TOYOTA

REPAIR MANUAL FOR CHASSIS & BODY

LAND CRUISER

(Station Wagon)

FJ80 series
HZJ80 series
HDJ80 series

Jan., 1990

For Europe & General
Pub. No. RM184E

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FOREWORD

This repair manual has been prepared to provide information covering general service repairs for the chassis and body of the TOYOTA LAND CRUISER (Station Wagon).

Applicable models: FJ80 series
HZJ80 series
HDJ80 series

For the service specifications and repair procedures of the above model other than those listed in this manual, refer to the following manuals.

Manual Name	Pub. No.
• 3F Engine Repair Manual	36253E
• 3F-E Engine Repair Manual Supplement	RM134E
• 1PZ, 1HZ, 1HD-T Engine Repair Manual	RM172E
• A441L, A440F, A442F Automatic Transmission Repair Manual	RM188E
• Land Cruiser Station Wagon Electrical Wiring Diagram	EWD090F
• Land Cruiser Station Wagon New Car Features	NCF064E

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

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CAUTION

This manual does not include all the necessary items about repair and service, this manual is made for the purpose of the use for the persons who have special techniques and certifications. In the cases that non-specialized or uncertified technicians perform repair or service only using this manual or without proper equipment or tool, that may cause severe injury to you or other people around and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damages to your customer's vehicle, be sure to follow the instruction shown below.

- Must read this manual thoroughly. It is especially important to have good understanding all the contents written in the PRECAUTION of "IN" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non-specified or recommended tools and service method, be sure to confirm safety of the technicians and any possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, must replace the part with the same part number or equivalent part. Do not replace it with inferior quality.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is important to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

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TOYOTA LAND CRUISER (Station Wagon) REPAIR MANUAL FOR CHASSIS & BODY

INTRODUCTION IN
CLUTCH CL
MANUAL TRANSMISSION MT
AUTOMATIC TRANSMISSION AT
TRANSFER TF
PROPELLER SHAFT PR
SUSPENSION AND AXLE SA
BRAKE SYSTEM BR
STEERING SR
BODY ELECTRICAL SYSTEM BE
BODY BO
WINCH WI
AIR CONDITIONING SYSTEM AC
SERVICE SPECIFICATIONS A
STANDARD BOLT TORQUE SPECIFICATIONS B
SST AND SSM C
ELECTRICAL WIRING DIAGRAMS D

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INTRODUCTION

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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.

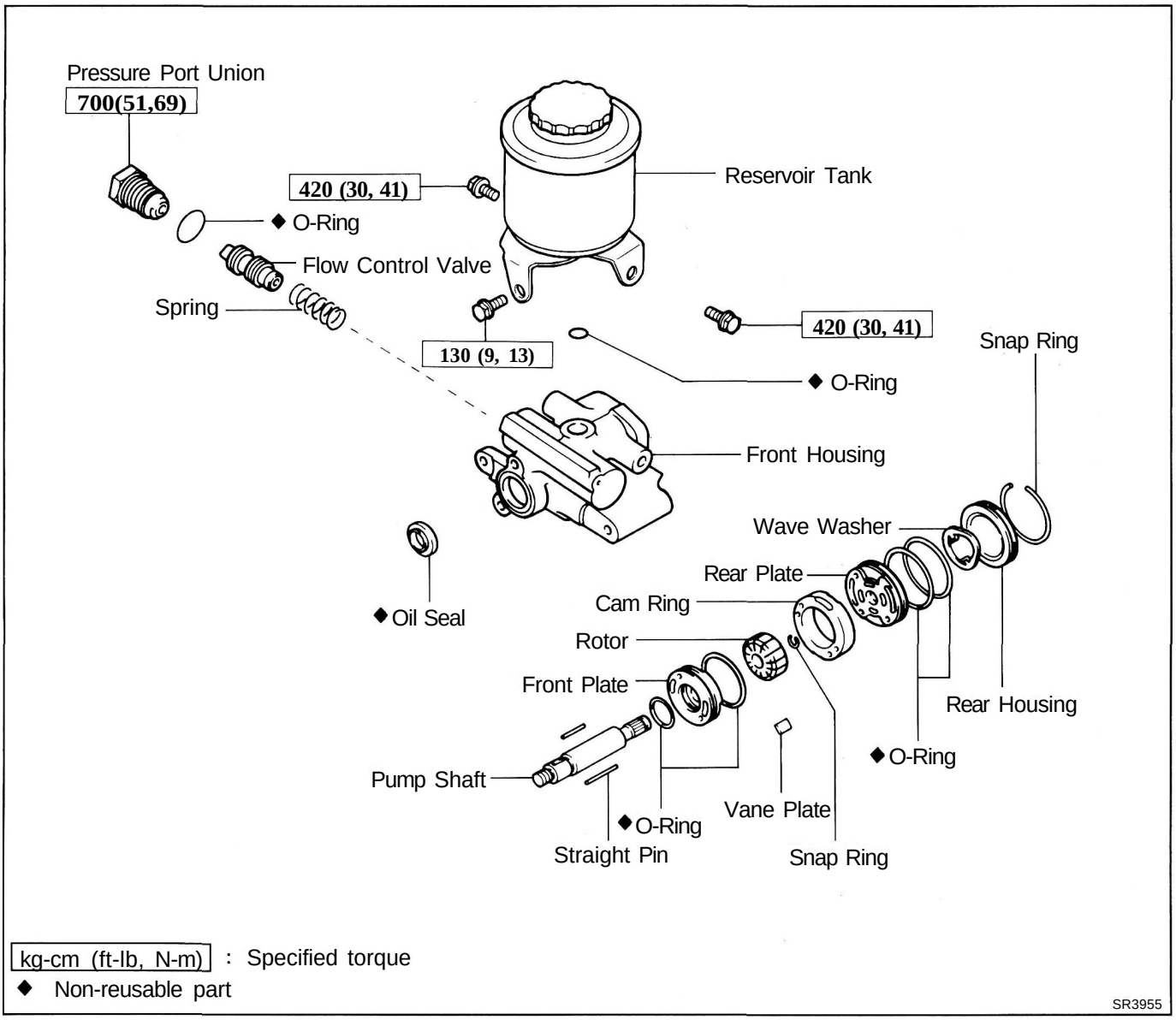
At the beginning of each section, **PRECAUTIONS** are given that pertain to *all* repair operations contained in that section. *Read these precautions before starting any repair task.*

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:



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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

Illustration: what to do and where

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^2, 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.

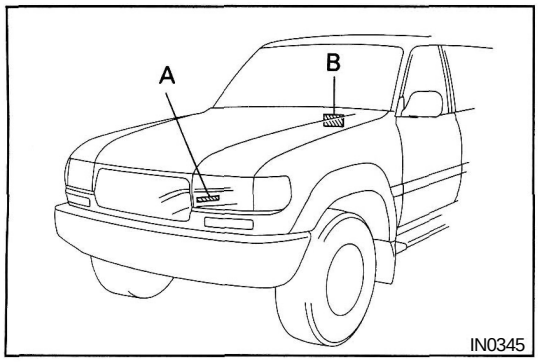
SPECIFICATIONS

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.

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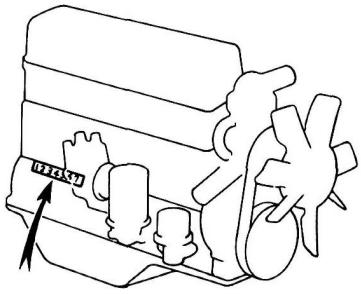
IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

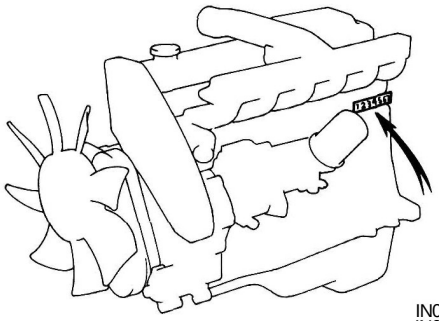
The vehicle identification number is stamped on the outer surface of the front right side frame. This number is also stamped on the manufacturer's name plate.

A: Vehicle Identification Number
B: Manufacturer's Name Plate

3F and 3F-E Engines

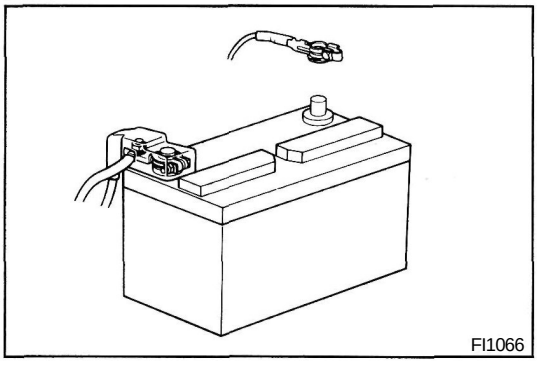


1 HZ and 1HD-T Engines



ENGINE SERIAL NUMBER

The engine serial number is stamped on the right side of the cylinder block.

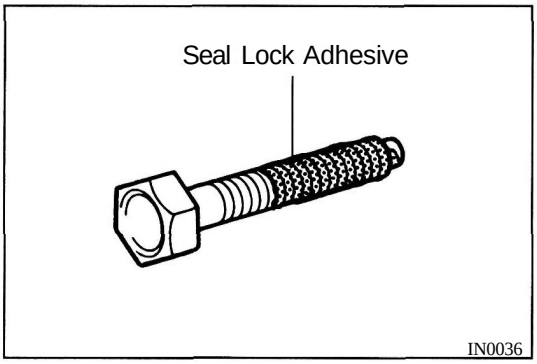


GENERAL REPAIR INSTRUCTIONS

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 (—) 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 object.
   (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.

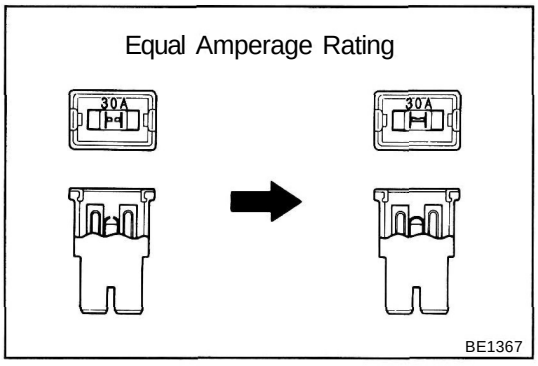
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5. Non-reusable parts
   (a) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.
   (b) Non-reusable parts are indicated in the component illustrations by the ''◆'' symbol.



6. Precoated parts

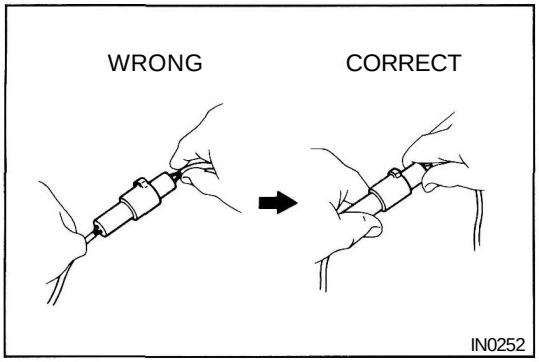
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is tightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) Recoating of precoated parts
      (1) Clean off the old adhesive from the bolt, nut or threads.
      (2) Dry with compressed air.
      (3) Apply the specified seal lock adhesive to the bolt or nut threads.
   (c) 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.



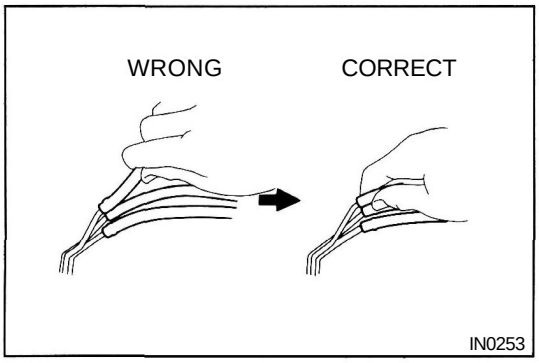
10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.
11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN-14).
   (a) If the vehicle 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.

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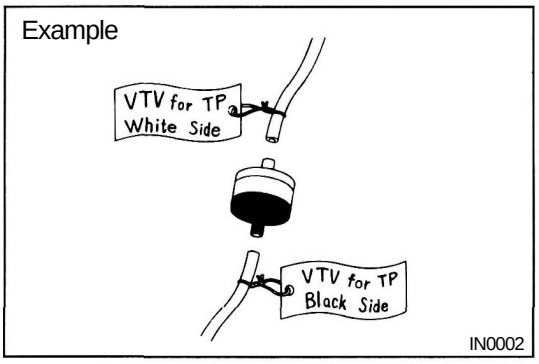
12. Observe the following precautions to avoid damage to the parts:
    (a) Do not open the cover or case of the ECU unless absolutely necessary.
    (If the IC terminals are touched, the IC may be destroyed by static electricity.)
    (b) To pull apart electrical connectors, pull on the connector itself, not the wires.



(c) 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.
(d) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
(e) To disconnect vacuum hoses, pull on the end, not the middle of the hose.
(f) When steam cleaning an engine, protect the distributor, coil, air filter and VCV from water.
(g) Never use an impact wrench to remove or install temperature switches or temperature sensors.
(h) 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 houses, 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.



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PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

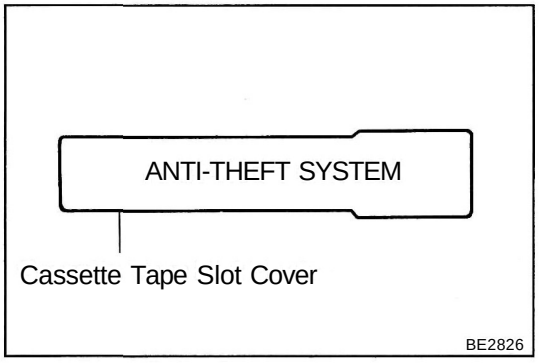
CAUTION: If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

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.**



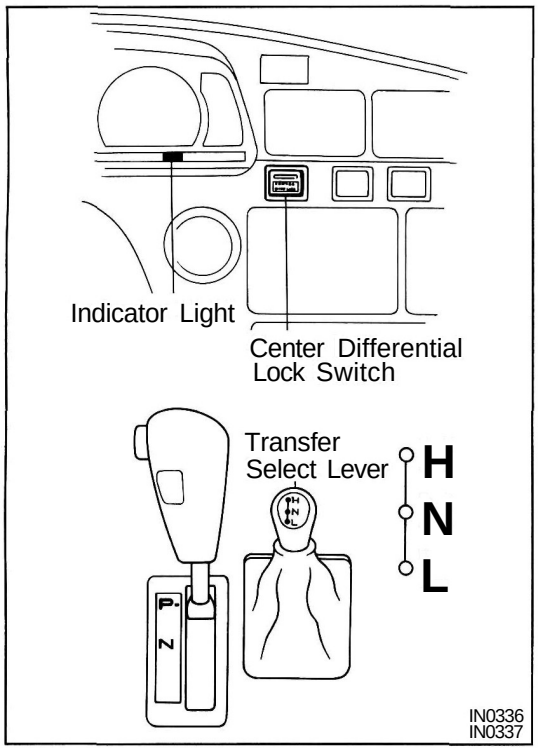
PRECAUTIONS FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT-IN ANTI-THEFT SYSTEM

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.

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PRECAUTIONS WHEN SERVICING FULL-TIME 4WD VEHICLES

The full-time 4WD Land Cruiser Station Wagon is equipped with the mechanical lock type center differential system. 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 (FREE or LOCK)
(3) Whether wheels should be touching ground or jacked up
(4) Transmission gear position
(5) Transfer gear position (H or L)
(6) Maximum testing vehicle speed
(7) 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.

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.

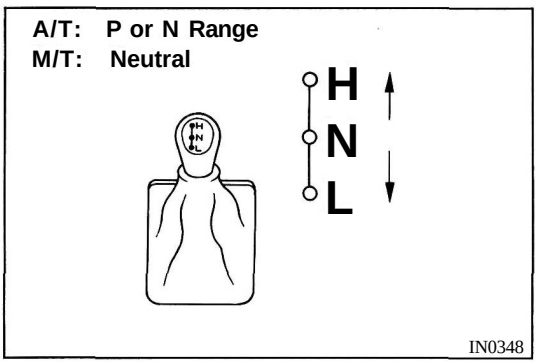
(1) Select the position of the center differential by pushing the center differential lock switch with the transfer select lever to "H" position.
(2) After selecting the position, confirm the operation of indicator light.

HINT:

- Move the vehicle backward or forward slightly if the indicator light does not operate correctly when the center differential lock switch is turned ON or OFF.
- When the transfer select lever is put in "L" position, the center differential is put in LOCK condition regardless of the position of the center differential lock switch.
- Transfer gear H ↔ L gear shifting procedure

  Automatic transmission:
  When shifting, always put the shift lever of the automatic transmission in P or N range. In other ranges, the gears of the transfer clash, and switching cannot occur.

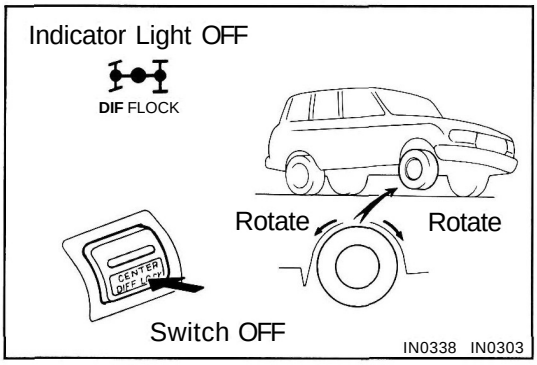
  Manual transmission:
  When shifting, always put the shift lever of the manual transmission in neutral.



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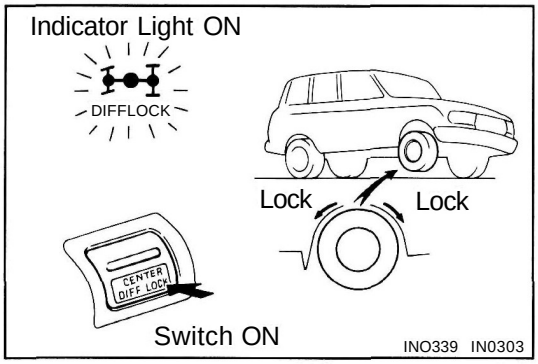
CAUTIONS WHEN CENTER DIFFERENTIAL CONTROL SWITCH IS TURNED ON

- Operate the switch only when 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.



FREE Position

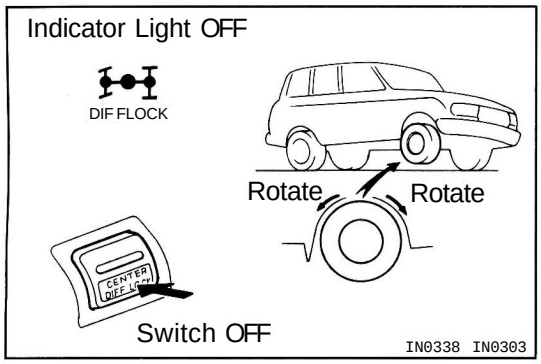
Center Differential Lock		Transfer Select Lever	Wheel
Control Switch	Indicator Light		
OFF	OFF	H	A lifted wheel can be rotated even if only one wheel is lifted up, as long as transmission is in neutral or N range.



LOCK Position

Center Differential Lock		Transfer Select Lever	Wheel
Control Switch	Indicator Light		
ON	ON	H	A lifted wheel cannot be rotated if only one wheel is lifted up, even if transmission is in neutral or N range.
OFF	ON	L	

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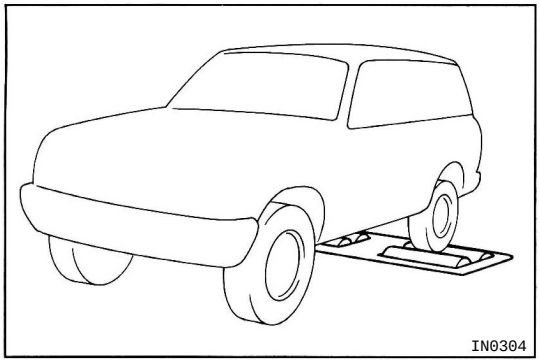
BRAKING FORCE TEST (Vehicle Speed : Below 0.5 km/h or 0.3 mph)

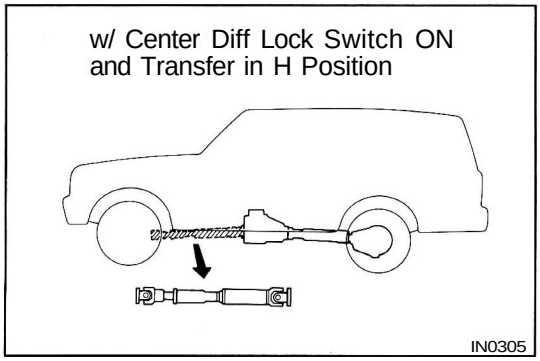
When performing low-speed type brake tester measurements, observe the following instructions.

(1) Put the center differential in FREE position.
- Shift the transfer select lever to H position.
- Turn the center differential lock switch to OFF and check that the center differential lock indicator light goes off.

(2) Shift the transmission shift lever to N range.

(3) Idle the engine, operate the brake booster and perform the test.

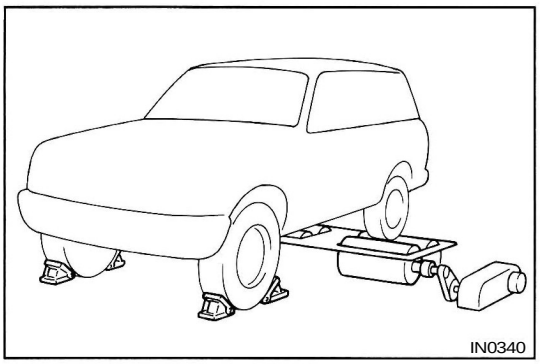




SPEEDOMETER TEST OR OTHER TESTS (Using Speedometer Tester or Chassis Dynamometer)

(1) Remove the front propeller shaft, put the center differential in LOCK position, then put the rear wheels on the tester roller and perform the test.

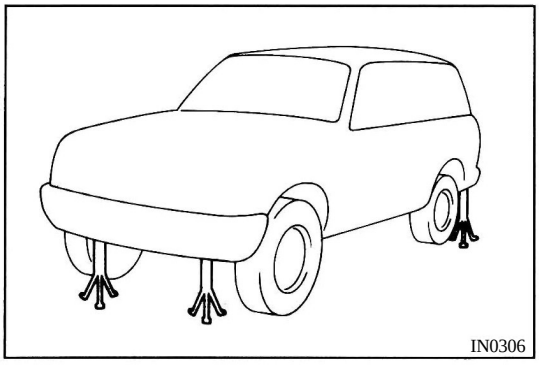
(2) When performing tests, observe the following precautions.
- Check that the center differential is securely in LOCK condition.
- Confirm that the vehicle is securely immobilised.
- Never operate the clutch or brakes suddenly, suddenly drive the wheels, or suddenly decelerate.



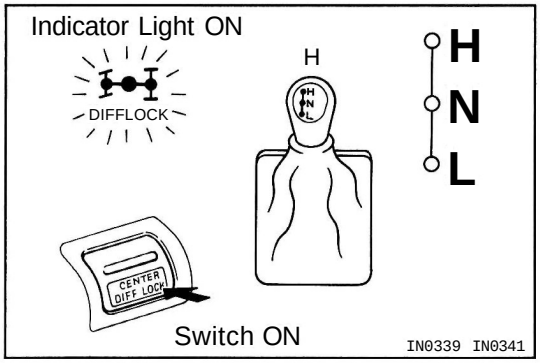
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ON-VEHICLE WHEEL BALANCING

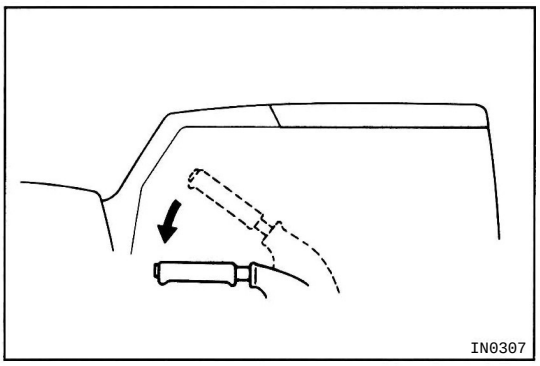
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent the wheels from rotating at different speeds or in different directions from each other (which could lead to damage to the center differential or transfer gears), always be sure to observe the following precautions:



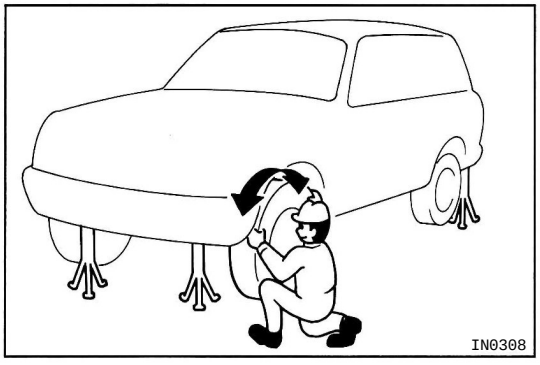
(1) All four wheels should be jacked up, clearing the ground completely.



(2) The center differential should be in the LOCK position with the transfer gear in H position.

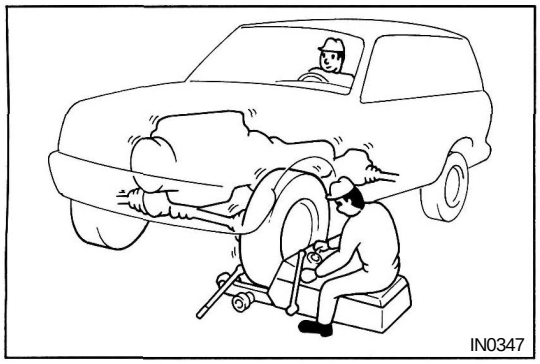


(3) The parking brake lever should be fully released.



(4) None of the brakes should be allowed to drag.

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(5) The wheels should be driven with both the engine and the wheel balancer.

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

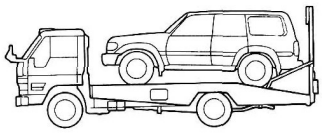
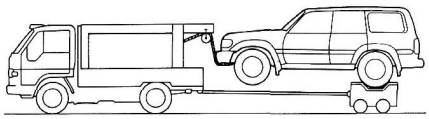
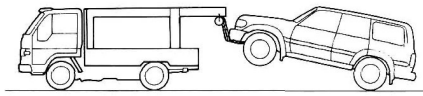
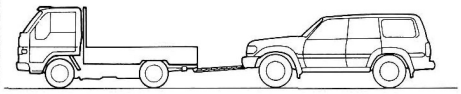
(6) Avoid sudden acceleration, deceleration and braking.

(7) Carry out the wheel balancing with the transmission in 3rd or 4th gear (or 3rd or D range).

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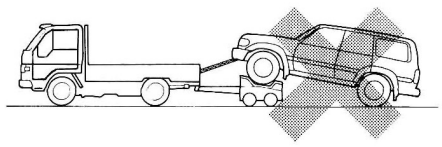
PRECAUTIONS WHEN TOWING FULL-TIME 4WD VEHICLES

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 ② (sling type tow truck with dollies)
3. Recommended Methods: No. ①, ② or ③
   Emergency Method: No. ④

<table>
<tr><th>Condition / Towing Method</th><th>Parking Brake</th><th>Transmission Shift Lever Position</th><th>Transfer Shift Lever Position</th><th>Center Differential Lock Switch</th><th>Center Differential</th></tr>
<tr><td>① Flat Bed Truck

IN0309</td><td rowspan="2">Applied</td><td rowspan="2">Any Position</td><td rowspan="2">" H " Position</td><td rowspan="2">OFF</td><td rowspan="2">FREE
(Normal Driving)</td></tr>
<tr><td>② Sling-Type Tow Truck with Dollies

IN0310</td></tr>
<tr><td>③ Sling-Type Tow Truck
(Front wheels must be able to rotate freely)

IN0311</td><td>Released</td><td>" N " Range or Neutral</td><td>" N " Position</td><td>OFF</td><td>↑</td></tr>
<tr><td>④ Towing with Rope

INO312</td><td>Released</td><td>" N " Range or Neutral</td><td>" N " Position</td><td>OFF</td><td>↑</td></tr>
<tr><td colspan="6">HINT: Do not tow the vehicle at a speed faster than 30 mph (45 km/h) or a distance greater than 50 miles (80 km).</td></tr>
</table>

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

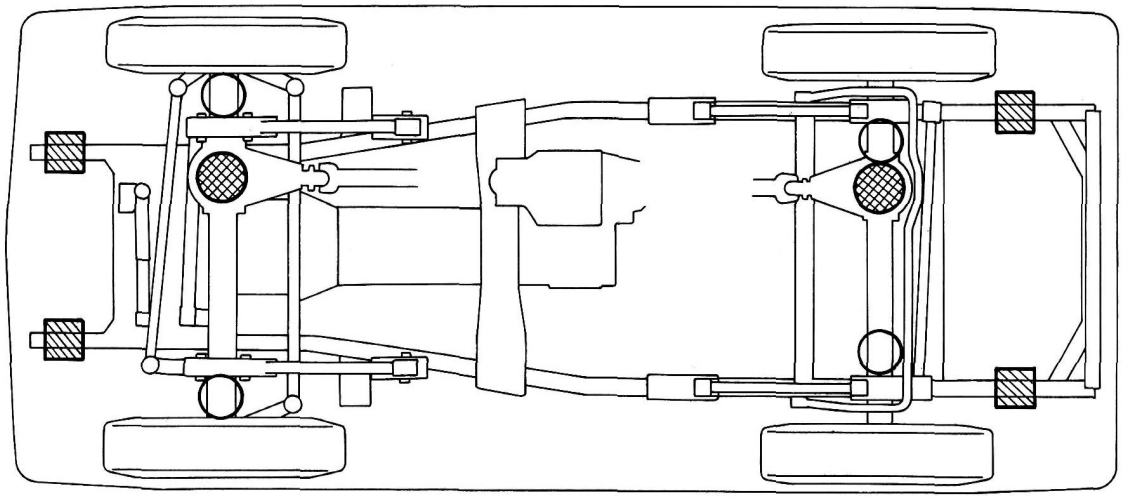
For example, the towing method shown below is dangerous, so do not use it.

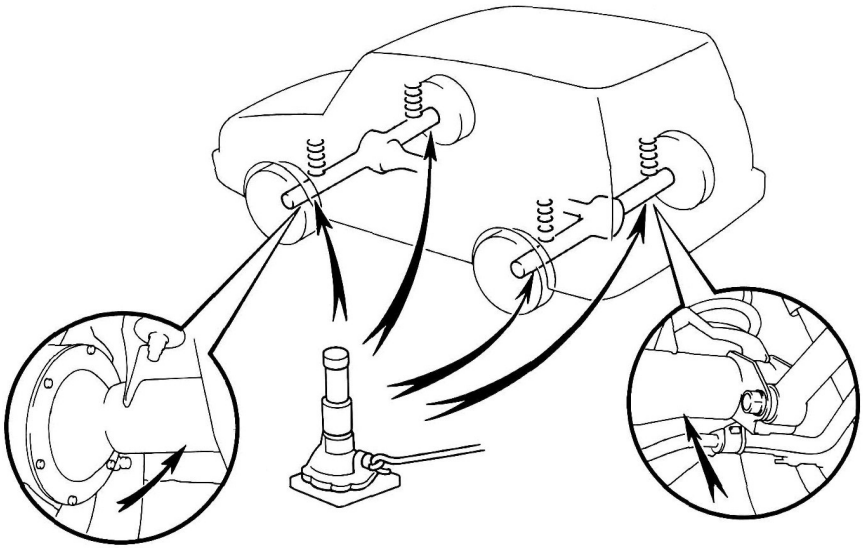
<table>
<tr><td>NO

IN0313</td><td>During towing with this towing method, there is a danger of the drive train heating up and causing breakdown, or of the front wheels flying off the dolly.</td></tr>
</table>

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VEHICLE LIFT AND SUPPORT LOCATIONS

Front





JACK POSITION

Front ..... Under the front differential

Rear ..... Under the rear differential

SCREW TYPE JACK POSITION

SUPPORT POSITION

Safety stand .....

IN0314
IN0342

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ABBREVIATIONS USED IN THIS MANUAL

A/C	Air Conditioner
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
A.T.P.	Automatic Transmission Parking
B_o	Overdrive Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_o	Overdrive Direct Clutch
C-,	Forward Clutch
C_2	Direct Clutch
CCS	Cruise Control System
CD	Compact Disc
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
ELR	Emergency Locking Retractor
Ex.	Except
F_o	Overdrive One-Way Clutch
F_2	No.2 One-Way Clutch
FIPG	Formed on Place Gasket
FL	Fusible Link
G.C.C.	Gulf Cooperation Council Countries
IG	Ignition
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
LSD	Limited Slip Differential
LSP & BV	Load Sensing Proportioning and By-Pass Valve
Max.	Maximum
M/T	Manual Transmission
MP	Multipurpose
O/D, OD	Overdrive
PPS	Progressive Power Steering
PS	Power Steering
PTO	Power Take-Off
RH	Right-Hand
RHD	Right-Hand Drive
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
SW	Switch
VSV	Vacuum Switching Valve
w/	With
w/o	Without
4WD	Four Wheel Drive Vehicles (4 x 4)

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