TOYOTA

REPAIR MANUAL FOR CHASSIS & BODY

LAND CRUISER
(Light Duty)

RJ70 series
LJ70 series

Oct., 1984

Pub. No. 36261E

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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 (Light Duty).

Applicable models:
RJ 70 series
LJ 70 series

For service of the TOYOTA LAND CRUISER (Light Duty), refer to the following repair manuals.

21R, 22R Engines Repair Manual	(Pub. No. 36056E)
L, 2L, 2L-T Engine Repair Manual	(Pub. No. 36251E)

For instructions on how to use this manual, please refer to page IN-2. All information contained in this manual is up-to-date at the time of publication. However, specifications and procedures are subject to change without prior notice.

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TOYOTA LAND CRUISER
(Light Duty)
REPAIR MANUAL
FOR CHASSIS & BODY

INTRODUCTION IN
CLUTCH CL
MANUAL TRANSMISSION MT
TRANSFER TF
PROPELLER SHAFT PR
FRONT AXLE AND SUSPENSION FA
REAR AXLE AND SUSPENSION RA
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

	Page
HOW TO USE THIS MANUAL	IN-2
IDENTIFICATION INFORMATION	IN-4
GENERAL REPAIR INSTRUCTIONS	IN-4
VEHICLE LIFT AND SUPPORT LOCATION	IN-6
ABBREVIATIONS USED IN THIS MANUAL	IN-7

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HOW TO USE THIS MANUAL

To assist 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.

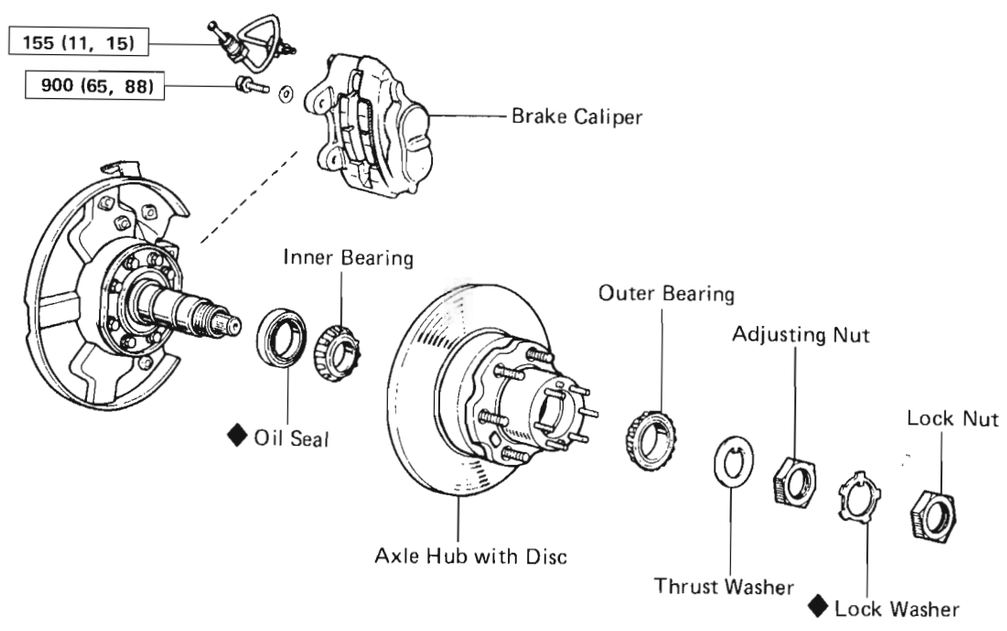
At the beginning of each section, **PRECAUTIONS** are given that pertain or *all* repair operations contained in that section.
Read these precautions before starting any repair task.

TROUBLESHOOTING tables are included for each system to help you diagnose the system 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 which identifies the components and shows how the parts fit together.

Example:



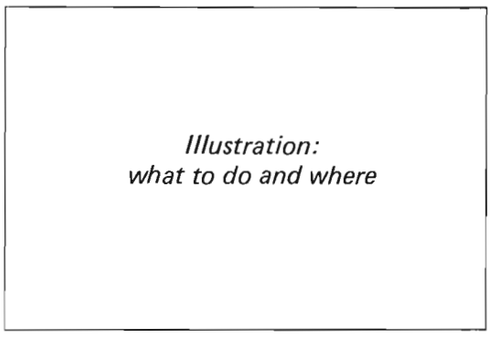
kg-cm (ft-lb, N·m) : Specified torque
◆ : Non-reusable part

FA0503

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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

CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE

(a) Align the marks on the flanges and connect the flanges with four bolts and nuts.

(b) Torque four bolts and nuts.

Detail text: how to do it

Torque: 600 — 750 kg-cm (44 — 54 ft-lb, 59 — 73 N·m)

Specification

This format enables the experienced technician to have a FAST TRACK. He can read the task headings and only refer to the detailed text when he needs it. 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 go to.

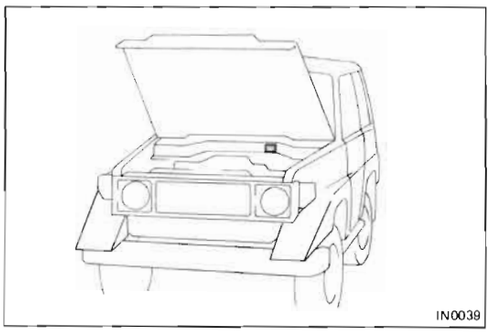
SPECIFICATIONS

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

WARNINGS, CAUTIONS, NOTES:

- WARNINGS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- CAUTIONS are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- NOTES 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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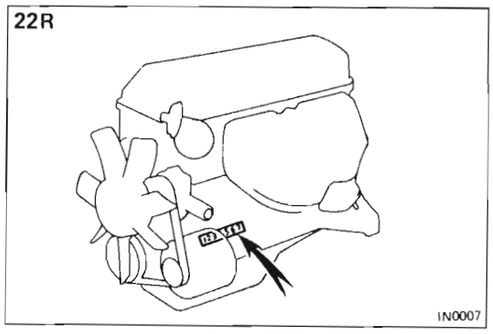

IN0039

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the base of the passenger seat. It is also stamped on the frame near the right front fender.

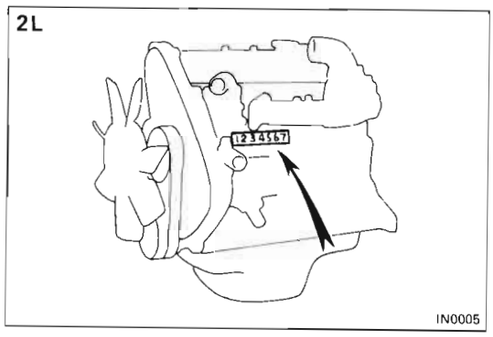
22R


IN0007

ENGINE SERIAL NUMBER

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

2L



IN0005

GENERAL REPAIR INSTRUCTIONS

1. Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
2. During disassembly, keep parts in order to facilitate re-assembly.
3. Observe the following:
   (a) Before performing electrical work, disconnect the 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 it or prying it.
   (d) Clean the battery terminal posts and cable terminals with a shop rag. Do not scrape them with a file or such.

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(e) Install the cable terminal to the battery post with the nut loose and tighten the nut after installation. Do not use a hammer, or such, to tap the terminal onto the post.

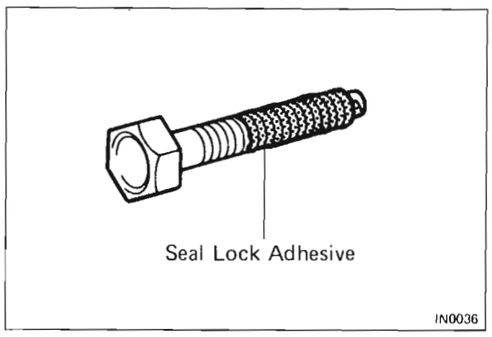
(f) Be sure the cover for the positive (+) terminal is properly in place.

4. Check hose and wiring connections 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 the bolts, nuts, etc. which 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 installation part 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 is the correct amperage rating. DO NOT exceeds the fuse amp rating or use one of a lower rating.

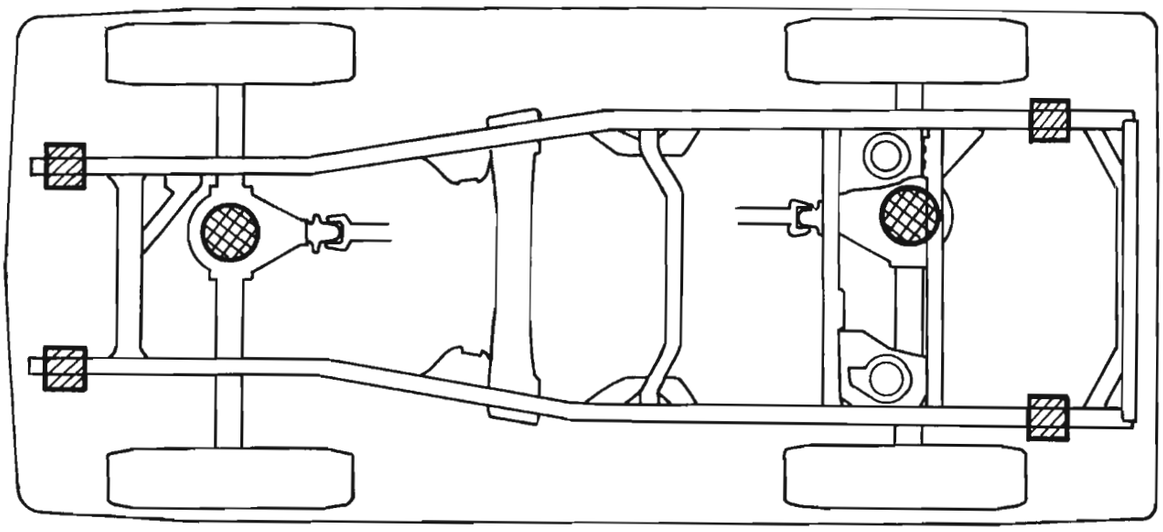
11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN-6).

(a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels 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 the vehicle raised on jack alone, even for a small job that can be finished quickly.

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VEHICLE LIFT AND SUPPORT LOCATIONS



JACK POSITION

Front ..... Under the front differential
Rear ..... Under the rear differential

SUPPORT POSITION

Safety stand .....

IN0040

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ABBREVIATIONS USED IN THIS MANUAL

A/C	Air Conditioner
A/T, ATM	Automatic Transmission
Approx.	Approximate
ATF	Automatic Transmission Fluid
CB	Circuit Breaker
Ex.	Except
Fr	Front
IG	Ignition
in.	Inch
LH	Left-hand
LHD	Left-hand Drive
LSPV	Load Sensing Proportioning Valve
Max.	Maximum
Min.	Minimum
MP	Multipurpose
M/T, MTM	Manual Transmission
OPT	Option
PS	Power Steering
P.T.O.	Power Take-off
RH	Right-hand
RHD	Right-hand Drive
Rr	Rear
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
S/W	Switch
Temp.	Temperature
VSV	Vacuum Switching Valve
w/	With
w/o	Without

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CLUTCH

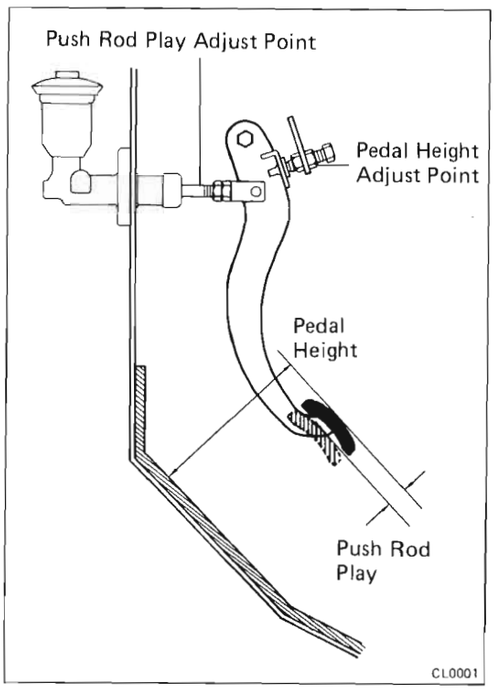
	Page
TROUBLESHOOTING	CL-2
CHECK AND ADJUSTMENT OF CLUTCH PEDAL	CL-3
BLEEDING OF CLUTCH SYSTEM	CL-3
CLUTCH MASTER CYLINDER	CL-4
CLUTCH RELEASE CYLINDER	CL-6
CLUTCH UNIT	CL-8

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TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Clutch pedal freeplay excessive	Adjust pedal freeplay	CL-3
	Air in clutch lines	Bleed clutch system	CL-3
	Clutch release cylinder faulty	Repair release cylinder	CL-6
	Clutch master cylinder faulty	Repair master cylinder	CL-4
	Clutch disc out of true, runout is excessive or lining broken	Inspect clutch disc	CL-8
	Splines on input shaft or clutch disc dirty or burred	Repair as necessary	CL-8
	Clutch pressure plate faulty	Replace pressure plate	CL-8
Transmission jumps out of gear	Clutch pilot bearing worn	Replace pilot bearing	CL-8
Clutch slips	Clutch pedal freeplay insufficient	Adjust pedal freeplay	CL-3
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-8
	Pressure plate faulty	Replace pressure plate	CL-8
	Release fork binding	Inspect release fork	
Clutch grabs/chatters	Clutch disc oily or worn out	Inspect clutch disc	CL-8
	Pressure plate faulty	Replace pressure plate	CL-8
	Clutch diaphragm spring bent	Align clutch diaphragm	CL-8
	Engine mounts loose	Repair as necessary	
Clutch pedal spongy	Air in clutch lines	Bleed clutch system	CL-3
	Clutch release cylinder faulty	Repair release cylinder	CL-6
	Clutch master cylinder faulty	Repair master cylinder	CL-4
Clutch noisy	Loose part inside housing	Repair as necessary	
	Release bearing worn or dirty	Replace release bearing	CL-8
	Pilot bearing worn	Replace pilot bearing	CL-8
	Release fork or linkage sticking	Repair as necessary	

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CHECK AND ADJUSTMENT OF CLUTCH PEDAL

1. CHECK THAT PEDAL HEIGHT AND PUSH ROD PLAY ARE CORRECT

Pedal height: 186 mm (7.32 in.)
Push rod play at pedal top: 1 – 5 mm (0.04 – 0.20 in.)

If incorrect, adjust the pedal height and push rod play.

2. IF NECESSARY, ADJUST PEDAL HEIGHT AND PUSH ROD PLAY

(a) Loosen the lock nut and turn the stopper bolt until the height is correct. Tighten the lock nut.

(b) Loosen the lock nut and turn the push rod until the push rod play is correct. Tighten the lock nut.

3. CHECK THAT PEDAL FREEPLAY IS CORRECT

Push in on the pedal until the beginning of clutch resistance is felt.

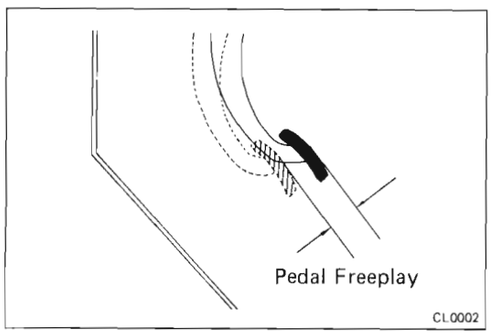
Pedal freeplay: LJ 5 – 15 mm (0.20 – 0.59 in.)
RJ 13 – 23 mm (0.51 – 0.91 in.)

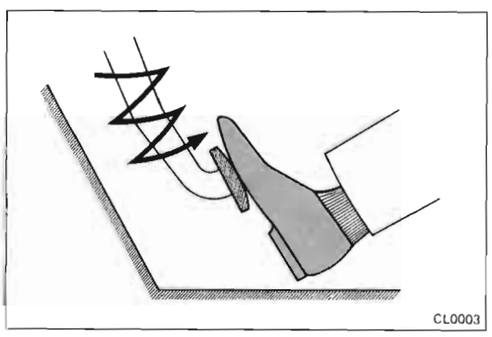
4. IF NECESSARY, ADJUST PEDAL FREEPLAY

(a) Loosen the lock nut and turn the push rod until the freeplay is correct.

(b) Tighten the lock nut.

(c) After adjusting the pedal freeplay, check the pedal height.





BLEEDING OF CLUTCH SYSTEM

NOTE: If any work is done on the clutch system or if air is suspected in the clutch lines, bleed the system of air.

CAUTION: DO NOT let brake fluid remain on a painted surface. Wash it off immediately.

1. FILL CLUTCH RESERVOIR WITH BRAKE FLUID

Check the reservoir frequently and add fluid if necessary.

2. CONNECT VINYL TUBE TO BLEEDER PLUG

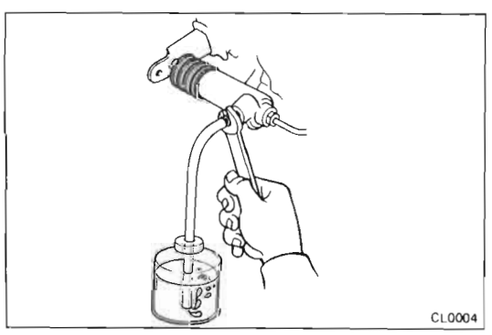
Insert the other end of the tube in a half-full container of brake fluid.

3. BLEED CLUTCH LINE

(a) Slowly pump the clutch pedal several times.

(b) While pressing on the pedal, loosen the bleeder plug until the fluid starts to run out. Then close the bleeder plug.

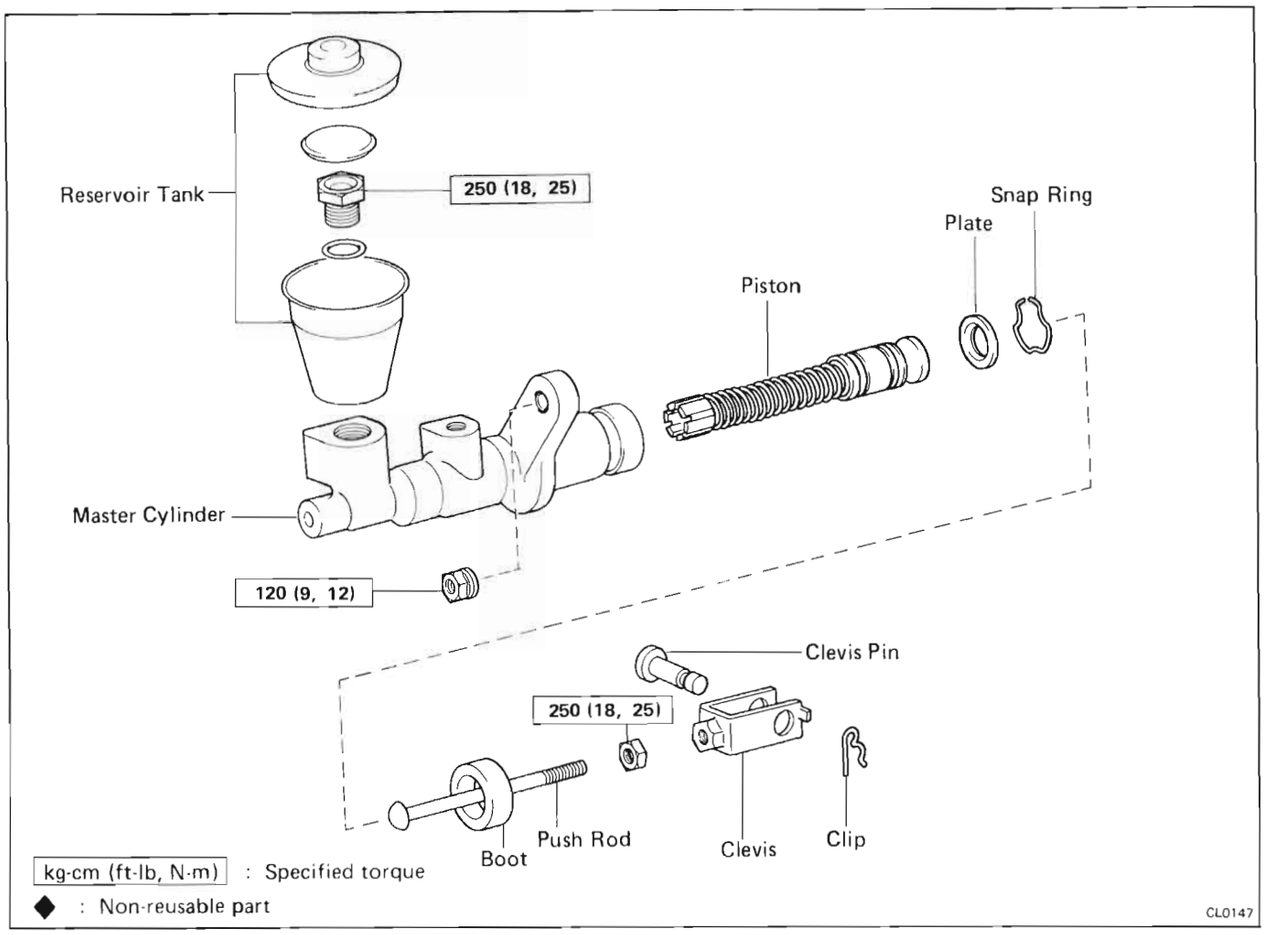
(c) Repeat this procedure until there are no more air bubbles in the fluid.

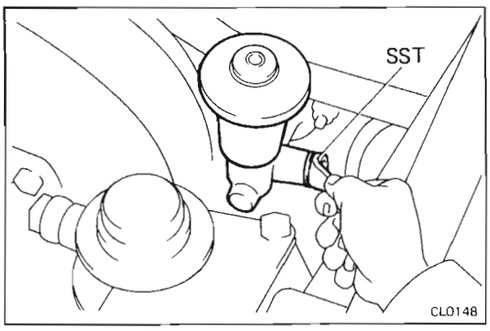


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CLUTCH MASTER CYLINDER

COMPONENTS





REMOVAL OF MASTER CYLINDER

1. DRAW OUT FLUID WITH SYRINGE

2. DISCONNECT CLUTCH LINE UNION

   Using SST, disconnect the union.

   SST 09751-36011

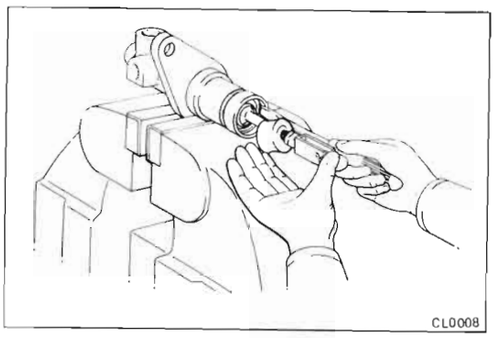
3. DISCONNECT CLEVIS FROM CLUTCH PEDAL

   Remove the clip and clevis pin, disconnect the clevis from the clutch pedal.

4. REMOVE MASTER CYLINDER

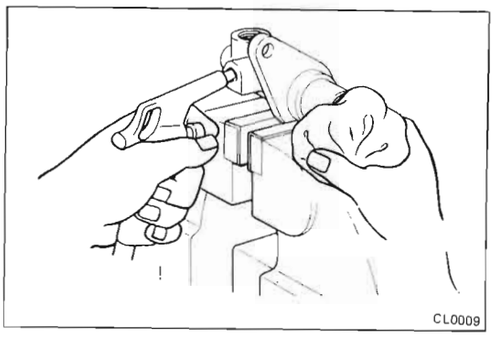
   Remove the two mounting nuts and pull off the master cylinder.

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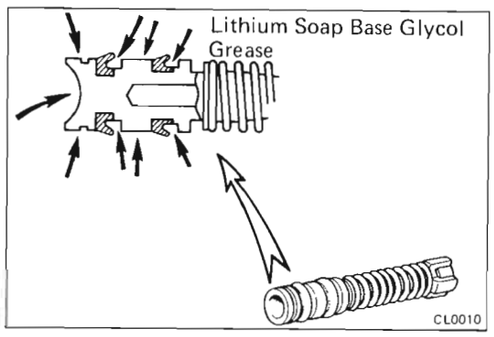


DISASSEMBLY OF MASTER CYLINDER

1. REMOVE PUSH ROD AND SNAP RING
   (a) Pull back the boot and using a screwdriver, remove the snap ring.
   (b) Pull off the push rod and washer.



2. REMOVE RESERVOIR TANK
3. REMOVE PISTON
   Using compressed air, remove the piston from the cylinder.



INSPECTION OF MASTER CYLINDER

INSPECT MASTER CYLINDER
Inspect the disassembled parts for wear, rust or damage.

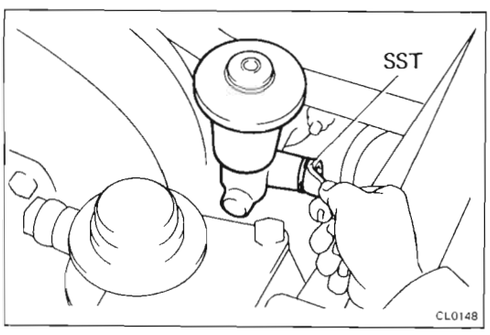
ASSEMBLY OF MASTER CYLINDER

(See page CL-4)

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE
2. INSTALL PISTON INTO CYLINDER
3. INSTALL PUSH ROD ASSEMBLY WITH SNAP RING
4. INSTALL RESERVOIR TANK
   Torque: 250 kg-cm (18 ft-lb, 25 N·m)

INSTALLATION OF MASTER CYLINDER

1. INSTALL MASTER CYLINDER
2. CONNECT CLEVIS AND CLUTCH PEDAL
   Connect the clevis and clutch pedal with clevis pin and clip.
3. CONNECT CLUTCH LINE UNION
   Using SST, connect the union.
   SST 09751-36011

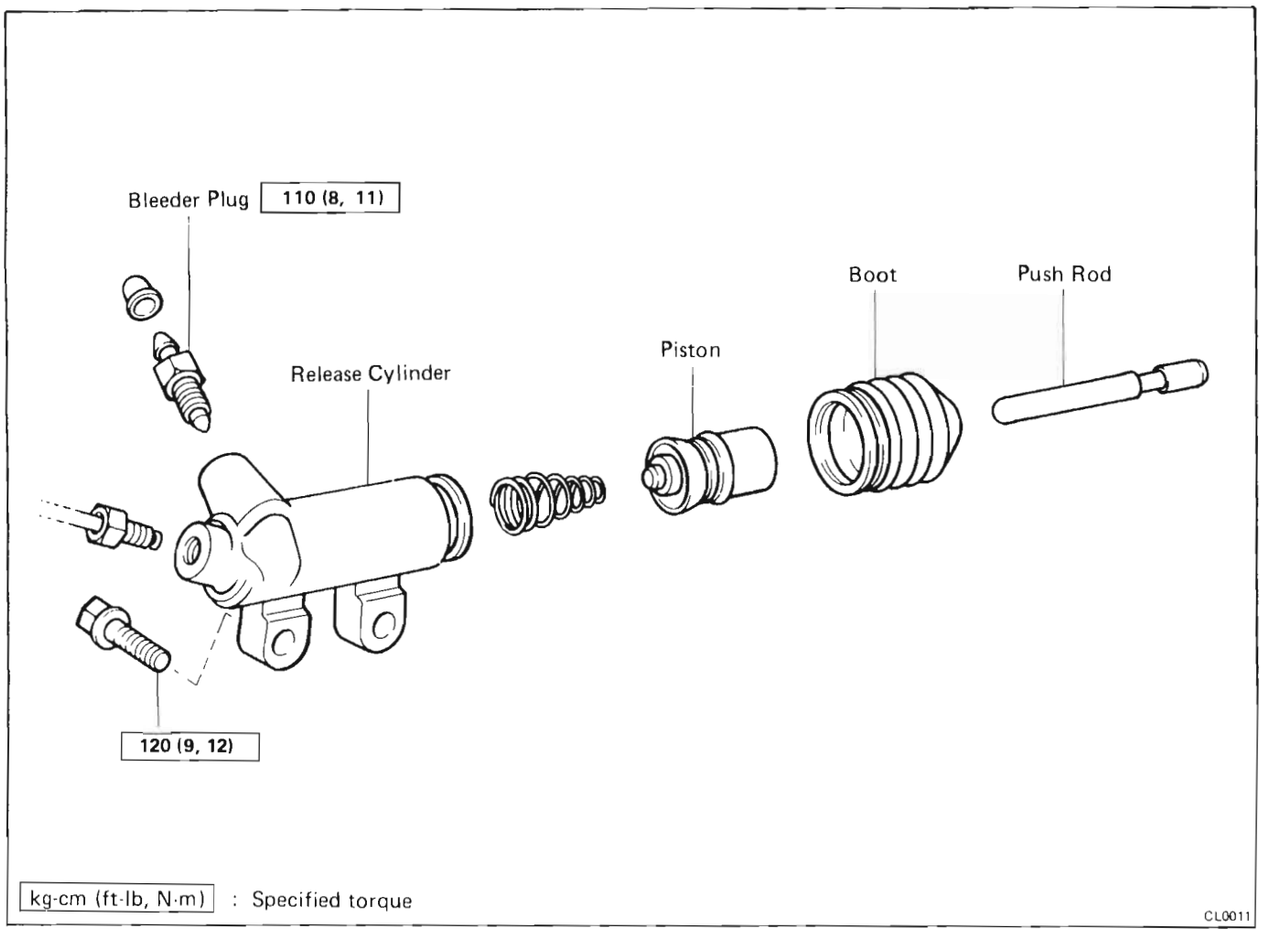


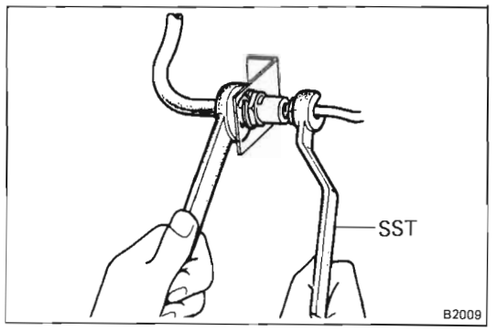
4. ADJUST CLUTCH PEDAL AND BLEED SYSTEM
   (See page CL-3)

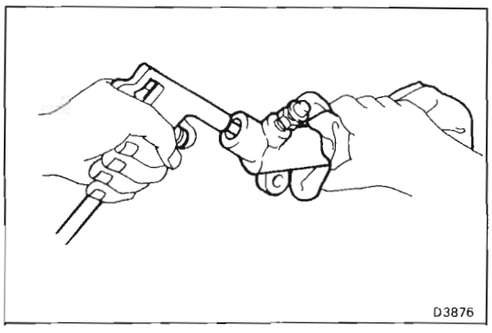
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CLUTCH RELEASE CYLINDER

COMPONENTS







REMOVAL OF RELEASE CYLINDER

1. REMOVE FLEXIBLE HOSE
   (a) Using SST, disconnect the union.
   SST 09751-36011
   (b) Remove the clip from flexible hose.
   (c) Loosen and remove the flexible hose from the release cylinder.
2. REMOVE RELEASE CYLINDER

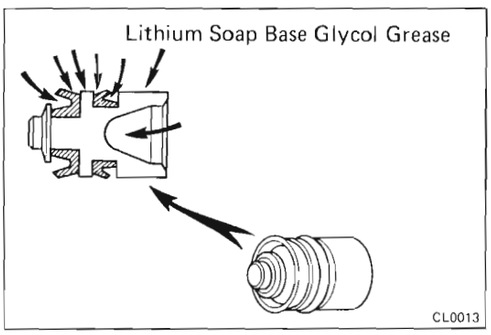
DISASSEMBLY OF RELEASE CYLINDER

1. PULL OFF PUSH ROD
2. REMOVE BOOT
3. REMOVE PISTON
   Using compressed air, remove the piston from the cylinder.

INSPECTION OF RELEASE CYLINDER

INSPECT RELEASE CYLINDER
Inspect the disassembled parts for wear, rust or damage.

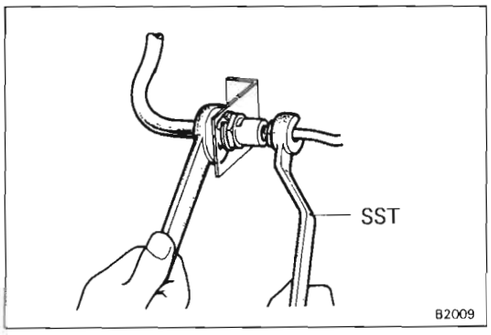
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ASSEMBLY OF RELEASE CYLINDER

(See page CL-6)

1. COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN
2. INSTALL PISTON
3. INSTALL BOOT AND INSERT PUSH ROD



INSTALLATION OF RELEASE CYLINDER

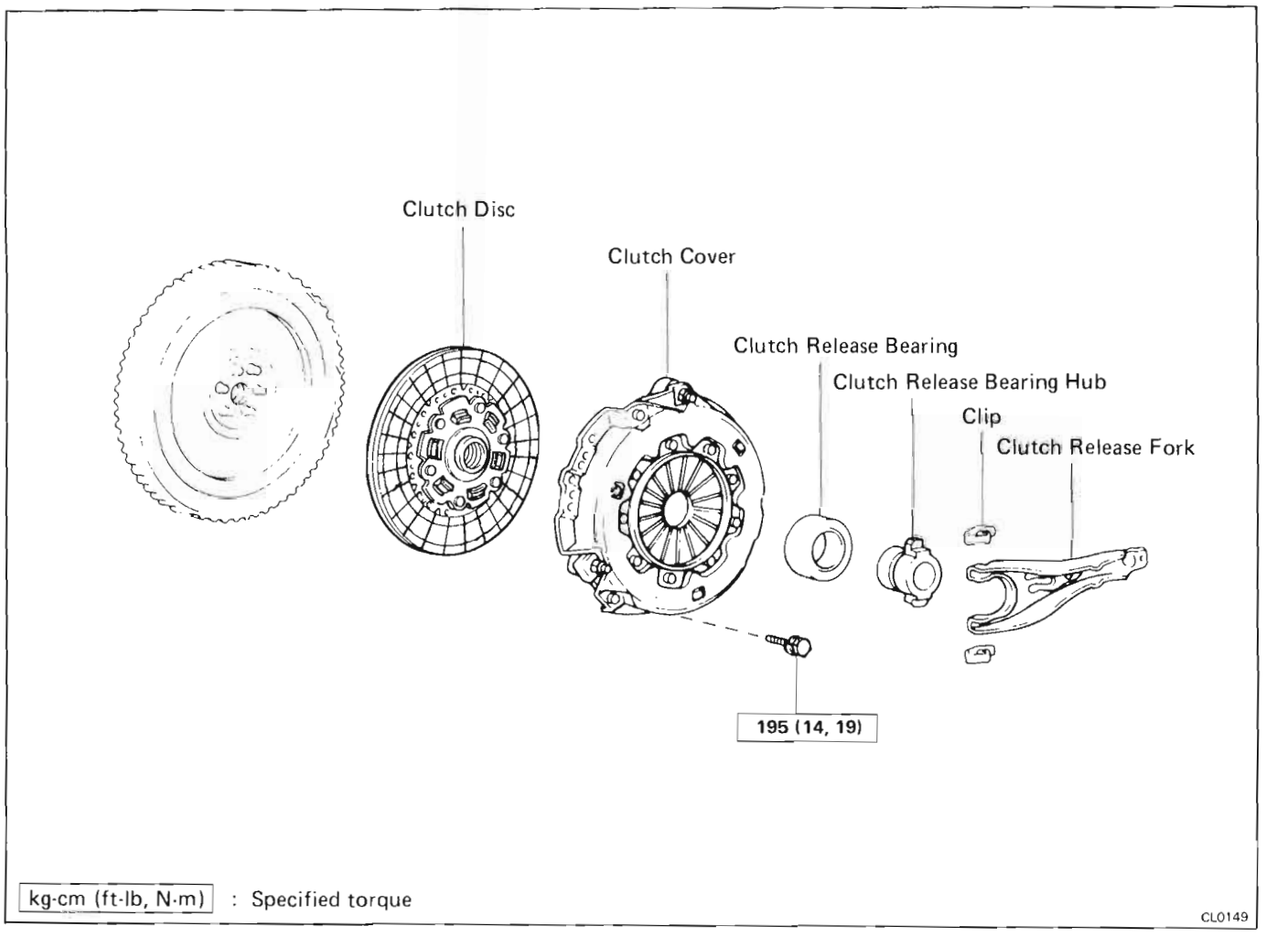
(See page CL-6)

1. INSTALL RELEASE CYLINDER WITH TWO BOLTS
   Torque: 120 kg-cm (9 ft-lb, 12 N·m)
2. INSTALL FLEXIBLE HOSE
   (a) Install the flexible hose to the release cylinder.
   (b) Using SST, connect the union.
   SST 09751-36011
   (c) Install the clip.
3. BLEED CLUTCH SYSTEM
   (See page CL-3)

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CLUTCH UNIT

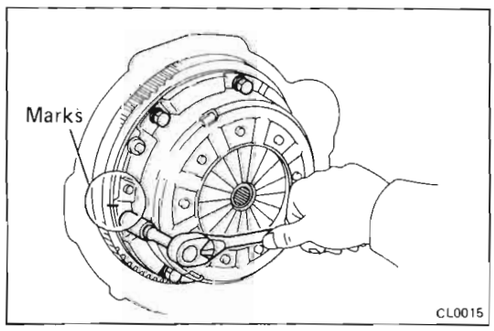
COMPONENTS



REMOVAL OF CLUTCH UNIT

1. REMOVE TRANSMISSION
(See page MT-3)

NOTE: Do not drain the transmission oil.



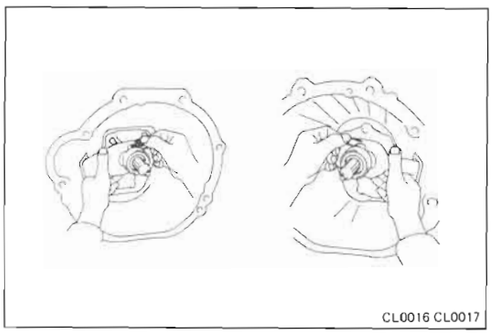
2. REMOVE CLUTCH COVER AND DISC

(a) Put alignment marks on the clutch cover and flywheel.

(b) Loosen the set bolts one turn at a time until spring tension is released.

(c) Remove the set bolts and pull off the clutch cover and disc.

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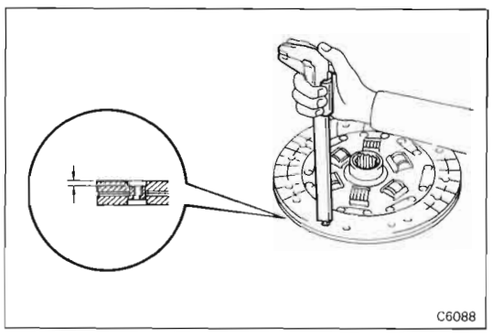

CL0016 CL0017

3. REMOVE BEARING, HUB AND FORK FROM TRANSMISSION

(a) Remove the retaining clip and pull off the bearing and hub.

(b) Remove the fork and boot.

INSPECTION OF CLUTCH PARTS

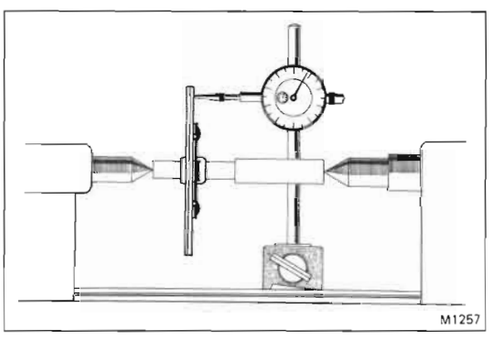

C6088

1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, replace the clutch disc.

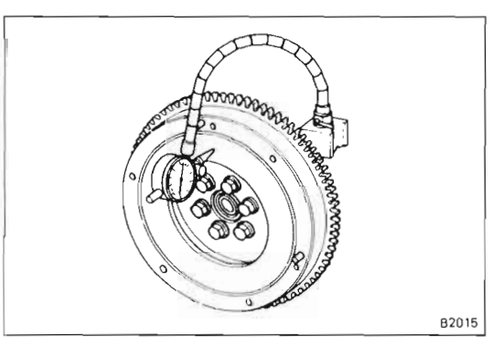

M1257

2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the disc.

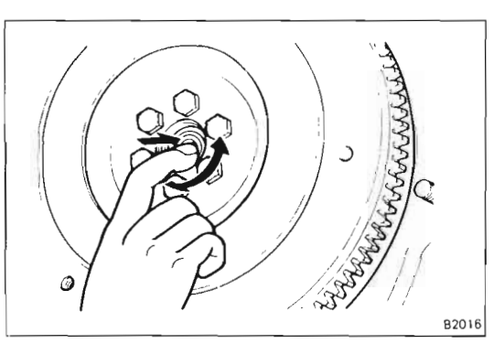

B2015

3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.2 mm (0.008 in.)

If runout is excessive, replace the flywheel.


B2016

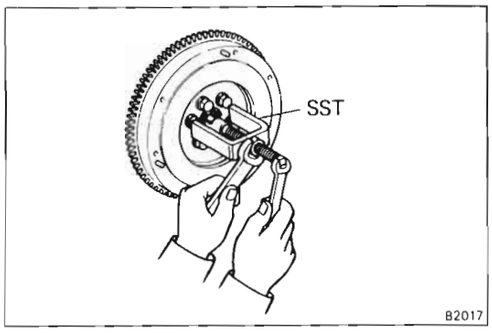
4. INSPECT PILOT BEARING

Turn the bearing by hand while applying force in the rotation direction.

If the bearing sticks or has much resistance, replace the pilot bearing.

NOTE: The bearing is permanently lubricated and requires no cleaning or lubrication.

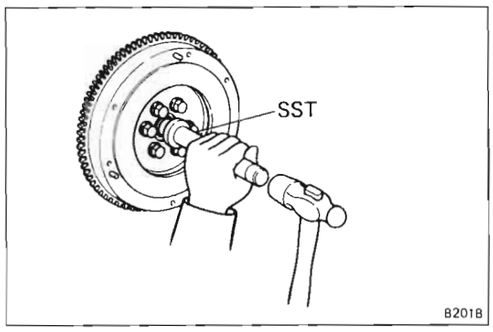
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5. IF NECESSARY, REPLACE PILOT BEARING

(a) Using SST, remove the pilot bearing.

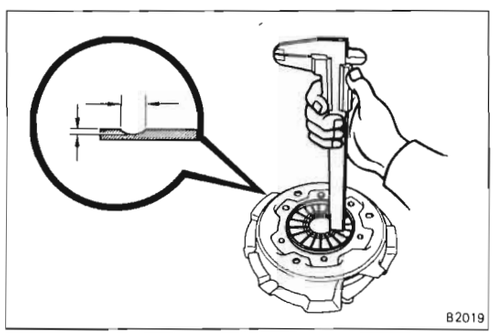
SST 09303-35011



(b) Using SST, install the pilot bearing.

SST 09304-30012

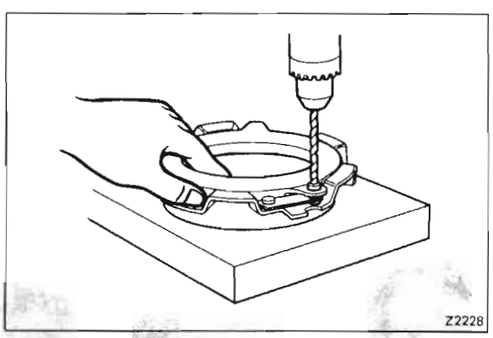
NOTE: After assembling the pilot bearing to the hub, insure that it rotates smoothly.



6. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.

Maximum: Depth 0.6 mm (0.024 in.)
Width 5.0 mm (0.197 in.)



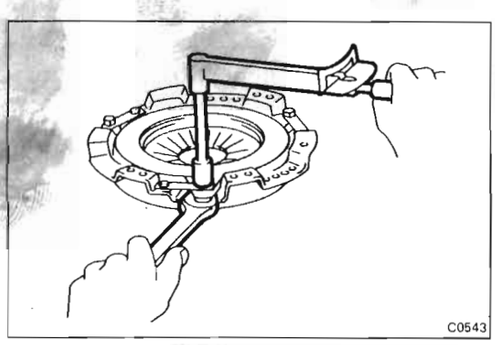
7. IF NECESSARY, REPLACE PRESSURE PLATE

(a) Remove the retracting spring.

(b) Drill out the rivet heads.

(c) Using a punch, drive out the rivets.

(d) Apply molybdenum disulphide lithium base grease (NLGI No. 2) to the contact surface of the pressure plate bolts and nuts. Torque the nuts.

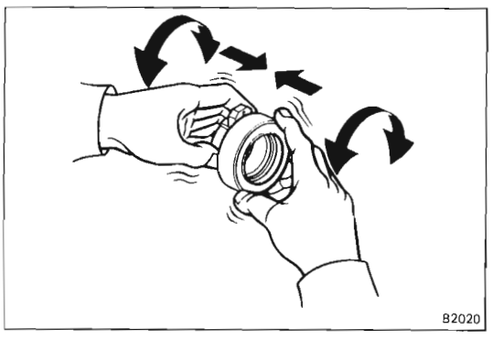


(e) Install a new pressure plate with the special pressure plate bolts and nuts. Torque the nuts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

(f) Using a punch, stake the nuts.

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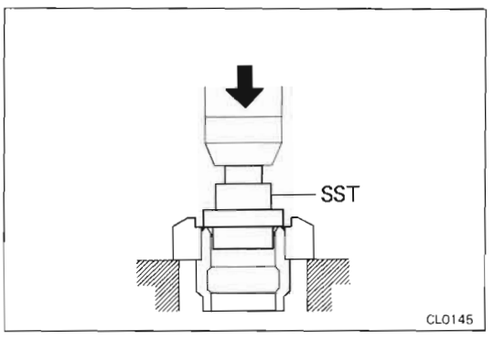


8. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the rotation direction.

If bearing sticks or has much resistance, replace the release bearing.

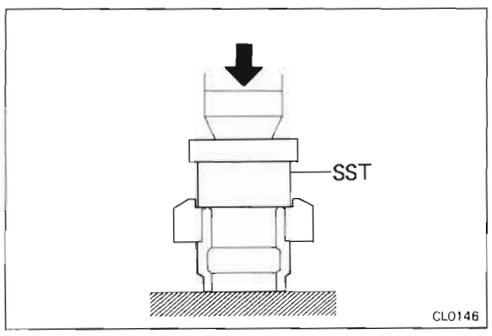
NOTE: The bearing is permanently lubricated and requires no cleaning or lubrication.



9. IF NECESSARY, REPLACE RELEASE BEARING

(a) Using a press and SST, press the release bearing from the hub.

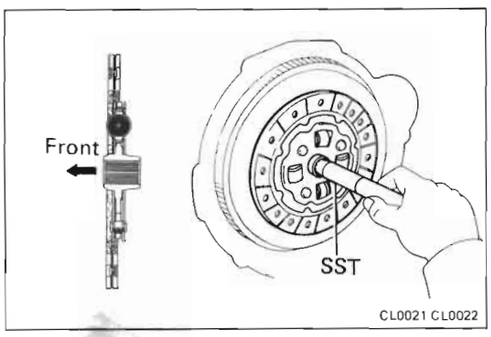
SST 09315-00010



(b) Using a press and SST, press a new release bearing into the hub.

SST 09315-00021

(c) After installing the bearing, check that there is no drag on the bearing when it is turned under pressure.



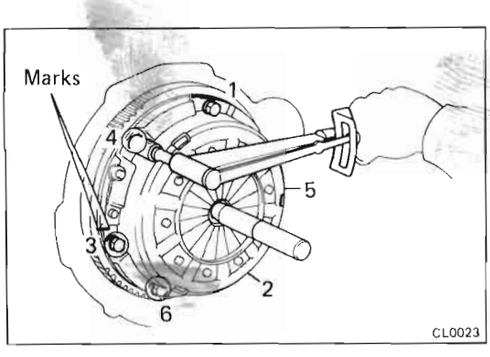
INSTALLATION OF CLUTCH UNIT

(See page CL-8)

1. INSTALL DISC ON FLYWHEEL

Using SST, install the disc on the flywheel.

SST 09301-20020



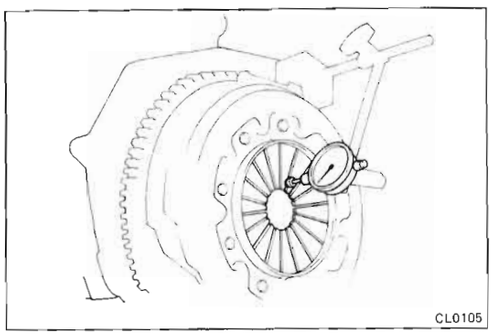
2. INSTALL CLUTCH COVER

(a) Align the marks on the clutch cover and flywheel.

(b) Tighten the bolts evenly. Make several passes around the cover until it is snug. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

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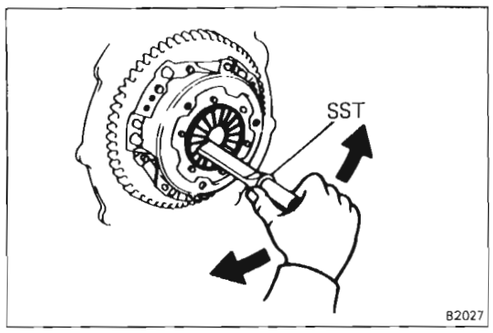

CL0105

3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

Using a dial indicator and measuring point, check the diaphragm spring tip alignment.

Maximum gap: 0.5 mm (0.020 in.)

If gap is excessive, adjust as follows.

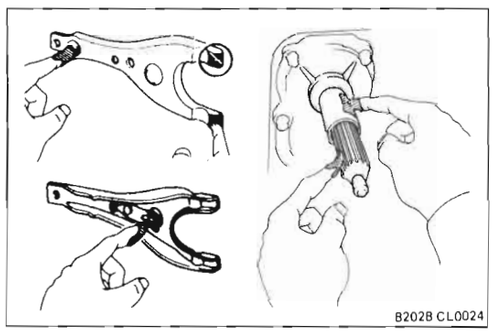


B2027

4. IF NECESSARY, ADJUST SPRINGS

Using SST, bend the springs to correct alignment.

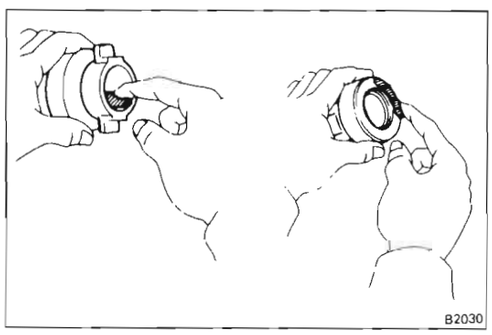
SST 09333-00012


B202B CL0024

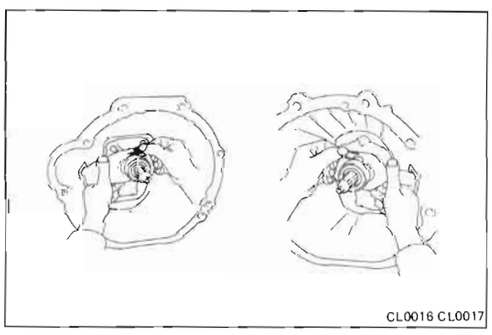
5. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE

(a) Apply molybdenum disulphide lithium base grease to the following parts:

- Release fork and hub contact point
- Release fork and push rod contact point
- Release fork pivot point
- Clutch disc spline
- Release bearing hub inside groove


B2030

(b) Apply molybdenum disulphide lithium base grease to release bearing.


CL0016 CL0017

6. INSTALL BOOT, FORK, HUB AND BEARING ON TRANSMISSION

7. INSTALL TRANSMISSION
(See page MT-35)

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MANUAL TRANSMISSION

	Page
TROUBLESHOOTING	MT-2
REMOVAL OF TRANSMISSION	MT-3
G40 AND G52F TRANSMISSIONS	MT-5
Components	MT-5
Disassembly of Transmission	MT-7
Inspection of Transmission Components	MT-16
Assembly of Transmission	MT-21
INSTALLATION OF TRANSMISSION	MT-35

MT

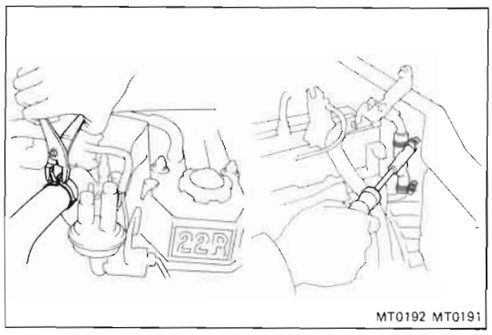
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TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Splines on input shaft dirty or burred	Repair as necessary	MT-3
	Transmission faulty	Disassemble and inspect transmission	MT-3
Transmission jumps out of gear	Transmission faulty	Disassemble and inspect transmission	MT-3

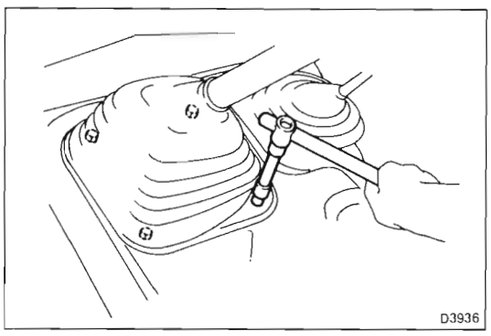
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REMOVAL OF TRANSMISSION

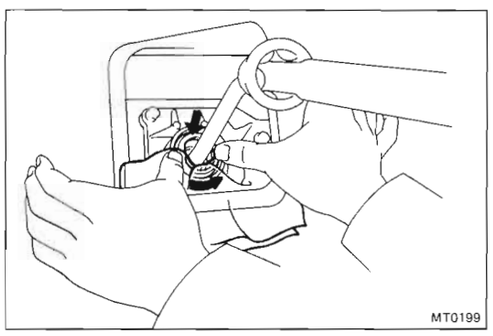


MT0192 MT0191

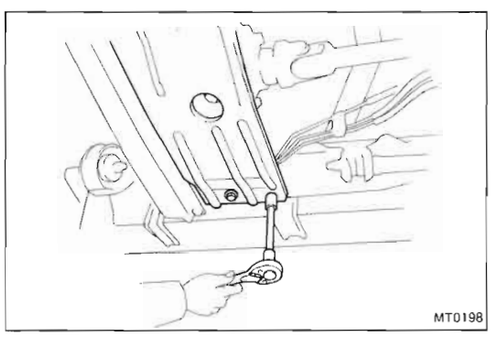
1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL
2. DRAIN OUT COOLANT (RJ)
3. DISCONNECT UPPER HOSE AND ENGINE REAR HEATER HOSE (RJ)


D3936

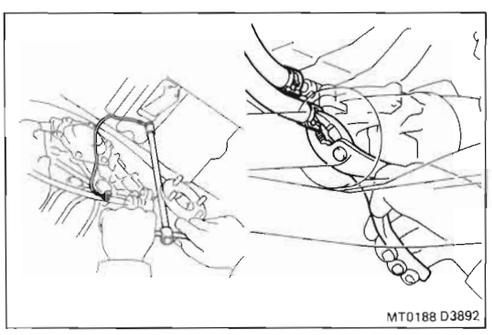
4. REMOVE TRANSMISSION SHIFT LEVER
   (a) Remove the shift lever boot.


MT0199

   (b) Cover the shift lever cap with a cloth.
   (c) Then, pressing down on the shift lever cap, rotate it counterclockwise to remove.
   (d) Remove the shift lever.

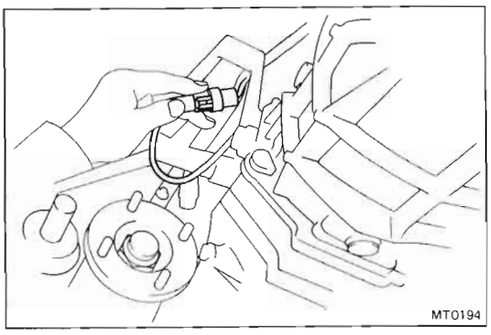

MT0198

5. RAISE VEHICLE AND DRAIN OUT TRANSMISSION AND TRANSFER GEAR OIL
6. REMOVE TRANSMISSION UNDERCOVER
7. REMOVE FRONT AND REAR PROPELLER SHAFTS (See page PR-3)


MT0188 D3892

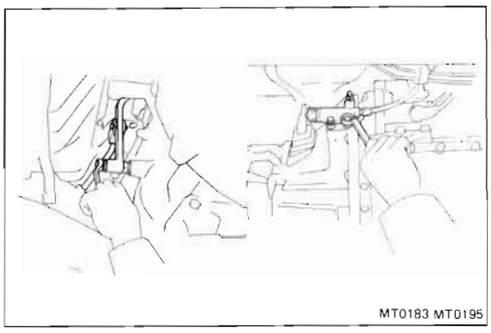
8. DISCONNECT BOND CABLE FROM BODY
9. REMOVE SPEEDOMETER CABLE
10. REMOVE DIAPHRAGM CYLINDER VACUUM HOSE (ELECTRICAL SHIFT TYPE)

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MT0194

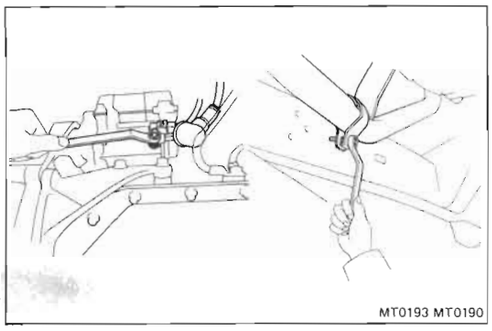
11. REMOVE 4WD AND BACK-UP LIGHT SWITCH CONNECTOR

12. REMOVE L4 SWITCH CONNECTOR (ELECTRICAL SHIFT TYPE)


MT0183 MT0195

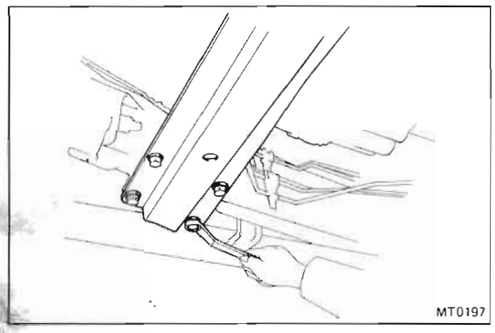
13. REMOVE TRANSFER SHIFT LEVER

14. REMOVE CLUTCH RELEASE CYLINDER


MT0193 MT0190

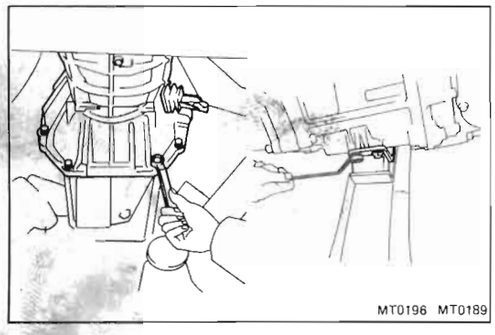
15. REMOVE STARTER
   (a) Disconnect the cable and connector.
   (b) Remove the starter.

16. REMOVE EXHAUST PIPE CLAMP AND BRACKET


MT0197

17. DISCONNECT ENGINE REAR SUPPORTMEMBER FROM BODY
   (a) Support the engine rear supportmember with the jack.
   (b) Remove the bolts from both sides of the supportmember.

18. LOWER TRANSMISSION


MT0196 MT0189

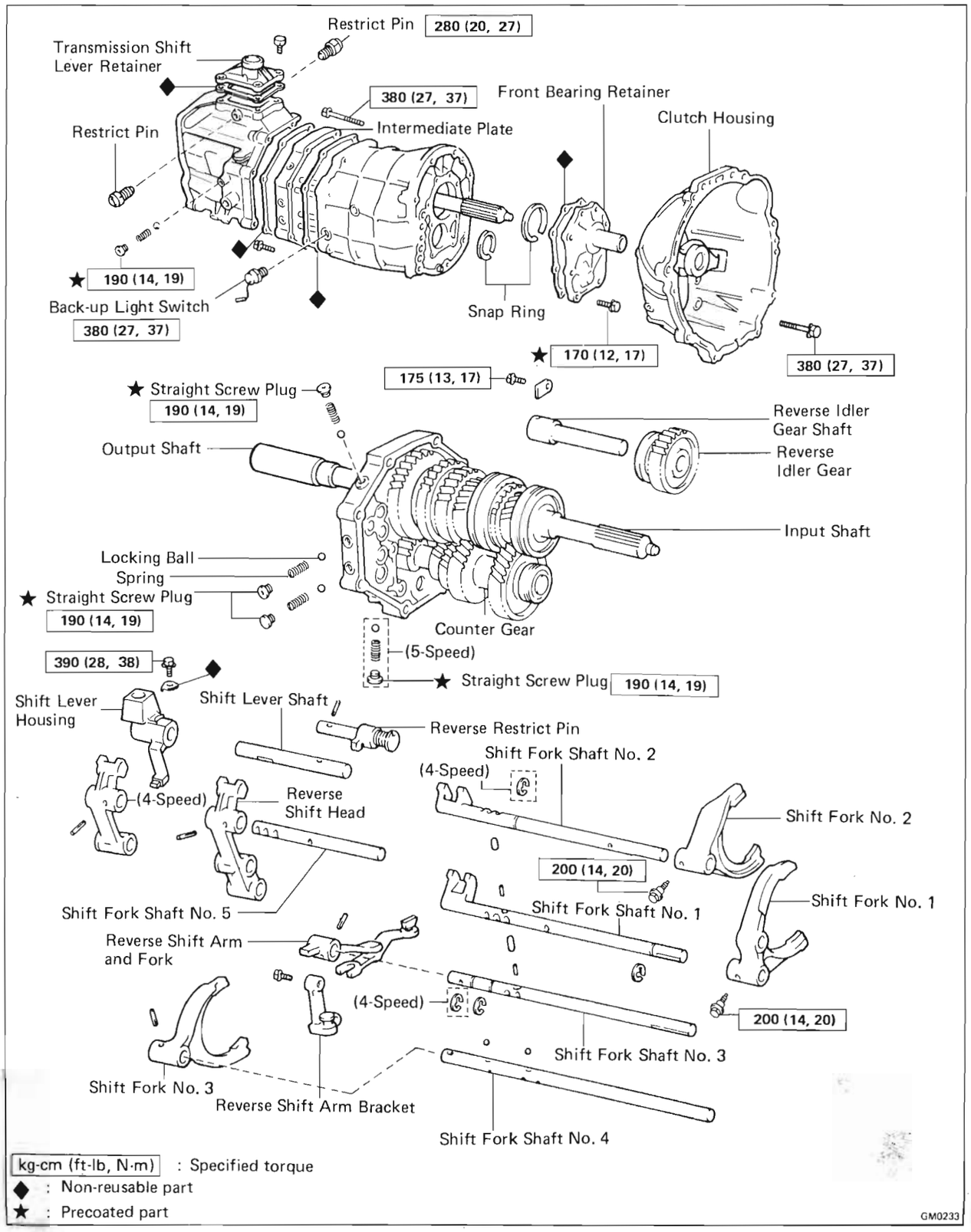
19. REMOVE TRANSMISSION WITH TRANSFER
   (a) Disconnect the transmission mounting bolts from the engine.
   (b) Remove the transmission with the transfer.

20. REMOVE ENGINE REAR SUPPORTMEMBER
   Remove the engine rear supportmember from the transmission.

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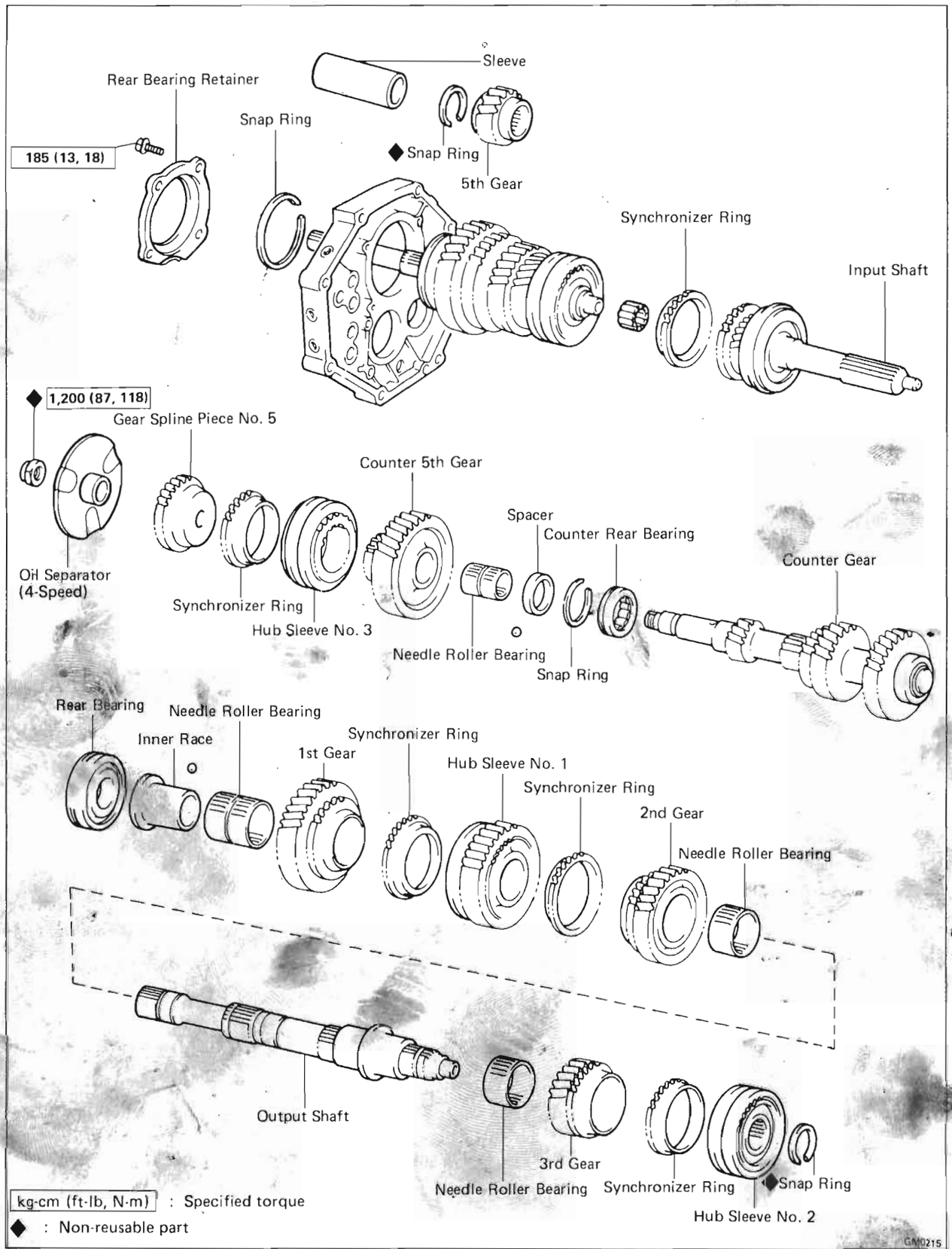
G40 AND G52F TRANSMISSIONS

COMPONENTS

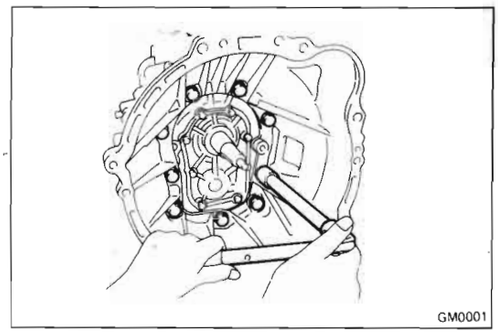


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COMPONENTS (Cont'd)



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GM0001

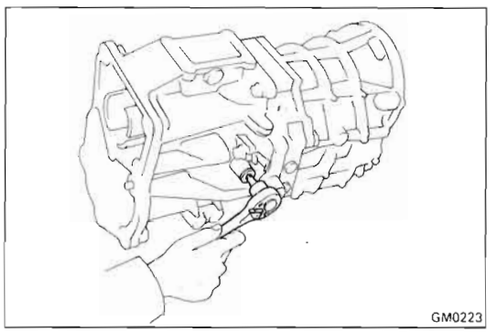
DISASSEMBLY OF TRANSMISSION

(See pages MT-5, 6)

1. REMOVE CLUTCH HOUSING

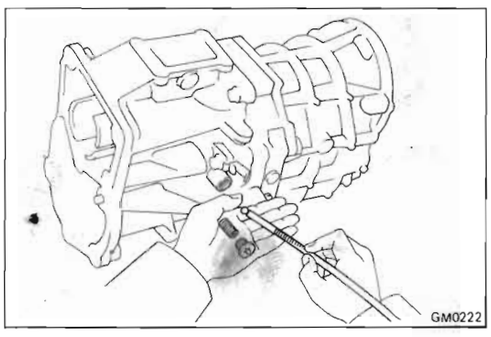
2. REMOVE BACK-UP LIGHT SWITCH, SHIFT LEVER RETAINER AND RESTRICT PINS

3. REMOVE TRANSFER
(See page TF-12)

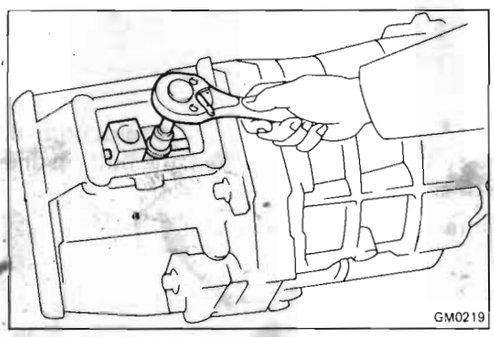

GM0223

4. REMOVE STRAIGHT SCREW PLUG, SPRING AND BALL

(a) Using a torx socket wrench, remove the screw plug from the transfer adapter.

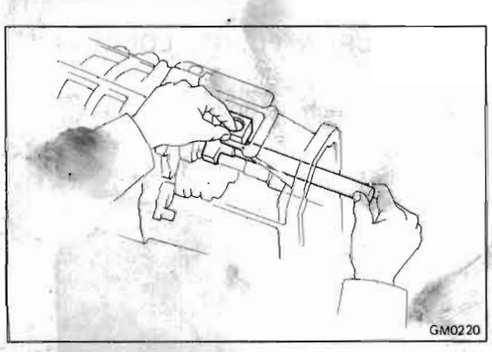

GM0222

(b) Using a magnetic finger, remove the spring and ball.


GM0219

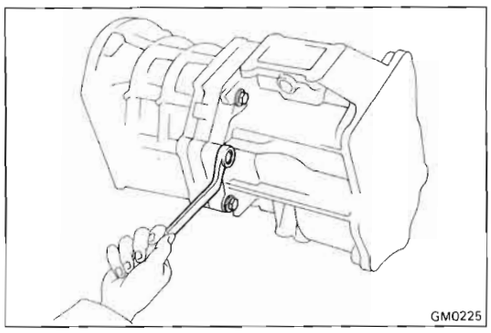
5. REMOVE TRANSFER ADAPTER

(a) Remove the shift lever housing set bolt and lock washer.


GM0220

(b) Remove the shift lever shaft and housing.

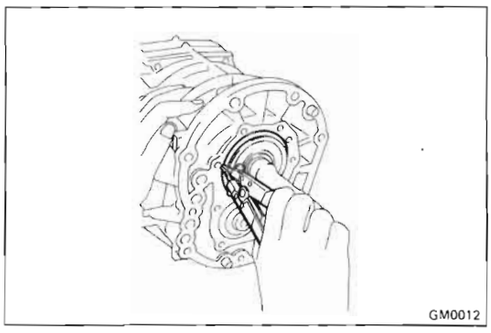
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GM0225

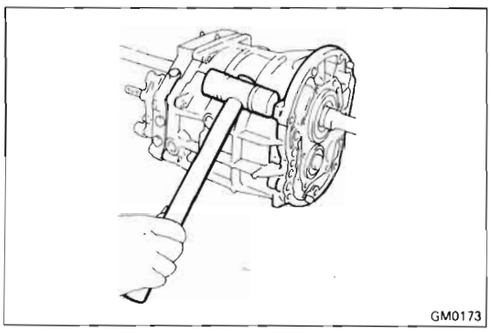
(c) Remove the eight bolts.

(d) Using a plastic hammer, remove the transfer adapter.

NOTE: Leave the gasket attached to the intermediate plate.


GM0012

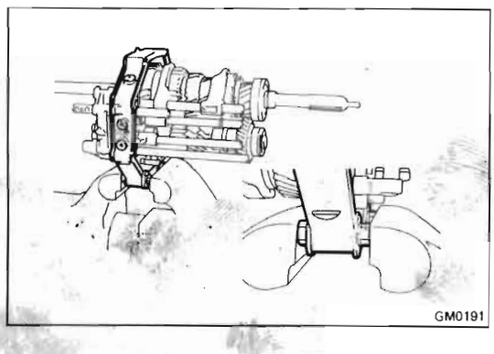
6. REMOVE FRONT BEARING RETAINER AND TWO BEARING SNAP RINGS


GM0173

7. SEPARATE INTERMEDIATE PLATE FROM TRANSMISSION CASE

(a) Using a plastic hammer, carefully tap off the transmission case.

(b) Remove the transmission case from the intermediate plate.

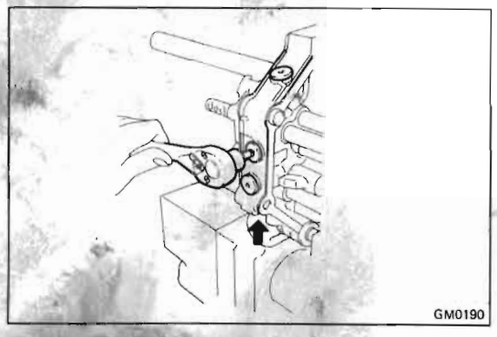

GM0191

8. MOUNT INTERMEDIATE PLATE IN VISE

(a) Use two clutch housing bolts, plate washers and suitable nuts as shown.

CAUTION: Install the plate washers in reverse of normal. Increase or decrease plate washers so that the bolt tip and front tip surface of the nut are aligned.

(b) Mount the intermediate plate in a vise.

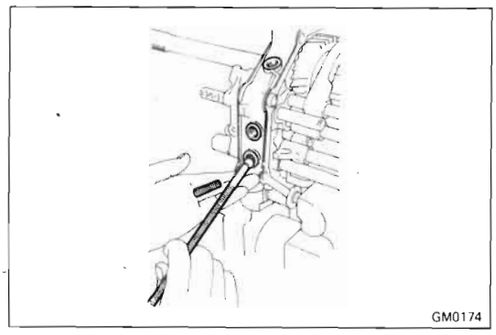

GM0190

9. REMOVE STRAIGHT SCREW PLUGS, LOCKING BALLS AND SPRINGS

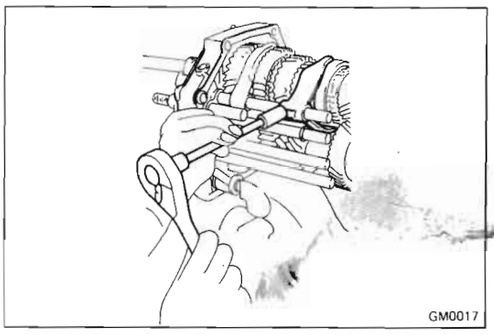
(a) Using a torx socket wrench, remove the plugs.

4-Speed: Three plugs
5-Speed: Four plugs

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GM0174

(b) Using a magnetic finger, remove the springs and balls.

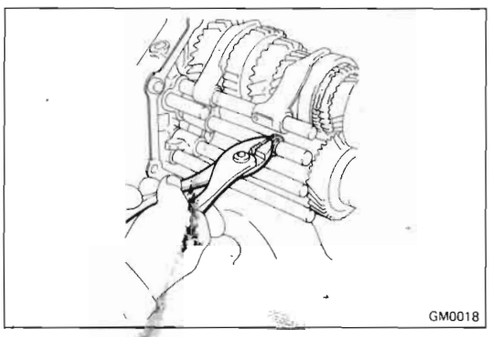

GM0017

10. REMOVE BOLTS AND SLOTTED SPRING PINS

(a) Remove the bolts from the shift fork No. 1 and No. 2.

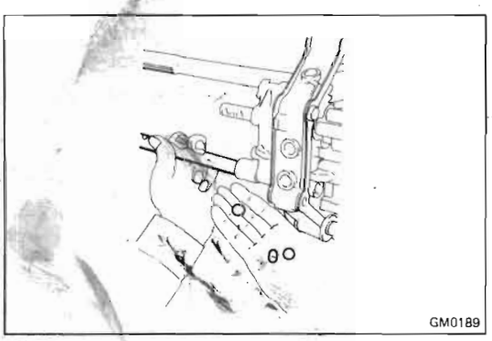
(b) Using a pin punch and hammer, drive out the pins.

4-Speed: Two pins
5-Speed: Three pins


GM0018

11. REMOVE E-RINGS

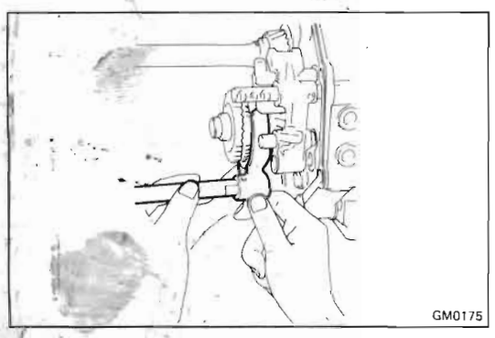
4-Speed: Four E-rings
5-Speed: Two E-rings


GM0189

12. REMOVE SHIFT FORK SHAFT NO. 4 AND SHIFT FORK NO. 3 (5-Speed)

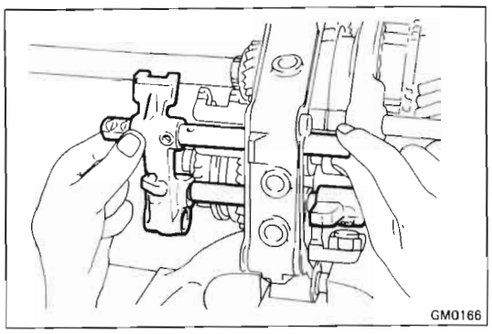
(a) Pull out the shift fork shaft No. 4 from the intermediate plate.

CAUTION: The locking balls and interlock pin will fall from the holes so be sure to catch them by hand. If they do not come out, remove them with a magnetic finger.


GM0175

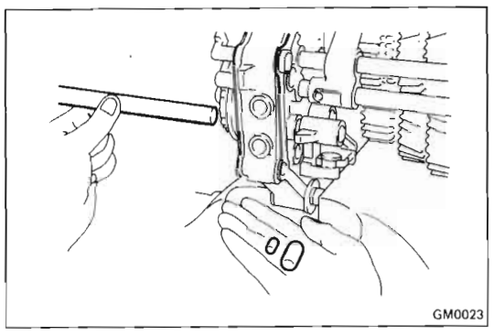
(b) Remove the shift fork shaft No. 4 and the shift fork No. 3.

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GM0166

13. REMOVE REVERSE SHIFT HEAD AND SHIFT FORK SHAFT NO. 5

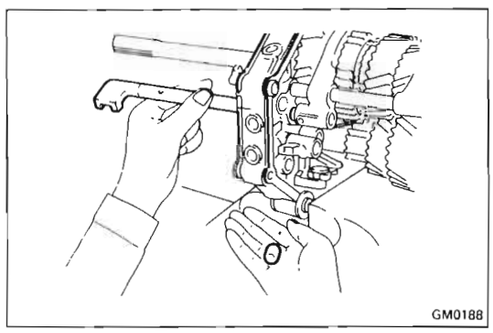
Pull out the shift fork shaft No. 5 from the intermediate plate, and remove it with the reverse shift head.


GM0023

14. REMOVE SHIFT FORK SHAFT NO. 3

Pull out the shift fork shaft No. 3 from the intermediate plate.

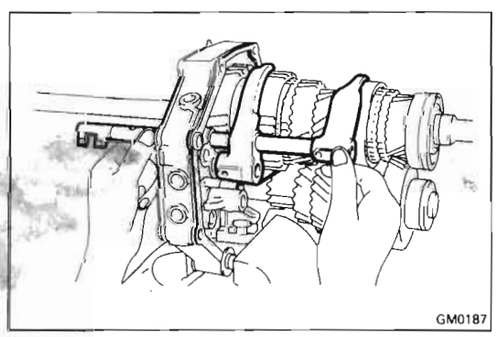
CAUTION: The interlock pins will fall from the hole so be sure to catch them by hand. If they do not come out, remove them with a magnetic finger.


GM0188

15. REMOVE SHIFT FORK SHAFT NO. 1

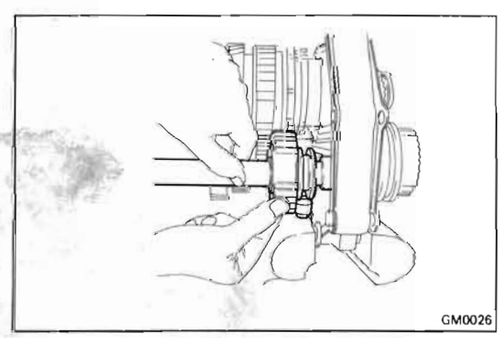
Pull out the shift fork No. 1 from the intermediate plate.

CAUTION: The interlock will fall from the hole so be sure to catch it by hand. If it does not come out, remove it with a magnetic finger.


GM0187

16. REMOVE SHIFT FORK SHAFT NO. 2, SHIFT FORK NO. 2 AND SHIFT FORK NO. 1

Pull out shift fork shaft No. 2 and remove shift fork No. 2 and No. 1.

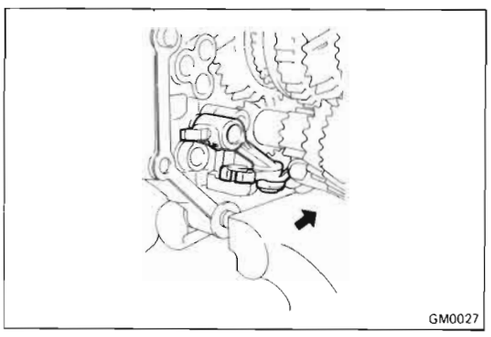

GM0026

17. REMOVE REVERSE IDLER GEAR AND SHAFT

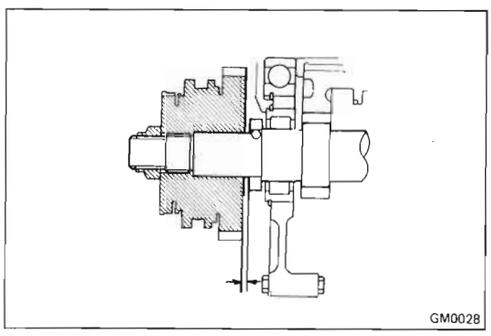
(a) Remove the reverse idler gear shaft stopper.

(b) Remove the reverse idler gear and shaft.

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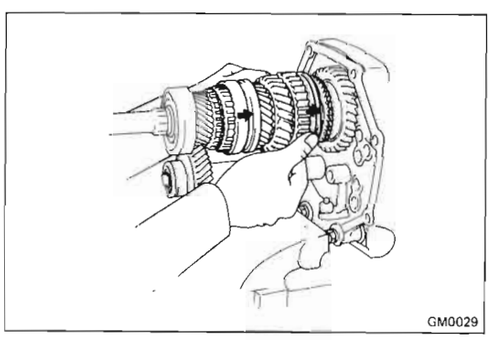
18. REMOVE REVERSE SHIFT ARM FROM REVERSE SHIFT ARM BRACKET



19. MEASURE COUNTER FIFTH GEAR THRUST CLEARANCE (5-Speed)

Using a feeler gauge, measure the counter 5th gear thrust clearance.

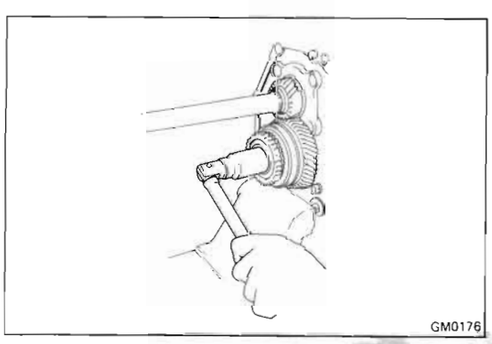
Standard clearance: 0.10 – 0.30 mm (0.0039 – 0.0118 in.)
Maximum clearance: 0.30 mm (0.0118 in.)



20.-1 REMOVE GEAR SPLINE PIECE NO. 5, SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS AND COUNTER FIFTH GEAR WITH HUB SLEEVE NO. 3 (5-Speed)

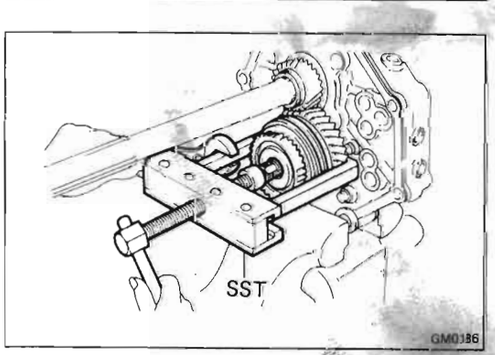
(a) Engage the gear double meshing.

(b) Using a hammer and chisel, loosen the staked part of the nut.



(c) Remove the lock nut.

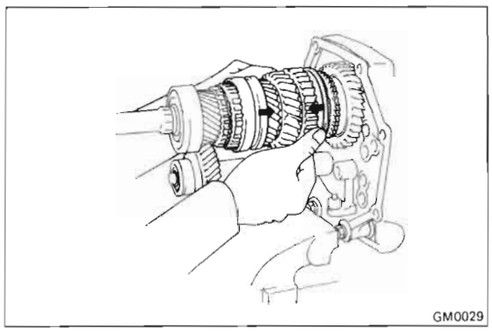
(d) Disengage the gear double meshing.



(e) Using SST, remove the gear spline piece No. 5, synchronizer ring, needle roller bearing and counter 5th gear.

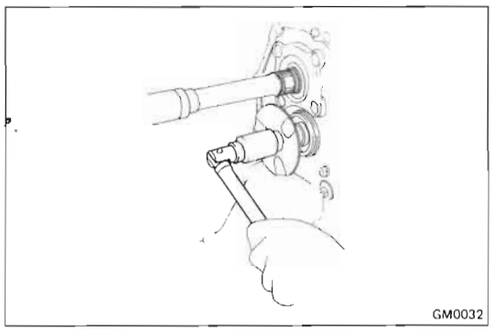
SST 09213-27010

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20.-2 REMOVE OIL SEPARATOR (4-Speed)

(a) Engage the gear double meshing.

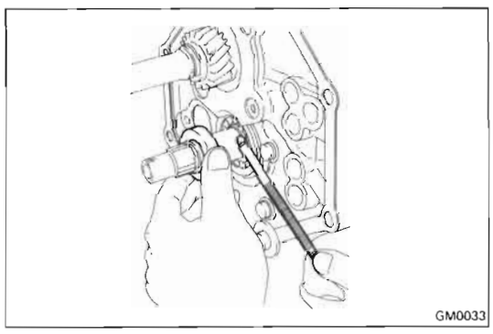


(b) Using a hammer and chisel, loosen the staked part of the nut.

(c) Remove the nut.

(d) Remove the oil separator.

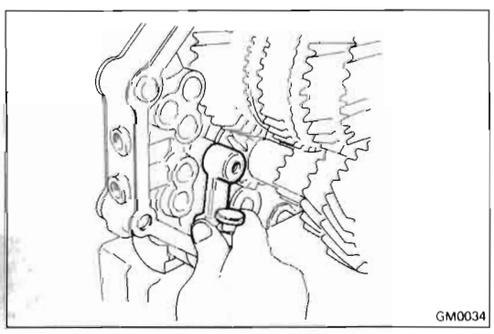
(e) Disengage the gear double meshing.



21. REMOVE SPACER AND BALL (5-Speed)

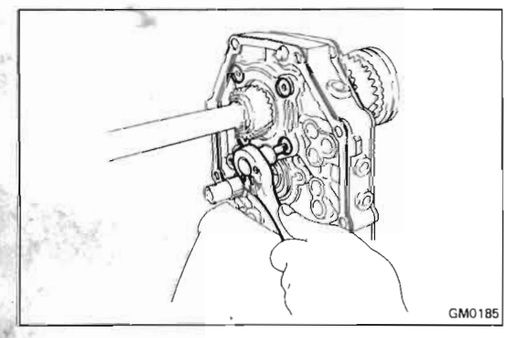
(a) Remove the spacer.

(b) Using a magnetic finger, remove the ball.



22. REMOVE REVERSE SHIFT ARM BRACKET

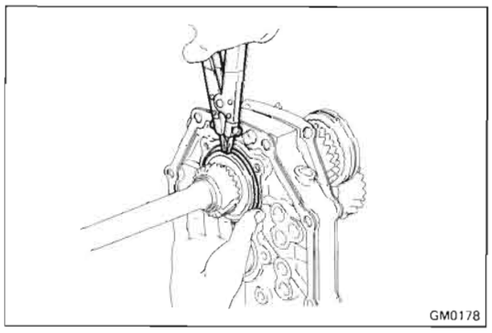
Remove the two bolts and the reverse shift arm bracket.



23. REMOVE REAR BEARING RETAINER

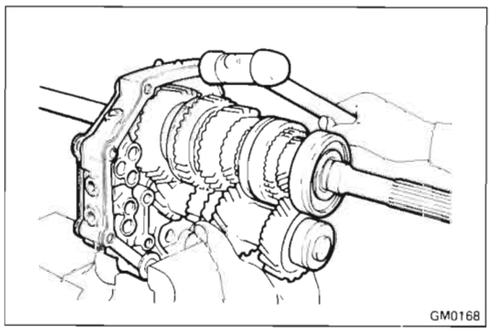
Using a torx socket wrench, remove the four bolts.

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24. REMOVE BEARING SNAP RING

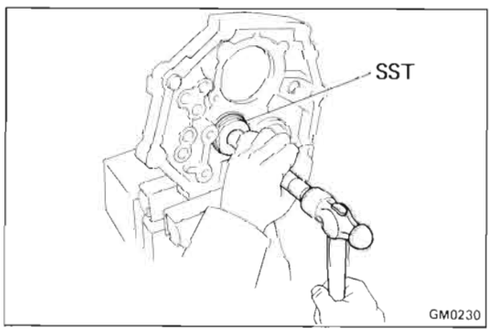
Using snap ring pliers, remove the snap ring.



25. REMOVE OUTPUT SHAFT, COUNTER GEAR AND INPUT SHAFT AS A UNIT FROM INTERMEDIATE PLATE

(a) Remove the output shaft, counter gear and input shaft as a unit from the intermediate plate by pulling on the counter gear and tapping on the intermediate plate with a plastic hammer.

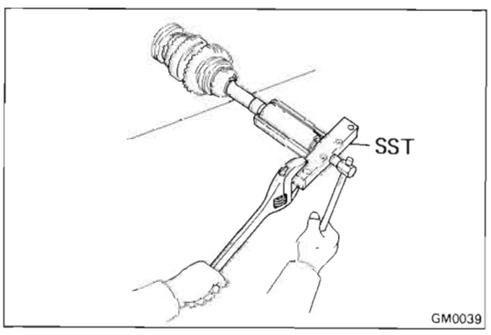
(b) Remove the input shaft with the 14-needle roller bearings from the output shaft.



26. REMOVE COUNTER REAR BEARING FROM INTERMEDIATE PLATE

Using SST, remove the counter rear bearing.

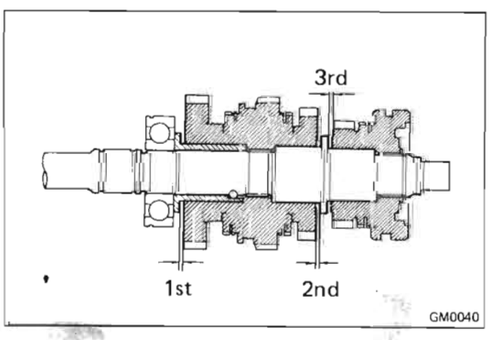
SST 09608-12010



27. REMOVE SLEEVE FROM OUTPUT SHAFT

Using SST, remove the sleeve from the output shaft.

SST 09950-20016



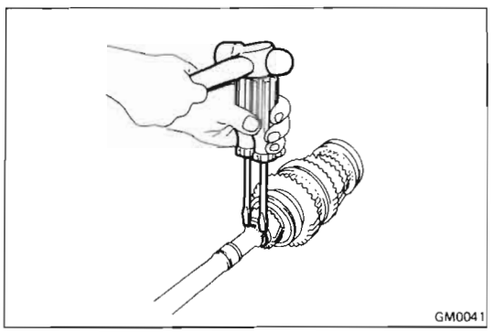
28. MEASURE EACH GEAR THRUST CLEARANCE

Measure the thrust clearance of each gear.

Standard clearance: **0.10 – 0.25 mm (0.0039 – 0.0098 in.)**

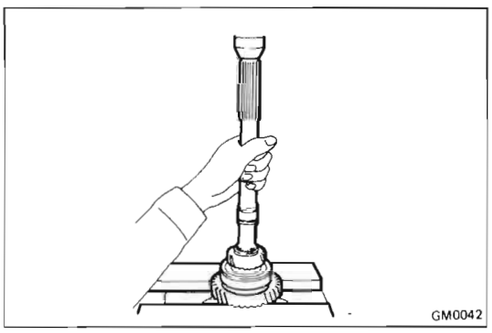
Maximum clearance: **0.25 mm (0.0098 in.)**

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GM0041

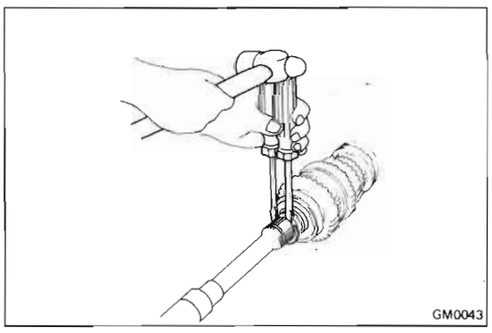
29.-1 REMOVE FIFTH GEAR, REAR BEARING, FIRST GEAR, INNER RACE AND NEEDLE ROLLER BEARING (5-Speed)

(a) Using two screwdrivers and a hammer, tap out the snap ring.


GM0042

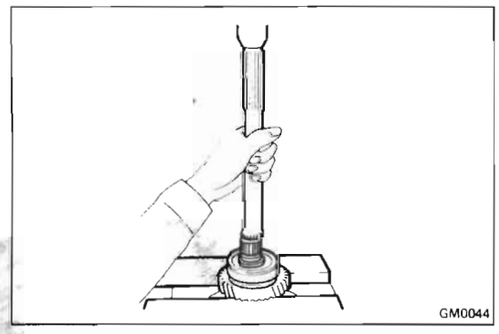
(b) Using a press, remove the 5th gear, rear bearing, 1st gear and inner race.

(c) Remove the needle roller bearing.


GM0043

29.-2 REMOVE REAR BEARING, FIRST GEAR, INNER RACE AND NEEDLE ROLLER BEARING (4-Speed)

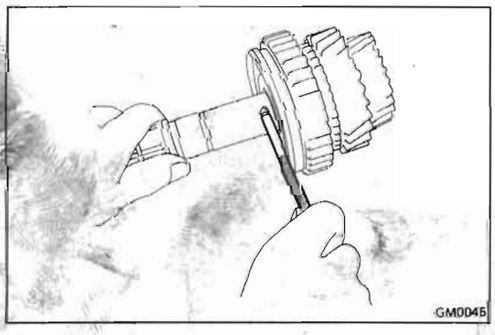
(a) Using two screwdrivers and a hammer, tap out the snap ring.


GM0044

(b) Using a press, remove the rear bearing, 1st gear and inner race.

(c) Remove the needle roller bearing.

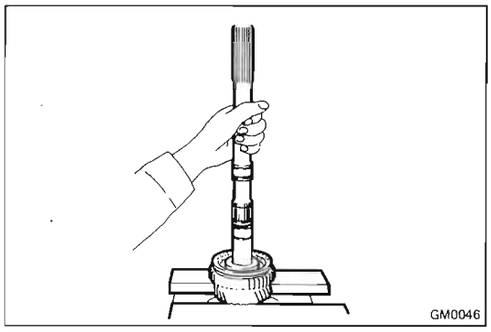
30. REMOVE SYNCHRONIZER RING


GM0045

31. REMOVE LOCKING BALL

Using a magnetic finger, remove the locking ball.

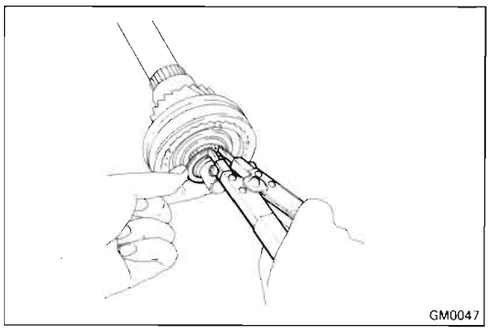
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32. REMOVE HUB SLEEVE NO. 1 ASSEMBLY AND SECOND GEAR ASSEMBLY

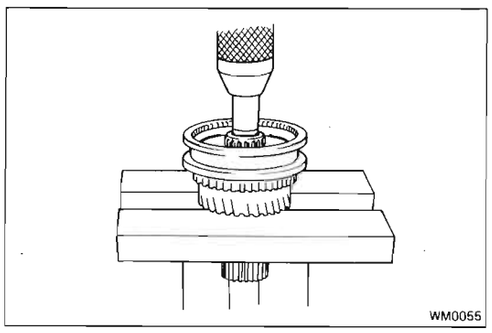
(a) Using a press, remove the hub sleeve No. 1, synchronizer ring and 2nd gear.

(b) Remove the needle roller bearing.



33. REMOVE HUB SLEEVE NO. 2 ASSEMBLY AND THIRD GEAR ASSEMBLY

(a) Using snap ring pliers, remove the snap ring.



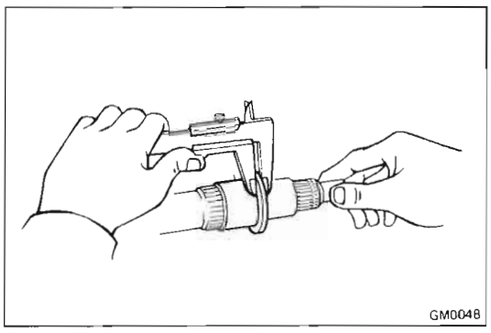
(b) Using a press, remove the hub sleeve No. 2, synchronizer ring and 3rd gear.

(c) Remove the needle roller bearing.

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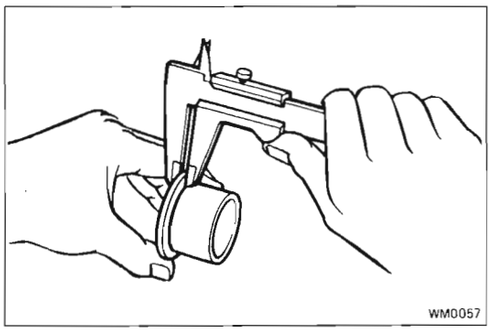
INSPECTION OF TRANSMISSION COMPONENTS

1. INSPECT OUTPUT SHAFT AND INNER RACE


GM0048

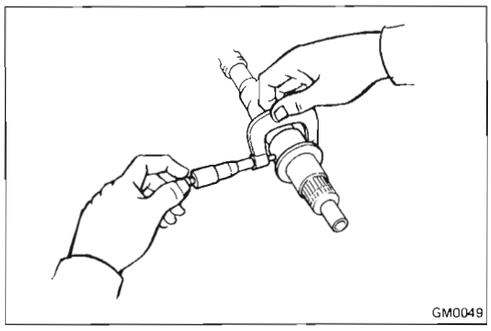
(a) Using calipers, meaure the output shaft flange thickness.

Minimum thickness: 4.80 mm (0.1890 in.)


WM0057

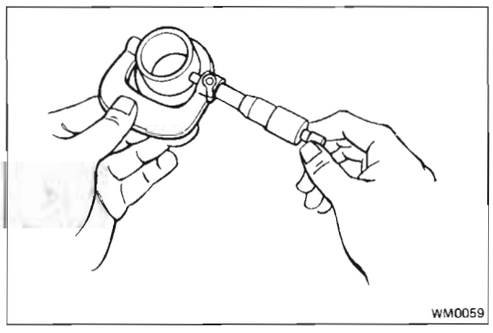
(b) Using calipers, measure the inner race flange thickness.

Minimum thickness: 3.99 mm (0.1571 in.)


GM0049

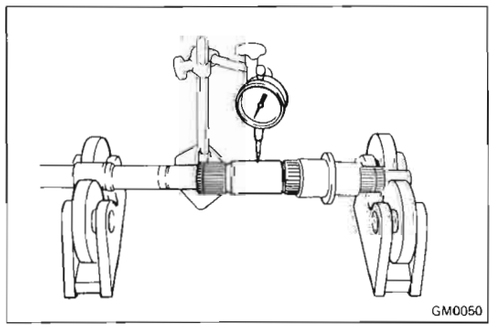
(c) Using a micrometer, measure the outer diameter of the output shaft journal.

Minimum diameter:
2nd gear 37.984 mm (1.4954 in.)
3rd gear 34.984 mm (1.3773 in.)


WM0059

(d) Using a micrometer, measure the outer diameter of the inner race.

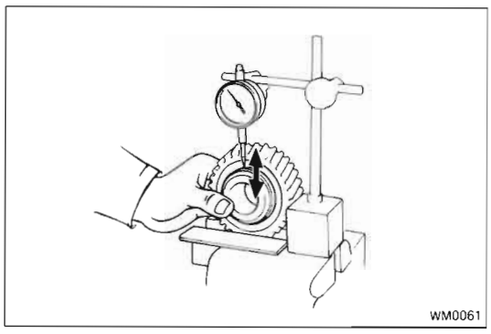
Minimum diameter: 38.985 mm (1.5348 in.)


GM0050

(e) Using a dial indicator, check the shaft runout.

Maximum runout: 0.05 mm (0.0020 in.)

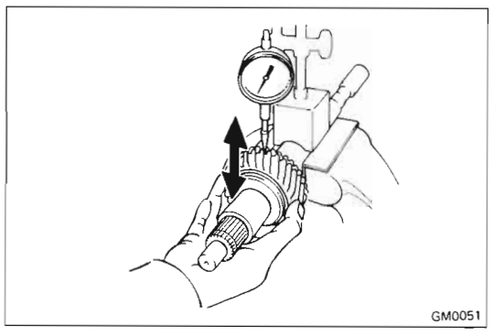
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WM0061

2. CHECK OIL CLEARANCE OF FIRST GEAR

Using a dial indicator, measure the oil clearance between the gear and inner race with the needle roller bearing installed.

Standard clearance: 0.009 – 0.032 mm (0.0004 – 0.0013 in.)
Maximum clearance: 0.032 mm (0.0013 in.)

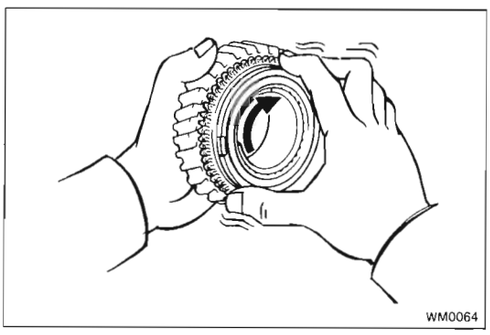

GM0051

3. CHECK OIL CLEARANCE OF SECOND, THIRD AND COUNTER FIFTH GEARS

Using a dial indicator, measure the oil clearance between the gear and shaft with the needle roller bearing installed.

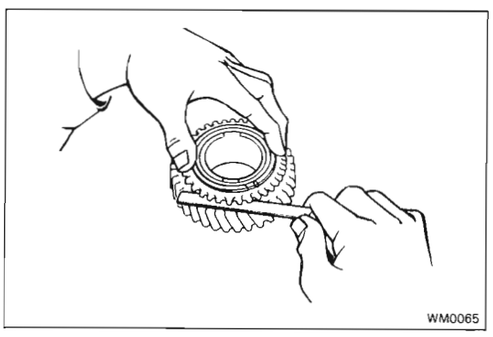
Standard clearance:
2nd and 3rd gears 0.009 – 0.033 mm (0.0004 – 0.0013 in.)
Counter 5th gear 0.009 – 0.032 mm (0.0004 – 0.0013 in.)

Maximum clearance:
2nd and 3rd gears 0.033 mm (0.0013 in.)
Counter 5th gear 0.032 mm (0.0013 in.)


WM0064

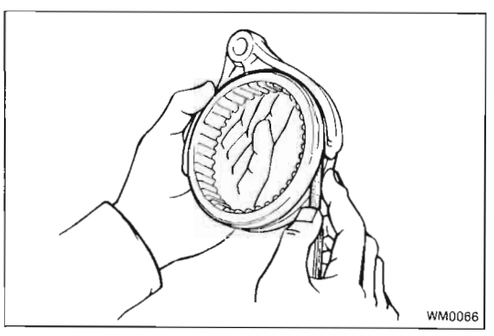
4. INSPECT SYNCHRONIZER RINGS

(a) Turn the ring and push it in to check the braking action.


WM0065

(b) Measure the clearance between the synchronizer ring back and the gear spline end.

Standard clearance: 1.0 – 2.0 mm (0.039 – 0.079 in.)
Minimum clearance: 0.8 mm (0.031 in.)

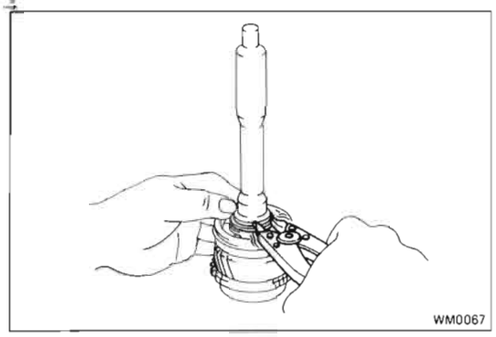

WM0066

5. MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVES

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

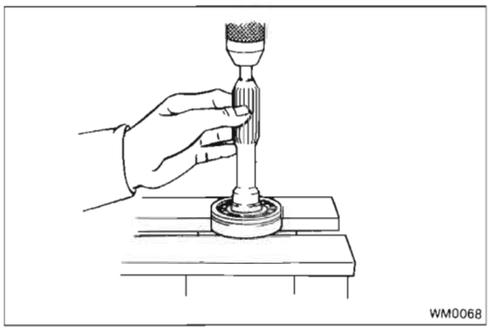
Maximum clearance: 1.0 mm (0.039 in.)

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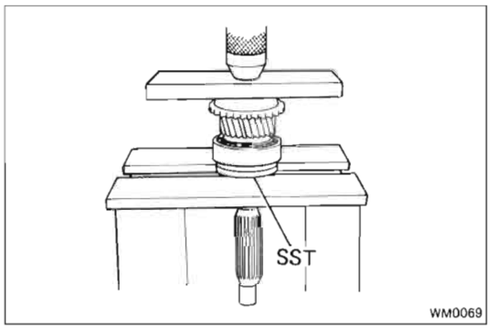

WM0067

6. **IF NECESSARY, REPLACE INPUT SHAFT BEARING**

(a) Using snap ring pliers, remove the snap ring.


WM0068

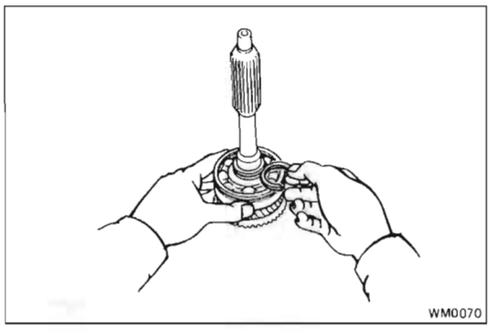
(b) Using a press, remove the bearing.



WM0069

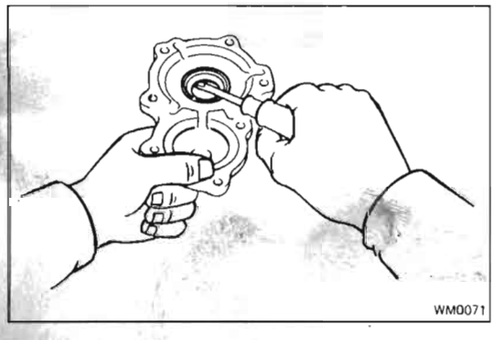
(c) Using a press and SST, install a new bearing.

SST 09506-35010


WM0070

(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

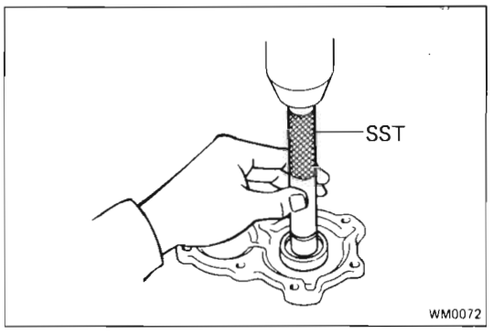
Mark	Thickness	mm (in.)
0	2.05 – 2.10	(0.0807 – 0.0827)
1	2.10 – 2.15	(0.0827 – 0.0846)
2	2.15 – 2.20	(0.0846 – 0.0866)
3	2.20 – 2.25	(0.0866 – 0.0886)
4	2.25 – 2.30	(0.0886 – 0.0906)
5	2.30 – 2.35	(0.0906 – 0.0925)


WM0071

7. **IF NECESSARY, REPLACE FRONT BEARING RETAINER OIL SEAL**

(a) Using a screwdriver, pry out the oil seal.

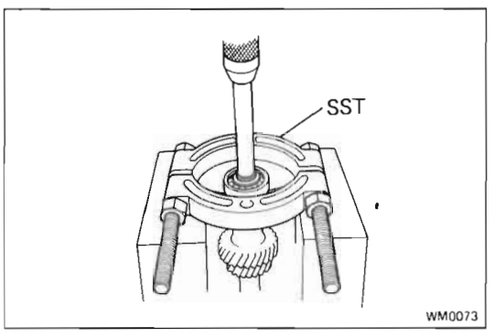
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(b) Using SST, press in the oil seal.

SST 09223-50010

Oil seal depth: 12.2 – 13.2 mm (0.480 – 0.520 in.)
Transmission case installation surface



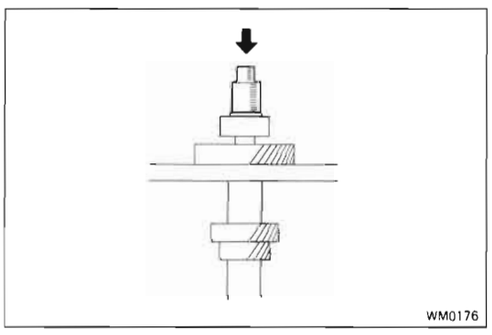
8. IF NECESSARY, REPLACE COUNTER GEAR FRONT BEARING

(a) Using snap ring pliers, remove the snap ring.

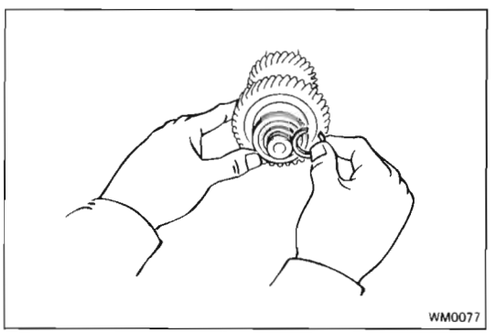
(b) Using SST, press out the bearing.

SST 09950-00020

(c) Replace the side race.

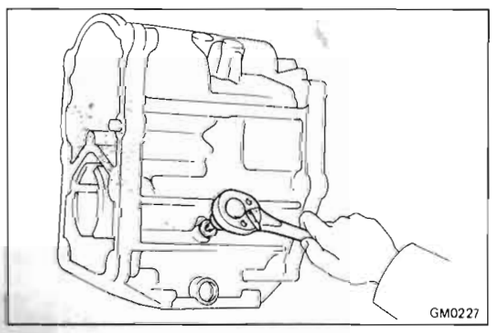


(d) Using a socket wrench, press in the bearing, side race and inner race.



(e) Select a snap ring that will allow minimum axial play and install it on the shaft.

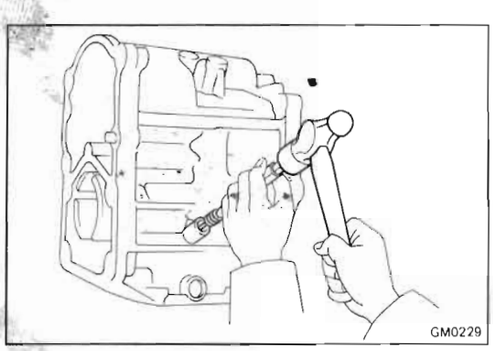
Mark	Thickness	mm (in.)
1	2.05 – 2.10	(0.0807 – 0.0827)
2	2.10 – 2.15	(0.0827 – 0.0846)
3	2.15 – 2.20	(0.0846 – 0.0866)
4	2.20 – 2.25	(0.0866 – 0.0886)
5	2.25 – 2.30	(0.0886 – 0.0906)
6	2.30 – 2.35	(0.0906 – 0.0925)



9. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

(a) Using a torx socket wrench, remove the screw plug.

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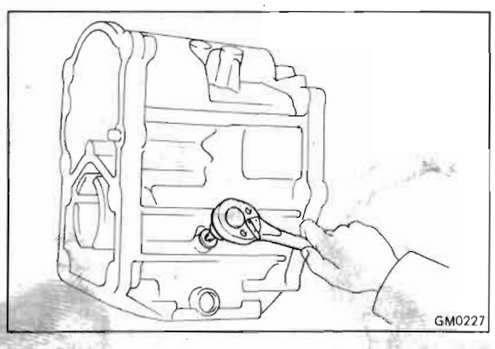

GM0229

(b) Using a pin punch and hammer, drive out the slotted spring pin.

(c) Pull off the lever housing and slide out the shaft.

(d) Install the level housing.

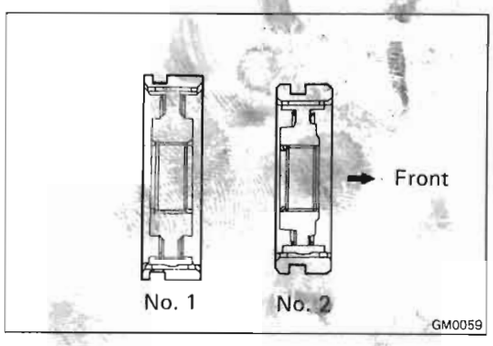
(e) Using a pin punch and hammer, drive in the slotted spring pin.


GM0227

(f) Using a torx socket wrench, install and torque the screw plug.

Torque: 190 kg-cm (14 ft-lb, 19 N·m)

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ASSEMBLY OF TRANSMISSION

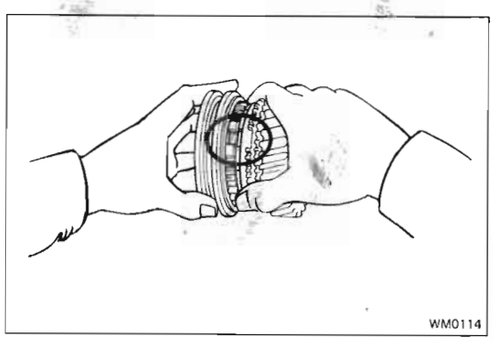
(See pages MT-5, 6)

1. INSERT CLUTCH HUBS NO. 1 AND NO. 2 INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

CAUTION: Install the key springs positioned so that their end gaps are not in line.

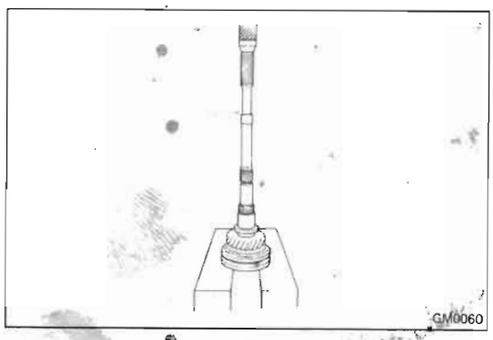


2. INSTALL THIRD GEAR AND HUB SLEEVE NO. 2 ON OUTPUT SHAFT

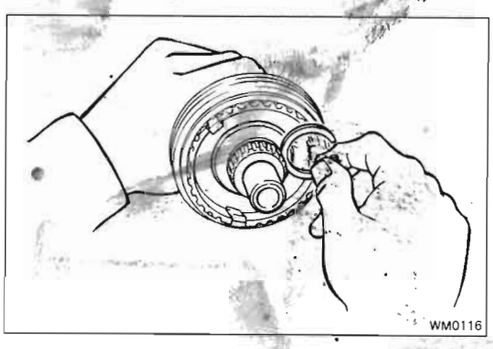
(a) Apply gear oil to the shaft and needle roller bearing.

(b) Place the synchronizer on the gear and align the ring slots with the shifting keys.

(c) Install the needle roller bearing in the 3rd gear.

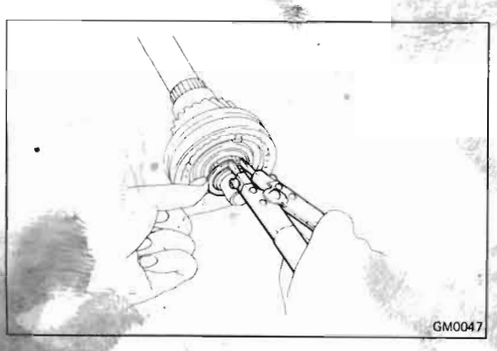


(d) Using a press, install the 3rd gear and hub sleeve No. 2.



3. INSTALL SNAP RING

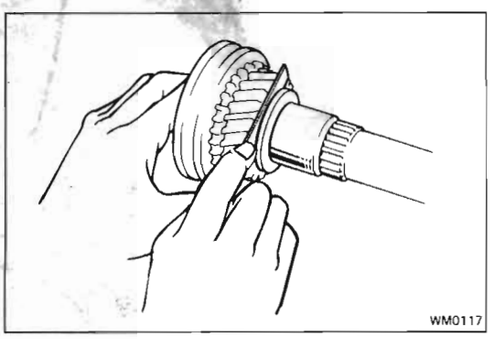
(a) Select a snap ring that will allow minimum axial play.



(b) Using snap ring pliers, install the snap ring.

Mark	C-1	1.75 – 1.80 mm (0.0689 – 0.0709 in.)
	D	1.80 – 1.85 mm (0.0709 – 0.0728 in.)
	D-1	1.85 – 1.90 mm (0.0728 – 0.0748 in.)
	E	1.90 – 1.95 mm (0.0748 – 0.0768 in.)
	E-1	1.95 – 2.00 mm (0.0768 – 0.0787 in.)
	F	2.00 – 2.05 mm (0.0787 – 0.0807 in.)
	F-1	2.05 – 2.10 mm (0.0807 – 0.0827 in.)

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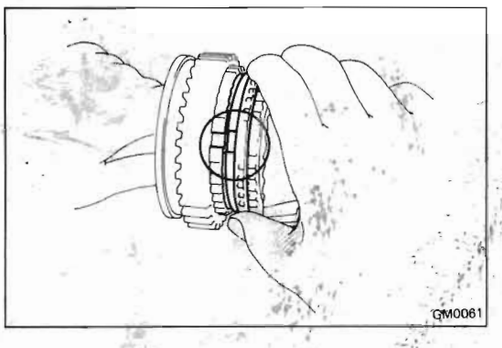


4. MEASURE THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

Standard clearance: **0.10 – 0.25 mm (0.0039 – 0.0098 in.)**

Maximum clearance: **0.25 mm (0.0098 in.)**

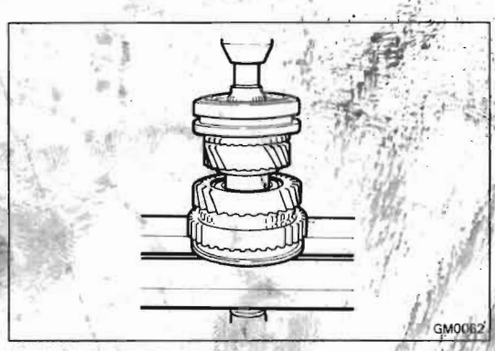


5. INSTALL SECOND GEAR AND HUB SLEEVE NO. 1

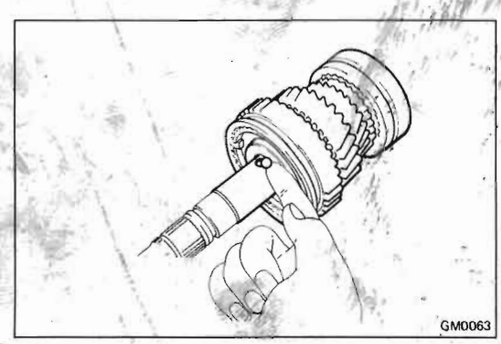
(a) Apply gear oil to the shaft and needle roller bearing.

(b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(c) Install the needle roller bearing in the 2nd gear.



(d) Using a press, install the 2nd gear and hub sleeve No. 1.

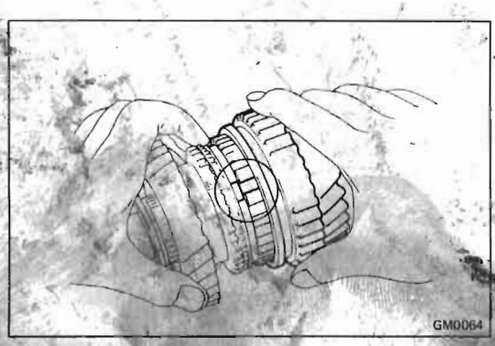


6. INSTALL LOCKING BALL AND FIRST GEAR ASSEMBLY

(a) Install the locking ball in the shaft.

(b) Apply gear oil to the needle roller bearing.

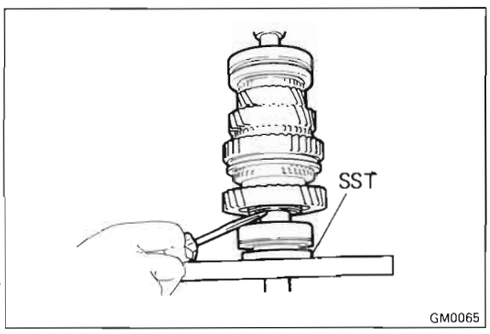
(c) Assemble the 1st gear, synchronizer ring, needle roller bearing and bearing inner race.



(d) Install the assembly on the output shaft with the synchronizer ring slots aligned with the shifting keys.

(e) Turn the inner race to align it with the locking ball.

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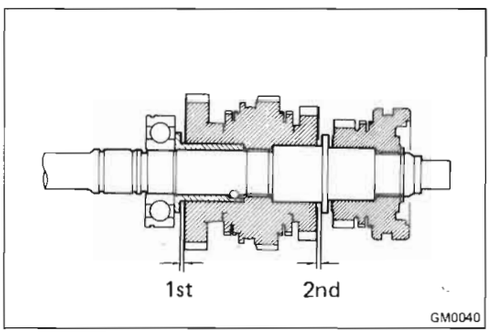


7. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and a press, install the bearing on the output shaft with the outer race snap ring groove toward the rear.

NOTE: Hold the 1st gear inner race to prevent it from falling.

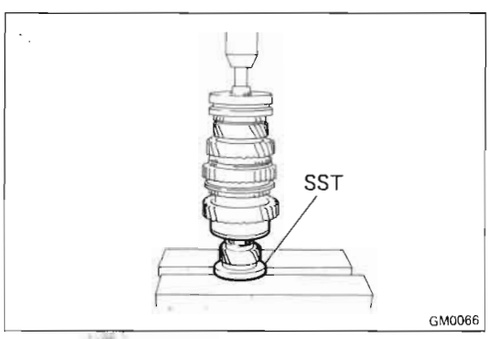
SST 09506-35010



8. MEASURE FIRST AND SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 1st and 2nd gear thrust clearance.

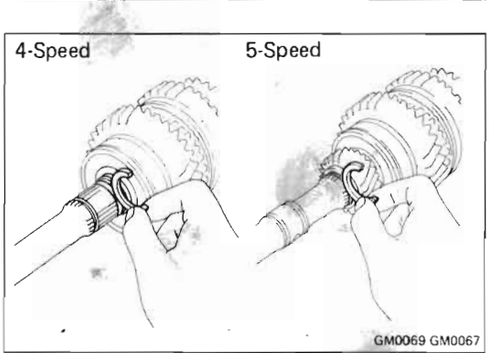
Standard clearance: **0.10 – 0.25 mm (0.0039 – 0.0098 in.)**
Maximum clearance: **0.25 mm (0.0098 in.)**



9. INSTALL FIFTH GEAR (5-Speed)

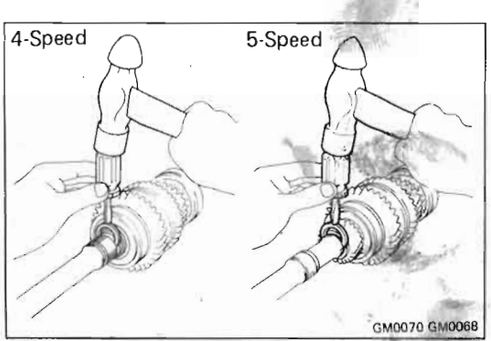
Using SST and a press, install the 5th gear.

SST 09506-35010



10. INSTALL SNAP RING

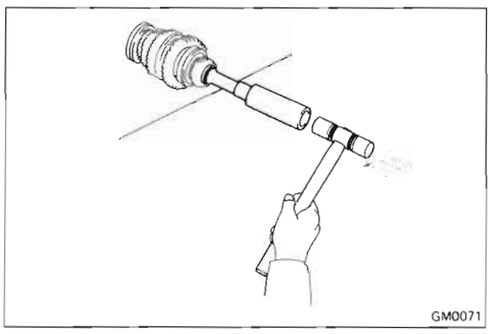
(a) Select a snap ring that will allow minimum axial play.



(b) Using a screwdriver and hammer, install the snap ring.

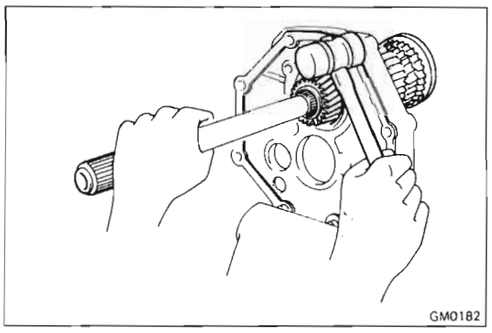
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.67 – 2.72 (0.1051 – 0.1071)	G	3.03 – 3.08 (0.1193 – 0.1213)
B	2.73 – 2.78 (0.1075 – 0.1094)	H	3.09 – 3.14 (0.1217 – 0.1236)
C	2.79 – 2.84 (0.1098 – 0.1118)	J	3.15 – 3.20 (0.1240 – 0.1260)
D	2.85 – 2.90 (0.1122 – 0.1142)	K	3.21 – 3.26 (0.1264 – 0.1283)
E	2.91 – 2.96 (0.1146 – 0.1165)	L	3.27 – 3.32 (0.1287 – 0.1307)
F	2.97 – 3.02 (0.1169 – 0.1189)		

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GM0071

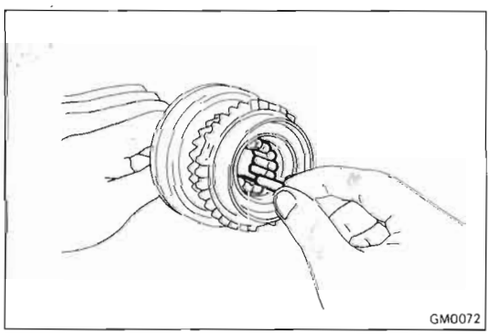
11. INSTALL SLEEVE TO OUTPUT SHAFT

Using a plastic hammer, tap the sleeve onto the output shaft.


GM0182

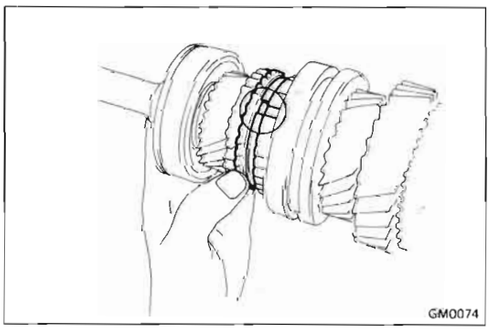
12. INSTALL OUTPUT SHAFT TO INTERMEDIATE PLATE

Install the output shaft into the intermediate plate by pulling on the output shaft and tapping on the intermediate plate.

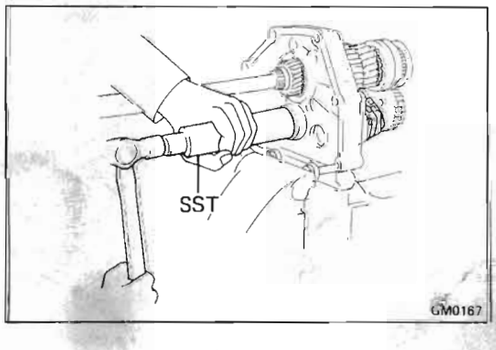

GM0072

13. INSTALL INPUT SHAFT

(a) Apply MP grease to the 14-needle roller bearing and install it into the input shaft.


GM0074

(b) Install the input shaft to the output shaft with the synchronizer ring slots aligned with the shifting keys.



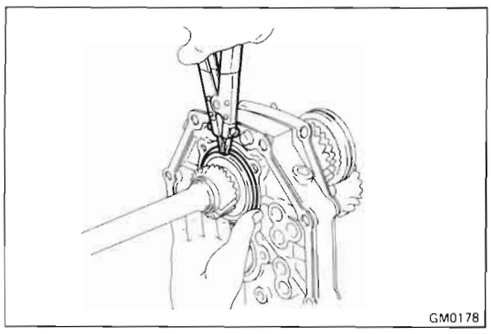
GM0167

14. INSTALL COUNTER GEAR

Install the counter gear into the intermediate plate while holding the counter gear, and install the counter rear bearing with SST.

SST 09316-60010

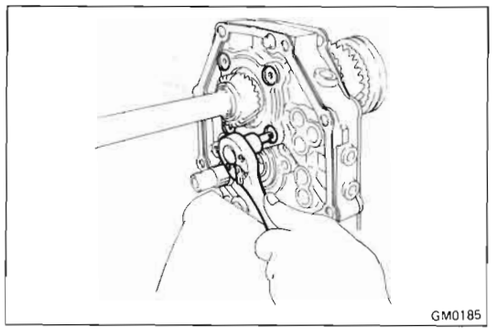
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GM0178

15. INSTALL BEARING SNAP RING

Using snap ring pliers, install the snap ring.

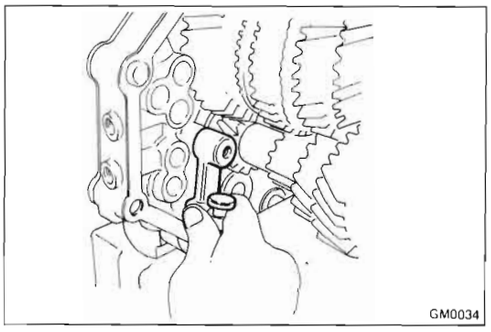
NOTE: Be sure the snap ring is flush with the intermediate plate surface.


GM0185

16. INSTALL REAR BEARING RETAINER

Using a torx socket wrench, install and torque the screws.

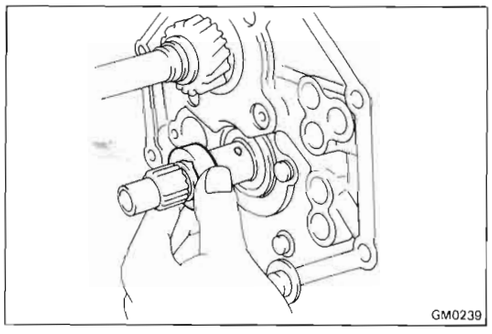
Torque: 185 kg-cm (13 ft-lb, 18 N·m)


GM0034

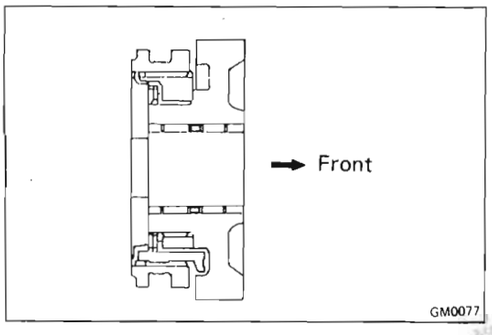
17. INSTALL REVERSE SHIFT ARM BRACKET

Install the reverse shift arm bracket and torque the bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)


GM0239

18. INSTALL BALL AND SPACER (5-Speed)



GM0077

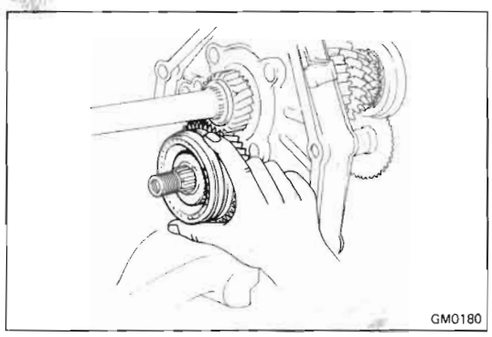
19. INSERT COUNTER FIFTH GEAR INTO HUB SLEEVE NO. 3 (5-Speed)

(a) Install the shifting keys and hub sleeve No. 3 onto the counter 5th gear.

(b) Install the shifting key springs under the shifting keys.

CAUTION: Install the key springs positioned so that their end gaps are not in line.

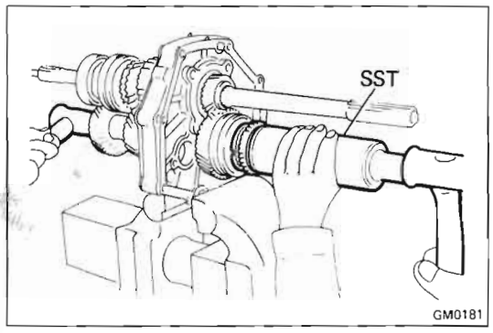
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GM0180

20. INSTALL COUNTER FIFTH GEAR WITH HUB SLEEVE NO. 3 ASSEMBLY AND NEEDLE ROLLER BEARINGS (5-Speed)

(a) Apply gear oil to the needle roller bearings.

(b) Install the counter 5th gear with hub sleeve No. 3 and needle roller bearings.



GM0181

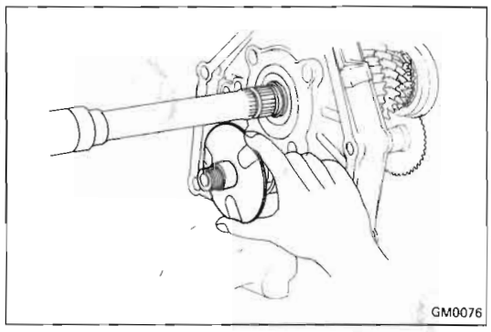
21. INSTALL SYNCHRONIZER RING AND GEAR SPLINE PIECE NO. 5 (5-Speed)

(a) Install the synchronizer ring on the gear spline piece No. 5.

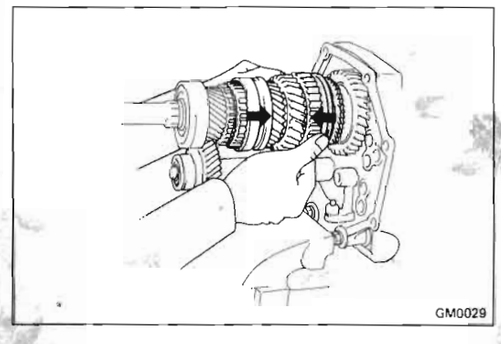
(b) Using SST, drive in the gear spline piece No. 5 with the synchronizer ring slots aligned with the shifting keys.

SST 09316-60010

NOTE: When installing the gear spline piece No. 5, support the counter gear in front with a 3-5 lb hammer or equivalent.

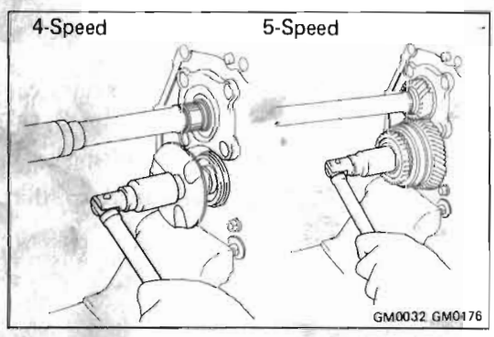

GM0076

22. INSTALL OIL SEPARATOR (4-Speed)


GM0029

23. INSTALL LOCK NUT

(a) Engage the gear double meshing.



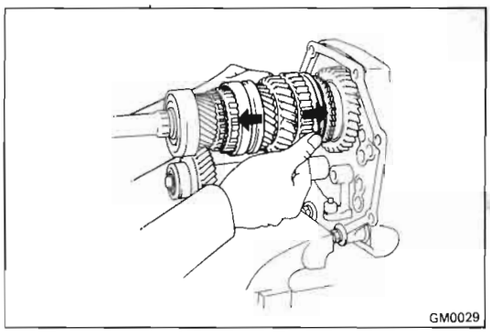
GM0032 GM0176

(b) Install and torque the lock nut.

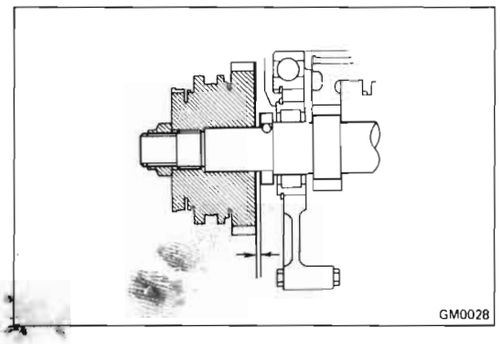
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)

(c) Stake the lock nut.

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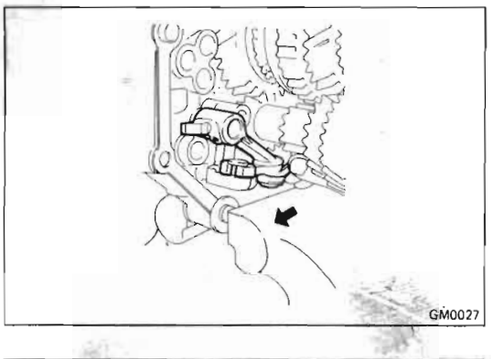
(d) Disengage the gear double meshing.



24. MEASURE COUNTER FIFTH GEAR THRUST CLEARANCE (5-Speed)

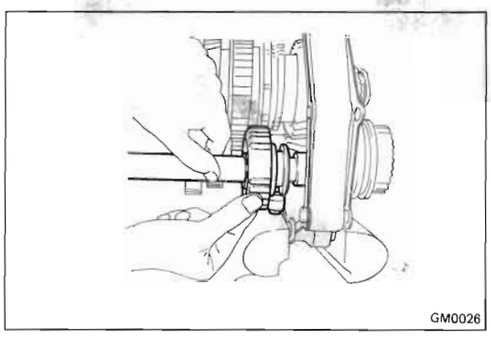
Using a feeler gauge, measure the counter 5th gear thrust clearance.

Standard clearance: **0.10 – 0.30 mm (0.0039 – 0.0118 in.)**
Maximum clearance: **0.30 mm (0.0118 in.)**



25. INSTALL REVERSE SHIFT ARM TO REVERSE SHIFT ARM BRACKET

Install the reverse shift arm to the pivot of the reverse shift arm bracket.



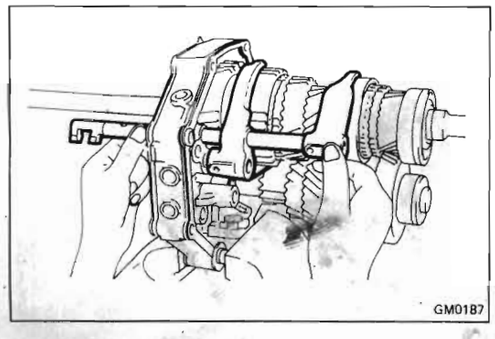
26. INSTALL REVERSE IDLER GEAR AND SHAFT

(a) Install the reverse idler gear on the shaft.

(b) Align the reverse shift arm shoe to the reverse idler gear groove and insert the reverse idler gear shaft to the intermediate plate.

(c) Install the reverse idler gear shaft stopper and torque the bolt.

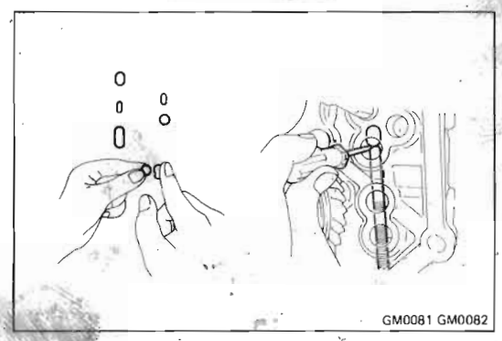
Torque: **175 kg-cm (13 ft-lb, 17 N·m)**



27. INSTALL SHIFT FORK SHAFT NO. 2, SHIFT FORK NO. 1 AND NO. 2

Place shift forks No. 1 and No. 2 into the groove of hub sleeves No. 1 and No. 2 and install fork shaft No. 2 to shift forks No. 1 and No. 2 through the intermediate plate.

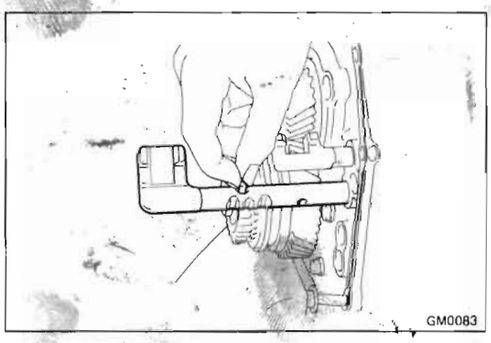
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GM0081 GM0082

28. INSTALL INTERLOCK PIN

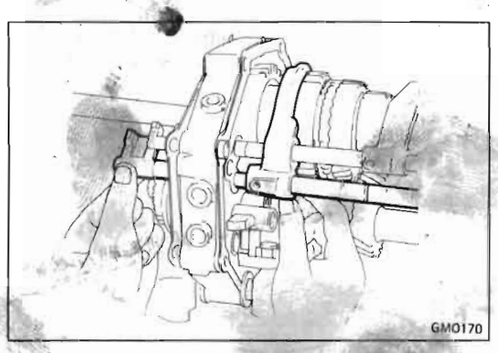
(a) Apply MP grease to the interlock pins.

(b) Using a magnetic finger and screwdriver, install the interlock pin into the intermediate plate.

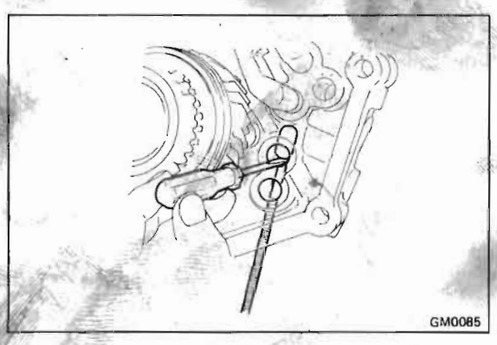

GM0083

29. INSTALL SHIFT FORK SHAFT NO. 1

(a) Install the interlock pin into the shaft hole.

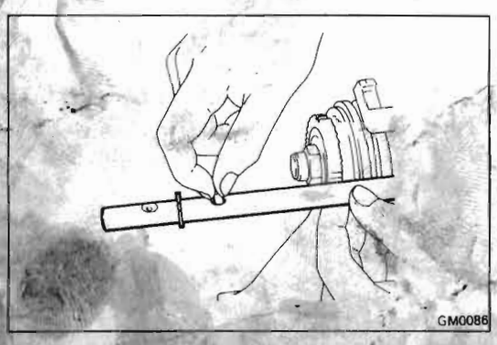

GM0170

(b) Install the fork shaft No. 1 to the shift fork No. 1 through the intermediate plate.


GM0085

30. INSTALL INTERLOCK PIN

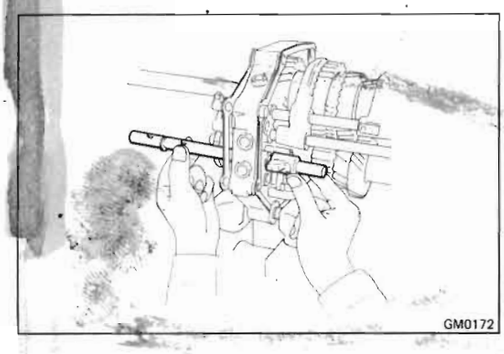
Using a magnetic finger and screwdriver, install the interlock pin into the intermediate plate.


GM0086

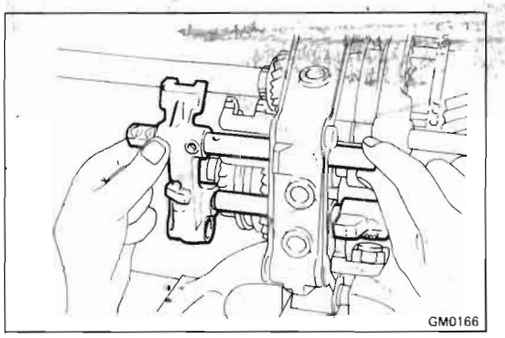
31. INSTALL SHIFT FORK SHAFT NO. 3

(a) Install the interlock pin into the shaft hole.

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GM0172

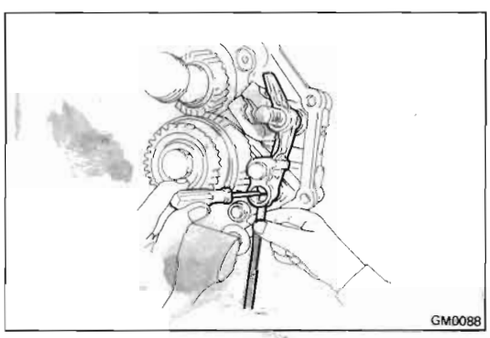
(b) Install the fork shaft No. 3 to the reverse shift arm through the intermediate plate.


GM0166

32. INSTALL SHIFT FORK SHAFT NO. 5 AND REVERSE SHIFT HEAD

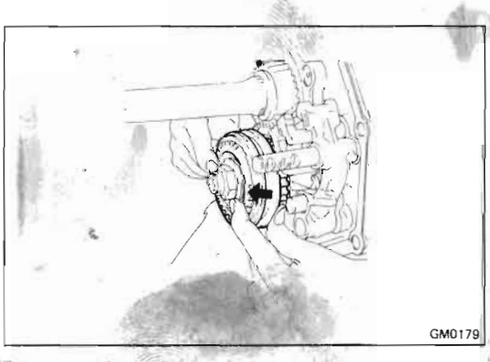
(a) Install the reverse shift head to the fork shaft No. 5.

(b) Insert fork shaft No. 5 to the intermediate plate and put in the reverse shift head to shift fork shaft No. 3.

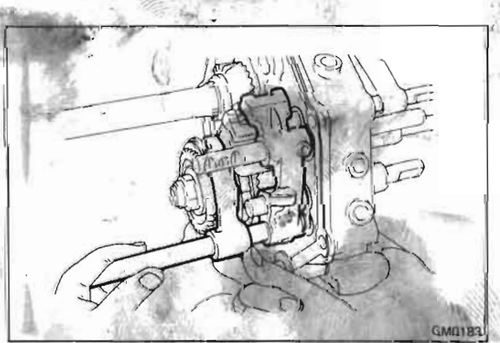

GM0088

33. INSTALL SHIFT FORK SHAFT NO. 4, SHIFT FORK NO. 3 AND TWO LOCKING BALLS (5-Speed)

(a) Using a magnetic finger and screwdriver, install the locking ball into the reverse shift head hole.

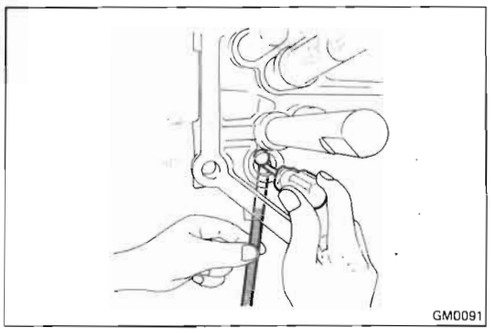

GM0179

(b) Shift hub sleeve No. 3 to the 5th speed position.

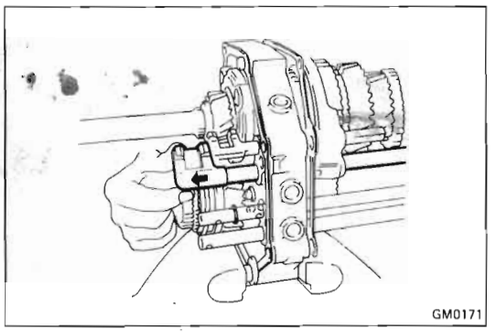

GM0183

(c) Place shift fork No. 3 into the groove of hub sleeve No. 3 and install fork shaft No. 4 to shift fork No. 3 and reverse shift arm.

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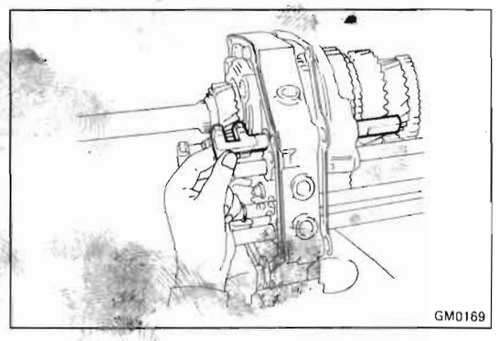

GM0091

(d) Using a magnetic finger and screwdriver, install the locking ball into the intermediate plate and insert fork shaft No. 4 to the intermediate plate.

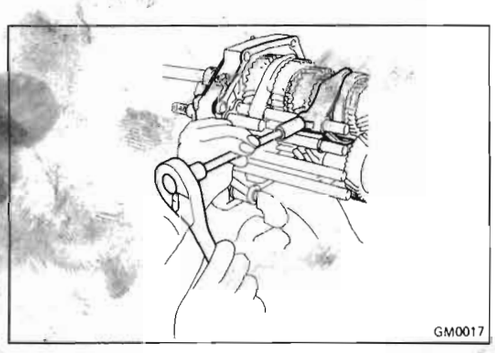

GM0171

34. CHECK INTERLOCK

(a) Shift the fork shaft No. 1 to the 1st speed position.


GM0169

(b) Fork shafts No. 2, No. 3, No. 4 and No. 5 should not move.

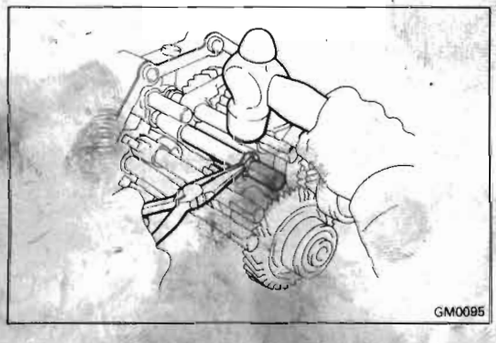

GM0017

35. INSTALL SLOTTED SPRING PINS

(a) Install the bolts to the shift fork No. 1 and No. 2.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)

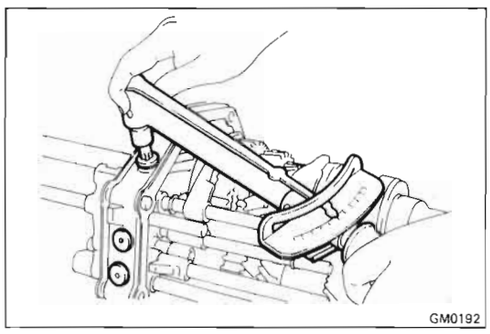
(b) Using a pin punch and hammer, drive in the slotted spring pins into the reverse shift arm, reverse shift head and shift fork No. 3 (5-Speed).


GM0095

36. INSTALL E-RINGS

4-Speed: Four E-rings
5-Speed: Two E-rings

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GM0192

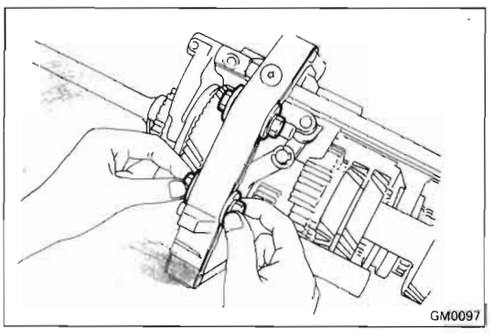
37. INSTALL LOCKING BALLS, SPRINGS AND SCREW PLUGS

(a) Apply liquid sealer to the plugs.

(b) Install the locking balls, springs and screw plugs and torque the screw plugs with a torx socket wrench.

Torque: 190 kg-cm (14 ft-lb, 19 N·m)

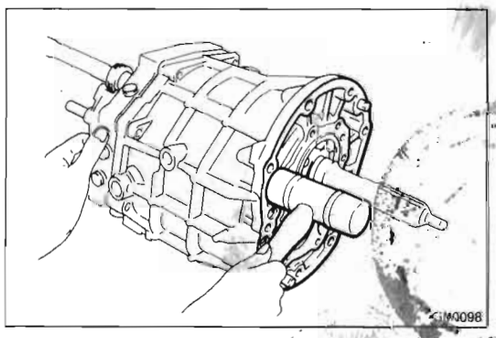
NOTE: (5-Speed) Install the short spring into the bottom of the intermediate plate.


GM0097

38. DISMOUNT INTERMEDIATE PLATE FROM VISE

(a) Dismount the intermediate plate from the vise.

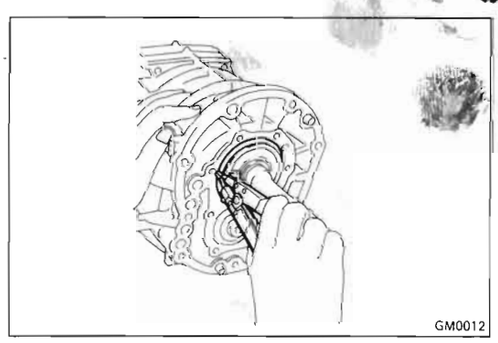
(b) Remove the bolts, nuts, plate washers and gasket.


GM0098

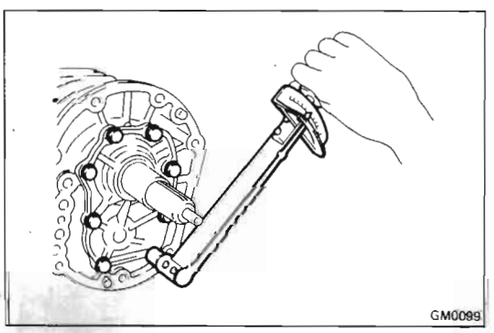
39. INSTALL TRANSMISSION CASE WITH NEW GASKET TO INTERMEDIATE PLATE

Align each bearing outer race, each fork shaft end and reverse idler gear shaft end with the case installation holes, and install the case.

If necessary, tap on the case with a plastic hammer.


GM0012

40. INSTALL TWO BEARING SNAP RINGS


GM0099

41. INSTALL FRONT BEARING RETAINER WITH NEW GASKET

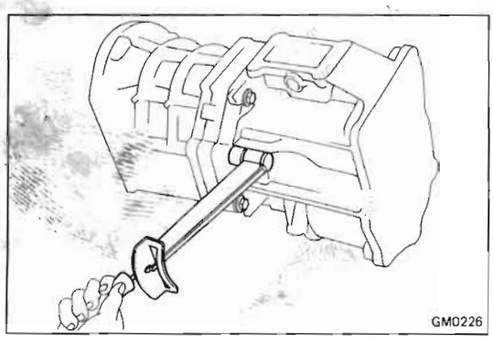
(a) Install the bearing retainer with a new gasket.

(b) Apply liquid sealer to the bolts.

(c) Install and torque the bolts.

Torque: 170 kg-cm (12 ft-lb, 17 N·m)

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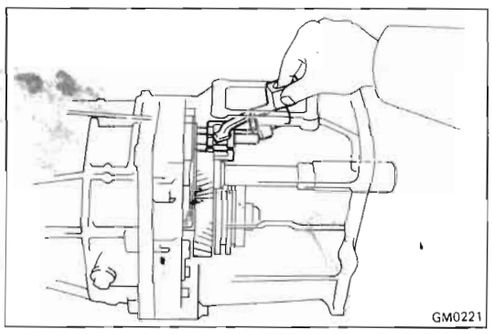


42. INSTALL TRANSFER ADAPTER, NEW GASKET, SHIFT LEVER SHAFT AND SHIFT LEVER HOUSING

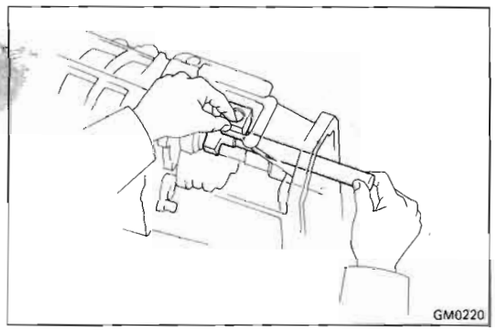
(a) Install a new gasket to the intermediate plate.

(b) Install and torque the transfer adapter with the eight bolts.

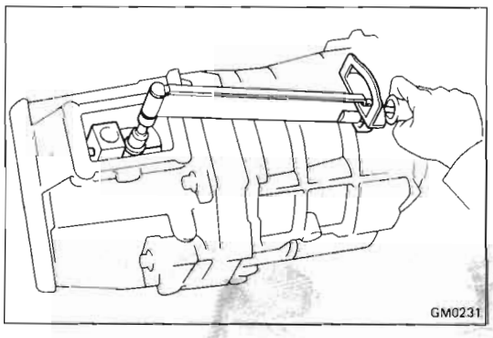
Torque: 380 kg-cm (27 ft-lb, 37 N·m)



(c) Insert the shift lever housing to the transfer adapter and connect the fork shafts.

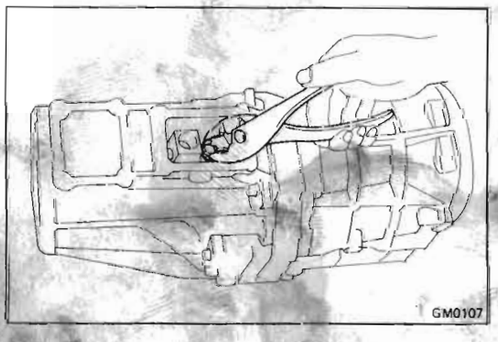


(d) Insert the shift lever shaft to the transfer adapter and shift lever housing.



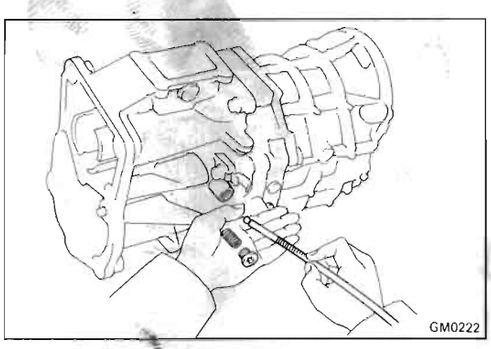
(e) Install and torque the shift lever housing bolt.

Torque: 390 kg-cm (28 ft-lb, 38 N·m)



(f) Stake the lock washer.

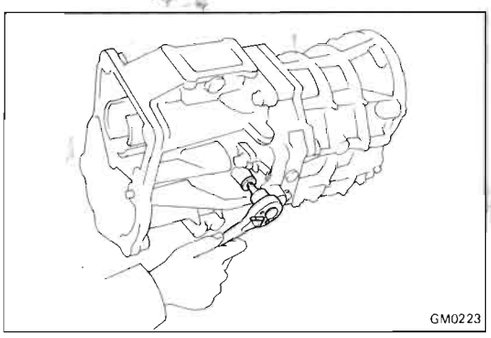
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GM0222

43. INSTALL LOCKING BALL, SPRING AND SCREW PLUG

(a) Apply liquid sealer to the plug.

(b) Install the locking ball and spring.


GM0223

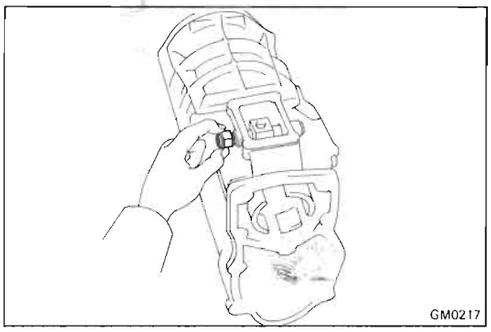
(c) Install and torque the plug.

Torque: 190 kg-cm (14 ft-lb, 19 N·m)

44. AFTER INSTALLING TRANSFER ADAPTER CHECK FOLLOWING ITEMS

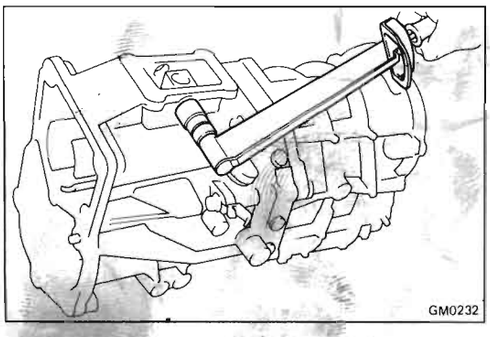
(a) Check to see that the input and output shafts rotate smoothly.

(b) Check to see that shifting can be made smoothly to all positions.


GM0217

45. INSTALL RESTRICT PINS

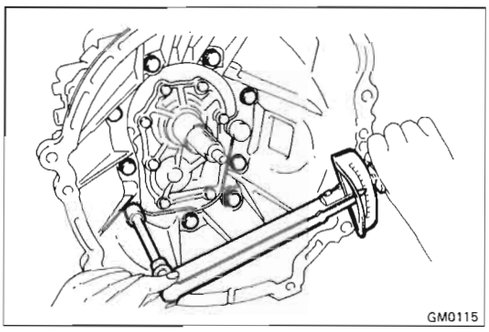
(a) Install the black pin on the reverse gear/5th gear side.


GM0232

(b) Install another pin and torque the pins.

Torque: 280 kg-cm (20 ft-lb, 27 N·m)

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46. INSTALL CLUTCH HOUSING
    (a) Install the clutch housing.
    (b) Install and torque the bolts.
    Torque: 380 kg-cm (27 ft-lb, 37 N·m)

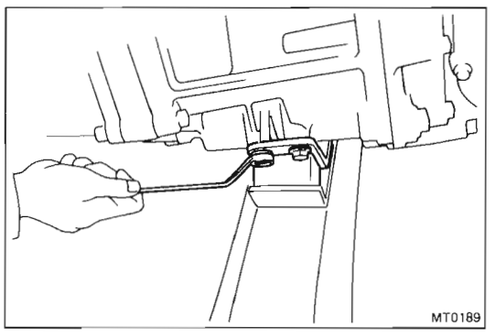
47. INSTALL SHIFT LEVER RETAINER WITH NEW GASKET
    Torque: 185 kg-cm (13 ft-lb, 18 N·m)

48. INSTALL BACK-UP LIGHT SWITCH
    Torque: 380 kg-cm (27 ft-lb, 37 N·m)

49. INSTALL TRANSFER
    (See page TF-25)

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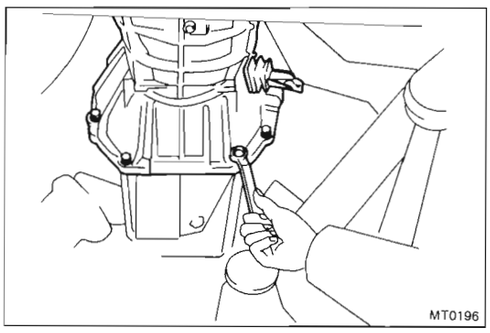
INSTALLATION OF TRANSMISSION


MT0189

1. INSTALL ENGINE REAR SUPPORTMEMBER

Install the engine rear supportmember to the transmission. Torque the bolt.

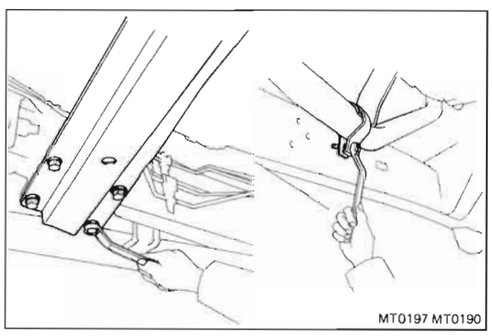
Torque: 260 kg-cm (19 ft-lb, 25 N·m)


MT0196

2. INSTALL TRANSMISSION WITH TRANSFER

Align the input shaft spline with the clutch disc, and install the transmission to the engine.

Torque: 10 mm 380 kg-cm (27 ft-lb, 37 N·m)
12 mm 730 kg-cm (53 ft-lb, 72 N·m)

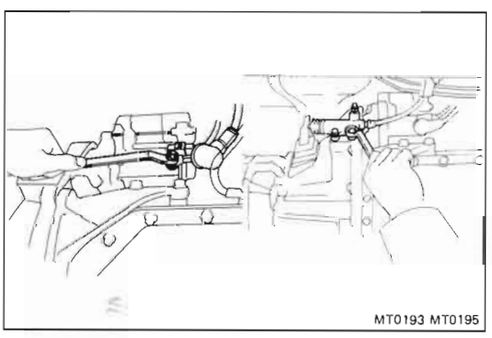

MT0197 MT0190

3. CONNECT ENGINE REAR SUPPORTMEMBER TO BODY

Torque the eight bolts.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

4. INSTALL EXHAUST PIPE CLAMP AND BRACKET


MT0193 MT0195

5. INSTALL STARTER

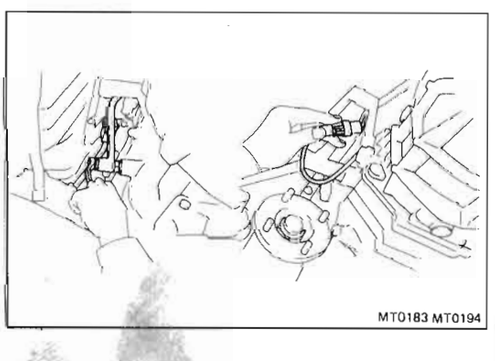
(a) Install the starter with the two bolts.

Torque: 730 kg-cm (53 ft-lb, 72 N·m)

(b) Connect the cable and connector.

6. INSTALL CLUTCH RELEASE CYLINDER

Torque: 120 kg-cm (9 ft-lb, 12 N·m)

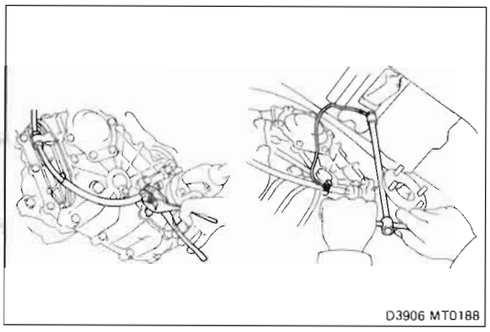

MT0183 MT0194

7. INSTALL TRANSFER SHIFT LEVER TO TRANSFER

8. INSTALL 4WD AND BACK-UP LIGHT SWITCH CONNECTOR

9. INSTALL L4 SWITCH CONNECTOR (ELECTRICAL SHIFT TYPE)

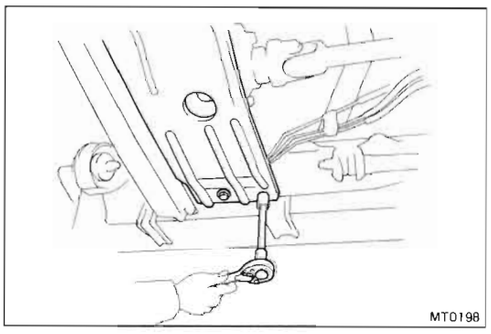
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D3906 MT0188

10. INSTALL SPEEDOMETER CABLE

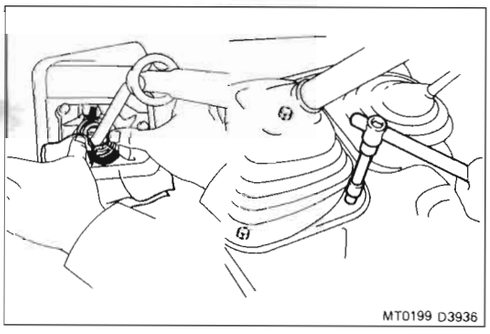
11. CONNECT BOND CABLE TO BODY

12. INSTALL DIAPHRAGM CYLINDER VACUUM HOSE (ELECTRICAL SHIFT TYPE)

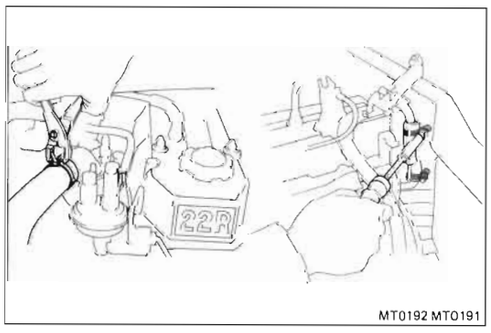

MT0198

13. INSTALL FRONT AND REAR PROPELLER SHAFTS
(See page PR-7)

14. INSTALL TRANSMISSION UNDERCOVER


MT0199 D3936

15. INSTALL TRANSMISSION SHIFT LEVER
   (a) Cover the shift lever cap with a cloth.
   (b) Then, install by rotating clockwise while applying downward pressure.
   (c) Install the shift lever boot.



MT0192 MT0191

16. INSTALL UPPER HOSE AND ENGINE REAR HEATER HOSE (RJ)

17. FILL WITH COOLANT (RJ)

18. CONNECT BATTERY CABLE TO NEGATIVE TERMINAL

19. FILL TRANSMISSION AND TRANSFER WITH OIL

Oil grade:
API GL-4, 5
SAE 75W-90

Capacity:
Transmission
G40 2.8 liters (3.0 US qts, 2.5 Imp. qts)
G52F 2.6 liters (2.7 US qts, 2.3 Imp. qts)
Transfer 2.1 liters (2.2 US qts, 1.8 Imp. qts)

20. PERFORM ROAD TEST

Check for abnormal noise and smooth operation.

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TRANSFER

	Page
TROUBLESHOOTING	TF-2
TRANSFER	TF-3
On-Vehicle Replacement of Front and Rear Output Shaft Oil Seal	TF-3
Removal of Transfer	TF-4
Diaphragm Cylinder Components	TF-5
Disassembly of Diaphragm Cylinder	TF-5
Inspection of Diaphragm Cylinder Components	TF-7
Assembly of Diaphragm Cylinder	TF-8
Transfer Components	TF-10
Disassembly of Transfer	TF-12
Inspection of Transfer Components	TF-19
Assembly of Transfer	TF-25
Installation of Transfer	TF-32
ELECTRICAL SHIFT TYPE	TF-33

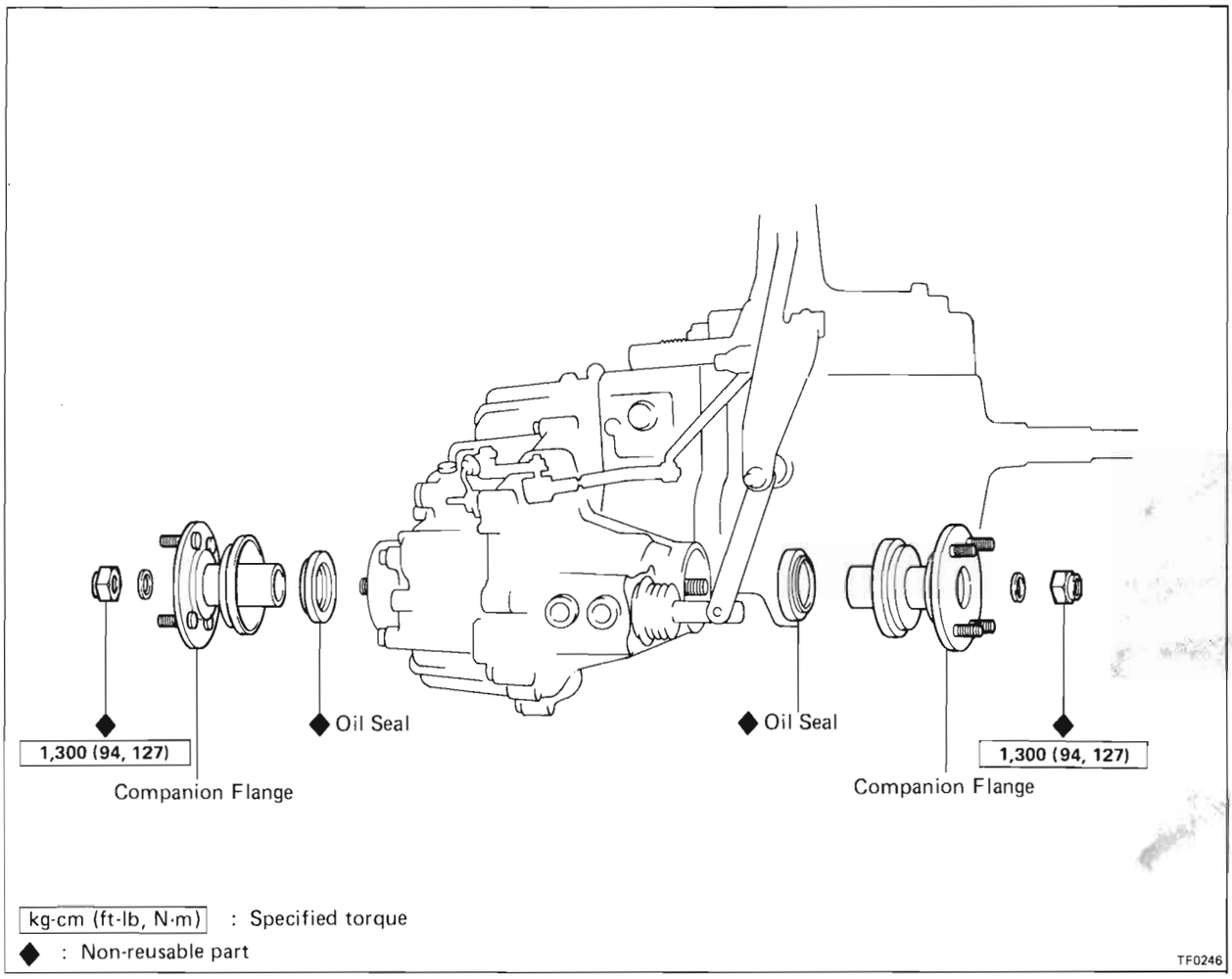
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TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Splines on input shaft dirty or burred	Repair as necessary	TF-3
	Transfer faulty	Disassemble and inspect transfer	TF-3
Transfer jumps out of gear	Transfer faulty	Disassemble and inspect transfer	TF-3

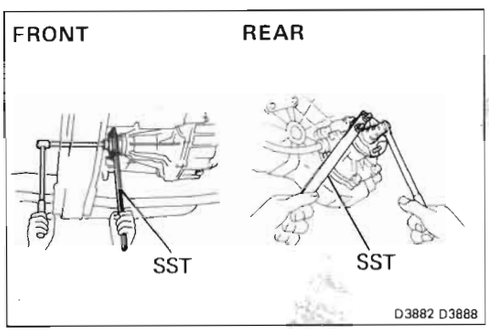
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TRANSFER



ON-VEHICLE REPLACEMENT OF FRONT AND REAR OUTPUT SHAFT OIL SEAL

1. DRAIN GEAR OIL FROM TRANSFER
2. REMOVE TRANSFER UNDER COVER
3. REMOVE FRONT AND REAR PROPELLER SHAFT
(See page PR-3)

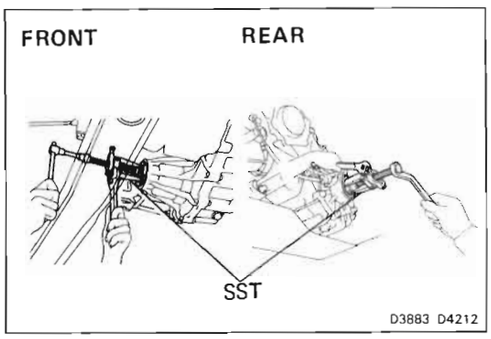


4. REMOVE COMPANION FLANGE
   (a) Using a hammer and chisel, loosen the staked part of the nut.
   (b) Using SST to hold the companion flange, remove the companion flange lock nut.

   SST 09330-00021

   (c) Remove the companion flange.

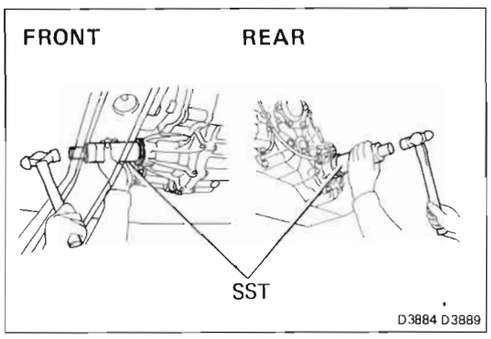
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5. REMOVE OIL SEAL

Using SST, remove the output shaft oil seal.

SST 09308-10010

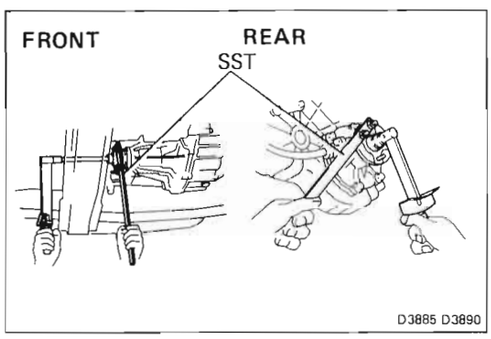


6. INSTALL OIL SEAL

(a) Using SST, drive in a new oil seal.

SST 09316-60010

(b) Apply MP grease to the oil seal lip.



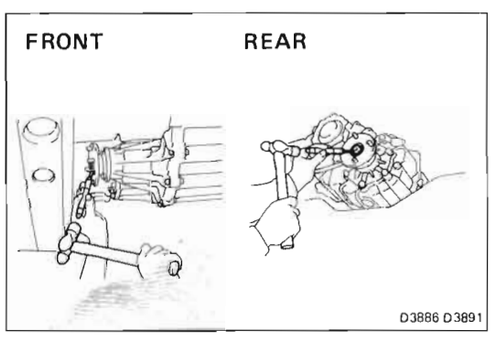
7. INSTALL COMPANION FLANGE

(a) Install the companion flange.

(b) Using SST to hold the companion flange, install the companion flange lock nut.

SST 09330-00021

Torque: 1,300 kg-cm (94 ft-lb, 127 N·m)



(c) Stake the companion flange lock nut.

8. INSTALL FRONT AND REAR PROPELLER SHAFTS
(See page PR-7)

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

9. INSTALL TRANSFER UNDERCOVER

10. FILL TRANSFER WITH OIL

Oil grade: API GL-4, 5
SAE 90

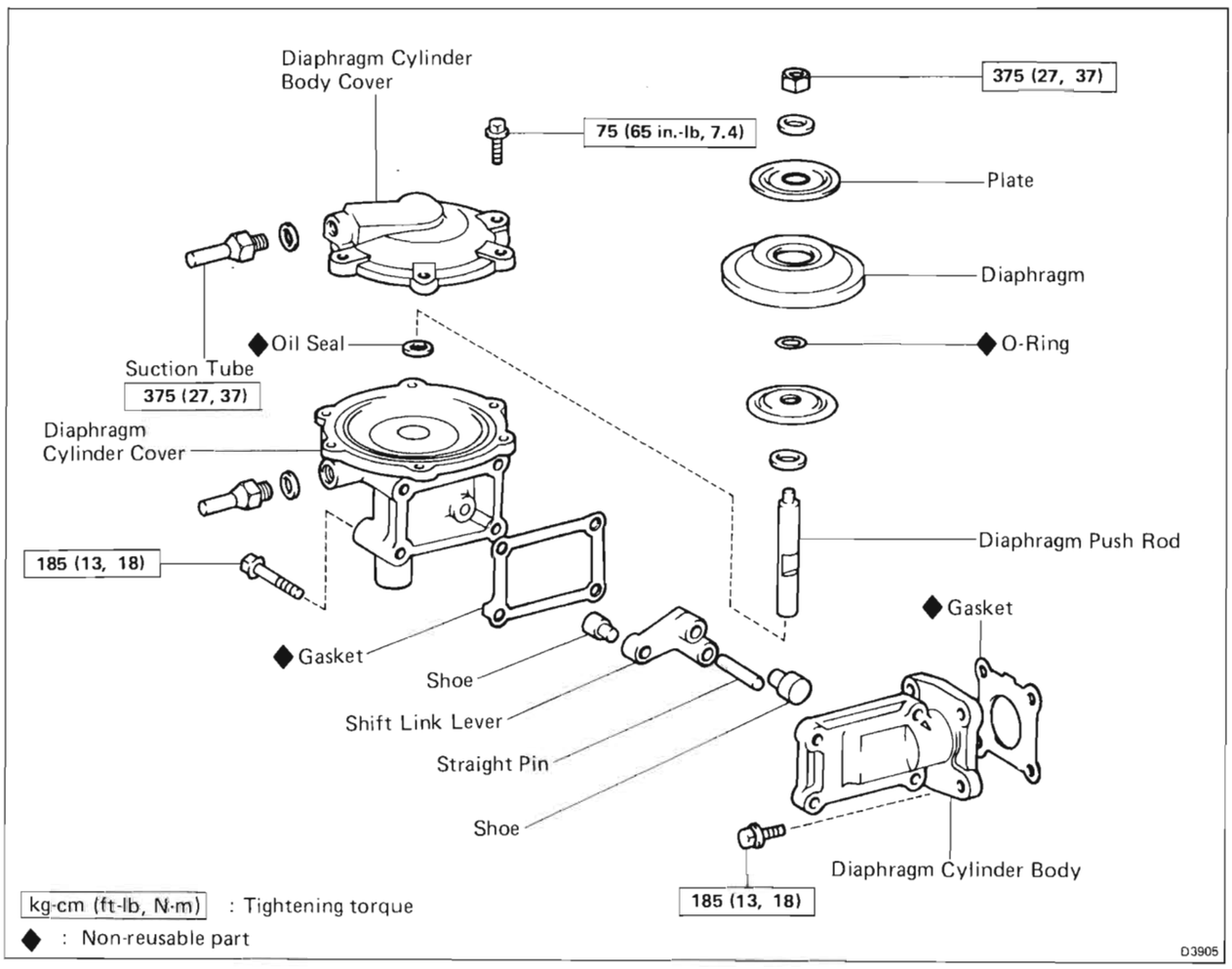
Capacity: 2.1 liters (2.2 US qts, 1.8 Imp. qts)

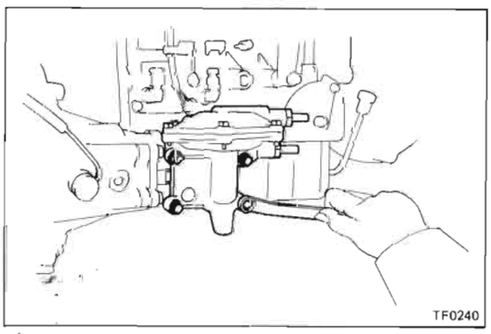
REMOVAL OF TRANSFER

(See page MT-3)

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DIAPHRAGM CYLINDER COMPONENTS



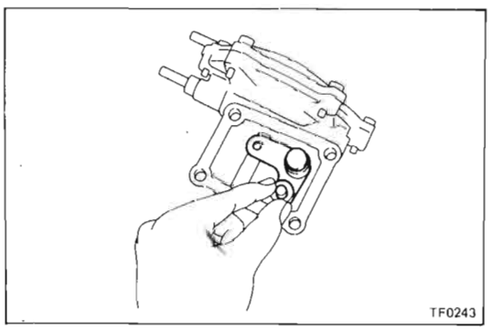


DISASSEMBLY OF DIAPHRAGM CYLINDER

1. REMOVE DIAPHRAGM CYLINDER ASSEMBLY

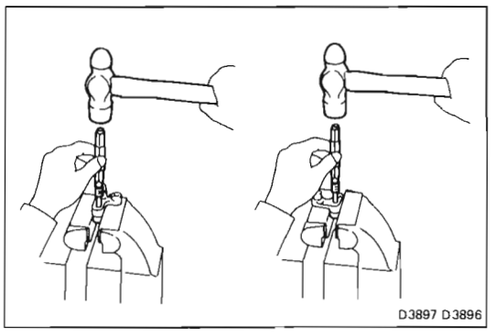
   (a) Remove the diaphragm cylinder assembly from the diaphragm cylinder body.

   (b) Remove the gasket.



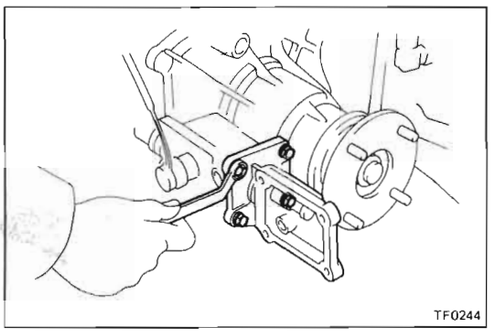
2. REMOVE SHIFT LINK LEVER AND STRAIGHT PIN

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3. REMOVE SHOE FROM SHIFT LINK LEVER

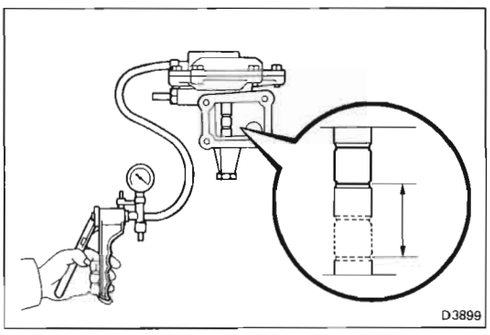
Using a pin punch and hammer, remove the two shoes from the shift link lever.



4. REMOVE DIAPHRAGM CYLINDER BODY

(a) Remove the diaphragm cylinder body from the transfer case.

(b) Remove the gasket.



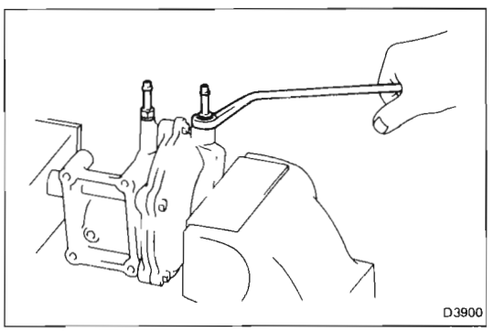
5. INSPECT DIAPHRAGM CYLINDER ASSEMBLY

(a) With at least 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum in the diaphragm, confirm that the shaft moves.

Standard stroke: 22 mm (0.87 in.)

(b) Confirm again on the diaphragm side.

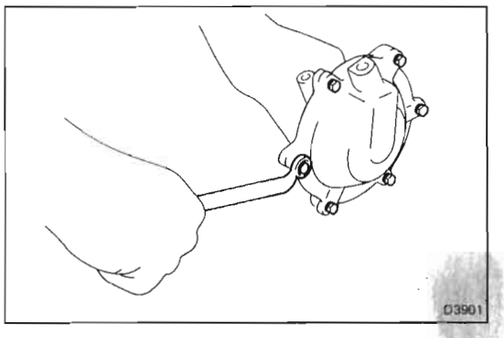
(c) With at least 400 mmHg of vacuum in the diaphragm, confirm the gauge needle is stable.



6. REMOVE SUCTION TUBE

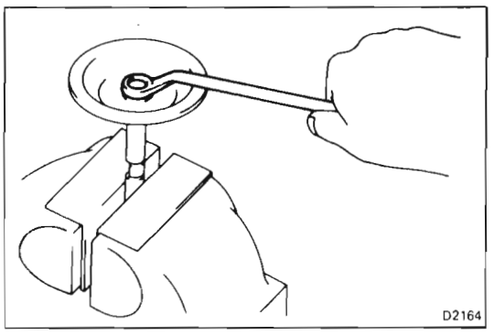
(a) Remove the suction tube from the diaphragm cylinder body cover.

(b) Remove the gasket.

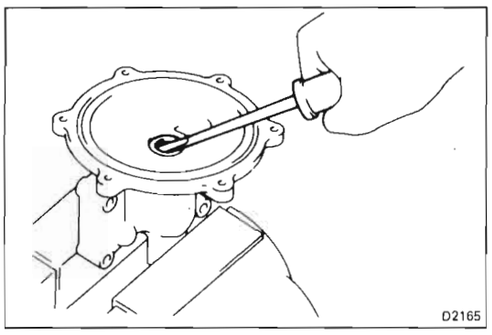


7. REMOVE DIAPHRAGM CYLINDER BODY COVER

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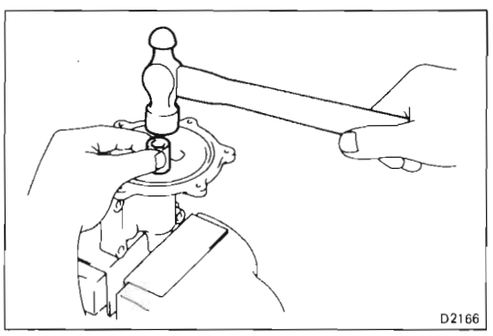
8. REMOVE FOLLOWING PARTS FROM DIAPHRAGM PUSH ROD
   - Two washers
   - Two plates
   - Diaphragm
   - O-ring



INSPECTION OF DIAPHRAGM CYLINDER COMPONENTS

IF NECESSARY, REPLACE OIL SEAL

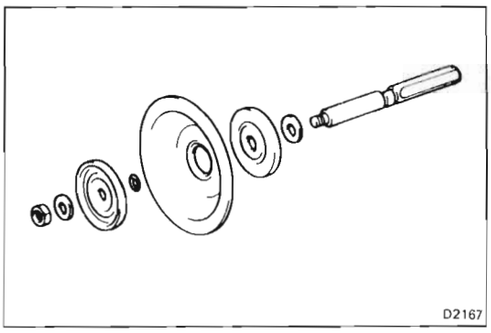
(a) Using a screwdriver, remove the oil seal.



(b) Using a socket wrench, drive in a new oil seal.

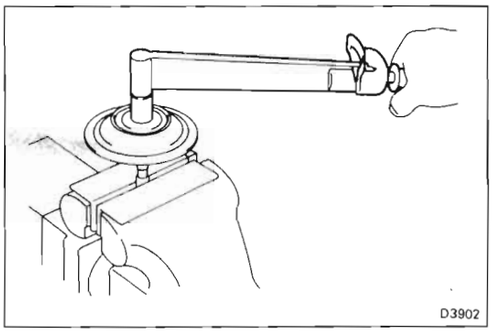
(c) Apply MP grease to the oil seal lip.

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D2167

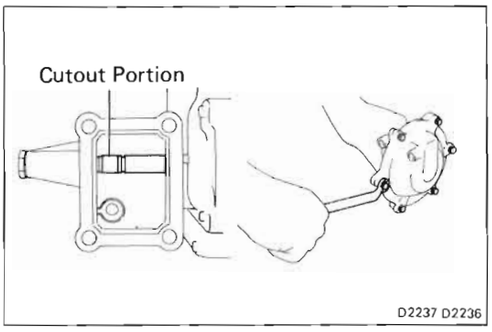
ASSEMBLY OF DIAPHRAGM CYLINDER

1. INSTALL FOLLOWING PARTS TO DIAPHRAGM PUSH ROD
   - Two washers
   - Two plates
   - Diaphragm
   - O-ring


D3902

2. TORQUE DIAPHRAGM PUSH ROD NUT

   Torque: 375 kg-cm (27 ft-lb, 37 N·m)



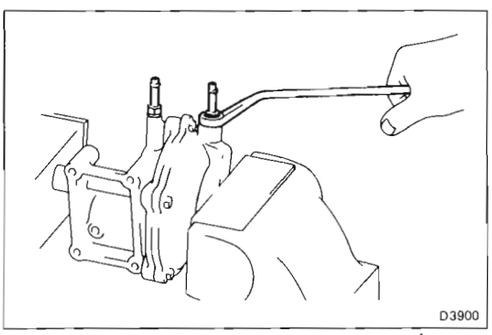
D2237 D2236

3. INSTALL DIAPHRAGM PUSH ROD INTO DIAPHRAGM CYLINDER COVER

4. INSTALL DIAPHRAGM CYLINDER BODY COVER

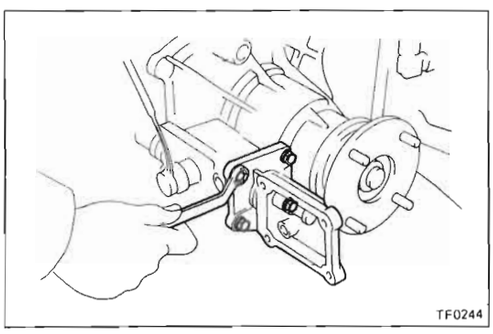
   Install the diaphragm cylinder body cover to the diaphragm cylinder cover.
   Torque the bolts.

   Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)


D3900

5. INSTALL SUCTION TUBE

   Torque: 375 kg-cm (27 ft-lb, 37 N·m)

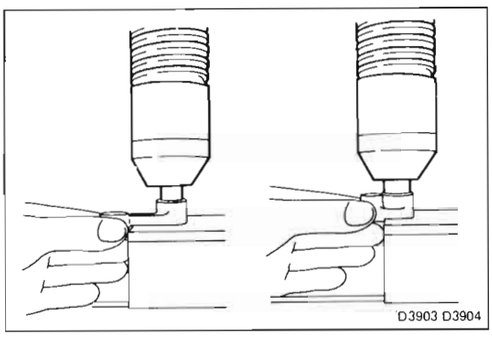

TF0244

6. INSTALL DIAPHRAGM CYLINDER BODY

   Install the diaphragm cylinder body with a new gasket to the transfer case.
   Torque the bolts.

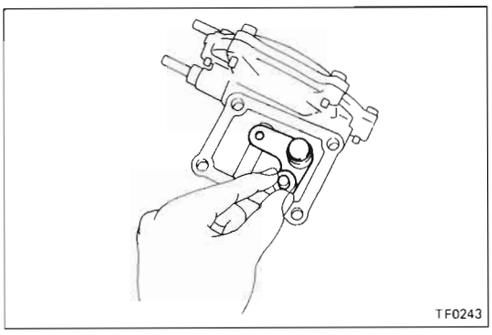
   Torque: 185 kg-cm (13 ft-lb, 18 N·m)

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7. INSTALL SHOE TO SHIFT LINK LEVER

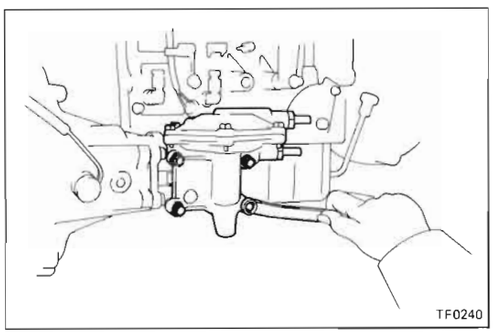
Using a press, install two shoes to shift link lever.



8. INSTALL SHIFT LINK LEVER AND STRAIGHT PIN

(a) Apply MP grease to shoe and straight pin.

(b) Install the shift link lever and straight pin.



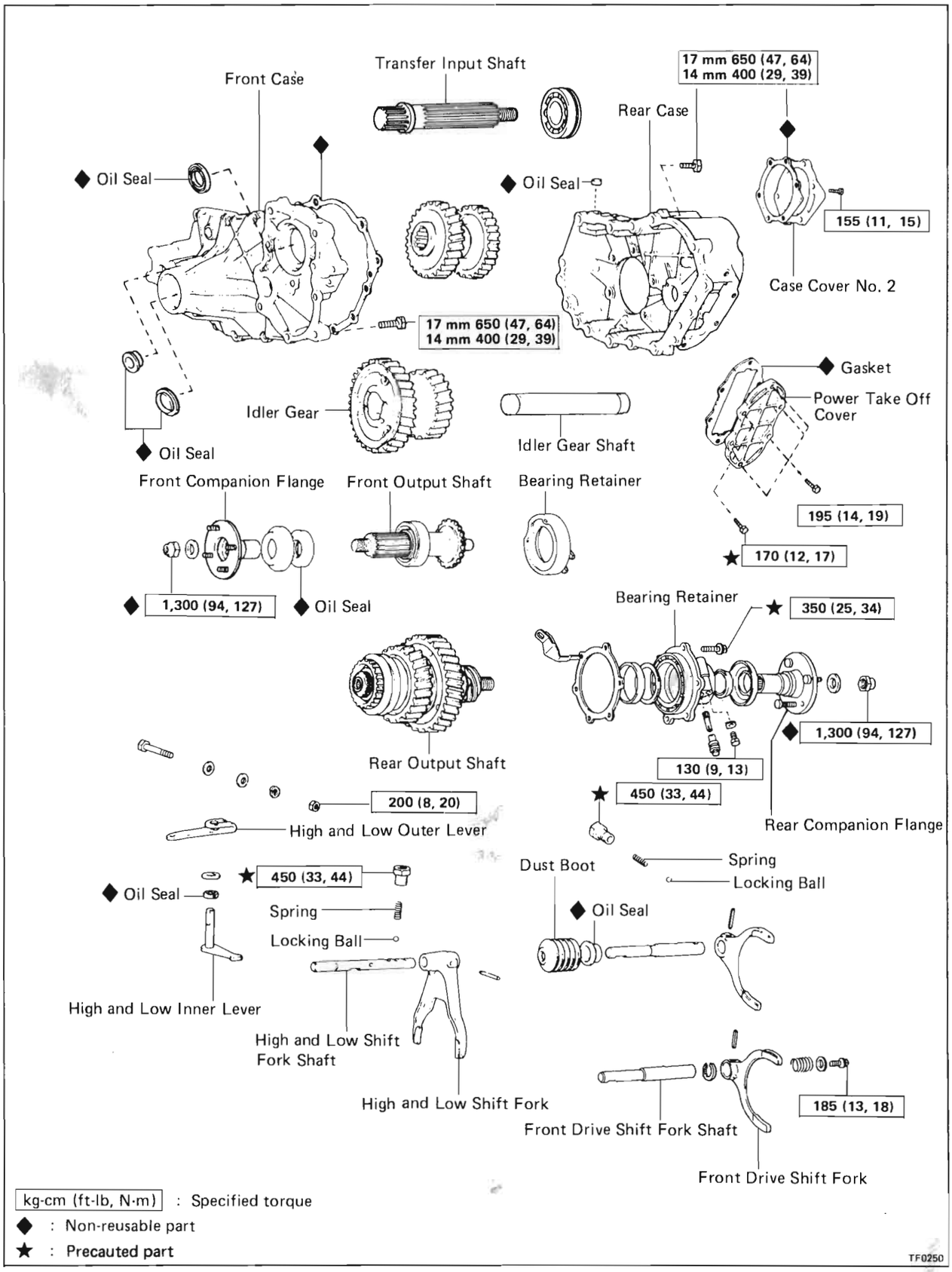
9. INSTALL DIAPHRAGM CYLINDER ASSEMBLY

Install the diaphragm cylinder assembly with a new gasket to the diaphragm cylinder body.
Torque the bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

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TRANSFER COMPONENTS

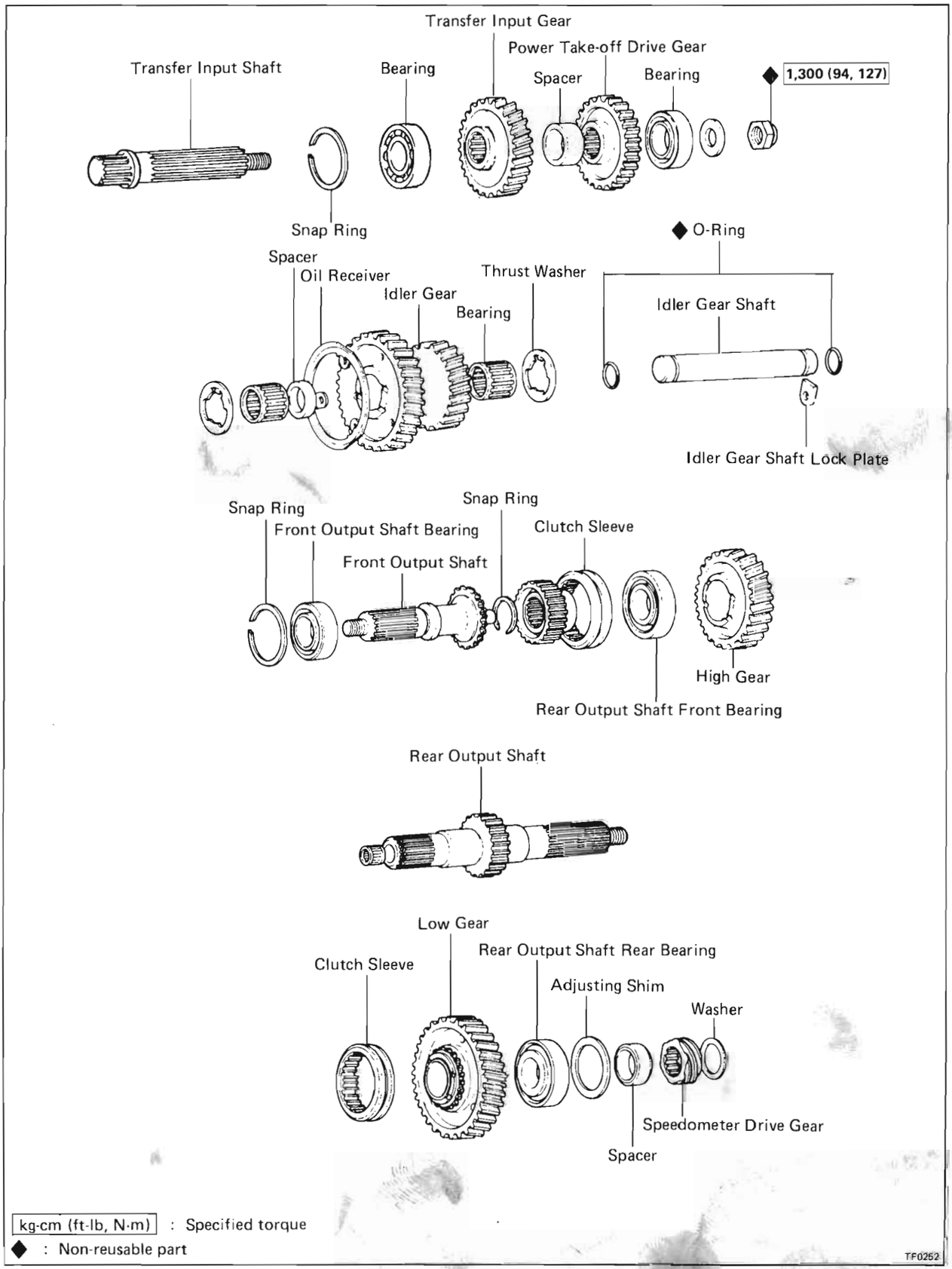


kg-cm (ft-lb, N·m) : Specified torque
◆ : Non-reusable part
★ : Precauted part

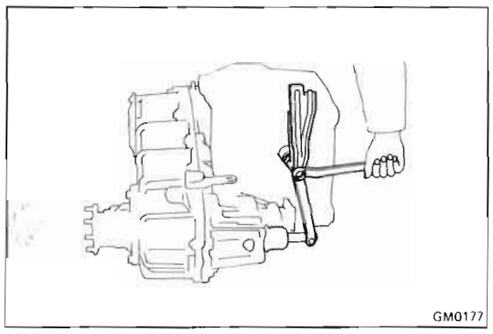
TF0250

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COMPONENTS (Cont'd)



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GM0177

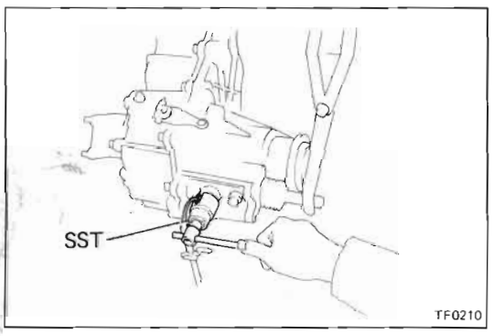
DISASSEMBLY OF TRANSFER

(See pages TF-10, 11)

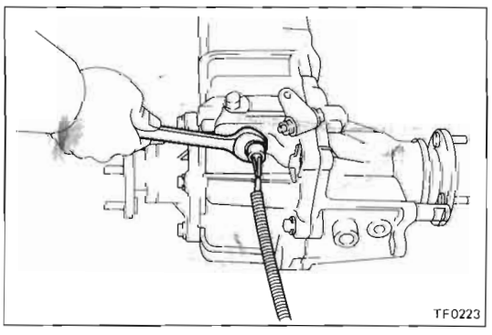
1. REMOVE DIAPHRAGM CYLINDER (ELECTRICAL SHIFT TYPE)
(See page TF-5)

2. REMOVE TRANSFER FRONT DRIVE SHIFT LEVER (MECHANICAL SHIFT TYPE)
   (a) Remove the transfer front drive shift lever.
   (b) Remove the dust boot.

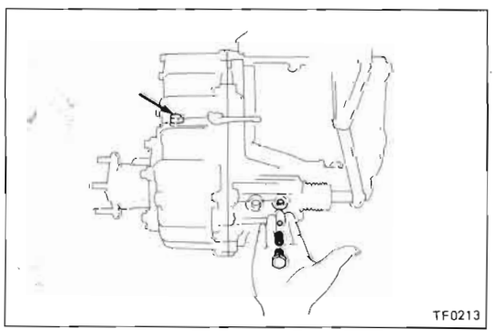
3. REMOVE 4WD INDICATOR SWITCH
   Using SST, remove the 4WD indicator switch.
   SST 09817-16011



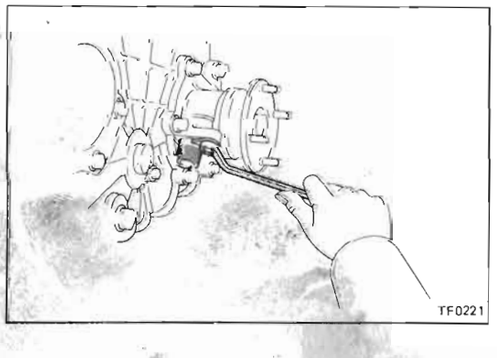
TF0210


TF0223

4. REMOVE L4 POSITION SWITCH (ELECTRICAL SHIFT TYPE)

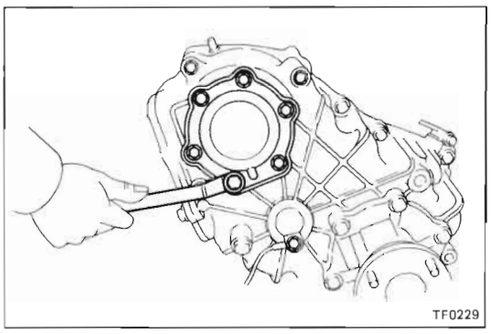

TF0213

5. REMOVE PLUGS, SPRINGS AND LOCKING BALLS
   [Mechanical Shift Type]
   Remove the plugs and, using a magnetic finger, remove the springs and locking balls.
   [Electrical Shift Type]
   Remove the plug and, using a magnetic finger, remove the spring and locking ball.


TF0221

6. REMOVE SPEEDOMETER DRIVEN GEAR

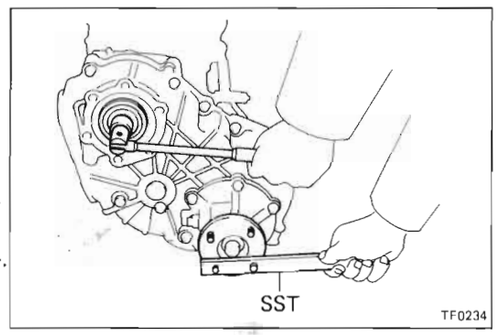
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TF0229

7. REMOVE TRANSMISSION OUTPUT SHAFT LOCK NUT

(a) Remove the transfer case cover No. 2 and gasket.

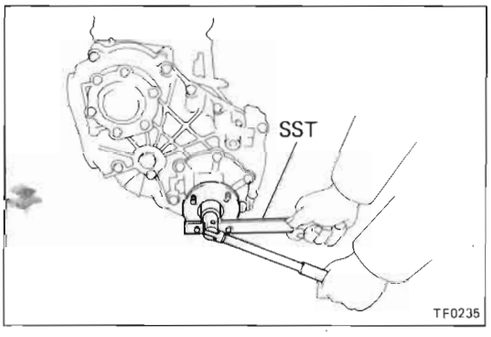
(b) Using a hammer and chisel, loosen the staked part of the nut.



TF0234

(c) Using SST to hold the rear companion flange, remove the transmission output shaft lock nut.

SST 09330-00021



TF0235

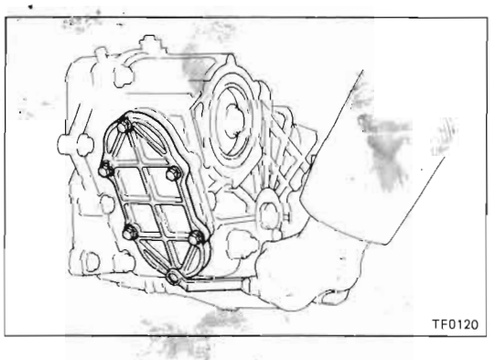
8. REMOVE FRONT AND REAR COMPANION FLANGE

(a) Using a hammer and chisel, loosen the staked part of the nut.

(b) Using SST to hold the companion flange, remove the companion flange lock nut.

SST 09330-00021

(c) Remove the companion flange.


TF0120

9. REMOVE POWER TAKE-OFF COVER

Remove the six bolts, and remove the power take-off cover.


TF0171

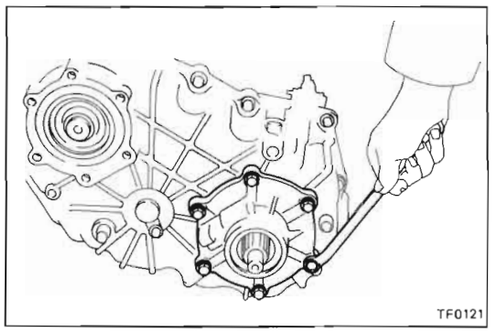
10. MEASURE IDLER GEAR THRUST CLEARANCE

Using a feeler gauge, measure the clearance between the idler gear and thrust washer.

Standard clearance: **0.275 – 0.625 mm (0.0110 – 0.0246 in.)**

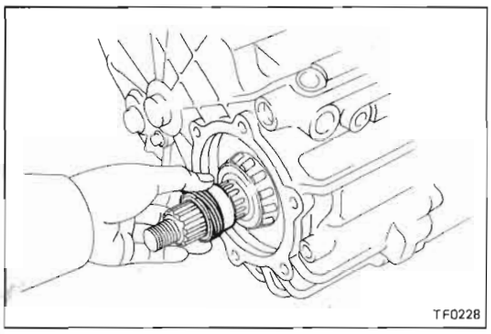
Maximum clearance: **0.625 mm (0.0246 in.)**

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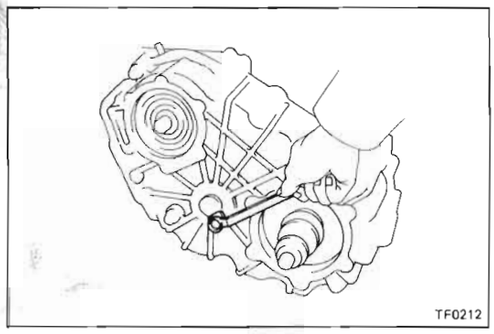


11. REMOVE REAR OUTPUT SHAFT REAR BEARING RETAINER

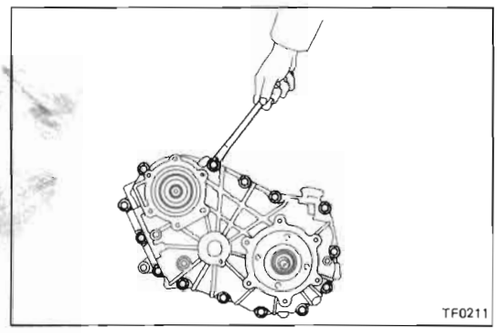
(a) Remove the six bolts, and remove the rear output shaft rear bearing retainer.



(b) Remove the speedometer drive gear and spacer.



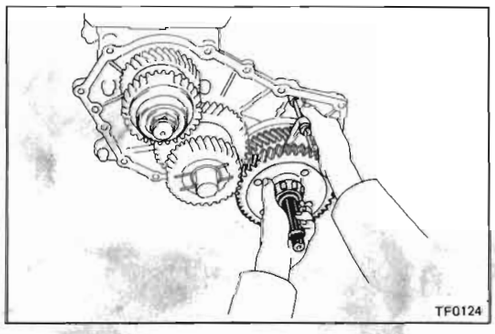
12. REMOVE IDLER GEAR SHAFT LOCK PLATE



13. REMOVE TRANSFER REAR CASE

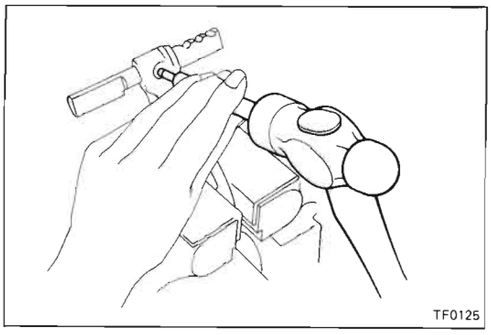
(a) Remove the bolts.

(b) Using a plastic hammer, remove the transfer rear case.



14. REMOVE REAR OUTPUT SHAFT ASSEMBLY WITH SHIFT FORK AND SHIFT FORK SHAFT

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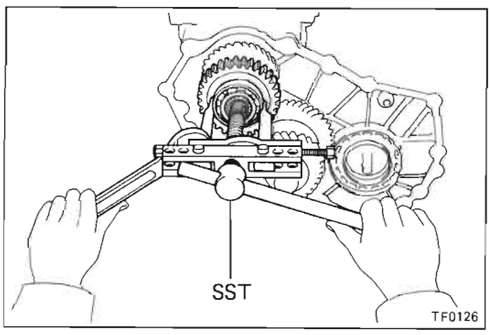


15. REMOVE SHIFT FORK SHAFT

(a) Using a pin punch and hammer, drive out the slotted spring pin.

(b) Remove the shift fork shaft from the shift fork.

NOTE: Use a set of soft jaws in the vise to protect the shift fork.

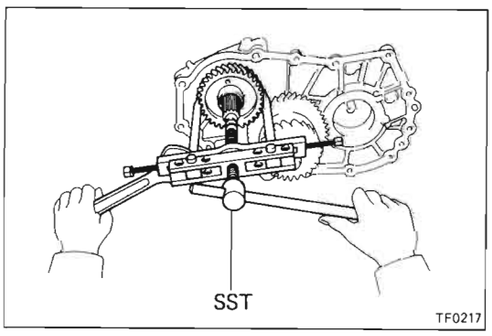


16. REMOVE TRANSMISSION OUTPUT SHAFT REAR BEARING, POWER TAKE-OFF DRIVE GEAR AND SPACER

(a) Using SST, remove the transfer input gear bearing.

SST 09950-20016

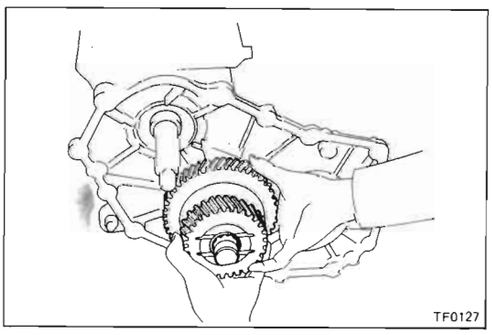
(b) Remove the power take-off drive gear and spacer.



17. REMOVE TRANSFER INPUT GEAR

Using SST, remove the transfer input gear.

SST 09950-20016

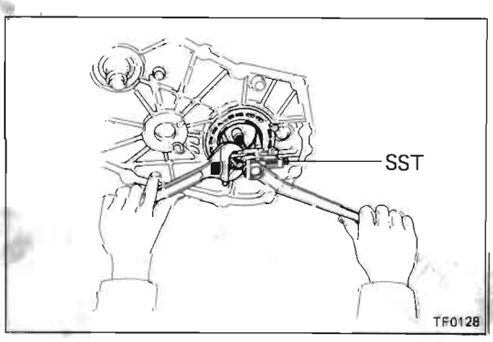


18. REMOVE IDLER GEAR, BEARINGS, SPACER AND IDLER GEAR SHAFT

(a) Remove the O-ring.

(b) Remove the idler gear, bearing and spacer.

(c) Remove the idler gear shaft.

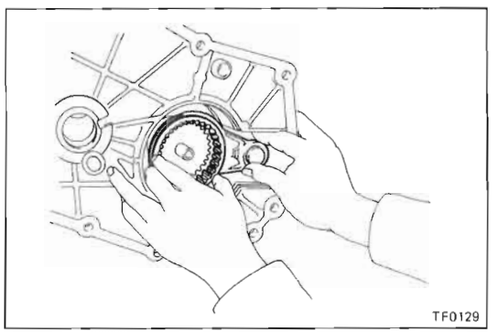


19. REMOVE REAR OUTPUT SHAFT FRONT BEARING RETAINER

Using SST, remove the output shaft front bearing retainer.

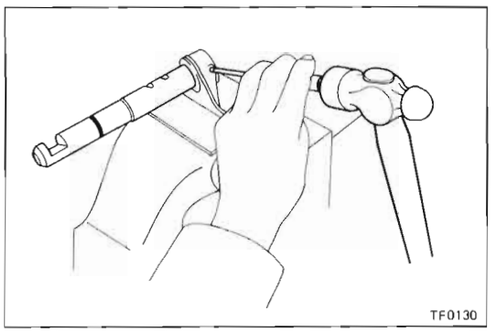
SST 09308-10010

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TF0129

20. REMOVE CLUTCH SLEEVE

Remove the clutch sleeve with the shift fork and shift fork shaft.

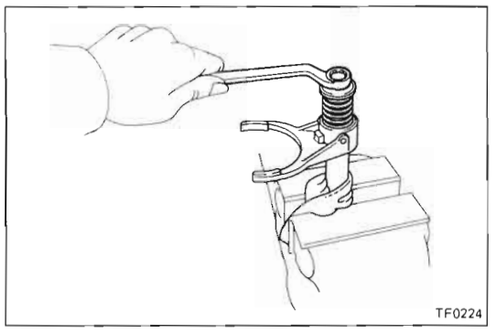

TF0130

21. REMOVE SHIFT FORK SHAFT

[**Mechanical Shift Type**]

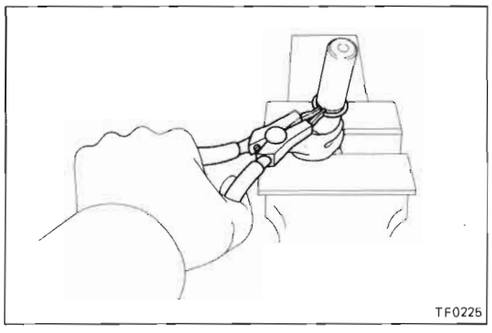
(a) Using a pin punch and hammer, drive out the slotted spring pin.

(b) Remove the shift fork from the shift fork shaft.

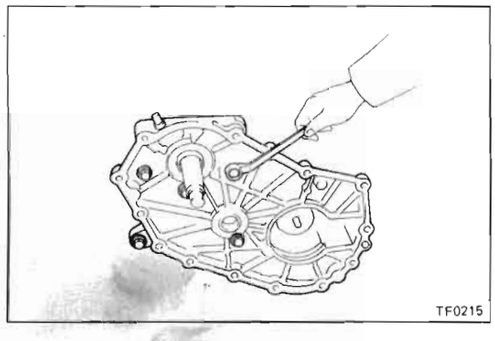

TF0224

[**Electrical Shift Type**]

(a) Remove the retainer, spring and shift fork from the shift fork shaft.


TF0225

(b) Using snap ring pliers, remove the snap ring.

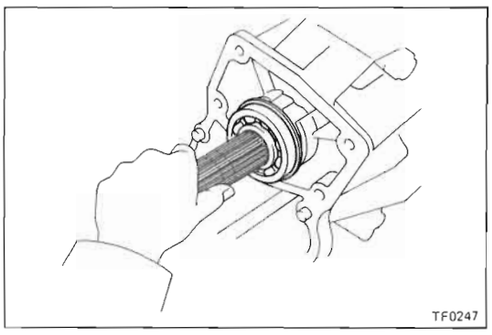

TF0215

22. REMOVE TRANSFER FRONT CASE

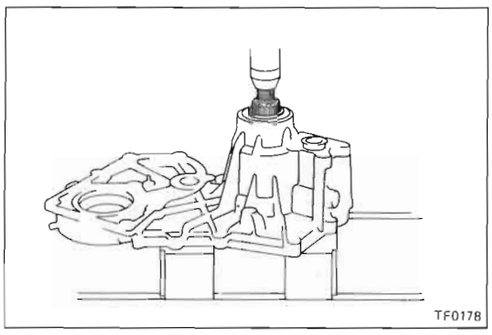
(a) Remove the five bolts.

(b) Using a plastic hammer, remove the transfer front case.

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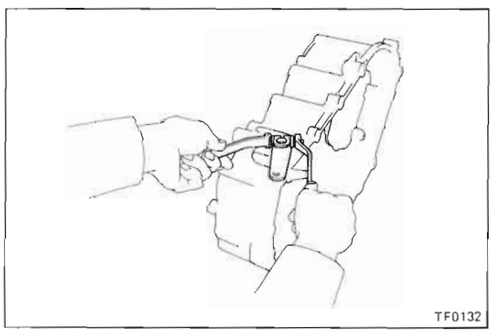

TF0247

23. REMOVE TRANSFER INPUT SHAFT FROM TRANSFER ADAPTER

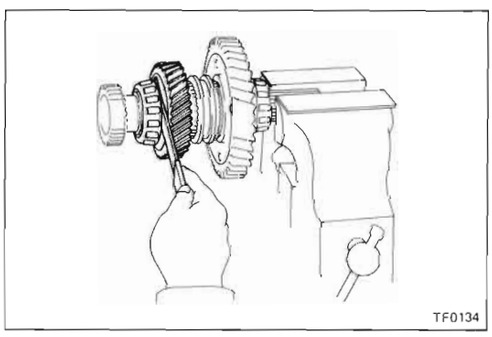

TF0178

24. REMOVE FRONT OUTPUT SHAFT

Using a press, remove the front output shaft.


TF0132

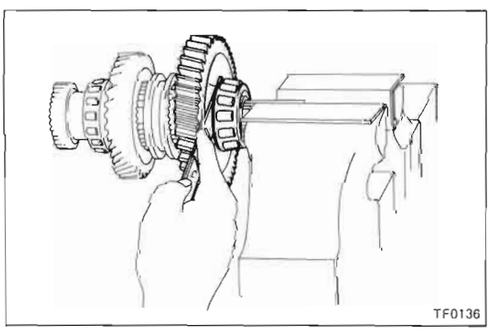
25. REMOVE TRANSFER HIGH AND LOW SHIFT OUTER AND INNER LEVER


TF0134

26. MEASURE LOW AND HIGH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the high gear thrust clearance.

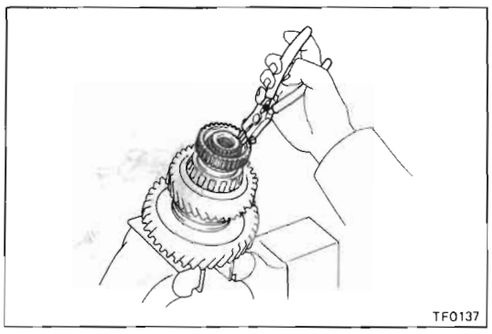
Standard clearance: **0.10 – 0.25 mm (0.0039 – 0.0098 in.)**
Maximum clearance: **0.25 mm (0.0098 in.)**


TF0136

(b) Using a feeler gauge, measure the low gear thrust clearance.

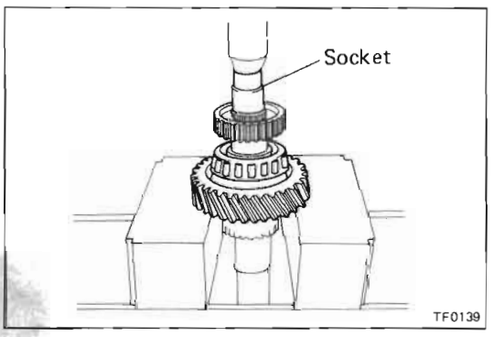
Standard clearance: **0.10 – 0.25 mm (0.0039 – 0.0098 in.)**
Maximum clearance: **0.25 mm (0.0098 in.)**

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TF0137

27. REMOVE HIGH GEAR FROM REAR OUTPUT SHAFT

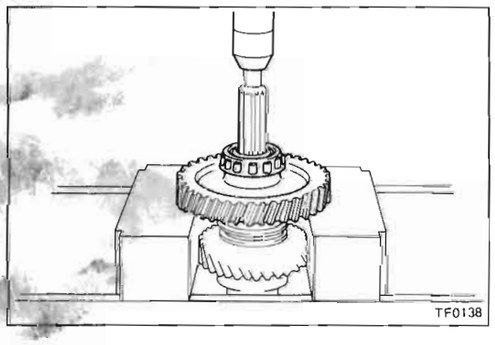
(a) Using snap ring pliers, remove the snap ring.



TF0139

(b) Using a press and socket wrench, remove the following parts.

- Clutch hub
- Output shaft front bearing
- High gear

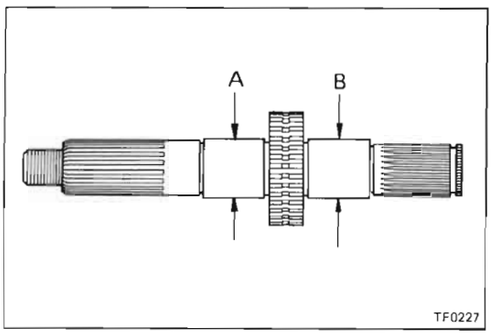

TF0138

28. REMOVE LOW GEAR FROM REAR OUTPUT SHAFT

Using a press, remove the following parts.

- Output shaft rear bearing
- Low gear
- Clutch hub

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INSPECTION OF TRANSFER COMPONENTS

1. INSPECT REAR OUTPUT SHAFT

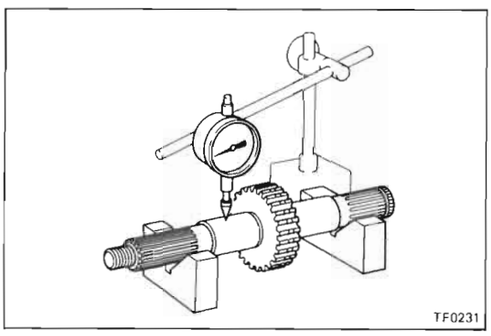
(a) Check the rear output shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the rear output shaft journal surface.

Minimum outer diameter:
Part A 40.009 mm (1.5752 in.)
B 40.009 mm (1.5752 in.)

(c) Using a dial indicator, check the shaft runout.

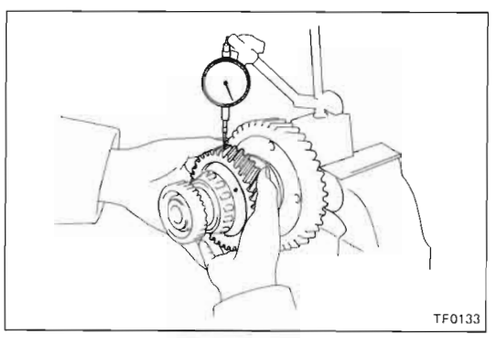
Maximum runout: 0.03 mm (0.0012 in.)



2. CHECK OIL CLEARANCE OF LOW AND HIGH GEAR

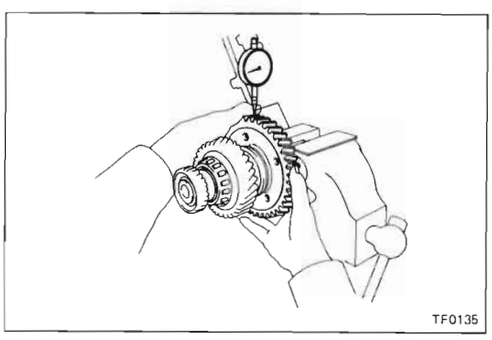
(a) Using a dial indicator, measure the oil clearance between the high gear and rear output shaft.

Standard clearance: 0.035 – 0.081 mm (0.0014 – 0.0032 in.)
Maximum clearance: 0.081 mm (0.0032 in.)



(b) Using a dial indicator, measure the oil clearance between the low gear and rear output shaft.

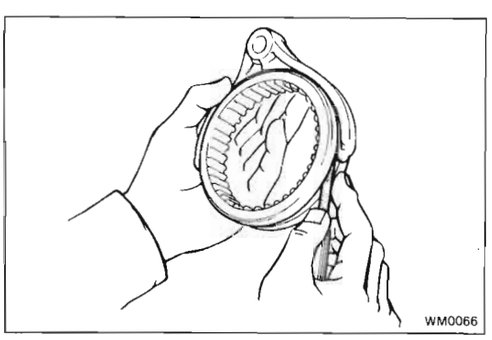
Standard clearance: 0.035 – 0.081 mm (0.0014 – 0.0032 in.)
Maximum clearance: 0.081 mm (0.0032 in.)



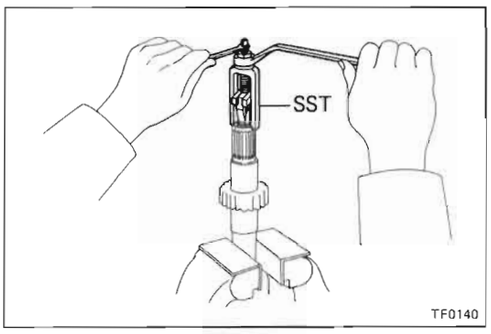
3. MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVES

Using a feeler gauge, measure the clearance between the hub sleeves and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)



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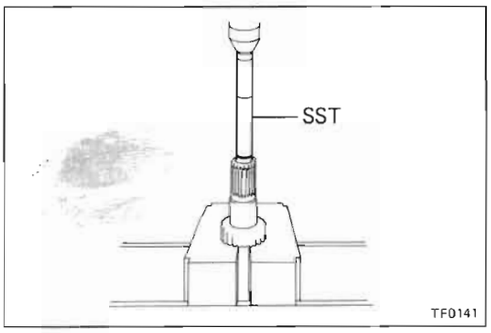


4. IF NECESSARY REPLACE REAR OUTPUT SHAFT PILOT BEARING

(a) Using SST, remove the rear output shaft pilot bearing.

SST 09319-60020

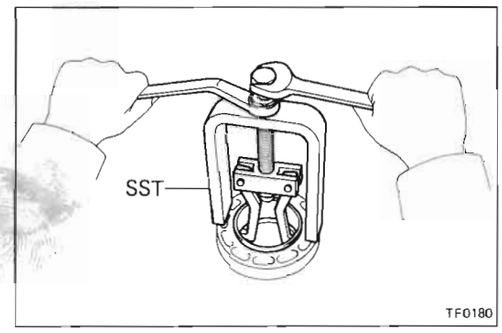
NOTE: The bearing will break.



(b) Using SST, press in a new pilot bearing.

SST 09608-20011

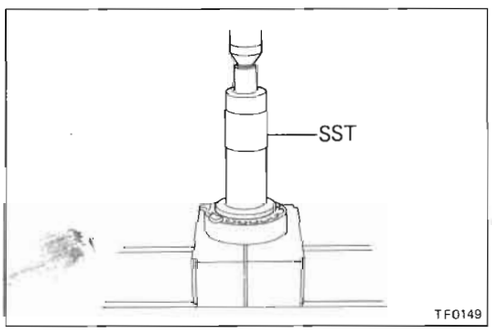
(c) Apply MP grease to the pilot bearing.



5. IF NECESSARY, REPLACE REAR OUTPUT SHAFT FRONT BEARING OUTER RACE

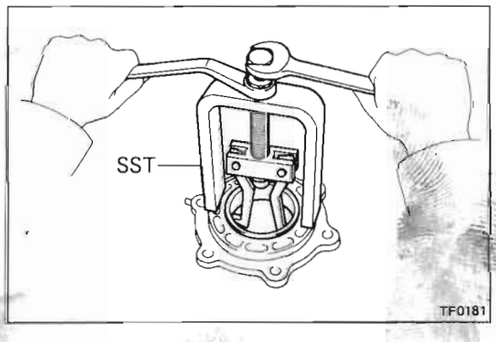
(a) Using SST, remove the rear output shaft front bearing outer race.

SST 09514-35011



(b) Using SST, press a new front outer race into the front bearing retainer.

SST 09316-60010

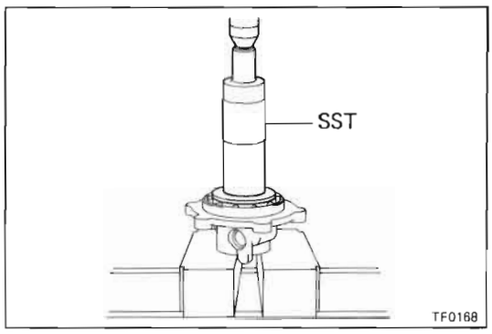


6. IF NECESSARY, REPLACE REAR OUTPUT SHAFT REAR BEARING OUTER RACE

(a) Using SST, remove the rear output shaft rear bearing outer race and shim.

SST 09514-35011

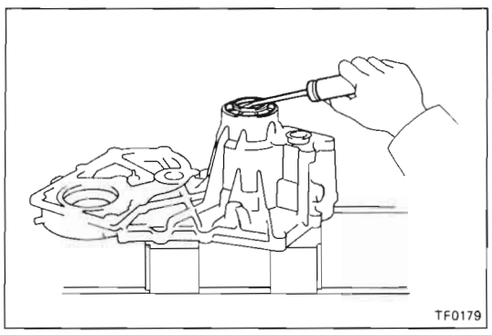
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(b) Install the thinnest shim into the rear bearing retainer.

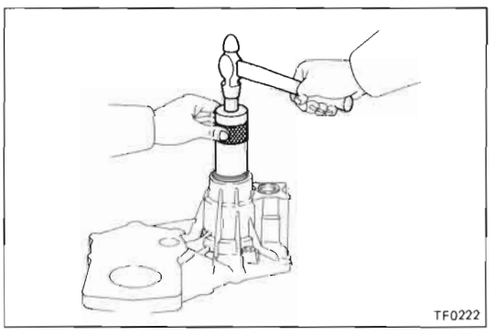
(c) Using SST, press in a new rear outer race to the rear bearing retainer.

SST 09316-60010



7. IF NECESSARY, REPLACE FRONT OUTPUT SHAFT OIL SEAL

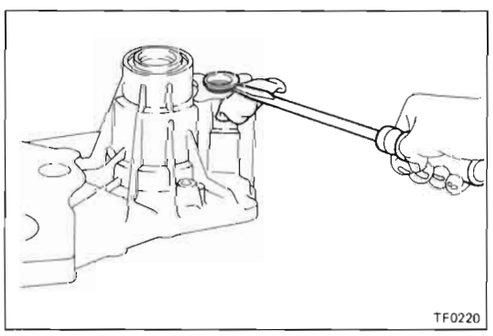
(a) Using a screwdriver, remove the oil seal.



(b) Using SST, drive in a new oil seal.

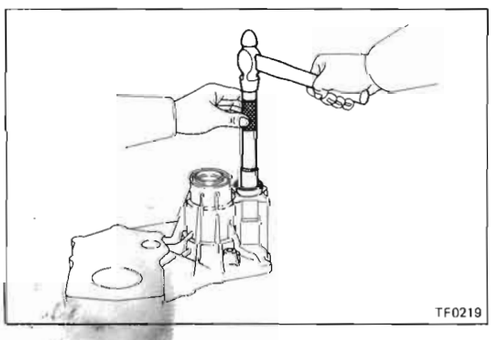
SST 09316-60010

(c) Apply MP grease to the oil seal lip.



8. IF NECESSARY, REPLACE FRONT DRIVE SHIFT FORK SHAFT OIL SEAL

(a) Using a screwdriver, remove the oil seal.

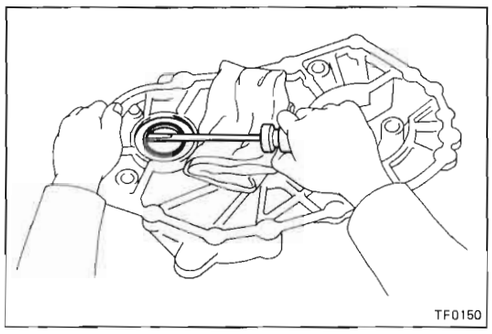


(b) Using SST, drive in a new oil seal.

SST 09608-20011

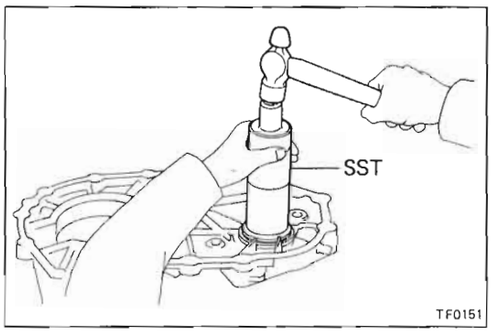
(c) Apply MP grease to the oil seal lip.

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9. IF NECESSARY, REPLACE TRANSMISSION REAR OIL SEAL

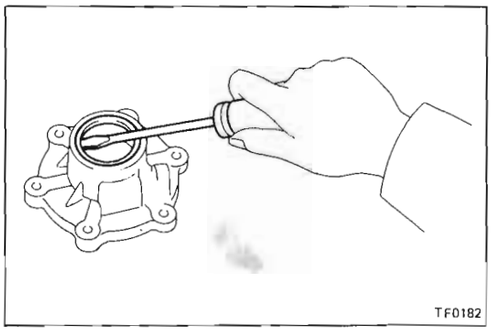
(a) Using a screwdriver, remove the transmission rear oil seal.



(b) Using SST, drive in a new oil seal.

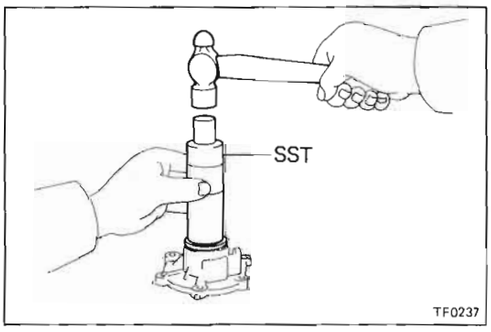
SST 09316-60010

(c) Apply MP grease to the oil seal.



10. IF NECESSARY, REPLACE REAR OUTPUT SHAFT OIL SEAL

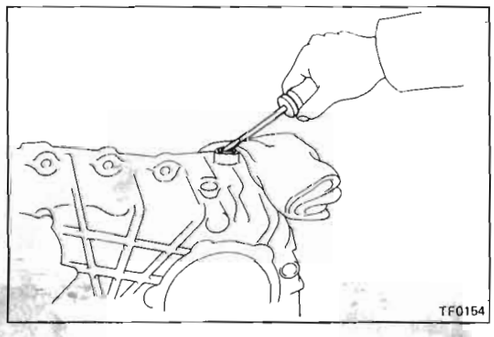
(a) Using a screwdriver, remove the oil seal.



(b) Using SST, drive in a new oil seal.

SST 09316-60010

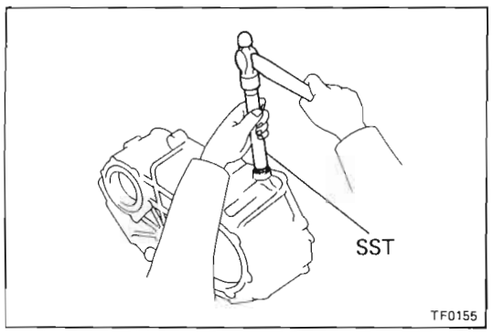
(c) Apply MP grease to the oil seal lip.



11. IF NECESSARY, REPLACE HIGH AND LOW GEAR SELECT LEVER OIL SEAL

(a) Using a screwdriver, remove the oil seal.

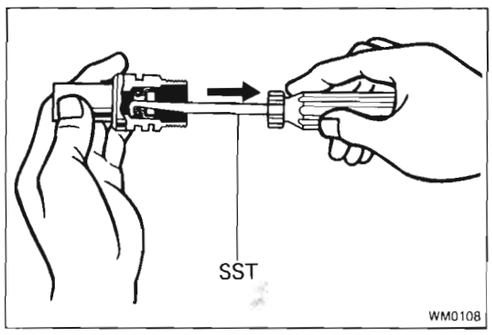
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(b) Using SST and hammer, drive in a new oil seal.

SST 09608-20011

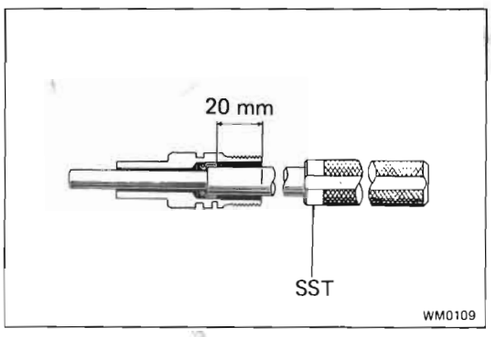
(c) Apply MP grease to the oil seal lip.



12. IF NECESSARY, REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

(a) Using SST, pull out the oil seal.

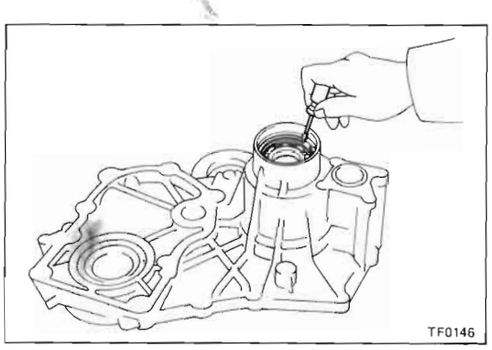
SST 09921-00010



(b) Using SST, drive a new oil seal into the sleeve.

SST 09201-60011

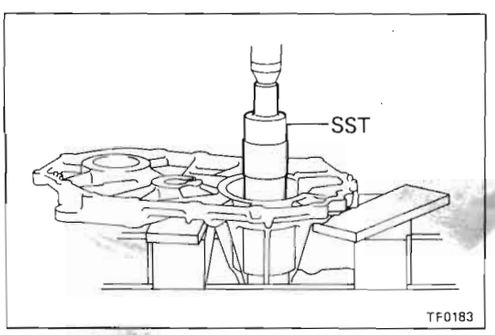
Oil seal depth: 20 mm (0.79 in.)



13. IF NECESSARY, REPLACE FRONT OUTPUT SHAFT BEARING

(a) Remove the oil seal.
(See page TF-21)

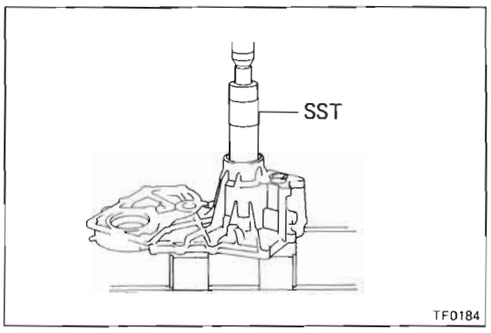
(b) Using a screwdriver, remove the snap ring.



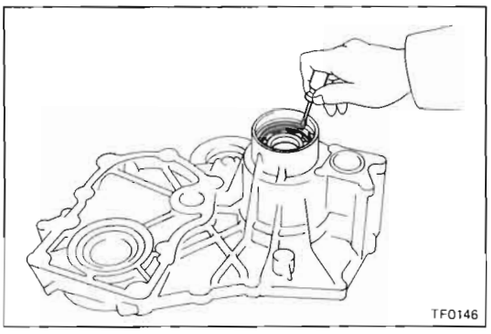
(c) Using SST, press out the bearing.

SST 09316-60010

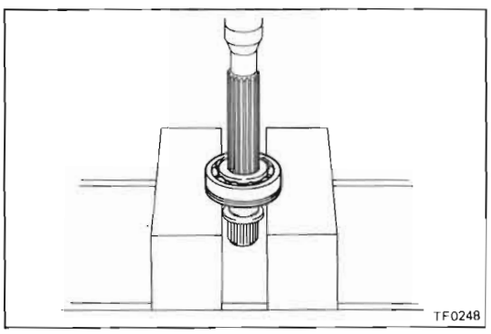
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(d) Using SST, press in a new bearing.
SST 09316-60010

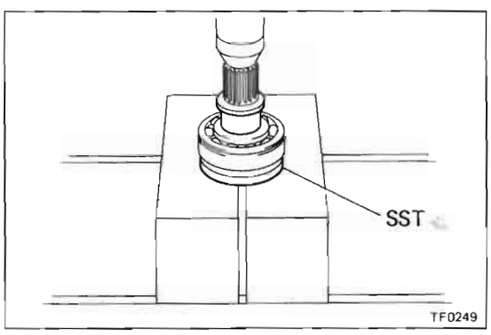


(e) Install the snap ring.
(f) Install a new oil seal.
(See page TF-21)



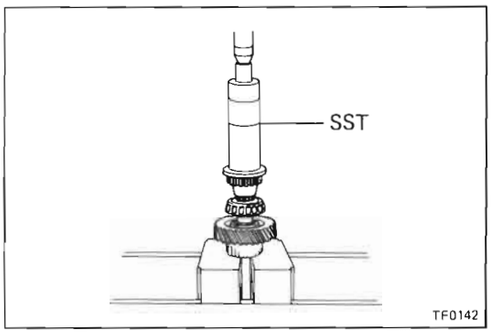
14. IF NECESSARY, REPLACE TRANSFER INPUT SHAFT FRONT BEARING

(a) Using a press, press out the bearing.



(b) Using SST, press in a new bearing.
SST 09310-60010

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ASSEMBLY OF TRANSFER

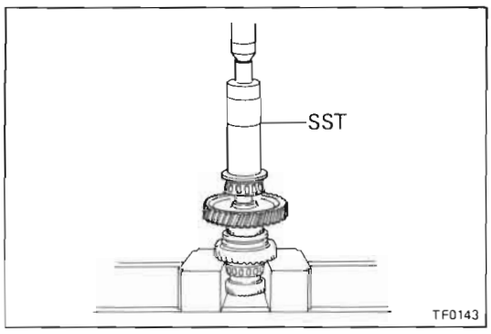
(See pages TF-10, 11)

1. INSTALL HIGH GEAR TO REAR OUTPUT SHAFT

Using SST, press in the following parts.

- High gear
- Output shaft front bearing
- Clutch hub

SST 09316-60010

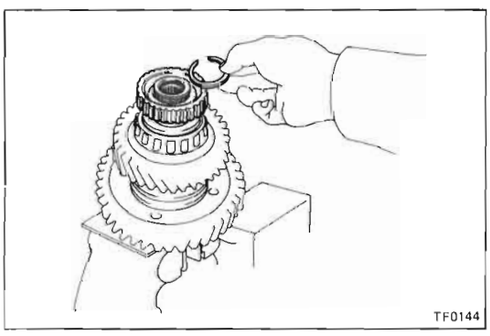


2. INSTALL LOW GEAR TO REAR OUTPUT SHAFT

Using SST, press in the following parts.

- Output shaft rear bearing
- Low gear
- Clutch hub

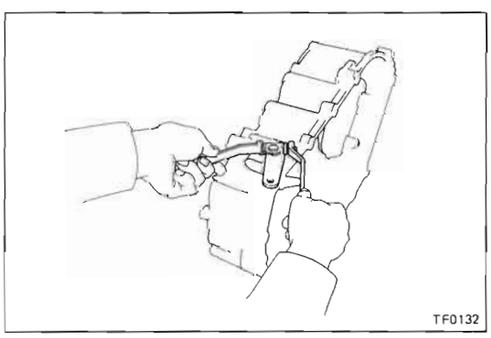
SST 09316-60010



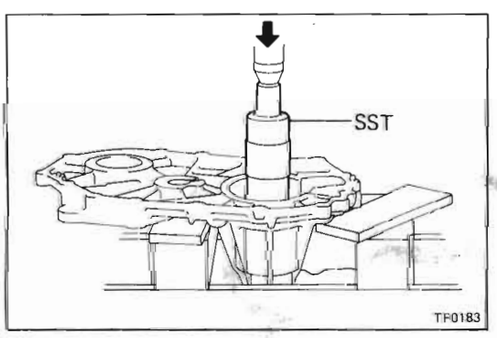
3. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

Mark	Thickness mm (in.)
11	2.30 – 2.35 (0.0906 – 0.0925)
17	2.60 – 2.65 (0.1024 – 0.1043)



4. INSTALL TRANSFER HIGH AND LOW SHIFT OUTER AND INNER LEVER

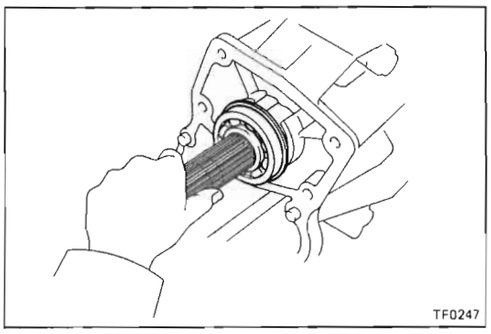


5. INSTALL FRONT OUTPUT SHAFT

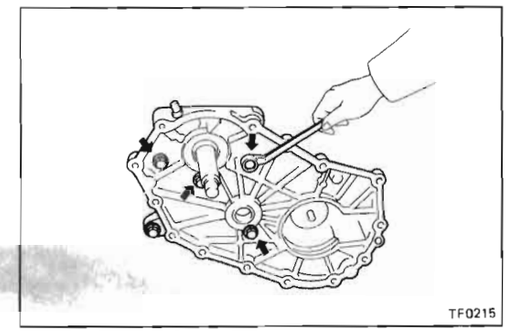
Using SST, press in the front output shaft to the transfer front case.

SST 09316-60010

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TF0247

6. INSTALL TRANSFER INPUT SHAFT TO TRANSFER ADAPTER


TF0215

7. INSTALL TRANSFER FRONT CASE

(a) Apply MP grease to the oil seal.

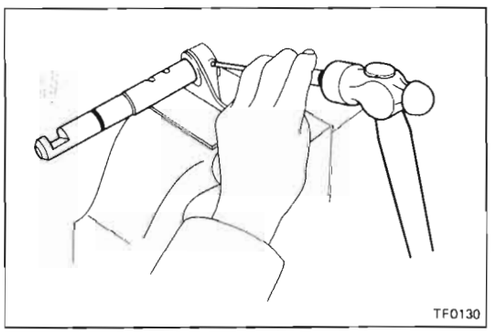
(b) Install the front case with a new gasket to the transfer adapter.

(c) Apply liquid sealer to the four bolts, and install and torque as shown.

Torque: 17 mm 650 kg-cm (47 ft-lb, 64 N·m)
14 mm 400 kg-cm (29 ft-lb, 39 N·m)

(d) Install and torque the other bolt.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)


TF0130

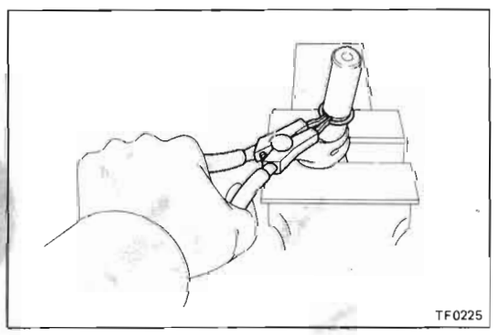
8. INSTALL SHIFT FORK SHAFT

[Mechanical Shift Type]

(a) Install the shift fork shaft into shift fork No. 1.

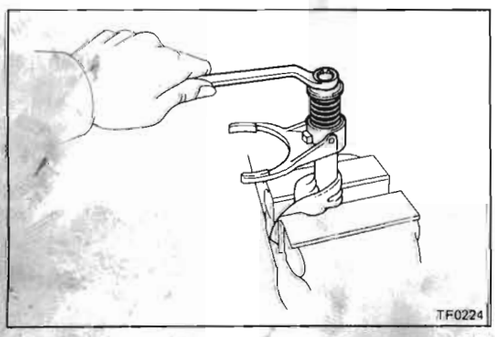
(b) Using a pin punch and a hammer, drive in the slotted spring pin.

NOTE: Use a set of soft jaws in the vise to protect the shift fork.


TF0225

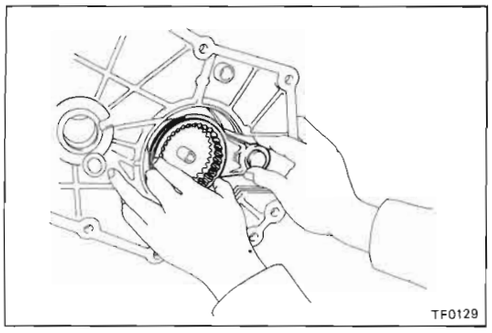
[Electrical Shift Type]

(a) Using snap ring pliers, install the snap ring.


TF0224

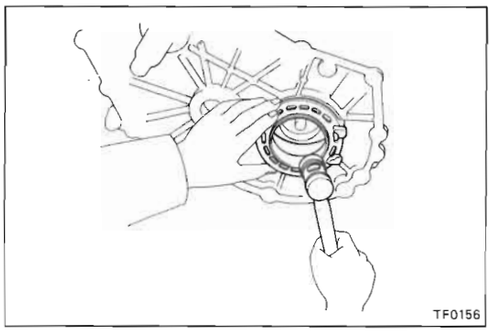
(b) Install the shift fork, spring and retainer to the shift fork shaft.

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TF0129

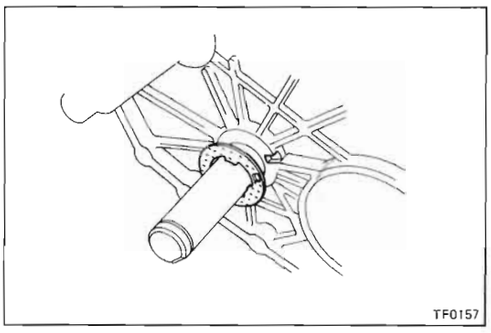
9. INSTALL CLUTCH SLEEVE

Install the clutch sleeve with the shift fork and shift fork shaft.


TF0156

10. INSTALL REAR OUTPUT SHAFT FRONT BEARING RETAINER

Using a plastic hammer, install the rear output shaft front bearing retainer.


TF0157

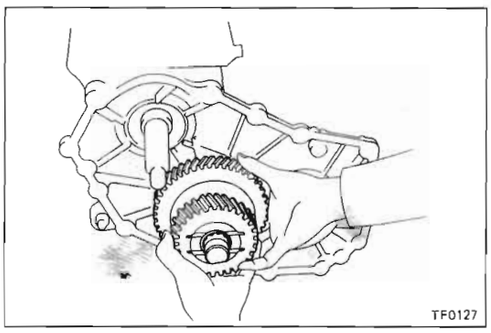
11. INSTALL IDLER GEAR

(a) Install a new O-ring on the idler gear shaft front side groove.

(b) Install the idler gear shaft to the transfer front case.

(c) Install the idler gear thrust washer.

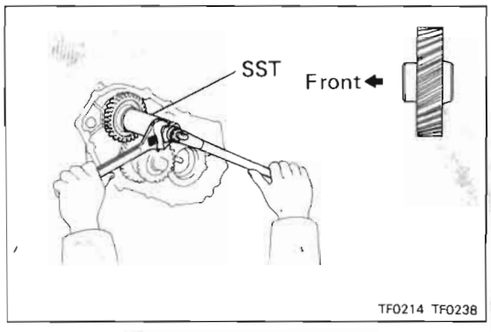
NOTE: Be sure that protruding part of washer fits in the case groove.


TF0127

(d) Apply MP grease to the two bearings.

(e) Install the two bearings and spacer to the idler gear shaft.

(f) Install the idler gear to the idler gear shaft.



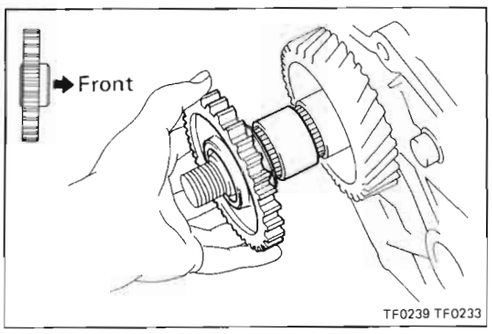
TF0214 TF0238

12. INSTALL TRANSFER INPUT GEAR

Using SST, install the transfer input gear.

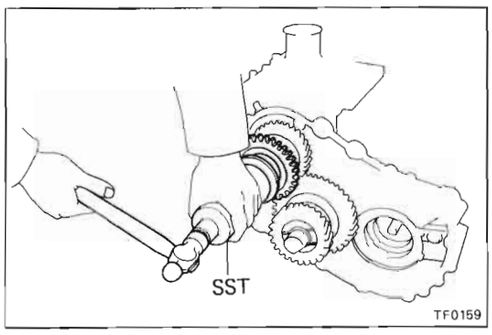
SST 09309-36033

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13. INSTALL SPACER AND POWER TAKE-OFF DRIVE GEAR

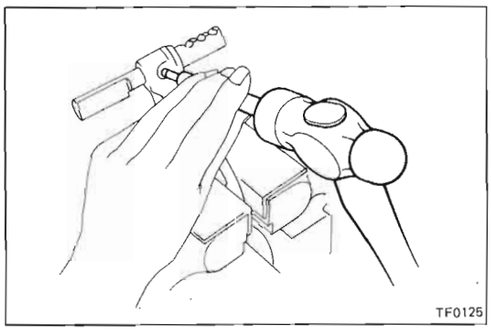
Install the spacer and power take-off drive gear to the output shaft.



14. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and hammer, drive in the output shaft bearing.

SST 09316-60010

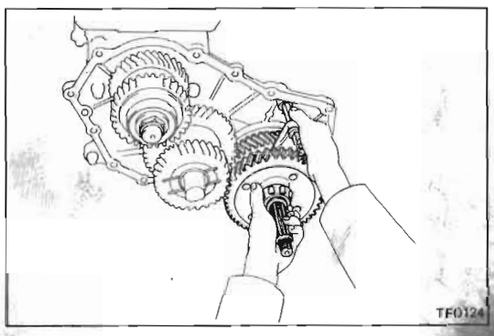


15. INSTALL SHIFT FORK SHAFT

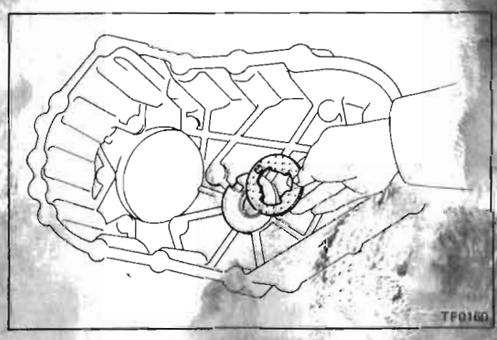
(a) Install the high and low shift fork shaft into shift fork.

(b) Using a pin punch and a hammer, drive in the slotted spring pin.

NOTE: Use a set of soft jaws in the vise to protect the shift fork.



16. INSTALL REAR OUTPUT SHAFT WITH SHIFT FORK AND SHAFT

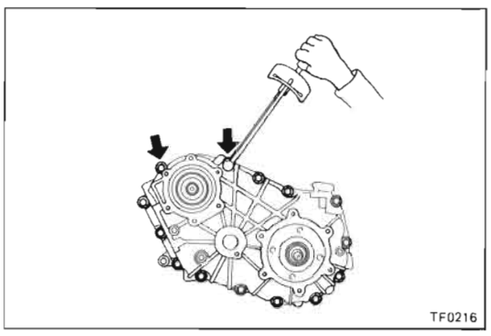


17. STICK ON THRUST WASHER

Stick the thrust washer to the transfer rear case with MP grease.

NOTE: Be sure that protruding part of washer fits in the case groove.

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TF0216

18. INSTALL TRANSFER REAR CASE

(a) Place a new gasket on the front case.

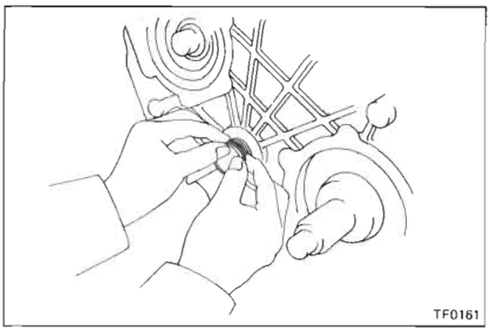
(b) Install the rear case.

(c) Apply liquid sealer to the two bolts, and install and torque as shown.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)

(d) Install and torque the other bolts.

Torque: 17 mm 650 kg-cm (47 ft-lb, 64 N·m)
14 mm 400 kg-cm (29 ft-lb, 39 N·m)


TF0161

19. INSTALL O-RING AND LOCK PLATE

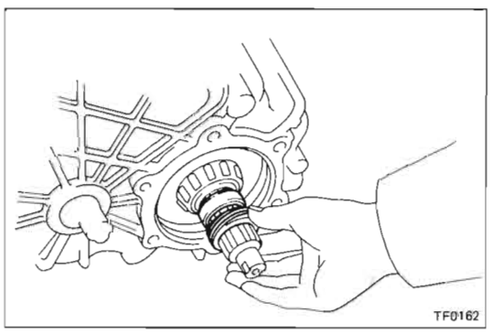
(a) Align the shaft groove to the bolt hole.

(b) Install an O-ring on the shaft groove.

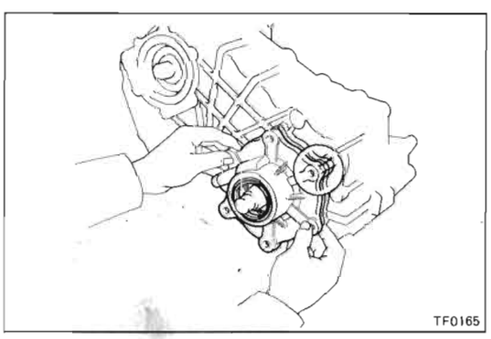
(c) Using a plastic hammer, drive in the shaft.

(d) Install the lock plate and bolt. Tighten the bolt.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)


TF0162

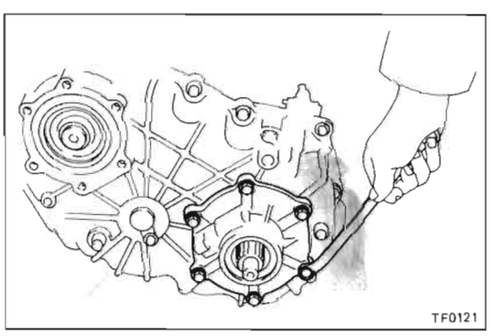
20. INSTALL SPEEDOMETER DRIVE GEAR AND SPACER


TF0165

21. ADJUST REAR OUTPUT SHAFT PRELOAD

(a) Install the rear output shaft rear bearing retainer.

NOTE: Align the bearing retainer rib with the case.

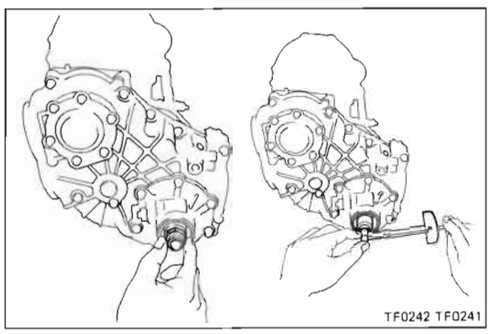

TF0121

(b) Torque the six bolts.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

(c) Shift the transfer lever to the N position.

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TF0242 TF0241

(d) Temporarily install the rear companion flange lock nut.

(e) Using a torque meter, measure the rear output shaft preload. (Starting torque)

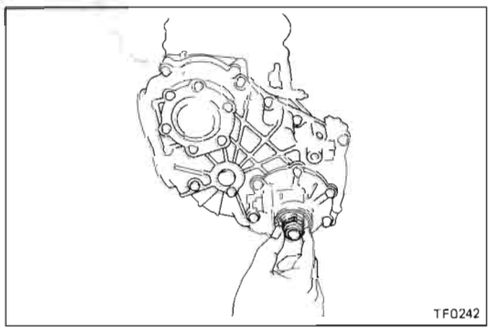
Preload:

New bearing	**15 – 24.7 kg-cm (13.0 – 21.4 in.-lb, 1.5 – 2.4 N·m)**
Reused bearing	**7 – 12 kg-cm (6.1 – 10.4 in.-lb, 0.7 – 1.2 N·m)**

If the preload is not within specification, remove the outer race of the rear output shaft rear bearing with SST.

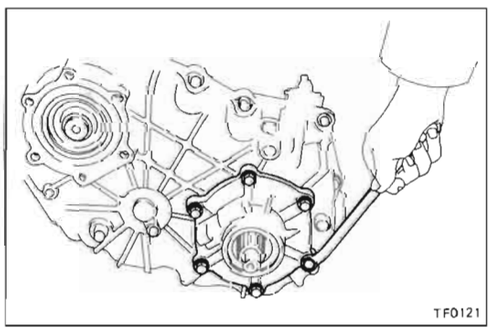
Reselect an adjusting shim.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	0.15 (0.0059)	10	1.0 (0.039)
4	0.4 (0.016)	11	1.1 (0.043)
5	0.5 (0.020)	12	1.2 (0.047)
6	0.6 (0.024)	13	1.3 (0.051)
7	0.7 (0.028)	14	1.4 (0.055)
8	0.8 (0.031)	15	1.5 (0.059)
9	0.9 (0.035)		

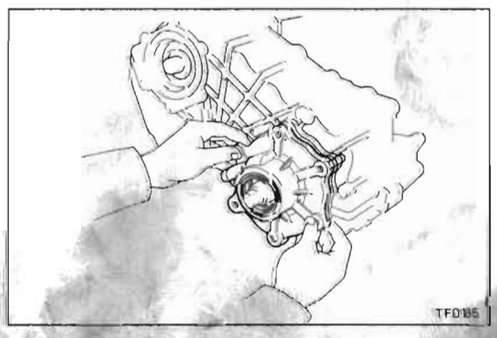

TF0242

NOTE: The preload will change about 10.0 kg-cm (8.7 in.-lb, 1.0 N·m) with each shim thickness.

(f) Remove the rear companion flange lock nut.


TF0121

22. REMOVE REAR OUTPUT SHAFT REAR BEARING RETAINER


TF0185

23. INSTALL REAR OUTPUT SHAFT REAR BEARING RETAINER

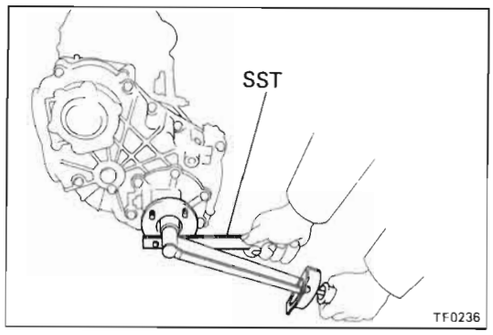
(a) Align the bearing retainer rib with the case rib and install the retainer with a new gasket.

(b) Apply liquid sealer to the six bolts.

(c) Install and torque the bolts.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

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24. INSTALL FRONT AND REAR COMPANION FLANGE

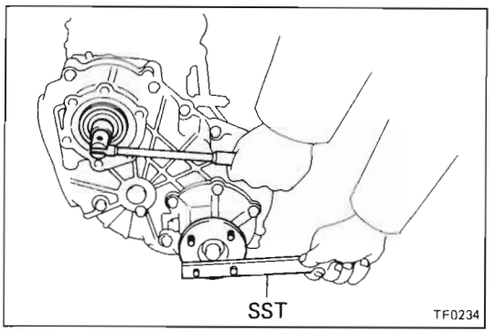
(a) Install the companion flange.

(b) Using SST to hold the companion flange, install the companion flange lock nut.

SST 09330-00021

Torque: 1,300 kg-cm (94 ft-lb, 127 N·m)

(c) Stake the companion flange lock nut.



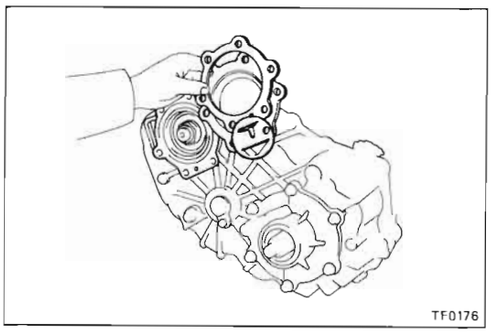
25. INSTALL TRANSMISSION OUTPUT SHAFT LOCK NUT

(a) Using SST to hold the rear companion flange, install the transmission output shaft lock nut.

SST 09330-00021

Torque: 1,300 kg-cm (94 ft-lb, 127 N·m)

(b) Stake the transmission output shaft lock nut.



26. INSTALL TRANSFER CASE COVER NO. 2

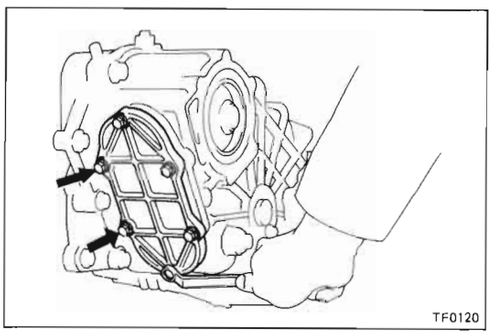
(a) Install the transfer case cover No. 2 with a new gasket to the transfer rear case.

NOTE: Face the gasket notch downward.

(b) Apply and torque the bolts.

(c) Install and torque the bolts.

Torque: 155 kg-cm (11 ft-lb, 15 N·m)



27. INSTALL POWER TAKE-OFF COVER

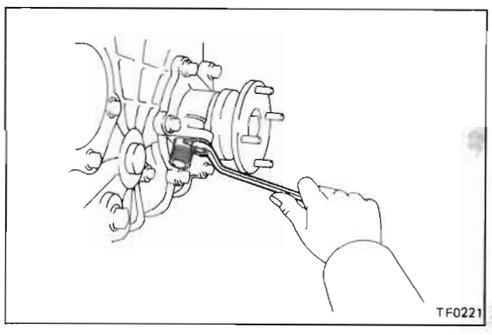
(a) Install the power take-off cover with a new gasket to the transfer rear case.

(b) Apply liquid sealer to the two bolts, and install and torque as shown.

Torque: 170 kg-cm (12 ft-lb, 17 N·m)

(c) Install and torque the other bolts.

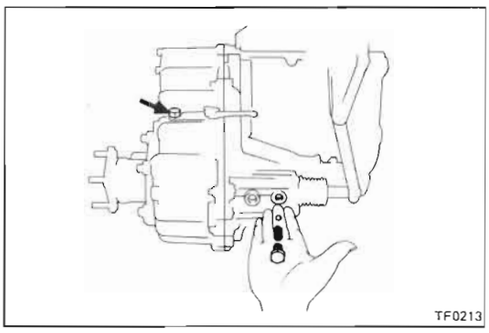
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



28. INSTALL SPEEDOMETER DRIVEN GEAR

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

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29. INSTALL PLUG, SPRING AND LOCKING BALL
[Mechanical Shift Type]

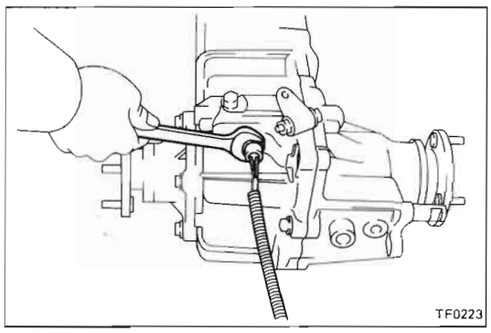
Apply liquid sealer to the plugs and install the locking balls, springs and plugs.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

[Electrical Shift Type]

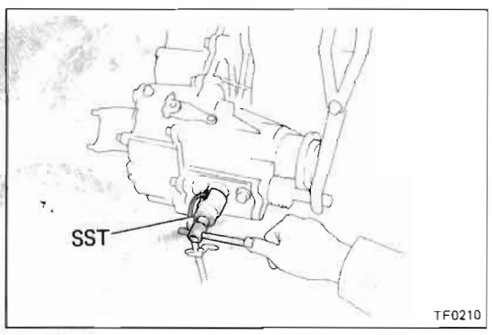
Apply liquid sealer to the plugs and install the locking balls, springs and plugs.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)



30. INSTALL L4 POSITION SWITCH (ELECTRICAL SHIFT TYPE)

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

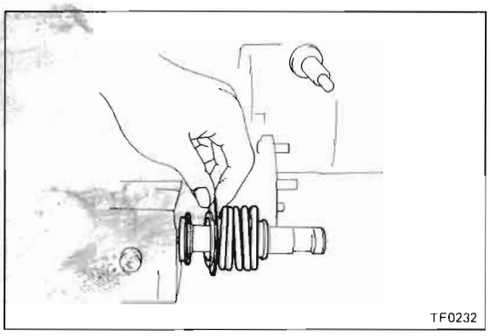


31. INSTALL 4WD INDICATOR SWITCH

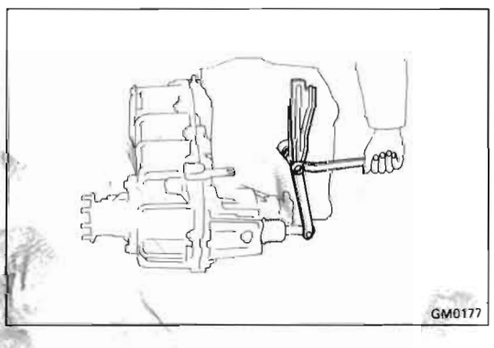
Using SST, install the 4WD indicator switch.

SST 09817-16011

Torque: 450 kg-cm (33 ft-lb, 44 N·m)



32. INSTALL DUST BOOT



33. INSTALL TRANSFER FRONT DRIVE SHIFT LEVER (MECHANICAL SHIFT TYPE)

34. INSTALL DIAPHRAGM CYLINDER (ELECTRICAL SHIFT TYPE)
(See page TF-8)

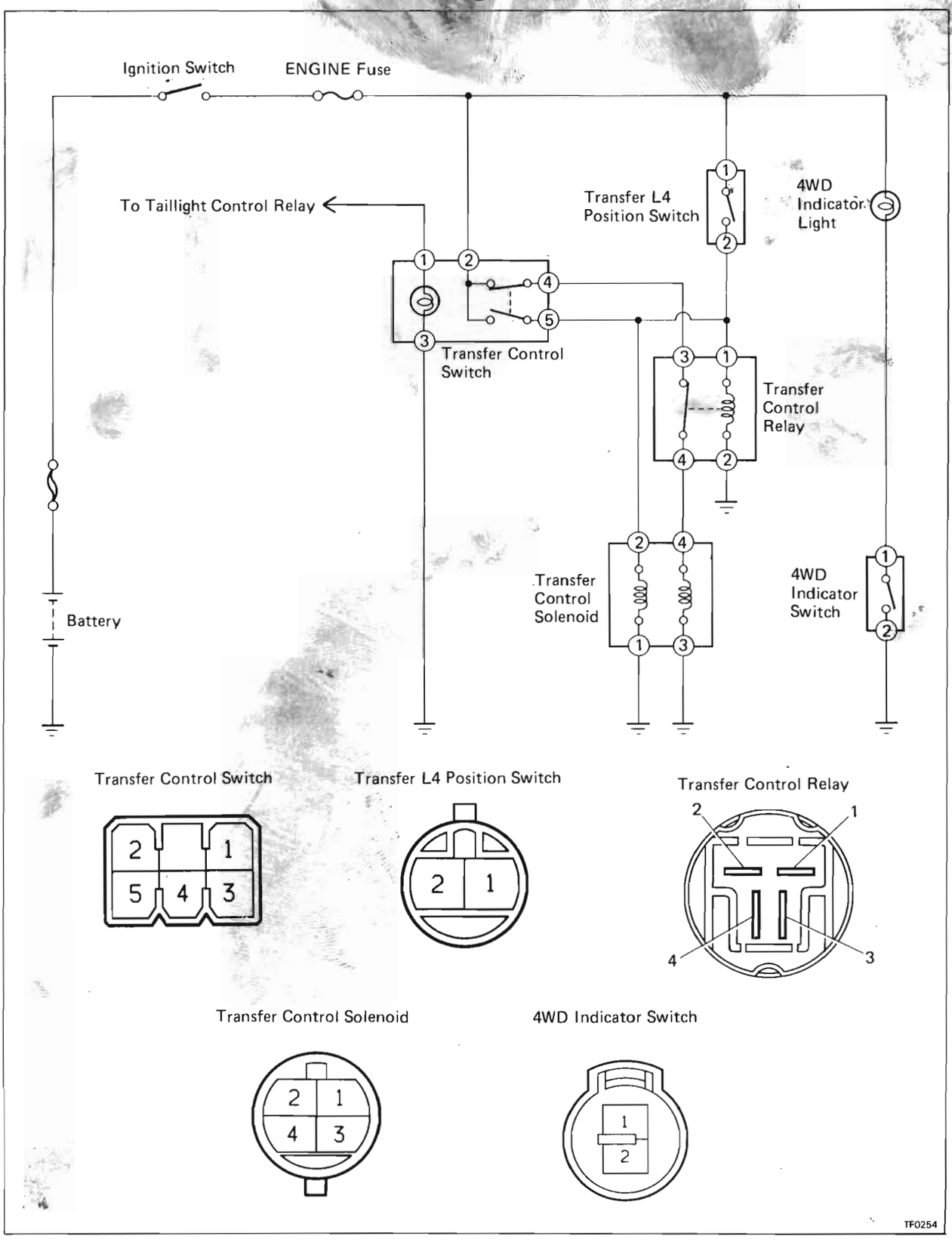
INSTALLATION OF TRANSFER

(See page MT-35)

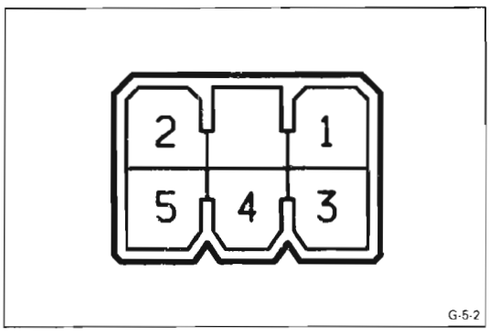
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ELECTRICAL SHIFT TYPE

Wiring Diagram



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Transfer Control Switch

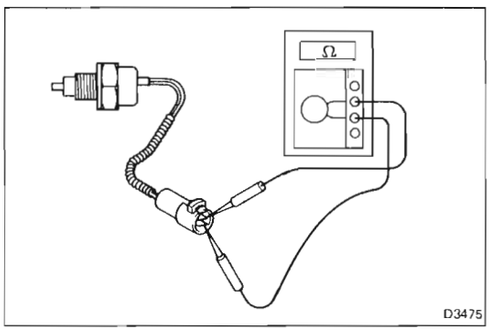
INSPECTION OF TRANSFER CONTROL SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	2	5	4
ON (H4)	○	○	
OFF (H2)	○		○

If continuity is not as specified, replace the switch.



Transfer L4 Position Switch

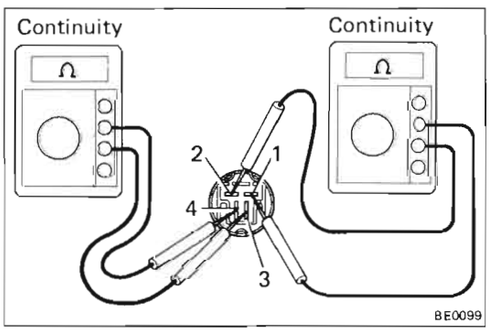
INSPECTION OF TRANSFER L4 POSITION SWITCH

INSPECT SWITCH CONTINUITY

(a) Check that there is continuity between terminals when the switch is pushed (transfer is H4 position).

(b) Check that there is no continuity between terminals when the switch is free (transfer is H2 position).

If continuity is not as specified, replace the switch.



Transfer Control Relay

INSPECTION OF TRANSFER CONTROL RELAY

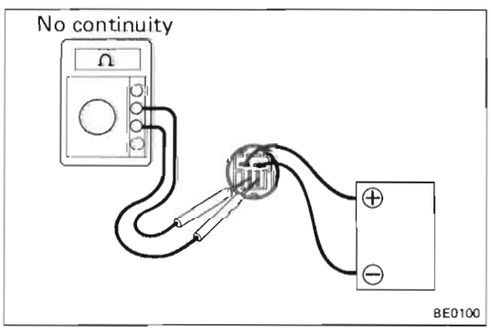
1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

(c) Check that there is no continuity between terminals 1 and 3.

If continuity is not as specified, replace the relay.

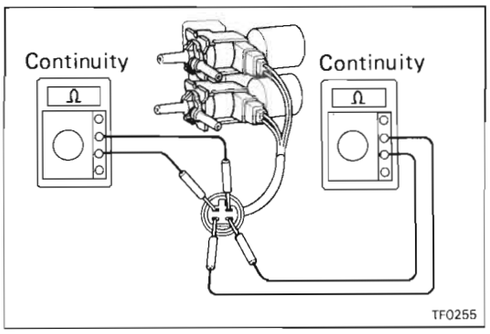


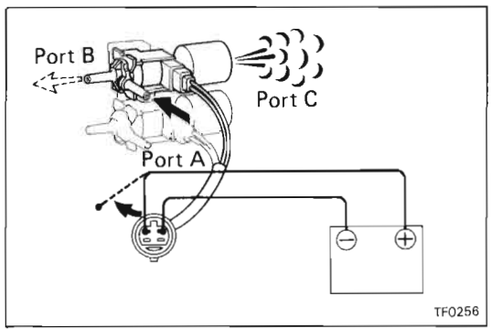
2. INSPECT RELAY OPERATION

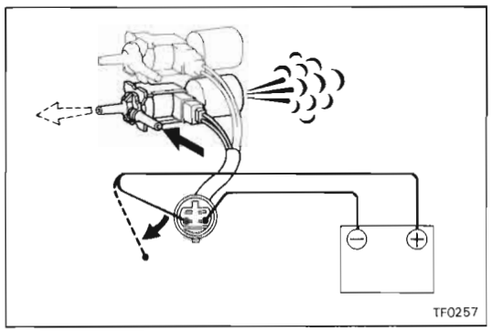
Apply the battery voltage across terminals 1 and 2.
Check that there is no continuity between terminals 3 and 4.

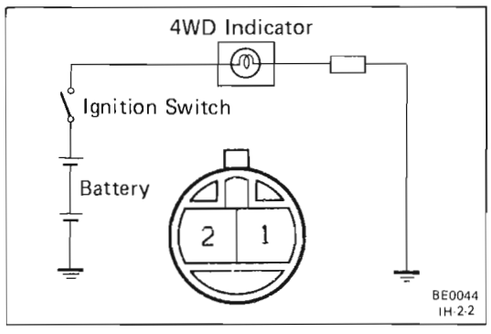
If operation is not as specified, replace the relay.

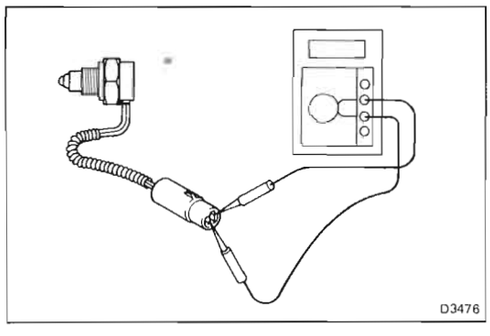
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Transfer Control Solenoid

INSPECTION OF TRANSFER CONTROL SOLENOID

1. INSPECT SOLENOID CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

(c) Check that there is no continuity between terminals 1 and 3.

If continuity is not as specified, replace the solenoid.

2. INSPECT H2 SOLENOID OPERATION

(a) Apply the battery voltage across terminals 1 and 2. Check that air flows from port A to port C. Check that air does not flow from port A to port B.

(b) Check that air flows from port A to port B. Check that air does not flow from port A to port C.

If operation is not as specified, replace the solenoid.

3. INSPECT H4 SOLENOID OPERATION

(a) Apply the battery voltage across terminals 3 and 4. Check that air flows from port A to port C. Check that air does not flow from port A to port B.

(b) Check that air flows from port A to port B. Check that air does not flow from port A to port C.

If operation is not as specified, replace the solenoid.

4WD Indicator Light

INSPECTION OF 4WD INDICATOR LIGHT

INSPECT INDICATOR LIGHT OPERATION

(a) Disconnect the connector the 4WD indicator switch. Connect the terminal 1 of the 4WD indicator switch and body ground.

(b) Turn the ignition switch or starter switch on. Check that the bulb lights.

If operation is not correct, remove and test the bulb.

4WD Indicator Switch

INSPECTION OF 4WD INDICATOR SWITCH

INSPECT SWITCH CONTINUITY

(a) Check that there is continuity between terminals when the switch is pushed (transfer is 4WD position).

(b) Check that there is no continuity between terminals when the switch is free (transfer is except 4WD position).

If continuity is not as specified, replace the switch.

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PROPELLER SHAFT

	Page
PRECAUTION	PR-2
TROUBLESHOOTING	PR-2
PROPELLER SHAFT	PR-2

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PRECAUTION

Be careful not to grip the propeller shaft tube too tightly in the vise as this will cause deformation.

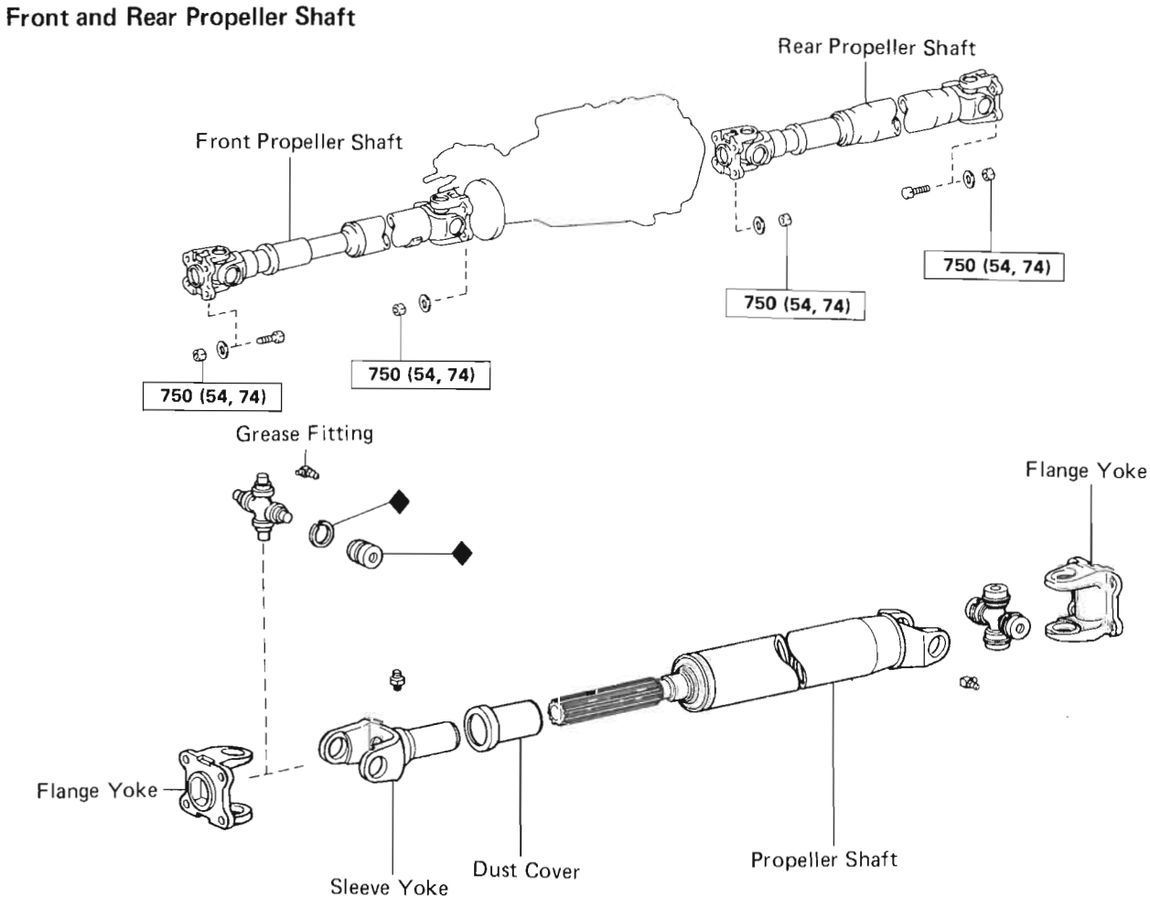
TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Noise	Sleeve yoke spline worn	Replace sleeve yoke	PR-4
	Spider bearing worn or stuck	Replace spider bearing	PR-4
Vibration	Propeller shaft runout	Replace propeller shaft	PR-3
	Propeller shaft unbalance	Balance propeller shaft	
	Sleeve yoke spline stuck	Replace sleeve yoke	PR-4

PROPELLER SHAFT

COMPONENTS

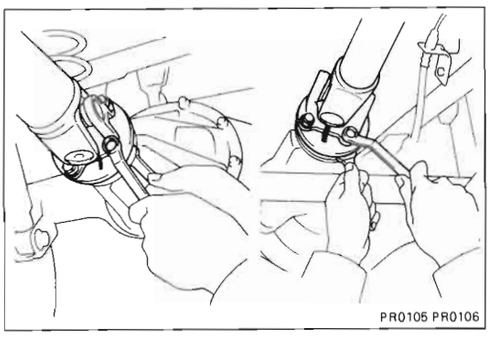
Front and Rear Propeller Shaft



kg-cm (ft-lb, N·m) : Specified torque

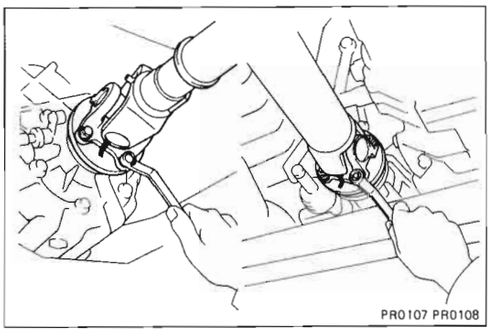
D3796
PR0109

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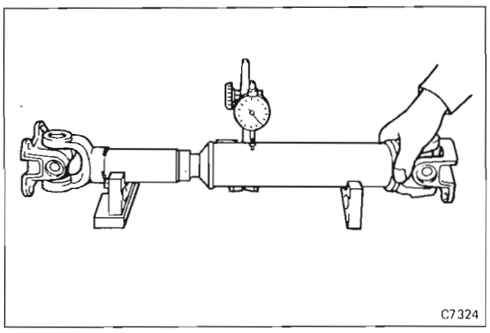


REMOVAL OF FRONT AND REAR PROPELLER SHAFT

1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON DIFFERENTIAL
   (a) Put matchmarks on the flanges.
   (b) Remove the four bolts and nuts.

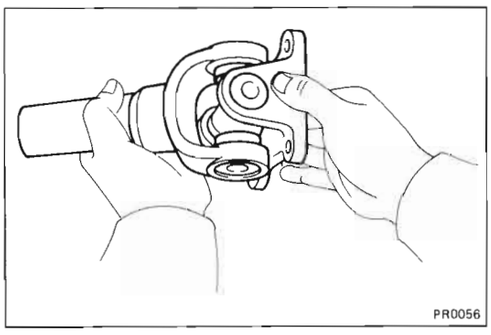


2. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON TRANSFER
   (a) Put matchmarks on the flanges.
   (b) Remove the four nuts.
   (c) Remove the propeller shaft.



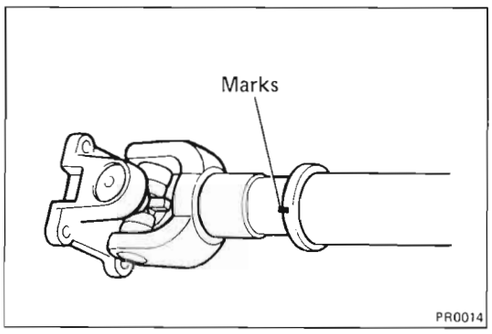
INSPECTION OF PROPELLER SHAFT

1. INSPECT PROPELLER SHAFT FOR DAMAGE OR RUNOUT
   If shaft runout is greater than maximum, replace the shaft.
   Maximum runout: 0.8 mm (0.031 in.)



2. INSPECT SPIDER BEARINGS
   (a) Inspect the spider bearings for wear or damage.
   (b) Check the spider bearing axial play by turning the yoke while holding the shaft tightly.
   Bearing axial play: Less than 0.05 mm (0.0020 in.)
   If necessary, replace the spider bearing.

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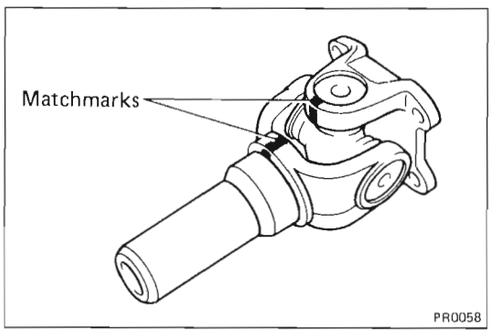
DISASSEMBLY OF PROPELLER SHAFT

(See page PR-2)

1. REMOVE SLEEVE YOKE FROM PROPELLER SHAFT

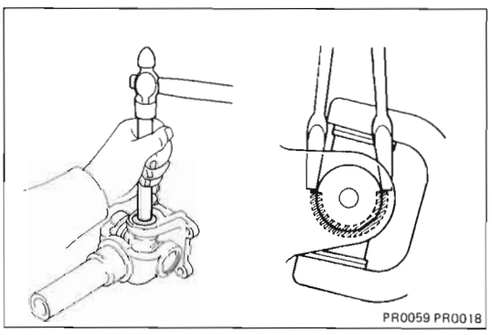
(a) Place alignment marks on the sleeve yoke and shaft.

(b) Pull out the sleeve yoke from the shaft.



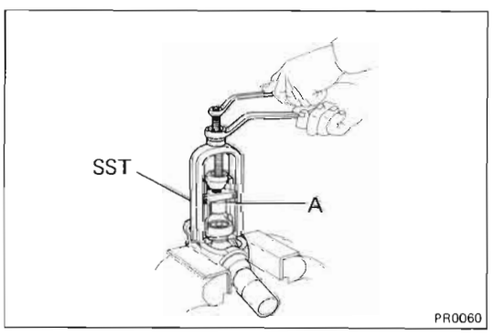
2. REMOVE SPIDER BEARING

(a) Put matchmarks on the shaft and flange.



(b) Slightly tap in the bearing outer races.

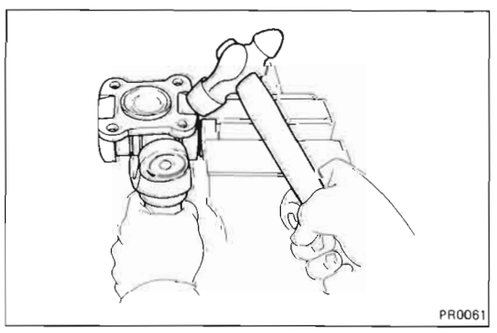
(c) Using two screwdrivers, remove the four snap rings from the grooves.



(d) Using SST, push out the bearing from the propeller shaft.

SST 09332-25010

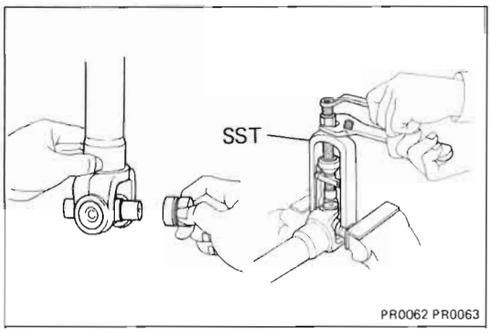
NOTE: Sufficiently raise the part indicated by A so that it does not come into contact with the bearing.



(e) Clamp the bearing outer race in a vise and tap off the propeller shaft with a hammer.

NOTE: Remove the bearing on the opposite side in the same procedure.

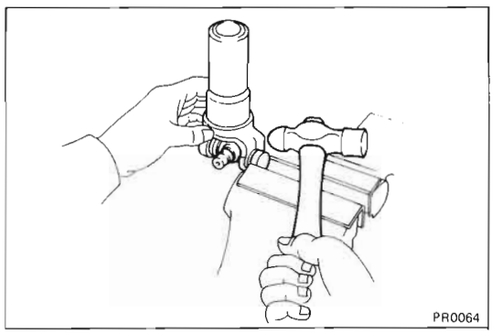
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(f) Install the two removed bearing outer races to the spider.

(g) Using SST, push out the bearing from the yoke.

SST 09332-25010



(h) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.

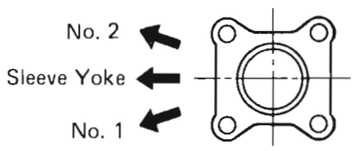
NOTE: Remove the bearing on the opposite side in the same procedure.

ASSEMBLY OF PROPELLER SHAFT

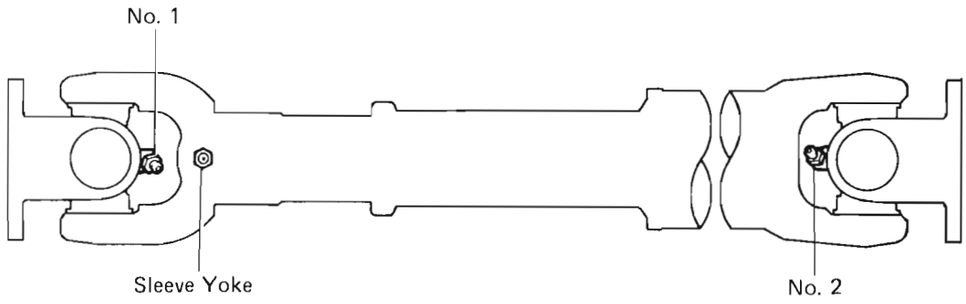
(See page PR-2)

NOTE: When replacing the spider, be sure that the grease fitting assembly hole is facing in the direction shown in figure.

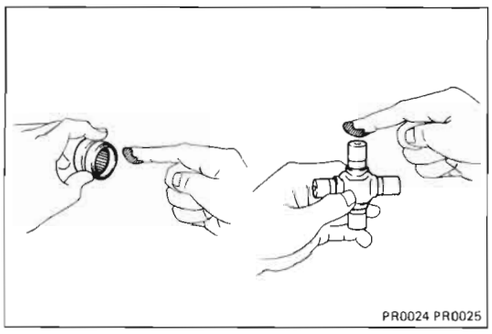
SPIDER GREASE FITTING ASSEMBLY DIRECTION



The figure at left shows the locations of the grease fittings as seen from the rear.



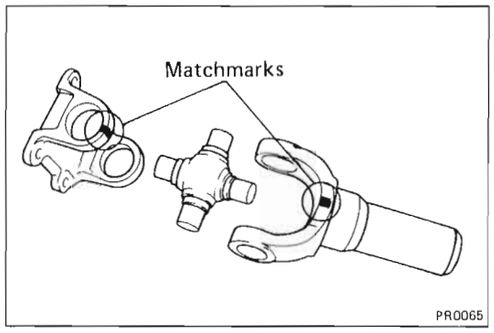
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PR0024 PR0025

1. INSTALL SPIDER BEARINGS

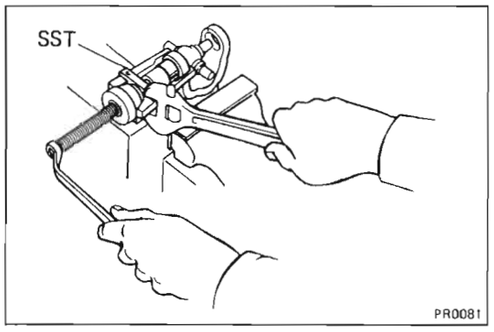
(a) Apply MP grease to the spider and bearings.

NOTE: Be careful not to apply too much grease.



PR0065

(b) Align the marks on the yoke and shaft.

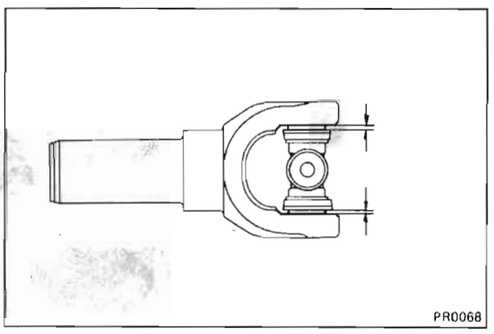


PR0081

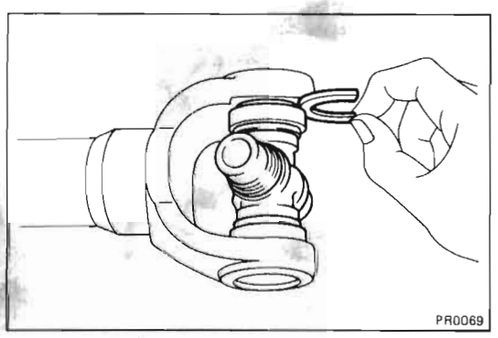
(c) Fit the new spider into the yoke.

(d) Using SST, install the new bearings on the spider.

SST 09332-25010


PR0068

(e) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal widths.


PR0069

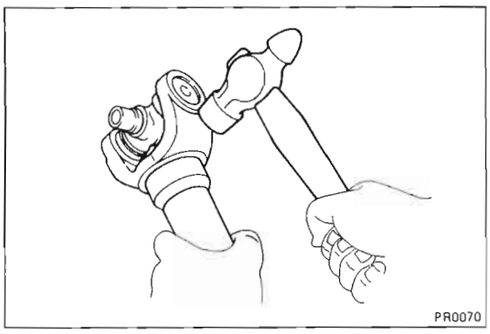
(f) Install two snap rings of equal thickness which will allow 0 – 0.05 mm (0 – 0.0020 in.) axial play.

NOTE: Do not reuse the snap rings.

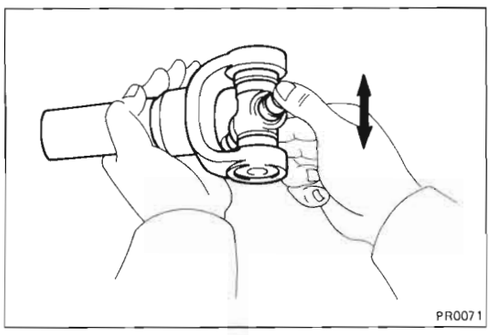
Thickness of snap ring

Thickness	mm (in.)	Color
1.475 – 1.525	(0.0581 – 0.0600)	–
1.525 – 1.575	(0.0600 – 0.0620)	Brown
1.575 – 1.625	(0.0620 – 0.0640)	Blue

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PR0070

(g) Using a hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.

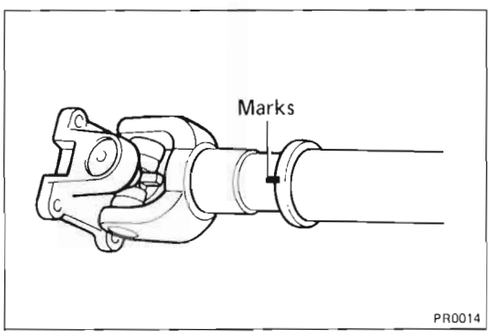

PR0071

(h) Check that the spider bearing moves smoothly.

(i) Check the spider bearing axial play.

Bearing axial play: Less than 0.05 mm (0.0020 in.)

NOTE: Install new spider bearings to the flange side in the procedure described above.



PR0014

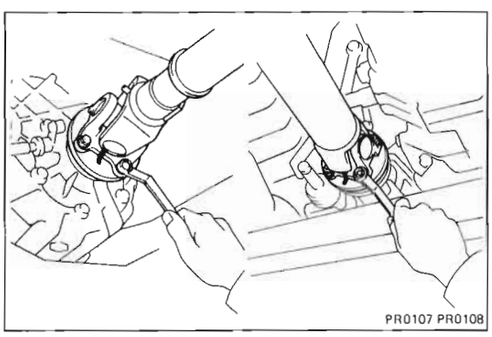
2. INSERT SLEEVE YOKE INTO PROPELLER SHAFT

(a) Apply MP grease to the propeller shaft spline and sleeve yoke sliding surface.

(b) Align the marks on the sleeve yoke and propeller shaft.

(c) Insert the sleeve yoke into the propeller shaft.

INSTALLATION OF FRONT AND REAR PROPELLER SHAFT

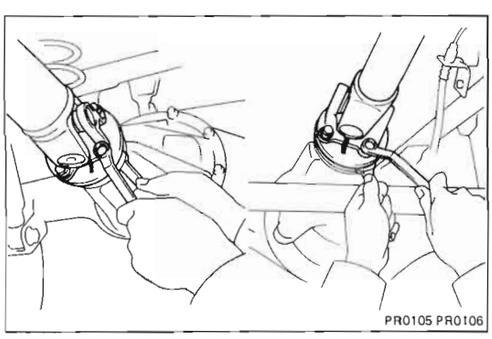

PR0107 PR0108

1. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON TRANSFER

(a) Align the matchmarks on the flanges and connect the flanges with four nuts.

(b) Torque the nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)


PR0105 PR0106

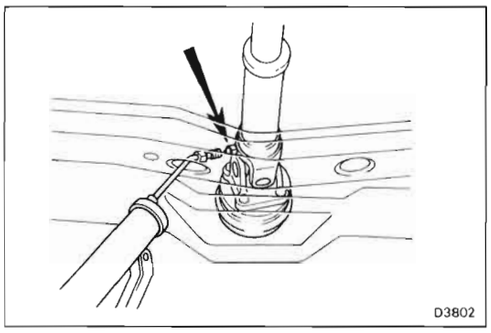
2. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFERENTIAL

(a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.

(b) Torque the bolts and nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

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3. APPLY MP GREASE TO GREASE FITTING

Using a grease gun, pump the MP grease into each fitting until it begins to flow from around the oil seal.

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FRONT AXLE AND SUSPENSION

	Page
TROUBLESHOOTING	FA-2
FRONT WHEEL ALIGNMENT	FA-3
FREE WHEEL HUB	FA-6
FRONT AXLE HUB	FA-12
STEERING KNUCKLE AND AXLE SHAFT	FA-17
FRONT DIFFERENTIAL	FA-28
FRONT SUSPENSION	FA-32
Coil Spring and Shock Absorber	FA-32
Lateral Control Rod	FA-33
Leading Arm	FA-35

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TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Oil leak at front axle	Oil seals damaged or worn	Replace oil seal	FA-13
	Front axle housing cracked	Repair as necessary	
Oil leak at pinion shaft	Oil level too high or wrong grade	Drain and replace oil	A-19
	Oil seal worn or damaged	Replace oil seal	FA-28
	Companion flange loose or damaged	Tighten or replace flange	RA-8
Noises in front axle	Oil level low or wrong grade	Drain and replace oil	A-19
	Excessive backlash between pinion and ring or side gear	Check backlash	RA-10
	Ring, pinion or side gears worn or chipped	Inspect gears	RA-13
	Pinion shaft bearing worn	Replace bearing	RA-13
	Wheel bearing worn	Replace bearing	FA-13
	Differential bearing loose or worn	Tighten or replace bearings	RA-13
Wanders/pulls	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	A-7
	Alignment incorrect	Check front end alignment	FA-3
	Wheel bearing adjusted too tight	Adjust wheel bearing	FA-13
	Front or rear suspension parts loose or broken	Tighten or replace suspension part	FA-32
	Steering linkage loose or worn	Tighten or replace steering linkage	SR-61
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3,20,46
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	FA-32
	Springs weak	Replace spring	FA-32
Sways/pitches	Tires improperly inflated	Inflate tires to proper pressure	A-7
	Shock absorber worn out	Replace shock absorber	FA-32
Front wheel shimmy	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	A-19
	Wheels out of balance	Balance wheels	
	Steering damper worn out	Replace steering damper	SR-63
	Shock absorber worn out	Replace shock absorber	FA-32
	Alignment incorrect	Check front end alignment	FA-3
	Wheel bearings worn or improperly adjusted	Replace or adjust wheel bearings	FA-13
	Steering knuckle bearing worn	Replace bearing	FA-18
	Steering linkage loosen or worn	Tighten or replace steering linkage	SR-61
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3,20,46
Abnormal tire wear	Tires improperly inflated	Inflate tire to proper pressure	A-7
	Shock absorbers worn out	Replace shock absorber	FA-32
	Alignment incorrect	Check toe-in	FA-3

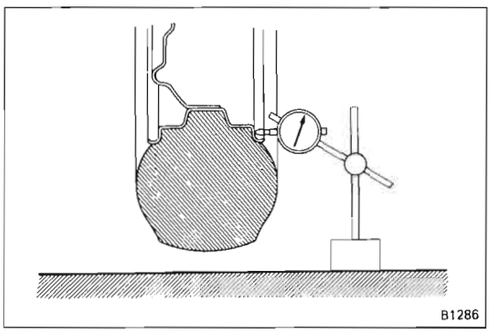
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FRONT WHEEL ALIGNMENT

1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

(a) Check the tires for wear and proper inflation.

Correct tire pressure: See page A.


B1286

(b) Check the wheel runout.

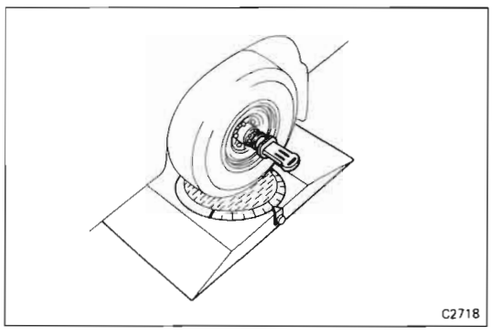
Lateral runout: Less than 1.2 mm (0.05 in.)

(c) Check the front wheel bearings for looseness.

(d) Check the front suspension for looseness.

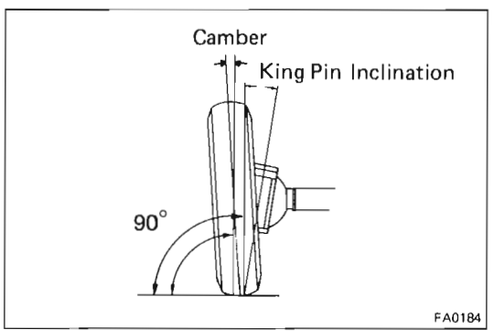
(e) Check the steering linkage for looseness.

(f) Use the standard bounce test to check that the front absorbers work properly.


C2718

2. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.

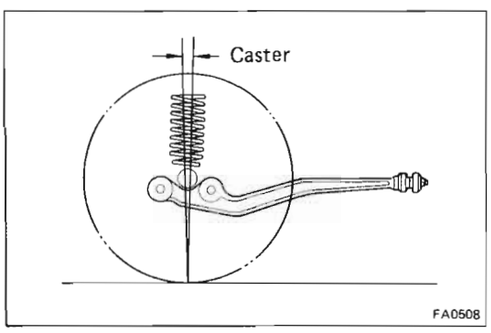


FA0184

3. CHECK CAMBER AND KING PIN INCLINATION

Camber: 1° ± 45'
King pin inclination: 9°30' ± 45'

If camber or king pin inclination checks are not within specification, rechecks the steering knuckle parts and the front wheel for bending or looseness.



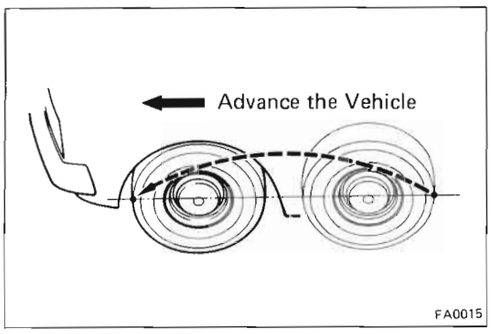
FA0508

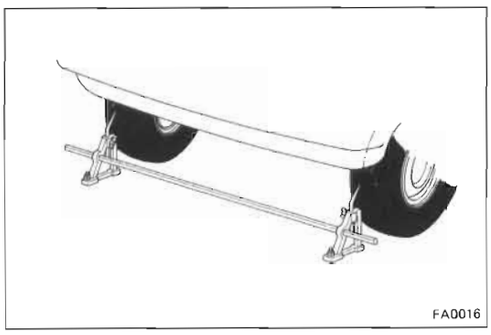
4. CHECK CASTER

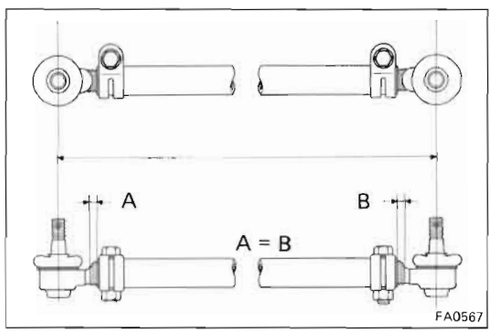
Caster: 4°05' ± 1°

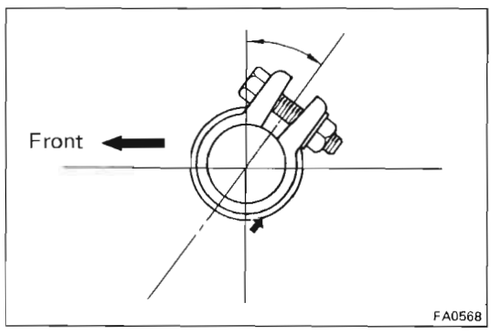
If caster is not as specified, inspect and replace damaged or worn suspension parts.

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5. ADJUST TOE-IN

(a) Make sure the wheels are positioned straight ahead.

(b) Mark the center of each rear tread at spindle height and measure the distance between the marks of right and left tires.

(c) Advance the vehicle until the marks on the rear side of the tires come to the front.

NOTE: The toe-in should be measured at the same point on the tire and at the same level.

(d) Measure the distance between the marks on the front side of the tires.

Tire		Toe-in mm(in.)	
		Inspection STD	Adjustment STD
Radial	10R-15	−1±2 (−0.04±0.08)	−1±1 (−0.04±0.04)
	Other	1±2 (0.04±0.08)	1±1 (0.04±0.04)
Bias		4±2 (0.16±0.08)	4±1 (0.16±0.04)

(e) Make sure the steering gear is centered.

(f) Loosen the nuts holding the clamps to the tie rod.

(g) Adjust toe-in to the correct value by turning the tie rod.

(h) Torque the nuts holding the clamps.

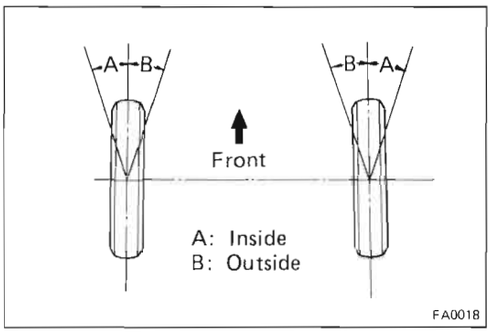
Torque: 375 kg-cm (27 ft-lb, 37 N·m)

NOTE: Insure that the lengths of the tie rod ends are the same.

- Insure that the lengths of the tie rod ends are the same.

- The clamps opening must be positioned at the rear of the tie rod and face within 45° from straight up as shown in the figure.

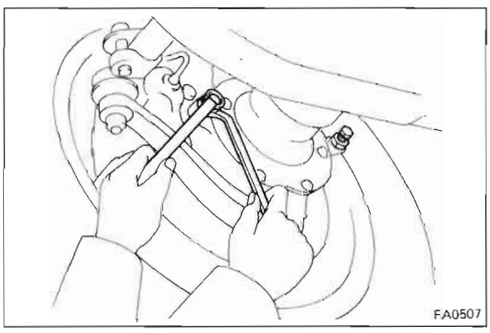
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6. ADJUST WHEEL ANGLE

Remove the caps of the knuckle stopper bolts and check the steering angles.

	Wheel angle	
Max.	Inside wheel	$32^\circ \begin{smallmatrix}+0^\circ \\ -3^\circ\end{smallmatrix}$
	Outside wheel	30°
at 20° (Outside wheel)	Inside wheel	20°30′

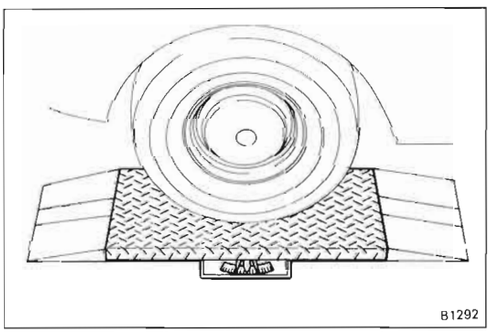


NOTE: When the steering wheel is fully turned, make sure that the wheel is not touching the body or brake flexible hose.

If maximum steering angles differ from the standard value, adjust the wheel angle with the knuckle stopper bolts.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

If the wheel angle still cannot be adjusted within limits, inspect and replace damaged or worn steering parts.



7. INSPECT SIDE SLIP WITH SIDE SLIP TESTER

Side slip limit:

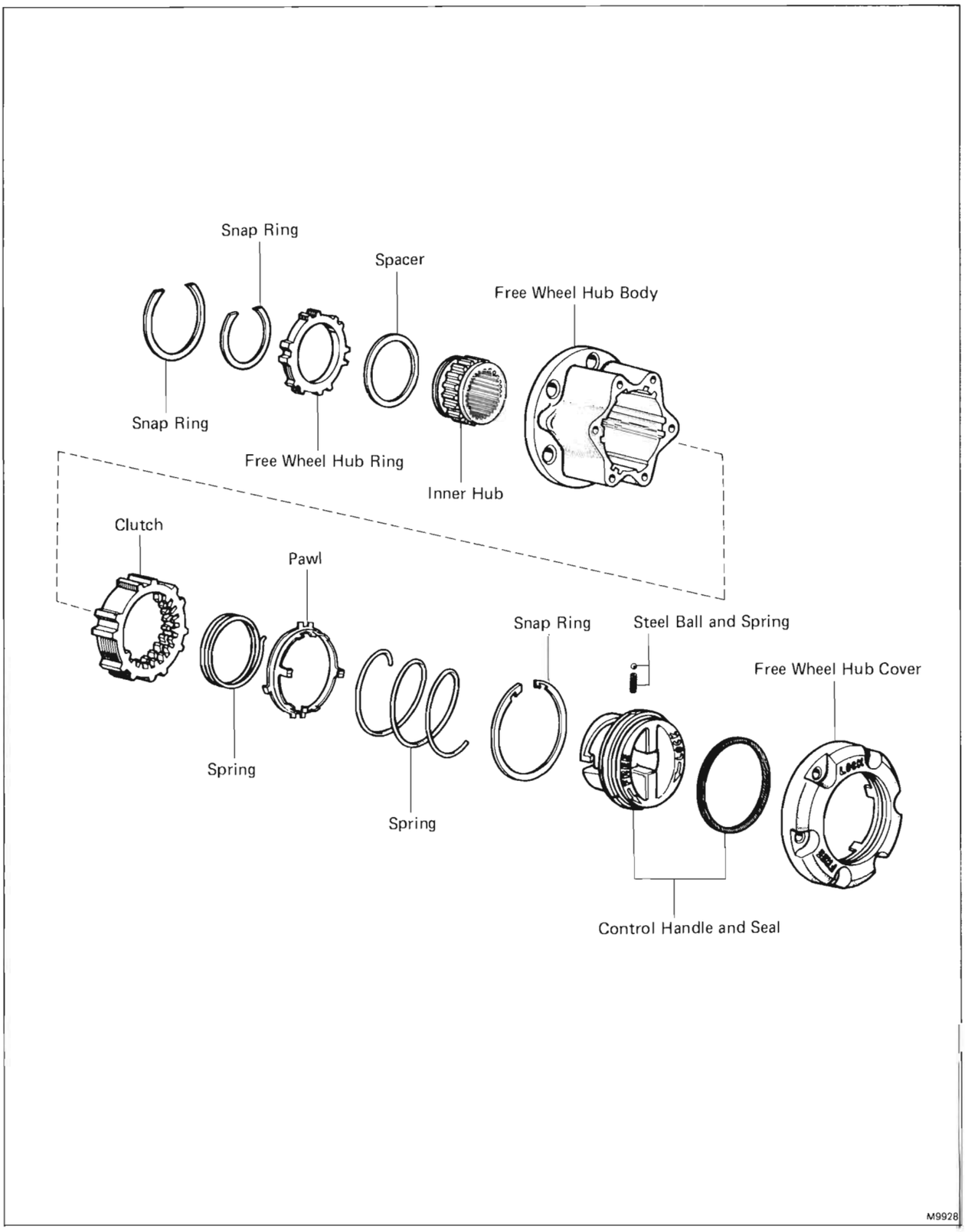
Less than 3.0 mm/m (0.118 in./3.3 ft)

If the side slip exceeds the limit, the toe-in or other front wheel alignment may not be correct.

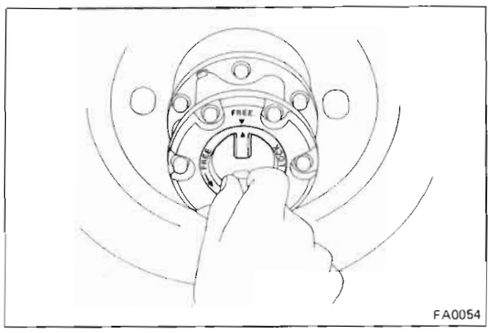
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FREE WHEEL HUB

COMPONENTS

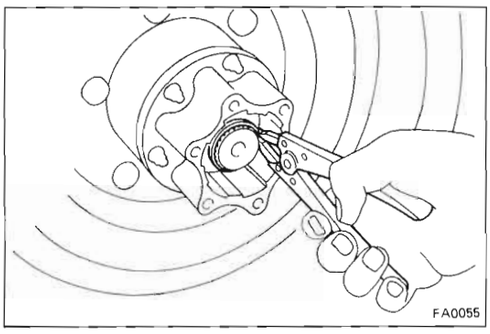


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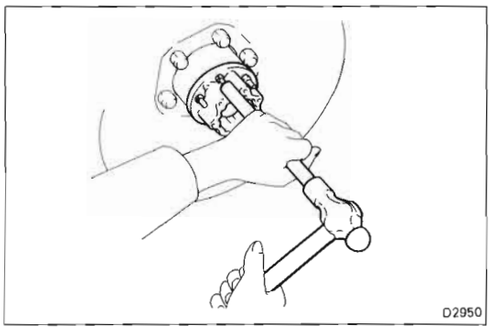


REMOVAL OF FREE WHEEL HUB

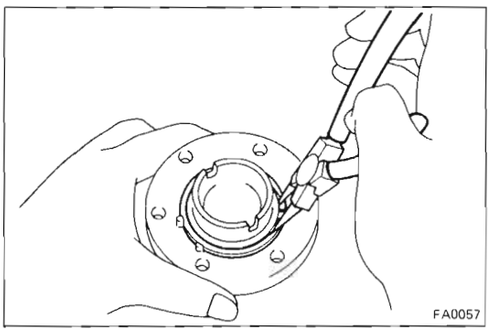
1. REMOVE FREE WHEEL HUB COVER
   (a) Set the control handle to FREE.
   (b) Remove the cover mounting bolts and pull off the cover.



2. REMOVE SNAP RING
   Using snap ring pliers, remove the snap ring.

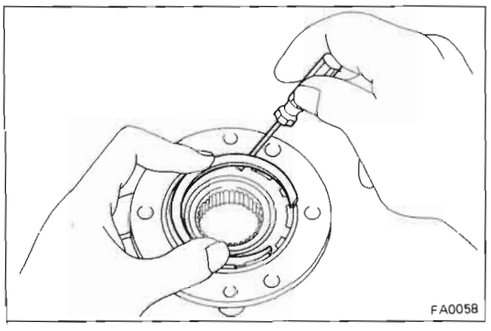


3. REMOVE FREE WHEEL HUB BODY
   (a) Remove the mounting nuts.
   (b) Using a brass bar and a hammer, tap on the bolts head and remove the cone washers.
   (c) Pull off the free wheel hub body.



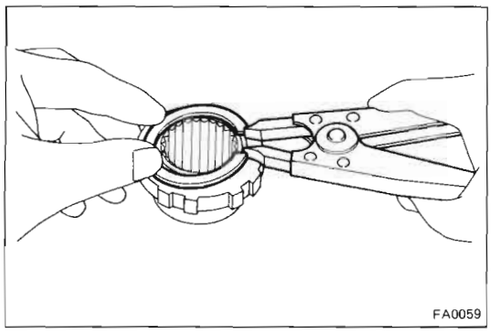
DISASSEMBLY OF FREE WHEEL HUB

1. REMOVE CONTROL HANDLE FROM FREE WHEEL HUB COVER
   (a) Using snap ring pliers, remove the snap ring.
   (b) Remove the control hadle.
   (c) Remove the steel ball and spring from the control handle.



2. REMOVE INNER HUB AND FREE WHEEL HUB RING FROM FREE WHEEL HUB BODY
   (a) Using a screwdriver, remove the snap ring.
   (b) Remove the inner hub and free wheel hub ring.

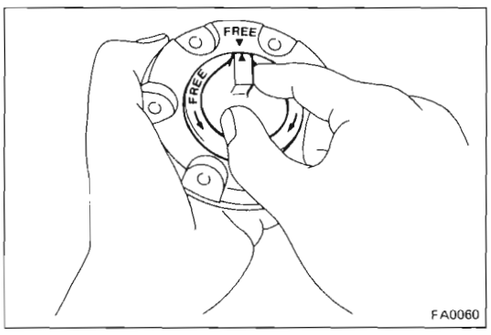
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FA0059

3. REMOVE FREE WHEEL HUB RING FROM INNER HUB

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the free wheel hub ring and spacer.

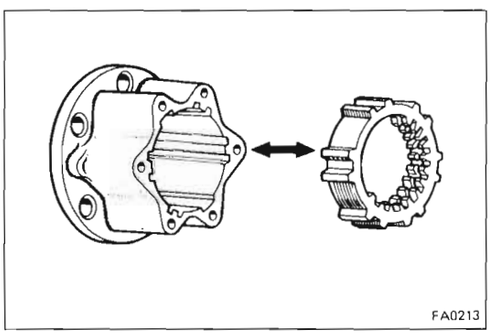


FA0060

INSPECTION OF FREE WHEEL HUB

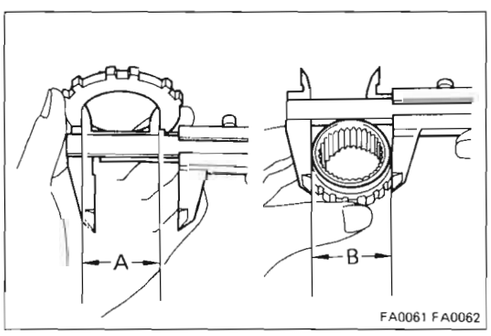
1. INSPECT COVER, HANDLE AND SEAL

Temporarily install the handle in the cover and check that the handle moves smoothly and freely.


FA0213

2. INSPECT BODY AND CLUTCH

Check that the clutch moves smoothly in the body.

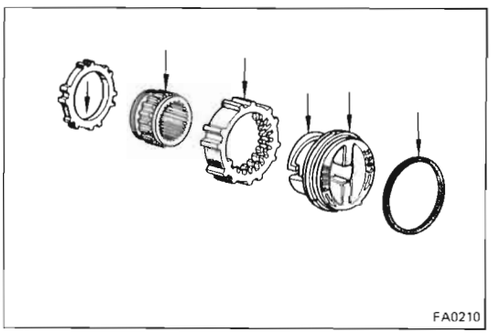


FA0061 FA0062

3. MEASURE THE OIL CLEARANCE BETWEEN THE INNER HUB AND FREE WHEEL HUB RING

Oil clearance (A–B): 0.3 mm (0.012 in.)

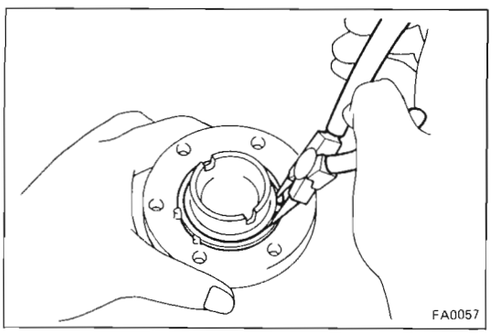
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FA0210

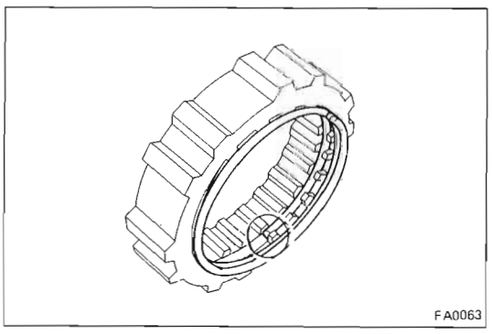
ASSEMBLY OF FREE WHEEL HUB

(See page FA-6)

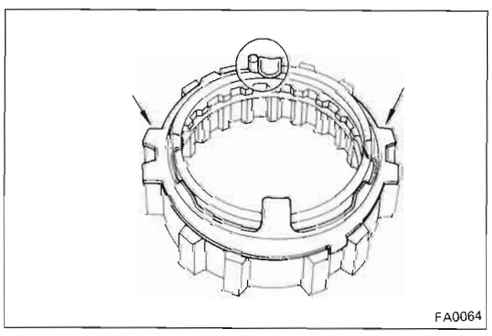
1. APPLY MP GREASE TO SLIDING SURFACE OF PARTS


FA0057

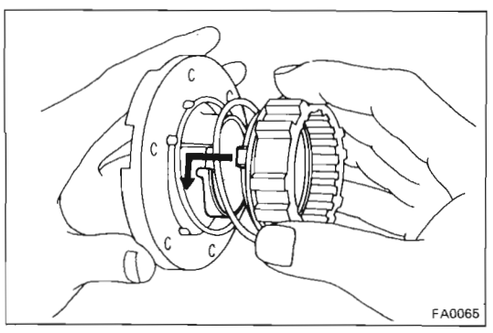
2. INSTALL CONTROL HANDLE TO COVER
   (a) Install the seal, spring and steel ball to the handle.
   (b) Insert the handle in the cover and install the snap ring with snap ring pliers.


FA0063

3. INSTALL TENSION SPRING IN CLUTCH
   Install the tension spring in the clutch with the spring end aligned with the initial groove.

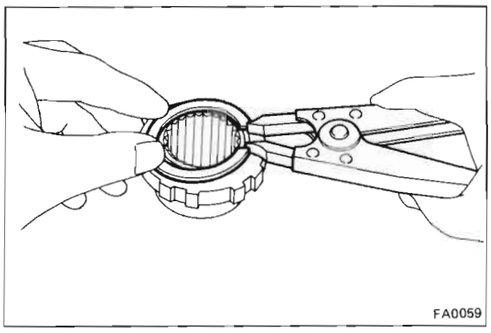

FA0064

4. INSTALL FOLLOWER PAWL TO CLUTCH
   (a) Place the follower pawl on the tension spring with one of the large tabs against the bent spring end.
   (b) Place the top ring of the spring on the small tabs.


FA0065

5. INSTALL CLUTCH AND SPRING INTO COVER
   (a) Place the spring between the cover and clutch with the large spring end toward the cover.
   (b) Compress the spring and install the clutch with the pawl tab fit to the handle cam.

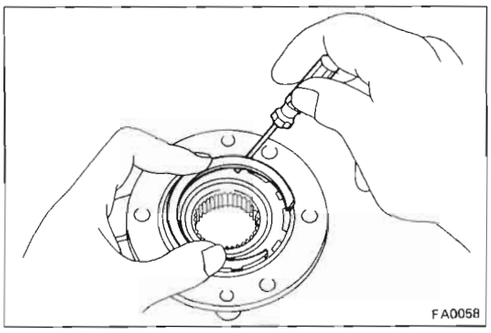
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6. INSTALL SPACER AND FREE WHEEL HUB RING TO INNER HUB

(a) Install the spacer and free wheel hub ring to the inner hub.

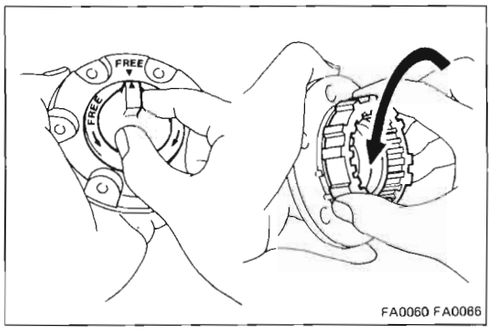
(b) Using snap ring pliers, install the snap ring.



7. INSTALL INNER HUB AND FREE WHEEL HUB RING IN FREE WHEEL HUB BODY

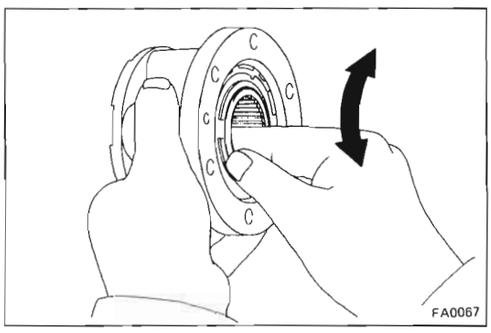
(a) Insert the inner hub and free wheel hub ring in the body.

(b) Using a screwdriver, install the snap ring.



8. TEMPORARILY INSTALL COVER TO BODY AND CHECK FREE WHEEL HUB

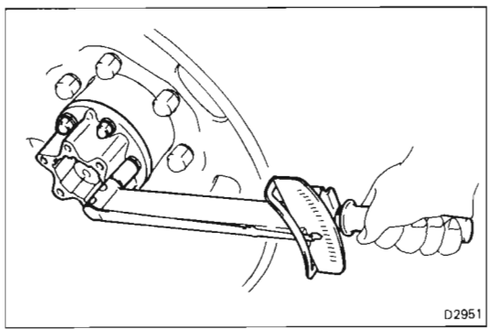
(a) Set the control handle and clutch to the free position.



(b) Insert the cover in the body and verify that the inner hub turns smoothly.

(c) Remove the cover from the body.

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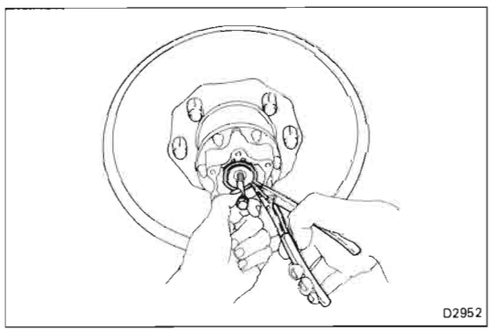


INSTALLATION OF FREE WHEEL HUB

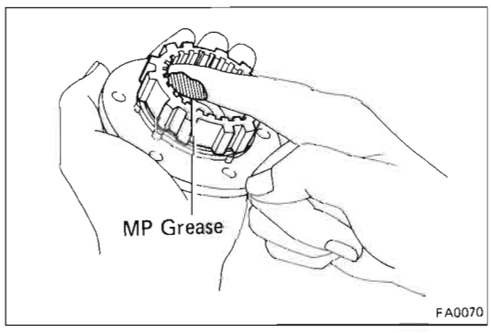
(See page FA-6)

1. INSTALL FREE WHEEL HUB BODY
   (a) Place the gasket in position on the front axle hub.
   (b) Install the free wheel hub body with six cone washes and nuts. Tighten the nuts.

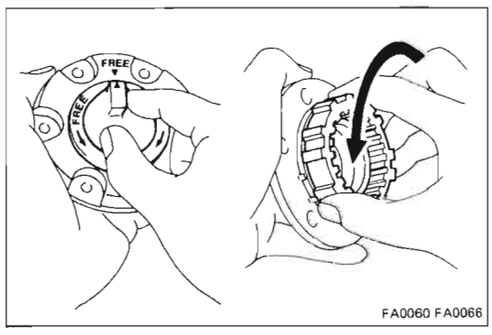
   Torque: 315 kg-cm (23 ft-lb, 31 N·m)



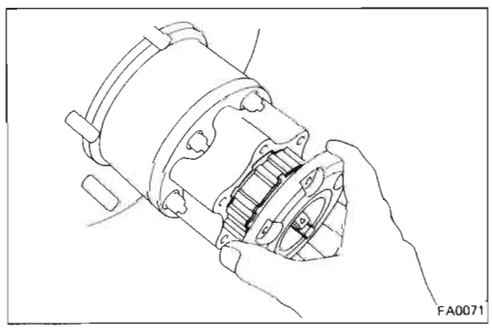
2. INSTALL SNAP RING
   (a) Install a bolt in the axle shaft and pull it out.
   (b) Using snap ring pliers, install the snap ring.
   (c) Remove the bolt.



3. APPLY MP GREASE TO INNER HUB SPLINES



4. INSTALL FREE WHEEL HUB COVER WITH NEW GASKET
   (a) Set the control handle and clutch to the free position.
   (b) Place a new gasket in position on the cover.



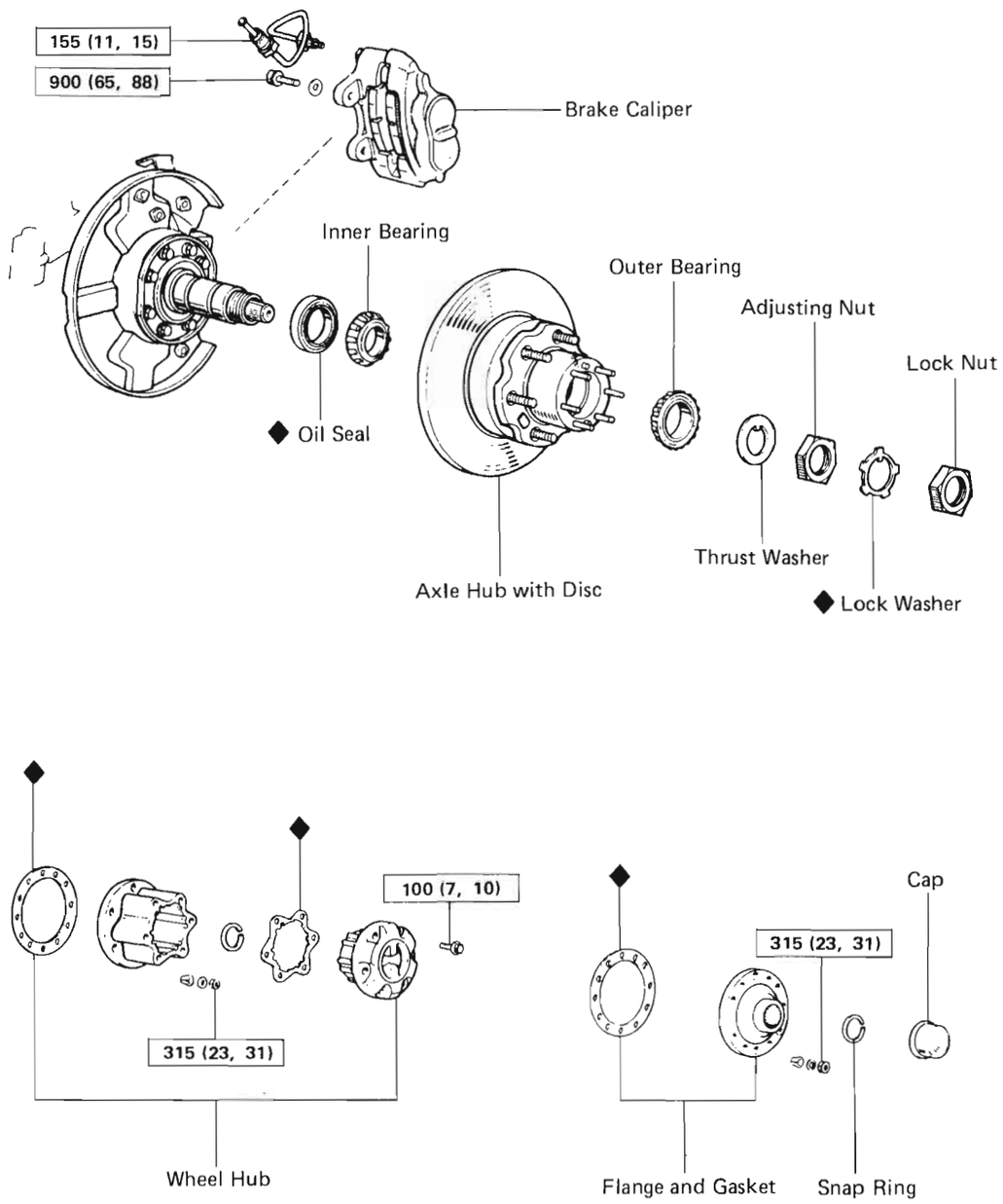
   (c) Install the cover to the body with the follower pawl tabs aligned with the non-toothed portions of the body.
   (d) Tighten the cover mounting bolts.

   Torque: 100 kg-cm (7 ft-lb, 10 N·m)

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FRONT AXLE HUB

COMPONENTS

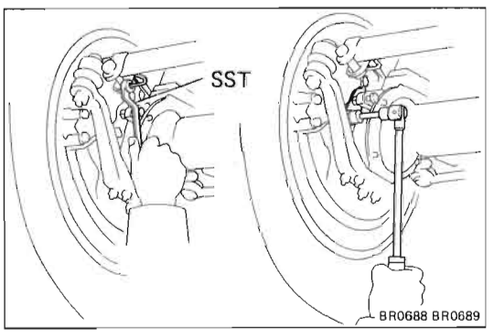


kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

FA0503
FA0086

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Front Axle Hub

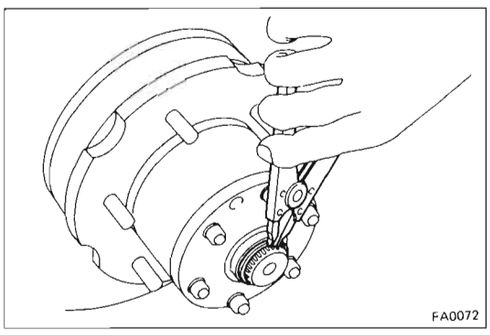
DISASSEMBLY OF FRONT AXLE HUB

1. REMOVE DISC BRAKE CYLINDER

(a) Using SST, disconnect the brake tube.

SST 09751-36011

(b) Remove the disc brake cylinder.



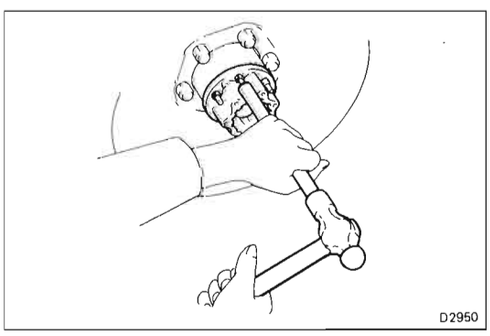
2. REMOVE FLANGE OR FREE WHEEL HUB

NOTE: For the free wheel hub. (See page FA-7)

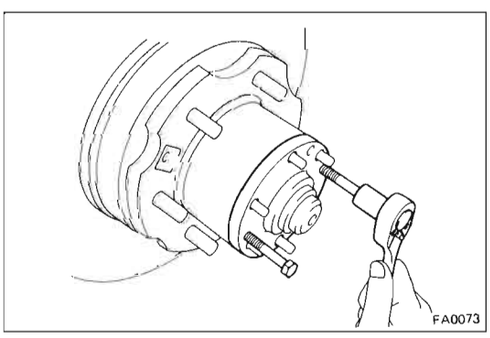
(a) Remove the cap from the flange.

(b) Using snap ring pliers, remove the snap ring.

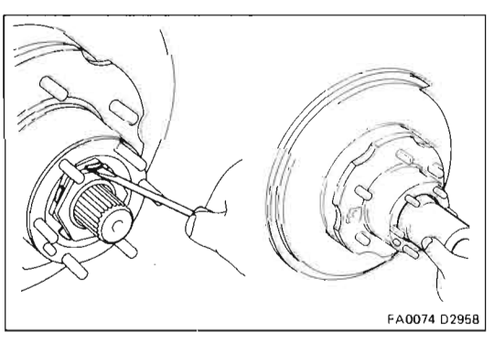
(c) Remove the mounting nuts.



(d) Using a brass bar and a hammer, tap the bolt heads and remove the cone washers.



(e) Install and tighten the two bolts, and remove the flange.



3. REMOVE AXLE HUB WITH DISC

(a) Using a screwdriver, release the lock washer.

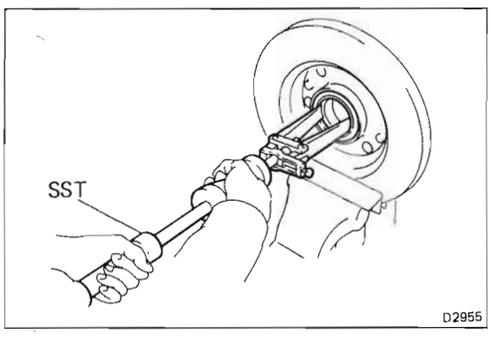
(b) Using SST, remove the lock nut.

SST 09607-60020

(c) Remove the lock washer and adjusting nut.

(d) Remove the axle hub with the disc.

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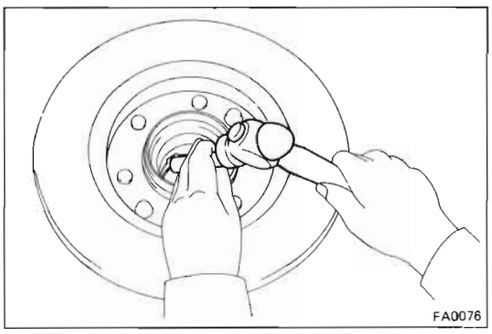


4. REMOVE INNER BEARING AND OIL SEAL

(a) Using SST, remove the oil seal.

SST 09308-00010

(b) Remove the inner bearing from the hub.



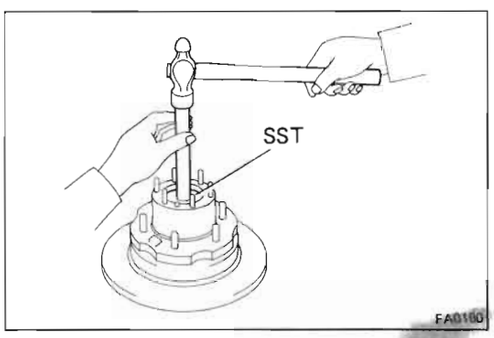
INSPECTION AND REPAIR OF FRONT AXLE HUB

1. INSPECT BEARING

Clean the bearings and outer races and inspect them for wear or damage.

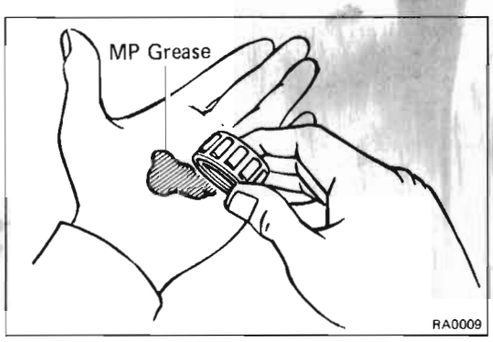
2. REPLACE BEARING OUTER RACE

(a) Using a brass bar and hammer, drive out the bearing outer race.



(b) Using SST, carefully drive in the new bearing outer race.

SST 09608-35013



ASSEMBLY OF FRONT AXLE HUB

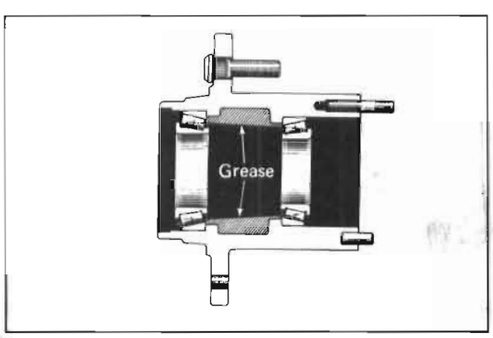
(See page FA-12)

1. PACK BEARINGS WITH MP GREASE

(a) Place MP grease in the palm of your hand.

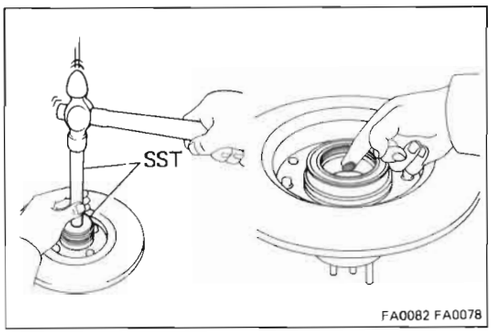
(b) Pack grease into the bearing, continuing until the grease oozes out from the other side.

(c) Do the same around the bearing circumference.



2. COAT INSIDE OF HUB AND CAP WITH MP GREASE

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3. INSTALL INNER BEARING AND OIL SEAL

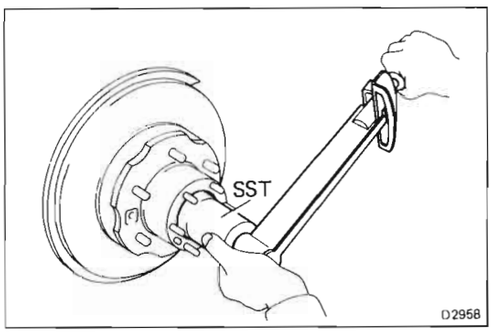
Place inner bearing into the hub. Using SST, drive the oil seal into the hub. Coat the oil seal with MP grease.

SST 09608-35013

4. INSTALL AXLE HUB ON SPINDLE

(a) Place the axle hub on the spindle.

(b) Install the outer bearing and thrust washer.



5. ADJUST PRELOAD

(a) Using SST, torque the bearing adjusting.

SST 09607-60020

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

(b) Turn the hub right and left two or three times.

(c) Using SST, retighten the bearing adjusting nut.

SST 09607-60020

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

(d) Loosen the nut until it can be turned by hand.

(e) Using a spring tension gauge, measure the frictional force of the oil seal at the hub bolt.

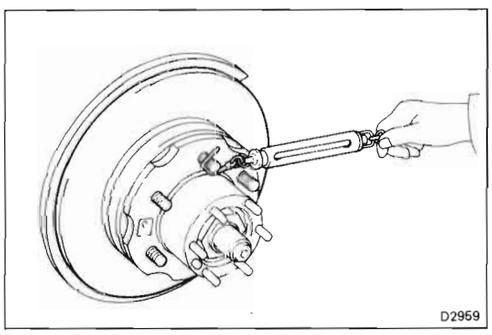
(f) Retighten the adjusting nut.

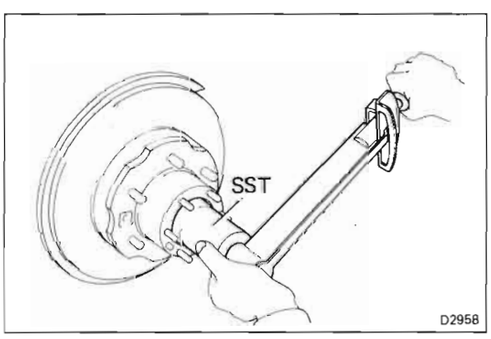
Torque: 40 – 70 kg-cm (35 – 61 in.-lb, 4 – 6 N·m)

(g) Using a spring tension gauge, measure the preload.

Preload (starting)

Frictional force plug 0.4 – 3.3 kg (0.9 – 7.3 lb, 4 – 32 N)





6. INSTALL LOCK WASHER AND LOCK NUT

(a) Install the lock washer and lock nut.

(b) Using SST, torque the lock nut.

SST 09607-60020

Torque: 800 kg-cm (58 ft-lb, 78 N·m)

(c) Check that the bearing has no play.

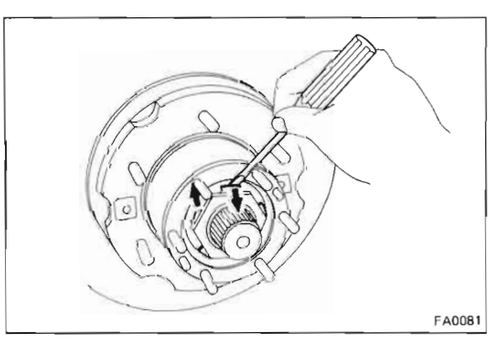
(d) Using a spring tension gauge check the preload.

Preload (starting):

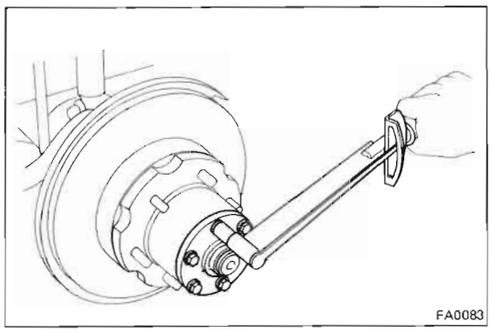
Frictional force plug 0.4 – 3.3 kg (0.9 – 7.3 lb, 4 – 32 N)

If not with in specification, adjust with the adjusting nut.

(e) Secure the lock nut by bending one of the lock washer teeth inward and another lock washer tooth outward.



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FA0083

7. INSTALL FLANGE OR FREE WHEEL HUB

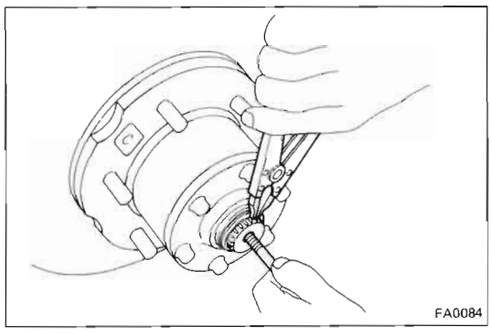
NOTE: In case of the free wheel hub, see page FA-9.

(a) Place the gasket in position on the axle hub.

(b) Install the flange to the axle hub.

(c) Install six cone washers and nuts.
Torque the nuts.

Torque: 315 kg-cm (23 ft-lb, 31 N·m)

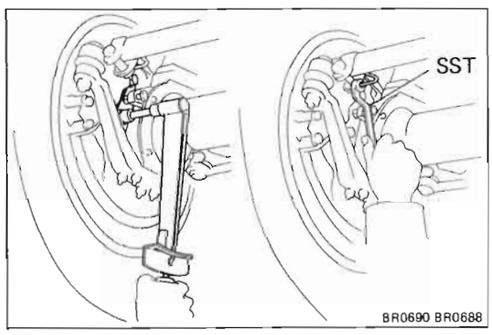

FA0084

(d) Install a bolt in the axle shaft and pull it out.

(e) Using snap ring pliers, install the snap ring.

(f) Remove the bolt.

(g) Install the cap to the flange.



BR0690 BR0688

8. INSTALL BRAKE CALIPER

(a) Install the brake caliper to the steering knuckle.
Torque the mounting bolts.

Torque: 900 kg-cm (65 ft-lb, 88 N·m)

(b) Using a SST, connect the brake tube.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)

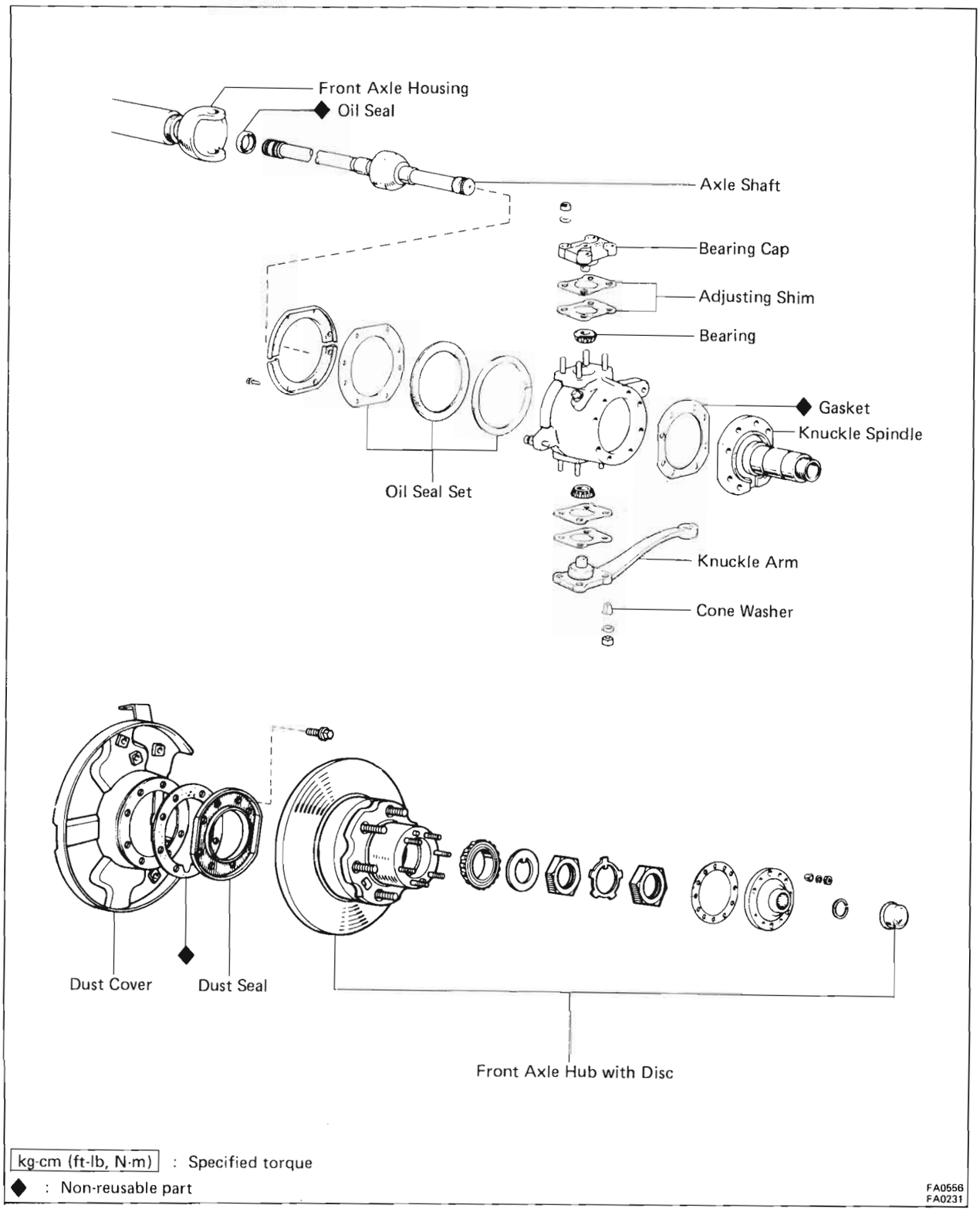
9. BLEED BRAKE LINE

(See page BR-6)

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STEERING KNUCKLE AND AXLE SHAFT

COMPONENTS

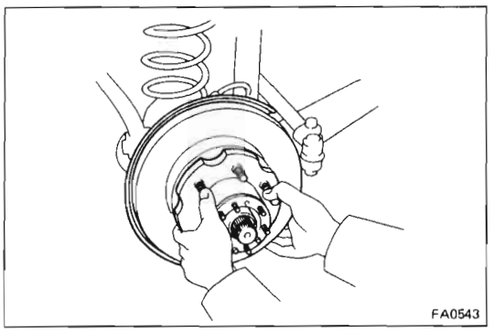


kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

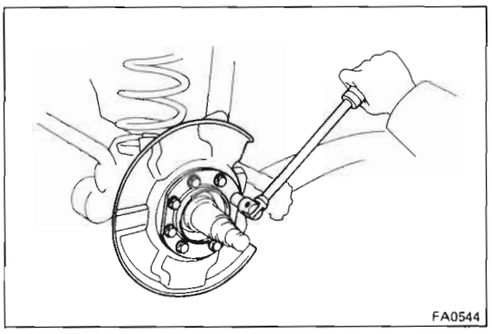
FA0556
FA0231

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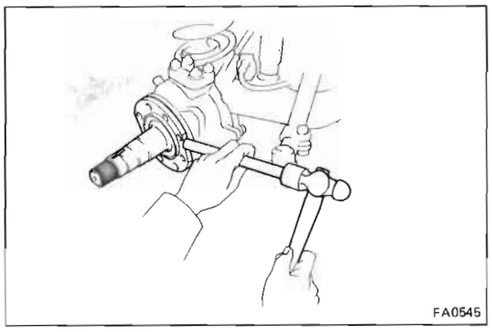

FA0543

DISASSEMBLY OF STEERING KNUCKLE AND AXLE SHAFT

1. REMOVE FRONT AXLE HUB
(See page FA-13)

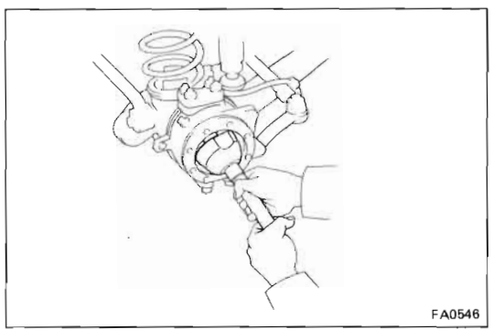

FA0544

2. REMOVE KNUCKLE SPINDLE MOUNTING BOLTS
3. REMOVE DUST SEAL AND DUST COVER


FA0545

4. REMOVE KNUCKLE SPINDLE

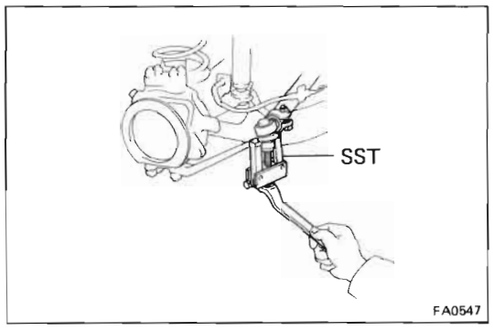
Using a brass bar, tap the knuckle spindle off of the steering knuckle.


FA0546

5. REMOVE AXLE SHAFT

Position one flat part of the outer shaft upward and pull out the axle shaft.

6. REMOVE OIL SEAL SET RETAINER

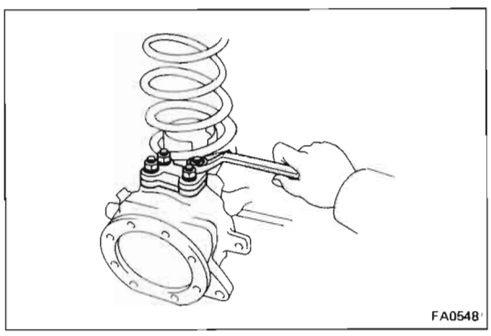


FA0547

7. DISCONNECT TIE ROD FROM KNUCKLE ARM

Using SST, disconnect the tie rod from the knuckle arm.
SST 09628-62011

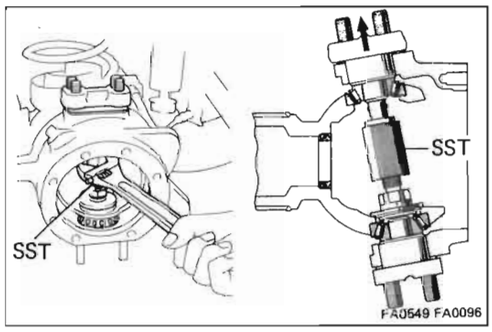
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FA0548

8. REMOVE KNUCKLE ARM AND BEARING CAP

(a) Remove the knuckle arm and bearing cap mounting nuts.

(b) Using a brass bar and hammer, tap the bolt heads and remove the cone washer.

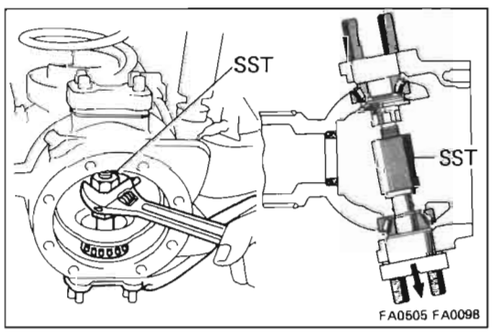


FA0549 FA0096

(c) Using SST, push out the knuckle arm and shims from the steering knuckle.

SST 09606-60020

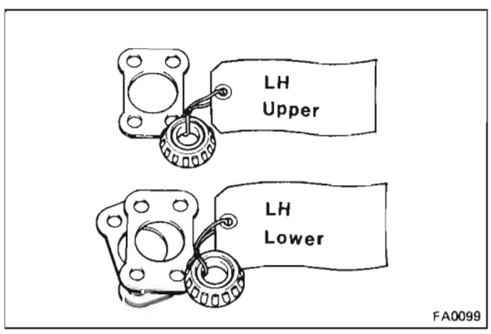
NOTE: Use the SST without a collar.



FA0505 FA0098

(d) Using SST, push out the bearing cap and shims from the steering knuckle.

SST 09606-60020



FA0099

9. REMOVE STEERING KNUCKLE AND BEARINGS

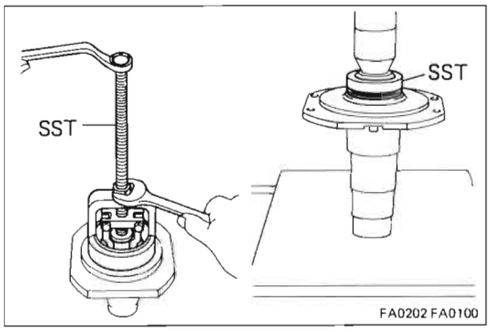
NOTE: Mark the removed adjusting shims and bearings so as to enable reassembling them to their proper positions.

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INSPECTION AND REPAIR OF STEERING KNUCKLE AND AXLE SHAFT

1. INSPECT KNUCKLE SPINDLE

Clean the knuckle spindle and inspect the bushing for wear or damage.



2. REPLACE BUSHING

(a) Using SST, remove the bushing.

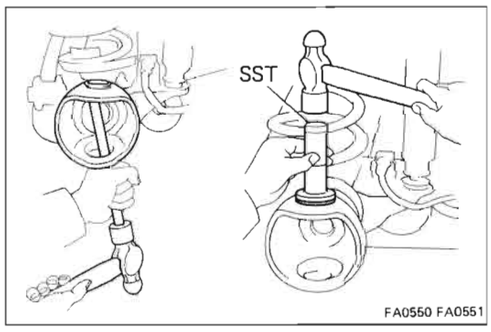
SST 09612-65013

(b) Using SST, press a new bushing into the spindle.

SST 09608-35013

3. INSPECT BEARING

Clean the bearings and outer races and inspect them for wear or damage.

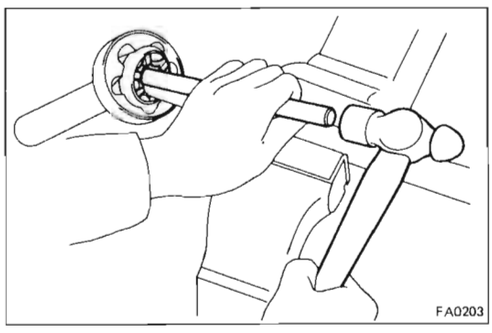


4. IF NECESSARY, REPLACE BEARING OUTER RACE

(a) Using a brass bar, drive out the bearing outer race.

(b) Using SST, carefully drive in a new bearing outer race.

SST 09605-60010

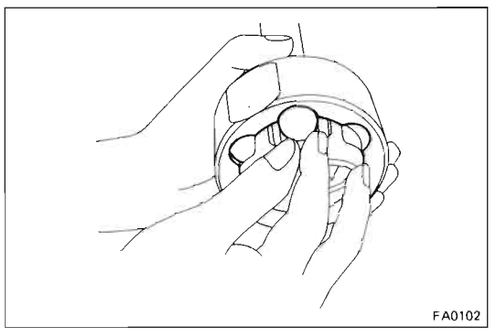


5. INSPECT BIRFIELD JOINT INNER PARTS

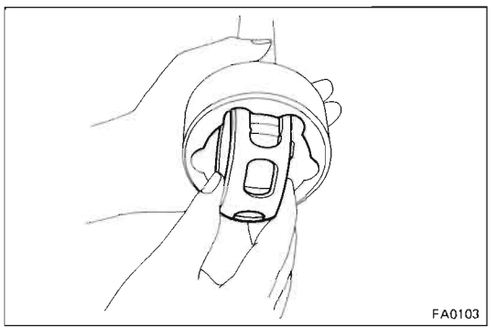
(a) Hold the inner shaft in a vise.

(b) Place a brass bar against the joint inner race and drive out the outer shaft.

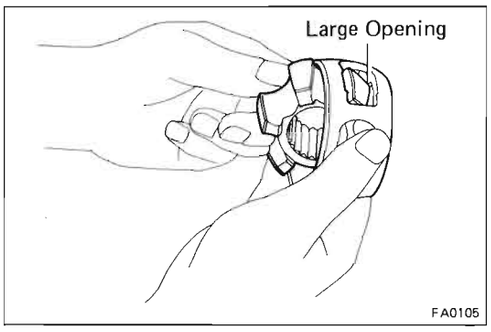
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(c) Tilt the inner race and cage and take out the bearing balls one by one.

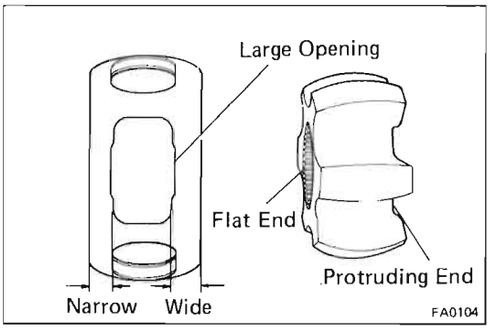


(d) Fit the two large openings in the cage against the protruding parts of the outer shaft, and pull out the cage and inner race.



(e) Take out the inner race from the cage through the large opening.

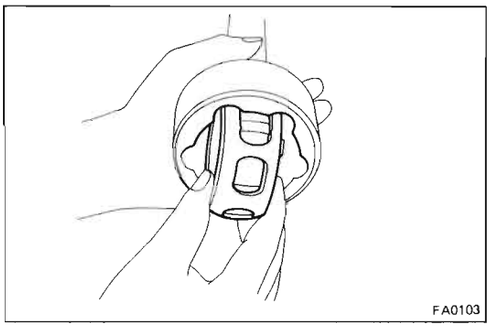
(f) Clean and inspect the joint inner parts for wear or damage.



(g) Coat the joint inner parts and outer shaft inside with Molybdenum disulphide lithium base grease.

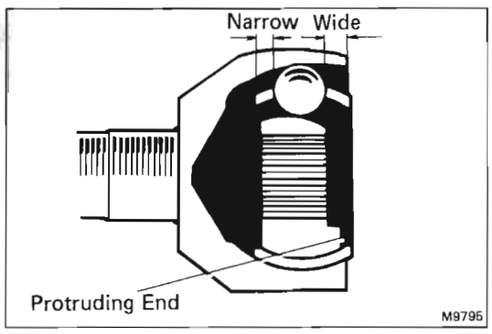
(h) Insert the inner race in the cage through the large opening.

(i) Position the protruding end of the inner race toward the wide side of the cage.



(j) Assemble the cage and inner race to the outer shaft by fitting the two large openings in the cage against the protruding parts of the outer shaft.

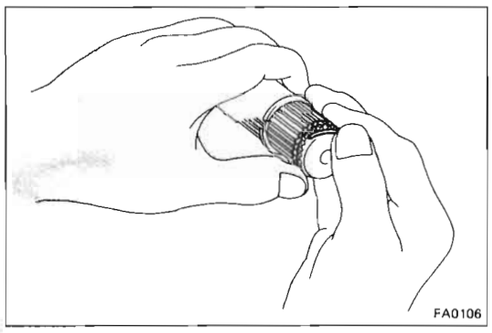
Donated by Onur Azeri . cruisercult.com



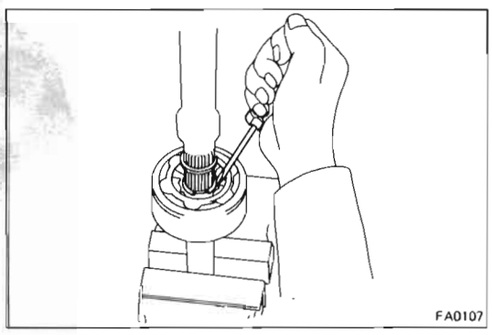
(k) Make sure to position the wide side of the cage and the inner race protruding end outward.

(l) Fit in the inner race and cage, and install the six bearing balls in the outer shaft. (See step (C))

(m) Pack Molybdenum disulphide lithium base grease in the outer shaft.



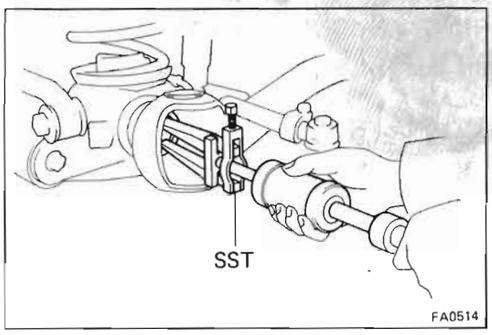
(n) Install the new snap rings on the inner shaft.



(o) Hold the outer shaft in a vise and, while compressing the snap inner ring, install the inner shaft to the outer shaft.

(p) Verify that the inner shaft cannot be pulled out.

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ADJUSTMENT OF STEERING KNUCKLE ALIGNMENT AND BEARING PRELOAD

NOTE: Whenever the axle housing or the steering knuckle is replaced, the steering knuckle alignment and knuckle bearing preload are to be adjusted with the SST.

SST 09634-60013

1. ADJUST BEARING PRELOAD

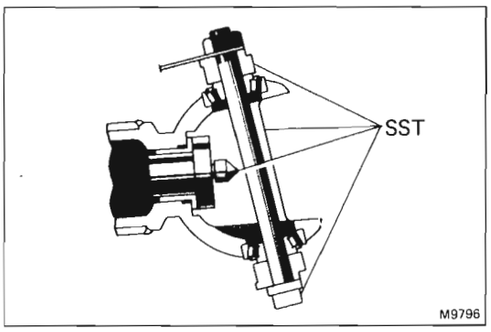
(a) Using SST, remove the oil seal.

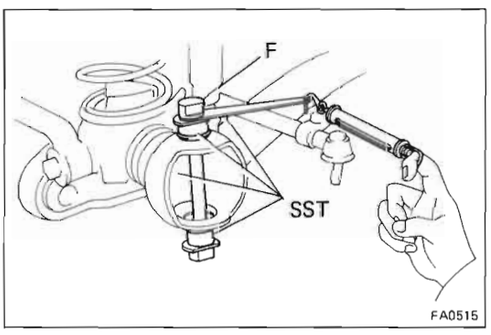
SST 09308-00010

(b) Coat the knuckle bearings lightly with Molybdenum disulphide lithium base grease.

(c) Mount the SST on the housing with the bearings.

SST 09634-60013

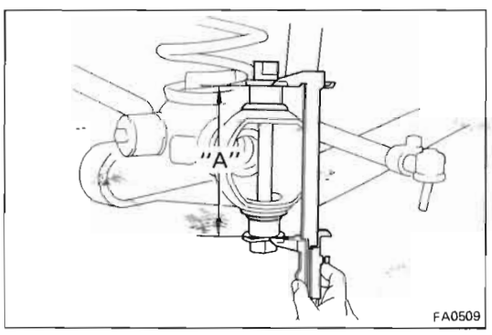




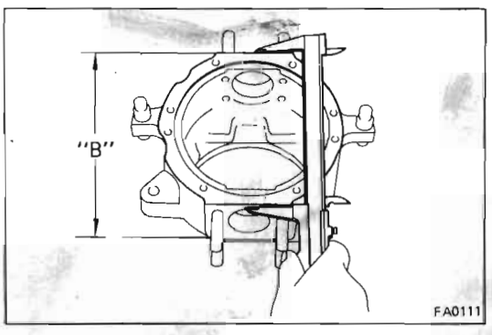
(d) Add preload to the bearings by tightening nut "F".

Using a spring tension gauge, measure the preload.

Preload (starting): 3.0 – 6.0 kg (6.6 – 13.2 lb) (29 – 59 N)



(e) Measure distance "A."

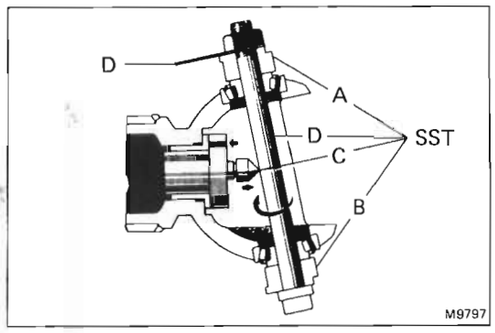


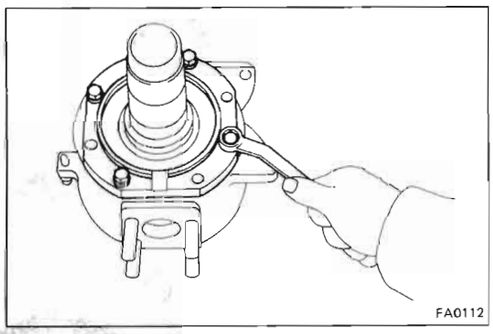
(f) Measure distance "B."

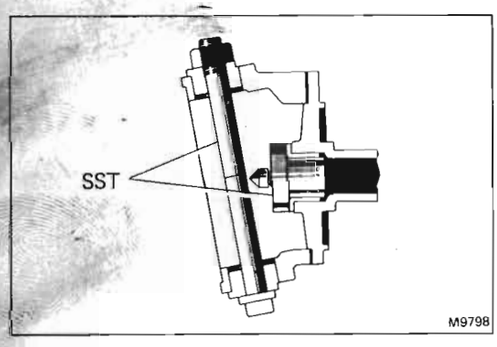
The difference between "A" and "B" is the total adjusting shim thickness that is required to maintain the correct bearing preload.

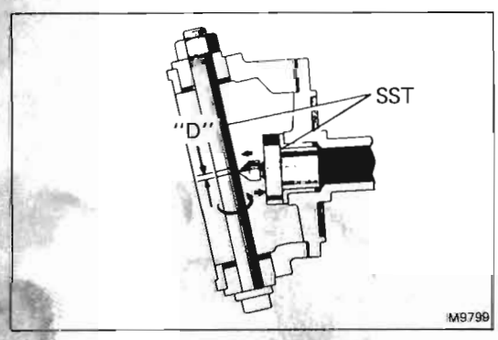
TOTAL SHIM THICKNESS "C"
C = A – B

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Adjusting shim thickness

Thickness mm (in.)
0.1 (0.004)
0.2 (0.008)
0.3 (0.012)
0.5 (0.020)
1.0 (0.039)

2. ADJUST STEERING KNUCKLE ALIGNMENT

(a) Apply a light coat of red lead on the center part of rod "D".

(b) Press adapters A and B against the housing, press plug "C" against the rod "D", and turn lever "G" so that a line will be scribed on rod "D".

(c) Temporarily install the spindle to the knuckle. Tighten the bolt with two washers.

(d) Dismount the SST from the housing, and mount it on the knuckle.

SST 09634-60013

NOTE: Use care not to erase the scribed line when dismounting and remounting the SST.

Make sure the rod "D" is in the same vertical direction that it was when mounted on the housing.

(e) Turn rod "D" and scribe another line on it. Measure distance "D" between the two scribed lines.

The thickness of the steering knuckle lower bearing shim "E" will be the distance "D" less 3 mm (0.12 in.).

LOWER SHIM THICKNESS "E"

E = D – 3 mm

The thickness of the steering knuckle upper bearing shim "F" will be the difference between the total adjusting shim thickness "C" and shim thickness "E".

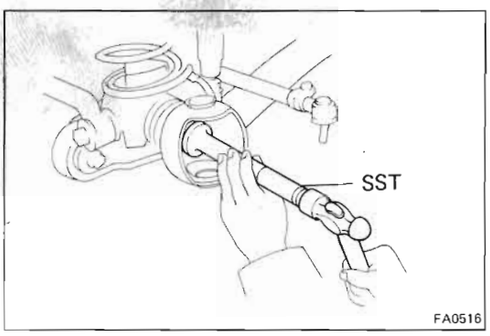
UPPER SHIM THICKNESS "F"

F = C – E

NOTE: Compare "E" and "F" with the thicknesses of the shims removed at disassembly. If there is considerable difference, remeasure "E" and "F".

(f) Apply Molybdenum disulphide lithium base grease to the axle shaft bushing.

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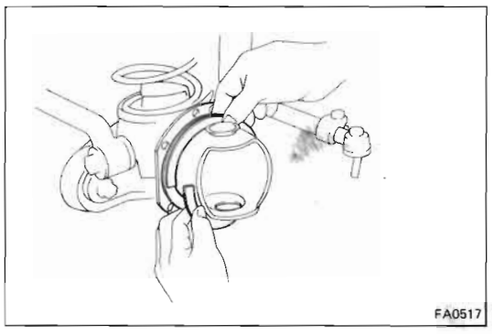
ASSEMBLY OF STEERING KNUCKLE AND AXLE SHAFT

(See page FA-17)

1. INSTALL OIL SEAL TO AXLE HOUSING

Using SST, drive the oil seal into the axle housing.

SST 09618-60010



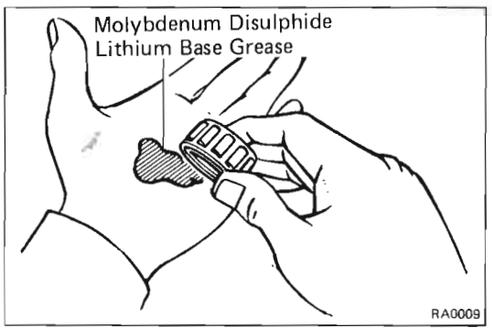
2. INSTALL OIL SEAL SET

Install the parts in the following order:

(a) Felt dust seal

(b) Rubber seal

(c) Steel ring

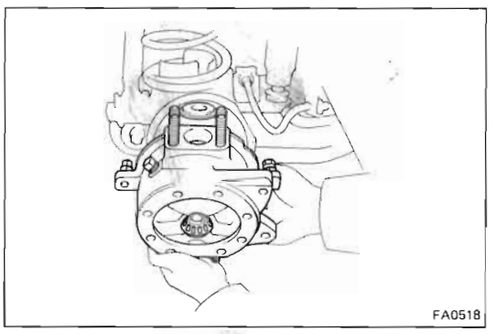


3. PACK BEARINGS WITH MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE

(a) Place Molybdenum disulphide lithium base grease in the palm of your hand.

(b) Pack grease into the bearing, continuing until the grease oozes out from the other side.

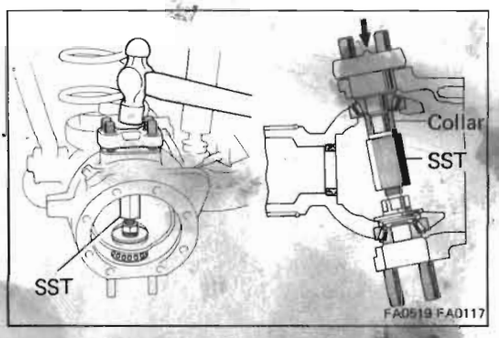
(c) Do the same around the bearing circumference.



4. INSTALL STEERING KNUCKLE AND BEARINGS

(a) Place the bearings in positions on the knuckle and axle housing.

(b) Insert the knuckle on the axle housing.



5. INSTALL KNUCKLE ARM AND BEARING CAP

(a) Using SST, support the upper bearing inner race.

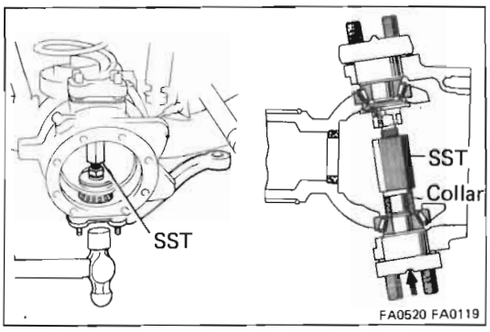
SST 09606-60020

NOTE: Use SST with a collar.

(b) Install the bearing cap or the third arm over the shims that were originally used or were selected as described in adjustment operations.

(c) Using a hammer, tap the bearing cap or the third arm into the bearing inner race.

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(d) Using SST, support the lower bearing inner race.

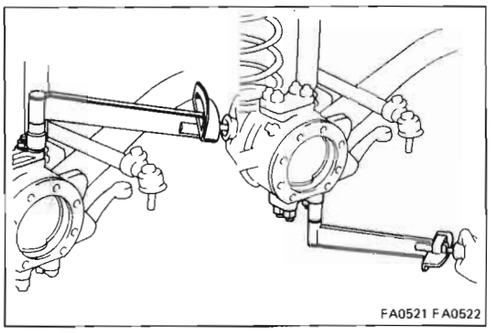
SST 09606-60020

NOTE: Use SST with a collar.

(e) Install the knuckle arm over the shims that were originally used or were selected in the adjustment operations.

(f) Using a hammer, tap the knuckle arm into the bearing inner race.

(g) Remove SST from the knuckle.



(h) Install and torque the nuts.

(Knuckle Arm)

Install the cone washers, plate washers and torque the nuts.

Torque: 975 kg-cm (71 ft-lb, 96 N·m)

(Third Arm)

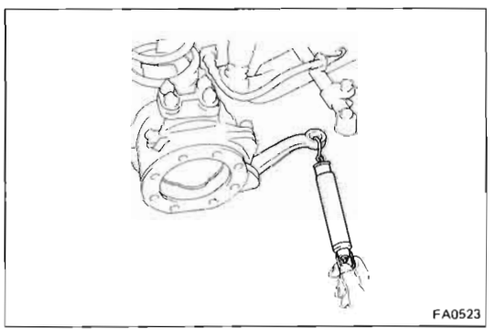
Install the cone washers, plate washers and torque the nuts.

Torque: 1,170 kg-cm (85 ft-lb, 115 N·m)

(Bearing Cap)

Install the spring washers and torque the nuts.

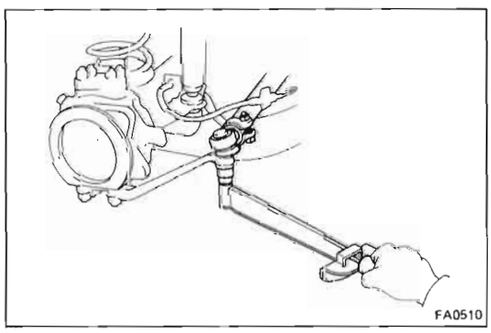
Torque: 975 kg-cm (71 ft-lb, 96 N·m)



6. MEASURE BEARING PRELOAD

Using a spring tension gauge, measure the preload.

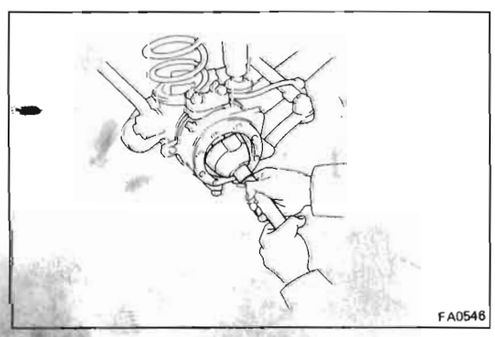
Preload (starting): 2.5 – 5.0 kg (5.6 – 11.0 lb) (26 – 49 N)



7. CONNECT TIE ROD TO KNUCKLE ARM

Torque the castle nut and secure it with a cotter pin.

Torque: 925 kg-cm (67 ft-lb, 91 N·m)

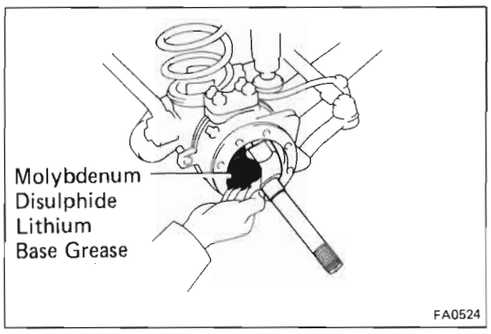


8. INSTALL OIL SEAL SET RETAINER TO KNUCKLE

9. INSTALL AXLE SHAFT

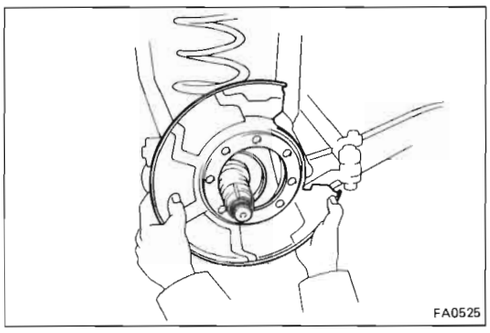
Position one flat part of the outer shaft upward, and install the shaft.

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10. PACK MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE

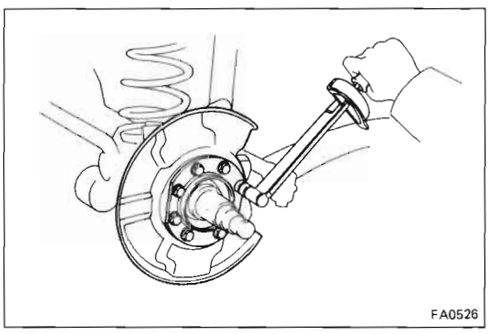
Pack Molybdenum disulphide lithium base grease into the knuckle to about three fourths of the knuckle.



11. INSTALL KNUCKLE SPINDLE, DUST COVER WITH NEW GASKETS AND DUST SEAL

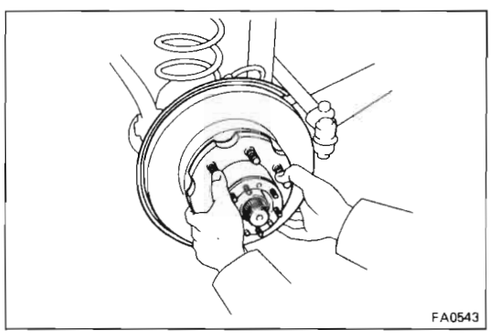
(a) Place a new gasket in position on the knuckle and install the spindle.

(b) Place the gasket, dust cover and dust seal on the spindle.



(c) Torque the spindle mounting bolts.

Torque: 475 kg-cm (34 ft-lb, 47 N·m)

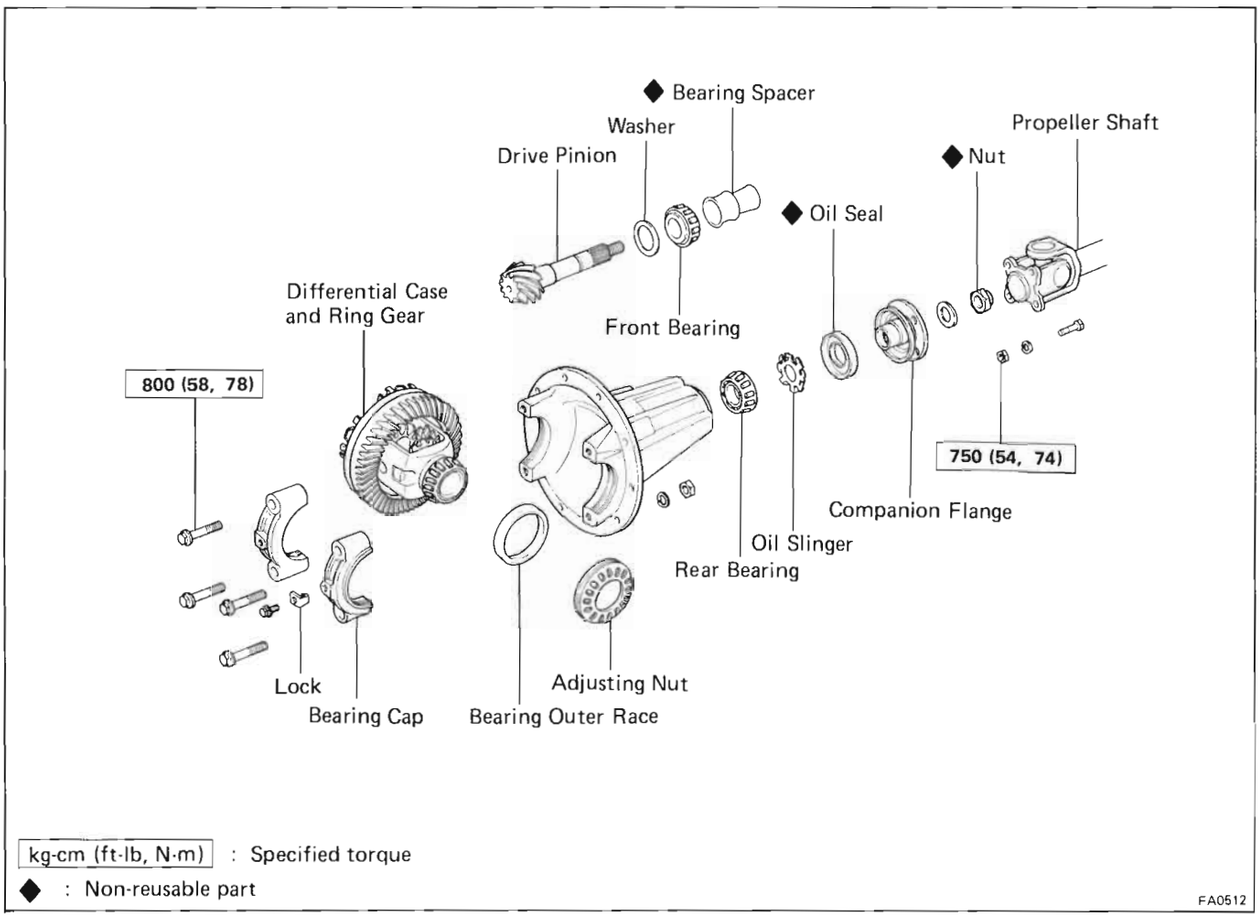


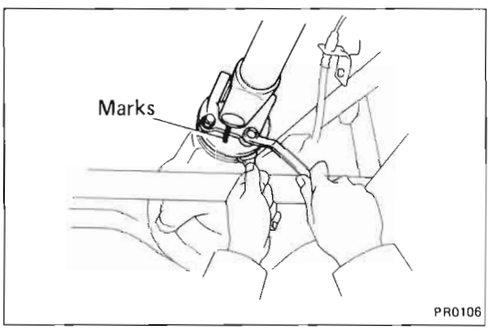
12. INSTALL AXLE HUB (See page FA-14)

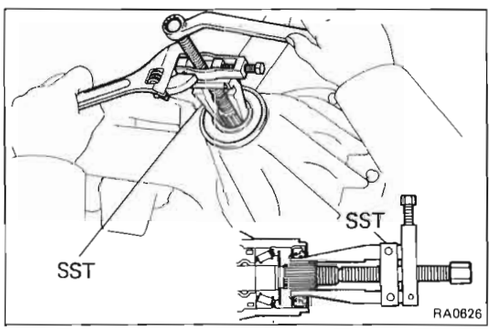
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FRONT DIFFERENTIAL

COMPONENTS



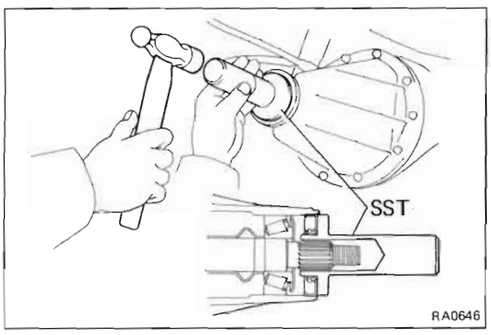




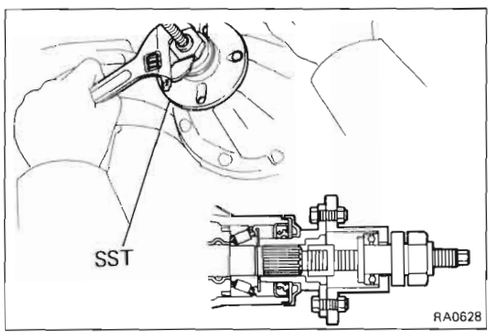
ON-VEHICLE REPLACEMENT OF OIL SEAL

1. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL
   (a) Place alignment marks on the flanges.
   (b) Remove the four bolts and nuts.
2. REMOVE COMPANION FLANGE
   (See step 2 on page RA-7)
3. REMOVE OIL SEAL AND OIL SLINGER
   (a) Using SST, remove the oil seal from the housing.
   SST 09308-10010
   (b) Remove the oil slinger.
4. REMOVE FRONT BEARING AND BEARING SPACER **(See step 4 on page RA-8)**
5. INSTALL NEW BEARING SPACER AND FRONT BEARING

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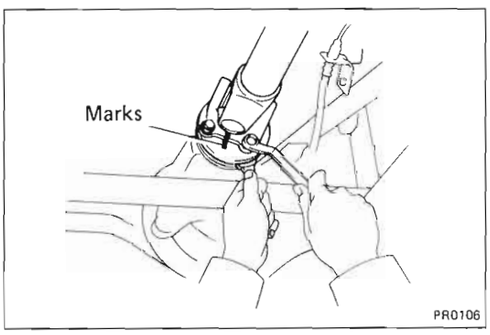


6. INSTALL OIL SLINGER AND NEW OIL SEAL
   (a) Install the oil slinger facing as shown.
   (b) Using SST, drive in a new oil seal as shown.
   SST 09554-30011
   Oil seal drive in depth: 1.0 mm (0.039 in.)
   (c) Apply MP grease to the oil seal lip.

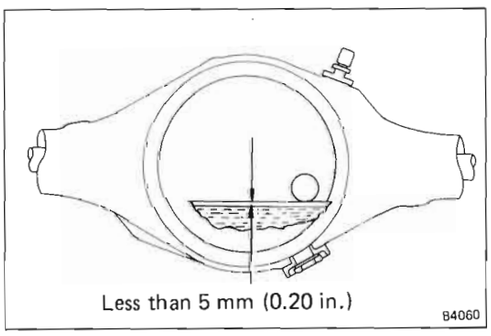


7. INSTALL COMPANION FLANGE
   (See step 7 on page RA-8)

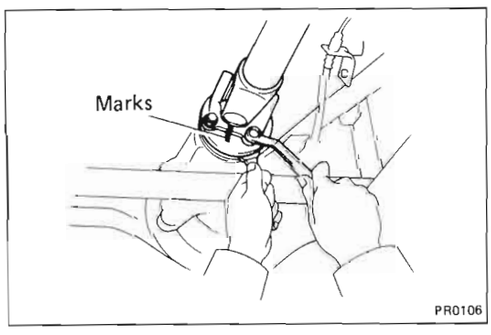
8. STAKE DRIVE PINION NUT



9. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE
   (a) Align the marks on the flanges and connect the flanges with four bolts and nuts.
   (b) Torque the four bolts and nuts.
   Torque: 750 kg-cm (54 ft-lb, 74 N·m)



10. CHECK DIFFERENTIAL OIL LEVEL
    Fill with hypoid gear oil if necessary.
    Hypoid gear oil: API GL-5
    Above –18°C (0°F) SAE 90
    Below –18°C (0°F) SAE 80W or 80W-90
    Capacity: 1.98 liters (2.1 US qts, 1.7 Imp. qts)

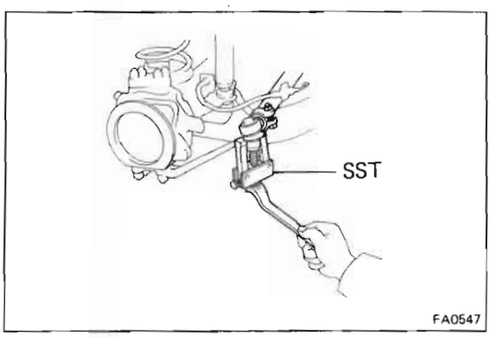


REMOVAL OF DIFFERENTIAL

(See page FA-28)

1. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL
2. REMOVE FRONT AXLE SHAFTS (See page FA-18)
3. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL

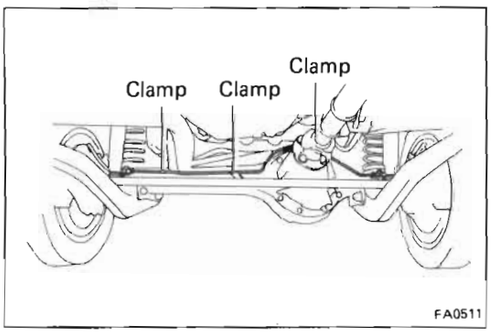
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4. DISCONNECT TIE ROD FROM KNUCKLE ARM

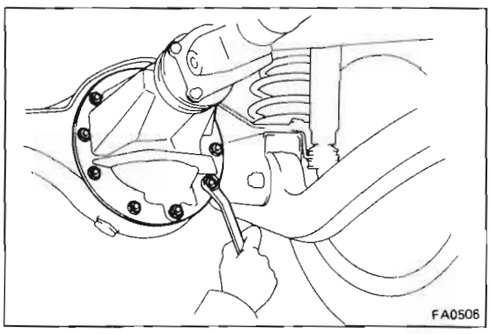
Using SST, disconnect the tie rod from the knuckle arm.

SST 09611-22012

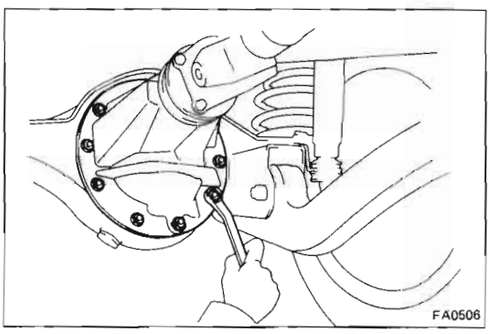


5. REMOVE FRONT BRAKE TUBE

Remove the three clamp bolts and nut.



6. REMOVE DIFFERENTIAL CARRIER ASSEMBLY



DISASSEMBLY OF DIFFERENTIAL

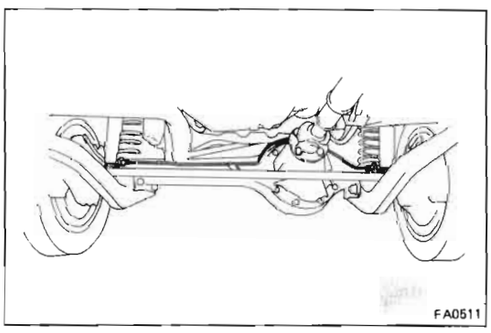
(See page RA-13)

ASSEMBLY OF DIFFERENTIAL

(See page RA-18)

INSTALLATION OF DIFFERENTIAL

(See page FA-28)



1. INSTALL A NEW GASKET

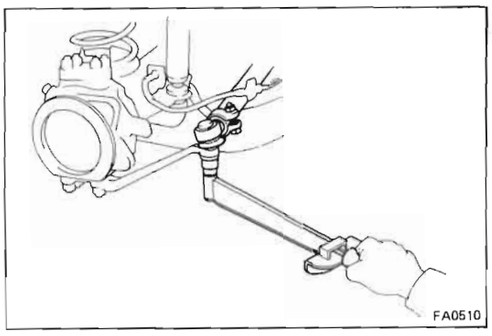
Install a new gasket onto the axle housing.

2. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

Install the differential carrier assembly in the axle and install the ten nuts and washers.

3. INSTALL FRONT BRAKE TUBE

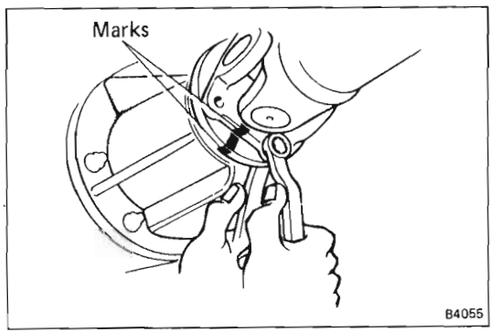
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4. CONNECT TIE ROD TO KNUCKLE ARM

Torque the castle nut and secure it with a new cotter pin.

Torque: 925 kg-cm (67 ft-lb, 91 N·m)



5. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE

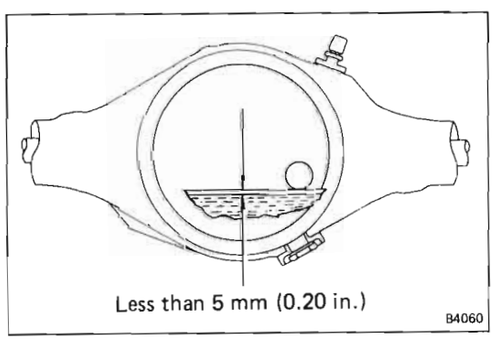
(a) Align the marks on the flanges and connect the flanges with the four bolts and nuts.

(b) Torque the bolts and nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

6. INSTALL FRONT AXLE SHAFT

(See page FA-23)



7. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

Differential oil
API GL-5 hypoid gear oil
SAE 90 above –18°C (0°F)
SAE 80W or 80W-90 below –18°C (0°F)
Capacity: 1.98 liters (2.1 US qts, 1.7 Imp. qts)

Install a filler plug.

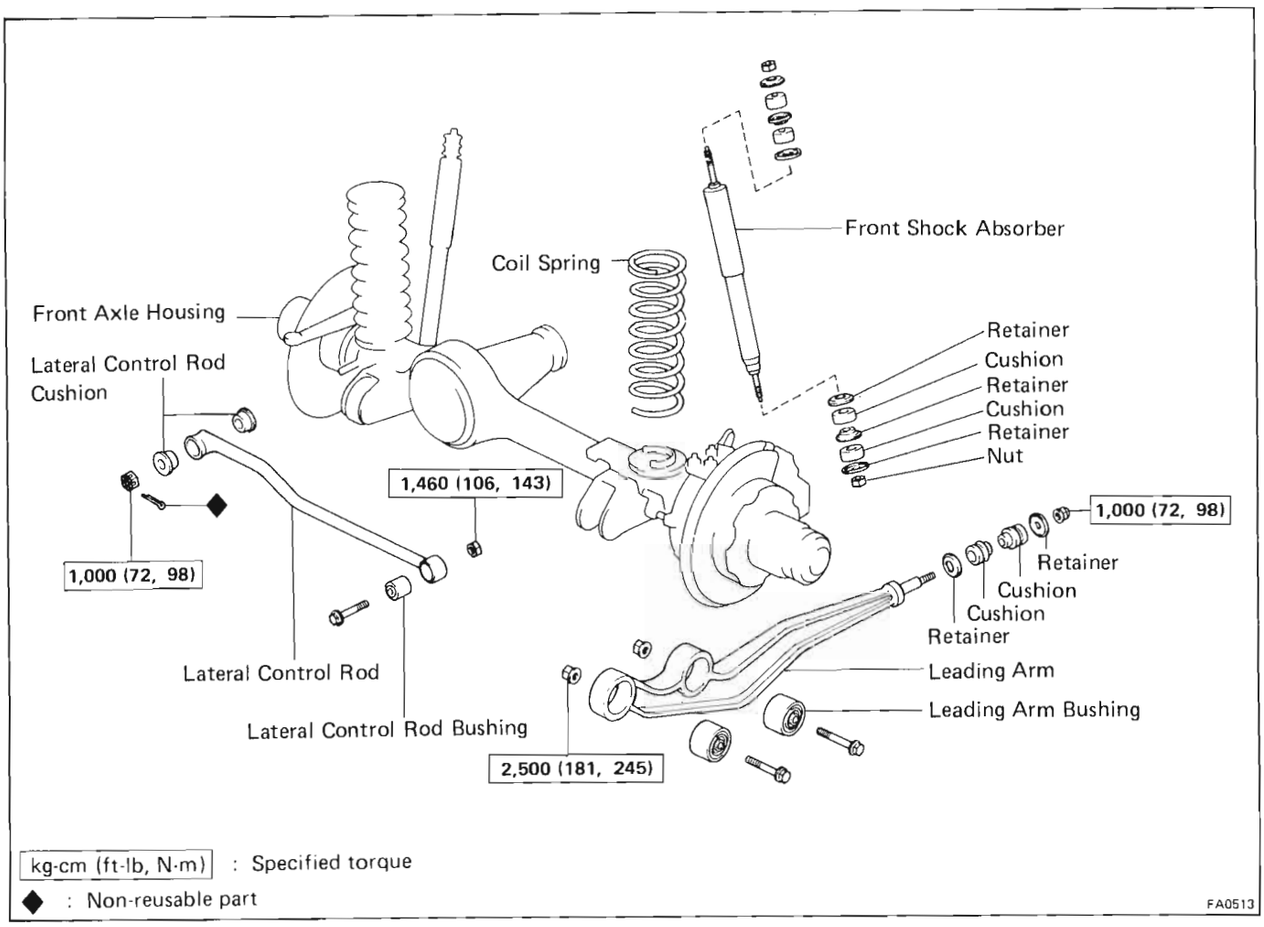
8. BLEED BRAKE LINE

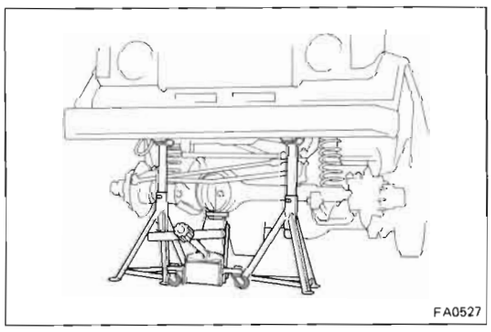
(See page BR-6)

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FRONT SUSPENSION

COMPONENTS





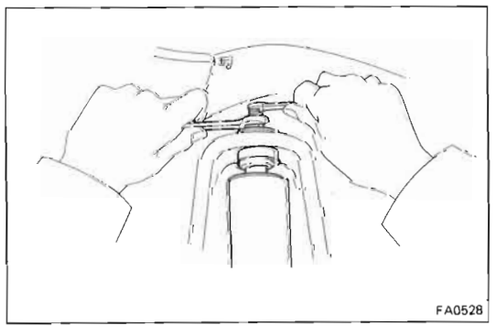
Coil Spring and Shock Absorber

REMOVAL OF COIL SPRING AND SHOCK ABSORBER

REMOVAL OF COIL SPRING AND SHOCK ABSORBER

1. JACK UP AND SUPPORT FRAME

Jack up and support the frame on the stands.

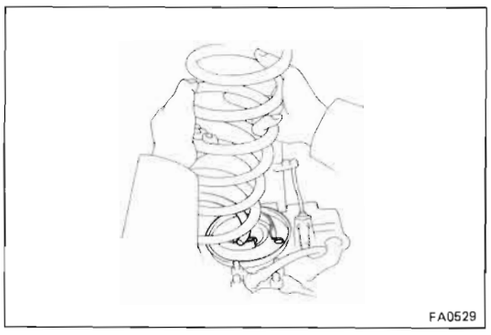


2. REMOVE FRONT SHOCK ABSORBER

(a) Jack up and support the axle housing.

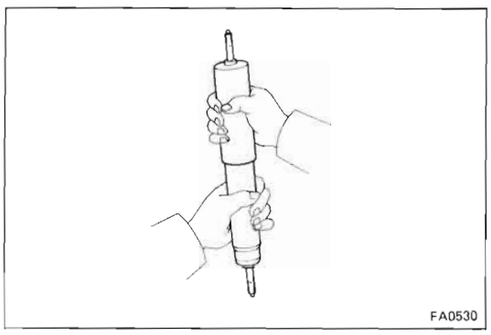
(b) Remove the shock absorber.

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FA0529

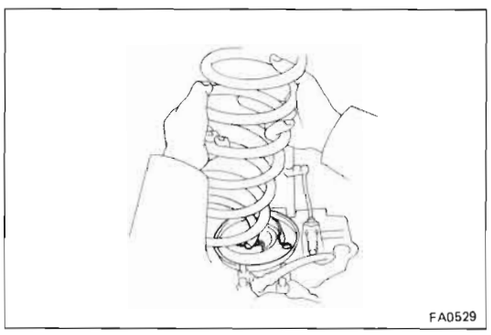
3. REMOVE COIL SPRING

Lower the jack until the coil spring is free and remove it.


FA0530

INSPECTION OF FRONT SHOCK ABSORBER

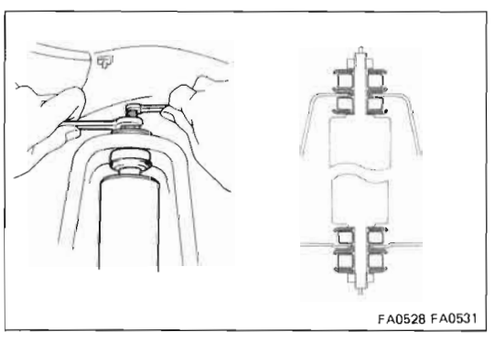
INSPECT OPERATION OF FRONT SHOCK ABSORBER


FA0529

INSTALLATION OF COIL SPRING AND SHOCK ABSORBER

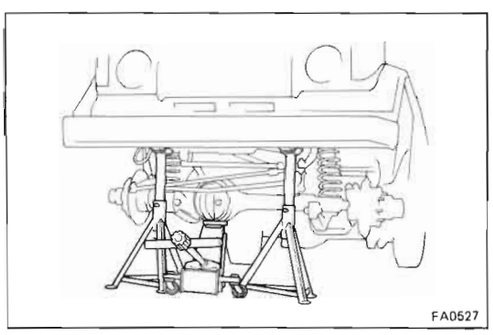
1. INSTALL COIL SPRING

Assemble the spring so its end catches in the hole of the lower seat.


FA0528 FA0531

2. INSTALL SHOCK ABSORBER

Raise the jack, and paying attention to the assembly sequence of the retainers and cushions, install the shock absorber.


FA0527

Lateral Control Rod

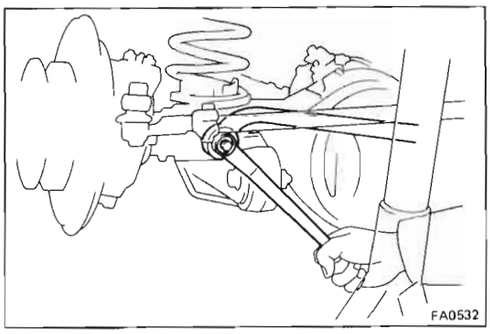
(See page FA-32)

REMOVAL OF LATERAL CONTROL ROD

1. JACK UP AND SUPPORT FRAME

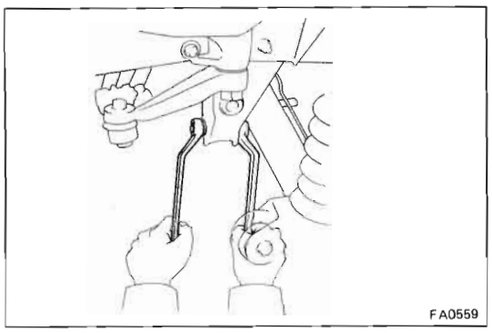
Jack up and support the frame on the stands.

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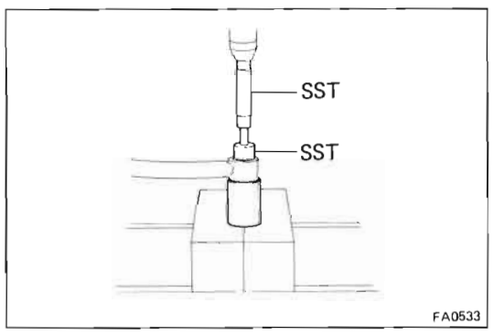
2. DISCONNECT LATERAL CONTROL ROD FROM AXLE HOUSING

Remove the cotter pin and castle nut, and disconnect the lateral control rod from the front axle housing.



3. DISCONNECT LATERAL CONTROL ROD FROM BODY

Remove the nut and the lateral control rod.

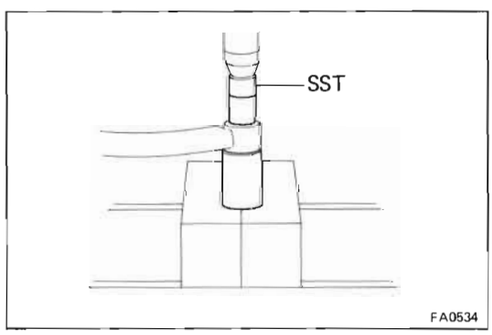


REPLACEMENT OF LATERAL CONTROL ROD BUSHING

1. REMOVE BUSHING

Using SST and a press, press out the bushing from the lateral control rod.

SST 09710-22041

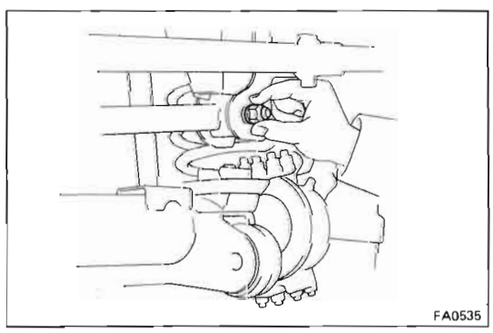


2. INSTALL BUSHING

Using SST and a press, press a new bushing into the lateral control rod.

SST 09710-22041

NOTE: Do not use a lubricant when pressing in the bushing.

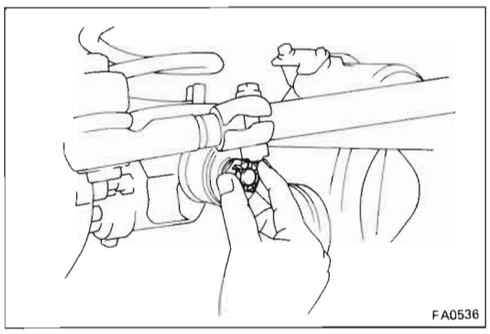


INSTALLATION OF LATERAL CONTROL ROD

1. INSTALL LATERAL CONTROL ROD TO BODY

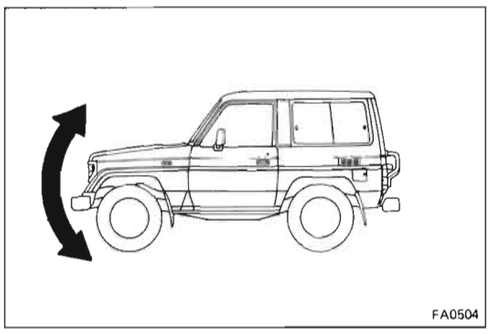
Install the lateral control rod to the body with the nut.

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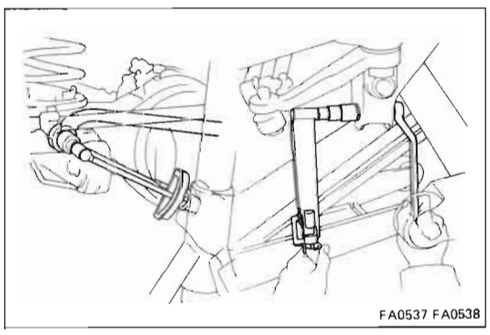

FA0536

2. INSTALL LATERAL CONTROL ROD TO FRONT AXLE HOUSING

(a) In this order, install the washer, cushion spacer, lateral control rod, cushion, washer, and castle nut on the front axle housing.


FA0504

(b) Remove the stands and rock the body up and down to stabilize the suspension.


FA0537 FA0538

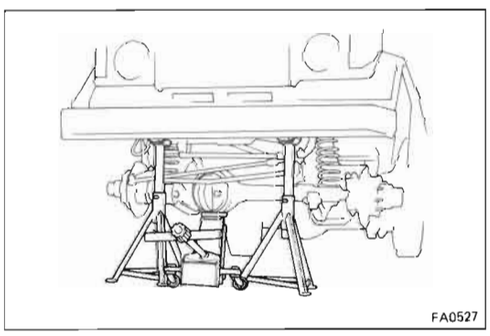
(c) Jack up the axle housing.

(d) Torque the nuts

Torque: Body side 1,460 kg-cm (106 ft-lb, 143 N·m)
Axle housing side 1,000 kg-cm (72 ft-lb, 98 N·m)

NOTE: When tightening the lateral control rod set nut and bolt, lower the vehicle load until the lateral control rod is horizontal.

(e) Install a new cotter pin into the front axle housing.


FA0527

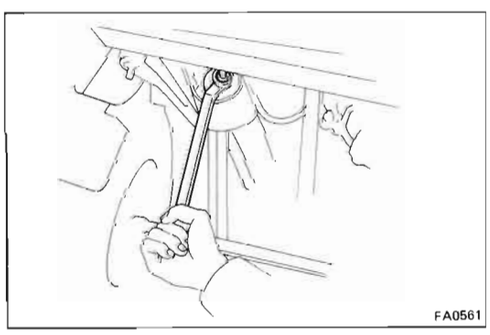
Leading Arm

(See page FA-32)

REMOVAL OF LEADING ARM

1. JACK UP VEHICLE

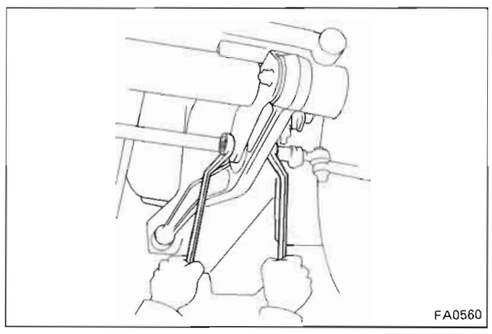
Jack up the vehicle and support the frame with stands. Hold the front axle housing with a jack.


FA0561

2. REMOVE LEADING ARM

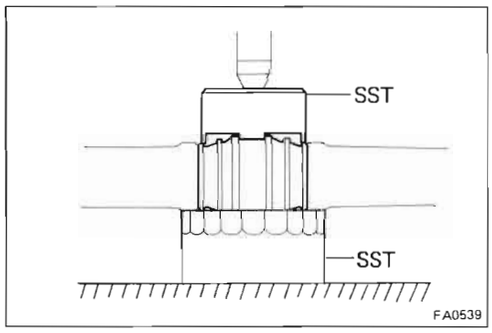
(a) Remove the nut, retainer and cushion from the leading arm body side.

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FA0560

(b) Remove the two bolts and nuts from the leading arm axle housing side.

(c) Remove the leading arm from body.



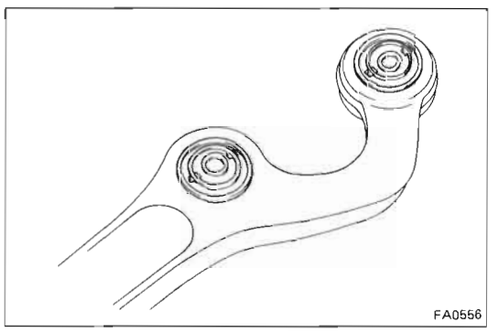
FA0539

REPLACEMENT OF LEADING ARM BUSHING

1. REMOVE BUSHINGS

Using SST and a press, press out the bushings from the leading arm.

SST 09710-30030 and 09228-22020


FA0556

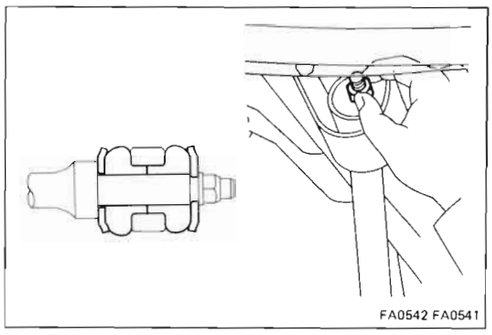
2. INSTALL BUSHINGS

Using SST and a press, press new bushings into the leading arm.

SST 09710-30030 and 09228-22020

NOTE: When assembling the bushing, assemble it so the its holes are aligned horizontally.

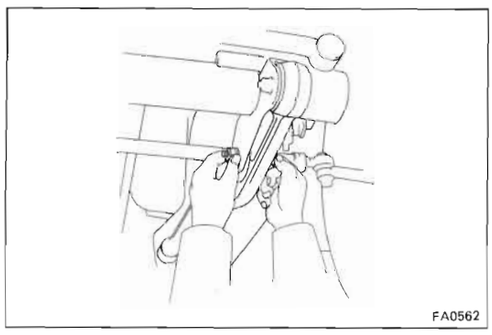
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FA0542 FA0541

INSTALLATION OF LEADING ARM

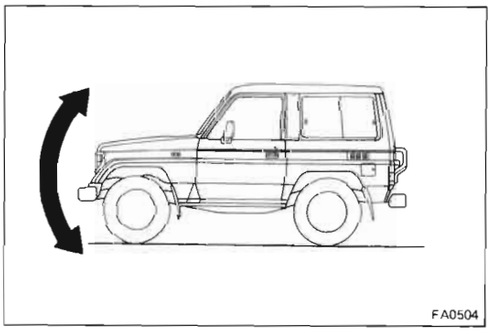
1. INSTALL LEADING ARM TO BODY

Install the cushion, retainer and nut.


FA0562

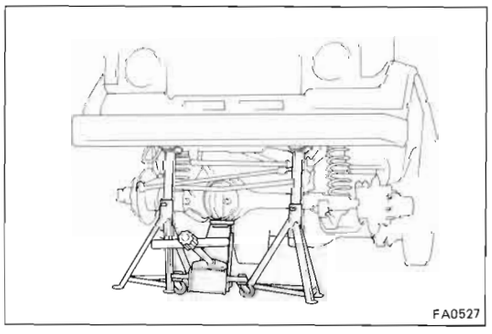
2. INSTALL LEADING ARM TO FRONT AXLE HOUSING

(a) Install the leading arm to the front axle with the two bolts and nuts.


FA0504

3. STABILIZE SUSPENSION

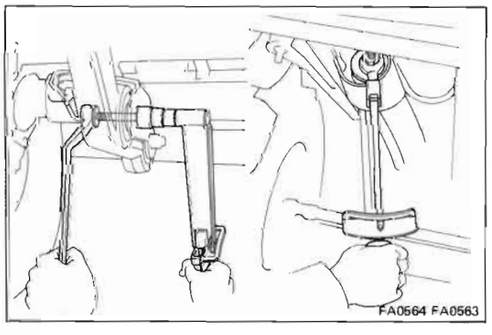
Remove the stands and rock the body up and down to stabilize the suspension.


FA0527

4. TIGHTEN NUTS

(a) Jack up the axle housing.

NOTE: For safety, place stands under either side of the vehicle's frame. The stands should come up to but nut contact the frame.


FA0564 FA0563

(b) Torque the nuts.

Torque:	**Body side**	**1,000 kg-cm (72 ft-lb, 98 N·m)**
	Axle housing side	**2,500 kg-cm (181 ft-lb, 245 N·m)**

NOTE: When tightening the nuts, tighten with the vehicle's full weight applied to the axle housing.

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REAR AXLE AND SUSPENSION

	Page
TROUBLESHOOTING	RA-2
REAR AXLE SHAFT	RA-3
DIFFERENTIAL	RA-7
REAR SUSPENSION	RA-29

RA

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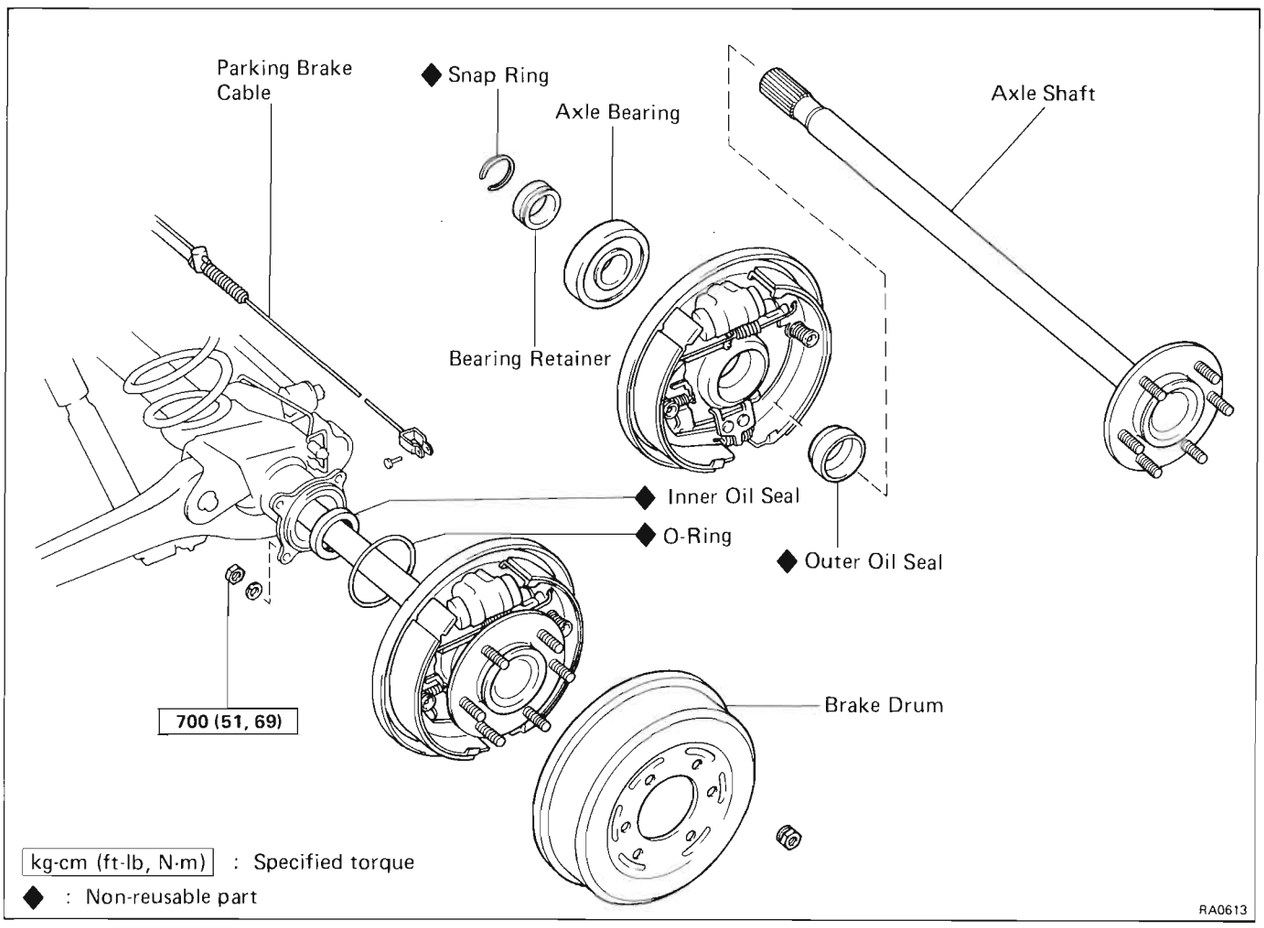
TROUBLESHOOTING

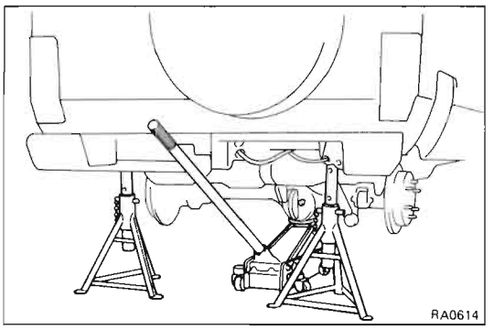
Problem	Possible cause	Remedy	Page
Oil leak from rear axle	Oil seals worn or damaged	Replace oil seal	RA-3
	Bearing retainer loose	Replace retainer	RA-3
	Rear axle housing cracked	Repair as necessary	
Oil leak from pinion shaft	Oil level too high or wrong grade	Drain and replace oil	
	Oil seal worn or damaged	Replace oil seal	RA-7
	Companion flange loose or damaged	Tighten or replace flange	RA-7
Noises in rear axle	Oil level low or wrong grade	Drain and replace oil	
	Excessive backlash between pinion and ring or side gear	Check backlash	RA-10
	Ring, pinion or side gears worn or chipped	Inspect gears	RA-10
	Pinion shaft bearing worn	Replace bearing	RA-8
	Axle shaft bearing worn	Replace bearing	RA-3
	Differential bearing loose or worn	Tighten or replace bearings	RA-13
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	RA-30
	Springs weak	Replace spring	RA-30

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REAR AXLE SHAFT

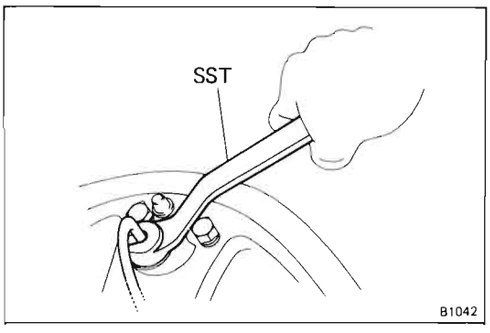
COMPONENTS





REMOVAL OF REAR AXLE SHAFT

1. JACK UP AND SUPPORT VEHICLE
2. REMOVE WHEEL AND BRAKE DRUM

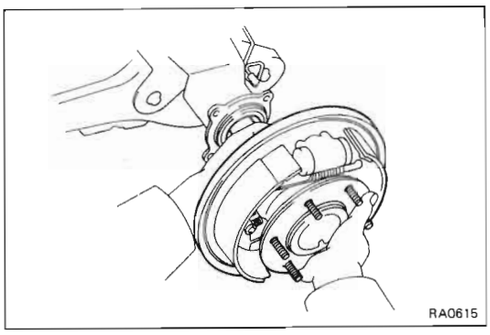


3. DISCONNECT BRAKE TUBE AND PARKING BRAKE CABLE
   (a) Using SST, disconnect the brake tube from the backing plate.

   SST 09751-36011

   (b) Remove the clip and pin from the parking brake cable.

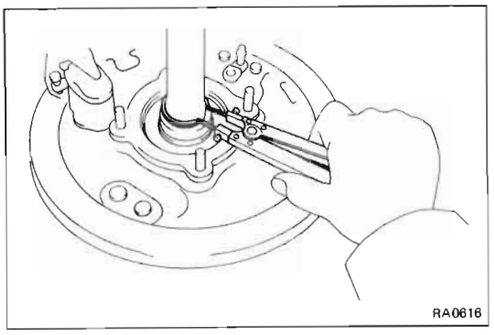
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4. REMOVE REAR AXLE SHAFT ASSEMBLY
   (a) Remove the four backing plate mounting nuts.
   (b) Pull out the rear axle shaft assembly from the rear axle housing.

   CAUTION: When pulling out the rear axle, be careful not to damage the oil seal.

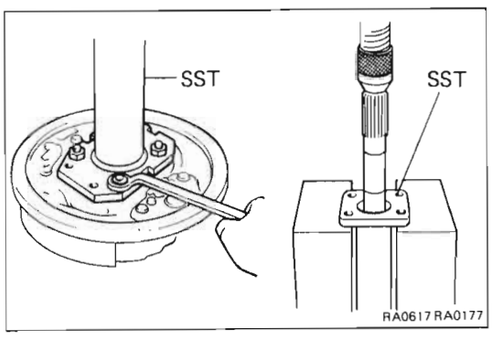
5. REMOVE O-RING FROM REAR AXLE HOUSING



DISASSEMBLY OF REAR AXLE SHAFT ASSEMBLY

(See page RA-3)

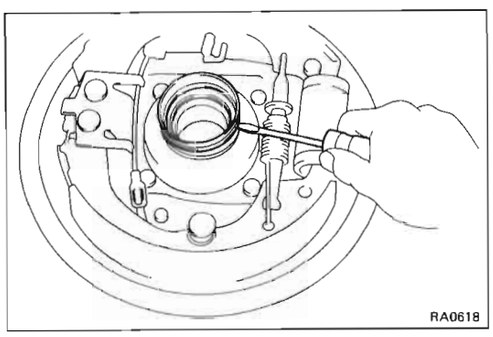
1. REMOVE SNAP RING FROM REAR AXLE SHAFT



2. REMOVE REAR AXLE SHAFT FROM BACKING PLATE
   (a) Attach SST to the backing plate.

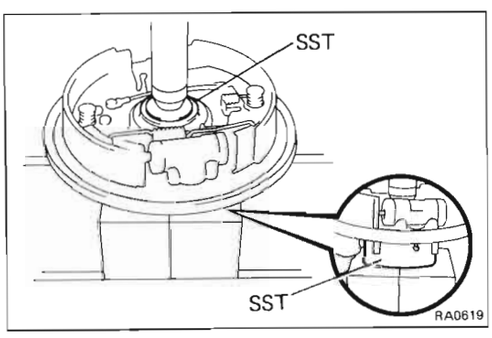
   SST 09521-25011

   (b) Press out the rear axle shaft from the backing plate.
   (c) Remove the bearing retainer from the axle shaft.



3. REMOVE OUTER OIL SEAL

   Using a screwdriver, remove a oil seal.

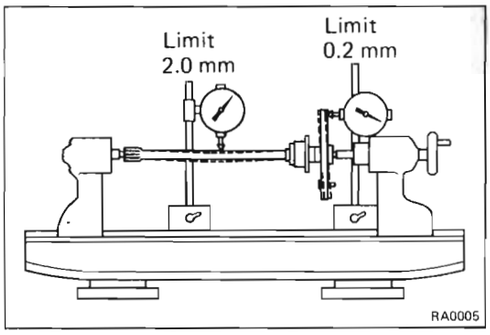


4. REMOVE REAR AXLE BEARING

   Using SST, press out the bearing.

   SST 09228-78010 and 09608-30011

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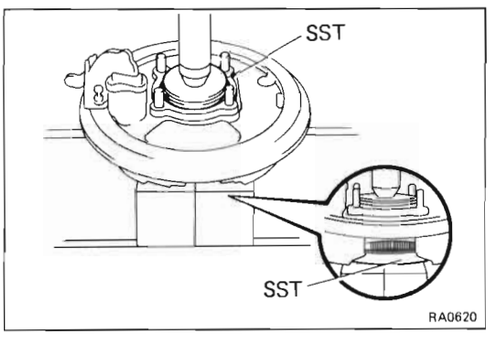


INSPECTION OF REAR AXLE SHAFT

INSPECT REAR AXLE SHAFT AND FLANGE FOR WEAR, DAMAGE OR RUNOUT

Maximum shaft runout: 2.0 mm (0.079 in.)
Maximum flange runout: 0.2 mm (0.008 in.)

If the rear axle shaft or flange are damaged or worn, or if runout is greater than maximum, replace the rear axle shaft.

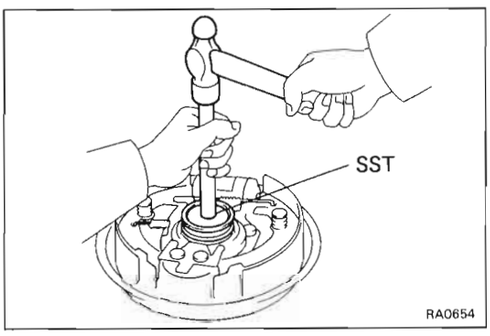


ASSEMBLY OF REAR AXLE SHAFT ASSEMBLY

(See page RA-3)

1. INSTALL REAR AXLE BEARING

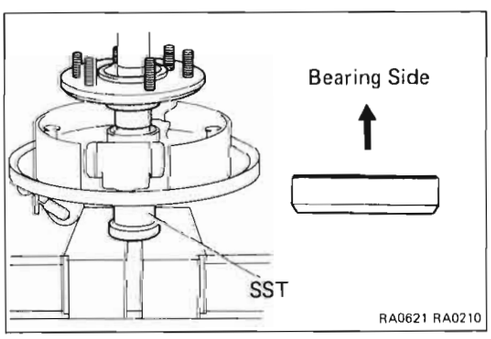
Using SST, press in the new bearing to the backing plate.
SST 09218-54011



2. INSTALL OUTER OIL SEAL

(a) Using a SST, press in the new oil seal to the backing plate.

(b) Apply the MP grease to the oil seal.

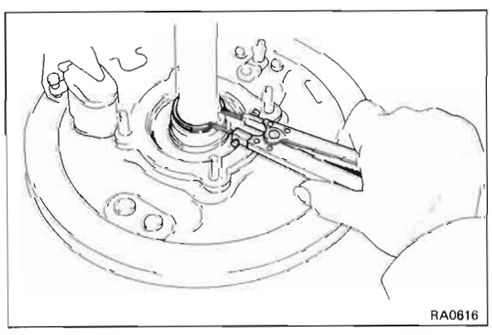


3. INSTALL REAR AXLE SHAFT TO BACKING PLATE

(a) Insert the backing plate and bearing retainer on the rear axle shaft.

(b) Using SST, press the rear axle shaft in to the backing plate.

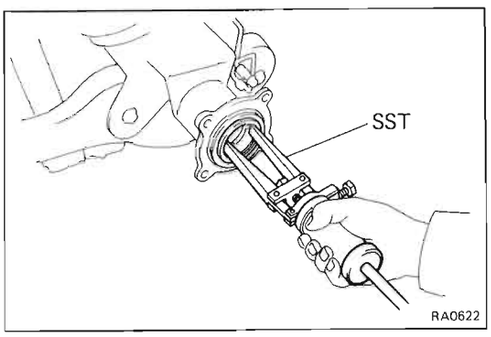
SST 09515-30010



4. INSTALL SNAP RING TO REAR AXLE SHAFT

Using snap ring pliers, install the snap ring.

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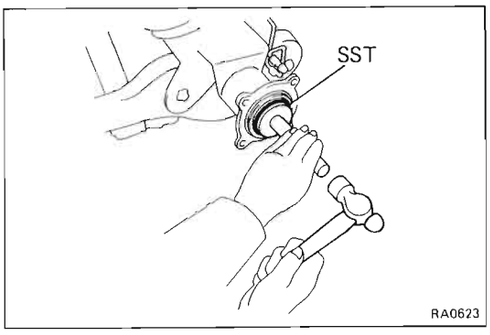
INSTALLATION OF REAR AXLE SHAFT ASSEMBLY

(See page RA-3)

1. REPLACE INNER OIL SEAL

(a) Using SST, remove the oil seal from the rear axle housing.

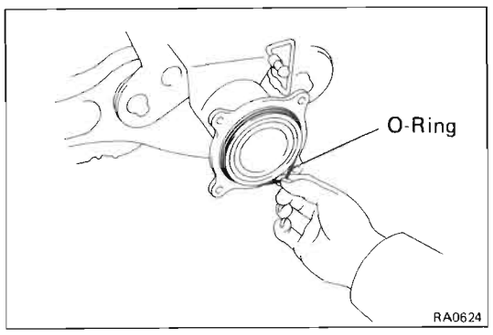
SST 09308-00010



(b) Using SST, drive in a new oil seal.

SST 09517-30010

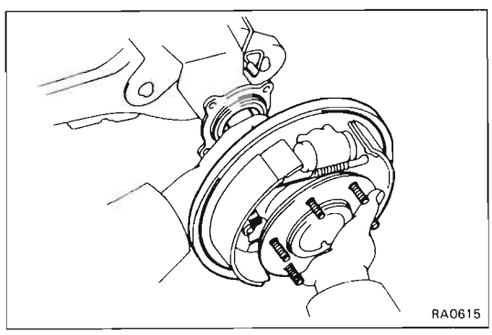
(c) Apply MP grease to the oil seal.



2. INSTALL O-RING TO REAR AXLE HOUSING

(a) Apply MP grease to the O-ring.

(b) Install the O-ring to the axle housing.



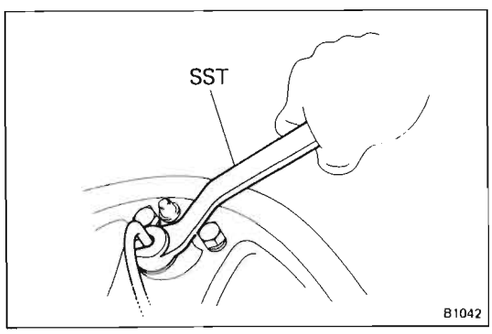
3. INSTALL REAR AXLE SHAFT ASSEMBLY IN AXLE HOUSING

(a) Insert the axle shaft to the housing.

CAUTION: Be careful not to damage the oil seal.

(b) Torque the four backing plate mounting nuts.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)



4. CONNECT BRAKE TUBE AND PARKING BRAKE CABLE

SST 09751-36011

5. INSTALL BRAKE DRUM AND WHEEL

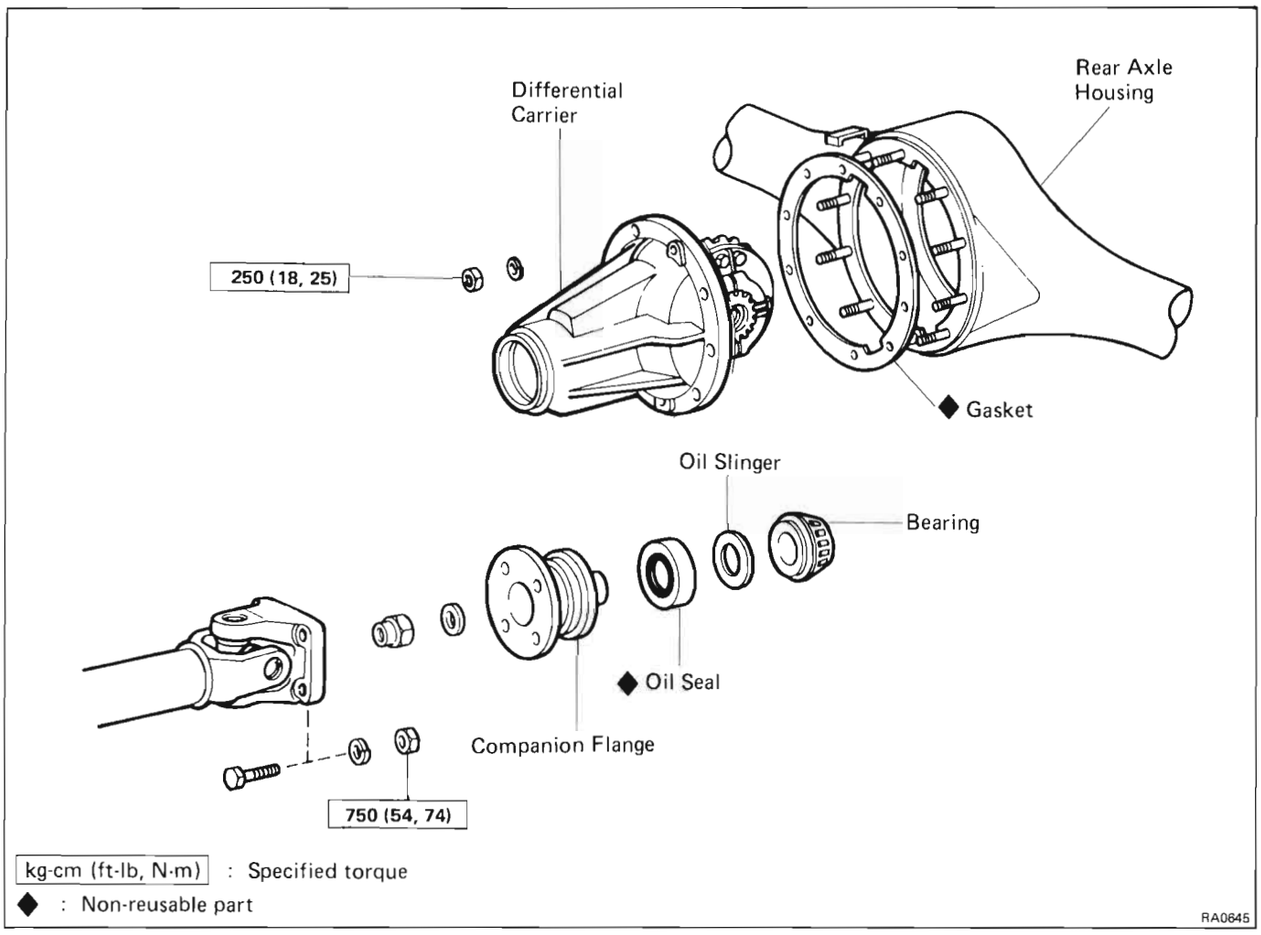
6. BLEED BRAKE SYSTEM

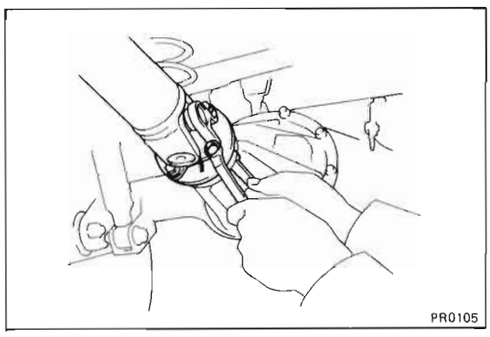
(See page BR-6)

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DIFFERENTIAL

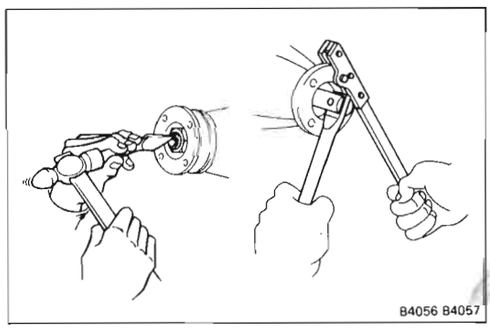
COMPONENTS





ON-VEHICLE REPLACEMENT OF OIL SEAL

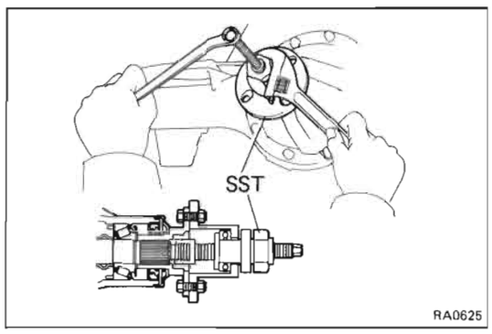
1. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL
   (a) Place matchmarks on the flanges.
   (b) Remove the four bolts and nuts.



2. REMOVE COMPANION FLANGE
   (a) Using a hammer and chisel, loosen the staked part of the nut.
   (b) Using SST to hold the flange, remove the nut.

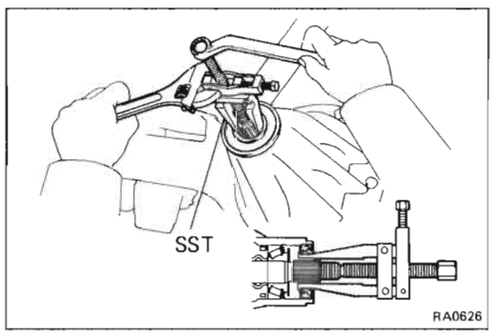
   SST 09330-00021

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(c) Using SST, remove the companion flange.

SST 09557-22022

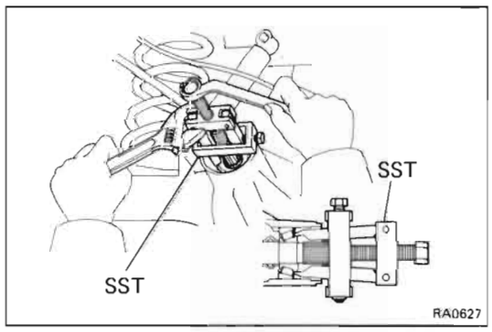


3. REMOVE OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal.

SST 09308-10010

(b) Remove the oil slinger.



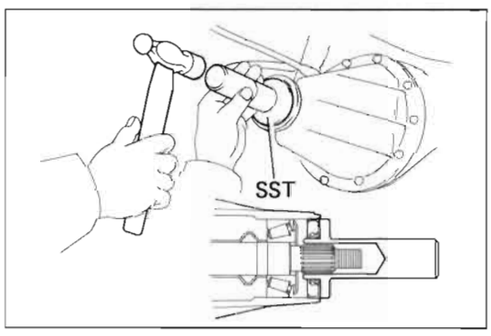
4. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the drive pinion.

SST 09556-22010

(b) Remove the bearing spacer.

5. INSTALL NEW BEARING SPACER AND FRONT BEARING



6. INSTALL OIL SLINGER AND NEW OIL SEAL

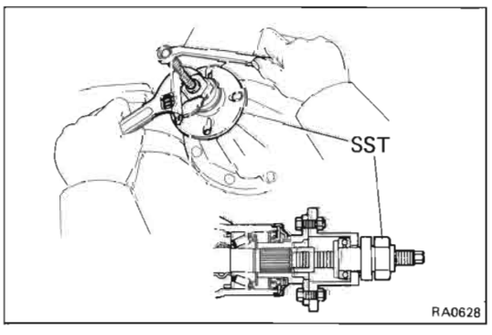
(a) Install the oil slinger.

(b) Using SST, install a new oil seal.

SST 09316-60010

Oil seal in depth: 1.0 mm (0.039 in.)

(c) Apply MP grease to the oil seal lip.



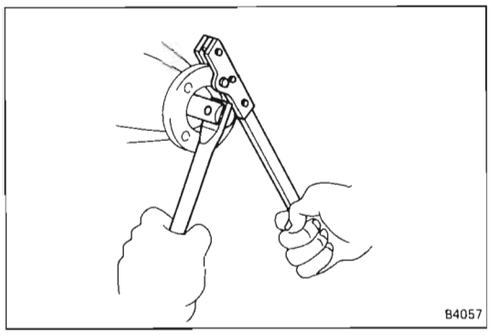
7. INSTALL COMPANION FLANGE

(a) Using SST, install the companion flange.

SST 09557-22022

(b) Coat the threads of a new nut with gear oil.

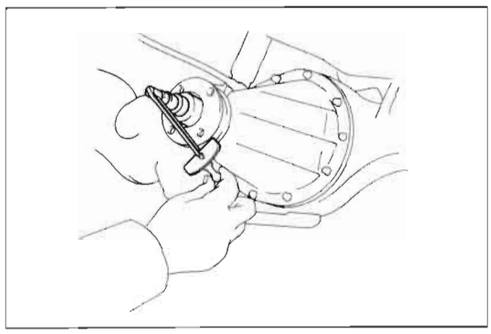
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(c) Using SST to hold the flange, tighten the nut.

SST 09330-00021

Torque: 2,750 kg-cm (199 ft-lb, 270 N·m)



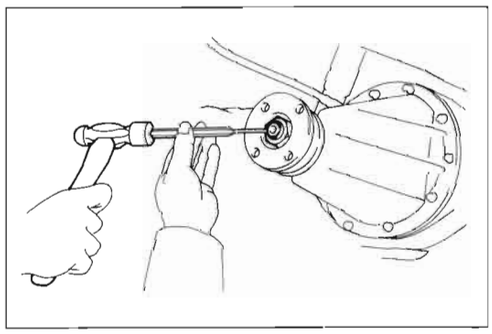
(d) Using a torque meter, measure the preload.

Preload (at starting):

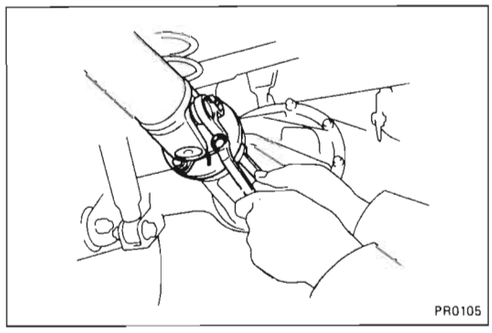
New bearing	**19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)**
Reused bearing	**9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)**

If preload is greater than specification, replace the bearing spacer.

If preload is less than specification, retighten the nut 130 kg-cm (9 ft-lb, 13 N·m) at a time until the specified preload is reached.



8. STAKE DRIVE PINION NUT

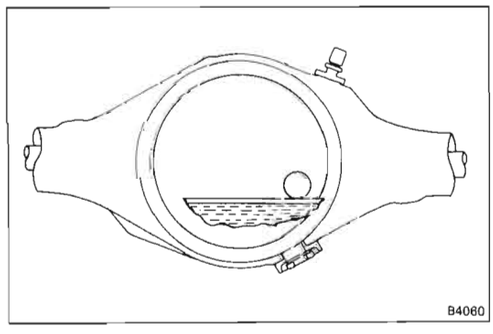


9. CONNECT PROPELLER SHAFT TO COMPANION FLANGE

(a) Align the matchmarks on the flanges and connect the flanges with four bolt and nuts.

(b) Torque the four bolts and nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)



10. CHECK DIFFERENTIAL OIL LEVEL

Fill with hypoid gear oil if necessary.

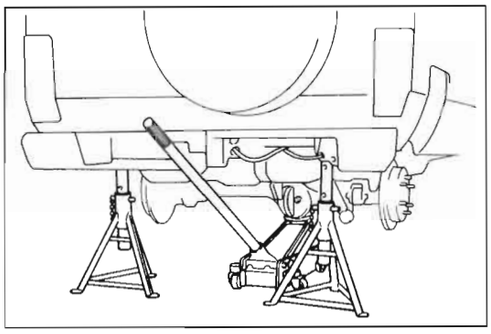
Hypoid gear oil: API GL-5

Above	**–18°C (0°F)**	**SAE 90**
Below	**–18°C (0°F)**	**SAE 80W or 80W-90**

Capacity: 2.2 liters (2.3 US qts, 1.9 Imp. qts)

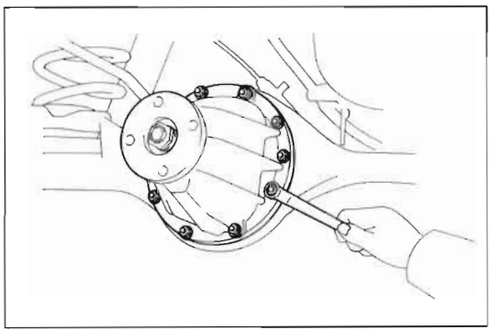
NOTE: With LSD fill in hypoid gear oil LSD, SAE 90 API-GL5.

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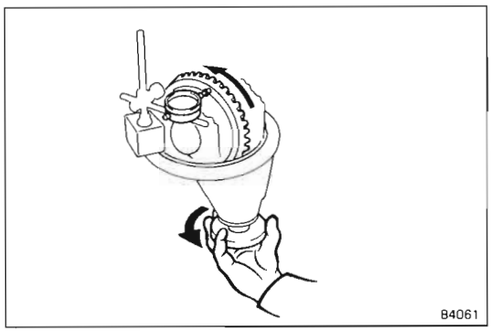


REMOVAL OF REAR DIFFERENTIAL

1. JACK UP AND SUPPORT VEHICLE
2. REMOVE TWO REAR WHEELS
3. DRAIN DIFFERENTIAL OIL

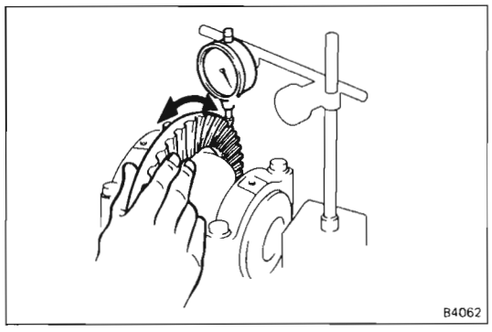


4. REMOVE REAR AXLE SHAFT ASSEMBLY
(See page RA-3)
5. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL
   (a) Place matchmarks on the flanges.
   (b) Remove the four bolts and nuts.
6. REMOVE DIFFERENTIAL CARRIER ASSEMBLY

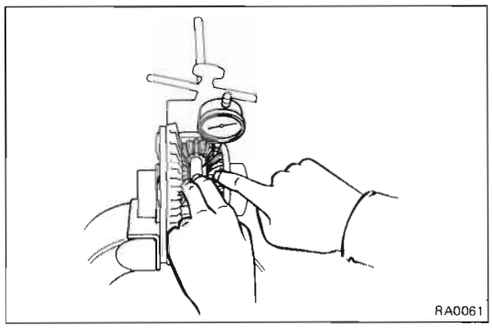


INSPECTION OF DIFFERENTIAL

1. CHECK RING GEAR RUNOUT
   Maximum runout: 0.10 mm (0.0039 in.)
   If the runout is greater than maximum, replace the ring gear.

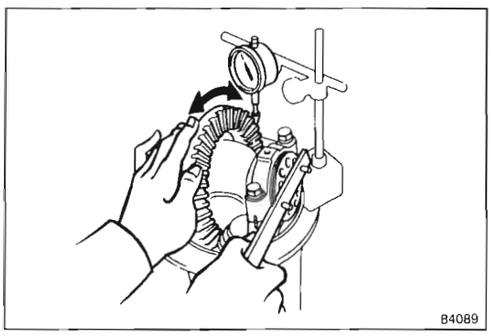


2. CHECK RING GEAR BACKLASH
   Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)
   If not specification, adjust ring gear backlash.



3. ADJUST RING GEAR BACKLASH
   (a) Remove the two adjusting nut locks.

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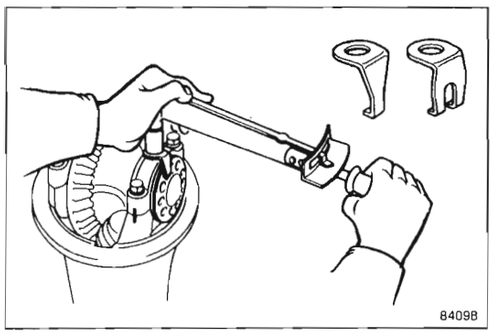


(b) Using SST, adjust the ring gear backlash until it is within specification.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

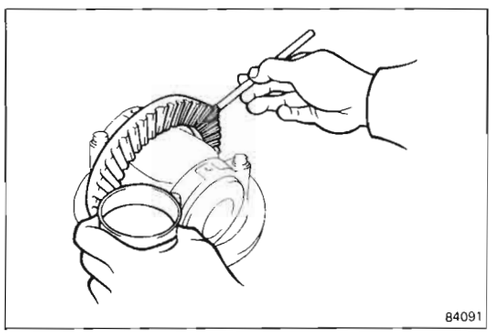
NOTE: The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on the left side one notch and tighten the nut on the right side one notch.

SST 09504-00011



(c) Select and install the adjusting nut lock on the bearing caps.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

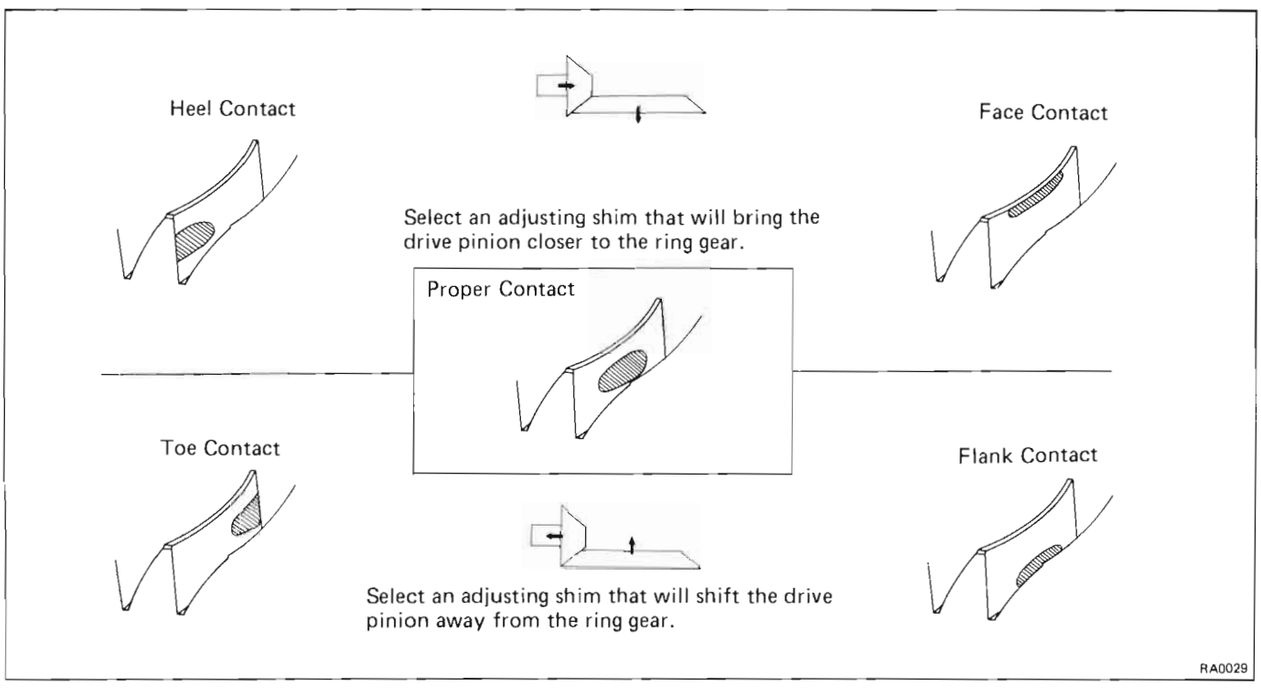


4. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

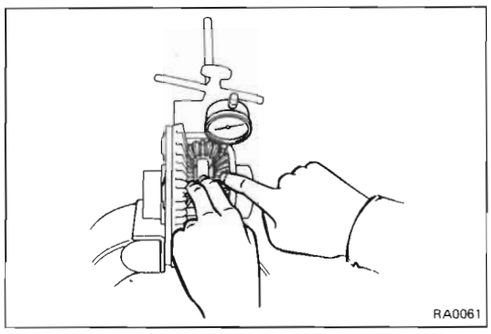
(a) Coat three or four teeth at three different positions on the ring gear with red lead.

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth pattern.



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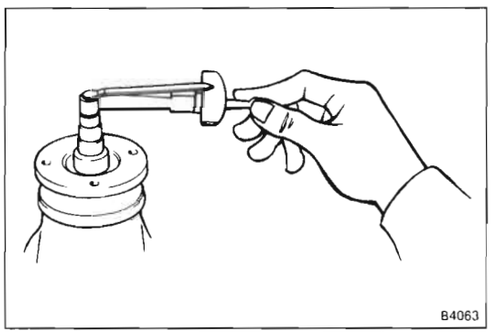

RA0061

5. CHECK SIDE GEAR BACKLASH

Measure the side gear backlash while holding one pinion gear toward the case.

Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within specification, install the proper thrust washers.


B4063

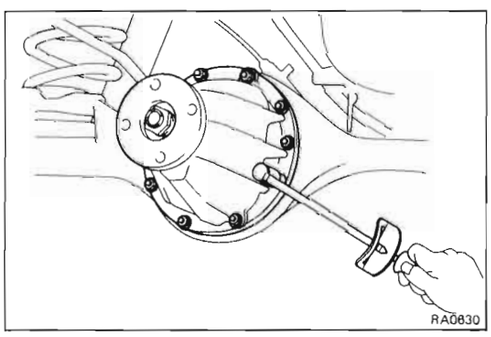
6. MEASURE PRELOAD

Using a torque meter, measure the preload.

Preload (at starting):

New bearing	**19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)**
Reused bearing	**9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)**

If not specification, repair the differential.


RA0830

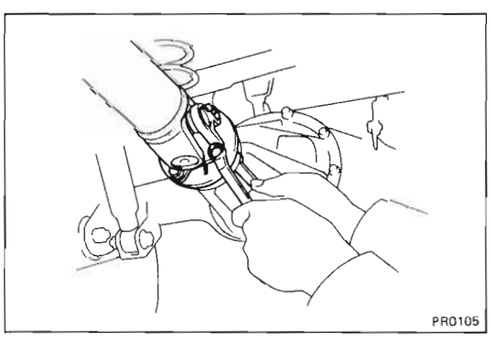
INSTALLATION OF REAR DIFFERENTIAL

1. INSTALL A NEW GASKET

2. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

Install the differential carrier assembly to the rear axle housing. Torque the ten nuts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)


PR0105

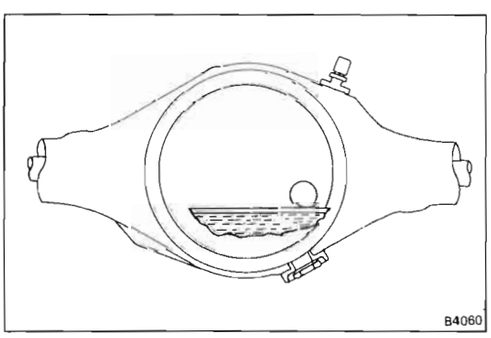
3. CONNECT PROPELLER SHAFT TO DIFFERENTIAL

(a) Align the matchmarks on the flanges.

(b) Torque the four bolts and nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

4. INSTALL REAR AXLE SHAFT ASSEMBLY
(See page RA-6)


B4060

5. FILL DIFFERENTIAL WITH GEAR OIL

Hypoid gear oil: API GL-5

Above	–18°C (0°F)	SAE 90
Below	–18°C (0°F)	SAE 80W or 80W-90

Capacity: 2.2 liters (2.3 US qts, 1.9 Imp. qts)

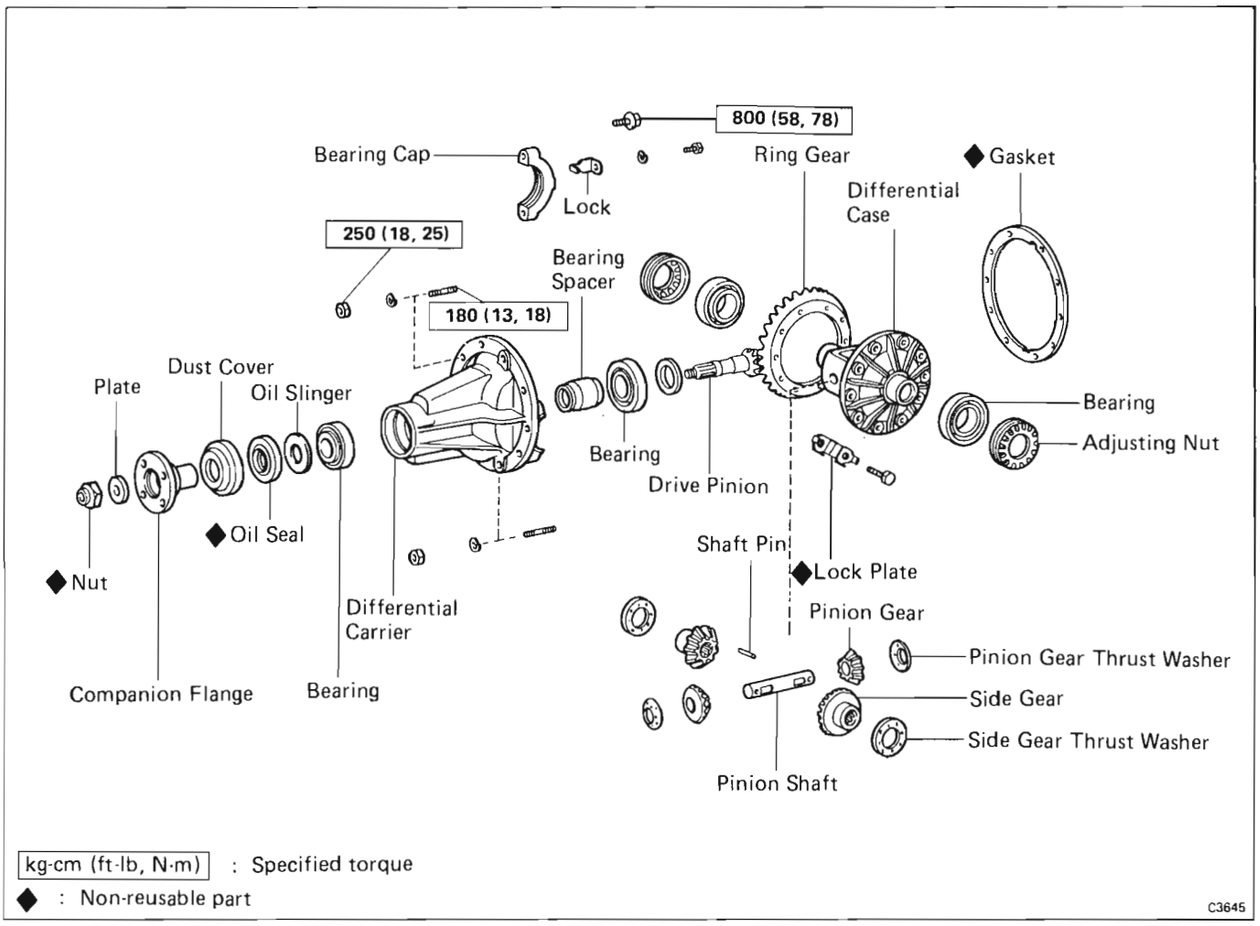
NOTE: With LSD, fill in hypoid gear oil LSD, SAE 90 API GL-5.

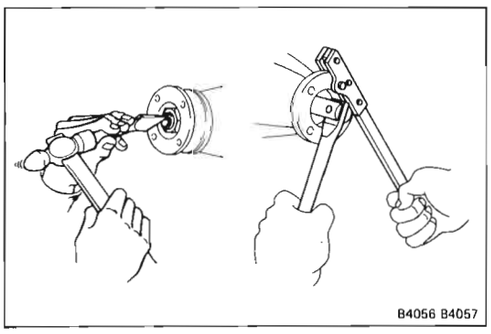
6. INSTALL TWO REAR WHEEL AND LOWER VEHICLE

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Conventional Type Differential

COMPONENTS





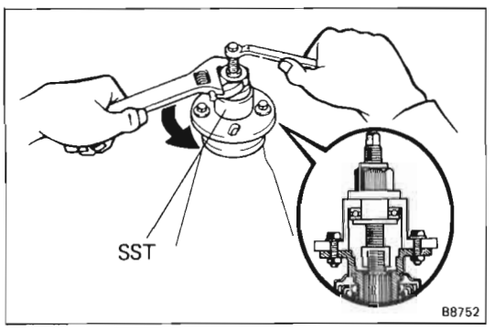
DISASSEMBLY OF DIFFERENTIAL

1. REMOVE COMPANION FLANGE

(a) Using a hammer and chisel, loosen the staked part of the nut.

(b) Using SST to hold the flange, remove the nut.

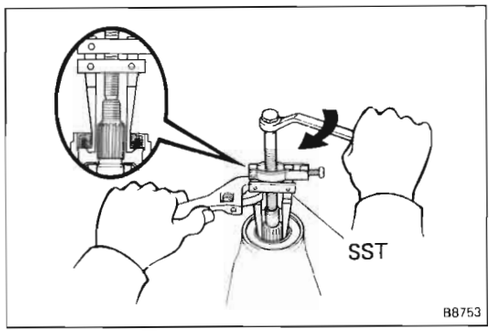
SST 09330-00021



(c) Using SST, remove the companion flange.

SST 09557-22022

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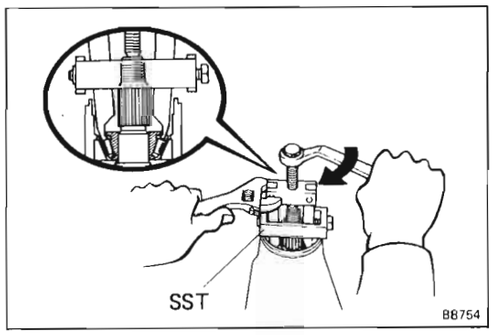


2. REMOVE OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the housing.

SST 09308-10010

(b) Remove the oil slinger.



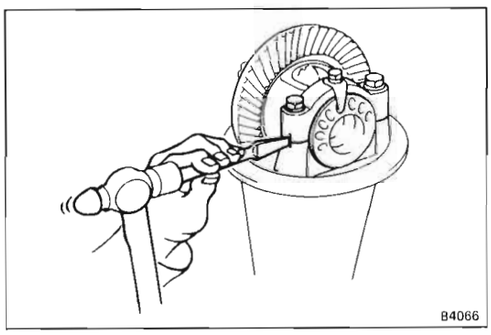
3. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the housing.

SST 09556-22010

(b) Remove the bearing spacer.

If the front bearing is damaged or worn, replace the bearing.

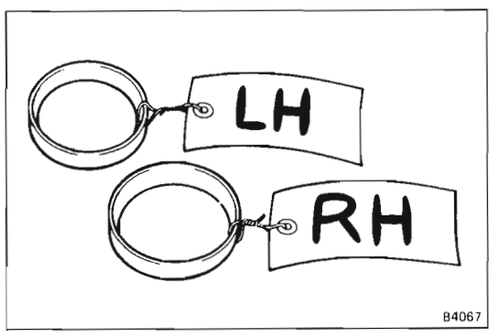


4. REMOVE DIFFERENTIAL CASE AND RING GEAR

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the two adjusting nut locks.

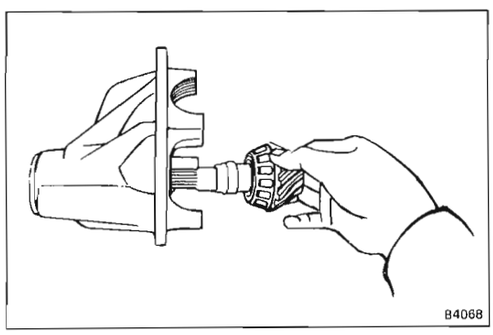
(c) Remove the two bearing caps and two adjusting nuts.



(d) Remove the bearing outer races.

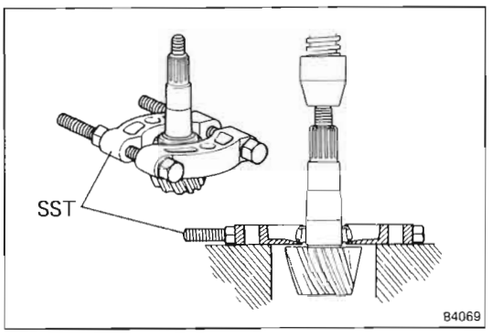
(e) Remove the differential case from the carrier.

NOTE: Tag the disassembled parts to show the location for reassembly.



5. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER

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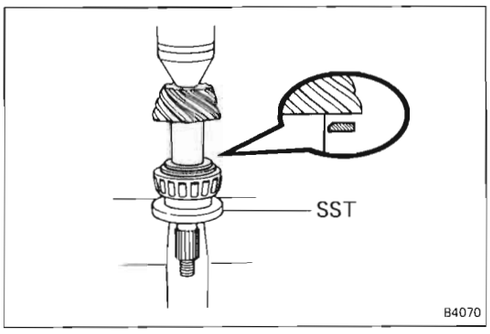
INSPECTION AND REPLACEMENT OF DIFFERENTIAL

1. REPLACE DRIVE PINION REAR BEARING RACE

(a) Using SST and a press, pull out the rear bearing from the drive pinion.

SST 09950-00020

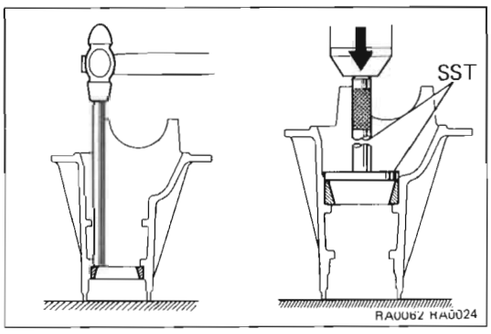
NOTE: If replacing the drive pinion, do so together with the ring gear.



(b) Install the washer on the drive pinion with the chamfered end facing the pinion gear.

(c) Using SST and a press, press the reused washer and rear bearing onto the drive pinion.

SST 09506-30011

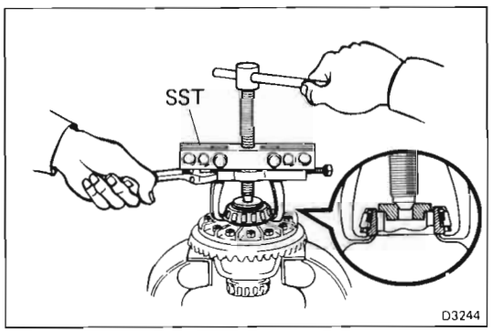


2. REPLACE DRIVE PINION FRONT AND REAR BEARING OUTER RACE

(a) Using a hammer and driver, drive out the outer race.

(b) Using a press and SST, drive in a new outer race.

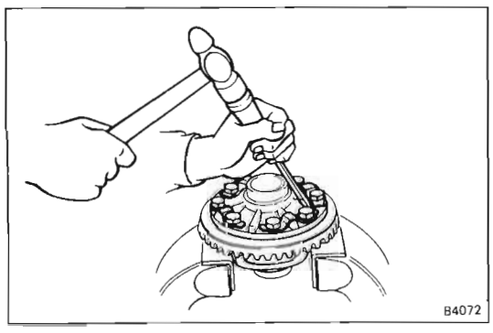
SST 09608-30011



3. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

Using SST, pull the side bearing from the differential case.

SST 09950-20016



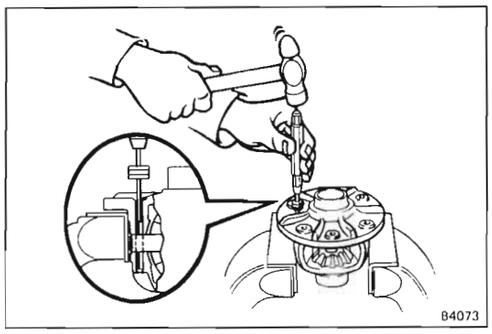
4. REMOVE RING GEAR

(a) Remove the ring gear set bolts and lock plates.

(b) Place alignment marks on the ring gear and differential case.

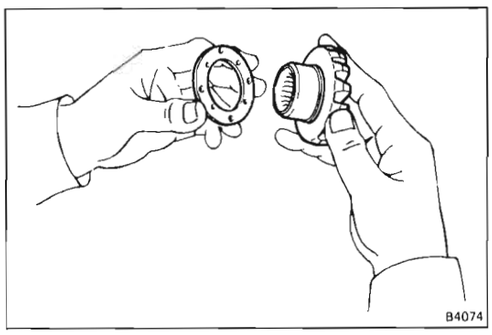
(c) Using a plastic or copper hammer, tap on the ring gear to separate it from the differential case.

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5. DISASSEMBLE DIFFERENTIAL CASE

Using a hammer and punch, drive out the straight pin. Remove the pinion shaft, two pinion gears, two side gears and two thrust washers.



6. ASSEMBLE DIFFERENTIAL CASE

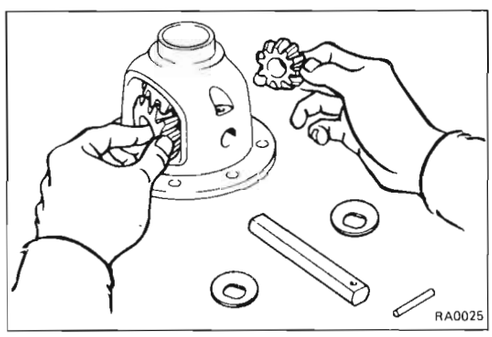
(a) Install the proper thrust washers and side gears.

Using the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.

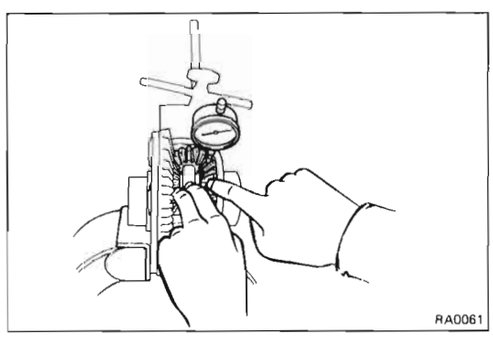
Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thrust washer thickness

Thickness	mm (in.)
1.60	(0.0630)
1.70	(0.0669)
1.80	(0.0709)



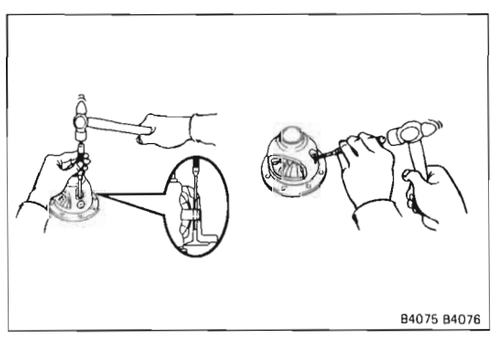
Install thrust washers and side gears in the differential case.



(b) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

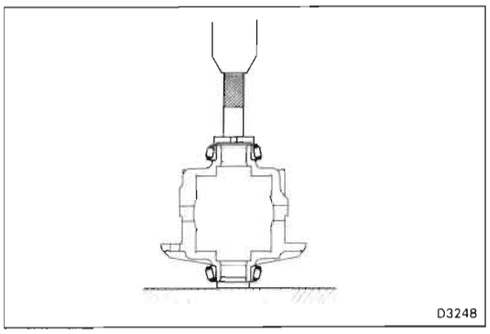
If the backlash is not within specification, install a thrust washer of a different thickness.



(c) Install the straight pin.

- Using the hammer and punch, drive the straight pin through the case and hole in the pinion shaft.
- Stake the pin and differential case.

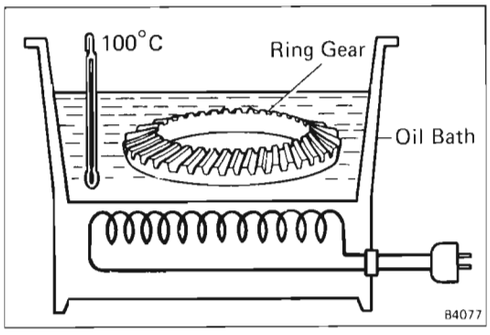
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7. INSTALL SIDE BEARINGS

Using a press and SST, press the side bearings on the differential case.

SST 09608-30011



8. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100°C (212°F) in an oil bath.

CAUTION: Do not heat the ring gear above 110°C (230°F).

(c) Clean the contact surface of the ring gear with cleaning solvent.

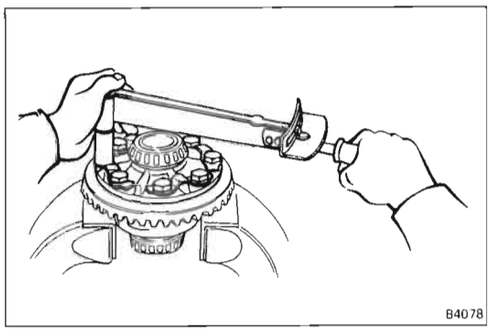
(d) Then quickly install the ring gear on the differential case.

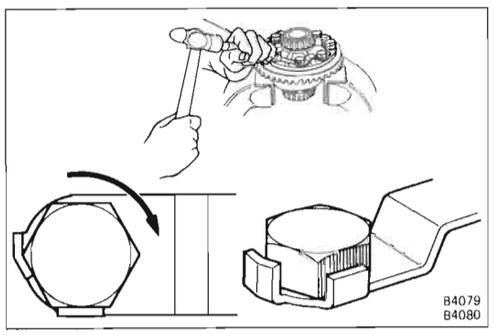
(e) Align the marks on the ring gear and differential case.

(f) Coat the ring gear set bolts with gear oil.

(g) Install the lock plates and set bolts. Tighten the set bolts uniformly, a little at a time. Torque the bolts.

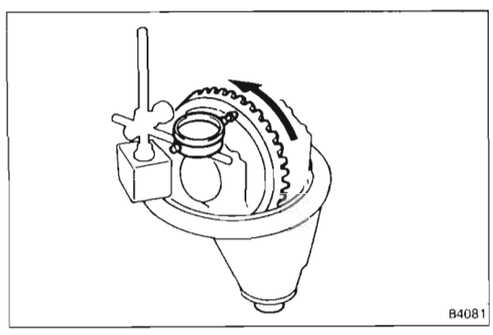
Torque: 985 kg-cm (71 ft-lb, 97 N·m)





(h) Using a hammer and drift punch, stake the lock plates.

NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.

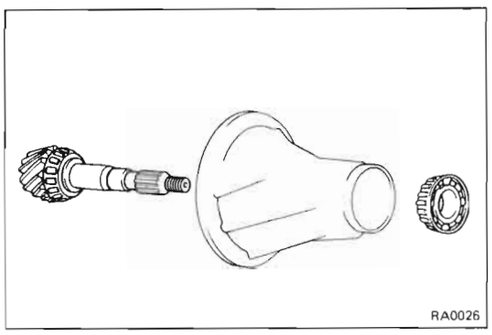


(i) Check the ring gear runout.

Maximum runout: 0.10 mm (0.0039 in.)

Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearing.

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RA0026

ASSEMBLY OF DIFFERENTIAL

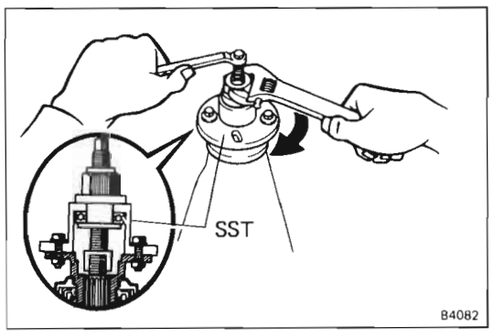
(See page RA-6)

1. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the following parts:

- Drive pinion
- Front bearing

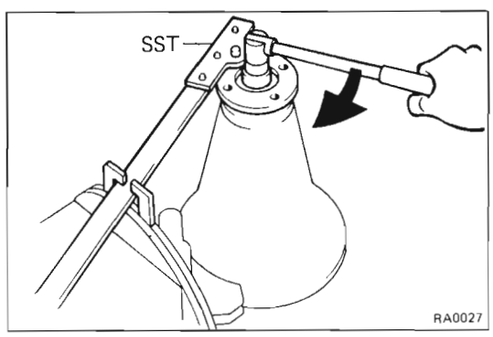
NOTE: Assemble the spacer, oil slinger and oil seal after adjusting the gear contact pattern.



B4082

(b) Install the companion flange with SST.

SST 09557-22022



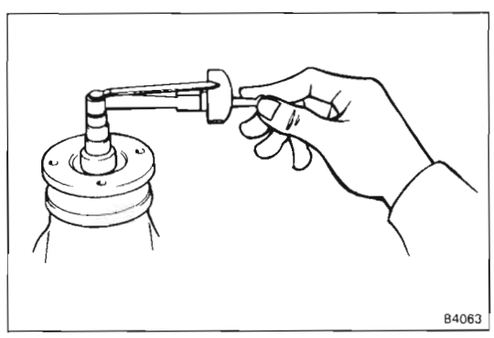
RA0027

(c) Adjust the drive pinion preload by tightening the companion flange nut.

Using SST to hold the flange, tighten the nut.

SST 09330-00021

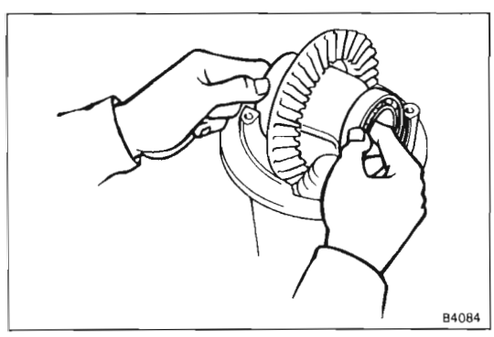
CAUTION: As there is no spacer, tighten a little at a time, being careful not to overtighten.


B4063

(d) Using a torque meter, measure the preload.

Preload:

New bearing	**19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)**
Reused bearing	**9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)**

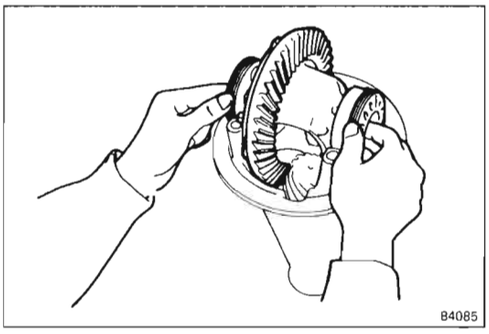

B4084

2. INSTALL DIFFERENTIAL CASE IN CARRIER

(a) Place the bearing outer races on their respective bearings. Make sure the left and right outer races are not interchanged.

(b) Install the case in the carrier.

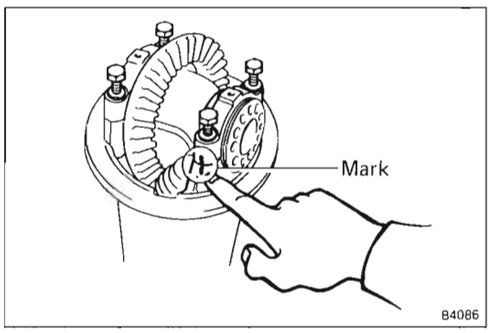
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B4085

3. INSTALL ADJUSTING NUTS

Install the adjusting nuts on their respective carrier, making sure the nuts are threaded properly.

NOTE: Make sure that there is backlash between the ring gear and drive pinion.

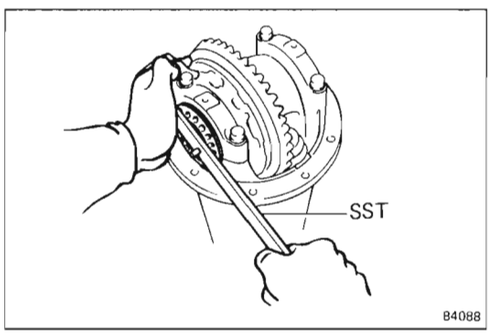


B4086

4. INSTALL BEARING CAPS

Align the marks on the cap and carrier. Screw in the two bearing cap bolts two or three turns and press down the bearing cap by hand.

NOTE: If the bearing cap does not fit tightly on the carrier, the adjusting nuts is not threaded properly.
Reinstall the adjusting nuts if necessary.



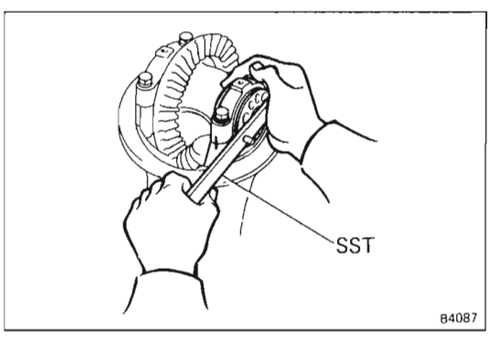
B4088

5. ADJUST SIDE BEARING PRELOAD

(a) Tighten the bearing cap bolts until the spring washers are slightly compressed.

(b) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

SST 09504-00011

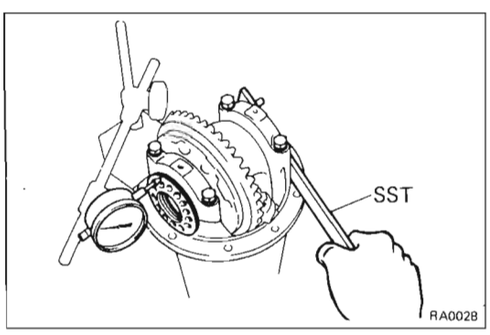


B4087

(c) Using SST, firmly tighten the adjusting nut on the drive pinion side.

(d) Check the ring gear backlash.

If tightening the adjusting nut creates ring gear backlash, loosen the nut so that backlash is eliminated.

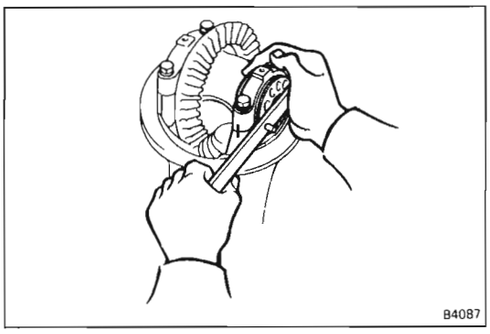


RA0028

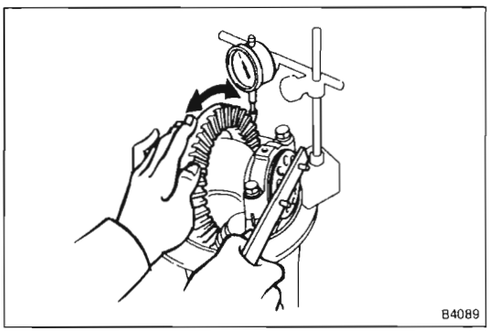
(e) Place a dial indicator on the top of the bearing cap on the ring gear side.

(f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.

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B4087

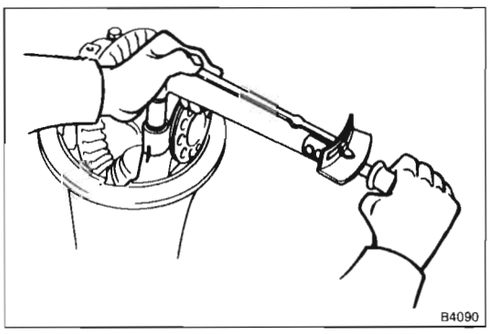
(g) Tighten the adjusting nut 1 – 1½ notches from the zero preload position.


B4089

(h) Using a dial indicator, adjust the ring gear backlash until it is within specification.

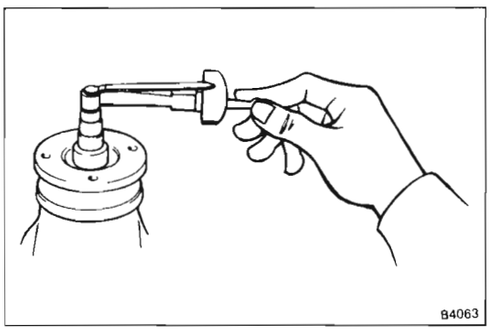
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

NOTE: The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on the left side one notch and tighten the nut on the right side one notch.


B4090

(i) Torque the bearing cap bolts.

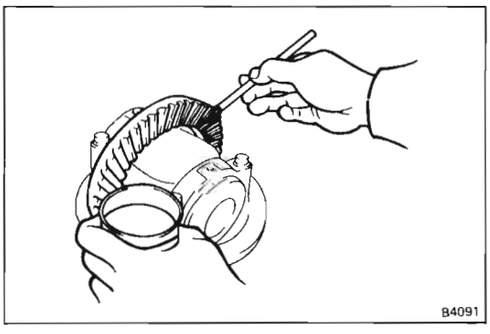
Torque: 800 kg-cm (58 ft-lb, 78 N·m)


B4063

(j) Recheck the ring gear backlash.

(k) Using a torque meter, measure the total preload.

Total preload:
In addition to drive pinion preload
4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6 N·m)
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)


B4091

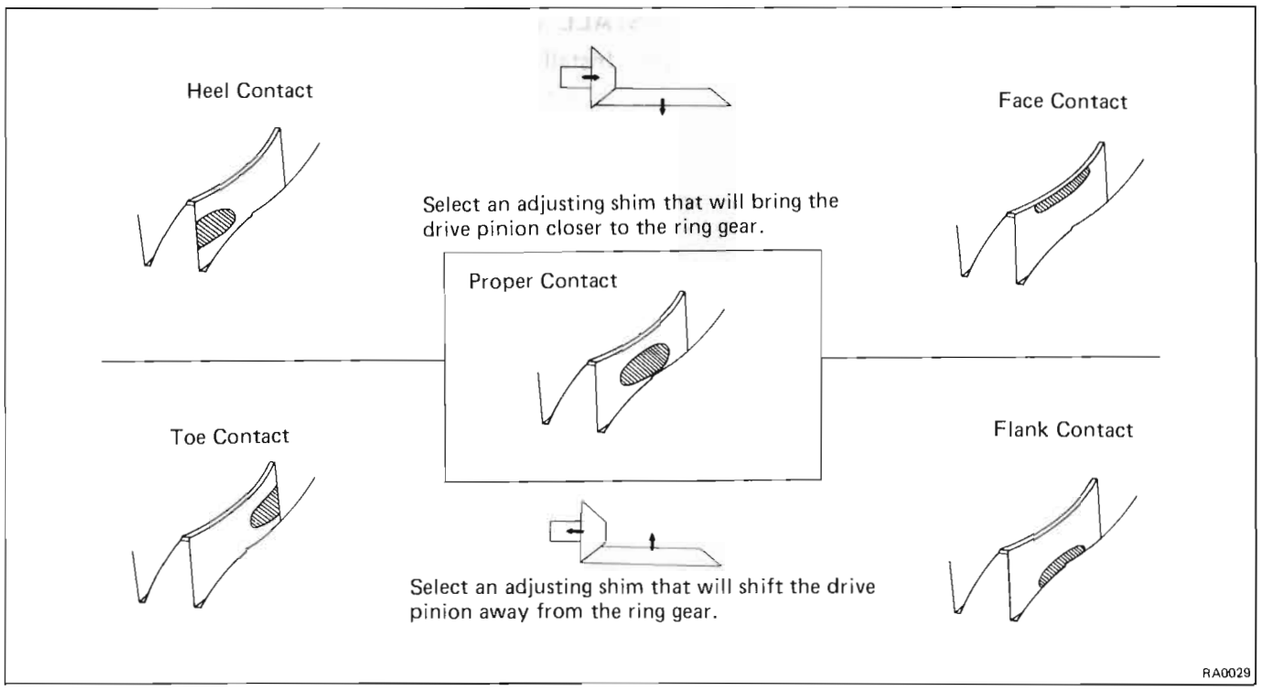
6. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

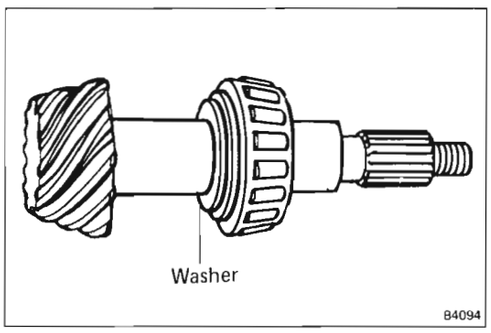
(a) Coat 3 or 4 teeth at three different positions on the ring gear with red lead.

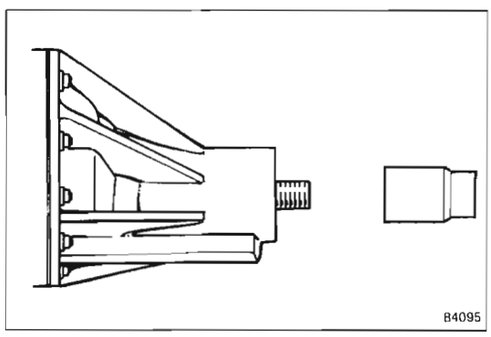
(b) Hold the companion flange firmly and rotate the ring gear in both directions.

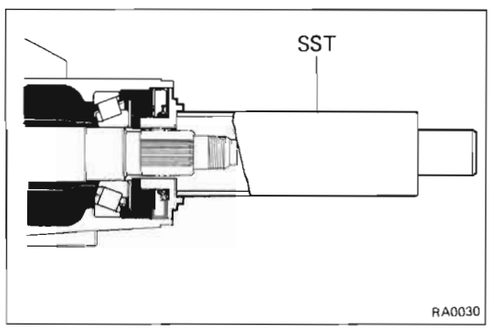
(c) Inspect the tooth pattern.

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If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness

Thickness mm (in.)			
1.70	(0.0669)	2.03	(0.0799)
1.73	(0.0681)	2.06	(0.0811)
1.76	(0.0693)	2.09	(0.0823)
1.79	(0.0705)	2.12	(0.0835)
1.82	(0.0717)	2.15	(0.0846)
1.85	(0.0728)	2.18	(0.0858)
1.88	(0.0740)	2.21	(0.0870)
1.91	(0.0752)	2.24	(0.0882)
1.94	(0.0764)	2.27	(0.0894)
1.97	(0.0776)	2.30	(0.0906)
2.00	(0.0787)	2.33	(0.0917)

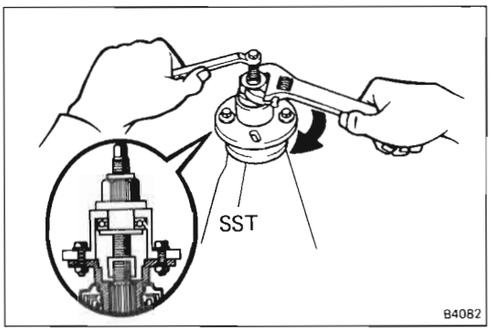
7. **REMOVE COMPANION FLANGE**
(See step 7 on page RA-9)

8. **REMOVE FRONT BEARING**
(See step 9 on page RA-9)

9. **INSTALL NEW BEARING SPACER AND FRONT BEARING**
   (a) Install a new bearing spacer on the shaft.
   (b) Install the front bearing on the shaft.

10. **INSTALL OIL SLINGER AND NEW OIL SEAL**
   (a) Install the oil slinger facing as shown.
   (b) Using SST, drive in a new oil seal as shown.
   SST 09554-30011
   Oil seal drive in depth: 1.0 mm (0.039 in.)
   (c) Apply MP grease to the oil seal lip.

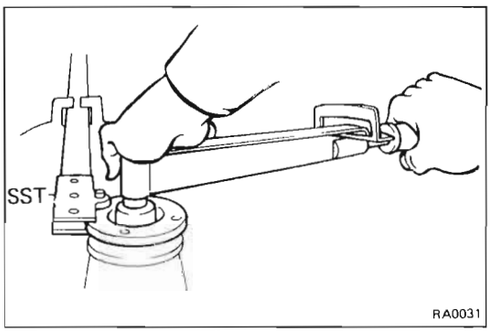
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11. INSTALL COMPANION FLANGE

(a) Install the companion flange with SST.

SST 09557-22022

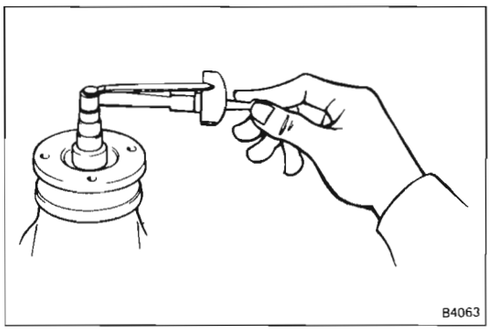


(b) Coat the threads of a new nut with MP grease.

(c) Using SST to hold the flange, tighten the nut. Torque the nut.

SST 09330-00021

Torque: 2,750 kg-cm (199 ft-lb, 270 N·m)



12. ADJUST DRIVE PINION PRELOAD

Using a torque meter, measure the preload of the backlash between the drive pinion and ring gear.

Preload:

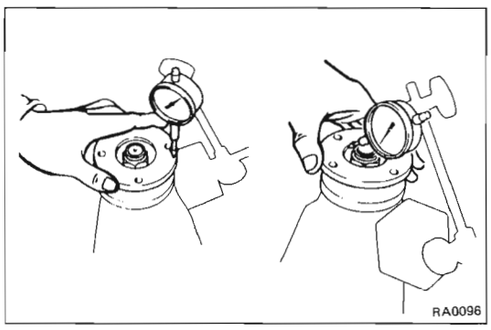
New bearing	**19 – 26 kg-cm (16.5 – 22.6 in.-lb, 1.9 – 2.5 N·m)**
Reused bearing	**9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)**

(a) If preload is greater than specification, replace the bearing spacer.

(b) If preload is less than specification, retighten the nut 130 kg-cm (9 ft-lb, 13 N·m) at a time until the specified preload is reached.

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

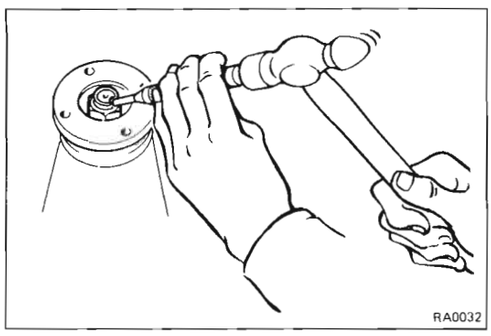
Maximum torque: 3,500 kg-cm (253 ft-lb, 343 N·m)



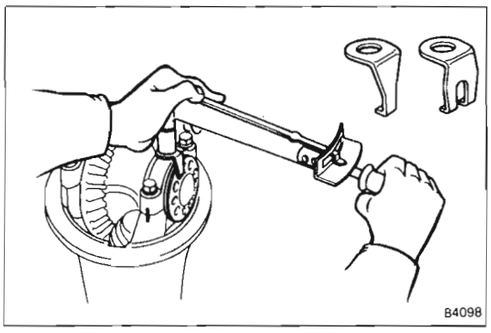
13. CHECK DEVIATION OF COMPANION FLANGE

Maximum longitudinal deviation:
0.10 mm (0.0039 in.)
Maximum latitudinal deviation:
0.10 mm (0.0039 in.)

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14. STAKE DRIVE PINION NUT



15. INSTALL ADJUSTING NUT LOCKS

(a) Select either a lock No. 1 or No. 2 whichever will fit the adjusting nuts.

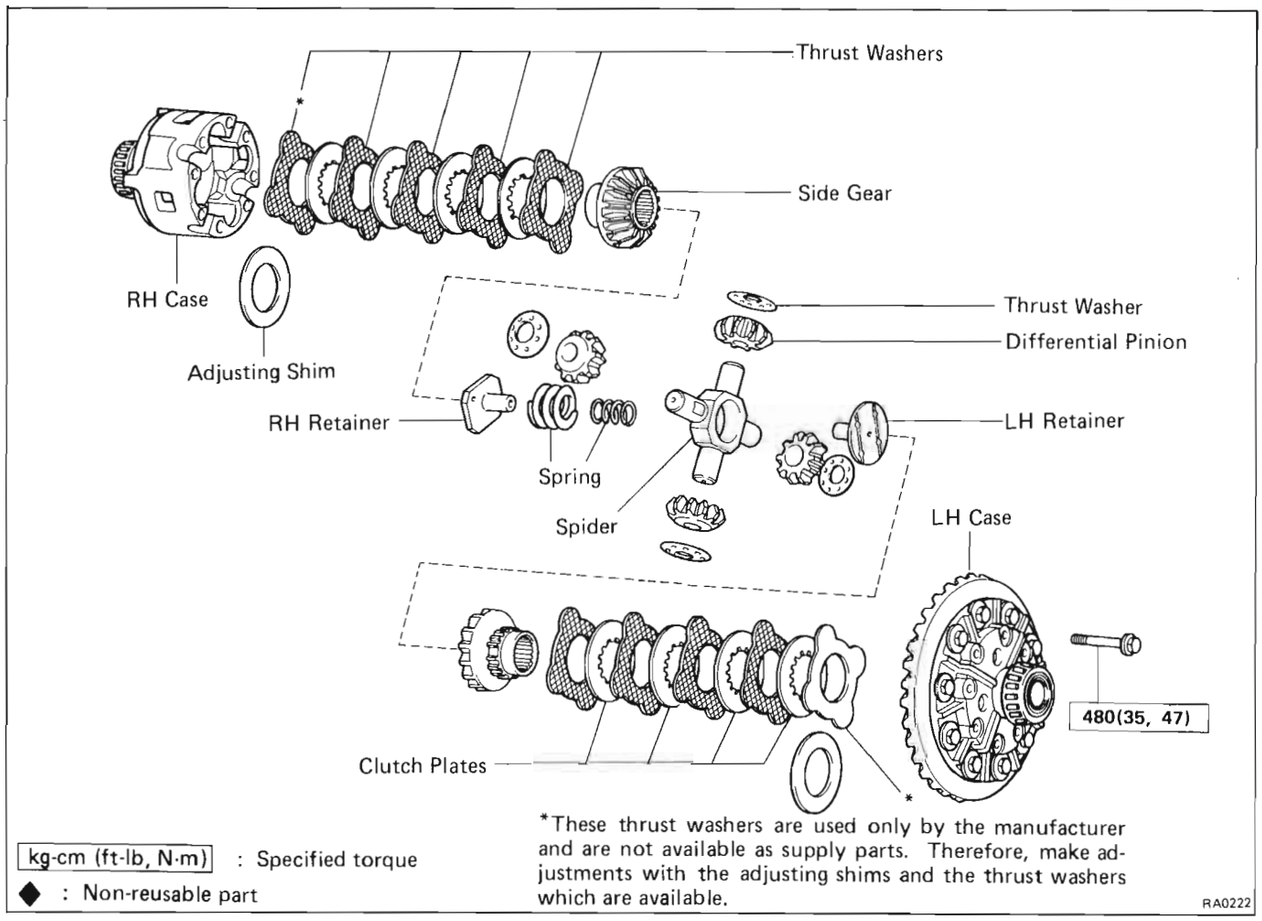
(b) Install the lock on the bearing caps.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

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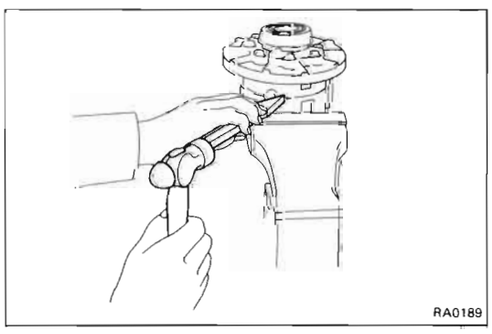
Limited Slip Differential

COMPONENTS



REMOVAL OF DIFFERENTIAL CASE

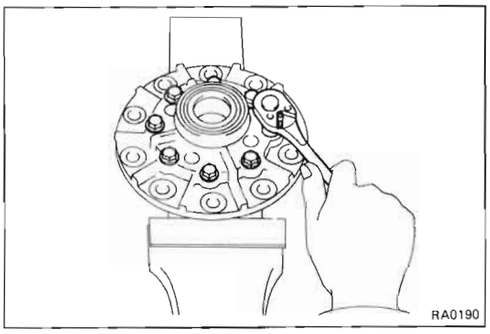
1. REMOVE DIFFERENTIAL (See page RA-10)
2. REMOVE DIFFERENTIAL CASE FROM CARRIER (See page RA-14)



DISASSEMBLY OF LIMITED SLIP DIFFERENTIAL

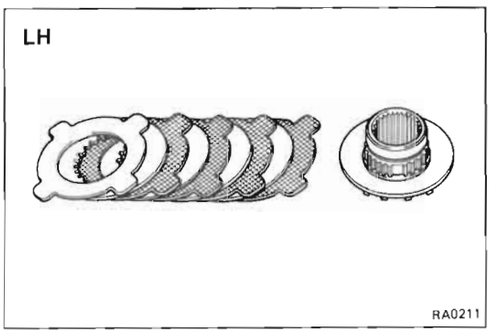
1. PUT MATCHMARKS ON RH AND LH CASE

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RA0190

2. REMOVE CASE BOLTS AND LH CASE WITH SIDE GEAR

Remove the bolts uniformly and a little at a time.

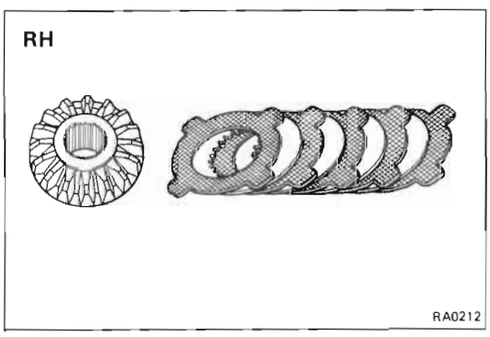


RA0211

3. REMOVE FOLLOWING PARTS FROM LH CASE:

(a) Side gear
(b) Side gear thrust washer (5 pieces)
(c) Clutch plate (4 pieces)

NOTE: Keep the disassembled parts in order



RA0212

4. REMOVE FOLLOWING PARTS FROM RH CASE:

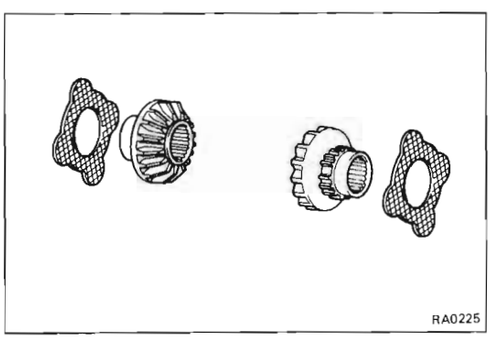
(a) Spring LH retainer and two spring
(b) Spider with pinion gear
(c) Spring RH retainer
(d) Side gear
(e) Side gear thrust washer (5 pieces)
(f) Clutch plate (4 pieces)

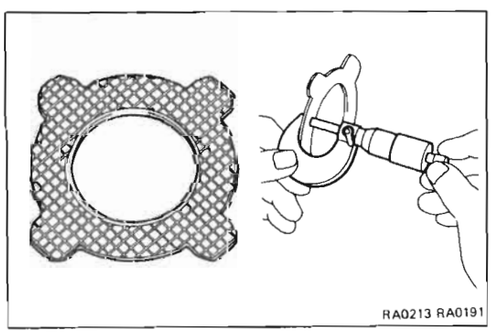
NOTE: Keep the disassembled parts in order.

INSPECTION OF COMPONENTS

1. REPLACE DAMAGED OR WORN PARTS

NOTE: If replacing the side gear, also replace the thrust washer making contact with it.


RA0225


RA0213 RA0191

2. INSPECT THRUST WASHERS FOR WEAR OR DAMAGE

Check that the contact surface of the thrust washer is even and that no bare metal is showing.

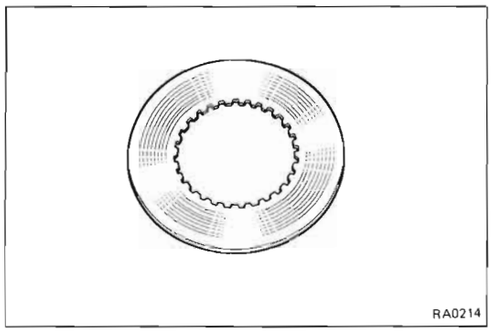
(For reference) Thickness limit:

1.74 mm (0.0685 in.)

If necessary, replace the thrust washers.

NOTE: If replacing the thrust washer also replace the clutch plate making contact with it.

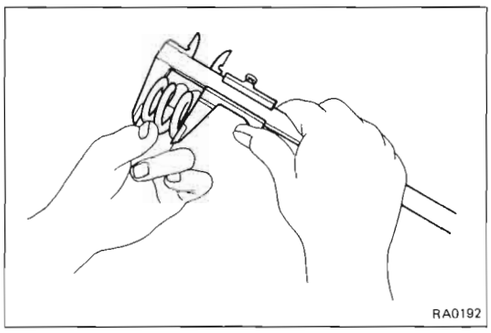
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RA0214

3. INSPECT CLUTCH PLATE FOR WEAR OR DAMAGE

Check to see that there is no abnormal wear.

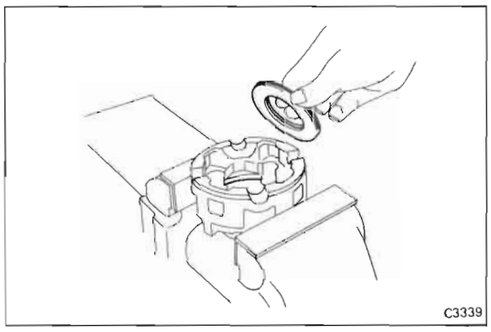
If necessary, replace the clutch plate.


RA0192

4. INSPECT SPRING FREE LENGTH

Measure the free length of the spring.

Limit: Large spring 31.3 mm (1.232 in.)
Small spring 31.3 mm (1.232 in.)


C3339

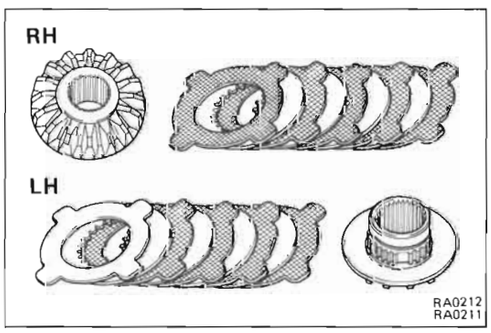
ASSEMBLY OF DIFFERENTIAL CASE

(See page RA-24)

NOTE: Apply LSD oil to each component.

1. ASSEMBLE RH CASE

(a) If necessary, install the adjusting shims.



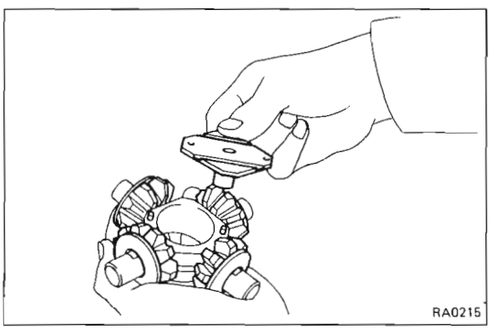
RA0212
RA0211

(b) Install the thrust washer clutch plate as shown in the figure.

NOTE: Install the thrust washer without the oil groove on the outermost side and so that it makes contact with the side of the case which has no oil groove.

(c) Install the side gear.

2. ASSEMBLE THE LH CASE IN THE SAME PROCEDURE

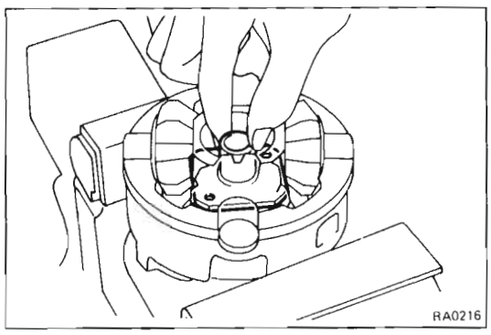

RA0215

3. INSTALL THE PINION WASHER AND RH RETAINER TO SPIDER

(a) Install the pinion gear and washer.

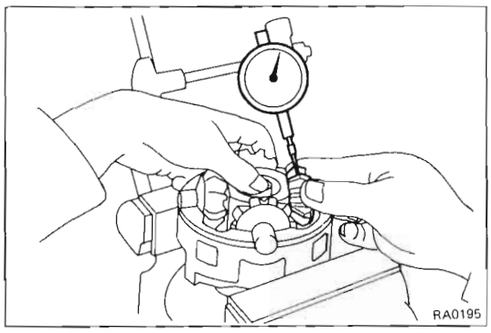
(b) Align the RH retainer hole with the spider knock pin and install.

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4. INSTALL THE SPIDER, PINION, AND RH RETAINER TO RH CASE

Check that the RH retainer is securely on the spider pin.



5. MEASURE THE PINION GEAR BACKLASH

Secure the side gear and measure the backlash while pushing in the spring retainer.

Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

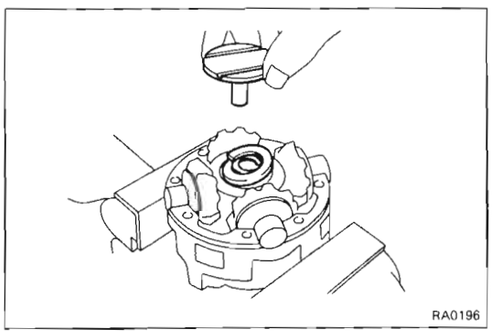
NOTE: Measure at all four locations.

If the backlash is not within specification, select an adjusting shim.

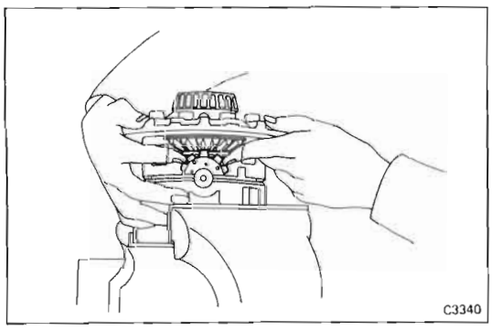
Adjusting shim sizes mm (in.)

Mark	Thickness	Mark	Thickness
A	0.15 (0.0059)	D	0.30 (0.0118)
B	0.20 (0.0079)	E	0.35 (0.0138)
C	0.25 (0.0098)		

6. MEASURE LH CASE IN SAME MANNER



7. INSTALL SPRING AND LH RETAINER

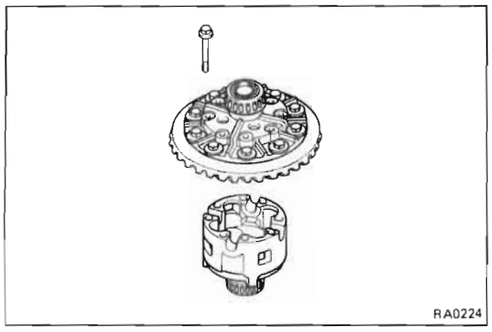


8. ASSEMBLE RH AND LH CASE

Align the marks on RH and LH case.

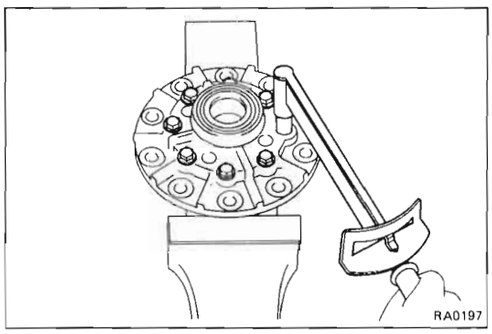
NOTE: Be careful not to drop the side gear, and check the pinion and side gear alignment.

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9. INSTALL CASE COVER BOLTS

(a) Apply a small amount of oil to the bolt.



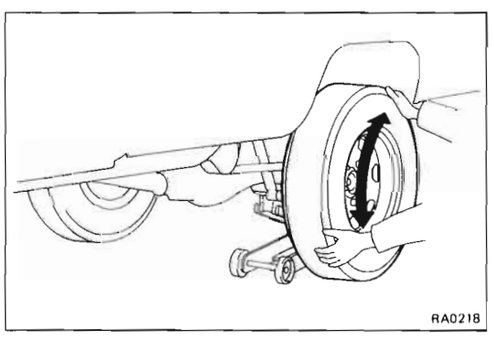
(b) Tighten the bolts uniformly, a little at a time.

Torque: 480 kg-cm (35 ft-lb, 47 N·m)

INSTALLATION OF DIFFERENTIAL

1. INSTALL DIFFERENTIAL CASE IN CARRIER
(See page RA-18)

2. INSTALLATION OF DIFFERENTIAL
(See page RA-12)



INSPECT OPERATION

(a) After completing work, block the front wheels and jack up one of the rear wheels.

(b) Rotate the rear wheel 3 – 6 times to break it in.

(c) Check that the wheel turns smoothly.

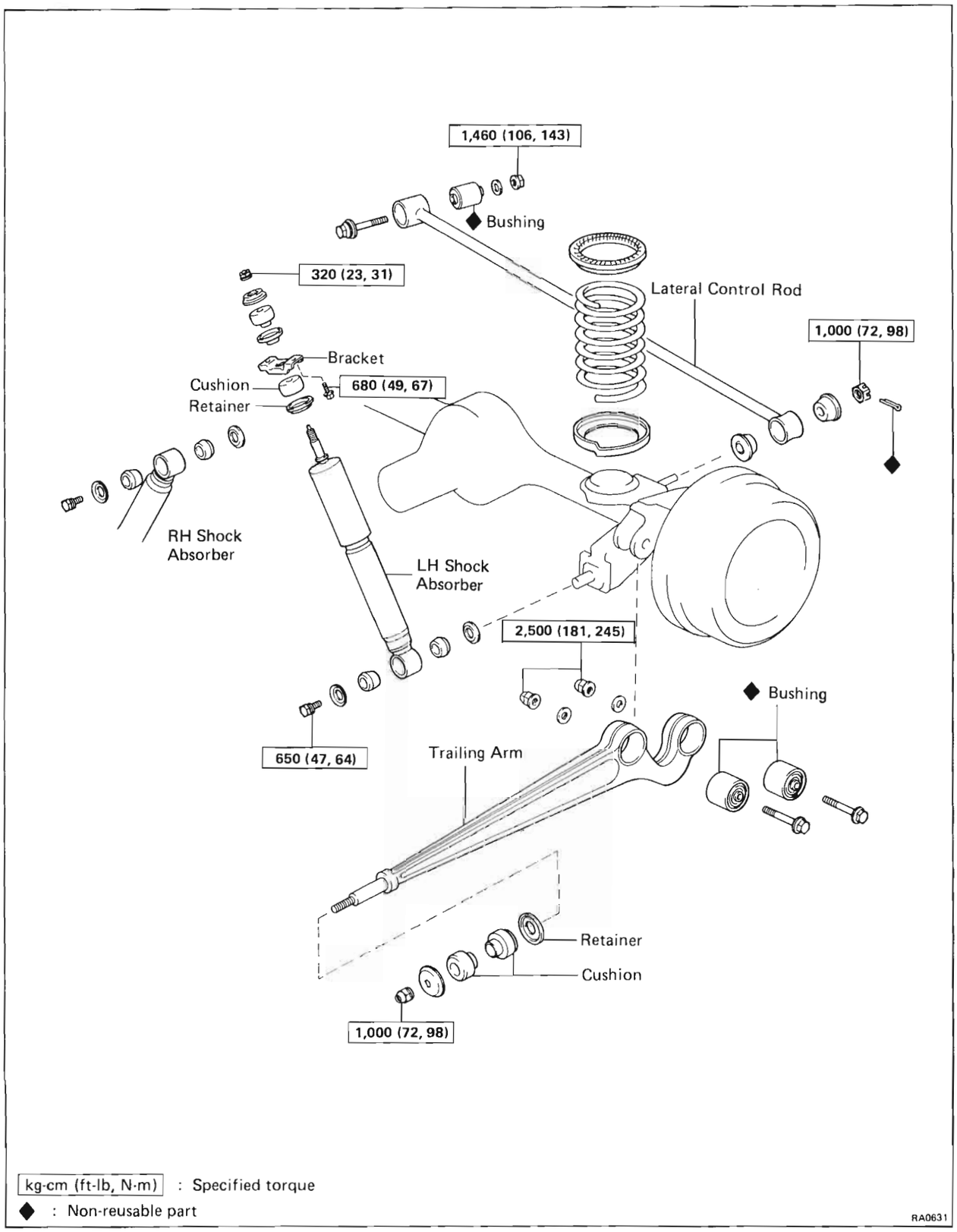
NOTE: If the wheel cannot be turned or if it turns with a drag, re-disassemble the differential case and select a different size adjusting shim.

(d) Check the opposite wheel in the same procedure.

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REAR SUSPENSION

COMPONENTS

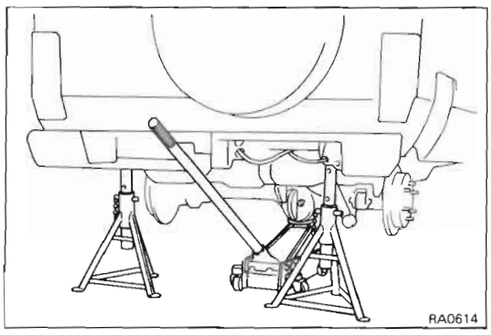


kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

RA0631

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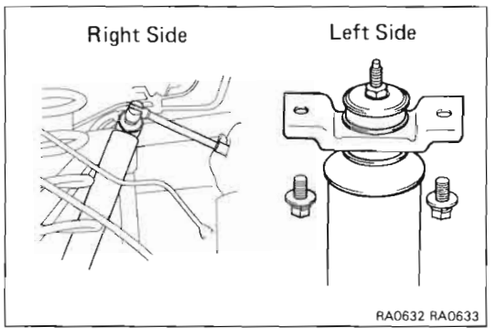
Rear Shock Absorber and Coil Spring

(See page RA-31)

REMOVAL OF REAR SHOCK ABSORBER AND COIL SPRING

1. JACK UP VEHICLE

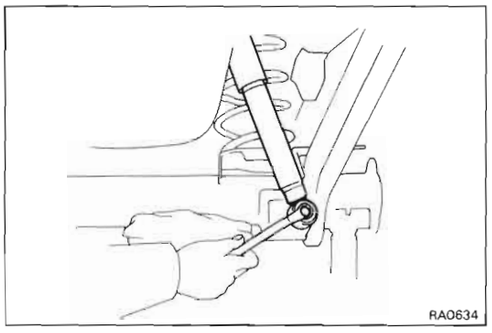
2. REMOVE WHEEL



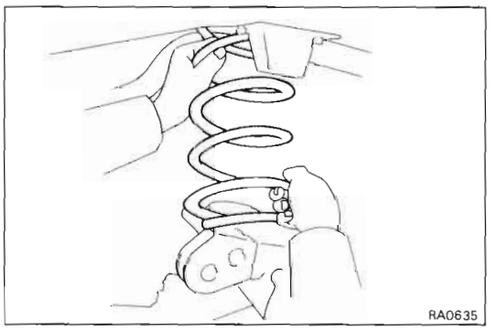
3. REMOVE REAR SHOCK ABSORBER

   (a) Using a jack, support the rear axle housing.

   (b) Disconnect the shock absorber upper bracket from the body.

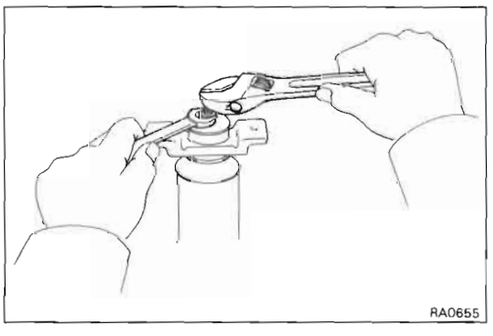


   (c) Remove the lower bracket bolt and remove the shock absorber.



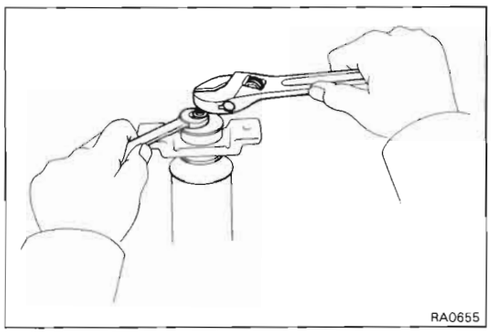
4. REMOVE COIL SPRING

   While lowering the axle housing and remove the coil spring and two coil spring insulators.



5. REMOVE CUSHION AND UPPER BRACKET OF LH SHOCK ABSORBER

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RA0655

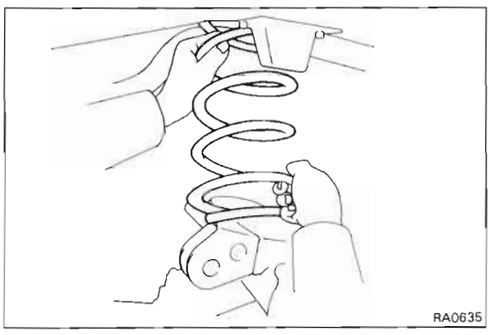
INSTALLATION OF REAR SHOCK ABSORBER AND COIL SPRING

1. INSTALL CUSHION, RETAINER AND UPPER BRACKET

(a) Install the retainer, cushion, bracket, retainer, cushion, retainer and nut.

(b) Torque the nut.

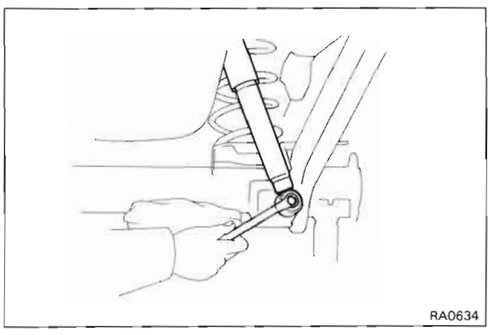
Torque: 320 kg-cm (23 ft-lb, 31 N·m)


RA0635

2. INSTALL COIL SPRING

(a) Install the coil spring and two spring insulator to the axle housing.

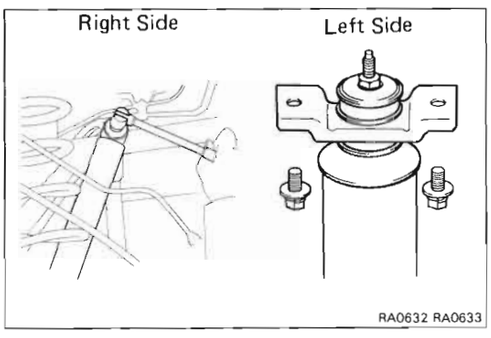
(b) Jack up the axle housing and check that the coil spring is installed correctly.


RA0634

3. INSTALL REAR SHOCK ABSORBER

(a) Connect the shock absorber to the rear axle housing and torque the bolt.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)



RA0632 RA0633

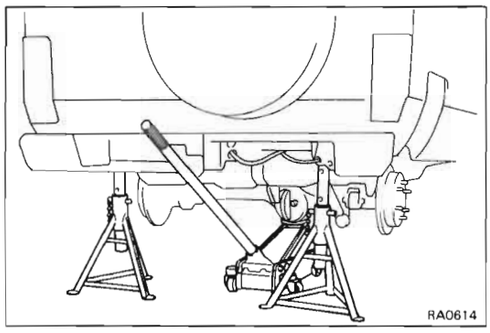
(b) Connect the shock absorber to the body.

Torque: Left side 380 kg-cm (27 ft-lb, 37 N·m)
Right side 650 kg-cm (47 ft-lb, 64 N·m)

(c) Remove the jack from the axle housing.

4. INSTALL WHEEL AND LOWER VEHICLE

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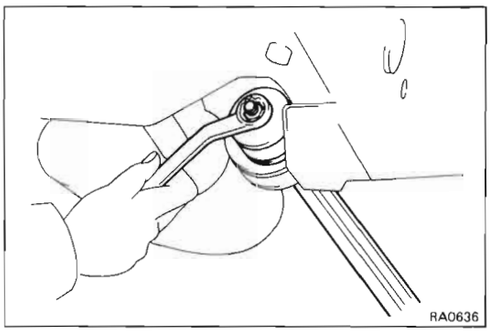
Trailing Arm

(See page RA-31)

REMOVAL OF TRAILING ARM

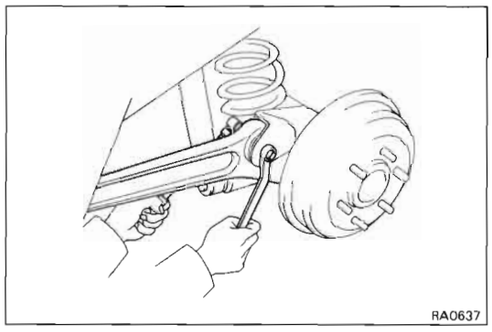
1. SUPPORT TRAILING ARM

Using a jack, support the trailing arm.



2. REMOVE TRAILING ARM

(a) Remove the front mounting nut, retainer and cushion.



(b) Remove the two rear mounting nuts and bolts from the axle housing.

(c) Lower and remove the trailing arm.

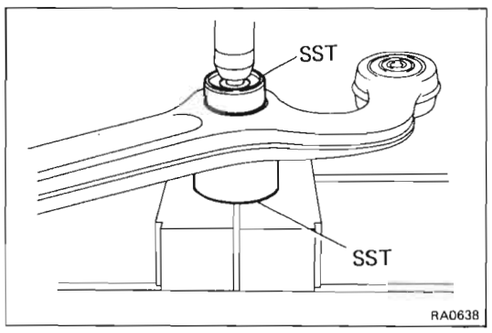
(d) Remove the cushion and retainer from the trailing arm.

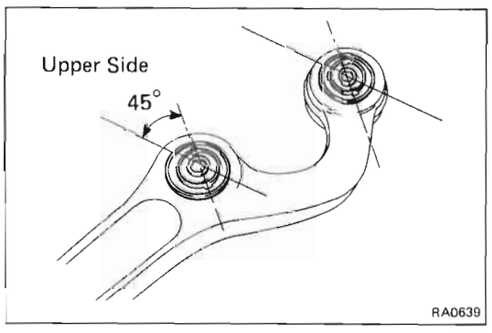
INSTALLATION OF TRAILING ARM

1. REPLACE TWO TRAILING ARM BUSHINGS

(a) Using SST, press out the bushing.

SST 09710-30030 and 09228-22020



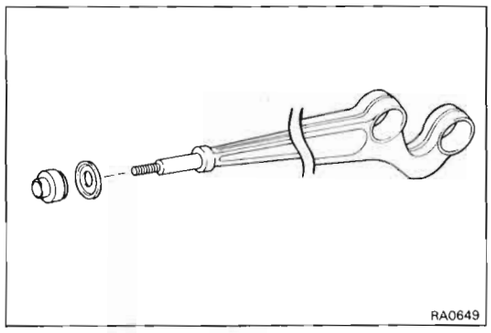


(b) Using SST, press in the bushing.

SST 09710-30030 and 09228-22020

NOTE: When assembling the bushing, assemble it so the its holes align at a 45° angle.

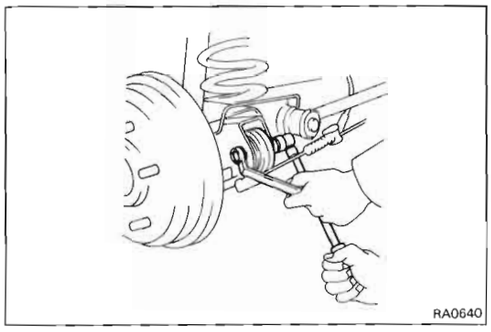
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RA0649

2. INSTALL TRAILING ARM

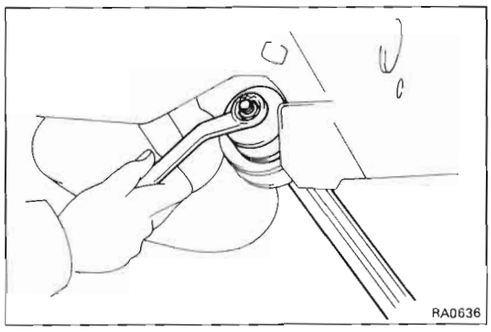
(a) Install the rear retainer and cushion to the trailing arm.

(b) Insert the trailing arm to the body.


RA0640

(c) Install the trailing arm to the axle housing, and torque the two nuts and bolts.

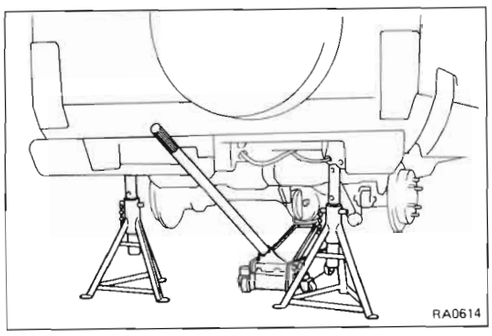
Torque: 2,500 kg-cm (181 ft-lb, 245 N·m)


RA0636

(d) Install the front cushion and retainer to the trailing arm and torque the nuts.

Torque: 1,000 kg-cm (72 ft-lb, 98 N·m)

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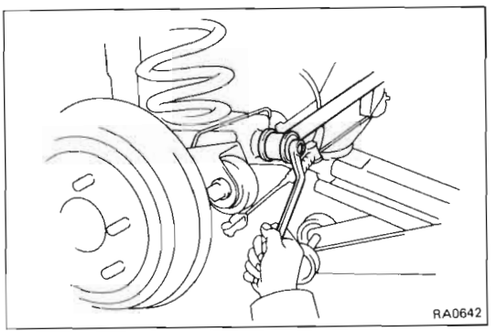
Lateral Control Rod

(See page RA-31)

REMOVAL OF LATERAL CONTROL ROD

1. SUPPORT REAR AXLE HOUSING

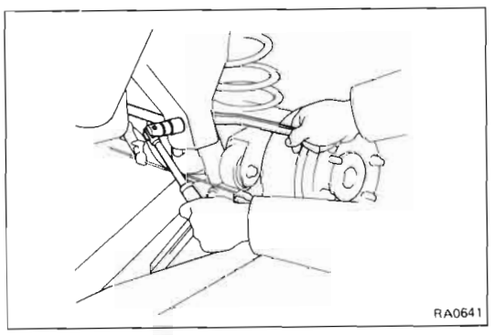
Jack up the rear axle housing and support it with stands.



2. DISCONNECT LATERAL CONTROL ROD FROM REAR AXLE HOUSING

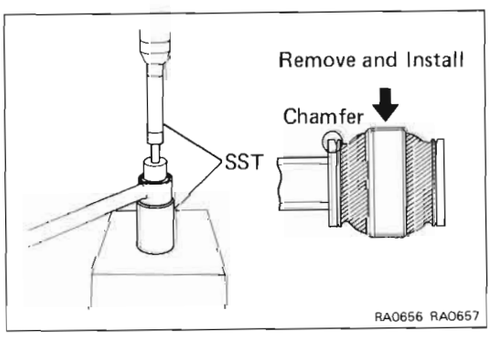
(a) Remove the cotter pin.

(b) Remove the nut holding the lateral control rod to the rear axle housing, and disconnect the lateral control rod.



3. DISCONNECT LATERAL CONTROL ROD FROM BODY

Remove the nut holding the lateral control rod to the body and remove the lateral control rod.



REPLACEMENT OF LATERAL CONTROL ROD BUSHING

1. REMOVE BUSHING

Using SST, press out the bushing from the lateral control rod.

SST 09710-22041

NOTE: When inserting and removing the bushing, press or pull from the chamfered side as shown in the figure.

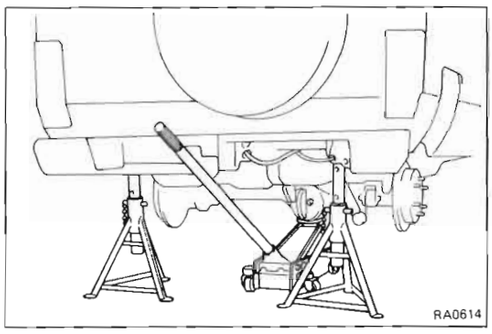
2. INSTALL BUSHING

Using SST, press the new bushing into the lateral control rod.

SST 09710-22041

NOTE: Do not use a lubricant when pressing in the bushing.

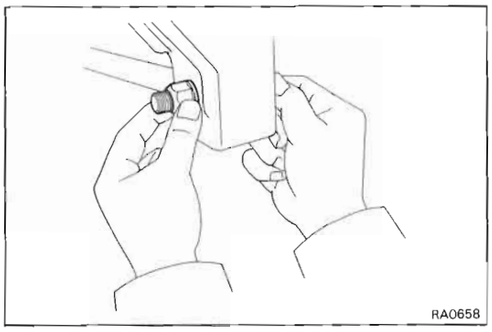
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RA0614

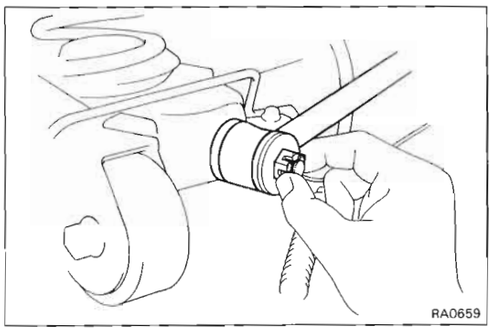
INSTALLATION OF LATERAL CONTROL ROD

1. INSTALL LATERAL CONTROL ROD TO BODY

(a) Raise the axle housing until the housing is free from the stands.

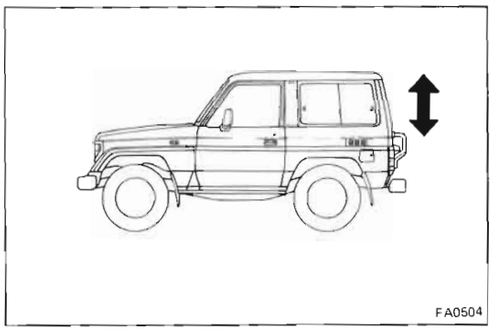

RA0658

(b) Install the lateral control rod to the frame with the nut.

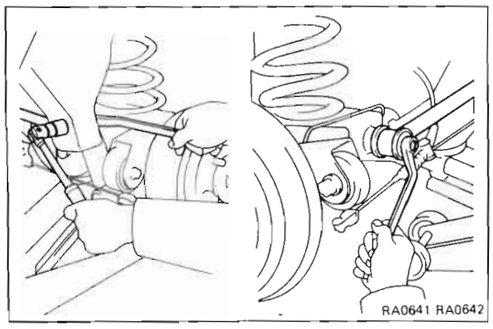

RA0659

2. INSTALL LATERAL CONTROL ROD TO REAR AXLE HOUSING

(a) In this order, install the washer, bushing, spacer, lateral control arm, bushing, washer and nut on the rear axle housing.


FA0504

(b) Remove the stands and bounce the car to stabilize the suspension.


RA0641 RA0642

(c) Jack up the axle housing.

(d) Torque the nut.

Torque:

Body-side	**1,460 kg-cm (106 ft-lb, 143 N·m)**
Axle housing side	**1,000 kg-cm (72 ft-lb, 98 N·m)**

NOTE: When tightening the lateral control rod set nut bolt, lower the vehicle load until the lateral control rod is horizontal.

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BRAKE SYSTEM

	Page
PRECAUTIONS	BR-2
TROUBLESHOOTING	BR-2
CHECKS AND ADJUSTMENTS	BR-5
MASTER CYLINDER	BR-9
BRAKE BOOSTER	BR-16
VACUUM PUMP	BR-25
FRONT BRAKE	
Drum Brake	BR-30
Disc Brake	BR-37
REAR BRAKE	BR-44
LOAD SENSING PROPORTIONING VALVE	BR-51
BRAKE HOSES AND TUBES	BR-61

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PRECAUTIONS

1. **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.**
2. **It is very important to keep parts and the area clean when repairing the brake system.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Low or spongy pedal	Linings worn	Replace brake shoes or pads	BR-30,37,44
	Leak in brake system	Repair leak	
	Master cylinder faulty	Repair or replace master cylinder	BR-9
	Air in brake system	Bleed brake system	BR-6,30,44
	Wheel cylinder faulty	Repair wheel cylinder	BR-30,44
	Piston seals worn or damaged	Repair brake calipers	BR-39
	Rear brake automatic adjuster faulty	Repair or replace adjuster	BR-44
Brakes drag	Parking brake out of adjustment	Adjust parking brake	BR-7
	Parking brake wire binding	Repair as necessary	
	Booster push rod out of adjustment	Adjust push rod	BR-16
	Return spring faulty	Replace spring	BR-30, 44
	Brake line restricted	Repair as necessary	
	Lining cracked or distorted	Replace brake shoes and pads	BR-30,37,44
	Wheel cylinder or caliper piston sticking	Repair as necessary	BR-30,39,44
	Automatic adjuster broken	Replace adjuster	BR-44
	Master cylinder faulty	Repair or replace master cylinder	BR-9
Brakes pull left or right	Tires improperly inflated	Inflate tires to proper pressure	
	Oil or grease on linings	Check for cause. Replace shoes	BR-30,37,44
	Brake shoes distorted, linings worn or glazed	Replace brake shoes	BR-30,44
	Drum or disc out of round	Replace drum or disc	BR-30,39,44
	Return spring faulty	Replace spring	BR-30,44
	Wheel cylinder faulty	Repair wheel cylinder	BR-30,44
	Piston frozen in caliper	Repair caliper	BR-39
	Disc brake pad sticking	Replace pads	BR-37
Brakes grab/chatter	Oil or grease on linings	Check for cause. Replace shoes	BR-30,37,44
	Drum or disc scored or out of round	Replace drum or disc	BR-30,39,44
	Drum or disc scored or out of round	Replace drum or disc	BR-30,39,44
	Brake shoes distorted, linings worn or glazed	Replace brake shoes	BR-30,44
	Wheel cylinder faulty	Repair wheel cylinder	BR-30,44
	Disc brake pad sticking	Replace pads	BR-37
	Brake booster faulty	Repair booster	BR-16

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TROUBLESHOOTING (Cont'd)

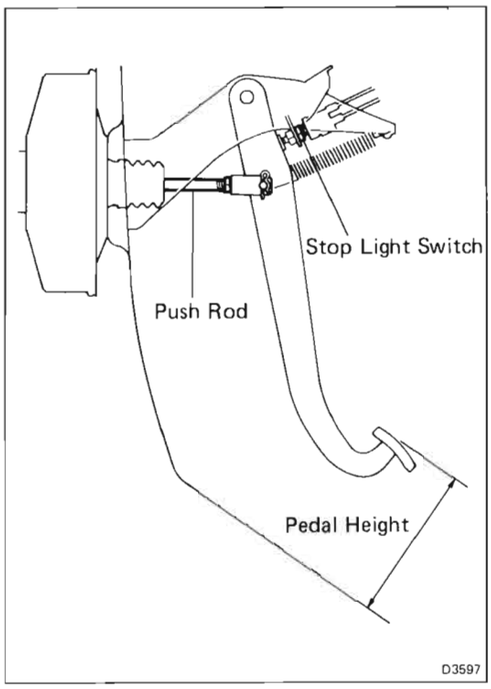
Problem	Possible cause	Remedy	Page
Hard pedal but brakes inefficient	Oil or grease on linings	Check for cause. Replace shoes	BR-30,37,44
	Brake shoes distorted, linings worn or glazed, drums worn	Replace brake shoes	BR-30,44
	Disc brake pads worn	Replace pads	BR-37
	Piston frozen in caliper	Repair caliper	BR-39
	Brake booster faulty	Repair booster	BR-16
	Brake line restricted	Repair as necessary	
	Vacuum leaking	Repair as necessary	
	Vacuum pump faulty	Repair or replace vacuum pump	BR-25
Snapping or clicking noise when brakes are applied	On drum brakes–brake shoes binding at backing plate ledges	Lubricate	BR-30,44
	On drum brakes–backing plate ledges worn	Replace and lubricate ledges	BR-30,44
	On drum brakes–loose or missing hold-down spring	Replace	BR-30,44
	On drum brakes–loose set bolt at backing plate	Tighten	BR-30,44
	On disc brakes–rust on front edge of inboard shoes	Inspect, lubricate. Replace if necessary	BR-37
	On disc brakes–loose or missing pad support plate	Replace	BR-37
	On disc brakes–loose installation bolt	Tighten	BR-37
Scraping or grinding noise when brakes are applied	Worn brake linings	Replace, refinish drums or rotors if heavily scored	BR-30,44
	Caliper to wheel or rotor interference	Replace as required	BR-39
	Dust cover to rotor or drum interference	Correct or replace	
	Other brake system components: Warped or bent brake backing plate, cracked drum or rotor	Inspect and service	BR-30,39,44
	Tires rubbing against chassis and body	Inspect and service	
Squealing, groaning or chattering noise when brakes are applied Note: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is normal and is aggravated by severe environmetal conditions such as cold, heat, wetness, snow, salt, mud, etc. This occasional squeal is not a functional problem and does not indicate any loss of brake effectiveness	Brake drums and linings rotors and pads worn or scored	Inspect, service or replace	BR-30,39,44
	Disc brakes–missing or damaged brake pad anti-squeal shim	Replace	BR-37
	Disc brakes–burred or rusted calipers	Clean deburr	BR-39
	Dirty, greased, contaminated or glazed linings	Clean or replace	BR-30,44
	Improper lining parts	Inspect for correct usage replace	BR-30,44
	Mal-adjustment of brake pedal or booster push-rod	Inspect and adjust	BR-5, 16
	Drum brakes–weak damaged or incorrect shoe hold-down springs, loose or damaged shoe hold-down pins and springs and grooved backing plate ledges	Inspect, service or replace	BR-30,44

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TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Squealing noise when brakes are not applied	Bent or warped backing plate causing interference with drum	Service or replace	BR-30,44
	Improper machining of drum causing interference with backing plate or shoe	Replace drum	BR-30,44
	Mal-adjustment of brake pedal or booster push-rod	Inspect and adjust	BR-5,16
	Poor return of brake booster or master cylinder or wheel cylinder	Inspect, service or replace	BR-9,16,30, 44
	Disc brakes—rusted, stuck	Inspect. Lubricate if necessary	BR-39
	Other brake system components: Loose or extra parts in brakes Rear drum adjustment too tight causing lining to glaze Worn, damaged or insufficiently lubricated wheel bearings	Inspect, service, replace as required	BR-30,44
	Drum brakes—weak, damaged or incorrect shoe retracting springs		BR-30,44
	Drum brakes—grooved backing plate ledges		BR-30,44
	Improper positioning of shoe in caliper		
	Outside diameter of rotor rubbing caliper housing		
	Housing installation of disc brake pad support plate		BR-37
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove stones, etc.	
	Loose wheel hub nuts	Tighten to correct torque. Replace if stud holes are elongated	
	Disc brakes—loose installation bolt	Inspect. Tighten if necessary	BR-39
	Mal-adjustment of brake pedal or booster push-rod	Inspect and adjust	BR-5, 16
	Disc brakes—poor return of piston	Inspect, service or replace	
	Drum brakes—loose or extra parts	Inspect, remove or service	BR-30, 44
	Worn, damaged or dry wheel bearings	Inspect, lubricate or replace	

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CHECKS AND ADJUSTMENTS

CHECK AND ADJUSTMENT OF BRAKE PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet: 169 – 179 mm (6.65 – 7.05 in.)

If incorrect, adjust the pedal height.

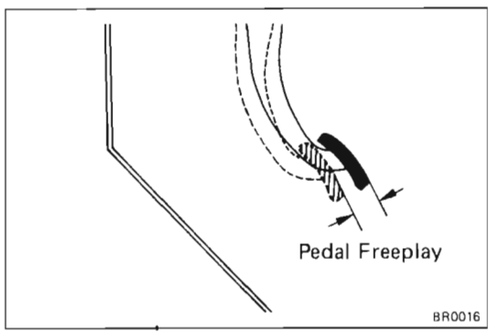
2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Disconnect the stop light switch connector and sufficiently loosen the switch.

(b) Adjust the pedal height by turning the pedal push rod.

(c) Return the stop light switch until its body lightly contacts the pedal stopper.

(d) After adjusting the pedal height, check and adjust the pedal freeplay.



3. CHECK PEDAL FREEPLAY

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

(b) Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

Pedal freeplay: 3 – 6 mm (0.12 – 0.24 in.)

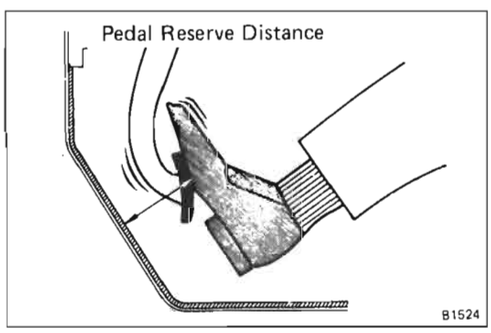
NOTE: The pedal freeplay is the amount of the stroke until the booster air valve is moved by the pedal push rod.

4. IF NECESSARY, ADJUST PEDAL FREEPLAY

(a) If incorrect, adjust the pedal freeplay by turning the pedal push rod.

(b) Start the engine and confirm that pedal freeplay exists.

(c) After adjusting the pedal freeplay, check the pedal height.



5. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT

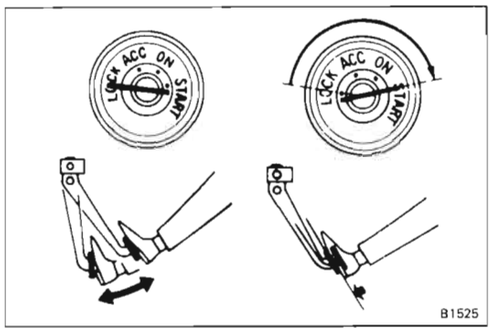
Release the parking brake lever.
With engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 50 kg (110 lb, 490 N):

Front disc type	**More than 80 mm (3.15 in.)**
Front drum type	**More than 105 mm (4.13 in.)**

If incorrect, troubleshoot the brake system.

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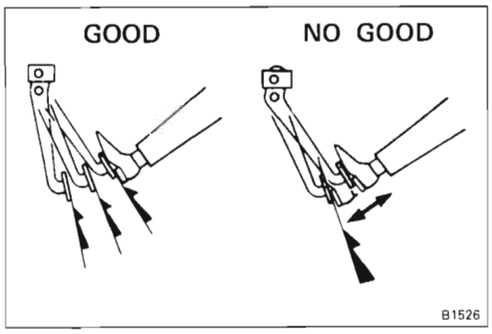
OPERATIONAL TEST OF BRAKE BOOSTER

NOTE: If there is leakage or lack of vacuum, repair before testing.

1. OPERATING CHECK

(a) Depress the brake pedal several times with the engine off, and check that there is no change in the pedal reserve distance.

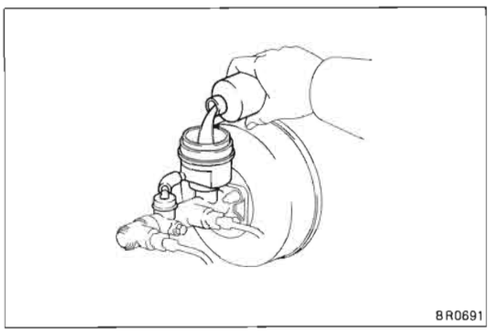
(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. AIR TIGHTNESS

(a) Start the engine and stop it after one or two minutes. Depress the brake pedal several times slowly. If the pedal goes down furtherest the first time, but gradually rises after the second or third time, the booster is air tight.

(b) Depress the brake pedal while the engine is running, and stop it with the pedal depressed. If there is no change in pedal reserve travel after holding the pedal for thirty seconds, the booster is air tight.



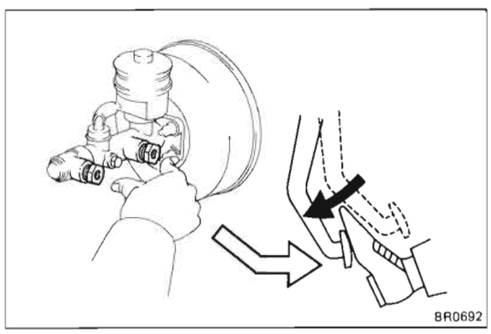
BLEEDING OF BRAKE SYSTEM

NOTE: If any work is done on the brake system or if air is suspected in the brake lines, bleed the system of air.

CAUTION: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. FILL BRAKE RESERVOIR WITH BRAKE FLUID

Check the fluid level in the reservoir. If necessary, add brake fluid.

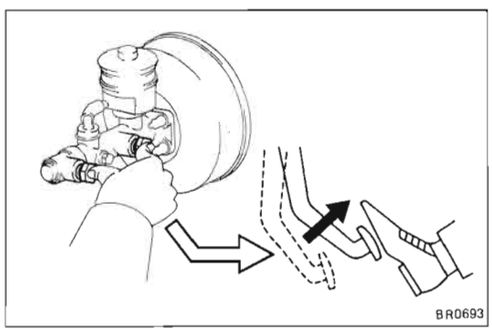


2. BLEED MASTER CYLINDER

NOTE: If the master cylinder was disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

(a) Disconnect the brake tubes from the master cylinder.

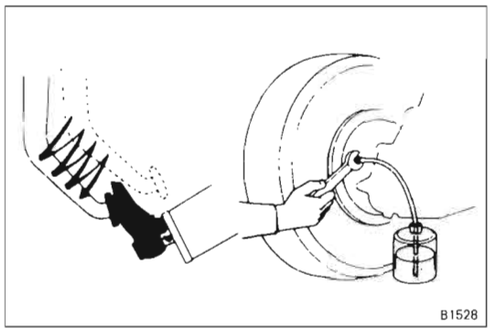
(b) Depress the brake pedal and hold it.



(c) Block off the outlet holes with your fingers, and release the brake pedal.

(d) Repeat (b) and (c) three or four times.

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3. BEGIN BLEEDING AIR FROM WHEEL CYLINDER WITH LONGEST HYDRAULIC LINE

(a) Connect the vinyl tube to the brake cylinder bleeder plug, and insert the other end of the tube in a half-full container of brake fluid.

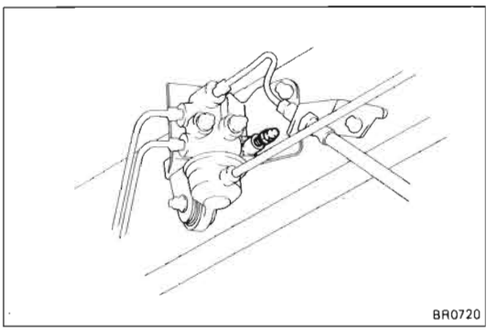
(b) Slowly pump the brake pedal several times.

(c) While having an assistant press on the pedal, loosen the bleeder plug until fluid starts to runout. Then close the bleeder plug.

(d) Repeat (b) and (c) until there are no more air bubbles in the fluid.

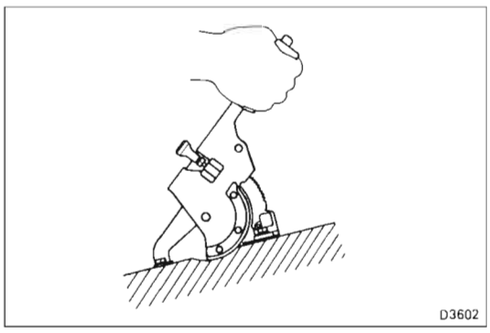
(e) Tighten the bleeder plug.

Bleeder plug tightening torque:
110 kg-cm (8 ft-lb, 11 N·m)



4. REPEAT PROCEDURE FOR EACH WHEEL

5. BLEED AIR FROM LSPV

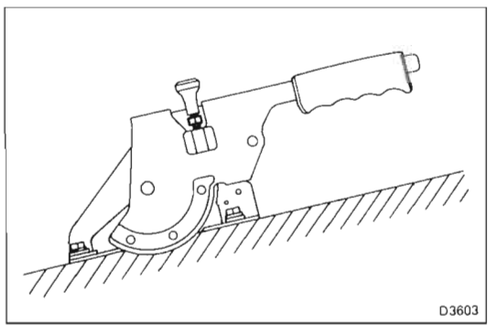


CHECK AND ADJUSTMENT OF PARKING BRAKE

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 20 kg (44 lb, 196 N):
7 – 9 clicks



2. IF NECESSARY, ADJUST PARKING BRAKE LEVER TRAVEL

NOTE: Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

For shoe clearance adjustment, see steps 7 and 8 on page BR-35.

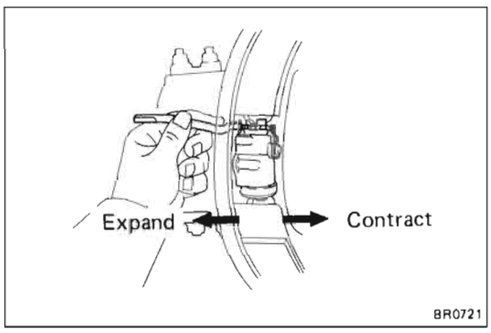
(a) Remove the console assembly and/or parking brake lever cover.

(b) Loosen the adjusting cap and turn the adjusting nut until the travel is correct.

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(c) Tighten the adjusting cap.

(d) Install the console assembly and/or parking brake lever cover.



ADJUSTMENT OF BRAKE SHOE CLEARANCE FOR DRUM BRAKE TYPE

ADJUST BRAKE SHOE CLEARANCE

(a) Jack up and support the vehicle.

(b) Remove the shoe adjusting hole plugs from the backing plate.

(c) Using a brake adjusting tool, turn the adjusting nut until the wheel locks.

(d) Using a brake adjusting tool, turn the adjusting nut until the wheel turns freely.

Standard number of notches to be backed off:
7 – 8 notches

(e) Repeat the steps (c) and (d) for other wheels.

(f) Install the shoe adjusting hole plugs.

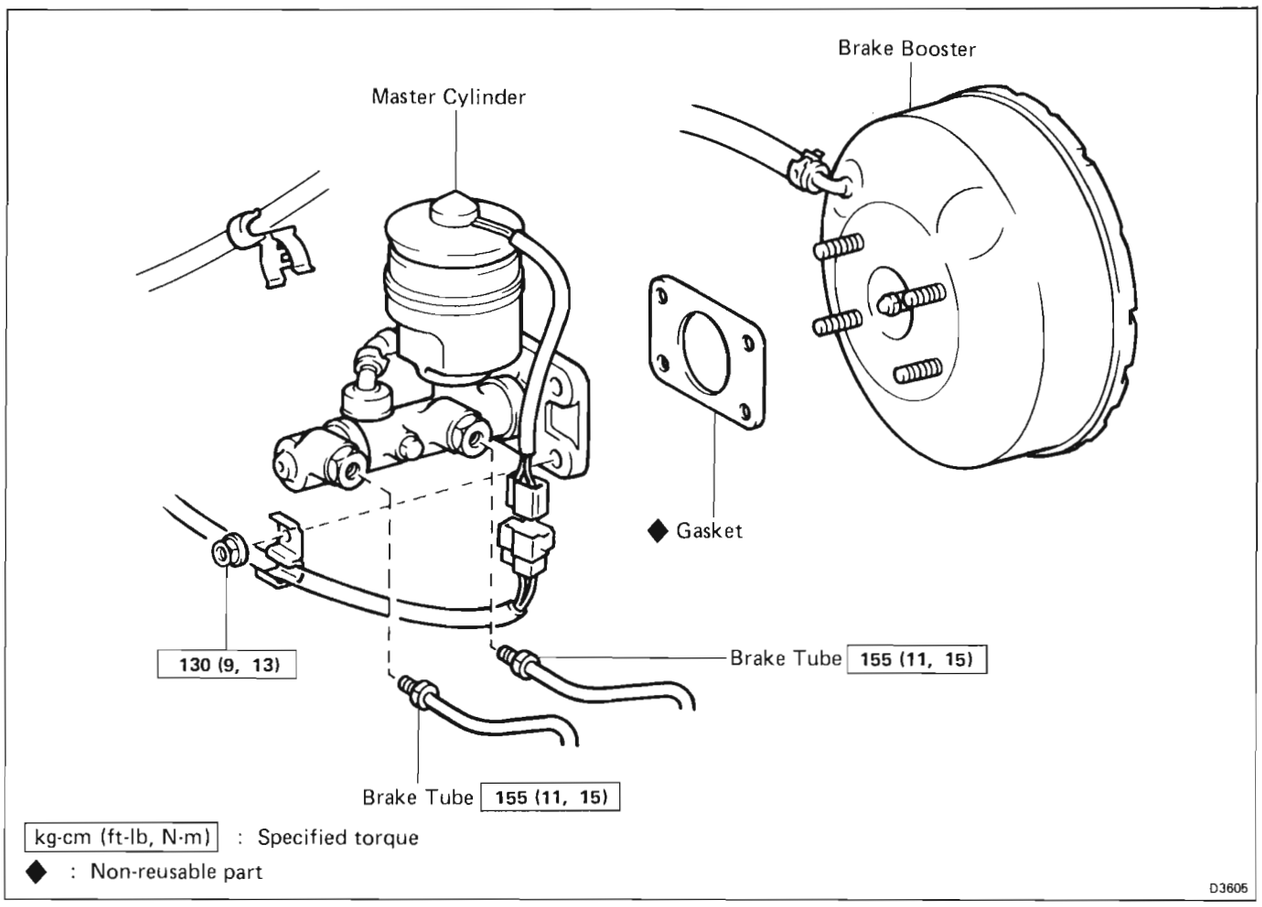
(g) Check that the pedal reserve distance is correct.

Pedal reserve distance from floor to pedal at 50 kg (110.2 lb, 490 N): More than 105 mm (4.13 in.)

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MASTER CYLINDER

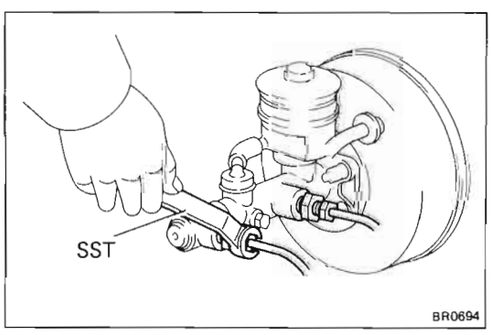
REMOVAL OF MASTER CYLINDER COMPONENTS



1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

2. TAKE OUT FLUID WITH SYRINGE OR SUCH

   CAUTION: **Do not let brake fluid remain on a painted surface. Wash it off immediately.**

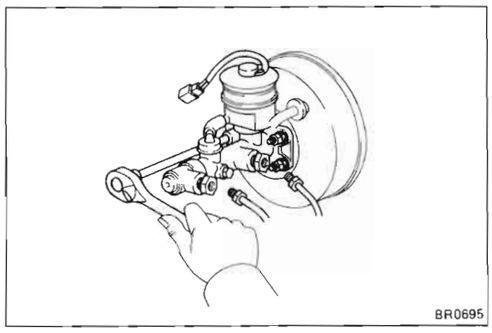


3. DISCONNECT TWO BRAKE TUBES

   Using SST, disconnect two brake tubes from the master cylinder.

   SST 09751-36011

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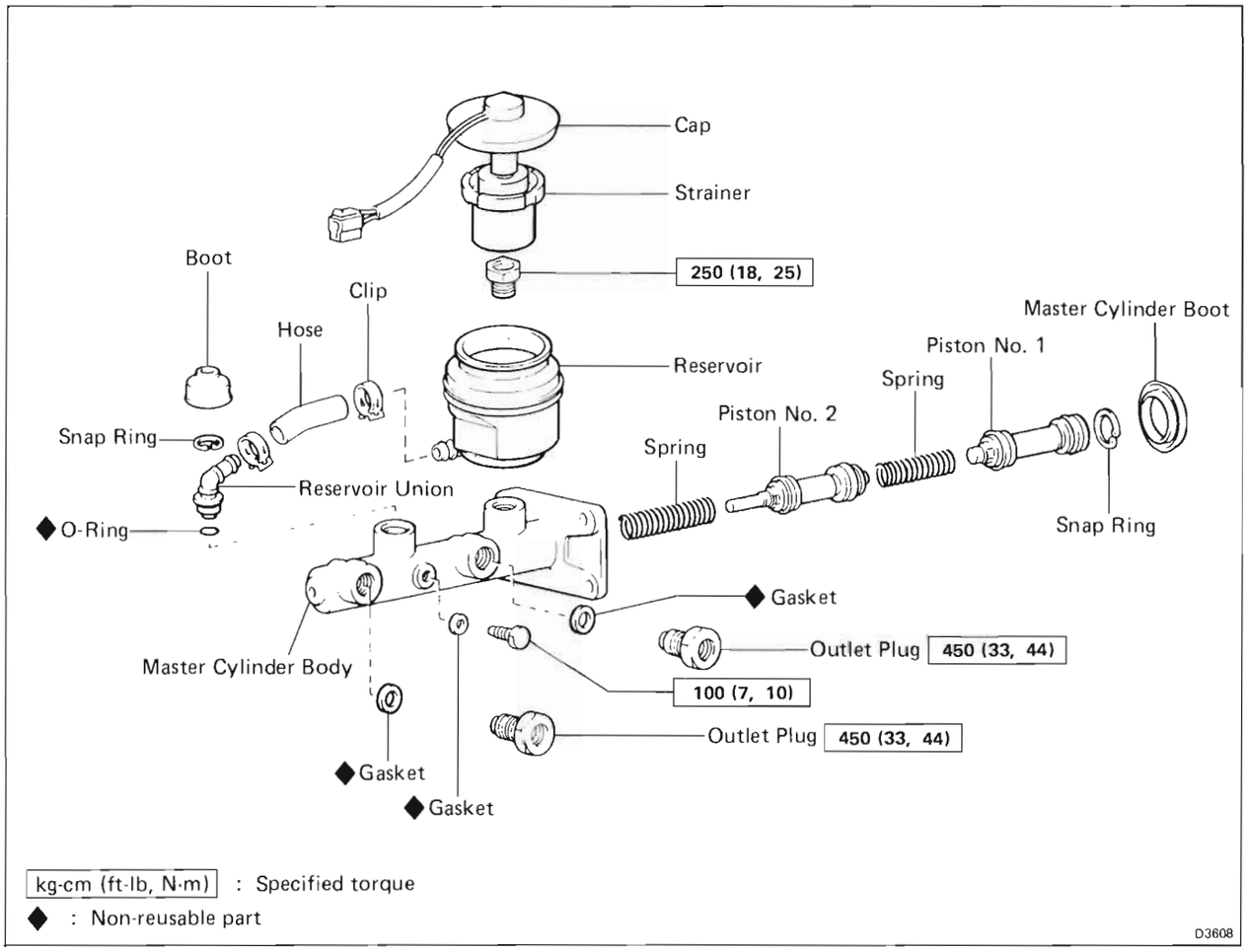
4. REMOVE MASTER CYLINDER

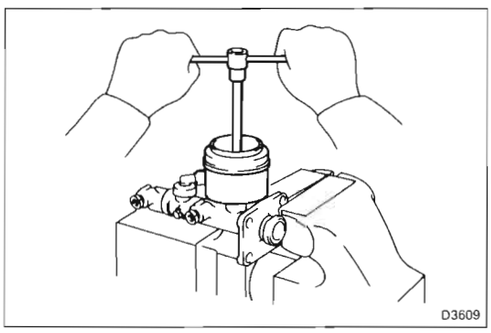
(a) Remove the four nuts.

(b) Remove the master cylinder, clamp and gasket from the brake booster.

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DISASSEMBLY OF MASTER CYLINDER COMPONENTS

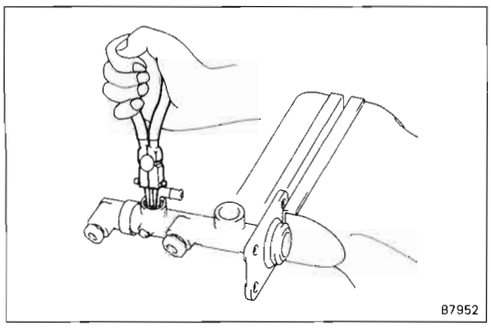




1. PLACE CYLINDER IN VISE

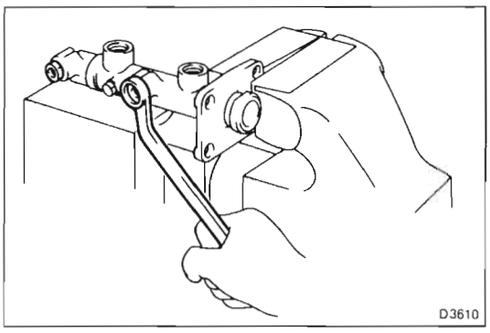
2. REMOVE RESERVOIR AND HOSE
   (a) Remove the set bolt from the reservoir.
   (b) Remove the reservoir with the hose from the master cylinder.

3. REMOVE BOOT



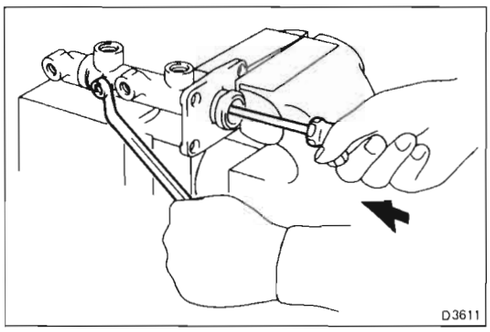
4. REMOVE RESERVOIR UNION
   (a) Using a snap ring pliers, remove the snap ring.
   (b) Remove the reservoir union and O-ring.

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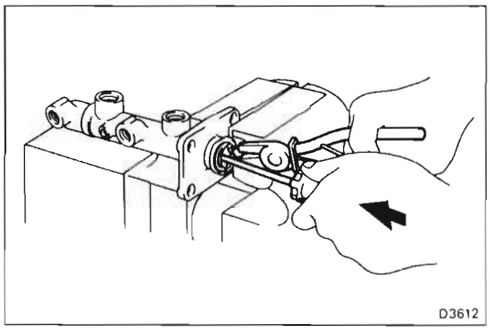
5. REMOVE OUTLET PLUGS

Remove the two outlet plugs and gaskets.



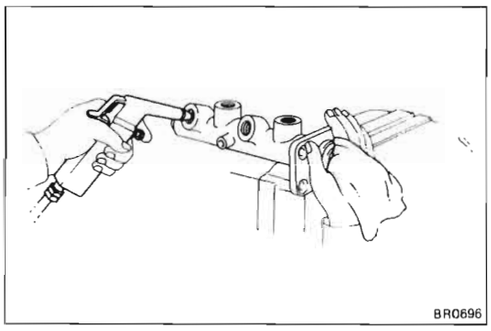
6. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way, and remove the piston stopper bolt and gasket.



7. REMOVE TWO PISTONS AND SPRINGS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.



(b) Remove the two pistons and springs from the master cylinder. If necessary, inject compressed air into the outlet hole to force out the piston.

INSPECTION OF MASTER CYLINDER

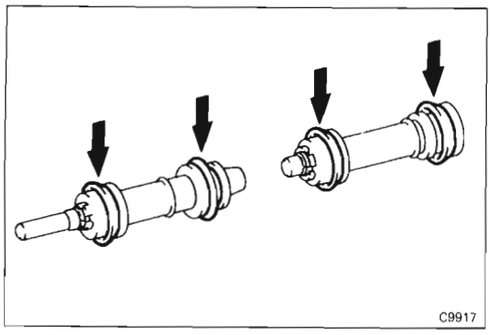
NOTE: Clean the disassembled parts with compressed air.

1. INSPECT CYLINDER BORE FOR RUST AND SCORING

2. INSPECT CYLINDER FOR WEAR OR DAMAGE

If necessary, clean or replace the cylinder.

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ASSEMBLY OF MASTER CYLINDER

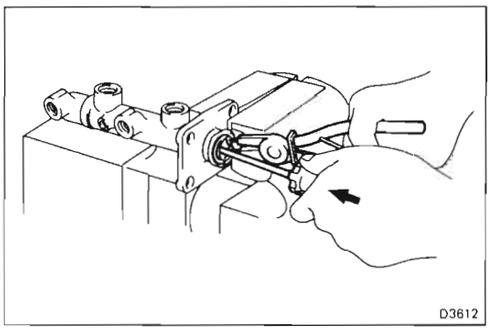
(See page BR-10)

1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO RUBBER PARTS OF PISTON

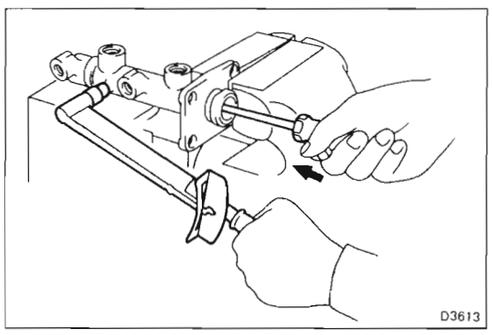
2. INSTALL TWO SPRINGS AND PISTONS

CAUTION: **Be careful not to damage the rubber lips on the pistons.**

(a) Insert two springs and pistons straight in, not at an angle.



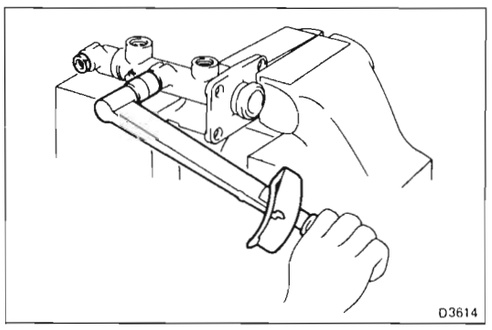
(b) Using snap ring pliers, install the snap ring.



3. INSTALL PISTON STOPPER BOLT AND NEW GASKET

Using a screwdriver, push the pistons in all the way and install the piston stopper bolt through the new gasket. Torque the bolt.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

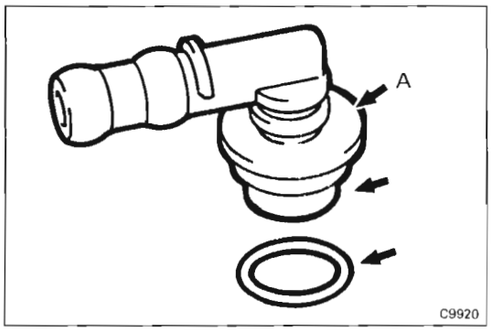


4. INSTALL OUTLET PLUGS

Install the two outlet plugs through the new gaskets, and torque the plugs.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

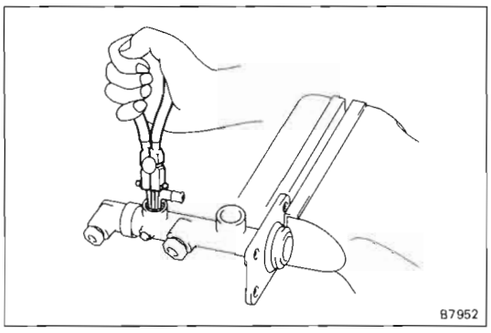
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5. INSTALL RESERVOIR UNION

(a) Apply lithium soap base glycol grease to the reservoir union.

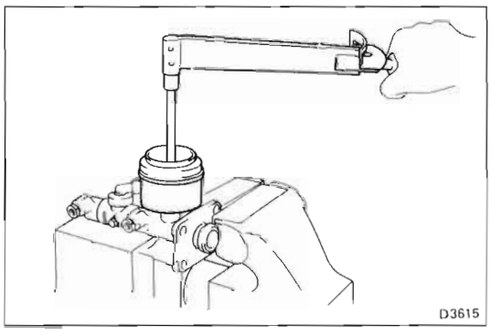
(b) Pack the lithium soap base glycol grease on the union (A).



(c) Install the union through the new O-ring.

(d) Using a snap ring pliers, install the snap ring.

(e) Install the boot.



6. INSTALL RESERVOIR AND HOSE

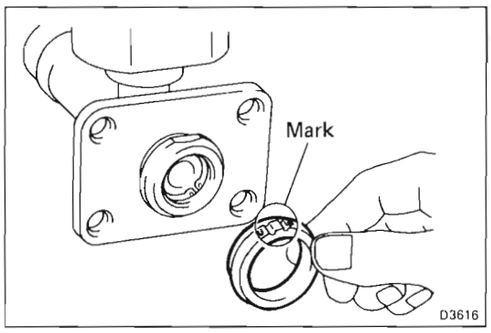
(a) Connect the hose to union and reservoir.

(b) Install the reservoir on the master cylinder with the "MAX" mark facing towrad the front.

(c) Install the bolt and torque it.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

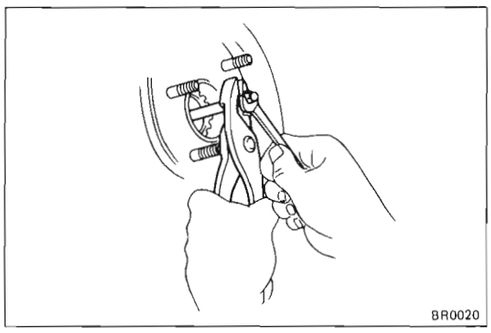
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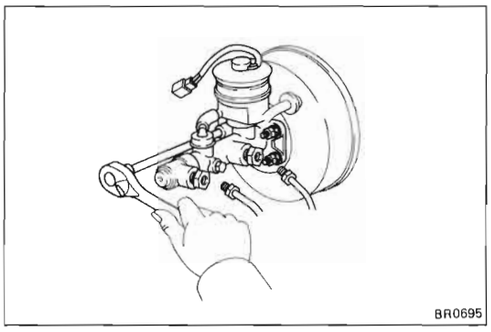
INSTALLATION OF MASTER CYLINDER

1. CLEAN OUT GROOVE ON LOWER INSTALLATION SURFACE OF MASTER CYLINDER

2. CONFIRM THAT "UP" MARK ON MASTER CYLINDER BOOT IS IN CORRECT POSITION



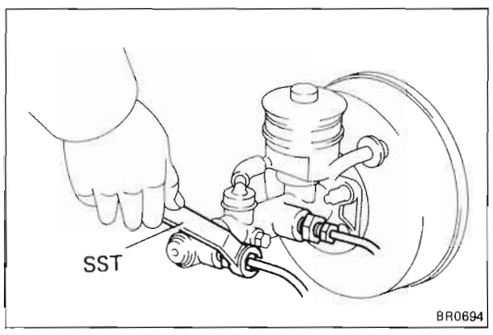
3. ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER
(See page BR-23)



4. INSTALL MASTER CYLINDER

Install the master cylinder and clamp on the brake booster with four nuts through the new gasket.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)



5. CONNECT TWO BRAKE TUBES

(a) Finger tighten the union nuts.

(b) Using SST, torque the union nuts.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)

6. CONNECT LEVEL WARNING SWITCH CONNECTOR

7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-6)

8. CHECK FOR LEAKS

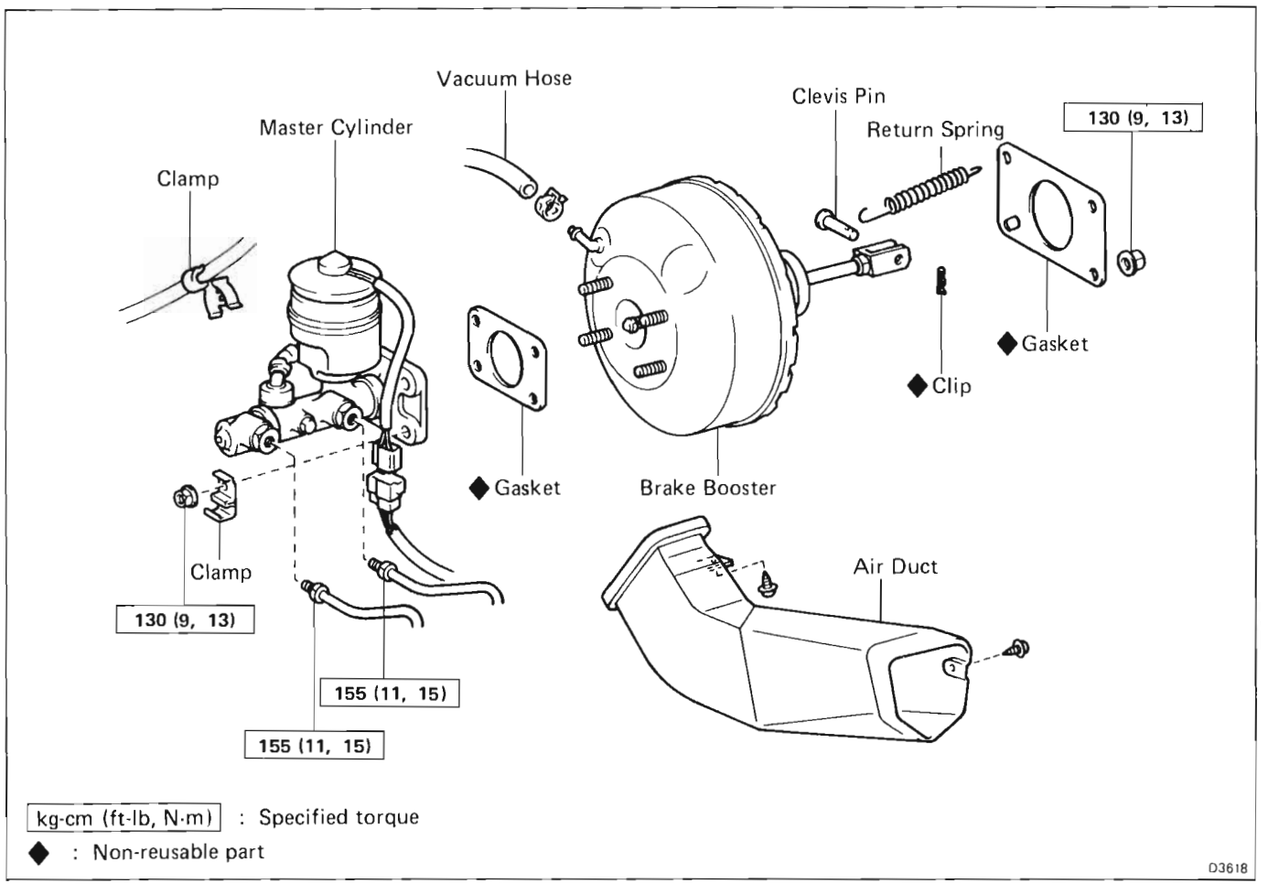
9. CHECK AND ADJUST BRAKE PEDAL
(See page BR-5)

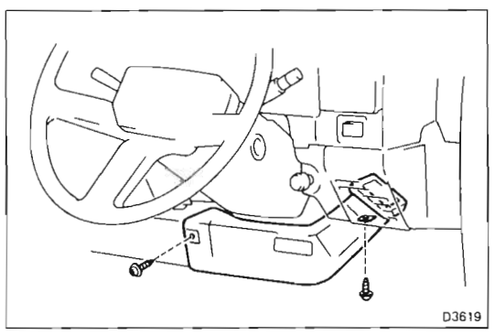
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BRAKE BOOSTER

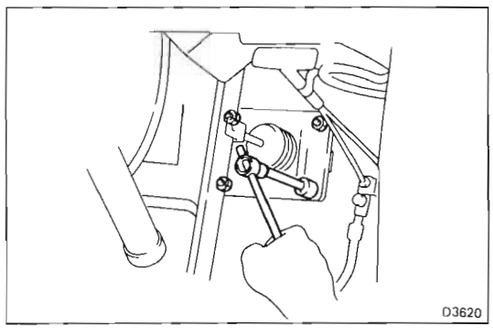
REMOVAL OF BRAKE BOOSTER

COMPONENTS





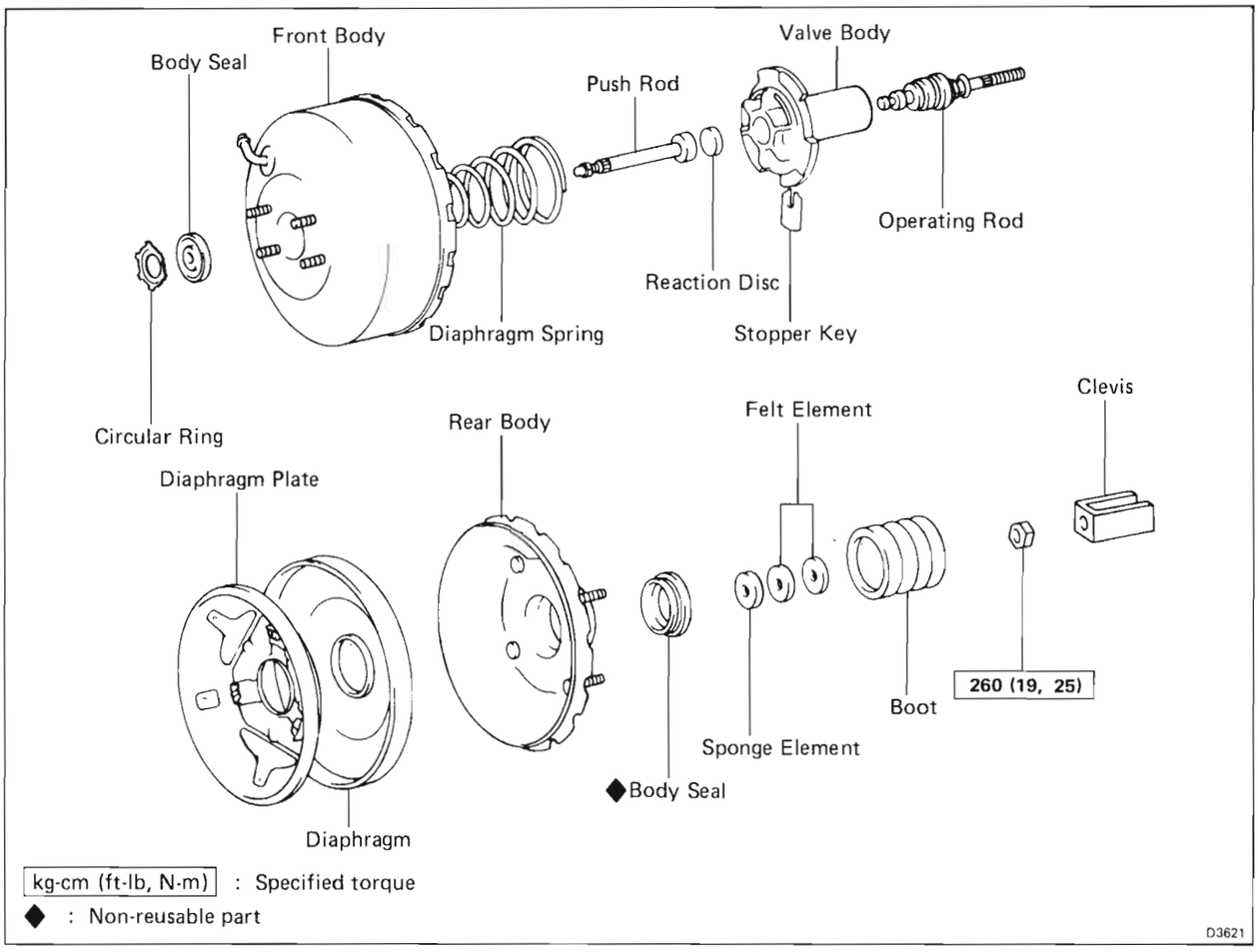
1. REMOVE MASTER CYLINDER (See page BR-9)
2. DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER
3. REMOVE AIR DUCT
   Remove the two screws and air duct.
4. REMOVE PEDAL RETURN SPRING
5. REMOVE CLIP AND CLEVIS PIN

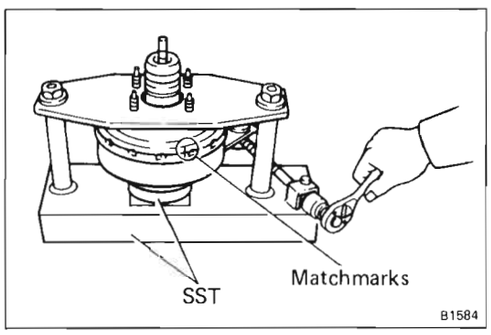


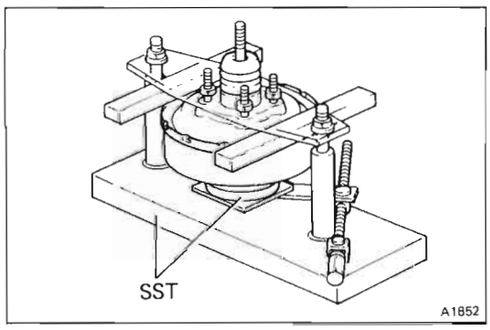
6. REMOVE BRAKE BOOSTER
   Remove the four nuts, and pull out the brake booster with gasket.

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DISASSEMBLY OF BRAKE BOOSTER COMPONENTS







1. REMOVE CLEVIS AND LOCK NUT

2. SEPARATE FRONT AND REAR BODIES

(a) Place the matchmarks on the front and rear bodies.

(b) Set the booster in SST.

SST 09753-00012 and 09753-40010

CAUTION: Be careful not to tighten the two nuts of SST too tightly.

(c) Turn the front body clockwise until the front and rear bodies separate.

(d) Loosen the upper left and right nuts of the SST, and insert pieces of wood between the front body and upper plate.

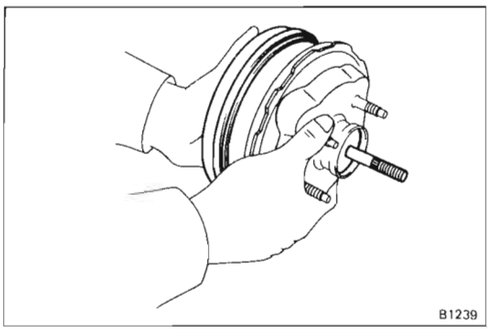
CAUTION: Be careful that pieces of wood do not contact the rear body.

(e) Evenly tighten down the four booster mounting nuts to separate the front and rear bodies.

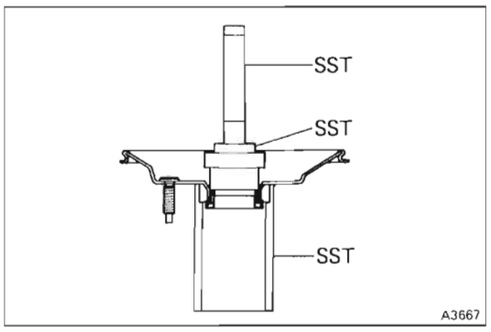
(f) Remove the diaphragm spring and push rod.

3. REMOVE BOOT FROM REAR BODY

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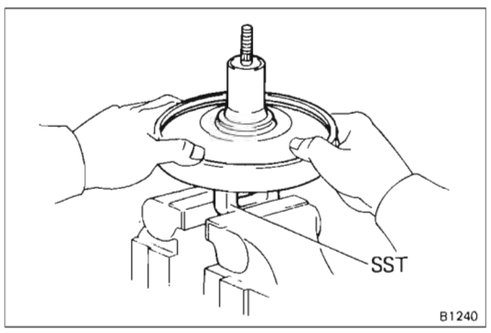
4. REMOVE DIAPHRAGM ASSEMBLY FROM REAR BODY



5. REMOVE BODY SEAL FROM REAR BODY

Using SST, remove the seal.

SST 09608-30011
09753-30020
09612-30012



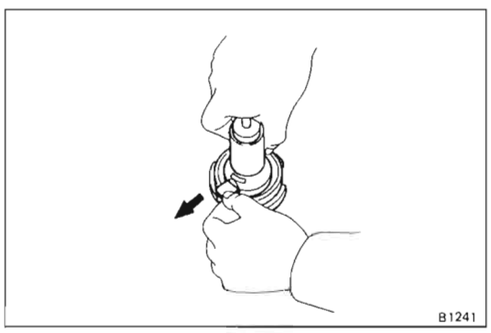
6. REMOVE VALVE BODY AND DIAPHRAGM FROM DIAPHRAGM PLATE

(a) Mount SST in a vise.

SST 09736-27010

(b) Put the diaphragm assembly on SST and turn it to separate the valve body and diaphragm plate.

(c) Remove the diaphragm from the plate.

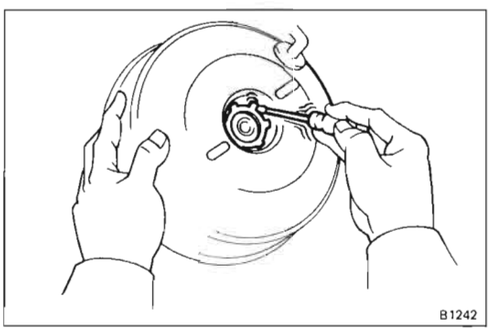


7. REMOVE OPERATING ROD FROM VALVE BODY

(a) Push the operating rod in the valve body and remove the stopper key.

(b) Pull out the operating rod with the three elements.

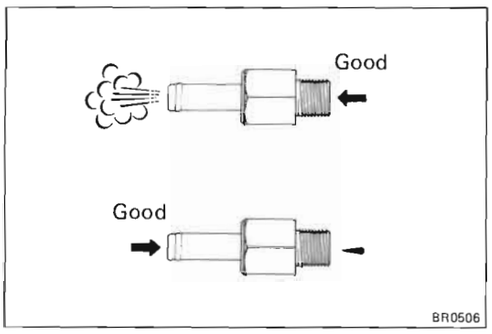
8. REMOVE REACTION DISC FROM VALVE BODY



9. REMOVE BODY SEAL FROM FRONT BODY

Using a screwdriver, pry out the circular ring, and remove the seal.

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INSPECTION OF BRAKE BOOSTER

INSPECT CHECK VALVE OPERATION

(a) Check that air flows from the booster side to the hose side.

(b) Check that air does not flow from the hose side to the booster side.

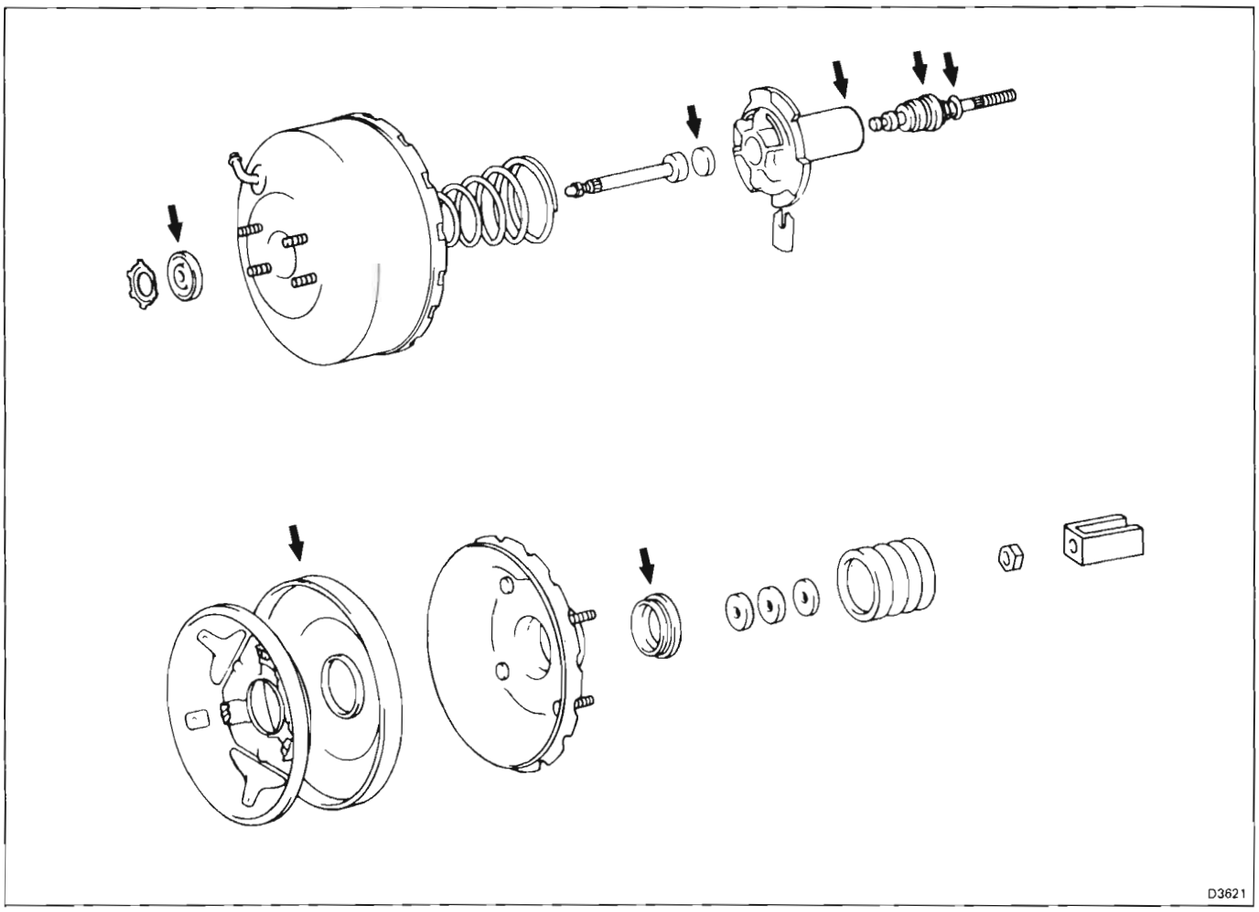
If necessary, replace the check valve.

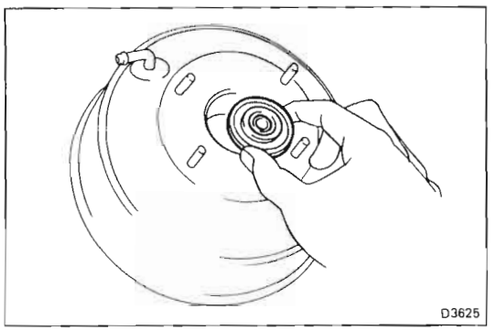
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ASSEMBLY OF BRAKE BOOSTER

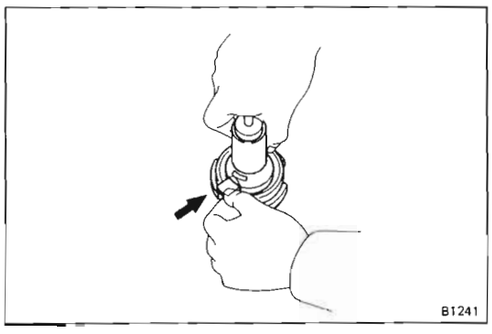
(See page BR-17)

1. APPLY SILICONE GREASE TO PARTS SHOWN BELOW



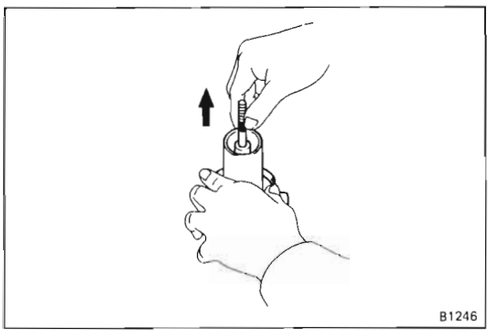


2. INSTALL BODY SEAL TO FRONT BODY
   (a) Place the body seal in position.
   (b) Secure the body seal with the circular ring.



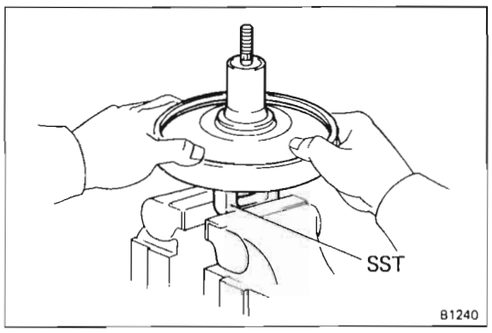
3. INSTALL OPERATING ROD TO VALVE BODY
   (a) Insert the operating rod in the valve body.
   (b) Push the operating rod in the valve body and install the stopper key.

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(c) Pull the operating rod and confirm that the stopper key is working.

4. INSTALL REACTION DISC TO VALVE BODY



5. INSTALL VALVE BODY AND DIAPHRAGM TO DIAPHRAGM PLATE

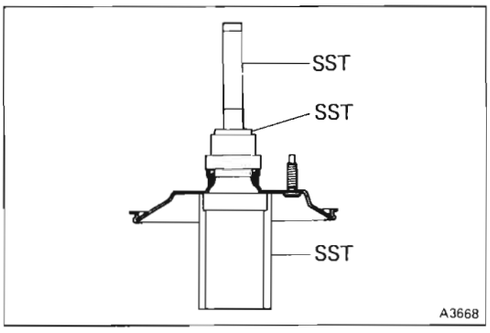
(a) Install the diaphragm to the plate.

(b) Insert the valve body to the plate.

(c) Mount SST in a vise.

SST 09736-27010

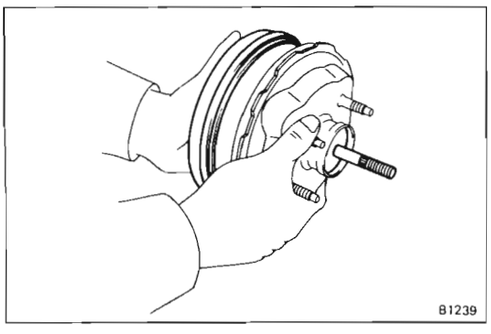
(d) Put the diaphragm assembly on SST, and turn it to install.



6. INSTALL BODY SEAL TO REAR BODY

Using SST, drive in the seal.

SST 09608-30011
09753-30020
09612-30012



7. INSTALL DIAPHRAGM ASSEMBLY TO REAR BODY

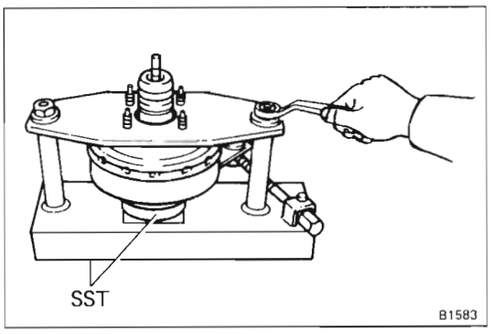
8. INSTALL FOLLOWING PARTS TO REAR BODY:

(a) Felt elements

(b) Sponge element

(c) Boot

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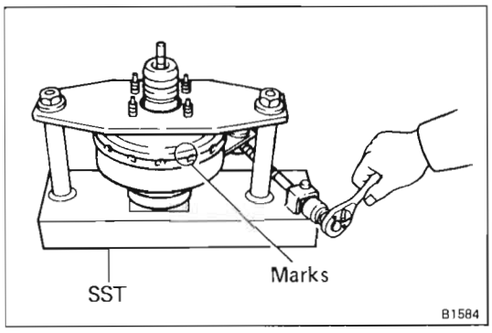
9. ASSEMBLE FRONT AND REAR BODIES

(a) Place the spring and push rod in the front body.

(b) Using SST, compress the spring between the front and rear bodies.

SST 09753-40010 and 09753-00012

CAUTION: Be careful not to tighten the two nuts of the SST too tightly.



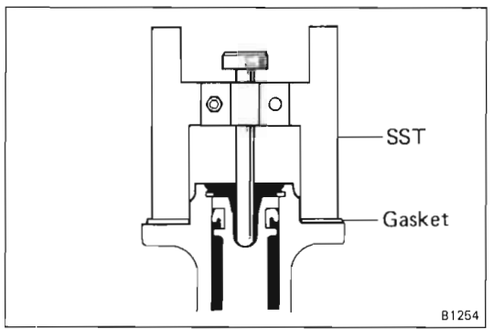
(c) Assemble the front and rear bodies by turning the front body counterclockwise until the alignment marks match.

NOTE: If the front body is too tight to be turned, apply more silicone grease on the diaphragm edge that contacts the front and rear bodies.

10. INSTALL CLEVIS AND LOCK NUT

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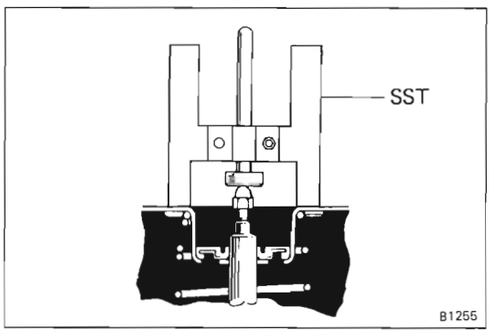
INSTALLATION OF BRAKE BOOSTER



1. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Set SST on the master cylinder with the gasket, and lower the pin until its tip slightly touches the piston.

SST 09737-00010

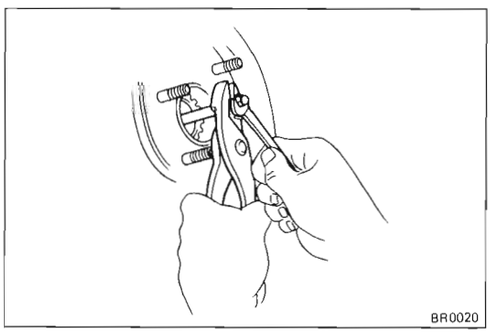


(b) Turn SST upside down, and set it on the booster.

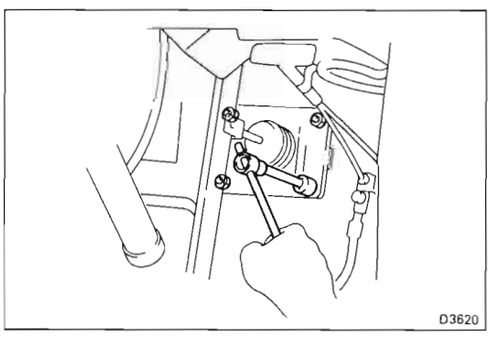
SST 09737-00010

(c) Measure the clearance between the booster push rod and pin head (SST).

Clearance: 0 mm (0 in.)



(d) Adjust the booster push rod length until the push rod lightly touches the pin head.



2. INSTALL BRAKE BOOSTER

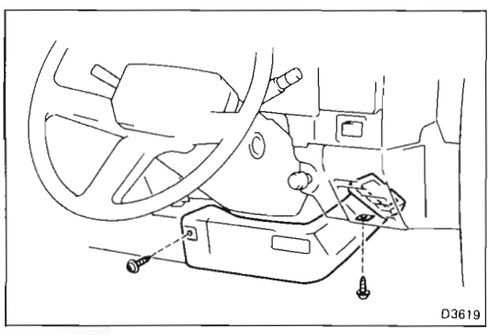
Install the brake booster, and torque the four nuts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

3. CONNECT CLEVIS TO BRAKE PEDAL

Insert the clevis pin into the clevis and brake pedal and install the clip to the clevis pin.

4. INSTALL PEDAL RETURN SPRING



5. INSTALL AIR DUCT

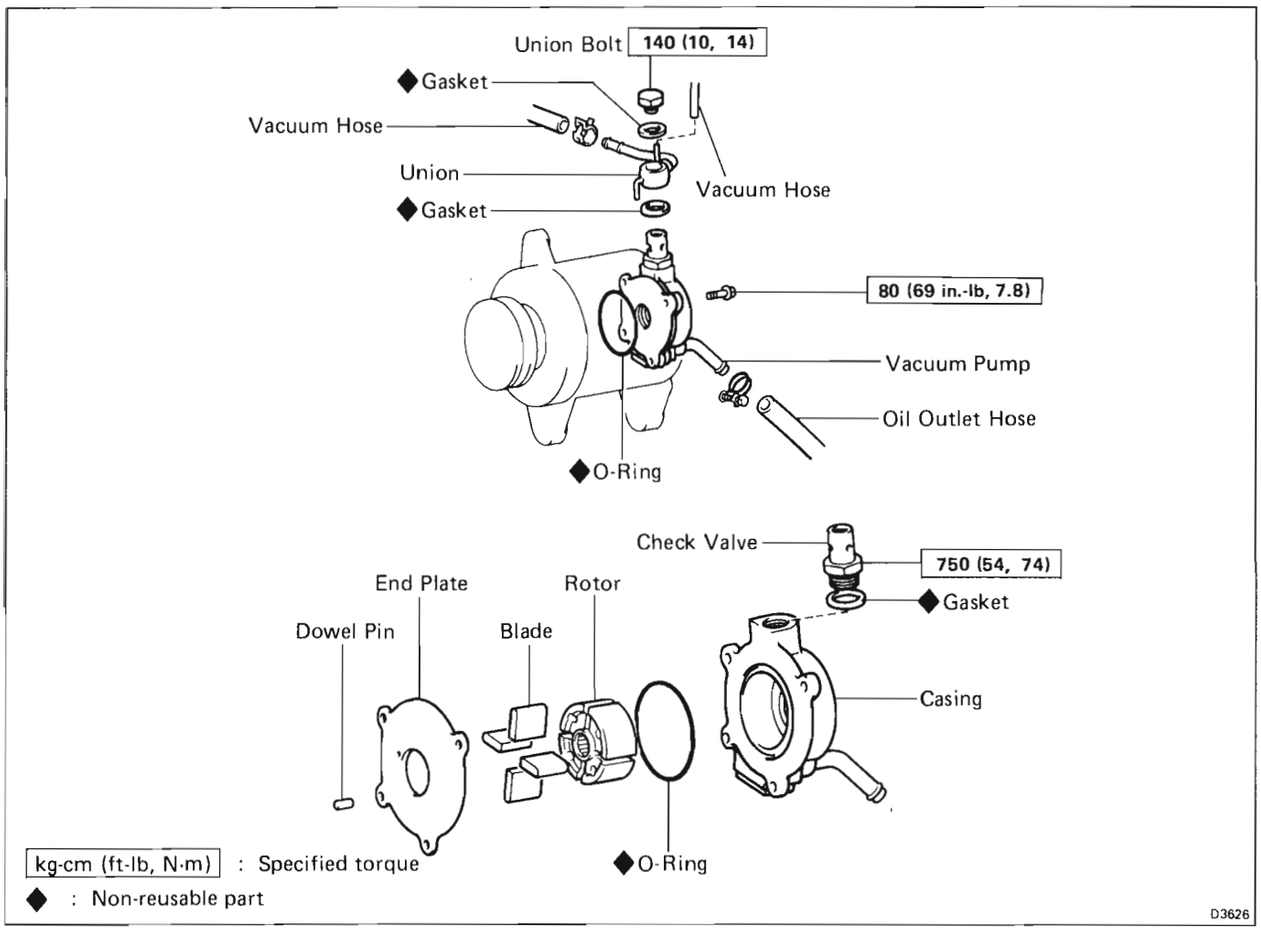
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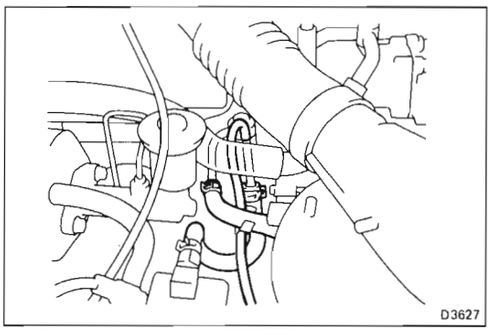
6. INSTALL MASTER CYLINDER (See page BR-14)
7. CONNECT HOSE TO BRAKE BOOSTER
8. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-6)
9. CHECK FOR LEAKS
10. CHECK AND ADJUST BRAKE PEDAL (See page BR-5)
11. PERFORM OPERATIONAL CHECK (See page BR-6)

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VACUUM PUMP

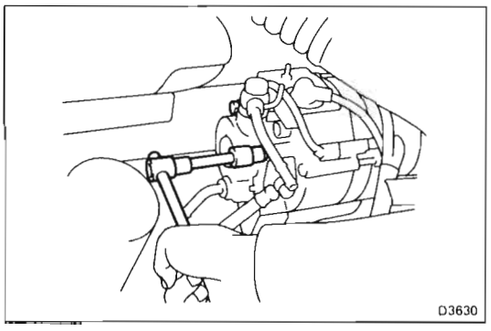
COMPONENTS





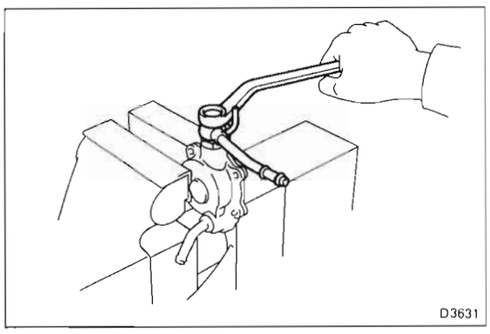
REMOVAL OF VACUUM PUMP

1. DISCONNECT VACUUM HOSES
2. DISCONNECT OIL OUTLET HOSE



3. REMOVE VACUUM PUMP AND O-RING
   (a) Remove the three mounting bolts.
   (b) Remove the pump.
   (c) Remove the O-ring.

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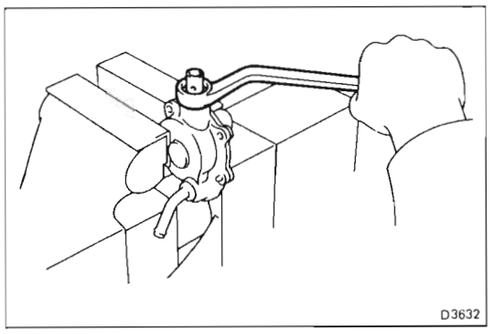


DISASSEMBLY OF VACUUM PUMP

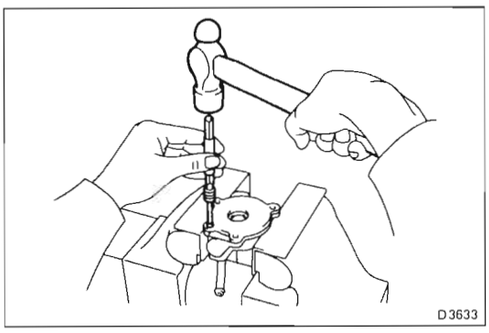
(See page BR-29)

1. REMOVE UNION BOLT, UNION AND CHECK VALVE

(a) Remove the union bolt, union and gaskets.

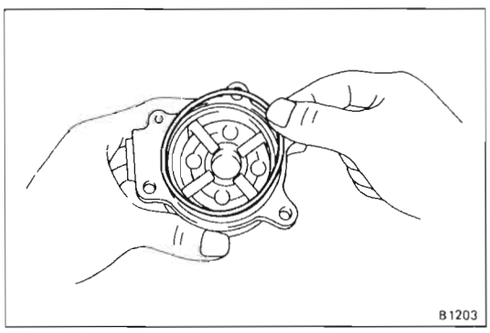


(b) Remove the check valve and gasket

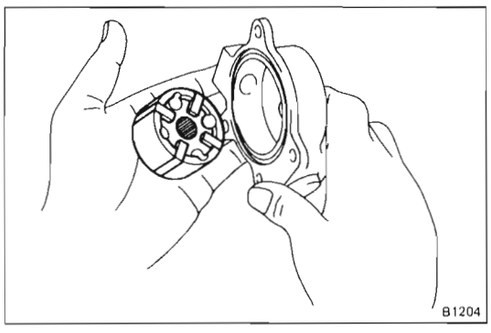


2. REMOVE VACUUM PUMP END PLATE

Using a pin punch and hammer, tap out the dowel pin rearward and remove the end plate.

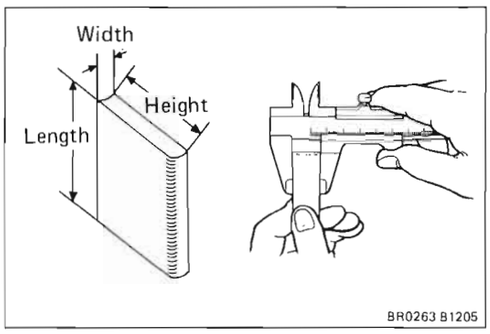


3. REMOVE O-RING



4. REMOVE ROTOR AND BLADES

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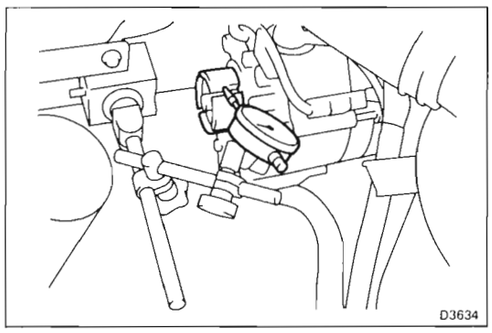
INSPECTION OF VACUUM PUMP COMPONENTS

1. INSPECT BLADE

(a) Check for wear or damage.

(b) Using calipers, measure the height, width and length of the blade.

Minimum height : 13.80 mm (0.5433 in.)
Minimum width : 5.95 mm (0.2343 in.)
Minimum length : 39.98 mm (1.5740 in.)

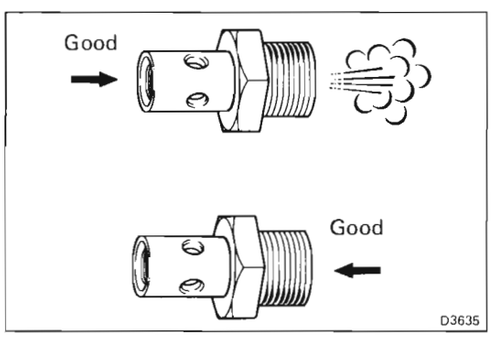


2. INSPECT ROTOR

(a) Check for wear of damage.

(b) Assemble the rotor to the alternator and check the amount of play in the direction of rotor spline rotation.

Maximum play: 1.0 mm (0.039 in.)



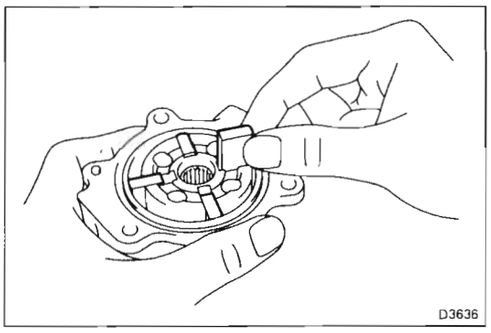
3. INSPECT CHECK VALVE OPERATION

(a) Check that air flow from the union side to the pump side.

(b) Check that air does not flow from the pump side to the union side.

If necessary, replace the check valve.

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ASSEMBLY OF VACUUM PUMP

(See page BR-29)

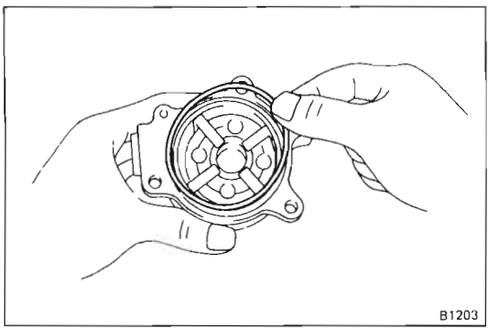
1. INSTALL ROTOR AND BLADES

(a) Apply engine oil to the rotor and blades.

(b) Place the rotor into the casing.

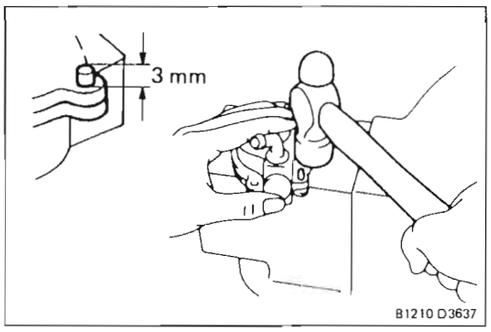
(c) Insert the blades with round end facing outward.

NOTE: Be sure that the blade and rotor surface are even.



2. INSTALL O-RING AND END PLATE

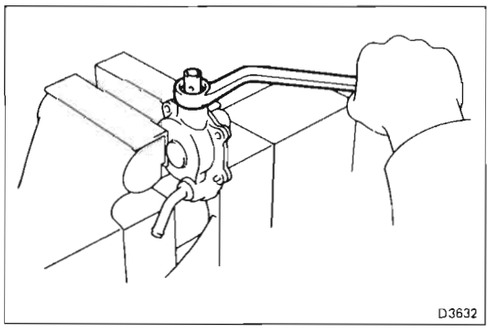
(a) Install the O-ring into the groove.



(b) Place the end plate onto the casing.

(c) Align the pin hole and tap in the pin.

NOTE: Be careful not to damaged the casing and end plate.

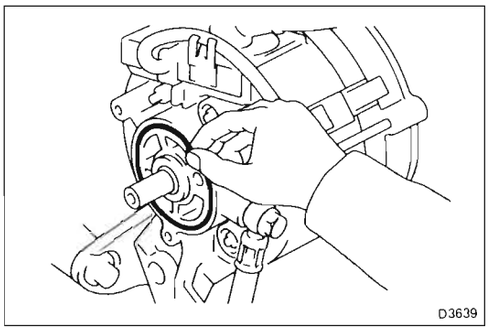


3. INSTALL CHECK VALVE

Install and torque the check valve with a new gasket.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

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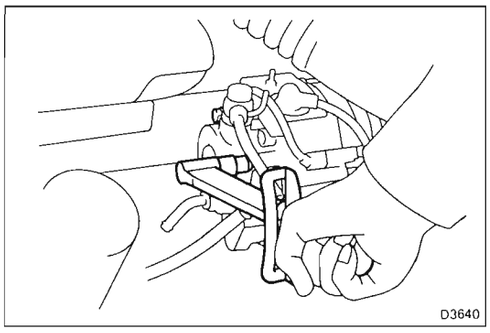

D3639

INSTALLATION OF VACUUM PUMP

(See page BR-29)

1. INSTALL O-RING

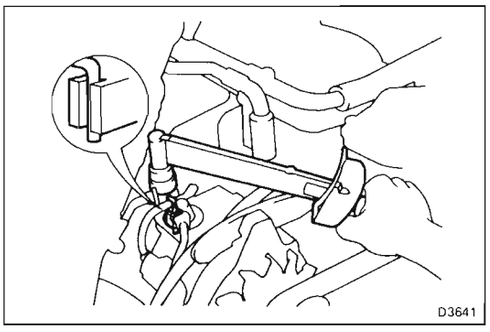
Install the O-ring into the groove of the alternator.


D3640

2. INSTALL VACUUM PUMP

Install the vacuum pump with three bolts. Torque the bolts.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

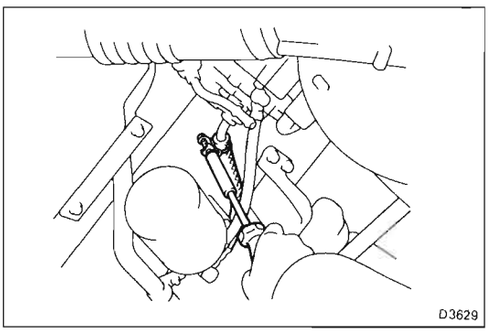

D3641

3. INSTALL UNION AND BOLT

Install the union and bolt with a new gaskets. Torque the bolt.

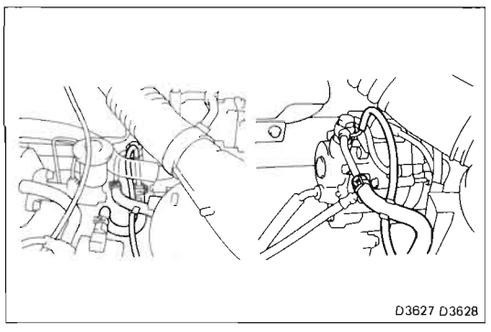
Torque: 140 kg-cm (10 ft-lb, 14 N·m)

NOTE: Be sure to align the alignment pin of union and groove of casing.


D3629

4. CONNECT OIL OUTLET HOSE

Connect the oil outlet hose on the fitting and tighten the clamp.


D3627 D3628

5. CONNECT VACUUM HOSES

Connect the vacuum hose on the fitting and install the clip.

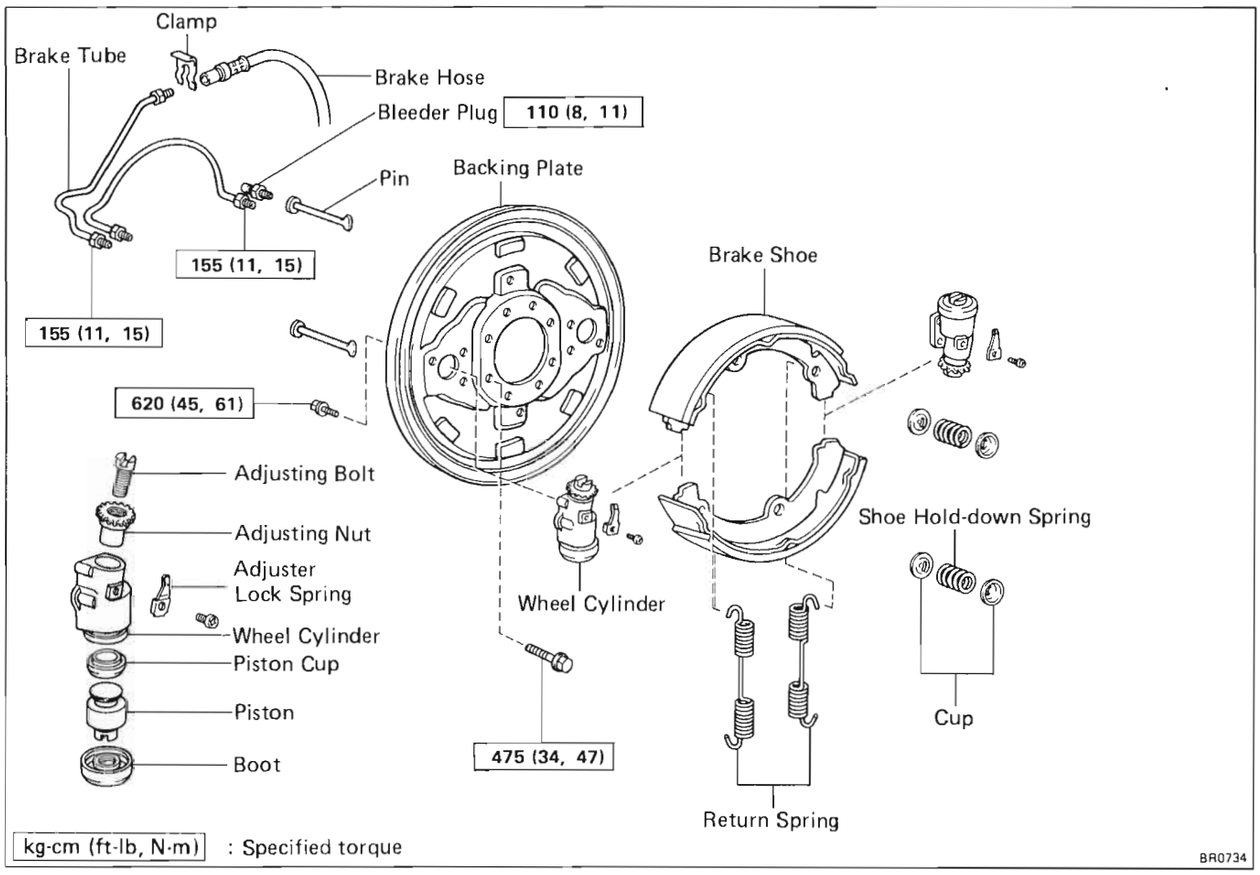
6. CHECK VACUUM PUMP OPERATION

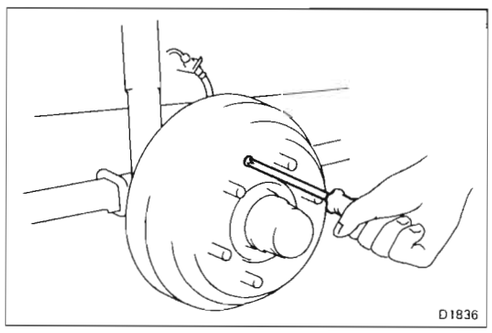
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FRONT BRAKE

Drum Brake

COMPONENTS

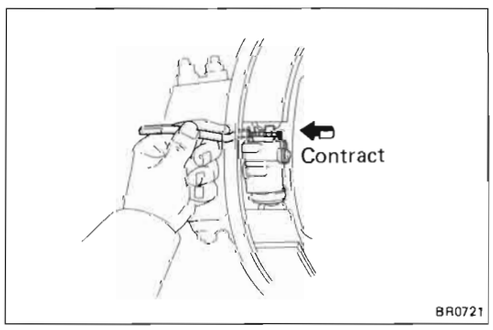




REMOVAL OF FRONT BRAKE

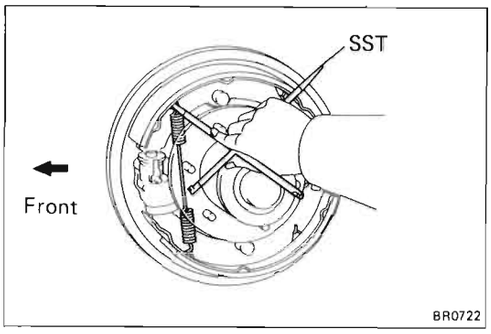
1. REMOVE WHEEL
2. REMOVE DRUM OR DRUM WITH FRONT AXLE HUB

   Remove the screw and then remove the drum.



NOTE: If the drum cannot be removed easily, return the shoe adjusted until the wheel turns freely.

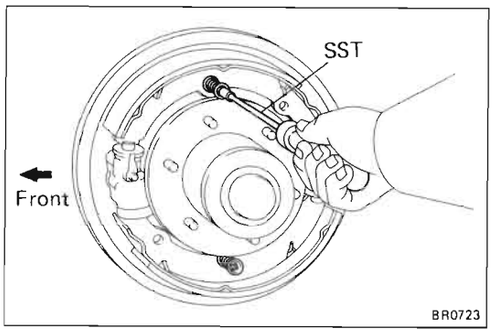
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3. REMOVE OUTER SIDE RETURN SPRING

Using SST, remove the outer side return spring.

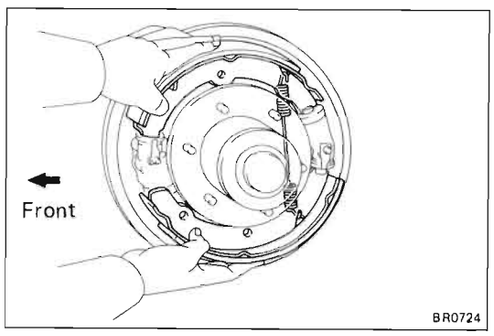
SST 09703-30010



4. REMOVE SHOE HOLD DOWN SPRINGS

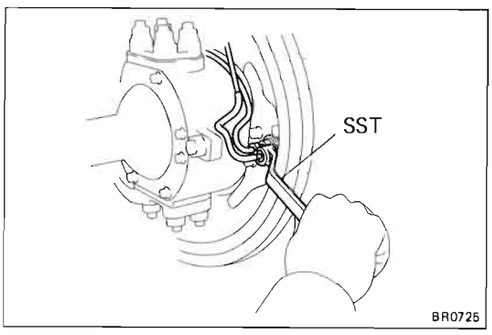
Using SST, remove the spring, retainers and pin.

SST 09718-00010



5. REMOVE BRAKE SHOES AND INNER SIDE RETURN SPRING

Slide the shoes and remove them together with the inner side return spring.



6. IF NECESSARY, REMOVE WHEEL CYLINDER

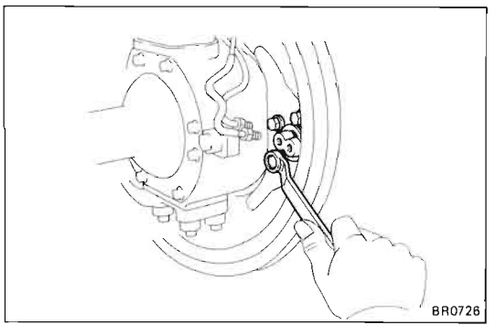
(a) Remove the brake tube clamp.

(b) Using SST, disconnect the brake tube from the wheel cylinder.

SST 09751-36011

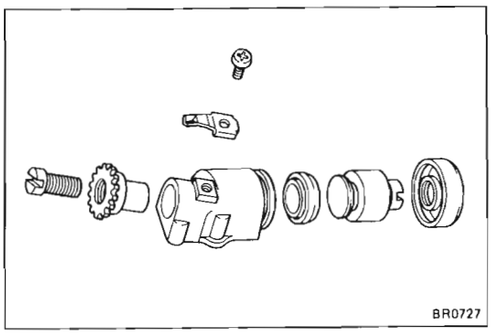
NOTE: Use a container to catch the brake fluid.

(c) Remove the bleeder plug from the front wheel cylinder.



(d) Remove the three bolts and wheel cylinder.

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7. IF NECESSARY, DISASSEMBLE WHEEL CYLINDER

(a) Remove the following parts from the wheel cylinder.
- Adjusting bolt and nut
- Boot
- Piston
- Cup

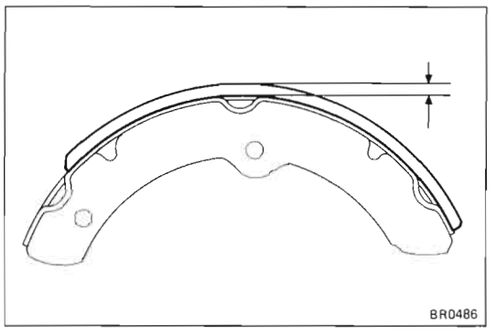
(b) Remove the screw and adjuster lock spring.

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INSPECTION AND REPAIR OF FRONT BRAKE COMPONENTS

1. INSPECT DISASSEMBLED PARTS

Inspect the disassemble parts for wear, rust or damage.

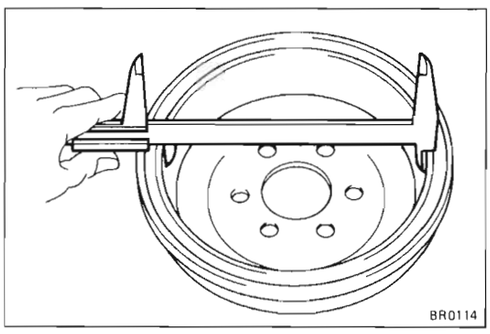


2. MEASURE BRAKE SHOE LINING THICKNESS

Standard thickness: 6.0 mm (0.236 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

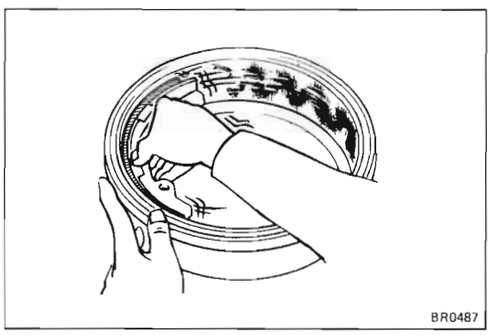
NOTE: If any of the brake shoes have to be replaced, replace all the rear brake shoes in order to maintain effective brakes.



3. MEASURE BRAKE DRUM INSIDE DIAMETER

Standard inside diameter : 279.4 mm (11.000 in.)
Maximum inside diameter: 281.4 mm (11.079 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.



4. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

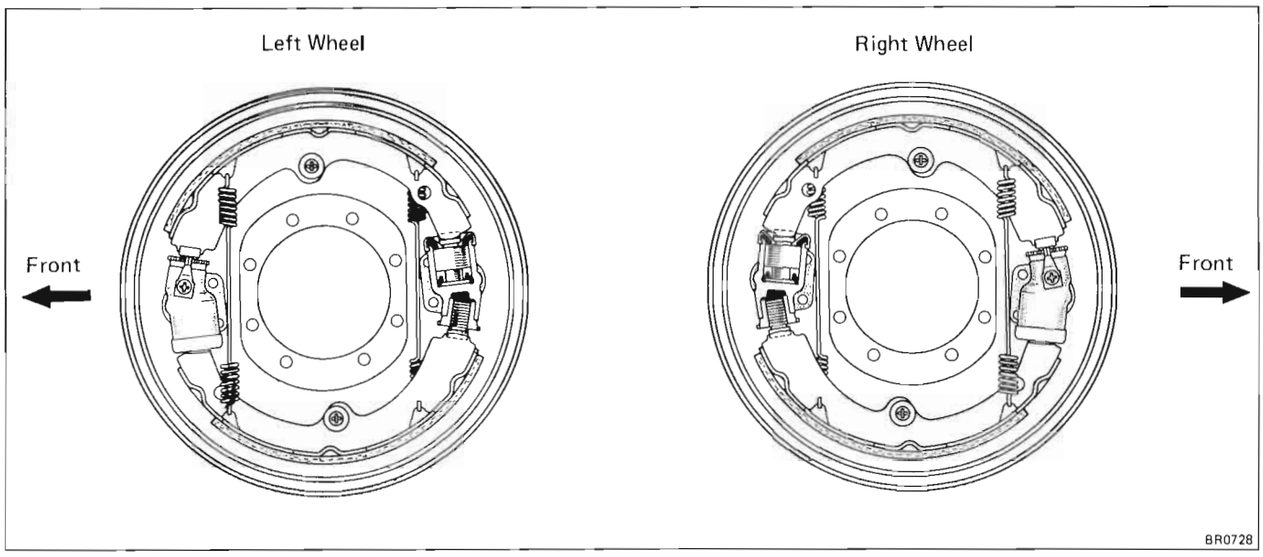
If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

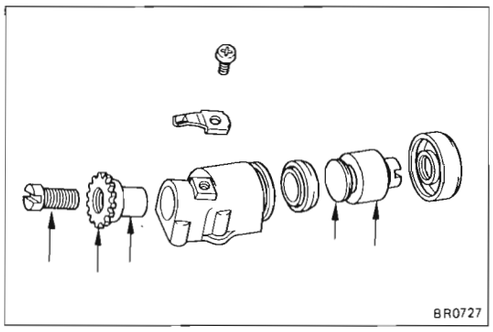
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ASSEMBLY OF FRONT BRAKE

(See page BR-30)

NOTE: Assemble the parts in the direction shown.





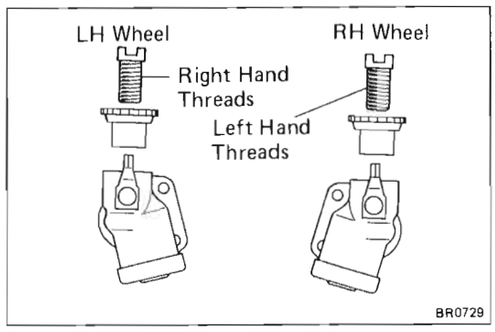
1. ASSEMBLE WHEEL CYLINDER

(a) Apply lithium soap base glycol grease to parts as shown.

(b) Assemble the wheel cylinder.

NOTE: Install in proper direction.

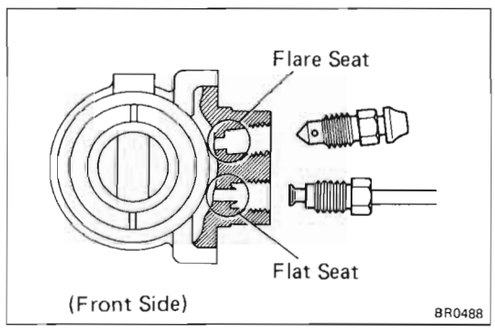
- Cup
- Piston
- Boot



(c) Install the adjusting bolt and nut to the wheel cylinder.

RH wheel cylinder—Left-hand threads (Yellow color)
LH wheel cylinder—Right-hand threads (White color)

(d) Install the adjusting lock spring with the screw.



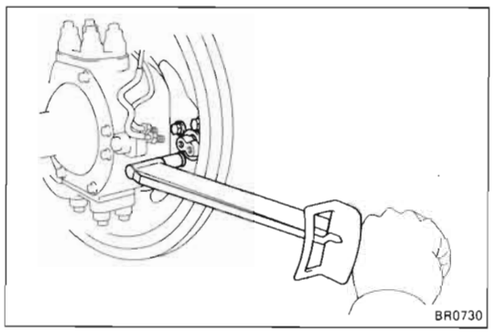
2. INSTALL BLEEDER PLUG

Temporarily install the bleeder plug as shown.

NOTE:

1. Front wheel cylinder union seats are flat and flare shaped as shown.
2. Both union seats of rear wheel cylinder are flat.

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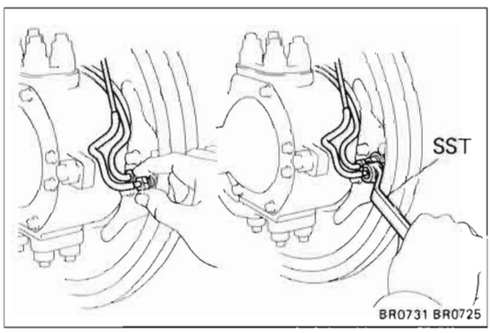
3. INSTALL WHEEL CYLINDER TO BACKING PLATE

(a) Install the front wheel cylinder with the adjuster facing upward. (See page BR-34)

(b) Install the rear wheel cylinder with the adjuster facing downward. (See page BR-34)

(c) Torque the bolts.

Torque: 620 kg-cm (45 ft-lb, 61 N·m)



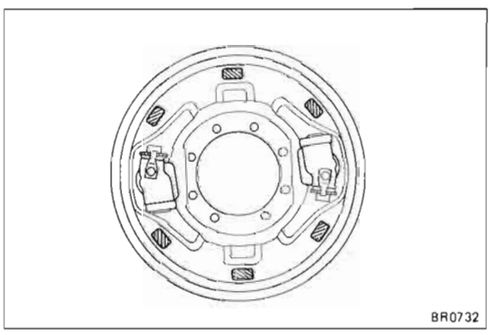
4. INSTALL BRAKE TUBE TO WHEEL CYLINDER

After tightening by finger, tighten the nut with SST.

SST 09751-36011

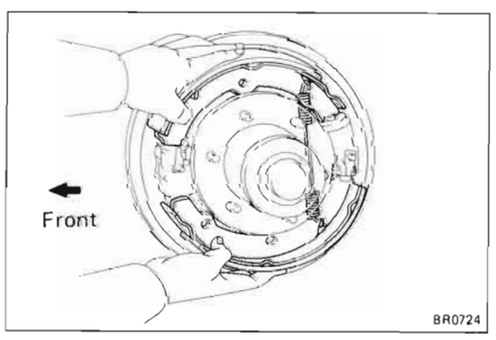
Torque: 155 kg-cm (11 ft-lb, 15 N·m)

5. INSTALL BRAKE TUBE CLAMP



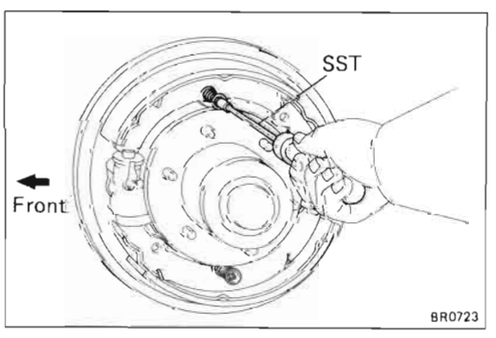
6. INSTALL BRAKE SHOES AND RETURN SPRINGS

(a) Apply high temperature grease to the brake shoe contact surfaces as shown.



(b) Hook the return spring to the brake shoe rear inner side.

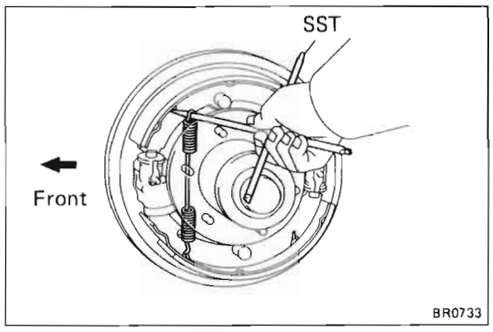
(c) Install the brake shoes assembly.



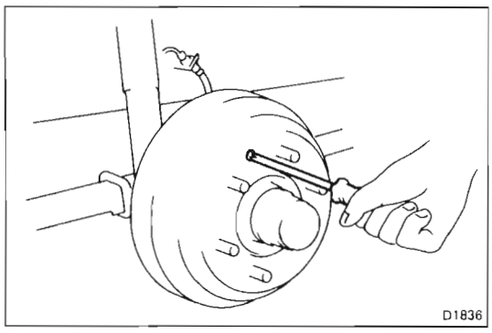
(d) Using SST, install the shoe hold-down spring, two cups and pin.

SST 09718-00010

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(e) Using SST, install the other side return spring.
SST 09703-30010



7. CLEAN LINING AND INNER DRUM WITH SANDPAPER

8. INSTALL DRUM OR DRUM WITH AXLE HUB
Install the drum with screw.

9. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-6)

10. CHECK FLUID LEAKAGE

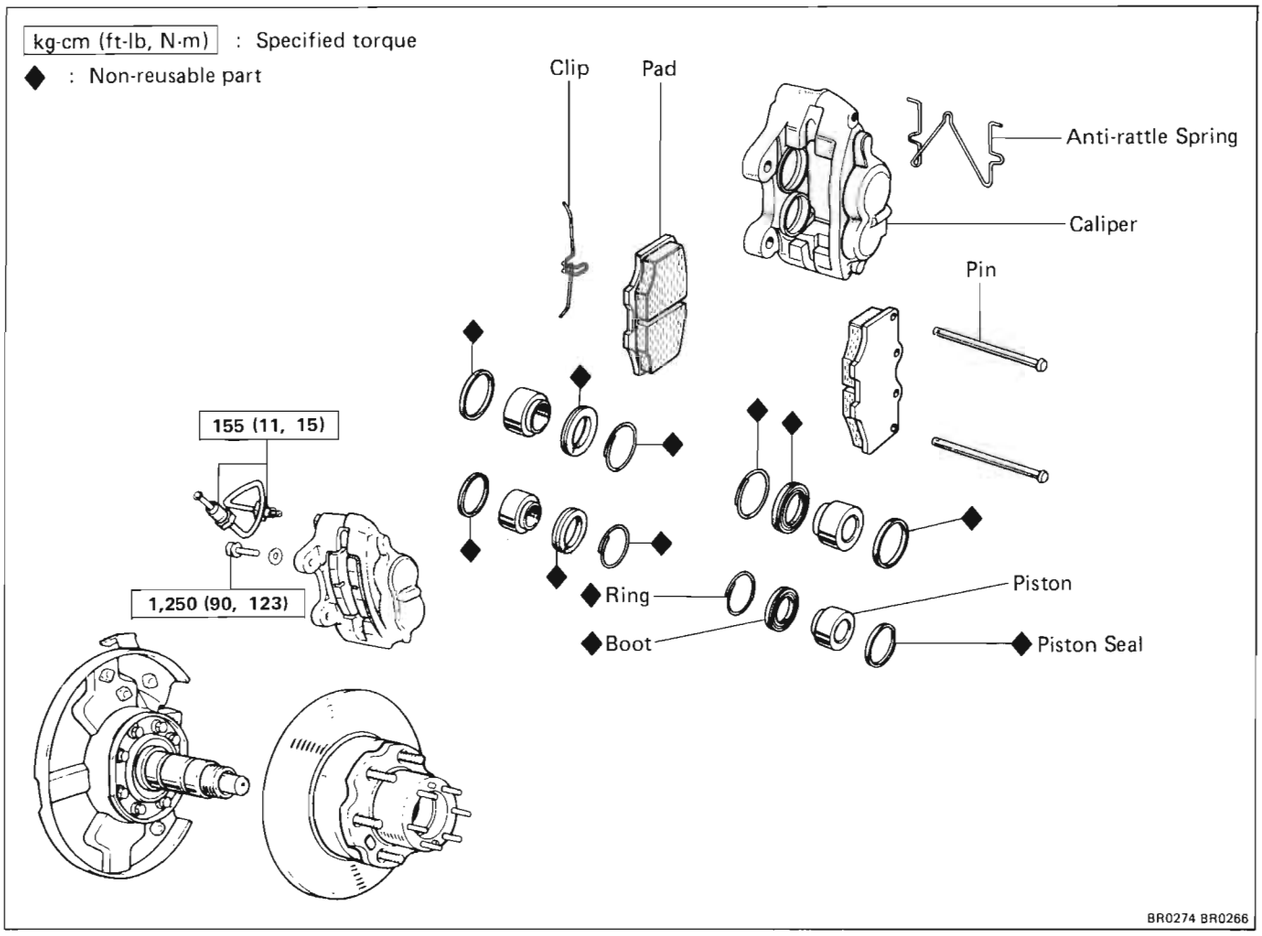
11. ADJUST BRAKE SHOE CLEARANCE
(See page BR-8)

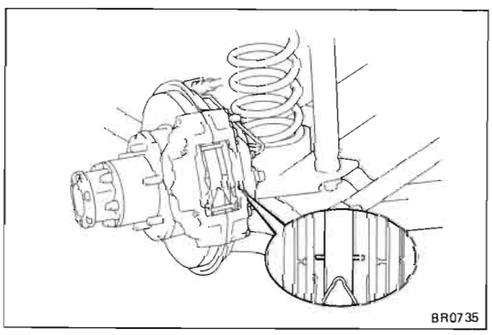
12. INSTALL WHEELS

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Disc Brake

COMPONENTS





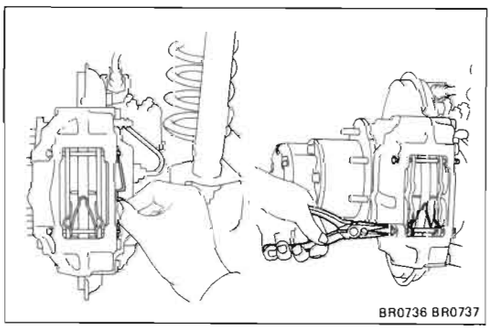
REPLACEMENT OF BRAKE PADS

1. REMOVE FRONT WHEEL

2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the cylinder inspection hole and replace pads if not within specification.

Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)



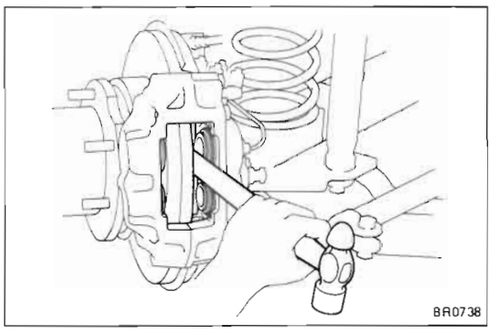
3. REMOVE FOLLOWING PARTS:

(a) Anti-rattle clip
(b) Two anti-rattle pins
(c) Anti-rattle spring
(d) Two pads

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4. CHECK ROTOR DISC THICKNESS
(See step 2 on page BR-41)

5. CHECK ROTOR DISC RUNOUT
(See step 3 on page BR-41)


BR0738

6. INSTALL NEW PADS

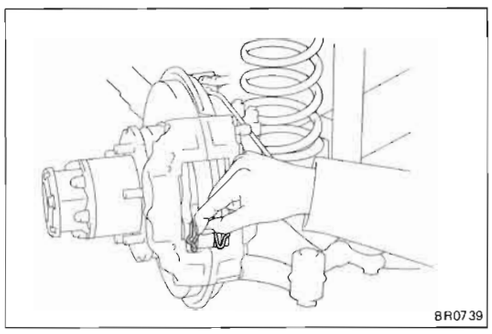
(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in the piston with a hammer handle or such.

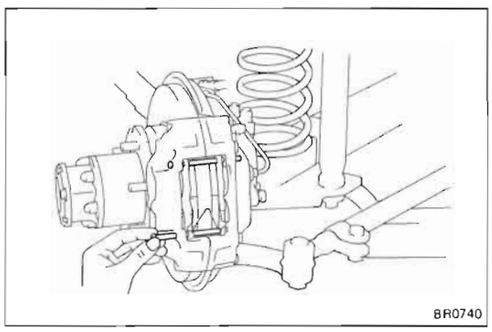
NOTE: Always change the pad on one wheel at a time as there is possibility of the opposite piston flying out.

(c) Install the new pads into the cylinder.

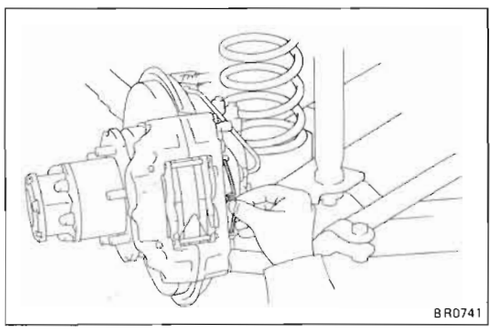
CAUTION: Do not allow oil or grease to get on the rubbing face.


BR0739

7. INSTALL ANTI-RATTLE SPRING

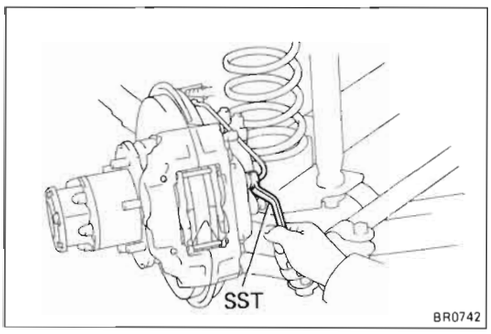

BR0740

8. INSTALL TWO PINS


BR0741

9. INSTALL ANTI-RATTLE CLIP

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REMOVAL OF CYLINDER

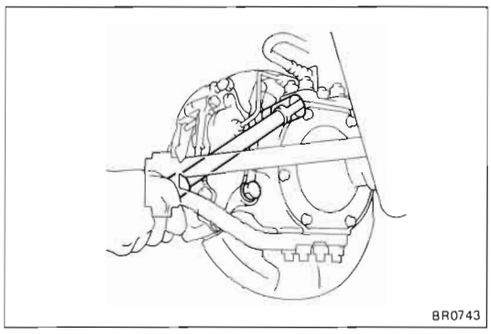
(See page BR-37)

1. REMOVE FRONT WHEEL

2. DISCONNECT BRAKE LINE

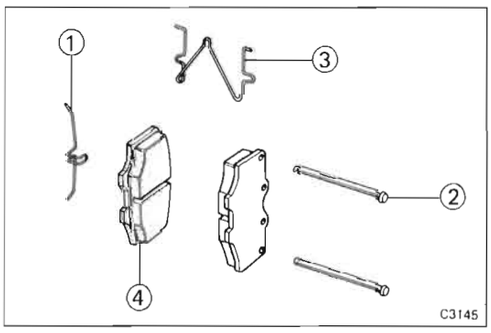
   Using SST, disconnect the brake line.
   Use a container to catch the brake fluid.

   SST 09751-36011



3. REMOVE CYLINDER

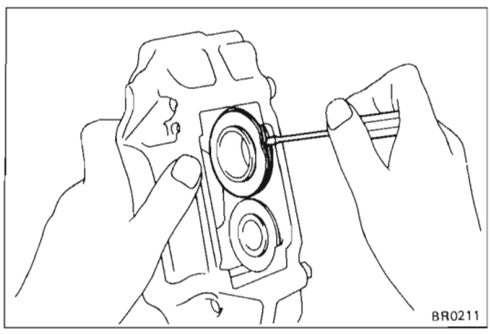
   Remove the two mounting bolts and cylinder.



4. REMOVE FOLLOWING PARTS:

   (a) Anti-rattle clip
   (b) Two anti-rattle pins
   (c) Anti-rattle spring
   (d) Two pads

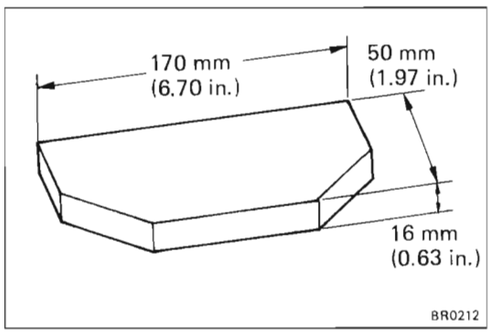
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DISASSEMBLY OF CYLINDER

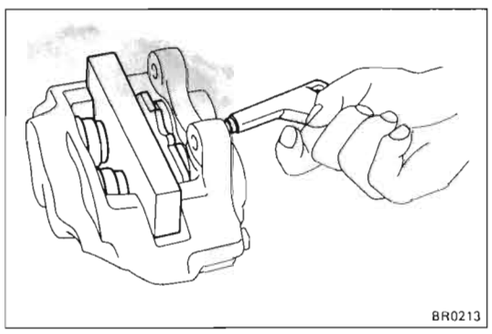
1. REMOVE CYLINDER BOOT SET RING AND BOOT

Using a screwdriver, remove the cylinder boot set ring and boot.



2. REMOVE PISTON FROM CYLINDER

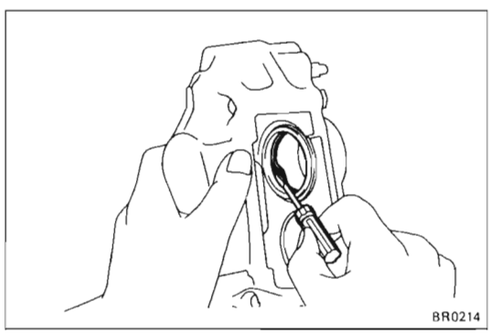
(a) Prepare the wooden plate as shown in the figure to hold the piston.



(b) Place the plate between the pistons and insert a pad at one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

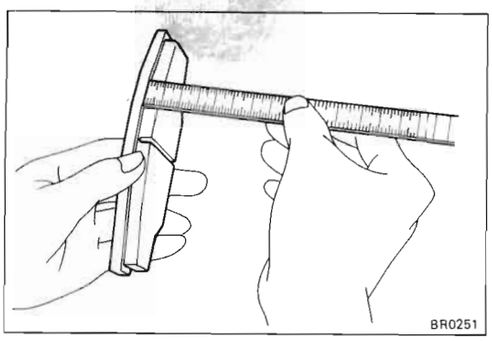
WARNING: Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEAL

Using a screwdriver, remove the seal from the cylinder.

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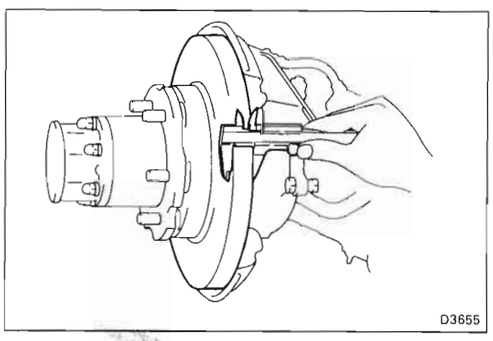


INSPECTION AND REPAIR OF FRONT BRAKE COMPONENTS

1. MEASURE PAD LINING THICKNESS

Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)

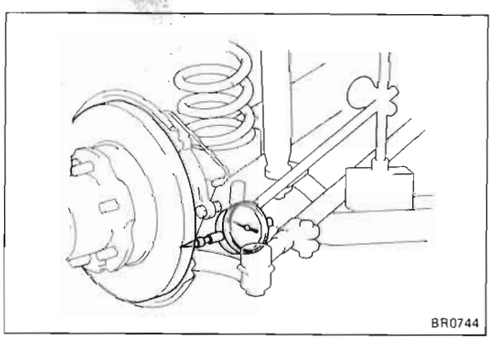
Replace the pad if the thickness is less than the minimum (the 1.0 mm slit is no longer visible) or if it shows sign of uneven wear.



2. MEASURE ROTOR DISC THICKNESS

Standard thickness: 12.5 mm (0.492 in.)
Minimum thickness: 11.5 mm (0.453 in.)

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.



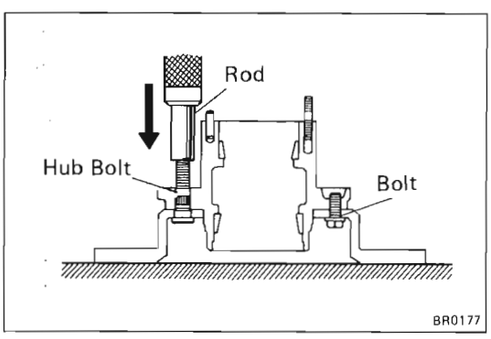
3. MEASURE ROTOR DISC RUNOUT

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

Maximum disc runout: 0.15 mm (0.0059 in.)

If the runout is greater than the maximum, replace the disc.

NOTE: Before measuring the runout, confirm that the front bearing play is within specification.

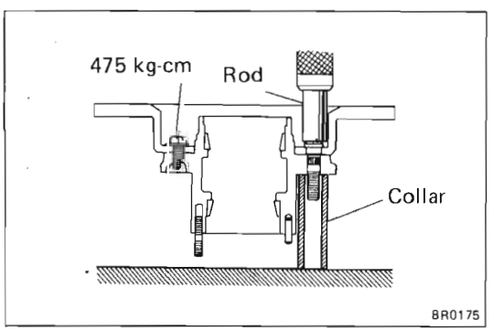


4. IF NECESSARY, REPLACE DISC

(a) Remove the axle hub. (See page FA-13)

(b) Using rod, press the hub bolts out of the axle hub.

(c) Remove the two bolts and separate the disc and hub.



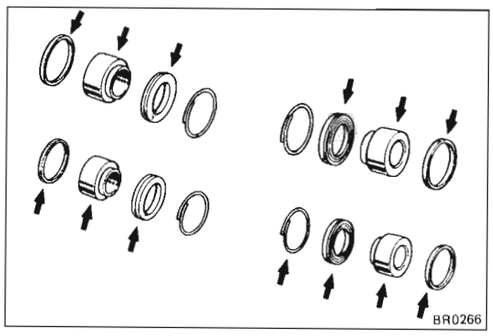
(d) Install a new disc to the axle hub and tighten the two bolts.

Troque: 475 kg-cm (34 ft-lb, 47 N·m)

(e) Using a collar and rod, press the hub bolts into the hub.

(f) Install the axle hub and adjust the front bearing pre-load. (See page FA-14)

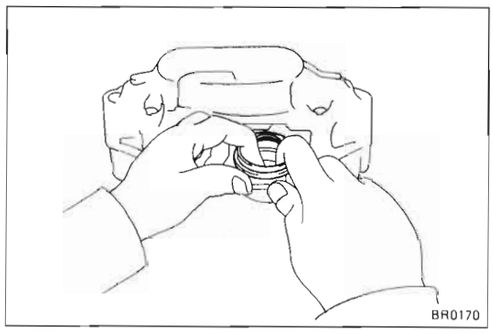
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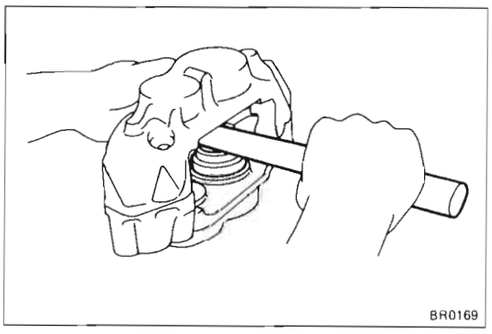
ASSEMBLY OF CYLINDER

(See page BR-37)

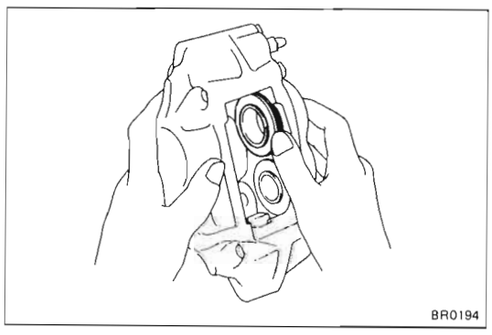
1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED BY ARROWS



2. INSTALL PISTON SEAL IN CYLINDER

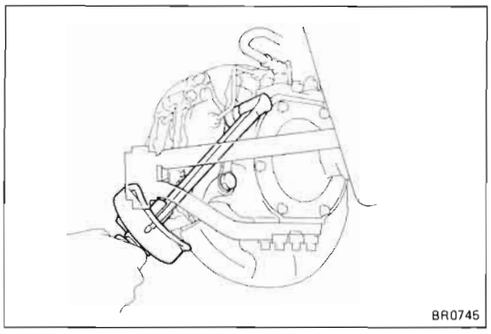


3. INSTALL PISTON IN CYLINDER



4. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER

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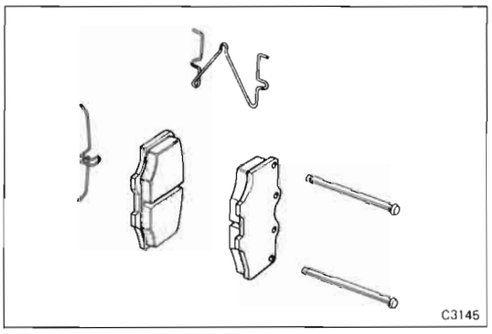
INSTALLATION OF CYLINDER

(See page BR-37)

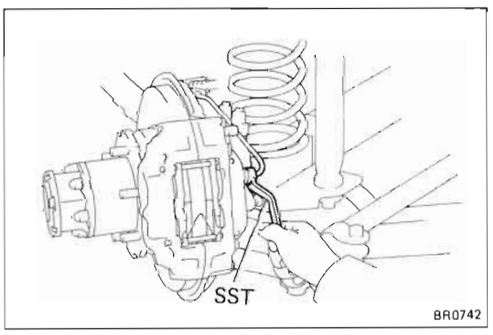
1. INSTALL CYLINDER

   Install and torque the mounting bolts.

   Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)



2. INSTALL FOLLOWING PARTS:
   (a) Two pads
   (b) Anti-rattle spring
   (c) Two anti-rattle pins
   (d) Anti-rattle clip



3. CONNECT BRAKE LINE

   Using SST, connect the brake line.

   SST 09751-36011

   Torque: 155 kg-cm (11 ft-lb, 15 N·m)

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
   (See page BR-6)

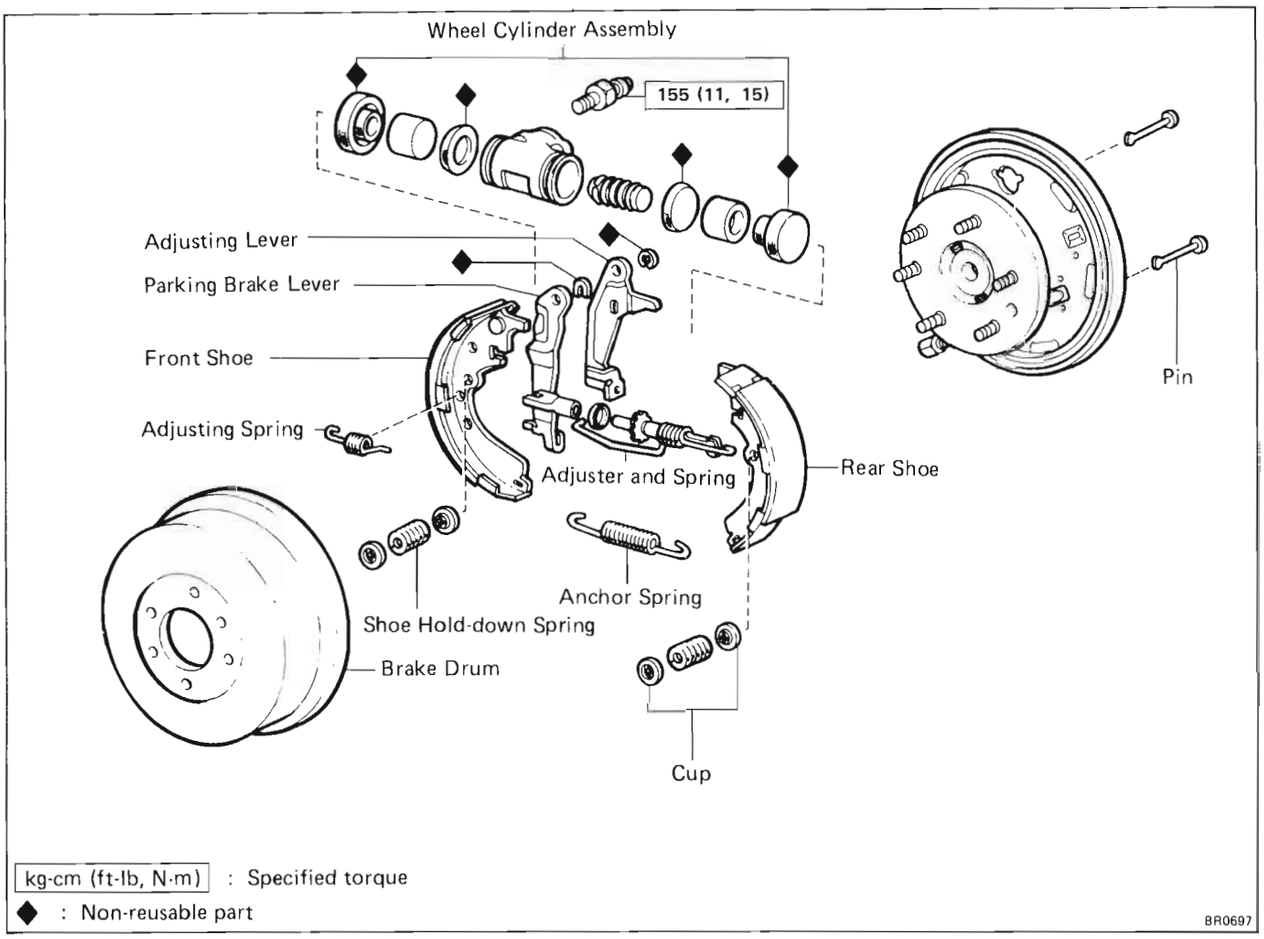
5. CHECK FOR FLUID LEAKAGE

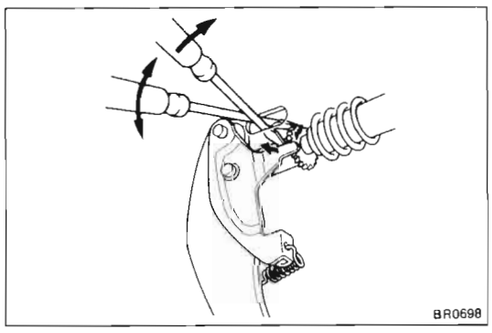
6. INSTALL FRONT WHEEL

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REAR BRAKE

COMPONENTS





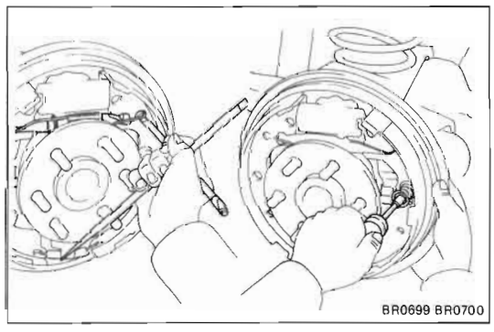
REMOVAL OF REAR BRAKE

1. REMOVE BRAKE DRUM

NOTE: If the brake drum cannot be removed easily, perform the following steps:

(a) Insert a hook through the hole in the backing plate, and hold the adjust lever away from the adjuster.

(b) Using screwdriver, reduce the brake shoe adjustment by turning the adjuster.



2. REMOVE REAR BRAKE SHOE

(a) Using SST, remove the return spring adjuster from the rear shoe side.

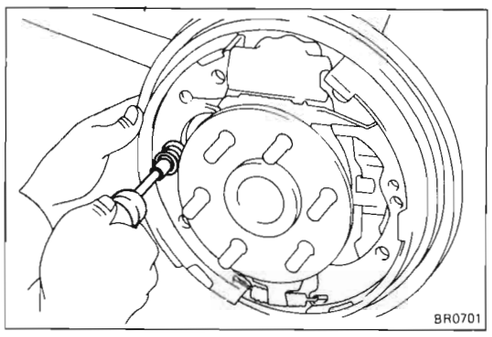
SST 09703-30010

(b) Using SST, remove the rear shoe hold-down spring and pin.

SST 09718-00010

(c) Remove the rear brake shoe and anchor spring.

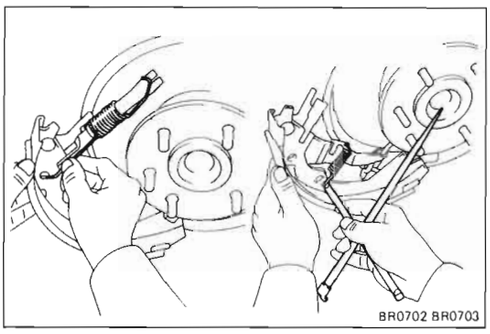
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3. REMOVE FRONT BRAKE SHOE, LEVER AND ADJUSTER

(a) Using SST, remove the hold-down spring and pin, and remove the shoe.

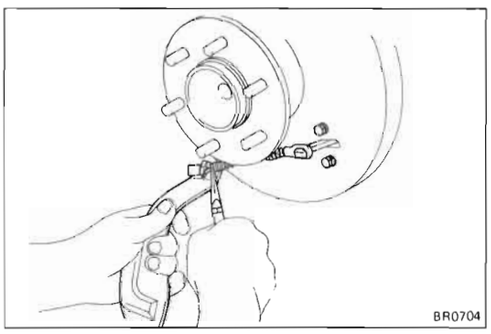
SST 09718-00010



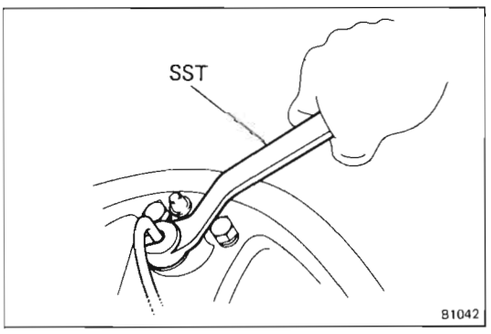
(b) Remove the adjuster and spring from the parking brake lever.

(c) Using SST, remove the adjusting lever spring.

SST 09703-30010



(d) Remove the parking brake cable from the parking brake lever.



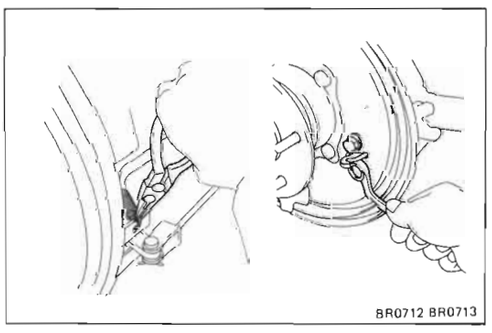
4. IF NECESSARY, REMOVE AND DISASSEMBLE WHEEL CYLINDER

(a) Using SST, disconnect the line.
Use a container to catch the brake fluid.

SST 09751-36011

(b) Remove the two bolts and the wheel cylinder.

(c) Remove the two boots, two pistons, two piston cups and spring from the cylinder.



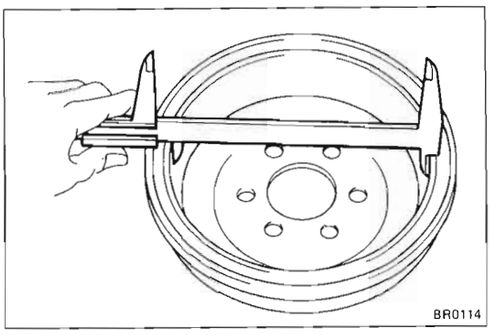
5. IF NECESSARY, REMOVE AND DISASSEMBLE BELLCRANK ASSEMBLY

(a) Remove the tension spring from the bellcrank.

(b) Remove the cotter pin and disconnect the parking brake cable No. 2.

(c) Remove the two mounting bolts and bellcrank assembly.

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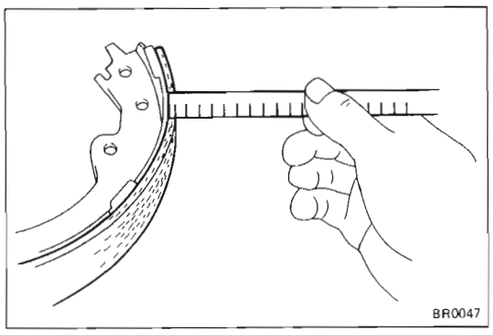


INSPECTION OF REAR BRAKE COMPONENTS

1. MEASURE BRAKE DRUM INSIDE DIAMETER

Standard inside diameter : 254.0 mm (10.000 in.)
Maximum inside diameter : 256.0 mm (10.079 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.

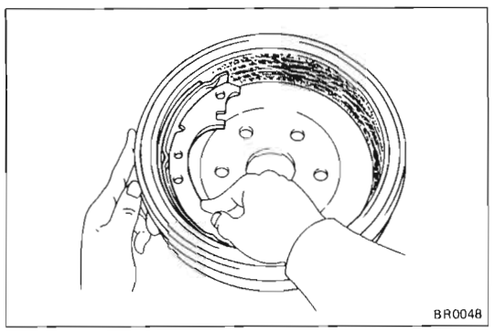


2. MEASURE BRAKE SHOE LINING THICKNESS

Standard thickness : 5.0 mm (0.197 in.)
Minimum thickness : 1.0 mm (0.039 in.)

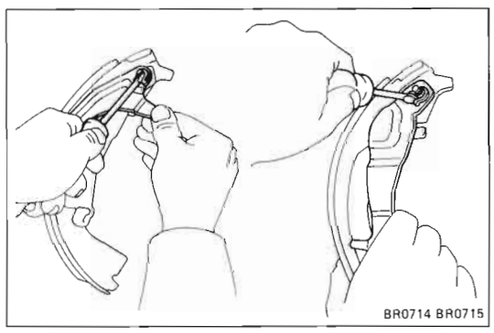
If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If any brake shoe has to be replaced, replace all the rear brake shoes to maintain effective brakes.



3. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

Replace the brake shoe or turn the brake drum, as necessary.



4. IF NECESSARY, REPLACE BRAKE SHOES

(a) Using a screwdriver, remove the parking brake lever and automatic adjusting lever from the front shoe.

(b) Using pliers, install the parking brake lever with a new C-washer, and install the automatic adjusting lever with an E-ring.

5. INSPECT WHEEL CYLINDER FOR CORROSION OR DAMAGE

6. INSPECT BACKING PLATE FOR WEAR OR DAMAGE

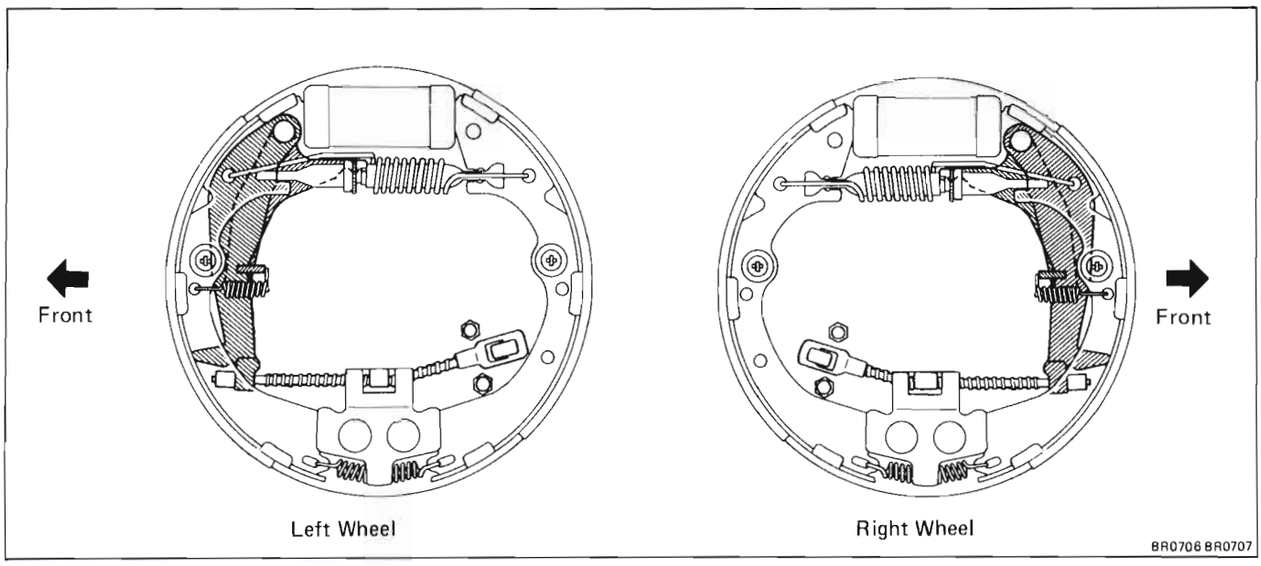
7. INSPECT BELLCRANK PARTS FOR BENDING, WEAR OR DAMAGE

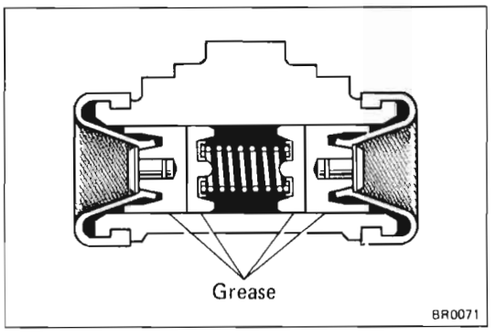
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ASSEMBLY OF REAR BRAKE

(See page BR-43)

NOTE: Assemble the parts in the direction shown.





1. IF NECESSARY, ASSEMBLE AND INSTALL WHEEL CYLINDER

(a) Apply lithium soap base glycol grease to the piston cups and piston.
Install the spring and two piston cups in the wheel cylinder.
Make sure the flanges of the cups are pointed inward.

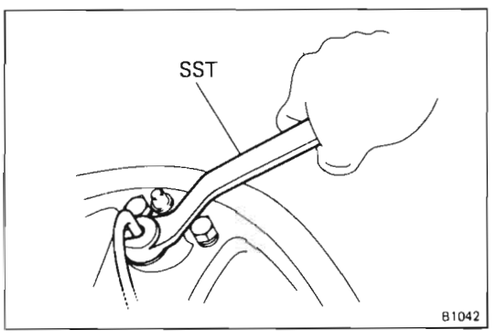
(b) Install two pistons. Apply lithium soap base glycol grease as shown, and install the two boots.

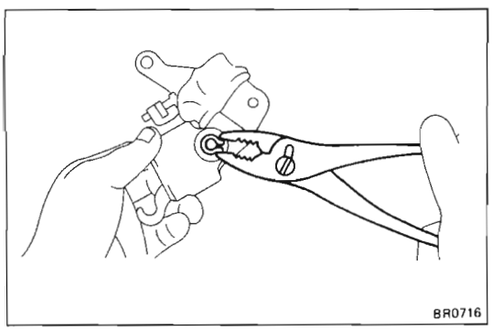
(c) Install the wheel cylinder on the backing plate with two bolts.

(d) Using SST, connect the brake line.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)





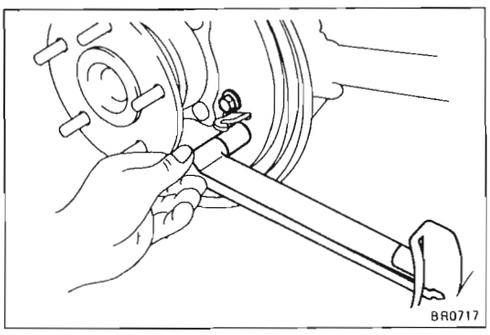
2. IF NECESSARY, ASSEMBLE AND INSTALL BELLCRANK ASSEMBLY

(a) Apply high-temperature type grease to the rotating parts of the bellcrank.

(b) Install the bellcrank to the bracket with a new C-washer.

(c) Apply lithium soap base glycol grease to the seal lip.

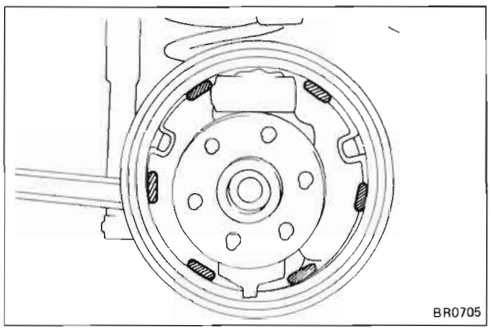
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(d) Install the bellcrank assembly on the backing plate with two bolts.

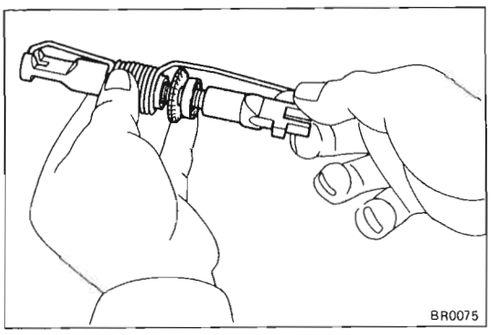
(e) Torque the bolts.

Torque: 130 kg-cm (9 ft-lb)



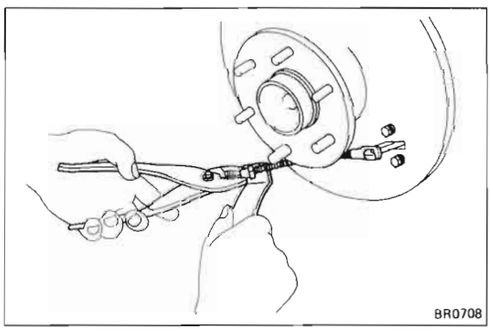
3. **APPLY GREASE ON BACKING PLATE, AS SHOWN**

Use high-temperature type grease.

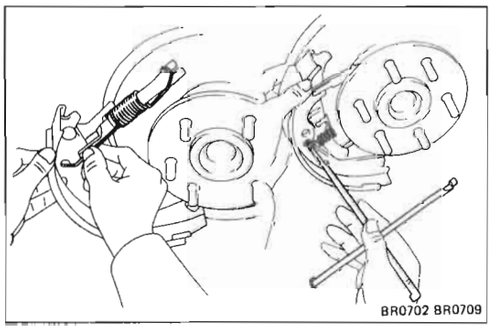


4. **APPLY GREASE TO ADJUSTER BOLT THREADS AND END**

Use high-temperature type grease.



5. **CONNECT PARKING BRAKE CABLE TO PARKING BRAKE LEVER**



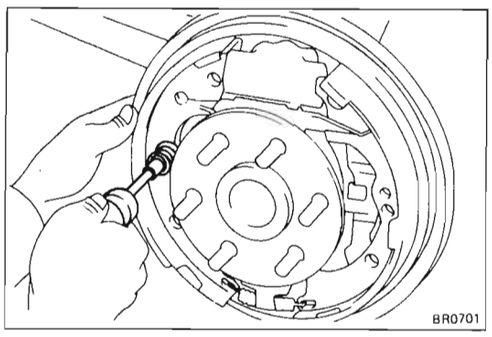
6. **INSTALL ADJUSTER ONTO FRONT SHOE**

(a) Install the adjuster and return spring to lever.

(b) Using SST, install the adjusting lever spring.

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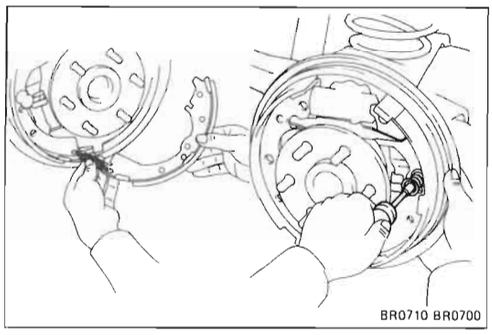


7. INSTALL FRONT SHOE

(a) Set the front shoe in place with the end of the shoe inserted in the wheel cylinder and the other end in the anchor plate.

(b) Using SST, install the pin and shoe hold-down spring.

SST 09718-00010



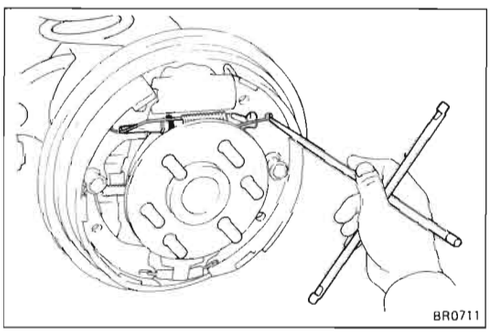
8. INSTALL REAR SHOE

(a) Install the anchor spring between the front and rear shoes.

(b) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the strut in place.

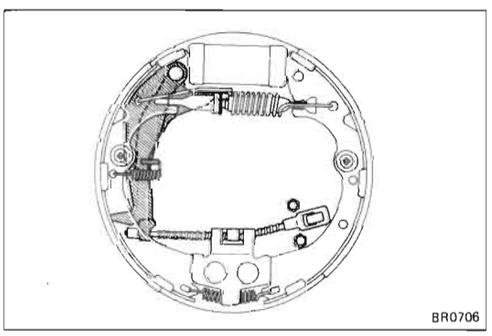
(c) Using SST, install the pin and shoe hold-down spring.

SST 09718-00010



(d) Using SST, install the return spring.

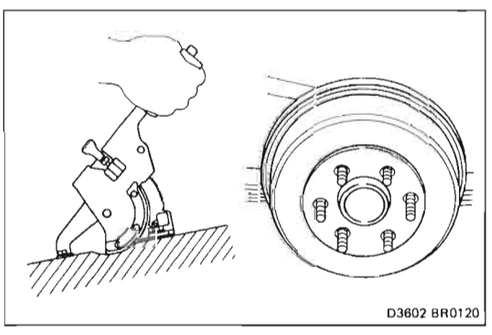
SST 09703-30010



9. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM

(a) Check that the adjusting bolt turns while pulling the parking brake lever up.

If the bolt does not turn, check for incorrect installation of the rear brakes.

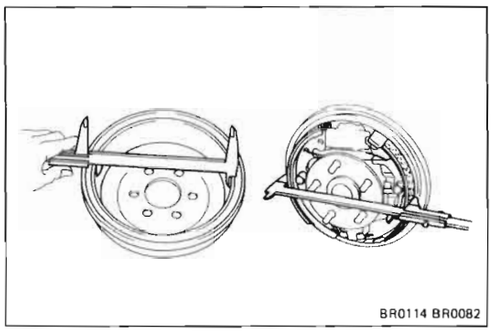


(b) Adjust the strut to the shortest possible length.

(c) Install the drum.

(d) Pull the parking brake lever all the way up several times.

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BR0114 BR0082

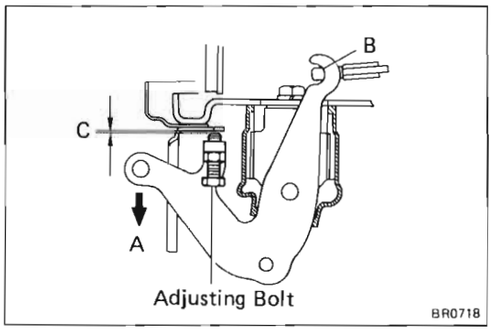
10. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameter is the correct shoes clearance.

Shoe clearance: 0.6 mm (0.024 in.)

If incorrect, check the parking brake system.



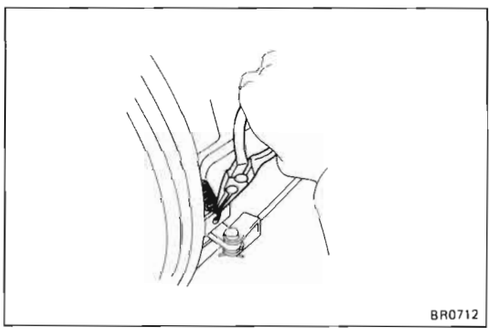
BR0718

11. IF NECESSARY, ADJUST BELLCRANK

(a) Lightly pull the bellcrank in direction A until there is no slack at part B.

(b) In this condition, turn the adjusting bolt so that dimension C will be 0.2 – 0.7 mm (0.008 – 0.028 in.).

(c) Lock the adjusting bolt with the lock nut.


BR0712

(d) Connect the parking brake cable No. 2 to the bellcrank.

(e) Install the tension spring.

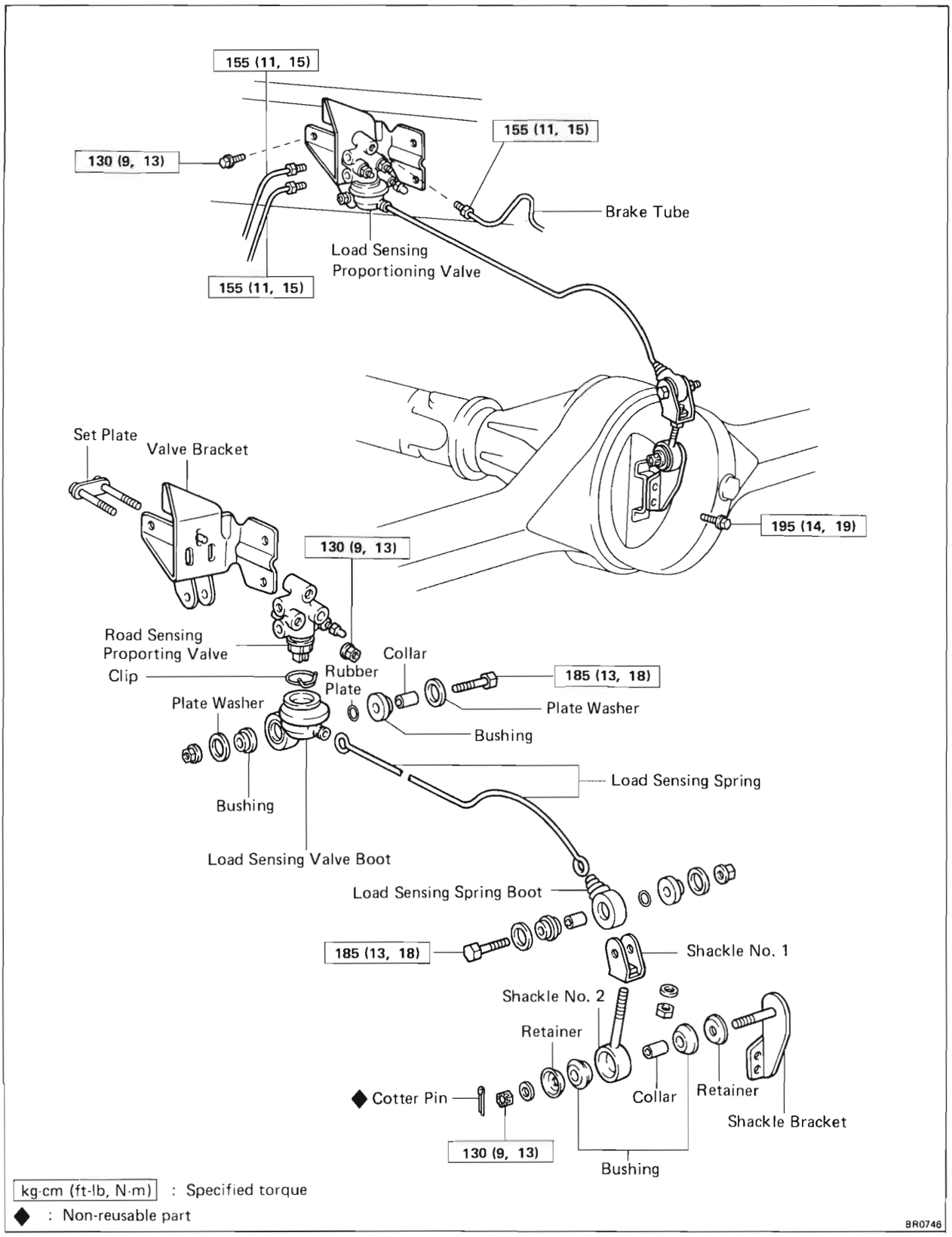
12. INSTALL BRAKE DRUM AND REAR WHEEL

13. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See page BR-6)

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LOAD SENSING PROPORTIONING VALVE

COMPONENTS

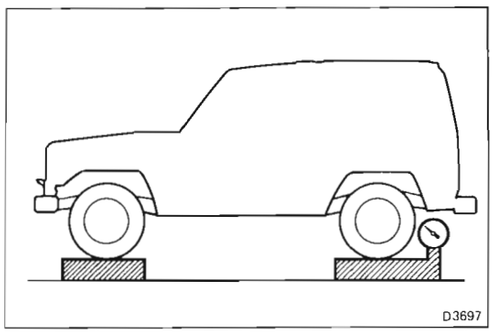


kg·cm (ft·lb, N·m) : Specified torque

◆ : Non-reusable part

BR0746

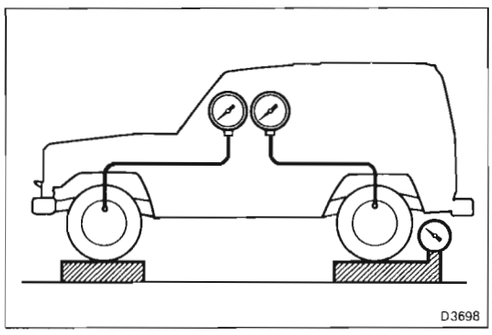
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CHECK AND ADJUSTMENT OF FLUID PRESSURE

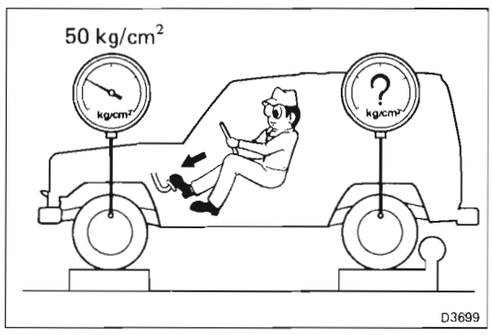
1. SET REAR AXLE LOAD

Rear axle load (include vehicle weight):
1,010 kg (2,227 lb, 9,905 N)



2. INSTALL LSPV GAUGE (SST) AND BLEED AIR

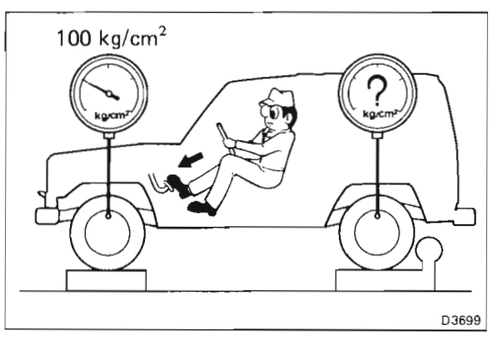
SST 09709-29017



3. RAISE FRONT BRAKE PRESSURE TO 50 kg/cm² (711 psi, 4,903 kPa) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:
33 ± 5 kg/cm² (469 ± 71 psi, 3,236 ± 490 kPa)

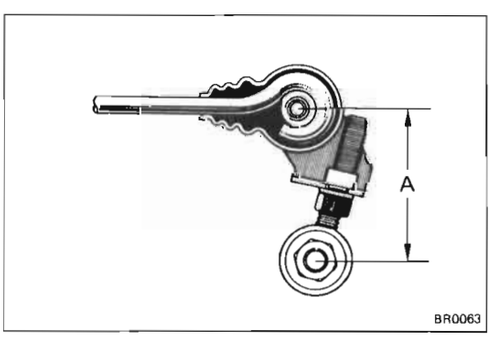
NOTE: The brake pedal should not be depressed twice and/or returned while setting to the specified pressure. Read the value of rear brake pressure two seconds after adjusting the specified fluid pressure.



4. RAISE FRONT BRAKE PRESSURE TO 100 kg/cm² (1,422 psi, 9,807 kPa) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:
46 ± 7 kg/cm² (654 ± 100 psi, 4,511 ± 686 kPa)

If the brake pressure is incorrect, adjust the fluid pressure.



5. IF NECESSARY, ADJUST FLUID PRESSURE

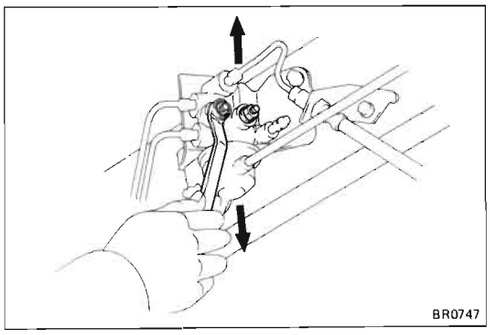
(a) Adjust the length of the No. 2 shackle.

Low pressure – Lengthen A
High pressure – Shorten A

Initial set: 120 mm (4.72 in.)
Adjusting range: 114 – 126 mm (4.49 – 4.96 in.)

NOTE: One turn of the No. 2 shackle changes the fluid pressure about 0.6 kg/cm² (8.5 psi, 59 kPa).

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(b) In event pressure cannot be adjusted by the No. 2 shackle, raise or lower the valve body.

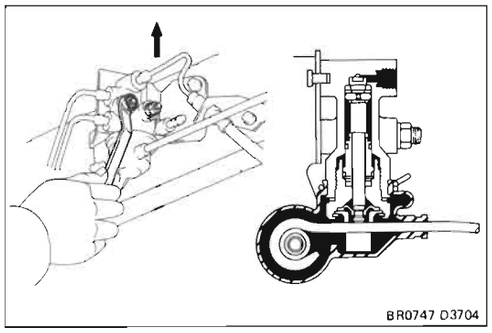
Low pressure – Lower
High pressure – Raise

(c) Torque the nuts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

(d) Adjust the length of the No. 2 shackle again.

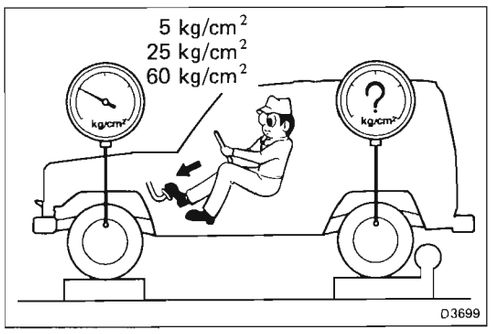
If it cannot be adjusted, inspect the valve housing.



6. IF NECESSARY, CHECK VALVE BODY

(a) Assemble the valve body in the uppermost position.

NOTE: When the brakes are applied, the piston will move down about 1 mm (0.04 in.). Even at this time, the piston should not make contact with or move the load sensing spring.



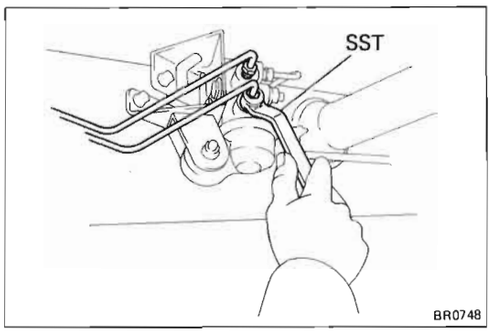
(b) In this position, check the rear brake pressure.

kg/cm^2 (psi, kPa)

Front brake pressure	Rear brake pressure
5 (71,490)	5 (71,490)
25 (356, 2,452)	8.0 – 12.0 (114 – 171, 785 – 1,177)
60 (853, 5,884)	15.3 – 22.3 (218 – 317, 1,500 – 2,187)

If the measured value is not within standard, replace the valve body.

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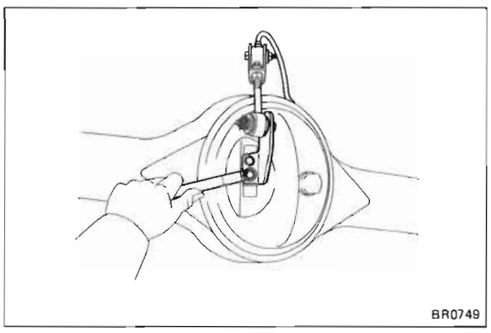
REMOVAL OF LSPV ASSEMBLY

(See page BR-51)

1. DISCONNECT BRAKE TUBES

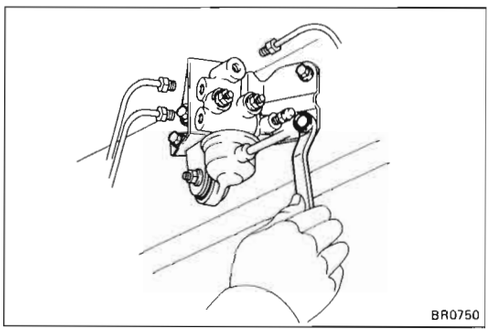
Using SST, disconnect the brake tubes from the valve body.

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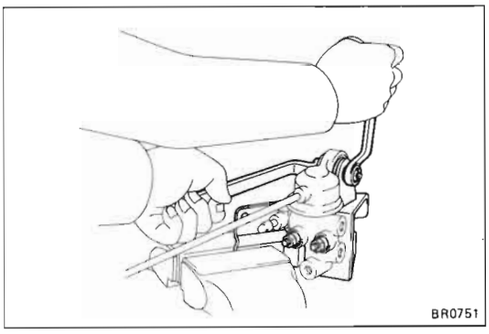
2. REMOVE LSPV ASSEMBLY

(a) Remove the two bolts and remove the shackle bracket.



(b) Remove the valve bracket mounting bolts and remove the LSPV assembly.

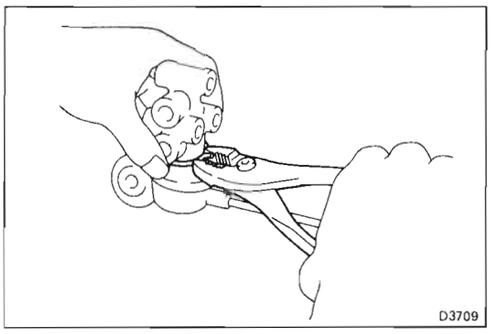
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DISASSEMBLY OF LOAD SENSING SPRING ASSEMBLY

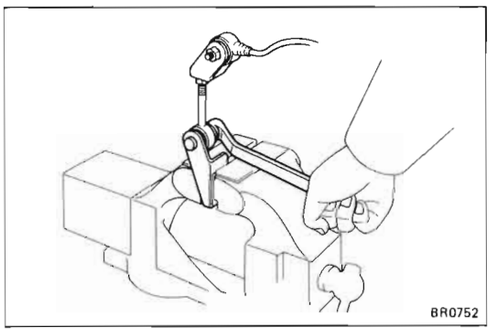
1. REMOVE VALVE BRACKET

Remove the three nuts, and remove the valve bracket.



2. DISCONNECT SPRING FROM VALVE

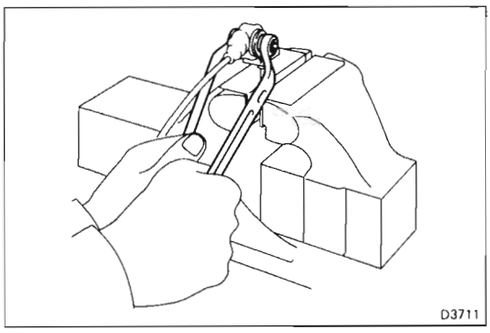
Using a pliers, remove the clip, and remove the spring from the valve.



3. REMOVE SHACKLE BRACKET

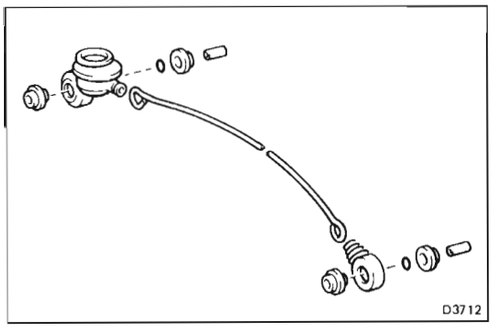
(a) Remove the cotter pin.

(b) Remove the nut, and remove the shackle bracket, two retainers, two bushings and collar.



4. REMOVE SHACKLE NO. 1 AND NO. 2

Remove the nut, and remove the shackle No. 1 and 2, and two plate washers.



5. DISASSEMBLE LOAD SENSING SPRING

Disassemble the following parts:

(a) Bushings

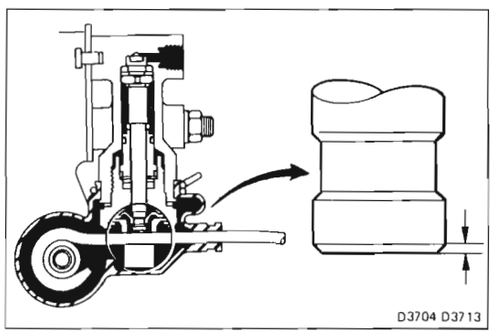
(b) Collars

(c) Rubber plate

(d) Load sensing valve boot

(e) Load sensing spring boot

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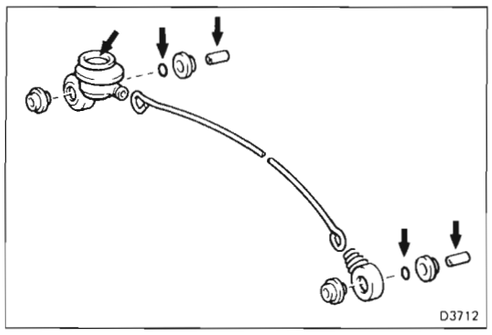


INSPECTION OF LSPV

INSPECT VALVE PISTON PIN AND LOAD SENSING CONTACT SURFACE FOR WEAR

Wear limit: 0.7 mm (0.028 in.)

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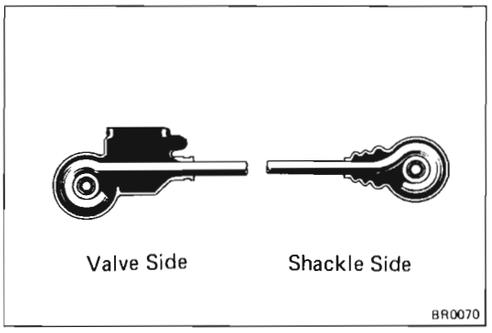
ASSEMBLY OF LSPV ASSEMBLY

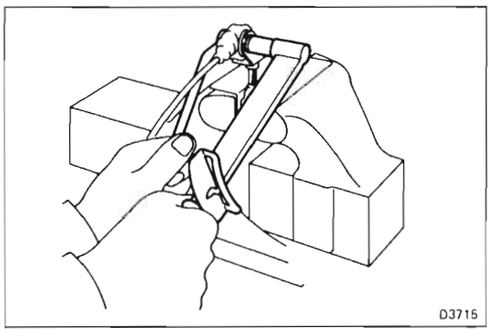
(See page BR-51)

1. ASSEMBLE FOLLOWING PARTS TO LOAD SENSING SPRING
   (a) Load sensing valve boot
   (b) Load sensing spring boot
   (c) Collars
   (d) Rubber plates
   (e) Bushings

   NOTE: Apply lithium soap base glycol grease to all rubbing areas.

   Do not mistake the valve side for the shackle side of the load sensing spring.

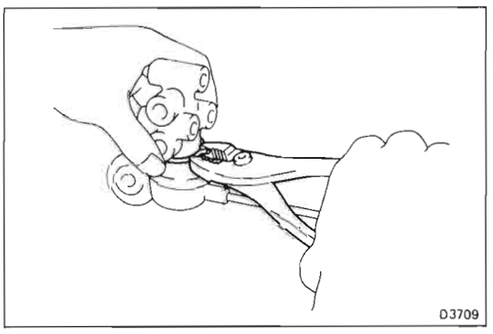




2. INSTALL SHACKLE NO. 1 AND NO. 2 TO LOAD SENSING SPRING

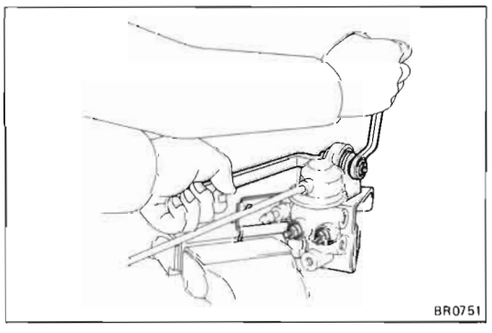
   Install the shackle to the load sensing spring through the two plate washers.

   Torque: 185 kg-cm (13 ft-lb, 18 N·m)



3. INSTALL LOAD SENSING SPRING TO VALVE

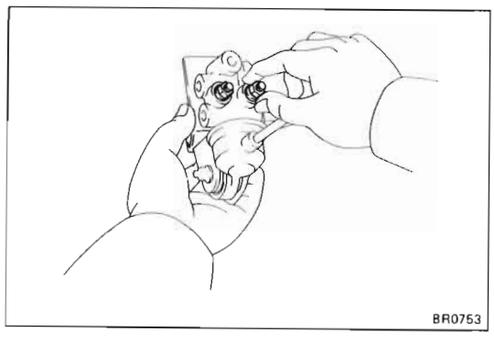
   Install the load sensing spring assembly to the load sensing valve with a clip.



4. INSTALL VALVE BRACKET
   (a) Install the valve assembly to the bracket and torque the bolt and nut of load sensing spring boot through the two plate washers.

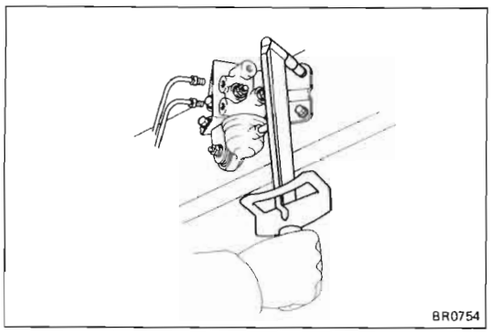
   Torque: 185 kg-cm (13 ft-lb, 18 N·m)

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(b) Install the set plate to the valve assembly and temporarily tighten the two valve body mounting nuts.

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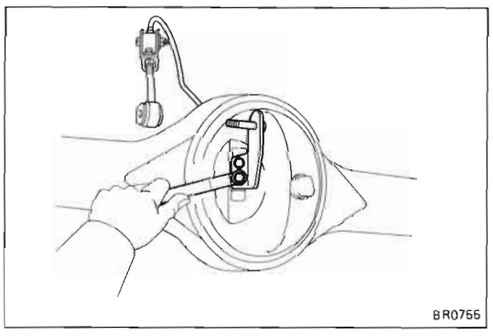


INSTALLATION OF LSPV

1. INSTALL LSPV ASSEMBLY

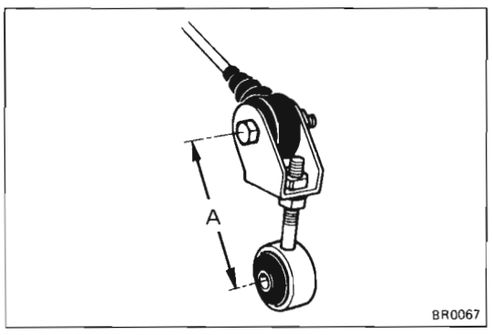
(a) Install the LSPV assembly to the frame with four bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)



(b) Install the shackle bracket to rear axle housing with two bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



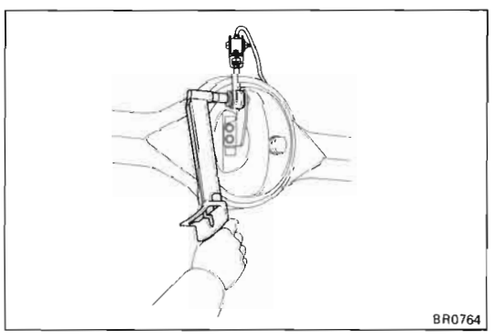
2. CONNECT SHACKLE NO. 2 TO BRACKET

(a) Set the dimension A by turning shackle No. 2.

Initial set: 120 mm (4.72 in.)

(b) Tighten the lock nut.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

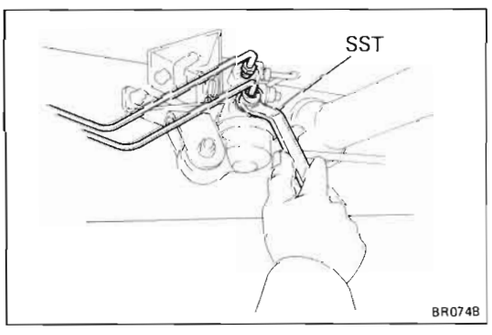


(c) Install the two bushings and collar to the load sensing spring shackle.

(d) Install the load sensing spring to the shackle bracket with the two retainer and a nut.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

(e) Install the new cotter pin.



3. CONNECT BRAKE TUBES

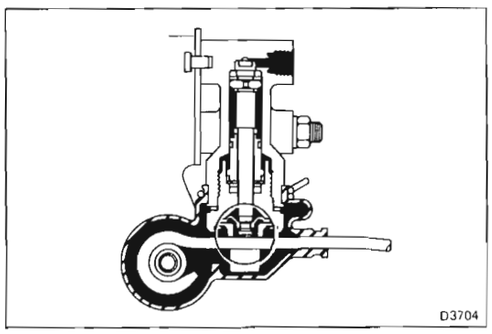
Using SST, connect the brake tubes.

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4. SET REAR AXLE LOAD

(See page BR-52)

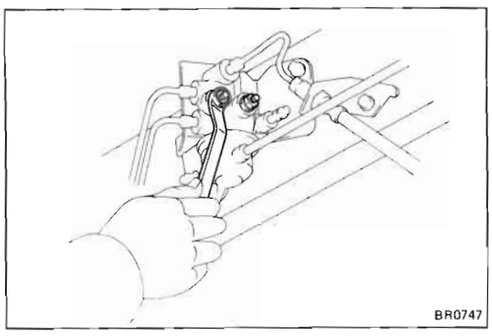
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5. SET VALVE BODY

(a) When pulling down the load sensing spring, confirm that the valve piston moves down smoothly.

(b) Position the valve body so that the valve piston lightly contacts the load sensing spring.



(c) Tighten the valve body mounting nuts.

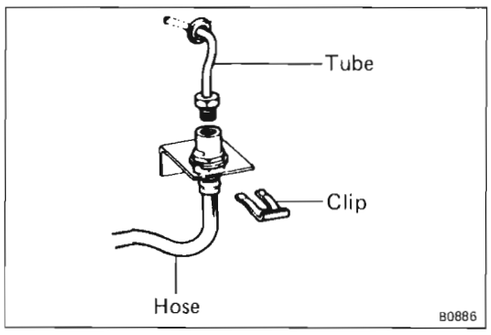
Torque: 130 kg-cm (9 ft-lb, 13 N·m)

6. BLEED BRAKE LINE

7. CHECK FOR FLUID LEAKAGE

8. CHECK AND ADJUST LSPV FLUID PRESSURE
(See page BR-52)

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BRAKE HOSES AND TUBES

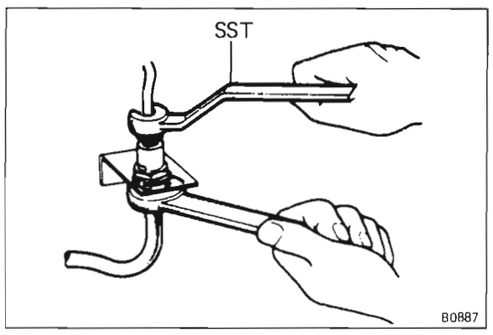
DISCONNECT AND CONNECT HOSE AND TUBE

1. DISCONNECT HOSE AND TUBE

(a) Disconnect the clip.

(b) Using a wrench to hold the hose and SST to hold the tube, disconnect the tube and hose.

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2. CONNECT HOSE AND TUBE

(a) Connect the hose and tube by hand.

(b) Using a wrench to hold the hose and SST to hold the tube, torque the connection.

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Torque: 155 kg-cm (11 ft-lb, 15 N·m)

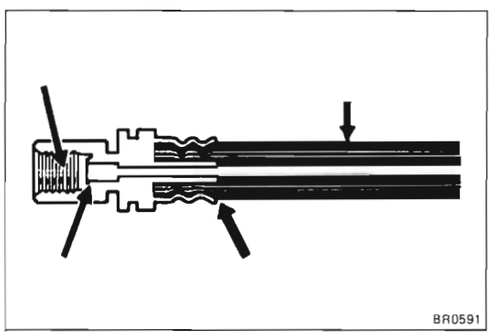
(c) Install a new hose clip.

INSPECTION OF BRAKE HOSES AND TUBES

1. INSPECT BRAKE HOSES

(a) Inspect the hose for damage, cracks or swelling.

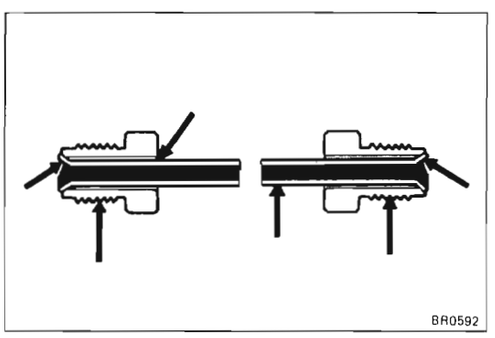
(b) Inspect the threads for damage.



2. INSPECT BRAKE TUBES

(a) Inspect the tube for damage, cracks, dens or corrosion.

(b) Inspect the threads for damage.



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STEERING

	Page
PRECAUTIONS	SR-2
TROUBLESHOOTING	SR-2
ON-VEHICLE INSPECTION	SR-3
STEERING COLUMN ASSEMBLY WITH TILT STEERING	SR-4
STEERING COLUMN ASSEMBLY	SR-16
STEERING GEAR HOUSING	SR-20
POWER STEERING	SR-30
On-Vehicle Inspection	SR-30
Bleeding of Power Steering	SR-33
Oil Pressure Check	SR-33
Power Steering Pump	SR-35
Gear Housing	SR-46
STEERING LINKAGE	SR-61
Relay Rod	SR-61
Steering Damper	SR-63
Tie Rod	SR-64

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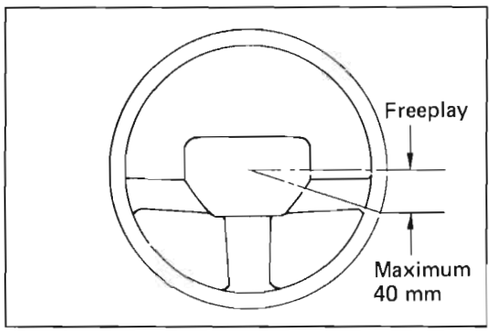
PRECAUTIONS

Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard steering	Tires improperly inflated	Inflate tires to proper pressure	A-7
	Excessive caster	Check front end alignment	FA-3
	Ball joints worn	Replace ball joints	SR-61
	Steering knuckle bearing worn	Replace knuckle bearing	FA-17
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Steering linkage worn or bent	Check linkage	SR-61
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3, 20, 46
	Power steering belt loose	Tighten belt	SR-30
	Oil level in reservoir low	Check reservoir	SR-31
	Power steering fluid foaming	Check power steering fluid	SR-31
	Power steering unit faulty	Check power steering unit	SR-30
	Steering column binding	Check steering column	SR-4, 16
Poor return	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Wheel alignment incorrect	Check front end alignment	FA-3
	Steering column binding	Check steering column	SR-4, 16
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3, 20, 46
Excessive play	Steering linkage worn	Check linkage	SR-61
	Steering gear loose	Tighten gear bolts	
	Steering shaft coupling worn	Inspect coupling	
	Ball joints worn	Replace ball joints	SR-61
	Steering knuckle bearing worn	Replace knuckle bearing	FA-17
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3, 20, 46

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ON-VEHICLE INSPECTION

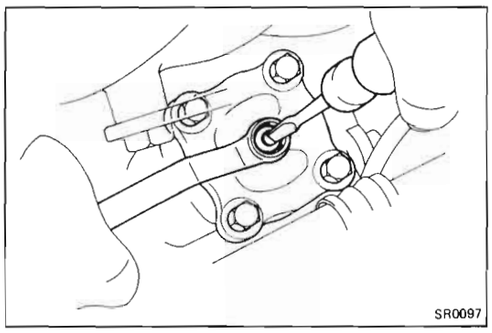
STEERING WHEEL FREEPLAY

1. CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT

With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure. Freeplay should not exceed the maximum limit.

Maximum play: 40 mm (1.57 in.)

If incorrect, adjust or repair as required.



2. POINT WHEELS STRAIGHT AHEAD

3. ADJUST STEERING GEAR BOX

(a) Loosen the lock nut.

(b) Turn the adjusting screw clockwise to decrease wheel freeplay and counterclockwise to increase it.

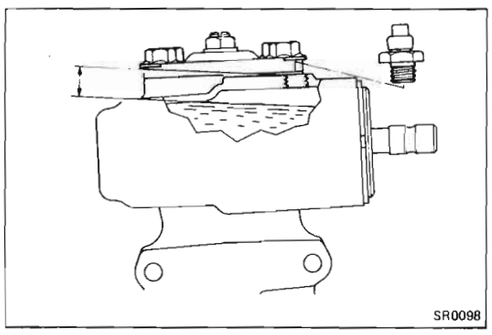
NOTE: Turn the adjusting screw in small increments and check the wheel freeplay between each adjustment.

4. CHECK THAT STEERING DOES NOT BIND

Turn the steering wheel half way around in both directions.

Check that the freeplay is correct and steering is smooth and without rough spots.

5. HOLD ADJUSTING SCREW AND TIGHTEN LOCK NUT



OIL LEVEL

CHECK STEERING GEAR BOX OIL LEVEL

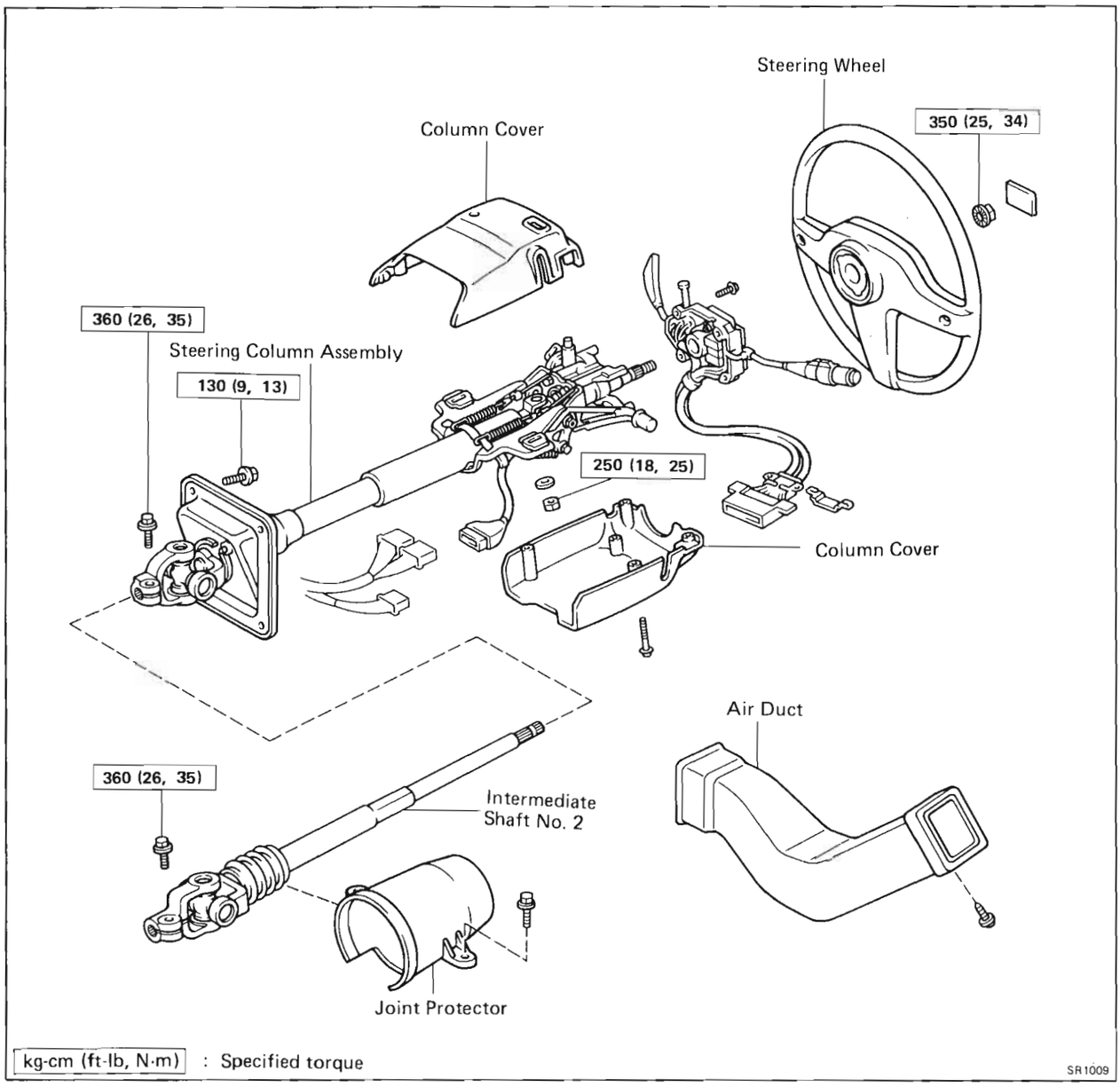
Oil level: 12 – 17 mm (0.47 – 0.67 in.) from top

If low, fill with gear oil and check for oil leaks.

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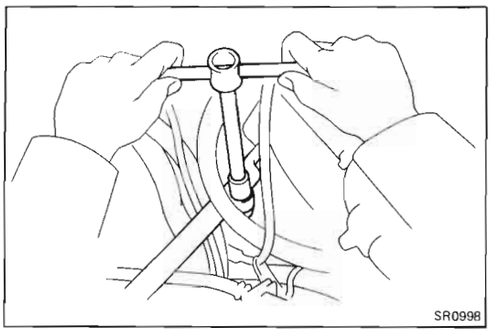
STEERING COLUMN ASSEMBLY WITH TILT STEERING

REMOVAL OF STEERING COLUMN ASSEMBLY

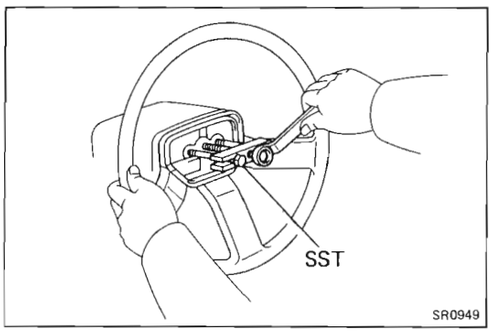


1. DISCONNECT NEGATIVE CABLE FROM BATTERY

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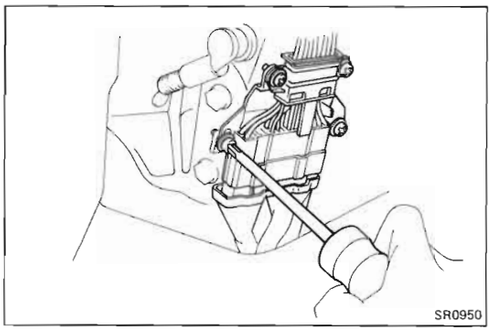


2. DISCONNECT NO. 1 AND NO. 2 INTERMEDIATE SHAFTS
   (a) Place matchmarks on the joint yoke of the No. 1 and No. 2 intermediate shaft.
   (b) Remove the set bolt.
   (c) Pull out the intermediate shaft No. 1 from No. 2.



3. REMOVE STEERING WHEEL
   (a) Remove the steering wheel pad.
   (b) Remove the set nut.
   (c) Place matchmarks on the steering wheel and main shaft.
   (d) Using SST, remove the steering wheel.

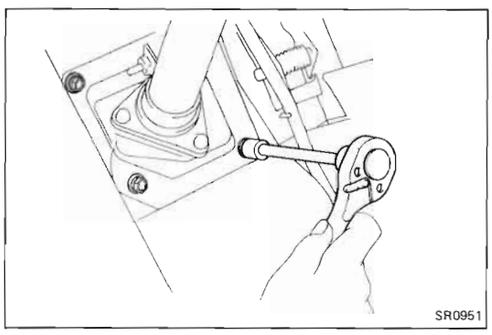
   SST 09609-20011



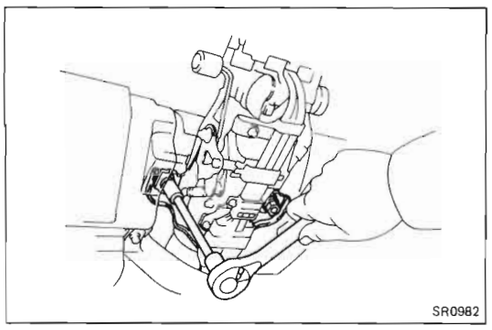
4. REMOVE AIR DUCT

5. REMOVE COLUMN COVER

6. REMOVE COMBINATION SWITCH
   (a) Remove the four screws from the connector.
   (b) Remove the clamp.
   (c) Disconnect the combination switch connector.
   (d) Remove the combination switch.



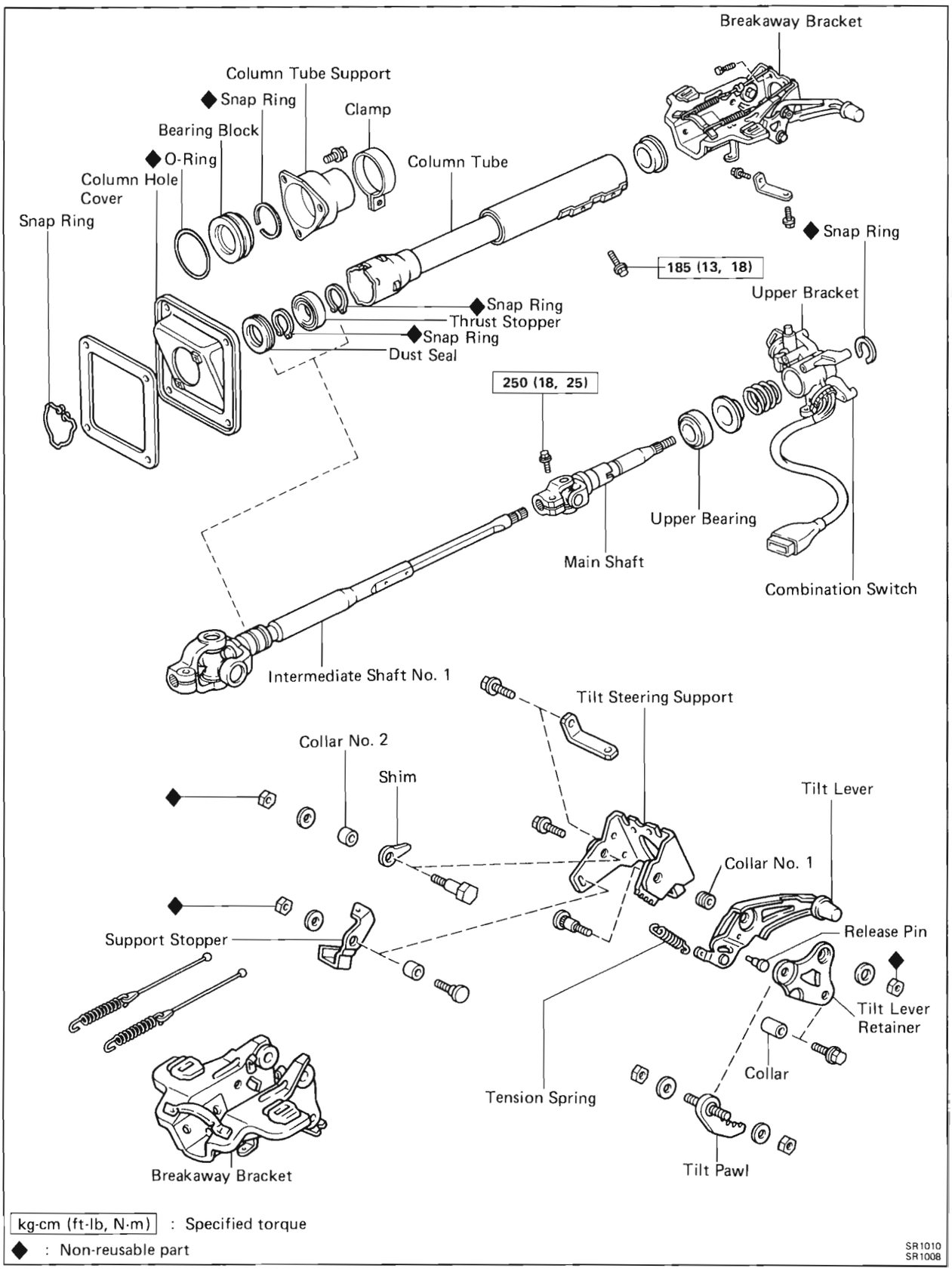
7. REMOVE FOUR BOLTS FROM COLUMN HOLE COVER



8. REMOVE STEERING COLUMN ASSEMBLY
   (a) Disconnect the ignition switch connector.
   (b) Remove the two mount nuts.
   (c) Pull out the steering column assembly.

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COMPONENTS

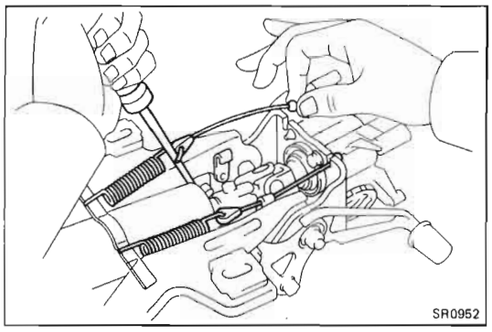


kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

SR1010
SR1008

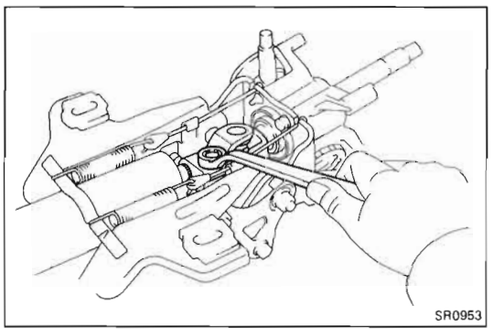
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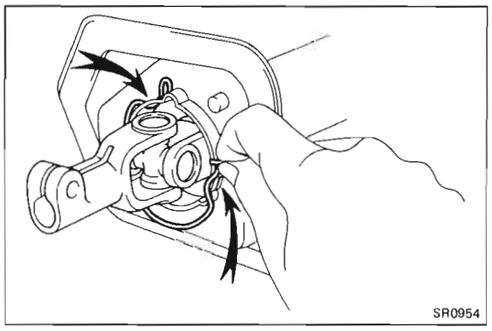
DISASSEMBLY OF STEERING COLUMN ASSEMBLY AND TILT MECHANISM

(See page SR-6)

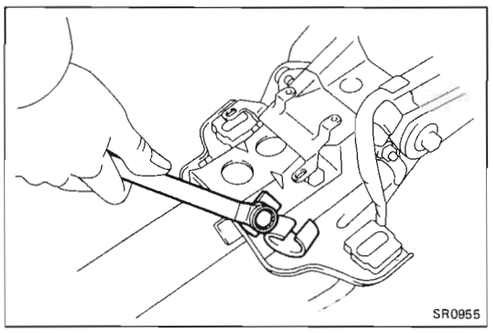
1. REMOVE TENSION SPRINGS AND CORDS
   (a) Fully tilt the main shaft upward.
   (b) Release the cord from the hook.
   (c) Using a screwdriver, pry out the cord tip and remove the spring and cord.



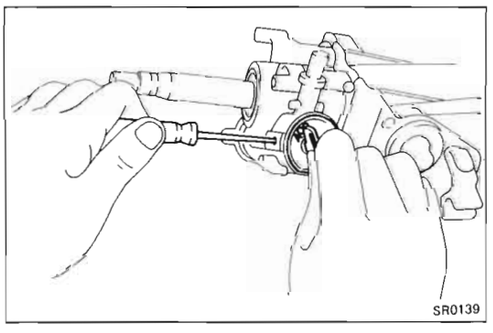
2. DISCONNECT INTERMEDIATE SHAFT FROM MAIN SHAFT
   (a) Place matchmarks on the intermediate shaft and universal joint.
   (b) Remove the bolt.



   (c) Remove the snap ring.
   (d) Pull out the intermediate shaft from the main shaft.

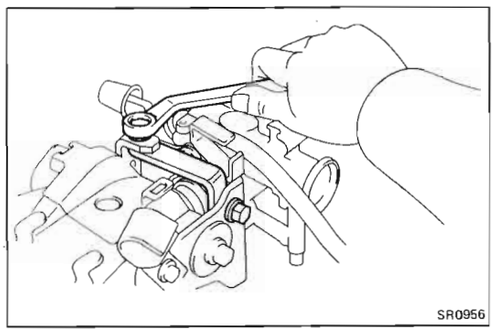


3. REMOVE COLUMN TUBE FROM BREAKAWAY BRACKET
   Remove the four bolts with a clamp.



4. REMOVE IGNITION KEY CYLINDER
   (a) Place the ignition key at the ACC position.
   (b) Push down the stop key with a thin rod, and pull out the key cylinder.

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5. REMOVE UPPER BRACKET WITH MAIN SHAFT FROM BREAKAWAY BRACKET

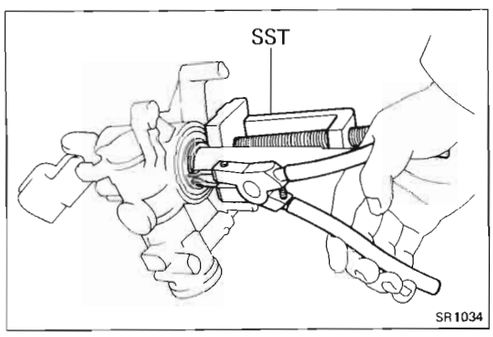
(a) Remove the support reinforcement with two bolts.

(b) Loosen the broken bolt by tapping the chisel.

(c) Remove the three bolts.

(d) Disconnect the upper bracket from the breakaway bracket.

6. REMOVE IGNITION SWITCH



7. REMOVE MAIN SHAFT FROM UPPER BRACKET

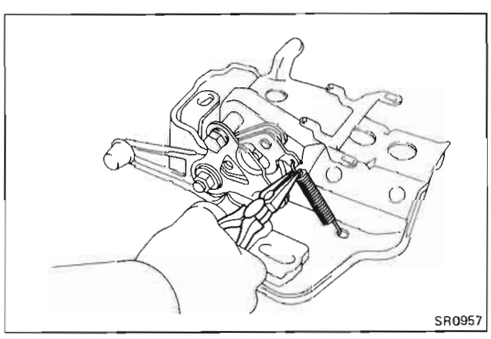
(a) Using SST, compress the main shaft and upper bracket.

SST 09950-20016

CAUTION: Do not overtighten SST.

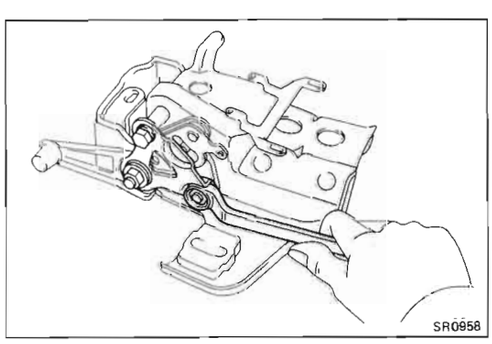
(b) Using snap ring pliers, remove the snap ring.

(c) Loosen SST and remove the main shaft, spring and collar from the upper bracket.



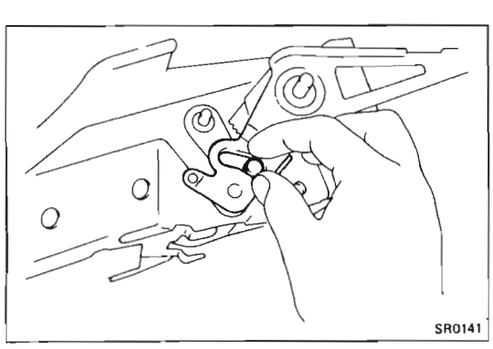
8. DISASSEMBLE TILT STEERING SUPPORT AND BREAKAWAY BRACKET

(a) Remove the tension spring.



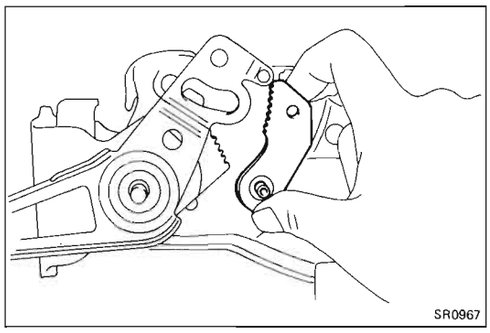
(b) Remove the two nuts and bolt.

(c) Remove the tilt lever retainer and collar.

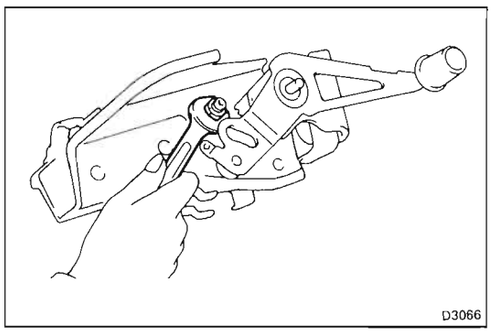


(d) Remove the release pin.

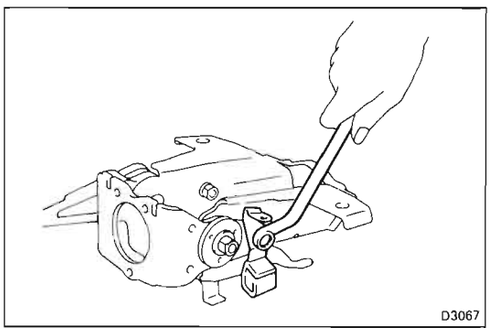
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(e) Remove the tilt steering pawl.

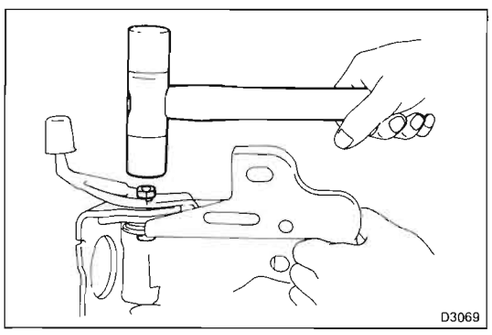


(f) Remove the tilt pawl set bolt.



(g) Remove the nut and support stopper bolt with a clamp.

(h) Remove the tilt lever set nut.

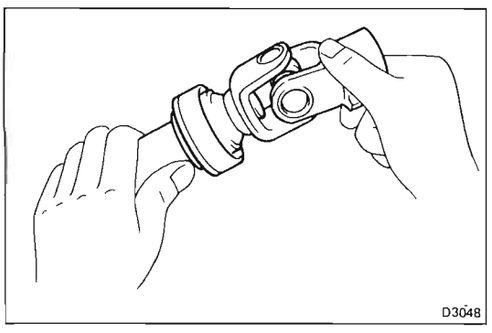


(i) Temporarily install the nut flat with the end of the bolt and tap it with a hammer.

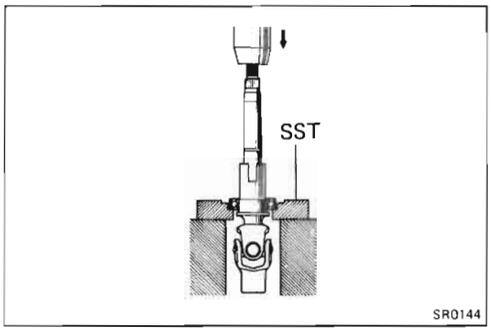
(j) Remove the nut.

(k) Remove the collar and shim.

(l) Remove the another set bolt, nut and collar.



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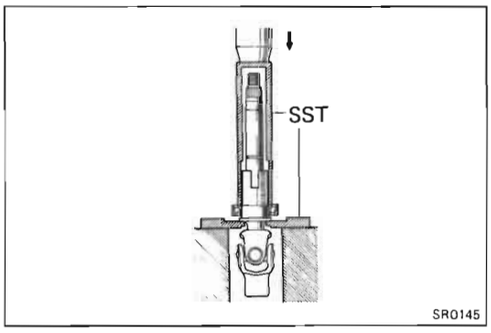
INSPECTION AND REPAIR OF STEERING COLUMN ASSEMBLY

1. IF NECESSARY, REPLACE LOWER BEARING

(a) Using SST and a press, remove the lower bearing from the main shaft.

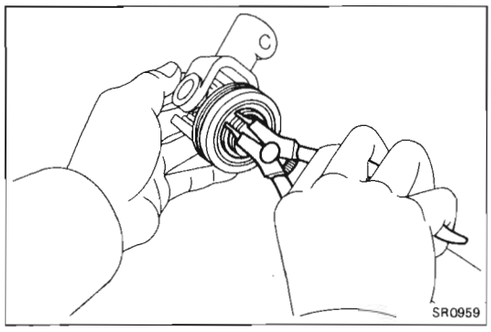
SST 09527-20011

(b) Pack MP grease into the bearing.



(c) Using SST and a press, assemble the lower bearing and main shaft.

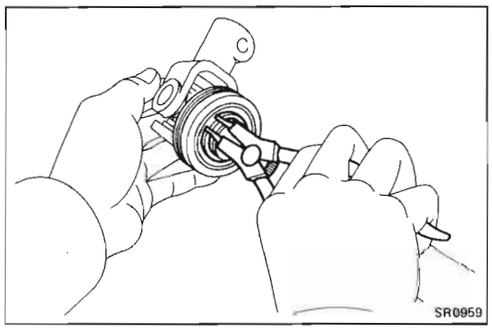
SST 09236-00101 and 09612-22011



2. IF NECESSARY, REPLACE INTERMEDIATE SHAFT BEARING

(a) Using snap ring pliers, remove the snap ring.

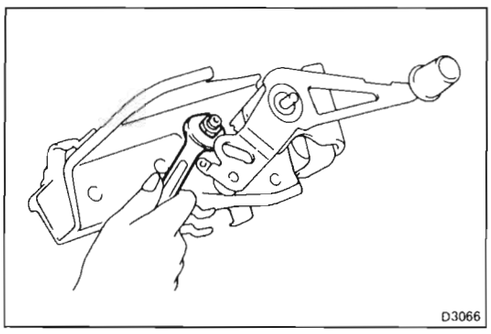
(b) Pull out the bearing from the intermediate shaft.



(c) Install the bearing.

(d) Using snap ring pliers, install the snap ring.

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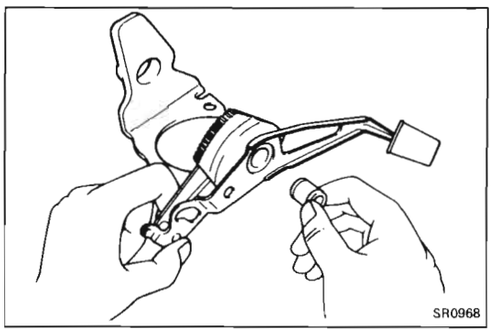


ASSEMBLY OF STEERING COLUMN ASSEMBLY AND TILT MECHANISM

(See page SR-6)

1. COAT ALL RUBBING PARTS WITH MP GREASE

2. ASSEMBLE PAWL SET BOLT
   Torque: 185 kg-cm (13 ft-lb, 18 N·m)



3. ASSEMBLE TILT LEVER TO SUPPORT
   (a) Select a No. 1 collar which will eliminate play.

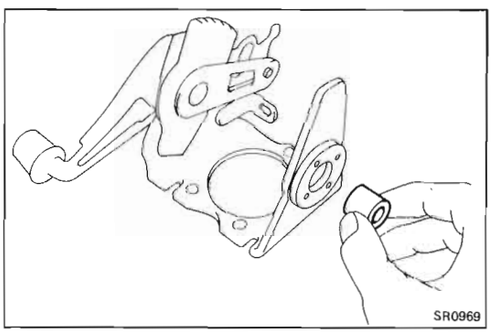
Outer diameter	mm (in.)
17.989 – 17.996	(0.7082 – 0.7085)
17.996 – 18.003	(0.7085 – 0.7088)
18.003 – 18.010	(0.7088 – 0.7091)
18.010 – 18.017	(0.7091 – 0.7093)
18.017 – 18.024	(0.7093 – 0.7096)

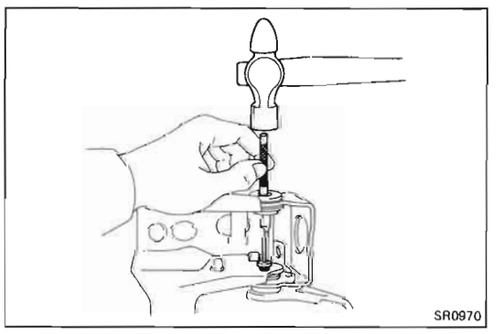
   (b) Install tilt lever and No. 1 collar to the support.

   (c) Select a No. 2 collar which eliminate all play.

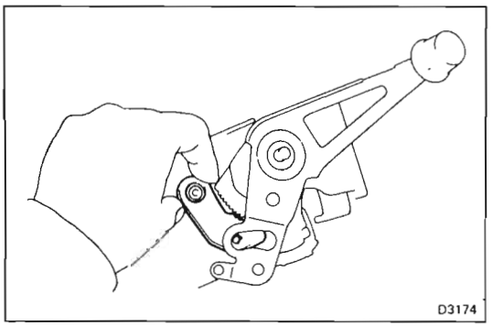
Outer diameter	mm (in.)
17.982 – 18.000	(0.7080 – 0.7087)
18.000 – 18.018	(0.7087 – 0.7094)

   (d) Install No. 2 collar to the support.



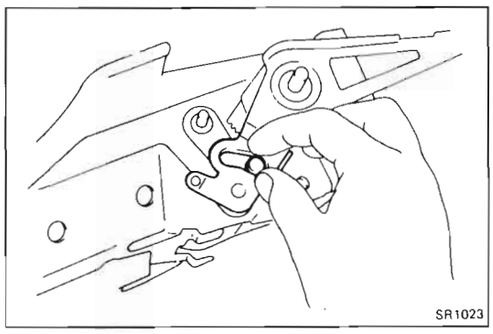


   (e) Drive in the serration bolt to the support.

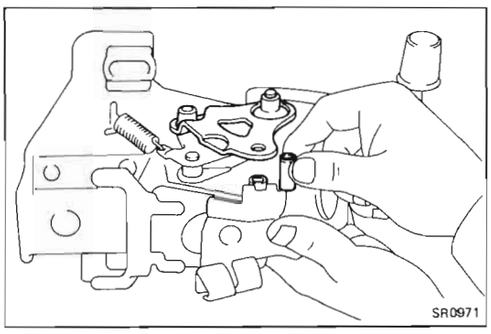


   (f) Install the tilt pawl.

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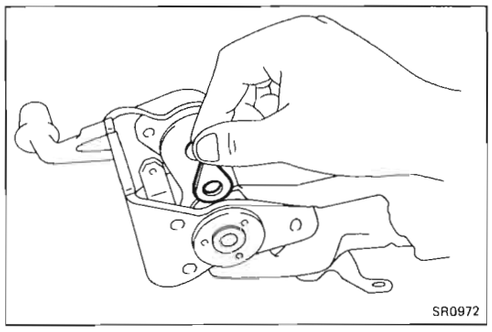


(g) Install the tension spring and the release pin.



(h) Assemble the collar and tilt lever retainer.

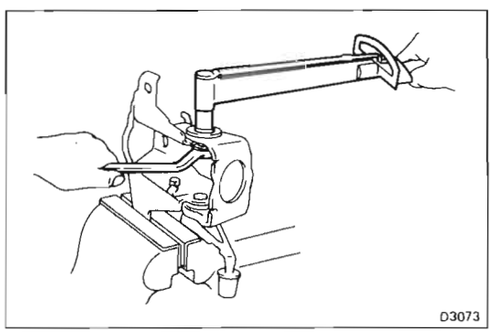
Torque: 185 kg-cm (13 ft-lb, 18 N·m)



4. INSTALL SHIM, BOLT AND NUT

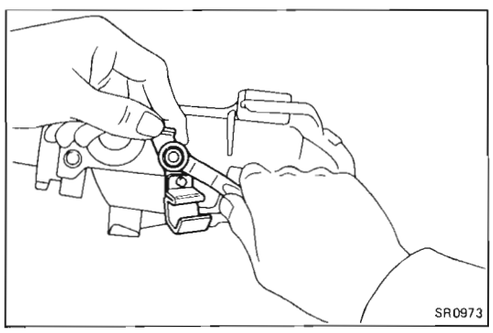
(a) Select a shim which fits snugly when pressed in by hand.

Mark	Thickness	mm (in.)
None	0.197 – 0.203	(0.0078 – 0.0080)
5	0.495 – 0.505	(0.0195 – 0.0199)
8	0.795 – 0.805	(0.0313 – 0.0317)
14	1.395 – 1.405	(0.0549 – 0.0553)
18	1.795 – 1.805	(0.0707 – 0.0711)



(b) Install the shim, bolt, washer and a lock nut.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



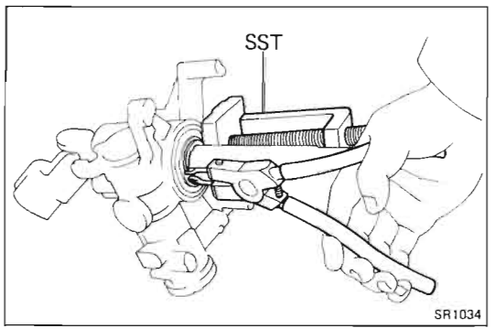
5. INSTALL TILT STEERING SUPPORT STOPPER BOLT

(a) Install the stopper bolt, bracket, washer and nut.

(b) Tighten the nut by holding the bracket with fingers as shown.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

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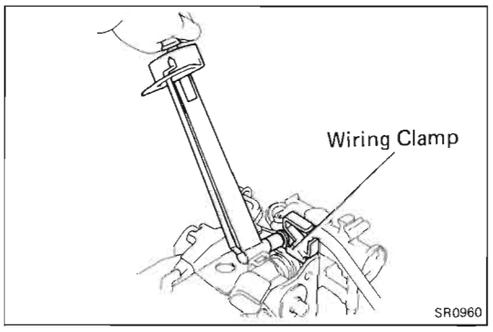
6. ASSEMBLE MAIN SHAFT AND UPPER BRACKET

(a) Assemble the collar, spring and main shaft, and insert them into the bracket.

(b) Using SST and snap ring pliers, install the snap ring by compressing the main shaft and upper bearing.

SST 09950-20016

CAUTION: Do not overtighten SST.



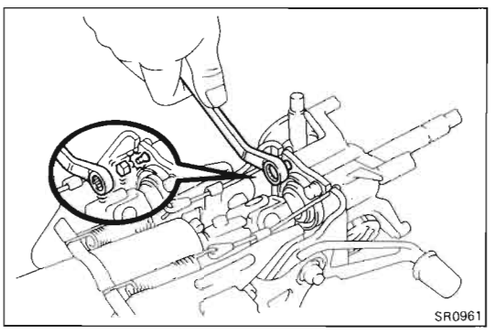
7. ASSEMBLE UPPER BRACKET AND SUPPORT

(a) Apply anaerobic adhesive and sealant [THREE BOND 1324 (Part No. 08833-00070) or equivalent] to 1 or 2 threads of the bolt end.

NOTE: This adhesive will not harden while exposed to air. It will act as a sealer or binding agent only when applied to threads, etc. and air is cut off.

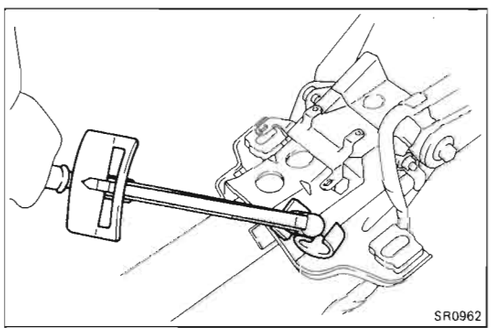
(b) Install the two bolts, and one with a wiring clamp.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



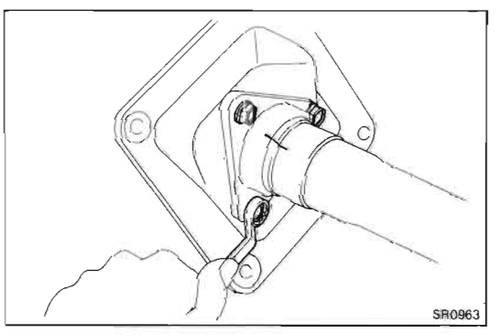
(c) Install the broken bolt and tighten if until the bolt head break off.

(d) Install the support reinforcement.



8. INSTALL BREAKAWAY BRACKET TO COLUMN TUBE

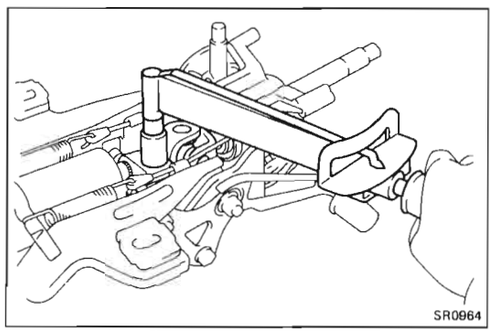
Torque: 185 kg-cm (13 kg-cm, 18 N·m)



9. INSTALL COLUMN HOLE COVER TO COLUMN TUBE

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

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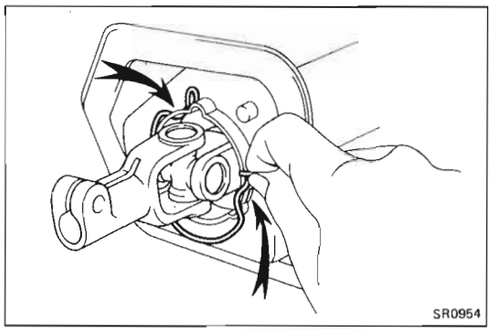


10. CONNECT MAIN SHAFT AND INTERMEDIATE SHAFT

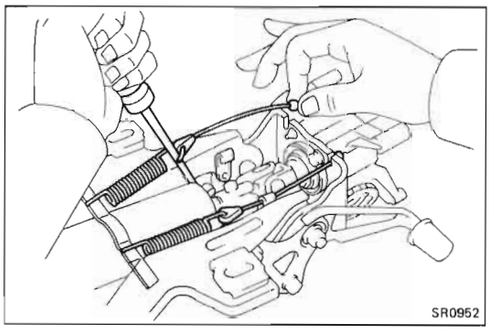
(a) Align the marks on the joint yoke and intermediate shaft and tighten the bolt.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

NOTE: Be careful not to push out the damper seal while installing the intermediate shaft.



(b) Install the snap ring.



11. INSTALL TWO SPRING AND TWO CORDS

(a) Connect the tension spring and cord, and hook the spring to the hanger.

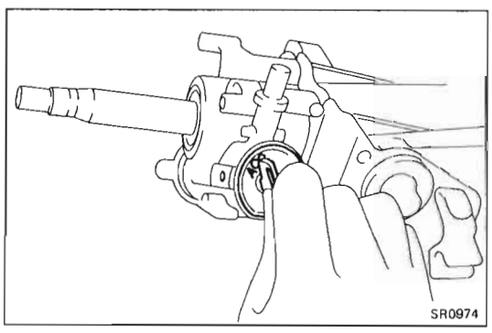
(b) Pry the spring end and hook the cord end to the support.

(c) Hook the cord to the cord guides.

12. CHECK OPERATION OF TILT STEERING LEVER AND SUPPORT

(a) Check that there is no axial or horizontal play at the end of the main shaft.

(b) Check that the main shaft locks securely in all six positions.

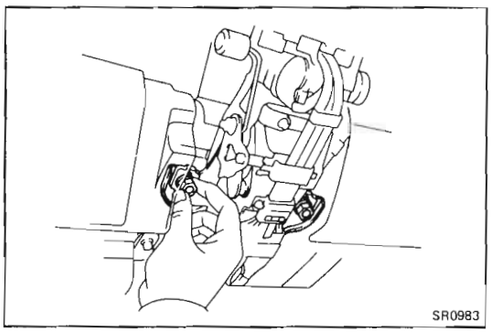


13. INSTALL IGNITION SWITCH

(a) Turn the ignition key plate to the ACC position, and install the key cylinder into the upper bracket.

(b) Install the ignition switch.

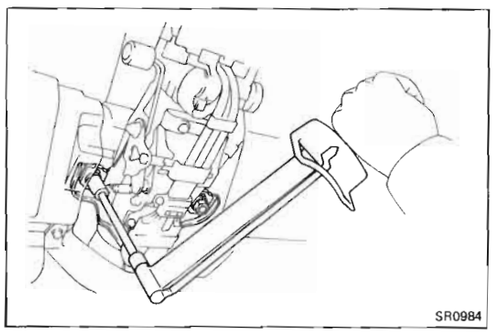
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SR0983

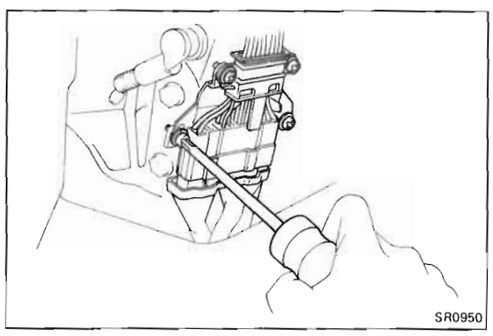
INSTALLATION OF STEERING COLUMN ASSEMBLY

(See page SR-4)

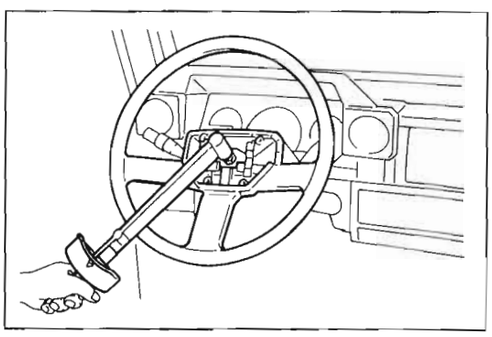
1. INSTALL STEERING COLUMN ASSEMBLY
   (a) Place the steering column assembly in the installed position.
   (b) Temporarily install the two breakaway bracket mount nuts.


SR0984

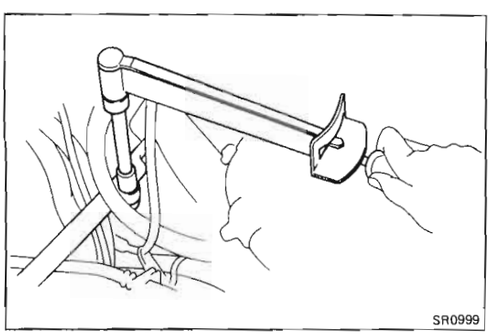
   (c) Install and torque the four column hole cover bolts.
   Torque: 130 kg-cm (9 ft-lb, 13 N·m)
   (d) Torque the two breakaway bracket mount nuts.
   Torque: 250 kg-cm (18 ft-lb, 25 N·m)


SR0950

2. INSTALL COMBINATION SWITCH
   (a) Install the combination switch with the three screws.
   (b) Connect the combination switch connector and ignition switch connector.
   (c) Install clamps.
   (d) Install the connector with the four screws.
3. INSTALL COLUMN COVER AND DUCT



4. INSTALL STEERING WHEEL
   (a) Align matchmarks on the steering wheel and main shaft, and install the steering wheel to the main shaft.
   (b) Install and torque the set nut.
   Torque: 350 kg-cm (25 ft-lb, 34 N·m)
   (c) Install the steering wheel pad.


SR0999

5. CONNECT NO. 1 AND NO. 2 INTERMEDIATE SHAFTS
   (a) Align matchmarks on the joint yoke of the No. 1 and No. 2 intermediate shaft, and connect them.
   (b) Install and torque the set bolt.
   Torque: 250 kg-cm (18 ft-lb, 25 N·m)
6. CONNECT NEGATIVE TERMINAL OF BATTERY
7. CHECK STEERING WHEEL CENTER POINT

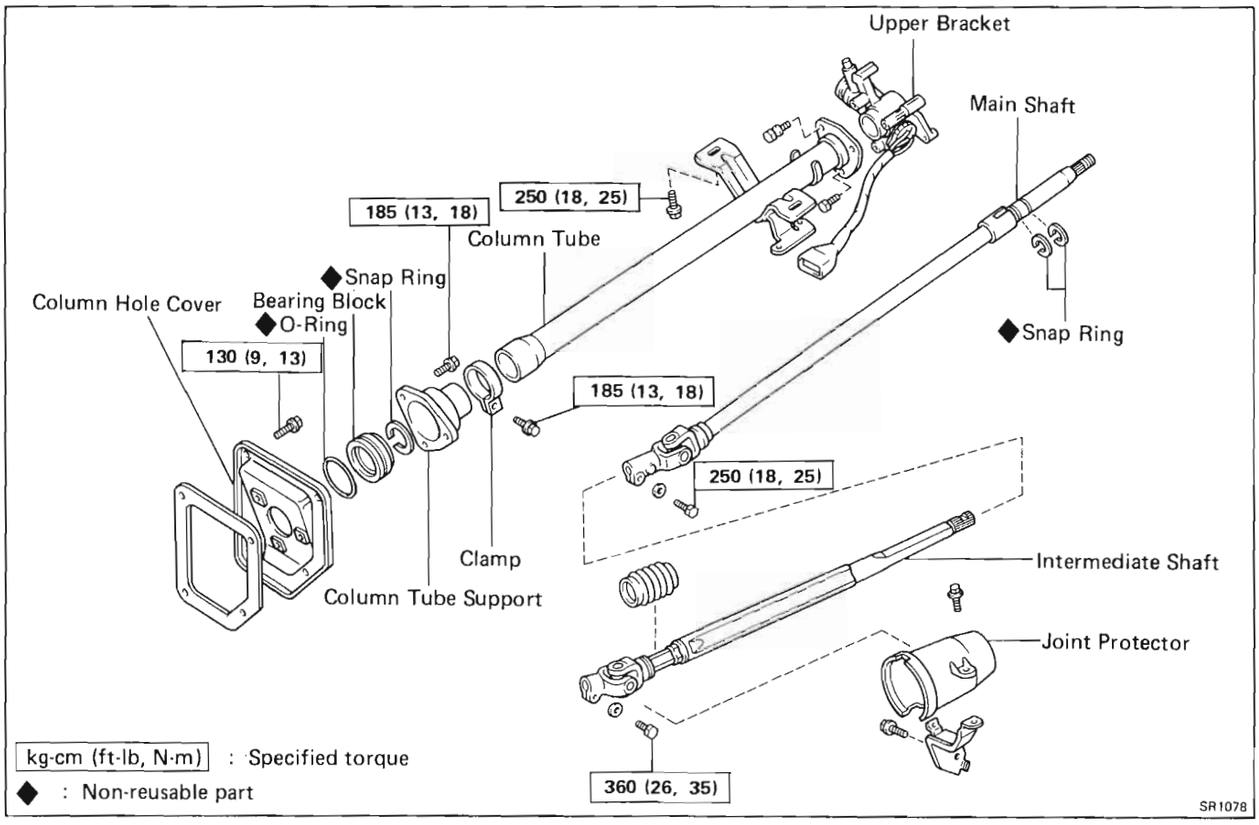
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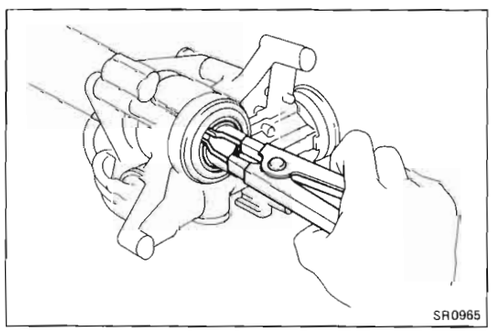
STEERING COLUMN ASSEMBLY

REMOVAL OF STEERING COLUMN ASSEMBLY

(See page SR-4)

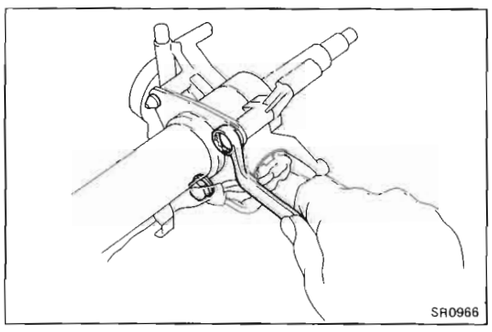
COMPONENTS





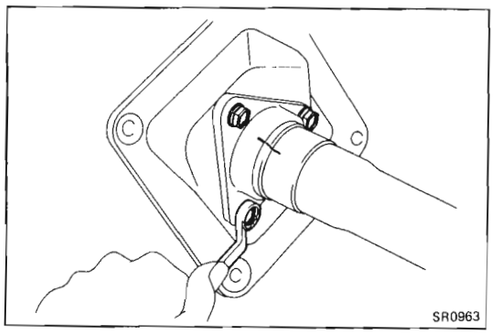
DISASSEMBLY OF STEERING COLUMN ASSEMBLY

1. REMOVE MAIN SHAFT
   (a) Turn ignition key to ACC position.
   (b) Using snap ring pliers, remove the snap ring.
   (c) Pull out the main shaft.



2. REMOVE UPPER BRACKET FROM COLUMN TUBE
   (a) Loosen the broken bolt by tapping the chisel.
   (b) Remove the three bolts.
   (c) Disconnect the upper bracket from the column tube.

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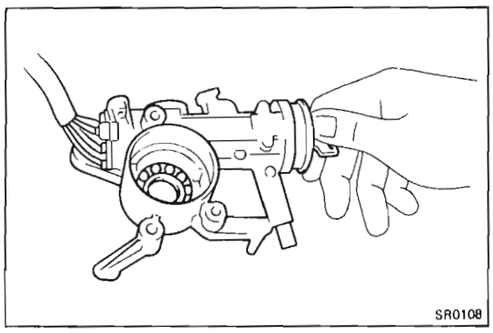


3. **REMOVE COLUMN HOLE COVER FROM COLUMN TUBE**

(a) Remove the three bolts.

(b) Remove the column hole cover.

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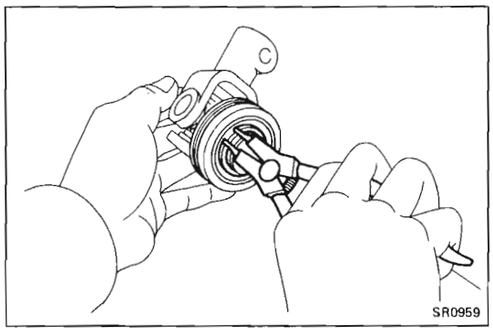
INSPECTION AND REPAIR OF STEERING COLUMN ASSEMBLY

1. INSPECT UPPER BRACKET

(a) Check that the steering lock mechanism operates properly.

(b) Check the upper bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the upper bracket.



2. IF NECESSARY, REPLACE MAIN SHAFT LOWER BEARING

(a) Remove the dust seal.

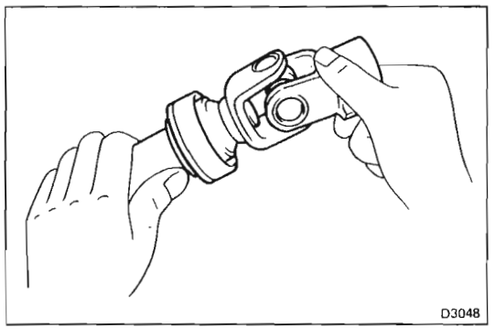
(b) Using snap ring pliers, remove the snap ring.

(c) Pull out the lower bearing.

(d) Push in the lower bearing.

(e) Using snap ring pliers, install the snap ring.

(f) Install the dust seal.

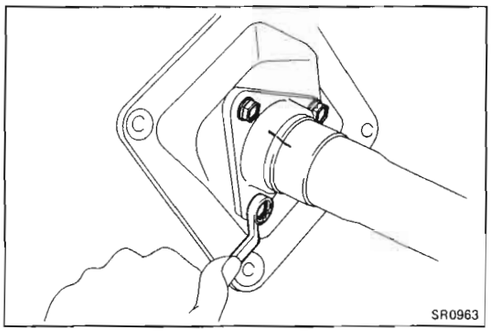


3. INSPECT SPIDER BEARING

Inspect for wear or damage.

If necessary, replace the main shaft.

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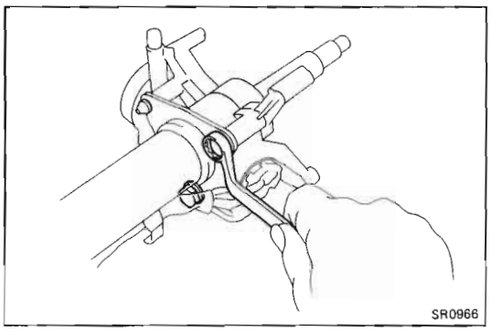
ASSEMBLY OF STEERING COLUMN ASSEMBLY

(See page SR-17)

1. INSTALL COLUMN HOLE COVER TO COLUMN TUBE

   Install the column hole cover with three bolts.

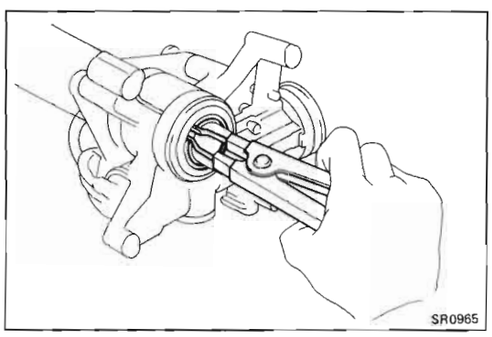
   Torque: 185 kg-cm (13 ft-lb, 18 N·m)



2. INSTALL UPPER BRACKET TO COLUMN TUBE

   Install the upper bracket with three bolts.
   (See SR-13)

   Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



3. INSTALL MAIN SHAFT TO COLUMN TUBE
   (a) Turn the ignition key to ACC position.
   (b) Insert the main shaft in the column tube.
   (c) Using snap ring pliers, install the snap ring.

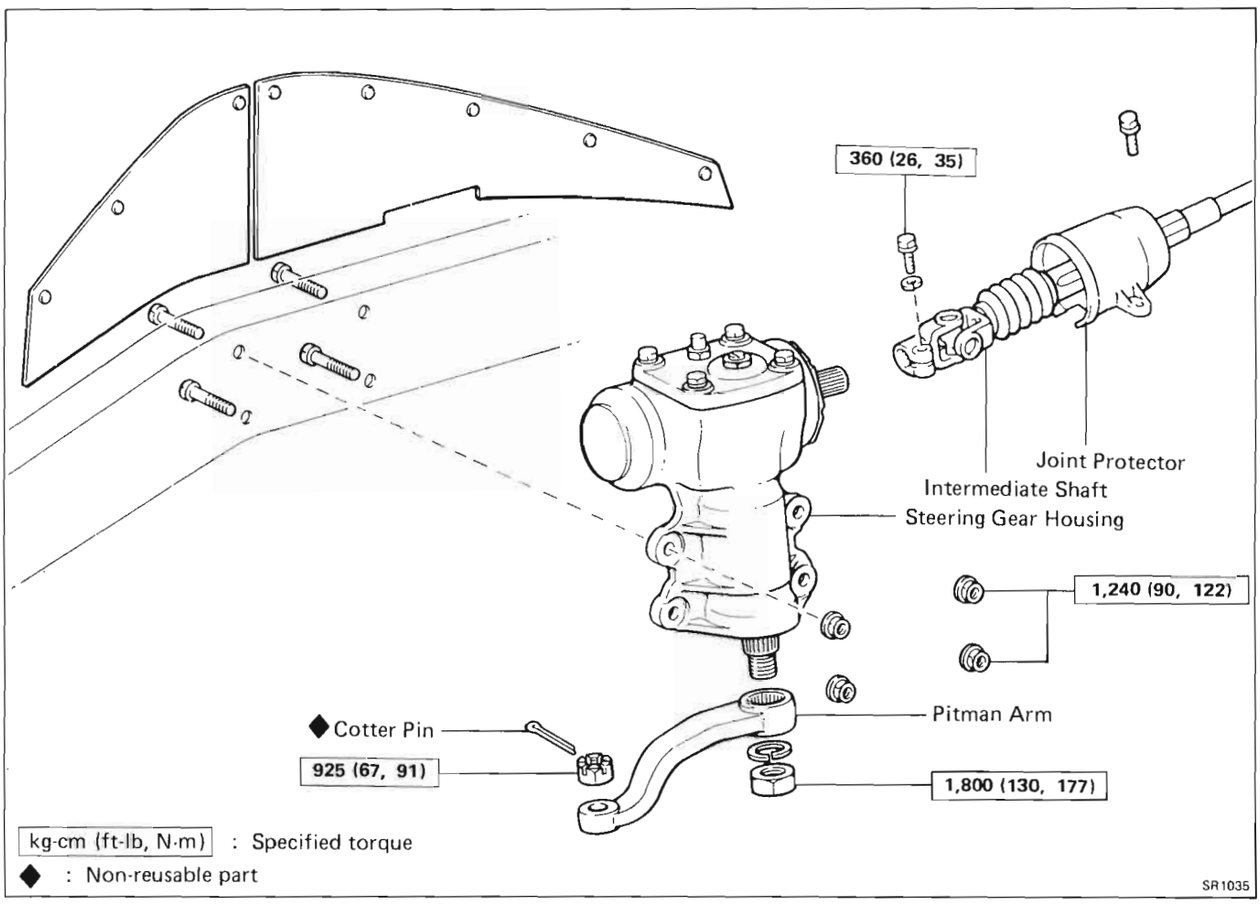
INSTALLATION OF STEERING COLUMN ASSEMBLY

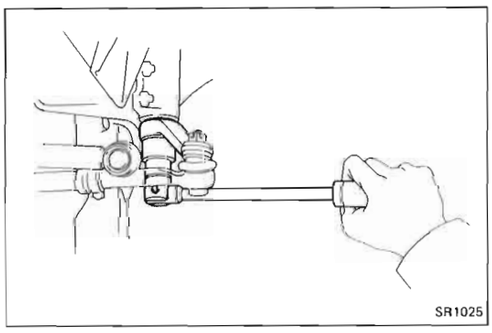
(See page SR-16)

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STEERING GEAR HOUSING

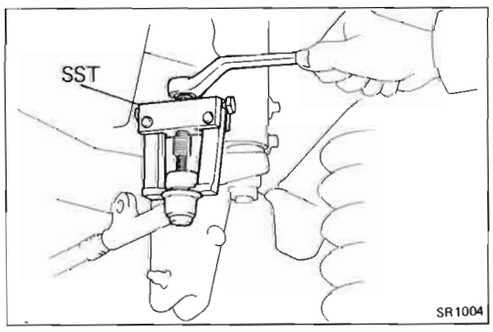
REMOVAL OF GEAR HOUSING





1. **DISCONNECT INTERMEDIATE SHAFT**
   (a) Remove joint protector.
   (b) Place matchmarks on the worn shaft and intermediate shaft joint yoke.
   (c) Remove the two set bolts from joint yokes.
   (d) Disconnect the intermediate shaft from the worn shaft.

2. **LOOSEN PITMAN ARM SET NUT**



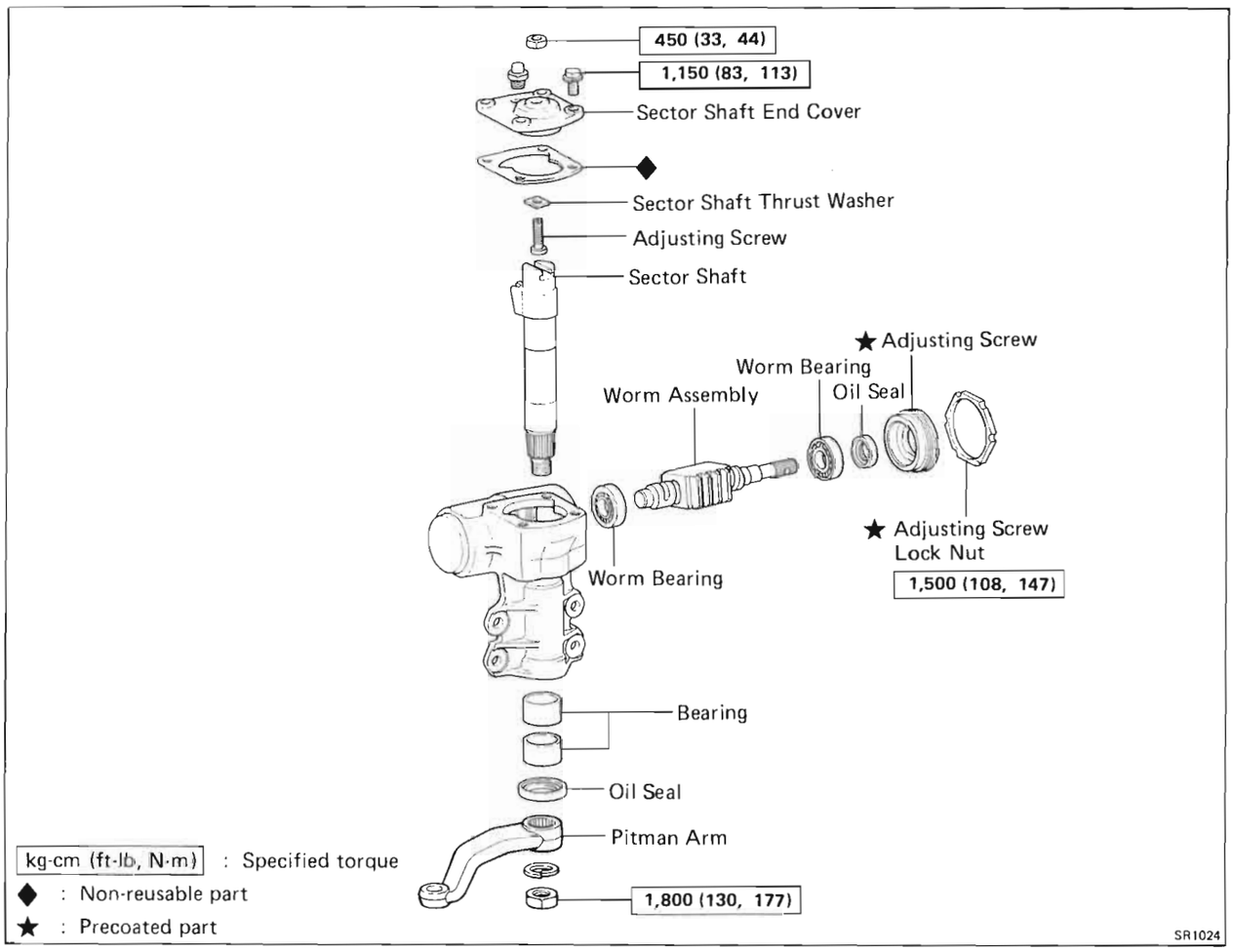
3. **DISCONNECT RELAY ROD FROM PITMAN ARM**
   (a) Remove the cotter pin.
   (b) Remove the set nut.
   (c) Using SST, disconnect the realy rod end from the pitman arm.

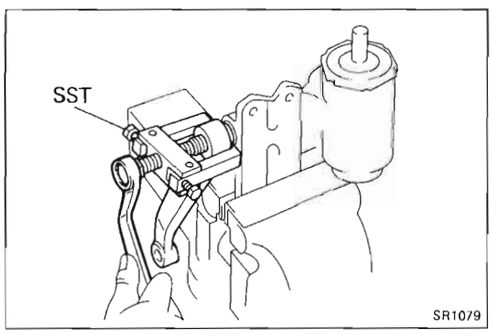
   SST 09628-62011

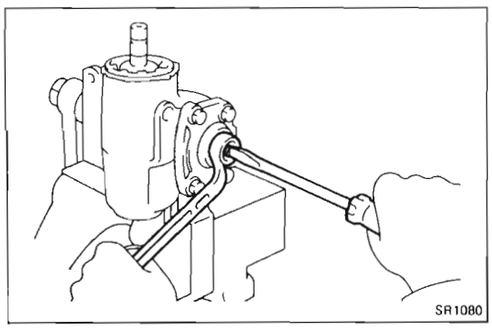
4. **REMOVE GEAR HOUSING**
   Remove the four nuts, four bolts and gear housing.

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COMPONENTS







DISASSEMBLY OF GEAR HOUSING

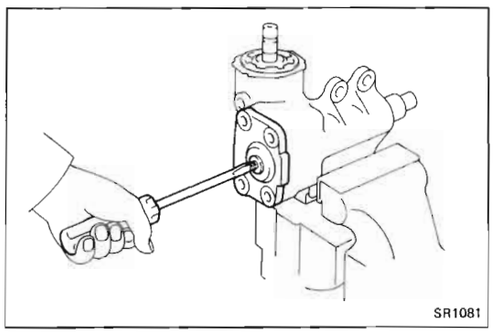
1. REMOVE BREATHER PLUG AND DRAIN GEAR OIL

2. DISCONNECT PITMAN ARM FROM GEAR HOUSING
   (a) Remove the pitman arm set nut.
   (b) Using SST, disconnect the pitman arm from the gear housing.

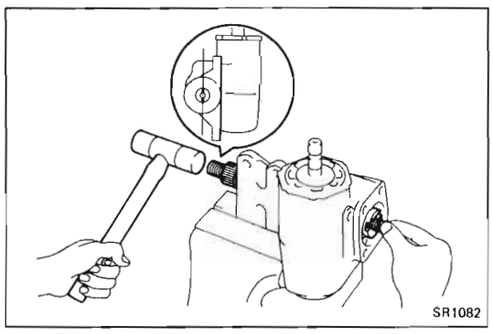
   SST 09628-62011

3. REMOVE END COVER
   (a) Remove the adjusting screw lock nut and four nuts.

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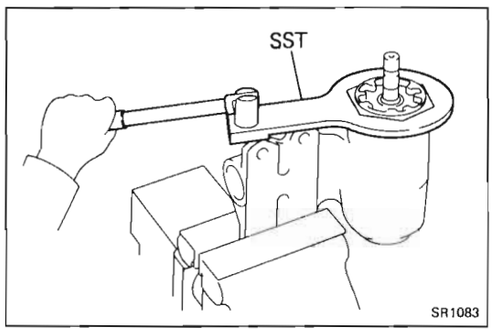
(b) Remove the end cover by turning the adjusting screw clockwise.



4. REMOVE SECTOR SHAFT

(a) Using a plastic hammer, tap out the sector shaft.

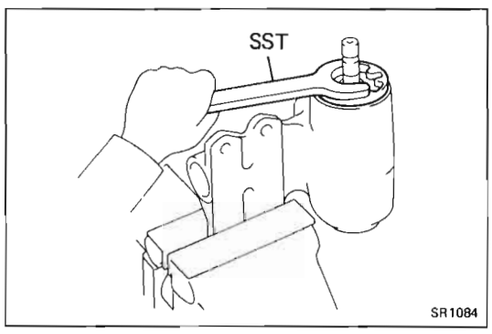
(b) Remove the sector shaft.



5. REMOVE WORM BEARING ADJUSTING SCREW LOCK NUT

Using SST, remove the lock nut.

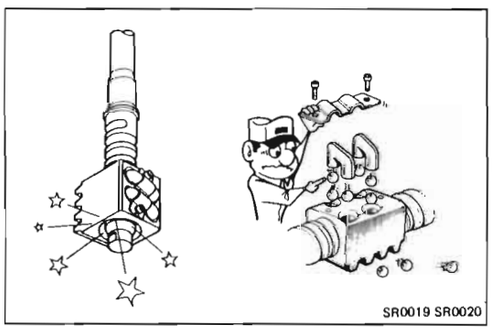
SST 09617-60010



6. REMOVE WORM BEARING ADJUSTING SCREW

Using SST, remove the adjusting screw.

SST 09616-30020

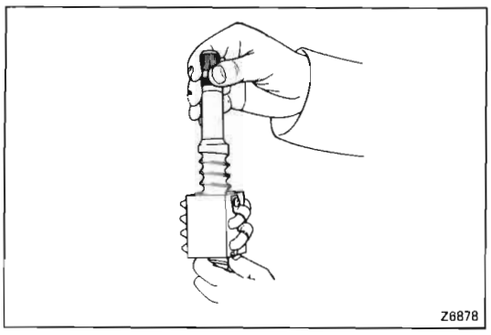


7. REMOVE WORM SHAFT

Pull the worm shaft out of the gear housing.

CAUTION: Do not disassemble the ball nut from the steering worm shaft. Do not allow the ball nut to hit the end of the worm shaft.

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INSPECTION AND REPAIR OF STEERING GEAR HOUSING

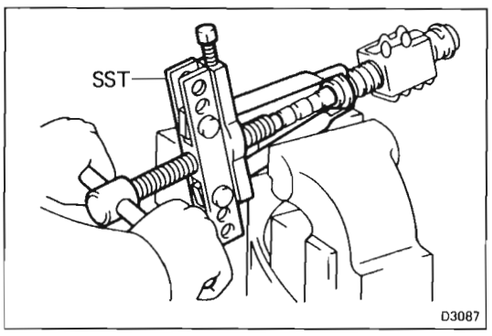
1. INSPECT WORM AND BALL NUT

(a) Check the worm and ball nut for wear or damage.

(b) Check that the nut rotates smoothly down the shaft by its own weight.

If a problem is found, repair or replace the worm.

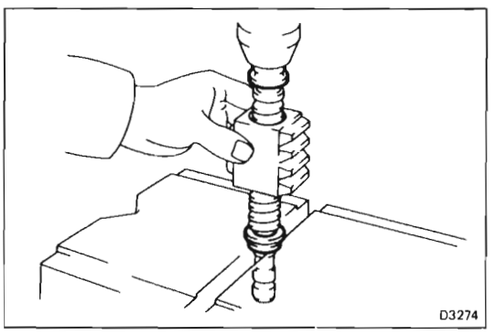
CAUTION: Do not allow the ball nut to hit the end of the worm shaft.



2. IF NECESSARY, REPLACE WORM BEARING

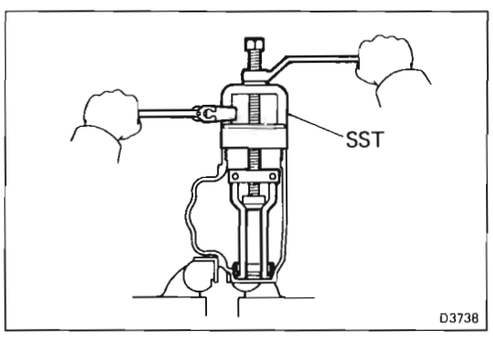
(a) Using SST, remove the both side bearings.

SST 09950-20016



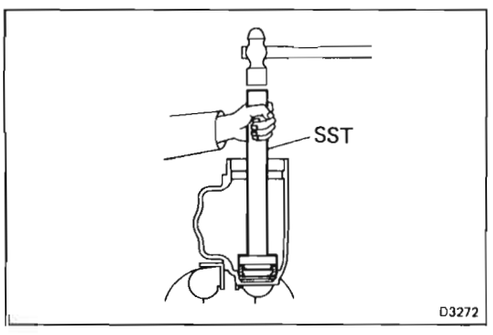
(b) Using a press, install the both side bearings.

CAUTION: Be careful not to damage the ball nut while holding it by hand.



(c) Using SST, remove the outer race from the gear housing.

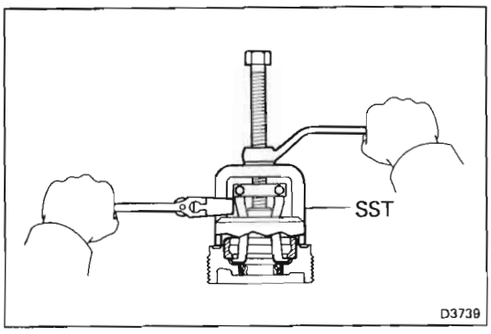
SST 09612-65013



(d) Using SST, drive in the outer race into the gear housing.

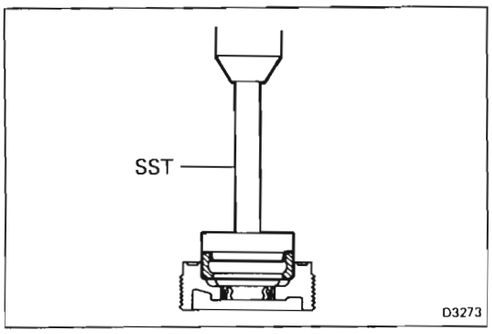
SST 09550-10012

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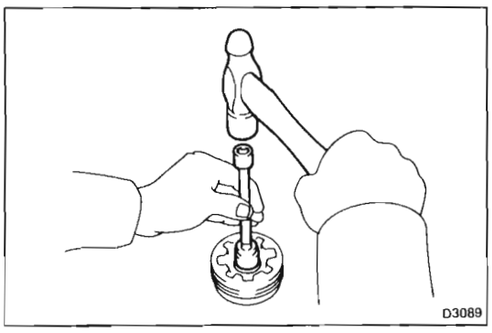
(e) Using SST, remove the outer race from the adjusting screw.

SST 09612-65013



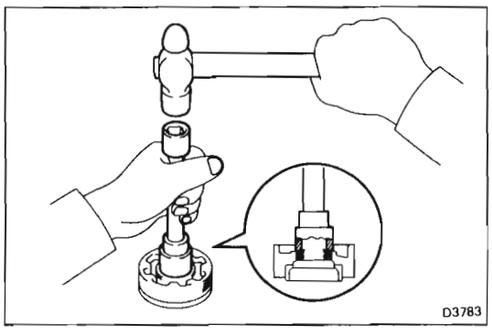
(f) Using SST, press in the outer race into the adjusting screw.

SST 09550-10012

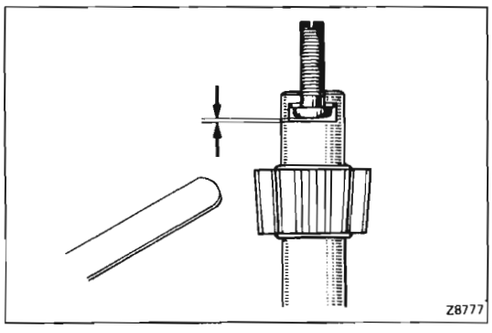


3. IF NECESSARY, REPLACE WORM SHAFT OIL SEAL

(a) Using a 19-mm socket wrench, drive out the oil seal.



(b) Using a 23-mm socket wrench, drive in the oil seal.



4. MEASURE SECTOR SHAFT THRUST CLEARANCE

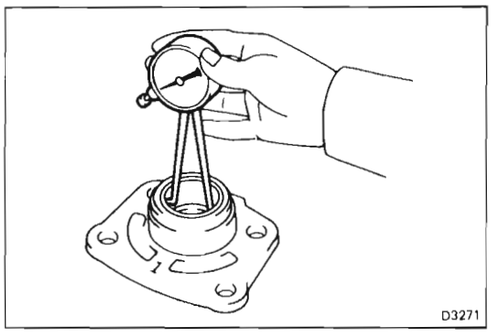
Using a feeler gauge, measure the shaft oil clearance.

Maximum clearance: 0.05 mm (0.0020 in.) or less

If necessary, install a new thrust washer to provide the minimum clearance between the sector shaft and adjusting screw.

Thrust washer thickness			mm (in.)
1.95	(0.0768)	2.05	(0.0807)
2.00	(0.0787)		

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5. INSPECT SECTOR SHAFT END COVER

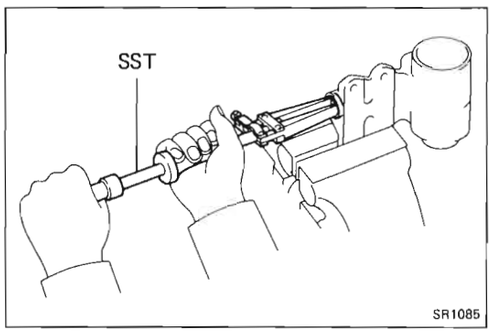
(a) Check for damage.

(b) Check the bushing for wear or damage.

If necessary, replace the end cover.

No.	Bushing inside diameter mm (in.)
1	36.055 – 36.065 (1.4195 – 1.4199)
2	36.045 – 36.055 (1.4191 – 1.4195)
3	36.035 – 36.045 (1.4187 – 1.4191)
4	36.025 – 36.035 (1.4183 – 1.4187)

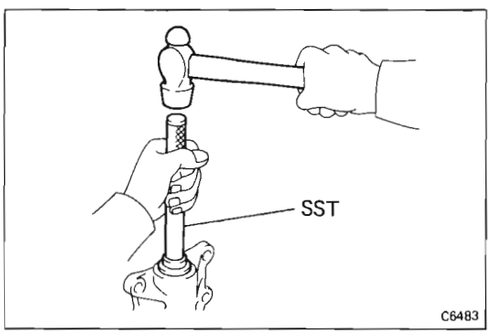
NOTE: When replacing the end cover, replace with one bearing the same number.



6. IF NECESSARY, REPLACE SECTOR SHAFT OIL SEAL

(a) Using SST, remove the oil seal.

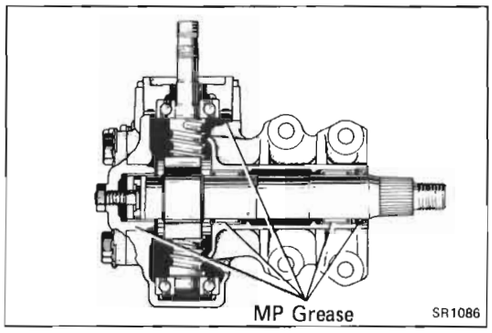
SST 09308-00010



(b) Using SST, drive in the oil seal.

SST 09550-10012

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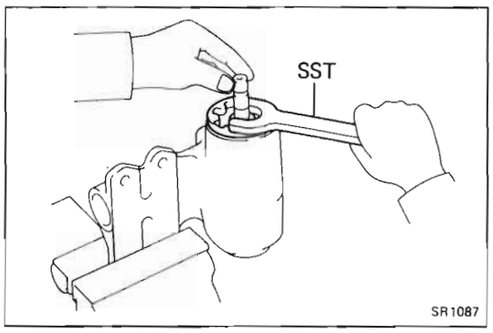
ASSEMBLY OF STEERING GEAR HOUSING

(See page SR-23)

1. APPLY MP GREASE TO BUSHING, NEEDLE ROLLER BEARING AND OIL SEALS

2. INSERT WORM SHAFT INTO GEAR HOUSING

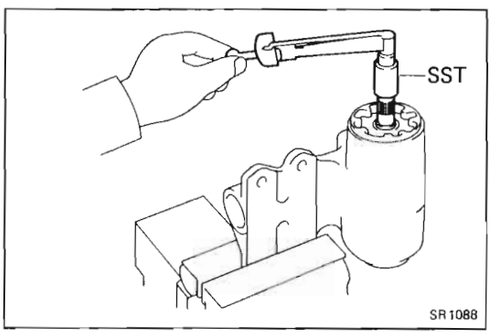
Place the worm bearing on the shaft and insert the shaft into the housing.



3. INSTALL AND ADJUST BEARING ADJUSTING SCREW

(a) Using SST, gradually tighten the adjusting screw until it is snug.

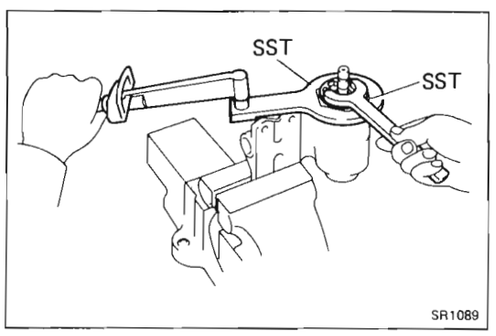
SST 09616-30020



(b) Using a torque meter and SST, measure the bearing preload in both directions. Turn the adjusting screw until the preload is correct.

Preload (starting): 3.5 – 5 kg-cm (3.0 – 4.3 in.-lb, 0.34 – 0.49 N·m)

SST 09616-00010

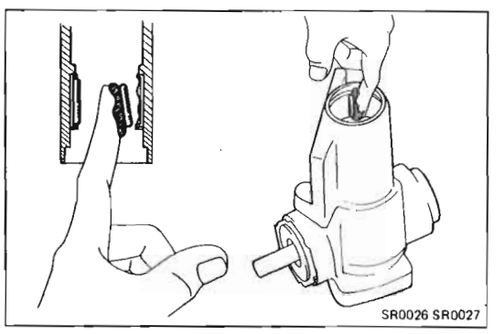


(c) Hold the adjusting screw in position with SST and tighten the lock nut with SST.

Torque. 1,500 kg-cm (108 ft-lb, 147 N·m)

SST 09616-30020 and 09617-60010

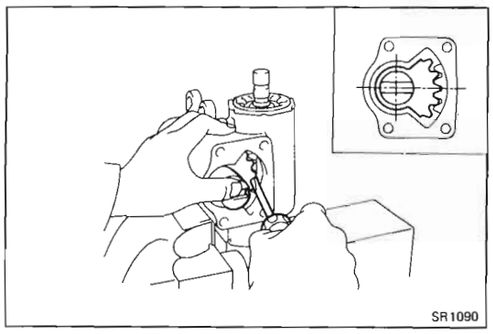
NOTE: Check that the bearing preload is still correct.



4. INSTALL NEEDLE ROLLER BEARING

Apply MP grease to the needle rollers and install them into the housing.

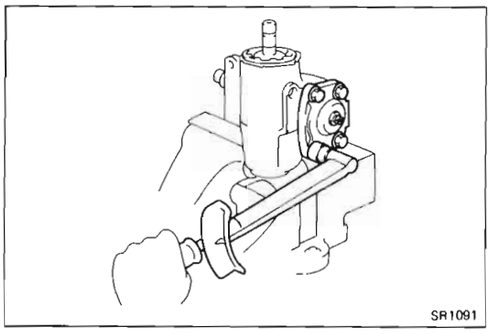
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SR1090

5. INSTALL SECTOR SHAFT

(a) Install the adjusting screw and thrust washer onto the sector shaft.

(b) Set the ball nut at the center of the worm shaft. Insert the sector shaft into the gear housing so that the center teeth mesh together.


SR1091

6. INSTALL END COVER

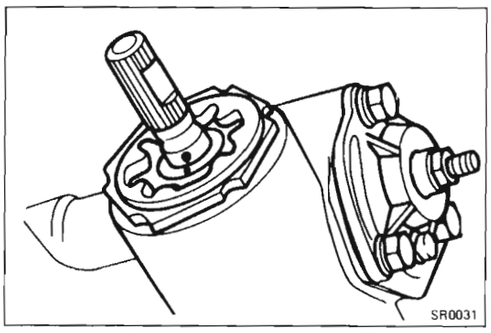
(a) Apply liquid sealer to the gasket and end cover.

(b) Install the end cover over the gasket.

(c) Loosen the adjusting screw as far as possible.

(d) Torque the three cover bolts.

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

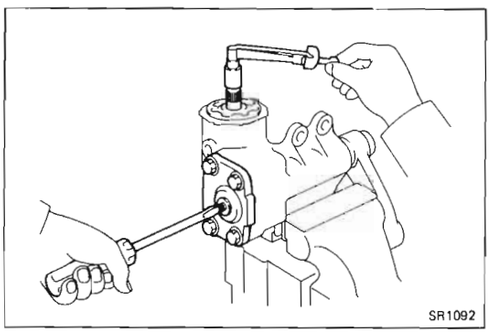

SR0031

7. PLACE WORM SHAFT IN NEUTRAL POSITION

(a) Count the total shaft rotation and turn the shaft back half of that number.

(b) The worm shaft is now in neutral position.

(c) Place matchmarks on the worm shaft and housing to show neutral position.


SR1092

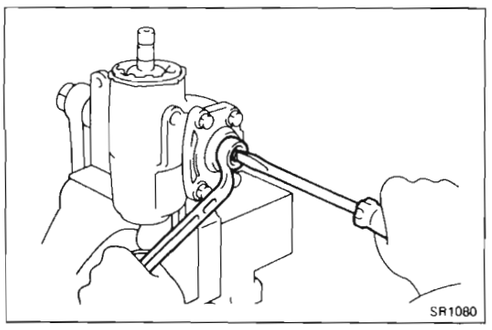
8. ADJUST TOTAL PRELOAD

Using a torque meter and SST, turn the adjusting screw while measuring the preload until the preload is correct.

NOTE: Be sure that the worm shaft is in neutral position.

Preload (starting): 8 — 11 kg-cm (6.9 — 9.5 in.-lb, 0.78 — 1.08 N·m)

SST 09616-00010


SR1080

9. TIGHTEN ADJUSTING SCREW LOCK NUT

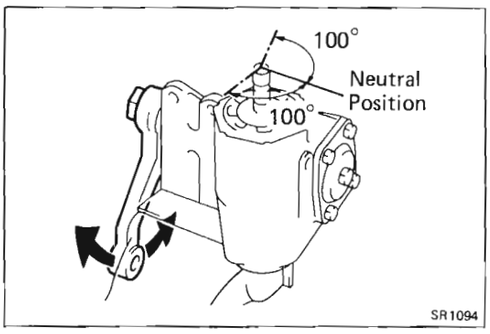
(a) Hold the screw with a screwdriver while tightening the lock nut.

(b) Torque the lock nut.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

NOTE: Check that the preload is still correct.

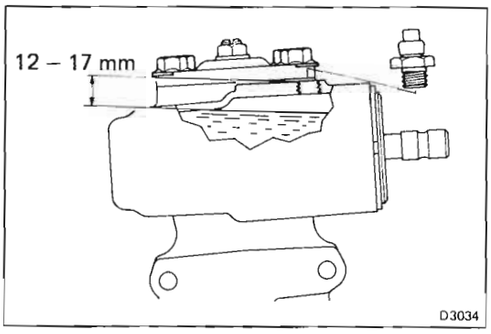
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10. MEASURE SECTOR SHAFT BACKLASH

(a) Align the marks on the sector shaft with the pitman arm. Install the pitman arm and tighten by hand.

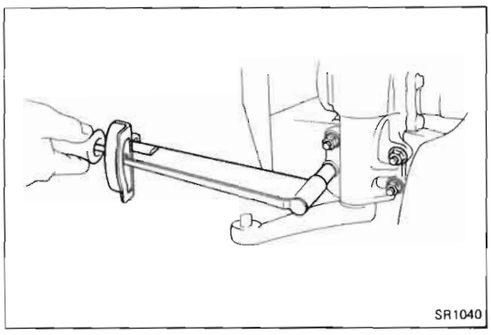
(b) Install the backlash gauge. Check that the sector shaft has no backlash within 100 degrees of the left and right side from neutral position.



11. REPLENISH WITH GEAR OIL

Oil level: 12 – 17 mm (0.47 – 0.67 in.)
Capacity: 630 cc (38.4 cu.in.)

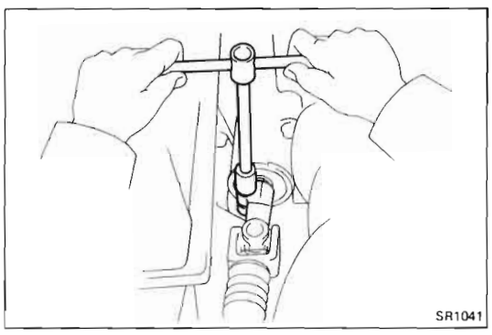
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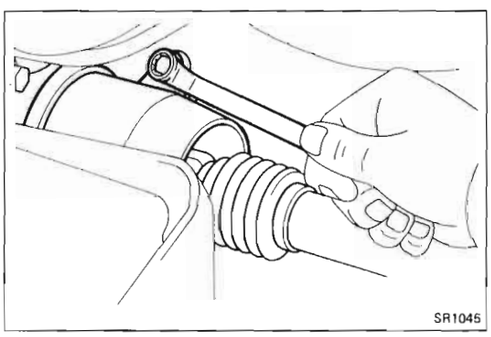
INSTALLATION OF STEERING GEAR HOUSING

(See page SR-23)

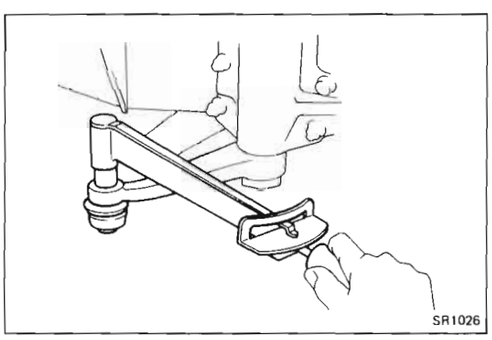
1. INSTALL GEAR HOUSING
   (a) Install the gear housing with the four bolts and nuts.
   Torque: 1,240 kg-cm (90 ft-lb, 122 N·m)



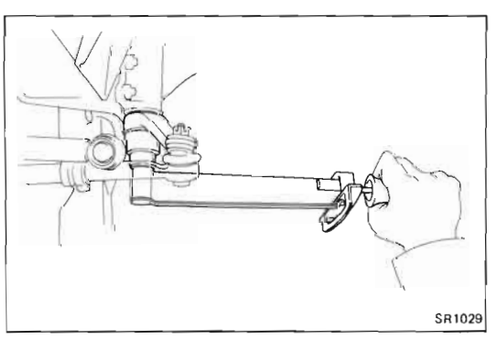
2. CONNECT INTERMEDIATE SHAFT
   (a) Align matchmarks on the worm shaft and intermediate shaft joint yoke and connect them.
   (b) Install and torque the two bolts.
   Torque: 360 kg-cm (26 ft-lb, 36 N·m)



3. INSTALL JOINT PROTECTOR
   (a) Install the joint protector.
   (b) Install and torque the bolt.
   Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)

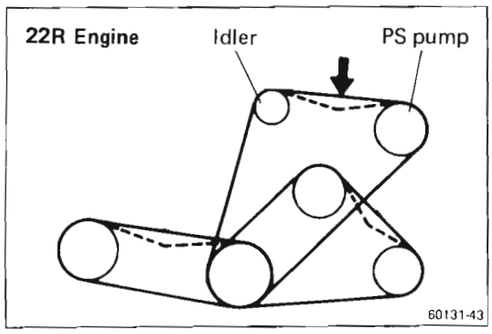


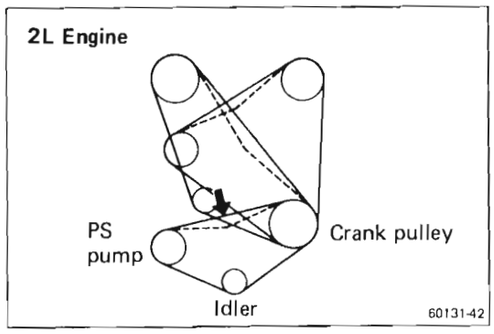
4. CONNECT RELAY ROD END
   (a) Install the pitman arm to the realy rod end.
   (b) Install and torque the nut.
   Torque: 925 kg-cm (67 ft-lb, 91 N·m)
   (c) Install the cotter pin.

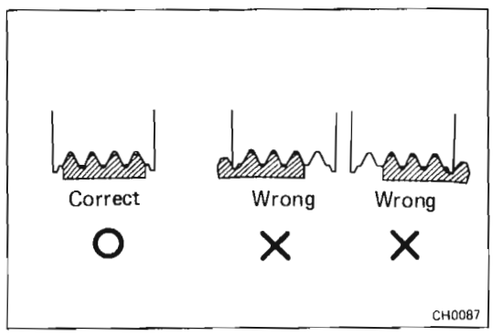


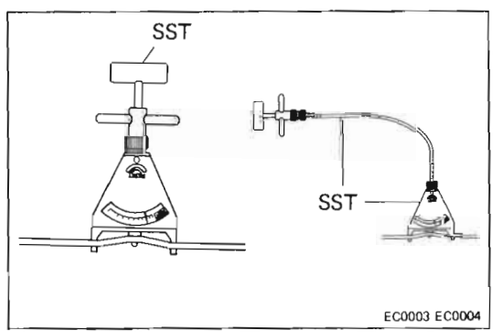
5. TORQUE PITMAN ARM SET NUT
   Torque: 1,800 kg-cm (130 ft-lb, 177 N·m)

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POWER STEERING
On-Vehicle Inspection

CHECKING DRIVE BELT TENSION

Measure the drive belt tension.

Drive belt tension: at 10 kg (22.0 lb, 98 N)

[22R Engine]
New belt 5 – 7 mm (0.20 – 0.28 in.)
Used belt 7 – 11 mm (0.28 – 0.43 in.)

[2L Engine]
New belt 8 – 10 mm (0.31 – 0.39 in.)
Used belt 10 – 15 mm (0.39 – 0.59 in.)

NOTE:
- "New belt" refers to a new belt which has never been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

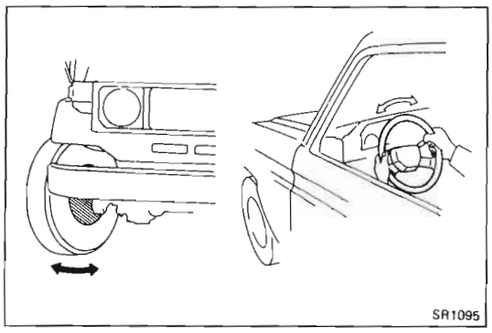
- After installing the drive belt, check that it fits properly in the ribbed grooves.

- Using SST, check the drive belt tension.

SST 09216-00020 and 09216-00030

Drive belt tension:
New belt 45 – 55 kg
Used belt 20 – 35 kg

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SR1095

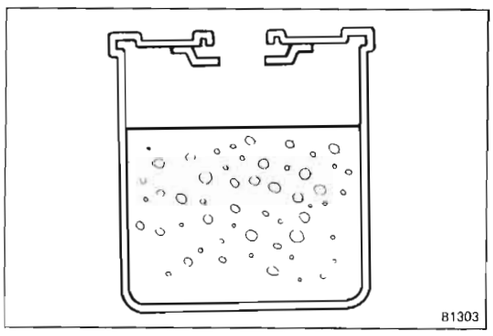
FLUID LEVEL CHECK

1. KEEP VEHICLE LEVEL

2. BOOST FLUID TEMPERATURE

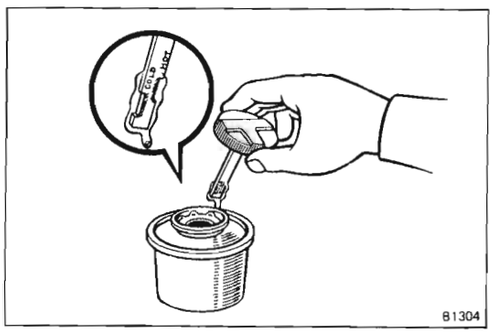
With the engine idling at 1,000 rpm or less, turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)


B1303

3. CHECK FOR FOAMING OR EMULSIFICATION

NOTE: Foaming and emulsification indicate the existence of air in the system or that the fluid level is too low.


B1304

4. CHECK FLUID LEVEL IN RESERVOIR

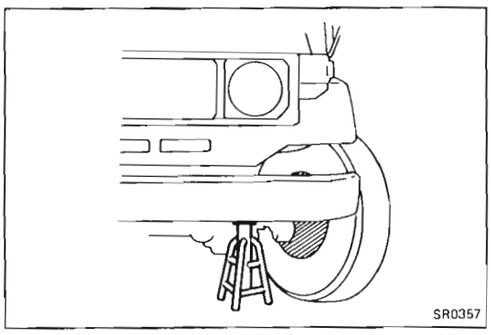
Check the fluid level and add fluid if necessary.

Fluid: ATF DEXRON® or DEXRON® II

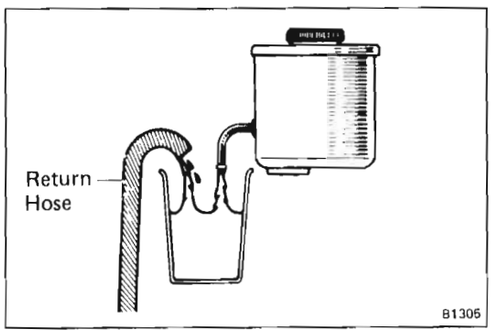
NOTE: Be sure to consider the "HOT" and "COLD" level distinction on the dipstick and check accordingly.

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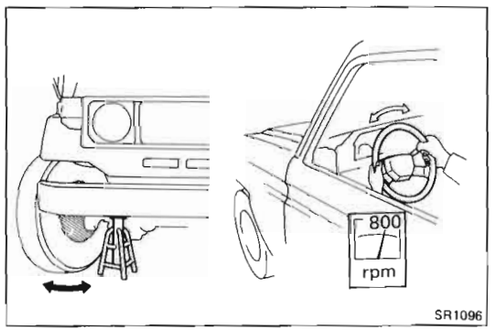
REPLACEMENT OF POWER STEERING FLUID



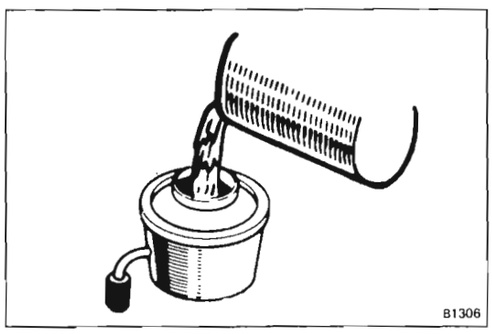
1. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS



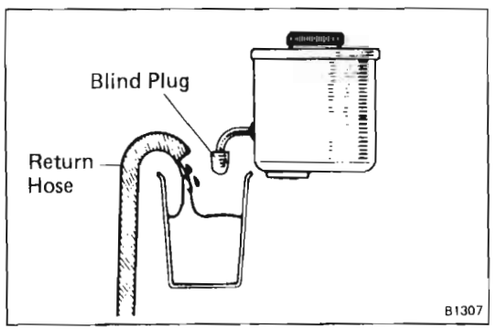
2. REMOVE FLUID RETURN HOSE FROM RESERVOIR TANK AND DRAIN FLUID INTO CONTAINER



3. WITH ENGINE IDLING, TURN STEERING WHEEL FROM LOCK TO LOCK WHILE DRAINING FLUID
4. STOP ENGINE

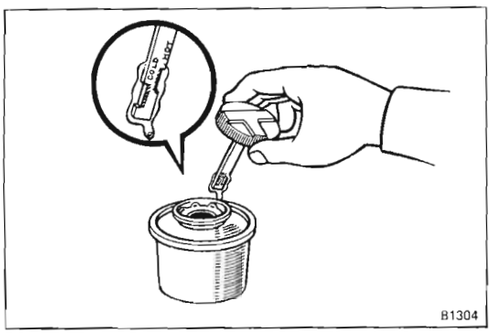


5. FILL RESERVOIR TANK WITH FRESH FLUID
   Fluid: ATF DEXRON® or DEXRON® II



6. START ENGINE AND RUN IT AT 1,000 RPM
   After 1 or 2 seconds, fluid will begin to discharge from the return hose. When this happen, stop the engine immediately.
7. REPEAT STEPS 5 AND 6 FOUR OR FIVE TIMES UNTIL THERE IS NO MORE AIR IN FLUID
8. CONNECT RETURN HOSE TO RESERVOIR TANK
9. BLEED POWER STEERING SYSTEM

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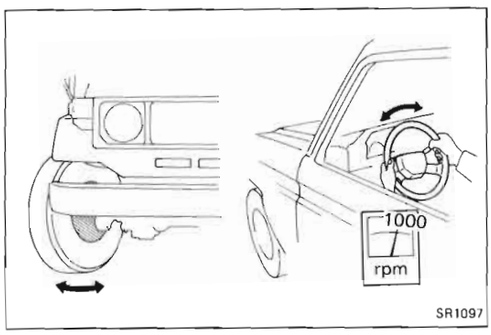
Bleeding of Power Steering System

1. CHECK FLUID LEVEL IN RESERVOIR TANK

Check the fluid level and add fluid if necessary.

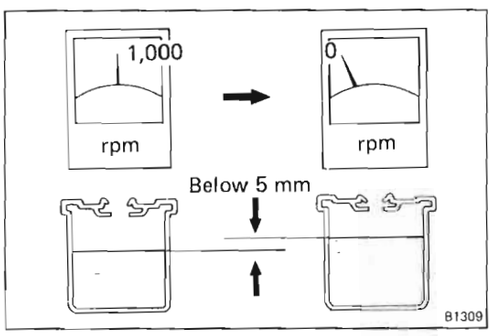
Fluid: ATF DEXRON® or DEXRON® II

NOTE: Check that the fluid level is within the HOT LEVEL of the dipstick. If the fluid is cold, check that it is within the COLD LEVEL of the dipstick.



2. START ENGINE AND TURN STEERING WHEEL FROM LOCK TO LOCK THREE OR FOUR TIMES

Run the engine at 1,000 rpm or less.

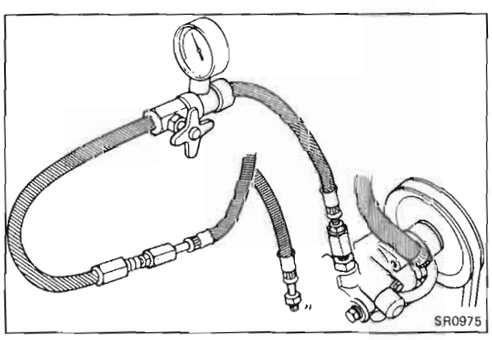


3. CHECK THAT FLUID IN RESERVOIR IS NOT FOAMY OR CLOUDY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED

Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

Maximum rise: 5 mm (0.20 in.)

If a problem is found, repeat steps 7 and 8. Repair the PS pump if the problem persists.



Oil Pressure Check

1. CONNECT PRESSURE GAUGE

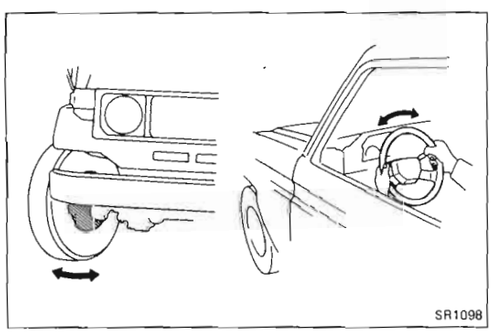
(a) Using SST, remove the pressure line from the PS pump.

SST 09631-22020

(b) Connect the gauge side of the pressure gauge to the PS pump and the PS side to the pressure line.

(c) Bleed the system. Start the engine and turn the steering wheel from lock to lock two or three times.

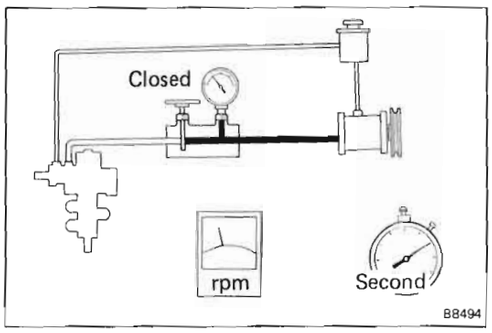
(d) Check that the fluid level is correct.



2. CHECK THAT FLUID TEMPERATURE IS AT LEAST 80°C (176°F)

3. START ENGINE AND RUN IT AT IDLE

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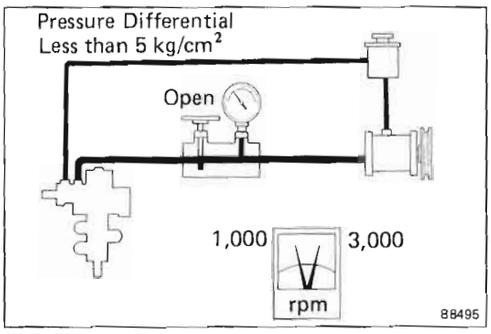
4. CHECK FLUID PRESSURE READING WITH VALVE CLOSED

Close the pressure gauge valve and observe the reading on the gauge.

Minimum pressure: 75 kg/cm² (1,067 psi, 7,355 kPa)

NOTE: Do not keep the valve closed for more than 10 seconds.

If pressure is low, repair or replace the PS pump.



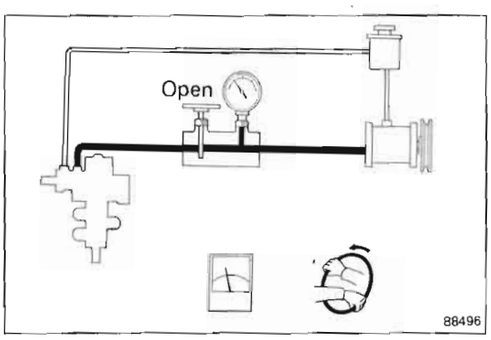
5. OPEN VALVE FULLY

6. CHECK AND RECORD PRESSURE READING AT 1,000 RPM

7. CHECK AND RECORD PRESSURE READING AT 3,000 RPM

Check that there is less than 5 kg/cm² (71 psi, 490 kPa) difference in pressure between the 1,000 rpm and 3,000 rpm checks.

If the difference is greater, repair or replace the PS pump flow control valve.

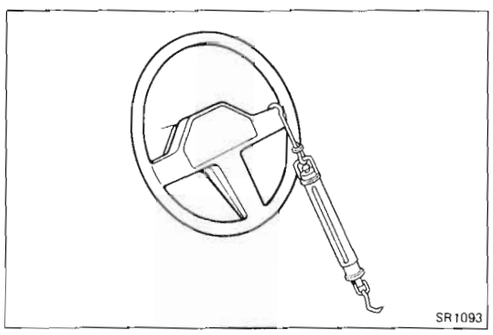


8. CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK

Be sure the pressure gauge valve is fully opened and the engine idling.

Minimum pressure: 75 kg/cm² (1,067 psi, 7,355 kPa)

If pressure is low, the gear housing has an internal leak and must be repaired or replaced.



9. MEASURE STEERING EFFORT

Center the steering wheel and run the engine at idle.

Using a scale, measure the steering effort in both directions.

Maximum steering effort: 4 kg (8.8 lb, 39 N)

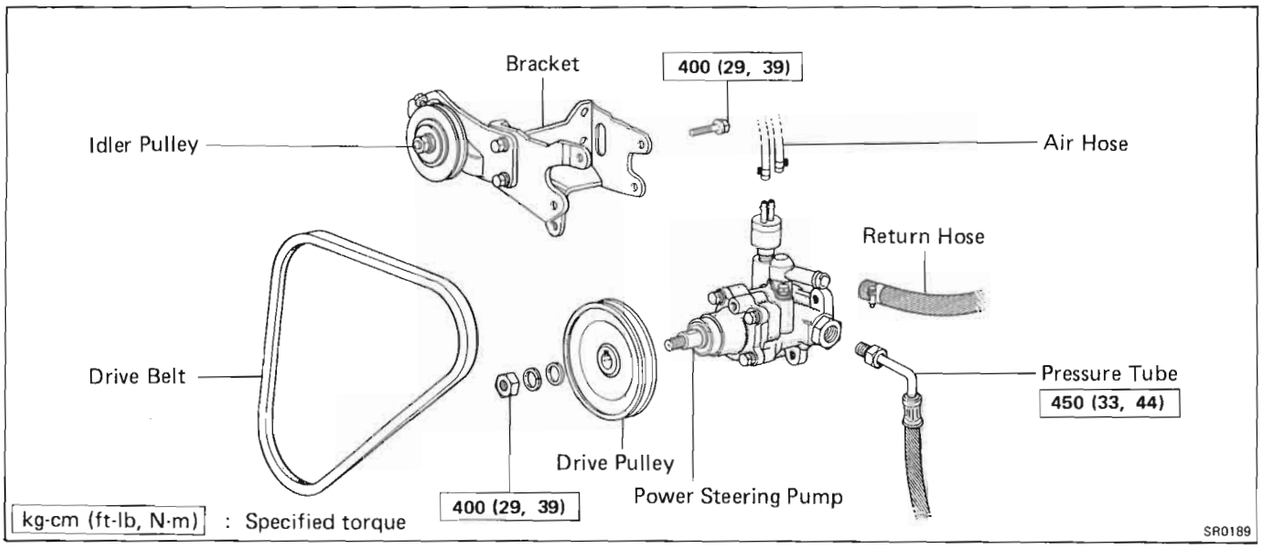
If steering effort is excessive, repair the power steering unit.

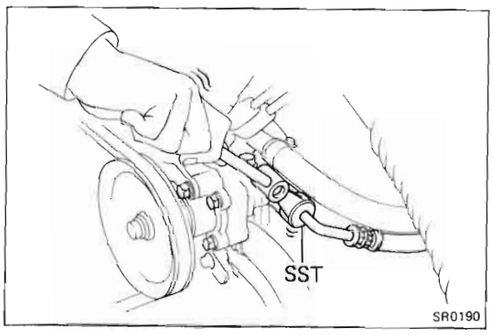
NOTE: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

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Power Steering Pump

REMOVAL OF POWER STEERING PUMP (22R ENGINE)

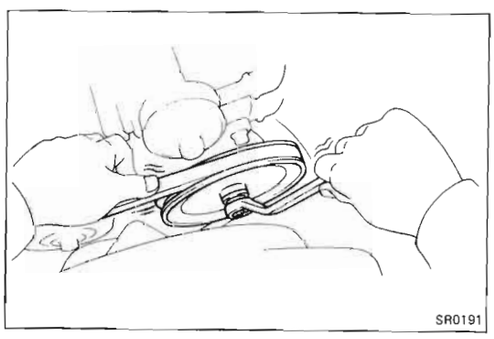




1. DRAW OUT FLUID FROM RESERVOIR TANK
2. DISCONNECT RETURN HOSE FROM POWER STEERING PUMP
3. DISCONNECT PRESSURE TUBE FROM POWER STEERING PUMP

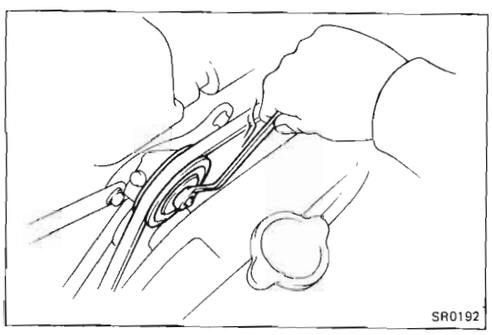
   Using SST, loosen and disconnect the pressure tube.

   SST 09631-22020



4. LOOSEN DRIVE PULLEY NUT

   Push on the drive belt to hold the pulley in place and loosen the pulley nut.



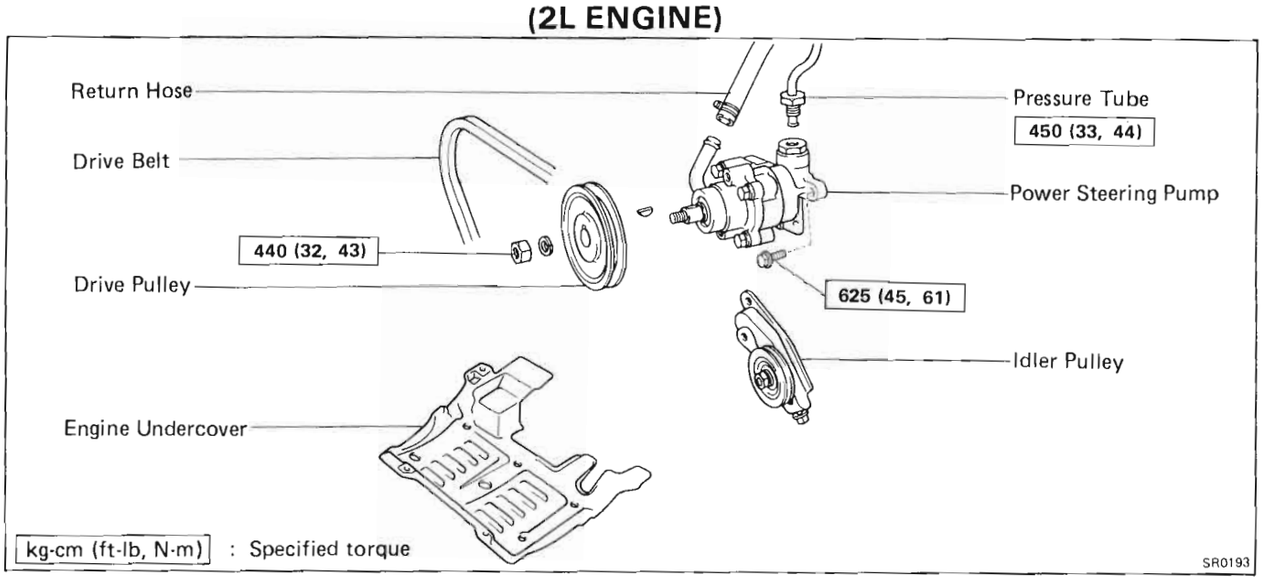
5. REMOVE DRIVE BELT
   (a) Loosen the idler pulley nut.
   (b) Loosen the adjusting bolt and remove the drive belt.
6. REMOVE DRIVE PULLEY AND WOODRUFF KEY
7. REMOVE POWER STEERING PUMP

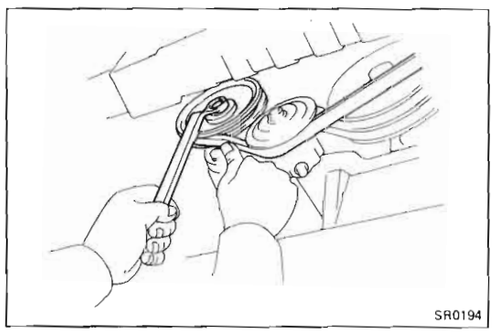
   Remove the PS pump mount bolts, and remove the PS pump from the bracket.

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Power Steering Pump

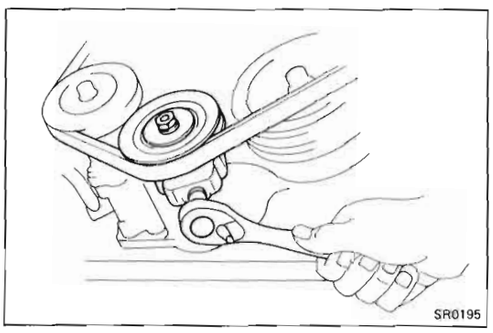
REMOVAL OF POWER STEERING PUMP (2L ENGINE)



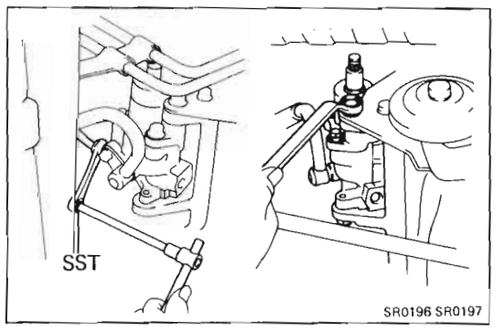


1. REMOVE ENGINE UNDERCOVER
2. DRAW OUT FLUID FROM RESERVOIR TANK
3. LOOSEN DRIVE PULLEY NUT

   Push on the drive belt to hold the pulley in place and loosen the pulley nut.



4. REMOVE DRIVE BELT
   (a) Loosen the idler pulley nut.
   (b) Loosen the adjusting bolt and remove the drive belt.
5. REMOVE DRIVE PULLEY AND WOODRUFF KEY
6. DISCONNECT RETURN HOSE FROM POWER STEERING PUMP



7. DISCONNECT PRESSURE TUBE FROM POWER STEERING PUMP

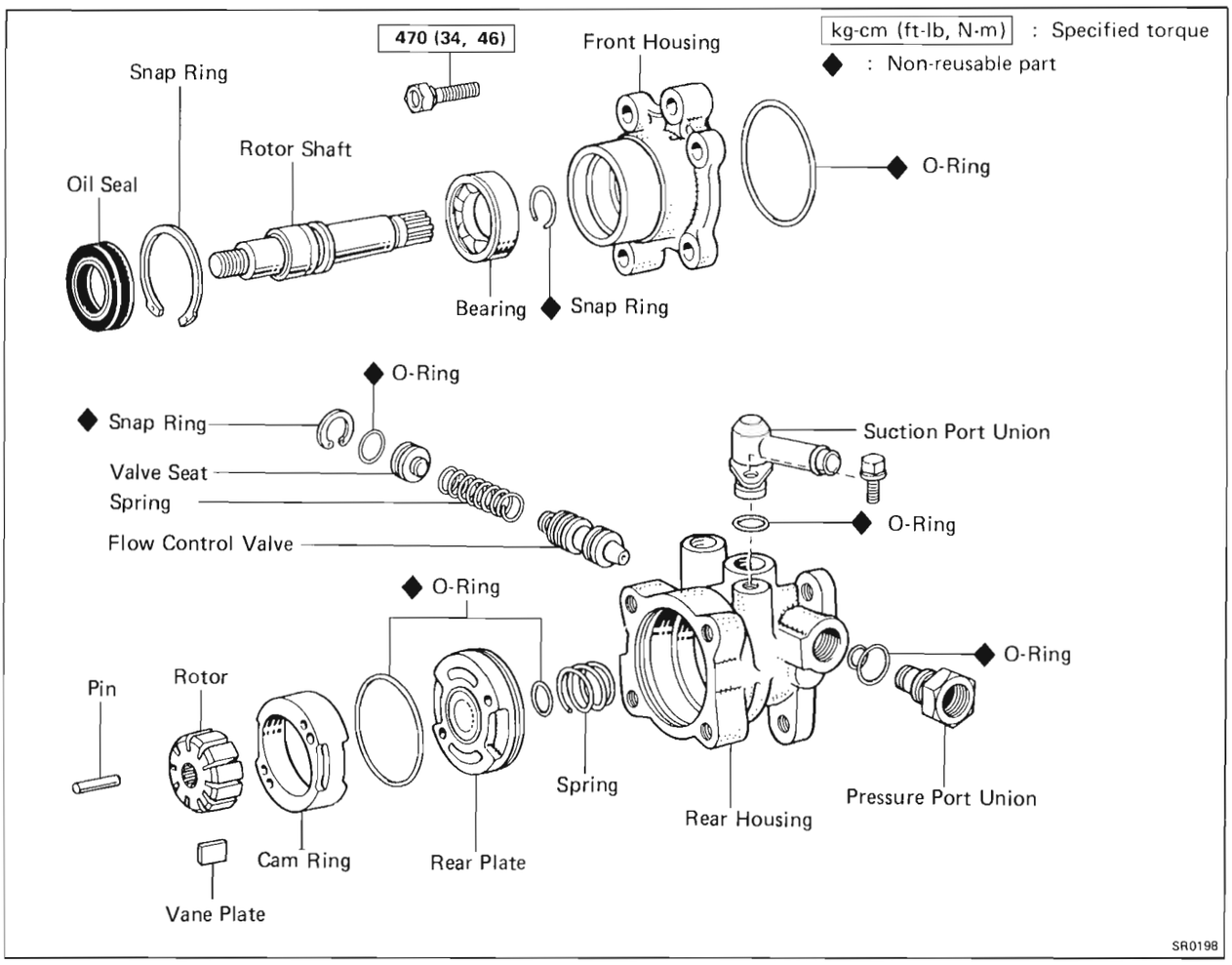
   Using SST, loosen and disconnect the pressure tube.

   SST 09631-22020
8. REMOVE POWER STEERING PUMP

   Remove PS pump mount bolts, and remove the PS pump from the bracket.

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COMPONENTS

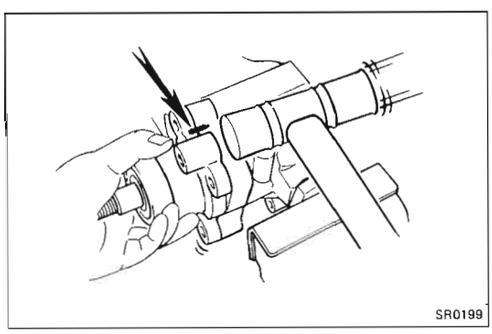


DISASSEMBLY OF POWER STEERING PUMP

1. CLAMP POWER STEERING PUMP IN VISE

   CAUTION: Do not overtighten the vice more than necessary.

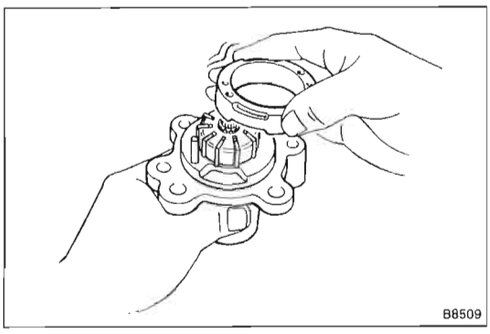
2. REMOVE SUCTION PORT UNION FROM REAR HOUSING



3. REMOVE FRONT HOUSING
   (a) Place matchmarks on the front and rear housing.
   (b) Remove the four front housing bolts.
   (c) Using a plastic hammer, tap off the front housing.

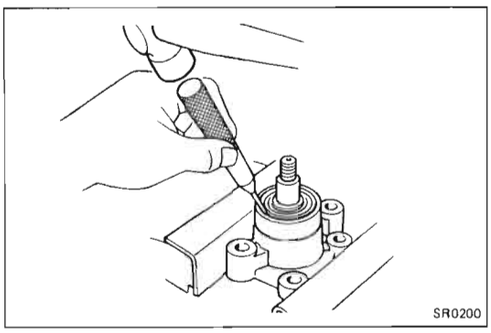
   CAUTION: Be careful that the vane plates, rotor and cam ring do not fall out.

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B8509

4. REMOVE CAM RING, ROTOR AND VANE PLATES

CAUTION: **Be careful not to scratch the cam ring, rotor or vane plates.**


SR0200

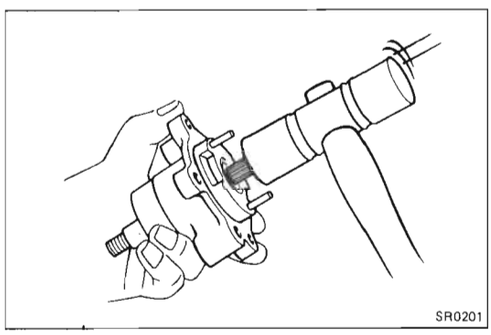
5. REMOVE ROTOR SHAFT

(a) Clamp the front housing in a vise.

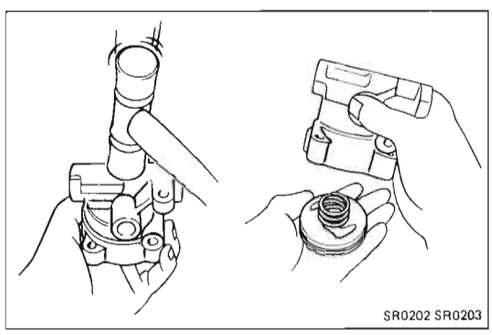
CAUTION: **Do not tighten the vice more than necessary.**

(b) Using a chisel and hammer, pry off the oil seal.

(c) Using snap ring pliers, remove the snap ring.


SR0201

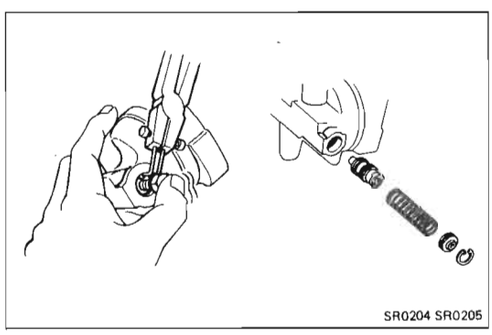
(d) Using a plastic hammer, lightly tap the rotor shaft out of the front housing.


SR0202 SR0203

6. REMOVE REAR PLATE AND SPRING

Using a plastic hammer, tap the bottom end of the rear housing, and remove the rear plate and spring.

CAUTION: **Avoid gripping the rear plate with pliers as this could damage it.**


SR0204 SR0205

7. REMOVE FLOW CONTROL VALVE

(a) Temporarily install a bolt to the plug.

(b) Push the bolt and remove the snap ring with snap ring pliers.

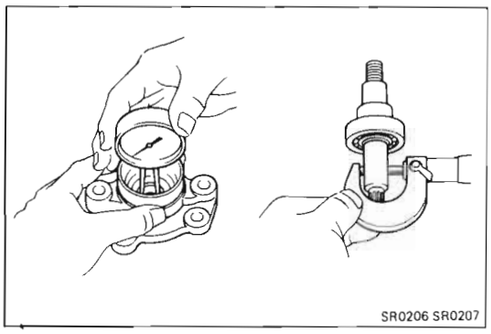
(c) Pull out the bolt and remove the plug.

(d) Remove the spring and flow control valve by hand.

CAUTION: **Use care not to drop, scratch or nick this valve.**

8. REMOVE PRESSURE PORT UNION

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SR0206 SR0207

INSPECTION OF POWER STEERING PUMP

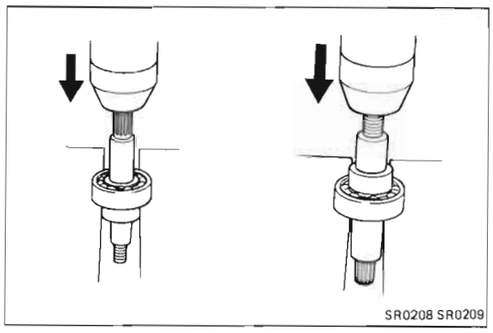
1. INSPECT BUSHING AND MEASURE BUSHING OIL CLEARANCE

(a) Check the bushing for wear or damage. The bushing cannot be replaced separately.

If wear or damage is found, replace entire housing.

(b) Check the oil clearance between the bushing and rotor shaft.

Maximum oil clearance: 0.07 mm (0.0028 in.)


SR0208 SR0209

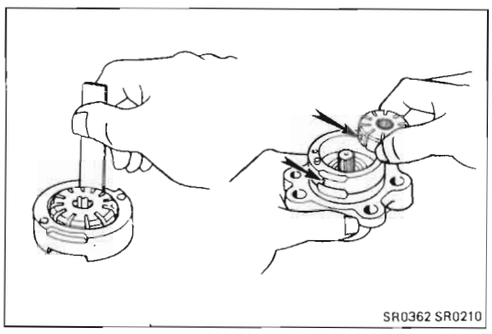
2. IF NECESSARY, REPLACE ROTOR SHAFT BEARING

(a) Using snap ring pliers, remove the snap ring.

(b) Using a press, press out the bearing.

(c) Using a press, press in the bearing.

(d) Using snap ring pliers, install the snap ring.

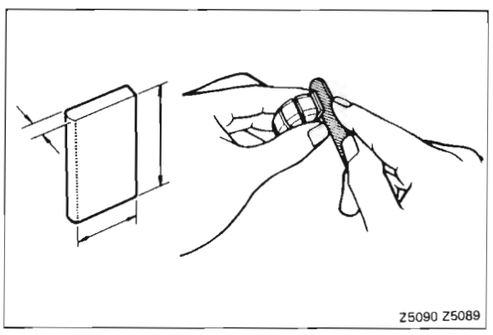

SR0362 SR0210

3. INSPECT ROTOR AND CAM RING

Measure the cam ring thickness. Check that the difference between the rotor and cam ring measurement is less than maximum.

Maximum difference: 0.06 mm (0.0024 in.)

If the difference is excessive, replace the cam ring with one having the same letter as on the rotor.


Z5090 Z5089

4. INSPECT AND MEASURE VANE PLATES

(a) Check the vane plates for wear or scratches.

(b) Measure the length, height and thickness of the vane plates.

Minimum length: 14.97 mm (0.5894 in.)
Minimum height: 7.8 mm (0.307 in.)
Minimum thickness: 1.7 mm (0.067 in.)

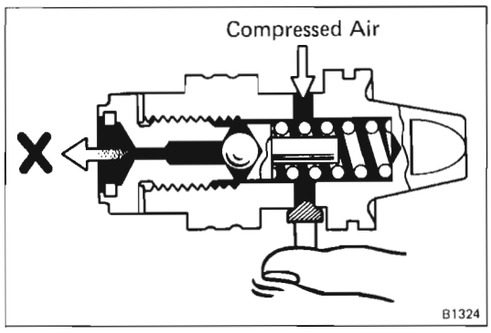
(c) Measure the clearance between the vane plate and rotor groove.

Maximum clearance: 0.06 mm (0.0024 in.)

NOTE: There are five lengths with the following rotor and cam ring numbers:

Rotor and cam ring number	Vane length mm (in.)
None	14.996 – 14.998 (0.5904 – 0.5905)
1	14.994 – 14.996 (0.5903 – 0.5904)
2	14.992 – 14.994 (0.5902 – 0.5903)
3	14.990 – 14.992 (0.59016 – 0.59024)
4	14.988 – 14.990 (0.5901 – 0.5902)

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5. INSPECT FLOW CONTROL VALVE

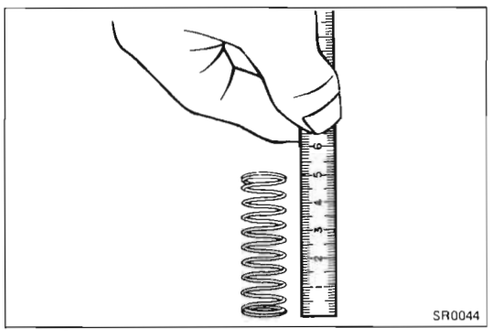
(a) Check the flow control valve for wear or damage.

(b) Apply fluid to the valve and check that if falls smothly into the valve hole by its own weight.

(c) Check the flow control valve for leakage.

- Close one of the holes and apply compressed air [4 or 5 kg/cm² (57 or 71 psi, 392 or 490 kPa)] into the opposite side.
- Confirm that air does not come out from the end hole.

If necessary, replace the valve with one having the same letter on the rear housing.

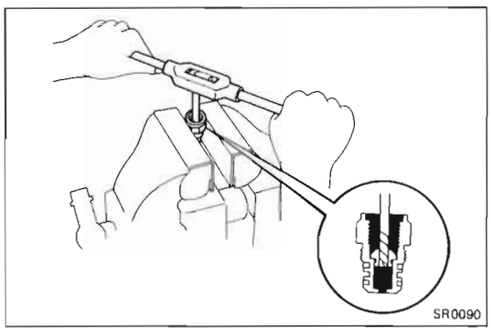


6. INSPECT FLOW CONTROL VALVE SPRING

Check that the spring is within specification.

Spring length: 47 – 50 mm (1.85 – 1.97 in.)

If the spring is not within specification, replace it.



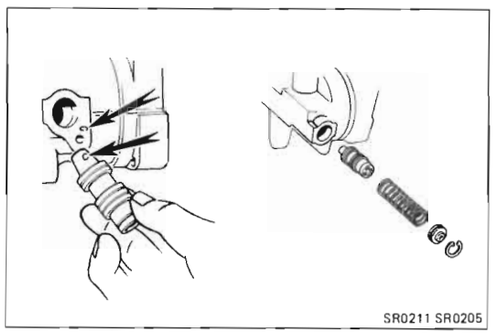
7. IF NECESSARY, REPLACE UNION SEAT

(a) Using a screw extractor, remove the union seat.

(b) Install a new floating type union seat.

NOTE: Only floating type parts are available.

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SR0211 SR0205

ASSEMBLY OF POWER STEERING PUMP

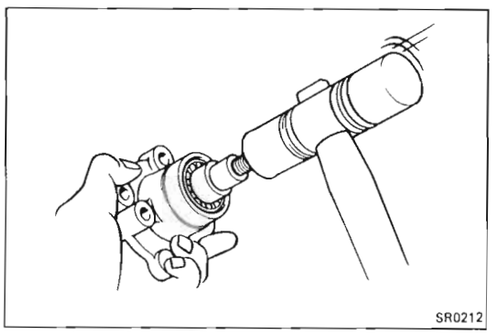
(See page SR-40)

1. INSTALL FLOW CONTROL VALVE

NOTE: Be sure the letter inscribed on the flow control valve matches the letter stamped on the rear of the pump body.

Inscribed mark: A, B, C, D, E or F

Install the flow control valve, spring, plug and snap ring.


SR0212

2. INSTALL PRESSURE PORT UNION

Install and torque the union.

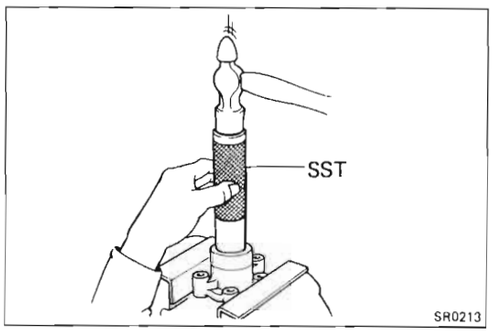
Torque: 700 kg-cm (51 ft-lb, 69 N·m)

3. INSTALL ROTOR SHAFT TO FRONT HOUSING

Install the rotor shaft into the front housing by tapping it in with a plastic hammer.

4. INSTALL SNAP RING

Using snap ring pliers, install the snap ring to the front housing.



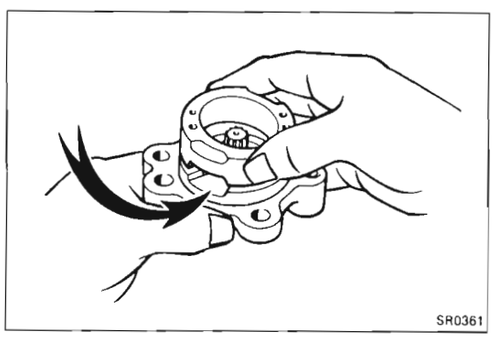
SR0213

5. INSTALL OIL SEAL

(a) Apply a light coat of MP grease to the oil seal lip.

(b) Using SST and hammer, install the oil seal.

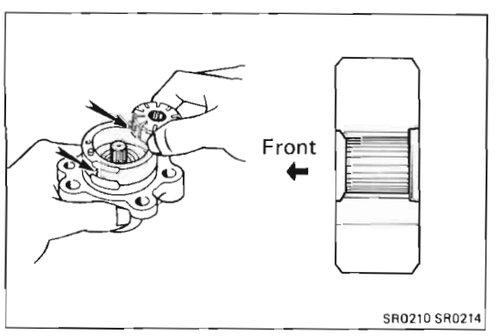
SST 09608-30011


SR0361

6. INSTALL O-RING

7. INSTALL CAM RING

Align the fluid passages of the cam ring and front housing, and install the cam ring.



SR0210 SR0214

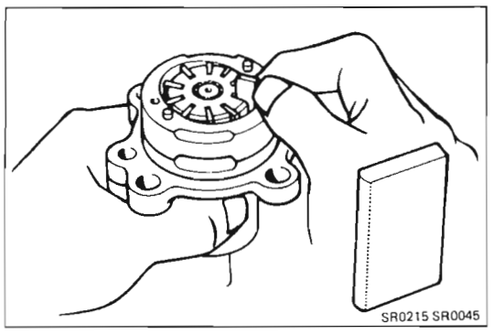
8. INSTALL ROTOR

Install the rotor with the chamfered end facing toward the front.

NOTE: Be sure the letters inscribed on the cam ring and rotor match.

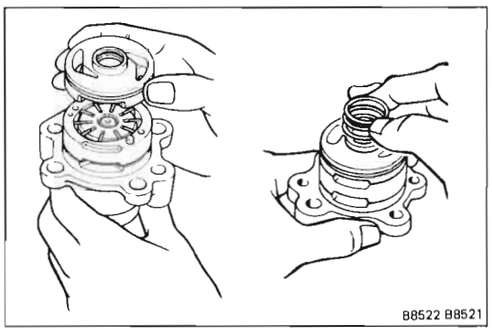
Inscribed mark: 1, 2, 3, 4 or None

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9. INSTALL VALVE PLATES

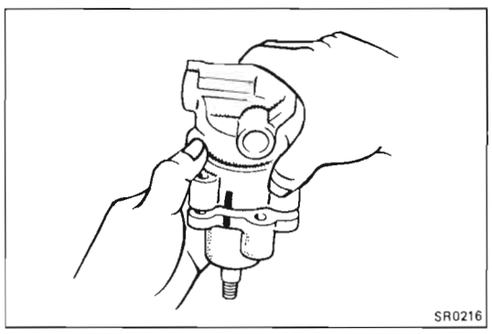
Install the vane plates with the round end facing outward.



10. INSTALL REAR PLATE AND SPRING

(a) Align the fluid passages of the rear plate and cam ring, and install the rear plate with the spring.

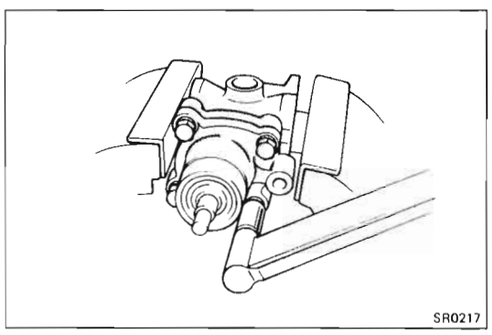
(b) Place the spring on the rear plate.



11. INSTALL REAR HOUSING

(a) Align the matchmarks on the front and rear housing, and assemble them.

(b) Tighten the front and rear housing mounting bolts by hand.



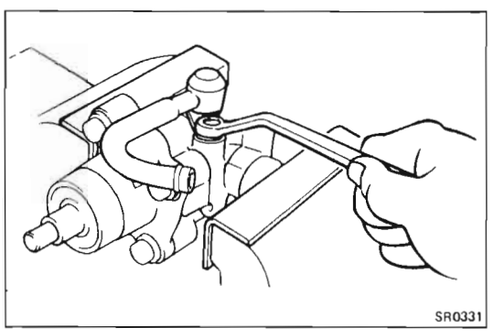
12. TIGHTEN FOUR HOUSING BOLTS

(a) Clamp the rear housing in a vise.

CAUTION: Do not tighten the vice more than necessary.

(b) Tighten the four housing bolts evenly in 3 or 4 passes.

Torque: 470 kg-cm (34 ft-lb, 46 N·m)

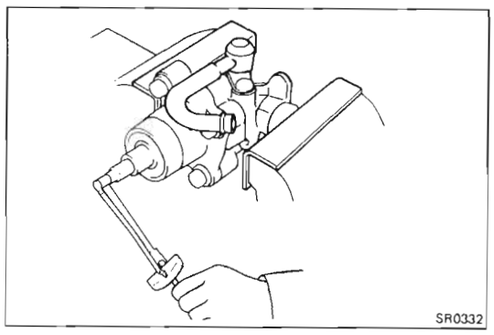


13. INSTALL UNION TO REAR HOUSING

Insert and tighten the union.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

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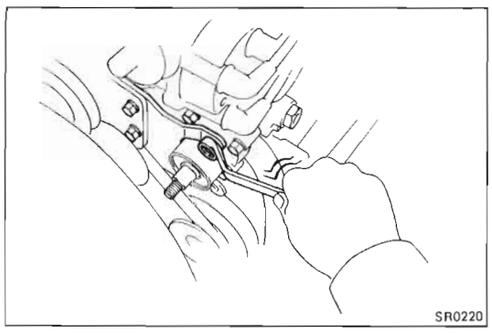
14. CHECK ROTOR SHAFT ROTATION CONDITION

(a) Check that the rotor shaft rotates smoothly without abnormal noise.

(b) Provisionally install the pulley nut and check the rotating torque.

Rotating torque: **2.8 kg-cm or less (2.4 in.-lb, 0.3 N·m)**

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INSTALLATION OF POWER STEERING PUMP (22R ENGINE)

(See page SR-38)

1. INSTALL POWER STEERING PUMP

Place the PS pump in position and torque the mount bolts.

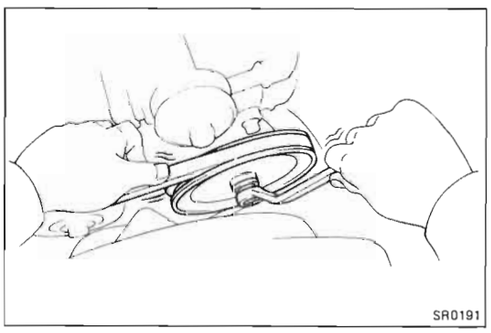
Torque: 400 kg-cm (29 ft-lb, 39 N·m)

2. INSTALL PULLEY AND DRIVE BELT

(a) Install the woodruff key, pulley and set nut.

(b) Install the drive belt.

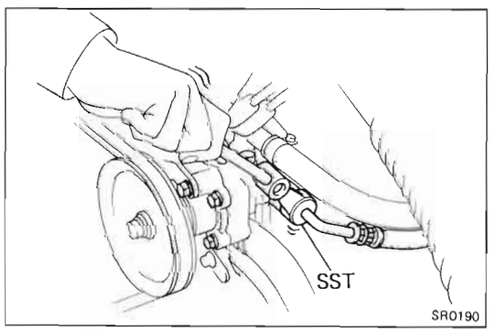
(c) Turn the adjusting bolt until the belt tension is the specified value.
(See page SR-30)



(d) Tighten the idler pulley nut and adjusting bolt.

(e) Push down on the drive belt to hold the pulley in place and torque the pulley set nut.

Torque: 440 kg-cm (32 ft-lb, 43 N·m)



3. CONNECT PRESSURE TUBE TO POWER STEERING PUMP

Using SST, torque the flare nut.

SST 09631-22020

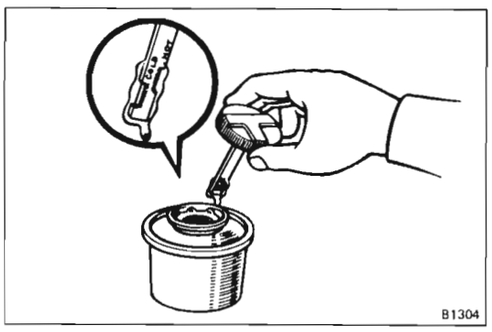
Torque: 450 kg-cm (33 ft-lb, 44 N·m)

4. CONNECT RETURN HOSE TO POWER STEERING PUMP

5. CONNECT AIR HOSES TO AIR CONTROL VALVE

(a) Connect the air hoses to the air control valve.

(b) Connect the high tension cords to the distributor.



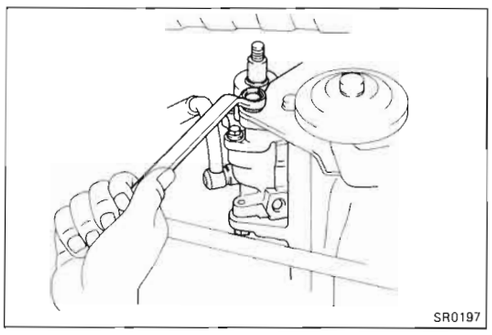
6. FILL RESERVOIR WITH FLUID

Fluid: ATF DEXRON® or DEXRON® II

7. BLEED POWER STEERING

8. CHECK FOR FLUID LEAKS

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SR0197

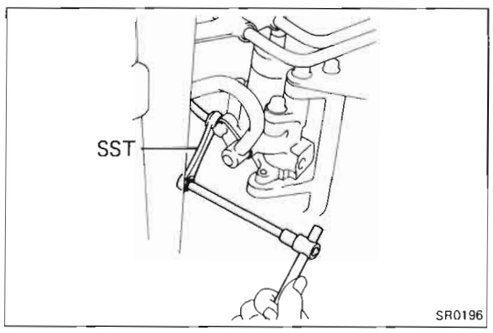
INSTALLATION OF POWER STEERING (2L ENGINE)

(See page SR-39)

1. INSTALL POWER STEERING PUMP

Place the PS pump in position and torque the mount bolts.

Torque: 625 kg-cm (45 ft-lb, 61 N·m)



SR0196

2. CONNECT PRESSURE TUBE TO POWER STEERING PUMP

Using SST, torque the flare nut.

SST 09631-22020

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

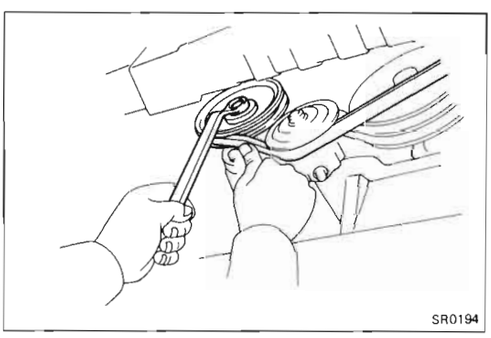
3. CONNECT RETURN HOSE TO POWER STEERING PUMP

4. INSTALL PULLEY AND DRIVE BELT

(a) Install the woodruff key, pulley and set nut.

(b) Install the drive belt.

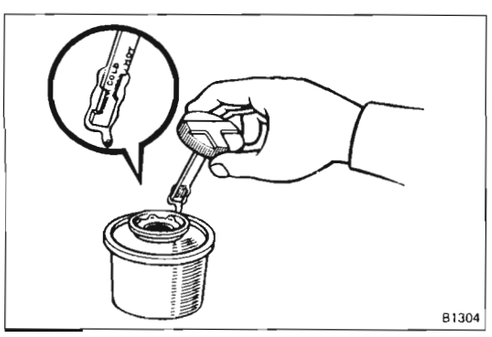
(c) Turn the adjusting bolt until the belt tension is the specified value.
(See page SR-30)


SR0194

(d) Tighten the idler pulley nut and adjusting bolt.

(e) Push down on the drive belt to hold the pulley in place and torque the pulley set nut.

Torque: 440 kg-cm (32 ft-lb, 43 N·m)


B1304

5. FILL RESERVOIR WITH FLUID

Fluid: ATF DEXRON® or DEXRON® II

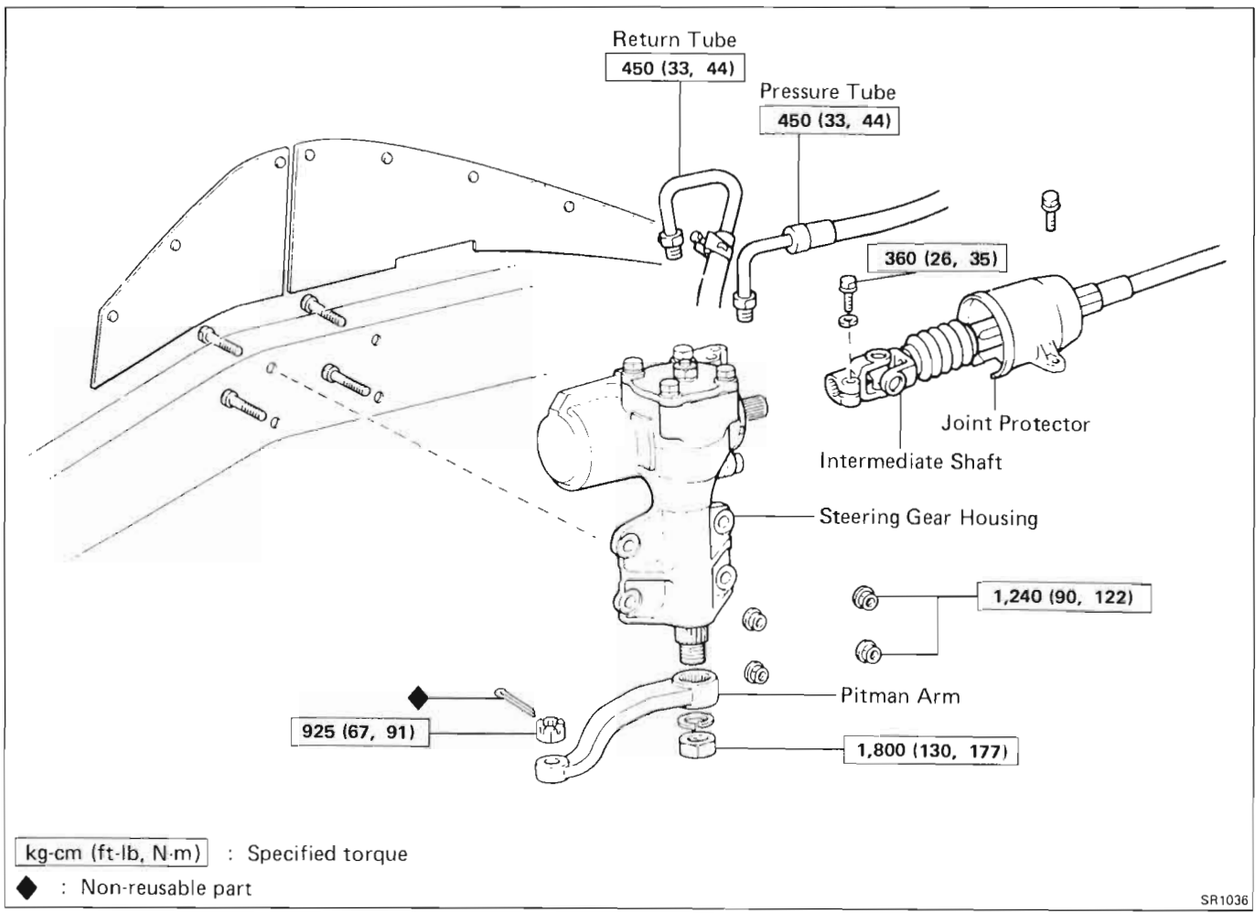
6. BLEED POWER STEERING

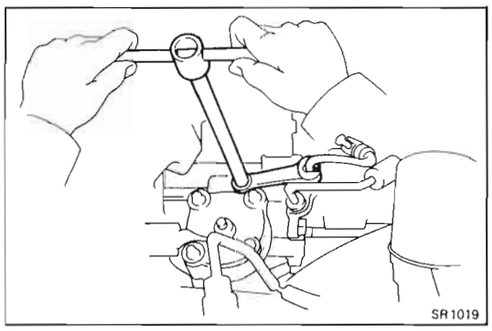
7. CHECK FOR FLUID LEAKS

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Gear Housing

REMOVAL OF GEAR HOUSING

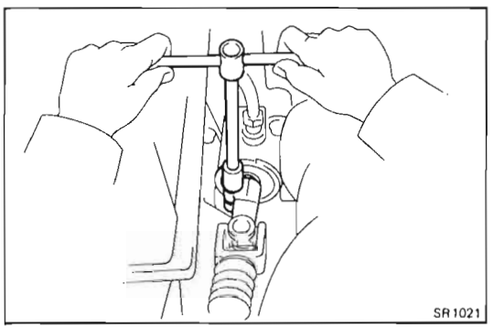




1. DISCONNECT RETURN LINE AND PRESSURE LINE

Using SST, disconnect the return and pressure line.

SST 09631-22020



2. DISCONNECT INTERMEDIATE SHAFT

(a) Remove the joint protector.

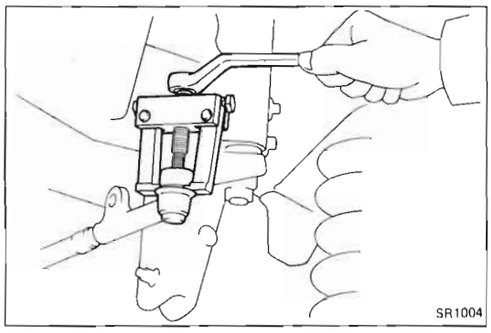
(b) Place matchmarks on the worm shaft and intermediate shaft joint yoke.

(c) Remove the two set bolts from joint yokes.

(d) Disconnect the intermediate shaft from the worm shaft.

3. LOOSEN PITMAN ARM SET NUT

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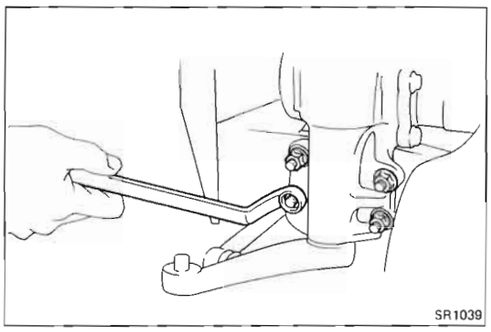
4. DISCONNECT RELAY ROD END FROM PITMAN ARM

(a) Remove the cotter pin.

(b) Remove the set nut.

(c) Using SST, disconnect the relay rod end from the pitman arm.

SST 09628-62011

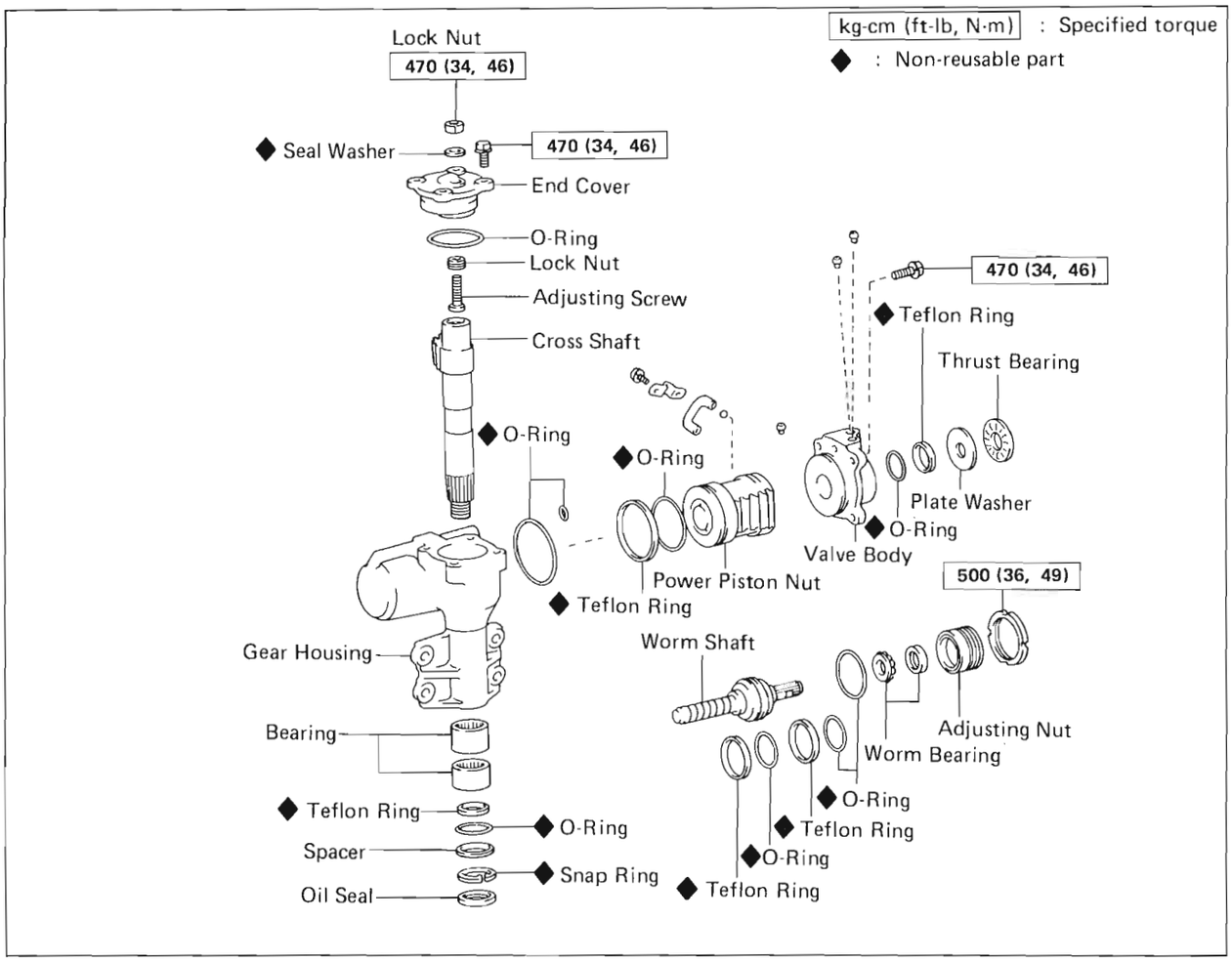


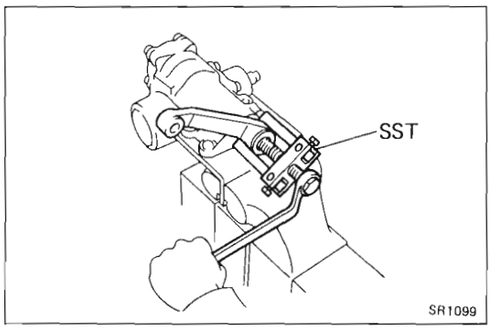
5. REMOVE GEAR HOUSING

Remove the four nuts, bolts and gear housing.

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COMPONENTS





DISASSEMBLY OF GEAR HOUSING

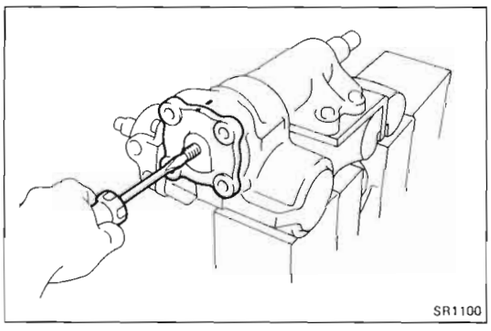
1. REMOVE PITMAN ARM

(a) Mount the gear housing on SST and clamp SST in vise.

SST 09630-00011

(b) Using SST, remove the pitman arm.

SST 09628-62011



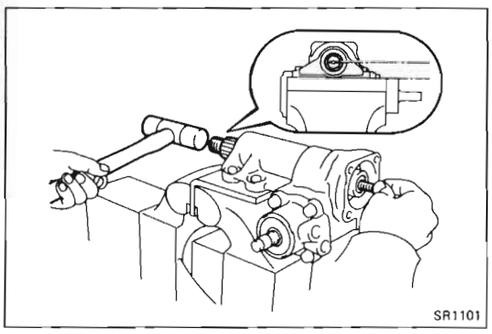
2. REMOVE END COVER

(a) Remove the adjusting screw lock nut.

(b) Remove the four bolts.

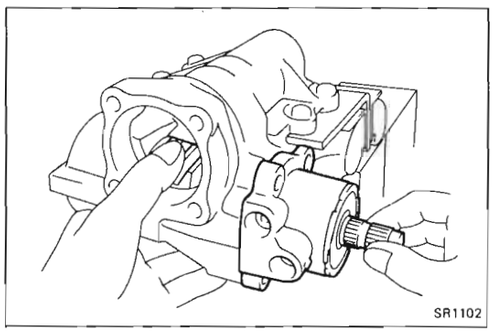
(c) Screw in the adjusting screw until the cover is removed.

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3. REMOVE CROSS SHAFT

Using a plastic hammer, tap on the cross shaft end and pull out the shaft.



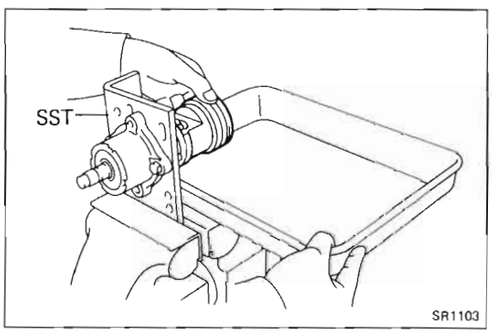
4. REMOVE WORM GEAR VALVE BODY ASSEMBLY

(a) Remove the four cap screws from the housing.

(b) Hold the power piston nut with your thumb so it cannot move, and turn the worm shaft clockwise. Then, withdraw the valve body and power piston assembly.

CAUTION: Ensure that the power piston nut does not come off the worm shaft.

(c) Remove the O-ring.



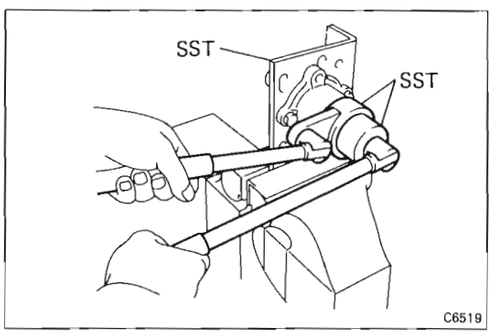
5. REMOVE POWER PISTON NUT

(a) Mount the valve body on SST and clamp SST in vise.

SST 09630-00011

(b) Pull out the power piston nut.

CAUTION: Do not lose the ball.



6. REMOVE LOCK NUT

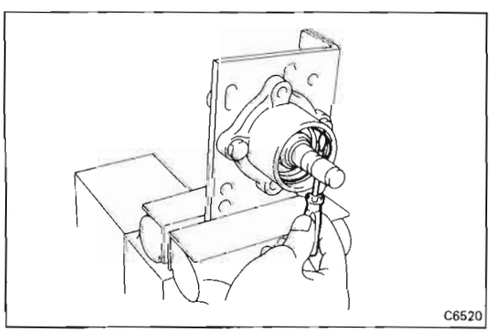
(a) Using SST, hold the adjusting screw and remove the lock nut with SST.

SST 09630-00011

(b) Using SST, remove the adjust screw.

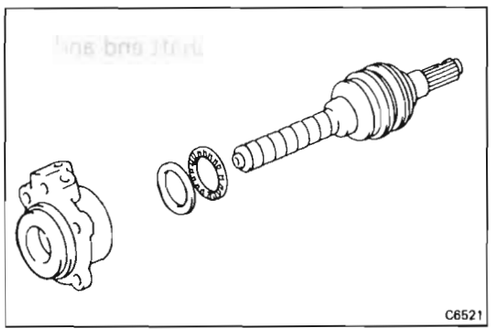
SST 09630-00011

(c) Remove the bearing.



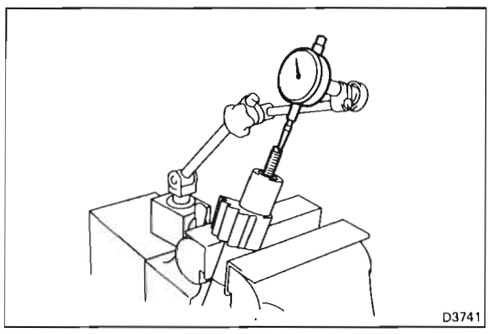
7. REMOVE O-RING

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8. **REMOVE FOLLOWING PARTS:**
   (a) Worm shaft
   (b) Thrust bearing
   (c) Plate washer
   (d) Teflon ring
   (e) O-ring

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INSPECTION AND REPAIR OF STEERING GEAR HOUSING

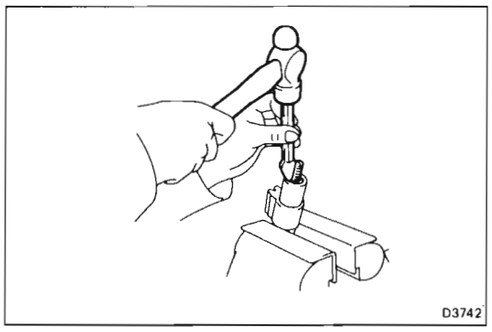
1. INSPECT CROSS SHAFT ADJUSTING SCREW THRUST CLEARANCE

(a) Clamp the cross shaft in a vise.

(b) Using a dial indicator, measure the thrust clearance.

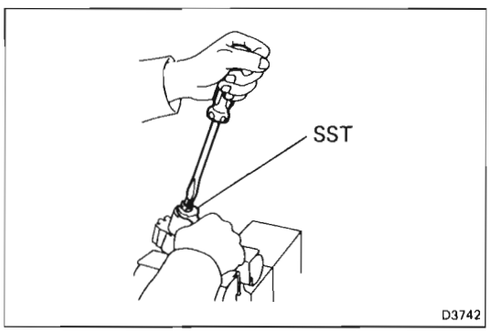
Thrust clearance: 0.03 — 0.05 mm (0.0012 — 0.0020 in.)

If thrust clearance is not correct, adjust the thrust clearance.



2. IF NECESSARY, ADJUST THRUST CLEARANCE

(a) Using a chisel and hammer, remove the lock nut stake.

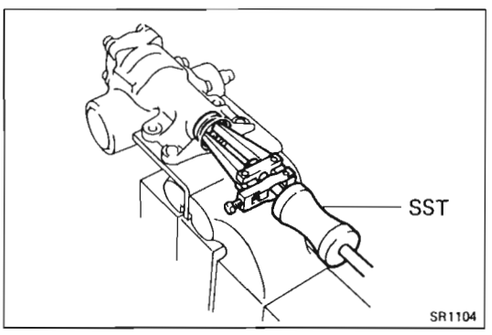


(b) Using SST, loosen the lock nut.

SST 09630-00011

(c) Adjust the adjusting screw for correct thrust clearance and tighten the lock nut.

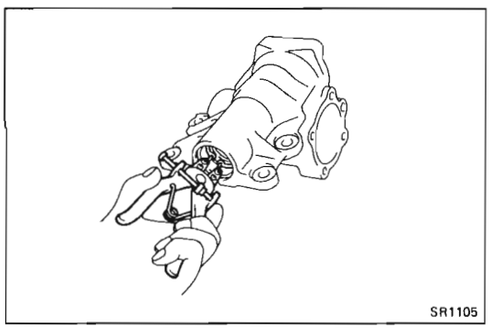
(d) Stake the lock nut.



3. REPLACE NEEDLE ROLLER BEARINGS

(a) Using SST, remove the oil seal.

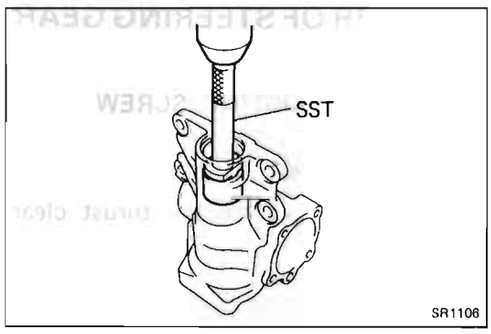
SST 09308-00010



(b) Using snap ring pliers, remove the snap ring.

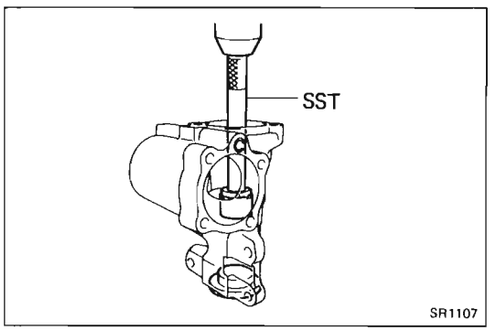
(c) Remove the metal spacer, teflon ring and O-ring.

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(d) Using SST, press out the bearing.

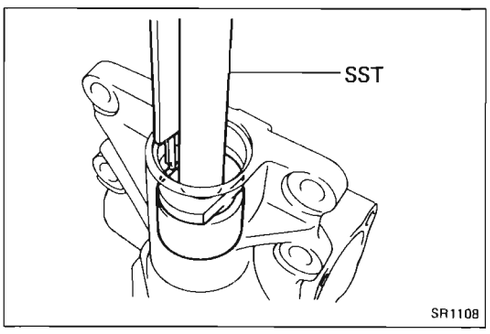
SST 09630-00011



(e) Using SST, press in the upper bearing.

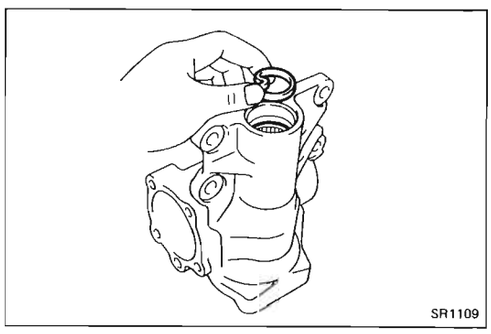
SST 09630-00011

NOTE: The bearing top end should be installed so that it aligns with the housing and surface.



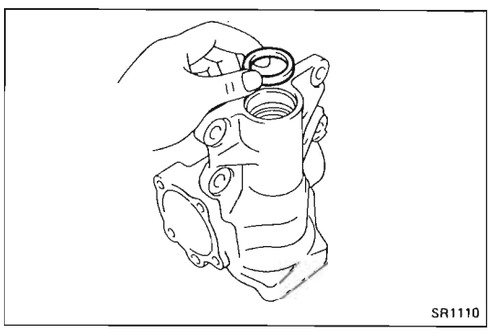
(f) Using SST, install the lower bearing so that it is positioned 23.1 mm (0.909 in.) away from the housing inner end surface.

SST 09630-00011



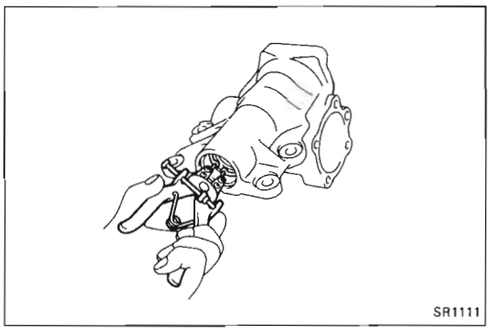
(g) Install the O-ring.

(h) Form the teflon ring into a heart shape and install it with your finger.

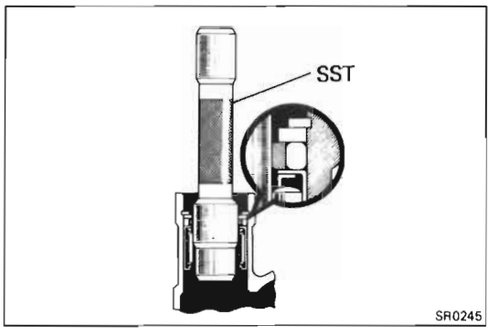


(i) Install the metal spacer.

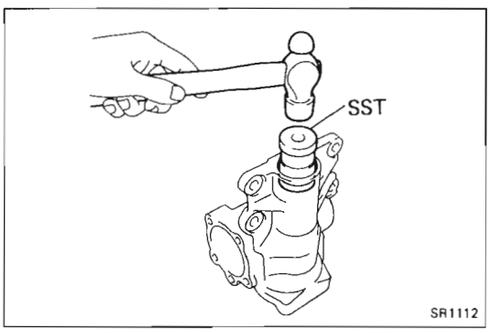
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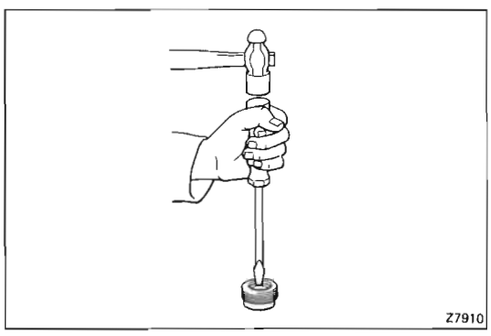
(j) Using snap ring pliers, install the snap ring.



(k) Using SST, form the teflon ring.
SST 09630-00011

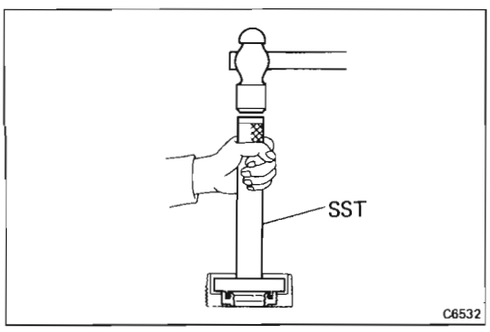


(l) Using SST, drive in the oil seal.
SST 09630-00011



4. IF NECESSARY, REPLACE ADJUSTING SCREW OIL SEAL

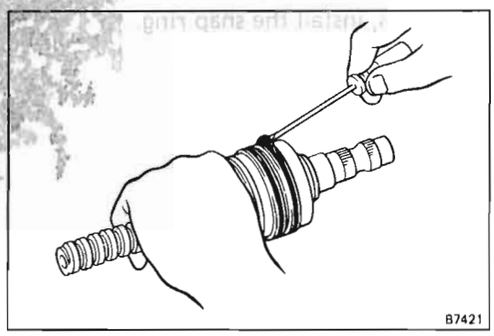
(a) Using a screwdriver, drive out the oil seal.



(b) Using SST, install the oil seal.
SST 09630-00011

(c) Apply MP grease to the oil seal lip.

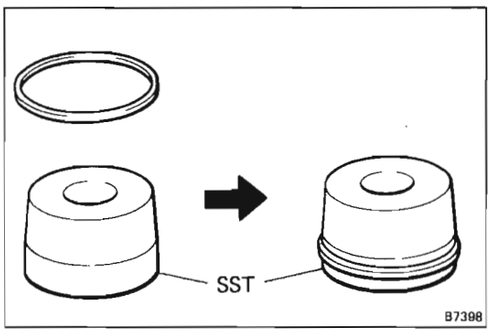
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5. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RING

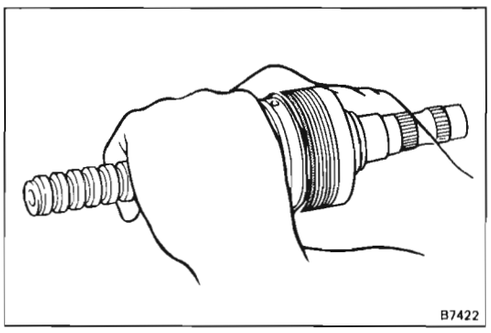
(a) Using a screwdriver, remove the two teflon ring.

NOTE: Be careful not to damage the control valve.

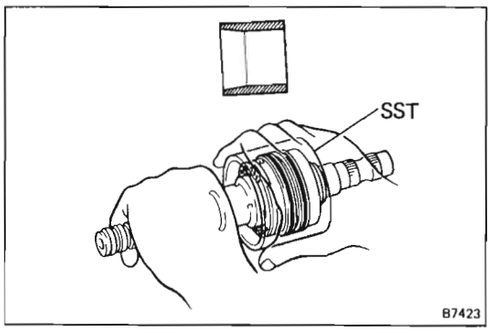


(b) Install the teflon ring to SST and expand it.

SST 09630-00011



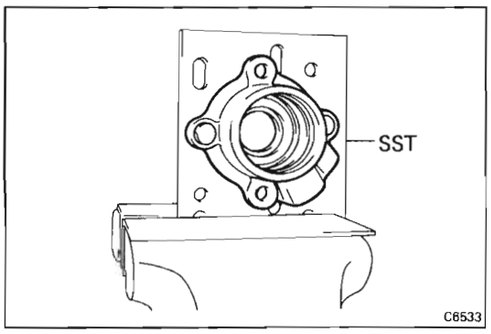
(c) Install the expanded teflon ring to the control valve and snug down it by hand.



(d) Coat the teflon ring with power steering fluid and snug down it with SST.

SST 09630-00011

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ASSEMBLY OF GEAR HOUSING

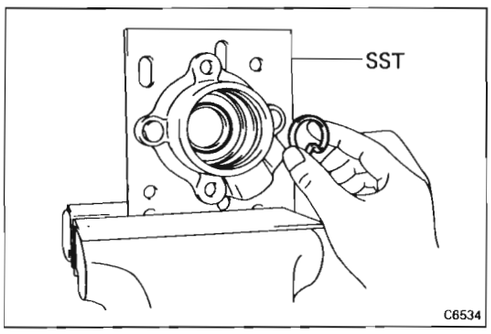
(See page SR-51)

1. COAT ALL PARTS WITH POWER STEERING FLUID

2. MOUNT VALVE BODY IN VISE

Mount the valve body on SST and clamp SST in vise.

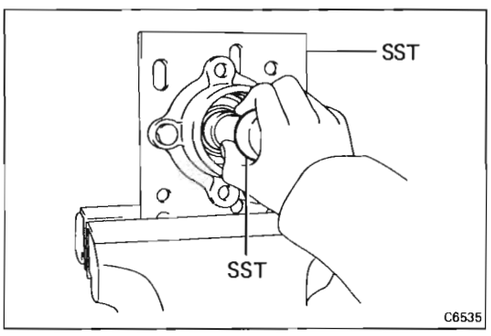
SST 09630-00011



3. INSTALL O-RING AND TEFLON RING

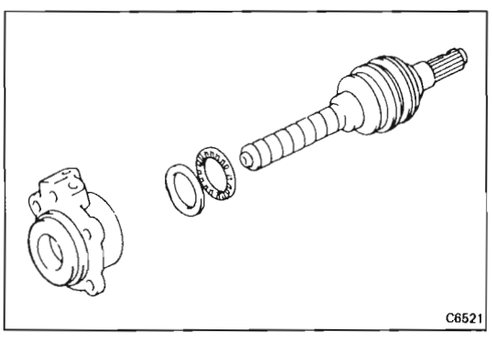
(a) Install the O-ring.

(b) Form the teflon ring into a heart shape and install it with your finger.



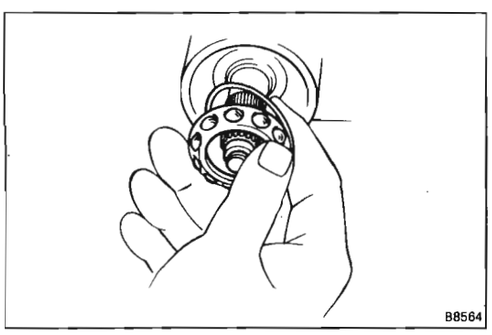
(c) Using SST, form the teflon ring.

SST 09630-00011



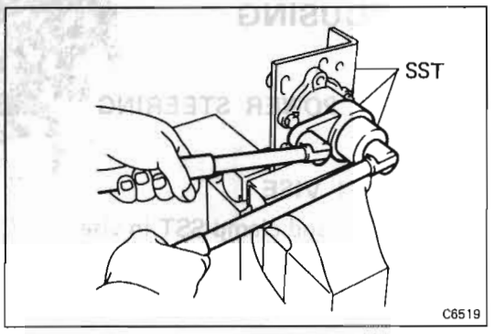
4. INSTALL WORM SHAFT

Install the worm shaft with the thrust bearing and the plate washer to the valve body.



5. INSTALL O-RING AND BEARING TO CONTROL VALVE

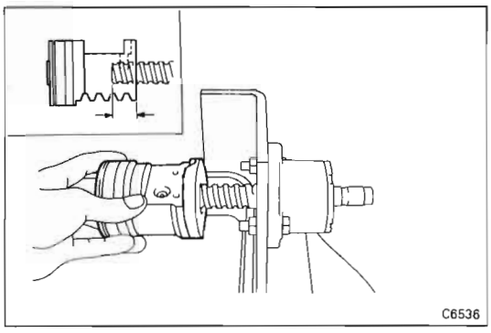
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6. INSTALL ADJUSTING SCREW AND LOCK NUT

Using SST, temporarily tighten the adjusting screw and lock nut.

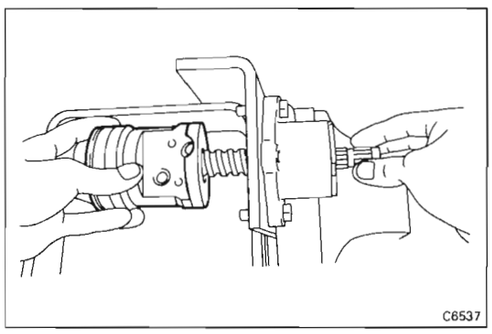
SST 09630-00011



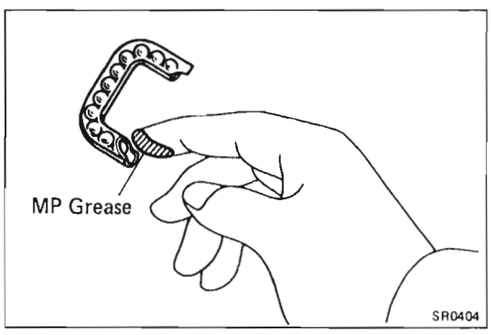
7. INSTALL POWER PISTON NUT AND BALLS

(a) Clean all parts with power steering fluid.

(b) Insert the power piston nut about 15 mm (0.59 in.) from the worm shaft end, and align the ball transfer surface with the ball hole.



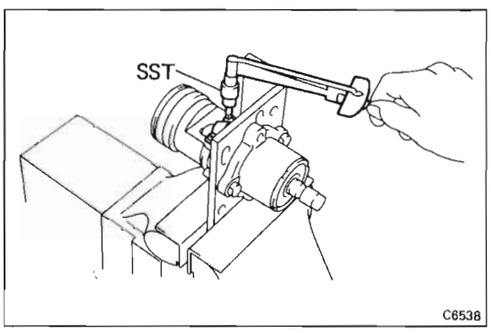
(c) Insert the balls one at a time into the holes, and turn the worm shaft a little with each insertion. Then, securely insert the 33 balls into the piston.



(d) Install eleven new balls to the ball guide, and apply MP grease to the ball guide lips so the balls do not fall out.

(e) Install the ball guide to the power piston nut.

NOTE: Be careful not to damage the ball guide.



(f) Using SST, install the ball guide clamp.

SST 09060-20010

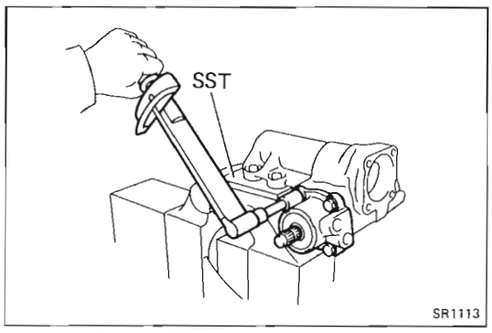
Torque: 30 kg-cm (26 in.-lb, 2.9 N·m)

(g) Check that the power piston nut rotates smoothly.

(h) Turn the power piston nut, and insure that it is adhered to the tip surface of the valve body.

NOTE: If a ball has fallen out, there will be a gap.

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8. **INSTALL WORM GEAR VALVE BODY ASSEMBLY**

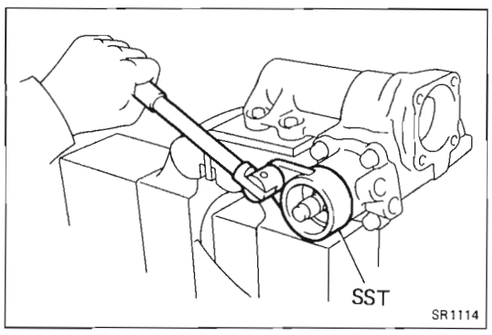
(a) Install the two O-rings to the gear housing and valve body.

(b) Mount the gear housing on SST and clamp SST in vise.

SST 09630-00011

(c) Install and torque the four bolts.

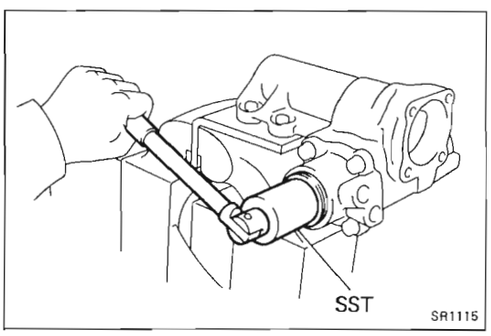
Torque: 470 kg-cm (34 ft-lb, 46 N·m)



9. **ADJUST WORM BEARING PRELOAD**

(a) Using SST, remove the lock nut.

SST 09630-00011



(b) Using SST, tighten the adjusting screw.

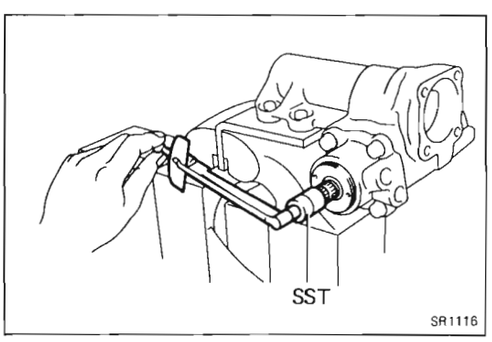
SST 09630-00011

(c) Turn the worm shaft to right and left and snug down the bearing.

(d) Slightly loosen the adjusting screw.

(e) Using SST, slightly tighten the adjusting screw until the preload is correct.

SST 09630-00011

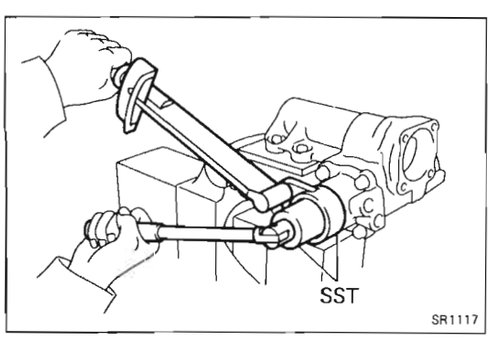


(f) Using SST and torque meter, check the preload of the bearing.

SST 09616-00010

Preload: 4.0 — 6.5 kg-cm
(3.5 — 5.6 in.-lb, 0.4 — 0.6 N·m)

NOTE: Hold the power piston nut to prevent it from turning.



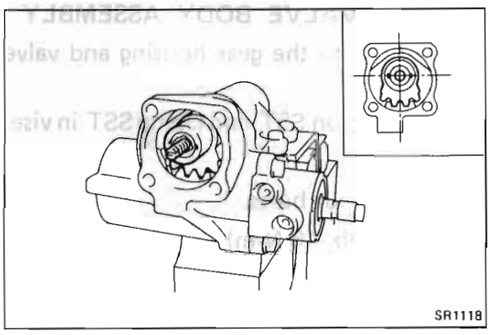
(g) Using SST, torque the lock nut while holding the adjusting nut with SST.

SST 09630-00011

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

(h) Recheck the preload.

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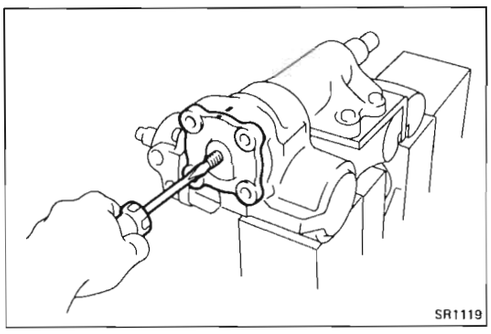
10. INSTALL CROSS SHAFT AND END COVER

(a) Install the O-ring on the end cover.

(b) Wrap the tape to the serration of the cross shaft.

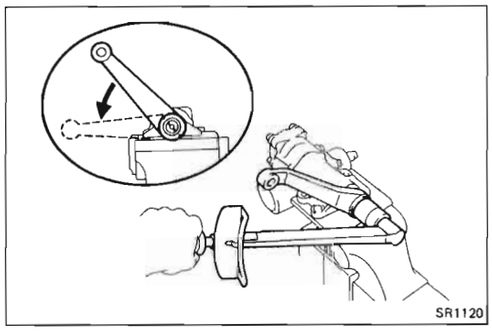
(c) Set the worm gear at the center of the gear housing.

(d) Insert and push the cross shaft into the gear housing so that the center teeth mesh.



(e) Fully loosen the adjusting screw and install the end cover with four bolts.

Torque: 470 kg-cm (34 ft-lb, 46 N·m)



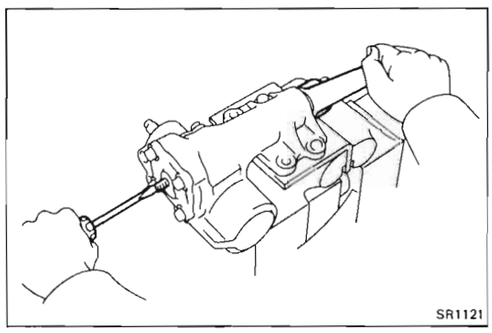
11. ADJUST TOTAL PRELOAD

(a) Match the alignment mark on the pitman arm and cross shaft, and install them.

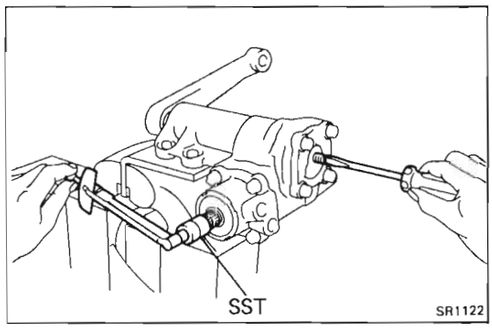
(b) Install and torque the pitman arm set nut.

Torque: 1,800 kg-cm (130 ft-lb, 177 N·m)

(c) Turn the pitman arm until the alignment marks are horizontally aligned.



(d) Tighten the adjusting screw while backlash until it is 0.



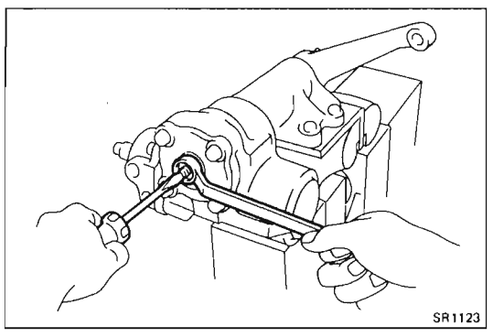
(e) Slightly tighten the adjusting screw while measuring the preload until it is correct.

SST 09616-00010

Total preload: 7.0 – 10.5 kg-cm (6.1 – 9.1 in.-lb, 0.69 – 1.03 N·m)

NOTE: Be sure that the worm shaft is in neutral.

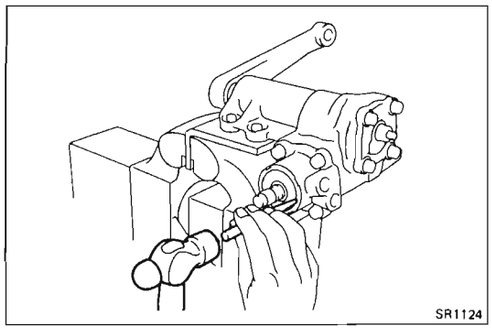
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(f) Install and torque the lock nut while holding the adjusting screw.

Torque: 470 kg-cm (34 ft-lb, 46 N·m)

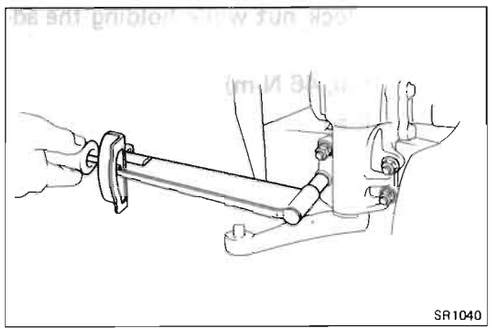
(g) Recheck the total preload.



12. STAKE LOCK NUT

Using a punch and hammer, stake the lock nut.

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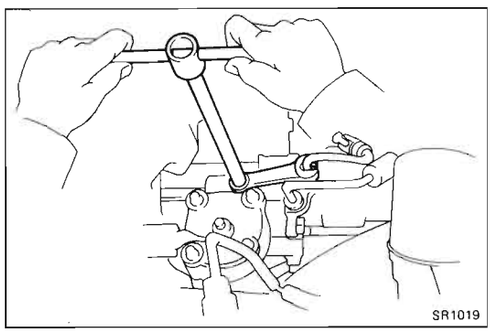
INSTALLATION OF GEAR HOUSING

(See page SR-49)

1. INSTALL GEAR HOUSING

Install the gear housing with the four bolts and nuts.

Torque: 1,240 kg-cm (90 ft-lb, 122 N·m)

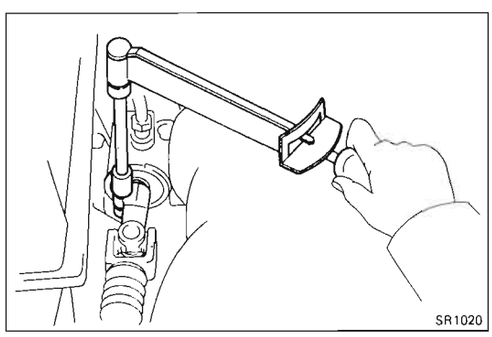


2. CONNECT PRESSURE AND RETURN LINE

Using SST, install and torque the union nuts.

SST 09631-22020

Torque: 450 kg-cm (33 ft-lb, 44 N·m)



3. CONNECT INTERMEDIATE SHAFT

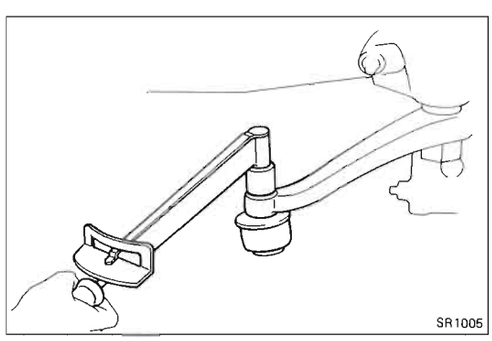
(a) Align matchmarks on the worm shaft and intermediate shaft joint yoke, and connect them.

(b) Install and torque the two bolts.

Torque: 360 kg-cm (26 ft-lb, 35 N·m)

(c) Install the joint protector and bolt.

Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)

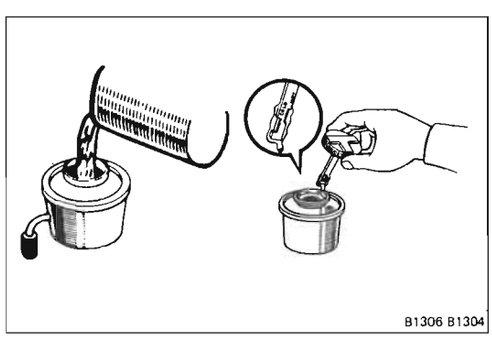


4. CONNECT PITMAN ARM TO RELAY ROD END

(a) Connect the pitman arm to the relay rod end and install the nut.

Torque: 925 kg-cm (67 ft-lb, 91 N·m)

(b) Install the cotter pin.



5. FILL RESERVOIR WITH FLUID

Fluid: ATF DEXRON® or DEXRON® II

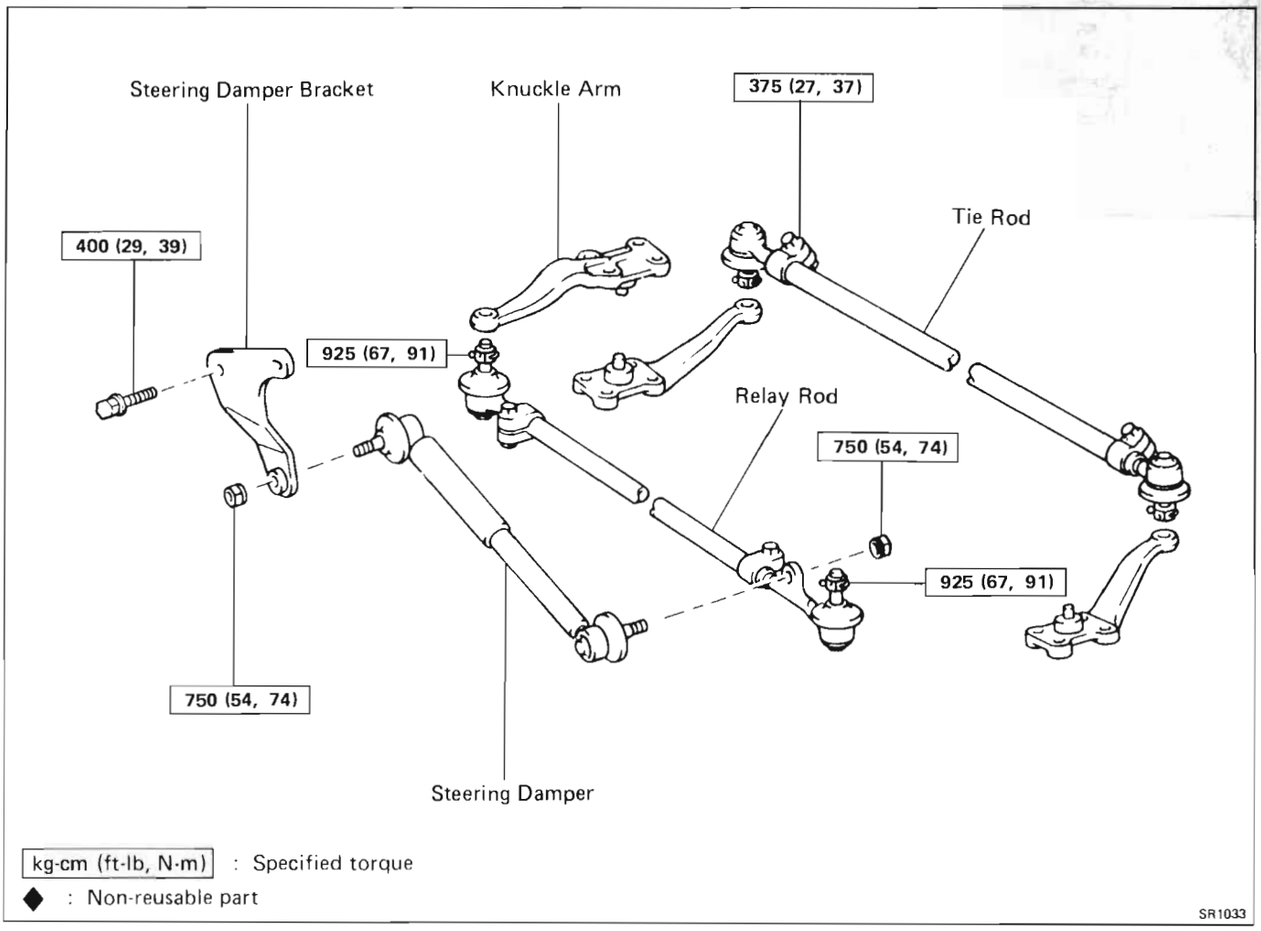
6. BLEED SYSTEM AND PERFORM PRESSURE CHECK

(See page SR-36)

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STEERING LINKAGE

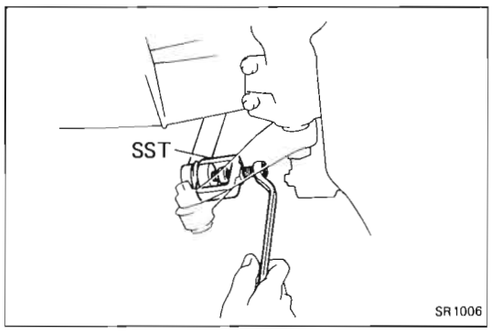
COMPONENTS



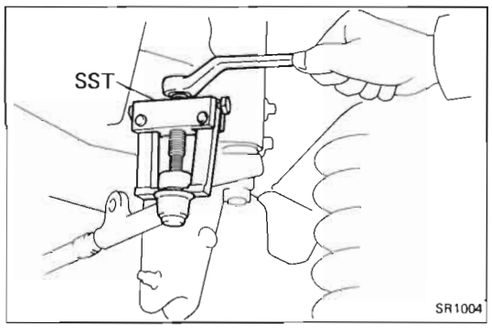
kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

SR1033



SR1006



SR1004

Relay Rod

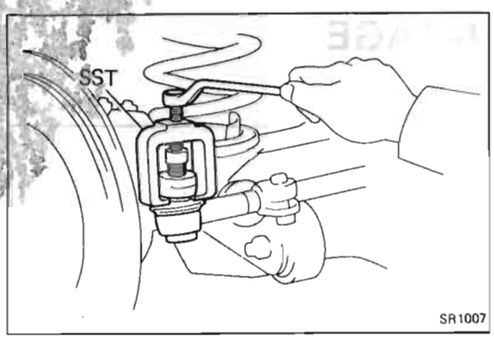
REMOVAL AND INSPECTION OF RELAY ROD

1. REMOVE WHEEL
2. DISCONNECT STEERING DAMPER FROM RELAY ROD
   (a) Remove the bolt.
   (b) Using SST, disconnect the steering damper from the relay rod.

   SST 09611-22012
3. DISCONNECT RELAY ROD FROM PITMAN ARM
   (a) Remove the cotter pin and nut.
   (b) Using SST, disconnect the realy rod from the pitman arm.

   SST 09628-62011

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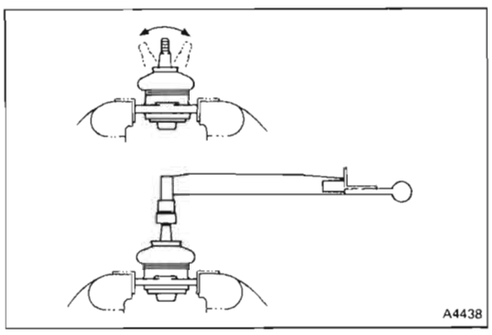


4. DISCONNECT RELAY ROD FROM KNUCKLE ARM
   (a) Remove the cotter pin and nut.
   (b) Using SST, disconnect the relay rod from the knuckle arm.

   SST 09611-22012

5. INSPECT BALL JOINT FOR ROTATION CONDITION
   (a) Clamp the ball joint in vise.
   (b) As shown in the figure, flip the ball joint stud back and forth 5 times before installing the nut.
   (c) Using a torque gauge, turn the nut continuously one turn each 2-4 seconds and take the torque reading on the fifth turn.

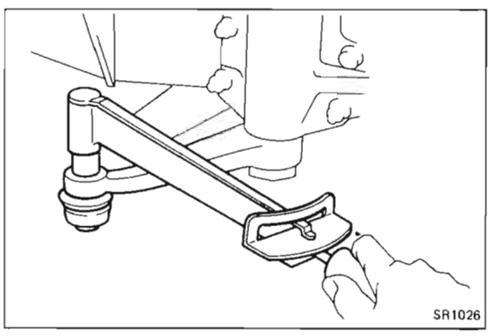
   Torque (turning): 10 — 30 kg-cm (8.7 — 26.0 in.-lb, 1.0 — 2.9 N·m)



6. INSPECT REALY ROD WEAR, DAMAGE OR CRACKS

   Check for wear or damage and check for cracks with flaw detecting penetrant.

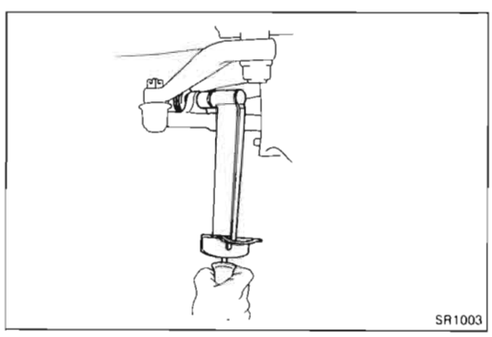
INSTALLATION OF RELAY ROD



1. CONNECT RELAY ROD TO KNUCKLE ARM AND PITMAN ARM
   (a) Torque the nuts.

   Torque: 925 kg-cm (67 ft-lb, 91 N·m)

   (b) Install the new cotter pins.

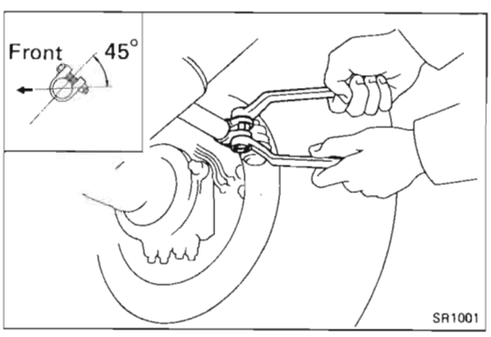


2. CONNECT STEERING DAMPER TO REALY ROD

   Torque the nut.

   Torque: 750 kg-cm (54 ft-lb, 74 N·m)

3. INSTALL WHEEL

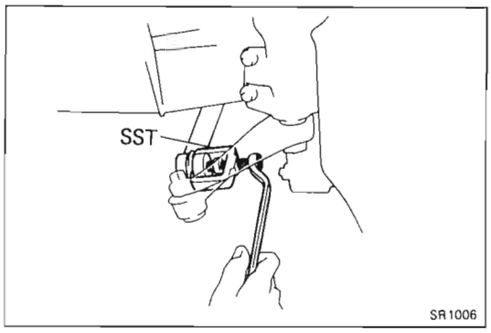


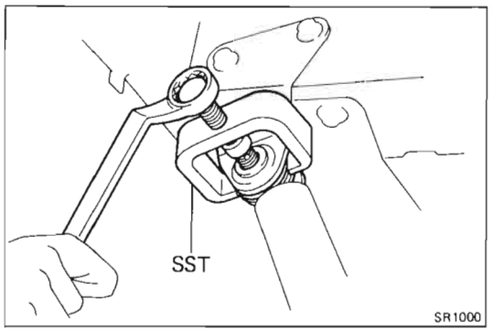
4. TORQUE RELAY ROD END CLAMP BOLTS

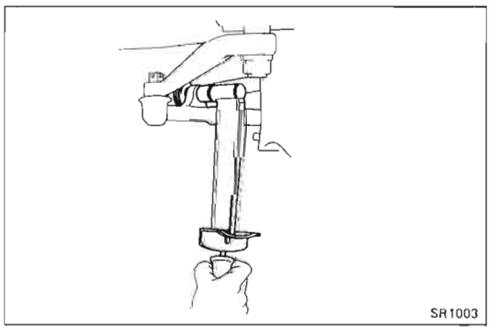
   Torque the clamp bolts.

   Torque: 375 kg-cm (27 ft-lb, 37 N·m)

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Steering Damper

REMOVAL AND INSPECTION OF STEERING DAMPER

(See page SR-61)

1. DISCONNECT STEERING DAMPER FROM RELAY ROD
   (a) Remove the nut.
   (b) Using SST, disconnect the steering damper from the relay rod.

   SST 09611-22012

2. DISCONNECT STEERING DAMPER FROM DAMPER BRACKET
   (a) Remove the nut.
   (b) Using SST, disconnect the steering damper from the damper bracket.

   SST 09628-12022

3. INSPECT STEERING DAMPER FOR DAMAGE OR OIL LEAKAGE

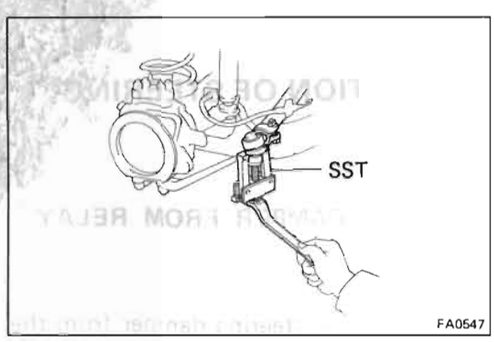
INSTALLATION OF STEERING DAMPER

CONNECT STEERING DAMPER TO RELAY ROD AND DAMPER BRACKET

Torque the nuts.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

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Tie Rod

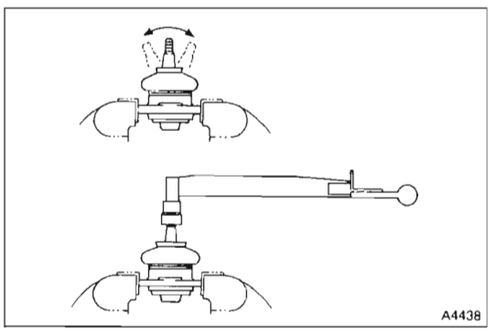
REMOVAL AND INSPECTION OF TIE ROD

(See page SR-61)

1. DISCONNECT TIE ROD FROM KNUCKLE ARM

Using SST, disconnect the tie rod from the knuckle arm.

SST 09628-62011



2. INSPECT BALL JOINT FOR ROTATION CONDITION

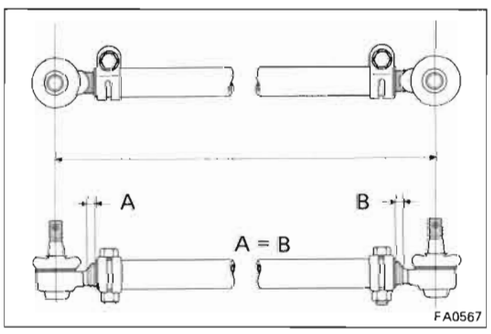
(a) Clamp the ball joint in vise.

(b) As shown in the figure, flip the ball joint stud back and forth 5 times before installing the nut.

(c) Using a torque gauge, turn the nut continuously one turn each 2-4 seconds and take the torque reading on the fifth turn.

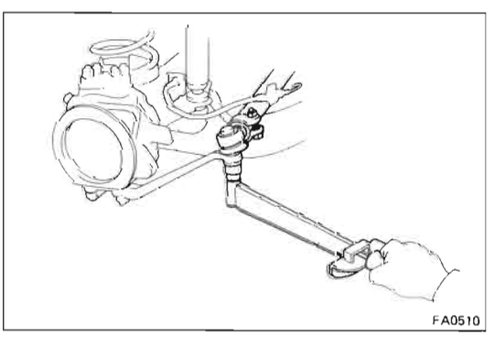
Torque (turning): 10 — 30 kg-cm (8.7 — 26.0 in.-lb, 1.0 — 2.9 N·m)

INSTALLATION OF TIE ROD



1. ASSEMBLE AND ADJUST TIE ROD TO SPECIFIED LENGTH

Turn the tie rod ends equal amounts into the tie rod tube. Tie rods should be approximately 1,134 mm (44.65 in.)



2. CONNECT TIE ROD TO KNUCKLE ARM

(a) Connect the tie rod ends and torque nuts.

Torque: 925 kg-cm (67 ft-lb, 91 N·m)

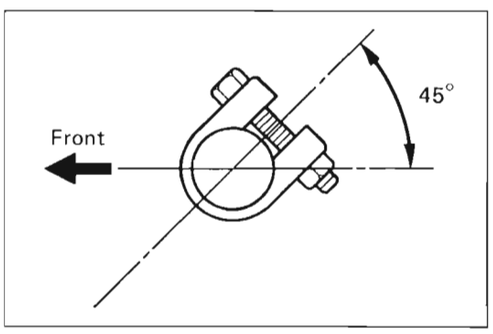
(b) Install the new cotter pins.

3. ADJUST TOE-IN (See page FA-4)

4. TORQUE TIE ROD END CLAMP BOLTS

Torque the clamp bolts.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)



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BODY ELECTRICAL SYSTEM

	Page
PRECAUTIONS	BE-2
LOCATION OF SWITCHES AND RELAYS	BE-5
IGNITION SWITCH	BE-9
LIGHTING	BE-10
HEADLIGHT CLEANER	BE-17
WIPERS AND WASHERS	BE-19
INSTRUMENTS, GAUGES AND WARNING LIGHTS	BE-24
REAR WINDOW DEFOGGER	BE-34
HEATER	BE-36
POWER WINDOW	BE-40
SUN ROOF	BE-42
RADIO, STEREO TAPE PLAYER AND ANTENNA	BE-44
CLOCK	BE-51

BE

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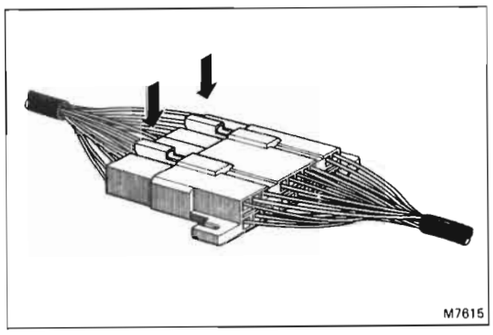
PRECAUTIONS

WIRING COLOR CODE

Wire colors are indicated by an alphabetical code.
The 1st letter indicates the basic wire color and the 2nd indicates the stripe color.

B = Black	BR = Brown
G = Green	GR = Grey
L = Light Blue	LG = Light Green
O = Orange	P = Pink
R = Red	V = Violet
W = White	Y = Yellow

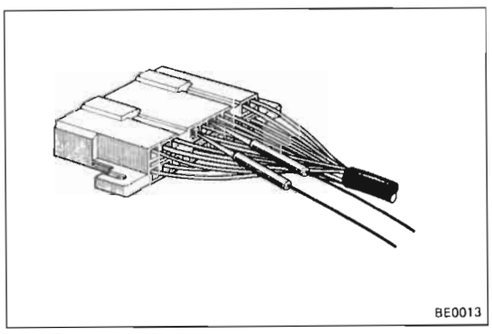
Example: R-G indicates a red wire with a green stripe.



HANDLING AND INSPECTION OF BULKHEAD TYPE CONNECTOR

DISCONNECT BULKHEAD TYPE CONNECTOR

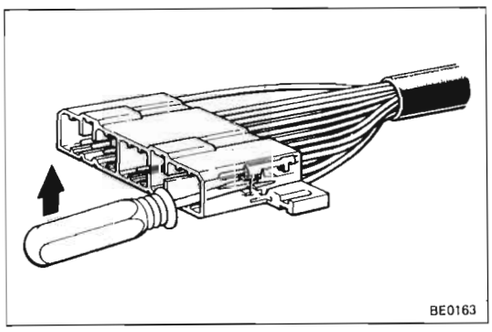
To remove the connector, push the lock levers, shown in the figure, and pull out.



INSPECT BULKHEAD TYPE CONNECTOR

When checking the continuity or voltage with a circuit tester, insertion of the test probe into the receptacle connector may open the fitting to the connector and result in poor contact.

Therefore, ensure that the test probe is inserted only from the wire harness side as shown in the figure.

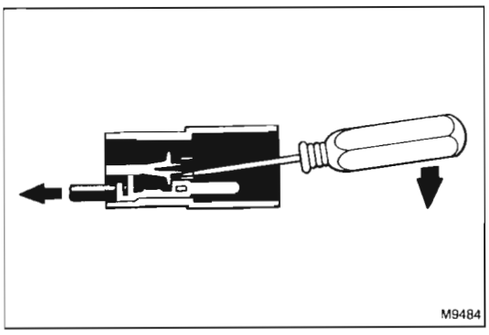


REPLACEMENT OF COMBINATION SWITCH

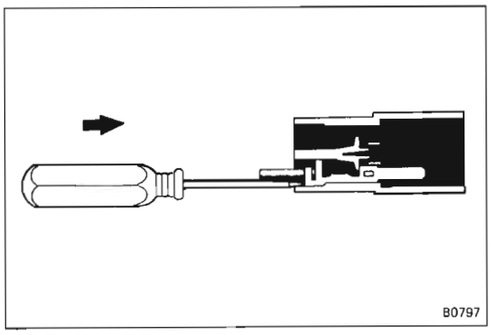
REMOVE TERMINALS FROM CONNECTOR

(a) From the open end, insert a miniature screwdriver between the locking lugs and terminal.

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(b) Pry up the locking lugs with the screwdriver and pull the terminal out from the rear.



INSTALL TERMINALS TO CONNECTOR

(a) Push in the terminal until it is securely locked in the connector lug.

(b) Pull on the wire to confirm that it is securely locked.

INSPECTION OF CIRCUIT AND CONNECTOR

INSPECT CIRCUIT

When inspecting the circuit, refer to the diagram at the back of the manual.

INSPECT CONNECTOR

All connectors are shown from the component side. Therefore, when inspecting from the body side, the left and right terminal connections will be in reverse.

REPLACEMENT OF FUSE

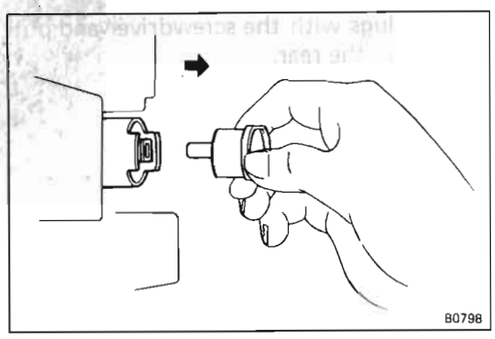
Install a new fuse with the correct amperage.

CAUTION:

1. **Turn off all electrical components and the ignition switch before replacing a fuse. Do not exceed the fuse amp rating.**
2. **Always use a fuse puller for removing and inserting a fuse. Remove and insert straight in and out without twisting. Twisting could force open the terminals too much, resulting in a bad connection.**

If a fuse continues to blow, a short circuit is indicated. The system must be checked by a qualified technician.

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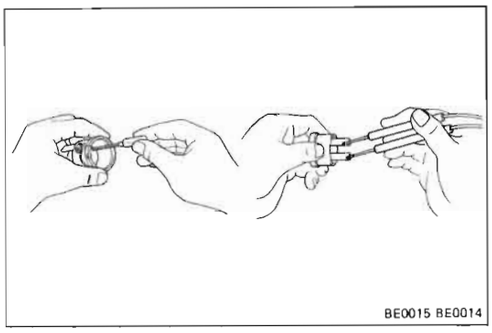


RESET CIRCUIT BREAKER

1. REMOVE CIRCUIT BREAKER

(a) Remove the kick panel.

(b) Remove the circuit breaker.

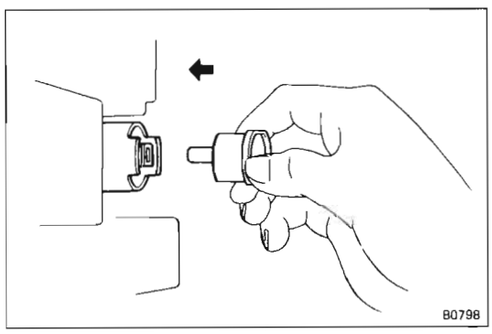


2. RESET CIRCUIT BREAKER

(a) Insert the needle into the reset hole and push it.

(b) Using an ohmmeter, check that there is continuity between both terminals of the circuit breaker.

If there is no continuity, replace the circuit breaker.



3. INSTALL CIRCUIT BREAKER

(a) Install the circuit breaker.

NOTE: If a circuit breaker continues to cut out, a short circuit is indicated. The system must be checked by a qualified technician.

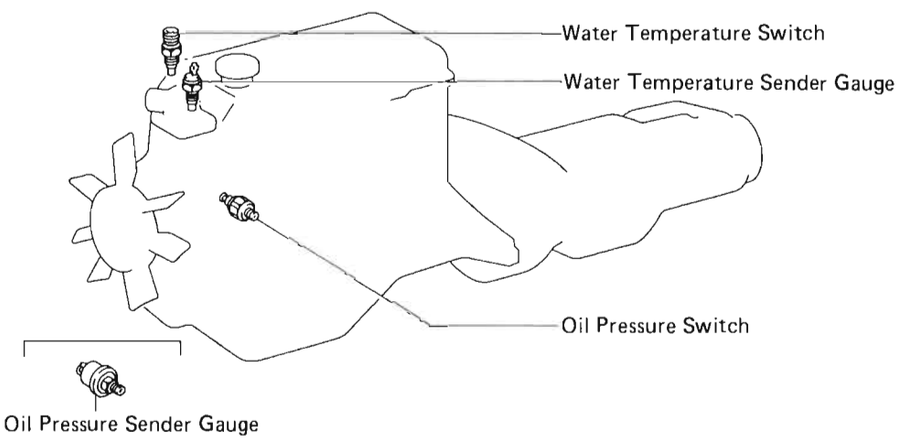
(b) Install the kick panel.

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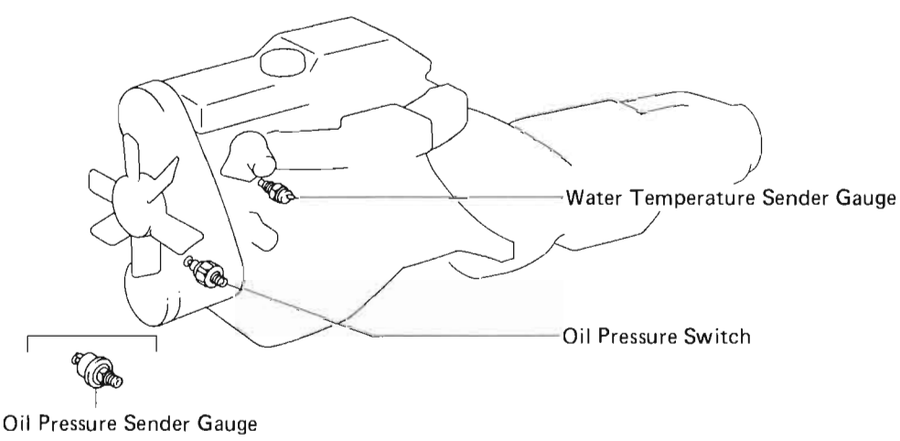
LOCATION OF SWITCHES AND RELAYS

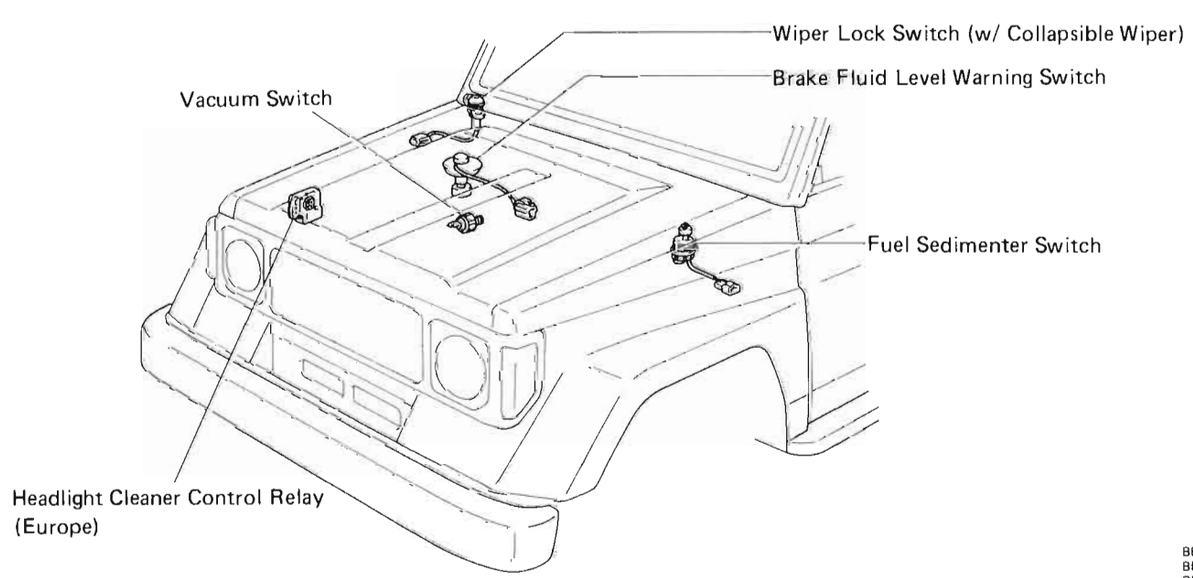
ENGINE COMPARTMENT SWITCHES AND RELAYS

22R Engine



2L Engine

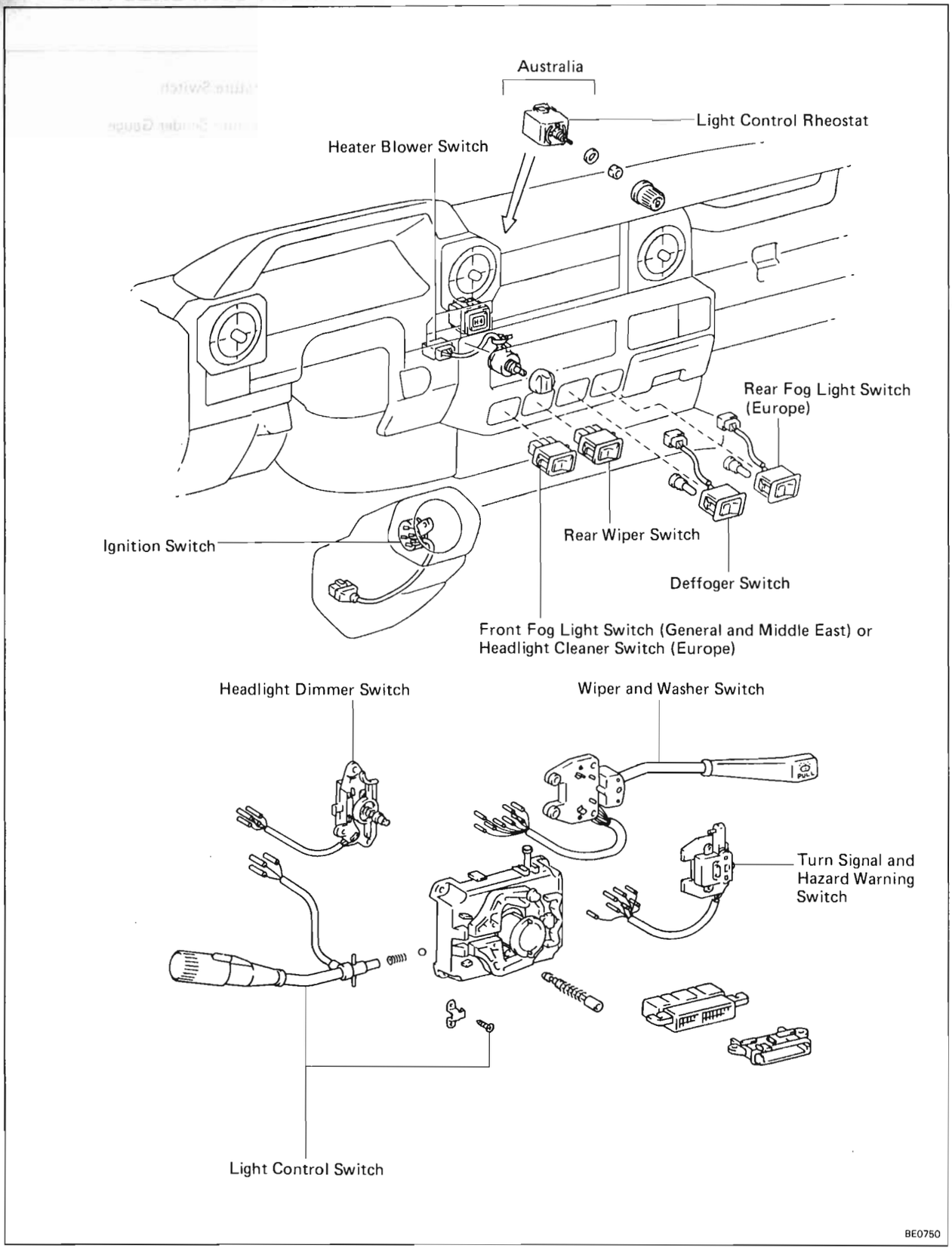




BE0747
BE0748
BE0749

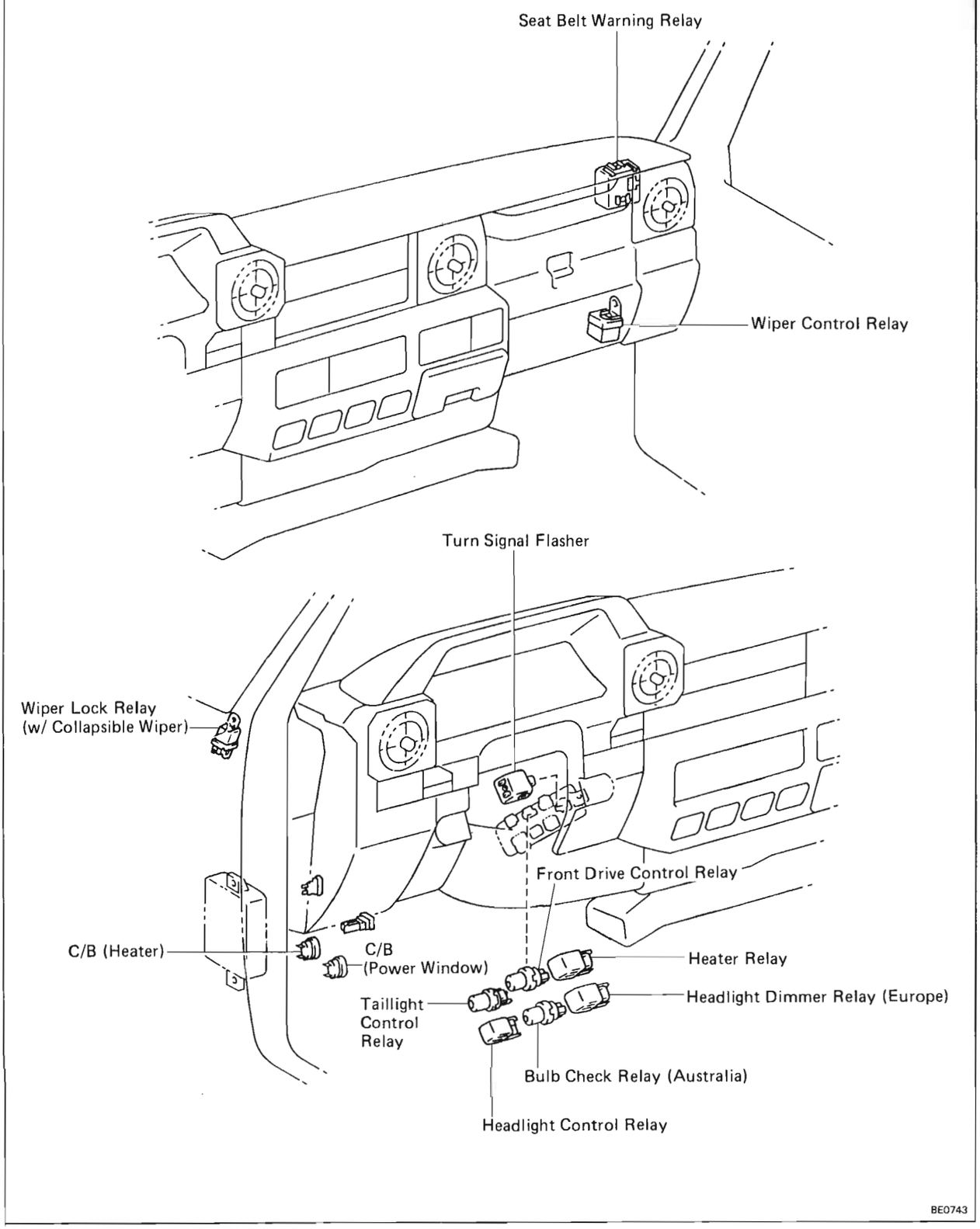
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INSTRUMENT PANEL SWITCHES AND RELAYS



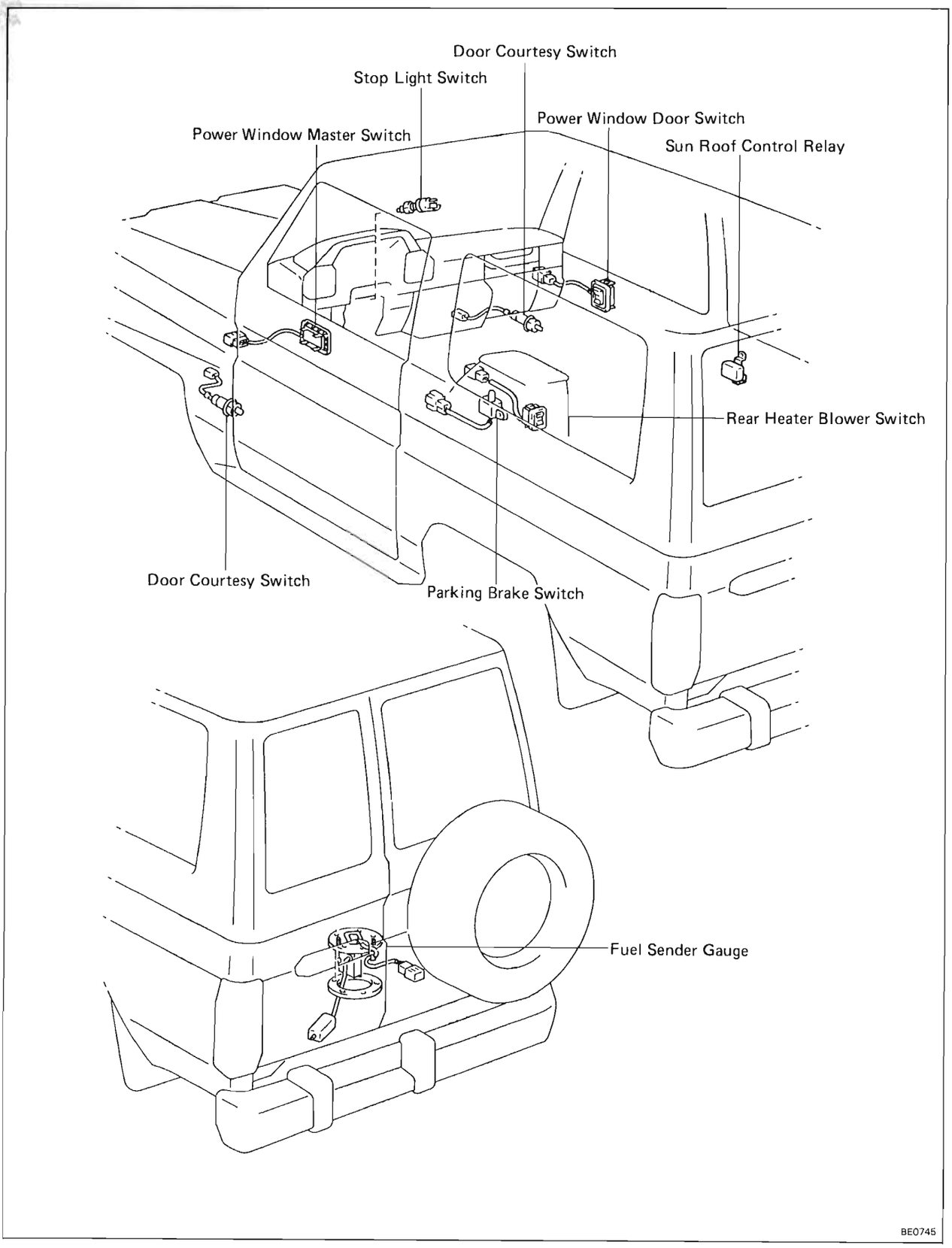
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PASSENGER COMPARTMENT SWITCHES AND RELAYS

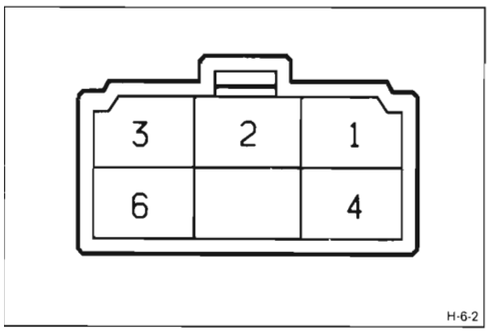


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PASSENGER AND LUGGAGE COMPARTMENT SWITCHES AND RELAYS



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IGNITION SWITCH

INSPECTION OF IGNITION SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	1	3	6	4	2
LOCK					
ACC	○	○			
ON	○	○	○		
START	○		○	○	○

If continuity is not as specified, replace the switch.

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LIGHTING

Troubleshooting

Problem	Possible cause	Remedy	Page
Only one light does not light (all exterior)	Light bulb burned out	Replace bulb	
	Socket, wire or ground faulty	Repair as necessary	
No headlights light	Fusible link blown	Replace fusible link	
	Headlight control relay faulty	Check relay	BE-12
	Light control switch faulty	Check switch	BE-11
	Wiring or ground faulty	Repair as necessary	
High beam headlights or headlight flasher does not operate	Light control switch faulty	Check switch	BE-11
	Wiring faulty	Repair as necessary	
Tail, parking and license lights do not light	TAIL fuse blown	Replace fuse and check for short	BE-3
	Fusible link blown	Replace fusible link	
	Taillight control relay faulty	Check relay	BE-12
	Light control switch faulty	Check switch	BE-11
	Wiring or ground faulty	Repair as necessary	
Stop lights do not light	STOP fuse blown	Replace fuse and check for short	BE-3
	Stop light switch faulty	Adjust or replace switch	
	Wiring or ground faulty	Repair as necessary	
Stop lights stay on	Stop light switch faulty	Adjust or replace switch	
Instrument lights do not light (taillights light)	Light control rheostat faulty	Check rheostat	BE-14
	Wiring or ground faulty	Repair as necessary	
Turn signal does not flash on one side	Turn signal switch faulty	Check switch	BE-15
	Wiring or ground faulty	Repair as necessary	
Turn signals do not operate	TURN fuse blown	Replace fuse and check for short	BE-3
	Turn signal flasher faulty	Check flasher	BE-15
	Turn signal/hazard switch faulty	Check switch	BE-15
	Wiring or ground faulty	Repair as necessary	
Hazard warning lights do not operate	HAZ-HORN fuse blown	Replace fuse and check for short	BE-3
	Turn signal flasher faulty	Check flasher	BE-15
	Turn signal/hazard switch faulty	Check switch	BE-15
	Wiring or ground faulty	Repair as necessary	
Hazard red indicator light does not operate	Hazard red indicator light relay faulty	Check relay	BE-16
	Wiring or ground faulty	Repair as necessary	
Rear fog lights do not light	DOME or HEAD RH-LWR fuse blown	Replace fuse and check for short	BE-3
	Rear fog light switch faulty	Check switch	BE-14
	Rear fog light relay faulty	Check relay	BE-14
	Wiring or ground faulty	Repair as necessary	

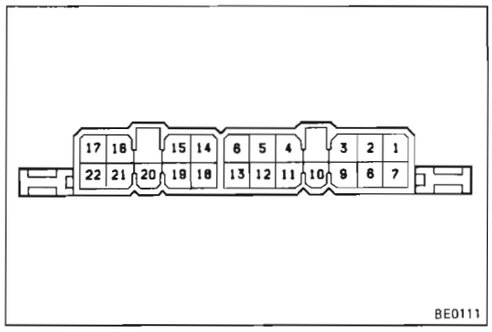
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Light Control Switch and Headlight Dimmer Switch

INSPECTION OF LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

INSPECT CONTINUITY OF LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

Inspect the switch continuity between terminals.



BE0111

Light control switch

Terminal (Wire color) / Switch position	10 EL (W)	11 T (W)	4 H (R)
OFF			
TAIL	○——	——○	
HEAD	○——	——○——	——○

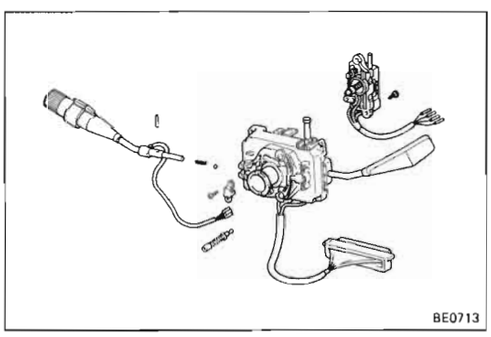
Headlight dimmer switch

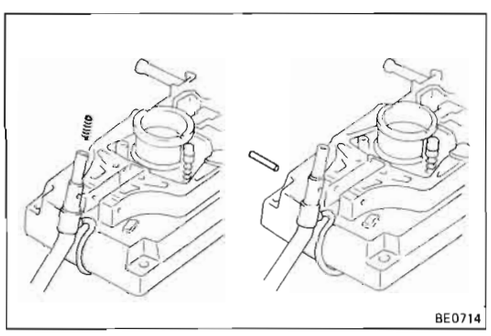
Terminal (Wire color) / Switch position	13 ED (W-B)	6 HL (R-G)	5 HU (R-Y)	12 HF (R-W)
Flash	○——	——	——○——	——○
Low Beam	○——	——○		
High Beam	○——	——	——○	

If continuity is not as specified, replace the switch.

REPLACEMENT OF LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

REPLACE LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH


BE0713


BE0714

(a) Remove the terminals from the connector. (See page BE-3)

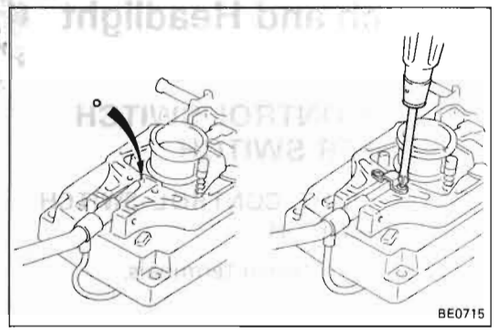
(b) Remove the light control switch.

(c) Remove the headlight dimmer switch.

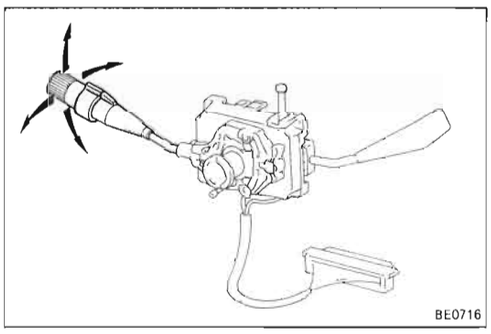
(d) Install the headlight dimmer switch.

(e) Insert the spring into the lever and install the lever with the pin.

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(f) Place the ball on the spring, position the lever at HI and install the plate.



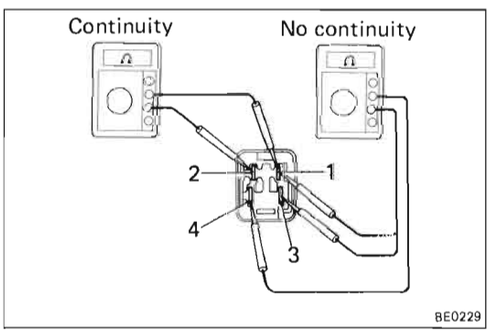
(g) Insure that the switch operates smoothly.

(h) Install the terminals to the connector. (See page BE-3)

Headlight Control Relay

INSPECTION OF HEADLIGHT CONTROL RELAY

1. INSPECT RELAY CONTINUITY



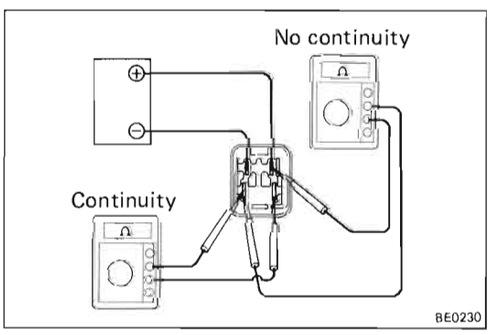
(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is no continuity between terminals 3 and 4.

(c) Check that there is no continuity between terminals 1 and 4.

If continuity is not specified, replace the relay.

2. INSPECT RELAY OPERATION



(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

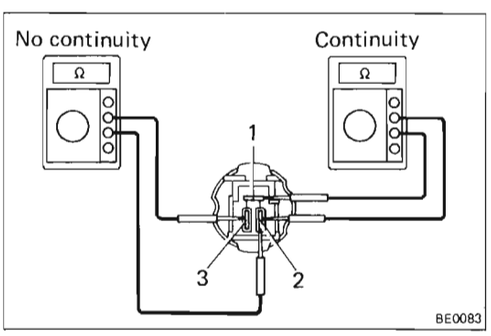
(c) Check that there is no continuity between terminals 1 and 4.

If operation is not as described, replace the relay.

Taillight Control Relay

INSPECTION OF TAILLIGHT CONTROL RELAY

1. INSPECT RELAY CONTINUITY

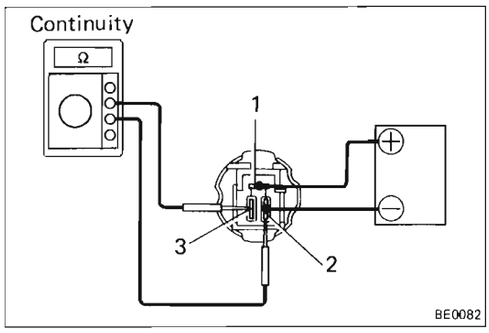


(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is no continuity between terminals 2 and 3.

If continuity is not as specified, replace the relay.

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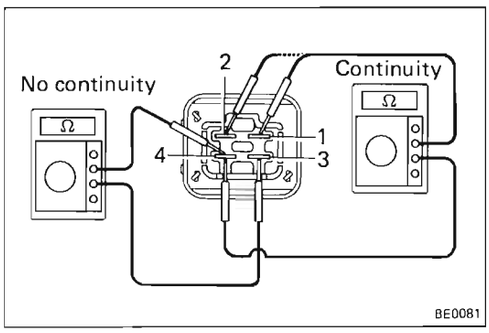


2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is continuity between terminals 2 and 3.

If operation is not as described, replace the relay.



Dimmer Relay

INSPECTION OF DIMMER RELAY

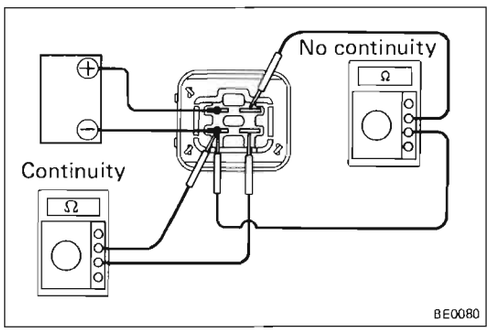
1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 4.

(b) Check that there is continuity between terminals 2 and 4.

(c) Check that there is no continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.



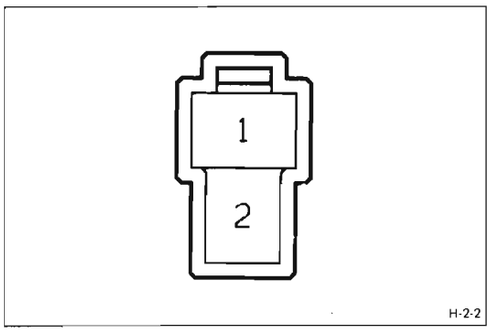
2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 2 and 4.

(b) Check that there is continuity between terminals 3 and 4.

(c) Check that there is no continuity between terminals 1 and 4.

If operation is not as described, replace the relay.



Front Fog Light Switch

INSPECTION OF FRONT FOG LIGHT SWITCH

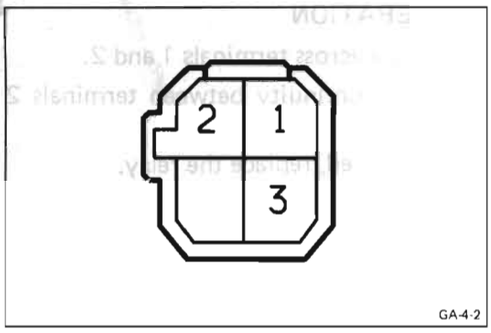
INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	1	2
OFF		
ON	○	○

If continuity is not as specified, replace the switch.

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Rear Fog Light Switch

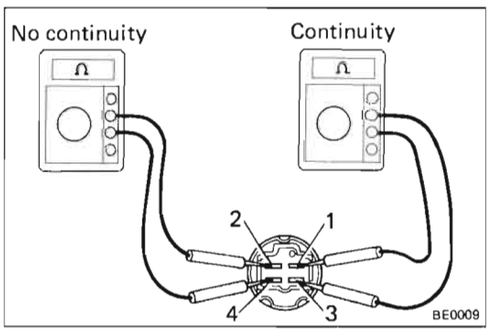
INSPECTION OF REAR FOG LIGHT SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	2	1	3
OFF		○ — ⊙	○
ON	○ — ⊙	○ — ⊙	○

If continuity is not as specified, replace the switch or bulb.



Rear Fog Light Relay

INSPECTION OF REAR FOG LIGHT RELAY

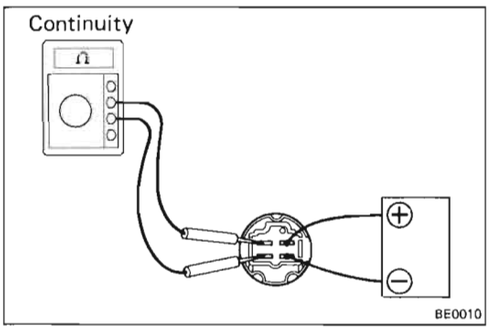
1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

(c) Check that there is no continuity between terminals 1 and 4.

If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Check that there is continuity between terminals 2 and 4.

(c) Check that there is no continuity between terminals 2 and 3.

If operation is not as described, replace the relay.

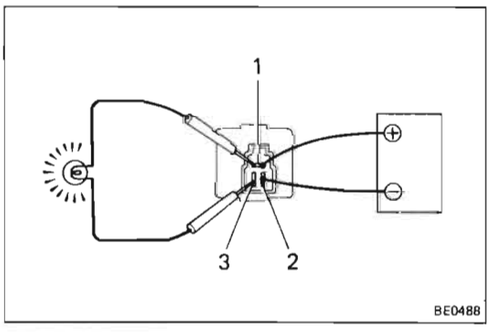
Light Control Rheostat

INSPECTION OF LIGHT CONTROL RHEOSTAT

INSPECT RHEOSTAT OPERATION

Connect the positive (+) lead from the battery to terminal 1. Connect the negative (–) lead from the battery to terminal 2, and connect a 3.4W test bulb between terminals 1 and 3.

Gradually slide the rheostat knob toward the bright side and/or dark side and check that the test bulb brightness changes.



If operation is not as described, replace the rheostat.

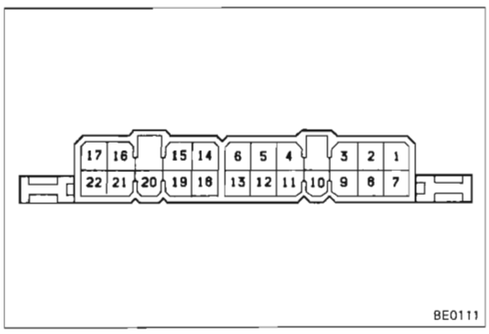
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Turn Signal and Hazard Warning Switch

INSPECTION OF TURN SIGNAL AND HAZARD WARNING SWITCH

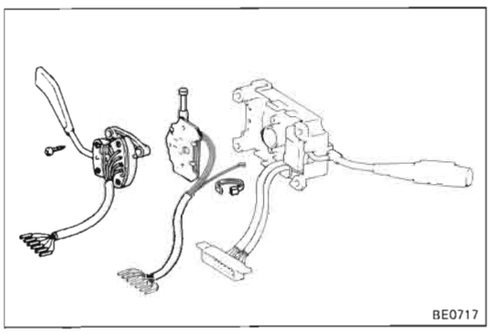
INSPECT CONTINUITY OF TURN SIGNAL AND HAZARD WARNING SWITCH

Inspect the switch continuity between terminals.



Switch position		Terminal (Wire color) 9 TL (G-B)	3 TB (G-W)	8 TR (G-Y)	2 B1 (G-L)	7 F (G)	1 B2 (G-O)
Turn signal	L	○—○			○—○		
	N				○—○		
	R		○—○		○—○		
Hazard	ON	○—○		○		○	—○

If continuity is not as specified, replace the switch.



REPLACEMENT OF TURN SIGNAL AND HAZARD WARNING SWITCH

REPLACE TURN SIGNAL AND HAZARD WARNING SWITCH

(a) Remove the terminals from the connector. (See page BE-3)

(b) Remove the three screws, and remove the wiper and washer switch.

(c) Remove the turn signal and hazard switch.

(d) Install the turn signal and hazard switch.

(e) Install the wiper and washer switch.

(f) Connect the terminals to the connector. (See page BE-3)

Turn Signal Flasher

INSPECTION OF TURN SIGNAL FLASHER

INSPECT FLASHER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (–) lead to terminal 2.

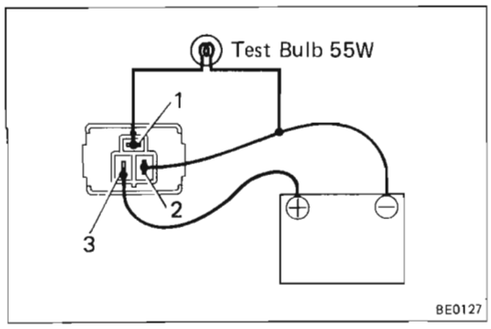
(b) Connect a 55W bulb between terminals 1 and 2, and check that the bulb goes on and off.

NOTE: The turn signal lights should flash 75 to 95 times per minute.

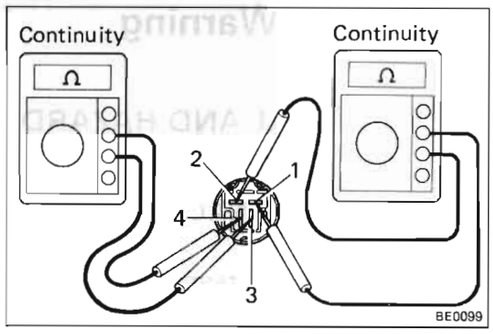
If one of the front or rear turn signal lights has an open circuit, the number of flashes would be more than 120 per minute.

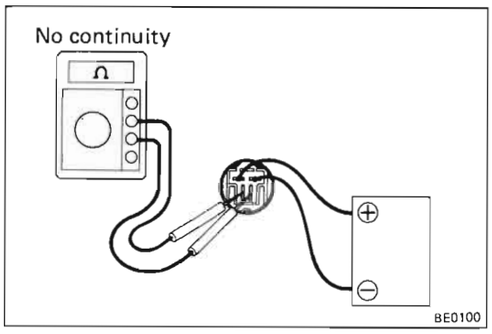
If one of the side turn signal lights has an open circuit, the number of flashes would increase by about 10 per minute.

If operation is not as described, replace the flasher.



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Hazard Red Indicator Light Relay

INSPECTION OF RED INDICATOR LIGHT RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

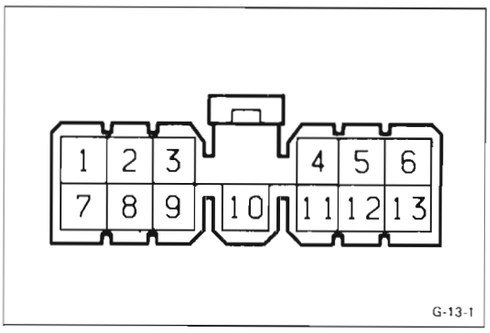
If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is no continuity between terminals 3 and 4.

If operation is not as described, replace the relay .



Running Light Relay (Norway only)

INSPECTION OF RUNNING LIGHT RELAY

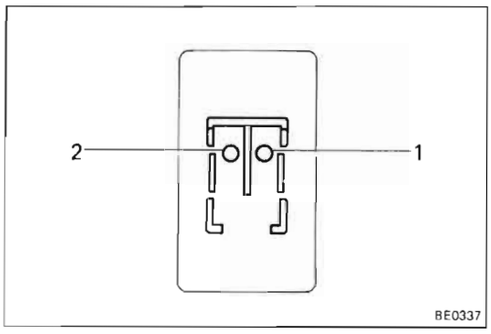
INSPECT RUNNING LIGHT RELAY CIRCUIT

Disconnect the relay and inspect the connector on wire harness side as shown in the chart below.

If circuit is correct as specified, replace the relay.

Terminal	Check Item	Tester Connection	Condition	Voltage or Continuity
1	Continuity	1 – Body ground	Turn headlight dimmer switch to Flash or High beam	Continuity
			Turn headlight dimmer switch to Low beam	No continuity
2	Voltage	2 – Body ground	–	Battery voltage
3	Continuity	3 – Body ground	Turn light control switch to TAIL or HEAD	Continuity
			Turn light control switch to OFF	No continuity
4	Voltage	4 – Body ground	–	Battery voltage
5	Continuity	5 – Body ground	Turn light control switch to TAIL	Continuity
			Turn light control switch to OFF	No continuity
6	Voltage	6 – Body ground	Turn ignition switch to ON	Battery voltage
			Turn ignition switch to OFF	No voltage
7	Voltage	7 – Body ground	Turn light control switch to HEAD	Battery voltage
			Turn light control switch to OFF	No voltage
8	Continuity	8 – Body ground	Turn headlight dimmer switch to High beam	Continuity
			Turn headlight dimmer switch to Low beam	No continuity
9	Continuity	9 – 10	–	Continuity
10	Voltage	10 – Body ground	–	Battery voltage
12	Continuity	12 – Body ground	Turn ignition switch to START	Continuity
			Turn ignition switch to ON or ACC	No continuity
13	Continuity	13 – Body ground	Turn ignition switch to START	Continuity
			Turn ignition switch to ON or ACC	No continuity

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HEADLIGHT CLEANER

Headlight Cleaner Switch

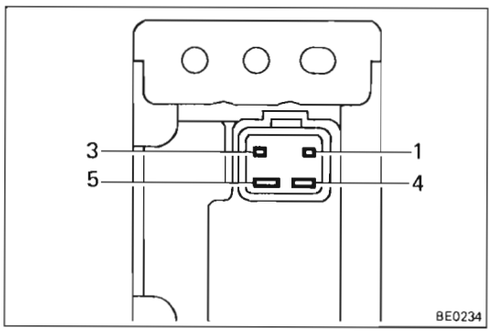
INSPECTION OF HEADLIGHT CLEANER SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	1	2
OFF		
ON	○	○

If continuity is not as specified, replace the switch.



Headlight Cleaner Control Relay

INSPECTION OF HEADLIGHT CLEANER CONTROL RELAY

INSPECT CONTROL RELAY CIRCUIT

(a) Disconnect the control relay and inspect the connector on the wire harness side as shown in the chart below.

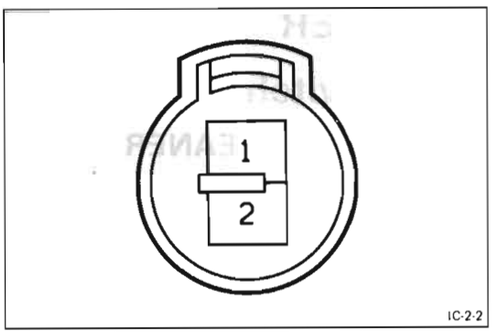
Terminal	Check Item	Tester Connection	Condition	Voltage or Continuity
1	Continuity	1 – Body ground	Turn light control switch to HEAD and turn headlight cleaner switch on	Continuity
			Turn light control switch to OFF or turn headlight cleaner switch off	No continuity
3	Voltage	3 – Body ground	Turn ignition switch to ON	Battery voltage
			Turn ignition switch to LOCK or ACC	No voltage
5	Continuity	5 – Body ground	–	Continuity

(b) With terminal 4 on the connector side grounded, check that the cleaner motor operates.

CAUTION: These tests must be performed quickly (within 3 – 5 seconds) to prevent the coil from burning out.

If circuit is as specified above, replace the relay.

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Cleaner Motor

INSPECTION OF CLEANER MOTOR

INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2. Connect the negative (–) lead to terminal 1.

(b) Check that the motor operates.

CAUTION: These tests must be performed quickly (within 3 – 5 seconds) to prevent the coil from burning out.

If operation is not as described, replace the motor.

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WIPERS AND WASHERS

Troubleshooting

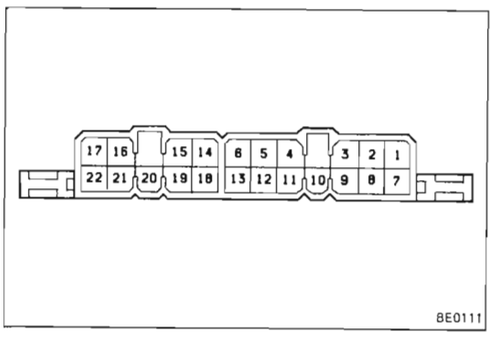
Problem	Possible cause	Remedy	Front Page	Rear Page
Wipers do not operate or return to off position	WIPER fuse blown	Replace fuse and check for short	BE-3	BE-3
	Wiper motor faulty	Check motor	BE-21	BE-22
	Wiper switch faulty	Check switch	BE-19	BE-22
	Wiper lock relay faulty	Check relay	BE-21	
	Wiper lock switch faulty	Check switch	BE-22	
	Wiring or ground faulty	Repair as necessary		
Wipers do not operate in INT position	Wiper control relay faulty	Check relay	BE-20	
	Wiper motor faulty	Check motor	BE-21	
	Wiring or ground faulty	Repair as necessary		
Washer does not operate	Washer hose or nozzle clogged	Repair as necessary		
	Washer motor faulty	Replace motor		
	Wiper switch faulty	Check switch	BE-19	BE-22
	Wiring or ground faulty	Repair as necessary		

Front Wiper and Washer Switch

INSPECTION OF FRONT WIPER AND WASHER SWITCH

INSPECT WIPER AND WASHER SWITCH CONTINUITY

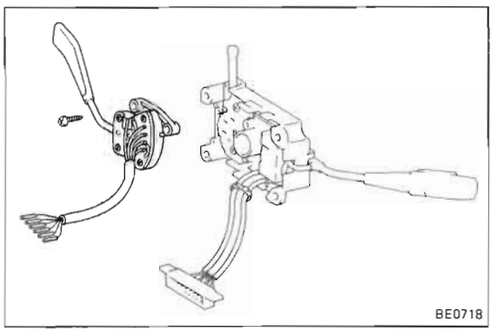
Inspect the switch continuity between terminals.



Switch position \ Terminal (Wire color)		20 +S (L-R)	21 +1 (L-B)	17 +B (L-W)	22 +2 (L-O)	19 C_1 (Lg-R)	14 Ew (B)	15 W (L)
MIST			○—○					
OFF		○—○						
INT		○—○				○—○		
LO			○—○					
HI				○—○				
Washer	OFF							
	ON						○—○	

If continuity is not as specified, replace the switch.

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BE0718

REPLACEMENT OF FRONT WIPER AND WASHER SWITCH

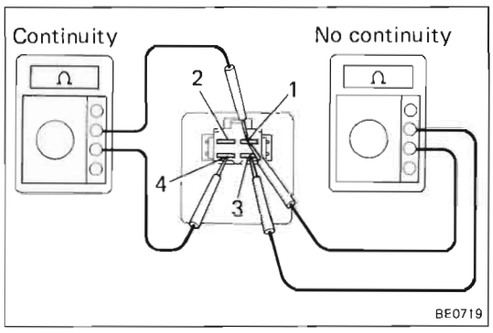
REPLACE WIPER AND WASHER SWITCH

(a) Remove the terminals from the connector. (See page BE-3)

(b) Remove the wiper and washer switch.

(c) Install the wiper and washer switch.

(d) Connect the terminals to the connector. (See page BE-3)



BE0719

Front Wiper Control Relay

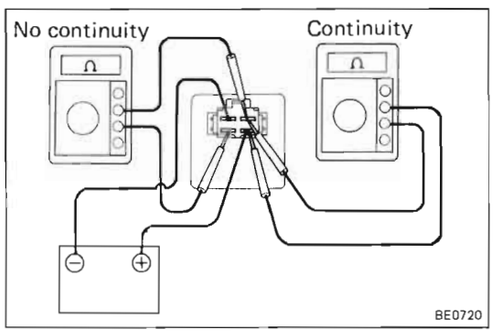
INSPECTION OF FRONT WIPER CONTROL RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 4.

(b) Check that there is no continuity between terminals 1 and 3.

If continuity is not as specified, replace the relay.



BE0720

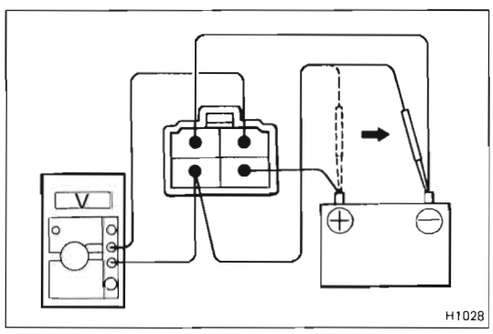
2. INSPECT RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (–) lead to terminal 2.

(b) Check that there is no continuity between terminals 1 and 4.

(c) Check that there is continuity between terminals 1 and 3.

If operation is not as described, replace the relay.



H1028

3. INSPECT INTERMITTENT OPERATION

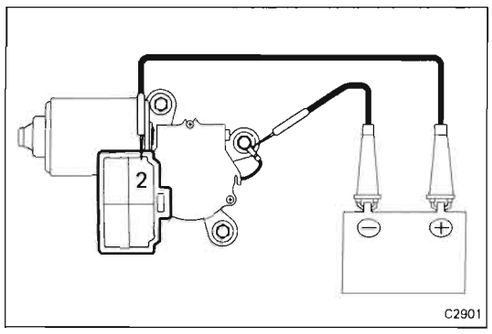
(a) Connect the positive (+) lead from the battery to terminal 3 and connect the negative (–) lead from the battery to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 1 and connect the negative (–) lead from the voltmeter to terminal 4.

(c) Connect terminal 4 to the battery positive (+) terminal for 1 second, and then connect to the battery negative (–) terminal.
The voltages should be 0V on the battery positive (+) terminal and jump to 12V on the battery negative (–) terminal.
There should be a 4 second delay before battery voltage is indicated after connecting to battery negative (–) terminal.

If operation is not as described, replace the relay.

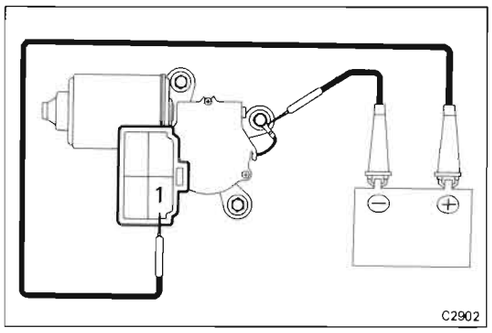
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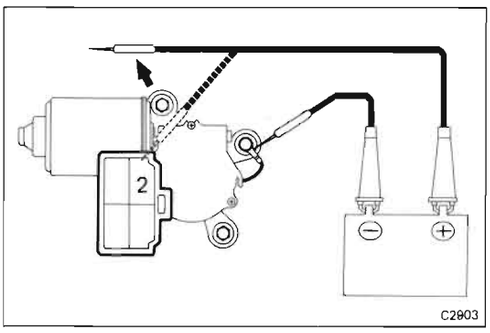
Front Wiper Motor

INSPECTION OF FRONT WIPER MOTOR

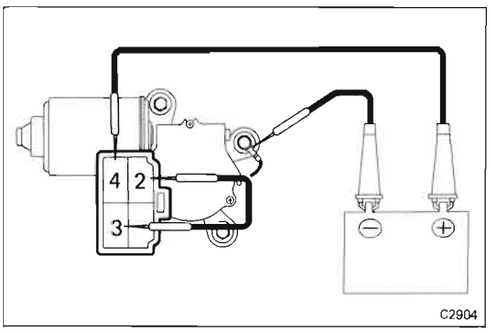
1. INSPECT THAT MOTOR TURNS AT LOW SPEED
   (a) Disconnect the connector from the wiper motor.
   (b) Connect the positive (+) lead from the battery to terminal 2. Connect the negative (–) lead to the motor body.
   (c) Check that the motor turns at low speed.



2. INSPECT THAT MOTOR TURNS AT HIGH SPEED
   (a) Connect the positive (+) lead from the battery to terminal 1. Connect the negative (–) lead to the motor body.
   (b) Check that the motor turns at high speed.



3. INSPECT THAT MOTOR STOPS RUNNING AT STOP POSITION
   (a) Turn the motor at low speed.
   (b) Stop the motor operation anywhere except the motor stop position by disconnecting the battery terminals.



   (c) Connect the positive (+) lead from the battery to terminal 4. Connect the negative (–) lead to the motor body. Connect terminals 2 and 3.
   (d) Check that the motor stops running at the stop position after the motor operates again.

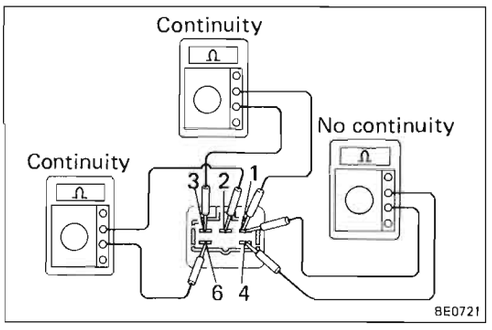
   If operation is not as described, replace the motor.

Wiper Lock Relay (with Collapsible Wiper)

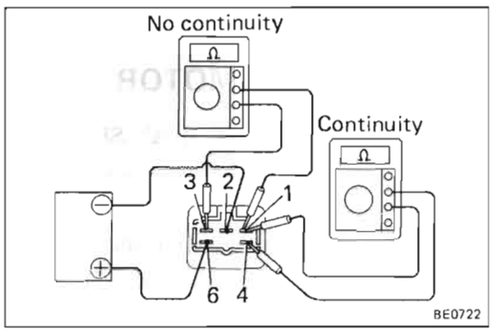
INSPECTION OF WIPER LOCK RELAY

1. INSPECT RELAY CONTINUITY
   (a) Check that there is continuity between terminals 1 and 3.
   (b) Check that there is continuity between terminals 2 and 6.
   (c) Check that there is no continuity between terminals 1 and 4.

   If continuity is not as specified, replace the relay.



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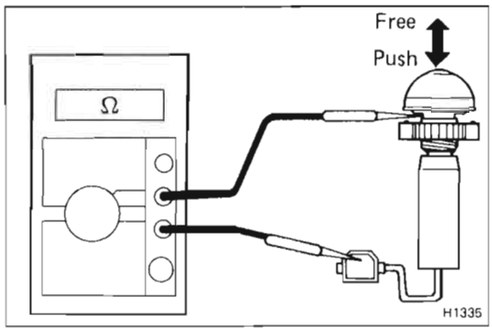
2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 2 and 6.

(b) Check that there is continuity between terminals 1 and 4.

(c) Check that there is no continuity between terminals 1 and 3.

If operation is not as described, replace the relay.



Wiper Lock Switch (with Collapsible Wiper)

INSPECTION OF WIPER LOCK SWITCH

INSPECT SWITCH CONTINUITY

Using an ohmmeter, inspect the continuity between the terminal and body ground.

(a) Check that there is continuity when the switch is pushed.

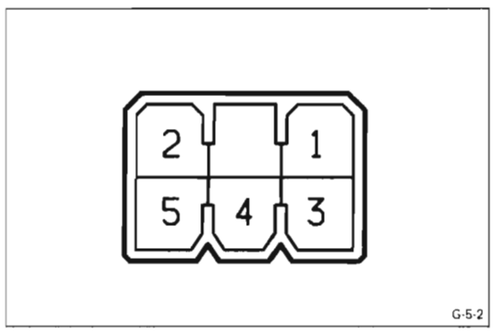
(b) Check that there is no continuity when the switch is free.

If continuity is not as specified, replace the switch.

Rear Wiper and Washer Switch

INSPECTION OF REAR WIPER AND WASHER SWITCH

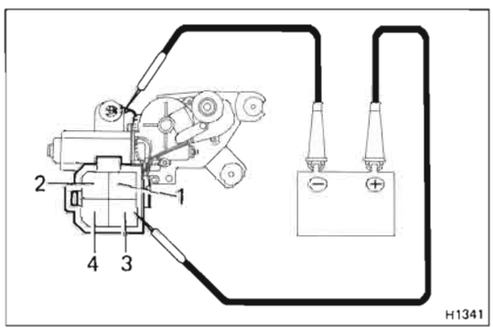
INSPECT SWITCH CONTINUITY



Inspect the continuity between terminals for each switch position shown in the table below.

Switch position \ Terminal	3	4	5	2	1
Washer I	○	○		○	○
OFF	○	○			
ON		○	○		
Washer II		○	○	○	○

If continuity is not as specified, replace the switch.



Rear Wiper Motor

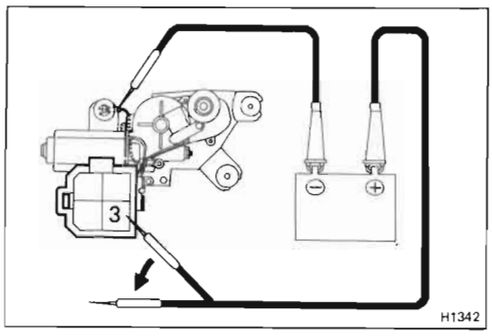
INSPECTION OF REAR WIPER MOTOR

1. INSPECT THAT MOTOR TURNS

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (–) lead to the motor body.

(b) Check that the motor turns.

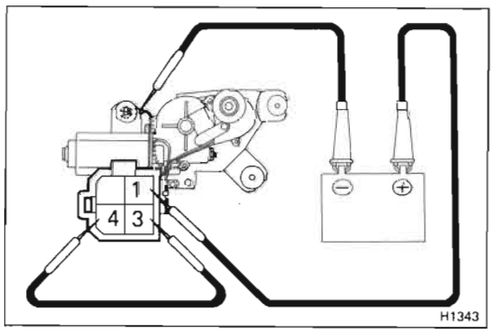
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2. **INSPECT THAT MOTOR STOPS RUNNING AT STOP POSITION**

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (–) lead to the motor body. Turn the motor.

(b) Stop motor operation anywhere except stop position by disconnecting terminal 3.



(c) Connect terminals 3 and 4.

(d) Connect the positive (+) lead from the battery to terminal 1.

(e) Check that the motor stops running at stop position after the motor operates again.

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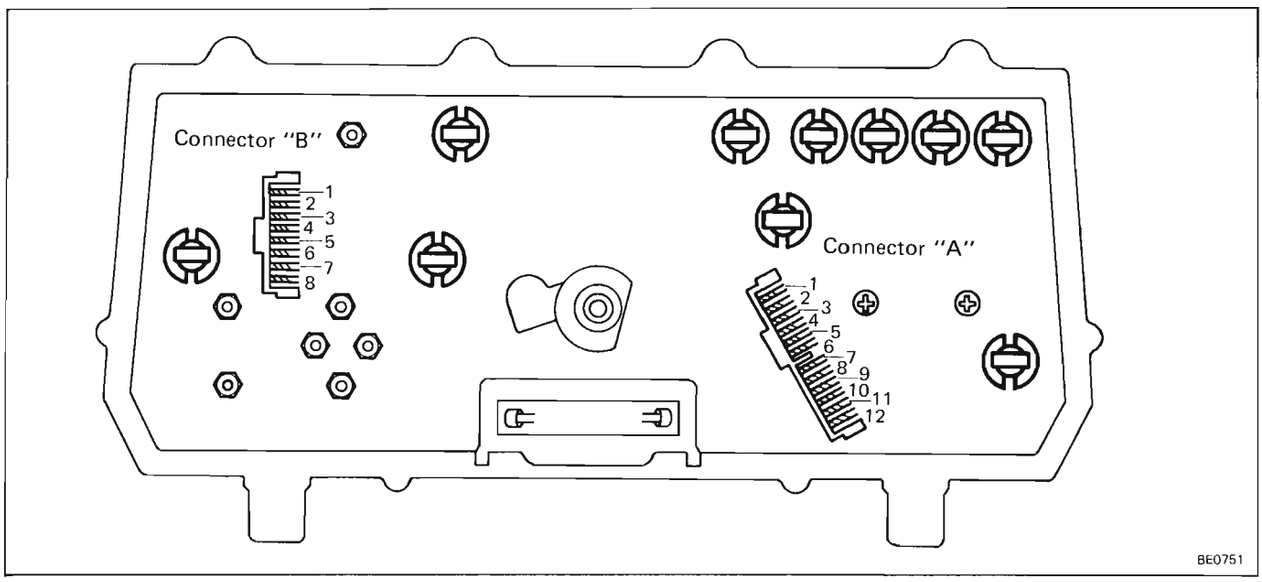
INSTRUMENTS, GAUGES AND WARNING LIGHTS

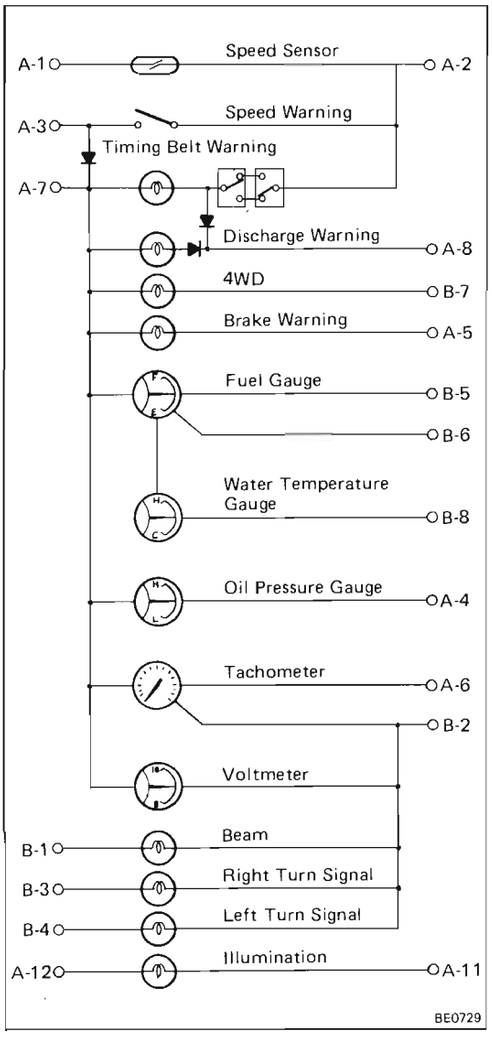
Troubleshooting

Problem	Possible cause	Remedy	Page
Voltmeter does not work	Fuses blown	Replace in-line fuses and check for short	
	Faulty	Check voltmeter	BE-27
	Wiring faulty	Repair as necessary	
Tachometer does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Tachometer faulty	Check tachometer	BE-27
	Wiring faulty	Repair as necessary	
Fuel gauge does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Fuel gauge faulty	Check gauge	BE-28
	Sender gauge faulty	Check sender gauge	BE-28
	Wiring or ground faulty	Repair as necessary	
Water temperature gauge does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Water temperature gauge faulty	Check gauge	BE-28
	Water temperature sender gauge faulty	Check sender gauge	BE-29
	Wiring or ground faulty	Repair as necessary	
Low oil pressure warning light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Oil pressure warning switch faulty	Check switch	BE-30
	Wiring or ground faulty	Repair as necessary	
Brake warning light does not light	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Brake fluid level warning switch faulty	Check switch	BE-31
	Wiring or ground faulty	Repair as necessary	
Discharge warning light does not light	"CHARGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Wiring or ground faulty	Repair as necessary	
Parking brake indicator light does not light (Australia only)	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Parking brake switch faulty	Check switch	BE-31
	Wiring or ground faulty	Repair as necessary	

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Combination Meter and Gauge (w/Tachometer)



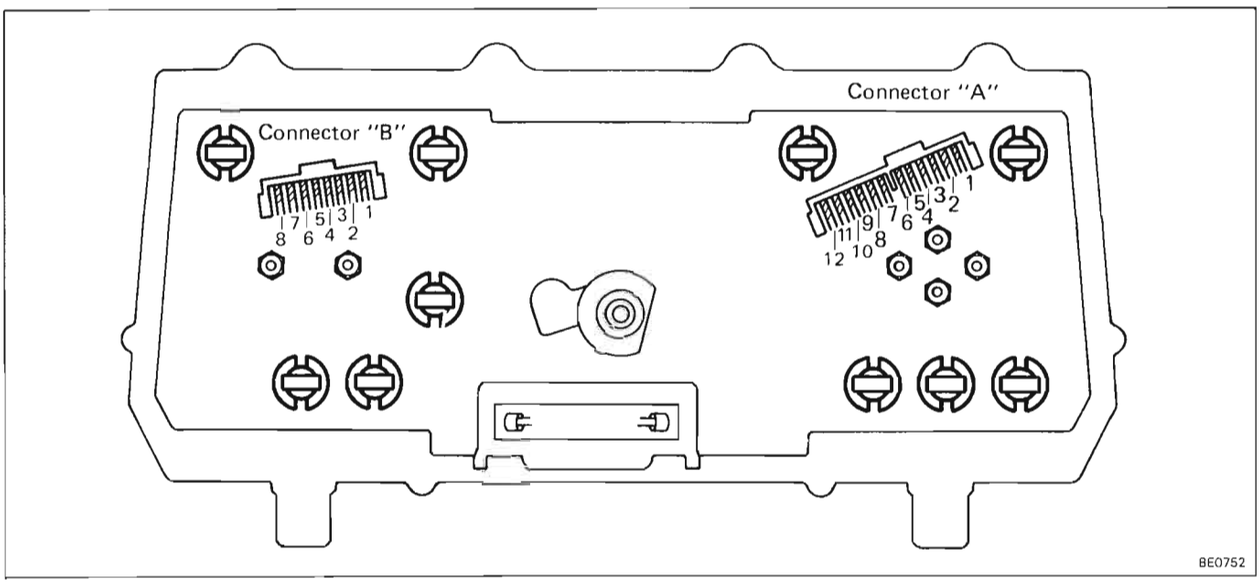


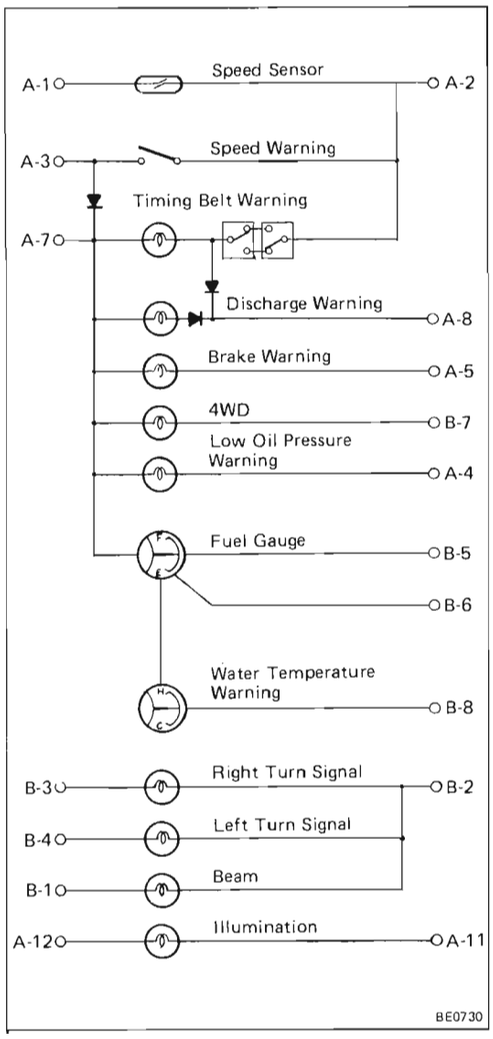
COMBINATION METER CIRCUIT

No.		Wiring connector sides
A	1	Emission Computer
	2	Ground
	3	Speed Warning Buzzer
	4	Oil Pressure Sender Gauge
	5	Vacuum Switch, Parking Brake Switch and Brake Fluid Level Warning Switch
	6	Ignition Coil (22R Engine) or Tacho Sensor (2L Engine)
	7	ENGINE Fuse
	8	CHARGE Fuse
	11	Light Control Rheostat Terminal to Ground
	12	TAIL Fuse
B	1	Headlight Dimmer Switch Terminal
	2	Ground
	3	Turn Signal Switch Terminal
	4	Turn Signal Switch Terminal
	5	Fuel Sender Gauge Terminal 1
	6	Ground
	7	4WD Indicator Switch
	8	Water Temperature Sender Gauge

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Combination Meter and Gauge (w/o Tachometer)





COMBINATION METER CIRCUIT

No.		Wiring connector sides
A	1	Emission Computer
	2	Ground
	3	Speed Buzzer
	4	Oil Pressure Switch
	5	Vacuum Switch, Parking Brake Switch and Brake Fluid Level Warning Switch
	7	ENGINE Fuse
	8	CHARGE Fuse
	11	Ground
	12	TAIL Fuse
B	1	Headlight Dimmer Switch Terminal
	2	Ground
	3	Turn Signal Switch Terminal
	4	Turn Signal Switch Terminal
	5	Fuel Sender Gauge Terminal 1
	6	Ground
	7	4WD Indicator Switch
	8	Water Temperature Sender Gauge

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Speedometer

ON-VEHICLE INSPECTION OF SPEEDOMETER

(a) Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

NOTE: Tire wear and tire over or under inflation will increase the indication error.

Standard indication (km/h)	Allowable range (km/h)	
	Ex. Australia	Australia
20	21 – 25	17.5 – 21.5
40	41.5 – 46	38 – 42
60	62.5 – 67	59 – 63.5
80	83 – 88	80 – 85
100	104 – 109	101 – 106.5
120	125 – 130.5	122 – 128
140	145.5 – 151.5	143 – 149.5

Standard indication (mph)	Allowable range (mph)
20	21 – 23.5
40	41.5 – 44
60	62.5 – 66
80	83 – 87

If error is excessive, replace the speedometer.

(b) Check the speedometer for pointer vibration and abnormal noise.

NOTE: Pointer vibration can be caused by a loose speedometer cable.

Tachometer

ON-VEHICLE INSPECTION OF TACHOMETER

(a) Connect a tune-up test tachometer, and start the engine.

CAUTION:
- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer indications.

rpm / Temp. and volts	1,000	3,000	5,000
25°C DC13V	±100	±150	±150

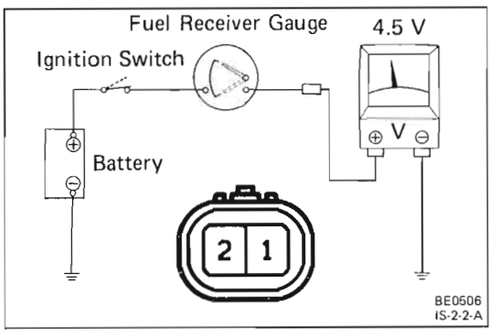
If error is excessive, replace the tachometer.

Voltmeter

INSPECTION OF VOLTMETER

Compare the tester and voltmeter indications.
If the error is excessive, replace the voltmeter.

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Fuel Gauge

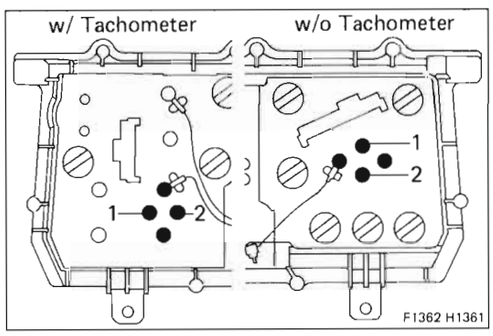
INSPECTION OF FUEL GAUGE

1. INSPECT RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the fuel sender gauge. Connect the positive (+) lead from the voltmeter to terminal 1 and connect the negative (–) lead from the voltmeter to terminal 1.

(b) Turn the ignition switch or starter switch on. Check that the meter needle vibrates near the 3.5V position.

If voltage is not correct, remove and test the receiver gauge.

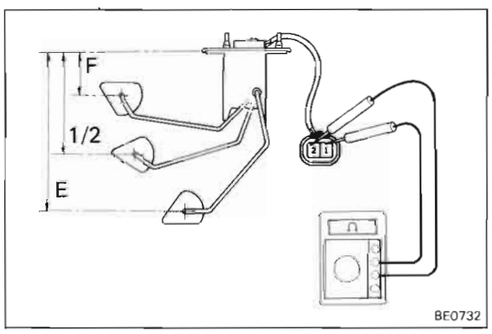


2. MEASURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals 1 and 2.

Resistance: Approx. 55 Ω

If resistance value is not as specified, replace the receiver gauge.



3. MEASURE SENDER GAUGE RESISTANCE

(a) Check that resistance changes as the float is moved from the top to bottom position.

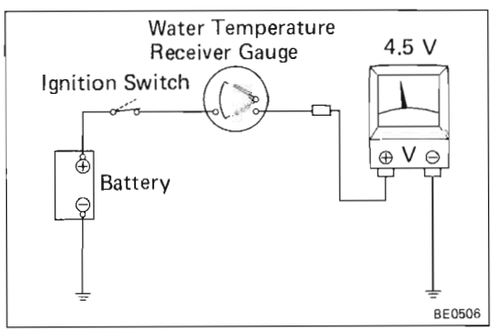
(b) Measure the resistance between terminal 1 and the sender gauge body for each float position.

Float position	mm (in.)	Resistance (Ω)
F	76.7 (3.020)	3 ± 2.1
½	189.8 (7.472)	32.5 ± 4.8
E	302.4 (11.905)	110 ± 7.7

If each resistance value is not as shown in the table above, replace the sender gauge.

Water Temperature Gauge

INSPECTION OF WATER TEMPERATURE GAUGE



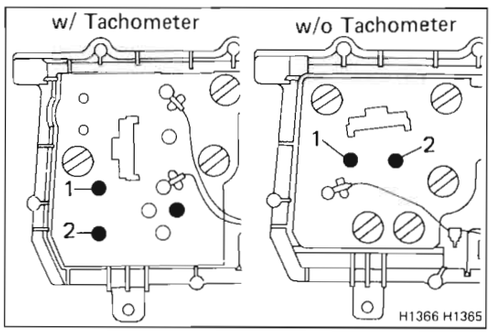
1. INSPECT RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge. Connect the positive (+) lead from the voltmeter to terminal and connect the negative (–) lead from the voltmeter to body ground.

(b) Turn the ignition switch or starter switch on. Check that the meter needle vibrates near the 3.5V position.

If voltage value is not correct, remove and test the receiver gauge.

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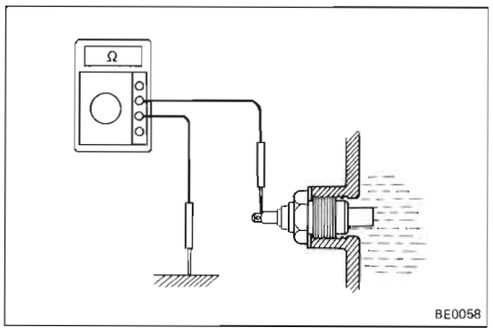


2. MEASURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals 1 and 2.

Resistance: Approx. 55 Ω

If resistance value is not correct, replace the receiver gauge.



3. MEASURE SENDER GAUGE RESISTANCE

Measure the resistance between the terminal and ground.

If each resistance value is not as shown in the table below, replace the sender gauge.

Water temperature °C (°F)	Resistance (Ω)
50 (122)	226.0 $^{+33.6}_{-36.6}$
115 (239)	26.4 $^{+1.71}_{-2.21}$

Oil Pressure Gauge

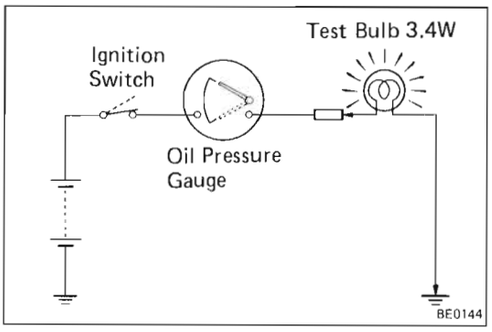
INSPECTION OF OIL PRESSURE GAUGE

1. INSPECT RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch to ON. Check that the bulb starts flashing and the gauge pointer deflects.

If indications are not as specified, remove and test the receiver gauge.

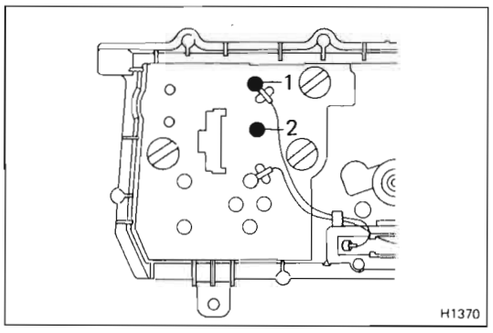


2. MEASURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals 1 and 2.

Resistance: Approx. 55 Ω

If resistance value is not correct, replace the receiver gauge.

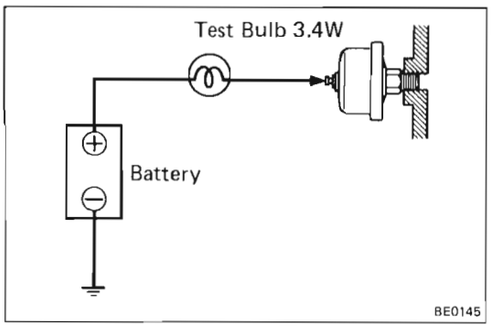


3. INSPECT SENDER GAUGE OPERATION

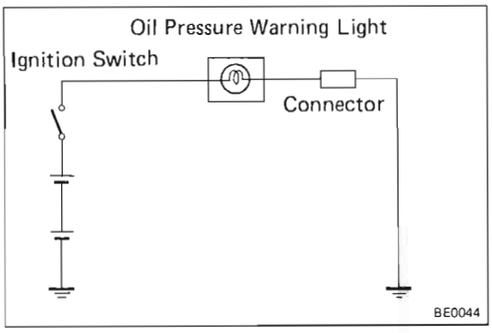
(a) Disconnect the connector from the sender gauge.

(b) Connect a 12V battery to the sender gauge terminal in series with a 3.4W bulb. Check that the bulb does not light when the engine is stopped, and flashes when the engine is running. The number of flashes should vary with engine speed.

If operation is not as specified, replace the sender gauge.



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Low Oil Pressure Warning

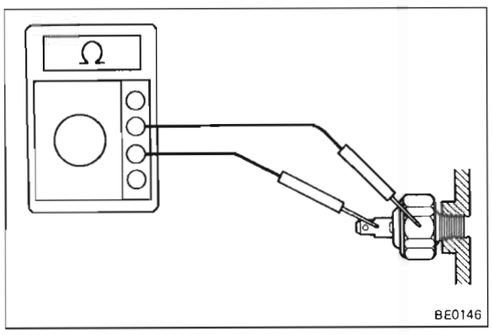
INSPECTION OF LOW OIL PRESSURE WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the pressure switch. Connect the wire harness side connector terminal and body ground.

(b) Turn the ignition switch or starter switch ON. Check that the warning light lights.

If operation is not correct, remove and test the bulb.



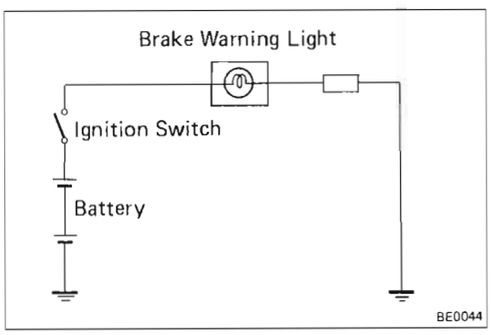
2. INSPECT WARNING SWITCH OPERATION

(a) Check that there is continuity between the terminal and body ground with the engine stopped.

(b) Check that there is no continuity between the terminal and body ground with the engine running.

NOTE: After the engine has started, oil pressure should be over 0.3 kg/cm² (4.3 psi, 29 kPa).

If operation is not correct, replace the switch.



Brake Warning

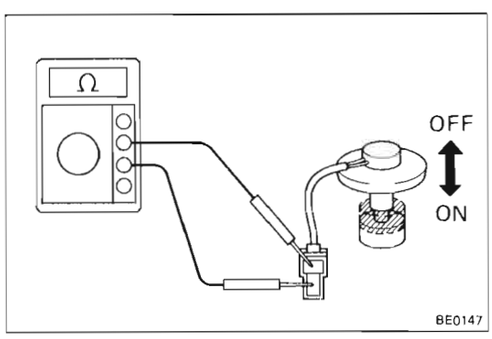
INSPECTION OF BRAKE WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the switch. Connect the switch terminal and body ground.

(b) Turn the ignition or starter switch on. Check that the bulb lights.

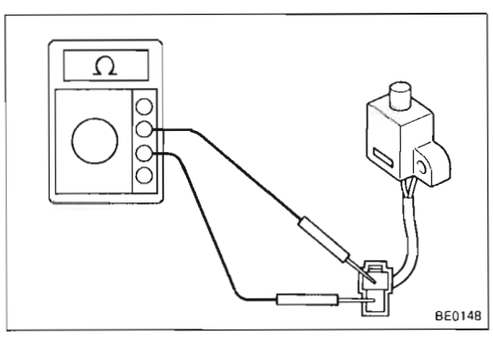
If operation is not correct, remove and test the bulb.



2. INSPECT BRAKE FLUID LEVEL WARNING SWITCH OPERATION

Inspect the switch operation when the switch is OFF (float up) and when the switch is ON (float down).

If operation is not correct, replace the switch.



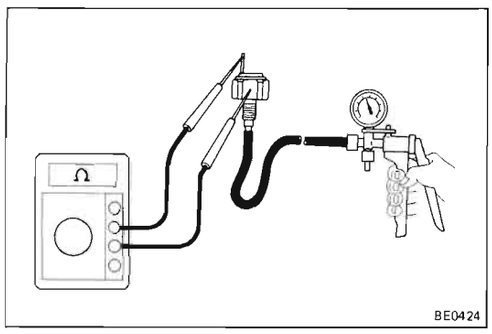
3. INSPECT PARKING BRAKE SWITCH OPERATION

(a) Check that there is continuity between the terminals with the parking brake lever pulled.

(b) Check that there is no continuity between the terminals with the parking brake lever returned.

If operation is not correct, replace the switch.

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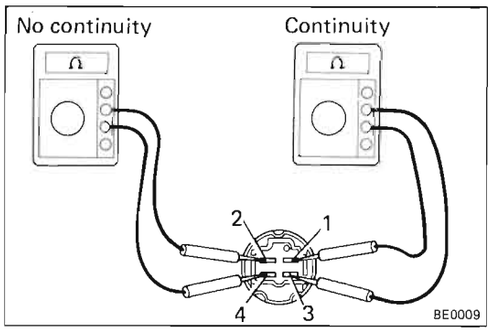


4. INSPECT VACUUM SWITCH OPERATION

(a) With a vacuum of 200 ± 40 mmHg (7.87 ± 1.57 in.Hg, 26.7 ± 5.3 kPa) or above, check that there is no continuity between the switch terminal and body.

(b) Check that there is continuity between the switch terminal and body ground with no vacuum.

If operation is not correct, replace the switch.



Bulb Check Relay (Australia only)

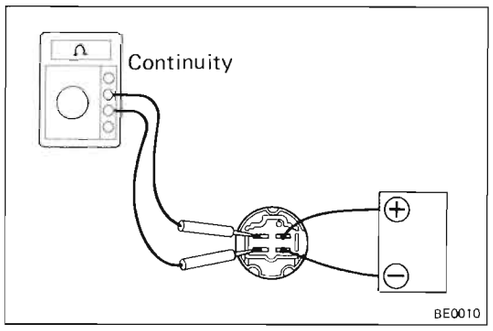
INSPECTION OF BULB CHECK RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

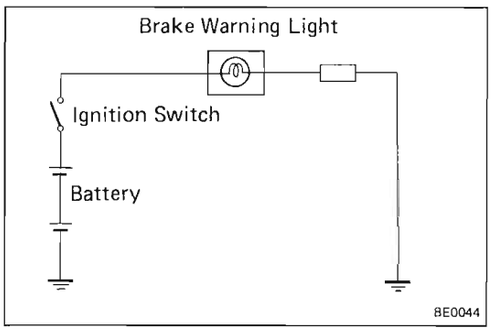
If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

Connect the positive (+) lead from the battery to terminal 1 and connect the negative (−) lead from the battery to terminal 3. Then check that there is continuity between terminals 2 and 4.

If operation is not correct, replace the relay.



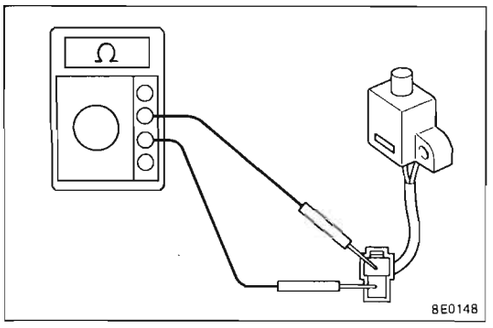
Parking Brake Warning (Australia only)

INSPECTION OF PARKING BRAKE WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the switch.
Connect the wire harness side connector terminals or connect the wire harness side connector terminal.

(b) Turn the ignition switch or starter switch ON. Check that the warning light lights.



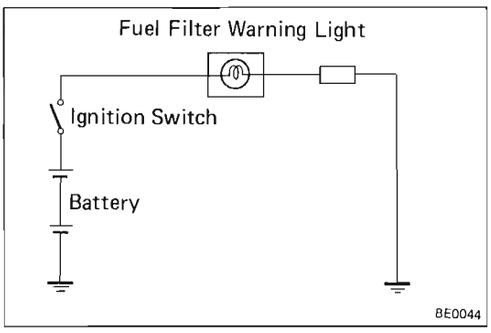
2. INSPECT PARKING BRAKE SWITCH OPERATION

(a) Check that there is continuity between the terminal and screw hole (ground) with the parking brake lever pulled.

(b) Check that there is no continuity between the terminal and screw hole (ground) with the parking brake lever returned.

If operation is not correct, replace the switch.

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Fuel Filter Warning

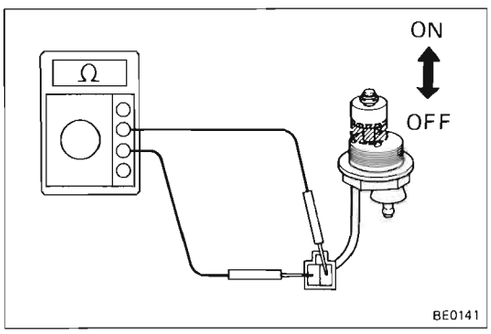
INSPECTION OF FUEL FILTER WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the switch. Connect the switch terminals.

(b) Turn the starter switch on. Check that the bulb lights.

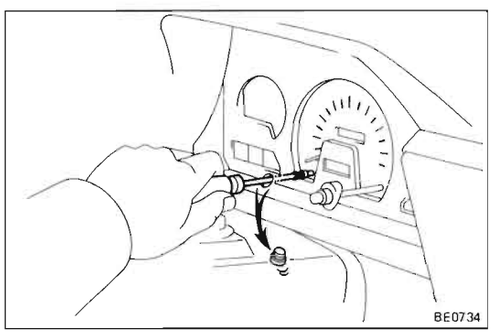
If operation is not correct, remove and test the bulb.



2. INSPECT FUEL FILTER WARNING SWITCH OPERATION

Inspect the switch operation when the switch is ON (float up) and OFF (float down).

If operation is not correct, replace the switch.



Timing Belt Warning

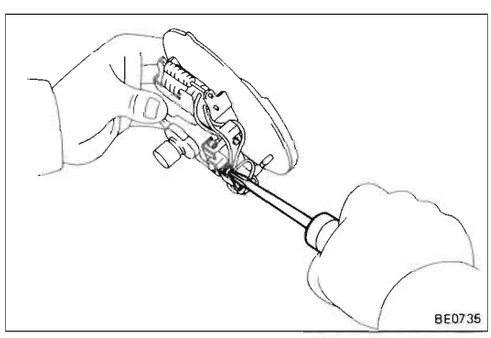
RESET OF TIMING BELT WARNING

If the timing belt warning light comes on, replace the timing belt and reset the switch in the procedure listed below.

1. REPLACE TIMING BELT

2. RESET TIMING BELT WARNING SWITCH

Remove the grommet on the speedometer and push the reset knob with a thin rod.



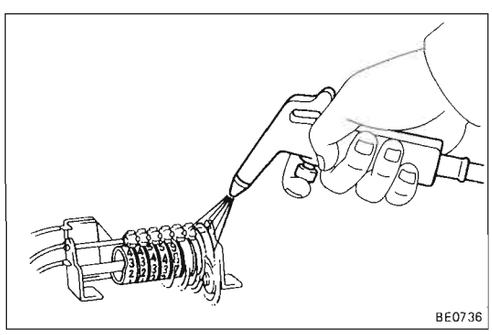
REPLACEMENT OF SPEEDOMETER

1. REMOVE COMBINATION METER
(See page BO-44)

2. REMOVE SPEEDOMETER FROM COMBINATION METER

3. REMOVE ODOMETER FROM SPEEDOMETER

Remove the odometer with the timing belt warning switch from the speedometer.

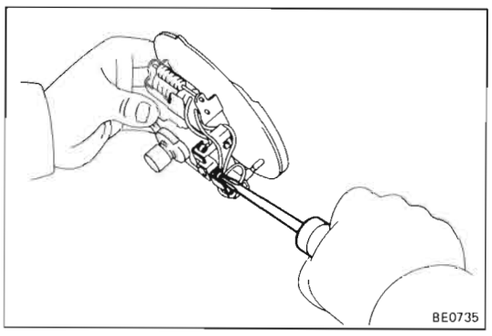


4. REVOLVE ODOMETER

(a) Make a note of the previous odometer reading, rounding off 1,000 km or 1,000 miles to the nearest 10,000 km or 10,000 miles.

(b) Using compressed air, advance the odometer to round off the meter count.

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5. INSTALL ODOMETER TO SPEEDOMETER

Install the odometer with the timing belt warning switch to speedometer.

6. INSTALL SPEEDOMETER TO COMBINATION METER

7. INSTALL COMBINATION METER
(See page BO-47)

8. RESET TIMING BELT WARNING SWITCH

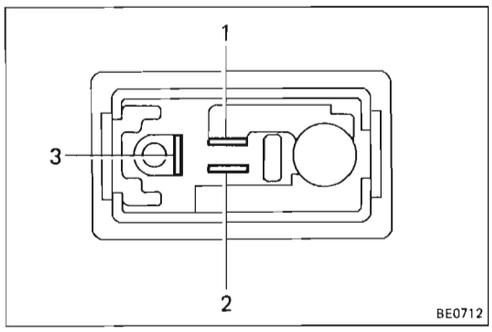
NOTE: If the timing belt warning light comes on when installing the combination meter, reset the timing belt warning switch.

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REAR WINDOW DEFOGGER

Troubleshooting

Problem	Possible cause	Remedy	Page
Rear window defogger does not work	DEFOG fuse blown	Replace fuse and check for short	BE-3
	Defogger switch faulty	Check switch	BE-34
	Defogger wire broken	Check wires	BE-34
	Wiring and ground faulty	Repair as necessary	



Rear Window Defogger Switch

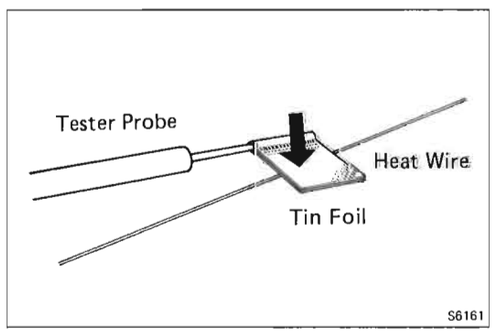
INSPECTION OF REAR WINDOW DEFOGGER SWITCH

INSPECT SWITCH CONTINUITY

Inspect continuity between the terminals.

Switch position \ Terminal	3	2	1
OFF		○	○
ON	○	○	○

If the continuity is not as shown above, replace the switch or bulb.



Rear Window Defogger Wires

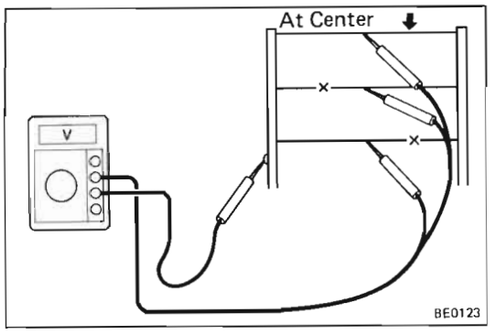
CAUTION:

- When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.
- Do not use detergents or glass cleaners with abrasive ingredients.
- When measuring voltage, wind a piece of tin foil around the tip of the negative probe and press the foil against the wire with your finger as shown.

INSPECTION OF REAR WINDOW DEFOGGER WIRES

1. INSPECT FOR WIRE BREAKAGE
   (a) Turn the ignition switch to ON.
   (b) Turn the defogger switch to ON.

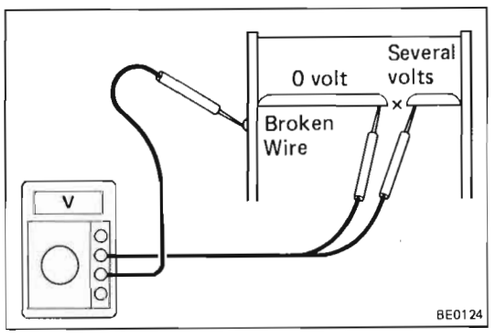
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(c) Inspect the voltage at the center of each heat wire as shown.

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

NOTE: If there are 10V, the wire is broken between the center of the wire and positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



2. INSPECT FOR WIRE BREAKAGE POINT

(a) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.

(b) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.

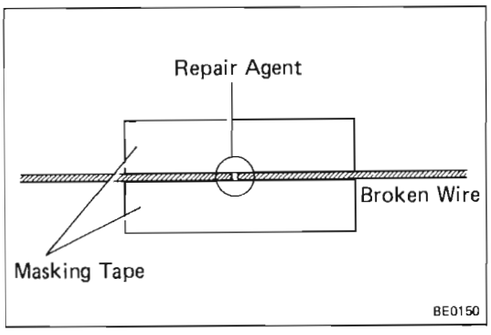
(c) The point where the voltmeter deflects from zero to several volts is the place where the heat wire is broken.

NOTE: If the heat wire is not broken, the voltmeter will indicate 0V at the positive (+) end of the heat wire but gradually increase to about 12V as the meter probe is moved to the other end.

REPAIR OF REAR WINDOW DEFOGGER WIRES

1. CLEAN BROKEN WIRE TIPS WITH WHITE GASOLINE

2. PLACE MASKING TAPE ALONG BOTH SIDES OF WIRE TO BE REPAIRED



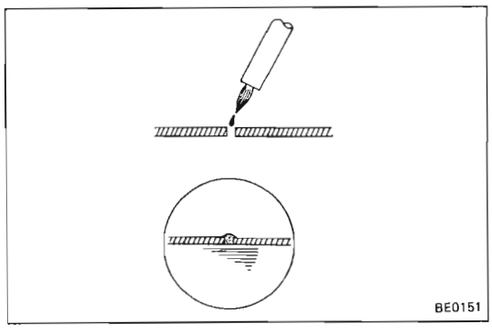
3. REPAIR DEFOGGER WIRES

(a) Thoroughly mix the repair agent (Dupont paste No. 4817).

(b) Using a fine tip brush, apply a small amount to the wire.

(c) After a couple of minutes, remove the masking tape.

(d) Allow to stand at least 24 hours.



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HEATER

Troubleshooting

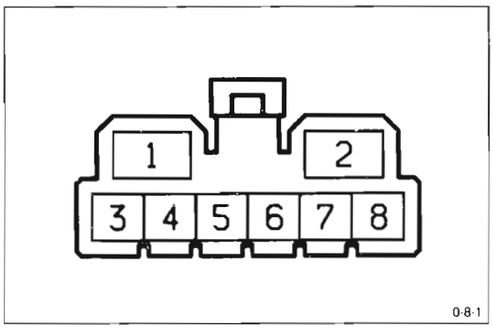
Problem	Possible cause	Remedy	Page	
			Front	Rear
Blower does not work when fan switch is on	Heater circuit breaker OFF	Reset breaker and check for short	BE-4	BE-4
	Heater relay faulty	Check relay	BE-36	BE-39
	Heater blower switch faulty	Check switch	BE-36	BE-39
	Heater blower resistor faulty	Check resistor	BE-37	BE-39
	Heater blower motor faulty	Replace motor		
	Wiring or ground faulty	Repair as necessary		
Incorrect temperature output	Control cables broken or binding	Check cables	BE-37	
	Heater hoses leaking or clogged	Replace hose		
	Water valve faulty	Replace valve		
	Air dampers broken	Repair dampers		
	Air ducts clogged	Repair ducts		
	Heater radiator leaking or clogged	Replace radiator		
	Heater control unit faulty	Repair control unit		

Front Heater Blower Switch

INSPECTION OF HEATER BLOWER SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.



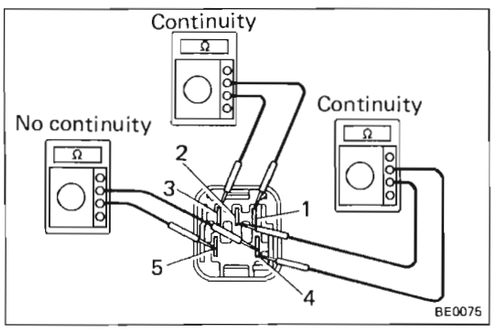
Switch position \ Terminal	2	3	4	5	6	1
OFF						
I	○	○	○			
II	○	○		○		
III	○	○			○	
IV (Hi)	○	○				○

If continuity is not as specified, replace the switch.

Front Heater Relay

INSPECTION OF HEATER RELAY

1. INSPECT RELAY CONTINUITY



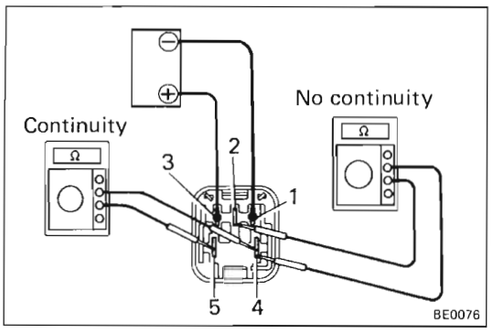
(a) Check that there is continuity between terminals 1 and 3.

(b) Check that there is continuity between terminals 2 and 4.

(c) Check that there is no continuity between terminals 4 and 5.

If continuity is not as specified, replace the relay.

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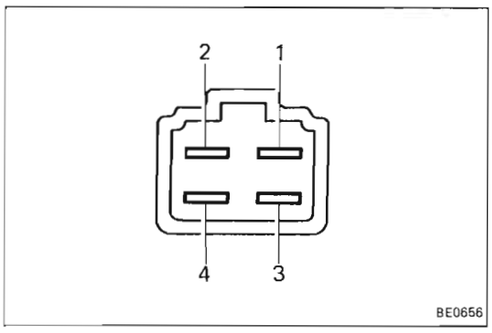
2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Check that there is continuity between terminals 4 and 5.

(c) Check that there is no continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.



Front Heater Blower Resistor

INSPECTION OF HEATER BLOWER RESISTOR

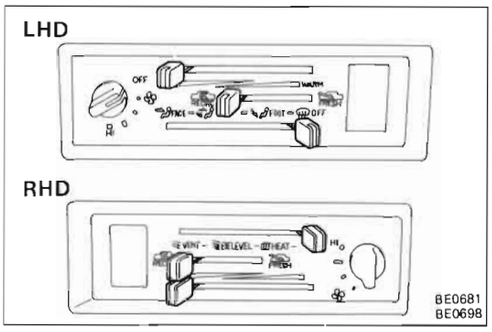
INSPECT RESISTOR CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is continuity between terminals 1 and 3.

(c) Check that there is continuity between terminals 1 and 4.

If continuity is not as specified, replace the resistor.

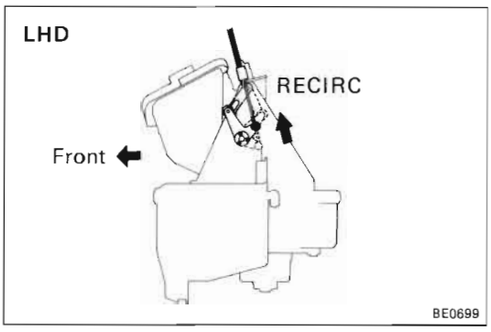


Front Heater Control

INSPECTION OF FRONT HEATER CONTROL

INSPECT HEATER CONTROL OPERATION

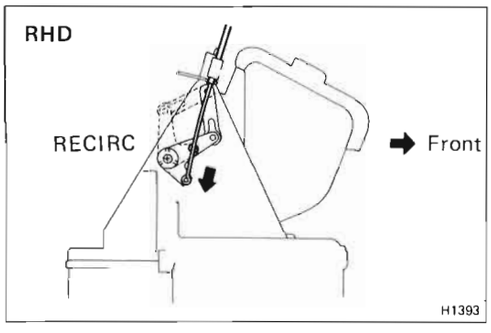
Move the control levers right and left, and check for stiffness and binding through the levers full range of operation.



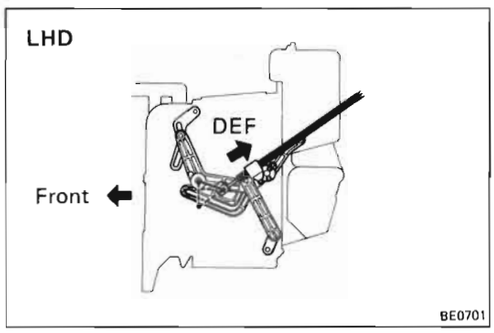
ADJUSTMENT OF FRONT HEATER CONTROL

1. ADJUST AIR INLET DAMPER

Set the air damper and control lever to "RECIRC."

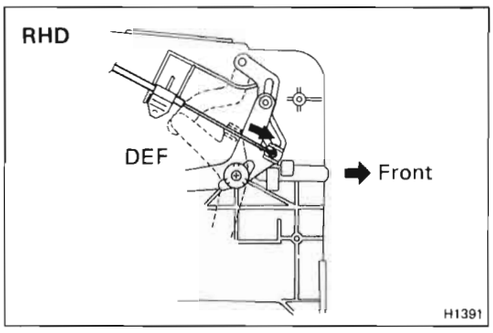


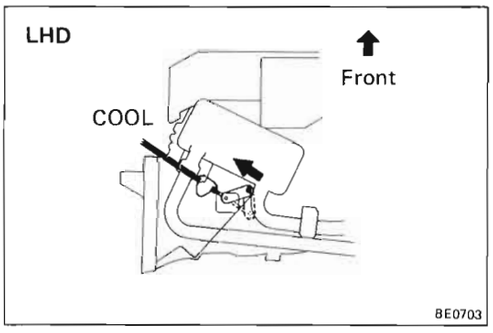
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2. ADJUST MODE SELECTOR DAMPER

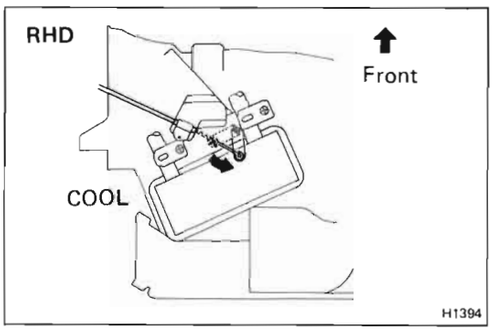
Set the mode selector and control lever to "DEF."

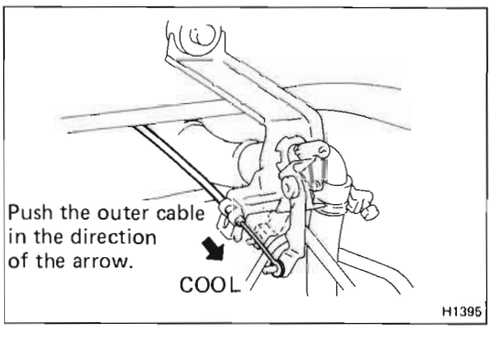




3. ADJUST AIR MIX DAMPER

Set the air mix damper and control lever to "COOL."



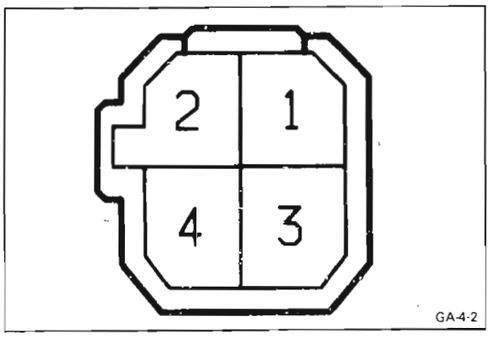


4. ADJUST WATER VALVE

Set the water valve and control lever to "COOL."

NOTE: Place the water valve lever on "COOL" and while pushing the outer cable in the "COOL" direction, clamp the outer cable to the water valve bracket.

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Rear Heater Blower Switch

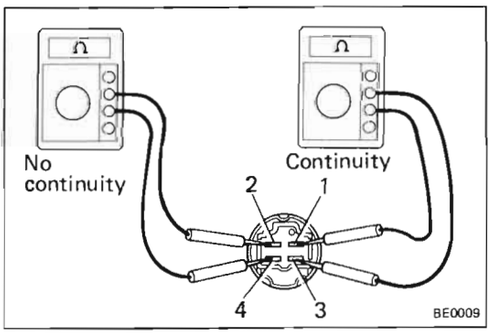
INSPECTION OF HEATER BLOWER SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal	1	2	3	4
HI	○	○		○
OFF				
LO		○	○	○

If continuity is not as specified, replace the switch.



Rear Heater Relay

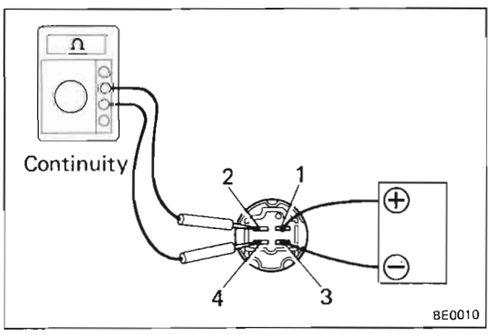
INSPECTION OF HEATER RELAY

1. INSPECT RELAY CONTINUITY

   (a) Check that there is continuity between terminals 1 and 3.

   (b) Check that there is no continuity between terminals 2 and 4.

   If continuity is not as specified, replace the relay.



2. INSPECT RELAY OPERATION

   Check that there is continuity between terminals 2 and 4 with battery voltage applied between terminals 1 and 3.

   If there is no continuity, replace the relay.

Rear Heater Blower Resistor

INSPECTION OF HEATER BLOWER RESISTOR

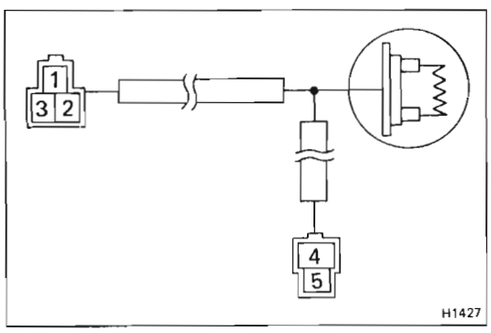
INSPECT RESISTOR CONTINUITY

(a) Check that there is continuity between terminals 1 and 4.

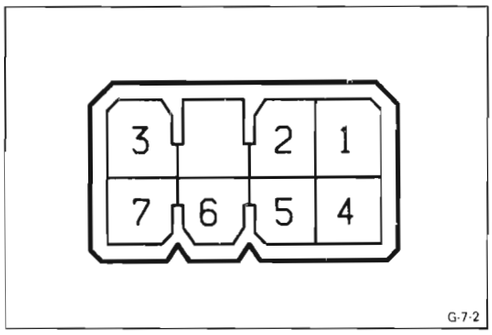
(b) Check that there is continuity between terminals 2 and 3.

(c) Check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the resistor.



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POWER WINDOW

Power Window Master Switch

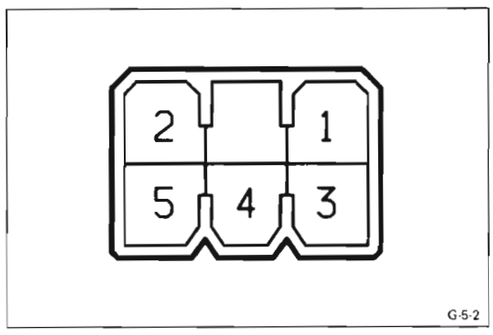
INSPECTION OF POWER WINDOW MASTER SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Mirror		Driver Side			Passenger Side			
S/W	Terminal / Switch position	6	7	3	2	1	4	0
Lock Switch	NORMAL	○						○
	LOCK							
Window Switch	UP	○	○		○	○		
				○	○		○	○
	OFF	○	○	○		○	○	○
	DOWN	○		○	○		○	
			○			○		○

If continuity is not as specified, replace the switch.



Power Window Door Switch

INSPECTION OF POWER WINDOW DOOR SWITCH

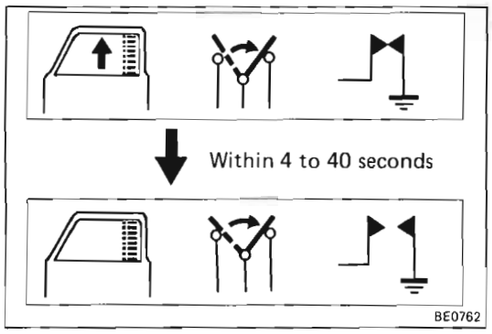
INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Terminal / Switch position	2	1	5	4	3
UP	○	○	○	○	
OFF			○	○	
		○			○
DOWN	○		○		
		○			○

If continuity is not as specified, replace the switch.

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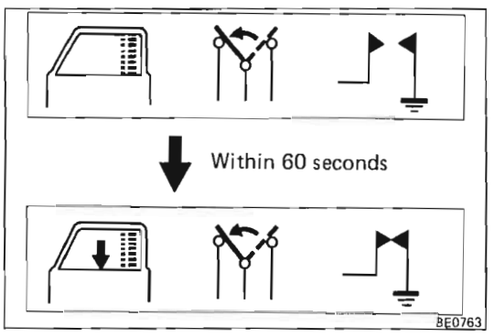


Power Window Motor

INSPECTION OF POWER WINDOW MOTOR

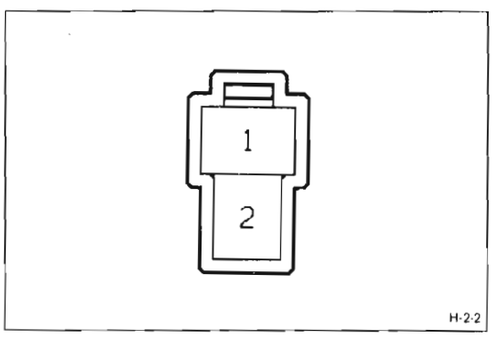
1. INSPECT CIRCUIT BREAKER OPERATION

(a) With the window in the fully closed position, hold the power window switch in the "UP" position and listen for circuit breaker operation noise within 4 to 40 seconds.



(b) With the window in the fully closed position, hold the switch in "DOWN" and check that the window begins to descend within 60 seconds.

If operation is not as specified, replace the motor.

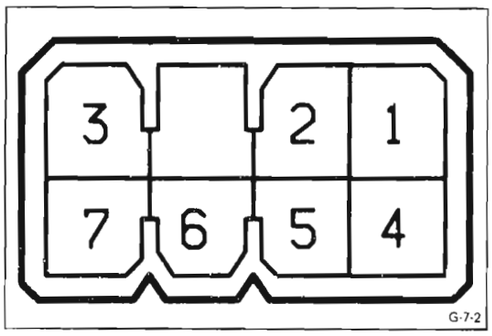


2. INSPECT MOTOR OPERATION

Apply battery voltage across the terminals.
Check that the motor turns smoothly.

If operation is not as specified, replace the motor.

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SUN ROOF

Sun Roof Control Relay

INSPECTION OF SUN ROOF CONTROL RELAY

INSPECT SUN ROOF CONTROL RELAY CIRCUIT

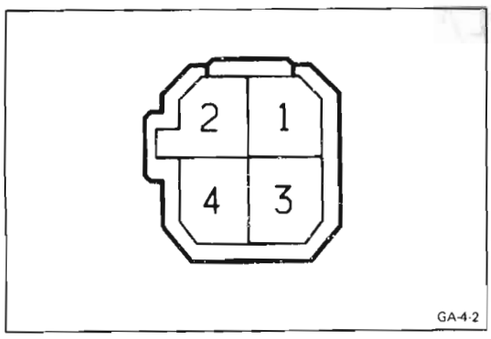
(a) Disconnect the relay and inspect the connector on the wire harness side as shown in the chart below.

Terminal	Item Checked	Tester Connection	Condition	Voltage or Continuity
7	Continuity	7-Body Ground		Continuity
4	Voltage	4 – 7	Ignition switch OFF	No battery voltage
			Turn ignition switch ON	Battery voltage
2	Continuity	2 – 7	Turn sun roof switch to OPEN	Continuity
			Turn sun roof anywhere except OPEN	No continuity
5	Continuity	5 – 7	Turn sun roof switch to CLOSE	Continuity
			Turn sun roof switch anywhere off CLOSE	No continuity
6	Continuity	6 – 7	Turn limit switch on (Move sun roof to any position except 100 mm (3.94 in.) in front of closed position)	Continuity
			Turn limit switch off (Move sun roof approx. 100 mm (3.94 in.) in front of closed position)	No continuity
3	Continuity	3 – 1		Continuity

(b) Connect the battery between terminals 1 and 3 of the wire harness side and check that the motor operates.

If circuit is correct and motor operates, replace the sun roof control relay.

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Sun Roof Switch

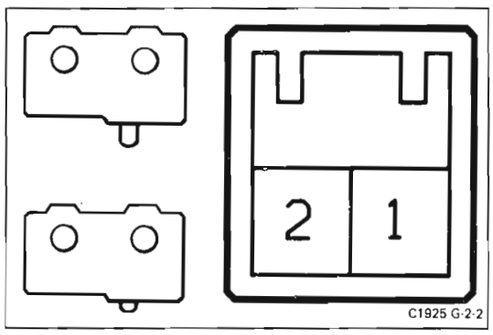
INSPECTION OF SUN ROOF SWITCH

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Switch position \ Terminal		1	2	3	4
Sun roof switch	OPEN		○	○	
	CLOSE		○		○
Map light switch ON		○	(M)	○	

If continuity is not as specified, replace the switch.



Limit Switch

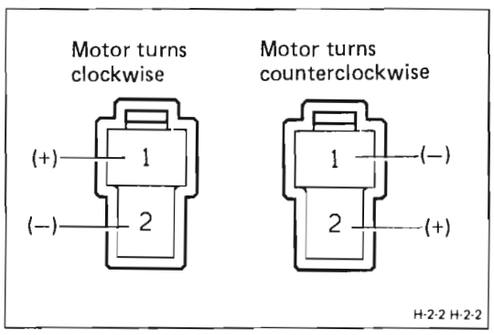
INSPECTION OF LIMIT SWITCH

INSPECT LIMIT SWITCH CONTINUITY

(a) Check that there is continuity between terminals 1 and 2 when the switch is ON.

(b) Check that there is no continuity between terminals 1 and 2 when the switch is OFF.

If continuity is not as specified, replace the switch.



Sun Roof Motor

INSPECTION OF SUN ROOF MOTOR

INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 and check that the motor turns clockwise.

(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1 and check that the motor turns counterclockwise.

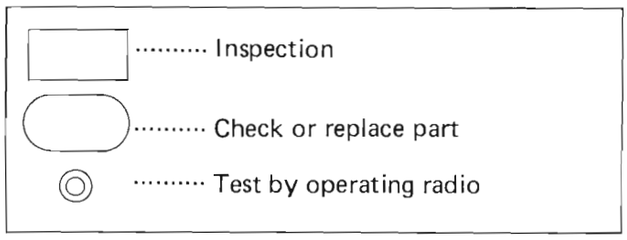
If operation is not as specified, replace the motor.

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RADIO, STEREO TAPE PLAYER AND ANTENNA

Troubleshooting

DESCRIPTION OF SYMBOLS



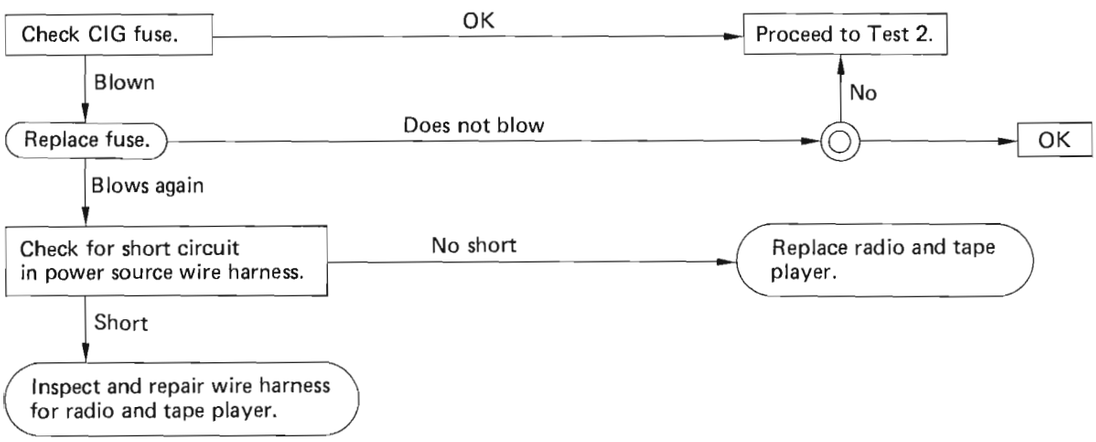
1. DEAD RADIO AND TAPE PLAYER

(a) No power to radio or tape player, or power but no sound.

Possible causes:

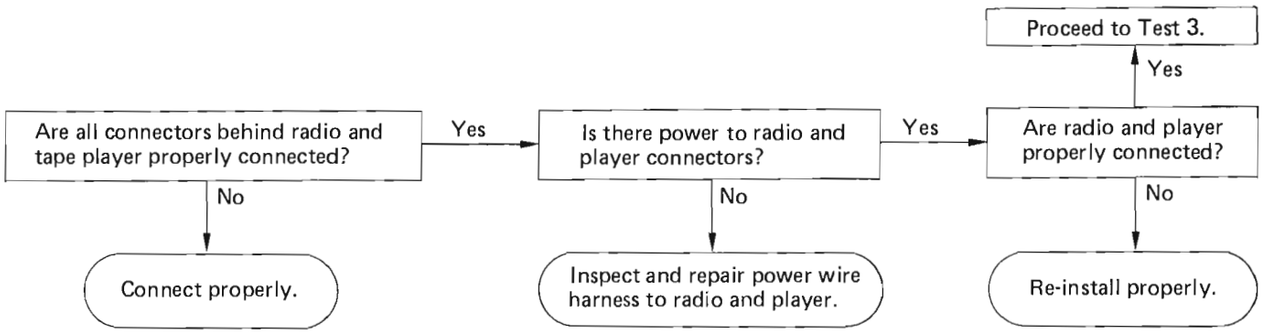
- Blown
- Short circuit or broken wire in power source wire harness
- Loose connectors behind radio and tape player
- Loose speaker connector
- Defective speaker
- Broken wire in speaker wire harness
- Improperly installed radio or tape player
- Defective radio or tape player

TEST 1

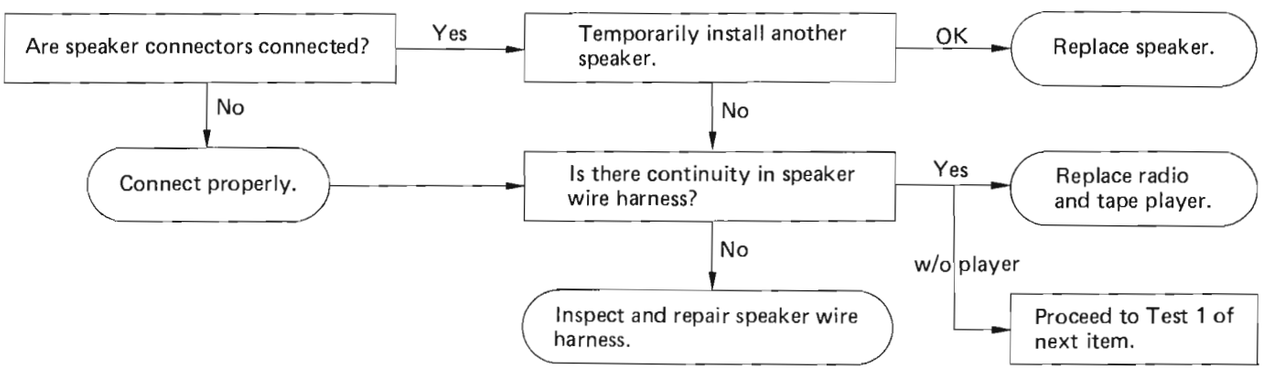


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TEST 2



TEST 3



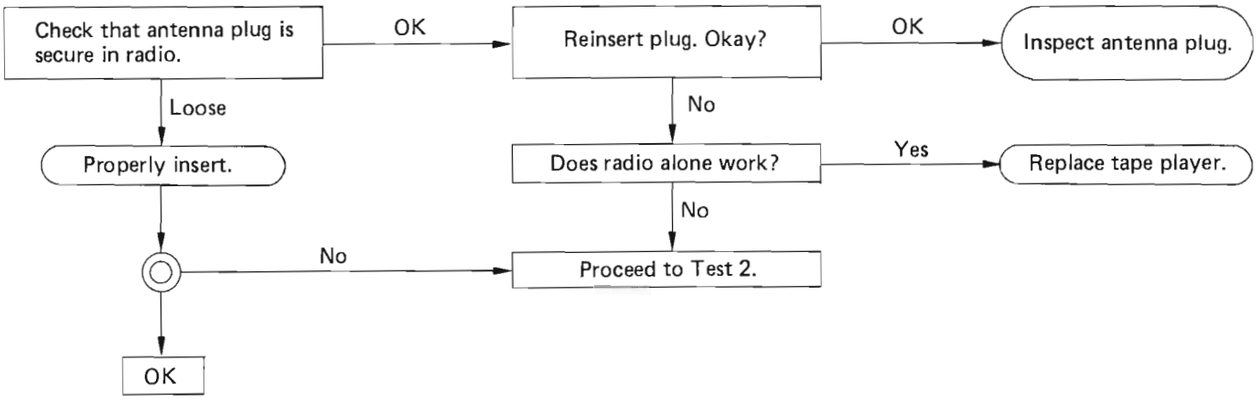
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(b) Tape player okay but no sound from AM and FM or either one.

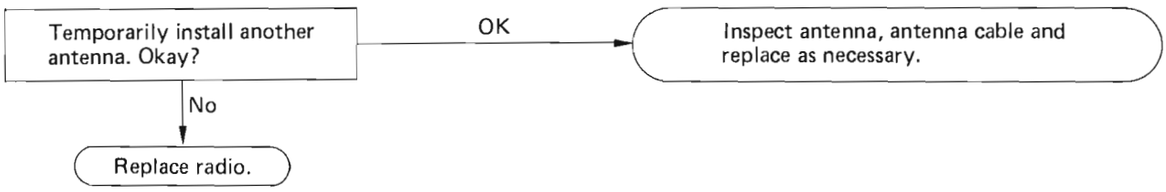
Possible causes:

- Antenna disconnected
- Antenna plug not properly connected
- Defective antenna
- Defective antenna cable
- Defective radio or tape player

TEST 1



TEST 2



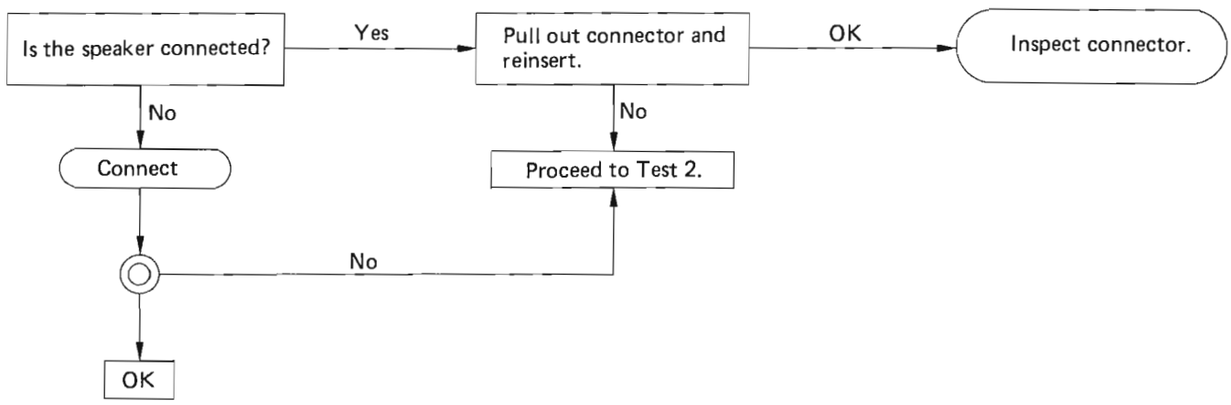
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(c) No sound from one speaker.

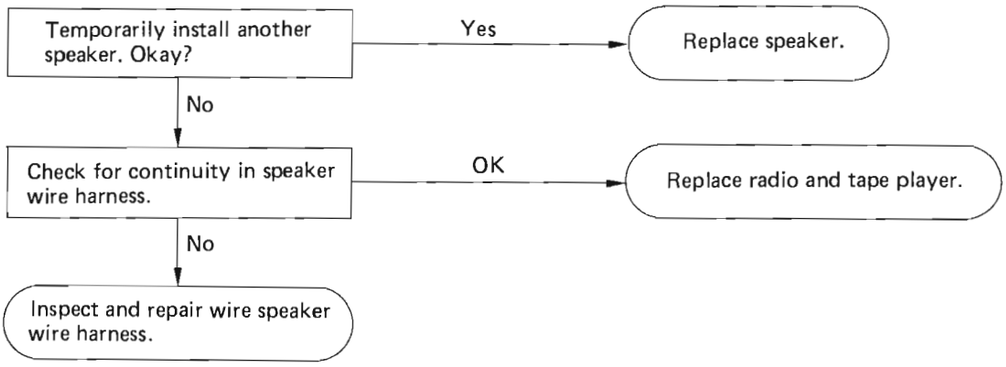
Possible causes:

- Loose speaker connector
- Broken wire in speaker wire harness
- Defective speaker
- Defective radio and tape player

TEST 1



TEST 2



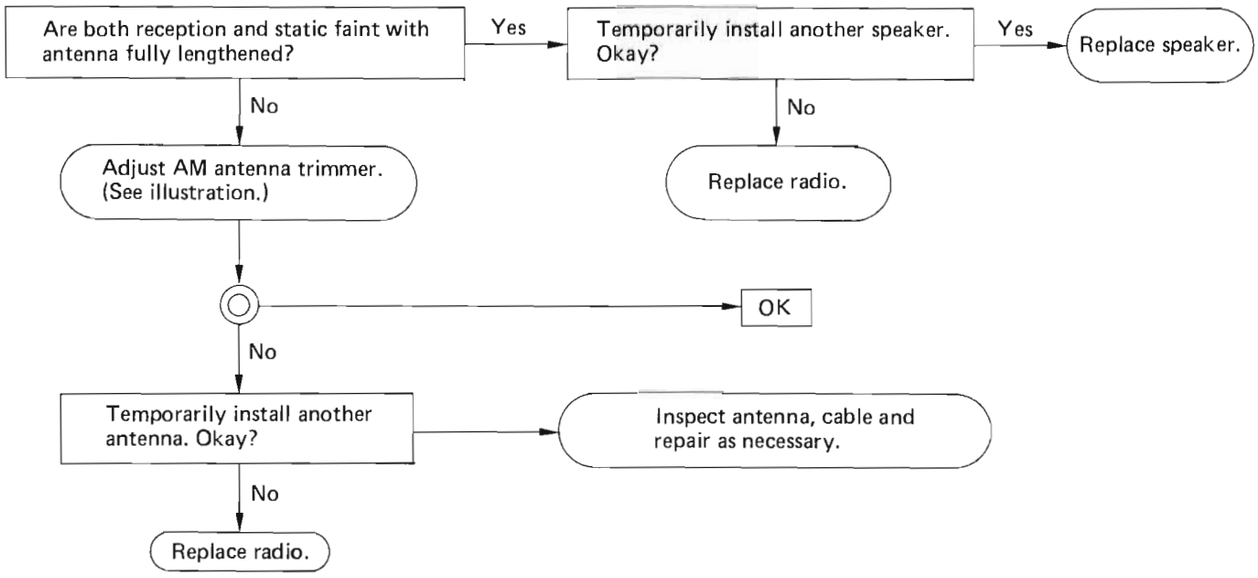
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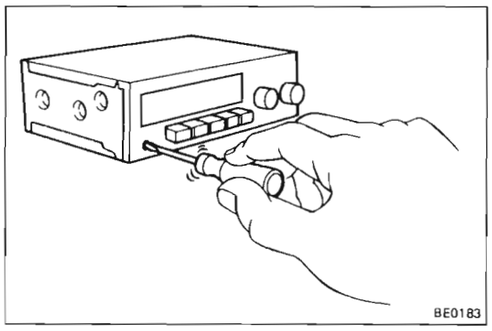
2. FAINT RECEPTION

Possible causes:

- Maladjusted antenna trimmer
- Defective antenna
- Defective antenna cable
- Defective speaker
- Defective radio

TEST





NOTE: Adjustment of antenna trimmer.

(1) Fully lengthen the antenna.

(2) With volume at maximum, turn the dial to around 1,400 kHz where there is no reception.

(3) Adjust the trimmer to where static is loudest.

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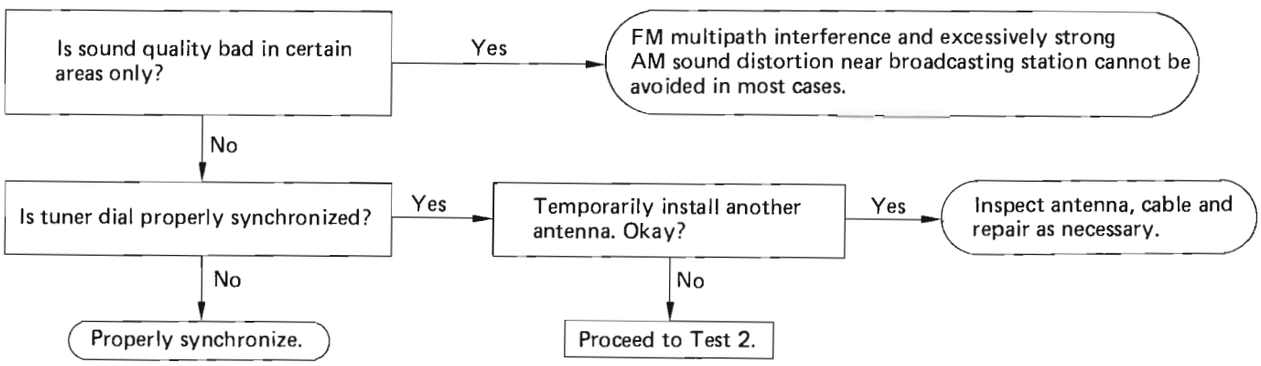
3. BAD SOUND QUALITY

(a) Sound quality bad when radio played.

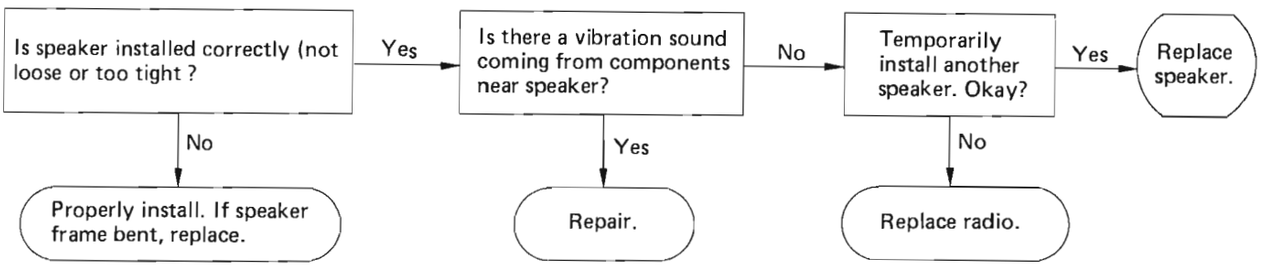
Possible causes:

- Multipath interference or excessive interception
- Tuner dial not synchronized with station
- Defective antenna
- Defective antenna cable
- Speaker improperly installed
- Vibration sound from components near speaker
- Defective speaker
- Defective radio

TEST 1



TEST 2



NOTE: FM distortion tends to increase sharply if the tuner is not synchronized.

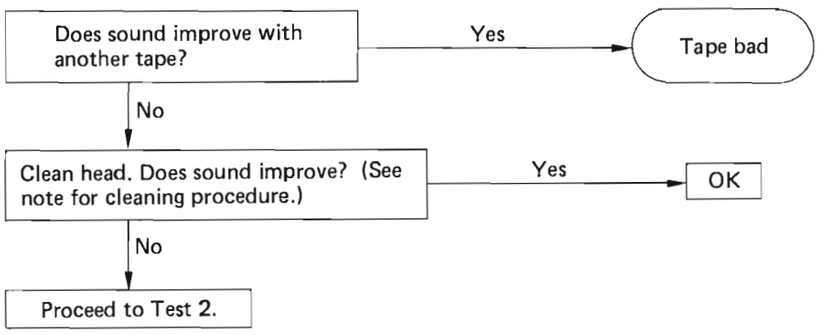
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(b) Sound quality bad when tape player played.

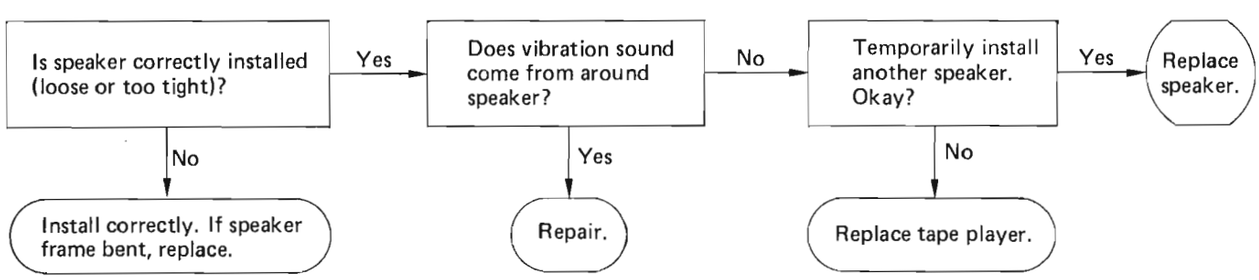
Possible causes:

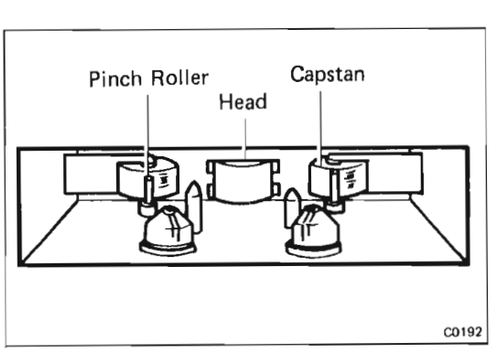
- Bad tape
- Dirty head
- Incorrectly installed speaker
- Vibration noise from around speaker
- Defective speaker
- Defective tape player

TEST 1



TEST 2





NOTE: Head cleaning procedure.

(1) Raise the cassette door with your finger. Next, using a pencil or like object, push in the guide.

(2) Using a cleaning pen or cotton applicator soaked in alcohol, clean the head surface, pinch rollers and capstans.

(3) Push in the "eject" button.

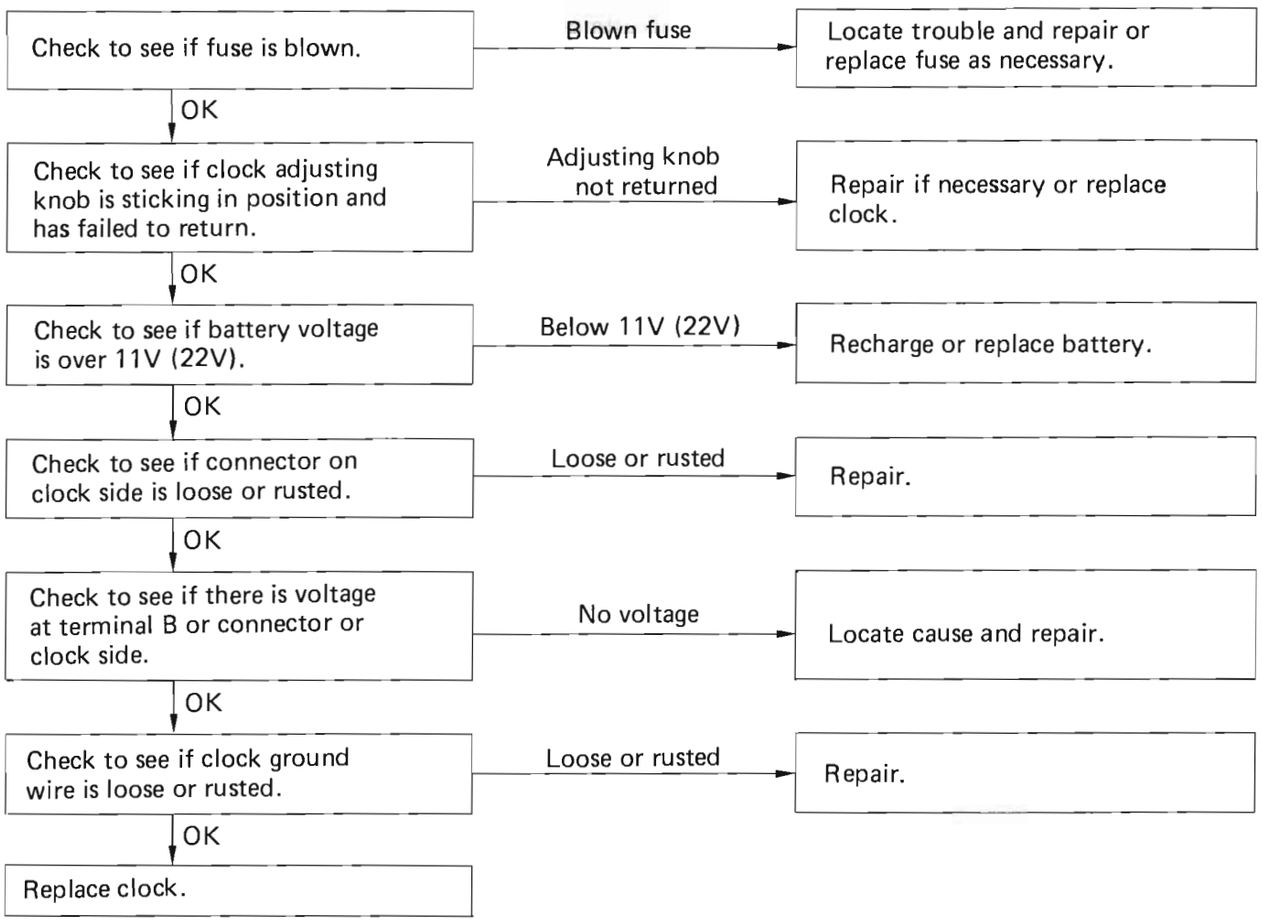
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CLOCK

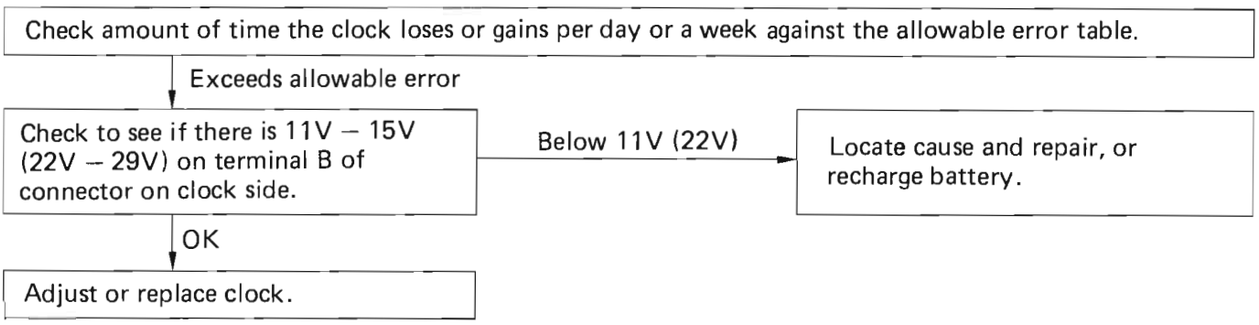
Troubleshooting

CLOCK WILL NOT OPERATE

( ) : 24V vehicle



CLOCK LOSES OR GAINS TIME



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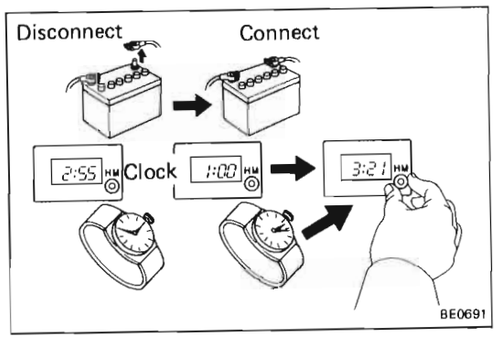
1. INSPECT ALLOWABLE ERROR OF CLOCK

Check the allowable error of the clock.

Allowable error (per day): ± 1.5 seconds

2. ADJUSTMENT OF CLOCK

Adjustment of the quartz clock requires a precise digital counter. Adjustment must be made in a shop specified by the manufacturer.



3. SETTING OF CLOCK

(a) Connect the battery terminal.

(b) Check the clock to see that it is running, and then set it to the correct time.

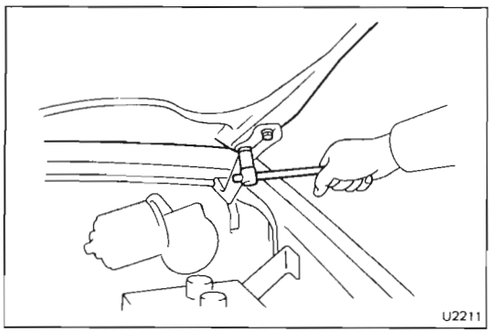
NOTE: Whenever the battery terminal is disconnected, make sure to set the clock to the correct time after reconnecting the battery.

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BODY

	Page
HOOD	BO-2
FRONT DOOR	BO-4
BACK DOOR	BO-12
Right Back Door	BO-13
Left Back Door	BO-17
MOULDING	BO-20
WINDSHIELD	BO-23
SIDE WINDOW	BO-27
BACK DOOR GLASS	BO-31
SUN ROOF	BO-34
INSTRUMENT PANEL	BO-41
TARPAULIN	BO-48
TARPAULIN BOW	BO-53
ROLL BAR	BO-54
SEAT	BO-55
SEAT BELT	BO-57
FUEL TANK AND LINE	BO-59
FRAME DIMENSIONS	BO-61

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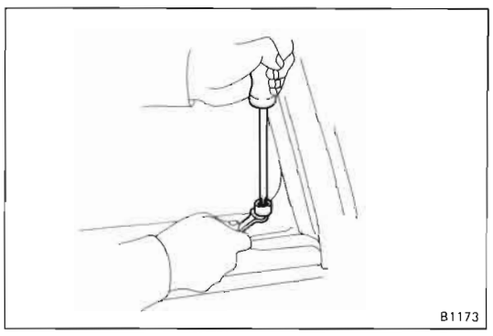


HOOD

ADJUSTMENT OF HOOD

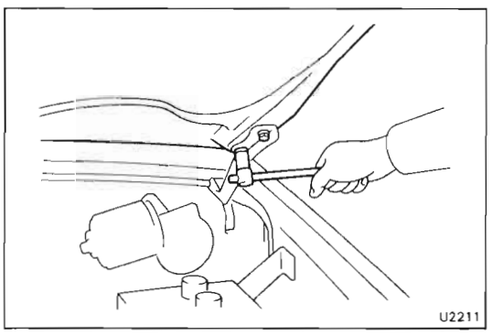
1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

Adjust the hood by loosening the hood side hinge bolts.



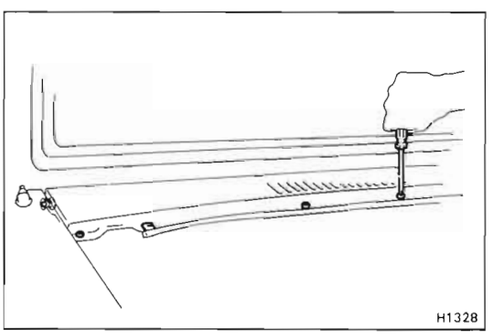
2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the hood cushions.

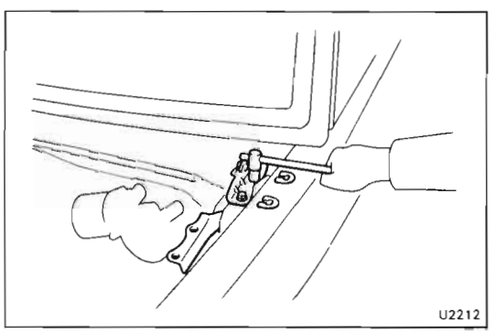


3. ADJUST REAR EDGE OF HOOD IN VERTICAL DIRECTION

(a) Disconnect the washer hose and remove the four bolts and hood.



(b) Remove the two clips and six screws and cowl louver.

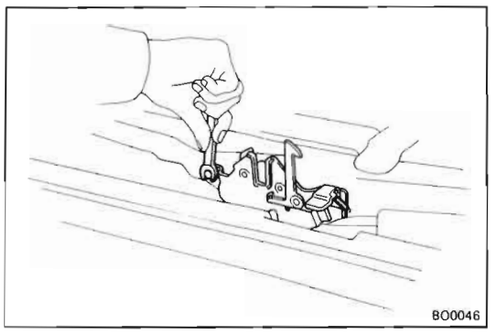


(c) Adjust the hood by increasing or decreasing the number of the shims.

(d) Install the cowl louver with two clips and six screws.

(e) Install the hood with four bolts and connect the washer hose.

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4. **ADJUST HOOD LOCK**

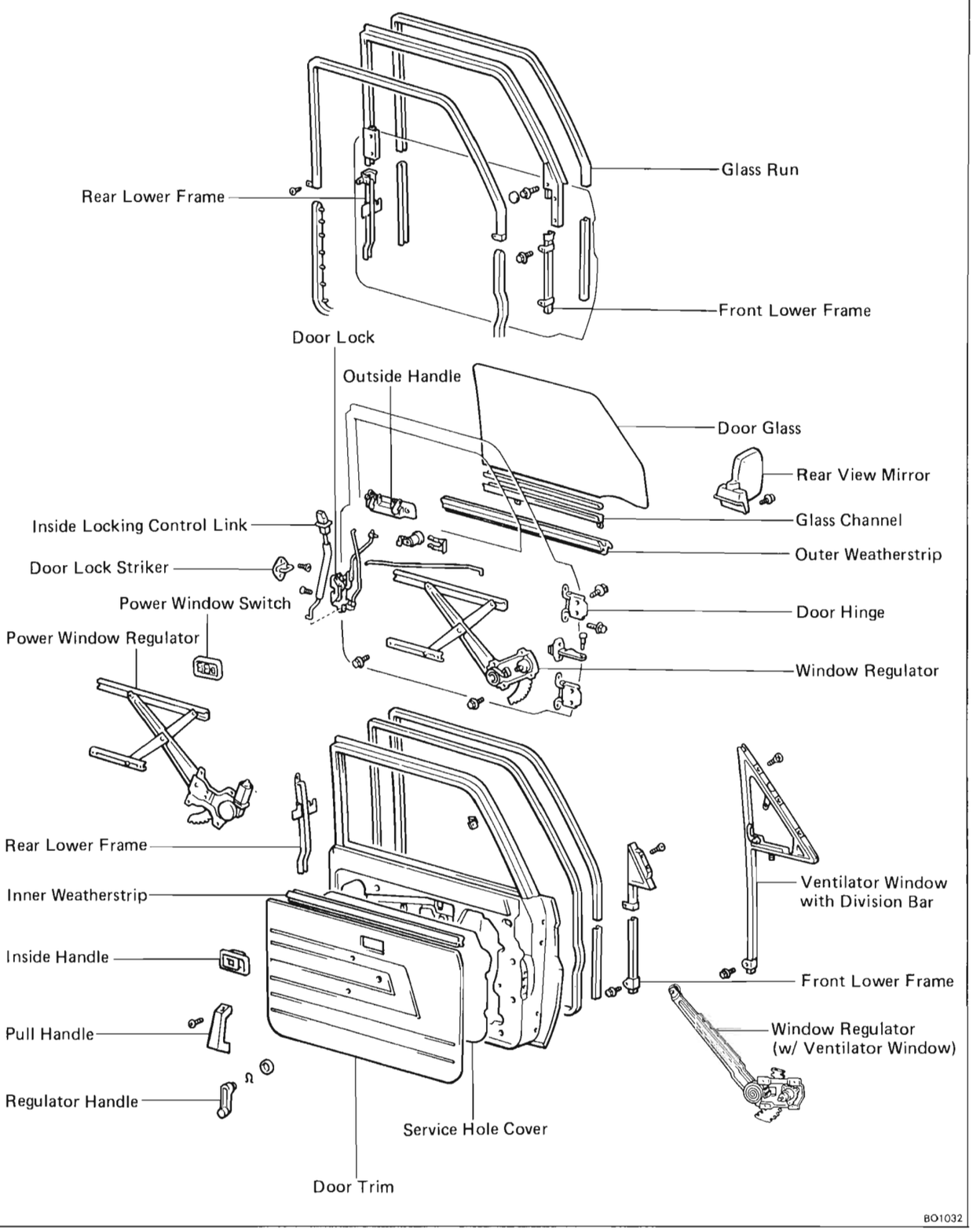
Adjust the hood lock by loosening the mounting bolts.

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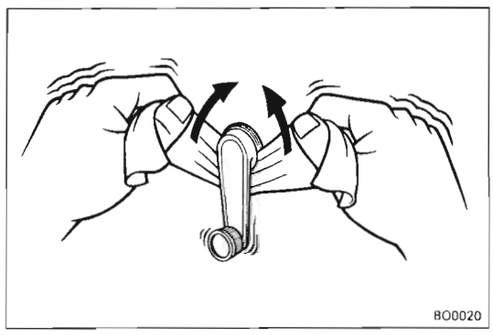
FRONT DOOR

COMPONENTS

[Soft Top Type]



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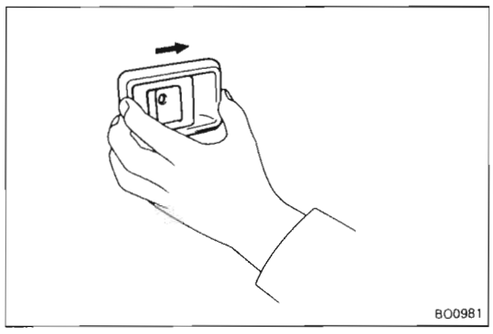


DISASSEMBLY OF FRONT DOOR

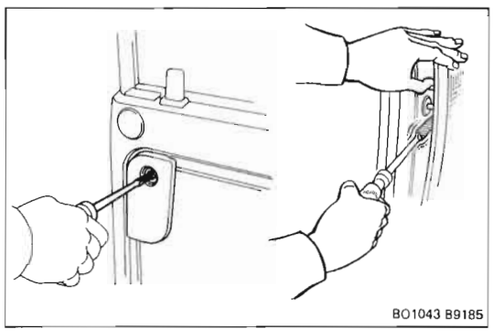
1. REMOVE WINDOW REGULATOR HANDLE

   Pull off the snap ring with a cloth and remove the regulator handle.

2. REMOVE ARMREST OR PULL HANDLE



3. REMOVE INSIDE HANDLE
   (a) Remove the screw.
   (b) Slide and pull off the inside handle.
   (c) Disconnect the link from the inside handle.

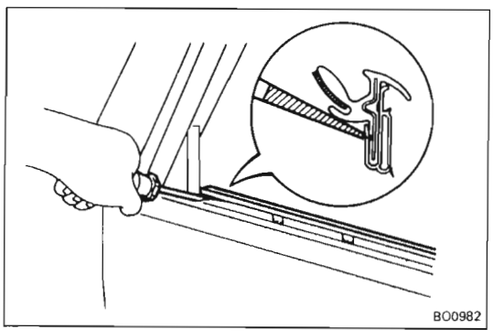


4. REMOVE DOOR TRIM
   (a) (w/ soft top)
   Remove the screw and service cover.
   (b) Insert a screwdriver between the trim retainers and door panel to pry it loose.

   NOTE: Tape the screwdriver tip before use.

   (c) (w/ power window)
   Disconnect the connector from the switch.

5. REMOVE REAR VIEW MIRROR

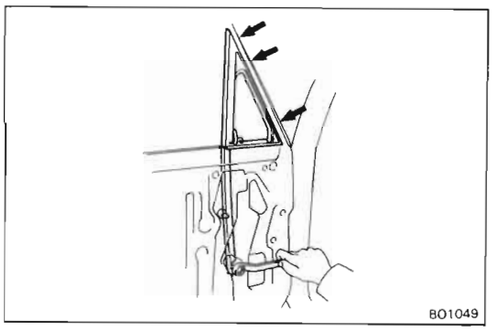


6. REMOVE INNER AND OUTER WEATHERSTRIP
   (a) Using a screwdriver, remove the inner weatherstrip.
   (b) Pull off the outer weatherstrip.

7. REMOVE SERVICE HOLE COVER

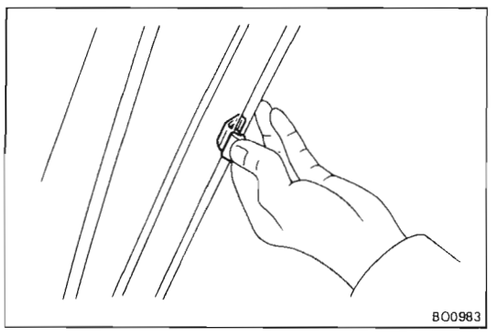
8. DISCONNECT INSIDE OPENING CONTROL LINK FROM DOOR LOCK

9. REMOVE GLASS RUN

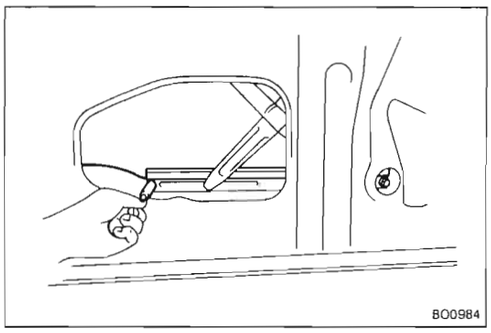


10. (w/ Ventilator Window type)
    REMOVE VENTILATOR WINDOW
    (a) Peel off the weatherstrip on the upper side of the ventilator window.
    (b) Remove the three screws.
    (c) Remove the division bar set bolt.
    (d) Remove the ventilator window by pulling it upward.

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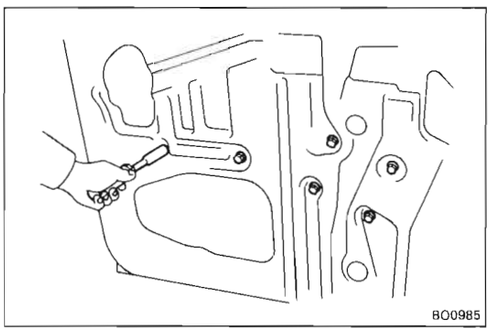
11. (w/o Ventilator Window type)
REMOVE CLIP



12. REMOVE DOOR GLASS

(a) (w/o ventilator window type)
Remove two glass channel mounting bolts.

(b) Incline the door glass and pull it upward.



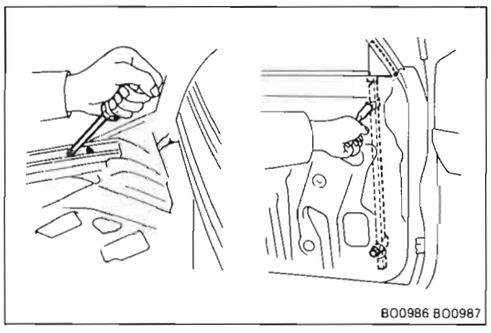
13. REMOVE WINDOW REGULATOR

(a) (w/o ventilator window type)
Remove the two equalizer arm bracket mounting bolts.

(b) (w/ power window)
Disconnect the connector from the motor and remove the four bolts.

(w/o power window)
Remove the three bolts.

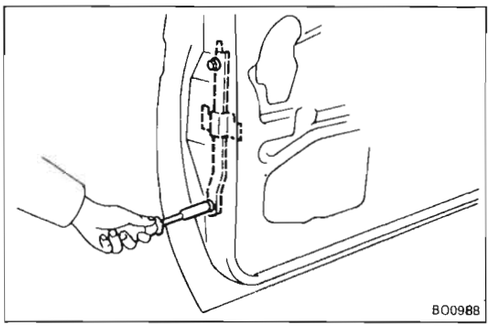
(c) Remove the regulator through the service hole.



14. (w/o Ventilator Window type)
REMOVE FRONT LOWER FRAME

(w/ soft top)
Remove the two bolts and front lower frame.

(w/o soft top)
Remove the two screws, two bolts and front lower frame.



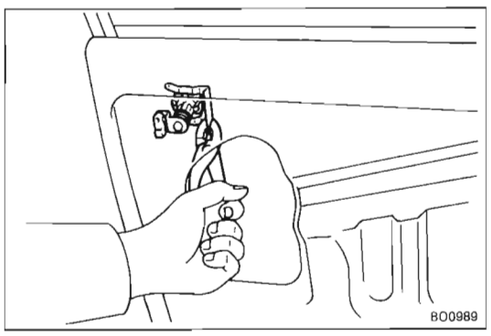
15. REMOVE REAR LOWER FRAME

(w/ soft top)
Remove the two bolts and rear lower frame.

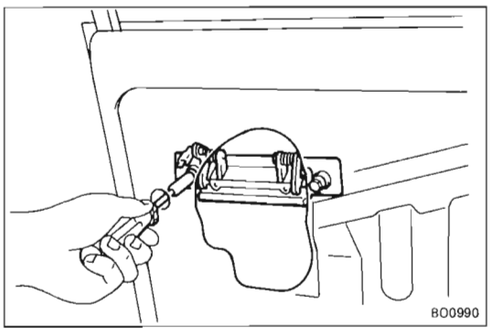
(w/o soft top)
Remove the bolt and rear lower frame.

16. DISCONNECT INSIDE LOCKING CONTROL LINK FROM DOOR LOCK

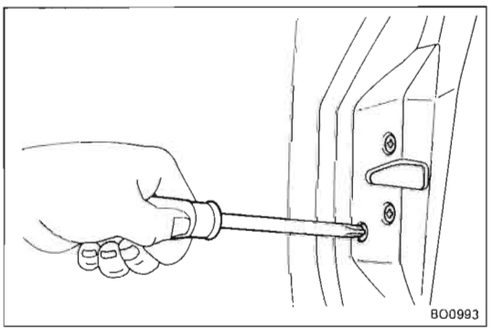
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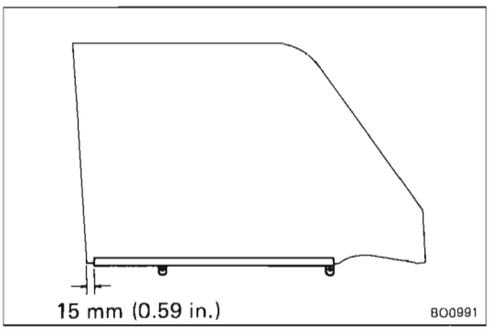
17. REMOVE DOOR LOCK CYLINDER
    (a) Disconnect the link from the cylinder.
    (b) Remove the retainer and cylinder.



18. REMOVE OUTSIDE HANDLE
    (a) Disconnect the link from the outside handle.
    (b) Remove the two bolts and outside handle.



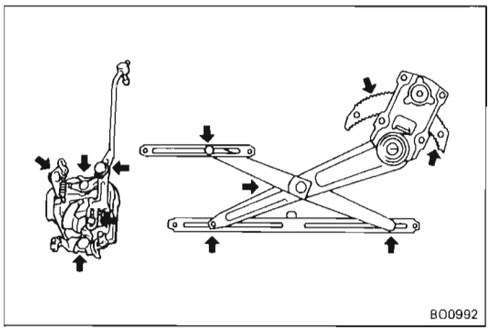
19. REMOVE DOOR LOCK
    Remove the three screws and door lock.



REPLACEMENT OF GLASS

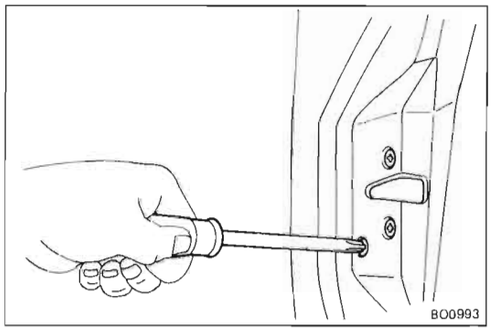
1. REMOVE GLASS CHANNEL WITH SCREWDRIVER OR SUCH
2. APPLY SOAPY WATER TO INSIDE OF WEATHER-STRIP
3. TAP ON CHANNEL WITH PLASTIC HAMMER

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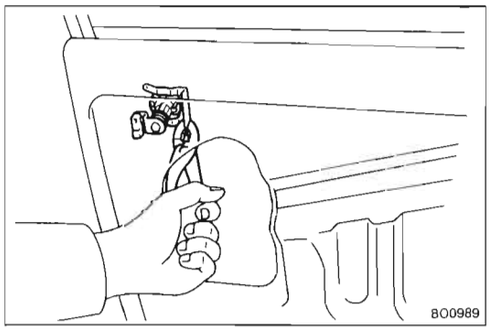


ASSEMBLY OF FRONT DOOR

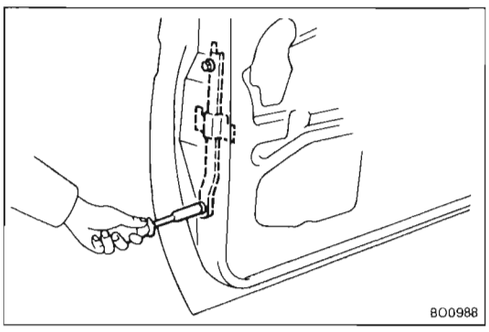
1. BEFORE INSTALLING PARTS, APPLY MP GREASE TO THEM
   (a) Apply MP grease to the sliding surface and gear of the window regulator.
   (b) Apply MP grease to the sliding surface of the door lock.



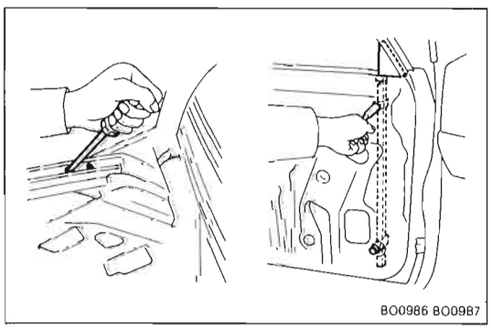
2. INSTALL DOOR LOCK
   Install the door lock with the three screws.



3. INSTALL DOOR LOCK CYLINDER
   Install the door lock cylinder with the retainer and connect the control link to it.
4. INSTALL OUTSIDE HANDLE
   Install the outside handle with the two bolts and connect the control link to it.
5. CONNECT INSIDE LOCKING CONTROL LINK TO DOOR LOCK

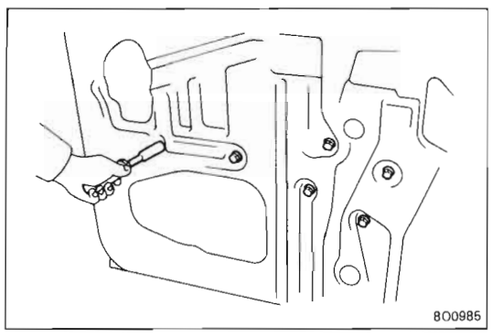


6. CHECK DOOR LOCK OPERATION
7. INSTALL REAR LOWER FRAME
   (w/ soft top)
   Install the rear lower frame with two bolts.
   (w/o soft top)
   Install the rear lower frame with bolt.



8. **(w/o Ventilator Window type)**
   INSTALL FRONT LOWER FRAME
   (w/ soft top)
   Install the front lower frame with two bolts.
   (w/o soft top)
   Install the front lower frame with two screws and two bolts.

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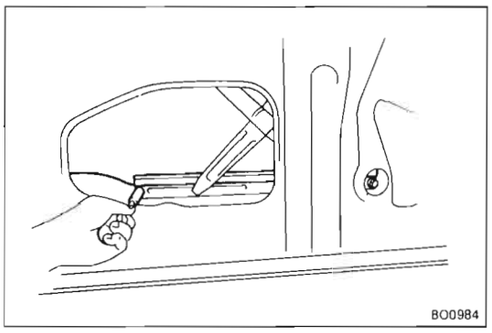


9. INSTALL WINDOW REGULATOR

(a) (w/ power window)
Connect the connector to the motor and install the regulator with four bolts.

(w/o power window)
Install the regulator with three bolts.

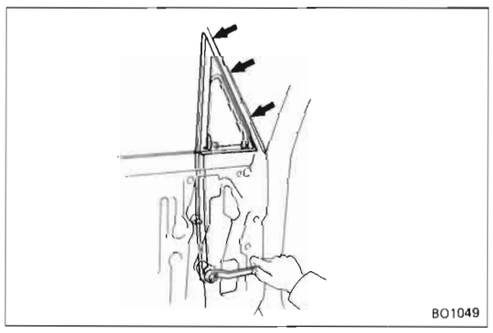
(b) (w/o ventilator window type)
Install the two equalizer arm bracket mounting bolts.



10. INSTALL DOOR GLASS

(a) Incline the door glass and install it to the window regulator.

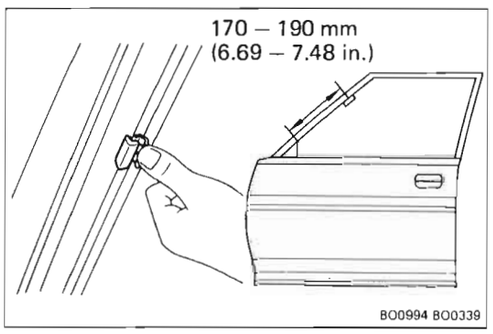
(b) (w/o ventilator window type)
Install the two glass channel mounting bolts.



11. (w/ Ventilator Window type)
INSTALL VENTILATOR WINDOW

(a) Install the three screws.

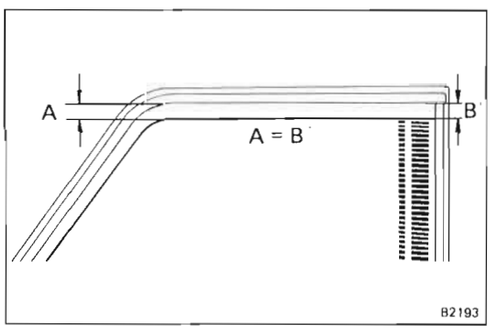
(b) Install the division bar set bolt.



12. (w/o Ventilator Window type)
INSTALL CLIP

13. INSTALL GLASS RUN

14. CONNECT INSIDE OPENING CONTROL LINK TO DOOR LOCK



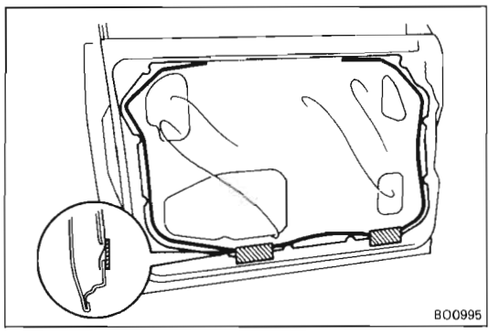
15. ADJUST DOOR GLASS

Adjust the equalizer arm up or down and tighten it where dimensions A and B, as shown, are equal.

16. INSTALL INNER AND OUTER WEATHERSTRIP

17. INSTALL REAR VIEW MIRROR

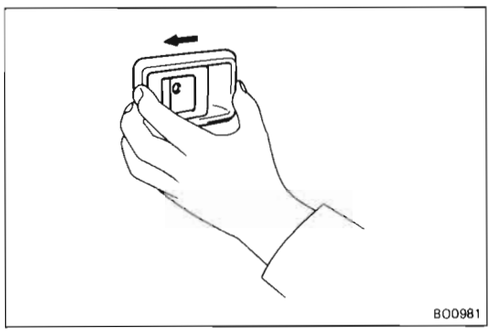
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18. INSTALL SERVICE HOLE COVER
   (a) Seal the service hole cover with adhesive.
   (b) Insert the lower edge of the service hole cover into the panel slit.
   (c) Seal the panel slit with cotton tape.

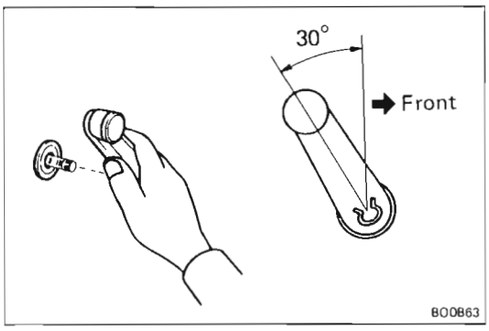
   CAUTION: Do not block the trim clip seating with the tape.

19. INSTALL DOOR TRIM
   (a) (w/ power window)
   Connect the connector.
   (b) Install the door trim with clips to the inside door panel by tapping.
   (c) (w/ soft top)
   Install the service cover with screw.



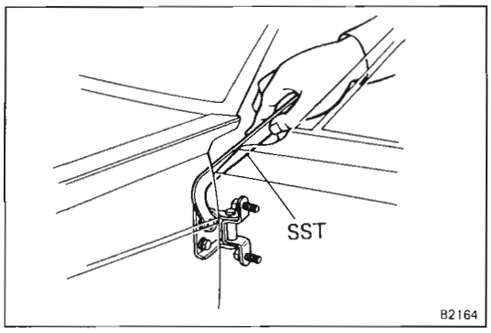
20. INSTALL INSIDE HANDLE
   (a) Connect the link to the inside handle.
   (b) Push the inside handle in the door panel and slide it.
   (c) Install the screw.

21. INSTALL ARMREST OR PULL HANDLE



22. INSTALL WINDOW REGULATOR HANDLE
   With the door glass fully closed, install the window regulator handle with a snap ring as shown.

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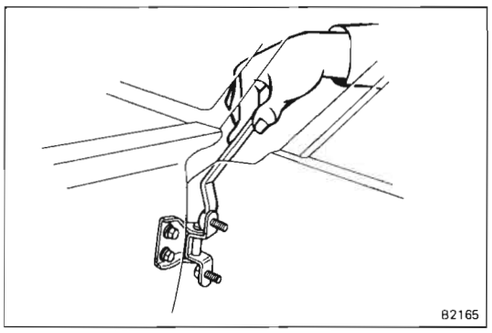


ADJUSTMENT OF FRONT DOOR

1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

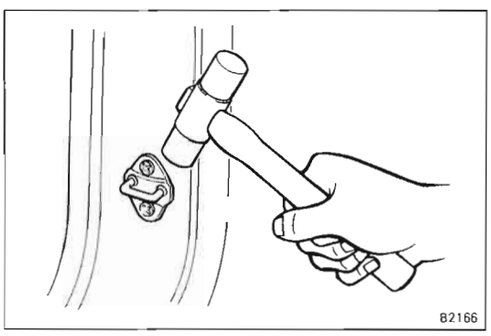
   Using SST, adjust the door by loosening the body side hinge bolts.

   SST 09812-00010



2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

   Adjust the door by loosening the door side hinge bolts.



3. ADJUST DOOR LOCK STRIKER

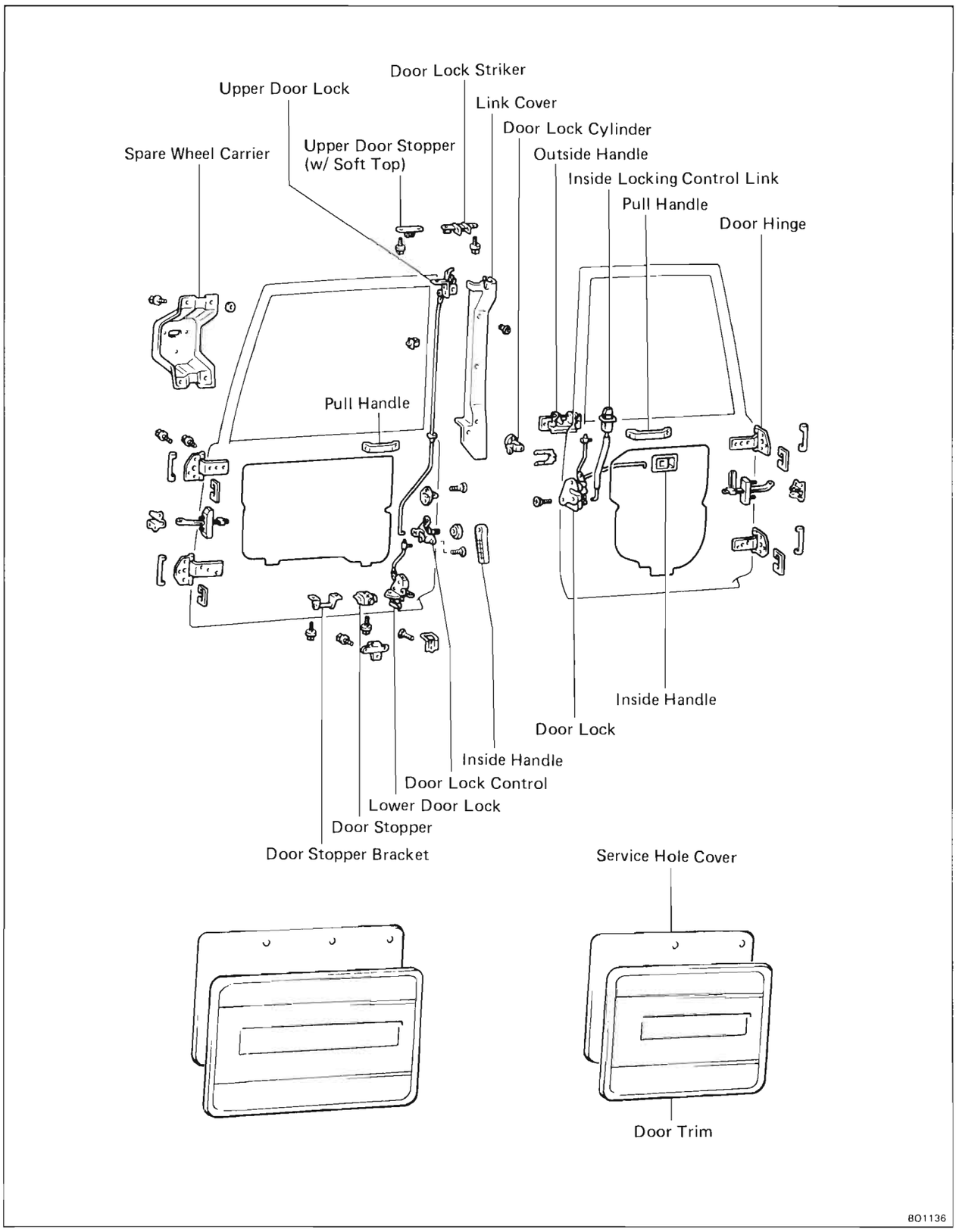
   (a) Check that the door fit and door lock linkages are adjusted correctly.

   (b) Adjust the door lock striker by loosening the screws.

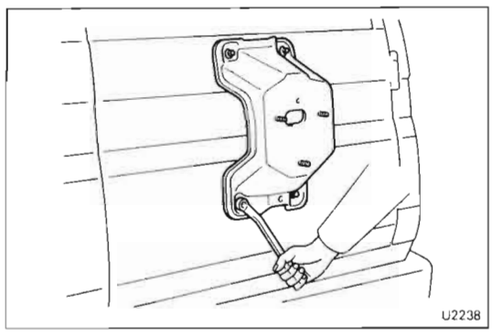
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BACK DOOR

COMPONENTS



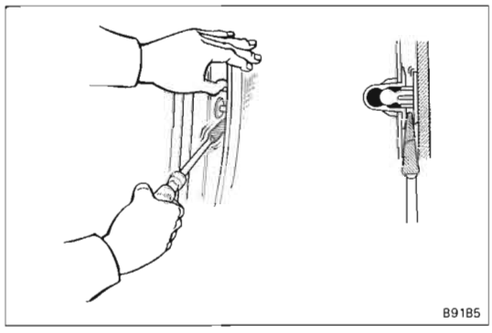
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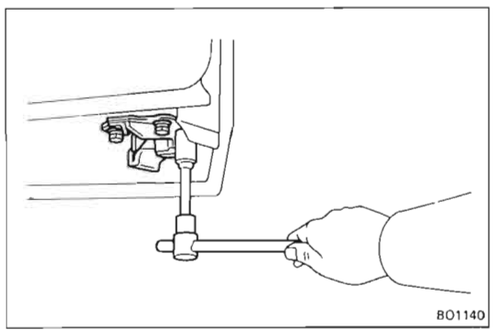
Right Back Door

DISASSEMBLY OF RIGHT BACK DOOR

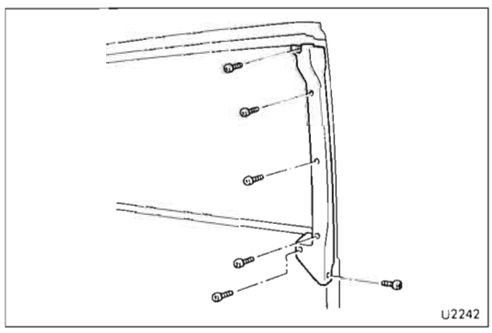
1. REMOVE SPARE WHEEL
2. REMOVE SPARE WHEEL CARRIER
   Remove the four bolts and spare wheel carrier.
3. REMOVE PULL HANDLE



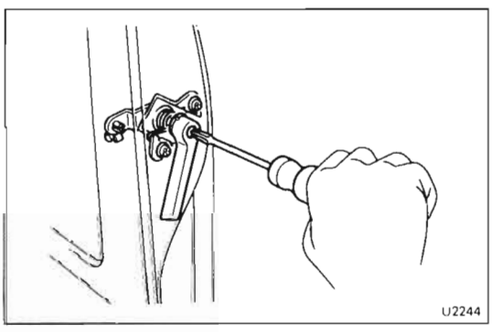
4. REMOVE DOOR TRIM
   Insert a screwdriver between the trim retainers and door panel to pry it loose.
   NOTE: Tape the screwdriver tip before use.
5. REMOVE SERVICE HOLE COVER
6. REMOVE DOOR STOPPER
7. REMOVE DOOR STOPPER BRACKET



8. REMOVE LOWER DOOR LOCK
   (a) Disconnect the link from the door lock control.
   (b) Remove the three bolts and lower door lock.

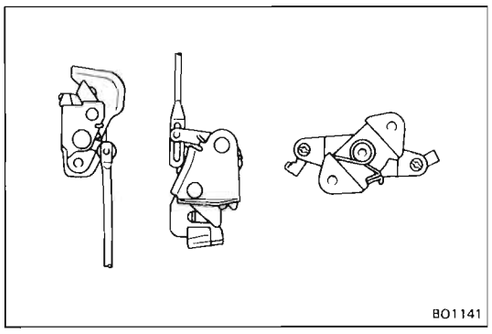


9. (w/o Soft Top)
   REMOVE UPPER DOOR LOCK
   (a) Remove the six screws and link cover.
   (b) Disconnect the link from the door lock control.
   (c) Remove the two bolts and upper door lock.



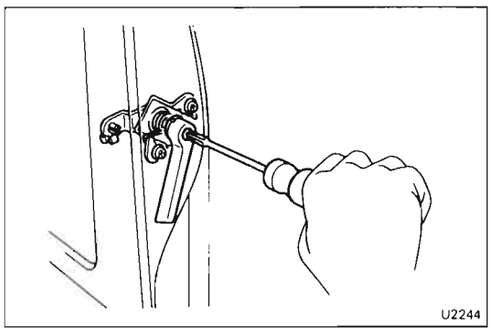
10. REMOVE DOOR LOCK CONTROL
    (a) Remove the screw and inside handle.
    (b) Remove the two screws, bushing and door lock control.

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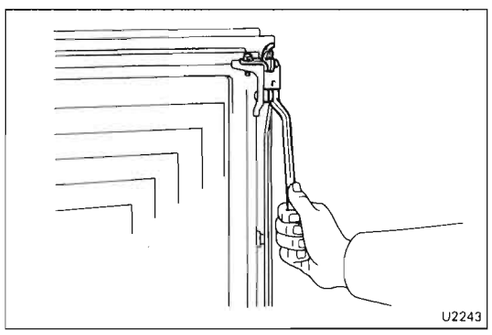


ASSEMBLY OF RIGHT BACK DOOR

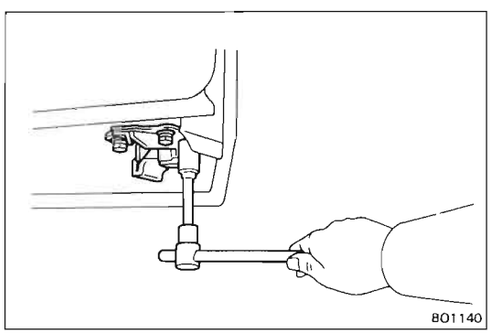
1. BEFORE INSTALLING PARTS, APPLY MP GREASE TO THEM
   (a) Apply MP grease to the sliding surface of the door lock.
   (b) Apply MP grease to the sliding surface of the door lock control.



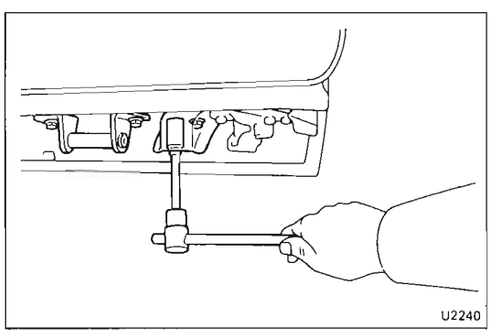
2. INSTALL DOOR LOCK CONTROL
   (a) Install the bushing and door lock control with two screws.
   (b) Install the inside handle with screw.



3. (w/o Soft Top)
   INSTALL UPPER DOOR LOCK
   (a) Install the upper door lock with two bolts.
   (b) Connect the link to the door lock control.
   (c) Install the link cover with six screws.

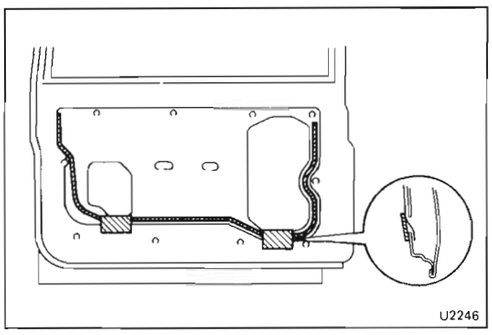


4. INSTALL LOWER DOOR LOCK
   (a) Install the lower door lock with three bolts.
   (b) Connect the link to the door lock control.
5. CHECK DOOR LOCK OPERATION



6. INSTALL DOOR STOPPER BRACKET
   Install the door stopper bracket with two bolts.
7. INSTALL DOOR STOPPER
   Install the door stopper with two bolts.

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8. INSTALL SERVICE HOLE COVER

(a) Seal the service hole cover with adhesive.

(b) Insert the lower edge of the service hole cover into the panel slit.

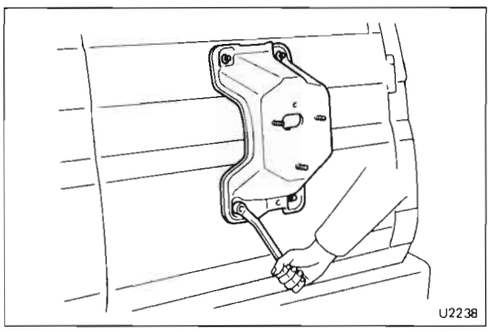
(c) Seal the panel slit with cotton tape.

CAUTION: Do not block the trim clip seating with the tape.

9. INSTALL DOOR TRIM

Install the door trim with clips to the inside door panel by tapping.

10. INSTALL PULL HANDLE

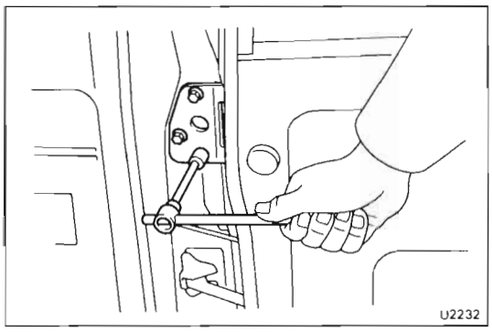


11. INSTALL SPARE WHEEL CARRIER

Install the spare wheel carrier with four bolts.

12. INSTALL SPARE WHEEL

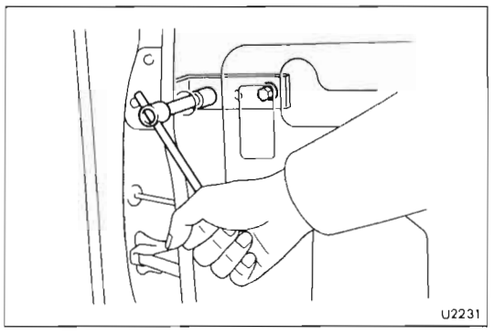
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ADJUSTMENT OF RIGHT BACK DOOR

1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Adjust the door by loosening the body side hinge bolts.

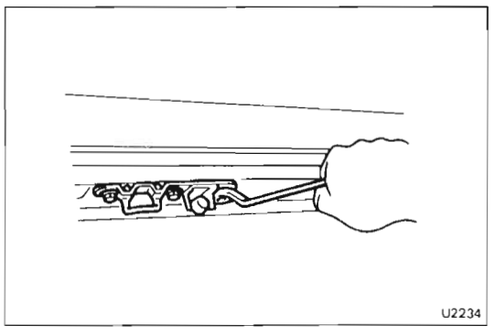


2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

(a) Remove the pull handle and door trim.

(b) Peel off the outer ridges of the service hole cover.

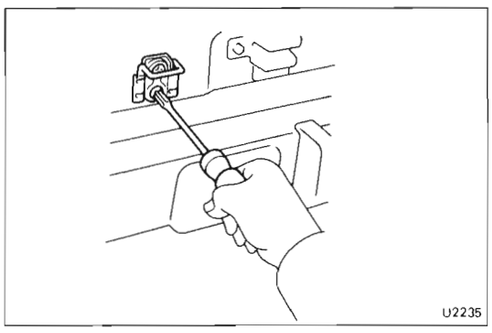
(c) Adjust the door by loosening the door side hinge bolts.



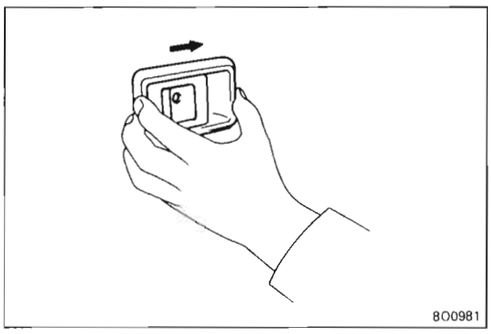
3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkage are adjusted correctly.

(b) Adjust the door lock striker by loosening the bolts or screws.



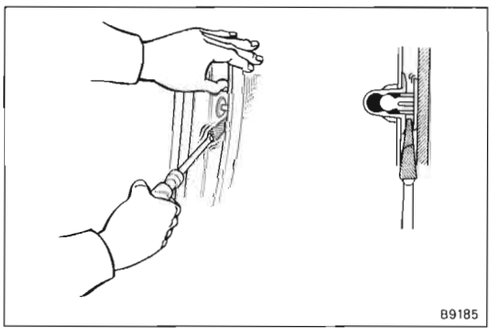
Donated by Onur Azeri . cruisercult.com



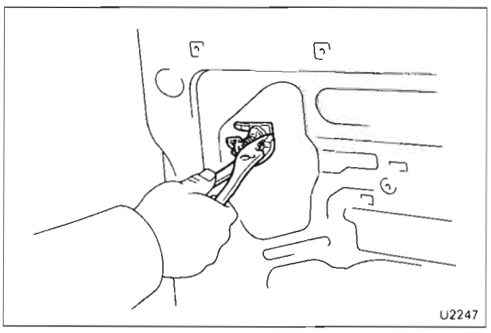
Left Back Door

DISASSEMBLY OF LEFT BACK DOOR

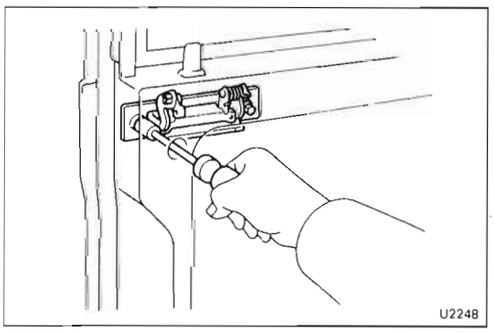
1. REMOVE INSIDE HANDLE
   (a) Remove the screw.
   (b) Slide and pull off the inside handle.
   (c) Disconnect the link from the inside handle.
2. REMOVE PULL HANDLE



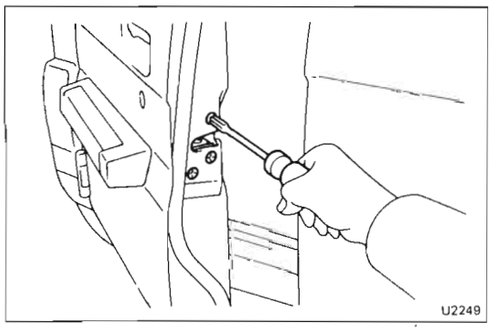
3. REMOVE DOOR TRIM
   Insert a screwdriver between the trim retainers and door panel to pry it loose.
   NOTE: Tape the screwdriver tip before use.
4. REMOVE SERVICE HOLE COVER
5. DISCONNECT INSIDE LOCKING CONTROL LINK FROM DOOR LOCK



6. REMOVE DOOR LOCK CYLINDER
   (a) Disconnect the link from the door lock cylinder.
   (b) Remove the retainer and cylinder.

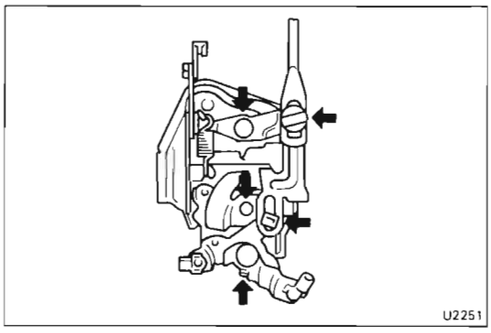


7. REMOVE OUTSIDE HANDLE
   (a) Disconnect the link from the outside handle.
   (b) Remove the two bolts and outside handle.



8. REMOVE DOOR LOCK
   Remove the three screws and door lock.

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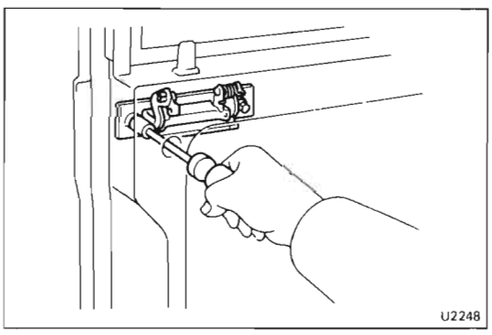
ASSEMBLY OF LEFT BACK DOOR

1. APPLY MP GREASE TO DOOR LOCK

   Apply MP grease to the sliding surface of the door lock.

2. INSTALL DOOR LOCK

   Install the door lock with three screws.



3. INSTALL OUTSIDE HANDLE

   (a) Install the outside handle with two bolts.

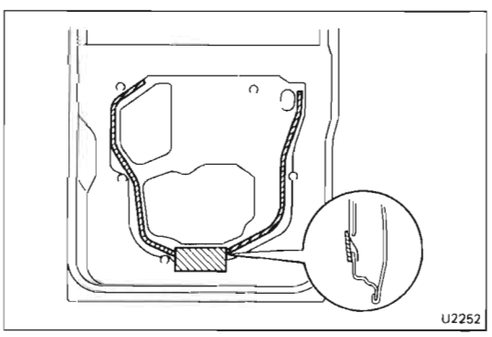
   (b) Connect the link to the outside handle.

4. INSTALL DOOR LOCK CYLINDER

   (a) Install the door lock cylinder with retainer.

   (b) Connect the link to the cylinder.

5. CONNECT INSIDE LOCKING CONTROL LINK TO DOOR LOCK



6. INSTALL SERVICE HOLE COVER

   (a) Seal the service hole cover with adhesive.

   (b) Insert the lower edge of the service hole cover into the panel slit.

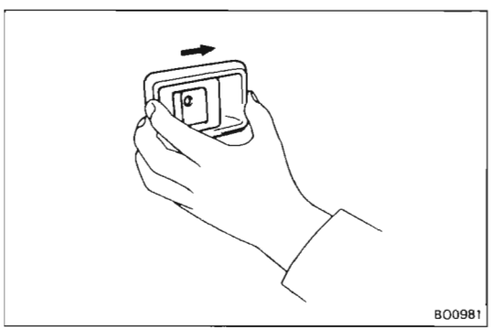
   (c) Seal the panel slit with cotton tape.

   CAUTION: Do not block the trim clip seating with the tape.

7. INSTALL DOOR TRIM

   Install the door trim with clips to the inside door panel by tapping.

8. INSTALL PULL HANDLE



9. INSTALL INSIDE HANDLE

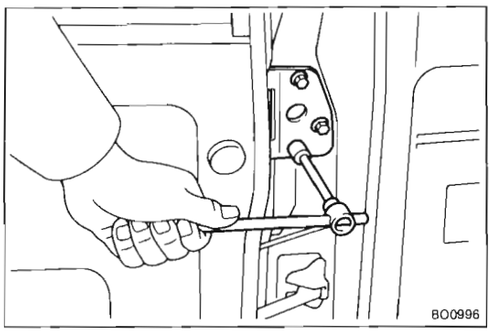
   (a) Connect the link to the inside handle.

   (b) Push the inside handle in the door panel and slide it.

   (c) Install the screw.

10. CHECK DOOR LOCK OPERATION

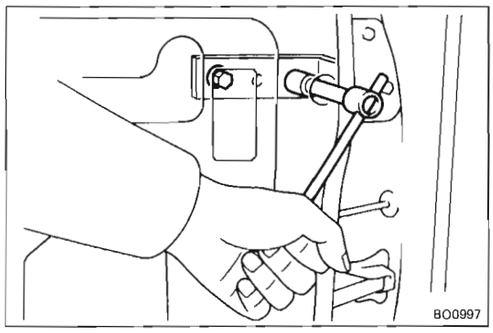
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ADJUSTMENT OF LEFT BACK DOOR

1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Adjust the door by loosening the body side hinge bolts.

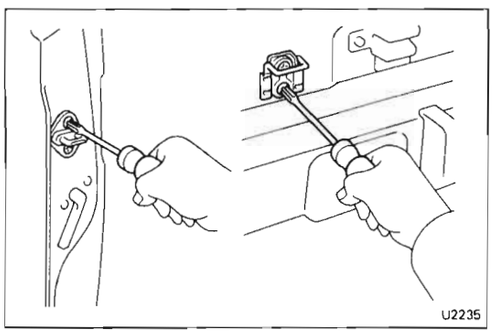


2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

(a) Remove the pull handle inside handle and door trim.

(b) Peel off the outer ridges of the service hole cover.

(c) Adjust the door by loosening the door side hinge bolts.



3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkage are adjusted correctly.

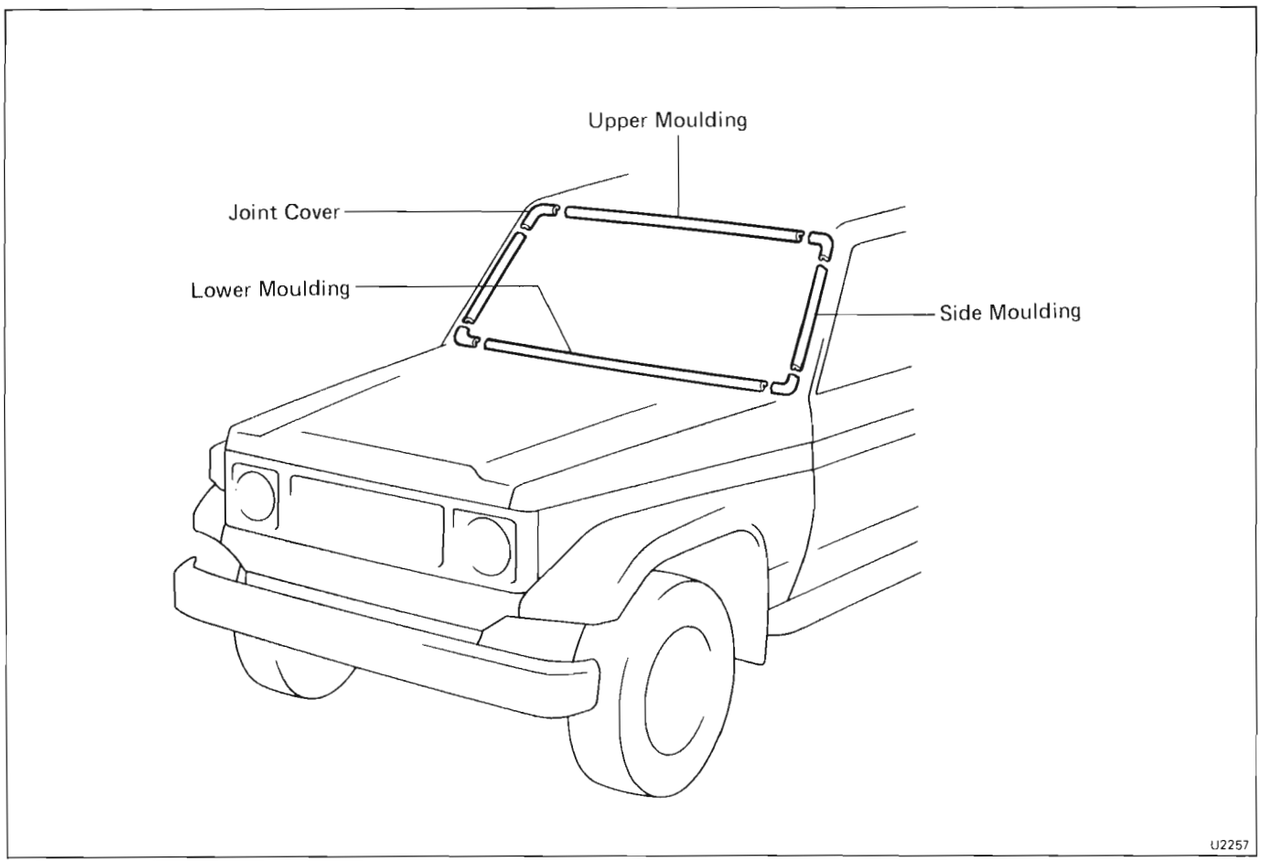
(b) Adjust the door lock striker by loosening the screws.

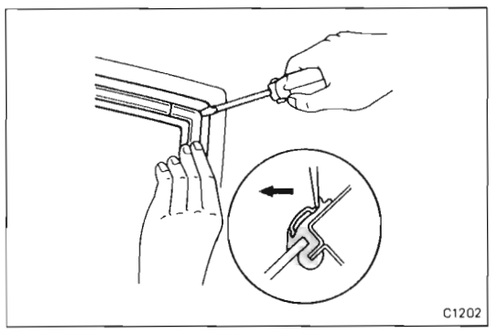
Donated by Onur Azeri . cruisercult.com

MOULDING

Windshield Outside Moulding

COMPONENTS



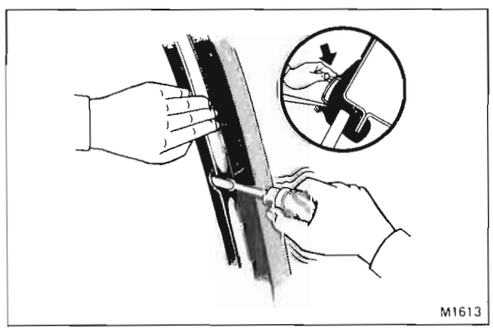


REMOVAL OF WINDSHIELD OUTSIDE MOULDING

REMOVE WINDSHIELD OUTSIDE MOULDING

(a) Using a screwdriver, pull off the joint cover.

(b) Using a screwdriver, pull off the moulding from the end.



INSTALLATION OF WINDSHIELD OUTSIDE MOULDING

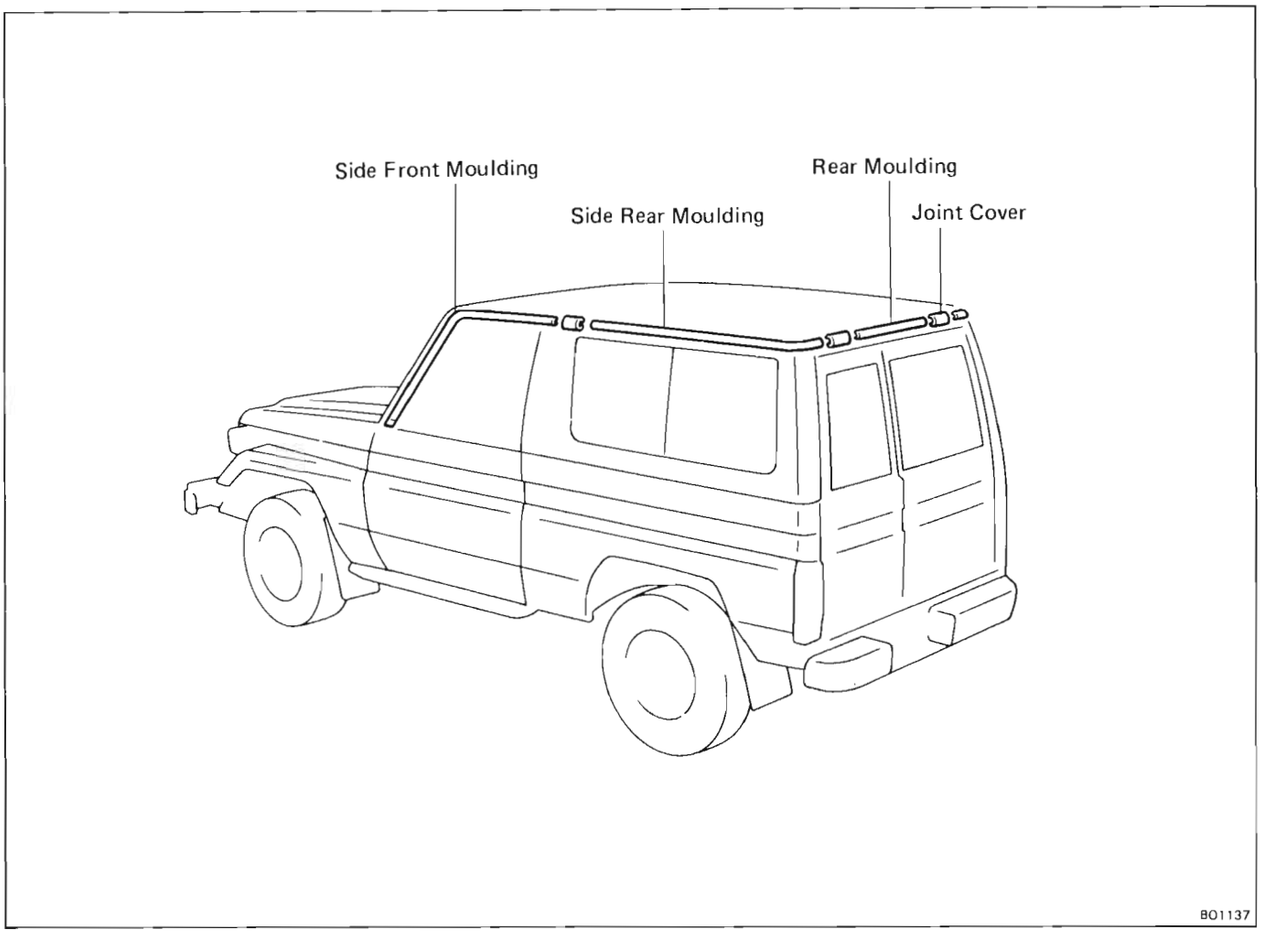
INSTALL WINDSHIELD OUTSIDE MOULDING

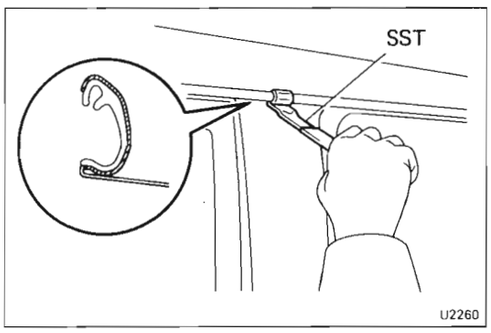
Using a screwdriver, install the moulding and joint cover.

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Roof Drip Moulding

COMPONENTS



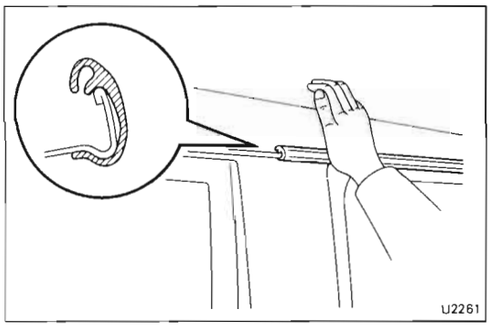


REMOVAL OF ROOF DRIP MOULDING

REMOVE ROOF DRIP MOULDING

Using SST, pull off the roof drip moulding from both ends.

SST 09806-30010



INSTALLATION OF ROOF DRIP MOULDING

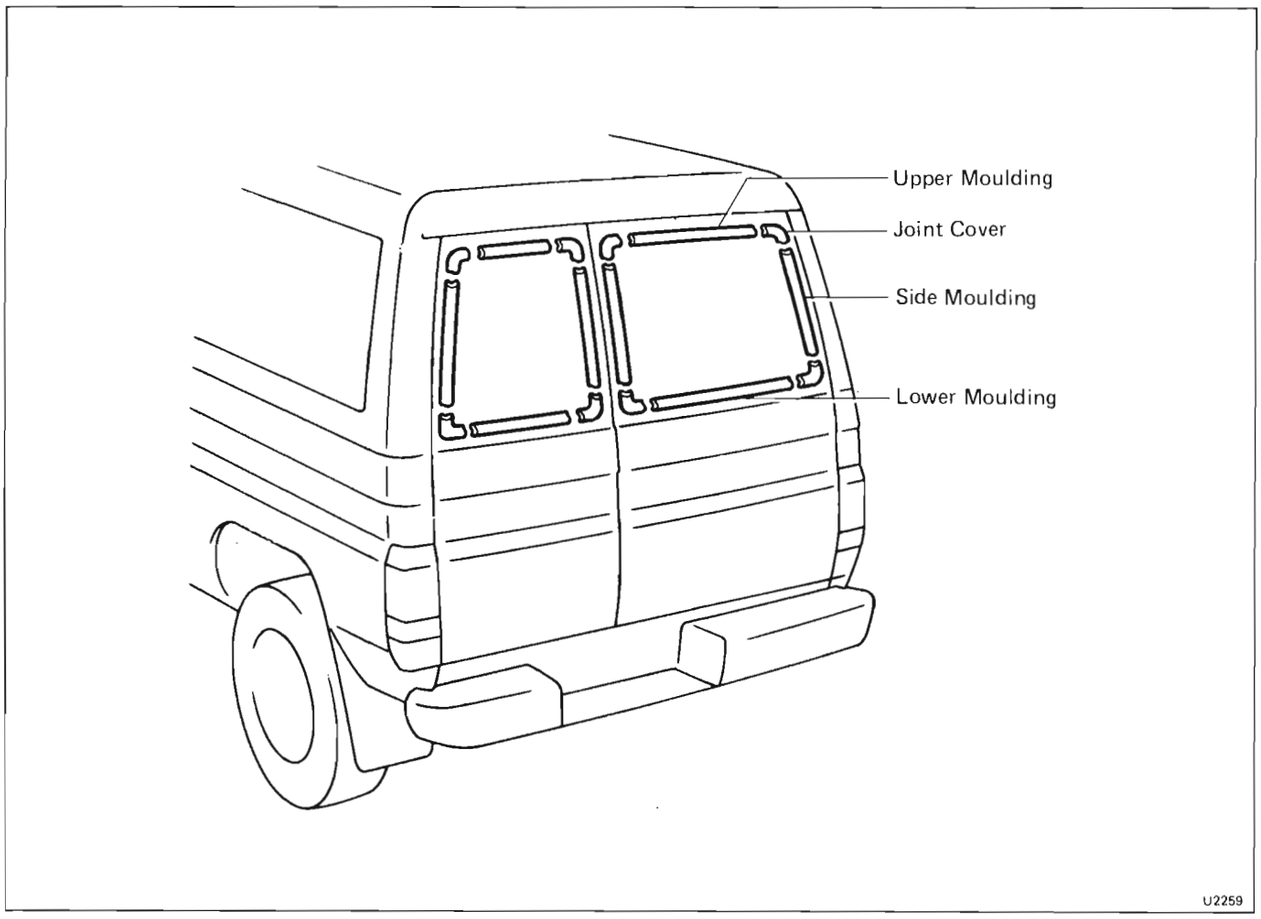
INSTALL ROOF DRIP MOULDING BY HAND

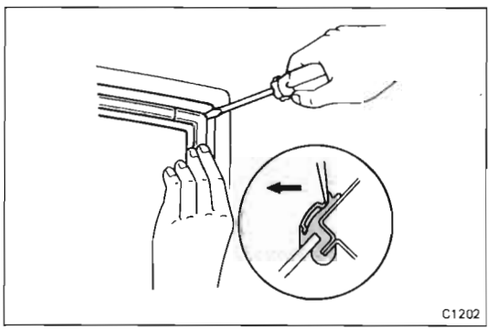
Attach the upper edge of the moulding to the body flange. Tap on the moulding by hand.

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Back Door Moulding

COMPONENTS



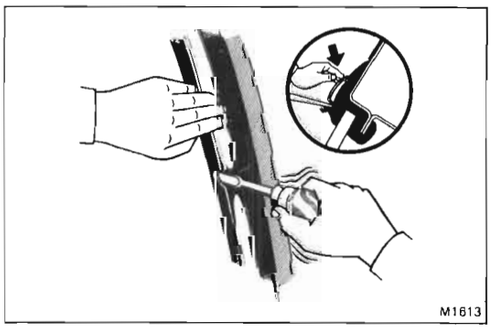


REMOVAL OF BACK DOOR MOULDING

REMOVE BACK DOOR MOULDING

(a) Using a screwdriver, pull off the joint cover.

(b) Using a screwdriver, pull off the moulding from the end.



INSTALLATION OF BACK DOOR MOULDING

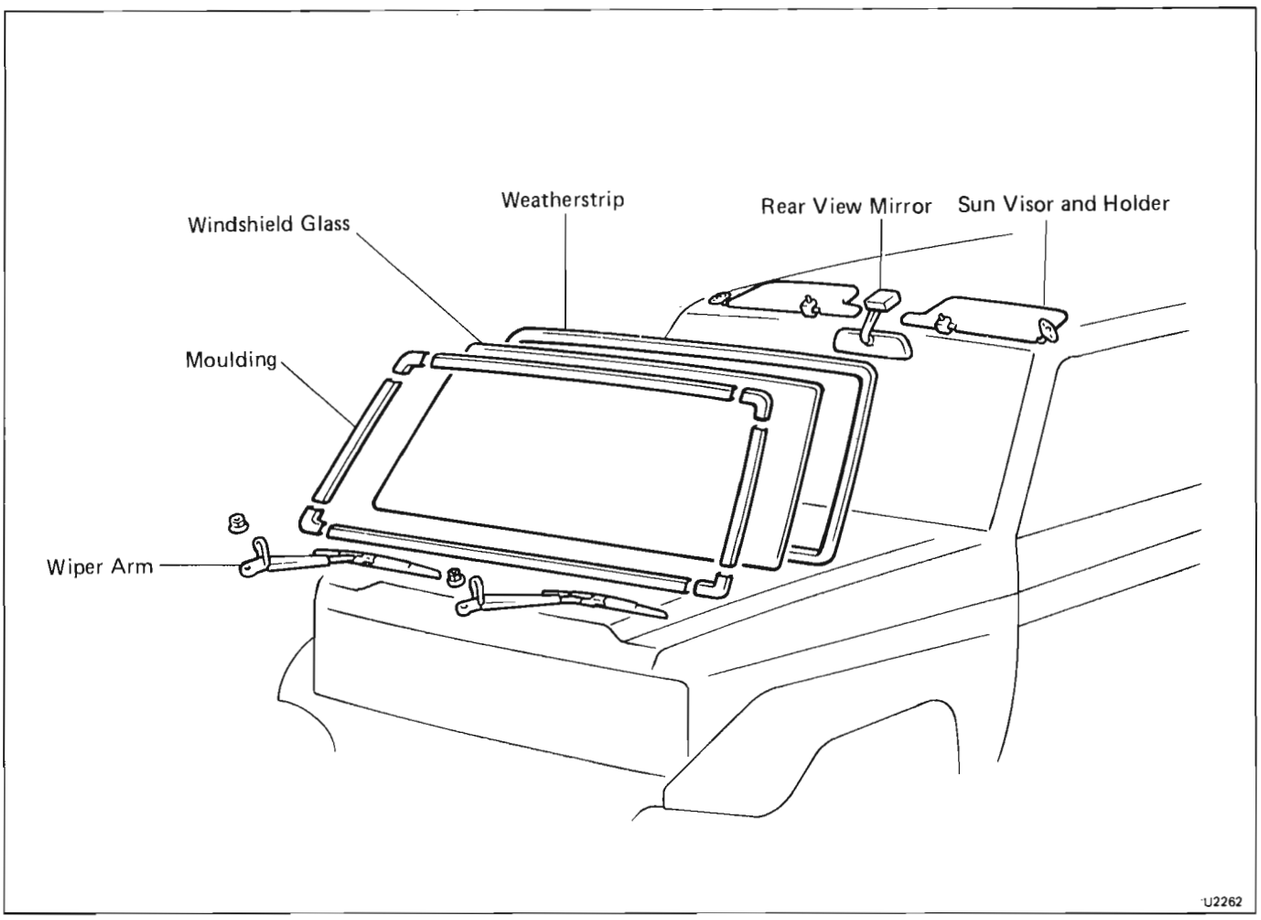
INSTALL BACK DOOR MOULDING

Using a screwdriver, install the moulding and joint cover.

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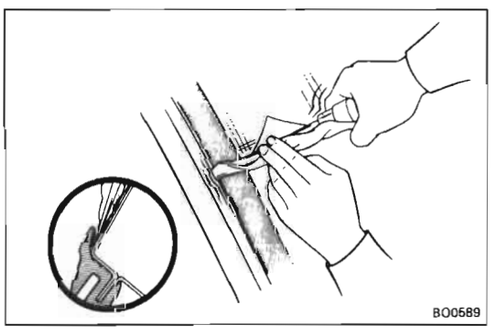
WINDSHIELD

COMPONENTS



REMOVAL OF WINDSHIELD

1. REMOVE FOLLOWING PARTS:
   (a) Wiper arms
   (b) Windshield mouldings (See page BO-20)
   (c) Inner rear view mirror
   (d) Sun visors and holders

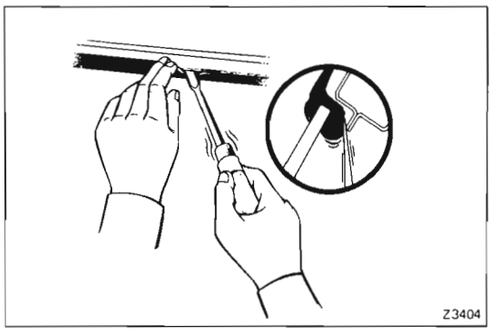


2. REMOVE WINDSHIELD

If reusing the weatherstrip:

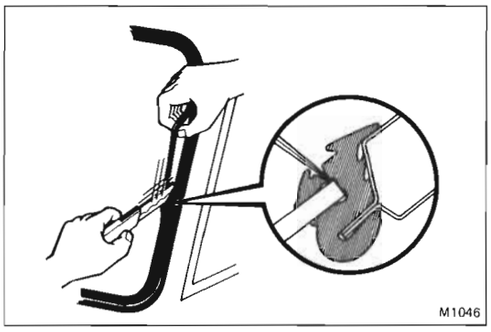
(a) Working from the vehicle outside with a screwdriver, loosen the weatherstrip lip from the body.

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(b) From inside of vehicle, stuff lip of weatherstrip under flange with screwdriver.

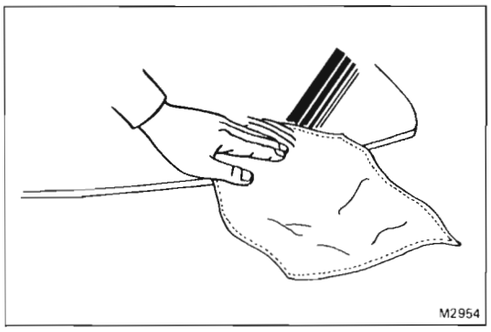
(c) Push the glass out to remove.



If not reusing the weatherstrip:

(a) From the outside, cut off the weatherstrip lip with a knife.

(b) From the vehicle interior, push the windshield with an even force.

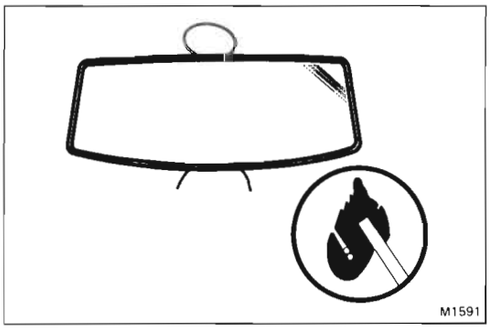


INSTALLATION OF WINDSHIELD

(See page BO-23)

1. CLEAN BODY AND GLASS

Using alcohol, wipe off any adhesive left on the body or glass.

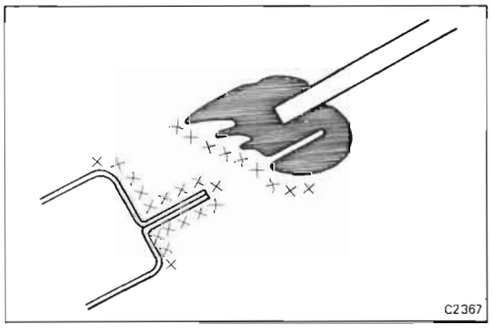


2. INSTALL WEATHERSTRIP ON GLASS

(a) Attach the weatherstrip to the glass.

CAUTION: If the weatherstrip has hardened, it may develop water leaks. Use a new one if possible.

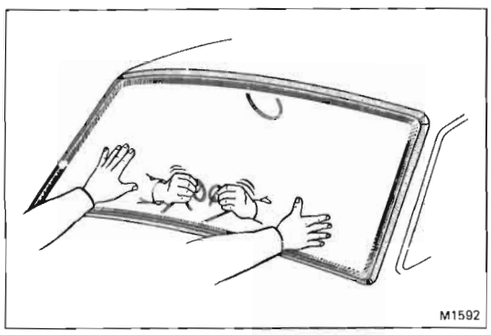
(b) Insert a cord into the groove of the weatherstrip, all the way around and so the ends overlap.



3. INSTALL GLASS

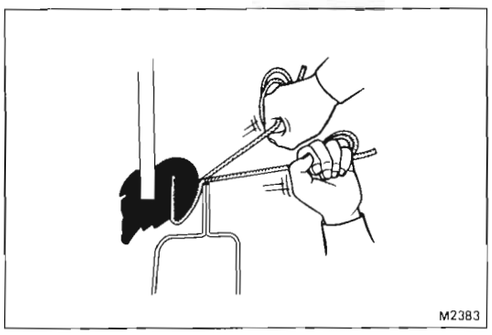
(a) Apply soapy water to the contact face of the weatherstrip lip and to the body flange.

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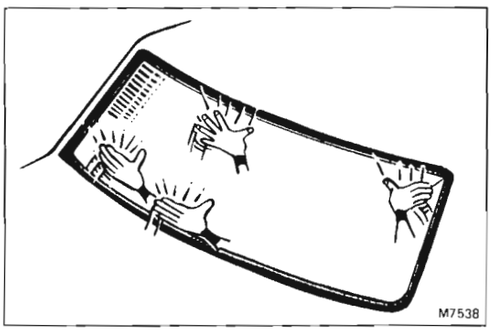


NOTE: Begin installation in the middle of the lower part of the glass.

(b) Hold the glass in position on the body.

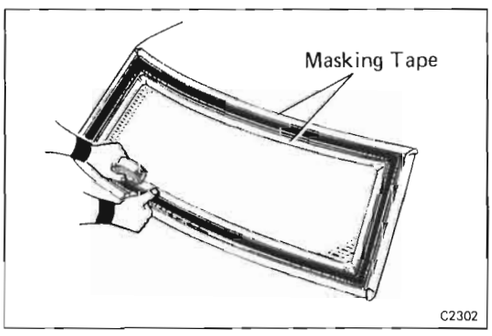


(c) From the inside, pull on one cord at an angle so it pulls the lip over the flange. From the outside, press the glass along the weatherstrip until the glass is installed.



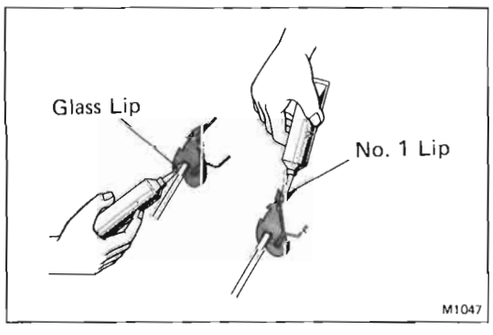
4. SNUG DOWN GLASS

To snug down the glass, tap from the outside with your open hand.



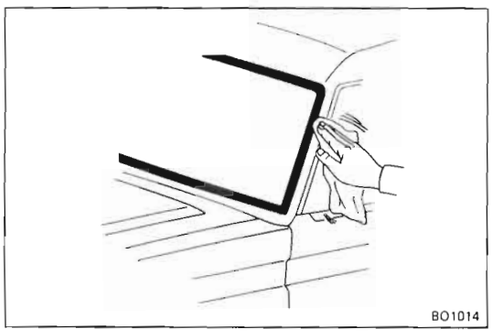
5. APPLY ADHESIVE

(a) Put masking tape around the weatherstrip to protect the paint and glass.



(b) Apply adhesive to the No. 1 weatherstrip lip and glass lip until it oozes out.

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6. CLEANING ADHESIVE SURFACE

(a) When adhesive is dry, remove the masking tape.

(b) Clean off the adhesive oozing out from the masking tape with a clean rag saturated in white gasoline.

7. CHECK FOR WATER LEAKS

If necessary, apply sealant.

8. INSTALL FOLLOWING PARTS:

(a) Sun visors and holders

(b) Inner rear view mirror

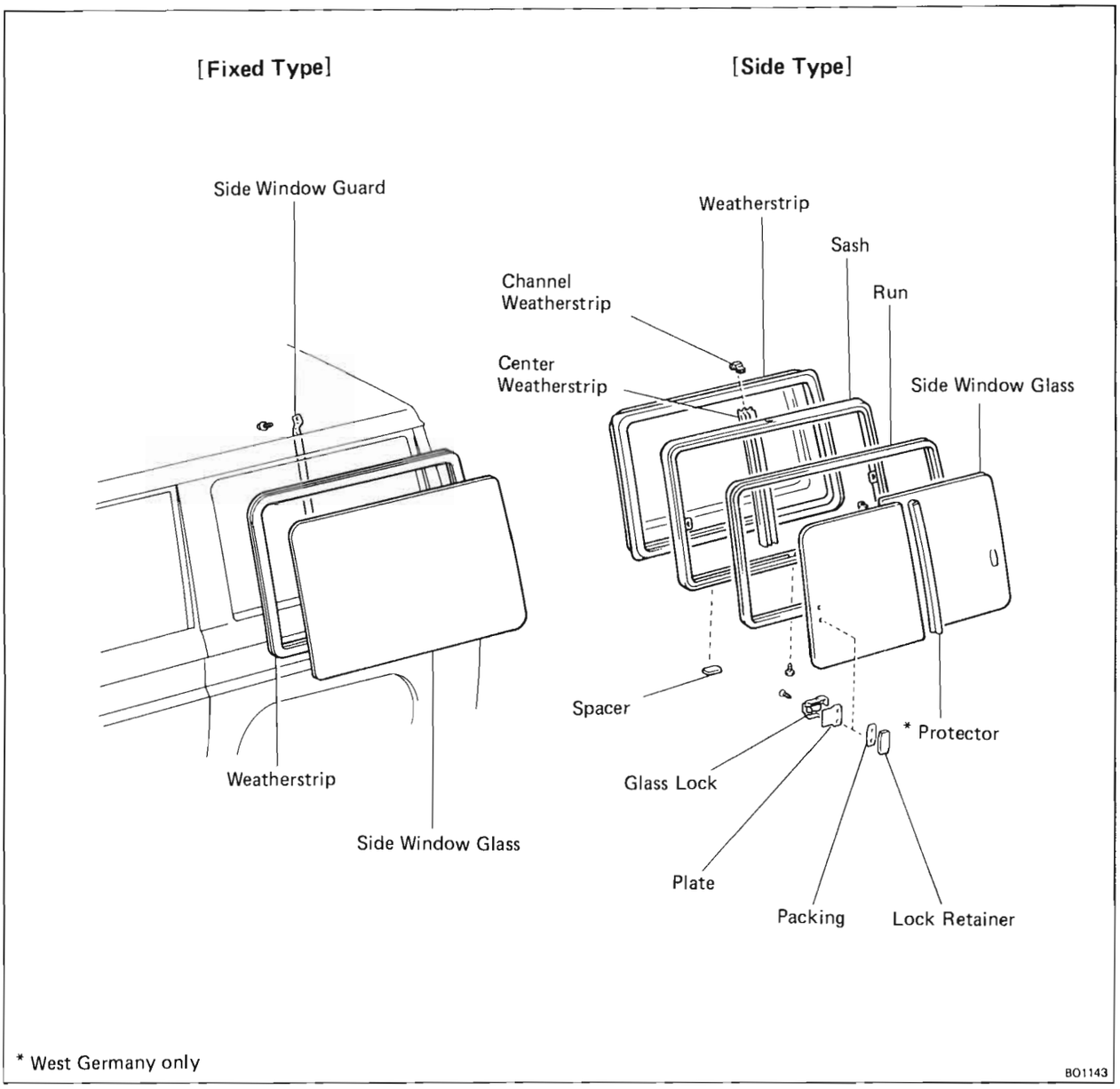
(c) Windshield mouldings (See page BO-20)

(d) Wiper arms

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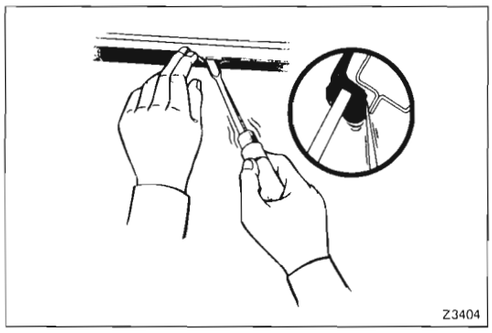
SIDE WINDOW

COMPONENTS



NOTE: Remove and install the fixed type of side window on the back door glass with the same procedure. (See page BO-31)

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REMOVAL OF SIDE WINDOW

(See page BO-27)

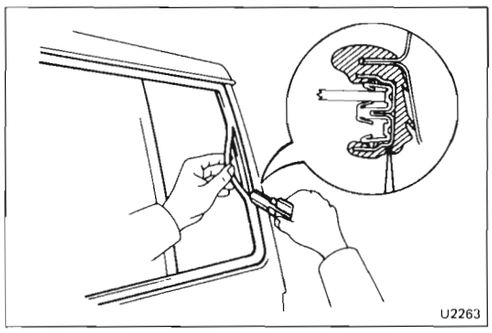
1. REMOVE SIDE WINDOW GUARD

2. REMOVE SIDE WINDOW

Reusing the weatherstrip:

(a) From inside of vehicle, stuff lip of weatherstrip under flange with screwdriver.

(b) Push the glass out to remove.

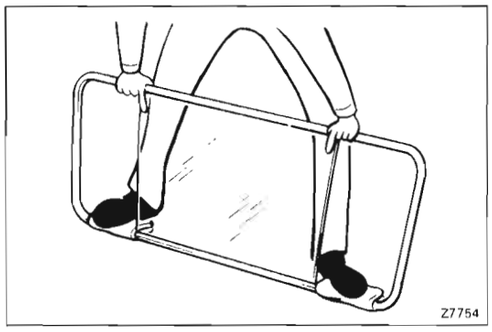


Using a new weatherstrip:

(a) From the outside of the vehicle, cut off the weatherstrip lip with a knife.

(b) Pull the side window outwards and remove the side window.

(c) Remove the remaining weatherstrip.

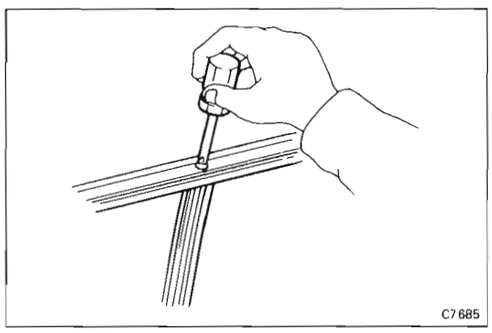


DISASSEMBLY OF SIDE WINDOW

(See page BO-27)

1. REMOVE SIDE WINDOW GLASS

Position the glass in the center, pull up on the sash and remove the two glasses.



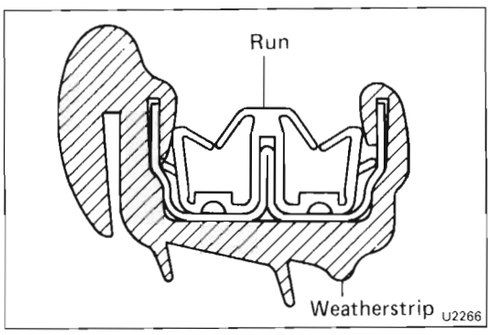
2. REMOVE CENTER WEATHERSTRIP AND CHANNEL

Remove the screw and then remove the weatherstrip and channel.

3. REMOVE SIDE WINDOW RUN FROM SASH

4. REMOVE SIDE WINDOW WEATHERSTRIP FROM SASH

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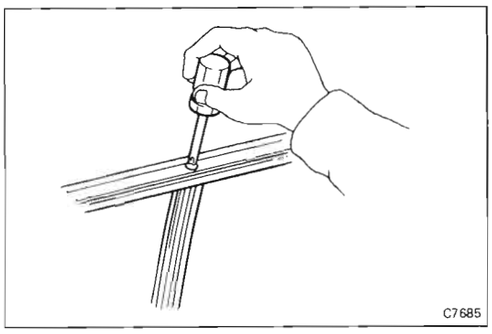
ASSEMBLY OF SIDE WINDOW

(See page BO-27)

1. INSTALL SIDE WINDOW WEATHERSTRIP ON SASH AS SHOWN

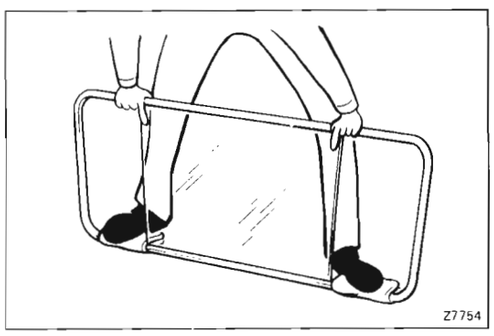
   CAUTION: If the weatherstrip has hardened, it may develop leaks.
   Use a new one if possible.

2. INSTALL SIDE WINDOW RUN AS SHOWN



3. INSTALL CENTER WEATHERSTRIP AND CHANNEL

   Install the channel and weatherstrip with the screw.



4. INSTALL SIDE WINDOW GLASS

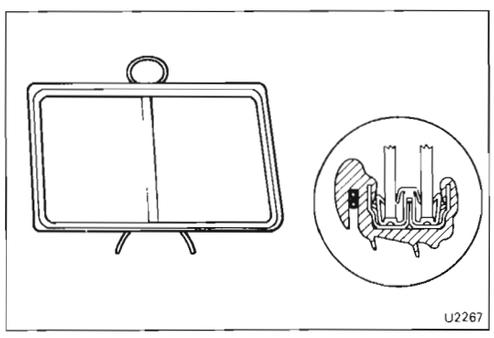
   Pull up on the sash and install the two glass panes to the center of the sash.

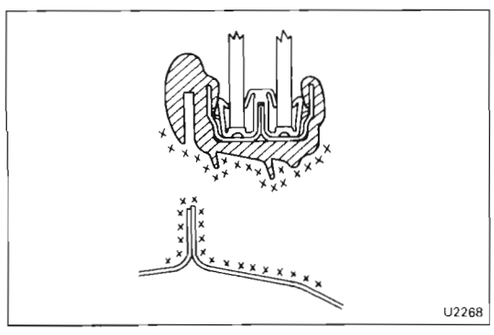
INSTALLATION OF SIDE WINDOW

(See page BO-27)

1. INSTALL SIDE WINDOW

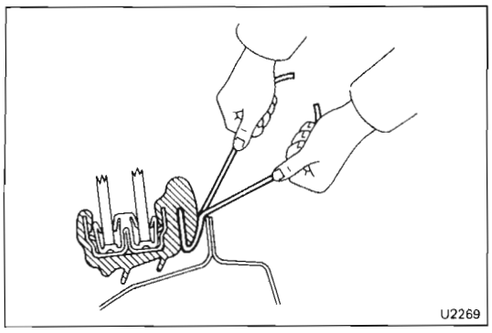
   (a) Insert a cord into the groove of the weatherstrip, all the way around and so the ends overlap.





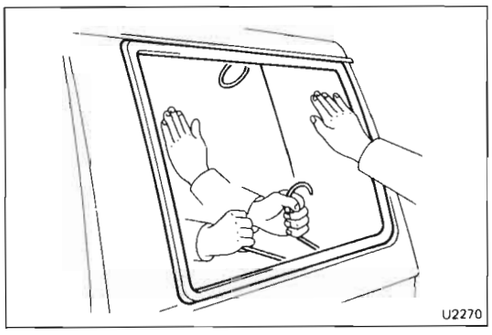
   (b) Apply soapy water to the contact face of the weatherstrip lip and to the body flange.

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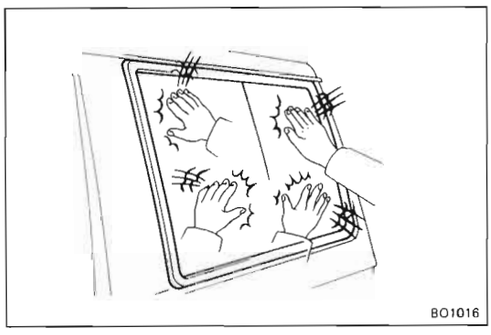


NOTE: Begin installation in the middle of the lower part of the side window.

(c) Hold the glass in position on the body.



(d) From the inside, pull on one cord at an angle so it pulls the lip over the flange. From the outside, press the glass along the weatherstrip until the glass is installed.



(e) To settle the side window in place, tap from outside with your open hand.

2. **CHECK FOR WATER LEAKS**

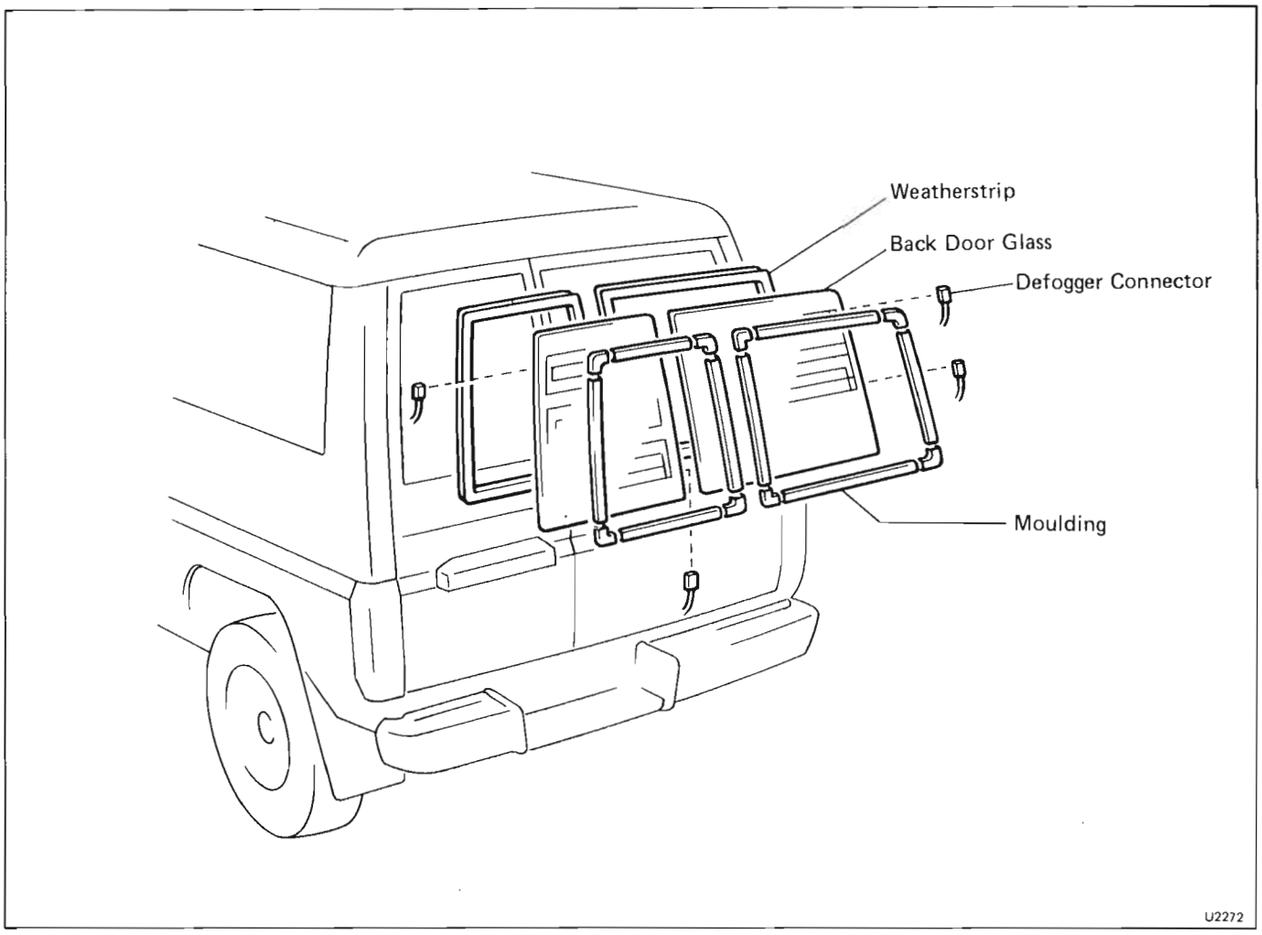
If necessary, apply sealant.

3. **INSTALL SIDE WINDOW GUARD**

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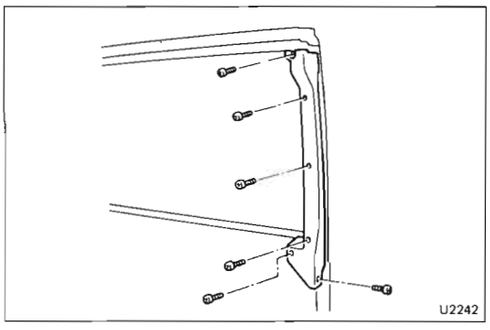
BACK DOOR GLASS

COMPONENTS



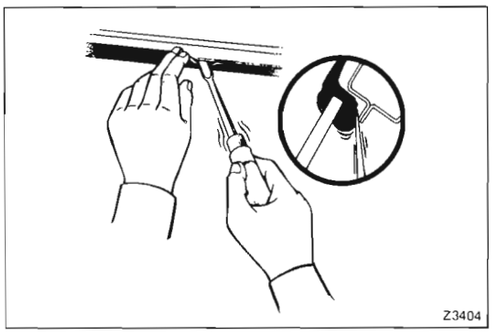
REMOVAL OF BACK DOOR GLASS

1. REMOVE FOLLOWING PARTS:
   (a) Spare wheel
   (b) Rear wiper arm
   (c) Back door moulding (See page BO-22)
   (d) Defogger connector



2. (Hard and FRP Top)
   REMOVE DOOR CONTROL LINK COVER
   Remove the six screws and link cover.

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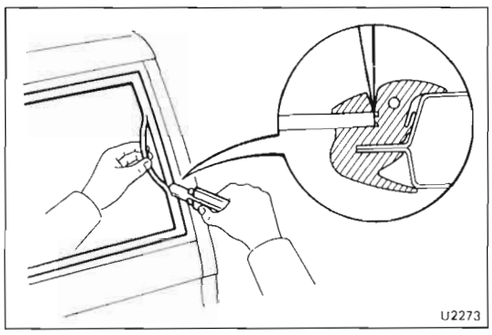


3. REMOVE BACK DOOR GLASS

Reusing the weatherstrip:

(a) From inside of vehicle, stuff lip of weatherstrip under flange with screwdriver.

(b) Push the glass out to remove.

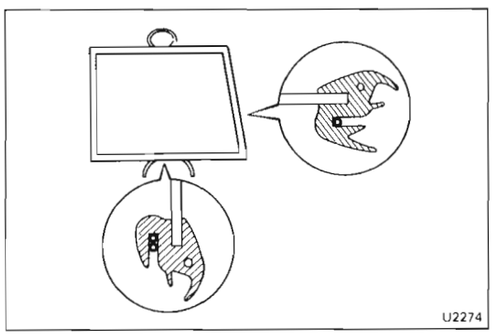


Using a new weatherstrip:

(a) From the outside of the vehicle, cut off the weatherstrip lip with a knife.

(b) Pull the back door glass outwards and remove the back door glass.

(c) Remove the remaining weatherstrip.



INSTALLATION OF BACK DOOR GLASS

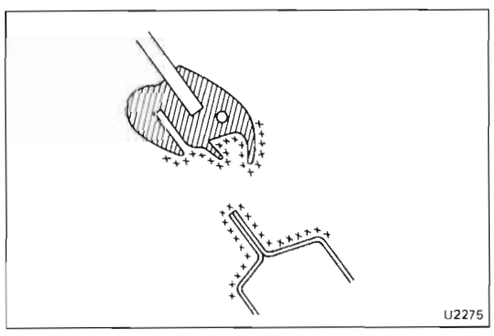
(See page BO-31)

1. INSTALL WEATHERSTRIP ON GLASS

(a) Attach the weatherstrip to the glass.

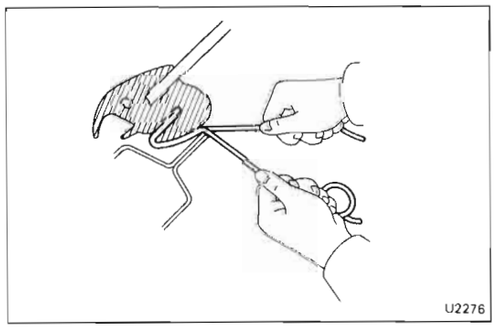
CAUTION: If the weatherstrip has hardened, it may develop water leaks.
Use a new one if possible.

(b) Insert a cord into the groove of the weatherstrip, all the way around and so the ends overlap.



2. INSTALL BACK DOOR GLASS

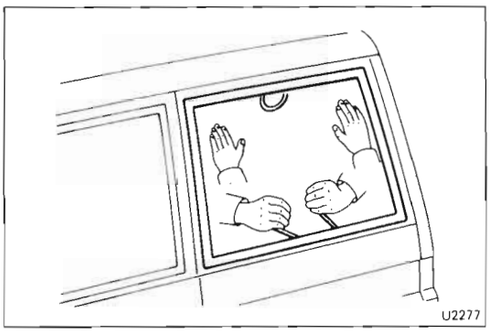
(a) Apply soapy water to the contact face of the weatherstrip lip and to the body flange.



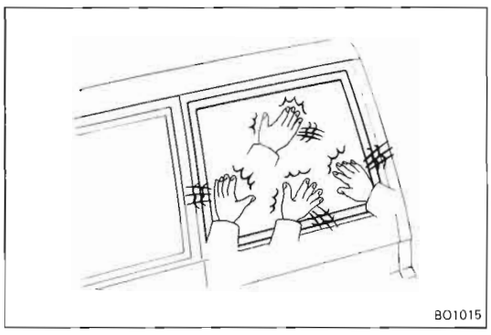
NOTE: Begin installation in the middle of the lower part of the back door glass.

(b) Hold the glass in position on the body.

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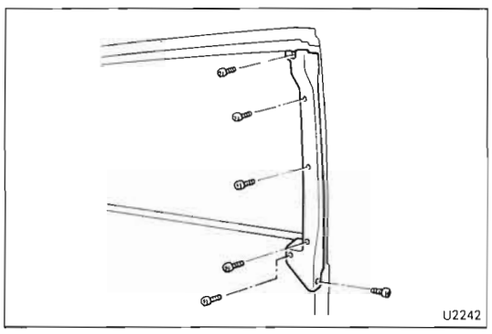
(c) From the inside, pull on one cord at an angle so it pulls the lip over the flange. From the outside, press the glass along the weatherstrip until the glass is installed.



(d) To settle the back door glass in place, tap from outside with your open hand.

3. CHECK FOR WATER LEAKS

If necessary, apply sealant.



4. INSTALL BACK DOOR CONTROL LINK COVER

Install the link cover with six screws.

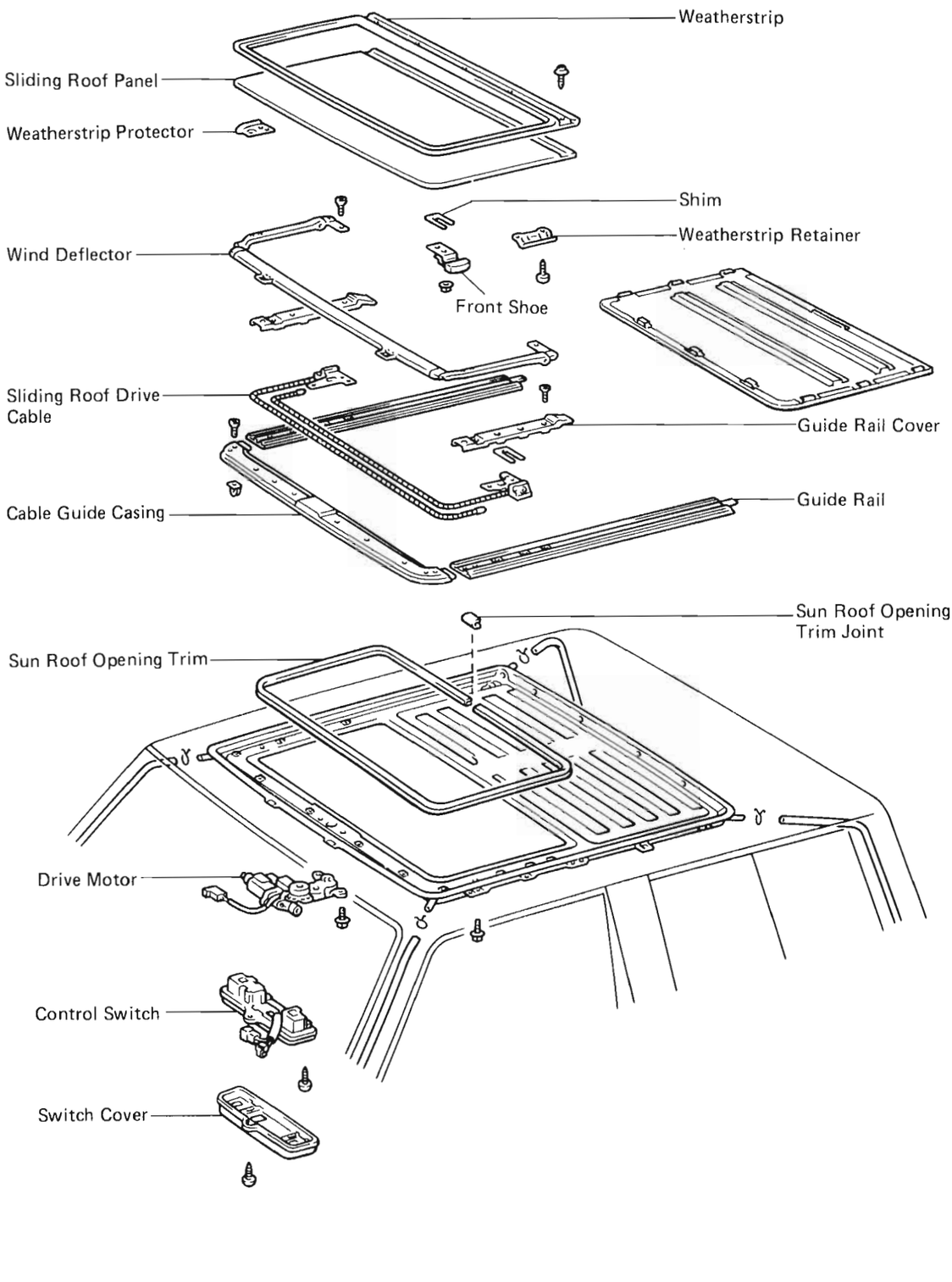
5. INSTALL FOLLOWING PARTS:

(a) Defogger connector
(b) Back door moulding (See page BO-22)
(c) Rear wiper arm
(d) Spare wheel

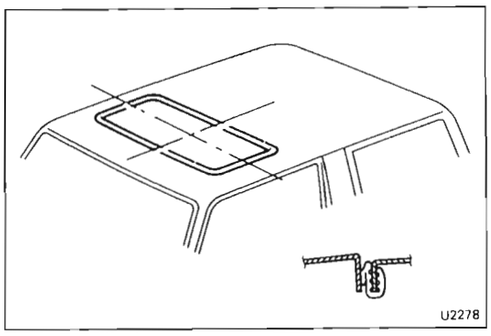
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SUN ROOF

COMPONENTS



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ON-VEHICLE INSPECTION

(a) Start the engine and check the operation time of the sun roof.

Operation time: Approx. 10 secs.

(b) Check for abnormal noise or binding during operation.

(c) With the sun roof fully closed, check for water leakage.

(d) Check for a difference in level between the sliding panel and roof panel.

Front side: $0\ ^{+1.0}_{-2.0}$ mm ($0\ ^{+0.039}_{-0.079}$ in.)

Rear side: $0\ ^{+1.0}_{-2.0}$ mm ($0\ ^{+0.039}_{-0.079}$ in.)

Left and right side: $0\ ^{+1.0}_{-2.0}$ mm ($0\ ^{+0.039}_{-0.079}$ in.)

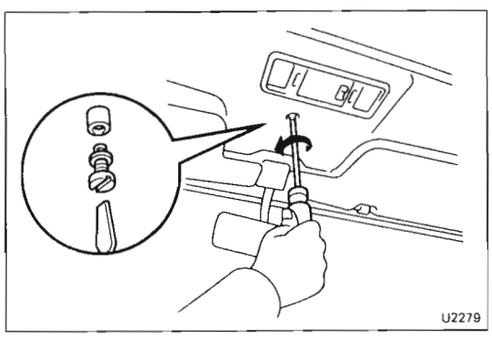
If the sliding roof does not operate:

(a) Remove the grommet in front of the control switch.

(b) Remove the screw inside.

CAUTION: Be careful not to lose the spring washer or washer.

(c) Manually operate the sun roof by inserting a screwdriver into the hole and turning the drive shaft.

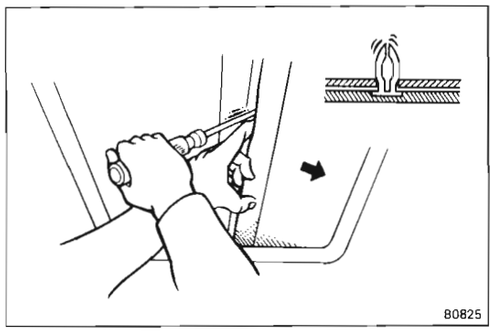


ADJUSTMENT OF SLIDING ROOF

1. REMOVE SLIDING ROOF HEADLINING

Before making adjustments, pull loose the clips and slide the headlining to the rear.

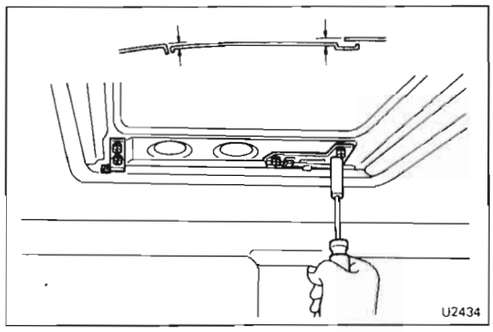
NOTE: When checking adjustment, reattach the headlining before sliding the roof.



2. TO ADJUST LEVEL DIFFERENCE

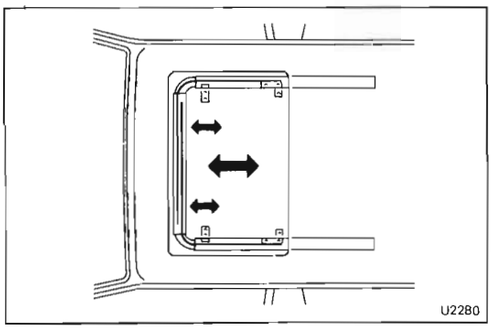
Adjust by increasing or decreasing the number of shims.

NOTE: If the front end is high, even without a shoe shim, check to see if the front shoes are in contact with the stoppers.

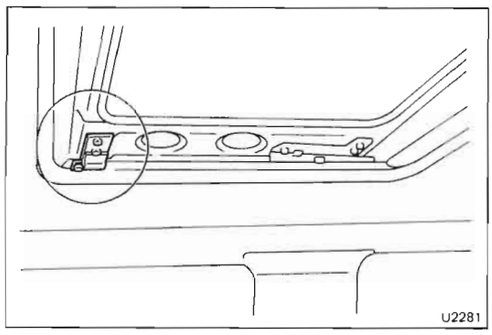


3. TO ADJUST FORWARD OR REARWARD

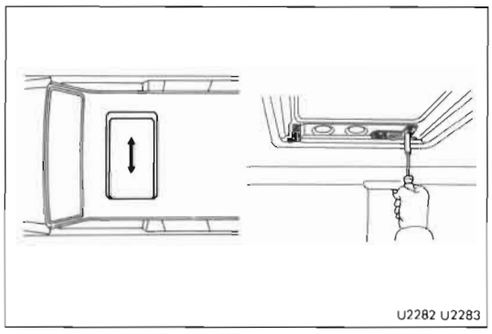
Adjust by moving the front shoe on both sides.



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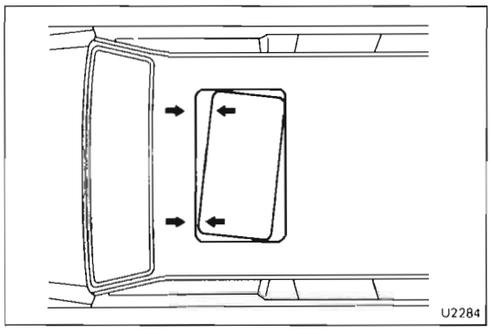


NOTE: When the sliding roof is fully closed, confirm that the front shoes are in contact with the stopper.



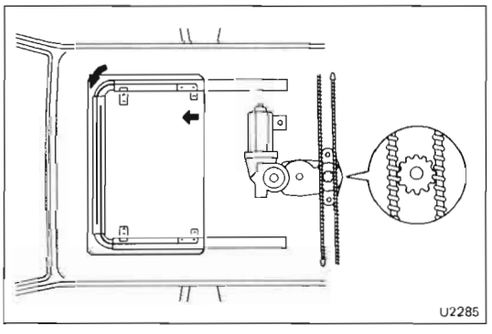
4. TO ADJUST RIGHT OR LEFT

Adjust by loosening the rear shoe bolts and moving the sliding roof to the right and left.



5. TO ADJUST CLEARANCE

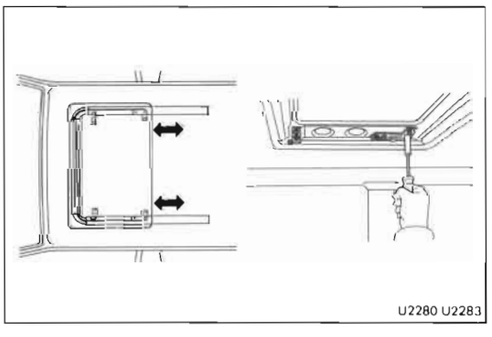
(Difference in left and right front clearance)



If the difference is about 2 mm (0.08 in.):

(a) Remove the drive motor and shift the cable one notch on the side with the larger clearance.

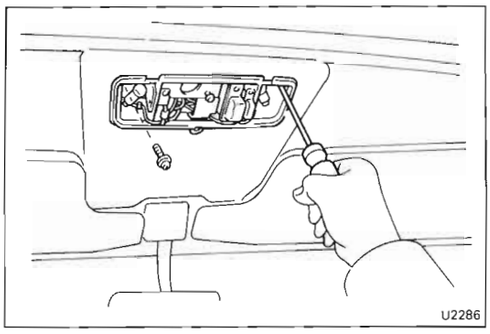
(b) Reinstall the motor.



If the difference is about 1 mm (0.04 in.):

Loosen the rear shoe bolts and readjust the sliding roof to the proper position.

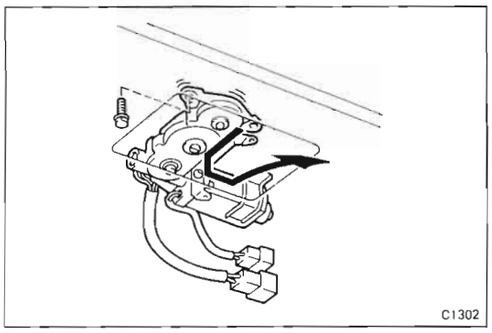
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REMOVAL OF SUN ROOF

(See page BO-34)

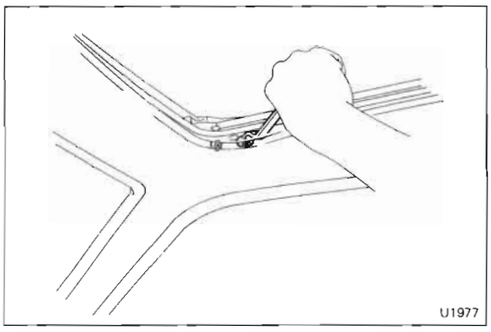
1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL
2. REMOVE SWITCH COVER
3. REMOVE CONTROL SWITCH
4. REMOVE SUN ROOF OPENING TRIM



5. REMOVE DRIVE MOTOR

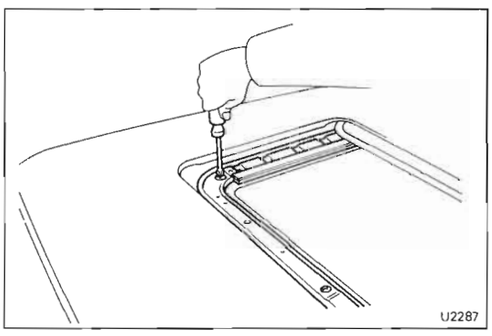
   Remove the three screws and the drive motor.

6. REMOVE WIND DEFLECTOR

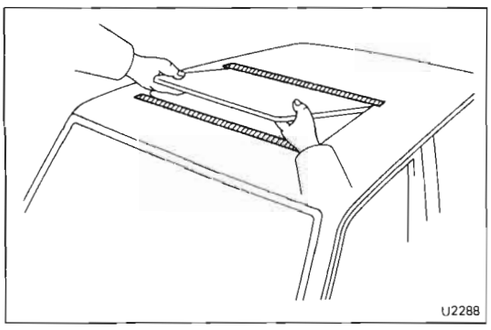


7. REMOVE GUIDE RAIL COVER

   Remove the one bolt from the inside and the two screws from the outside; then remove the guide rail cover.

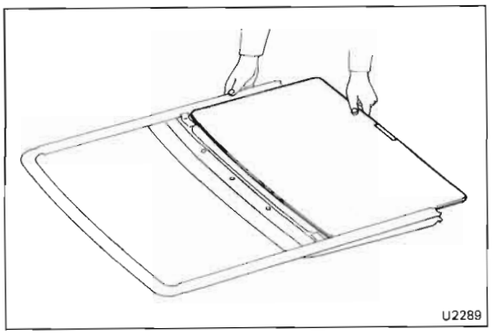


8. REMOVE SLIDING ROOF AND GUIDE RAIL
   (a) Apply adhesive tape to protect the body.
   (b) Remove the four set screws of the cable guide casing.



   (c) Pull the sliding roof with the guide rail upward and forward to remove.

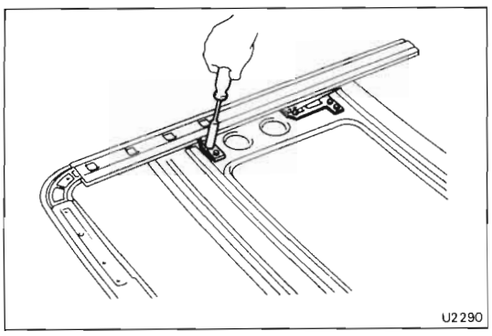
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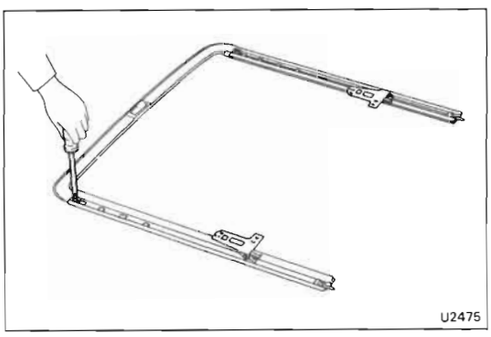
DISASSEMBLY OF SUN ROOF

(See page BO-34)

1. REMOVE SLIDING ROOF HEADLINING
   (a) Pry off the clip.
   (b) Pull the sliding roof headlining rearward to remove.



2. NOTE NUMBER OF SHIMS ON FRONT AND REAR
3. REMOVE TWO FRONT SHOE SET NUTS
4. REMOVE THREE REAR SHOE SET NUTS

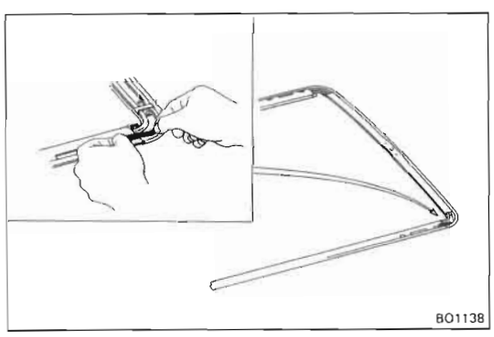


5. REMOVE GUIDE RAIL
   (a) Loosen the screw.
   (b) Pull the guide rail rearward to remove.
6. REMOVE DRIVE CABLES FROM CABLE GUIDE CASING

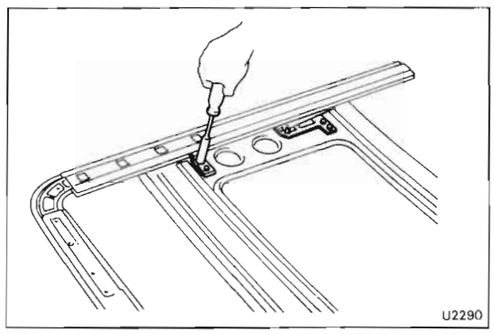
ASSEMBLY OF ROOF

(See page BO-34)

1. APPLY MP GREASE TO DRIVE CABLE
2. PLACE DRIVE CABLES INTO GUIDE CASING
3. INSTALL GUIDE RAILS ON BOTH SIDES
   (a) Install both side guide rails through the rear and front shoes.
   (b) Install the guide rail and cable guide casing with screws.
   (c) Use butyl tape to cover the cut portion of the weatherstrip at the connection between the cable guide case and guide rail.



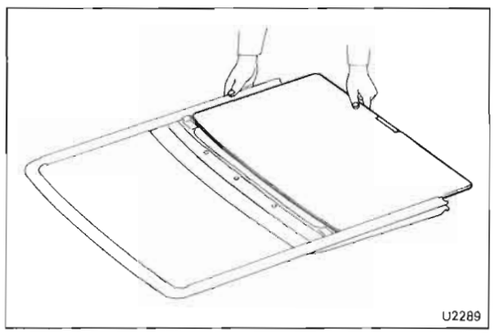
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4. INSTALL FRONT AND REAR SHOES ONTO ROOF PANEL

Install the front and rear shoes and shims to their original positions when disassembled.

NOTE: Now just hand tighten the front shoe bolts. Tighten down the rear shoe bolts.

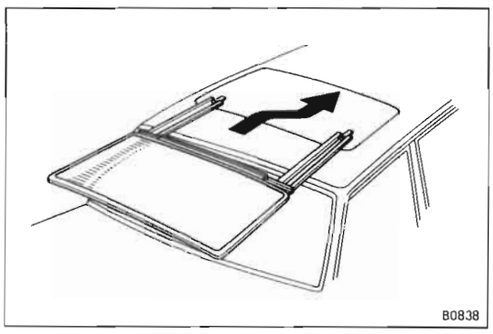


5. ASSEMBLE SLIDING ROOF HEADLINING

Run the headlining through the guide rail and install the clips to the sliding roof.

INSTALLATION OF SUN ROOF

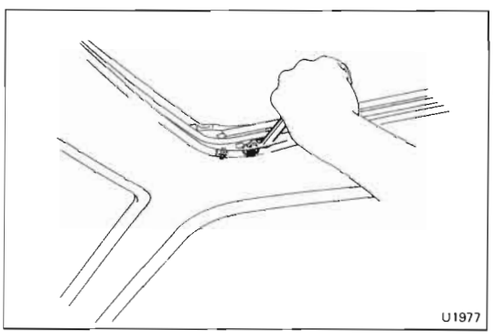
(See page BO-34)



1. INSTALL SLIDING ROOF WITH GUIDE RAIL ONTO ROOF

(a) Install the sliding roof assembly onto the roof.

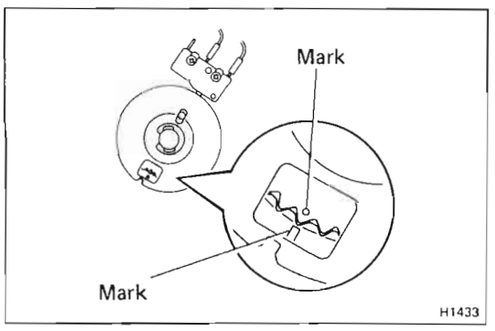
(d) Tighten the four cable guide casing set screws.



2. INSTALL SIDE RAIL COVER

Install the side rail cover from the inside with the one bolt and from the outside with the two screws.

3. INSTALL WIND DEFLECTOR



4. INSTALL DRIVE MOTOR

(a) Fully open the sliding roof.

(b) Peel off tape on motor cam adjusting hole.

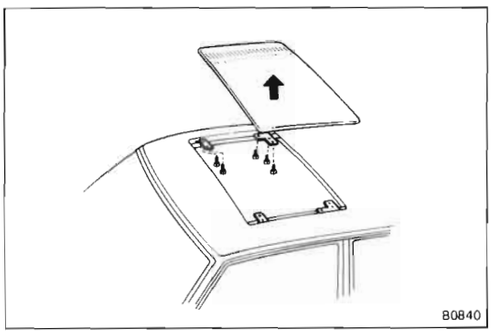
(c) Rotate the drive motor cam and align the housing and cam marks.

(d) Adhere tape to motor cam adjusting hole.

(e) Connect the two connectors and install the drive motor with the three bolts.

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5. INSTALL SUN ROOF OPENING TRIM
6. ADJUST SLIDING ROOF OPERATION
7. INSTALL CONTROL SWITCH
8. INSTALL CENTER COVER
9. CONNECT BATTERY CABLE TO NEGATIVE TERMINAL



REMOVAL OF SLIDING ROOF PANEL

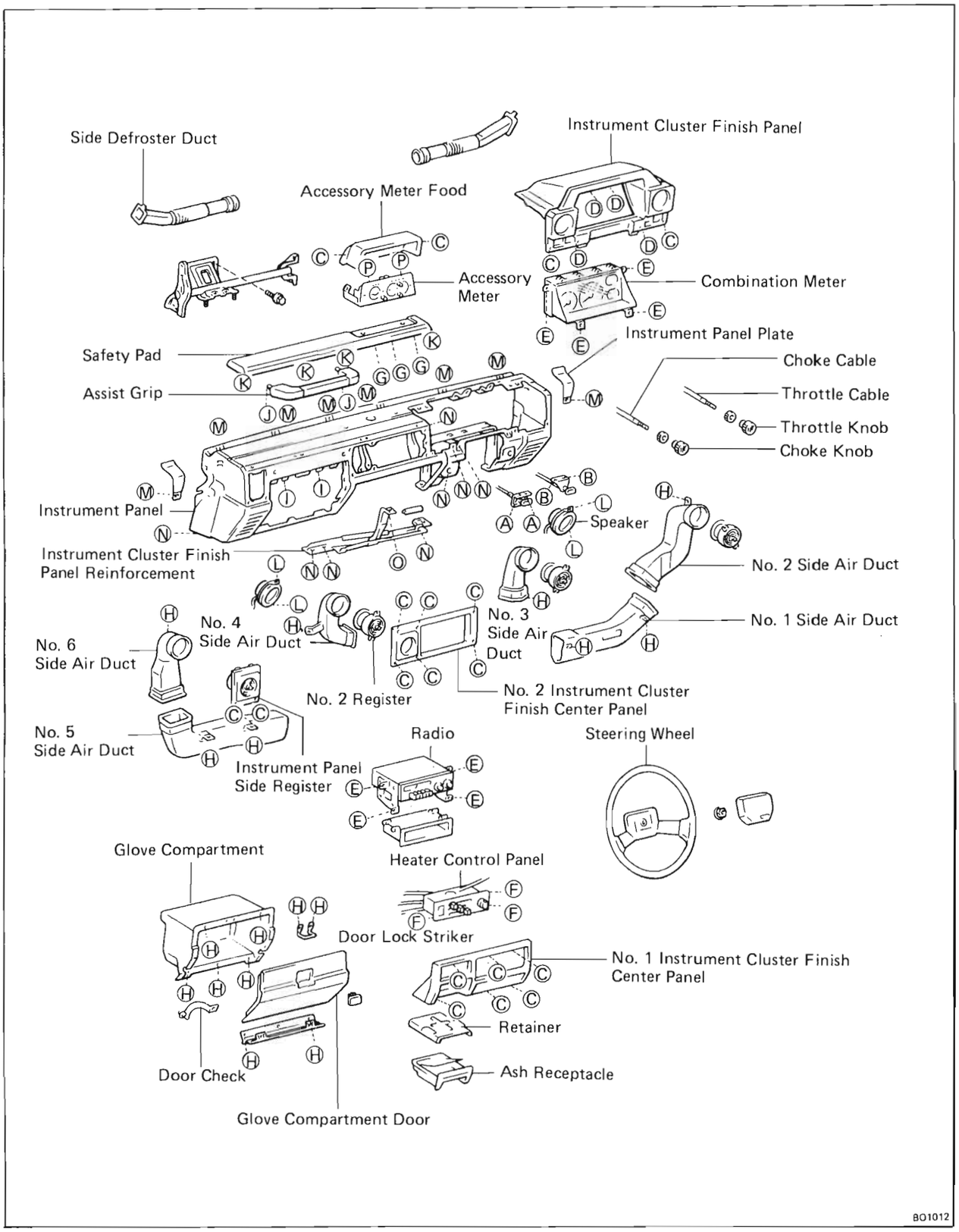
TO REMOVE ONLY SLIDING ROOF PANEL

(a) Pull loose the clips and slide the headlining rearward.
(b) Remove the front and rear shoe bolts.
(c) Remove the roof panel.

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INSTRUMENT PANEL

COMPONENTS



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NOTE: Screw sizes are indicated by following the code below for removal and installation of instrument panel.

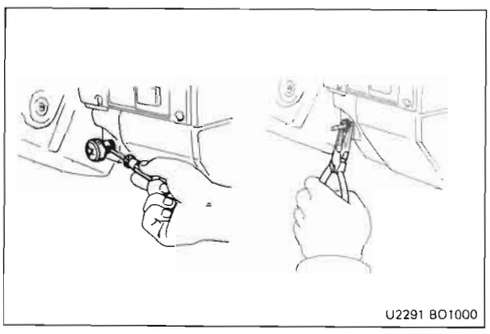
Code	Shape	Code	Shape	Code	Shape
A	φ 6 L = 16	G	φ 6	L	φ 6
B	φ 6 L = 16	H	φ 5 L = 16	M	φ 6 L = 20
C	φ 5 L = 16	I	φ 6 L = 16	N	φ 6 L = 20
D	φ 5 L = 25	J	φ 6	O	φ 6 L = 10
E	φ 5 L = 16	K	φ 6 L = 14	P	φ 6 L = 14
F	φ 5 L = 12				

BO0960

REMOVAL OF INSTRUMENT PANEL

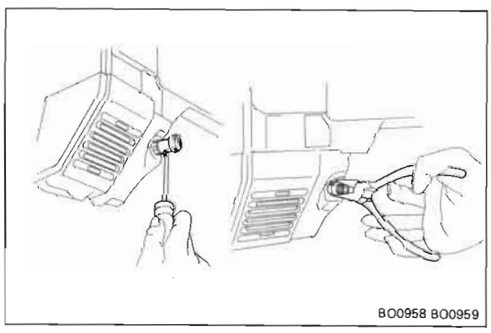
(See page BO-41)

1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL
2. REMOVE STEERING WHEEL
3. REMOVE STEERING COLUMN COVER



U2291 BO1000

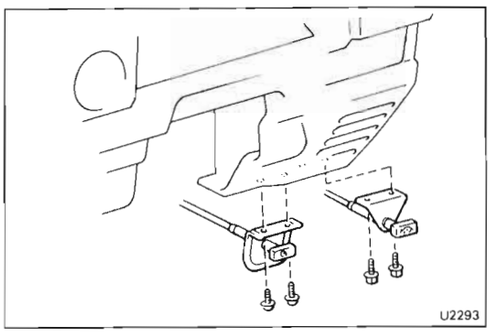
4. REMOVE THROTTLE CABLE
   (a) Using a screwdriver, push in the throttle cable packing and pull off the knob.
   (b) Remove the throttle cable set nut and the cable.



BO0958 BO0959

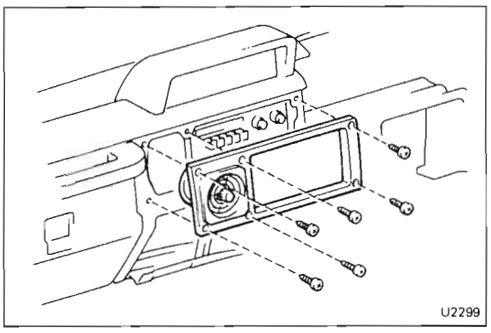
5. REMOVE CHOKE CABLE
   (a) Using a screwdriver, loosen the choke knob set screw and remove the knob.
   (b) Remove the choke cable set nut and the cable.

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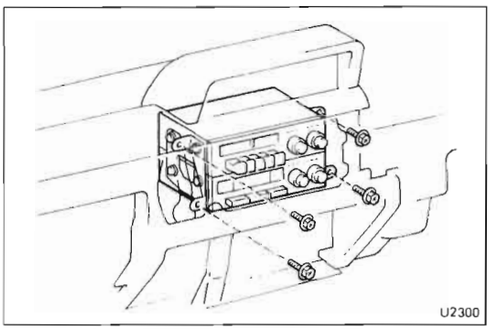


6. REMOVE HOOD LOCK RELEASE LEVER

7. REMOVE FUEL LID OPENER



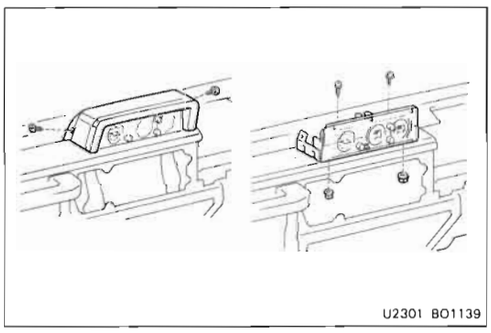
8. REMOVE NO. 2 INSTRUMENT CLUSTER FINISH CENTER PANEL



9. REMOVE RADIO AND STEREO

(a) Remove the four screws.

(b) Disconnect the connector and antenna cable, then remove the radio.

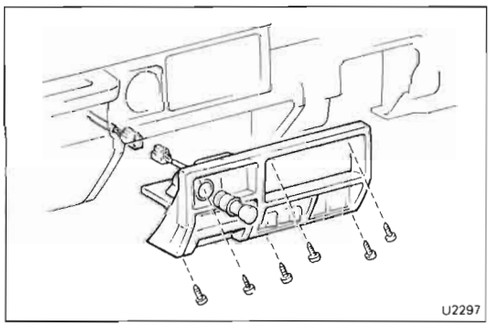


10. REMOVE ACCESSORY METER

(a) Remove the two screws and the hood.

(b) Disconnect the connector, then remove the two nuts and two screws.

(c) Remove the accessory meter.

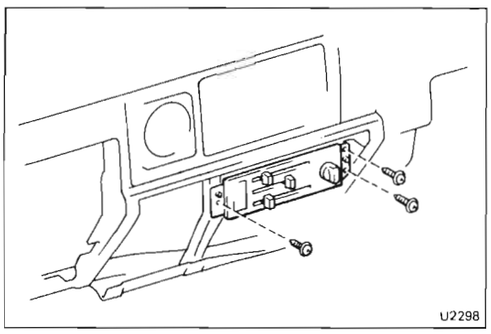


11. REMOVE NO. 1 INSTRUMENT CLUSTER FINISH CENTER PANEL

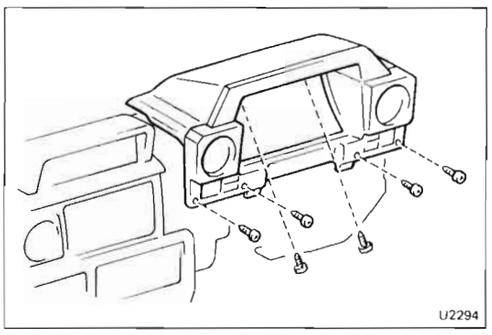
(a) Remove the six screws.

(b) Remove the connectors and the panel.

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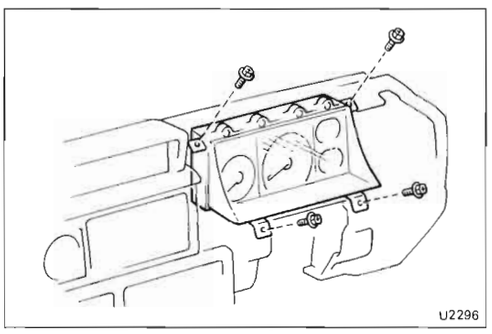
12. REMOVE HEATER CONTROL PANEL



13. REMOVE INSTRUMENT CLUSTER FINISH PANEL

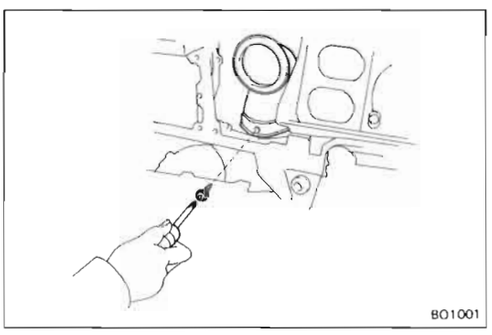
(a) Remove the six screws.

(b) Disconnect the connectors and warning valves, then remove the finish panel.



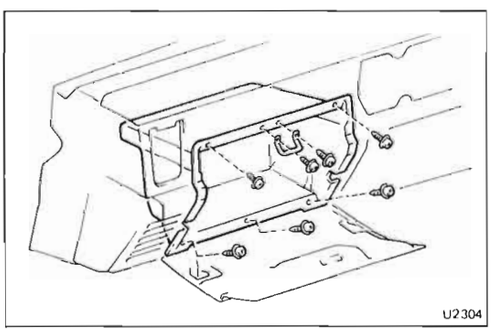
14. REMOVE COMBINATION METER

(a) Remove the four screws.



(b) Remove the No. 3 side air duct.

(c) Reach in from where the No. 3 side air duct has been removed and disconnect the speedometer cable and the two connectors. Remove the combination meter.

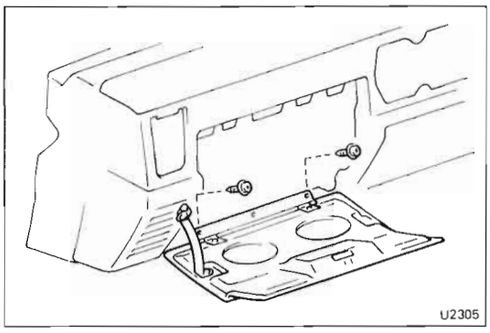


15. REMOVE GLOVE COMPARTMENT

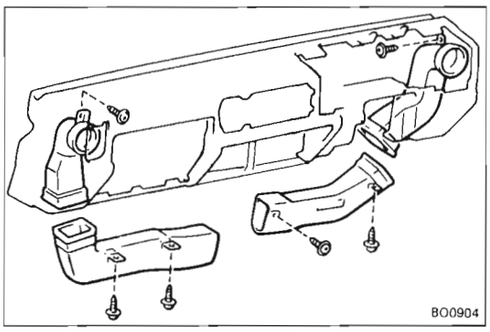
(a) Remove the two screws and the door lock striker.

(b) Remove the five screws and the glove compartment.

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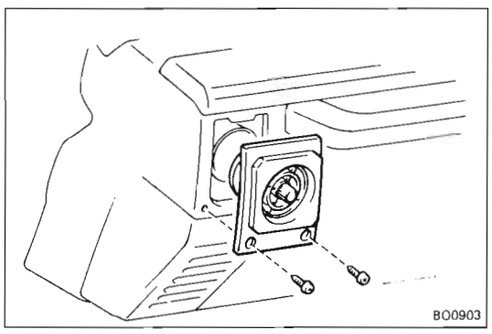


16. REMOVE GLOVE COMPARTMENT DOOR



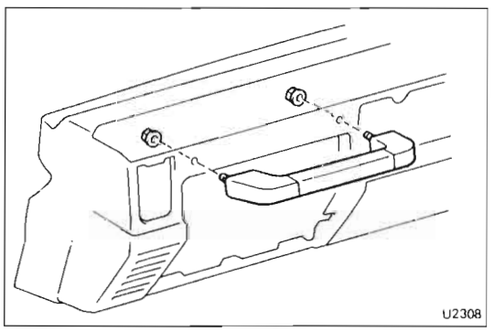
17. REMOVE SIDE AIR DUCT

NOTE: The No. 4 side air duct must be removed.

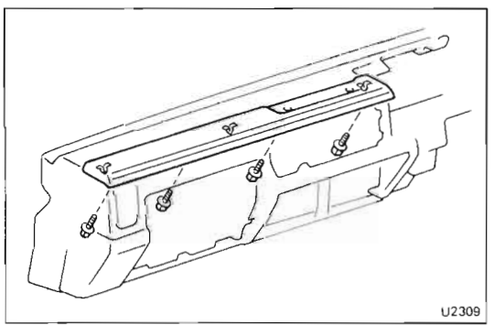


18. REMOVE INSTRUMENT PANEL SIDE REGISTER

19. REMOVE BOTH SIDE DEFROSTER DUCTS



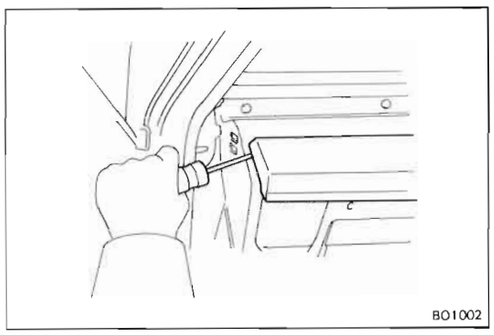
20. REMOVE ASSIST GRIP



21. REMOVE SAFETY PAD

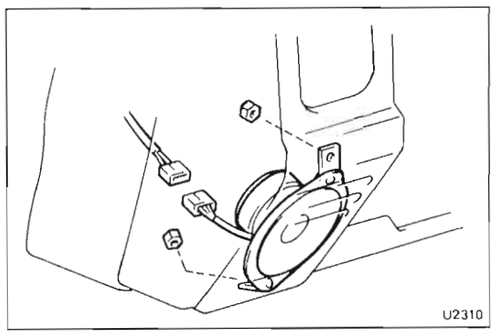
(a) Remove the four screws.

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(b) Using a screwdriver, pry up the safety pad and remove it with the three clips.

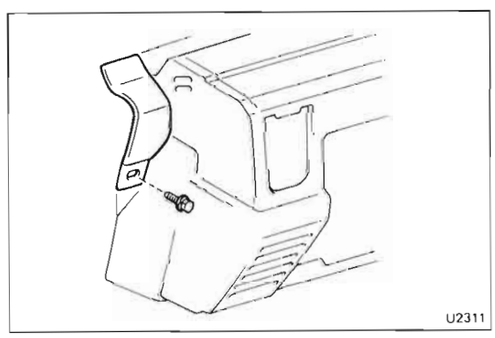
NOTE: Tape a screwdriver tip before use.



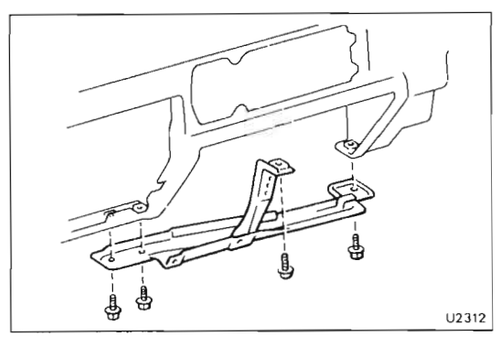
22. REMOVE BOTH SPEAKERS

(a) Disconnect the connector.

(b) Remove the two nuts and the speaker.

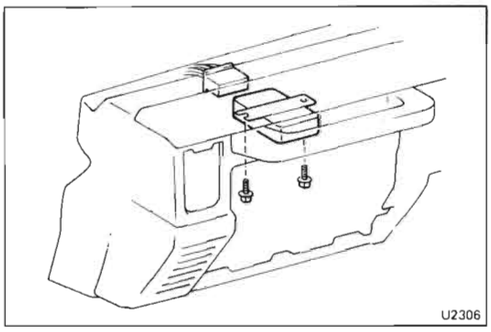


23. REMOVE BOTH INSTRUMENT PANEL PLATES



24. REMOVE INSTRUMENT CLUSTER FINISH PANEL REINFORCEMENT

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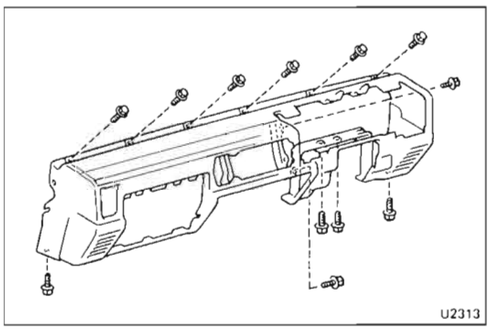
25. REMOVE INSTRUMENT PANEL

(a) Remove the following parts:
(EC)
- Red indicator relay
- Rear fog light relay
- Pre-heating timer (LJ)
- Running light relay (Norway)

(Saudi Arabia)
- Emission control
- Seat belt warning buzzer

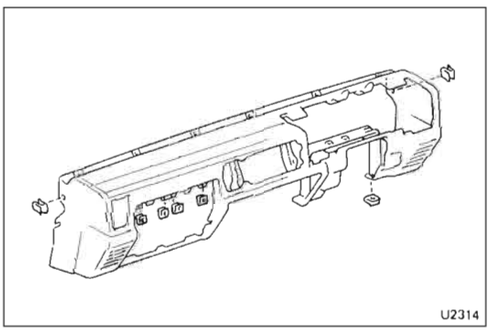
(Australia)
- Emission control
- Pre-heating timer (LJ)

(b) Remove the three wiring harness clamps from the instrument panel.



(c) Remove the steering column upper support.

(d) Remove the twelve bolts and the instrument panel.



26. REMOVE FOLLOWING PARTS FROM INSTRUMENT PANEL

- Two clips
- Five spring nuts

INSTALLATION OF INSTRUMENT PANEL

(See page BO-41)

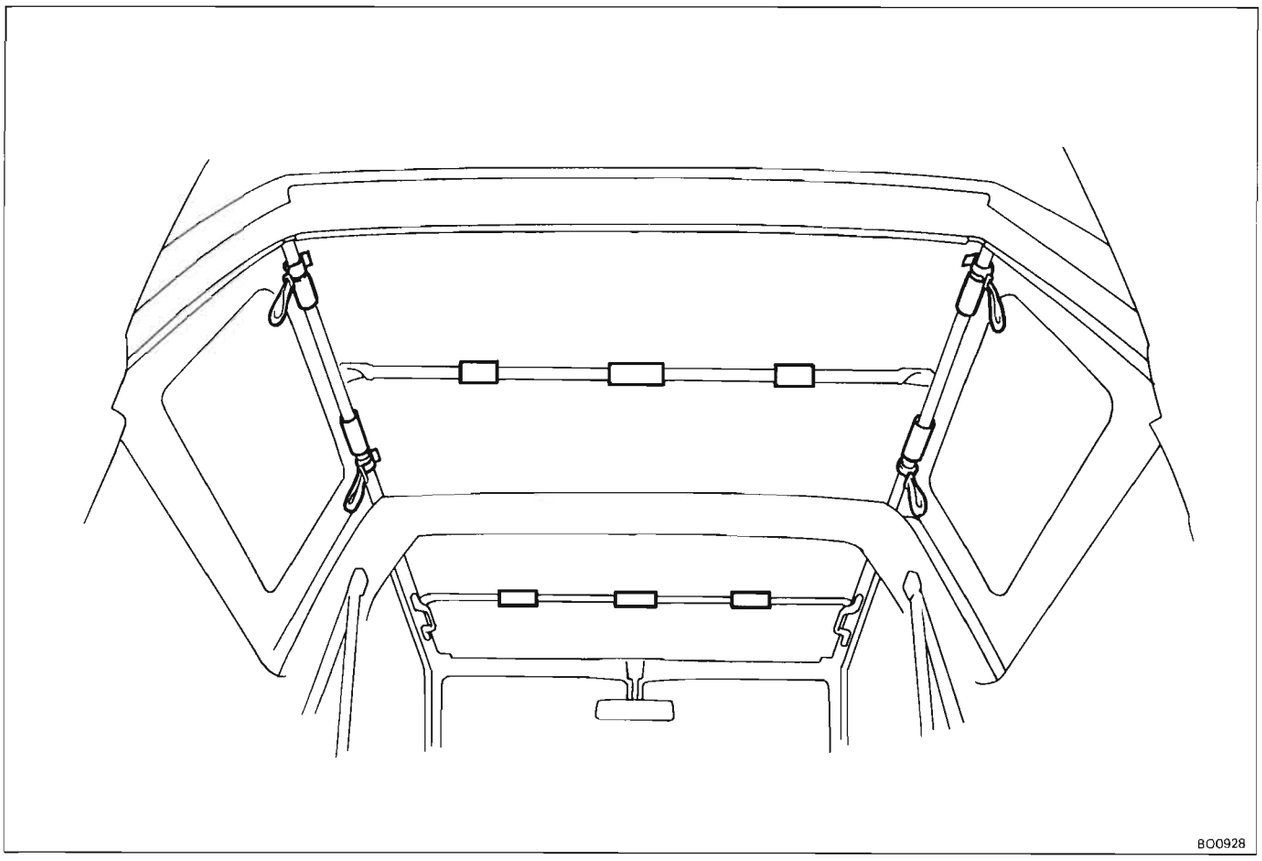
INSTALL INSTRUMENT PANEL IN REVERSE SEQUENCE OF REMOVAL

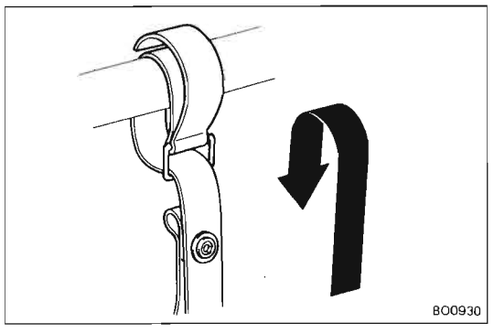
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TARPAULIN

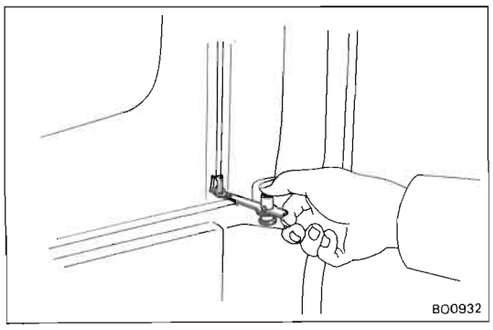
REMOVAL OF TARPAULIN

1. UNPEEL TEN STRIPS OF MAGIC TAPE AROUND TARPAULIN BOW





2. RELEASE FOUR BELTS (TWO EACH SIDE) WRAPPED AROUND TARPAULIN SPARS

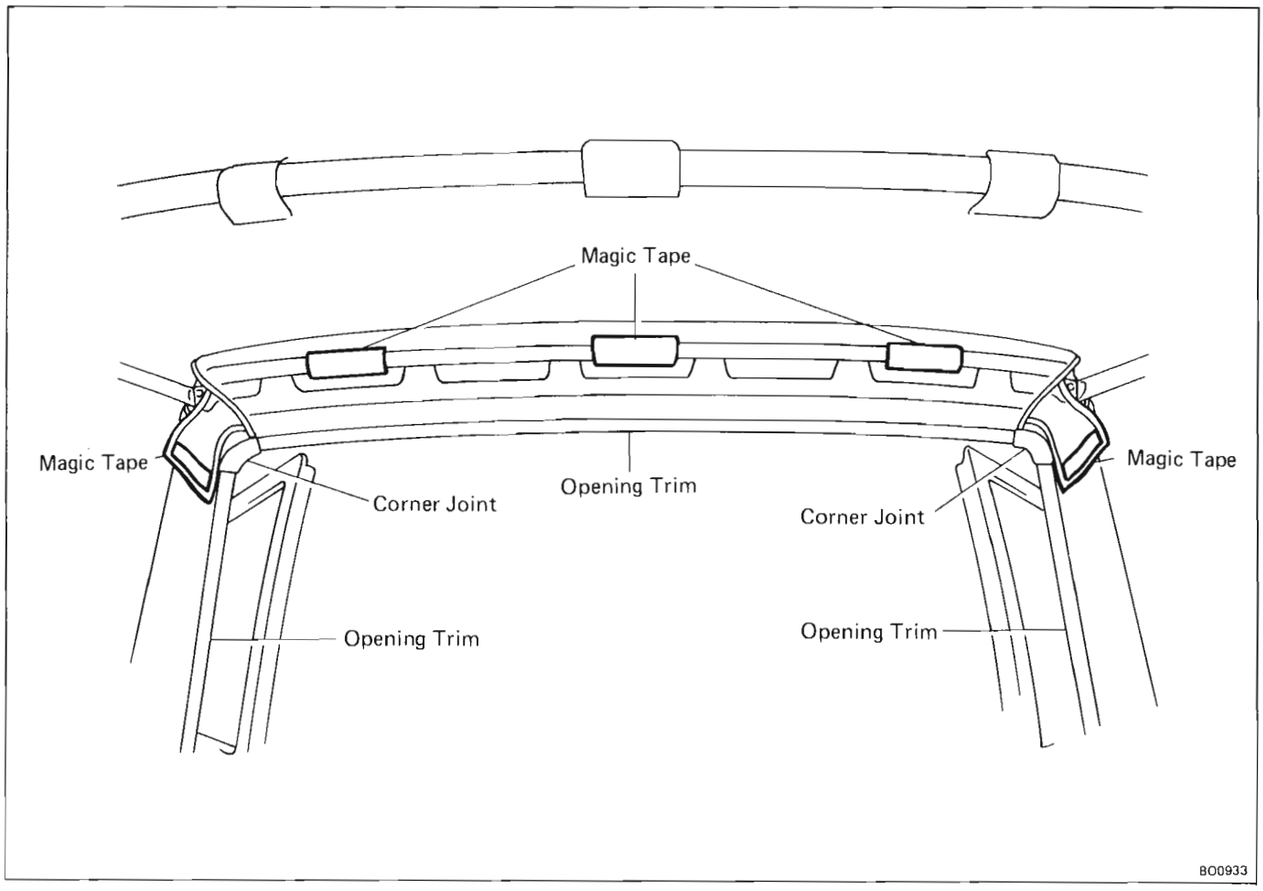


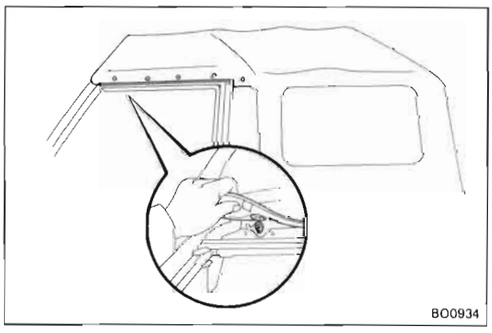
3. UNZIP FOUR ZIPPERS (TWO EACH SIDE)
   Release the burglary prevention cock and unzip the zipper.

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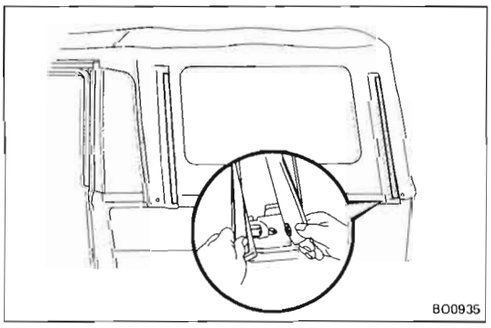
4. REMOVE TWO BACK DOOR OPENING TRIM CORNER JOINTS AND THREE OPENING TRIMS

5. UNPEEL FIVE STRIPS OF MAGIC TAPE ABOVE BACK DOOR



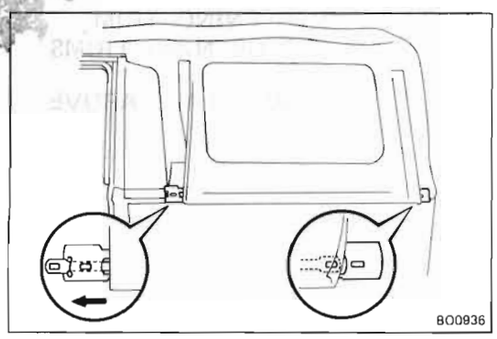


6. DISCONNECT ROOF SIDE RAIL AS WELL AS TEN SNAPS (FIVE EACH SIDE)



7. UNPEEL TWELVE STRIPS OF MAGIC TAPE OUTSIDE VEHICLE (SIX EACH SIDE), AND UNHOOK FOUR SNAPS (TWO EACH OUTSIDE)

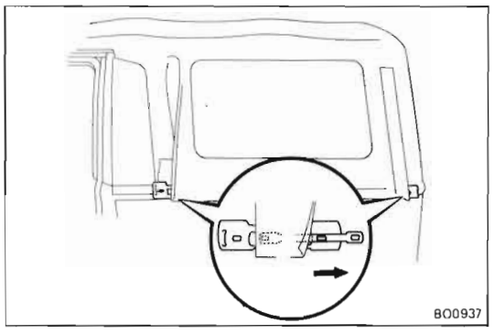
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BO0936

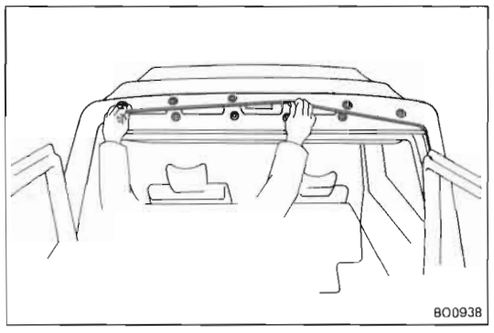
8. FREE BOTH SIDEWALL PIPES FROM SIDEWALLS OF TARPAULIN

(a) Disconnect both ends of the pipe from the hooks.

(b) From the back end of the pipe, push the pipe forward so the opposite end protrudes a few inches from the service notch and the back end slides out of the service hole.

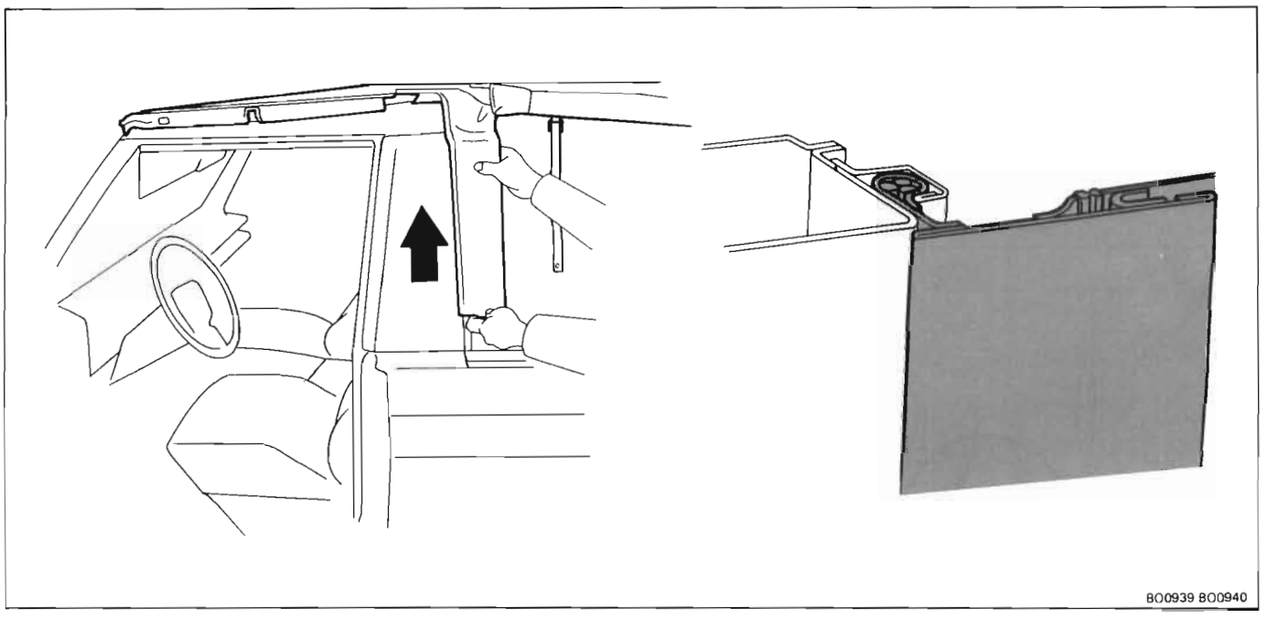

BO0937

(c) Pull the pipe out by the back end.


BO0938

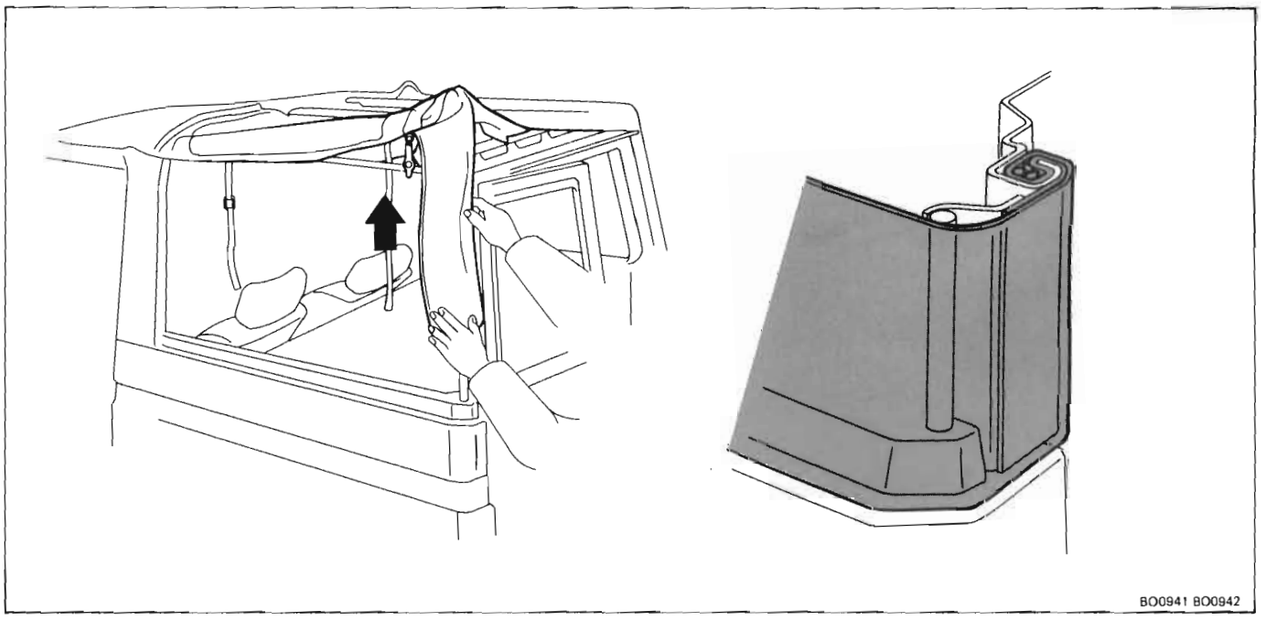
9. DISCONNECT SIX SNAPS ABOVE BACK DOOR

10. SLIDE BOTH WATER SEALS UP AND OUT OF ROLL BAR SIDE CHANNEL

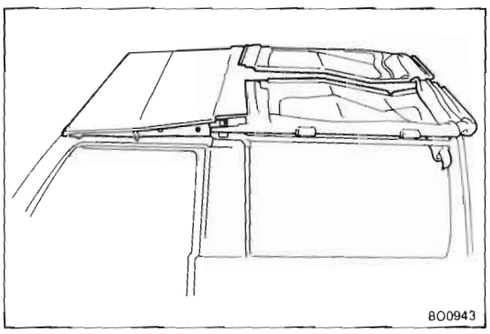

BO0939 BO0940

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11. SLIDE BOTH WATER SEALS UP AND OUT OF REAR PILLAR CHANNEL

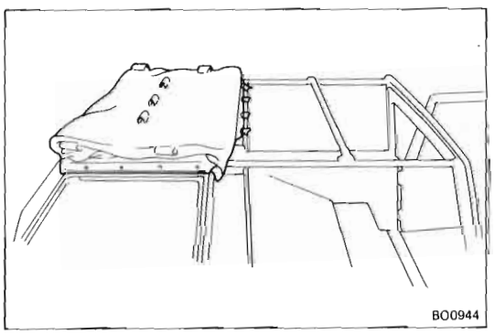


BO0941 BO0942



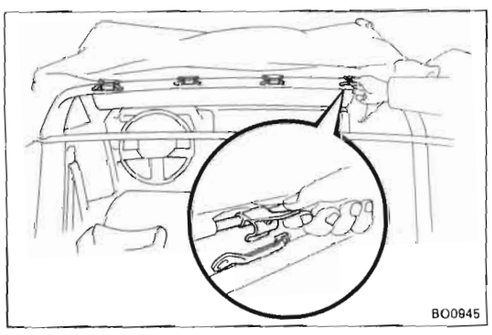
BO0943

12. FLIP UP SIDEWALL ONTO ROOF, ABOVE CARGO COMPARTMENT



BO0944

13. FLIP FOLDED BACK HALF OF TARPAULIN ONTO ROOF ABOVE DRIVER'S COMPARTMENT

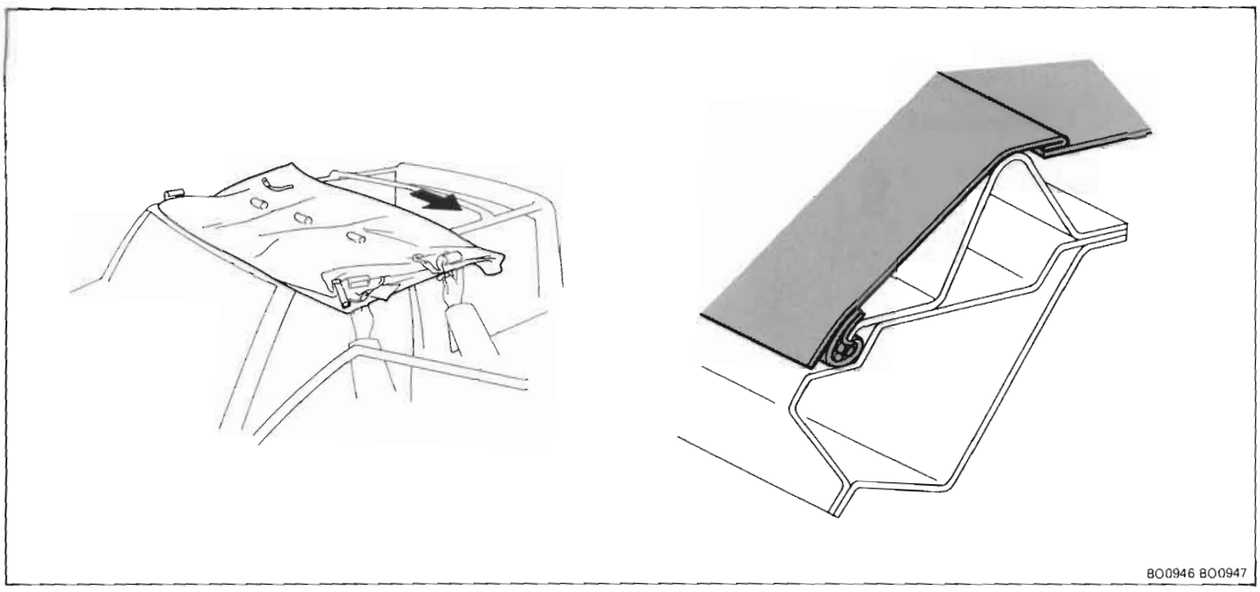


BO0945

14. DISCONNECT FOUR CLIPS ABOVE BACK SIDE OF ROLL BAR

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15. SLIDE WHOLE TARPAULIN TO EITHER VEHICLE RIGHT OR LEFT TO FREE FRONT WATER SEAL AND REMOVE TARPAULIN



BO0946 BO0947

INSTALLATION OF TARPAULIN

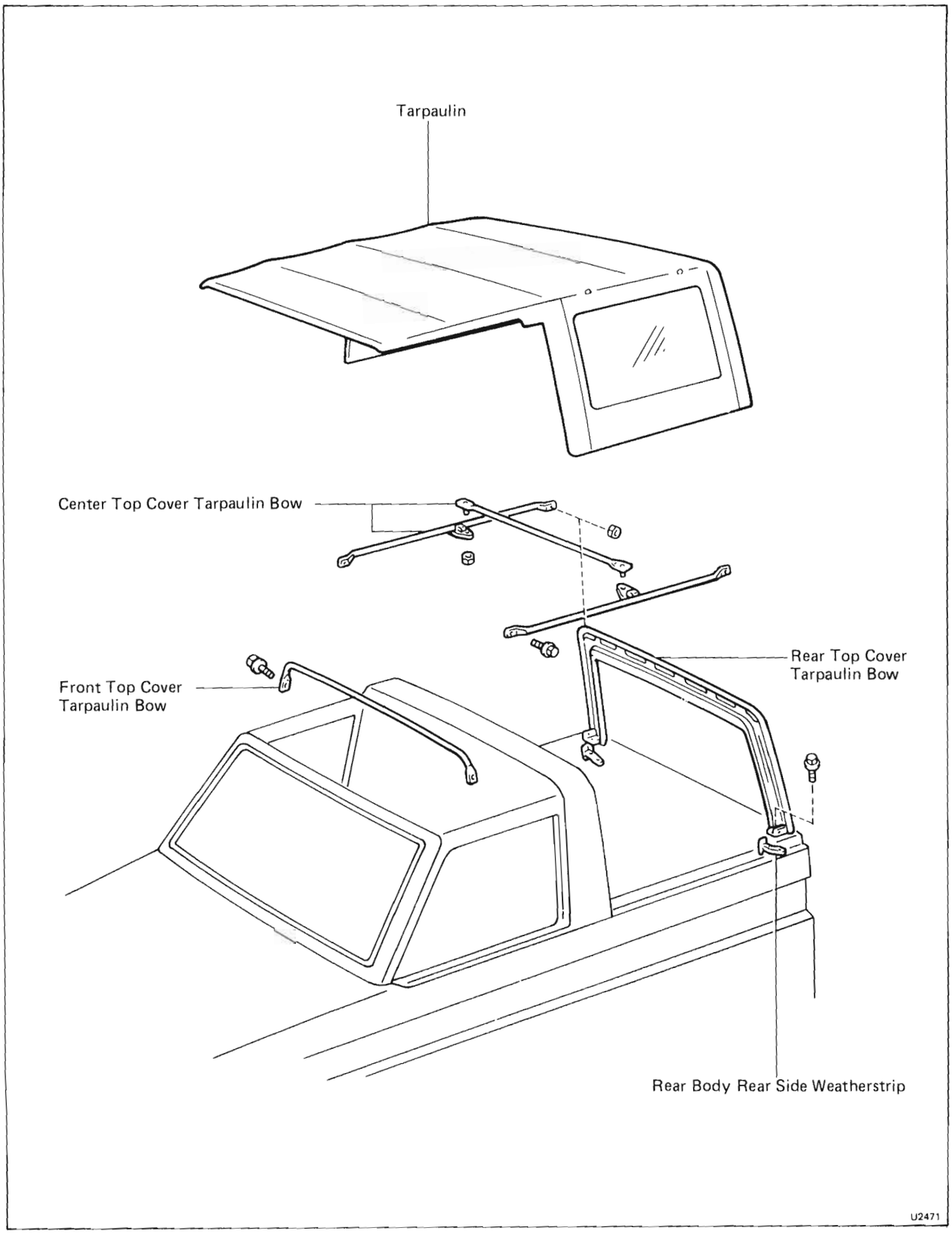
INSTALL TARPAULIN IN REVERSE SEQUENCE OF REMOVAL

NOTE: Before installing the tarpaulin, adjust the front and back doors positioning.

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TARPAULIN BOW

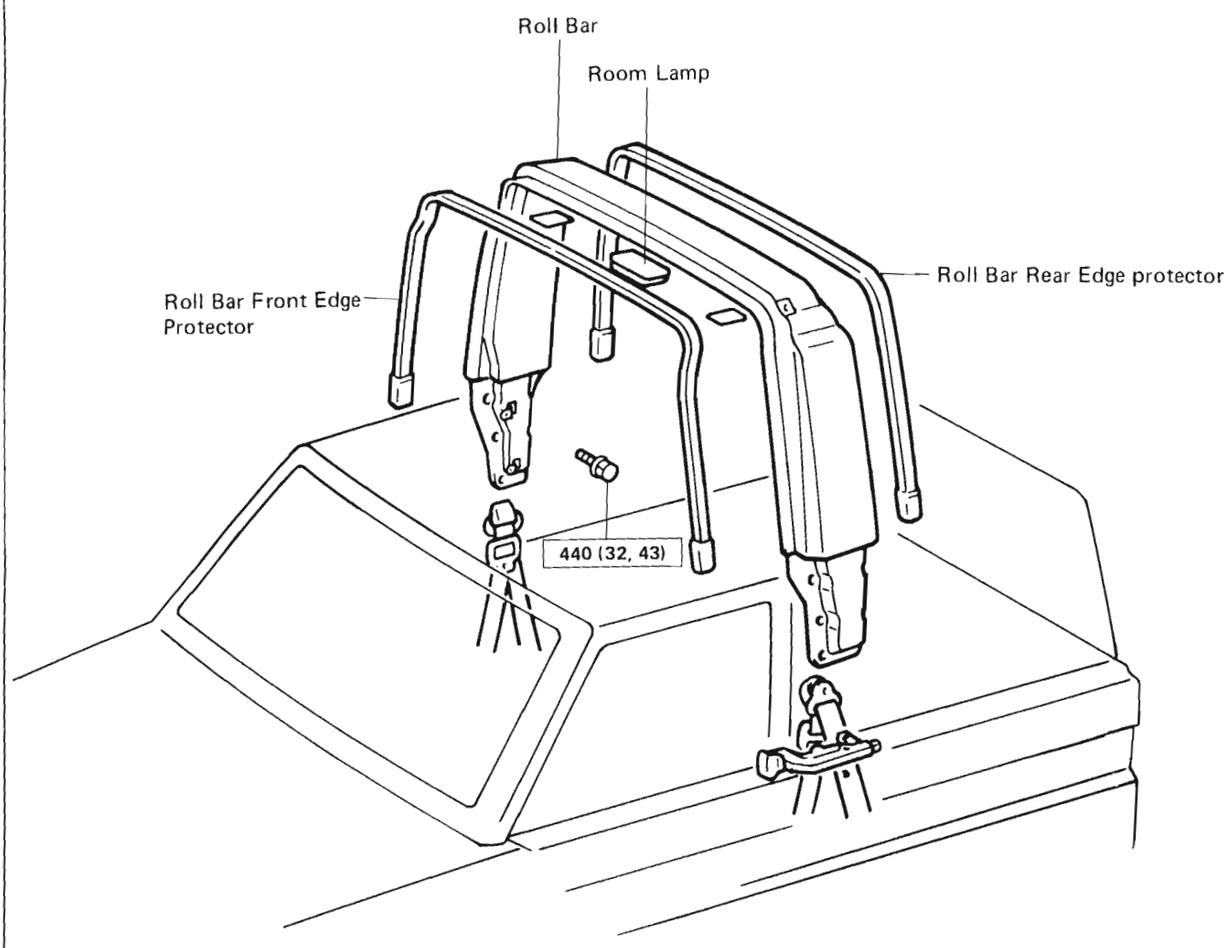
COMPONENTS



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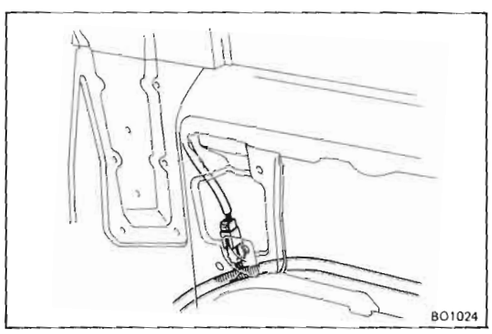
ROLL BAR

COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

BO1022



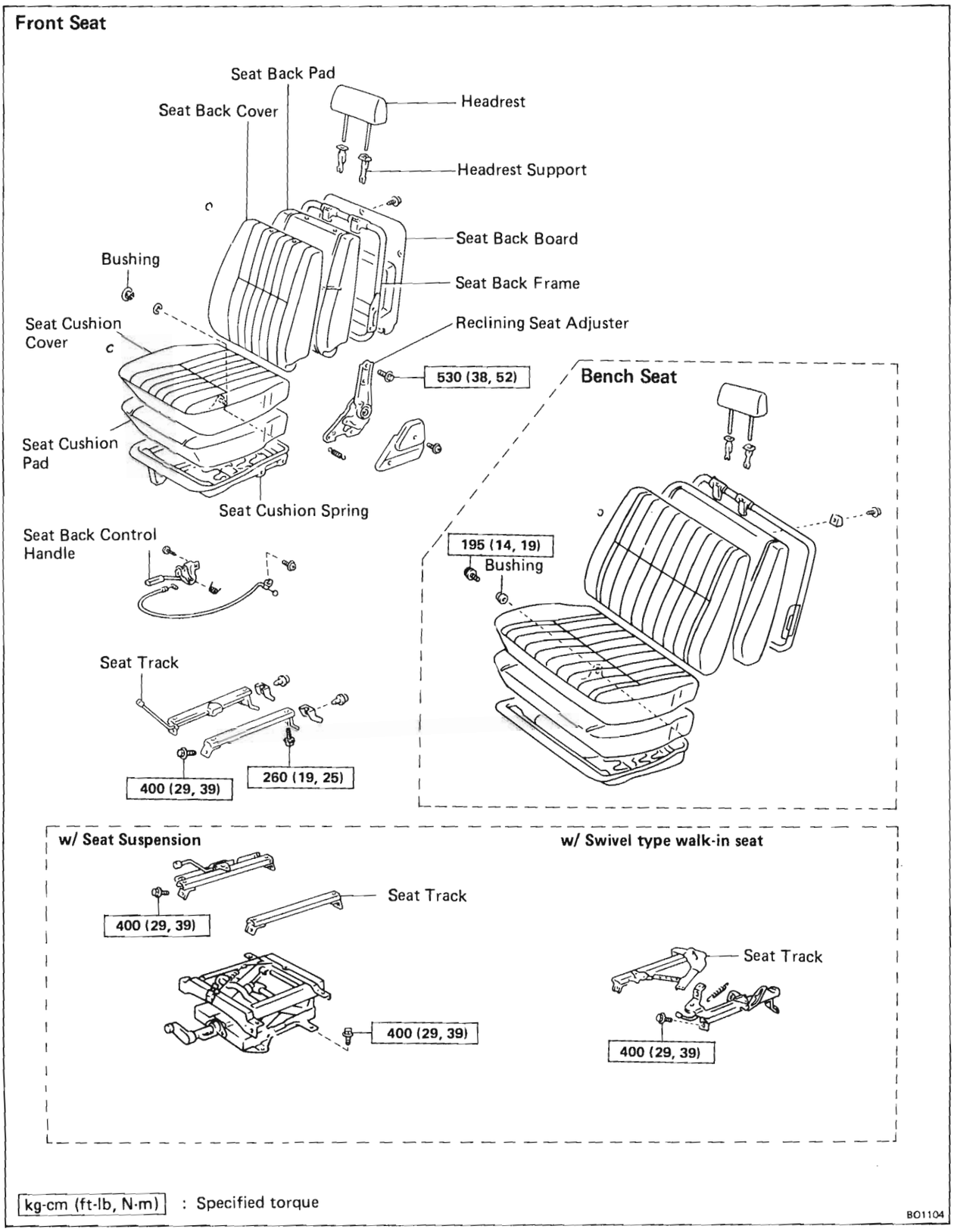
BO1024

NOTE: Remove the roll bar after disconnecting the wire harness for the room lamp inside the right quarter rim.

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SEAT

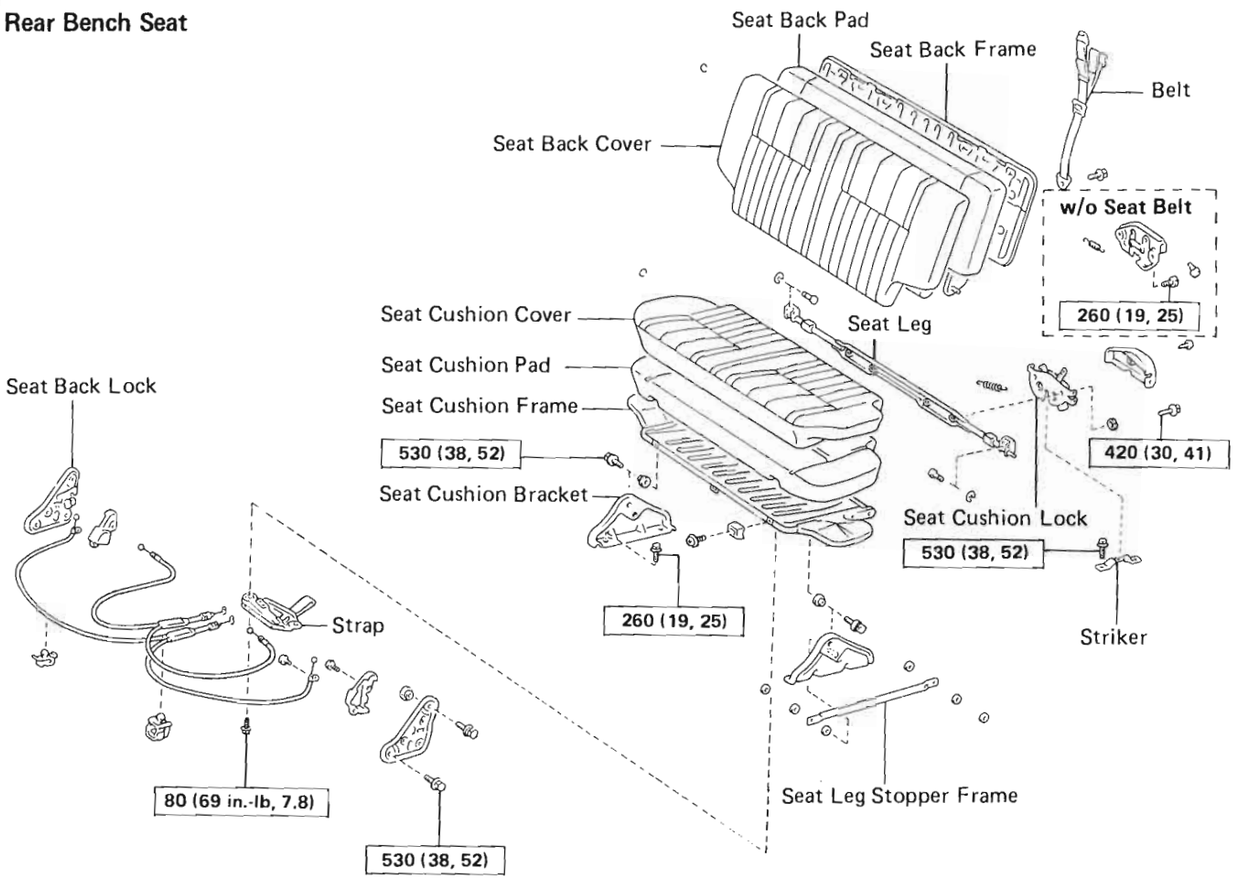
COMPONENTS



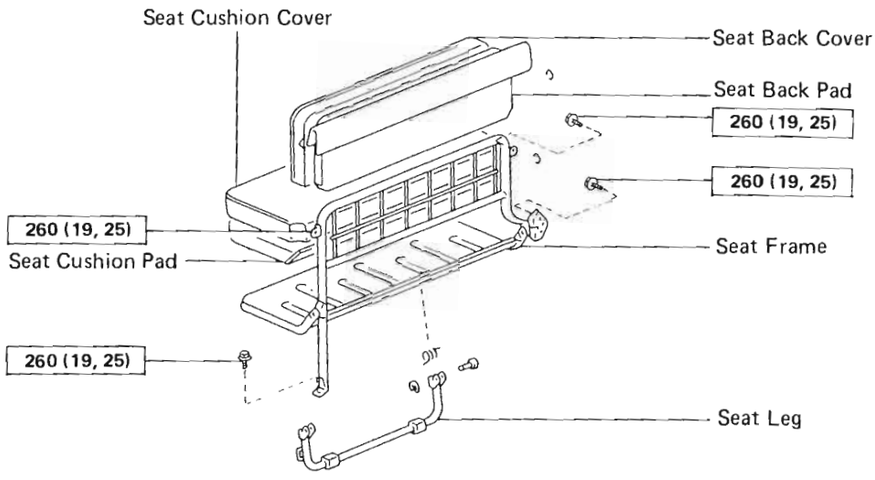
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COMPONENTS (Cont'd)

Rear Bench Seat



Rear Parallel Seat



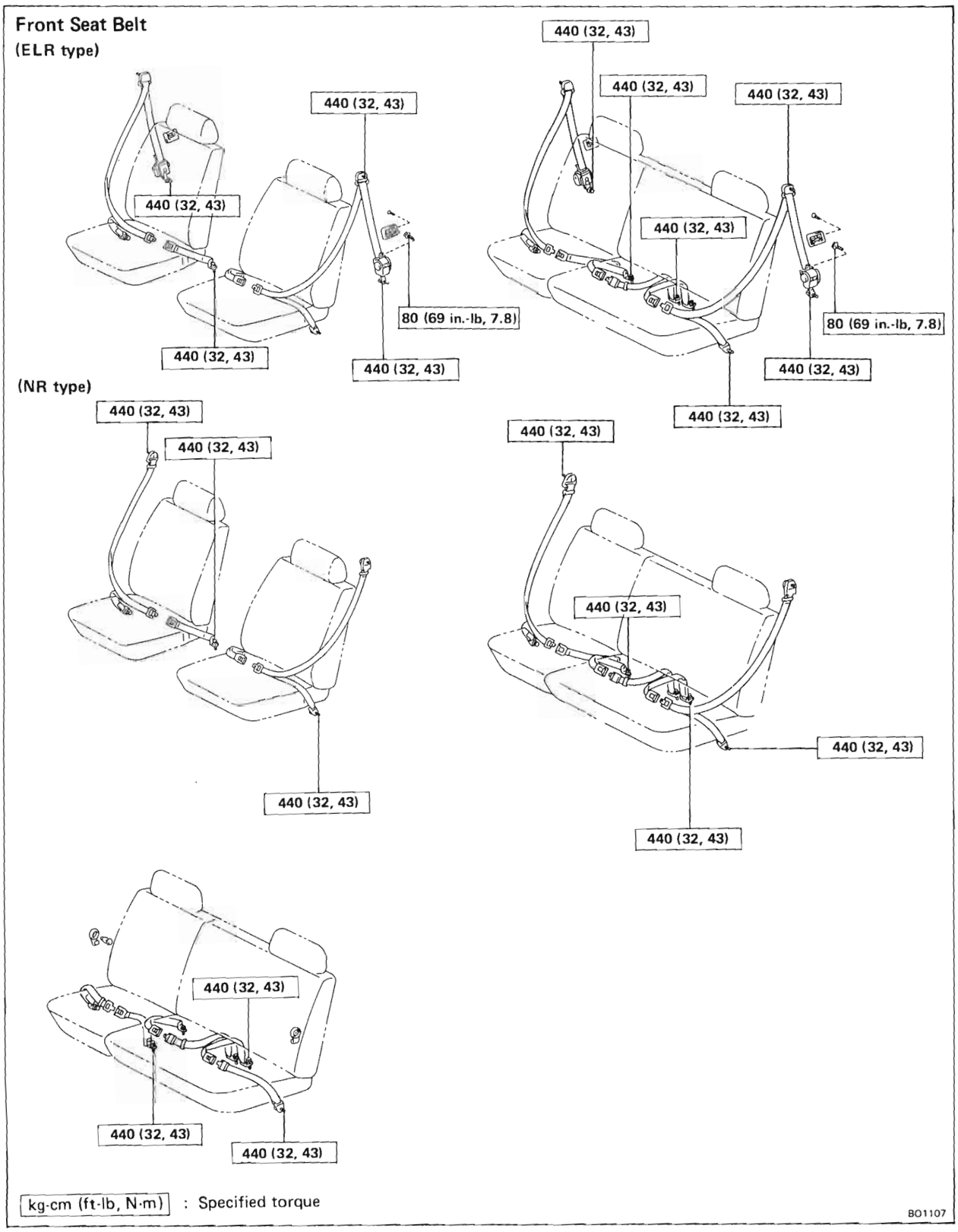
kg-cm (ft-lb, N·m) : Specified torque

BO1105
BO1106

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SEAT BELT

COMPONENTS

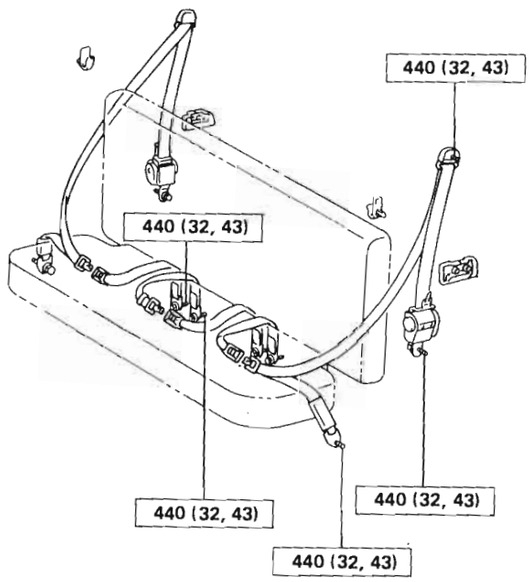


Donated by Onur Azeri . cruisercult.com

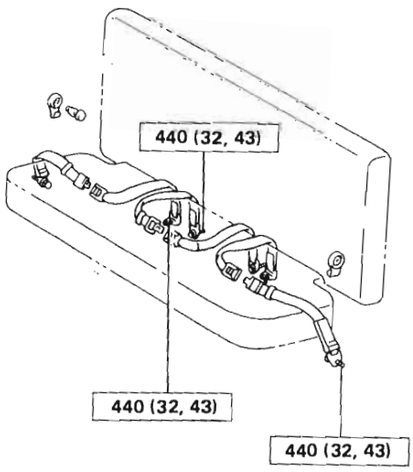
COMPONENTS (Cont'd)

Rear Seat Belt

(ELR type)



(NR type)



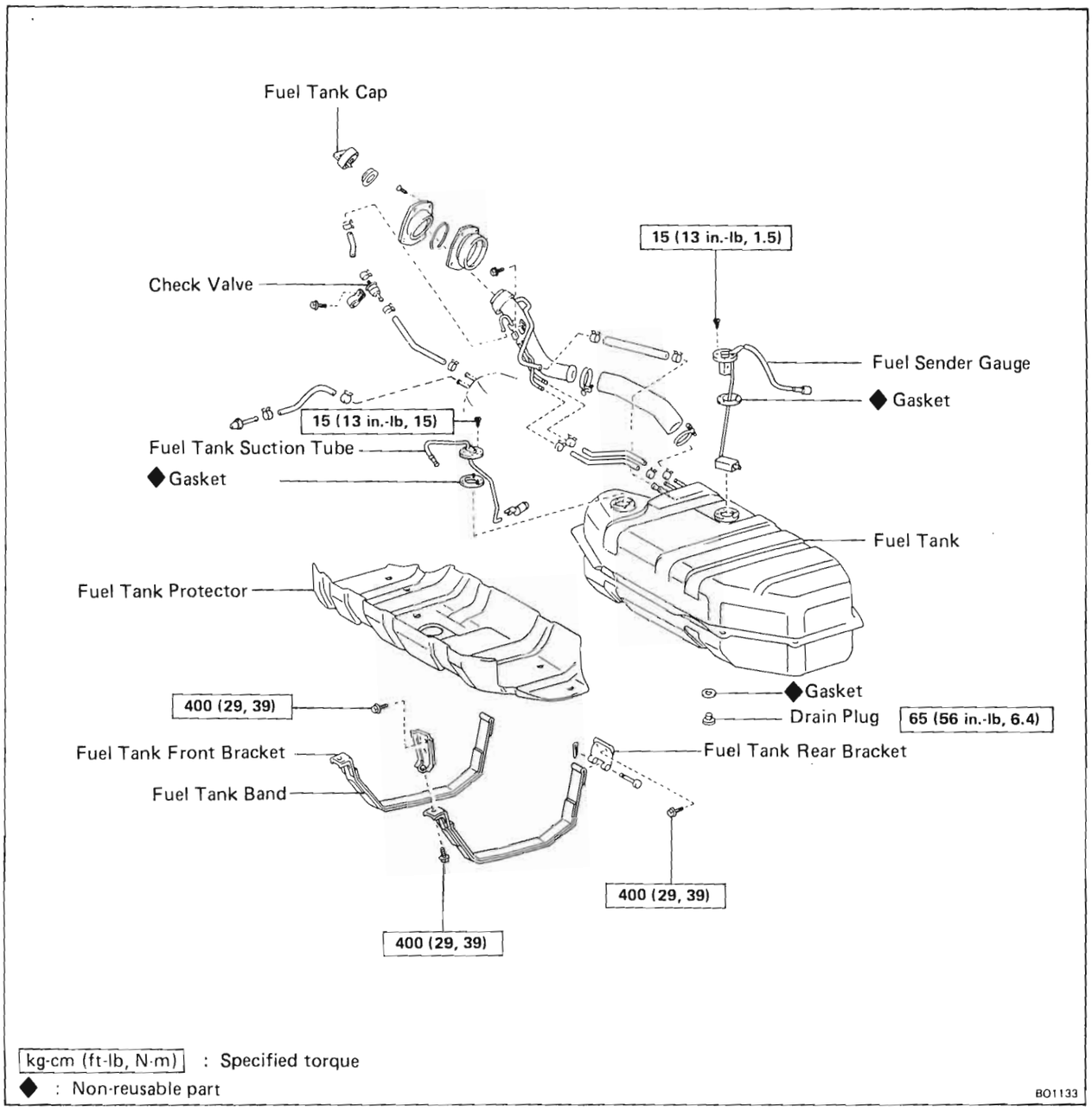
kg·cm (ft·lb, N·m) : Specified torque

BO1108

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FUEL TANK AND LINE

COMPONENTS



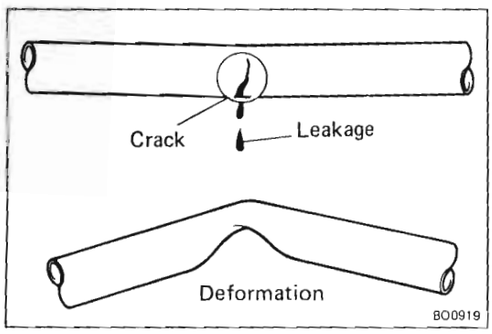
kg-cm (ft-lb, N·m) : Specified torque
◆ : Non-reusable part

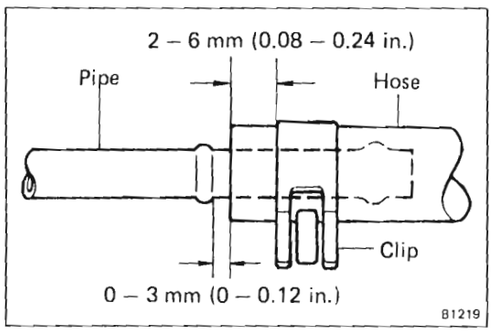
BO1133

PRECAUTIONS

1. Always use new gaskets when replacing the fuel tank or component parts.
2. When re-installing, be sure to include the rubber protectors on the upper surfaces of the fuel tank and tank band.
3. Apply the proper torque to all tightened parts.

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INSPECT FUEL LINES AND CONNECTIONS

(a) Inspect the fuel lines and connections for cracks, leakage or deformation.

(b) Inspect the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

(c) Inspect the fuel tank for deformation, cracks, fuel leakage or tank band looseness.

(d) Inspect the filler neck for damage or fuel leakage.

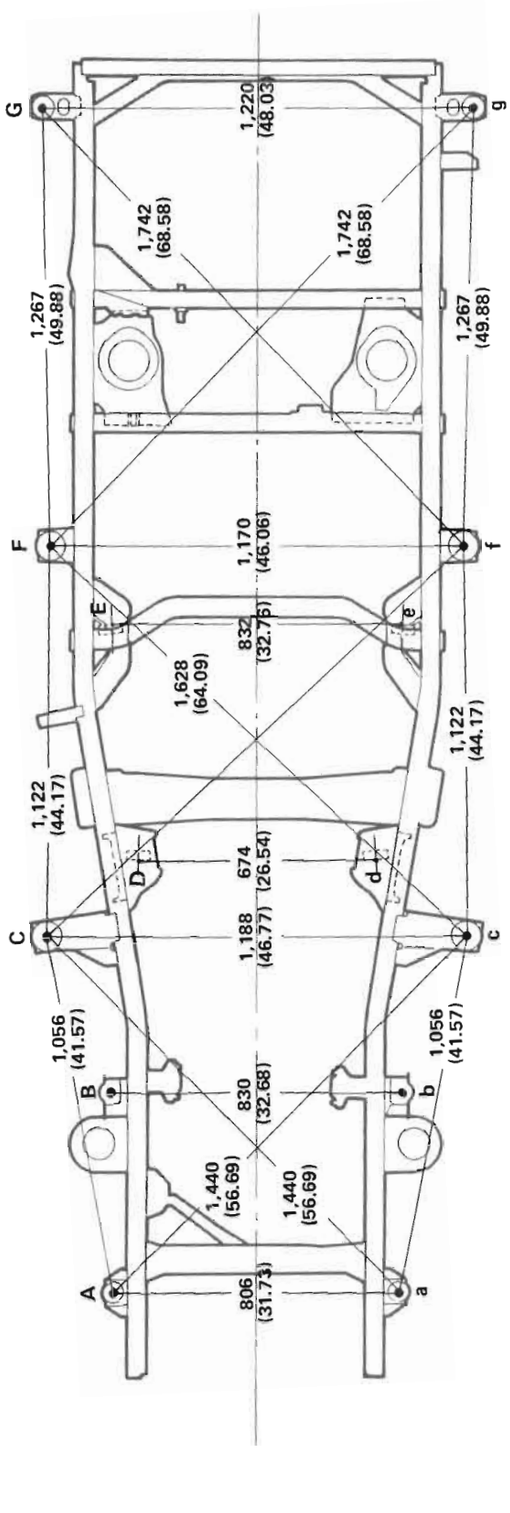
(e) Hose and tube connections are as shown in the illustration.

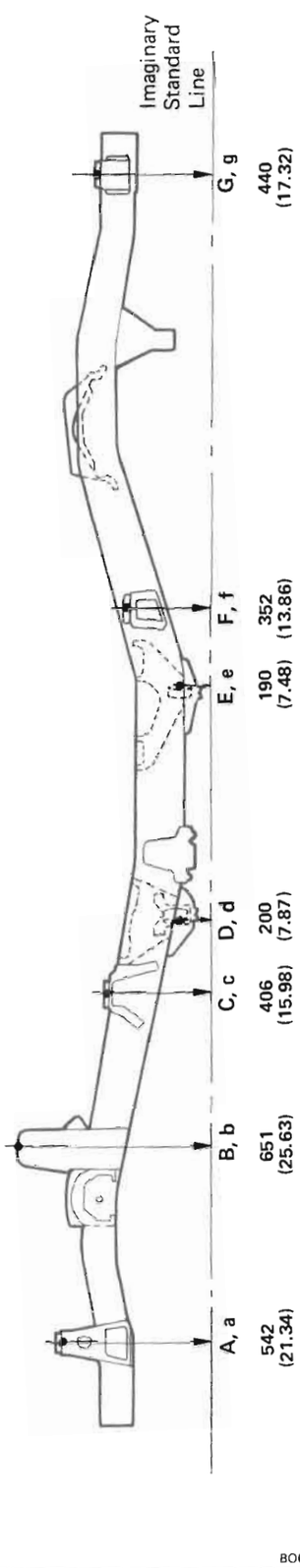
If problem is found, repair or replace parts as necessary.

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FRAME DIMENSIONS

Wheel base	2,310 (90.94)





BO0911

mm (in.)

Symbol	Nomenclature	Hole dia.
A, a	Body mounting hole	24 (0.94)
B, b	Shock absorber installation hole	16 (0.63)
C, c	Body mounting hole	24 (0.94)
D, d	Leading arm installation hole–front side	37 (1.46)

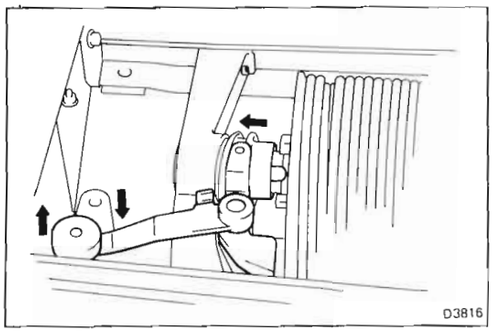
Symbol	Nomenclature	Hole dia.
E, e	Trailing arm installation hole–rearside	37 (1.46)
F, f	Body mounting hole	24 (0.94)
G, g	Body mounting hole	24 (0.94)
–	–	–

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WINCH

	Page
MECHANICAL WINCH	WI-2
Chain Wire	WI-2
Power Take-off (P.T.O)	WI-4
Drive Shaft	WI-12
Winch	WI-22
ELECTRIC WINCH	WI-37
On-Vehicle Inspection	WI-37
Chain Wire	WI-40
Winch	WI-42
Winch Motor with No. 2 Magnet Switch Assembly	WI-58

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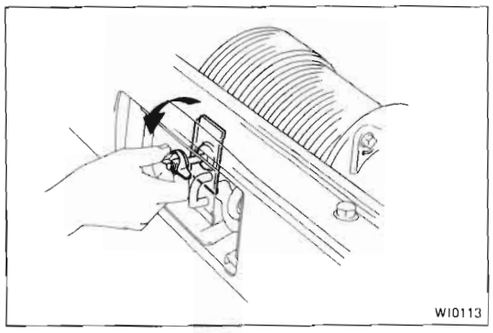
MECHANICAL WINCH

Chain wire

REMOVAL OF CHAIN WIRE

1. REMOVE CHAIN WIRE

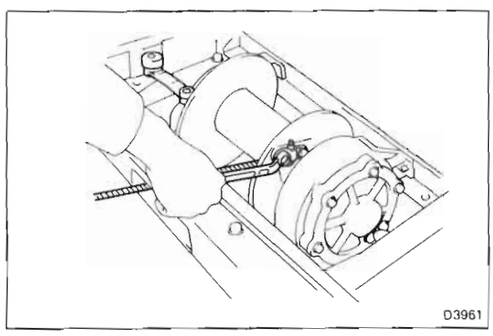
(a) Shift the clutch lever to the free position.



(b) Loosen the wing nut and turn the No. 1 support bracket 90°.

(c) Pull out the No. 1 bracket support together with the chain wire from the drum.

2. REMOVE HOOK HOLDER FROM CHAIN WIRE



3. REMOVE WIRE LOCK

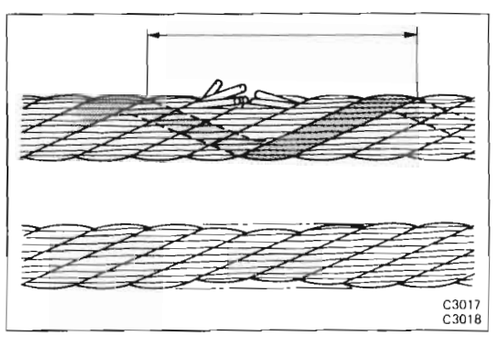
(a) Shift the clutch lever to the lock position.

(b) Remove the two bolts and wire lock.

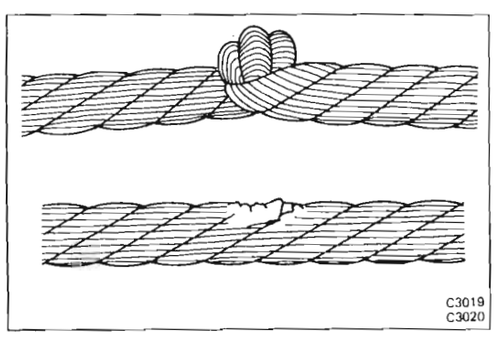
INSPECTION OF CHAIN WIRE

INSPECT CHAIN WIRE

Inspect the chain wire for the following items. If damaged, replace the chain wire.

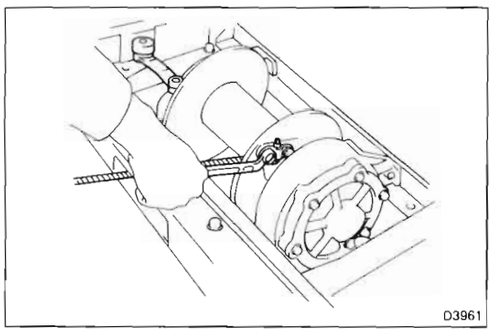


- More than 12 severed strands per wind.
- Wire diameter of less than 7.5 mm (0.295 in.)



- Kinks
- Corrosion
- Fraying

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D3961

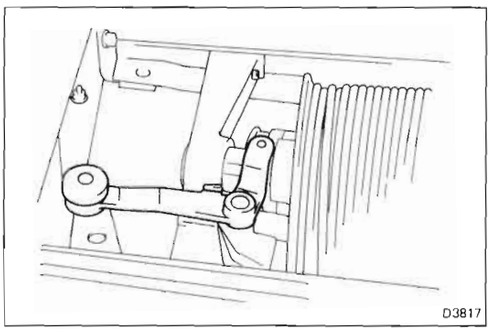
INSTALLATION OF CHAIN WIRE

1. INSTALL WIRE LOCK

(a) Insert the chain wire into the drum side plate hole.

(b) Install the wire lock and chain wire with two bolts. Torque the bolts.

Torque: 120 kg-cm (9 ft-lb, 12 N·m)


D3817

2. WINDING CHAIN WIRE

(a) Confirm the clutch lever is in the "locked" position.

(b) Shift the transfer lever in neutral.

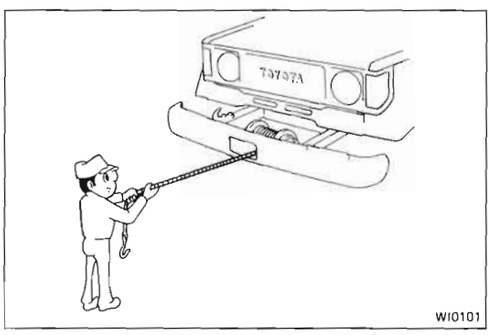
(c) Shift the P.T.O lever to ON.

(d)-1 (Manual Transmission)
Start the engine and slowly shift into the first or second gears.

(d)-2 (Automatic Transmission)
Start the engine and slowly shift into the "L" or "2" ranges.

(e) Pull the chain wire tense and feed into the winch as it winds.

CAUTION: The winch speed varies according to the gear the transmission is in and the speed of the engine. However, for your safety and for the long life of the winch, it is advised that you operate it slowly.
In vehicles with automatic transmissions, operate the winch only with the transmission in the "L" or "2" ranges.


WI0101

(f) Stop winding with about one meter (40 in.) of the chain wire remaining out.

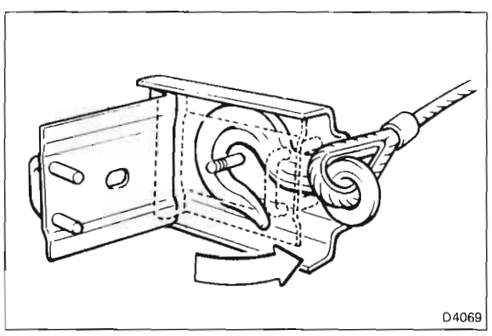
(g) Stop the engine.

3. INSTALL HOOK HOLDER

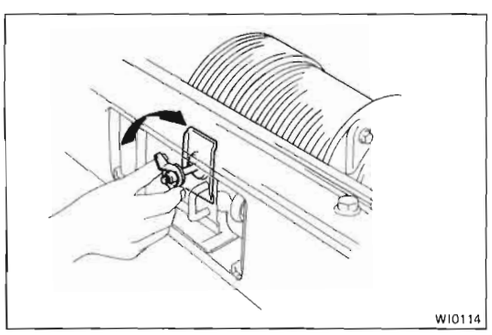
(a) Set the wire hook in the hook holder and temporarily tighten the wing nut.

(b) Shift the clutch lever into the free position.

(c) Wind the remaining chain wire.


D4069

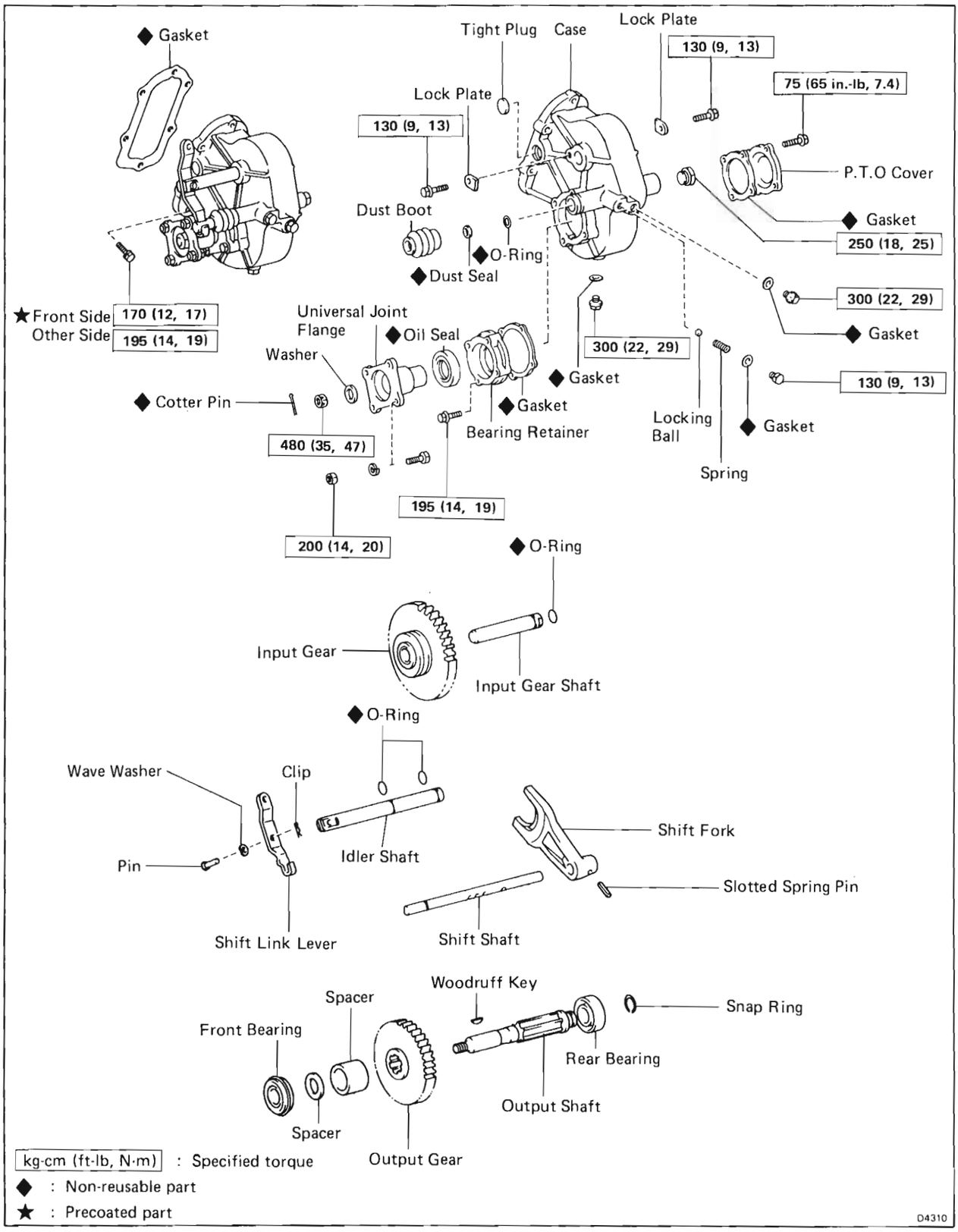
(d) Loosen the wing nut and turn the No. 1 support bracket 90°, then tighten the wing nut.


WI0114

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Power Take-off (P.T.O)

COMPONENTS



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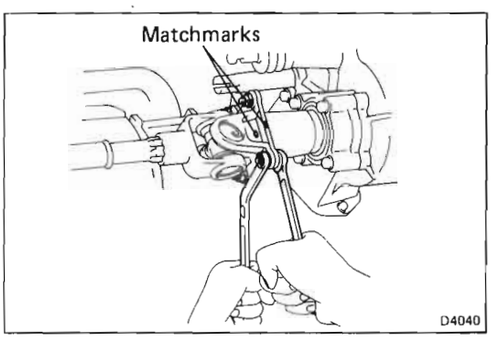
REMOVAL OF P.T.O.

(See page WI-4)

1. REMOVE TRANSMISSION UNDERCOVER

2. DRAIN P.T.O OIL

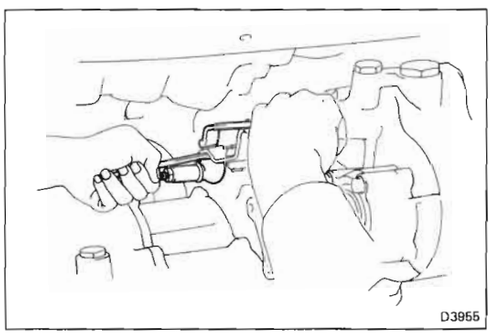
Remove the drain plug and drain the oil.



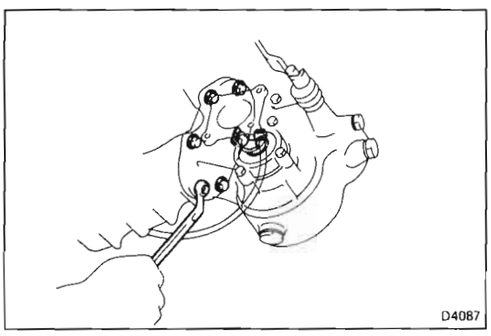
3. DISCONNECT P.T.O DRIVE SHAFT

(a) Place matchmarks on the flange of P.T.O and yoke of drive shaft.

(b) Remove the four bolts and nuts and disconnect the drive shaft.



4. DISCONNECT P.T.O SHIFT ROD



5. REMOVE P.T.O FROM TRANSMISSION

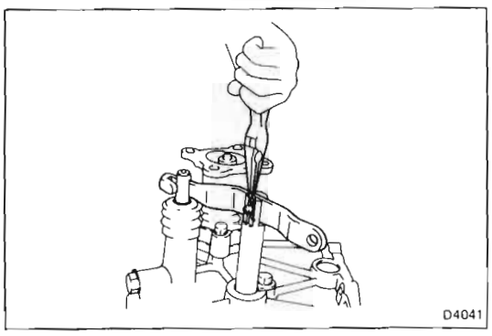
(a) Remove the six bolts.

(b) Lightly tap the P.T.O case, and then remove the P.T.O assembly and gasket.

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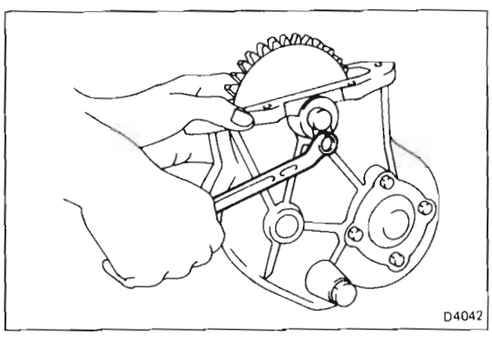
DISASSEMBLY OF DRIVE SHAFT

(See page WI-4)



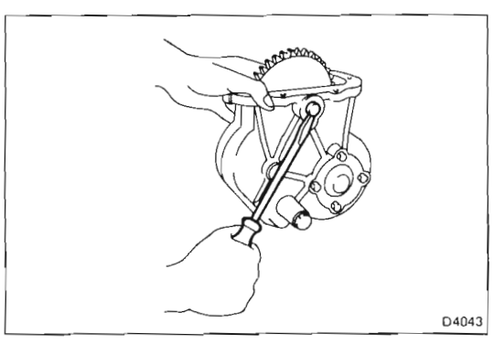
1. REMOVE SHIFT LINK LEVER

Remove the clip and then remove the wave washer, pin and shift link lever.



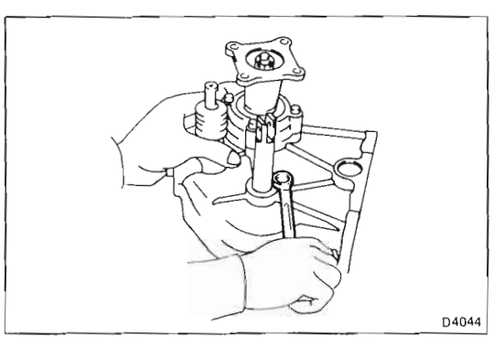
2. REMOVE INPUT GEAR AND SHAFT

(a) Remove the lock plate.



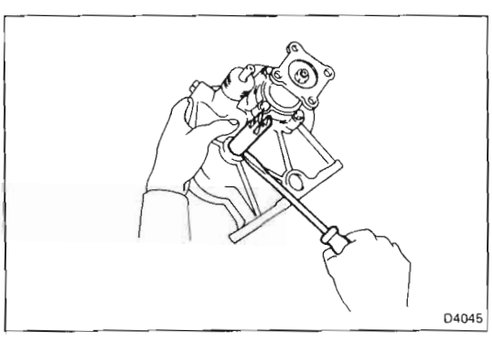
(b) Using a screwdriver, remove the input gear shaft, and remove the input gear.

(c) Remove the O-ring from the shaft.



3. REMOVE IDLER SHAFT

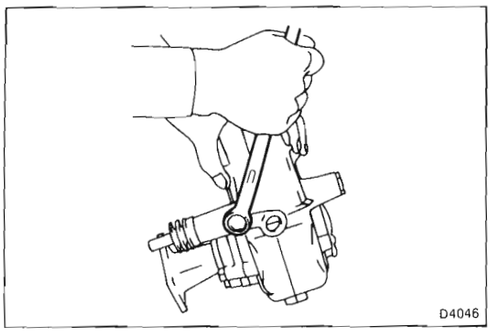
(a) Remove the lock plate.



(b) Using a screwdriver, remove the idler shaft.

(c) Remove the two O-rings from the shaft.

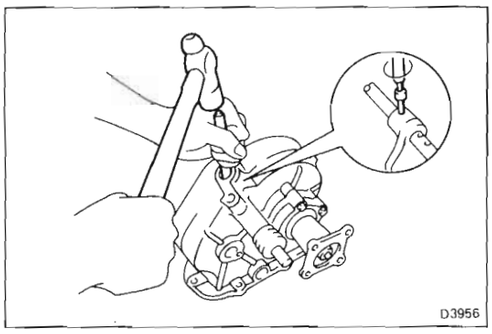
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4. REMOVE SHIFT SHAFT AND FORK

(a) Remove the locking ball bolt and gasket.

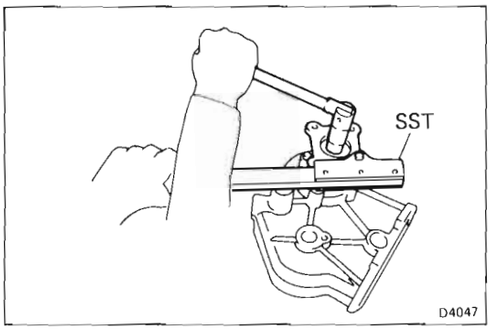
(b) Remove the spring and locking ball.



(c) Using a pin punch and hammer, tap out the slotted spring pin.

(d) Remove the dust boot, and then remove the shift shaft and fork.

(e) Remove the dust seal and O-ring.



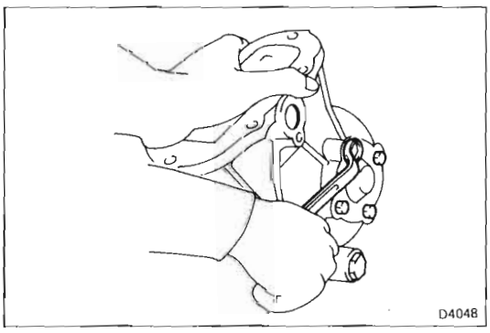
5. REMOVE UNIVERSAL JOINT FLANGE

(a) Remove the cotter pin.

(b) Using SST to hole the flange, remove the nut.

SST 09330-00021

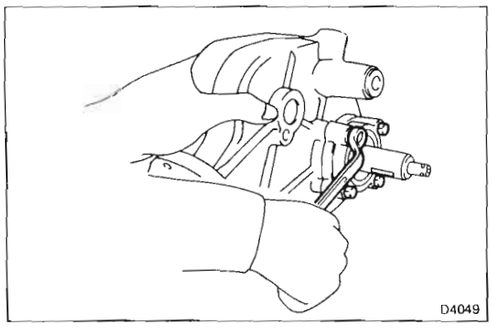
(c) Remove the washer, flange and woodruff key.



6. REMOVE P.T.O COVER

(a) Remove the four bolts.

(b) Remove the P.T.O cover and gasket.

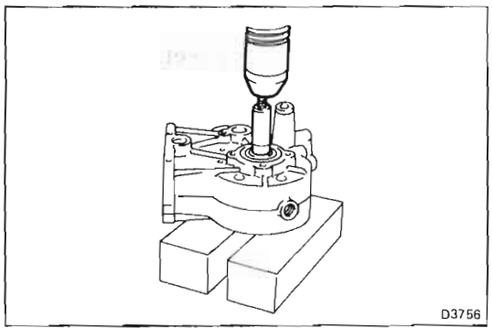


7. REMOVE BEARING RETAINER

(a) Remove the four bolts.

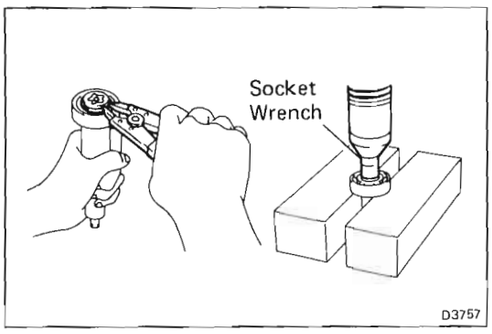
(b) Remove the bearing retainer and gasket.

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8. REMOVE OUTPUT GEAR AND SHAFT

Using a press, remove the front bearing, two spacers, output gear and shaft.

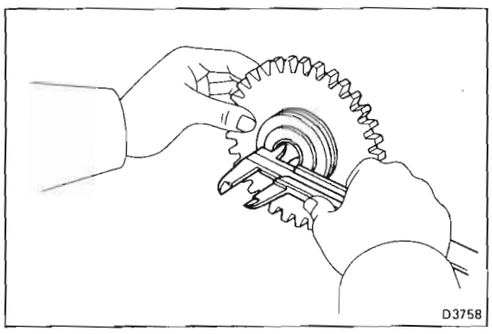


9. REMOVE REAR BEARING FROM OUTPUT SHAFT

(a) Using snap ring pliers, remove the snap ring.

(b) Using a press and 17-mm socket wrench, remove the bearing.

INSPECTION OF P.T.O COMPONENTS

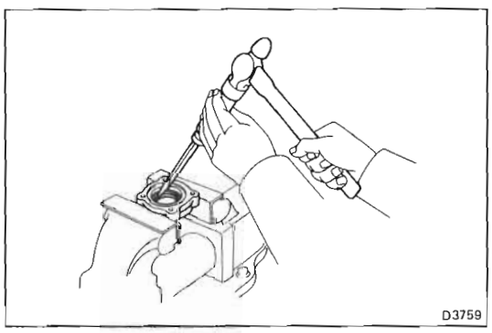


1. INSPECT INPUT GEAR BUSHING

Using calipers, measure the bushing bore.

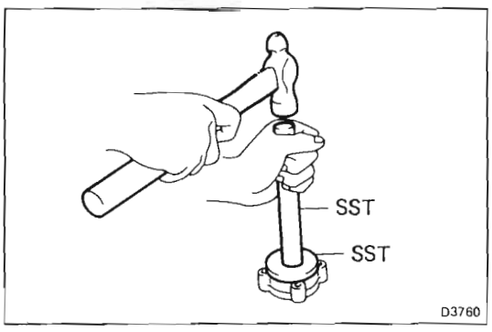
Maximum bore: 20.1 mm (0.791 in.)

If the bushing bore is greater than the maximum, replace the input gear assembly.



2. REPLACE BEARING RETAINER OIL SEAL

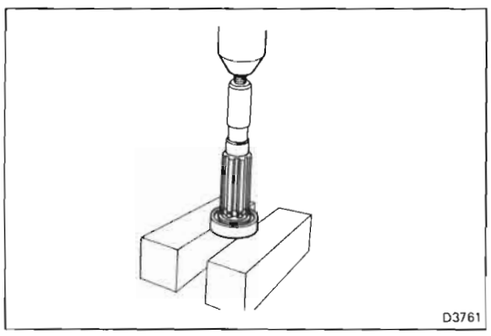
(a) Using a screwdriver, tap out the oil seal.



(b) Using SST, install a new oil seal.

SST 09608-35013

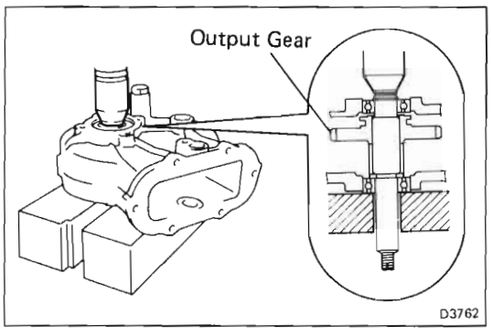
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ASSEMBLY OF P.T.O

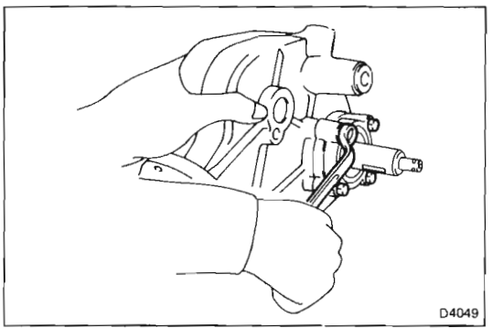
(See page WI-4)

1. INSTALL REAR BEARING TO OUTPUT SHAFT
   (a) Using a press, install the bearing to the shaft.
   (b) Using snap ring pliers, install the snap ring.



2. INSTALL OUTPUT GEAR AND SHAFT
   (a) Install the front bearing, output gear and two spacers to the case as shown.
   (b) Put the output shaft into the front bearing through the output gear and two spacers.
   (c) Using a press, press the output shaft into the front bearing.

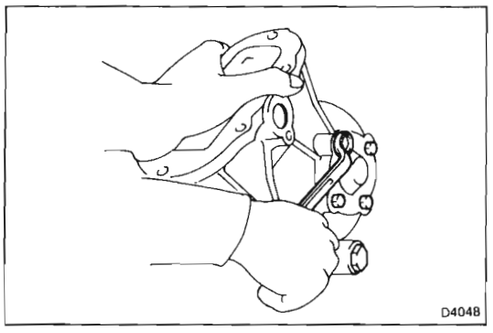
   NOTE: Install in proper direction only.



3. INSTALL BEARING RETAINER

   Install a new gasket and bearing retainer with four bolts. Torque the bolts.

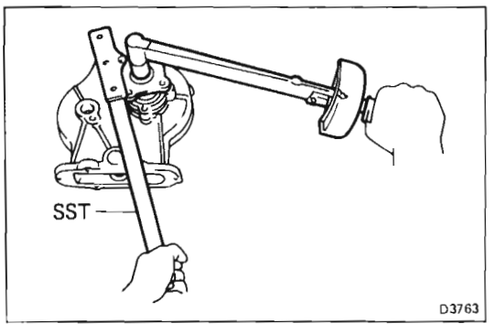
   Torque: 195 kg-cm (14 ft-lb, 19 N·m)



4. INSTALL P.T.O COVER

   Install a new gasket and the cover with four bolts. Torque the bolts.

   Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



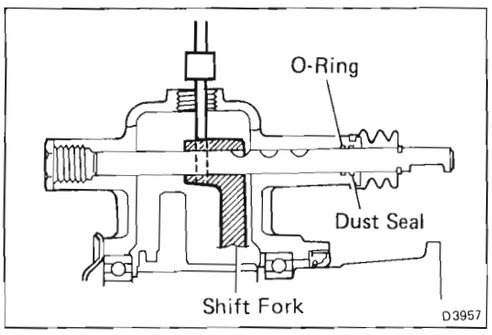
5. INSTALL UNIVERSAL JOINT FLANGE
   (a) Install the woodruff key, flange and washer.
   (b) Using SST to hold the flange, install the nut. Torque the nut.

   SST 09330-00021

   Torque: 480 kg-cm (35 ft-lb, 47 N·m)

   (c) Install a new cotter pin.

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6. INSTALL SHIFT FORK AND SHAFT

(a) Apply MP grease to the O-ring and then install it.

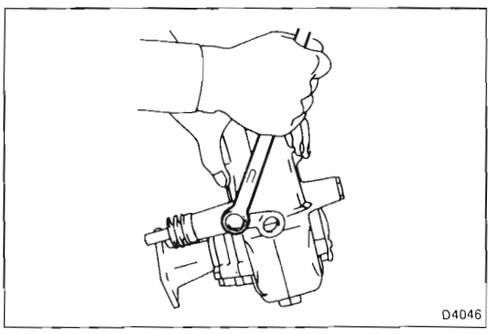
(b) Install the dust seal.

(c) Put the shift shaft into the case and install the shift fork shaft into the case through the shift fork.

NOTE: Install in proper direction only.

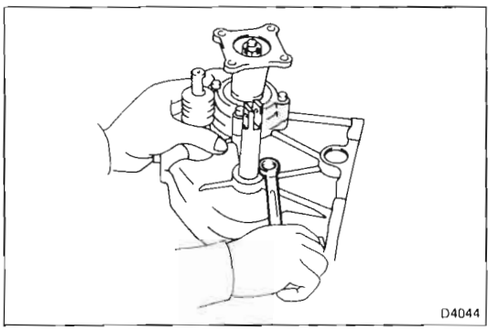
(d) Using a pin punch and hammer, drive in the slotted spring pin.

(e) Install the dust boot.



7. INSTALL LOCKING BALL, SPRING, NEW GASKET AND BOLT

Torque: 130 kg-cm (9 ft-lb, 13 N·m)



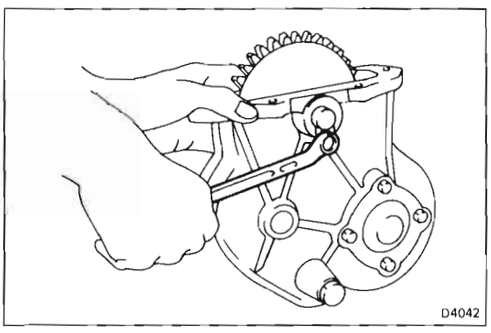
8. INSTALL IDLER SHAFT

(a) Apply MP grease to the O-rings and install the O-rings to the shaft.

(b) Install the shaft into the case with the lock plate and bolt. Torque the bolt.

NOTE: Be careful not to damage the O-ring.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)



9. INSTALL INPUT GEAR AND SHAFT

(a) Apply MP grease to the O-ring and install the O-ring to the shaft.

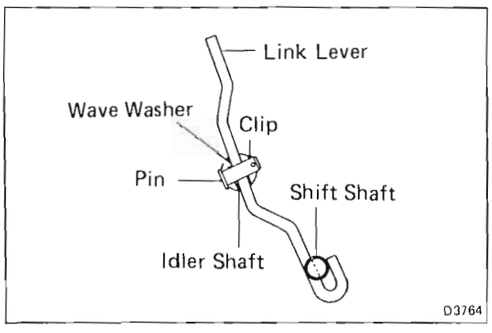
(b) Put the input gear to the shift fork.

NOTE: Install in proper direction only.

(c) Install the input gear shaft into the case through the input gear.

(d) Install the lock plate and bolt. Torque the bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

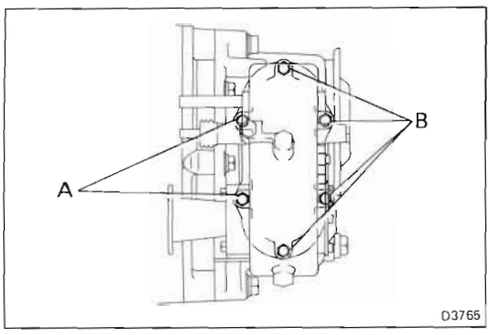


10. INSTALL LINK LEVER

(a) Align the notch of the shift shaft and the hook of the link lever.
Install the shaft together with a wave washer.

(b) Insert the pin and install the clip.

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INSTALLATION OF P.T.O

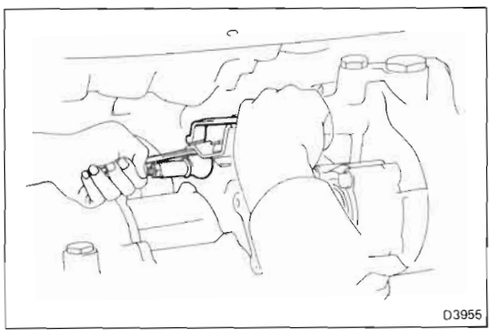
(See page WI-4)

1. INSTALL P.T.O

   (a) Apply anaerobic adhesive and sealant [THREE BOND 1324 (Part No. 08833-00070) or equivalent] to the threads of the two front side bolts A.

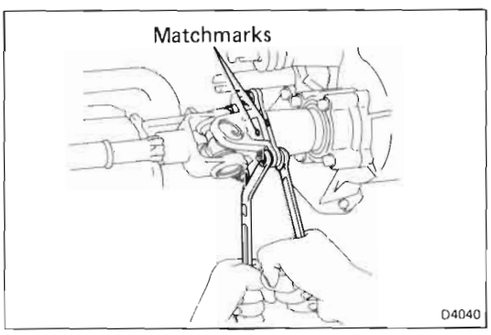
   (b) Install a new gasket and P.T.O assembly with six bolts. Torque the bolts.

   Torque:
   A Front side 170 kg-cm (12 ft-lb, 17 N·m)
   B Other side 195 kg-cm (14 ft-lb, 19 N·m)



2. CONNECT P.T.O SHIFT ROD

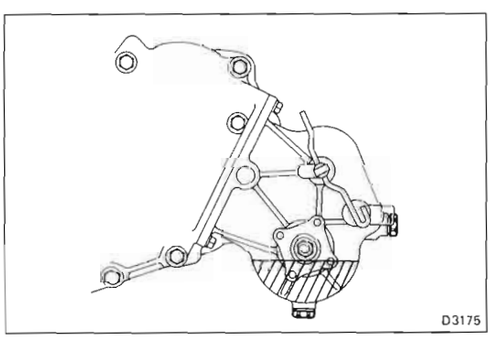
   Torque: 200 kg-cm (14 ft-lb, 20 N·m)



3. CONNECT P.T.O DRIVE SHAFT

   Align the matchmarks and connect the drive shaft with bolts and nuts. Torque the bolts and nuts.

   Torque: 200 kg-cm (14 ft-lb, 20 N·m)



4. FILL P.T.O WITH TRANSMISSION OIL

   Oil grade: API service GL-4 or GL-5
   SAE 90

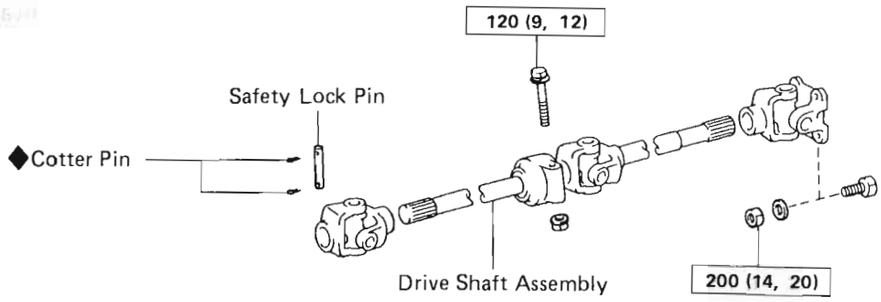
   Capacity: about 0.5 liter (0.5 US qts, 0.4 Imp. qts)

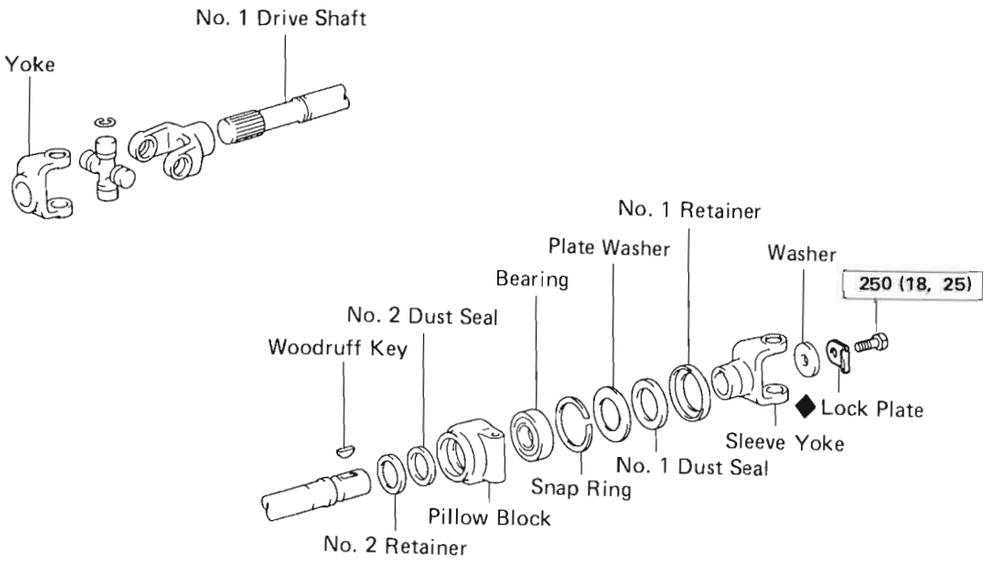
5. INSTALL TRANSMISSION UNDERCOVER

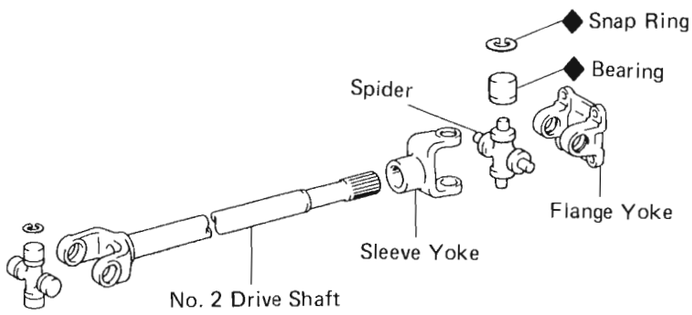
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Drive Shaft

COMPONENTS







kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

WI0074

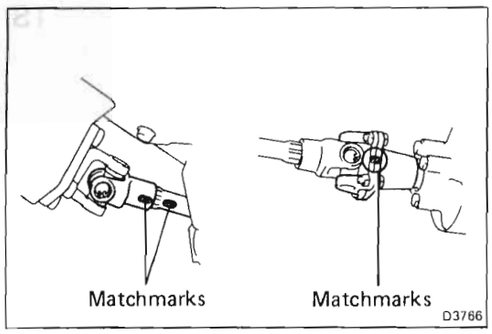
Donated by Onur Azeri . cruisercult.com

REMOVAL OF DRIVE SHAFT

(See page WI-12)

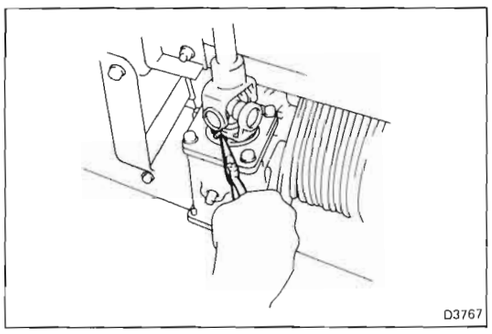
1. REMOVE ENGINE UNDERCOVER
2. REMOVE TRANSMISSION UNDERCOVER
3. PLACE MATCHMARKS

   Place the matchmarks on the drive shaft and universal joint or P.T.O companion flange.



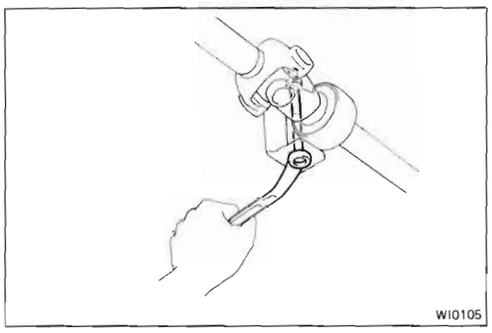
4. REMOVE SAFETY LOCK PIN

   Remove the two cotter pins and safety lock pin.



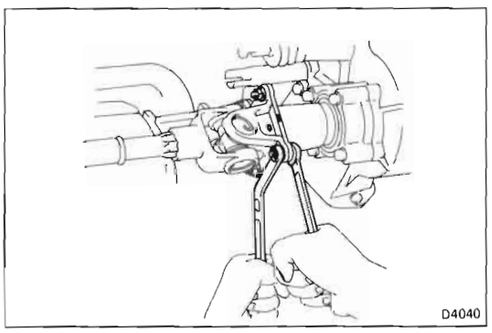
5. DISCONNECT DRIVE SHAFT

   (a) Remove the pillow block set bolt and nut.



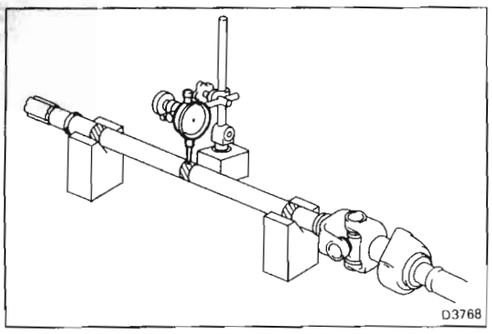
   (b) Remove the P.T.O companion flange set bolts and nuts, then disconnect the drive shaft assembly.

   NOTE: Do not forcefully remove the universal joint.



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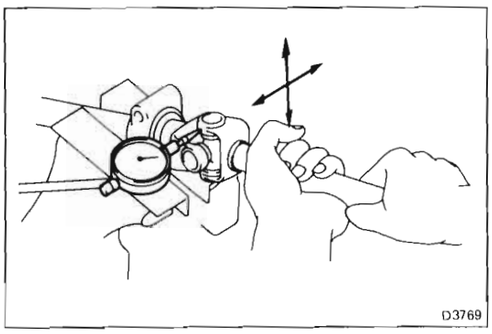
INSPECTION OF DRIVE SHAFT COMPONENTS



1. INSPECT DRIVE SHAFT FOR DAMAGE OR RUNOUT

Maximum runout: 0.7 mm (0.028 in.)

If the shaft runout is greater than the maximum, replace the shaft.



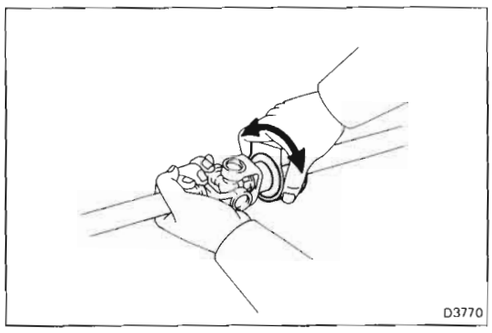
2. INSPECT SPIDER BEARINGS

(a) Inspect the spider bearings for wear or damage.

(b) Check the spider bearing axial play by turning the yoke while tightly holding the shaft.

Bearing axial play: 0.15 mm (0.0059 in.)

If necessary, replace the spider bearing.



3. INSPECT PILLOW BLOCK BEARING

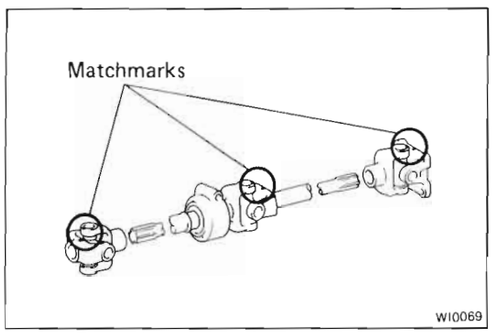
Check that the bearing turns freely.

If the bearing is damaged, worm or does not turn freely, replace it.

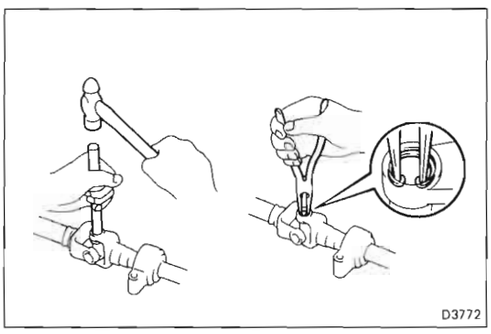
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REPLACEMENT OF SPIDER BEARINGS

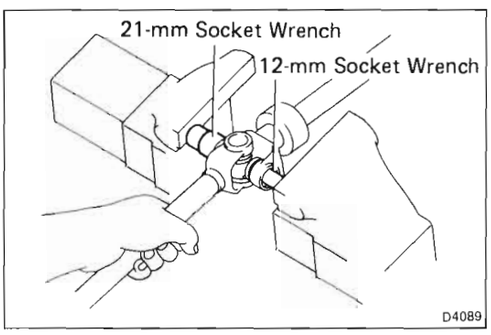
(See page WI-12)



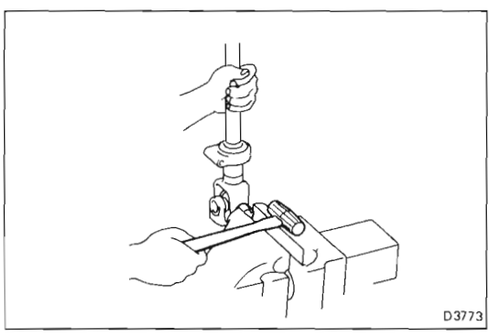
1. PLACE MATCHMARKS ON DRIVE SHAFT AND YOKES



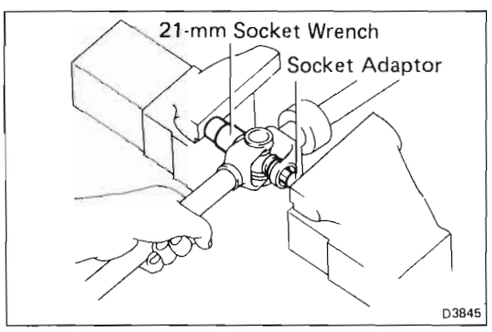
2. REMOVE SNAP RINGS
   (a) Slightly tap in the bearing outer races.
   (b) Using snap ring pliers, remove the four snap rings from the grooves.



3. REMOVE SPIDER BEARINGS
   (a) Using 12-mm and 21-mm socket wrenches and a vise, press out the bearing.

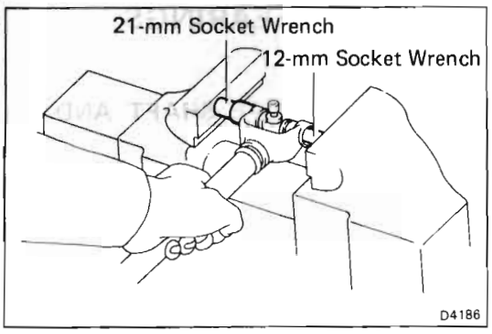


   (b) Clamp the outer bearing race in a vise and tap off the shaft with a plastic hammer or copper hammer.

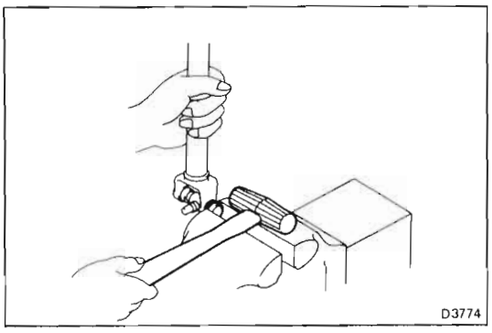


   (c) Using a socket adaptor, 21-mm socket wrench and vise, press out the bearing on the opposite side.
   (d) Remove the bearing on the opposite side in the same procedure as shown in step (b).

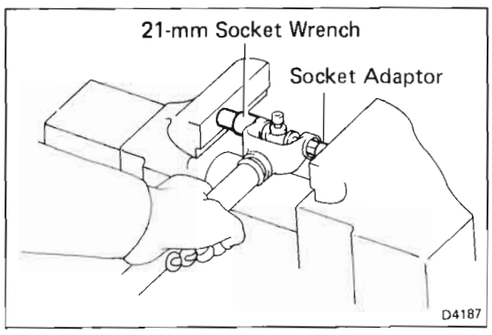
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(e) Using 12-mm and 21-mm socket wrenches and a vise, press out the bearing.

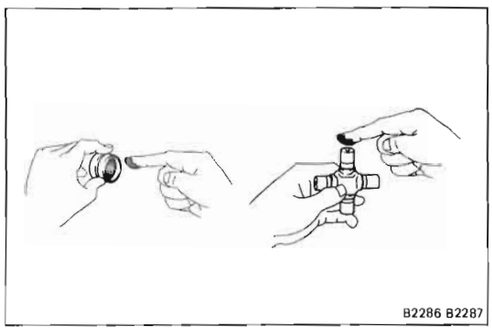


(f) Clamp the outer bearing race in a vise, and tap off the yoke with a plastic hammer or copper hammer.



(g) Using a socket adaptor, 21-mm socket wrench and vise, press out the bearing on the opposite side.

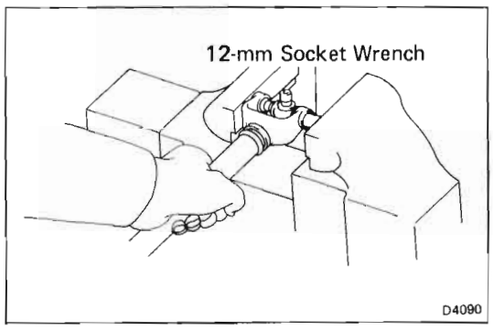
(h) Remove the bearing on the opposite side in the same procedure as shown in step (f).



4. INSTALL SPIDER BEARINGS

(a) Apply molybdenum disulphide lithium base grease to the spider and bearings.

NOTE: Be careful not to apply too much grease.

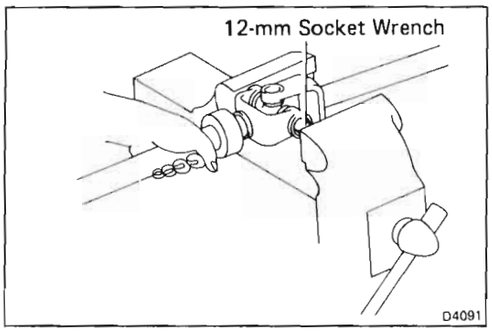


(b) Put the spider into the yoke.

(c) Using a 12-mm socket wrench and vise, press the bearing into the spider.

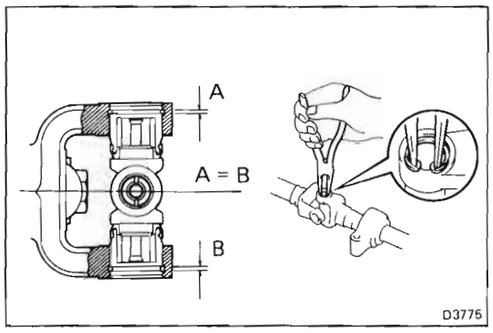
(d) Install the bearing on the opposite side using the procedure in (c).

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(e) Align the matchmarks on the yoke and shaft.

(f) Install new spider bearings in the shaft side using the procedure in steps (c) and (d).



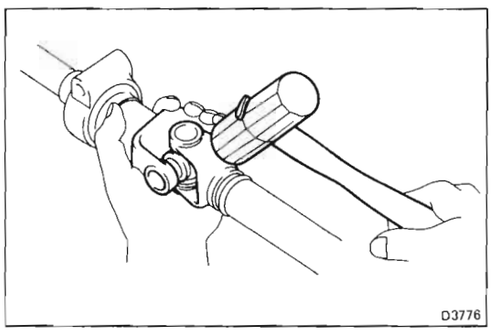
5. INSTALL SNAP RINGS

(a) Install two snap rings of the same thickness which will allow 0 – 0.15 mm (0 – 0.0059 in.) of axial play.

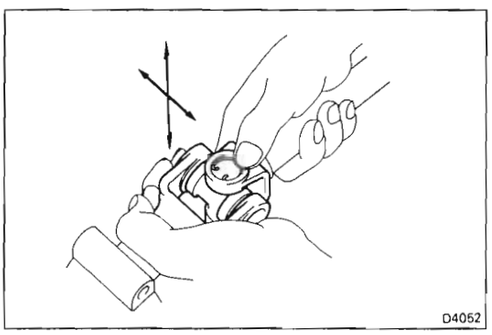
NOTE: Do not reuse the snap rings.

Snap ring thicknesses

Thickness	mm (in.)	Color
1.20	(0.0472)	None
1.25	(0.0492)	Brown
1.30	(0.0512)	Blue



(b) Using a plastic hammer or copper hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.



6. CHECK SPIDER BEARING

(a) Check that the spider bearing moves smoothly.

(b) Check the spider bearing axial play.

Bearing axial play: Less than 0.15 mm (0.0059 in.)

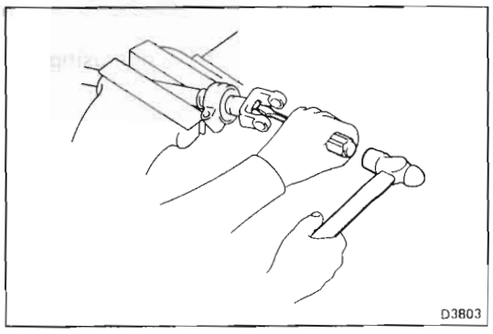
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REPLACEMENT OF PILLOW BLOCK BEARING

(See page WI-12)

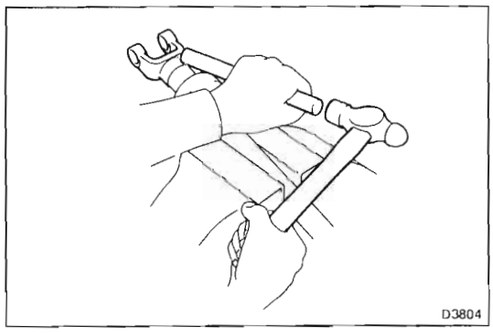
1. REMOVE UNIVERSAL JOINT
(See page WI-15)

2. REMOVE SLEEVE YOKE


D3803

(a) Using a chisel and hammer, loosen the staked part of the lock plate.

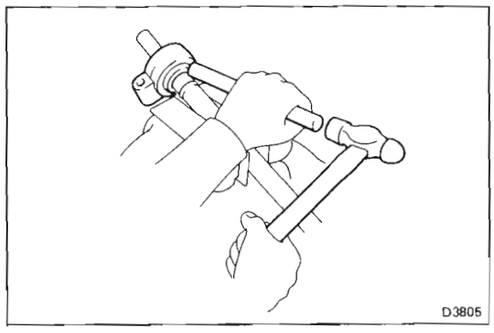
(b) Remove the bolt, lock plate and plate washer.


D3804

(c) Using a brass bar and hammer, remove the sleeve yoke.

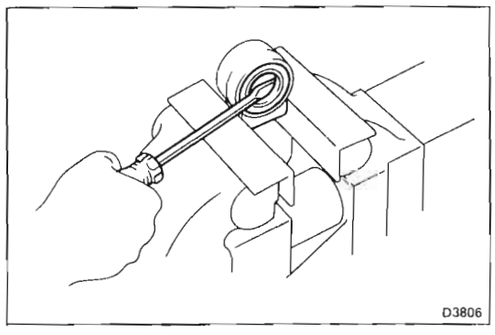
(d) Remove the woodruff key.

3. REMOVE PILLOW BLOCK


D3805

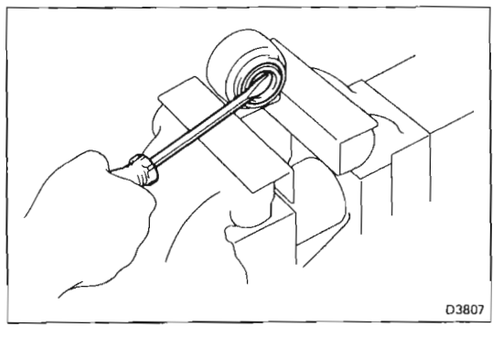
Using a brass bar and hammer, drive out the shaft.

4. REMOVE DUST SEALS, RETAINERS AND PLATE WASHER


D3806

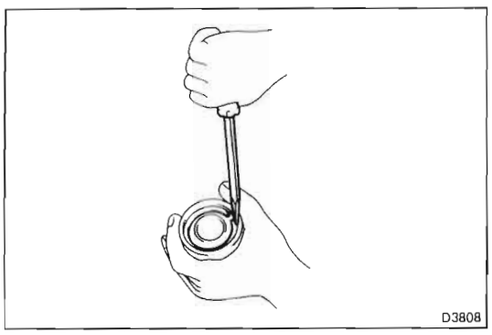
(a) Using a screwdriver, pry out the No. 1 dust seal retainer and No. 1 dust seal.

(b) Remove the plate washer.


D3807

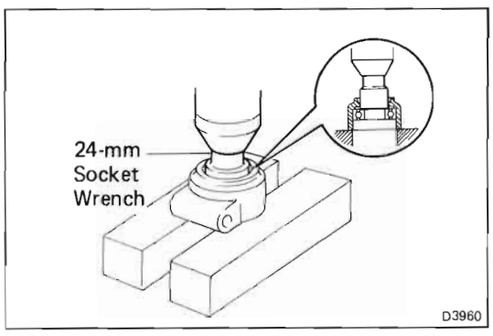
(c) Using a screwdriver, pry out the No. 2 dust seal retainer and No. 2 dust seal.

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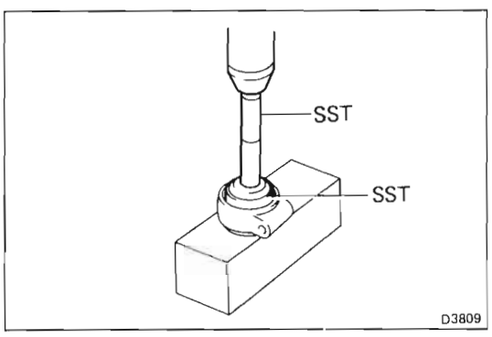


5. REMOVE BEARING

(a) Using a screwdriver, remove the snap ring.



(b) Using a press and 24-mm socket wrench, press out the bearing.

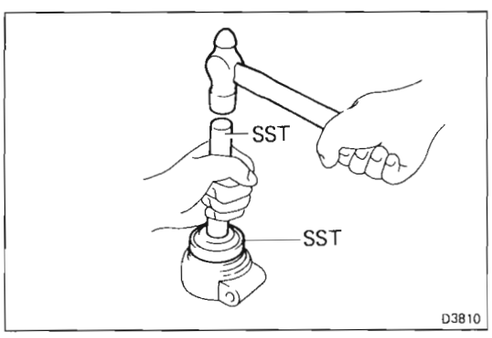


6. INSTALL NEW BEARING

(a) Using a press and SST, install a new bearing.

SST 09608-35013

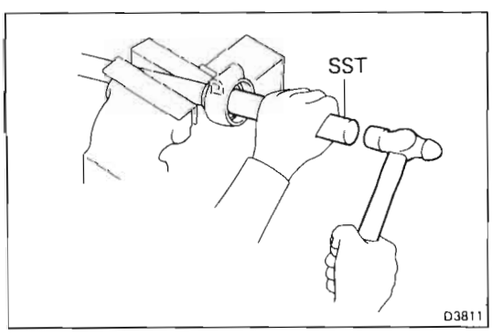
(b) Install the snap ring.



7. INSTALL NO. 2 DUST SEAL AND NO. 2 RETAINER

Using SST, install the No. 2 dust seal and No. 2 retainer.

SST 09608-35013

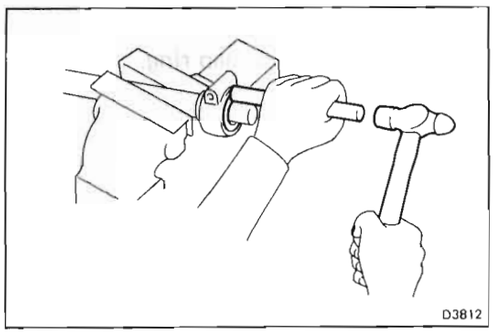


8. INSTALL PILLOW BLOCK

Using SST, install the pillow block.

SST 09612-22011

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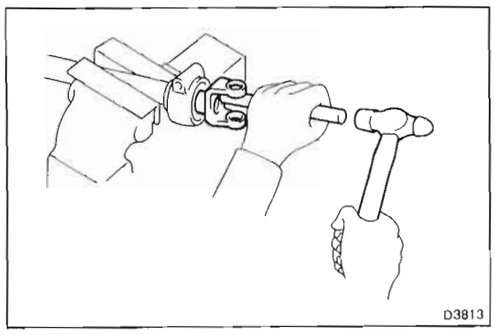


9. **INSTALL PLATE WASHER, NO. 1 DUST SEAL AND NO. 1 RETAINER**

(a) Install the plate washer.

(b) Using a brass bar and hammer, drive in the No. 1 dust seal and No. 1 retainer.

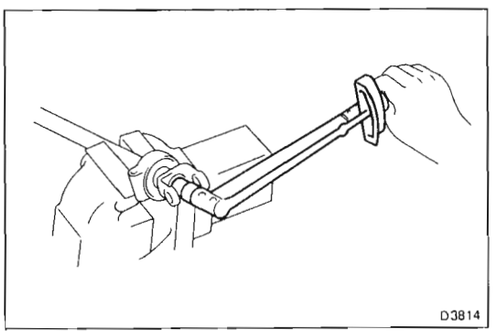
NOTE: Be careful not to damage the retainer.



10. **INSTALL SLEEVE YOKE**

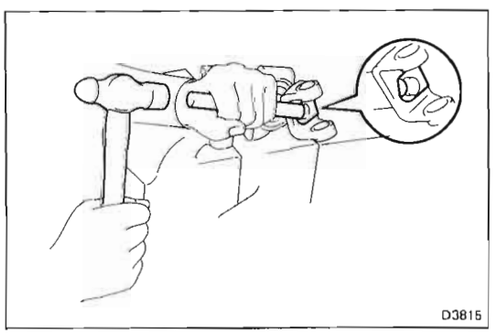
(a) Install the woodruff key.

(b) Using a brass bar and hammer, drive in the sleeve yoke.



(c) Install the washer, lock plate and bolt. Torque the bolt.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



(d) Using a brass bar and hammer, stake the lock plate.

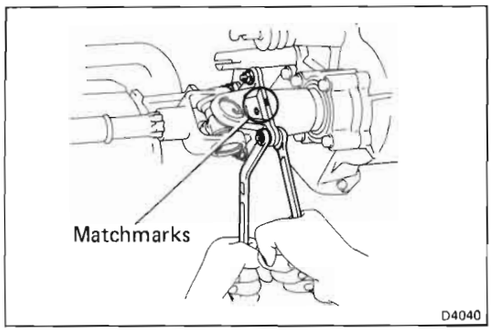
NOTE: Stake clow flush with the flat surface of the bolt.

11. **INSTALL UNIVERSAL JOINT**
(See page WI-16)

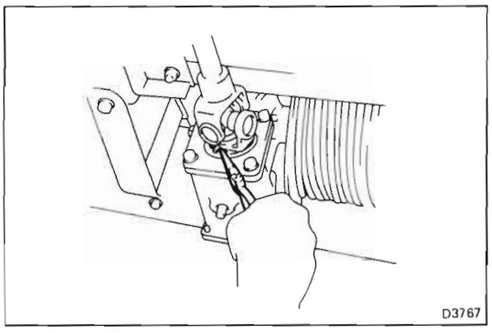
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INSTALLATION OF DRIVE SHAFT

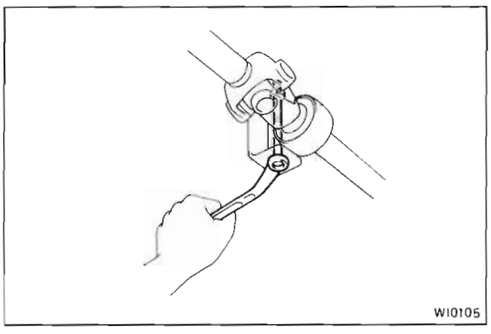
(See page WI-12)



1. INSTALL DRIVE SHAFT
   (a) Align the matchmarks on the drive shaft and universal joint or P.T.O companion flange.
   (b) Install and torque the bolts and nuts.
   Torque: 200 kg-cm (14 ft-lb, 20 N·m)



2. INSTALL SAFETY LOCK PIN
   (a) Align the safety lock pin hole of the universal joint and worm.
   (b) Install the safety lock pin and two cotter pins.



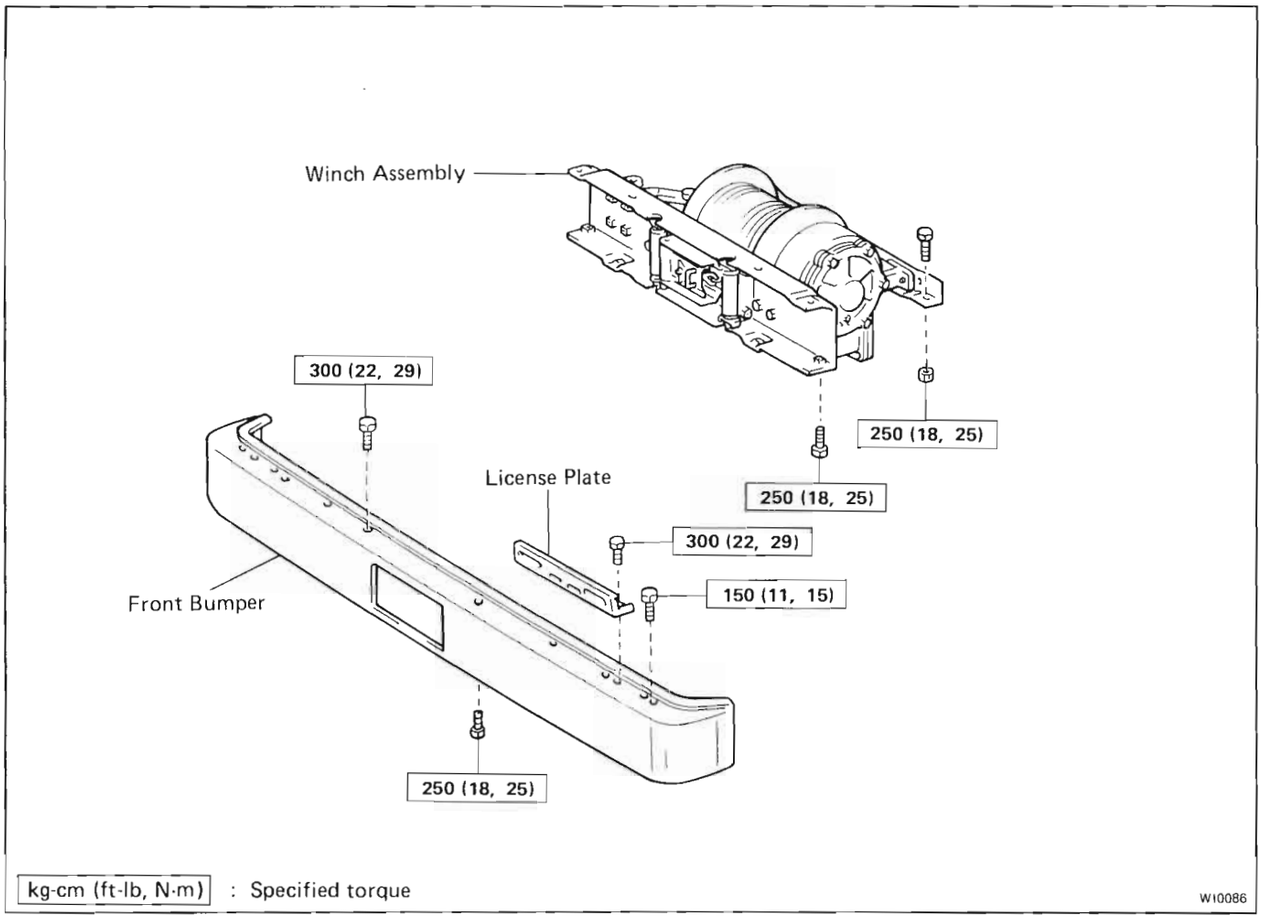
3. INSTALL PILLOW BLOCK
   Install the pillow blocks with bolts and nuts. Torque the bolts and nuts.
   Torque: 120 kg-cm (9 ft-lb, 12 N·m)

4. INSTALL ENGINE UNDERCOVER
5. INSTALL TRANSMISSION UNDERCOVER

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Winch

COMPONENTS



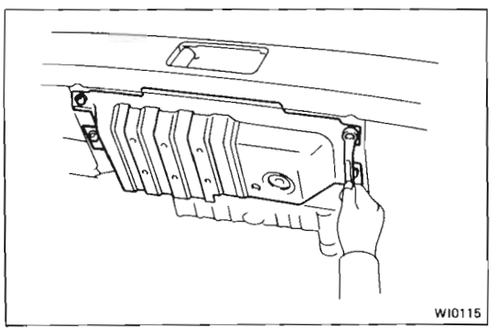
REMOVAL OF WINCH

1. REMOVE CHAIN WIRE
(See page WI-2)

   NOTE: Except when repairing the winch, do not remove the chain wire.

2. DRAIN WINCH OIL

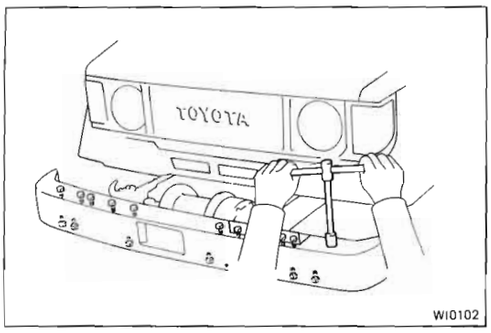
3. DISCONNECT DRIVE SHAFT
(See page WI-13)



4. REMOVE WINCH UNDERCOVER

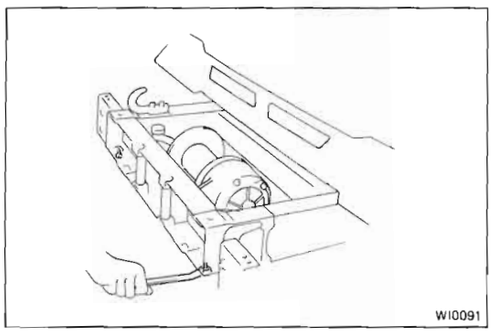
   Remove the four bolts and winch undercover.

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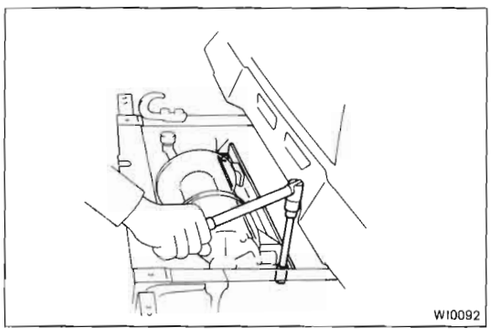
5. REMOVE FRONT BUMPER

Remove the 16 bolts, front bumper and license plate bracket.



6. REMOVE WINCH ASSEMBLY

(a) Remove the two winch roller bracket bolts.

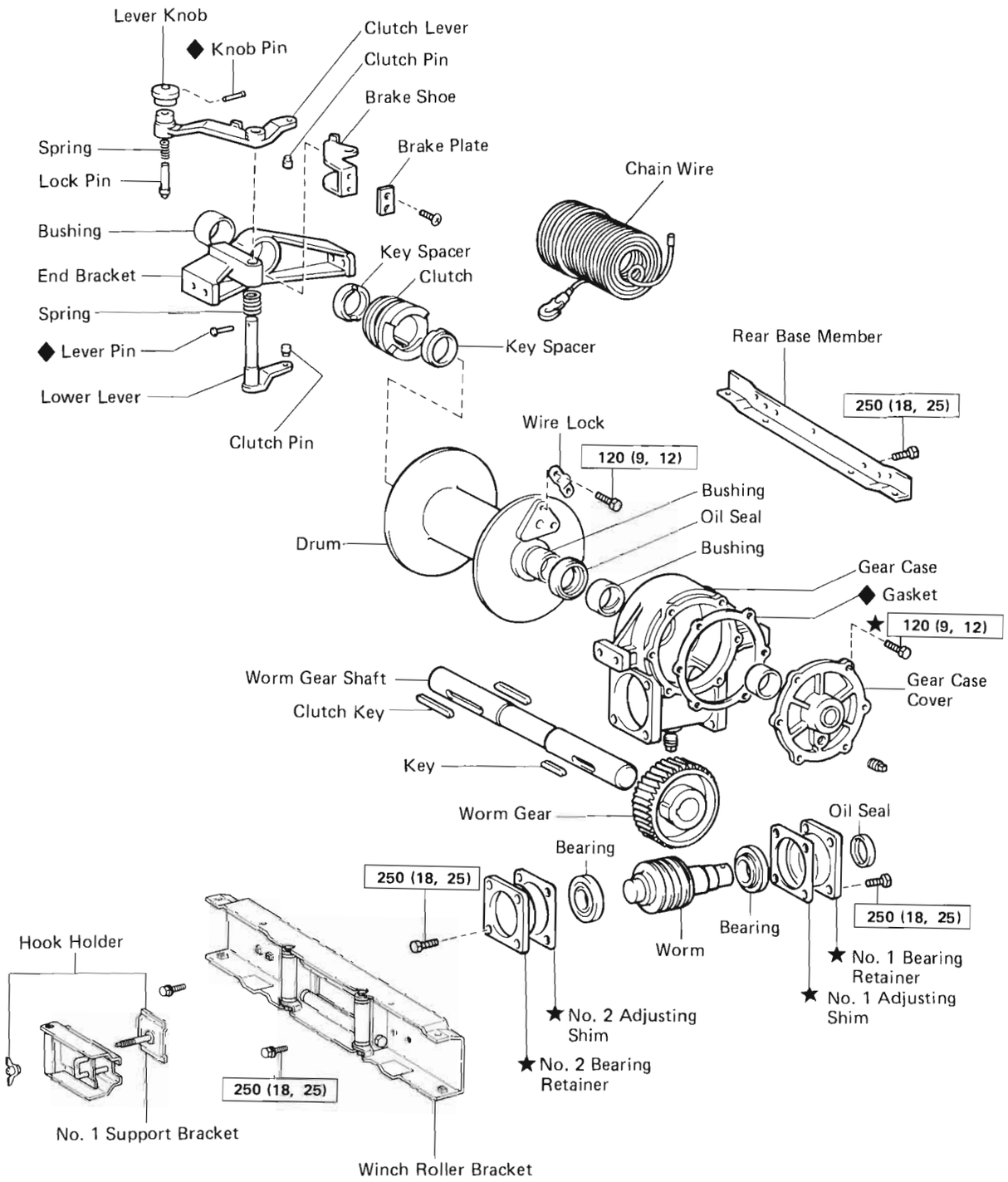


(b) Remove the two winch rear base member bolts.

(c) Remove the winch assembly from the vehicle.

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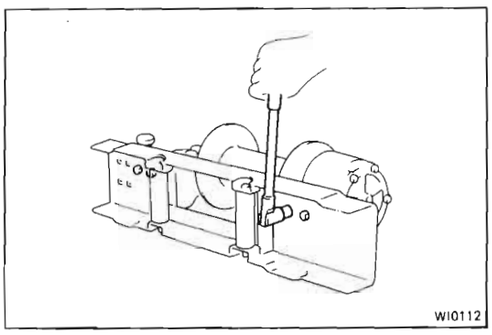
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque
◆ : Non-reusable part
★ : Precoated part

WI0106

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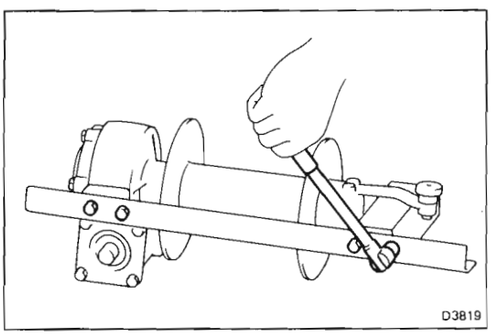


DISASSEMBLY OF WINCH

(See page WI-24)

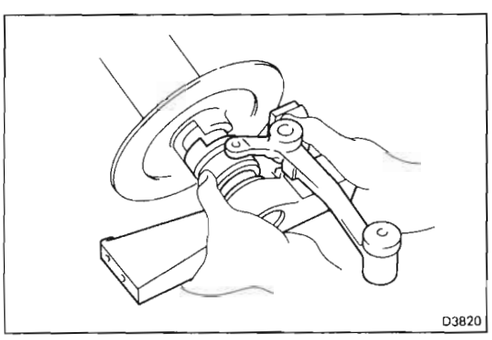
1. REMOVE WINCH ROLLER BRACKET

Remove the four bolts and winch roller bracket.

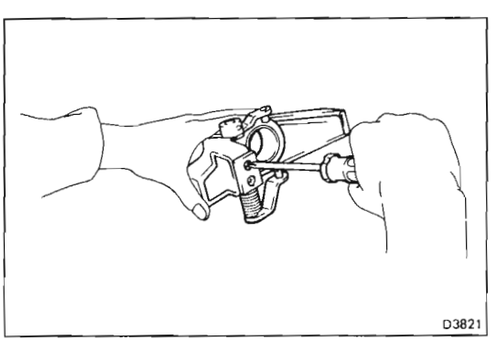


2. REMOVE REAR BASE MEMBER

Remove the four bolts and rear base member.

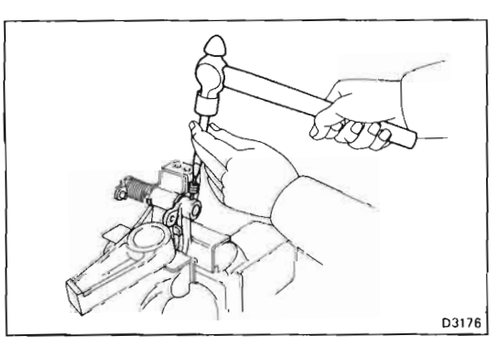


3. REMOVE END BRACKET WITH CLUTCH LEVER, KEY SPACER AND CLUTCH



4. REMOVE BRAKE PLATE

Remove the two screws and brake plate.

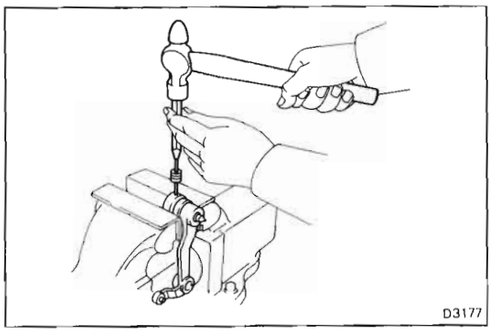


5. DISASSEMBLY CLUTCH LEVER ASSEMBLY

(a) Using a file, file off the staked part of the lever pin.

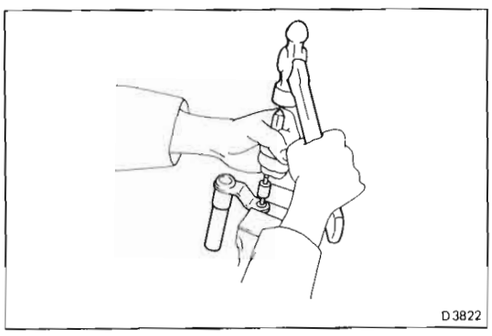
(b) Using a pin punch and hammer, tap out the lever pin and remove the lower lever, spring and clutch lever.

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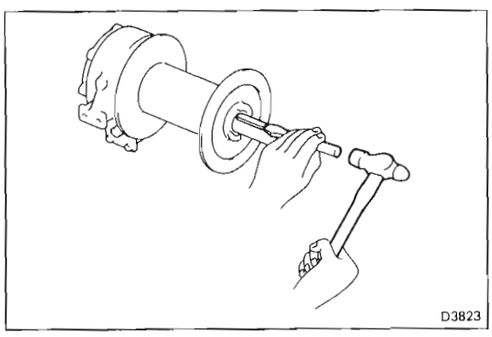
(c) Using a file, file off the staked part of the knob pin.

(d) Using a pin punch and hammer, tap out the knob pin and remove the lever knob, lock pin and spring.



6. REMOVE CLUTCH PIN

Using a pin punch and hammer, tap out the clutch pin.

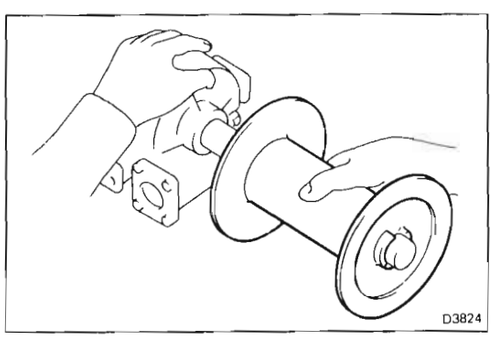


7. REMOVE DRUM

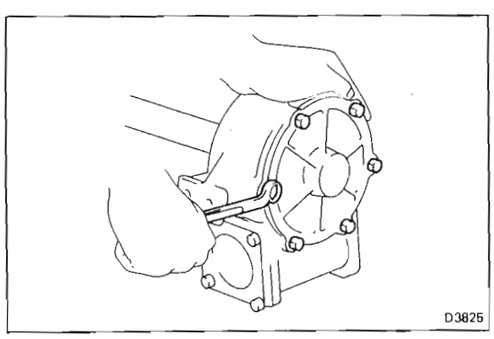
(a) Using a chisel and hammer, remove the two clutch keys.

NOTE: Be careful not to damage the worm gear shaft.

(b) Remove the key spacer.



(c) Remove the drum.

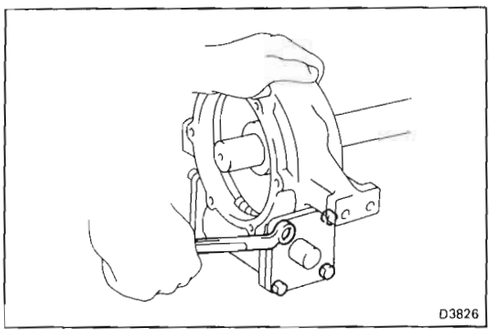


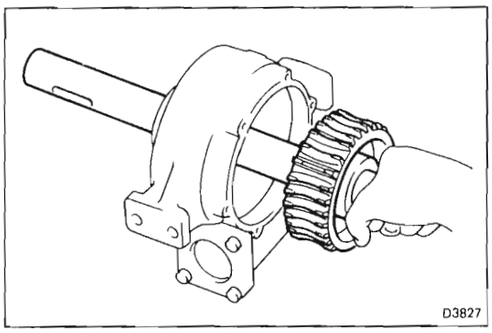
8. REMOVE GEAR CASE COVER

(a) Remove the six bolts.

(b) Using a plastic hammer, lightly tap the gear case cover and remove the gear case cover and gasket.

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D3826


D3827

9. REMOVE WORM

(a) Remove the four bolts.

(b) Using a plastic hammer, lightly tap the bearing retainer and remove the No. 1 bearing retainer and No. 1 adjusting shim.

(c) Remove the worm.

(d) Remove the four bolts.

(e) Using a plastic hammer, lightly tap the bearing retainer and remove the No. 2 bearing retainer and No. 2 adjusting shim.

10. REMOVE WORM GEAR AND SHAFT

(a) Remove the worm gear with the shaft.

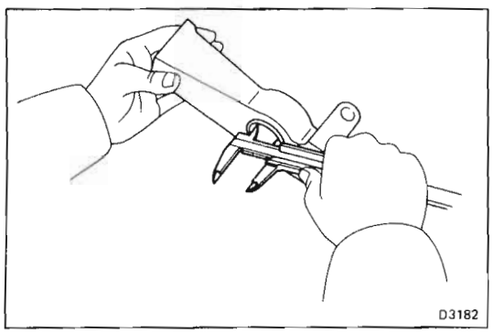
NOTE: Be careful not to damage the oil seal and bushing.

(b) Remove the worm gear from the shaft.

(c) Using a chisel and hammer, remove the key from the shaft.

NOTE: Be careful not to damage the shaft.

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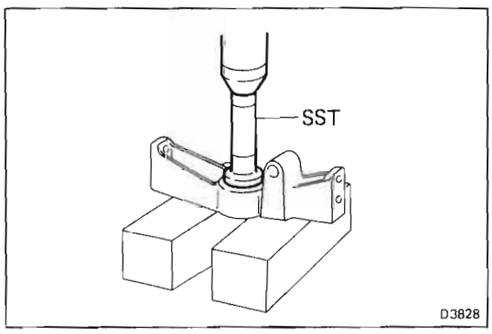


INSPECTION AND REPLACEMENT OF WINCH COMPONENTS

1. INSPECT END BRACKET BUSHING

Using calipers, measure the bushing bore.

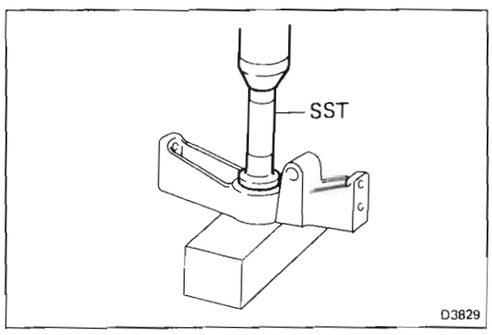
Maximum bore: 38.4 mm (1.512 in.)



2. IF NECESSARY, REPLACE END COVER BRACKET BUSHING

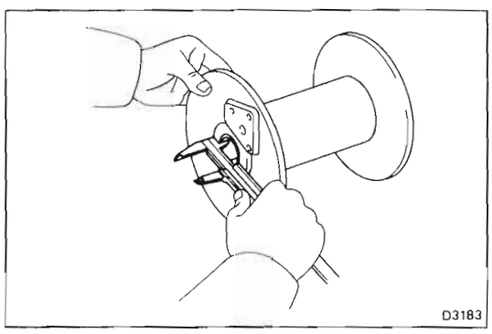
(a) Using a press and SST, press out the bushing.

SST 09307-30010



(b) Using a press and SST, press in the new bushing.

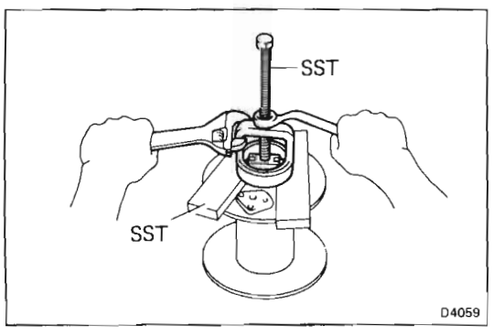
SST 09307-30010



3. INSPECT DRUM BUSHING

Using calipers, measure the bushing bore.

Maximum bore: 38.4 mm (1.512 in.)

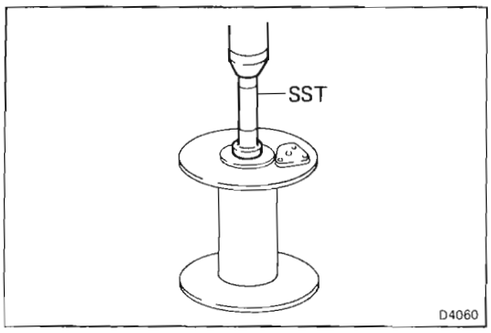


4. IF NECESSARY, REPLACE DRUM BUSHING

(a) Using SST, remove the bushing.

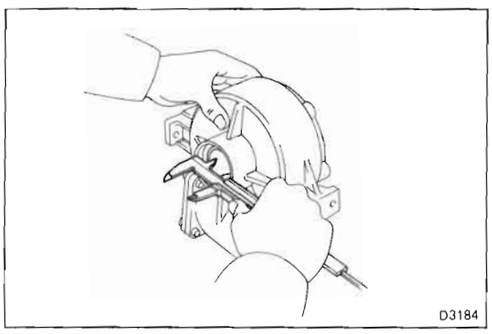
SST 09527-20011 and 09612-65013

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(b) Using a press and SST, press in the new bushing.

SST 09307-30010

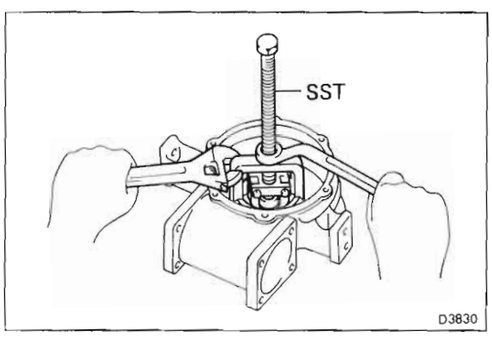


5. **INSPECT GEAR CASE BUSHING**

(a) Remove the gear case oil seal.
(See step 11 on page WI-31)

(b) Using calipers, measure the bushing bore.

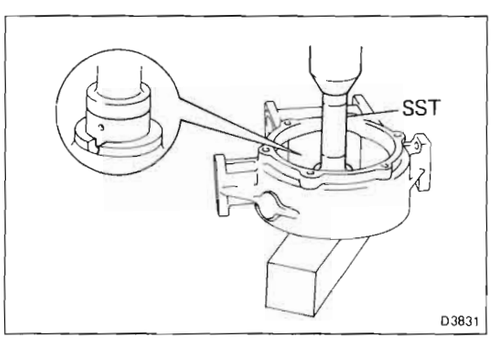
Maximum bore: 38.3 mm (1.508 in.)



6. **IF NECESSARY, REPLACE GEAR CASE BUSHING**

(a) Using SST, remove the bushing.

SST 09612-65013

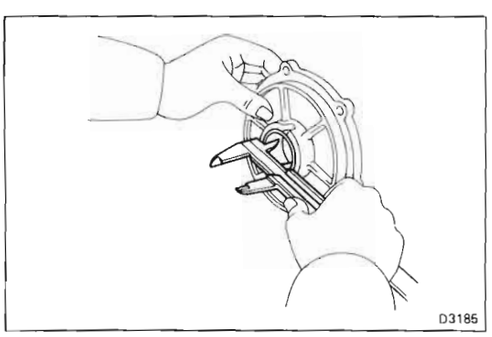


(b) Using a press and SST, press in the new bushing.

SST 09307-30010

NOTE: Align the groove of gear case and the oil hole of bushing.

(c) Install a new oil seal.
(See step 11 on page WI-31)

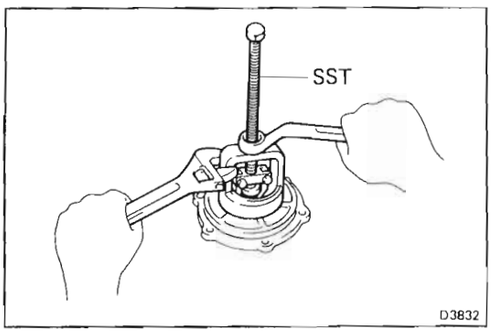


7. **INSPECT GEAR CASE COVER BUSHING**

Using calipers, measure the bushing bore.

Maximum bore: 38.3 mm (1.508 in.)

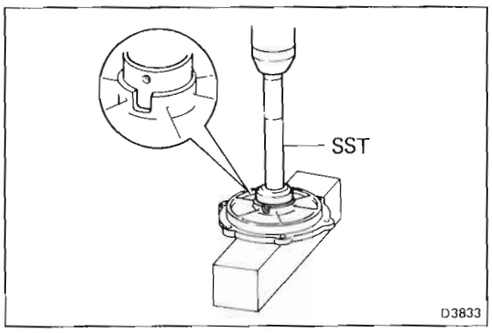
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8. **IF NECESSARY, REPLACE GEAR CASE COVER BUSHING**

(a) Using SST, remove the bushing.

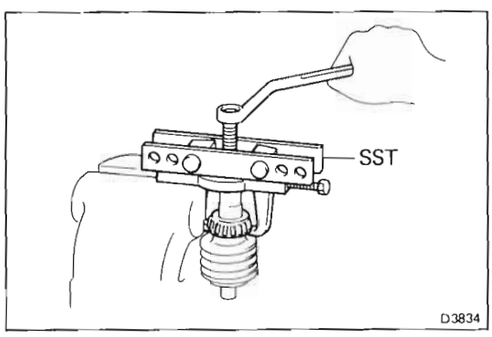
SST 09612-65013



(b) Using a press and SST, press in the new bushing.

SST 09307-30010

NOTE: Align the groove of gear case cover and the oil hole of bushing.



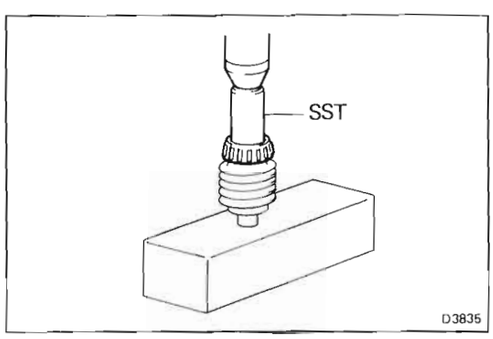
9. **INSPECT WORM BEARING**

Inspect for worm or damage.

10. **IF NECESSARY, REPLACE WORM BEARING**

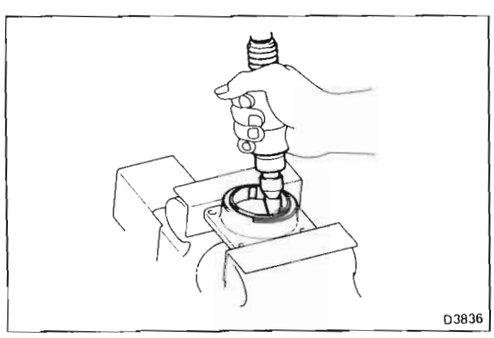
(a) Using SST, remove the inner bearing.

SST 09950-20016



(b) Using a press and SST, press in the new inner bearing.

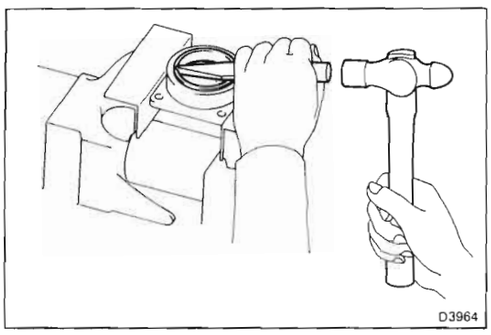
SST 09632-36010



(c) Using an air grinder, grind the bearing outer race.

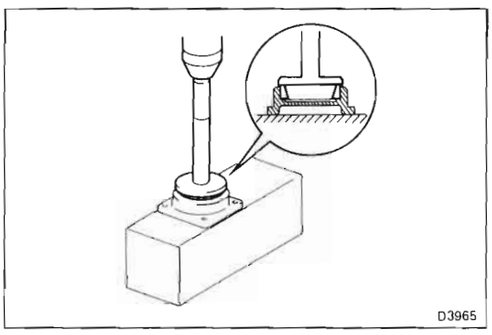
NOTE: Be careful not to damage the bearing retainer.

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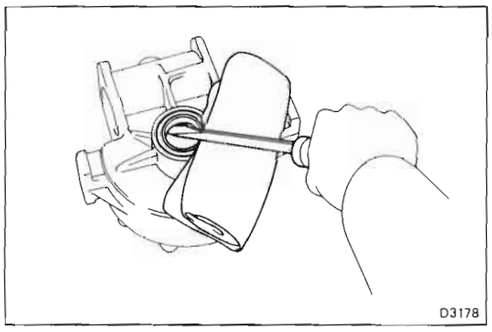
(d) Using a chisel and hammer, remove the bearing outer race.

NOTE: Be careful not to damage the retainer.



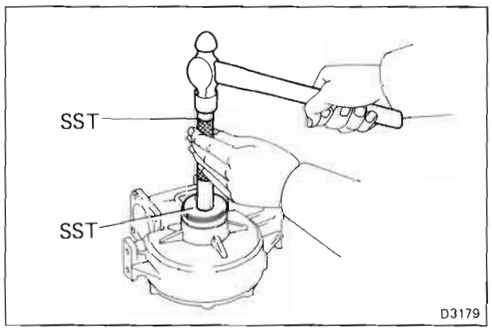
(e) Using a press and SST, press in the new bearing outer race.

SST 09608-35013



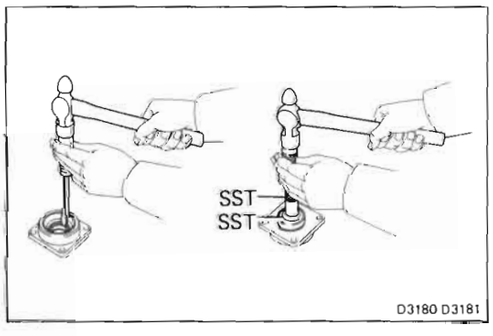
11. REPLACE GEAR CASE OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST, install a new oil seal.

SST 09608-35013



12. REPLACE RETAINER OIL SEAL

(a) Using a screwdriver, tap out the oil seal.

(b) Using SST, install a new oil seal.

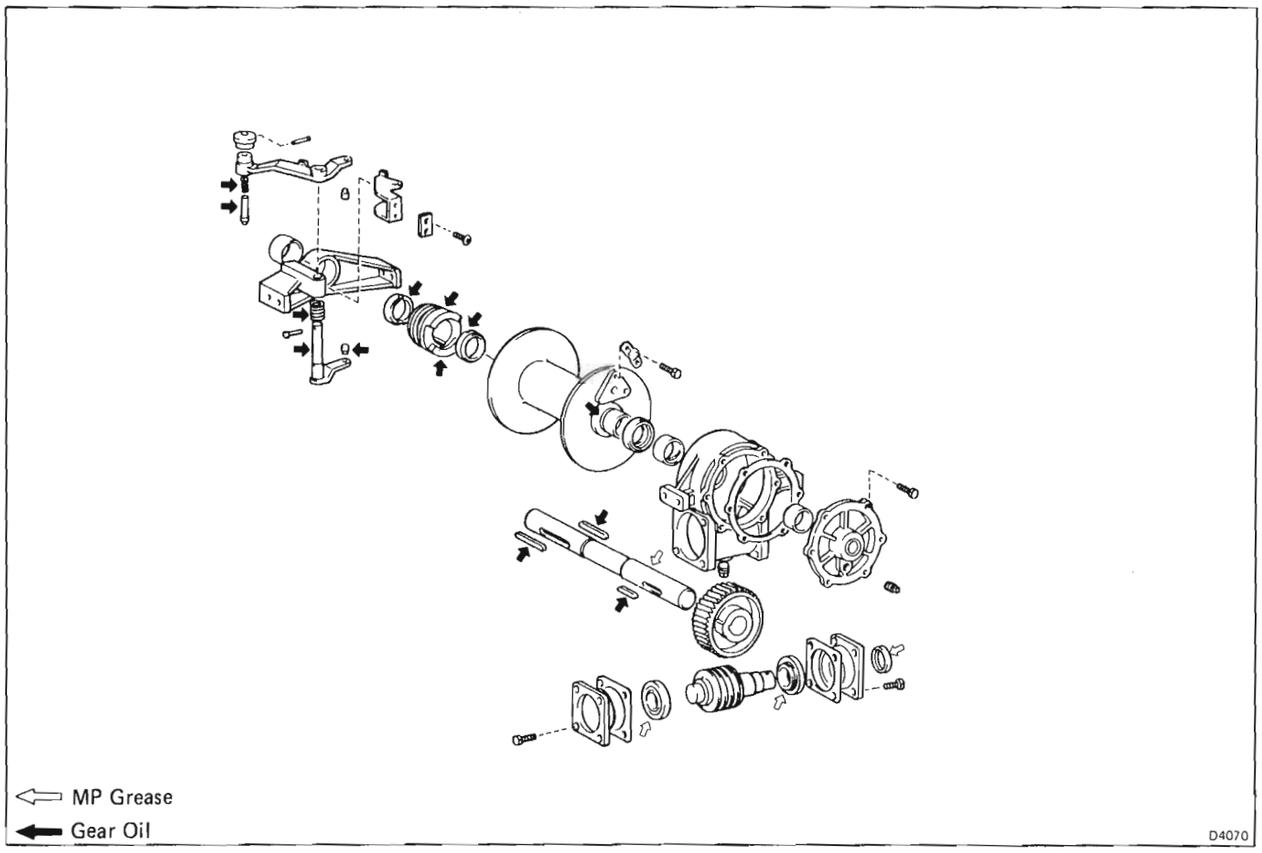
SST 09608-35013

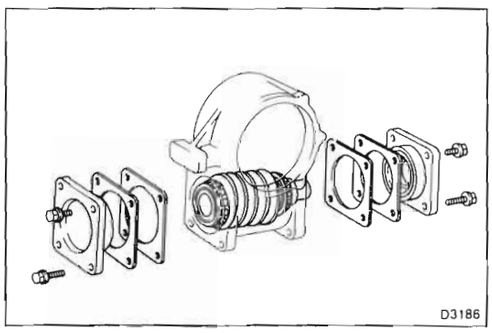
Donated by Onur Azeri . cruisercult.com

ASSEMBLY OF WINCH

(See page WI-24)

1. APPLY GEAR OIL OR MP GREASE TO PARTS SHOWN BELOW





2. SELECT WORM ADJUSTING SHIMS

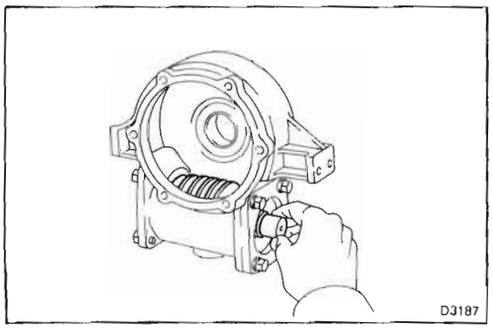
(a) Install the two No. 2 adjusting shims and No. 2 bearing retainer with four bolts. Torque the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

(b) Put the worm into the gear case.

(c) Install the two No. 1 adjusting shim and No. 1 bearing retainer with four bolts. Torque the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

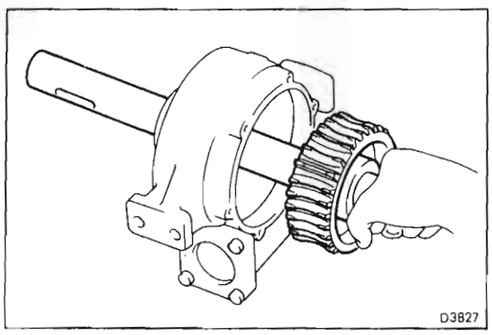


(d) Rocking the worm to and from, check for looseness or tightness.

Tightness: Reduce shim one each both side
Looseness: Add shim one each both side

(e) Remove the bearing retainers, adjusting shims and worm.

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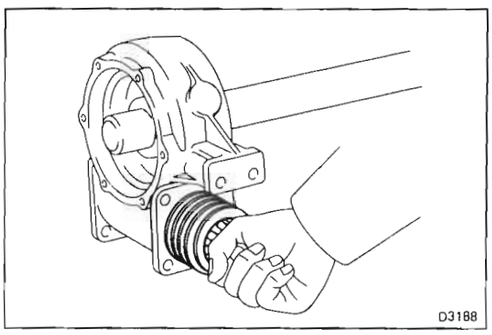


3. INSTALL WORM GEAR AND SHAFT

(a) Install the key and worm gear to the shaft.

(b) Install the worm gear with shaft into the gear case.

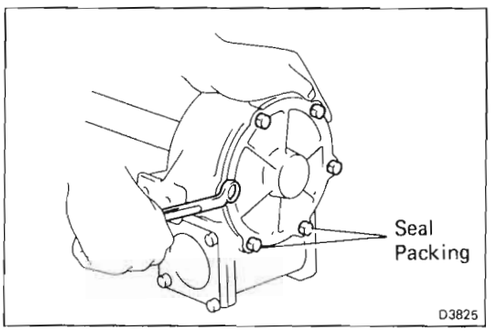
NOTE: Be careful not to damage the oil seal and bushing.



4. INSTALL WORM

(a) Apply seal packing yellow (08826-00012 or such) to the adjusting shims and bearing retainers.

(b) Install the adjusting shims, worm and bearing retainers as shown in step 2 on page WI-32.

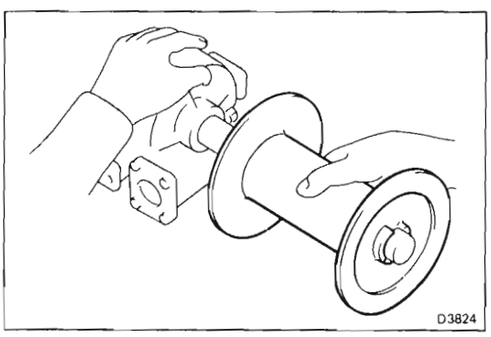


5. INSTALL GEAR CASE COVER

(a) Apply seal packing yellow (08826-00012 or such) to a new gasket and two lower side bolts.

(b) Install a new gasket and gear case cover with six bolts. Torque the bolts.

Torque: 120 kg-cm (9 ft-lb, 12 N·m)



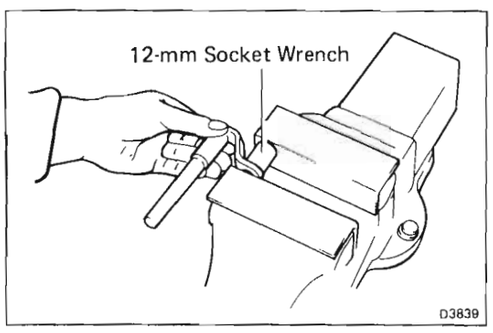
6. INSTALL DRUM

(a) Pack the inside of drum with MP grease.

(b) Insert the worm gear shaft into the drum.

(c) Install the spacer and two clutch keys.

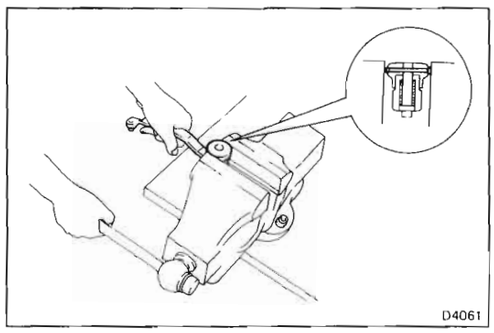
NOTE: Install in proper direction only.



7. INSTALL CLUTCH PIN

Using a 12-mm socket wrench and vise, install the clutch pin.

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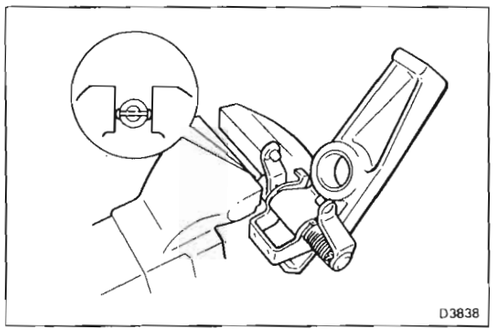

D4061

8. INSTALL CLUTCH LEVER

(a) Install the spring, lock pin and knob, and tap in the knob pin.

(b) Using a vise, stake both ends of the knob pin.

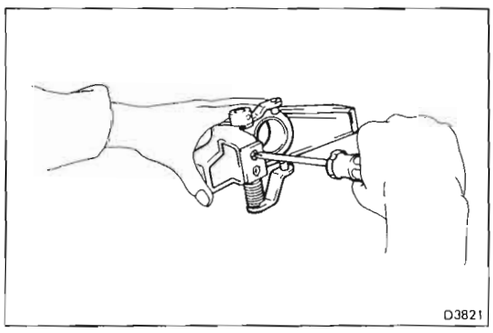
(c) Using a file, file off any tips or jags on the staked part of the pin.


D3838

(d) Install the spring, lower lever and clutch lever to the end bracket and then tap in the lever pin.

(e) Using a vise, stake both ends of the pin.

(f) Using a file, file off any tips or jags on the staked part of the pin.

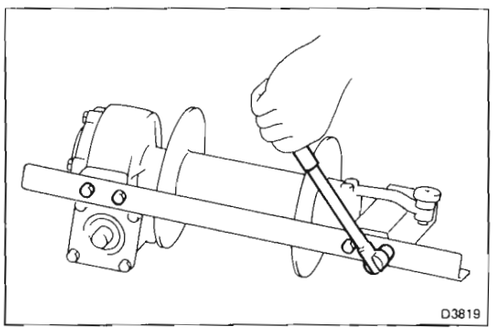

D3821

9. INSTALL BRAKE PLATE

Install the brake plate with two screws.

10. INSTALL END BRACKET WITH CLUTCH LEVER

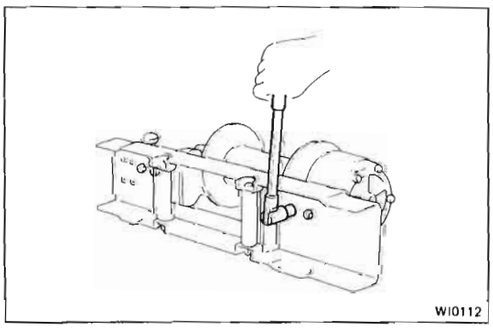
Install the spacer and end bracket with clutch lever to the worm gear shaft.


D3819

11. INSTALL REAR BASE MEMBER

Install the rear base member with four bolts. Torque the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

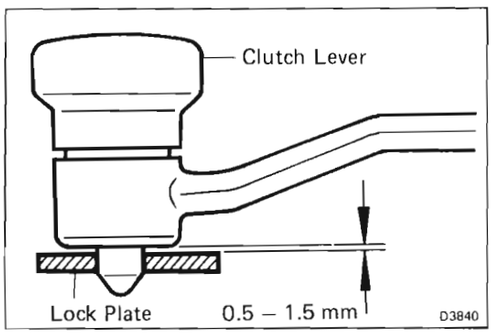

WI0112

12. INSTALL WINCH ROLLER BRACKET

(a) Install the winch roller bracket with four bolts. Torque the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

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(b) Adjust the clearance of the clutch lever and lock plate with the lock plate set bolts.

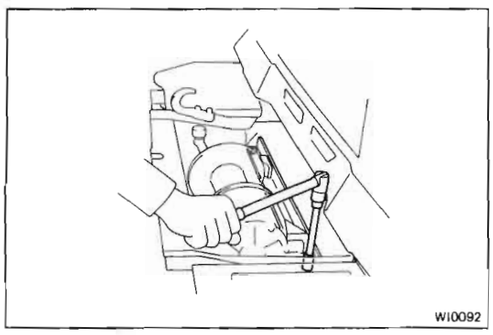
Standard clearance: 0.5 – 1.5 mm (0.020 – 0.059 in.)

13. INSTALL CHAIN WIRE
(See page WI-2)

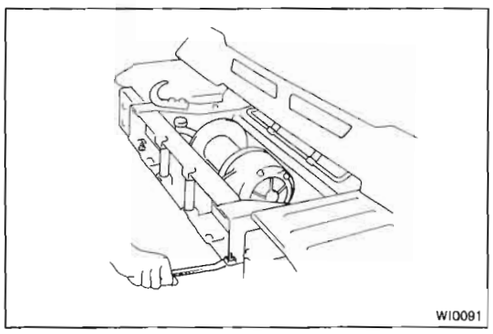
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INSTALLATION OF WINCH

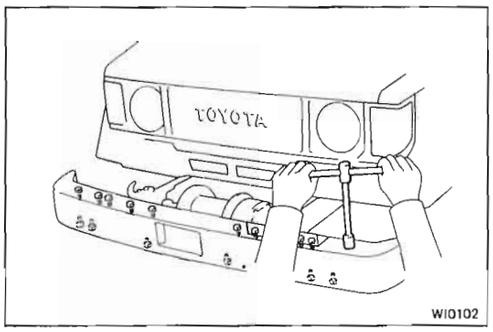
(See page WI-22)


WI0092

1. INSTALL WINCH ASSEMBLY
   (a) Place the winch assembly on the vehicle.
   (b) Install the two winch rear base member bolts. Torque the bolts.
   Torque: 250 kg-cm (18 ft-lb, 25 N·m)

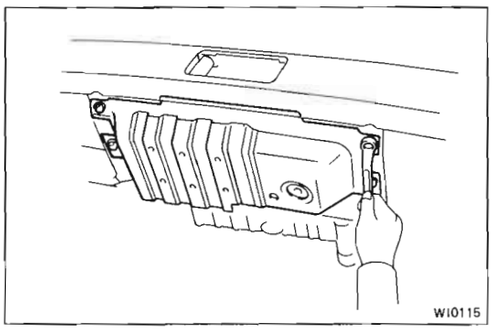

WI0091

   (c) Install the two winch roller bolts. Torque the bolts.
   Torque: 250 kg-cm (18 ft-lb, 25 N·m)



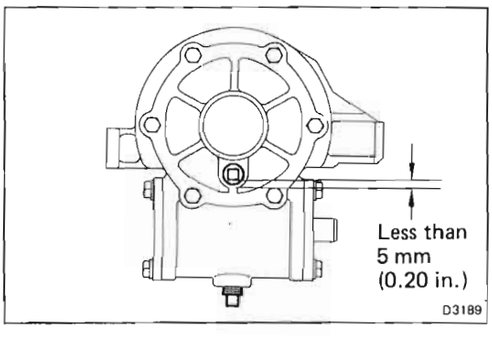
WI0102

2. INSTALL FRONT BUMPER
   Install the front bumper and license plate bracket with 16 bolts.
   Torque: See page WI-22


WI0115

3. INSTALL WINCH UNDERCOVER
   Install the winch undercover with four bolts.

4. CONNECT DRIVE SHAFT
   (See page WI-21)



D3189

5. FILL WINCH WITH GEAR OIL
   Oil grade: API service GL-4
   SAE 90
   Capacity: 0.3 liters (0.3 US qts, 0.3 Imp. qts)

6. INSTALL CHAIN WIRE
   (See page WI-3)

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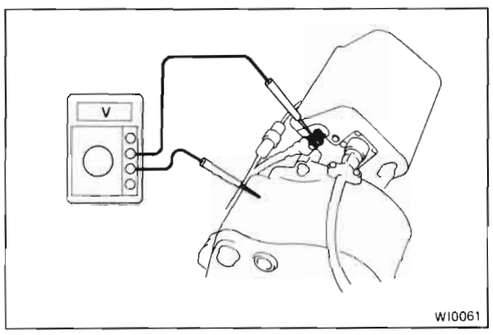
ELECTRIC WINCH

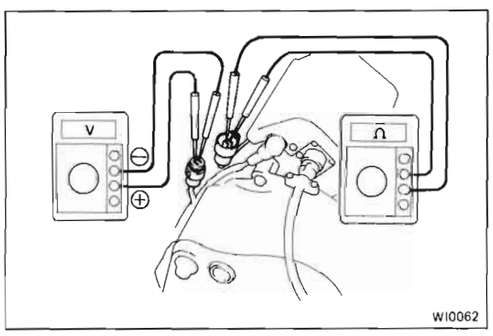
On-Vehicle Inspection

NOTE: These tests must be performed within several seconds to avoid discharging the battery.

INSPECTION OF NO. 1 MAGNET SWITCH

1. CONNECT WINCH REMOTE CONTROL SWITCH
2. TURN IGNITION SWITCH ON
3. INSPECT NO. 1 MAGNET SWITCH
   (a) Using a voltmeter, check the battery voltage at terminal "B" of the No. 2 magnet switch.
   (b) If no voltage, check for voltage and continuity at the connector of the No. 1 magnet switch.



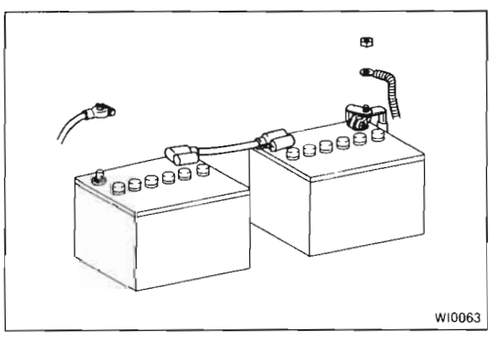


- Using a voltmeter, check the continuity between the terminals of the wire harness side connector.
- Using an ohmmeter, check the battery voltage between the terminals of the winch side connector.

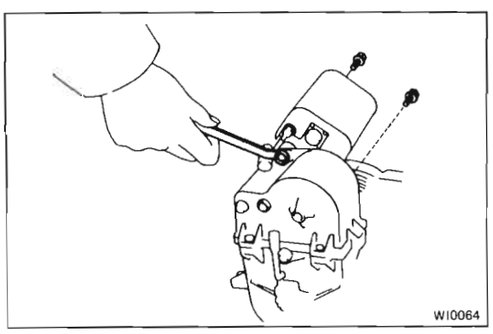
4. TURN IGNITION SWITCH OFF
5. DISCONNECT WINCH REMOTE CONTROL SWITCH

INSPECTION OF NO. 2 MAGNET SWITCH

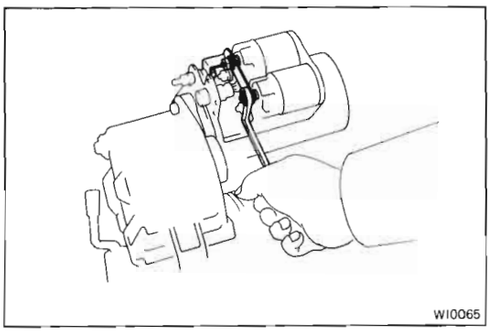
1. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL
2. DISCONNECT MAGNET SWITCH CABLE FROM BATTERY POSITIVE TERMINAL



3. REMOVE WINCH MOTOR
   Remove the three bolts and motor.
4. REMOVE MAGNET SWITCH COVER
   Remove the four screws and cover.
5. TEMPORARILY INSTALL WINCH MOTOR



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WI0065

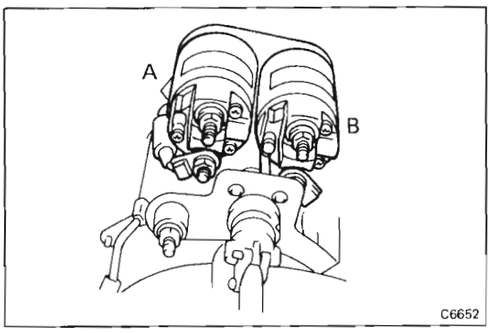
6. REMOVE TERMINAL PLATE

Remove the three nuts and terminal plate.

7. CONNECT BATTERY CABLE TO NEGATIVE TERMINAL

8. CONNECT WINCH REMOTE CONTROL SWITCH

9. TURN IGNITION SWITCH ON



C6652

10. INSPECT NO. 2 MAGNET SWITCH

(a) Using an ohmmeter and voltmeter, check operation of both magnet switches with the winch remote control switch in the "NEUTRAL" position.

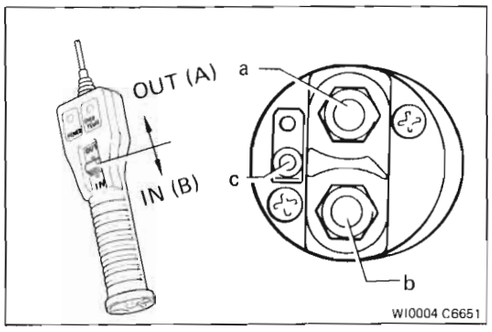
Terminal "c": No voltage
Terminal "a" and "b": No continuity

(b) Using an ohmmeter and voltmeter, check operation of magnet switch "A" with the winch remote control switch on the IN position.

Terminal "c": Battery voltage
Terminal "a" and "b": Continuity

(c) Using an ohmmeter and voltmeter, check operation of magnet switch "B" with the winch remote control switch on the "OUT" position.

Terminal "c": Battery voltage
Terminal "a" and "b": Continuity



WI0004 C6651

11. TURN IGNITION SWITCH OFF

12. DISCONNECT WINCH REMOTE CONTROL SWITCH

13. DISCONNECT BATTERY CABLE FROM NEGATIVE TERMINAL

14. INSTALL TERMINAL PLATE

15. REMOVE WINCH MOTOR

16. INSTALL MAGNET SWITCH COVER

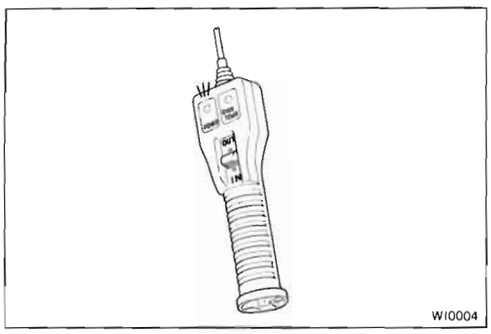
17. INSTALL WINCH MOTOR

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

18. CONNECT MAGNET SWITCH CABLE TO BATTERY

19. CONNECT BATTERY CABLE TO NEGATIVE TERMINAL

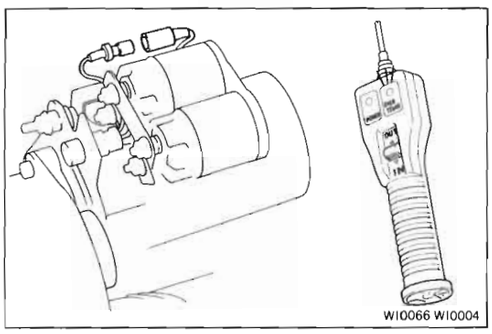
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INSPECTION OF WINCH REMOTE CONTROL SWITCH

1. CHECK INDICATOR LIGHT AND BUZZER

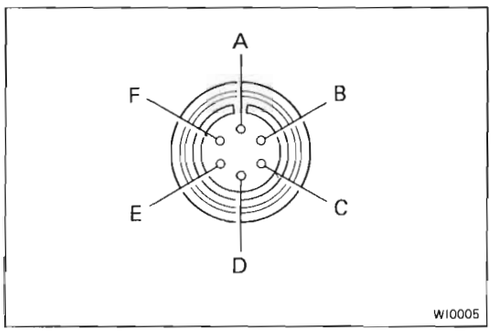
(a) The power indicator light will light when the winch remote control switch connector is connected.



(b) Remove the magnet switch cover.
(See steps 1, 3, 4 and 5 on page WI-37)

(c) The overheat temperature indicator light will light and buzzer sound when the thermo switch connector is disconnected.

(d) Install the magnet switch cover.
(See steps 15, 16, 17 and 19 on page WI-38)



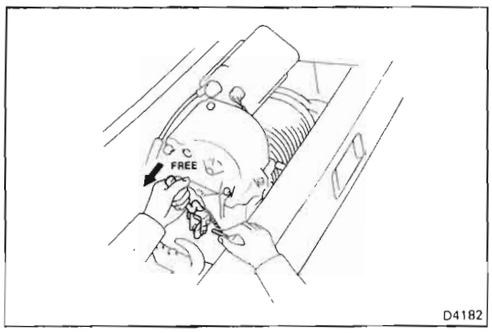
2. CHECK WINCH REMOTE CONTROL SWITCH CIRCUIT

(a) Using an ohmmeter, check for continuity between terminals "B" and "C" or "B" and "E" with the winch remote control switch on the "NEUTRAL" position.

(b) Using an ohmmeter, check for continuity between terminals "B" and "D" with the winch remote control switch on the "IN" position.

(c) Using an ohmmeter, check for continuity between terminals "B" and "F" with the winch remote control switch on the "OUT" position.

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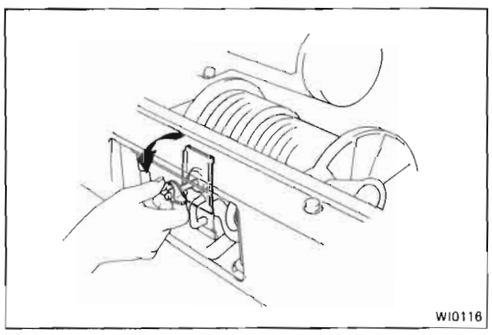


Chain Wire

REMOVAL OF CHAIN WIRE

1. REMOVE CHAIN WIRE

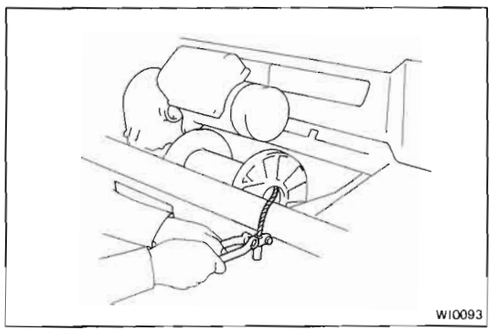
(a) Shift the hub shift lever to the free position.



(b) Loosen the wing nut and turn the No. 1 support bracket 90°.

(c) Pull out the No. 1 bracket support together with the chain wire from the drum.

2. REMOVE HOOK HOLDER FROM CHAIN WIRE



3. REMOVE WIRE LOCK

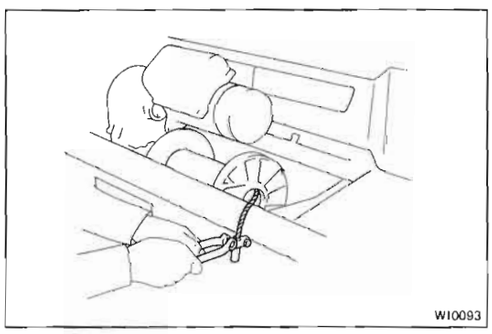
(a) Remove the drum housing cover and then pull out the lock plate from the drum.

(b) Remove the wire lock and lock plate from the chain wire.

INSPECTION OF CHAIN WIRE

(See page WI-2)

INSTALLATION OF CHAIN WIRE



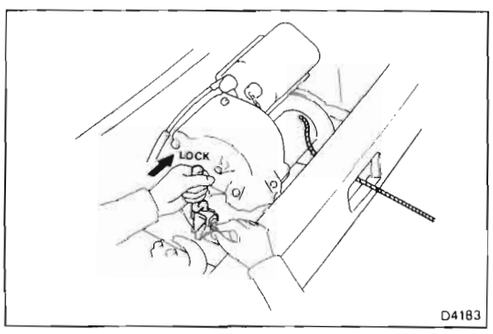
1. INSTALL WIRE LOCK

(a) Insert the chain wire into the wire installation hole of the drum and drum housing cover hole.

(b) Install the wire lock and lock plate to the end of chain wire with the two bolts. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

(c) Install the drum housing cover.

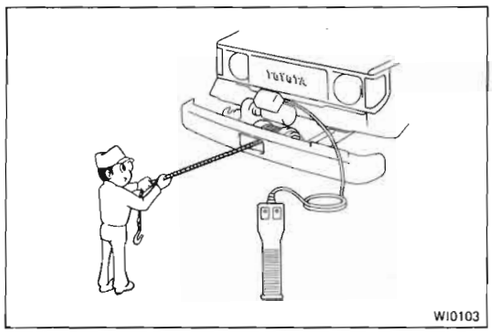


2. WINDING CHAIN WIRE

(a) Shift the hub shift lever in the locked position, and insert the lever lock pin into the hole of the hub shift shaft.

NOTE: If reaching the lever is difficult, move the drum by hand.

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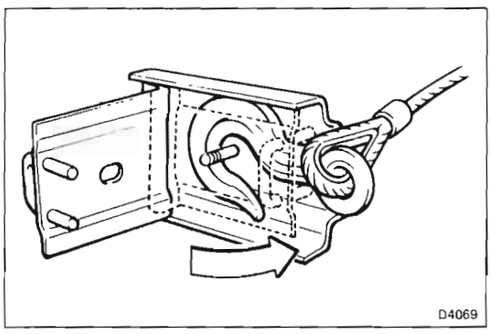
(b) Connect the remote control switch and start the engine.

(c) Confirm that the "power" lamp goes out and place the switch on "IN."

(d) Pull the chain wire tense and feed it to the winch as it winds.

CAUTION: The speed of the winch increases as the end of the cable nears.

(e) Stop winding with about one meter (40 in.) of the chain wire remaining out.

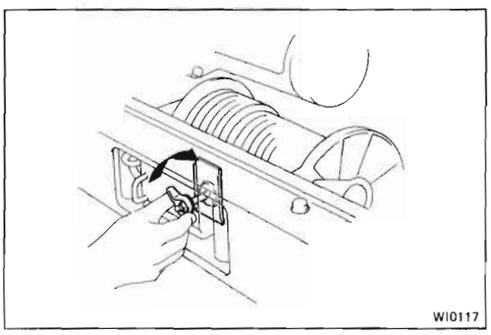


3. INSTALL HOOK HOLDER

(a) Set the wire hook in the hook holder and temporarily tighten the wing nut.

(b) Wind the chain wire until the hook holder enters the bumper.

NOTE: Due to inertia, the drum will continue to rotate for a short time after the switch it off.
To prevent damage to the mechanism, switch off the winch with 300 – 400 mm (11.81 – 15.75 in.) of the chain wire remaining.



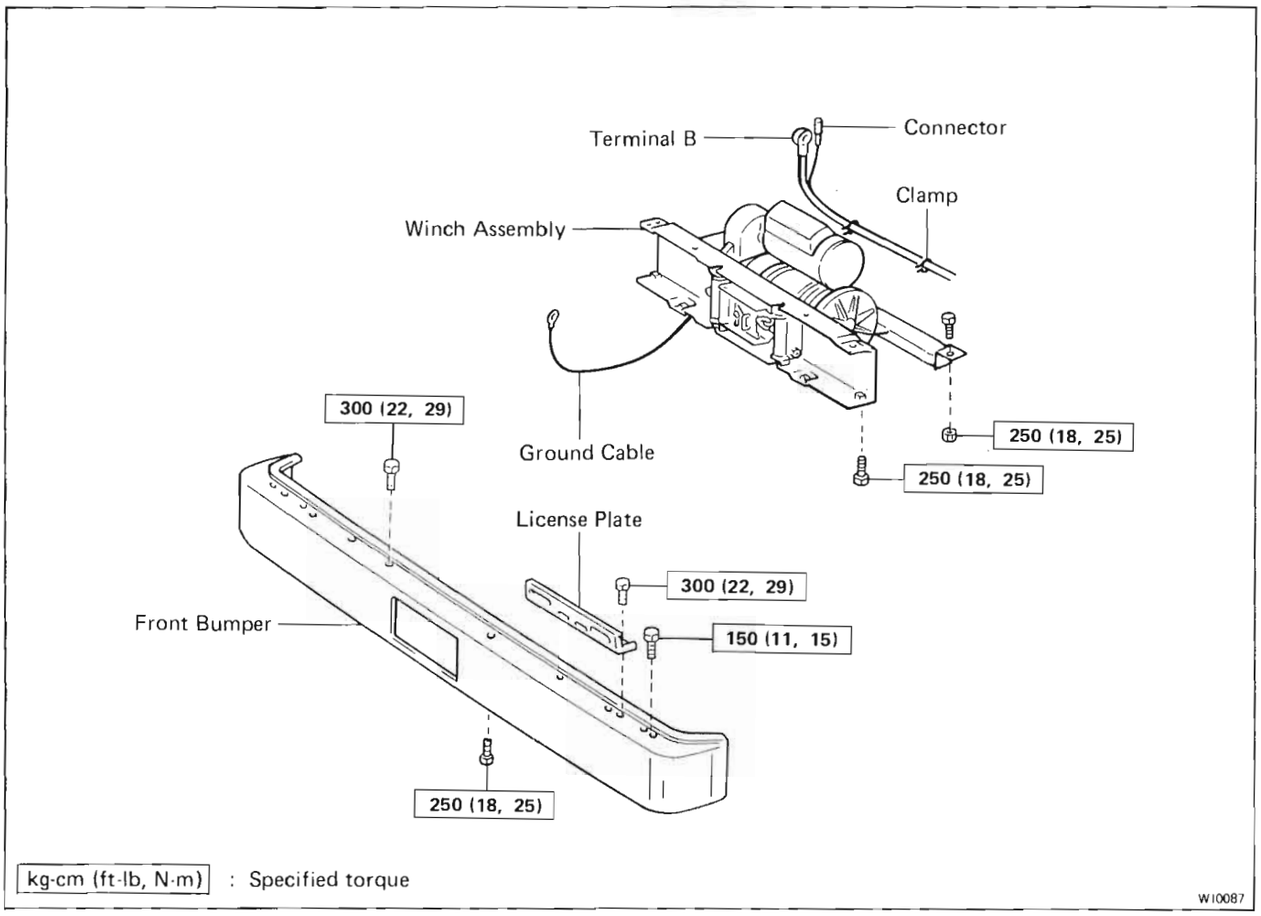
(c) Loosen the wing nut and turn the No. 1 support bracket 90°, then tighten wing nut.

(d) Disconnect the remote control switch and install the connector cover.

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Winch

COMPONENTS

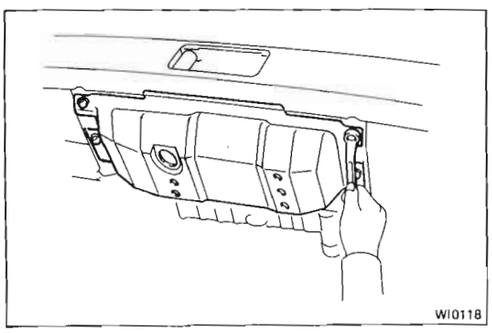


REMOVAL OF WINCH

1. REMOVE CHAIN WIRE
(See page WI-40)

NOTE: Except when repairing the winch, do not remove the chain wire.

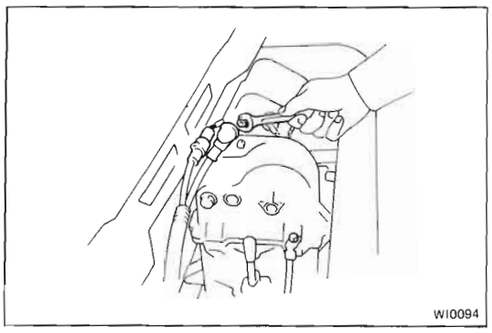
2. DRAIN WINCH FLUID



3. REMOVE WINCH UNDERCOVER

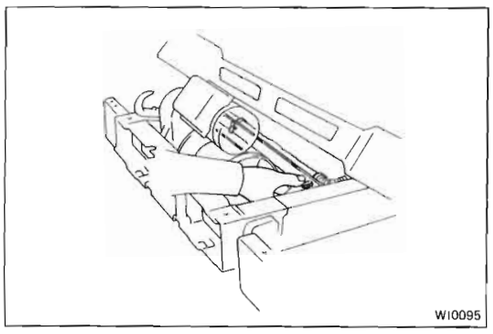
Remove the four bolts and winch undercover.

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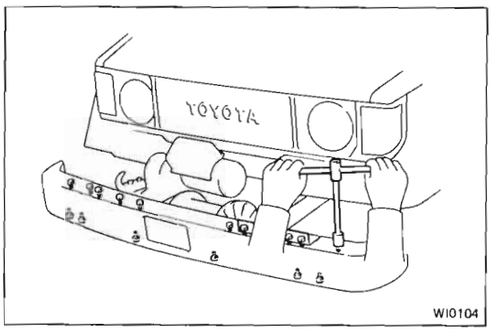

WI0094

4. DISCONNECT WIRE HARNESS

(a) Disconnect connector for No. 1 magnet switch.
(b) Disconnect terminal B.
(c) Disconnect ground cable at mounting bracket.

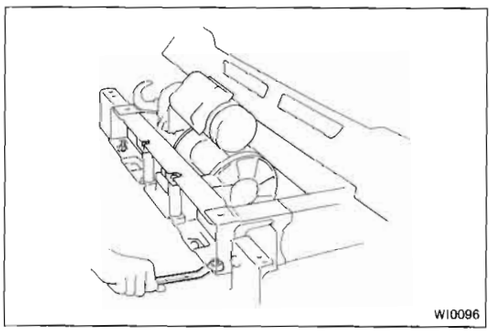

WI0095

5. REMOVE TWO WIRE HARNESS CLAMPS


WI0104

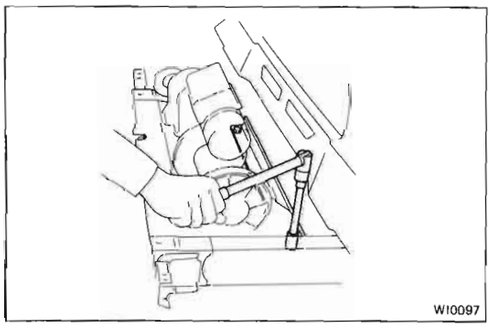
6. REMOVE FRONT BUMPER

Remove the 16 bolts, front bumper and license plate bracket.


WI0096

7. REMOVE WINCH ASSEMBLY

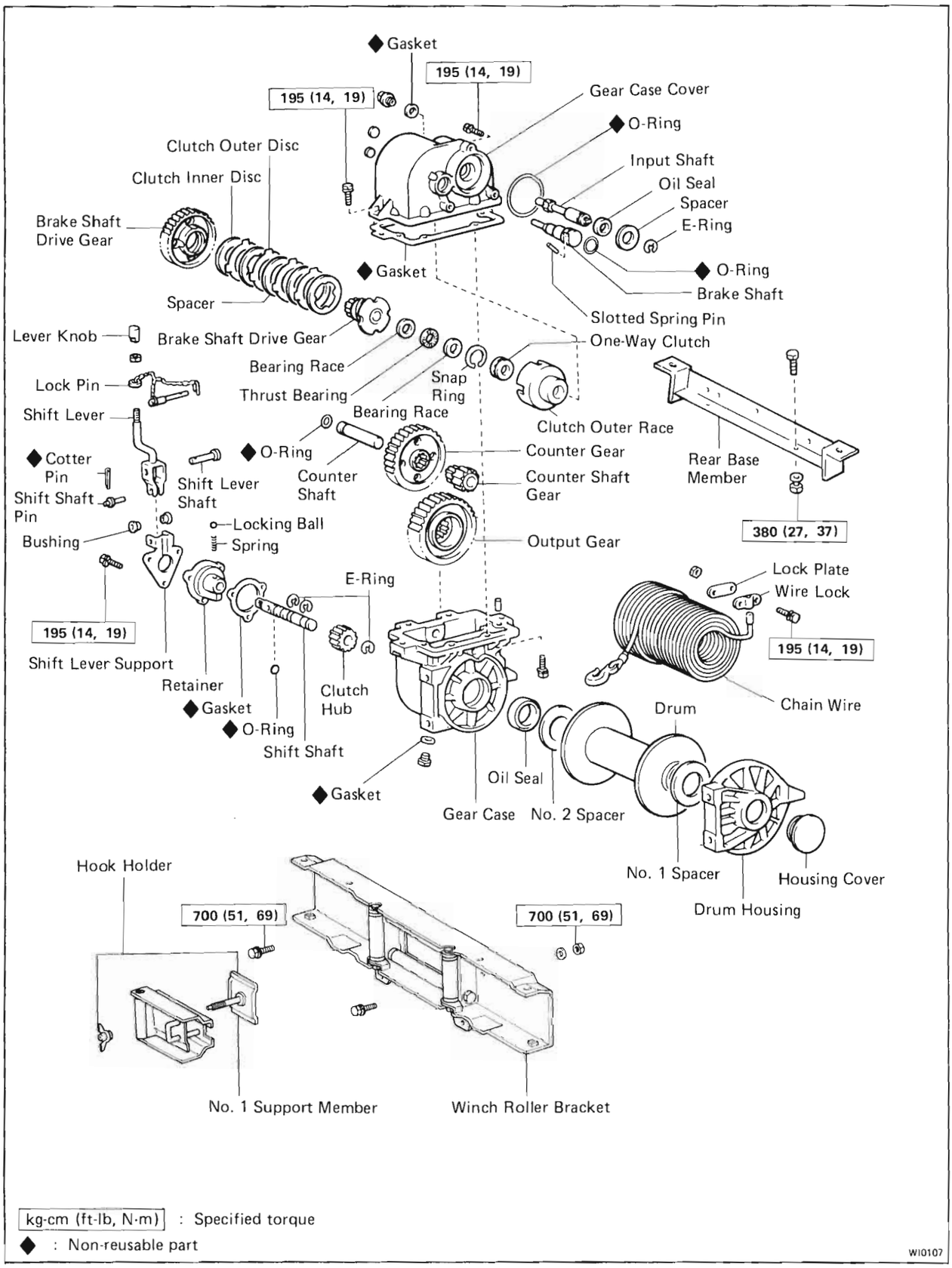
(a) Remove the two winch roller bracket bolts.


WI0097

(b) Remove the two winch rear base member bolts.
(c) Remove the winch assembly from the vehicle.

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COMPONENTS

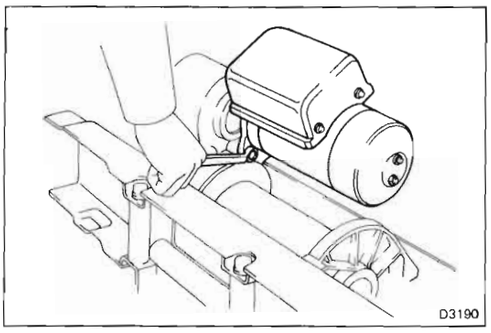


kg-cm (ft-lb, N·m) : Specified torque

◆ : Non-reusable part

WI0107

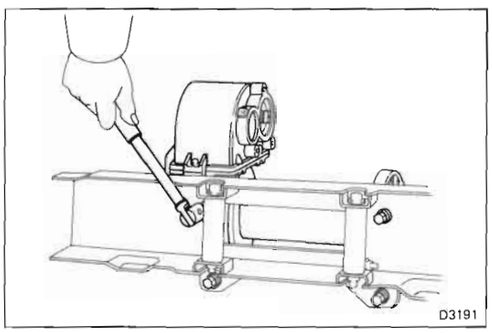
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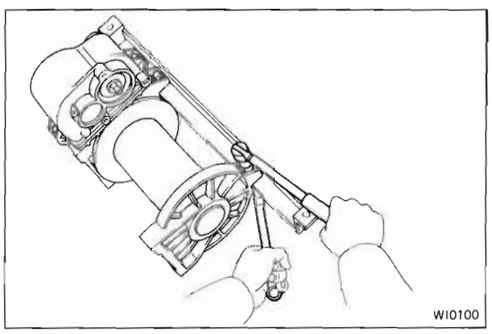
DISASSEMBLY OF WINCH

(See page WI-44)

1. REMOVE MOTOR
   (a) Remove the three bolts and motor.
   (b) Remove the O-ring.

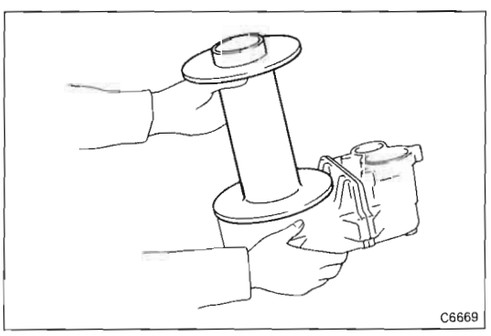


2. REMOVE WINCH ROLLER BRACKET
   Remove the four bolts, two nuts and winch roller bracket.

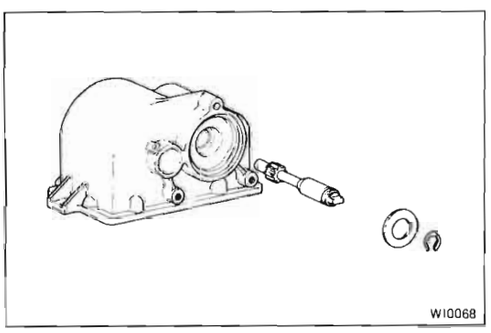


3. REMOVE REAR BASE MEMBER
   Remove the two bolts and rear base member.

4. REMOVE DRUM HOUSING AND NO. 1 SPACER

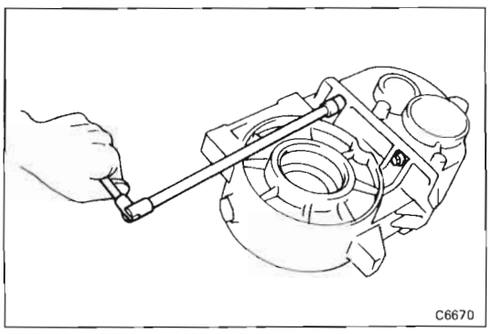


5. REMOVE DRUM AND NO. 2 SPACER
   (a) Shift the shift lever to the lock position.
   (b) Remove the drum and spacer.
   NOTE: Be careful not to damage the oil seal.



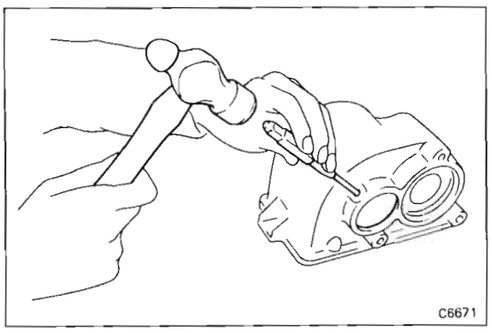
6. REMOVE INPUT SHAFT AND SPACER
   (a) Pull out the input shaft with the spacer from the gear case cover.
   (b) Remove the E-ring and spacer from the input shaft.

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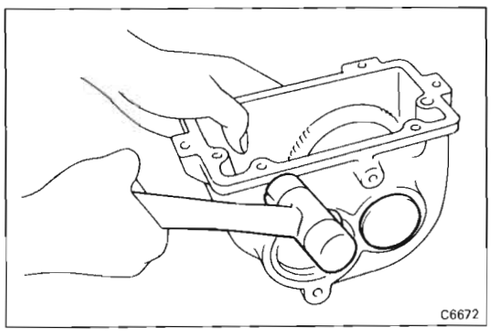
7. REMOVE GEAR CASE COVER AND GASKET FROM GEAR CASE

Remove the six bolts, gear case cover and gasket.



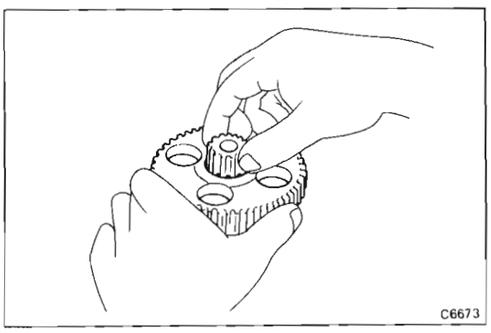
8. REMOVE BRAKE SHAFT AND CLUTCH SUB-ASSEMBLY

(a) Using a pin punch and hammer, drive out the slotted spring pin.



(b) Using a plastic hammer, lightly tap the gear case cover and remove the brake shaft.

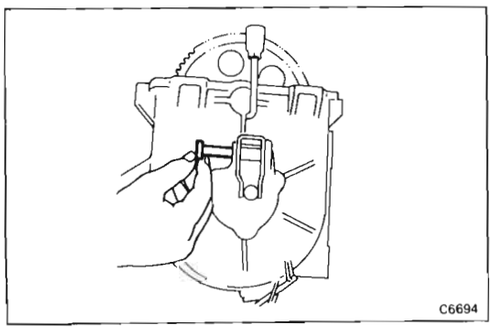
(c) Remove the clutch subassembly.



9. DISASSEMBLE CLUTCH SUBASSEMBLY

(a) Remove the clutch outer race, and then remove the thrust bearing and two bearing races.

(b) Turn the brake shaft driven gear counterclockwise and then remove the brake shaft drive gear, four clutch outer discs, four inner discs and spacer from the brake shaft driven gear.



10. REMOVE SHIFT LEVER

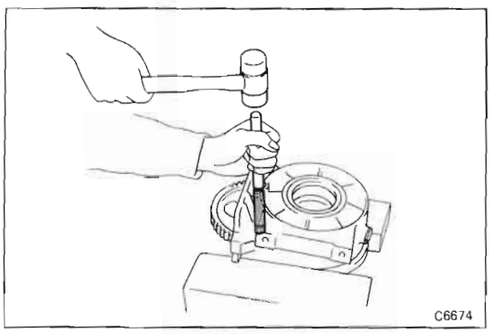
(a) Remove the lock pin.

(b) Remove the cotter pin and shift lever shaft.

(c) Remove the shift lever with two bushings.

(d) Remove the shift shaft pin from the shift shaft.

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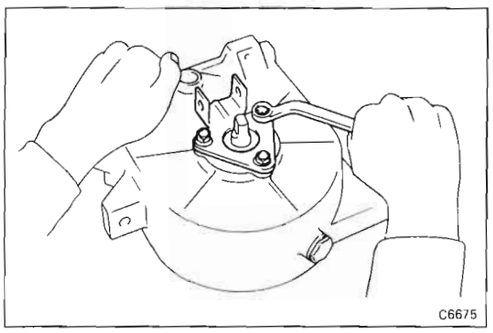


11. REMOVE COUNTER SHAFT, NO. 1 COUNTER GEAR AND COUNTER SHAFT GEAR

(a) Using a brass bar and hammer, drive out the counter shaft from the gear case.

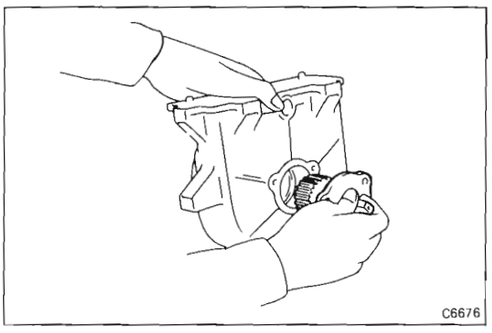
(b) Remove the No. 1 counter gear and counter shaft gear.

(c) Remove the O-ring from the counter shaft.



12. REMOVE SHIFT LEVER SUPPORT

Remove the three bolts and support.

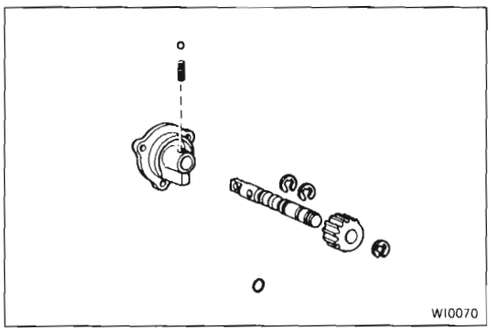


13. REMOVE CLUTCH HUB WITH SHIFT SHAFT, RETAINER AND GASKET

(a) Remove the clutch hub with the shift shaft and retainer.

(b) Remove the gasket.

(c) Remove the output gear.



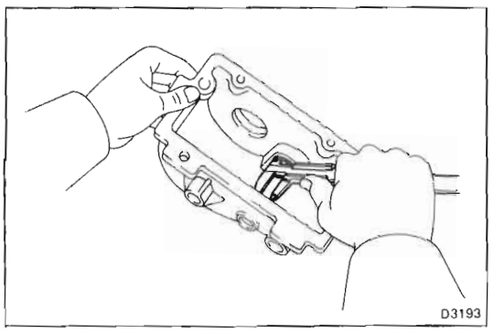
(d) Remove the retainer from the shift shaft.

NOTE: Be careful not to lose the locking ball.

(e) Remove the E-ring and clutch hub.

(f) Remove the O-ring.

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INSPECTION AND REPLACEMENT OF WINCH COMPONENTS

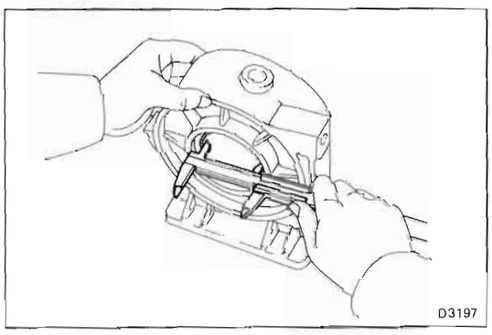
1. INSPECT GEAR CASE COVER BUSHING

Using calipers, measure the bushing bore.

Maximum bore:

Motor side	22.3 mm (0.878 in.)
Case side	14.2 mm (0.559 in.)

If the bushing bore exceeds maximum, replace the gear case cover assembly.

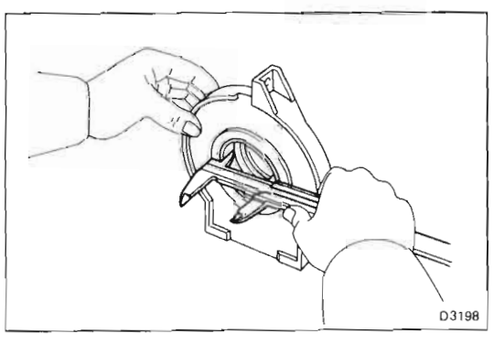


2. INSPECT GEAR CASE BUSHING

Using calipers, measure the bushing bore.

Maximum bore: 75.5 mm (2.972 in.)

If the bushing bore is greater than maximum, replace the gear case assembly.

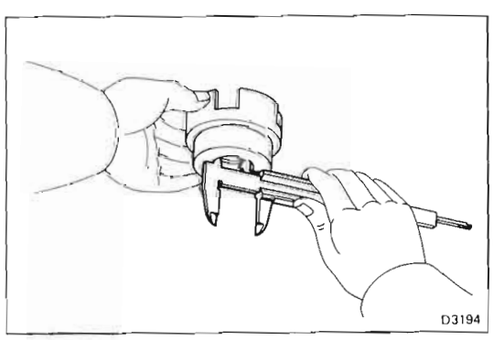


3. INSPECT DRUM HOUSING BUSHING

Using calipers, measure the bushing bore.

Maximum bore: 86.0 mm (3.386 in.)

If the bushing bore is greater than maximum, replace the drum housing assembly.

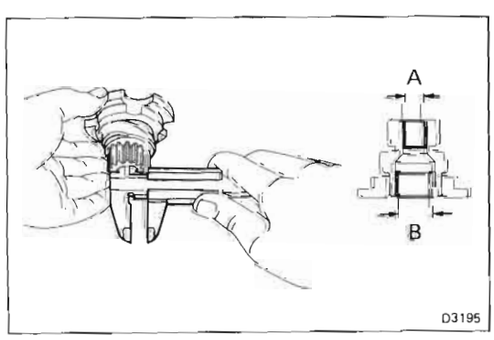


4. INSPECT CLUTCH OUTER RACE BUSHING

Using calipers, measure the bushing bore.

Maximum bore: 37.7 mm (1.484 in.)

If the bushing bore is greater than maximum, replace the clutch outer race assembly.



5. INSPECT BRAKE SHAFT DRIVE GEAR BUSHING

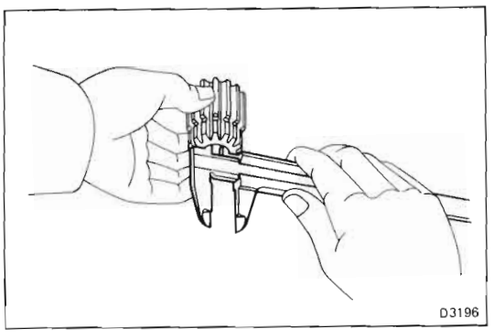
Using calipers, measure the bushing bore.

Maximum bore:

A	12.8 mm (0.504 in.)
B	22.3 mm (0.878 in.)

If the bushing bore is greater than maximum, replace the brake shaft drive gear assembly.

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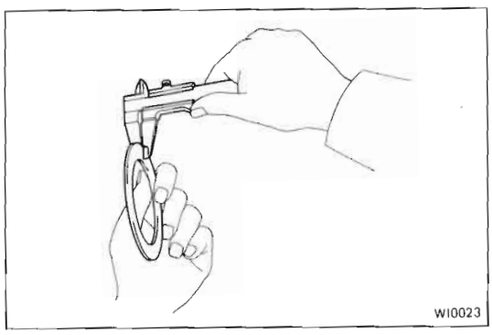


6. INSPECT COUNTER SHAFT GEAR BUSHING

Using calipers, measure the bushing bore.

Maximum bore: 18.3 mm (0.720 in.)

If the bushing bore is greater than maximum, replace the counter shaft gear assembly.

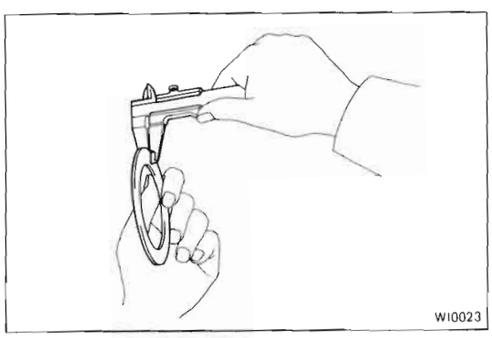


7. INSPECT CLUTCH OUTER DISC, INNER DISC AND SPACER

Using calipers, measure the disc or spacer thickness.

Minimum thickness:

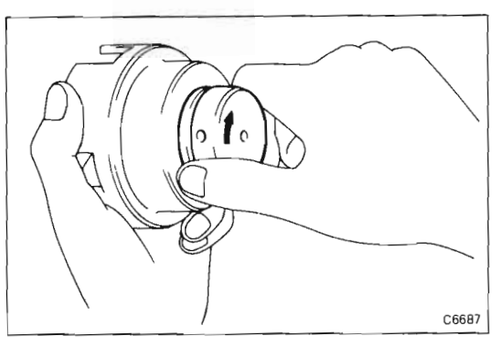
Outer disc	**1.0 mm (0.039 in.)**
Inner disc	**1.9 mm (0.075 in.)**
Spacer	**2.0 mm (0.079 in.)**



8. INSPECT NO. 1 AND NO. 2 DRUM SPACERS

Using calipers, measure the spacer thickness.

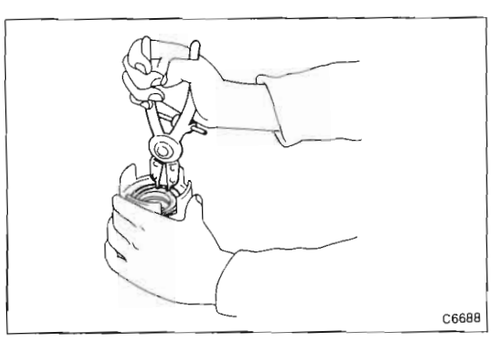
Minimum thickness: 1.2 mm (0.047 in.)



9. INSPECT ONE-WAY CLUTCH OPERATION

(a) Install the brake shaft into the one-way clutch.

(b) Hold the clutch outer race and turn the brake shaft. The brake shaft should turn freely counterclockwise and should lock clockwise.



10. IF NECESSARY, REPLACE ONE-WAY CLUTCH

(a) Using snap ring pliers, remove the snap ring and then remove the one-way clutch.

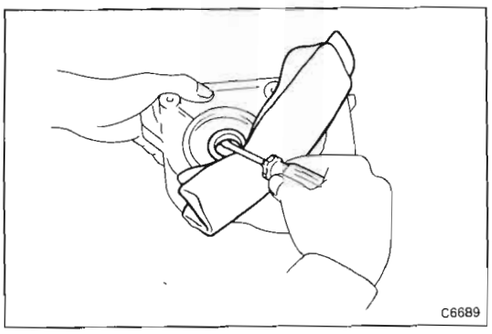
(b) Install the new one-way clutch.

NOTE: Install in proper direction only.

(c) Using snap ring pliers, install the snap ring.

(d) Inspect the one-way clutch operation. (See step 9 on this page)

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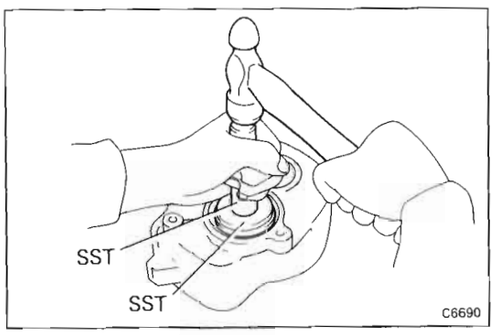


11. INSPECT GEAR CASE COVER OIL SEAL

Inspect for wear or damage.

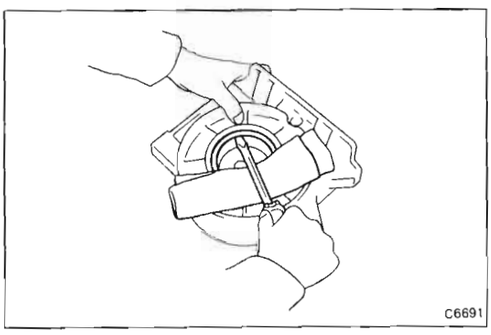
12. IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST, drive in the new oil seal.

SST 09608-35013

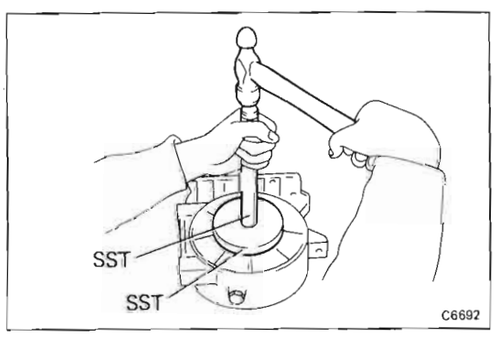


13. INSPECT GEAR CASE OIL SEAL

Inspect for wear or damage.

14. IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST, drive in the new oil seal.

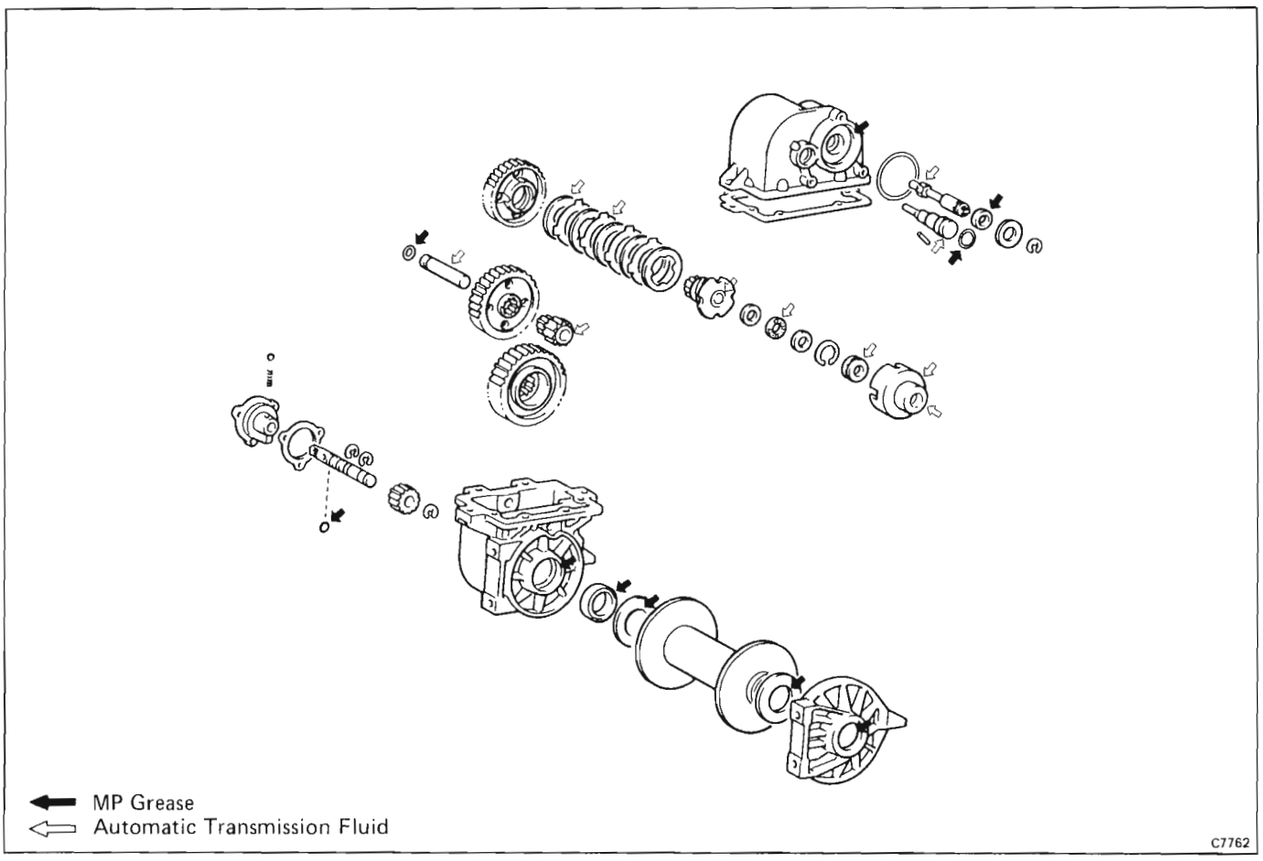
SST 09608-35013

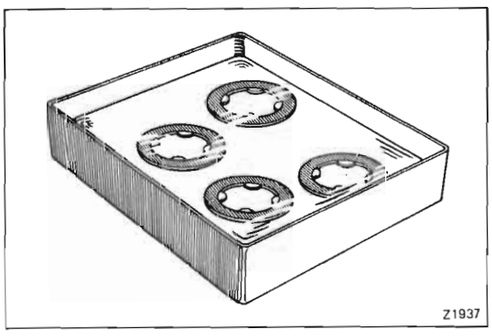
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ASSEMBLY OF WINCH

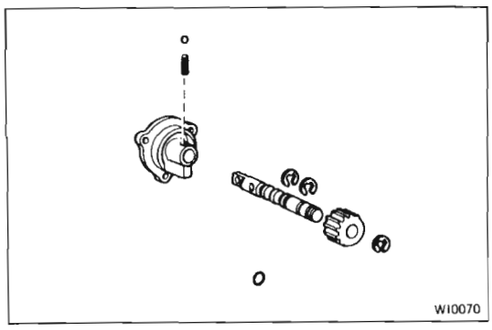
(See page WI-44)

1. APPLY MP GREASE OR AUTOMATIC TRANSMISSION FLUID(ATF) TO PARTS SHOWN BELOW





NOTE: Before assembling, soak new inner discs in automatic transmission fluid for two hours.

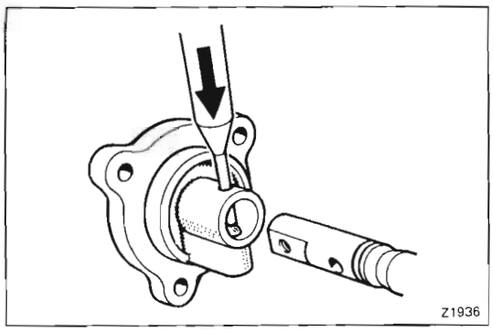


2. INSTALL CLUTCH HUB, THREE E-RINGS AND O-RING TO SHIFT SHAFT

(a) Install a new O-ring to the shift shaft.

(b) Install the two E-rings to the shift shaft, and then install the clutch hub and E-ring.

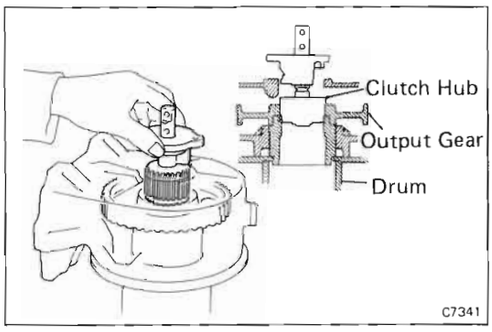
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3. INSTALL SHIFT SHAFT WITH CLUTCH HUB TO RETAINER

(a) Install the spring and locking ball to the retainer.

(b) Using a pin punch, depress the locking ball, install the shift shaft into the retainer.

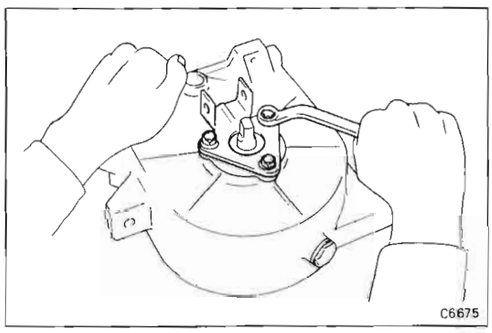


4. INSTALL OUTPUT GEAR INTO GEAR CASE

5. INSTALL NEW GASKET AND CLUTCH HUB WITH SHIFT SHAFT AND RETAINER TO GEAR CASE

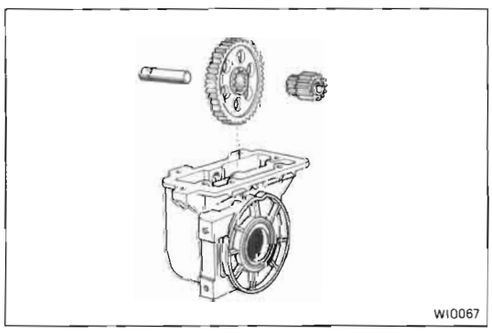
(a) Place a new gasket on the gear case.

(b) Install the clutch hub with shift shaft and retainer into the gear case.



6. INSTALL SHIFT LEVER SUPPORT

Torque: **195 kg-cm (14 ft-lb, 19 N·m)**

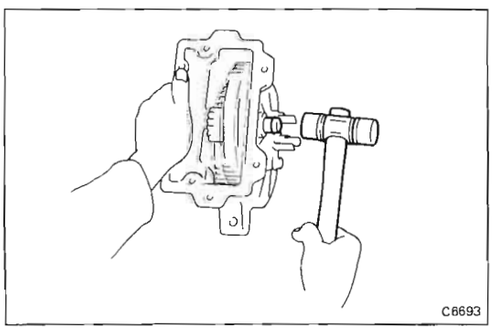


7. INSTALL COUNTER SHAFT GEAR, NO. 1 COUNTER GEAR AND COUNTER SHAFT

(a) Install a new O-ring to the counter shaft.

(b) Install the counter shaft gear into the No. 1 counter gear.

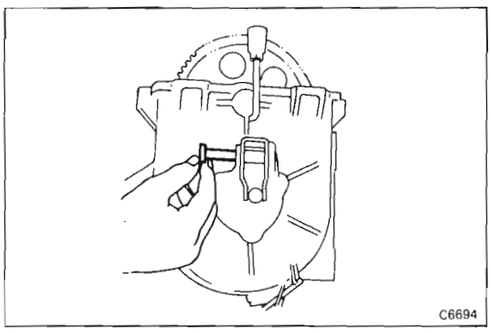
(c) Put the No. 1 counter gear with counter shaft gear into the gear case.



(d) Using a plastic hammer, drive the counter shaft into the gear case through the counter shaft gear.

NOTE: Install in proper direction only.

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8. INSTALL SHIFT LEVER

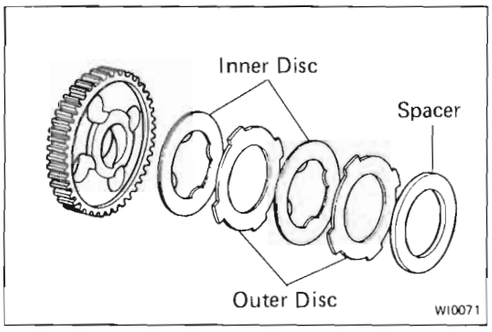
(a) Install the shift shaft pin to the shift shaft.

(b) Install the two bushings into the shift lever holes.

(c) Install the shift lever into the support with shift lever shaft.

(d) Install a new cotter pin.

(e) Install the lock pin.

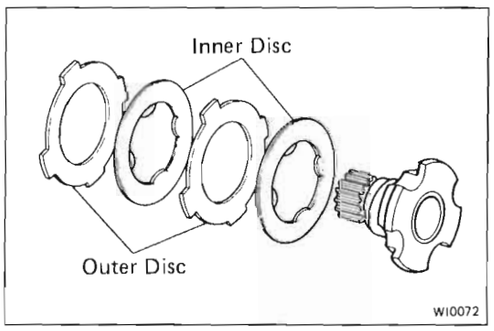


9. ASSEMBLE CLUTCH SUBASSEMBLY

(a) Install the two clutch outer discs, two inner discs and spacer on the brake shaft drive gear.

Install in order: drive gear, inner disc, outer disc, inner disc, outer disc and spacer.

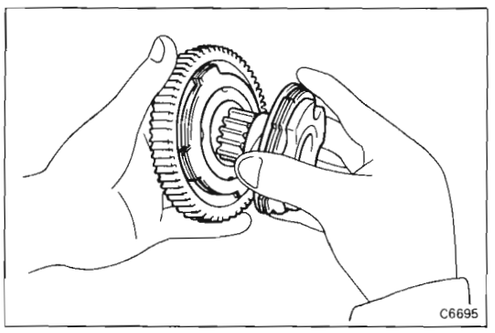
NOTE: Align the notches and tabs.



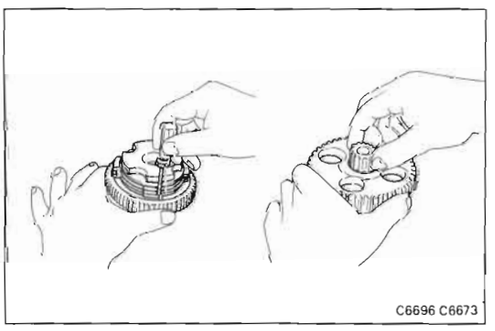
(b) Install the two clutch outer discs, and two inner discs on the brake shaft driven gear.

Install in order: driven gear, inner disc, outer disc, inner disc and outer disc.

NOTE: Align the notches and tabs.



(c) Hold the drive gear with discs, turn the driven gear with discs counterclockwise and assemble them.



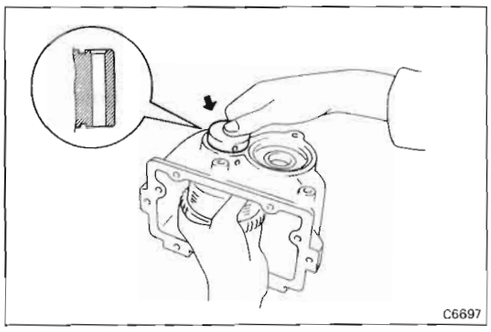
(d) Align the outer disc flukes.

(e) Lock the clutch and turn the driven gear clockwise.

(f) Install the thrust bearing, two bearing races and clutch outer race.

NOTE: Confirm that the thrust bearing and race are aligned in the center.

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C6697

10. INSTALL CLUTCH SUBASSEMBLY AND BRAKE SHAFT

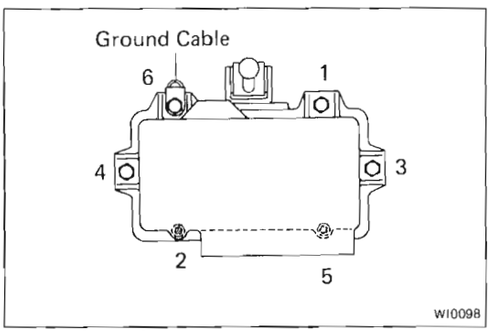
(a) Put the clutch subassembly into the gear case cover.

(b) Install a new O-ring to the brake shaft.

(c) Install the brake shaft into the gear case cover through the clutch subassembly.

NOTE: Align the pin hole of the brake shaft and gear case cover as shown.

(d) Using a pin punch and hammer, tap in a new slotted spring pin.



WI0098

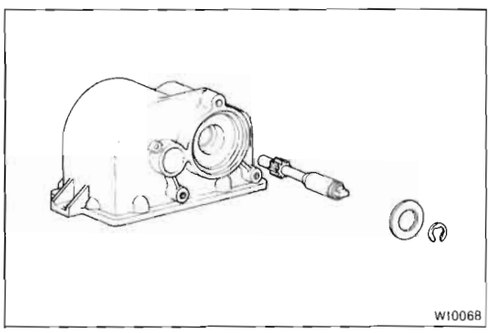
11. INSTALL NEW GASKET AND GEAR CASE COVER

(a) Place a new gasket and gear case cover on the gear case.

(b) Install the set bolts together with the ground cable as shown. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

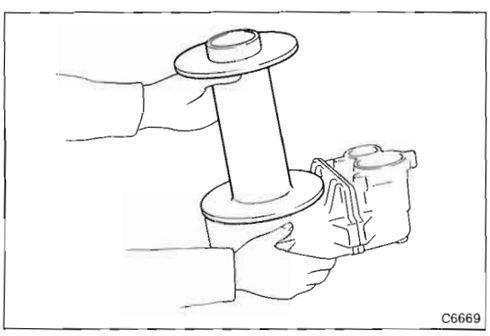
NOTE: Gradually tighten each bolt in several passes in the sequence shown.


WI0068

12. INSTALL WINCH INPUT SHAFT

(a) Install the spacer to the input shaft with the E-ring.

(b) Install the input shaft into the gear case cover.

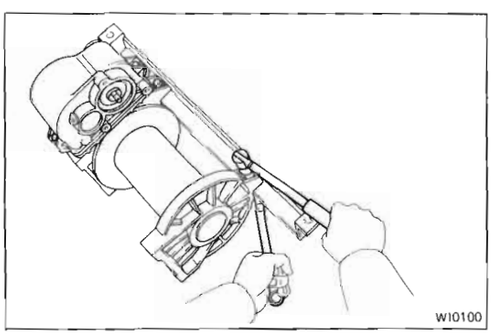

C6669

13. INSTALL NO. 2 DRUM SPACER AND DRUM

Install the spacer and drum on the gear case.

14. INSTALL NO. 1 DRUM SPACER AND DRUM HOUSING

Install the spacer and drum housing on the drum.

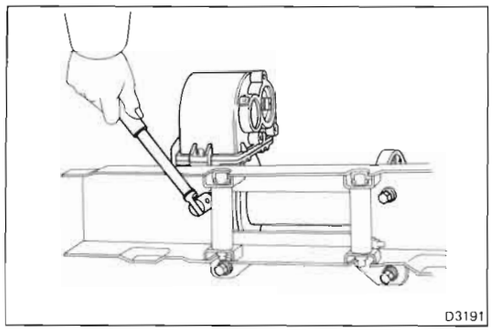

WI0100

15. INSTALL REAR BASE MEMBER

Install the rear base member to the winch with two bolts. Torque the bolts.

Torque: 380 kg-cm (27 ft-lb, 37 N·m)

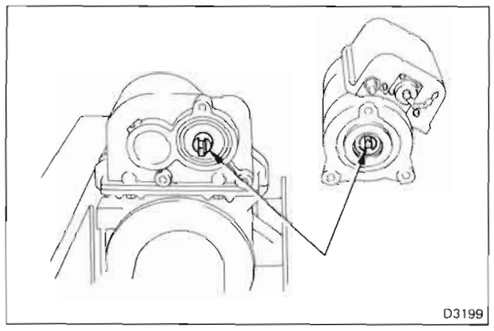
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16. INSTALL WINCH ROLLER BRACKET

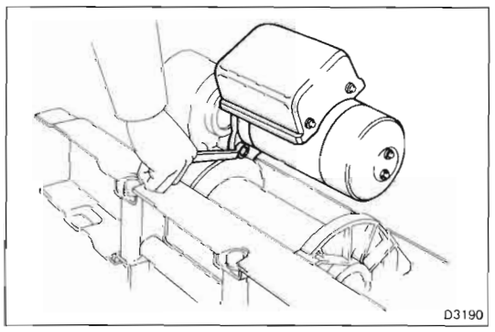
Install the winch roller bracket with four bolts and two nuts. Torque the bolts.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)



17. INSTALL WINCH MOTOR

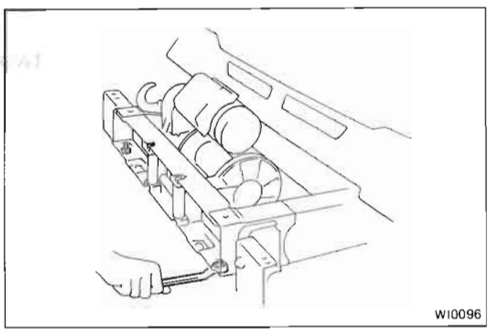
(a) Align the grooves of the motor and input shaft, and assemble through the O-ring.



(b) Install and torque the three bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

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WI0096

INSTALLATION OF WINCH

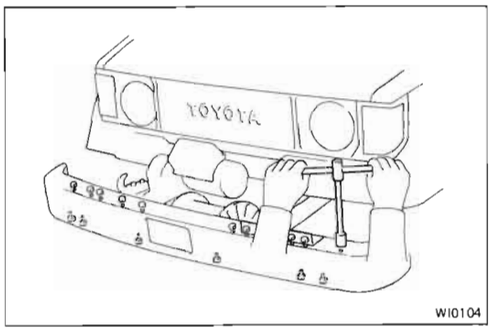
(See page WI-42)

1. INSTALL WINCH ASSEMBLY

(a) Place the winch assembly on the vehicle.

(b) Install the two winch roller bracket bolts. Torque the bolts.

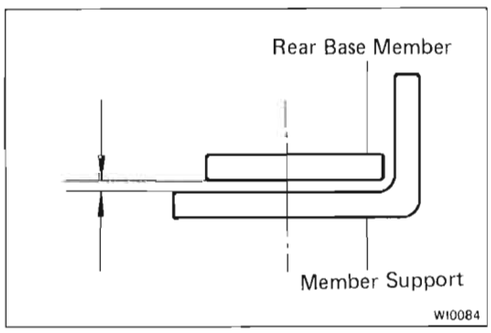
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



WI0104

(c) Install the front bumper and license plate bracket with the 16 bolts.

Torque: See page WI-42

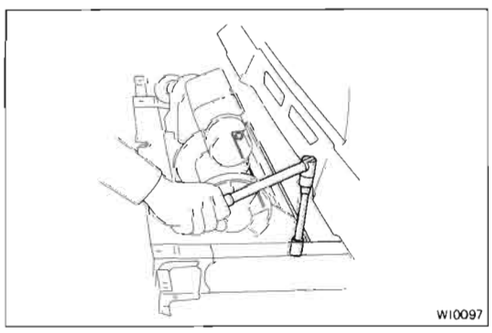


WI0084

(d) Check the clearance between the rear base member and member support.

Standard clearance: Zero

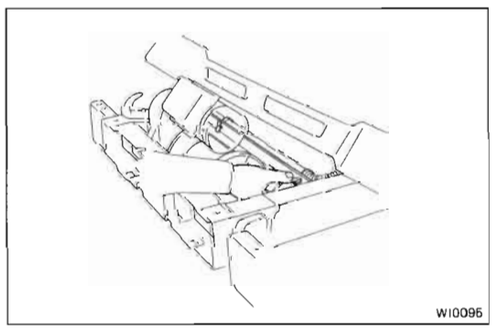
If necessary, adjust the member support position.


WI0097

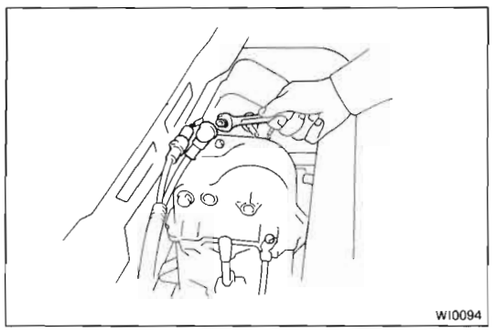
(e) Install and torque the rear base member bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

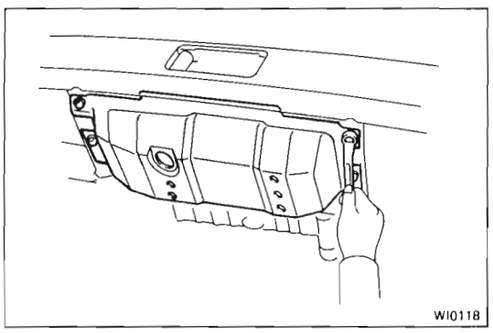
2. INSTALL TWO WIRE HARNESS CLAMPS


WI0095

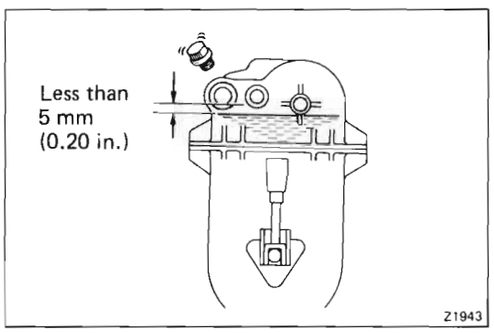
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3. CONNECT WIRE HARNESS
   (a) Connect terminal "B".
   (b) Connect ground cable at mounting bracket.
   (c) Connect connector for No. 1 magnet switch.



4. INSTALL WINCH UNDERCOVER
   Install the winch undercover with the four bolts.



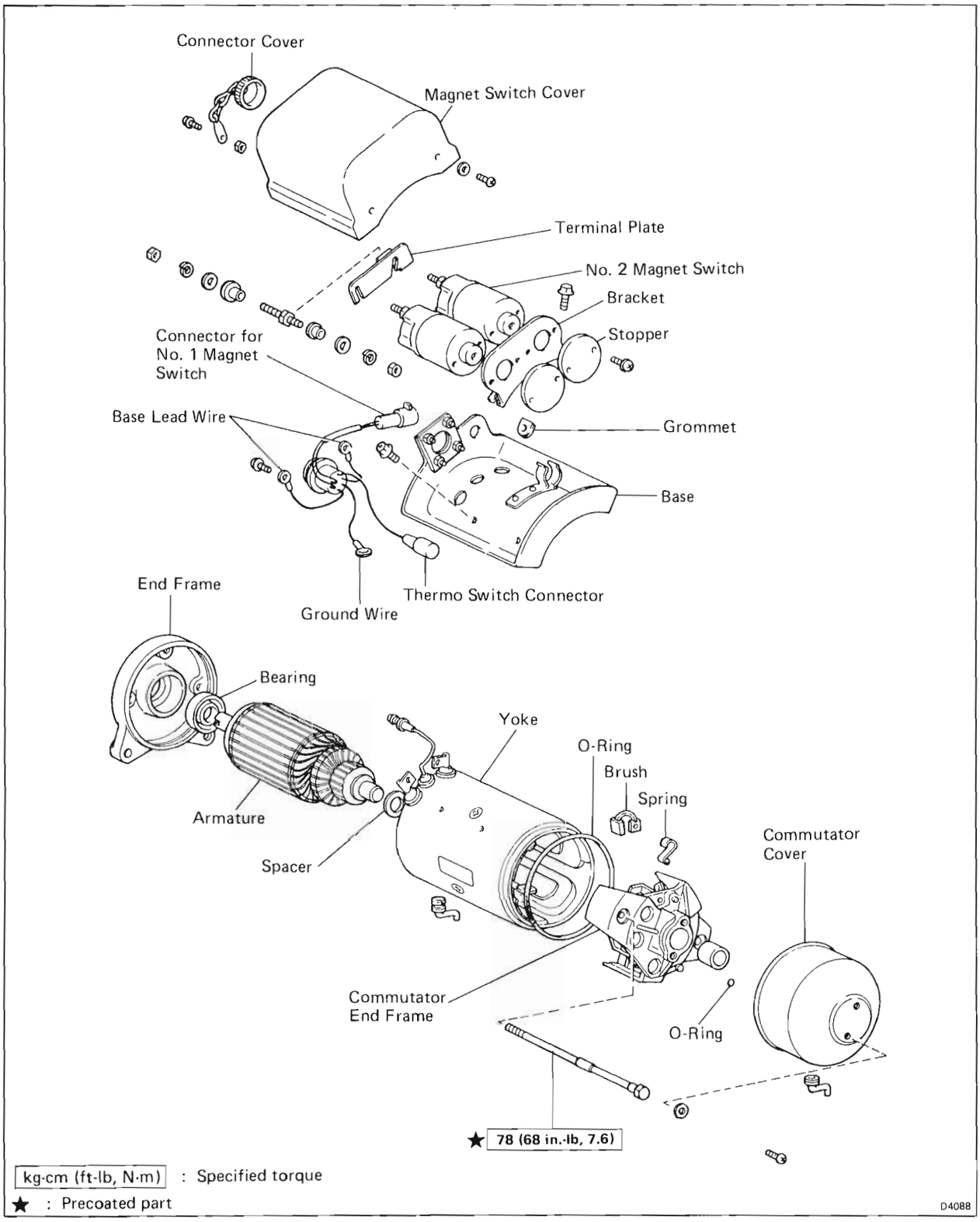
5. FILL WINCH WITH AUTOMATIC TRANSMISSION FLUID
   Oil grade: ATF Type F
   Capacity: 2.0 liters (2.1 US qts, 1.8 Imp. qts)

6. INSTALL CHAIN WIRE
   (See page WI-40)

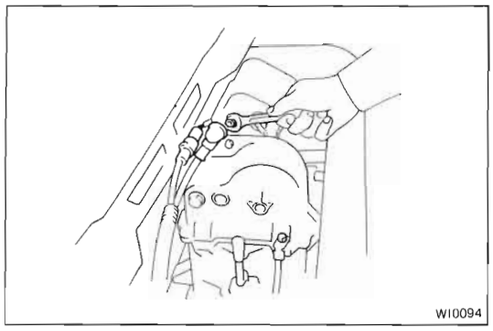
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Winch Motor with No.2 Magnet Switch Assembly

COMPONENTS



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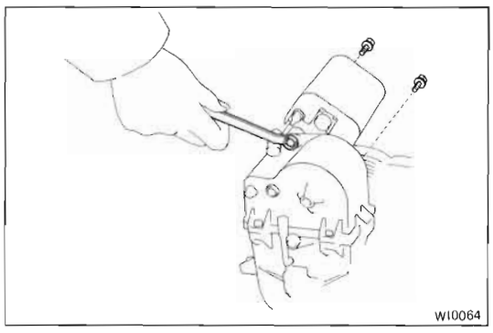


REMOVAL OF WINCH MOTOR WITH NO. 2 MAGNET SWITCH ASSEMBLY

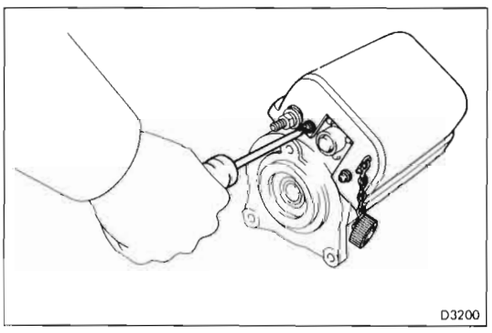
1. REMOVE WINCH MOTOR WITH NO. 2 MAGNET SWITCH ASSEMBLY

(a) Disconnect the battery cable from the negative terminal.

(b) Disconnect terminal B and the connector.



(c) Remove the three bolts, and then remove the winch motor with No. 2 magnet switch assembly.



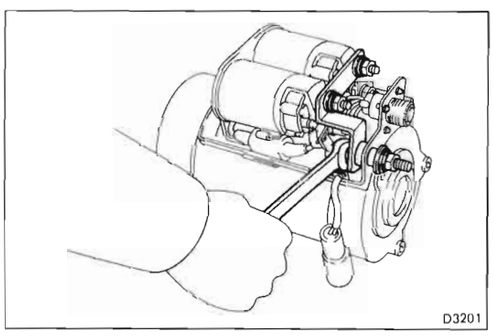
DISASSEMBLY OF NO. 2 MAGNET SWITCH ASSEMBLY

(See page WI-58)

1. REMOVE MAGNET SWITCH COVER

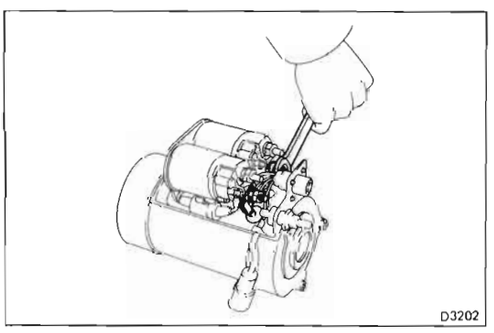
(a) Remove the connector cover.

(b) Remove the four screws and cover.



2. REMOVE TERMINAL PLATE

Remove the three nuts and terminal plate.

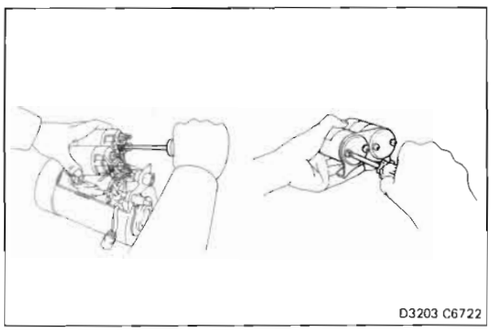


3. REMOVE NO. 2 MAGNET SWITCH

(a) Remove the two nuts and motor lead wire.

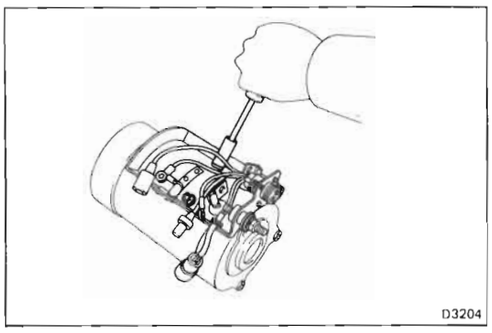
(b) Remove the two magnet switch bracket bolts.

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D3203 C6722

(c) Disconnect the base lead wires from the magnet switches.

(d) Remove the four screws, stoppers and bracket.


D3204

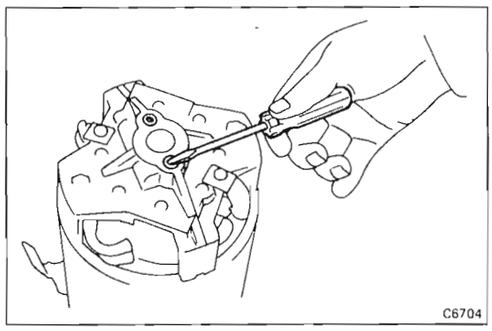
4. REMOVE BASE

(a) Disconnect the thermo sensor connector.

(b) Remove the two bolts and base.

DISASSEMBLY OF WINCH MOTOR

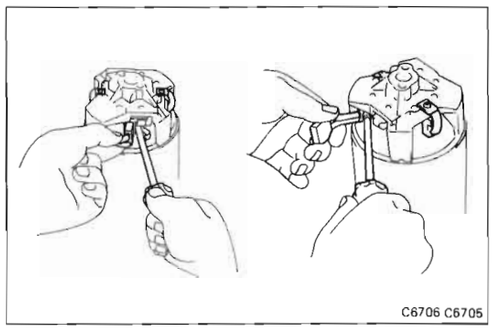
(See page WI-58)


C6704

1. REMOVE COMMUTATOR COVER

(a) Remove the two screws and cover.

(b) Remove the O-ring.


C6706 C6705

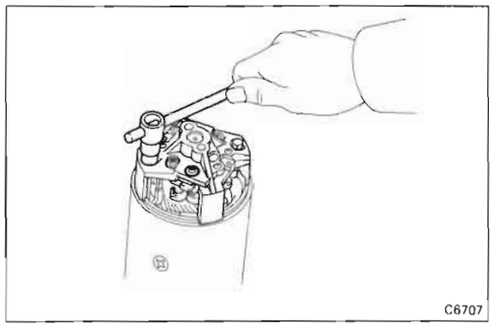
2. REMOVE BRUSHES

(a) Using a screwdriver, remove the positive brush from the brush holder.

(b) Remove the two screws and positive brushes.

(c) Remove the two screws.

(d) Using a screwdriver, remove the negative brush from the positive holder.


C6707

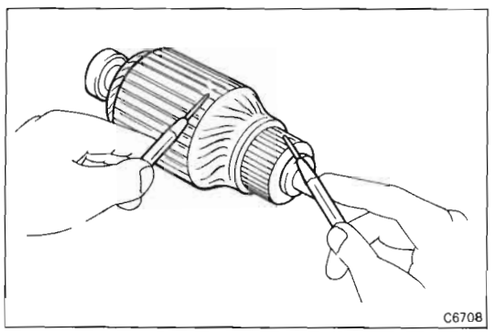
3. REMOVE COMMUTATOR END FRAME

(a) Remove the two bolts.

(b) Remove the commutator end frame and O-ring.

4. REMOVE END FRAME AND ARMATURE FROM YOKE

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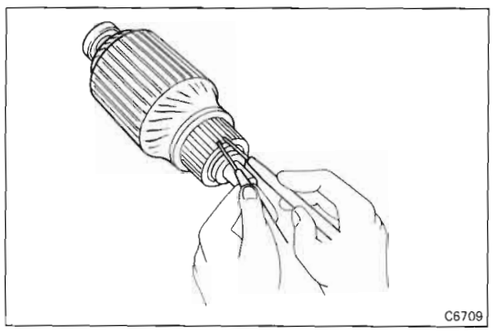

C6708

INSPECTION OF WINCH MOTOR WITH NO.2 MAGNET SWITCH ASSEMBLY

Armature Coil

1. INSPECT THAT COMMUTATOR IS NOT GROUNDED

Using an ohmmeter, check that, there is no continuity between the commutator and armature core.
If there is continuity, replace the armature.


C6709

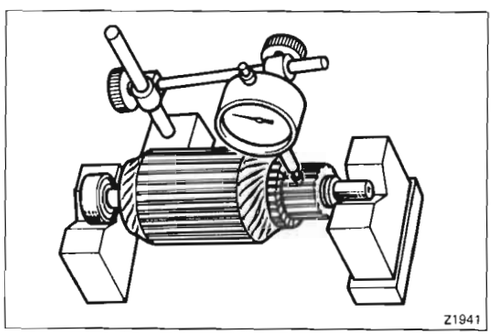
2. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check for continuity between the segment of the commutator.
If there is no continuity between any segment, replace the armature.

Commutator

1. INSPECT COMMUTATOR FOR DIRTY OR BURNT SURFACE

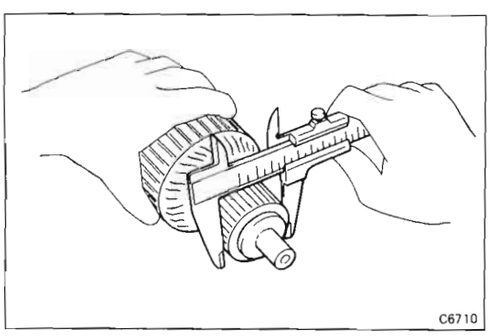
If the surface is dirty or burnt, clean with sandpaper (NO. 400) or a lathe.


Z1941

2. INSPECT COMMUTATOR CIRCLE RUNOUT

Using a dial indicator, measure the circle runout of the commutator.
If the circle runout is greater than the maximum, correct with a lathe.

Maximum runout: 0.2 mm (0.008 in.) or less

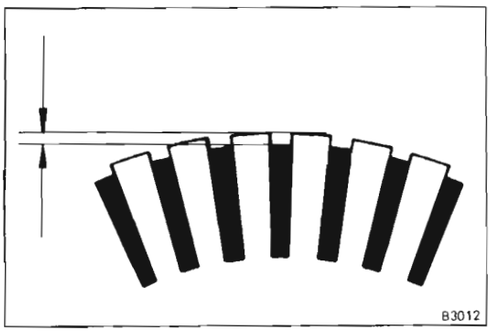

C6710

3. MEASURE DIAMETER OF COMMUTATOR

Using calipers, measure the diameter of the commutator.
If the diameter of the commutator is less than the minimum, replace the armature.

Minimum diameter: 41.0 mm (1.614 in.)

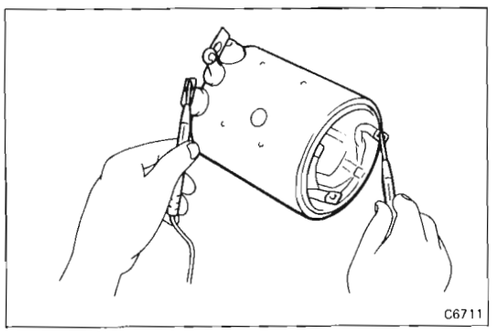
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4. INSPECT UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign particles. Then smooth off the edge.
If the undercut depth is less than the minimum, correct with a hacksaw blade.

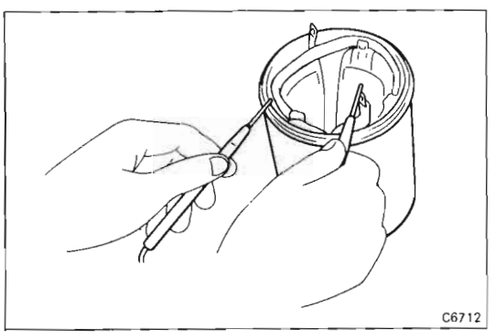
Minimum undercut depth: 0.3 mm (0.012 in.)



Field Coil

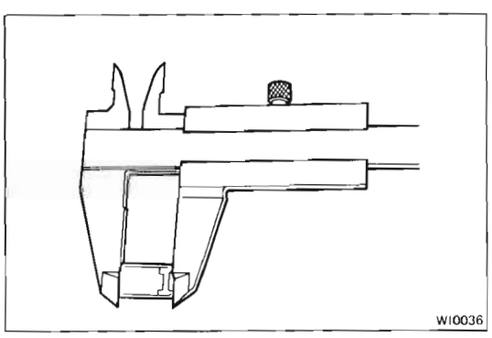
1. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check for continuity between the lead wire and field brush lead.
If there is no continuity, replace the field coil.



2. INSPECT THAT FIELD COIL IS NOT GROUNDED

Using an ohmmeter, check for continuity between the field coil brush lead and field frame.
If there is continuity, repair or replace the yoke sub-assembly.



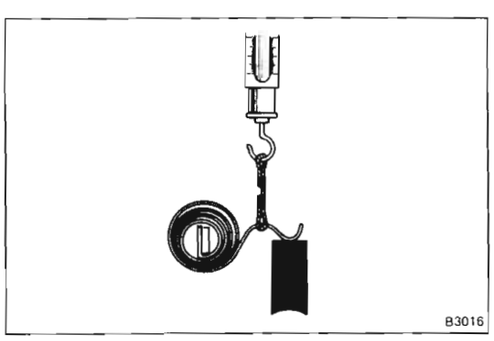
Brush

MEASURE BRUSH LENGTH

Using calipers, measure length of the brush.

Minimum length: 15.0 mm (0.591 in.)

If the brush length is less than the minimum, replace the brush holder assembly.



Brush Spring

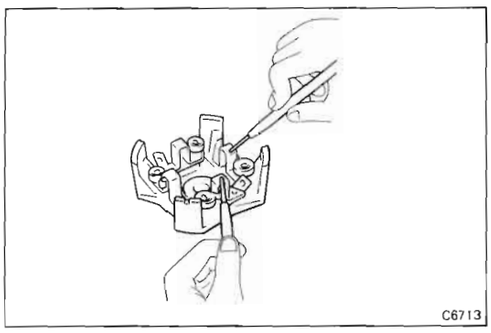
MEASURE BRUSH SPRING LOAD

Using a pull scale, measure the installed load of the brush spring.

Standard installed load: 3,200 – 4,000 g (7.1 – 8.8 lb)

NOTE: Take the pull scale reading at the very instant the brush spring separates from the brush.

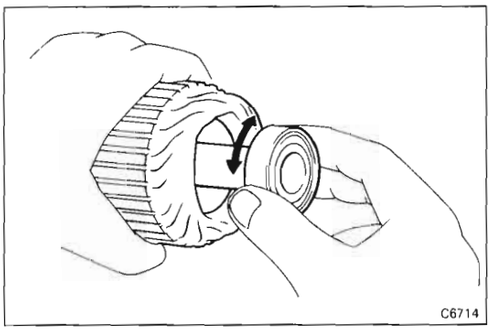
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Brush Holder

INSPECT BRUSH HOLDER

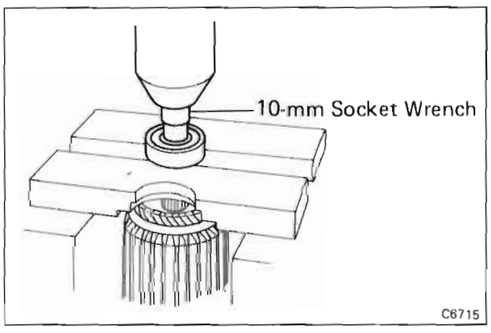
Using an ohmmeter, check for continuity between the positive and negative brush holders.
If there is continuity replace the brush holder assembly.



Bearing

1. INSPECT BEARING

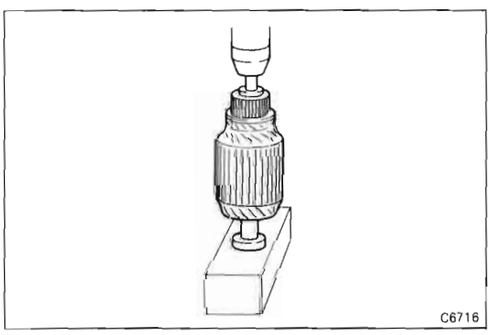
Turn each bearing by hand while applying inward force.
If the bearing sticks or resists, replace it.



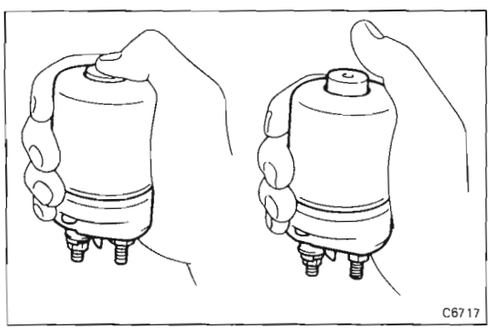
2. IF NECESSARY, REPLACE BEARING

(a) Using a 10-mm socket wrench and SST, remove the bearing from the armature shaft.

SST 09527-20011



(b) Using a press, install the bearing into the shaft.

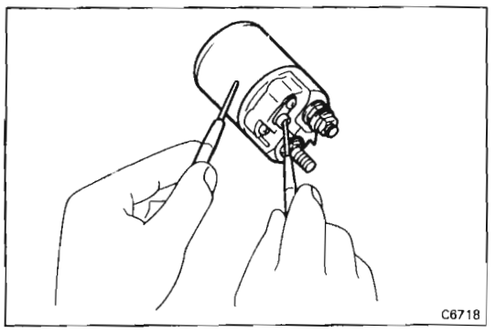


No.2 Magnet Switch

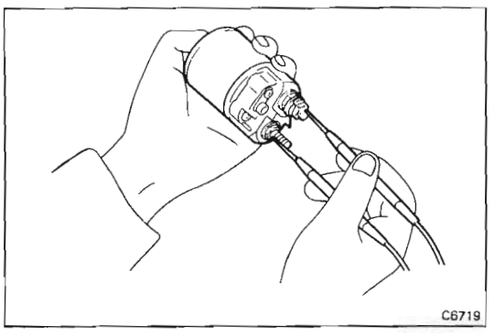
INSPECT NO. 2 MAGNET SWITCH

(a) Push in the plunger and release it. Check that it returns quickly to its original position.

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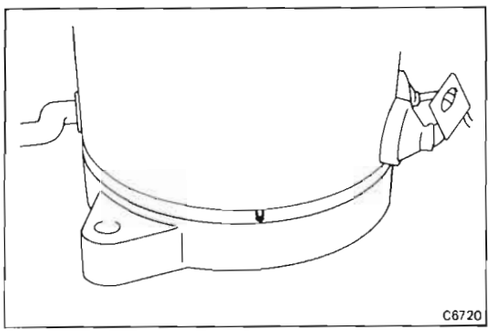
(b) Using an ohmmeter, check for continuity between the base lead wire terminal and magnet switch body. If there is no continuity, replace the magnet switch.



(c) Using an ohmmeter, check for continuity between the main terminals with the plunger pushed in.

(d) Using an ohmmeter, check for no continuity between the terminals with the plunger released.

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C6720

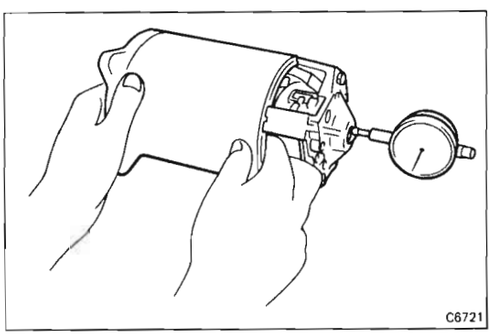
ASSEMBLY OF WINCH MOTOR

(See page WI-58)

1. INSTALL ARMATURE AND YOKE TO END FRAME

Install the armature and yoke to the end frame.

NOTE: Match the protrusion of the yoke with the end frame.


C6721

2. CHECK ARMATURE SHAFT THRUST CLEARANCE

(a) Install the thrust washer and commutator end frame with two bolts.

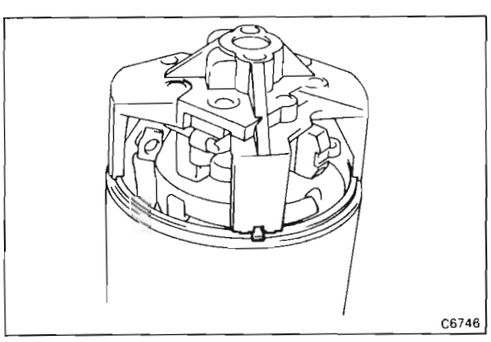
(b) Using a dial gauge, measure the armature shaft thrust clearance.

Standard clearance: 0.05 – 0.50 mm (0.0020 – 0.0197 in.)

If clearance is greater than the standard, replace the thrust washer.

Thrust washer standard thickness: 1.6 mm (0.063 in.)

(c) Remove the commutator end frame and thrust washer.


C6746

3. INSTALL O-RING, THRUST WASHER AND COMMUTATOR END FRAME

(a) Install the O-ring on the yoke.

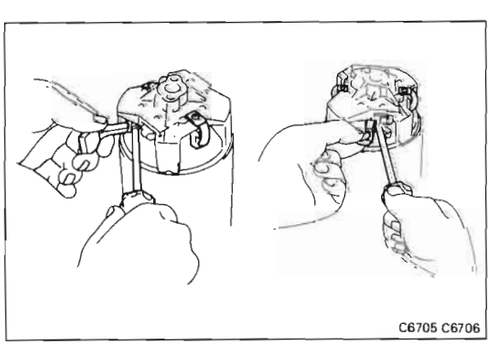
(b) Place the commutator end frame on the yoke.

NOTE: Match the protrusion of the yoke with commutator end frame.

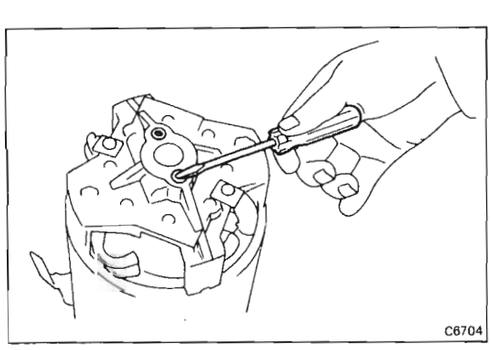
(c) Apply anaerobic adhesive and sealant THREE BOND 1324 (Part No. 08833-00070) or equivalent to the threads of the bolts.

(d) Install and torque the bolts.

Torque: 78 kg-cm (68 in.-lb, 7.6 N·m)


C6705 C6706

4. INSTALL BRUSHES

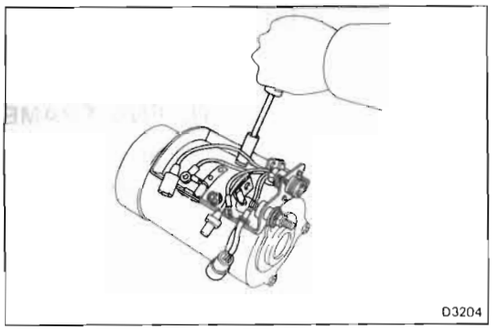

C6704

5. INSTALL COMMUTATOR COVER

(a) Place the two O-rings on the commutator end frame.

(b) Install the commutator cover with two screws.

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D3204

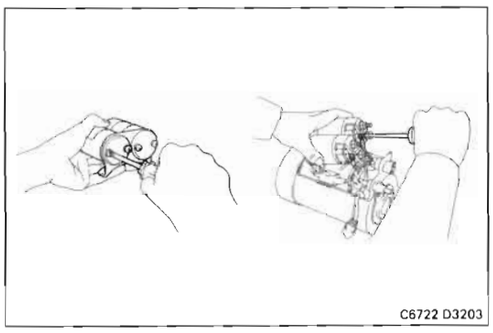
ASSEMBLY OF NO. 2 MAGNET SWITCH ASSEMBLY

(See page WI-58)

1. INSTALL BASE

(a) Set the motor lead wires and thermo switch connector through the base hole.

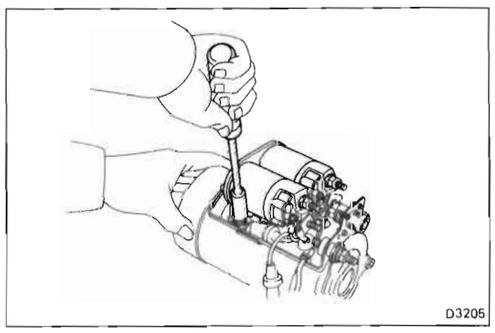
(b) Install the base on the winch motor with two bolts.


C6722 D3203

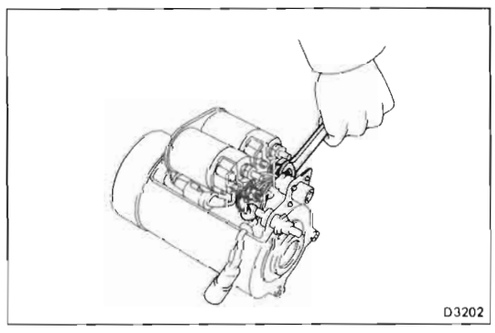
2. INSTALL BRACKET AND STOPPER TO NO. 2 MAGNET SWITCH

(a) Install the bracket and stopper to the magnet switches with screws.

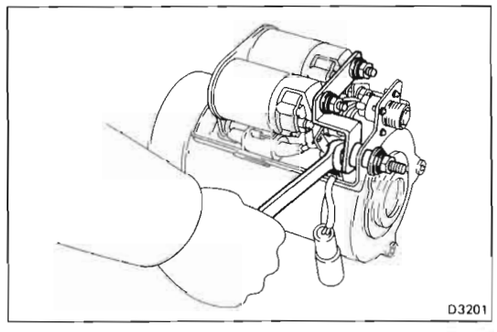
(b) Connect the base lead wires.


D3205

(c) Install the magnet switches with ground wire.


D3202

(d) Connect the motor lead wires with nuts.

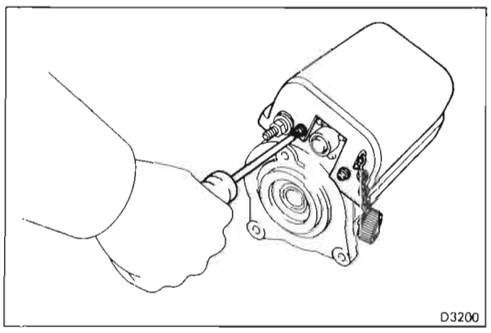

D3201

3. INSTALL TERMINAL PLATE

Install the terminal plate to the magnet switches and terminal "B" with nuts.

4. CONNECT THERMO SWITCH CONNECTOR

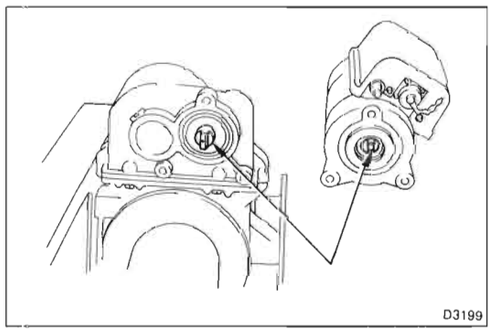
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5. INSTALL MAGNET SWITCH COVER

(a) Install magnet switch cover with four screws.

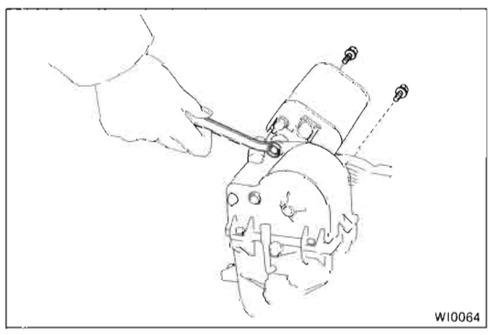
(b) Install the connector cover.



INSTALLATION OF WINCH MOTOR WITH NO. 2 MAGNET SWITCH ASSEMBLY

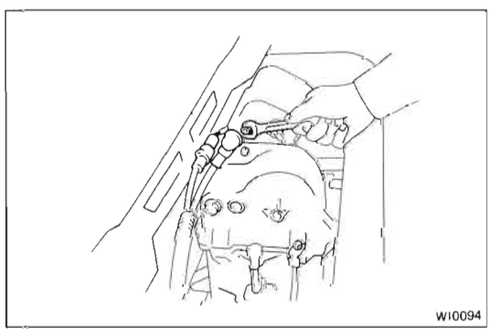
INSTALL WINCH MOTOR

(a) Align the grooves of the motor and input shaft, and assemble through the O-ring.



(b) Install and torque the three bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



(c) Connect the connector and terminal B.

(d) Connect the battery cable to the negative terminal.

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AIR CONDITIONING SYSTEM

	Page
PRECAUTIONS	AC-2
TROUBLESHOOTING	AC-2
Checking of Refrigeration System with Manifold Gauge	AC-4
SPECIAL TOOLS AND EQUIPMENT	AC-8
AIR CONDITIONING SYSTEM CIRCUIT	AC-9
ON-VEHICLE INSPECTION	AC-11
REFRIGERATION SYSTEM	AC-12
Checking of Refrigerant Charge	AC-12
Installation of Manifold Gauge Set	AC-12
Discharging of Refrigeration System	AC-13
Evacuating and Charging of Refrigeration System	AC-13
Performance Test	AC-16
SYSTEM COMPONENTS	AC-18
COMPRESSOR	AC-19
CONDENSER	AC-23
RECEIVER	AC-24
COOLING UNIT	AC-24
Evaporator	AC-26
Thermistor	AC-26
EXPANSION VALVE	AC-28
TEMP. CONTROL SWITCH	AC-28
REFRIGERANT LINES	AC-29
AIR CONDITIONER AMPLIFIER	AC-29
PRESSURE SWITCH	AC-30
VACUUM SWITCHING VALVE (VSV)	AC-30

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PRECAUTIONS

1. **The following precautions should be observed when handling refrigerant (R-12):**
   (a) Always wear eye protection.
   (b) Keep the refrigerant container (service drum) below 40°C (104°F).
   (c) Do not handle refrigerant in an enclosed area where there is an open flame.
   (d) Discharge refrigerant slowly when purging the system.
   (e) Be careful that the liquid refrigerant does not get on your skin.

2. **If liquid refrigerant gets in the eyes or on the skin:**
   (a) Do not rub eyes or skin.
   (b) Wash the area with a lot of cool water.
   (c) Apply clean petroleum jelly to the skin.
   (d) Rush to a physician or hospital for immediate professional treatment.
   (e) Do not attempt to treat yourself.

3. **When tubing:**
   (a) Apply a few drops of compressor oil to the seats of the O-ring fittings.
   (b) Use two wrenches to tighten the nuts to prevent twisting the tube.
   (c) Tighten the O-ring fitting to the specified torque.

Tightening torque for O-ring fittings

Fitting size	Torque
0.31 in. Tube	135 kg-cm (10 ft-lb, 13 N·m)
0.50 in. Tube	225 kg-cm (16 ft-lb, 22 N·m)
0.62 in. Tube	325 kg-cm (24 ft-lb, 32 N·m)

TROUBLESHOOTING

Problem	Possible causes	Remedy	Page
No cooling or warm air	Magnetic clutch does not engage		
	(a) A/C fuse blown	Replace fuse and check for short	AC-9, 10
	(b) Magnetic clutch faulty	Check magnetic clutch	AC-19
	(c) Temp. control switch faulty	Check switch	AC-28
	(d) Thermistor faulty	Check thermistor	AC-26
	(e) A/C amplifier faulty	Check amplifier	AC-29
	(f) Wiring or ground faulty	Repair as necessary	AC-9, 10
	(g) Refrigerant empty	Check refrigerant pressure	AC-12
	(h) Heater relay faulty	Check heater relay	AC-9, 10
	(i) Circuit braker faulty	Check circuit breaker	AC-9, 10
	(j) Pressure switch faulty	Check pressure switch	AC-29
	Compressor does not rotate properly		
	(a) Drive belt loose or broken	Adjust or replace drive belt	AC-22
	(b) Compressor faulty	Check compressor	AC-19
	Expansion valve faulty	Check expansion valve	AC-6
	Leak in system	Test system for leaks	AC-14
	Fusible plug on receiver blown or clogged screen	Check receiver	AC-12

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TROUBLESHOOTING (Cont'd)

Problem	Possible causes	Remedy	Page
No cooling or warm air (Cont'd)	Blower does not operate		
	(a) Heater CB blown	Reset CB and check for short	AC-9, 10
	(b) Temp. control switch faulty	Check switch	AC-28
	(c) Circuit breaker faulty	Check circuit breaker	AC-9, 10
	(d) Heater relay faulty	Check heater relay	AC-9, 10
	(e) Blower motor faulty	Check blower motor	
	(f) Wiring faulty	Repair as necessary	AC-9, 10
Cool air comes out intermittently	Magnetic clutch slipping	Check magnetic clutch	AC-19
	Expansion valve faulty	Check expansion valve	AC-34
	Wiring connection faulty	Repair as necessary	AC-9, 10
	Excessive moisture in system	Evacuate and charge system	AC-13
Cool air comes out only at high speed	Condenser clogged	Check condenser	AC-23
	Drive belt slipping	Check or replace drive belt	AC-22
	Compressor faulty	Check compressor	AC-19
	Insufficient or too much refrigerant	Check refrigerant charge	AC-4
	Air in system	Evacuate and charge system	AC-13
Insufficient cooling	Condenser clogged	Check condenser	AC-23
	Drive belt slipping	Check or replace drive belt	AC-22
	Magnetic clutch faulty	Check magnetic clutch	AC-19
	Compressor faulty	Check compressor	AC-19
	Expansion valve faulty	Check expansion valve	AC-6
	Thermistor faulty	Check thermistor	AC-26
		Check amplifier	AC-29
	Insufficient or too much refrigerant	Check refrigerant charge	AC-12
	Air or excessive compressor oil in system	Evacuate and charge system	AC-13
	Receiver clogged	Check receiver	AC-24
	Water valve set faulty	Replace water valve cable set	BE-38
Insufficient velocity of cool air	Evaporator clogged or frosted	Clean evaporator fins or filters	AC-26
	Air leakage from cooling unit or air duct	Repair as necessary	
	Air inlet blocked	Repair as necessary	
	Blower motor faulty	Replace blower motor	

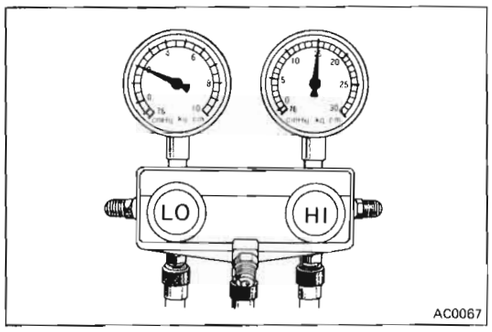
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Checking of Refrigeration System with Manifold Gauge

Read the manifold gauge pressure with the following established conditions:

(a) Temperature at the air inlet 30 – 35°C (86 – 95°F)
(b) Engine running at 2,000 rpm
(c) Blower speed set at high
(d) A/C switch ON
(e) Temperature control lever set at cool

NOTE: It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



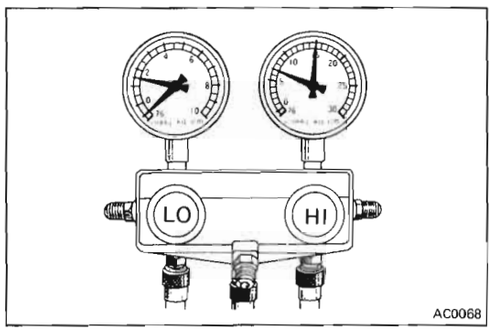
AC0067

1. NORMALLY FUNCTIONING REFRIGERATION SYSTEM

Gauge reading:

Low pressure side
1.5 – 2.0 kg/cm² (21 – 28 psi, 147 – 196 kPa)

High pressure side
14.5 – 15.0 kg/cm² (206 – 213 psi)
(1,422 – 1,471 kPa)



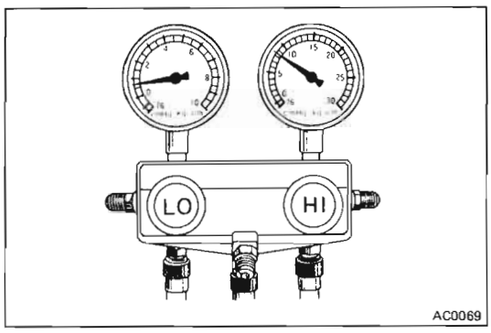
AC0068

2. MOISTURE PRESENT IN REFRIGERATION SYSTEM

Condition: Cools only periodically

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal	Moisture entered refrigeration system, freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts.	Drier in oversaturated state ↓ Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver and drier (2) Remove moisture in cycle through repeated vacuum purging (3) Charge refrigerant to proper amount

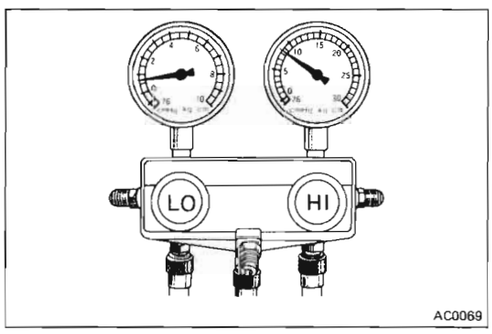
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3. INSUFFICIENT REFRIGERANT

Condition: Insufficient cooling

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Bubbles seen in sight glass Insufficient cooling performance	Gas leakage some place in refrigeration system	Insufficient refrigerant in system ↓ Refrigerant leaking	(1) Check with leak tester and repair (2) Charge refrigerant to proper amount

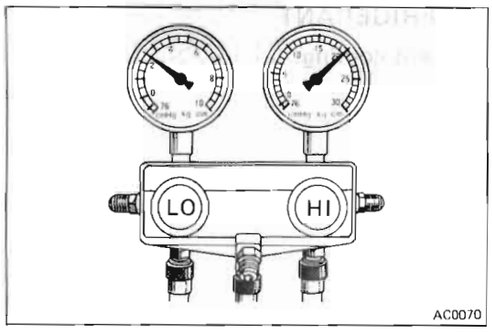


4. POOR CIRCULATION OF REFRIGERANT

Condition: Insufficient cooling

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver

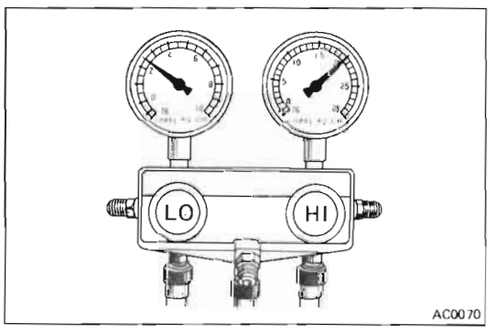
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5. REFRIGERANT OVERCHARGE OR INSUFFICIENT COOLING OF CONDENSER

Condition: Does not cool sufficiently

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides	Unable to develop sufficient performance due to excessive refrigerant in system Condenser cooling insufficient	Excessive refrigerant in cycle → refrigerant overcharged Condenser cooling insufficient → condenser fins clogged or fan motor faulty	(1) Clean condenser (2) Check fan motor operation (3) If (1) and (2) are in normal state, check amount of refrigerant NOTE: Vent out refrigerant through gauge manifold low pressure side by gradually opening valve.

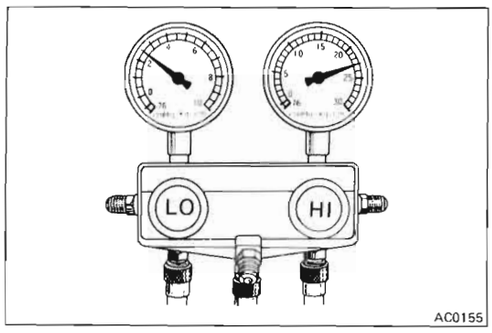


6. EXPANSION VALVE IMPROPERLY MOUNTED/ HEAT SENSING TUBE DEFECTIVE (OPENS TOO WIDE)

Condition: Insufficient cooling

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides Frost or large amount of dew on piping at low pressure side	Trouble in expansion valve or heat sensing tube not installed correctly Refrigerant flow out of adjustment	Excessive refrigerant in low pressure piping ↓ Expansion valve opened too wide	(1) Check heat sensing tube installation (2) If (1) is normal, test expansion valve in unit Replace if defective

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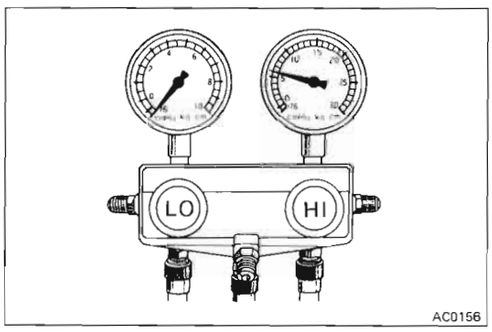


7. AIR PRESENT IN REFRIGERATION SYSTEM

Condition: Does not cool down sufficiently

NOTE: These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides	Air entered refrigeration system	Air present in refrigeration system ↓ Insufficient vacuum purging	(1) Replace receiver and drier (2) Check for dirty or insufficient compressor oil (3) Vacuum purge and charge new refrigerant

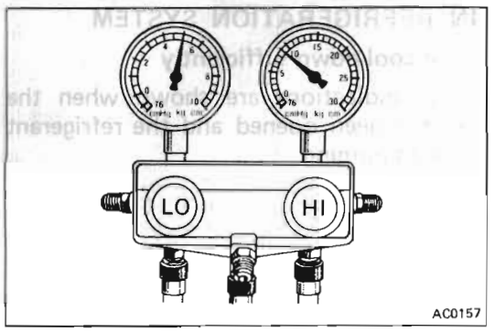


8. REFRIGERANT DOES NOT CIRCULATE

Condition: Does not cool (Cools from time to time in some cases)

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Vacuum indicated at low pressure side, very low pressure indicated at high pressure side Frost or dew seen on piping in front and behind receiver and drier or expansion valve	Refrigerant flow obstructed by moisture or dirt refrigerant freezing or adhering to the expansion valve orifice Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube	Expansion valve orifice clogged ↓ Refrigerant does not flow	Allow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt. If caused by moisture refer to step 2 on page AC-4. If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve. Vacuum purge and charge refrigerant to proper amount. If gas leaks from heat sensing tube, replace expansion valve.

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9. INSUFFICIENT COMPRESSION

Condition: Does not cool

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at low pressure side Pressure too low at high pressure side	Internal leak in compressor	Compression defective ↓ (Valves, sliding parts piston, cylinder, gasket, etc.)	Replace or repair compressor

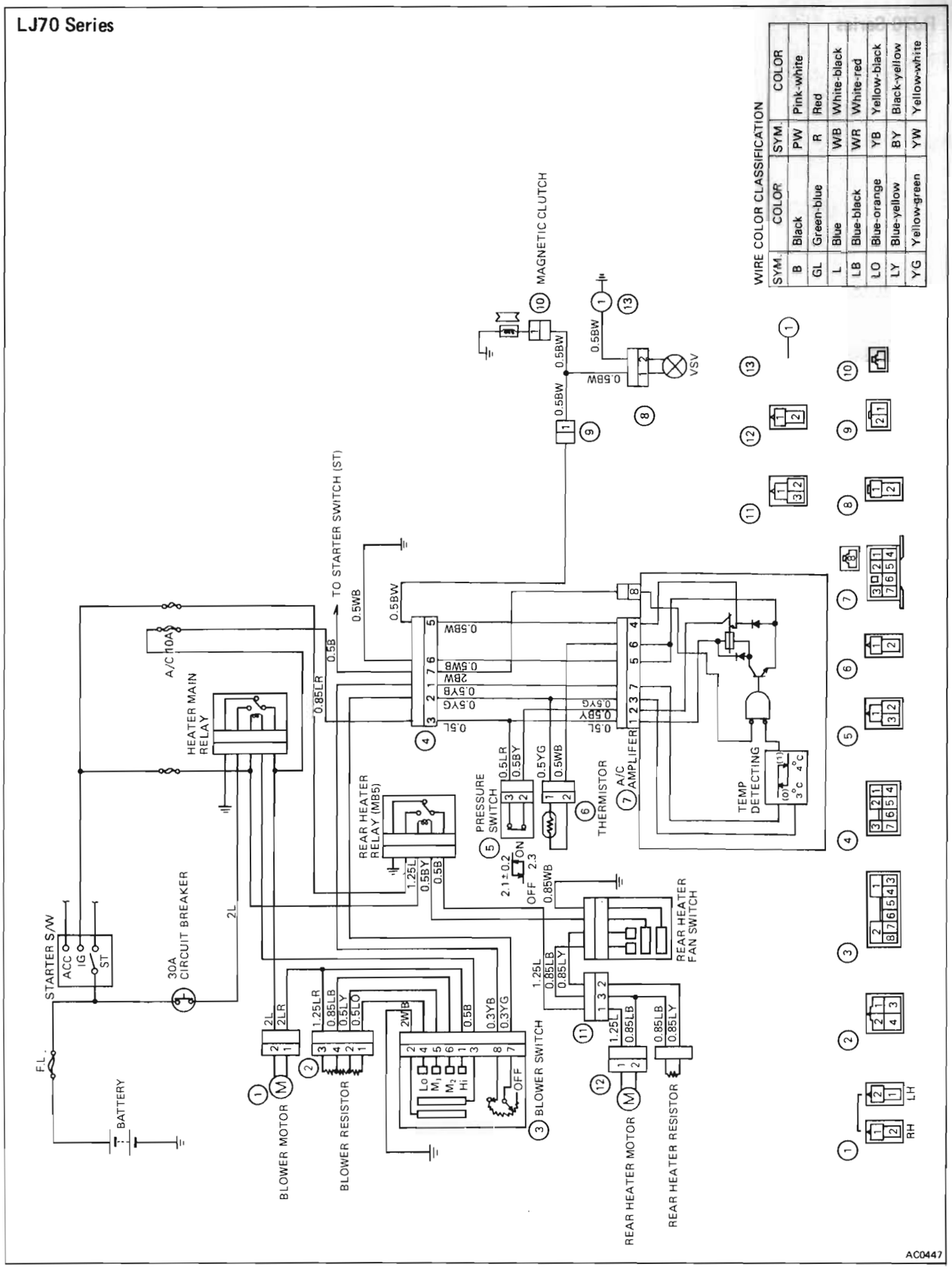
SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Manifold gauge set Ohmmeter	07110-78010	To evacuate and charge system To perform electrical diagnosis

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AIR CONDITIONING SYSTEM CIRCUIT

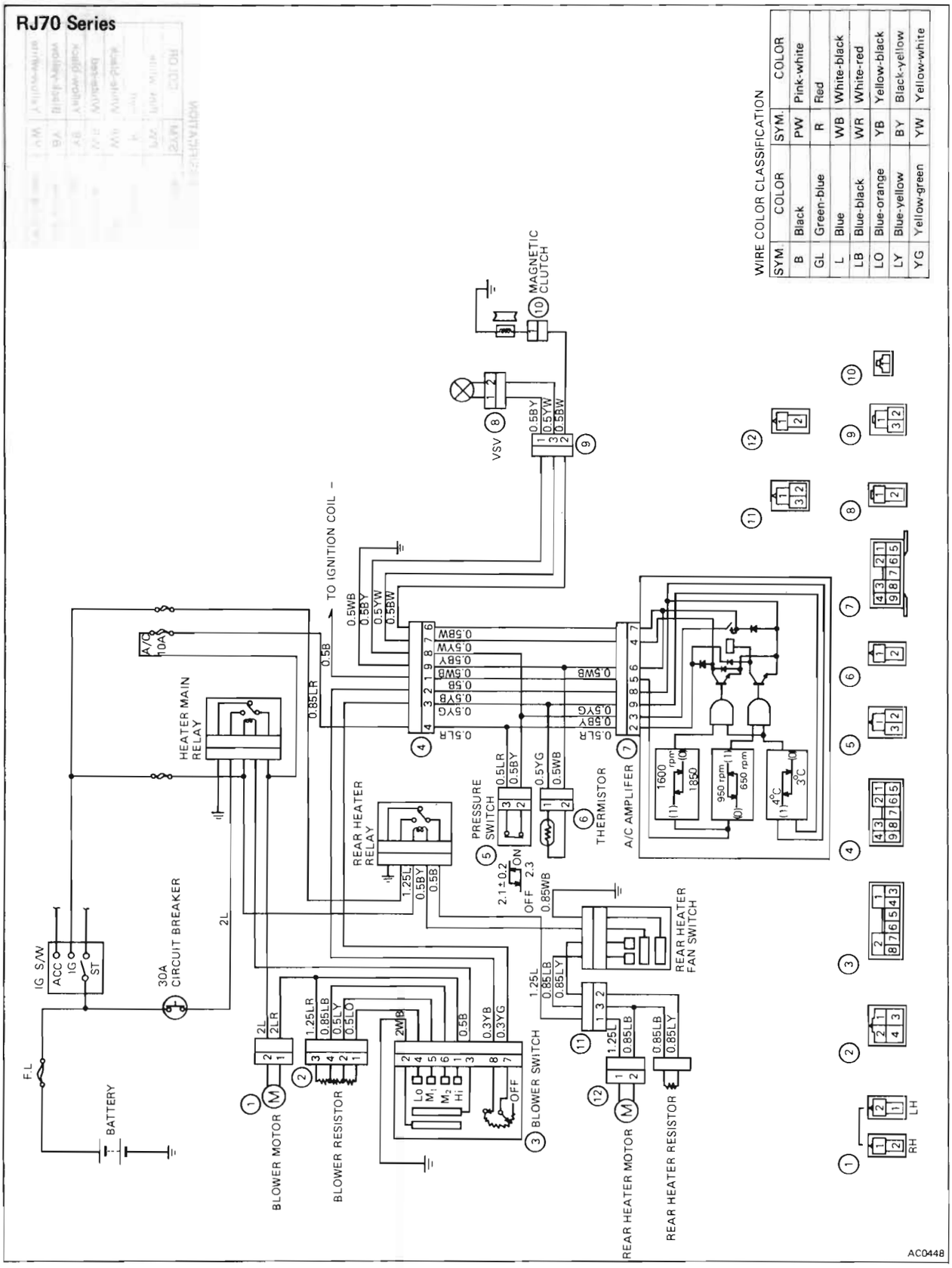
LJ70 Series



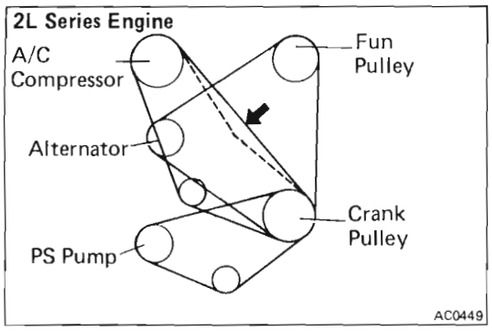
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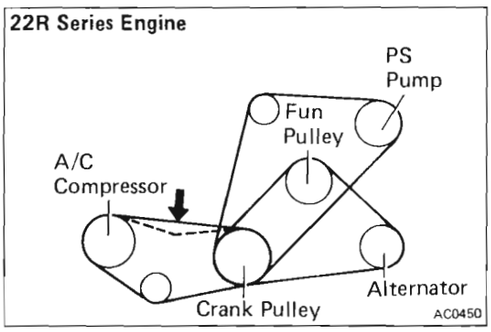
AIR CONDITIONING SYSTEM CIRCUIT (Cont'd)

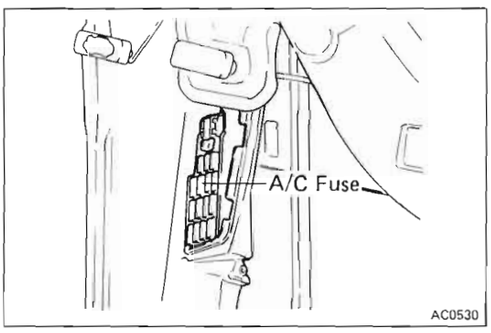
RJ70 Series



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ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

   If the fins are clogged, clean them with pressurized water.

   CAUTION: **Be careful not to damage the fins.**

2. CHECK DRIVE BELT TENSION

   Drive belt tension at 10 kg (22.0 lb, 98 N):

   mm (in.)

Engine	New belt	Used belt
2L	13 – 17 (0.51 – 0.67)	17 – 21 (0.67 – 0.83)
22R	13 – 17 (0.51 – 0.67)	17 – 23 (0.67 – 0.91)

   NOTE:
   - "New belt" refers to a new belt which has never been used.
   - "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

3. START ENGINE

4. POSITION THE TEMPERATURE CONTROL RESISTOR ON "MAX COOL"

   Check that the A/C operates at each position of the blower switch.

   If A/C does not operate, check A/C fuse.

5. CHECK MAGNETIC CLUTCH OPERATION

6. CHECK THAT IDLE INCREASES

   When the magnetic clutch engages, engine revolution should increase.

   Standard idle up rpm: 900 – 1,000 rpm

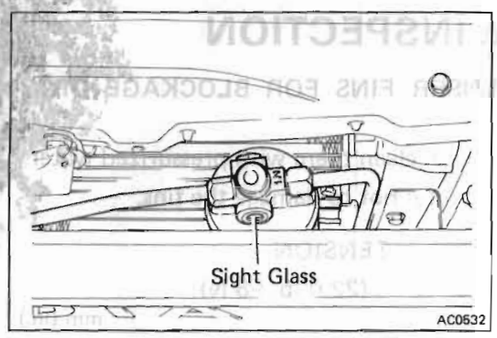
7. CHECK AMOUNT OF REFRIGERANT

   If you can see bubbles in the sight glass, additional refrigerant is needed. (See page AC-12)

8. IF NO OR INSUFFICIENT COOLING, INSPECT FOR LEAKAGE

   Using a gas leak tester, inspect each component of the refrigeration system.

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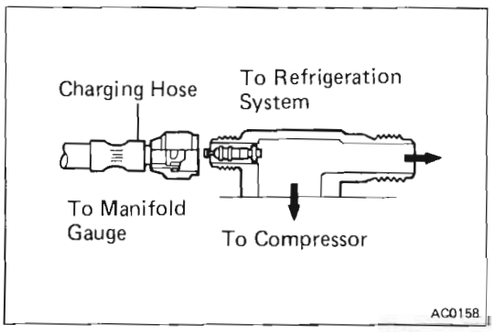


REFRIGERATION SYSTEM
Checking of Refrigerant Charge

1. RUN ENGINE AT FAST IDLE
2. OPERATE AIR CONDITIONER AT MAXIMUM COOLING FOR A FEW MINUTES
3. CHECK AMOUNT OF REFRIGERANT

   Observe the sight glass on the receiver.

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	Check for leak with gas leak tester
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	Evacuate and charge system. Then check for leak with gas leak tester
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge excess refrigerant to specified amount
6	When air conditioner is turned off, refrigerant foams and then stays clear	Proper	———



Installation of Manifold Gauge Set

NOTE: Fittings for attaching the manifold gauge set are located on the compressor service valves.

1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
2. INSTALL CHARGING HOSES OF GAUGE SET TO SERVICE VALVES

   Connect the low pressure hose to the suction service valve and the high pressure hose to the discharge service valve. Tighten the hose nuts by hand.

   NOTE: Do not apply compressor oil to the seat of the connection.

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Discharging of Refrigeration System

1. CONNECT MANIFOLD GAUGE SET TO COMPRESSOR

2. PLACE FREE END OF CENTER HOSE IN A SHOP TOWEL

3. DISCHARGE SYSTEM

(a) Slowly open the high pressure hand valve to adjust the refrigerant flow. Do not open the valve very much.

CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

(b) Check the shop towel to make sure no oil is being discharged.

If oil is present, partially close the hand valve.

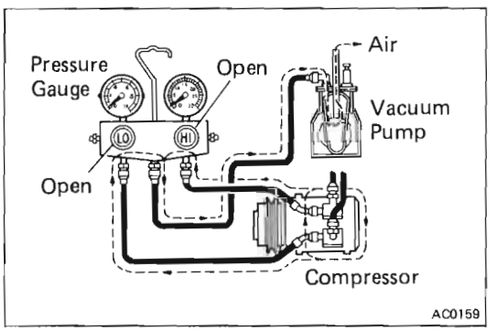
(c) After the manifold gauge reading drops below 3.5 kg/cm^2 (50 psi, 343 kPa), slowly open the low pressure valve.

(d) As the system pressure drops, gradually open both high and low valves until both gauges read 0 kg/cm^2 (0 psi, 0 kPa).

Evacuating and Charging of Refrigeration System

NOTE:

- Whenever the air conditioning system has been exposed to the atmosphere, it must be evacuated.
- After installation of a component, the system should be evacuated for approximately 15 minutes. A component in service that has been opened for repair should be evacuated for 30 minutes.



1. EVACUATE SYSTEM

(a) Connect the manifold gauge set. (See page AC-12)

(b) Install the center hose of the gauge set to the vacuum pump inlet.

(c) Run the vacuum pump, and then open both hand valves.

(d) After about ten minutes, check that the low pressure gauge indicates more than 600 mmHg (23.62 in.Hg, 80.0 kPa) of vacuum pressure.

If the reading is not more than 600 mmHg (23.62 in.Hg, 80.0 kPa), close both valves and stop the vacuum pump. Check the system for leaks and repair as necessary.

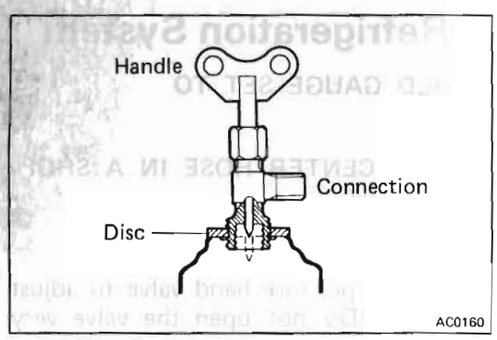
If no leaks are found, continue evacuating the system.

(e) After the low pressure gauge indicates more than 700 mmHg (27.56 in.Hg, 93.3 kPa) of vacuum, continue evacuating for 15 minutes.

(f) Close both hand valves, and stop the vacuum pump. Disconnect the hose from the vacuum pump.

The system is now ready for charging.

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2. INSTALL REFRIGERANT CONTAINER TAP VALVE

CAUTION: Observe the precautions listed in the front of this section.

(a) Before installing the valve on the refrigerant container, turn the handle counterclockwise until the valve needle is fully retracted.

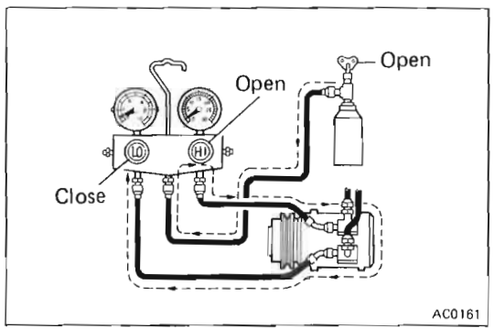
(b) Turn the disc counterclockwise until it reaches its highest position.
Screw down the valve on the refrigerant container.

(c) Connect the center hose to the valve fitting. Turn the disc fully clockwise by hand.

(d) Turn the handle clockwise to make a hole in the sealed tap.

(e) Turn the handle fully counterclockwise to fill the center hose with gas. Do not open the high and low pressure valves.

(f) Loosen the center hose nut connected to the center fitting of the manifold gauge until a hiss can be heard. Allow air to escape for a few seconds, and then tighten the nut.



3. TEST SYSTEM FOR LEAKS

NOTE: After evacuating the system, check for leaks.

(a) Install the refrigerant container tap valve as described in step 2.

(b) Open the high pressure valve to charge the system with refrigerant vapor.

(c) When the low pressure gauge reads 1 kg/cm^2 (14 psi, 98 kPa), close the high pressure valve.

(d) Using a halide gas leak detector, propane torch, or electric leak detector, check the system for leaks.

If a leak is found, repair the faulty component or connection.

(e) After checking and repairing the system, perform the following:

- Turn the can tap handle fully clockwise.
- Disconnect the center hose from the can valve fitting.
- Evacuate the system for at least 15 minutes.
(See step 1 on page AC-12)

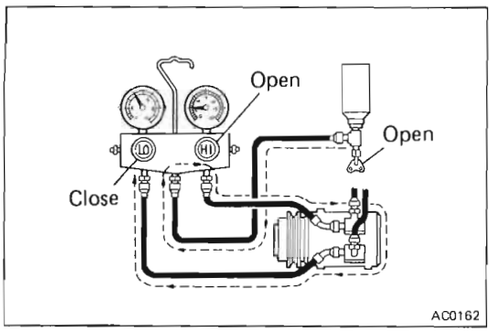
4. CHARGE EMPTY SYSTEM (LIQUID)

NOTE: This step is to charge an empty system through the high pressure side with refrigerant in a liquid state.
When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION:

- **Never run the engine when charging the system through the high pressure side.**
- **Do not open the low pressure valve when the system is being charged with liquid refrigerant.**

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(a) Close both high and low pressure valves completely after the system is evacuated.

(b) Install the refrigerant can tap valve as described in step 2.

(c) Open the high pressure valve fully, and keep the container upside down.

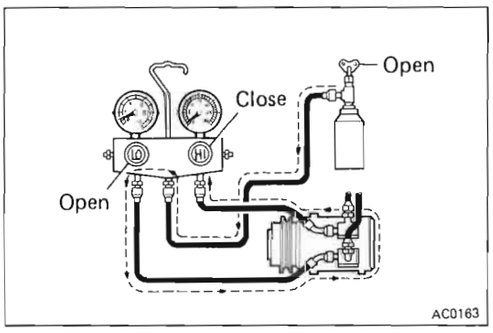
(d) Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the high pressure valve.

Specified amount: 650 — 750 g (1.4 — 1.7 lb)

NOTE:
- A fully charged system is indicated when the receiver sight glass is free of any bubbles.
- If the low pressure gauge does not show a reading, the system is clogged and must be repaired.

5. CHARGE EMPTY SYSTEM OR PARTIALLY CHARGED SYSTEM (VAPOR)

NOTE:
- This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed rightside up, refrigerant will enter the system as a vapor.
- Put the refrigerant container in a pan of warm water (maximum temperature 40°C (104°F)) to keep vapor pressure in the container slightly higher than vapor pressure in the system.



(a) Install the refrigerant container tap valve as described in step 2.

(b) Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 4.2 kg/cm^2 (60 psi, 412 kPa).

(c) Run the engine at fast idle, and operate the air conditioner.

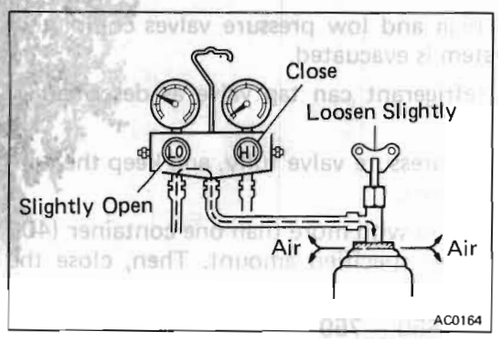
CAUTION: Be sure to keep the container in the upright position to prevent liquid refrigerant being charged into the system through the suction side, resulting in possible damage to the compressor.

(d) Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the low pressure valve.

Specified amount: 650 — 750 g (1.4 — 1.7 lb)

NOTE: A fully charged system is indicated by the receiver sight glass being free of any bubbles.

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6. IF NECESSARY, CHARGE SYSTEM WITH ANOTHER REFRIGERANT CONTAINER

(a) When the refrigerant container is empty, close the pressure valves.

(b) Remove the container tap valve from the container.

(c) Attach the container tap valve to a new refrigerant container.

(d) Purge the air from the center hose by slightly opening the low pressure valve and loosening the valve disc.

(e) Make a hole in the sealed tap of the new container and charge the system.

CAUTION: Be careful not to overcharge the refrigerant as it could cause failure of the bearings and belt.

7. WHEN SYSTEM IS FULLY CHARGED, DISCONNECT MANIFOLD GAUGE SET

(a) Close both low and high pressure valves.

(b) Close the valve of the refrigerant container. If using one-pound containers of R-12, allow remaining refrigerant to escape by slowly removing the charge line.

(c) Turn off the engine.

(d) Using a shop rag, quickly remove both hoses from the compressor service valves.

WARNING: Care must be taken to protect eyes and skin when removing the high pressure hoses.

(e) Put the cap nuts on the service valve fittings.

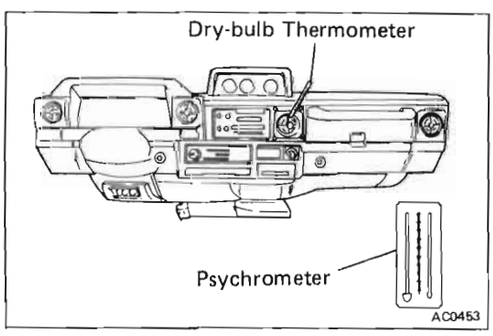
Performance Test

1. INSTALL MANIFOLD GAUGE SET

(a) Close the high pressure and low pressure hand valves.

(b) Connect the high pressure hose to the discharge service valve of the compressor.

(c) Connect the low pressure hose to the suction service valve of the compressor.



2. RUN ENGINE AND OPERATE AIR CONDITIONER

(a) Run the engine at 2,000 rpm.

(b) Set the blower switch at HI, temperature control switch ON, temperature control at COOL, and air flow control at VENT.

(c) Keep all windows and doors open.

3. POSITION THERMOMETERS

(a) Place a dry-bulb thermometer in the cool air outlet.

(b) Place a psychrometer close to the inlet of the cooling unit.

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4. WAIT UNTIL AIR CONDITIONING SYSTEM STABILIZES

(a) Check that the reading on the high pressure gauge is 14.0 – 15.5 kg/cm² (199 – 220 psi, 1,373 – 1,520 kPa).

If the reading is too high, pour water on the condenser.
If the reading is too low, cover the front of the condenser.

(b) Check that the reading on the dry-bulb thermometer at the air inlet is 25 – 35°C (77 – 95°F).

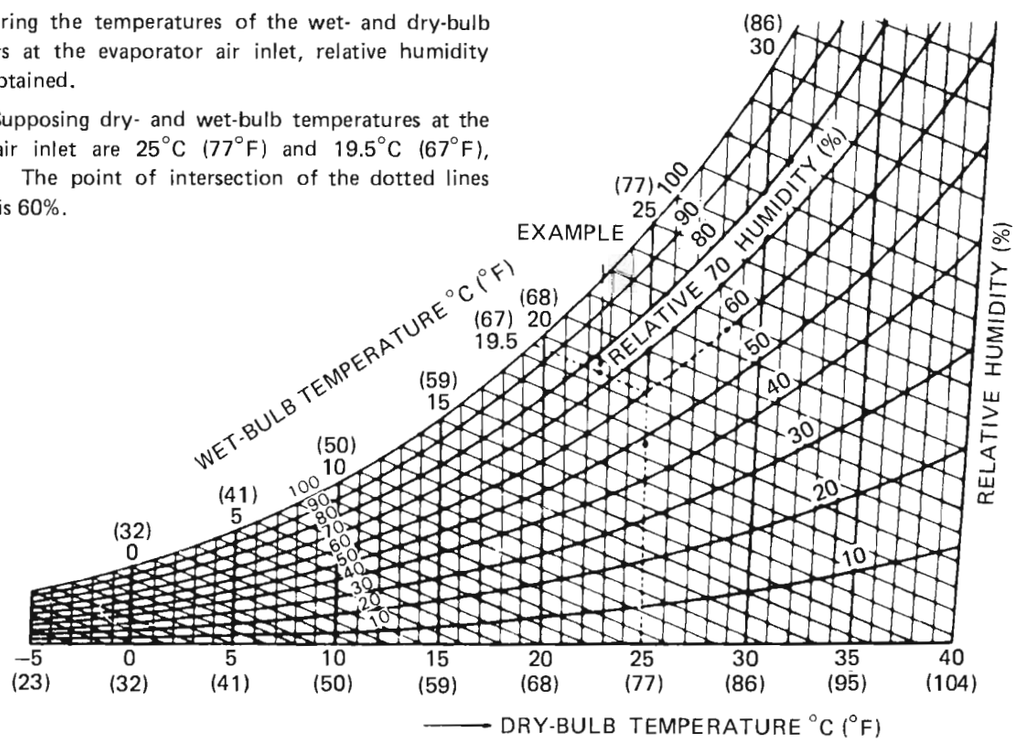
5. CHECK PERFORMANCE OF AIR CONDITIONING SYSTEM

(a) Calculate the relative humidity from the psychrometric graph by comparing the wet- and dry-bulb readings of the psychrometer at the air inlet.

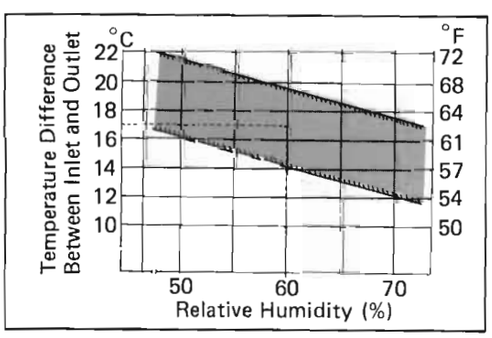
HOW TO READ THE GRAPH:

After measuring the temperatures of the wet- and dry-bulb thermometers at the evaporator air inlet, relative humidity (%) can be obtained.

Example: Supposing dry- and wet-bulb temperatures at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F), respectively. The point of intersection of the dotted lines in the graph is 60%.



AC0174



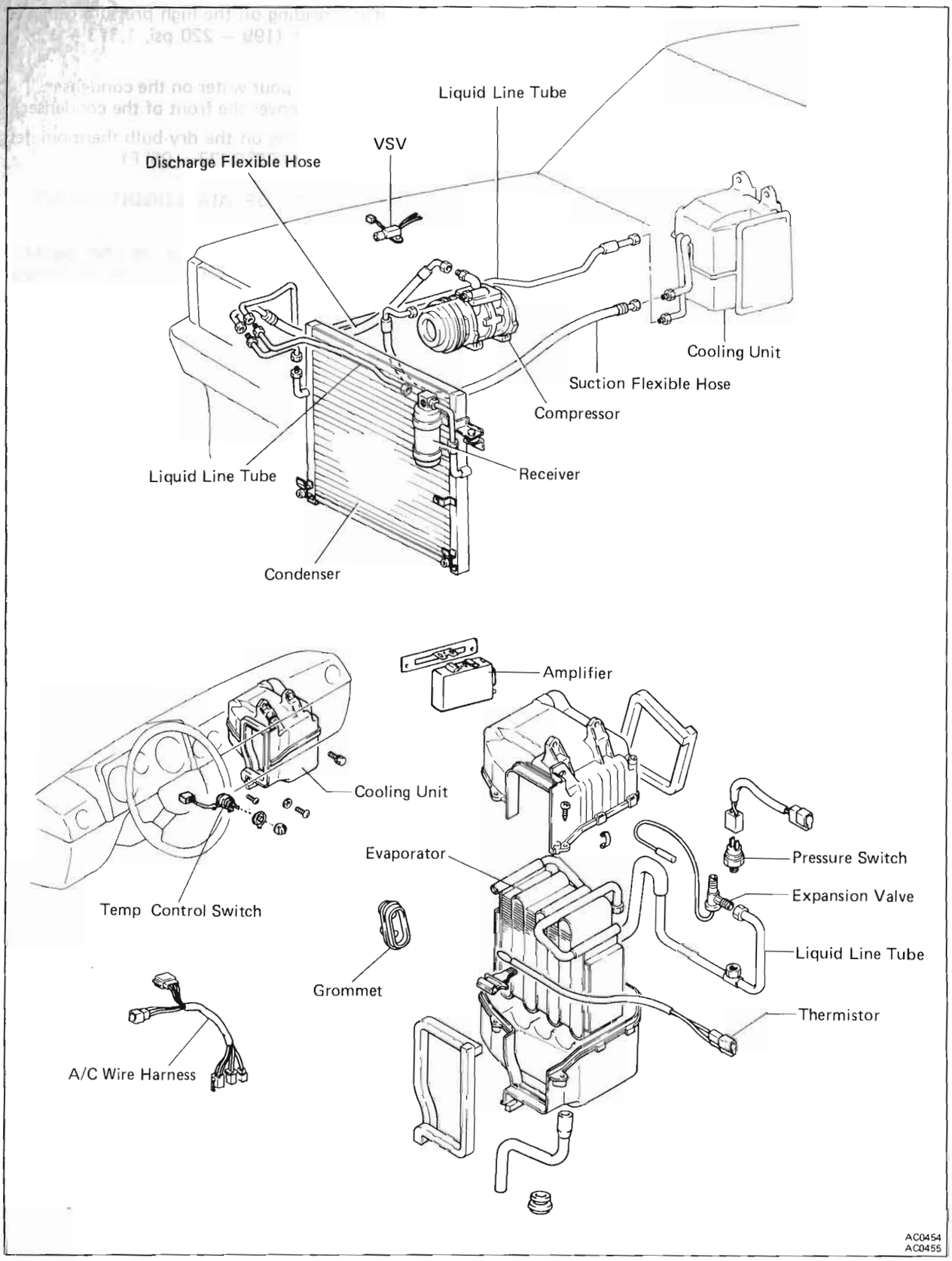
(b) Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.

(c) Check that the intersection of the relative humidity and temperature difference is between the two hatched lines.

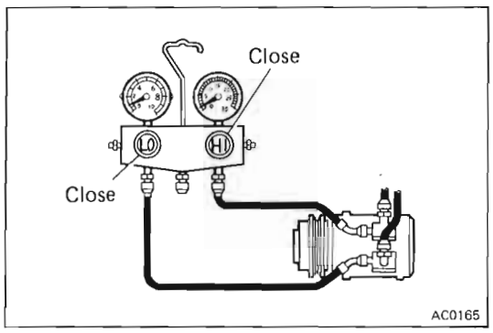
If the intersection is within the two lines, cooling performance is satisfactory.

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SYSTEM COMPONENTS



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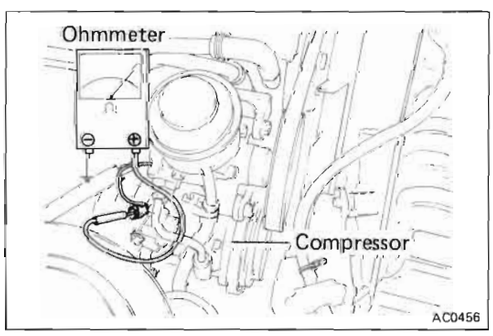


COMPRESSOR

ON-VEHICLE INSPECTION

1. INSTALL MANIFOLD GAUGE SET
   (a) Close the HI and LO hand valves.
   (b) Connect the high pressure hose to the discharge service valve of the compressor.
   (c) Connect the low pressure hose to the suction service valve of the compressor.
2. RUN ENGINE AT FAST IDLE
3. CHECK COMPRESSOR FOR FOLLOWING:
   (a) High pressure gauge reading is not low and low pressure gauge reading is not higher than normal.
   (b) Metallic sound
   (c) Leakage from shaft seal

   If defects are found, repair the compressor.
4. CHECK MAGNETIC CLUTCH
   (a) Inspect the pressure plate and the rotor for signs of oil.
   (b) Check the clutch bearings for noise and leaking grease.



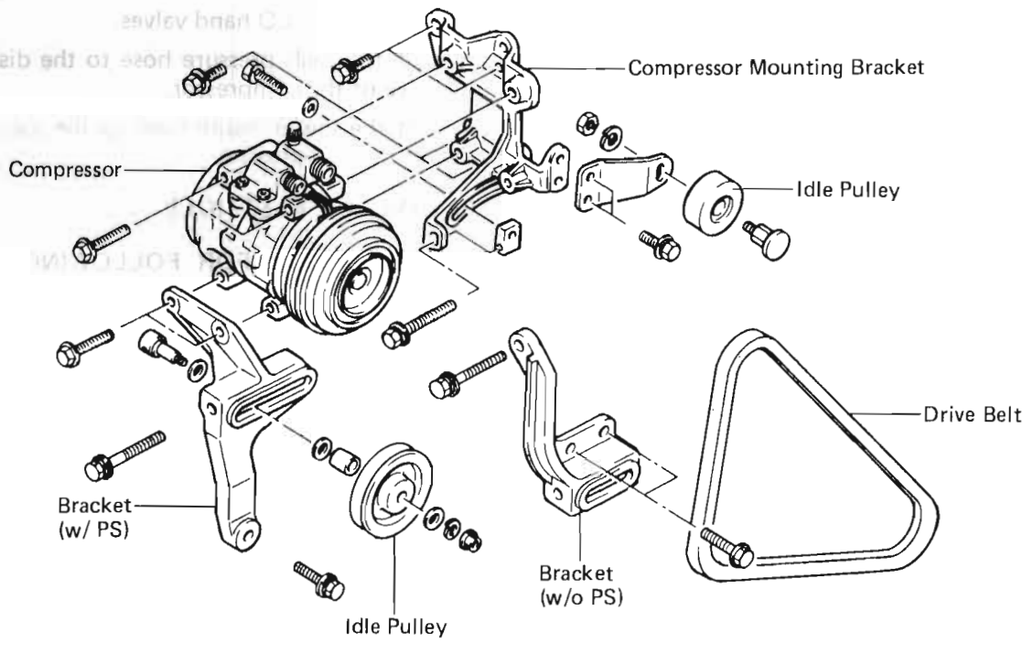
(c) Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.

If the resistance is not within tolerance, replace the coil.

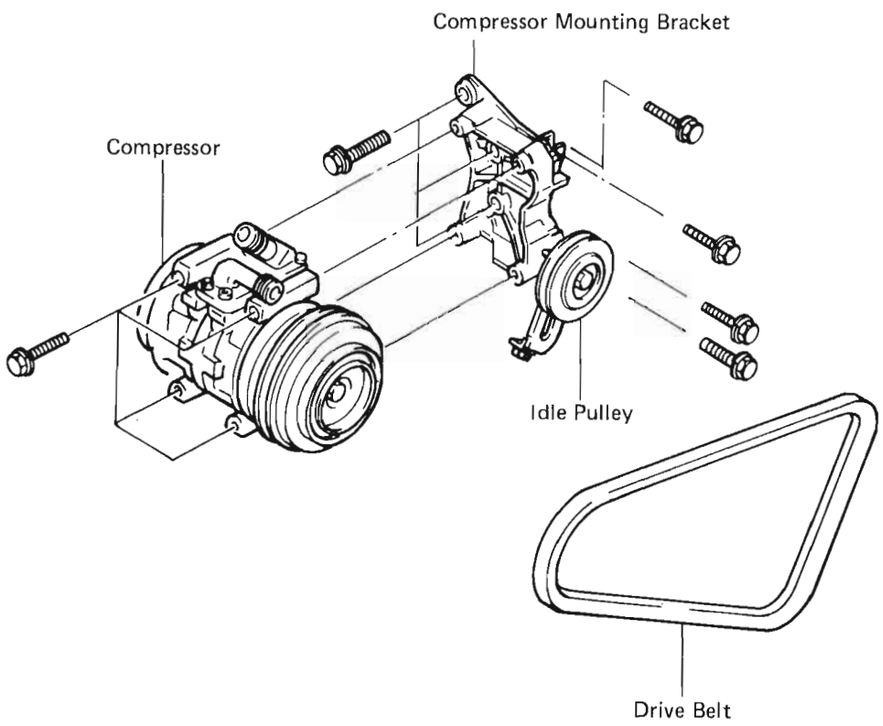
Standard resistance: 3.7 ± 0.2 Ω at 20°C (68°F)

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LJ70 Series



RJ70 Series



AC0457
AC0458

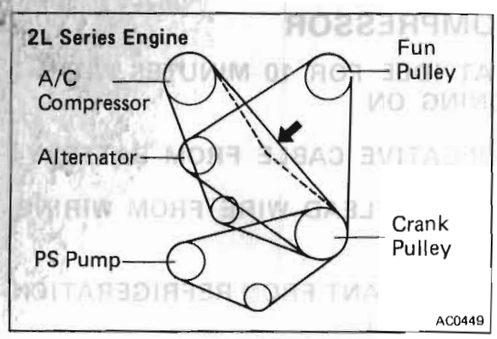
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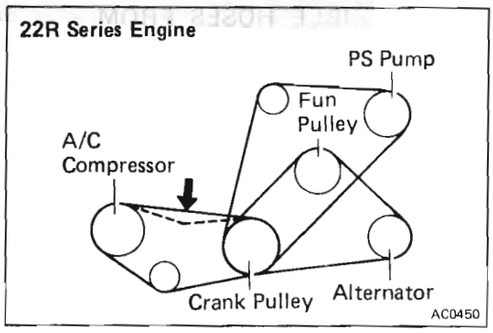
REMOVAL OF COMPRESSOR

1. RUN ENGINE AT IDLE FOR 10 MINUTES WITH AIR CONDITIONING ON
2. DISCONNECT NEGATIVE CABLE FROM BATTERY
3. DISCONNECT CLUTCH LEAD WIRE FROM WIRING HARNESS
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-12)
5. DISCONNECT TWO FLEXIBLE HOSES FROM COMPRESSOR SERVICE VALVES

   Cap the open fitting immediately to keep moisture out of the system.
6. REMOVE COMPRESSOR
   (a) Loosen the drive belt.
   (b) Remove the compressor mounting bolts and the compressor.

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INSTALLATION OF COMPRESSOR

(See page AC-20)

1. INSTALL COMPRESSOR WITH FOUR MOUNTING BOLTS

2. INSTALL DRIVE BELT

   (a) Install the drive belt to the pulley.

   (b) Tighten the belt with the adjusting bolts.

   Drive belt tension at 10 kg (22.0 lb, 98 N):

mm (in.)

Engine	New belt	Used belt
2L	13 – 17 (0.51 – 0.67)	17 – 21 (0.67 – 0.83)
22R	13 – 17 (0.51 – 0.67)	17 – 23 (0.67 – 0.91)

NOTE:

- "New belt" refers to a new belt which has never been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

3. CONNECT TWO FLEXIBLE HOSES TO COMPRESSOR SERVICE VALVES

   Torque: Discharge line 225 kg-cm (16 ft-lb, 22 N·m)
   Suction line 325 kg-cm (24 ft-lb, 32 N·m)

4. CONNECT CLUTCH LEAD WIRE TO WIRING HARNESS

5. CONNECT NEGATIVE CABLE TO BATTERY

6. EVACUATE AND CHARGE REFRIGERATION SYSTEM (See page AC-13)

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CONDENSER

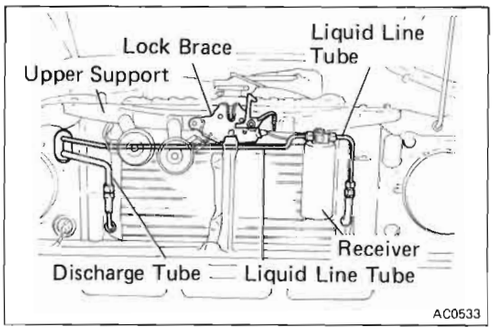
ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

   If the fins are clogged, wash them with water and dry with compressed air.

   CAUTION: **Be careful not to damage the fins.**

   If the fins are bent, straighten them with a screwdriver or pliers.



2. CHECK CONDENSER FITTINGS FOR LEAKAGE

   Repair as necessary.

REMOVAL OF CONDENSER

(See page AC-18)

1. DISCHARGE REFRIGERATION SYSTEM (See page AC-13)

2. REMOVE FRONT GRILLE, HOOD LOCK BRACE AND RADIATOR UPPER SUPPORT

3. DISCONNECT DISCHARGE TUBE FROM CONDENSER INLET FITTING

4. DISCONNECT TWO LIQUID LINE TUBES FROM RECEIVER

   NOTE: Cap the open fittings immediately to keep moisture out of the system.

5. REMOVE RECEIVER

6. REMOVE CONDENSER

   Remove the four bolts.

INSTALLATION OF CONDENSER

(See page AC-18)

1. INSTALL CONDENSER

   Install the four bolts, making sure the rubber cushions fit on the mounting flanges correctly.

2. INSTALL RECEIVER

3. CONNECT TWO LIQUID LINE TUBES TO RECEIVER AND DISCHARGE TUBE TO CONDENSER

   Torque: Liquid line tube 135 kg-cm (10 ft-lb, 13 N·m)
   Discharge tube 225 kg-cm (16 ft-lb, 22 N·m)

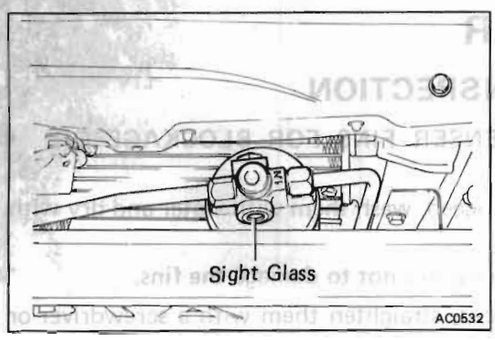
4. INSTALL FRONT GRILLE, HOOD LOCK BRACE AND RADIATOR UPPER SUPPORT

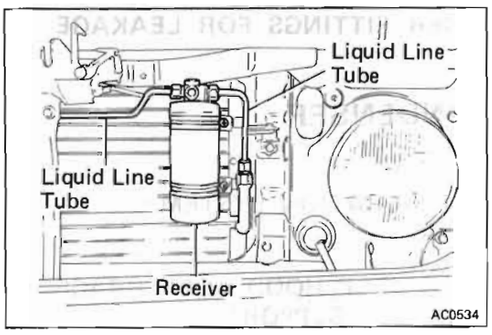
5. IF CONDENSER IS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

   Add 40 – 50 cc (1.4 – 1.7 oz)

6. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-13)

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RECEIVER

ON-VEHICLE INSPECTION

CHECK SIGHT GLASS, FUSIBLE PLUG AND FITTINGS FOR LEAKAGE

Use a gas leak tester. Repair as necessary.

REMOVAL OF RECEIVER

(See page AC-17)

1. DISCHARGE REFRIGERATION SYSTEM (See page AC-12)
2. DISCONNECT TWO LIQUID LINE TUBES FROM RECEIVER

   NOTE: Cap the open fittings immediately to keep moisture out of the system.
3. REMOVE RECEIVER FROM RECEIVER HOLDER

INSTALLATION OF RECEIVER

(See page AC-18)

1. INSTALL RECEIVER IN RECEIVER HOLDER

   NOTE: Do not remove the caps until ready for connection.
2. CONNECT TWO LIQUID LINE TUBES TO RECEIVER

   Torque: 135 kg-cm (10 ft-lb, 13 N·m)
3. IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

   Add 20 cc (0.7 oz)
4. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-13)

COOLING UNIT

ON-VEHICLE INSPECTION OF EXPANSION VALVE

1. CONNECT MANIFOLD GAUGE TO COMPRESSOR
2. CHECK EXPANSION VALVE OPERATION

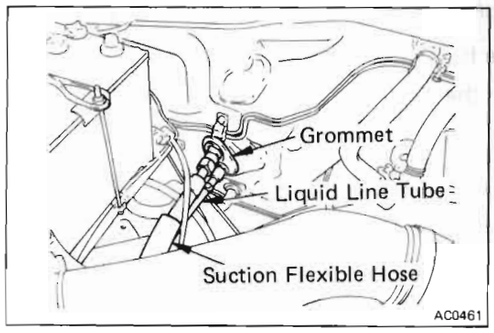
   (a) Run the engine at fast idle with the air conditioning on.

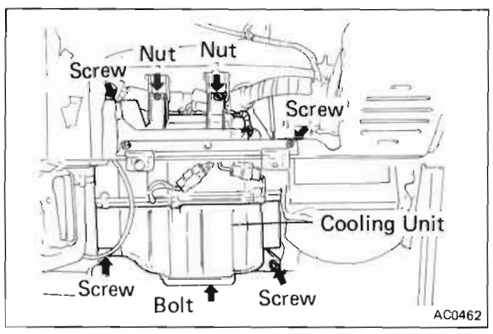
   (b) Check that the low pressure reading is between 0.5 – 5.0 kg/cm^2 (7 – 71 psi, 49 – 490 kPa).

   If the reading is too low, check and replace the expansion valve and/or receiver.

   If the reading is too high, tighten the remote bulb holders and/or replace the expansion valve.

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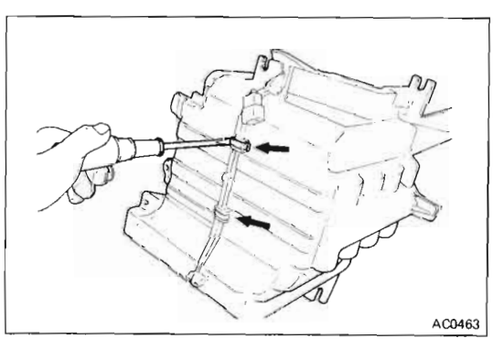


REMOVAL OF COOLING UNIT

1. DISCONNET NEGATIVE CABLE FROM BATTERY
2. DISCHARGE REFRIGERATION SYSTEM
   (See page AC-13)
3. DISCONNECT SUCTION FLEXIBLE HOSE FROM COOLING UNIT OUTLET FITTING
4. DISCONNECT LIQUID LINE TUBE FROM COOLING UNIT INLET FITTING

   NOTE: Cap the open fittings immediately to keep moisture out of the system.
5. REMOVE GROMMETS FROM INLET AND OUTLET FITTINGS
6. REMOVE FOLLOWING COMPONENTS:
   (a) Glove box
   (b) Duct
7. DISCONNECT FOLLOWING CONNECTORS:
   (a) Temp. control switch connector
   (b) Connector connected to vehicle wire harness
8. REMOVE COOLING UNIT

   Remove the two nuts, the four screws and one bolt.
9. REMOVE A/C WIRE HARNESS FROM COOLING UNIT

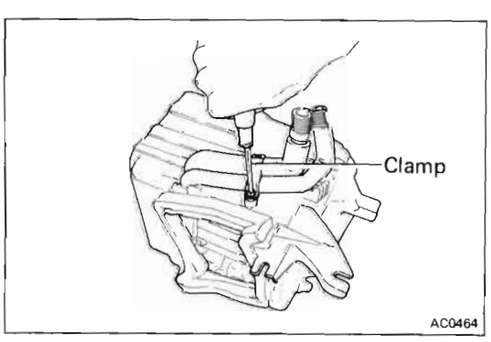


DISASSEMBLY OF COOLING UNIT

(See page AC-18)

1. REMOVE LOWER AND UPPER CASE FROM EVAPORATOR

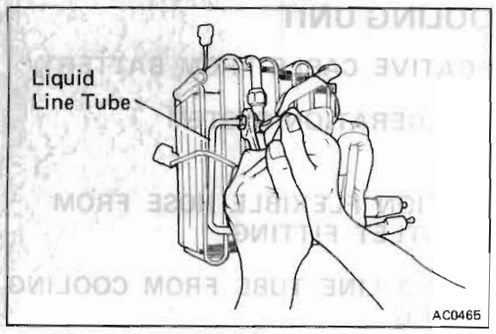
   Using a screwdriver, remove the two clamps, and four screws.



2. REMOVE CLAMP

   Remove two screws.

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3. REMOVE COMPONENTS FROM EVAPORATOR

(a) Remove the heat insulator.

(b) Disconnect the liquid line tube from inlet fitting of the expansion valve.

(c) Disconnect the expansion valve from the inlet fitting of the evaporator.

(d) Remove the pressure switch, if necessary.

Evaporator

INSPECTION OF EVAPORATOR

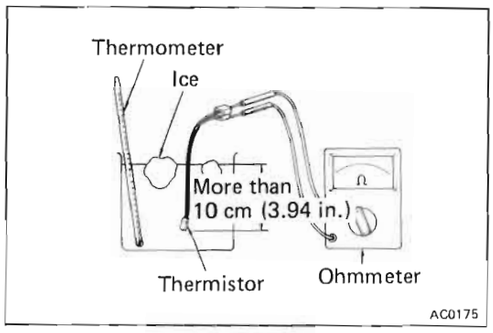
1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

CAUTION: **Never use water to clean the evaporator.**

2. CHECK FITTINGS FOR CRACKS OR SCRATCHES

Repair as necessary.



Thermistor

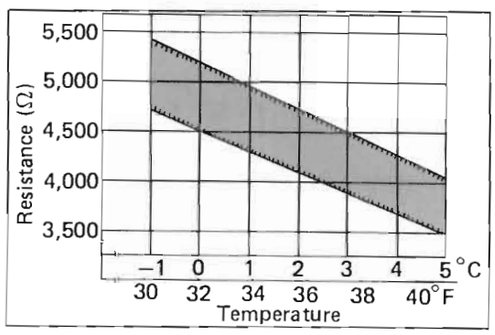
INSPECTION OF THERMISTOR

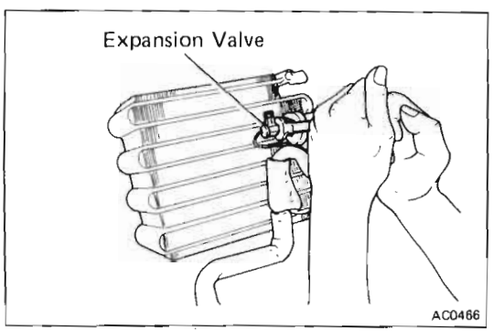
CHECK THERMISTOR OPERATION

(a) Place the thermistor in cold water. While varying the temperature of the water, measure the resistance at the connector and, at the same time, measure the temperature of the water with a thermometer.

(b) Compare the two readings on the chart.

If the intersection is not between the two lines, replace the thermistor.





ASSEMBLY OF COOLING UNIT

(See page AC-18)

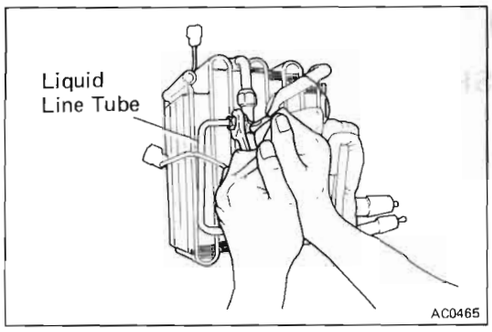
1. INSTALL COMPONENTS ON EVAPORATOR

(a) Connect the expansion valve to the inlet fitting of the evaporator. Torque the nut.

Torque: 235 kg-cm (17 ft-lb, 23 N·m)

NOTE: Be sure that the O-ring is positioned on the tube fitting.

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(b) Connect the liquid line tube to the inlet fitting of the expansion valve. Torque the nut.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

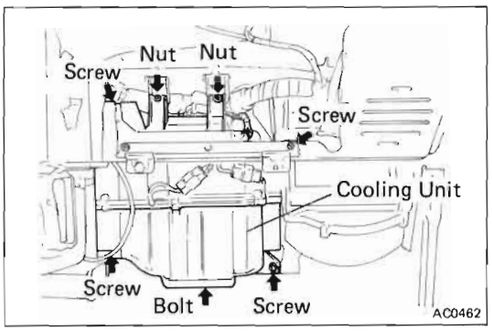
(c) Install the pressure switch, if removed.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

(d) Install the heat insulator.

2. INSTALL THERMISTOR ON EVAPORATOR

3. INSTALL UPPER AND LOWER CASES ON EVAPORATOR



INSTALLATION OF COOLING UNIT

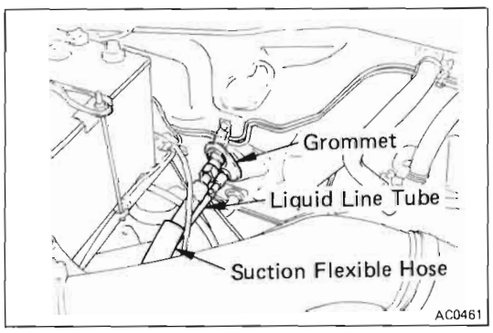
1. INSTALL A/C WIRE HARNESS TO COOLING UNIT

2. INSTALL COOLING UNIT

Install the cooling unit with the two nuts, the four screws and one bolt.

CAUTION: Be careful not to pinch the wire harness while installing the cooling unit.

3. INSTALL GLOVE BOX AND DUCT



4. INSTALL GROMMETS ON INLET AND OUTLET FITTINGS

5. CONNECT LIQUID LINE TUBE TO COOLING UNIT INLET FITTINGS

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

6. CONNECT SUCTION FLEXIBLE HOSE TO COOLING UNIT OUTLET FITTING

Torque: 325 kg-cm (24 ft-lb, 32 N·m)

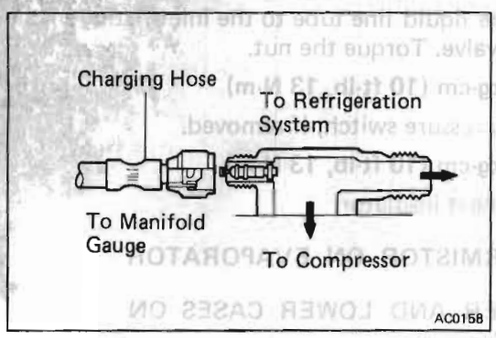
7. IF EVAPORATOR WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

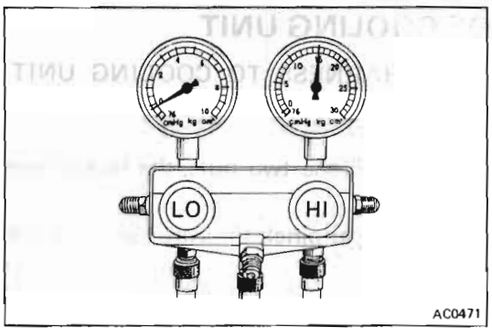
Add 40 – 50 cc (1.4 – 1.7 oz)

8. CONNECT NEGATIVE CABLE TO BATTERY

9. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-13)

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EXPANSION VALVE

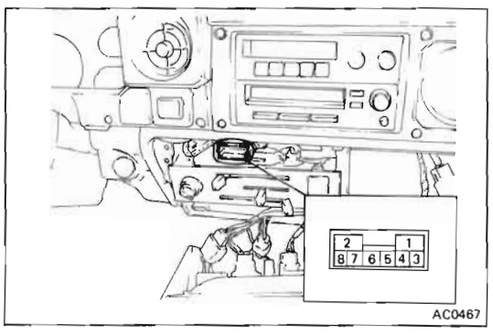
ON-VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE

2. INSTALL MANIFOLD GAUGE SET
   (a) Close the high pressure and low pressure valves.
   (b) Connect the high pressure hose to the discharge tube service valve.
   (c) Connect the low pressure hose to the liquid tube valve.

3. RUN ENGINE
   Run the engine at 2,000 rpm for at least 5 minutes.
   Then check that the high pressure reading is 13 – 15 kg/cm² (185 – 213 psi, 1,275 – 1,471 kPa).

4. CHECK EXPANSION VALVE
   If the expansion valve is faulty, the low pressure reading will drop to 0 kg/cm² (0 psi, 0 kPa), otherwise it is OK.
   NOTE: When the low pressure drops to 0 kg/cm² (0 psi, 0 kPa), feel the receiver's IN and OUT sides for no temperature difference.



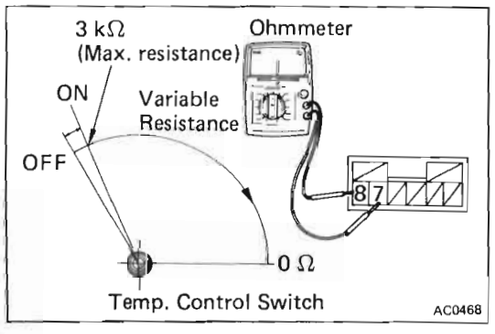
TEMP. CONTROL SWITCH

ON-VEHICLE INSPECTION

1. DISCONNECT NEGATIVE CABLE FROM BATTERY

2. REMOVE CENTER CLUSTER

3. DISCONNECT TEMP. CONTROL SWITCH CONNECTOR



4. CHECK TEMP. CONTROL SWITCH FOR RESISTANCE
   Using an ohmmeter, check for resistance between the terminals while rotating the switch.
   If an ohmmeter indicates incorrect resistance, replace the switch.

5. CONNECT TEMP. CONTROL CONNECTOR

6. INSTALL CENTER CLUSTER

7. CONNECT NEGATIVE CABLE TO BATTERY

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REFRIGERANT LINES

ON-VEHICLE INSPECTION

1. INSPECT HOSES AND TUBES FOR LEAKAGE

   Use a gas leak tester. Replace, if necessary.

2. CHECK THAT HOSE AND TUBE CLAMPS ARE NOT LOOSE

   Tighten or replace, as necessary.

REPLACEMENT OF REFRIGERANT LINES

(See page AC-18)

1. DISCHARGE REFRIGERATION SYSTEM
   (See page AC-13)

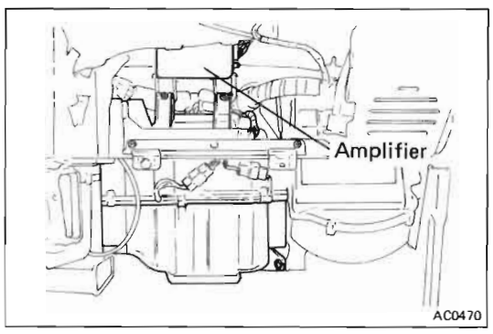
2. REPLACE FAULTY TUBE OR HOSE

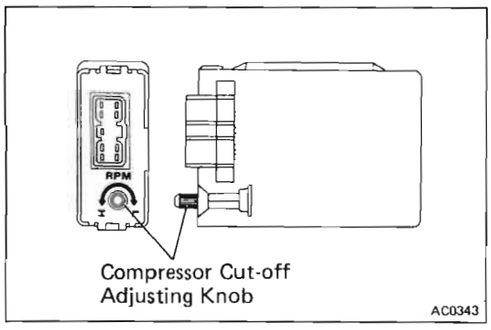
   NOTE: Cap the open fittings immediately to keep moisture out of the system.

Torque specification for O-ring fittings

Fitting size	Torque
0.31 in. tube for liquid line	135 kg-cm (10 ft-lb, 13 N·m)
0.50 in. tube for discharge line	225 kg-cm (16 ft-lb, 22 N·m)
0.62 in. tube for suction line	325 kg-cm (24 ft-lb, 32 N·m)

3. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-13)





AIR CONDITIONER AMPLIFIER

(See page AC-18)

INSPECTION OF AIR CONDITIONER AMPLIFIER

1. CHECK ENGINE SPEED DETECTING CIRCUIT

   (a) Run the engine, and operate the air conditioner.

   (b) Check that the magnetic clutch disengages at the specific engine revolution.

   Cut-off rpm: 600 – 700 rpm

   If the cut-off rpm is too high, turn the adjusting knob clockwise to adjust.

   If the cut-off rpm is too low, turn the adjusting knob counterclockwise to adjust.

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PRESSURE SWITCH

(See page AC-18)

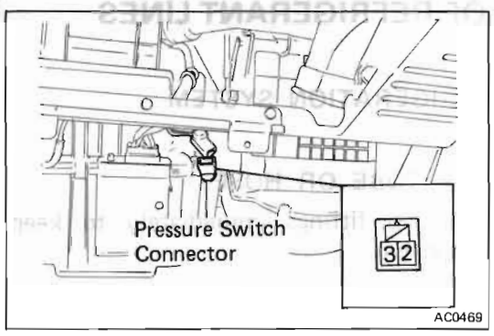
INSPECTION OF PRESSURE SWITCH

1. CHECK REFRIGERANT PRESSURE

   (a) Connect the hoses of the manifold gauge set to the compressor service valves and observe the gauge reading.

   (b) The gauge reading must be more than 2.1 kg/cm² (30 psi, 206 kPa) when the ambient temperature is higher than 0°C (32°F).

   If the pressure is less than 2.1 kg/cm² (30 psi, 206 kPa), charge the refrigerant. (See page AC-12)



2. CHECK PRESSURE SWITCH

   (a) Remove the glove box.

   (b) Disconnect the lead wires of the A/C harness.

   (c) Using an ohmmeter, check the continuity between the two terminals of the pressure switch.
   The ohmmeter must indicate zero ohm.

   If there is no continuity, replace the pressure switch. (See page AC-18)

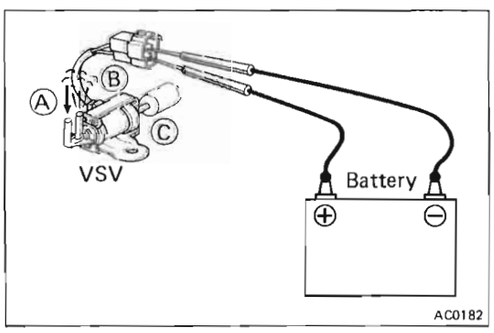
3. REINSTALL REMOVED PARTS IN REVERSE ORDER

VACUUM SWITCHING VALVE (VSV)

(See page AC-18)

INSPECTION OF VSV

1. DISCONNECT VACUUM HOSES AND CONNECTOR FROM VSV

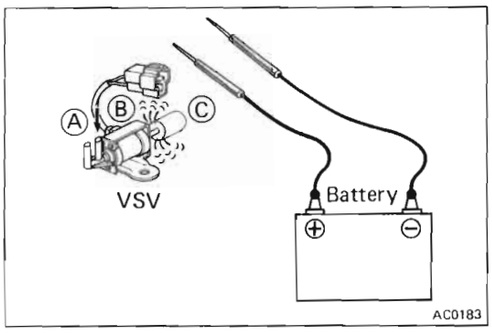


2. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE

   (a) Connect the VSV terminals to the battery terminals as shown.

   (b) Blow into pipe "A", and check that air comes out of pipe "B."

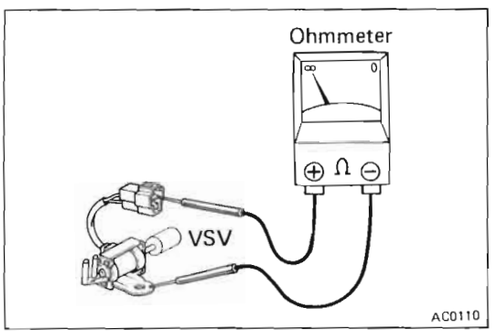
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(c) Disconnect the battery.

(d) Blow into pipe "B" and check that air comes out of filter "C" – not out of pipe "A."

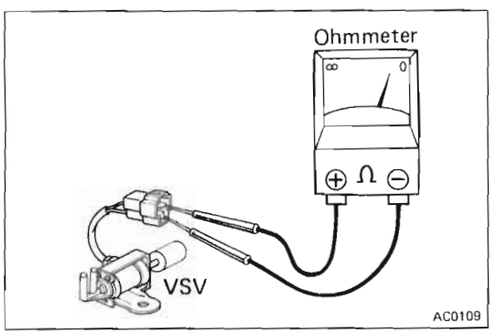
If a problem is found, replace the VSV.



3. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between each terminal and the VSV body.

If a short circuit is found, repair or replace the VSV.



4. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between two terminals of the VSV.

Specified resistance: 37 – 44 Ω at 20°C (68°F)

If the resistance is not within specification, replace the VSV.

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SERVICE SPECIFICATIONS

	Page
CLUTCH	A-2
MANUAL TRANSMISSION	A-3
TRANSFER	A-5
PROPELLER SHAFT	A-6
FRONT AXLE AND SUSPENSION	A-7
REAR AXLE AND SUSPENSION	A-9
BRAKE SYSTEM	A-11
STEERING	A-13
BODY	A-16
WINCH	A-17
LUBRICANT	A-19

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CLUTCH

Specifications

Pedal height			186 mm	7.32 in.
Push rod play at pedal top			1 – 5 mm	0.04 – 0.20 in.
Pedal freeplay		LJ	5 – 15 mm	0.20 – 0.59 in.
		RJ	13 – 23 mm	0.51 – 0.91 in.
Disc rivet head depth		Limit	0.3 mm	0.012 in.
Disc runout		Limit	0.8 mm	0.031 in.
Diaphragm spring tip alignment		Limit	1.0 mm	0.039 in.
Diaphragm spring finger wear	Depth	Limit	0.6 mm	0.024 in.
	Width	Limit	5.0 mm	0.197 in.
Flywheel runout		Limit	0.2 mm	0.008 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Clutch cover x Flywheel	195	14	19
Strap x Clutch pressure plate	195	14	19
Master cylinder reservoir set bolt	250	18	25
Master cylinder set nut	120	9	12
Clutch line union	155	11	15
Clevis lock nut	250	18	25
Release cylinder x Clutch housing	120	9	12
Release cylinder bleeder plug	110	8	11

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MANUAL TRANSMISSION
Specifications

Output shaft				
2nd gear journal diameter		Limit	37.984 mm	1.4954 in.
3rd gear journal diameter		Limit	34.984 mm	1.3773 in.
Flange thickness		Limit	4.80 mm	0.1890 in.
Runout		Limit	0.05 mm	0.0020 in.
Inner race flange thickness		Limit	3.99 mm	0.1571 in.
Inner race outer diameter		Limit	38.985 mm	1.5348 in.
Gear thrust clearance				
1st, 2nd & 3rd		STD	0.10 – 0.25 mm	0.0039 – 0.0098 in.
		Limit	0.25 mm	0.0098 in.
Counter 5th		STD	0.10 – 0.30 mm	0.0039 – 0.0118 in.
		Limit	0.30 mm	0.0118 in.
Gear oil clearance				
1st & counter 5th		STD	0.009 – 0.032 mm	0.0004 – 0.0013 in.
		Limit	0.032 mm	0.0013 in.
2nd & 3rd		STD	0.009 – 0.033 mm	0.0004 – 0.0013 in.
		Limit	0.033 mm	0.0013 in.
Shift fork to hub sleeve clearance		Limit	1.0 mm	0.039 in.
Synchronizer ring to gear clearance		STD	1.0 – 2.0 mm	0.039 – 0.079 in.
		Limit	0.8 mm	0.031 in.
Input shaft snap ring thickness				
	Mark			
	0		2.05 – 2.10 mm	0.0807 – 0.0827 in.
	1		2.10 – 2.15 mm	0.0827 – 0.0846 in.
	2		2.15 – 2.20 mm	0.0846 – 0.0866 in.
	3		2.20 – 2.25 mm	0.0866 – 0.0886 in.
	4		2.25 – 2.30 mm	0.0886 – 0.0906 in.
	5		2.30 – 2.35 mm	0.0906 – 0.0925 in.
Output shaft snap ring thickness				
Front	Mark			
	C-1		1.75 – 1.80 mm	0.0689 – 0.0709 in.
	D		1.80 – 1.85 mm	0.0709 – 0.0728 in.
	D-1		1.85 – 1.90 mm	0.0728 – 0.0748 in.
	E		1.90 – 1.95 mm	0.0748 – 0.0768 in.
	E-1		1.95 – 2.00 mm	0.0768 – 0.0787 in.
	F		2.00 – 2.05 mm	0.0787 – 0.0807 in.
	F-1		2.05 – 2.10 mm	0.0807 – 0.0827 in.

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Specifications (Cont'd)

Rear	Mark		
	A	2.67 – 2.72 mm	0.1051 – 0.1071 in.
	B	2.73 – 2.78 mm	0.1075 – 0.1094 in.
	C	2.79 – 2.84 mm	0.1098 – 0.1118 in.
	D	2.85 – 2.90 mm	0.1122 – 0.1142 in.
	E	2.91 – 2.96 mm	0.1146 – 0.1165 in.
	F	2.97 – 3.02 mm	0.1169 – 0.1189 in.
	G	3.03 – 3.08 mm	0.1193 – 0.1213 in.
	H	3.09 – 3.14 mm	0.1217 – 0.1236 in.
	J	3.15 – 3.20 mm	0.1240 – 0.1260 in.
	K	3.21 – 3.26 mm	0.1264 – 0.1283 in.
	L	3.27 – 3.32 mm	0.1287 – 0.1307 in.
Counter gear snap ring (Front bearing)			
	Mark		
	1	2.05 – 2.10 mm	0.0807 – 0.0827 in.
	2	2.10 – 2.15 mm	0.0827 – 0.0846 in.
	3	2.15 – 2.20 mm	0.0846 – 0.0866 in.
	4	2.20 – 2.25 mm	0.0866 – 0.0886 in.
	5	2.25 – 2.30 mm	0.0886 – 0.0906 in.
	6	2.30 – 2.35 mm	0.0906 – 0.0925 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Straight screw plug	190	14	19
Transfer adapter x Transmission case	380	27	37
Restrict pin	280	20	27
Shift lever retainer x Extension housing	185	13	18
Front bearing retainer x Transmission case	170	12	17
Rear bearing retainer x Intermediate plate	185	13	18
Reverse shift arm bracket	185	13	18
Counter gear rear lock nut	1,200	87	118
Reverse idler gear shaft stopper bolt	175	13	17
Clutch housing x Transmission case	380	27	37
Shift lever housing bolt	390	28	38
Shift fork No. 1 and No. 2 x Fork shaft	200	14	20

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TRANSFER
Specifications

Rear output shaft			
High gear journal diameter	Limit	40.009 mm	1.5752 in.
Low gear journal diameter	Limit	40.009 mm	1.5752 in.
Runout		0.03 mm	0.0012 in.
High and low gear oil clearance			
	STD	0.035 – 0.081 mm	0.0014 – 0.0032 in.
	Limit	0.081 mm	0.0032 in.
High and low gear thrust clearance			
	STD	0.10 – 0.25 mm	0.0039 – 0.0098 in.
	Limit	0.25 mm	0.0098 in.
Shift fork to hub sleeve clearance			
	Limit	1.0 mm	0.039 in.
Rear output shaft snap ring thickness			
	Mark		
	11	2.30 – 2.35 mm	0.0906 – 0.0925 in.
	17	2.60 – 2.65 mm	0.1024 – 0.1043 in.
Idler gear thrust clearance			
	STD	0.275 – 0.625 mm	0.0108 – 0.0246 in.
	Limit	0.625 mm	0.0246 in.
Rear output shaft preload			
	New bearing	15 – 24.7 kg-cm	(13.0 – 21.4 in.-lb, 1.5 – 2.4 N·m)
	Reused bearing	7 – 12 kg-cm	(6.1 – 10.4 in.-lb 0.7 – 1.2 N·m)
Rear output shaft preload adjusting shim			
	Mark		
	0	0.15 mm	0.0059 in.
	4	0.4 mm	0.016 in.
	5	0.5 mm	0.020 in.
	6	0.6 mm	0.024 in.
	7	0.7 mm	0.028 in.
	8	0.8 mm	0.031 in.
	9	0.9 mm	0.035 in.
	10	1.0 mm	0.039 in.
	11	1.1 mm	0.043 in.
	12	1.2 mm	0.047 in.
	13	1.3 mm	0.051 in
	14	1.4 mm	0.055 in.
	15	1.5 mm	0.059 in.
Oil seal drive in depth			
Speedometer driven gear		20 mm	0.787 in.

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Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Transfer front case x Transmission case	17 mm	650	47	64
	14 mm	400	29	39
Transfer front case x Transfer rear case	17 mm	650	47	64
	14 mm	400	29	39
Idler gear shaft lock plate bolt		130	9	13
Front companion flange lock nut		1,300	94	127
Transfer rear case x Transfer case cover No.2		155	11	15
Transfer rear case x Rear output shaft rear bearing retainer		350	25	34
Rear companion flange lock nut		1,300	94	127
Transmission output shaft lock nut		1,300	94	127
Transfer rear case x Power take-off cover				
	With liquid sealer	170	12	17
	Others	195	14	19
Transfer indicator switch		450	33	44
Speedometer driven gear lock plate bolt		130	9	13
Diaphragm cylinder body x Transfer front case		185	13	18
Diaphragm cylinder cover x Diaphragm cylinder body		185	13	18
Diaphragm cylinder body cover x Diaphragm cylinder cover		75	65 in.-lb	7.4
Suction tube x Diaphragm cylinder body cover		375	27	37
Diaphragm push rod nut		375	27	37

PROPELLER SHAFT

Specifications

Spider axial play		Less than 0.05 mm (0.0020 in.)	
Snap ring thickness	Color		
	None	1.475 – 1.525 mm	0.0581 – 0.0600 in.
	Brown	1.525 – 1.575 mm	0.0600 – 0.0620 in.
	Blue	1.575 – 1.625 mm	0.0620 – 0.0640 in.
Runout	Limit	0.8 mm	0.031 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Propeller shaft x Differential	750	54	74
Propeller shaft x Transfer	750	54	74

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FRONT AXLE AND SUSPENSION

Specifications

Cold tire inflation pressure	Model	Tire size	Inflation pressure kg/cm² (psi, kPa)			
			Front	Rear	Front	Rear
Australia	RJ·LJ70 series	205R16C 6PR	1.7 (24,167)	2.0 (28, 196)	1.7 (24, 167)	2.4 (34, 236)
		10R15-6PRLT	1.75 (25,172)	2.1 (30, 206)	1.75 (25, 172)	2.5 (36, 245)
Europe	RJ·LJ70 series	7.00-16-6PRLT	1.8 (26,177)	2.2 (31, 216)	1.8 (26, 177)	2.6 (37, 255)
		205 SR 16	1.7 (24,167)	2.0 (28, 196)	1.7 (24, 167)	2.3 (33, 226)
Except Europe and Australia	RJ·LJ70 series	7.00-15-6PRLT	1.8 (26,177)	2.2 (31, 216)	1.8 (26, 177)	2.6 (37, 255)
		7.00-16-6PRLT	1.8 (26,177)	2.0 (28, 196)	1.8 (26, 177)	2.4 (34, 235)
		205R16C 6PR	1.7 (24,167)	2.0 (28, 196)	1.7 (24, 167)	2.4 (34, 235)
		10R15-6PRLT	1.75 (25, 172)	2.1 (30, 206)	1.75 (25, 172)	2.5 (36, 245)

Front wheel alignment	Camber			1° ± 1°	
	King pin inclination			9°30′ ± 1°	
	Caster			4°05′ ± 1°	
	Toe-in	Tire		Inspection STD	Adjustment STD
		Radial	10R-15 7.50R-16	−1 ± 2 mm (−0.04 ± 0.08 in.)	−1 ± 1 mm (−0.04 ± 0.04 in.)
			Other	1 ± 2 mm (0.04 ± 0.08 in.)	1 ± 1 mm (0.16 ± 0.04 in.)
		Bias		4 ± 2 mm (0.16 ± 0.08 in.)	4 ± 1 mm (0.16 ± 0.04 in.)
	Wheel angle	Max.	Inside wheel	32°00′ ± $^{+0°}_{-3°}$	
			Outside wheel	30°00′	
		at 20° (Outside wheel)	Inside wheel	20°30′	
	Side slip			Less than 3.0 mm/m (0.118 in./3.3 ft)	

Disc wheel lateral runout	Limit	1.2 mm	0.047 in.	
Wheel bearing preload (rotating load at hub bolt)	Frictional force of oil seal plus	0.4 – 3.3 kg	0.9 – 7.3 lb	4 – 32 N
Steering knuckle bearing preload (Starting load at knuckle arm end, before install dust seal)		2.5 – 5.0 kg	5.5 – 11.0 lb	25 – 49 N
(Starting load at SST, before install dust seal)		3.0 – 6.0 kg	6.6 – 13.2 lb	29 – 59 N
Steering knuckle preload adjusting shim thickness		0.1 mm	0.004 in.	
		0.2 mm	0.008 in.	
		0.3 mm	0.012 in.	
		0.5 mm	0.020 in.	
		1.0 mm	0.039 in.	

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Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Tie rod clamp bolt	375	27	37
Steering knuckle stopper bolt lock nut	450	33	44
Free wheel hub body (Flange) x Axle hub	315	23	31
Free wheel hub body x Free wheel hub cover	100	7	10
Front axle hub bearing lock nut	800	58	78
Disc brake caliper x Steering knuckle	900	65	88
Steering knuckle arm x Steering knuckle	975	71	96
Bearing cap x Steering knuckle	975	71	96
Third arm x Steering knuckle	1,170	85	115
Knuckle arm x Tie rod	925	67	91
Knuckle spindle x Steering knuckle	475	34	47
Propeller shaft x Differential	750	54	74
Leading arm x Frame	1,000	72	98
Leading arm x Axle housing	2,500	181	245
Lateral control rod x Frame	1,460	106	143
Lateral control rod x Axle housing	1,000	72	98

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REAR AXLE AND SUSPENSION

Specifications

Rear axle shaft	Maximum shaft runout		2.0 mm	0.079 in.
	Maximum flange runout		0.2 mm	0.008 in.
Differential	Drive pinion bearing preload	at Starting		
		New bearing	19–26 kg-cm	16.5–22.6 in.-lb 1.9–2.5 N·m
		Reused bearing	9 – 13 kg-cm	7.8–11.3 in.-lb 0.9–1.3 N·m
	Total preload	at Starting	Add drive pinion bearing preload	
		New and reused bearing	4 – 6 kg-cm	3.5–5.2 in.-lb 0.4–0.6 N·m
	Drive pinion to ring gear backlash		0.13 – 0.18 mm	0.0051 – 0.0071 in.
	Pinion gear to side gear backlash		0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Ring gear runout	Limit	0.10 mm	0.0039 in.
	Companion flange runout	Limit		
		Radial	0.10 mm	0.0039 in.
		Lateral	0.10 mm	0.0039 in.
	Ring gear installing temperature		90 – 110°C	194 – 230°F
	Side gear thrust washer thickness			
			1.6 mm	0.063 in.
			1.7 mm	0.067 in.
			1.8 mm	0.071 in.
	Drive pinion adjusting plate washer thickness			
			1.70 mm	0.0669 in.
			1.73 mm	0.0681 in.
			1.76 mm	0.0693 in.
			1.79 mm	0.0705 in.
			1.82 mm	0.0717 in.
			1.85 mm	0.0728 in.
			1.88 mm	0.0740 in.
			1.91 mm	0.0752 in.
			1.94 mm	0.0764 in.
			1.97 mm	0.0776 in.
			2.00 mm	0.0787 in.
			2.03 mm	0.0799 in.
			2.06 mm	0.0811 in.
			2.09 mm	0.0823 in.
			2.12 mm	0.0835 in.
			2.15 mm	0.0846 in.
			2.18 mm	0.0858 in.
			2.21 mm	0.0870 in.
			2.24 mm	0.0882 in.
			2.27 mm	0.0894 in.
			2.30 mm	0.0906 in.
			2.32 mm	0.0913 in.

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Specifications (Cont'd)

Differential (Cont'd)	Side gear adjusting shims thickness (LSD)	0.15 mm	0.0059 in.
		0.20 mm	0.0079 in.
		0.25 mm	0.0098 in.
		0.30 mm	0.0118 in.
		0.35 mm	0.0138 in.

Tightening Torque

Differential	Part tightened		kg-cm	ft-lb	N·m
	Propeller shaft x Companion flange		750	54	74
	Drive pinion x Companion flange		2,000 – 3,500	145 – 253	196 – 343
	Ring gear x Differential case		985	71	97
	Side bearing cap x Differential carrier		800	58	78
	Differential carrier x Axle housing		260	19	25
Rear axle and suspension	Backing plate x Axle housing		700	51	69
	Rear shock absorber x Axle housing		650	47	64
	Rear shock absorber x Body	LH	380	27	37
		RH	650	47	64
	Trailing arm x Front bracket		1,000	72	98
	Trailing arm x Rear bracket		2,500	181	245
	Lateral control rod x Body		1,460	106	143
	Lateral control rod x Axle housing		1,000	72	98

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BRAKE SYSTEM
Specifications

Brake pedal	Pedal height (from asphalt sheet)		169 – 179 mm	6.65 – 7.05 in.
	Pedal freeplay		3 – 6 mm	0.12 – 0.24 in.
	Pedal reserve distance at 50 kg (110.2 lb, 490 N)			
	Front disc type		More than 80 mm (3.15 in.)	
	Front drum type		More than 105 mm (4.13 in.)	
Brake booster	Booster push rod to piston clearance			
	at idling vacuum		0.1 – 0.5 mm	0.004 – 0.020 in.
	w/ SST		0 mm	0 in.
Vacuum pump	Brade	Height	13.80 mm	0.5433 in.
		Width	5.95 mm	0.2343 in.
		Length	39.98 mm	1.5740 in.
	Rotation play		1.0 mm	0.039 in.
Front brake (Drum)	Shoe lining thickness	STD	6.0 mm	0.236 in.
		Limit	1.0 mm	0.039 in.
	Drum inside diameter	STD	279.4 mm	11.00 in.
		Limit	281.4 mm	11.08 in.
Front brake	Pad thickness	STD	10.0 mm	0.394 in.
		Limit	1.0 mm	0.039 in.
	Disc thickness	STD	12.5 mm	0.492 in.
		Limit	11.5 mm	0.453 in.
	Disc runout	Limit	0.15 mm	0.0059 in.
Rear brake	Drum inside diameter	STD	254.0 mm	10.000 in.
		Limit	256.0 mm	10.079 in.
	Lining thickness	STD	5.0 mm	0.197 in.
		Limit	1.0 mm	0.039 in.
	Drum to shoe clearance		0.6 mm	0.024 in.
Parking brake	Lever travel at 20 kg (44.1 lb, 196 N)		7 – 9 clicks	

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Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Bleeder plug	110	8	11
Piston stopper bolt x Master cylinder	100	7	10
Outlet plug x Master cylinder	450	33	44
Reservoir set bolt x Master cylinder	250	18	25
Master cylinder x Brake booster	130	9	13
Brake tube union nut	155	11	15
Brake booster x Pedal bracket	130	9	13
Brake booster devis lock nut	260	19	25
Vacuum pump x Check valve	750	54	74
Vacuum pump x Alternator	80	69 in.-lb	7.8
Alternator x Oil inlet union bolt	140	10	14
Front brake wheel cylinder x Backing plate	185	13	18
Drum brake backing plate x Steering knuckle	475	34	47
Front disc x Front axle hub	475	34	47
Front disc brake cylinder x Steering knuckle	1,250	90	123
Drum brake backing plate x Rear axle housing	700	51	69
Rear brake wheel cylinder x Backing plate	1,000	72	98
Parking brake bellcrank bracket x Backing plate	130	9	13
LSPV x Valve bracket	130	9	13
Load sensing spring x Shackle No. 1	185	13	18
Load sensing spring x Valve bracket	185	13	18
LSPV bracket x Frame	130	9	13
LSPV shackle bracket x Rear axle housing	195	14	19
LSPV shackle lock nut	130	9	13
LSPV No. 2 shackle x Shackle bracket	130	9	13

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STEERING
Specifications

Steering	Steering wheel freeplay		40 mm (1.57 in.) or less
Tilt steering	Collar No.1 outer diameter		17.989 – 17.996 mm 0.7082 – 0.7085 in.
			17.996 – 18.003 mm 0.7085 – 0.7088 in.
			18.003 – 18.010 mm 0.7088 – 0.7091 in.
			18.010 – 18.017 mm 0.7091 – 0.7093 in.
			18.017 – 18.024 mm 0.7093 – 0.7096 in.
	Collar No.2 outer diameter		17.982 – 18.000 mm 0.7080 – 0.7087 in.
			18.000 – 18.018 mm 0.7087 – 0.7094 in.
	Tilt steering support shim thickness	Mark	
		None	0.197 – 0.203 mm 0.0078 – 0.0080 in.
		5	0.495 – 0.505 mm 0.0195 – 0.0199 in.
		8	0.795 – 0.805 mm 0.0313 – 0.0317 in.
		14	1.395 – 1.405 mm 0.0549 – 0.0553 in.
		18	1.795 – 1.805 mm 0.0707 – 0.0711 in.
Steering gear housing	Sector shaft thrust clearance		0.05 mm (0.0020 in.) or less
	Thrust washer thickness		1.95 mm 0.0768 in.
			2.00 mm 0.0787 in.
			2.05 mm 0.0807 in.
	Sector shaft bushing inside diameter	No.	
		1	36.055 – 36.065 mm 1.4195 – 1.4199 in.
		2	36.045 – 36.055 mm 1.4191 – 1.4195 in.
		3	36.035 – 36.045 mm 1.4187 – 1.4191 in.
		4	36.025 – 36.035 mm 1.4183 – 1.4187 in.
	Worm shaft preload (starting)		3.5 – 5 kg-cm 3.0 – 4.3 in.-lb 0.34 – 0.49 N·m
	Total preload (starting)		8 – 11 kg-cm 6.9 – 9.5 in.-lb 0.78 – 1.08 N·m
	Gear housing oil level		12 – 17 mm 0.47 – 0.67 in.
Power steering	Drive belt tension	at 10 kg (22 lb, 98 N)	
	22 R Engine	New belt	5 – 7 mm 0.20 – 0.28 in.
		Used belt	7 – 11 mm 0.28 – 0.43 in.
	2L Engine	New belt	8 – 10 mm 0.31 – 0.39 in.
		Used belt	10 – 15 mm 0.39 – 0.59 in.
	Drive belt tension w/ SST	New belt	45 – 55 kg
		Used belt	20 – 35 kg
	Maximum rise of oil level		Below 5 mm (0.20 in.)
	Oil pressure	at idle speed	75 kg/cm^2 (1,067 psi, 7,355 kPa) or more
	Steering effort		4 kg (8.8 lb, 39 N) or less
	Rotor shaft bushing oil clearance		
		STD	0.01 – 0.03 mm 0.0004 – 0.0012 in.
		Maximum	0.07 mm 0.0028 in.
	Rotor to cam ring clearance		0.06 mm (0.0024 in.) or less
	Vane plate to rotor groove clearance		0.06 mm (0.0024 in.) or less
	Vane plate		
	Minimum length		14.97 mm 0.5894 in.
	Minimum height		7.8 mm 0.307 in.
	Minimum thickness		1.7 mm 0.067 in.

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Specifications (Cont'd)

Power steering (Cont'd)	Vane plate length			
	Rotor and cam ring mark			
		None	14.996 – 14.998 mm	0.5904 – 0.5905 in.
		1	14.994 – 14.996 mm	0.5903 – 0.5904 in.
		2	14.992 – 14.994 mm	0.5902 – 0.5903 in.
		3	14.990 – 14.992 mm	0.59016 – 0.59024 in.
		4	14.988 – 14.990 mm	0.5901 – 0.5902 in.
	Flow control valve spring length	STD	50 mm	1.97 in.
		Minimum	47 mm	1.85 in.
	Pump rotating torque		2.8 kg-cm (2.4 in.-lb, 0.3 N·m) or less	
	Cross shaft adjusting screw thrust crearance		0.03 – 0.05 mm	0.0012 – 0.0020 in.
	Worm bearing preload	at Starting	4.0 – 6.5 kg-cm	3.5 – 5.6 in.-lb 0.4 – 0.6 N·m
	Total preload	at Starting	7.0 – 10.5 kg-cm	6.1 – 9.1 in.-lb 0.69 – 1.03 N·m
Steering linkage	Ball joint rotating torque		10 – 30 kg-cm	8.7–26.0 in.-lb 1.0 – 2.9 N·m

Torque Specifications

Tilt steering	Part tightened	kg-cm	ft-lb	N·m
	Pawl set bolt	185	13	18
	Tilt lever retainer	185	13	18
	Tilt steering support x Breakaway bracket	185	13	18
	Tilt steering support stopper bolt	100	7	10
	Tilt steering support x Upper bracket	75	65 in.-lb	7.4
	Breakaway bracket x Column Tube	185	13	18
	Column hole cover x Column tube	185	13	18
	Main shaft x Intermediate shaft	250	18	25
	Column hole cover x Body	130	9	13
	Breakaway bracket x Body	250	18	25
	Steering wheel x Main shaft	350	25	34
	Intermediate shaft No.1 x No.2	360	26	35
Right steering	Upper bracket x Column tube	75	65 in.-lb	7.4
	Column hole cover x Body	130	9	13
	Column tube x Body	250	18	25
	Steering wheel x Main shaft	350	25	34
	Main shaft x Intermediate shaft	360	26	35
	Intermediate shaft x Worm shaft	360	26	35
Steering gear housing	Worm bearing adjusting screw lock nut	1,500	108	147
	Sector shaft end cover x Gear housing	1,150	83	113
	Sector shaft adjusting screw lock nut	450	33	44
	Gear housing x Frame	1,240	90	122
	Intermediate shaft x Worm shaft	360	26	35
	Joint protector bolt	65	56 in.-lb	6.4
	Pitman arm x Tie rod end	925	67	91
	Pitman arm x Sector shaft	1,800	130	177

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Torque Specifications (Cont'd)

Power steering	Part tightened	kg-cm	ft-lb	N·m
	Pressure port union x Rear housing	700	51	69
	Front housing x Rear housing	470	34	46
	Suction port union x Rear housing	130	9	13
	PS pump x Bracket (22R Engine)	400	29	39
	PS pump pulley x Rotor shaft	440	32	43
	Pressure tube x Pressure port union	450	33	44
	PS pump x Bracket (2L Engine)	625	45	61
	Ball guide clamp set screw	30	26 in.-lb	2.9
	Valve body x Gear housing	470	34	46
	Worm bearing adjusting screw lock nut	500	36	49
	End cover x Gear housing	470	34	46
	Pitman arm x Cross shaft	1,800	130	177
	Cross shaft adjusting screw lock nut	470	34	46
	Gear housing x Frame	1,240	90	122
	Pressure tube x Valve body	450	33	44
	Intermediate shaft x Worm shaft	360	26	35
	Joint protector bolt	65	56 in.-lb	6.4
	Pitman arm x Tie rod end	925	67	91
Steering linkage	Tie rod x Knuckle arm	925	67	91
	Tie rod x Pitman arm	925	67	91
	Steering damper x Tie rod	750	54	74
	Tie rod end clamp bolt	375	27	37
	Steering damper x Bracket	750	54	74
	Steering knuckle stopper bolt	450	33	44
	Steering damper bracket x Frame	400	29	39

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BODY

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Roll bar				
Roll bar set bolt		440	32	43
Front seat				
Reclining seat adjuster x Seat back		530	38	52
Reclining seat adjuster x Seat cushion		530	38	52
Seat back x Seat cushion		530	38	52
Seat cushion x Seat track		260	19	25
Seat track x Body	w/o Seat suspension	400	29	39
Seat track x Seat suspension	w/ Seat suspension	400	29	39
Rear bench seat				
Seat cushion lock x Seat leg	w/o Seat belt	260	19	25
	w/ Seat belt	420	30	41
Striker x Body		530	38	52
Seat cushion bracket x Seat cushion		530	38	52
Seat cushion bracket x Body		260	19	25
Seat back lock x Seat back		530	38	52
Seat back lock x Seat cushion		530	38	52
Strap set bolt		80	69 in.-lb	7.8
Rear parallel seat				
Seat frame x Body		260	19	25
Seat belt				
Seat belt anchor x Body		440	32	43
Fuel tank				
Fuel sender gauge set screw		15	13 in.-lb	1.5
Fuel tank suction tube set screw		15	13 in.-lb	1.5
Fuel tank front bracket x Fuel tank band		400	29	39
Fuel tank front bracket x Body		400	29	39
Fuel tank rear bracket x Body		400	29	39
Drain plug		65	56 in.-lb	6.4

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WINCH
Mechanical Winch
Specifications

P.T.O.	Input gear bushing	STD	20.1 mm	0.791 in.
		Limit	20.04 – 20.08 mm	0.7889 – 0.7905 in.
	Input gear x Shaft oil clearance	STD	0.040 – 0.093 mm	0.0015 – 0.0036 in.
		Limit	0.10 mm	0.0039 in.
Drive Shaft	Drive shaft runout	Limit	0.7 mm	0.028 in.
	Spider bearing axial play	STD	0.15 mm (0.0059 in.) or less	
	Snap ring thicknesses	Color		
		None	1.20 mm	0.0472 in.
		Brown	1.25 mm	0.0492 in.
		Blue	1.30 mm	0.0512 in.
Winch	End bracket bushing	STD	38.000–38.039 mm	1.4961–1.4976 in.
		Limit	38.4 mm	1.512 in.
	Drum bushing	STD	38.000–38.039 mm	1.4961–1.4976 in.
		Limit	38.4 mm	1.512 in.
	Gear case bushing	STD	38.000–38.025 mm	1.4961–1.4970 in.
		Limit	38.3 mm	1.508 in.
	Gear case cover bushing	STD	38.000–38.025 mm	1.4961–1.4970 in.
		Limit	38.3 mm	1.508 in.
	Clutch lever to lock plate clearance	STD	0.5 – 1.5 mm	0.020 – 0.059 in.

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Chain wire	Lock plate x drum	120	9	12
P.T.O.	Bearing retainer x P.T.O. case	195	14	19
	P.T.O cover x P.T.O case	75	65 in.-lb	7.4
	Universal joint flange lock nut	480	35	47
	Locking ball bolt	130	9	13
	Idler shaft lock plate	130	9	13
	Input gear shaft lock plate	130	9	13
	P.T.O x transfer			
	Front side	170	12	17
	Other side	195	14	19
	P.T.O shift rod x Link lever	200	14	20
Drive shaft	Drive shaft x Sleeve yoke	250	18	25
	Drive shaft x Universal joint	200	14	20
	x P.T.O companion flange	200	14	20
	Pillow block	120	9	12
Winch	Worm bearing No.1 retainer	250	18	25
	Worm bearing No.2 retainer	250	18	25
	Gear case cover x Gear case	120	9	12
	Rear base member x Winch	250	18	25
	Winch roller bracket x Winch	250	18	25
	Winch assembly x Vehicle	See page WI-22		

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Electric Winch Specifications

Winch	Gear case cover bushing			
	Motor side	STD	22.000–22.033mm	0.8661–0.8674 in.
		Limit	22.3 mm	0.878 in.
	Case side	STD	14.000–14.027mm	0.5512–0.5522 in.
		Limit	14.2 mm	0.559 in.
	Gear case bushing	STD	75.000–75.046mm	2.9528–2.9546 in.
		Limit	75.5 mm	2.972 in.
	Drum housing bushing	STD	85.2 – 85.3 mm	3.354 – 3.358 in.
		Limit	86.0 mm	3.386 in.
	Clutch outer race bushing	STD	37.351–37.388mm	1.4705–1.4720 in.
		Limit	37.7 mm	1.484 in.
	Brake shaft drive gear bushing			
	Drive gear side	STD	12.500–12.527mm	0.4921–0.4932 in.
		Limit	12.8 mm	0.504 in.
	Other side	STD	22.000–22.033mm	0.8661–0.8674 in.
		Limit	22.3 mm	0.878 in.
	Counter shaft gear bushing	STD		
		Limit	18.3 mm	0.720 in.
	Clutch disc thickness			
	Outer disc	STD	1.45 – 1.65 mm	0.0571–0.0650 in.
		Limit	1.0 mm	0.039 in.
	Inner disc	STD	2.2 – 2.4 mm	0.087 – 0.094 in.
		Limit	1.9 mm	0.075 in.
	Disc spacer thickness	STD	2.4 – 2.7 mm	0.094 – 0.106 in.
		Limit	2.0 mm	0.079 in.
	Drum spacer thickness			
	No.1 and No.2	STD	1.88 – 2.12 mm	0.0740–0.0835 in.
		Limit	1.2 mm	0.047 in.
Motor	Commutator runout	Limit	0.2 mm (0.008 in.) or less	
	Commutator diameter	STD	43.0 mm	1.693 in.
		Limit	41.0 mm	1.614 in.
	Commutator mica depth	STD	0.7 mm	0.028 in.
		Limit	0.3 mm	0.012 in.
	Brush length	STD	22.0 mm	0.866 in.
		Limit	15.0 mm	0.591 in.
	Brush spring installed load	STD	3,200 – 4,000 g	7.1 – 8.8 lb
	Armature shaft thrust clearance	STD	0.05 – 0.50 mm	0.0020–0.0197 in.
	Thrust washer thickness	STD	1.6 mm	0.063 in.

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Chain wire	Wire lock x Lock plate	195	14	19
Winch	Shift lever support x Gear case	195	14	19
	Gear case x Gear case cover	195	14	19
	Rear base member x Winch	380	27	37
	Winch roller bracket x Winch	700	51	69
	Motor x Winch	195	14	19
	Winch assembly x Vehicle	See page WI-42		
Motor	Commutator end frame x Yoke	78	68 in.-lb	7.6

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LUBRICANT

Item	Capacity			Classification
	Liters	US qts	Imp. qts	
Manual Transmission				
G40	2.8	3.0	2.5	API GL-4 or GL-5
G52F	2.6	2.7	2.3	SAE 75W-90, 90, 80W-90
Transfer (G40, G52F)	2.1	2.2	1.8	API GL-4 or GL-5 SAE 90
Differential				API GL-5 hypoid gear oil
Front	1.98	2.1	1.7	Above −18°C (0°F)
Rear	2.2	2.3	1.9	SAE 90
				Below −18°C (0°F)
				SAE 80W-90 or 80W
Brake fluid	–			SAE J1703, DOT3
Steering gear housing	630 cc	21.3 oz		API GL-4 SAE 90
Power steering				ATF DEXRON® or DEXRON® II
Total	800 cc	27.1 oz		
Reservoir tank	390 cc	13.2 oz		
Power take-off	0.5	0.5	0.4	API GL-4 or GL-5 SAE 90
Mechanical winch	0.3	0.3	0.3	API GL-4 SAE 90
Electric winch	2.0	2.1	1.8	ATF Type F
Wheel bearing grease	–			Lithium base multipurpose, NLGI No.2
Steering knuckle and front axle shaft grease	–			Molybdenum disulphide lithium base, NLGI No.2

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STANDARD BOLT TORQUE SPECIFICATIONS

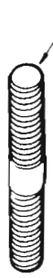
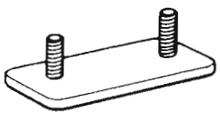
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STANDARD BOLT TORQUE SPECIFICATIONS B-2

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STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4– / 5– / 6– / 7–	4T / 5T / 6T / 7T	Stud bolt	 No mark	4T
	 No mark	4T			
Hexagon flange bolt w/washer hexagon bolt	 No mark	4T		 Grooved	6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/washer hexagon bolt	 Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 Three protruding lines	7T			

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SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Hexagon head bolt			Hexagon flange bolt		
			kg-cm	ft-lb	N·m	kg-cm	ft-lb	N·m
4T	6	1	55	48 in.-lb	5.4	60	52 in.-lb	5.9
	8	1.25	130	9	13	145	10	14
	10	1.25	260	19	25	290	21	28
	12	1.25	480	35	47	540	39	53
	14	1.5	760	55	75	850	61	83
	16	1.5	1,150	83	113		–	
5T	6	1	65	56 in.-lb	6.4		–	
	8	1.25	160	12	16		–	
	10	1.25	330	24	32		–	
	12	1.25	600	43	59		–	
	14	1.5	930	67	91		–	
	16	1.5	1,400	101	137		–	
6T	6	1	80	69 in.-lb	7.8	90	78 in.-lb	8.8
	8	1.25	195	14	19	215	16	21
	10	1.25	400	29	39	440	32	43
	12	1.25	730	53	72	810	59	79
	14	1.5		–		1,250	90	123
7T	6	1	110	8	11	120	9	12
	8	1.25	260	19	25	290	21	28
	10	1.25	530	38	52	590	43	58
	12	1.25	970	70	95	1,050	76	103
	14	1.5	1,500	108	147	1,700	123	167
	16	1.5	2,300	166	226		–	

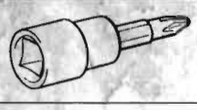
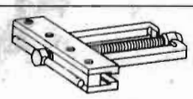
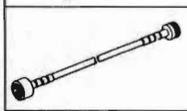
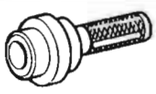
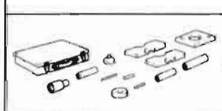
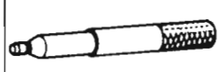
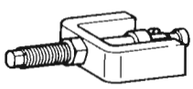
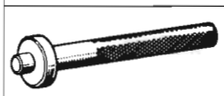
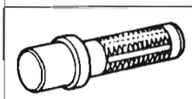
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SST AND SSM

SST (Special Service Tools) C-2
SSM (Special Service Materials) C-7

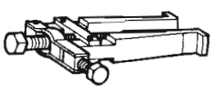
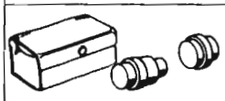
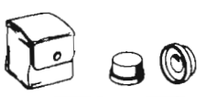
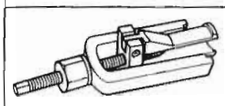
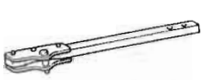
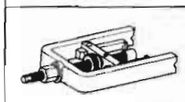
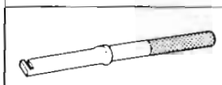
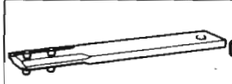
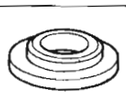
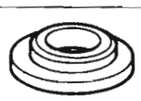
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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09060-20010	(Socket Wrench)								●			
	09201-60011	(Valve Guide Bushing Remover & Replacer)			●								
	09213-27010	(Gear Remover)		●									
	09216-00020	(Belt Tension Gauge)								●			●
	09216-00030	(Belt Tension Cable)								●			●
	09218-54011	(Cylinder Liner Remover & Replacer)						●					
	09223-50010	(Crankshaft Front Oil Seal Replacer)		●									
	09228-22020	(Oil Filter Wrench)					●	●					
	09228-78010	(Oil Filter Wrench)						●					
	09236-00101	(Water Pump Overhaul Tool Set)								●			
	09301-20020	(Clutch Guide Tool)	●										
	09303-35011	(Input Shaft Front Bearing Puller)	●										
	09304-30012	(Input Shaft Front Bearing Replacer)	●										
	09307-30010	(Transmission Extension Housing Metal Replacer)										●	

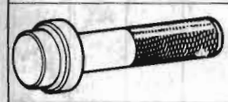
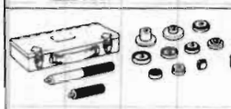
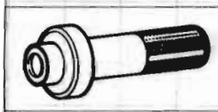
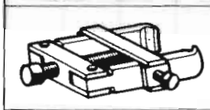
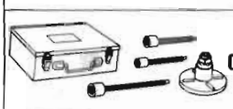
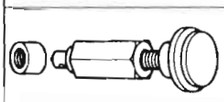
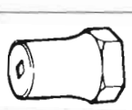
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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09308-00010	(Oil Seal Puller)					●	●		●			
	09308-10010	(Oil Seal Puller)			●		●	●					
	09309-36033	(Transmission Bearing Replacer)			●								
	09315-00010	(Clutch Release Bearing Remover & Replacer)	●										
	09315-00021	(Clutch Release Bearing Remover & Replacer)	●										
	09316-60010	(Transmission & Transfer Bearing Replacer)		●	●			●					
	09319-60020	(Transfer Output Shaft Needle Roller Bearing Remover)			●								
	09330-00021	(Companion Flange Holding Tool)			●			●				●	
	09332-25010	(Universal Joint Bearing Remover & Replacer)				●							
	09333-00012	(Clutch Diaphragm Spring Aligner)	●										
	09504-00011	(Differential Side Bearing Adjusting Nut Wrench)						●					
	09506-30011	(Differential Drive Pinion Rear Bearing Cone Replacer)						●					
	09506-35010	(Differential Drive Pinion Rear Bearing Replacer)		●									
	09514-35011	(Rear Wheel Bearing Puller)			●								

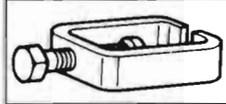
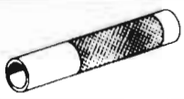
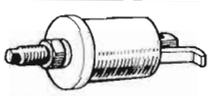
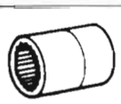
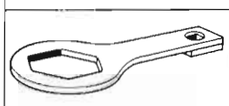
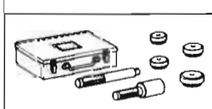
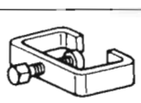
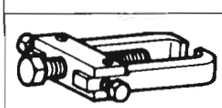
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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09515-30010	(Rear Wheel Bearing Replacer)						●					
	09517-30010	(Rear Axle Shaft Oil Seal Replacer)						●					
	09521-25011	(Rear Axle Shaft Puller)						●					
	09527-20011	(Rear Axle Shaft Bearing Remover)								●		●	
	09550-10012	("B" Replacer Set)								●			
	09554-30011	(Differential Oil Seal Replacer)					●	●					
	09556-22010	(Drive Pinion Front Bearing Remover)						●					
	09557-22022	(Companion Flange Remover & Replacer)						●					
	09605-60010	(Steering Knuckle Bearing Cup Replacer)					●						
	09606-60020	(Steering Knuckle Bearing Cup Remover)					●						
	09607-60020	(Front Wheel Adjusting Nut Wrench)					●						
	09608-12010	(Front Hub & Drive Pinion Bearing Replacer Set)		●									
	09608-20011	(Front Hub & Drive Pinion Bearing Tool Set)			●								
	09608-30011	(Front Hub & Drive Pinion Bearing Tool Set)						●	●	●			

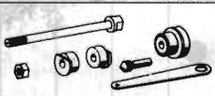
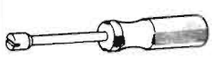
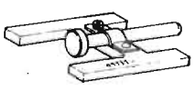
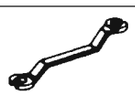
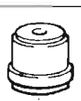
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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09608-35013	Axle Hub & Drive Pinion Bearing Tool Set					●					●	
	09609-20011	Steering Wheel Puller								●			
	09611-22012	(Tie Rod End Puller)								●			
	09612-22011	Tilt Handle Bearing Replacer								●		●	
	09612-30012	Steering Worm Bearing Puller							●				
	09612-65013	Steering Worm Bearing Puller					●			●		●	
	09616-00010	Steering Worm Bearing Adjusting Socket								●			
	09616-30020	Steering Worm Bearing Adjusting Screw Wrench								●			
	09617-60010	Worm Bearing Adjusting Screw Lock Nut Wrench								●			
	09618-60010	Front Axle & Drive Shaft Bearing Replacer					●						
	09620-30010	Steering Gear Box Replacer Set								●			
	09628-12022	(Ball Joint Puller)								●			
	09628-62011	(Ball Joint Puller)					●			●			
	09630-00011	Power Steering Gear Housing Overhaul Tool Set								●			

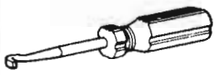
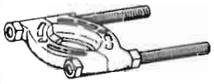
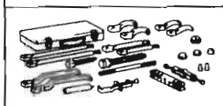
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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09631-22020	(Power Steering Hose Nut 14 x 17 Wrench)								●			
	09632-36010	(Steering Vane Pump Bearing Replacer)										●	
	09634-60013	(Steering Knuckle Centering Gauge)					●						
	09703-30010	(Brake Shoe Return Spring Tool)							●				
	09709-29017	(LSPV Gauge Set)							●				
	09710-22041	(Rear Suspension Bushing Tool Set)					●	●					
	09710-30030	(Rear Suspension Bushing Tool Set)					●	●					
	09718-00010	(Shoe Hold Down Spring Driver)							●				
	09736-27010	(Booster Diaphragm Remover & Replacer)							●				
	09737-00010	(Brake Booster Push Rod Gauge)							●				
	09751-36011	(Brake Tube Union Nut 10 x 12 Wrench)	●				●	●	●				
	09753-00012	(Brake Booster Overhaul Tool)							●				
	09753-30020	(Oil Seal Replacer)							●				
	09753-40010	(Base Plate)							●				

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SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	CL	MT	TF	PR	FA	RA	BR	SR	BO	WI	AC
	09806-30010	(Windshield Moulding Remover)									●		
	09812-00010	(Door Hinge Set Bolt Wrench Set)									●		
	09817-16011	(Back-up Light Switch Tool)			●								
	09921-00010	(Spring Tension Tool)			●								
	09950-00020	(Bearing Remover)		●				●					
	09950-20016	(Universal Puller)		●	●			●		●		●	

SSM (Special Service Materials)

Part Name	Part No.	Sec.	Use, etc.
THREE BOND 1324	08833-00070	RA WI SR	Differential Case P.T.O. set bolt Upper bracket
Dupont paste No. 4817	–	BE	Rear window defogger wire
Seal Packing Yellow	08826-00012	WI	Mechanical Winch ○ Adjusting shim ○ Bearing retainer ○ Gear case cover and set bolt Electrical Winch ○ Gear case cover set bolt

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ELECTRICAL WIRING DIAGRAMS

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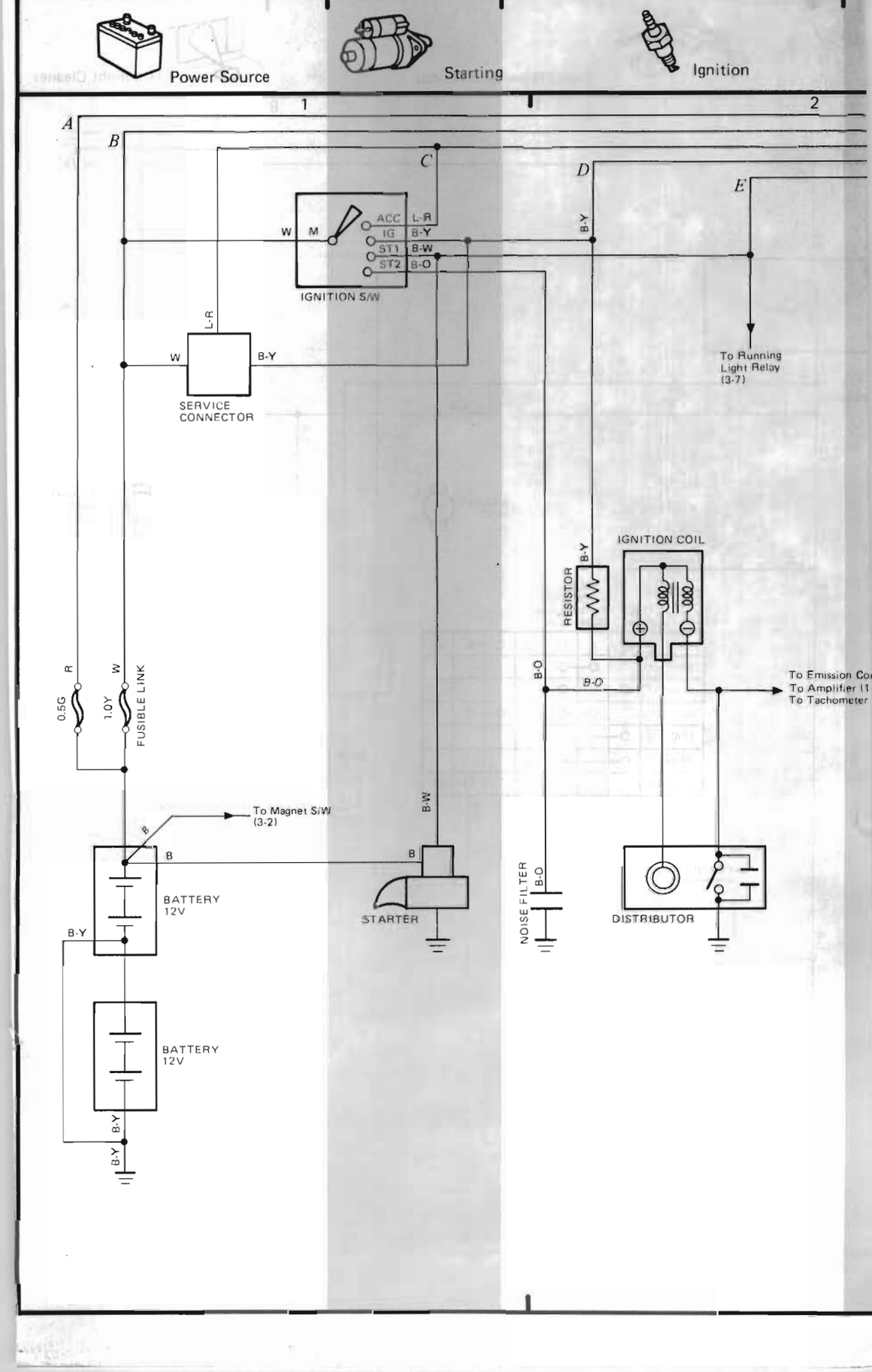
SYSTEM INDEX

LAND CRUISER (Light Duty) 1985 Production Vehicles (Page 1 to Page 5)

SYSTEMS	LOCATION	SYSTEMS	LOCATION
Air Conditioner, Cooler and Heater	1-6	Power Windows	3-3
Back-up Lights	3-1	Radio and Tape Player	4-3
Charging	1-2	Rear Air Conditioner	1-8
Cigarette Lighter	4-3	Rear Fog Lights	3-8
Clock	4-3	Rear Window Defogger	2-7
Combination Meter	2-2, 4-7	Rear Wiper and Washer	3-1
EDIC	4-5	Seat Belt Warning	2-4
Emission Control	1-4	Starting	1-1, 4-5
Fog Lights	4-1	Stop Lights	4-1
Front Wiper and Washer	2-7	Sun Roof	3-2
Fuel Heater	2-4	Taillights and Illumination	3-4
Glow Plugs	5-2	Trailer Socket	2-6
Headlights	3-7	Turn Signal and Hazard	2-5
Headlight Cleaner	2-8	Winch	3-2
Horn	2-6	4WD	2-3
Ignition	1-2		
Interior Lights	4-2		
Power Source	1-1, 4-4		

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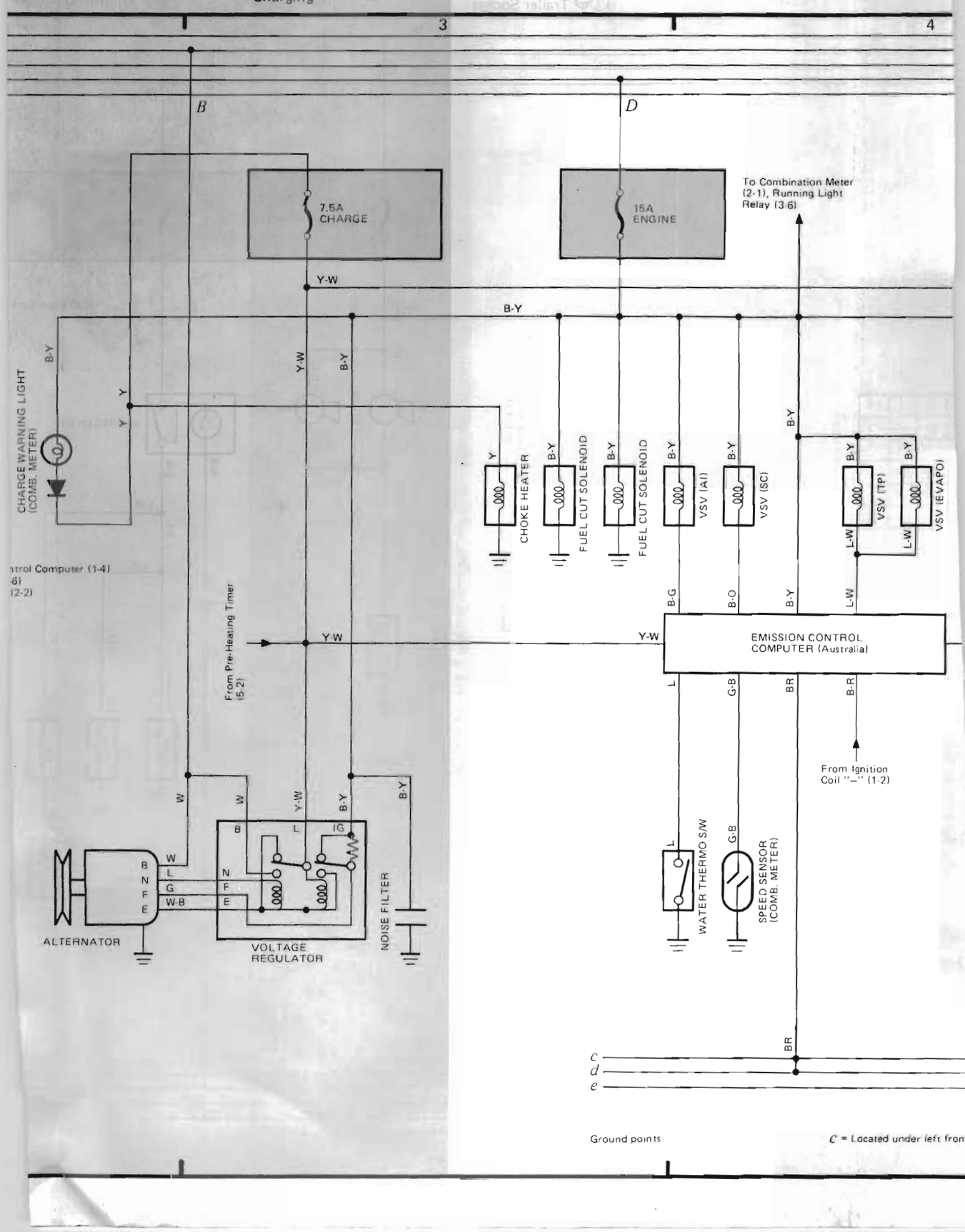
LAND CRUISER (Light Duty) ELECTRICAL WIRING DIAGRAM-



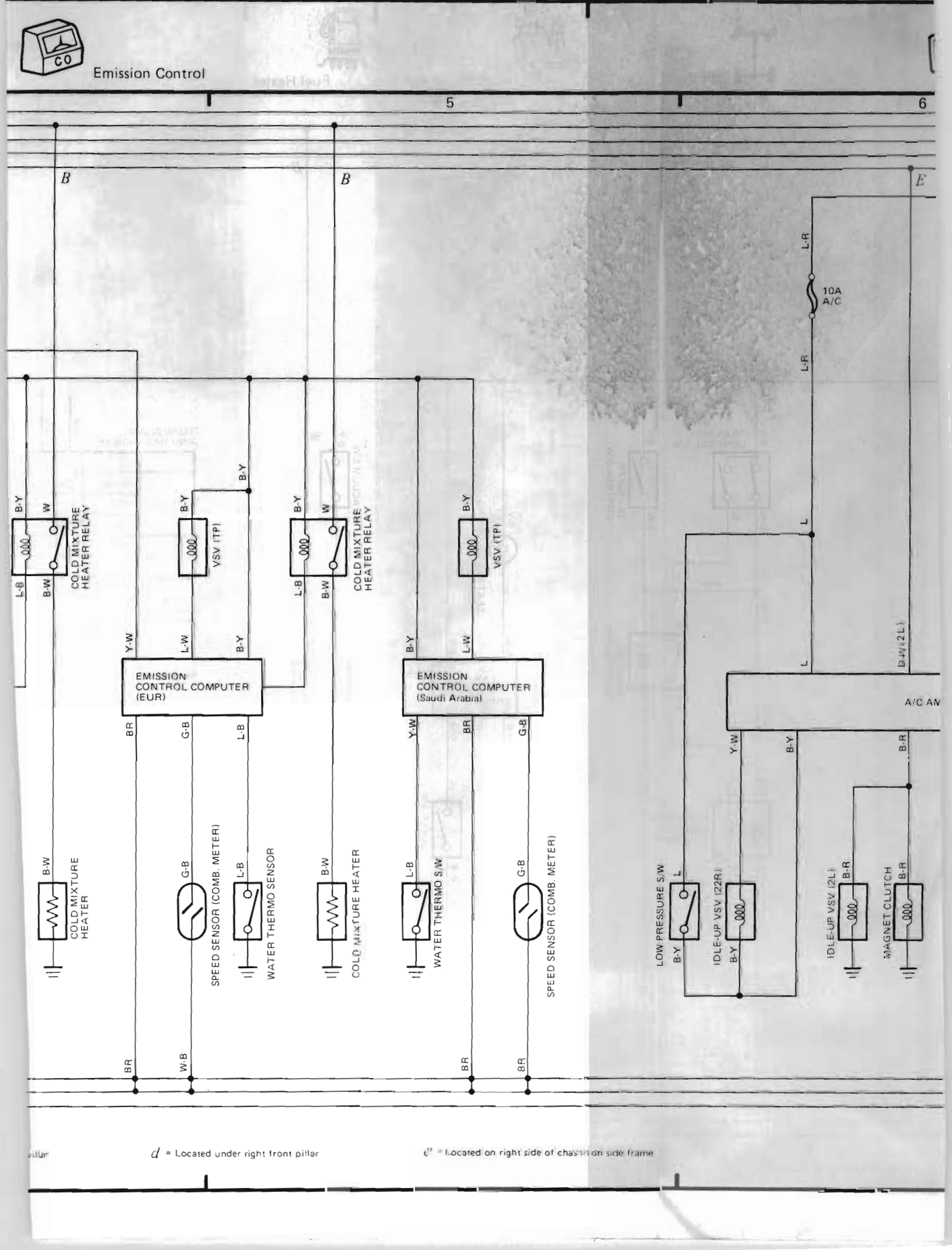
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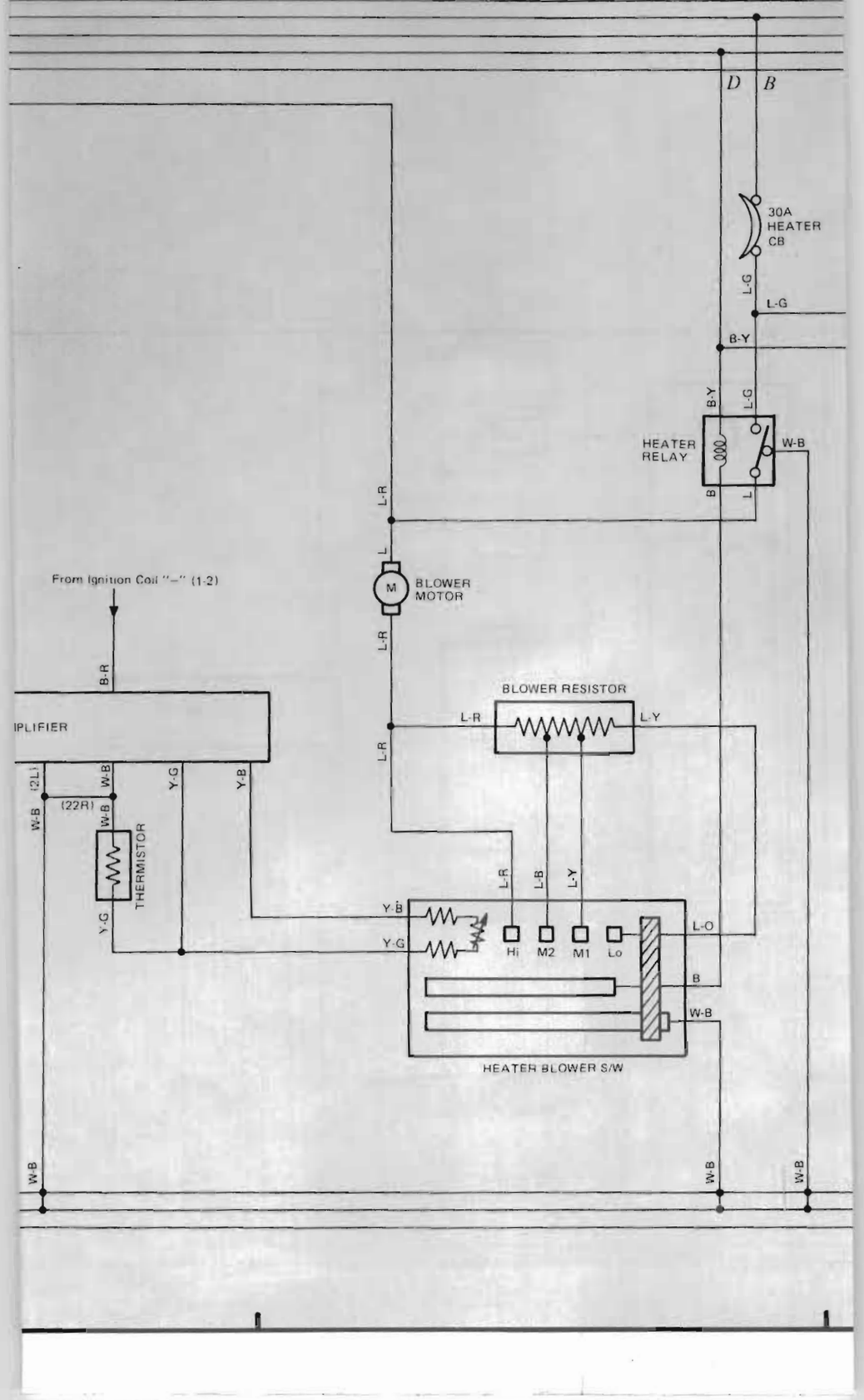
Charging



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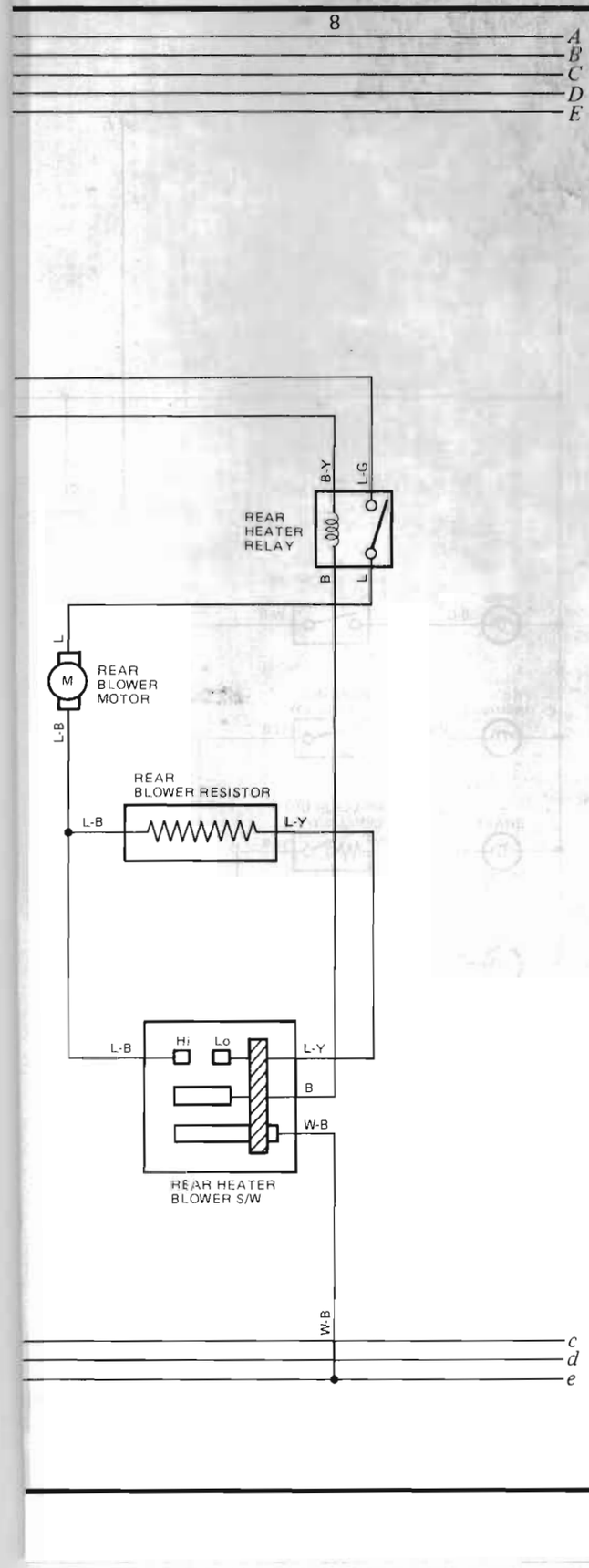


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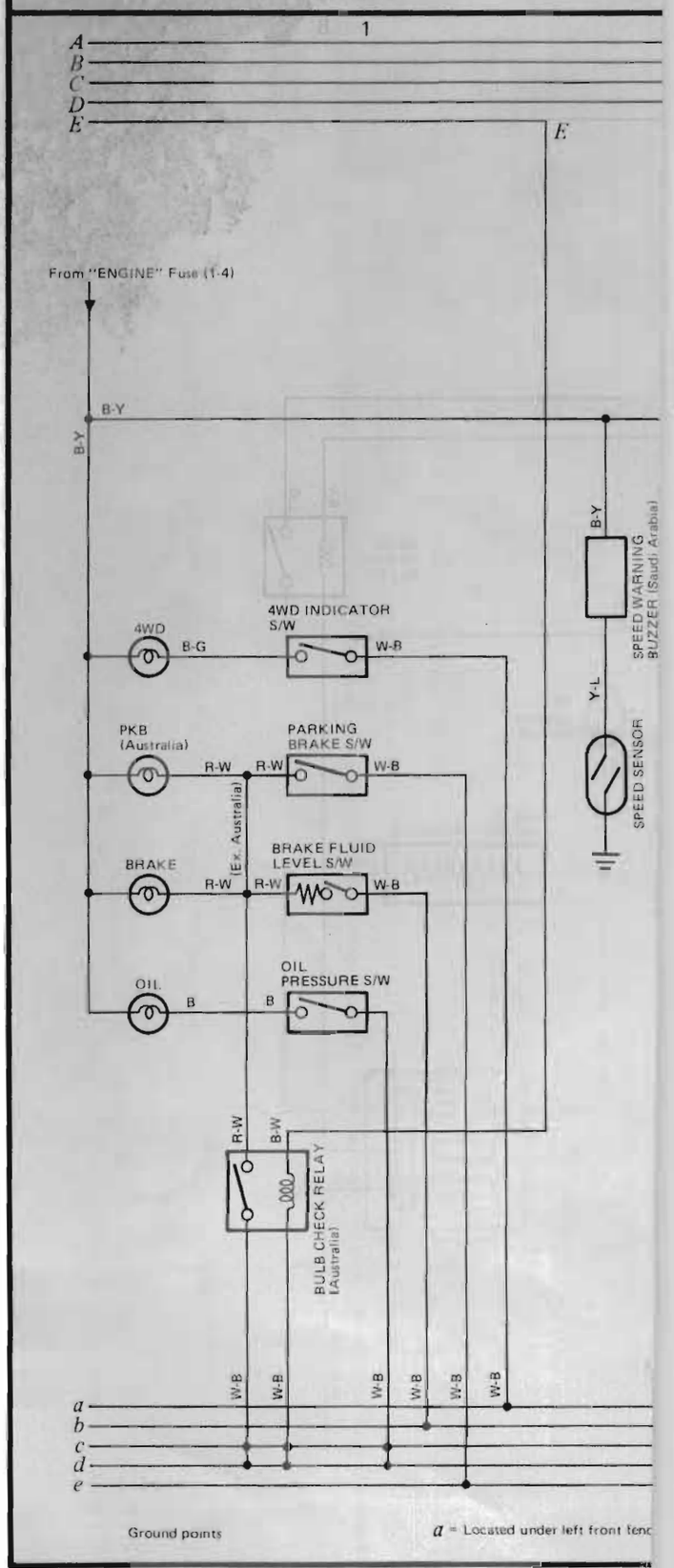
Rear Air Conditioner

8



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2 LAND CRUISER (Light Duty) (Con

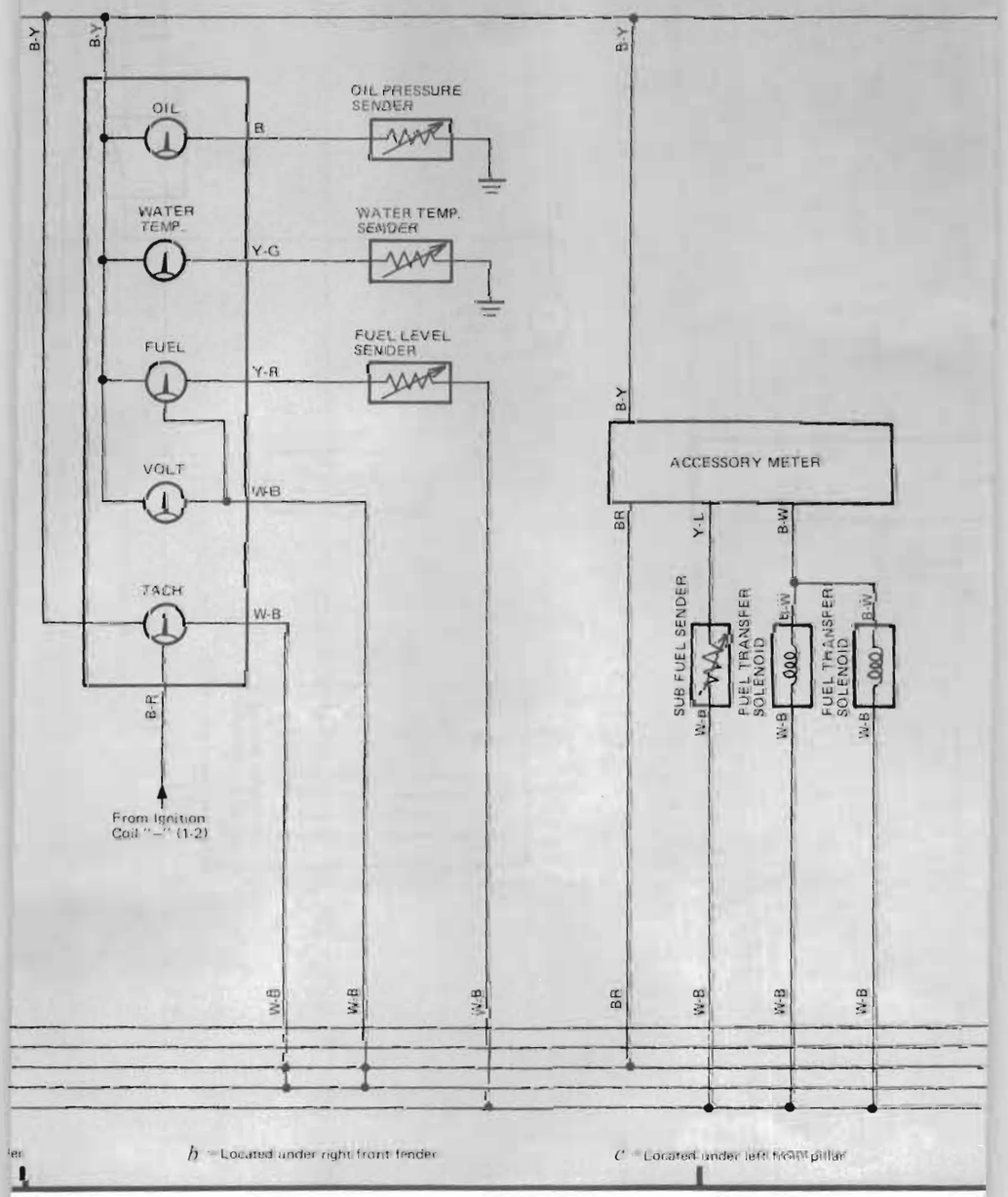


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t'd)

Combination Meter (22R)

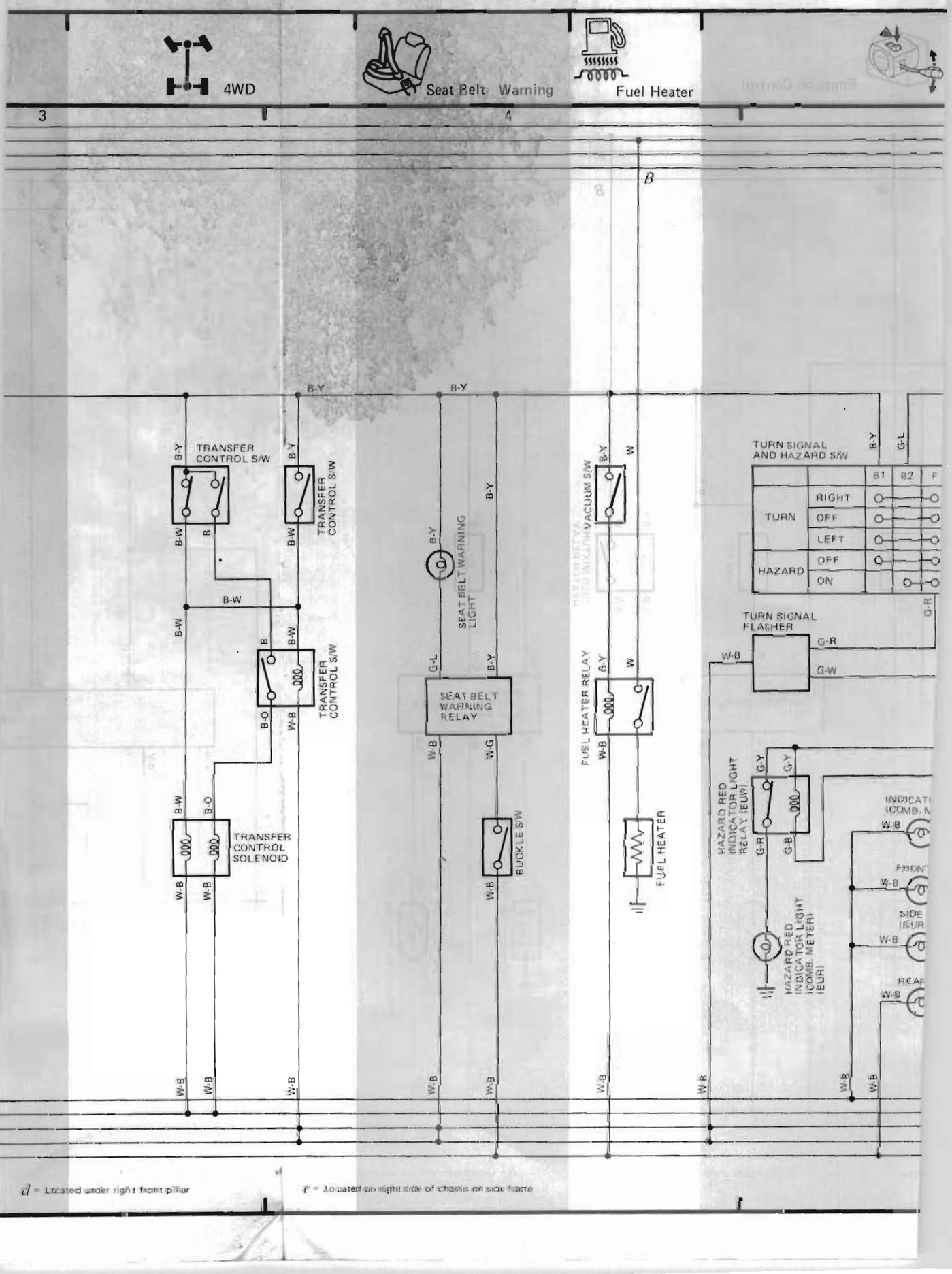
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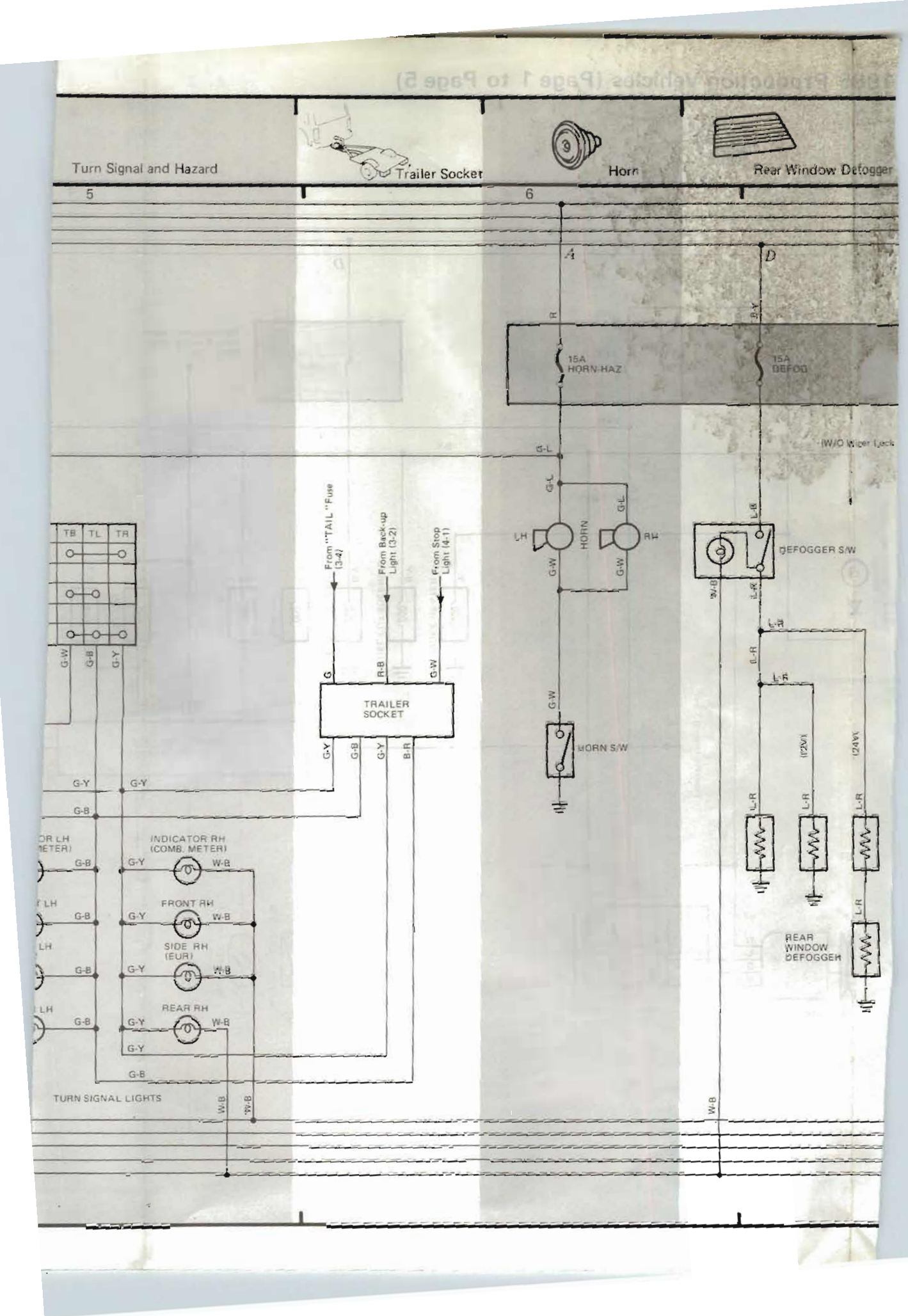
b = Located under right front fender

c = Located under left front pillar

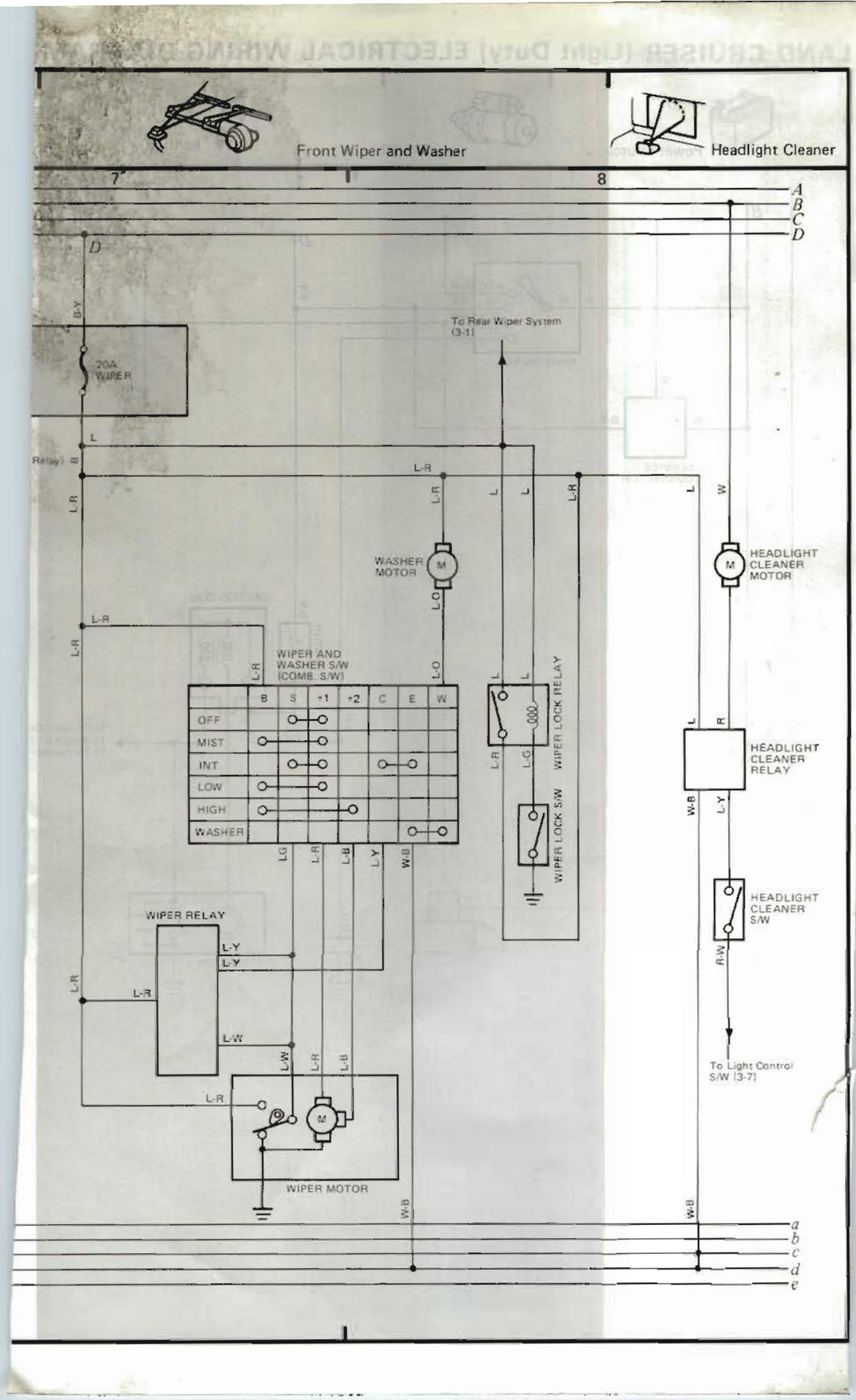
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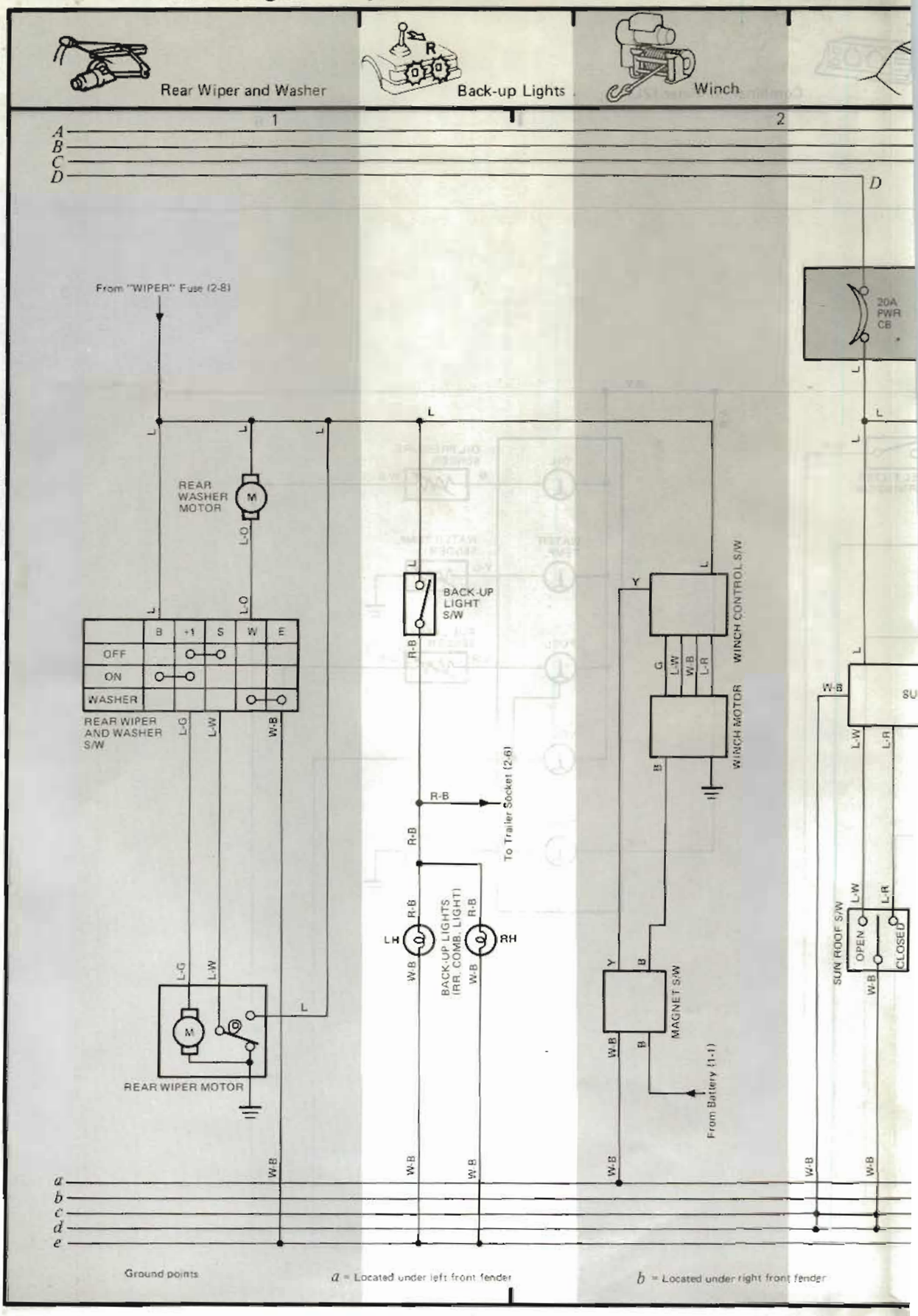


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LAND CRUISER (Light Duty) (Cont'd)



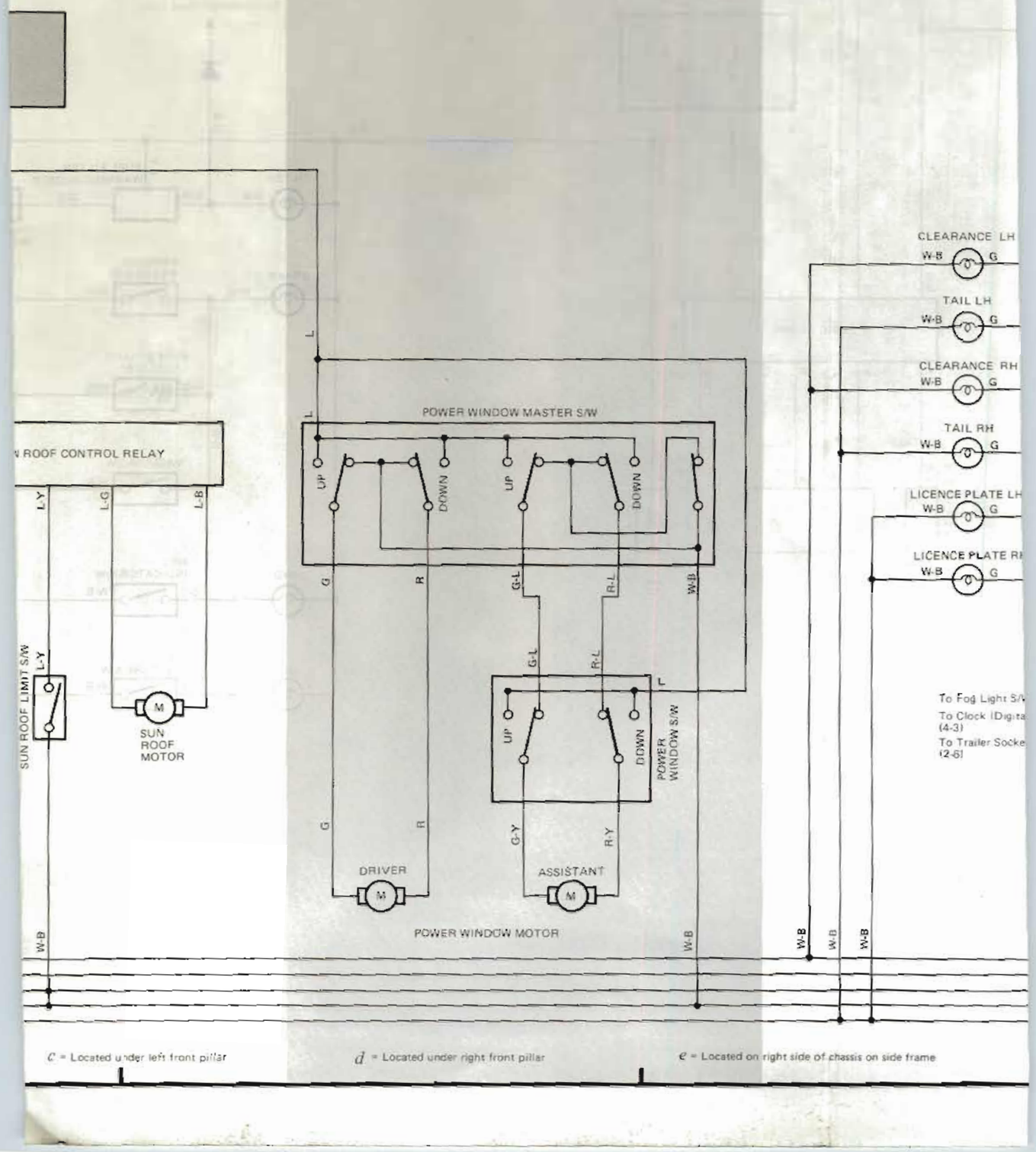
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Sun Roof

Power Windows

3

4

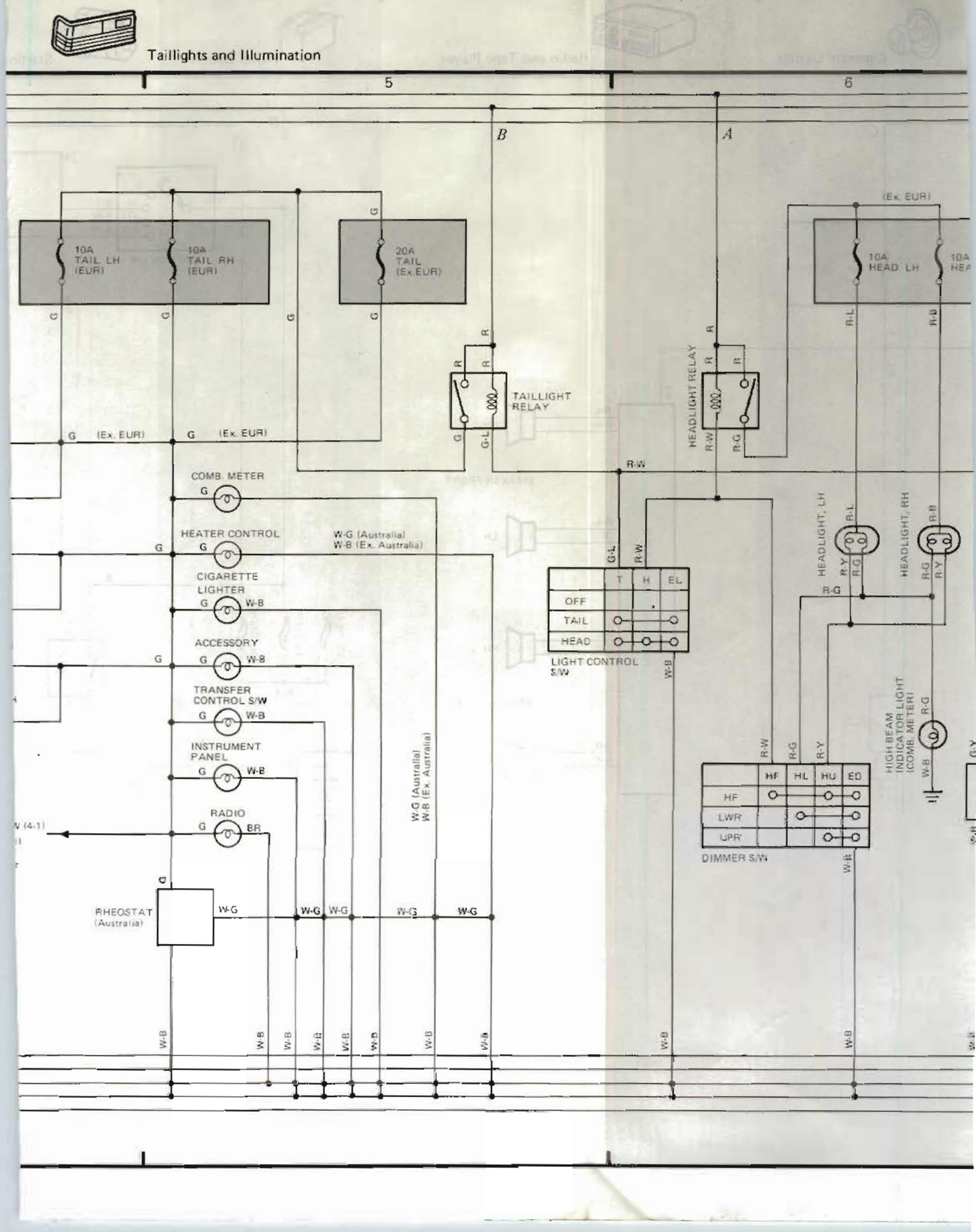


c = Located under left front pillar

d = Located under right front pillar

e = Located on right side of chassis on side frame

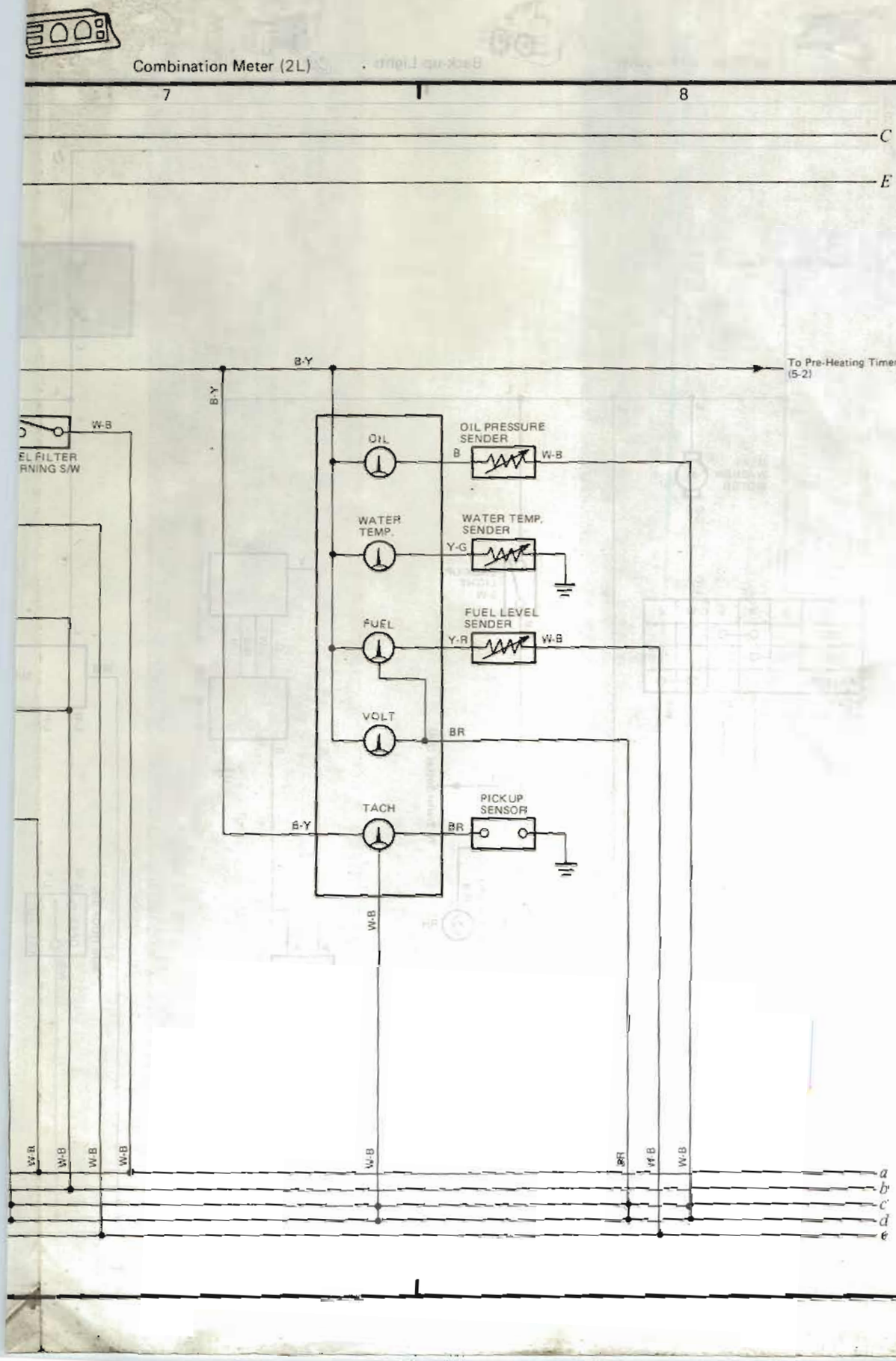
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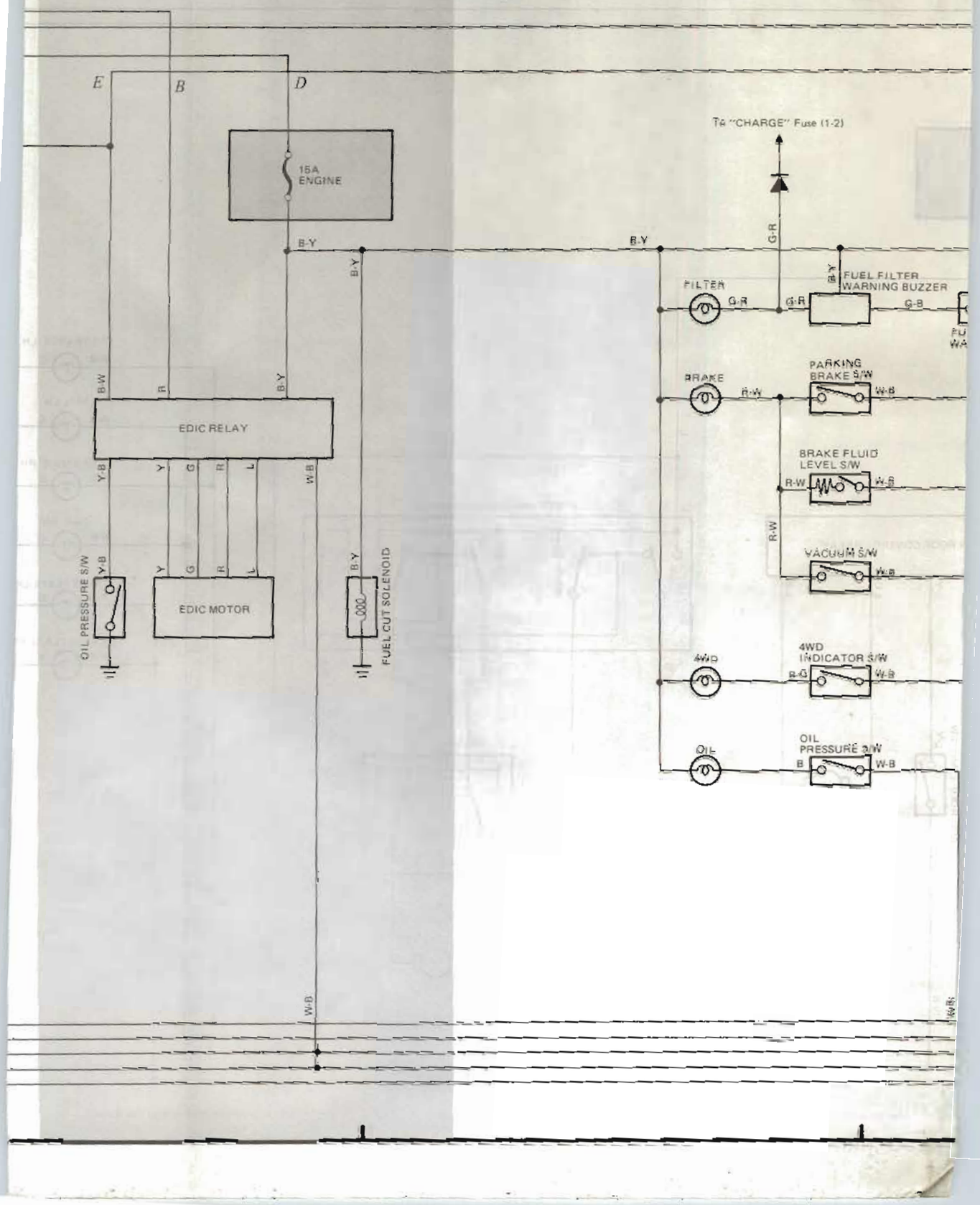
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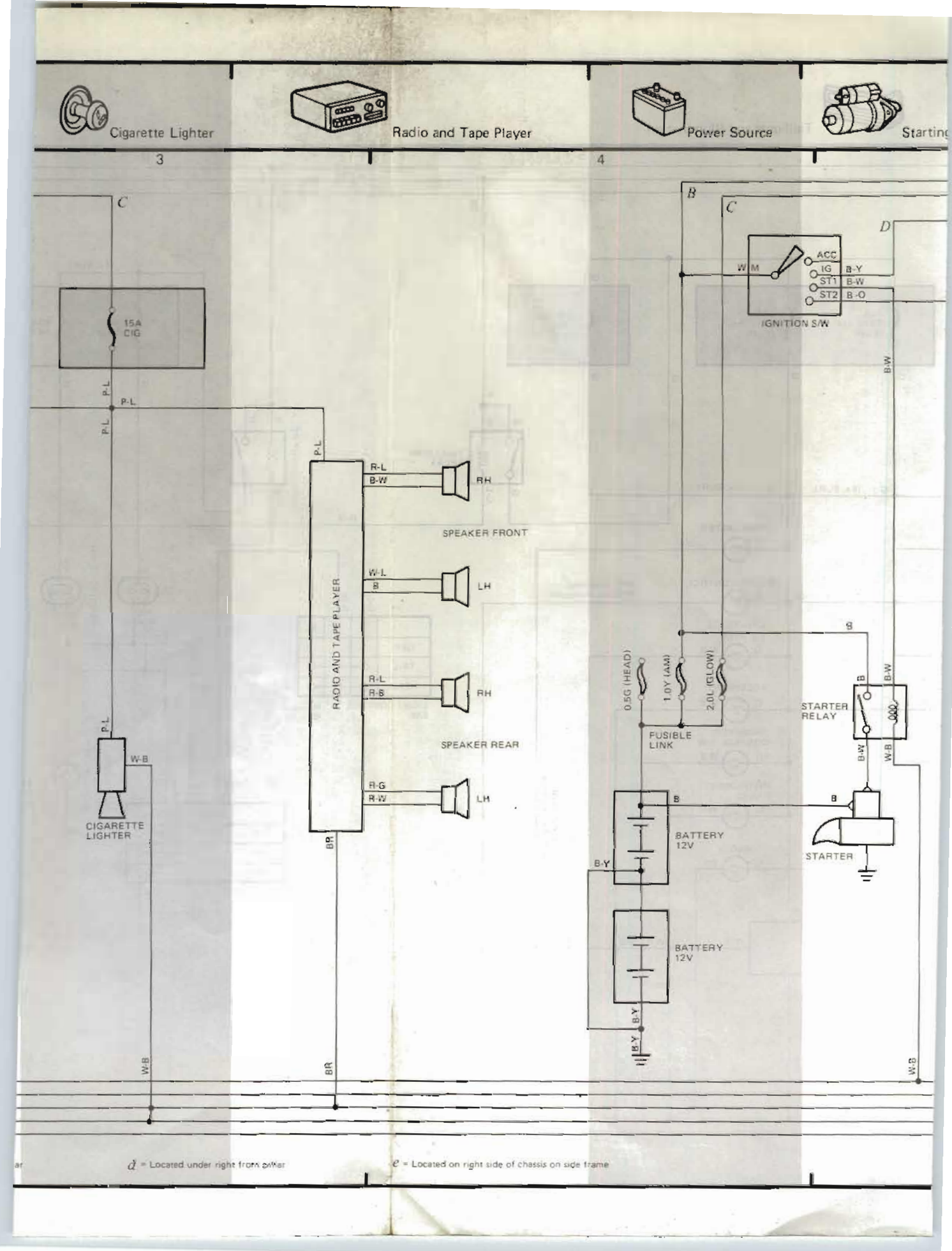
Combination Meter (2L)



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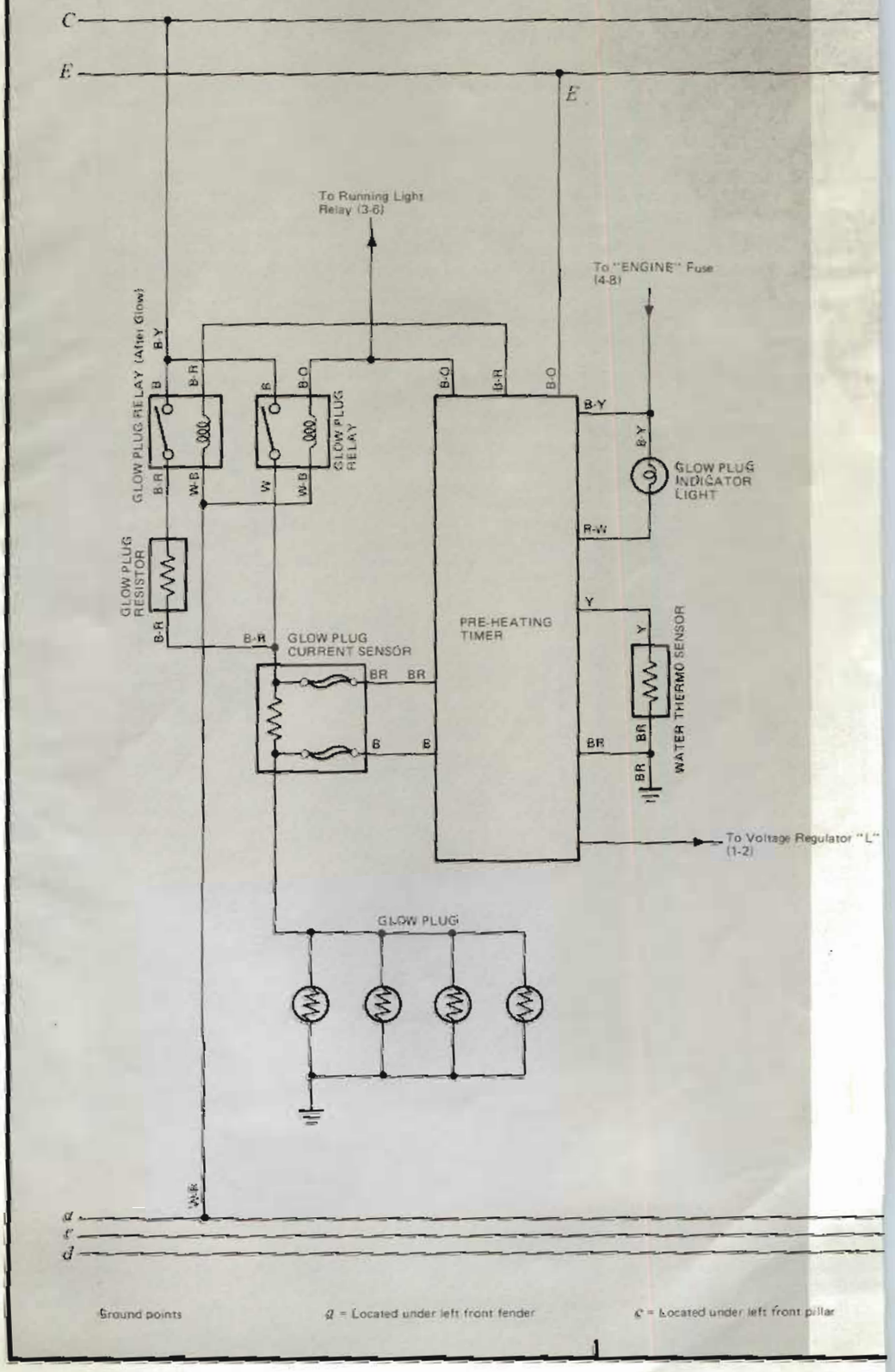
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LAND CRUISER (Light Duty) (Cont'd)

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LAND CRUISER (Light Duty) (Cont'd)

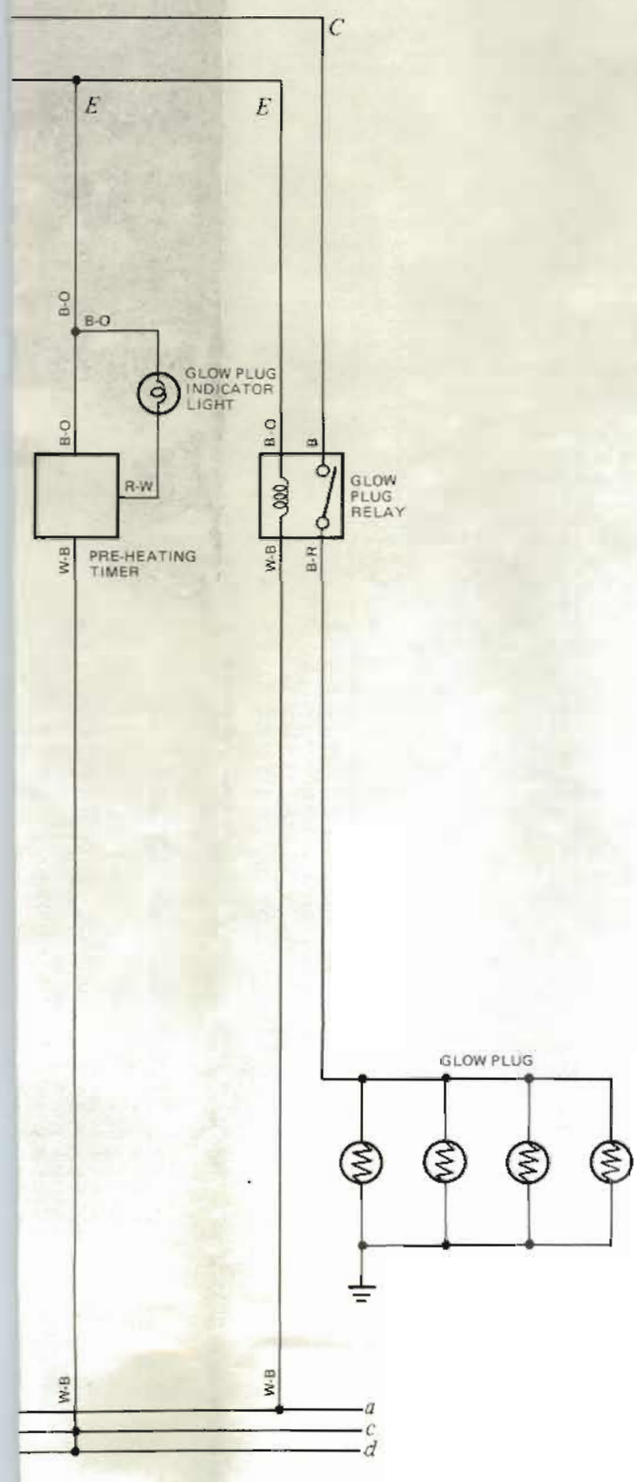
Glow Plugs (Ex. GEN)



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Glow Plugs (GEN)

2 3



d = Located under right front pillar

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