

# INTRODUCTION

## HOW TO USE THIS MANUAL

To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

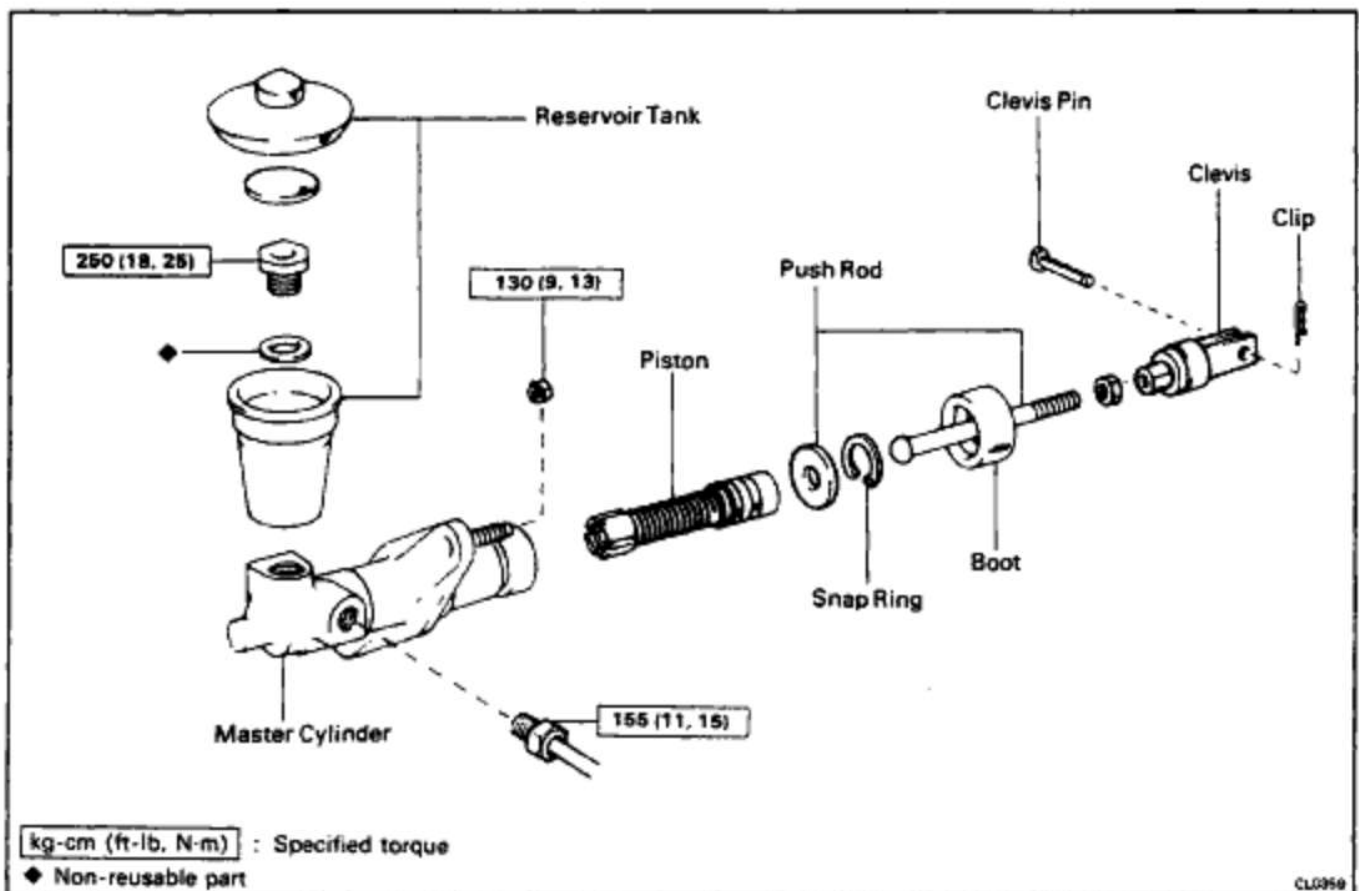
An **INDEX** is provided on the first page of each section to guide you to the item to be repaired.

At the beginning of each section, **PRECAUTIONS** are given that pertain to all repair operations contained in that section. *Read these precautions before starting any repair task.*

**TROUBLESHOOTING** tables are included for each system to help you diagnose the problem and find the cause. The repair for each possible cause is referenced in the remedy column to quickly lead you to the solution.

## REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together. Example:

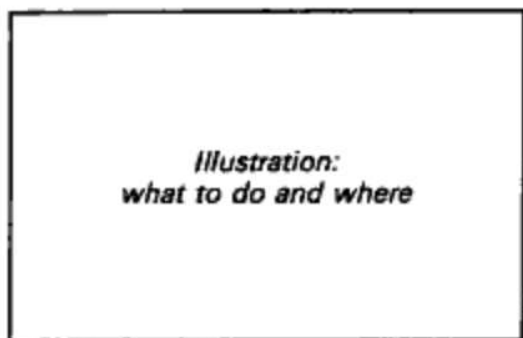


The procedures are presented in a step-by-step format:

- The illustration shows what to do and where to do it.
- The task heading tells what to do.
- The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:

Task heading: what to do



## 21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

- (a) Place SST and a dial indicator onto the overdrive brake piston as shown in the figure.

SST 09350-30020 (09350-06120)

Set part No.

Component part No.

Detailed text: how to do task

- (b) Measure the stroke applying and releasing the compressed air (4 – 8 kg /cm<sup>2</sup>, 57 –114 psi or 392 – 785 kPa) as shown in the figure.

**Piston stroke: 1.40 –1.70 mm (0.0551 – 0.0669 in.)**

Specification

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

## REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

## SPECIFICATIONS

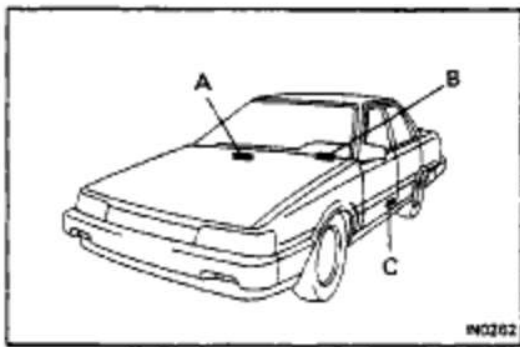
Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found in Appendix A, for quick reference.

## CAUTIONS, NOTICES, HINTS:

- **CAUTIONS** are presented in bold type, and indicate there is a possibility of injury to you or other people.
- **NOTICES** are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- **HINTS** are separated from the text but do not appear in bold. They provide additional information to help you efficiently perform the repair.

## IN-4

## INTRODUCTION — Identification Information



## IDENTIFICATION INFORMATION

### VEHICLE IDENTIFICATION NUMBER

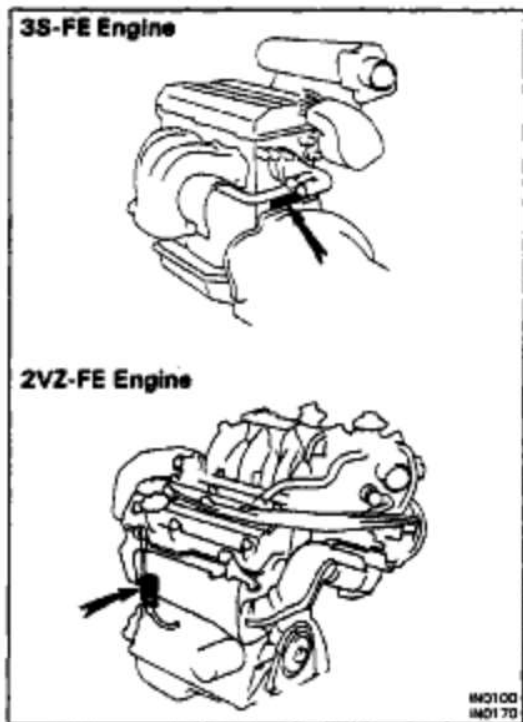
The vehicle identification number is stamped on the cowl panel.

This number has also been stamped on the vehicle identification number plate and certification regulation label.

A. Vehicle Identification Number

B. Vehicle Identification Number Plate

C. Certification Regulation Label



### ENGINE SERIAL NUMBER

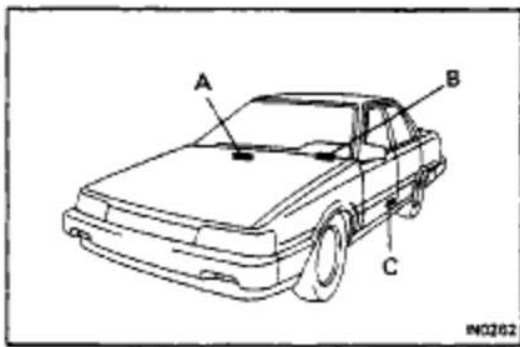
The engine serial number is stamped on the engine block as shown.

## GENERAL REPAIR INSTRUCTIONS

1. Use fender seat and floor covers to keep the vehicle clean and prevent damage.
2. During disassembly, keep parts in the appropriate order to facilitate reassembly.
3. Observe the following:
  - (a) Before performing electrical work, disconnect the negative cable from the battery terminal.
  - (b) If it is necessary to disconnect the battery for inspection or repair, always disconnect the cable from the negative H terminal which is grounded to the vehicle body.
  - (c) To prevent damage to the battery terminal post, loosen the terminal nut and raise the cable straight up without twisting or prying it.
  - (d) Clean the battery terminal posts and cable terminals with a shop rag. Do not scrape them with a file or other abrasive objects.
  - (e) Install the cable terminal to the battery post with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the terminal onto the post.
  - (f) Be sure the cover for the positive (+) terminal is properly in place.
4. Check hose and wiring connectors to make sure that they are secure and correct.
5. Non-reusable parts
  - (a) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.
  - (b) Non-reusable parts are indicated in the component illustrations by the "♦" symbol.

## IN-4

## INTRODUCTION — General Repair Instructions



## IDENTIFICATION INFORMATION

### VEHICLE IDENTIFICATION NUMBER

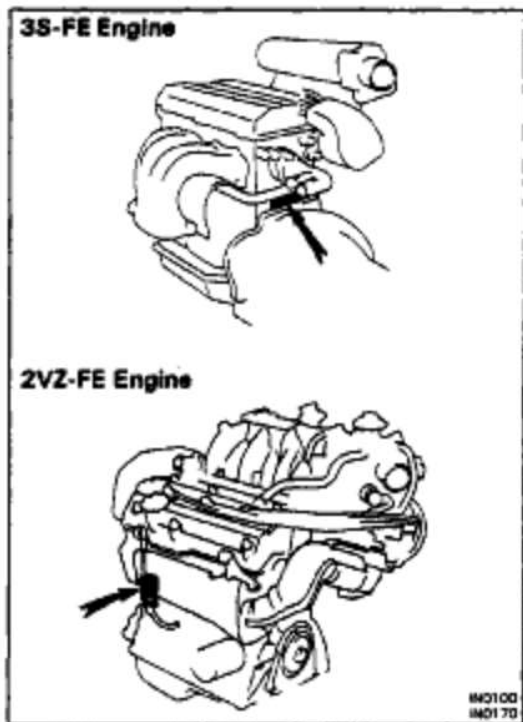
The vehicle identification number is stamped on the cowl panel.

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A. Vehicle Identification Number

B. Vehicle Identification Number Plate

C. Certification Regulation Label

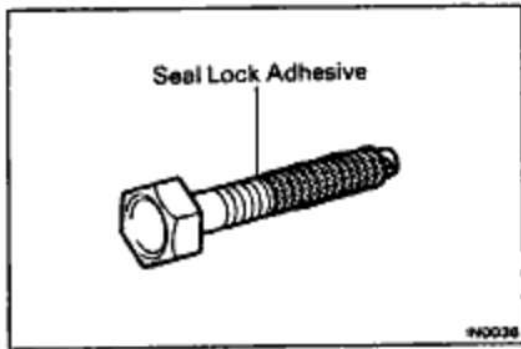


### ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block as shown.

## GENERAL REPAIR INSTRUCTIONS

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4. Check hose and wiring connectors to make sure that they are secure and correct.
5. Non-reusable parts
  - (a) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.
  - (b) Non-reusable parts are indicated in the component illustrations by the "♦" symbol.



#### 6. Precoated parts

Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

- (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
- (b) Recoating of precoated parts
  - (1) Clean off the old adhesive from the bolt, nut or threads.
  - (2) Dry with compressed air.
  - (3) Apply the specified seal lock adhesive to the bolt or nut threads.
- (e) Precoated parts are indicated in the component illustrations by the "♦" symbol.

7. When necessary, use a sealer on gaskets to prevent leaks.

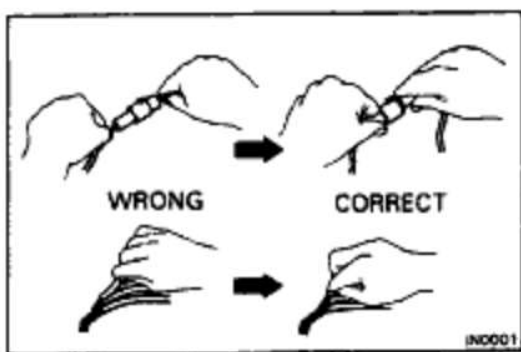
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the back of this manual.

10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations. (See page [IN-27](#))

- (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
- (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.



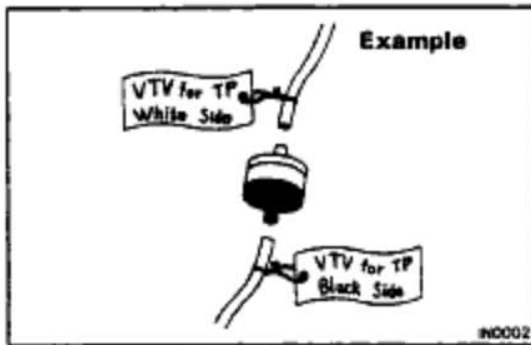
12. Observe the following precautions to avoid damage to the parts:

- (a) **Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)**
- (b) **When replacing the internal mechanism (computer part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).**
- (c) To disconnect vacuum hoses, pull on the end, not the middle of the hose.  
M To pull apart electrical connectors, pull on the connector itself, not the wires.
- (e) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.

## IN-6

## INTRODUCTION – General Repair Instructions

- (f) When steam cleaning an engine, protect the distributor, air filter and VCV from water.
- (g) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (h) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (i) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.



13. Tag hoses before disconnecting them:
  - (a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
  - (b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

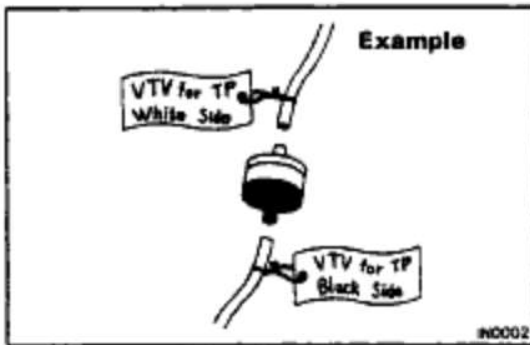
## PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

**CAUTION:** If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

1. **Use only unleaded gasoline.**
2. **Avoid prolonged idling.**  
Avoid running the engine at idle speed for more than 20 minutes.
3. **Avoid spark jump test.**
  - (a) Spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
  - (b) While testing, never race the engine.
4. **Avoid prolonged engine compression measurement.**  
Engine compression tests must be made as rapidly as possible.
5. **Do not run engine when fuel tank is nearly empty.**  
This may cause the engine to misfire and create an extra load on the converter.
6. **Avoid coasting with ignition turned off and prolonged braking.**
7. **Do not dispose of used catalyst along with parts contaminated with gasoline or oil.**

## IN-6

## INTRODUCTION – Precautions for Vehicles Equipped with a Catalytic Converter



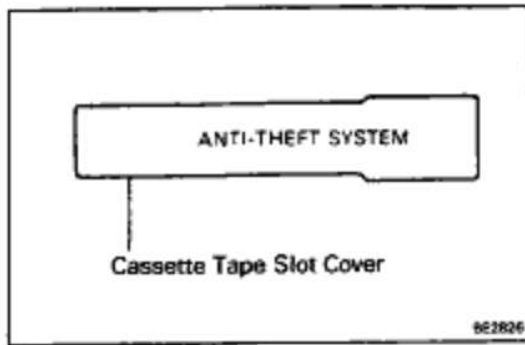
- (f) When steam cleaning an engine, protect the distributor, air filter and VCV from water.
  - (g) Never use an impact wrench to remove or install temperature switches or temperature sensors.
  - (h) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
  - (i) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.
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- (a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
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## PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

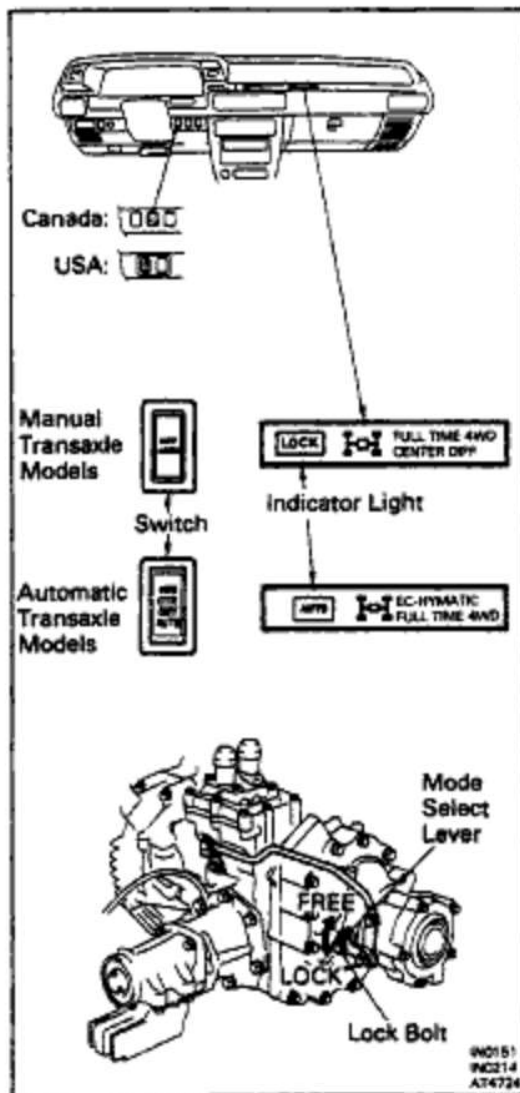
**CAUTION:** If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

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4. **Avoid prolonged engine compression measurement.**  
Engine compression tests must be made as rapidly as possible.
5. **Do not run engine when fuel tank is nearly empty.**  
This may cause the engine to misfire and create an extra load on the converter.
6. **Avoid coasting with ignition turned off and prolonged braking.**
7. **Do not dispose of used catalyst along with parts contaminated with gasoline or oil.**

## PRECAUTIONS FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT-IN ANTI-THEFT SYSTEM



Audio Systems displaying the sign "ANTI-THEFT SYSTEM" shown on the left has a built-in anti-theft system which makes the audio system soundless if stolen. If the power source for the audio system is cut even once, the anti-theft system operates so that even if the power source is reconnected, the audio system will not produce any sound unless the ID number selected by the customer is input again. Accordingly, when performing repairs on vehicles equipped with this system, before disconnecting the battery terminals or removing the audio system the customer should be asked for the ID number so that the technician can input the ID number afterwards, or else a request made to the customer to input the ID number. For the method to input the ID number or cancel the anti-theft system, refer to the Owner's Manual.



## PRECAUTIONS WHEN SERVICING FULL-TIME 4WD VEHICLES

The 1990 model year full-time 4WD Camry is equipped with two types of transaxle – either the manual transaxle or the automatic transaxle. The center differential system of the manual transaxle is the mechanical lock type. The center differential system of the automatic transaxle is a hydraulic multiplate clutch control type. When carrying out any kind of servicing or testing on a full-time 4WD in which the front or rear wheels are made to rotate (braking test, speedometer test, on-vehicle wheel balancing, etc.), or when towing the vehicle, be sure to observe the precautions given below. If incorrect preparations or test procedures are used, the test cannot be successfully carried out, and may be dangerous as well. Therefore, before beginning any such servicing or test, be sure to check the following items:

- (1) Center differential lock type
- (2) Center differential mode position
- (3) Whether wheels should be touching ground or jacked up
- (4) Transmission gear position
- (5) Maximum testing vehicle speed
- (6) Maximum testing time

Also be sure to observe the following cautions:

- (1) Never accelerate or decelerate the vehicle suddenly.
- (2) Observe the other cautions given for each individual test.

### 1. MANUAL TRANSAXLE MODELS: (Mechanical Lock Type Center Differential)

#### BEFORE BEGINNING TEST

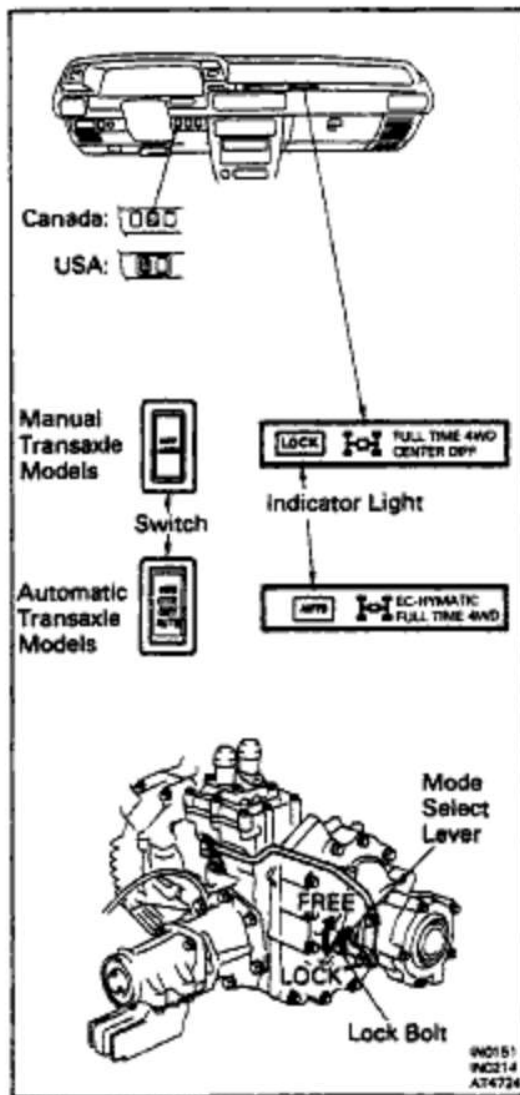
During tests with a brake tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the front or rear wheels are to be rotated, it is necessary to set the position of the center differential to the FREE position or to the LOCK position depending on the type of test being performed.

- (1) Select the position of the center differential by pushing the center differential control switch.
- (2) After selecting the position, confirm the operations of indicator light and center differential as follows:

**HINT:** Move the vehicle backward or forward slightly if the indicator light does not operate correctly when the center differential control switch is turned ON or OFF.

#### CAUTIONS WHEN CENTER DIFFERENTIAL CONTROL SWITCH IS TURNED ON

- Operate the switch only when the all four wheels are stopped or when driving with the wheels in a straight line.
- Never operate the switch under the following conditions.
  - (1) When any tire is slipping.
  - (2) When any tire is spinning freely.
  - (3) When swerving or cornering.



## PRECAUTIONS WHEN SERVICING FULL-TIME 4WD VEHICLES

The 1990 model year full-time 4WD Camry is equipped with two types of transaxle – either the manual transaxle or the automatic transaxle. The center differential system of the manual transaxle is the mechanical lock type. The center differential system of the automatic transaxle is a hydraulic multiplate clutch control type. When carrying out any kind of servicing or testing on a full-time 4WD in which the front or rear wheels are made to rotate (braking test, speedometer test, on-vehicle wheel balancing, etc.), or when towing the vehicle, be sure to observe the precautions given below. If incorrect preparations or test procedures are used, the test cannot be successfully carried out, and may be dangerous as well. Therefore, before beginning any such servicing or test, be sure to check the following items:

- (1) Center differential lock type
- (2) Center differential mode position
- (3) Whether wheels should be touching ground or jacked up
- (4) Transmission gear position
- (5) Maximum testing vehicle speed
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### 1. MANUAL TRANSAXLE MODELS: (Mechanical Lock Type Center Differential)

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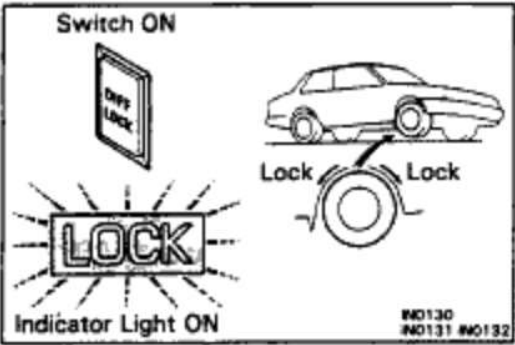
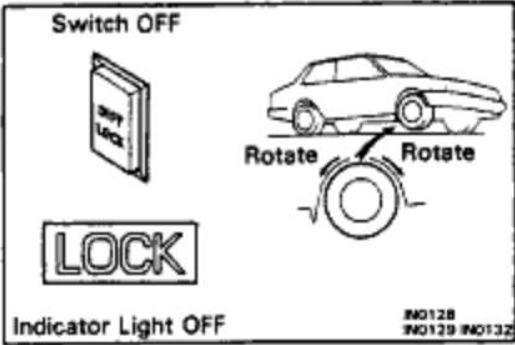
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  - (2) When any tire is spinning freely.
  - (3) When swerving or cornering.



FREE Position

| Center Differential |                 | Wheel                                                                                                     |
|---------------------|-----------------|-----------------------------------------------------------------------------------------------------------|
| Control Switch      | Indicator Light |                                                                                                           |
| OFF                 | OFF             | A lifted wheel can be rotated even if only one wheel is lifted up, as long as transmission is in neutral. |

LOCK Position

| Center Differential |                 | Wheel                                                                                                |
|---------------------|-----------------|------------------------------------------------------------------------------------------------------|
| Control Switch      | Indicator Light |                                                                                                      |
| ON                  | ON              | A lifted wheel cannot be rotated if only one wheel is lifted up, even if transmission is in neutral. |

CAUTIONS WHEN CENTER DIFFERENTIAL IS IN "FREE" OR "LOCK" POSITION

FREE POSITION

- (1) Do not engage the clutch or pump the accelerator or brakes suddenly. Always start slowly and decelerate gradually.
- (2) If either the front or the rear wheels are placed on the tester rollers in the FREE position, be careful not to exceed the following limits:

Maximum speed:

Speed indicated on speedometer

19 mph (30 km/h)

or

Wheel speed (Tester speed) 38 mph (60 km/h)

Maximum test time: 60 sec.

Note that the actual wheel speed (tester speed) is twice the speed indicated by the speedometer due to center differential operation.

LOCK POSITION

- (1) Do not engage the clutch or pump the accelerator or brakes suddenly. Always start slowly and decelerate gradually.
- (2) Be sure to conduct the test with the rear propeller shaft removed.

## IN-10

## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles

**BRAKING FORCE TEST**

**HINT:** According to the vehicle speed during the test, select one of the two test methods described below, either A or B.

**Method A :** Conduct the test with the center differential in the "FREE" position.  
(Low Speed Test)

**Method B :** Conduct the test with the center differential in the "LOCK" position and with the rear propeller shaft removed.  
(High Speed Test)

**TEST METHOD A (Low Speed Test)**

**Speed indicates on speedometer:**

**Below 19 mph (30 km/h),**

**Wheel speed (tester speed):**

**Below 38 mph (60 km/h) and**

**Test time: Within 60 sec.**

**1. PUT CENTER DIFFERENTIAL IN "FREE" POSITION**

(1) Set the center differential control switch to OFF and check that the differential lock indicator light goes off.

(2) Put the transmission in neutral.

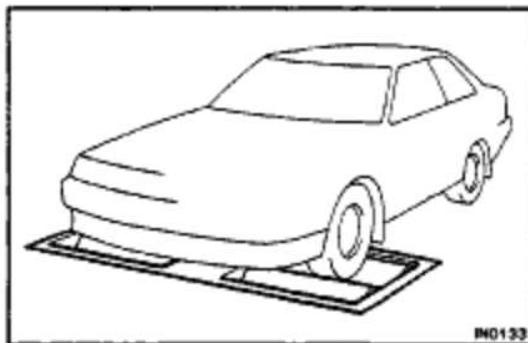
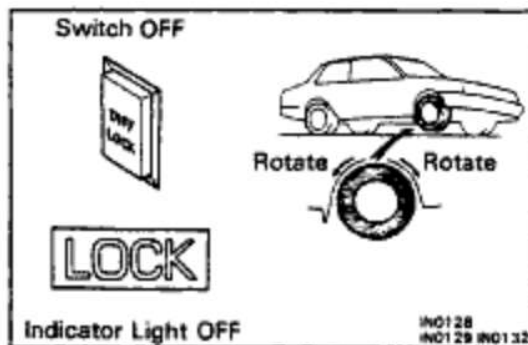
(3) Jack up one wheel and check that the wheel can be rotated by hand.

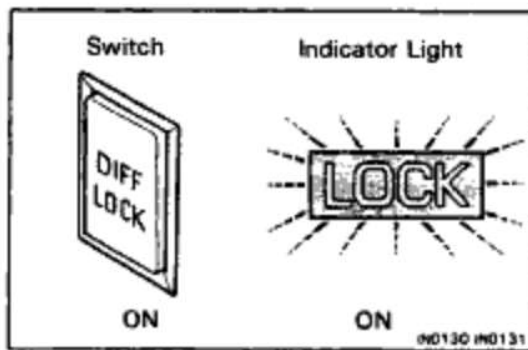
**2. PLACE WHEELS (EITHER FRONT OR REAR) TO BE TESTED ON TESTER ROLLERS****3. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (If equipped with it)****4. PUT TRANSMISSION IN NEUTRAL****5. OPERATE TESTER ROLLERS AND MEASURE BRAKING FORCE**

**HINT:**

1. Since different types of tester are used, such as specialized brake testers and combination testers with built-in chassis dynamometer, speedometer tester, brake tester, etc., conduct the test in accordance with the instructions furnished for the tester model in use.

2. The actual wheel speed (tester speed) is twice the speed indicated by the speedometer due to center differential operation, so take adequate precautions.





## TEST METHOD B (High Speed Test)

[Vehicle speed: Over 38 mph (60 km/h)]

### 1. PUT CENTER DIFFERENTIAL IN "LOCK" POSITION

- (1) Set the center differential control switch to ON and check that the differential lock indicator light goes on.  
HINT: If the indicator light does not go on when the center differential control switch is turned on, move the vehicle backward or forward slightly.

- (2) Put the transmission in neutral.

- (3) Jack up one wheel and check that the wheel cannot be rotated by hand.

### 2. REMOVE REAR PROPELLER SHAFT

Make matching marks on each end of the rear propeller shaft, then remove it.

### 3. PLACE WHEELS (EITHER FRONT OR REAR) TO BE TESTED ON TESTER ROLLERS

### 4. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (If equipped with it)

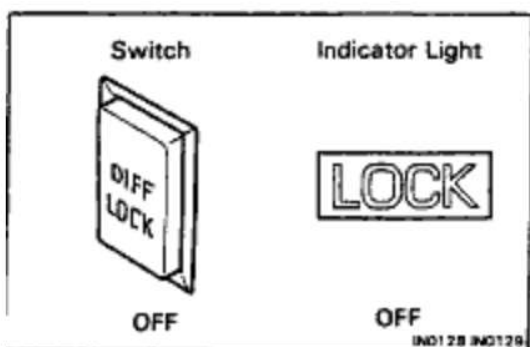
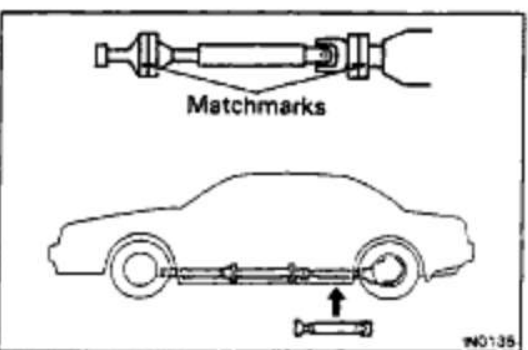
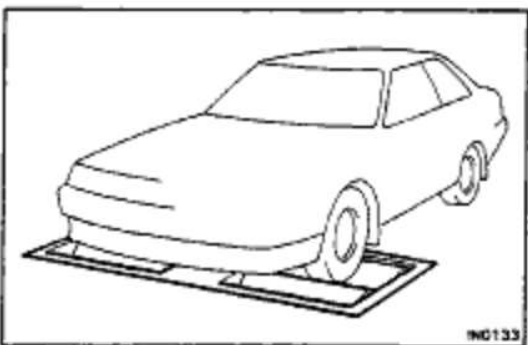
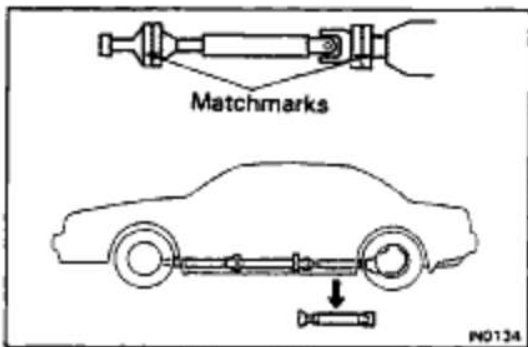
### 5. PUT TRANSMISSION IN NEUTRAL

### 6. OPERATE TESTER ROLLERS AND MEASURE BRAKING FORCE

HINT: Since different types of tester are used, such as specialized brake testers and combination testers with built-in chassis dynamometer, speedometer tester, brake tester, etc., conduct the test in accordance with the instructions furnished for the tester model in use.

### 7. INSTALL REAR PROPELLER SHAFT

Align the matching marks made on the rear propeller shaft before removal, then install it.

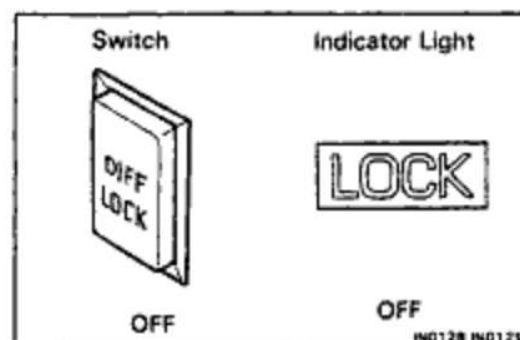
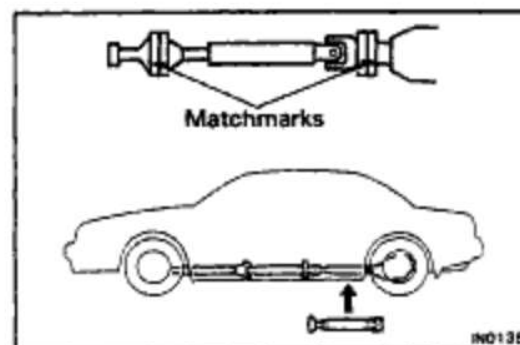
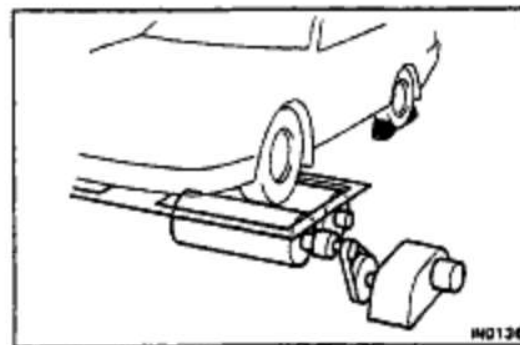
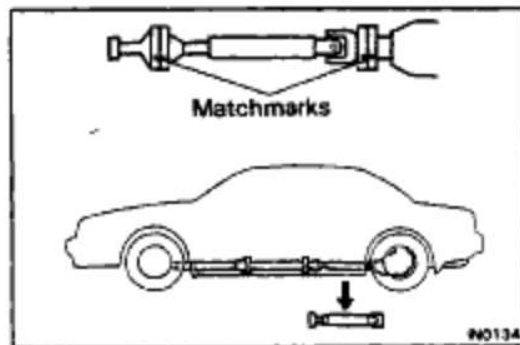
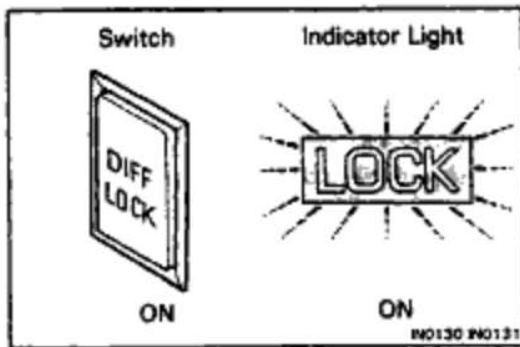


### 8. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

NOTE: If the indicator light does not go off when the center differential control switch is turned off, move the vehicle backward or forward slightly and check that the indicator light goes off.

## IN-12

## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles



## SPEEDOMETER TEST OR OTHER TESTS (Using Speedometer Tester or Chassis Dynamometer)

### 1. PUT CENTER DIFFERENTIAL IN "LOCK" POSITION

- (1) Set the differential control switch to ON and check that the differential lock indicator light goes on.

HINT: If the indicator light does not go on when the center differential control switch is turned on, move the vehicle backward or forward slightly.

- (2) Put the transmission in neutral.

- (3) Jack up one wheel and check that the wheel cannot be rotated by hand.

### 2. REMOVE REAR PROPELLER SHAFT

Make matching marks on each end of the rear propeller shaft, then remove it.

### 3. PLACE FRONT WHEELS ON TESTER ROLLERS

### 4. CHOCK REAR WHEELS

### 5. APPLY PARKING BRAKE

### 6. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (If equipped with it)

### 7. TEST VEHICLE

- (1) Start the engine.
- (2) Engage the clutch slowly and gradually increase the speed as the test is conducted.
- (3) After the test is finished, reduce the speed gradually and stop the engine.

### 8. INSTALL REAR PROPELLER SHAFT

Align the matching marks made on the rear propeller shaft before removal, then install it.

### 9. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

HINT: If the indicator light does not go off when the center differential control switch is turned off, move the vehicle backward or forward slightly and check that the indicator light goes off.

## ON-VEHICLE WHEEL BALANCING

### NOTICE:

1. When doing on-the-car wheel balancing on a fulltime 4WD vehicle, to prevent the wheels from rotating at different speeds or in different directions from each other (which could lead to damage to the center differential or transaxle gears), always be sure to observe the following precautions:
  - (1) All four wheels should be jacked up, clearing the ground completely.
  - (2) The wheels should be driven with both the engine and the wheel balancer.
  - (3) The mechanical lock-type center differential should be in the LOCK position.
  - (4) The parking brake lever should be fully released.
  - (5) None of the brakes should be allowed to drag.
2. Avoid sudden acceleration, deceleration and braking.
3. Carry out the wheel balancing with the transmission in 3rd or 4th gear.

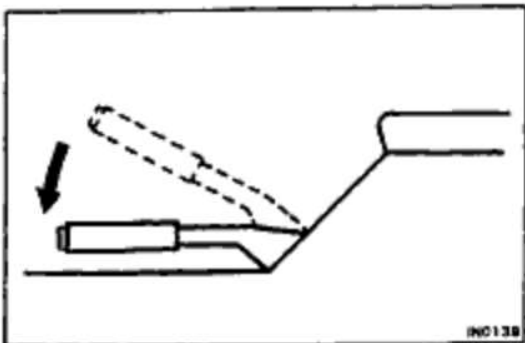
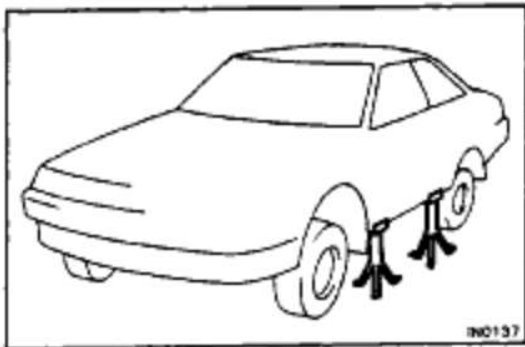
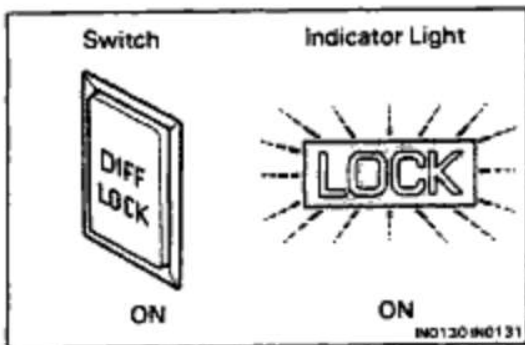
### 1. PUT CENTER DIFFERENTIAL IN "LOCK" POSITION

- (1) Set the center differential control switch to ON and check that the differential lock indicator light goes on.  
HINT: If the indicator light does not go on when the center differential control switch is turned on, move the vehicle backward or forward slightly.
- (2) Put the transmission in neutral.
- (3) Jack up one wheel and check that the wheel cannot be rotated by hand.

### 2. JACK UP VEHICLE SO THAT ALL FOUR WHEELS CAN ROTATE

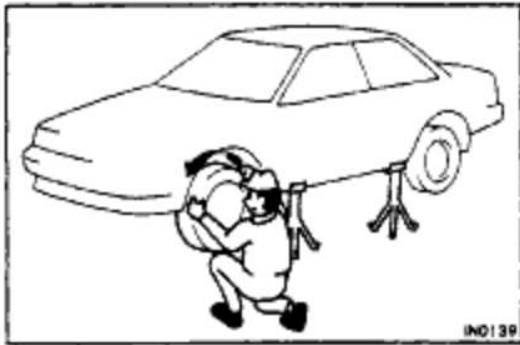
The wheels will be rotating fast, so make sure the vehicle is firmly supported on stands.

### 3. RELEASE PARKING BRAKE FULLY

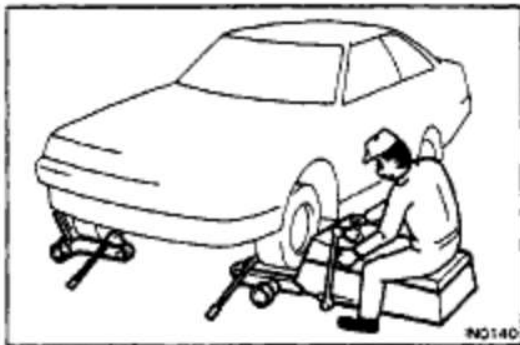


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## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles

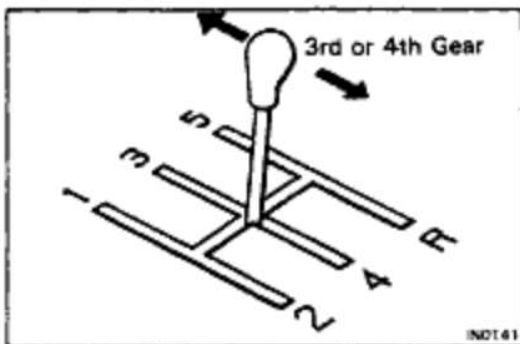


#### 4. MAKE SURE THAT BRAKES ARE NOT DRAGGING ON ANY OF FOUR WHEELS



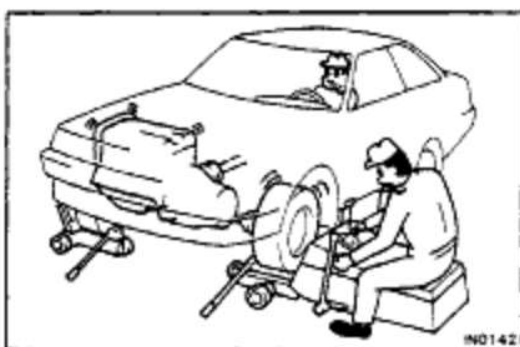
#### 5. PLACE WHEEL TO BE BALANCED ON WHEEL BALANCER

Follow the procedure specified by the wheel balancer manufacturer.



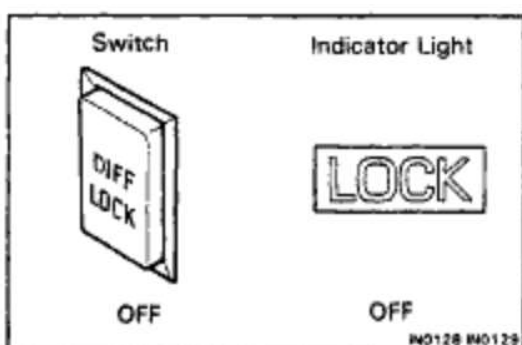
#### 6. START ENGINE

#### 7. PUT TRANSMISSION IN 3RD OR 4TH GEAR AND ENGAGE CLUTCH SLOWLY, THEN GRADUALLY INCREASE SPEED TO TEST SPEED



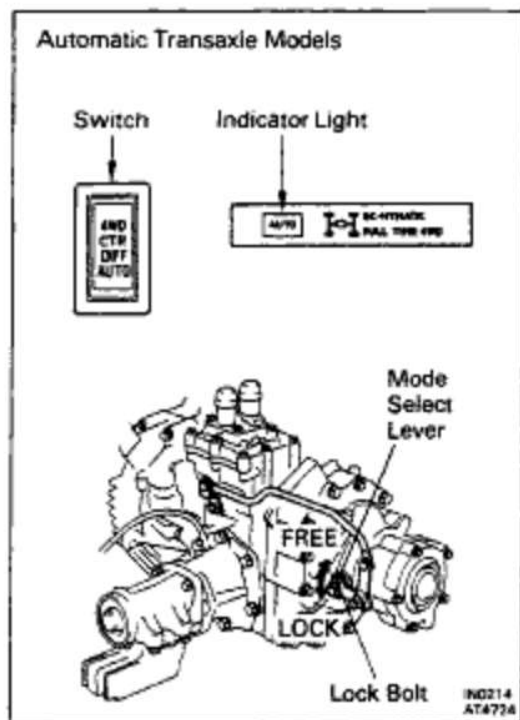
#### 8. ROTATE WHEELS USING BOTH ENGINE'S DRIVING FORCE AND DRIVING FORCE OF WHEEL BALANCER AND CHECK WHEEL BALANCE

HINT: When doing this be careful of the other wheels, which will rotate at the same time.



#### 9. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

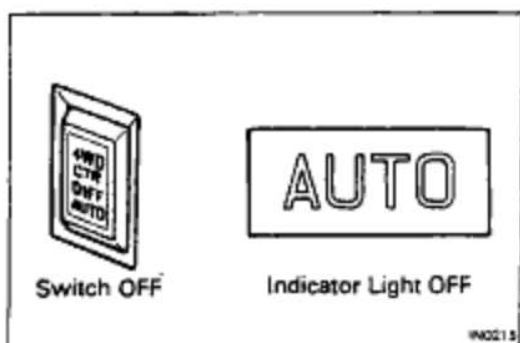
HINT: If the indicator light does not go off when the center differential control switch is turned off, move the vehicle backward or forward slightly and check that the indicator light goes off.



## 2. AUTOMATIC TRANSAXLE MODELS: (Hydraulic Multiplate Clutch Control Type Center Differential)

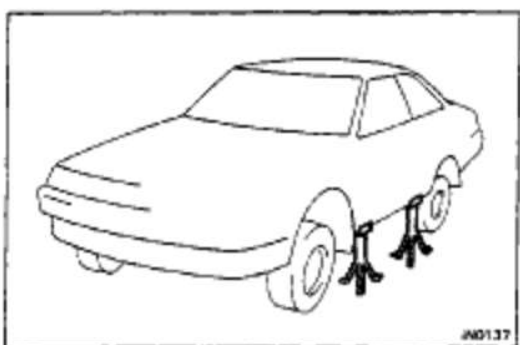
### BEFORE BEGINNING TEST

During tests with a brake tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the front or the rear wheels are to be rotated, it is necessary to first set the center differential control switch to OFF (Hydraulic multiplate clutch control is released), then set the Mode Select Lever on the automatic transaxle to the FREE (Normal) Mode or to the LOCK Mode depending on the type of test being performed.



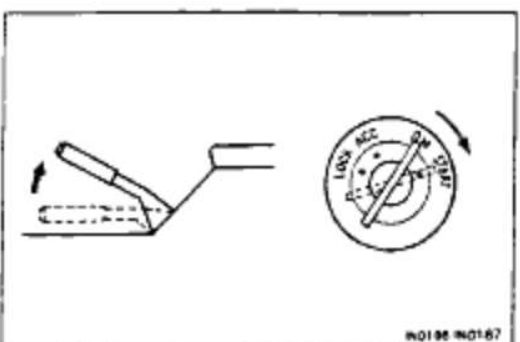
### 1. Release Hydraulic Multiplate Clutch Control of Center Differential

1. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF AND CHECK THAT INDICATOR LIGHT GOES OFF



### 2. CHECK THAT OPERATION OF HYDRAULIC MULTIPLATE CLUTCH CONTROL IS IN "OFF" CONDITION

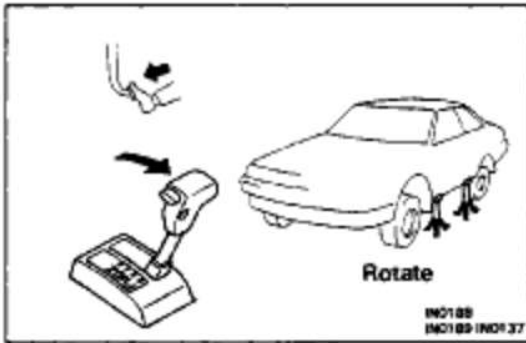
- (1) Jack up the vehicle so that all four wheels can rotate.



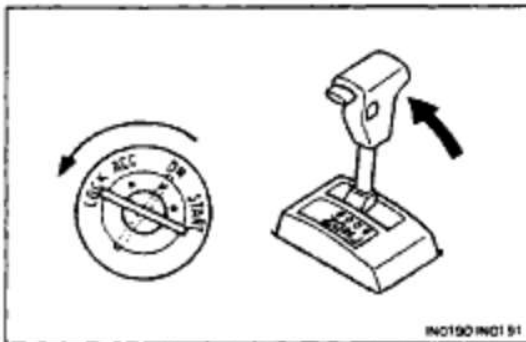
- (2) Apply the parking brake.
- (3) Start the engine and run it at idle speed.  
When the engine speed is high, warm-up the engine, then run it at idle speed.

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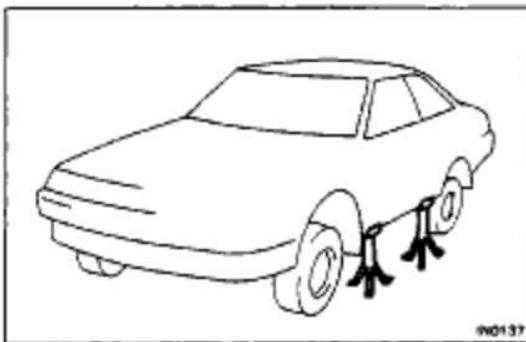
## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles



- (4) Depress the brake pedal, shift into L range and gradually release the brake pedal.
- (5) Check that the front wheels begin to rotate and that the rear wheels do not rotate.

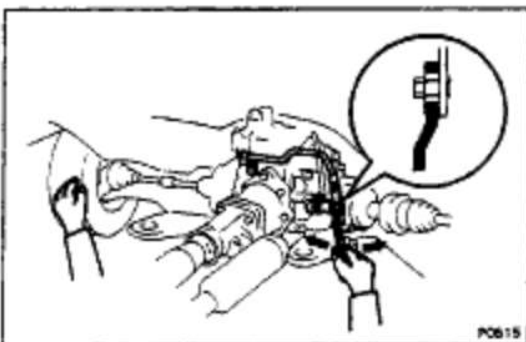


- (6) Stop the engine and put the transmission in N range.



## 2. Moving Mode Select Lever

### 1. JACK UP VEHICLE

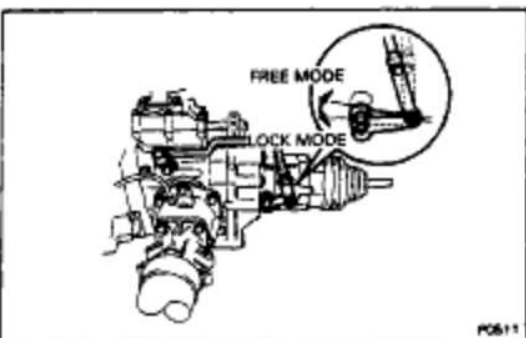


### 2. REMOVE MODE SELECT LEVER LOCK BOLT

### 3. MOVE MODE SELECT LEVER TO DESIRED MODE POSITION

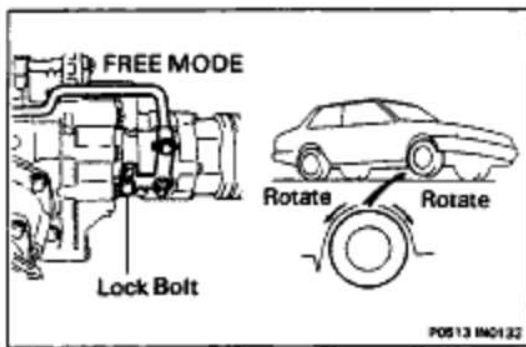
While rotating one front wheel by hand, shift the select lever towards the LOCK mode or FREE mode.

HINT: Do not use excessive force when moving the mode select lever.



### 4. AFTER MAKING SHIFT, LOCK MODE SELECT LEVER SECURELY WITH BOLT

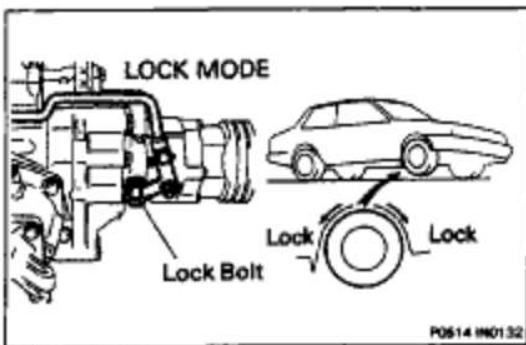
HINT: Be sure to tighten the lock bolt securely each time after moving the mode select lever.



### 5. CONFIRM MODE

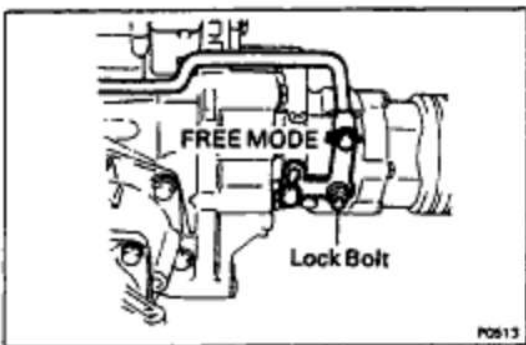
**FREE (Normal) Mode:**

A lifted wheel can be rotated even if only one wheel is lifted up, as long as transmission is in N range.



**LOCK Mode:**

A lifted wheel cannot be rotated if only one wheel is lifted up, even if transmission is in N range.



6. AFTER FINISHING TEST, RETURN MODE SELECT LEVER TO "FREE (NORMAL)" MODE POSITION AND LOCK SELECT LEVER SECURELY WITH BOLT

7. SET CENTER DIFFERENTIAL CONTROL SWITCH TO AUTO

**CAUTIONS WHEN MODE SELECT LEVER IS IN "FREE" OR "LOCK" MODE**

#### FREE MODE

- (1) Do not drive off suddenly or apply the accelerator or brakes suddenly. Always start slowly and decelerate gradually.
- (2) If either the front or the rear wheels are placed on the tester rollers in the FREE mode, be careful not to exceed the following limits:

Maximum speed:

Speed indicated on speedometer

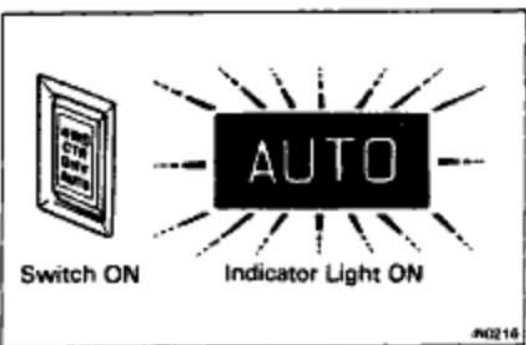
19 mph(30 km/h) or

Wheel speed (Tester speed)

38 mph160 km/h)

Maximum test time: 60 sec.

Note that the actual wheel speed (tester speedy is twice the speed indicated by the speedometer due to center differential operation.



#### LOCK MODE

- (1) Do not drive off suddenly or apply the accelerator or brakes suddenly. Always start slowly and decelerate gradually.
- (2) Be sure to conduct the test with the rear propeller shaft removed.

## BRAKING FORCE TEST

HINT: According to the vehicle speed during the test, select one of the two test methods described below, either A or B.

Method A : Conduct the test with the center differential control switch off and the select lever on the transaxle in the FREE (Normal) mode.

Method B : Conduct the test with the center differential control switch off, the select lever on the transaxle in the LOCK mode and the rear propeller shaft removed.

### TEST METHOD A (Low Speed Test)

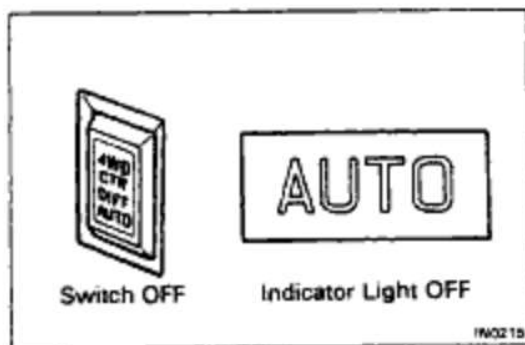
Speed indicated on speedometer:

Below 19 mph (30 km/h)

Wheel speed (tester speed):

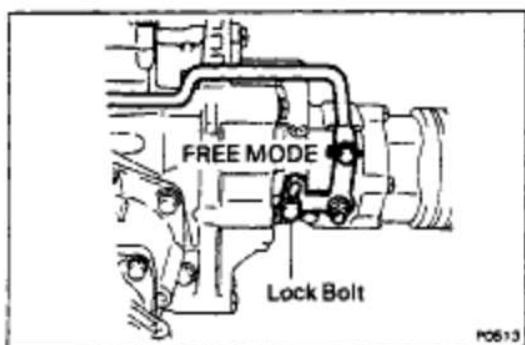
Below 38 mph (60 km/h)

Test time: Within 60 sec.



#### 1. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

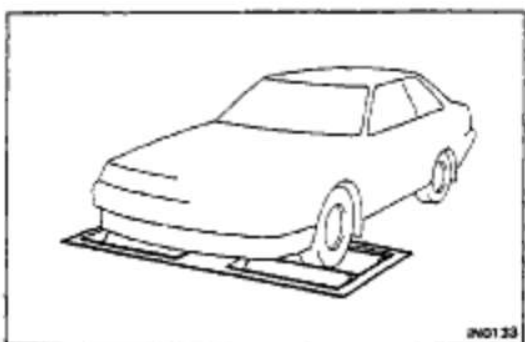
- (1) Check that the center differential control indicator light goes off.
- (2) Further check that operation of hydraulic multiplate clutch control of center differential is in OFF condition (See page [IN-15](#)).



#### 2. MOVE MODE SELECT LEVER ON TRANSAXLE TO "FREE (NORMAL)" MODE AND LOCK SELECT LEVER SECURELY WITH BOLT (See page [IN-1](#))

HINT: During normal driving conditions select lever is already in FREE mode so there is no need to change it.

#### 3. CONFIRM MODE SELECTION (See page [IN-17](#))



#### 4. PLACE WHEELS (EITHER FRONT OR REAR) TO BE TESTED ON TESTER ROLLERS

HINT: The actual wheel speed (tester speed) is twice the speed indicated by the speedometer due to center differential operation.

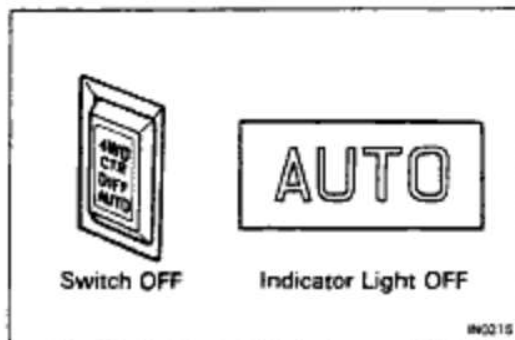
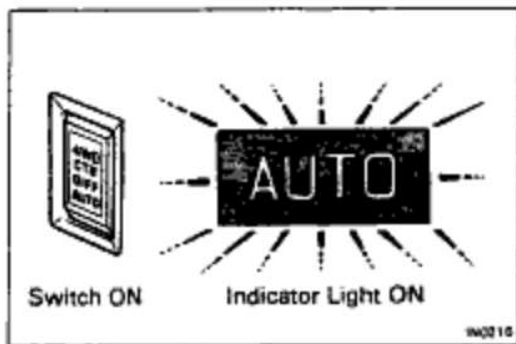
#### 5. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (If equipped with it)

#### 6. PUT TRANSMISSION IN "N" RANGE

## 7. OPERATE TESTER ROLLERS AND MEASURE BRAKING FORCE WITH ENGINE AT IDLE

HINT: Since different types of tester are used, such as specialized brake testers and combination testers with built in chassis dynamometer, speedometer tester, brake tester, etc., conduct the test in accordance with the instructions furnished for the tester model used.

## 8. AFTER FINISHING TEST, RETURN CENTER DIFFERENTIAL CONTROL SWITCH TO "AUTO" AND CHECK THAT INDICATOR LIGHT GOES ON



## TEST METHOD B (High Speed Test)

[Vehicle speed: Over 38 mph (60 km/h)]

### 1. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

- (1) Check that the center differential control indicator light goes off.
- (2) Further check that the operation of the hydraulic multi-plate clutch control of the center differential is in OFF condition.

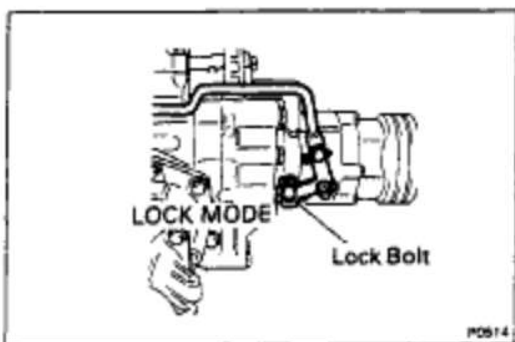
(See page [IN-15](#))

### 2. MOVE MODE SELECT LEVER ON TRANSAXLE TO "LOCK" MODE AND LOCK IT SECURELY WITH BOLT

(See page [IN-16](#))

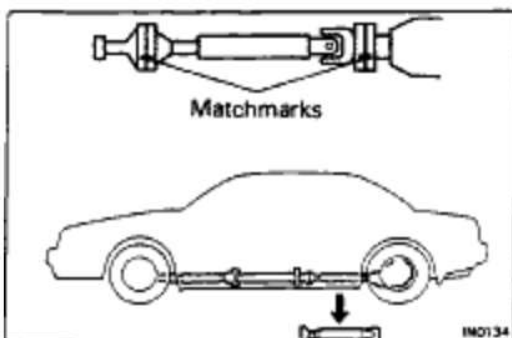
### 3. CONFIRM MODE SELECTION

(See page [IN-17](#))



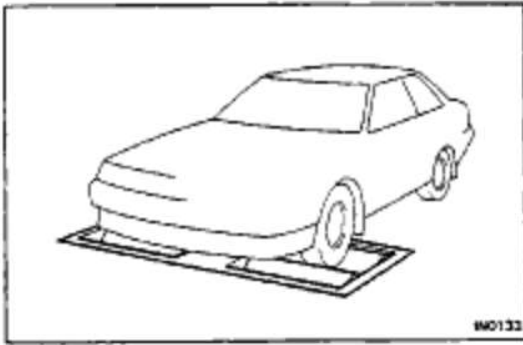
### 4. REMOVE REAR PROPELLER SHAFT

Make matching marks on each end of the propeller shaft, then remove it.



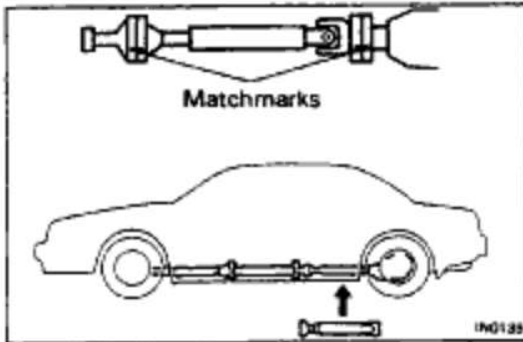
## IN-20

## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles



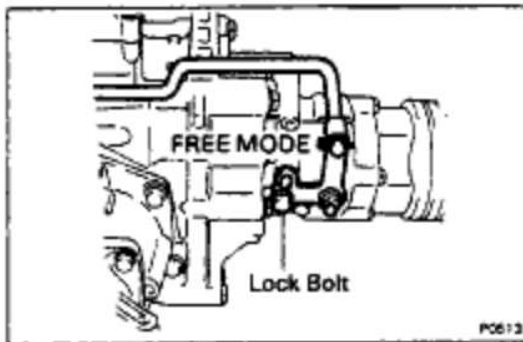
5. PLACE WHEELS (EITHER FRONT OR REAR) TO BE TESTED ON TESTER ROLLERS
6. CHOCK OTHER WHEELS
7. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (if equipped with it)
8. PUT TRANSMISSION IN N RANGE
9. OPERATE TESTER ROLLERS AND MEASURE BRAKING FORCE WITH ENGINE AT IDLE

HINT: Since different types of tester are used, such as specialized brake testers and combination testers with builtin chassis dynamometer, speedometer tester, brake tester, etc., conduct the test in accordance with the instructions furnished for the tester in use.

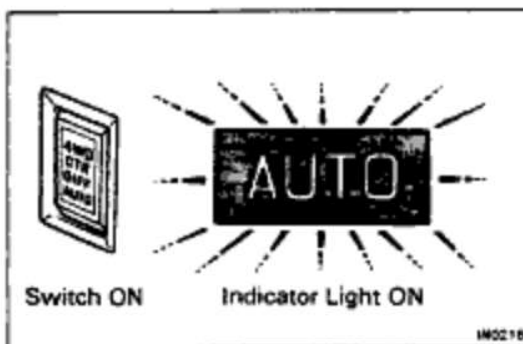


10. AFTER FINISHING TEST, INSTALL REAR PROPELLER SHAFT

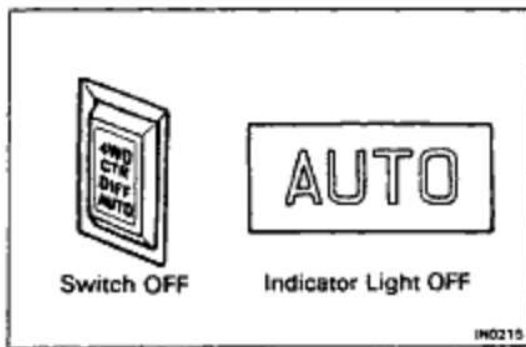
Align the matching marks made on the rear propeller shaft before removal, then install it.



11. RETURN MODE SELECT LEVER TO "FREE (NORMAL)" MODE POSITION AND LOCK IT SECURELY WITH BOLT



12. SET CENTER DIFFERENTIAL CONTROL SWITCH TO AUTO



## SPEEDOMETER TEST OR OTHER TESTS

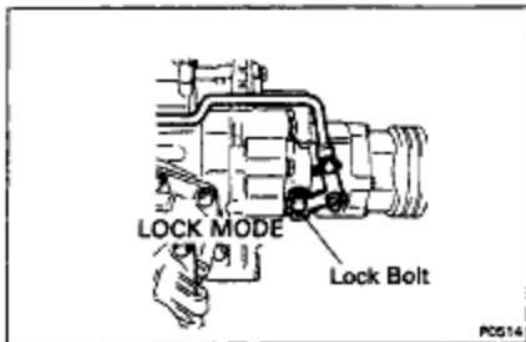
[Using Speedometer Tester or Chassis Dynamometer]

### 1. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

- (1) Check that the center differential control indicator light goes off.
  - (2) Further check that the operation of the hydraulic multiplate clutch control of the center differential is in OFF condition.
- (See page [IN-15](#))

### 2. MOVE MODE SELECT LEVER ON TRANSAXLE TO "LOCK" MODE AND LOCK IT SECURELY WITH BOLT (See page [IN-16](#))

### 3. CONFIRM MODE SELECTION (See page [IN-17](#))



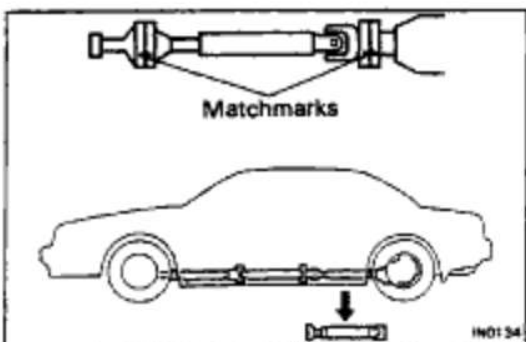
### 4. REMOVE REAR PROPELLER SHAFT

Make matching marks on each end of the rear propeller shaft, then remove it.

### 5. PLACE FRONT WHEELS ON TESTER ROLLERS

### 6. CHOCK REAR WHEELS

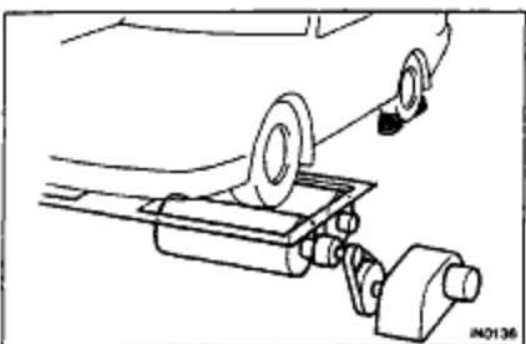
### 7. APPLY PARKING BRAKE



### 8. DISCONNECT INERTIA WEIGHT FROM TESTER ROLLER (If equipped with it)

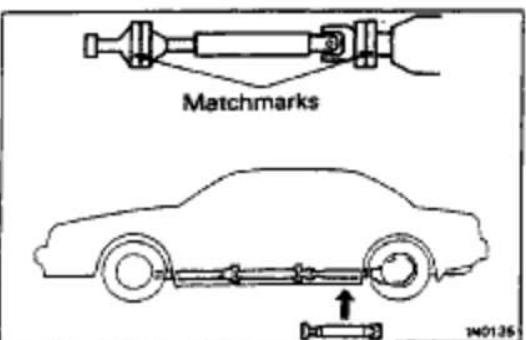
### 9. TEST VEHICLE

- (1) Start the engine.
- (2) Put the transmission in D range, then gradually increase the speed as the test is conducted.
- (3) After the test is finished, reduce the speed gradually and stop the engine.



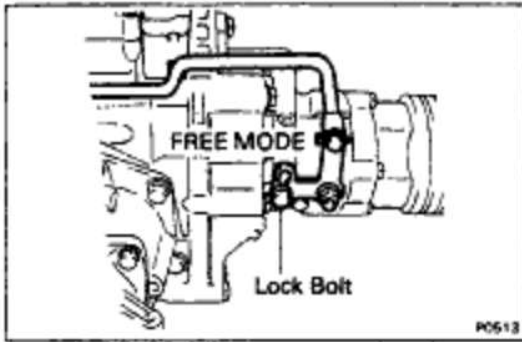
### 10. AFTER FINISHING TEST, INSTALL REAR PROPELLER SHAFT

Align the matching marks made on the rear propeller shaft before removal, then install it.

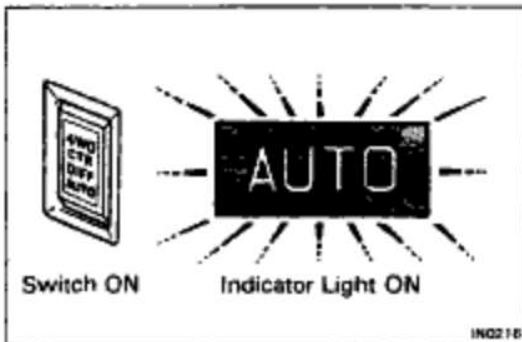


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## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles



- 11. RETURN MODE SELECT LEVER TO "FREE (NORMAL)" MODE POSITION AND LOCK IT SECURELY WITH BOLT**

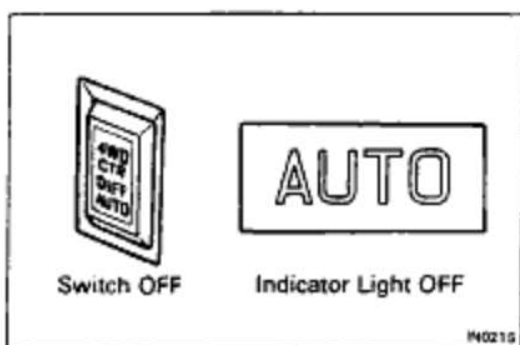


- 12. SET CENTER DIFFERENTIAL CONTROL SWITCH TO AUTO**

## ON-VEHICLE WHEEL BALANCING

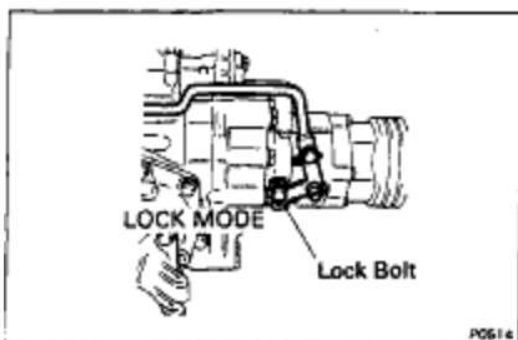
### NOTICE:

1. When doing on-vehicle wheel balancing on a fulltime 4WD vehicle, to prevent the wheels from rotating at different speeds or in different directions from each other (which could lead to damage to the center differential or trans-axle gears), always be sure to observe the following precautions:
  - (1) All four wheels should be jacked up, completely clear of the ground.
  - (2) The wheels should be driven by both the engine and the wheel balancer.
  - (3) The center differential control switch should be in the OFF condition.
  - (4) The mode select lever on the transaxle should be in the LOCK position.
  - (5) The parking brake lever should be fully released.
  - (6) None of the brakes should be allowed to drag.
2. Avoid sudden acceleration, deceleration and braking.
3. Carry out the wheel balancing with the transmission in D range.



### 1. SET CENTER DIFFERENTIAL CONTROL SWITCH TO OFF

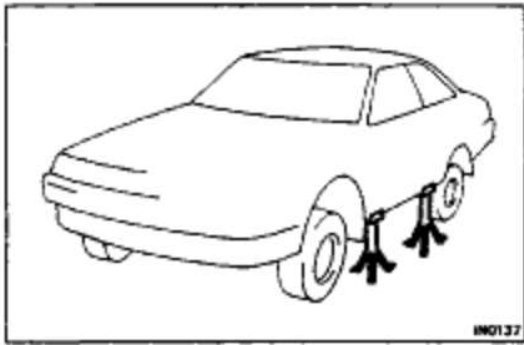
- (1) Check that the center differential control indicator light goes off.
- (2) Further check that hydraulic multiplate clutch control of the center differential is in OFF condition.  
(See page [IN-15](#))



2. MOVE MODE SELECT LEVER ON TRANSAXLE TO "LOCK" MODE AND LOCK IT SECURELY WITH BOLT  
(See page [IN-16](#))
3. CONFIRM MODE SELECTION  
(See page [IN-17](#))

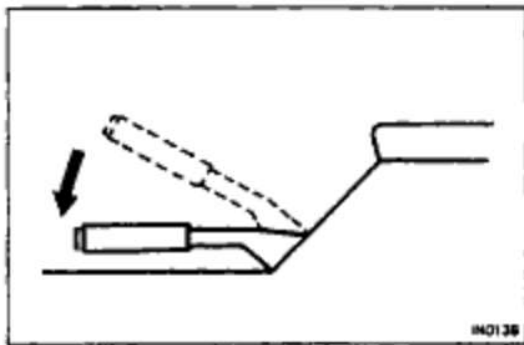
## IN-24

## INTRODUCTION — Precautions When Servicing Full-Time 4WD Vehicles

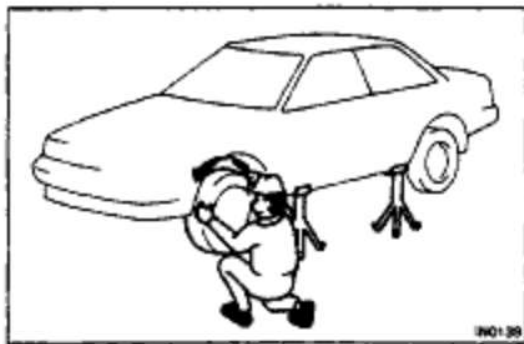


#### 4. JACK UP VEHICLE SO THAT ALL FOUR WHEELS CAN ROTATE

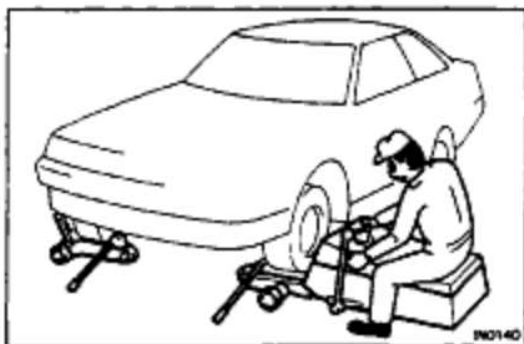
The wheels will be rotating fast, so make sure the vehicle is firmly supported on stands.



#### 5. RELEASE PARKING BRAKE FULLY



#### 6. MAKE SURE THAT BRAKES ARE NOT DRAGGING ON ANY OF FOUR WHEELS



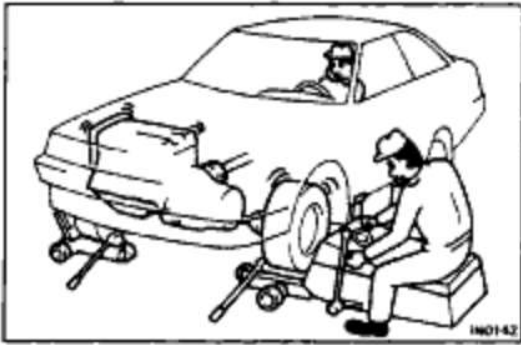
#### 7. PLACE WHEEL TO BE BALANCED ON WHEEL BALANCER

Follow the procedure specified by the wheel balancer manufacturer.



#### 8. START ENGINE

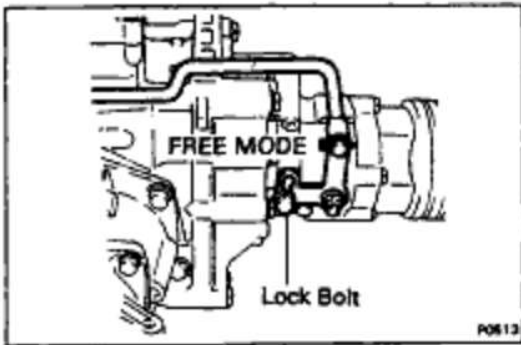
#### 9. PUT TRANSMISSION IN "D" RANGE, THEN GRADUALLY INCREASE SPEED TO TEST SPEED



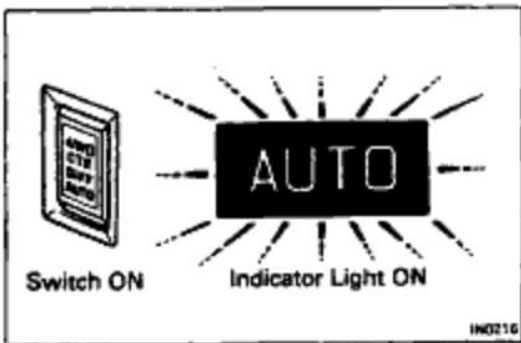
**10. ROTATE WHEELS USING BOTH THE ENGINE'S DRIVING FORCE AND DRIVING FORCE OF WHEEL BALANCER AND CHECK WHEEL BALANCE**

HINT:

1. When doing this be careful of the other wheel which will rotate at the same time.
2. Completely the measurement quickly, within a short time.



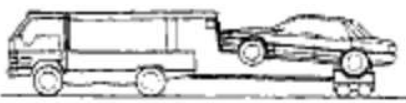
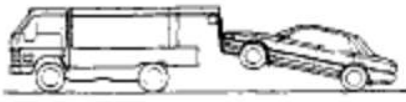
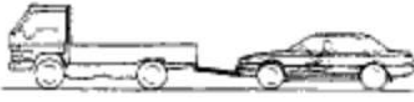
**11. AFTER FINISHING WHEEL BALANCING, RETURN MODE SELECT LEVER TO "FREE (NORMAL)" MODE POSITION AND LOCK IT SECURELY WITH BOLT**



## 12. SET CENTER DIFFERENTIAL CONTROL SWITCH TO AUTO

## PRECAUTIONS WHEN TOWING FULL-TIME 4WD VEHICLES

1. Use one of the methods shown below to tow the vehicle.
2. When there is trouble with the chassis and drivetrain, use method **[1]** (flat bed truck) or method T (sling type tow truck with dollies)
3. Recommended Methods: No. **[1]**, **[2]**, or **[3]**  
Emergency Method: No. **[4]**

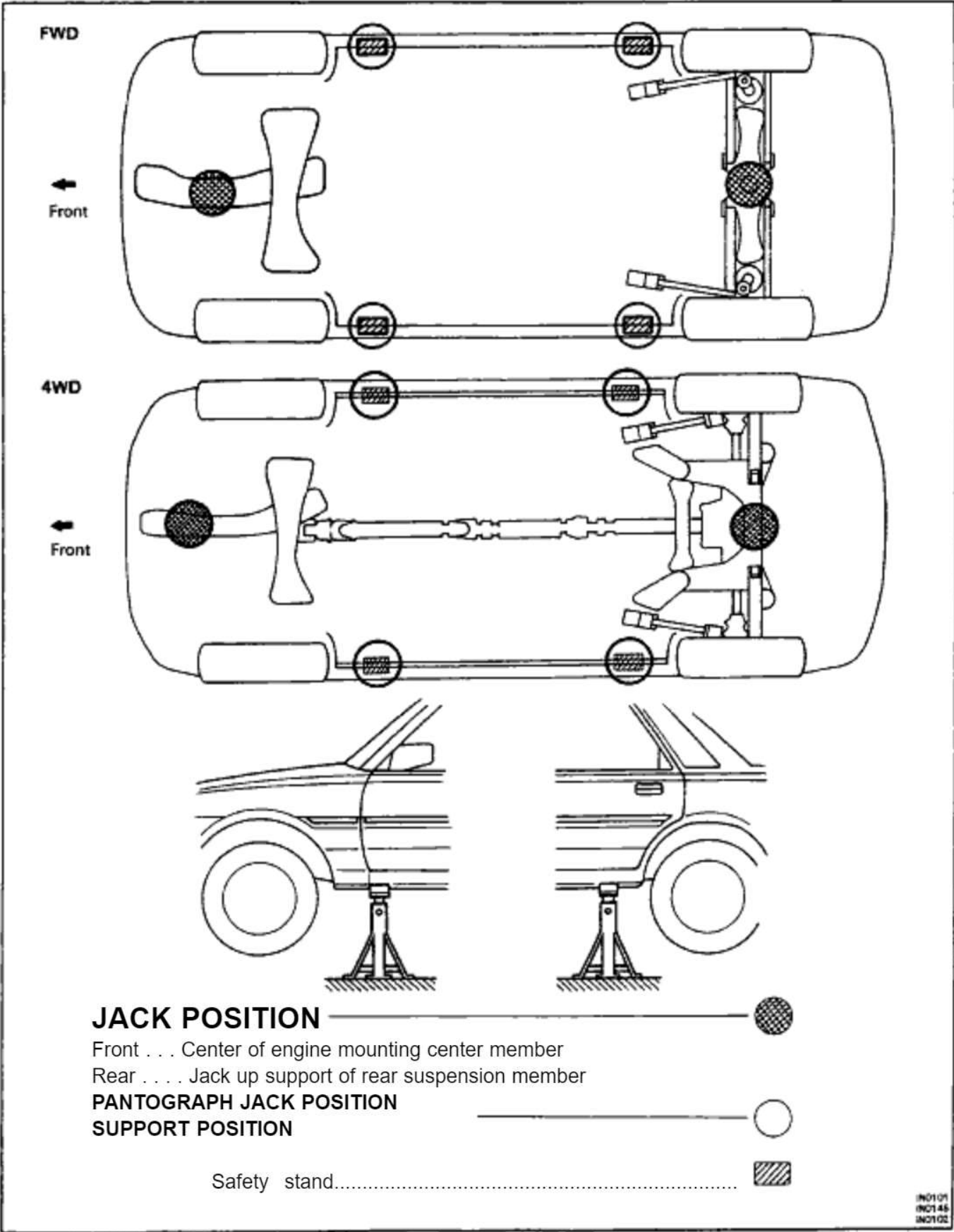
| Type of Transaxle<br><br>Towing Method                                                                                                                                                    | Manual Transaxle |                          |                                                               | Automatic Transaxle |                          |                             |                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|---------------------------------------------------------------|---------------------|--------------------------|-----------------------------|------------------------------------------------------|
|                                                                                                                                                                                           | Parking Brake    | T/M Shift Lever Position | Center Diff.                                                  | Parking Brake       | T/M Shift Lever Position | Center Diff. Control Switch | Mode Select Lever on Transaxle                       |
| <b>① Flat Bed Truck</b><br><br><small>PC442</small>                                                      | Applied          | 1 st Gear                | Free or Lock Center Differential Control Switch "ON" or "OFF" | Applied             | "P" range                | "AUTO" or "OFF"             | Free (Normal Driving) No Special Operation Necessary |
| <b>② Sling-Type Tow Truck with Dollies</b><br>                                                         |                  |                          |                                                               |                     |                          |                             |                                                      |
| <b>③ Sling-Type Tow Truck (Front wheels must be able to rotate freely)</b><br><br><small>PC438</small> | Released         | Neutral                  | Free Center Differential Control Switch "OFF"                 | Release             | "N" range                | "OFF"                       |                                                      |
| <b>④ Towing with a Rope</b><br><br><small>PC437</small>                                                | Released         | Neutral                  | Free Center Differential Control Switch "OFF"                 | Released            | "N" range                | "OFF"                       |                                                      |

**HINT: Do not use any towing methods other than those shown above.**

For example, the towing method shown below is dangerous, so do not use it

|                                                                                                             |                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><small>PC481</small> | <p>During towing with this towing method, there is a danger of the drivetrain heating up and causing breakdown, or of the front wheels flying off the dolly.</p> |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|

VEHICLE LIFT AND SUPPORT LOCATIONS



## ABBREVIATIONS USED IN THIS MANUAL

|                |                                  |
|----------------|----------------------------------|
| A.B.S.         | Anti-Lock Brake System           |
| A/C            | Air Conditioner                  |
| ALR            | Automatic Locking Retractor      |
| Approx.        | Approximation                    |
| A/T, ATM       | Automatic Transaxle              |
| ATF            | Automatic Transmission Fluid     |
| B <sub>0</sub> | Overdrive Brake                  |
| B <sub>1</sub> | Second Coast Brake               |
| B <sub>2</sub> | Second Brake                     |
| B <sub>3</sub> | First and Reverse Brake          |
| BDC            | Bottom Dead Center               |
| BTDC           | Before Top Dead Center           |
| BVSV           | Bimetal Vacuum Switching Valve   |
| C <sub>0</sub> | Overdrive Clutch                 |
| C <sub>1</sub> | Forward Clutch                   |
| C <sub>2</sub> | Direct Clutch                    |
| CB             | Circuit Breaker                  |
| DP             | Dash Pot                         |
| CRS            | Child Restraint System           |
| ECT            | Electronic Controlled Transaxle  |
| ECU            | Electronic Controlled Unit       |
| EFI            | Electronic Fuel Injection        |
| E/G            | Engine                           |
| EGR            | Exhaust Gas Recirculation        |
| ELR            | Emergency Locking Retractor      |
| ESA            | Electronic Spark Advance         |
| EVAP           | Evaporative (Emission Control)   |
| EX             | Exhaust (manifold, valve)        |
| Ex.            | Except                           |
| F <sub>0</sub> | Overdrive One-Way Clutch         |
| F <sub>1</sub> | No. 1 One-Way Clutch             |
| F <sub>2</sub> | No. 2 One-Way Clutch             |
| FIPG           | Formed in Place Gasket           |
| FL             | Fusible Link                     |
| Fr             | Front                            |
| IG             | Ignition                         |
| IN             | Intake (manifold, valve)         |
| ISC            | Idle Speed Control               |
| LED            | Light Emitting Diode             |
| LH             | Left-Hand                        |
| LSPV           | Load Sensing Proportioning Valve |
| Max.           | Maximum                          |
| Min.           | Minimum                          |
| MP             | Multipurpose                     |
| M/T, MTM       | Manual Transaxle                 |
| O/D, OD        | Overdrive                        |
| O/S            | Oversize                         |
| PCV            | Positive Crankcase Ventilation   |
| PBR            | Parking Brake                    |