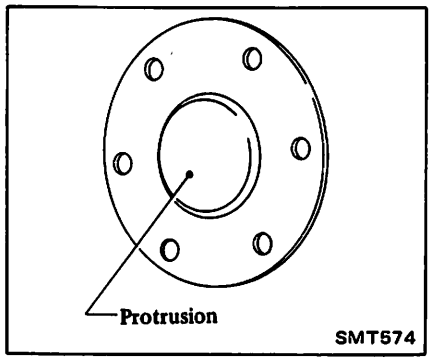
7. After properly adjusting mainshaft bearing, remove transmission case cover.

   Clean mating surface of transmission case and case cover, then apply sealant to transmission case.

Ensure that mating surfaces are evenly coated with sealant.

8. Install case cover.

Ensure that convex side of transmission case cover faces outward when installed.

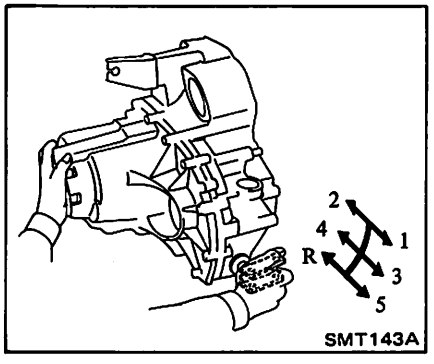


Ⓣ: 6.3 - 8.3 N·m (0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)

9. Measure gear rotary frictional force and ensure that gear moves smoothly without binding.

Refer to "Gears and Shafts (Except final drive)" for adjustment.

10. Make sure that gears operate smoothly.



11. **Apply sealant to thread of drain plug,** then install it to transmission case.

Ⓣ: 25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)

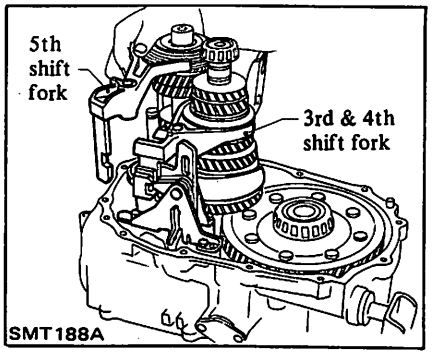
CLUTCH HOUSING

DISASSEMBLY

1. Wipe off dirt and grease.
2. Drain oil.
3. Remove transmission case.

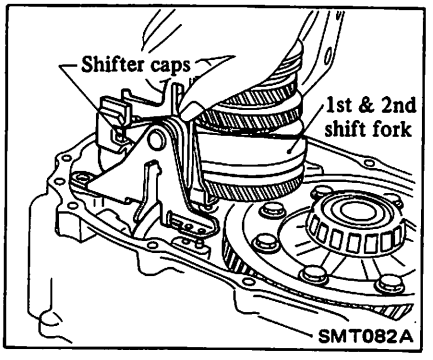
Refer to "Transmission Case" for disassembly.

4. Draw out reverse idler spacer and fork shaft, then remove 5th, 3rd & 4th shift fork. **Be careful not to lose shifter cap.**



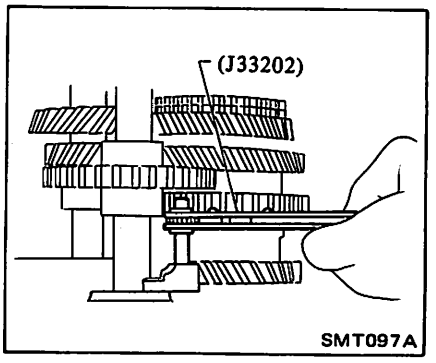
5. Remove control bracket with 1st & 2nd shift fork.

Be careful not to lose shifter cap.



6. Remove three screws and detach bearing retainer.

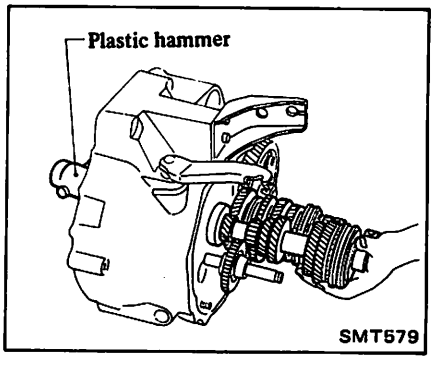
One of these three screws is a torx type and should be removed with a special-purpose tool, as shown in figures below; otherwise screw will be difficult to remove because of small clearance between screw and reverse idler gear.



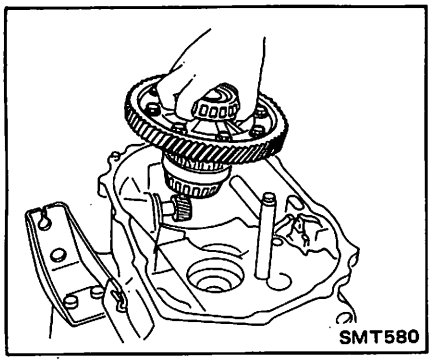
Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.

7. Turn clutch housing so its side faces down. Lightly tap input shaft end (on engine side) with a plastic hammer, then remove input shaft together with mainshaft.

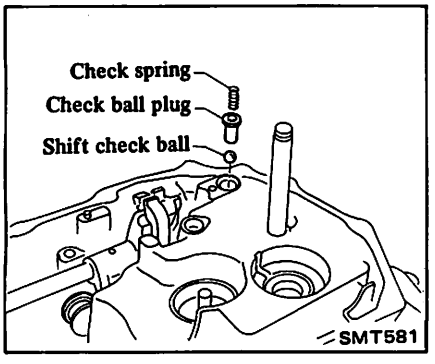
a. **Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.**
b. **When removing input shaft, be careful not to scratch oil seal lip with shaft spline.**
c. **While tapping input shaft end, use care not to allow final gear assembly to fall out.**



8. Remove reverse idler gear and final drive assembly.



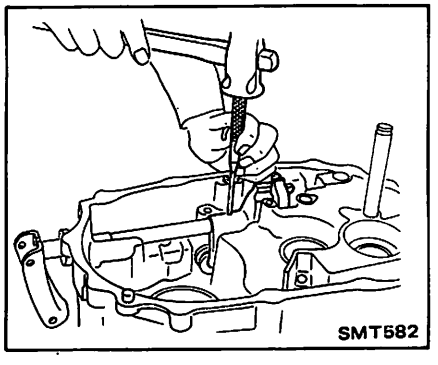
9. Remove oil pocket, shift check ball, check spring and check ball plug.

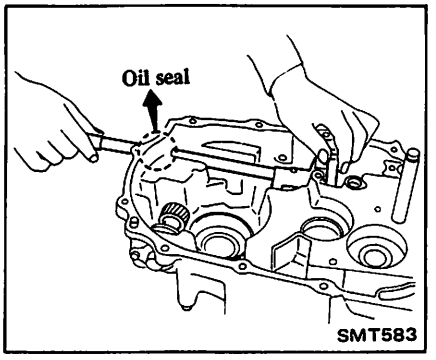


10. Drive retaining pin out of striking lever, then remove striking rod, striking lever and striking interlock.

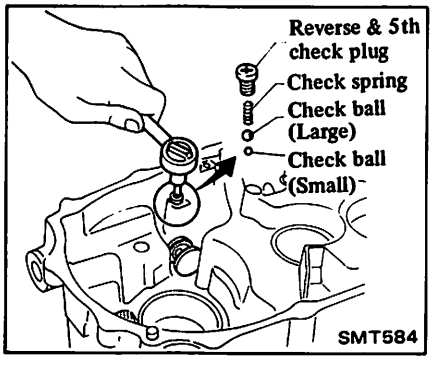
a. Select a position where retaining pin does not interfere with clutch housing when removing the former.

b. When removing striking rod, use care not to damage oil seal's lip. If necessary, tape edges of striking rod when removing the rod.

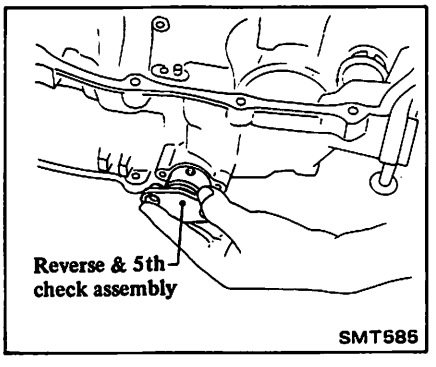




11. Remove reverse & 5th check plug, then detach check spring and check balls.



12. Remove reverse & 5th check assembly.



13. Remove clutch control shaft, clutch release bearing and clutch lever.

Refer to "Release Bearing (Section CL)" for removal.

14. Remove mainshaft bearing outer race and differential side bearing outer race.

Refer to "Replacement of Bearings".

15. Remove oil channel.

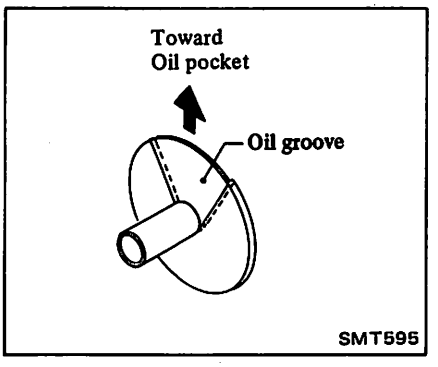
INSPECTION

1. Clean with solvent and check for cracks or cavities by means of dyeing test.
2. Check mating surface of clutch housing for small nicks, projections or sealant.

ASSEMBLY

1. Install a new oil channel.

Ensure that oil groove in oil channel always faces toward oil pocket when installing it on clutch housing.



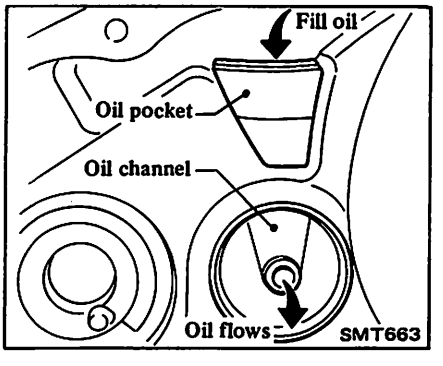
2. Install mainshaft bearing outer race and differential side bearing outer race.

Refer to "Replacement of Bearings".

3. Install clutch control shaft, clutch release bearing and clutch lever.

Refer to "Release Bearing (Section CL)" for installation.

4. Install oil pocket, then **make sure oil flows from oil pocket to oil channel.**

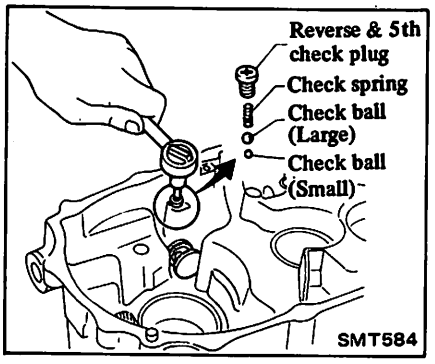


5. Install following parts in reverse order of disassembly.
- Reverse & 5th check assembly
- Reverse & 5th check plug (check spring, check balls)

a. Install smaller check ball first, then larger one.

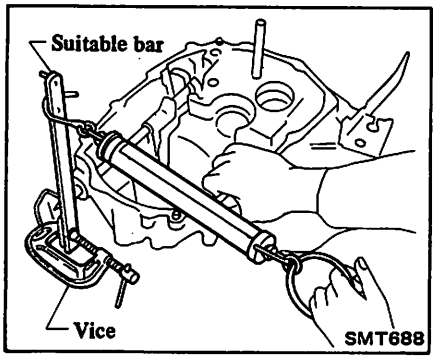
b. When replacing clutch housing, reverse & 5th check assembly, check spring and check plug, it is necessary to adjust reverse check force.

1) First, install used check plug or standard check plug and tighten it to the specified torque.



Ⓣ: Reverse & 5th check plug
19 - 25 N·m
(1.9 - 2.5 kg-m,
14 - 18 ft-lb)

2) Check reverse check force.

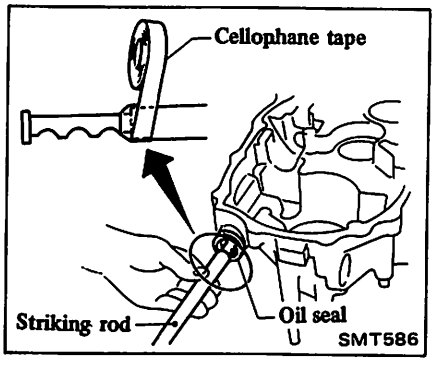


Reverse check force:
10.3 - 12.7 N·m
(105 - 130 kg-cm,
91 - 113 in-lb)

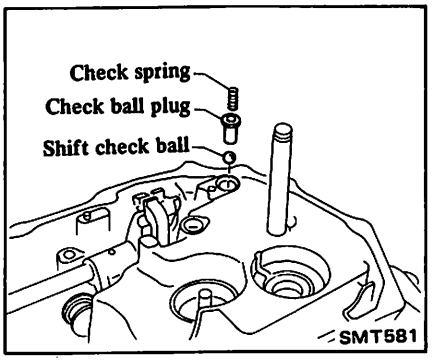
3) If reverse check force is not within the above range, select another check plug having a different length and reinstall it.
Reverse check plug:
Refer to S.D.S.

c. Apply locking sealer to thread of check plug.
- Striking lever
- Striking interlock
- Boot (for shift control oil seal)
- Striking rod

CAUTION:
When inserting striking rod into clutch housing, tape edges of striking rod to avoid damaging oil seal's lip if it hits against oil seal.



- Shift check related parts (check ball plug, shift check ball, check spring)



- Oil pocket
- Differential case assembly
  If clutch housing is replaced with a new one, adjust differential side bearing rotary frictional force by selecting shim. Refer to Transmission Case for assembly and adjustment.
- Reverse idler gear
- Mainshaft

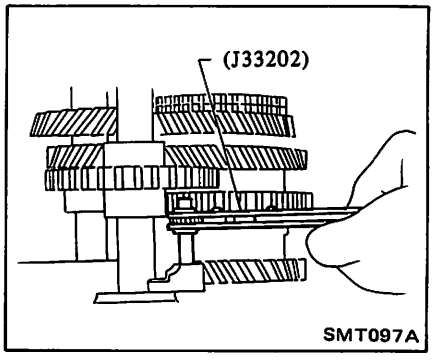
A resin oil channel is used at end of mainshaft on clutch housing side. Use care not to damage oil channel when inserting mainshaft into clutch housing.

- Input shaft

Use care not to damage oil seal's lip by splines of input shaft while shaft is being inserted into clutch housing.

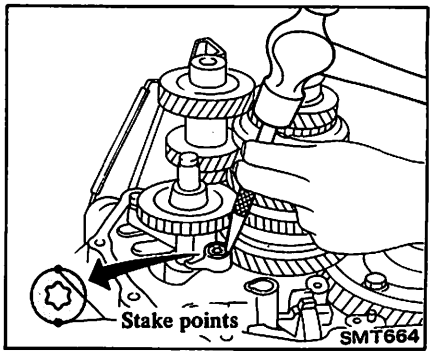
- Bearing retainer
  One of three screws is a torx design and should be installed with a special-purpose tool referred to in "Disassembly". A conventional tool will not do, as clearance between reverse idler gear and screw location is not wide enough for screw to be inserted.

a. Apply locking sealer to thread of torx screw.

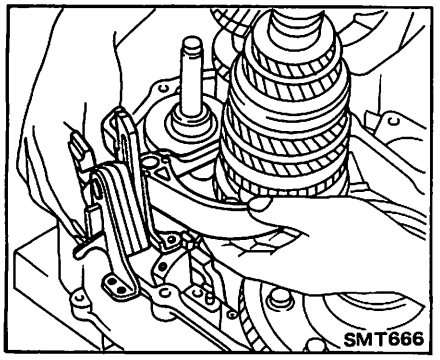


Ⓣ: Torx screw
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)
Bearing retainer bolt
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

b. After installing torx screw, stake it at two points.



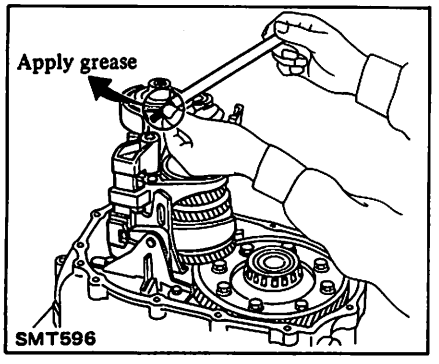
6. Apply grease to shifter caps, then install it to control bracket. Install control bracket with 1st & 2nd shift fork.



Ⓣ: **Control bracket bolt**
6.3 - 8.3 N·m
(0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)

7. Install 3rd & 4th and 5th shift fork.
8. Insert fork shaft.

Apply grease to support spring before installing, in order to prevent spring from falling into hole for fork shaft on clutch housing.



9. Install reverse idler spacer.
10. Install transmission case.
Refer to "Transmission Case" for assembly.
11. Measure gear rotary frictional force and ensure that gear moves smoothly without binding. Refer to "Transmission Case" for assembly.
12. **Apply sealant to thread of drain plug,** then install it to transmission case.

Ⓣ: **25 - 34 N·m**
(2.5 - 3.5 kg-m, 18 - 25 ft-lb)

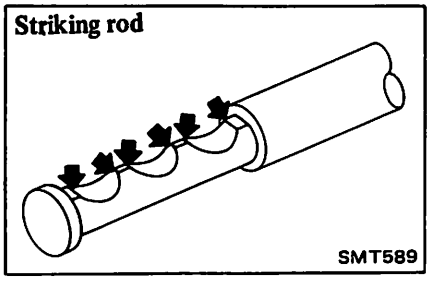
SHIFT CONTROL MECHANISM (Inside transaxle)

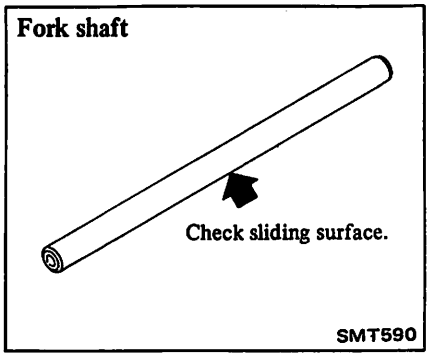
DISASSEMBLY

Disassemble shift control mechanism, following steps 1 through 12 described under "Disassembly of Clutch Housing".

INSPECTION

Clean with solvent and check for wear, scratches, projections, damage or other faulty conditions. Replace any part which is worn or damaged.





ASSEMBLY

Assemble shift control mechanism, following steps 5 through 12 described under "Assembly of Clutch Housing".

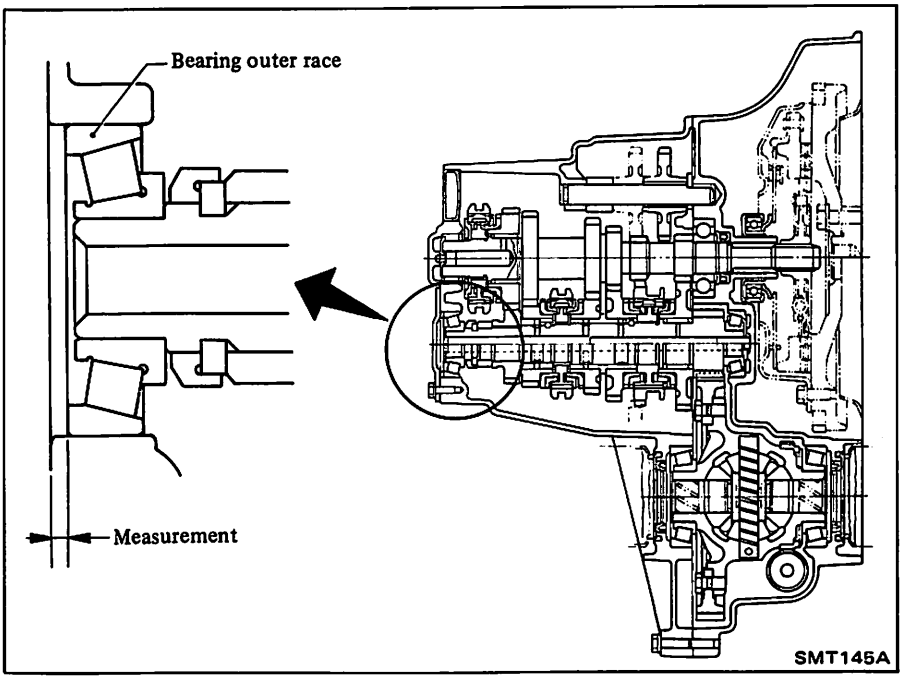
GEARS AND SHAFTS (Except final drive)

ADJUSTMENT

If any of following parts is replaced, mainshaft bearing rotary frictional force should be adjusted.

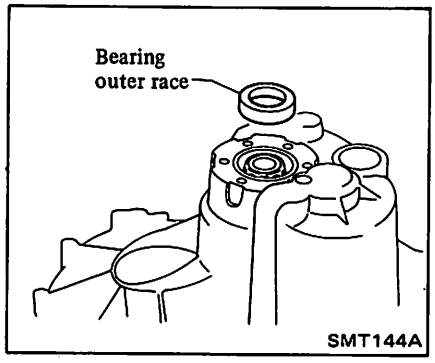
- Mainshaft
- Mainshaft bearings (front and rear)
- Clutch housing
- Transmission case

To properly adjust mainshaft bearing rotary frictional force, measure distance from rear of transmission case to bearing outer race, then select proper thickness of shim.

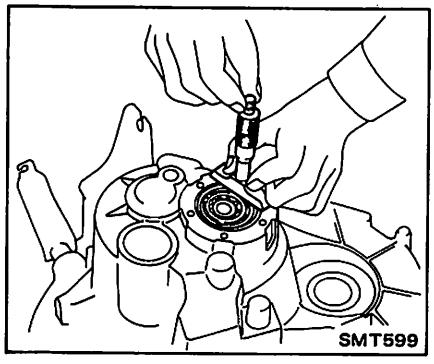


To properly adjust mainshaft bearing rotary frictional force, proceed as follows:

1. Apply gear oil to mainshaft rear bearing outer race, then install bearing outer race.



2. Measure distance from transmission case to bearing outer race.



3. Select a shim, using **"Table for selecting mainshaft bearing adjusting shim"** in S.D.S.
4. Install selected shim, spacer and case cover.

Ⓣ : 6.3 - 8.3 N·m (0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)

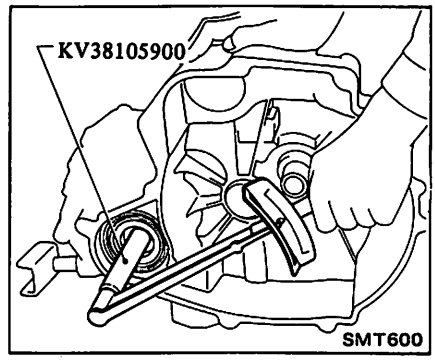
5. Ensure that differential side bearing rotary frictional force is within specified range. Then, check all gear rotary frictional force to see if it is within specified range without binding.

This check should be performed only when using a new bearing. When reusing a bearing, check to see if final drive assembly revolves smoothly.

To do this proceed as follows:

(1) Shift to 4th gear, then turn input shaft at least ten times until bearing is properly seated and gears are properly broken in.

(2) Insert special tool KV38105900 into final drive assembly at drive shaft location. With tool held in position, measure gear's rotary frictional force to ensure that it is within specified range.



Rotary frictional force:
7.4 - 10.8 N·m (75 - 110 kg-cm, 65 - 95 in-lb)

Changes in rotary frictional force of final drive per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.

(3) If any abnormality is noted while checking rotary frictional force, disassemble final drive assembly and readjust it.

(4) After properly adjusting mainshaft bearing rotary frictional force, remove case cover and apply sealant to it, then install it to transmission case.

Ⓣ : Case cover bolt
6.3 - 8.3 N·m (0.64 - 0.85 kg-m, 4.6 - 6.1 ft-lb)

DISASSEMBLY

Input gears and input shaft

1. Remove transmission case, fork rod, shift forks, control bracket and bearing retainer.

Refer to "Clutch Housing" for disassembly.

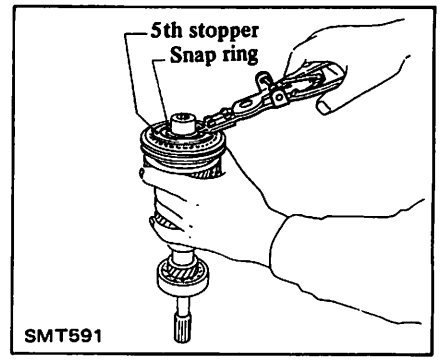
2. Remove input shaft assembly.

Refer to "Clutch Housing" for disassembly.

3. Remove input shaft front bearing.

Refer to "Replacement of Bearings".

4. Measure 5th input gear end play. Refer to "Gears and Shafts" for inspection.
5. Remove snap ring and 5th stopper.



6. Draw out 5th synchronizer and 5th gear.

Main gears and mainshaft

1. Remove transmission case, fork rod, shift forks, control bracket and bearing retainer.

Refer to "Clutch Housing" for disassembly.

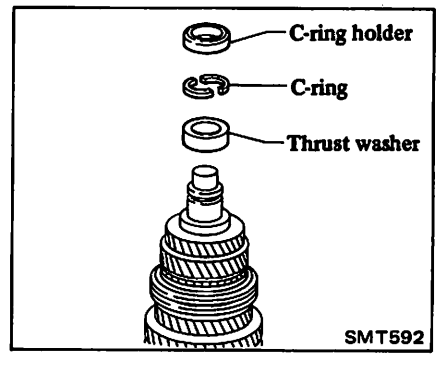
2. Remove main gears and shaft assembly.

Refer to "Clutch Housing " for disassembly.

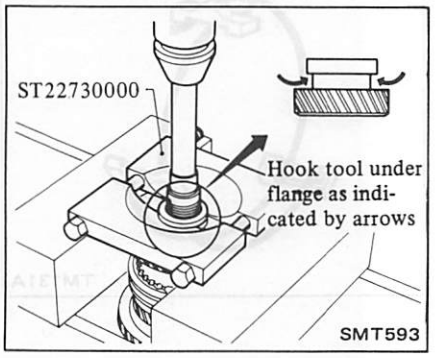
3. Measure gear end play. Refer to "Gears and Shafts" for inspection.
4. Remove mainshaft front and rear bearing inner race.

Refer to "Replacement of Bearing".

5. Remove C-rings, C-ring holder and thrust washer.

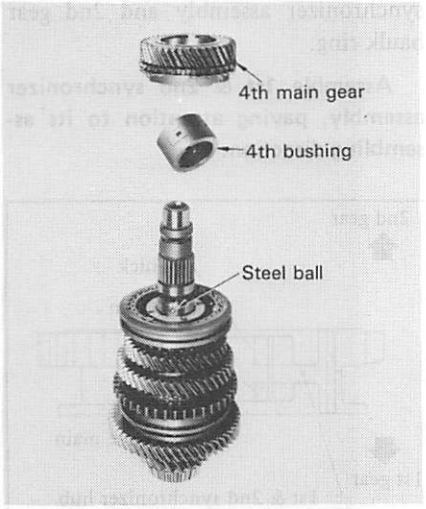


6. Remove 5th main gear.



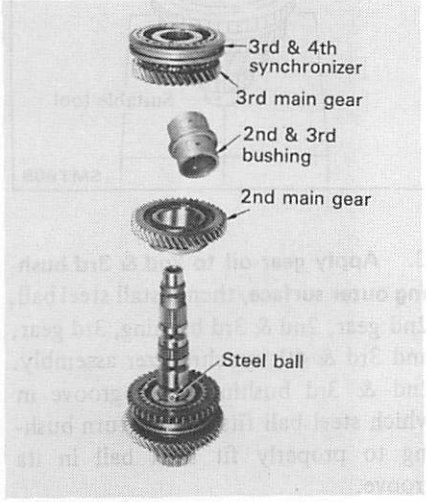
7. Remove 4th main gear, 4th bushing and steel ball.

Be careful not to lose steel ball.

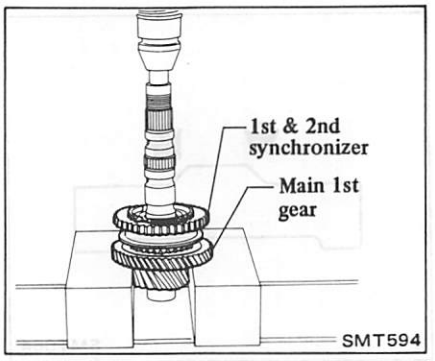


8. Draw out 3rd & 4th synchronizer, main 3rd gear, 2nd & 3rd bushing, steel ball and main 2nd gear.

Be careful not to lose steel ball.



9. Remove 1st & 2nd synchronizer and main 1st gear **as an assembly,** then remove 1st needle bearing.

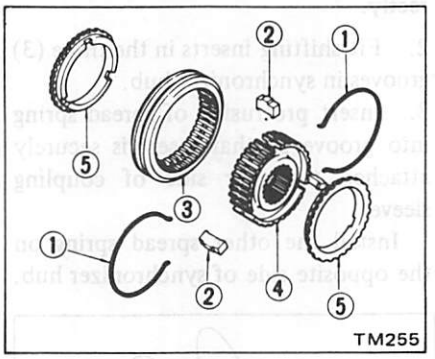


Reverse idler gear

Follow steps 1 throuth 8 described under "Disassembly of Clutch Housing" to disassemble reverse idler gear.

Synchronizer (1st & 2nd, 3rd & 4th and 5th)

1. Remove spread springs ①, and take out shifting inserts ②.
2. Separate coupling sleeve ③ from synchro-hub ④.



1 Spread spring
2 Shifting insert
3 Coupling sleeve
4 Synchro hub
5 Baulk ring

INSPECTION

Bearings

Thoroughly clean bearings and dry with compressed air.

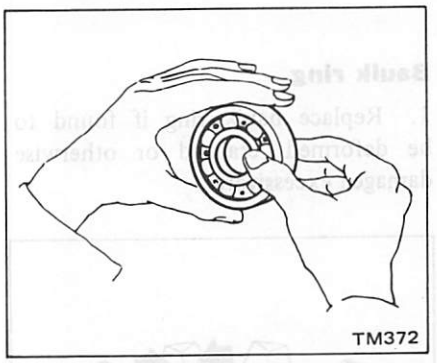
Tapered roller bearings

Check bearings for wear, scratches, pitching or flaking.

Ball bearing

When race and ball surfaces are worn or rough, or when balls are out-of-round or rough, replace bearing with a new one.

CAUTION:
Do not allow the bearings to spin when using compressed air because it will damage the race and balls. Turn them slowly by hand.



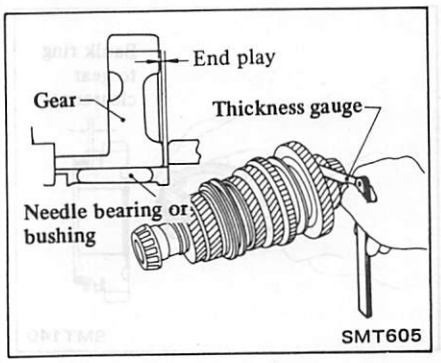
Needle bearing

Replace needle bearing if worn or damaged.

Gears and shafts

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shaft for bending, crack, wear or worn spline; if necessary, replace.
3. **Measure gear end play:**

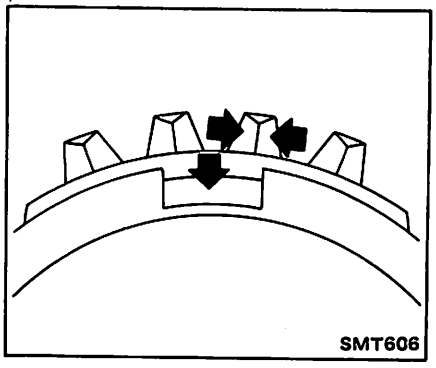
- It is necessary to measure end play before disassembling shafts and after reassembling shafts.
- Measure end play to insure that it is within the specified limit.
- If end play is not within the specified limit, disassemble and check the parts.
- Replace any part which is worn or damaged.



Standard end play:
Main 1st gear
0.18 - 0.31 mm
(0.0071 - 0.0122 in)
Main 2nd, 3rd, 4th gear
0.20 - 0.40 mm
(0.0079 - 0.0157 in)
Input 5th gear
0.18 - 0.41 mm
(0.0071 - 0.0161 in)

Baulk ring

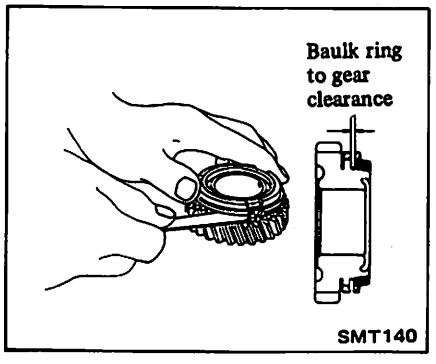
1. Replace baulk ring if found to be deformed, cracked or otherwise damaged excessively.


SMT606

2. Place baulk ring in position on gear cone. While holding baulk ring against gear as far as it will go, measure gap between baulk ring and outer gear.

If the clearance is smaller than the wear limit, discard baulk ring.

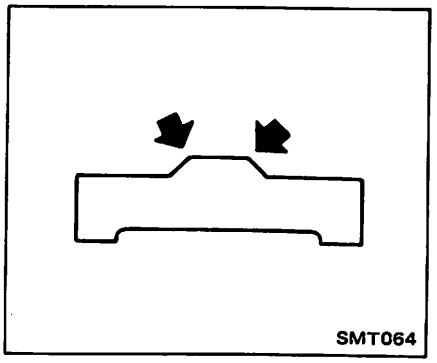
Baulk ring to gear clearance:
Standard
1.0 - 1.35 mm
(0.039 - 0.0531 in)
Wear limit
Less than 0.7 mm
(0.028 in)



SMT140

Shifting insert

Replace, if worn excessively or unevenly, deformed, or damaged.


SMT064

ASSEMBLY

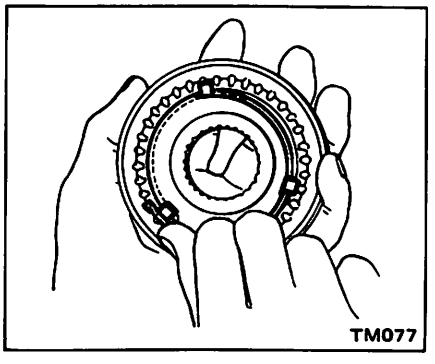
Synchronizer

1. Place synchronizer hub into coupling sleeve.

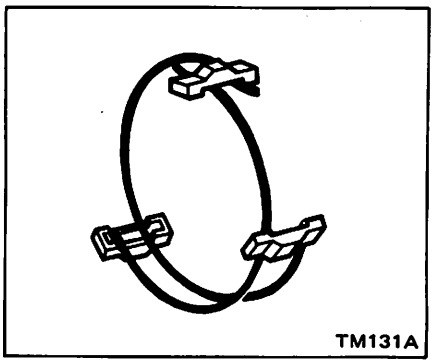
Turn hub and sleeve by hand to be sure they operate smoothly and correctly.

2. Fit shifting inserts in the three (3) grooves in synchronizer hub.
3. Insert protrusion of spread spring into groove so that insert is securely attached to inner side of coupling sleeve.

Install the other spread spring on the opposite side of synchronizer hub.


TM077

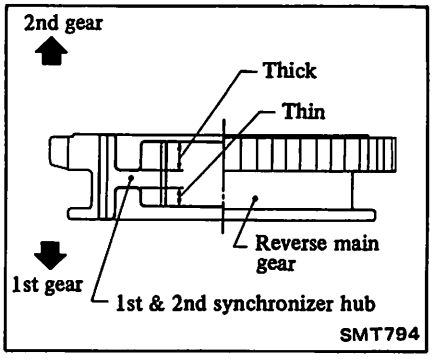
Be careful not to hook front and rear ends of spread spring to the same insert.


TM131A

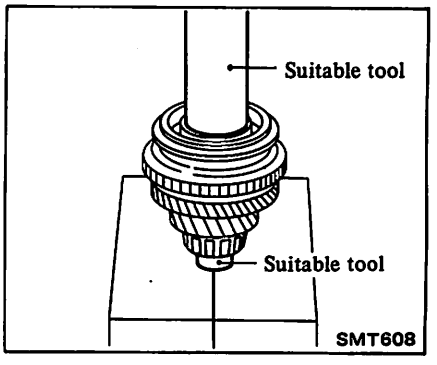
Main gears and mainshaft

1. **Apply gear oil to 1st needle bearing,** then assemble needle bearing, 1st gear, 1st gear baulk ring, 1st & 2nd synchronizer assembly and 2nd gear baulk ring.

Assemble 1st & 2nd synchronizer assembly, paying attention to its assembling direction.



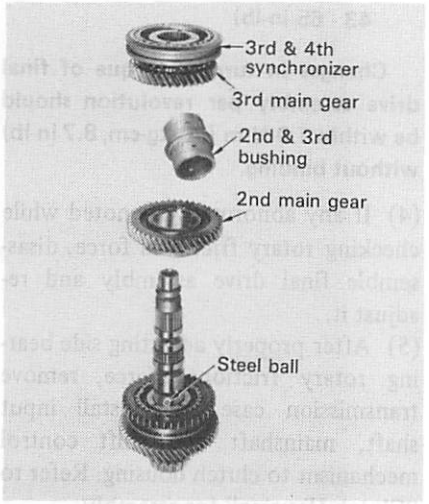
SMT794

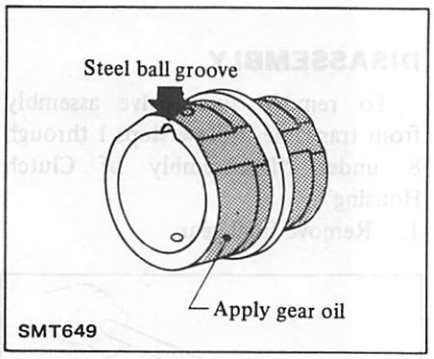


SMT608

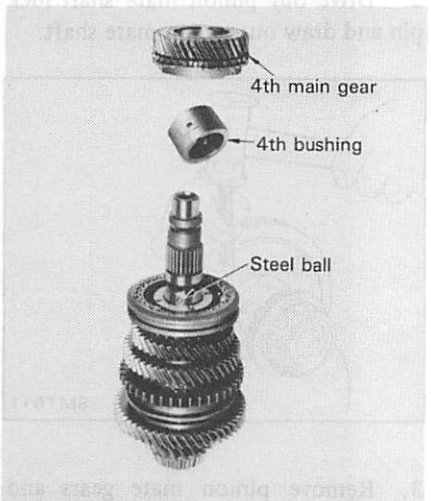
2. **Apply gear oil to 2nd & 3rd bushing outer surface,** then install steel ball, 2nd gear, 2nd & 3rd bushing, 3rd gear, and 3rd & 4th synchronizer assembly. 2nd & 3rd bushing has a groove in which steel ball fits. Slowly turn bushing to properly fit steel ball in its groove.

Before installing steel ball, apply grease to it.

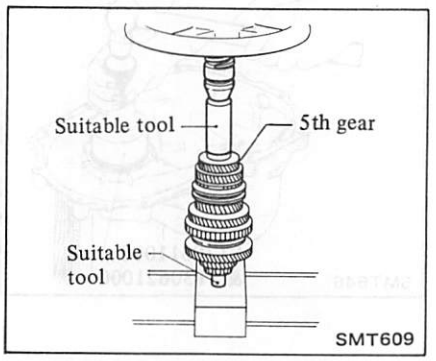




3. Apply grease to steel ball, then install it to mainshaft. **Apply gear oil to 4th bushing outer surface.** 4th bushing also has a groove in which steel ball fits. Ensure that steel ball fits properly in its groove when installing 4th bushing.

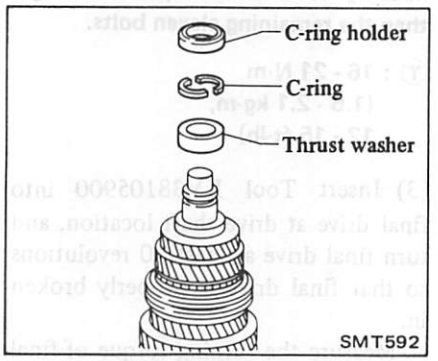


4. Install 5th gear.



5. Install thrust washer. Select C-ring that will minimize clearance of groove in mainshaft, then install C-ring and C-ring holder.

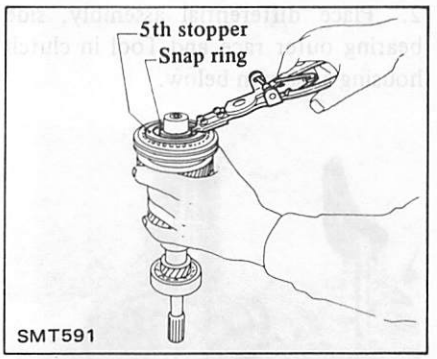
Allowable clearance of groove:
0 - 0.1 mm
(0 - 0.004 in)
C-ring:
Refer to S.D.S.



6. Install mainshaft front and rear bearing inner race. Refer to "Replacement of Bearings".
7. **Measure gear end play.** Refer to "Gears and Shafts" for inspection.
8. Install mainshaft assembly, input shaft assembly, bearing retainer, control bracket, shift forks, fork rod and transmission case. Refer to "Clutch Housing" for assembly.

Input gears and input shaft

1. Install 5th gear and 5th synchronizer.
2. Install 5th stopper on 5th synchronizer and secure it with snap ring of proper thickness that will minimize clearance of groove in input shaft.



Allowable clearance of groove:
0 - 0.1 mm
(0 - 0.004 in)
Input shaft gear snap ring:
Refer to S.D.S.

3. Measure 5th input gear end play. Refer to "Gears and Shafts" for inspection.
4. Install input shaft front bearing. Refer to "Replacement of Bearings".
5. Install input shaft assembly, mainshaft assembly, bearing retainer, control bracket, shift forks, fork rod and transmission case. Refer to "Clutch Housing" for assembly.

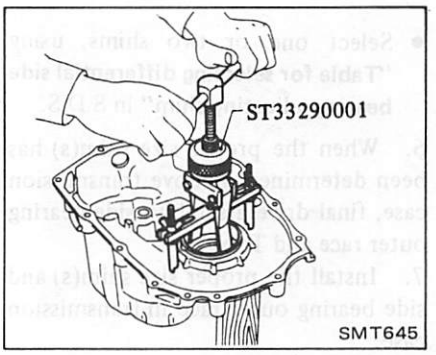
Reverse idler gear

Follow steps 5 through 12 described under "Assembly of Clutch Housing" to assemble reverse idler gear.

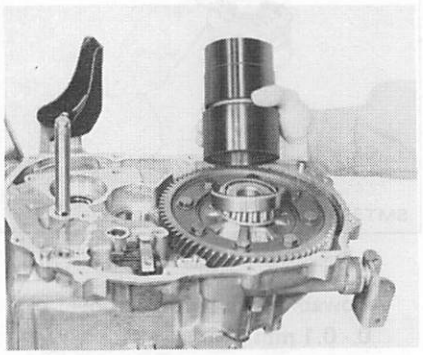
FINAL DRIVE

ADJUSTMENT

1. Remove side bearing outer race from transmission case.



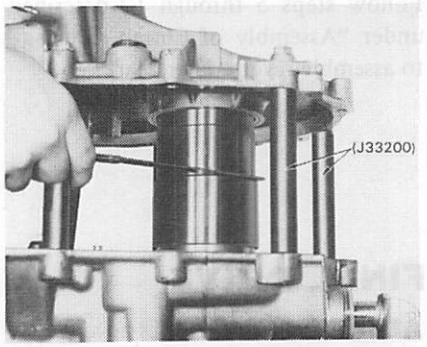
2. Place differential assembly, side bearing outer race and Tool in clutch housing as shown below.



3. Position four spacers evenly spaced apart around clutch housing and install transmission case. Then tighten the bolts alternately to the specified torque.

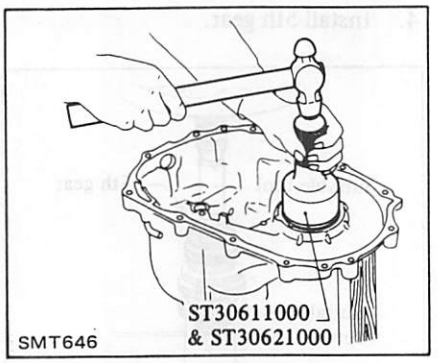
Ⓣ: 16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

4. Rotate final drive assembly a few times to ensure proper seating.
5. To find the correct shim size, use the method described below.
- Using a feeler gauge, measure the widest gap around Tool.



- Select one or two shims, using **"Table for selecting differential side bearing adjusting shim"** in S.D.S.

6. When the proper size shim(s) has been determined, remove transmission case, final drive assembly, side bearing outer race and Tools.
7. Install the proper size shim(s) and side bearing outer race in transmission case.



8. Check preload to determine if final drive assembly turns smoothly without binding.
To do this, proceed as follows:
(1) Install final drive assembly on clutch housing.
(2) Assemble transmission case on clutch housing.

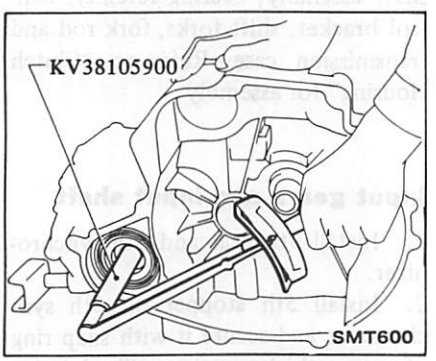
A total of twelve bolts are used to secure transmission case and clutch housing. Note that only one is longer than the remaining eleven bolts.

Ⓣ : 16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

(3) Insert Tool KV38105900 into final drive at drive shaft location, and turn final drive at least 10 revolutions so that final drive is properly broken in.

Measure the turning torque of final drive assembly to determine if it is within specified range.

This check should be performed only when using a new bearing. When reusing a bearing, the turning torque will decrease depending on distance driven.



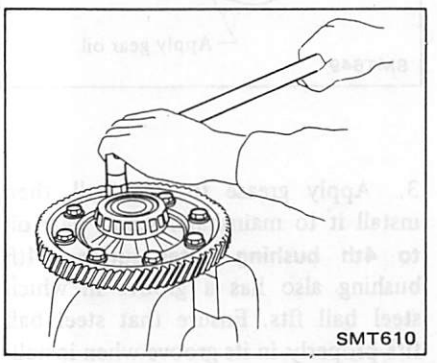
Rotary frictional force:
4.9 - 7.4 N·m
(50 - 75 kg-cm,
43 - 65 in-lb)

Changes in turning torque of final drive assembly per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.

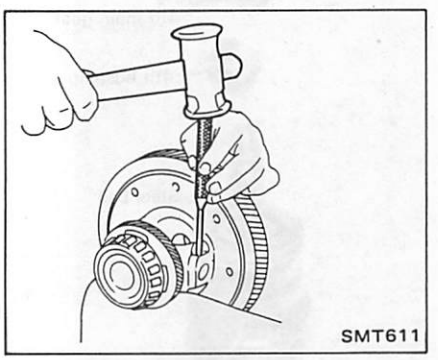
(4) If any abnormality is noted while checking rotary frictional force, disassemble final drive assembly and readjust it.
(5) After properly adjusting side bearing rotary frictional force, remove transmission case and install input shaft, mainshaft and shift control mechanism to clutch housing. Refer to "Clutch Housing" for assembly.

DISASSEMBLY

To remove final drive assembly from transaxle, follow steps 1 through 8 under "Disassembly of Clutch Housing".
1. Remove final gear.



2. Drive out pinion mate shaft lock pin and draw out pinion mate shaft.

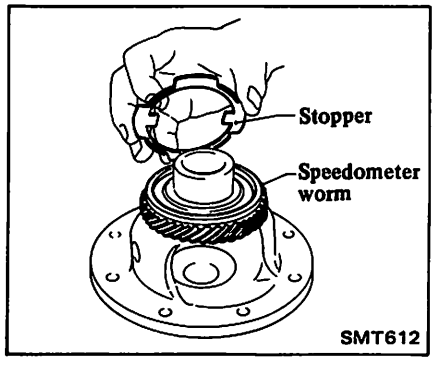


3. Remove pinion mate gears and side gears.

4. Drive out differential side bearing inner races. Refer to "Replacement of Bearings".

Be careful not to confuse the right- and left-hand bearings.

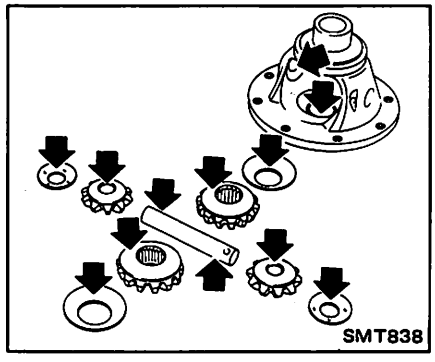
5. Remove speedometer worm and stopper.



INSPECTION

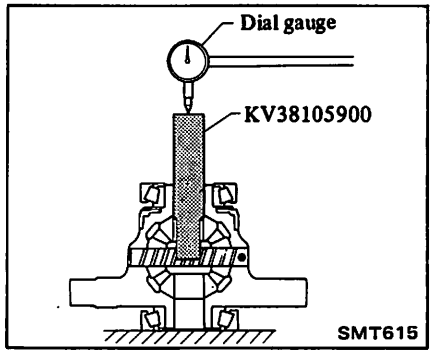
1. Thoroughly clean all disassembled parts, and check mating surfaces of differential case, side gears and pinion mate gears.

Replace as required.

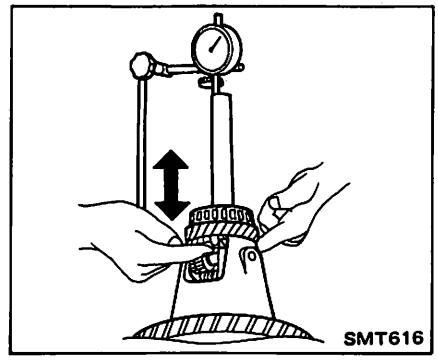


2. Check clearance between side gear and pinion mate gear following the procedure below.

(1) Set Tool and dial gauge on side gear.



(2) Move side gear up and down to measure dial gauge deflection. Always measure gauge deflection on both side gears.



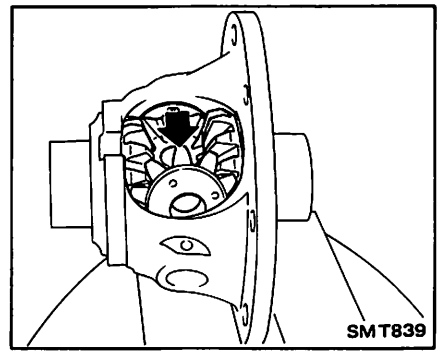
Side gear to pinion mate clearance:
0 - 0.3 mm (0 - 0.012 in)

(3) If clearance exceeds the specified value, check for wear and replace necessary parts.

3. Check tapered roller bearings for wear, scratches, pitching or flaking.

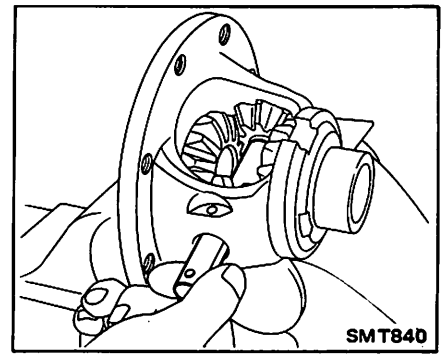
ASSEMBLY

1. Fit side gear thrust washers and side gears, then install pinion mate washers and pinion mate gears in place.



2. Insert pinion mate shaft.

When inserting, be careful not to damage pinion mate washers.



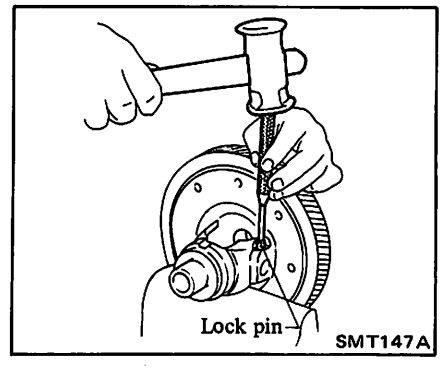
3. Measure clearance between side gear and pinion mate gear, referring to "Inspection". If necessary, adjust.

Side gear to pinion mate clearance:
0 - 0.3 mm
(0 - 0.012 in)

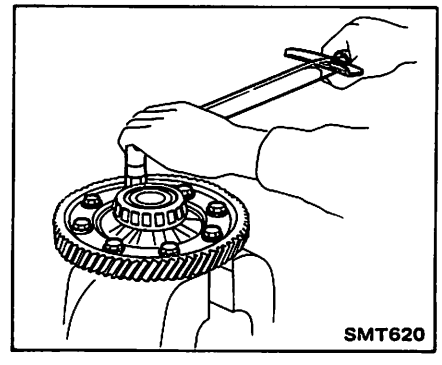
Side gear thrust washer:
Refer to S.D.S.

4. Install pinion mate shaft lock pin using a punch.

Make sure that lock pin is flush with case.



5. Install speedometer worm and stopper.
6. Press on differential side bearing inner races. Refer to "Replacement of Bearings".
7. Apply locking sealer to final gear bolts, then install final gear.



Ⓣ : 74 - 88 N·m
(7.5 - 9.0 kg-m,
54 - 65 ft-lb)

8. Assemble transaxle. Follow steps 5 through 12 under "Assembly of Clutch Housing".

REPLACEMENT OF OIL SEALS

DIFFERENTIAL SIDE OIL SEAL

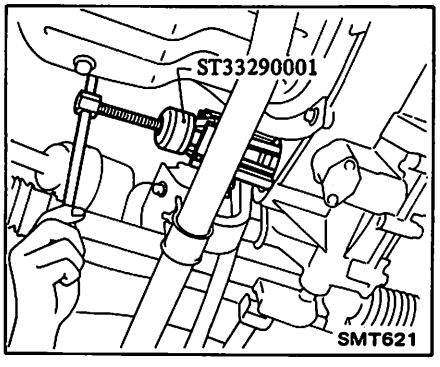
Differential side oil seals can be replaced without removing transaxle unit.

Replace oil seal as follows:

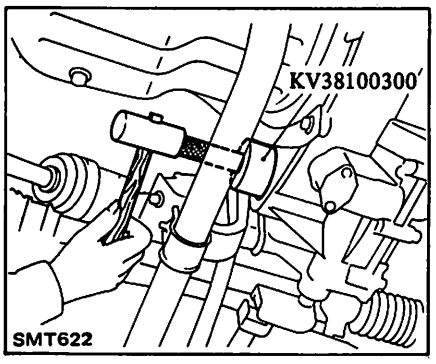
1. Drain oil.
2. Remove drive shaft.

Refer to "Drive Shaft (Section FA)" for removal.

3. Pull out oil seal.



4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.



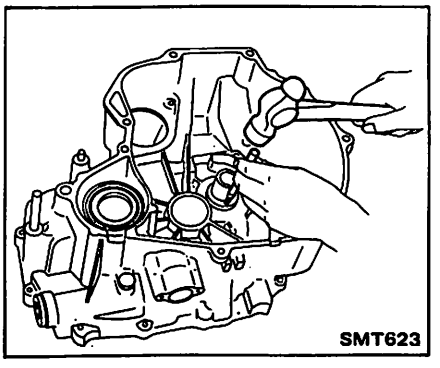
5. Lubricate seal lip with multi-purpose grease, then install drive shafts. Refer to "Drive Shaft (Section FA)" for installation.
6. Refill oil.

INPUT SHAFT OIL SEAL

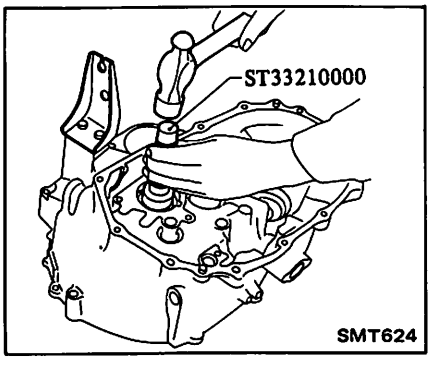
It is necessary to remove transaxle unit from vehicle.

Replace oil seal as follows:

1. Remove transaxle. Refer to "Removal".
2. Remove input shaft assembly from transaxle. Follow steps 1 through 7 under "Disassembly of Clutch Housing" for removal of required parts prior to removal of input shaft.
3. Remove oil seal.



4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.



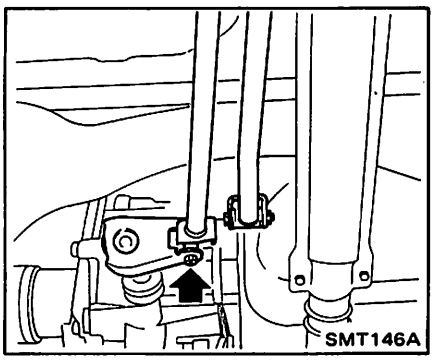
5. Lubricate seal lip with multi-purpose grease.
6. Assemble transaxle. Follow steps 5 through 12 under "Assembly of Clutch Housing".

SHIFT CONTROL OIL SEAL

It can be replaced without removing transaxle unit.

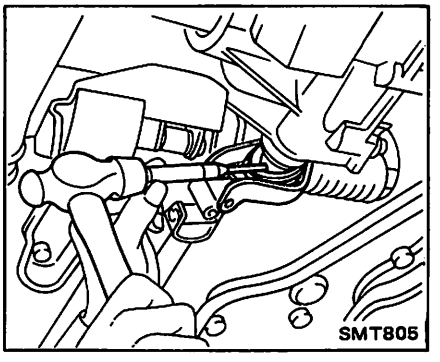
Replace oil seal as follows.

1. Separate control rod from transaxle.

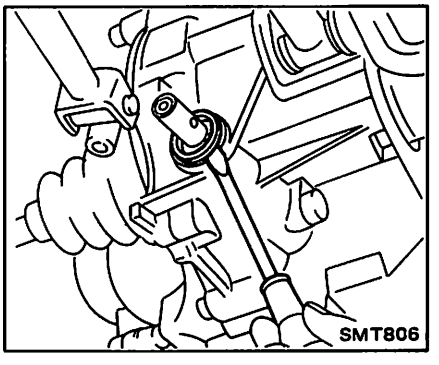


2. Remove yoke.

Be careful not to damage boot.



3. Remove oil seal.



4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place using suitable tool.
5. Install yoke.
6. Connect control rod to transaxle.

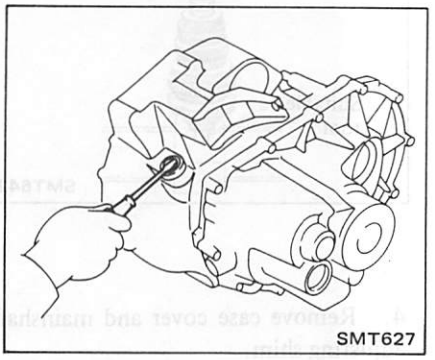
CLUTCH CONTROL SHAFT OIL SEAL

It is necessary to remove transaxle unit from vehicle.

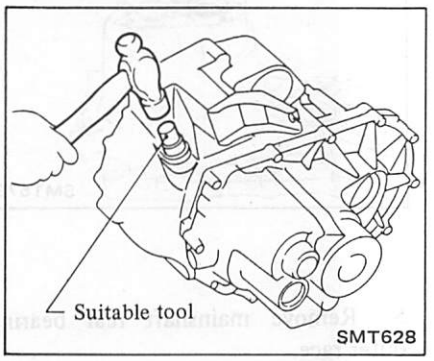
Replace oil seal as follows:

1. Remove transaxle. Refer to "Removal".

2. Draw out clutch control shaft. Refer to "Release Bearing (Section CL)" for disassembly.
3. Remove oil seal.



4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.



5. Lubricate seal lip with multi-purpose grease.
6. Install clutch control shaft.
   Refer to "Release Bearing (Section CL)" for assembly.
7. Install transaxle. Refer to "Installation".

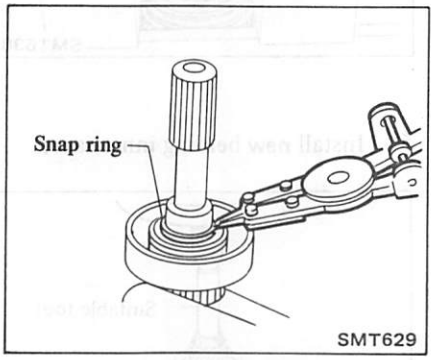
REPLACEMENT OF BEARINGS

CAUTION:
When replacing tapered roller bearing, replace inner and outer bearings at the same time to prevent mixed use of bearings of different brands.

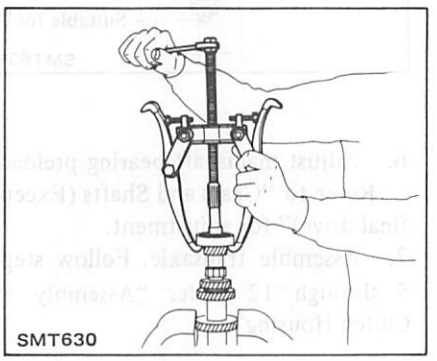
INPUT SHAFT FRONT BEARING

1. Remove input shaft assembly from transaxle. Before removing it, follow steps 1 through 7 under "Disassembly of Clutch Housing" so that input shaft can then be removed.
2. Remove snap ring from front bearing, and withdraw input gear spacer.

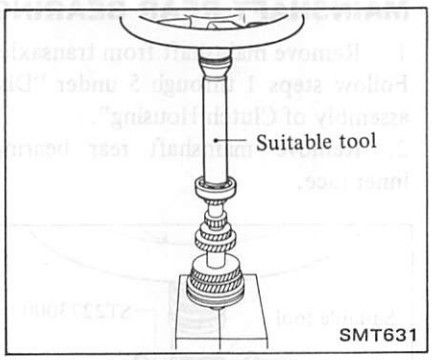
Snap ring must not be reused.



3. Pull out input shaft front bearing.



4. Press fit new ball bearing.



5. Install input gear spacer on front bearing and secure it with snap ring of proper thickness that will minimize clearance of groove in input shaft.

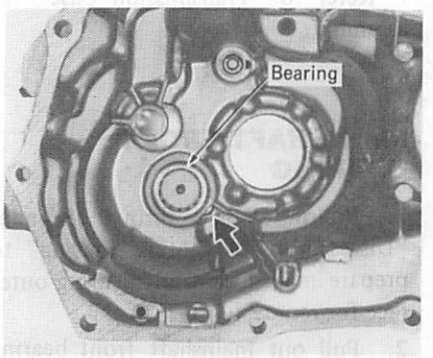
Allowable clearance of groove:
0 - 0.1 mm
(0 - 0.004 in)

Input shaft front snap ring:
Refer to S.D.S.

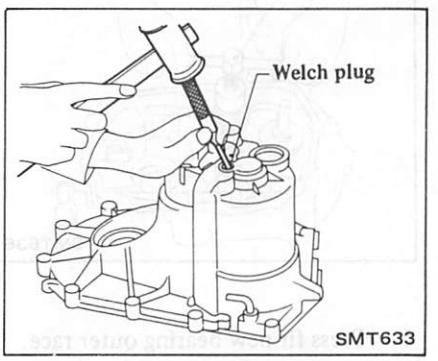
6. Assemble transaxle. Follow steps 5 through 12 under "Assembly of Clutch Housing".

INPUT SHAFT REAR BEARING

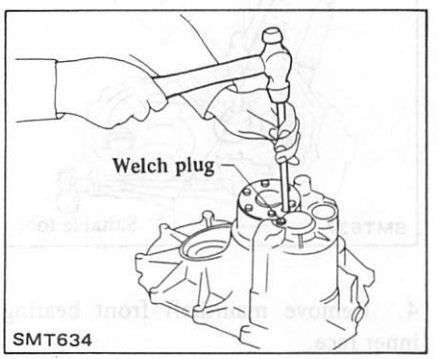
1. Remove transmission case.
   Refer to "Transmission Case" for disassembly.
2. Remove welch plug from transmission case using a punch.



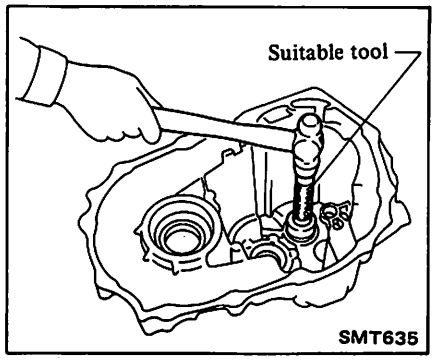
3. Using a punch, drive input shaft rear bearing out of hole from which welch plug was removed.



4. **Apply sealant to welch plug** and punch it on transmission case.



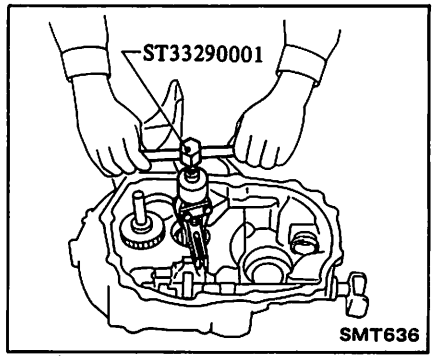
5. Press fit new bearing.



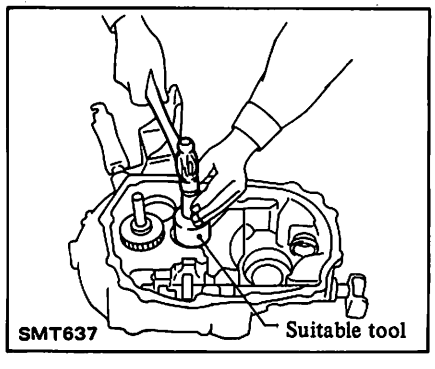
6. Install transmission case.
Refer to "Transmission Case" for assembly.

MAINSHAFT FRONT BEARING

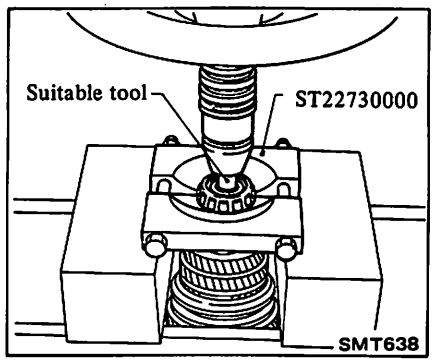
1. Follow steps 1 through 8 under "Disassembly of Clutch Housing" to prepare mainshaft front bearing outer race for removal.
2. Pull out mainshaft front bearing outer race.



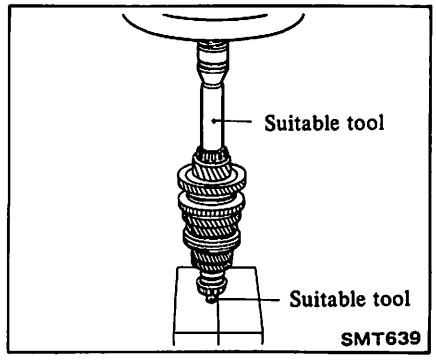
3. Press fit new bearing outer race.



4. Remove mainshaft front bearing inner race.



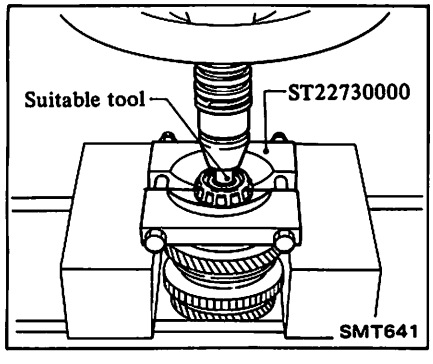
5. Install new bearing inner race.



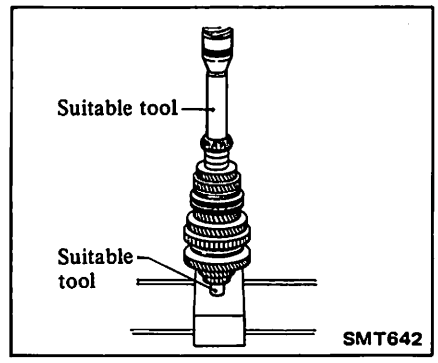
6. Adjust mainshaft bearing preload.
Refer to "Gears and Shafts (Except final drive)" for adjustment.
7. Assemble transaxle. Follow steps 5 through 12 under "Assembly of Clutch Housing".

MAINSHAFT REAR BEARING

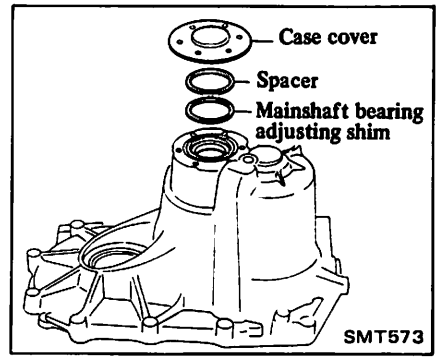
1. Remove mainshaft from transaxle. Follow steps 1 through 5 under "Disassembly of Clutch Housing".
2. Remove mainshaft rear bearing inner race.



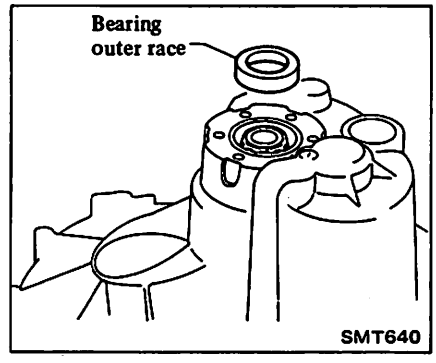
3. Install new bearing inner race.



4. Remove case cover and mainshaft adjusting shim.



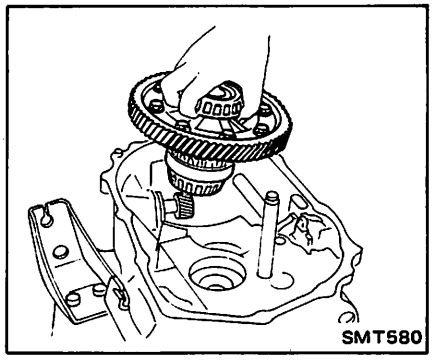
5. Remove mainshaft rear bearing outer race.



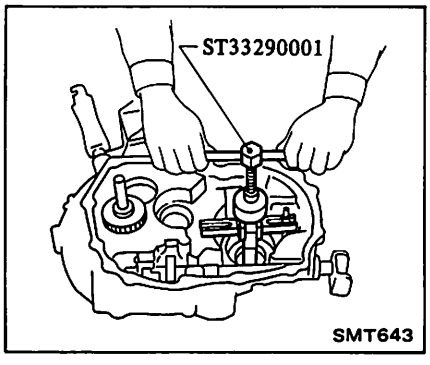
6. Install new bearing outer race and spacer.
7. Adjust mainshaft bearing preload. Refer to "Gears and Shafts (Except final drive)" for adjustment.
8. Install case cover.
Refer to "Transmission Case" for assembly.
9. Assemble transaxle. Follow steps 5 through 12 under "Assembly of Clutch Housing".

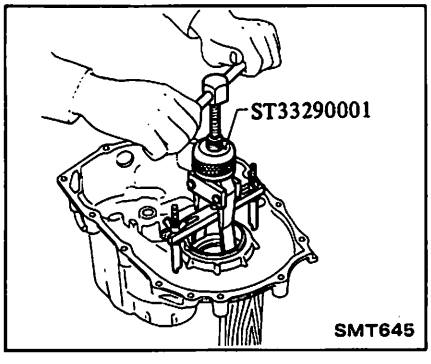
DIFFERENTIAL SIDE BEARING

1. Follow steps 1 through 8 under "Disassembly of Clutch Housing" to prepare bearing outer race for removal.
2. Remove differential case assembly.

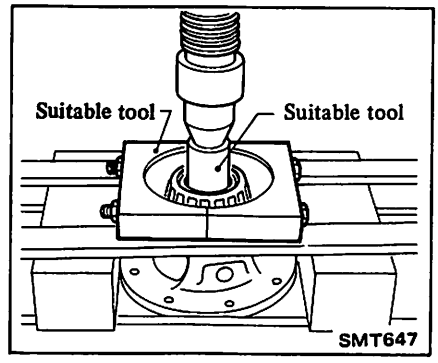


3. Pull out differential side bearing outer race.

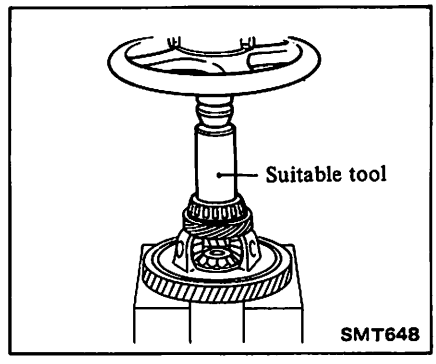




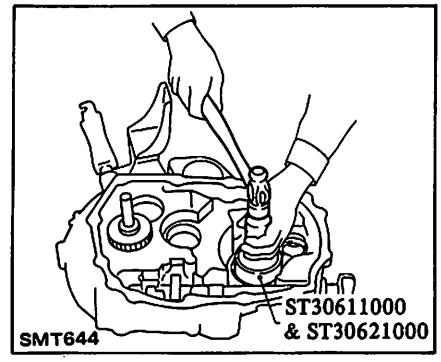
4. Remove differential side bearing inner race.

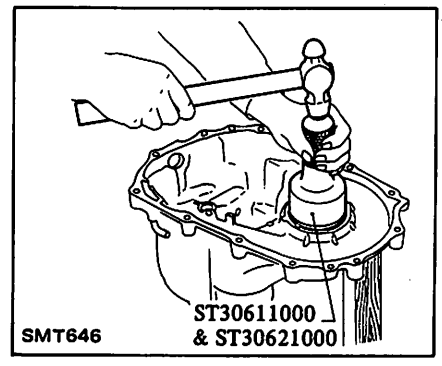


5. Install **new** bearing inner race.



6. Press fit **new** bearing outer race.



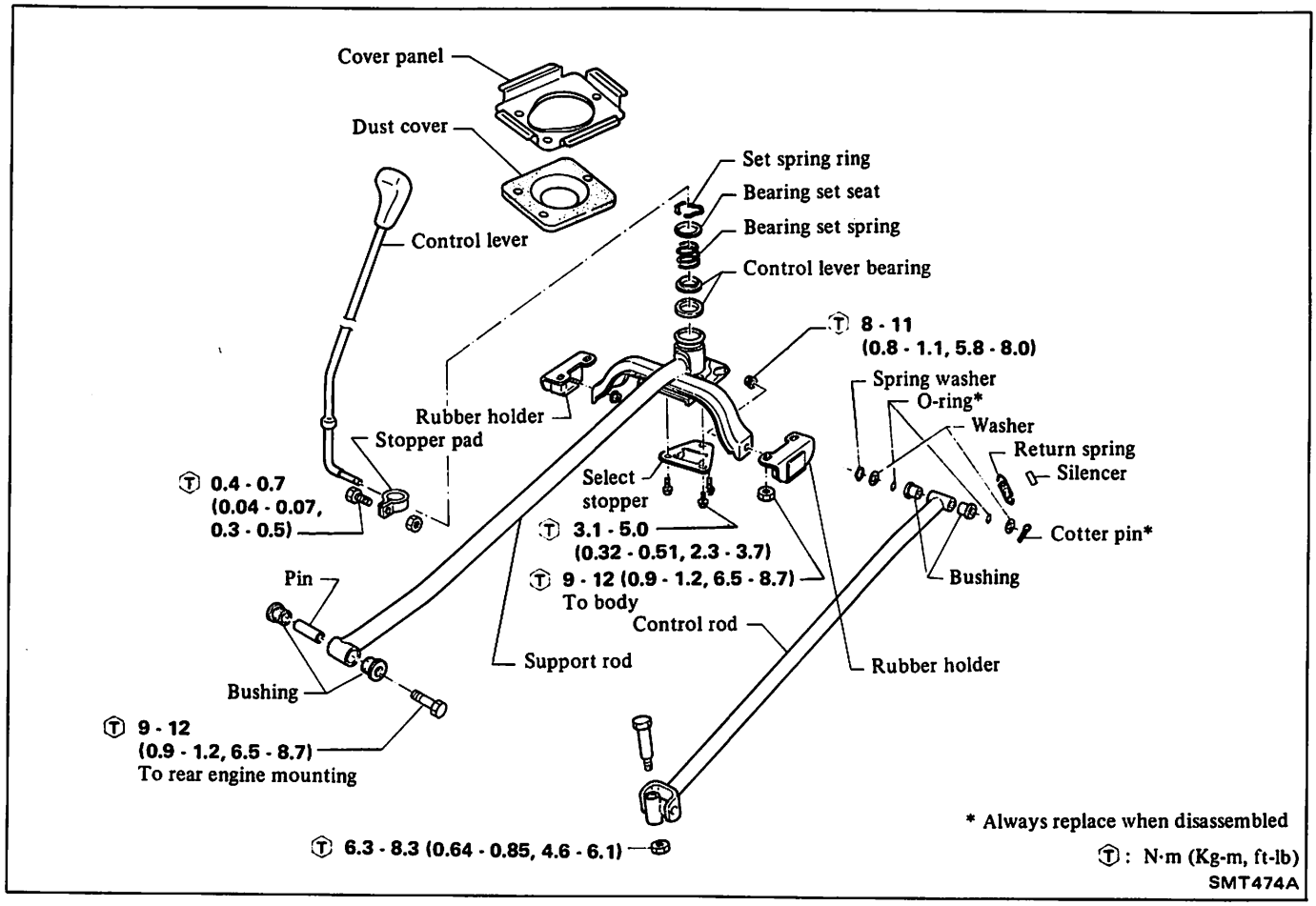


7. Install differential case assembly.
8. Adjust differential side bearing preload.

   Refer to "Final Drive" for adjustment.
9. Install transmission case.

   Refer to "Transmission Case" for assembly.

TRANSMISSION GEAR CONTROL

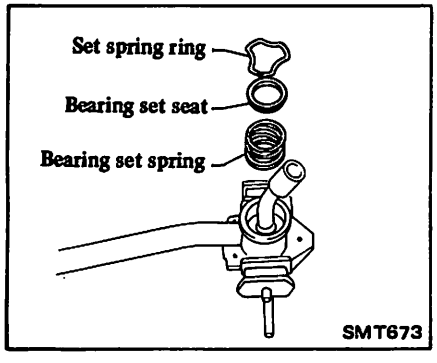


DISASSEMBLY

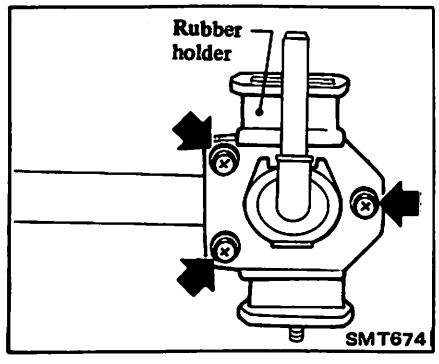
1. Remove control rod.

Cotter pin must not be reused.

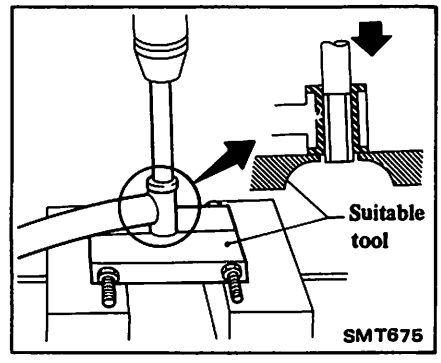
2. Remove control lever bracket, set spring ring, bearing set seat and bearing set spring.



3. Remove rubber holder, dust cover and control lever bearing.



4. Draw out rubber bushing from control rod and support rod if necessary.

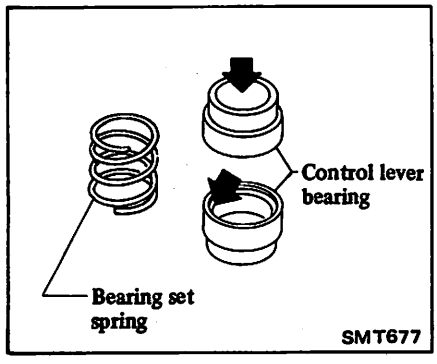


INSPECTION

Check for wear, cracks or other damage on sliding contact surfaces of parts. If any of the above conditions is apparent, replace faulty part.

- Check bushings and rubbers for deformation or cracks, and replace with a new one if necessary.

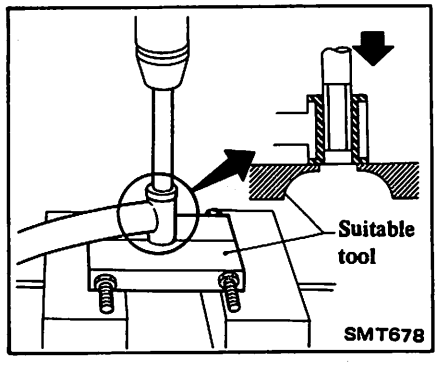
- Check bearing set spring, set spring ring and control lever bearing for deformation, cracks, wear or other damage, and replace with a new one if necessary.



ASSEMBLY

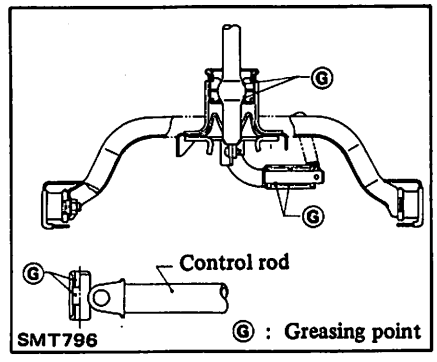
Assemble transmission gear control in the reverse order of disassembly, noting the following points.

- When installing rubber bushing to control rod and support rod, be sure to install in its proper place.

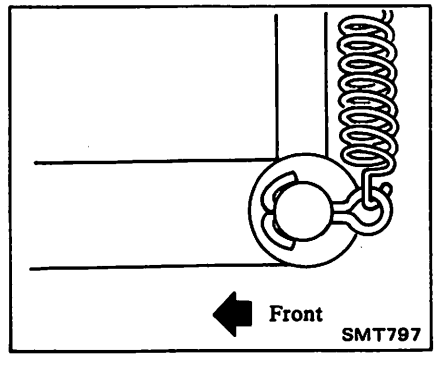


Ⓣ : Rubber holder nut
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)

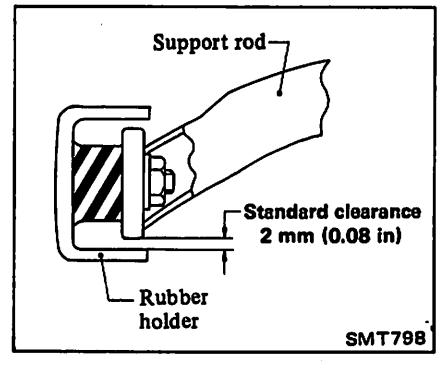
- **When assembling transaxle gear control, apply grease to the following positions.**



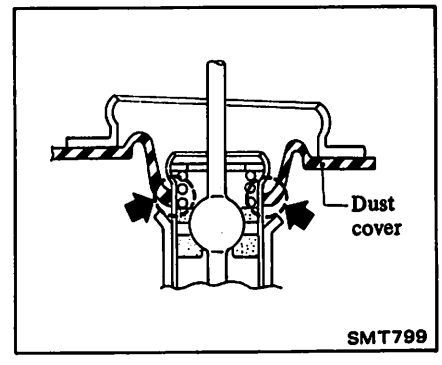
- **When installing cotter pin, pay attention to its direction and bend it securely.**



- **Adjust standard clearance with support rod exerting no weight.**



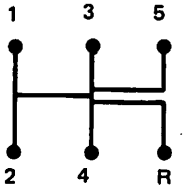
- **Install dust cover securely.**



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

TRANSAXLE

Engine			E16
Transaxle model			RS5F30A
No. of speeds			5
Synchromesh type			Warner
Shift pattern			
Gear ratio		1st	3.063
		2nd	1.826
		3rd	1.207
		4th	0.902
		5th	0.733
		Rev.	3.417
Number of teeth	Input gear	1st	16
		2nd	23
		3rd	29
		4th	41
		5th	45
		Rev.	12
	Main gear	1st	49
		2nd	42
		3rd	35
		4th	37
		5th	33
		Rev.	41
	Reverse idler gear		30
Speedometer gear ratio (Worm/pinion)			41/36
Oil capacity liters (US pt, Imp pt)			2.7 (5-3/4, 4-3/4)

FINAL GEAR

Transaxle model		RS5F30A
Final gear ratio		3.895
Number of teeth	Final gear/Pinion gear	74/19
	Side gear/Pinion mate gear	14/10

INSPECTION AND ADJUSTMENT

GEAR END PLAY

Unit: mm (in)

Main 1st gear	0.18 - 0.31 (0.0071 - 0.0122)
Main 2nd - 4th gear	0.20 - 0.40 (0.0079 - 0.0157)
Input 5th gear	0.18 - 0.41 (0.0071 - 0.0161)

CLEARANCE BETWEEN BAULK RING AND GEAR

Unit: mm (in)

Standard	1.0 - 1.35 (0.039 - 0.0531)
Wear limit	0.7 (0.028)

MAINSHAFT C-RING

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
32348 M8800	3.63 (0.1429)	32348 M8807	4.12 (0.1622)
M8801	3.70 (0.1457)	M8808	4.19 (0.1650)
M8802	3.77 (0.1484)	M8809	4.26 (0.1677)
M8803	3.84 (0.1512)	M8810	4.33 (0.1705)
M8804	3.91 (0.1539)	M8811	4.40 (0.1732)
M8805	3.98 (0.1567)	M8812	4.47 (0.1760)
M8806	4.05 (0.1594)	M8813	4.54 (0.1787)

AVAILABLE SNAP RING

Input shaft front bearing snap ring

Unit: mm (in)

Part No.	Thickness
32204 M8004	1.27 (0.0500)
M8005	1.33 (0.0524)
M8006	1.39 (0.0547)
M8007	1.45 (0.0571)

Input shaft 5th synchronizer snap ring

Unit: mm (in)

Part No.	Thickness
32311 M8812	2.00 (0.0787)
M8813	2.05 (0.0807)
M8814	2.10 (0.0827)
M8815	2.15 (0.0846)
M8816	2.20 (0.0866)
M8817	2.25 (0.0886)
M8818	2.30 (0.0906)

REVERSE CHECK TURNING TORQUE (At striking rod)

10.3 - 12.7 N·m (105 - 130 kg-cm, 91 - 113 in-lb)

REVERSE CHECK PLUG

Unit: mm (in)

Part No.	Length
32188 M8001*	8.3 (0.327)
32188 M8002	7.1 (0.280)
32188 M8003	7.7 (0.303)
32188 M8004	8.9 (0.350)

*Standard check plug

CLEARANCE BETWEEN SIDE GEAR AND PINION MATE GEAR

0 - 0.3 mm (0 - 0.012 in)

Side gear thrust washer

Unit: mm (in)

Part number	Thickness
38424 01M00	0.76 - 0.81 (0.0299 - 0.0319)
01M01	0.81 - 0.86 (0.0319 - 0.0339)
01M02	0.86 - 0.91 (0.0339 - 0.0358)
01M03	0.91 - 0.96 (0.0358 - 0.0378)

ROTARY FRICTIONAL FORCE

Unit: N·m (kg-cm, in-lb)

Final drive only	4.9 - 7.4 (50 - 75, 43 - 65)
Total	7.4 - 10.8 (75 - 110, 65 - 95)

AVAILABLE SHIM

Mainshaft bearing adjusting shim

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
32137 M8000	0.10 (0.0039)	32137 M8010	0.60 (0.0236)
M8001	0.15 (0.0059)	M8011	0.65 (0.0256)
M8002	0.20 (0.0079)	M8012	0.70 (0.0276)
M8003	0.25 (0.0098)	M8013	0.75 (0.0295)
M8004	0.30 (0.0118)	M8014	0.80 (0.0315)
M8005	0.35 (0.0138)	M8015	0.85 (0.0335)
M8006	0.40 (0.0157)	M8016	0.90 (0.0354)
M8007	0.45 (0.0177)	M8017	0.95 (0.0374)
M8008	0.50 (0.0197)	M8018	1.00 (0.0394)
M8009	0.55 (0.0217)		

Table for selecting mainshaft bearing adjusting shim

Unit: mm (in)

Measured distance	Suitable shim thickness
2.35 - 2.40 (0.0925 - 0.0945)	0.10 (0.0039)
2.40 - 2.45 (0.0945 - 0.0965)	0.15 (0.0059)
2.45 - 2.50 (0.0965 - 0.0984)	0.20 (0.0079)
2.50 - 2.55 (0.0984 - 0.1004)	0.25 (0.0098)
2.55 - 2.60 (0.1004 - 0.1024)	0.30 (0.0118)
2.60 - 2.65 (0.1024 - 0.1043)	0.35 (0.0138)
2.65 - 2.70 (0.1043 - 0.1063)	0.40 (0.0157)
2.70 - 2.75 (0.1063 - 0.1083)	0.45 (0.0177)
2.75 - 2.80 (0.1083 - 0.1102)	0.50 (0.0197)
2.80 - 2.85 (0.1102 - 0.1122)	0.55 (0.0217)
2.85 - 2.90 (0.1122 - 0.1142)	0.60 (0.0236)
2.90 - 2.95 (0.1142 - 0.1161)	0.65 (0.0256)
2.95 - 3.00 (0.1161 - 0.1181)	0.70 (0.0276)
3.00 - 3.05 (0.1181 - 0.1201)	0.75 (0.0295)
3.05 - 3.10 (0.1201 - 0.1220)	0.80 (0.0315)
3.10 - 3.15 (0.1220 - 0.1240)	0.85 (0.0335)
3.15 - 3.20 (0.1240 - 0.1260)	0.90 (0.0354)
3.20 - 3.25 (0.1260 - 0.1280)	0.95 (0.0374)
3.25 - 3.30 (0.1280 - 0.1299)	1.00 (0.0394)

Differential side bearing adjusting shim

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
38454 M8000	0.44 (0.0173)	38454 M8008	0.76 (0.0299)
M8001	0.48 (0.0189)	M8009	0.80 (0.0315)
M8003	0.56 (0.0220)	M8010	0.84 (0.0331)
M8004	0.60 (0.0236)	M8011	0.88 (0.0346)
M8005	0.64 (0.0252)		
M8006	0.68 (0.0268)		
M8007	0.72 (0.0283)		

Table for selecting differential side bearing adjusting shim

Unit: mm (in)

Measured clearance	Suitable shim thickness	Appropriate shim(s)
0.58 - 0.62 (0.0228 - 0.0244)	0.64 (0.0252)	0.64 (0.0252)
0.62 - 0.66 (0.0244 - 0.0260)	0.68 (0.0268)	0.68 (0.0268)
0.66 - 0.70 (0.0260 - 0.0276)	0.72 (0.0283)	0.72 (0.0283)
0.70 - 0.74 (0.0276 - 0.0291)	0.76 (0.0299)	0.76 (0.0299)
0.74 - 0.78 (0.0291 - 0.0307)	0.80 (0.0315)	0.80 (0.0315)
0.78 - 0.82 (0.0307 - 0.0323)	0.84 (0.0331)	0.84 (0.0331)
0.82 - 0.86 (0.0323 - 0.0339)	0.88 (0.0346)	0.88 (0.0346)
0.86 - 0.90 (0.0339 - 0.0354)	0.92 (0.0362)	0.44 (0.0173) + 0.48 (0.0189)
0.90 - 0.94 (0.0354 - 0.0370)	0.96 (0.0378)	0.48 (0.0189) + 0.48 (0.0189)
0.94 - 0.98 (0.0370 - 0.0386)	1.00 (0.0394)	0.44 (0.0173) + 0.56 (0.0220)
0.98 - 1.02 (0.0386 - 0.0402)	1.04 (0.0409)	0.44 (0.0173) + 0.60 (0.0236)
1.02 - 1.06 (0.0402 - 0.0417)	1.08 (0.0425)	0.44 (0.0173) + 0.64 (0.0252)
1.06 - 1.10 (0.0417 - 0.0433)	1.12 (0.0441)	0.44 (0.0173) + 0.68 (0.0268)
1.10 - 1.14 (0.0433 - 0.0449)	1.16 (0.0457)	0.44 (0.0173) + 0.72 (0.0283)
1.14 - 1.18 (0.0449 - 0.0465)	1.20 (0.0472)	0.44 (0.0173) + 0.76 (0.0299)
1.18 - 1.22 (0.0465 - 0.0480)	1.24 (0.0488)	0.44 (0.0173) + 0.80 (0.0315)
1.22 - 1.26 (0.0480 - 0.0496)	1.28 (0.0504)	0.44 (0.0173) + 0.84 (0.0331)
1.26 - 1.30 (0.0496 - 0.0512)	1.32 (0.0520)	0.44 (0.0173) + 0.88 (0.0346)
1.30 - 1.34 (0.0512 - 0.0528)	1.36 (0.0535)	0.88 (0.0346) + 0.48 (0.0189)
1.34 - 1.38 (0.0528 - 0.0543)	1.40 (0.0551)	0.68 (0.0268) + 0.72 (0.0283)
1.38 - 1.42 (0.0543 - 0.0559)	1.44 (0.0567)	0.88 (0.0346) + 0.56 (0.0220)
1.42 - 1.46 (0.0559 - 0.0575)	1.48 (0.0583)	0.88 (0.0346) + 0.60 (0.0236)
1.46 - 1.50 (0.0575 - 0.0591)	1.52 (0.0598)	0.88 (0.0346) + 0.64 (0.0252)
1.50 - 1.54 (0.0591 - 0.0606)	1.56 (0.0614)	0.88 (0.0346) + 0.68 (0.0268)
1.54 - 1.58 (0.0606 - 0.0622)	1.60 (0.0630)	0.88 (0.0346) + 0.72 (0.0283)
1.58 - 1.62 (0.0622 - 0.0638)	1.64 (0.0646)	0.88 (0.0346) + 0.76 (0.0299)
1.62 - 1.66 (0.0638 - 0.0654)	1.68 (0.0661)	0.88 (0.0346) + 0.80 (0.0315)
1.66 - 1.70 (0.0654 - 0.0669)	1.72 (0.0677)	0.88 (0.0346) + 0.84 (0.0331)
1.70 - 1.74 (0.0669 - 0.0685)	1.76 (0.0693)	0.88 (0.0346) + 0.88 (0.0346)

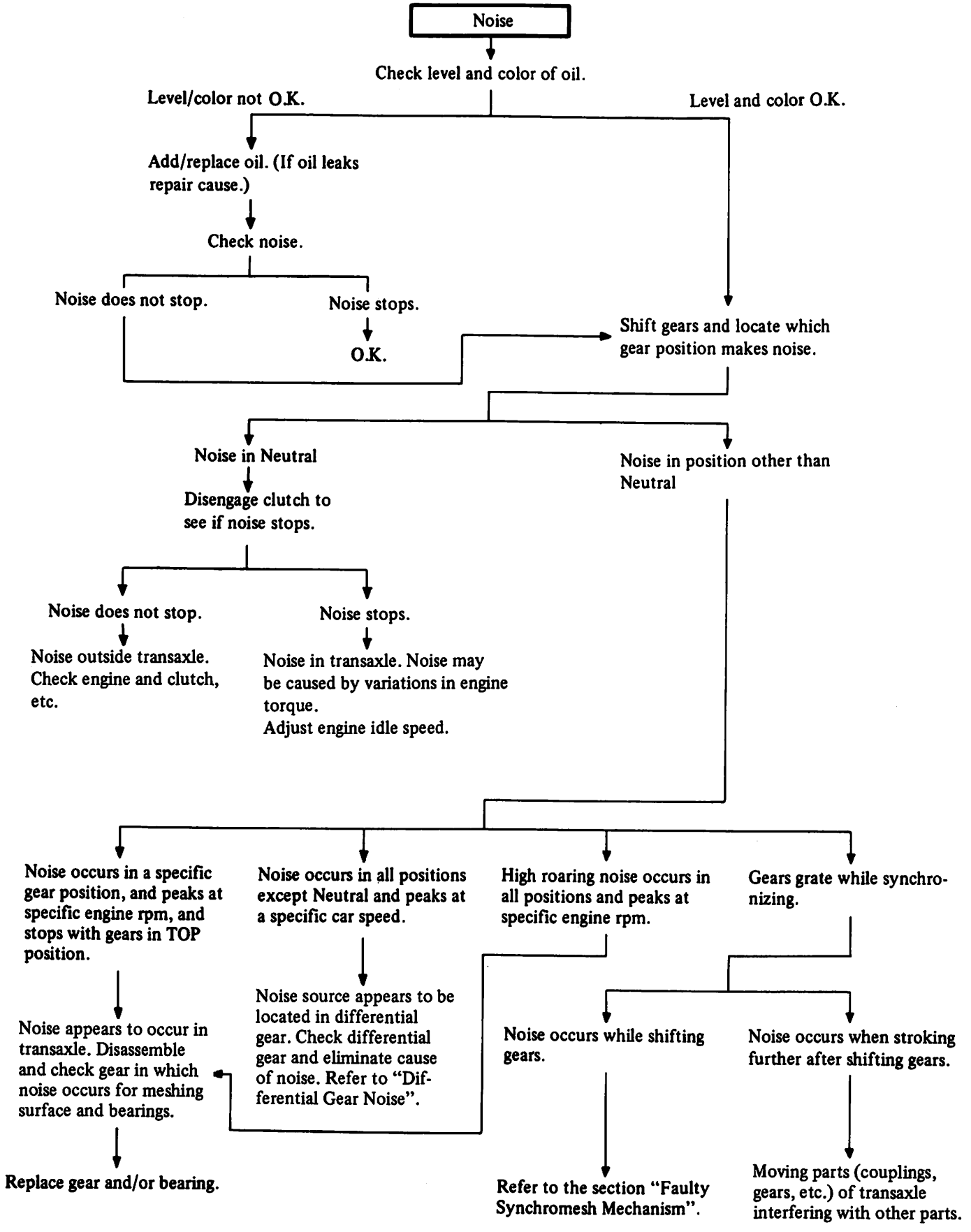
TIGHTENING TORQUE

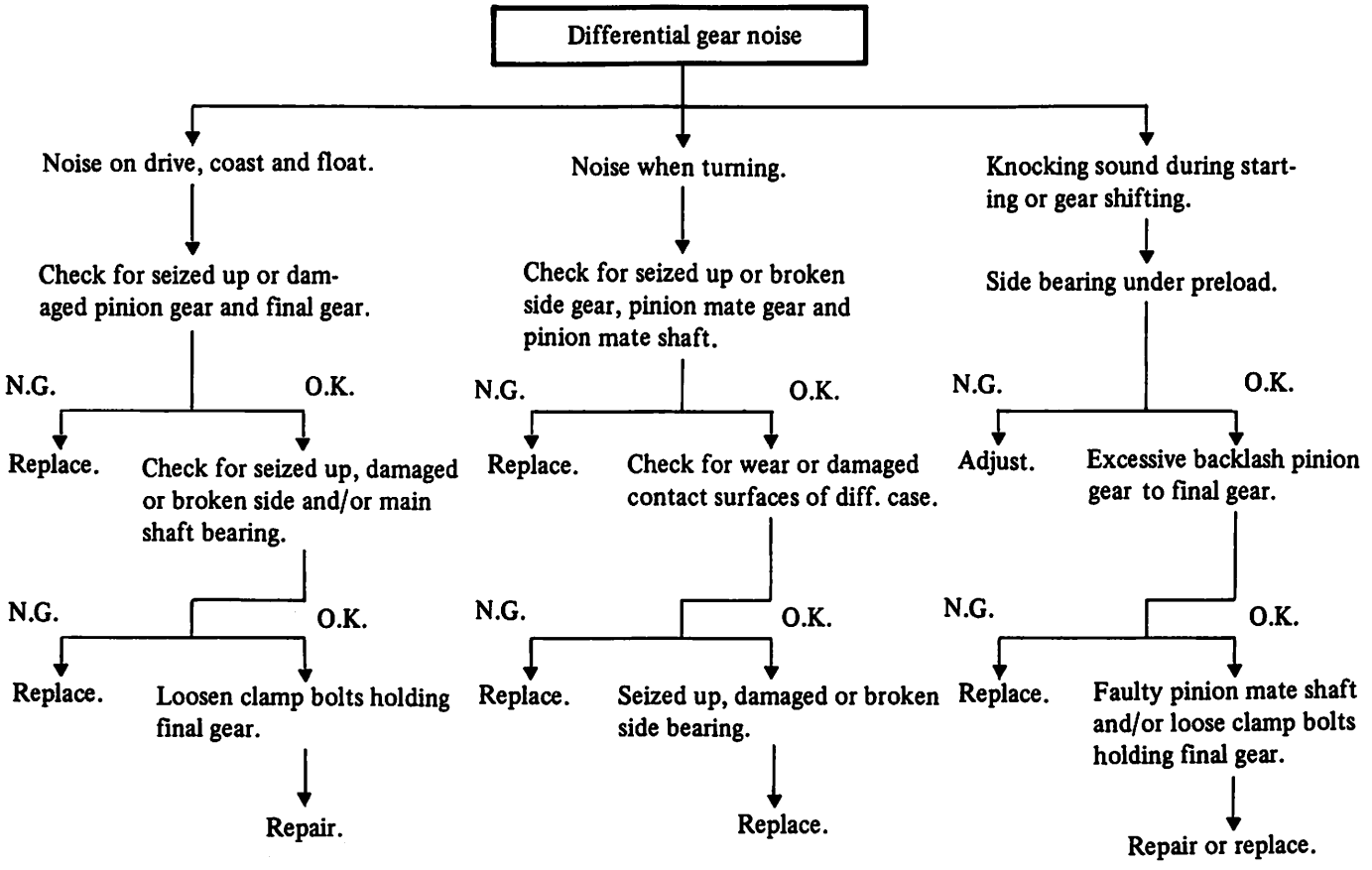
Item \ Unit	N·m	kg-m	ft-lb
Transaxle installation			
Clutch control cable lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Transaxle to engine	16 - 21	1.6 - 2.1	12 - 15
Engine gusset to transaxle	16 - 21	1.6 - 2.1	12 - 15
Front buffer rod bracket			
To engine	29 - 39	3 - 4	22 - 29
To transaxle	16 - 21	1.6 - 2.1	12 - 15
Left engine mounting to transaxle	29 - 39	3 - 4	22 - 29
Rear engine mounting			
To body	29 - 39	3 - 4	22 - 29
To transaxle *	16 - 21 29 - 39 34 - 39	1.6 - 2.1 3 - 4 3.5 - 4.0	12 - 15 22 - 29 25 - 29
Buffer rod	39 - 49	4 - 5	29 - 36
Speedometer pinion gear	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Transmission gear control			
Control rod to transaxle	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Support rod to transaxle	9 - 12	0.9 - 1.2	6.5 - 8.7
Select stopper bolt	3.1 - 5.0	0.32 - 0.51	2.3 - 3.7
Rubber holder to body	9 - 12	0.9 - 1.2	6.5 - 8.7
Rubber holder nut	9 - 12	0.9 - 1.2	6.5 - 8.7

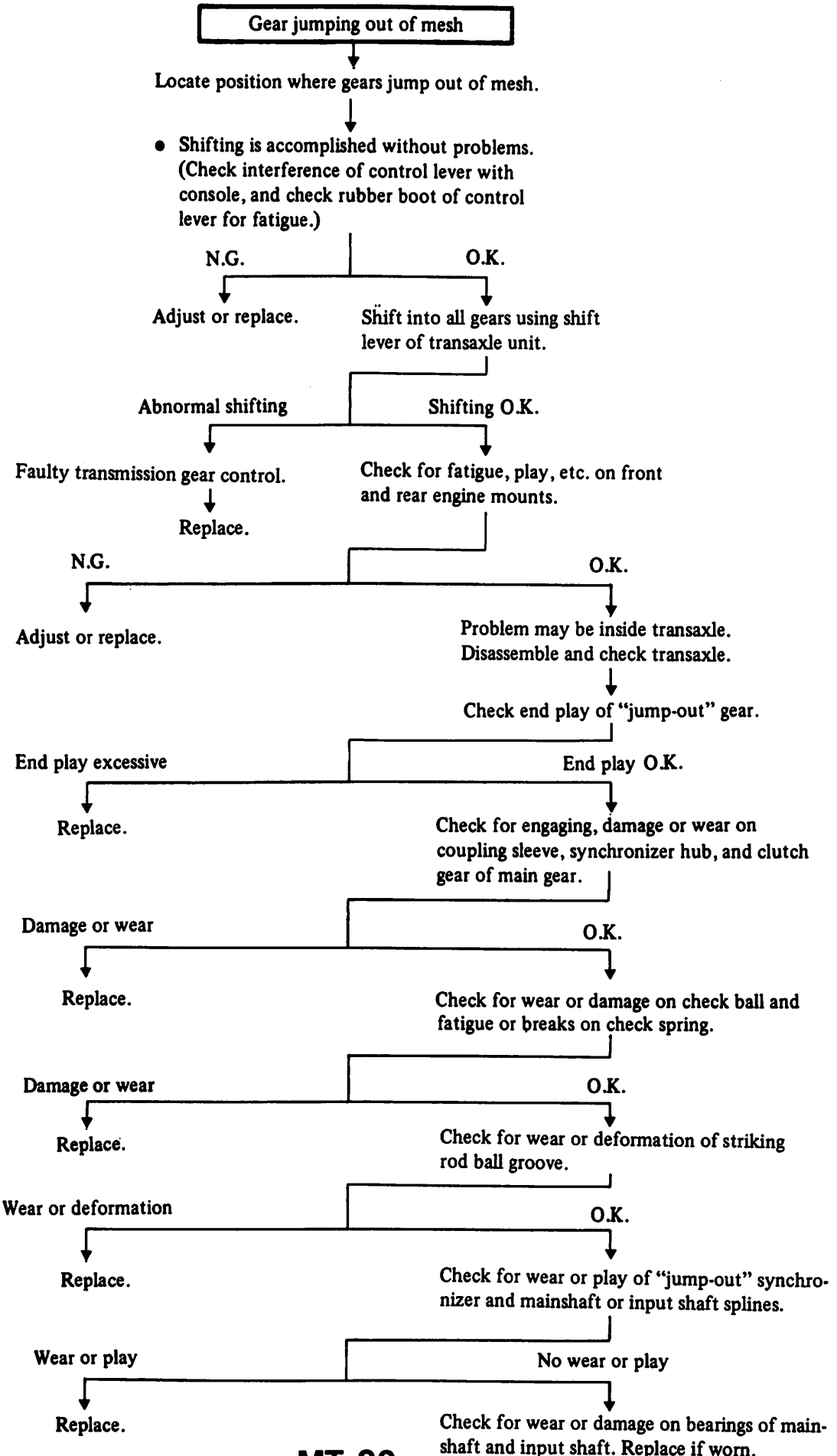
Item \ Unit	N·m	kg-m	ft-lb
Gear assembly			
Clutch housing to transmission case	16 - 21	1.6 - 2.1	12 - 15
Case cover to transmission case	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Bearing retainer to clutch housing	16 - 21	1.6 - 2.1	12 - 15
Control bracket to clutch housing	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
5th & Rev. check plug	19 - 25	1.9 - 2.5	14 - 18
5th & Rev. check assembly to clutch housing	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Final gear to differential case	74 - 88	7.5 - 9.0	54 - 65
Filler plug	25 - 34	2.5 - 3.5	18 - 25
Drain plug	25 - 34	2.5 - 3.5	18 - 25
Reverse lamp switch	20 - 29	2.0 - 3.0	14 - 22
Neutral switch	20 - 29	2.0 - 3.0	14 - 22
Switch plug	15 - 20	1.5 - 2.0	11 - 14

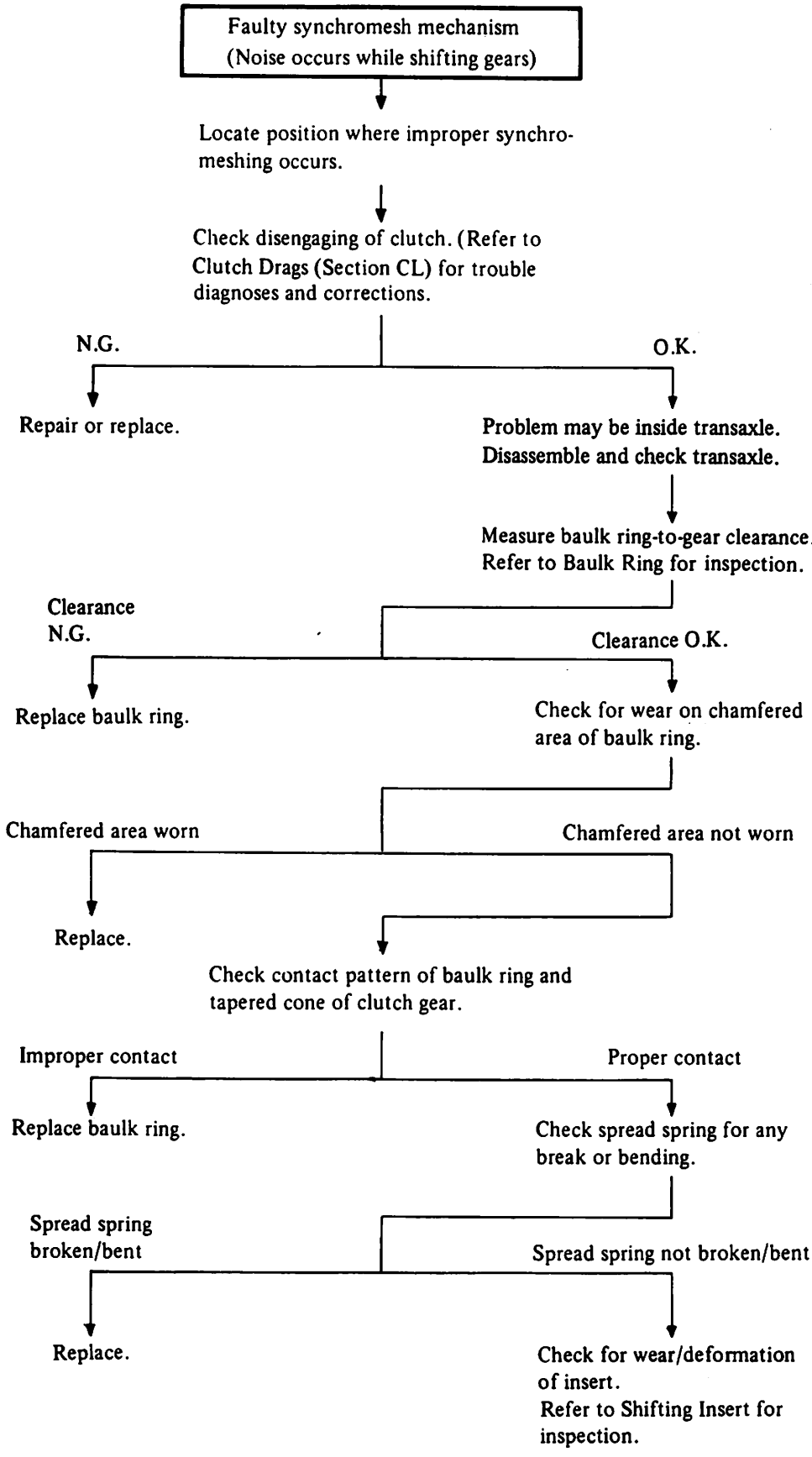
*For details, refer to ER section.

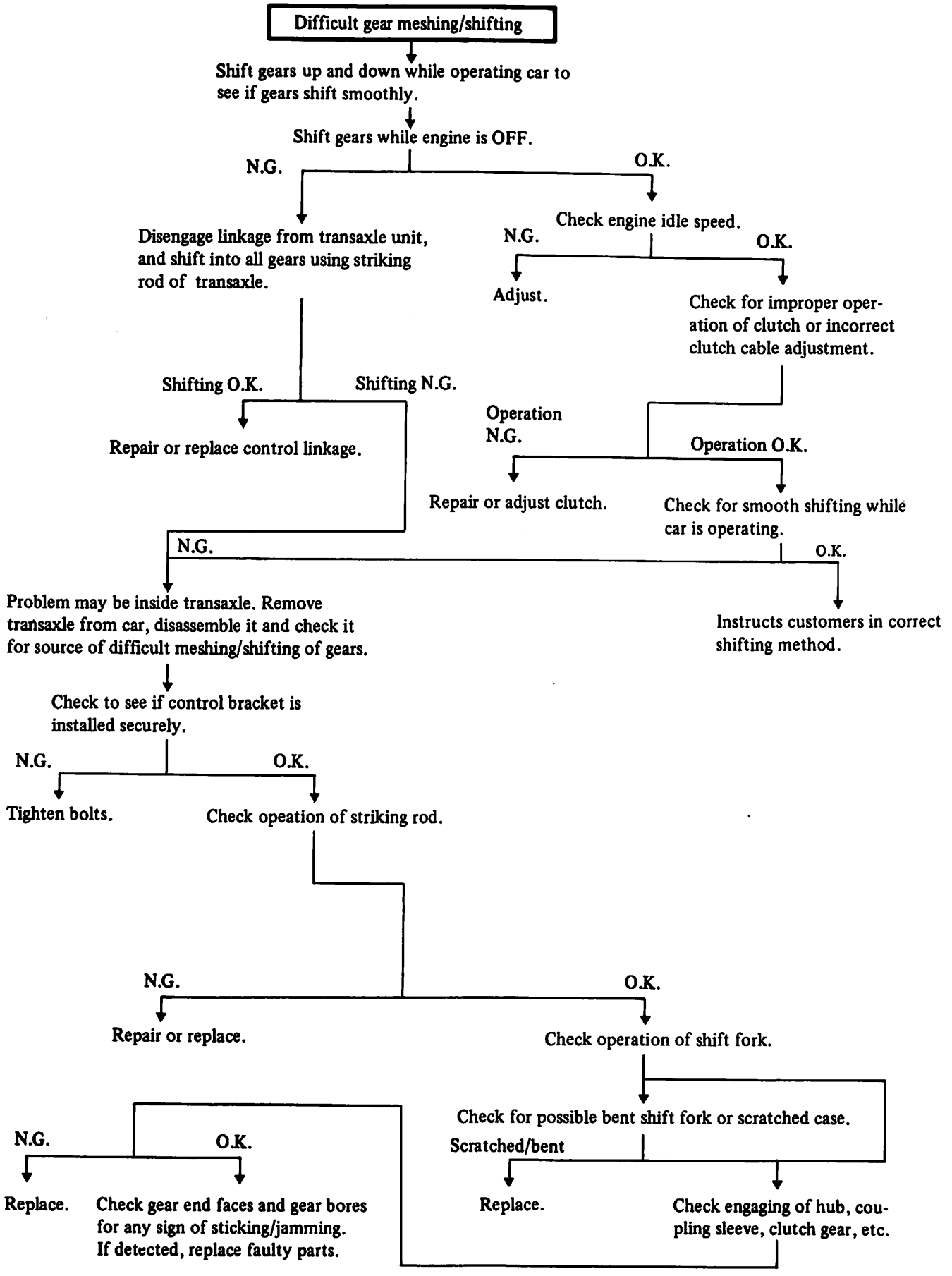
TROUBLE DIAGNOSES AND CORRECTIONS



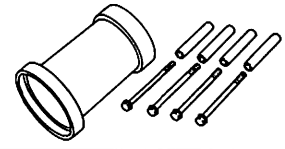
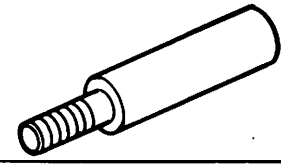
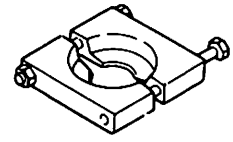
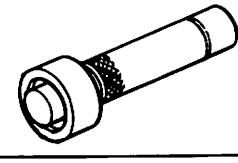
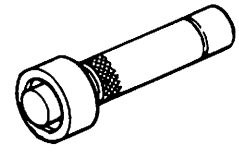
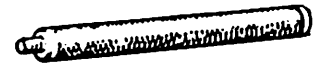

Differential gear noise
Noise on drive, coast and float.
Check for seized up or damaged pinion gear and final gear.
N.G.
O.K.
Replace.
Check for seized up, damaged or broken side and/or main shaft bearing.
N.G.
O.K.
Replace.
Loosen clamp bolts holding final gear.
Repair.
Noise when turning.
Check for seized up or broken side gear, pinion mate gear and pinion mate shaft.
N.G.
O.K.
Replace.
Check for wear or damaged contact surfaces of diff. case.
N.G.
O.K.
Replace.
Seized up, damaged or broken side bearing.
Replace.
Knocking sound during starting or gear shifting.
Side bearing under preload.
N.G.
O.K.
Adjust.
Excessive backlash pinion gear to final gear.
N.G.
O.K.
Replace.
Faulty pinion mate shaft and/or loose clamp bolts holding final gear.
Repair or replace.

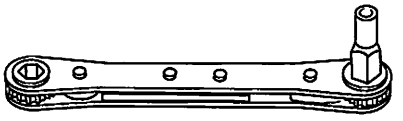

Gear jumping out of mesh
Locate position where gears jump out of mesh.
• Shifting is accomplished without problems. (Check interference of control lever with console, and check rubber boot of control lever for fatigue.)
N.G.
O.K.
Adjust or replace.
Shift into all gears using shift lever of transaxle unit.
Abnormal shifting
Shifting O.K.
Faulty transmission gear control.
Replace.
Check for fatigue, play, etc. on front and rear engine mounts.
N.G.
O.K.
Adjust or replace.
Problem may be inside transaxle. Disassemble and check transaxle.
Check end play of "jump-out" gear.
End play excessive
End play O.K.
Replace.
Check for engaging, damage or wear on coupling sleeve, synchronizer hub, and clutch gear of main gear.
Damage or wear
O.K.
Replace.
Check for wear or damage on check ball and fatigue or breaks on check spring.
Damage or wear
O.K.
Replace.
Check for wear or deformation of striking rod ball groove.
Wear or deformation
O.K.
Replace.
Check for wear or play of "jump-out" synchronizer and mainshaft or input shaft splines.
Wear or play
No wear or play
Replace.
Check for wear or damage on bearings of mainshaft and input shaft. Replace if worn.


Faulty synchromesh mechanism
(Noise occurs while shifting gears)
Locate position where improper synchro-meshing occurs.
Check disengaging of clutch. (Refer to Clutch Drags (Section CL) for trouble diagnoses and corrections.
N.G.
O.K.
Repair or replace.
Problem may be inside transaxle. Disassemble and check transaxle.
Measure baulk ring-to-gear clearance. Refer to Baulk Ring for inspection.
Clearance N.G.
Clearance O.K.
Replace baulk ring.
Check for wear on chamfered area of baulk ring.
Chamfered area worn
Chamfered area not worn
Replace.
Check contact pattern of baulk ring and tapered cone of clutch gear.
Improper contact
Proper contact
Replace baulk ring.
Check spread spring for any break or bending.
Spread spring broken/bent
Spread spring not broken/bent
Replace.
Check for wear/deformation of insert.
Refer to Shifting Insert for inspection.


Difficult gear meshing/shifting
Shift gears up and down while operating car to see if gears shift smoothly.
Shift gears while engine is OFF.
N.G.
O.K.
Disengage linkage from transaxle unit, and shift into all gears using striking rod of transaxle.
Check engine idle speed.
N.G.
O.K.
Adjust.
Check for improper operation of clutch or incorrect clutch cable adjustment.
Shifting O.K.
Shifting N.G.
Repair or replace control linkage.
Operation N.G.
Operation O.K.
Repair or adjust clutch.
Check for smooth shifting while car is operating.
N.G.
O.K.
Problem may be inside transaxle. Remove transaxle from car, disassemble it and check it for source of difficult meshing/shifting of gears.
Instructs customers in correct shifting method.
Check to see if control bracket is installed securely.
N.G.
O.K.
Tighten bolts.
Check opeation of striking rod.
N.G.
O.K.
Repair or replace.
Check operation of shift fork.
Check for possible bent shift fork or scratched case.
N.G.
O.K.
Scratched/bent
Replace.
Check gear end faces and gear bores for any sign of sticking/jamming. If detected, replace faulty parts.
Replace.
Check engaging of hub, coupling sleeve, clutch gear, etc.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV38105810 (J33200)	Differential preload shim selector 
KV38105900 (J33201)	Preload adapter 
KV38106000 (J33200)	Height gauge adapter (diff. side bearing) 
ST22730000 (J25681)	Bearing puller 
ST33290001 (J25810-A)	Side bearing outer race puller 
KV38100300 (J25523)	Drift 
ST33210000 (J25803-01)	Drift 
ST30611000 (J25742-1)	Drift bar 
ST30621000 (–)	Drift 

Tool number (Kent-Moore No.)	Tool name
(J33202)	Bearing retainer wrench 

AUTOMATIC TRANSAXLE

SECTION AT

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DESCRIPTION

The RL3F01A transaxle is a fully automatic unit consisting primarily of a 3 element hydraulic lock-up torque converter, two planetary gear sets and final gear. Two multiple-disc clutches, a multiple-disc brake, brake band, and one-way clutch provide the friction elements necessary to obtain the desired function of the two planetary gear-sets.

A hydraulic control system is used to operate the friction elements and automatic shift controls.

TORQUE CONVERTER

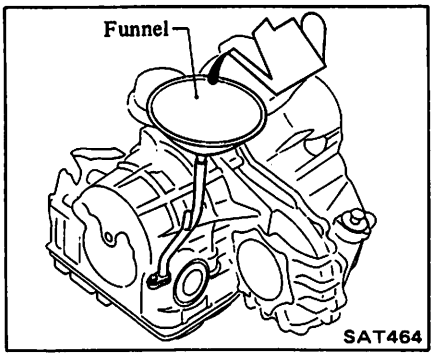
The lock-up torque converter is attached to the crankshaft through a flexible drive plate and serves to directly couple the turbine runner and pump impeller through the lock-up piston which is controlled by the speed cut valve and lock-up control valve. Heat generated in the torque converter is dissipated by circulating the transaxle fluid through an oil-to-water type cooler in the radiator lower tank.

The welded construction of the torque converter prohibits disassembly or service unless highly specialized equipment is available.

FLUID RECOMMENDATION

Use "DEXRON" type automatic transaxle fluid only.

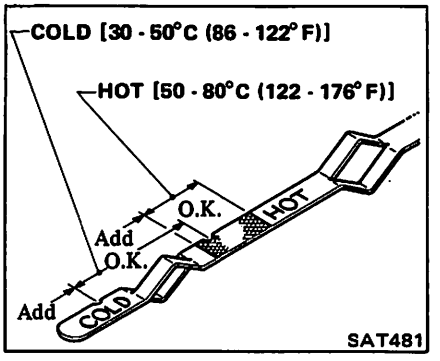
FLUID REFILLING POSITION



FLUID LEVEL

The dipstick can check the fluid level at "HOT" fluid temperatures [50 to 80°C (122 to 176°F)] after the vehicle has been driven approximately 10 minutes. It also can check the fluid level at "COLD" fluid temperatures [30 to 50°C (86 to 122°F)].

1. Park the vehicle on a level surface and set the parking brake.
2. Start the engine and then move the selector lever through each gear range, ending in "P".
3. Check the fluid level with the engine idling. (If the vehicle has not been driven for some time and the outside temperature is below 30°C (86°F), a "COLD" fluid temperature can be obtained by warming the engine up completely.)
4. Remove the dipstick and clean it with lint-free paper. Reinsert it into the charging pipe as far as it will go.
5. Remove the dipstick and note the reading. If the fluid temperature is "HOT", the level should be in the hot range (in the shaded area). If it is "COLD", the level should be in the cold range (within the cutout portion).



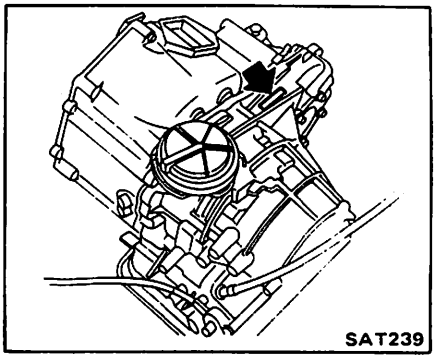
Keep the fluid at the proper level.

- **Overfilling may blow off the fluid or break the transaxle.**
- **Underfilling may cause the clutches to slip, and finally break them.**

IDENTIFICATION NUMBER LABEL

Location

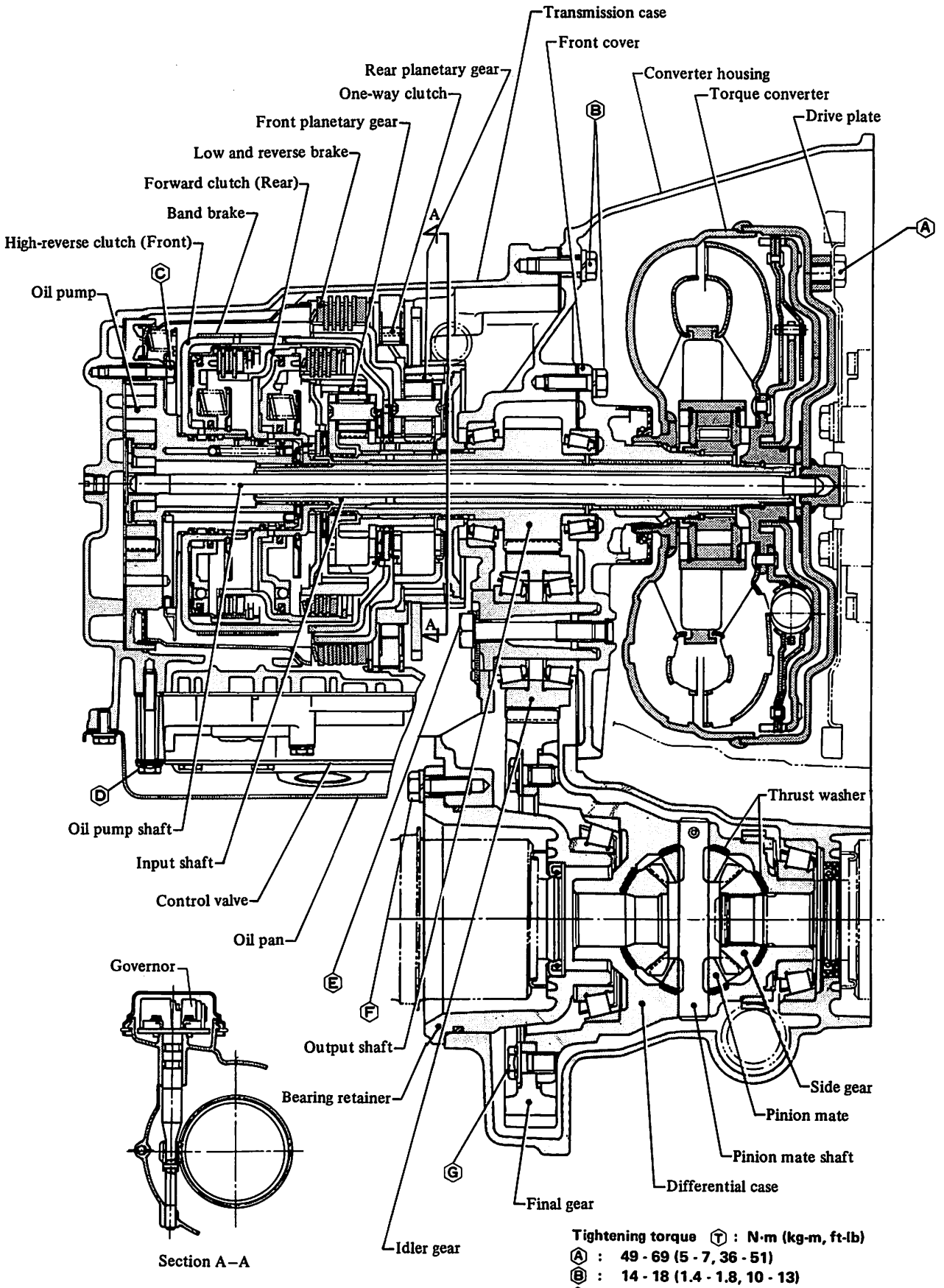
The label is pasted on right upper face of transmission case.



Number designation

0 6 0 1 2 3 4

- 0: This figure denoting the transaxle model
  - 0: Automatic transaxle
  - 1.2, and 9: Manual transaxle
- 6: Month of production
  - 1: Jan., 2: Feb., ...
  - X: Oct., Y: Nov., Z: Dec.
- 0 1 2 3 4: Serial production number for the month



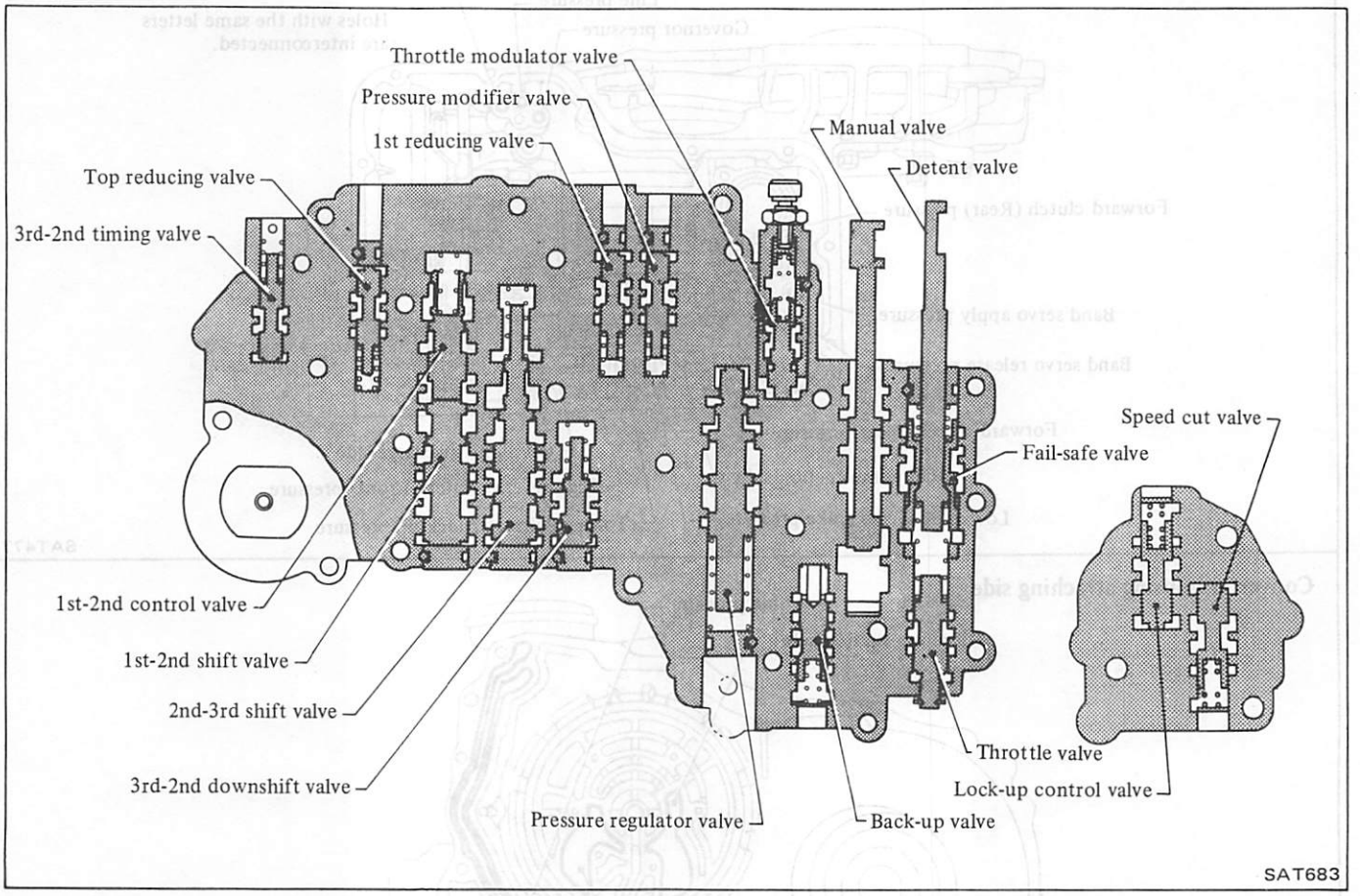
Tightening torque (T) : N·m (kg-m, ft-lb)

- (A) : 49 - 69 (5 - 7, 36 - 51)
- (B) : 14 - 18 (1.4 - 1.8, 10 - 13)
- (C) : 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- (D) : 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- (E) : 3 - 4 (0.3 - 0.4, 2.2 - 2.9)
- (F) : 19 - 25 (1.9 - 2.5, 14 - 18)
- (G) : 69 - 78 (7.0 - 8.0, 51 - 58)

SAT612

HYDRAULIC CONTROL UNIT AND VALVES

Control valve

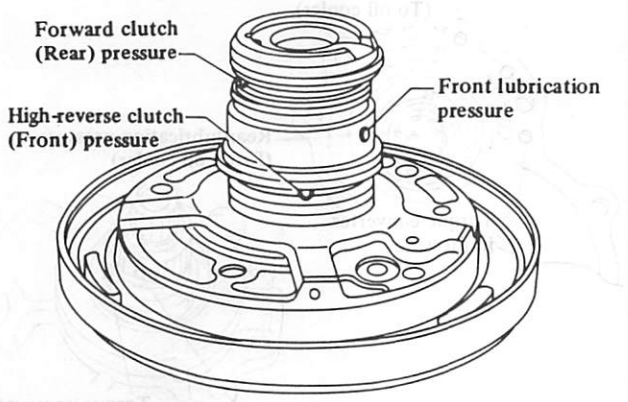


OIL CHANNEL

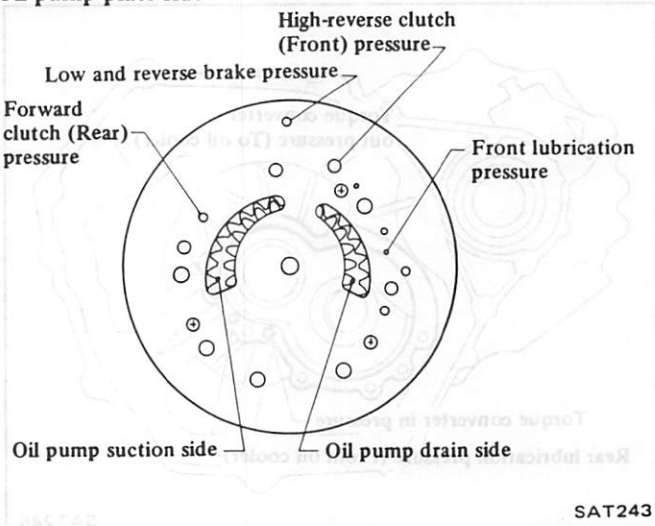
Oil channels which connect components are located in areas shown below.

Oil channels in oil pump housing

Oil pump housing side

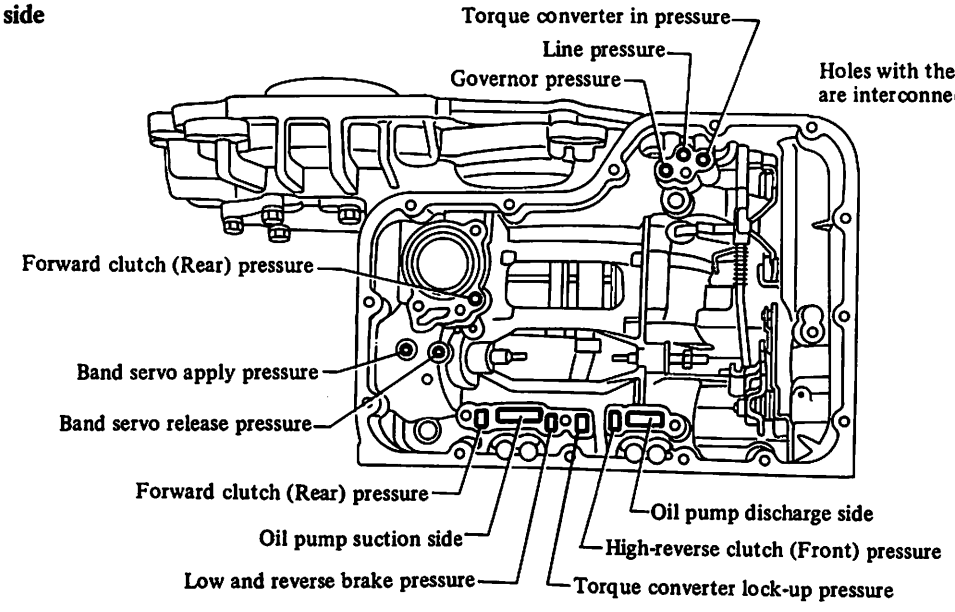


Oil pump plate side



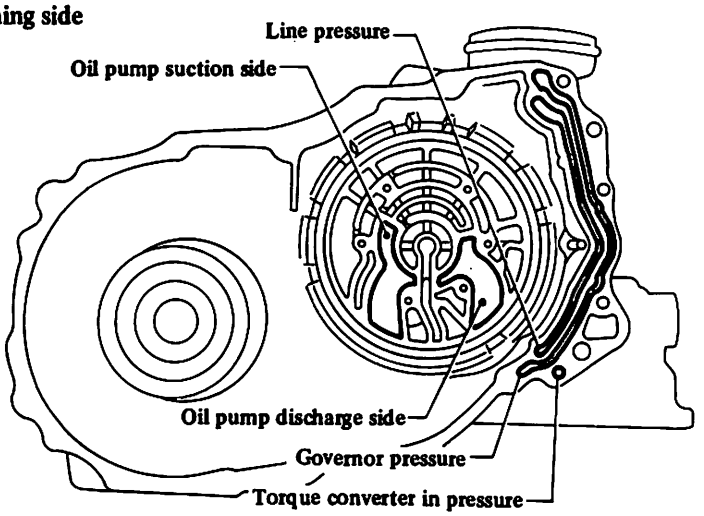
Oil channels in transmission case

Lower face side



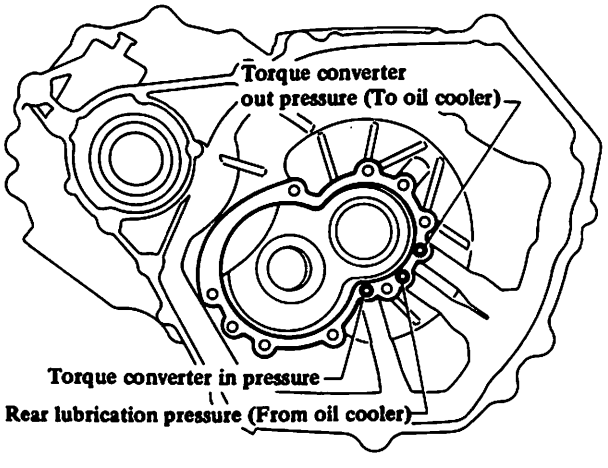
SAT477

Converter housing attaching side



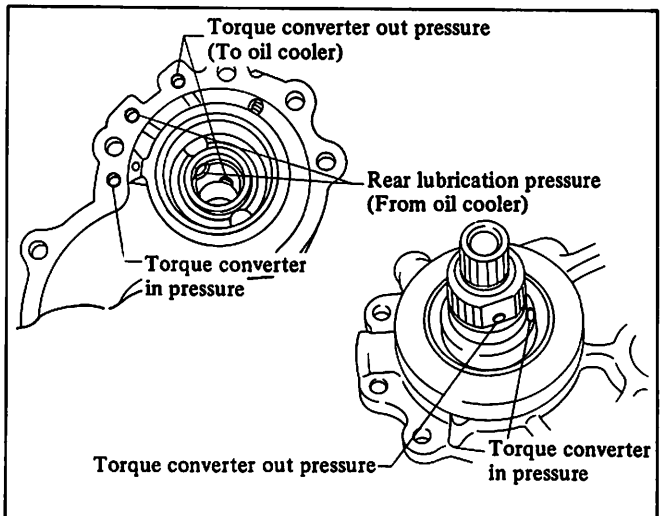
SAT245

Oil channels in converter housing



SAT246

Oil channels in front cover



SAT478

MECHANICAL OPERATION

In the RL3F01A automatic transaxle, each part operates as shown in the following table at each gear select position.

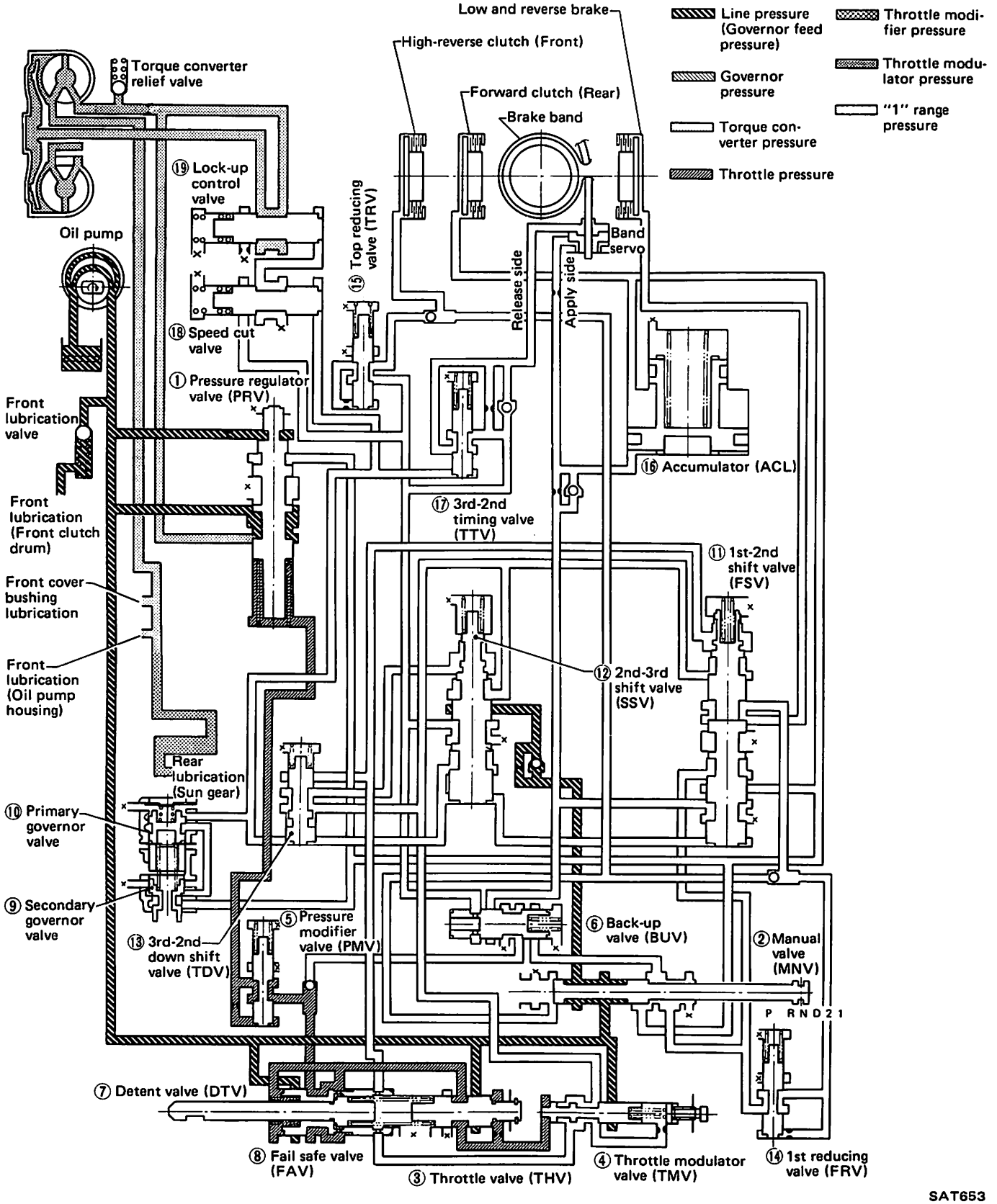
Range		Gear ratio	Clutch		Low & reverse brake	Lock-up	Band servo		One-way clutch	Parking pawl
			High-reverse clutch (Front)	Forward clutch (Rear)			Operation	Release		
Park										on
Reverse		2.364	on		on					
Neutral										
Drive	D_1 Low	2.826		on					on	
	D_2 Second	1.543		on			on			
	D_3 Top (3rd)	1.000	on	on		on	(on)	on		
2	2_1 Low	2.826		on					on	
	2_2 Second	1.543		on			on			
1	1_1 Low	2.826		on	on				on	
	1_2 Second	1.543		on			on			

The low & reverse brake is applied in "1_1" range to prevent free wheeling when coasting and allows engine braking.

HYDRAULIC CONTROL CIRCUITS

Oil Pressure Circuit Diagram - "N" range (Neutral)

Note: Marked X are drain.



SAT653

ON-VEHICLE SERVICE

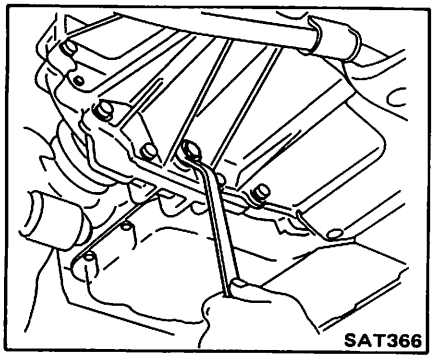
The following parts can be serviced with the transaxle on the vehicle.

1. Control valve assembly
2. Throttle wire
3. Governor shaft assembly
4. Inhibitor switch
5. Bearing retainer oil seal
6. Converter housing oil seal

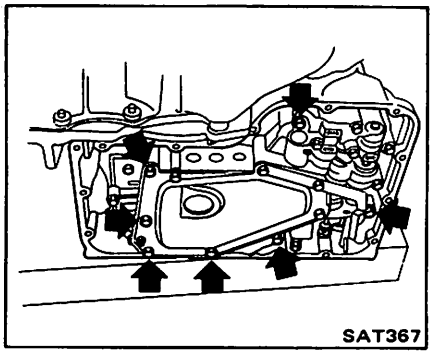
Check and/or replace faulty parts as follows:

CONTROL VALVE ASSEMBLY

1. Remove hexagon plug and drain oil completely.



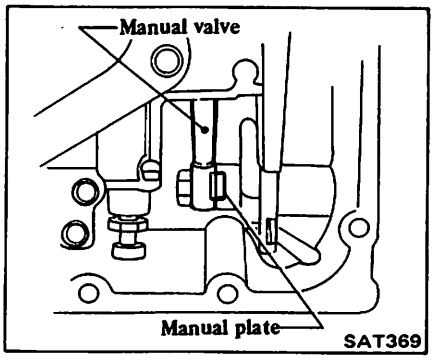
2. Remove oil pan guard, oil pan and gasket.
3. Remove control valve assembly.



4. Disassemble, inspect and assemble control valve assembly. Refer to page AT-24 for Control Valve Body.
5. Install control valve assembly.

Ⓣ : **7 - 9 N·m**
(0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)

a. Set manual shaft at Neutral, then align manual plate with groove in manual valve of control valve assembly.



b. Install detent valve with its groove facing forward.
c. After installing control valve to transmission case, make sure that selector lever can be moved to all positions.

6. Install gasket, oil pan and oil pan guard.

Ⓣ : **5 - 7 N·m**
(0.5 - 0.7 kg-m, 3.6 - 5.1 ft-lb)

7. Apply sealant to threads of hexagon plug, and install it in place.

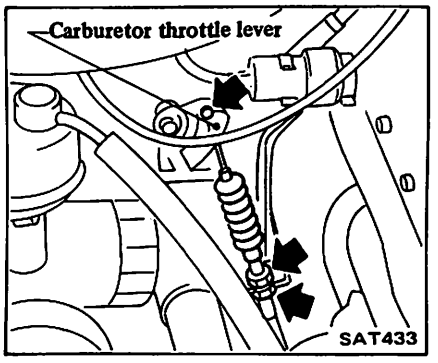
Ⓣ : **7 - 13 N·m**
(0.7 - 1.3 kg-m, 5.1 - 9.4 ft-lb)

8. Refill automatic transaxle fluid.

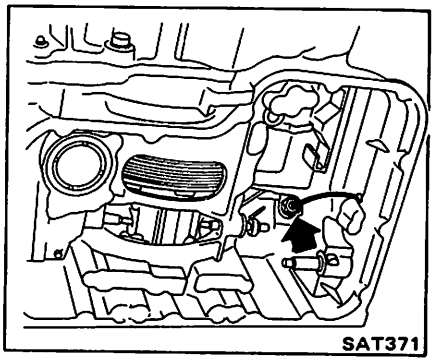
Oil capacity:
Refer to S.D.S.

THROTTLE WIRE

1. Remove control valve assembly. Refer to Control Valve Assembly.
2. Disconnect throttle wire from carburetor throttle valve.



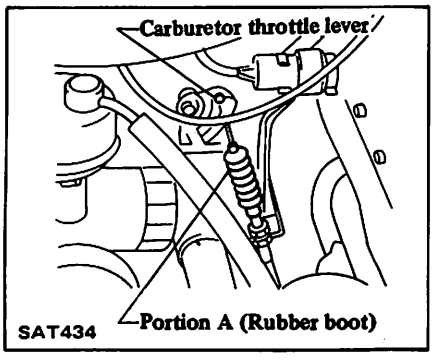
3. Disconnect the other end of throttle wire from throttle lever.
4. Remove throttle wire from transmission case.



5. Install throttle wire in the reverse order of removal. After tightening nut, bend the lock plate securely.

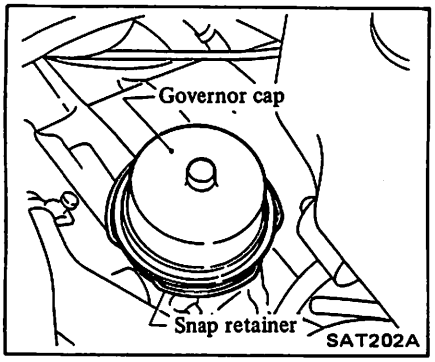
Ⓣ : **Throttle wire securing nut**
2 - 3 N·m
(0.2 - 0.3 kg-m, 1.4 - 2.2 ft-lb)

6. Adjust throttle wire. Refer to Minor Adjustments.
7. After properly adjusting throttle wire, turn portion (A) to correct any twisting of rubber boot. Ensure the parting line is as straight as possible.

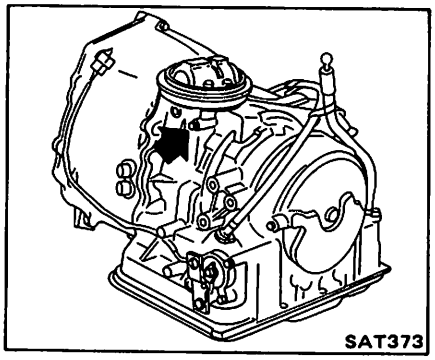


GOVERNOR SHAFT ASSEMBLY

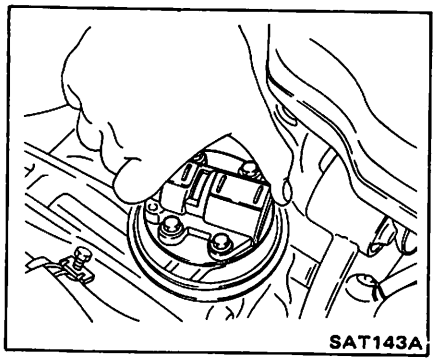
1. Remove distributor cap.
2. Remove snap retainer, governor cap with breather hose, and seal ring.



3. Remove governor shaft securing bolt.



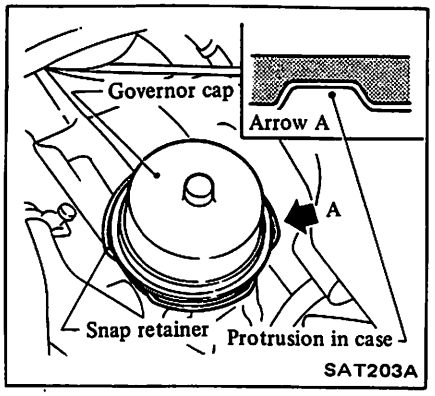
4. Remove governor shaft assembly.



5. Disassemble, check and reassemble governor shaft assembly. Refer to page AT-33 for Governor.

6. Install governor shaft assembly.
7. Install O-ring governor cap with breather hose, then secure it with snap retainer.

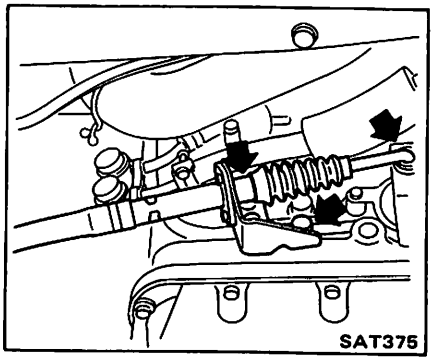
When installing governor cap, pay attention to its direction.



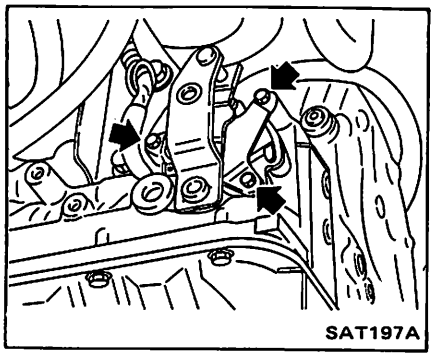
8. Install distributor cap.

INHIBITOR SWITCH

1. Remove undercover.
2. Remove control cable end from unit.



3. Disconnect harness at connector, then remove inhibitor switch.



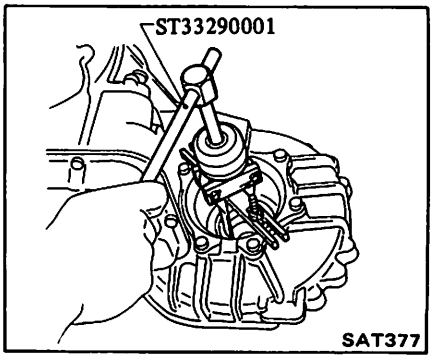
4. Install inhibitor switch in the reverse order of removal.

Ⓣ : **2.0 - 2.5 N·m (0.20 - 0.25 kg-m, 1.4 - 1.8 ft-lb)**

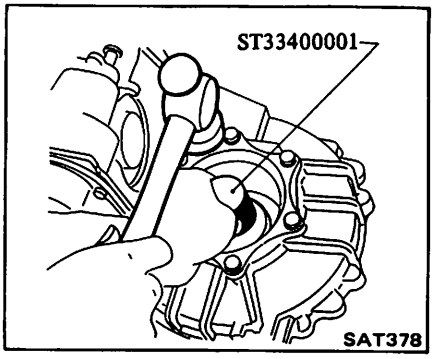
5. Adjust inhibitor switch. Refer to Minor Adjustments.

BEARING RETAINER OIL SEAL

1. Remove left drive shaft assembly. Refer to Drive Shaft for removal.
2. Remove oil seal.



3. Apply coat of automatic transaxle fluid to oil seal surface, then drive new seal into place.

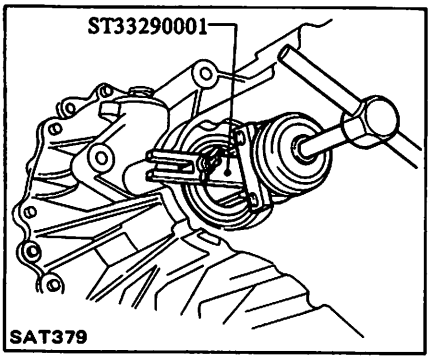


4. Install left drive shaft assembly. Refer to Drive Shaft for installation.

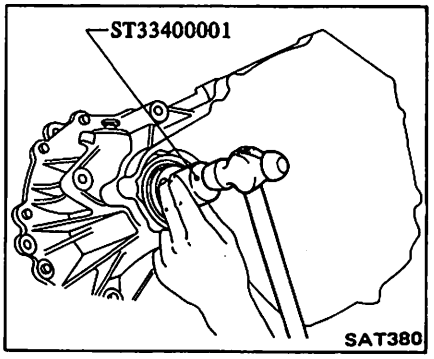
Be extremely careful not to scratch oil seal when inserting drive shaft.

CONVERTER HOUSING OIL SEAL

1. Remove right drive shaft assembly. Refer to Drive Shaft for removal.
2. Remove oil seal.



3. Apply coat of automatic transaxle fluid to oil seal surface, then drive new seal into place.



4. Install right drive shaft assembly. Refer to Drive Shaft for installation.

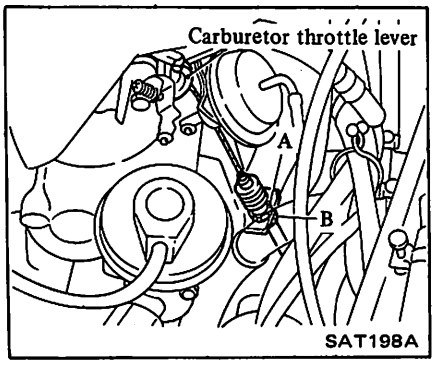
Be extremely careful not to scratch oil seal when inserting drive shaft.

MINOR ADJUSTMENTS

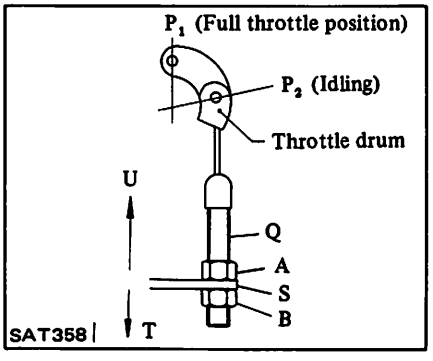
THROTTLE WIRE ADJUSTMENT

Throttle wire is adjusted by means of double nuts on carburetor side.

1. Loosen throttle wire double nuts A and B on carburetor side.



2. With throttle drum set at "P_1" (fully-open), move fitting "Q" fully in direction "T" and tighten nut "B" by hand until it contacts bracket "S".



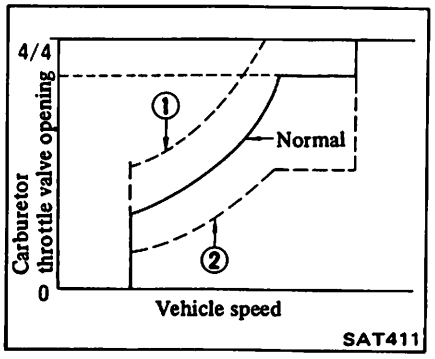
3. Back off nut "B" 1 to 1½ turns, in direction T, then tighten nut "A" securely. Throttle drum should be held at "P_1".

Ⓣ : **Double nuts**
8 - 10 N·m
(0.8 - 1.0 kg-m,
5.8 - 7.2 ft-lb)

Problems arising from improper adjustment of throttle wire

If throttle wire stroke is improperly adjusted, the following problems may arise.

- When full-throttle position "P_1" of throttle drum is closer to direction T, shift schedule will be as shown by ② in figure below, and kick-down range will greatly increase.



- When full-throttle position "P_1" of throttle drum is closer to direction U, shift schedule will be as shown by ① in figure above, and kick-down range will not occur.

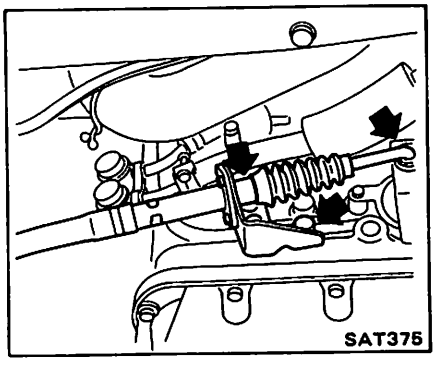
CONTROL CABLE ADJUSTMENT

Adjustment of the control cable is an important adjustment of the automatic transaxle. Move the selector lever from the "P" range to "1" range. You should be able to feel the detents in each range.

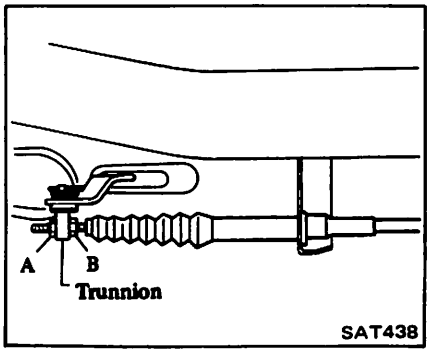
If the detents cannot be felt or the pointer indicating the range is improperly aligned, the control cable needs adjustment.

Control cable adjustment

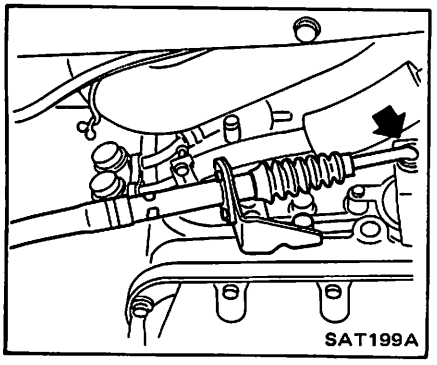
1. Place selector lever at "P" range.
2. Connect control cable end to manual lever in transaxle unit, and tighten control cable securing bolts.



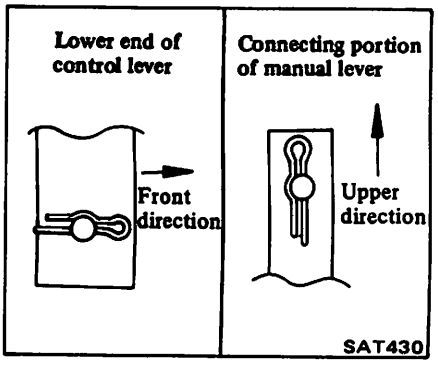
3. Move selector lever from "P" range to "1" range. Make sure that selector lever can move smoothly and without any sliding noise.
4. Place control lever at "P" range again.
5. Make sure that selector lever locks at "P" range.
6. Remove selector cable adjusting nut A and loosen nut B. Then connect control cable to trunnion. Install nut A and B, then tighten them.



7. Move selector lever from "P" range to "1" range again. Make sure that selector lever can move smoothly and without any sliding noise.
8. Apply grease to spring washer.



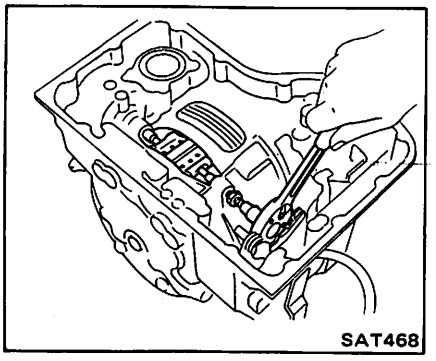
9. After properly adjusting control cable, check spring pin to see if it is assembled as shown in figure below. If not, adjust spring pin.



BRAKE BAND ADJUSTMENT

Proper brake band adjustment results in smooth shifting between 1st & 2nd and 2nd & 3rd. Although the adjustment is very simple, it is important to use an accurate torque wrench.

1. Loosen locknut.



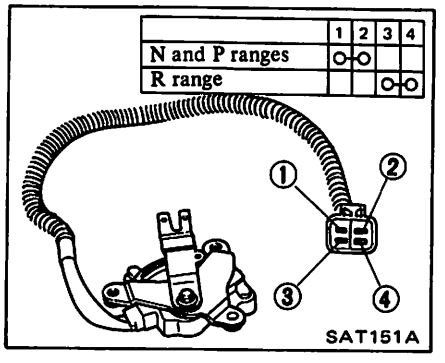
2. Torque anchor end pin lock nut to 4 to 6 N·m (0.4 to 0.6 kg-m, 2.9 to 4.3 ft-lb).
3. Back off anchor end pin lock nut 2.5 complete turns.
4. Tighten locknut to 16 to 22 N·m (1.6 to 2.2 kg-m, 12 to 16 ft-lb) while holding anchor end pin lock nut stationary.

INHIBITOR SWITCH ADJUSTMENT

The inhibitor switch has two major functions. It allows the back-up lights to illuminate when the shift lever is placed in the reverse range. It also acts as a neutral safety switch allowing current to pass from the starter only when the selector lever is placed in the "P" or "N" range.

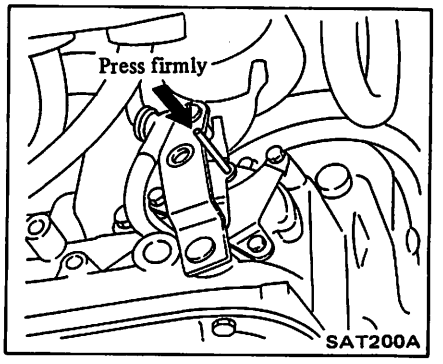
A continuity tester may be used to check the inhibitor switch for proper operation.

- Check continuity at "N", "P" and "R" ranges.



- With selector lever held in Neutral, turn manual lever an equal amount in both directions to see if current flow ranges are nearly the same. (Current normally begins to flow before manual lever reaches an angle of 1.5° in either direction.)
  If current flows outside normal range, or if normal flow range is out of specifications, properly adjust inhibitor switch.

Adjust inhibitor switch as follows:
This adjustment can be done on the vehicle.
1. Loosen attaching screws.
2. Set selector lever (manual shaft) at "N" position.
3. Insert a 2.5 mm (0.098 in) dia. pin into adjustment holes of both inhibitor switch and switch selector lever as near vertical as possible.



4. Tighten screws.

Ⓣ : **2.0 - 2.5 N·m (0.20 - 0.26 kg-m, 1.4 - 1.9 ft-lb)**

5. Recheck for continuity. If faulty, replace the switch.

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

When dismounting the automatic transaxle from a vehicle, pay attention to the following points:

1. Before dismounting the transaxle, rigidly inspect it by using the "Trouble-shooting Chart", and dismount it only when it is necessary.
2. Dismount the transaxle with utmost care; and when mounting, observe the tightening torque indicated in Service Data and Specifications. Do not exert excessive force.

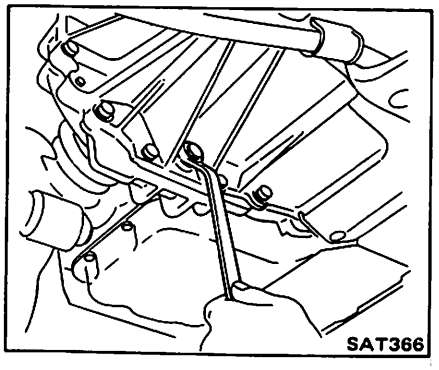
REMOVAL

In dismounting the automatic transaxle from a vehicle, proceed as follows:

1. Disconnect battery ground cable from terminal.
2. Jack up vehicle and support it on safety stands. We recommend a hydraulic hoist or open pit be utilized, if available.

Observe all safety regulations.

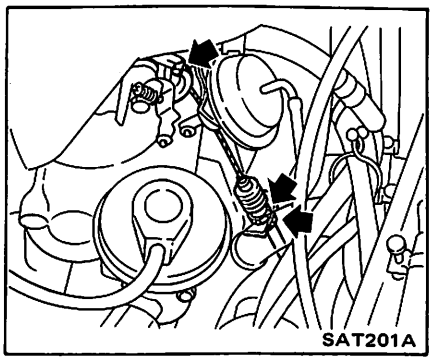
3. Remove front L.H. tire.
4. Drain oil.



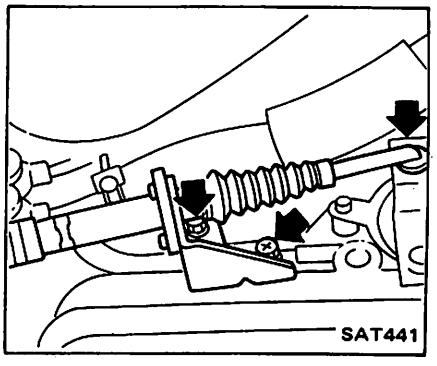
5. Remove left side fender protector.
6. Disconnect drive shafts.

Refer to Drive shaft (Section FA) for removal.

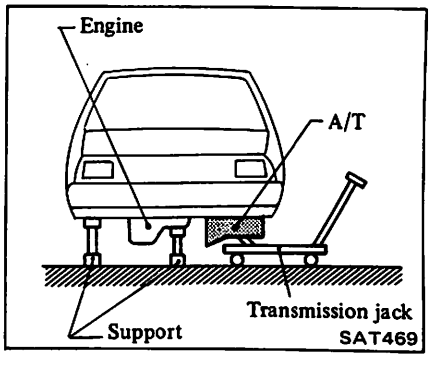
7. Disconnect speedometer cable.
8. Disconnect throttle wire from carburetor throttle lever.



9. Remove control cable rear end from unit.

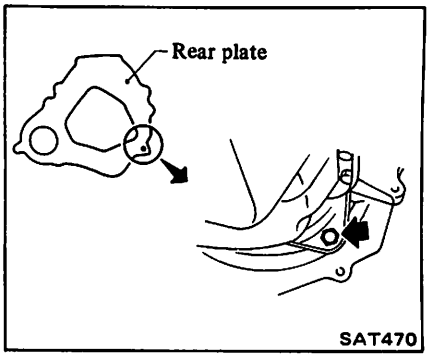


10. Remove oil level gauge tube.
11. Place jack under transaxle and engine.



CAUTION:
Do not place the jack under the oil pan drain plug.

12. Disconnect oil cooler hoses from tubes.
13. Remove bolts securing torque converter to drive plate.



a. Remove those bolts turning crankshaft.
b. Before removing torque converter, inscribe chalk marks on two parts so that they may be replaced in their original positions during assembly.

14. Remove engine mount securing bolts.
15. Remove starter motor.
16. Remove bolts securing transaxle to engine. After removing these bolts, move the jack gradually until transaxle can be removed and taken out from left side wheel house.

Plug up openings such as oil charging pipe, oil cooler tubes, etc.

CAUTION:
Take care when dismounting transaxle not to strike any adjacent parts.

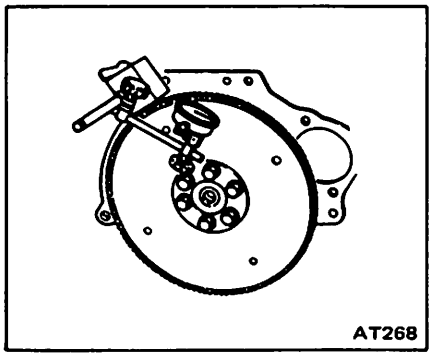
INSTALLATION

Installation of automatic transaxle on vehicle is in reverse order of removal. However, observe the following installation notes.

1. Drive plate runout

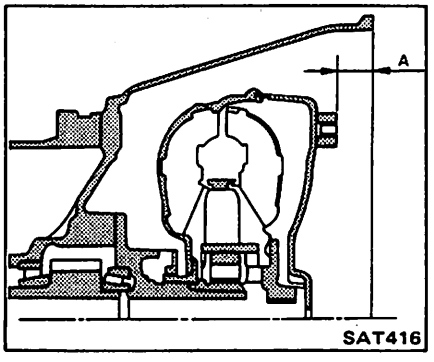
Turn crankshaft one full turn and measure drive plate runout with indicating finger of a dial gauge rested against plate.

Maximum allowable runout:
0.5 mm (0.020 in)



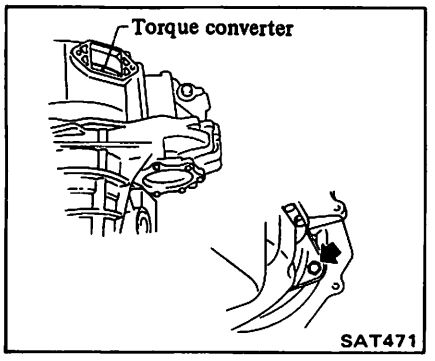
2. When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

Distance "A":
More than 21.1 mm (0.831 in)



3. Bolt converter to drive plate.

When installing the first bolt, turn torque converter by reaching for it through hole in starter motor mounting portion on converter housing. Then align hole in drive plate with that in torque converter.



a. Align chalk marks painted across both parts during disassembly.
b. Before installing torque converter securing bolts, apply locking sealer to threads of bolts.

4. After converter is installed, rotate crankshaft several turns and check to be sure that transaxle rotates freely without binding.

5. Pour recommended automatic transaxle fluid up to correct level through oil charge pipe.

6. Connect control cable to manual shaft. Adjust control cable. Refer to Minor Adjustments.

7. Connect inhibitor switch wires.

a. Refer to page AT-13 for Inhibitor Switch Adjustment.
b. Inspect and adjust switch as above, whenever it has to be removed for service.

8. Check inhibitor switch for operation:

Starter should be brought into operation only when selector lever is in "P" and "N" positions (it should not be started when lever is in "D", "2", "1" and "R" positions).

Back-up lamp should also light when selector lever is placed in "R" position.

9. Check fluid level in transaxle. For detailed procedure, see page AT-2.

10. Move selector lever through all positions to be sure that transaxle operates correctly.

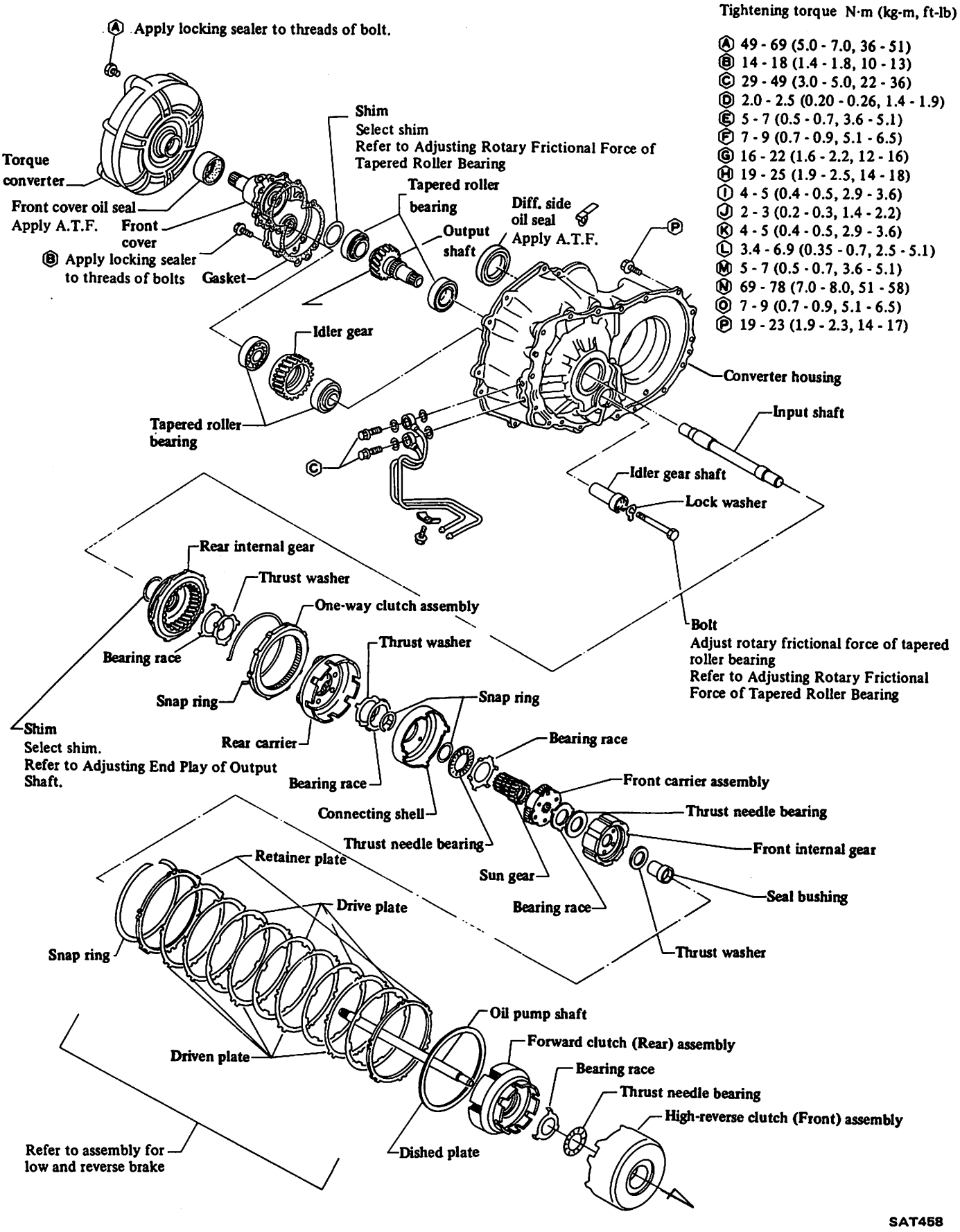
With hand brake applied, run engine at idle. Without disturbing the above setting, move selector lever through "N" to "D", to "2", to "1" and to "R". A slight shock should be felt by hand gripping selector lever each time transaxle is shifted.

Refer to MA section.

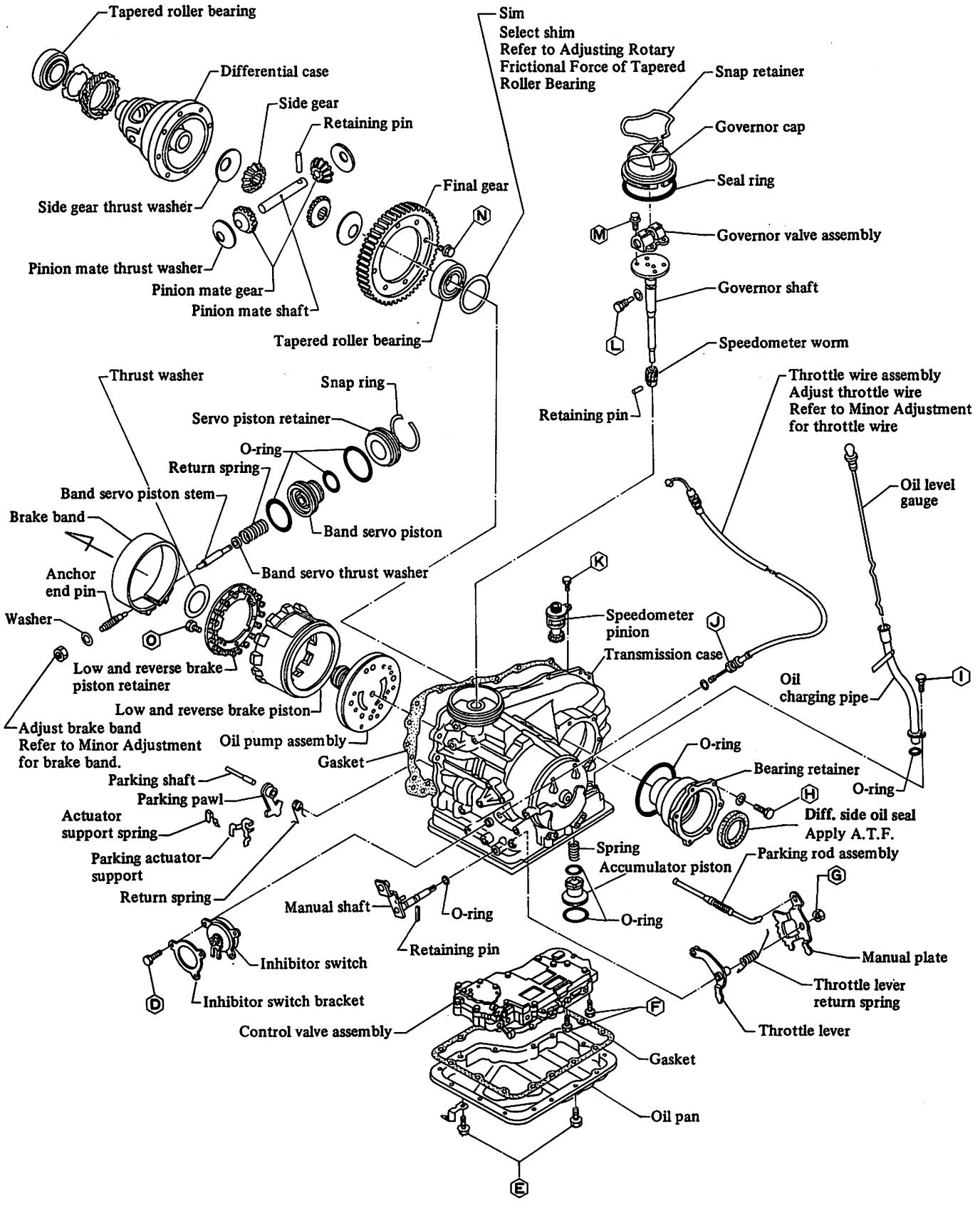
11. Check to be sure that line pressure is correct. To do this, refer to page AT-47 for Line Pressure Test.

12. Perform stall test as described on page AT-47.

MAJOR OVERHAUL OPERATIONS



SAT458


Tapered roller bearing
Differential case
Side gear
Retaining pin
Side gear thrust washer
Pinion mate thrust washer
Pinion mate gear
Pinion mate shaft
Final gear
N
Tapered roller bearing
Sim
Select shim
Refer to Adjusting Rotary Frictional Force of Tapered Roller Bearing
Snap retainer
Governor cap
Seal ring
M
Governor valve assembly
Governor shaft
L
Speedometer worm
Retaining pin
Throttle wire assembly
Adjust throttle wire
Refer to Minor Adjustment for throttle wire
Thrust washer
Snap ring
Servo piston retainer
O-ring
Return spring
Band servo piston stem
Brake band
Band servo piston
Band servo thrust washer
Anchor end pin
Washer
O
Low and reverse brake piston retainer
Low and reverse brake piston
Adjust brake band
Refer to Minor Adjustment for brake band.
Oil pump assembly
Gasket
K
Speedometer pinion
Transmission case
J
Oil level gauge
Oil charging pipe
I
O-ring
Bearing retainer
H
O-ring
Diff. side oil seal
Apply A.T.F.
Parking shaft
Parking pawl
Actuator support spring
Parking actuator support
Return spring
Spring
Accumulator piston
O-ring
Parking rod assembly
G
Manual shaft
O-ring
Retaining pin
Manual plate
Throttle lever return spring
Throttle lever
Inhibitor switch
D
Inhibitor switch bracket
Control valve assembly
F
Gasket
Oil pan
E

SAT053A

SERVICE NOTES FOR DISASSEMBLY

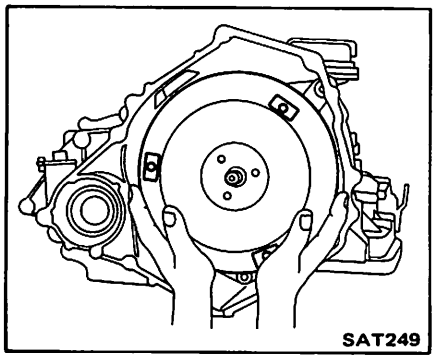
Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts of the transaxle from becoming contaminated by dirt or other foreign matter.

Disassembly should be done in a clean work area.

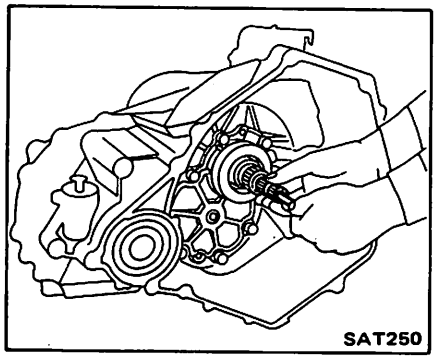
Use a nylon cloth or paper towel for wiping parts clean. Common shop rags can leave lint that might interfere with the transaxle's operation.

DISASSEMBLY

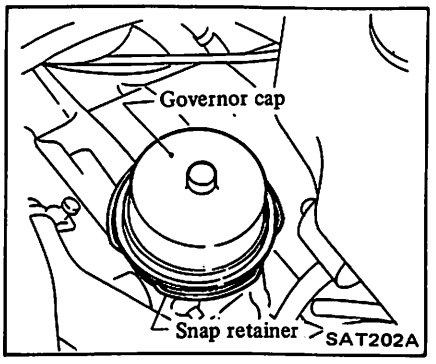
1. Remove hexagon plug, then drain transaxle fluid from plug hole.
2. Remove torque converter.



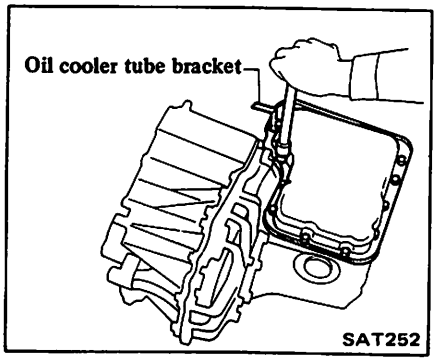
3. Remove oil pump shaft and input shaft.



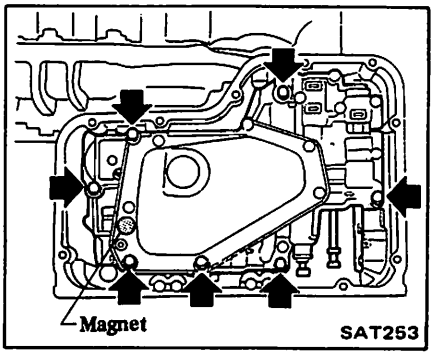
4. Remove snap retainer, governor cap with breather hose and O-ring.



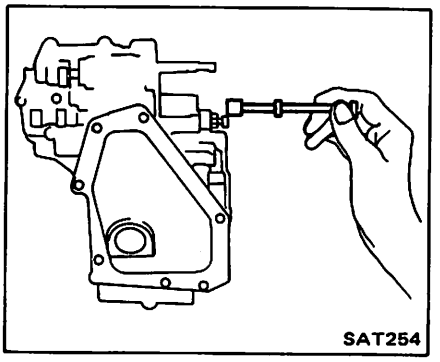
5. Remove oil pan guard and oil pan and inspect its contents. An analysis of any foreign matter can indicate the types of problems to look for. If the fluid is very dark, smells burned or contains foreign particles, the frictional material (clutches, band.) may need replacement. A tacky film that will not wipe clean indicates varnish build up which can cause valves, servo and clutches to stick and may inhibit pump pressure.



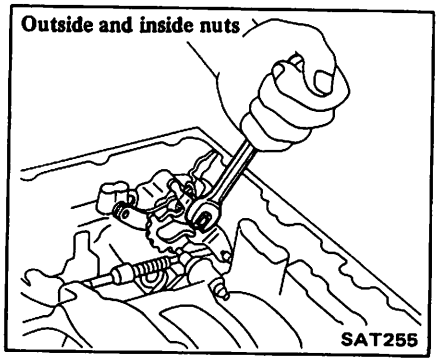
6. Remove control valve body and magnet.



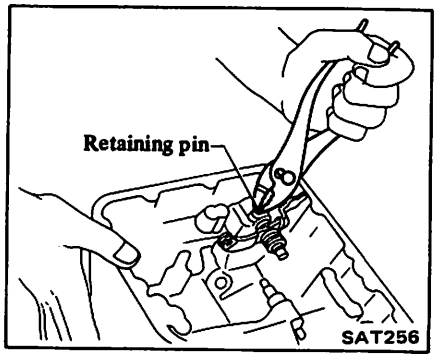
Remove manual valve from valve body as a precaution, to prevent valve from dropping out accidentally.



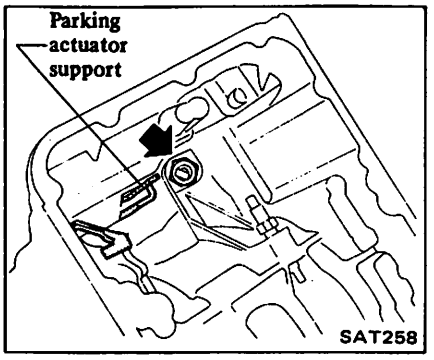
7. Remove manual shaft securing nuts.



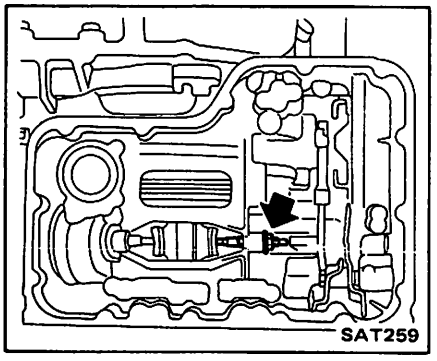
8. Pull out retaining pin, then remove throttle lever, manual plate, manual shaft, selector range lever and parking rod assembly.



9. Disconnect throttle wire from throttle lever, then remove throttle wire. Remove parking actuator support from transmission case.

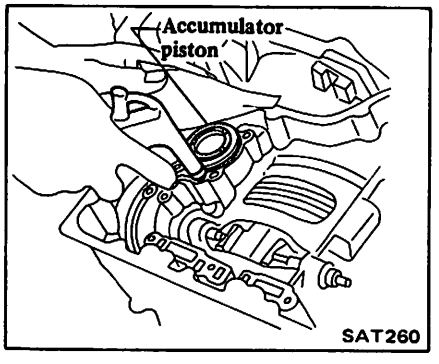


10. Loosen band brake piston stem lock nut, then back off piston stem.

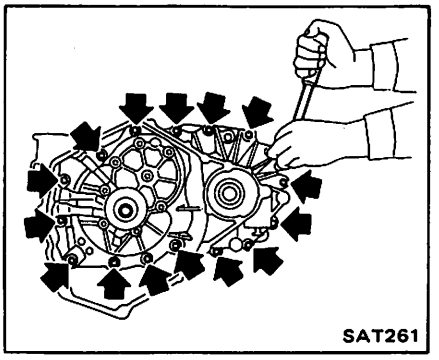


11. Remove accumulator piston with compressed air.

Be careful that accumulator piston does not jump out.

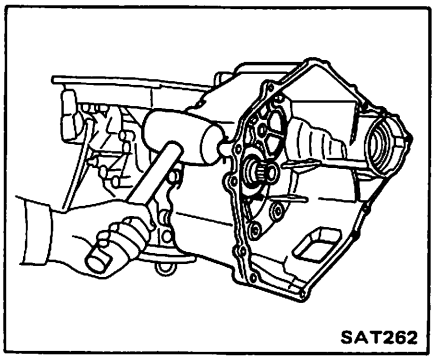


12. Remove converter housing securing bolts.

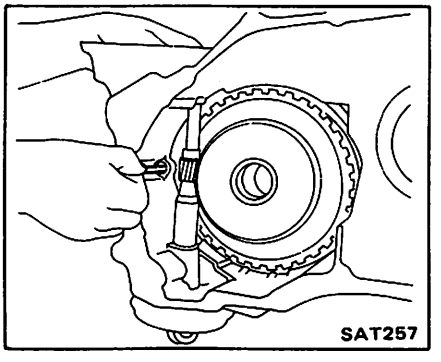


13. Separate converter housing from transmission case by tapping it.

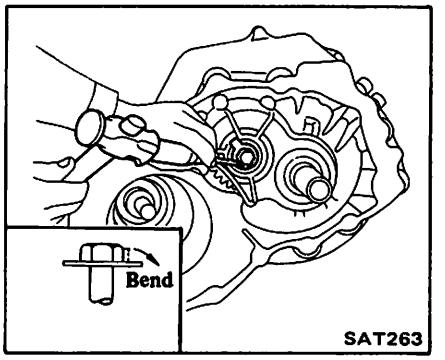
Be careful not to drop final drive assembly.



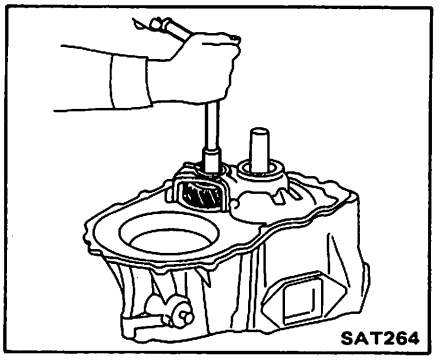
14. Remove final drive assembly.
15. Pull out parking pawl shaft, then remove parking pawl and return spring.



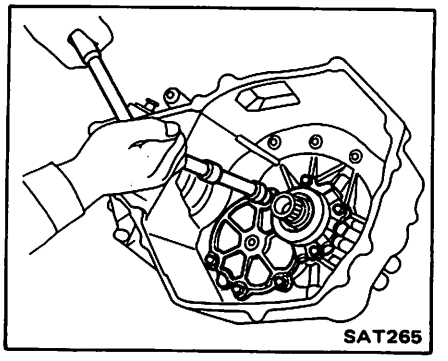
16. Straighten lock washer.



17. Remove idler gear bolt and lock washer.

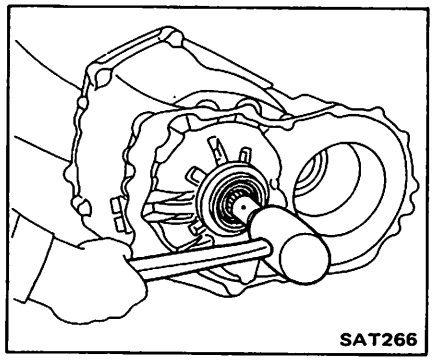


18. Remove front cover retaining bolts.

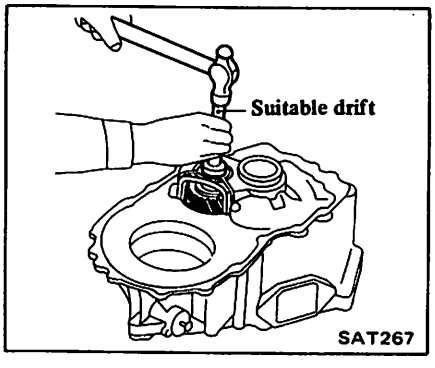


19. Tap output shaft, then remove it together with front cover.

a. When tapping output shaft, be sure to hold front cover so that it does not fall.
b. Adjusting shim is attached to rear internal gear side of output shaft so be careful not to lose it.

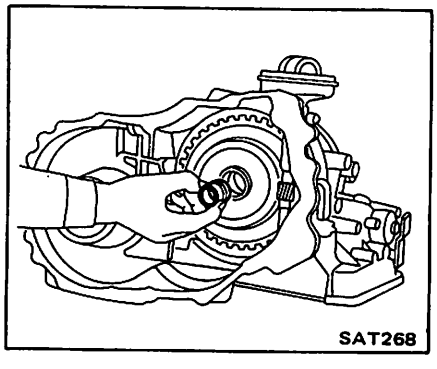

SAT266

20. Remove front cover gasket.
21. Remove idler gear, idler gear shaft and taper roller bearings by tapping idler gear shaft.

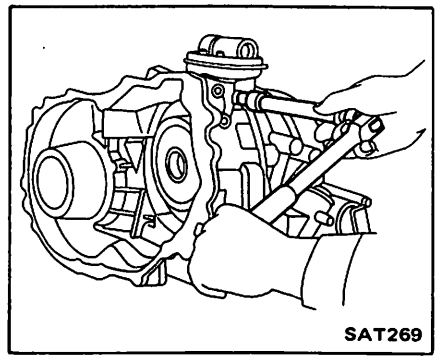


SAT267

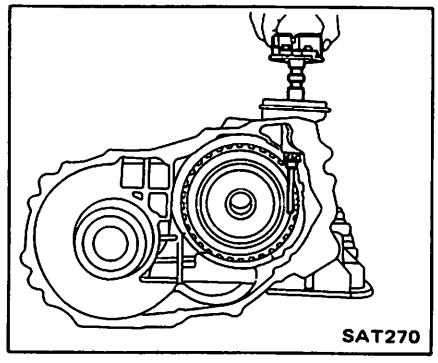
22. Remove seal bushing.


SAT268

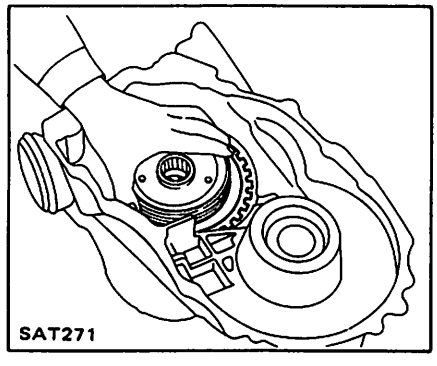
23. Remove governor shaft retaining bolt.


SAT269

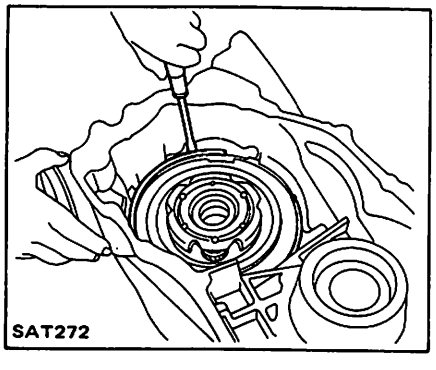
24. Pull out governor shaft.


SAT270

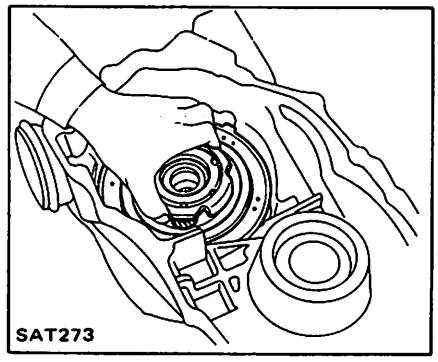
25. Remove rear internal gear, bearing race and thrust washer.


SAT271

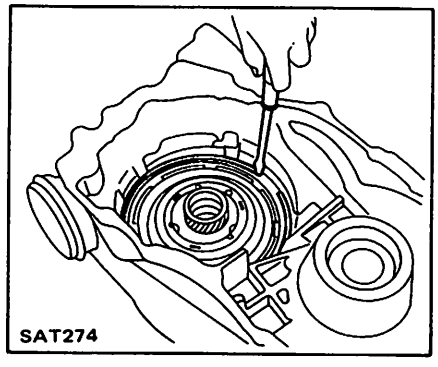
26. Remove one-way clutch snap ring.


SAT272

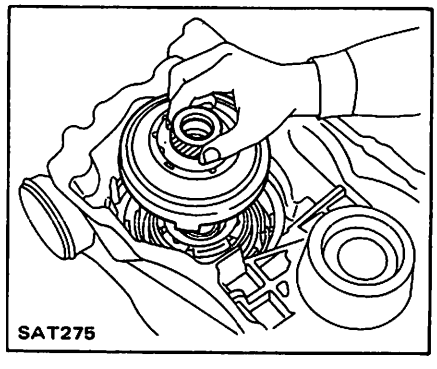
27. Remove one-way clutch assembly together with rear carrier assembly.


SAT273

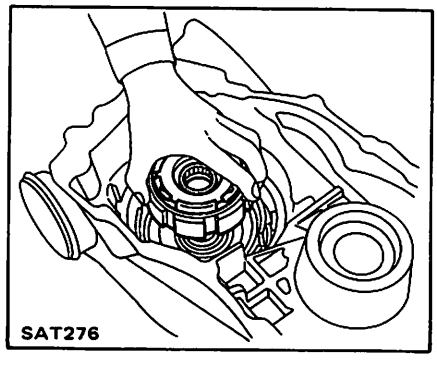
28. Remove bearing race and thrust washer.
29. Remove low and reverse brake snap ring.


SAT274

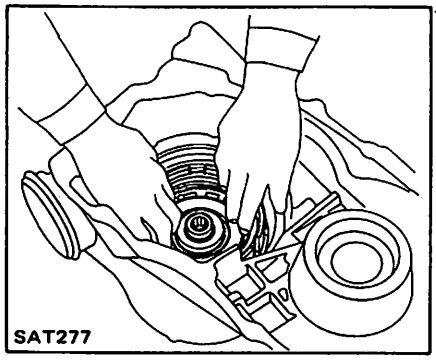
30. Remove shell & sun gear assembly, thrust needle bearing and bearing race.


SAT275

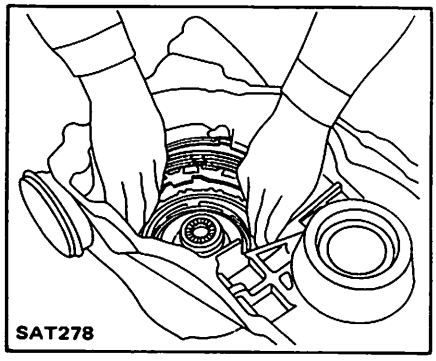
31. Remove front carrier assembly together with front internal gear.


SAT276

32. Remove forward clutch (Rear) assembly and plastic thrust washer.

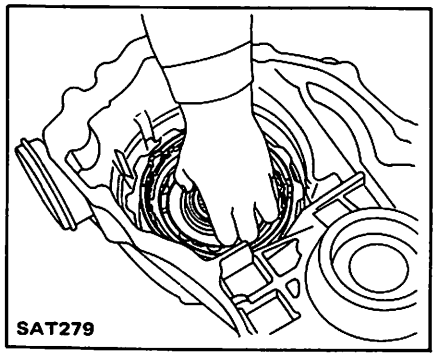


33. Remove low and reverse brake retaining plate, driven plates and drive plates at the same time.

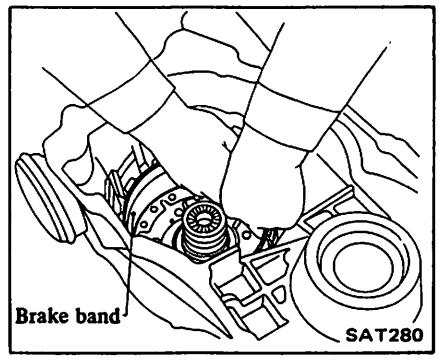


34. Remove high-reverse clutch (Front) assembly by turning it.

Check seal rings to ensure that they have not expanded. If they have, high-reverse clutch (Front) assembly will be hard to remove. If it is forcibly removed, seal rings may be damaged.

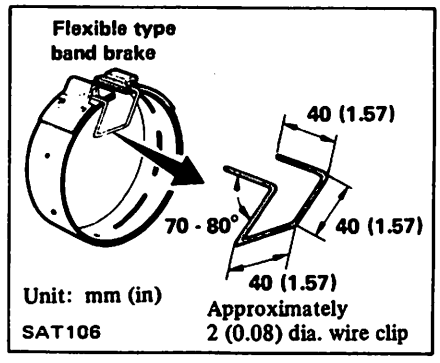


35. Remove brake band.

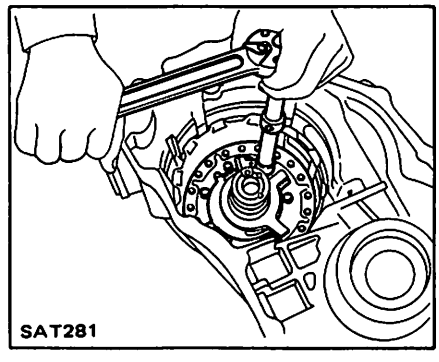


To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. Before removing the brake band, always secure it with a clip as shown in the figure below.

Leave the clip in position after removing the brake band.

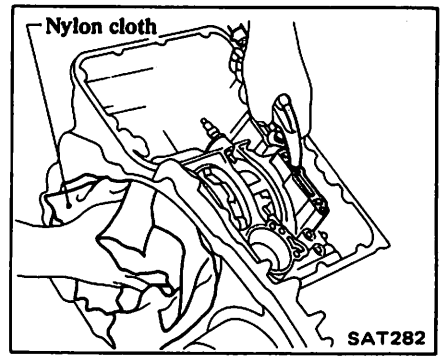


36. Remove low and reverse brake retainer.

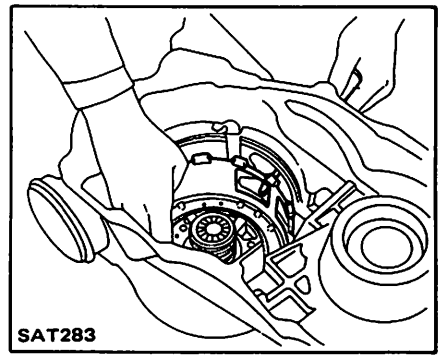


37. Remove low and reverse brake piston with compressed air.

Be sure to hold low and reverse brake piston with nylon cloth so that they do not jump out.

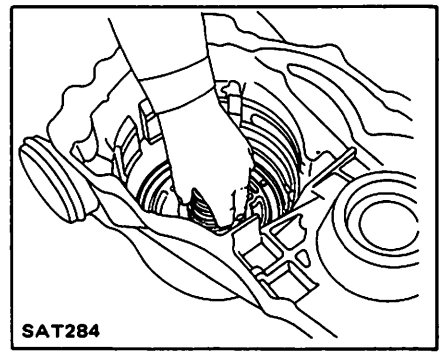


If compressed air is not available, remove it with a screwdriver.

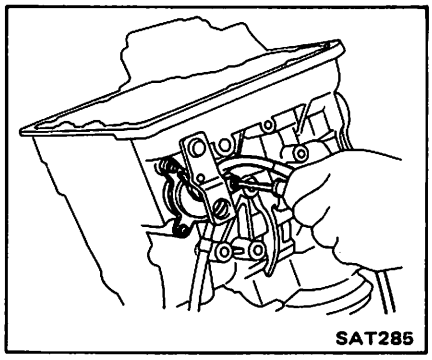


38. Remove oil pump assembly, thrust washer and thrust needle bearing.

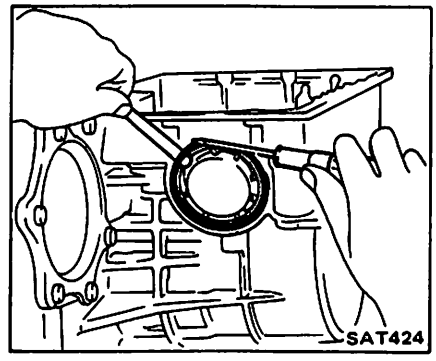
The oil pump and transmission case fit loosely, but the clearance is very small. So always lift it straight out of transmission case.



39. Remove inhibitor switch.



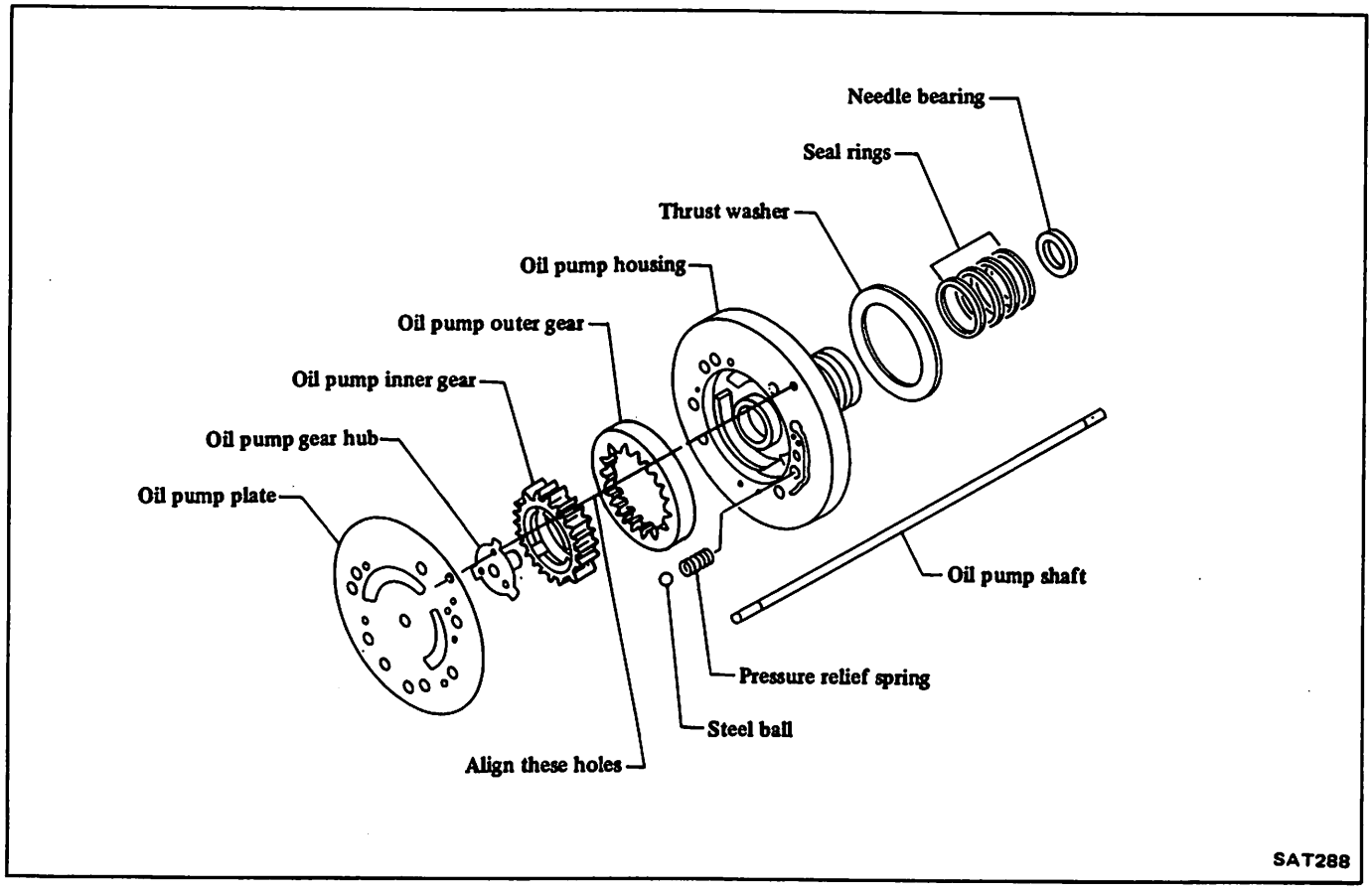
40. Remove band servo piston and return spring. Then, transmission case can be removed.



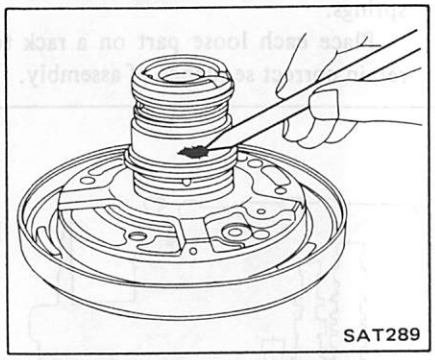
COMPONENT PARTS

The transaxle consists of many small parts that are quite alike in construction yet machined to very close tolerances. When disassembling parts, be sure to place them in order in parts rack so they can be put back in the unit in their proper positions. All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspeciton or reassembly. Gaskets, seals and similar parts should be replaced. It is also very important to perform functional tests whenever it is designated.

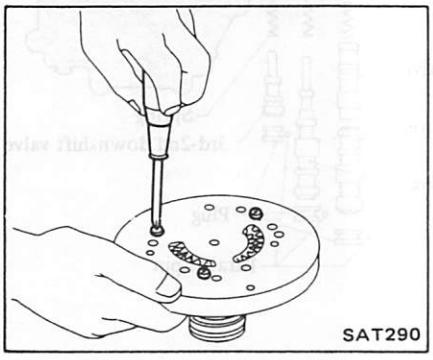
OIL PUMP



1. Inspect oil pump body, oil pump shaft and ring groove areas for wear.



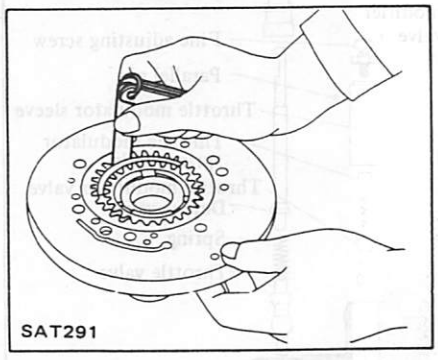
2. Remove oil pump plate.



3. Inspect gears and all internal surfaces for faults and visible wear.
4. Measure clearance between outer gear and crescent.

Standard clearance:
0.20 - 0.30 mm
(0.0079 - 0.0118 in)

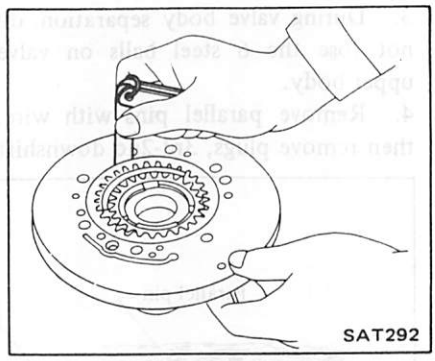
Repalce if the clearance exceeds **0.35 mm (0.0138 in).**



5. Measure clearance between outer gear and pump housing.

Standard clearance:
0.20 - 0.30 mm
(0.0079 - 0.0118 in)

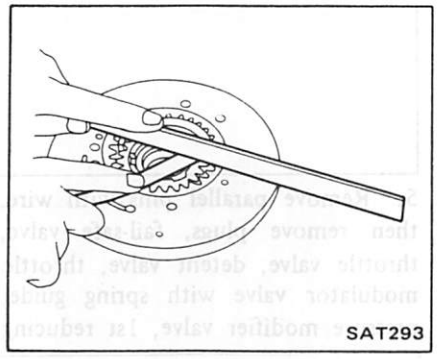
Replace if the clearance exceeds **0.35 mm (0.0138 in).**



6. Using a feeler gauge and straight edge, measure clearance between gears and pump plate.

Standard clearance:
0.02 - 0.04 mm
(0.0008 - 0.0016 in)

Replace if the clearance exceeds **0.08 mm (0.0031 in).**



Select oil pump inner and outer gears of the proper thickness from among those in the following table before installation.

Oil pump outer gear

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31347-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31347-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31347-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31347-01X03

Oil pump inner gear

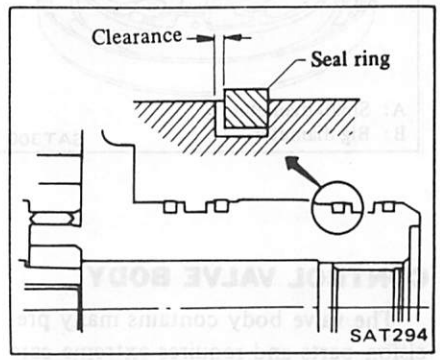
Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31346-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31346-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31346-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31346-01X03

7. Measure clearance between seal ring and ring groove.

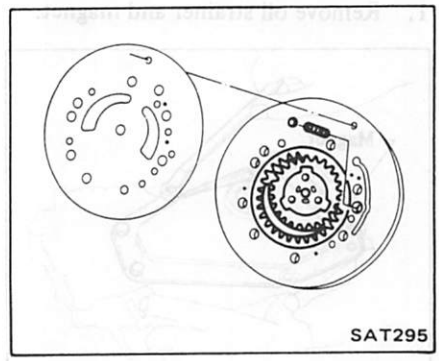
Standard clearance:
0.10 - 0.25 mm
(0.0039 - 0.0098 in)

Replace if the clearance exceeds **0.25 mm (0.0098 in).**

Of course, it is good practice to replace all seal rings during an overhaul.

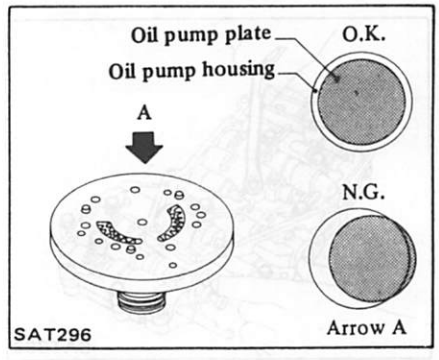


8. Install oil pump gear hub, pressure relief spring and steel ball onto oil pump housing.



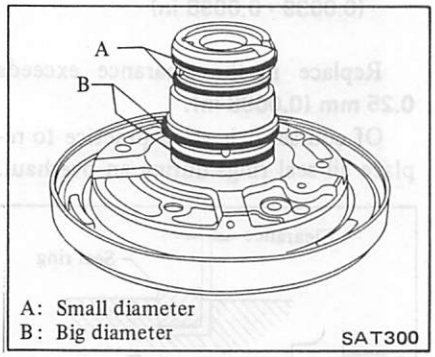
9. Install oil pump plate.

Do not allow periphery of oil pump plate to protrude beyond periphery of oil pump housing.



10. Install seal rings.

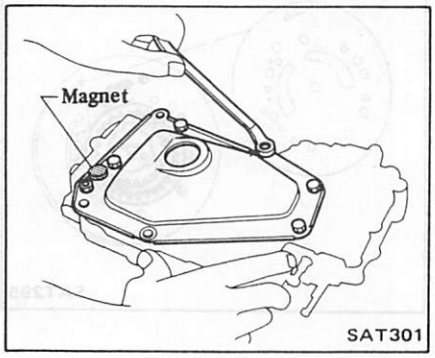
Refer to the following figure for proper locations of the two different types of seal rings.



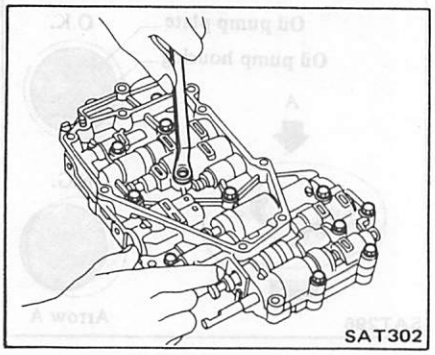
CONTROL VALVE BODY

The valve body contains many precision parts and requires extreme care when parts are removed and serviced. Place removed parts on a parts rack so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.

1. Remove oil strainer and magnet.

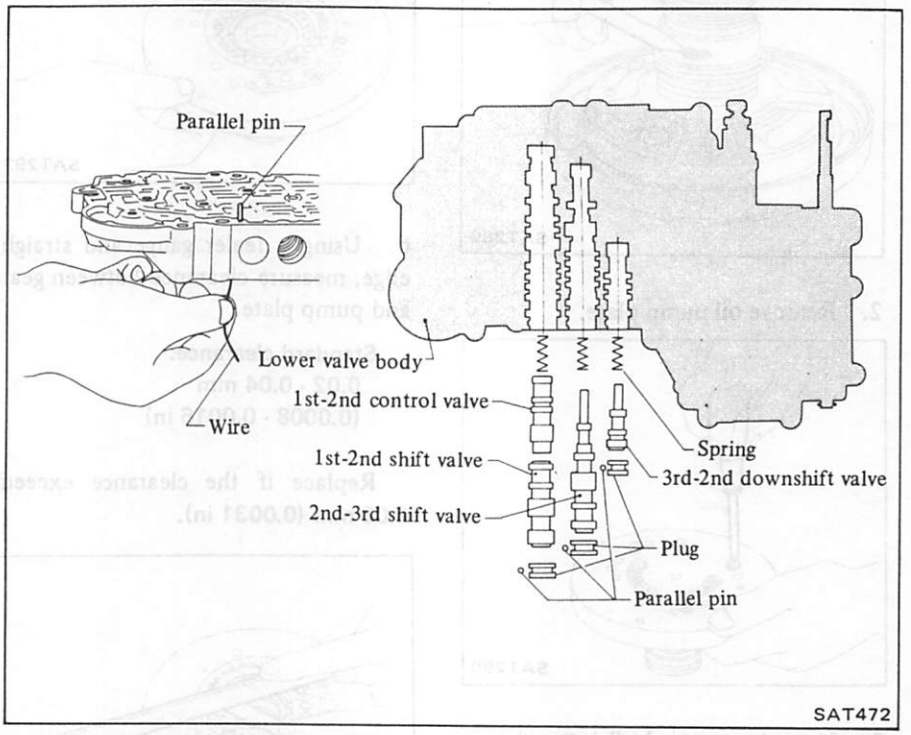


2. Disassemble valve body and its remaining attaching bolts and nuts to carefully separate lower body, separator plate and upper body.



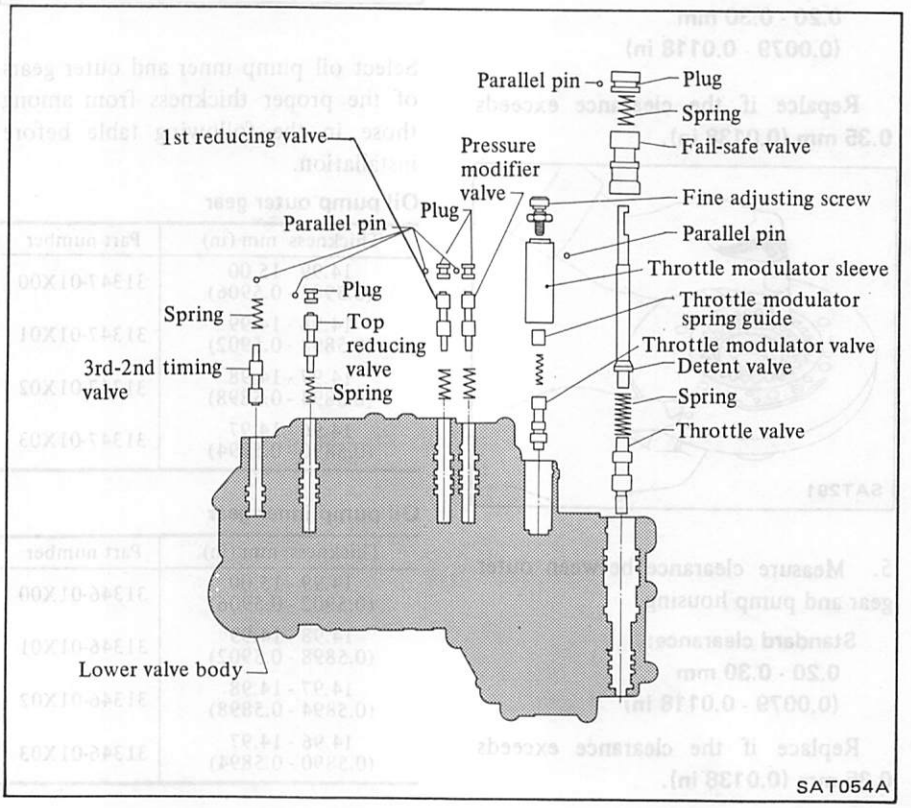
3. During valve body separation, do not lose the 6 steel balls on valve upper body.
4. Remove parallel pins with wire, then remove plugs, 3rd-2nd downshift valve, 2nd-3rd shift valve, 1st-2nd shift valve, 1st-2nd control valve and their springs.

Place each loose part on a rack to retain correct sequence of assembly.



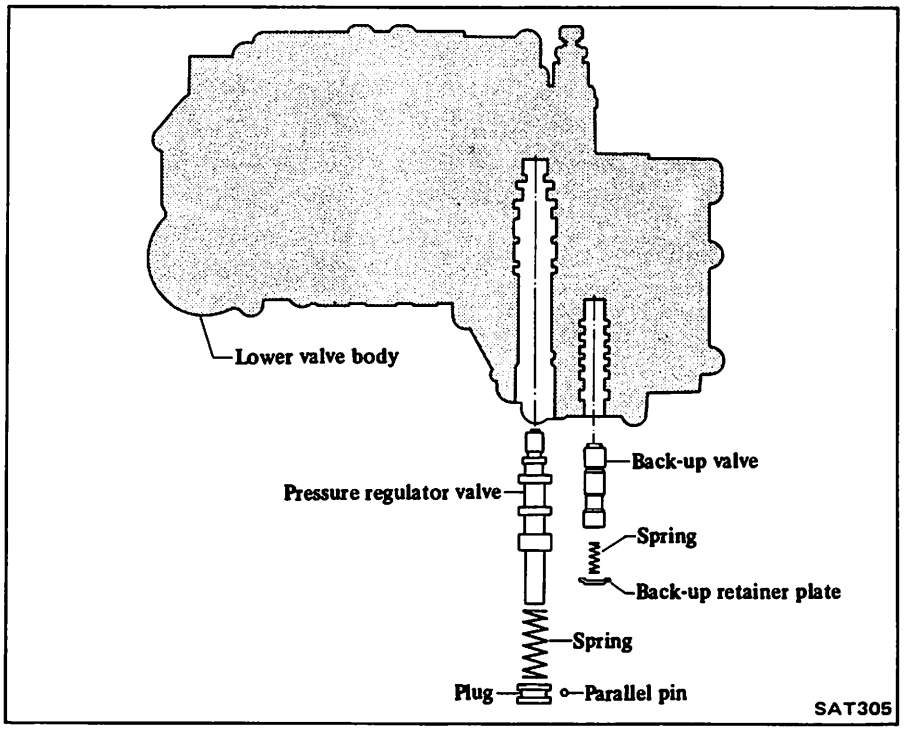
5. Remove parallel pins with wire, then remove plugs, fail-safe valve, throttle valve, detent valve, throttle modulator valve with spring guide, pressure modifier valve, 1st reducing valve, top reducing valve, 3rd-2nd timing valve and their springs.

Place each loose part on a rack to retain sequence of assembly.



6. Remove back up valve retaining plate by pressing its spring with small screwdriver. Remove parallel pin, then remove plug, pressure regulator valve and its spring.

Place each loose part on a rack to retain sequence of assembly.



Manual valve was removed when valve body was removed from transaxle. Include valve in subsequent inspection and service sequence.

Precaution for inspection

A newly manufactured valve body represents precision manufactured valves assembled with close tolerances into precision bores of the valve body. If inspection reveals excessive clearances, 0.03 mm (0.0012 in) or more, between the valves and the valve body bores, replace the entire valve body rather than attempt rework.

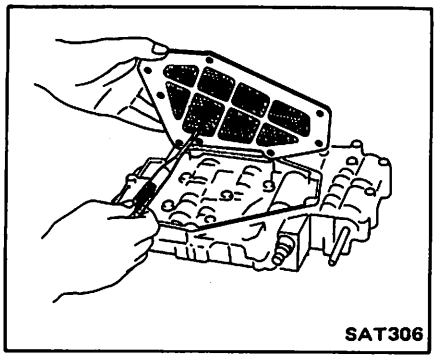
If one or more valves are sticking from varnish deposits or burns resulting from deteriorated oil or overheating, you may be able to clean the valves and valve bodies. **Always use crocus cloth**, which is a very fine type of cutting material. **Never use emery cloth**, as it is too coarse and can scratch the valves or valve bores. Scratches can lead to future deposits of varnish or foreign matter.

During cleaning, do not remove the sharp edges of the valve. When edges are rounded or scratched, entry is provided for dirt or foreign matter to work into the sides of the valves and hinder valve movement.

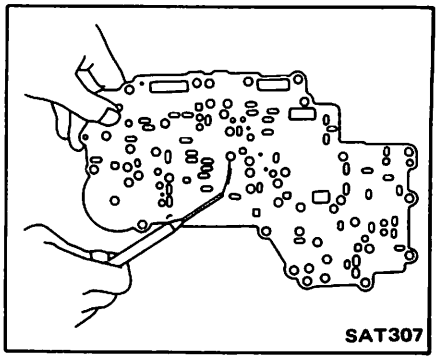
The valves may be cleaned using alcohol or lacquer thinner. The valve bodies can be dip cleaned with a good carburetor cleaner or lacquer thinner. **Do not leave valve bodies submerged in carburetor cleaner longer than five minutes. Rinse parts thoroughly and dry.**

Lubricate all parts in clean automatic transaxle fluid before reassembly.

7. Check valves for signs of burning. Replace if beyond clean-up.
8. Check oil strainer for general condition. Replace if necessary.

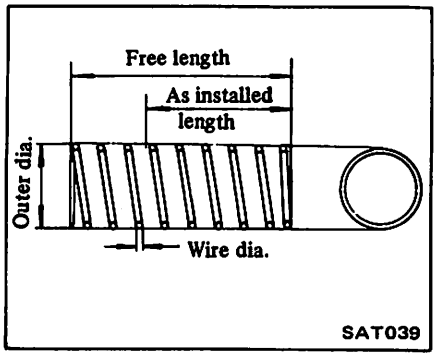


9. Check separator plate for scratches or damage. Replace if necessary. Scratches or score marks can cause oil to bypass correct oil passages and result in system malfunction.



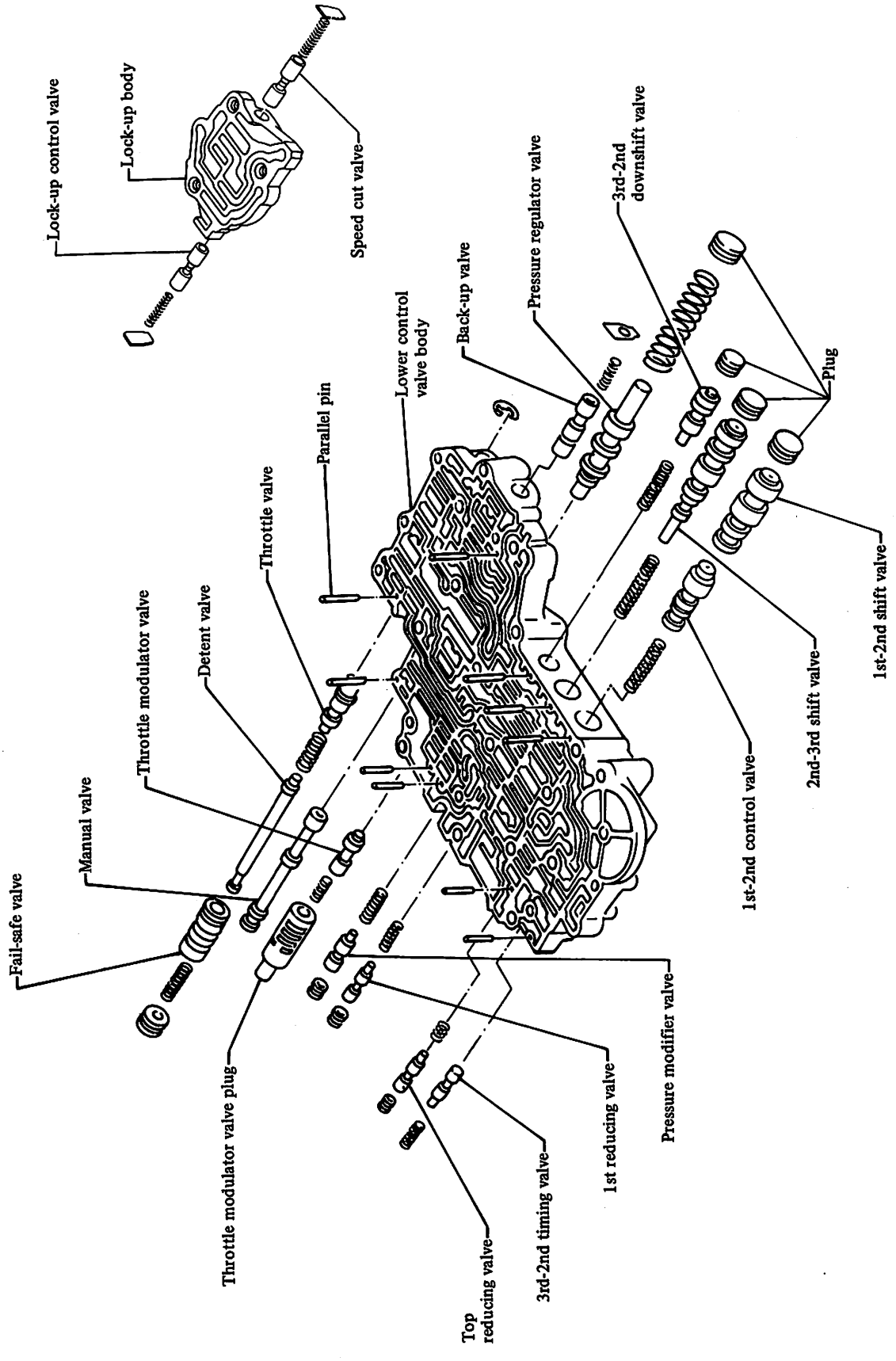
10. Check oil passages in upper and lower valve bodies for varnish deposits, scratches or other damage that would impair valve movement. Check threaded holes and related bolts and screws for stripped threads; replace as needed.
11. Test valve springs for weakened load condition. Refer to Valve Body Spring Chart for spring specifications.

Valve body spring chart



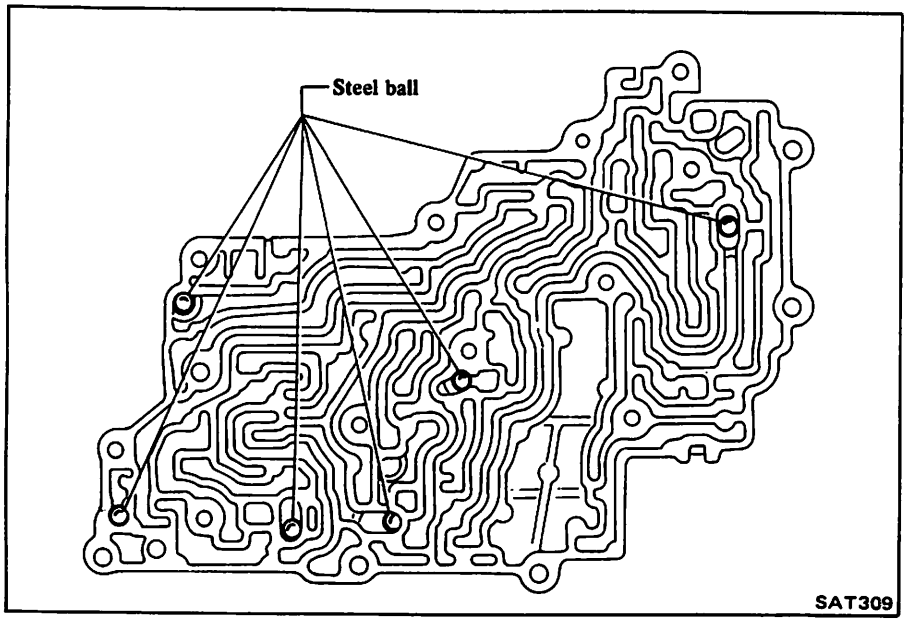
Valve spring	Free length mm (in)
Pressure regulator valve	46.4 (1.827)
Throttle valve	33.4 (1.315)
Fail-safe valve	23.1 (0.909)
Throttle modulator valve	22.5 (0.886)
Pressure modifier valve	25.1 (0.988)
1st reducing valve	21.4 (0.843)
3rd-2nd timing valve	20.6 (0.811)
Back-up valve	18.8 (0.740)
1st-2nd shift valve	38.9 (1.531)
2nd-3rd shift valve	45.7 (1.799)
3rd-2nd downshift valve	38.9 (1.531)
Speed cut valve	19.7 (0.776)
Lock-up control valve	20.6 (0.811)
Top reducing valve	20.6 (0.811)

12. Assemble all parts into lower valve body in the reverse order of disassembly.



SAT050A

13. Reinstall the six steel balls in upper valve body.



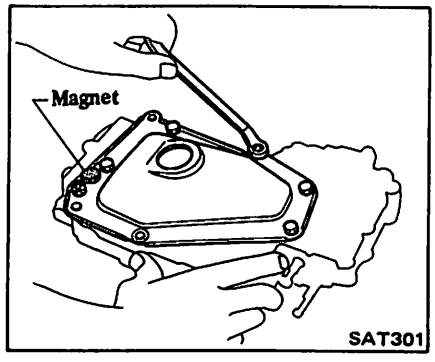
14. Assemble separator plate and lower valve body on upper valve body, then tighten bolts.

When installing these bolts, first be sure to install the two reamer bolts to their original positions.

Ⓣ : **Lower valve body to upper valve body securing bolts:**
7 - 9 N·m
(0.7 - 0.9 kg-m,
5.1 - 6.5 ft-lb)

Accumulator support plate securing bolt:
3.4 - 4.4 N·m
(0.35 - 0.45 kg-m,
2.5 - 3.3 ft-lb)

15. Install oil strainer and magnet.



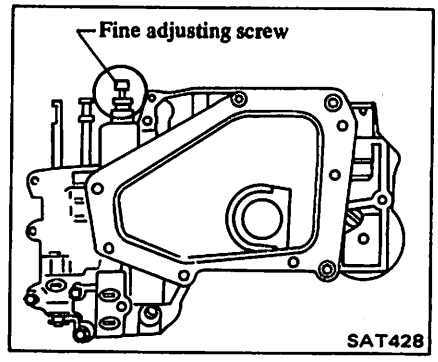
Ⓣ : **Oil strainer to valve body**
7 - 9 N·m
(0.7 - 0.9 kg-m,
5.1 - 6.5 ft-lb)

The manual valve is inserted into the valve body when the latter is installed in the transaxle.

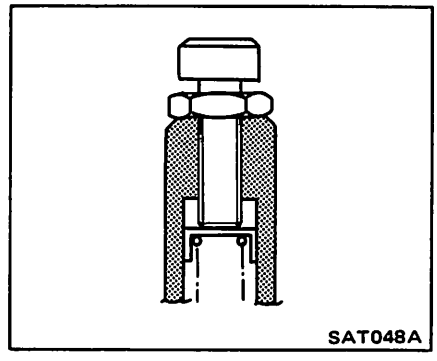
Fine adjusting screw

The fine adjusting screw provides a maximum fine adjustment of approximately 5 km/h (3 MPH).

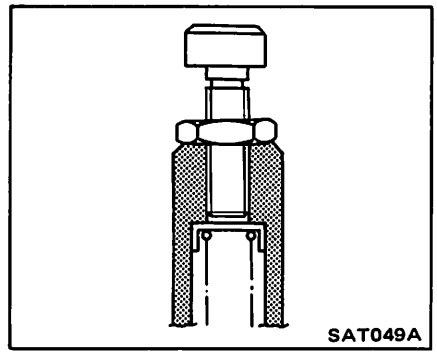
Tightening it causes the shifting point to occur at a lower point, and vice versa, except in the "kickdown" range.



(1) Tighten adjusting screw all the way.



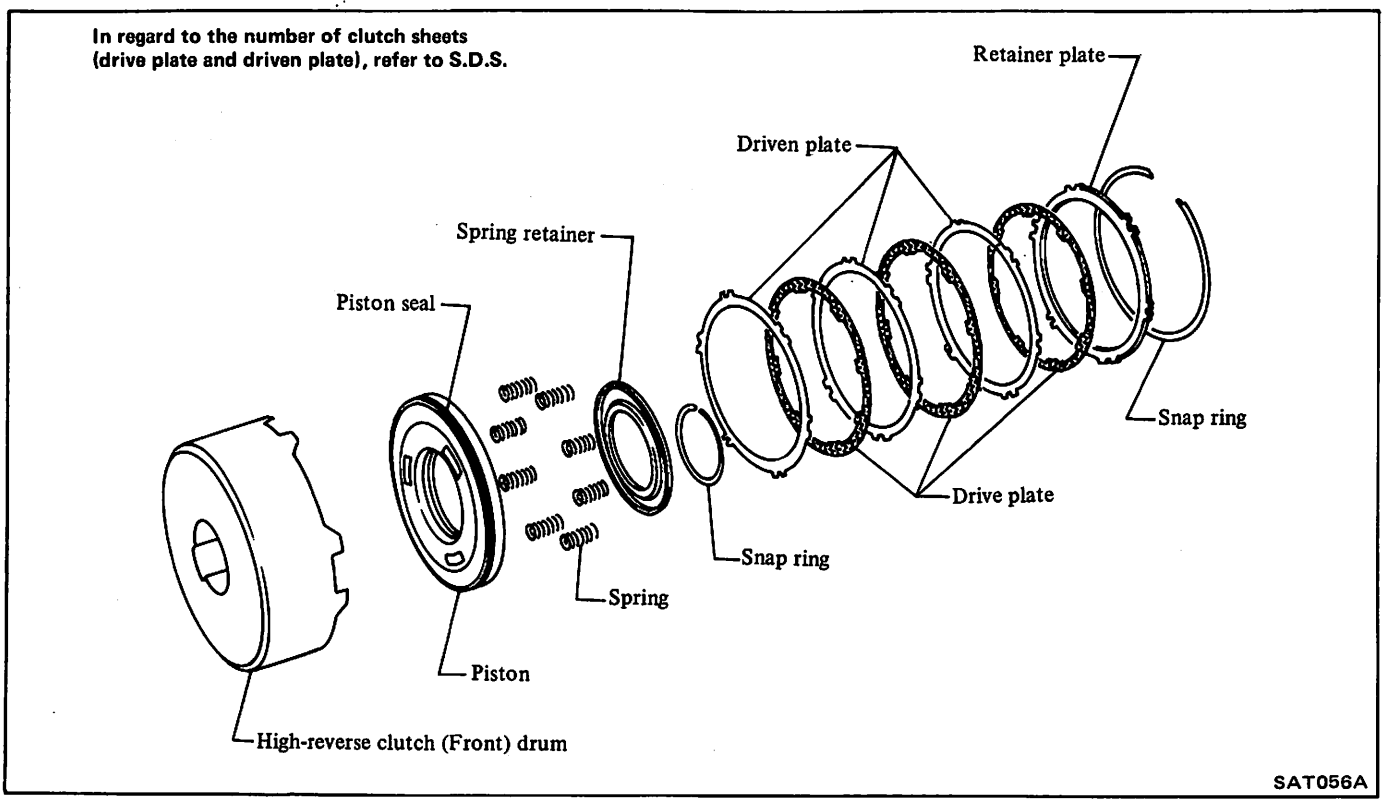
(2) Then back off by 6 and a half turns.



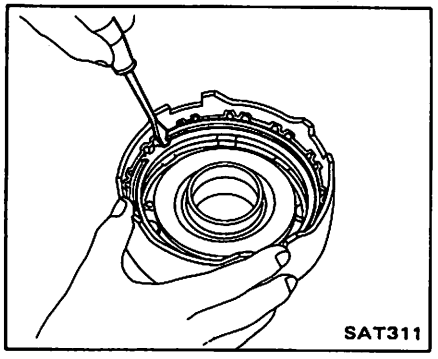
(3) Tighten lock nut.

Ⓣ : **Lock nut**
3.4 - 4.4 N·m
(0.35 - 0.45 kg-m,
2.5 - 3.3 ft-lb)

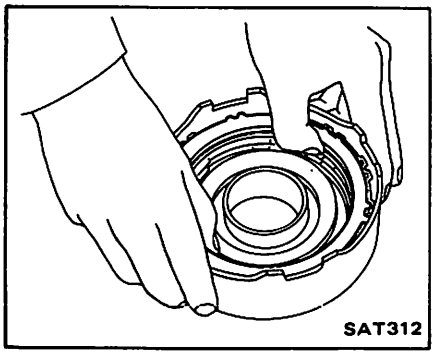
HIGH-REVERSE CLUTCH (Front)



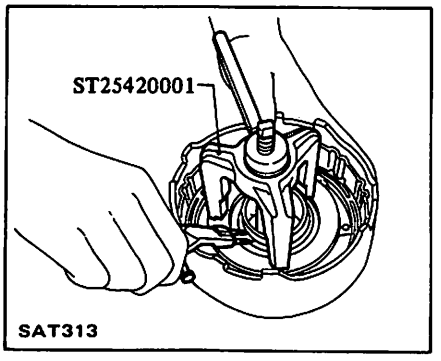
1. Using a screwdriver, remove large clutch retaining plate snap ring.



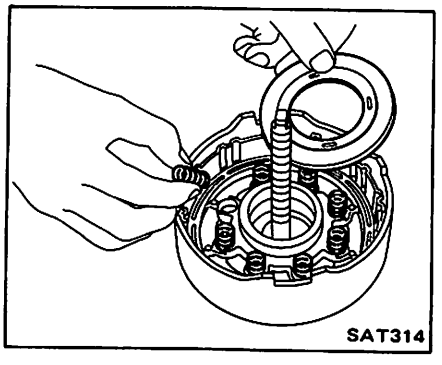
2. Remove clutch plates assembly.



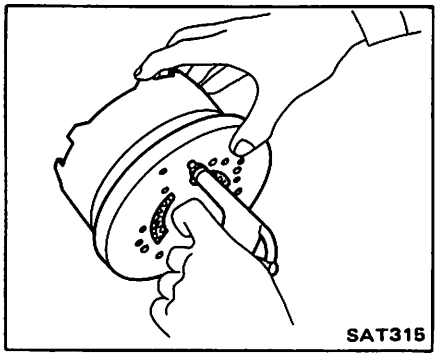
3. Compress clutch springs and remove snap ring from spring retainer.



4. Remove spring retainer and springs.



5. For easy removal of piston from drum, use an air gun with a tapered rubber tip and carefully apply air pressure to loosen piston from drum.



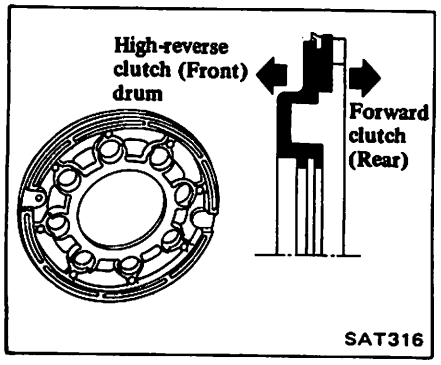
6. Check clutch drive plate facing for wear or damage. Drive plate thickness must not be less than **1.4 mm (0.055 in)**.

Standard drive plate thickness:
1.50 - 1.65 mm
(0.0591 - 0.0650 in)

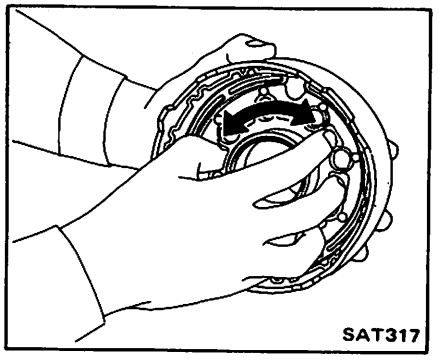
7. Check for wear on snap ring, weak or broken coil springs and warped spring retainer.

8. Lubricate clutch drum bushing and install inner seal and piston seal as illustrated. *Be careful not to stretch seals during installation.*

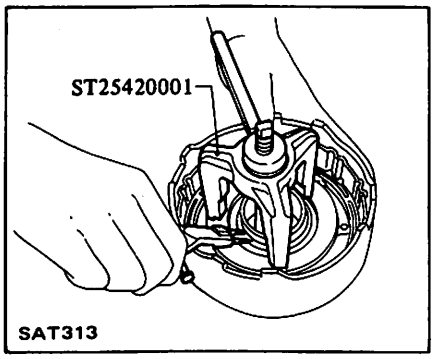
a. Never assemble clutch dry; always lubricate its components thoroughly.
b. Always install piston seal in direction shown in figure below.



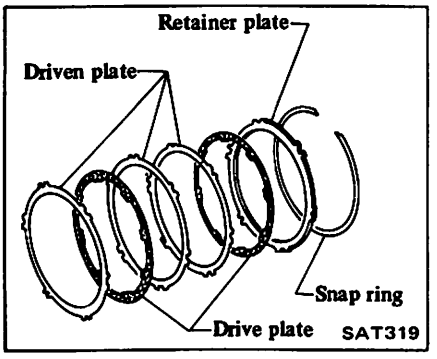
9. Assemble piston, being careful not to allow seal to kink or become damaged during installation. After installing, turn piston by hand to ensure that there is no binding.



10. Reassemble springs and retainer. Reinstall snap ring. Be sure snap ring is properly seated.



11. Install driven plates (steel plate) and drive plates (friction plate) in the order shown below. Then install retainer plate and snap ring.



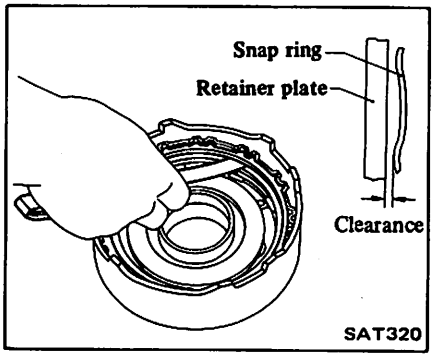
12. Measure the clearance between the retainer plate and the wave type snap ring (Fig. SAT 320). Do not compress the wave type snap ring when measuring the clutch clearance. When correctly measured there should only be light contact pressure between the retainer plate, the feeler gauge and the low point of the wave type snap ring.

Specified clearance:
Standard
1.0 - 1.4 mm (0.039 - 0.055 in)
Allowable limit
2.6 mm (0.102 in)

If necessary, try other retaining plates having different thicknesses until correct clearance is obtained.

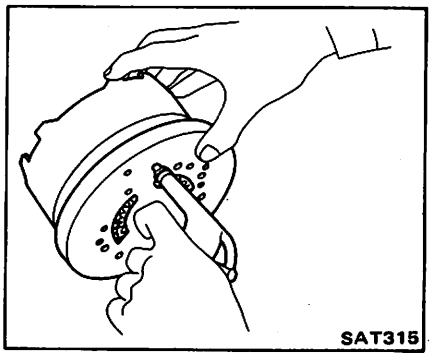
Available retainer plate

Thickness mm (in)	Part number
3.4 (0.134)	31537-01X05
3.6 (0.142)	31537-01X00
3.8 (0.150)	31537-01X01
4.0 (0.157)	31537-01X02
4.2 (0.165)	31537-01X03
4.4 (0.173)	31537-01X04

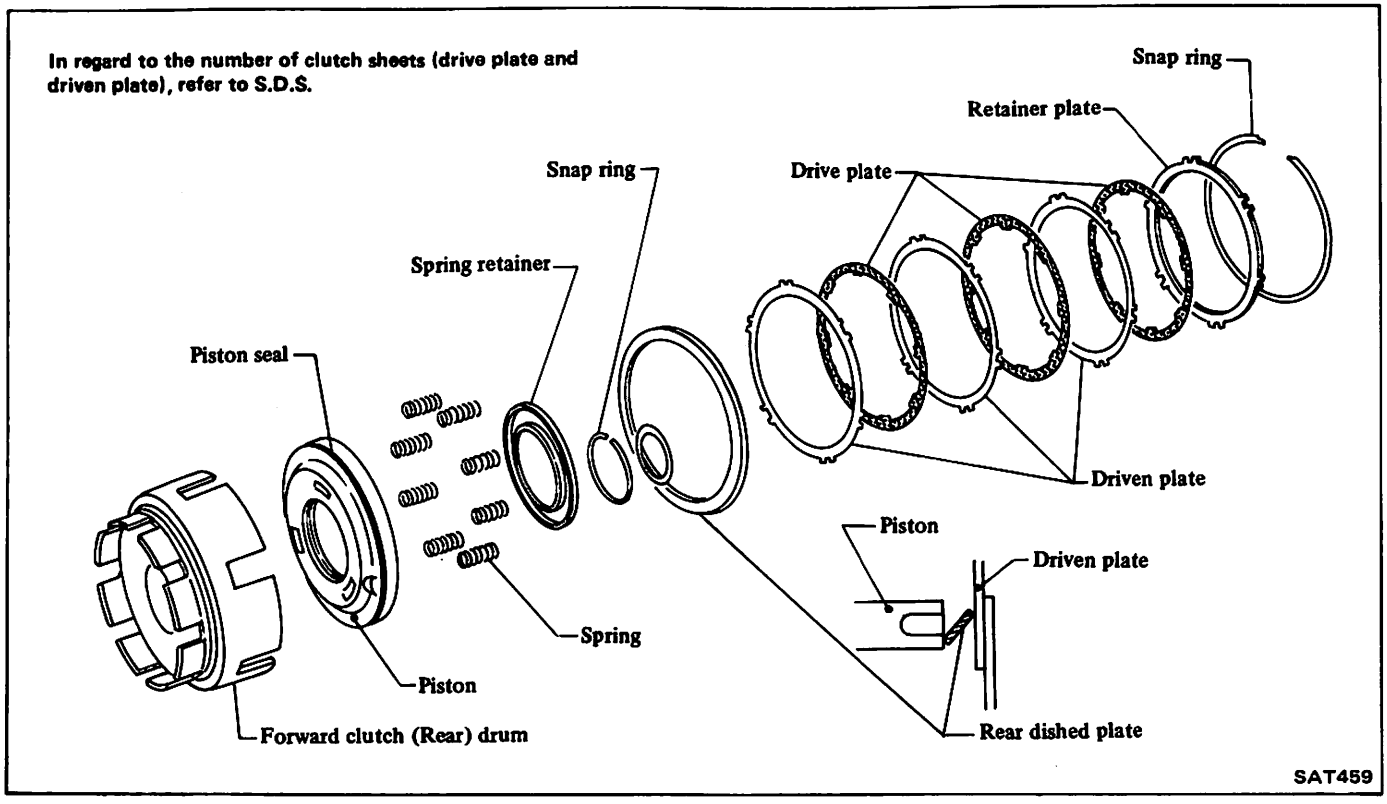


13. Testing high-reverse clutch (Front)

With high-reverse clutch (Front) assembled on oil pump housing, direct a jet of air into hole in clutch drum for definite clutch operation.

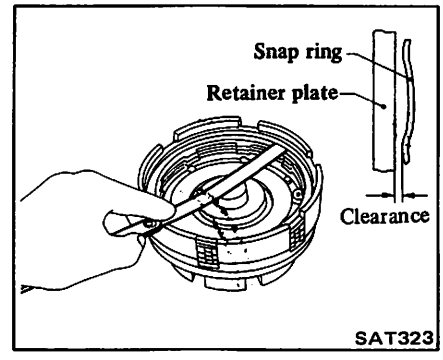


FORWARD CLUTCH (Rear)



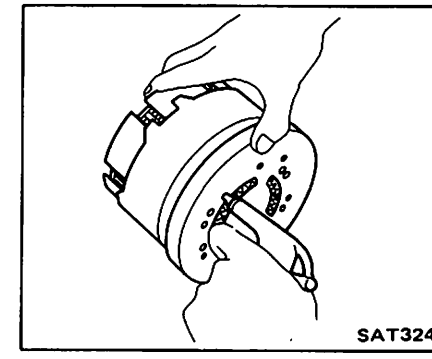
Service procedures for forward clutch (Rear) are essentially the same as those for high-reverse clutch (Front), with the following exception:

Standard drive plate thickness:
1.70 - 1.85 mm
(0.0669 - 0.0728 in)
Allowable limit
1.60 mm (0.0630 in)
Specified clearance between retainer plate and snap ring:
Standard
0.5 - 0.8 mm
(0.020 - 0.031 in)
Allowable limit
2.8 mm (0.110 in)

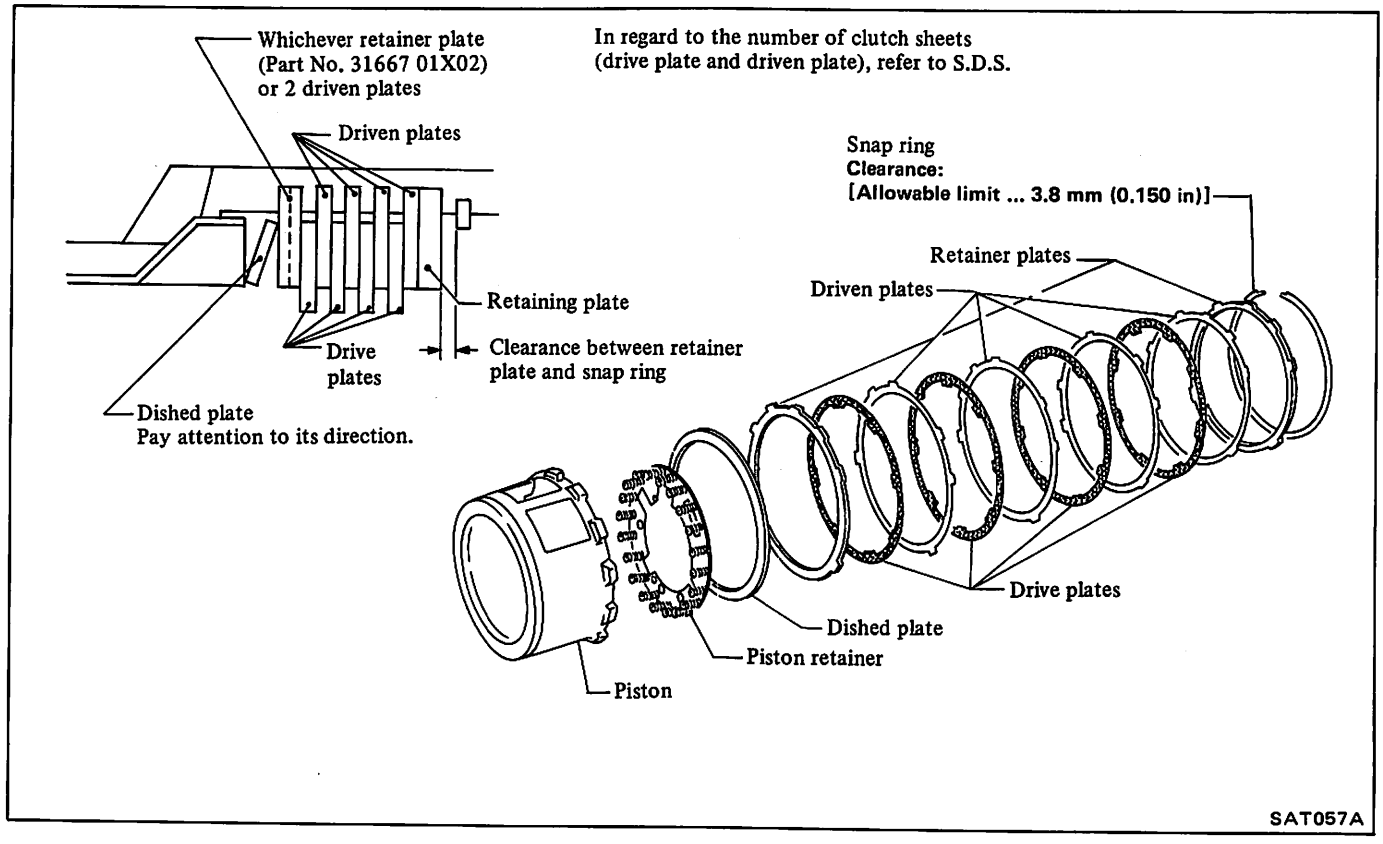


In regard to thickness of retainer plate, refer to S.D.S.

Test forward clutch (Rear)



LOW & REVERSE BRAKE



- Examine low and reverse brake for damaged clutch drive plate facing and worn snap ring.
- Check drive plate facing for wear or damage; if necessary, replace.

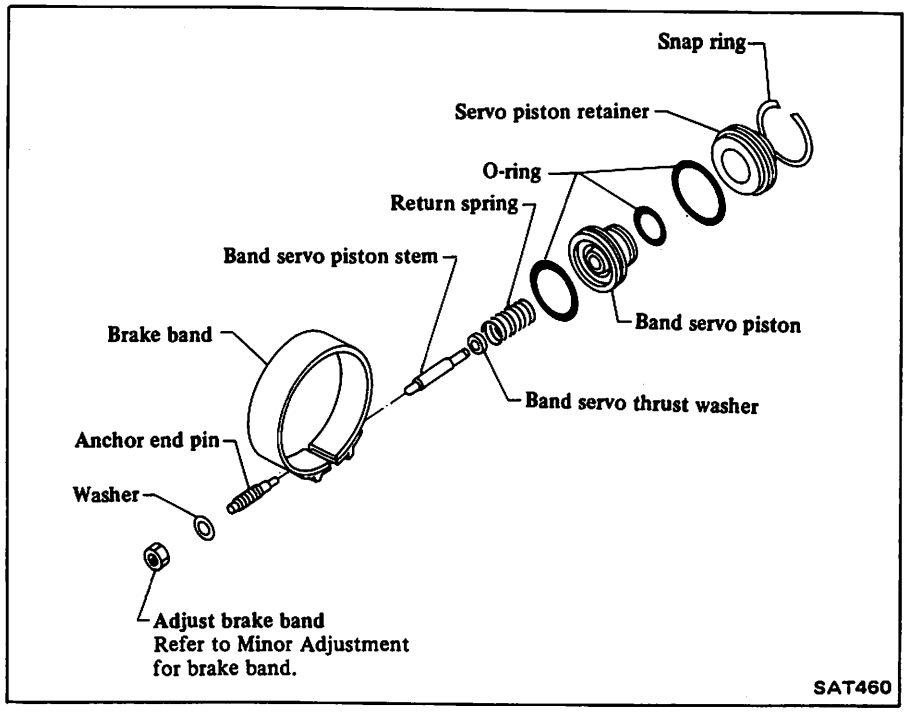
Drive plate thickness:
Standard
1.90 - 2.05 mm
(0.0748 - 0.0807 in)
Allowable limit
1.8 mm (0.071 in)

Specified clearance between retainer plate and snap ring:
Standard
1.90 - 2.20 mm
(0.0748 - 0.0866 in)
Allowable limit
3.8 mm (0.150 in)

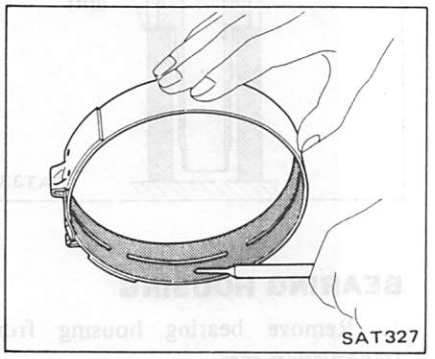
In regard to thickness of retainer plate, refer to S.D.S.

- Test piston return spring for weakness. Discard if it is too weak.

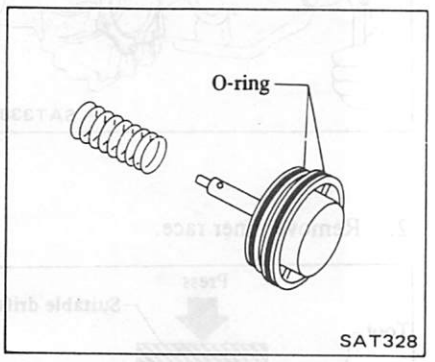
BRAKE BAND AND BAND SERVO



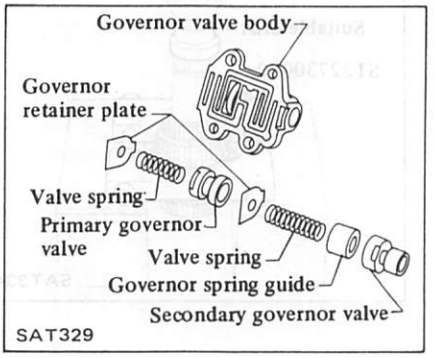
- Inspect band friction material for wear. If cracked, chipped or burnt spots are apparent, replace the band.



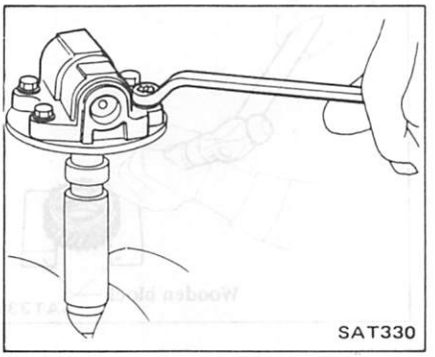
- Check band servo components for wear and scoring. Replace piston O-rings and all other components as necessary.



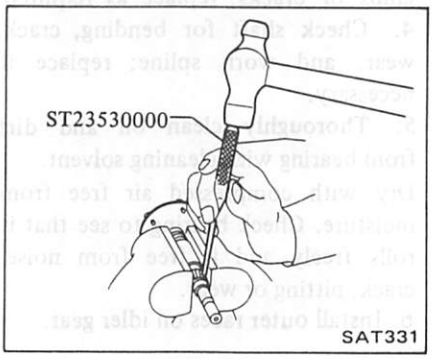
GOVERNOR



- Remove governor body from governor shaft.



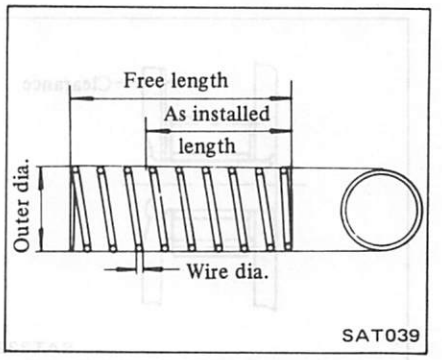
- Remove governor worm.



- Disassemble governor and check valves for indication of burning or scratches. Inspect springs for weakness or burning. Replace parts as necessary and reassemble.

Do not interchange components of primary and secondary governor valves.

Governor valve spring chart



- Assemble governor on governor shaft.

Ⓣ: **Governor valve body to governor shaft**
5 - 7 N·m
(0.5 - 0.7 kg-m, 3.6 - 5.1 ft-lb)

Valve spring	Free length mm (in)
Primary governor	31.7 (1.248)
Secondary governor	38.2 (1.504)

PLANETARY CARRIER

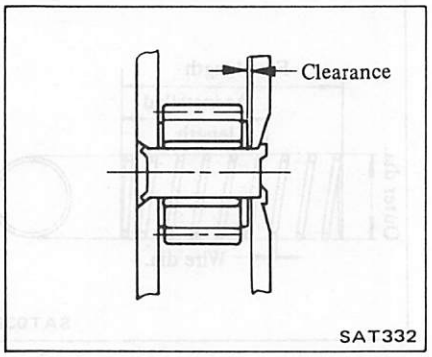
The planetary carrier cannot be divided into its individual components.

If any part of the component is faulty, replace the carrier as a unit.

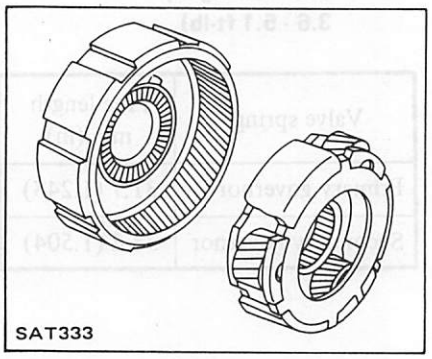
- Check clearance between pinion washer and planetary carrier with a feeler.

Standard clearance:
0.20 - 0.70 mm
(0.0079 - 0.0276 in)

Replace if the clearance exceeds **0.80 mm (0.0315 in).**

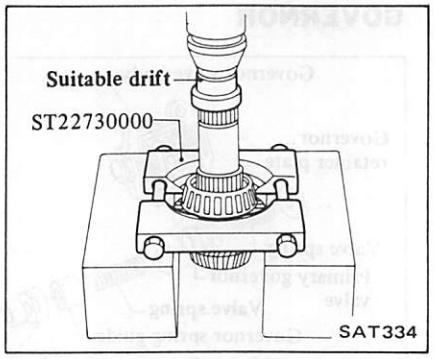


- Check planetary gear sets for damaged or worn gears. Gear sets that have been damaged by overheating will have a blue discoloration.

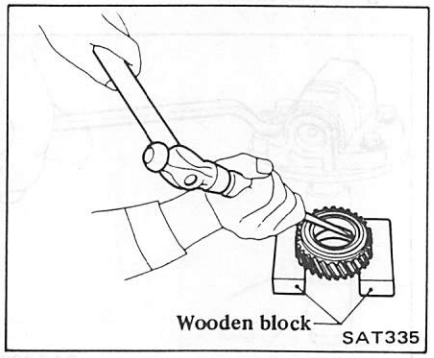


OUTPUT SHAFT AND IDLER SHAFT

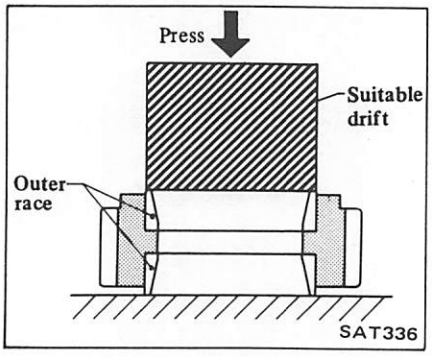
1. Remove inner races from output shaft.



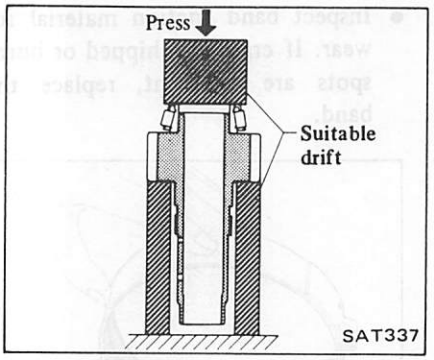
2. Remove outer races from idler gear.



3. Check all gears for excessive wear, chips or cracks; replace as required.
4. Check shaft for bending, crack, wear, and worn spline; replace if necessary.
5. Thoroughly clean oil and dirt from bearing with cleaning solvent. Dry with compressed air free from moisture. Check bearing to see that it rolls freely and is free from noise, crack, pitting or wear.
6. Install outer races on idler gear.

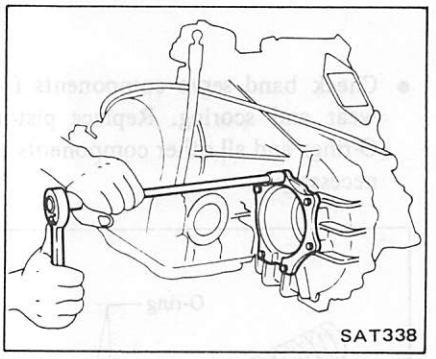


7. Install inner races on output shaft.

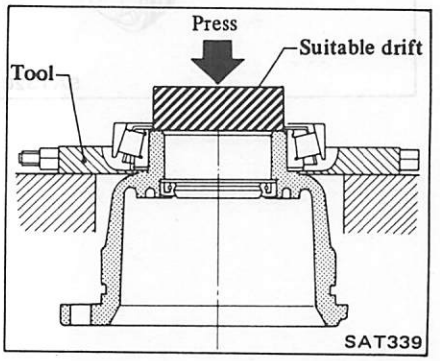


BEARING HOUSING

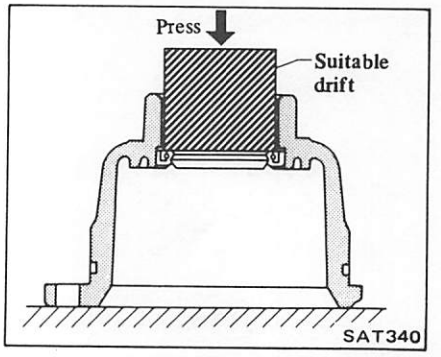
1. Remove bearing housing from transmission case.



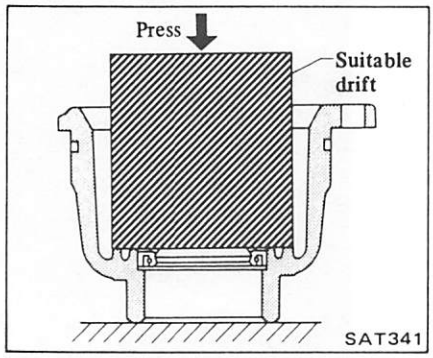
2. Remove inner race.



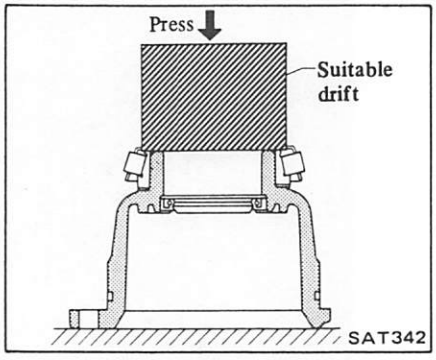
3. Remove oil seal and O-ring.



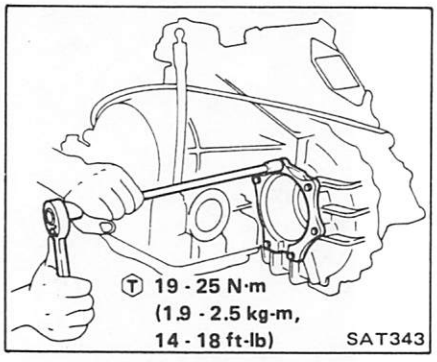
4. Apply coat of gear oil to seal surface and O-ring, then drive new seal and O-ring into place.



5. Install inner race.



6. Install bearing housing.



ADJUSTING ROTARY FRICTIONAL FORCE OF TAPERED ROLLER BEARING

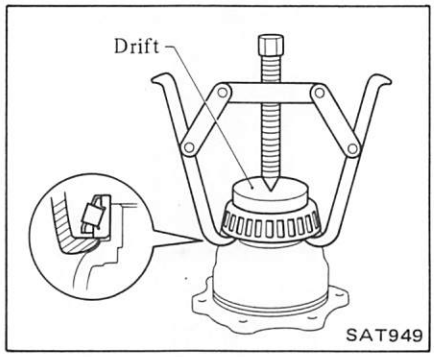
Before assembling automatic transaxle, be sure to adjust rotary frictional force of each tapered roller bearing first.

FINAL DRIVE

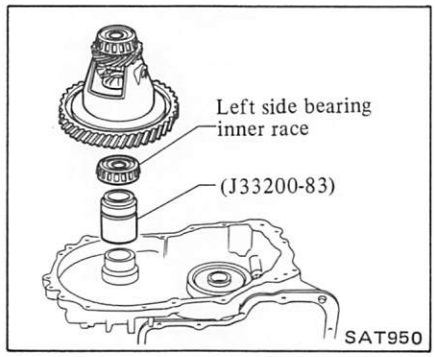
If transmission case, bearing housing, tapered roller bearing, differential case or converter housing is replaced, final drive should be adjusted. Adjusting procedures are basically the same as those for final drive of manual transaxle. Rotary frictional force is adjusted by selecting shims of appropriate thickness.

Adjusting procedures

1. Remove left side bearing inner race and shim(s) from bearing retainer.



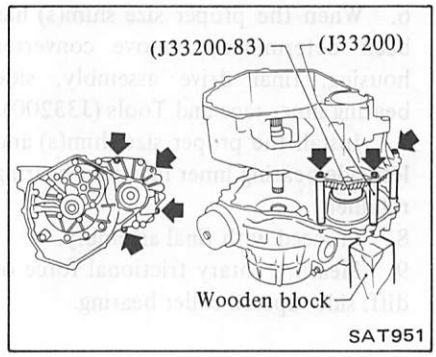
2. Place Tool and the following parts in transmission case.



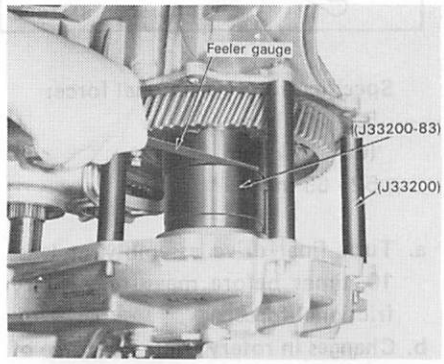
Gasket must be installed on transmission case.

3. Position four spacers so they are evenly spaced around transmission case and install converter housing. Then tighten bolts alternately to the specified torque.

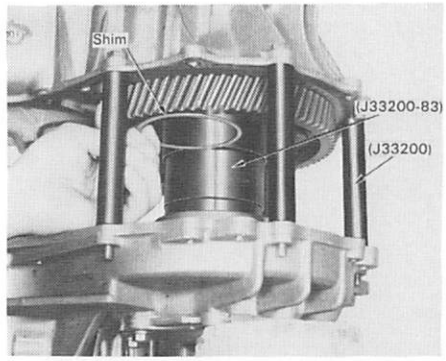
Ⓣ : 14 N·m
(1.4 kg-m, 10 ft-lb)



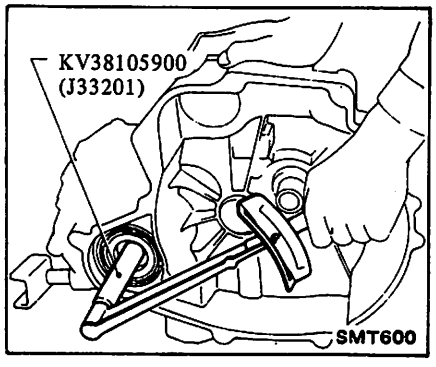
4. Rotate final drive assembly a few times to ensure proper seating.
5. To find the correct shim size, use method (1) or (2) described below.
(1) Using a feeler gauge, measure the widest gap around Tool for the proper shim size to be installed.



(2) If shims are available, find the largest shim that can be placed into the gap at any point around Tool. This will be the correct shim size to use.



6. When the proper size shim(s) has been determined, remove converter housing, final drive assembly, side bearing inner race and Tools (J33200).
7. Install the proper size shim(s) and left side bearing inner race into bearing retainer.
8. Proceed with final assembly.
9. Measure rotary frictional force of diff. side tapered roller bearing.



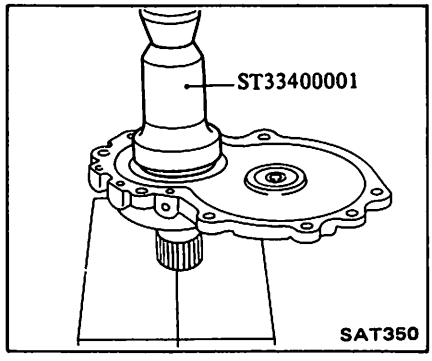
Specified rotary frictional force:
5.9 - 7.4 N·m
(60 - 75 kg-cm,
52 - 65 in-lb)

a. Turn final drive assembly at least 10 times before measuring rotary frictional force.
b. Changes in rotary frictional force of final drive assembly per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.
c. If any abnormalities are noted in b. above, or rotary frictional force is outside the specified range, disassemble and reassemble again.

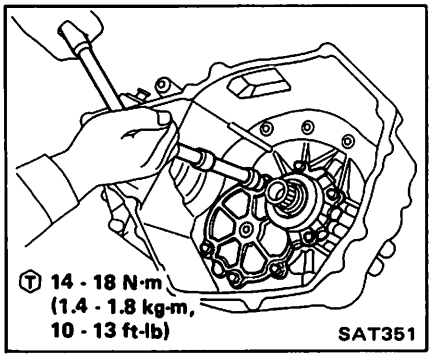
OUTPUT SHAFT

If transmission case, output shaft, tapered roller bearing or front cover is replaced, output shaft should be adjusted by means of shims.

1. Apply automatic transaxle fluid to bearing outer race.
2. Press bearing outer race into bore in transmission case.
3. Install two or three shims on front cover, and press bearing outer race into bore in front cover.



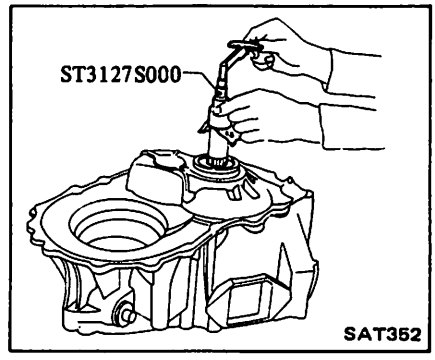
4. Install gasket and front cover on converter housing.



5. Measure rotary frictional force of output shaft.

Specified rotary frictional force:
0.35 - 0.47 N·m
(3.6 - 4.8 kg-cm,
3.1 - 4.2 in-lb)

a. Turn output shaft at least 10 times before measuring rotary frictional force.
b. Ensure that output shaft turns smoothly without binding.
c. If any abnormalities are noted in b. above, or rotary frictional force is outside specified range, disassemble and reassemble again.



Available shims:
Refer to S.D.S.

6. Remove front cover and withdraw output shaft.

IDLER GEAR

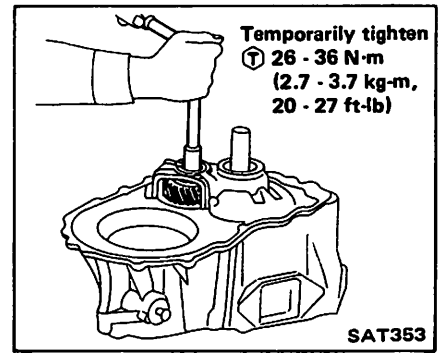
1. Press bearing outer races onto idler gear.
2. Assemble bearing inner races and idler shaft to idler gear.
3. Attach idler gear assembly and output shaft assembly to converter housing.
4. Install gasket and front cover on converter housing as follows:
(1) Clean threads of bolts and converter housing with solvent.
(2) Apply locking sealer to threads of bolts and install them into place.

Ⓣ : 14 - 18 N·m
(1.4 - 1.8 kg-m,
10 - 13 ft-lb)

5. Install lock washer and idler gear bolt, and tighten bolt to specified torque.

Be sure to align lock washer with groove on converter housing.

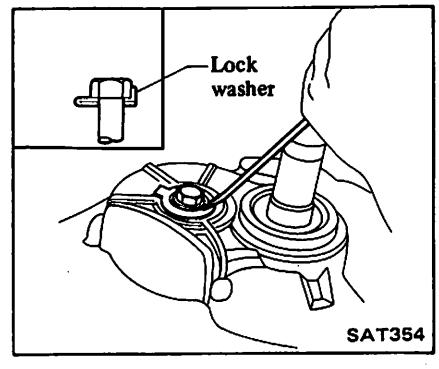
Ⓣ : 26 - 36 N·m
(2.7 - 3.7 kg-m,
20 - 27 ft-lb)



6. After tightening bolt, turn output shaft five complete rotations. Loosen idler gear bolt, then tighten it to specified torque.

Ⓣ : 3 - 4 N·m
(0.3 - 0.4 kg-m,
2.2 - 2.9 ft-lb)

7. Bend lock washer.

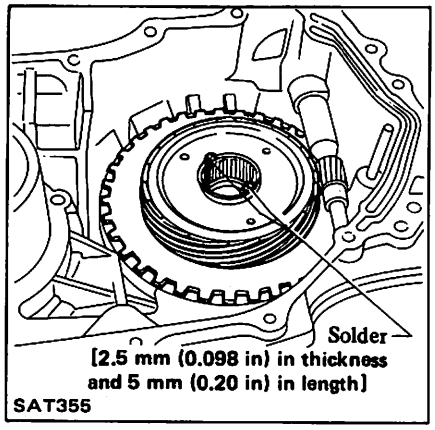


ADJUSTING END PLAY OF OUTPUT SHAFT

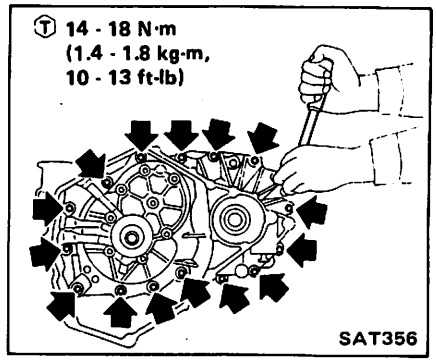
1. After adjusting rotary frictional force of tapered roller bearing used with output shaft, put solder on rear internal gear.

a. Be sure to use fuse of 2.5 mm (0.098 in) in diameter or soldering plate of 2.5 mm (0.098 in) in thickness and 5 mm (0.20 in) in length, as maximum gear clearance is 2.3 mm (0.091 in). [If diameter or thickness is smaller than 2.5 mm (0.098 in), also use shim(s).]

b. Always install two fuses or soldering plates symmetrically over the periphery of internal gear.



2. Install converter housing and output shaft assembly as a unit on transmission case.



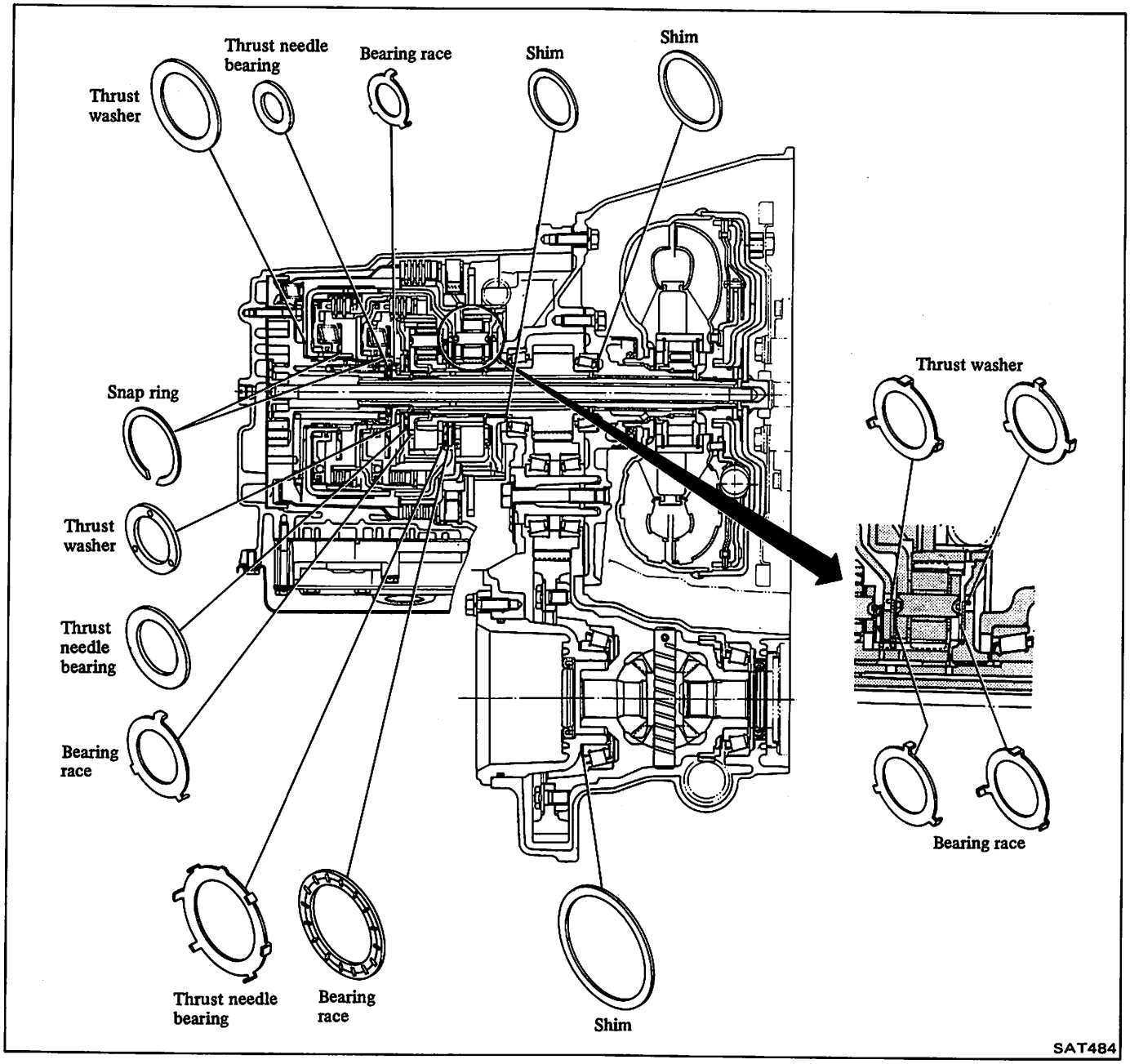
3. Disassemble output shaft assembly and remove soldering plate.

4. Measure thickness of soldering plate and, if necessary, select shim(s) of appropriate thickness so that end play of output shaft is within specified range.

End play:
0.25 - 0.55 mm
(0.0098 - 0.0217 in)
Available shims:
Refer to S.D.S.

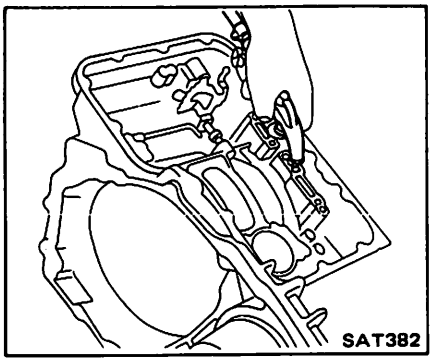
FINAL ASSEMBLY

When installing/assembling needle bearing, bearing race, snap ring and seal ring, use the following illustration as a guide to installation procedures and locations.



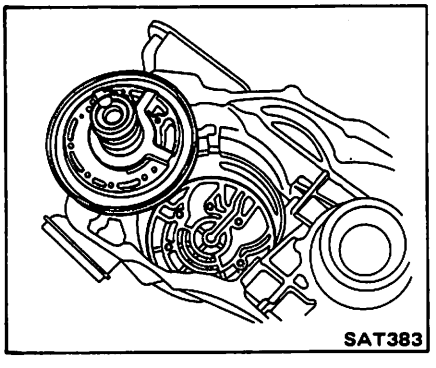
1. Before proceeding with the final assembly of all components, it is important to verify that the case, housing and parts are clean and free from dust, dirt and foreign matter (use air gun). Have a tray available with clean transaxle fluid for lubricating parts.

Petroleum jelly can be used to secure washers during installation. All new seals and rings should have been installed before beginning final assembly.

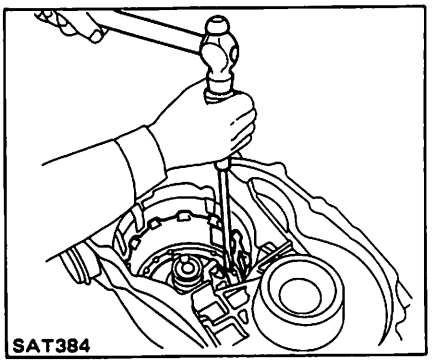


2. Apply automatic transaxle fluid or vaseline to outer diameter part of oil pump assembly. Install oil pump assembly, nylon washer and thrust bearing.

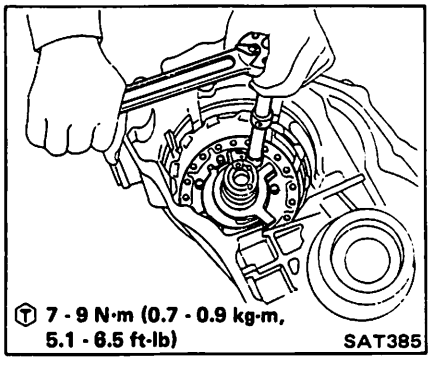
Align five bolt holes on oil pump assembly and transmission case and install oil pump.



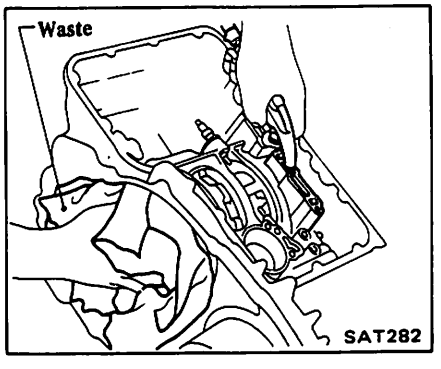
3. Apply automatic transaxle fluid or vaseline to low and reverse brake piston seal, then install piston by tapping it evenly.



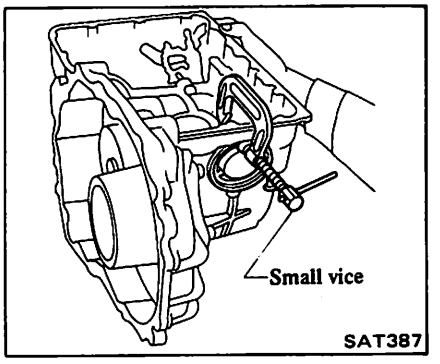
4. Install low and reverse brake piston retainer.



After installing piston retainer, make sure that its piston seal is not turned over by the application of air pressure to low and reverse brake circuit. The piston is installed properly if it moves smoothly.



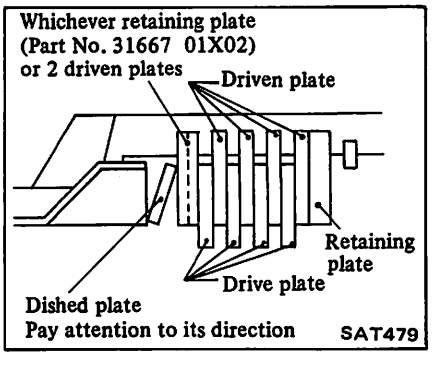
5. Install brake band. Apply automatic transaxle fluid or vaseline to band servo piston O-ring and install band servo piston, return spring and snap ring holding piston with a small vice.



6. Apply automatic transaxle fluid or vaseline to seals in oil pump housing, then install high-reverse clutch (Front).

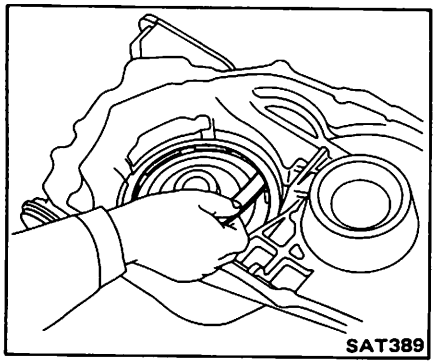
7. Install forward clutch (Rear), front internal gear, thrust bearing, bearing race, front carrier, bearing race, thrust bearing and sun gear assembly in the reverse order of removal. Prior to assembly, apply automatic transaxle fluid or grease to thrust bearings and bearing races.

8. Install low and reverse brake retainer plate, drive and driven plates, retainer plate and snap ring.



9. After low and reverse brake has been completely assembled, measure clearance between snap ring and retainer plate. If measurement exceeds specifications it can be adjusted by replacing retainer plate with one of a different thickness.

Low and reverse brake clearance:
Standard
1.90 - 2.20 mm
(0.0748 - 0.0866 in)
Allowable limit
3.8 mm (0.150 in)



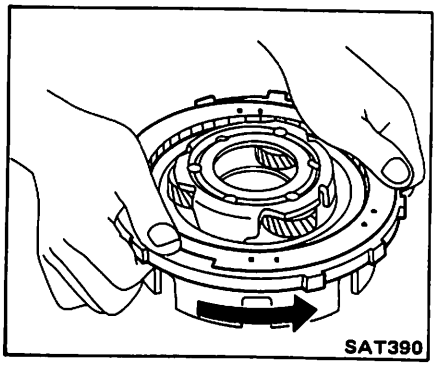
Available retainer plate (Piston side)

Thickness mm (in)	Part Number
3.6 (0.142)	31667-01X00
3.8 (0.150)	31667-01X01

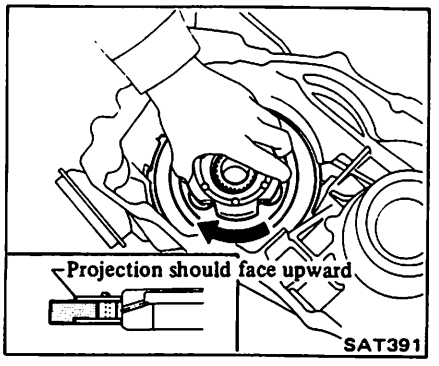
Available retainer plate (O.W.C. side)

Thickness mm (in)	Part Number
3.6 (0.142)	31667-01X00
3.8 (0.150)	31667-01X01
4.0 (0.157)	31667-01X02
4.2 (0.165)	31667-01X03
4.4 (0.173)	31667-01X04

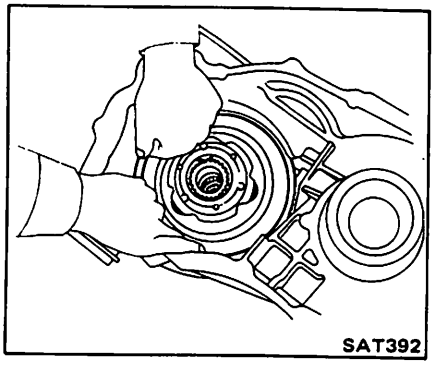
10. Install bearing race on connecting shell.
11. Apply vaseline to thrust washer, then attach it to rear carrier.
12. Install one-way clutch assembly to rear carrier by turning it counterclockwise.



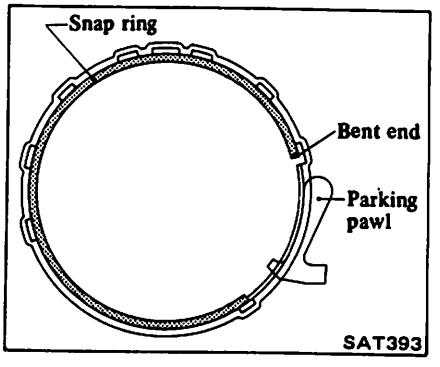
13. Apply vaseline to thrust washer and install it on rear carrier.
14. Install one-way clutch together with rear carrier by turning rear carrier clockwise.



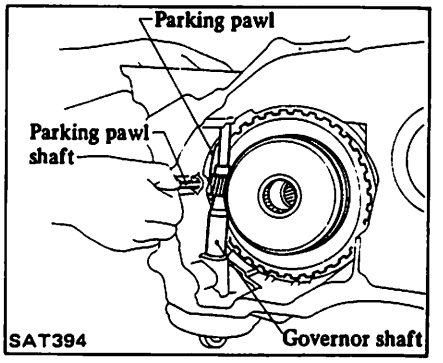
15. Install snap ring



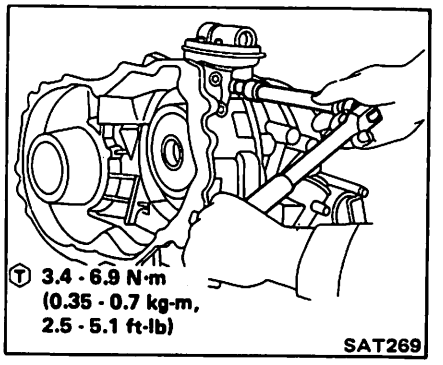
Install snap ring. Ensure that its bent end is positioned so that it does not interfere with parking pawl.



16. Apply vaseline to bearing race, then attach it to rear internal gear.
17. Install rear internal gear, then assemble governor shaft assembly, parking pawl, return spring and parking pawl shaft.

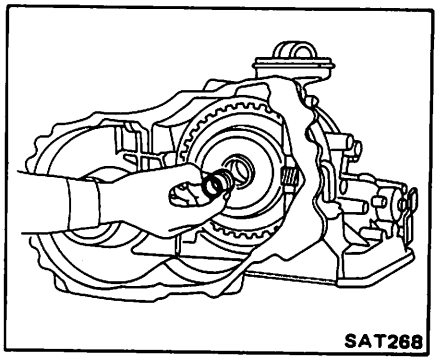


18. Install governor shaft retaining bolt.

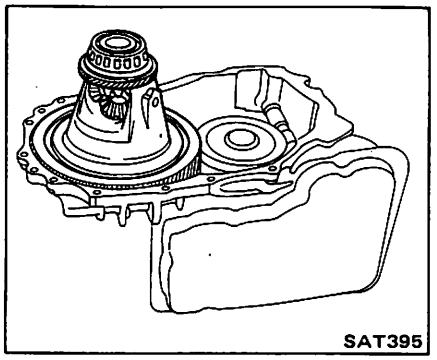


19. Install seal bushing.

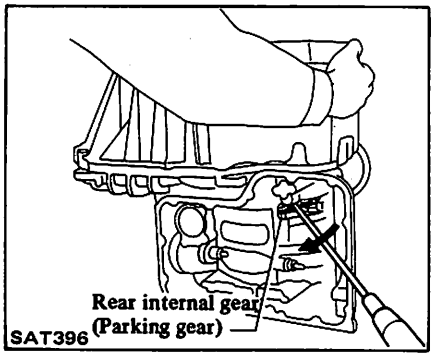
CAUTION:
Always install seal bushing to prevent sun gear and output shaft from becoming jammed.



20. **Adjust end play of output shaft.** Refer to Adjusting End Play of Output Shaft.
21. **Adjust rotary frictional force of output shaft and idler gear tapered roller bearing.** Refer to Adjusting Rotary Frictional Force of Tapered Roller Bearing.
22. **Adjust rotary frictional force of final drive tapered roller bearing.** Refer to Adjusting Rotary Frictional Force of Tapered Roller Bearing.
23. Install final drive assembly on transmission case.

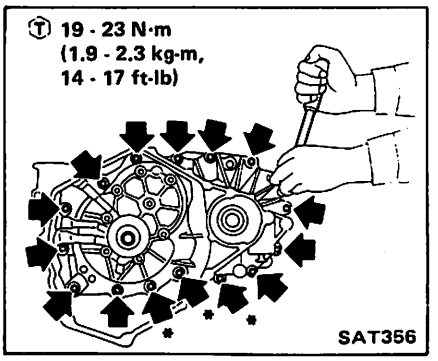

SAT395

24. Apply vaseline to output shaft shim selected, then attach it to output shaft.
25. Place gasket on transmission case.
26. Install converter housing assembly to transmission case.
27. Turn parking gear (rear internal gear) clockwise with screwdriver while supporting converter housing assembly by hand, until output shaft splines, front carrier and rear internal gear are engaged properly.



SAT396

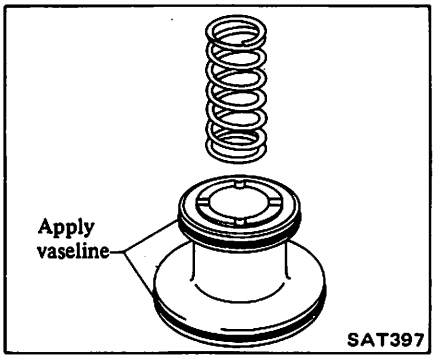
28. Tighten converter housing securing bolts to the specified torque.



SAT356

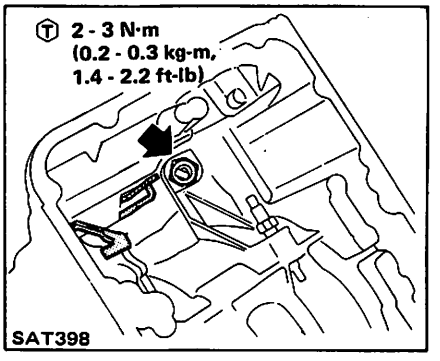
Before installing bolts marked "*" in figure below, ensure that bolt threads are clean and that locking sealer has been applied. Also ensure that the transmission case has been cleaned with solvent.

29. Apply vaseline to lathe cut ring, then install return spring and accumulator piston on transmission case.



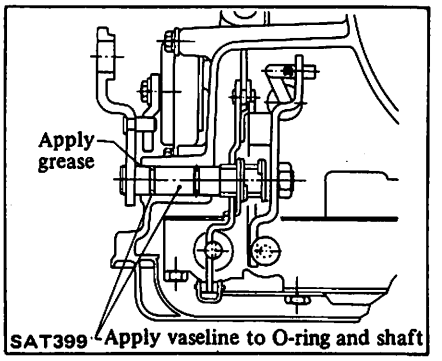
SAT397

30. **Adjust brake band.** Refer to Brake Band Adjustment.
31. Assemble parking actuator support and throttle wire to transmission case. After tightening nut, bend the lock-plate securely.



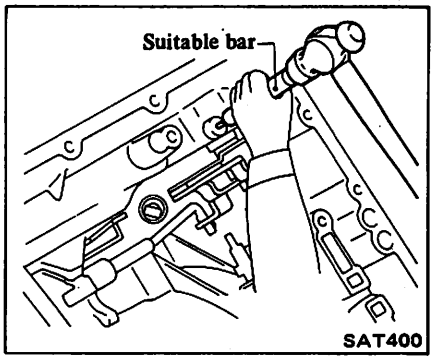
SAT398

32. Apply grease and vaseline to manual shaft.



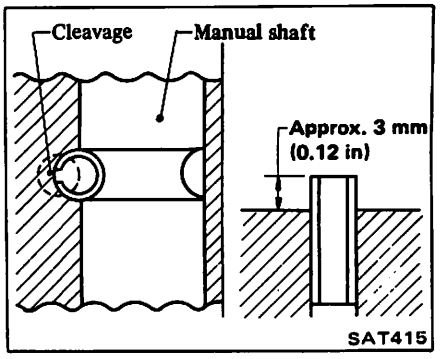
SAT399

33. Install throttle lever, manual plate, manual shaft, selector range lever and parking rod assembly, then secure them with retaining pin.



SAT400

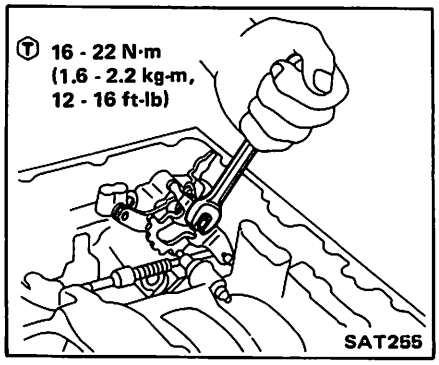
Install retaining pin as shown in figures below.



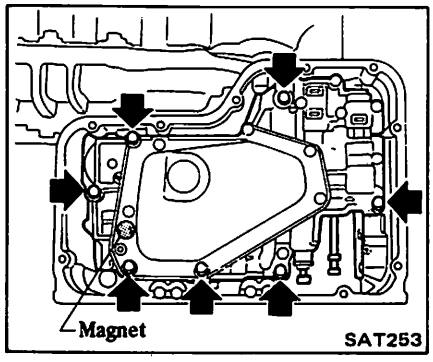
SAT415

34. Tighten manual shaft securing nuts:

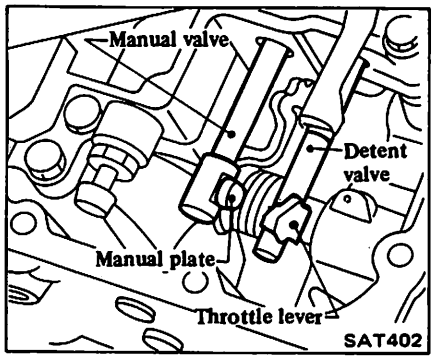
Ⓣ **16 - 22 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)**



35. Insert manual valve to control valve body, then assemble them to transmission case. Then install magnet in place.

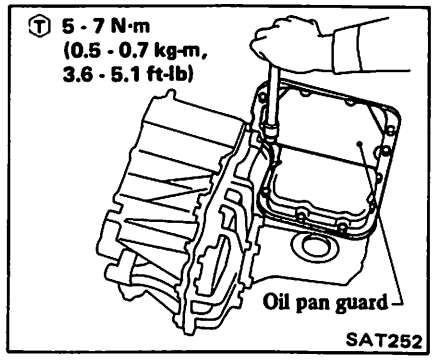


Install manual valve, manual plate, detent valve and throttle lever securely, as shown in figure below.



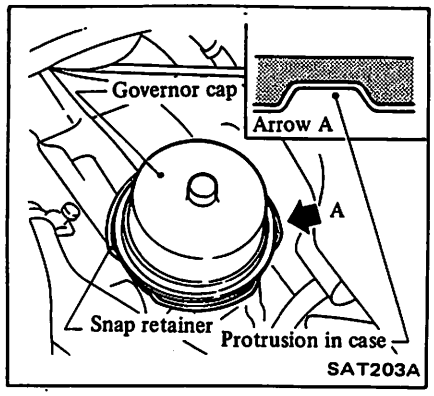
36. Before installing oil pan, check alignment and operation of manual lever and parking pawl engagement. Blow mechanism with air to clean. Make final check to be sure all bolts are installed in valve body.

37. Install oil pan with new gasket and oil pan guard.



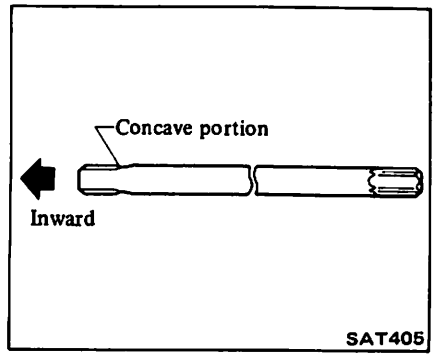
38. Install seal ring and governor cap, then secure it with snap retainer.

When installing snap retainer, pay attention to its direction.



39. Install oil pump shaft and input shaft.

Ensure that concave portion of oil pump shaft faces inward.



40. Carefully inspect torque converter for damage. Check converter hub for grooves caused by hardened seals. Also check bushing contact area.

41. Lubricate oil pump lip seal and converter neck before installing converter.

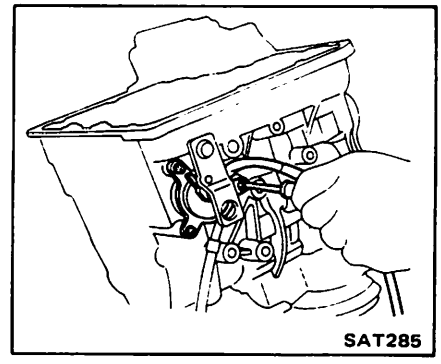
42. Install torque converter to converter housing.

Be careful not to scratch front cover oil seal.

43. Apply sealant to threads of hexagon plug and install it in place.

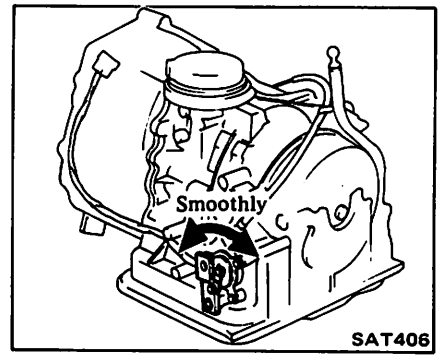
Ⓣ **: Hexagon plug**
7 - 13 N·m (0.7 - 1.3 kg-m, 5.1 - 9.4 ft-lb)

44. Install inhibitor switch to transaxle case.



45. Adjust inhibitor switch. Refer to Minor Adjustments.

46. Make sure that manual lever operates smoothly.



TROUBLE-SHOOTING AND DIAGNOSES

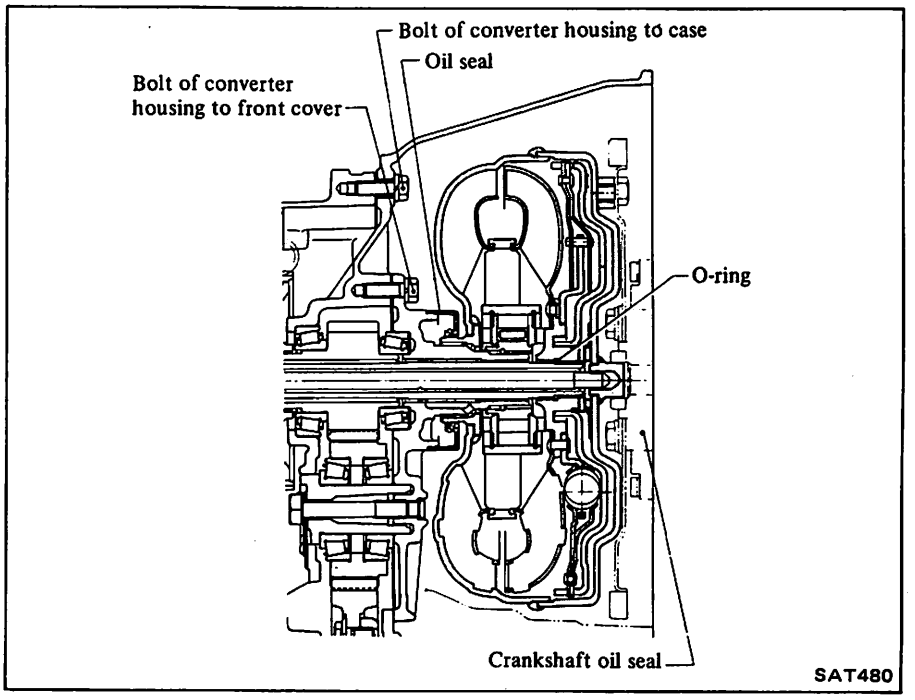
PRELIMINARY CHECKS (Prior to road testing)

Verify customer complaint

The customer should supply as much information as possible, including any unusual characteristics that accompany the complaint.

Fluid level

Refer to Description (on the first page).



Fluid leakage

To detect a fluid leak:

1) Raise vehicle.
2) Clean area suspected of leaking.
3) Start engine, apply foot brake, place control lever in drive, and wait a few minutes.
4) Stop engine.
5) Check for fresh leakage.

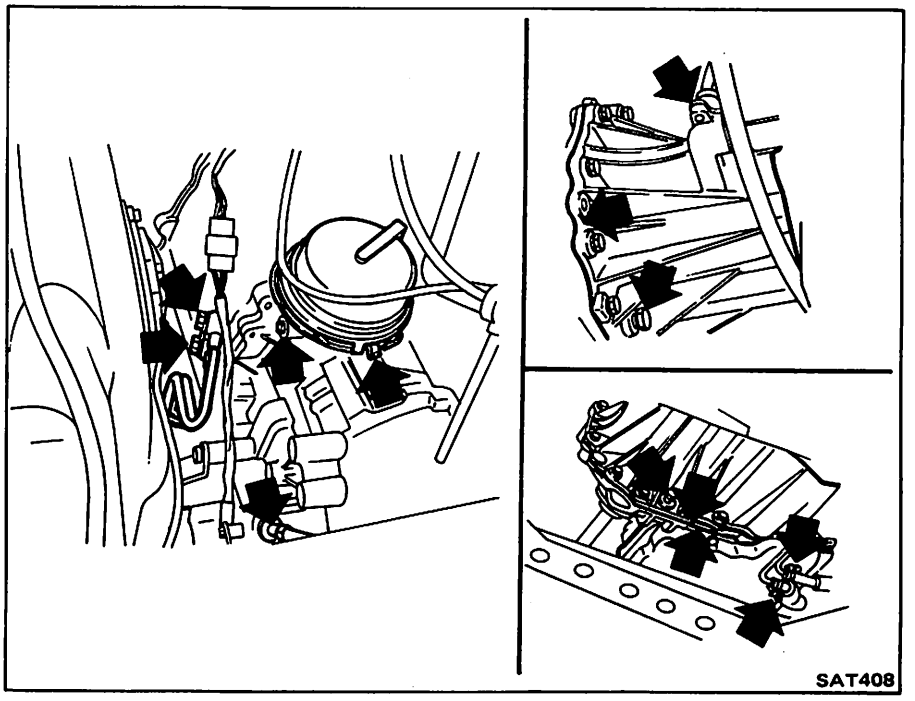
If the governor cap is suspected:

1) Open hood.
2) Remove snap retainer, governor cap and seal ring, then reinstall them. Refer to ON-VEHICLE SERVICE.
3) Clean the area around the governor cap.
4) Run the car at highway speeds.
5) Check the governor cap for fresh leakage.

To aid in locating leaks, use the following list of seals and gaskets.

1) Converter housing
- Front cover oil seal (transaxle front seal).
- Crankshaft oil seal.
- Bolts of converter housing to case and converter housing to front cover.
- Input shaft O-ring.

2) Transaxle and bearing housing.
- Junction of transmission case and converter housing.
- Junction of transmission case and bearing housing.
- Oil cooler inlet and outlet tube connectors.
- Oil pressure inspection ports.
- O-ring of manual shaft.
- O-ring of throttle wire.
- Speedometer pinion sleeve.
- Drive shaft oil seals.
- Governor cap seal ring.



Fluid condition

Transaxle fluid color and texture can aid greatly in transaxle trouble-shooting. When checking fluid level, examine the transaxle fluid and note its color, texture and odor. Some common forms of contamination are listed below:

1) Dark of Black Fluid:
   With a burned odor
   – Worn friction material.
   Without an odor
   – Slight engine coolant leak (in radiator).
2) Milky Pink Fluid: Water Contamination
   – Coolant leak.
   – Road water entering through filler tube or breather.
3) Varnished Fluid, light to dark brown and tacky: Oxidation
   – Over or Underfilling.
   – Overheating.

Engine idle

Check and adjust idle to specifications.

Idling speed:

Refer to MA section.

Engine oil and coolant levels

Prior to road testing, check engine oil and coolant levels, and fill as necessary.

Control cable

Start in park position, depress detent button and slowly move the gear selector through all ranges. The detent "clicks" should correspond with the range indicator.

DIAGNOSTIC ROAD TEST

Prior to road testing, perform the preliminary inspections outlined earlier. If the car is not equipped with a tachometer, install a portable tachometer in the car. Also install a suitable pressure gauge. If the customer has a specific complaint, select road conditions similar to those described. (e.g. steep hills, freeways, etc.)

Follow the test sequence as outlined in this section and mark the results on the Symptom Chart on page AT-55. It may be necessary to repeat sections of the test under different throttle conditions. (e.g. light, medium of full throttle.) After completing the road test, compare the test results to the Trouble-shooting Chart on page AT-51.

ROAD TESTING

1. Park Range

Place the selector lever in "P" range and start the engine. Stop the engine and repeat the procedure in all other ranges and neutral. In Park, the car should be locked in position, unable to roll or move. Make all results on the Symptom Chart.

2. Reverse

Move the selector lever from "P" to "R", and note shift quality. Drive the car in reverse long enough to detect slippage or other abnormalities. Note results.

3. Neutral

Move the selector lever from "P" to "N" and note quality. In neutral no clutches or bands are applied, and there should be no movement. Note results.

4. Drive Range

Move the selector lever to range "D", and note shift quality. Drive the car through all automatic shifts and in all gear ranges. Note shift quality and timing [km/h (MPH)], check for slippage, noise or other abnormal conditions. If necessary, drive the test sequence under different throttle openings (e.g. light, medium or full throttle).

5. Range "2"

Move the selector lever to range "2". Check for slippage, hesitation or abnormal condition. When the lever is set at this position, the transaxle will be automatically shifted between 1st and 2nd gears in response to the depression of the accelerator pedal. However, the transaxle will not shift to 3rd gear. When the car is slowing down, the transaxle will automatically down-shift.

6. Range "1"

Move the selector lever to range "1". Note shift quality. It should, however, downshift immediately to 2nd gear and downshift again to 1st gear as road speed decreases. Accelerate and decelerate in 1st gear to determine engine braking. Note results.

The transaxle should not shift into 1st gear from "D" range if the car road speed is above approximately 65 km/h (40 MPH).

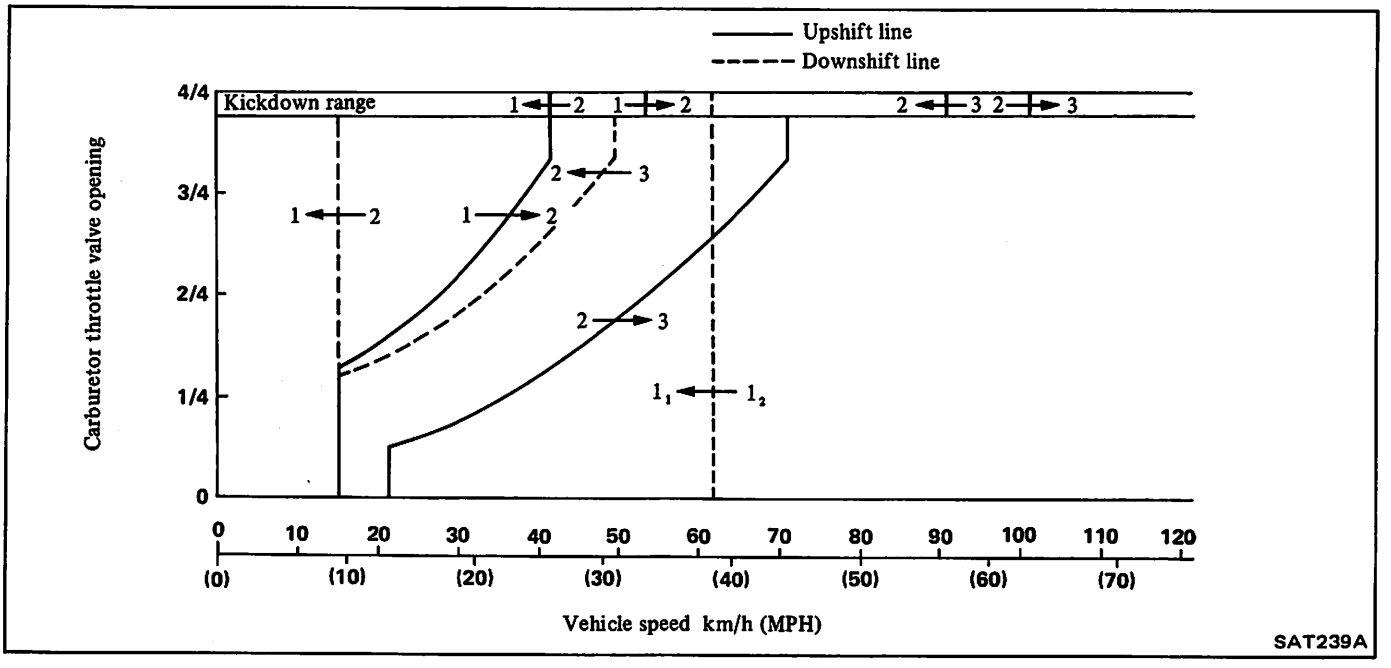
7. Record line pressure and governor pressure at each range and at each throttle valve opening in accordance with the pressure testing described below.

CAR SPEED AND LINE PRESSURE WHEN SHIFTING GEARS

This check should be carried out when oil temperature is between 43 to 57°C (109 to 135°F).

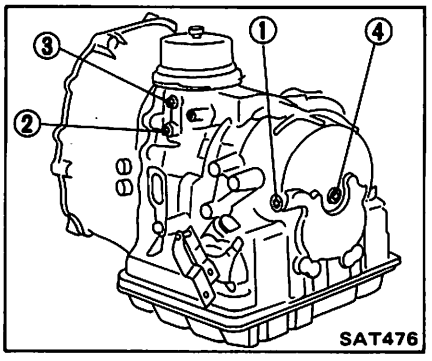
Throttle position	Gearshift	Vehicle speed km/h (MPH)
Full throttle	$D_1 \rightarrow D_2$ ($2_1 \rightarrow 2_2$)	49 - 57 (30 - 35)
	$D_2 \rightarrow D_3$	95 - 106 (59 - 66)
	$D_3 \rightarrow D_2$	88 - 94 (55 - 58)
	$D_2 \rightarrow D_1$ ($2_2 \rightarrow 2_1$)	35 - 43 (22 - 27)
	$D_3 \rightarrow 2_2$	–
	$1_2 \rightarrow 1_1$	–

SHIFT SCHEDULE



PRESSURE TESTING

The RL3F01A transaxle is provided with three pressure test ports. All are useful for transaxle trouble-shooting, Line Pressure [To high-reverse clutch (Front)], Line Pressure [To forward clutch (Rear)] and Governor Pressure.



1 Line pressure [To high-reverse clutch (Front)]
2 Line pressure [To forward clutch (Rear)]
3 Governor pressure
4 Torque converter lock-up pressure

LINE PRESSURE

1. Install pressure gauge to line pressure port. (When selector lever is in "D", "2" or "1" range, install pressure gauge to port ② and when in "R" range, install pressure gauge to port ① shown above.) Locate the gauge so it can be seen by driver. Measure line pressure at idling and at stall test.
2. Road test car and note pressure under different throttle conditions.

At idling

Range	Line pressure kPa (kg/cm², psi)
R	628 - 775 (6.4 - 7.9, 91 - 112)
D	245 - 343 (2.5 - 3.5, 36 - 50)
2	245 - 343 (2.5 - 3.5, 36 - 50)
1	245 - 343 (2.5 - 3.5, 36 - 50)

At stall test

Range	Line pressure kPa (kg/cm², psi)
R	1,275 - 1,471 (13.0 - 15.0, 185 - 213)
D	618 - 696 (6.3 - 7.1, 90 - 101)
2	549 - 696 (5.6 - 7.1, 80 - 101)
1	549 - 696 (5.6 - 7.1, 80 - 101)

a. Line pressure can be measured by gradually opening throttle, starting with engine idle.
b. Line pressure should be measured while fluid temperature is within the 43 to 57°C (109 to 135°F) range.

Lock-up test

Install pressure gauge to port ④. Shift selector lever in "D" range.

Condition	Torque converter lock-up pressure kPa (kg/cm², psi)
Lock-up "ON"	Less than 49 (0.5, 7)
Lock-up "OFF"	More than 196 (2.0, 28)

Key points of pressure testing are:

a. Pressure at idle: Look for a steady rise in pressure as car speed increases under light load.
b. Pressure drop between shift points should not exceed 98 kPa (1.0 kg/cm², 14 psi). Excessive pressure drop may indicate an internal leak at a servo or clutch seal.

GOVERNOR PRESSURE

1. Install pressure gauge to governor pressure port. Locate the gauge so it can be seen by driver.
2. Road test car and note pressure at different road speeds. Governor pressure increases directly with road speed, and should always be less than line pressure.

STALL TESTING

The stall test is an effective method of testing clutch and band holding ability, torque converter one-way clutch operation and engine performance. A stall test should only be performed as a last resort because of the high fluid temperature it generates and the excessive load it places on the engine and transaxle.

CAUTION:
a. Transaxle and engine fluid levels should always be checked and fluid added as needed.
b. Run engine at 1,200 rpm to attain proper warm-up.
c. During test, never hold throttle wide-open for more than 5 seconds.
d. Do not test more than two gear ranges without driving car to cool off engine and transaxle.

STALL TEST PROCEDURE

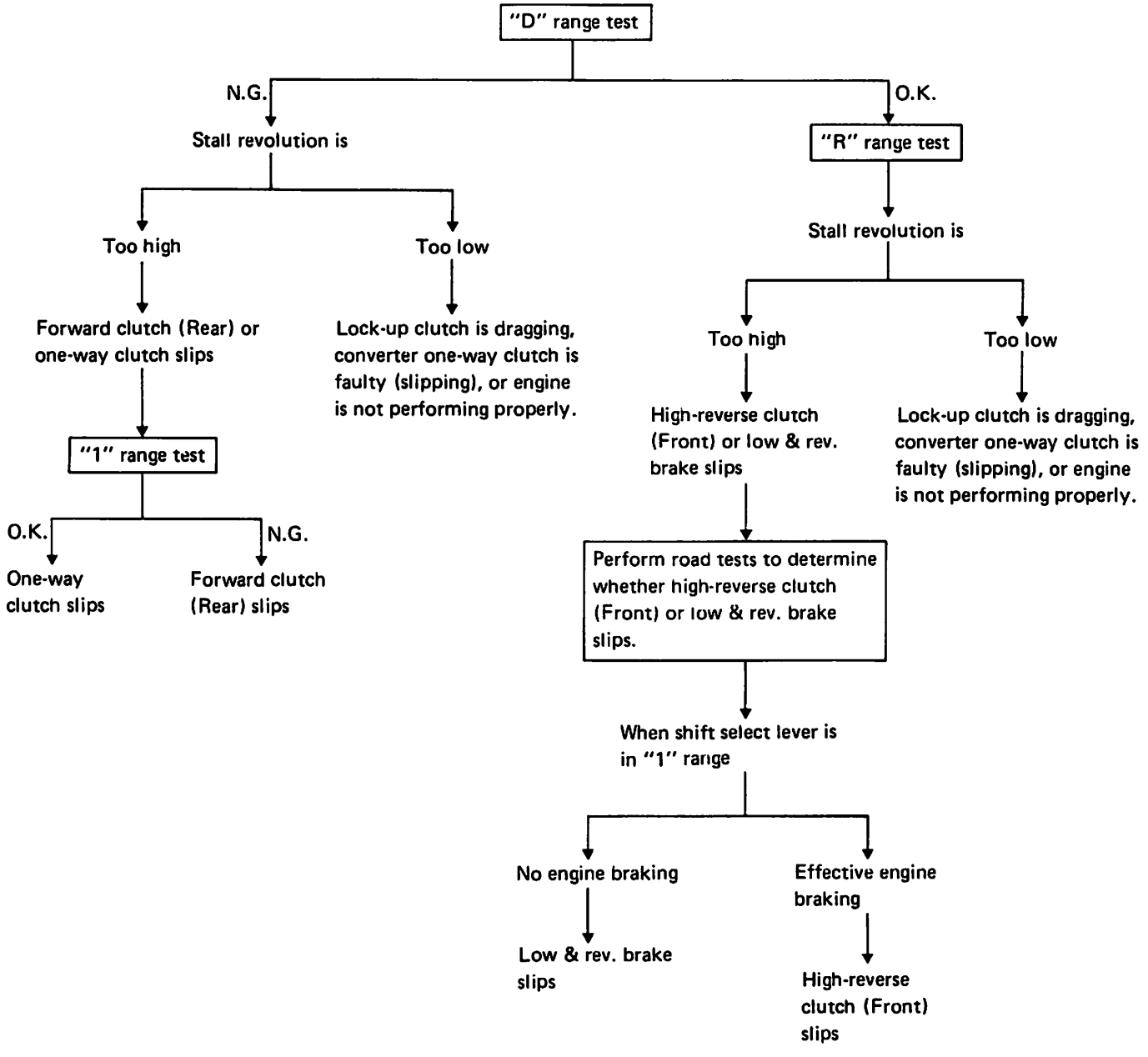
1. Install a tachometer where it can be seen by driver during test.
2. Set hand brake and block wheels.
3. Start engine and place selector lever in "D" range.
4. Apply foot brake and accelerate to wide-open throttle. Do not hold throttle open longer than five seconds.
5. Quickly note the engine stall speed and immediately release throttle.

Stall revolution:
1,900 - 2,200 rpm

6. Place selector lever in "R" range and repeat above test (same as in "D" range).

If stall test indicates proper stall revolution in "D" range, no further testing is necessary.

STALL TEST ANALYSIS



If converter one-way clutch is frozen, vehicle will have poor high speed performance. If converter one-way clutch is slipping, vehicle will be sluggish up to 50 or 60 km/h (30 or 40 MPH).

TROUBLE-SHOOTING CHART

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

	ON CAR									OFF CAR									
	Oil level	Control cable	Inhibitor switch and wiring	Throttle wire	Detent valve	Engine idling rpm	Line pressure	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Ignition switch and starter motor	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle on-way clutch	High-reverse clutch (Front) check ball	Park linkage
Engine does not start in "N", "P" ranges.		2	3										1										
Engine starts in range other than "N" and "P".		1	2																				
Transaxle noise in "P" and "N" ranges.	1						2												⑧				
Car moves when changing into "P" range or parking gear does not disengage when shifted out of "P" range		1																					②
Car runs in "N" range.		1						3				2			④								
Car will not run in "R" range (but runs in "D", "2" and "1" ranges.) Clutch slips. Very poor acceleration.	1	2					3		5		6	4			⑨	⑧		⑦		⑩		⑪	
Car braked when shifting into "R" range.										3	2	1			④		⑤						⑥
Sharp shock in shifting from "N" to "D" range.				2		1	3		4						⑤								
Car will not run in "D" range (but runs in "2", "1" and "R" ranges).		1					2		3													④	
Car will not run in "D", "1", "2" ranges (but runs in "R" range). Clutch slips. Very poor acceleration.	1	2					4		5		6	3		7	⑧	⑩				⑨			
Clutches or brakes slip somewhat in starting.	1	2		6			3		5		7	4						⑧		⑨			
Excessive creep.						1																	
No creep at all.	1	2				3			5			4			⑧	⑨			⑥	⑦			
Failure to change gear from "1st" to "2nd".		1		2	3				5	6	8	7	4				⑨			⑩		⑪	
Failure to change gear from "2nd" to "3rd".		1		2	3				5	6	8	7	4			⑨				⑩		⑪	
Too high a gear change point from "1st" to "2nd", from "2nd" to "3rd".				1	2		3		5	6			4							⑦			
Gear change directly from "1st" to "3rd" occurs.									2	4		3	1				⑤			⑥			
Engine stops when shifting lever into "D" range.														1									
	ON CAR														OFF CAR								

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

	ON CAR									OFF CAR				
	Oil level	Control cable	Throttle wire	Detent valve	Line pressure	Engine stall rpm	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle one-way clutch	High-reverse clutch (Front) check ball
Too sharp a shock in change from "1st" to "2nd".	.	.	1	.	.	2	4	.	5	.	3	.	.	.	⑥	.	.	.	.	.
Too sharp a shock in change from "2nd" to "3rd".	.	.	1	.	2	.	3	.	5	4	.	.	.	⑥	.	.	.	.	.	.
Almost no shock or clutches slipping in change from "1st" to "2nd".	1	2	3	.	4	.	6	.	8	7	5	.	.	.	⑨	.	.	⑩	.	.
Almost no shock or slipping in change from "2nd" to "3rd". Engine races extremely fast.	1	2	3	.	4	.	6	.	8	7	5	.	.	⑨	.	.	.	⑩	.	⑪
Car braked by gear change from "1st" to "2nd".	.	.	.	.	.	.	2	.	.	.	1	.	.	④	.	③	.	.	⑤	.
Car braked by gear change from "2nd" to "3rd".	.	.	.	.	.	.	3	.	2	.	1	.	.	.	④	.	.	.	.	.
Maximum speed not attained. Acceleration poor.	1	2	.	.	4	5	7	.	6	.	3	8	⑪	⑫	⑨	⑩	⑬	.	.	.
Failure to change gear from "3rd" to "2nd".	.	.	1	.	.	.	3	4	6	5	2	.	.	⑦	⑧	.	.	⑨	.	.
Failure to change gear from "2nd" to "1st" or from "3rd" to "1st".	.	.	1	.	.	.	3	4	6	5	2	.	.	.	⑦	.	.	.	⑧	.
Gear change shock felt during deceleration by releasing accelerator pedal.	.	1	2	3	4	.	5	6	.	.	.	.	.	.	.	.	.	⑦	.	.
Too high a change point from "3rd" to "2nd", from "2nd" to "1st".	.	1	2	3	4	.	5	6	.	.	.	.	.	.	.	.	.	⑦	.	.
Kickdown does not operate when depressing pedal in "3rd" within kickdown car speed.	.	.	2	1	.	.	4	5	.	.	3	.	.	.	⑥	.	.	⑦	.	.
Kickdown operates or engine overruns when depressing pedal in "3rd" beyond kickdown car speed limit.	.	1	2	.	3	.	5	6	.	7	4	.	.	⑧	.	.	.	⑨	.	.
Races extremely fast or slips in changing from "3rd" to "2nd" when depressing pedal.	.	.	1	.	2	.	4	.	6	5	3	.	.	⑦	⑧	.	.	⑨	.	⑩
	ON CAR									OFF CAR				

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

	ON CAR									OFF CAR										
	Oil level	Control cable	Throttle wire	Engine idling rpm	Line pressure	Engine stall rpm	Lubrication	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Torque converter, one-way clutch	Transaxle one-way clutch	Park linkage	Planetary gear
Car will not run in any range.	1	2	.	.	3	.	.	5	.	.	6	4	.	.	.	.	⑦	⑧	.	.	⑨	.
Transmission noise in "D", "2", "1" and "R" ranges.	1	.	.	.	2	.	.	.	.	.	.	.	③	.	.	.	④	.	.	⑤	.	⑥
Failure to change from "3rd" to "2nd" when changing lever into "2" range.	.	1	.	.	2	.	.	4	.	5	.	3	.	.	⑥	.	.	⑦	.	.	.	.
Gear change from "2nd" to "3rd" in "2" range.	.	1	.	.	2	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No shock at change from "1" to "2" range or engine races extremely fast.	1	2	3	4	.	5	.	7	.	.	8	6	.	.	⑨	.	⑩	.	.	.	.	.
Failure to change from "3rd" to "2nd" when shifting lever into "1" range.	.	1	.	.	2	.	.	4	5	7	6	3	.	⑧	⑨	.	.	⑩	.	.	.	.
Engine brake does not operate in "1" range.	.	1	.	.	2	.	.	4	.	.	5	3	.	.	.	⑥	.	⑦	.	.	.	.
Gear change from "1st" to "2nd" or from "2nd" to "3rd" in "1" range.	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	③	.	.	.	.
Does not change from "2nd" to "1st" in "1" range.	1	2	.	.	.	.	.	4	5	6	7	3	.	.	.	⑧	.	⑨	.	.	.	.
Large shock changing from "2nd" to "1st" in "1" range.	.	.	1	.	.	2	.	4	.	.	.	3	.	.	.	⑤	.	.	.	.	.	.
Transaxle overheats.	1	.	.	.	3	4	2	6	.	8	7	5	.	⑨	⑩	⑪	⑫	⑬	⑭	.	.	⑮
Oil shoots out during operation. White smoke emitted from exhaust pipe during operation.	1	.	3	.	5	6	2	7	.	.	8	4	.	⑨	⑩	⑪	⑫	⑬	⑭	.	.	⑮
Offensive smell at oil charging pipe.	1	.	.	.	.	.	.	.	.	.	.	2	③	④	⑤	⑥	⑦	⑧	⑨	.	.	⑩
	ON CAR									OFF CAR										

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the vehicle.

	←ON CAR→		←OFF CAR→				
	Governor	*Line pressure*	*O-ring in input shaft*	*Torque converter*	*Speed cut valve*	*Lock-up control valve*	*Oil pump*
Torque converter is not locked up	1	2	③	⑦	⑤	⑥	④
Lock-up piston slip		1	②	④			③
Lock-up point is extremely high or low	1				②	③	
Engine is stopped at R.D. 2 and 1 ranges				②		①	
Transmission overheats		1	②	④			③

ROAD TEST SYMPTOM CHART

		SHIFT QUALITY										
		ROUGH	SHIFT TIMING [Mark km/h (MPH)]	NO SHIFT	SHIFT SLIPPAGE	CAR WON'T MOVE	CRUISE SLIPPAGE	POOR POWER/ ACCELERATION	NOISY	OK	COMMENTS
PARK RANGE	ENG. START										
	HOLDING										
"R" RANGE	Man. shift P-R										
	REVERSE										
"N" RANGE	Man. shift R-N										
	ENG. START										
	N										
"D" RANGE	Man. shift N-D										
	1st										
	Auto shift 1-2										
	2nd										
	Auto shift 2-3										
	3rd in lock-up "OFF"										
	Auto shift Lock-up "OFF" (3) → Lock-up "ON" (3)										
	3rd in Lock-up "ON"										
	Auto shift Lock-up "ON" (3) → Lock-up "OFF" (3)										
	Decel. 3-2										
	Kickdown 3-2										
	Decel. 2-1										
	Kickdown 2-1										
"2" RANGE	Man. shift D-2										
	1st										
	Auto shift 1-2										
	2nd										
	Decel. 2-1										
	Kickdown 2-1										
"1" RANGE	Man. shift 2-1										
	Man. shift D-1										
	Acceleration										
	"1" Engine Braking										

TROUBLE-SHOOTING GUIDE FOR RL3F01A AUTOMATIC TRANSAXLE

Order	Test item	Procedure
Checking	1. Oil level gauge	Check gauge for oil level and leakage before and after each test.
	2. Control cable	Check by shifting into "P", "R", "N", "D", "2" and "1" ranges with selector lever.
	3. Inhibitor switch	Check whether starter operates in "N" and "P" ranges only and whether reverse lamp operates in "R" range only.
	4. Engine idling rpm.	Check whether idling rpm meet standard.
	5. Throttle wire	Check whether the throttle wire is adjusted properly.
	6. Operation in each range.	Check whether transmission engages positively by shifting "N" → "D", "N" → "2", "N" → "1" and "N" → "R" range while idling with brake applied.
	7. Creep of car.	Check whether there is any creep in "D", "2", "1" and "R" ranges.
Stall test	1. Oil pressure before testing.	Measure line pressures in "D", "2", "1" and "R" range while idling.
	2. Stall test.	Measure engine rpm and line pressure in "D", "2", "1" and "R" ranges during full throttle operation. **Temperature of torque converter oil used in test should be from 60 to 100°C (140 to 212°F) i.e., sufficiently warmed up but not overheated.** **CAUTION:** **To cool oil between each stall test for "D", "2", "1" and "R" ranges, idle engine, i.e., rpm at about 1,200 rpm for more than 1 minute in "P" range. Measurement time must not be more than 5 seconds.**
	3. Oil pressure after testing	Same as item 1.
Road test	1. Slow acceleration, 1st → 2nd 2nd → 3rd	Check car speeds and engine rpm in shifting up 1st → 2nd range and 2nd → 3rd range while running with lever in "D" range and accelerator pedal half-way down.
	2. Quick acceleration, 1st → 2nd 2nd → 3rd	Same as item 1 above except with accelerator pedal more than 15/16 down (i.e., in the position just before kick-down).
	3. Lock-up operation, Lock-up "OFF" ⟷ "ON"	Check whether the lock-up operates and measure the operating vehicle speeds.
	4. Kickdown operation, 3rd → 2nd or 2nd → 1st	Check whether the kickdown operates and measure the time delays while running at 30, 40, 50, 60, 70 km/h (19, 25, 31, 37, 43 MPH) in "D_3" range.
	5. Shift down, $D_3 \rightarrow D_2 \rightarrow D_1$	Check car speeds and engine rpm in shifting down from 3rd → 2nd → 1st (sequentially) while coasting with accelerator pedal released and in "D_3" range with accelerator pedal half-way down.

Order	Test item	Procedure
Road test	6. Shift down, $D_3 \rightarrow 1_2 \rightarrow 1_1$	Check for shifting down $D_3 \rightarrow 1_2$ and engine braking, and further for shifting down $1_2 \rightarrow 1_1$ and engine braking after shifting the lever into "1" range with the accelerator pedal released and while driving at about 60 km/h (37 MPH) in "D_3" range.
	7. Shift down, $D_3 \rightarrow 2$	Check for quick shifting down $D_3 \rightarrow 2$ and engine braking, after shifting the selector lever into "2" range while driving at about 50 km/h (31 MPH) in "D_3" range.
	8. Shift up and down $2_2 \rightarrow 2_1 \rightarrow 2_2$	Check for shifting up and down between 2_2 and 2_1 in response to car speed.
	9. Shift up, $1_1 \rightarrow 1_2$	Check for failure of the transaxle to shift up during acceleration, when starting in "1" range.
	10. Parking	Confirm that car will not move on grade when shifting to "P" range.
Others	Abnormal shock, oil leakage.	Enter into record conditions observed during these tests such as gear noise, abnormal clutch noise and acceleration performance.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Vehicle model		E16 engine
Automatic transaxle model		RL3F01A
Stall torque ratio		2.0 : 1
Transaxle gear ratio	1st	2.826
	2nd	1.543
	Top	1.000
	Reverse	2.364
	Final drive	3.476
Number of teeth	Output shaft	21
	Idler gear	31
	Final gear	73
Oil		Automatic transmission fluid "Dexron" type
Oil capacity		6.0 liters (6-3/8 US qt, 5-1/4 Imp qt)

SPECIFICATIONS AND ADJUSTMENT

Vehicle model			E16 engine	
Automatic transaxle assembly Model code number			11X69	
High-reverse clutch (Front)	Number of drive plates		3	
	Number of driven plates		3	
	Clearance mm (in)	Standard	1.0 - 1.4 (0.039 - 0.055)	
		Allowable limit	2.6 (0.102)	
	Drive plate thickness mm (in)	Standard	1.50 - 1.65 (0.0591 - 0.0650)	
		Allowable limit	1.4 (0.055)	
	Thickness of retaining plate		Thickness mm (in)	Part number
			3.4 (0.134)	31537-01X05
			3.6 (0.142)	31537-01X00
			3.8 (0.150)	31537-01X01
			4.0 (0.157)	31537-01X02
			4.2 (0.165)	31537-01X03
			4.4 (0.173)	31537-01X04
Forward clutch (Rear)	Number of drive plates		3	
	Number of driven plates		3	
	Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
		Allowable limit	2.8 (0.110)	
	Drive plate thickness mm (in)	Standard	1.70 - 1.85 (0.0669 - 0.0728)	
		Allowable limit	1.6 (0.063)	
	Thickness of retaining plate		Thickness mm (in)	Part number
			3.4 (0.134)	31537-01X05
			3.6 (0.142)	31537-01X00
			3.8 (0.150)	31537-01X01
			4.0 (0.157)	31537-01X02
			4.2 (0.165)	31537-01X03
			4.4 (0.173)	31537-01X04
Low & reverse brake	Number of drive plates		4	
	Number of driven plates		4 (6)*	
	Clearance mm (in)	Standard	1.90 - 2.20 (0.0748 - 0.0866)	
		Allowable limit	3.8 (0.150)	
	Drive plate thickness mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)	
		Allowable limit	1.8 (0.071)	
	Thickness of retaining plate		Thickness mm (in)	Part number
			3.6 (0.142)	31667-01X00
			3.8 (0.150)	31667-01X01
			4.0 (0.157)	31667-01X02
			4.2 (0.165)	31667-01X03
			4.4 (0.173)	31667-01X04
Brake band Piston size mm (in)		Big dia.	68 (2.68)	
		Small dia.	40 (1.57)	
Identification mark on separator plate (Punch mark on separator plate)			BJ	

*: In the case where two driven plates are used instead of the retaining plate (Part No. 31667-01X02).

Oil pump clearance mm (in)	Outer gear-pump housing	Standard	0.20 - 0.30 (0.0079 - 0.0118)
		Allowable limit	0.35 (0.0138)
	Outer gear-crescent	Standard	0.20 - 0.30 (0.0079 - 0.0118)
		Allowable limit	0.35 (0.0138)
	Gears-pump plate	Standard	0.02 - 0.04 (0.0008 - 0.0016)
		Allowable limit	0.08 (0.0031)
	Seal ring-ring groove	Standard	0.10 - 0.25 (0.0039 - 0.0098)
		Allowable limit	0.25 (0.0098)
Planetary carrier mm (in)	Clearance between pinion washer and planetary carrier	Standard	0.20 - 0.70 (0.0079 - 0.0276)
		Allowable limit	0.80 (0.0315)

ROTARY FRICTIONAL FORCE

Unit: N·m (kg-cm, in-lb)

Output shaft	0.35 - 0.47 (3.6 - 4.8, 3.1 - 4.2)
Final drive	5.9 - 7.4 (60 - 75, 52 - 65)

OUTPUT SHAFT END PLAY

0.25 - 0.55 mm (0.0098 - 0.0217 in)

AVAILABLE SHIMS

Output shaft tapered roller bearing

Thickness mm (in)	Part number
0.11 (0.0043)	31499-01X00
0.13 (0.0051)	31499-01X01
0.15 (0.0059)	31499-01X02
0.17 (0.0067)	31499-01X03
0.19 (0.0075)	31499-01X04
0.30 (0.0118)	31499-01X05
0.40 (0.0157)	31499-01X06
0.50 (0.0197)	31499-01X07
0.60 (0.0236)	31499-01X08
0.70 (0.0276)	31499-01X09
0.80 (0.0315)	31499-01X10
0.90 (0.0354)	31499-01X11
1.00 (0.0394)	31499-01X12

Output shaft end play

Thickness of soldering plate −0.05 mm (−0.0020 in)* mm (in)	Thickness mm (in)	Part number
0.55 - 0.85 (0.0217 - 0.0335)	0.3 (0.012)	31484-01X00
0.75 - 1.05 (0.0295 - 0.0413)	0.5 (0.020)	31484-01X01
0.95 - 1.25 (0.0374 - 0.0492)	0.7 (0.028)	31484-01X02
1.15 - 1.45 (0.0453 - 0.0571)	0.9 (0.035)	31484-01X03
1.35 - 1.65 (0.0531 - 0.0650)	1.1 (0.043)	31484-01X04
1.55 - 1.85 (0.0610 - 0.0728)	1.3 (0.051)	31484-01X05
1.75 - 2.05 (0.0689 - 0.0807)	1.5 (0.059)	31484-01X06
1.95 - 2.25 (0.0768 - 0.0886)	1.7 (0.067)	31484-01X07

* 0.05 mm (0.0020 in) is the amount the soldering plate recovers due to its elasticity, and it must be subtracted from the thickness of soldering plate.

Final drive

Thickness mm (in)	Part number
0.44 (0.0173)	38454-01X60
0.48 (0.0189)	38454-01X61
0.52 (0.0205)	38454-01X62
0.56 (0.0220)	38454-01X63
0.60 (0.0236)	38454-01X64
0.64 (0.0252)	38454-01X65
0.68 (0.0268)	38454-01X66
0.72 (0.0283)	38454-01X67
0.76 (0.0299)	38454-01X68
0.80 (0.0315)	38454-01X69
0.84 (0.0331)	38454-01X70
0.88 (0.0346)	38454-01X71
0.92 (0.0362)	38454-01X72

Oil pump outer gear

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31347-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31347-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31347-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31347-01X03

Oil pump inner gear

Thickness mm (in)	Part number
14.99 - 15.00 (0.5902 - 0.5906)	31346-01X00
14.98 - 14.99 (0.5898 - 0.5902)	31346-01X01
14.97 - 14.98 (0.5894 - 0.5898)	31346-01X02
14.96 - 14.97 (0.5890 - 0.5894)	31346-01X03

STALL REVOLUTION

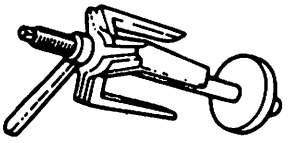
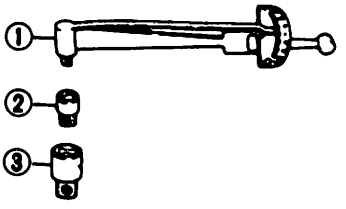
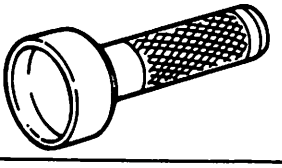
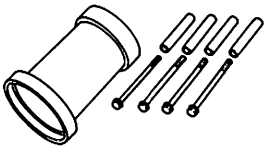
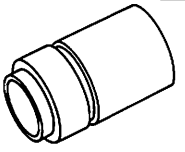
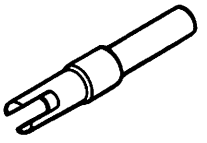
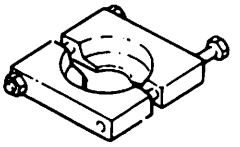
Stall revolution	
E16 engine	1,900 - 2,200 rpm

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Drive plate to torque converter	49 - 69	5.0 - 7.0	36 - 51
Converter housing to engine	16 - 22	1.6 - 2.2	12 - 16
Transmission case to converter housing	19 - 23	1.9 - 2.3	14 - 17
Transmission case to front cover	14 - 18	1.4 - 1.8	10 - 13
Oil pan to transaxle case	5 - 7	0.5 - 0.7	3.6 - 5.1
Bearing retainer to transmission case	19 - 25	1.9 - 2.5	14 - 18
Piston stem (when adjusting band brake)	4 - 6	0.4 - 0.6	2.9 - 4.3
Piston stem lock nut	16 - 22	1.6 - 2.2	12 - 16
Low and reverse brake piston retainer	7 - 9	0.7 - 0.9	5.1 - 6.5
Control valve body to transmission case	7 - 9	0.7 - 0.9	5.1 - 6.5
Lower valve body to upper valve body	7 - 9	0.7 - 0.9	5.1 - 6.5
Final gear bolt	69 - 78	7.0 - 8.0	51 - 58
Oil strainer to valve body	7 - 9	0.7 - 0.9	5.1 - 6.5
Governor valve body to governor shaft	5 - 7	0.5 - 0.7	3.6 - 5.1
Governor shaft securing nut	3.4 - 6.9	0.35 - 0.7	2.5 - 5.1
Idler gear (when adjusting turning frictional force)	26 - 36	2.7 - 3.7	20 - 27
Idler gear lock nut	**		
Throttle wire securing nut (Transaxle side)	2 - 3	0.2 - 0.3	1.4 - 2.2
Control cable securing nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Inhibitor switch to transmission case	2.0 - 2.5	0.20 - 0.25	1.4 - 1.8
Manual shaft lock nut	16 - 22	1.6 - 2.2	12 - 16
Oil cooler pipe to transmission case	29 - 49	3.0 - 5.0	22 - 36
Test plug (oil pressure inspection hole	5 - 10	0.5 - 1.0	3.6 - 7.2
Support actuator (parking rod inserting position) to rear extension	8 - 11	0.8 - 1.1	5.8 - 8.0
Engine to gusset	30 - 40	3.1 - 4.1	22 - 30
Gusset to converter housing	16 - 21	1.6 - 2.1	12 - 15

* Turn back 2.5 turns after tightening.
** Refer to Adjusting Turning Frictional Force of Tapered Roller Bearing.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
ST25420001 (J26063-A) ST25420000 (J26063-A)	Clutch spring compressor	
ST33290001 (J25810-A)	Side bearing outer race puller	
ST3127S000 (See J25765-A) ① GG91030000 (J25765-A) ② HT26940000 (–) ③ HT62900000 (–)	Preload gauge Torque wrench Socket adapter Socket adapter	
ST33400001 (J26082)	Oil seal drift	
(J33200)	Differential preload shim selector	
(J33200-83)	Transaxle shim selector adapter	
KV38105900 (J33201)	Preload adapter	
ST22730000	Bearing puller	
ST2505S001 (–)	Oil pressure gauge set	

FRONT AXLE & FRONT SUSPENSION

SECTION FA

CONTENTS

FRONT AXLE AND FRONT SUSPENSION ..... FA- 2
FRONT AXLE ..... FA- 3
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SPECIAL SERVICE TOOLS FA-17

Refer to section MA (Front Axle and Front Suspension) for:

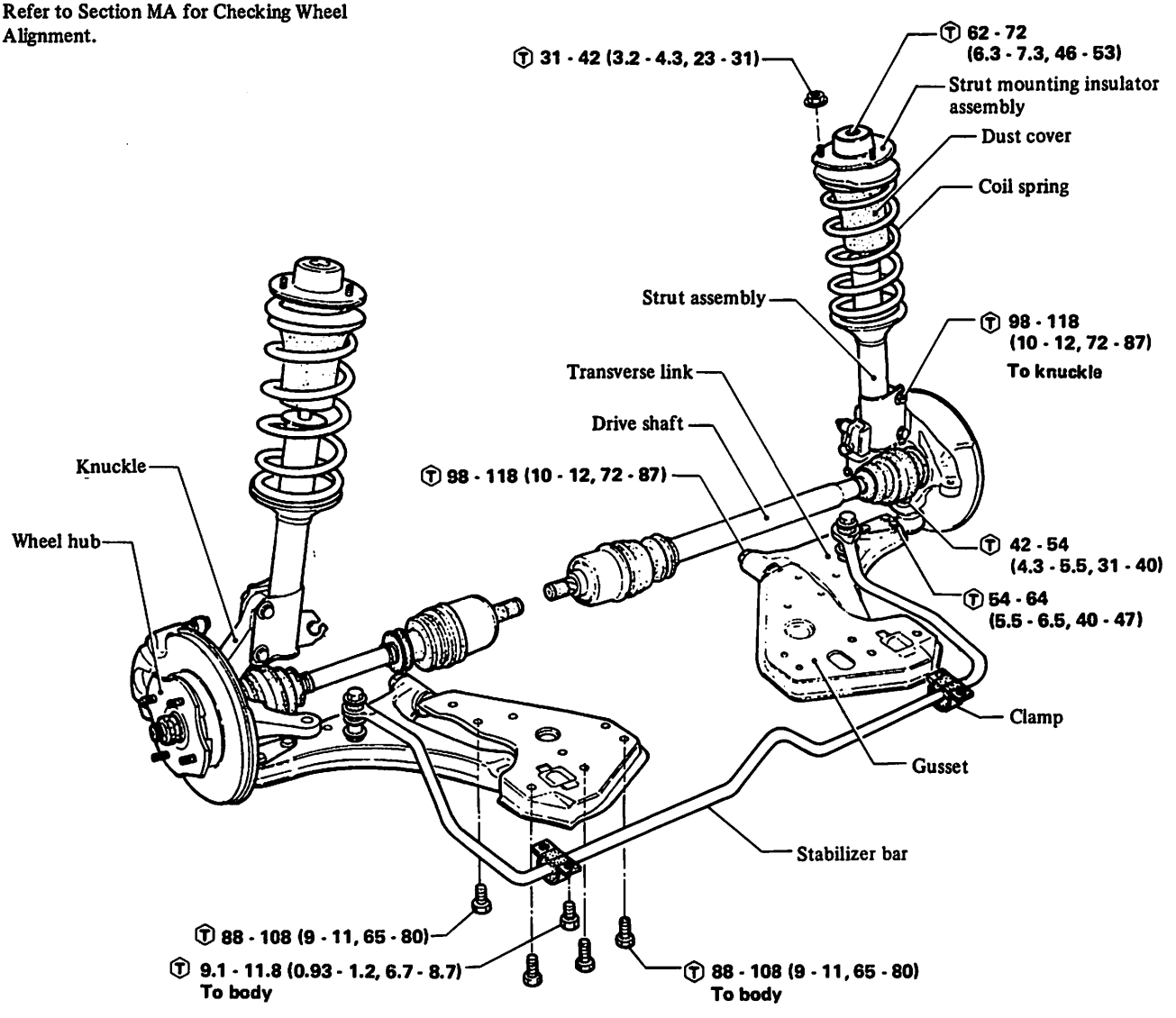
- CHECKING FRONT AXLE AND SUSPENSION PARTS
- CHECKING WHEEL ALIGNMENT

FRONT AXLE AND FRONT SUSPENSION

Wheel alignment
- Camber, caster and kingpin are preset at factory and cannot be adjusted.
- The vehicle requires only toe-in adjustments.

  Toe-in **3 - 5 mm (0.12 - 0.20 in)**
  [19' - 32'] ... Total toe-in

  Refer to Section MA for Checking Wheel Alignment.

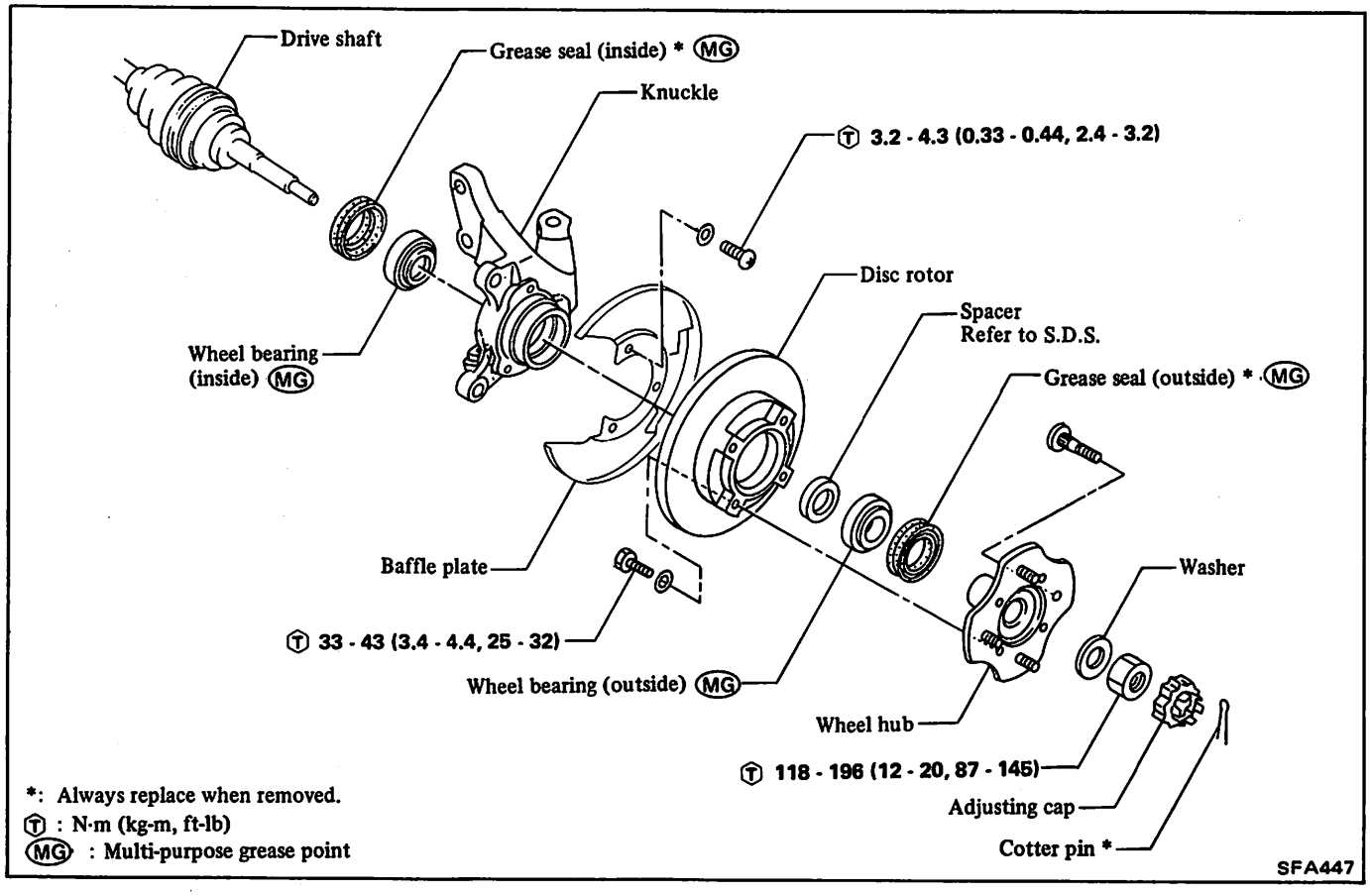


Wheel bearing
- Do not overtighten wheel bearing nuts, as this can cause wheel bearing seizure.
- **Axial play: 0 mm (0 in)**
- **Ⓣ 118 - 196 N·m (12 - 20 kg-m, 87 - 145 ft-lb)**
- **Rotation starting torque (with grease seal)**
  0.8 - 2.7 N·m (8 - 28 kg-cm, 6.9 - 24.3 in-lb)
  As measured at wheel hub bolt
  13.7 - 48.1 N (1.4 - 4.9 kg, 3.1 - 10.8 lb)
- When measuring starting torque, do not include "dragging" resistance with brake pads.
- Adjust shim thickness. Refer to S.D.S.

Ⓣ: N·m (kg-m, ft-lb)

SFA473

FRONT AXLE



WHEEL HUB AND KNUCKLE

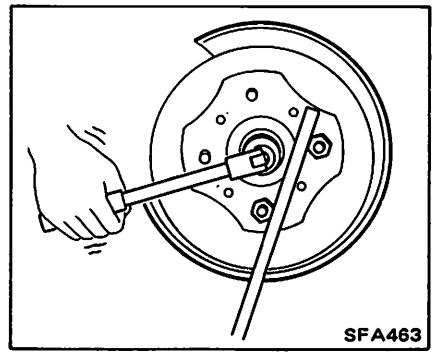
REMOVAL

1. Jack up vehicle and support it with safety stands.
2. Remove wheel and tire.
3. Remove caliper assembly.

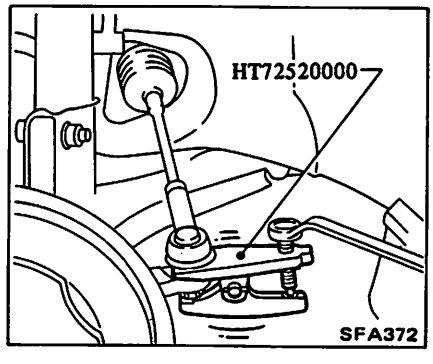
Refer to section BR.

4. Pry off cotter pin.
5. Loosen (not remove) wheel hub nut from drive shaft while holding wheel hub with suitable tool.

CAUTION:
Install wheel nuts so that the wheel bolts will not be damaged during above operation.

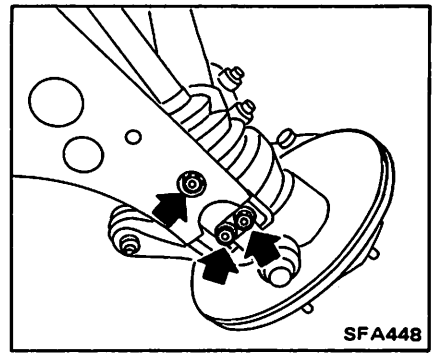


6. Remove tie-rod ball joint.



7. Remove lower ball joint.

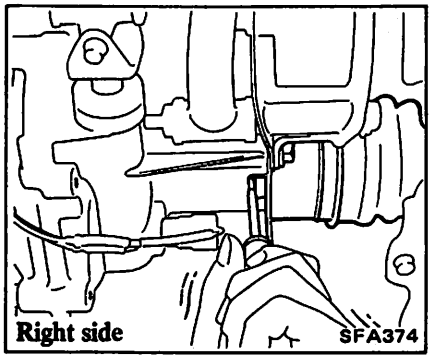
Do not reuse nut once it has been removed.

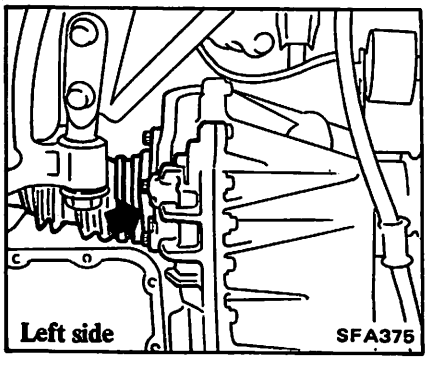


8. Drain gear oil.
9. Remove drive shaft.

Circlip that was installed on shaft should not be used again after drive shaft has been removed.

CAUTION:
Do not attempt to remove drive shafts from transaxle by pulling them. Inner joint is a slide joint and will separate, causing damage to the boots.

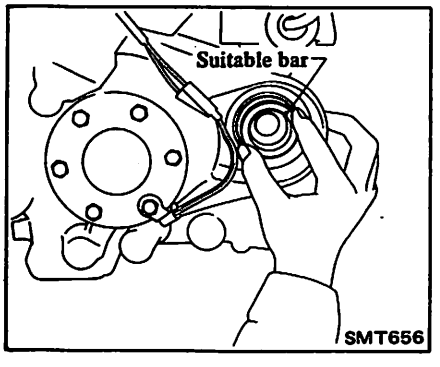




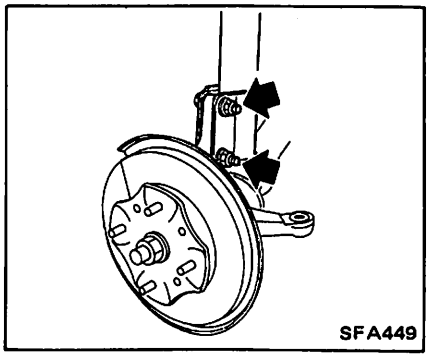
10. Remove oil seal on transaxle side. Refer to section MT or AT.

When removing drive shaft, replace oil seal.

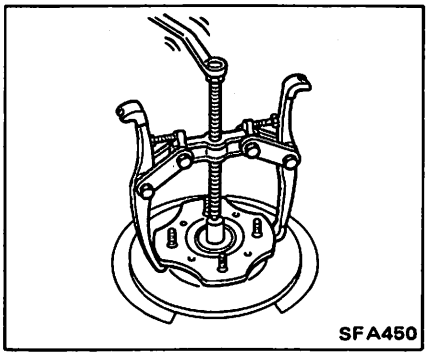
11. Insert a suitable bar or similar tool to prevent side gear from dropping.



12. Remove bolts, then remove wheel hub, knuckle and drive shaft as a unit.



13. Remove hub nut and then separate drive shaft.

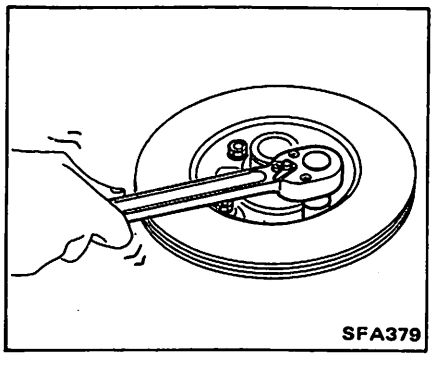


14. If necessary, separate lower ball joint from knuckle, using Ball Joint Remover HT72520000.

DISASSEMBLY

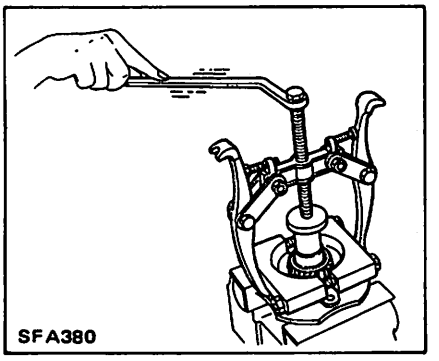
Wheel hub

1. Separate wheel hub and knuckle using tools KV40101000 and ST36230000.
2. Remove bolts securing wheel hub to disc rotor.



3. Remove outer wheel bearing with suitable bearing replacer.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



4. Remove grease seal (outside).

Do not reuse grease seal once it has been removed.

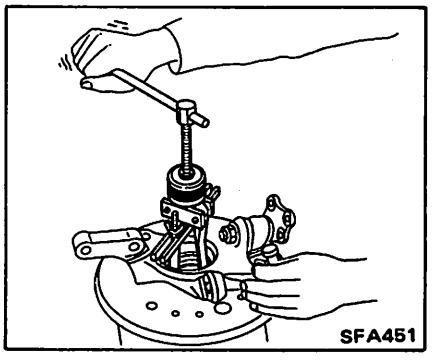
Knuckle

1. Remove grease seal (inside).

Do not reuse grease seal once it has been removed.

2. Remove wheel bearing outer race with suitable bearing puller.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



INSPECTION

Wheel bearing

Thoroughly clean grease and dirt from wheel bearing with cleaning solvent, and dry with compressed air free from moisture. Check wheel bearing to see that it rolls freely and is free from noise, crack, pitting or wear.

Wheel hub and knuckle

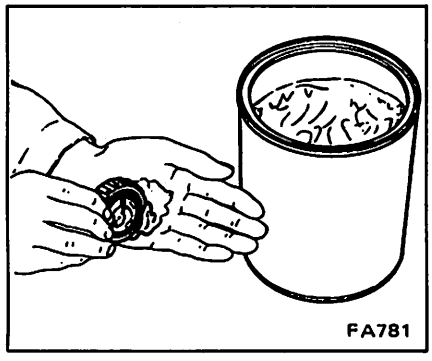
Check wheel hub for crack by means of a magnetic exploration or dyeing test, and replace if cracked.

Grease seal

If grease leakage is detected during removal, replace grease seal. Replace grease seal at every disassembly even if it appears good.

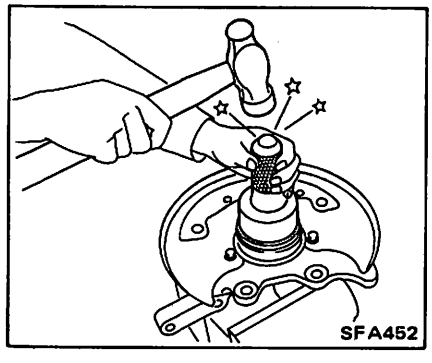
ASSEMBLY

1. Coat each bearing with recommended multi-purpose grease.



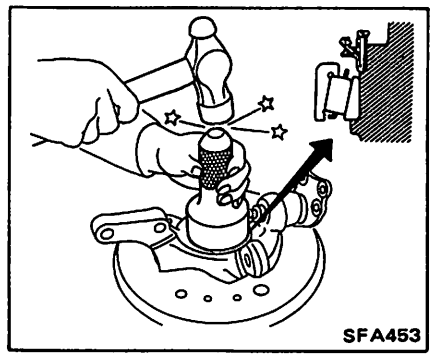
2. Install bearing outer race into each side of knuckle using suitable drift or brass bar.

CAUTION:
When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix use of bearings of different brands.



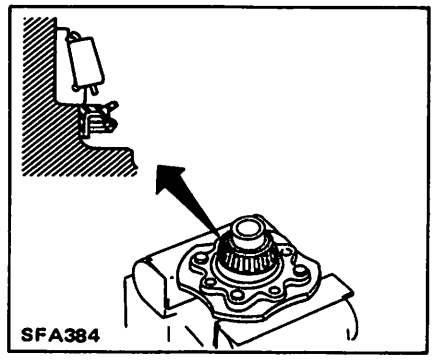
3. Install inside bearing inner race and grease seal using suitable drift.

a. Pack seal lip with recommended multi-purpose grease.
b. Be sure that grease seal is facing in proper direction.



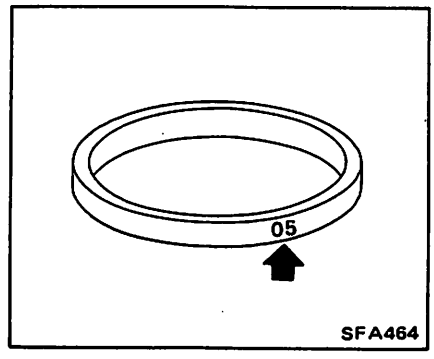
4. Install outside grease seal and bearing into wheel hub with suitable drift.

a. Pack seal lip with recommended multi-purpose grease.
b. Be sure that grease seal is facing in proper direction.
c. Press bearing inner race to install. Never apply force to the roller or cage.



5. Install spacer.

Select suitable spacer as follows:
a. When grease seal, bearing or spacer is replaced, select a spacer having same mark as old one. The old spacer can be used if it is still serviceable.

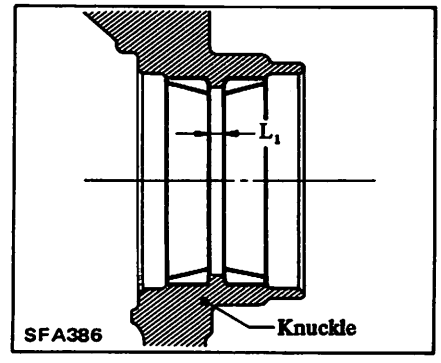


b. When knuckle is replaced, use a spacer determined by the following equation:

$L = L_1 - L_2$

L: Spacer thickness, mm (in)
L_1: Distance between outer races of bearing, mm (in)
L_2: 0.16 mm (0.0063 in)

For relationship between spacer's mark and its thickness, refer to S.D.S.



6. Tighten bolts securing hub to disc rotor.

Ⓣ: 33 - 43 N·m (3.4 - 4.4 kg-m, 25 - 32 ft-lb)

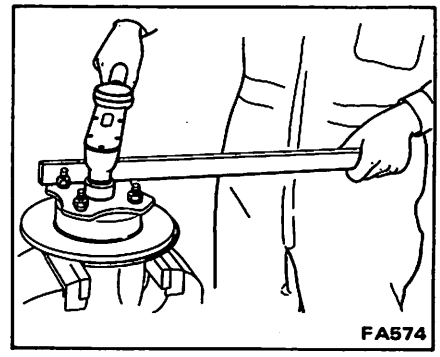
7. Put drive shaft into knuckle, and fit drive shaft serration to wheel hub.
(1) Clamp drive shaft in vise and install knuckle with bearings, spacer and hub nut.

CAUTION:
Do not tap drive shaft.

(2) Tighten hub nut.

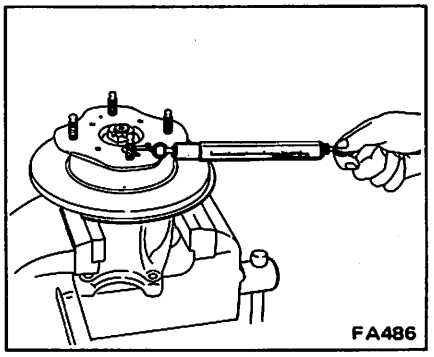
Ⓣ: 118 - 196 N·m (12 - 20 kg-m, 87 - 145 ft-lb)

CAUTION:
Install wheel nuts so as not to damage wheel bolts during above operation.



8. Spin wheel hub several turns in both directions.
9. Measure bearing preload.

Rotation starting torque of wheel bearing:
0.8 - 2.7 N·m
(8 - 28 kg-cm,
6.9 - 24.3 in-lb)
As measured at wheel hub bolt:
13.7 - 48.1 N
(1.4 - 4.9 kg,
3.1 - 10.8 lb)



If bearing preload does not accord with the specification, reselect spacer as follows:

a. **When any axial end-play is present in wheel bearing, or bearing preload is lower than the specification, replace spacer with a smaller one.**
b. **When bearing preload is greater than the specification, replace spacer with a larger one.**

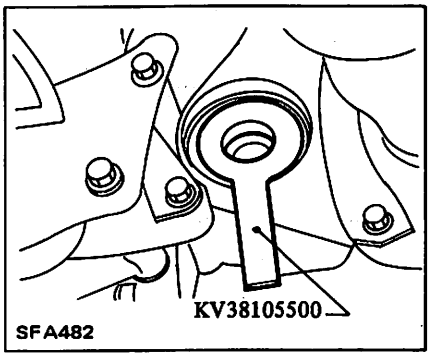
10. Repeat steps 7 and 9 until specified preload is obtained.
11. Insert a new cotter pin, and bend up.

INSTALLATION

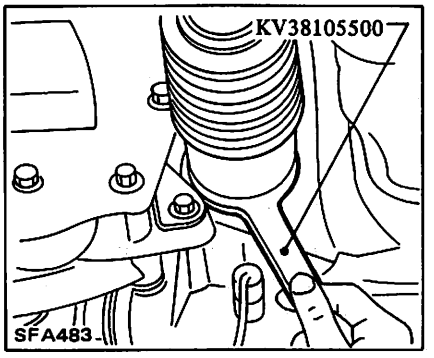
Install hub and knuckle in reverse order of removal, noting the following.

- When installing drive shaft in transaxle;

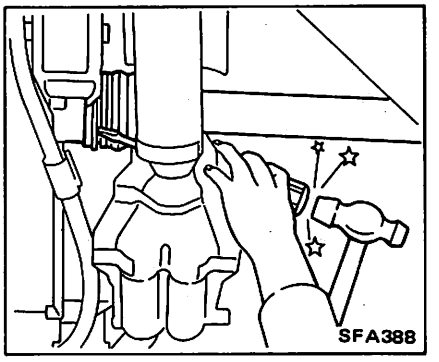
1. Install new oil seal on transaxle side. (Refer to section MT or AT.)
2. Install new circlip to drive shaft. When removing drive shaft, replace with new one.
3. Set Tool along the inner circumference of oil seal (transaxle side).



4. Insert drive shaft into transaxle. Be sure to properly align the serrations and then withdraw Tool.



5. Push drive shaft or hammer the flange of slide joint cover, and then press-fit circlip on the drive shaft into circlip groove of side gear.



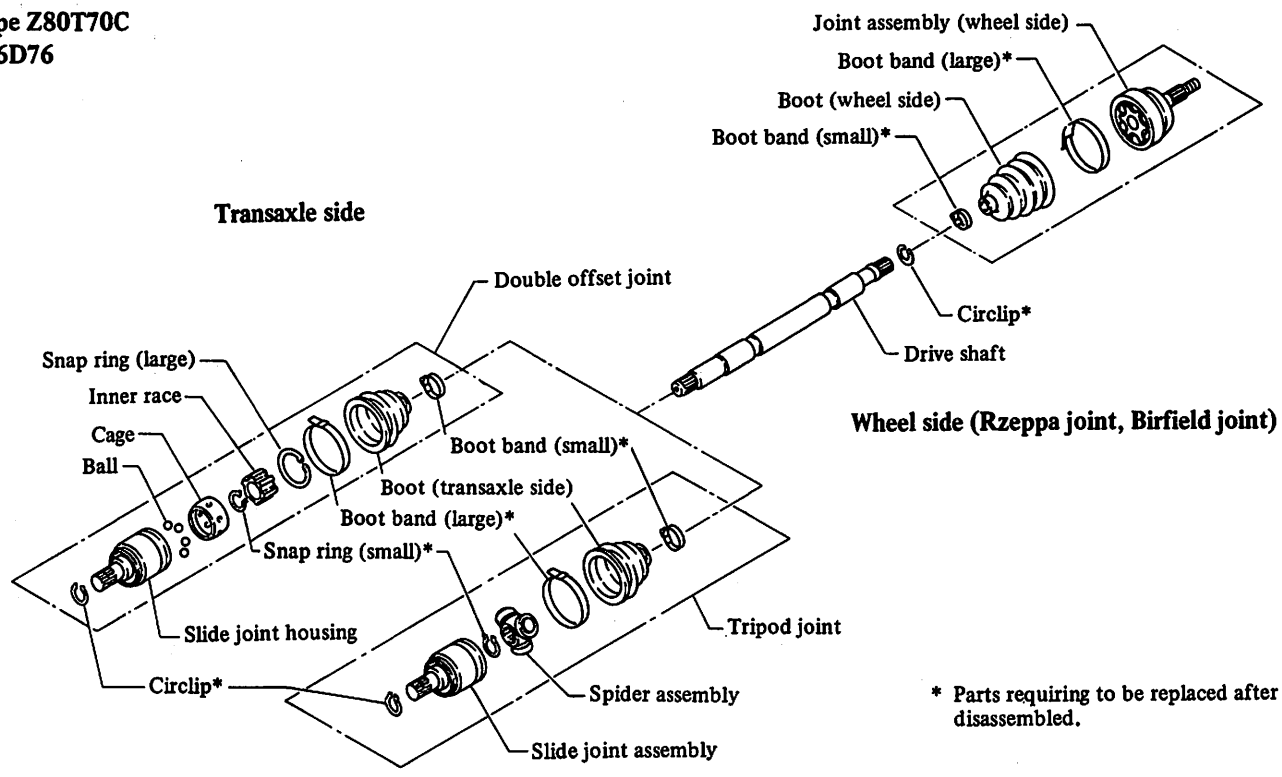
- **After it is inserted, try to pull flange out of slide joint by hand to make sure circlip is properly meshed with side gear and will not come out.**
- Always use new cotter pins and lower ball joint fixing nuts.
- After installation, pour gear oil into transaxle.

Refer to installation (section MT or AT) of Transaxle in Removal and Installation.

Ⓣ : Strut to knuckle
98 - 118 N·m
(10 - 12 kg-m,
72 - 87 ft-lb)
Transverse link to ball joint
54 - 64 N·m
(5.5 - 6.5 kg-m,
40 - 47 ft-lb)
Lower ball joint stud nut
42 - 54 N·m
(4.3 - 5.5 kg-m,
31 - 40 ft-lb)
Tie-rod stud nut
29 - 49 N·m
(3.0 - 5.0 kg-m,
22 - 36 ft-lb)

DRIVE SHAFT

Type Z80T70C
B76D76



REMOVAL

Refer to Hub and Knuckle for removal.

DISASSEMBLY

CAUTION:

a. The joint on the wheel side employs a non-disassembling design. It does not need to be disassembled except as designated in this Service Manual.

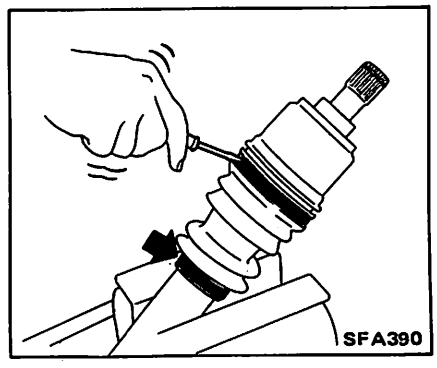
b. Tripod joint:
The spider assembly on the transaxle side is also a non-disassembling type, consisting of a tripod, rollers, needle bearing and washer.

Transaxle side

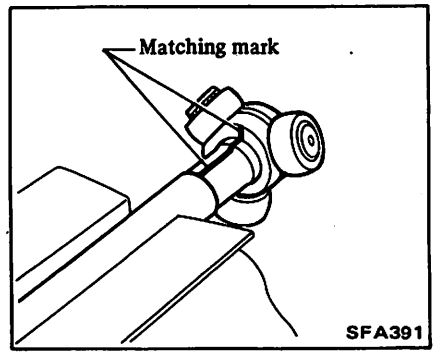
Tripod joint

1. Place "soft" jaws over steel jaws of bench vise, and place drive shaft securely in vise.
2. Remove boot bands.

Use new boot bands once they have been removed.

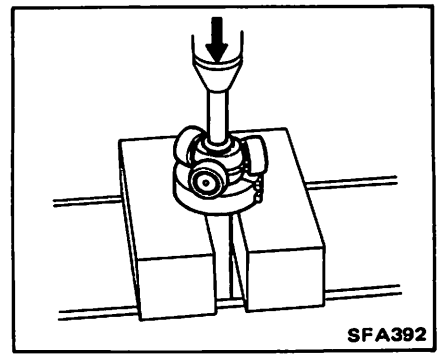


3. Separate slide joint assembly and drive shaft (with spider assembly).
4. Make matching mark.



5. Remove snap ring, then detach spider assembly, using press.

- **Use a new snap ring once it has been removed.**
- **To prevent drive shaft from dropping, always support drive shaft by hand when removing spider assembly.**

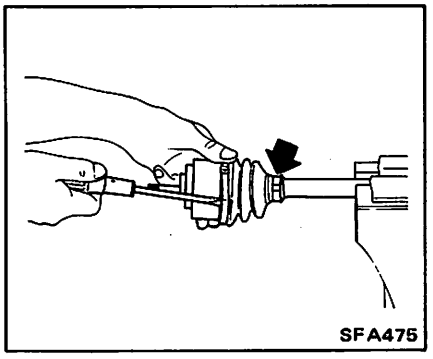


6. Remove boot.

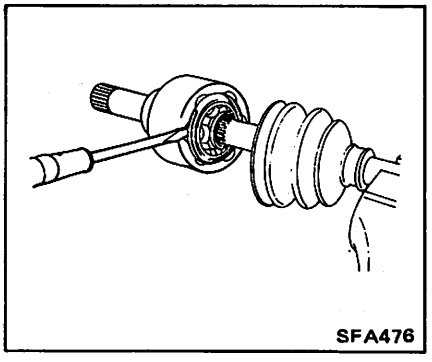
Double offset joint

1. Place "soft" jaws over steel jaws of bench vise, and place drive shaft securely in vise.
2. Remove boot bands.

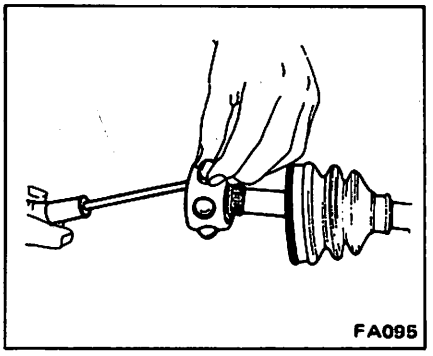
Use new boot bands once they have been removed.



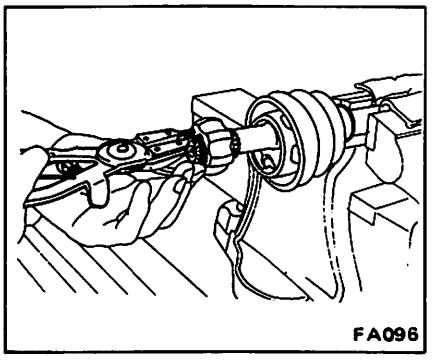
3. To disassemble double offset joint, pry off snap ring with a screwdriver, and pull out slide joint housing.



4. Wipe grease off ball cage, and drive out balls. Turn cage approximately a half turn, and detach from inner race.



5. Pry off snap ring, and withdraw inner race. This inner race is removed easily by lightly tapping on it with a mallet.



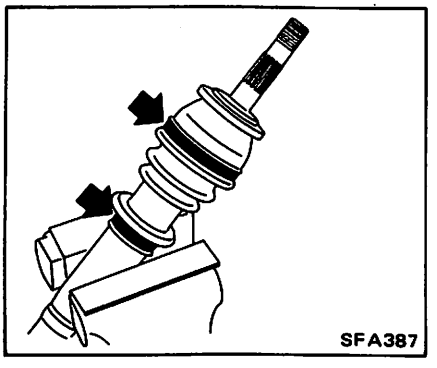
Use a new snap ring once it has been removed.

6. Draw out boot.

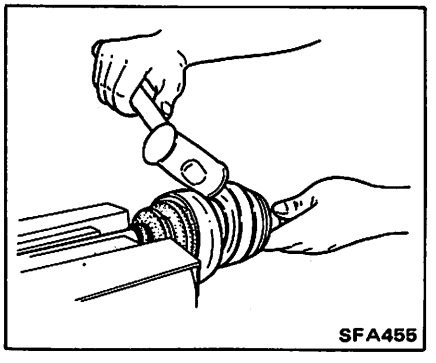
Wheel side

1. Remove boot bands.

Use new boot bands once they have been removed.



2. Put matching marks on drive shaft and joint assembly.
3. Separate joint assembly by lightly tapping it.



Joint assembly does not need to be disassembled.
Use a new circlip once it has been separated.

4. Draw out boot.

INSPECTION

Thoroughly clean all parts in cleaning solvent, and dry with compressed air. Check parts for evidence of deformation or other damage.

Drive shaft

Replace drive shaft if it is twisted or cracked.

Joint assembly (Wheel side)

Replace joint assembly if it is deformed or damaged.

Spider assembly
(Transaxle side --- tripod joint)

1. Replace spider assembly if needle bearing and washer are damaged.
2. Check to see if serrated portions are deformed; also check serrated portions on the drive shaft side. If necessary, replace.
3. Check to see if roller surfaces are scratched, worn or damaged; also check slide joint assembly for abnormalities. If necessary, replace.

Double offset joint (Transaxle side)

Replace any parts of double offset joint which show sign of burn, rust, wear, or excessive play.
Check groove of slide joint housing for cracks, wear or deformation. Replace if necessary.

Boot

Replace fatigued, cracked, or worn boot.

ASSEMBLY

- **After drive shaft has been assembled, ensure that it moves smoothly over its entire range without binding.**
- **Use NISSAN GENUINE GREASE or equivalent after every overhaul.**

Rzeppa joint - Tripod joint:

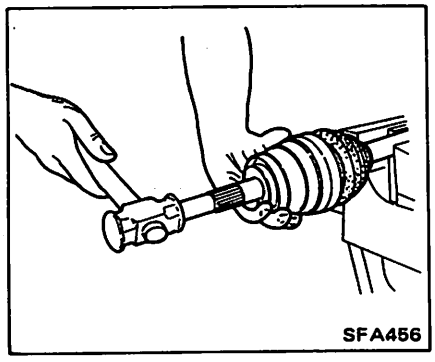
Be careful when applying grease to transaxle side and wheel side as different types are used for each.

Wheel side

1. Install boot and new small boot band to drive shaft.

- **Be careful not to damage boot on the edge of drive shaft.**

2. Set joint assembly onto drive shaft (with new circlip) by lightly tapping it.



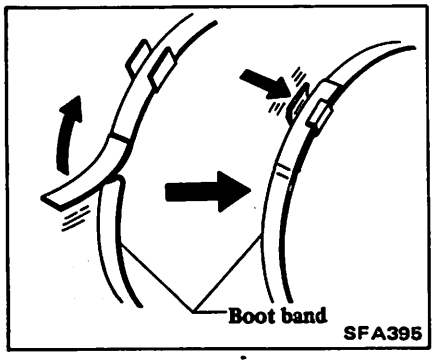
- **Use a new circlip once it has been separated.**
- **Install joint assembly securely, ensuring marks are properly aligned.**
- **If there is not mark, position both spider assemblies (one on the wheel side and the other on the transaxle side) so that their phases are nearly zero.**

3. Pack drive shaft with specified amount of grease.

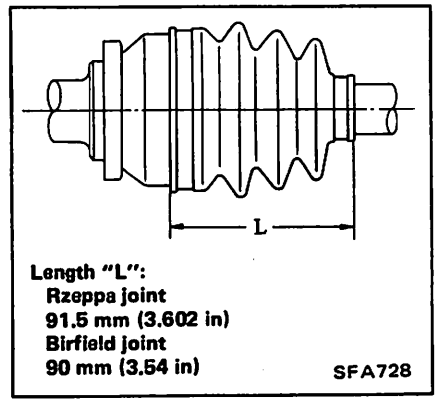
Specified amount:
Rzeppa joint
Approx. 140 g (4.94 oz)
Birfield joint
70 - 100 g (2.47 - 3.53 oz)

4. Install new larger diameter boot band.
Lock band securely with a punch.

In securing band, be careful not to scratch boot.



5. Set boot so that it does not swell and deform when its length is "L".



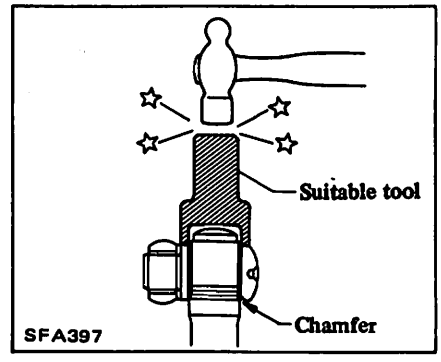
6. Install new smaller diameter boot band.

Transaxle side

Tripod type

1. Install boot and new small boot band onto drive shaft.
2. Place drive shaft in a vise, using soft cushioning pads.
3. Install spider assembly securely, ensuring marks are properly aligned.

- **If there is not mark, position both spider assemblies (one on the wheel side and the other on the transaxle side) so that their phases are nearly zero.**
- **Press-fit with spider assembly serration chamfer facing shaft.**



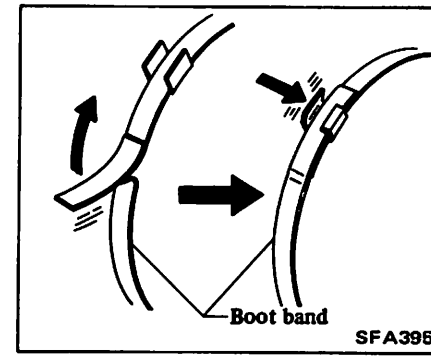
4. Install new snap ring.

Ensure that round surface faces toward spider assembly.

5. Pack with grease.

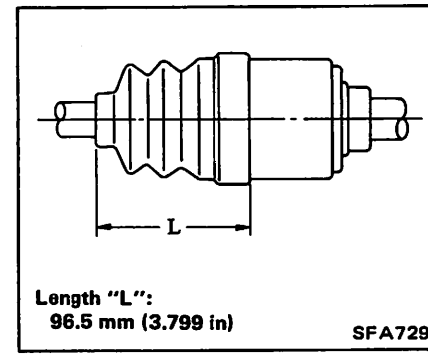
Specified amount of grease:
Approx. 190 g (6.70 oz)

6. Install slide joint assembly.
7. Fasten new large diameter boot band.



In securing boot bands, be careful not to scratch boot.

8. Set boot so that it does not swell of deform when its length is "L".



9. Fasten new smaller diameter boot band.

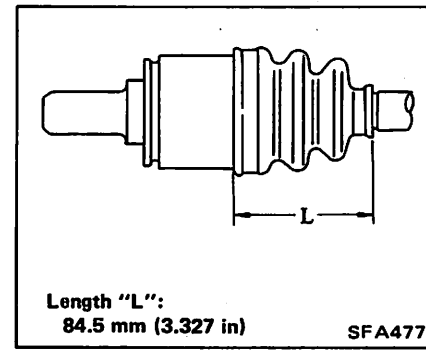
Double offset joint

To assemble drive shaft assembly, reverse the order of disassembly, noting the following.

- Pack with grease.

Specified amount of grease:
70 - 100 g (2.47 - 3.53 oz)

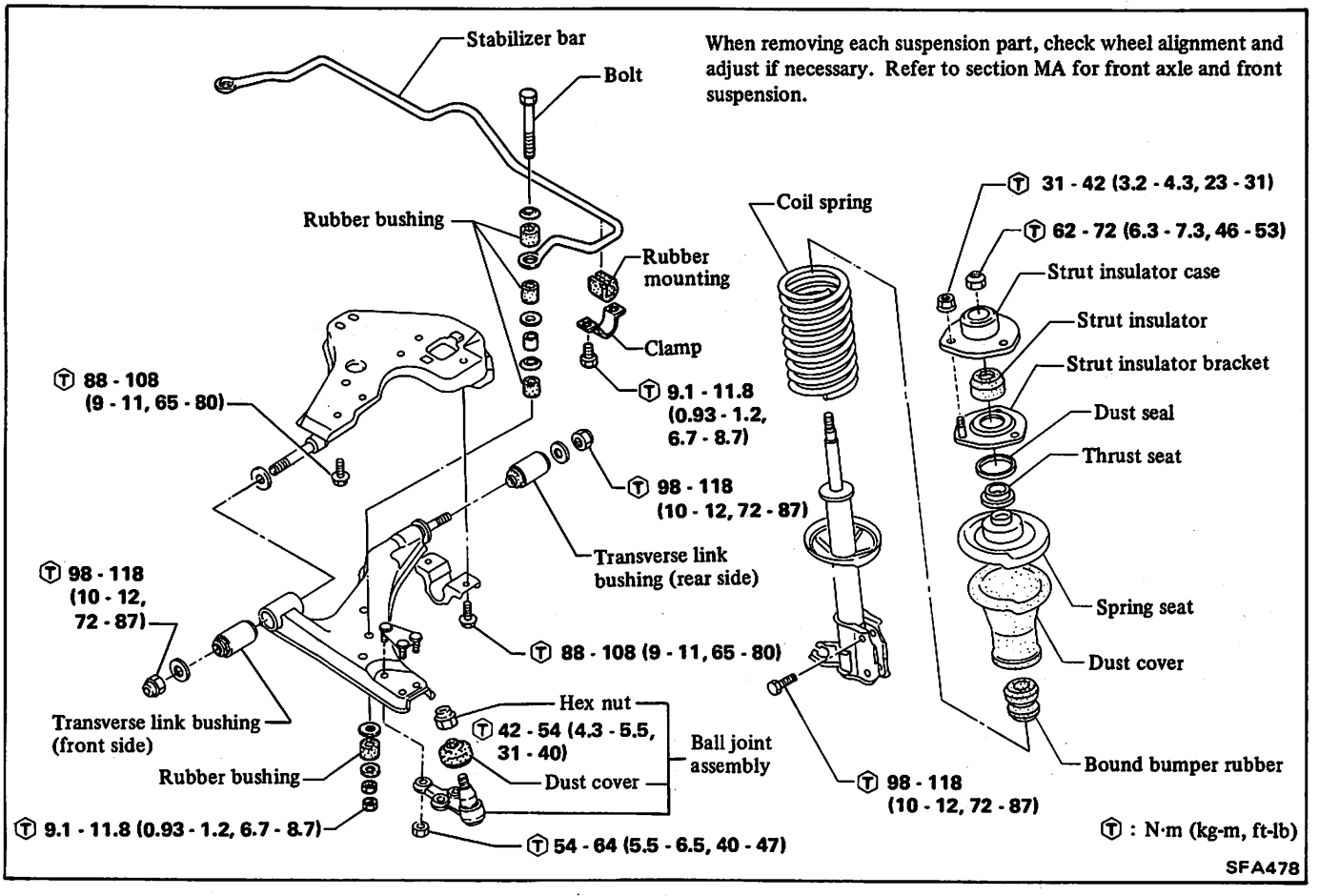
- Fasten boot bands.
Refer to Tripod type.



INSTALLATION

Refer to Wheel Hub and Knuckle for installation.

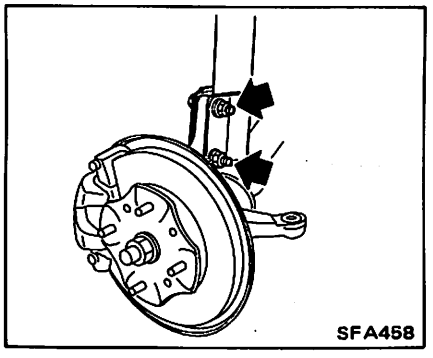
FRONT SUSPENSION



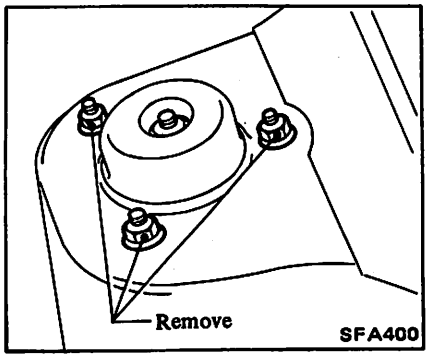
SPRING AND STRUT ASSEMBLY

REMOVAL AND INSTALLATION

1. Jack up vehicle and support it with safety stands.
2. Remove wheel and tire.
3. Detach brake tube from strut.
4. Support transverse link with safety stand.
5. Detach strut from knuckle.



6. Supporting strut assembly, remove strut attaching nut, and then withdraw strut assembly.



7. Install spring and strut assembly in reverse order of removal.

Ⓣ: Strut to body
31 - 42 N·m
(3.2 - 4.3 kg-m,
23 - 31 ft-lb)

Piston rod self-locking nut
62 - 72 N·m
(6.3 - 7.3 kg-m,
46 - 53 ft-lb)

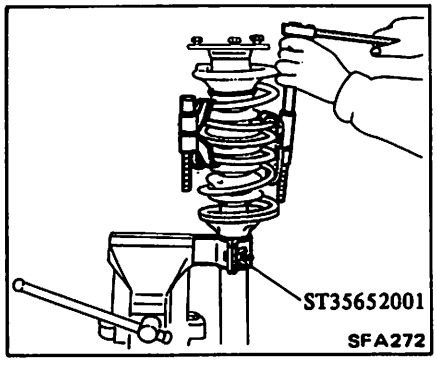
Strut to knuckle
98 - 118 N·m
(10 - 12 kg-m,
72 - 87 ft-lb)

DISASSEMBLY

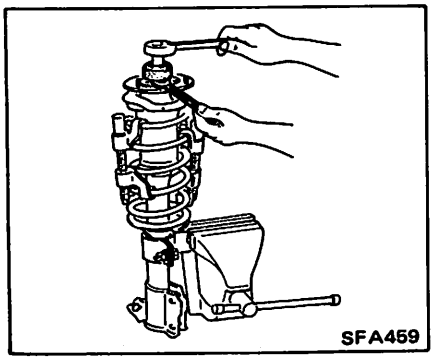
When disassembling strut assembly, extra caution should be exercised to prevent dirt and dust from entering strut.

1. Set up Tool on strut assembly.

Compress spring with coil spring compressor just for enough to permit turning of strut mounting insulator by hand.



2. Remove self-locking nut from top of piston rod.



Separate following parts:
- Strut mounting insulator
- Thrust seat
- Dust seal
- Spring upper seat
- Bound bumper rubber
- Coil spring
- Dust cover

CAUTION:
Pay attention not to damage piston rod.

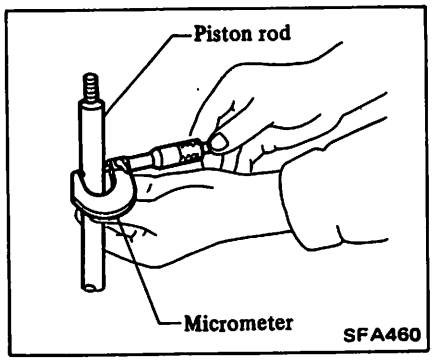
INSPECTION

- Wash all parts, except for nonmetallic parts, clean with suitable solvent and dry with compressed air.
- Blow dirt and dust off of nonmetallic parts using compressed air.
- **If oil leakage occurs on welded and gland packing portion of outer strut casing, replace strut assembly.**

Piston rod

- Inspect piston rod for cracks, deformation or other damage. Replace strut assembly.
- Inspect threads for cracks or other damage. Replace strut assembly.

Rod diameter:
17.940 - 17.975 mm
(0.7063 - 0.7077 in)
Maximum runout:
Less than 0.1 mm (0.004 in)



Strut mounting insulator

Inspect rubber bushing for damage, cracks and deformation. Replace part if necessary.

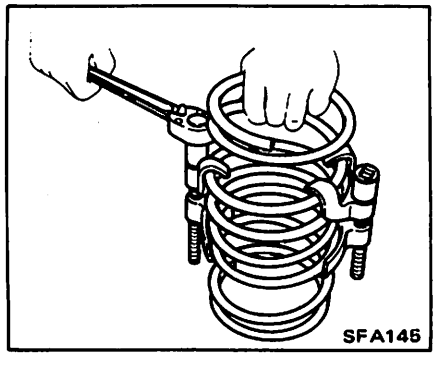
Thrust seat

Replace if inspection reveals abnormal noise or excessive rattle in axial direction.

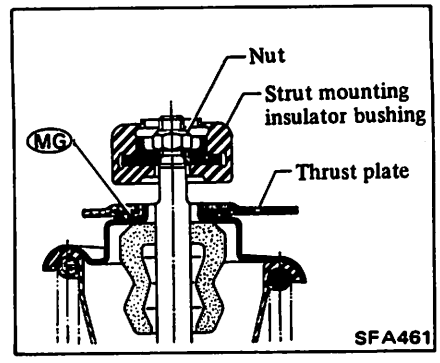
ASSEMBLY

Before assembly, clean away all dirt to prevent any possible entry of dirt into strut assembly.

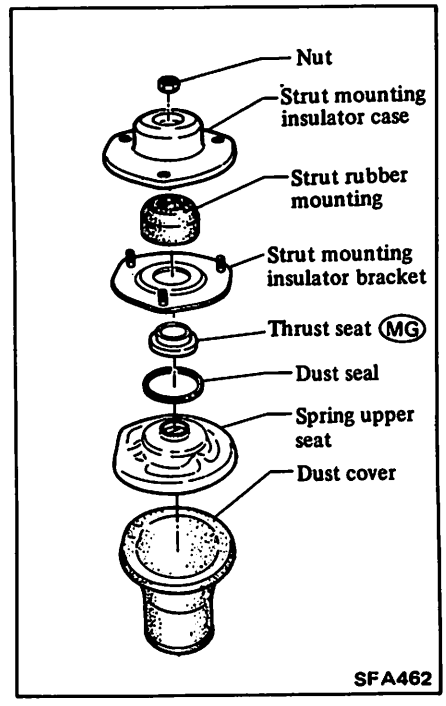
1. Install strut assembly on Tool ST35652001.
2. Compress coil spring using coil spring compressor.



3. Set up coil spring with coil spring compressor on spring lower seat of strut.
4. Lubricate parts indicated in figure.

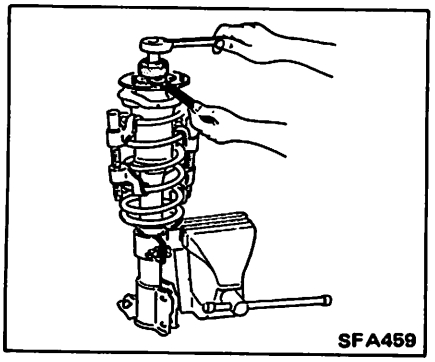


5. Mount following part as shown in figure.



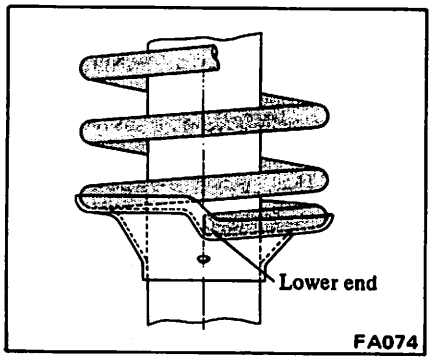
- Install bound bumper rubber in place to prevent piston rod from falling by its own weight.
- Install thrust seat so that it points in correct direction.

6. Tighten new piston rod self-locking nut.



7. Remove coil spring compressor on strut assembly.

After placing spring in position between upper and lower spring seats, release compressor gradually.

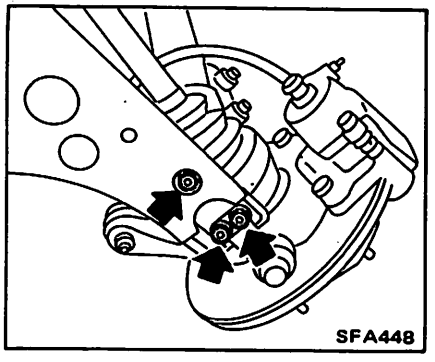


TRANSVERSE LINK

REMOVAL AND INSTALLATION

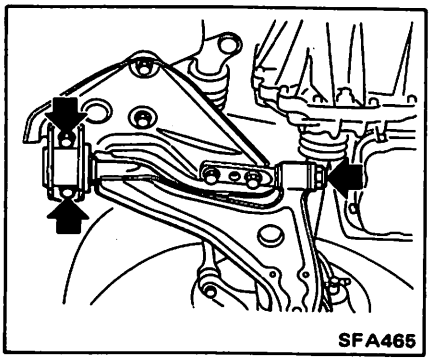
1. Jack up vehicle and support it with safety stands.
2. Remove wheel and tire.
3. Remove stabilizer bar.
4. Remove lower ball joint.

Do not reuse nuts once they have been removed.

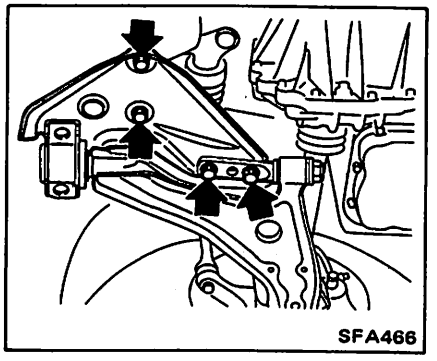


5. Remove transverse link.

Do not reuse nut once it has been removed.



6. Remove gusset.



7. Install transverse link in reverse order of removal, noting the following.

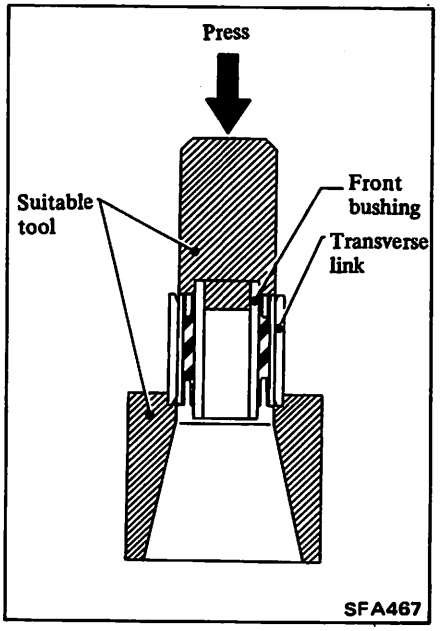
- **To install transverse link, tighten nut securing transverse link spindle which connects transverse link to gusset.**
- **Final tightening should be carried out at curb weight with tires on ground.**

Ⓣ: Gusset to body
88 - 108 N·m
(9 - 11 kg-m,
65 - 80 ft-lb)
Transverse link securing nut
98 - 118 N·m
(10 - 12 kg-m,
72 - 87 ft-lb)
Transverse link securing bolts
88 - 108 N·m
(9 - 11 kg-m,
65 - 80 ft-lb)
Lower ball joint fixing nuts
54 - 64 N·m
(5.5 - 6.5 kg-m,
40 - 47 ft-lb)

DISASSEMBLY

Front bushing

Press out front bushing with suitable bushing replacer.



ASSEMBLY

Front and rear bushing

- **Exercise care not to allow oil or grease to come into contact with it.**
- **Make sure that bushing is exposed evenly on the transverse link side.**

LOWER BALL JOINT

REMOVAL AND INSTALLATION

1. Remove drive shaft.
Refer to Hub and Knuckle for removal.
2. Remove lower ball joint using Ball Joint Remover HT72520000.
3. Install ball joint in reverse order of removal.

INSPECTION

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

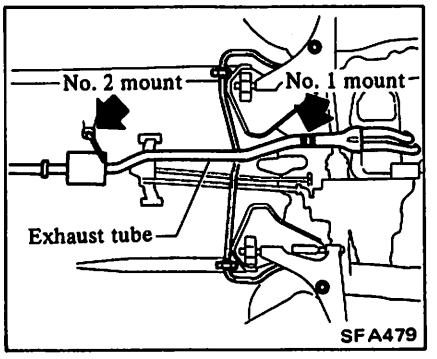
Turning torque:
New parts
2.9 - 9.8 N·m
(30 - 100 kg-cm,
26 - 87 in-lb)
Used parts
More than 1.0 N·m
(10 kg-cm, 8.7 in-lb)

2. Check condition of dust cover. If it is cracked excessively, replace ball joint.

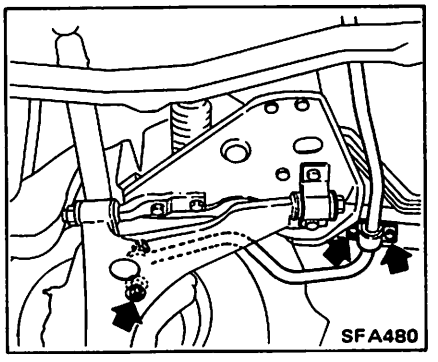
STABILIZER BAR

REMOVAL AND INSTALLATION

1. Remove exhaust tube No. 1 mounting nut and No. 2 mounting rubber.



2. Remove stabilizer attaching bolts as shown below.
- Clamp to body
- Connecting bolt to transverse link



3. Install stabilizer bar in reverse order of removal, noting the following.
- Do not allow the bushings and washers to come in contact with grease or oil.
- To install stabilizer bar, first temporarily tighten stabilizer bar bracket securing nuts and bolts. Final tightening should be carried out at curb weight with tires on ground.

Ⓣ : Clamp bolt
9.1 - 11.8 N·m
(0.93 - 1.2 kg-m,
6.7 - 8.7 ft-lb)
Stabilizer to transverse link
9.1 - 11.8 N·m
(0.93 - 1.2 kg-m,
6.7 - 8.7 ft-lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

COIL SPRING

Engine / Transaxle	E16S	
	M/T	A/T
Wire diameter (L.H./R.H.) mm (in)	11.4 (0.449)/ 11.2 (0.441)	11.5 (0.453)/ 11.4 (0.449)
Coil diameter mm (in)	110 (4.33)	
Free length mm (in)	376 (14.80)/ 367 (14.45)	385 (15.16)/ 376 (14.80)
Spring constant N/mm (kg/mm, lb/in)	17.6 (1.79, 100.2)	
Identification color (L.H./R.H.)	Orange x 1, Orange x 1/ Yellow green x 1, Orange x 1	Blue x 1, Blue x 2/ Orange x 1, Orange x 1

STRUT ASSEMBLY

Shock absorber type		Double acting hydraulic
Piston rod diameter	mm (in)	18 (0.71)
Piston diameter	mm (in)	25 (0.98)
Stroke	mm (in)	162 (6.38)
Damping force [at 0.3 m (1.0 ft)/sec.]		
Expansion	N (kg, lb)	539 - 736 (55 - 75, 121 - 165)
Compression	N (kg, lb)	186 - 304 (19 - 31, 42 - 68)

STABILIZER BAR

Diameter	mm (in)	22 (0.87)

INSPECTION AND ADJUSTMENT

WHEEL ALIGNMENT

Refer to section MA.

LOWER BALL JOINT

Turning torque N·m (kg-cm, in-lb)		
New parts		2.9 - 9.8 (30 - 100, 26 - 87)
Used parts		More than 1.0 (10, 8.7)
Axial end play	mm (in)	0.1 - 1.5 (0.004 - 0.059)

WHEEL BEARING ADJUSTMENT

Rotation starting torque N·m (kg-cm, in-lb)		0.8 - 2.7 (8 - 28, 6.9 - 24.3)
As measured at wheel hub bolt	N (kg, lb)	13.7 - 48.1 (1.4 - 4.9, 3.1 - 10.8)

Spacer thichness

Mark	H mm (in)
05	7.381 - 7.440 (0.2906 - 0.2929)
06	7.441 - 7.500 (0.2930 - 0.2953)
07	7.501 - 7.560 (0.2953 - 0.2976)
08	7.561 - 7.620 (0.2977 - 0.3000)
09	7.621 - 7.680 (0.3000 - 0.3024)
10	7.681 - 7.740 (0.3024 - 0.3047)
11	7.741 - 7.800 (0.3048 - 0.3071)
12	7.801 - 7.860 (0.3071 - 0.3094)
13	7.861 - 7.920 (0.3095 - 0.3118)
14	7.921 - 7.980 (0.3118 - 0.3142)
15	7.981 - 8.040 (0.3142 - 0.3165)
16	8.041 - 8.100 (0.3166 - 0.3189)
17	8.101 - 8.160 (0.3189 - 0.3213)
18	8.161 - 8.220 (0.3213 - 0.3236)
19	8.221 - 8.280 (0.3237 - 0.3260)
20	8.281 - 8.340 (0.3260 - 0.3283)
21	8.341 - 8.400 (0.3284 - 0.3307)
22	8.401 - 8.460 (0.3307 - 0.3331)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Strut assembly			
Piston rod self-lock nut	62 - 72	6.3 - 7.3	46 - 53
Strut to body	31 - 42	3.2 - 4.3	23 - 31
Strut to knuckle	98 - 118	10 - 12	72 - 87
Lower ball joint			
Transverse link to ball joint	54 - 64	5.5 - 6.5	40 - 47
Stud nut	42 - 54	4.3 - 5.5	31 - 40
Tie-rod			
Lock nut	35 - 47	3.6 - 4.8	26 - 35
Stud nut	29 - 49	3.0 - 5.0	22 - 36
Transverse link			
Securing bolt	88 - 108	9 - 11	65 - 80
Securing nut	98 - 118	10 - 12	72 - 87
Gusset to body	88 - 108	9 - 11	65 - 80
Axle			
Drive shaft to hub	118 - 196	12 - 20	87 - 145
Hub to disc rotor	33 - 43	3.4 - 4.4	25 - 32
Baffle plate	3.2 - 4.3	0.33 - 0.44	2.4 - 3.2
Caliper	54 - 64	5.5 - 6.5	40 - 47
Stabilizer bar			
Stabilizer bar to body	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Stabilizer bar to transverse link	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7

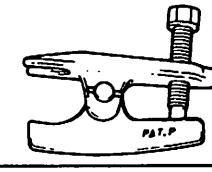
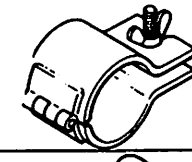
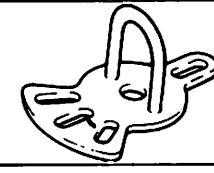
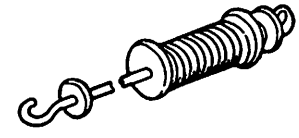
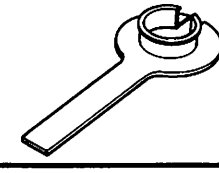
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Steering wheel shock, vibration or shimmying	• Steering wheel oscillation is often experienced when there is an excessive free play in steering linkage, improper backlash in steering gear, or oscillation of front wheels. • Steering shock or kickback is sharply felt on steering wheel when front wheels encounter obstructions on road. This condition may be due to improper backlash in steering gear or other associated units. • Shimmy is rapid oscillation of front suspension system and related parts and is often experienced when vehicle reaches a certain speed.	
	Improper tire air pressure.	Adjust.
	Wheel out of balance or deformed.	Correct or replace.
	Worn or loose tire.	Replace or retighten.
	Worn suspension ball joint or lack of preload.	Replace ball joint.
	Steering gear out of adjustment.	Readjust.
	Improper wheel alignment.	Readjust.
	Worn rubber bushing in transverse link.	Replace.
	Excessive free play in steering linkage.	Check and correct.
	Excessive play or wear on front wheel bearing.	Replace bearing.
	Loose steering gear box.	Retighten.
	Loose or inoperative shock absorber (in strut assembly).	Retighten or replace.
	Unbalanced vehicle posture.	Adjust.
Vehicle drifts.	This condition becomes evident when vehicle is running on a flat surface with your hands off steering wheel. **Also refer to Trouble diagnoses and corrections under the Rear suspension section.**	
	Improper tire air pressure, or loose wheel nuts.	Replace tires.
	Difference in height between right and left tire treads.	Replace.
	Worn front wheel bearing.	Replace.
	Fatigued front spring, or use of improper spring.	Replace.
	Improper wheel alignment.	Readjust.
	Brake drag.	Check and correct.
	Worn rubber bushing in transverse link.	Replace.
	Deformed steering linkage or suspension link.	Replace.
	Unbalanced vehicle posture.	Adjust.
	Worn radial tire.	Replace.
Vehicle wanders.	Improper tire air pressure.	Adjust.
	Improper wheel alignment.	Readjust.

Condition	Probable cause	Corrective action
	Excessive free play or wear on steering linkage or suspension link.	Replace.
	Steering gear out of adjustment.	Readjust.
	Wheel deformed or out of balance.	Check and correct.
	Worn bushing in transverse link.	Replace.
Stiff steering wheel	• Check and correct in the following manner: Jack up front of vehicle and support it with safety stands. Separate knuckle arm from tie rod and manipulate steering wheel. a) When steering wheel operation is light, check and locate cause of problem in steering linkage, suspension system, or front axle. b) When steering wheel operation is heavy, check and locate cause of problem in steering gear or steering column.	
	Improper tire air pressure.	Adjust.
	Improper lubrication in steering gear housing or dirt in oil.(b)	Lubricate, service, or replace.
	Improper lubrication in steering linkage, dirt in grease, or abnormal wear on steering linkage.(a)	Lubricate or replace.
	Seized or damaged suspension ball joint. Lack of lubrication in ball joint.(a)	Replace.
	Worn or seized wheel bearing.(a)	Replace.
	Steering gear out of adjustment.(b)	Readjust.
	Deformed steering linkage.(a)	Replace.
	Improper wheel alignment.(a)	Readjust.
	Damaged thrust seal on upper end of strut.(a)	Replace.
	Seized or damaged piston or piston rod in shock absorber (in strut).(a)	Replace.
Excessive play in steering wheel.	Steering gear out of adjustment.	Readjust.
	Worn steering linkage.	Replace.
	Loose steering gear box.	Retighten.
	Worn wheel bearing.	Replace.
	Worn bushing in transverse link.	Replace.
Noise	Improper tire air pressure.	Adjust.
	Damaged or worn suspension ball joint or steering linkage, or lack of lubrication.	Replace or lubricate.
	Loose steering gear linkage or suspension system.	Retighten.
	Damaged shock absorber (in strut).	Replace.
	Worn wheel bearing.	Replace.
	Worn steering linkage or steering gear.	Replace.
	Worn bushing in transverse link.	Replace.
	Broken or fatigued coil spring.	Replace.

Condition	Probable cause	Corrective action
	Loose. mounting nut on strut mounting insulator.	Retighten.
	Improper tightening of strut and gland packing.	Retighten.
	Loose bolt on gusset.	Retighten.
	Deformed wheel.	Replace.
Tires squeal.	Improper tire air pressure.	Adjust.
	Improper wheel alignment.	Readjust.
	Deformed knuckle, spindle or suspension.	Replace.
	Rough driving.	Avoid rough driving.
Abnormal (or uneven) tire wear.	Improper tire air pressure.	Adjust.
	Improper wheel alignment.	Readjust.
	Worn wheel bearing.	Replace.
	Brake out of adjustment.	Readjust.
	Improper tire rotation.	Rotate tires properly.
	Rough or hard driving.	Avoid rough or hard driving.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
HT72520000 (J25730-A)	Ball joint remover	
ST35652001 (–)	Clamp	
KV40101000 (J25604-01)	Rear axle stand	
ST36230000 (J25840-A)	Sliding hammer	
KV38105500 (J33904)	Differential side oil seal protector	

REAR AXLE & REAR SUSPENSION

SECTION RA

CONTENTS

REAR AXLE RA-2
- Removal RA-2
- Inspection RA-3
- Installation RA-3

REAR SUSPENSION RA-4
- Shock absorber RA-4
- Coil spring RA-4
- Rear arm RA-5

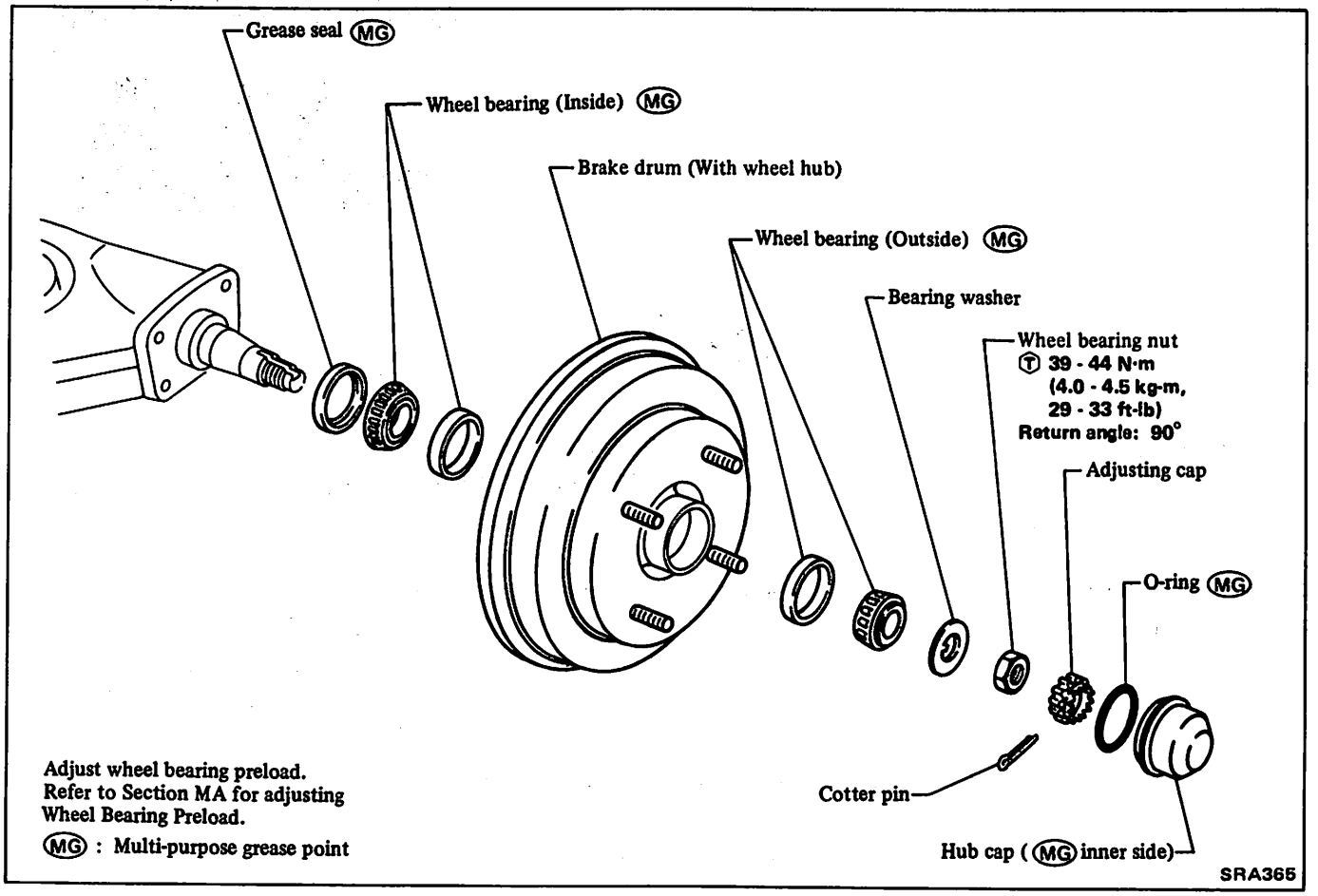
SERVICE DATA AND SPECIFICATIONS (S.D.S.) RA-6
- General specifications RA-6
- Inspection and adjustment RA-6
- Tightening torque RA-6

TROUBLE DIAGNOSES AND CORRECTIONS RA-7

SPECIAL SERVICE TOOLS RA-7

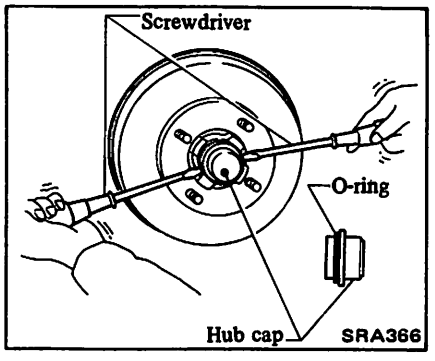
Refer to Section MA (Rear Axle & Rear Suspension) for:
- CHECKING REAR AXLE AND SUSPENSION PARTS
- ADJUSTING WHEEL BEARING PRELOAD

REAR AXLE



REMOVAL

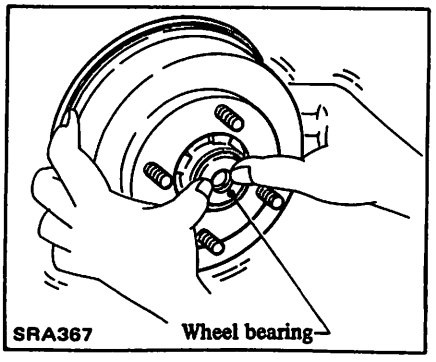
1. Block front wheels and raise rear of vehicle, and then support it with safety stands. Refer to Section GI for Lifting Points and Towing.
2. Remove rear wheel of side to be worked on.
3. Release parking brake.
4. Work off hub cap.



5. Pry off cotter pin; take out adjusting cap and wheel bearing nut.

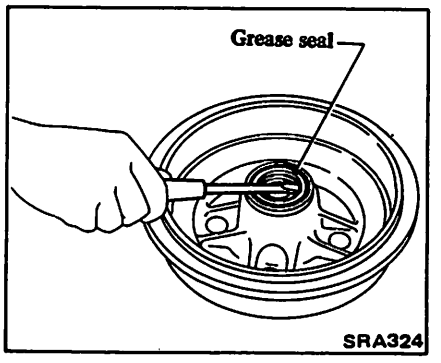
Cotter pin must not be reused.

6. Remove rear brake drum with outer bearing and washer.

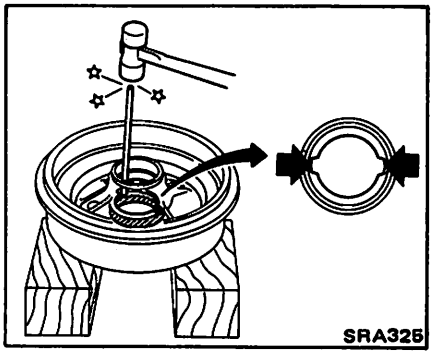


CAUTION:
Be careful not to drop wheel bearing.

7. Remove grease seal and inside wheel bearing inner race. Grease seal must not be reused.



8. Remove inside and outside wheel bearing outer races.



INSPECTION

Thoroughly clean bearing and each part, and dry with compressed air.

WHEEL BEARING

When race, cage or roller surfaces make a noise, or are cracked, pitted, worn, rough or out-of-round, replace bearing assembly.

CAUTION:
When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix use of bearings of different brands.

BRAKE DRUM

Check drum for cracks using magnetic exploration or dyeing test; replace if necessary. Refer to Section BR for inspection or sliding portion.

KNUCKLE SPINDLE

Also check brake drum; replace if cracked or damaged. When thread is damaged, replace rear arm.

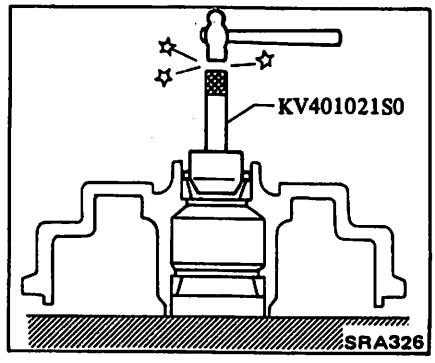
GREASE SEAL

If grease leakage is detected during removal, replace grease seal. Replace grease seal at every disassembly even if it appears good.

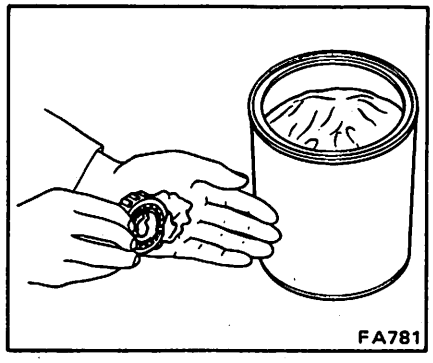
INSTALLATION

Install rear axle in the reverse order of removal as follows:

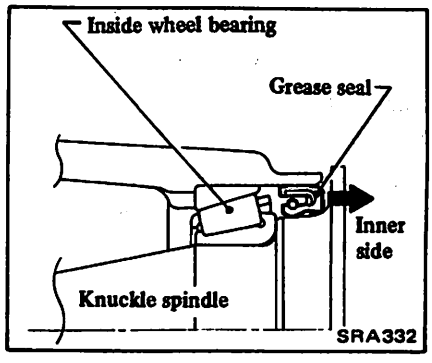
1. Install bearing outer race with Tool until it seats in hub.



2. Coat each bearing with recommended multi-purpose grease.

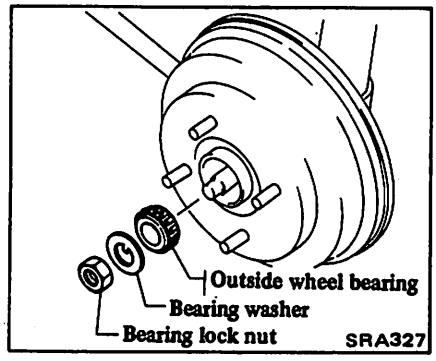


3. Place inside bearing in hub and install a new grease seal, coating sealing lips with recommended multi-purpose grease.



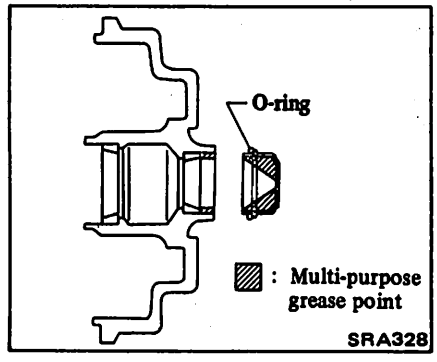
4. Apply recommended multi-purpose grease sparingly to each part.
- Threaded portion of spindle.
- Contacting surface of wheel bearing nut.
- Contacting surface of bearing washer.

5. Put hub assembly on spindle, and then install outside bearing, bearing washer and wheel bearing nut.



6. Adjust wheel bearing preload.
Refer to Section MA for adjustment.

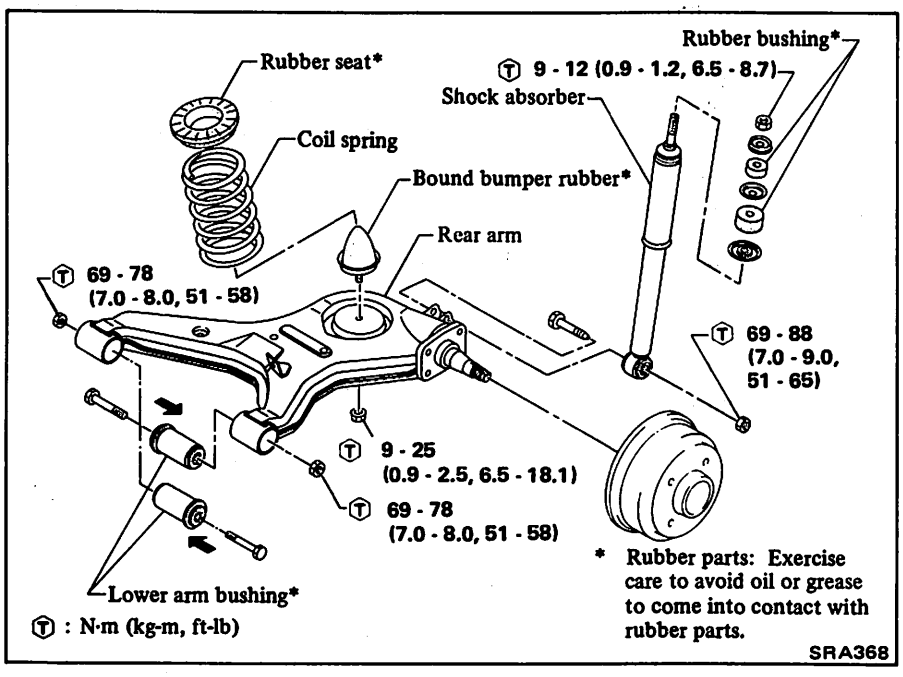
7. Pack hub cap with recommended multi-purpose grease. Coat O-ring with recommended multi-purpose grease.



8. Install hub cap with O-ring on hub.
9. Install wheel.

Ⓣ : **Wheel nut**
78 - 98 N·m
(8.0 - 10.0 kg-m, 58 - 72 ft-lb)

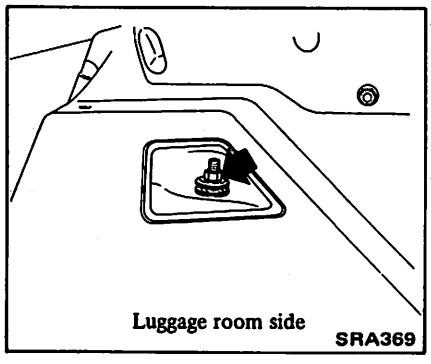
REAR SUSPENSION

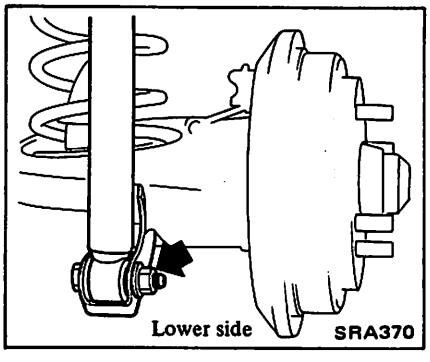


SHOCK ABSORBER

REMOVAL

1. Block front wheels and raise rear of vehicle, and then support it with safety stands. Refer to Section GI for Lifting Points and Towing.
2. Remove nuts and bolt from shock absorber.





3. Lower jack slowly. Remove shock absorber.

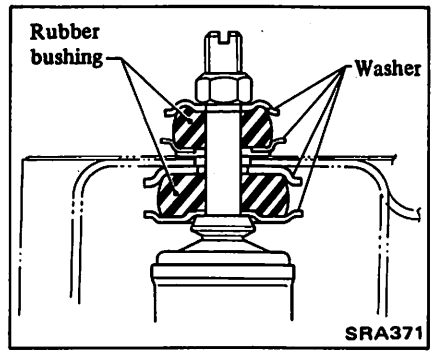
INSPECTION

1. Test shock absorber and compare with specification given in Service Data and Specifications. Replace if necessary.
2. Check for cracks.
3. Check all rubber parts for wear, cracks, damage or deformation. Replace if necessary.

INSTALLATION

Install shock absorber in reverse order of removal.

When installing upper end of shock absorber, bushing and washer must be located and oriented as shown below.



Ⓣ : Shock absorber upper end nut
9 - 12 N·m
(0.9 - 1.2 kg-m,
6.5 - 8.7 ft-lb)

Shock absorber lower end bolt
69 - 88 N·m
(7.0 - 9.0 kg-m,
51 - 65 ft-lb)

CAUTION:
a. Be careful not to damage or bend piston rod during operation.
b. Do not open or heat gas filled type shock absorbers.

COIL SPRING

REMOVAL

1. Block front wheels with chocks.
2. Jack up vehicle and support it with safety stands.
3. Remove wheel and tire.
4. Securely support lower end of rear arm with jack.
5. Remove shock absorber lower end bolt. Refer to Shock Absorber.
6. Lower jack slowly. Remove coil spring.

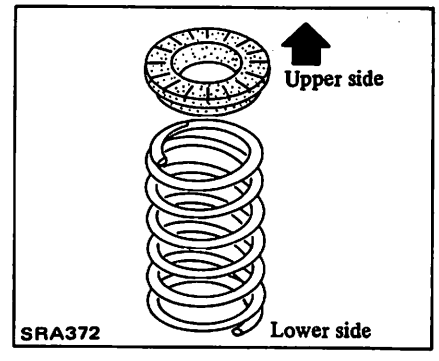
INSPECTION

1. Check coil spring for yield, deformation or cracks.
2. Test spring and compare with specifications given in S.D.S.
3. Check all rubber parts for wear, cracks, damage or deformation. Replace if necessary.

INSTALLATION

Install coil spring in reverse order of removal.

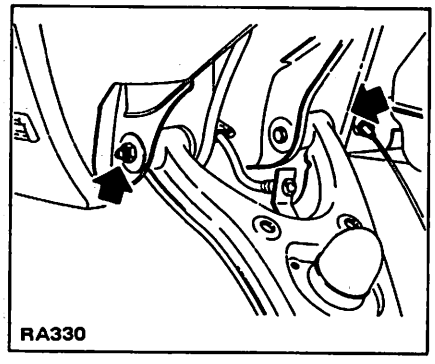
CAUTION:
Correctly fit flattened end of coil spring on spring seat.



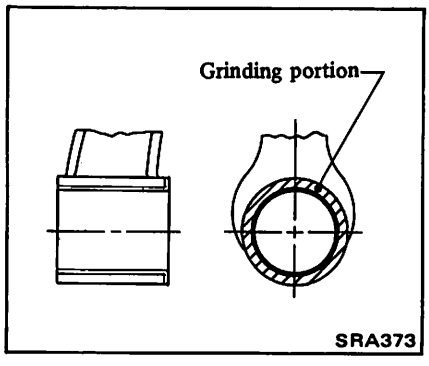
REAR ARM

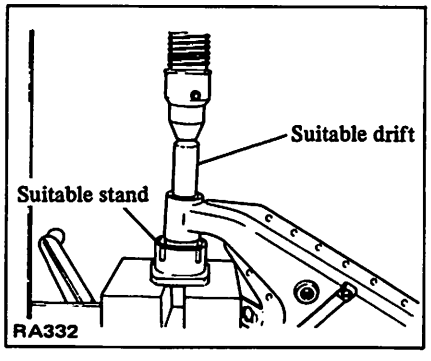
REMOVAL

1. Remove coil spring. Refer to Coil Spring.
2. Loosen flare nut connecting brake tube, and detach brake tube. Install brake line plug.
3. Detach hand brake wire.
4. Remove brake drum. Refer to Rear Axle.
5. Remove rear arm bolts.



6. Grind the flanged portion of rear arm bushing.
Set the grinding portion of rear arm on Tool, press bushing out using suitable Drift.





INSPECTION

Rear arm

1. Examine rear arms to ensure they are not deformed or cracked.
2. Check rubber bushings for wear, damage or separation. Replace if necessary.

Rear arm bushing

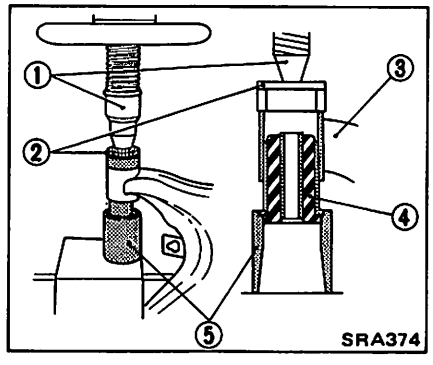
Check condition of bushing without removing it from rear suspension arm. If bushing shows indications of cracks, deformation or other damage, replace it.

Bound bumper

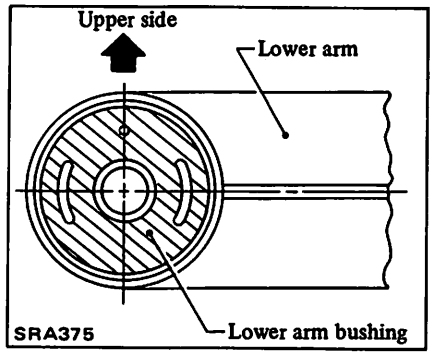
If bound bumper is deteriorated, cracked or damaged to such an extent that it is no longer serviceable, replace it.

INSTALLATION

1. Press bushing into rear arm collar, using Tool.



1 Press
2 Suitable plate
3 Rear arm
4 Bushing
5 Suitable stand



2. Install rear arm in the reverse order of removal.

At first, tighten rear arm attaching bolts temporarily. Final tightening should be carried out with vehicle under normal load.

CAUTION:
When installing brake tubes, use Flare Nut Torque Wrench GG94310000.

Ⓣ : Rear arm attaching bolt
69 - 78 N·m
(7.0 - 8.0 kg-m,
51 - 58 ft-lb)
Shock absorber lower end bolt
69 - 88 N·m
(7.0 - 9.0 kg-m,
51 - 65 ft-lb)
Brake disc attaching bolt
25 - 33 N·m
(2.5 - 3.4 kg-m,
18 - 25 ft-lb)
Brake tube flare nut
15 - 18 N·m
(1.5 - 1.8 kg-m,
11 - 13 ft-lb)
Brake hose connector
17 - 20 N·m
(1.7 - 2.0 kg-m,
12 - 14 ft-lb)
Wheel nut
78 - 98 N·m
(8.0 - 10 kg-m,
58 - 72 ft-lb)

3. Bleed air out of brake system. Refer to section BR.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

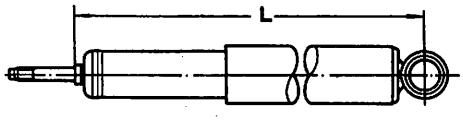
GENERAL SPECIFICATIONS

COIL SPRING

Wire diameter	mm (in)	
End		10.1 (0.398)
Center		12.0 (0.472)
Coil diameter	mm (in)	88 (3.46)
Free length	mm (in)	299 (11.77)
Spring constant N/mm (kg/mm, lb/in)		
First		23.0 (2.35, 131.6)
Second		46.1 (4.7, 263)
Identification color		Red x 1, Pink x 1

SHOCK ABSORBER

Maximum length "L"	mm (in)	552 (21.73)
Stroke	mm (in)	227 (8.94)
Damping force [at 0.3 m (1.0 ft)/sec.]		
Expansion	N (kg, lb)	392 - 588 (40 - 60, 88 - 132)
Compression	N (kg, lb)	206 - 284 (21 - 29, 46 - 64)



SRA112

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Wheel bearing lock nut	39 - 44	4.0 - 4.5	29 - 33
Shock absorber lock nut (upper end)	9 - 12	0.9 - 1.2	6.5 - 8.7
Shock absorber lock bolt (lower end)	69 - 88	7.0 - 9.0	51 - 65
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Back plate	25 - 33	2.5 - 3.4	18 - 25
Wheel nut	78 - 98	8.0 - 10.0	58 - 72
Rear arm to body	69 - 78	7.0 - 8.0	51 - 58
Bumper rubber to rear arm	9 - 25	0.9 - 2.5	6.5 - 18.1

INSPECTION AND ADJUSTMENT

WHEEL ALIGNMENT AND WHEEL BEARING

Refer to section MA.

TROUBLE DIAGNOSES AND CORRECTIONS

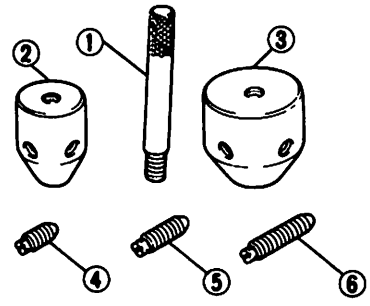
When rear axle and suspension are suspected of being noisy, it is advisable to make thorough test to determine whether the noise originates in the tires, road surface, exhaust, engine, transaxle, wheel bearings or suspension.

Noise which originates in other places cannot be corrected by adjustment or replacement of parts in the rear axle and rear suspension.

Condition	Probable cause	Corrective action
Noise (Unusual sound).	Loose wheel nuts.	Tighten to specified torque.
	One or more securing bolts loose.	Tighten to specified torque.
	Lack of lubricating grease.	Lubricate as required.
	Damaged shock absorber.	Replace.
	Damaged or worn wheel bearing.	Replace.
	Unbalance of wheel and tire.	Balance.
	Damage to the rubber parts such as lower arm bushing.	Replace damaged parts.
	Breakage of coil spring.	Replace.
Instability in driving This problem is also related to the front suspension. For trouble diagnoses, also refer to Section FA.	Loose wheel nuts.	Tighten to specified torque.
	Malfunctioning of shock absorber.	Repair or replace.
	Incorrect wheel alignment.	Adjust.
	Worn coil spring.	Replace.
	Damaged lower arm bushing or bound bumper.	Replace.
	Worn or damaged wheel bearing.	Replace.
	Loose or broken lower arm.	Retighten or replace.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV40102150 (–)	Bearing outer race drift set
① ST35325000 (–)	Drift bar
② KV40102110 (–)	Drift (A)
③ KV40102120 (–)	Drift (B)
④ KV40102130 (–)	Screw (A)
⑤ KV40102140 (–)	Screw (B)
⑥ KV40102150 (–)	Screw (C)



BRAKE SYSTEM

SECTION BR

CONTENTS

SERVICE BRAKE ..... BR- 2
- Bleeding hydraulic system ..... BR- 2
- Brake pedal ..... BR- 3
- Brake hydraulic line ..... BR- 4
- DP (Dual Proportioning) valve ..... BR- 4
- Master cylinder ..... BR- 5
- Front disc brake –CL18B– ..... BR- 6
- Front disc rotor ..... BR- 8
- Rear drum brake –LT20A– ..... BR- 9
- Brake booster BR-11

PARKING BRAKE BR-13
- Parking brake control BR-13

SERVICE DATA AND SPECIFICATIONS (S.D.S.) BR-14
- General specifications BR-14
- Inspection and adjustment BR-14
- Tightening torque BR-15

TROUBLE DIAGNOSES AND CORRECTIONS BR-16

SPECIAL SERVICE TOOL BR-18

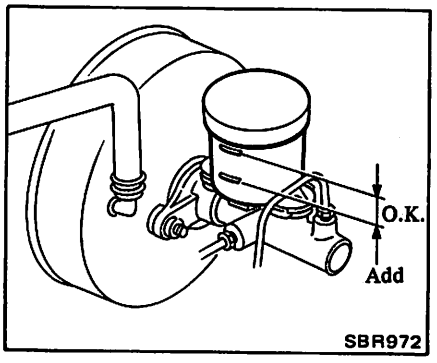
Refer to section MA (Brake System) for:
- CHECKING FOOT BRAKE
- CHECKING PARKING BRAKE

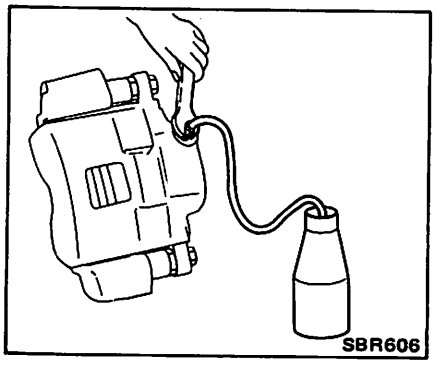
SERVICE BRAKE

BLEEDING HYDRAULIC SYSTEM

Precautions

- Recommended fluid is brake fluid "DOT 3".
- Carefully monitor brake fluid level at master cylinder during bleeding operation.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.





Bleeding procedure

To bleed air out of a master cylinder equipped with fast-fill mechanism:

1. Fill reservoir with recommended brake fluid, and make sure it is kept full at all times while bleeding air out of system.
2. Remove primary line from master cylinder. (This is line at rear, nearest vacuum booster.)
3. Place a container beneath master cylinder to avoid spillage of brake fluid.
4. Depress brake pedal all the way down.
5. Release pedal slowly.
6. Wait five seconds.
7. Repeat steps 4 through 6 until clear fluid comes out of primary cylinder .
8. Replace primary line and tighten.
9. Depress brake pedal all the way down.
10. Loosen primary line at master cylinder to bleed remaining air out of line-junction.
11. Tighten primary line.
12. Release pedal slowly.
13. Wait five seconds.
14. Repeat steps 9 through 13 until clear fluid comes out of primary line-junction.
15. Now, bleed secondary bore of master cylinder by removing secondary line and using same procedures outlined above. However, instead of waiting five seconds after pedal is released, wait 20 seconds or more while bleeding secondary side. Do not pump pedal at any time while bleeding air out of secondary system.
16. Bleed air out of lines and wheel cylinders or calipers according to following procedure.

To bleed hydraulic lines and wheel cylinders/calipers pressurized by secondary piston in master cylinder (left rear wheel cylinder and right front caliper):

1. Top up reservoir with recommended brake fluid.
2. Connect a transparent vinyl tube to the air bleeder valve of the left rear wheel.
3. Depress brake pedal all the way down. Do not pump pedal.
4. Open bleeder valve to release air.
5. Close bleeder valve.
6. Release brake pedal slowly.
7. **Wait 20 seconds.**
8. Repeat steps 3 through 7 above until clear brake fluid comes out of air bleeder valve. Then tighten the air bleeder valve.
9. Connect a transparent vinyl tube to the air bleeder valve on the right front wheel.
10. Repeat steps 3 through 7 above until clear brake fluid comes out of the air bleeder valve. Then tighten the air bleeder valve.

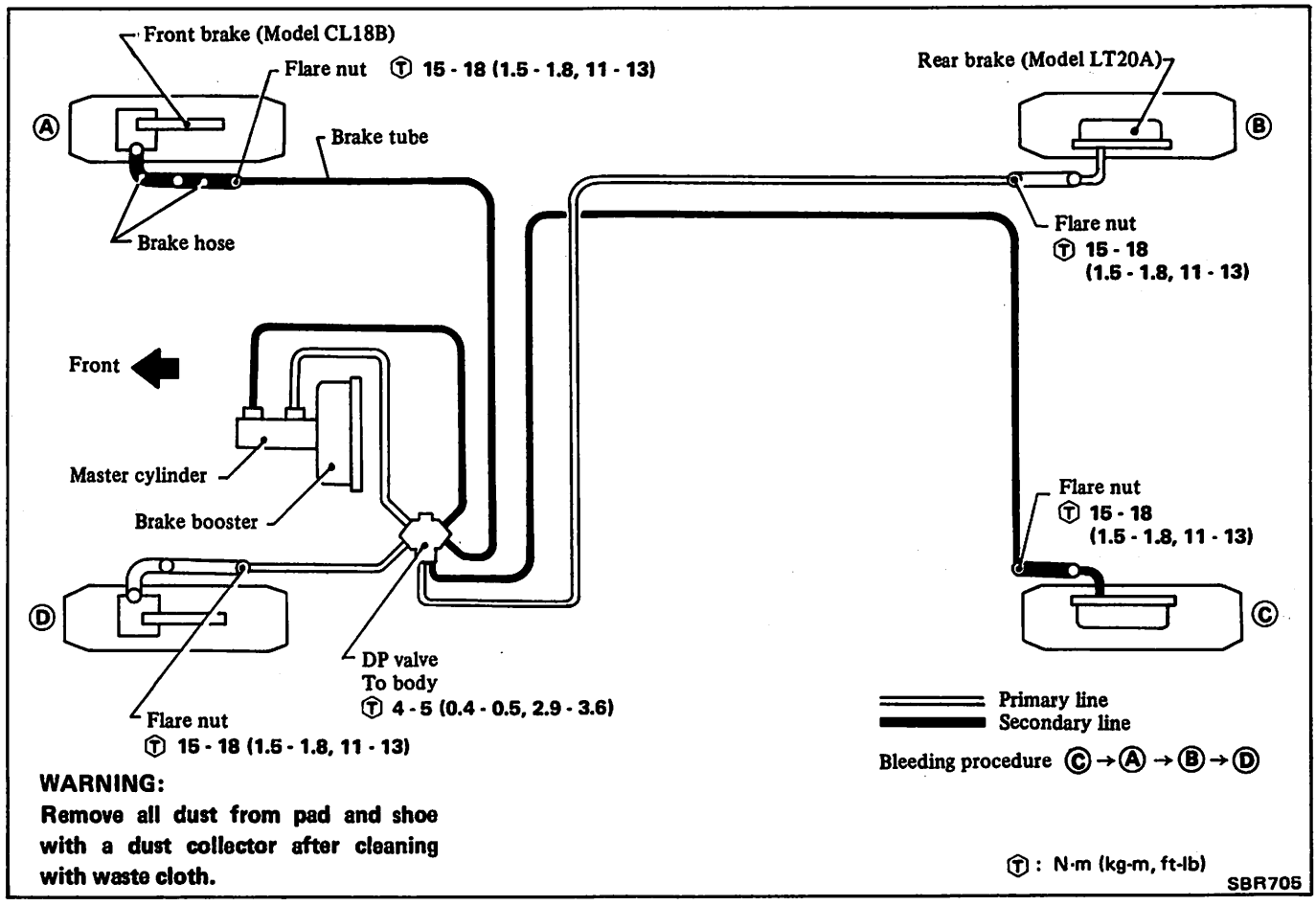
To bleed hydraulic lines and wheel cylinders/calipers pressurized by primary piston in master cylinder right rear wheel cylinder and left front caliper):

1. Top up reservoir with recommended brake fluid.
2. Connect a transparent vinyl tube to the air bleeder valve on the right rear wheel.
3. Fully depress brake pedal several times.
4. With brake pedal depressed, open bleeder valve to release air.
5. Close bleeder valve.
6. Repeat steps 3 through 5 above until clear brake fluid comes out of air bleeder valve.

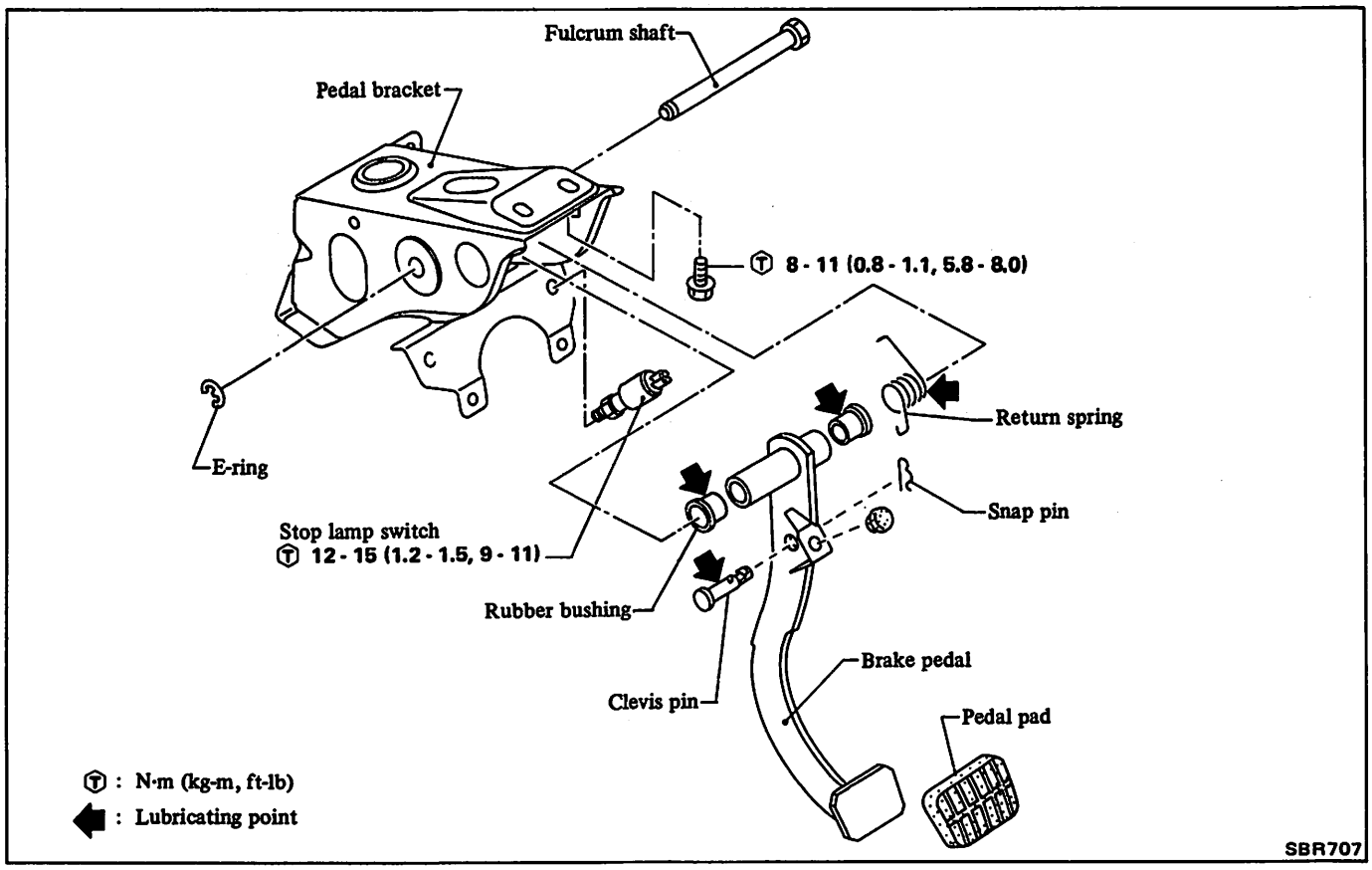
Then tighten the air bleeder valve.

7. Connect a transparent vinyl tube to the air bleeder valve on the left front wheel.
8. Repeat steps 3 through 5 above until clear brake fluid comes out of the air bleeder valve.

Then tighten the air bleeder valve.

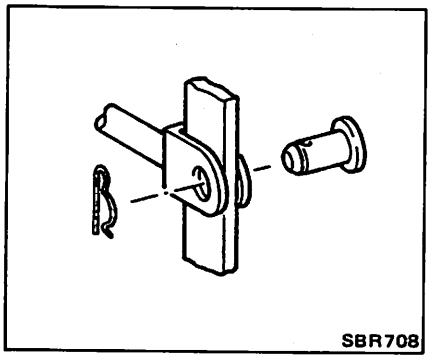

Front brake (Model CL18B)
Flare nut Ⓣ 15 - 18 (1.5 - 1.8, 11 - 13)
Rear brake (Model LT20A)
Brake tube
Brake hose
Flare nut
Ⓣ 15 - 18
(1.5 - 1.8, 11 - 13)
Front
Master cylinder
Brake booster
Flare nut
Ⓣ 15 - 18
(1.5 - 1.8, 11 - 13)
DP valve
To body
Ⓣ 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
Flare nut
Ⓣ 15 - 18 (1.5 - 1.8, 11 - 13)
Primary line
Secondary line
Bleeding procedure Ⓒ → Ⓐ → Ⓑ → Ⓓ
WARNING:
Remove all dust from pad and shoe with a dust collector after cleaning with waste cloth.
Ⓣ : N·m (kg-m, ft-lb)
SBR705

BRAKE PEDAL

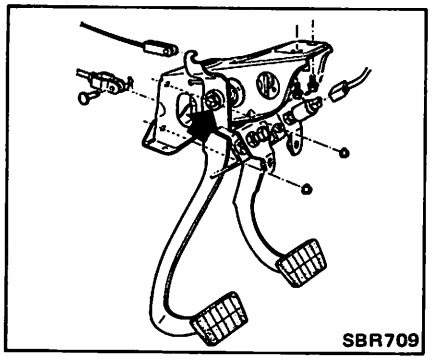

Fulcrum shaft
Pedal bracket
Ⓣ 8 - 11 (0.8 - 1.1, 5.8 - 8.0)
Return spring
E-ring
Snap pin
Stop lamp switch
Ⓣ 12 - 15 (1.2 - 1.5, 9 - 11)
Rubber bushing
Brake pedal
Clevis pin
Pedal pad
Ⓣ : N·m (kg-m, ft-lb)
: Lubricating point
SBR707

REMOVAL

1. Remove instrument lower cover and heater duct.
2. Remove snap pin and clevis pin.



3. Remove fulcrum shaft. Brake pedal can then be taken out.



INSPECTION

Check brake pedal for the following items, servicing as necessary.

1. Check brake pedal for bend.
2. Check return springs for fatigue.
3. Check clevis for deformation and crack at welded part.

INSTALLATION

1. Apply coating of recommended multi-purpose grease to sliding portion and return spring.
2. Adjust brake pedal after installation is completed. Refer to Section MA for adjustment.

Ⓣ : Input rod lock nut
16 - 22 N·m
(1.6 - 2.2 kg-m,
12 - 16 ft-lb)
Stop lamp switch lock nut
12 - 15 N·m
(1.2 - 1.5 kg-m,
9 - 11 ft-lb)

BRAKE HYDRAULIC LINE

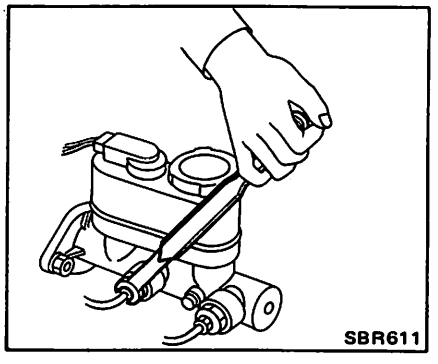
INSPECTION

Check brake lines (tubes and hoses) for evidence of cracks, deterioration or other damage. Replace any faulty parts.
If leakage occurs at end around joints, re-tighten or, if necessary, replace faulty parts.

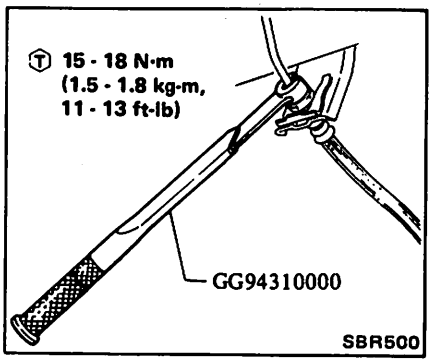
REMOVAL AND INSTALLATION

CAUTION:
a. When removing and installing brake tube, use Tool GG94310000.
b. Cover openings to prevent entrance of dirt whenever disconnecting hydraulic line.

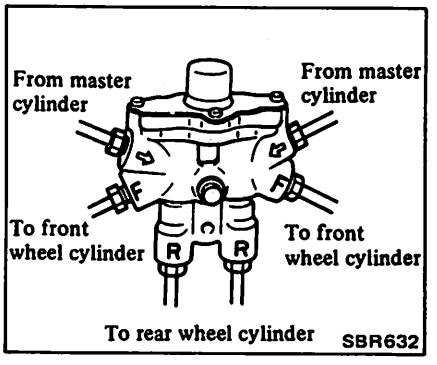
- To remove brake tube, disconnect flare nuts on both ends, and remove retainers and clips.



- To remove brake hose, first remove flare nut securing brake tube to hose, then withdraw lock spring. Next disconnect the other side.
Do not twist brake hose.



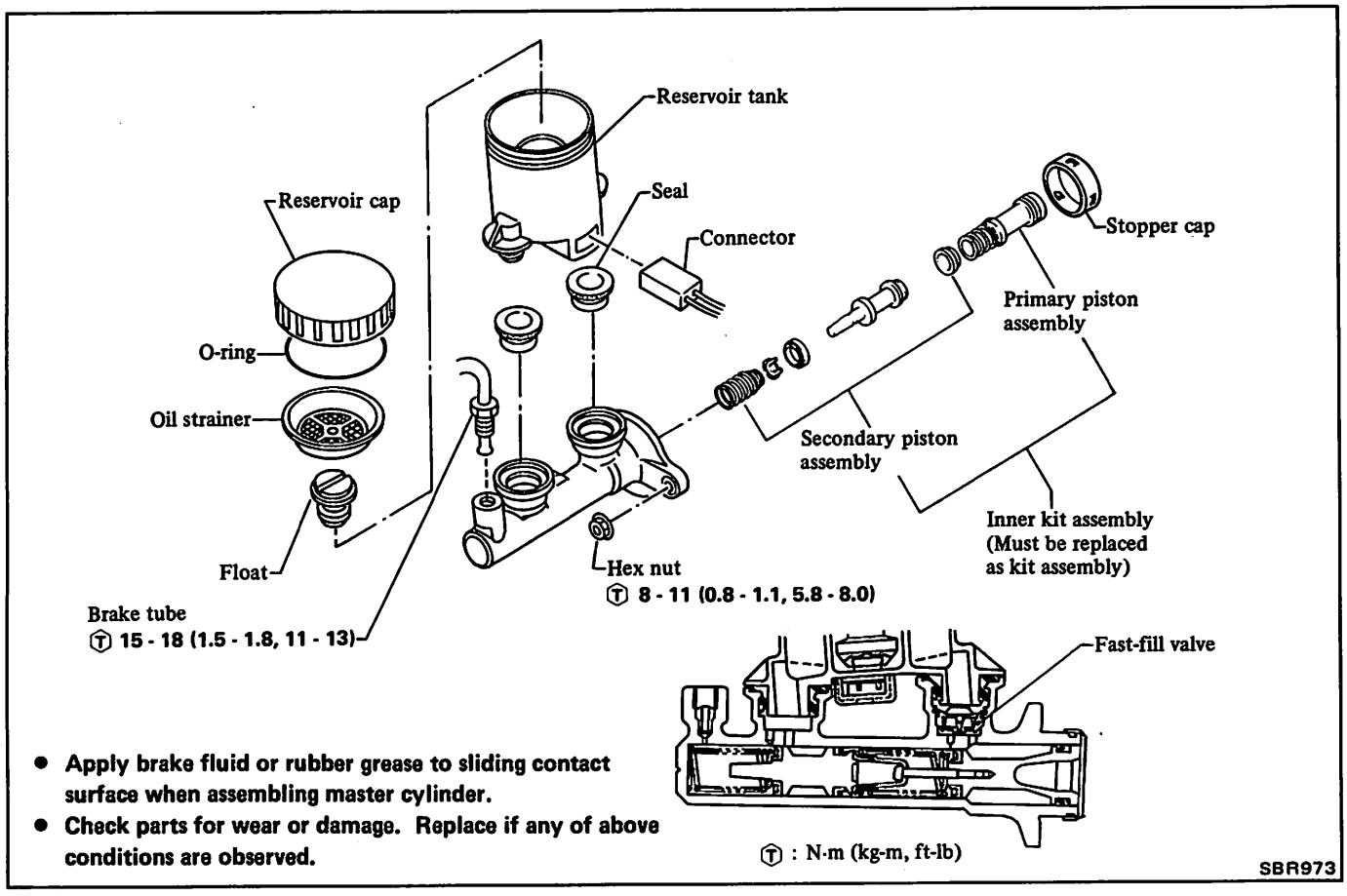
DP (Dual Proportioning) VALVE



Do not disassemble DP valve.

Ⓣ : Brake tube flare nut
15 - 18 N·m
(1.5 - 1.8 kg-m,
11 - 13 ft-lb)
DP valve to body
4 - 5 N·m
(0.4 - 0.5 kg-m,
2.9 - 3.6 ft-lb)

MASTER CYLINDER



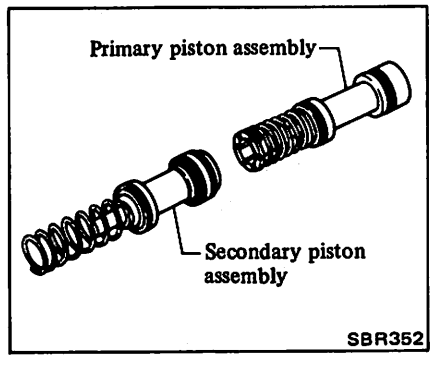
DISASSEMBLY

There is no interchangeability of repair kits or component parts between NABCO and TOKICO makes.
When replacing the repair kit or component parts, ascertain the brand of the brake master cylinder body. Be sure to use parts of the same make as the former ones.

1. Pry off stopper ring.

Primary piston assembly can then be taken out.

2. Disassemble piston assembly. Do not disassemble primary piston assembly.



3. Remove piston cups and discard them.
4. Remove seal on valve assembly side.

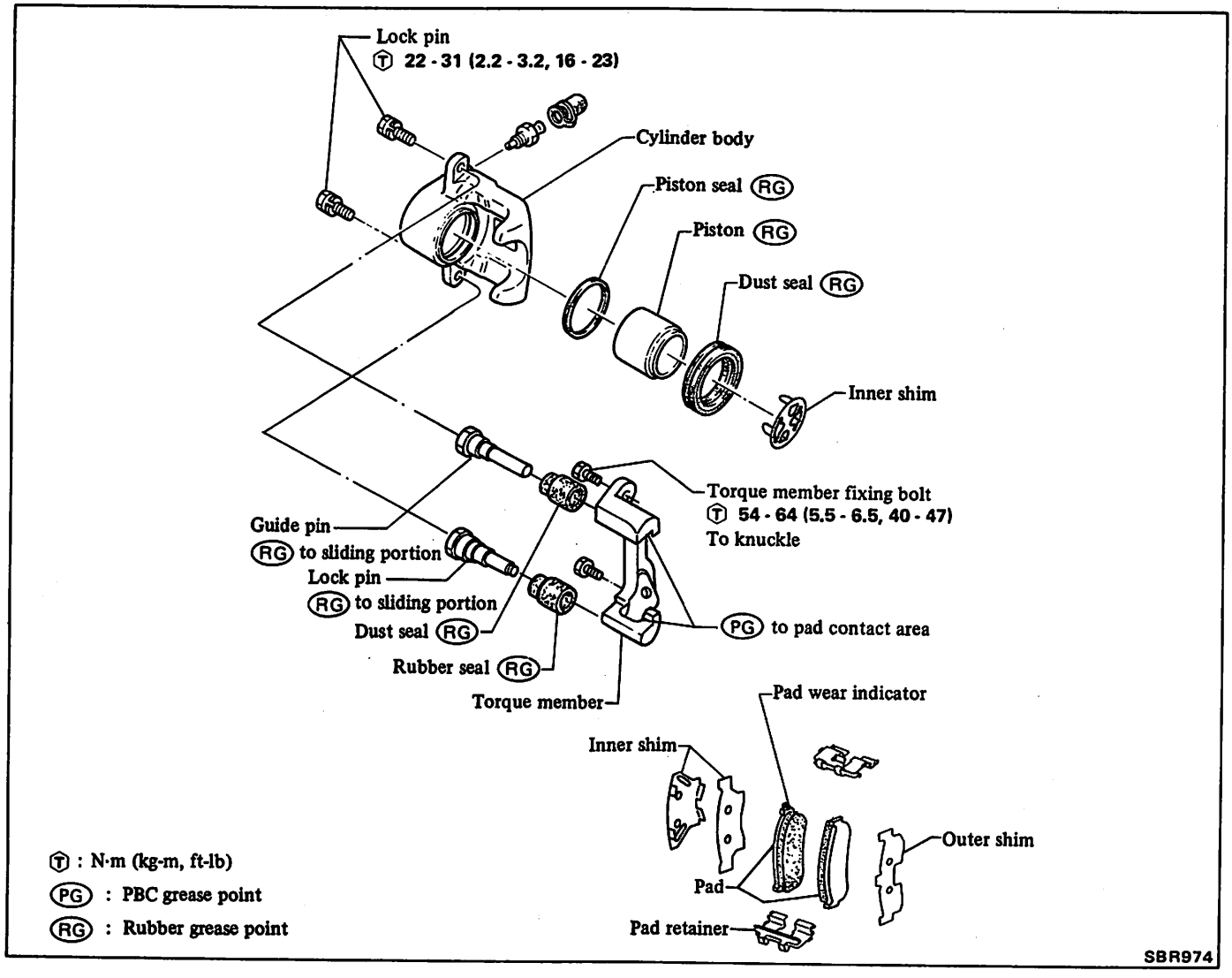
INSPECTION

1. Clean all parts with brake fluid.
2. Check the parts for evidence of abnormal wear or damage.

ASSEMBLY

a. Replace piston cups and packing with new ones.
b. Apply brake fluid or rubber grease to sliding contact surface of parts to facilitate assembly of master cylinder.

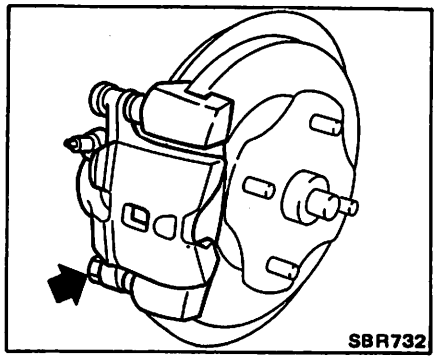
FRONT DISC BRAKE –CL18B–



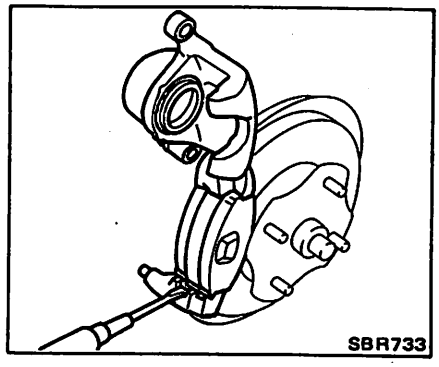
PAD REPLACEMENT

Removal

1. Jack up front of vehicle and support it on safety stands. Refer to section GI for lifting points and towing.
2. Remove lock pin.



3. Swing cylinder body upward. Remove pad retainers and pads.



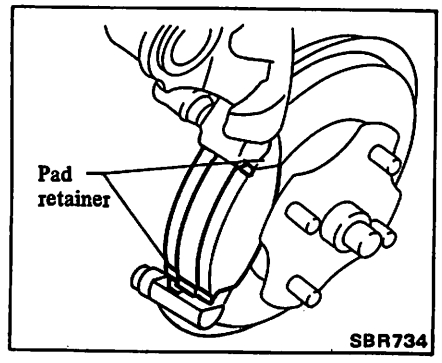
CAUTION:
When cylinder body is open, do not depress brake pedal, or piston will jump out.

Installation

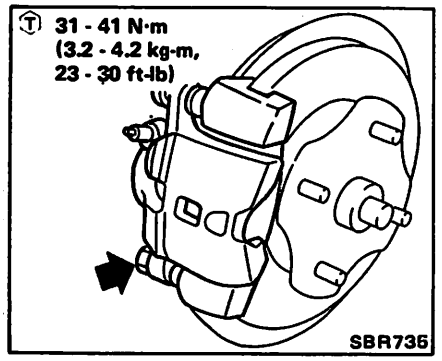
1. Clean piston end and surroundings of pin bolts.
2. Apply a coat of PBC grease to pad-to-torque member clearance.

Be careful not to get grease on pads or rotor.

3. Install inner pad. Pull cylinder body to outer side.
4. Install outer pad, then pad retainers.

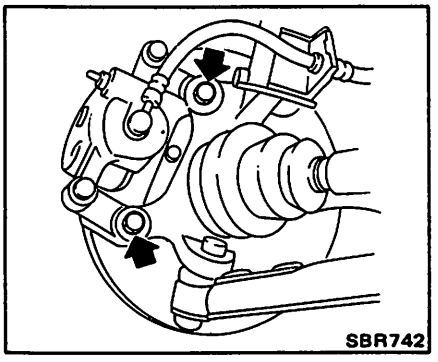


5. Tighten lock pin.



REMOVAL AND INSTALLATION

1. Disconnect brake line at brake tube and hose connection.
2. Remove caliper mounting bolts.

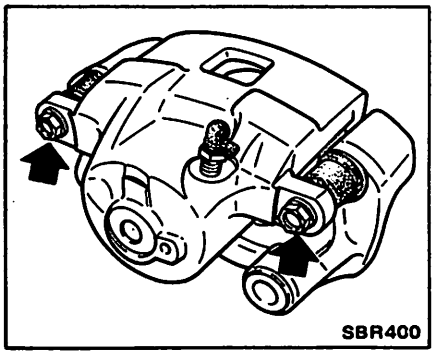


Install caliper assembly in the reverse order of removal.

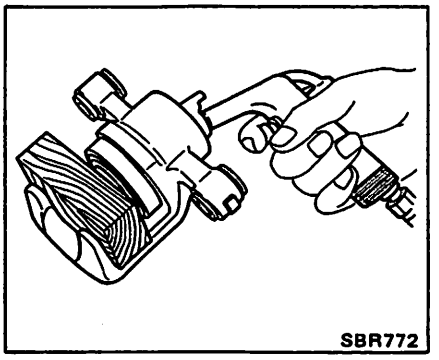
Ⓣ : Torque member fixing bolt
54 - 64 N·m
(5.5 - 6.5 kg-m,
40 - 47 ft-lb)

DISASSEMBLY

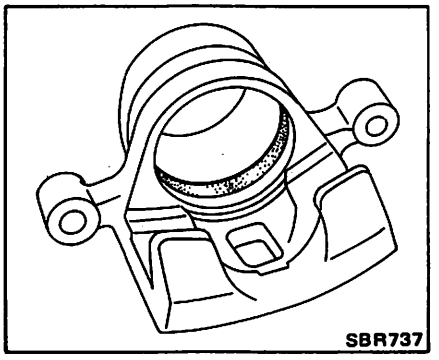
1. Separate cylinder body and torque member.



2. Remove brake hose. Push out piston with dust seal using compressed air.



3. Remove piston seal.



4 Remove guide pin and lock pin from torque member.

INSPECTION

Clean all parts and check as follows.

CAUTION:
Use brake fluid to clean. Never use mineral oil.

Cylinder body

1. Check inside surface of cylinder for score, rust, wear, damage or presence of foreign substances. If any surface fault is detected, replace cylinder body.
2. Minor damage from rust of foreign substances may be eliminated by polishing surface with a fine emery paper. If damage is major, cylinder assembly must be replaced.

Torque member

Check for wear, cracks or other damage. Replace if any fault is detected.

Piston

Check piston for score, rust, wear, damage or presence of foreign substances. Replace if any fault is detected.

CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

Piston seal and dust seal

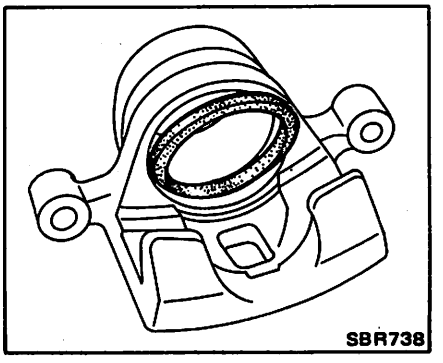
Replace piston seal and dust seal at each disassembly.

Guide pin, lock pin and boots

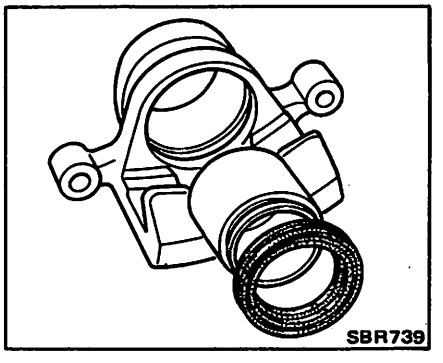
Check for wear, cracks or other damage. Replace if any fault is detected.

ASSEMBLY

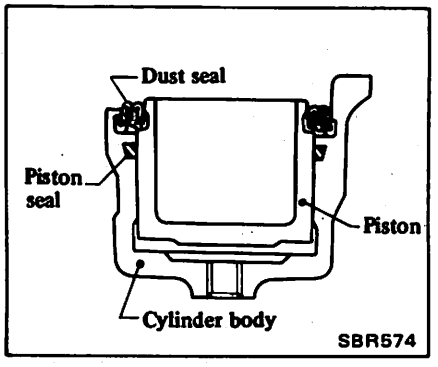
1. Install piston seal applying rubber grease or brake fluid to seal groove and seal.



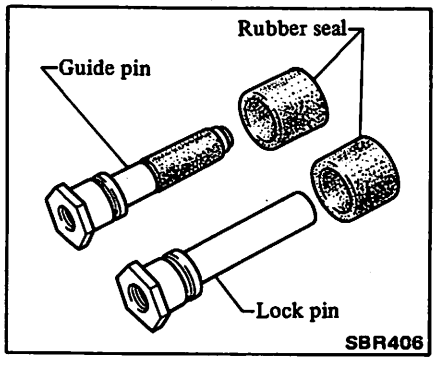
2. Apply rubber grease or brake fluid to sliding portions and inside of dust seal.



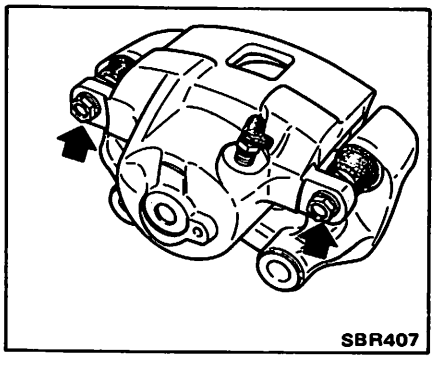
3. With dust seal fitted to piston, insert dust seal into groove on cylinder body and install piston.
4. Properly secure dust seal.



5. Apply a coat of rubber grease to guide pin and lock pin sliding portion. Install lock pin boot, guide pin boot, lock pin and guide pin.



6. Attach torque member to cylinder body.



Ⓣ : 31 - 41 N·m
(3.2 - 4.2 kg-m, 23 - 30 ft-lb)

FRONT DISC ROTOR

REMOVAL AND INSTALLATION

Refer to section FA.

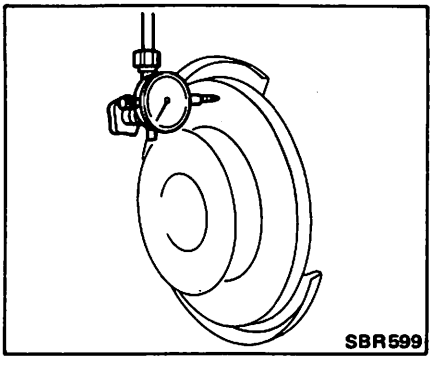
INSPECTION

Sliding surface

If there are cracks or considerable chips, repair or replace.

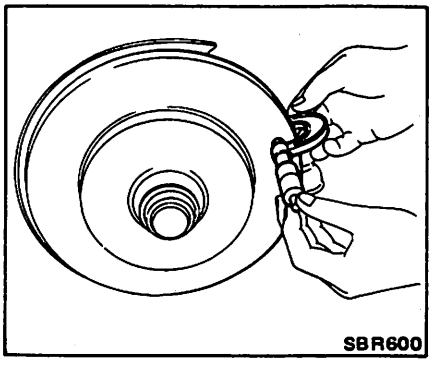
Runout

Adjust wheel bearing correctly. Measure runout.



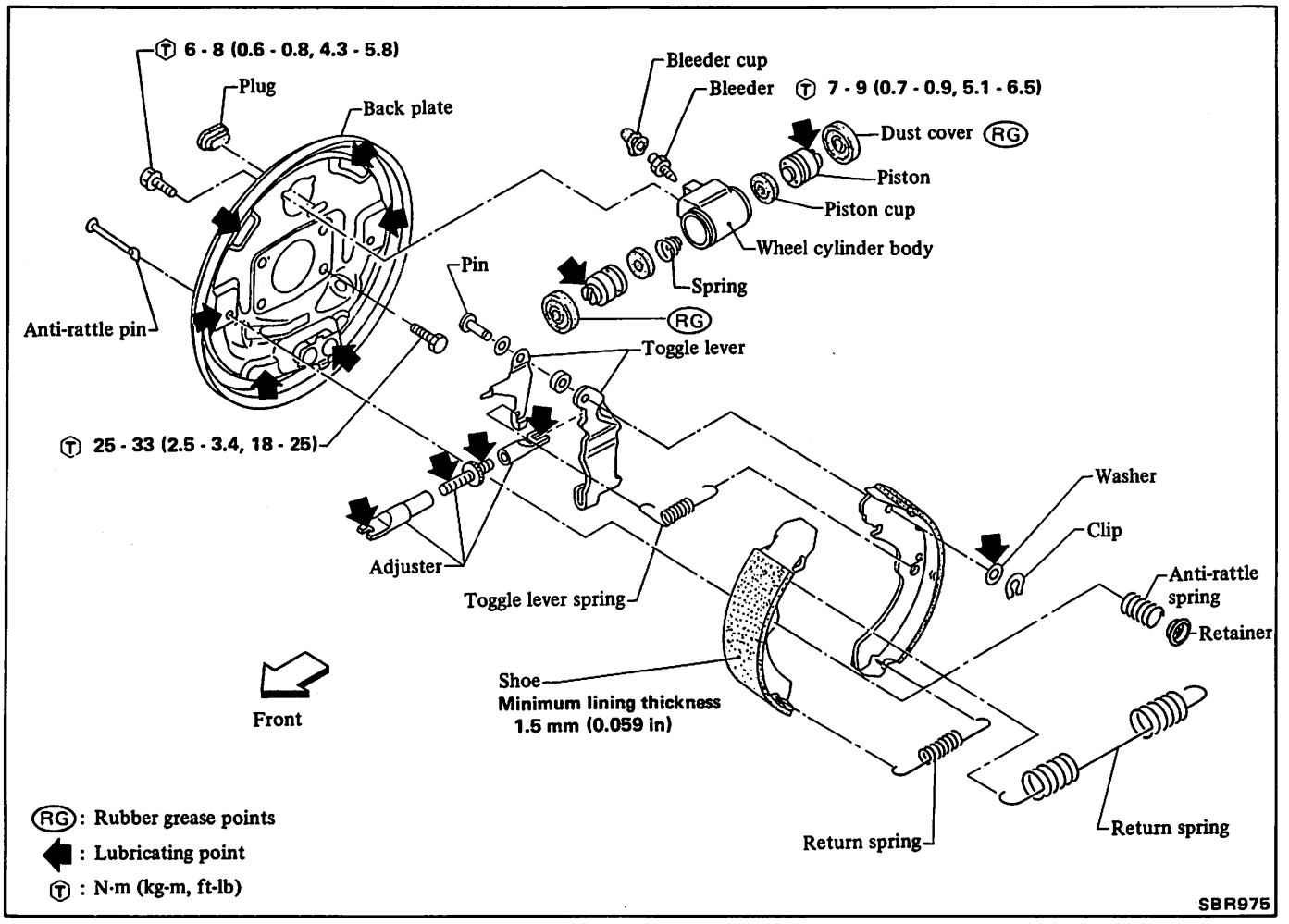
Rotor repair limit:
Maximum runout (Total indicator reading at center of rotor pad contact surface)
Less than 0.07 mm (0.0028 in)

Thickness



Rotor repair limit:
Minimum thickness
More than 11.0 mm (0.433 in)

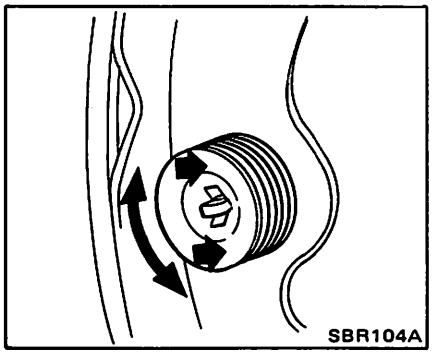
REAR DRUM BRAKE –LT20A–



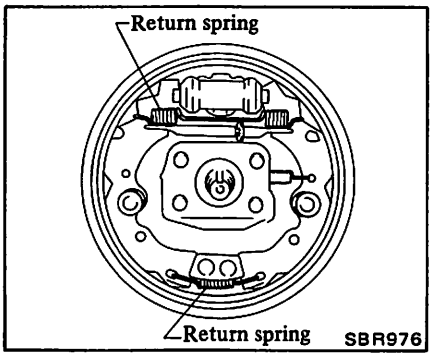
SHOE REPLACEMENT

Removal

1. Remove wheel and brake drum. Refer to Section RA for removal.
2. Remove parking brake rear cable.
3. Remove anti-rattle spring and pin.



4. Remove retainer and then return spring and brake shoe.

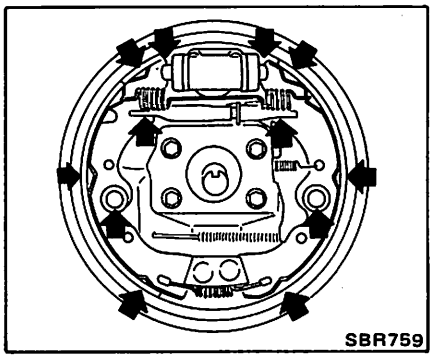


5. Remove toggle lever. Refer to Adjuster.

Installation

Apply brake grease to the following contact areas:

- Shoe to wheel cylinder and anchor
- Shoe to back plate
- Shoe to adjuster
- Spring seat to shoe



Before installing new shoes, set shoe-to-drum clearance [0.23 to 0.32 mm (0.0091 to 0.0126 in)] with the adjuster.

After installation is completed, adjust shoe-to-drum clearance. Measure the drum inner diameter and diameter of the brake shoes. Turn the adjuster so that the difference between the diameters is the correct shoe clearance. Then operate parking brake several times.

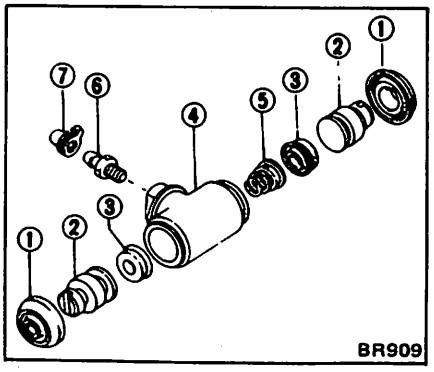
Shoe clearance:
0.35 - 0.55 mm
(0.0138 - 0.0217 in)

WHEEL CYLINDER

Removal

1. Remove brake shoe.
2. Disconnect brake tube.
3. Then remove wheel cylinder.

Disassembly



1 Dust cover
2 Piston
3 Piston cup
4 Wheel cylinder body
5 Spring
6 Bleeder
7 Bleeder cap

Inspection

1. Replace any cylinder or piston which is scratched, scored or worn on its sliding contact surface.
2. Replace worn parts if piston-to-cylinder clearance is beyond limit.
3. Replace any piston cup which is worn or otherwise damaged.
4. Replace if contacting face of cylinder and shoe is worn locally or in step.
5. Replace any damaged dust cover, fatigued piston spring or faulty threaded parts.
6. Replace any tube connector which is worn on its threaded portion.

Assembly

a. Apply a coating of rubber grease or brake fluid to piston cup at assembly.

b. Charge with rubber grease or equivalent before installing dust cover.

c. The brake wheel cylinder is available in both NABCO make and TOKICO make. There is no interchangeability of repair kits or component parts between NABCO and TOKICO makes.
When replacing the repair kit or component parts, ascertain the brand of the brake wheel cylinder body. Be sure to use parts of the same make as the former ones.

Installation

Ⓣ: Wheel cylinder fixing bolt
6 - 8 N·m
(0.6 - 0.8 kg-m,
4.3 - 5.8 ft-lb)

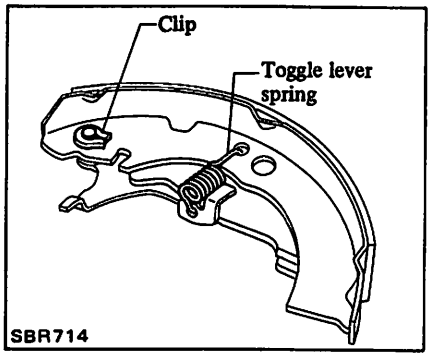
ADJUSTER

Removal

1. Separate equalizer and rear cable.
2. Remove brake shoe.

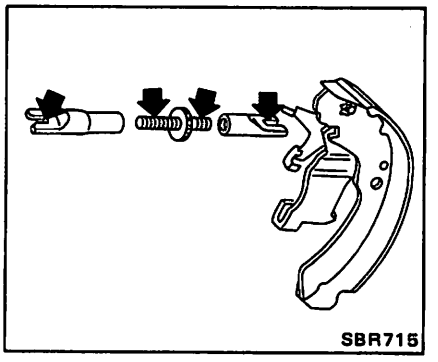
Refer to Shoe Replacement.

3. Remove adjuster assembly.
4. Remove toggle lever spring and clip, and then separate toggle lever and shoe.



Installation

Lubricating points:
- Adjuster nut and rod threads
- Mating surfaces between adjuster and toggle lever.



Right side brake:
Right thread adjuster
Left side brake:
Left thread adjuster

After installation is completed, adjust shoe-to-drum clearance.

Refer to SHOE REPLACEMENT.

Then adjust parking brake system.

BRAKE DRUM

Inspection

1. Check inner diameter of brake drum to make sure it is properly round and tapered. If it is not, repair or replace brake drum.

Standard inner diameter:
203.2 mm (8.00 in)
Maximum inner diameter:
204.5 mm (8.05 in)
Out-of-roundness (ellipticity):
Less than
0.03 mm (0.0012 in)
Radial run-out
(Total indicator reading):
Less than
0.05 mm (0.0020 in)

2. Contact surface with which linings come into contact should be fine-finished with No. 120 to 150 emery paper.
3. Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial wear or stepped wear on its contact surface.

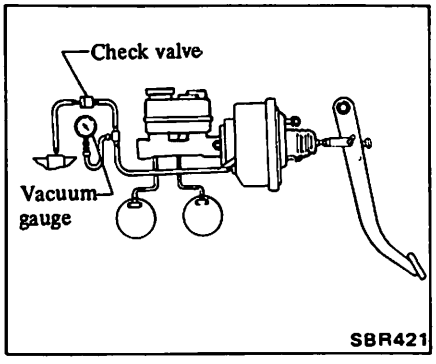
After brake drum has been completely re-conditioned or replaced, check drum and shoes for proper contact pattern.

BRAKE BOOSTER

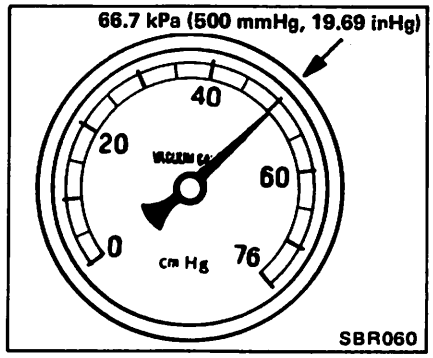
INSPECTION

Airtight test (No load)

1. Connect a vacuum gauge between check valve and brake booster.



2. Start engine and increase engine speed. Stop engine when vacuum is 66.7 kPa (500 mmHg, 19.69 inHg).



3. If vacuum pressure drops more than the specified value, correct the cause in accordance with the following chart.

Maximum vacuum leakage (15 seconds after engine is stopped):
3.3 kPa
(25 mmHg, 0.98 inHg)

Probable cause	Corrective action
Air leakage at check valve.	Inspect check valve.
Air leakage at output rod seat.	Replace brake booster as an assembly.
Air leakage between valve body and seal.	
Air leakage at valve plunger seat.	
Damaged piping or connectors	Repair or replace.

Airtight test (Under load)

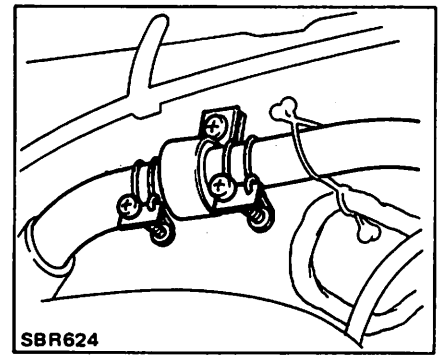
Keep brake pedal fully depressed. Following procedures are same as for no-load conditions.

Maximum vacuum leakage (15 seconds after engine is stopped)
3.3 kPa
(25 mmHg, 0.98 inHg)

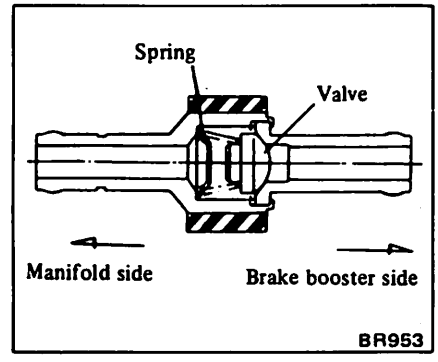
Probable cause	Corrective action
Air leakage at check valve.	Inspect check valve.
Damaged diaphragm.	Replace brake booster as an assembly.
Air leakage at poppet assembly seat and valve body.	

Check valve

1. Remove check valve.



2. Apply a vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg) to the port of check valve on the brake booster side.

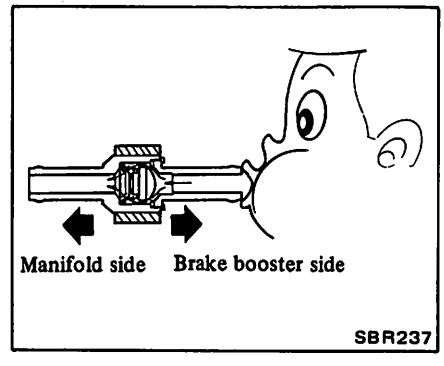


3. If vacuum pressure drops more than the specified value in 15 seconds, replace check valve with a new one.

Maximum vacuum leakage of check valve:
1.3 kPa
(10 mmHg, 0.39 inHg)

4. When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.

Do not apply any oil or lubricants to vacuum hose and check valve.



Operating test

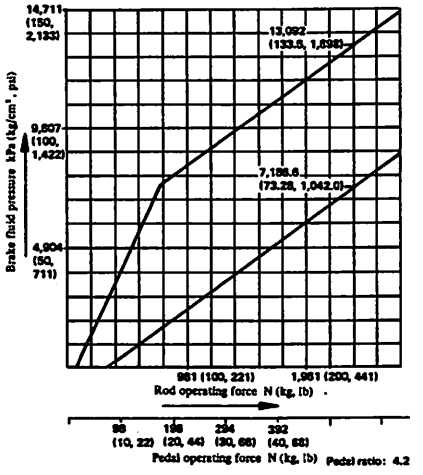
1. Connect an oil pressure gauge to brake line at connection on master cylinder.
2. Install a pedal force gauge on brake pedal.
3. Start engine, and increase engine speed until a vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg) is registered on vacuum pressure gauge. With a steady vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg), measure oil pressure with respect to each pedal operating force.

Relationship between oil pressure and pedal operating force is illustrated in the following figures. If test results are not as specified, check brake booster for condition in manner described under "Inspection" before removal of this unit.

Also check brake line for evidence of fluid leakage.

Determine whether source of problem is in brake booster or check valve. Before you reach a final conclusion, always inspect check valve first.

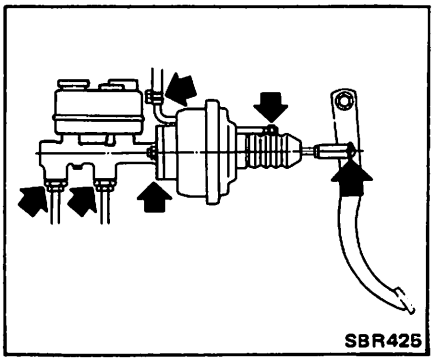
Brake booster: model G18, M18



SBR857

REMOVAL

To remove brake booster, detach the following points.

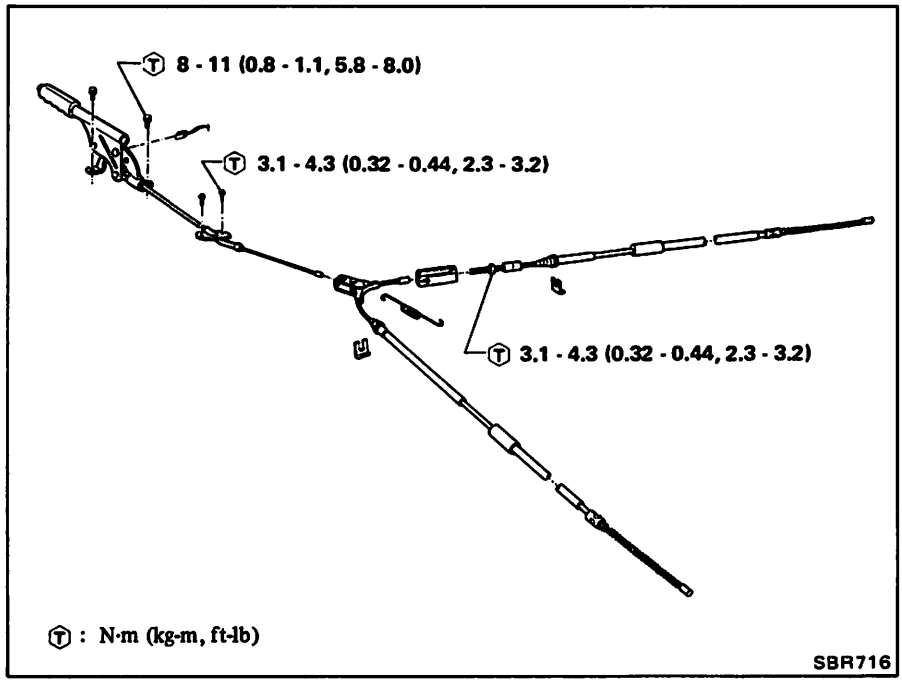


SBR425

INSTALLATION

Ⓣ : Master cylinder to brake booster
8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)
Brake booster to pedal bracket
8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)
Input rod lock nut
16 - 22 N·m
(1.6 - 2.2 kg-m,
12 - 16 ft-lb)

PARKING BRAKE

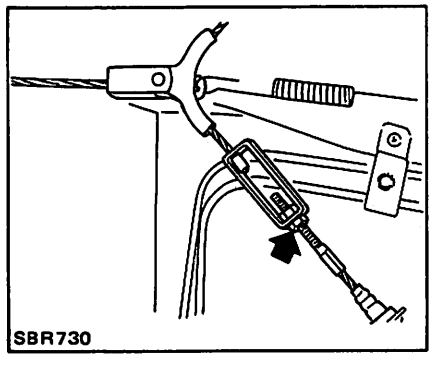


PARKING BRAKE CONTROL

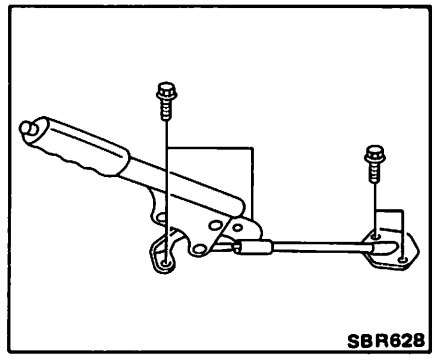
REMOVAL

Control lever and front cable

1. Separate equalizer and rear cable.

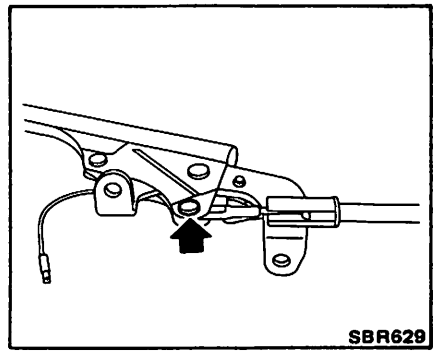


2. Remove center console.
3. Disconnect parking brake lamp switch harness connector.
4. Remove seat belt anchor bolts.
5. Remove control lever attaching bolts and front cable bracket attaching screws.



6. Remove front cable out through driver's compartment.
7. If necessary separate front cable from parking brake lever by breaking pin.

Front cable, clevis pin and cotter pin are available as service parts.



Rear cable

Refer to Adjuster (Rear drum brake –LT20A–).

INSPECTION

1. Check control lever for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Replace malfunctioning warning lamp and switch.
4. Check parts at each connection and, if found deformed or damaged, replace.

INSTALLATION

Install parking brake control assembly following the reverse procedure of removal. Closely observe the following items:

When installing, apply a coat of grease to sliding contact surfaces.

: Control lever to floor panel
8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)
Front cable to floor panel
3.1 - 4.3 N·m
(0.32 - 0.44 kg-m,
2.3 - 3.2 ft-lb)
Rear cable adjusting nut lock nut
3.1 - 4.3 N·m
(0.32 - 0.44 kg-m,
2.3 - 3.2 ft-lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Front brake		
Type		CL18B
Cylinder dia.	mm (in)	48.1 (1.894)
Pad width x thickness x length	mm (in)	37.0 x 10.0 x 94.0 (1.457 x 0.394 x 3.701)
Rotor outer dia.	mm (in)	240 (9.45)
Rear brake		
Type		LT20A
Cylinder dia.	mm (in)	17.46 (11/16)
Lining width x thickness x length	mm (in)	35.0 x 4.5 x 195.0 (1.378 x 0.177 x 7.677)
Drum inner dia.	mm (in)	203.2 (8.00)
Master cylinder inner dia.	mm (in)	19.05 (3/4) ... Small 23.81 (15/16) ... Large
Brake booster type		G18 or M18
Dual proportioning valve Split point x reducing ratio	kPa (kg/cm^2, psi)	1,961 (20, 284) x 0.4

FRONT DISC BRAKE

Unit: mm (in)

Pad wear limit Minimum thickness	2.0 (0.079)
Rotor wear limit Maximum runout	Less than 0.07 (0.0028)
Minimum thickness	More than 11.0 (0.433)

REAR BRAKE

Unit: mm (in)

Lining wear limit	Minimum thickness	1.5 (0.059)
Drum wear limit	Maximum inner diameter	204.5 (8.05)
	Out-of-roundness	Less than 0.03 (0.0012)
	Radial runout	Less than 0.05 (0.0020)
	Taper [Measured at a point 35 mm (1.38 in) from inlet]	Less than 0.04 (0.0016)

INSPECTION AND ADJUSTMENT

BRAKE PEDAL AND PARKING BRAKE

Refer to section MA.

CHECK VALVE

Maximum vacuum leakage [15 seconds after 66.7 kPa (500 mmHg, 19.69 inHg) pressure is applied] kPa (mmHg, inHg)	1.3 (10, 0.39)

BRAKE BOOSTER

Maximum vacuum leakage (15 seconds after engine is stopped) kPa (mmHg, inHg)	3.3 (25, 0.98)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Pedal bracket to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake booster to pedal bracket	8 - 11	0.8 - 1.1	5.8 - 8.0
Master cylinder to brake booster	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake booster input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Stop lamp switch lock nut	12 - 15	1.2 - 1.5	9 - 11
DP valve mounting bolt	4 - 5	0.4 - 0.5	2.9 - 3.6
Air bleeder	7 - 9	0.7 - 0.9	5.1 - 6.5
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Torque member fixing bolt	54 - 64	5.5 - 6.5	40 - 47
Cylinder body to torque member	22 - 31	2.2 - 3.2	16 - 23
Disc rotor to wheel hub	33 - 43	3.4 - 4.4	25 - 32
Drum brake back plate	25 - 33	2.5 - 3.4	18 - 25
Wheel cylinder to back plate	6 - 8	0.6 - 0.8	4.3 - 5.8

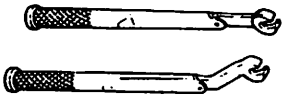
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Excessive pedal travel	Low brake fluid level or empty master cylinder reservoir.	Fill and bleed as necessary. Test for source of leakage by examining all lines, connections and wheel cylinder.
	Leakage in master cylinder.	Overhaul master cylinder.
	Deteriorated check valve.	Replace check valve and bleed system.
	Air in system.	Bleed system.
	Improper brake adjustment.	Adjust shoe-to-drum clearance.
	Excessive lateral play on disc caused by loose or worn wheel bearings or steering parts.	Replace or adjust damaged parts.
Spongy pedal	Low fluid level in master cylinder.	Top with fluid and inspect for leakage.
	Air in system.	Correct as necessary.
	Improper brake adjustment.	Adjust shoe-to-drum clearance.
	Reservoir filler cap vent hole clogged.	Clean and bleed system.
	Swollen hose due to deterioration or use of poor quality hose.	Replace hose and bleed system.
	Distorted brake shoes, or excessively worn or cracked brake drum.	Replace damaged parts.
	Soft or swollen caliper seals.	Drain hydraulic system, flush with alcohol and replace all seals.
	Use of a brake fluid with too low boiling point.	Replace with specified brake fluid and bleed system.
Poor braking effect	Fluid leakage in brake lines.	Check master cylinder, piping and wheel cylinder for leaks, and repair.
	Low brake fluid level or empty master cylinder reservoir.	Fill and bleed as necessary.
	Air in brake lines.	Bleed system.
	Excessive shoe-to-drum clearance.	Adjust.
	Grease, oil, mud or water on linings or pads.	Clean brake mechanism and check for cause of problem. Replace linings or pads.
	Deterioration of linings or pads.	Replace.
	Local fit of linings or pads.	Shave or replace.
	Linings or pads excessively worn.	Replace.
	Master cylinder or wheel cylinders in poor condition.	Repair or replace.
	Frozen or seized caliper pistons on disc brakes.	Disassemble caliper and free up as required.
	Binding mechanical linkage at brake pedal and shoes.	Free up as required.

Condition	Probable cause	Corrective action
Unbalanced brakes	Improper tire inflation.	Inflate to correct pressure.
	Improper adjustment of shoe-to-drum clearance.	Readjust.
	Grease, oil, mud or water on linings or pads.	Clean brake mechanism and check for cause of problem. Replace linings or pads.
	Mud in brake drum.	Clean.
	Deterioration of linings or pads.	Replace.
	Excessive wear of linings or pads.	Replace.
	Wheel cylinder in poor condition.	Repair or replace.
	Poor sliding condition of brake shoe.	Adjust.
	Looseness of cylinder body or back plate securing bolts/nuts.	Fasten or replace.
	Scored or out-of-round drums.	Recondition or replace brake drum as required. Check for improper lining contact with drum and grind lining if necessary.
	Sticking wheel cylinder cups.	Recondition or replace cylinder.
	Deformation of back plate.	Replace.
	Incorrect adjustment of wheel bearings.	Adjust.
	Incorrect adjustment of wheel alignment.	Adjust.
Brakes fade	Brake fluid has too low boiling point.	Drain and fill system with approved fluid.
	Use of improper linings or brake linings are contaminated.	Replace linings.
	Brake drums are out-of-round.	Repair or replace as necessary.
	Hydraulic connections, master cylinder and wheel cylinders are corroded or damaged.	Repair as necessary.
	Bleed screw is open.	Close screw and bleed system.
Brake chatters	Groove or out-of-round brake drum or rotor.	Grind or replace as required.
	Loose or bent support plate.	Tighten support plate bolts to specified torque, or replace plate.
	Distorted brake shoes or pads.	Replace as necessary.
	Grease or brake fluid on linings.	Replace linings.
Brake squeals	Dirty or scored brake drums.	Blow out assembly with compressed air or refinish drum.
	Distorted brake shoes or bent support plate.	Replace damaged unit.
	Weak or broken brake shoe retaining spring or return spring.	Replace if necessary.
	Glazed or contaminated brake lining.	Cam ground lining to eliminate glaze. If it does not, replace linings.
Brakes drag	Pedal linkage is binding or output rod adjustment is too long.	Lubricate linkage, check pedal return spring for condition and adjust output rod as necessary.

Condition	Probable cause	Corrective action
(Brakes drag)	Master cylinder compensator part is obstructed.	Blow out foreign matter with compressed air.
	Seized master cylinder piston.	Disassemble master cylinder and replace piston. Bleed system.
	Poor shoe condition.	Clean and repair.
	Poor wheel cylinder condition.	Repair or replace.
	Deformation of piston cups.	Replace.
	Poor condition of caliper because of damaged piston seals.	Replace piston seals.
	Excessive runout of rotor.	Turn rotor on lathe or replace.
	Parking brake will not return.	Check and repair.
	Clogged master cylinder return port.	Clean.
	Clogged brake lines.	Check and clean.
	Incorrect adjustment of wheel bearings.	Adjust.
	Improper shoe-to-drum clearance.	Inspect auto-adjuster operation.
	Weak shoe return springs.	Replace.
	No free travel in brake shoe return.	Adjust pedal height.
Pedal pulsates	Out-of-round or off-center drum.	Turn drum or replace as necessary.
	On disc brakes, lateral runout of brake rotor is excessive.	Check with dial indicator, turning disc by hand. If runout exceeds specifications, repair or replace disc.
	Excessive variation in thickness of brake rotor surfaces.	Measure around disc face with micrometer. Replace disc as required.
Rear lock (Under light brake pedal force)	Improper tire pressures.	Check and adjust.
	Excessive wear of tires.	Check and replace.
	Damaged DP valve.	Replace.
Rear lock (Under heavy brake pedal force)	Improper tire pressures.	Check and adjust.
	Excessive wear of tires.	Check and replace.
	Poor front braking effect.	
	• Grease, oil, mud or water on linings or pads.	Clean or replace.
	• Excessive wear of linings or pads.	Replace.
	• Local fit of linings or pads.	Shave or replace.
	• Master cylinder or wheel cylinder in poor condition.	Repair or replace.

SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.)	Tool name
GG94310000 (–)	Flare nut torque wrench 

STEERING SYSTEM

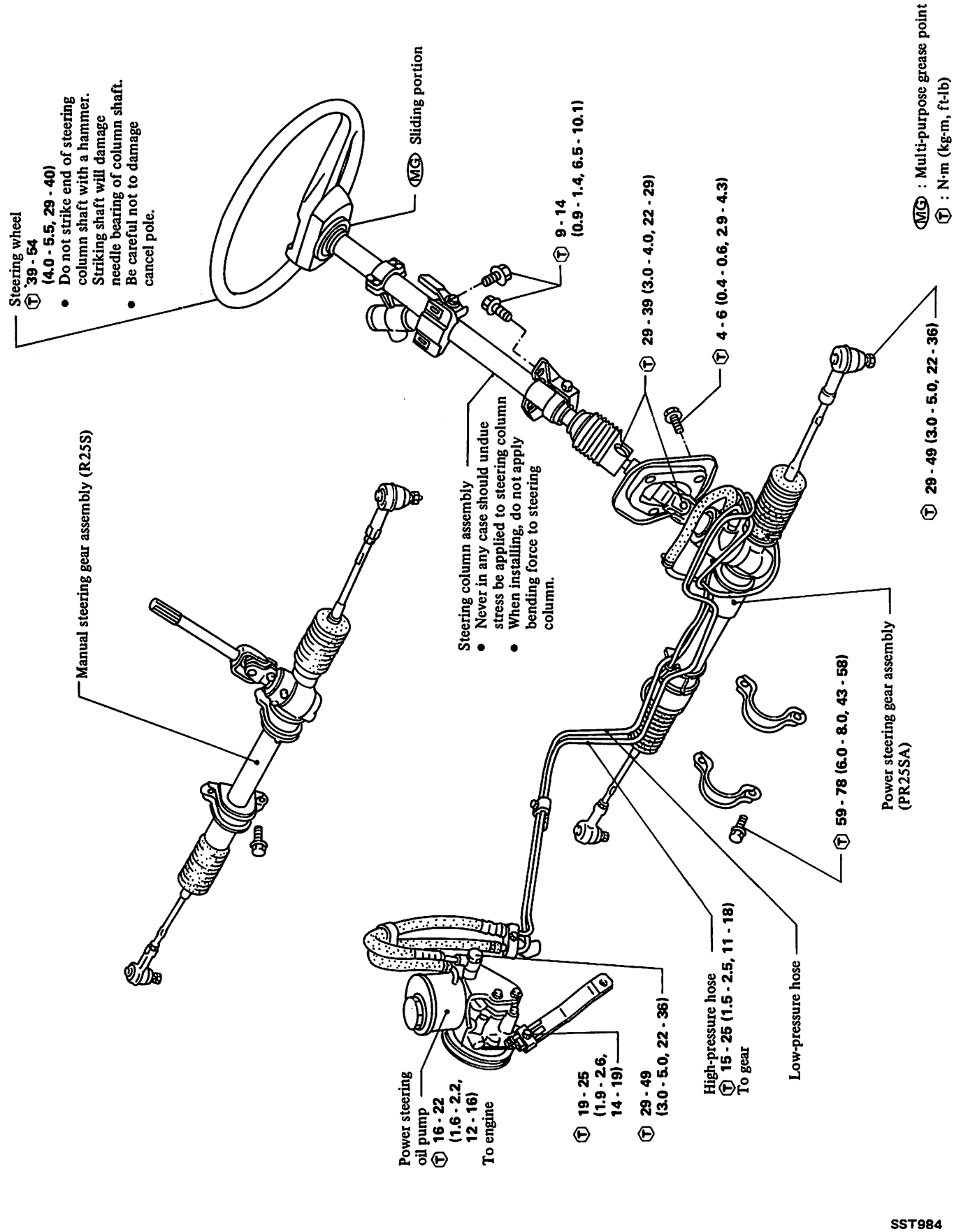
SECTION ST

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Refer to section MA (Front Axle and Front Suspension) for:
CHECKING WHEEL ALIGNMENT
- Toe-in
- Front wheel turning angle

STEERING SYSTEM



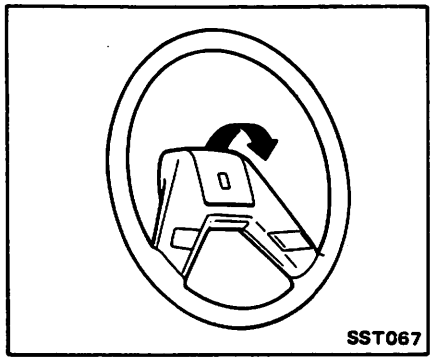
SST984

STEERING WHEEL AND COLUMN

STEERING WHEEL

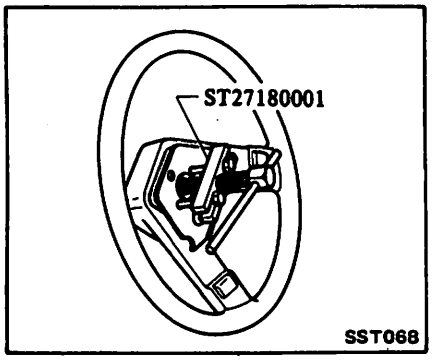
REMOVAL

1. Disconnect battery ground cable.
2. Remove horn pad and steering wheel nut.



3. Remove steering wheel using **Tool.**

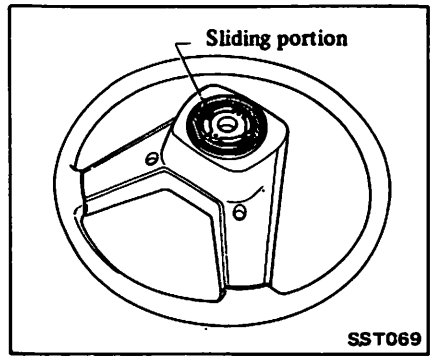
CAUTION:
Do not strike end of steering column shaft with a hammer. Striking shaft will damage bearing of column shaft.



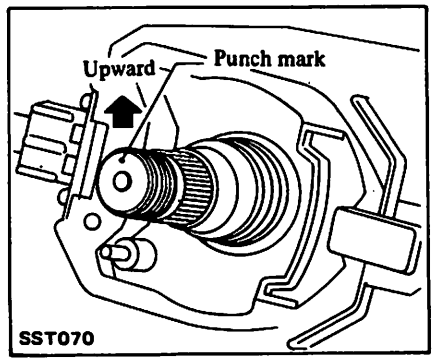
INSTALLATION

Install steering wheel in the reverse order of removal. Observe the following instructions.

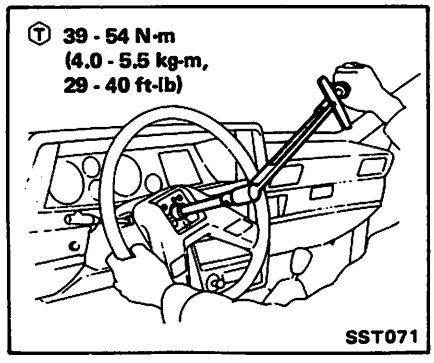
1. Apply grease to sliding portions.



2. Install steering wheel **on column shaft in a straight-ahead position.**



3. Tighten steering wheel nut.

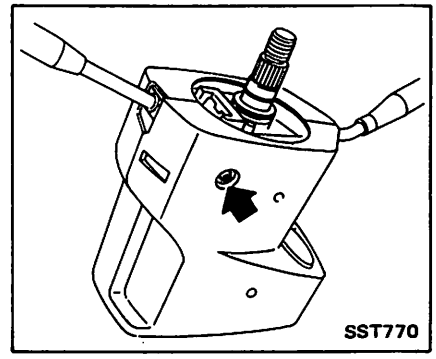


4. After installing steering wheel, **turn it clockwise and counterclockwise, checking for catch or drag. Also check horn operation.**

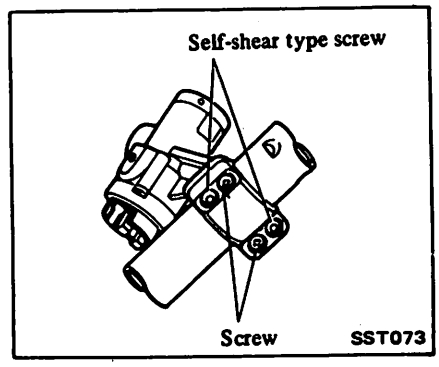
STEERING LOCK

REMOVAL

1. Remove steering wheel. Refer to Steering Wheel for removal.
2. Remove steering column shell cover.

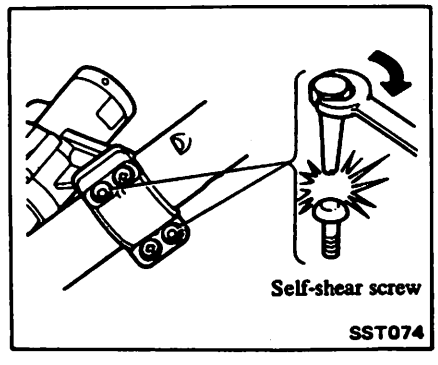


3. Break self-shear type screws **with a drill or other appropriate tool.**
4. Remove screws and disconnect steering lock.



INSTALLATION

1. Align steering lock hole in steering column tube with mating portion of steering lock.
2. Install screws and self-shear type screws and then cut off self-shear type screw heads.

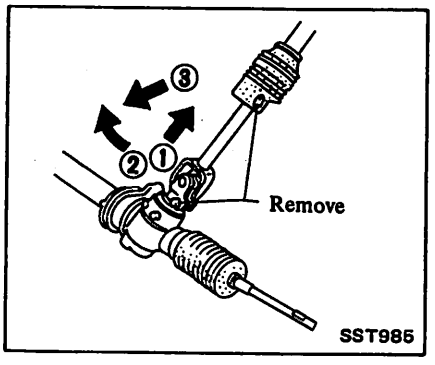


STEERING LOWER JOINT

REMOVAL

Remove steering lower joint.

If necessary, remove hole cover.

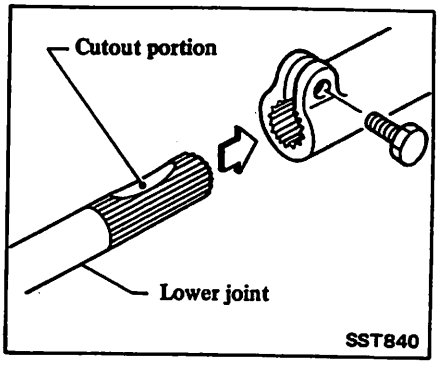


INSTALLATION

1. Set wheels in the straight ahead position.

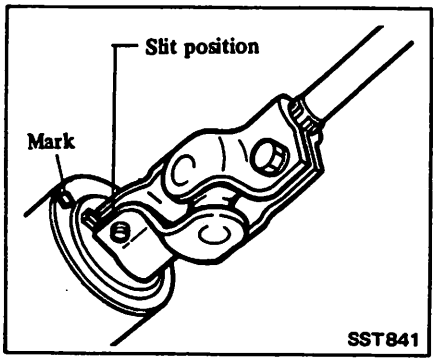
2. Fit steering lower joint into steering column.

- **Apply grease to portion where lower joint and hole cover make contact.**
- **When fitting, be sure tightening bolt faces cutout portion perfectly.**



3. Fit steering lower joint into steering gear.

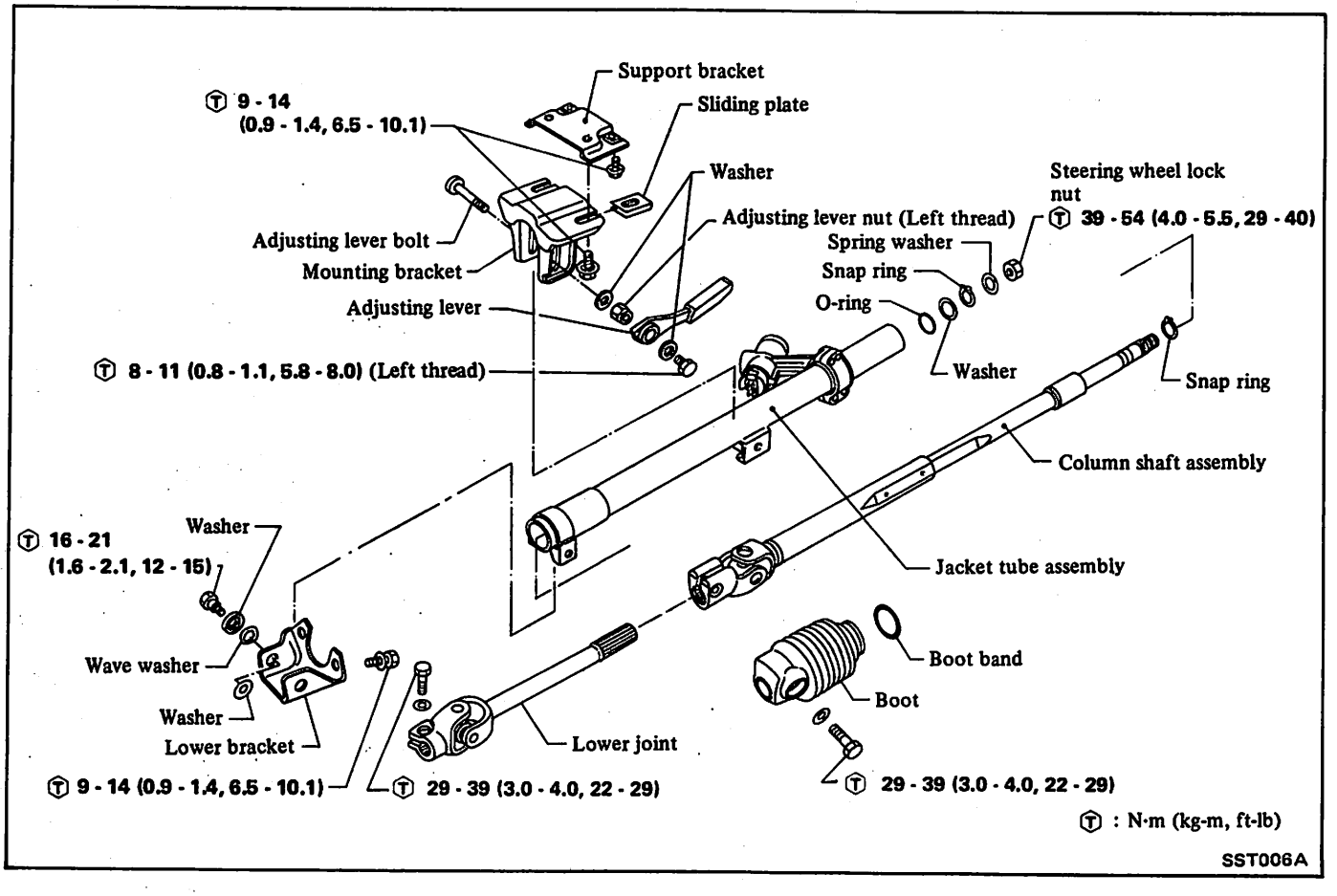
Ensure that slit position of steering lower joint is aligned with steering gear cap or spacer mark.



4. Install steering lower joint bolts.

Ⓣ : **Lower joint fixing bolt**
29 - 39 N·m
(3.0 - 4.0 kg-m,
22 - 29 ft-lb)

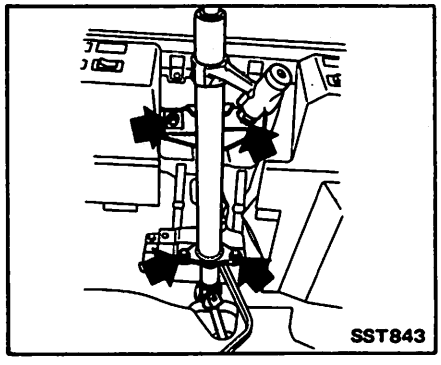
STEERING COLUMN



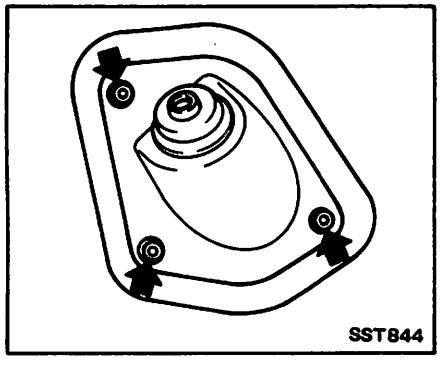
REMOVAL

1. Remove steering wheel. Refer to Steering Wheel for removal.
2. Remove steering lower joint. Refer to Steering Lower Joint for removal.
3. Remove steering column shell cover.
4. Remove combination switch assembly.
5. Remove heater ducts.
6. Draw out steering column assembly.

Be careful not to lose sliding plate.



7. Remove hole cover.



INSTALLATION

Install in the reverse order of removal.

- **Properly position sliding plate on steering column.**
- Finger tighten all lower bracket and clamp retaining bolts; then tighten them securely.
- **After installing, turn steering wheel to make sure it moves smoothly and that the number of turns from the straight-forward position to left and right locks are equal.**

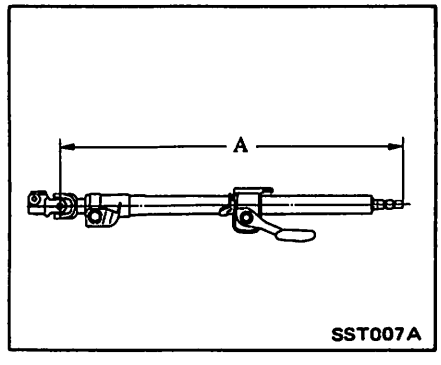
CAUTION:
Make sure that undue stress is not applied to steering column.

Ⓣ : Lower bracket to pedal bracket
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)
Steering column clamp
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

INSPECTION

1. When steering wheel can not be rotated smoothly, check the steering column for the following matters and replace faulty parts.
(1) Check column bearings for damage or unevenness. If so, lubricate with recommended multi-purpose grease or replace with a new one as steering column assembly.
(2) Check jacket tube for deformation or breakage. Replace if necessary.
2. When the vehicle is involved in a light collision, check dimension "A". If they are not within specifications, replace steering column as an assembly.

Column length "A":
593.6 - 595.2 mm
(23.37 - 23.43 in)



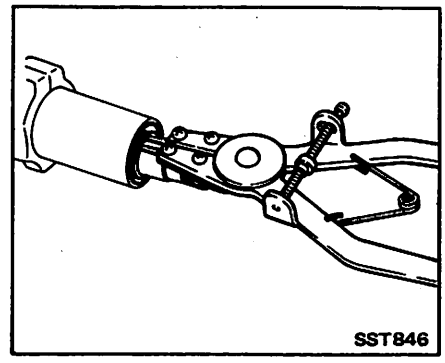
DISASSEMBLY AND ASSEMBLY

While disassembling and assembling, unlock steering lock with a key.

Jacket tube assembly

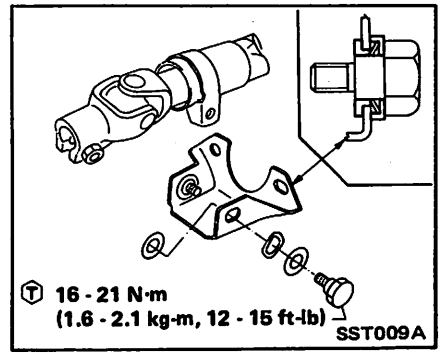
1. Remove lower bracket.
2. Remove snap ring.

Do not reuse snap ring once it has been removed.

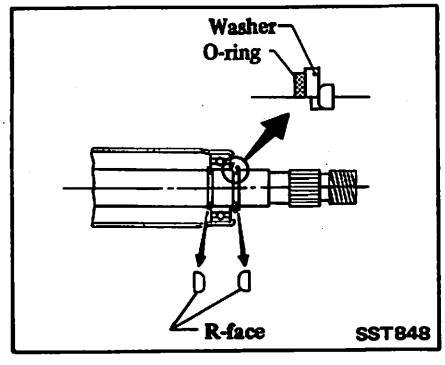


3. Assemble jacket tube assembly, observing the following instructions.

a. Assemble lower bracket, noting the direction of parts.

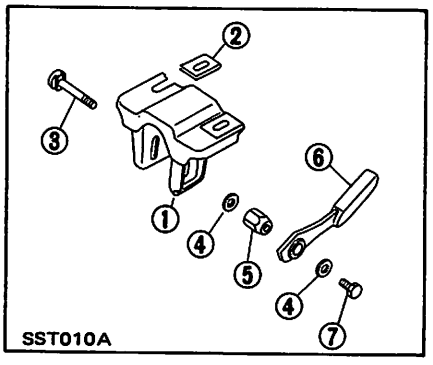


b. Apply a coat of grease to column bearing and lower bushing.
c. Make sure that undue stress is not applied to column shaft in axial direction.
d. Ensure that rounded surface of snap ring faces toward bearing when snap ring is installed.



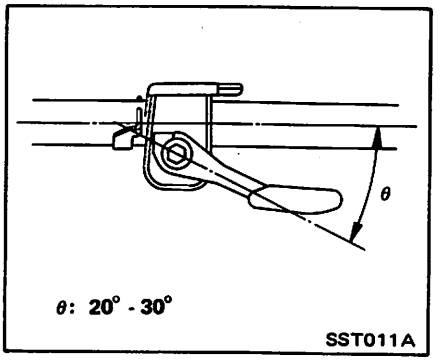
Tilt mechanism (Mounting bracket)

1. Remove bolt, and then separate each part.



1 Mounting bracket
2 Sliding plate
3 Adjusting lever bolt
4 Washer
5 Adjusting lever nut (Left thread)
6 Adjusting lever
7 Bolt (Left thread)

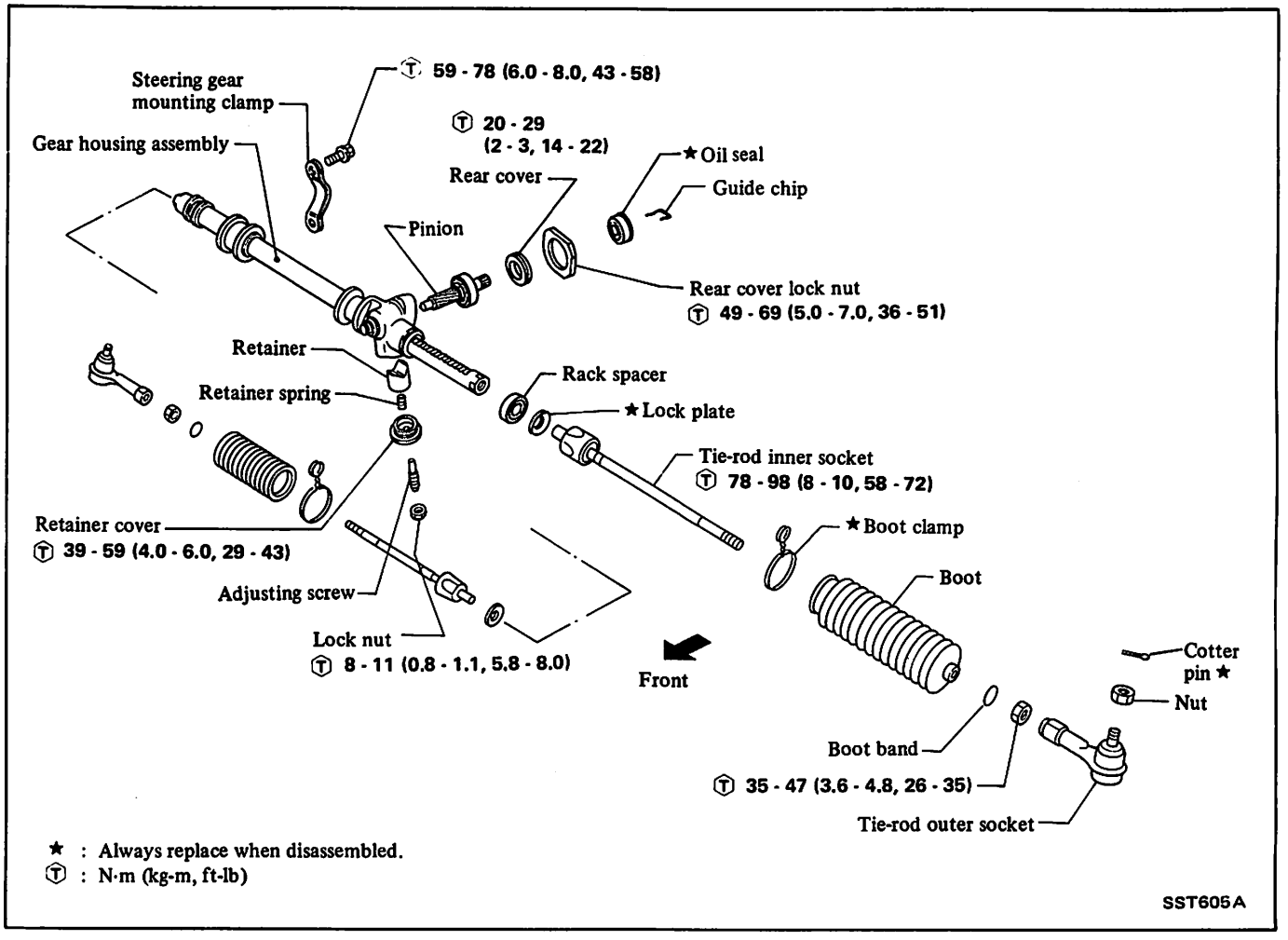
2. Install tilt component parts, and then adjust tilt mechanism.
- Apply grease to sliding portion.
- Adjust tilt lever angle to "θ" when adjusting lever nut is tightened to 8 N·m (0.8 kg-m, 5.8 ft-lb).



3. Move tilt lever from lock (where tilt lever angle is "θ") to release position (where tilt lever angle is 90° away from "lock") several times to ensure that:
- Jacket tube is securely tightened when tilt lever is at "lock", and
- Jacket tube moves smoothly when tile lever is at "release".

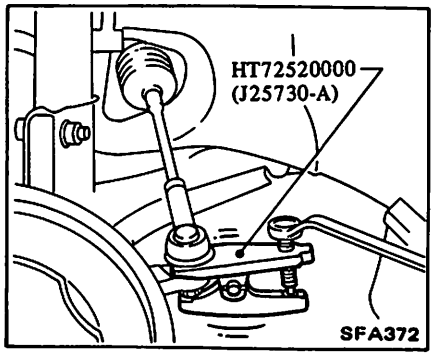
If necessary, readjust tilt mechanism.

MANUAL STEERING GEAR (Model : R22S) AND LINKAGE

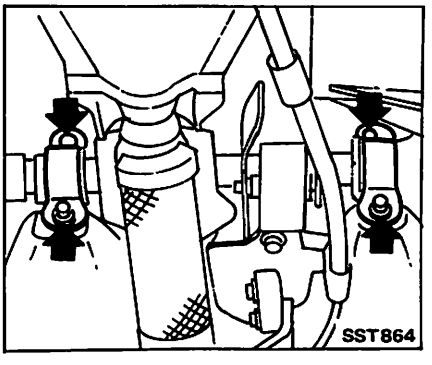


REMOVAL

1. Jack up front of vehicle and support it with safety stand.
2. Remove tie-rod from steering knuckle using Tool.



3. Loosen steering gear mounting bolts in advance to facilitate removal of lower joint.



4. Remove lower joint.

Refer to Steering Lower Joint for removal.

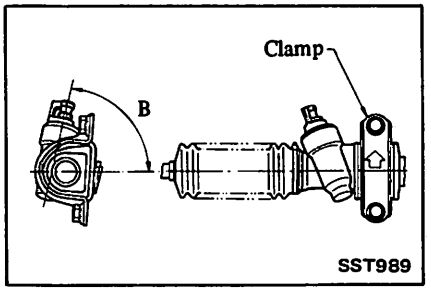
5. Remove bolts securing steering gear housing to body. Then remove steering gear and linkage assembly from vehicle.

INSTALLATION

Install steering gear and linkage in reverse order of removal.

- **Install both mounting rubber and clamp with arrow marks pointing upward.**

"B" angle: 76.5°

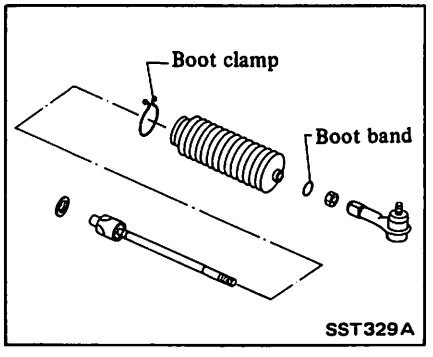


Ⓣ : Tie-rod to steering knuckle
29 - 49 N·m
(3.0 - 5.0 kg-m,
22 - 36 ft-lb)
Gear housing clamp bolt
59 - 78 N·m
(6.0 - 8.0 kg-m,
43 - 58 ft-lb)
Lower joint to pinion gear
29 - 39 N·m
(3.0 - 4.0 kg-m,
22 - 29 ft-lb)
Lower joint to steering column
29 - 39 N·m
(3.0 - 4.0 kg-m,
22 - 29 ft-lb)

Check wheel alignment, and if necessary adjust.
Refer to Section MA.

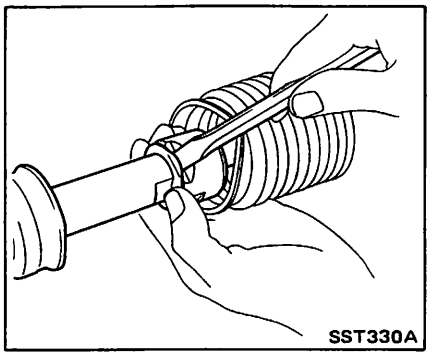
DISASSEMBLY

1. Clamp steering gear and linkage assembly in a vise using patches on steering gear housing to prevent scarring.
2. Remove boot clamps. (Both left and right)



3. Flatten lock plates.

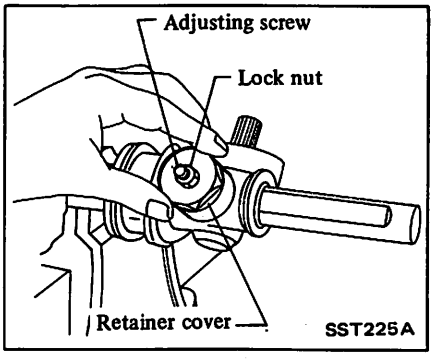
Always replace lock plate when disassembled.



4. Disconnect tie-rod inner socket. And remove tie rod assembly from rack.

CAUTION:
Do not disassemble inner socket assembly and outer socket assembly.

5. Loosen adjust screw lock nut and remove adjust screw.
Remove retainer cover.



6. Remove oil seal from gear housing and **discard seal.**
7. Loosen rear cover lock nut and remove rear cover.
8. Draw pinion assembly out.
9. Draw rack out from gear housing.

INSPECTION

Thoroughly clean all parts in cleaning solvent, and blow dry with compressed air, if available.

Rack

Thoroughly examine rack gear. If rack gear is damaged, cracked or worn, replace.

Pinion

Thoroughly examine pinion gear. If pinion gear is damaged, cracked or worn, replace.

Tie-rod outer ball joint

Ball joint is assembled at factory and cannot be disassembled.
1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Tie-rod outer ball joint:
Swinging torque
0.15 - 2.94 N·m
(1.5 - 30 kg-cm,
1.3 - 26.0 in-lb)
Axial play max.
0.8 mm (0.031 in)

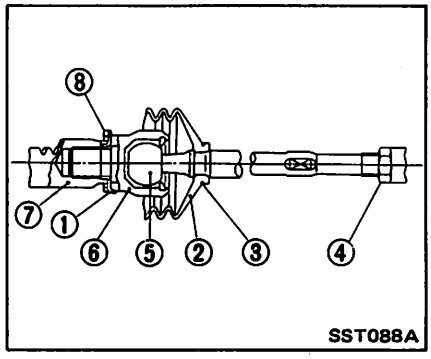
2. Check condition of dust cover. If it is cracked excessively, replace ball joint.

Tie-rod inner ball joint

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Tie-rod inner ball joint:
Swinging torque
0.1 - 7.4 N·m
(1 - 75 kg-cm,
0.9 - 65.1 in-lb)
Axial play
0 mm (0 in)



1 Lock plate
2 Boot
3 Boot band
4 Lock nut
5 Inner ball joint
6 Inner socket
7 Rack
8 Rack spacer

2. Check condition of boot. If it is cracked excessively, replace boot.

Pinion bearing

Inspect bearings to see that they roll freely and are free from cracked, pitted, or worn balls, rollers and races. If pinion bearing is damaged, replace it as a pinion assembly.

Oil seal

Always replace oil seal at each disassembly.

ASSEMBLY AND ADJUSTMENT

Assemble steering gear in reverse order of disassembly. Observe the following instructions.

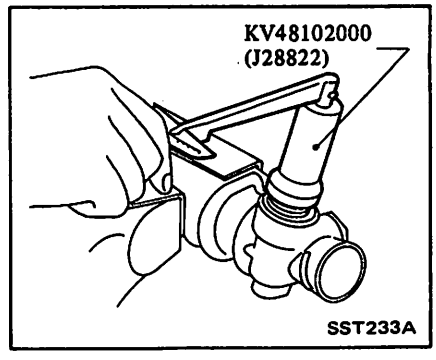
Rack and pinion

1. Clamp steering gear housing in a vise.
2. Sparingly apply recommended multi-purpose grease to toothed faces and friction surfaces of rack.
3. Insert rack gear from gear housing side.

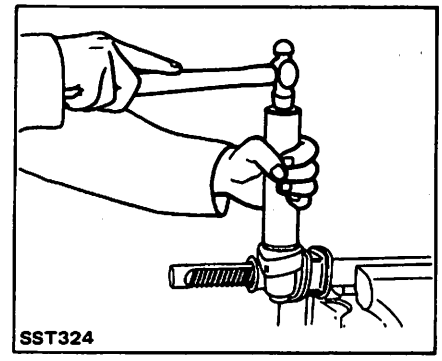
- **Pay attention to direction of rack teeth.**

4. Properly mesh pinion with rack and insert pinion assembly into groove.
5. Tighten rear cover using tool and secure with lock nut.

Ⓣ : **Rear cover**
5 - 10 N·m
(0.5 - 1.0 kg-m,
3.6 - 7.2 ft-lb)
Lock nut
49 - 69 N·m
(5 - 7 kg-m,
36 - 51 ft-lb)



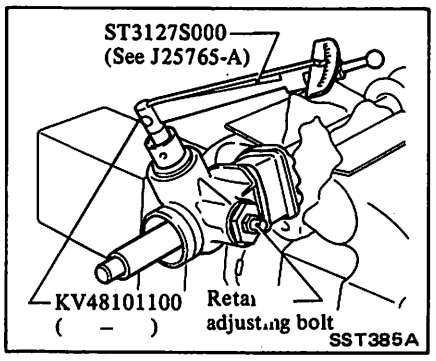
6. Make sure that rack protrudes by the same amount from both ends of housing.
7. Fit new oil seal.



Pack sealing lips with multi-purpose grease.

8. Make sure that pinion assembly rotates smoothly.
9. Apply an adequate amount of recommended multi-purpose grease to steering gear retainer.
10. Insert retainer and retainer spring into housing. Tighten retainer cover at 39 to 59 N·m (4 to 6 kg-m, 29 to 43 ft-lb), and install adjust screw and lock nut.
11. Adjust pinion rotating torque as follows.
1) Set gears to Neutral position.
2) Loosen lock nut.
3) Tighten adjusting screw one or two times to a torque of 4.9 N·m (50 kg-cm, 43 in-lb).
4) Loosen adjusting screw and retighten it to a torque of 0.2 N·m (2 kg-cm, 1.7 in-lb).

5) Rotate pinion to move rack back and forth two times, and return it to Neutral position.
6) Slowly rotate the pinion and measure rotating torque ±180° from Neutral position.
Find the position where the rotating torque is at its maximum.

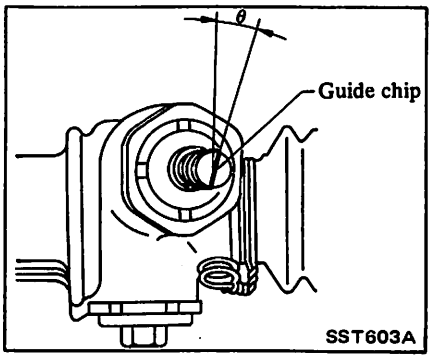


7) Loosen adjusting screw at the position where the rotating torque is at its maximum.
8) Hand-tighten adjusting screw until its end touches retainer.
9) Prevent adjusting nut from rotating and tighten lock nut to specified torque holding adjusting nut in place.
10) While slowly rotating pinion from Neutral position to the end of rack, make sure its rotating torque is within the following range.

Pinion rotating torque:
1.5 N·m (15 kg-cm 13 in-lb)

12. Set guide chip at neutral position.

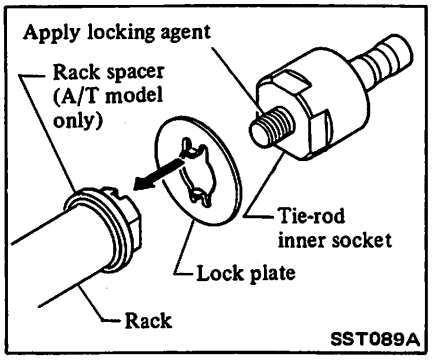
Guide chip set angle "θ":
43.5° to 56.5°



Tie-rod and boot

1. Fit boot and boot band on tie rod inner socket.
2. Fit rack spacer to rack end. (Automatic transaxle equipped model only)
3. Fit tie-rod inner socket to rack end together with new lock plate.

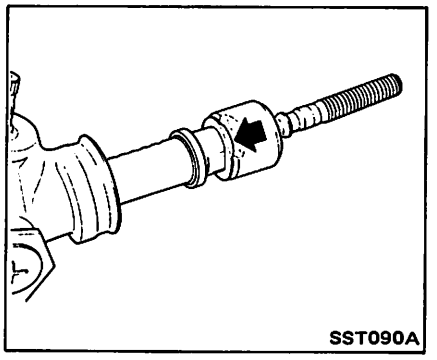
Be sure lock plate ratchet enters groove at end portion of rack.



3. After tightening tie-rod inner socket to specified torque, securely bend lock plate at 2 cutout portions of tie rod inner socket.

To prevent damage to boot, remove burrs after bending lock plate.

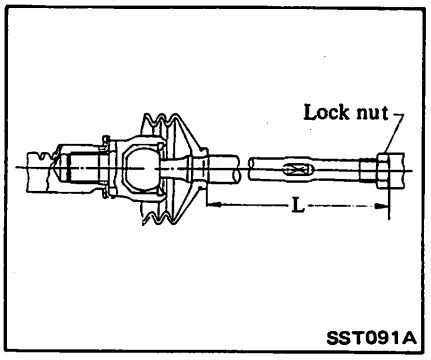
Ⓣ : **78 - 98 N·m**
(8 - 10 kg-m,
58 - 72 ft-lb)



4. Fit lock nut and outer socket to inner socket, and tighten lock nut with tie rod length that has been set to the length specified.

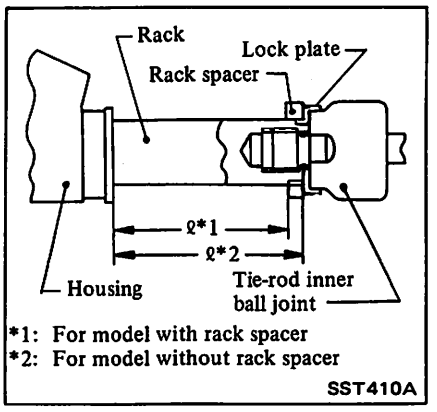
Ⓣ : **35 - 47 N·m**
(3.6 - 4.8 kg-m,
26 - 35 ft-lb)

Tie-rod length (both sides) "L":
175.9 mm (6.93 in)



5. Measure rack stroke.

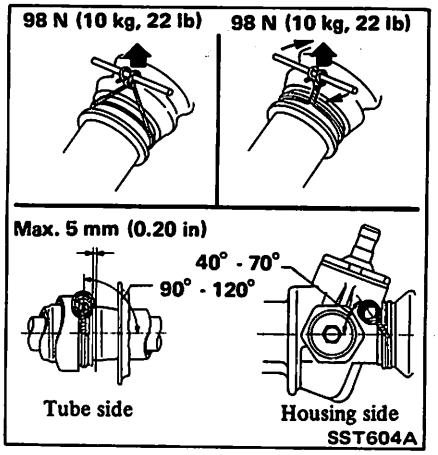
Measure length "ℓ" (both sides):
Manual transaxle equipped model (Without rack spacer)
73.5 mm (2.894 in)
Automatic transaxle equipped model (With rack spacer)
70.0 mm (2.756 in)



6. Install boot to gear housing, then tighten inside boot clamp securely.

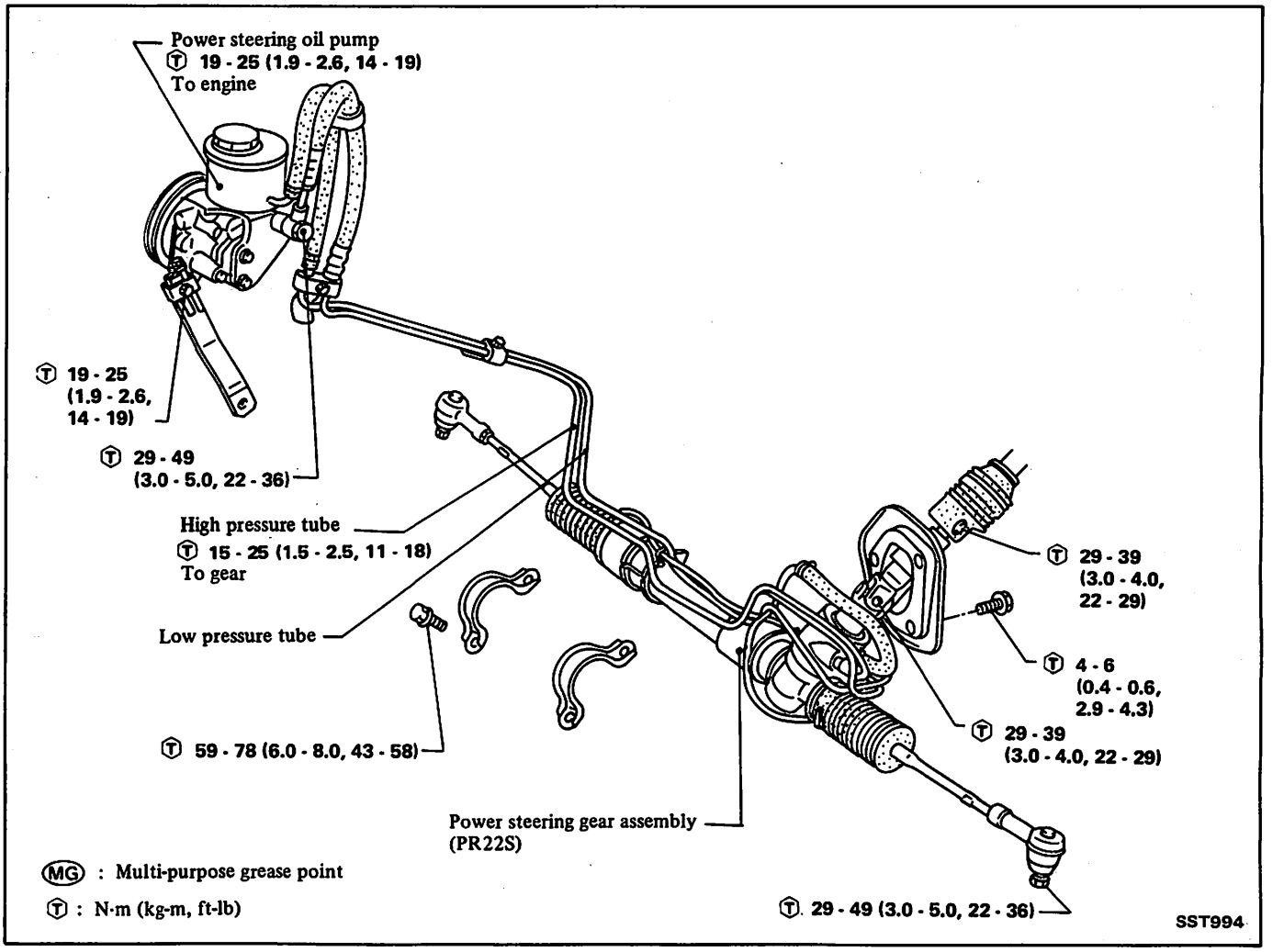
Apply sealant between boot and gear housing.

Position boot clamp in boot groove and wind it around the boot two times. Then twist it tight 4 to 5 times while pulling with a force of 98 N (10 kg, 22 lb).



Boot should be neither too inflated nor too elongated.

POWER STEERING SYSTEM (Model : PR22S)



DESCRIPTION

POWER STEERING SYSTEM

The major components are as follows:

- Power steering pump
- Power steering gear and linkage
- Hydraulic piping

POWER STEERING GEAR AND OIL PUMP

The integral power steering gear and oil pump are an accurate hydraulic pressure mechanism.

Only the sealing parts can be replaced. The remaining parts must be replaced as an assembly.

CAUTION:

a. The parts which can be disassembled are strictly limited, and never disassemble parts other than the specified ones.
b. Disassembly should be performed in a place as clean as possible.
c. Hands should be cleaned before disassembly.
d. Do not use a rag. Be sure to use nylon or paper cloth.
e. Be sure to follow procedures and cautions indicated in the Service Manual.

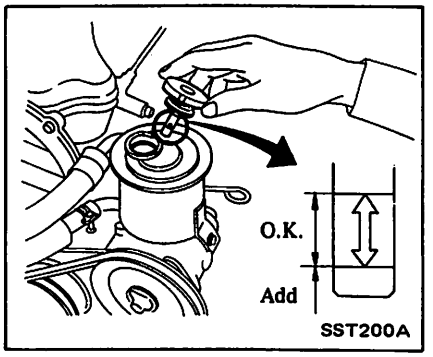
POWER STEERING SYSTEM

INSPECTION

Fluid level

1. Check the fluid level in reservoir by observing the dipstick when the fluid is cold. Add fluid as necessary to bring the level into the proper range on dipstick.

CAUTION:
Do not overfill.



2. Check fluid level and for leakage.

Recommended fluid is Automatic Transmission Fluid "Dexron Type".
Refer to Section MA for "Recommended Lubricant".
Fluid capacity (With pump, each hose and steering gear assembly):
Approximately 0.9 ℓ
(1 US qt, 3/4 Imp qt)

Pump belt adjustment

Refer to Checking and Adjusting Drive Belts (Section MA) for drive belt tension.

Check fluid leakage

1. Run engine at idle speed or 1,000 rpm.

Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F).

2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each "lock" position for five seconds and carefully check the following points for fluid leakage.

- Pinion housing
- Rear housing and rear cover
- Rack end (Both sides)
- Cylinder
- Pulley
- Suction pipe
- Connector
- Rear cover
- If fluid leakage occurs at connectors, loosen flare nut and then retighten.

CAUTION:
Do not hold steering wheel at lock position for more than fifteen seconds at a time.

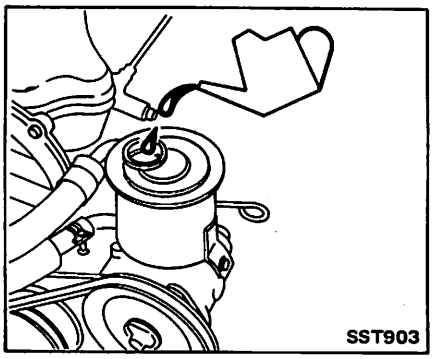
Hydraulic system check

To determine whether problem is in steering gear or power steering pump, measure operating pressure.

Before conducting hydraulic system test, carefully check belt tension and condition of driving pulley.

Tires must be inflated to normal pressure.

1. Check fluid level and for fluid leakage, adding fluid if necessary.

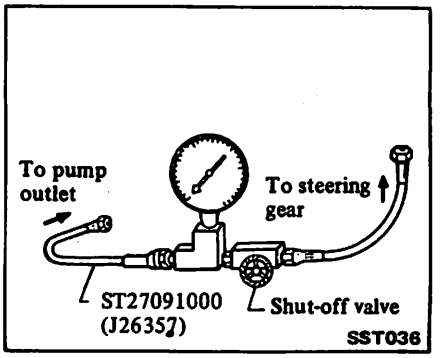


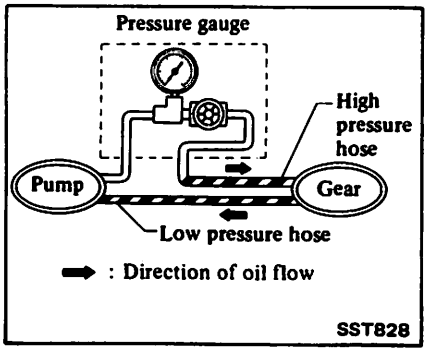
2. Run engine.

Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F).

3. Stop engine.
4. Attach Tool and bleed air.

- **Gauge must be between shut-off valve and power steering pump.**
- **Use pressure Gauge Adapter KV48102500 when installing Pressure Gauge ST27091000.**





5. Open shut-off valve.
6. Check fluid level, **adding fluid if necessary.**
7. Run engine at idle **for 3 to 5 seconds.**
8. Stop engine and check fluid level, **adding fluid if necessary.**
9. Run engine and **check fluid level again, adding fluid if necessary.**
10. Turn steering wheel fully in left or right until fluid reaches operating temperature.

- **Be sure that all connections are tight.**
- **Expel any air from system.**

11. Check pressure **with steering wheel fully turned in left and right.**

CAUTION:
Do not hold steering wheel at lock position for more than fifteen seconds, as this would abnormally increase fluid temperature and cause undue gear and pump wear.

Pressure should be as follows:

Normal pressure:
5,198 - 5,786 kPa
(53 - 59 kg/cm^2,
754 - 839 psi) at idling

12. If oil pressure is abnormal, slowly close shut-off valve and check oil pressure to determine which part is damaged, as follows:

Pressure	Damaged part
Normal	Gear
Abnormal	Pump

CAUTION:
Do not close shut-off valve for more than fifteen seconds, as this would abnormally increase lubricant temperature and cause undue pump wear.

13. Replace any part that is damaged.

CAUTION:
The power steering system consists primarily of an accurate hydraulic pressure unit.
Any abnormality in one of this unit's parts will cause the other part(s) to malfunction, or the fluid to deteriorate. Whenever faulty parts must be replaced, oil should be discarded and all other parts should be cleaned.

14. Open shut-off valve, pour fresh fluid into and bleed air from power steering system, as outlined in the "Bleeding Hydraulic System" section.
15. **Repeat steps 10 through 14** above until oil pressure is normal.

After checking hydraulic system, remove Tool and add fluid as necessary, then completely bleed air out of system.

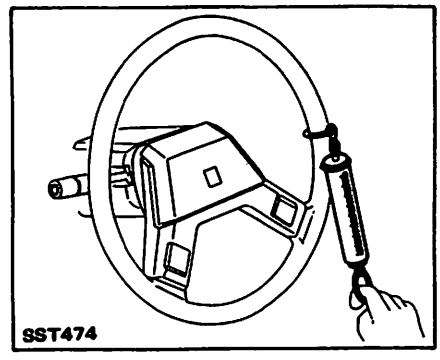
Steering wheel turning force check

1. Park vehicle on a level, dry surface and set parking brake firmly.
2. Bring power steering fluid up to adequate operating temperature. **[Approximately 60 to 80°C (140 to 176°F)].**

- **Fluid temperature can be warmed up more easily by idling engine and at the same time turning steering wheel from left to right for about two minutes. Alternatively, drive vehicle several miles.**
- **Tires must be inflated to normal pressure.**

3. Check steering wheel turning force when steering wheel has been turned 360° from straight-ahead position.

Steering wheel turning force:
Less than 39.2 N (4 kg, 8.8 lb)



REMOVAL

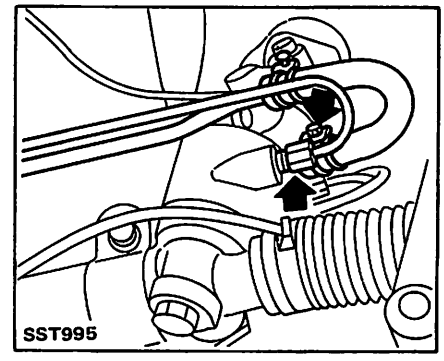
Power steering gear and linkage

CAUTION

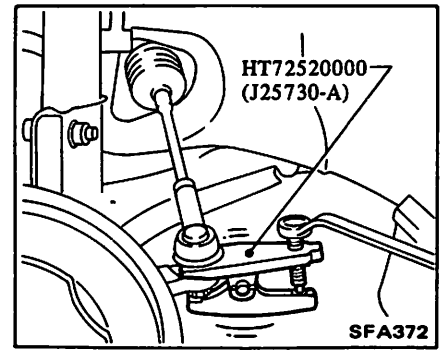
- **Whenever disconnecting hydraulic lines, cover openings to prevent foreign matter from entering.**
- **When installing or carrying power steering gear, be sure to hold gear, and not tube. When tube is held, it may be deformed or fluid will leak out from connector.**

1. Jack up front of vehicle and support it with safety stand.
2. Disconnect hose clamp.
3. Disconnect flare nut and hose at steering gear and drain fluid.

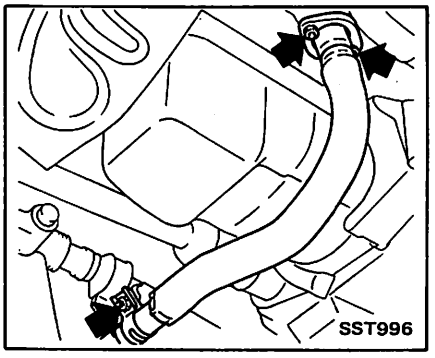
Be careful not to damage flare nut.



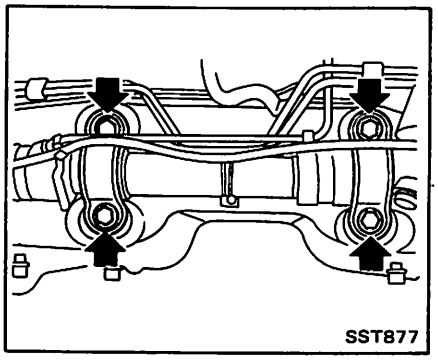
4. Remove cotter pins and nuts fastening tie-rod ball studs, and detach tie-rod ball studs from knuckle arms with Tool.



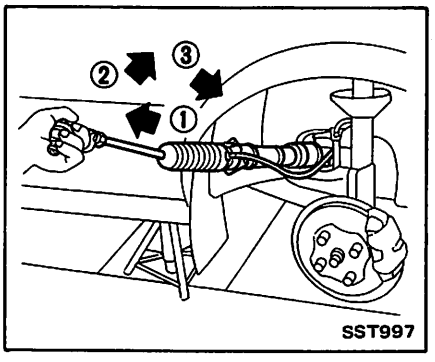
5. Support transaxle with a jack.
6. Remove exhaust tube.



7. Remove rear engine mounting.
8. Remove steering gear mounting bolts.



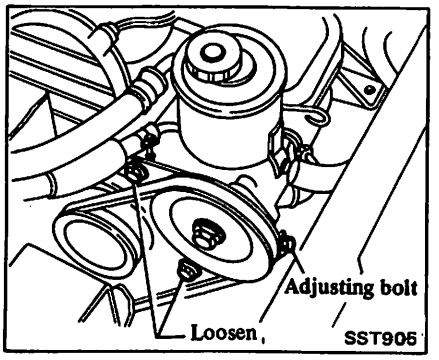
9. Remove steering lower joint.
Refer to Steering Lower Joint for removal.
10. Remove steering gear and linkage from vehicle.



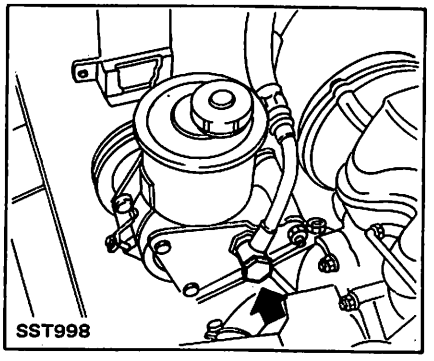
Oil pump and hoses

CAUTION:
Whenever disconnecting hydraulic lines, cover openings to prevent foreign matter from entering.

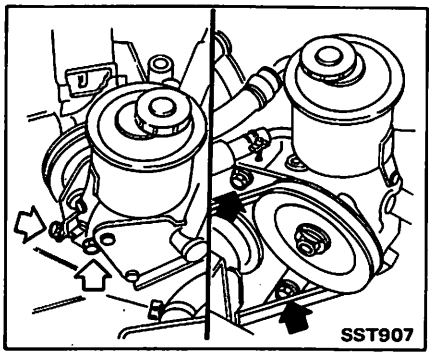
1. Loosen power steering pump adjusting bolt lock bolt.
2. Turn adjusting bolt counterclockwise to loosen pump belt.



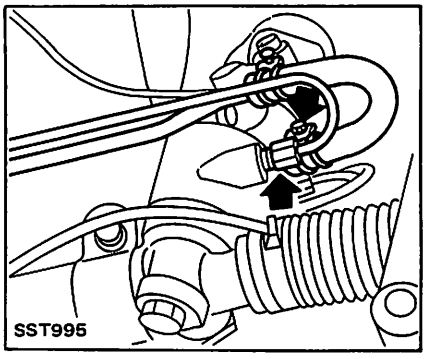
3. Remove power steering pump belt.
4. Disconnect pressure hose at power steering pump, and drain fluid. Then remove return hose clamp.



5. Remove power steering pump assembly.



6. Disconnect hoses on steering gear side.



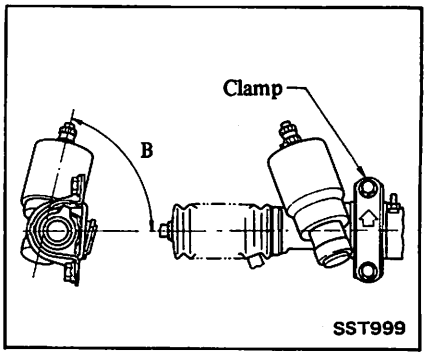
7. Disconnect hose clamp bolts and remove hoses from vehicle.

INSTALLATION AND ADJUSTMENT

Power steering gear and linkage

Install steering gear and linkage in the reverse order of removal.

- Install both mounting rubber and clamp with arrow marks pointing upward.



"B" angle: 70.7°

Ⓣ : Tie-rod to knuckle
29 - 49 N·m
(3.0 - 5.0 kg-m,
22 - 36 ft-lb)
Gear housing clamp bolt
59 - 78 N·m
(6.0 - 8.0 kg-m,
43 - 58 ft-lb)
High pressure pipe to gear
15 - 25 N·m
(1.5 - 2.5 kg-m,
11 - 18 ft-lb)

Check wheel alignment, and if necessary adjust.

Refer to Section MA.

After installation is completed, fill fluid and bleed system.

Oil pump and hoses

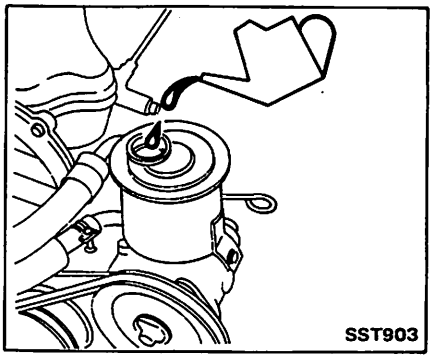
Install oil pump and hoses in the reverse order of removal.

Ⓣ : **High pressure hose to pump**
29 - 49 N·m
(3 - 5 kg-m,
22 - 36 ft-lb)
High pressure pipe to gear
15 - 25 N·m
(1.5 - 2.5 kg-m,
11 - 18 ft-lb)
Pump mounting bolt
19 - 25 N·m
(1.9 - 2.6 kg-m,
14 - 19 ft-lb)

After installation is completed, fill fluid and bleed system.

Bleeding hydraulic system

1. Raise front end of car until wheels clear ground.
2. Quickly turn steering wheel **all the way to right and left ten times and lightly touch wheel stoppers.**
3. Check fluid level, **adding fluid if necessary.**
4. Run engine. **Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F) with a temperature indicator.**
5. Stop engine, **adding fluid if necessary.**



6. Run engine for 3 to 5 seconds.
7. Stop engine, **adding fluid if necessary.**
8. Quickly turn steering wheel **all the way to right and left ten times and lightly touch wheel stoppers.**
9. Check fluid level, **adding fluid if necessary.**
10. Start engine at idle.

Repeat steps 6 through 10 until air is bled from pump.

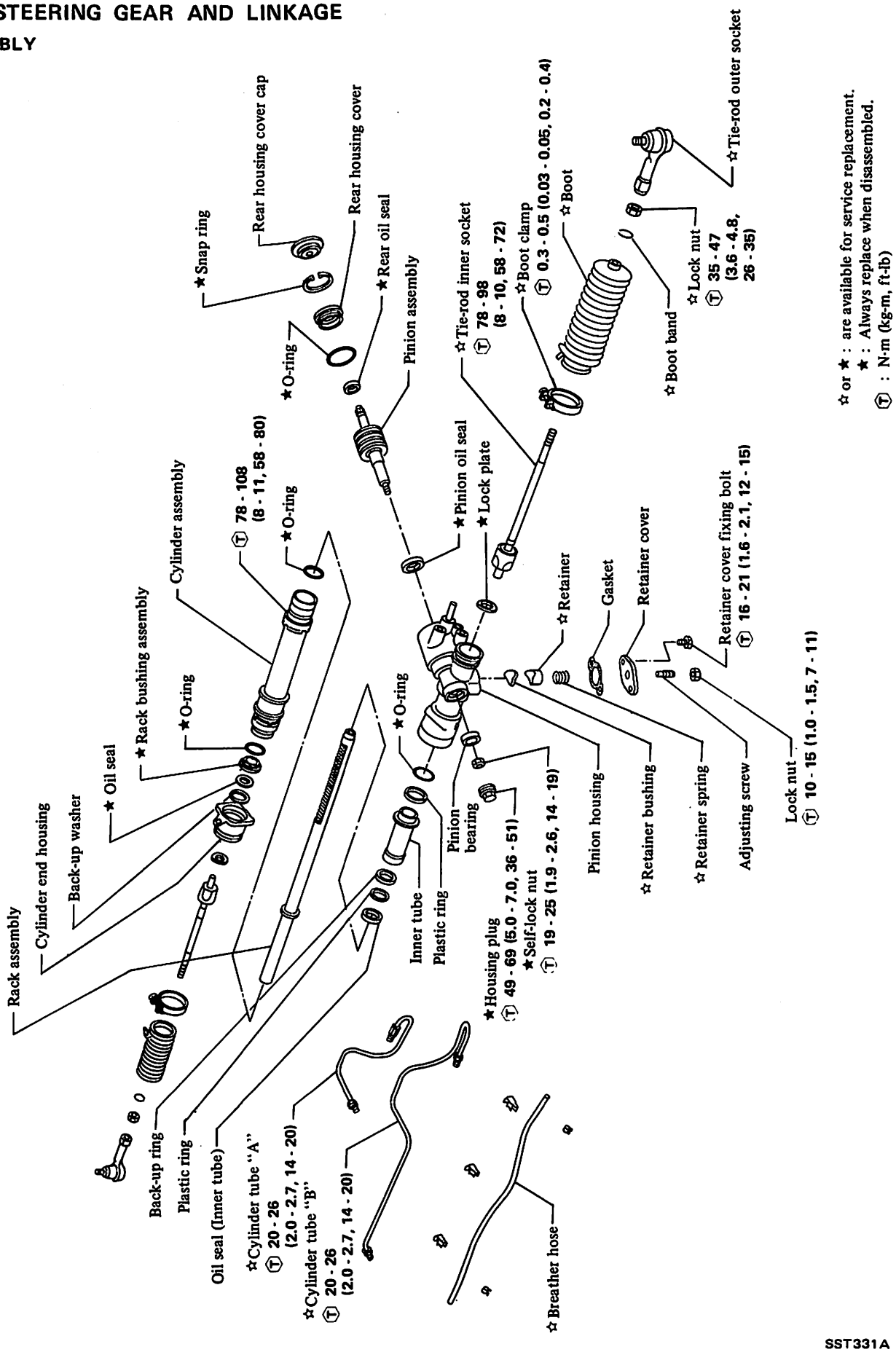
11. If air cannot be bled completely in steps 1 through 10, proceed as follows:

Turn steering wheel to right and left from lock to lock five to ten times. Carefully check fluid leakage with steering wheel held at each lock position for five seconds.

CAUTION:
Do not hold steering wheel at lock position for more than fifteen seconds at a time.

POWER STEERING GEAR AND LINKAGE

DISASSEMBLY



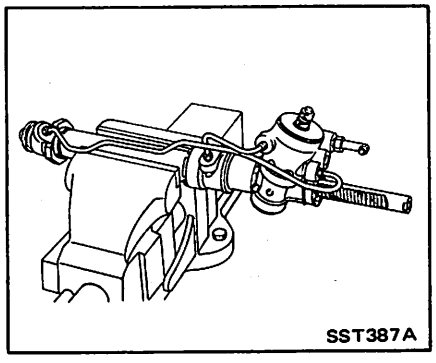
SST331A

CAUTION:
When disassembling and reassembling, do not allow any foreign matter to enter or contact any parts of steering gear.

Measuring pinion rotating torque and rack sliding force

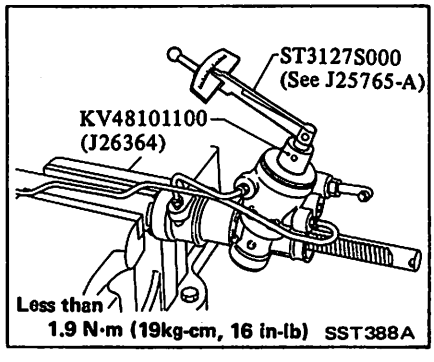
Prior to disassembling, measure pinion rotating torque and rack sliding force. If they are not within specifications, adjust retainer adjust screw. If adjustments cannot be made properly, replace steering gear assembly.
Install steering gear in a vise.

Use soft jaws when holding steering gear housing. Handle it carefully as it is made of aluminum.

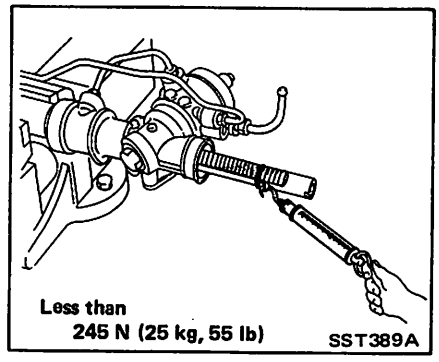


Before measuring, be sure to disconnect cylinder tube and drain fluid.

a. Pinion rotating torque

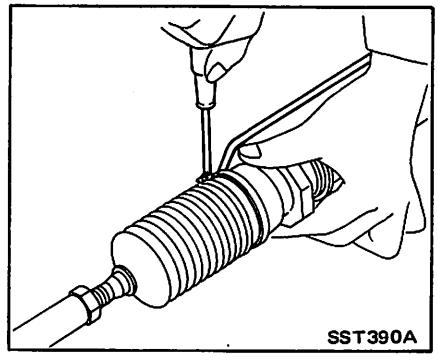


b. Rack sliding force



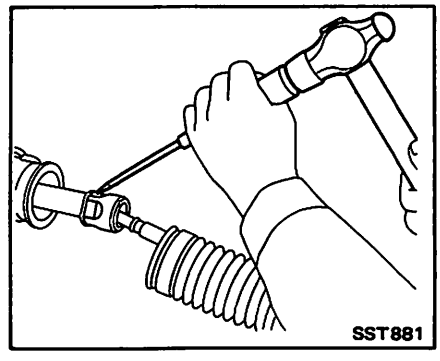
Tie-rod and breather hose

1. Install steering gear in a vice.
2. Remove boot clamp and then remove breather hose. (Both left and right)



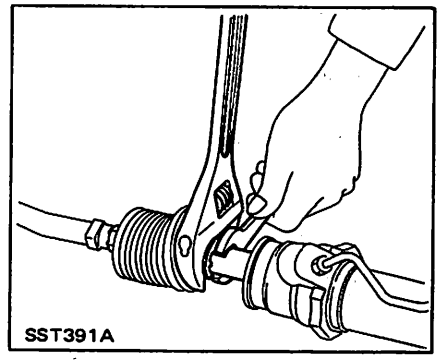
3. Flatten lock plate.

Always replace lock plate when disassembled.

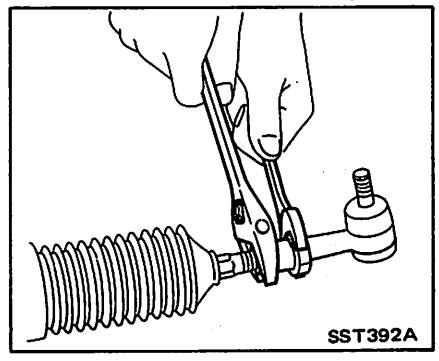


4. Disconnect tie-rod inner socket and remove tie-rod assembly from steering gear assembly.

Use a wrench of approximately 6 mm (0.24 in) in thickness which can be placed in the thickness across flats of rack.



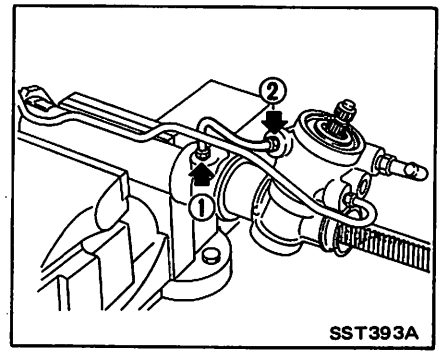
5. Remove tie-rod inner socket from tie-rod outer socket.



CAUTION:
Do not disassemble inner socket assembly and outer socket assembly.

Cylinder tubes

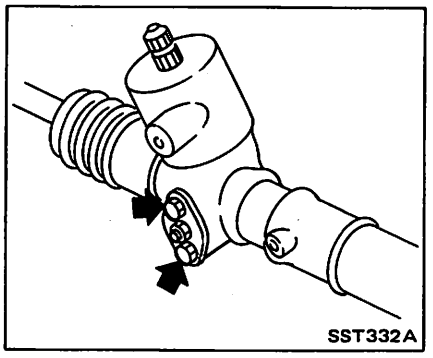
1. Install steering gear in a vice.
2. On cylinder tube "A", first disconnect flare nut at cylinder side and then the other one at pinion housing side.



3. Remove cylinder tube "B" in the same way.

Retainer

1. Install steering gear in a vise.
2. Loosen adjust screw lock nut and then remove retainer adjust screw. Take retainer out.

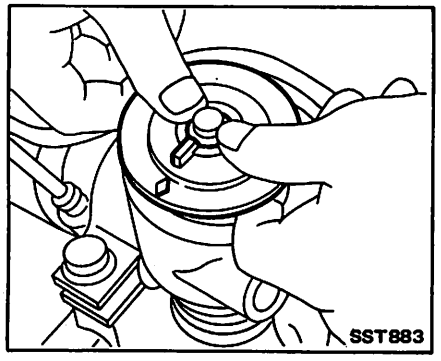


Rear cover oil seal and pinion oil seal

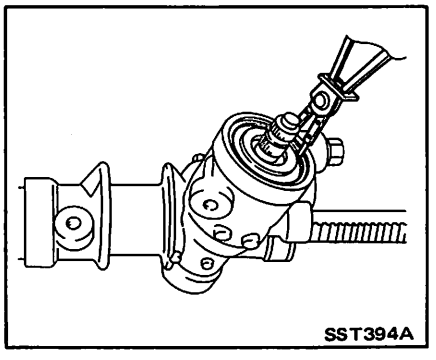
1. Install steering gear in a vise.
2. Remove retainer.

Refer to Retainer for disassembly.

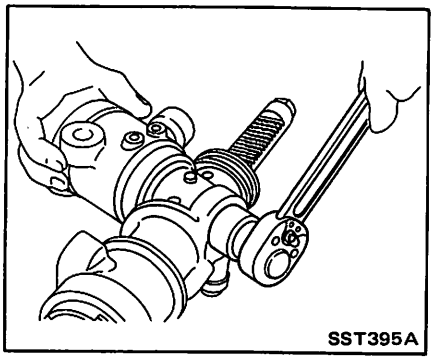
3. Remove rear cover cap.



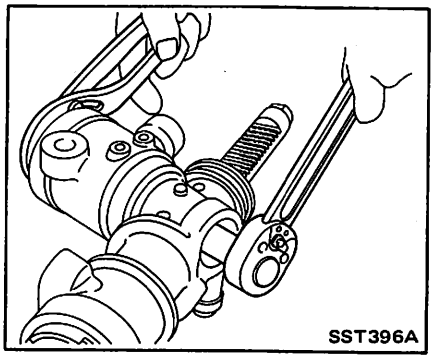
4. Remove snap ring and **discard.**



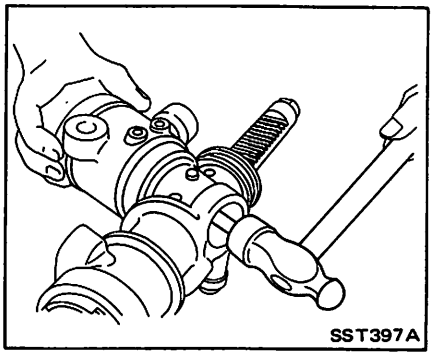
5. Remove housing plug and **discard.**



6. Remove self-locking nut and **discard.**

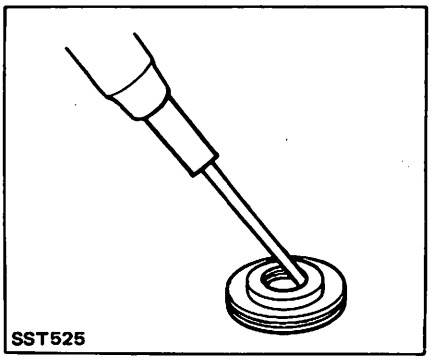


7. Draw pinion assembly out by **lightly** tapping it with a plastic hammer.

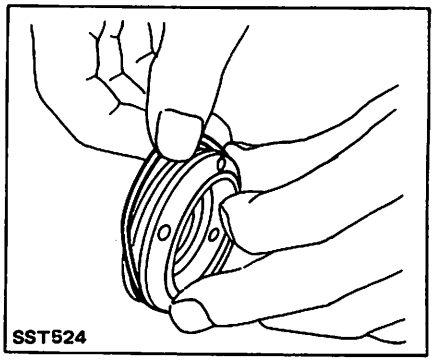


8. Separate rear housing cover from pinion and then remove rear oil seal using suitable tool.

Always replace oil seal when disassembled.

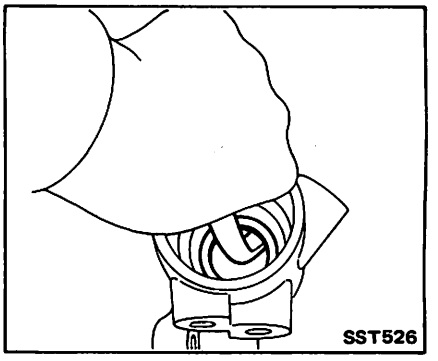


9. Remove O-ring and **discard.**



10. Remove pinion oil seal using suitable tool as necessary.

Always replace oil seal when disassembled.



Rack bush assembly
(Cylinder end housing)

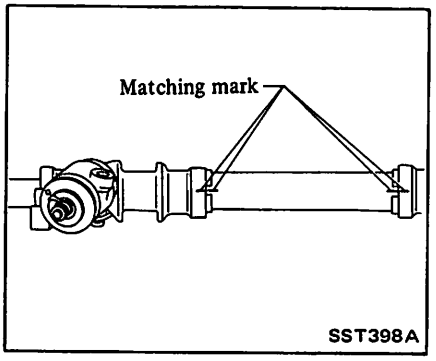
1. Install steering gear in a vise.
2. Remove tie-rod and breather hose.

Refer to Tie-Rod and Breather Hose for disassembly.

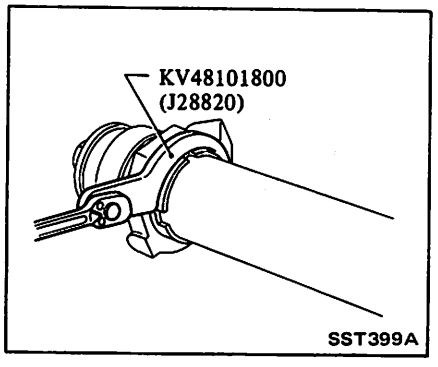
3. Remove cylinder tubes.

Refer to Cylinder Tubes for disassembly.

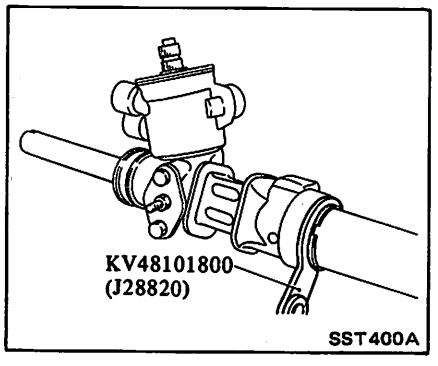
4. Put matching mark.



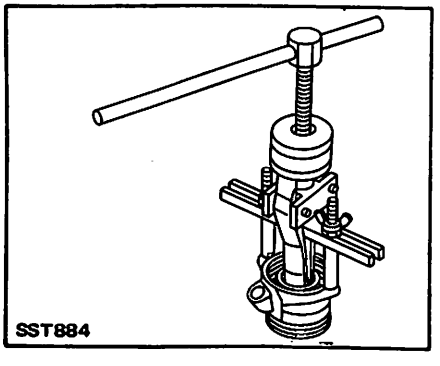
5. Remove cylinder end housing using Tool.



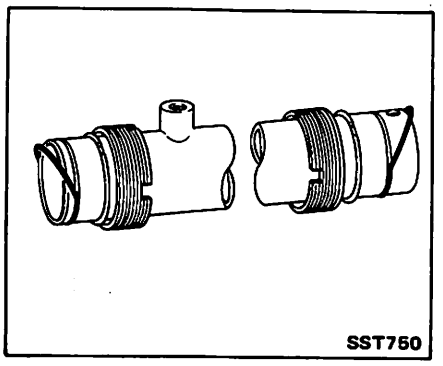
6. Disconnect cylinder lock nut using Tool and separate cylinder from pinion housing.



7. Remove rack bush assembly using suitable tool and **discard it.**



8. Remove cylinder O-rings and **discard.**



Rack packing (Inner tube)

1. Install steering gear in a vise.
2. Remove tie-rod and breather hose.

Refer to Tie-Rod and Breather Hose for disassembly.

3. Remove cylinder tubes.

Refer to Cylinder Tubes for disassembly.

4. Remove retainer.

Refer to Retainer for disassembly.

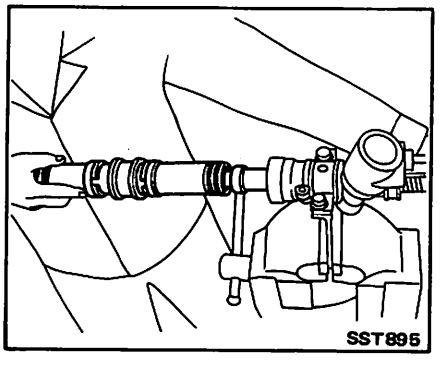
5. Remove cylinder end housing and cylinder assembly.

Refer to Rack Bush Assembly (Cylinder End Housing) for disassembly.

6. Remove pinion assembly.

Refer to Rear Cover Oil Seal and Pinion Oil Seal for disassembly.

7. Draw out rack assembly.

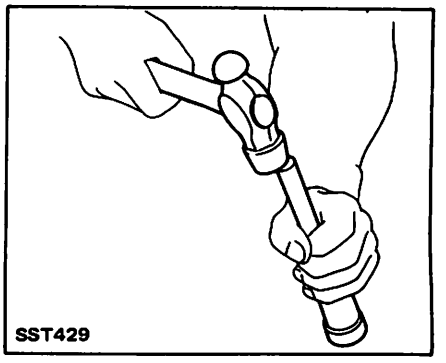


8. Remove inner tube assembly.
9. Remove O-ring from pinion housing.

Always replace O-ring when disassembled.

10. Remove rack packing and back-up collar using suitable tool.

Always replace rack packing when disassembled.



INSPECTION

Thoroughly clean all parts in cleaning solvent or automatic transmission fluid "Dexron Type", and blow dry with compressed air, if available.

Oil seals and O-rings

Always replace oil seals and O-rings when disassembled.

Snap rings

Always replace snap rings when disassembled.

Tie-rod outer ball joint

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Tie-rod outer ball joint:
Swinging torque
0.15 - 2.94 N·m
(1.5 - 30 kg-cm,
1.3 - 26.0 in-lb)
Axial play max.
0.8 mm (0.031 in)

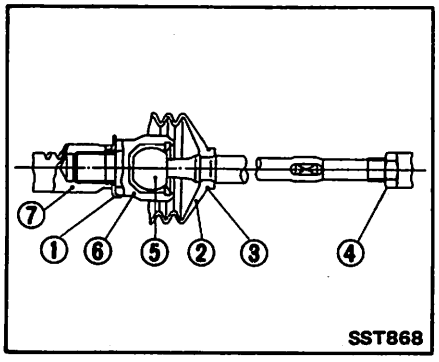
2. Check condition of dust cover. If it is cracked excessively, replace ball joint.

Tie-rod inner ball joint

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Tie-rod inner ball joint:
Swinging torque
0.1 - 7.4 N·m
(1 - 75 kg-cm,
0.9 - 65.1 in-lb)
Axial play
0 mm (0 in)



1 Lock plate
2 Boot
3 Boot band
4 Lock nut
5 Inner ball joint
6 Inner socket
7 Rack

2. Check condition of boot. If it is cracked excessively, replace boot.

Cylinder tubes and breather hose

Check cylinder tubes and breather hose for scratches or other damage. Replace if necessary.

Steering gear component parts

Thoroughly examine those component parts. If those parts are damaged, cracked or worn, replace as steering gear assembly.

ASSEMBLY AND ADJUSTMENT

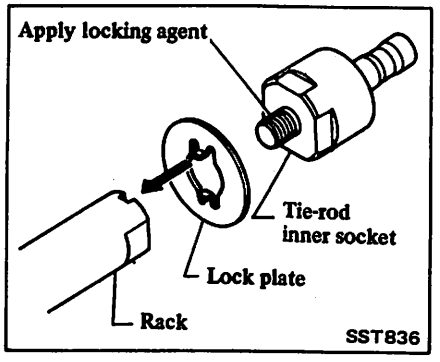
CAUTION:
a. When assembling power steering gear, apply a coat of automatic transmission fluid "Dexron Type" as necessary.
b. Be careful not to damage or deform O-rings and oil seals when installing them.

Assemble power steering gear and linkage in reverse order of disassembly. Observe the following instructions.

Tie-rod and breather hose

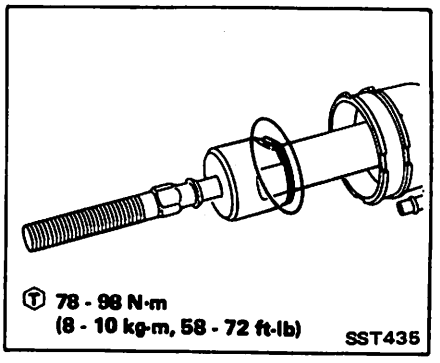
1. Apply locking agent to threaded portion of inner socket and fit inner socket to rack end together with new lock plate.

Be sure lock plate ratchet enters groove at end portion of rack so that rack and inner socket fit snugly.



2. Tighten inner socket and securely bend lock plate at 2 cut-out portions of inner socket.

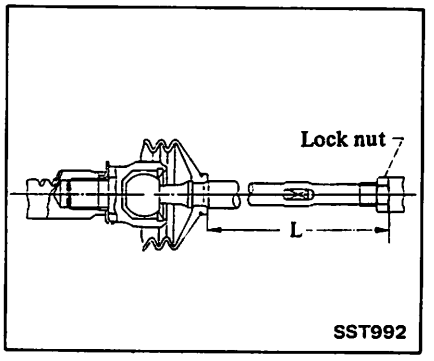
To prevent damage to boot, remove burrs after bending lock plate.



3. Fit lock nut and outer socket to inner socket, and tighten lock nut with the rod length that has been set to the length specified.

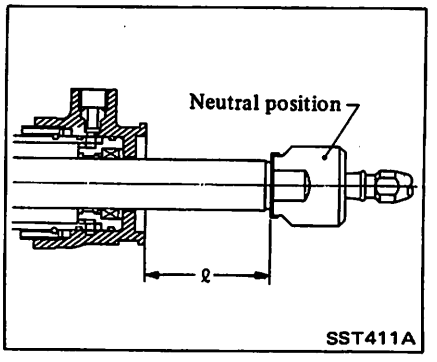
T : 35 - 47 N·m
(3.6 - 4.8 kg-m,
26 - 35 ft-lb)

Tie-rod length "L":
175.9 mm (6.93 in)

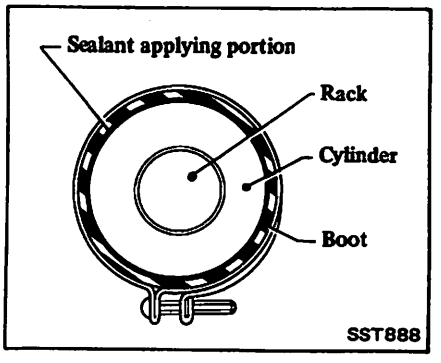


4. Measure rack stroke (without rack spacer).

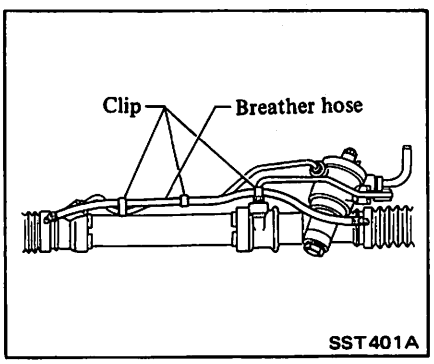
Measure length "ℓ"
Pinion gear side:
60.0 mm (2.362 in)
Opposite pinion gear side:
73.5 mm (2.894 in)

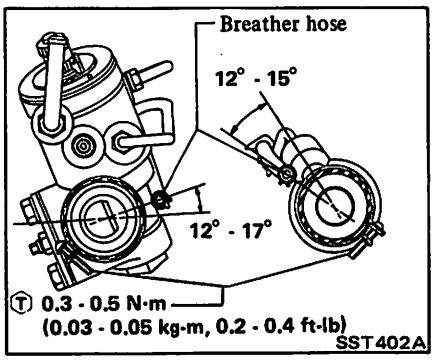


5. Apply a coat of sealant to contact surfaces between boot and cylinder before installing boot.



6. Set breather hose as shown below, and tighten boot clamp.



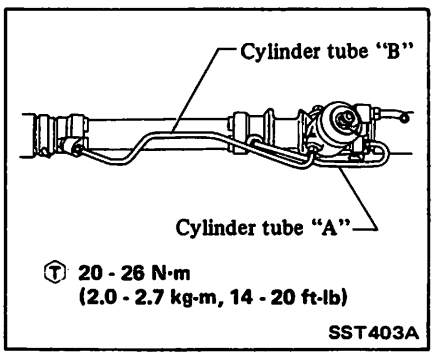


7. Upon completion of assembly, make sure that rack operates smoothly, that boot is not deformed, and that clamp is tightly in place.

Cylinder tubes

1. On cylinder tube "B", temporarily tighten flare nut at pinion housing side and then the other one at cylinder side. **Finally tighten these nuts to specified torque.**

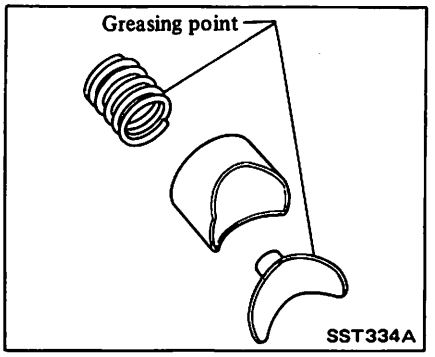
Be careful not to damage flare nut.



2. Install and tighten flare nuts for cylinder tube "A" in the same way.

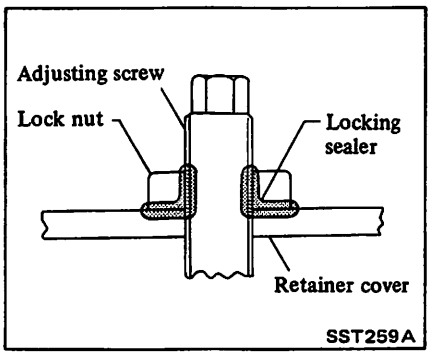
Retainer

1. Apply a coat of grease to contact surfaces with rack, retainer bushing and retainer spring.

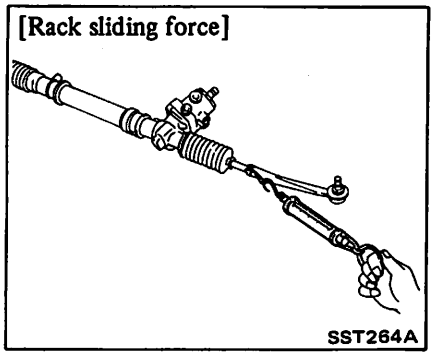


2. Install retainer bushing, retainer, retainer spring, gasket and retainer cover.
3. Adjust pinion rotating torque as follows.
1) Set gears to Neutral.
2) Tighten adjusting screw one or two times to a torque of 4.9 N·m (50 kg-cm, 43 in-lb).
3) Loosen adjusting screw, then retighten it to 0.05 to 0.20 N·m (0.5 to 2 kg-cm, 0.43 to 1.74 in-lb).
4) Apply a coat of locking sealer to adjusting screw and lock nut.

- Shaded areas shown in the following figure refer to portions that should be coated with sealer.

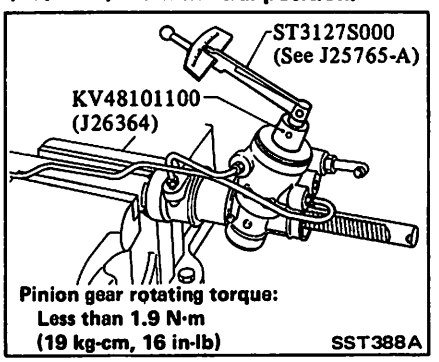


5) Prevent adjusting screw from turning, and tighten lock nut to specified torque.
6) Move rack over its entire stroke several times.
7) Measure rack sliding force and pinion rotating torque.



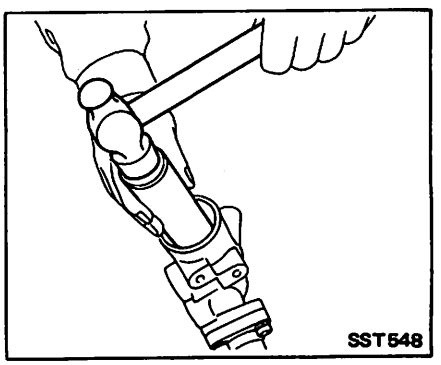
Rack sliding force:
Less than 245 N (25 kg, 55 lb)

Measure rack sliding force in both directions within the range of ±5 mm (±0.20 in) from neutral position.

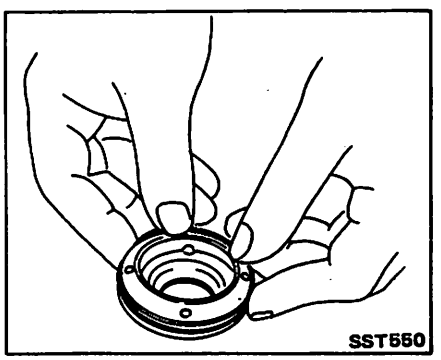


Rear cover oil seal and pinion oil seal

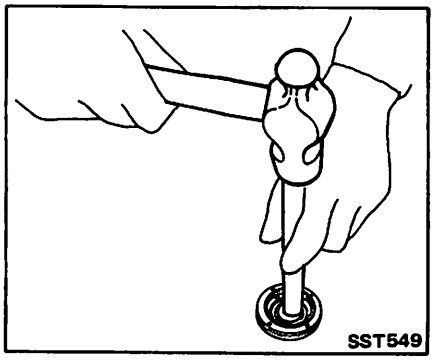
1. Install new pinion oil seal to pinion housing using suitable tool.



2. Apply a coat of automatic transmission fluid to new O-ring prior to installation.

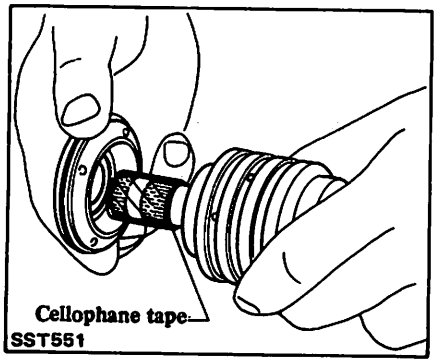


3. Apply a coat of automatic transmisstion fluid to new rear oil seal and install it to rear housing cover using suitable tool.



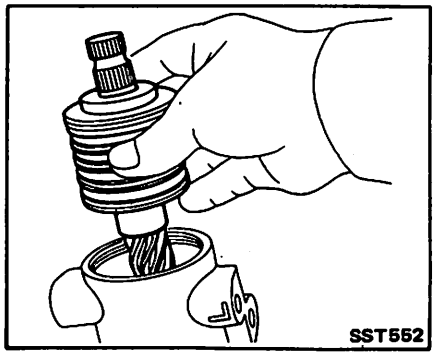
4. Install rear housing cover assembly to pinion.

Wrap cellophane tape around pinion serrations to prevent oil seal from being damaged.

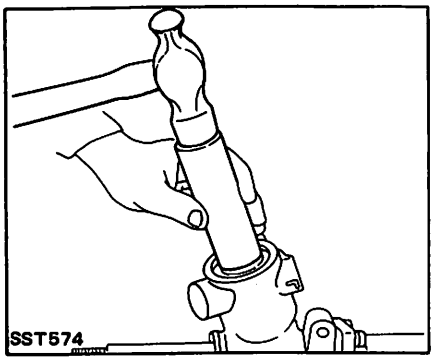


5. Install pinion assembly to pinion housing.

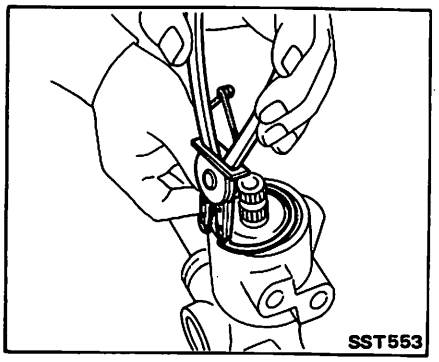
a. Apply a coat of grease to gear surfaces of pinion and rack.
b. Be careful not to damage pinion teflon ring.



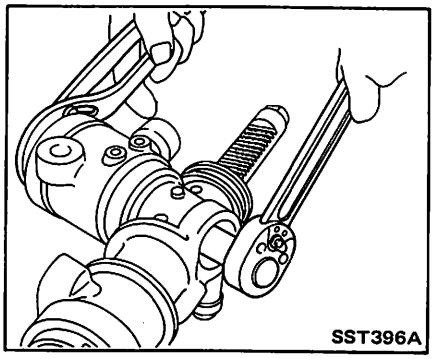
When installing pinion assembly, use suitable tool.



6. Install snap ring.



7. Tighten self-lock nut using suitable tool and wrap pinion shaft serrations with a cloth to prevent pinion shaft from turning.

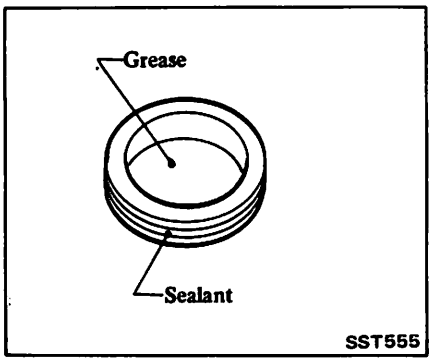


8. Install retainer and adjust pinion rotating torque.

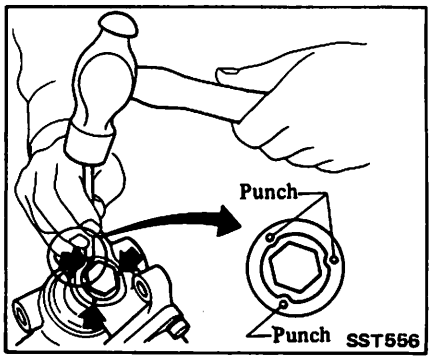
Refer to Retainer for assembly.

9. Apply grease to housing plug, coat its threads with sealant, and tighten plug.

Ⓣ : 49 - 69 N·m
(5 - 7 kg-m,
36 - 51 ft-lb)

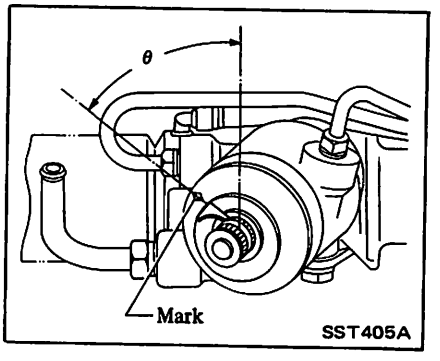


10. Stake housing plug at three places with a punch.



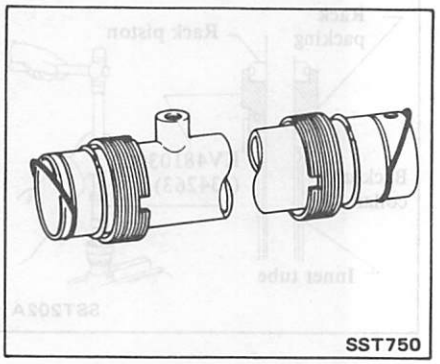
11. Set rear cover cap at neutral position.

Rear cover set angle "θ":
–39° - –29°



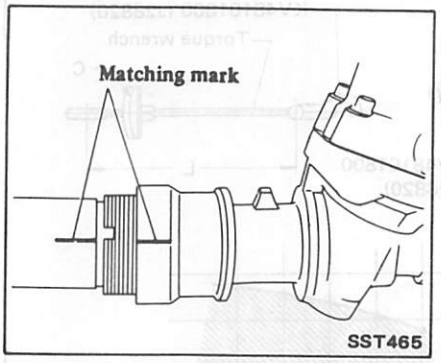
Rack bush assembly (Cylinder end housing)

1. Apply a coat of automatic transmission fluid to new O-ring before installing it on cylinder.

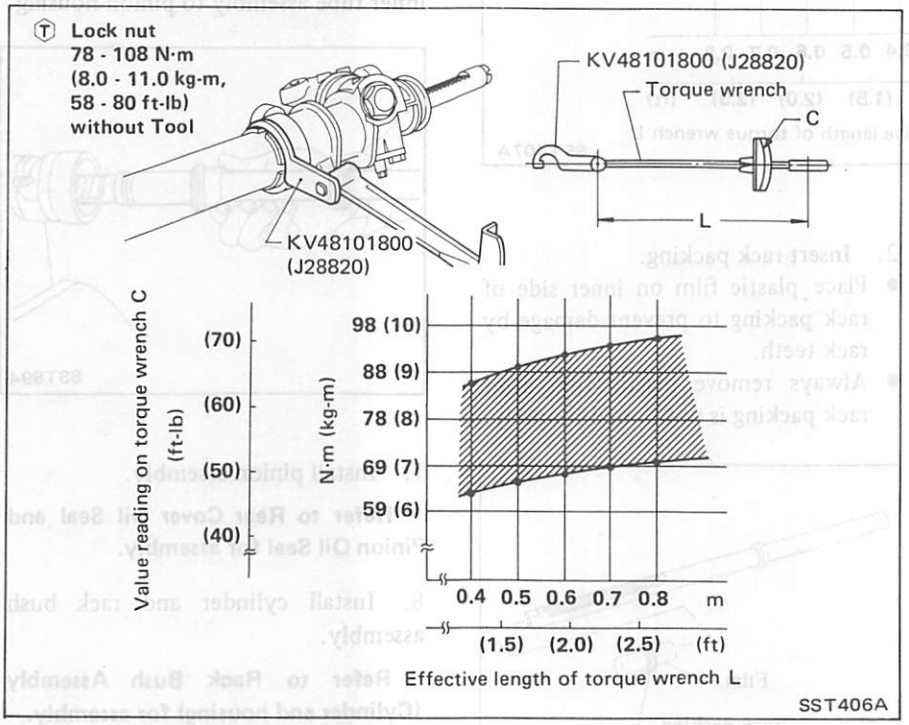


2. Position cylinder on pinion housing by aligning matching marks.

Be careful not to damage piston teflon ring.

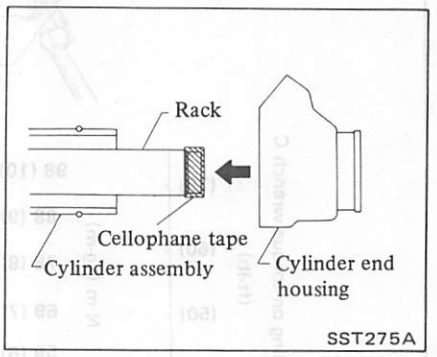


3. Tighten cylinder lock nut using Tool.

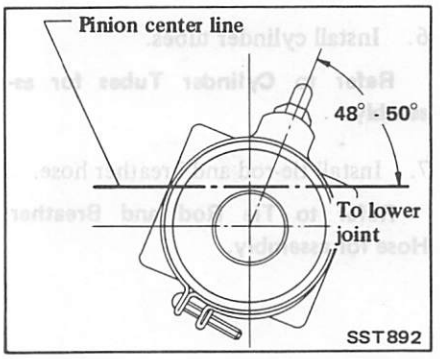


4. Wrap cellophane tape around rack end. Then place a new rack bush assembly and back-up washer onto rack end. Next align cylinder end housing at matching marks.

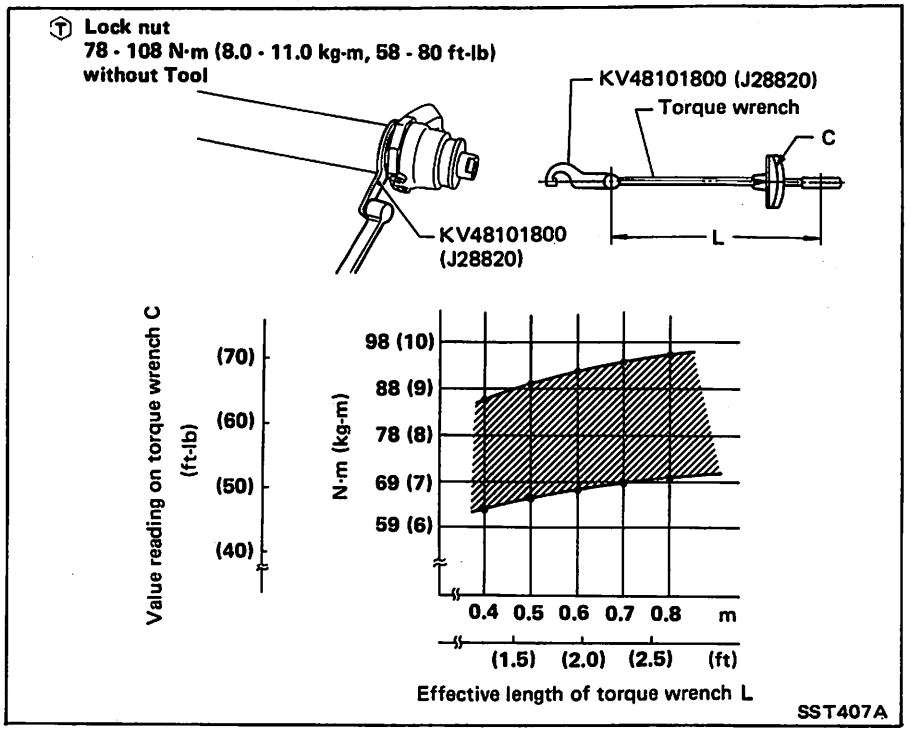
Apply a coat of grease to rack.



If matching marks are not present, position cylinder end housing as follows:



5. Tighten cylinder end housing using Tool.



6. Install cylinder tubes.

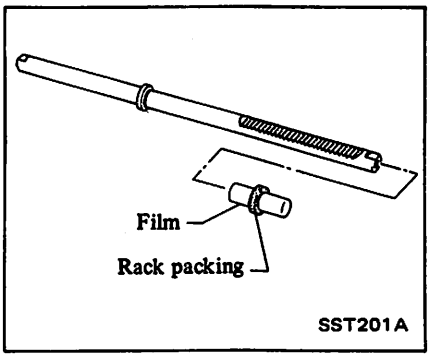
Refer to Cylinder Tubes for assembly.

7. Install tie-rod and breather hose.

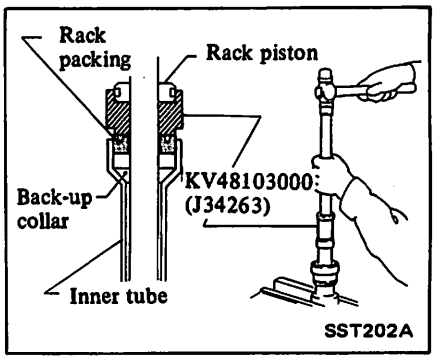
Refer to Tie Rod and Breather Hose for assembly.

Rack packing (Inner tube)

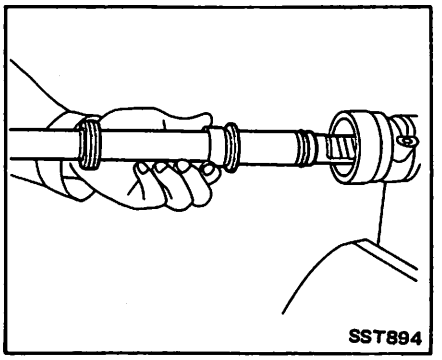
1. Apply a coat of automatic transmission fluid to new O-ring when installing it to pinion housing.
2. Insert rack packing.
- Place plastic film on inner side of rack packing to prevent damage by rack teeth.
- Always remove plastic film after rack packing is positioned properly.



3. Attach back-up collar to inner tube.
4. Insert inner tube assembly.
5. Press rack packing into inner tube, using a suitable tool.



6. Insert rack assembly, and then set inner tube assembly to pinion housing.



7. Install pinion assembly.

Refer to Rear Cover Oil Seal and Pinion Oil Seal for assembly.

8. Install cylinder and rack bush assembly.

Refer to Rack Bush Assembly (Cylinder end housing) for assembly.

9. Install retainer and adjust pinion rotating torque.

Refer to Retainer for assembly.

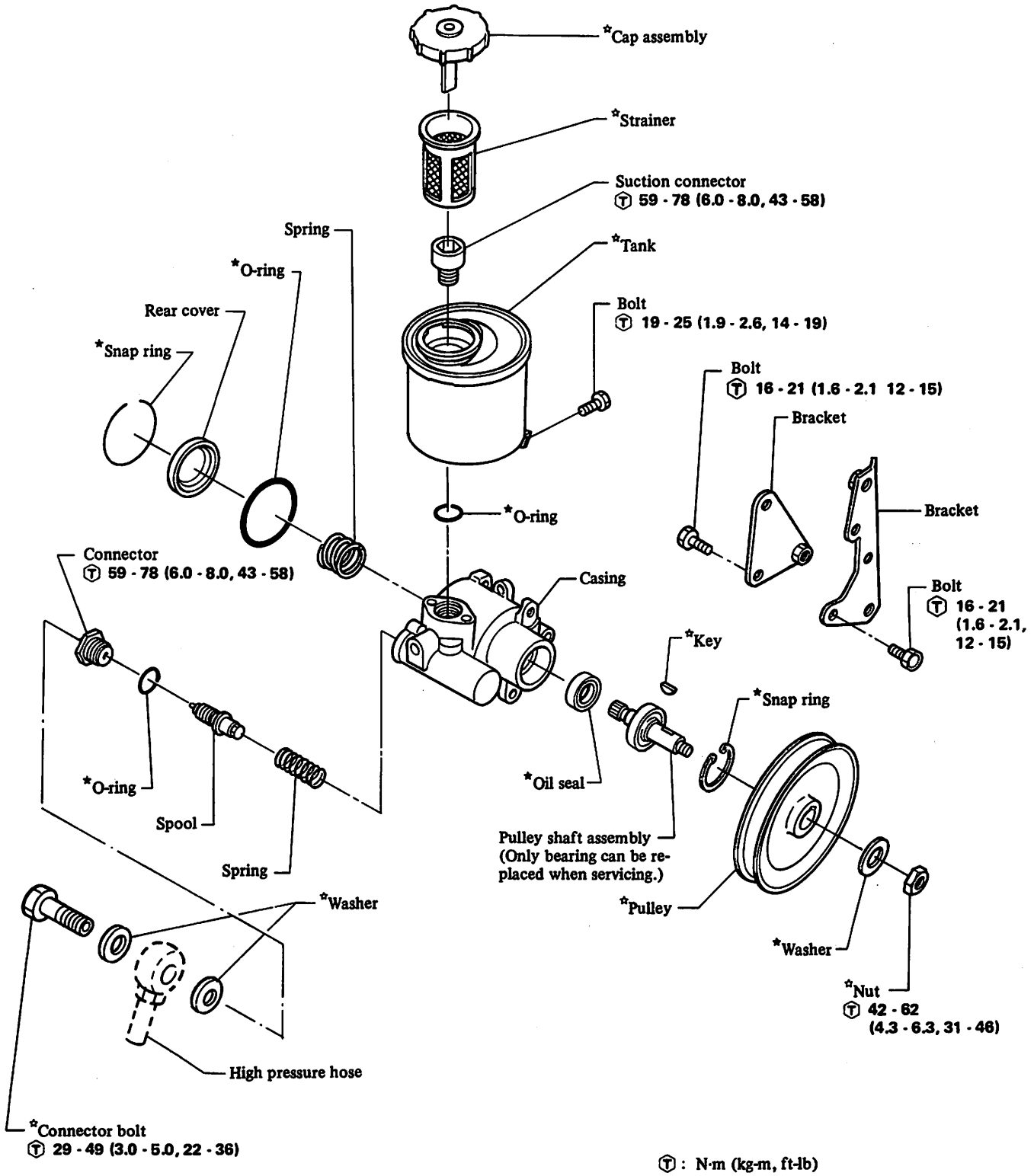
10. Install cylinder tubes.

Refer to cylinder Tubes for assembly.

11. Install tie-rod and breather hose.

Refer to Tie-Rod and Breather Hose for assembly.

POWER STEERING OIL PUMP

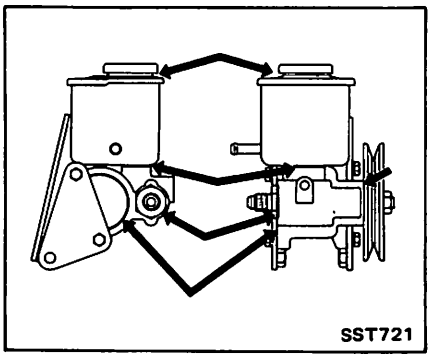


Ⓣ : N·m (kg-m, ft-lb)
★ or ☆: are available for service replacement.
★: always replace when disassembled.

SST003A

The power steering oil pump should be disassembled only, if any of the following phenomena are noted.

- **Oil leak at the following points**



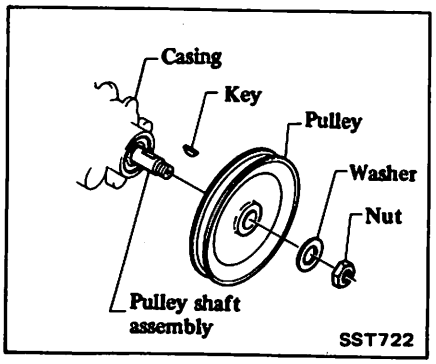
- **Deformed or damaged pulley**
- **Deformed or damaged cap assembly or strainer**

CAUTION:
This power steering oil pump is a precision hydraulic unit. Extreme care should be taken to prevent entry of dust, dirt, metal chips, etc. into oil pump during disassembly.

DISASSEMBLY

Pulley

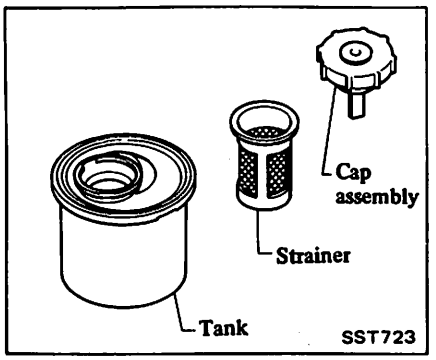
Remove pulley.



Do not reuse washer once it has been removed.

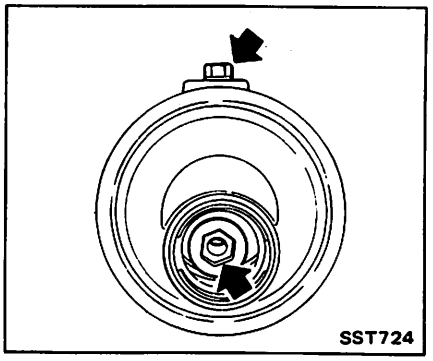
Cap assembly and strainer

Remove cap assembly.

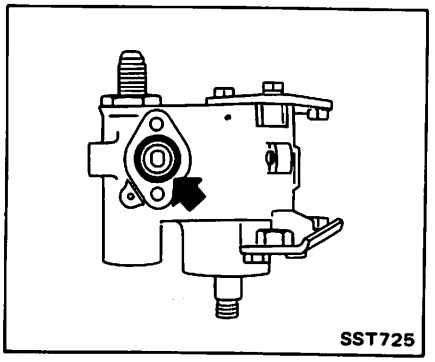


Tank O-ring

1. Remove tank.



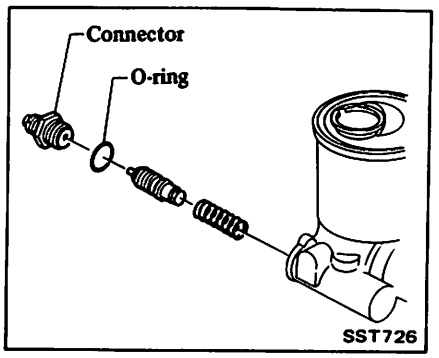
2. Remove O-ring.



Do not reuse O-ring once it has been removed.

Connector

Remove connector, then remove O-ring.



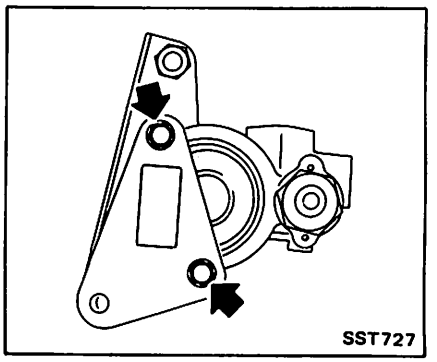
Do not reuse O-ring once it has been removed.

Rear cover O-ring

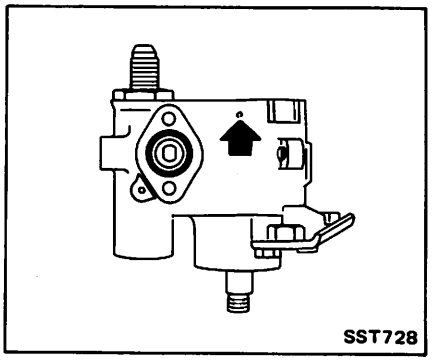
1. Remove tank.

Refer to "Tank O-ring" for disassembly.

2. Remove bracket.

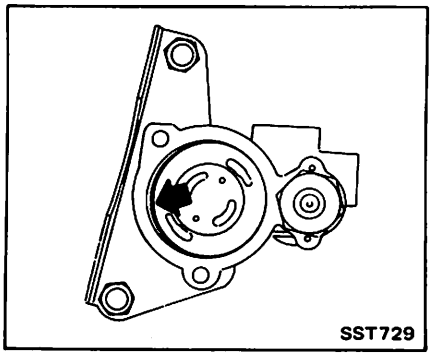


3. Remove snap ring.



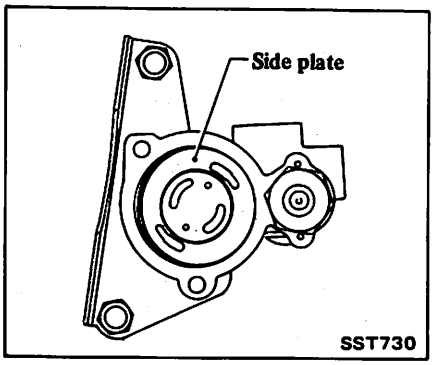
Do not reuse snap ring once it has been removed.

4. Remove rear cover and spring.
5. Remove O-ring.



Do not reuse O-ring once it has been removed.

CAUTION:
Do not face rear cover side of housing downwards, nor jar the housing; otherwise, the side plate, etc. may fall. If dropped, do not attempt to reassemble them; replace oil pump assembly.

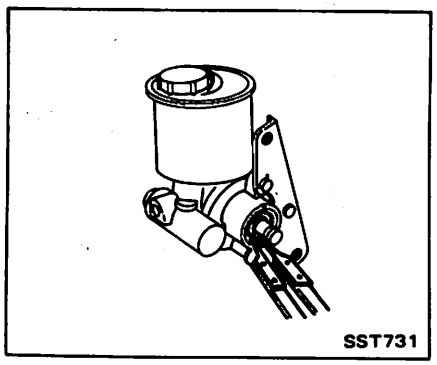


Pulley shaft oil seal

1. Remove pulley.

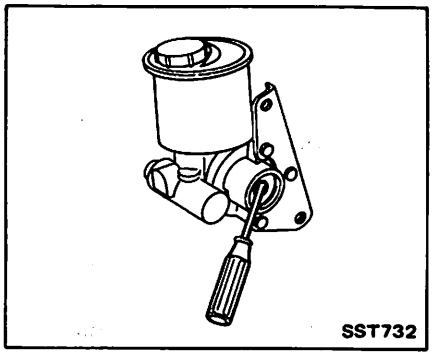
Refer to "Pulley" for disassembly.

2. Remove snap ring, then remove pulley shaft assembly.



Do not reuse snap ring once it has been removed.

3. Remove oil seal.



Do not reuse oil seal once it has been removed.

INSPECTION

Wash clean all disassembled parts in suitable cleaning solvent.

Discard any oil seals and O-rings which have been removed.

Replace oil seal and O-ring, if sealing surface is deformed or cracked.

Pulley and pulley shaft

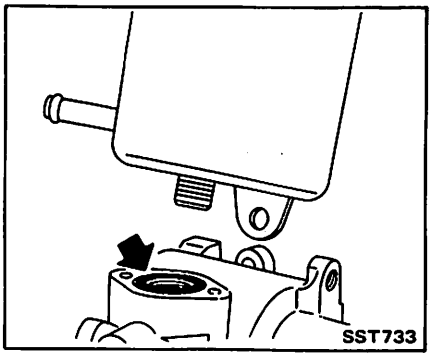
a. **If pulley is cracked or deformed, replace it.**
b. **If an oil leak is noticed around pulley shaft oil seal, replace it.**
c. **If key or pulley's key groove is deformed or worn, replace oil pump assembly.**

Cap assembly and strainer

a. **If cap assembly is deformed, damaged, or cracked, replace it.**
b. **If an oil leak is noticed, replace cap assembly. If cap contacting portion of tank is damaged or deformed, replace tank.**

Tank

a. **If tank is deformed or cracked, replace it.**
b. **If an oil leak is noticed, replace O-ring.**



Connector

a. **If connector is deformed or cracked, replace oil pump assembly.**
b. **If an oil leak is noticed, replace O-ring.**

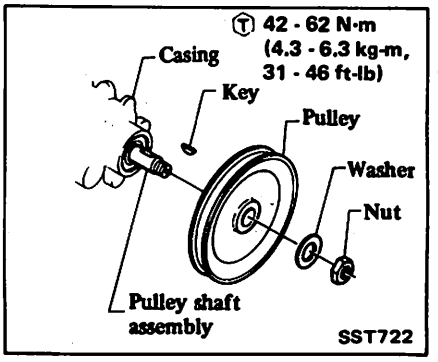
Rear cover

If an oil leak is noticed, replace O-ring.

CAUTION:
a. **When disassembling, reassembling or inspecting, use utmost care not to damage housing and rear cover contacting portion. If damaged accidentally, do not attempt to reassemble them; replace oil pump assembly.**
b. **When rear cover is removed, do not face housing downwards; or the side plate, etc. may fall. If dropped, do not attempt to reassemble them; replace oil pump assembly.**

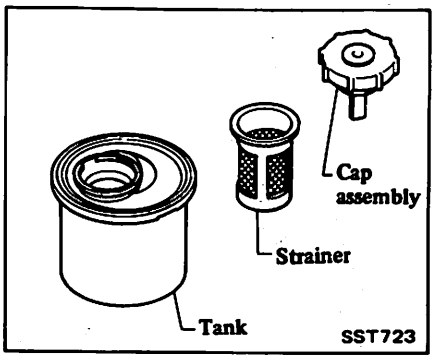
ASSEMBLY

Pulley



a. **Always use new washer.**
b. **After tightening nuts securely, be sure to bend washer.**

Cap assembly and strainer

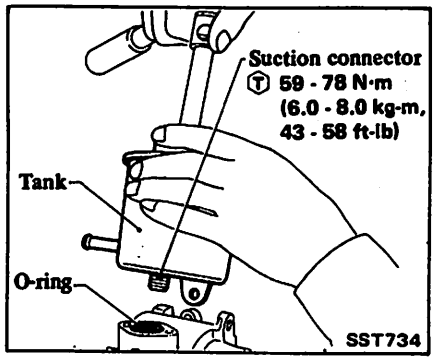


Tank O-ring

1. Install new O-ring.

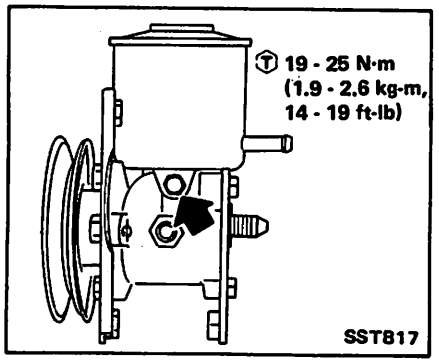
a. Before installing, apply a thin coat of vaseline to O-ring.
b. Make certain that O-ring is installed properly.

2. Install tank.



Use utmost care not to damage O-ring when installing suction connector.

3. Install bolt.

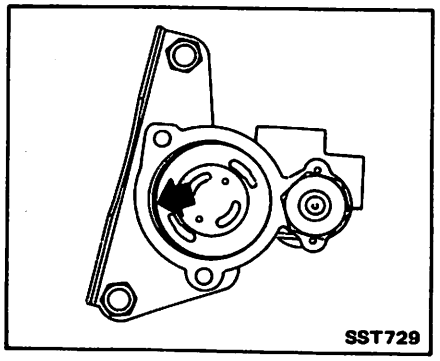


4. Install cap assembly.

Refer to "Cap assembly and strainer" for assembly.

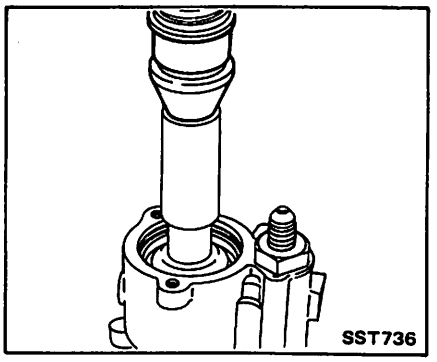
Rear cover O-ring

1. Install new O-ring.

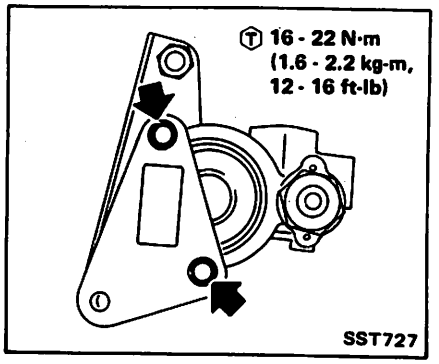


a. Before installing, apply a thin coat of vaseline to O-ring.
b. Make certain that O-ring is installed properly.

2. Install spring, and press rear cover with a hydraulic press so that snap ring can be installed.



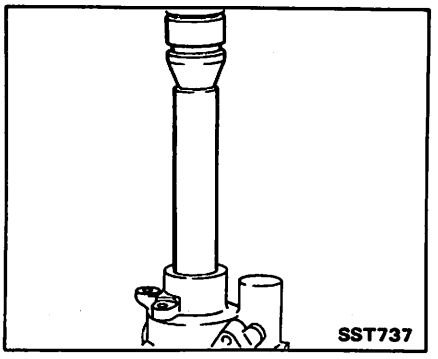
3. Install new snap ring.
4. Install bracket.



5. Assemble by referring to "Assembly of Tank O-ring".

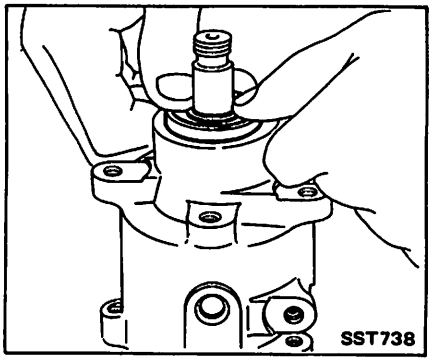
Pulley shaft oil seal

1. Using a suitable tool, install new oil seal.

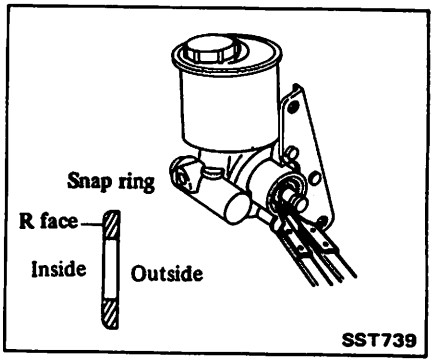


Before installing, apply a thin coat of vaseline to oil seal.

2. Securely install pulley shaft assembly by adjusting with screwdriver until rotor comes to the center position.



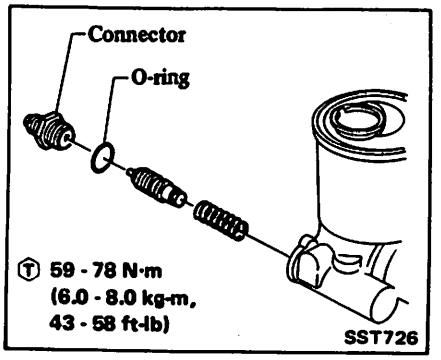
3. Install new snap ring.



4. Install pulley.

Refer to "Pulley" for assembly.

Connector

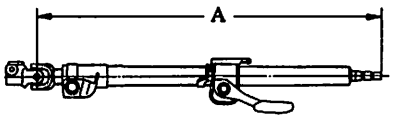


a. Before installing, apply a thin coat of vaseline to O-ring.
b. Make certain that O-ring is installed properly.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Steering gear type		[R22S Manual steering]	[PR22S Power steering]
Steering column		Collapsible column	
Steering column length "A" mm (in)		593.6 - 595.2 (23.37 - 23.43)	
Turns of steering wheel (Lock to lock)	M/T	3.9	3.3
	A/T	3.7	
Steering overall gear ratio		21.55	17.04



SST007A

INSPECTION AND ADJUSTMENT

GENERAL

Steering gear type	R22S	PR22S
Steering wheel axial play mm (in)	0 (0)	
Steering wheel play mm (in)	Less than 35 (1.38)	

STEERING GEAR AND LINKAGE

		R22S	PR22S
Engine		E16	E16
Tie-rod outer ball joint Swinging torque N·m (kg-cm, in-lb)		0.15 - 2.94 (1.5 - 30, 1.3 - 26.0)	0.15 - 2.94 (1.5 - 30, 1.3 - 26.0)
Tie-rod inner ball joint Swinging torque N·m (kg-cm, in-lb)		0.1 - 7.4 (1 - 75, 0.9 - 65.1)	0.1 - 7.4 (1 - 75, 0.9 - 65.1)
Tie-rod length mm (in)		175.9 (6.93)	175.9 (6.93)
Pinion gear rotating torque (Pinion gear and rack gear assembly) N·m (kg-cm, in-lb)		Less than 1.5 (15, 13)	Less than 1.9 (19, 16)
Rack force to pull (At neutral position) N (kg, lb)		–	Less than 245 (25, 55)
Steering wheel turning force N (kg, lb)		–	Less than 39.2 (4.0, 8.8)
Normal operating temperature at fluid °C (°F)		–	60 - 80 (140 - 176)
Fluid capacity ℓ (US qt, Imp qt)		–	Approximately 0.9 (1, 3/4)
Measure length "ℓ" mm (in) Pinion gear side	M/T	73.5 (2.894)	60.0 (2.362)
	A/T	70.0 (2.756)	
Opposite pinion gear side	M/T	73.5 (2.894)	73.5 (2.894)
	A/T	70.0 (2.756)	

TIGHTENING TORQUE

STEERING COLUMN

Unit	N·m	kg-m	ft-lb
Steering wheel nut	39 - 54	4.0 - 5.5	29 - 40
Lower joint to column	29 - 39	3.0 - 4.0	22 - 29
Lower joint to gear	29 - 39	3.0 - 4.0	22 - 29
Hole cover to dash panel	4 - 6	0.4 - 0.6	2.9 - 4.3
Lower bracket to pedal bracket	9 - 14	0.9 - 1.4	6.5 - 10.1
Steering column clamp or mounting bracket	9 - 14	0.9 - 1.4	6.5 - 10.1

STEERING GEAR AND LINKAGE

Model R22S

Unit	N·m	kg-m	ft-lb
Tie-rod to knuckle	29 - 49	3.0 - 5.0	22 - 36
Tie-rod lock nut	35 - 47	3.6 - 4.8	26 - 35
Tie-rod to gear	78 - 98	8.0 - 10.0	58 - 72
Gear housing clamp bolt	59 - 78	6.0 - 8.0	43 - 58
Retainer cover	39 - 59	4.0 - 6.0	29 - 43
Adjust screw lock nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Rear cover	20 - 29	2 - 3	14 - 22
Rear cover lock nut	49 - 69	5.0 - 7.0	36 - 51

Model PR22S

Unit	N·m	kg-m	ft-lb
Gear and linkage			
Tie-rod to knuckle	29 - 49	3.0 - 5.0	22 - 36
Tie-rod lock nut	35 - 47	3.6 - 4.8	26 - 35
Tie-rod to gear	78 - 98	8 - 10	58 - 72
Gear housing clamp bolt	59 - 78	6.0 - 8.0	43 - 58
Boot clamp securing bolt	0.3 - 0.5	0.03 - 0.05	0.2 - 0.4
Retainer cover fixing bolt	16 - 21	1.6 - 2.1	12 - 15
Adjust screw lock nut	10 - 15	1.0 - 1.5	7 - 11
Housing plug	49 - 69	5.0 - 7.0	36 - 51
Self lock nut	19 - 25	1.9 - 2.6	14 - 19
Cylinder tube flare nut	20 - 26	2.0 - 2.7	14 - 20
Cylinder lock nut	78 - 108	8 - 11	58 - 80
Low pressure connector at gear	27 - 39	2.8 - 4.0	20 - 29
Oil pump, tank and hoses			
High pressure hose to pump	29 - 49	3.0 - 5.0	22 - 36
High pressure to gear	15 - 25	1.5 - 2.5	11 - 18
Pump to bracket	19 - 25	1.9 - 2.6	14 - 19
Pump belt adjusting bracket fixing bolt	19 - 25	1.9 - 2.6	14 - 19
Pump bracket	16 - 21	1.6 - 2.1	12 - 15
Pulley lock nut	42 - 62	4.3 - 6.3	31 - 46
Connector	59 - 78	6.0 - 8.0	43 - 58
Suction connector	59 - 78	6.0 - 8.0	43 - 58

TROUBLE DIAGNOSES AND CORRECTIONS

Except for the following probable causes and corrective actions, refer to Trouble Diagnoses and Corrections in Front Axle and Front Suspension section.

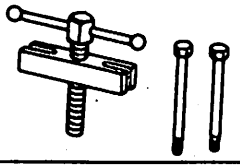
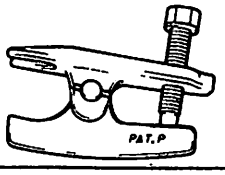
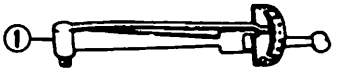
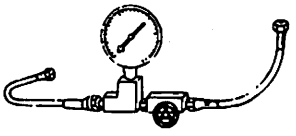
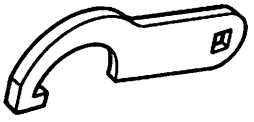
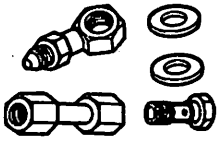
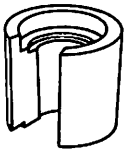
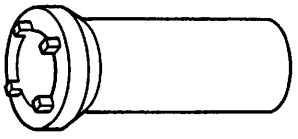
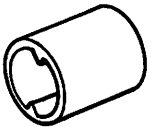
MANUAL STEERING

Condition	Probable cause	Corrective action
Excessive wheel play.	Insufficiently tightened or improperly installed steering gear housing.	Retighten.
	Damaged steering linkage or ball joint.	Replace faulty parts.
	Incorrect adjustment of steering gear.	Adjust.
Vibration, shock or shimmying of steering wheel.	Insufficiently tightened or improperly installed steering gear housing.	Retighten.
	Wear of steering linkage.	Replace faulty parts.
	Worn column bearing, weakened column bearing spring, or loose clamp.	Replace or retighten.
Car pulls to right or left.	Deformed steering linkage and/or suspension link.	Replace.
Stiff or heavy steering wheel.	Insufficient lubricants or mixing impurities in steering linkage or excessively worn steering linkage.	Replenish grease or replace the part.
	Worn or damaged steering gear and bearing.	Replace.
	Incorrectly adjusted steering gear.	Adjust.
	Deformed steering linkage.	Replace.
	Interference of steering column with turn signal switch.	Adjust.

POWER STEERING

Condition	Probable cause	Corrective action
Fluid pressure does not build up.	Pump drive belt slipping on pulley.	Readjust belt tension.
	Pump malfunctioning.	Replace.
	Fluid leaking through hose connectors.	Replace or retighten.
	Fluid leaking through power steering gear.	Replace or retighten.
	Fluid leaking through power steering oil pump.	Replace.
Steering wheel moves heavily.	Lack of fluid in power steering pump.*	Refill.
	Air present in fluid.	Bleed air.
	Fluid pressure too low.	See "Hydraulic system check".
	Wheel alignment out of specifications or air pressure in tires too low.*	Re-align or inflate tires to correct pressure.
	Steering column out of alignment.*	Repair or replace.
	Worn or damaged ball joint at suspension and steering linkage.*	Replace.
Steering wheel fails to return.	Refer to items marked "*" above.	
	Front wheel caster improperly adjusted.	Readjust.
	Internal gears dragged or gouged.	Replace gear assembly.
Steering effort is not the same in both directions.	Fluid leakage in steering gear.	Replace sealing parts.
	Stuffy fluid passage in steering gear.	Replace gear assembly.
Unstable running.	Wheel bearing not properly adjusted.	Readjust.
	Stuck or damaged control valve in steering gear.	Replace gear assembly.
	Front wheel alignment not properly.	Readjust.
	Excessive steering gear play.	Readjust backlash or replace gear assembly.
	Play at suspension and linkage ball joint.	Replace.
Noisy pump.	Lack of fluid in power steering pump.	Refill.
	Hoses or filter clogged.	Clean or, if necessary, replace.
	Loose pulley.	Repair.
	Belt noisy or slapping.	Readjust belt tension.
	Broken pump part.	Replace.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	Unit application	
		R22S	PR22S
ST27180001 (J25726-A)	Steering wheel puller 	X	X
HT72520000 (J25730-A)	Ball joint remover 	X	X
ST3127S000 (See J25765-A) ① GG91030000 (J25765-A) ② HT62900000 (–) ③ HT62940000 (–)	Preload gauge Torque wrench  Socket adapter (Useless)  Socket adapter (Useless) 	X	X
ST27091000 (J26357)	Pressure gauge 	–	X
KV48101800 (J28820)	Cylinder lock nut wrench 	–	X
KV48102500 (–)	Pressure gauge adapter 	–	X
KV48103000 (J34263)	Oil seal drift 	–	X
KV48102000 (J28822)	End cover socket wrench 	X	–
KV48101100 (J26364)	Steering pinion adapter 	X	X

SECTION BF

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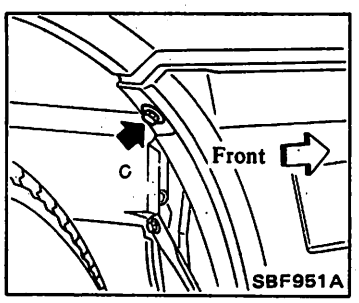
MIRROR BF-28
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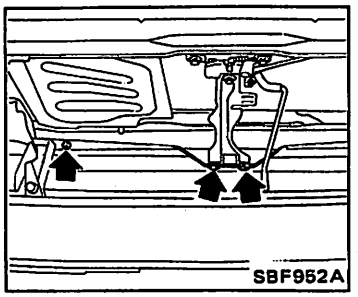
BODY ALIGNMENT BF-29
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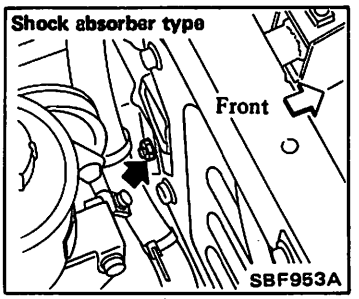
BODY FRONT END

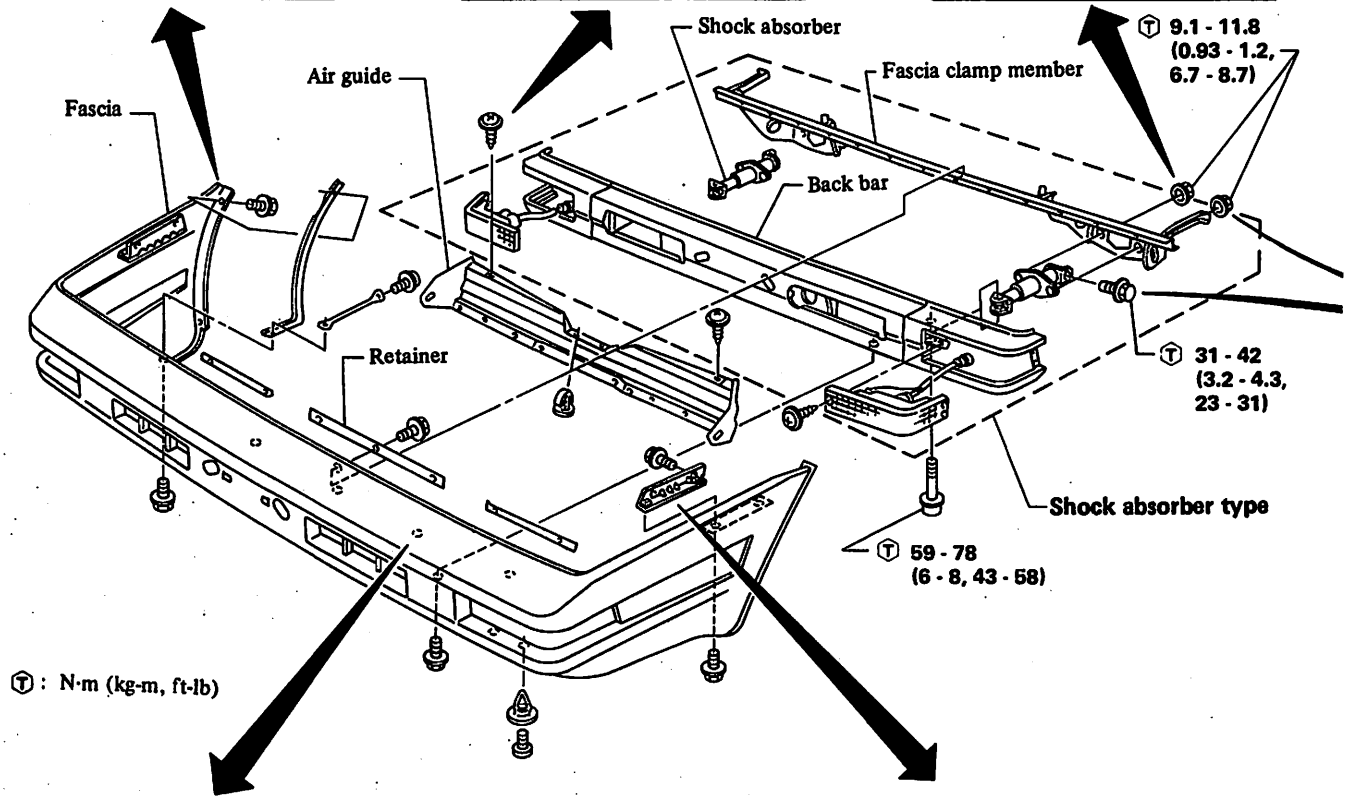
FRONT BUMPER (Coupe)

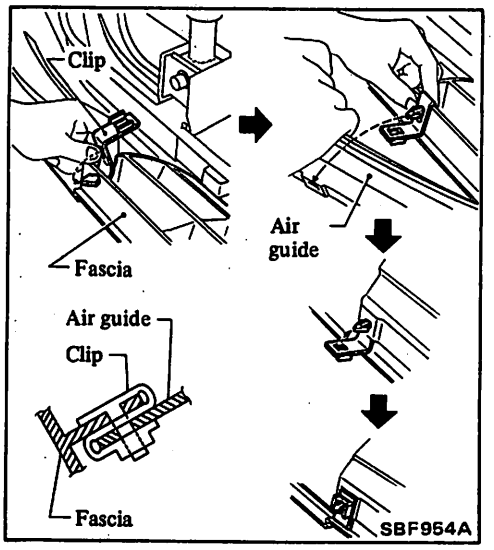
REMOVAL AND INSTALLATION

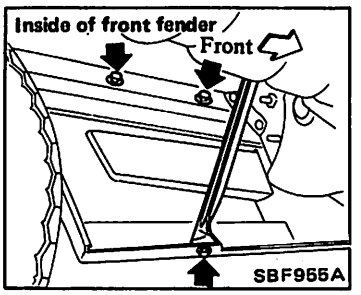




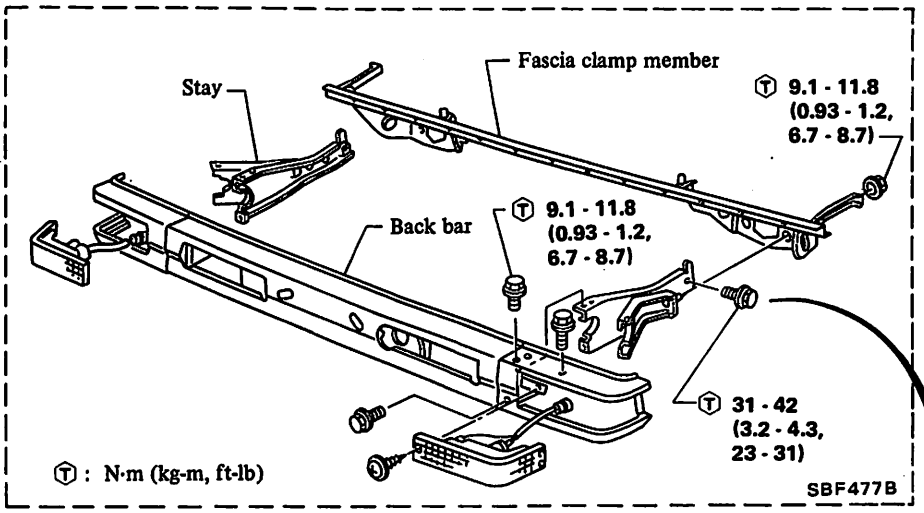




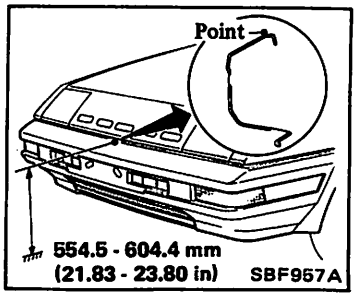


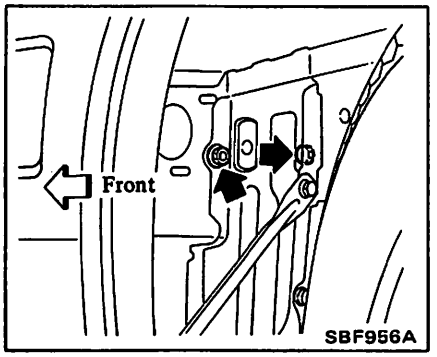


Stay type



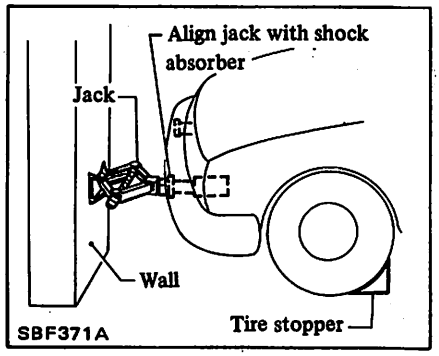
BUMPER HEIGHT





SHOCK ABSORBER

Shock absorber inspection



1. Check shock absorber for oil leakage, cracks or deformation.
2. Check function of shock absorber:

(1) Place vehicle in front of a wall. Apply parking brake and place tire stoppers securely.

(2) Place a jack between bumper and wall; jack should be positioned squarely with bumper directly in line with shock absorber to be checked.

(3) Apply pressure to compress shock absorber at least 10.0 mm (0.394 in).

Use a jack with capacity of more than 600 kg (1,323 lb).

(4) Make sure bumper returns to its original position when jack is retracted. Replace shock absorber if necessary.

CAUTION:

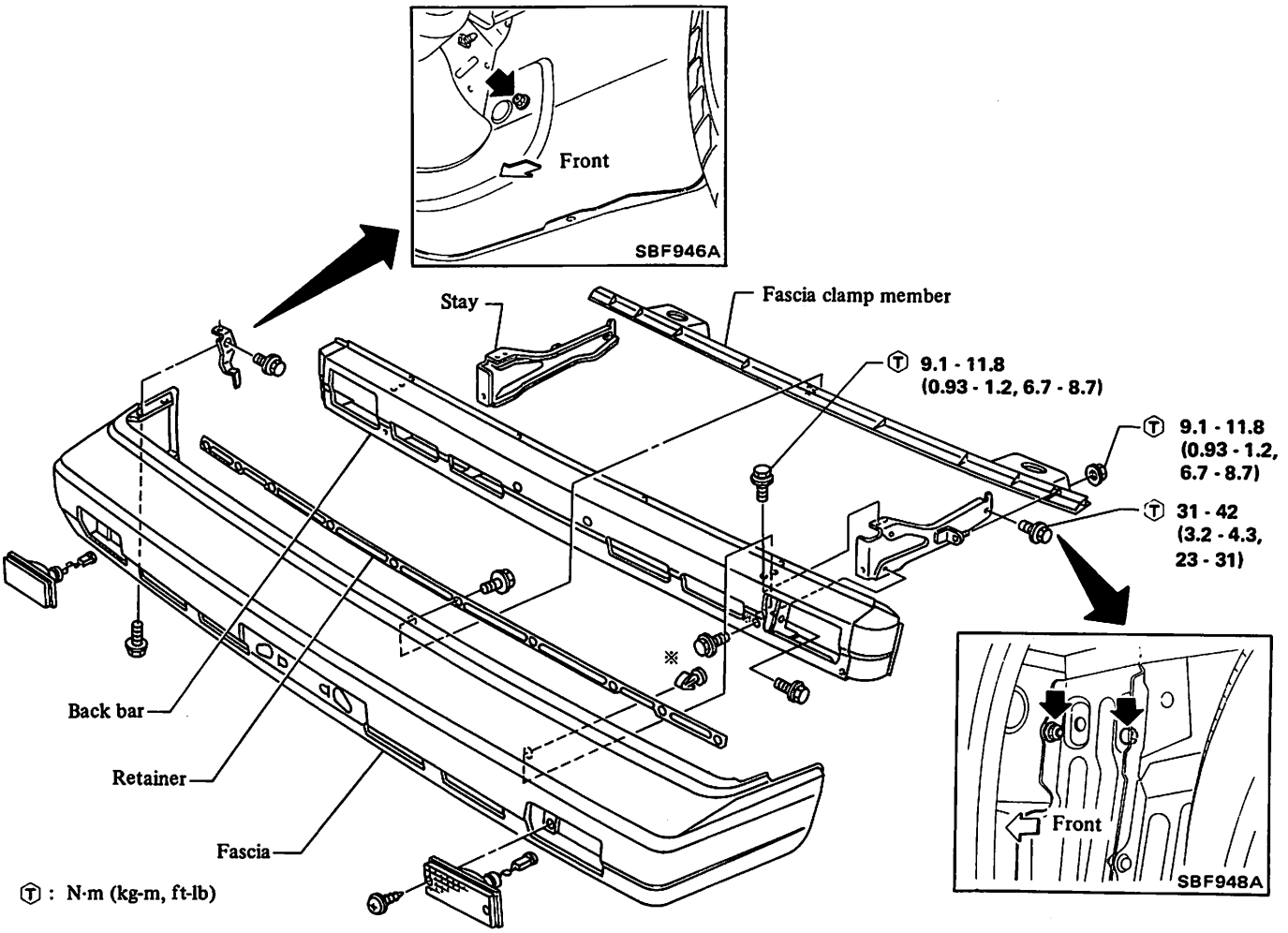
It is not recommended to confirm proper operation by driving into walls or other barriers as this could cause personal injury or damage to the vehicle.

When replacing shock absorbers, make sure they are of the same type and rating, and manufactured by the same maker.

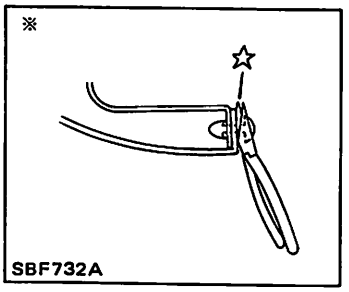
SBF476B

FRONT BUMPER (Sedan)

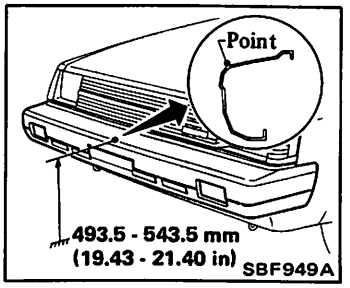
REMOVAL AND INSTALLATION



DISASSEMBLY



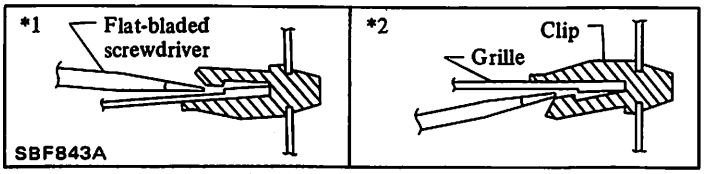
BUMPER HEIGHT



SBF478B

FRONT FENDER

REMOVAL AND INSTALLATION

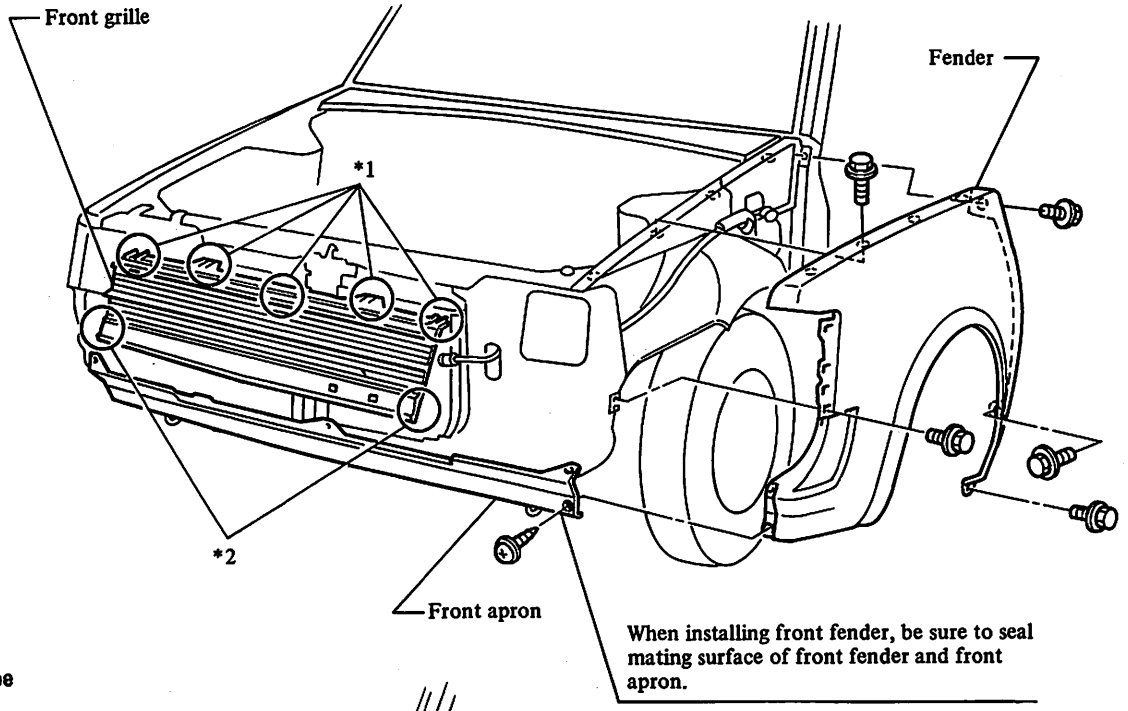


CAUTION:

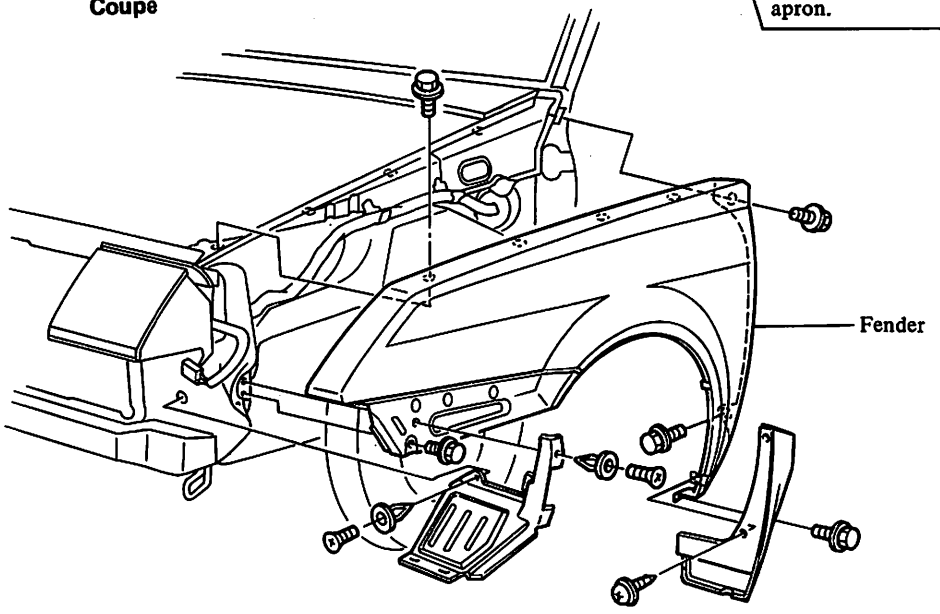
a. Grille is made of plastic, so do not use excessive force.

b. Take care to keep oil away from grille.

Sedan



Coupe

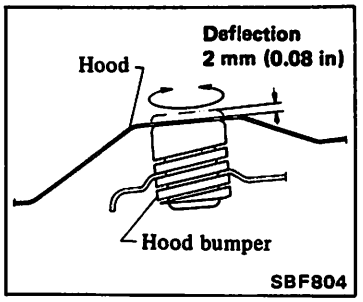


SBF479B

HOOD

REMOVAL AND INSTALLATION

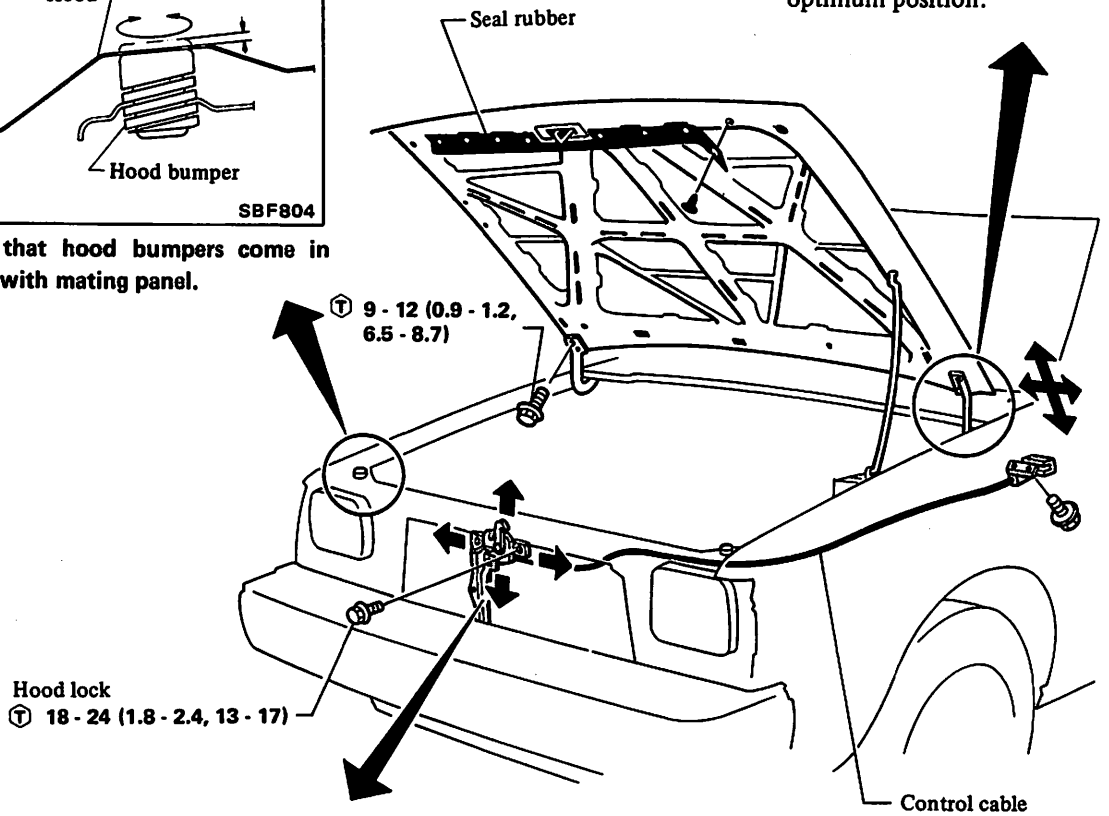
When removing and installing hood, place a cloth or other padding on hood corners to avoid scratching vehicle body.

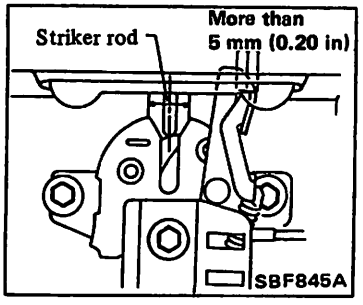


Ensure that hood bumpers come in contact with mating panel.

ADJUSTMENT

Loosen bolts attaching hood hinge, and move hood forward or backward and side to side until it is set in optimum position.





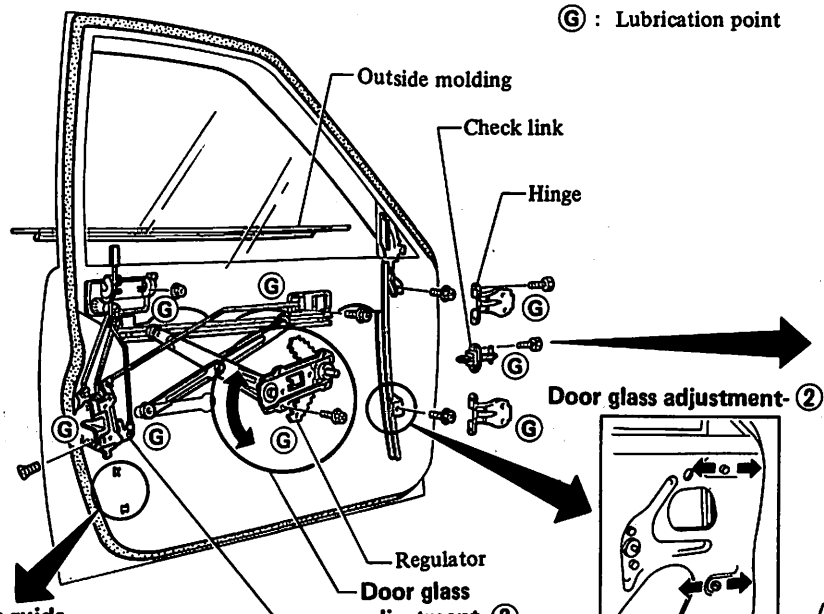
- **When installing hood lock, ensure that striker rod is positioned in the center of lock slit. Then, temporarily tighten the lock.**
- **With the lock temporarily tightened, properly adjust hood height and securely tighten the lock.**
- **Ensure that safety catch engages at least 5 mm (0.20 in) with mating part.**
- **Check hood lock control operation. Apply a coat of grease to hood lock's engaging mechanism.**
- **Do not attempt to bend cable forcibly. Doing so increases effort required to unlock hood.**

SBF959A

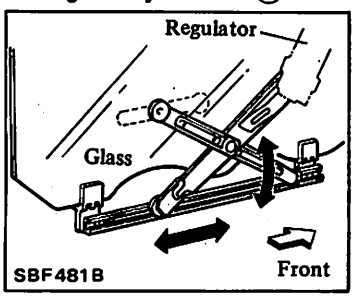
DOOR

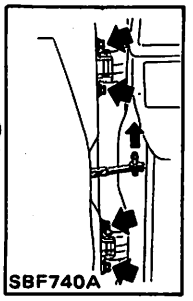
FRONT DOOR

REMOVAL AND INSTALLATION

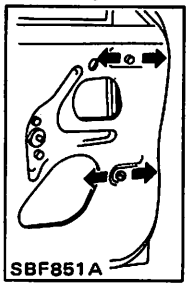


Door glass adjustment-①

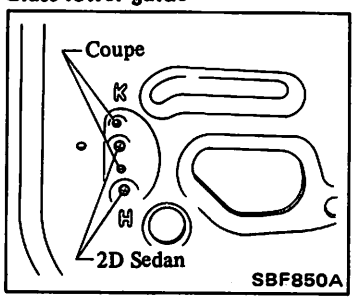


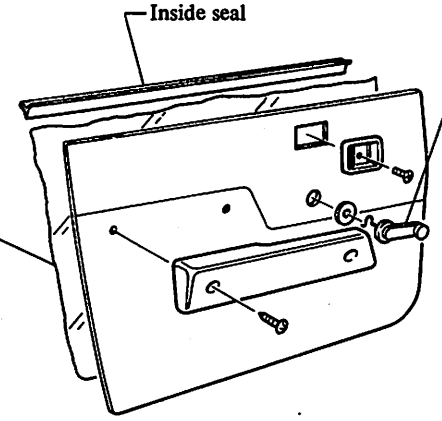


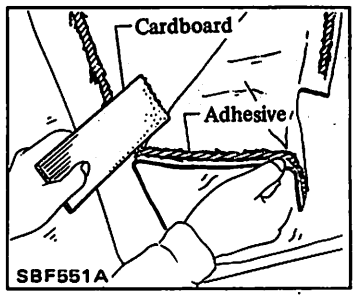
Door glass adjustment-②



Glass lower guide

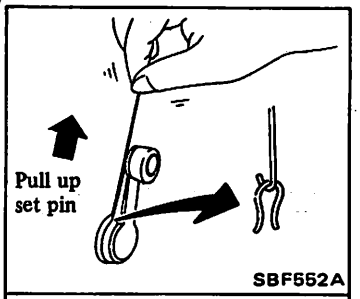




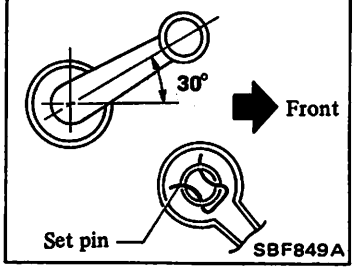


When removing sealing screen, be careful not to allow it to come in contact with adjacent parts.

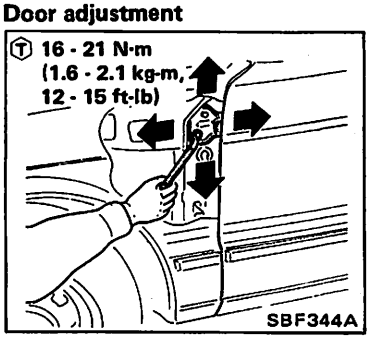
Regulator handle



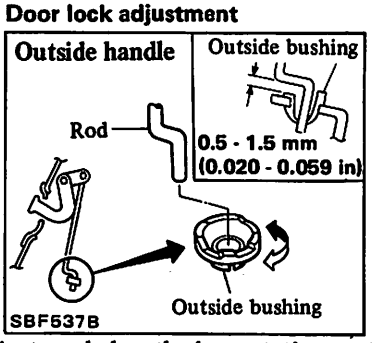
Install regulator handle as shown below, using set pins. Door should be closed.

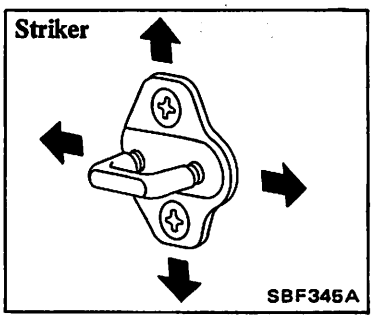


Door adjustment



Door lock adjustment





Adjust rod length by rotating outside bushing.

SBF480B

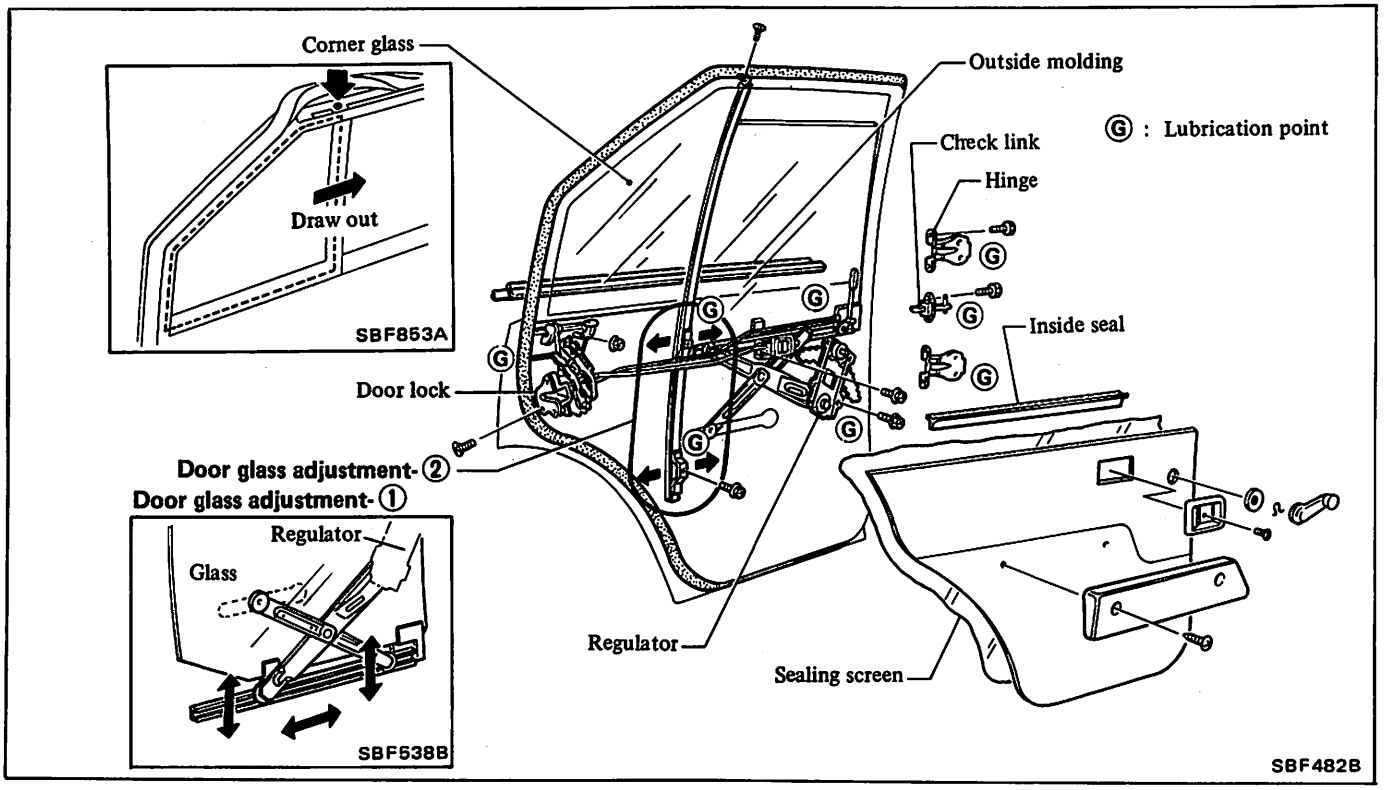
REAR DOOR

REMOVAL AND INSTALLATION

Removal and installation procedures are basically the same as those for front door.

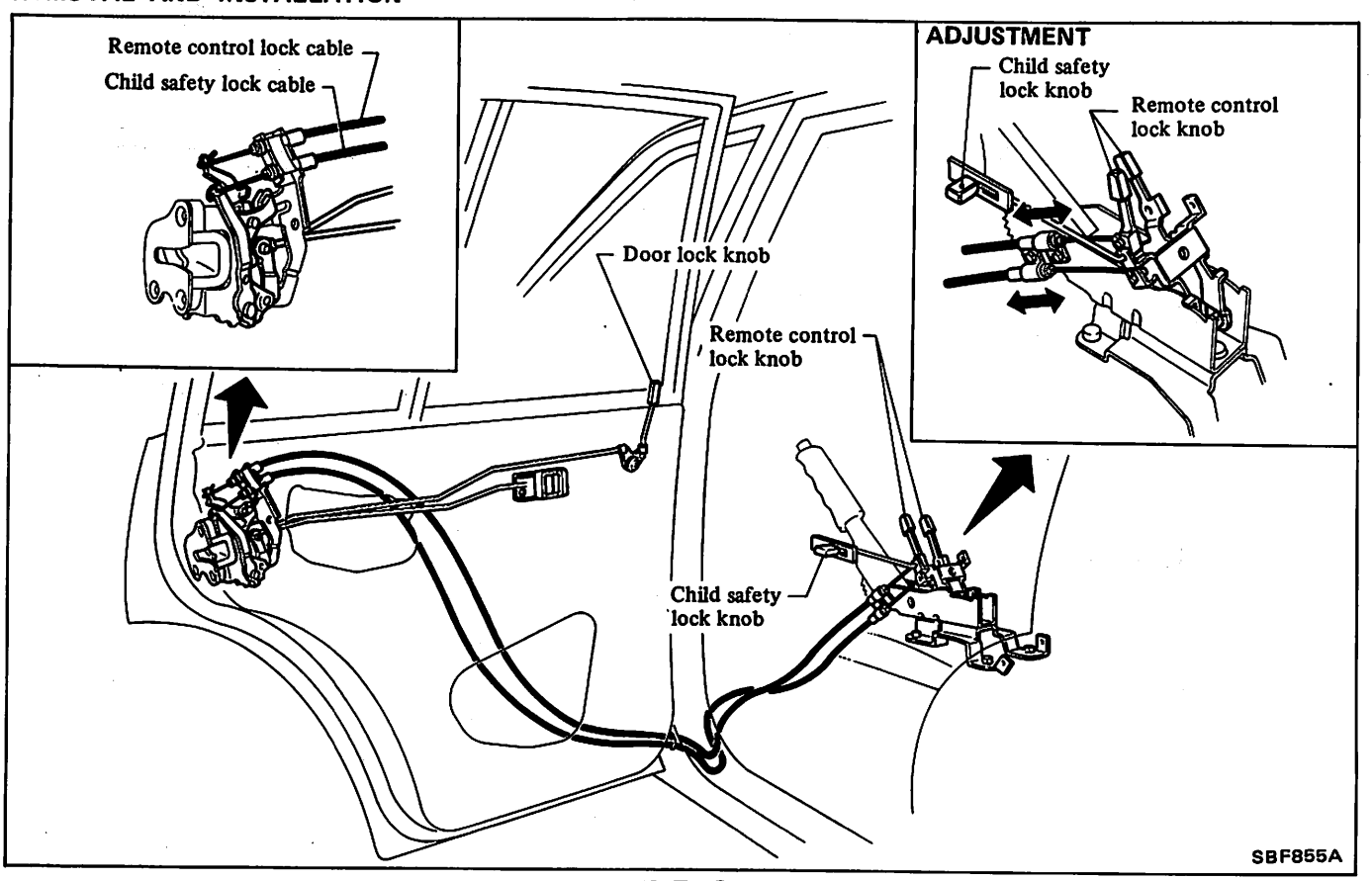
ADJUSTMENT

Adjustment procedures (for door, door lock) are basically the same as those for front door.



REAR DOOR REMOTE CONTROL LOCK AND CHILD SAFETY LOCK

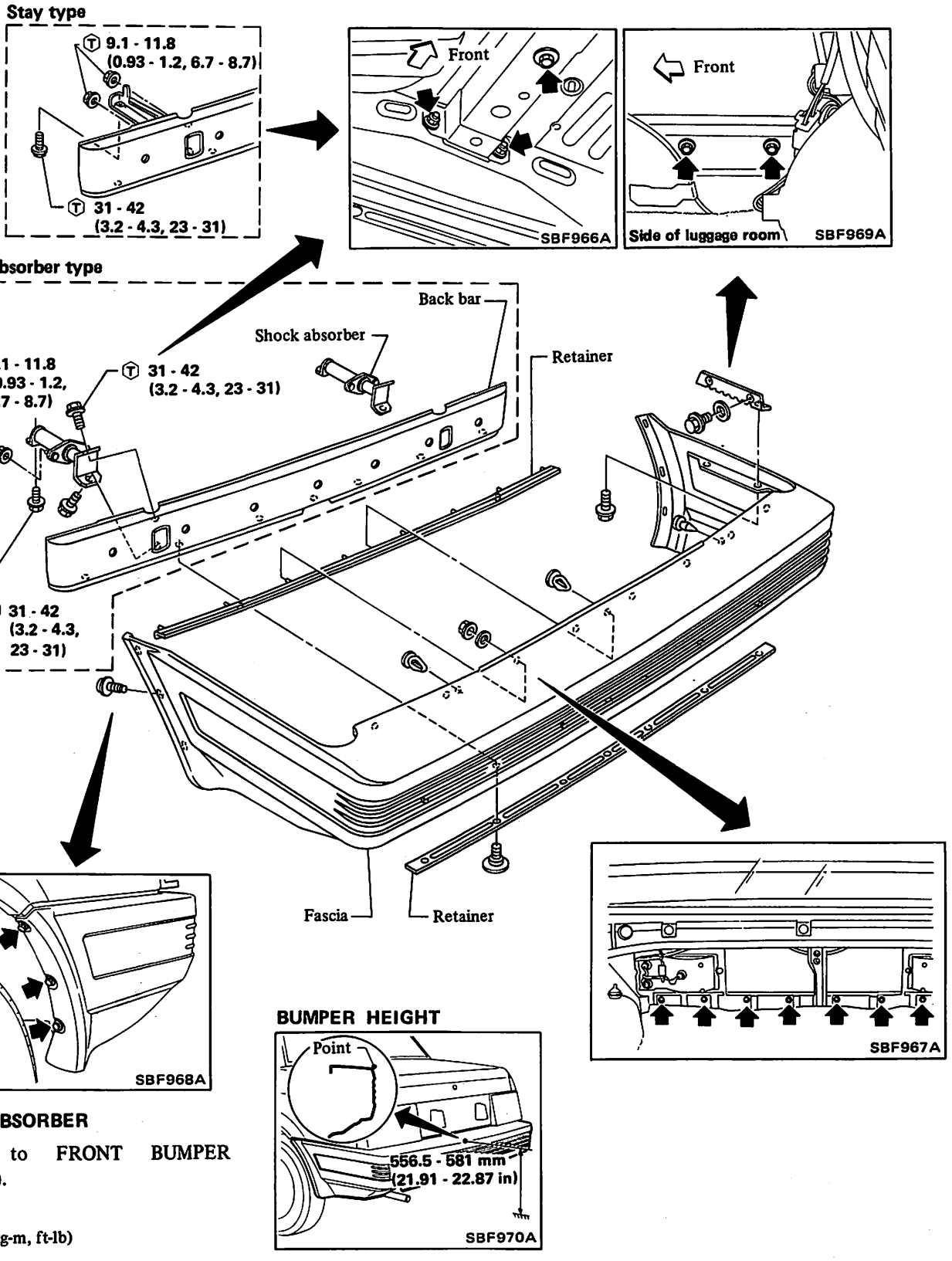
REMOVAL AND INSTALLATION



BODY REAR END

REAR BUMPER (Coupe)

REMOVAL AND INSTALLATION



BUMPER HEIGHT

SHOCK ABSORBER

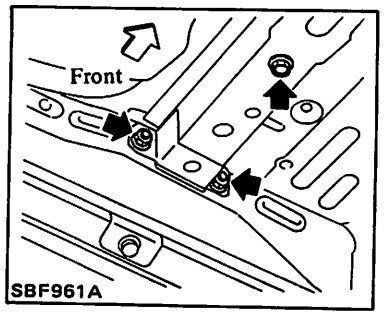
- Refer to FRONT BUMPER (Coupe).

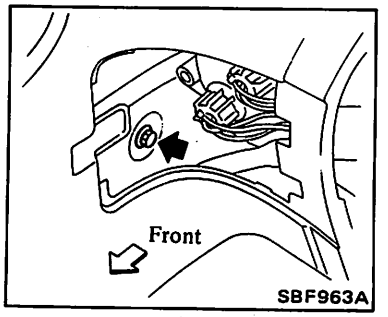
Ⓣ : N·m (kg-m, ft-lb)

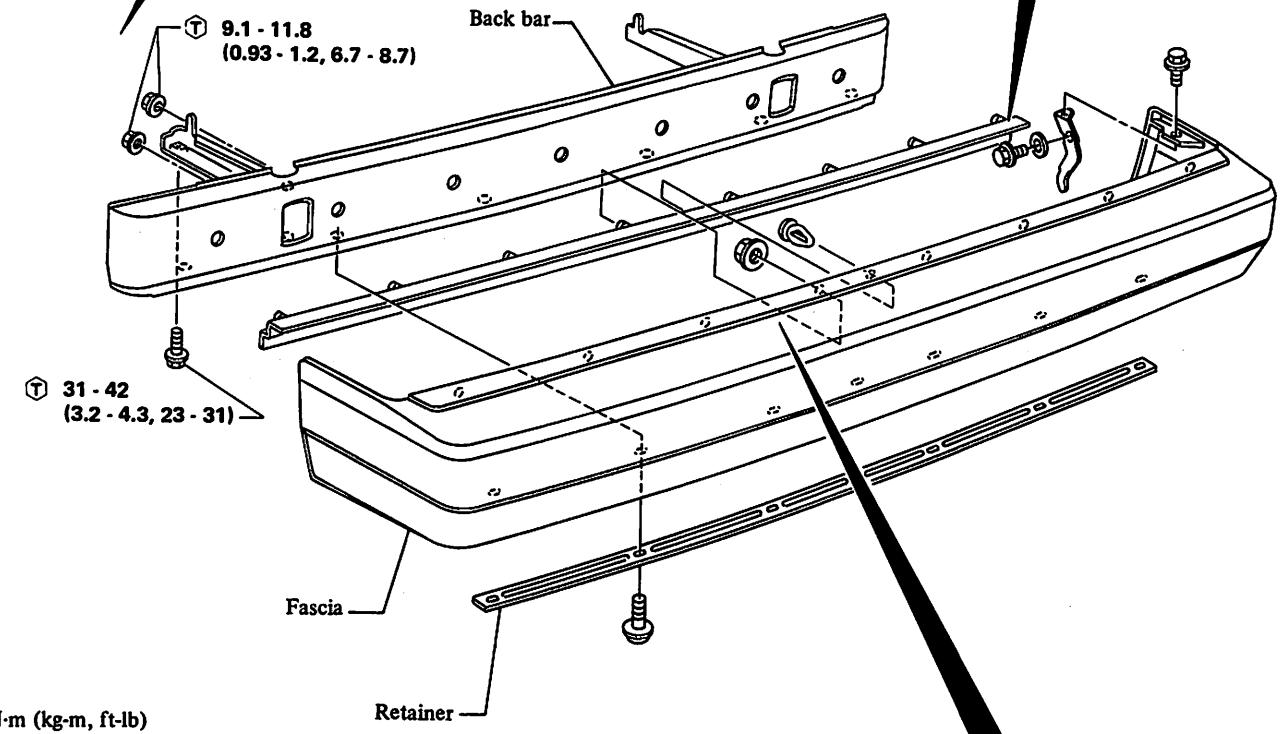
SBF483B

REAR BUMPER (Sedan)

REMOVAL AND INSTALLATION

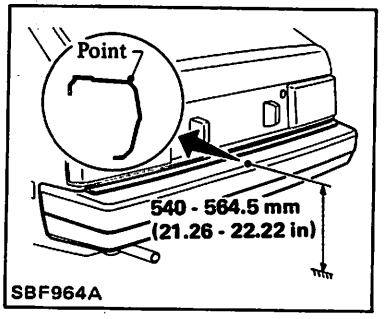


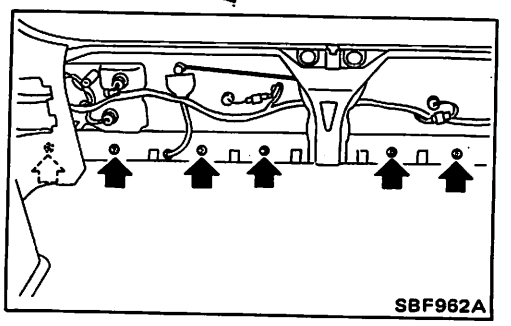




Ⓣ : N·m (kg-m, ft-lb)

BUMPER HEIGHT





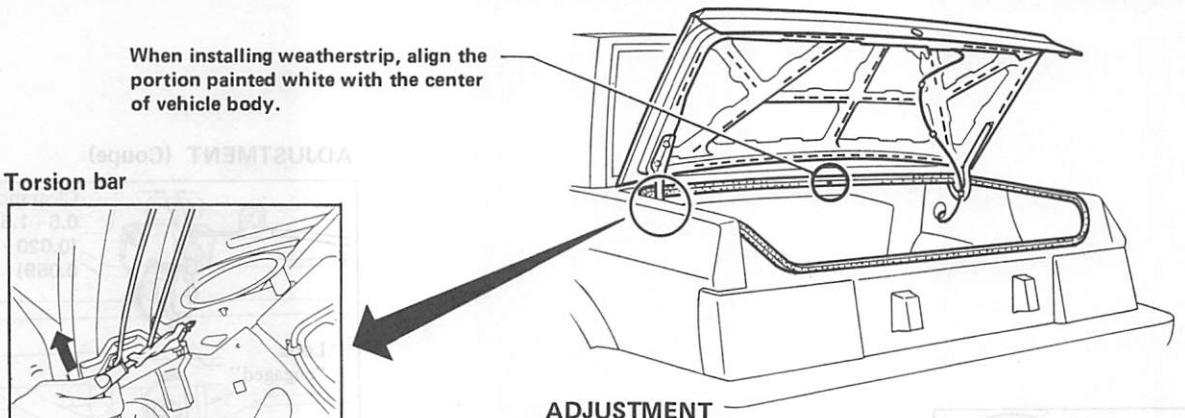
SBF484B

TRUNK LID

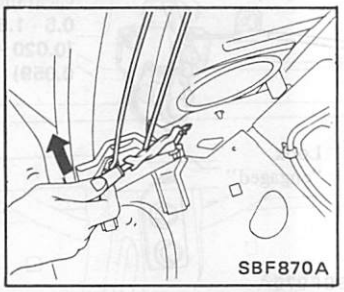
REMOVAL AND INSTALLATION

When removing and installing trunk lid, place a cloth or other padding on trunk lid corners to avoid scratching vehicle body.

When installing weatherstrip, align the portion painted white with the center of vehicle body.



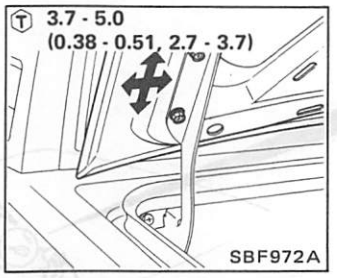
Torsion bar



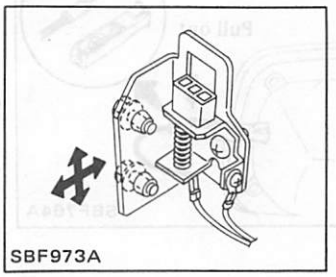
WARNING:
When removing torsion bar, carefully release its reaction force.

ADJUSTMENT

Hinge



Striker



T : N·m (kg-m, ft-lb)

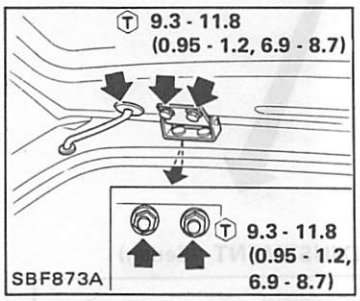
SBF971A

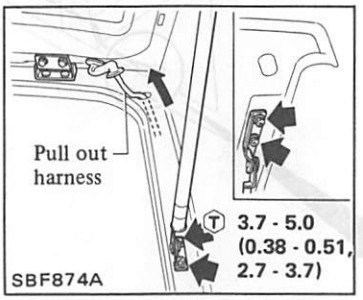
BACK DOOR

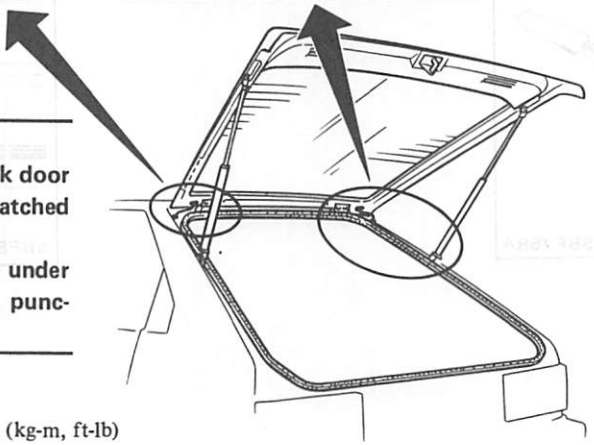
REMOVAL AND INSTALLATION

When removing and installing back door, place a cloth or other padding on back door corners to avoid scratching vehicle body.

CAUTION:
Support the weight of back door when removing it.

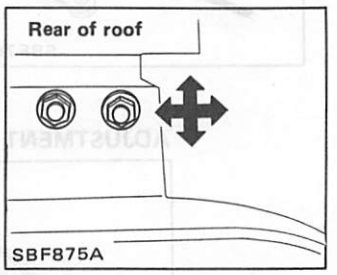




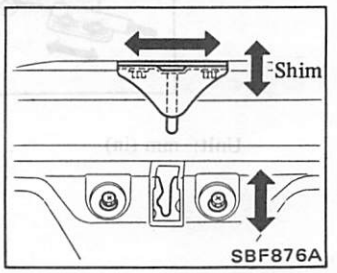


ADJUSTMENT

Hinge



Back door lock and striker



WARNING:

a. **Be careful not to scratch back door stay when installing. A scratched stay may cause gas leakage.**
b. **Back door stay contents are under pressure. Do not take apart, puncture, apply heat or fire.**

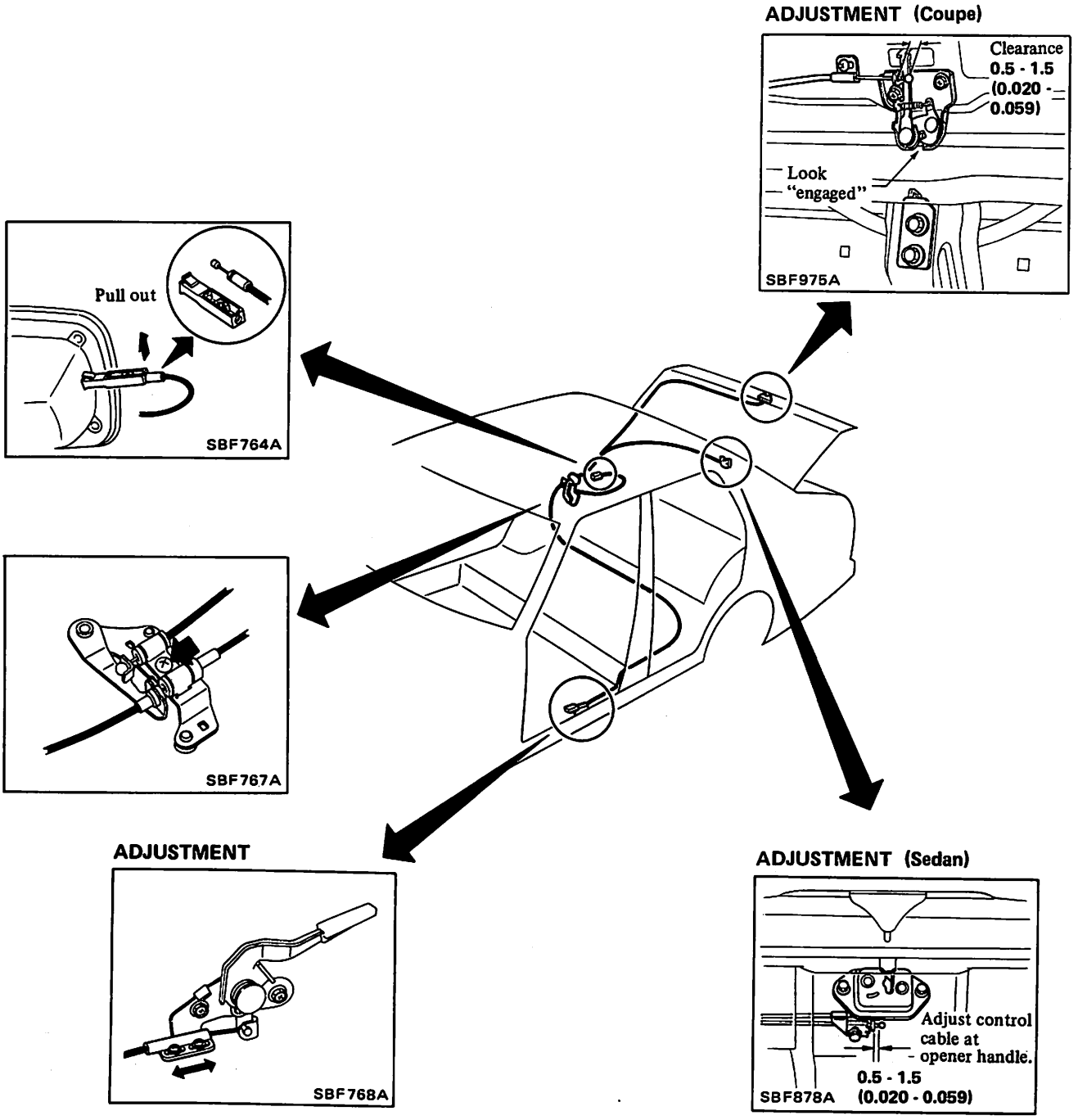
SBF872A

T : N·m (kg-m, ft-lb)

TRUNK LID/BACK DOOR OPENER AND FUEL FILLER LID OPENER

REMOVAL AND INSTALLATION

- **Install cable without bending it forcibly.**
- **After installation, make sure that trunk lid, back door and fuel filler lid open smoothly.**



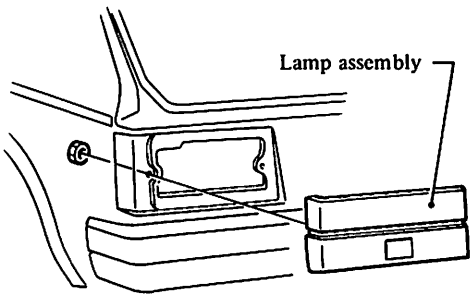
Unit: mm (in)

SBF974A

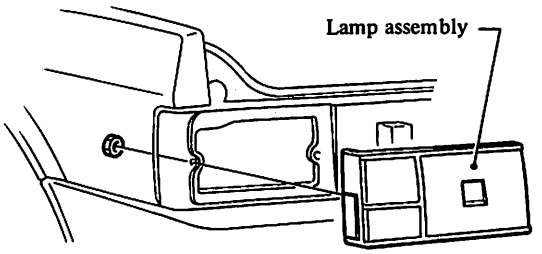
REAR COMBINATION LAMP

REMOVAL AND INSTALLATION

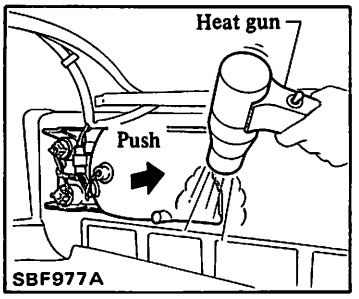
Sedan



Coupe

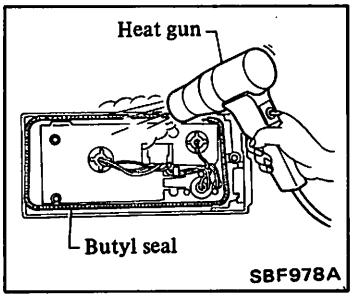


Removal



- **Warm up lamp assembly area to a temperature of a little below 60°C (140°F).**

Installation



- **Warm up lamp assembly area to a temperature of a little below 60°C (140°F).**
- **Apply butyl seal evenly as it tends to become thin in the corners.**

SBF976A

WINDSHIELD AND WINDOWS

WINDSHIELD

REMOVAL AND INSTALLATION

A pre-mixed, one-part sealant to cement windshield glass to windshield opening is available.

After using this sealant, it is highly recommended that the vehicle should remain stationary for about 24 hours so that the sealant can cure well.

CAUTION:

a. Use Genuine Nissan Sealant Kit "72891 U7425" or equivalent. Sealant kit consists of Primer-A, Primer-E, dam, caution label and sealant which is made from silicone. When using this kit, proceed to operations described in removal and installation.

b. It is not recommended to use the sealant more than 12 months after the production date. Production date is shown on the cartridge.

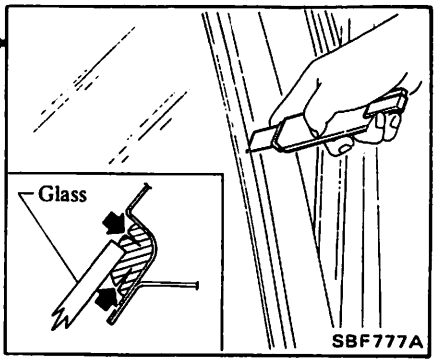
c. Open cartridge only at the time of use.

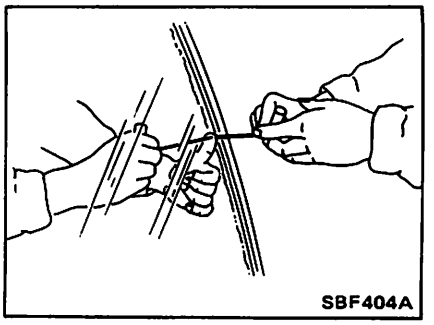
d. Keep Primers and sealant in a cool, dry place. Ideally, sealant should be stored in a refrigerator.

WARNING:
Keep heat or open flames away as Primers are flammable.

Remove moldings. → For molding removal and installation procedures, refer to "Trim and Molding".

Remove glass.

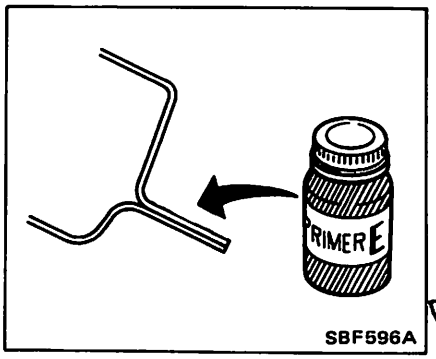




CAUTION:
Be careful not to scratch glass when removing.

Body side:

Remove old sealant, and clean bonding surface thoroughly with non-leaded gasoline.



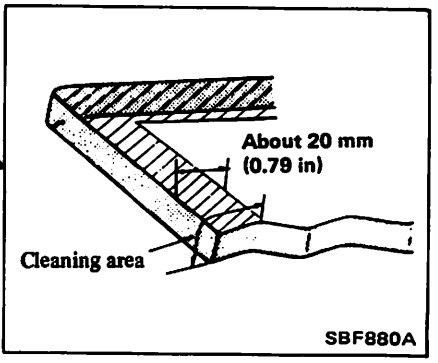
Apply Primer E.

CAUTION:
Allow Primers to dry for 10 to 15 minutes before proceeding to the next step.

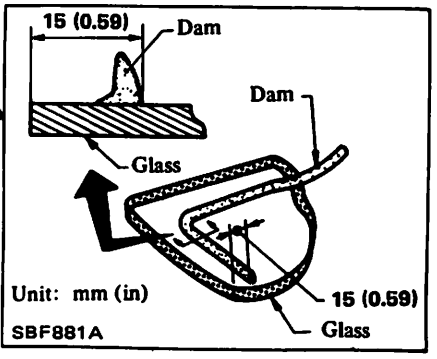
Ⓐ

Glass side:

Clean bonding surface thoroughly with non-leaded gasoline.



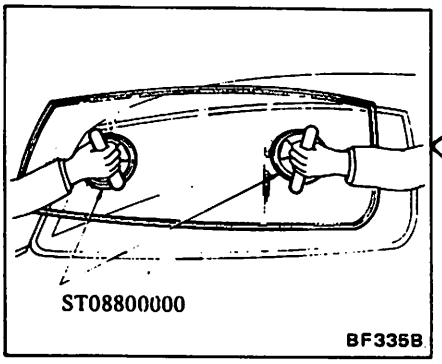
Attach dam rubber at 15 mm (0.59 in) position from the end of glass.



Ⓑ

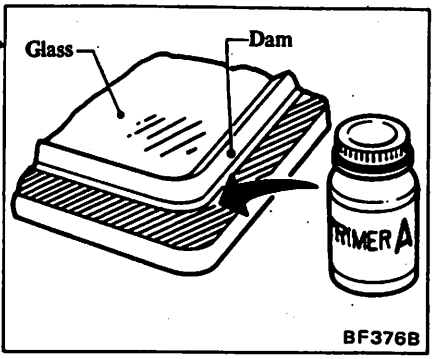
Ⓐ

Set glass in position, and press glass lightly and evenly.



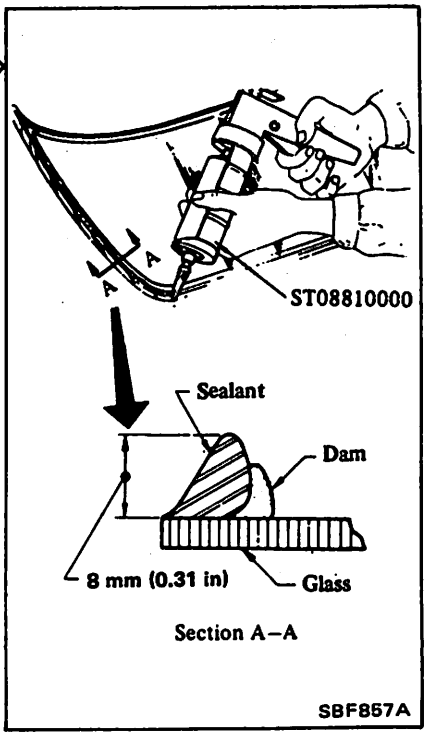
Ⓑ

Apply Primer A.



CAUTION:
Do not apply Primer A to windshield opening flanges.

Apply sealant evenly to the outside of dam rubber.



CAUTION:
Sealant starts to harden 15 minutes after it is applied; therefore, windshield glass should be installed in windshield opening in body within 15 minutes of applying sealant.

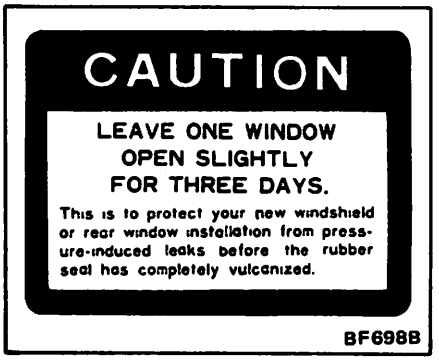
Check for water leakage.

Do not direct stream of water at fresh adhesive material.

Install moldings.

Wipe excess caulking material off glass and body.

After installing attach caution label to glass surface.



Be sure that it does not obstruct visibility. The label, noting the fact that sealing will be impaired if door is opened or closed with window closed before sealant has dried, is furnished with the sealant kit.

CAUTION:
Advise the user of the fact that vehicle should not be driven on rough roads or surfaces until sealant has properly vulcanized.

Reference: Period required for sealant to dry to desired hardness.

Unit: days

Temperature °C (°F) \ Relative humidity %	90	50	25
25 (77)	1.5	2.5	6
10 (50)	3	5.3	10
–10 (14)	10	17	34

REPAIRING LEAKS

Leaks can be repaired without removing and reinstalling glass in the following manner:

1. To stop leaks, first remove moldings in area of leak.
2. Mark location of leak.

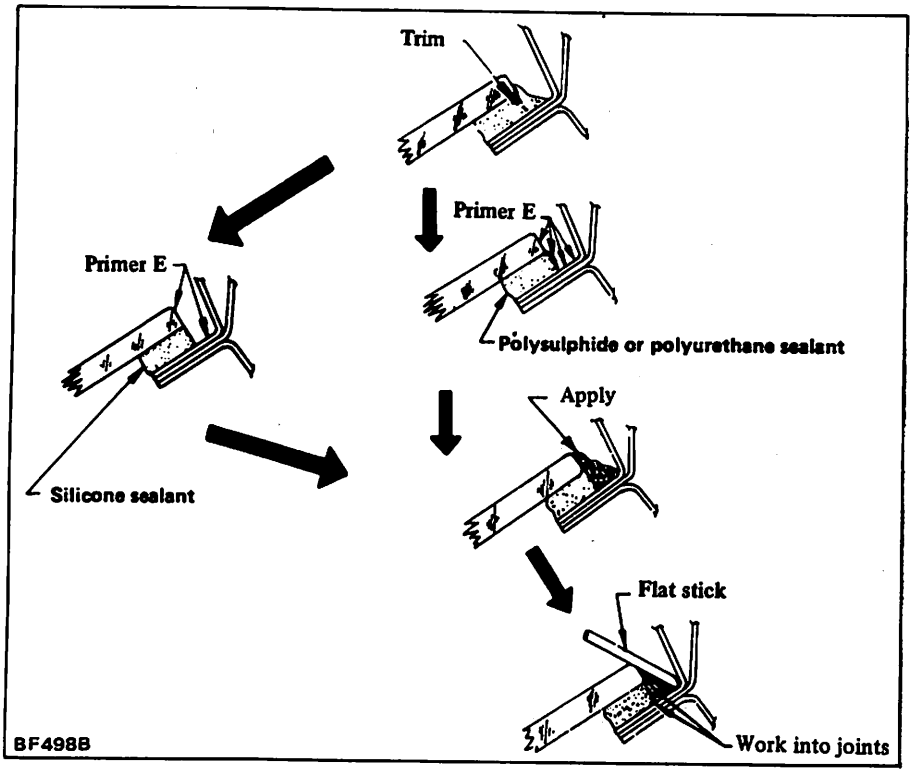
If water is leaking between caulking material and body or between glass and caulking material, determine extent of leak by pushing glass outwards.

Apply water to leak area while pushing on glass.

Mark extent of leak point.

3. Apply Primer and then sealant to leak points, following procedures shown below.

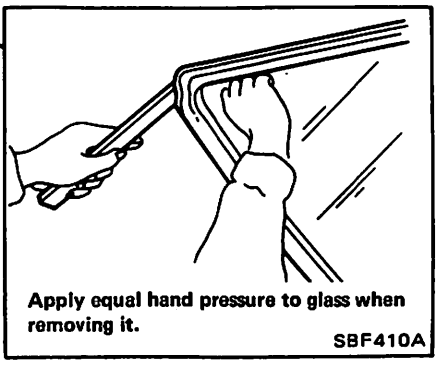
CAUTION:
Do not apply Primer to old silicone sealant.



REAR WINDOW

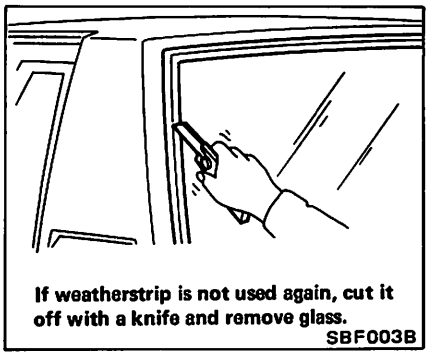
REMOVAL AND INSTALLATION

Remove glass.



Apply equal hand pressure to glass when removing it.

SBF410A



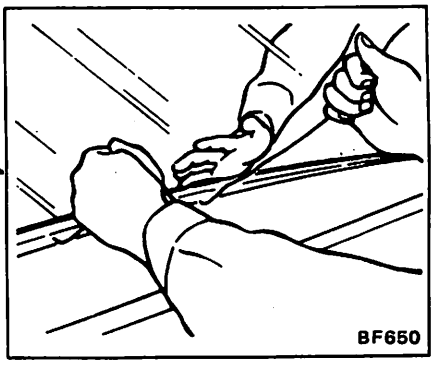
If weatherstrip is not used again, cut it off with a knife and remove glass.

SBF003B

Body side:

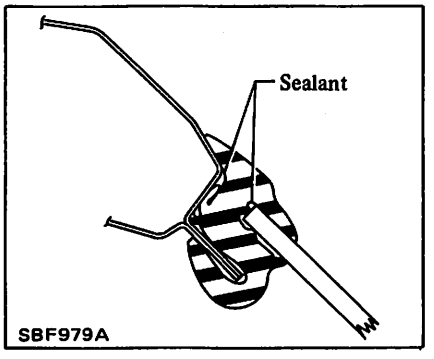
Clean flange surface with non-leaded gasoline.

Tap glass from the outside while pulling cord from the inside until weatherstrip is fitted in body flange.



BF650

Apply sealant.



SBF979A

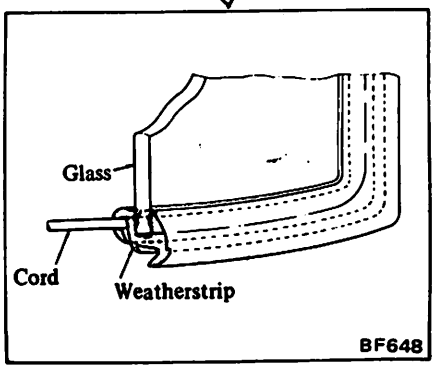
Wipe excess sealer off glass and body.

Glass side:

Clean glass surface thoroughly with non-leaded gasoline.

Install weatherstrip to glass.

Insert a strong cord.



BF648

- **To facilitate cord's installation, apply soapy water to it, so it will fit into weatherstrip's groove easily.**
- **Insert cord so that its ends are at bottom center glass.**

BACK DOOR WINDOW

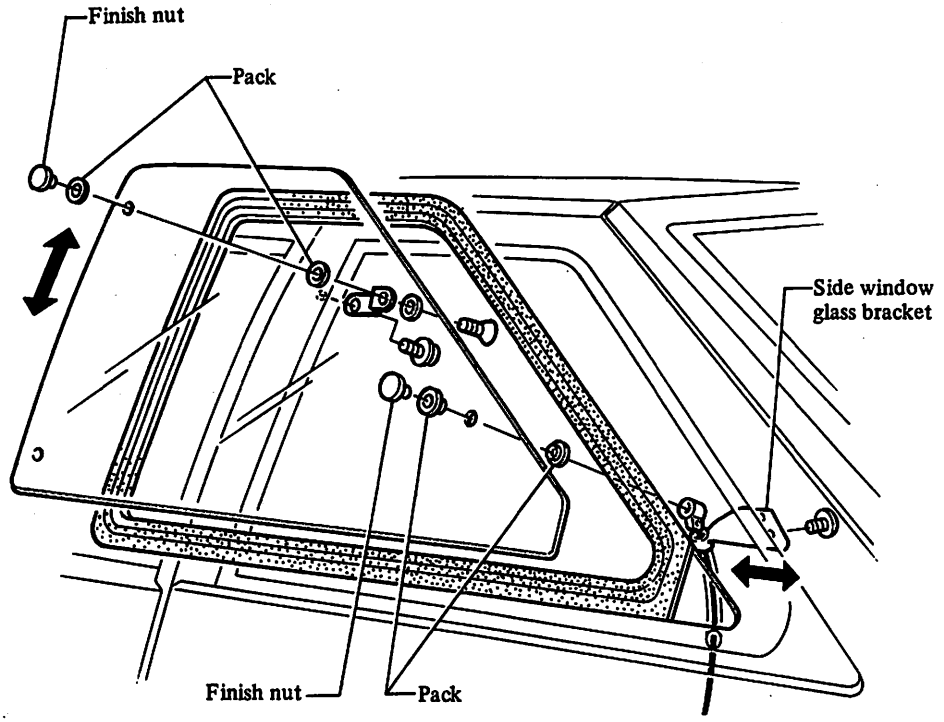
REMOVAL AND INSTALLATION

Follow the same procedures as for Rear Window.

SIDE WINDOW

REMOVAL AND INSTALLATION

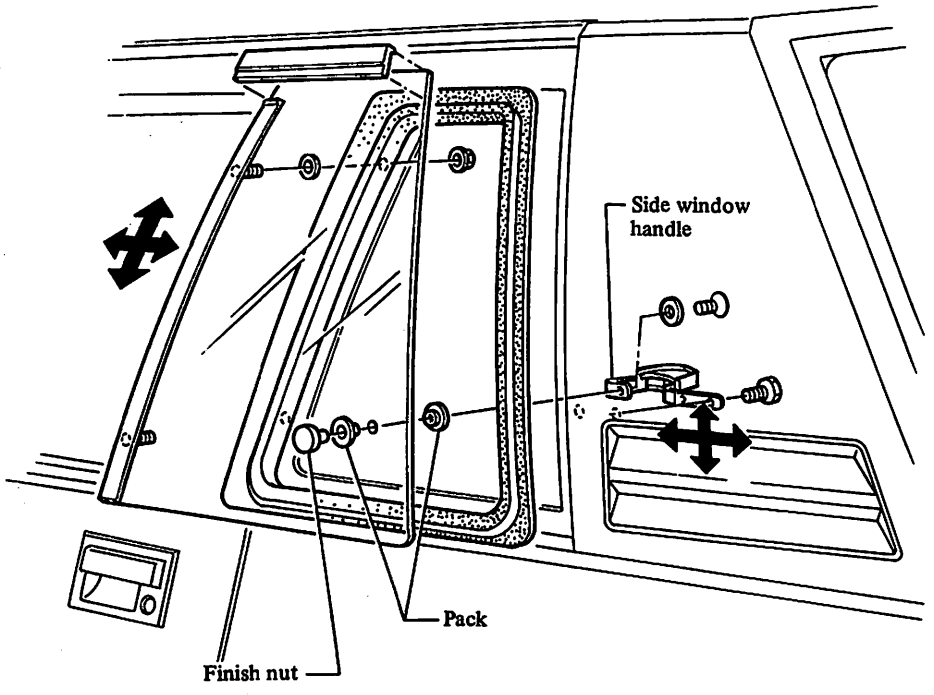
Sedan



After aligning the holes properly, insert a finish nut in side window hinge hole and side window handle hole.

SBF980A

Coupe

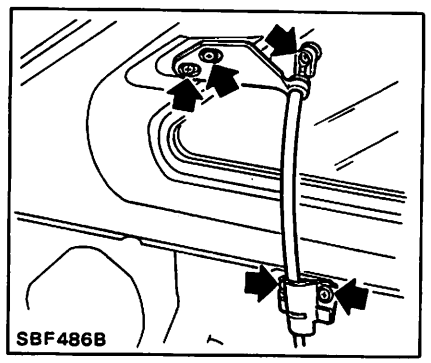


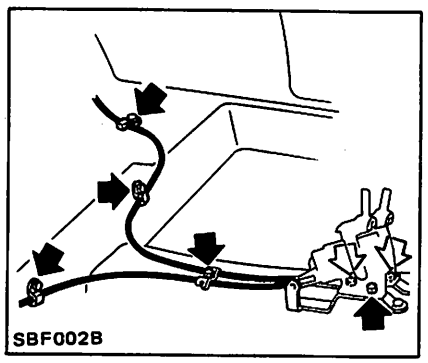
After aligning the holes properly, insert finish nut in side window glass bracket hole.

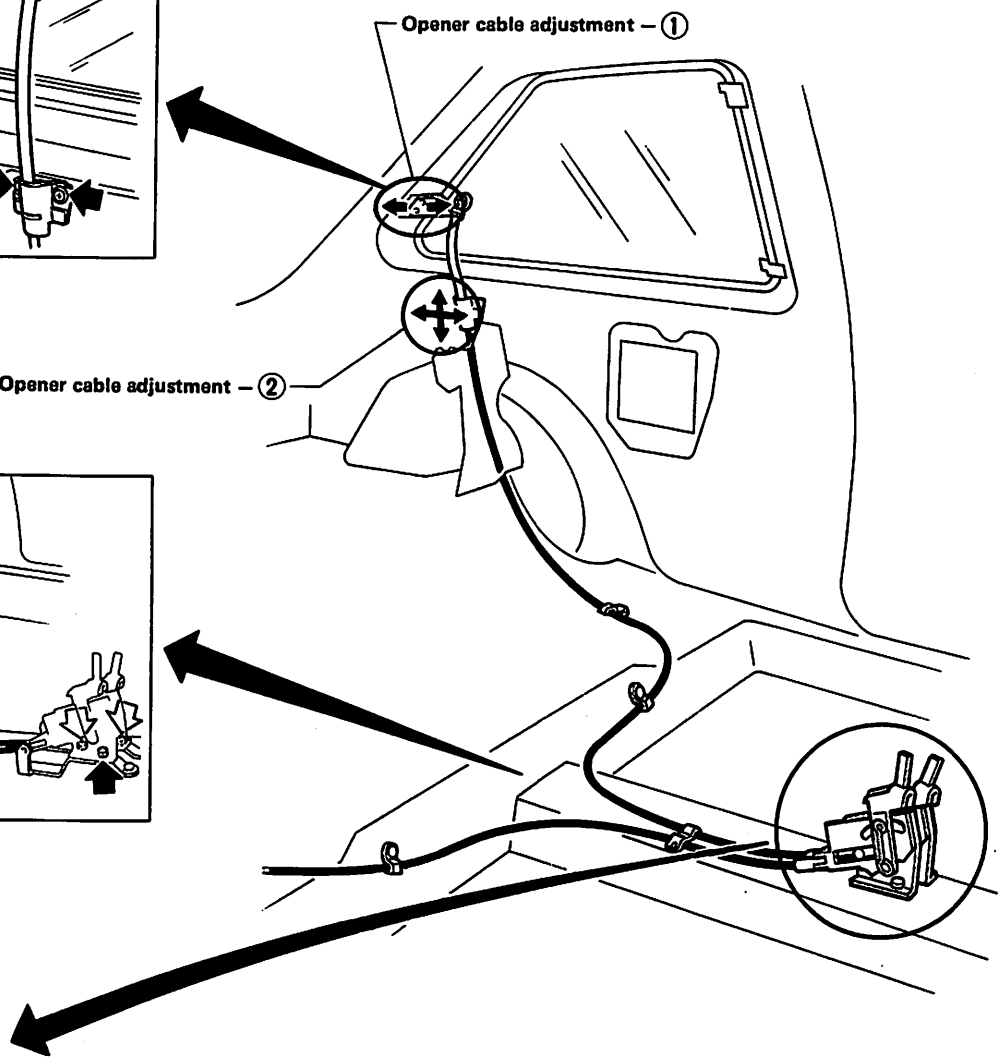
SBF485B

SIDE WINDOW OPENER

REMOVAL AND INSTALLATION

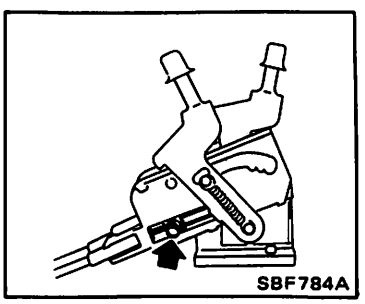




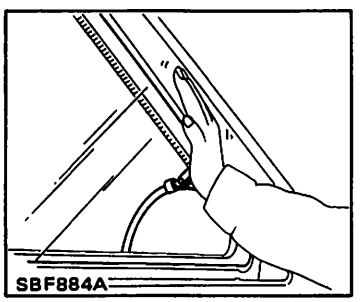


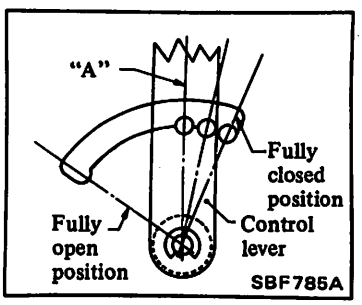
Opener cable adjustment – ③

1. Loosen screw securing control wire end.



2. Set control lever to position "A" while side window is lightly touching weatherstrip, then tighten screw to secure control wire end.



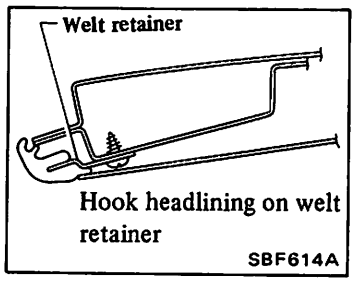


TRIM AND MOLDING

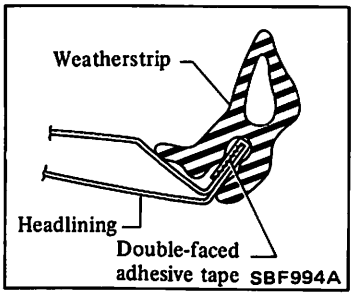
ROOF TRIM

HEADLINING

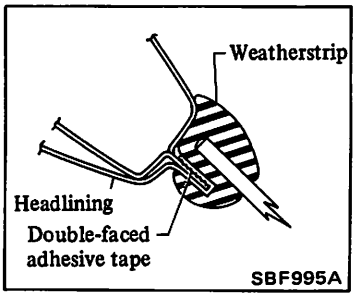
Removal and installation

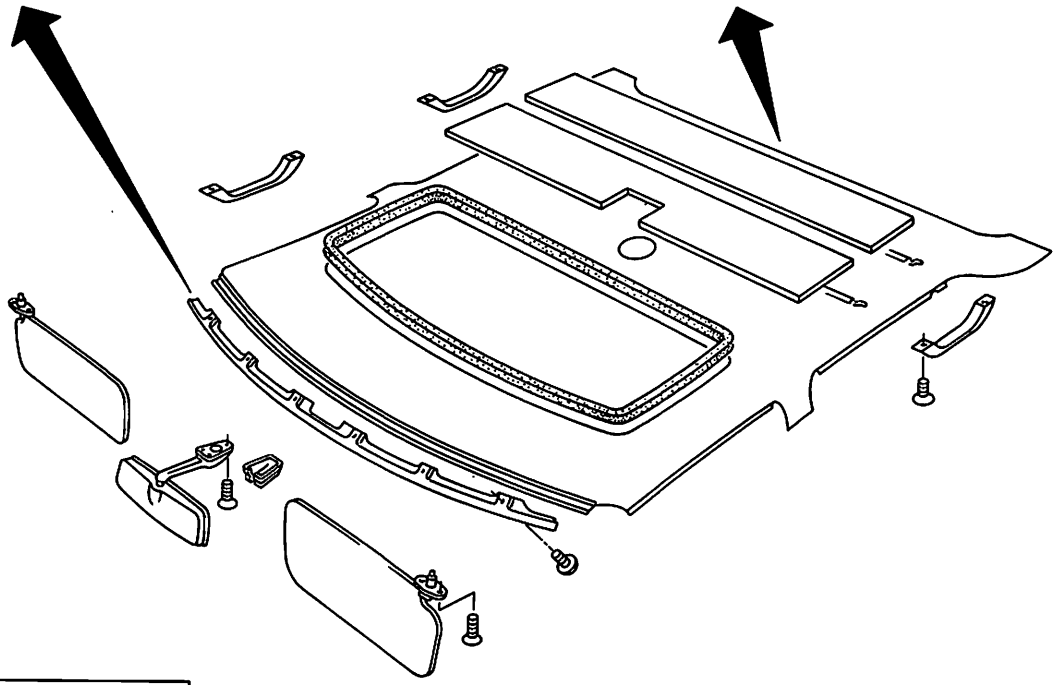


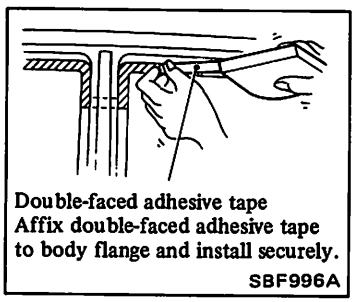
Sedan



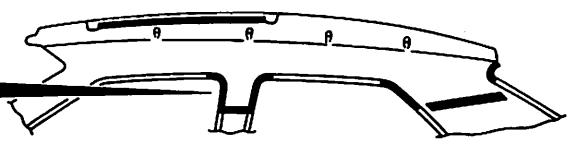
Coupe



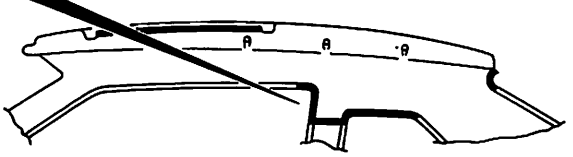


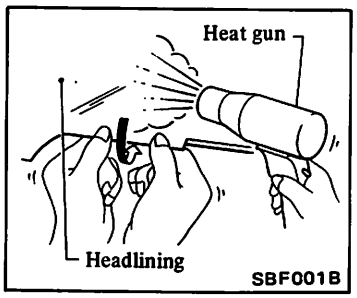


4-door Sedan



2-door Sedan, Coupe





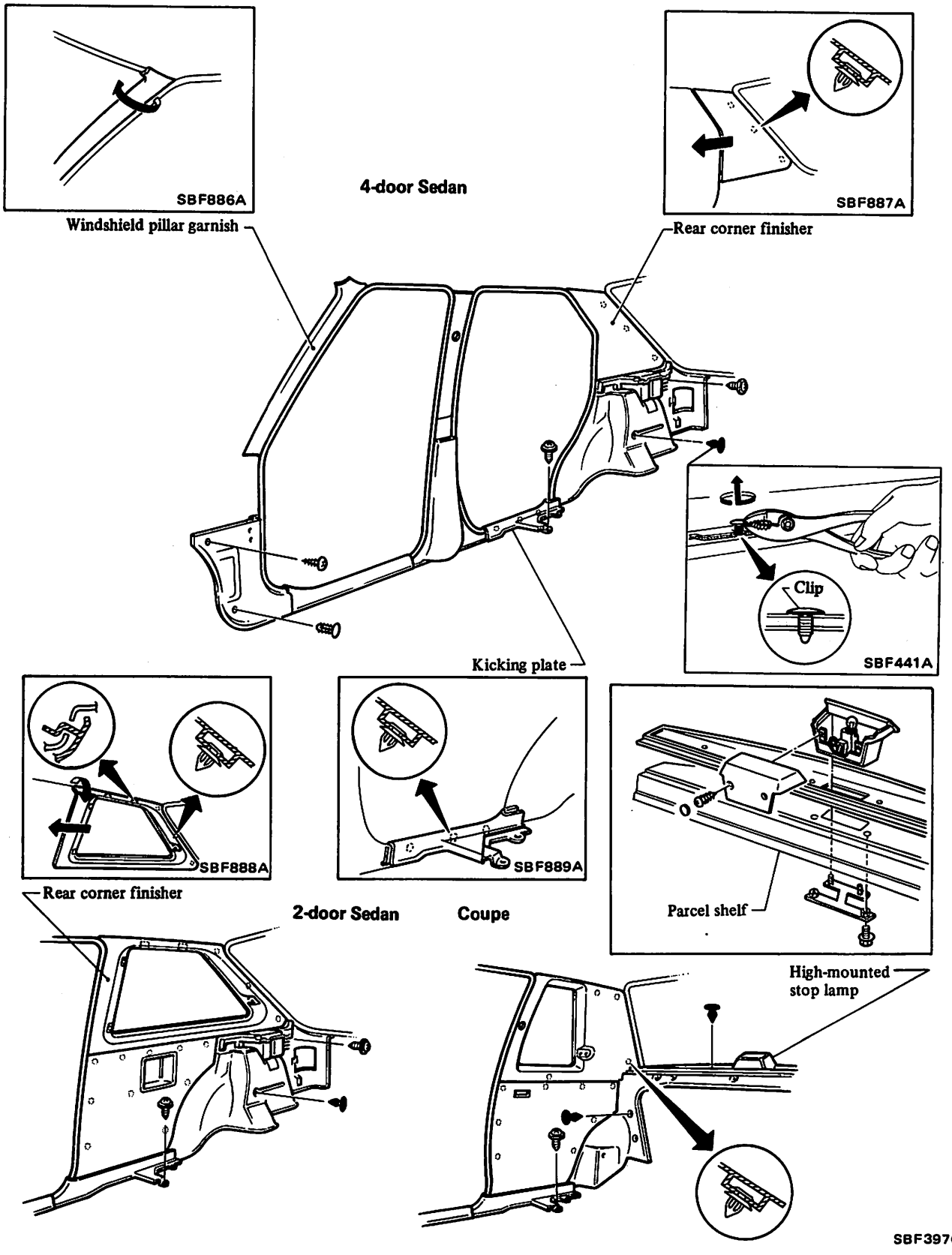
Affix headlining to body flange starting from "R" portion.

SBF993A

BODY SIDE TRIM

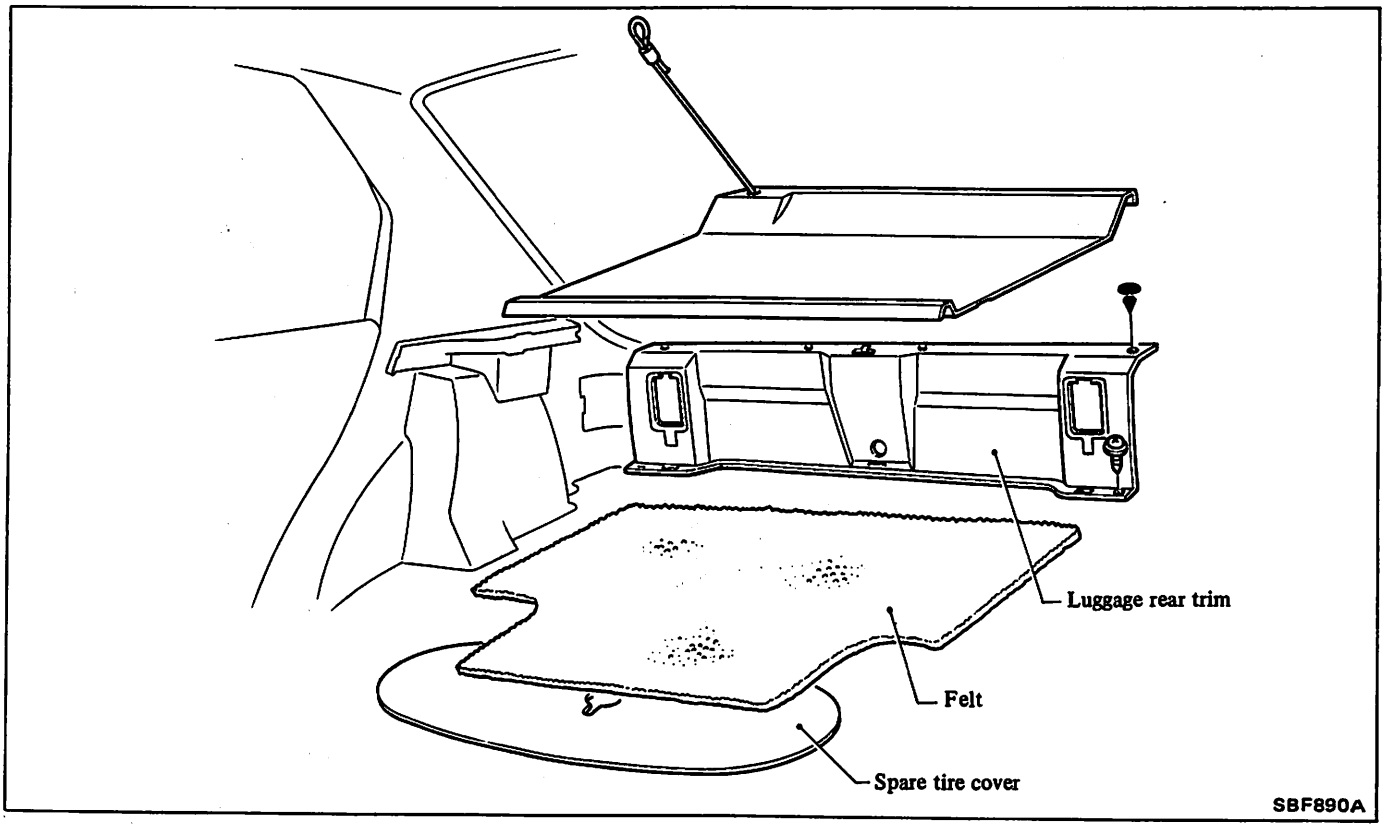
CAUTION: Body side trim is made of plastic so do not use excessive force.

REMOVAL AND INSTALLATION



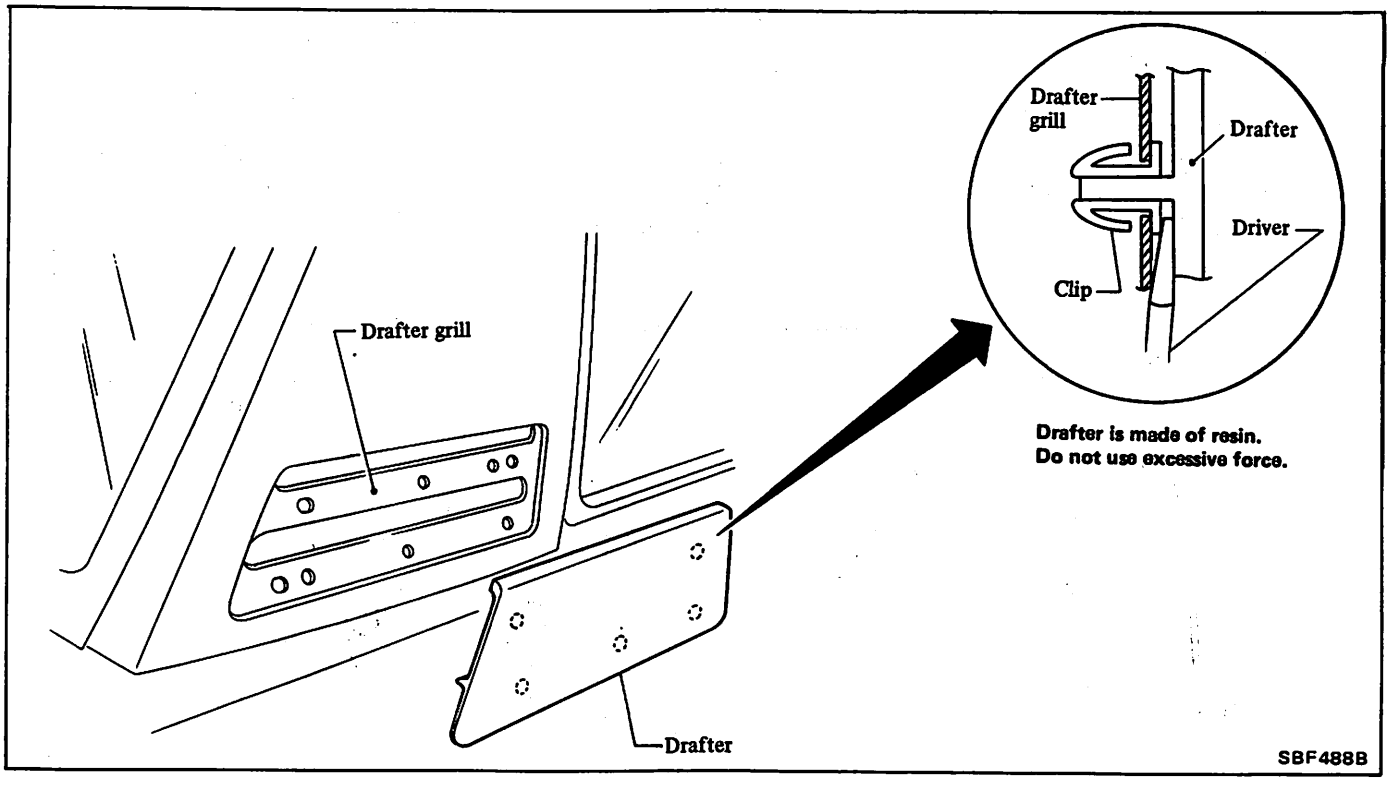
LUGGAGE ROOM TRIM

REMOVAL AND INSTALLATION



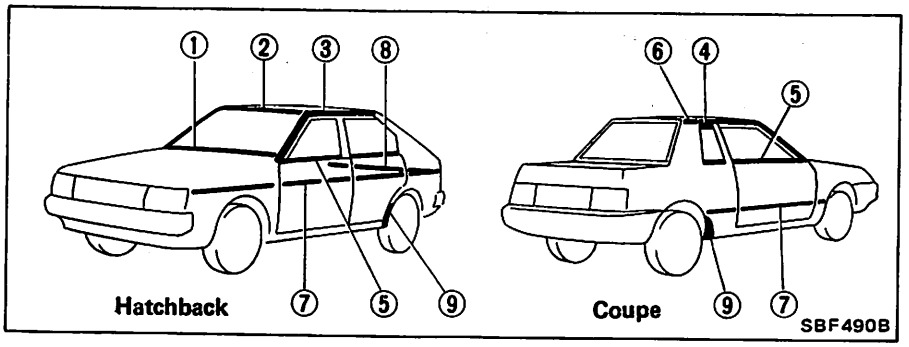
DRAFTER

REMOVAL AND INSTALLATION

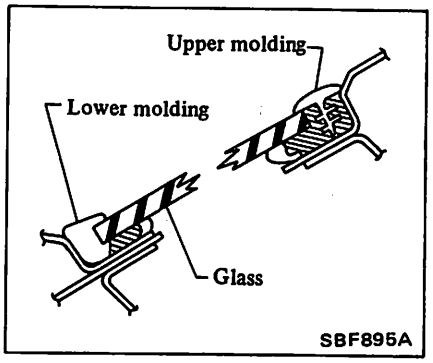


MOLDING

REMOVAL AND INSTALLATION

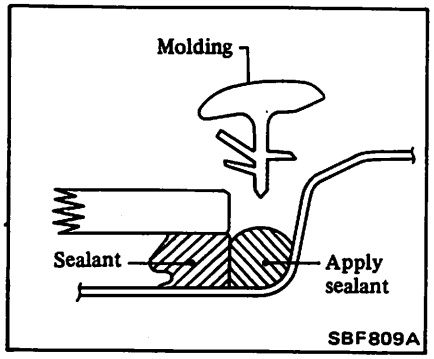


①② Windshield upper and lower molding



Method 1

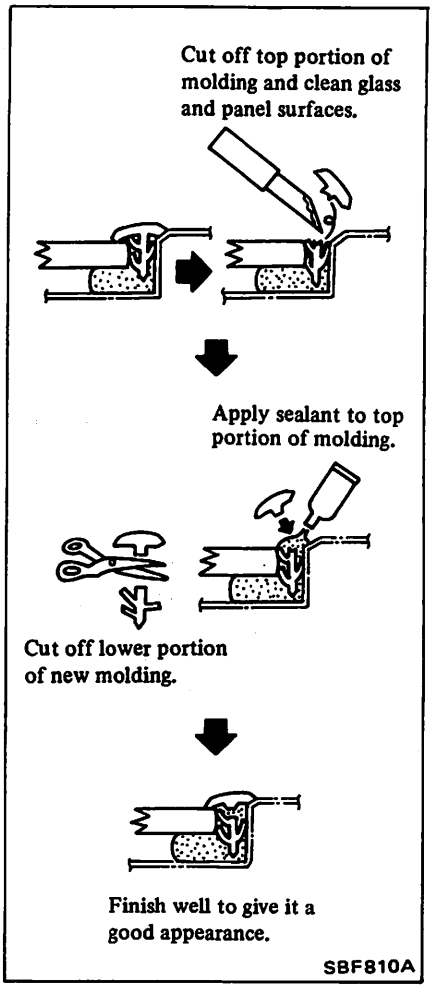
- Cut off sealant at glass end.
- Clean the side on which panel was mounted.



- Install molding by aligning the mark located on center of molding with vehicle center.

Be sure to install tightly so that there is no gap around the corner.

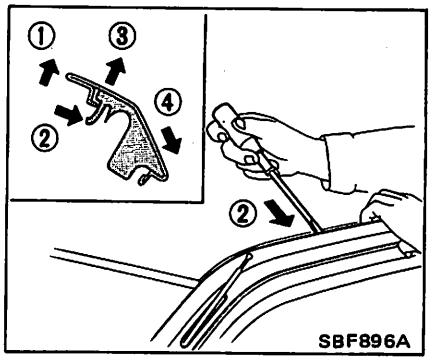
Method 2



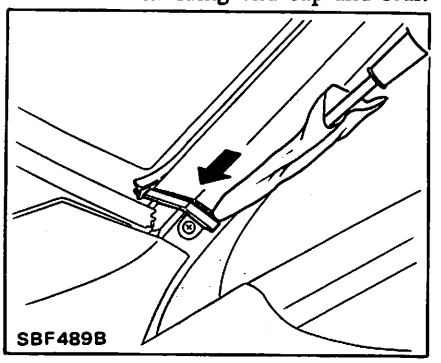
③· Drip molding

Removal

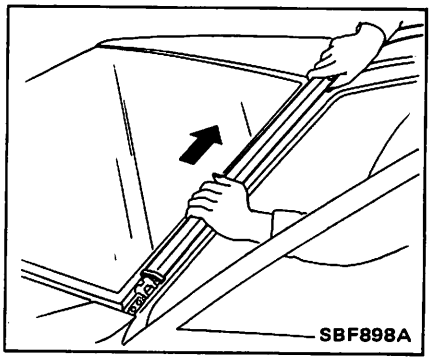
- Depress clip pawl.



- Remove molding end cap and seal.

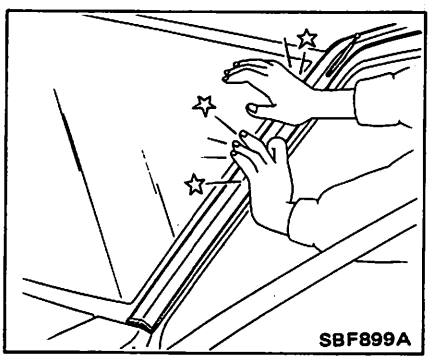


- Slide molding off by pulling upward.



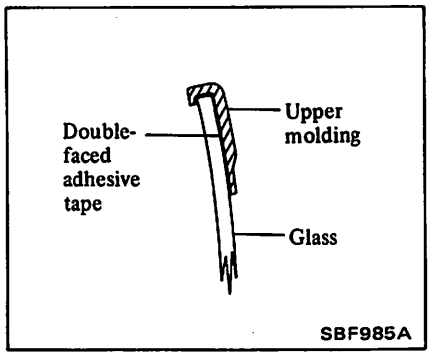
Installation

- Put molding in place and install it by tapping it lightly.

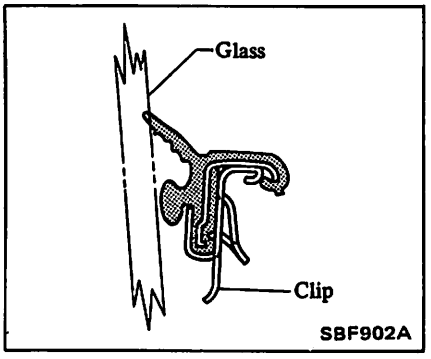


Be sure to align cowl panel with front end of molding end cap and seal.

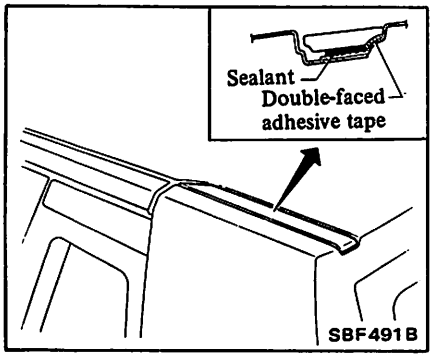
④ Side window upper molding (Coupe)



⑤ Door molding



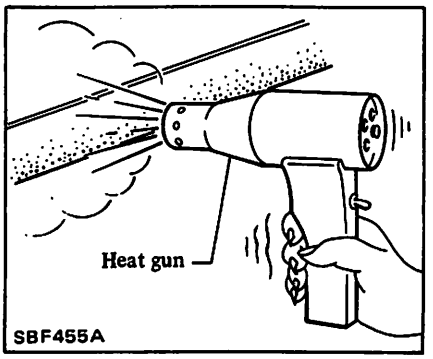
⑥ Roof garnish



⑦ Side guard moding

- **Side guard molding is affixed to body panel with double-faced adhesive tape and sealant. And the repair part is affixed with double-faced adhesive tape.**
- **Remove it only if it is necessary to do so.**
- **Removal:**

1. Heat molding portion to 30 to 40°C (86 to 104°F) with a heat gun.



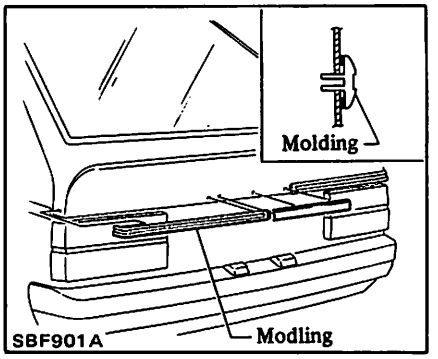
2. Raise end of molding and, while cutting off bonding agent, detach molding.

- **Installation**

1. Remove all traces of bonding agent from body panel. Then clean contact face of body.
2. Heat body panel and molding to 30 to 40°C (86 to 104°F) with a heat gun. Then install molding.

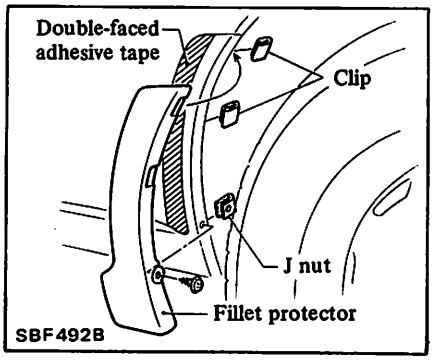
⑧ Back door molding

Remove and install back door molding in the same way as side guard molding.

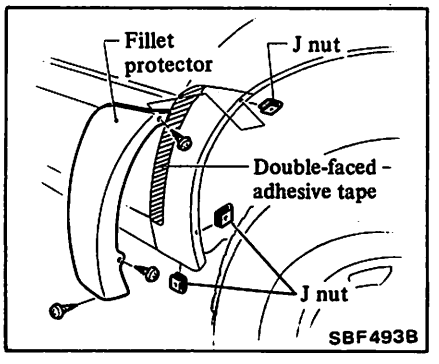


⑨ Fillet protector

Sedan



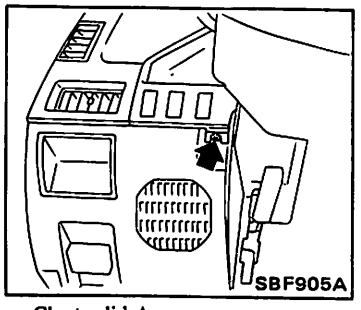
Coupe



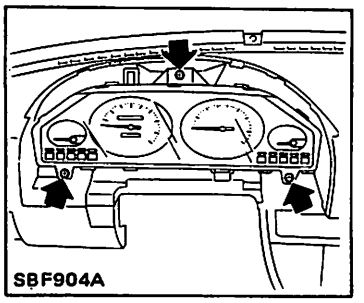
INSTRUMENT AND SEAT

INSTRUMENT

REMOVAL AND INSTALLATION

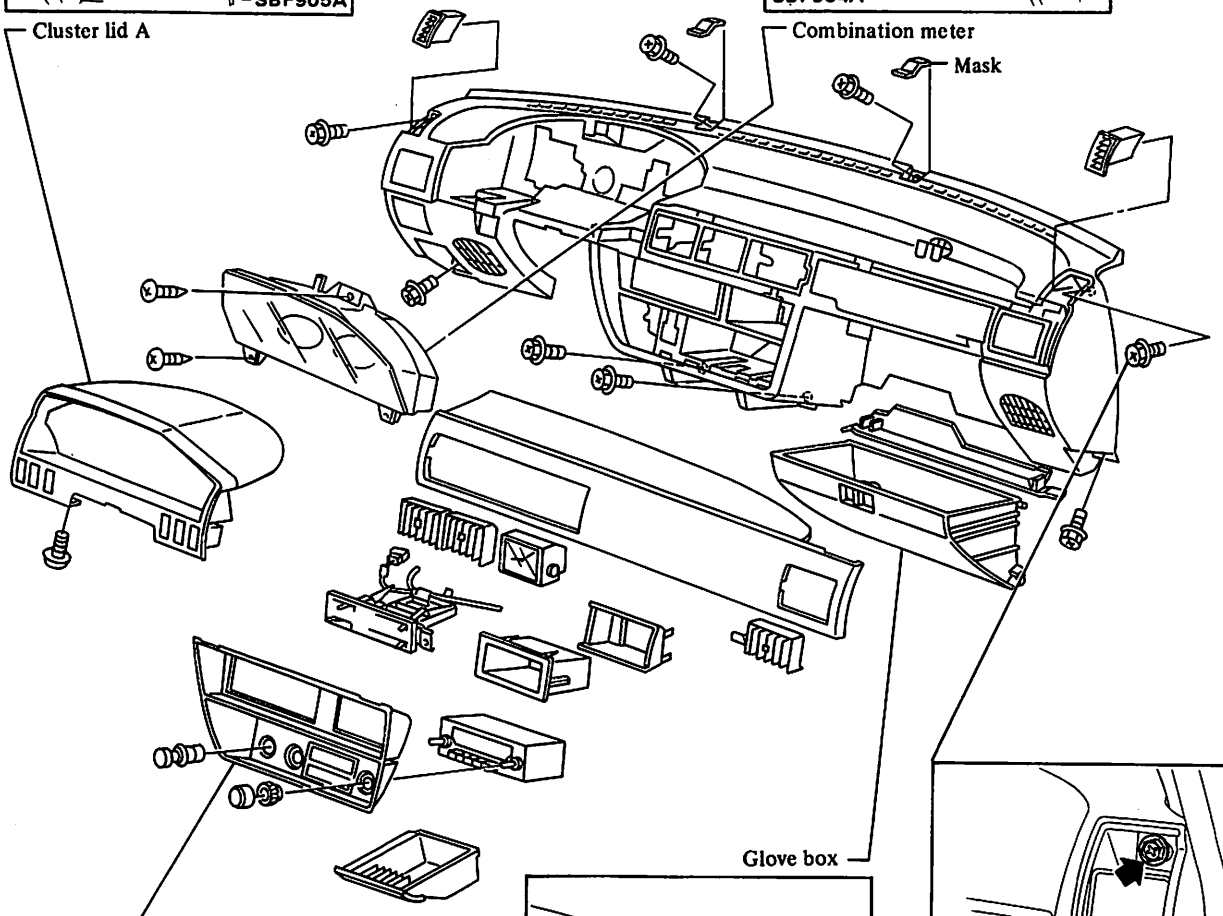


Cluster lid A

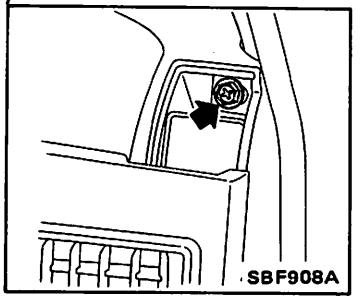


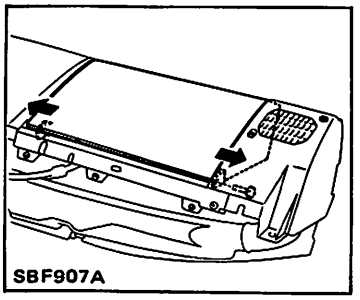
Combination meter

Mask

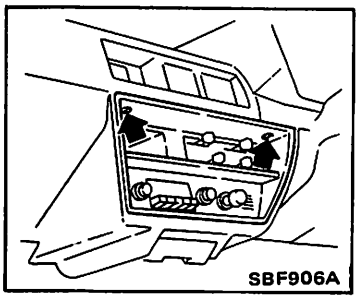


Glove box





Cluster lid C



Be sure to remove the following parts.

- **Choke control cable**
- **Harness connectors**
- **Hood lock control cable**
- **Speedometer cable**
- **Radio feeder cable**

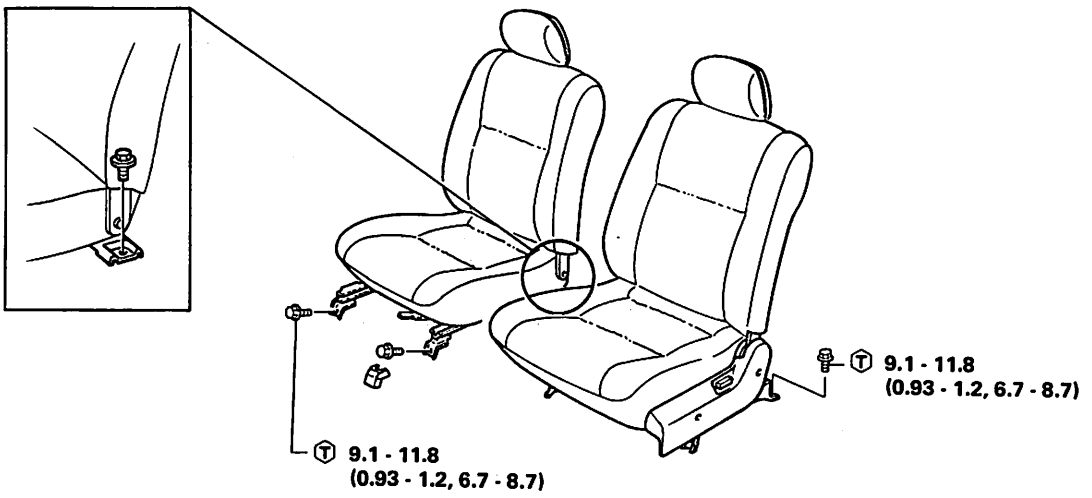
SBF986A

SEAT

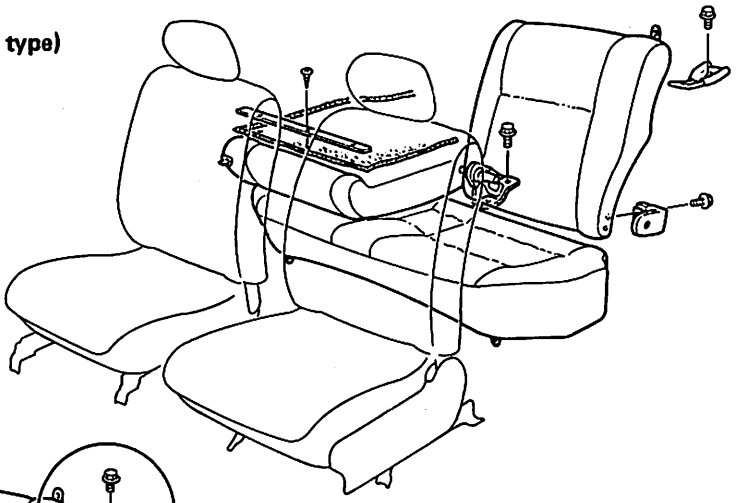
REMOVAL AND INSTALLATION

CAUTION:
Be sure to remove the thin polyethylene covers:
1) Pre-delivery service
2) Parts replacements

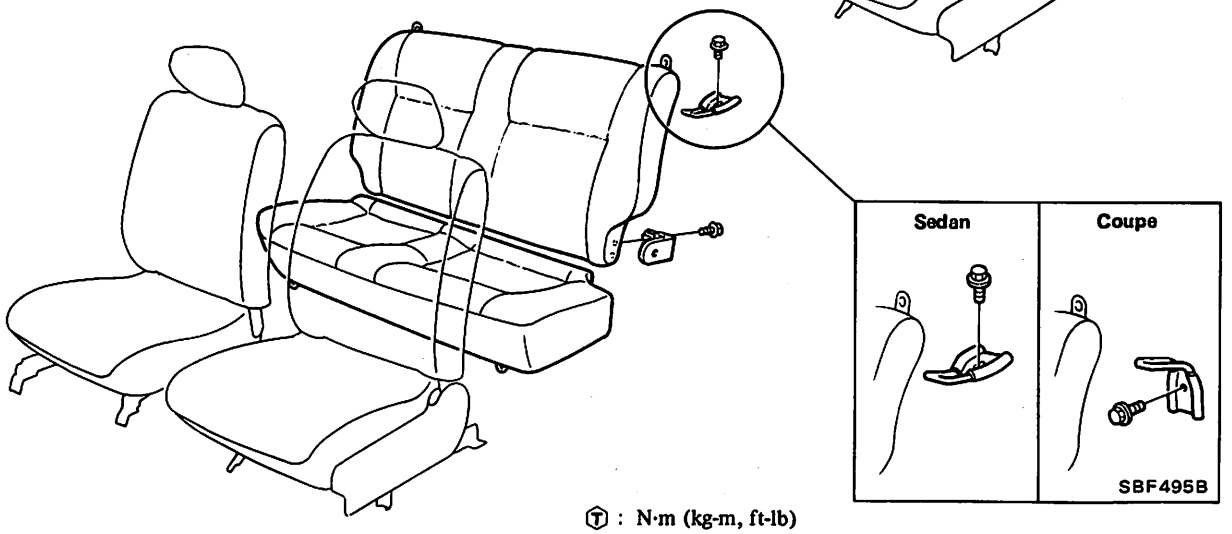
Front seat



Rear seat (Separate seatback type)
- **Sedan**



Rear seat (Non-separate seatback type)
- **Sedan**
- **Coupe**



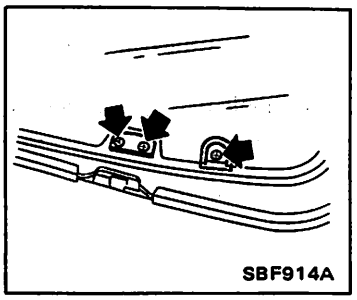
Ⓣ : N·m (kg-m, ft-lb)

SBF494B

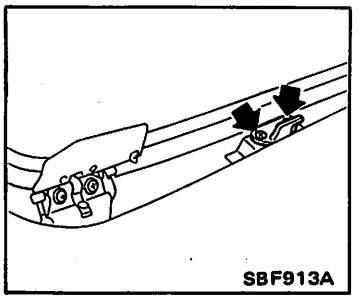
SUN ROOF

SUN ROOF

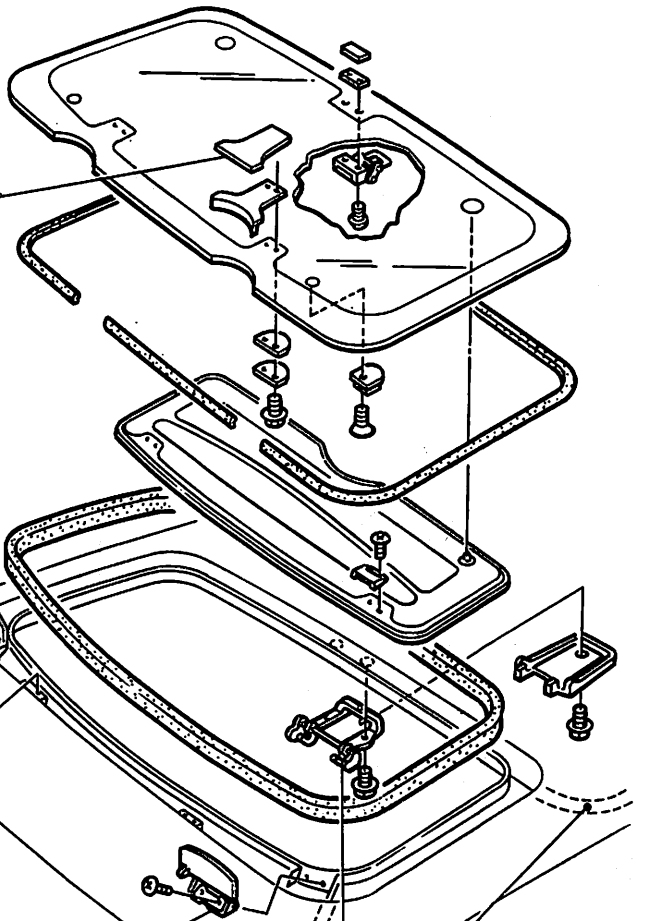
REMOVAL AND INSTALLATION



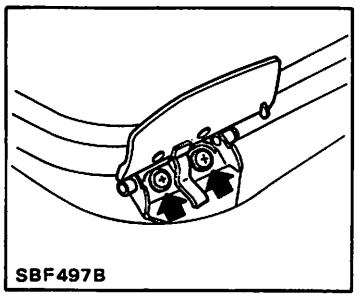
Female hinge



Hinge bracket

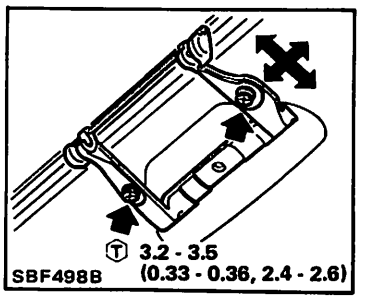


Air deflector



Drain hose
After installation of drain hoses, make sure water drains smoothly.

Handle



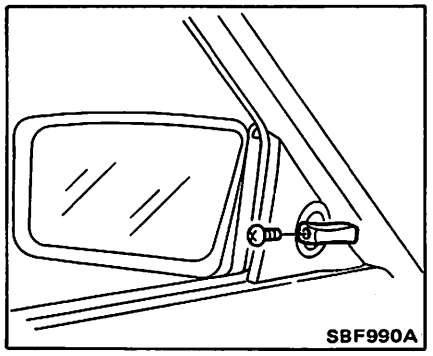
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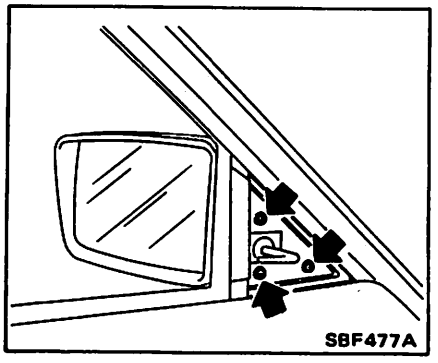
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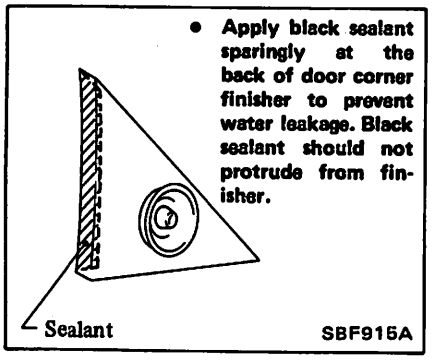
MIRROR

DOOR MIRROR

REMOVAL AND INSTALLATION





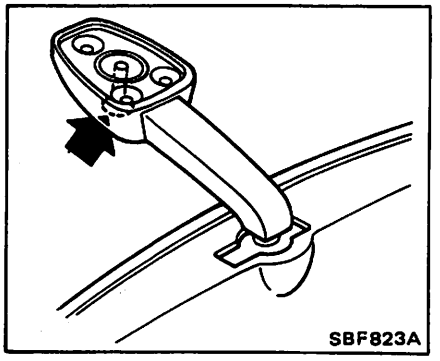


INSIDE MIRROR

DELUXE MODEL

Replacement of broken mirror base:

1. Remove all broken pieces of base from roof rail.
2. Clean any pieces of base from stay.

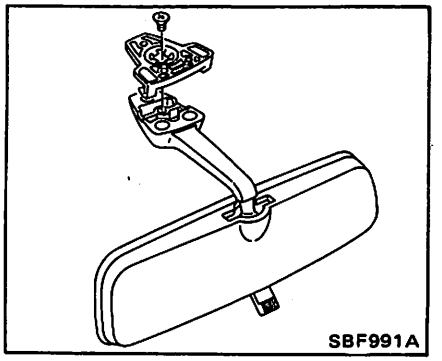


3. Position new base on stay.
4. Install inside mirror assembly on roof rail.

GL AND GT MODELS

When spring plate of mirror base can be used.

1. Remove mirror base from roof rail.
2. Remove connecting screw from stay.
3. Assemble mirror base and stay.



4. Install inside mirror assembly on roof rail.

When spring plate of mirror base cannot be used.

Replace mirror base.

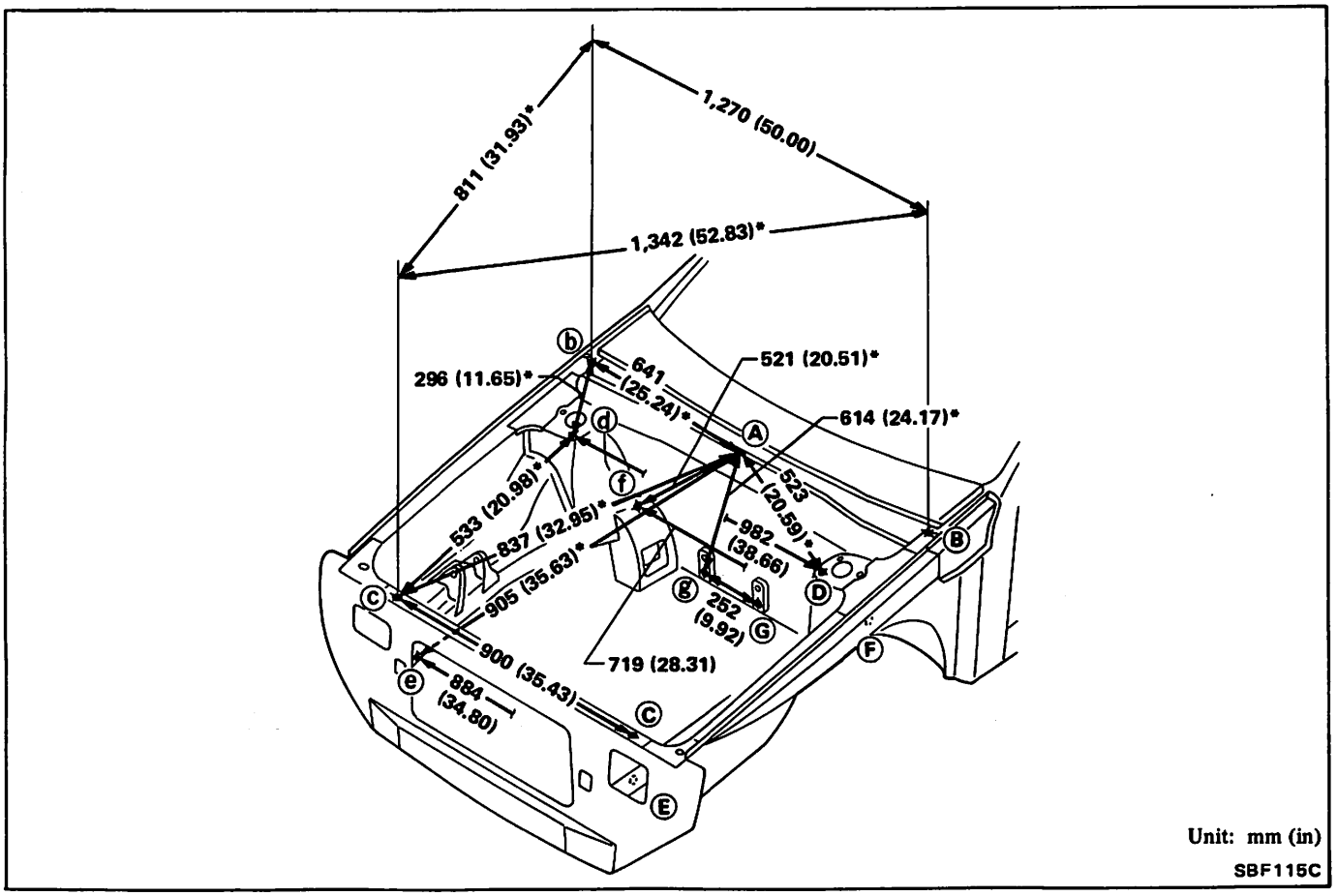
BODY ALIGNMENT

DESCRIPTION

- All dimensions indicated in figures are actual ones.
- When a tram tracking gauge is used, adjust both pointers to equal length and check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- Measurement points
  The coordinates of the measurement points are the distances measured from the respective dimension lines in the directions of "x", "y" and "z".
  Dimension lines: "x" line – Center line of vehicle
  "y" line – Center line of front axle (Any measurement point in front of the dimension line refers to a minus "–" value.)
  "z" line – Datum line (Any measurement point under the dimension line refers to a minus "–" value.)
- (LH): L.H. side
  (RH): R.H. side

ENGINE COMPARTMENT

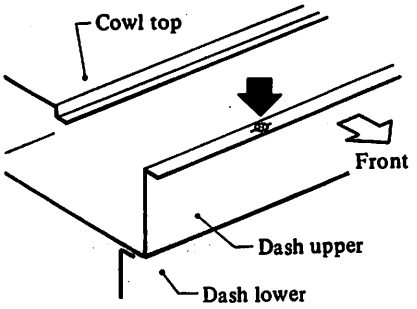
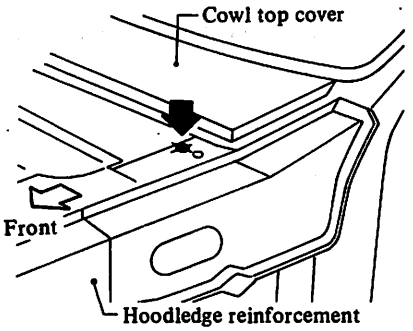
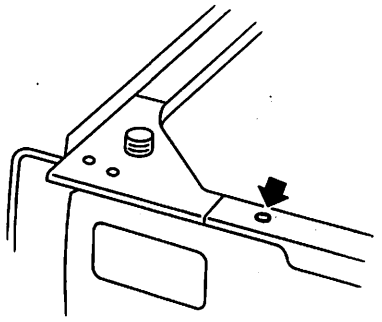
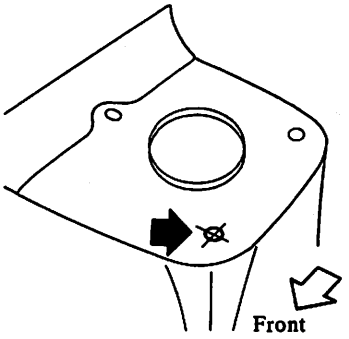
MEASUREMENT

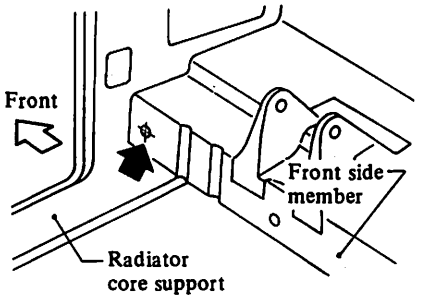
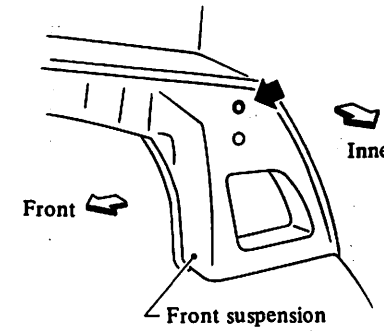
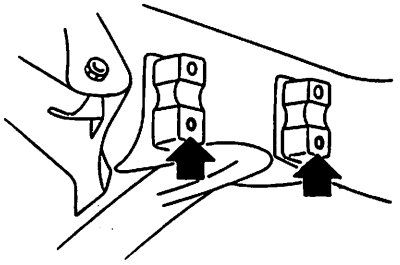


Unit: mm (in)

SBF115C

MEASUREMENT POINTS

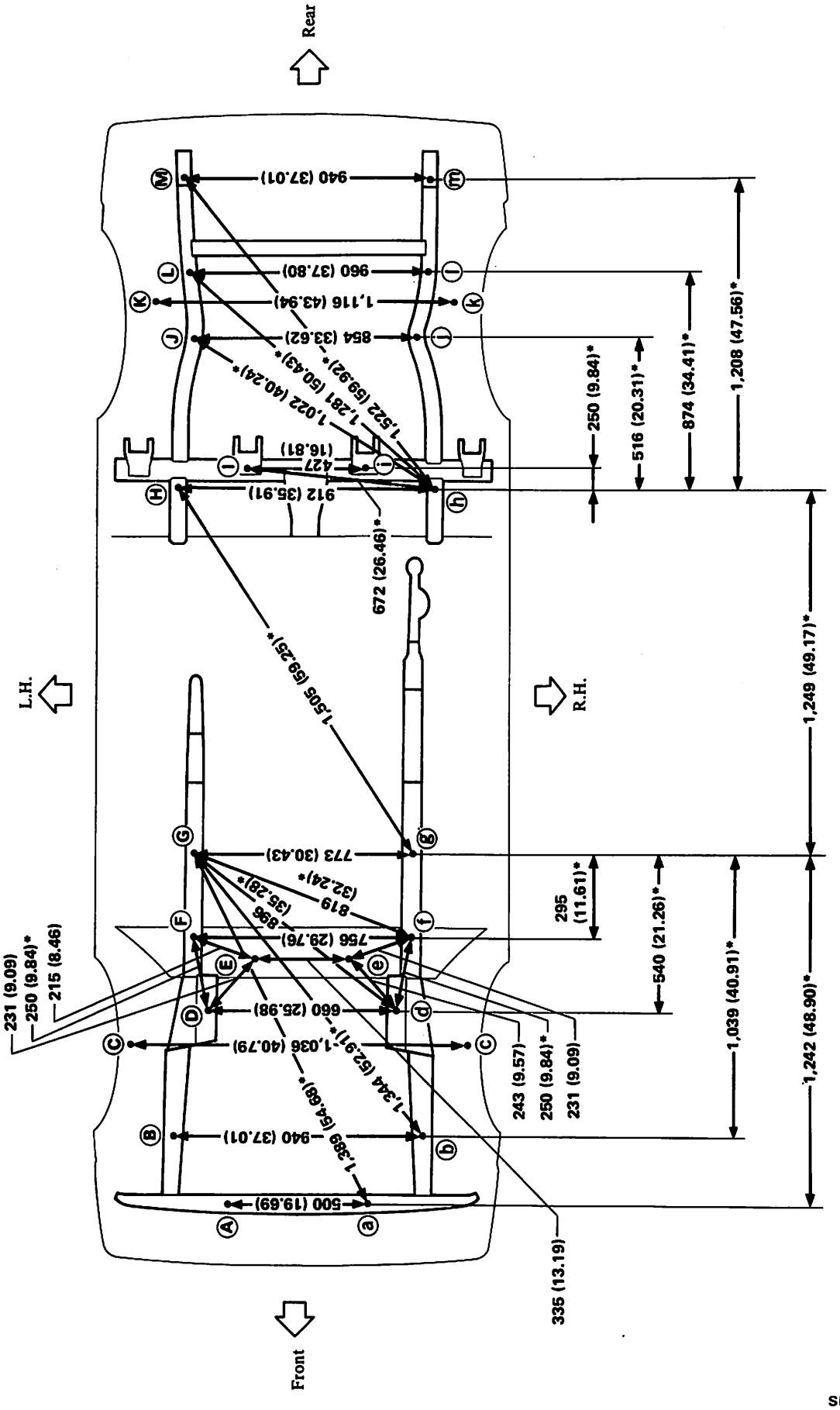
Points	Hole dia. mm (in)	Detailed Points		Coordinates mm (in)		
				"x"	"y"	"z"
Ⓐ	5 (0.20)	 SBF684A	Hole for installing sealing rubber at upperside of dash upper	0.0 (0.00)	138.0 (5.43)	637.3 (25.09)
Ⓑ ⓑ	7 (0.28)	 SBF682A	Hole for installing hood hinge and front fender at upperside of air box side outer. (Behind front fender)	635.0 (25.00)	225.9 (8.89)	618.9 (24.37)
Ⓒ ⓒ	9 (0.35)	 SBF116C	Hole for installing headlamp at upper-side of radiator core upper support center	450.0 (17.72)	−556.0 (−21.89)	509.6 (20.06)
Ⓓ ⓓ	12 (0.47)	 SBF683A	Front suspension upper mounting hole	491.2 (19.34)	−28.1 (−1.11)	566.8 (22.31)

Points	Hole dia. mm (in)	Detailed Points		Coordinates mm (in)		
				"x"	"y"	"z"
Ⓔ ⓔ	16 (0.63)	 SBF685A	Hole for locating at side of front side member	442.1 (17.41)	−533.6 (−21.01)	221.0 (8.70)
Ⓕ ⓕ	18 (0.71)	 SBF686A	Hole at side of front suspension mounting member	359.5 (14.15)	129.0 (5.08)	261.0 (10.28)
Ⓖ ⓖ	12.5 (0.49)	 SBF352B	Steering gearbox mounting hole	126.0 (4.96)	170.8 (6.72)	37.3 (1.47)

UNDERBODY

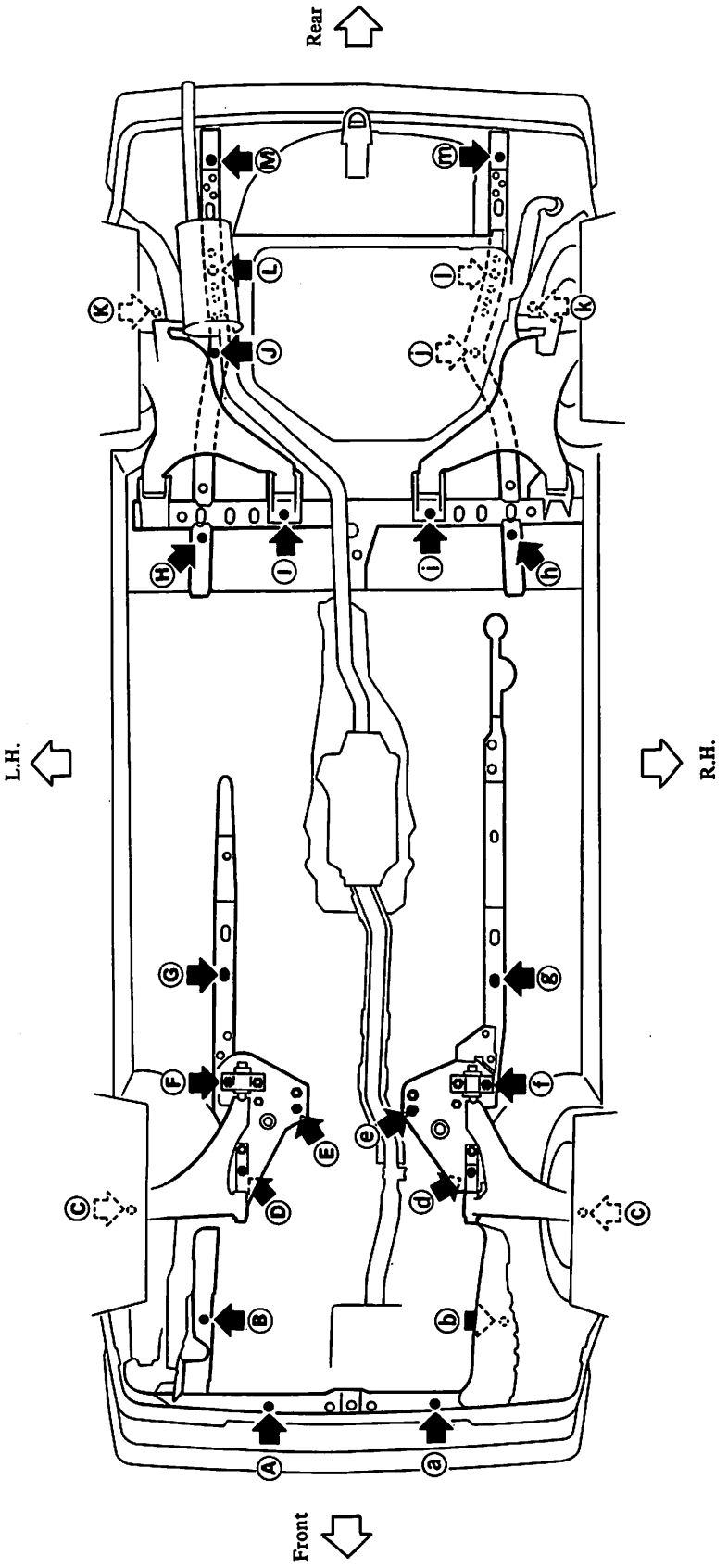
MEASUREMENT

Unit: mm (in)



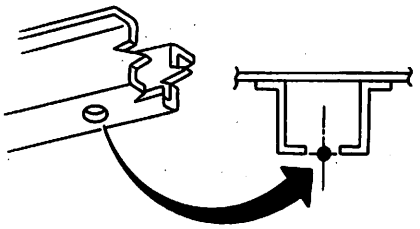
SBF121C

MEASUREMENT POINTS

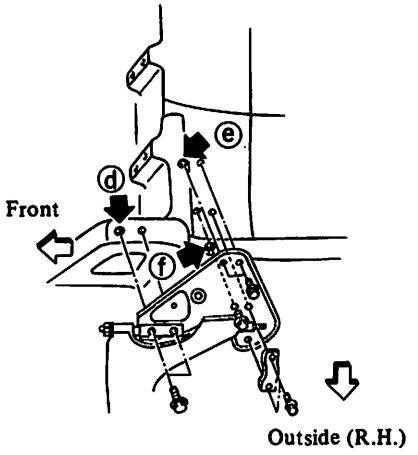
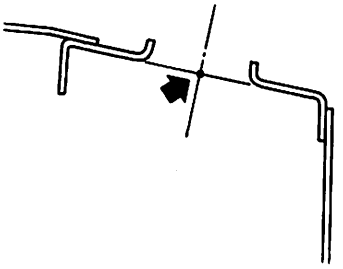
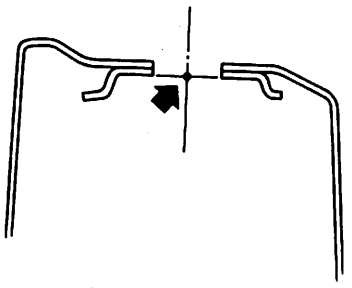


SBF398C

Points	Hole dia. mm (in)	Detailed Points	Coordinates mm (in)		
			"x"	"y"	"z"
Ⓐ ⓐ	14 (0.55)	Hole for locating at underside of front crossmember	250.0 (9.84)	−600.0 (−23.62)	47.1 (1.85)
Ⓑ ⓑ	16 (0.63)	Hole for locating at underside of front side member	470.0 (18.50)	−375.0 (−14.76)	191.0 (7.52)
Ⓖ ⓖ	16 x 20 (0.63 x 0.79)	Hole for locating at underside of front side member front extension	386.5 (15.22)	630.0 (24.80)	−60.0 (−2.36)
Ⓗ ⓗ	16 (0.63)	Hole for locating at underside of rear side member front extension	456.0 (17.95)	1,875.0 (73.82)	11.8 (0.46)
Ⓘ ⓘ	16 (0.63)	Hole at underside of rear suspension arm inner mounting bracket	213.5 (8.41)	1,936.0 (76.22)	11.2 (0.44)
Ⓙ ⓙ	14 (0.55)	Hole for locating rear suspension spring bracket at underside of rear side member	427.0 (16.81)	2,360.0 (92.91)	185.7 (7.31)
Ⓛ Ⓘ	14 (0.55)	Hole for locating at underside of rear side member	480.0 (18.90)	2,731.0 (107.52)	188.8 (7.43)
Ⓜ ⓜ	13 (0.51)	Hole for locating at underside of rear side member rear extension	470.0 (18.50)	3,070.0 (120.87)	187.6 (7.39)



SBF192B

Points	Hole dia. mm (in)	Detailed Points		Coordinates mm (in)		
				"x"	"y"	"z"
Ⓓ ⓓ	15 (0.59)	 SBF351B	Hole for installing transverse link bracket at underside of front suspension mounting member	330.0 (12.99)	95.0 (3.74)	−8.6 (−0.34)
Ⓔ ⓔ	15 (0.59)		Hole for installing transverse link bracket at underside of dash lower cross-member	R.H. side 159.0 (6.26) L.H. side 176.0 (6.93)	267.0 (10.51)	−6.1 (−0.24)
Ⓕ ⓕ	16 (0.63)		Hole for installing transverse link bracket at underside of front side member extension	378.0 (14.88)	340.0 (13.39)	−7.0 (−0.28)
Ⓒ ⓒ	73 (2.87)	 SBF119C	Front suspension upper mounting hole	518.0 (20.39)	18.1 (0.71)	566.2 (22.29)
Ⓚ ⓚ	14 (0.55)	 SBF120C	Rear suspension upper mounting hole	558.0 (21.97)	2,514.6 (99.00)	437.7 (17.23)

HEATER & AIR CONDITIONER

SECTION HA

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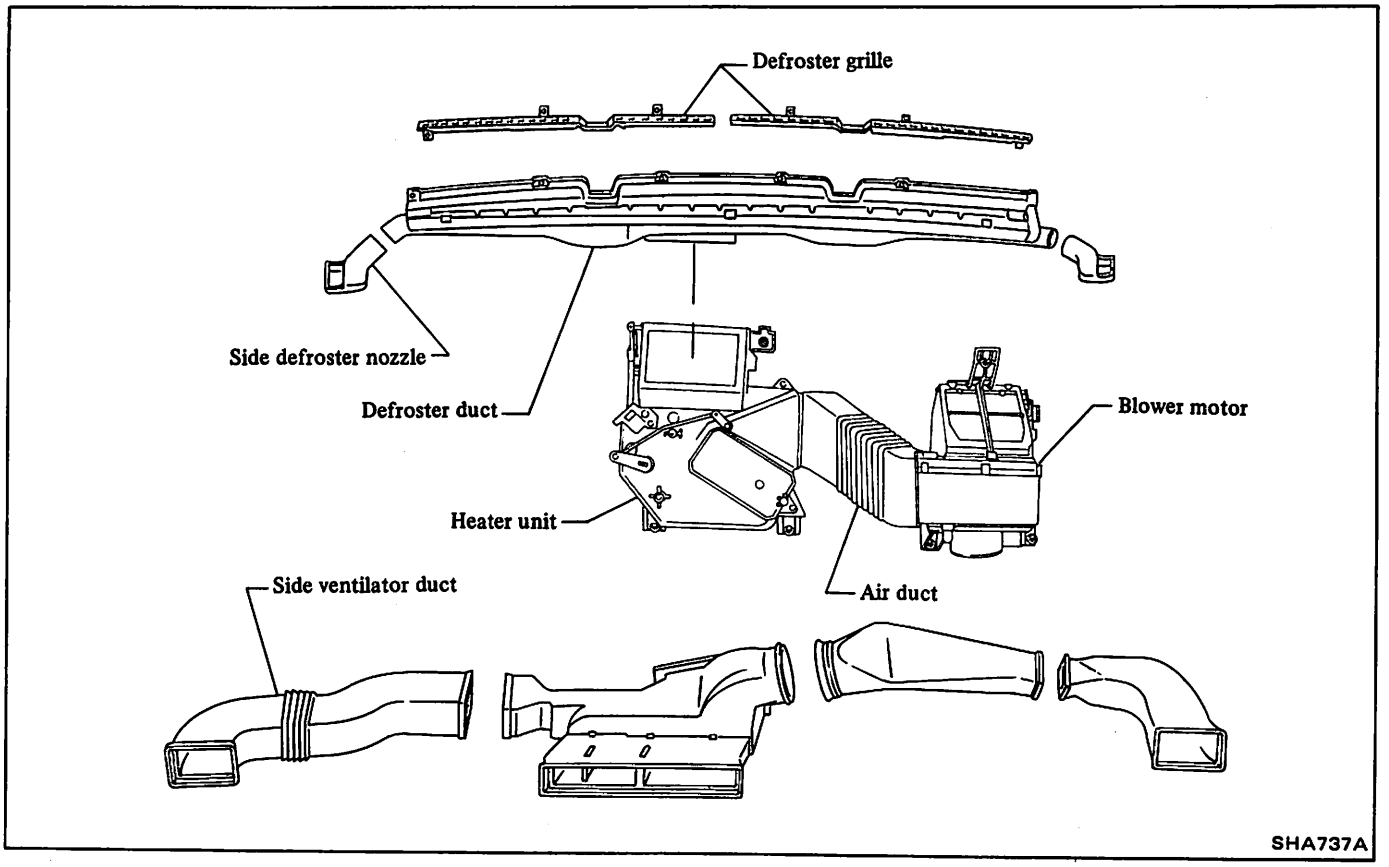
SPECIAL SERVICE TOOLS HA-39

Refer to section MA (Basic Mechanical System) for:

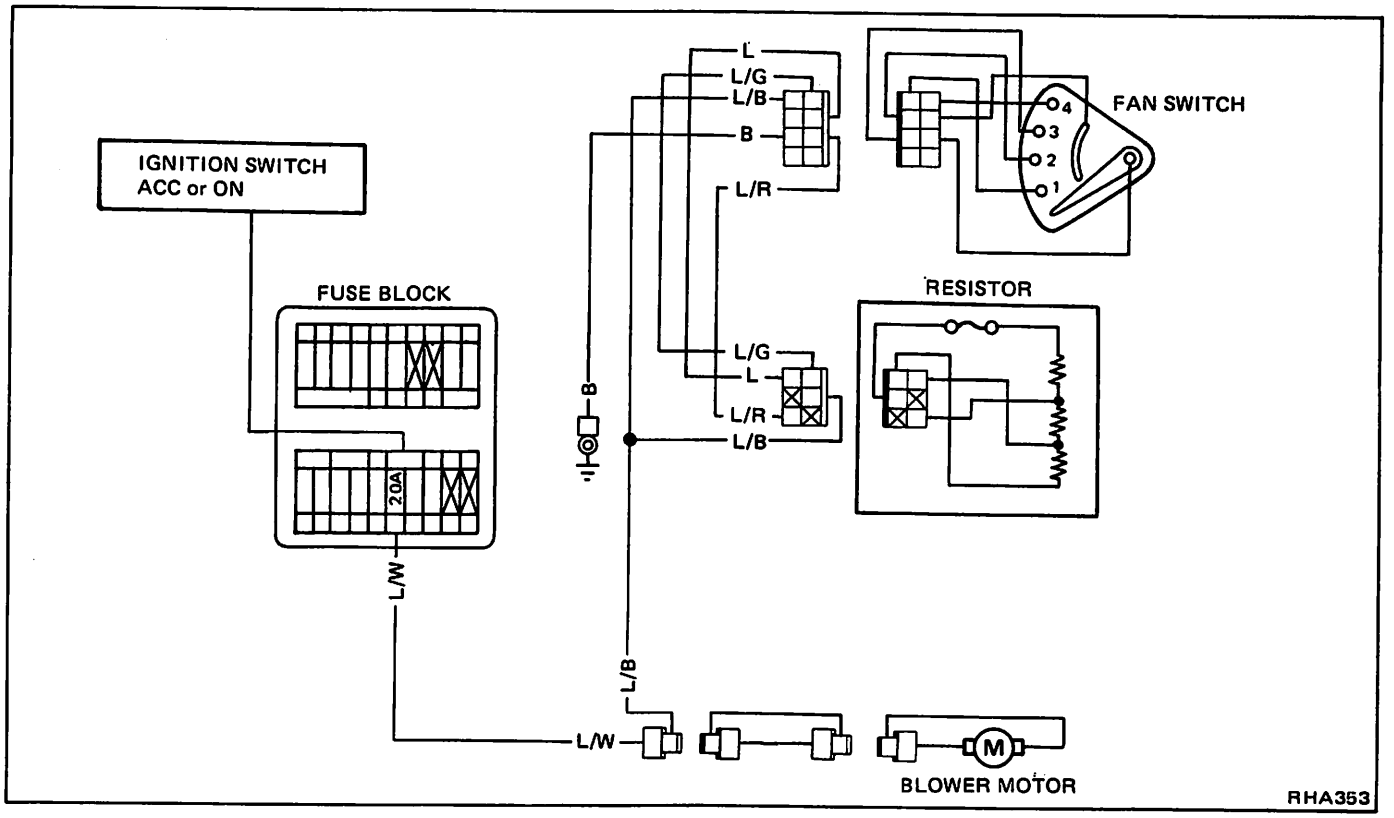
- CHECKING AND ADJUSTING DRIVE BELTS

DESCRIPTION (Heater)

HEATER COMPONENTS

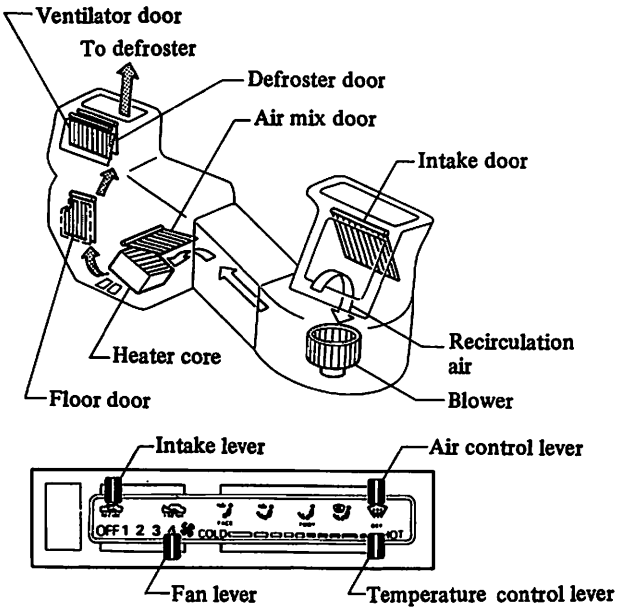


WIRING DIAGRAM

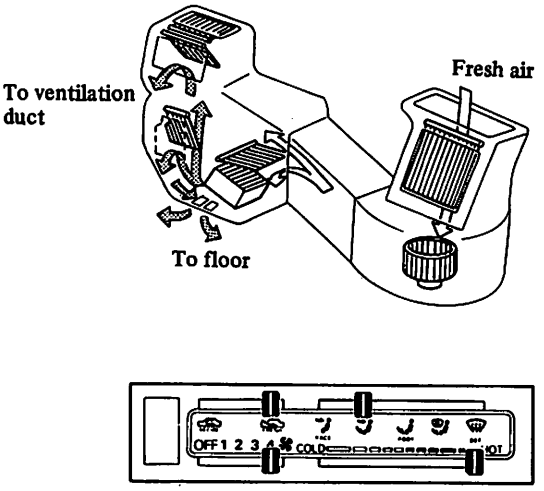


AIR FLOW

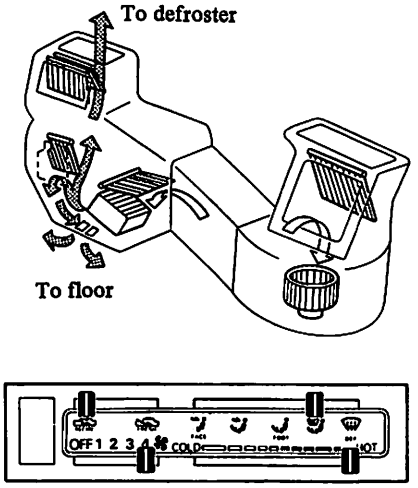
Defroster



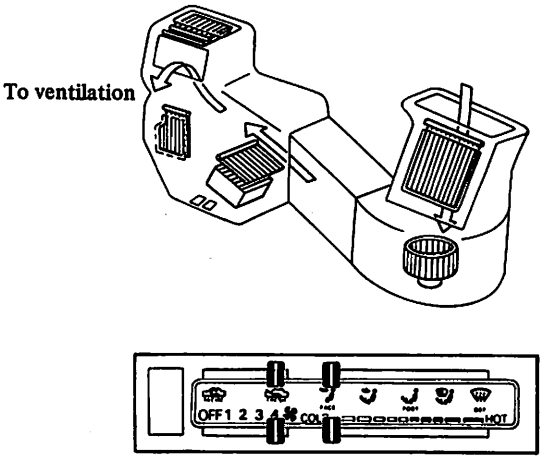
Ventilation and Floor



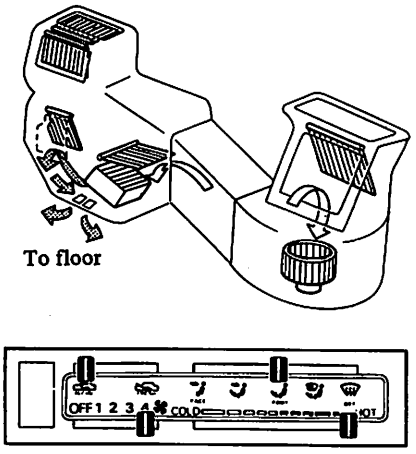
Defroster and Floor



Ventilation



Floor



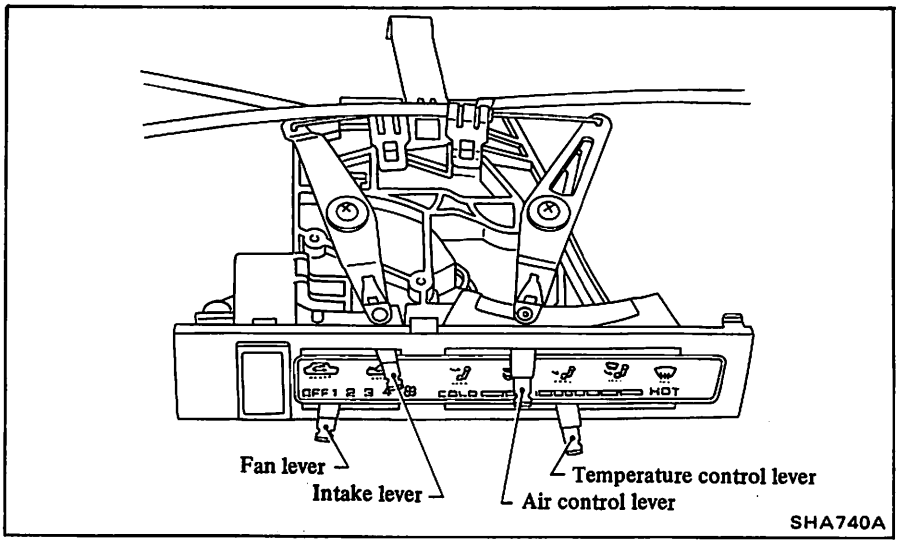
SHA739A

TROUBLE DIAGNOSES AND CORRECTIONS (Heater)

Condition	Probable cause	Corrective action
Insufficient heating performance.		
No heated air discharged.	Cooling water temperature too low.	Check thermostat. Replace as necessary.
	Heater core plugged.	Clean.
	Insufficient cooling water level.	Refill.
	Malfunctioning air mix door.	Adjust control cable.
	Malfunctioning heater cock.	Adjust control cable. Check heater cock. Replace as necessary.
Insufficient air flow to floor.	Blower motor speed too low.	Check motor terminal voltage. Repair poor connection and discontinuity. Replace motor if necessary.
	Malfunctioning floor door.	Adjust control cable.
	Malfunctioning door control cable and lever.	Replace as necessary.
Insufficient defrosting performance.		
Cold air discharged.	Refer to "No heated air discharged".	
Insufficient air flow to defroster.	Malfunctioning defroster door (or faulty seal).	Adjust control cable.
	Malfunctioning door control cable and lever.	Replace as necessary.
	Defroster nozzle plugged.	Clean.
	Leak at defroster duct-to-nozzle connection.	Correct.
Air does not discharge from correct outlets.	Defroster, vent or floor door sticking.	Repair.
Blower motor does not operate.	Refer to Trouble Diagnoses and Corrections (Air conditioner).	
Control lever drags.	Inner wire rubbing against outer case end.	Adjust control cable.
	Control cable bent excessively.	Correct.
	Malfunctioning doors, door levers, etc.	Check and correct.
Outside air comes in with REC position.	Air intake door not operating properly.	Repair or replace.
	Malfunctioning door control cable and lever.	Replace as necessary.
	Control cable out of adjustment.	Adjust control cable.
Noise from blower motor.	Loose bolt in blower motor.	Check and tighten.
	Broken fan blade(s).	Replace fan.

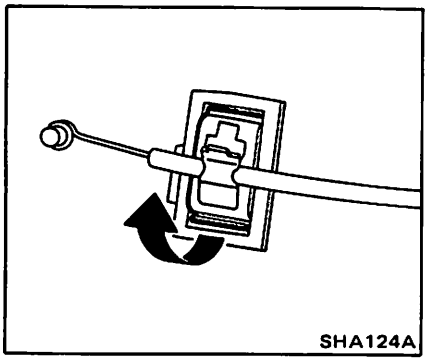
SERVICE PROCEDURES (Heater)

HEATER CONTROL ASSEMBLY

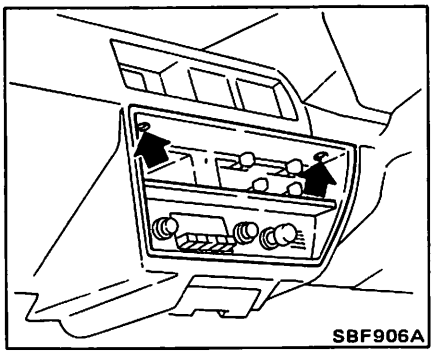


REMOVAL AND INSTALLATION

1. Remove control cables by unfastening clamps at door levers.



2. Disconnect harness connector.
3. Remove heater control finisher and mounting bolts, and remove heater control assembly.

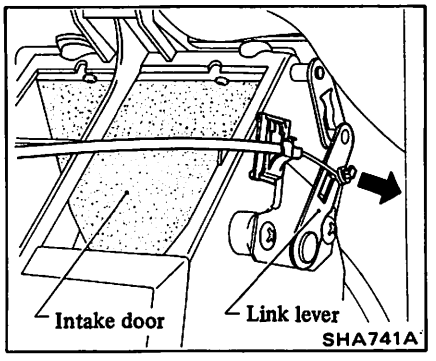


4. Installation is in the reverse order of removal.

ADJUSTMENT

Intake door control cable

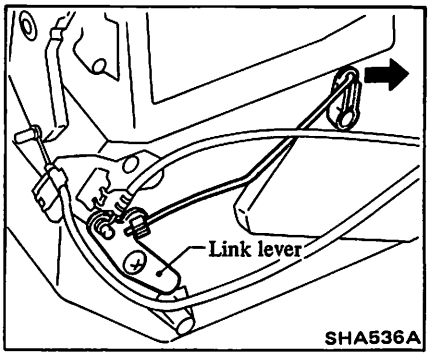
1. Set intake lever at "RECIRC" position ("MAX. A/C" position for models with air conditioner).
2. Set intake door at recirculation position.
3. Connect control cable to link lever and securely clamp the cable.



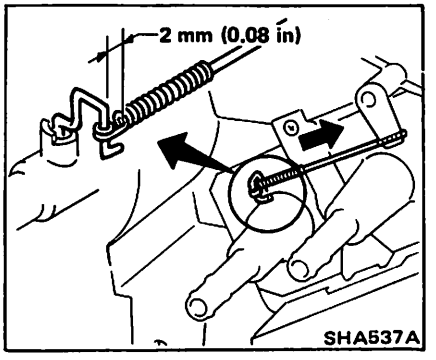
4. Check knob to see if it moves smoothly.

TEMP. control cable

1. Set TEMP. control lever at max. "COLD POSITION".
2. With air mix door knob moved in direction of arrow, connect TEMP. control rod to link lever.
3. Connect control cable to link lever and clamp the cable.



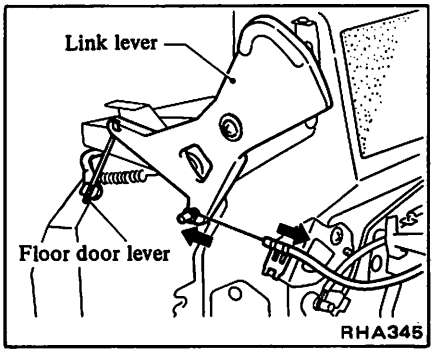
4. Pull control rod of water cock in direction of arrow so that about 2 mm (0.08 in) clearance exists between ends of rod and link lever. Connect the rod to door lever.



5. Check knob to see if it moves smoothly.

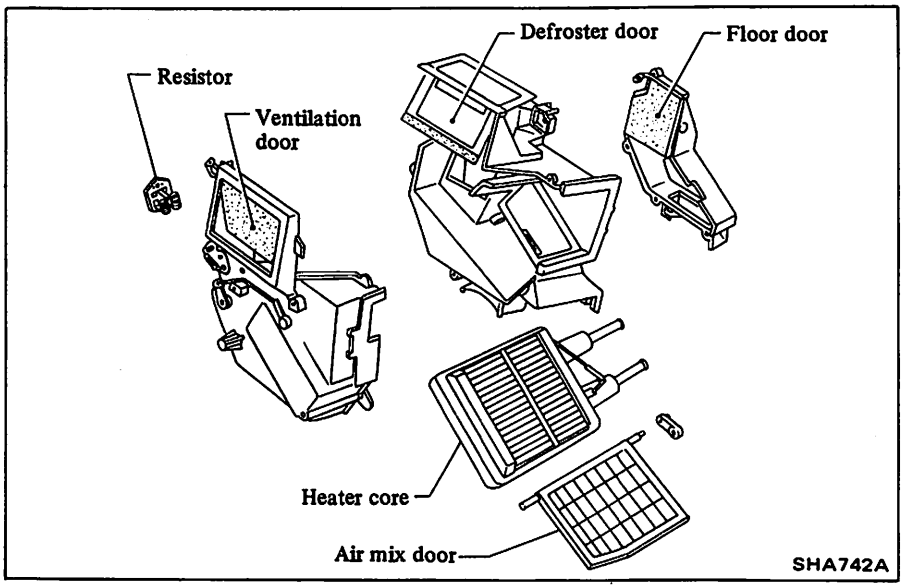
Air control cable

1. Set air control lever at "DEF" position.
2. Move link lever in direction of arrow.
3. Connect air control cable to link lever and clamp the cable.



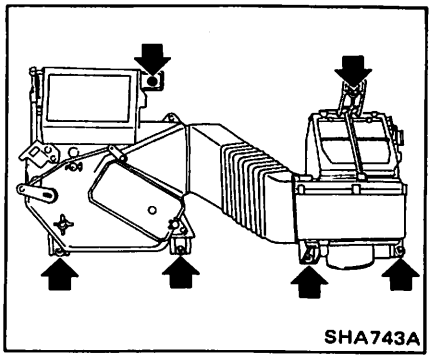
4. Check knob to see if it moves smoothly.

HEATER UNIT



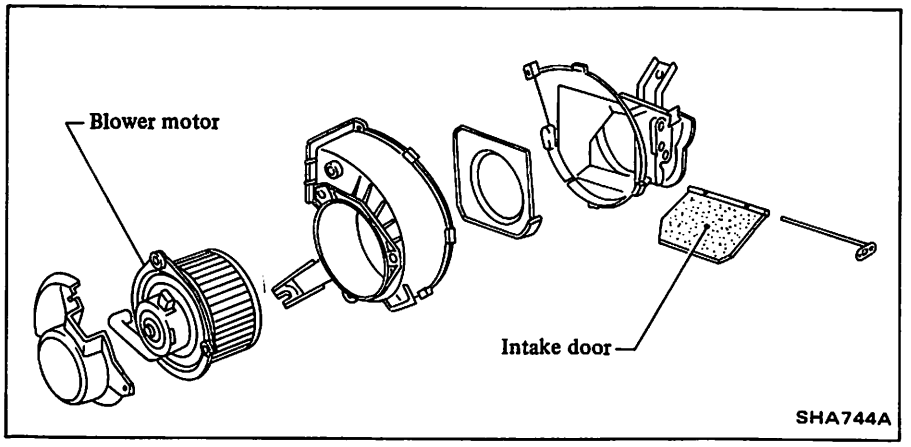
REMOVAL AND INSTALLATION

1. Set TEMP. lever to max. "HOT" position and drain engine coolant.
2. Disconnect heater hoses at engine compartment.
3. Remove instrument assembly. Refer to BF section.
4. Remove heater control assembly.
5. Remove heater unit assembly.



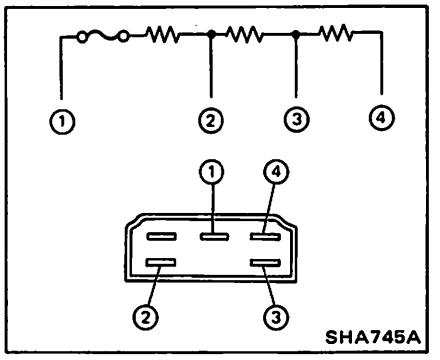
6. Installation is in the reverse order of removal.

BLOWER MOTOR



RESISTOR

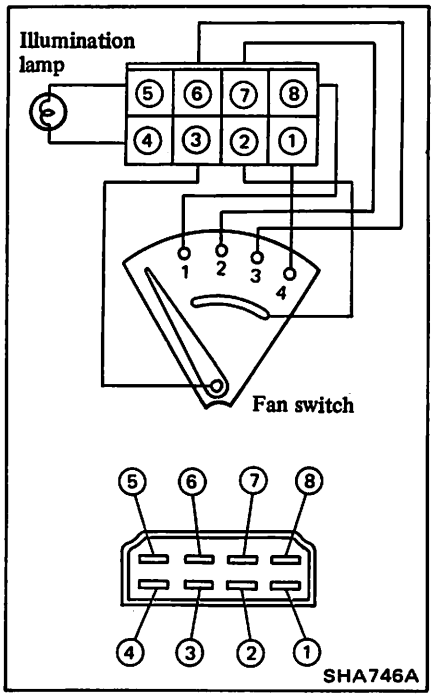
INSPECTION



FAN SWITCH

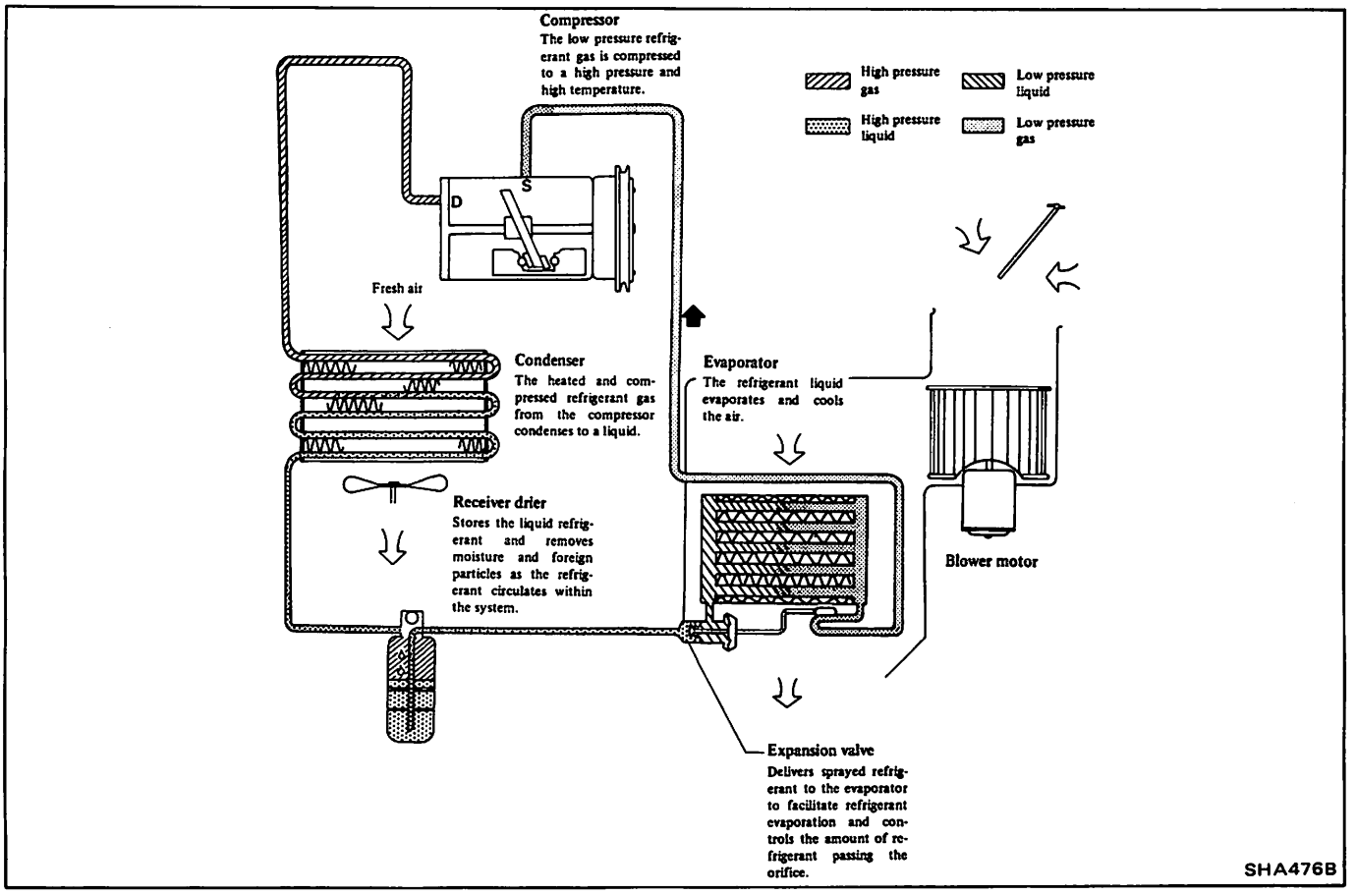
INSPECTION

Check to make sure that continuity exists at each position of fan switch.

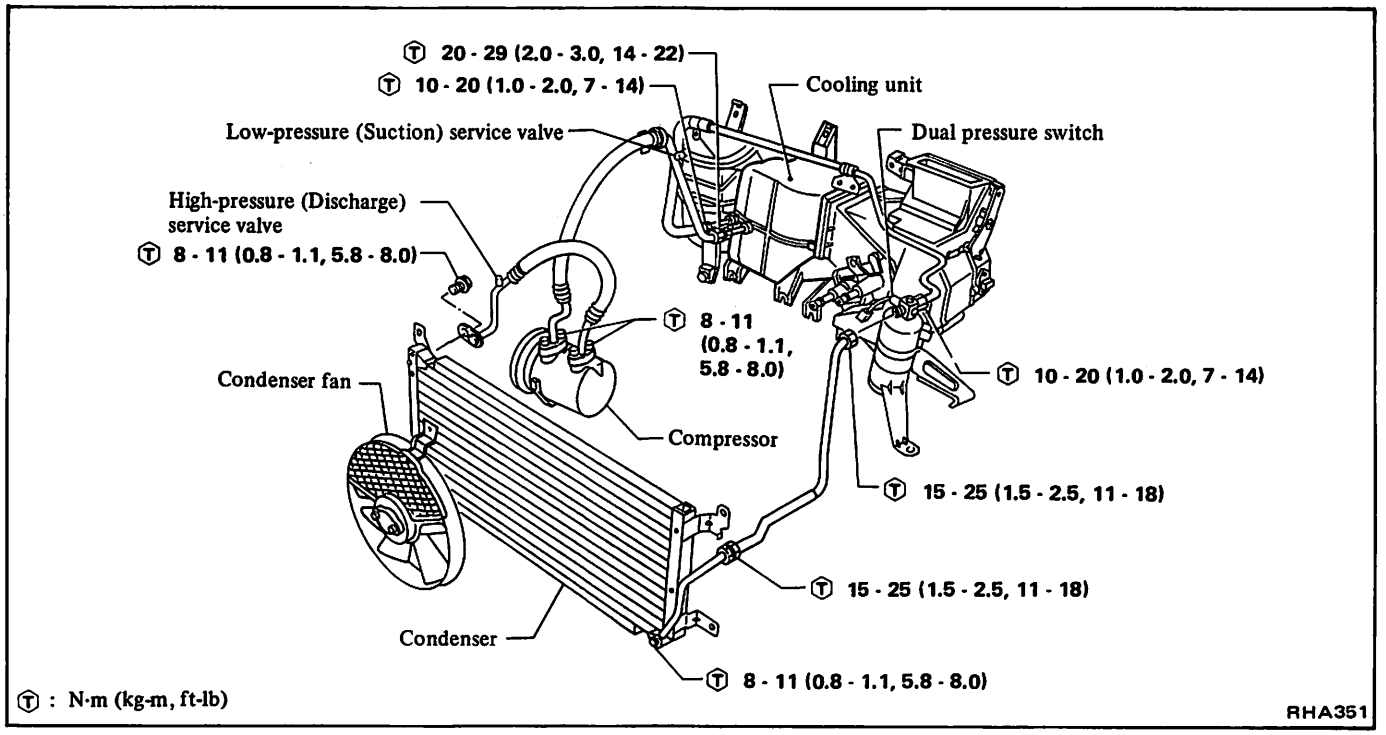


DESCRIPTION (Air conditioner)

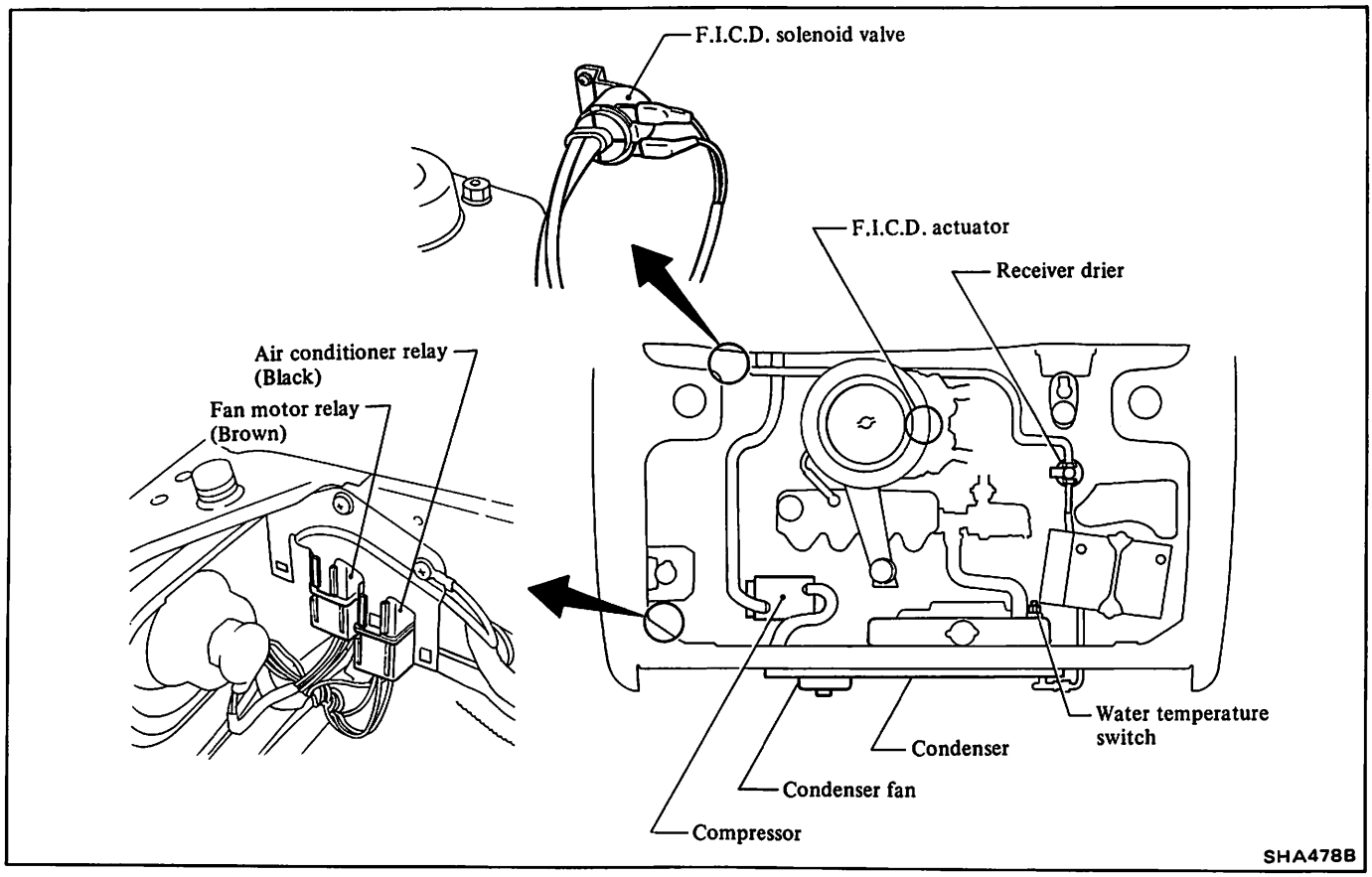
REFRIGERATION CYCLE



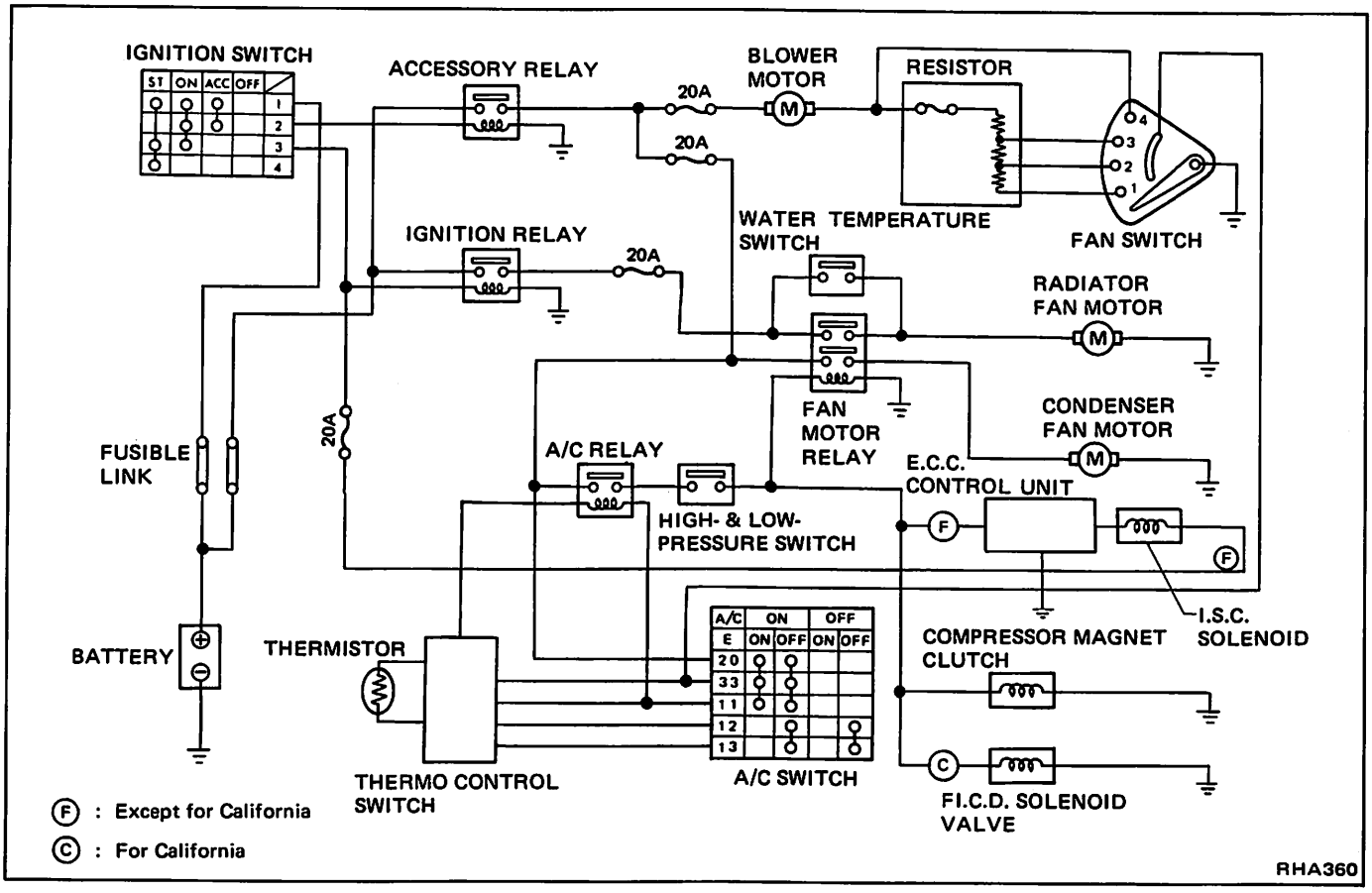
REFRIGERANT LINE



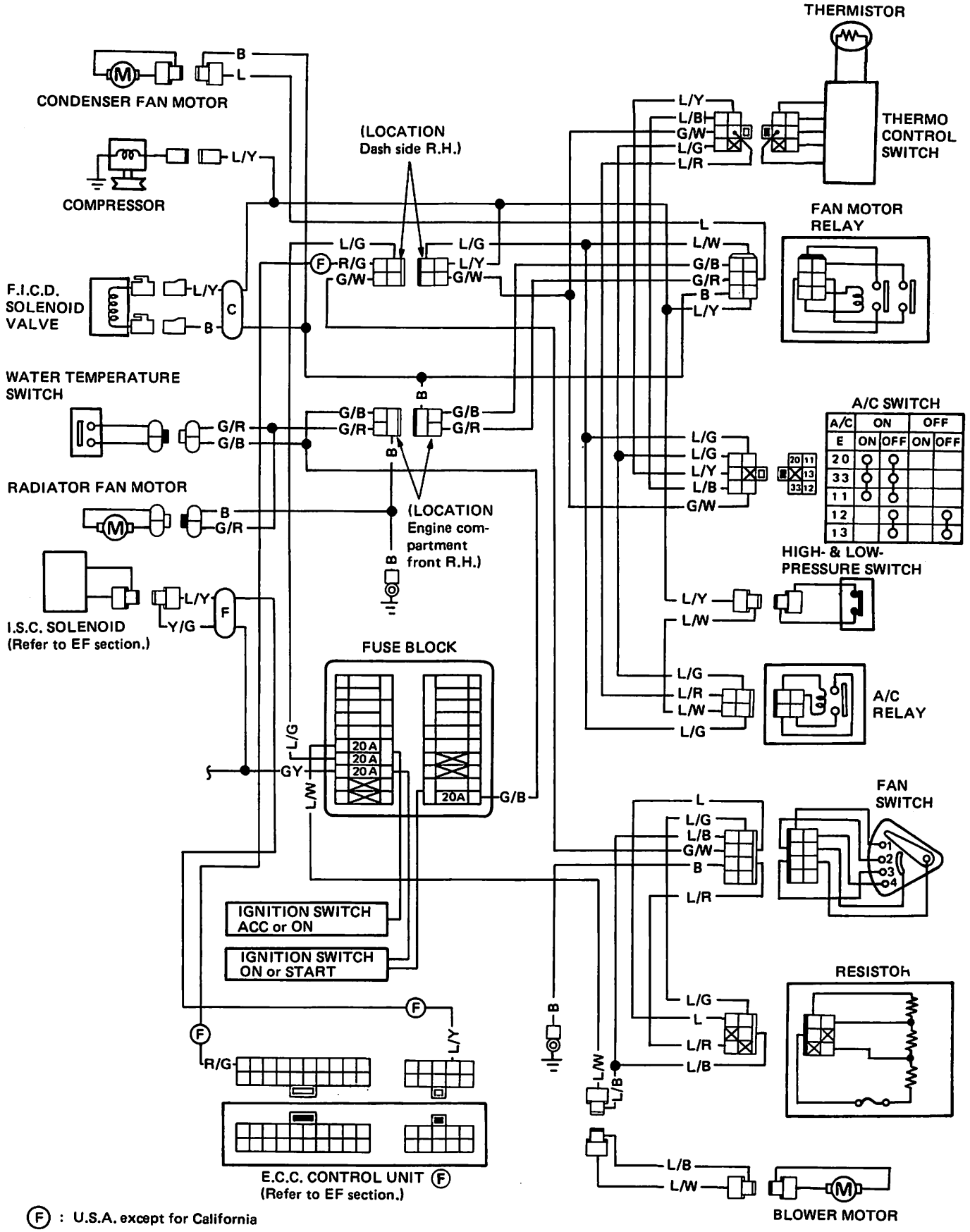
LOCATION OF COMPONENT PARTS



SCHEMATIC



WIRING DIAGRAM



GENERAL SERVICE

PRECAUTIONS

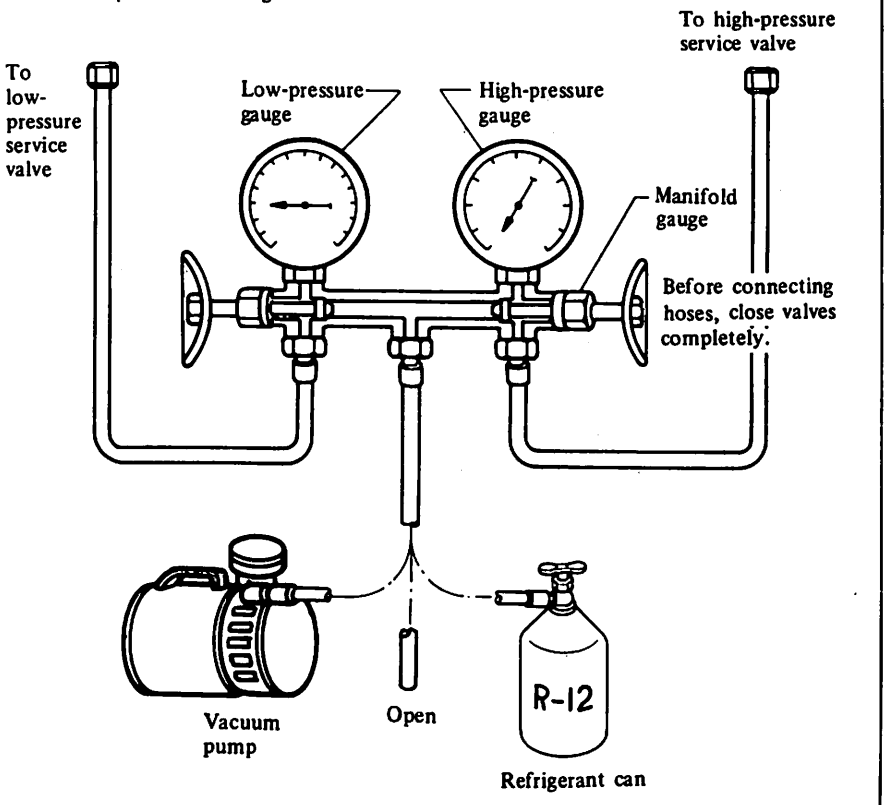
WARNING:

1. **Since direct contact of the liquid refrigerant with your skin will cause frostbite, always be careful when handling. the refrigerant. Always wear goggles to protect your eyes when working around the system.**
2. **The refrigerant service container has a safe strength. However, if handled incorrectly, it will explode. Therefore, always follow the instructions on the label. In particular, never store it in a hot location [above 52°C (126°F)] or drop it from a high height.**
3. **The refrigerant gas is odorless and colorless and breathing may become difficult due to the lack of oxygen. Since the refrigerant gas is heavier than air and will lay close to the floor, be especially careful when handling it in small, confined spaces.**
4. **The refrigerant itself is nonflammable. However, a toxic gas (phosgene gas) is produced when it contacts fire and special care is therefore required when checking for leaks in the system with a halide torch.**
5. **Do not steam clean the system, especially condenser since excessively high pressure will build up in the system, resulting in explosion of the system.**

INSTALLING MANIFOLD GAUGE

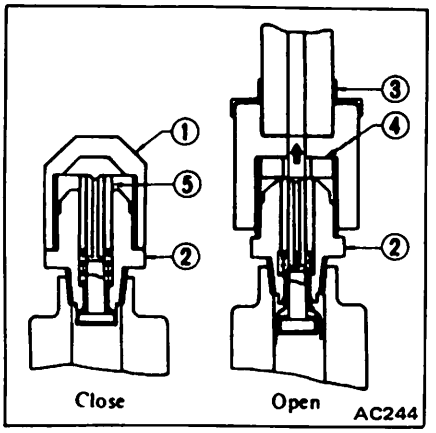
Hoses for the low-pressure service valve (suction valve) and high-pressure service valve (discharge valve) should be connected securely to "high" and "low" connection, respectively, on the manifold gauge.

Refer to identification marks ("S": Suction side or "D": Discharge side) on compressor or Refrigerant Lines.



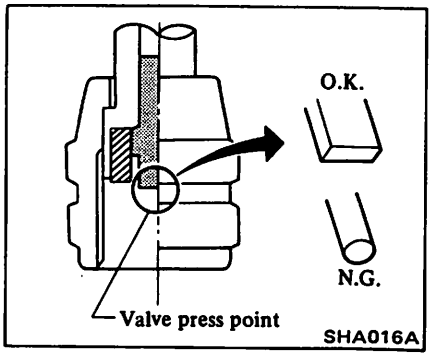
Connection to service valve

1. Fully close both valves of manifold gauge. Connect high- and low-pressure charging hoses to manifold gauge.
2. Remove caps from service valves. Connect high- and low-pressure charging hoses to service valves in system.



1 Cap
2 Service valve
3 Charging hose
4 Packing
5 Check valve

Be careful not to use manifold gauge valve with other similar-looking press point, or insufficient evacuating may occur.



Disconnection from service valve

1. Fully close both valves of manifold gauge.
2. Quickly disconnect two charging hoses from service valves and install caps on service valves.

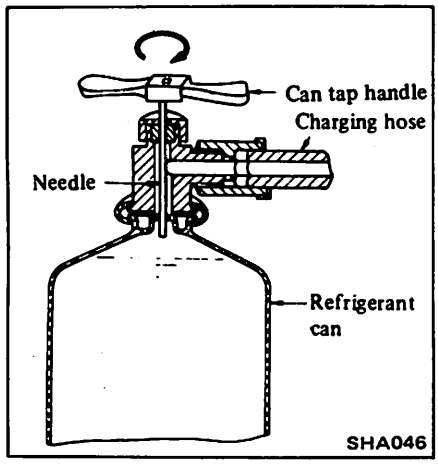
CAUTION:
Do not over-tighten valve cap.

HANDLING REFRIGERANT SERVICE CAN TAP

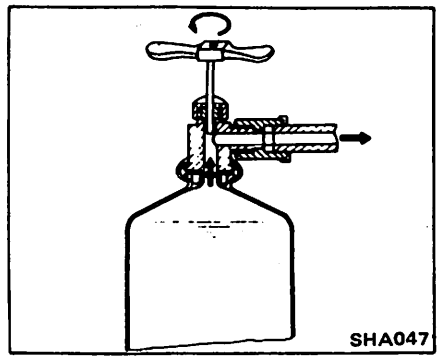
The following procedures apply to conventional can taps.

For correct usage, refer to the manufacturer's instructions.

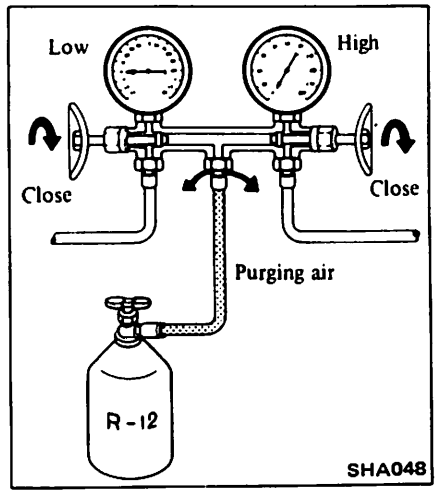
1. Connect charging hose between manifold gauge and can tap.
2. Fully turn in (close) valve stem of manifold gauge.
3. Attach can tap to refrigerant can by turning can tap handle fully counterclockwise.
4. Make a hole in refrigerant can by turning can tap handle clockwise.



5. Turn the handle fully counterclockwise to raise the needle. Refrigerant gas will flow up to the manifold gauge.



6. Purge air from charging hose by loosening charging hose nut at manifold gauge.



DISCHARGING REFRIGERANT

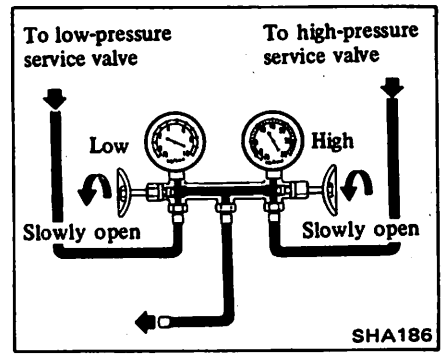
The pressurized refrigerant gas inside the system must be discharged at a pressure approaching atmospheric pressure prior to evacuating refrigerant inside the system.

1. Close high- and low-pressure valves of manifold gauge fully.
2. Connect two charging hoses of manifold gauge to their respective service valves.

WARNING:
Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge.

3. Open both manifold gauge valves and discharge refrigerant from system.

Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.



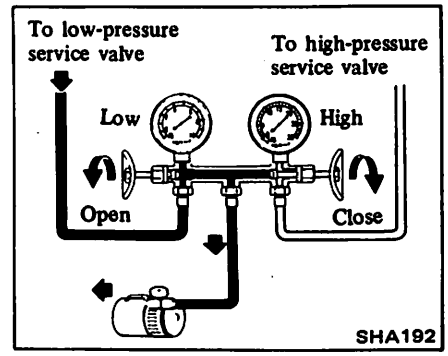
EVACUATING AND CHARGING REFRIGERANT SYSTEM

EVACUATING REFRIGERANT SYSTEM

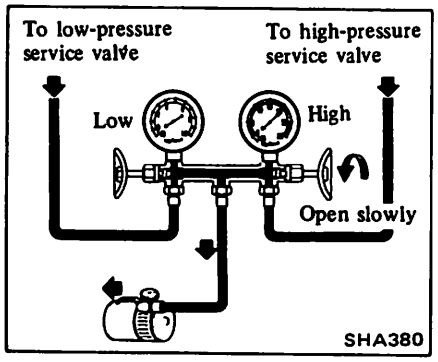
1. Install manifold gauge on system and discharge refrigerant from system until pressure reaches atmospheric pressure.

WARNING:
Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge.

2. Connect center charging hose to vacuum pump.
3. Close both valves of manifold gauge fully. Then start vacuum pump.
4. Open low-pressure valve and suck old refrigerant from system.



5. When low-pressure gauge reading has reached approximately 66.7 kPa (500 mmHg, 19.69 inHg), slowly open high-pressure valve.



6. When pressure inside system has dropped to 94.6 kPa (710 mmHg, 27.95 inHg), fully close both valves of manifold gauge and stop vacuum pump. Let it stand for 5 to 10 minutes in this state and confirm that the reading does not rise.

a. The low-pressure gauge reads lower by 3.3 kPa (25 mmHg, 0.98 inHg) per 300 m (1,000 ft) elevation. Perform evacuation according to the following table.

Elevation m (ft)	Vacuum of system* kPa (mmHg, inHg)
0 (0)	94.6 (710, 27.95)
300 (1,000)	91.3 (685, 26.97)
600 (2,000)	88.0 (660, 25.98)
900 (3,000)	84.6 (635, 25.00)

*: Values show reading of the low-pressure gauge.

b. The rate of ascension of the low-pressure gauge should be less than 3.3 kPa (25 mmHg, 0.98 inHg) in five minutes.

If the pressure rises or the specified negative pressure can not be obtained, there is a leak in the system. In this case, repair the leak as described in the following.

(1) Charge system with a can of refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.

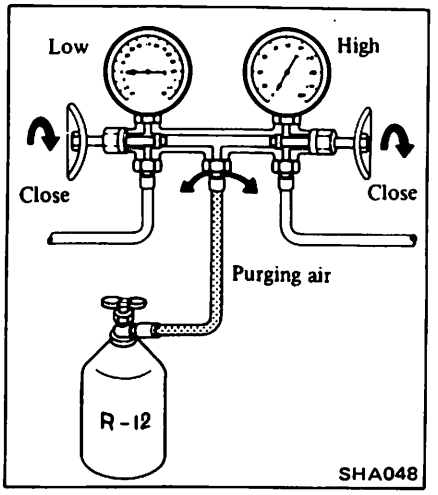
(2) Check for refrigerant leakage with a leak detector. Repair any leakages found. Refer to Checking for Leaks (MA section).

(3) Discharge refrigerant again, and then evacuate system.

CHARGING REFRIGERANT SYSTEM

1. Evacuate refrigerant system.
2. Close manifold gauge valves securely and disconnect charging hose from vacuum pump.
3. Purge air from center charging hose.

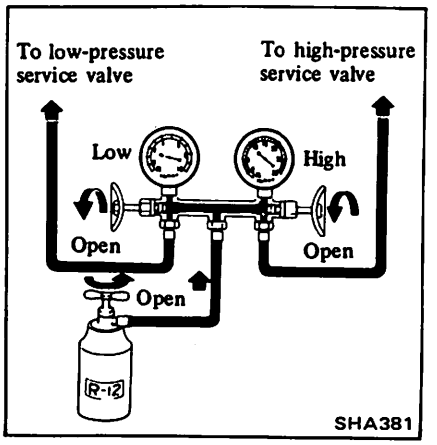
(1) Connect center charging hose to refrigerant can through can top.
(2) Break seal of refrigerant can and purge air.



4. Charge refrigerant into system.

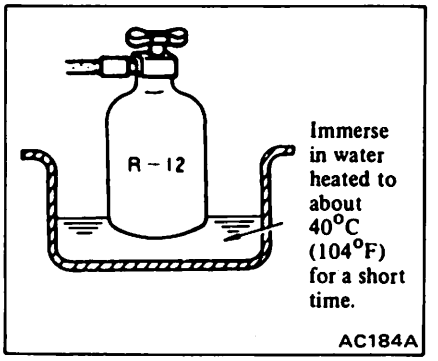
(1) In case of charging refrigerant gas

Open high- and low-pressure valves of manifold gauge and charge refrigerant into system.



When refrigerant charging speed is slow, immerse refrigerant can in water, heated to a temperature of about 40°C (104°F), for a short time.

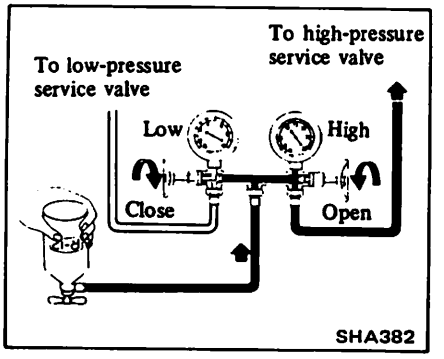
WARNING:
a. Under no circumstances should the refrigerant be warmed in water heated to a temperature of over 52°C (126°F).
b. A blow torch or stove must never be used to warm up the can.



(2) In case of charging liquefied refrigerant

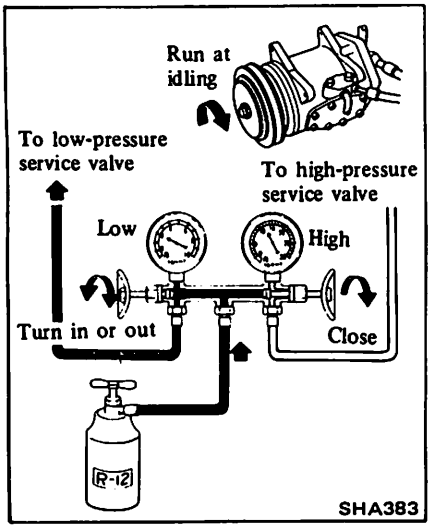
Open high pressure valve of manifold gauge and charge liquefied refrigerant into system with can upside down.

CAUTION:
When charging liquefied refrigerant into the system with the can turned upside down to reduce charging time, charge it only through high pressure (discharge) service valve. After completion of charging, the compressor should always be turned several times manually.



5. **When refrigerant charging speed slows down,** charge it while running the compressor for ease of charging. After completing up to step 3 above, proceed with charging in the following order.
(1) Shut off high pressure valve of manifold gauge.
(2) Run the engine at idling speeds below 1,500 rpm.
(3) Set mode dial, temperature dial and fan lever at maximum cool and speed respectively.
(4) Charge refrigerant while controlling low-pressure gauge reading at 275 kPa (2.8 kg/cm^2, 40 psi) or less by turning in or out low-pressure valve of manifold gauge.

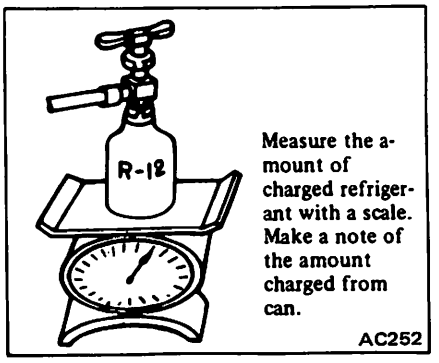
WARNING:
Never charge refrigerant through high pressure side (discharge side) of system since this will force refrigerant back into refrigerant can and can may explode.



6. When refrigerant can is empty, fully close both valves of manifold gauge and replace refrigerant can with a new one.

Before charging refrigerant from new can, **purge air from inside charging hose.**
7. Charge the specified amount of refrigerant into system by weighing charged refrigerant with scale. Overcharging will cause discharge pressure to rise.

Refrigerant capacity:
0.8 - 1.0 kg (1.8 - 2.2 lb)



The state of the bubbles in sight glass should only be used for checking whether the amount of charged refrigerant is small or not. Refer to Checking Refrigerant Level (Section MA). The amount of charged refrigerant can be correctly judged by checking discharge pressure.

8. Close manifold gauge valves. Then detach charging hoses from service valves of system. Be sure to install valve cap on service valve.
9. Confirm that there are no leaks in system by checking with a leak detector.
Refer to Checking for Leaks (HA-16).

Conducting a performance test prior to removing manifold gauge is a good service operation. Refer to Performance Test.

COMPRESSOR OIL LEVEL CHECK

Almost all compressor oil is circulating in the system together with refrigerant. If an excessive quantity of oil is charged into the system, most of the oil goes around the system and stays in the condenser or in the evaporator, thus causing considerable reduction in the cooling capacity of the system. Insufficient compressor oil leads to poor lubrication of the compressor. Whenever replacing any component of the refrigeration system, the original total oil charge must always be maintained.

Check and adjust the quantity of oil according to the following procedures.

CAUTION:
a. The oil should not be transfused from one container into another, as this will possibly cause moisture to mix with the oil.
b. The used oil should not be returned into a container.
c. The oil should not be used if its state of preservation is not clear enough.

Oil capacity

Unit: mℓ (US fl oz, Imp fl oz)

Total in system	200 (6.8, 7.0)
Residual oil in system after oil return operation and draining oil	Approx. 100 (3.4, 3.5)*
Compressor (Service parts) charging amount	200 (6.8, 7.0)

*: All oil cannot be drained from system.

Oil return operation

Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes in order to return oil to compressor.

Checking and adjusting for used compressor

1. After oil return operation, stop the engine and discharge refrigerant and then remove compressor from the vehicle.
2. Drain compressor oil from compressor discharge port and measure the amount.

Oil is sometimes hard to extract when compressor is cooled. Remove oil while compressor is warm [maintained to 40 to 50°C (104 to 122°F)].

3. If the amount is less than 90 mℓ (3.0 US fl oz, 3.2 Imp fl oz), some refrigerant may have leaked out. Conduct leak tests on connections of each system, and if necessary, repair or replace faulty parts.
4. Check the purity of the oil and then adjust oil level following the procedure below.

(a) Oil is clean

Unit: mℓ (US fl oz, Imp fl oz)

Amount of oil drained	Adjusting procedure
Above 90 (3.0, 3.2)*	Oil level is right. Pour in same amount of oil as was drained out.
Below 90 (3.0, 3.2)	Oil level may be low. Pour in 90 mℓ (3.0 US fl oz, 3.2 Imp fl oz) of oil.

*: If amount of oil drained is greater than under normal circumstances, flush air conditioner system with refrigerant. Then pour in 200 mℓ (6.8 US fl oz, 7.0 Imp fl oz) of oil into air conditioner system.

(b) Oil contains chips or other foreign material.
After air conditioner system has been flushed with refrigerant, replace receiver dryer. Then pour in 200 mℓ (6.8 US fl oz, 7.0 Imp fl oz) of oil into air conditioner system.

Checking and adjusting for compressor replacement

200 mℓ (6.8 US fl oz, 7.0 Imp fl oz) of oil is charged in compressor (service parts). So it is necessary to drain the proper amount of oil from new compressor. Follow the procedure below.

1. After oil return operation, drain compressor oil from used compressor and measure the amount.
(It is the same procedure as CHECKING AND ADJUSTING FOR USED COMPRESSOR.)
2. Check the purity of the oil and then adjust oil level following the procedure below.

(a) Oil is clean.

Unit: mℓ (US fl oz, Imp fl oz)

Amount of oil drained from used compressor	Draining amount of oil from new compressor
Above 90 (3.0, 3.2)*	200 (6.8, 7.0) – [Amount of oil drained + 20 (0.7, 0.7)]
Below 90 (3.0, 3.2)	90 (3.0, 3.2)

*: If amount of oil drained is greater than under normal circumstances, flush air conditioner system with refrigerant. Then install new compressor [200 mℓ (6.8 US fl oz, 7.0 Imp fl oz) of oil is charged in compressor service parts.].

Example:

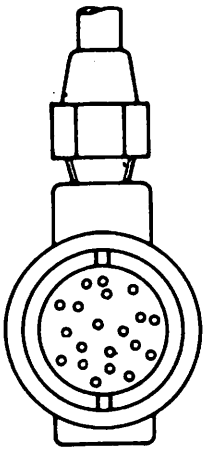
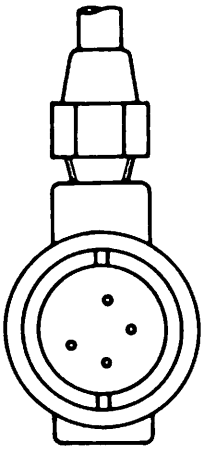
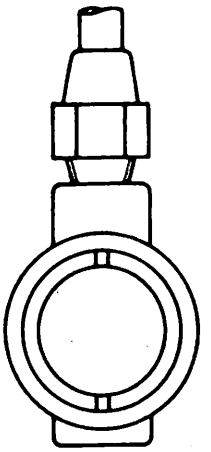
Unit: mℓ (US fl oz, Imp fl oz)

Amount of oil drained from used compressor	Draining amount of oil from new compressor
110 (3.7, 3.9)	70 (2.4, 2.5)
70 (2.4, 2.5)	90 (3.0, 3.2)

(b) Oil contains chips or foreign material.
After air conditioner system has been flushed with refrigerant, replace receiver drier. Then install new compressor [200 mℓ (6.8 US fl oz, 7.0 Imp fl oz) of oil charged in compressor service parts.].

REFRIGERANT LEVEL CHECK

1. Open doors fully.
2. Start the engine.
3. Set air conditioner switch to "ON" position.
4. Set temperature lever to maximum cold position.
5. Set blower to maximum speed.
6. Check sight glass after the lapse of about five minutes. Judge according to the following table.

Check item \ Amount of refrigerant	Almost no refrigerant	Insufficient	Suitable	Too much refrigerant
Temperature of high pressure and low pressure lines.	Almost no difference between high pressure and low pressure side temperature.	High pressure side is warm and low pressure side is fairly cold.	High pressure side is hot and low pressure side is cold.	High pressure side is abnormally hot.
State in sight glass.	Bubbles flow continuously. **Bubbles will disappear and something like mist will flow when refrigerant is nearly gone.**  AC256	The bubbles are seen at intervals of 1 - 2 seconds.  AC257	Almost transparent. Bubbles may appear when engine speed is raised and lowered. **No clear difference exists between these two conditions.**  AC258	No bubbles can be seen.
Pressure of system.	High pressure side is abnormally low.	Both pressure on high and low pressure sides are slightly low.	Both pressures on high and low pressure sides are normal.	Both pressures on high and low pressure sides are abnormally high.
Repair.	**Stop compressor immediately** and conduct an overall check.	Check for gas leakage, repair as required, replenish and charge system.		Discharge refrigerant from service valve of low pressure side.

a. The bubbles seen through the sight glass are influenced by the ambient temperature. Since the bubbles are hard to show up in comparatively low temperatures below 20°C (68°F), it is possible that a slightly larger amount of refrigerant would be filled, if supplied according to the sight glass. Be sure to recheck the amount when it exceeds 20°C (68°F). In higher temperature the bubbles are easy to show up.

b. When the screen in the receiver drier is clogged, the bubbles will appear even if the amount of refrigerant is normal. In this case, the outlet side pipe of the receiver drier becomes considerably cold.

CHECKING COMPRESSOR DRIVE BELT

Refer to Engine Maintenance for inspection and adjustment.

CHECKING HOSES AND PIPES

Check heater and air conditioner for damaged hoses or pipes due to interference or friction with adjoining parts. If damage is minor, repair those affected hose or pipes. If damage is major and if there is the possibility of encountering holes, replace the affected parts.

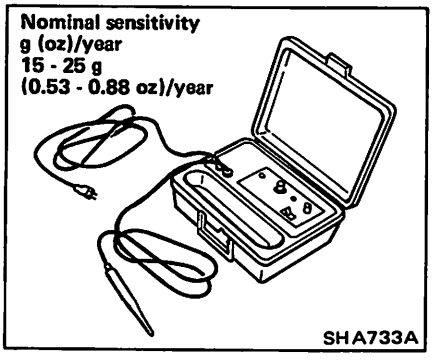
Carefully check hoses and pipes, especially those located close to moving parts or sharp edge of panel.

CHECKING REFRIGERANT LEAKS

Conduct a leak test with electric leak detector whenever leakage of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening of connection fittings.

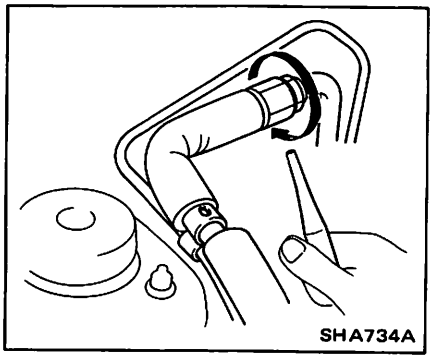
Electric leak-detector

The leak detector is a delicate device that detects small amounts of halogen. **In order to use the device properly, read the manuals put out by each maker and perform the specified maintenance and inspections.**

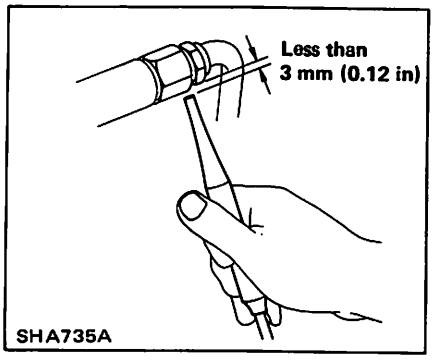


General precautions for handling leak detector

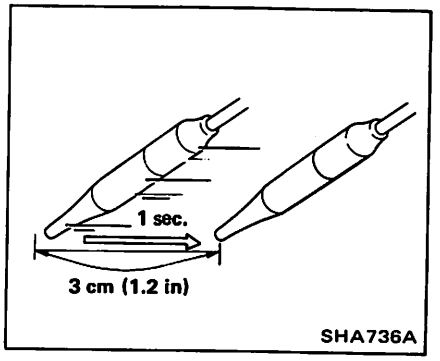
1. The probe must be correctly aimed at the point to be checked. Each fitting must be checked around its entire periphery. Refrigerant gas is heavier than air, so the underside of the fitting must also be checked.



2. The probe must be held as close as possible to the checking point, within 3 mm (0.12 in) of the object.



3. The detector requires a certain length of time to react to the gas. The moving speed of the probe must be maintained at less than 3 cm (1.2 in)/sec.



Measurement standard

If any reaction is noted using a detector having a nominal sensitivity of 15 to 25 g (0.53 to 0.88 oz)/year, that portion found leaking, must be repaired.

- The nominal sensitivity of the detector is determined under the assumption that all the leaking gas is collected by the detector. Accordingly, the quantity of gas actually leaking can amount to five to ten times the indicated value. Generally speaking, leakage of 150 to 200 g (5.29 to 7.05 oz) of refrigerant can cause insufficient cooling.
- Oil deposited during assembling must be wiped off before inspection. Refrigerant easily dissolves in oil, and the presence of oil can cause an error in measurement. This precaution is important when checking a used car for refrigerant leakage.
- If any trace of oil is noted at or around connection fittings, it is a sure indication that refrigerant is leaking.

MAJOR CHECK POINTS

(1) Compressor
- Compressor shaft seal (rotate the compressor by hand)
- Flexible hose connections
- Front and rear head gaskets
- Service valve

(2) Condenser
- Condenser pipe fitting
- Condenser inlet and outlet pipe connections

(3) Refrigerant lines
- Line connections

(4) Evaporator housing
- Inlet and outlet line connections
- Expansion valve

If a gas leak is detected, proceed as follows:

1. Check torque on the connection fitting and, if too loose, tighten to the proper torque. Refer to S.D.S. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge refrigerant from system, disconnect the fittings, and check its seating face for damage. Always replace even if damage is slight.
3. Check compressor oil and add oil if required.
4. Charge refrigerant and recheck for gas leaks. If no leaks are found, evacuate and charge system.

OFF-SEASON MAINTENANCE

During the off-season, operate the compressor for 10 minutes at least once a month while running the engine at idling rpm.

PERFORMANCE TEST

PERFORMANCE CHART

TEST CONDITION

Testing must be performed as follows:

Car location:	Indoors or in the shade
Doors:	Closed
Door window:	Open
Hood:	Open
TEMP. lever position:	Max. COLD
Air control lever position:	(Ventilation)
INTAKE lever position:	RECIRC
FAN lever position:	4
Engine speed:	1,500 rpm
Time required before starting testing after air conditioner starts operating:	More than 10 minutes

TEST READING

Recirculating-to-discharge air temperature table

Inside air (Recirculating air at blower inlet)		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
40 - 60	25 (77)	6.0 - 8.5 (43 - 47)
	30 (86)	9.0 - 12.5 (48 - 55)
	35 (95)	13.0 - 18.5 (55 - 65)
60 - 80	25 (77)	8.5 - 12.8 (47 - 55)
	30 (86)	12.5 - 18.4 (55 - 65)
	35 (95)	18.5 - 26.7 (65 - 80)

Ambient air temperature-to-compressor pressure table

Ambient air		High pressure (Discharge side) kPa (kg/cm², psi)	Low pressure (Suction side) kPa (kg/cm², psi)
Relative humidity %	Air temperature °C (°F)		
40 - 80	25 (77)	1,118 - 1,353 (11.4 - 13.8, 162 - 196)	127 - 206 (1.3 - 2.1, 18 - 30)
	30 (86)	1,353 - 1,657 (13.8 - 16.9, 196 - 240)	157 - 255 (1.6 - 2.6, 23 - 37)
	35 (95)	1,638 - 2,040 (16.7 - 20.8, 237 - 296)	186 - 304 (1.9 - 3.1, 27 - 44)

a. The pressure will change during the following conditions:

- **When blower speed is low, discharge pressure will drop.**
- **When the relative humidity of intake air is low, discharge pressure will drop.**

b. The temperature will change during the following condition:

- **When the ambient air temperature is low, the outlet air temperature will become low.**

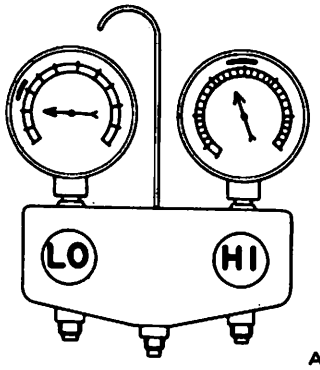
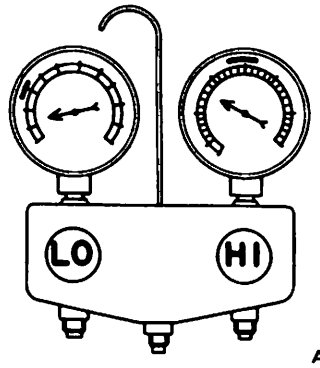
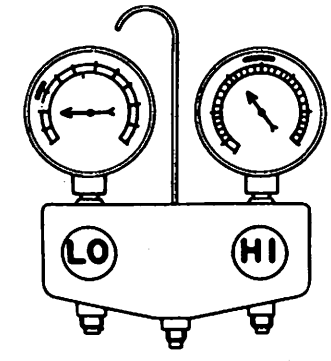
If the test reveals that there is any abnormality in system pressure, isolate the cause and repair. Refer to Performance Test Diagnoses.

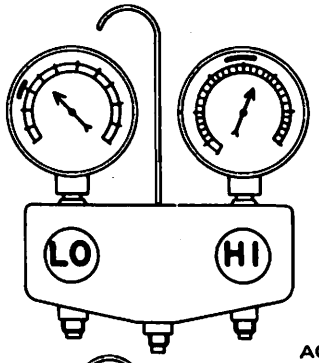
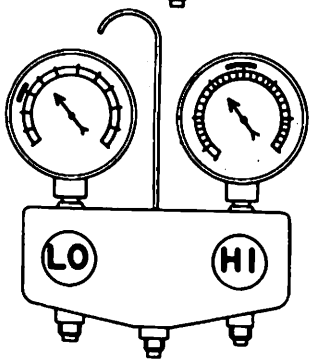
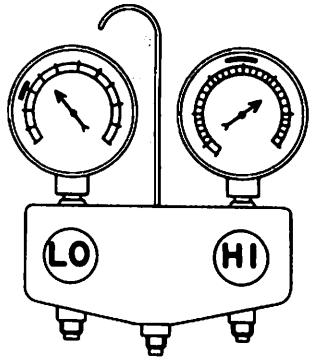
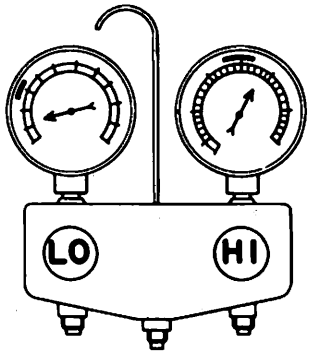
PERFORMANCE TEST DIAGNOSES

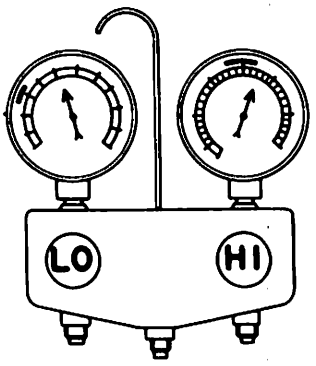
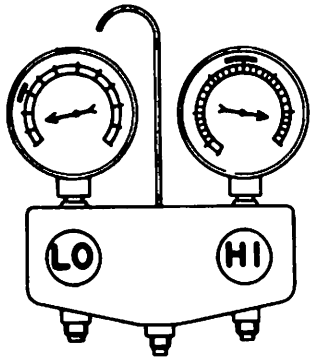
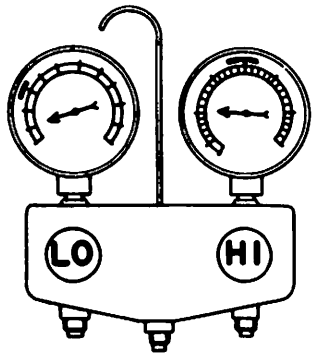
Characteristics revealed on the manifold gauge reading for the air conditioning system are shown in the following.

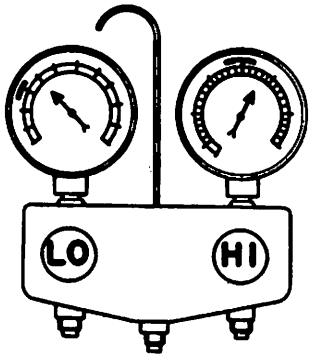
As to the method of a performance test, refer to the item of "Performance Test".

In the following table, the portion marked with ink on each gauge scale indicates a range based on the assumption that the air conditioning system is in good order. This range is described in PERFORMANCE CHART.

Condition	Probable cause	Corrective action
INSUFFICIENT REFRIGERANT CHARGE  AC352A Insufficient cooling. Bubbles appear in sight glass.	Refrigerant is small, or leaking a little.	1. Leak test. 2. Repair leak. 3. Charge system. **Evacuate, as necessary, and recharge system.**
ALMOST NO REFRIGERANT  AC353A No cooling action. A lot of bubbles or something like mist appear in sight glass.	Serious refrigerant leak.	**Stop compressor immediately.** 1. Leak test. 2. Discharge system. 3. Repair leak(s). 4. Replace receiver drier if necessary. 5. Check oil level. 6. Evacuate and recharge system.
FAULTY EXPANSION VALVE  AC354A Slight cooling. Sweating or frosted expansion valve inlet.	Expansion valve restricts refrigerant flow. • Expansion valve is clogged. • Expansion valve is inoperative. Valve stuck closed. Thermal bulb has lost charge.	If valve inlet reveals sweat or frost: 1. Discharge system. 2. Remove valve and clean it. Replace it if necessary. 3. Evacuate system. 4. Charge system. If valve does not operate: 1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

Condition		Probable cause	Corrective action
 AC355A	Insufficient cooling. Sweated suction line.	Expansion valve allows too much refrigerant through evaporator.	Check valve for operation. If suction side does not show a pressure decrease, replace valve.
 AC356A	No cooling. Sweating or frosted suction line.	Faulty expansion valve.	1. Discharge system. 2. Replace valve. 3. Evacuate and replace system.
AIR IN SYSTEM			
 AC359A	Insufficient cooling. Sight glass shows occasional bubbles.	Air mixed with refrigerant in system.	1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
MOISTURE IN SYSTEM			
 AC360A	After operation for a while, pressure on suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As a warning of this, reading shows 39 kPa (0.4 kg/cm^2, 6 psi) vibration.	Drier is saturated with moisture. Moisture has frozen at expansion valve. Refrigerant flow is restricted.	1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely. (Repeat 30-minute evacuating three times.) 4. Recharge system.

Condition	Probable cause	Corrective action
FAULTY CONDENSER  AC361A No cooling action: engine may overheat. Bubbles appear in sight glass of drier. Suction line is very hot.	Usually a malfunctioning condenser.	• Check fan belt and fluid coupling. • Check condenser for dirt accumulation. • Check engine cooling system for overheat. • Check for refrigerant overcharge. **If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.**
HIGH PRESSURE LINE BLOCKED  AC362A Insufficient cooling. Frosted high pressure liquid line.	Drier clogged, or restriction in high pressure line.	1. Discharge system. 2. Remove receiver drier or strainer and replace it. 3. Evacuate and charge system.
FAULTY COMPRESSOR  AC363A Insufficient cooling.	Internal problem in compressor, or damaged gasket and valve.	1. Discharge system. 2. Remove and check compressor. 3. Repair or replace compressor. 4. Check oil level. 5. Replace receiver drier. 6. Evacuate and charge system.

Condition		Probable cause	Corrective action
TOO MUCH OIL IN SYSTEM (Excessive)  AC364A	Insufficient cooling.	Too much oil circulates with refrigerant, causing the cooling capacity of the system to be reduced.	Refer to Oil Level Check for correcting oil level.

SERVICE PROCEDURES

PRECAUTIONS FOR REMOVAL AND INSTALLATION

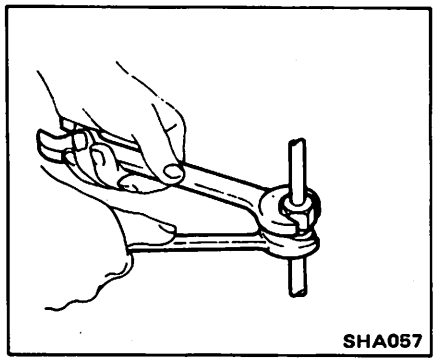
When replacing refrigerant cycle components, observe the following:

1. Disconnect battery ground cable.
2. Before starting work, be sure to discharge system.

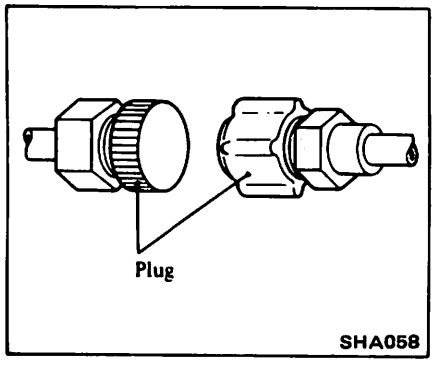
WARNING:
Gradually loosen discharge side hose fitting, and remove it after remaining pressure has been released.

CAUTION:

- When disconnecting or connecting tubes, be sure to use two wrenches on both tubes.


SHA057

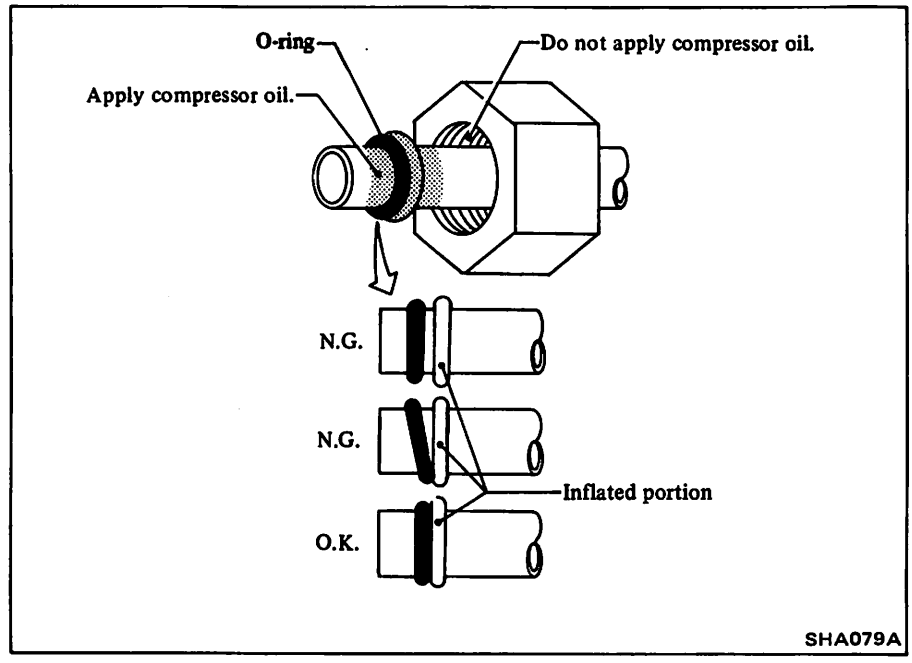
- After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.



SHA058

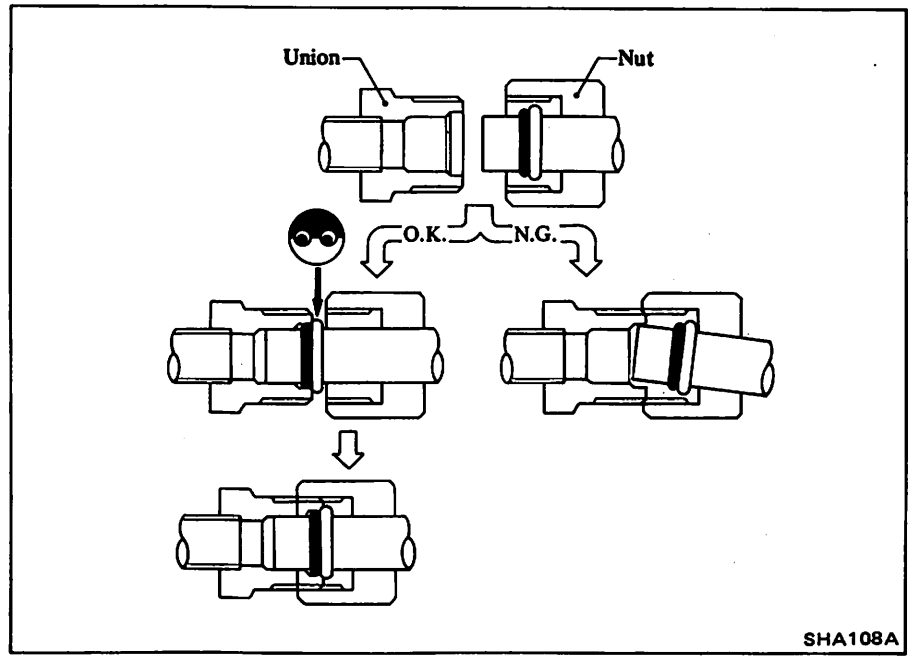
- Compressed air must never be used to clean dirty line. Clean with refrigerant gas.
- Do not reuse used O-ring.

- When connecting tube, apply compressor oil to portions shown in illustration. Be careful not to apply oil to threaded portion.
- O-ring must be closely attached to inflated portion of tube.



SHA079A

- After inserting tube into union until O-ring is no longer visible, tighten nut to specified torque.

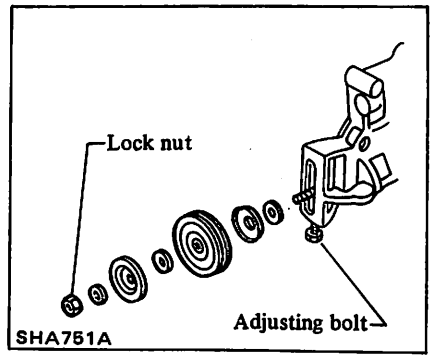


SHA108A

COMPRESSOR IDLER PULLEY

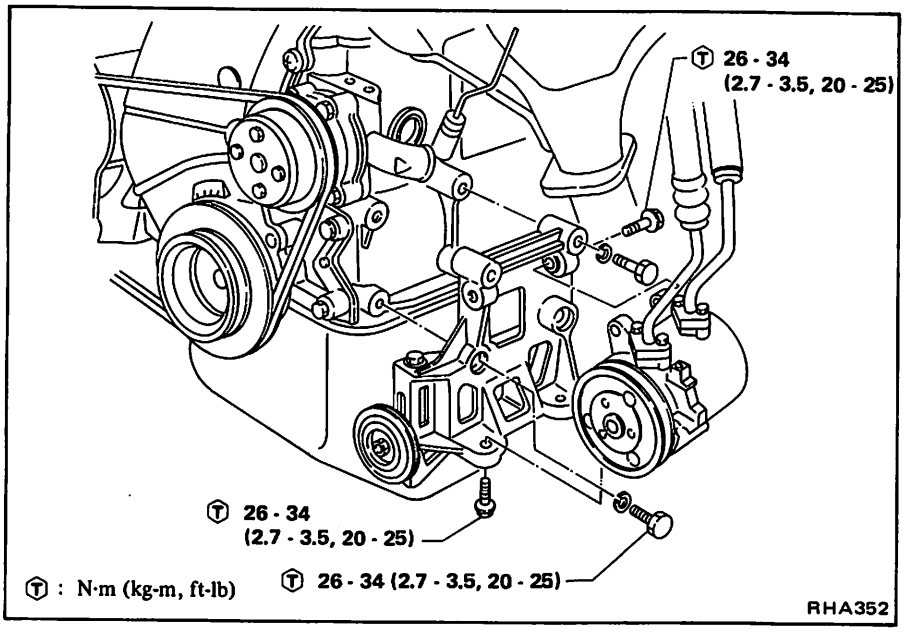
REMOVAL AND INSTALLATION

1. Loosen idler pulley lock nut and fully loosen adjusting bolt.
2. Remove drive belt.
3. Remove idler pulley assembly.
4. Installation is in the reverse order of removal.



Refer to Checking and Adjusting Drive Belts (Section MA) for drive belt tension.

COMPRESSOR



REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Discharge refrigerant from system. Refer to General Service.
3. Block rear wheels with chocks and raise front of car, and then support it with safety stands. Refer to section GI for Lifting Points and Towing.
4. Remove compressor drive belt.
5. Disconnect compressor clutch harness.
6. Disconnect high and low flexible hoses from compressor.
7. Remove compressor.

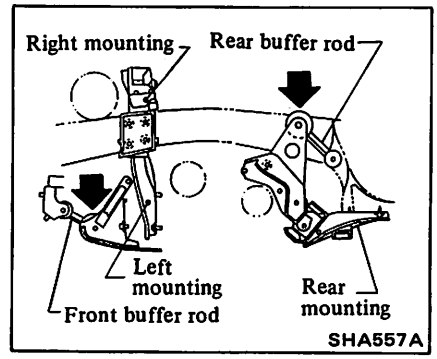
CAUTION:

Do not leave the compressor on its side or upside down for more than 10 minutes, because the compressor oil will enter the low pressure chambers. If, under that condition, compressor should be operated suddenly, internal damage would result. To expel oil from chambers, handcrank compressor several times in its installed condition.

8. Installation is in the reverse order of removal.

When connecting high and low flexible hoses to compressor, install new O-ring into connection.

After installing compressor on engine, loosen bolts securing front and rear buffer rods on engine side and tighten them again. When tightening bolts, be careful not to place your hand or any other object on engine.



Ⓣ : Front and rear buffer rods
39 - 49 N·m
(4.0 - 5.0 kg-m,
29 - 36 ft-lb)

CONDENSER

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Discharge refrigerant from system. Refer to General Service.
3. Remove radiator grille.
4. Disconnect refrigerant lines from condenser.
5. Remove condenser cooling fan.
6. Remove radiator fixing bolts and nuts.
7. Remove condenser fixing bolts, then remove condenser while pushing away radiator in the direction of engine side.

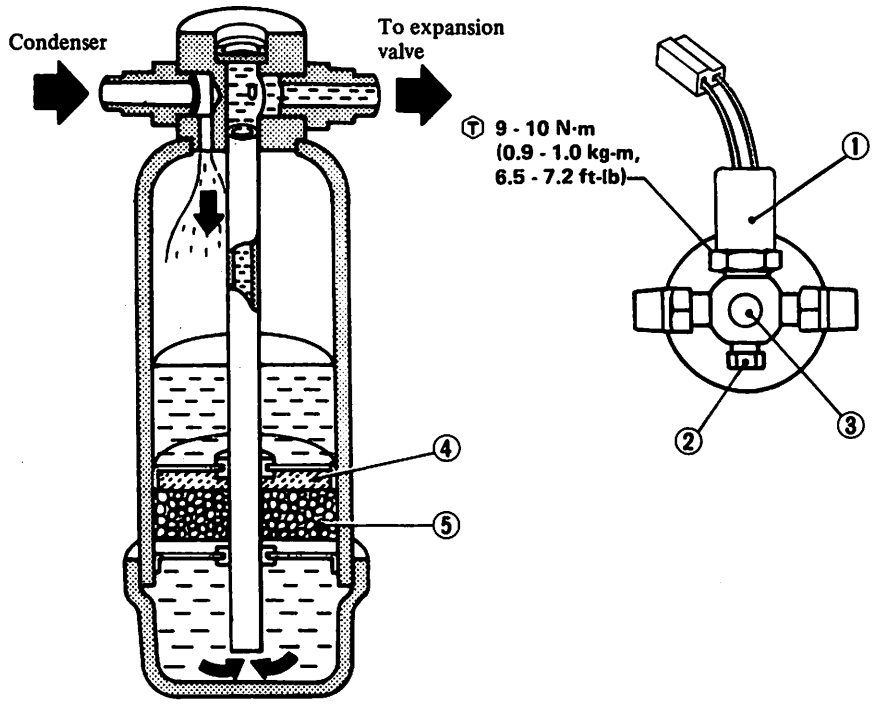
INSPECTION

Inspect joints of inlet and outlet pipes for cracks and scratches. Upon finding any problem which may cause gas to leak, repair or replace condenser.
Condenser fins or air passages clogged with dirt, insects or leaves will reduce cooling efficiency of condenser. In such a case, clean fins or air passages with compressed air.

CAUTION:

a. Do not clean condenser with steam. Be sure to use cold water or compressed air.
b. Plug all openings to prevent entrance of dirt and moisture into receiver drier.

RECEIVER DRIER



1 Dual pressure switch:
Turns off when refrigerant pressure reaches at more than 2,452 kPa (25 kg/cm², 356 psi) and less than 216 kPa (2.2 kg/cm², 31 psi), cutting compressor power supply.
2 Fusible plug:
Open at temperatures above 105°C (221°F), thereby discharging refrigerant to the atmosphere. If this valve opened, check the refrigerant line and replace valve.
3 Sight glass
4 Strainer:
Removes foreign material in refrigerant.
5 Desiccant:
Removes water in refrigerant.

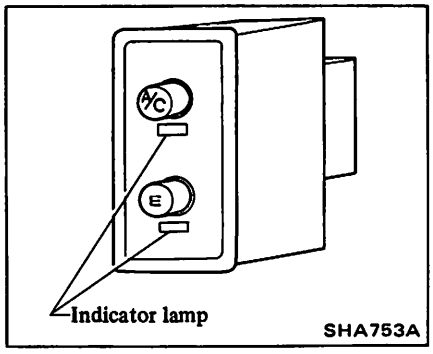
SHA752A

CAUTION:
Plug all openings to prevent entrance of dirt and moisture into receiver drier.

AIR CONDITIONER SWITCH AND THERMO SWITCH

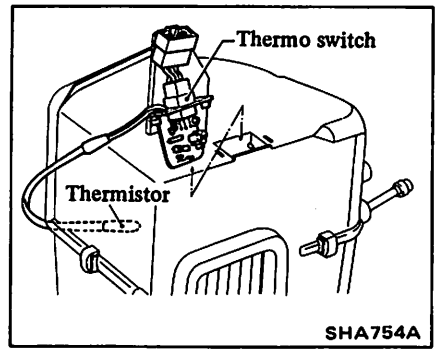
The air conditioner switch consists of "A/C" and "E" push buttons and sets the Max. or Economy condition on the air conditioner. The specified temperature in the evaporator which turns the air conditioner on or off is different for Max. and Economy modes.

"A/C" switch		ON	ON	OFF	OFF
"E" switch		OFF	ON	ON	OFF
Indicator lamp	"A/C" side	ON	ON	OFF	OFF
	"E" side	OFF	ON	OFF	OFF
Air conditioner		Operated (Max.)	Operated (Economy)	Not operated	Not operated



SHA753A

The thermistor detects the evaporator temperature and the thermo switch turns the compressor on or off. The thermo switch has a variable thermo control design for greater fuel economy.



SHA754A

Maximum/Economy	Evaporator outlet air temperature °C (°F)	Compressor
Maximum	Below 0 - 1 (32 - 34)	OFF
	Above 2.5 - 3.5 (37 - 38)	ON
Economy	Below 4 - 6 (39 - 43)	OFF
	Above 6.5 - 8.5 (44 - 47)	ON

COOLING UNIT

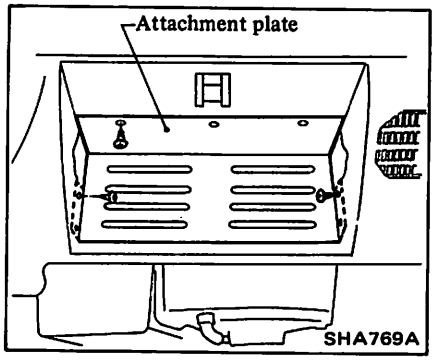
REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Discharge refrigerant from system.
3. Disconnect refrigerant lines from evaporator.

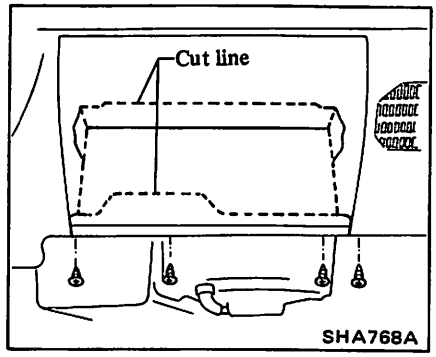
Remove piping grommet and cover.

CAUTION:
Immediately plug up all openings to prevent entrance of dirt and moisture.

4. Remove passenger side instrument lower cover and glove box. (Refer to section BF.) Remove attachment plate from instrument panel.

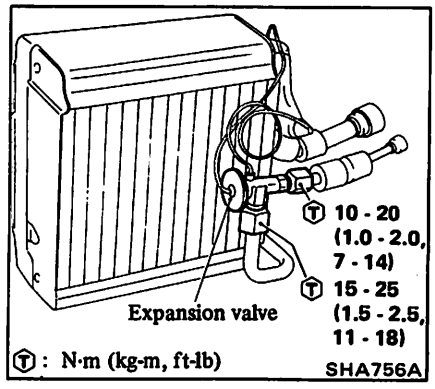


For vehicles with factory installed air conditioner, cut instrument panel with hacksaw blade on cut-lines. Before cutting, cover blower motor vent holes with tape. After cutting, brush the shavings away from the area around blower motor and remove tape.



5. Remove blower motor unit.
6. Remove cooling unit.
7. Installation is in the reverse order of removal. After reinstalling the cooling unit, install the attachment plate to the instrument panel.

EVAPORATOR



1. Clean fins and check for corrosion.

CAUTION:
a. Do not clean evaporator with steam. Be sure to use cold water or compressed air.
b. Do not disassemble expansion valve. Replace as assembly if necessary.

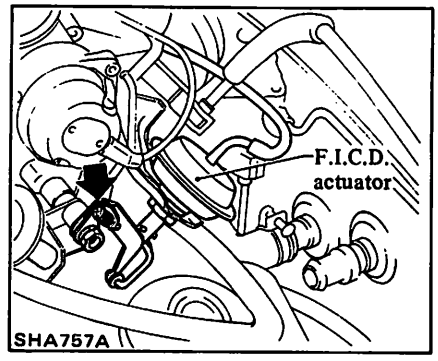
2. Check for gas leaks at fins and expansion valve.

If there are leaks, retighten or replace.

FAST IDLE CONTROL DEVICE (F.I.C.D.) (Only for California)

ADJUSTMENT OF IDLE SPEED

1. Run engine until it reaches operating temperature.
2. With air conditioning system OFF (when compressor is not operated), make sure that engine is at correct idle speed.
3. With air conditioning system ON (Air conditioner switch at "A/C" position, fan control lever at "4" position), make sure that compressor, F.I.C.D. actuator and solenoid valve are functioning properly.
4. Set idle speed at the specified value.



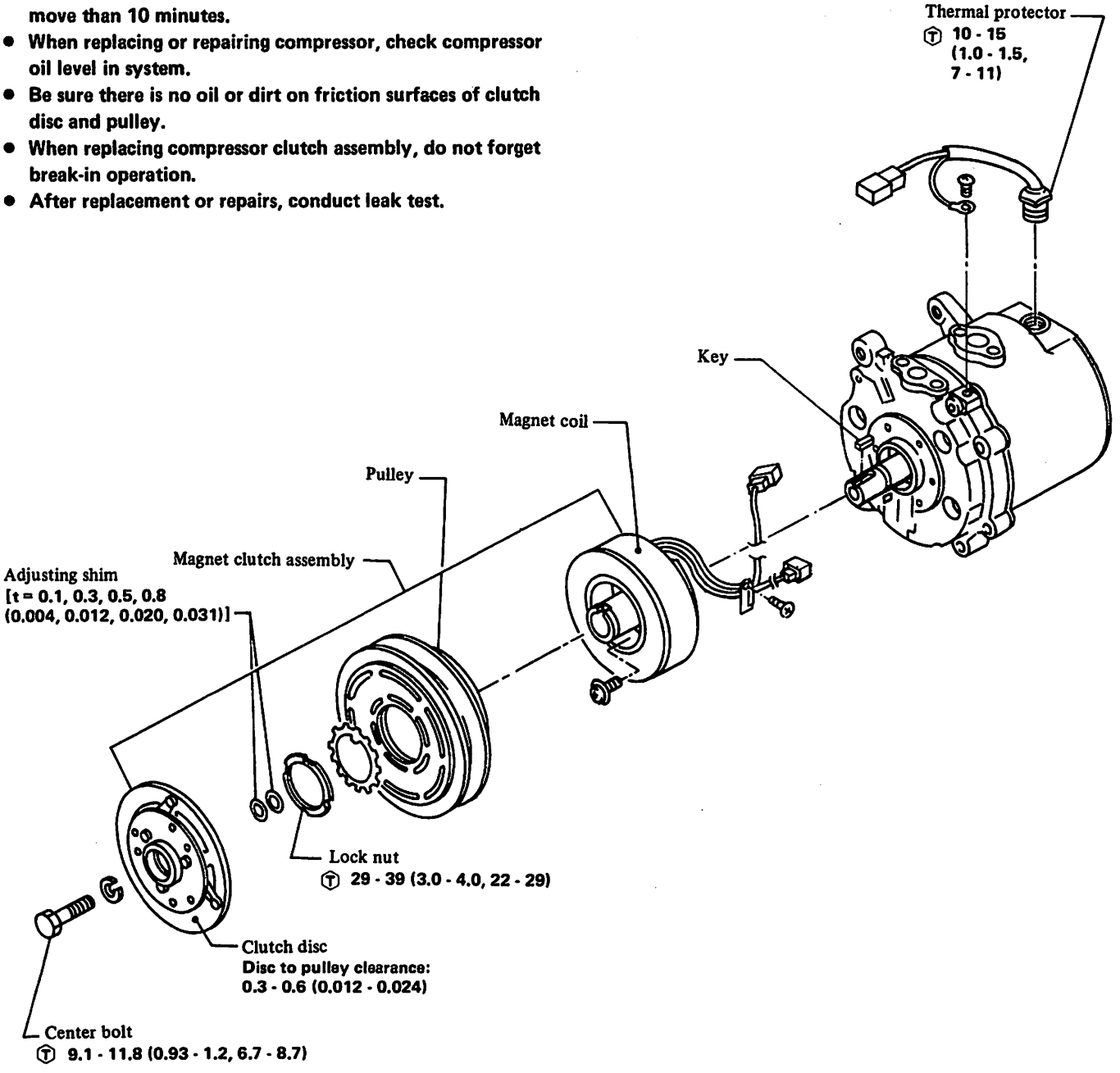
Engine revolution:
M/T
800±50 rpm
A/T
620±40 rpm

When adjusting engine revolution for A/T model, shift position of transmission should be in "D" range, and apply parking brake and tire stoppers.
For models except for California, the ECC unit controls idling speed, so that adjustment for fast idle speed is not necessary.

COMPRESSOR—Model NVR-140S (ATSUGI make)

Precautions

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **Do not leave compressor on its side or upside down for move than 10 minutes.**
- **When replacing or repairing compressor, check compressor oil level in system.**
- **Be sure there is no oil or dirt on friction surfaces of clutch disc and pulley.**
- **When replacing compressor clutch assembly, do not forget break-in operation.**
- **After replacement or repairs, conduct leak test.**



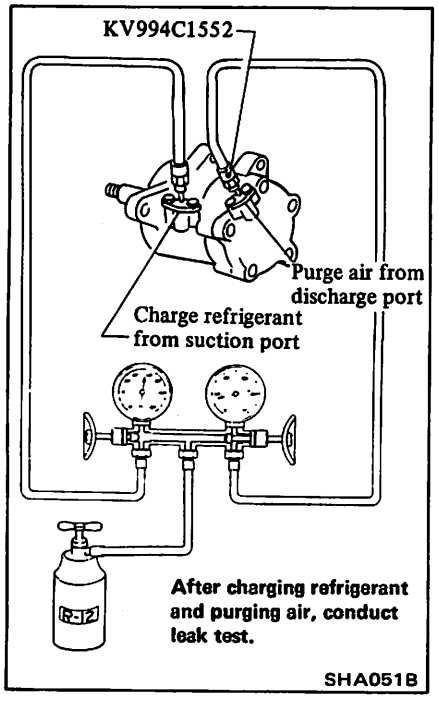
Unit: mm (in)
Ⓣ : N·m (kg-m, ft-lb)

RHA283

LEAK TEST

EVACUATING AND CONDUCTING LEAK TESTS

Perform tests with blind caps (equipped with service parts compressor) and special tool.



BREAK-IN OPERATION

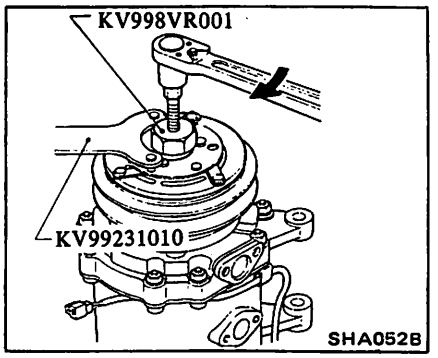
When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch about thirty times.

Break-in operation raises the level of transmitted torque.

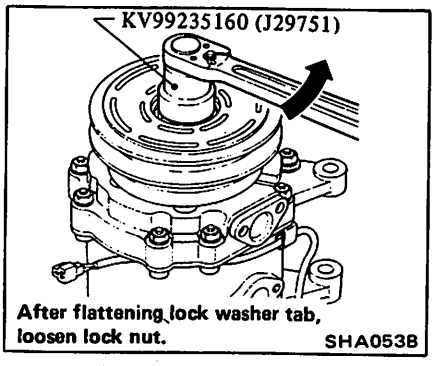
COMPRESSOR CLUTCH

REPLACEMENT

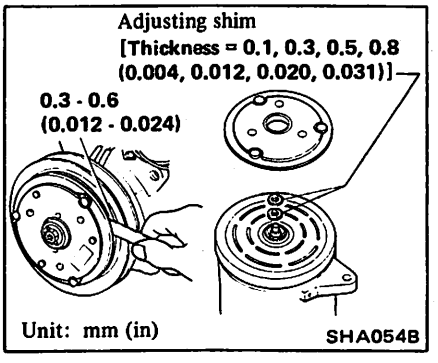
- When replacing compressor clutch, be careful not to scratch shaft or bend pulley.
- When removing center bolt, hold clutch disc with Tool KV99231010.
- Using Tool KV998VR001 and KV99231010, clutch disc can be removed.



- When removing pulley, remove lock nut with Tool KV99235160 (J29751).



- When assembling clutch disc, thoroughly wipe oil off the clutch surface. Then adjust disc-pulley clearance.



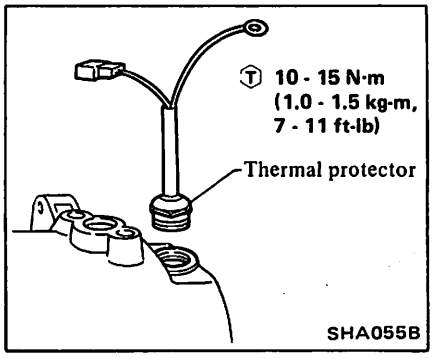
- After replacement, do not forget break-in operation.

Ⓣ : **Center bolt**
9.1 - 11.8 N·m
(0.93 - 1.2 kg-m,
6.7 - 8.7 ft-lb)
Clutch lock nut
29 - 39 N·m
(3.0 - 4.0 kg-m,
22 - 29 ft-lb)

INSPECTION

- Check the friction surfaces of the clutch for damage due to excessive heat, or excessive grooving due to slippage. If necessary, replace coil, pulley and bearing assembly, and clutch disc as a set.
- Oil or dirt on the friction surfaces should be cleaned with a suitable solvent and a dry rag.
- Check coil for shorted or opened binding leads.
- Make sure that terminal voltage at coil is normal.

THERMAL PROTECTOR



OPERATION

Temperature in compressor °C (°F)	Operation
Increasing to approx. 135 - 145 (275 - 293)	Turns OFF
Decreasing to approx. 120 - 130 (248 - 266)	Turns ON

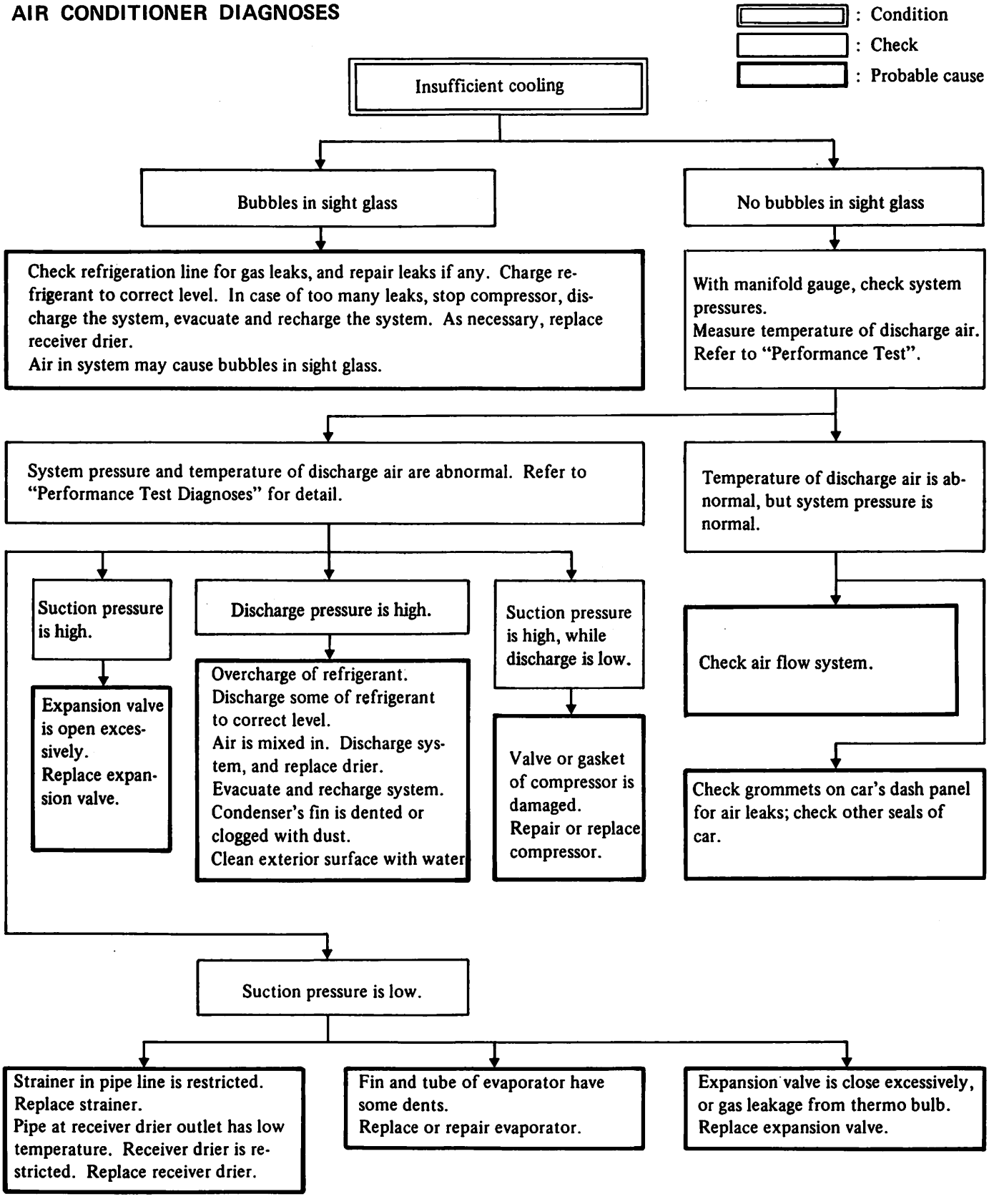
REMOVAL AND INSTALLATION

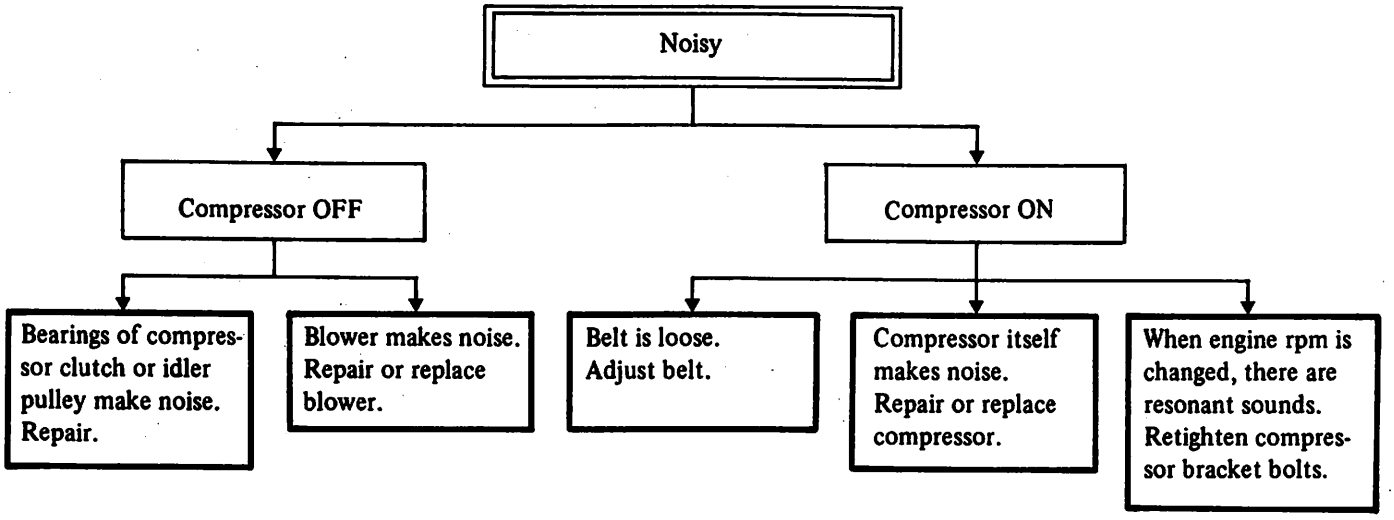
- When servicing, do not allow foreign matter to get into compressor.

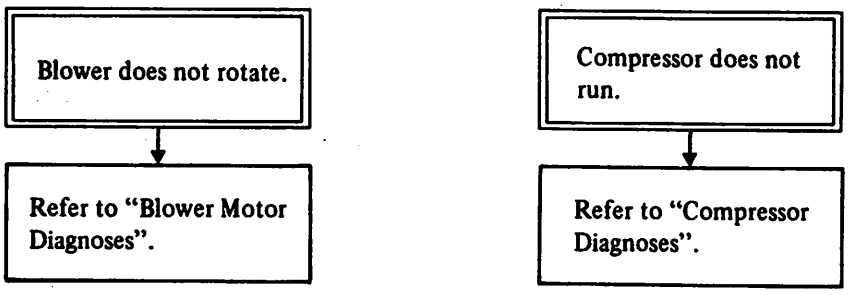
Ⓣ : **10 - 15 N·m**
(1.0 - 1.5 kg-m,
7 - 11 ft-lb)

TROUBLE DIAGNOSES AND CORRECTIONS

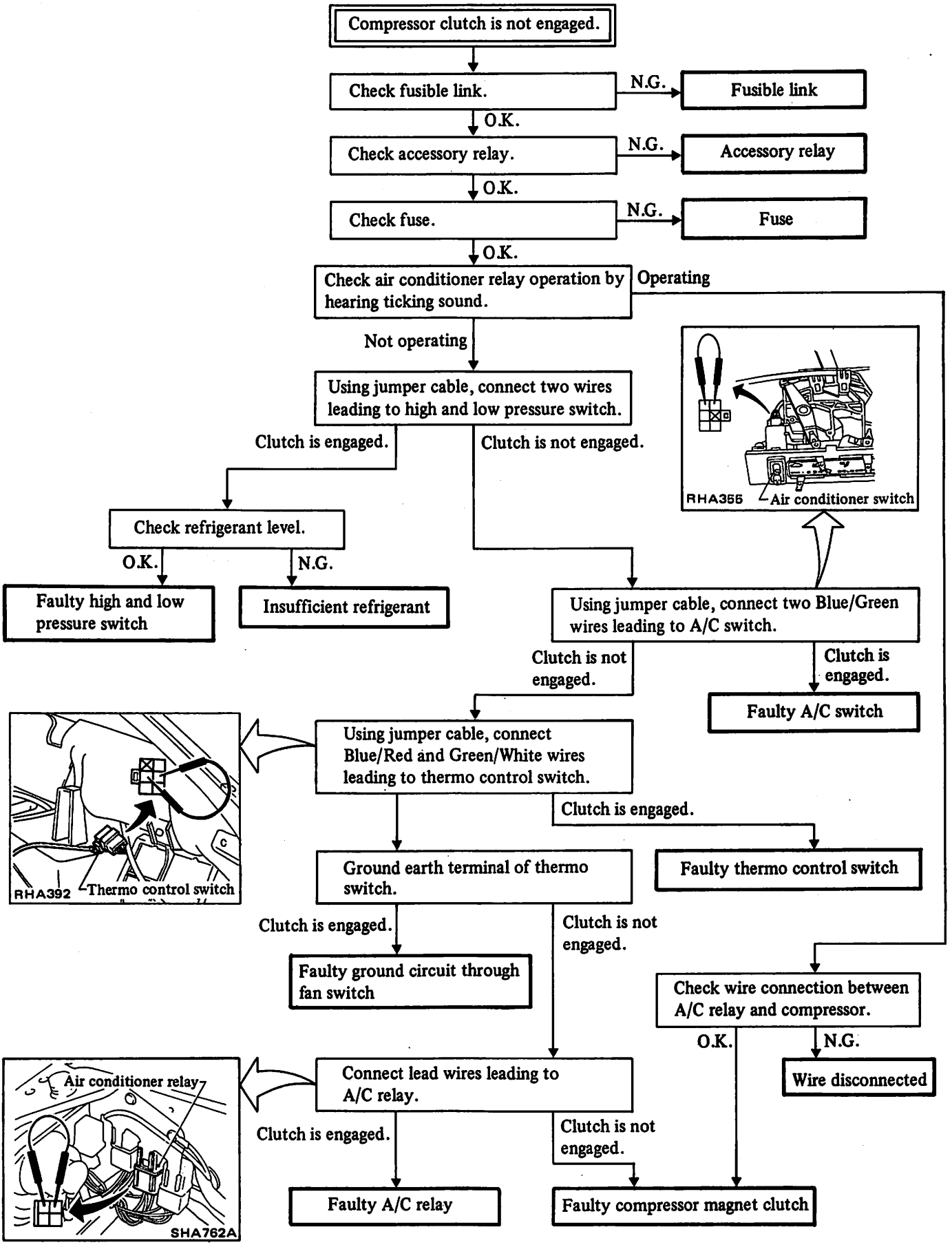
AIR CONDITIONER DIAGNOSES



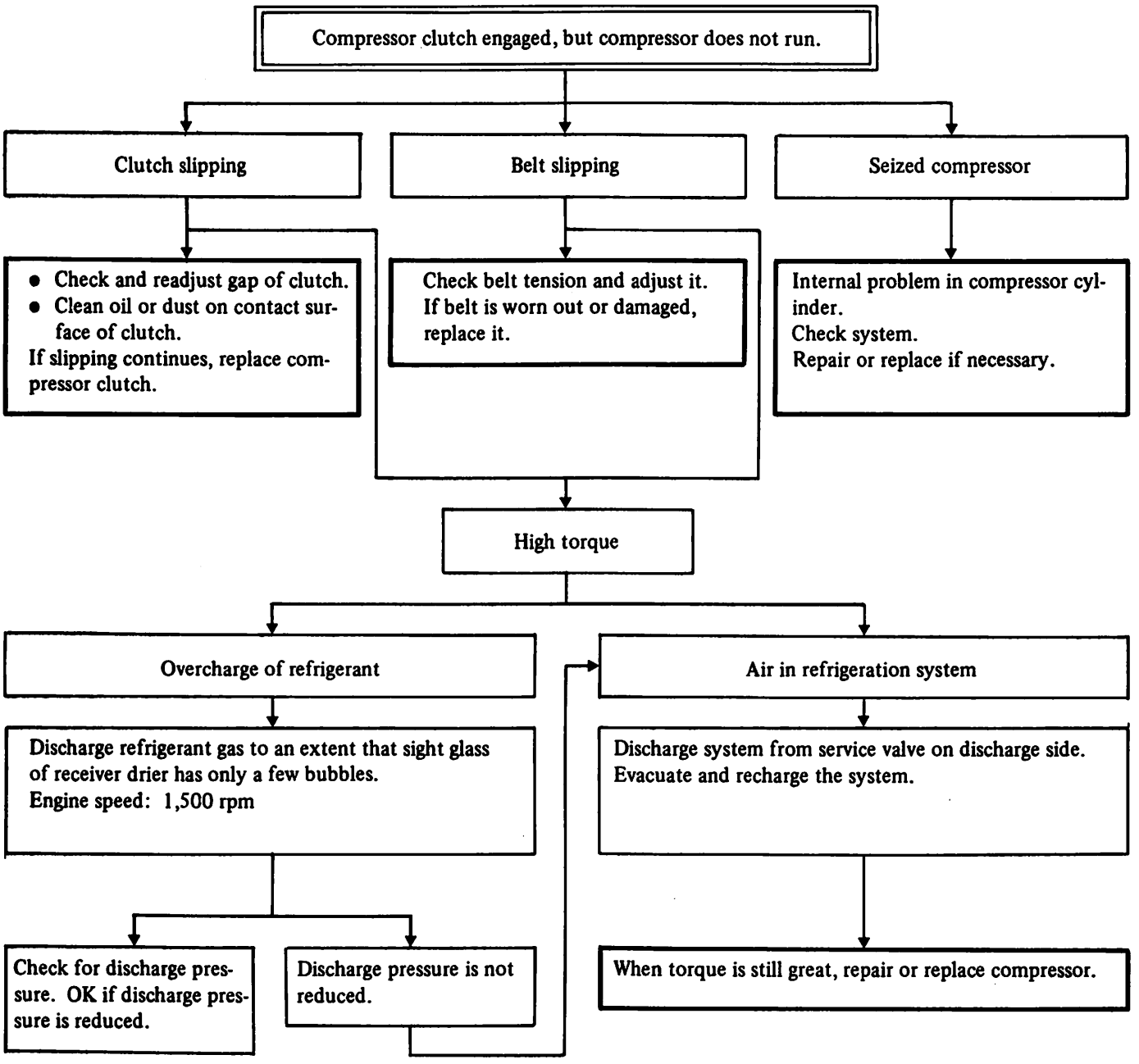

Noisy
Compressor OFF
Compressor ON
Bearings of compressor clutch or idler pulley make noise. Repair.
Blower makes noise. Repair or replace blower.
Belt is loose. Adjust belt.
Compressor itself makes noise. Repair or replace compressor.
When engine rpm is changed, there are resonant sounds. Retighten compressor bracket bolts.

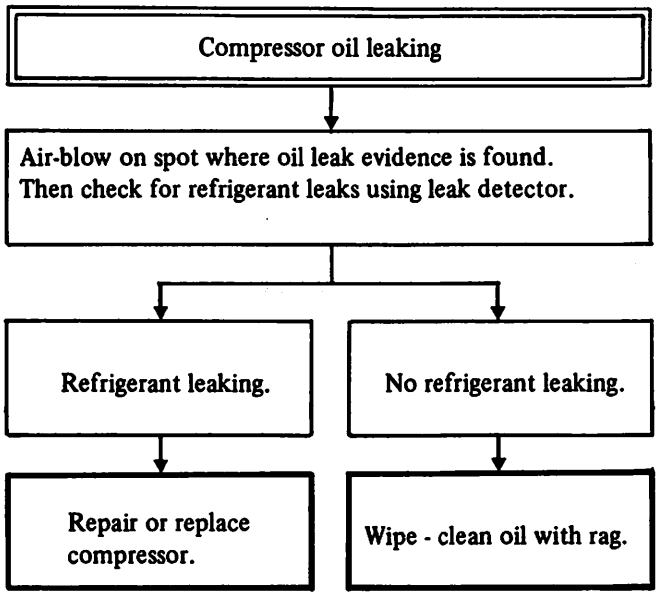

Blower does not rotate.
Refer to "Blower Motor Diagnoses".
Compressor does not run.
Refer to "Compressor Diagnoses".

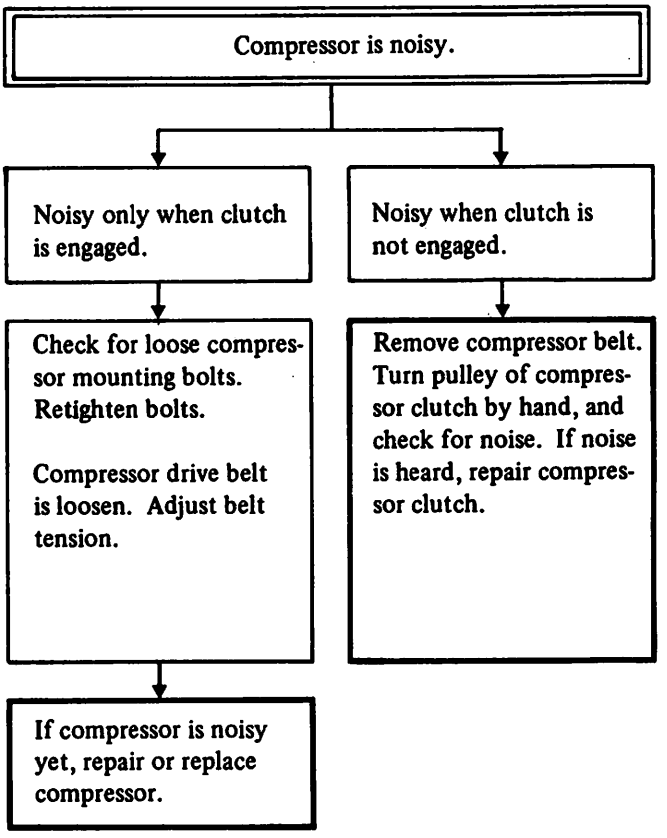
COMPRESSOR CLUTCH DIAGNOSES



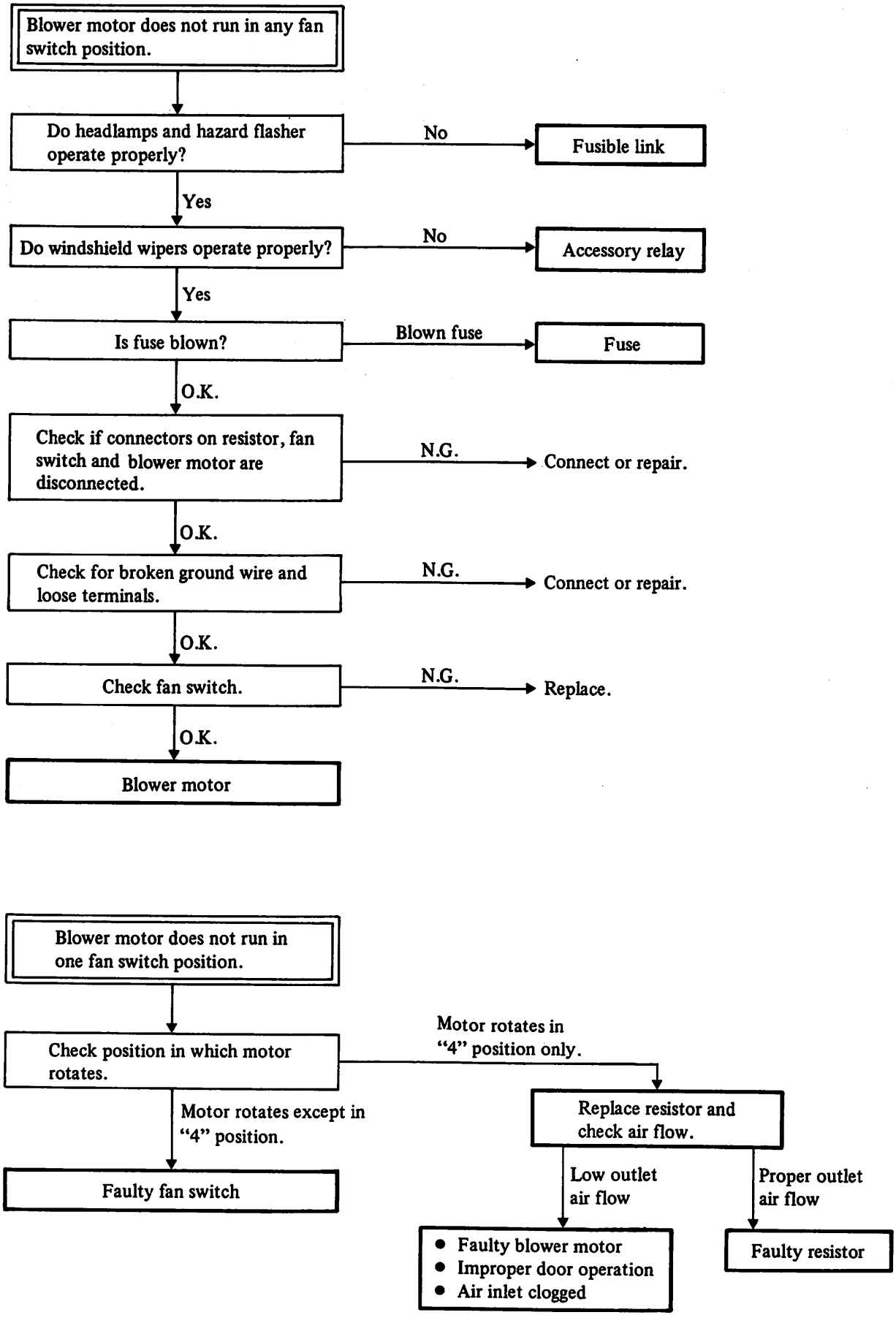
COMPRESSOR DIAGNOSES




Compressor oil leaking
Air-blow on spot where oil leak evidence is found.
Then check for refrigerant leaks using leak detector.
Refrigerant leaking.
No refrigerant leaking.
Repair or replace compressor.
Wipe - clean oil with rag.

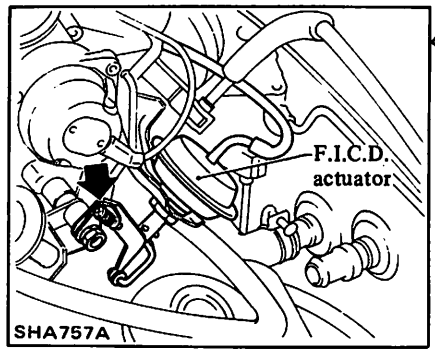

Compressor is noisy.
Noisy only when clutch is engaged.
Noisy when clutch is not engaged.
Check for loose compressor mounting bolts.
Retighten bolts.
Compressor drive belt is loosen. Adjust belt tension.
Remove compressor belt.
Turn pulley of compressor clutch by hand, and check for noise. If noise is heard, repair compressor clutch.
If compressor is noisy yet, repair or replace compressor.

BLOWER MOTOR DIAGNOSES



FAST IDLE CONTROL DEVICE DIAGNOSES

- F.I.C.D. solenoid and F.I.C.D. actuator are used only for California.
- Concerning fast idle control except for California, refer to EF section.



F.I.C.D. is not engaged.
Check operation of compressor clutch.
Clutch is not engaged.
Clutch is engaged.
Check electric circuit of clutch, referring to compressor clutch diagnoses.
Connect test light between solenoid valve lead wires.
Light OFF
Light ON
Ground terminal A of solenoid valve.
Check continuity between terminals of solenoid valve.
F.I.C.D. is engaged.
F.I.C.D. is not engaged.
O.K.
N.G.
Faulty ground circuit
Check vacuum hoses from solenoid valve to F.I.C.D. actuator and intake manifold.
N.G.
O.K.
Faulty vacuum hose
Disconnect vacuum hose at actuator, and check for presence of vacuum.
Vacuum exists.
No vacuum exists.
Faulty F.I.C.D. actuator
Faulty solenoid valve

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

COMPRESSOR

Model	NVR140S
Type	Vane rotary
Displacement cm^3 (cu in)/rev.	140 (8.54)
Direction of rotation	Clockwise (viewed from drive end)
Type of driving belt	A type

LUBRICATING OIL

Model	NVR140S
Type	SUNISO 5GS
Capacity mℓ (US fl oz, Imp fl oz)	200 (6.8, 7.0)

REFRIGERANT

Type	R-12
Capacity kg (lb)	0.8 - 1.0 (1.8 - 2.2)

INSPECTION AND ADJUSTMENT

AIR CONDITIONER DRIVE BELT TENSION

	Belt deflection [mm (in)] [Applied pressure is 98 N (10 kg, 22 lb)]		
	Used belt		New belt
	Limit	Adjust	
A/C compressor	12.5 (0.49)	9 - 11 (0.35 - 0.43)	7 - 9 (0.28 - 0.35)

COMPRESSOR

Model	NVR140S
Clutch disc-pulley clearance mm (in)	0.3 - 0.6 (0.012 - 0.024)

ENGINE IDLING SPEED

When A/C switch is ON	M/T	800±50 rpm
	A/T	620±40 rpm (Shift lever is D position)

TIGHTENING TORQUE

COMPRESSOR INSTALLATION

	N·m	kg-m	ft-lb
Compressor bracket to cylinder block	26 - 34	2.7 - 3.5	20 - 25
Compressor to compressor bracket	26 - 34	2.7 - 3.5	20 - 25

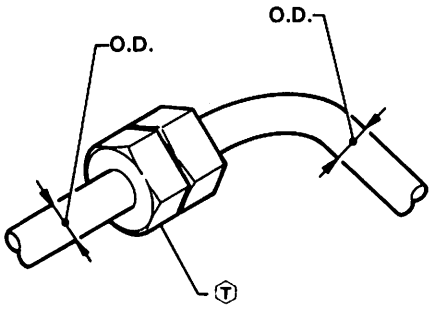
COMPRESSOR

Model	NVR 140S		
	N·m	kg-m	ft-lb
Center bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Clutch pulley lock nut	29 - 39	3.0 - 4.0	22 - 29
Thermal protector	10 - 15	1.0 - 1.5	7 - 11

REFRIGERANT LINE

When connecting lines made of different material, basically use the lower tightening torque of the two.

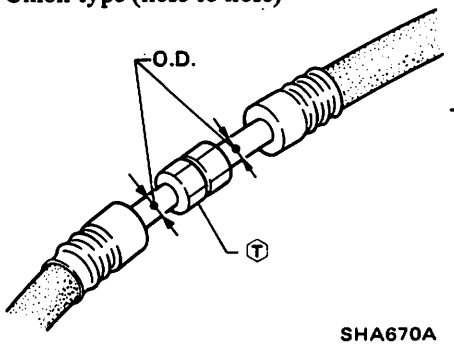
Union type (pipe to pipe)



SHA669A

Pipe O.D. mm (in)	Material					
	Steel or copper			Aluminum		
	N·m	kg-m	ft-lb	N·m	kg-m	ft-lb
6 (1/4)	10 - 20	1.0 - 2.0	7 - 14	—	—	—
8 (5/16)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
10 (3/8)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
12 (1/2)	20 - 29	2.0 - 3.0	14 - 22	15 - 25	1.5 - 2.5	11 - 18
16 (5/8)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22
19 (3/4)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22

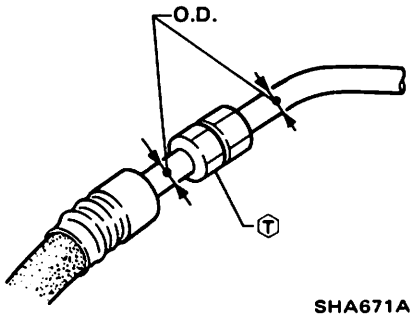
Union type (hose to hose)



SHA670A

Pipe O.D. mm (in)	Material					
	Steel or copper			Aluminum		
	N·m	kg-m	ft-lb	N·m	kg-m	ft-lb
6 (1/4)	10 - 20	1.0 - 2.0	7 - 14	—	—	—
8 (5/16)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
10 (3/8)	15 - 25	1.5 - 2.5	11 - 18	10 - 20	1.0 - 2.0	7 - 14
12 (1/2)	25 - 34	2.5- 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22
16 (5/8)	25 - 34	2.5 - 3.5	18 - 25	20 - 29	2.0 - 3.0	14 - 22

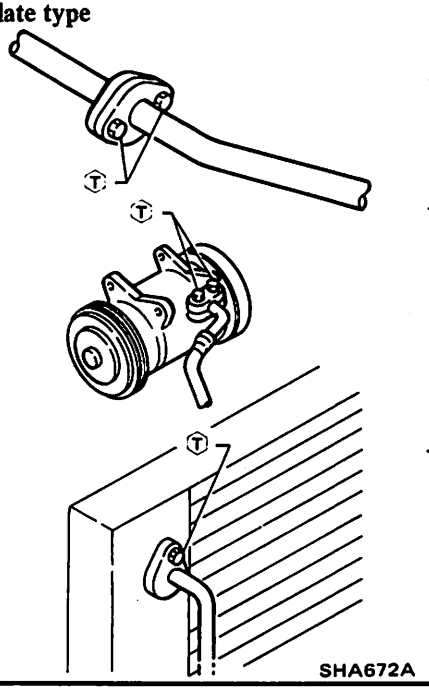
Union type (hose to pipe)



SHA671A

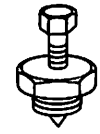
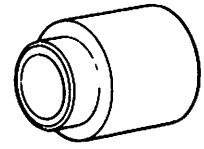
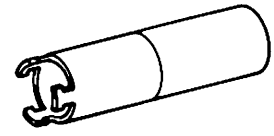
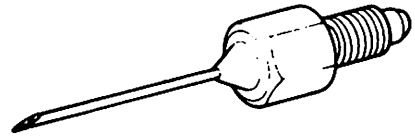
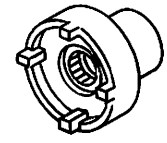
- Use tightening torque for flexible hose.

Plate type



Bolt type				Tightening torque		
Grade	Nominal size	Bolt diameter mm (in)	Pitch mm (in)	N·m	kg-m	ft-lb
4T	M6	6.0 (0.236)	1.0 (0.039)	3 - 4	0.3 - 0.4	2.2 - 2.9
	M8	8.0 (0.315)	1.25 (0.0492)	8 - 11	0.8 - 1.1	5.8 - 8.0
	M10	10.0 (0.394)	1.5 (0.059)	16 - 22	1.6 - 2.2	12 - 16
7T	M6	6.0 (0.236)	1.0 (0.039)	6 - 7	0.6 - 0.7	4.3 - 5.1
	M8	8.0 (0.315)	1.25 (0.0492)	14 - 18	1.4 - 1.8	10 - 13
	M10	10.0 (0.394)	1.5 (0.059)	25 - 35	2.6 - 3.6	19 - 26

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV99231010 (–)	Clutch hub wrench 
KV998VR001 (–)	Clutch hub puller 
KV99233040 (–)	Puller pilot 
KV994C1143 (–)	Shaft seal remover and installer 
KV994C1552 (–)	Charge nozzle 
KV99235160 (J29751)	Nut wrench 

ELECTRICAL SYSTEM

SECTION EL

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For other electrical systems, refer to the following sections:

- EMISSION CONTROL SYSTEM ... EF & EC section
- HEATER AND AIR CONDITIONER ... HA section

For ignition system in U.S.A. model for non-California, refer to the following sections:

- ELECTRICAL WIRING DIAGRAM ... EF & EC section
- SPARK TIMING CONTROL SYSTEM ... EF & EC section

ELECTRICAL DIAGNOSIS INTRODUCTION

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

The key to timely and accurate diagnosis of electrical problems is to:

- Have a basic understanding of electrical principles and electrical component operation.
- Be able to interpret wiring diagram and schematics.
- Know the various test methods and when to use each.
- Have a systematic approach to identify the specific cause of an electrical problem.

BASIC RULE OF ELECTRICITY

A complete electircal circuit must have:

- A Source (battery, alternator)
- A Load (lights, coil, amplifiers, motor, etc.)
- Electrical Pathway (connecting from the source to the load and back to the source); (wires, switches, body of vehicle (ground).

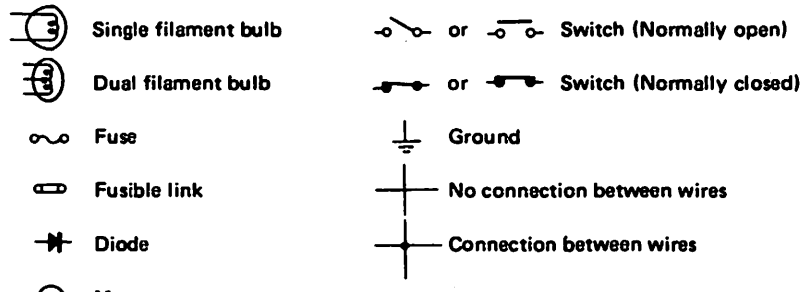
Remembering this basic rule will make it a lot easier to troubleshoot electrical problems.

WIRING DIAGRAMS

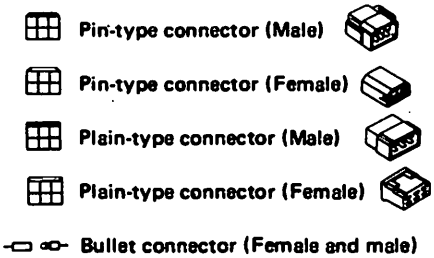
There is a schematic illustrating each electrical circuit. Accurate diagnosis of electrical problems requires that you effectively use and interpret this diagram. Since it uses a special language, i.e., symbols, codes and abbreviations, review the following chart.

ELECTRICAL SYMBOLS AND ABBREVIATIONS

SYMBOLS



CONNECTORS



WIRE COLOR CODING

B	= Black	BR	= Brown
W	= White	OR	= Orange
R	= Red	P	= Pink
G	= Green	PU	= Purple
L	= Blue	GY	= Gray
Y	= Yellow	SB	= Sky blue
LG	= Light Green		

In case of color coding using a Stripe. Base Color is given first, followed by the Stripe Color:

Example: L/W = Blue with White Stripe

ABBREVIATIONS

- Ⓢ : Sedan
- Ⓒ : Coupe
- Ⓥ : For California
- Ⓤ : U.S.A. except for California
- Ⓝ : For Canada
- Ⓜ : M/T models
- Ⓐ : A/T models

To trace a problem in any electrical circuit, several types of diagrams can be used.

POWER SUPPLY ROUTING

This diagram is helpful in identifying specific problems in the power supply portion of the electrical circuits. For example, a vehicle has inoperative rear window defogger. A quick check proves that turn signal lamp in the vehicle are operative. The power supply diagram shows that there cannot be a problem between the battery, ignition relay, ignition switch of fuse since the power supply circuit for the rear window defogger is common with the turn signal lamp. Therefore, the cause of this specific problem must lie past the fuse, such as in the wiring, rear window defogger, or ground.

SCHEMATIC

A schematic is a very simplified wiring diagram useful for tracing electrical current flow and studying the operation of an electrical circuit.

WIRING DIAGRAM

This diagram is a more "true to life" layout of a complete circuit than the schematic. It identifies types and number of connectors, electrical terminal positions in the connector, color coding of wires, and connector codes.

In order to quickly find the exact location of a connector, the connector codes can be cross-referenced to the harness layout illustrations in the back of this section.

HARNESS DIAGRAM
(Foldout page)

The harness diagram shows the actual harness components. It will assist in locating interrelated circuits i.e., circuits which share common ground circuits, power circuits, etc.

TESTING

Many people think of electrical testing as connecting electrical test instruments into a circuit and measuring amps, volts and ohms. But there is really a lot more. In fact using test instruments should be one of the last steps in correcting an electrical problem.

SIGHT AND SOUND play an important role in electrical testing. Relays click, blowers spin, air condition clutches engage, lights illuminate, etc. Even though we cannot observe current flowing through a wire or a component, we can observe the effect it has on an electrical component. Sight and sound testing methods should be thoroughly exhausted before hooking-up any test instrument.

SUBSTITUTION is another test method. For example, you suspect a bad ground at the tail lamp. Try a jumper wire from ground to the lamp. What about a questionable fuse? Simply replace it with another. In several instances substitution may turn out to be the most effective method of correcting an electrical problem.

TEST INSTRUMENTS

Problems that cannot be solved through sight, sound, or substitution can be solved by using the appropriate test instrument.

A general rule to follow while trouble-shooting is to perform the easiest and least expensive checks first. This often means giving some careful thought to a trouble-shooting plan. Some of the most frustrating and confusing electrical problems begin with a haphazard and planless start. Make sure the checks you have selected are going to give the answers you need. If you test the wrong circuit, use the wrong meter, or forget to check the meter scale and calibration, you just can't diagnose the problem.

TROUBLE-SHOOTING APPROACH

You should have a routine procedure or approach when trouble-shooting a problem, a method you are familiar with which gives you the maximum amount of information at minimum expense and effort. Sometimes it is helpful to ask yourself some questions first. For example:

WHAT IS THE PROBLEM? While this may seem a foolish question at first glance, the problem involved may not be the same as stated on the repair order or even as observed by the customer. Sometimes, other problems or symptoms have been overlooked. Do not forget to identify the problem and controls involved. Check to see what electrical components work and what components do not work. This is an opportune time to use sight and sound testing methods.

HOW DOES THE CIRCUIT WORK? Once the electrical problem has been identified, consult the wiring diagram in the service manual.

Study the simplified schematic to develop an understanding of how the circuit is supposed to work. Then use harness layout illustration, power supply routing diagram, and vehicle wiring diagram. Get an idea of how the circuit is laid out in the vehicle and how it interrelates with other circuits.

WHICH TEST IS BEST? Stop and think of exactly what information you need to reach a proper solution. Decide which test will give you the most information. Do not forget to think of where you are going to make your test connections. Make sure you are performing your test at the most advantageous point. You do not want to dismantle a dash assembly to check a component which could be tested at a more accessible location. For instance, it is much easier to check terminal connectors and plugs than to break into a harness.

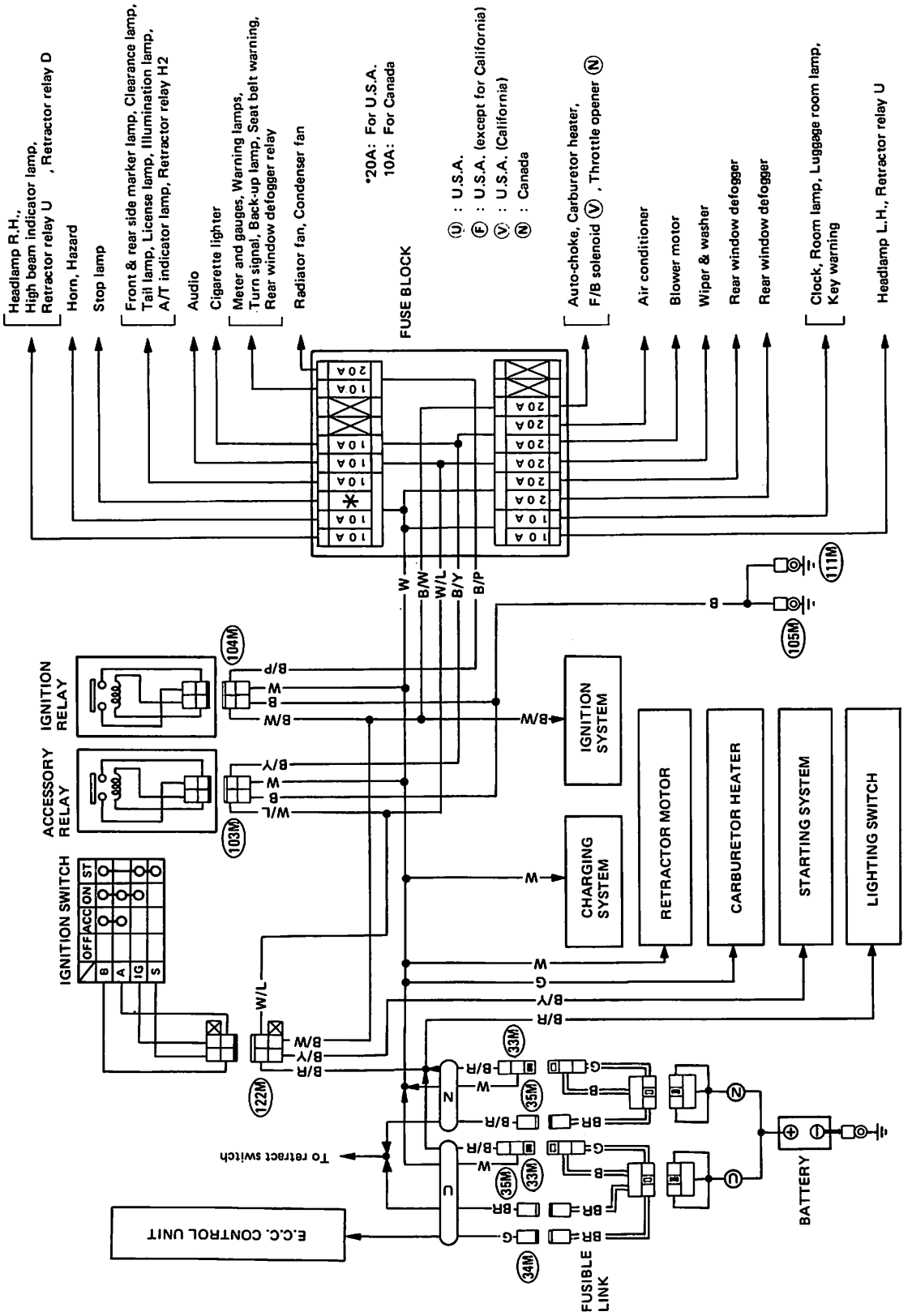
Once the tests have been performed, you should have the information you need to reach a logical conclusion and solve the problem but, if not, then review your testing procedure. Be certain that you are performing the test correctly and your procedure is valid.

Remember the most complex circuits are constructed from combinations and/or variations of the basic circuit: Source, Conductors, and Load. If you keep this in mind, use the service manual, and follow a logical trouble-shooting sequence, you can effectively troubleshoot electrical problems.

POWER SUPPLY ROUTING

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

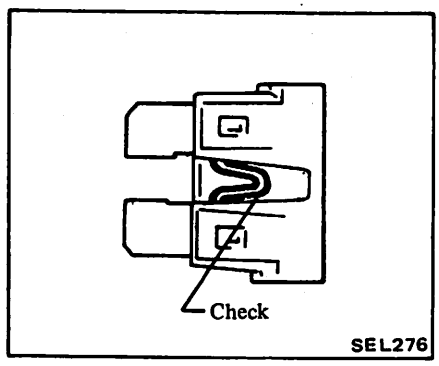
SCHEMATIC/POWER SUPPLY ROUTING



SEL507G

FUSE

INSPECTION



CAUTION:

a. If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of problem.

b. Never wrap periphery of fusible link with vinyl tape. Extreme care should be taken with this link to ensure that it does not come into contact with any other wiring harness or vinyl or rubber parts.

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.

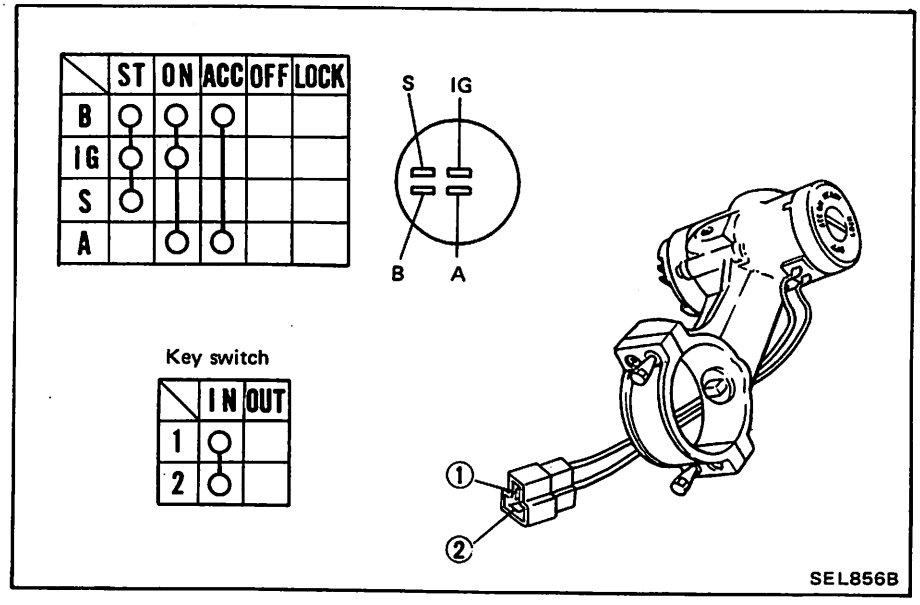
a. If fuse is blown, be sure to eliminate cause of problem before installing new fuse.

b. Use fuse of specified rating. Never use fuse of more than specified rating.

c. Do not install fuse in oblique direction; always insert it into fuse holder properly.

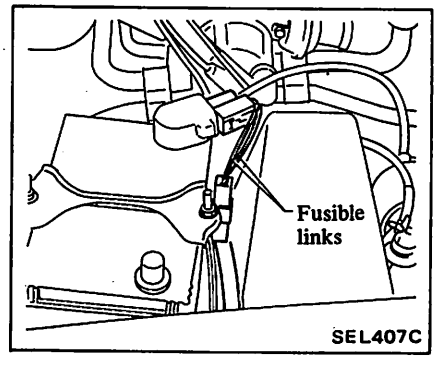
d. Remove fuse for clock if vehicle is not used for a long period of time.

IGNITION SWITCH



FUSIBLE LINK

LOCATION



IGNITION AND ACCESSORY RELAYS

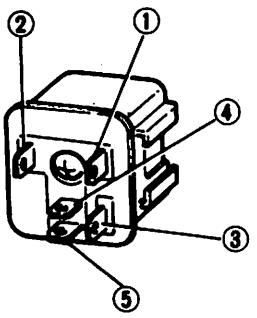
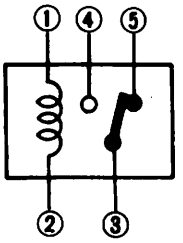
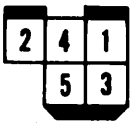
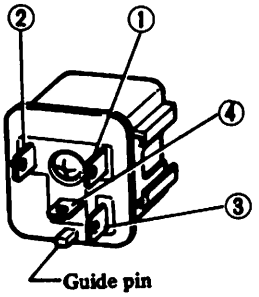
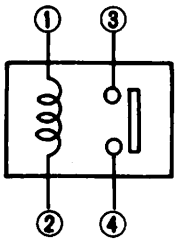
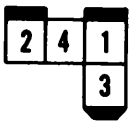
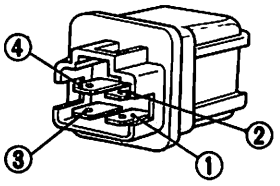
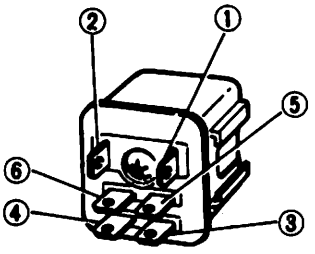
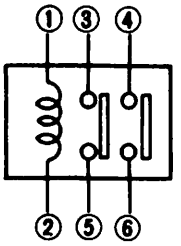
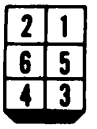
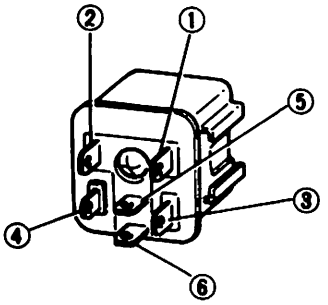
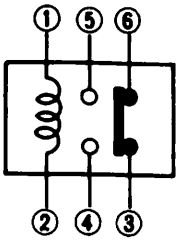
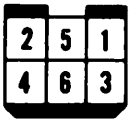
LOCATION

Ignition and accessory relays are located on the fuse block. Refer to "LOCATION OF ELECTRICAL UNITS".

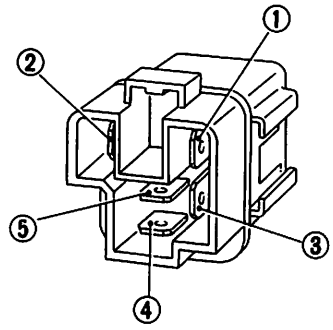
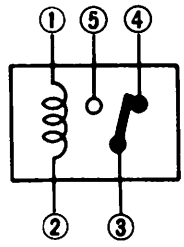
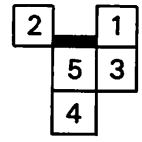
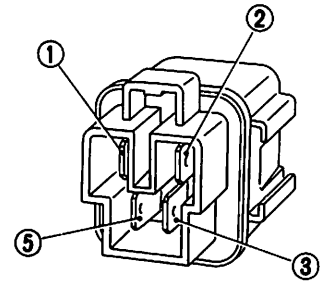
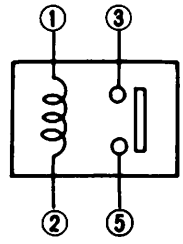
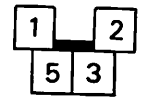
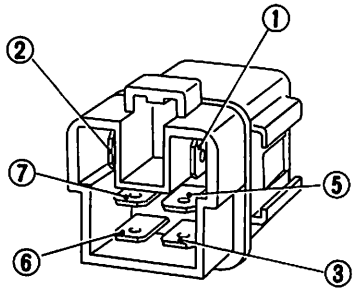
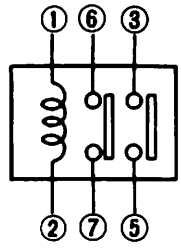
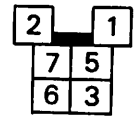
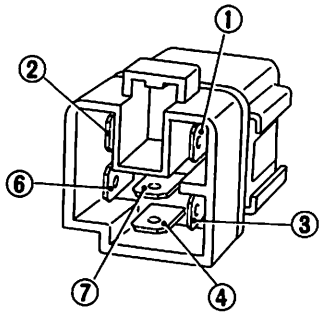
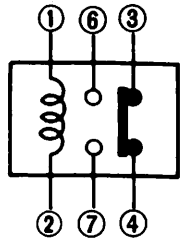
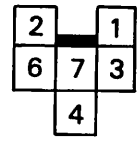
INSPECTION

Ignition and accessory relays are 1M type standardized relay. Refer to "STANDARDIZED RELAY".

STANDARDIZED RELAY

Type	Outer view	Circuit	Symbols	Case color
1T				BLACK
1M				BLUE
				BLACK
2M				BROWN
1M·1B				GRAY

SEL451C

Type	Outer view	Circuit	Symbols	Case color
1T				BLACK
1M				BLUE
2M				BROWN
1M·1B				GRAY

SEL639D

CAUTION:

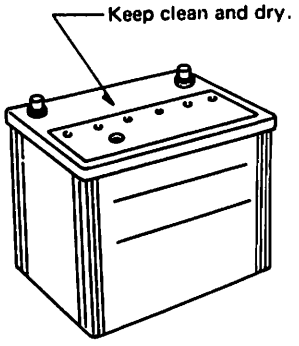
a. If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
b. After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.
c. Never add distilled water through the hole used to check specific gravity.

How to Handle Battery

METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

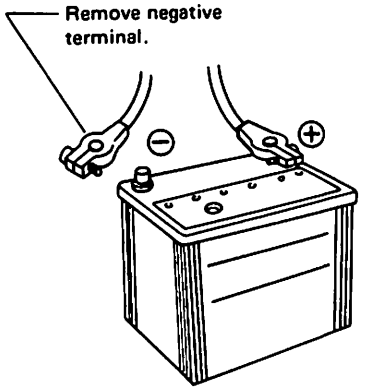
- The battery surface (particularly its top) should always be kept clean and dry.



SEL711E

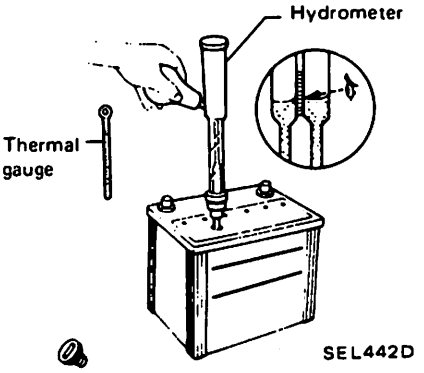
If the top surface of a battery is wet with electrolyte or water, leakage current will cause the battery to discharge. Always keep the battery clean and dry.

- When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal. (If the vehicle has an extended storage switch, turn it off.)



SEL712E

- Check the charge condition of the battery.



SEL442D

Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

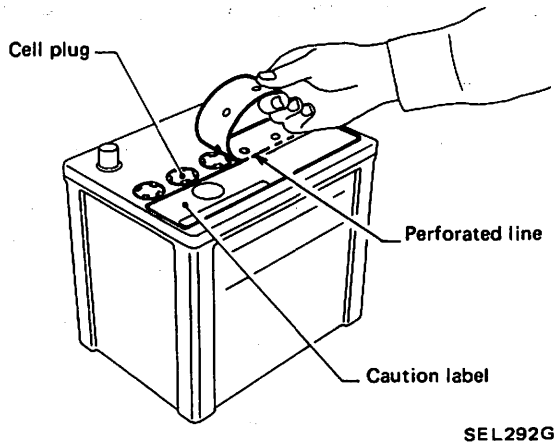
WARNING:

Do not allow battery fluid to come in contact with skin, eyes, fabrics or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If the acid contacts the eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

Normally the battery does not require additional water. However, when the battery is used under severe conditions, adding distilled water may be necessary during the battery life.
To maintain serviceability, a perforated line has been added to the battery caution label.

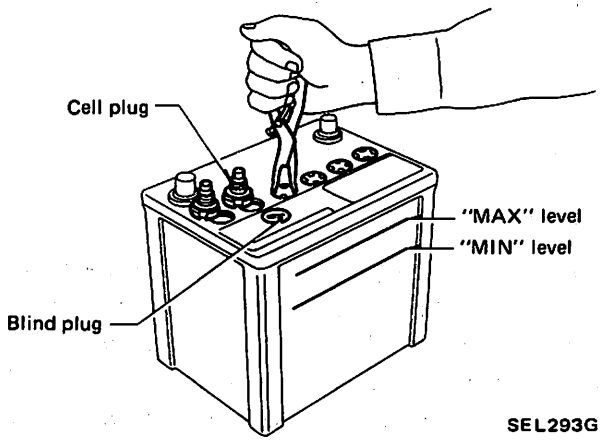
How to Handle Battery (Cont'd)

- If the electrolyte level is low, remove label at perforated line.



SEL292G

- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.

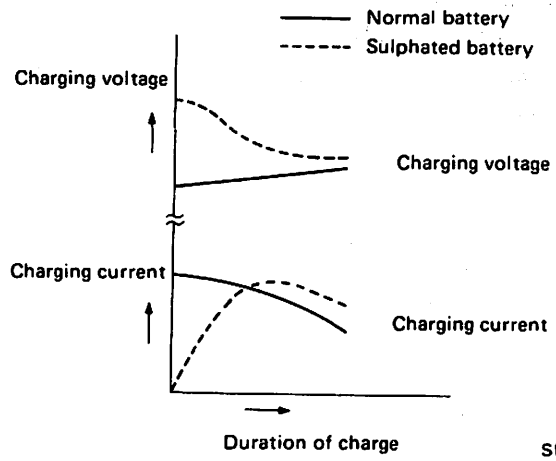


SEL293G

SULPHATION

When a battery has been left unattended for a long period of time and has a specific gravity of less than 1.100, it will be completely discharged, resulting in sulphation on the cell plates.

Compared with a battery discharged under normal conditions, the current flow in a "sulphated" battery is not as smooth although its voltage is high during the initial stage of charging, as shown in the following figure.



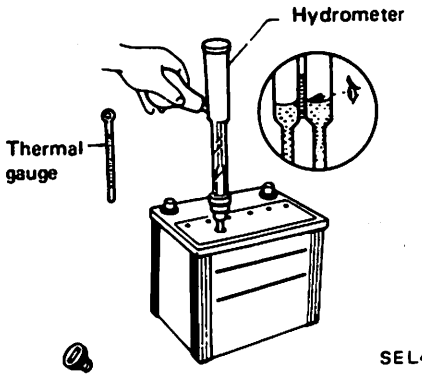
SEL709E

Specific Gravity Check

SPECIFIC GRAVITY CHECK

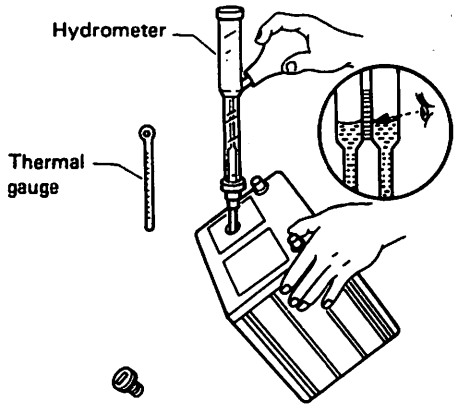
1. Read hydrometer and thermal gauge indications at eye level.

   Read top level with scale.



SEL442D

- When electrolyte level is too low, tilt battery case to raise it for easy measurement.

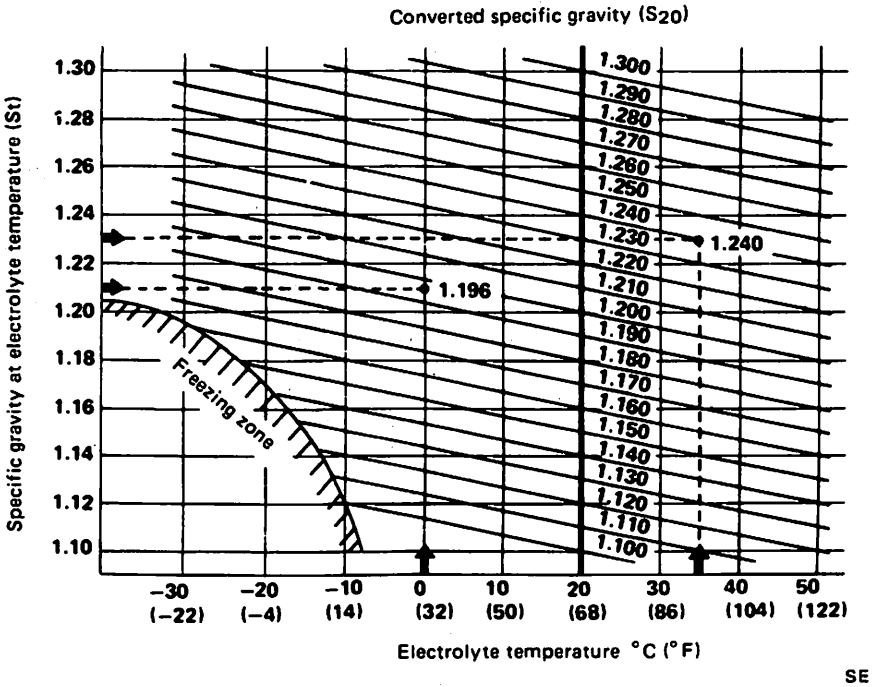


SEL710E

2. Convert into specific gravity at 20°C (68°F).

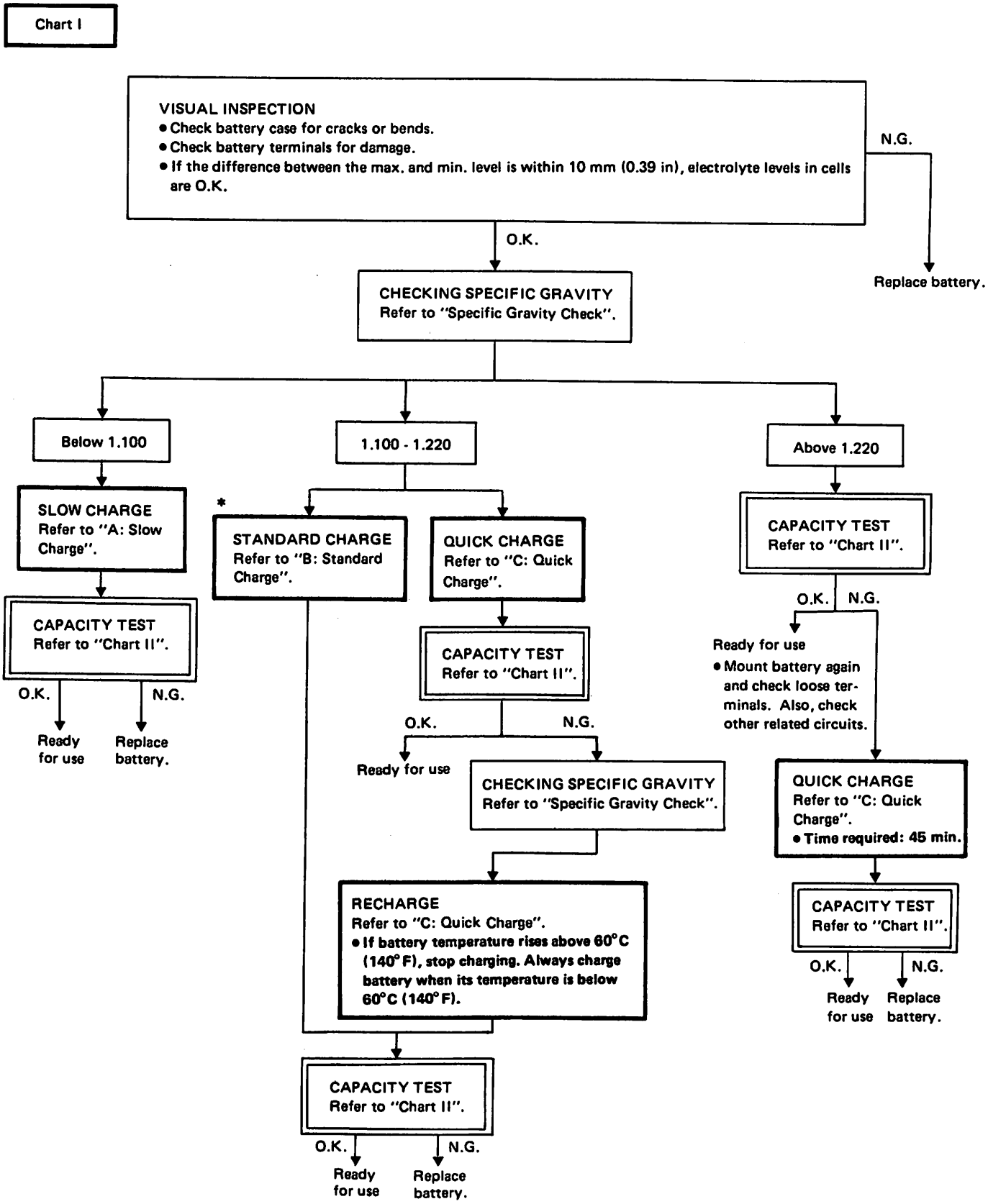
Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte is 1.230, converted specific gravity at 20°C (68°F) is 1.240.
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.



SEL042D

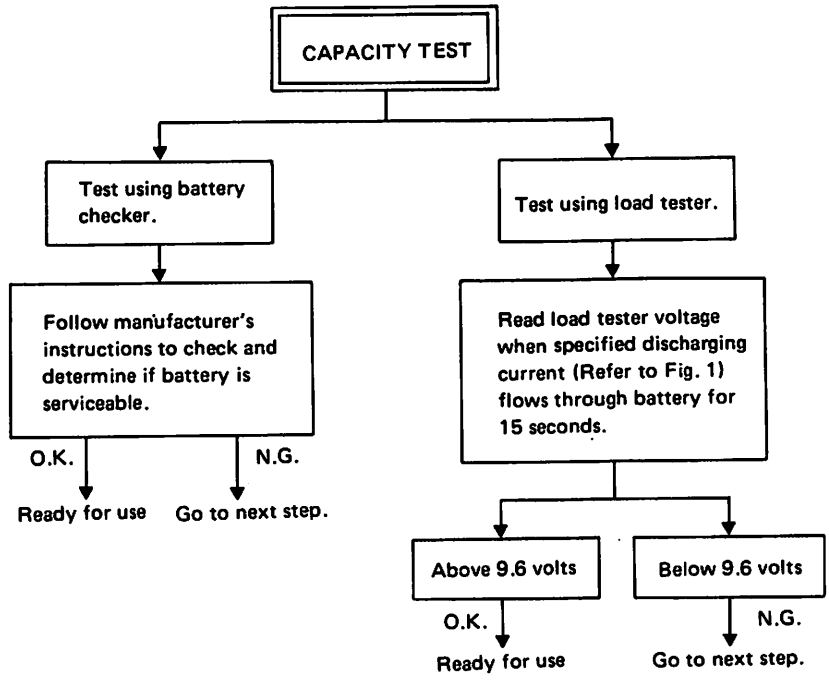
M.F. Battery Test and Charging Chart



* "STANDARD CHARGE" is recommended in case that the vehicle is in storage after charging.

M.F. Battery Test and Charging Chart (Cont'd)

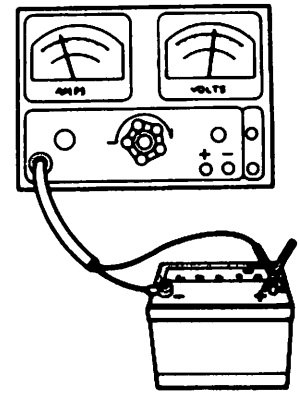
Chart II



- Check battery type and determine the specified current using the following table.

Fig. 1 DISCHARGING CURRENT (Load tester)

Type	Current (A)
NS40S-MF	90 (A)
NS40ZA-MF	99 (A)
NS60-MF	135 (A)
N50S-MF	150 (A)
N60-MF 55D23-MF	180 (A)
NS70-MF	195 (A)
N70Z-MF	210 (A)
NX120-7-MF	240 (A)



SEL697B

M.F. Battery Test and Charging Chart (Cont'd)

A: SLOW CHARGE

Determine initial charging current from specific gravity referring to Fig. 2.

- Charge battery.
- Check charging voltage 30 minutes after starting the battery charge.

12 to 15 volts — O.K. → Continue to charge for 12 hours.

Below 12 volts or above 15 volts — N.G. → Replace battery.

CHECKING SPECIFIC GRAVITY
Refer to "Specific Gravity Check".

Conduct additional charge as per Fig 3, if necessary.

Go to "CAPACITY TEST".

Fig. 2 INITIAL CHARGING CURRENT SETTING (Slow charge)

BATTERY TYPE / CONVERTED SPECIFIC GRAVITY	NS40S-MF NS40ZA-MF	NS60-MF	N60-MF 55D23-MF N50S-MF	NS70-MF	N70Z-MF	NX120-7-MF
Below 1.100	4.0 (A)	5.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)	10.0 (A)

- Check battery type and determine the specified current using the following table.
- After starting charging, adjustment of charging current is not necessary.

Fig. 3 ADDITIONAL CHARGE (Slow charge)

Below 1.150	1.150 - 1.200	1.200 - 1.240	Above 1.240
Charge for 5 hours at initial charging current setting.	Charge for 4 hours at initial charging current setting.	Charge for 2 hours at initial charging current setting.	

Go to "CAPACITY TEST".

CAUTION:

a. Set charging current to value specified in Fig. 2. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
b. Keep battery away from open flame while it is being charged.
c. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
d. If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

M.F. Battery Test and Charging Chart (Cont'd)

B: STANDARD CHARGE

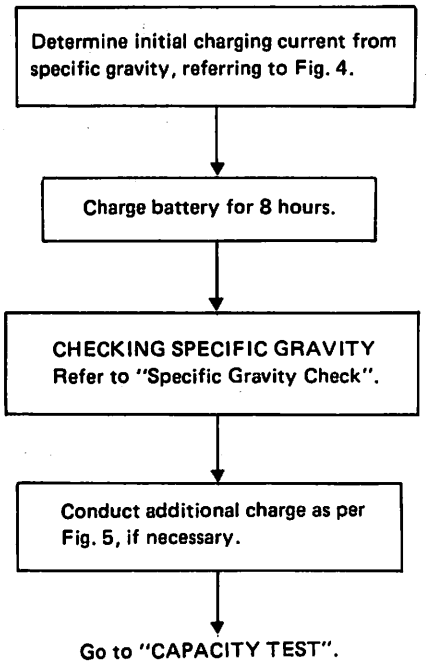
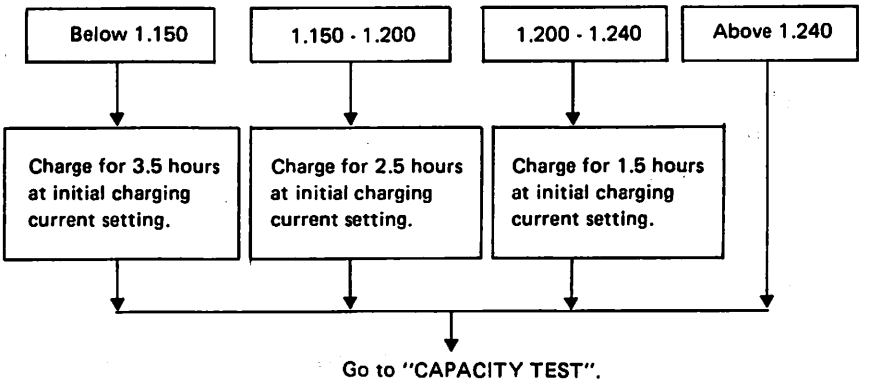


Fig. 4 INITIAL CHARGING CURRENT SETTING (Standard charge)

BATTERY TYPE / CONVERTED SPECIFIC GRAVITY	NS40S-MF NS40ZA-MF	NS60-MF	N60-MF 55D23-MF N50S-MF	NS70-MF	N70Z-MF	NX120-7-MF
1.100 - 1.130	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)
1.130 - 1.160	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)
1.160 - 1.190	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)
1.190 - 1.220	2.0 (A)	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	5.0 (A)

- Check battery type and determine the specified current using the following table.
- After starting charging, adjustment of charging current is not necessary.

Fig. 5 ADDITIONAL CHARGE (Standard charge)



CAUTION:

a. Do not use standard charge method on a battery whose specific gravity is less than 1.100.
b. Set charging current to value specified in Fig. 4. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
c. Keep battery away from open flame while it is being charged.
d. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
e. If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

M.F. Battery Test and Charging Chart (Cont'd)

C: QUICK CHARGE

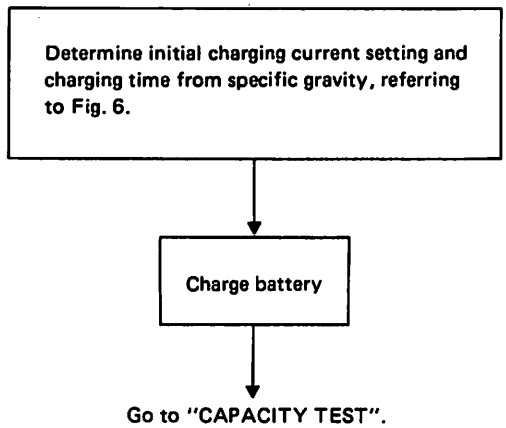


Fig. 6 INITIAL CHARGING CURRENT SETTING AND CHARGING TIME (Quick charge)

CONVERTED SPECIFIC GRAVITY \ BATTERY TYPE / CURRENT [A]	NS40S -MF NS40ZA -MF	NS60-MF N50S-MF	N60-MF 55D23-MF NS70-MF	N70Z-MF NX120-7 -MF
	10 (A)	15 (A)	20 (A)	30 (A)
1.100 - 1.130	2.5 hours			
1.130 - 1.160	2.0 hours			
1.160 - 1.190	1.5 hours			
1.190 - 1.220	1.0 hours			
Above 1.220	0.75 hours (45 min.)			

- Check battery type and determine the specified current using the following table.
- After starting charging, adjustment of charging current is not necessary.

CAUTION:

a. Do not use quick charge method on a battery whose specific gravity is less than 1.100.
b. Set initial charging current to value specified in Fig. 6. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
c. Keep battery away from open flame while it is being charged.
d. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
e. Be careful of a rise in battery temperature because a large current flow is required during quick-charge operation.
   If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).
f. Do not exceed the charging time specified in Fig. 6. Because if the battery is charged over the charging time, it can cause deterioration of the battery.

Service Data and Specifications (S.D.S.)

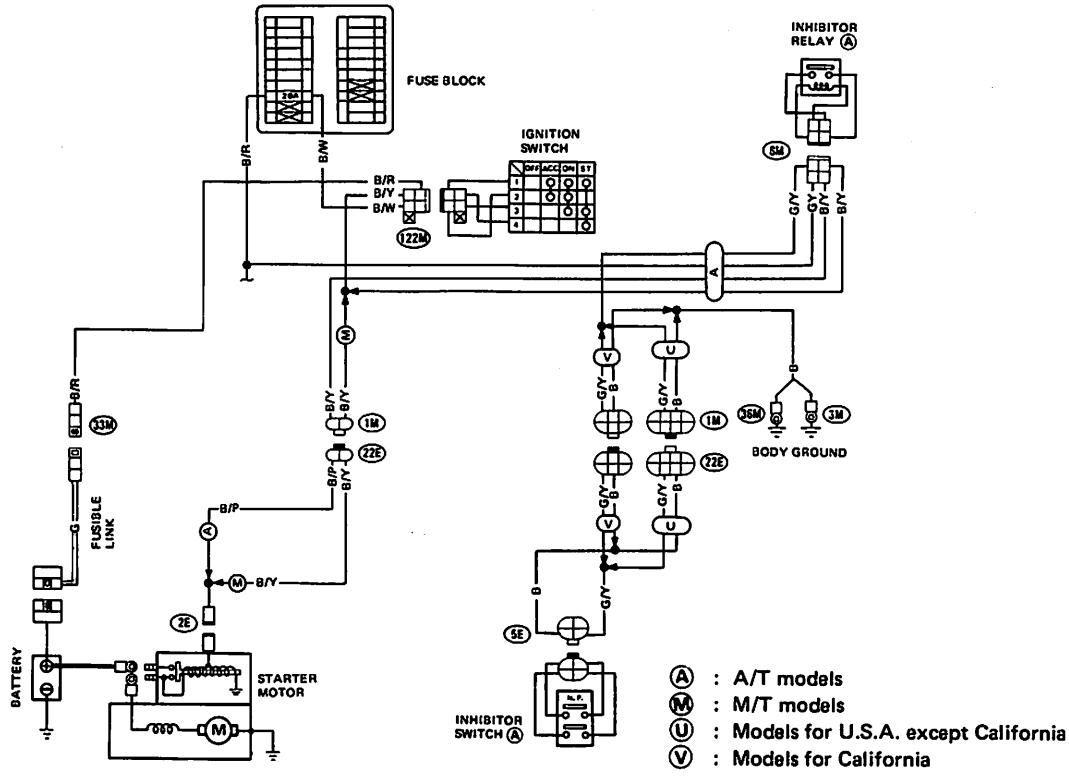
Applied model		U.S.A.	Canada
Type		55D23L-MF	NS70L-MF
		Maintenance-free	
Capacity	V-AH	12-60	12-65

STARTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

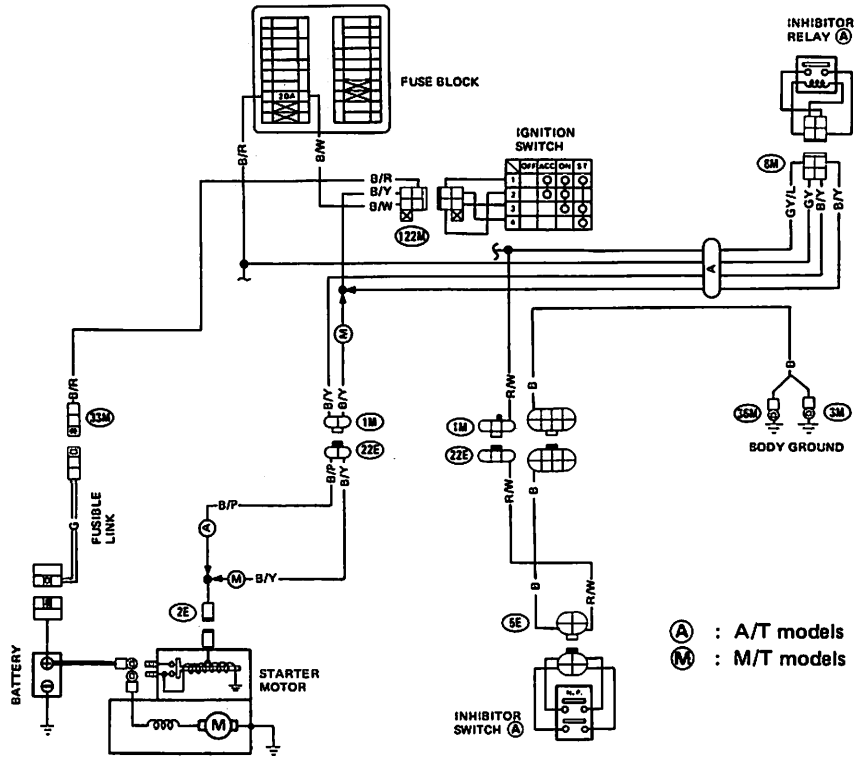
WIRING DIAGRAM

For U.S.A.

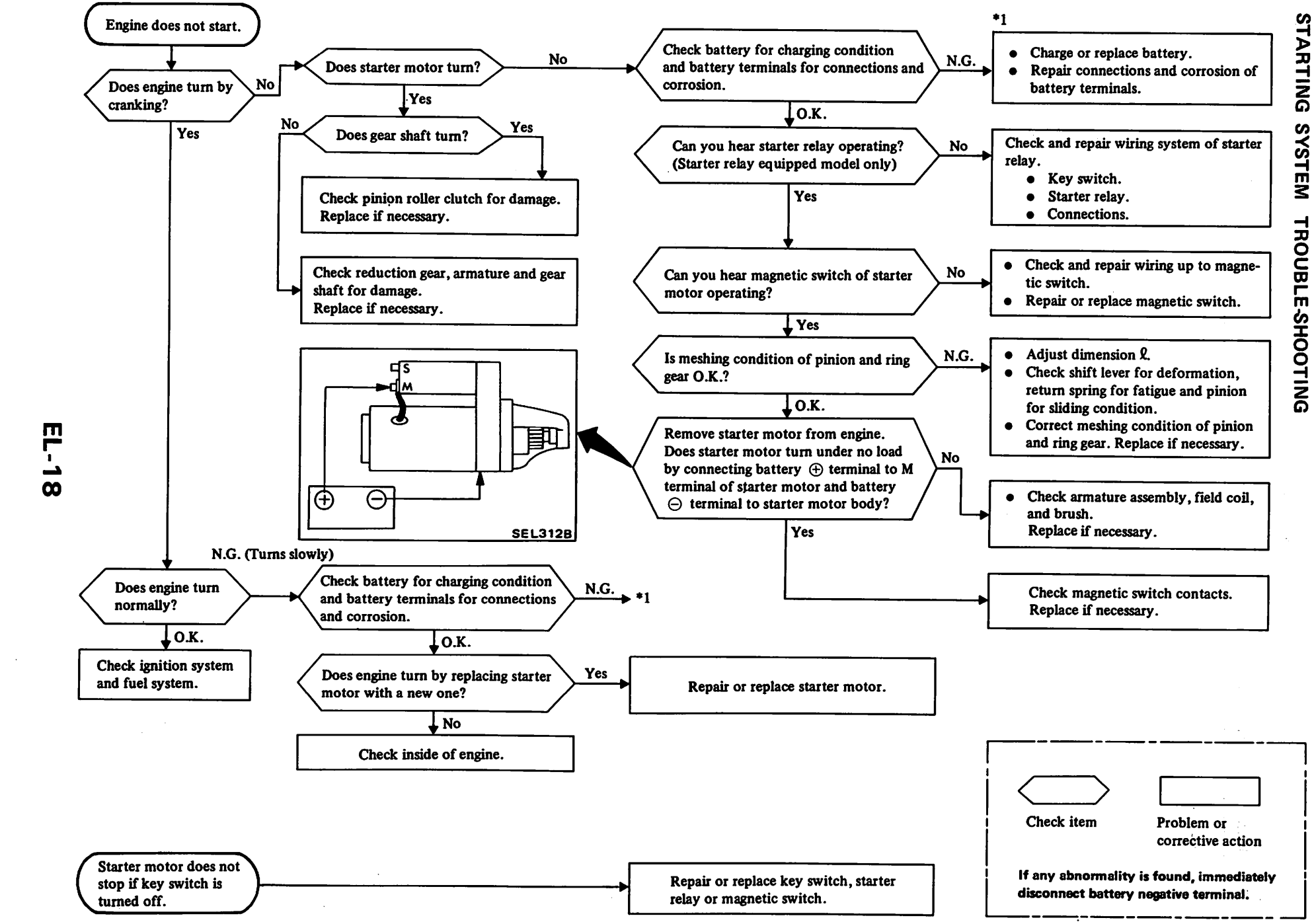


SEL268F

For Canada

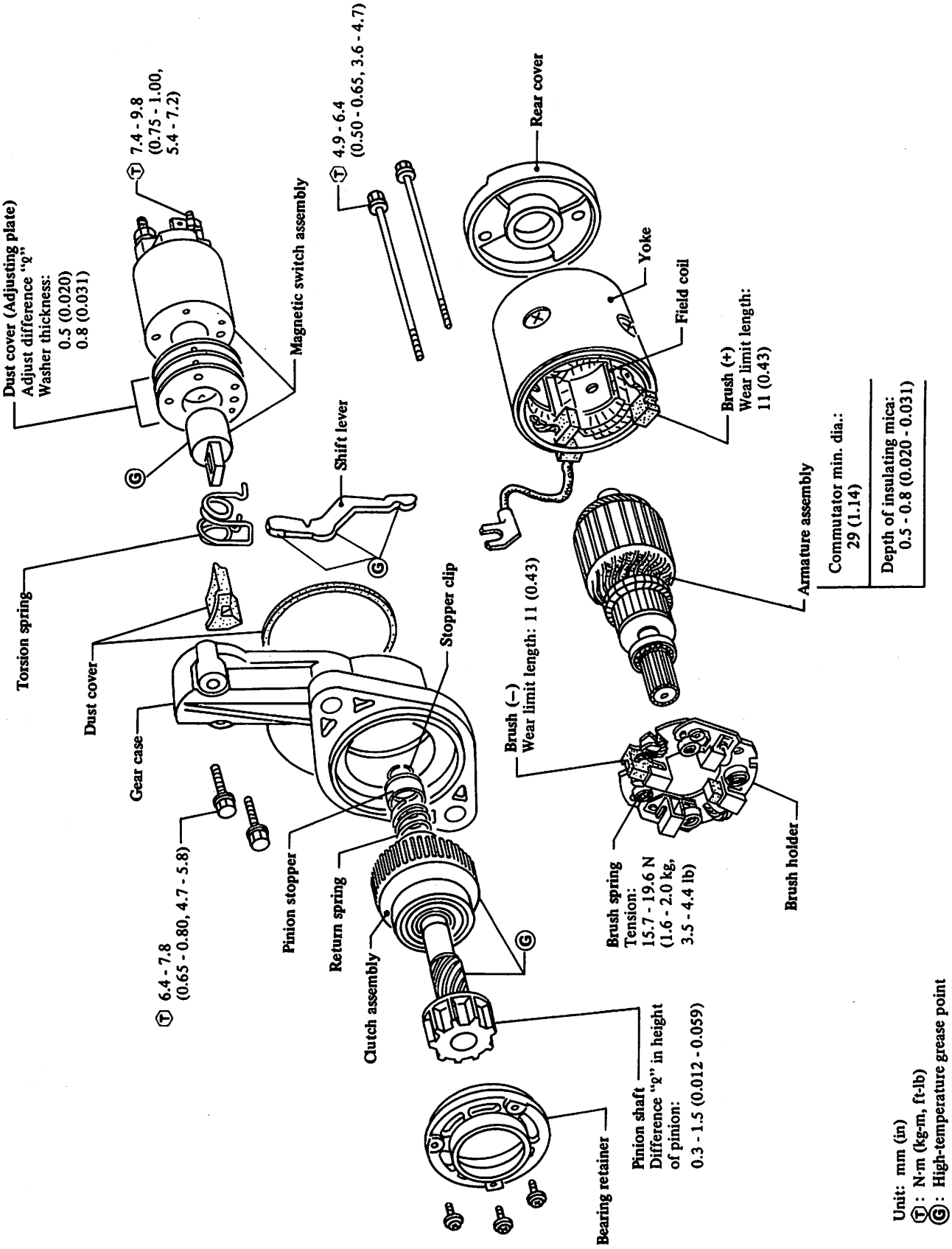


SEL347F


Engine does not start.
Does engine turn by cranking?
No
Yes
Does starter motor turn?
No
Yes
Does gear shaft turn?
No
Yes
Check pinion roller clutch for damage. Replace if necessary.
Check reduction gear, armature and gear shaft for damage. Replace if necessary.
Check battery for charging condition and battery terminals for connections and corrosion.
N.G.
*1
Charge or replace battery.
Repair connections and corrosion of battery terminals.
O.K.
Can you hear starter relay operating? (Starter relay equipped model only)
No
Check and repair wiring system of starter relay.
Key switch.
Starter relay.
Connections.
Yes
Can you hear magnetic switch of starter motor operating?
No
Check and repair wiring up to magnetic switch.
Repair or replace magnetic switch.
Yes
Is meshing condition of pinion and ring gear O.K.?
N.G.
Adjust dimension ℓ.
Check shift lever for deformation, return spring for fatigue and pinion for sliding condition.
Correct meshing condition of pinion and ring gear. Replace if necessary.
O.K.
Remove starter motor from engine. Does starter motor turn under no load by connecting battery ⊕ terminal to M terminal of starter motor and battery ⊖ terminal to starter motor body?
No
Check armature assembly, field coil, and brush. Replace if necessary.
Yes
Check magnetic switch contacts. Replace if necessary.
S
M
SEL312B
N.G. (Turns slowly)
Does engine turn normally?
O.K.
Check ignition system and fuel system.
Check battery for charging condition and battery terminals for connections and corrosion.
N.G.
*1
O.K.
Does engine turn by replacing starter motor with a new one?
Yes
Repair or replace starter motor.
No
Check inside of engine.
Starter motor does not stop if key switch is turned off.
Repair or replace key switch, starter relay or magnetic switch.
Check item
Problem or corrective action
If any abnormality is found, immediately disconnect battery negative terminal.

STARTER MOTOR

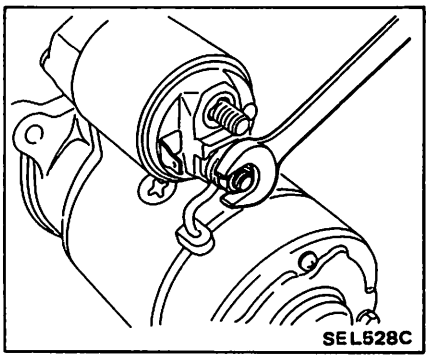
S114-440 (M/T models)



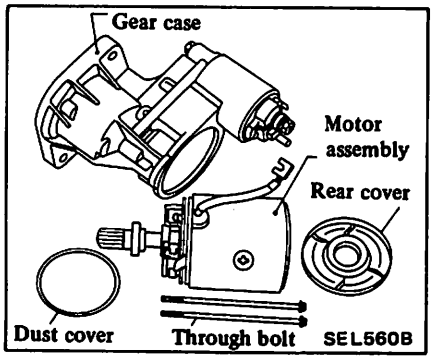
DISASSEMBLY

S114-440

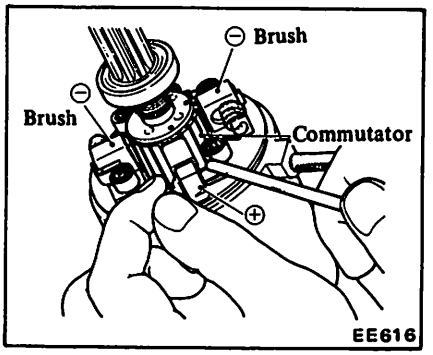
1. Loosen nut from "M" terminal and remove lead wire.



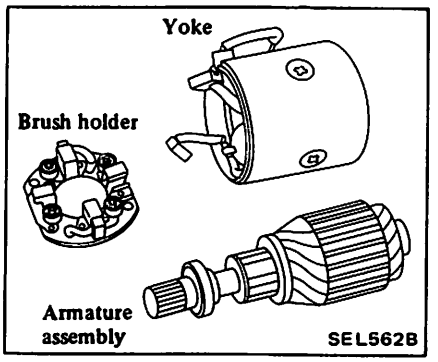
2. Remove through bolts.
3. Draw out rear cover and motor assembly.



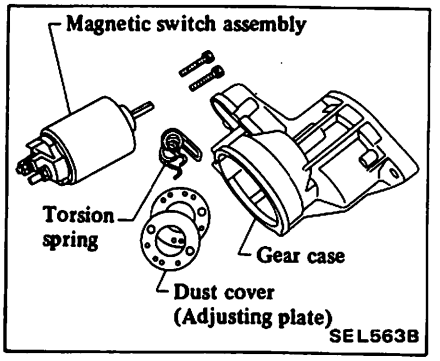
4. Lift up brush (–) and remove brush (+), then remove brush holder.



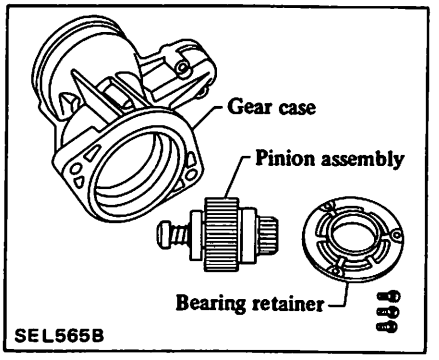
5. Draw out armature assembly from yoke.



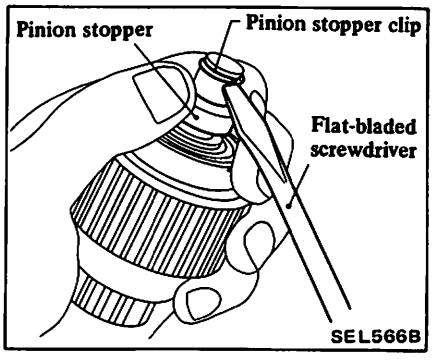
6. Remove magnet switch assembly. Then remove torsion spring, dust cover and shift lever.



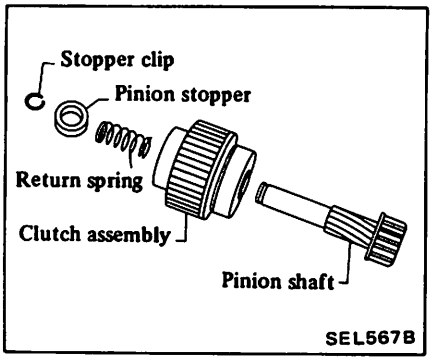
7. Remove bearing retainer and draw out pinion assembly.



8. Remove pinion stopper clip.



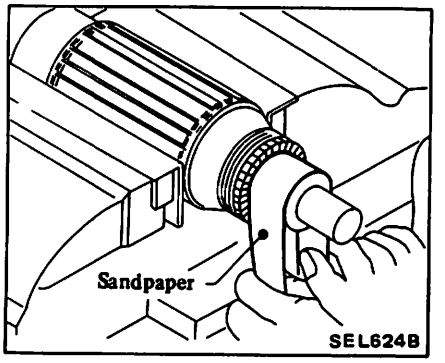
9. Remove pinion shaft



INSPECTION

Armature assembly

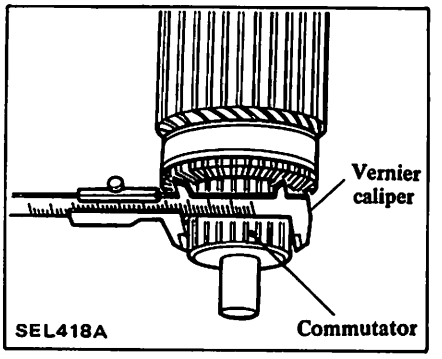
1. Check commutator surface.
- Rough ... Sand lightly with No. 500 sandpaper.



2. Check diameter of commutator.

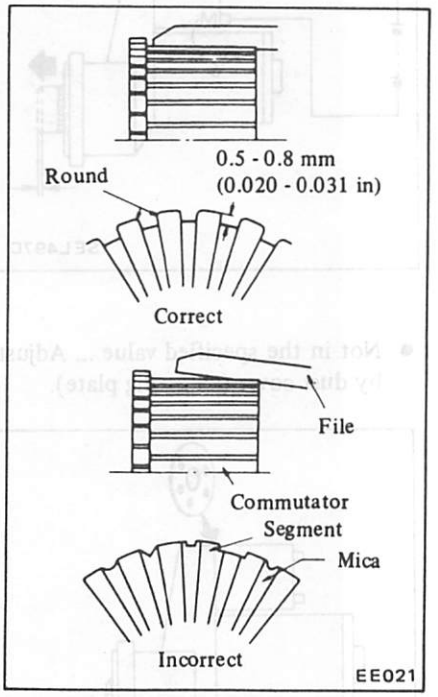
Commutator minimum diameter:
Refer to S.D.S.

- Less than specified value ... Replace.

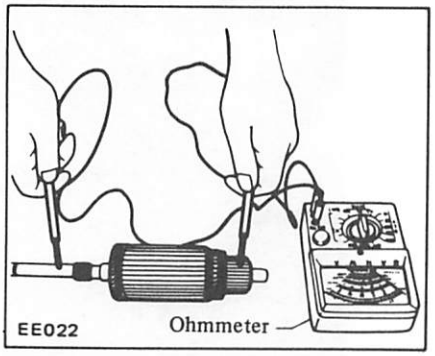


3. Check depth of insulating mica from commutator surface.

- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in).

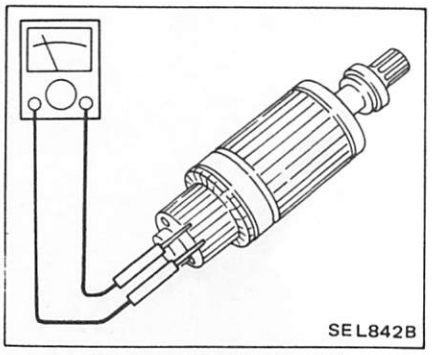


4. Insulation test (between each commutator bar and shaft).



- Continuity exists ... Replace.

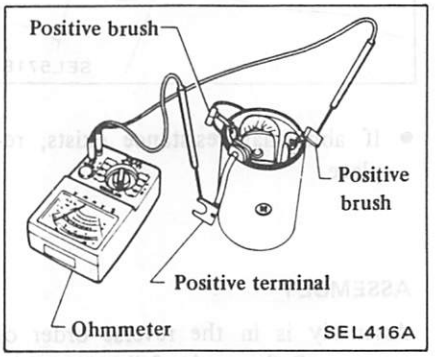
5. Continuity test (between two segments side by side).



- No continuity ... Replace.

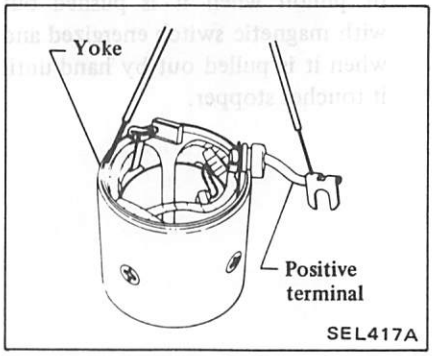
Field coil

1. Continuity test (between field coil positive terminal and positive brushes).



- No continuity ... Replace field coil.

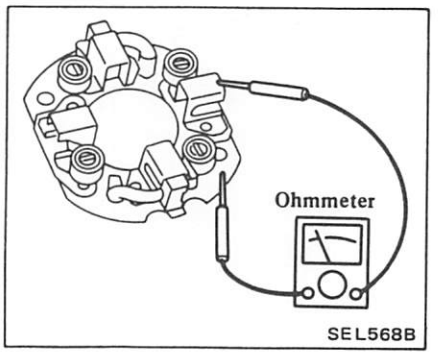
2. Insulation test (between field coil positive terminal and yoke).



- Continuity exists ... Replace field coil.

Brush holder

1. Insulation test (between negative side of brush holder and another positive side).



- Continuity exists ... Replace.

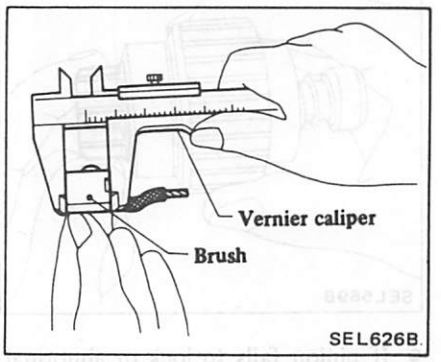
2. Check brush holder to see if it moves smoothly.

- If brush holder is bent, replace it; if sliding surface is dirty, clean.

Brush

Check wear of brush.

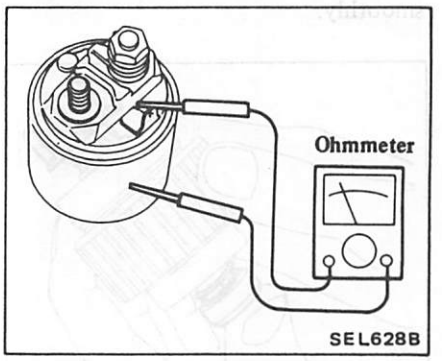
Wear limit length:
Refer to S.D.S.



- Excessive wear ... Replace.

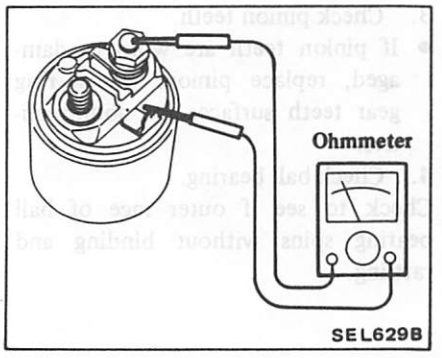
Magnetic switch

1. Continuity test (between "S" terminal and switch body).



- No continuity ... Replace.

2. Continuity test (between "S" terminal and "M" terminal).

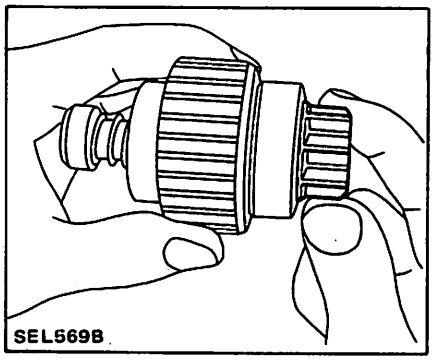


- No continuity ... Replace.

Pinion assembly

1. Check clutch for proper operation.

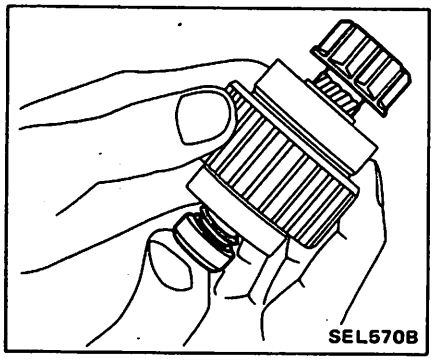
Check to see that pinion locks when turned in standard direction and rotates smoothly when turned in reverse.



- If pinion fails to lock or abnormal resistance exists, replace.

2. Check pinion for proper movement.

Check to see that pinion slides smoothly.



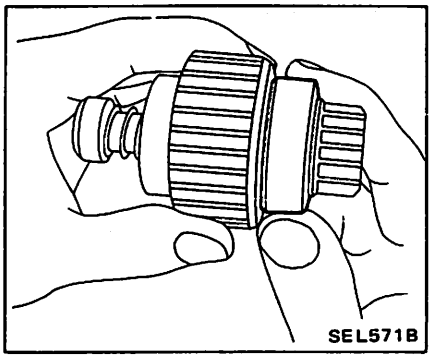
- If pinion is hard to slide, apply grease or, if necessary, replace.

3. Check pinion teeth.

- If pinion teeth are worn or damaged, replace pinion. Check ring gear teeth surfaces for abnormalities.

4. Check ball bearing.

Check to see if outer race of ball bearing spins without binding and rattling.



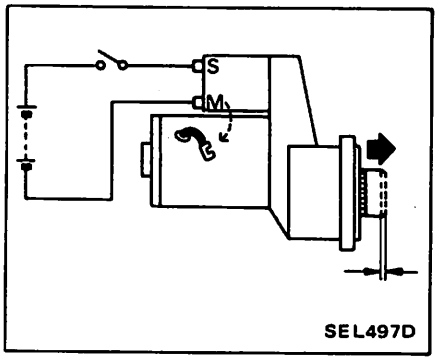
- If abnormal resistance exists, replace.

ASSEMBLY

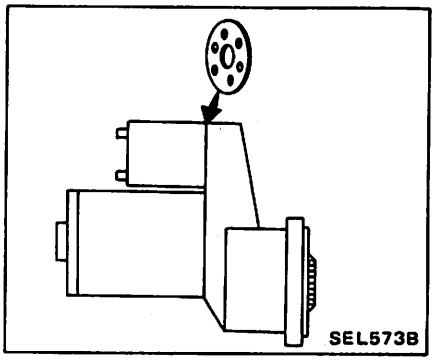
Assembly is in the reverse order of removal. Refer to the following table.

- Apply grease to sliding contact of pinion, moving part of shift lever, sliding contact of plunger, reduction gear.
- Compare difference "ℓ" in height of pinion when it is pushed out with magnetic switch energized and when it is pulled out by hand until it touches stopper.

Difference "ℓ":
Refer to S.D.S.



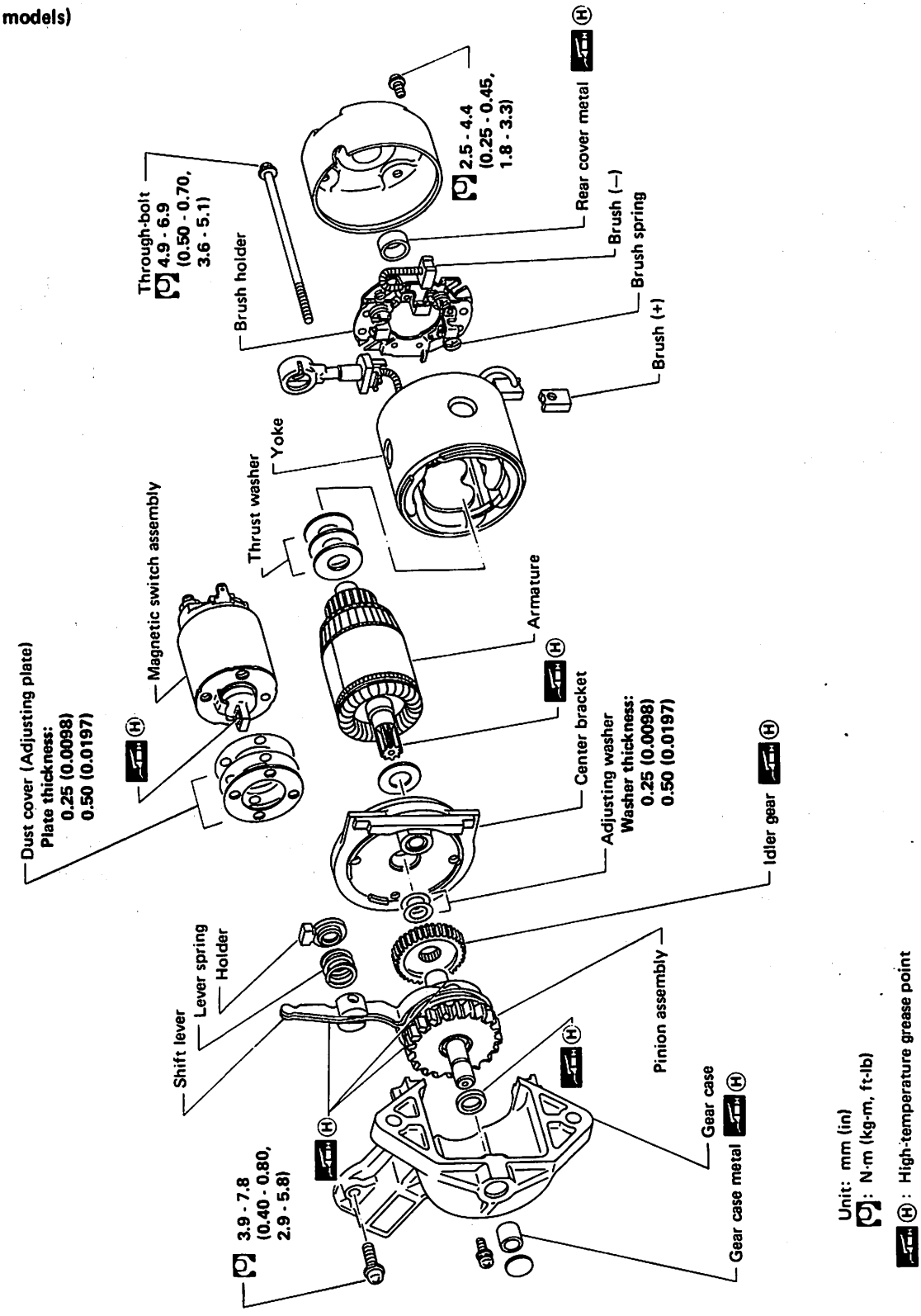
- Not in the specified value ... Adjust by dust cover (adjusting plate).



Construction

STARTER MOTOR

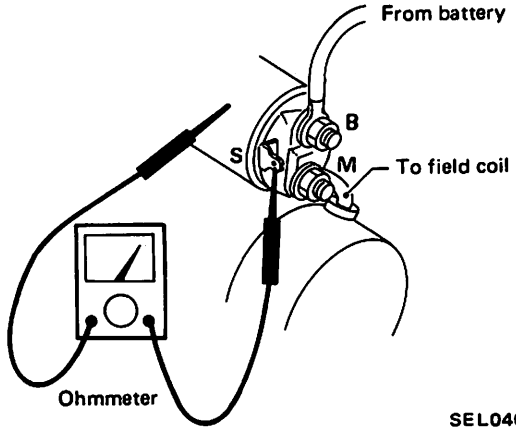
M3T26685 (A/T models)



SEL045D

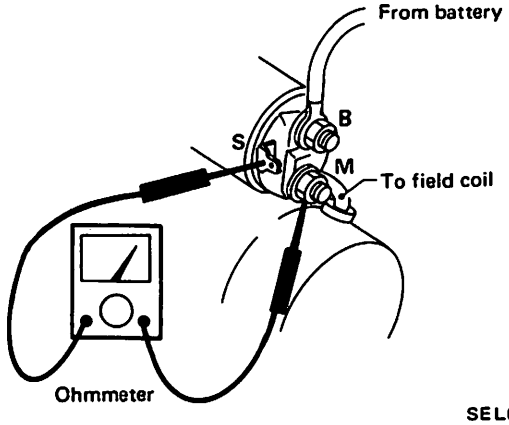
Magnetic Switch Check

1. Continuity test (between "S" terminal and switch body).
   - No continuity ... Replace.



SEL046D

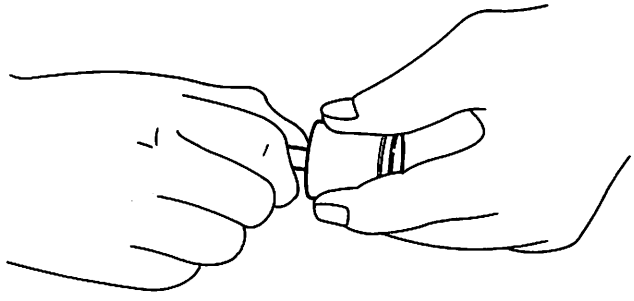
2. Continuity test (between "S" terminal and "M" terminal).
   - No continuity ... Replace.



SEL047D

Plunger Check

- Pull by hand the portion where plunger lever engages with magnet of magnetic switch to check for looseness.

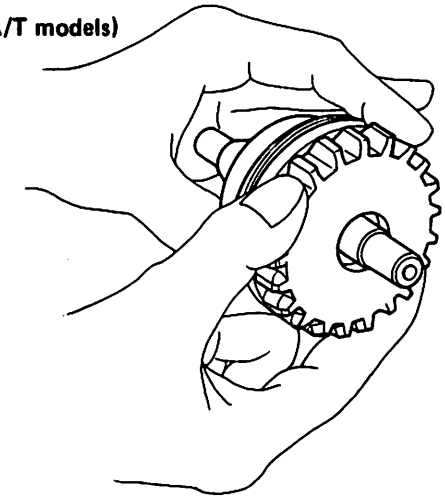


SEL772D

Pinion/Clutch Check

1. Check clutch.
   Check pinion to see that it locks properly when turned in "drive" direction and rotates smoothly when turned in reverse.

(A/T models)



SEL048D

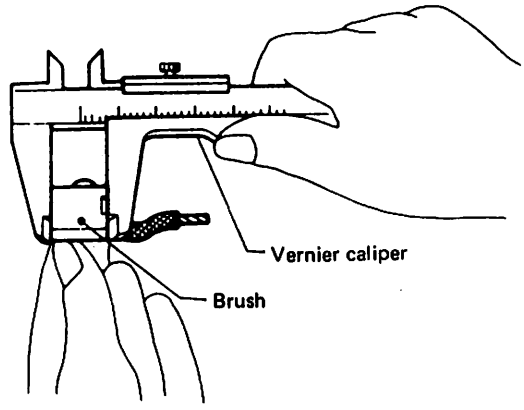
   - Pinion does not lock in either direction or unusual resistance is evident ... Replace.
2. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
3. Inspect idle gear teeth. (A/T models only)
   - Replace idle gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)

Brush Check

BRUSH

Check wear of brush.

Wear limit length: Refer to S.D.S.

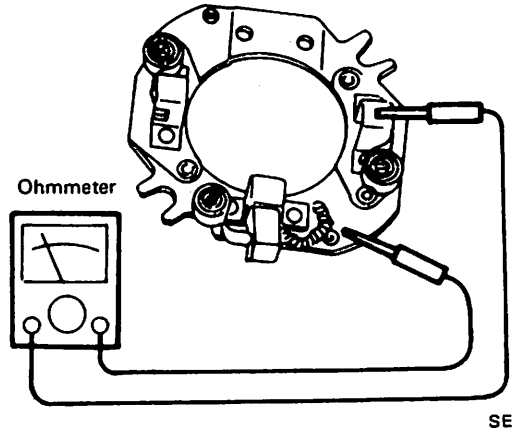


SEL626B

- Excessive wear ... Replace.

BRUSH HOLDER

1. Perform insulation test between brush holder (positive side) and its base (negative side).



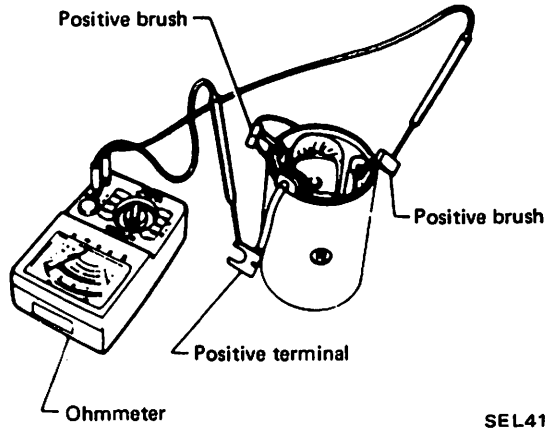
SEL627B

- Continuity exists ... Replace.

2. Check brush holder to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

Field Coil Check

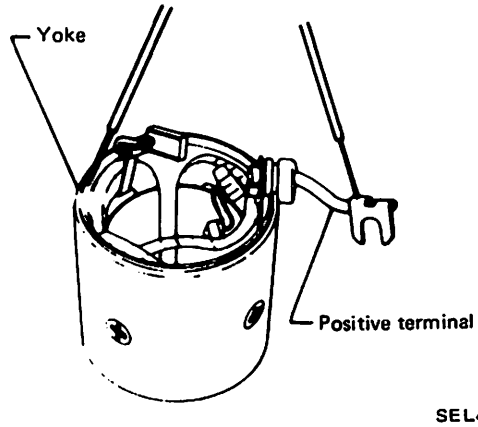
1. Continuity test (between field coil positive terminal and positive brushes).



SEL416A

- No continuity ... Replace field coil.

2. Insulation test (between field coil positive terminal and yoke).

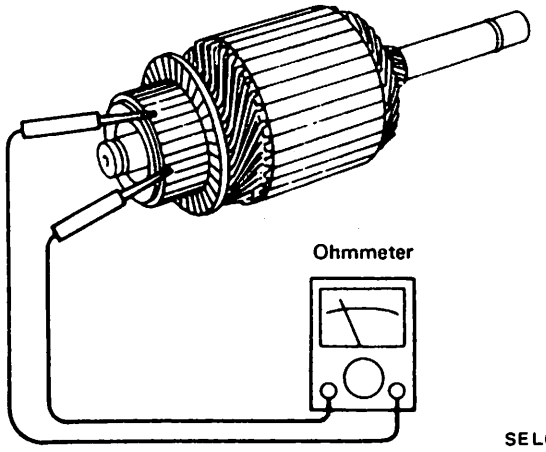


SEL417A

- Continuity exists ... Replace field coil.

Armature Check

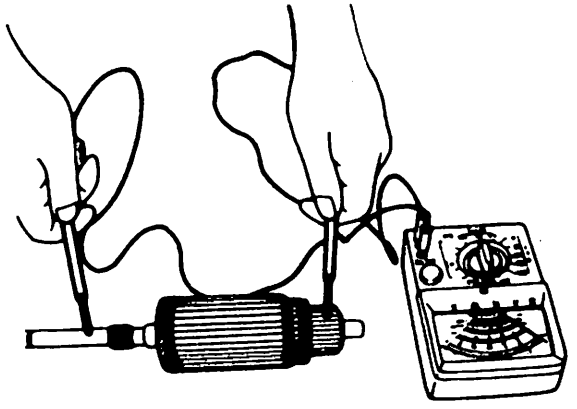
1. Continuity test (between two segments side by side).



SEL625B

- No continuity ... Replace.

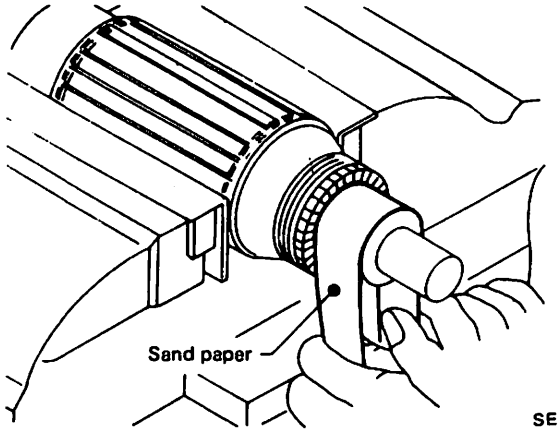
2. Insulation test (between each commutator bar and shaft).



EE022

- Continuity exists ... Replace.

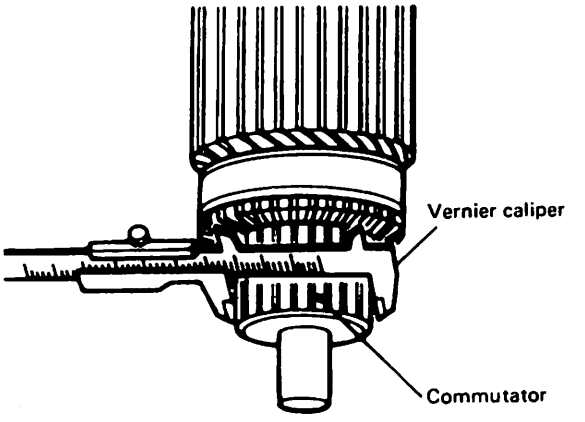
3. Check commutator surface.
   - Rough ... Sand lightly with No. 500 - 600 sandpaper.



SEL624B

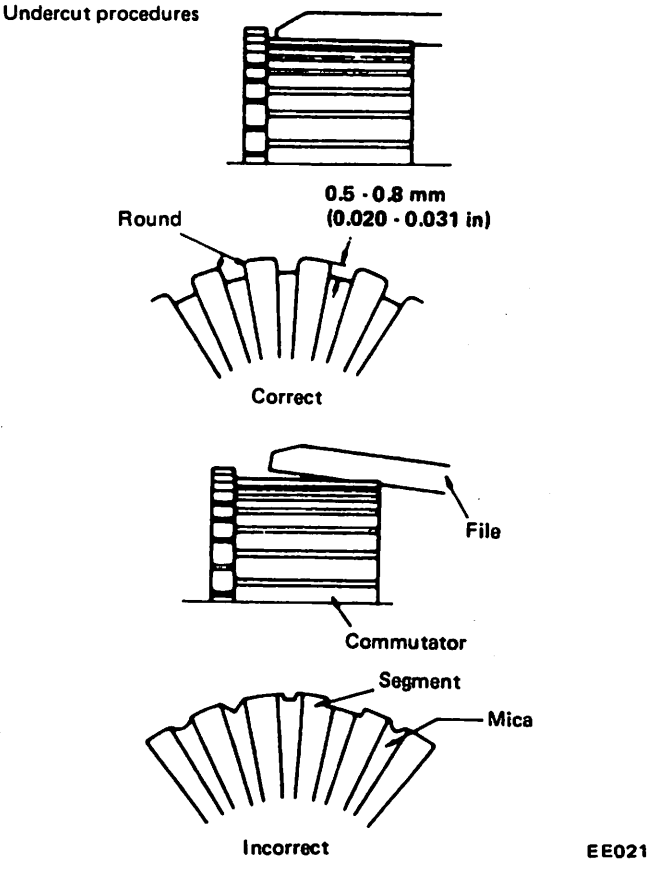
4. Check diameter of commutator.

   Commutator minimum diameter:
   Refer to S.D.S.
   - Less than specified value ... Replace.



SEL418A

5. Check depth of insulating mica from commutator surface.
   - Less than 0.2 mm (0.008 in) ... Undercut to 0.5 - 0.8 mm (0.020 - 0.031 in)



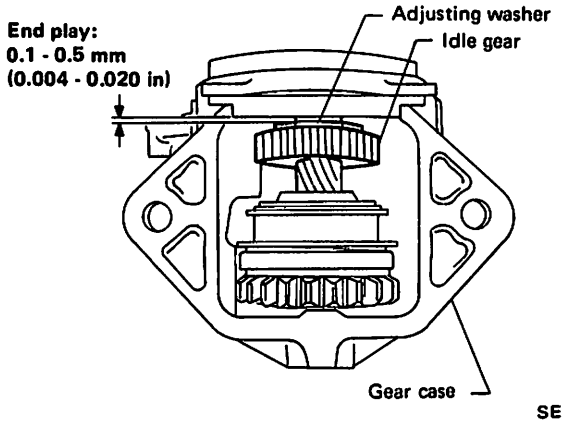
EE021

Reassembly

Carefully observe the following instructions.

a. **Apply grease to:**
   - Rear cover metal
   - Gear case metal
   - Frictional surface of pinion
   - Moving portion of shift lever
   - Plunger of magnetic switch

b. **After assembling gear case, pinion assembly, idler gear, adjusting washers and center bracket, turn idler gear with your hand in axial direction and adjust end play to the 0.1 to 0.5 mm (0.004 to 0.020 in) range using adjusting washer(s). (A/T models only)**



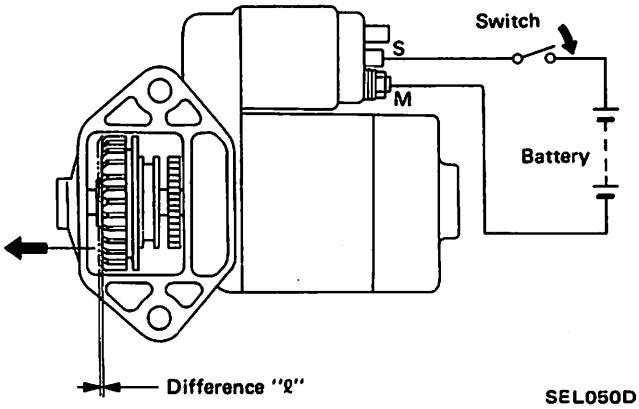
SEL049D

c. **Check pinion to see if its engagement length is correct**

A/T models

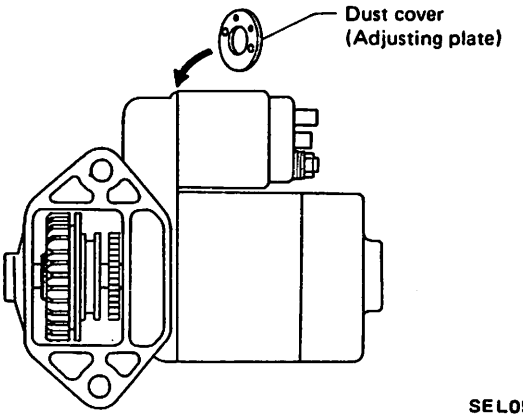
Measure difference in length "ℓ" of pinion assembly front edge when pinion assembly is forced out by the magnetic switch and then when it is pulled out by hand.

Difference "ℓ": Refer to S.D.S.



SEL050D

- Not in the specified value ... Adjust by dust cover (Adjusting plate).



SEL051D

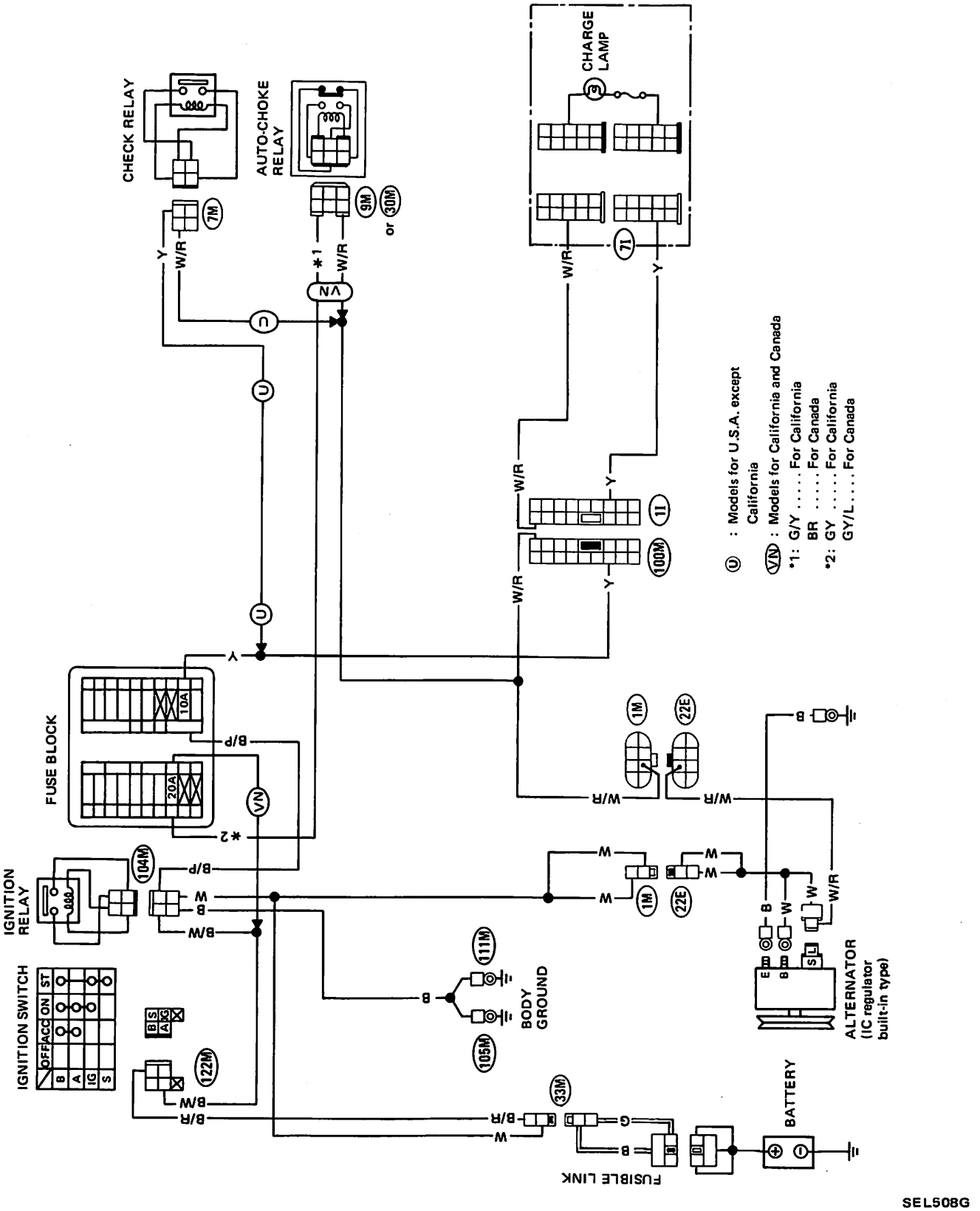
Service Data and Specifications (S.D.S.)

Applied model			M/T models	A/T models
Type			S114-440	M3T26685
System voltage		V	12	
No-load	Terminal voltage	V	11	11.5
	Current	A	Less than 100	Less than 70
	Revolution	rpm	More than 3,900	More than 1,800
Outer diameter of commutator		mm (in)	More than 29 (1.14)	More than 31 (1.22)
Minimum length of brush		mm (in)	11 (0.43)	11.8 (0.465)
Brush spring tension		N (kg, lb)	15.7 - 19.6 (1.6 - 2.0, 3.5 - 4.4)	13.7 - 25.5 (1.4 - 2.6, 3.1 - 5.7)
Clearance "ℓ" between pinion front edge end pinion stopper		mm (in)	–	
Difference "ℓ" in height of pinion assembly		mm (in)	0.3 - 1.5 (0.012 - 0.059)	0.3 - 2.5 (0.012 - 0.098)

CHARGING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WIRING DIAGRAM



SEL508G

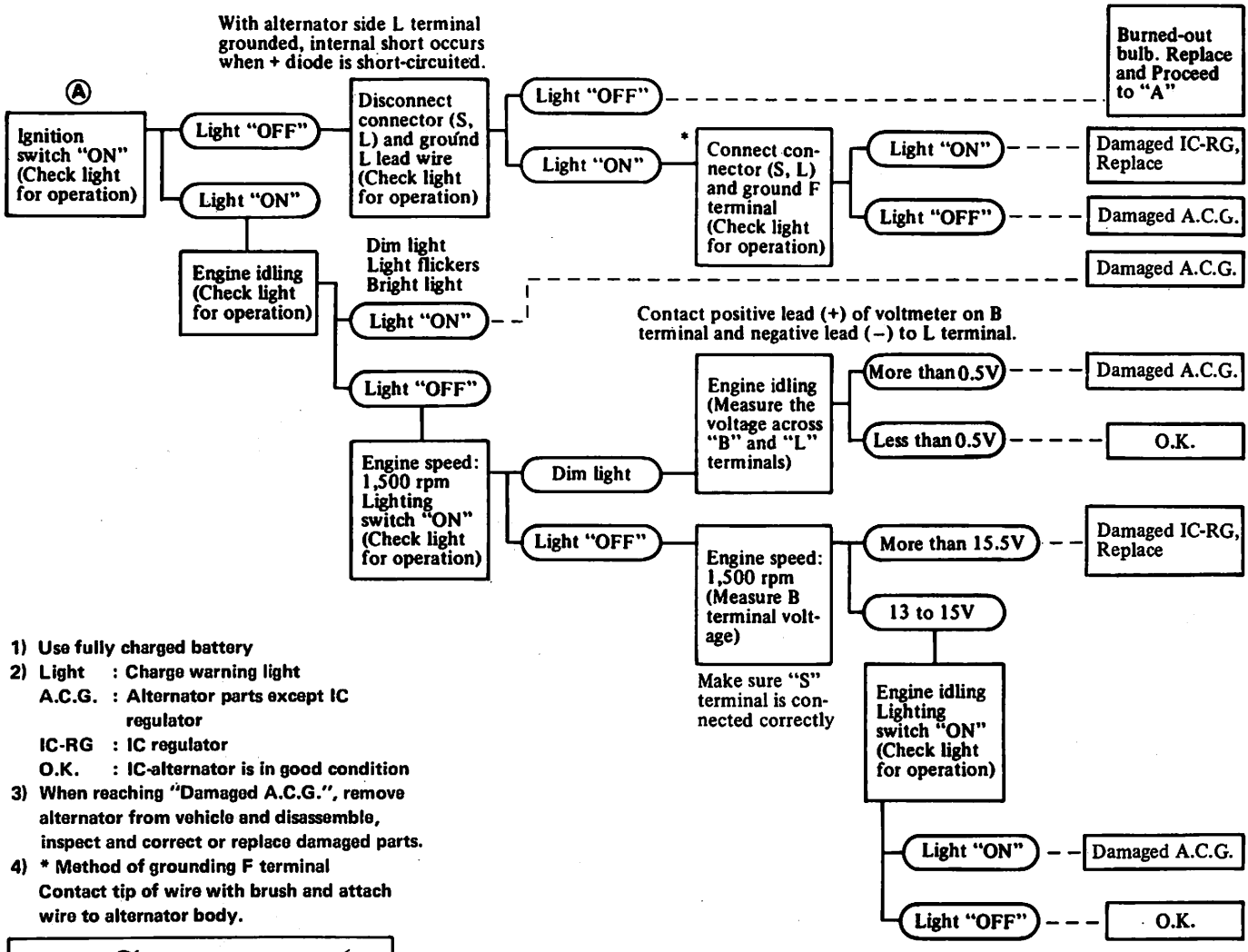
CHARGING SYSTEM TROUBLE-SHOOTING

Before conducting an alternator test, make sure that the battery is fully charged.

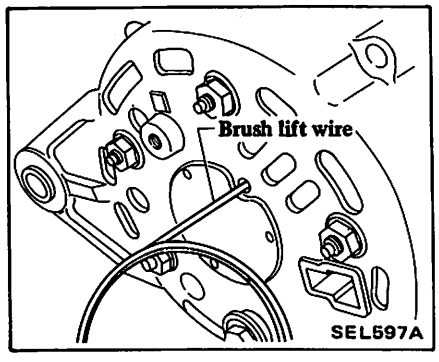
A 30-Volt voltmeter and suitable test probes are necessary for the test.

The alternator can be checked easily by referring to the Inspection Table.

- **Before starting trouble-shooting, inspect the fusible link.**

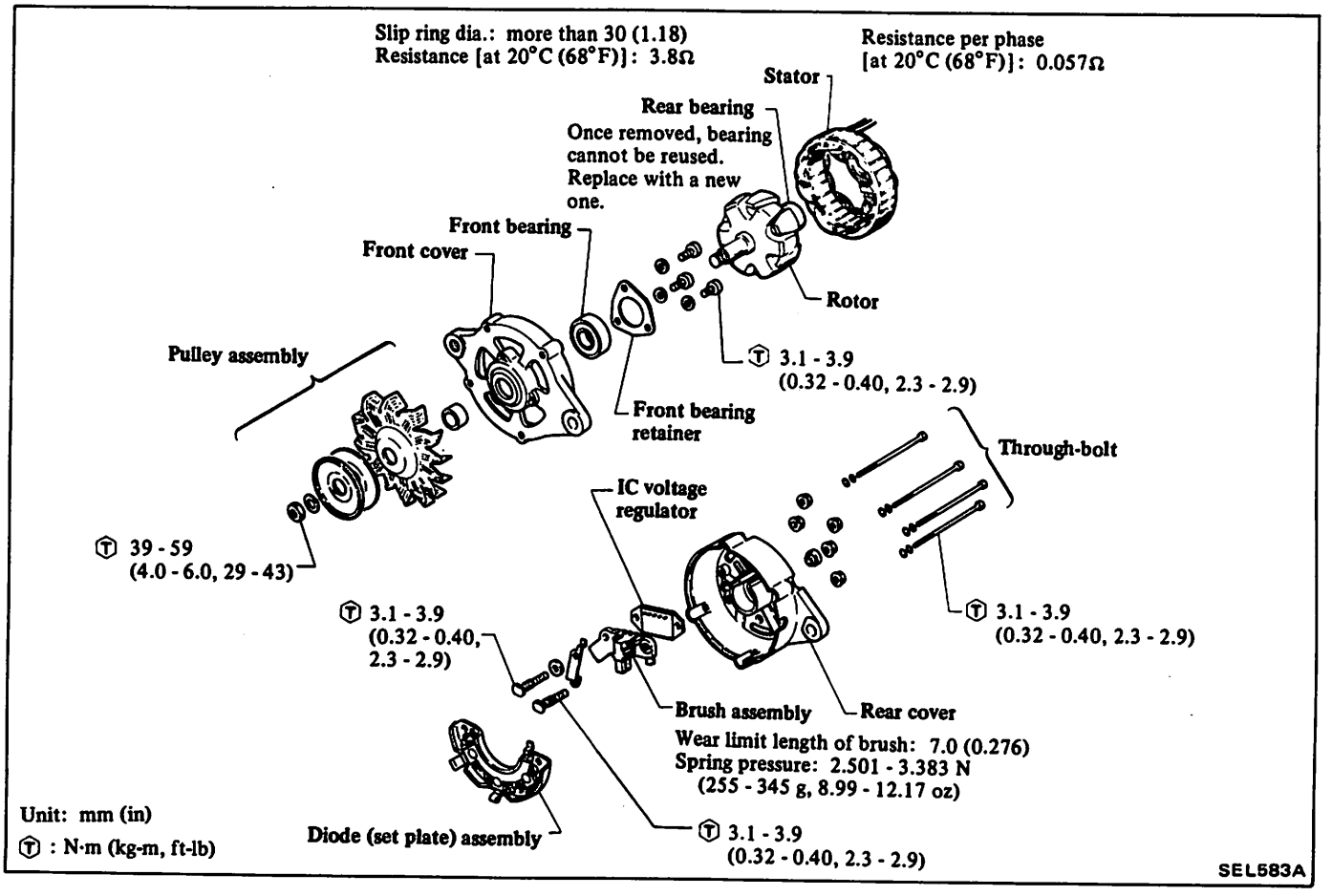


1) Use fully charged battery
2) Light : Charge warning light
   A.C.G. : Alternator parts except IC regulator
   IC-RG : IC regulator
   O.K. : IC-alternator is in good condition
3) When reaching "Damaged A.C.G.", remove alternator from vehicle and disassemble, inspect and correct or replace damaged parts.
4) * Method of grounding F terminal
   Contact tip of wire with brush and attach wire to alternator body.



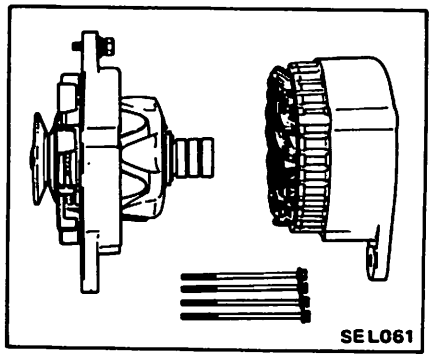
5) Terminals "S", "L", "BAT" and "E" are marked on rear cover of alternator.

ALTERNATOR

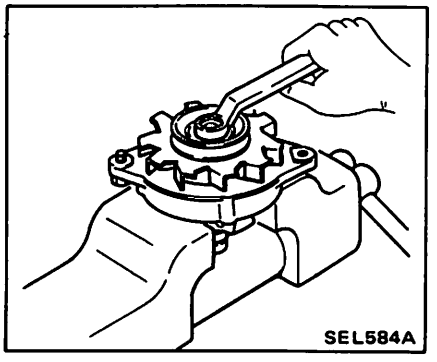


DISASSEMBLY

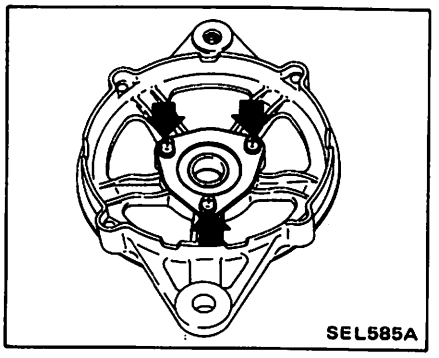
1. Remove through-bolts.
2. Separate front cover and rear cover.



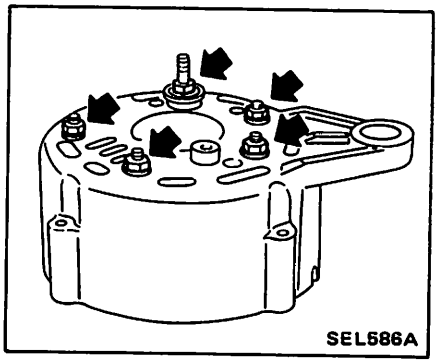
3. Remove pulley and fan.
(1) Place rear cover side of rotor in a vice.
(2) Remove pulley nut.



4. Remove setscrews from bearing retainer.



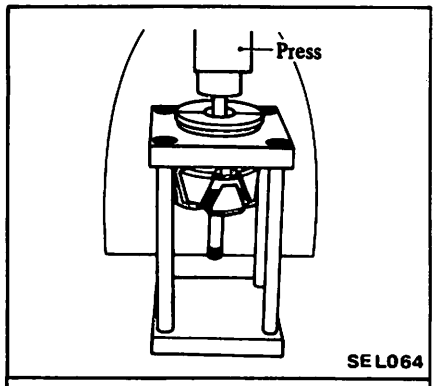
5. Remove attaching nuts and take out stator assembly.

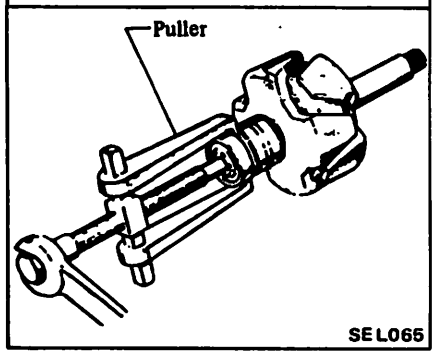


Rotor

Pull rear bearing off from rotor assembly with a press or bearing puller.

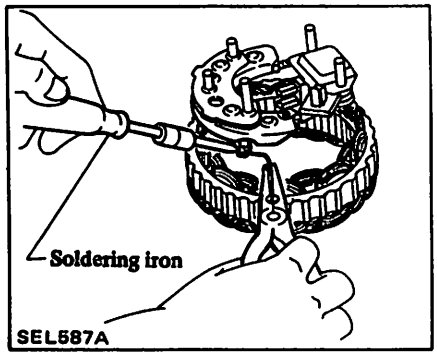
Once removed, bearing cannot be reused. Replace with a new one.





Stator

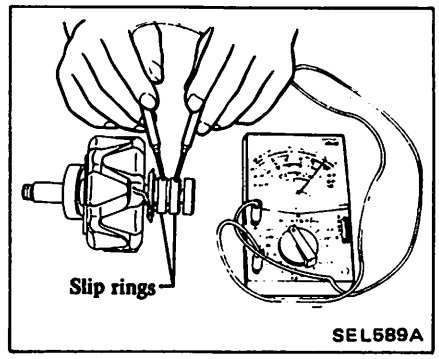
Disconnect stator coil lead wires from diode terminals.



INSPECTION

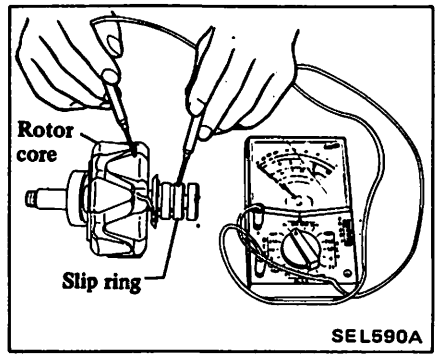
Rotor

1. Continuity test.



- No continuity ... Replace rotor.

2. Insulation test



- Continuity exists ... Replace rotor.

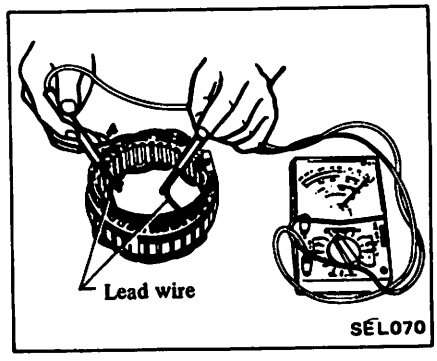
3. Check slip ring for wear.

Slip ring outer diameter:
Refer to S.D.S.

If necessary, replace rotor assembly.

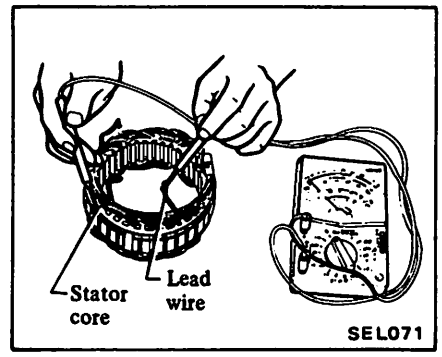
Stator

1. Continuity test



- No continuity ... Replace stator.

2. Insulation test



- Continuity exists ... Replace stator.

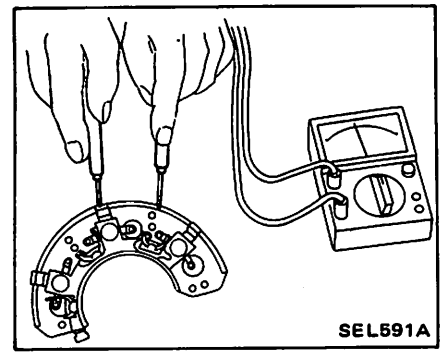
Diode

Perform a continuity test on diodes in both directions, using an ohmmeter.

Circuit tester terminal		Conduction
Positive	Negative	
(+) plate Holder plate	Diode terminal	Yes
Diode terminal	(+) plate Holder plate	No
(–) plate Rear cover	Diode terminal	No
Diode terminal	(–) plate Rear cover	Yes

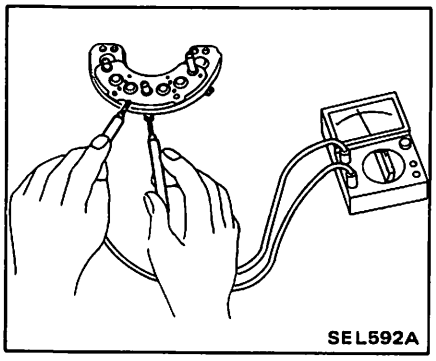
Some ohmmeters use a reverse polarity, in which case continuity will be exactly opposite from the chart above.

Positive diode



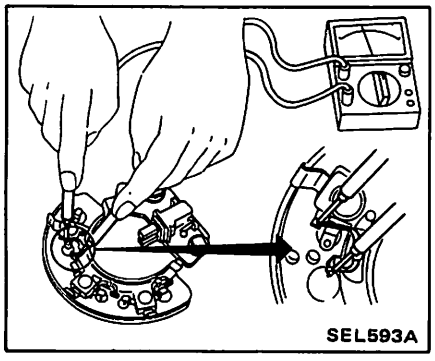
- Conduction test is N.G. ... Replace diode assembly.

Negative diode



- Conduction test is N.G. ... Replace diode assembly.

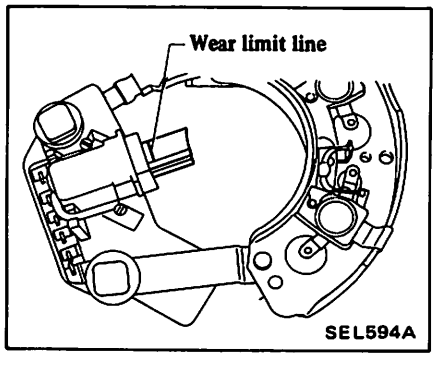
Sub-diode



- Conduction test is N.G. ... Replace diode assembly.

Brush

1. Check smooth movement of brush.
- Not smooth ... Check brush holder and clean.
2. Check brush for wear.

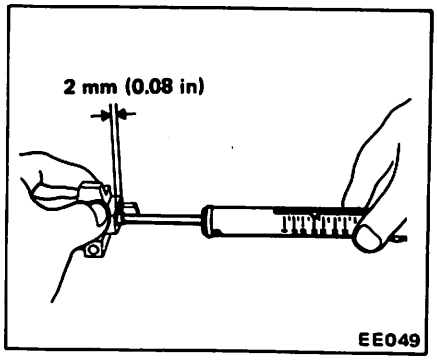


3. Check brush pig tail for damage.
- Damaged ... Replace.
4. Check brush spring pressure.

Measure brush spring pressure with brush projected approximately 2 mm (0.08 in) from brush holder.

Spring pressure:
Refer to S.D.S.

When brush is worn, pressure decreases approximately 0.196 N (20 g, 0.71 oz) per 1 mm (0.04 in) wear.



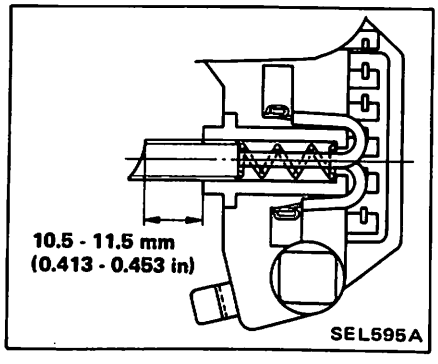
- Not in the specified value ... Replace brush assembly.

ASSEMBLY

Assemble alternator in the reverse order of disassembly, noting the following:

1. When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.
2. When soldering brush lead wire, observe the following.

(1) Position brush so that it extends 11 mm (0.43 in) from brush holder.

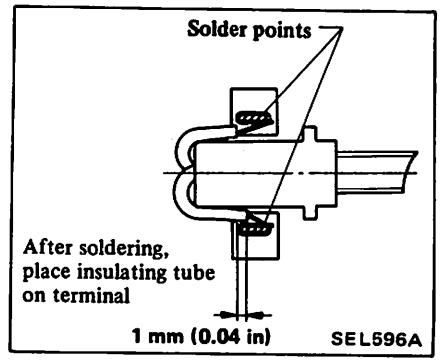


(2) Coil lead wire 1.5 times around terminal groove. Solder outside of terminal.

Ⓣ : **Brush holder**
3.1 - 3.9 N·m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

Diode and IC regulator
3.1 - 3.9 N·m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

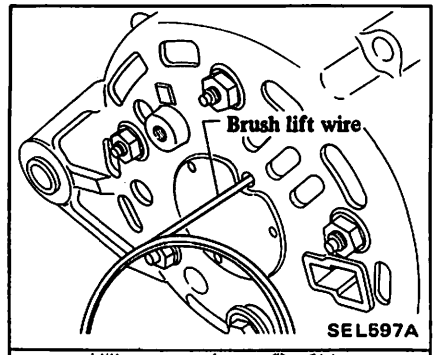
Bearing retainer
3.1 - 3.9 N·m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

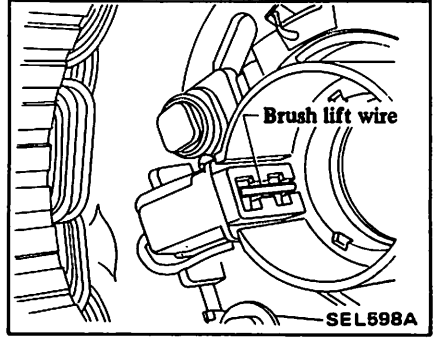


3. Tighten pulley nut and make sure that deflection of V-groove is proper.

Ⓣ : **Pulley nut**
39 - 59 N·m
(4 - 6 kg-m,
29 - 43 ft-lb)
V-groove deflection:
0.3 mm (0.012 in)

4. Before installing front and rear sides of alternator, push brush up with fingers and retain brush, by inserting brush lift into brush lift hole from outside.





5. After installing front and rear sides of alternator, pull brush lift by pushing toward center.

Do not pull brush lift by pushing toward outside of cover as it will damage slip ring sliding surface.

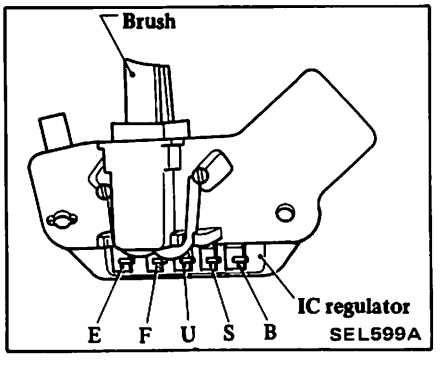
6. Tighten through-bolts.

Ⓣ : **Through-bolts**
3.1 - 3.9 N·m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

IC VOLTAGE REGULATOR

DESCRIPTION

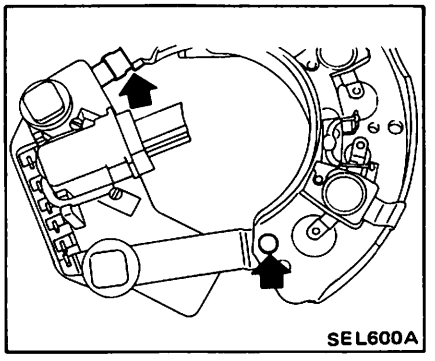
The regulator consists essentially of integrated circuits incorporating transistors. These transistors interrupt and admit current flow to the alternator rotor coil, thus maintaining its output voltage at a constant value. Unlike in a mechanical type regulator, an electronic relay employing transistors is utilized. These transistors are enclosed in a very compact, sealed case. On the charge warning lamp circuit, a diode monitors generating voltage at the stator so that when the monitored voltage and charging voltage are equal during re-charging, the charge warning lamp is turned off. Accordingly, a charge warning relay is not employed in this circuit.



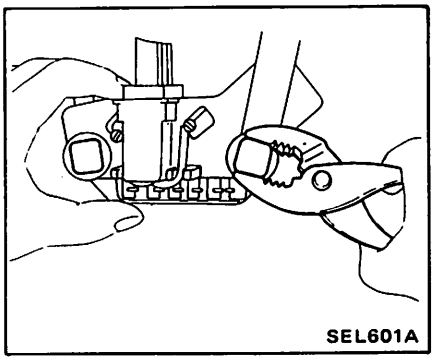
REPLACEMENT

Removal should be done only when IC regulator is being replaced.

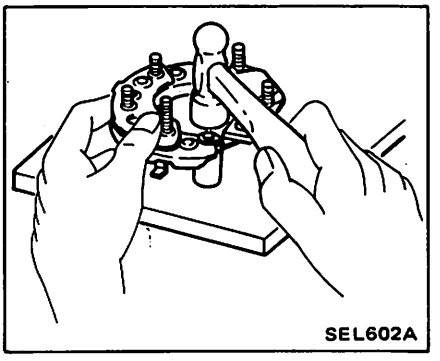
1. Remove rivet and solder.



2. Remove the terminals solder and take out bolts.



When installing the regulator, reverse order removal noting following.
(1) Put IC regulator on brush holder and press-fit bolts using hand press.
(2) Stake rivets using Tool.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

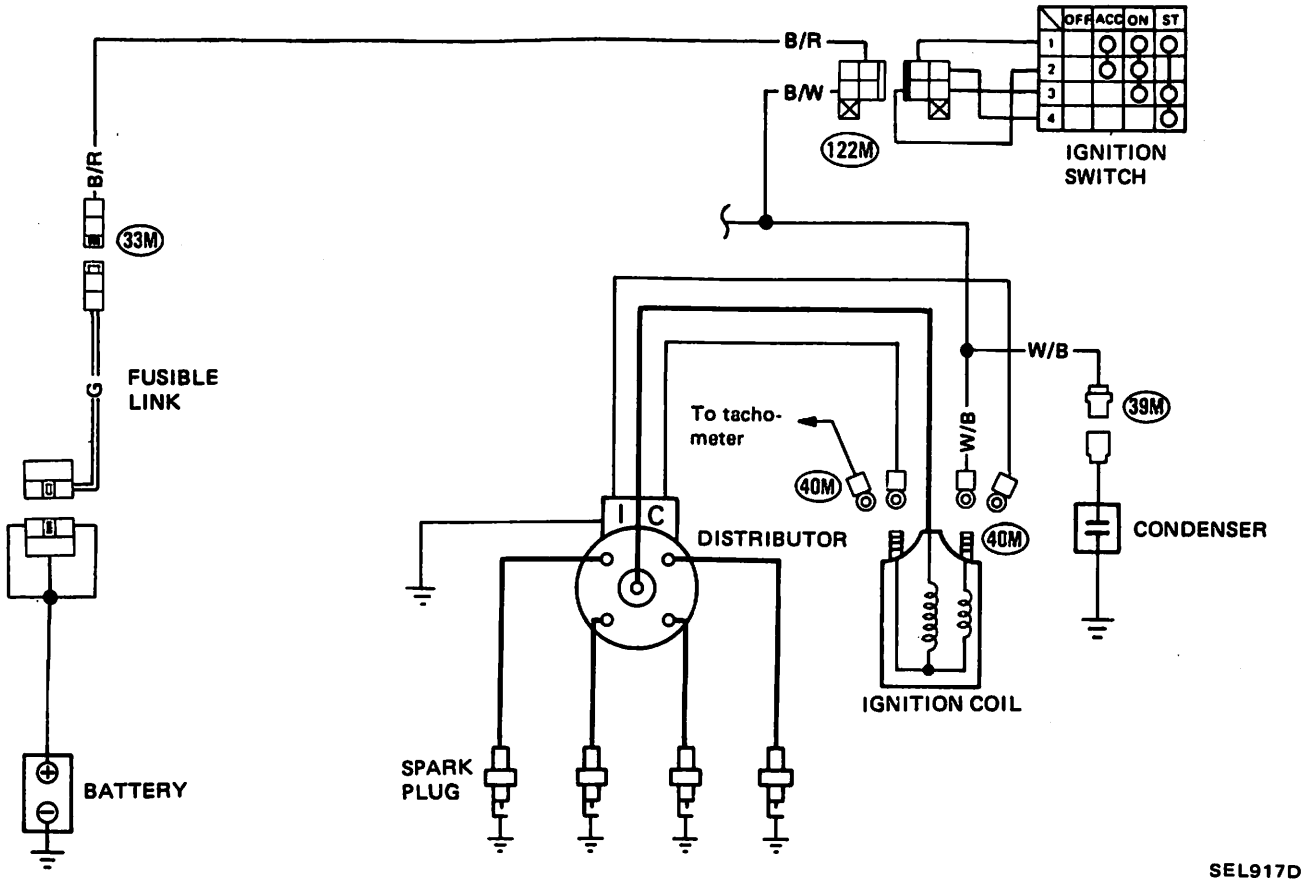
ALTERNATOR

Type		LR160-121
Nominal rating	V-A	12-60
Ground polarity		Negative
Minimum revolution under no-load (When 14 volts is applied)	rpm	Less than 1,000
Hot output current	A/rpm	More than 50/2,500 More than 60/5,000
Regulated output voltage	V	14.4 - 15.0
Brush wear limit	mm (in)	More than 7.0 (0.276)
Brush spring pressure	N (g, oz)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)
Slip ring outer diameter	mm (in)	More than 30 (1.18)

IGNITION SYSTEM
(For California model and Canada model)

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WIRING DIAGRAM



IC IGNITION SYSTEM TROUBLE-SHOOTING

Engine turns erratically.

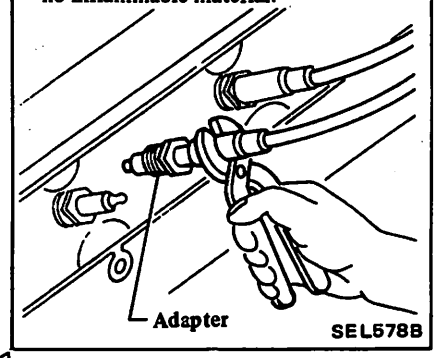
Engine cranks but does not start.

Check ignition timing.

N.G. → Adjust.

O.K. → Attach adapter *1 to high tension cable and position tip of adapter approx. 6 mm (0.24 in) away from cylinder block. With adapter held in that position, crank engine to see if spark jumps across gaps between tip and cylinder block at regular intervals.

Before cranking, disconnect fuel cut solenoid harness connector.
Before operation, make sure there is no inflammable material.



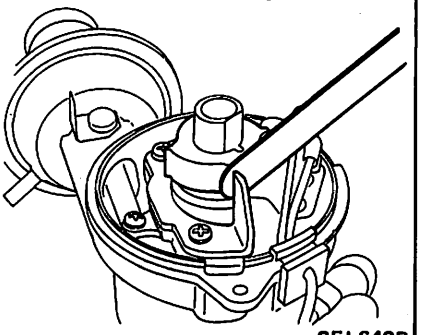
SEL578B

N.G. → Check air gap between reluctor and stator.

O.K. → Check IC ignition system.
IC Ignition System is checked using a volt-ohm-milliammeter (V.O.M.). Follow the steps in the sequence indicated. If a fault is found, correct the problem before continuing. If all tests indicate "O.K." replace the IC Ignition Unit. DO NOT REPLACE THE UNIT UNTIL ALL TESTS HAVE BEEN COMPLETED AND INDICATE "O.K."

Go to test table.

Specified range ... Refer to S.D.S.
If necessary, adjust air gap.


SEL640B

O.K. → Check for burned or fouled spark plug.

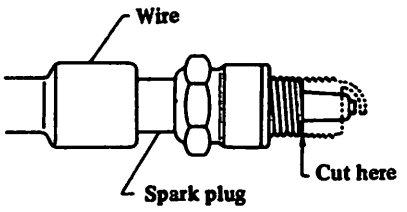
N.G. → Clean or replace.

O.K. → Check fuel system.

WARNING:
When current is flowing, never touch with bare hand high tension cables or any other parts with high voltage. If parts are moist, touching them could cause an electric shock, even if they are insulated. Always wear dry, well-insulated gloves or wrap affected parts with dry cloth before handling.

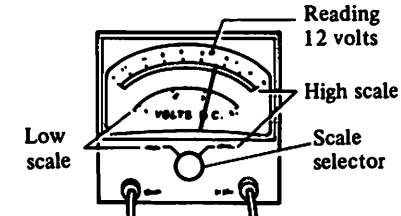
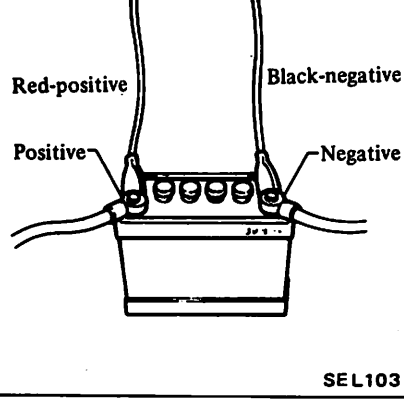
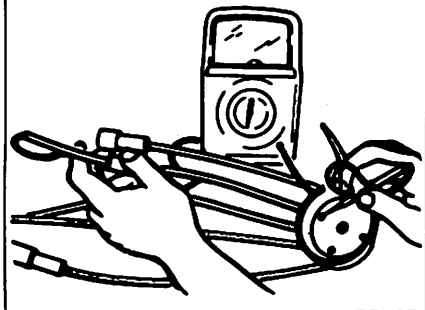
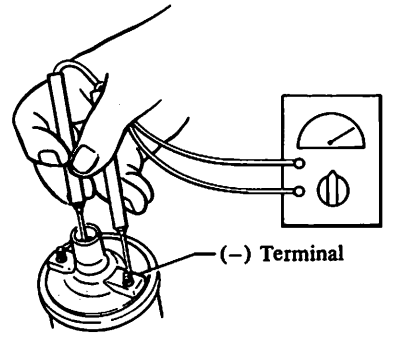
NOTE:
1. **When performing the following tests, use a multitester which can measure accurately in the following ranges; 0 to 20V. D.C.; 0 to 1,000Ω; 0 to 10V A.C.; 0 to 50,000Ω.**
2. **If possible, start the vehicles and let it run for 5 to 15 minutes with the hood closed. This will bring all components to normal operating temperature, and will make it easier to diagnose intermittent problems.**
3. **It is not necessary to disconnect the harness connectors when performing the tests which follow. Simply insert the meter probes into the back of appropriate connector cavity.**

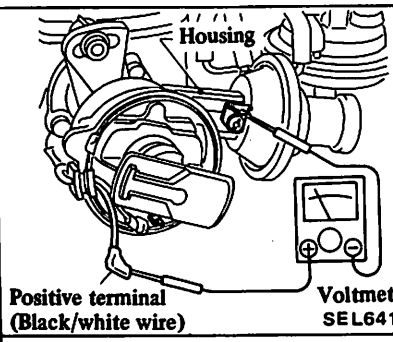
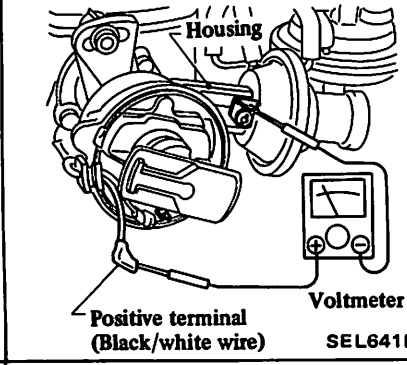
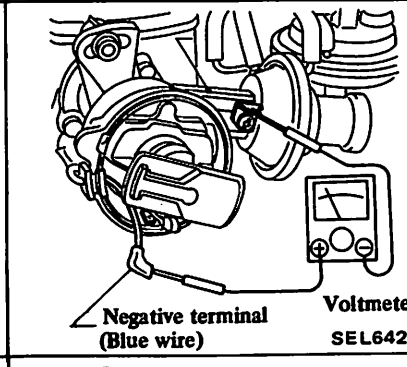
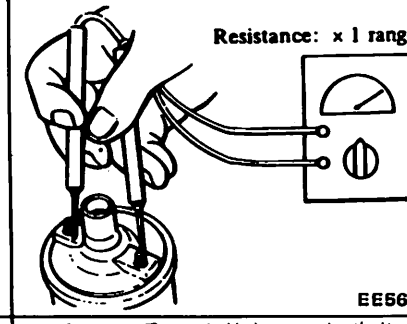
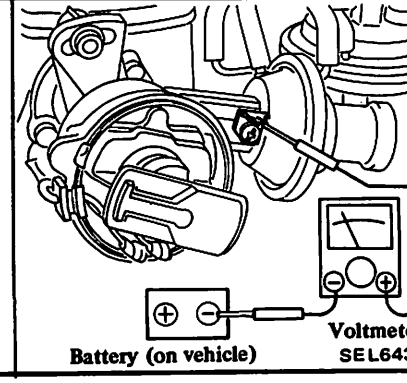
*1:
Preparation of spark plug for checking
Many things can be utilized as an adapter. However, it is recommended that a used spark plug whose threaded portion has been half cut off as shown in the figure be utilized.



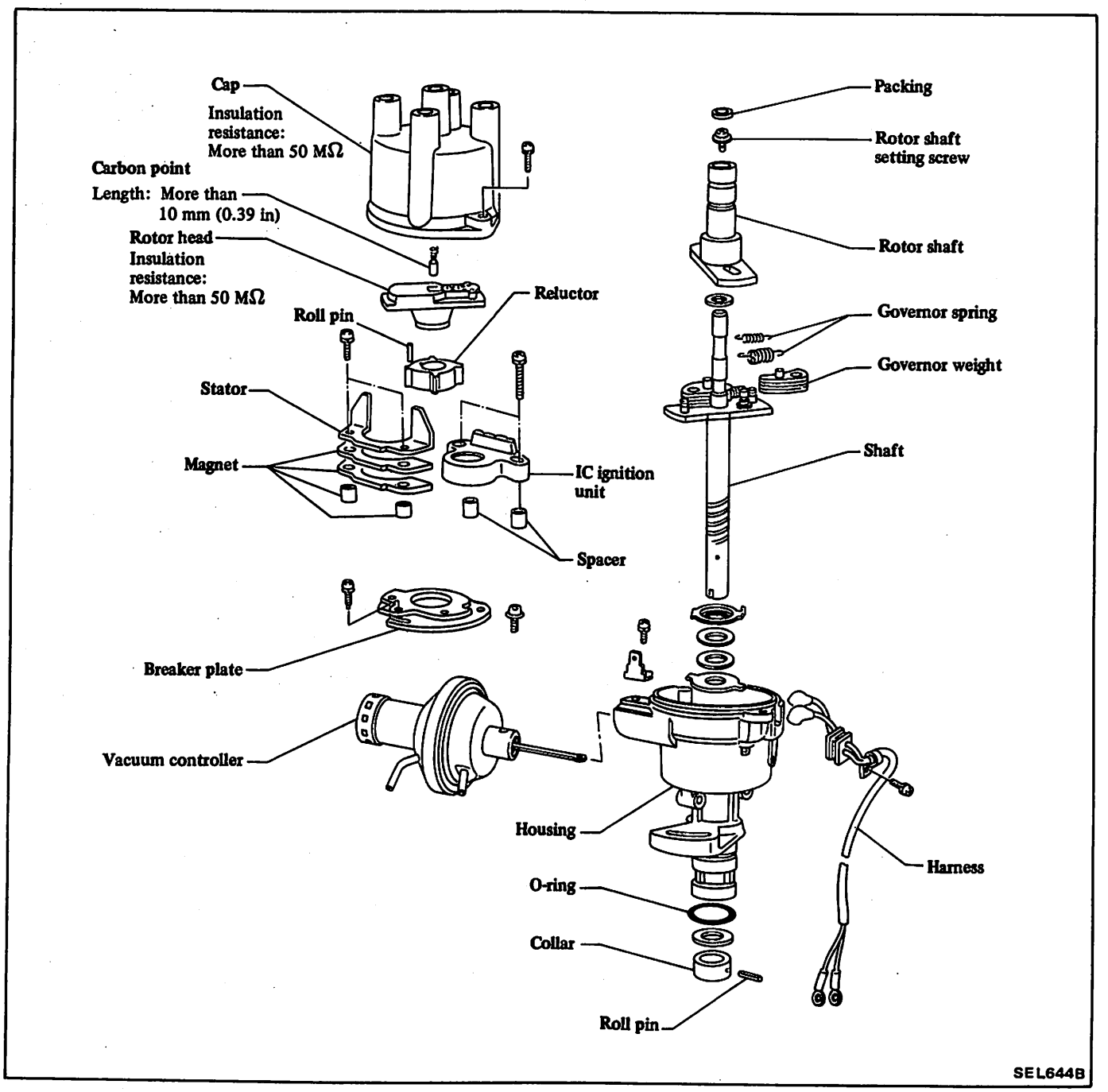
SEL581B

TEST TABLE

TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
1. Battery Voltage (no load)		1. Ignition key in "OFF" position. 2. Connect voltmeter as illustrated and set to appropriate scale. 3. Read and record battery voltage reading. Battery voltage [ ]	11.5 - 12.5 volts	Proceed to Step 2.
			Below 11.5 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
2. Battery Cranking Voltage	 SEL103	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Remove coil wire from distributor cap and ground it. 3. Read voltmeter while cranking engine for approximately 15 seconds. 4. Record voltage reading. Battery cranking voltage [ ]	Voltage reading greater than 9.6 volts	Battery O.K. Proceed to Step 3.
			Voltage reading less than 9.6 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
3. Secondary Wiring	 EF125	1. Connect ohmmeter as illustrated and measure the resistance of each high tension cable.	Resistance readings less than 30,000 ohms	Distributor cap and high tension cables – O.K. Proceed to Step 4.
			Resistance readings greater than 30,000 ohms	Replace high tension cable(s) and/or distributor cap as required.
4. Ignition Coil Secondary Circuit	 SEL104	1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated.	7,300 - 11,000 ohms	Ignition coil secondary windings – O.K. Proceed to step 5 for California
			Resistance reading not between 7,300 - 11,000 ohms	Faulty ignition coil – replace

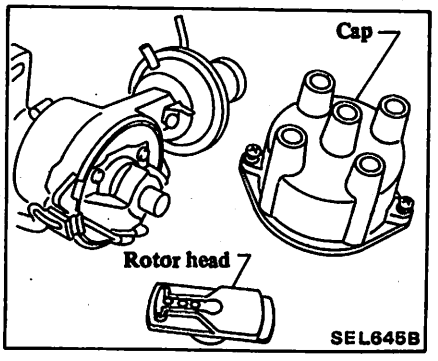
TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
5. Power Supply Circuit		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Turn ignition key to "ON" position.	11.5 - 12.5 volts	Proceed to Step 6.
			Below 11.5 volts	Check wiring from ignition switch to IC unit.
6. Power Supply Circuit (Cranking)		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking.	Voltage reading is less than 1 volt below battery cranking voltage and is greater than 8.6 volts.	Proceed to Step 7.
			Voltage reading is more than 1 volt below battery cranking voltage and/or is below 8.6 volts.	Check ignition switch and wiring from switch to IC unit.
7. Ignition Primary Circuit		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Ignition key in "ON" position.	11.5 - 12.5 volts	Proceed to Step 9.
			Below 11.5 volts	Proceed to Step 8.
8. Ignition Coil Primary Circuit		1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated.	1.04 - 1.27 ohms	Ignition coil primary winding O.K. Check ignition switch and wiring from ignition switch to coil and IC unit.
			Resistance reading not between 1.04 - 1.27 ohms	Faulty ignition coil – replace.
9. I.C. Unit Ground Circuit		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking.	0.5 volts or less	Replace IC ignition unit assembly.
			More than 0.5 volts	Check distributor ground, wiring from chassis ground to battery including battery cable connections.

DISTRIBUTOR

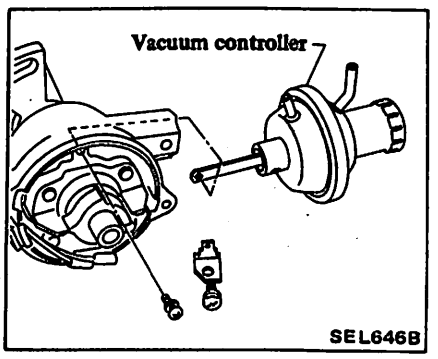


DISASSEMBLY

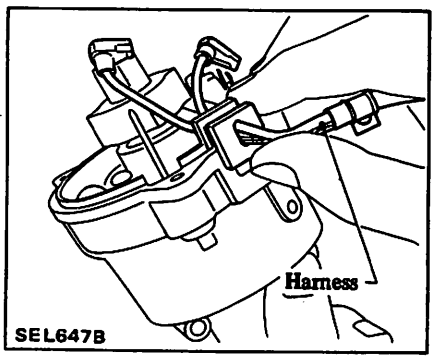
1. Remove cap and rotor head.



2. Remove vacuum controller.

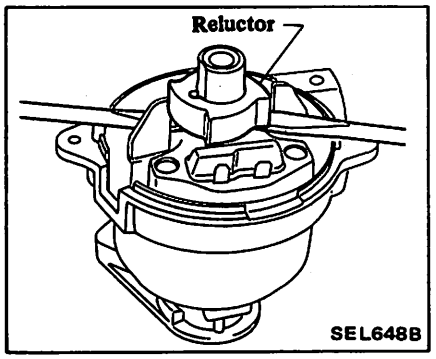


3. Remove harness from housing.

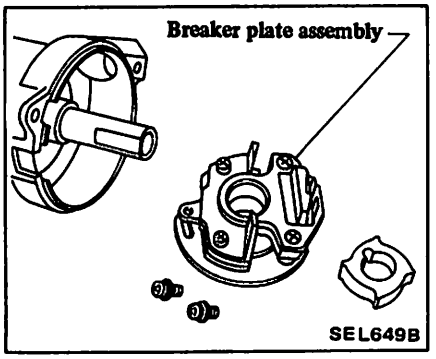


4. Insert a flat-bladed screwdriver under lower side of reluctor, and pry reluctor from shaft. Remove roll pin from reluctor.

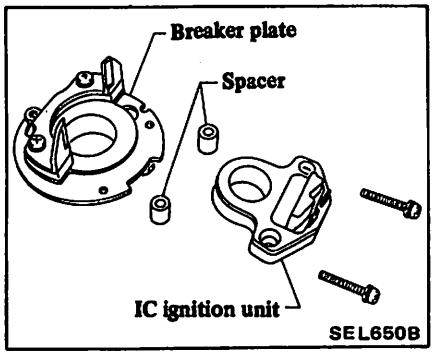
CAUTION:
When removing reluctor, be careful not to distort or damage the teeth.



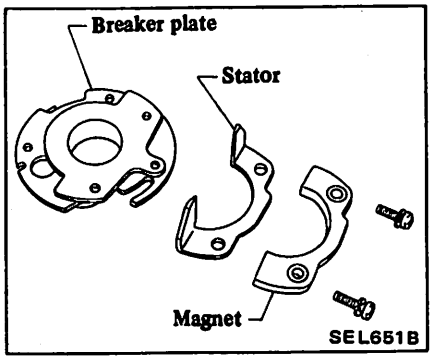
5. Remove breaker plate assembly.



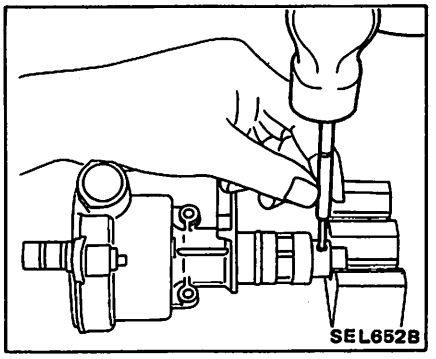
6. Remove IC ignition unit and spacer.



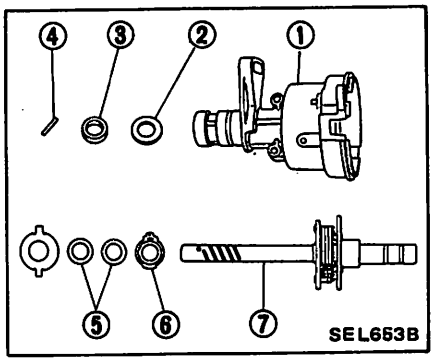
7. Remove magnet and stator from breaker plate.



8. Knock roll pin out and remove collar.

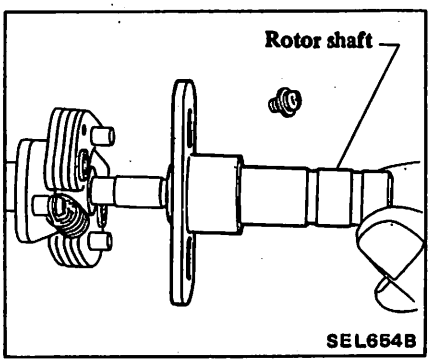


9. Draw out shaft assembly from housing.

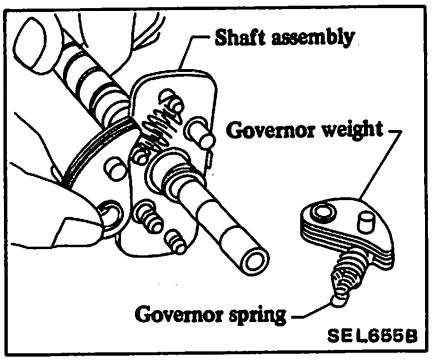


1 Housing
2 Thrust washer
3 Collar
4 Roll pin
5 Thrust washer
6 Thrust plate
7 Shaft

10. Remove packing from the top of rotor shaft and unscrew rotor shaft setscrew.
Remove rotor shaft.



11. Remove governor weight and governor spring from the shaft assembly.



INSPECTION

Carbon point

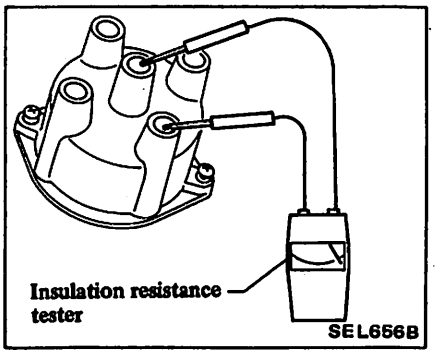
Check length of carbon point inside cap.

Carbon point length:
Refer to S.D.S.

Cap and rotor head

Measure insulation resistance between electrodes on ignition coil and side of spark plug.

Insulation resistance:
Refer to S.D.S.



- Less than specified value ... Replace.

Reluctor and stator

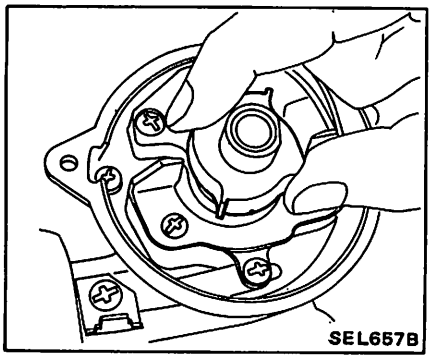
- Check reluctor and stator for bending or scratches. If necessary, replace.

Breaker plate

- If breaker plate shows any signs of binding or dragging, replace.

Centrifugal advance mechanical parts

- While preventing the shaft from turning, turn reluctor counterclockwise by hand and release it. It should return to its original position.



Vacuum advance mechanical parts

Apply negative pressure to vacuum controller with a vacuum pump to see if leakage is present. Also check breaker plate for smooth movement.

- If leak is found, replace vacuum controller.
- If breaker plate does not move smoothly, this condition could be due to sticky steel balls or pivot. Apply grease to steel balls or, if necessary, replace breaker plate assembly.

ASSEMBLY

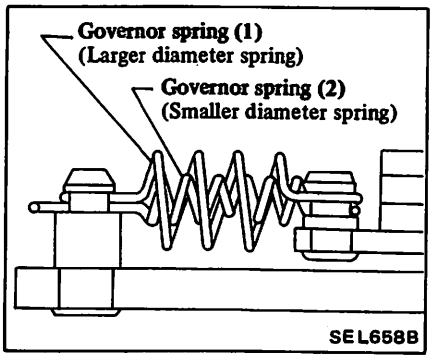
To assemble, reverse order of disassembly. Note the following:

a. Apply grease to:

- Shaft bearing metal
- Governor spring
- Frictional surface of governor weight
- Frictional surface of breaker plate

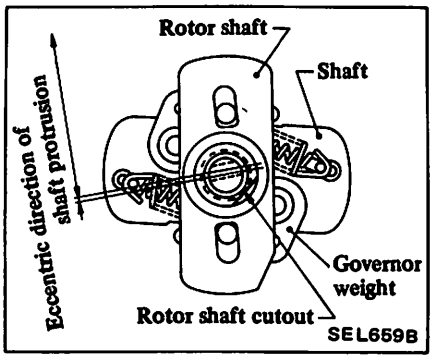
b. Installation of governor springs

Attach the smaller diameter spring to the hanger pins of shaft and governor weight first; then install the larger diameter spring.



c. Installation of rotor shaft

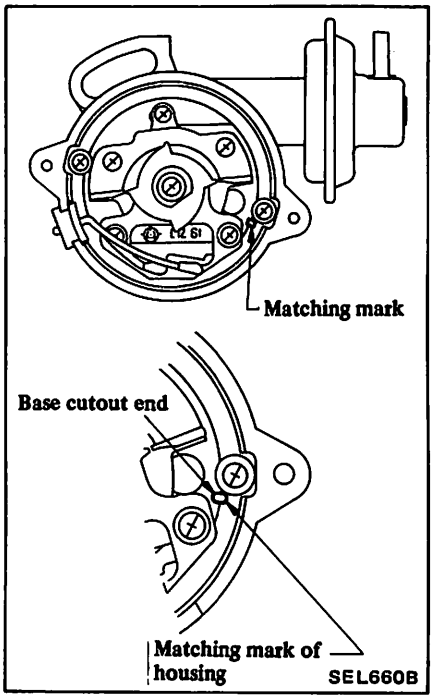
Position cutout direction of rotor shaft and eccentric direction of drive shaft protrusion as shown below; then install rotor shaft to drive shaft.



d. Use a new roll pin when installing collar.

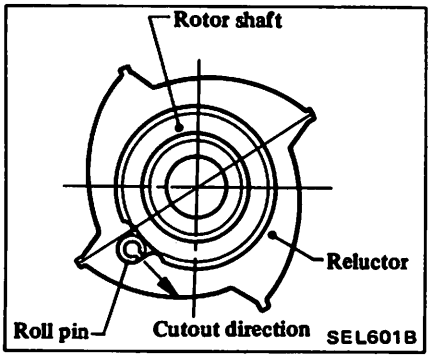
e. Installation of breaker plate

Ensure that alignment marks on breaker plate and housing are lined up properly.



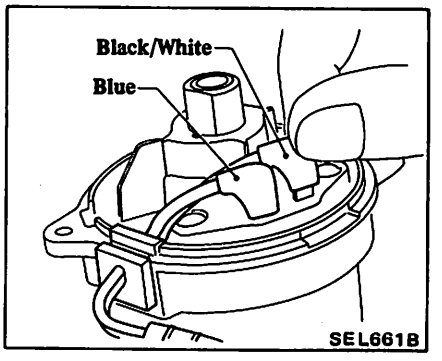
f. Inserting roll pin into reluctor

Position cutout direction of roll pin in parallel with notch in reluctor.



g. Connecting harness

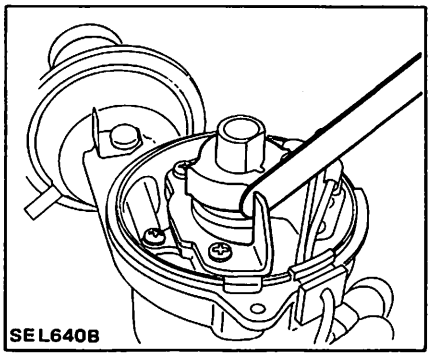
Ensure that harness to IC ignition unit is tightly secured.



ADJUSTMENT

Air gap

Measure air gap between reluctor and stator. If it is not within specifications, loosen stator retaining screws and adjust.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

DISTRIBUTOR

Type		D4R82-12	D4R82-24	D4R82-21	D4R82-22
Applied model		California M/T model	California A/T model	Canada M/T model	Canada A/T model
Firing order		1-3-4-2			
Rotating direction		Counterclockwise			
Air gap	mm (in)	0.3 - 0.5 (0.012 - 0.020)			
Cap insulation resistance	MΩ	More than 50			
Rotor head insulation resistance	MΩ	More than 50			
Cap carbon point length	mm (in)	More than 10 (0.39)			
Vacuum advance [Distributor degree/distributor kPa (mmHg, inHg)] Advance side		0°/9.3 (70, 2.76) 4°/13.3 (100, 3.94) 10°/28.0 (210, 8.27)	0°/9.3 (70, 2.76) 3.3°/14.7 (110, 4.33) 5.5°/20.0 (150, 5.91)	0°/14.0 (105, 4.13) 3.6°/24.0 (180, 7.09) 6.5°/33.3 (250, 9.84)	0°/14.0 (105, 4.13) 2.0°/18.7 (140, 5.51) 3.5°/24.0 (180, 7.09)
Centrifugal advance [Distributor degree/distributor]		0°/700 5°/1,300 13°/2,600		0°/800 13°/2,400	

IGNITION COIL

Type		HITACHI make	
		C1T-72	E12-59
Applied model		California, Canada	Non-California
Primary voltage	V	12	
Primary resistance [at 20°C (68°F)]	Ω	1.04 - 1.27	0.84 - 1.02
Secondary resistance [at 20°C (68°F)]	kΩ	7.3 - 11.0	8.2 - 12.4

LIGHTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

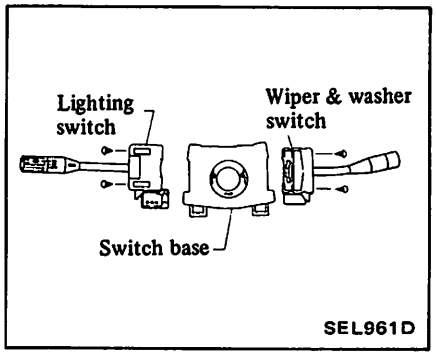
BULB SPECIFICATIONS

Item	Wattage (W)	Bulb No.
Headlamp (Sealed beam halogen)		
High/Low	65/35	H6054
Front turn signal lamp	23	–
Front side marker lamp	5	194
Clearance lamp	8	–
License plate lamp	10	–
Rear combination lamps		
Turn signal	23	–
Back-up	23	–
Stop/Tail	23/8	–
Rear side marker lamp	5	158
Luggage compartment lamp	5	–
Interior lamp	10	–
High-mounted stop lamp	27	1156

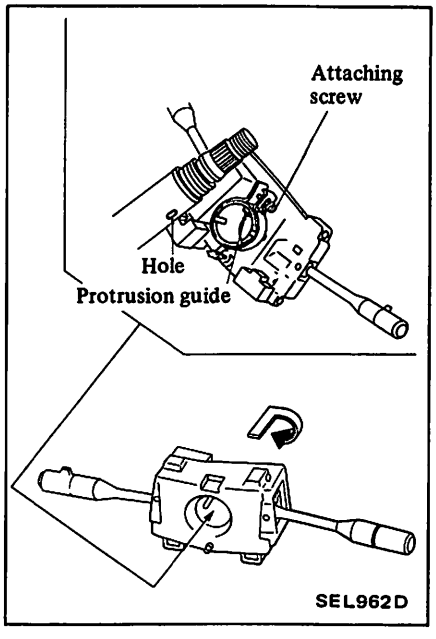
COMBINATION SWITCH

REMOVAL AND INSTALLATION

Lighting switch and wiper & washer switch can be replaced without removing combination switch base.

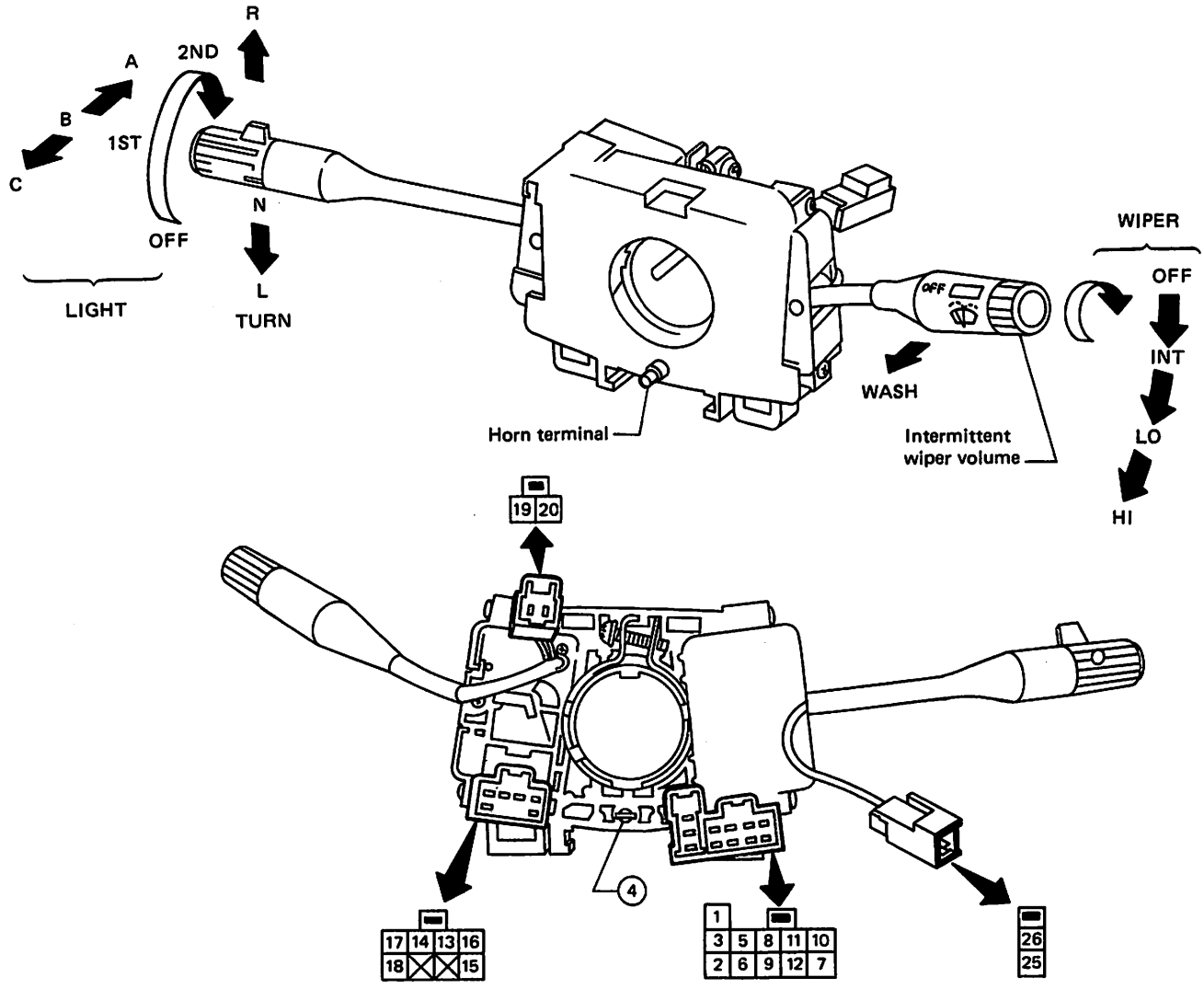


To remove combination switch base, remove base attaching screw and turn after pushing on it.



INSPECTION

Test continuity through switch with a test lamp or ohmmeter.



LIGHT SWITCH

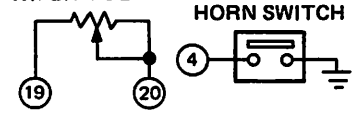
	OFF			1ST			2ND		
	A	B	C	A	B	C	A	B	C
5			○			○	○	○	○
6			○			○	○		○
7								○	
8			○			○	○	○	○
9			○			○	○		○
10								○	
11	○	○	○	○	○	○			
12	○	○	○	○	○	○			
25				○	○	○	○	○	○
26				○	○	○	○	○	○

WIPER SWITCH

	OFF	INT	LO	HI	WASH
13	○	○			
14	○	○			
15		○	○		
16				○	
17		○	○	○	○
18					○

INTERMITTENT WIPER VOLUME

HORN SWITCH



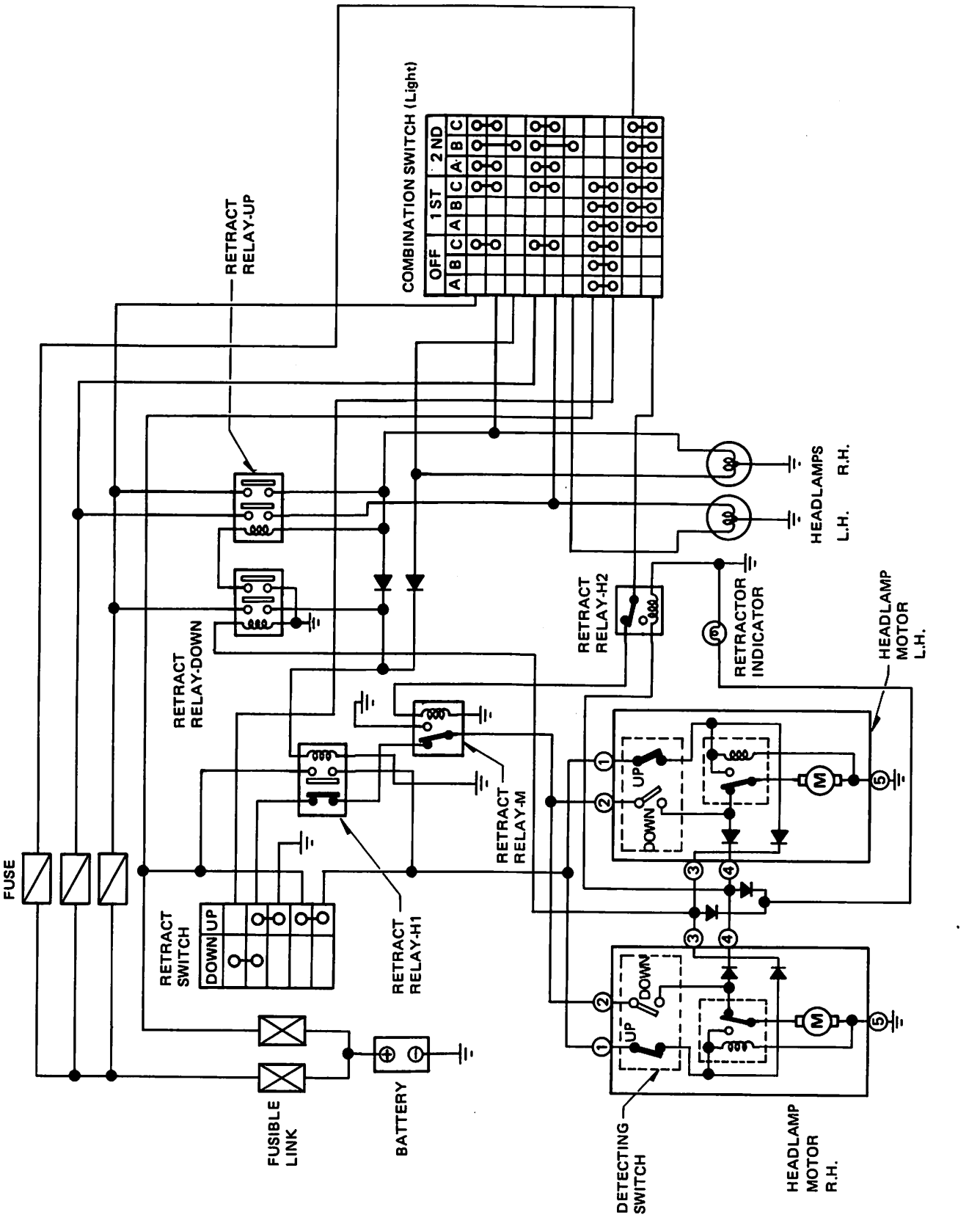
TURN SIGNAL SWITCH

	R	N	L
1	○		○
2	○		
3			○

SEL232F

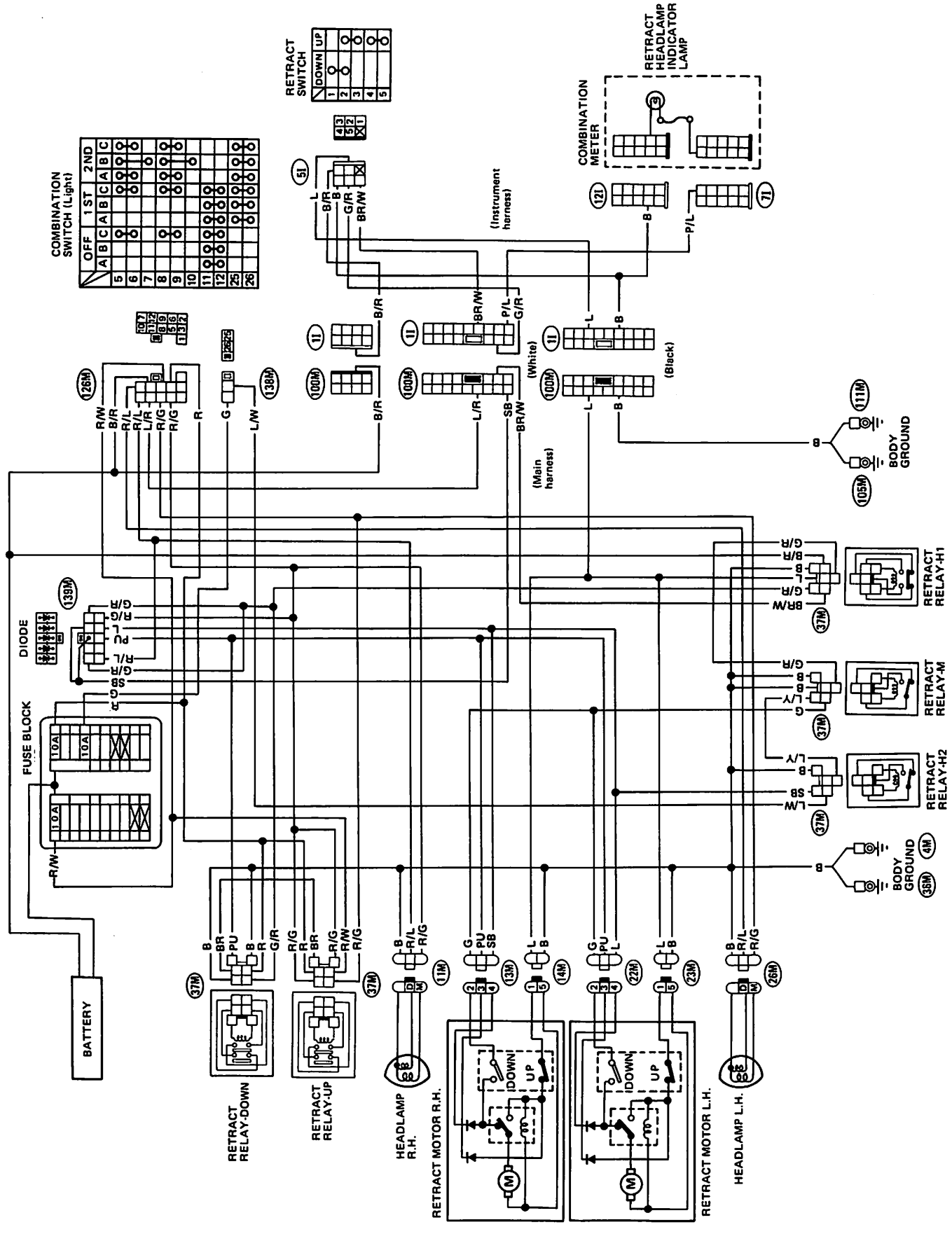
HEADLAMP

SCHEMATIC



SEL233F

WIRING DIAGRAM



SEL234F

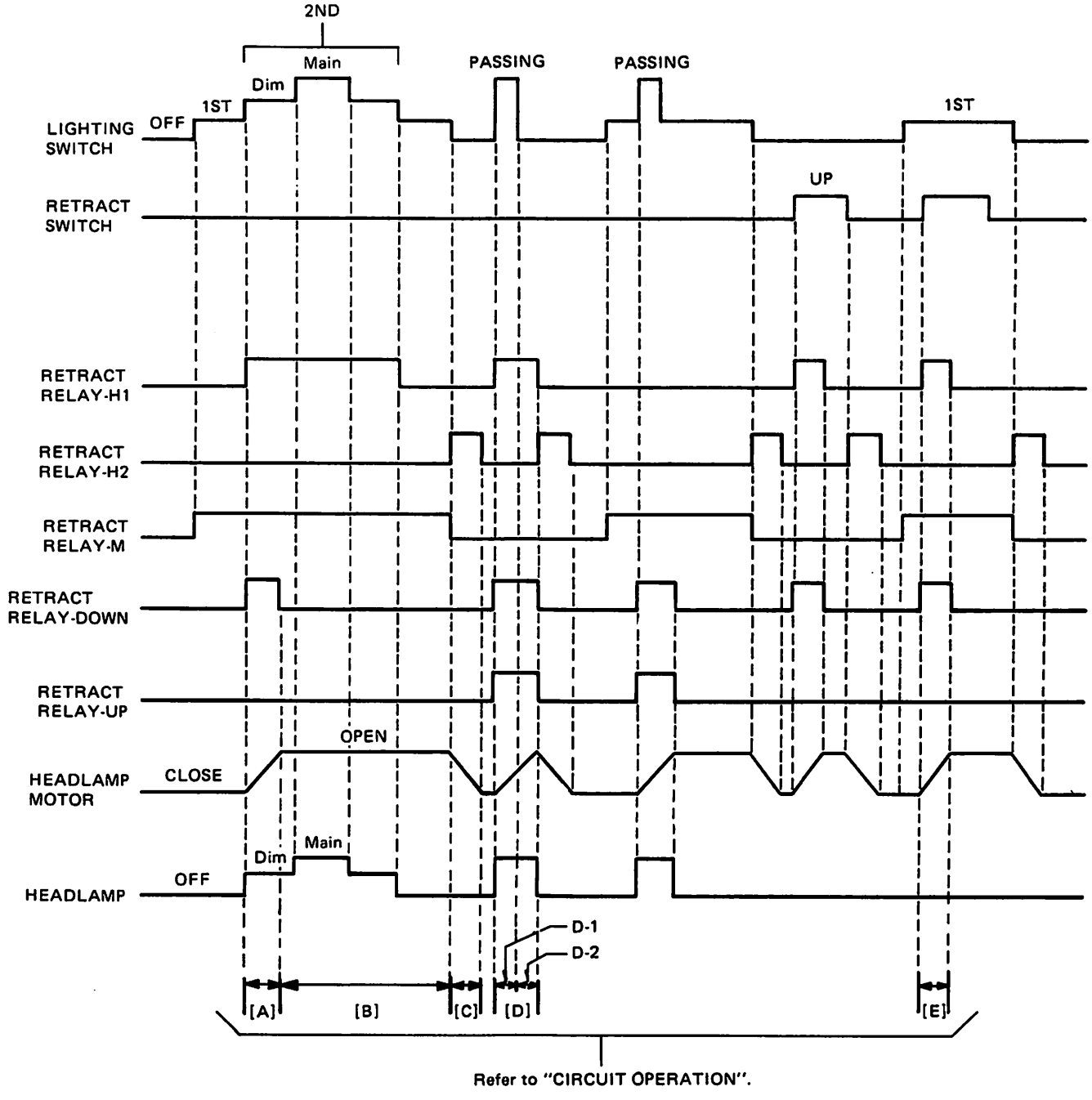
DESCRIPTION

Basic operation

Condition		Operation	
Lighting switch	Retractor switch	Headlamp motor	Headlamps
OFF → 1ST	OFF	No operation	OFF
1ST → 2ND	OFF	Open	ON
2ND → 1ST	OFF	Held to open position	OFF
1ST → OFF	OFF	Closed	OFF
Momentarily turned to PASSING	OFF	Opened and closed after headlamps go off	ON until headlamp motor reaches fully open position, and then go off
OFF	ON	Open	OFF

TIMING CHART

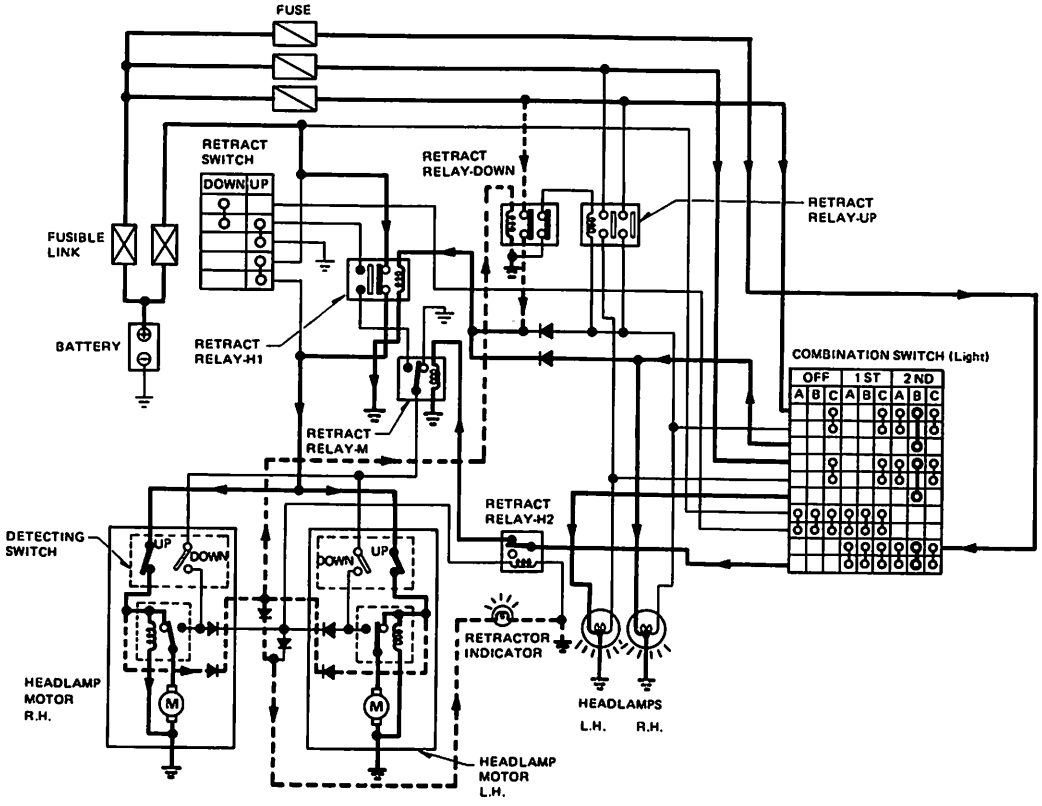
- The following chart depicts the operational models of relays and headlamp motors in relation to the positions of the lighting switch and retract switch.



SEL971E

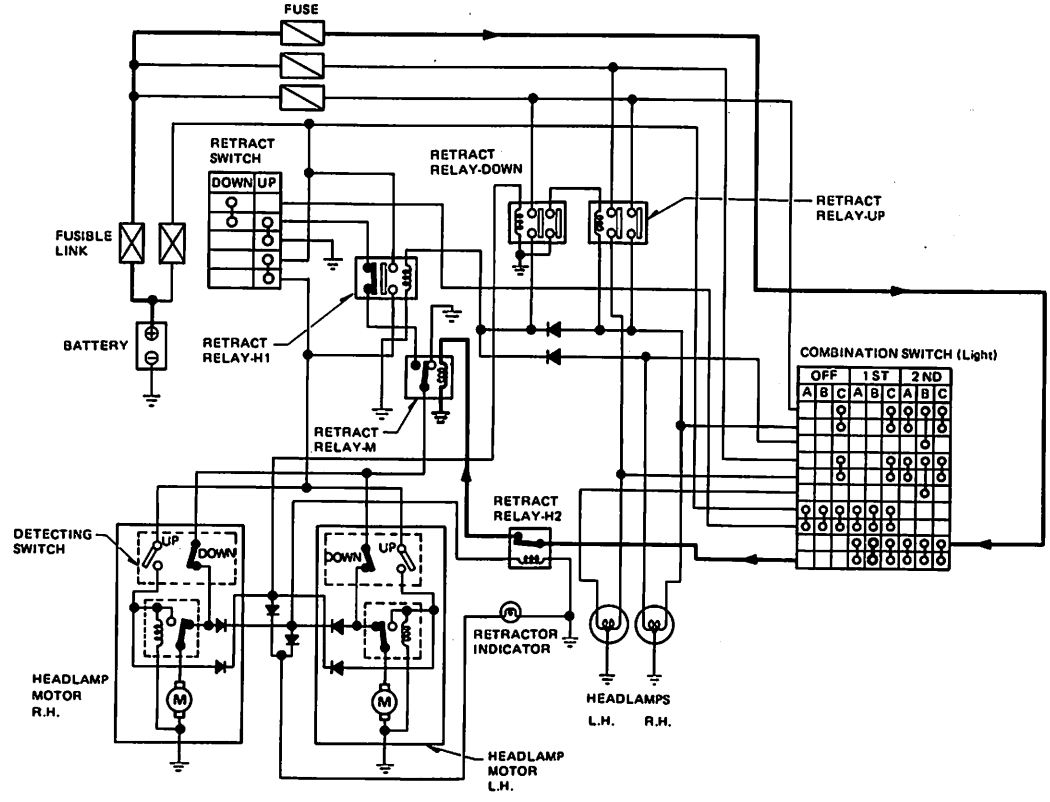
CIRCUIT OPERATION

[A] When lighting switch is switched, from "1ST" → "2ND"
(While headlamp motor is operating headlamps to the open position)



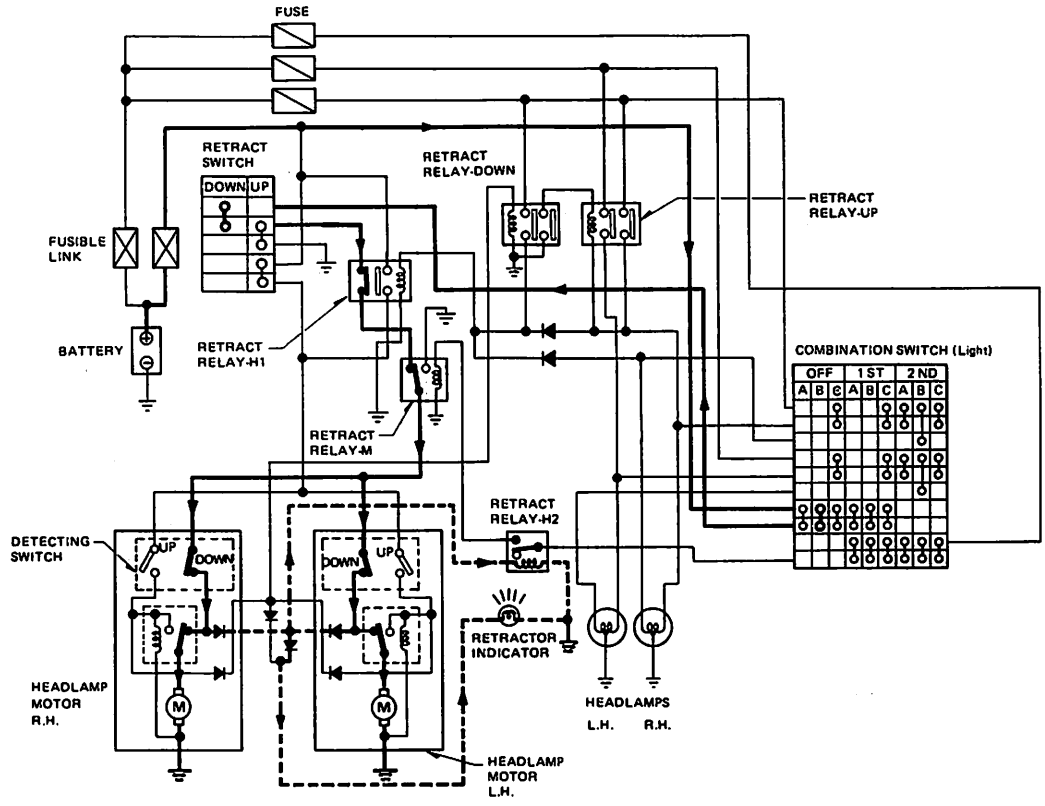
SEL235F

[B] When lighting switch is switched from "2ND" → "1ST"
(Headlamp motor holds open position)



SEL236F

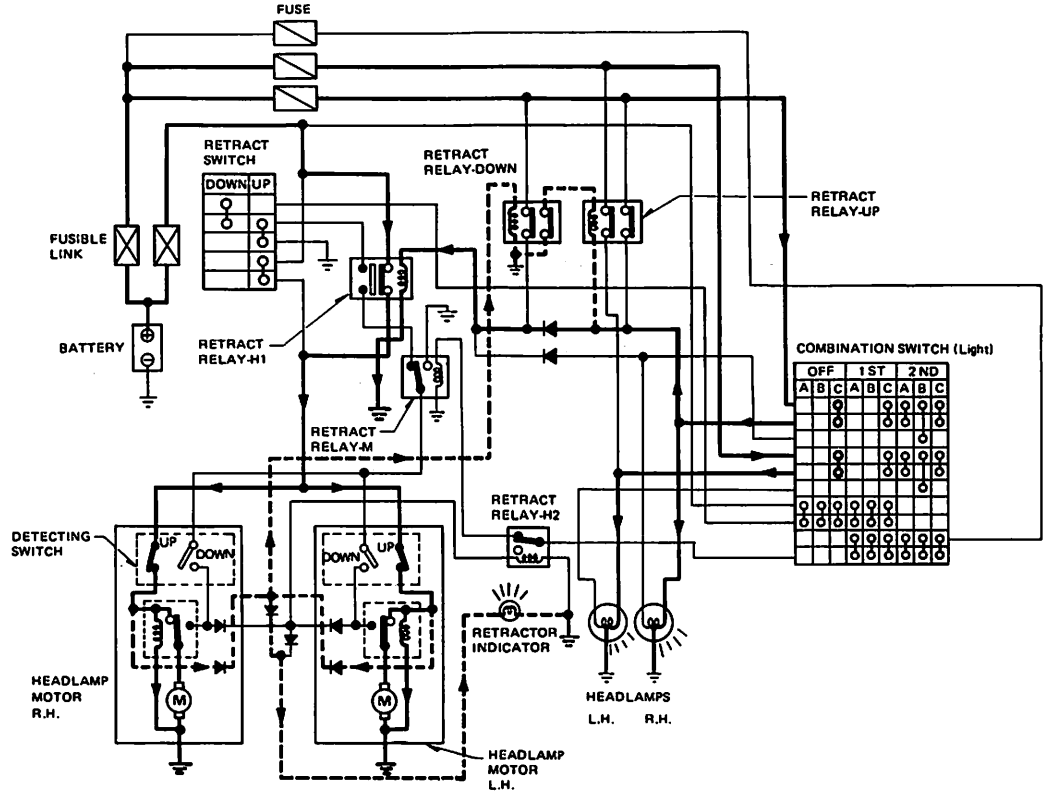
[C] When lighting switch is switched from "1ST" → "OFF"
(While headlamp motor is operating headlamps to the closed position)



SEL237F

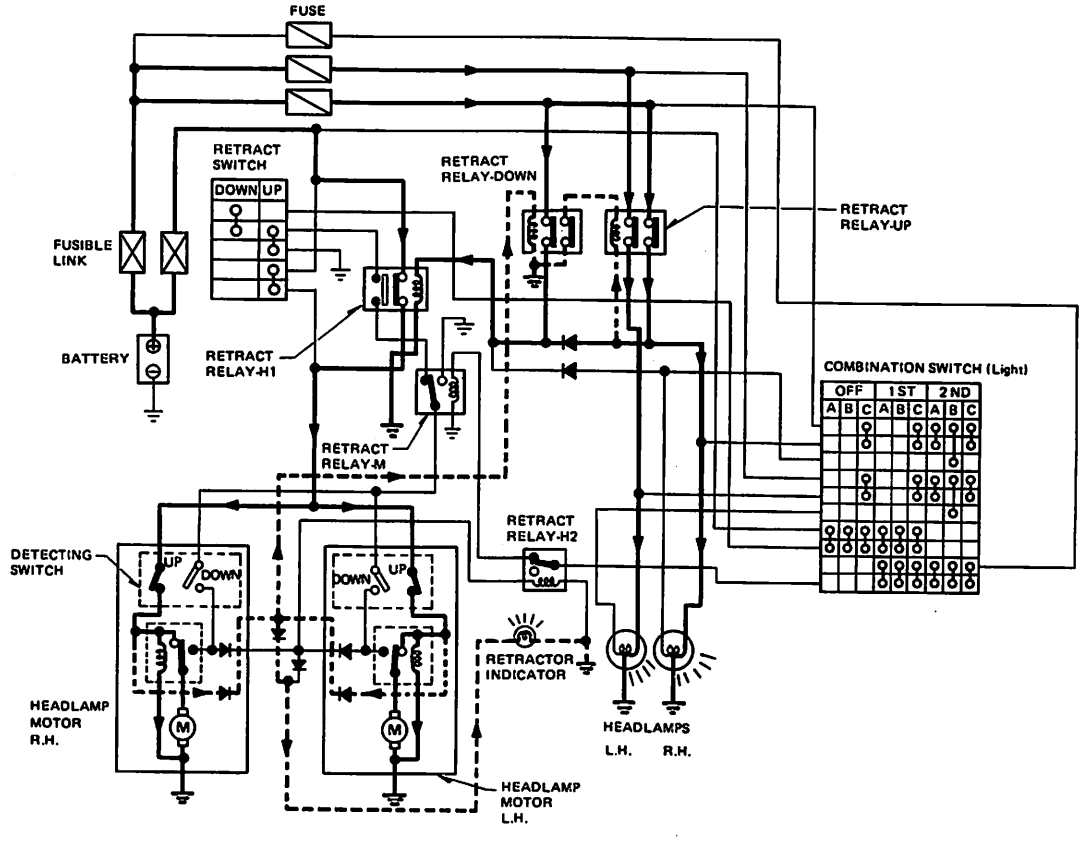
[D] When lighting switch is switched to "PASSING"

D-1: While headlamp motor is operating headlamps to the open position
(The moment the lighting switch is turned to "PASSING" position)



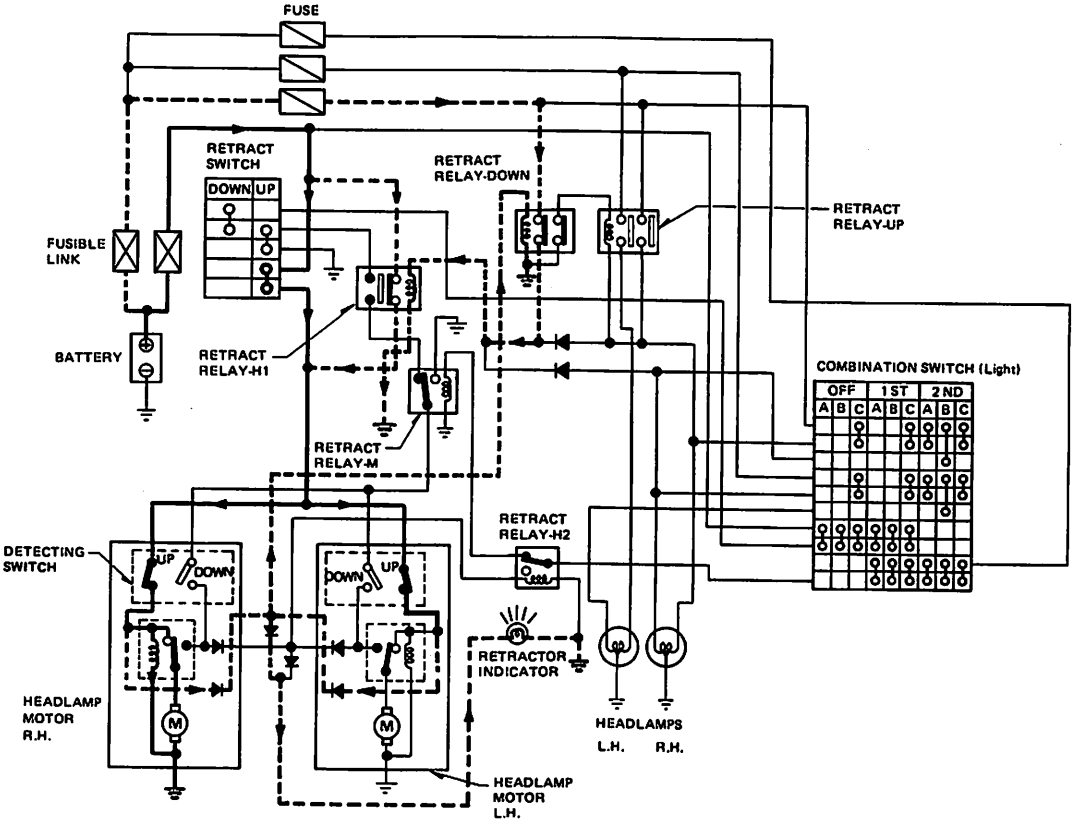
SEL238F

D-2: While headlamp motor is operating headlamps to the open position (When lighting switch is released from "PASSING" position)



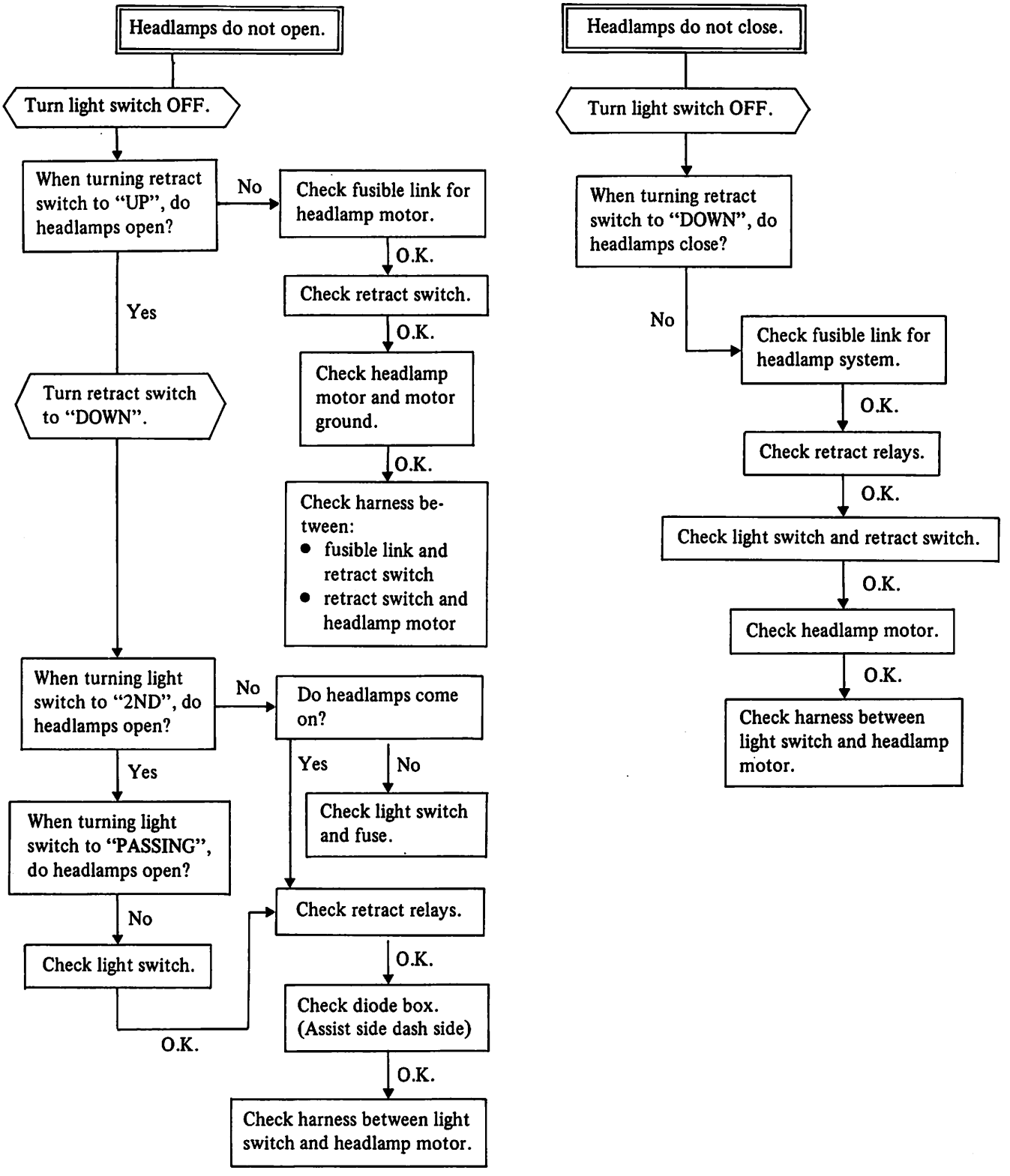
SEL239F

[E] When retractor switch is turned ON (While headlamp motor is operating headlamps to the open position)

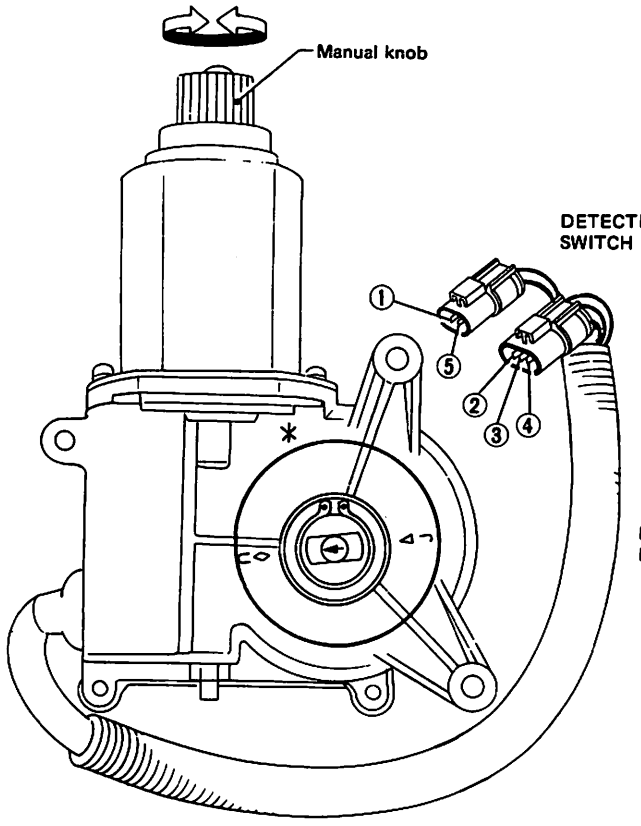


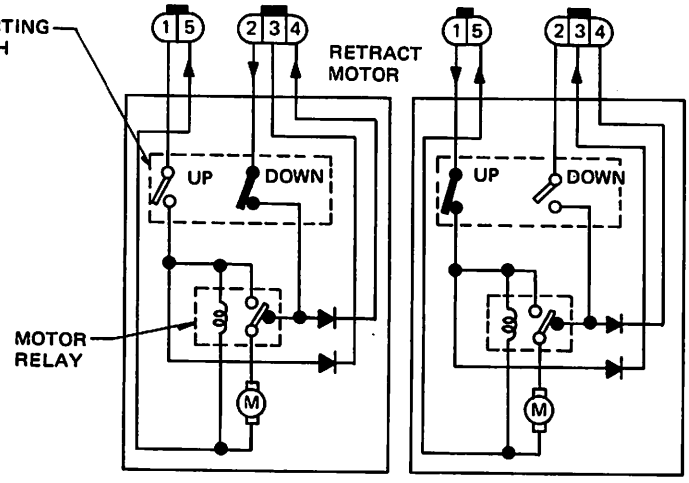
SEL240F

TROUBLE-SHOOTING



HEADLAMP MOTOR CHECK

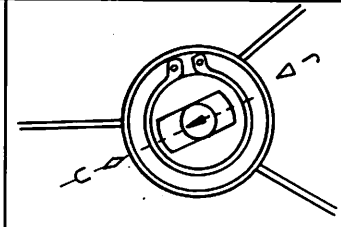
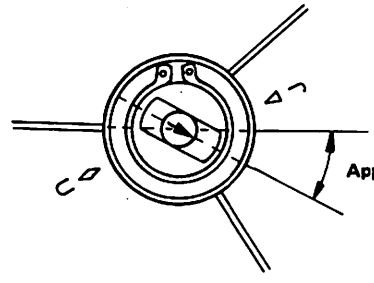




Detecting switch	"Down (Headlamp unit completely opened)" position	"Up (Headlamp unit completely closed)" position

CAUTION:
Prior to performing continuity test, disconnect ground cable from battery.

- Use an ohmmeter to check for continuity in headlamp motor circuit while rotating motor with manual knob.

Headlamp	*Aligning marks	Ohmmeter probe (+)	Ohmmeter probe (—)	Continuity
Completely opened		②	⑤	Yes
		②	④	No
		④	②	Yes
Completely closed		①	⑤	Yes
		①	③	No
		③	①	Yes

SEL963D

RETRACT SYSTEM

- When removing retract motor, remove motor and headlamp unit as an assembly first. Then remove motor unit from headlamp unit.
- After working on this unit, be sure to confirm proper operation using manual knob.
- When installing retract motor, align matching mark on motor with that of motor body with headlamp unit in completely opened position (Fig. 1). Then install retract motor and adjust stopper bolt (Fig. 2 and Fig. 3).
- Apply grease to sliding portion and link joint as necessary.
- Pack harness connector with watertight grease as necessary.

CAUTION:
Before turning the manual knob or removing headlamp unit, be sure to disconnect battery ground cable.

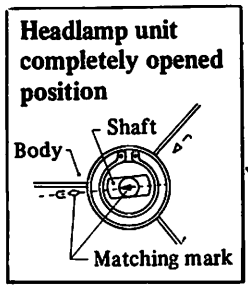


Fig. 1

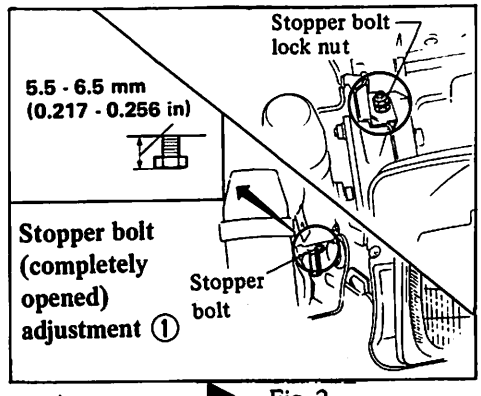


Fig. 2

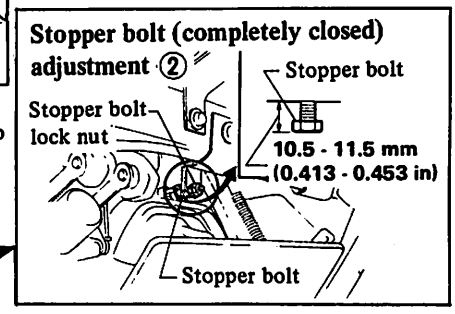
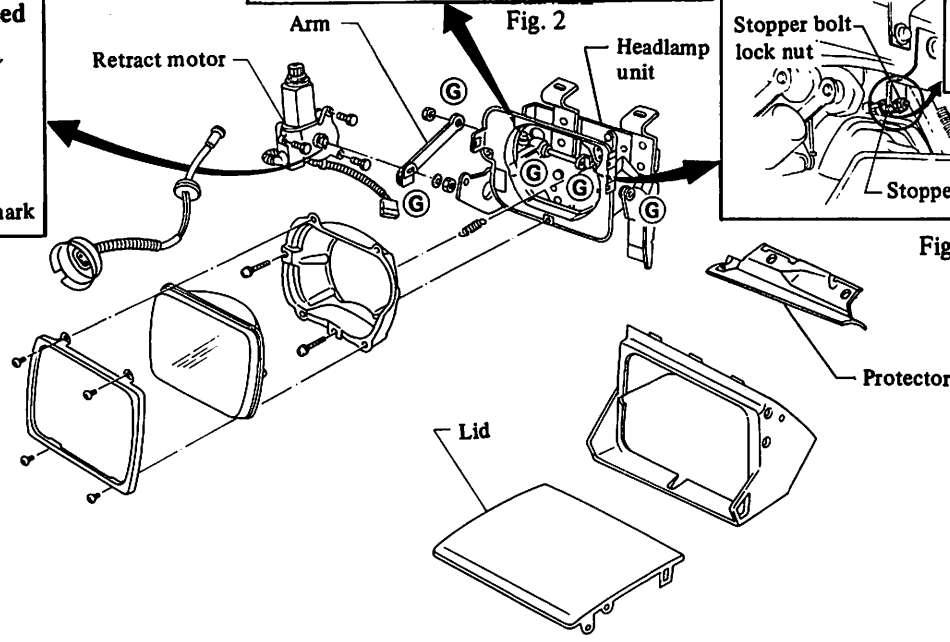


Fig. 3



Ⓖ : Grease point

SEL409D

Adjusting installed headlamp unit

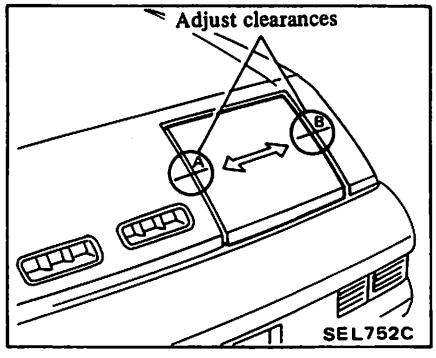


Fig. 4

Adjusting installation of lid

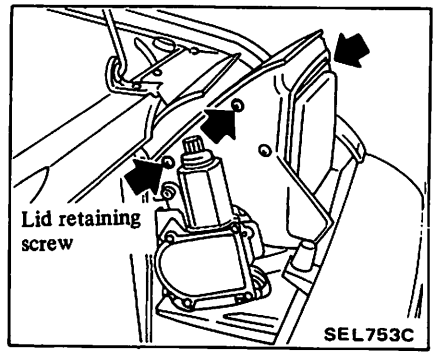


Fig. 5

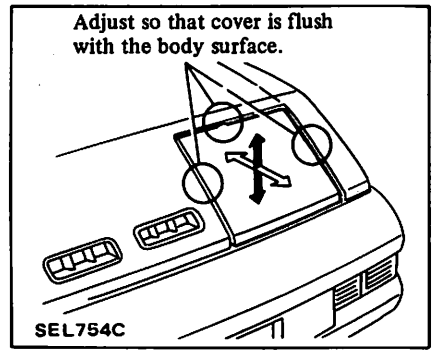
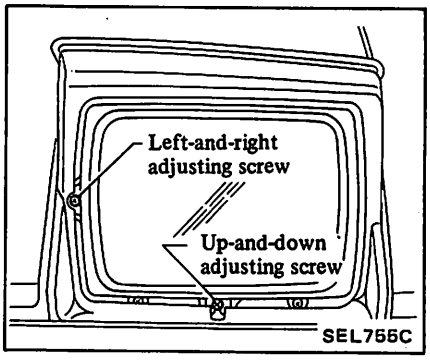


Fig. 6

A: Approx. 6 mm (0.24 in)
B: Approx. 7 mm (0.28 in)

- After adjusting installed headlamp unit or installation of lid, be sure to confirm that the protector and lid do not interfere with each other using manual knob.

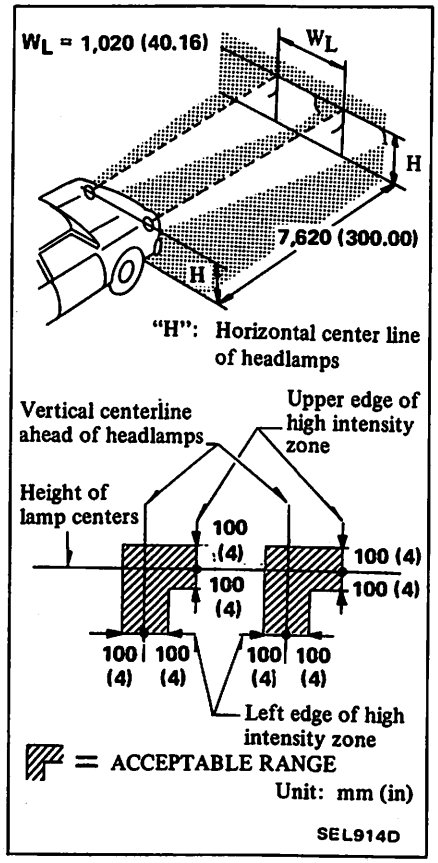
AIMING ADJUSTMENT



Before making headlamp aiming adjustment, observe the following instructions.

a. **Keep all tires inflated to correct pressures.**
b. **Place car and tester on the same flat surface.**
c. **Ensure that there is no load in car (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).**
d. **For details, refer to the regulations in your region.**

When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. For operating instructions of any aimer, it should be in good repair, calibrated and used according to respective operation manuals supplied with the unit.
If any aimer is not available, aiming adjustment can be done as follows:
Turn headlamp low beam on.

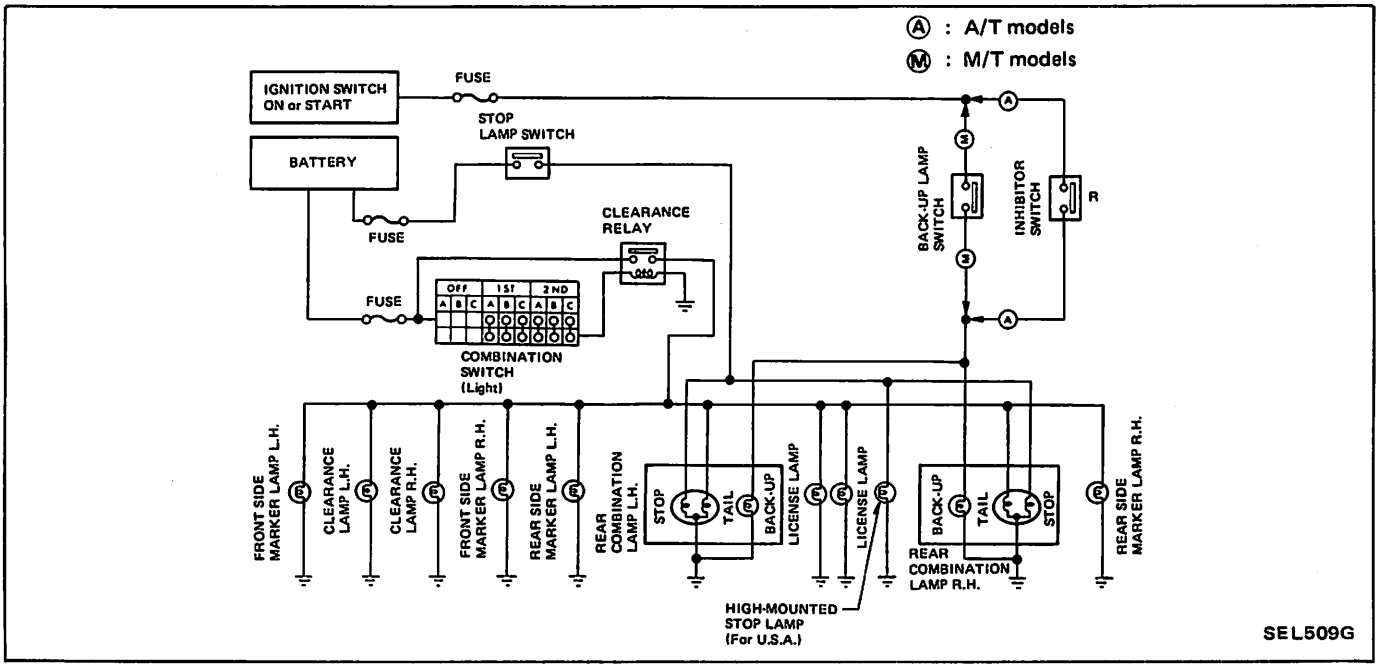


- **Adjust headlamps so that upper edge and left edge of high intensity zone are within the acceptable range as shown in the figure above.**
- **Dotted lines in illustration show center of headlamp.**

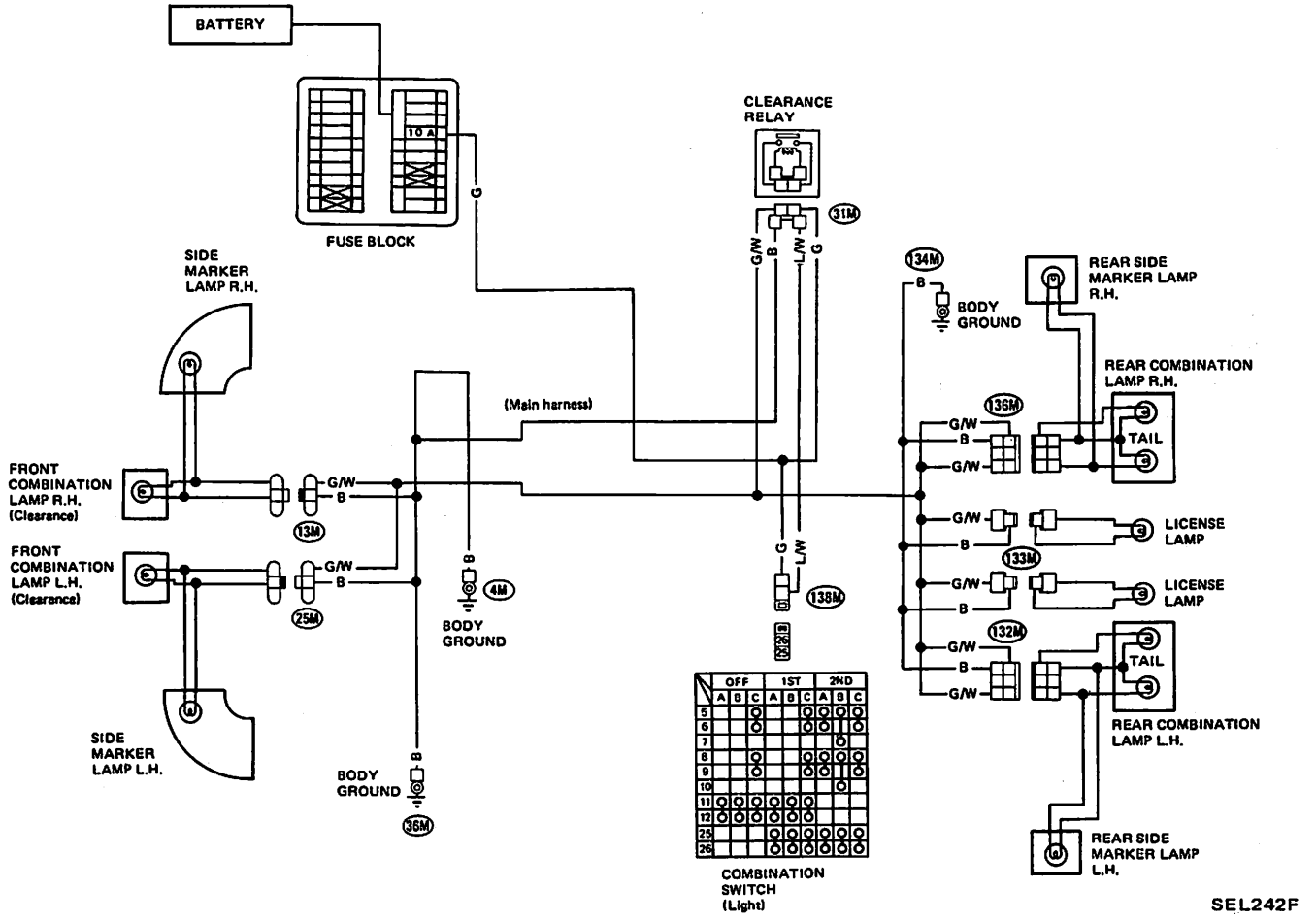
EXTERIOR LAMPS

CAUTION: Do not wipe lens surface using cloth dampened with gasoline.

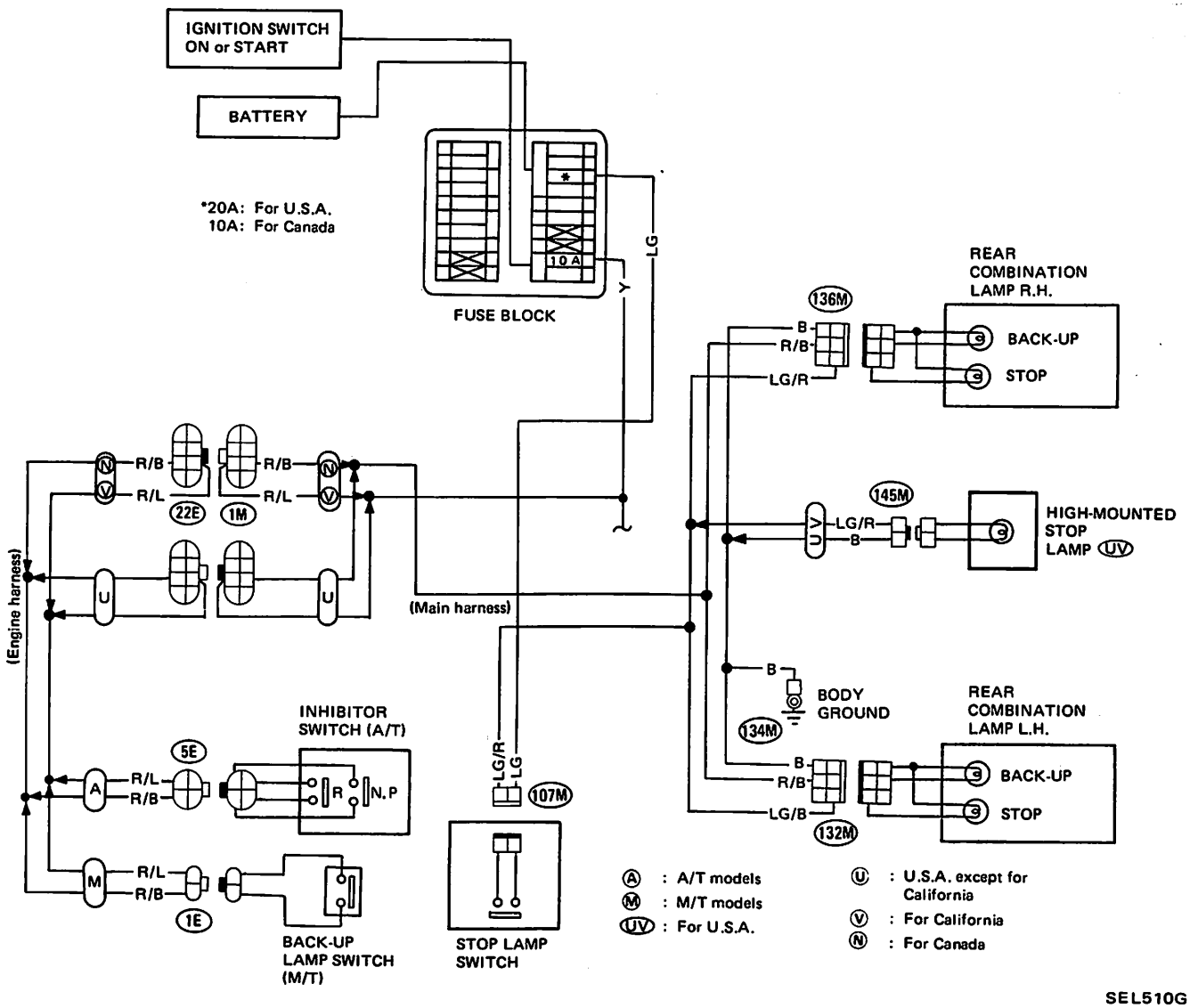
SCHEMATIC/CLEARANCE, SIDE MARKER, LICENSE, STOP, TAIL AND BACK-UP LAMPS



WIRING DIAGRAM/CLEARANCE, SIDE MARKER, LICENSE AND TAIL LAMPS



WIRING DIAGRAM/STOP AND BACK-UP LAMPS



SEL510G

TROUBLE DIAGNOSES AND CORRECTIONS

Clearance, side marker, license and tail lamps

Condition	Probable cause
Neither left nor right lamp lights.	Burnt fuse. Burnt fusible link. Loose connection or open circuit. Faulty lighting switch.
Tail lamp on only one side lights.	Burnt bulb. Loose bulb. Loose connection or open circuit.
Front or rear side lamps do not light.	Loose connection or open circuit. No ground.

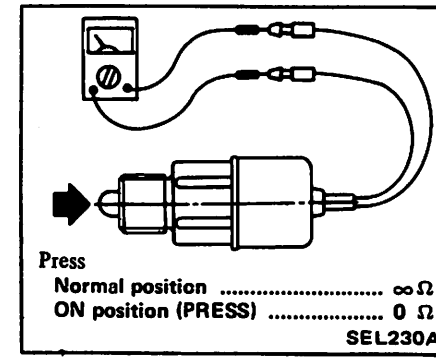
Stop lamps

Condition	Probable cause
Neither left nor right lamp lights.	Burnt fuse. Faulty stop lamp switch. No ground. Loose connection or open circuit.
Lamp on only one side lights.	Burnt bulb. Loose bulb. Loose connection or open circuit.

Back-up lamps

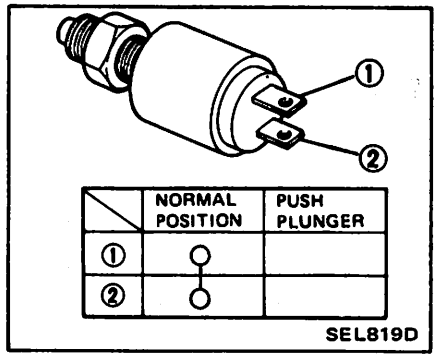
Condition	Probable cause
Neither left nor right lamp lights.	Faulty back-up lamp switch. Burnt fuse. Loose connection or open circuit.
Lamp on only one side lights.	Burnt bulb. Loose bulb. Loose connection or open circuit.

Inspection



STOP LAMP SWITCH

Inspection



BACK-UP LAMP SWITCH (Manual transaxle)

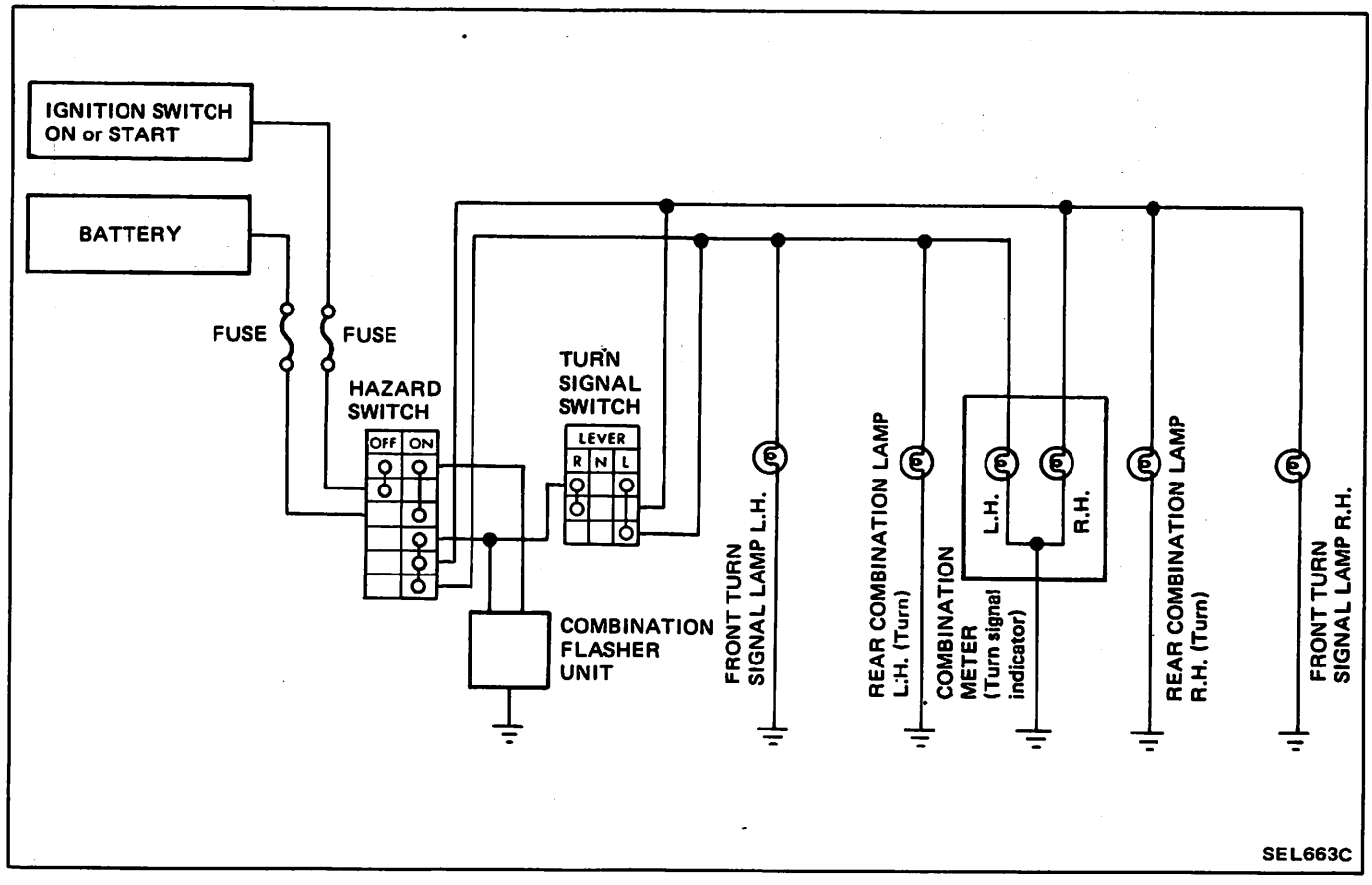
Location

Back-up lamp switch is installed on the manual transmission case. Refer to MT section.

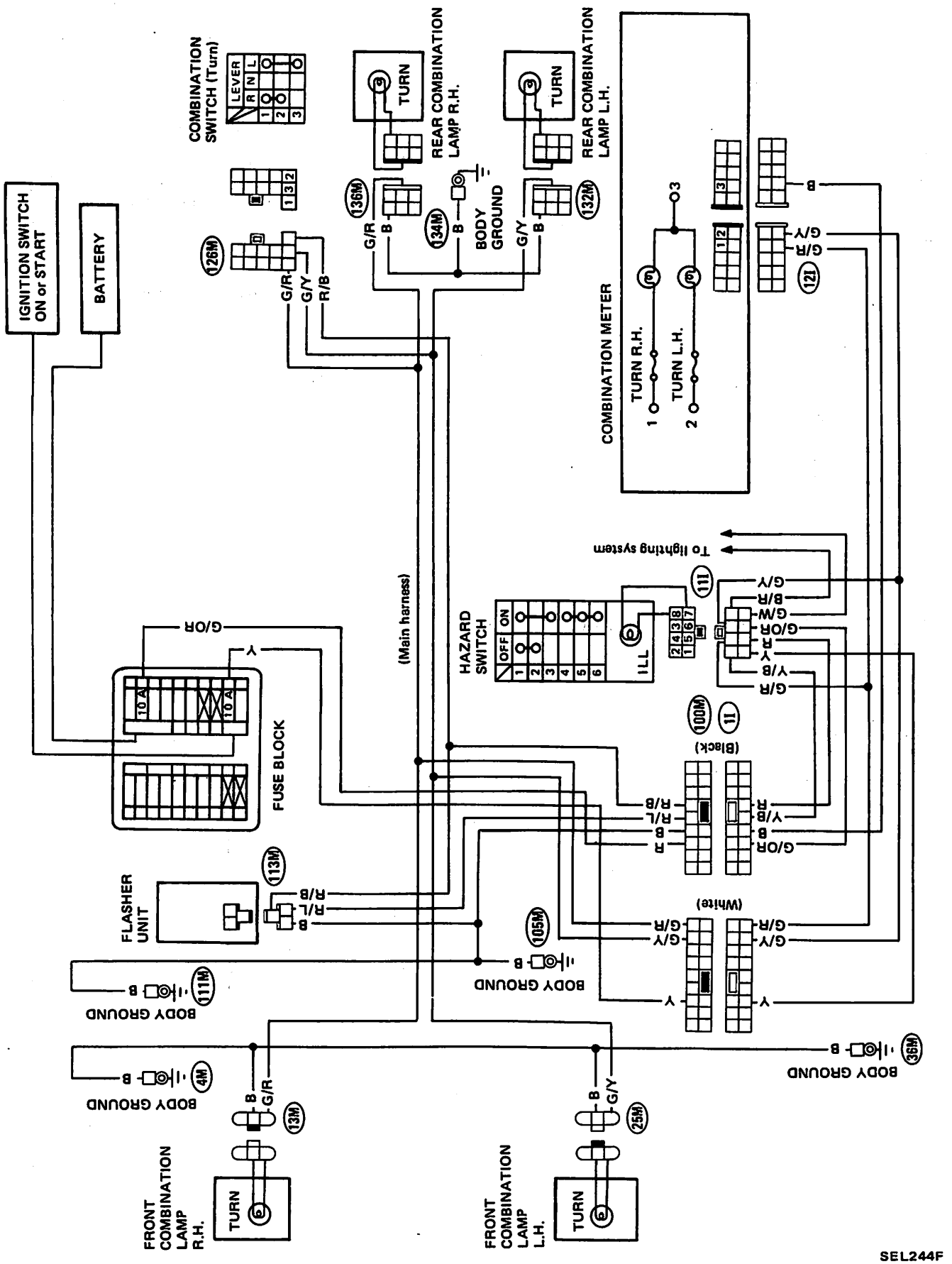
LIGHTING SWITCH

Refer to "COMBINATION SWITCH".

SCHEMATIC/TURN SIGNAL AND HAZARD



WIRING DIAGRAM/TURN SIGNAL AND HAZARD



Turn signal and hazard warning lamps

Condition	Probable cause
Turn signals do not operate. (Hazard warning lamps operate)	Burnt fuse. Loose connection or open circuit. Faulty turn signal switch. Faulty hazard switch.
Hazard warning lamps do not operate. (Turn signals operate)	Burnt fuse. Faulty hazard switch.
Turn and hazard flasher lamps do not operate.	Faulty hazard switch. Loose connection. Faulty flasher unit.
No flasher click is heard.	Burnt bulb. Faulty flasher unit. Loose connection.

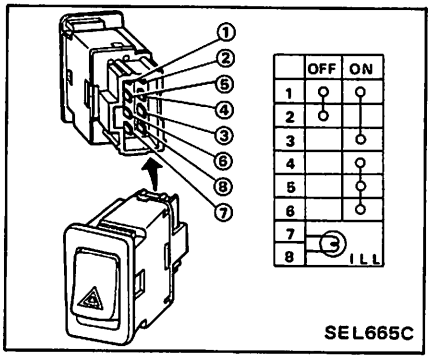
Condition	Probable cause
Flashing cycle is too slow (Pilot lamp does not go out.), or too fast.	Bulb other than specified wattage being used. Burnt bulb. Loose connection. Faulty flasher unit.
Flashing cycle is irregular.	Burnt bulb. Loose connection. Bulbs other than specified wattage being used. Faulty flasher unit.

TURN SIGNAL SWITCH

Refer to "COMBINATION SWITCH".

HAZARD SWITCH

Inspection



COMBINATION FLASHER UNIT

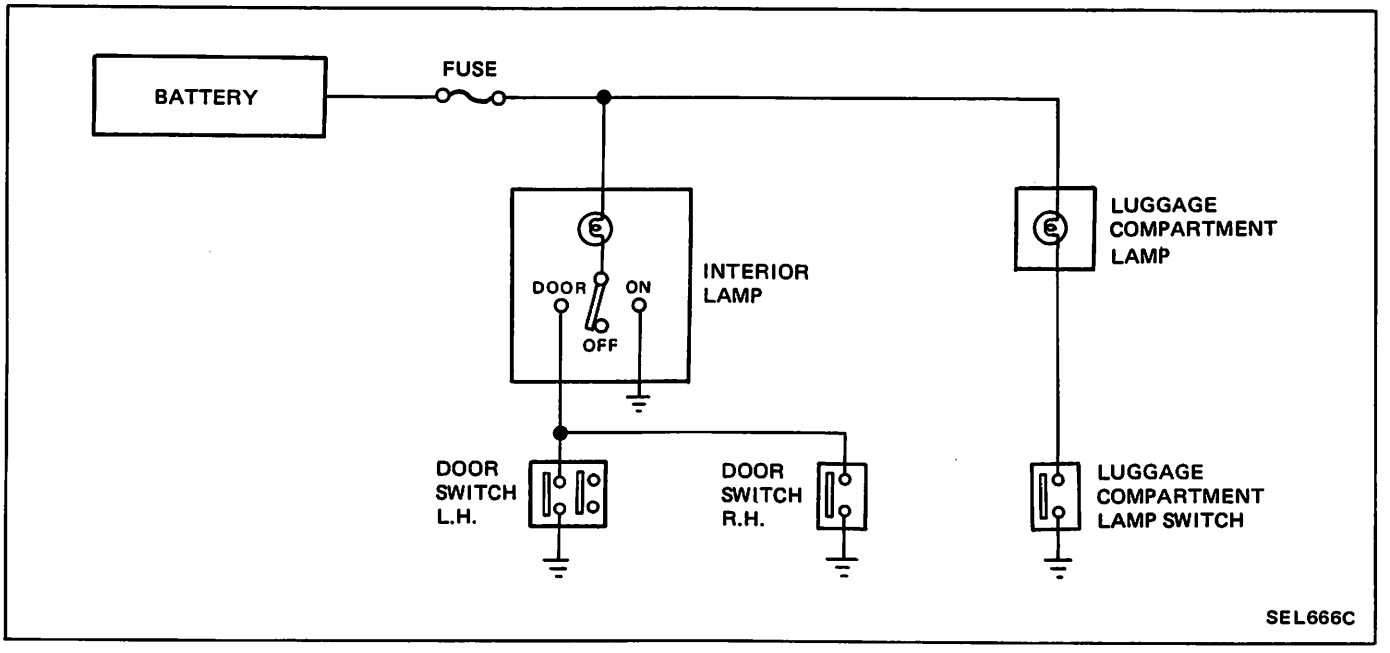
Location

Combination flasher unit is located on the steering column support (back side of instrument panel). Refer to "LOCATION OF ELECTRICAL UNITS".

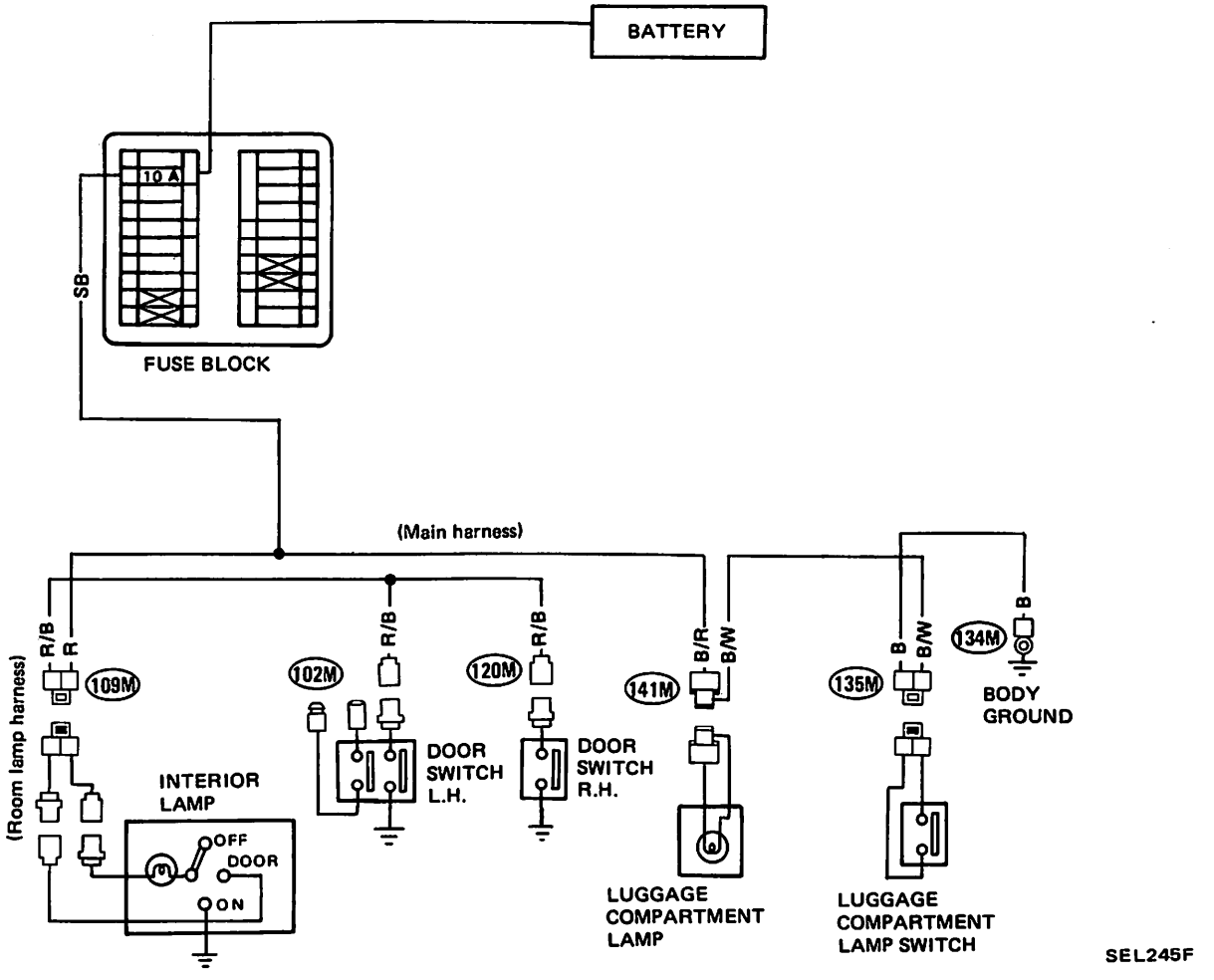
INTERIOR AND LUGGAGE COMPARTMENT LAMPS

CAUTION: Do not wipe lens surface using cloth dampened with gasoline.

SCHEMATIC/INTERIOR AND LUGGAGE COMPARTMENT LAMPS

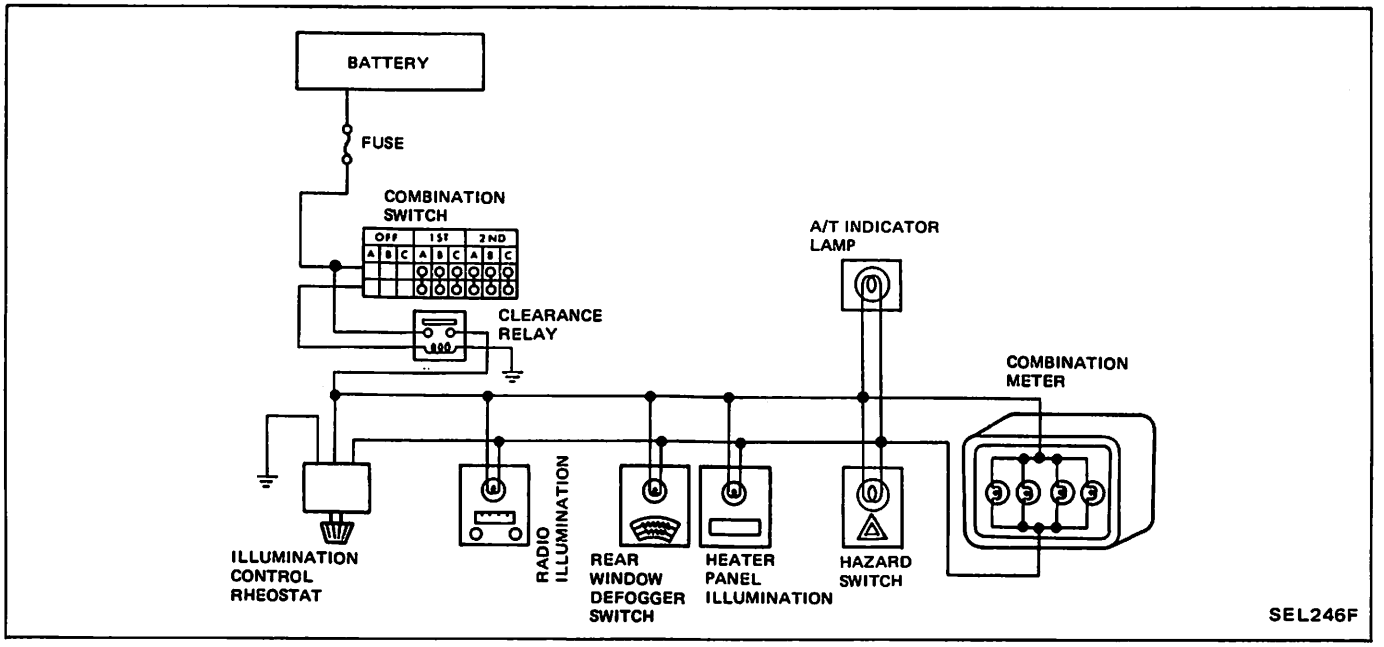


WIRING DIAGRAM/INTERIOR AND LUGGAGE COMPARTMENT LAMPS

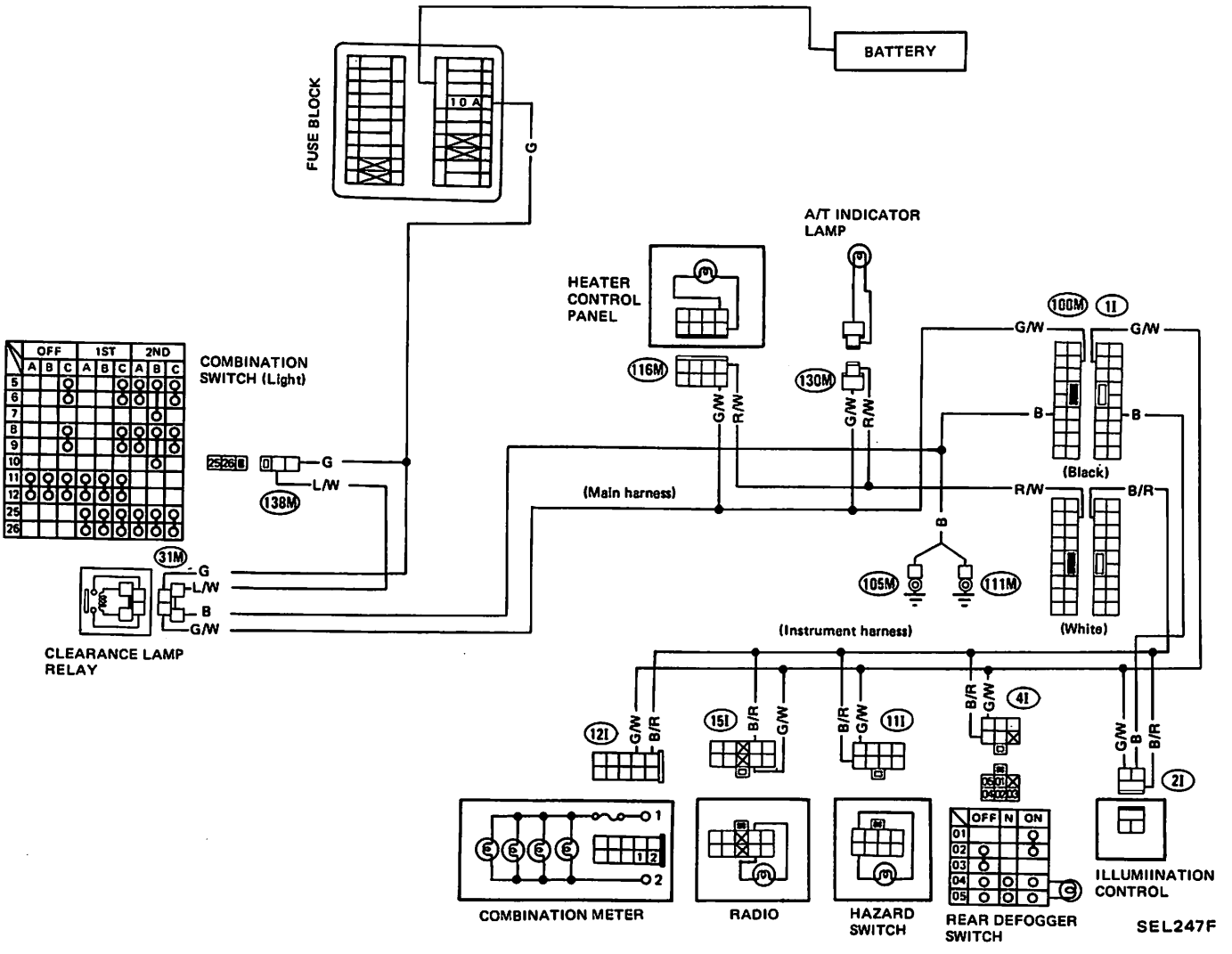


ILLUMINATION LAMPS

SCHEMATIC/ILLUMINATION LAMPS



WIRING DIAGRAM/ILLUMINATION LAMPS

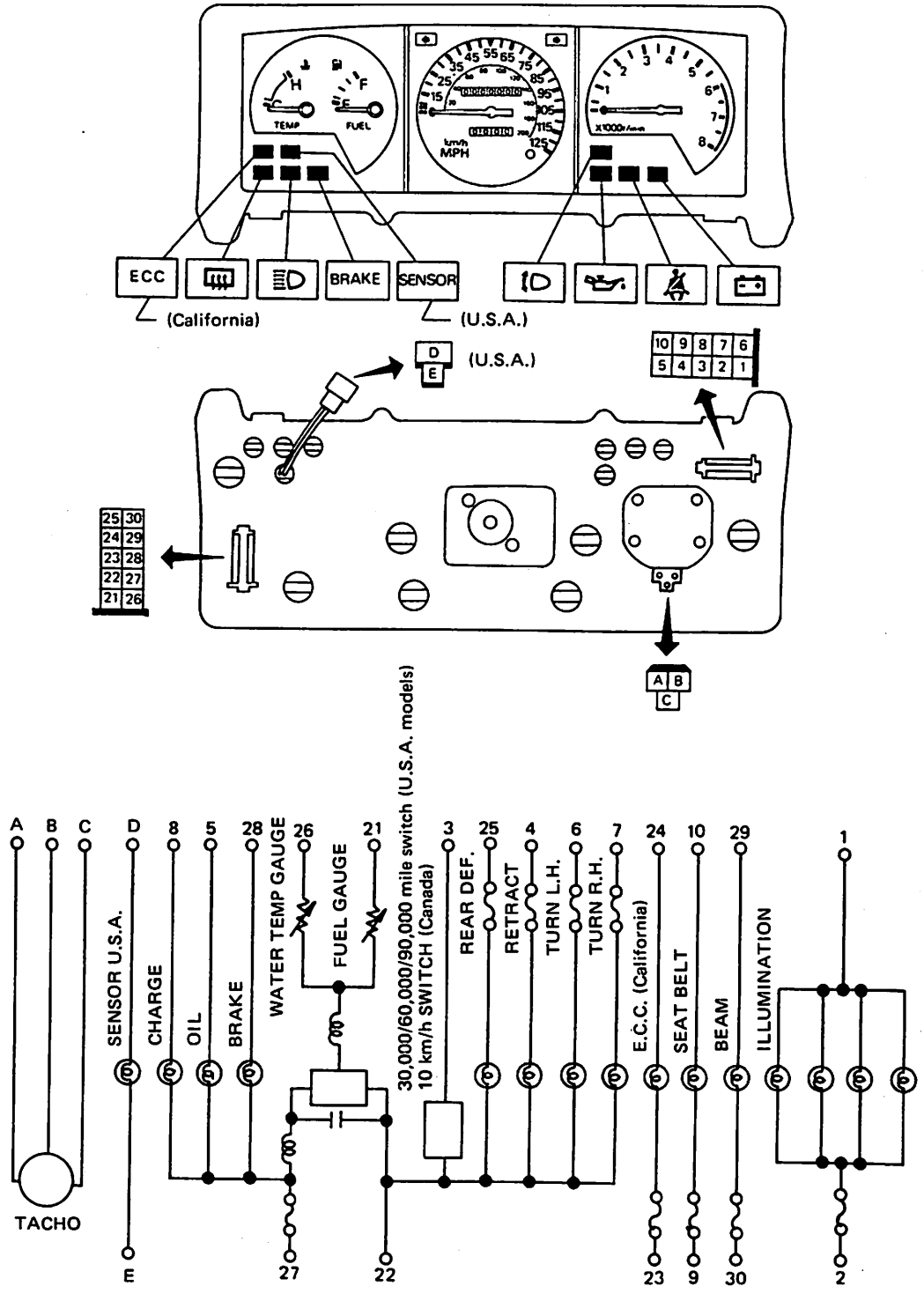


METERS, GAUGES AND WARNING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

COMBINATION METER

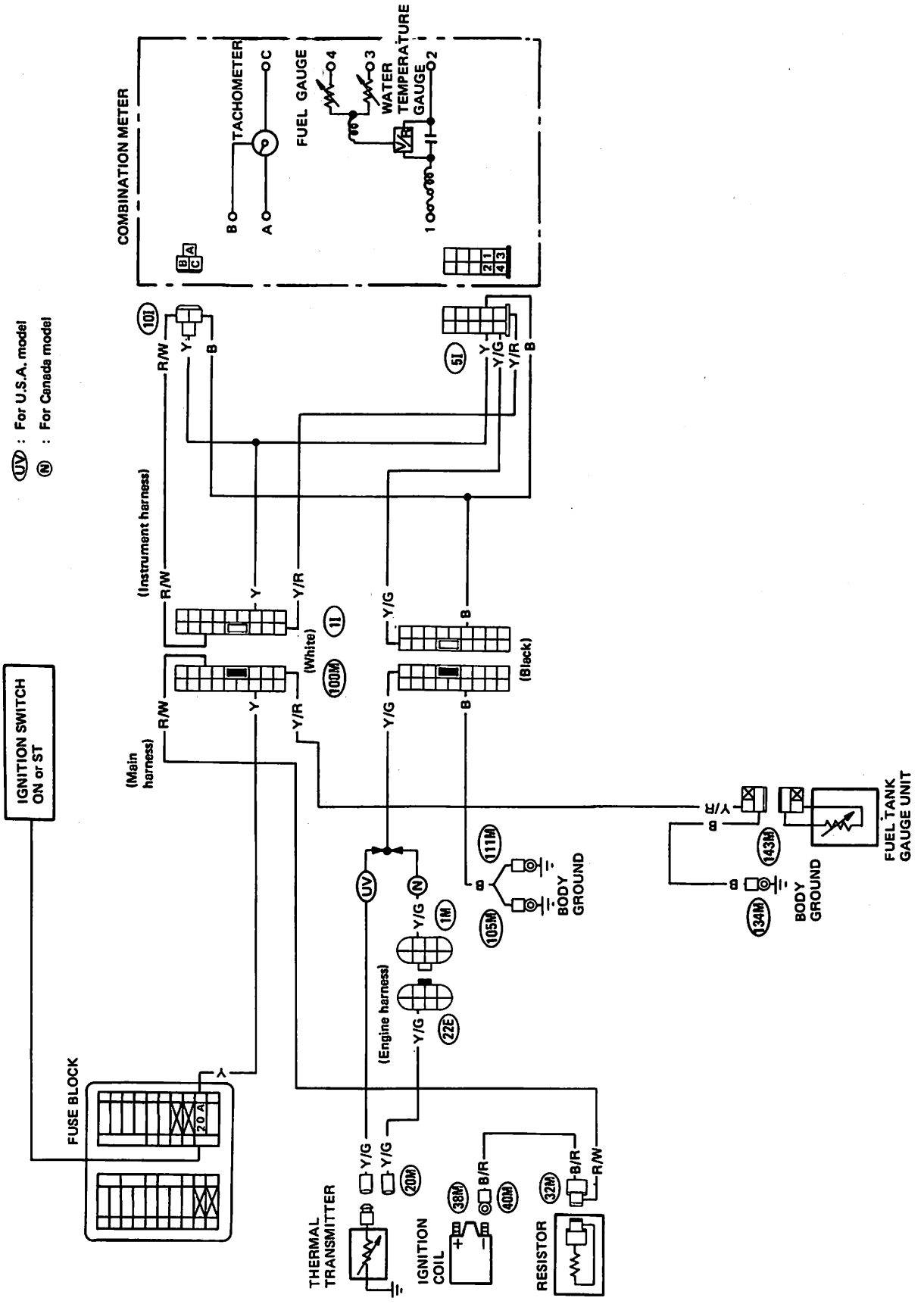
SCHEMATIC/COMBINATION METER



SEL119G

METER AND GAUGES

WIRING DIAGRAM/GAUGES AND TACHOMETER



TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause
Water temperature gauge	
Gauge does not operate.	Faulty thermal transmitter or loose terminal connection. (When wire to thermal transmitter is grounded, gauge pointer fluctuates.) Faulty water temperature gauge.
Gauge indicates only maximum temperature.	Faulty thermal transmitter. (Gauge pointer returns to original position when ignition switch is turned off.) Faulty water temperature gauge. (Gauge pointer indicates maximum temperature even after ignition switch is turned off.)
Gauge does not operate accurately.	Faulty water temperature gauge. Loose or poor connection.
Fuel level gauge	
Fuel level gauge does not operate.	Faulty fuel tank gauge unit. (Pointer deflects when fuel tank gauge unit yellow/red wire is grounded.) Faulty fuel level gauge. Loose connection or open circuit.
Pointer indicates only "F" position.	Faulty fuel tank gauge unit. Faulty fuel level gauge.
Fuel level gauge does not operate accurately.	Faulty fuel tank gauge unit. Faulty fuel gauge. Poor or loose connection.

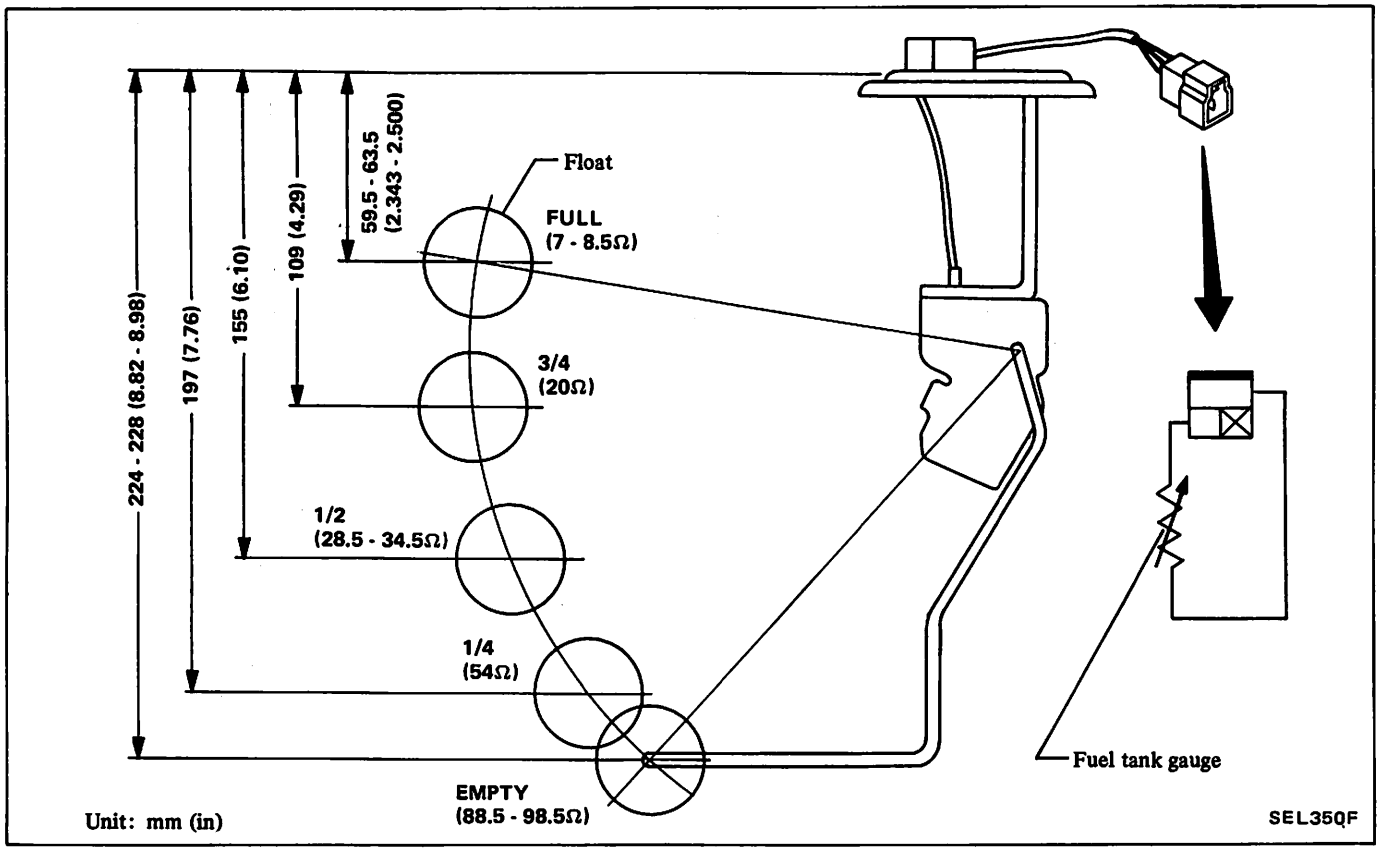
Condition	Probable cause
Tachometer	
Tachometer pointer deflects.	Loose or poor connection. Faulty tachometer.
Tachometer pointer will not move.	Loose or poor connection. Faulty tachometer.
Speedometer	
Neither speedometer pointer nor odometer operates.	Loose speedometer cable union nut. Broken speedometer cable. Damaged transmission speedometer pinion gear. Faulty speedometer.
Unstable speedometer pointer.	Loose speedometer cable nut. Damaged speedometer cable. Faulty speedometer.
Unusual sound occurs in response to increase in driving speed.	Excessively bent or twisted speedometer cable inner wire or lack of lubrication. Faulty speedometer.
Inaccurate speedometer indication.	Faulty speedometer.
Inaccurate odometer operation.	Faulty speedometer.

FUEL TANK GAUGE UNIT

Removal and installation

Refer to FE section.

Inspection



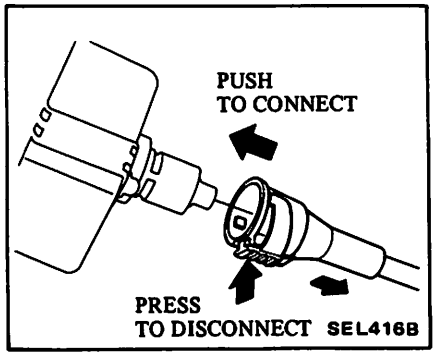
RESISTOR (For tachometer)

Location

Refer to "LOCATION OF ELECTRICAL UNITS".

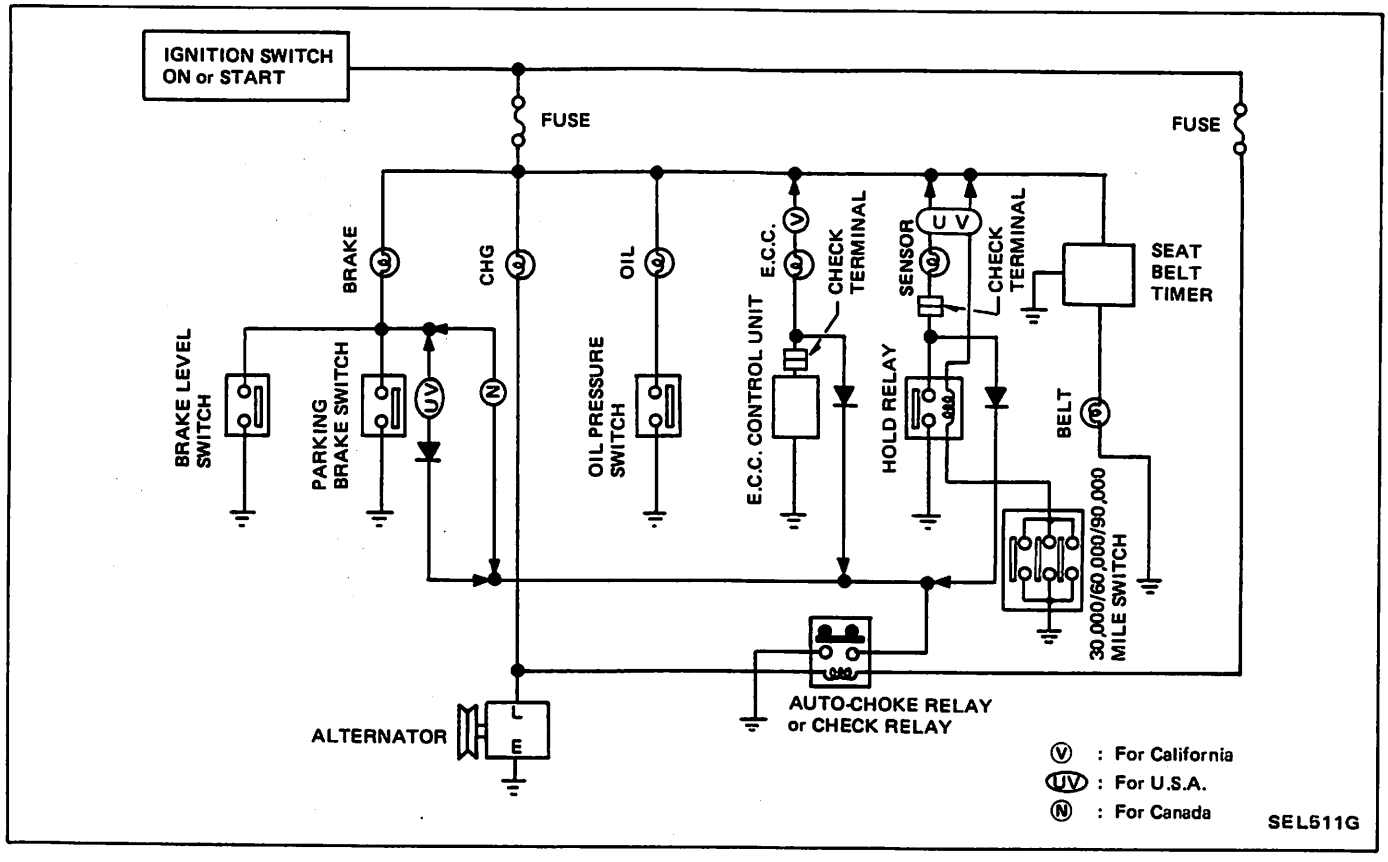
SPEEDOMETER CABLE

Removal and installation



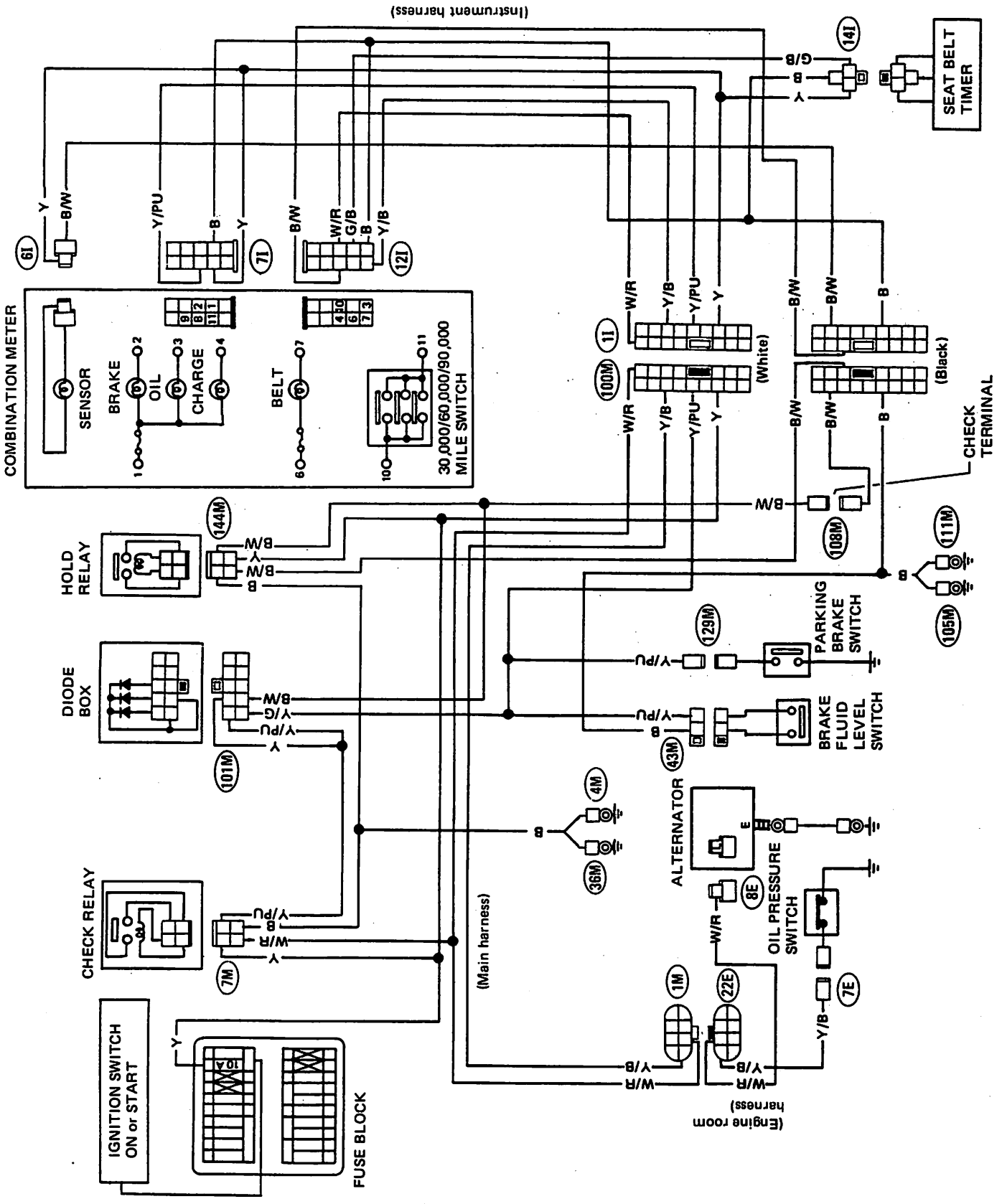
WARNING LAMPS

SCHEMATIC/WARNING LAMPS



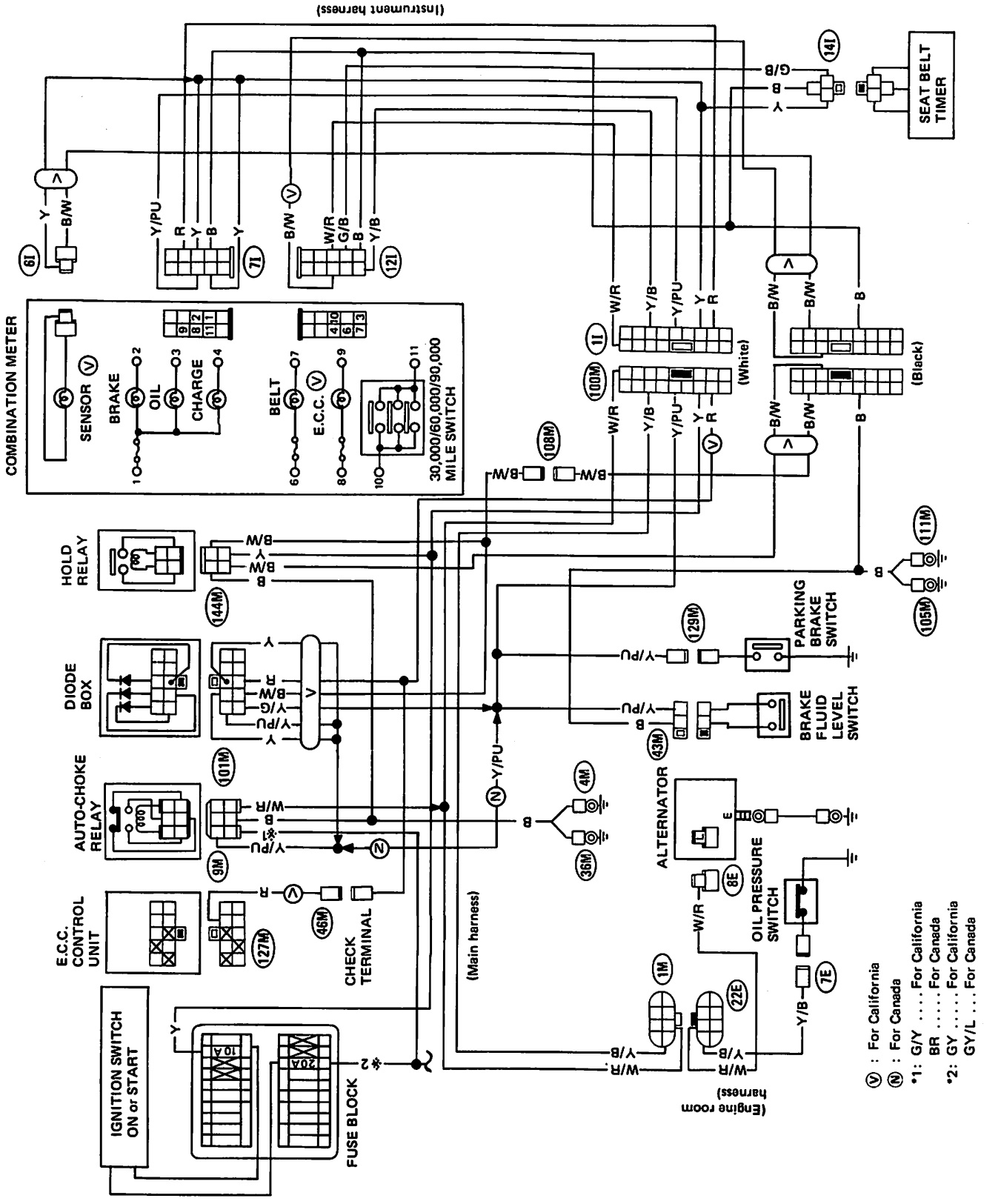
WARNING DIAGRAM/WARNING LAMPS

U.S.A. model except for California



SEL512G

For California and Canada models



SEL513G

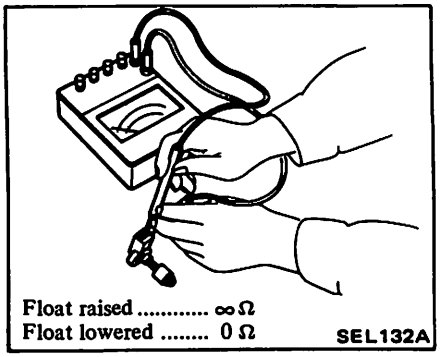
TROUBLE DIAGNOSES AND CORRECTIONS/ WARNING LAMPS

Condition	Probable cause
Charge warning lamp	
Lamp does not go out when engine is started.	Faulty charging system.
Lamp does not glow when ignition switch is turned "ON" without running engine.	Burnt bulb or loose bulb. Loose or poor connection. Faulty printed circuit sheet. Faulty alternator.
Oil pressure warning lamp	
Lamp does not light when ignition switch is set to "ON".	Faulty oil pressure switch or loose terminal connection. (When lead wire connected to oil pressure switch is grounded, warning lamp lights.) Burnt bulb or loose bulb. Loose connection or open circuit.
Lamp does not go out while engine is being operated.	Lack of engine oil. Oil pressure too low. Faulty oil pressure switch.

Condition	Probable cause
Brake warning lamp	
Lamp does not go out.	Faulty parking brake switch (When parking brake lever is released.) Faulty brake fluid level switch (When brake fluid level is normal).
Lamp does not glow when ignition switch is turned "ON" without running engine.	Burnt bulb or loose bulb. Faulty auto-choke relay. Loose or poor connection.

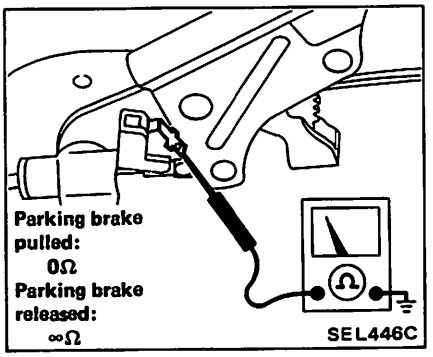
BRAKE FLUID LEVEL SWITCH

Inspection



PARKING BRAKE SWITCH

Inspection



AUTO-CHOKE RELAY

Location

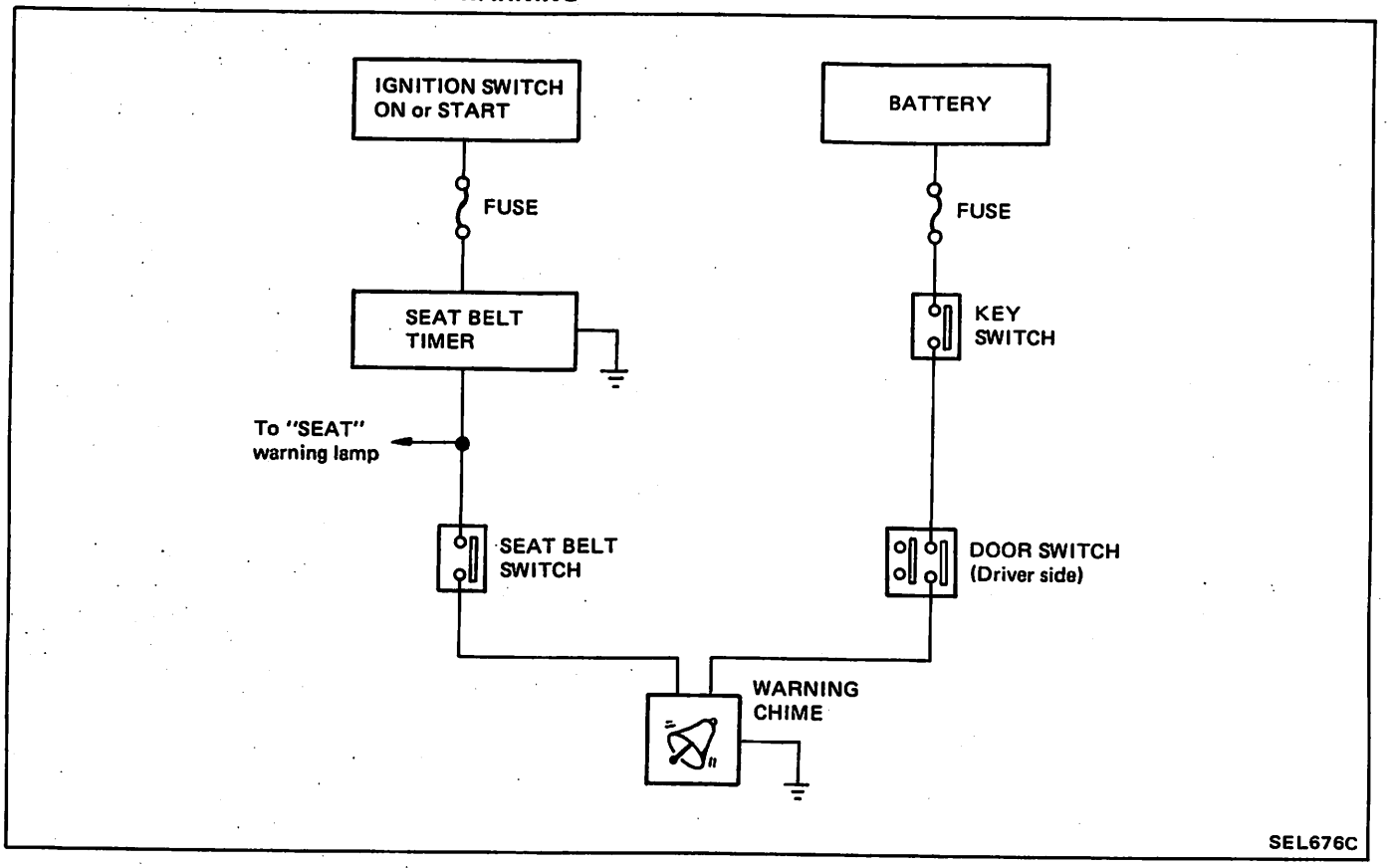
Auto-choke relay is installed on the relay bracket. Refer to "LOCATION OF ELECTRICAL UNITS".

Inspection

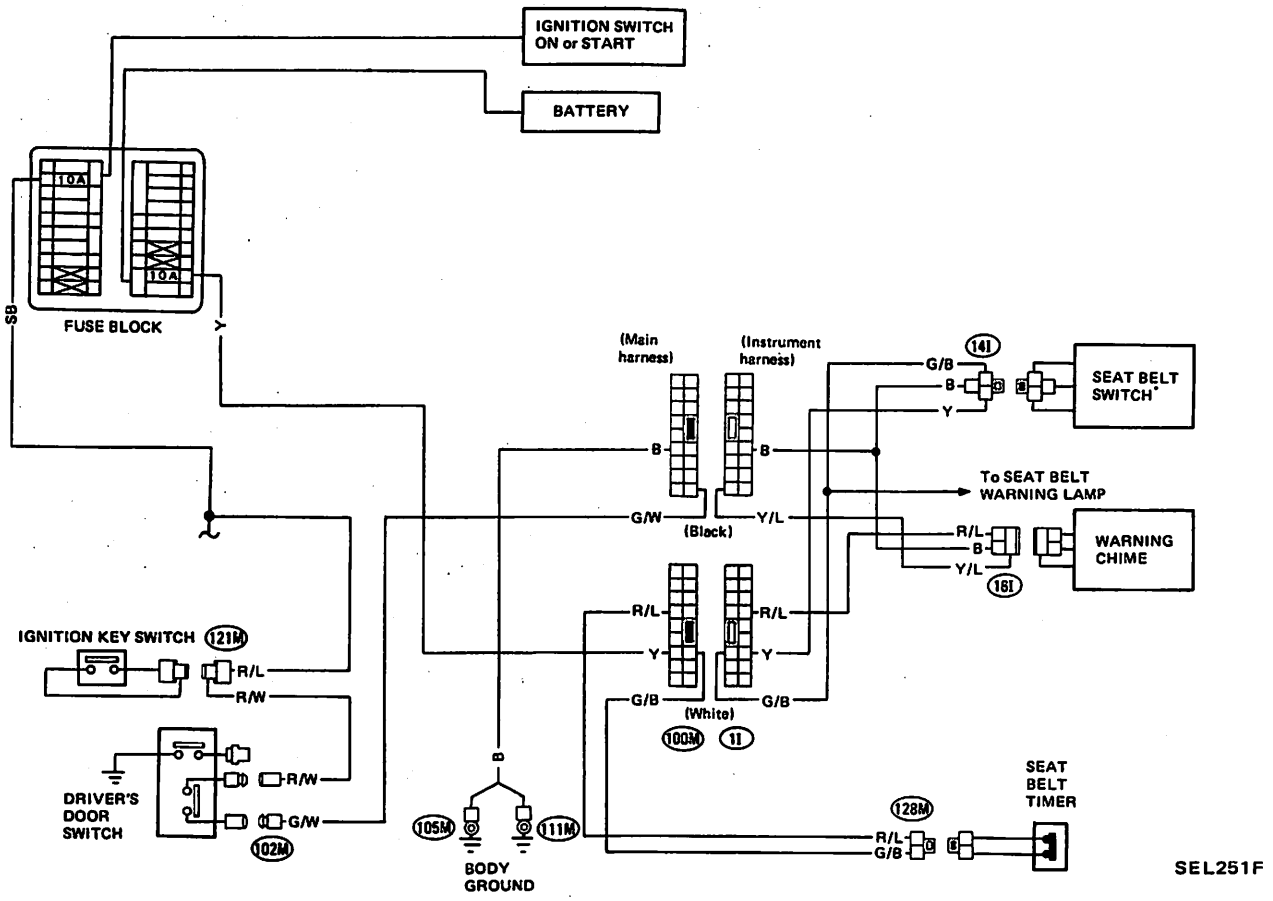
Auto-choke relay is 1M·1B type standardized relay. Refer to "STANDARDIZED RELAY".

WARNING CHIME

SCHEMATIC/SEAT BELT AND KEY WARNING



WIRING DIAGRAM/SEAT BELT AND KEY WARNING



TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause
Key	
Warning chime does not sound with ignition key in ignition switch when driver side door is open.	Faulty warning chime. Loose connection or open circuit. Faulty door switch. Faulty key warning chime switch.

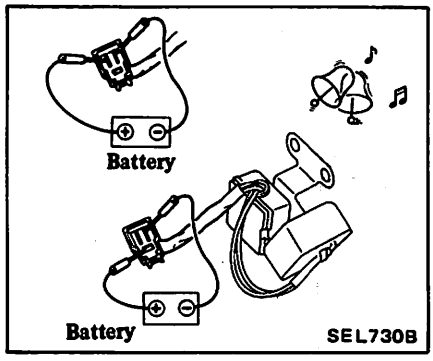
Condition	Probable cause
Seat belt	
Chime does not sound and warning lamp does not glow with ignition switch on.	Faulty seat belt switch. Faulty seat belt warning timer. Loose connection or open circuit.
Either chime or warning lamp does not operate with proper condition	Loose connection or open circuit. Burnt bulb. Faulty chime.

WARNING CHIME

Location

Warning chime is attached to the back of instrument panel. Refer to "LOCATION OF ELECTRICAL UNITS".

Inspection



KEY SWITCH

Inspection

Key switch is installed in ignition switch. Refer to "IGNITION SWITCH".

SEAT BELT TIMER

Location

Seat belt timer is attached to the back of instrument panel. Refer to "LOCATION OF ELECTRICAL UNITS".

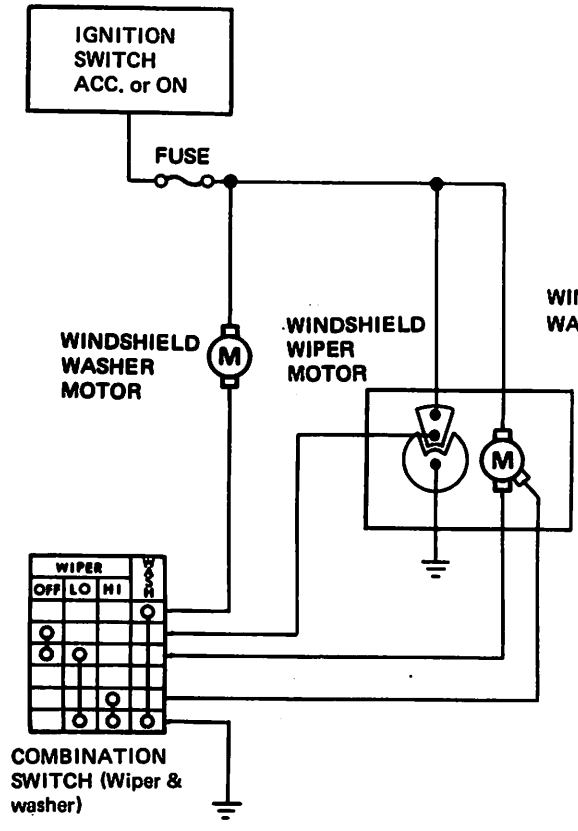
WIPER AND WASHER

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

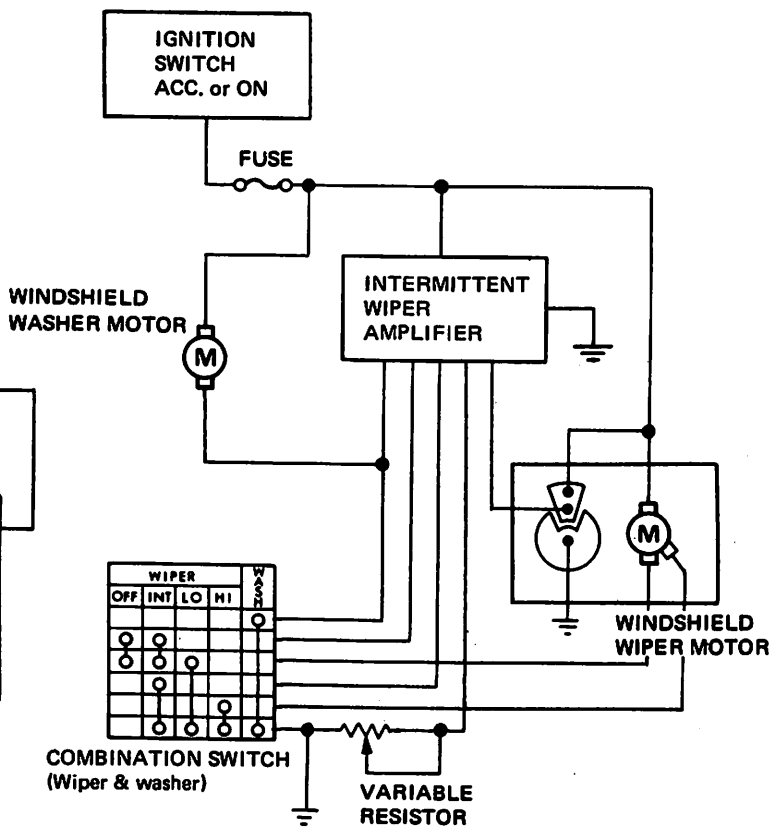
WINDSHIELD WIPER AND WASHER

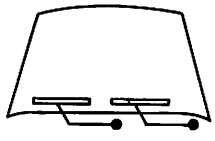
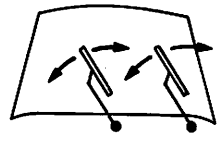
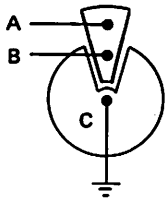
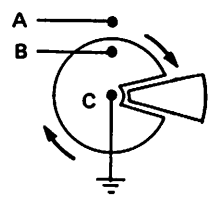
SCHEMATIC/WINDSHIELD WIPER AND WASHER

Without intermittent wiper



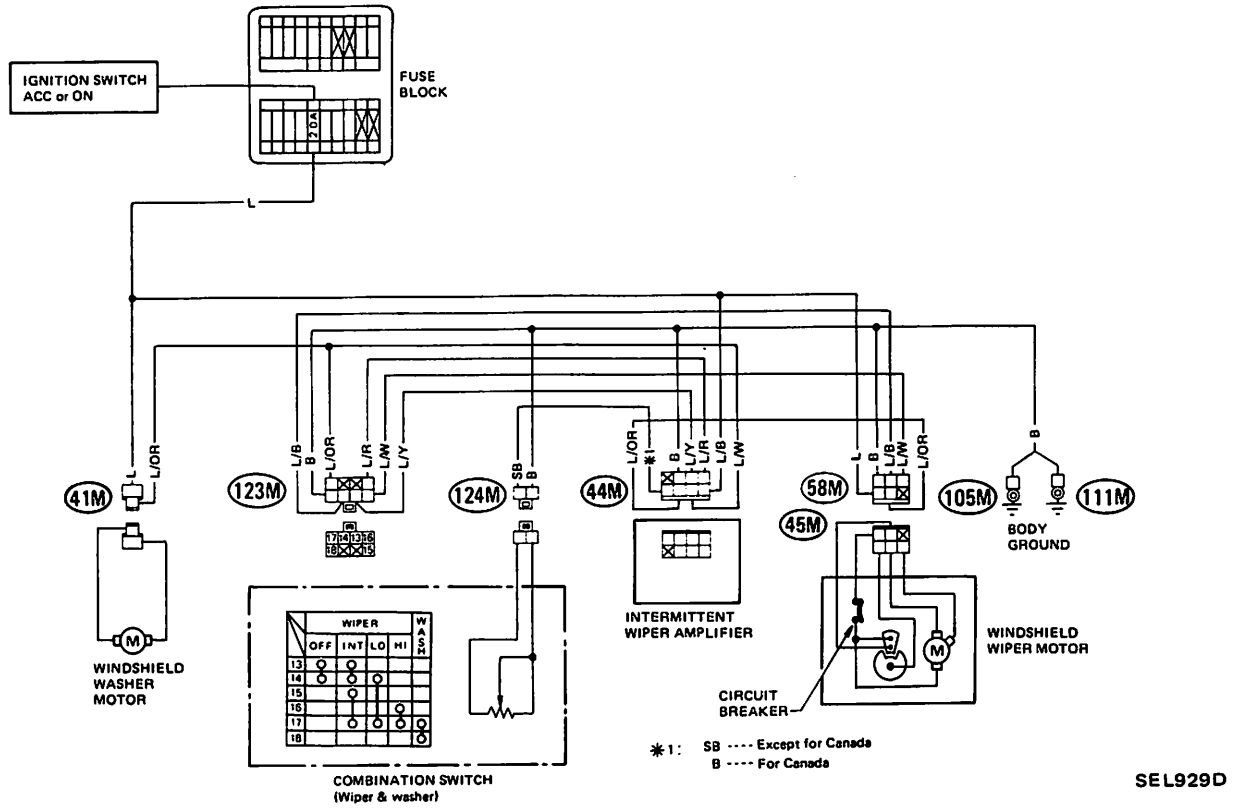
With intermittent wiper



	Stop position	In operation
Wiper arm		
Auto stop device	 Continuity exists between A and B.	 Continuity exists between B and C.

SEL678C

WIRING DIAGRAM/WINDSHIELD WIPER AND WASHER



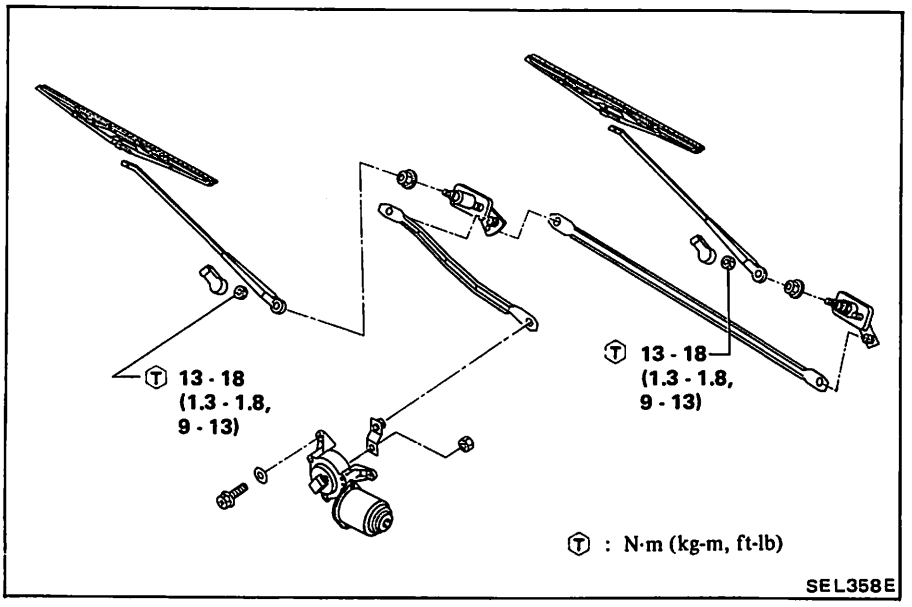
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause
Windshield wiper does not operate.	Burnt fuse. Loose connection or open circuit. Improper switch contact. Foreign material interrupts link mechanism. Disconnected rod. Seized or rusted arm shaft.
Windshield wiper operating speed is too slow.	Short circuit of motor armature. Worm brushes or seized shaft. Low source voltage. Humming of motor.
Windshield wiper does not stop correctly.	Faulty auto-stop device. Faulty wiper switch.
Washer fluid does not eject (Washer motor operates).	Clogged washer nozzle or hose.

Intermittent windshield wiper

Condition	Probable cause
Wiper does not operate intermittently but operates at low and high speeds.	Faulty wiper switch. Faulty wiring. Faulty intermittent amplifier.
Intermittent speed is too short for proper wiping.	Faulty auto-stop device. Faulty variable intermittent time control rheostat. Faulty intermittent amplifier.
Intermittent speed is too long for proper wiping.	Line voltage below 10 volts. Faulty intermittent time control rheostat. Faulty intermittent amplifier.
Wipers do not shut off.	Faulty wiper motor. Faulty intermittent amplifier.
Intermittent speed is erratic.	Faulty wiper switch. Faulty wiring. Faulty wiper motor. Faulty intermittent amplifier.

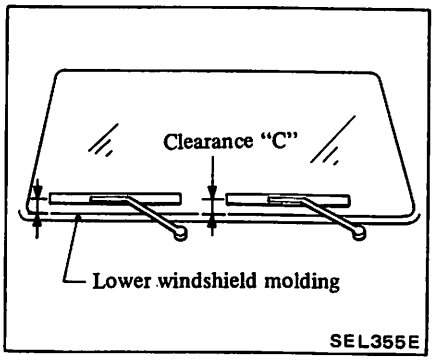
REMOVAL AND INSTALLATION



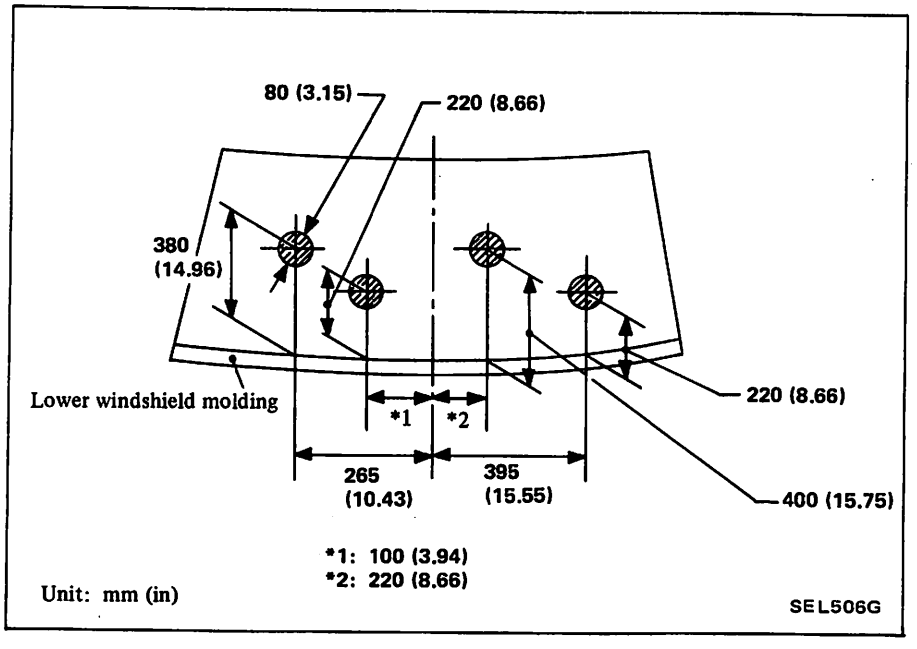
ADJUSTMENT

1. Prior to wiper arm installation, set wiper switch to "LOW" to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Adjust wiper blades within clearance "C".
3. Eject washer fluid. Set wiper switch to "LOW" to operate wiper blades and then turn it "OFF".
4. Ensure that wiper blades stop within clearance "C".

Clearance "C":
15 - 25 mm (0.59 - 0.98 in)



WINDSHIELD WASHER NOZZLE ADJUSTMENT



INTERMITTENT WIPER AMPLIFIER (IC built-in)

Location

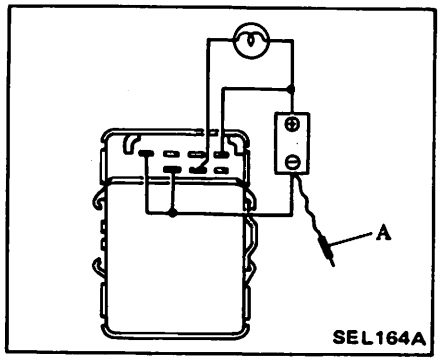
The intermittent wiper amplifier is attached to the dash upper (Engine compartment side). Refer to LOCATION OF ELECTRICAL UNITS.

Inspection

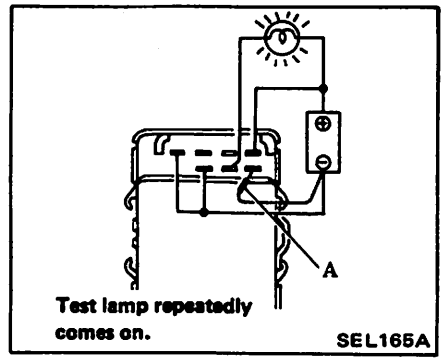
Variable intermittent type

Be careful not to connect lead wires to incorrect terminals.

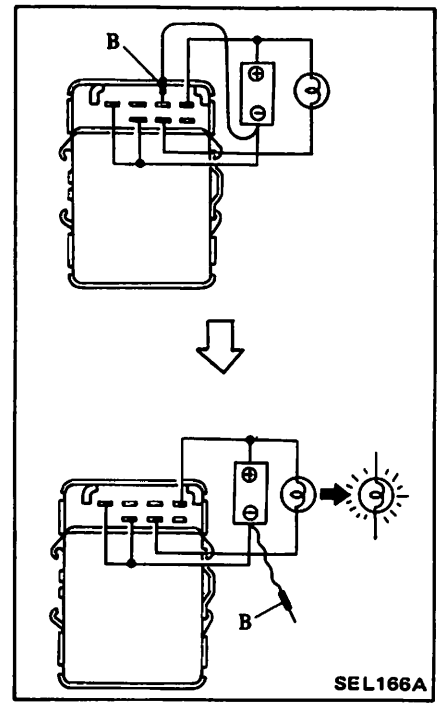
1. Connect test lead wires.



2. Make sure that test lamp comes on when negative lead wire (A) is connected.



3. Disconnect lead wire (B).
Test lamp should go out and come back on in a few seconds.

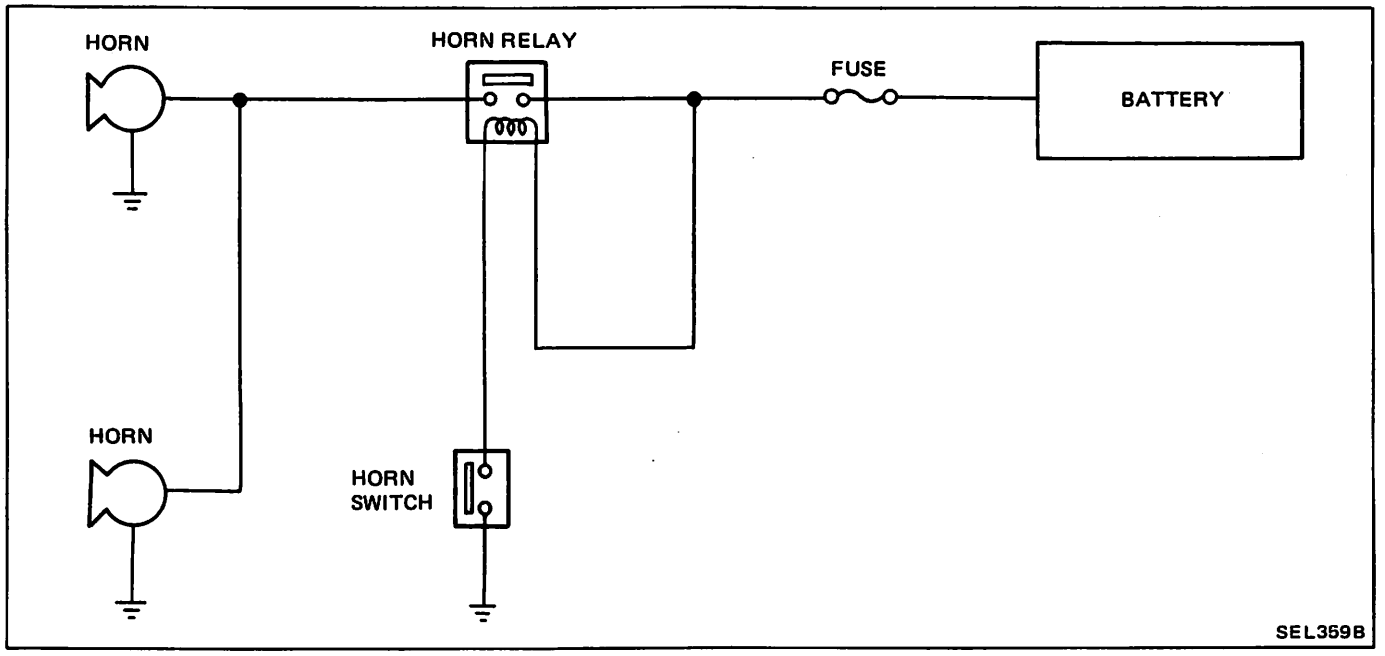


ELECTRICAL ACCESSORIES

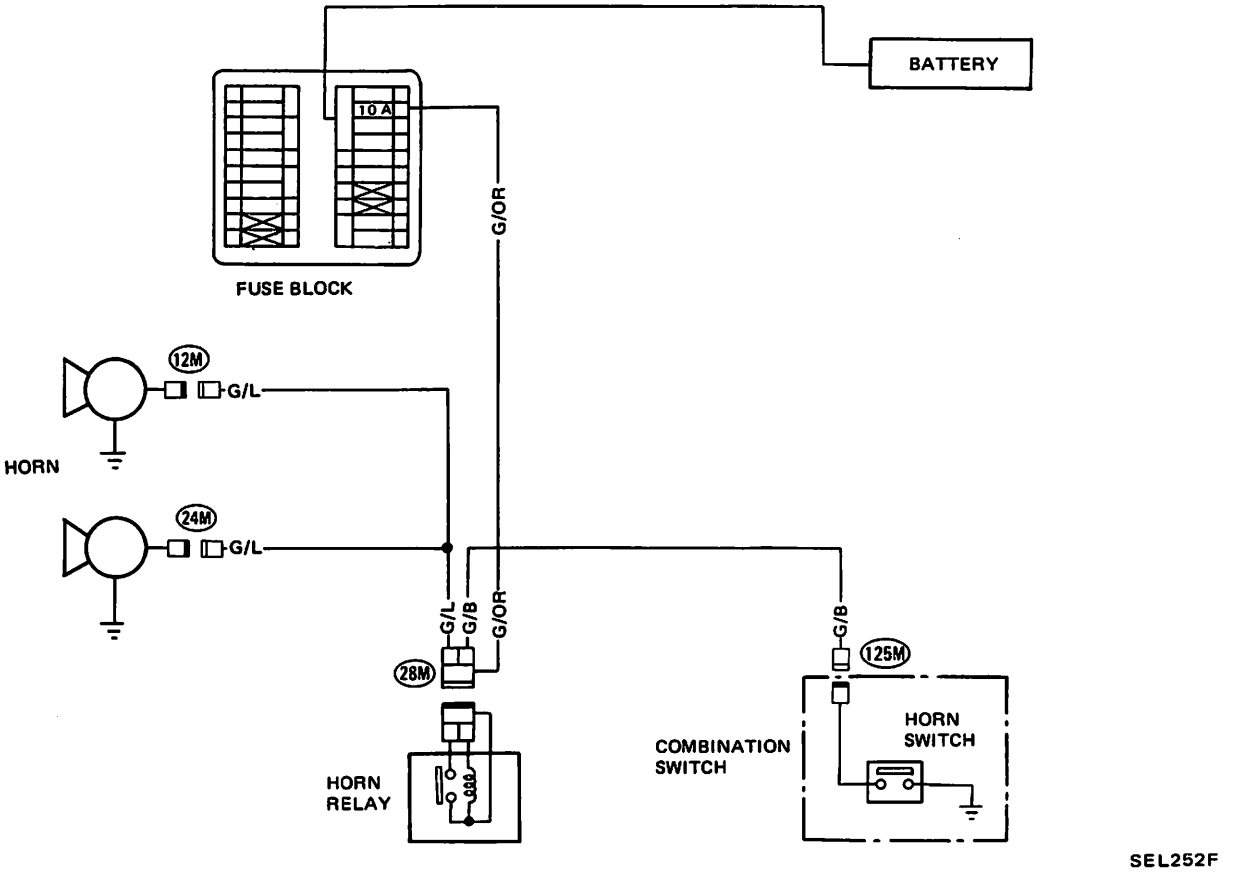
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

HORN

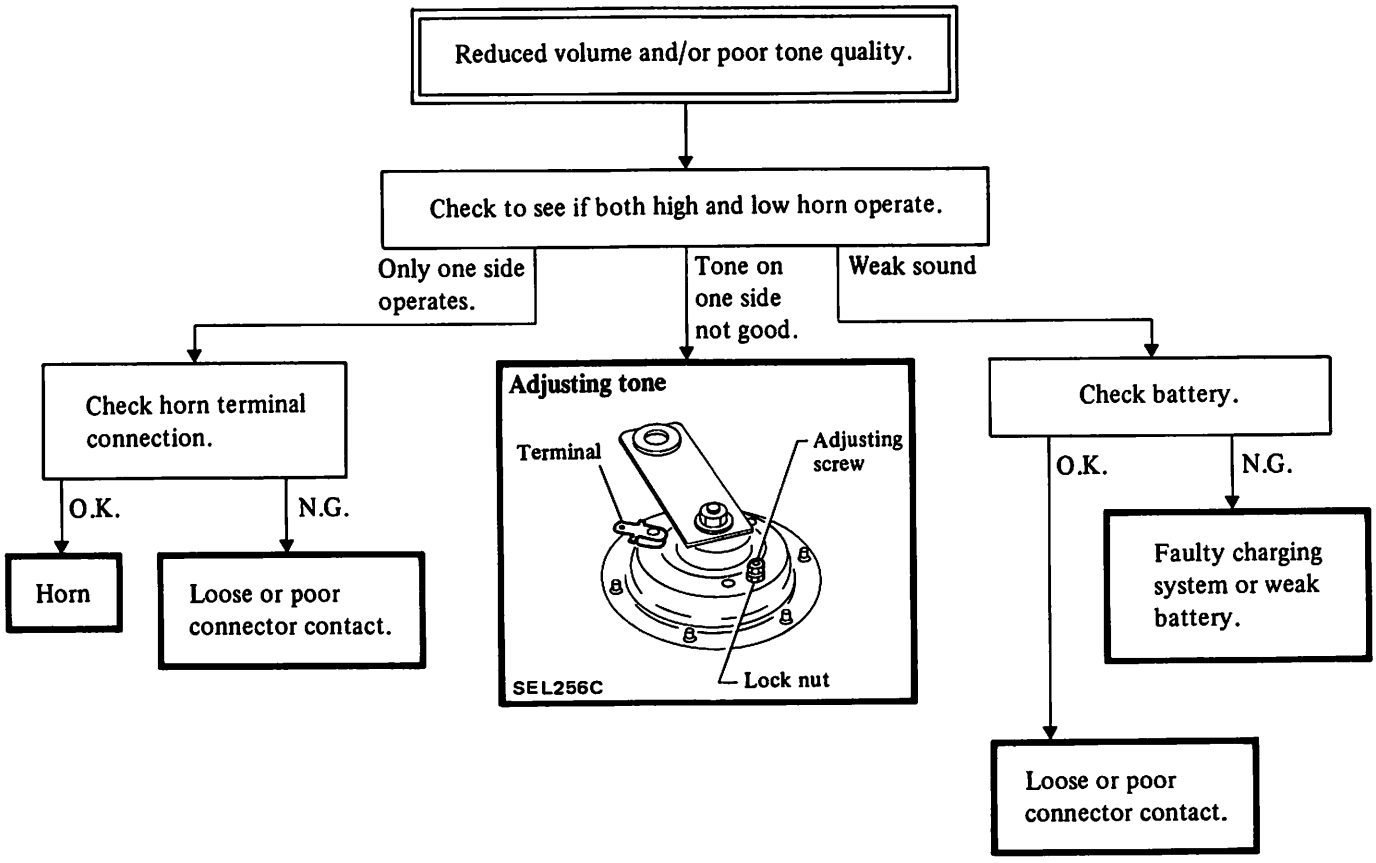
SCHEMATIC/HORN



WIRING DIAGRAM/HORN



TROUBLE DIAGNOSES AND CORRECTIONS



HORN BUTTON

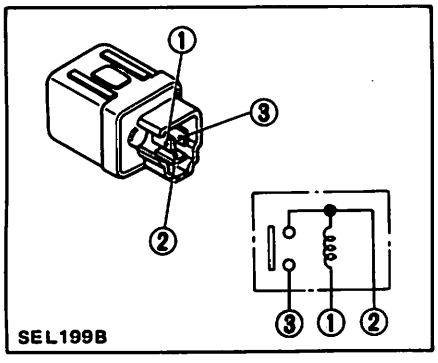
Refer to "COMBINATION SWITCH".

HORN RELAY

Location

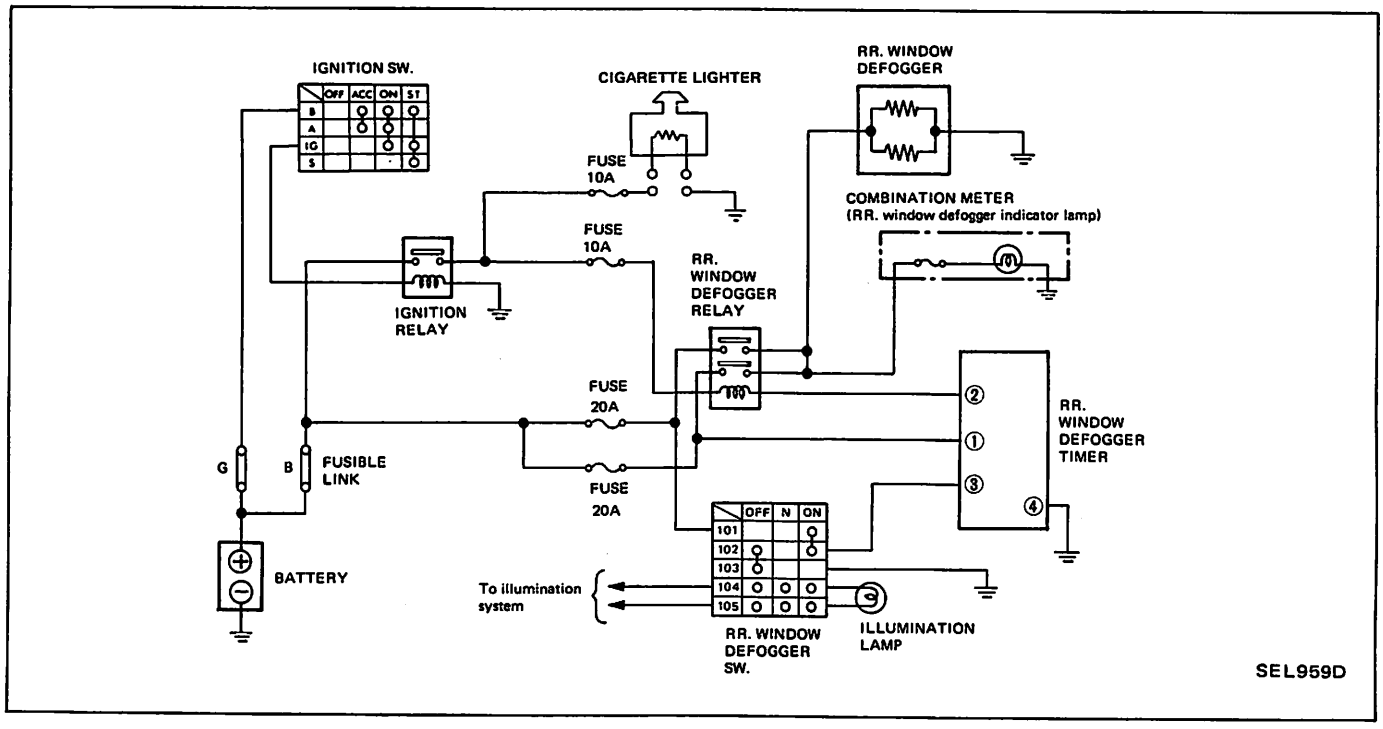
Horn relay is installed on the relay bracket. Refer to LOCATION OF ELECTRICAL UNITS.

Inspection

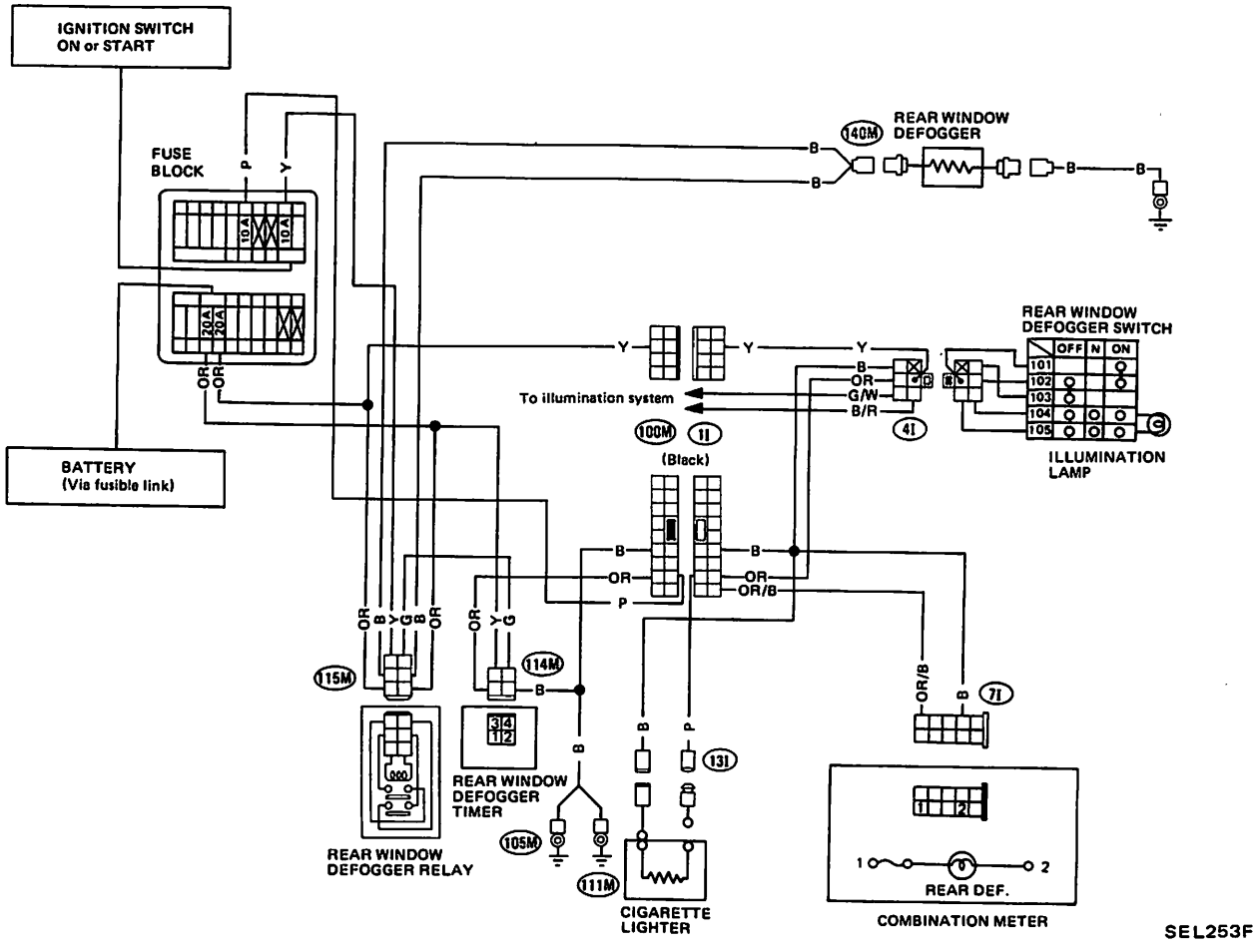


REAR WINDOW DEFOGGER AND CIGARETTE LIGHTER

SCHEMATIC/REAR WINDOW DEFOGGER AND CIGARETTE LIGHTER

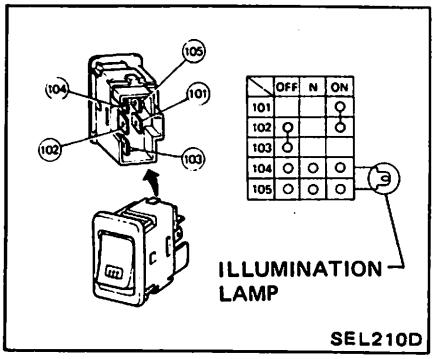


WIRING DIAGRAM/REAR WINDOW DEFOGGER AND CIGARETTE LIGHTER



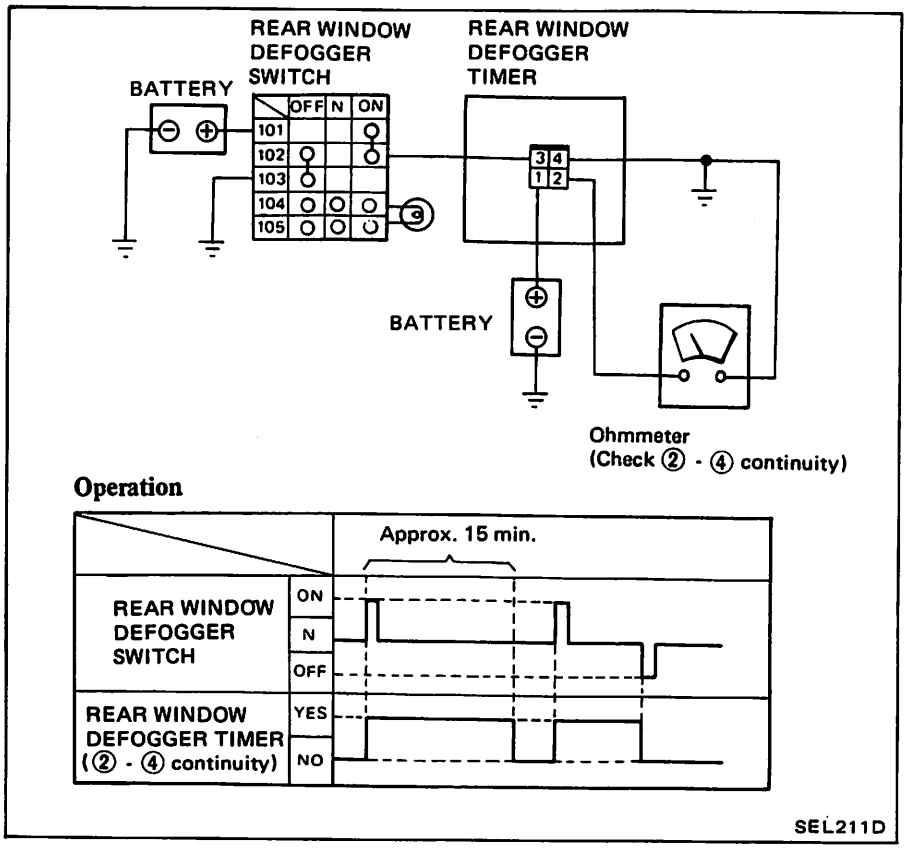
REAR WINDOW DEFOGGER SWITCH

Inspection



REAR WINDOW DEFOGGER TIMER

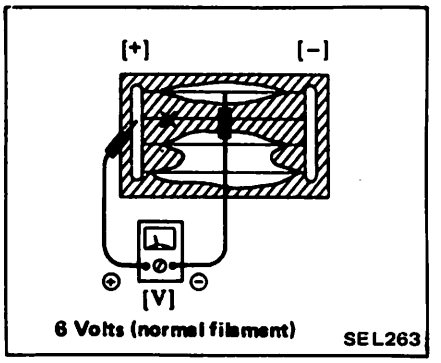
Operation



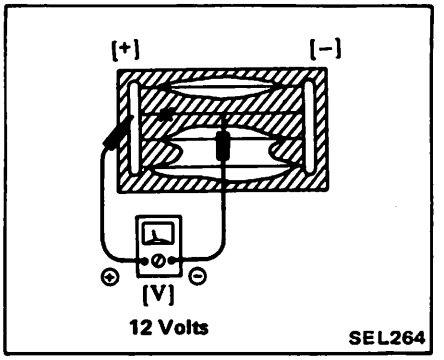
REAR WINDOW DEFOGGER FILAMENTS

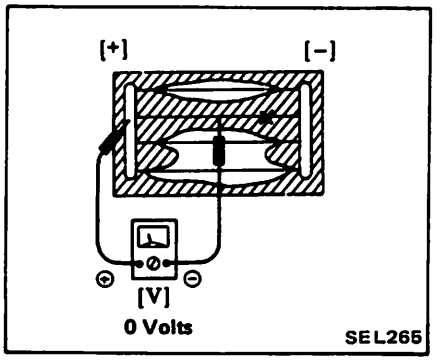
Inspection

1. Attach probe circuit tester (in volt range) to middle portion of each filament.

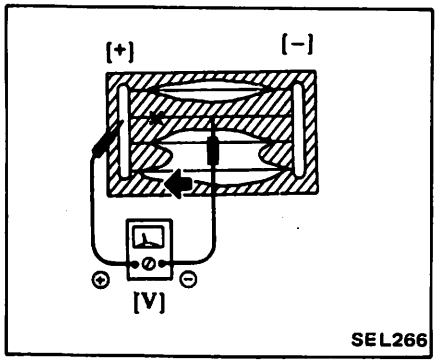


2. If a filament is burned out, circuit tester registers 0 or 12 volts.





3. To locate burned out point, move probe to left and right along filament to determine point where tester needle swings abruptly.



Filament maintenance

Repair equipment

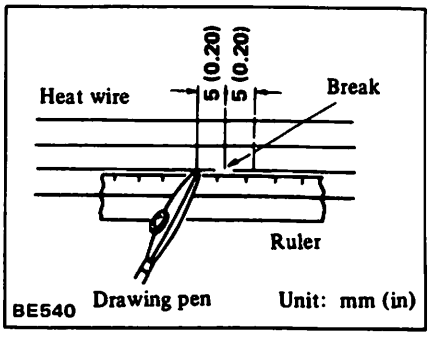
1. Conductive silver composition (Dupont No. 4817 or equivalent)
2. Ruler, 30 cm (11.8 in) long
3. Drawing pen
4. Heat gun
5. Alcohol
6. Cloth

Repair procedure

1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.

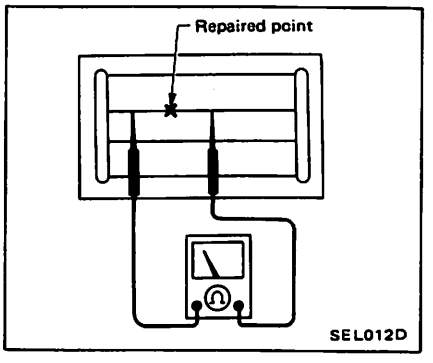
Shake silver composition container before use.

3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.

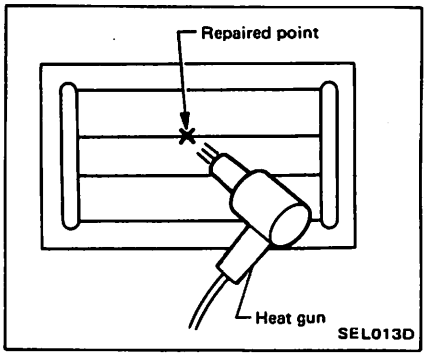


4. Wipe clean silver composition from tip of drawing pen.
5. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.

Do not touch repaired area while test is being conducted.

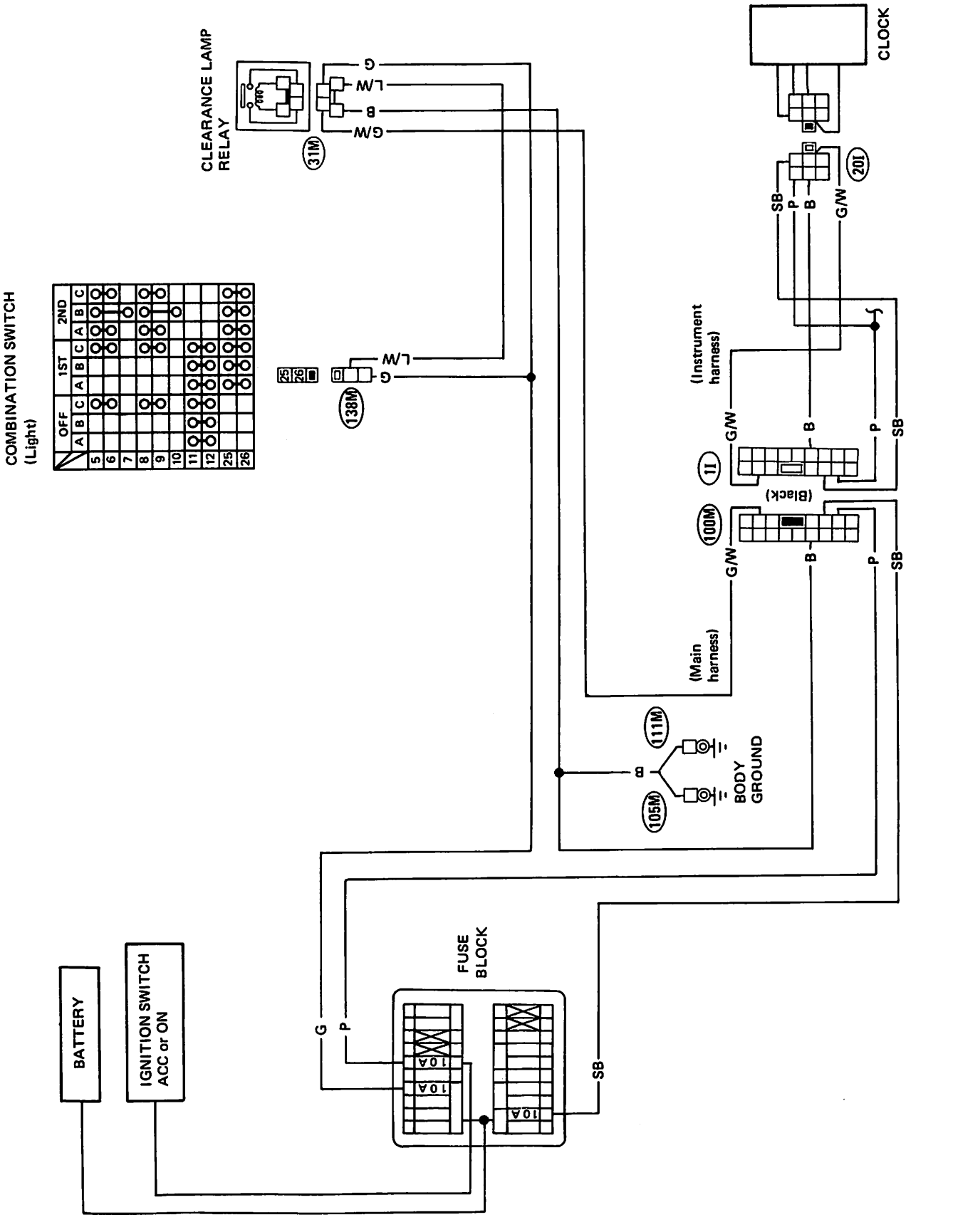


6. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet. If a heat gun is not available, let the repaired area dry for 24 hours.



CLOCK

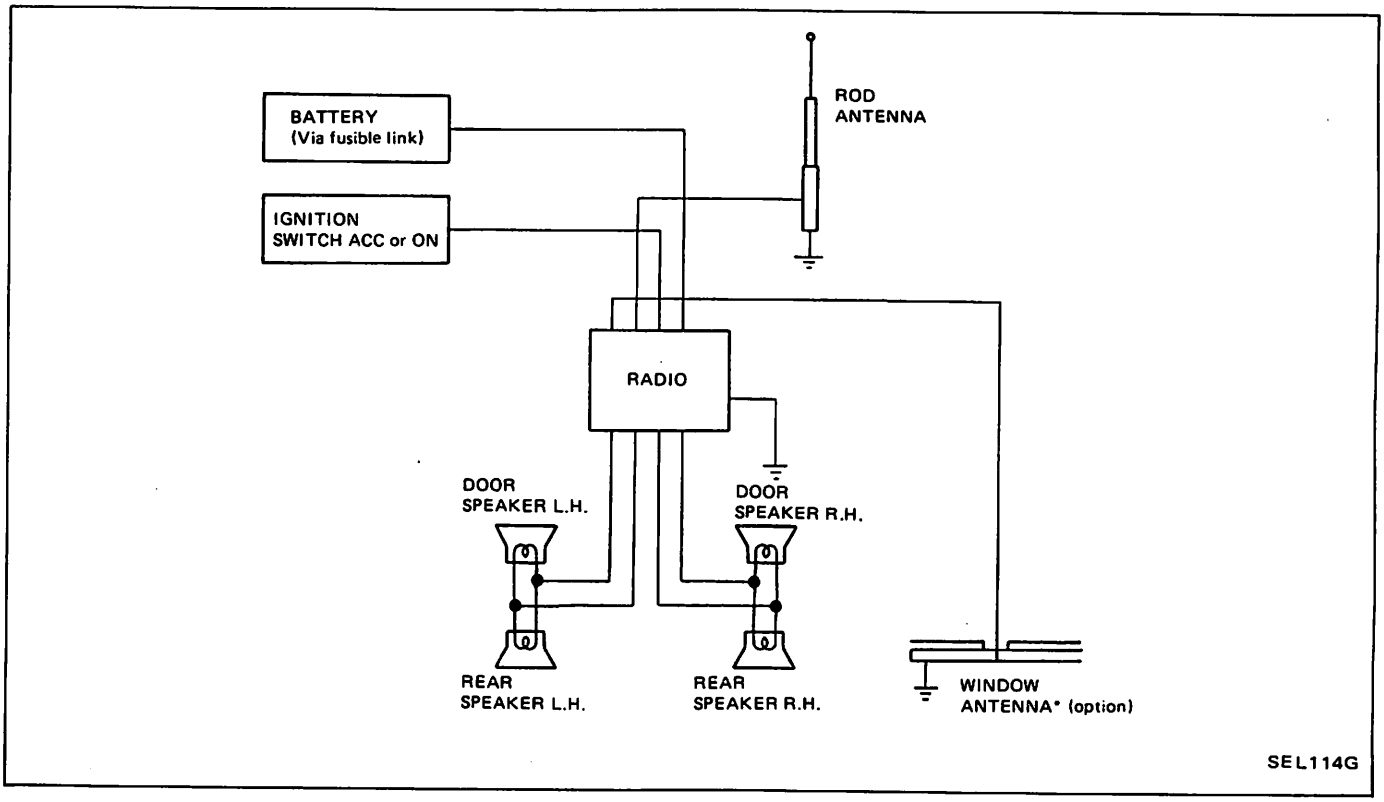
WIRING DIAGRAM/CLOCK



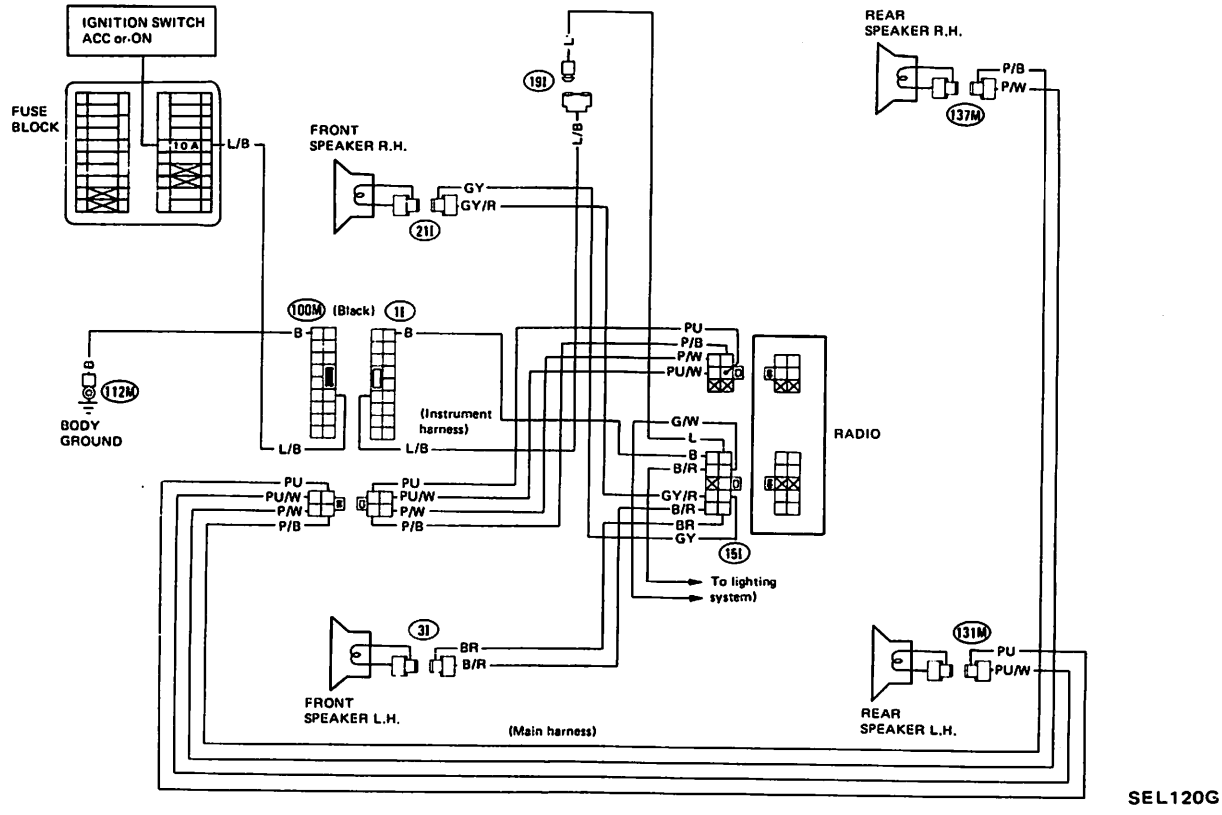
SEL254F

AUDIO

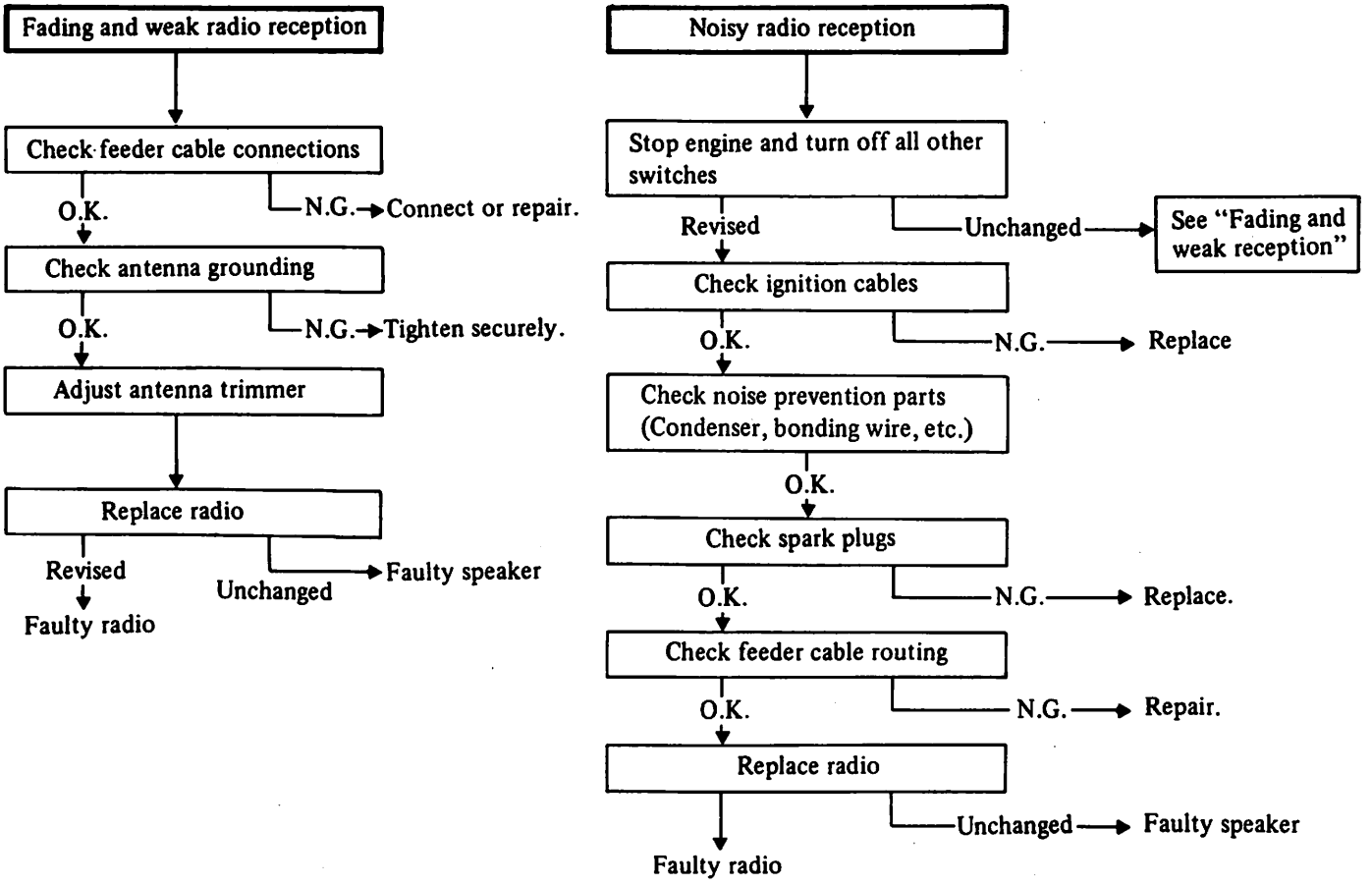
SCHEMATIC/RADIO



WIRING DIAGRAM/RADIO



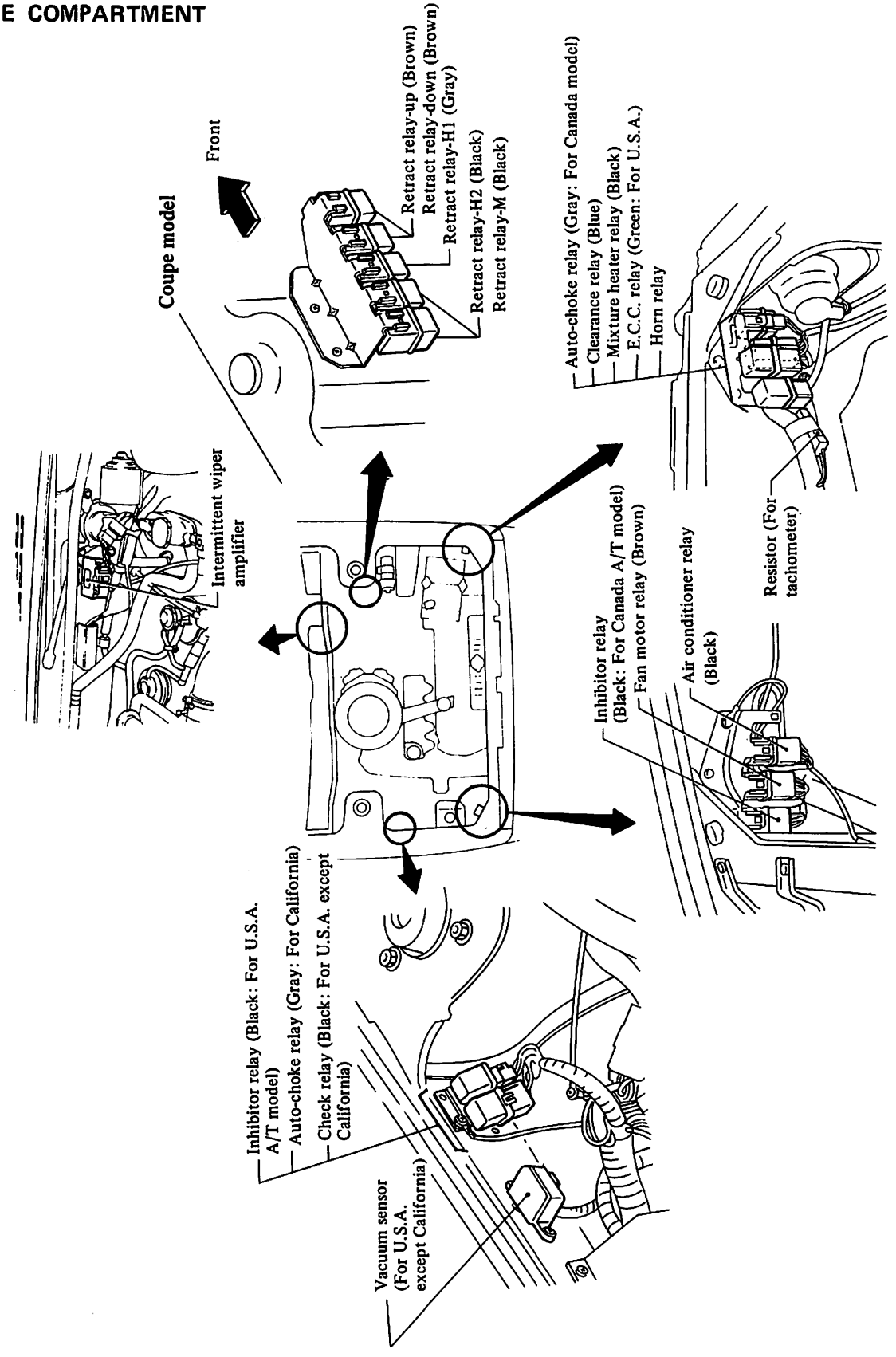
TROUBLE DIAGNOSES AND CORRECTIONS



LOCATION OF ELECTRICAL UNITS

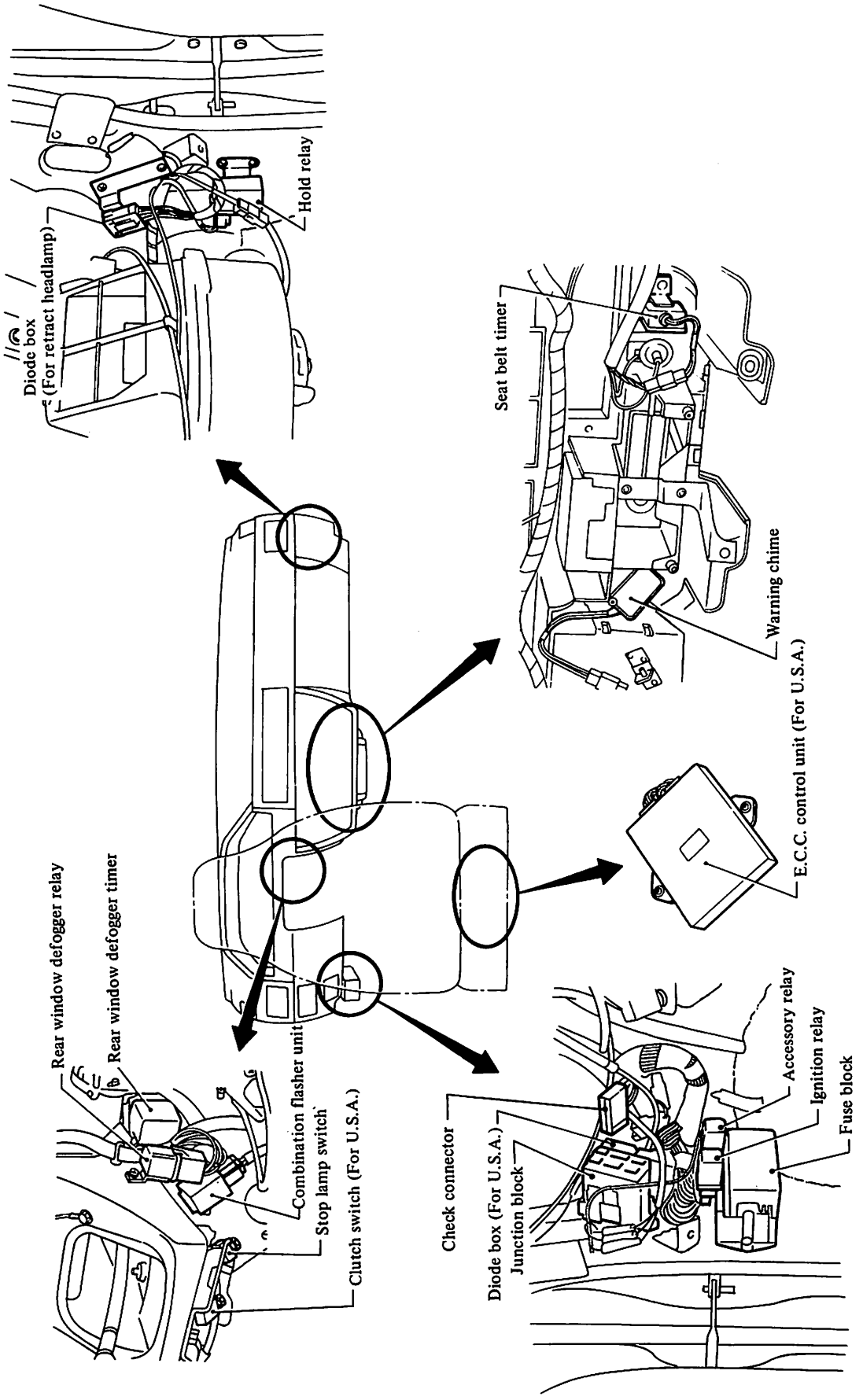
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

ENGINE COMPARTMENT



SEL261F

PASSENGER COMPARTMENT

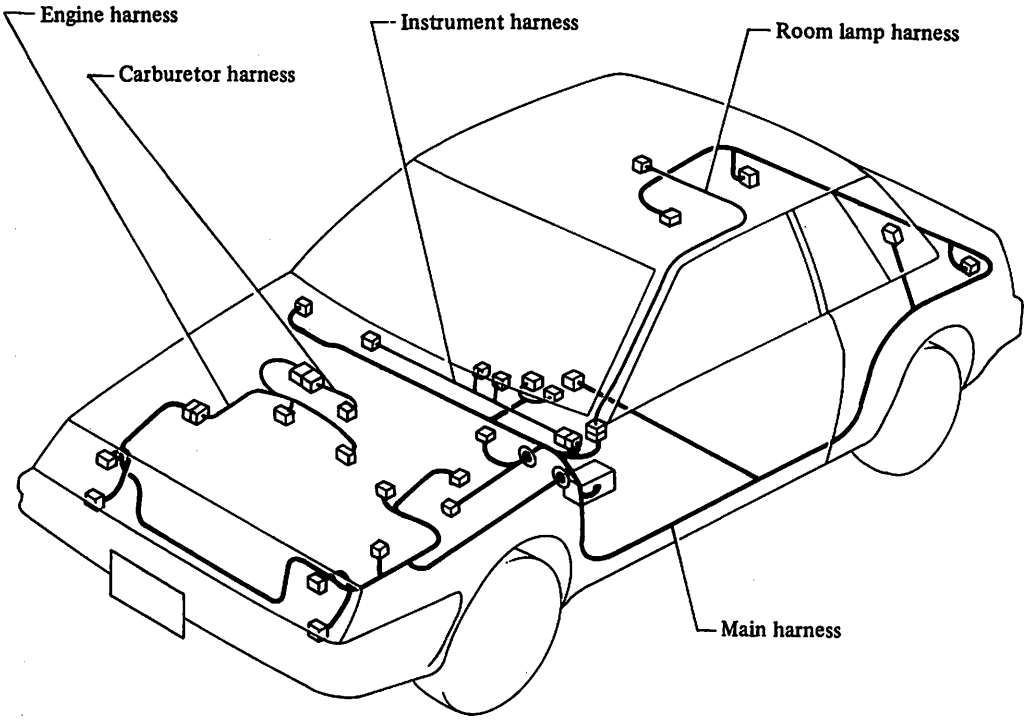


SEL505G

HARNESS LAYOUT

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

DESCRIPTION

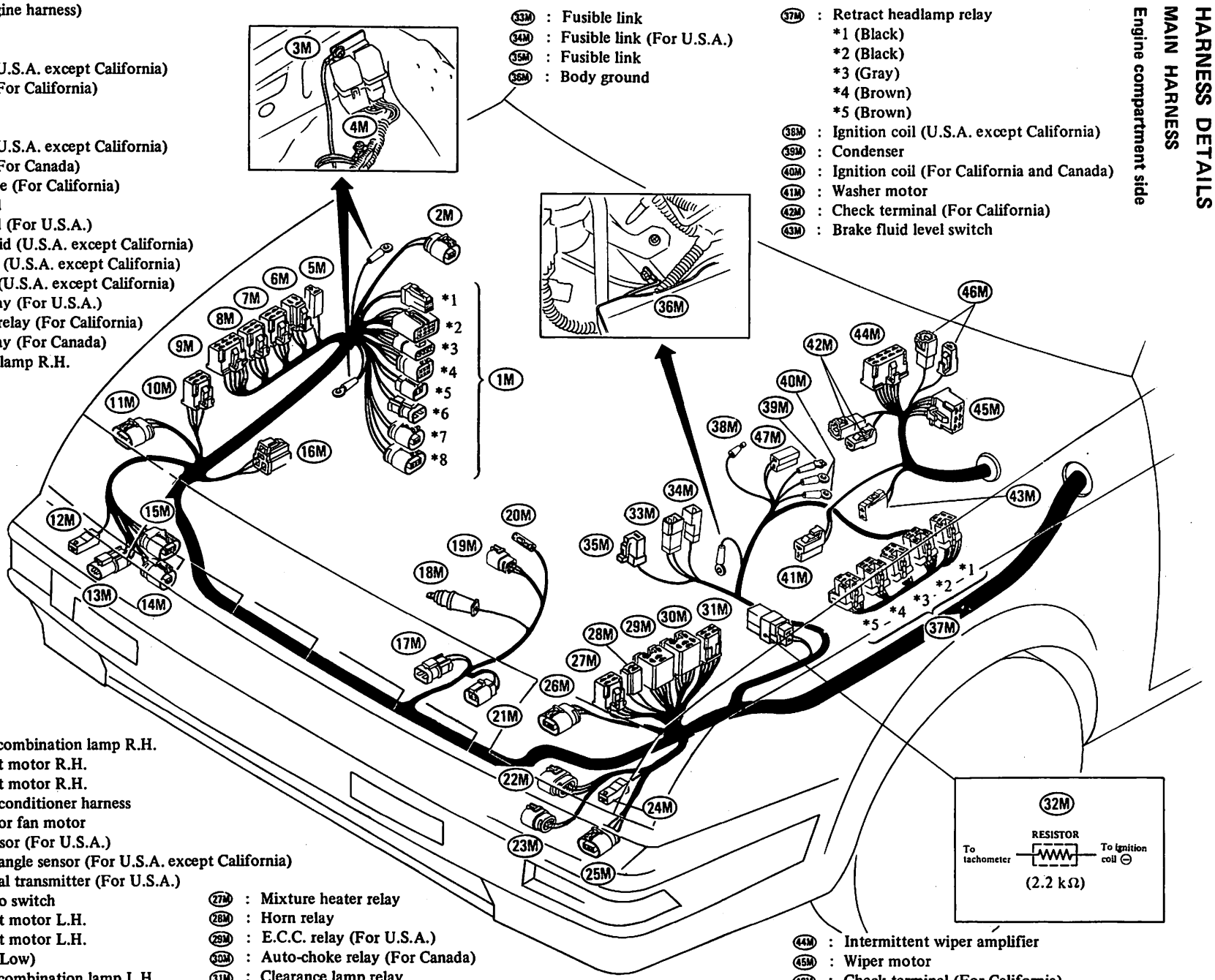


SEL263F

HARNESS DETAILS

MAIN HARNESS

Engine compartment side



(1M) : To (22E) (Engine harness)
*1 (Black)
*2 (White)
*3 (White) (U.S.A. except California)
*4 (White) (For California)
*5 (White)
*6 (White)
*7 (White) (U.S.A. except California)
*8 (White) (For Canada)

(2M) : Vacuum valve (For California)
(3M) : Body ground
(4M) : Body ground (For U.S.A.)
(5M) : I.S.C. solenoid (U.S.A. except California)
(6M) : Boost sensor (U.S.A. except California)
(7M) : Check relay (U.S.A. except California)
(8M) : Inhibitor relay (For U.S.A.)
(9M) : Auto-choke relay (For California)
(10M) : Inhibitor relay (For Canada)
(11M) : Retract headlamp R.H.
(12M) : Horn (High)

(33M) : Fusible link
(34M) : Fusible link (For U.S.A.)
(35M) : Fusible link
(36M) : Body ground

(37M) : Retract headlamp relay
*1 (Black)
*2 (Black)
*3 (Gray)
*4 (Brown)
*5 (Brown)
(38M) : Ignition coil (U.S.A. except California)
(39M) : Condenser
(40M) : Ignition coil (For California and Canada)
(41M) : Washer motor
(42M) : Check terminal (For California)
(43M) : Brake fluid level switch

(13M) : Front combination lamp R.H.
(14M) : Retract motor R.H.
(15M) : Retract motor R.H.
(18M) : To air conditioner harness
(17M) : Radiator fan motor
(18M) : O_2 sensor (For U.S.A.)
(19M) : Crank angle sensor (For U.S.A. except California)
(20M) : Thermal transmitter (For U.S.A.)
(21M) : Thermo switch
(22M) : Retract motor L.H.
(23M) : Retract motor L.H.
(24M) : Horn (Low)
(25M) : Front combination lamp L.H.
(26M) : Retract headlamp L.H.

(27M) : Mixture heater relay
(28M) : Horn relay
(29M) : E.C.C. relay (For U.S.A.)
(30M) : Auto-choke relay (For Canada)
(31M) : Clearance lamp relay
(32M) : Resistor (Tachometer)

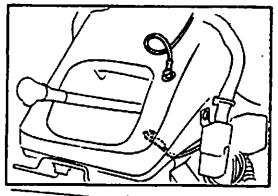
(44M) : Intermittent wiper amplifier
(45M) : Wiper motor
(46M) : Check terminal (For California)
(47M) : Ignition coil (U.S.A. except California)

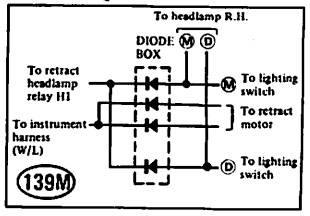
SEL584G

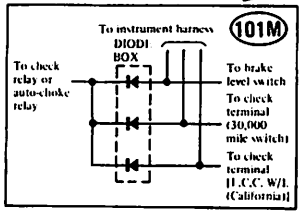
(100M) : To (11) (Instrument harness)
*1 (White)
*2 (Black)
*3 (White)
*4 (White)
(101M) : Diode box (For U.S.A.)
(102M) : Door switch L.H.
(103M) : Accessory relay
(104M) : Ignition relay
(105M) : Body ground
(106M) : Clutch switch (For U.S.A.)
(107M) : Stop lamp switch
(108M) : Check terminal (For U.S.A.)
(109M) : To room lamp harness
(110M) : Check connector
(111M) : Body ground
(112M) : Body ground
(113M) : Flasher unit

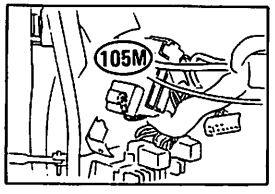
(114M) : Rear defogger timer
(115M) : Rear defogger relay
(116M) : Heater control
(117M) : Resistor
(118M) : To air conditioner harness
(119M) : Blower motor
(120M) : Door switch R.H.
(121M) : Key switch
(122M) : Ignition switch
(123M) : Combination switch (Wiper)

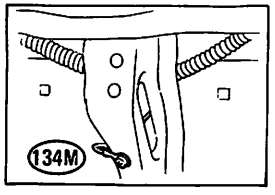
(124M) : Combination switch (Variable resistor)
(125M) : Combination switch (Horn)
(126M) : Combination switch (Light and turn)
(127M) : E.C.C. control unit (For U.S.A.)
(128M) : Seat belt switch
(129M) : Parking brake switch
(130M) : A/T indicator lamp
(131M) : Rear speaker L.H.
(132M) : Rear combination lamp L.H.
(133M) : License plate lamp











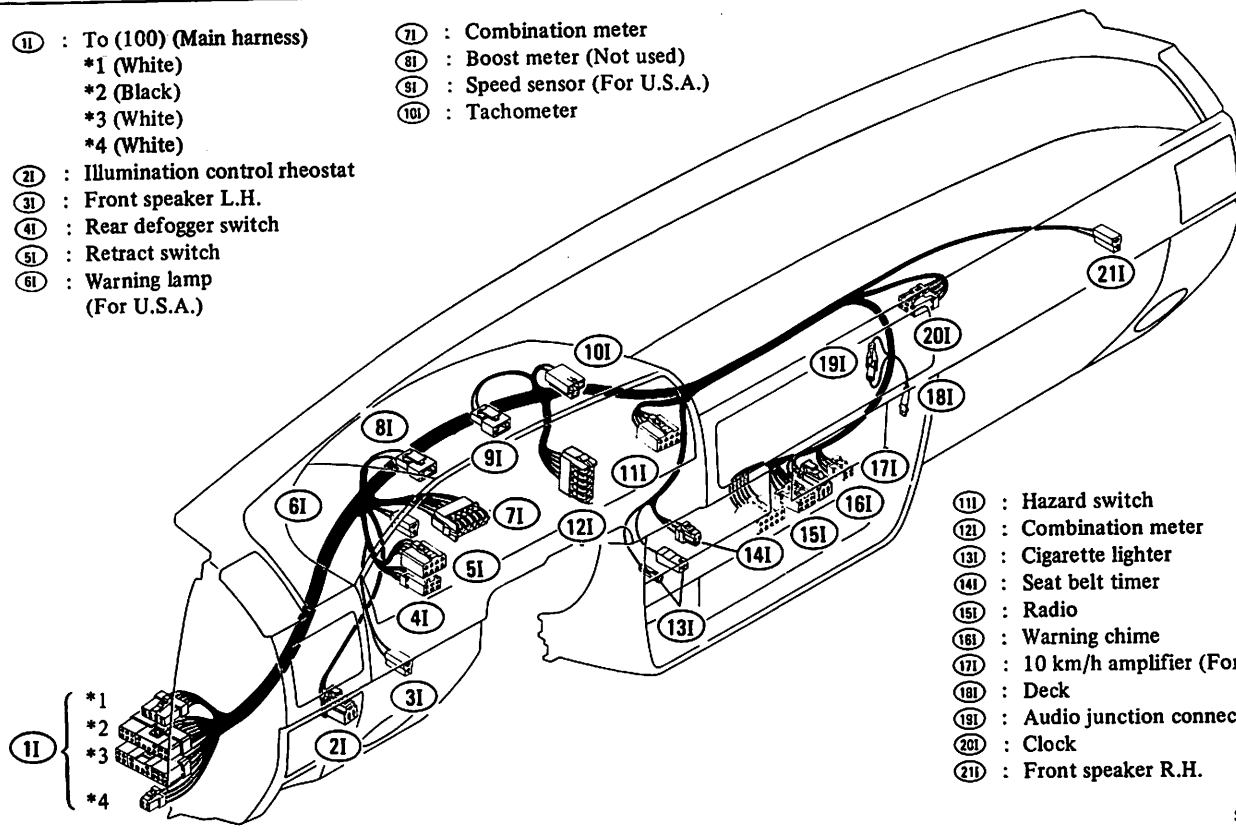
Fuse block

(134M) : Body ground
(135M) : Luggage compartment lamp switch
(136M) : Rear combination lamp R.H.
(137M) : Rear speaker harness R.H.
(138M) : Combination switch (Light)

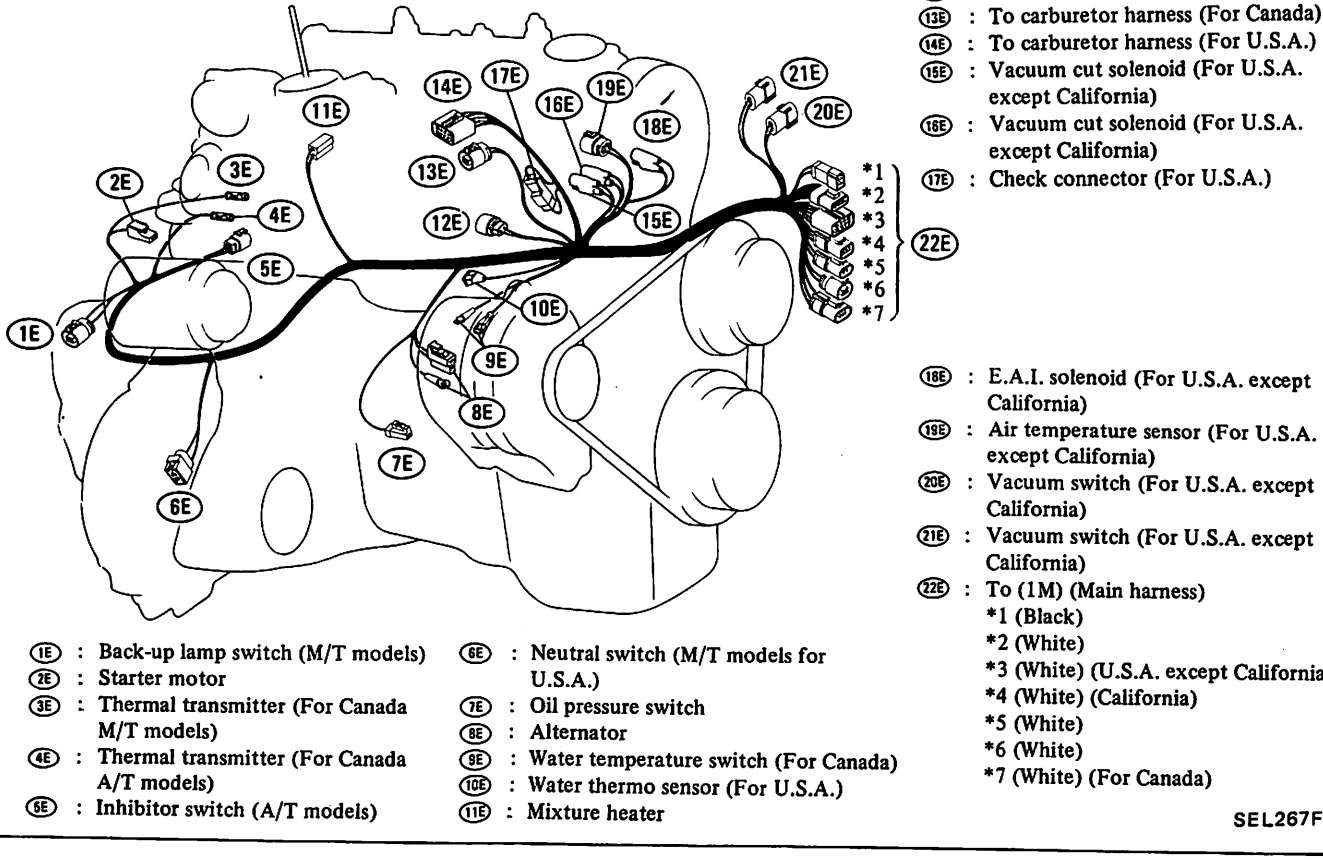
(139M) : Diode box
(140M) : Rear defogger
(141M) : Luggage compartment lamp
(143M) : Fuel tank gauge unit
(144M) : Hold relay (For U.S.A.)
(145M) : High-mounted stop lamp (For U.S.A.)

SEL514G

INSTRUMENT HARNESS



ENGINE HARNESS



INCH TO METRIC CONVERSION TABLE

(Rounded-off for automotive use)

inches	mm	inches	mm
.100	2.54	.610	15.49
.110	2.79	.620	15.75
.120	3.05	.630	16.00
.130	3.30	.640	16.26
.140	3.56	.650	16.51
.150	3.81	.660	16.76
.160	4.06	.670	17.02
.170	4.32	.680	17.27
.180	4.57	.690	17.53
.190	4.83	.700	17.78
.200	5.08	.710	18.03
.210	5.33	.720	18.29
.220	5.59	.730	18.54
.230	5.84	.740	18.80
.240	6.10	.750	19.05
.250	6.35	.760	19.30
.260	6.60	.770	19.56
.270	6.86	.780	19.81
.280	7.11	.790	20.07
.290	7.37	.800	20.32
.300	7.62	.810	20.57
.310	7.87	.820	20.83
.320	8.13	.830	21.08
.330	8.38	.840	21.34
.340	8.64	.850	21.59
.350	8.89	.860	21.84
.360	9.14	.870	22.10
.370	9.40	.880	22.35
.380	9.65	.890	22.61
.390	9.91	.900	22.86
.400	10.16	.910	23.11
.410	10.41	.920	23.37
.420	10.67	.930	23.62
.430	10.92	.940	23.88
.440	11.18	.950	24.11
.450	11.43	.960	24.38
.460	11.68	.970	24.64
.470	11.94	.980	24.89
.480	12.19	.990	25.15
.490	12.45	1.000	25.40
.500	12.70	2.000	50.80
.510	12.95	3.000	76.20
.520	13.21	4.000	101.60
.530	13.46	5.000	127.00
.540	13.72	6.000	152.40
.550	13.97	7.000	177.80
.560	14.22	8.000	203.20
.570	14.48	9.000	228.60
.580	14.73	10.000	254.00
.590	14.99	20.000	508.00
.600	15.24		

METRIC TO INCH CONVERSION TABLE

(Rounded-off for automotive use)

mm	inches	mm	inches
1	.0394	51	2.008
2	.079	52	2.047
3	.118	53	2.087
4	.157	54	2.126
5	.197	55	2.165
6	.236	56	2.205
7	.276	57	2.244
8	.315	58	2.283
9	.354	59	2.323
10	.394	60	2.362
11	.433	61	2.402
12	472	62	2.441
13	.512	63	2.480
14	.551	64	2.520
15	.591	65	2.559
16	.630	66	2.598
17	.669	67	2.638
18	.709	68	2.677
19	.748	69	2.717
20	.787	70	2.756
21	.827	71	2.795
22	.866	72	2.835
23	.906	73	2.874
24	.945	74	2.913
25	.984	75	2.953
26	1.024	76	2.992
27	1.063	77	3.031
28	1.102	78	3.071
29	1.142	79	3.110
30	1.181	80	3.150
31	1.220	81	3.189
32	1.260	82	3.228
33	1.299	83	3.268
34	1.339	84	3.307
35	1.378	85	3.346
36	1.417	86	3.386
37	1.457	87	3.425
38	1.496	88	3.465
39	1.535	89	3.504
40	1.575	90	3.543
41	1.614	91	3.583
42	1.654	92	3.622
43	1.693	93	3.661
44	1.732	94	3.701
45	1.772	95	3.740
46	1.811	96	3.780
47	1.850	97	3.819
48	1.890	98	3.858
49	1.929	99	3.898
50	1.969	100	3.937

QUICK REFERENCE CHART : PULSAR NX [ ] 1986

ENGINE TUNE-UP DATA

	U.S.A.				Canada	
	California		Non-California			
	E16S					
	M/T	A/T	M/T	A/T	M/T	A/T
Firing order	1-3-4-2					
Ignition timing/ Idle speed degree/rpm	5°±2°/ 800±50*1 A.T.D.C. See page EF & EC-29.	5°±2°/ 650±50*1 (in "D" position) A.T.D.C. See page EF & EC-29.	10°±2°/ 800±100*2 B.T.D.C. See page EF & EC-93.	10°±2°/ 650±100*2 (in "D" position) B.T.D.C. See page EF & EC-93.	5°±2°/ 800±50*1 A.T.D.C. See page MA-19.	5°±2°/ 650±50*1 (in "D" position) A.T.D.C. See page MA-19.
"CO"% at idle speed	Idle mixture screw is preset and sealed at factory. See page EF & EC-29.		See page EF & EC-93.		2±1 See page MA-19.	
Valve clearance (HOT) mm (in)	See page MA-15.					
Intake	0.28 (0.011)					
Exhaust	0.28 (0.011)					
Engine compression pressure kPa (kg/cm², psi)/rpm						
Standard	1,245 (12.7, 181)/350					
Minimum	981 (10.0, 142)/350					
Differential limit between cylinders	98 (1.0, 14)/350					

Spark plug	California	Non-California		Canada
Type				
Standard	BPR5ES-11	BPR5ES-11	–	BPR5ES
Hot	BPR4ES-11	BPR4ES-11	BPR4ES	BPR4ES
Cold	BPR6ES-11	BPR6ES-11	–	BPR6ES
Gap mm (in)	1.0 - 1.1 (0.039 - 0.043)		0.8 - 0.9 (0.031 - 0.035)	

Drive belt deflection (Cold)	Used belt		Set deflection of new belt
	Limit	Adjust deflection	
Alternator mm (in)	19 (0.748)	13 - 17 (0.51 - 0.67)	10 - 14 (0.39 - 0.55)
Air conditioner compressor mm (in)	12.5 (0.492)	9 - 11 (0.35 - 0.43)	7 - 9 (0.28 - 0.35)
Power steering pump mm (in)	10.5 (0.413)	7 - 9 (0.28 - 0.35)	6.5 - 8.5 (0.256 - 0.335)
Applied pressed force N (kg, lb)	98 (10, 22)		

Tightening torque	N·m	kg-m	ft-lb
Valve rocker adjusting nut	16 - 21	1.6 - 2.1	12 - 15
Oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Spark plug	20 - 29	2.0 - 3.0	14 - 22

*1 Measure with distributor vacuum hose disconnected and vacuum hose plugged up.
*2 Adjust idle rpm to the specified level shown below with harness connector for V.C.M. (vacuum control modulator) valve disconnected, then check with harness connector for V.C.M. valve connected that idle rpm is within the above range.
(Idle rpm (V.C.M. valve is OFF) for manual transaxle is 725±50 and for automatic transaxle 575±50 (in "D" position).)

CLUTCH PEDAL

Unit: mm (in)

Pedal free height	197 - 207 (7.76 - 8.15)
Withdrawal lever play	2.5 - 3.5 (0.098 - 0.138)

WHEEL ALIGNMENT (Unladen*1)

		Front	Rear
Camber	degree	–25′ to 1°05′	–1°45′ to –15′
Caster	degree	45′ - 2°15′	–
Toe-in	mm (in)	3 - 5 (0.12 - 0.20)	–6.5 to 6.5 (–0.256 to 0.256)
	degree (Total)	19′ - 32′	–42′ to 42′
Front wheel turning angle Toe-out turns (Inside/Outside)	degree	22°30′/20°	–
Full turn Inside	degree	37°30′ - 40°30′*2 40°30′ - 43°30′*3	–
Outside	degree	29°30′ - 32°30′*2 31°30′ - 34°30′*3	–

*1 Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designated positions.
*2 A/T model with manual steering *3 Other models

REAR WHEEL BEARING

Tightening torque	N·m (kg-m, ft-lb)	39 - 44 (4.0 - 4.5, 29 - 33)
Return angle	degree	90°
Axial end play	mm (in)	0 (0)

BRAKE

Unit: mm (in)

Disc brake Pad minimum thickness		2.0 (0.079)
Rotor repair limit Minimum thickness		11.0 (0.433)
Drum brake Lining minimum thickness		1.5 (0.059)
Drum repair limit Maximum inner diameter		204.5 (8.05)
Pedal free height	M/T	194 - 204 (7.64 - 8.03)
	A/T	197 - 207 (7.76 - 8.15)
Depressed height*1		85 (3.35) or more
Parking brake Number of notches*2		6 - 7

*1 Under force of 490 N (50 kg, 110 lb) with engine running *2 At pulling force 196 N (20 kg, 44 lb)

REFILL CAPACITIES

		Liter	US measure
Fuel tank		50	13-1/4 gal
Coolant With heater			
E16S	M/T	4.7	5 qt
E16S	A/T	5.3	5-5/8 qt
Without heater			
E16S	M/T	4.1	4-3/8 qt
E16S	A/T	4.7	5 qt
Reservoir tank		0.7	3/4 qt
Engine oil With oil filter		3.2	3-3/8 qt
Without oil filter		2.8	3 qt
Manual transaxle		2.7	5-3/4 pt
Automatic tranxaxle		6.0	6-3/8 qt
Power steering system		0.9	1 qt
Windshield/Rear window washer reservoir tank		3.0	3-1/8 qt
Air conditioner system Compressor oil		0.15	5.1 fl oz
Refrigerant		0.8 - 1.0 kg	1.8 - 2.2 lb

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