

TOYOTA

REPAIR MANUAL SUPPLEMENT FOR CHASSIS & BODY

LAND CRUISER

(Hardtop, Canvas Top & Station Wagon)

RJ7_ series

PZJ7_ series

LJ7_ series

HZJ7_, 80 series

FJ7_, 80 series

HDJ7_, 80 series

Jan., 1992

FZJ7_, 80 series

FOREWORD

This supplement has been prepared to provide information covering general service repairs for the chassis and body of the TOYOTA LAND CRUISER (Hardtop, Canvas Top and Station Wagon) which underwent changes in January, 1992.

Applicable models:

Hardtop & Canvas Top	RJ70, 73, 77 series
	LJ70, 72, 73, 77, 79 series
	FJ70, 73, 75 series
	FZJ70, 73, 75 series
	PZJ70, 73, 75 series
	HZJ70, 73, 75 series
Station Wagon	FJ80 series
	FZJ80 series
	HZJ80 series
	HDJ80 series

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

Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (4-Door Hardtop) Chassis and Body Repair Manual Supplement	RM192E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• 21R, 22R Engine Repair Manual	RM053E
• 22R-E Engine Repair Manual Supplement	RM138E
• 2L, 3L Engine Repair Manual	RM123E
• 2L-T, 3L Engine Repair Manual Supplement	RM169E
• 1FZ-F Engine Repair Manual	RM283E
• 3F Engine Repair Manual	36253E
• 3F-E Engine Repair Manual Supplement	RM134E
• 1PZ, 1HZ, 1HD-T Engine Repair Manual	RM172E
• A441L, A440F, A442F Automatic Transmission Repair Manual	RM188E
• Land Cruiser Station Wagon Electrical Wiring Diagram	EWD090F
• Land Cruiser Station Wagon New Car Features	NCF064E

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

TOYOTA LAND CRUISER

(Hardtop, Canvas Top & Station Wagon)

REPAIR MANUAL SUPPLEMENT

FOR CHASSIS & BODY

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IN

HOW TO USE THIS MANUAL

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

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

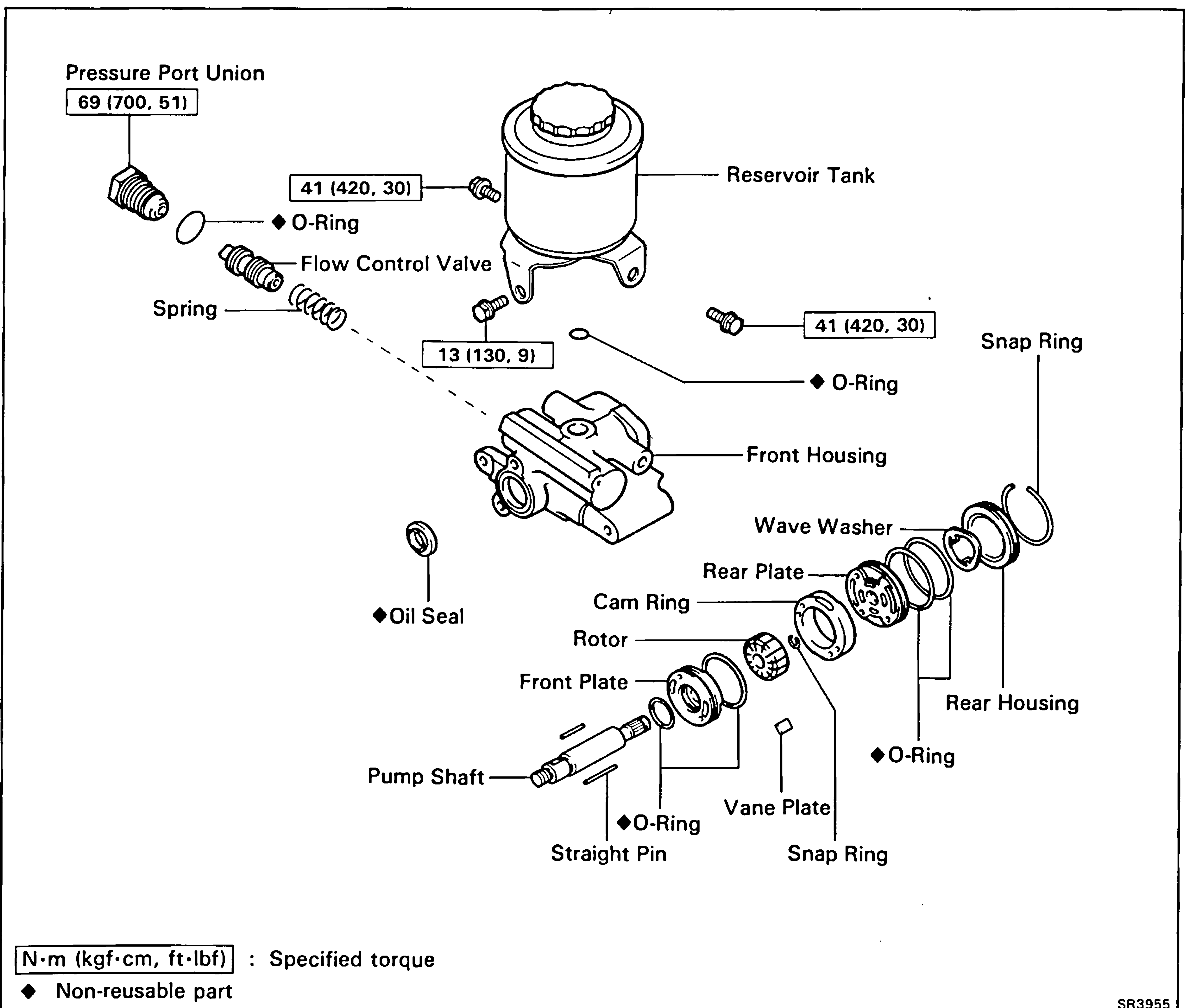
At the beginning of each section, **PRECAUTIONS** are given that pertain to *all* repair operations contained in that section. *Read these precautions before starting any repair task.*

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

REPAIR PROCEDURES

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

Example:



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

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

Example:



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

REFERENCES

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

SPECIFICATIONS

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

CAUTIONS, NOTICES, HINTS:

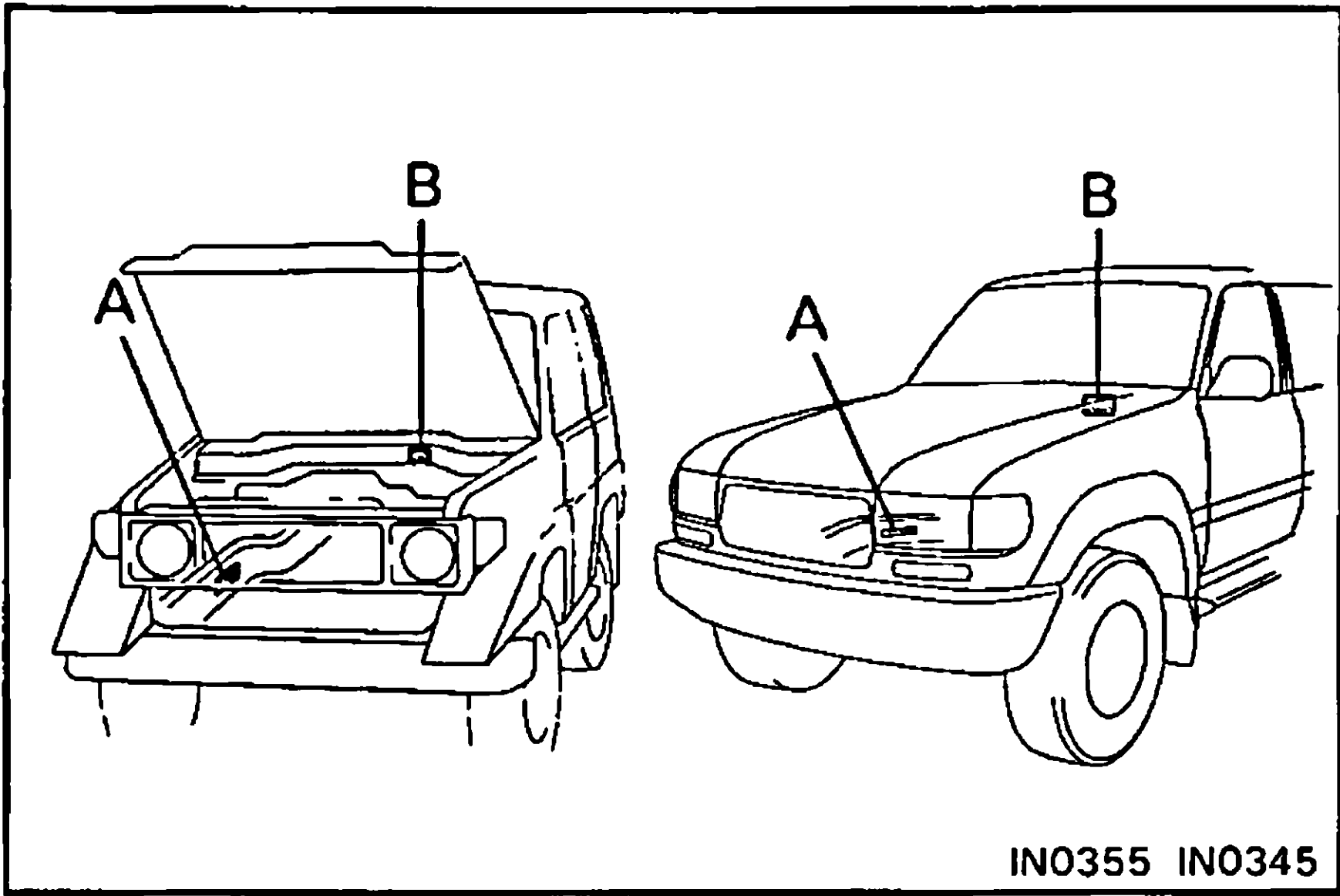
- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

The UNIT given in this manual are primarily expressed with the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.

Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)



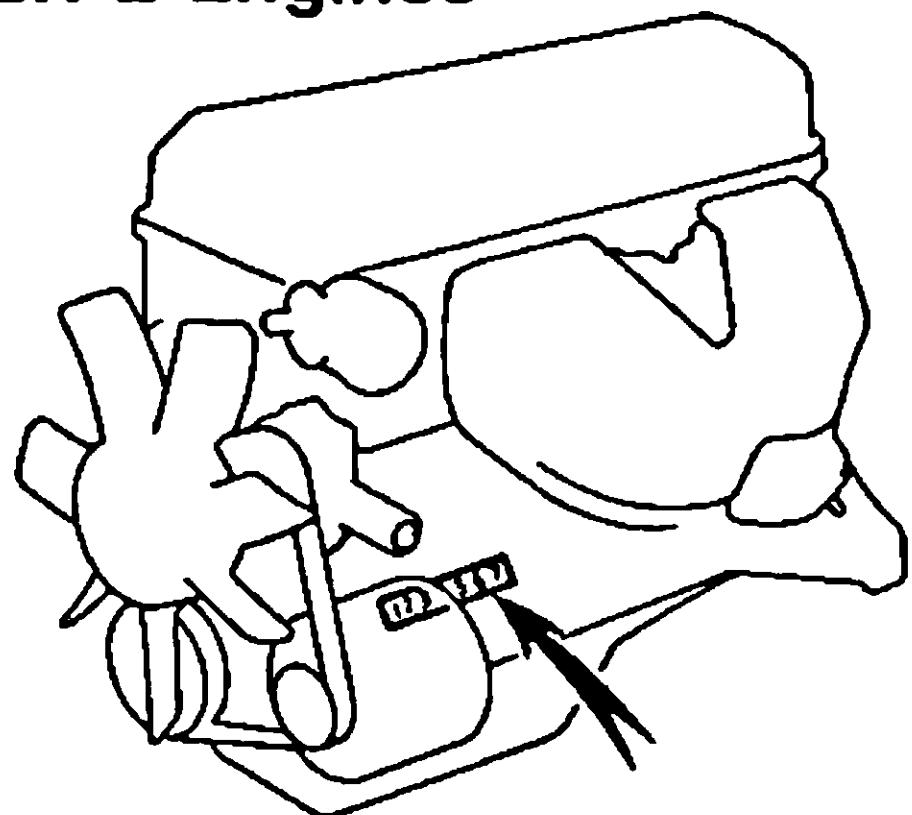
IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

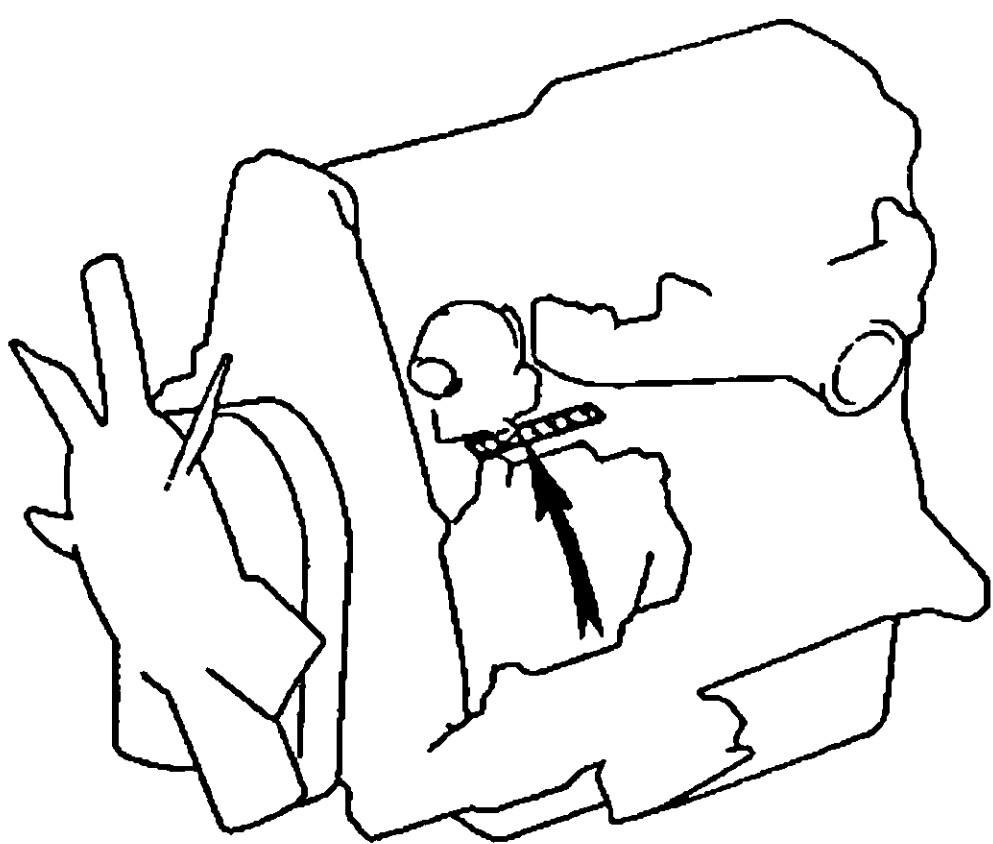
The vehicle identification number is stamped on the outer surface of the front right side frame. This number is also stamped on the manufacturer's name plate.

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

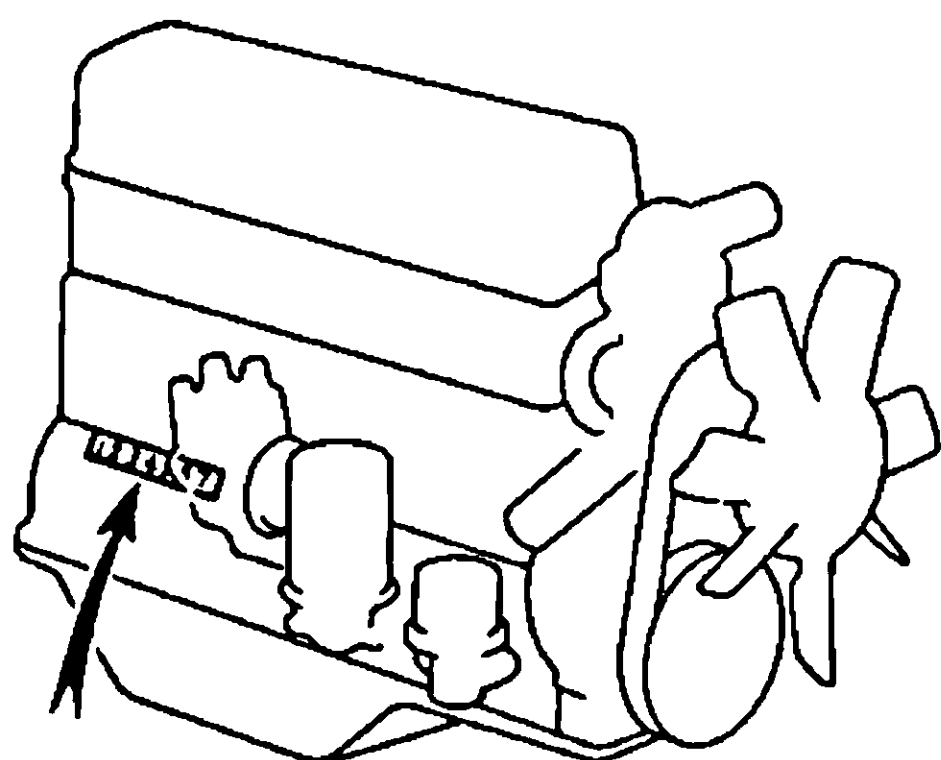
22R & 22R-E Engines



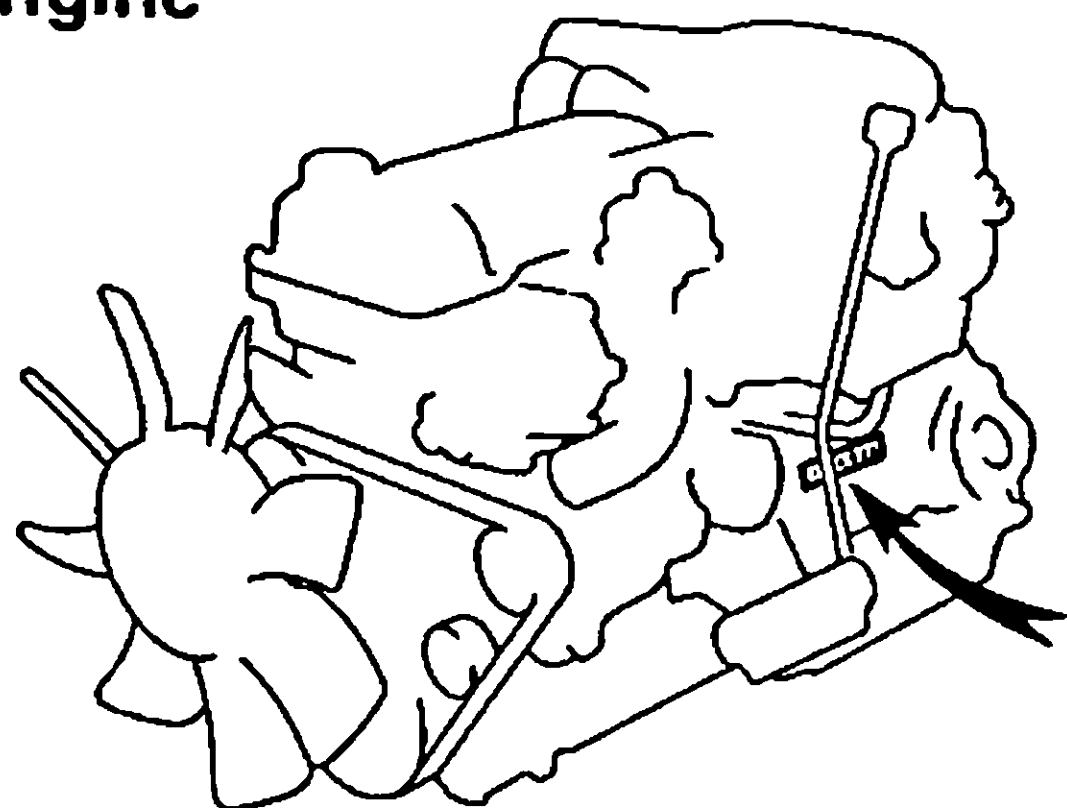
2L-T & 3L Engines



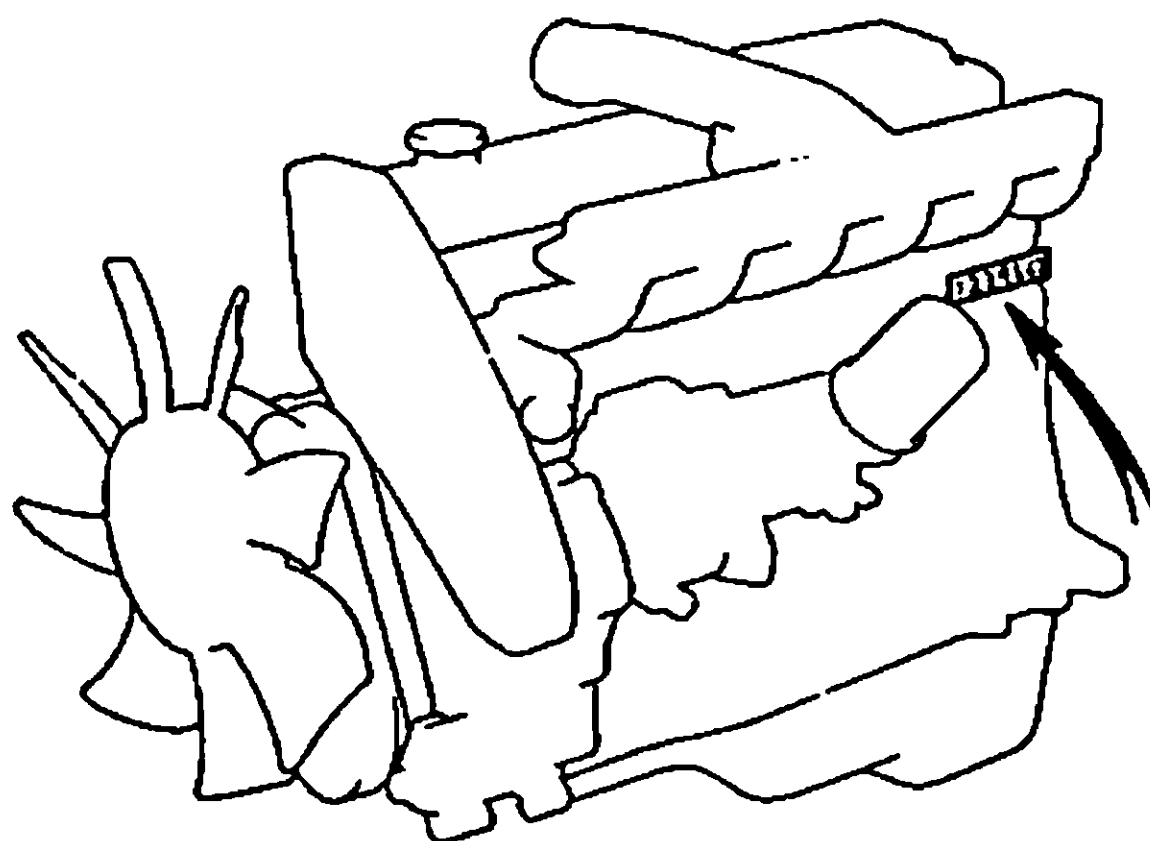
3F & 3F-E Engines



1FZ-F Engine



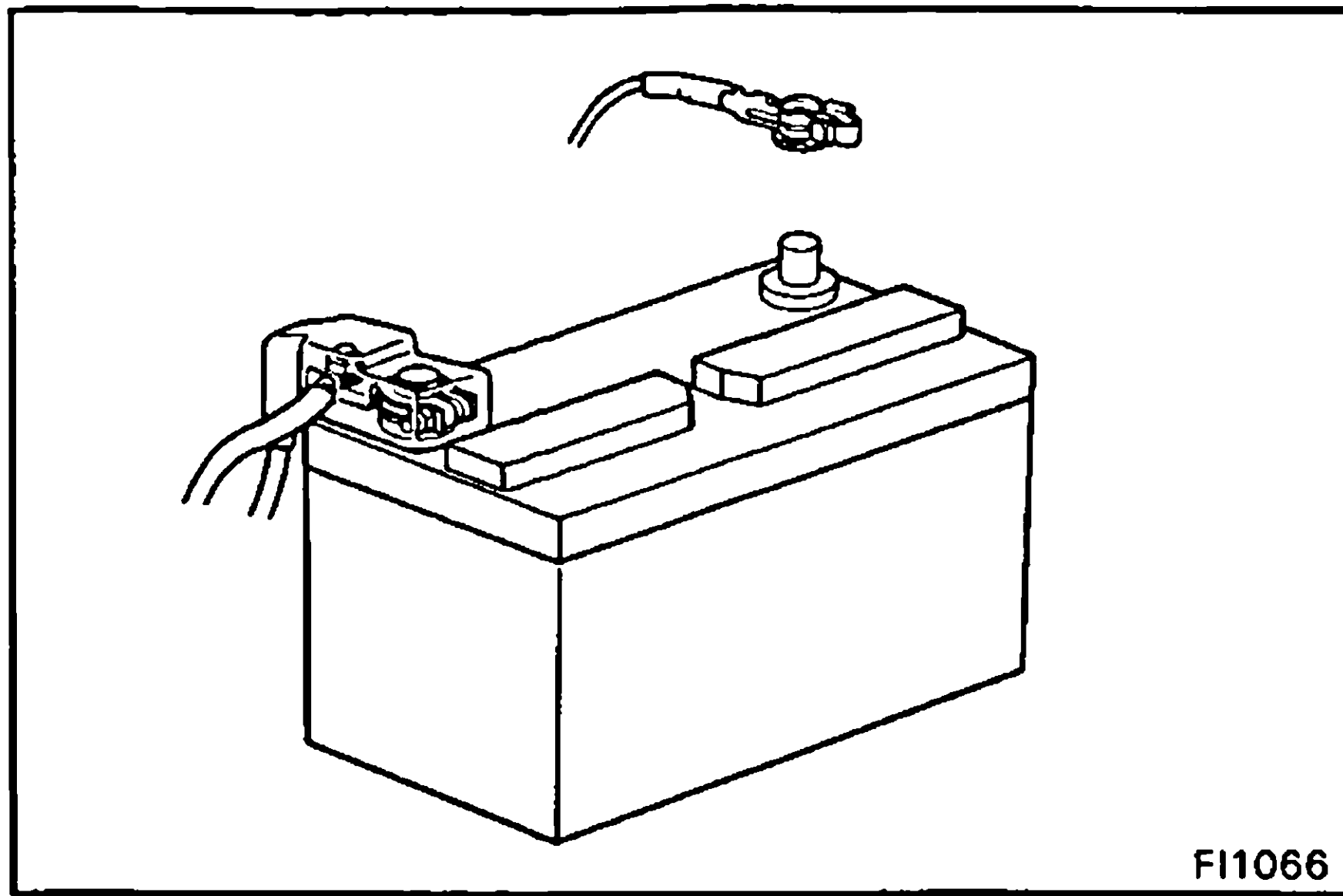
1PZ, 1HZ & 1HD-T Engines



IN0007
IN0209
IN0037
P03780
IN0294

ENGINE SERIAL NUMBER

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

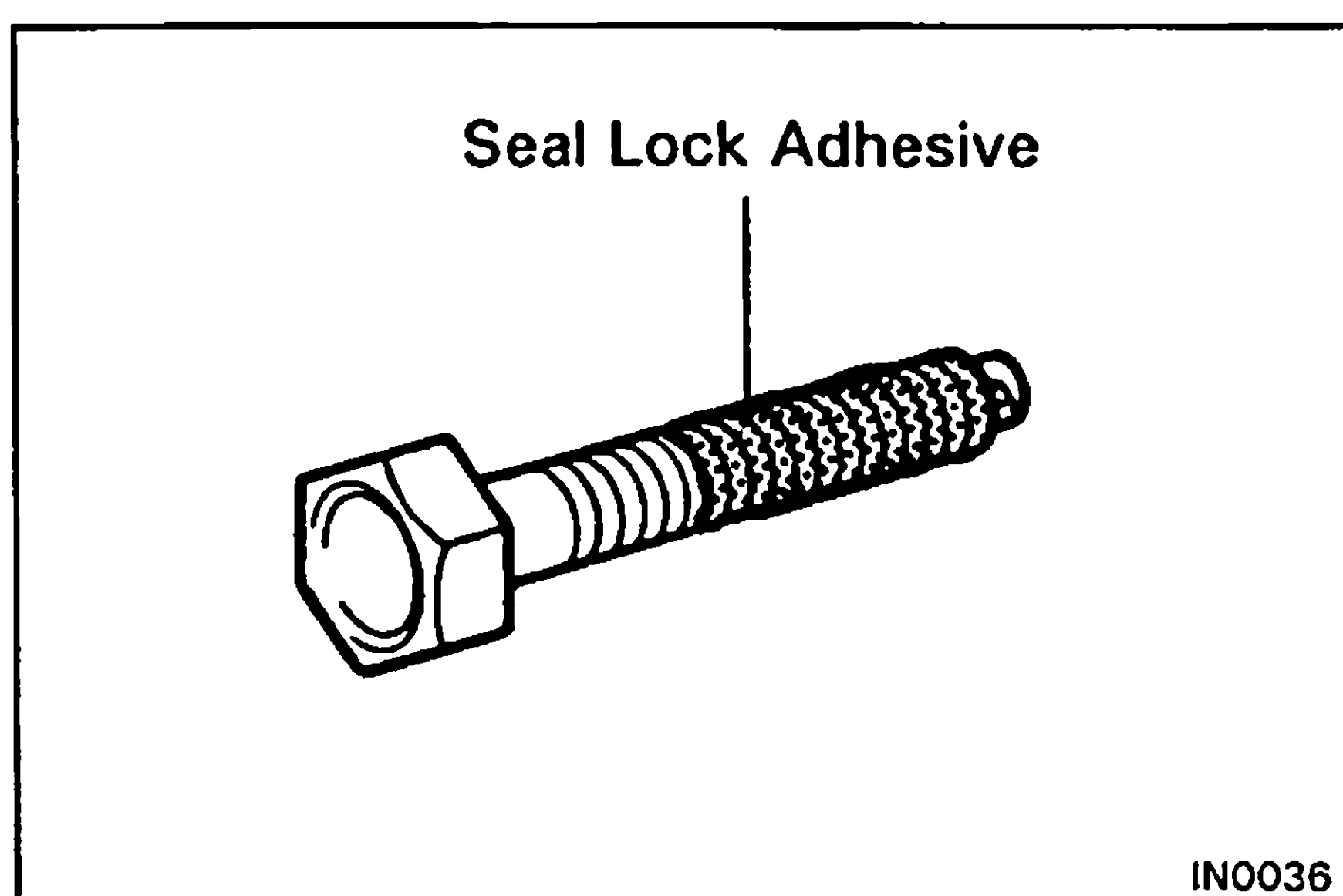


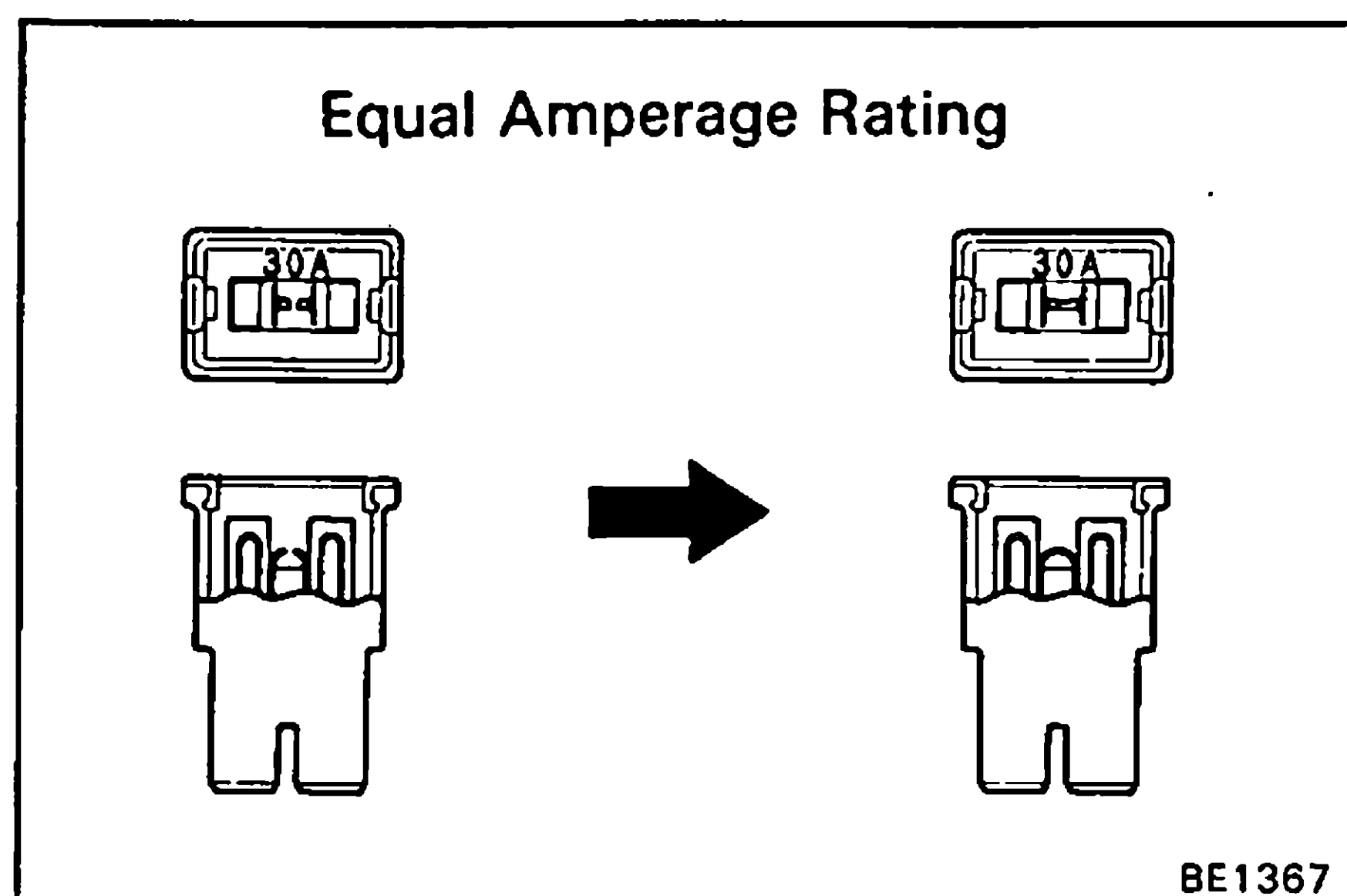
GENERAL REPAIR INSTRUCTIONS

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

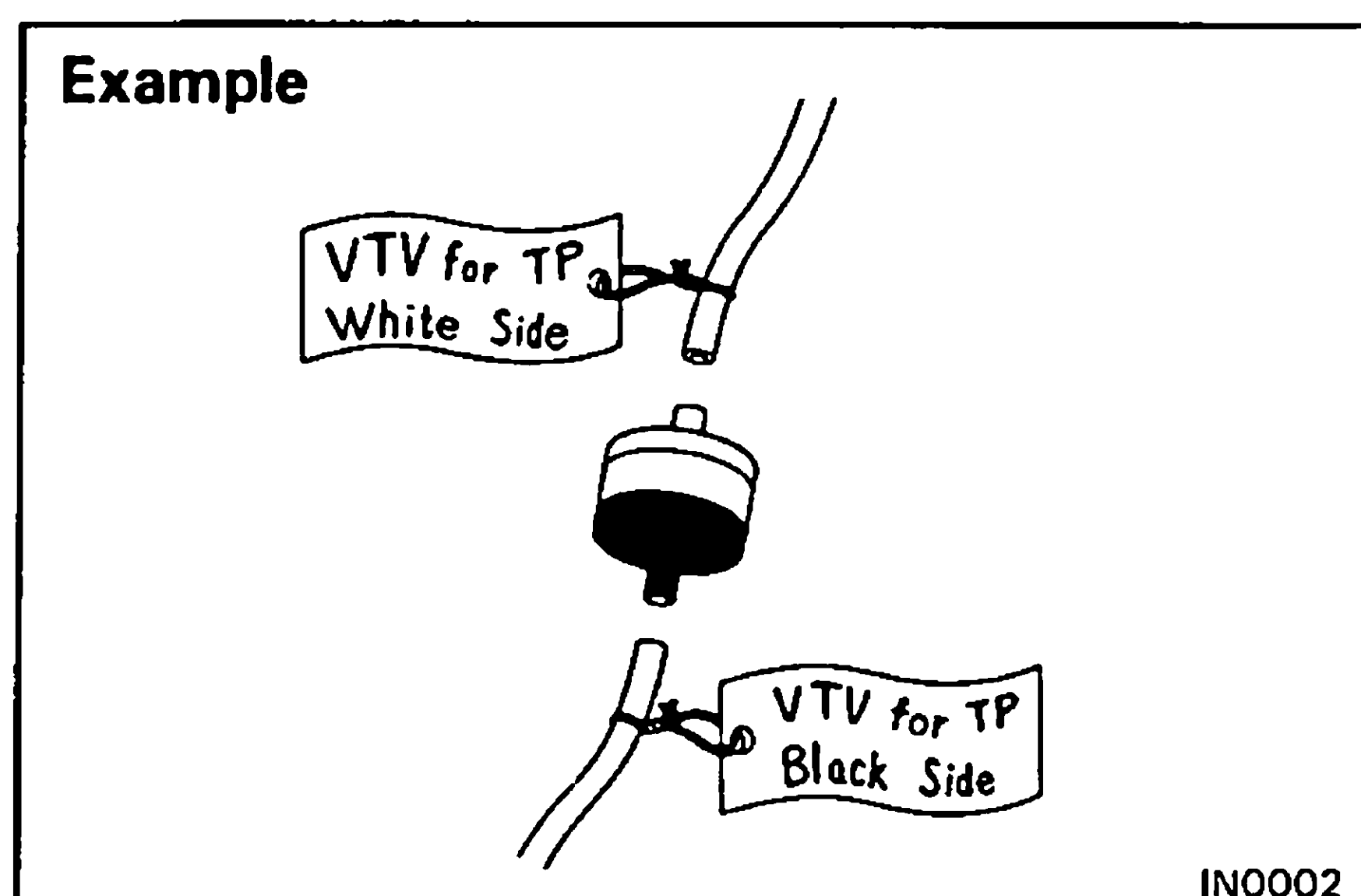
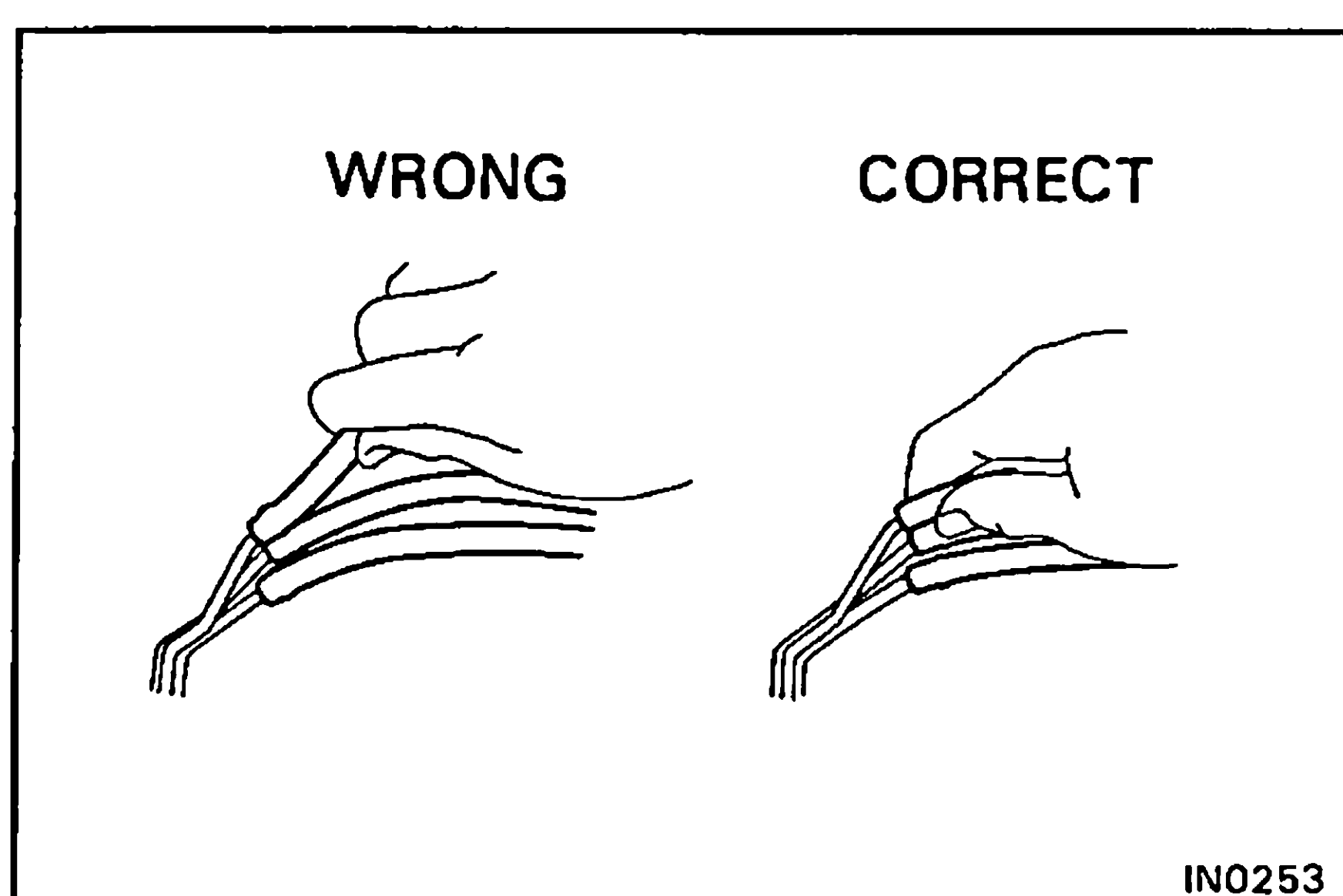
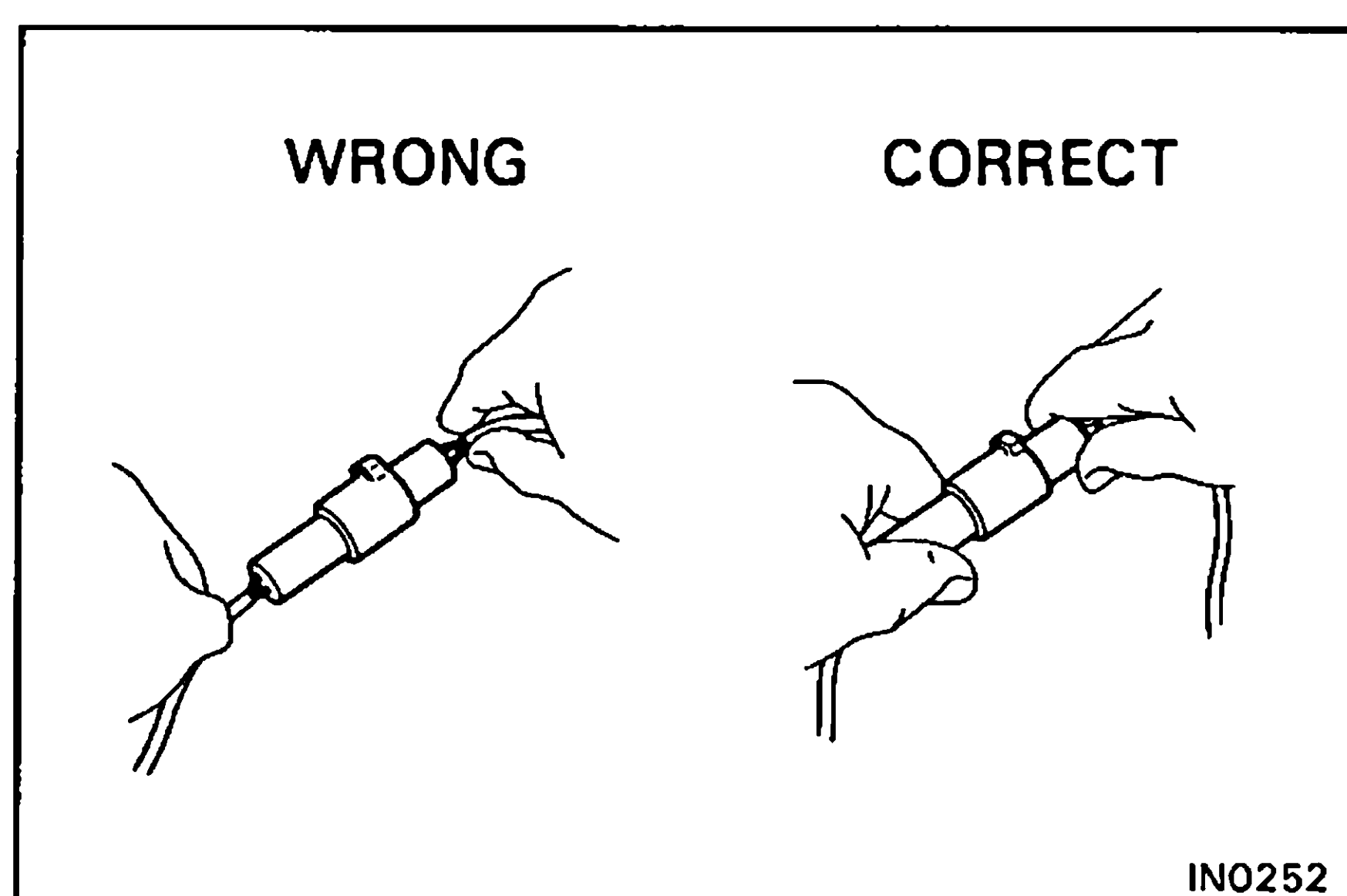
Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

 - (a) If a precoated part is tightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
 - (b) Recoating of precoated parts
 - (1) Clean off the old adhesive from the bolt, nut or threads.
 - (2) Dry with compressed air.
 - (3) Apply the specified seal lock adhesive to the bolt or nut threads.
 - (c) Precoated parts are indicated in the component illustrations by the "★" symbol.
7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.





9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the back of this manual.
10. When replacing fuses, be sure the new fuse has the correct amperage rating. **DO NOT** exceed the rating or use one with a lower rating.
11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See pages IN-14 to 16).
 - (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
 - (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.
12. Observe the following precautions to avoid damage to the parts:

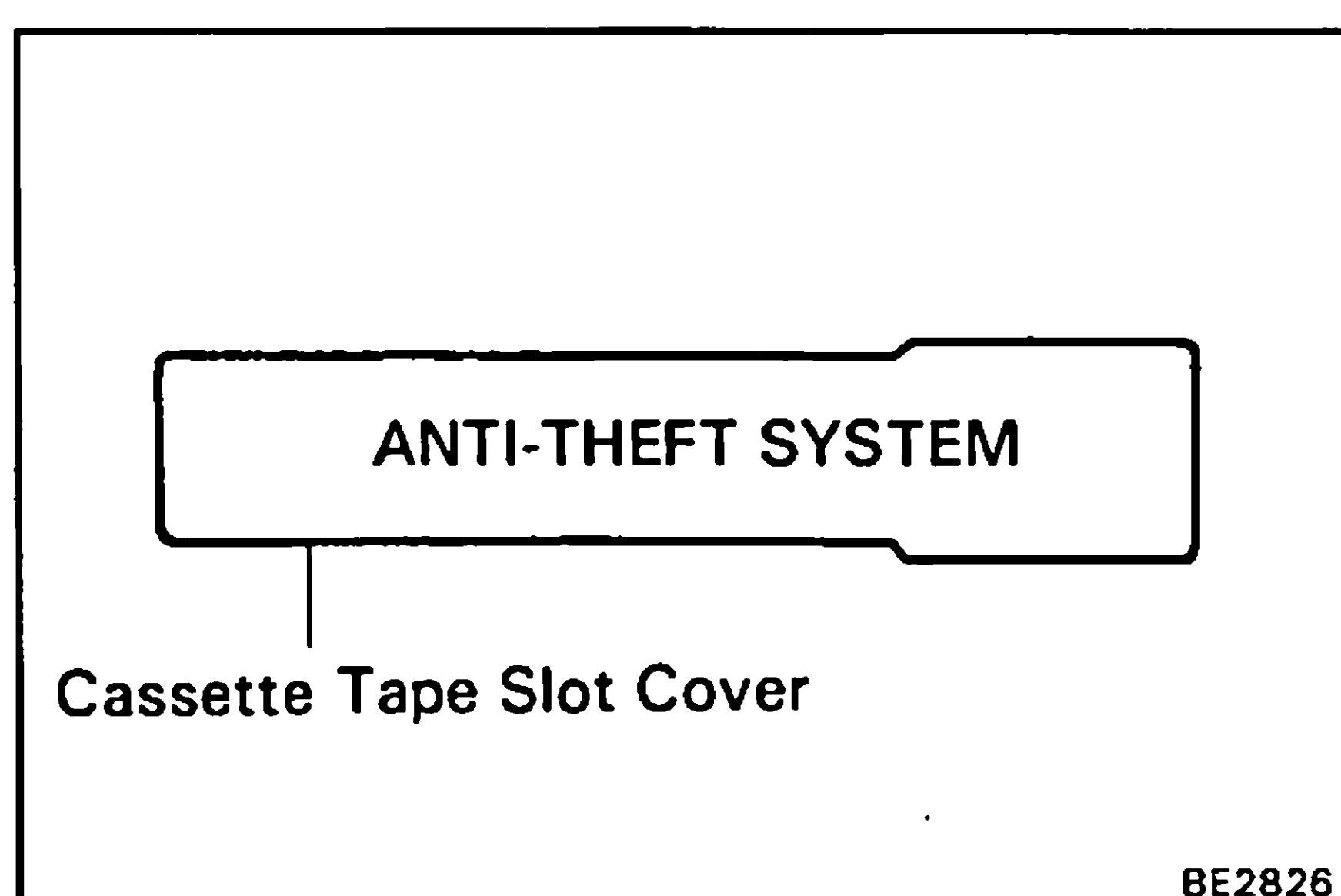


13. Tag hoses before disconnecting them:
 - (a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
 - (b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

PRECAUTIONS FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

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

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

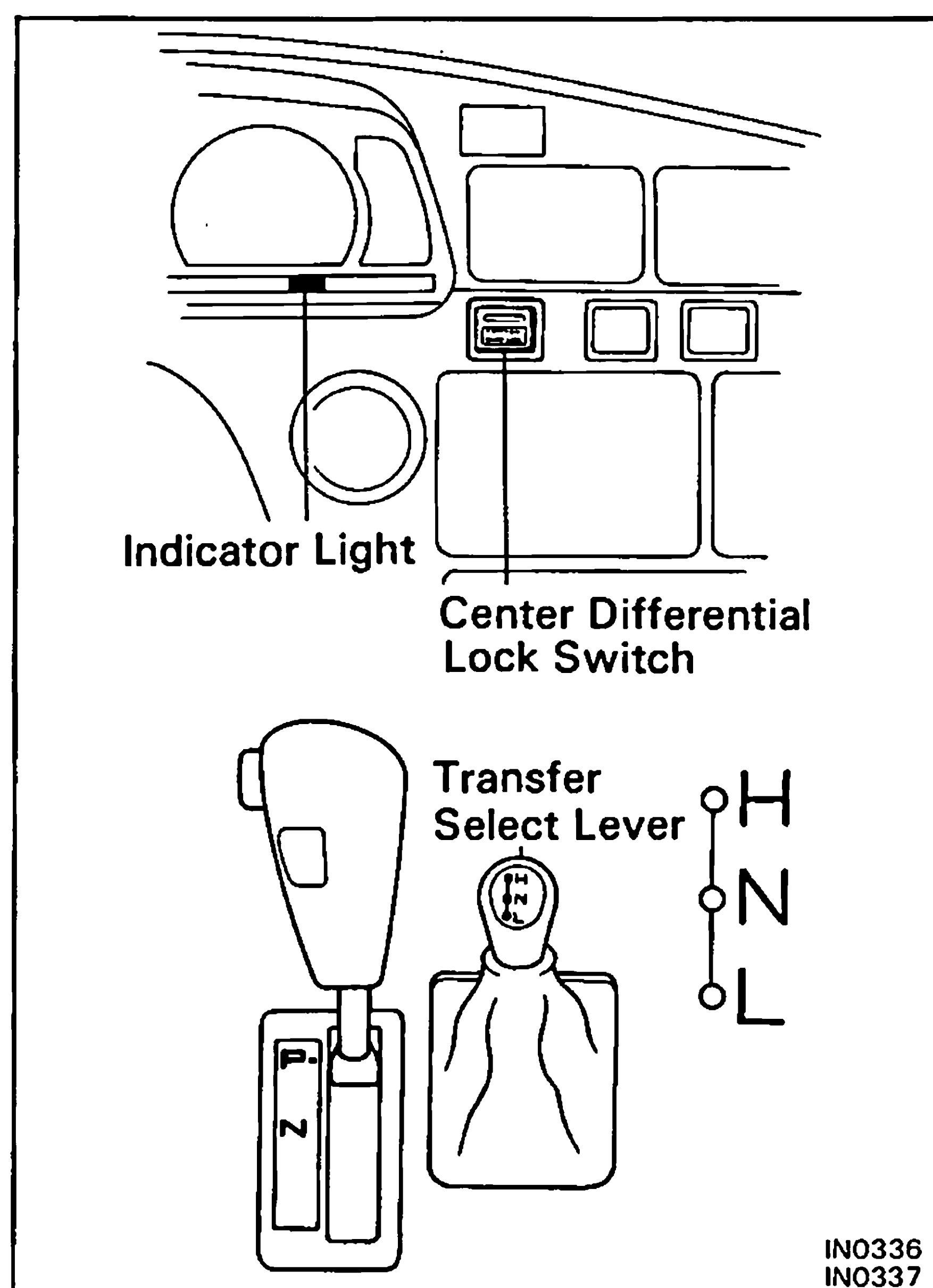


PRECAUTIONS FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT-IN ANTI-THEFT SYSTEM

Audio Systems displaying the sign "ANTI-THEFT SYSTEM" shown on the left has a built-in anti-theft system which makes the audio system soundless if stolen.

If the power source for the audio system is cut even once, the anti-theft system operates so that even if the power source is reconnected, the audio system will not produce any sound unless the ID number selected by the customer is input again. Accordingly, when performing repairs on vehicles equipped with this system, before disconnecting the battery terminals or removing the audio system the customer should be asked for the ID number so that the technician can input the ID number afterwards, or else a request made to the customer to input the ID number.

For the method to input the ID number or cancel the anti-theft system, refer to the Owner's Manual.



PRECAUTIONS WHEN SERVICING FULL-TIME 4WD VEHICLES (Station Wagon)

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

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

Also be sure to observe the following cautions:

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

BEFORE BEGINNING TEST

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

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

HINT:

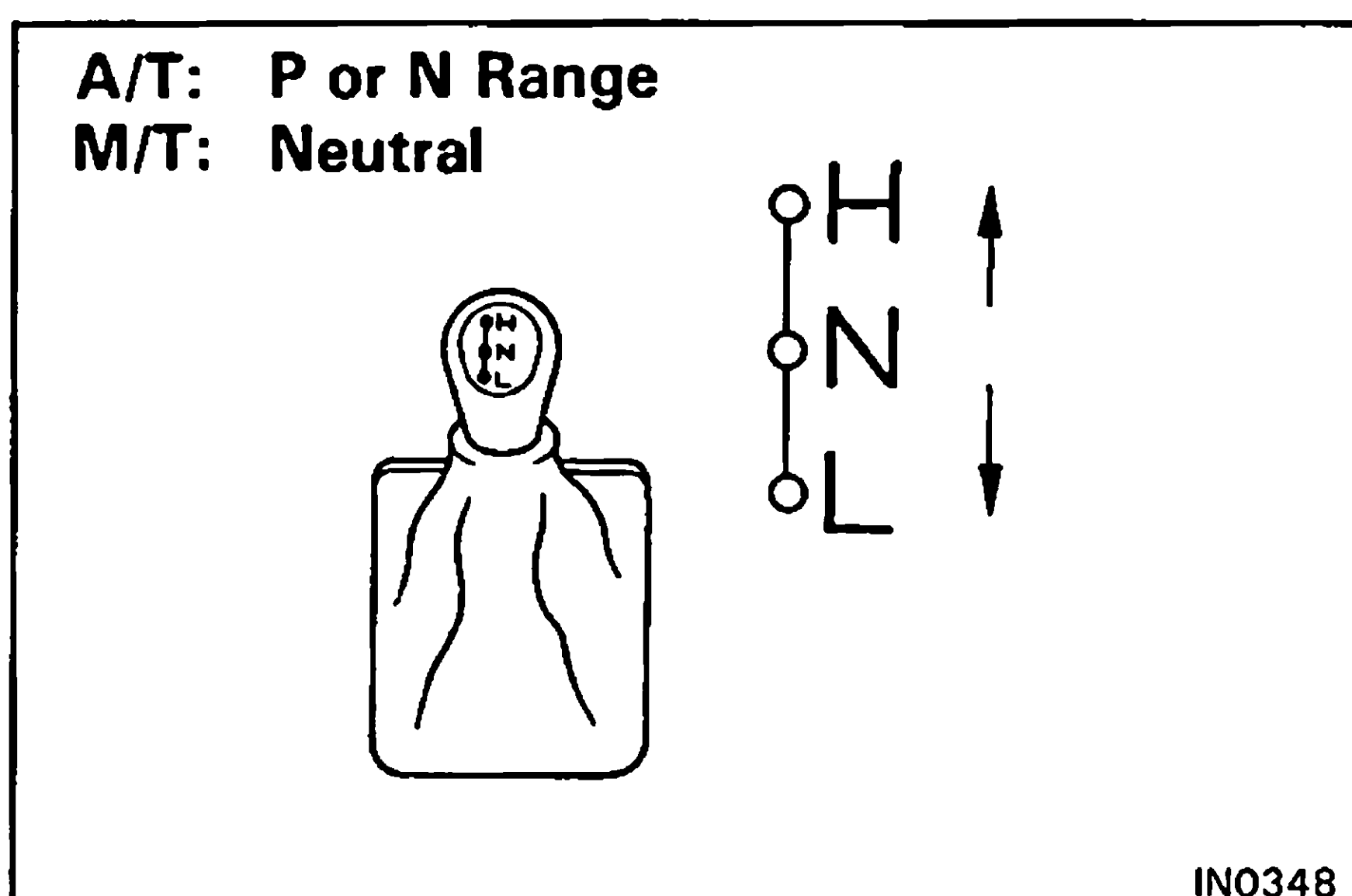
- Move the vehicle backward or forward slightly if the indicator light does not operate correctly when the center differential lock switch is turned ON or OFF.
- When the transfer select lever is put in "L" position, the center differential is put in LOCK condition regardless of the position of the center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

Automatic transmission:

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

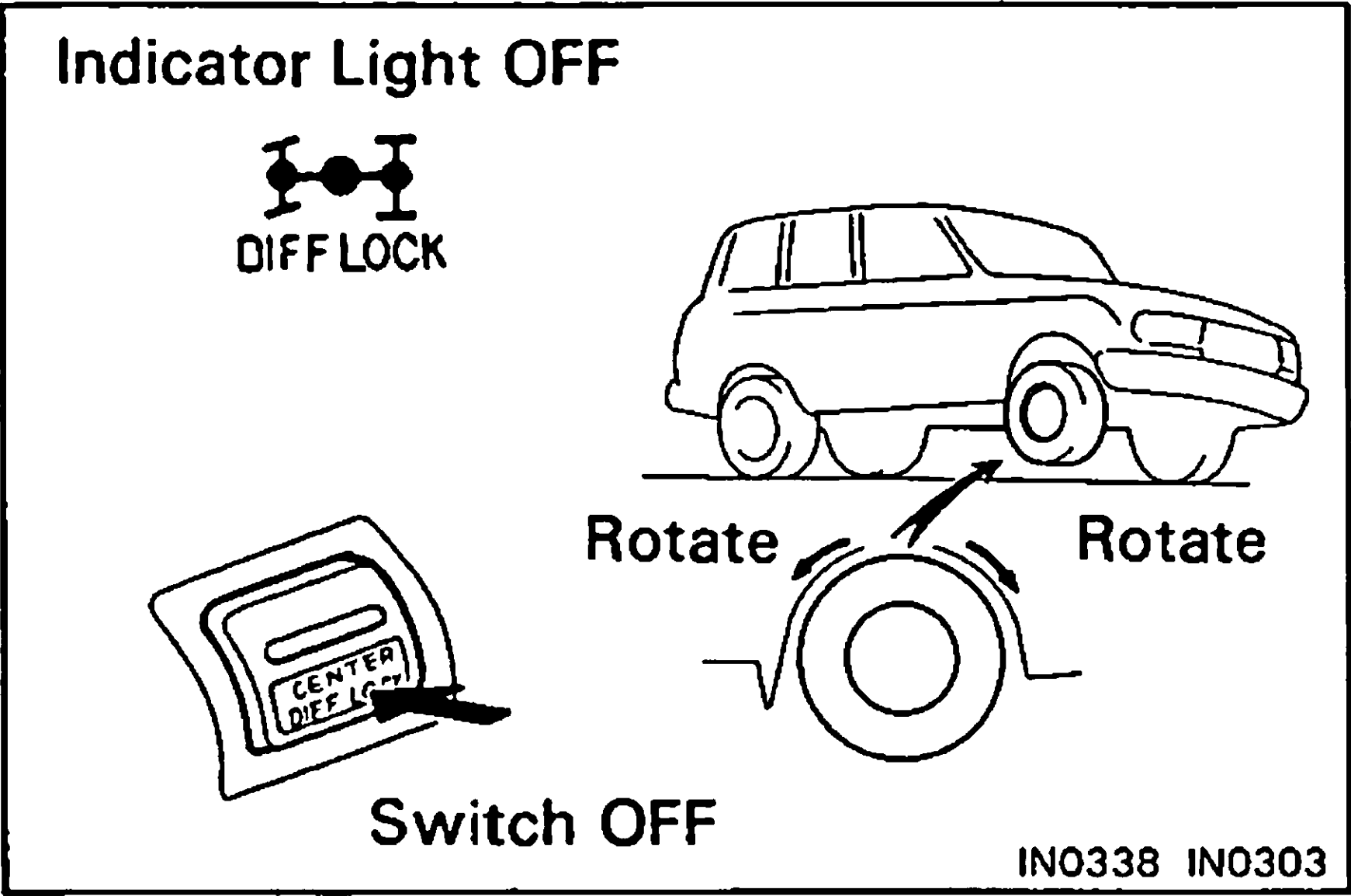
Manual transmission:

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



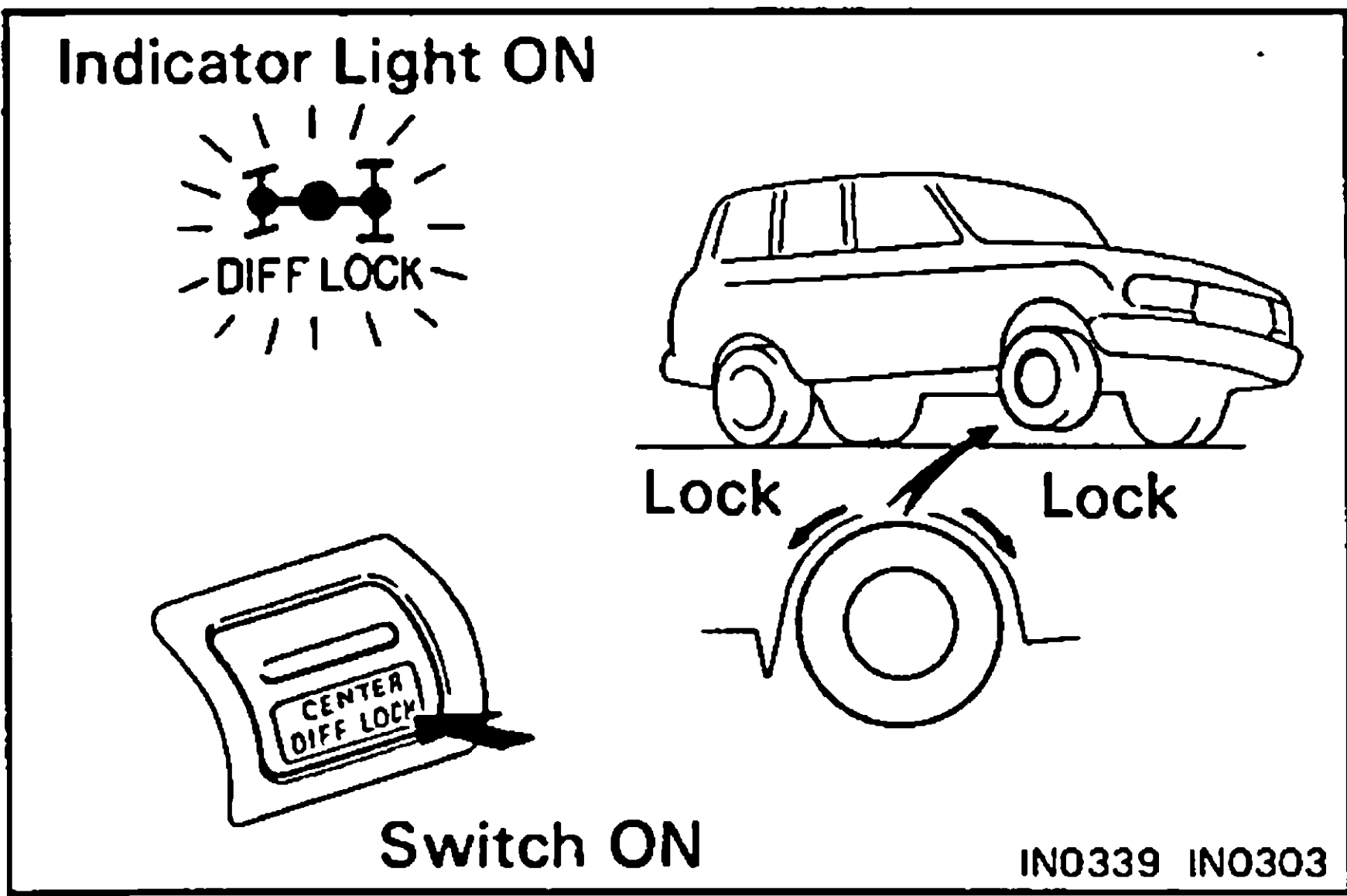
CAUTIONS WHEN CENTER DIFFERENTIAL CONTROL SWITCH IS TURNED ON

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



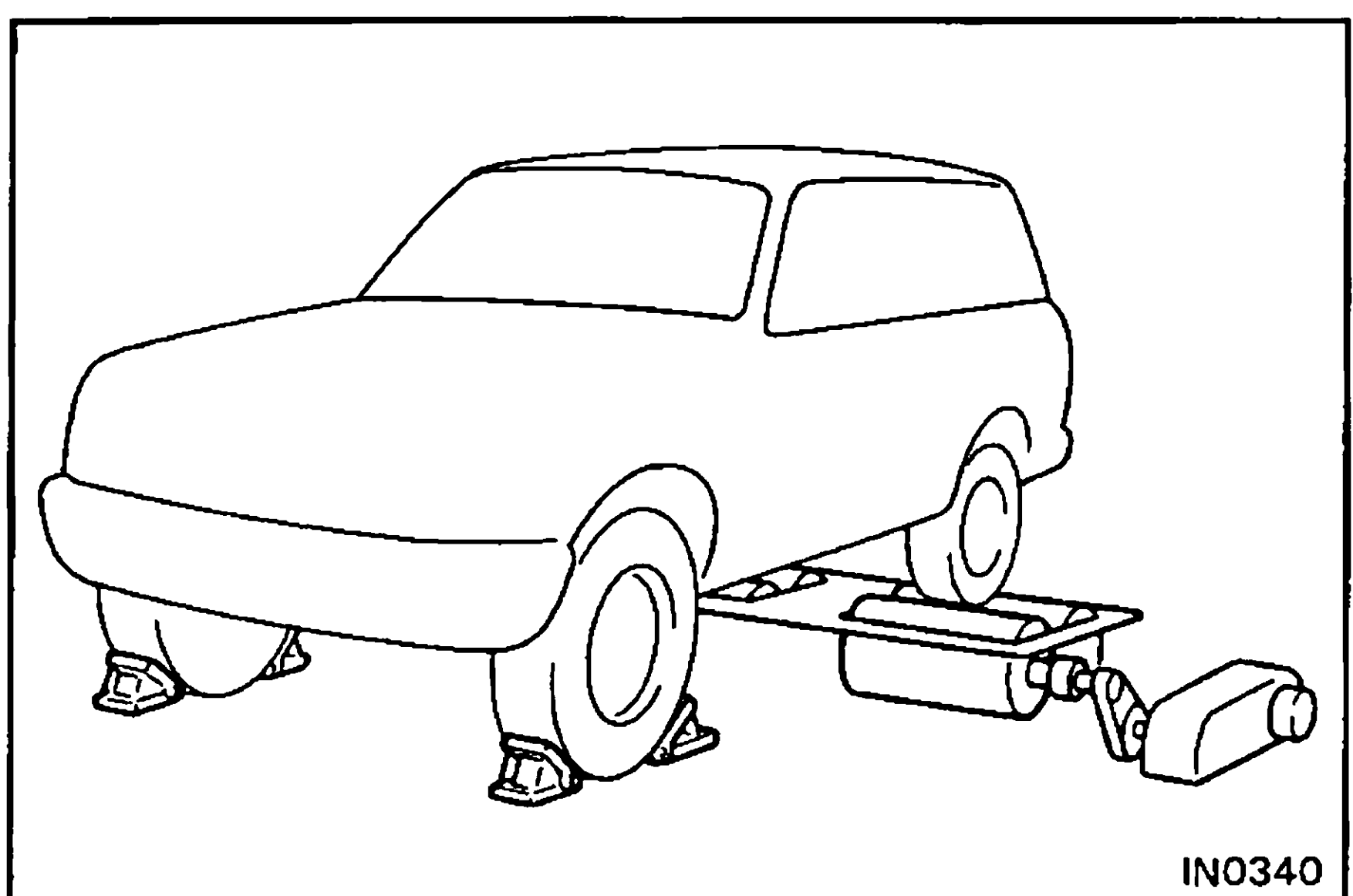
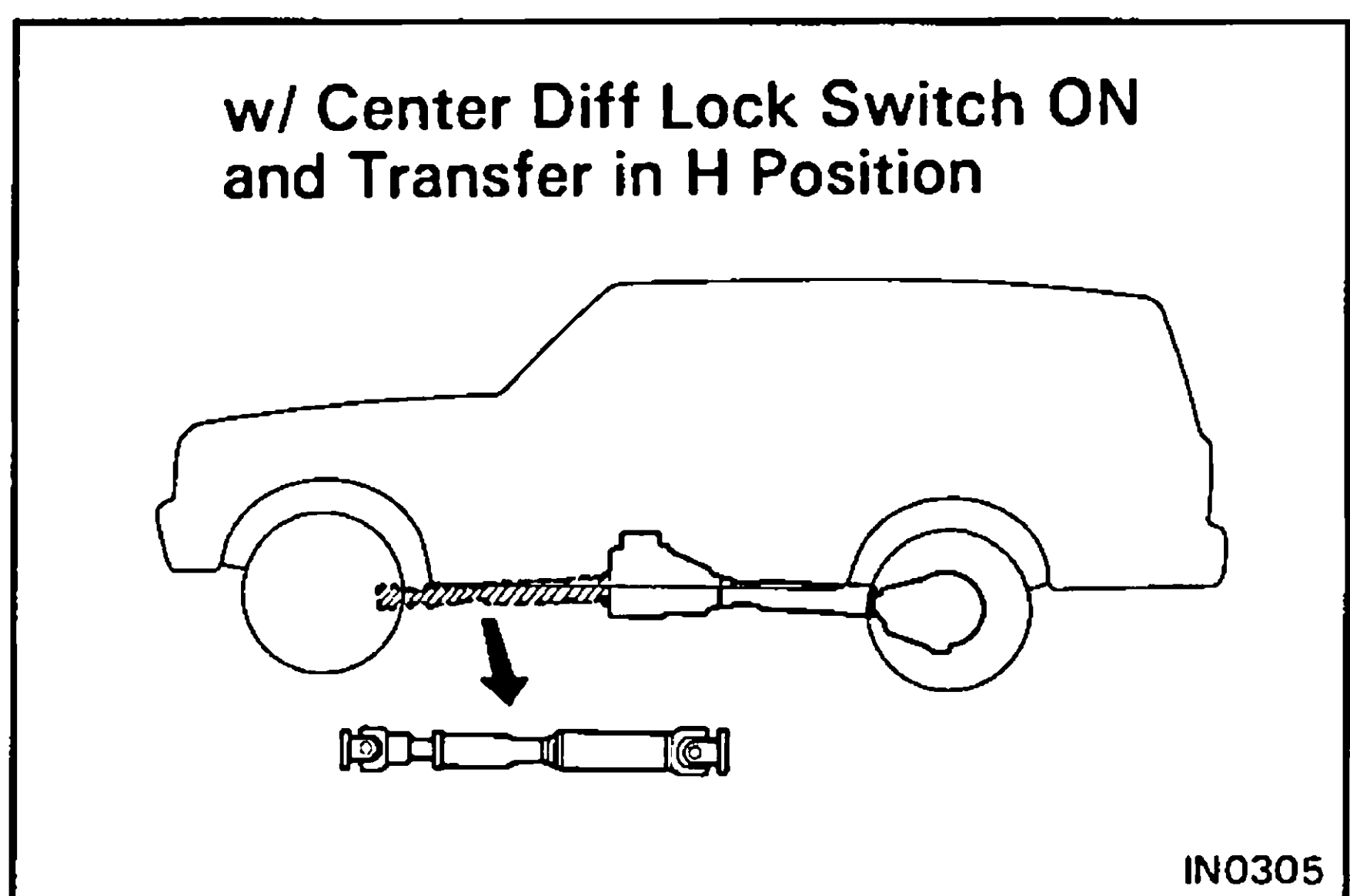
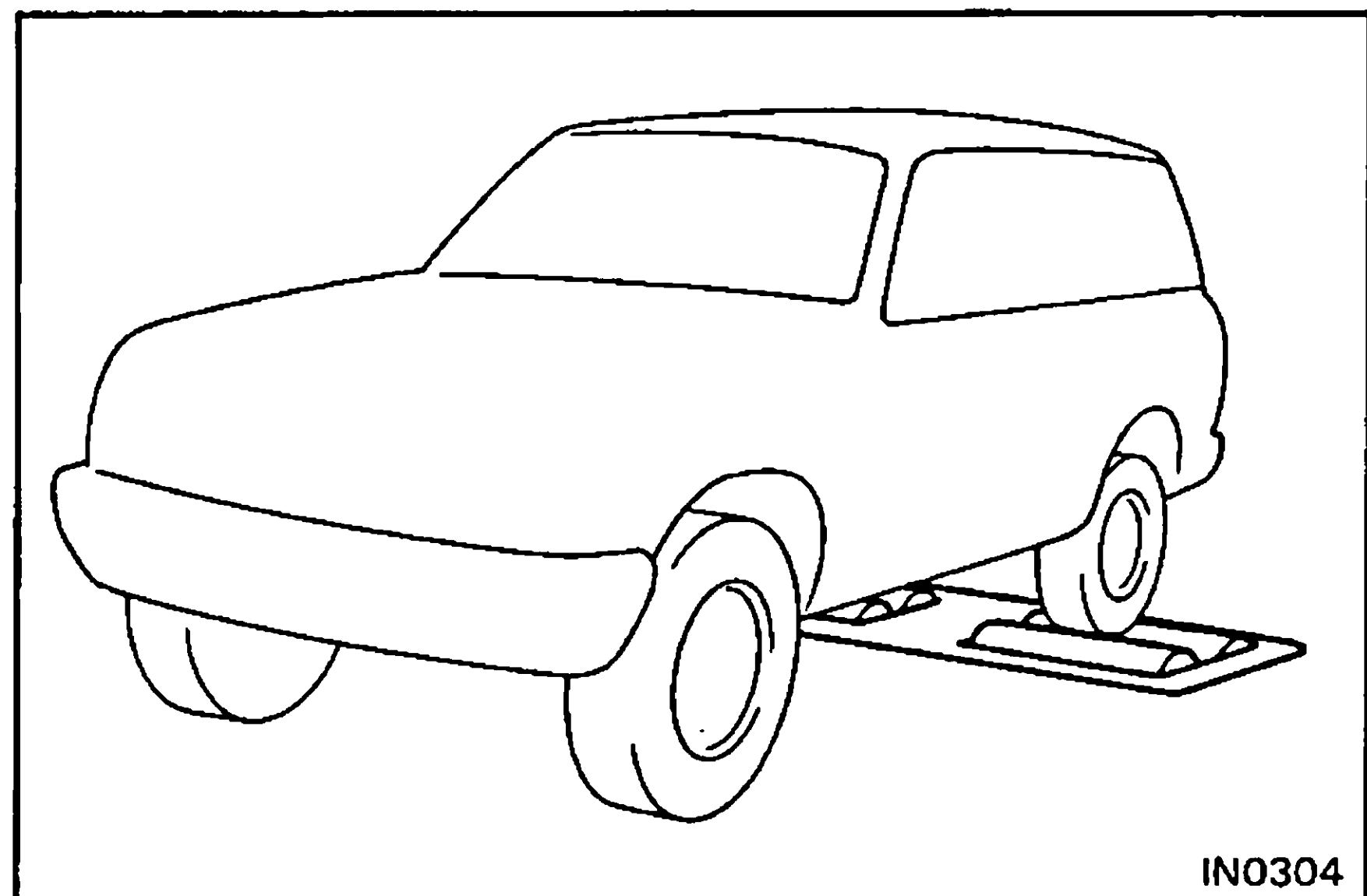
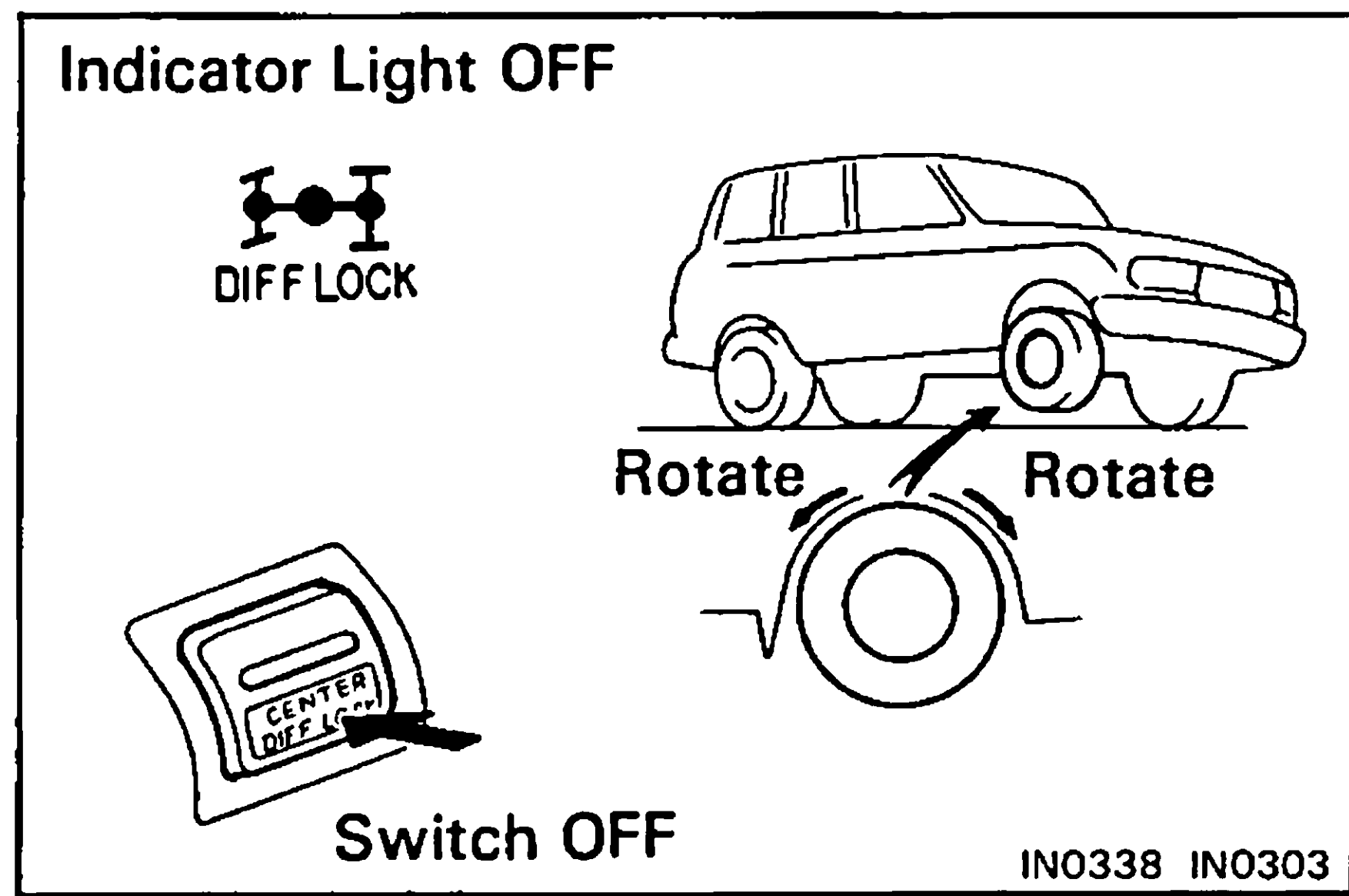
FREE Position

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



LOCK Position

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



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

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

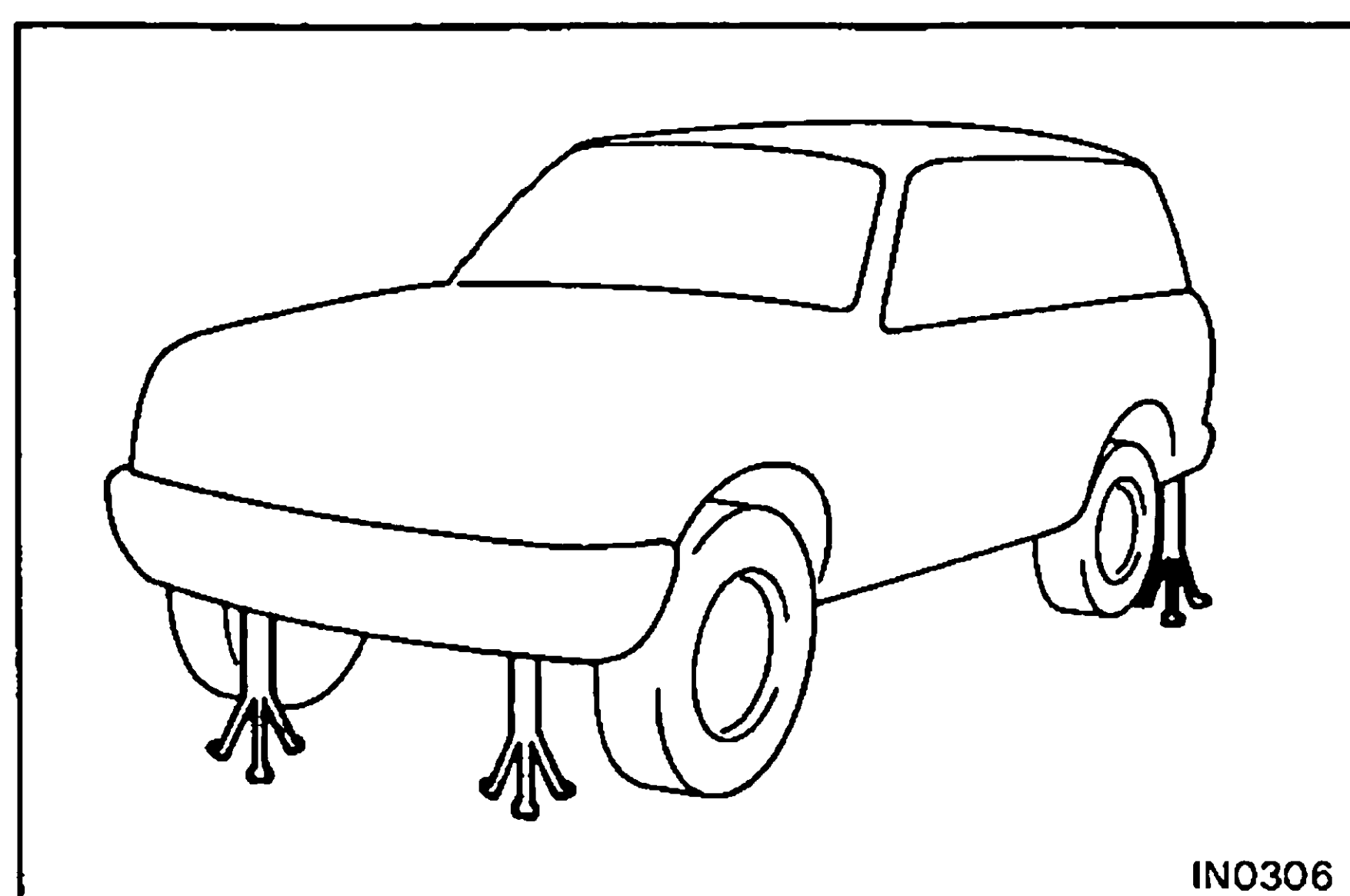
- (1) Put the center differential in FREE position.
 - Shift the transfer select lever to H position.
 - Turn the center differential lock switch to OFF and check that the center differential lock indicator light goes off.
- (2) Shift the transmission shift lever to N range.
- (3) Idle the engine, operate the brake booster and perform the test.

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

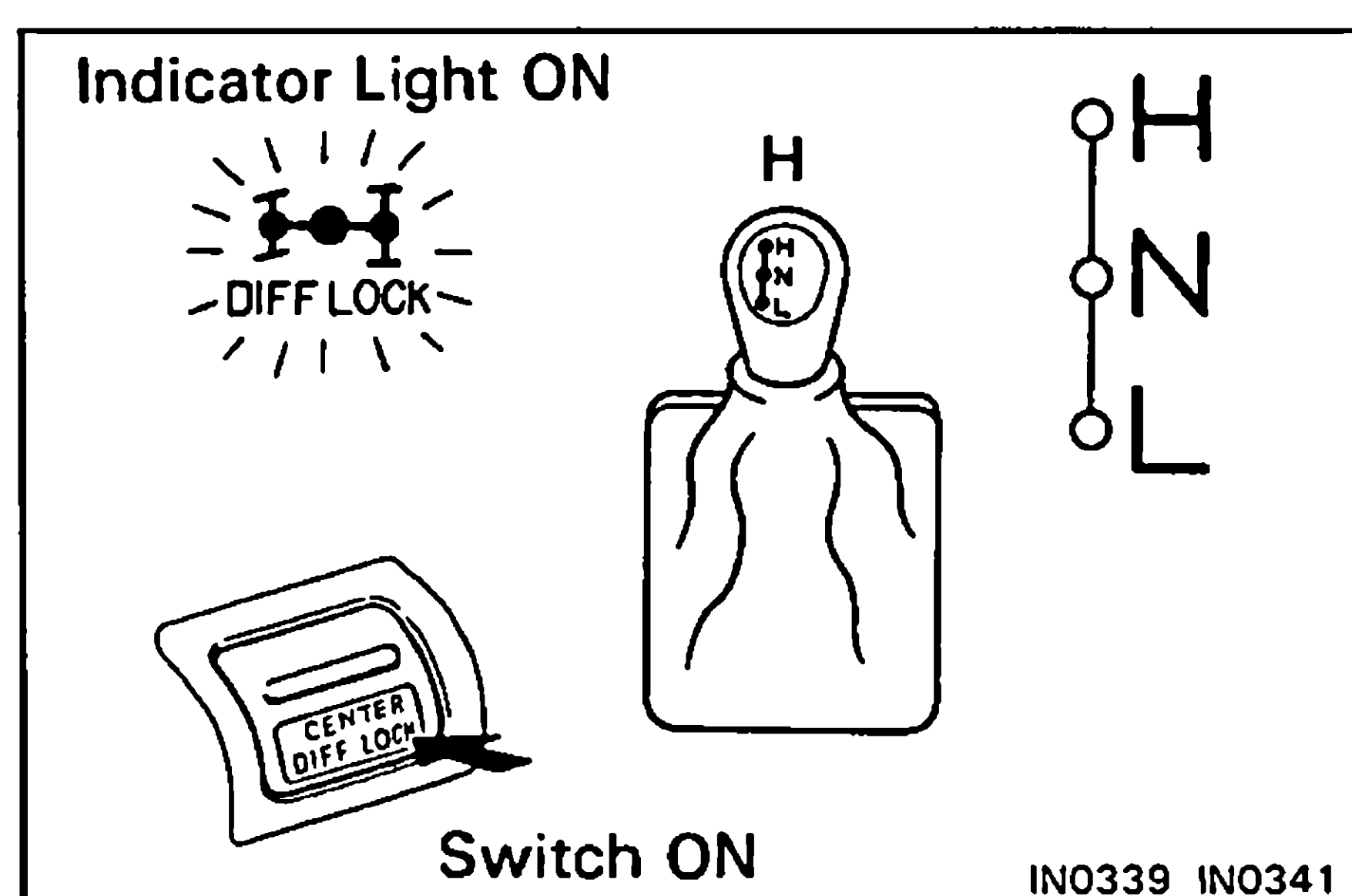
- (1) Remove the front propeller shaft, put the center differential in LOCK position, then put the rear wheels on the tester roller and perform the test.
- (2) When performing tests, observe the following precautions.
 - Check that the center differential is securely in LOCK condition.
 - Confirm that the vehicle is securely immobilised.
 - Never operate the clutch or brakes suddenly, suddenly drive the wheels, or suddenly decelerate.

ON-VEHICLE WHEEL BALANCING

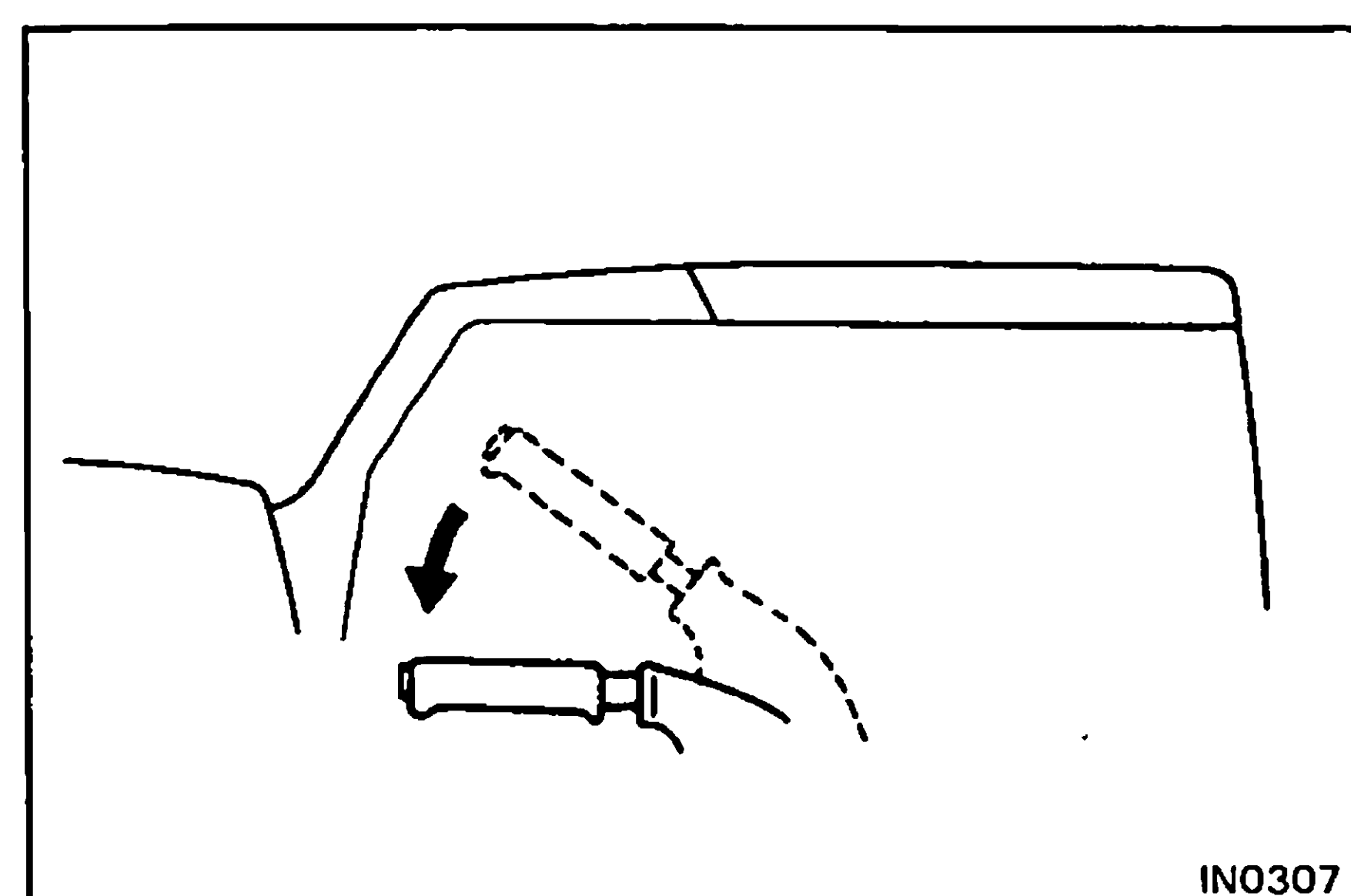
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent the wheels from rotating at different speeds or in different directions from each other (which could lead to damage to the center differential or transfer gears), always be sure to observe the following precautions:



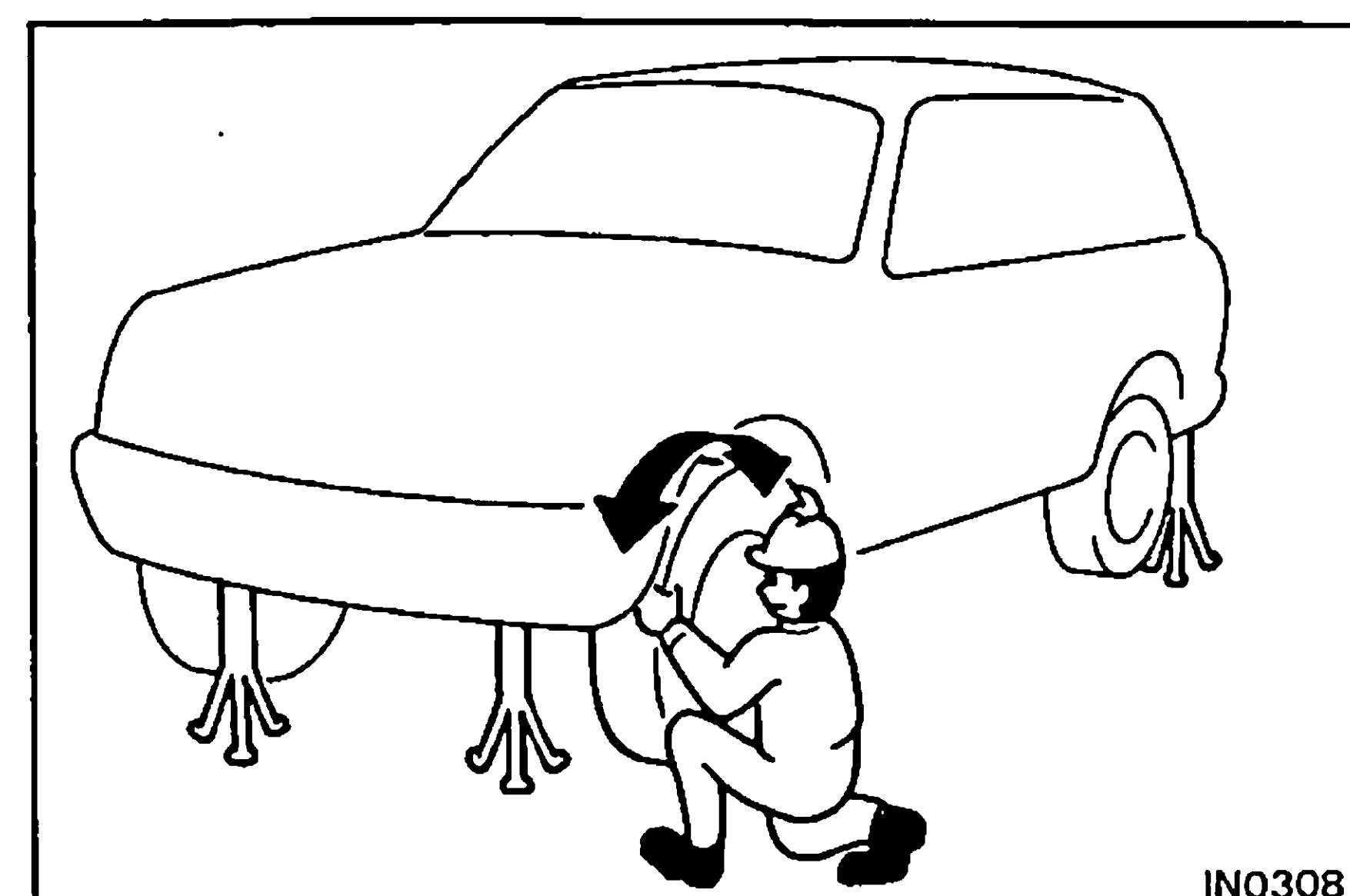
- (1) All four wheels should be jacked up, clearing the ground completely.



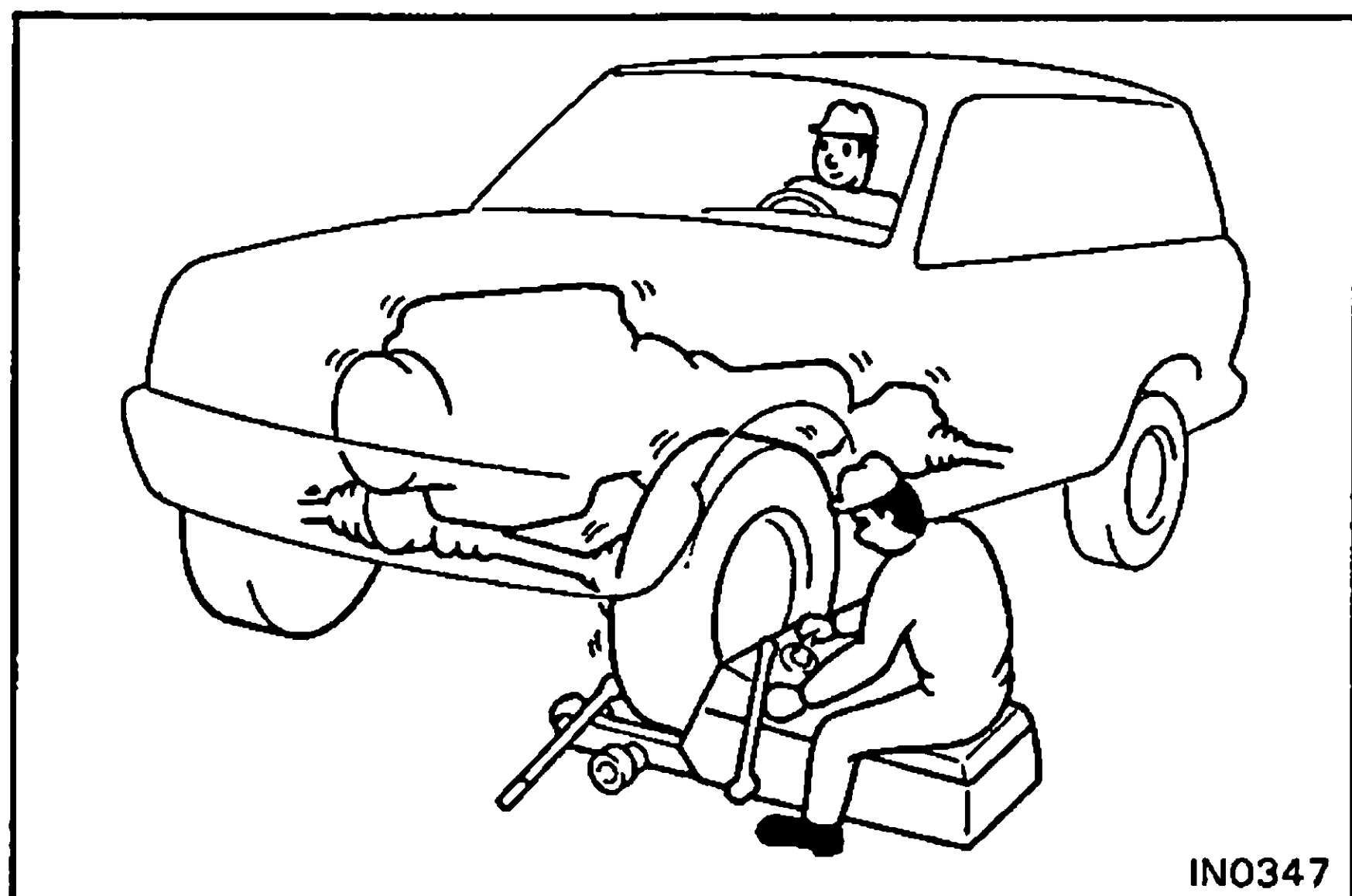
- (2) The center differential should be in the LOCK position with the transfer gear in H position.



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



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



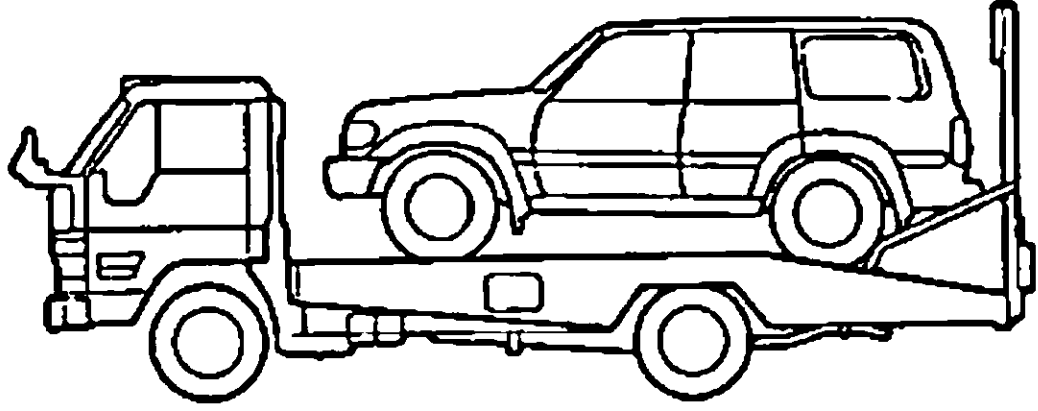
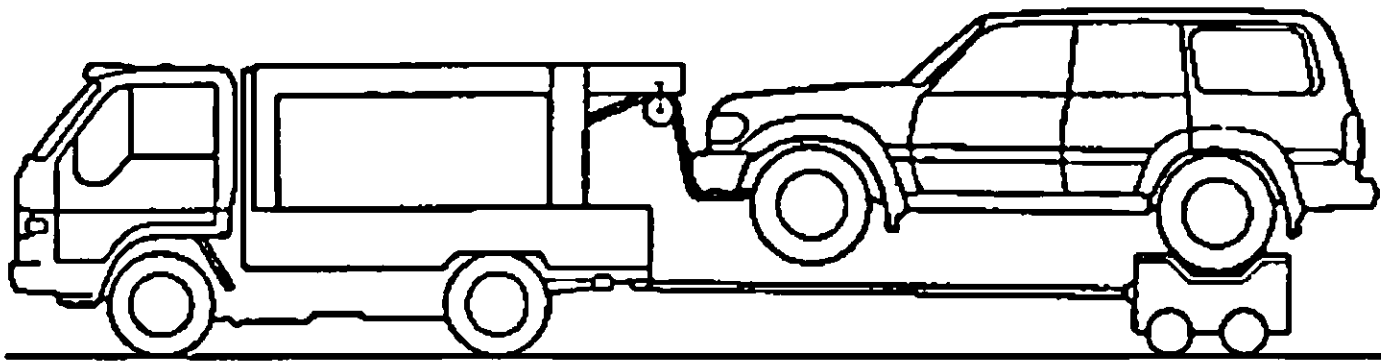
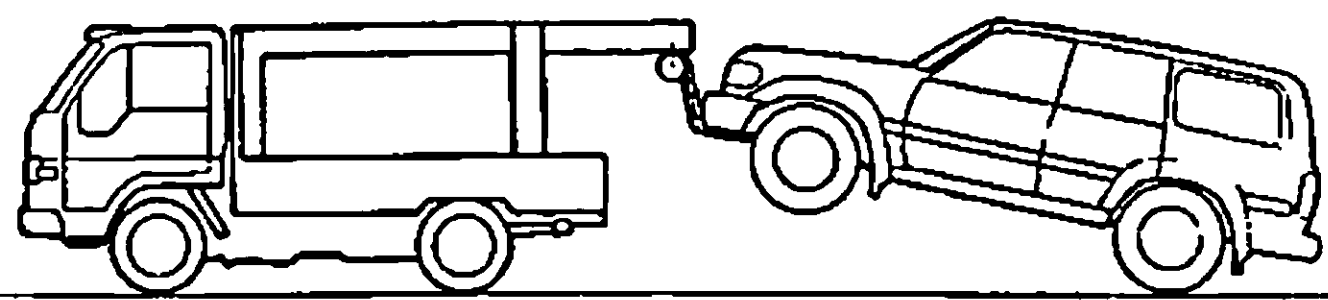
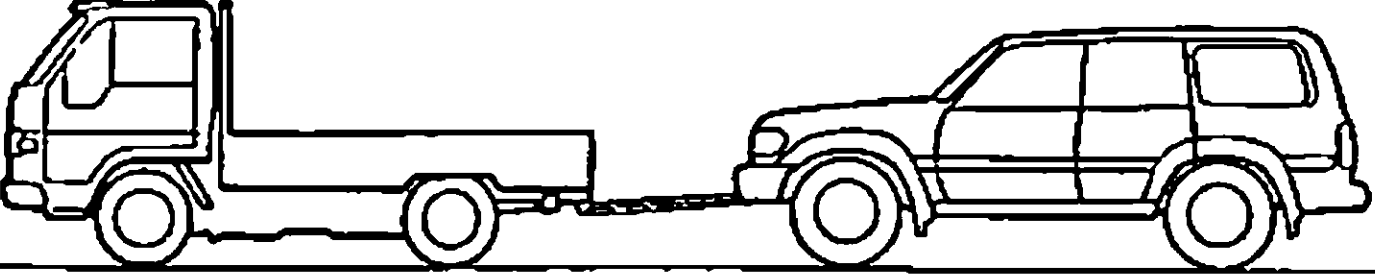
- (5) The wheels should be driven with both the engine and the wheel balancer.**

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

- (6) Avoid sudden acceleration, deceleration and braking.**
- (7) Carry out the wheel balancing with the transmission in 3rd or 4th gear (or 3rd or D range).**

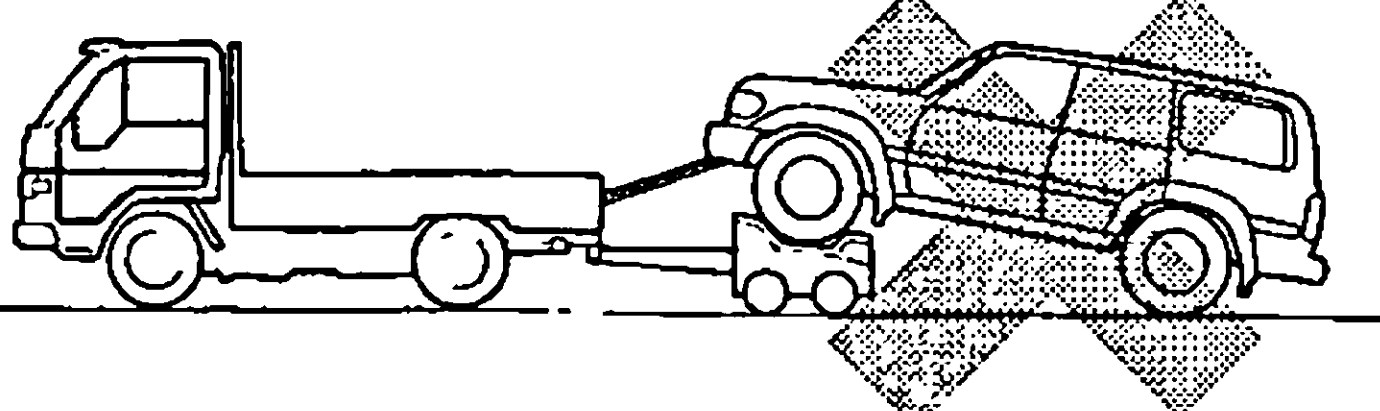
PRECAUTIONS WHEN TOWING FULL-TIME 4WD VEHICLES (Station Wagon)

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

Condition Towing Method	Parking Brake	Transmission Shift Lever Position	Transfer Shift Lever Position	Center Differential Lock Switch	Center Differential
① Flat Bed Truck  IN0309	Applied	Any Position	"H" Position	OFF	FREE (Normal) Driving
② Sling-Type Tow Truck with Dollies  IN0310					
③ Sling-Type Tow Truck (Front wheels must be able to rotate freely)  IN0311	Released	"N" Range or Neutral	"N" Position	OFF	↑
④ Towing with Rope  IN0312	Released	"N" Range or Neutral	"N" Position	OFF	↑
HINT: Do not tow the vehicle at a speed faster than 45 km/h (30 mph) or a distance greater than 80 km (50 miles).					

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

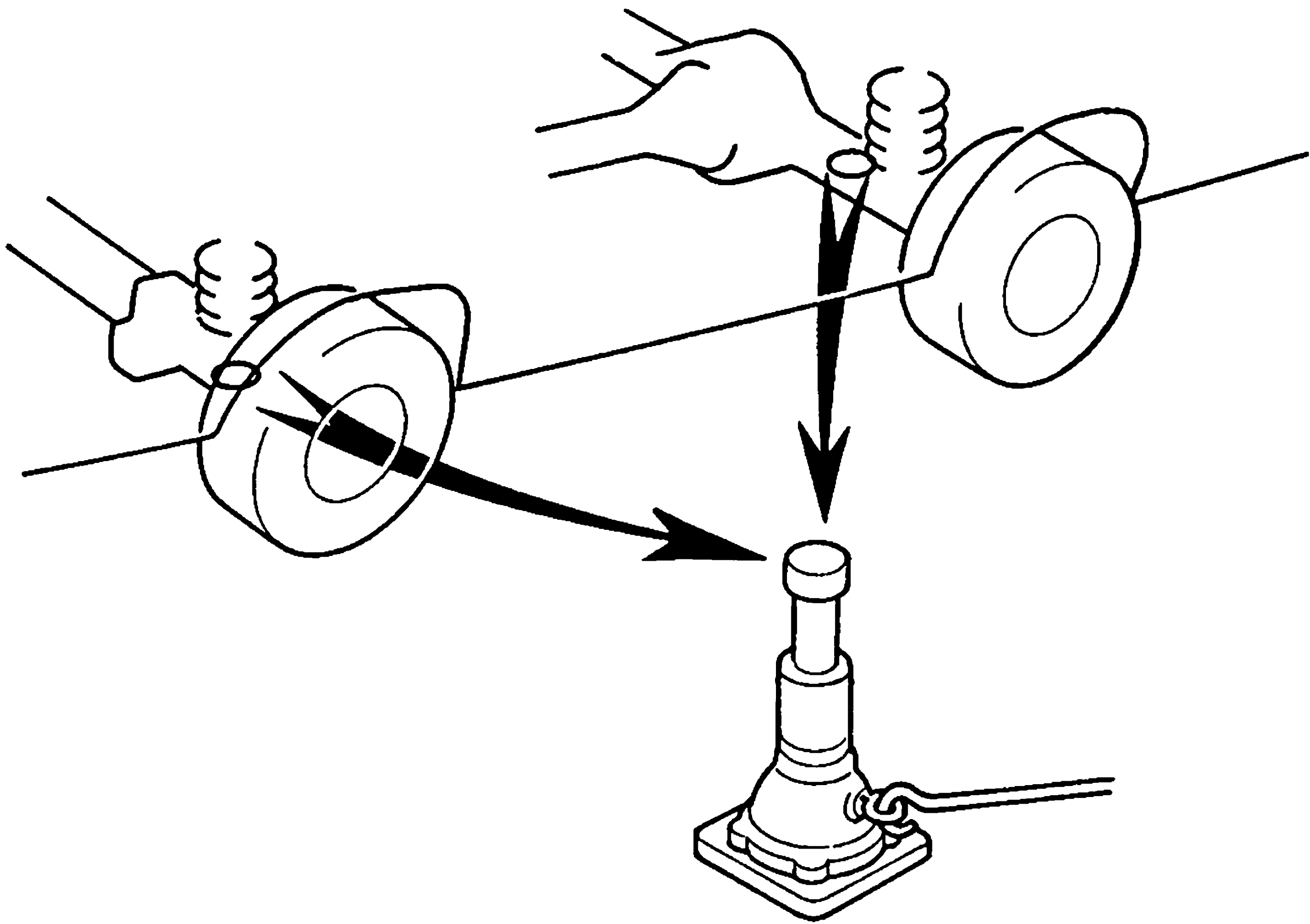
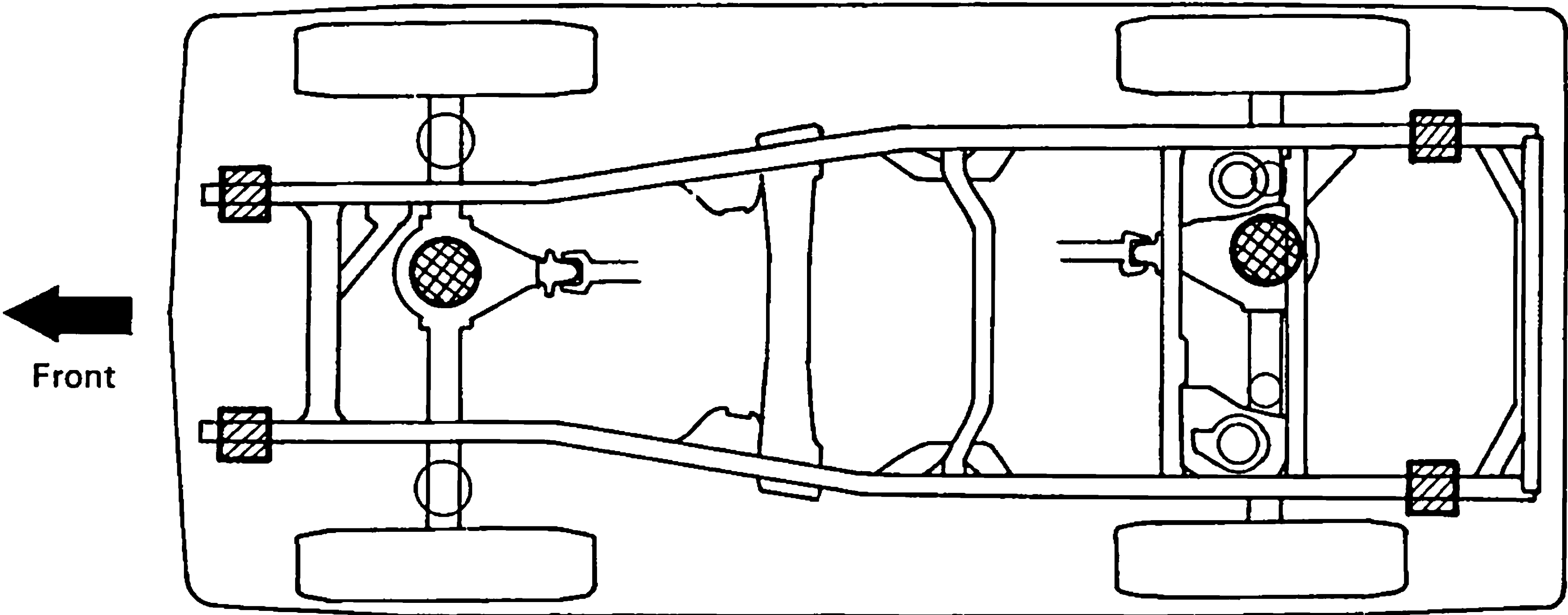
For example, the towing method shown below is dangerous, so do not use it.

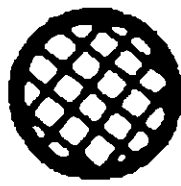
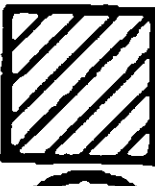
NO  IN0313	During towing with this towing method, there is a danger of the drive train heating up and causing breakdown, or of the front wheels flying off the dolly.
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VEHICLE LIFT AND SUPPORT LOCATIONS

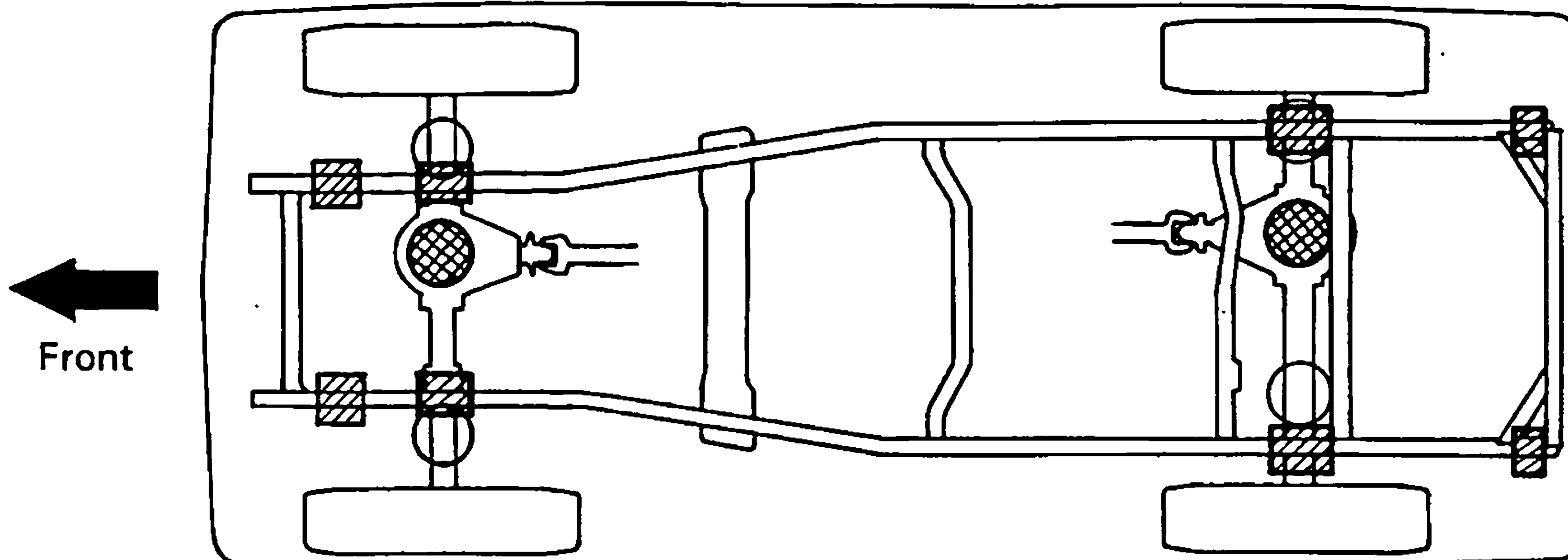
(Hardtop & Canvas Top)

Coil Spring Type (LJ and RJ series)

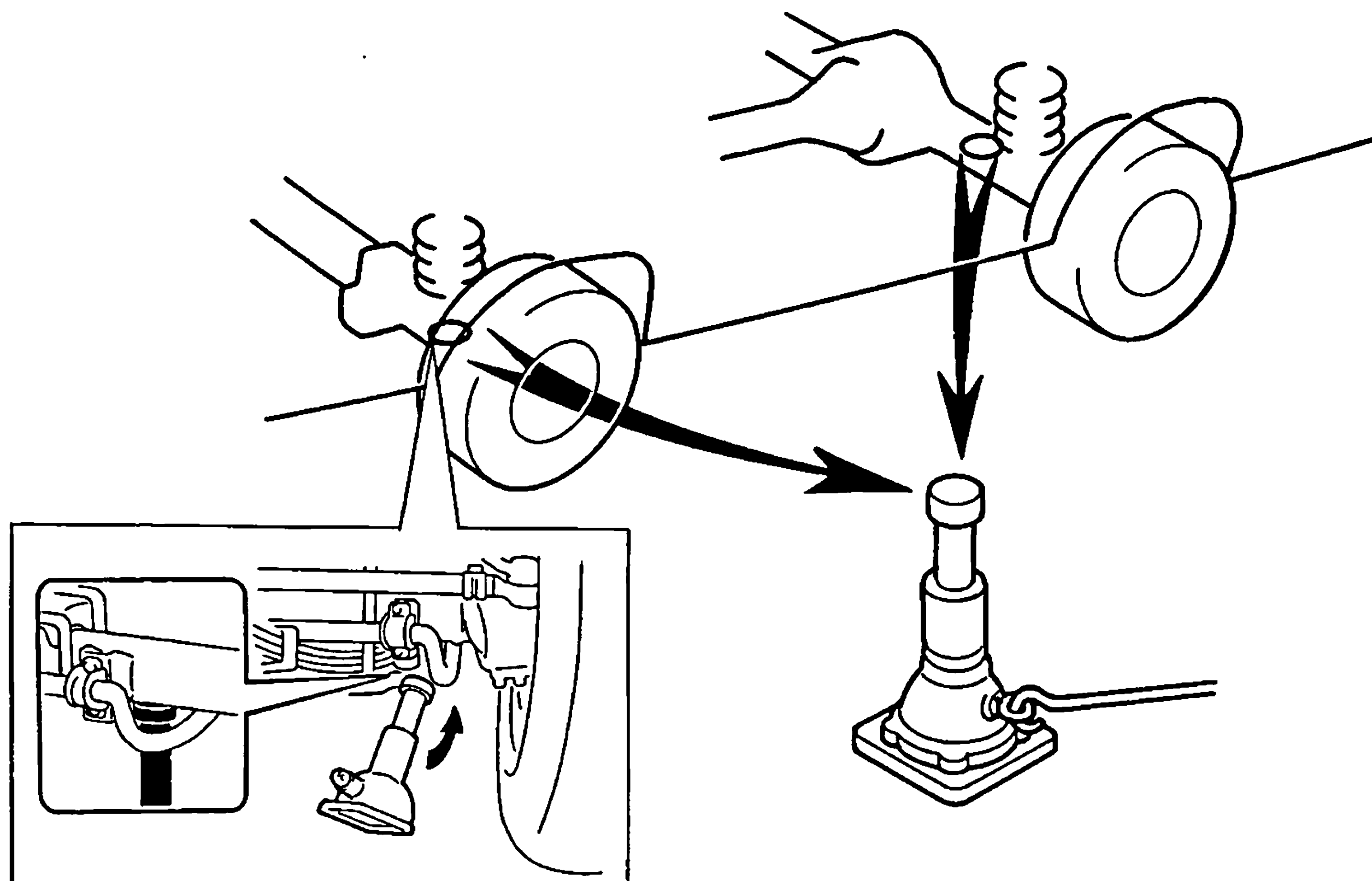
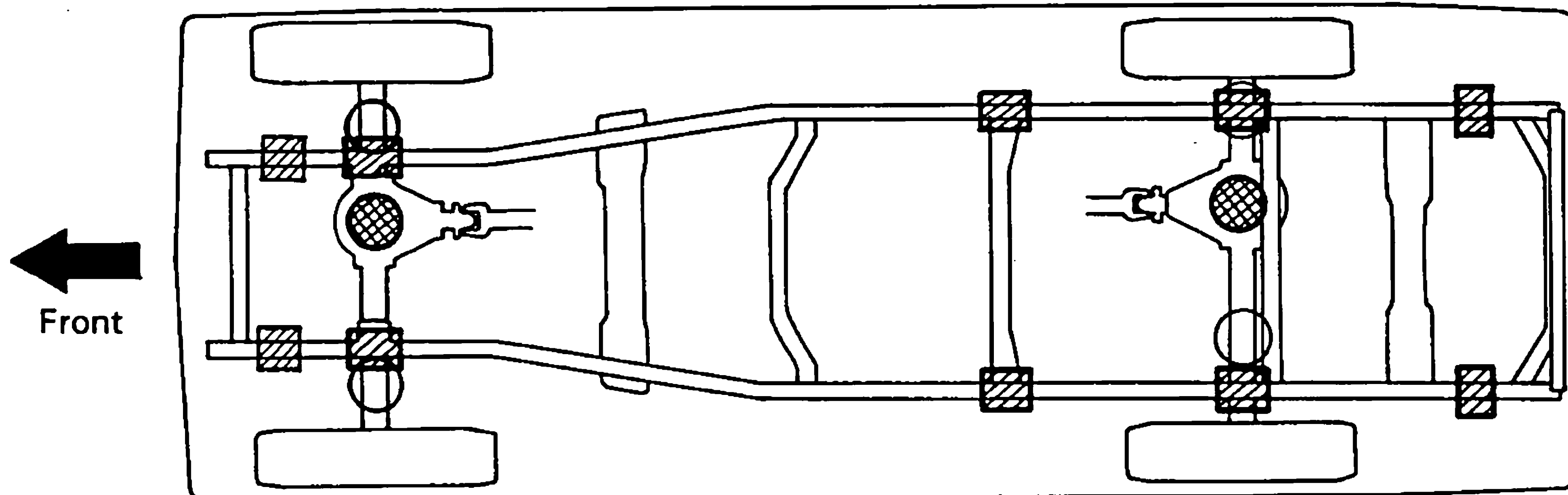


- JACK POSITION** _____ 
- Front Under the front differential
- Rear Under the rear differential
- SUPPORT POSITION**
- Safety stand 
- SCREW TYPE JACK POSITION** 

Leaf Spring Type (PZJ, HZJ, FJ and FZJ series)
70 series (short) and 73 series (middle)



75 series (long)



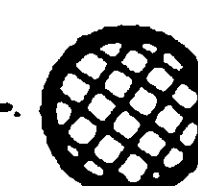
JACK POSITION

Front Under the front differential
 Rear Under the rear differential

SUPPORT POSITION

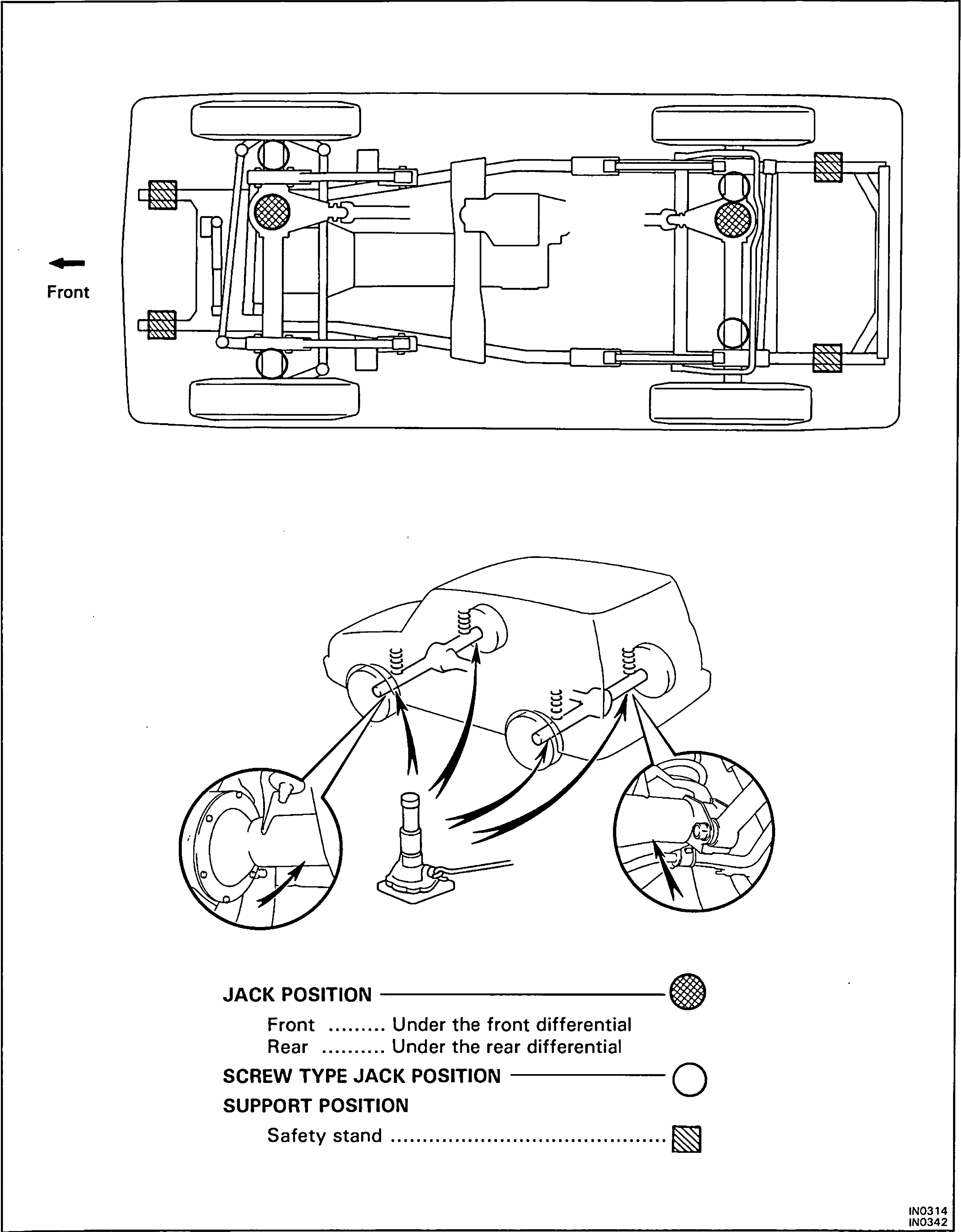
Safety stand

SCREW TYPE JACK POSITION



VEHICLE LIFT AND SUPPORT LOCATIONS

(Station Wagon)



ABBREVIATIONS USED IN THIS MANUAL

A/C	Air Conditioner
CB	Circuit Breaker
CCS	Cruise Control System
CD	Compact Disc
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
ELR	Emergency Locking Retractor
Ex.	Except
FIPG	Formed on Place Gasket
FL	Fusible Link
IG	Ignition
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
LSD	Limited Slip Differential
M/T	Manual Transmission
MP	Multipurpose
PTO	Power Take-Off
RH	Right-Hand
RHD	Right-Hand Drive
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
SW	Switch
VSV	Vacuum Switching Valve
w/	With
w/o	Without
2WD	Two Wheel Drive Vehicles (4 × 2)
4WD	Four Wheel Drive Vehicles (4 × 4)

CLUTCH

REFER TO FOLLOWING REPAIR MANUALS:

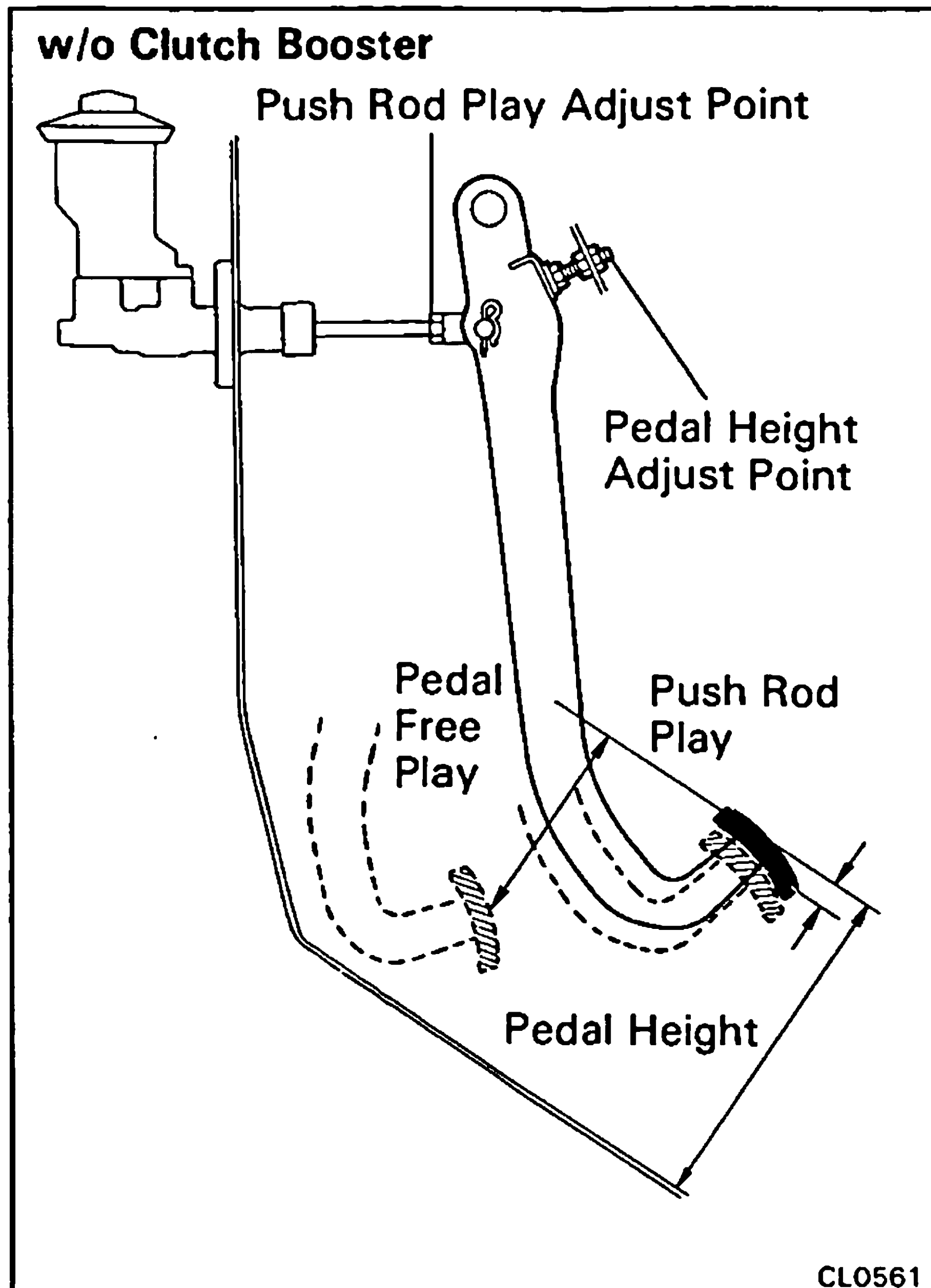
Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

NOTE: The following pages contain only the points which differ from the above listed manuals.

	Page
(HARDTOP & CANVAS TOP)	
TROUBLESHOOTING	CL-2
CHECK AND ADJUSTMENT OF CLUTCH PEDAL	CL-3
OPERATIONAL TEST OF CLUTCH BOOSTER	CL-5
BLEEDING OF CLUTCH SYSTEM	CL-5
CLUTCH MASTER CYLINDER	CL-6
CLUTCH BOOSTER	CL-10
CLUTCH ACCUMULATOR	CL-17
CLUTCH RELEASE CYLINDER	CL-21
CLUTCH UNIT	CL-24
(STATION WAGON)	
TROUBLESHOOTING	CL-28
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OPERATIONAL TEST OF CLUTCH BOOSTER	CL-30
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CLUTCH MASTER CYLINDER	CL-32
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CLUTCH ACCUMULATOR	CL-43
CLUTCH RELEASE CYLINDER	CL-47
CLUTCH UNIT	CL-51

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Clutch pedal freeplay excessive	Adjust pedal freeplay	CL-3
	Clutch booster faulty	Inspect clutch booster	CL-10
	Clutch release cylinder faulty	Repair release cylinder	CL-21
	Clutch master cylinder faulty	Repair master cylinder	CL-6, 8
	Clutch disc out of true, lining greasy or broken	Inspect clutch disc	CL-24
	Splines on input shaft or clutch disc dirty or burred	Repair as necessary	CL-24
	Clutch pressure plate faulty	Replace pressure plate	CL-24
Transmission jumps out of gear	Pilot bearing worn	Replace pilot bearing	CL-24
Clutch slips	Clutch pedal freeplay insufficient	Adjust pedal freeplay	CL-3
	Clutch booster faulty	Inspect clutch booster	CL-10
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-24
	Pressure plate faulty	Replace pressure plate	CL-24
	Release fork binds	Inspect release fork	CL-24
Clutch grabs/chatters	Clutch booster faulty	Inspect clutch booster	CL-10
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-24
	Pressure plate faulty	Replace pressure plate	CL-24
	Clutch diaphragm spring bending	Align clutch diaphragm	CL-24
	Engine mounts loose	Repair as necessary	
Clutch pedal spongy	Air in clutch lines	Bleed clutch system	CL-5
	Clutch release cylinder faulty	Repair release cylinder	CL-21
	Clutch master cylinder faulty	Repair master cylinder	CL-6, 8
Clutch noisy	Loose part inside housing	Repair as necessary	
	Release bearing worn or dirty	Replace release bearing	CL-24
	Pilot bearing worn	Replace pilot bearing	CL-24
	Release fork or linkage sticks	Repair as necessary	



CHECK AND ADJUSTMENT OF CLUTCH PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from dash panel: 186 mm (7.32 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

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

HINT: After adjusting the pedal height, check and adjust the pedal free play and push rod play or booster air valve stroke.

3-1. (w/o Clutch Booster)

CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT

(Pedal Freeplay)

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

Pedal freeplay: 13.0 — 23.0 mm (0.51 — 0.91 in.)

(Push rod play)

Push in on the pedal with a finger softly until the resistance begins to increase a little.

Push rod play at pedal top: 1.0 — 5.0 mm
(0.039 — 0.197 in.)

3-2. (w/ Clutch Booster)

CHECK PEDAL FREEPLAY AND BOOSTER AIR VALVE STROKE

(Pedal Freeplay)

Push in on the pedal until the clutch begins to resist.

Pedal freeplay: 15.0 — 30.0 mm (0.59 — 1.18 in.)

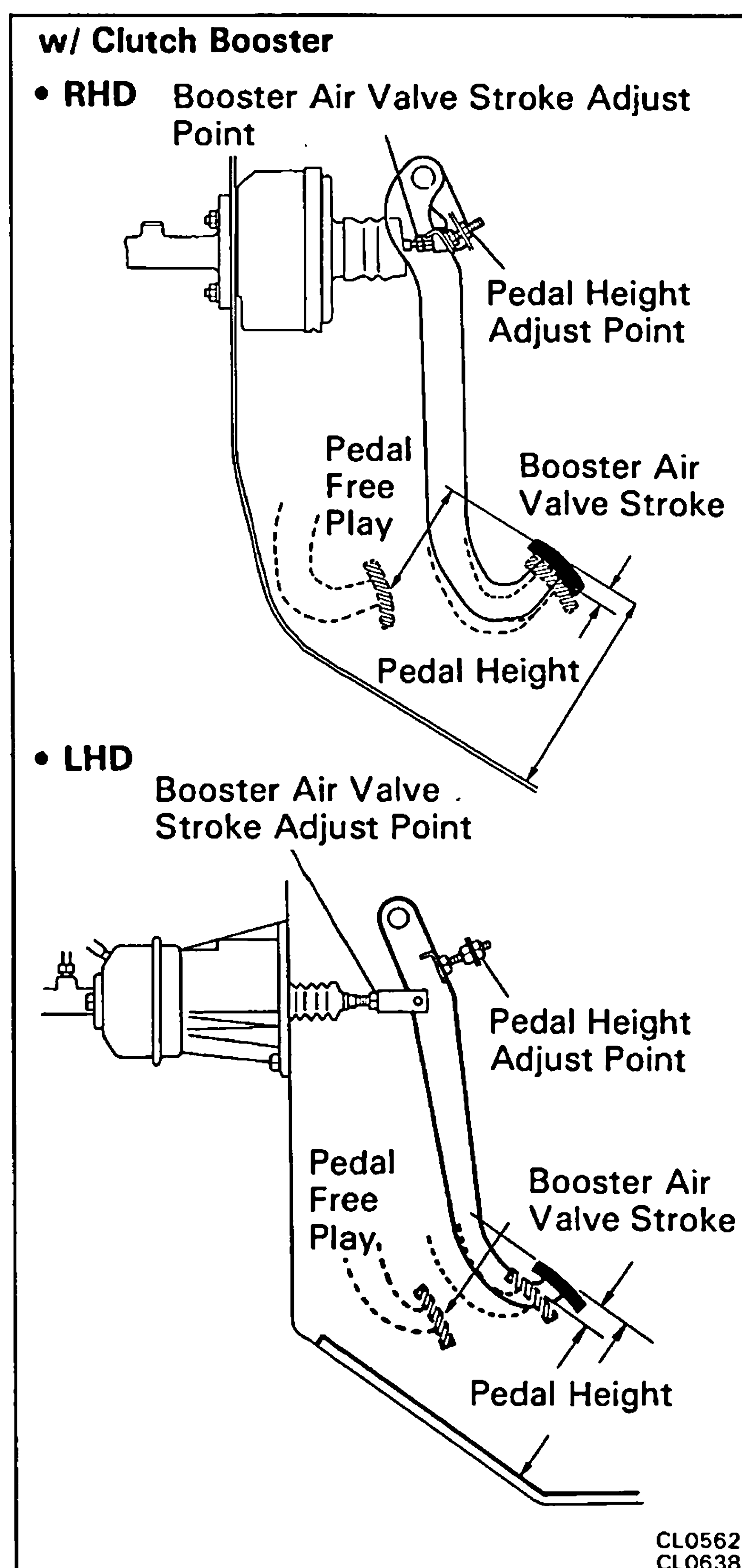
(Booster Air Valve Stroke)

(a) Stop the engine and depress the clutch pedal several times until there is no vacuum left in the clutch booster.

(b) Push in on the pedal with a finger softly until the resistance begins to increase a little.

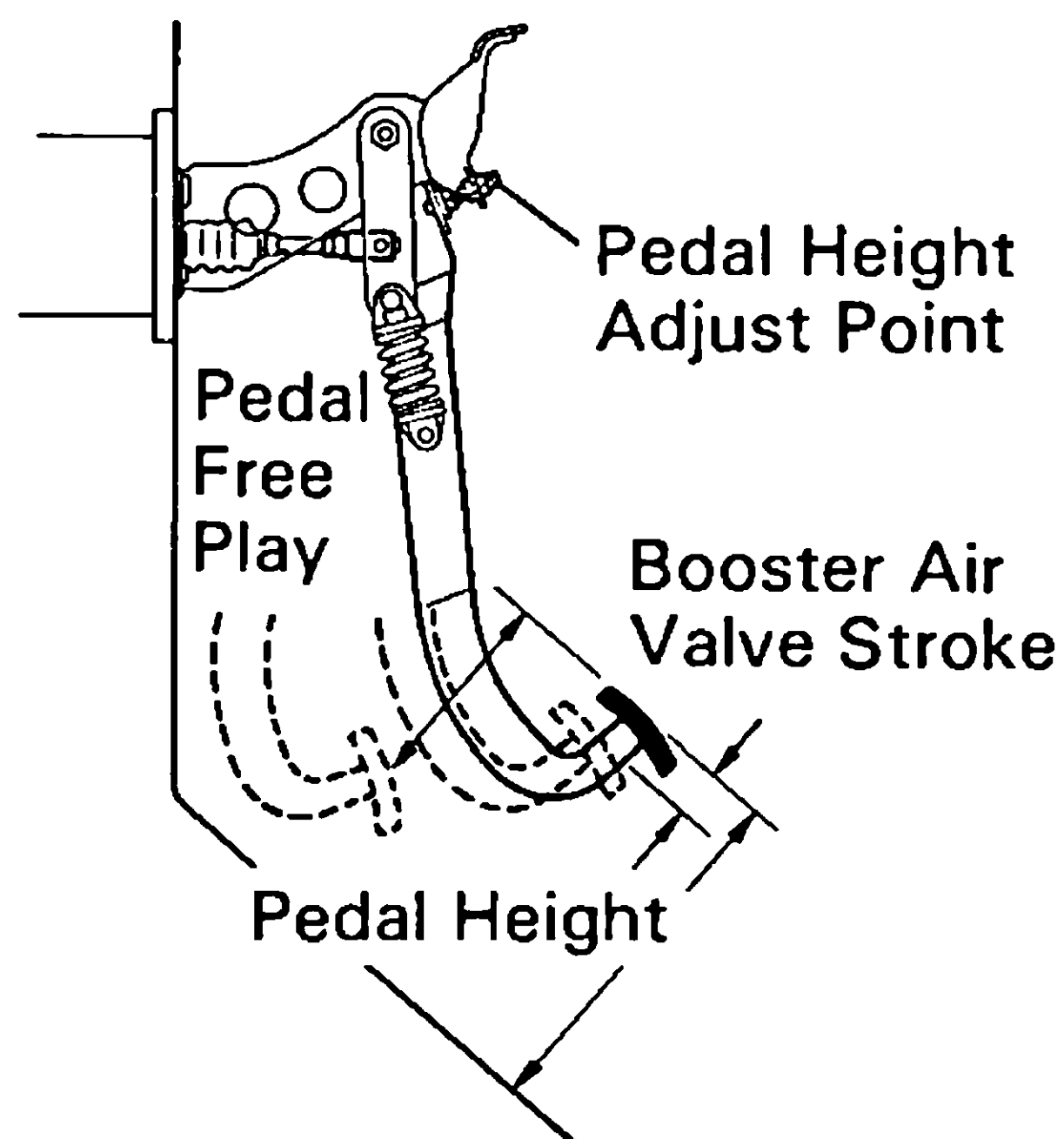
Booster air valve stroke at pedal top:
5.0 — 9.0 mm (0.20 — 0.35 in.)

HINT: The booster air valve stroke is the amount of the stroke until the booster piston is moved by the booster air valve.

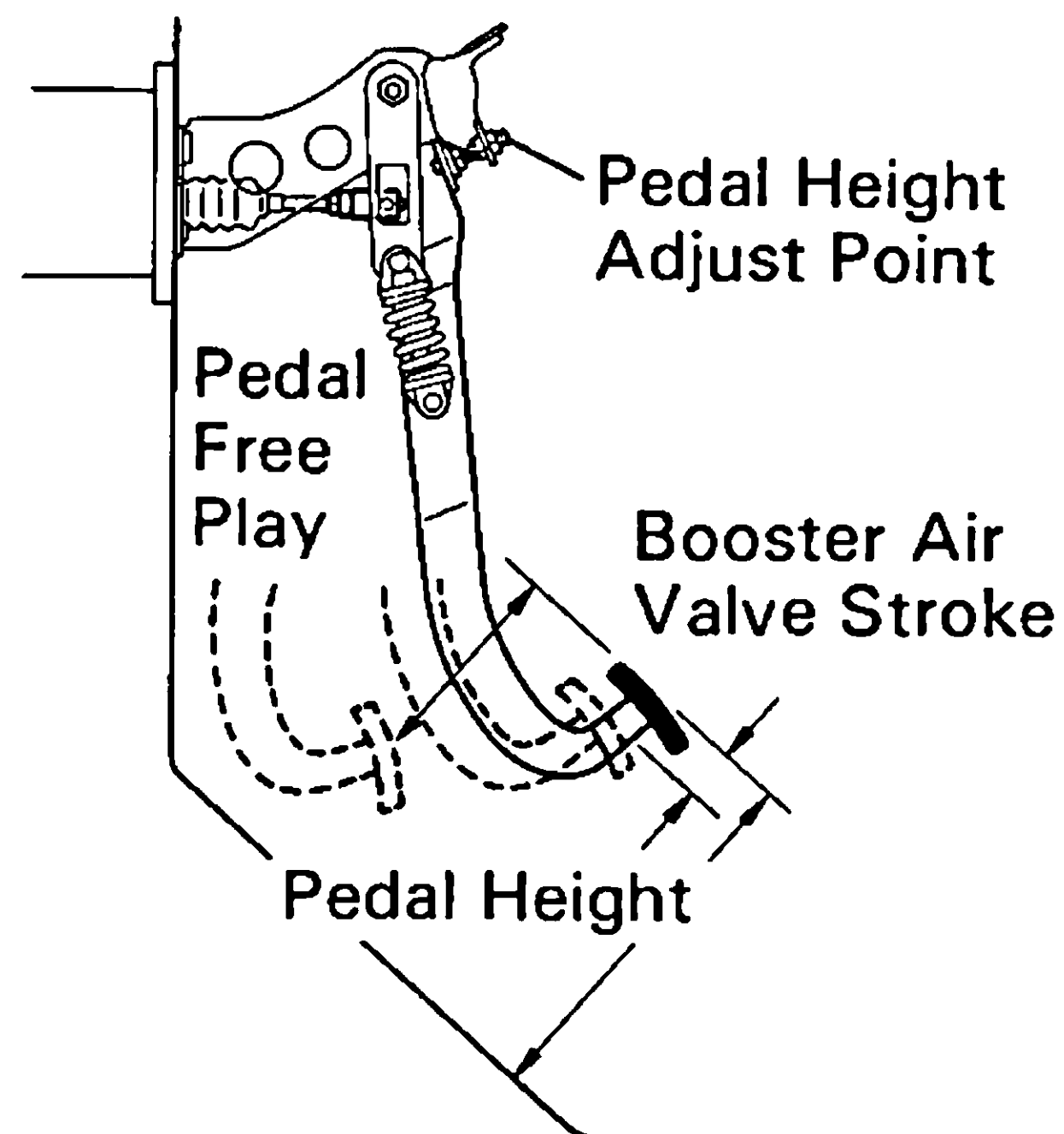


w/ Clutch Booster

- **RHD** Booster Air Valve Stroke Adjust Point



- **LHD** Booster Air Valve Stroke Adjust Point



Q01774
Q01773

4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY OR BOOSTER AIR VALVE STROKE

- Loosen the lock nut and turn the push rod until the freeplay and push rod play are correct.
- Tighten the lock nut.
- After adjusting the pedal freeplay, check the pedal height.
- Connect the air duct and install the lower finish panel.

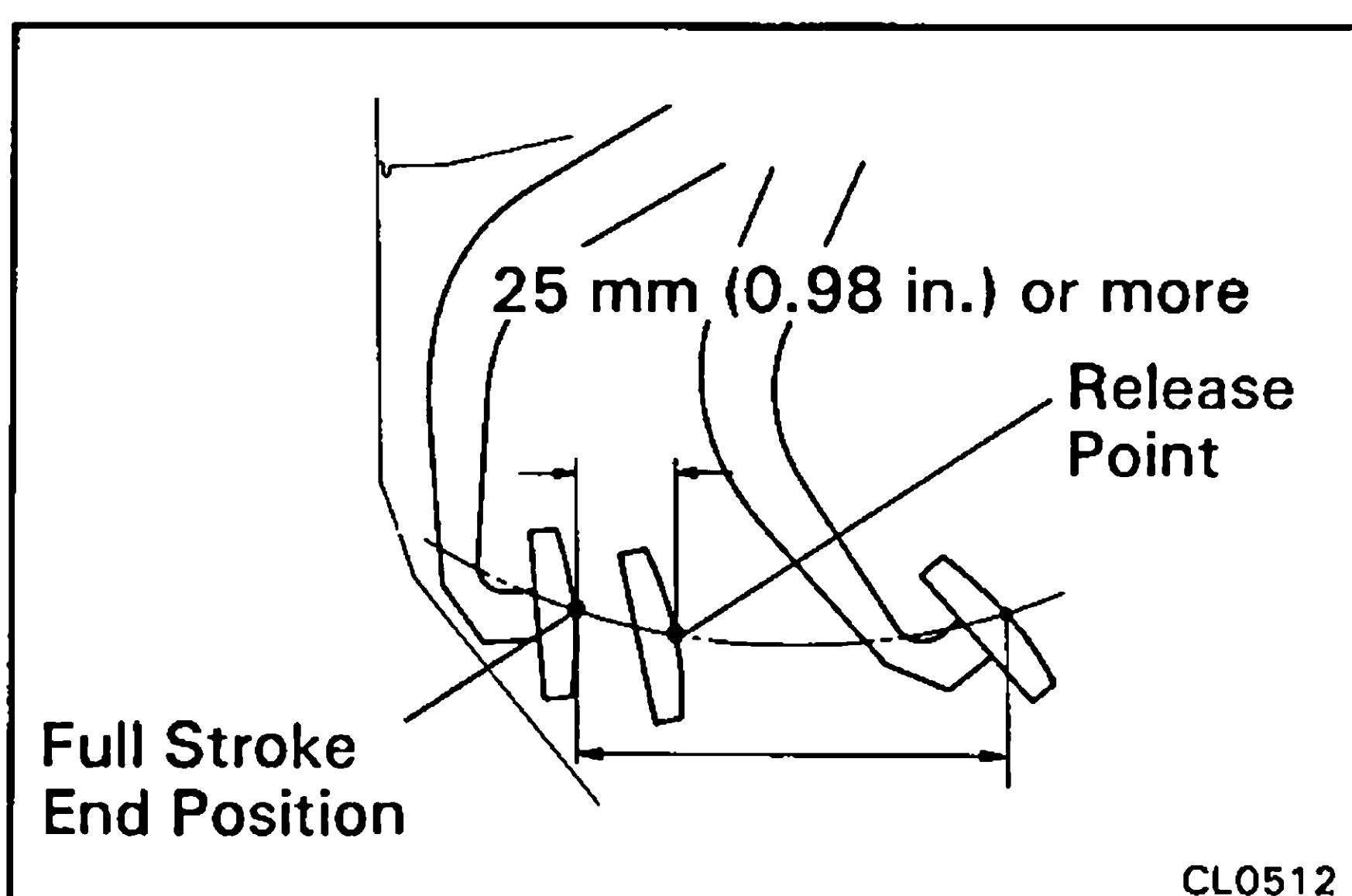
5. INSPECT CLUTCH RELEASE POINT

- Pull the parking brake lever and install wheel stopper.
- Start the engine and idle the engine.
- Without depressing the clutch pedal, slowly shift lever into reverse position until the gears contact.
- Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) up to the full stroke end position.

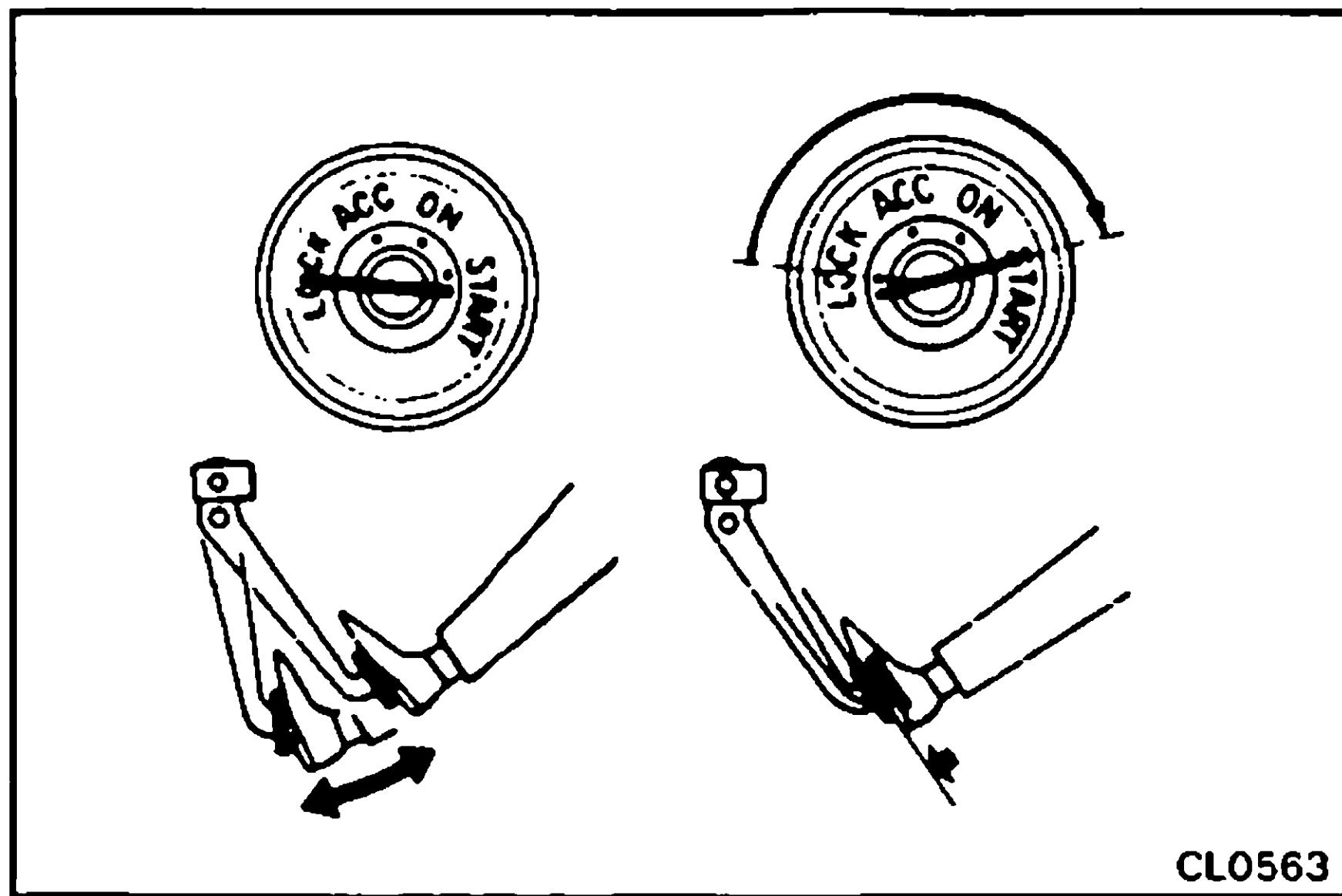
Standard distance: 25 mm (0.98 in.) or more (From pedal stroke end position to release position to release point)

If the distance not as specified, perform the following operation.

- Inspect pedal height.
- Inspect push rod play and pedal freeplay.
- Bleed the clutch line.
- Inspect the clutch cover and disc.



CL0512



OPERATIONAL TEST OF CLUTCH BOOSTER

HINT: If there is leakage or lack of vacuum, repair before testing.

1. OPERATING CHECK

With the engine stopped, depress the clutch pedal several times. Then, with the pedal at the mid point, start the engine and confirm that the pedal sinks down slightly.

2. AIR-TIGHTNESS CHECK

(a) Depress the clutch pedal several times with the engine stopped. Then, start the engine and depress the clutch pedal and check that there is a light difference in pedal effort.

(b) Start the engine and turn it off after is sufficient vacuum in the booster. Depress the clutch pedal and confirm that the effort required for at least one time is equal to that with the engine running.

HINT: If (a) and (b) are not as stipulates, inspect the vacuum check valve and, if necessary, the clutch booster also.

BLEEDING OF CLUTCH SYSTEM

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

NOTICE: 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. 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

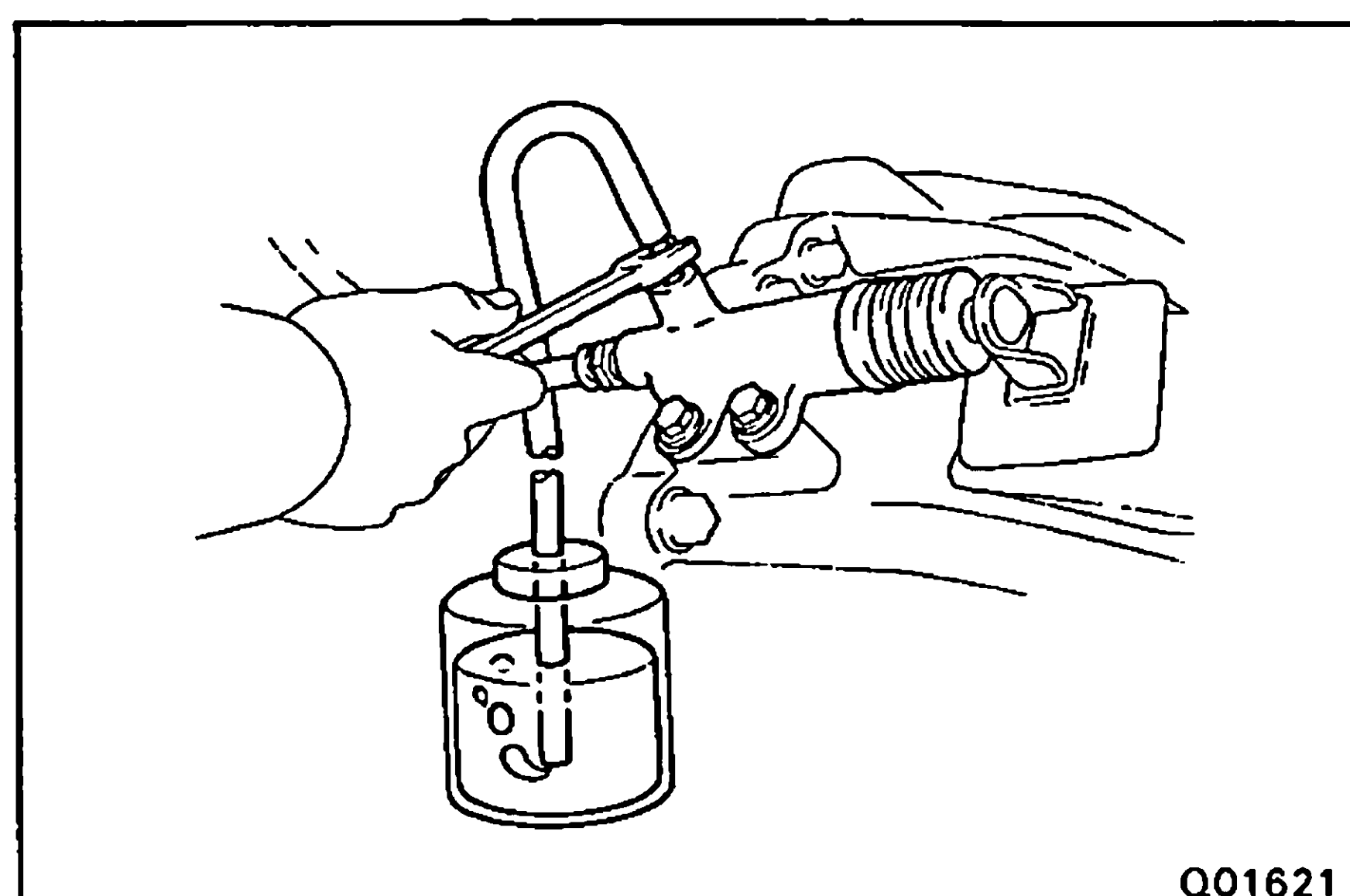
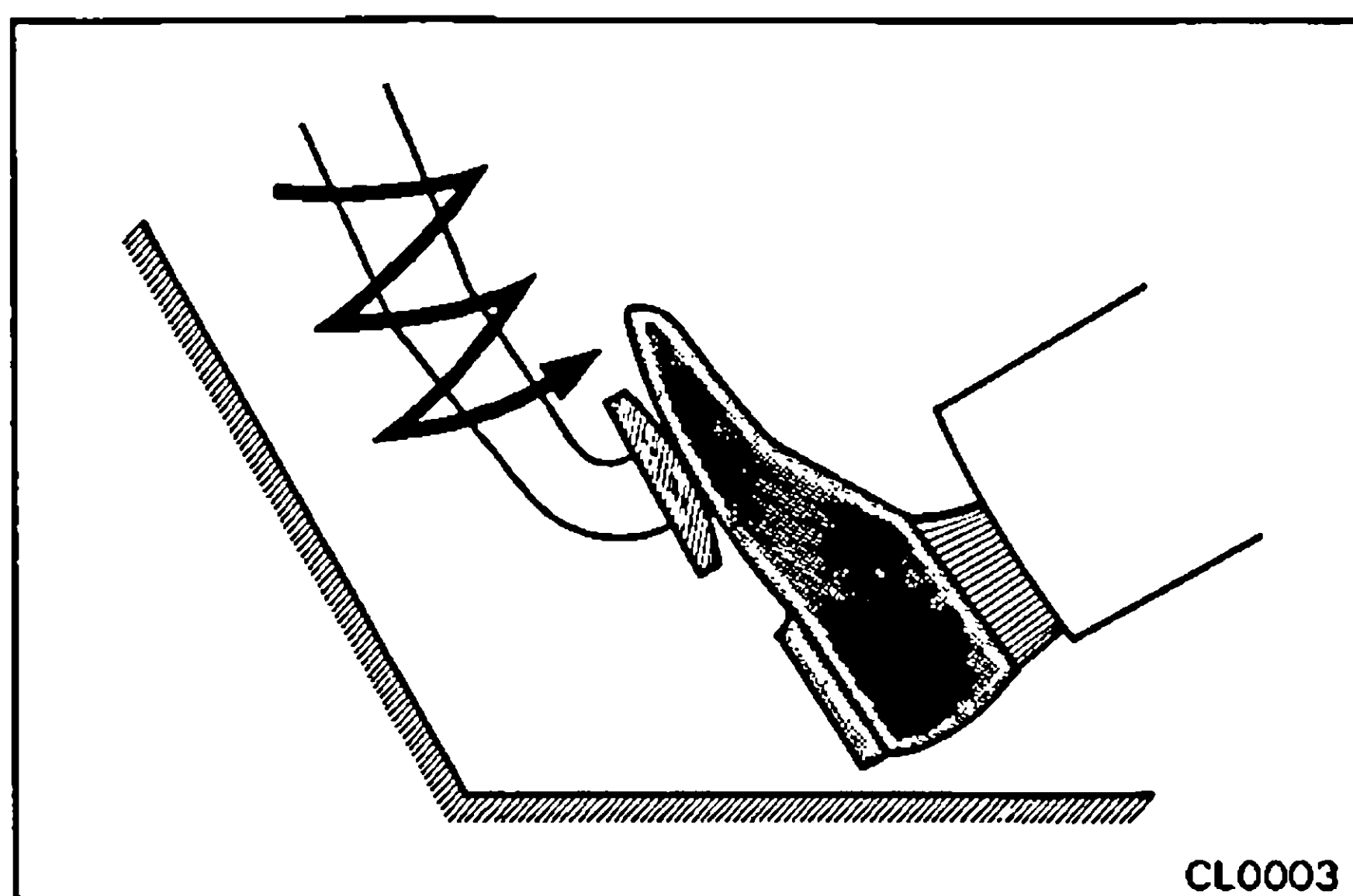
(a) Slowly pump the clutch pedal several times.

(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.

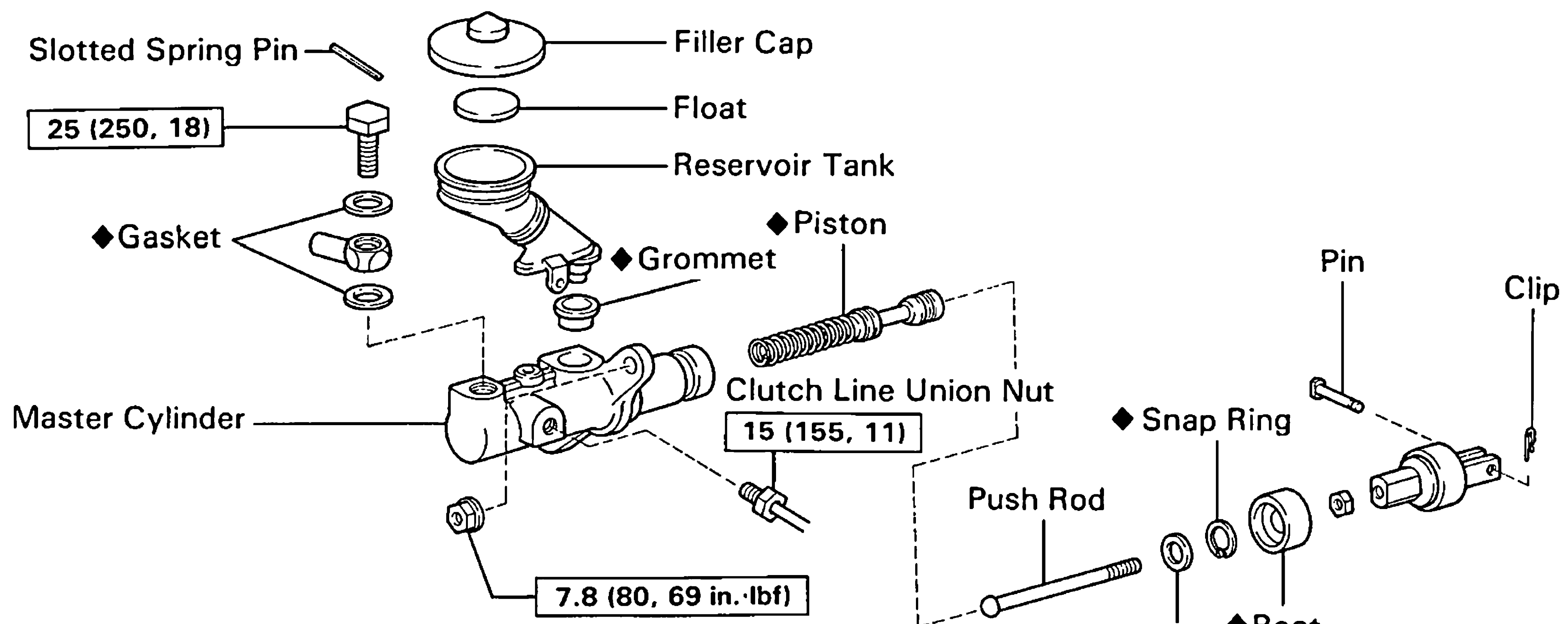
4. TIGHTEN BLEEDER PLUG

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

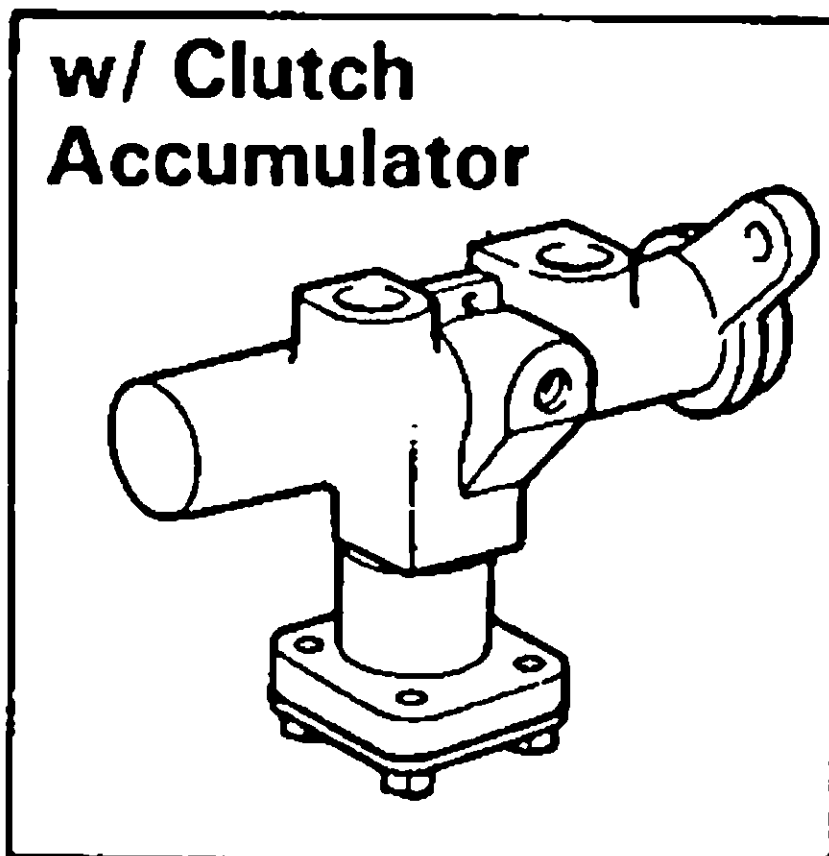
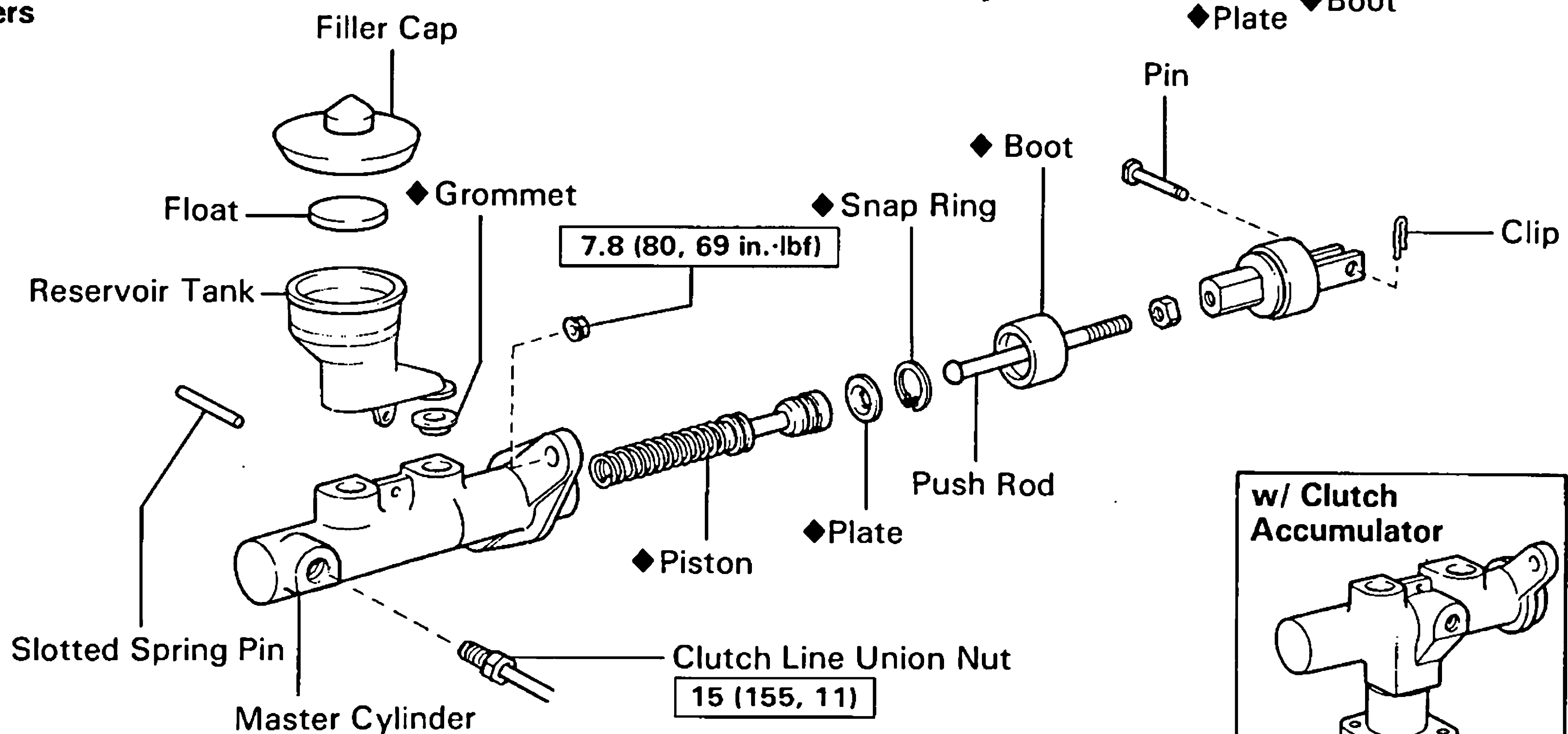


CLUTCH MASTER CYLINDER (w/o Clutch Booster) COMPONENTS

LJ Series RHD Models



Others



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

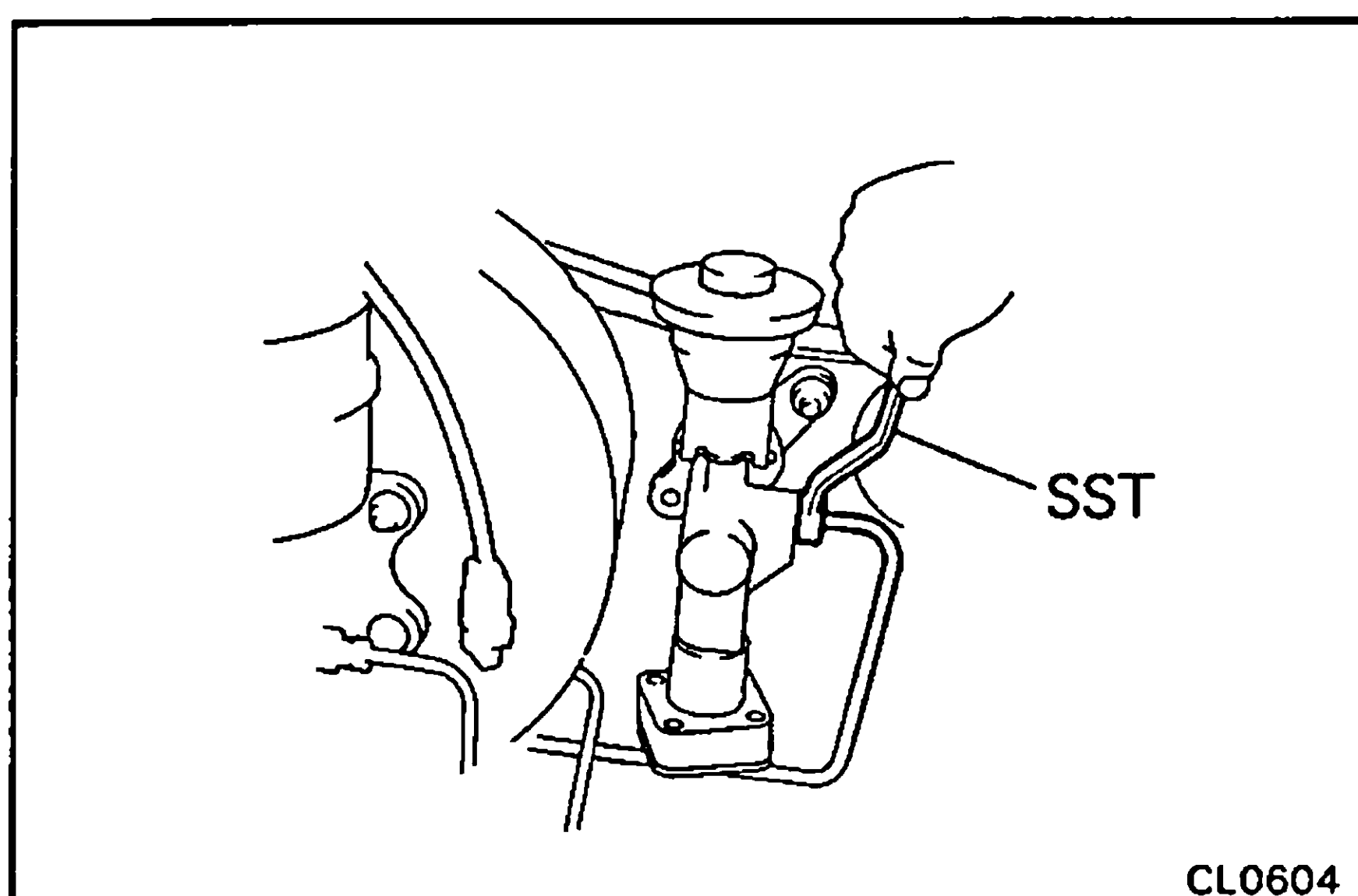
Q01825
Q01770

REMOVAL AND INSTALLATION OF CLUTCH MASTER CYLINDER

(MAIN POINT OF REMOVAL AND INSTALLATION)

REMOVE MASTER CYLINDER

- Draw out fluid with syringe.
- Using SST, disconnect the clutch tube.
SST 09751-36011
- Remove the clip, clevis pin and return spring.
- Remove the nut from the room side.
- Remove the nut from the engine room side.
- Pull out the master cylinder.



CL0604

DISASSEMBLY OF MASTER CYLINDER

1. REMOVE RESERVOIR TANK

- (a) Using a pin punch and a hammer, drive out the slotted spring pin.
- (b) Remove reservoir tank and grommet.

2. REMOVE PUSH ROD AND PISTON

INSPECTION OF MASTER CYLINDER

HINT: Clean the disassembled parts with compressed air.

1. INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION

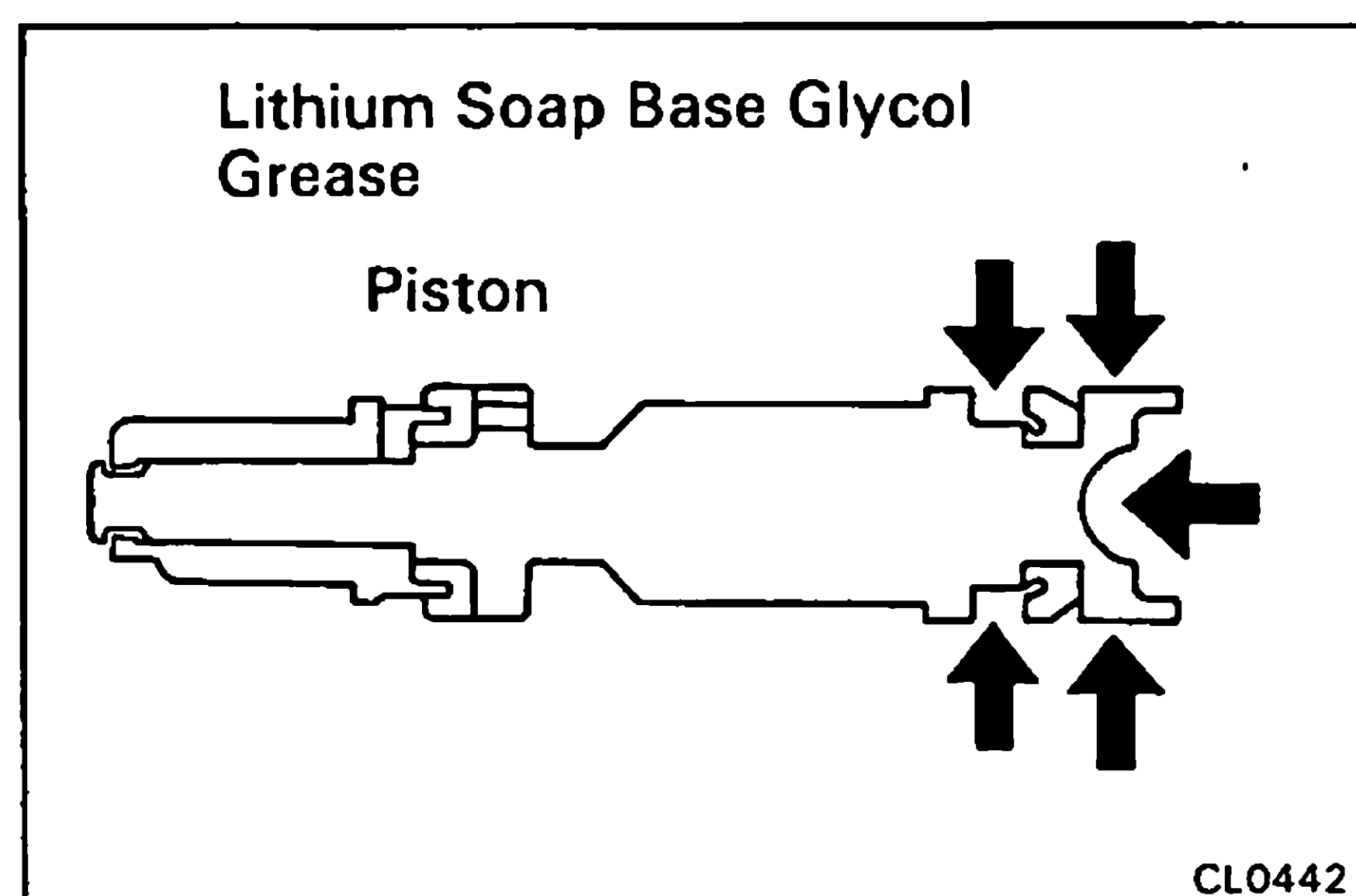
If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the push rod.



ASSEMBLY OF MASTER CYLINDER

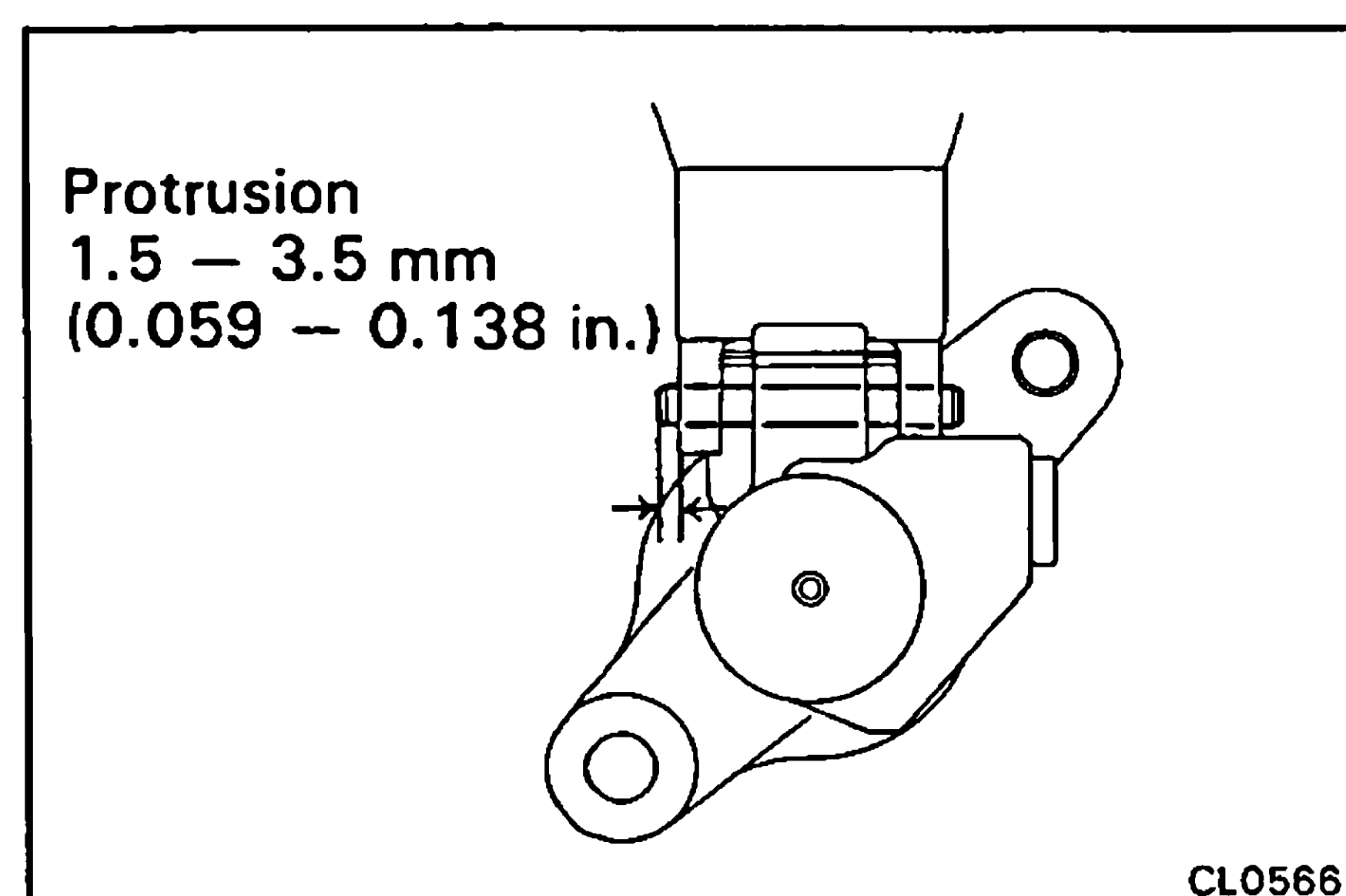
1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE AS SHOWN

2. INSERT PISTON INTO CYLINDER

3. INSTALL PUSH ROD ASSEMBLY WITH SNAP RING

4. INSTALL RESERVOIR TANK

- (a) Install reservoir tank and new grommet.
- (b) Using a pin punch and a hammer, drive in the slotted spring pin.



INSTALLATION OF MASTER CYLINDER

(See page CL-6)

1. INSTALL MASTER CYLINDER

Install the mounting nut, and torque them.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

2. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

SST 09751-36011

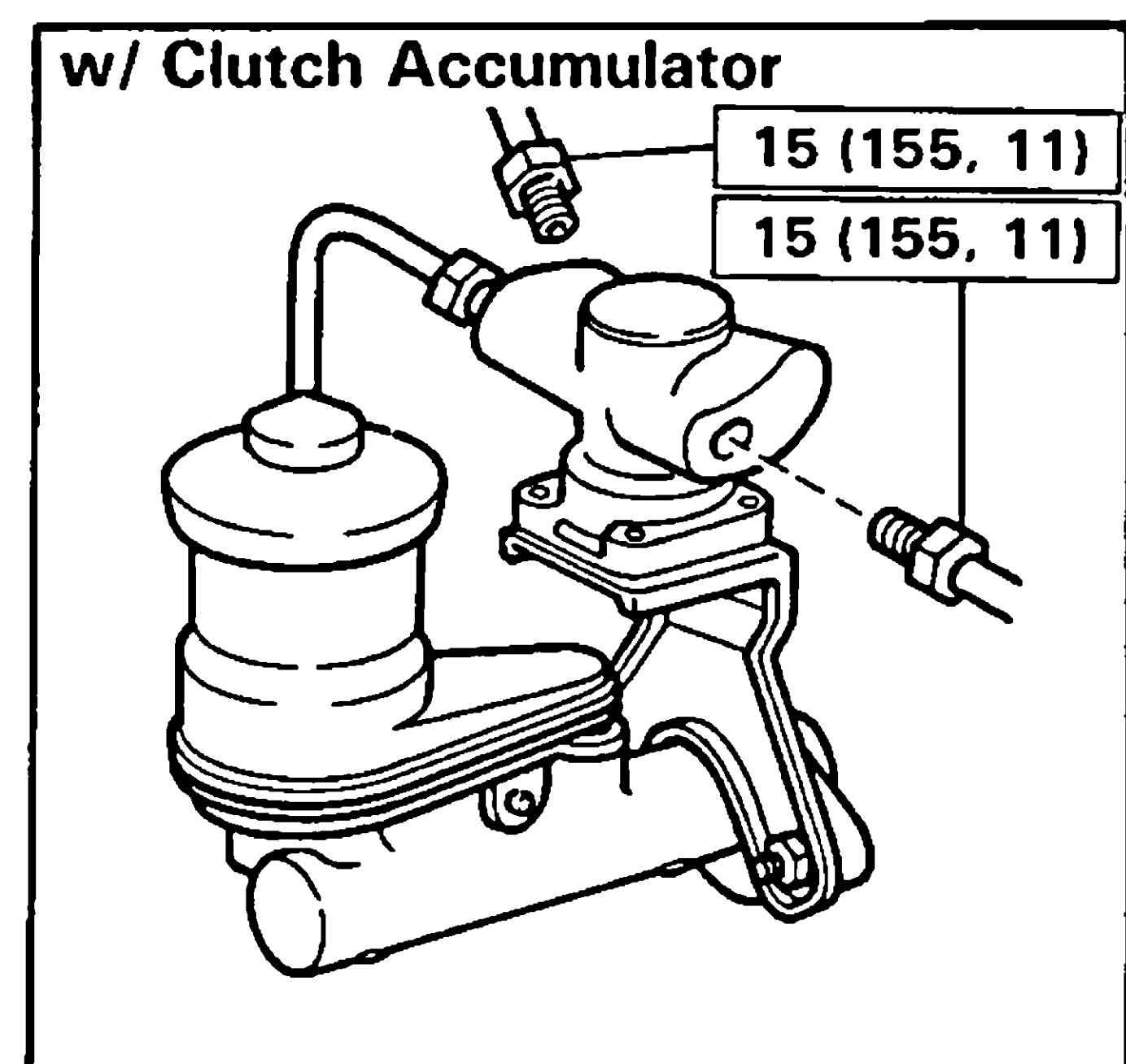
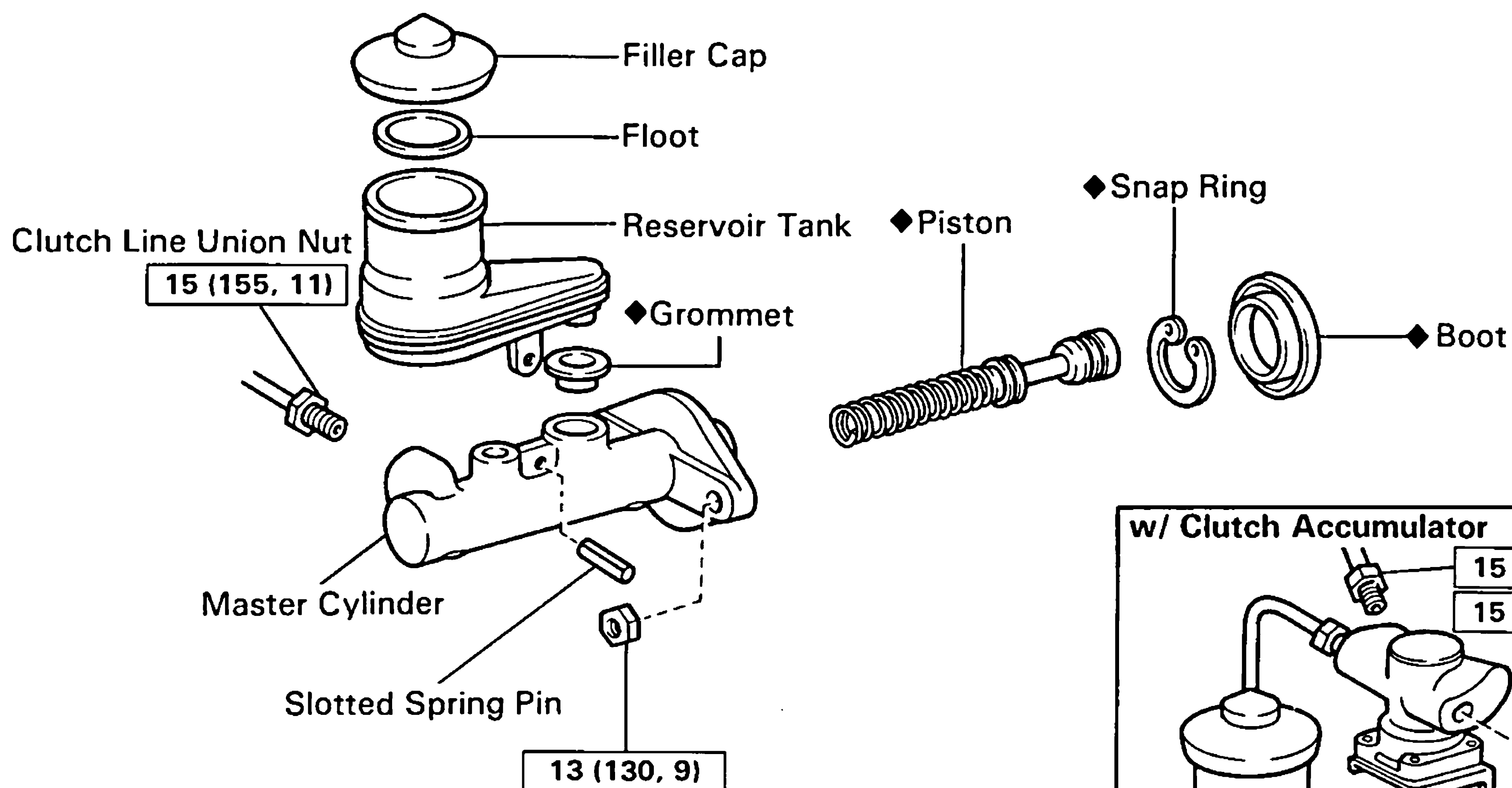
3. CONNECT PUSH ROD AND INSTALL PIN

Install the clip in the push rod pin.

4. BLEED SYSTEM AND ADJUST CLUTCH PEDAL (See page CL-5)

(w/ Clutch Booster)

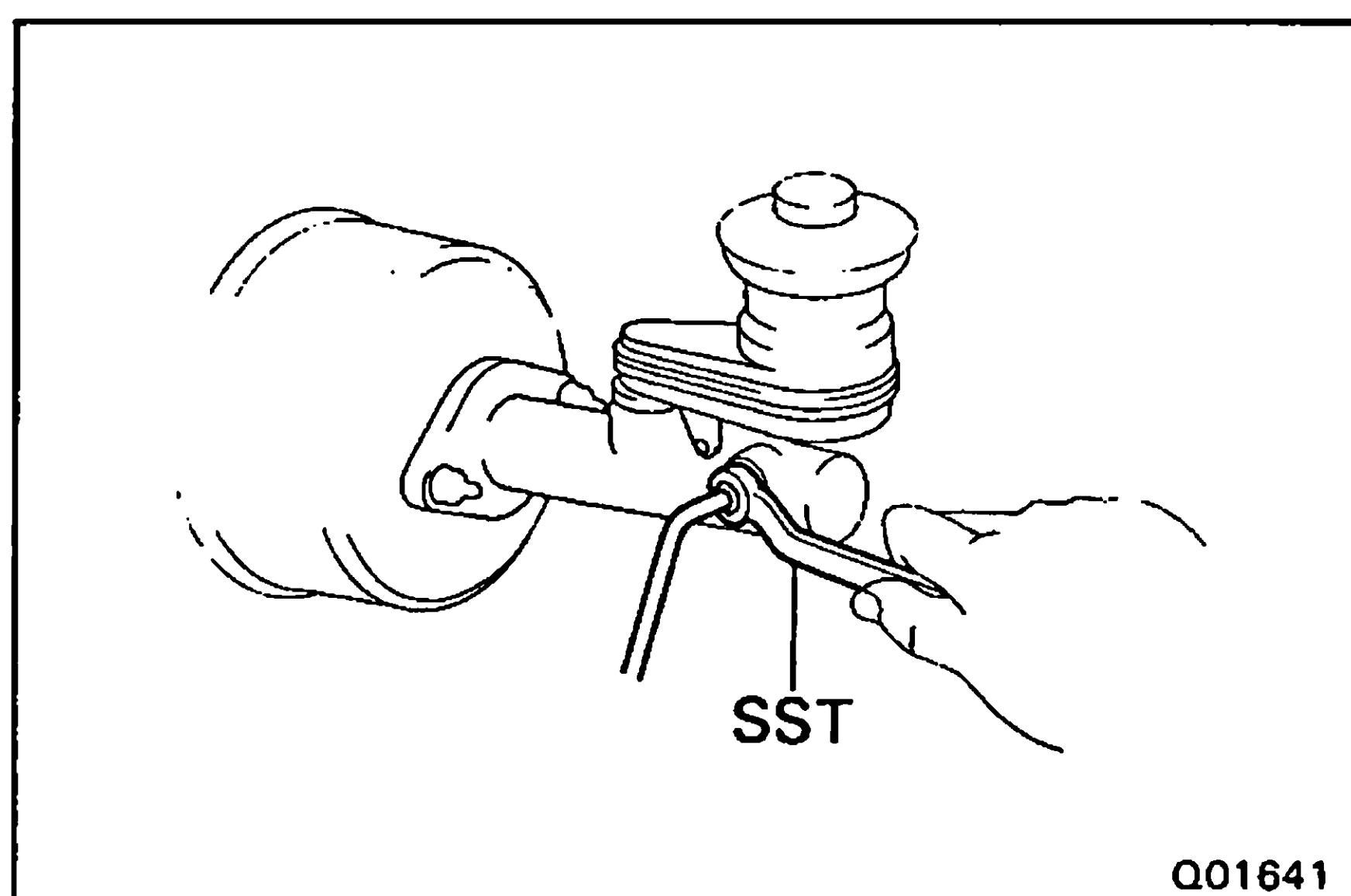
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

Q01769



REMOVAL AND INSTALLATION OF CLUTCH MASTER CYLINDER

(MAIN POINT OF REMOVAL AND INSTALLATION)

REMOVE MASTER CYLINDER

- Draw out fluid with syringe.
- Using SST, disconnect the clutch tube.
SST 09751-36011
- (LHD Models)
Remove two nuts.
(RHD Models)
Remove three nuts.
- Pull out the master cylinder.

DISASSEMBLY OF MASTER CYLINDER

1. REMOVE RESERVOIR TANK

- Using a pin punch and a hammer, drive out the slotted spring pin.
- Remove reservoir tank and grommet.

2. REMOVE PISTON

INSPECTION OF MASTER CYLINDER

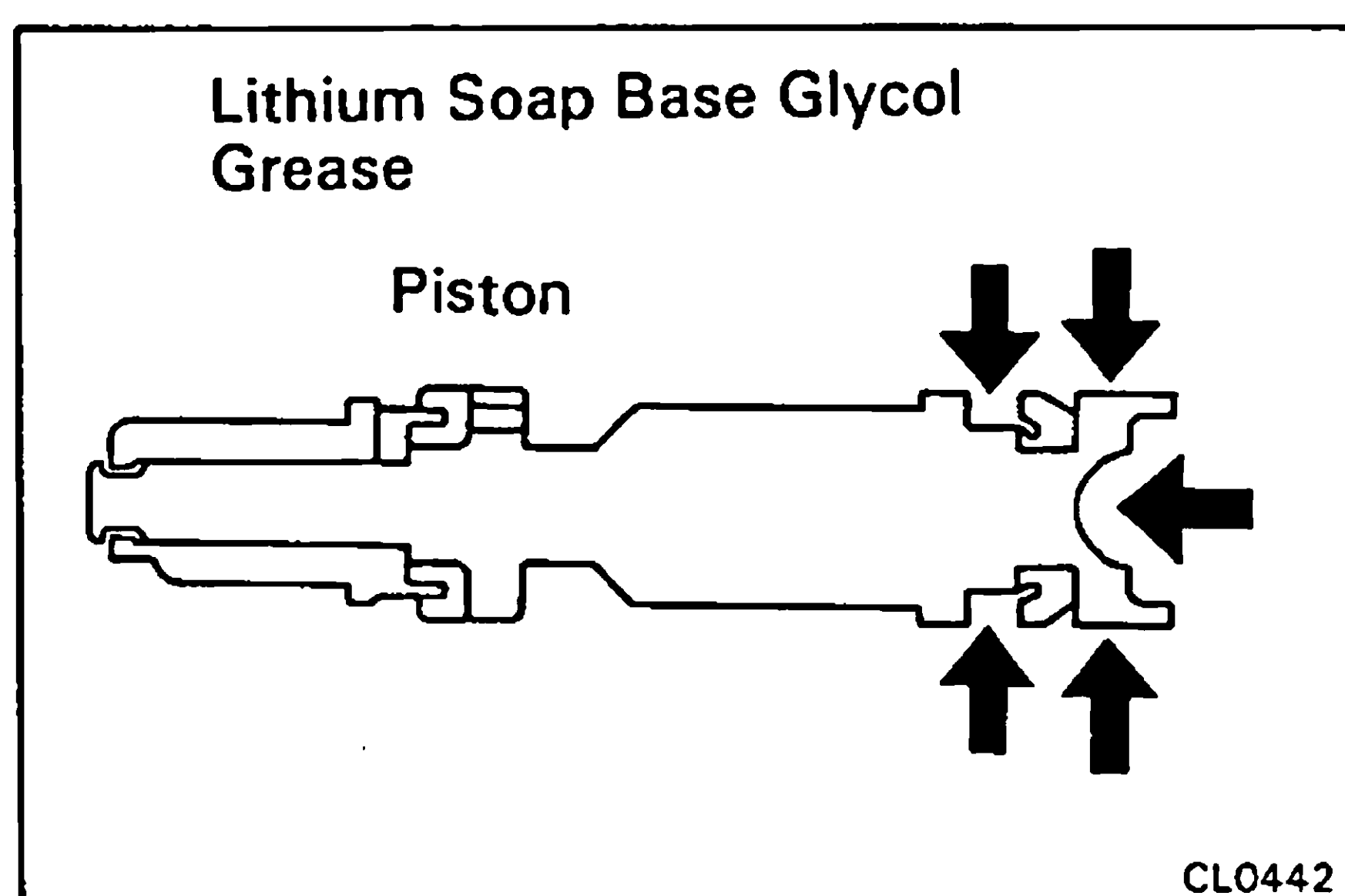
HINT: Clean the disassembled parts with compressed air.

1. INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION

If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.



ASSEMBLY OF MASTER CYLINDER

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE AS SHOWN

2. INSTALL PISTON INTO CYLINDER

3. INSTALL RESERVOIR TANK

- Install reservoir tank and new grommet.
- Using a pin punch and a hammer, drive in the slotted spring pin.

INSTALLATION OF MASTER CYLINDER

(See page CL-8)

1. ADJUST LENGTH OF CLUTCH BOOSTER PUSH ROD (See step 1 on page CL-16)

2. INSTALL MASTER CYLINDER WITH MOUNTING NUTS

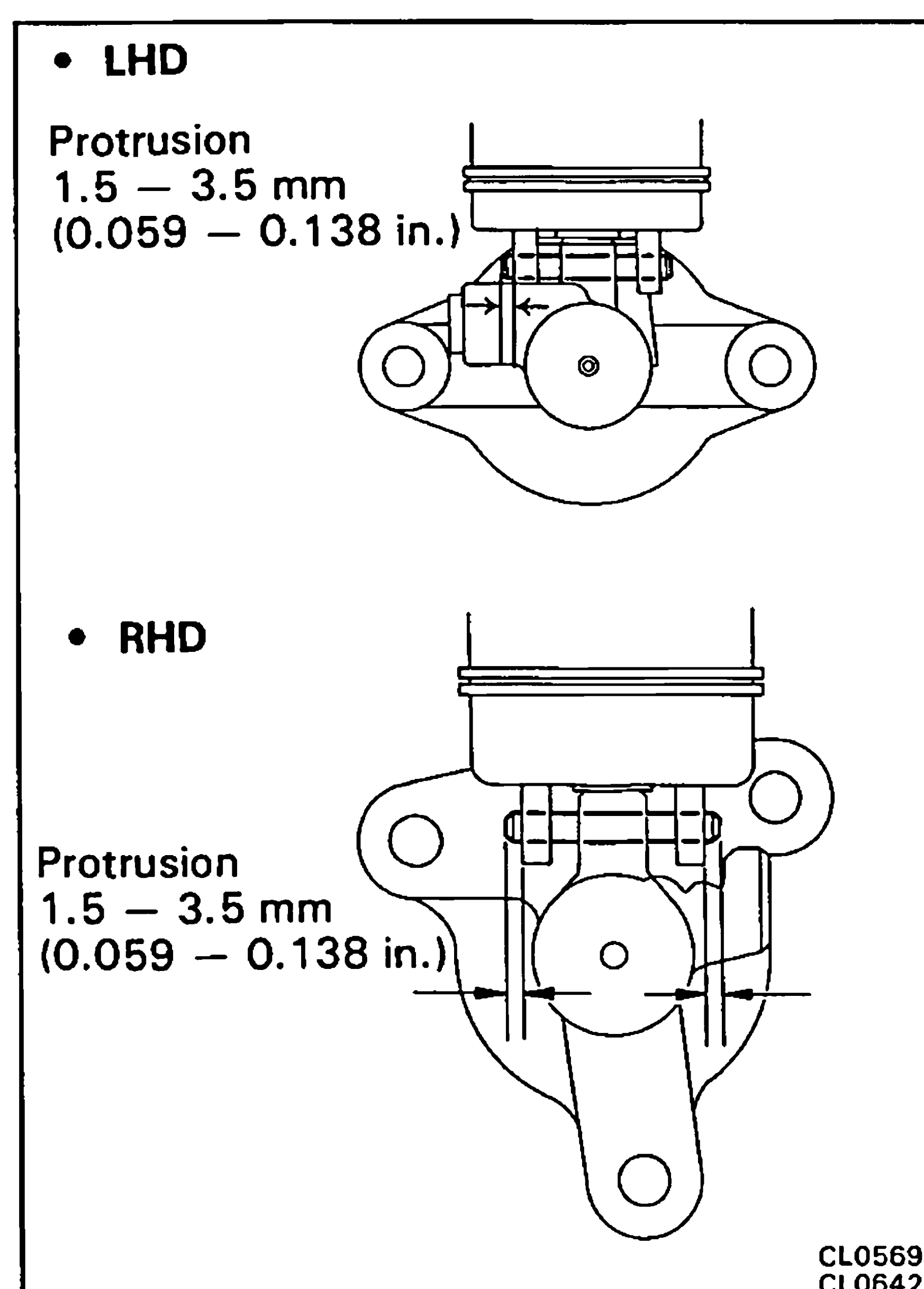
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

3. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

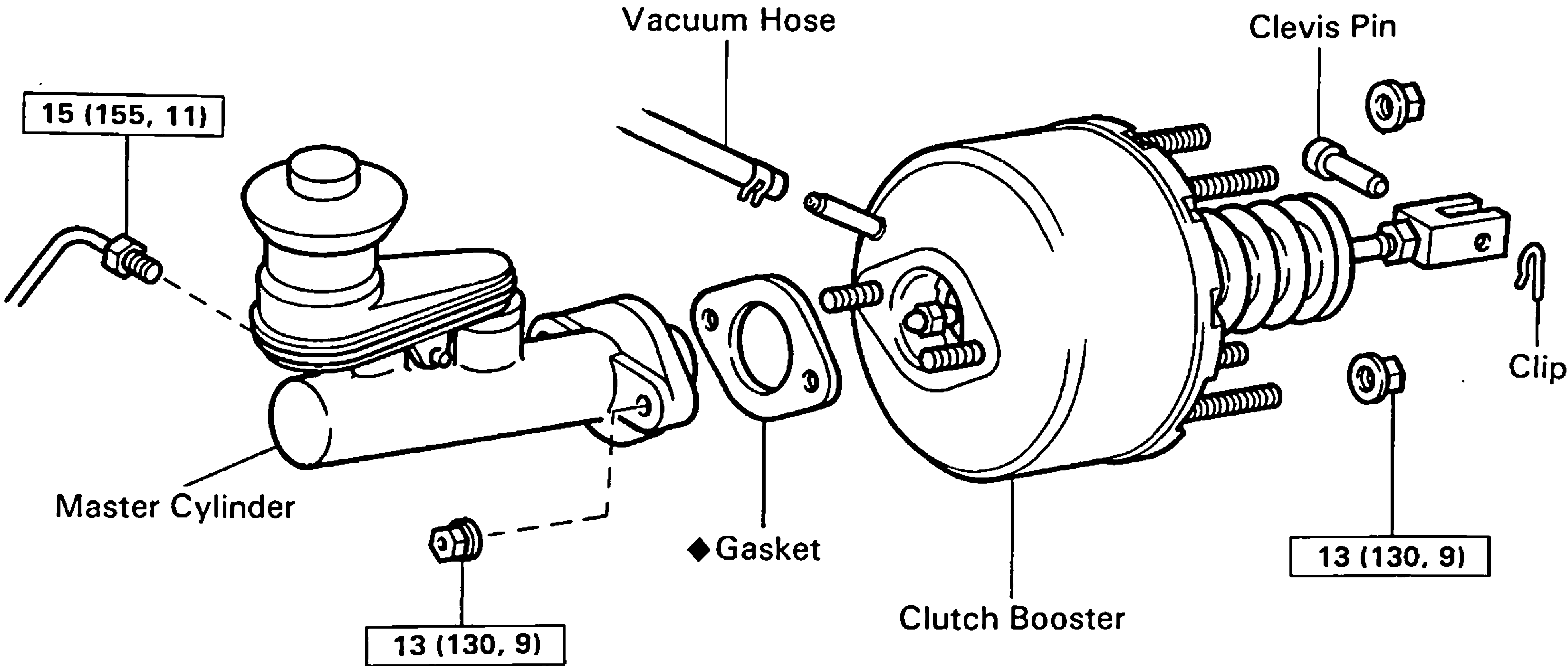
SST 09751-36011

4. BLEED SYSTEM AND ADJUST CLUTCH PEDAL (See page CL-5)

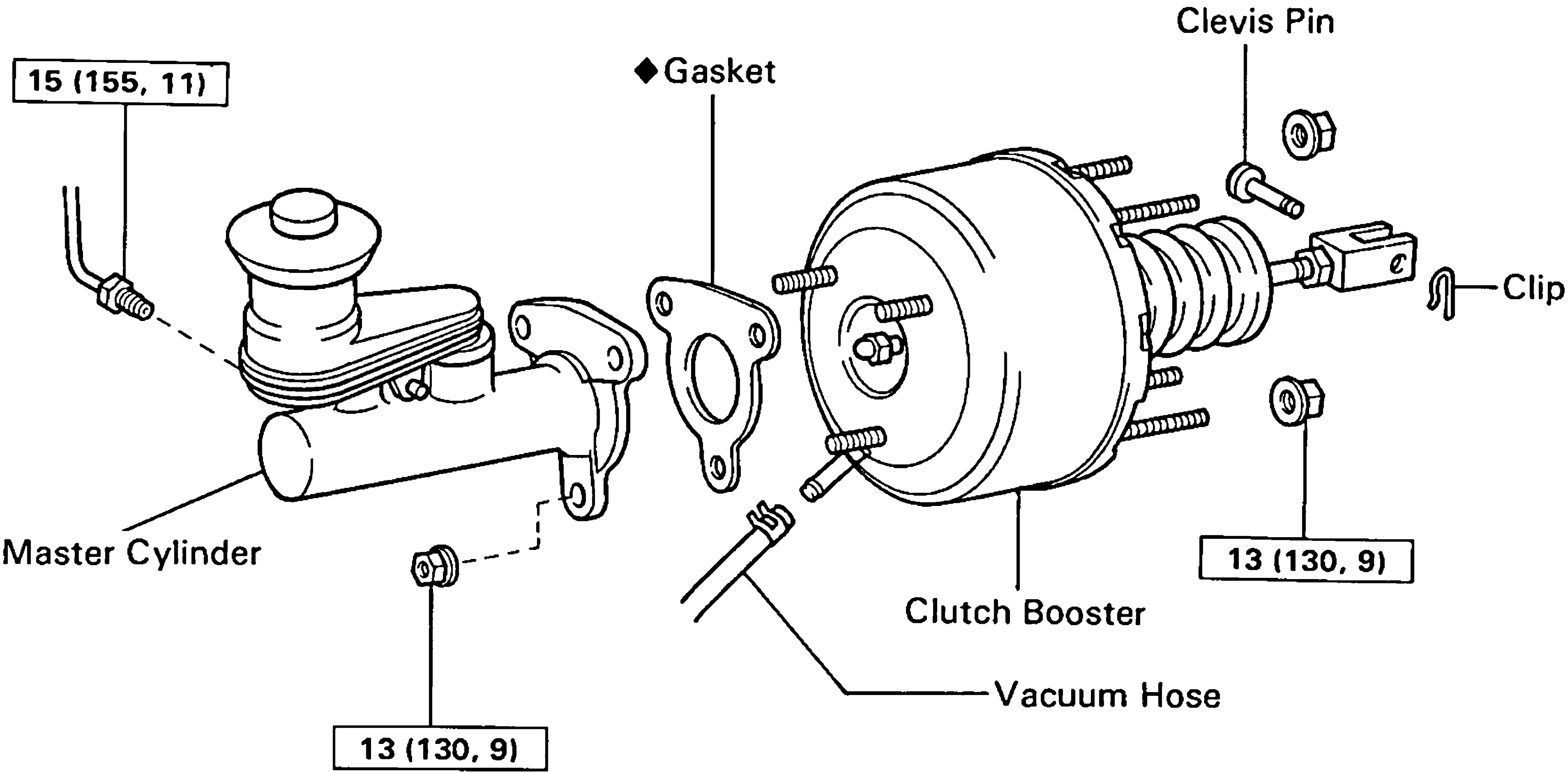


CLUTCH BOOSTER
REMOVAL OF CLUTCH BOOSTER

• LHD Models

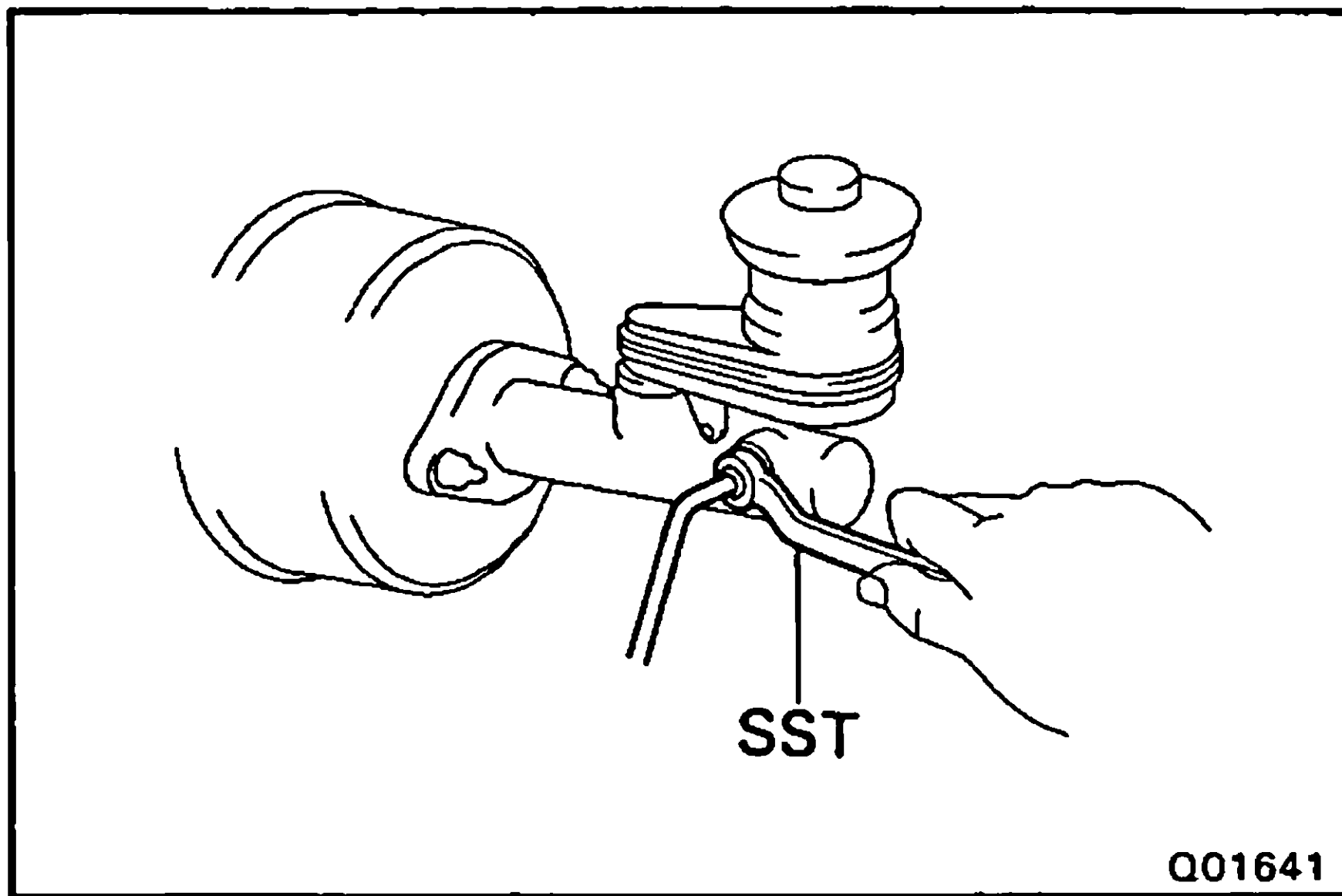


• RHD Models

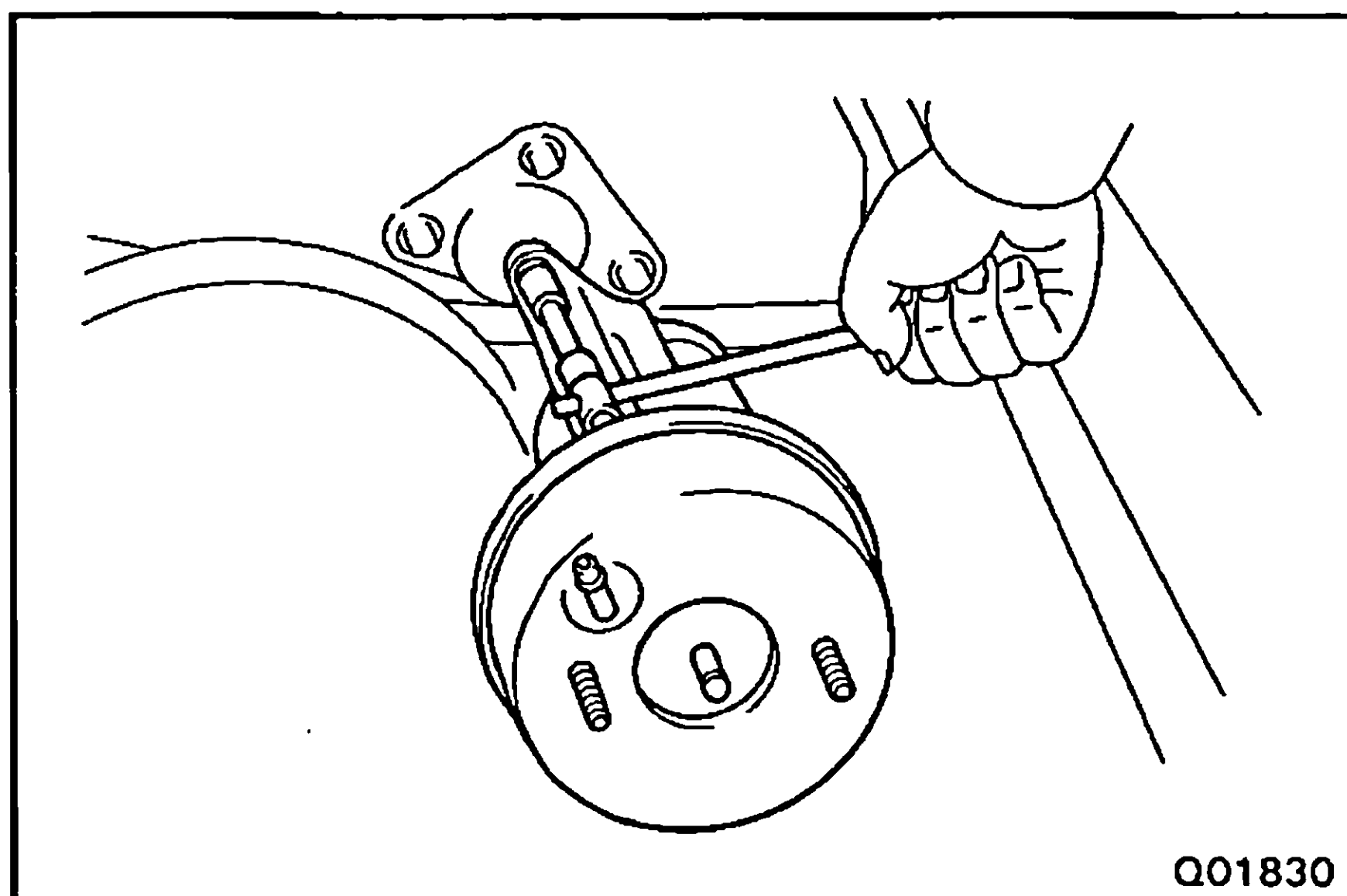


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

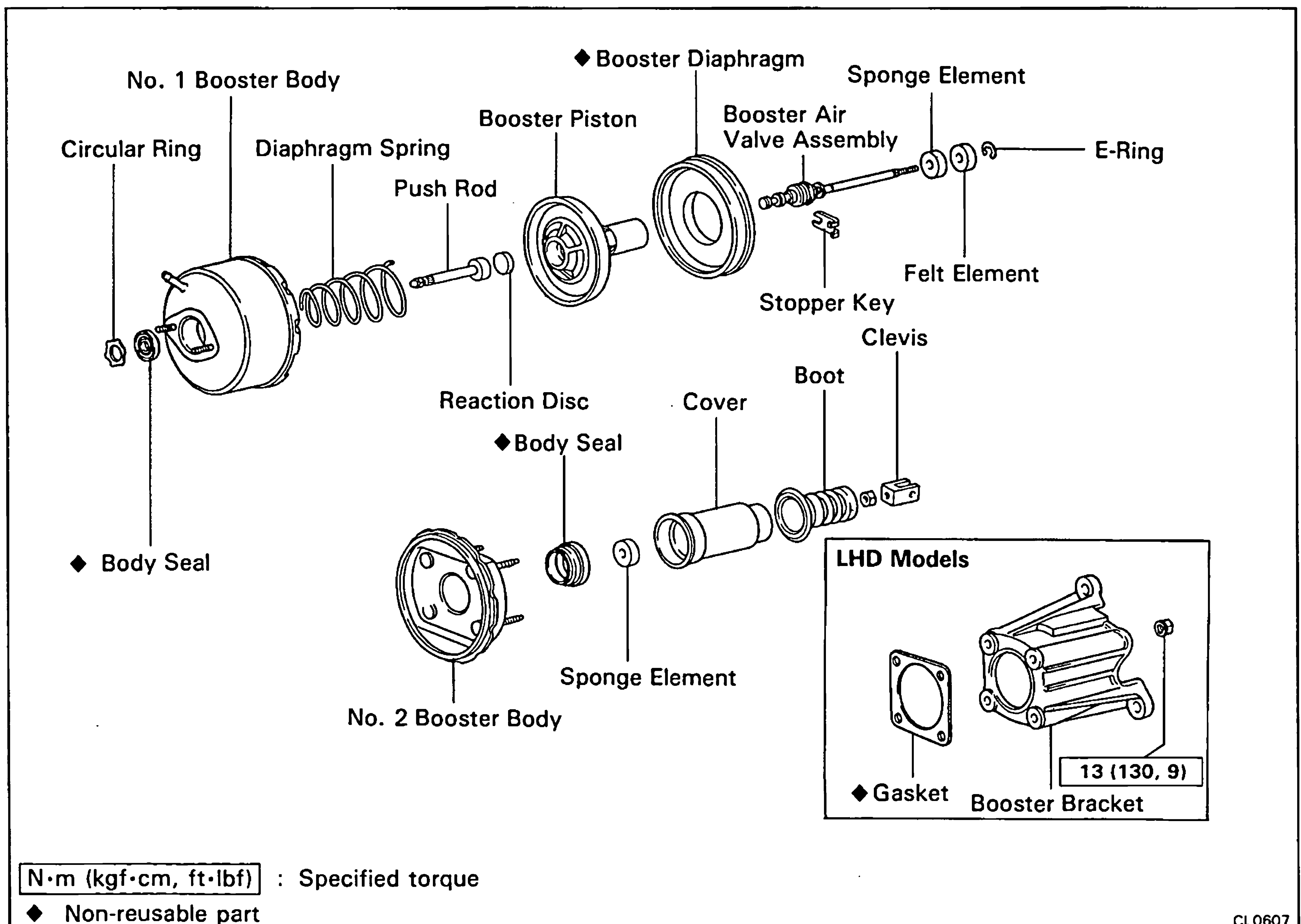


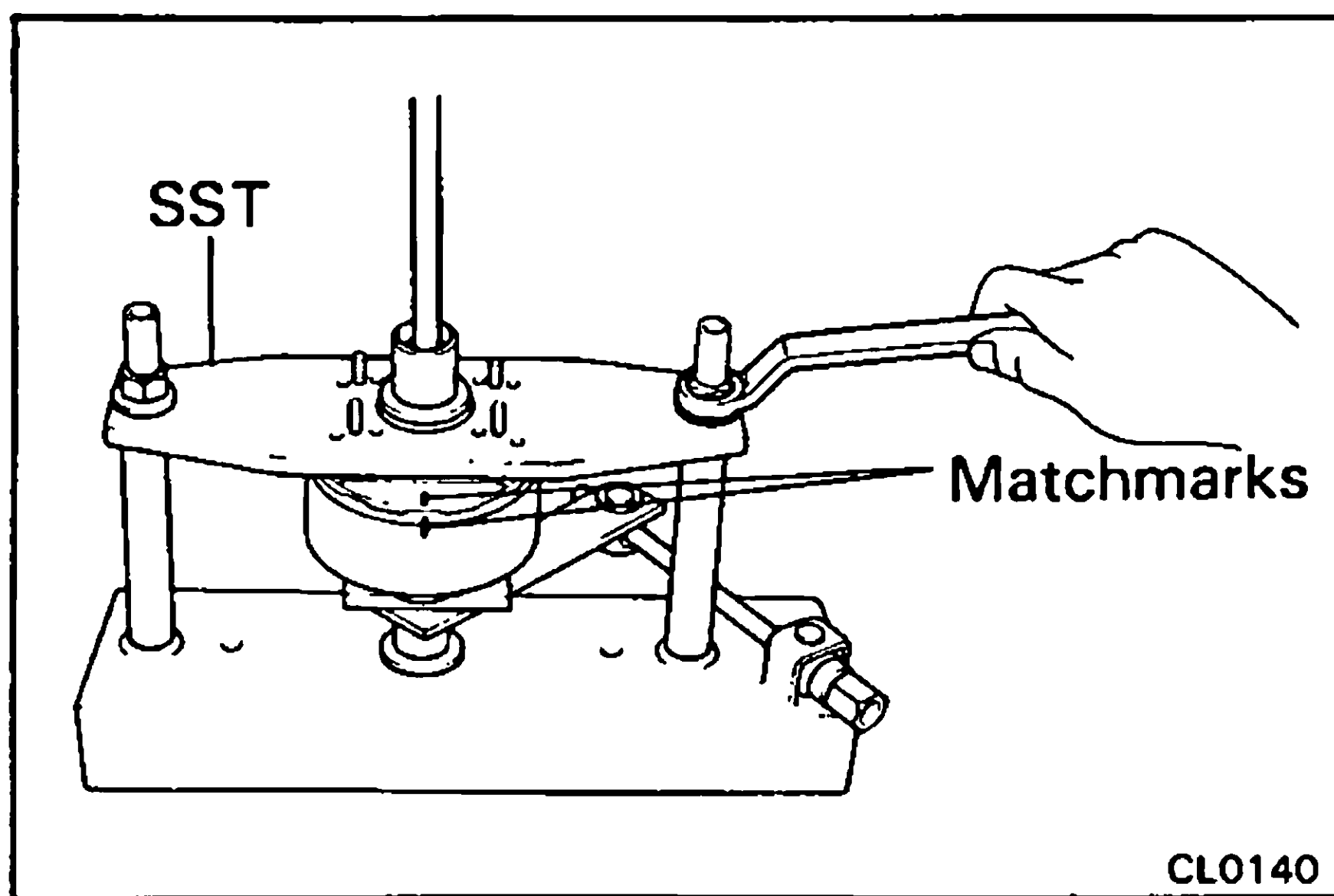
1. **REMOVE MASTER CYLINDER**
(See page CL-8)
2. **DISCONNECT VACUUM HOSE FROM CLUTCH BOOSTER**
3. **REMOVE CLUTCH PIPE AND VACUUM PIPE CLAMP BOLTS**



4. **DISCONNECT CLEVIS FROM CLUTCH PEDAL**
Remove the clip and clevis pin.
5. **(LHD Models)**
REMOVE CLUTCH BOOSTER WITH BOOSTER CYLINDER BRACKET
 - (a) Remove two nuts from room side.
 - (b) Remove one bolt and pull off the clutch booster with bracket.
6. **(RHD Models)**
REMOVE CLUTCH BOOSTER
Remove four bolts and the clutch booster.

COMPONENTS





DISASSEMBLY OF CLUTCH BOOSTER

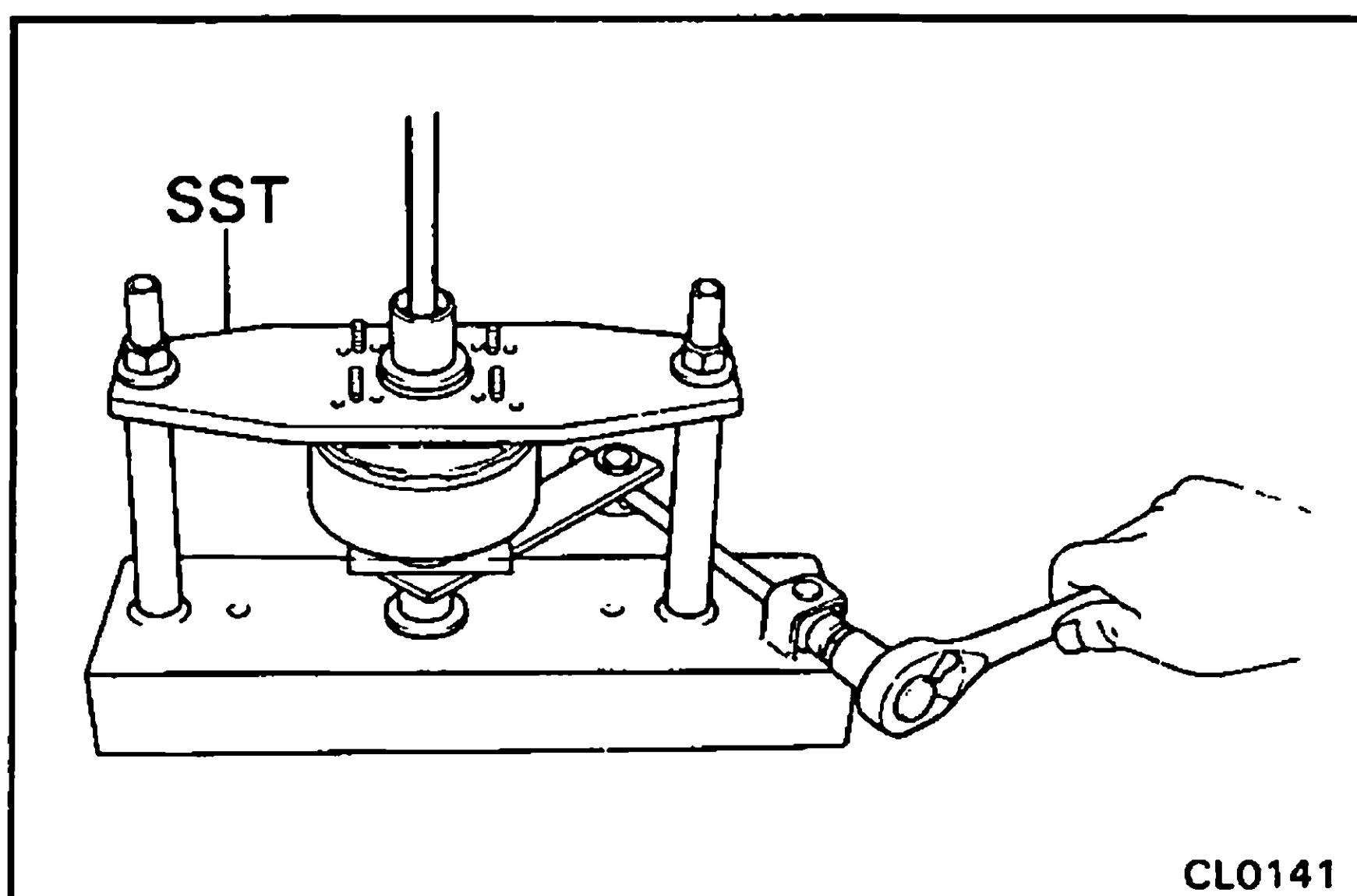
1. REMOVE CLEVIS

2. (LHD Models) REMOVE BOOSTER BRACKET

Remove four nuts and the booster bracket.

3. REMOVE PISTON COVER AND BOOT

- (a) Remove the piston cover and boot.
- (b) Remove the sponge element from the boot.



4. REMOVE SPONGE AND FELT ELEMENT

Using a screwdriver, remove the E-ring and sponge and felt element.

5. SEPARATE NO.1 AND NO.2 BOOSTER BODIES

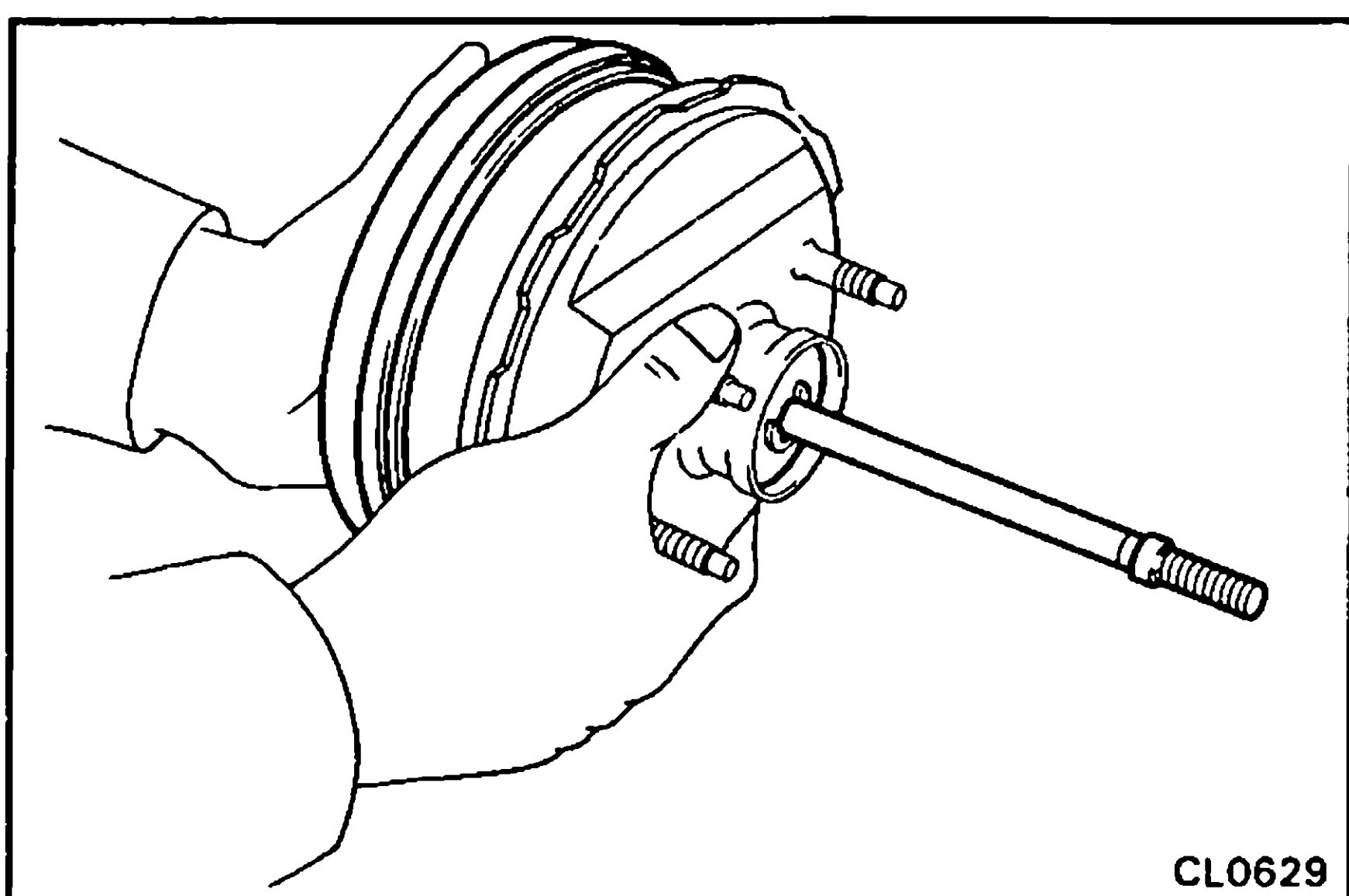
- (a) Put matchmarks on the No.1 and No.2 booster bodies.
- (b) Set the booster in SST.

SST 09753-00013

NOTICE: Be careful not to tighten the two nuts of the SST too tightly.

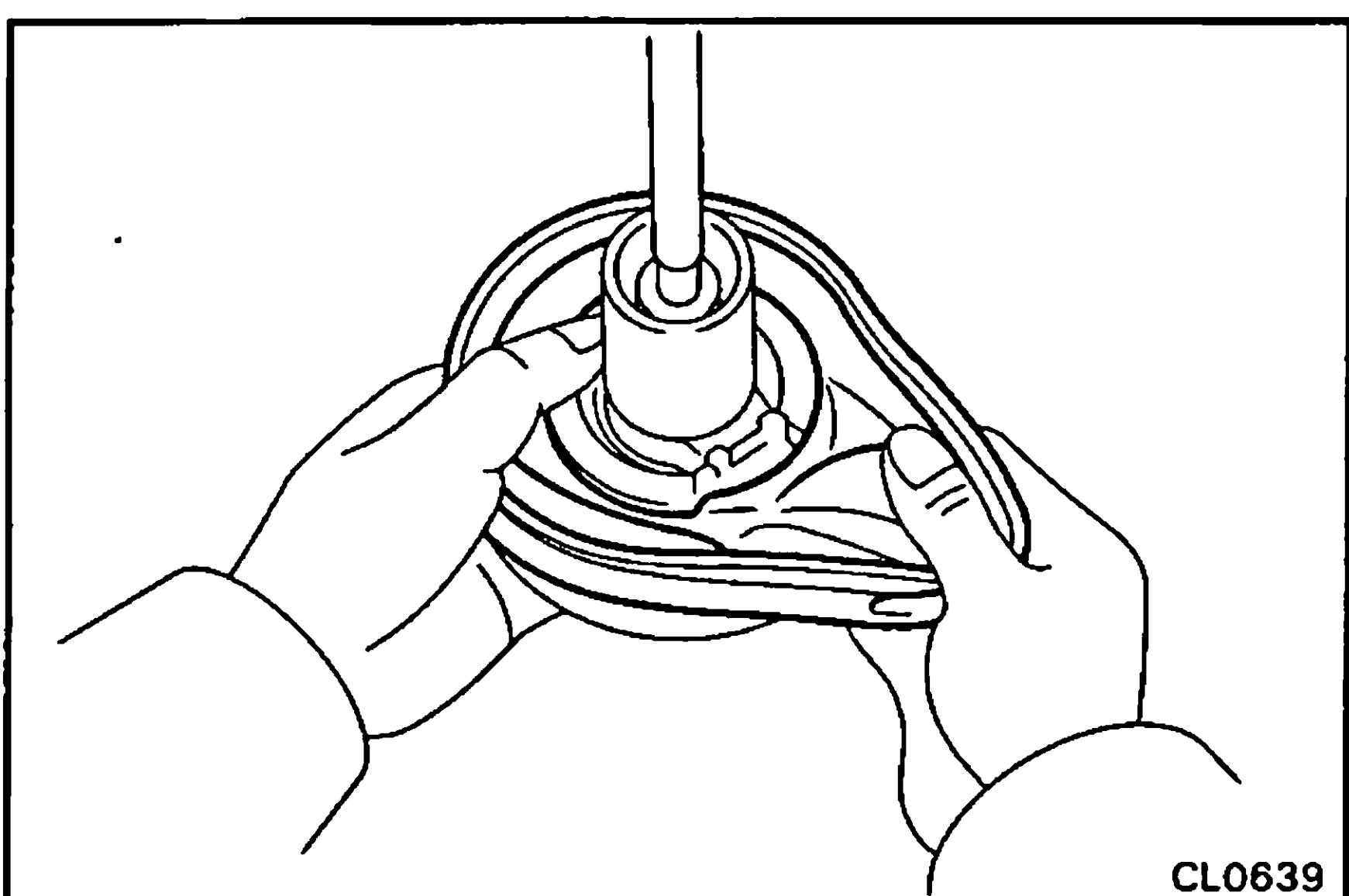
- (c) Turn the No.1 booster body clockwise, until the No.1 and No.2 booster bodies separate.

6. REMOVE BOOSTER PISTON ASSEMBLY FROM NO.2 BOOSTER BODY



7. REMOVE BOOSTER DIAPHRAGM FROM BOOSTER PISTON

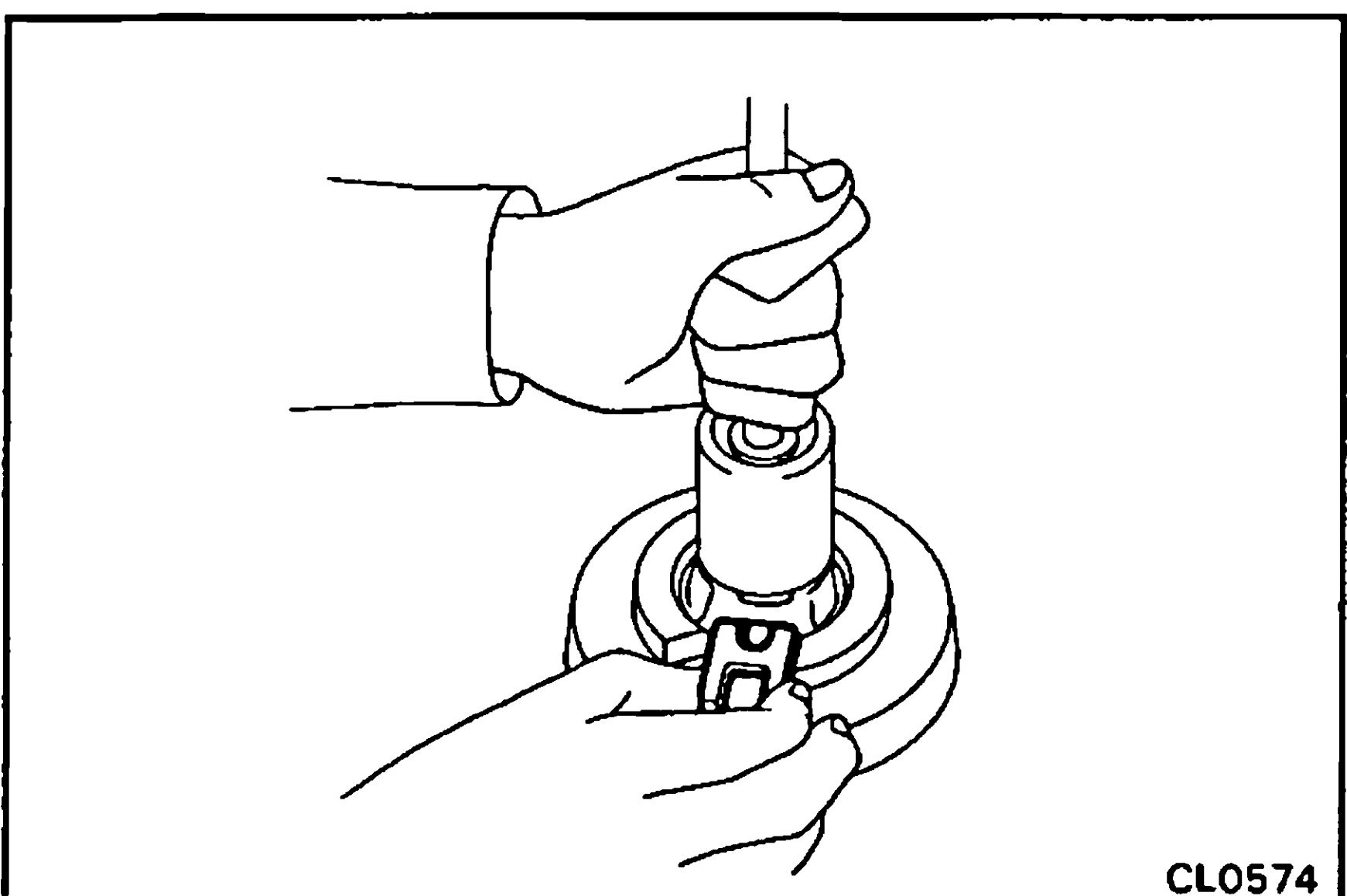
Pull off the diaphragm.

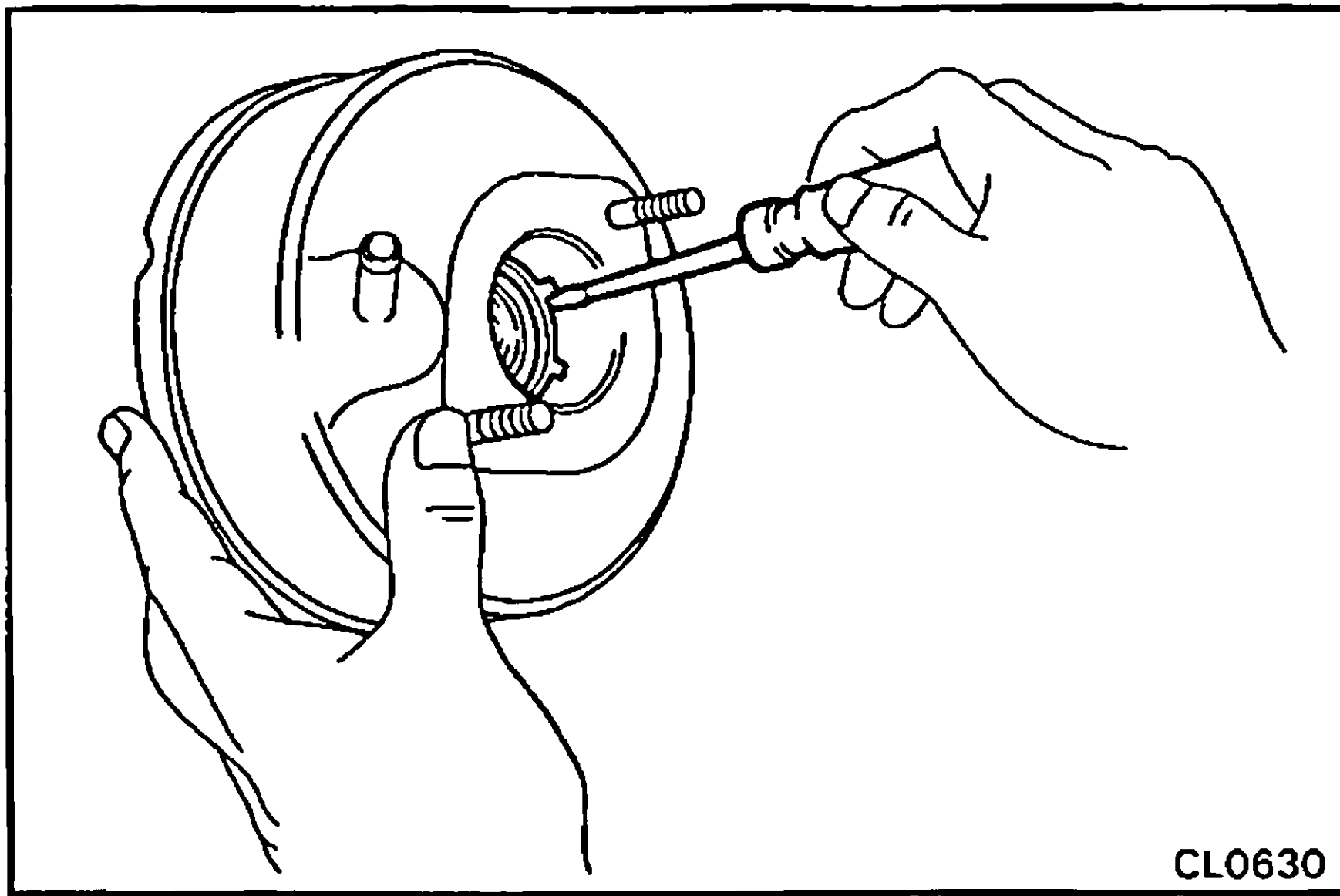


8. REMOVE BOOSTER AIR VALVE ASSEMBLY FROM BOOSTER PISTON

- (a) Push down the booster air valve in the booster piston and remove the stopper key.
- (b) Pull off the booster air valve assembly.

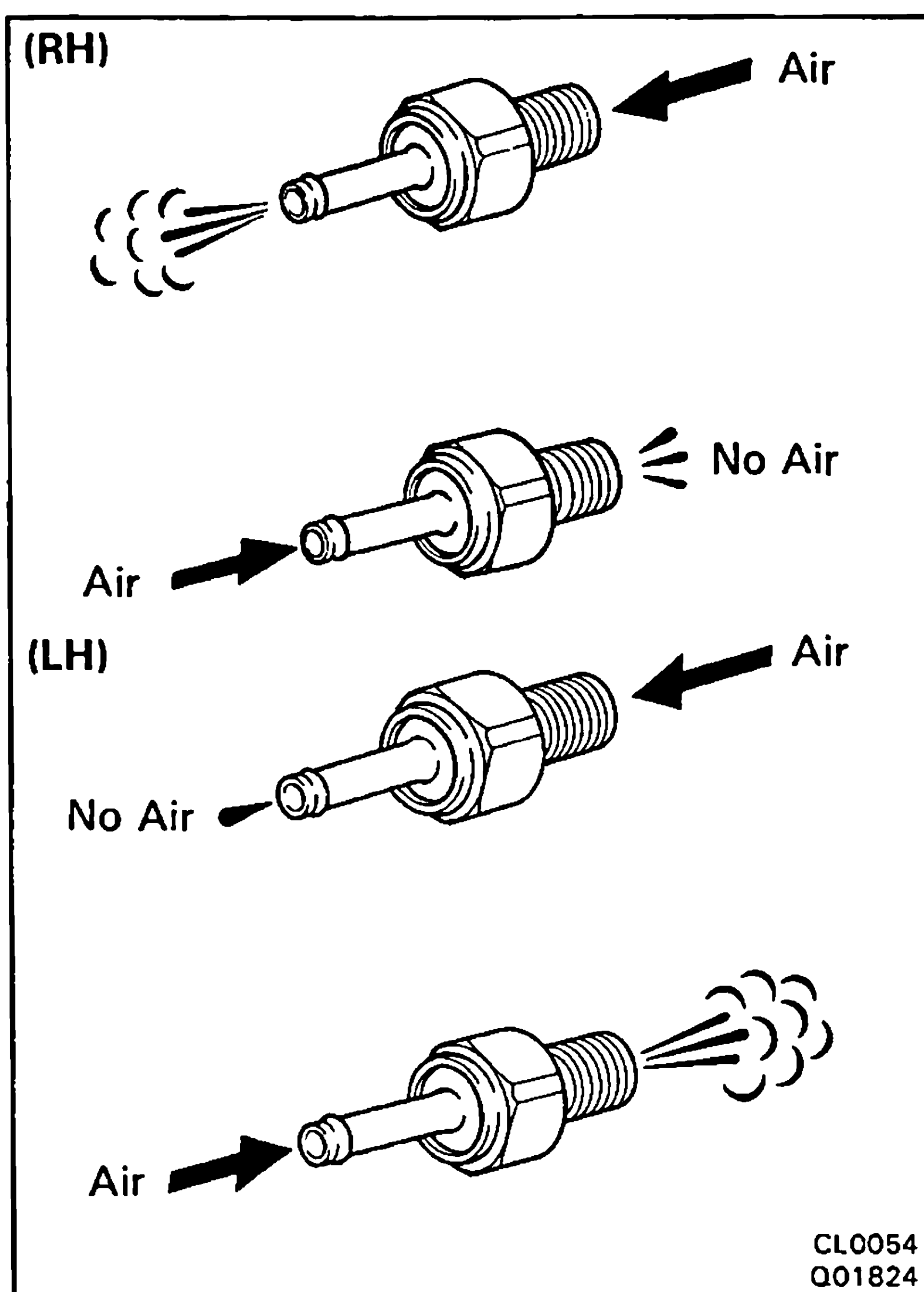
9. REMOVE REACTION DISC FROM BOOSTER PISTON





10. REMOVE BODY SEAL FROM NO.1 BOOSTER BODY

Using a screwdriver, pry out the circular ring and remove the body seal.



INSPECTION AND REPLACEMENT OF CLUTCH BOOSTER

1. INSPECT CHECK VALVE OPERATION

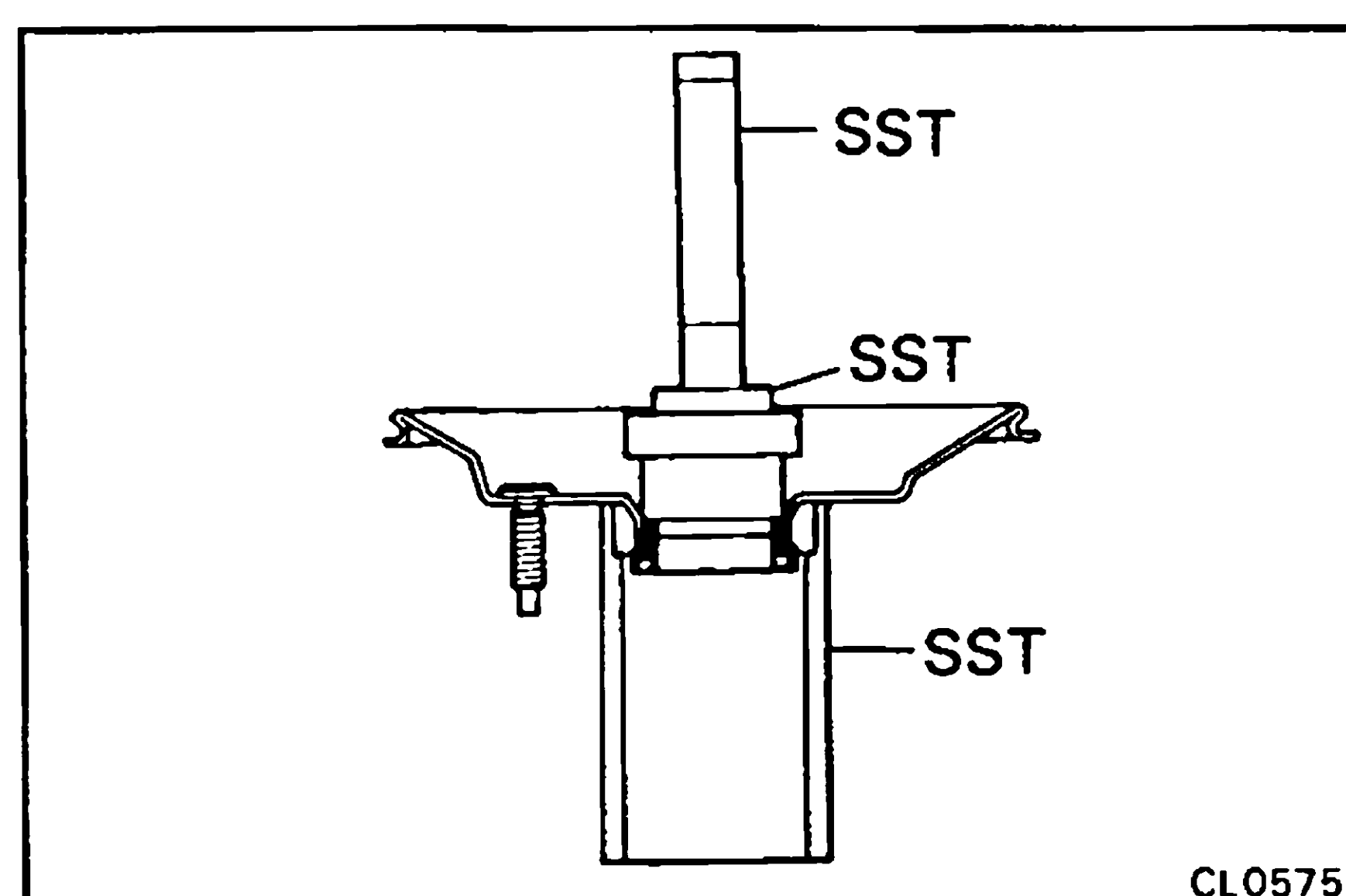
- Check that air flows from the vacuum tank side to the vacuum hose side.
- Check that air does not flow the vacuum hose side to the vacuum tank side.

2. IF NECESSARY, REPLACE BODY SEAL FOR NO.2 BOOSTER BODY

- Using SST, remove the body sealer.

SST 09630-00012, 09631-00060, 09753-30020, 09612-30012

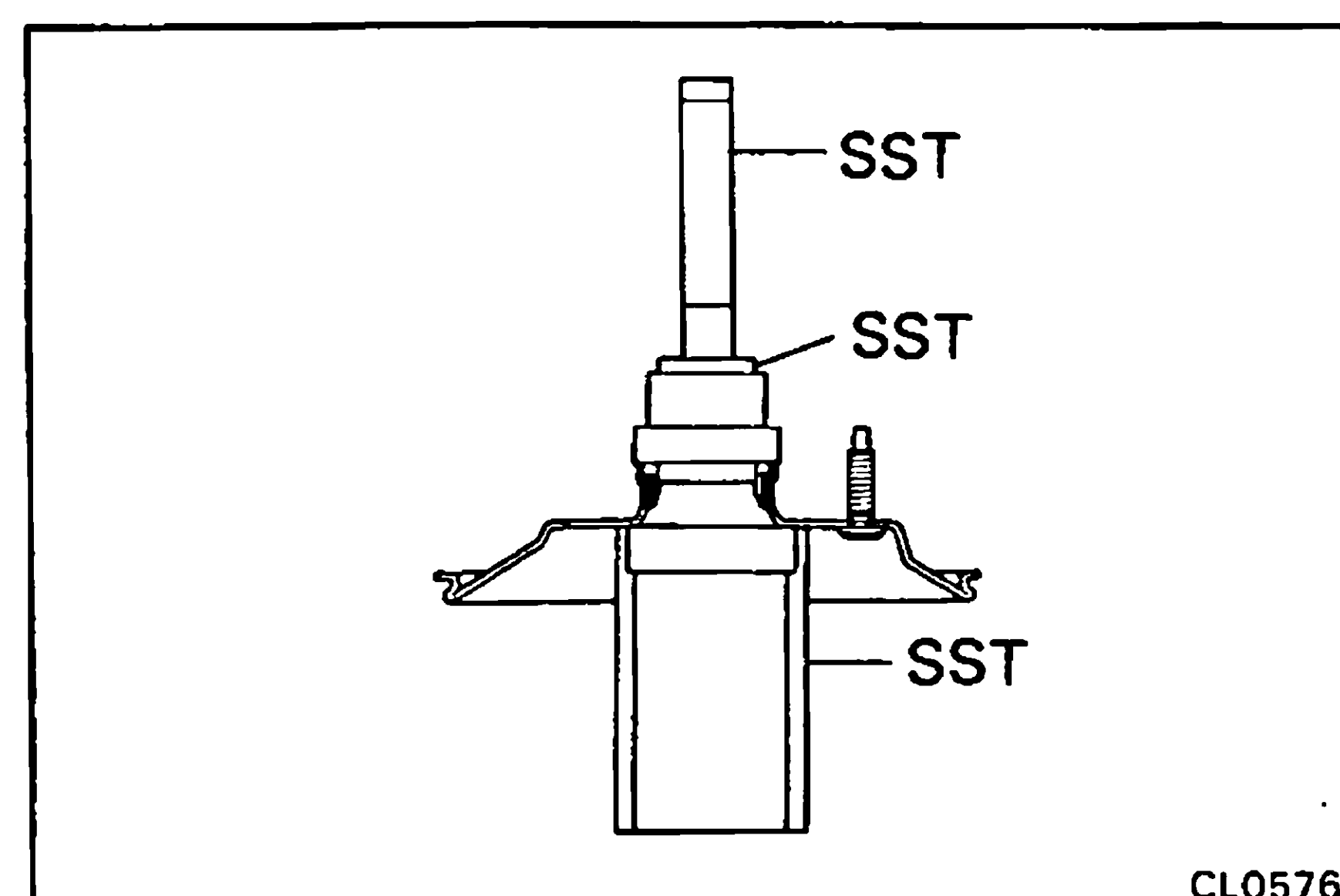
HINT: Support the No.2 booster body using SST cylinder base only.



- Using SST, drive in the body sealer.

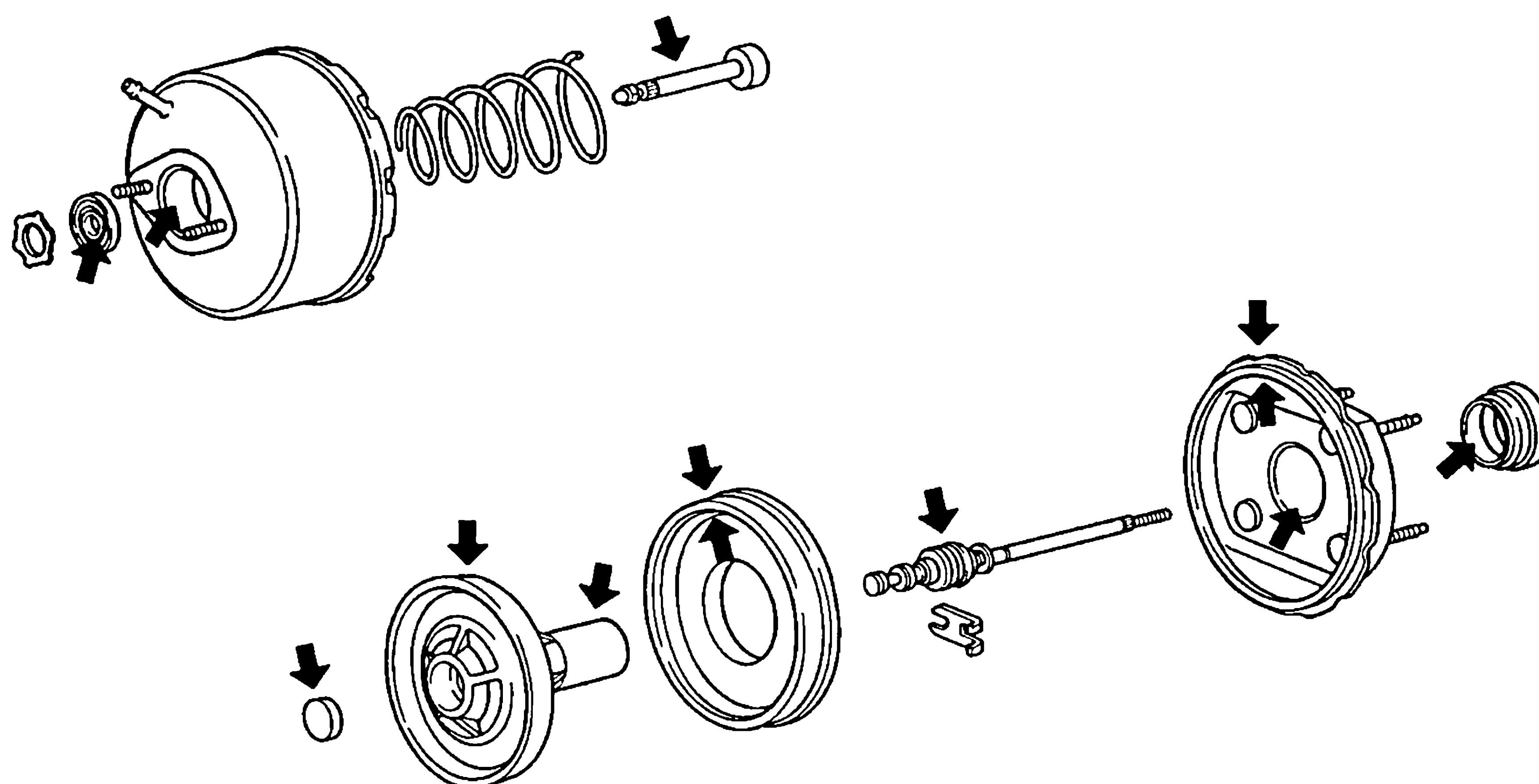
SST 09630-00012, 09753-30020, 09612-30012

HINT: Support the No.2 booster body using SST cylinder base only.



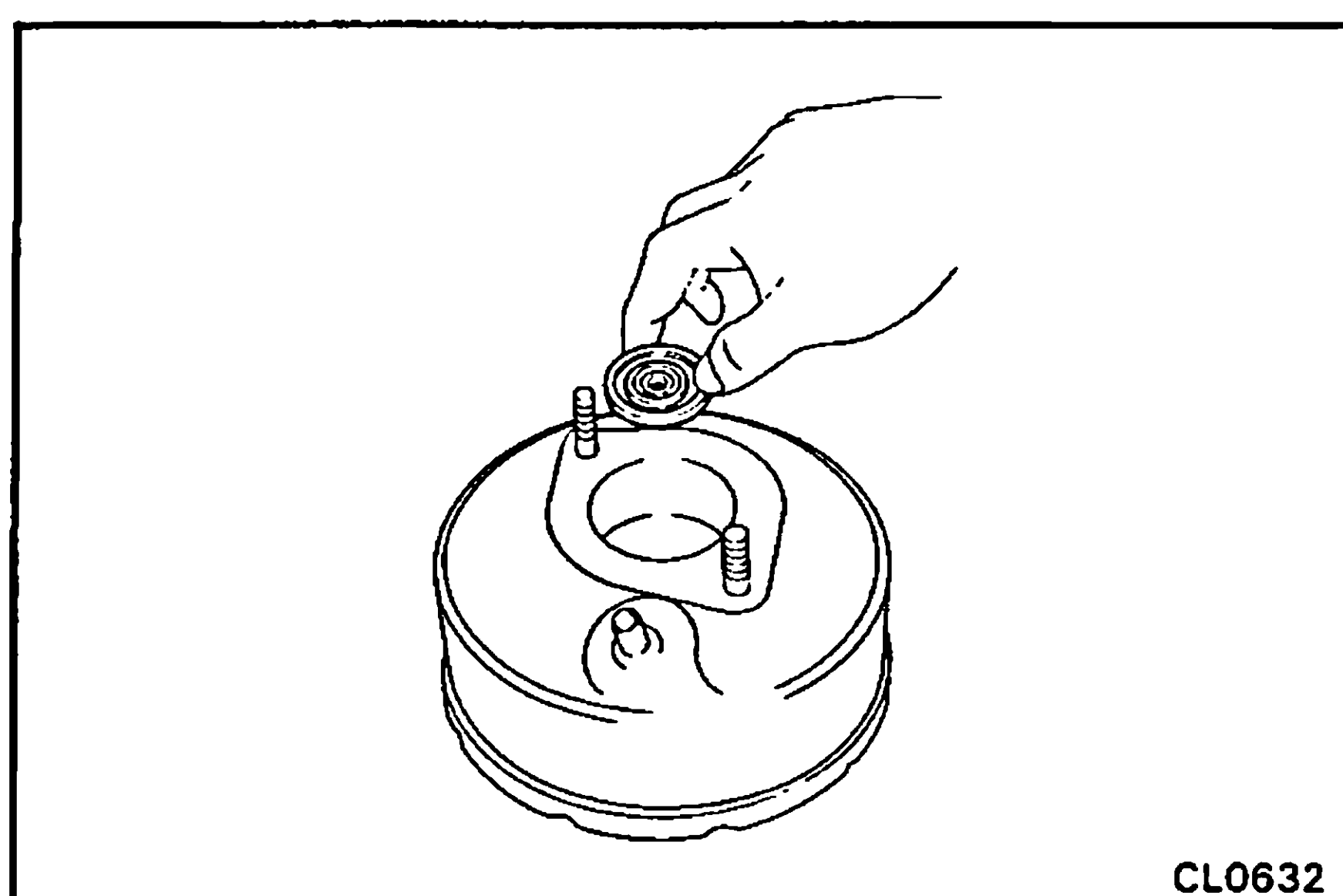
ASSEMBLY OF CLUTCH BOOSTER

(See page CL-10)

1. APPLY SILICONE GREASE TO PARTS SHOWN BELOW

← : Silicone Grease

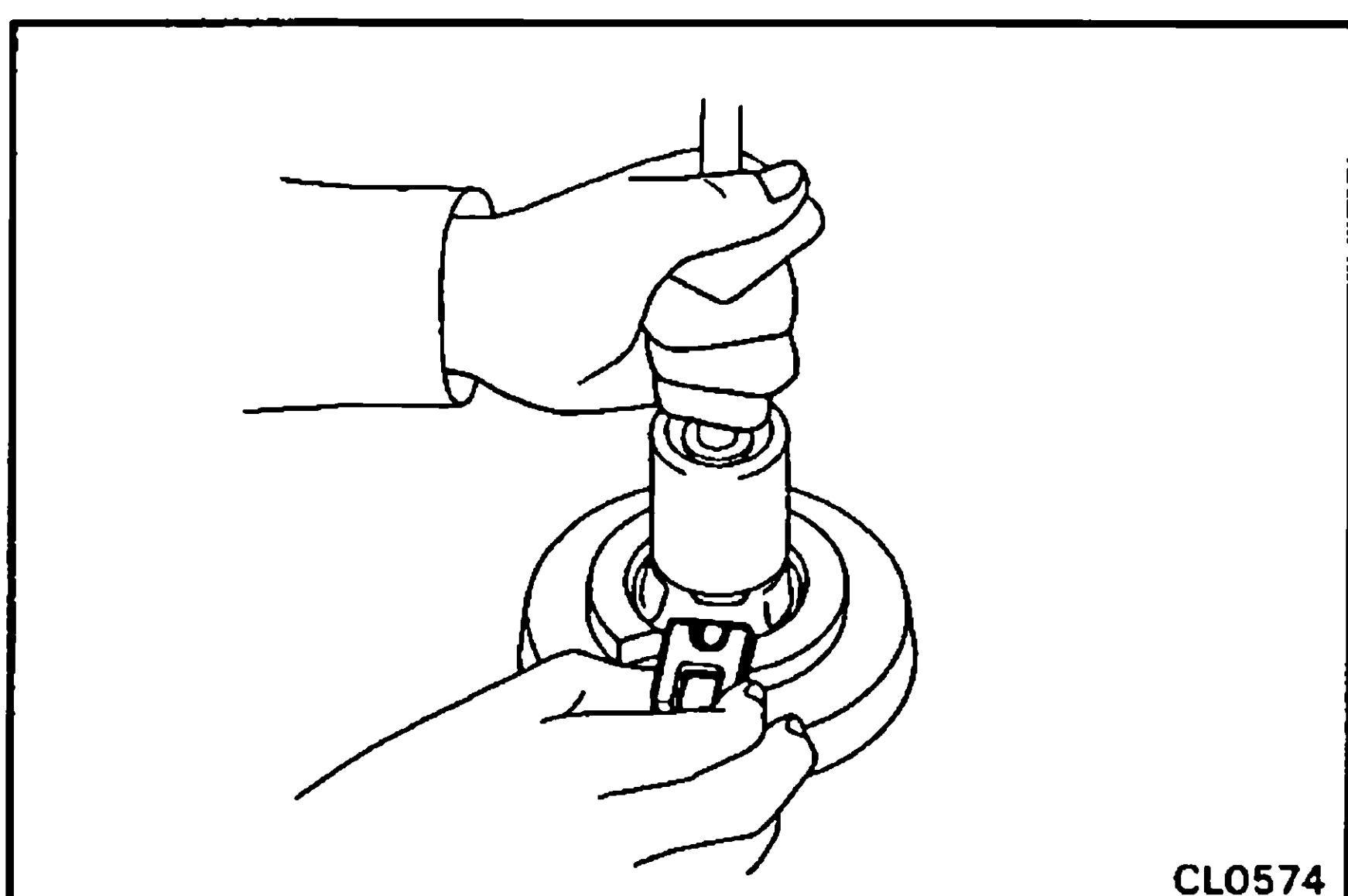
CL0139



CL0632

2. INSTALL BODY SEAL TO NO.1 BOOSTER BODY

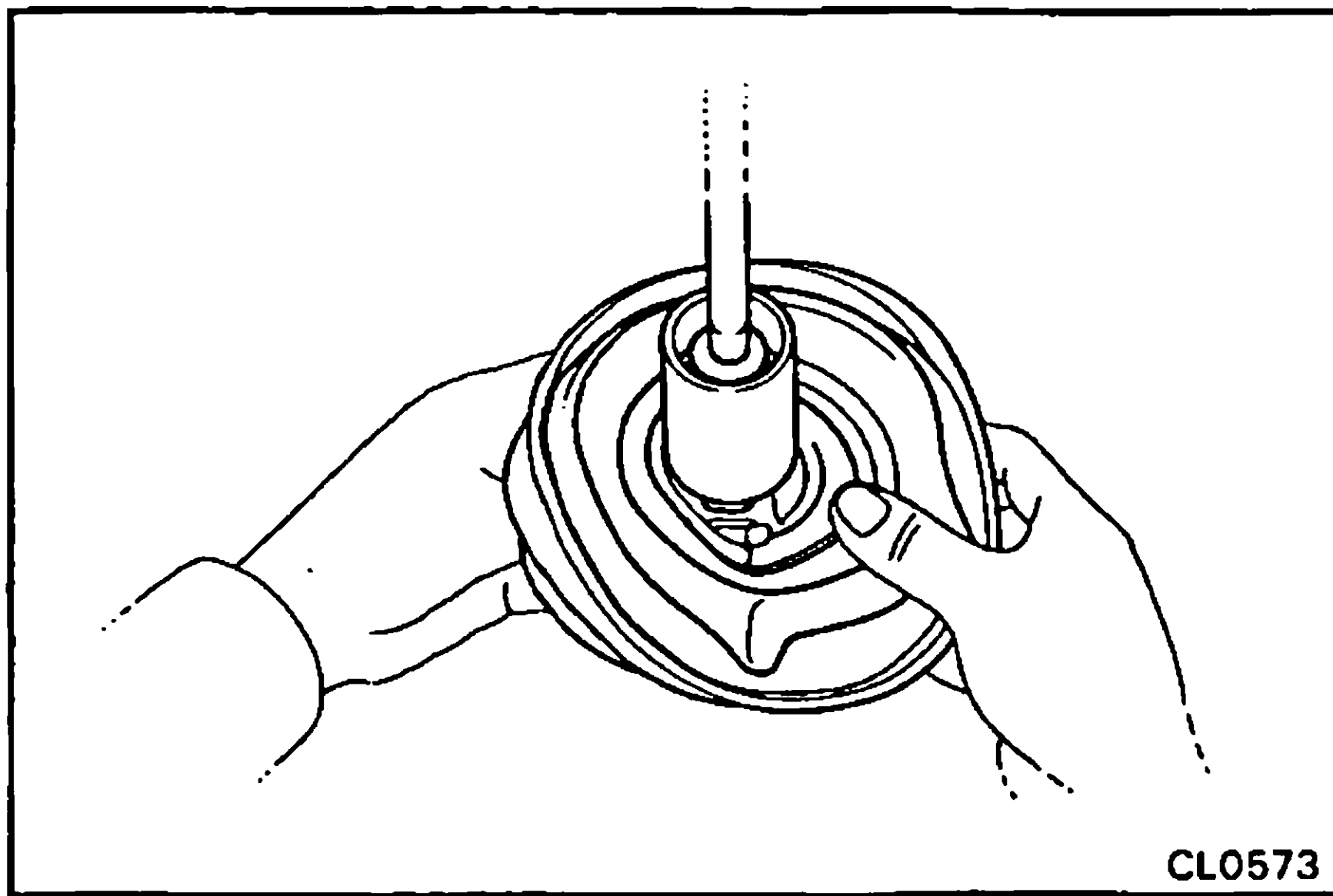
- (a) Place the body seal in position.
- (b) Secure the body seal with the circular ring.



CL0574

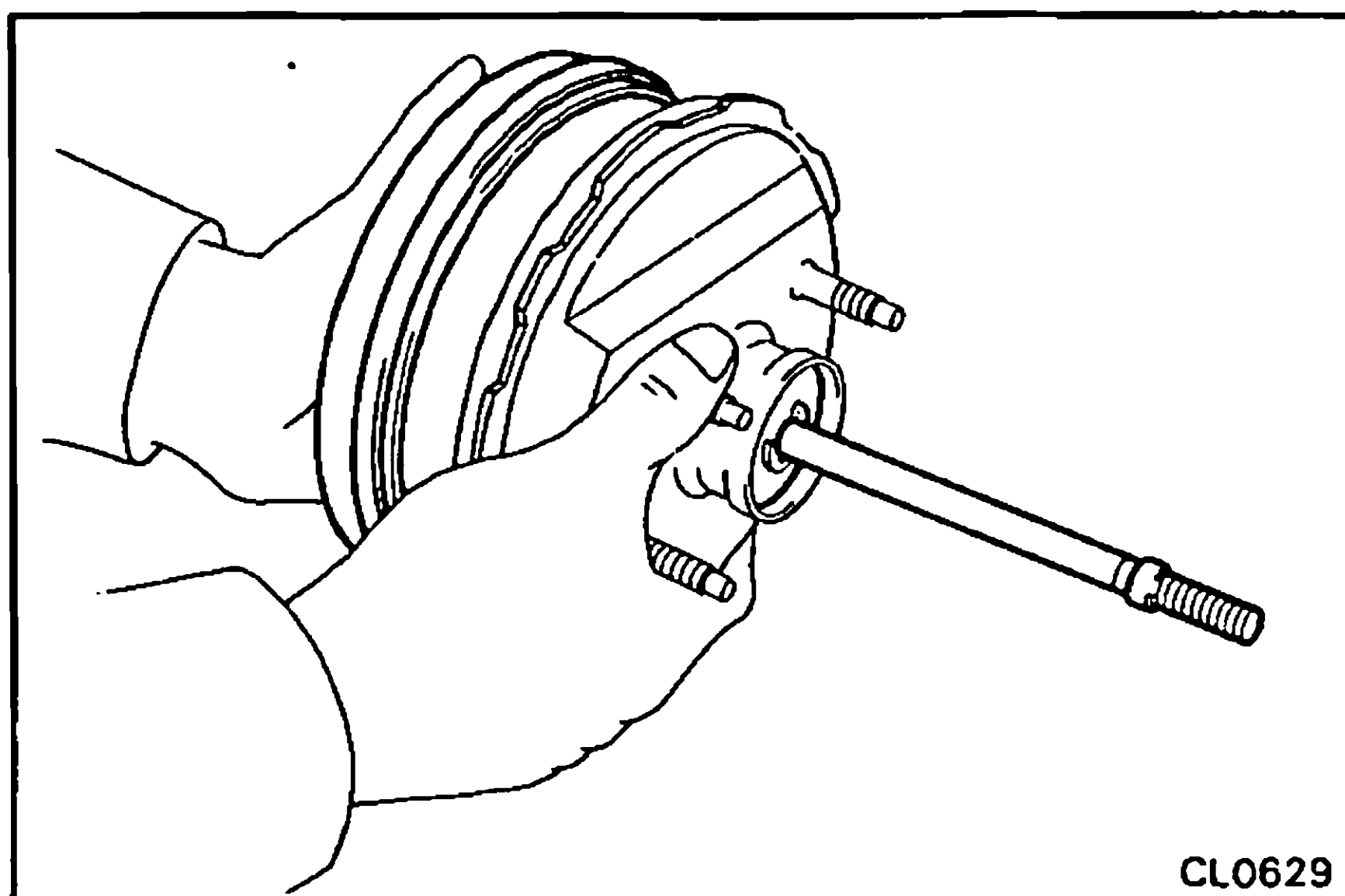
3. INSTALL BOOSTER AIR VALVE ASSEMBLY TO BOOSTER PISTON

- (a) Insert the booster air valve in the booster piston.
- (b) Push the booster air valve in the booster piston and install the stopper key.



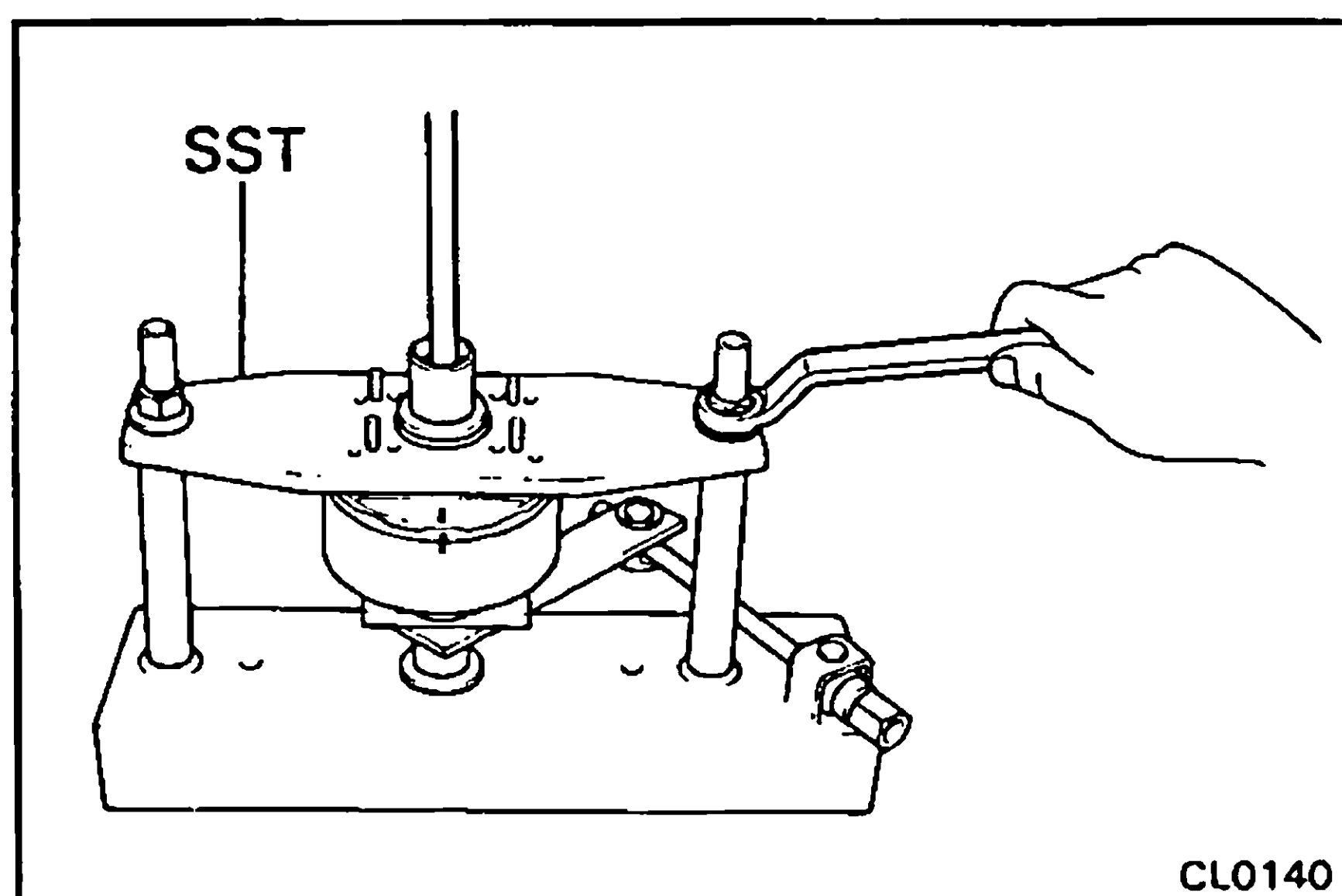
4. INSTALL DIAPHRAGM TO BOOSTER PISTON

Push in the head of the diaphragm.



5. INSTALL BOOSTER PISTON ASSEMBLY TO NO.2 BOOSTER BODY

6. INSTALL REACTION DISC TO BOOSTER PISTON



7. ASSEMBLY NO.1 AND NO.2 BOOSTER BODIES

(a) Place the No.1 booster on SST.

SST 09753-00013

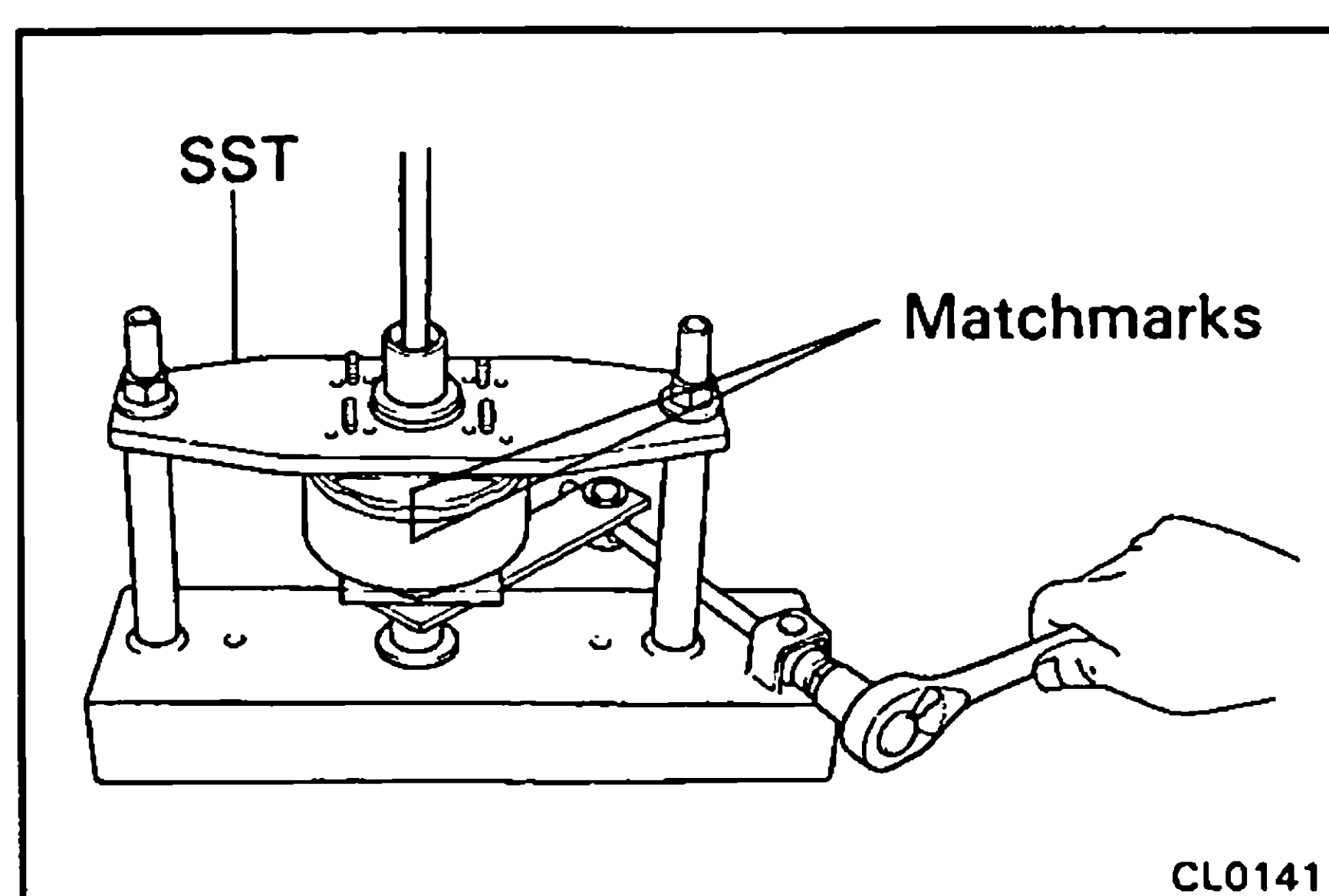
(b) Place the push rod, diaphragm spring and No.2 booster body in the No.1 booster body.

(c) Compress the diaphragm spring between the No.1 and No.2 booster bodies.

NOTICE: Be careful not to tighten the two nuts of the SST too tightly.

(d) Turn the No.1 booster body counterclockwise, until the matchmarks match.

HINT: If the No.1 booster body is too tight to be turned, apply more silicone grease on the diaphragm edge that contacts the No.1 and No.2 booster bodies.



8. INSTALL SPONGE AND FELT ELEMENT

(a) Install the sponge and felt element into the booster.

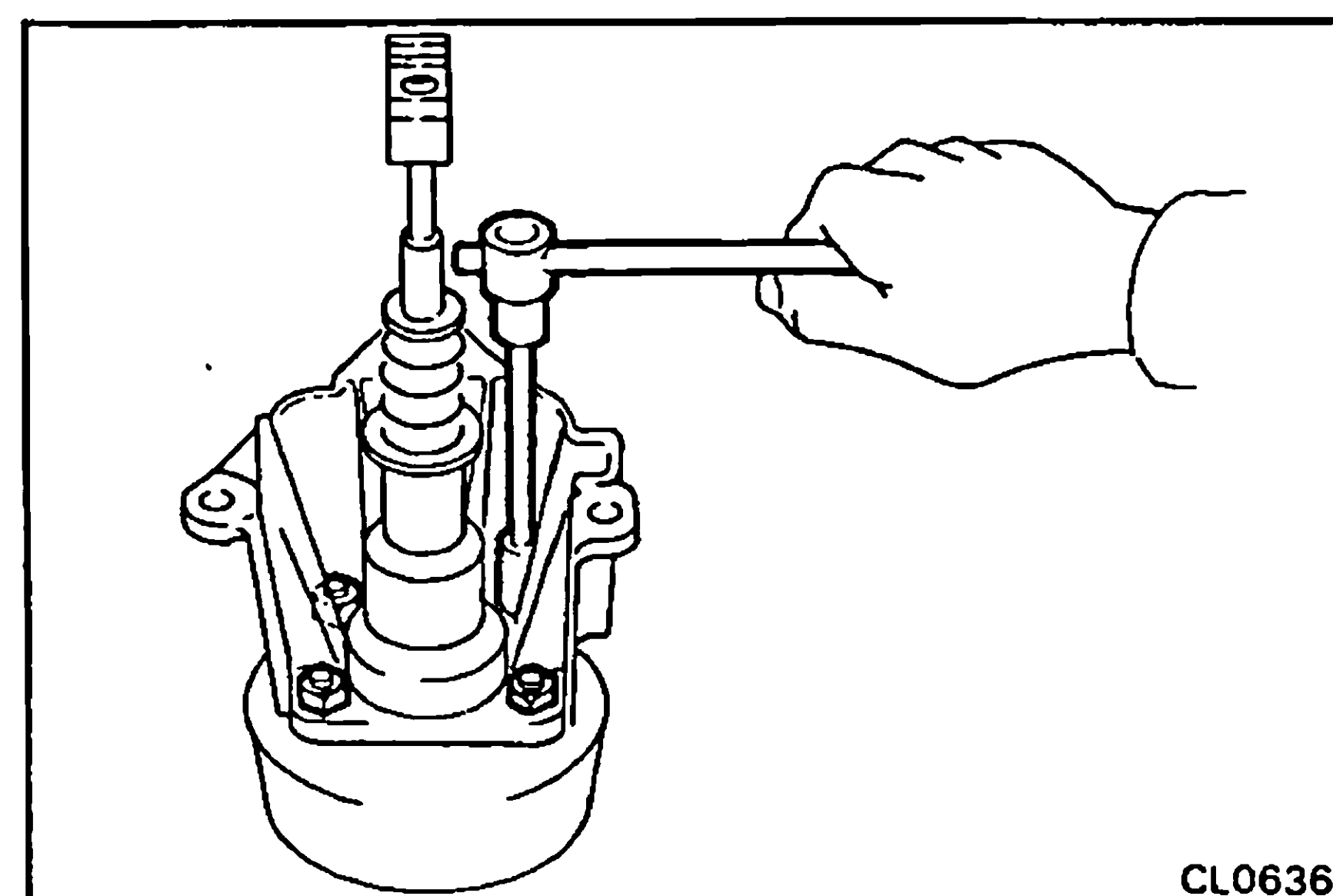
(b) Install E-ring onto booster air valve assembly.

9. INSTALL PISTON COVER WITH BOOT

(a) Install the sponge element into the boot.

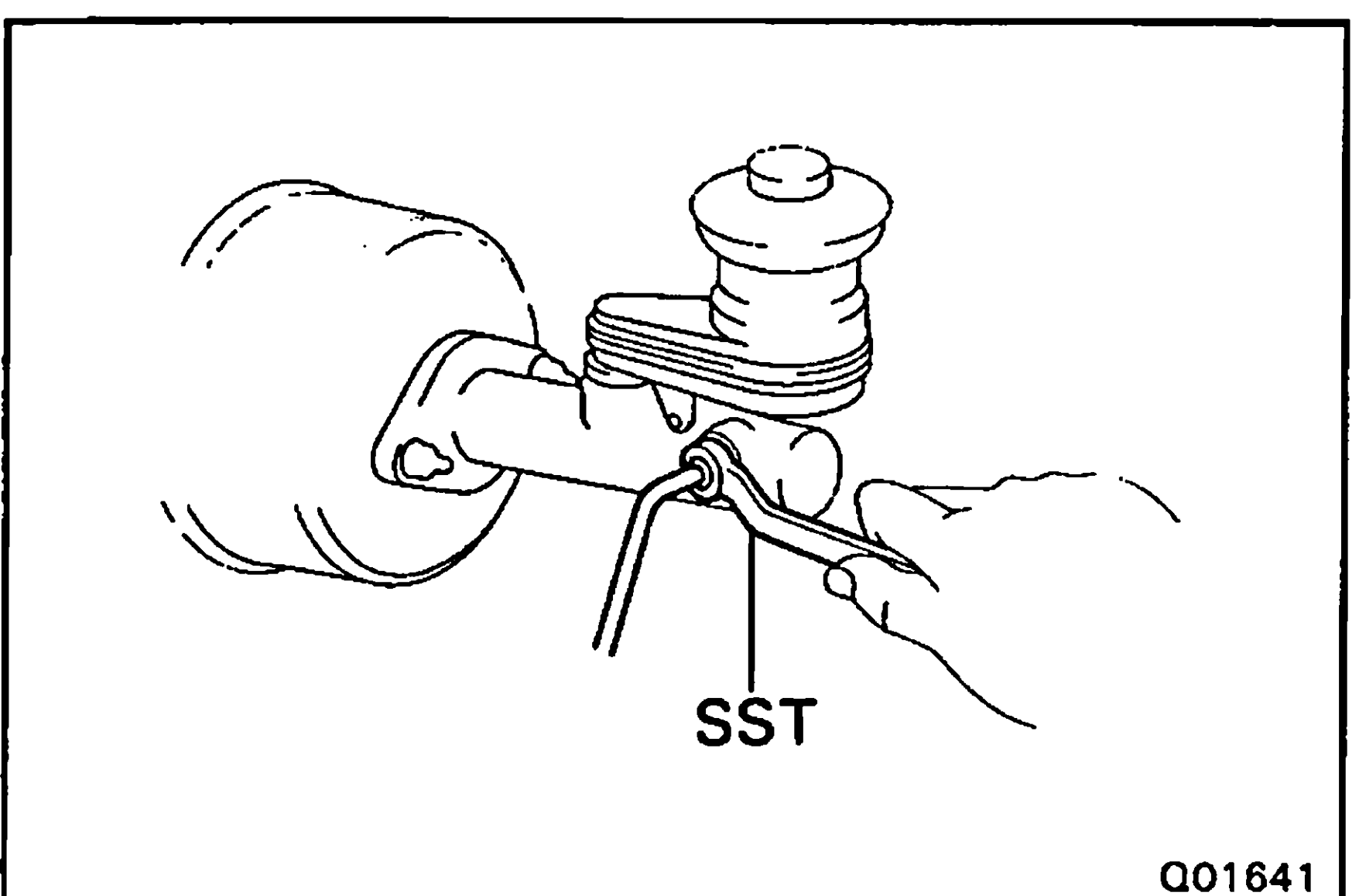
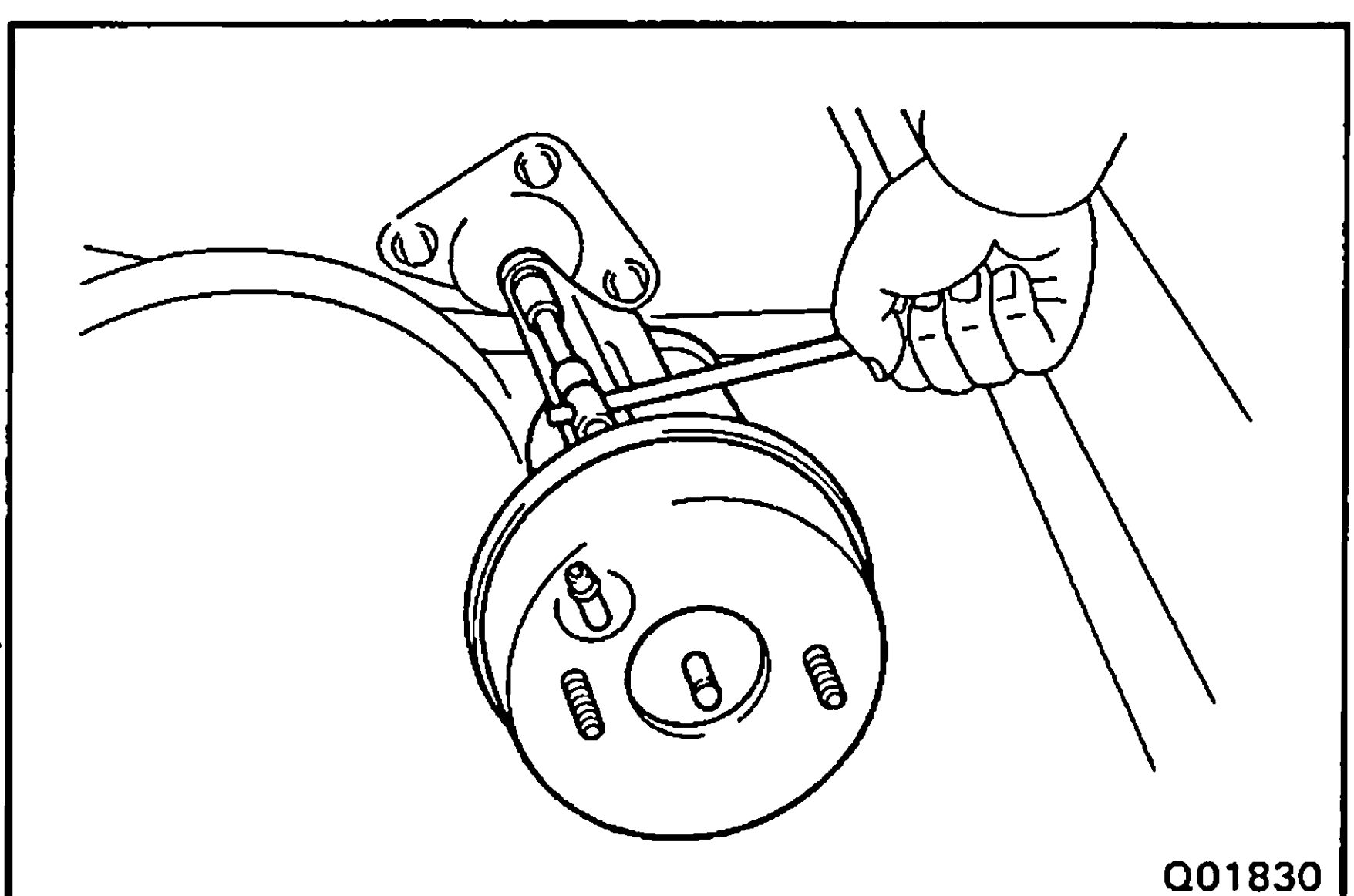
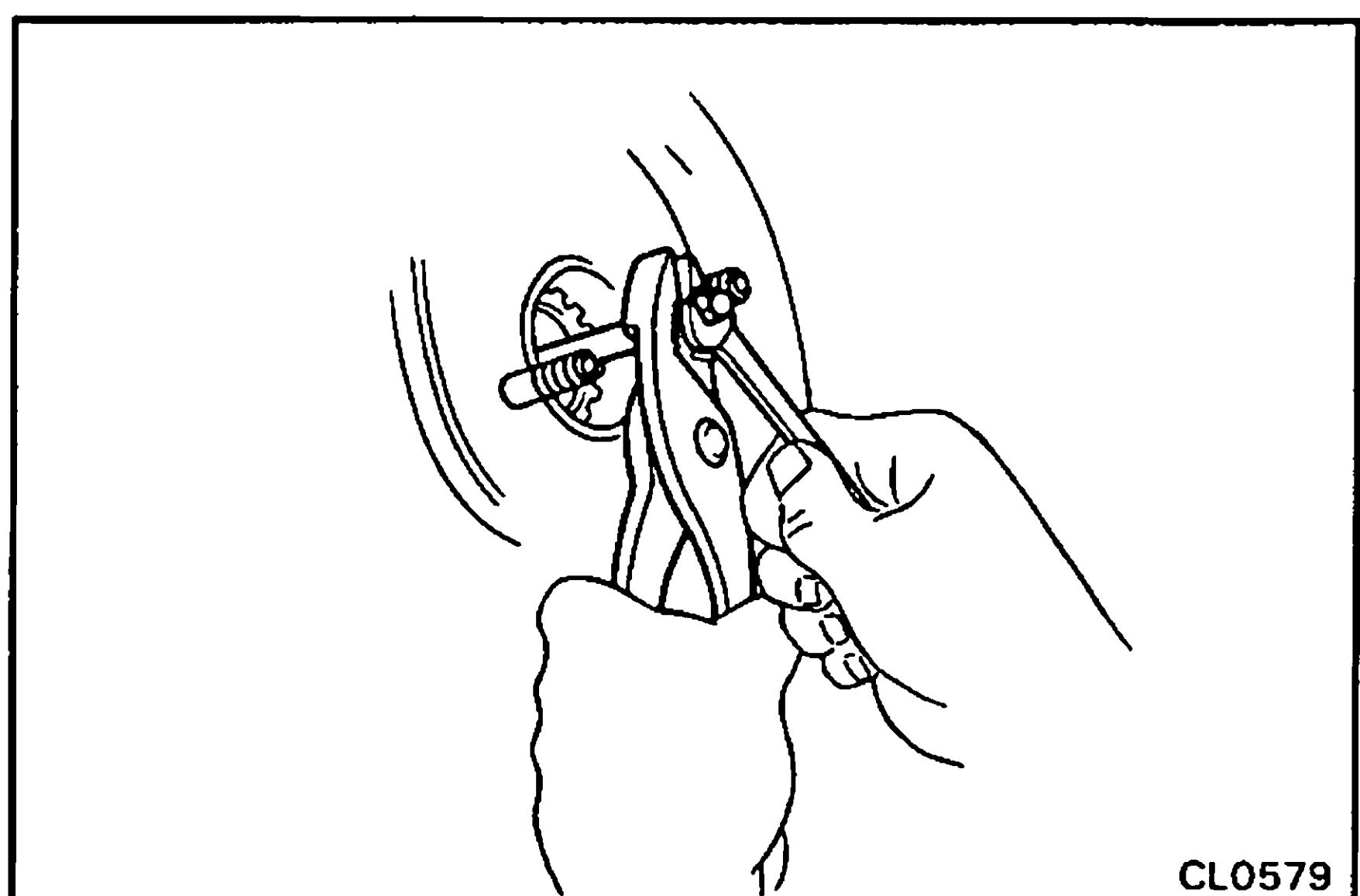
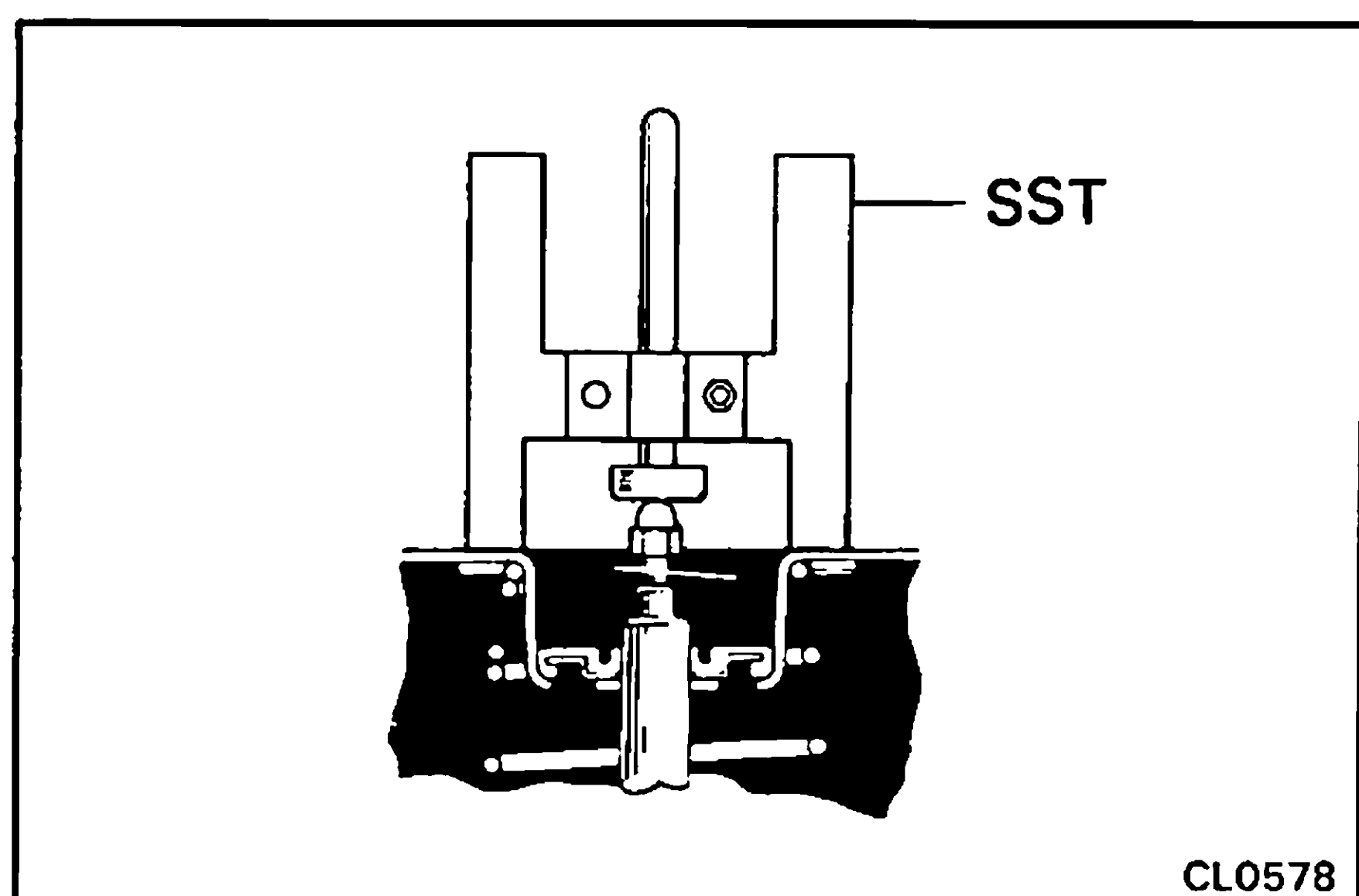
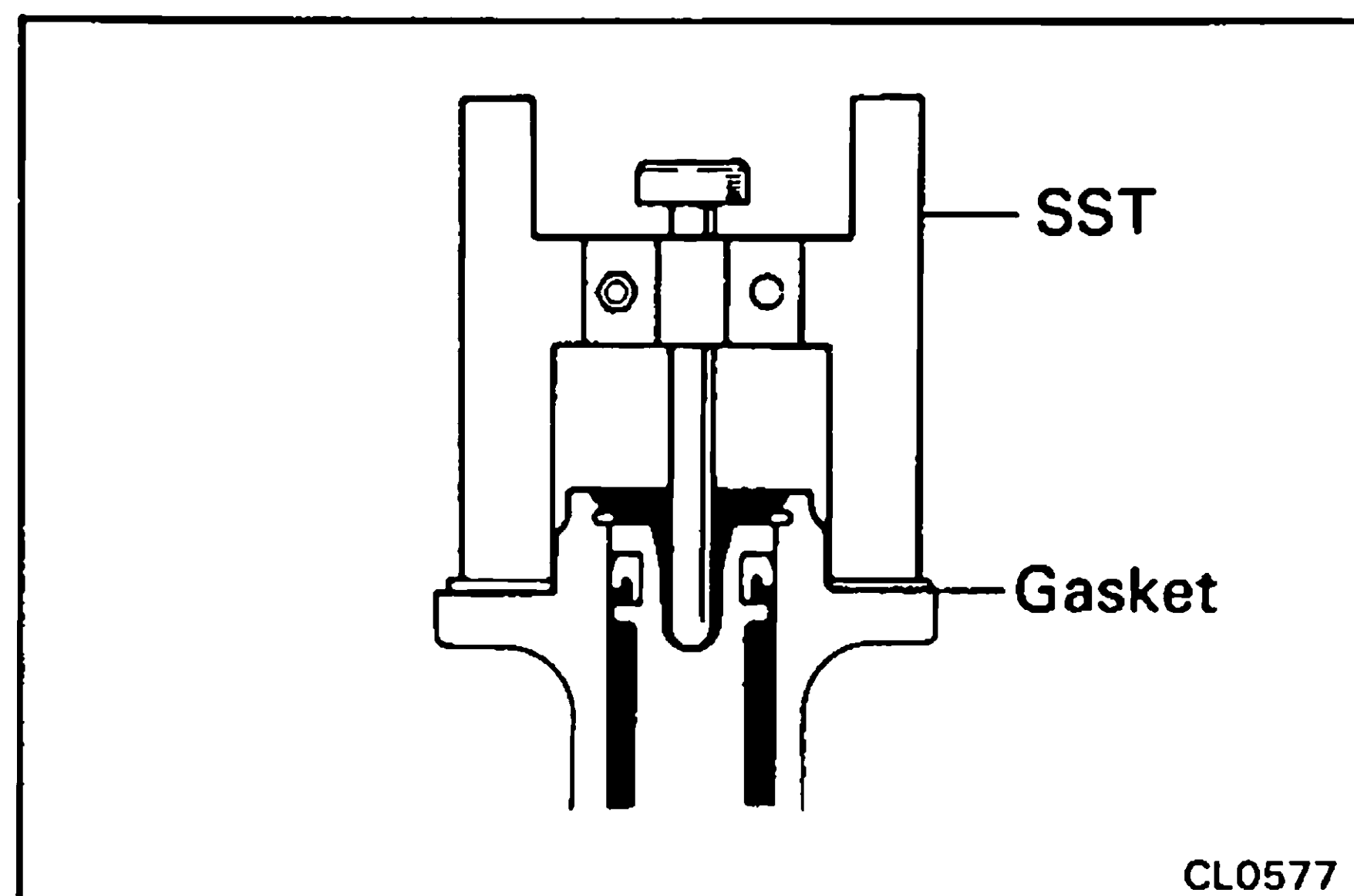
(b) Install the boot to the piston cover.

(c) Install a new gasket onto the booster and the piston cover with the boot.



10. (LHD Models) INSTALL BOOSTER TO BOOSTER BRACKET WITH FOUR NUTS

11. INSTALL CLEVIS



INSTALLATION OF CLUTCH BOOSTER

(See page CL-11)

1. ADJUST LENGTH OF BOOSTER PUSH ROD

- Install the gasket on the master cylinder.
- Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.

SST 09737-00010

- Turn the SST upside down, and set it on the booster.

SST 09737-00010

- Measure the clearance between the booster push rod and pin head (SST).

Clearance: 0 mm (0 in.)

- Adjust the booster push rod length until the push rod lightly touches the pin head.

HINT: When adjusting the push rod, depress the brake pedal enough so that the push rod sticks out.

2. (LHD Models) INSTALL CLUTCH BOOSTER WITH BOOSTER CYLINDER BRACKET TO BODY

(RHD Models)
INSTALL CLUTCH BOOSTER TO BODY

3. CONNECT CLEVIS TO CLUTCH PEDAL

Connect the clevis to the clutch pedal with the clevis pin and clip.

4. INSTALL MASTER CYLINDER TO CLUTCH BOOSTER (See page CL-8)

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

5. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

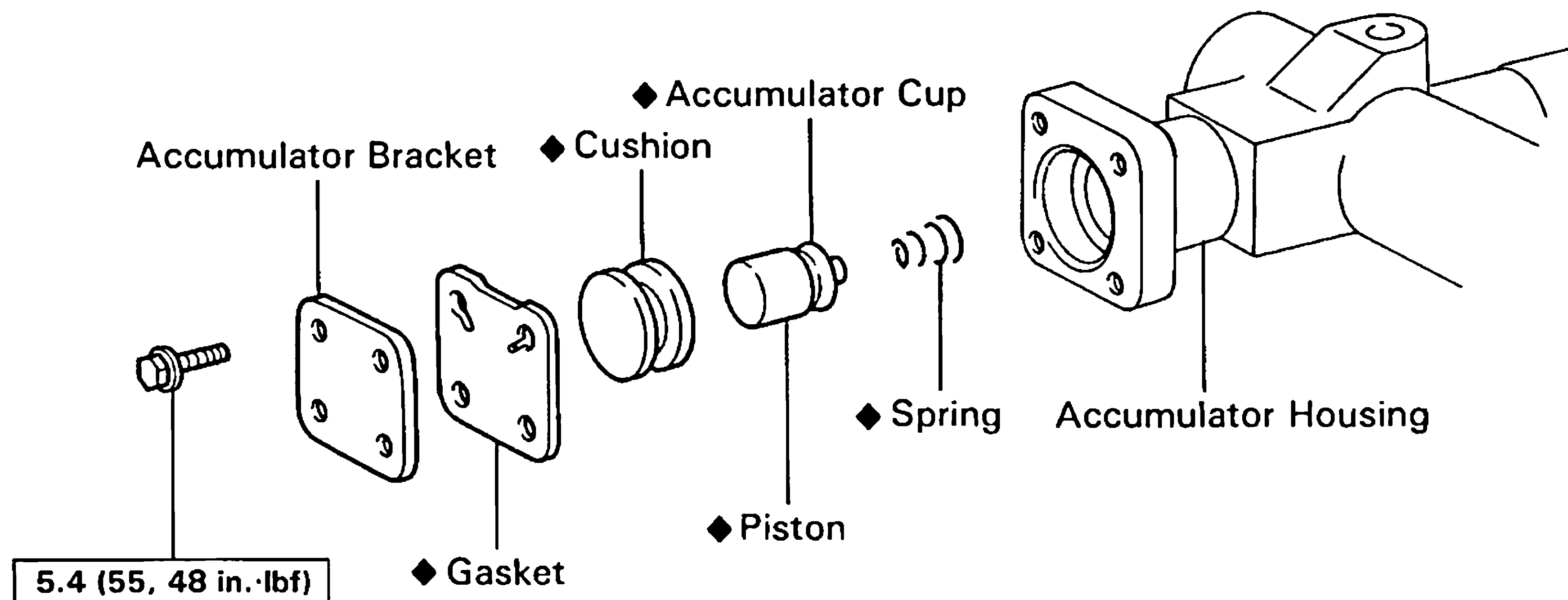
SST 09751-36011

6. CONNECT VACUUM HOSE TO CLUTCH BOOSTER

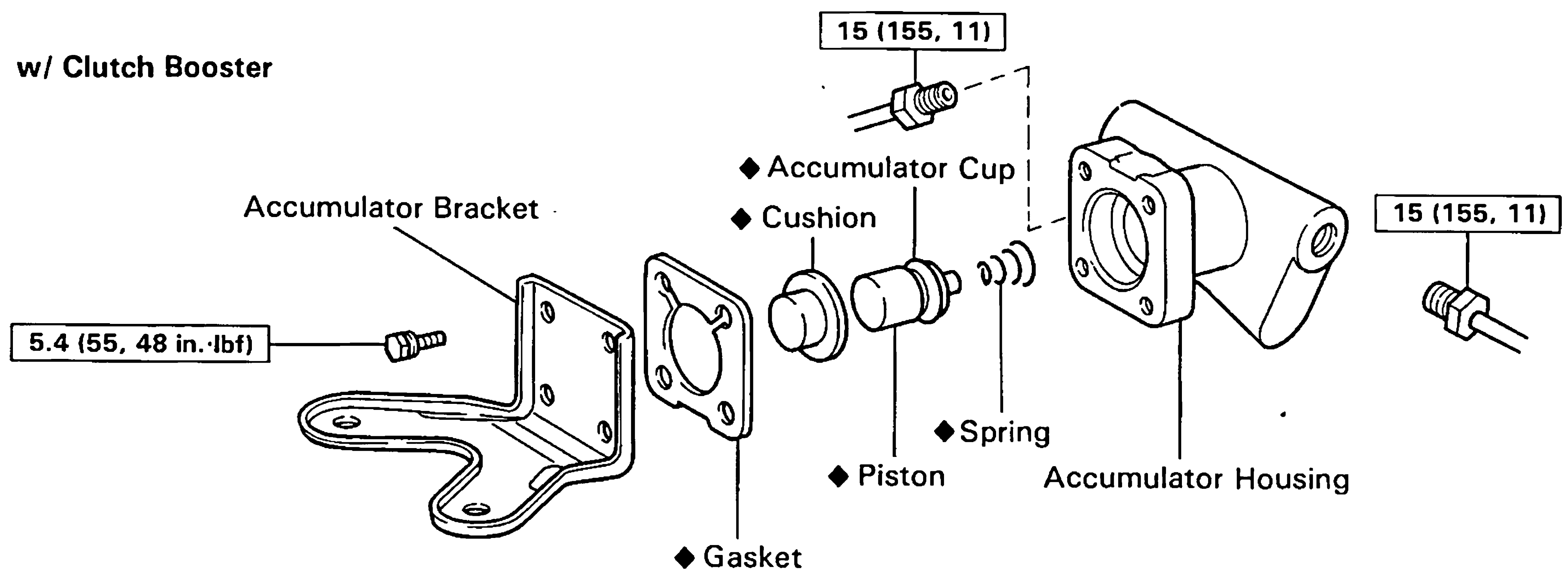
7. ADJUST CLUTCH PEDAL AND BLEED SYSTEM (See page CL-5)

CLUTCH ACCUMULATOR COMPONENTS

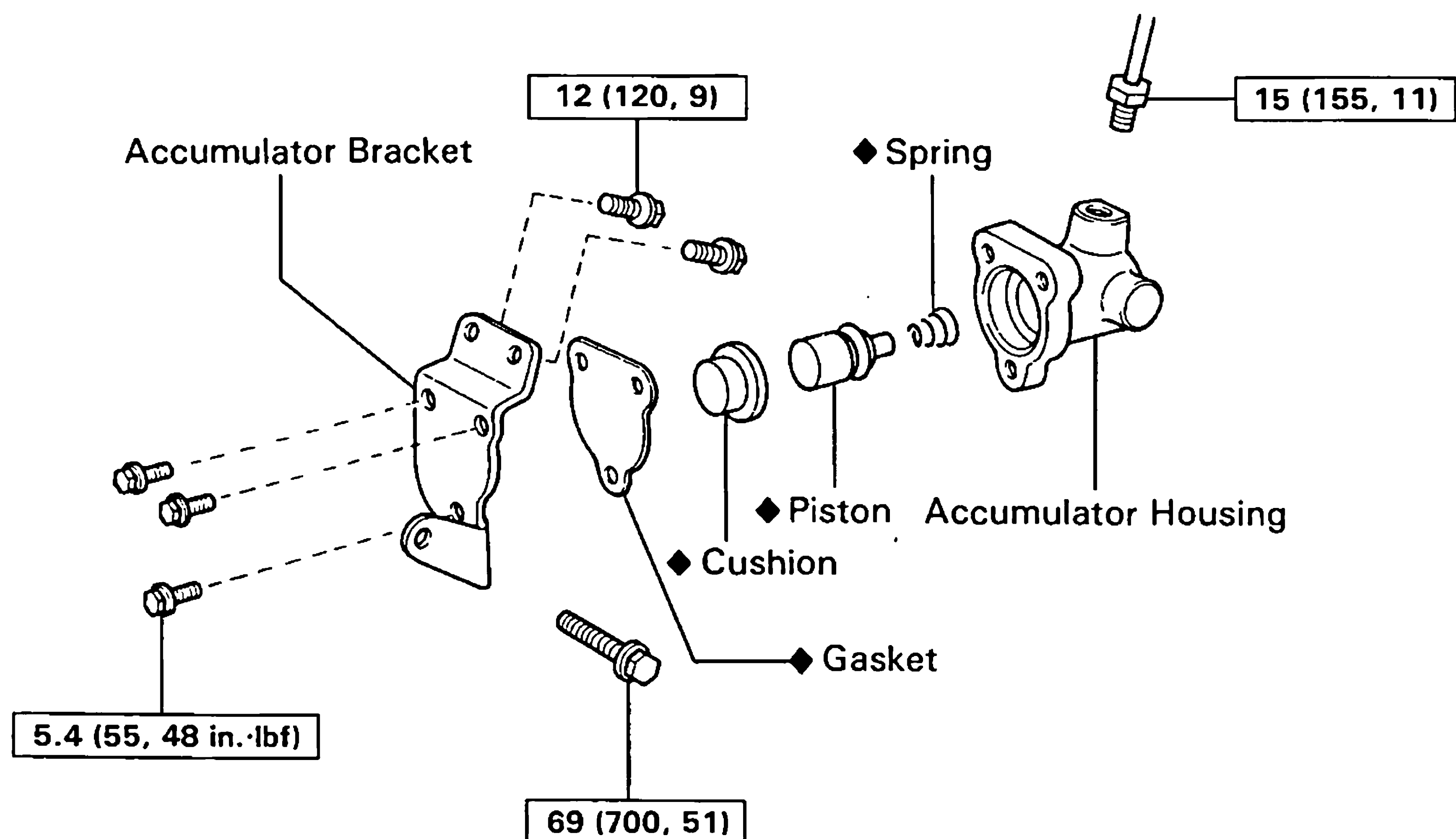
• w/o Clutch Booster



• w/ Clutch Booster

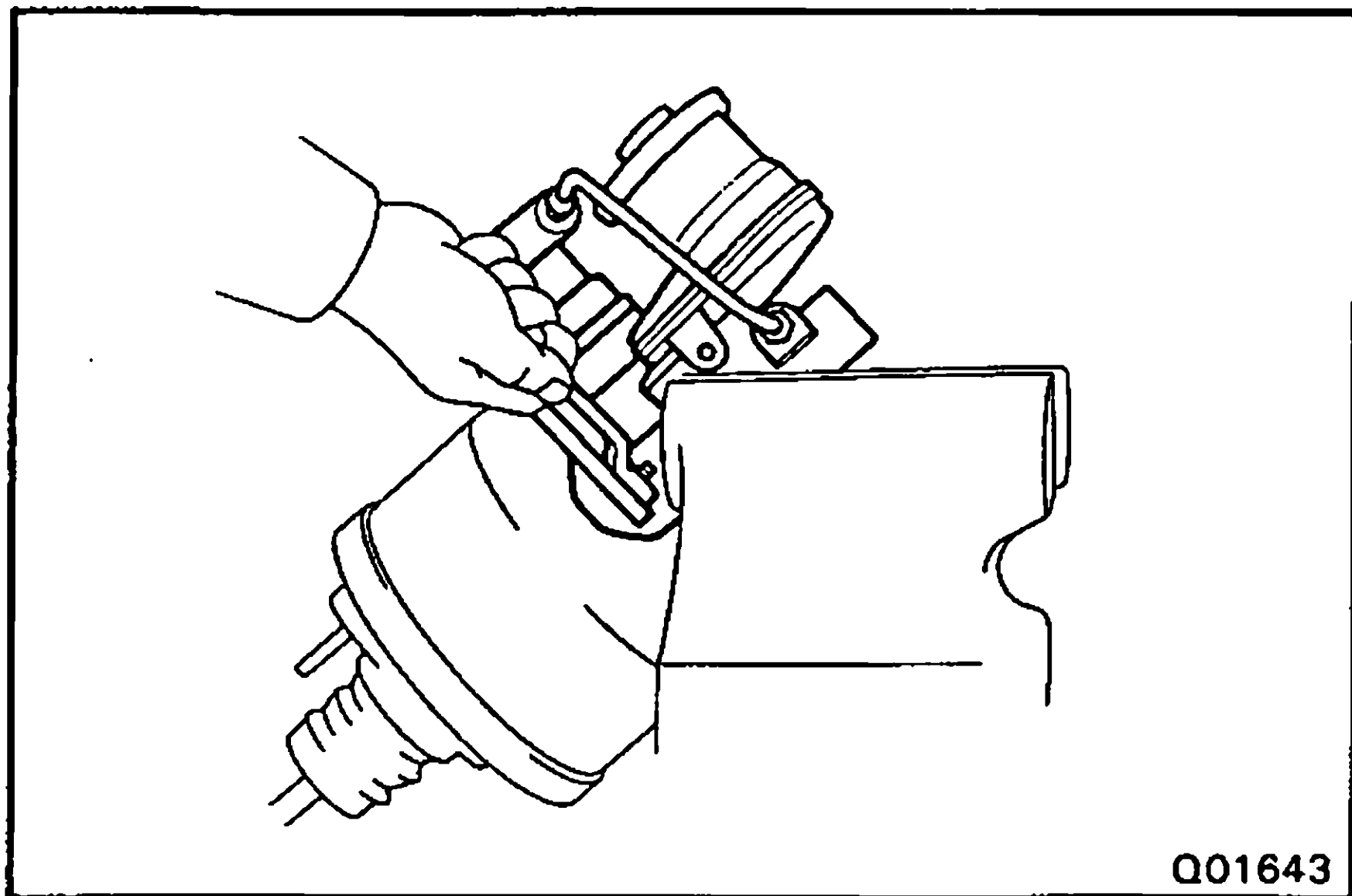


• 2L-T Engine Europe RHD Models



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part



REMOVAL OF CLUTCH ACCUMULATOR (MAIN POINT OF REMOVAL AND INSTALLATION)

(w/o Clutch Booster)

[2L-T Engine Europe RHD Models]

REMOVE CLUTCH ACCUMULATOR

Remove a bolt and the clutch accumulator with bracket from transmission.

[Others]

REMOVE MASTER CYLINDER

(See page CL-6)

(w/ Clutch Booster)

1. REMOVE MASTER CYLINDER

(See page CL-8)

2. REMOVE CLUTCH ACCUMULATOR

Remove two bolts and clutch accumulator with bracket.

DISASSEMBLY OF CLUTCH ACCUMULATOR

1. REMOVE CLUTCH BRACKET

(a) (2L-T Engine Europe RHD Models)

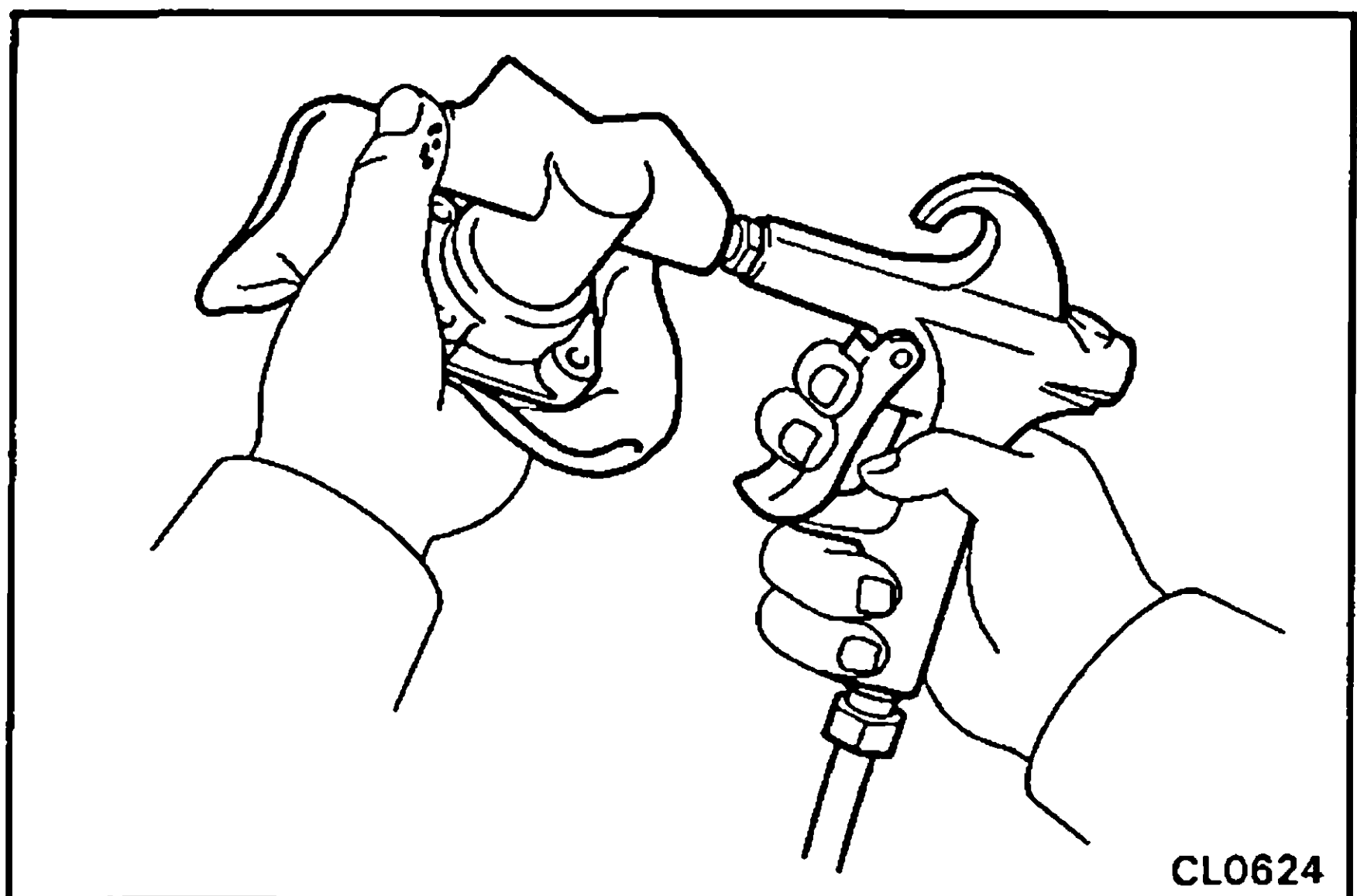
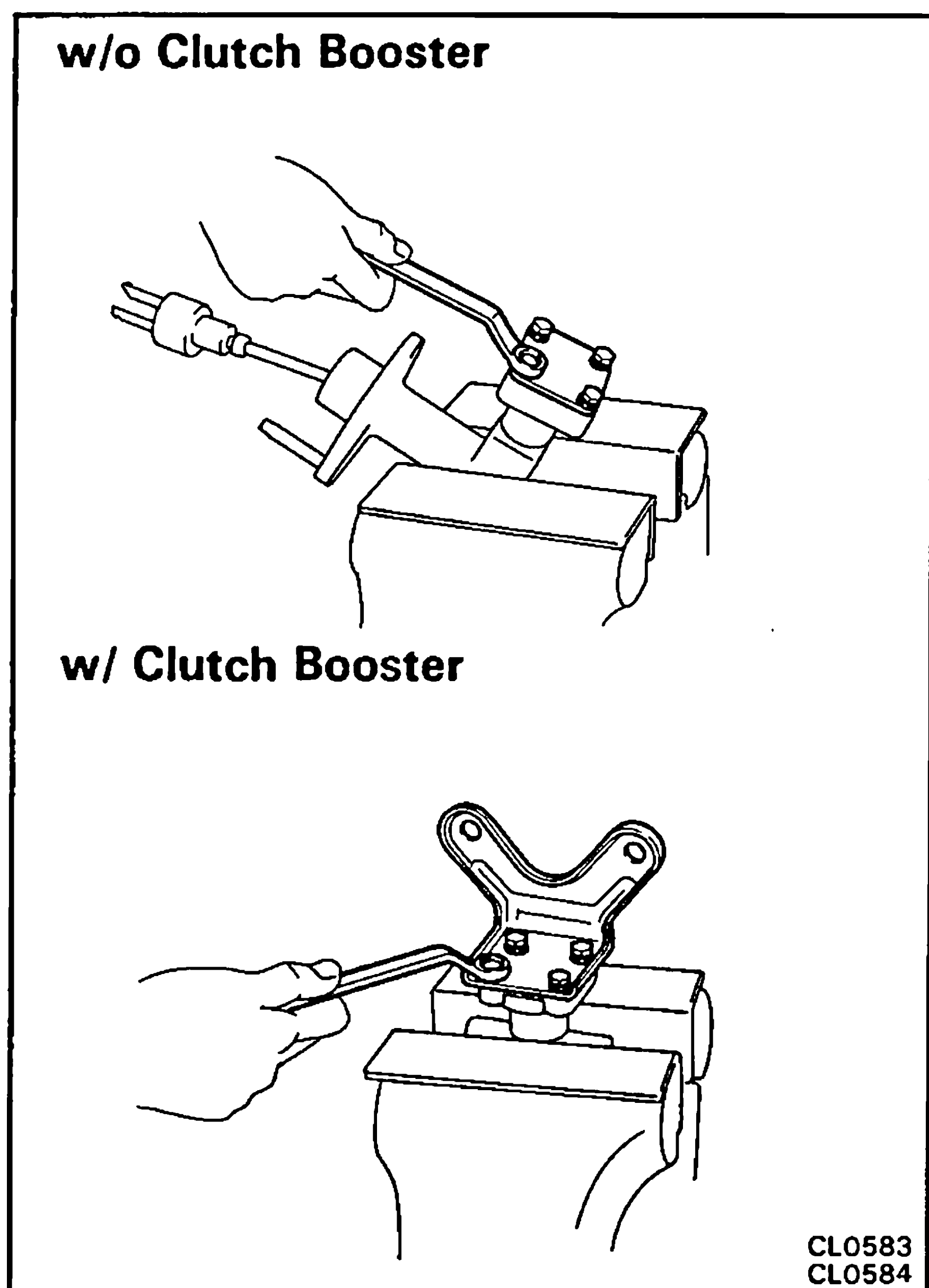
Remove three bolts and the bracket.

(b) (Others)

Remove four bolts and the bracket.

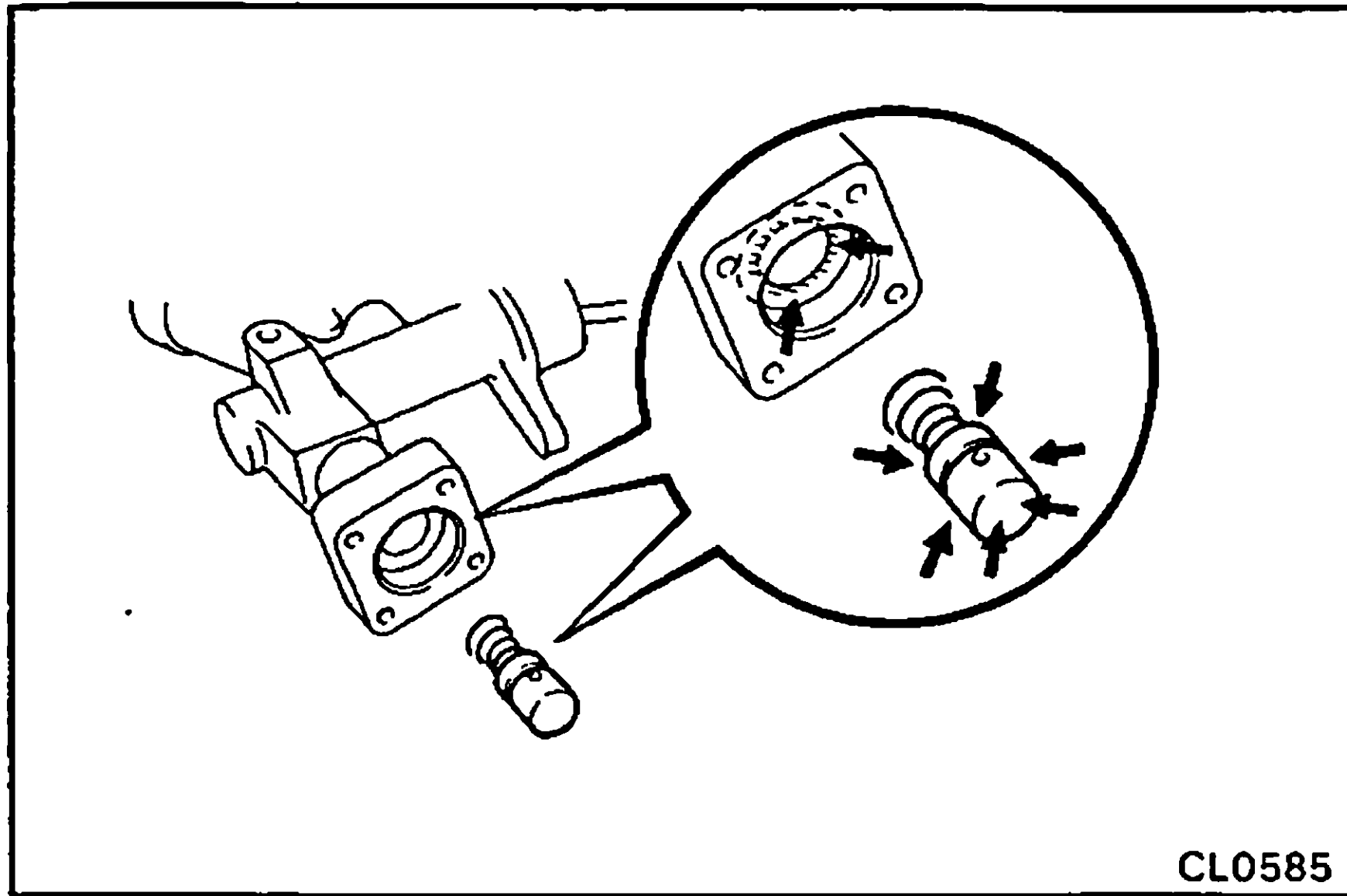
(c) Remove the gasket from the bracket.

2. REMOVE CUSHION

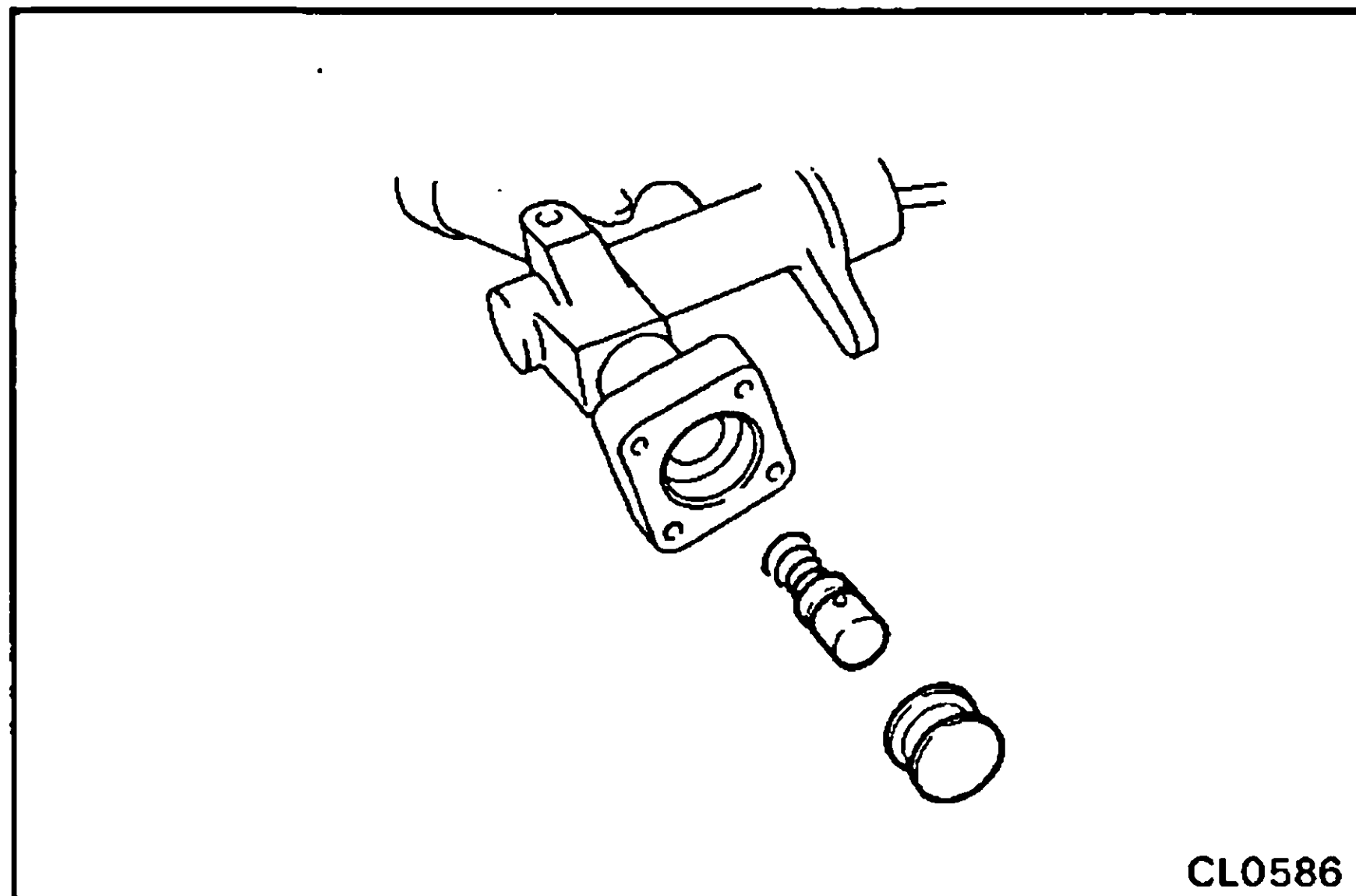


3. REMOVE PISTON AND SPRING

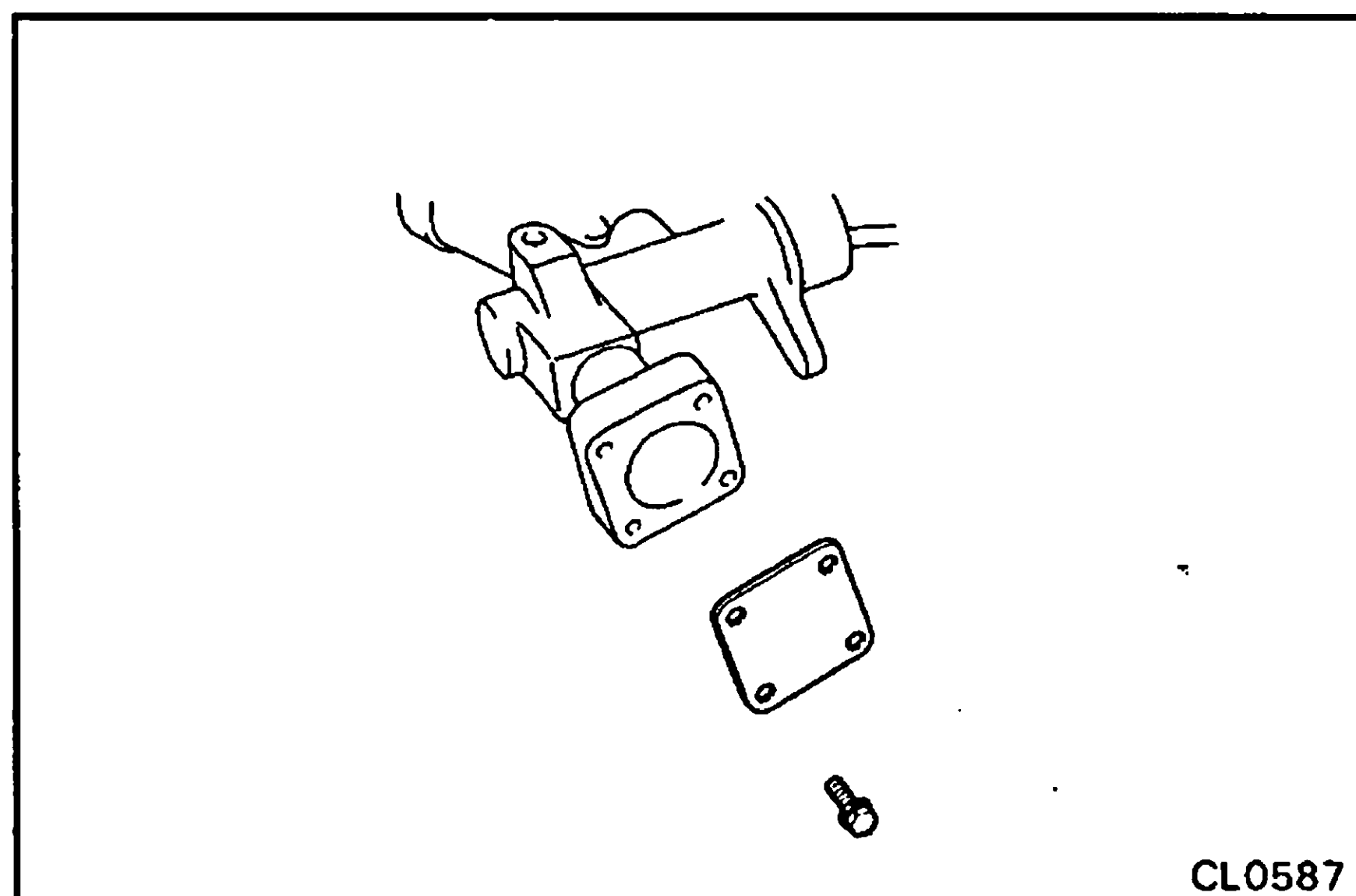
Using compressed air, remove the piston and spring.

**ASSEMBLY OF CLUTCH ACCUMULATOR****(w/o Clutch Booster)****(See page CL-17)**

1. **COAT PISTON AND ACCUMULATOR BODY WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**



2. **INSTALL SPRING, PISTON AND CUSHION INTO ACCUMULATOR**



3. **INSTALL ACCUMULATOR BRACKET**

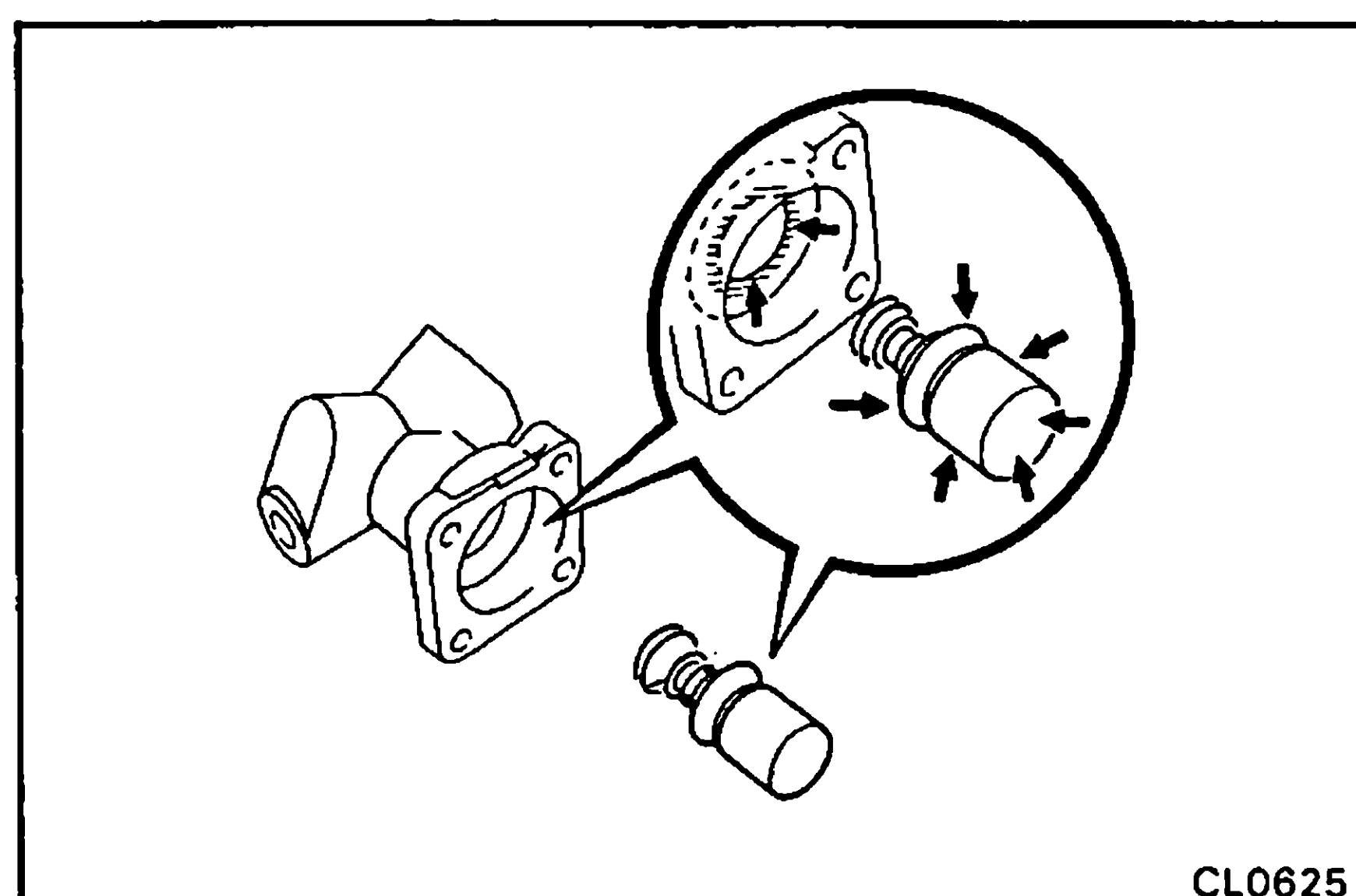
(a) Install a new gasket to the bracket.

(b) (2L-T Engine Europe RHD Models)
Install the bracket to the accumulator and tighten the three bolts.

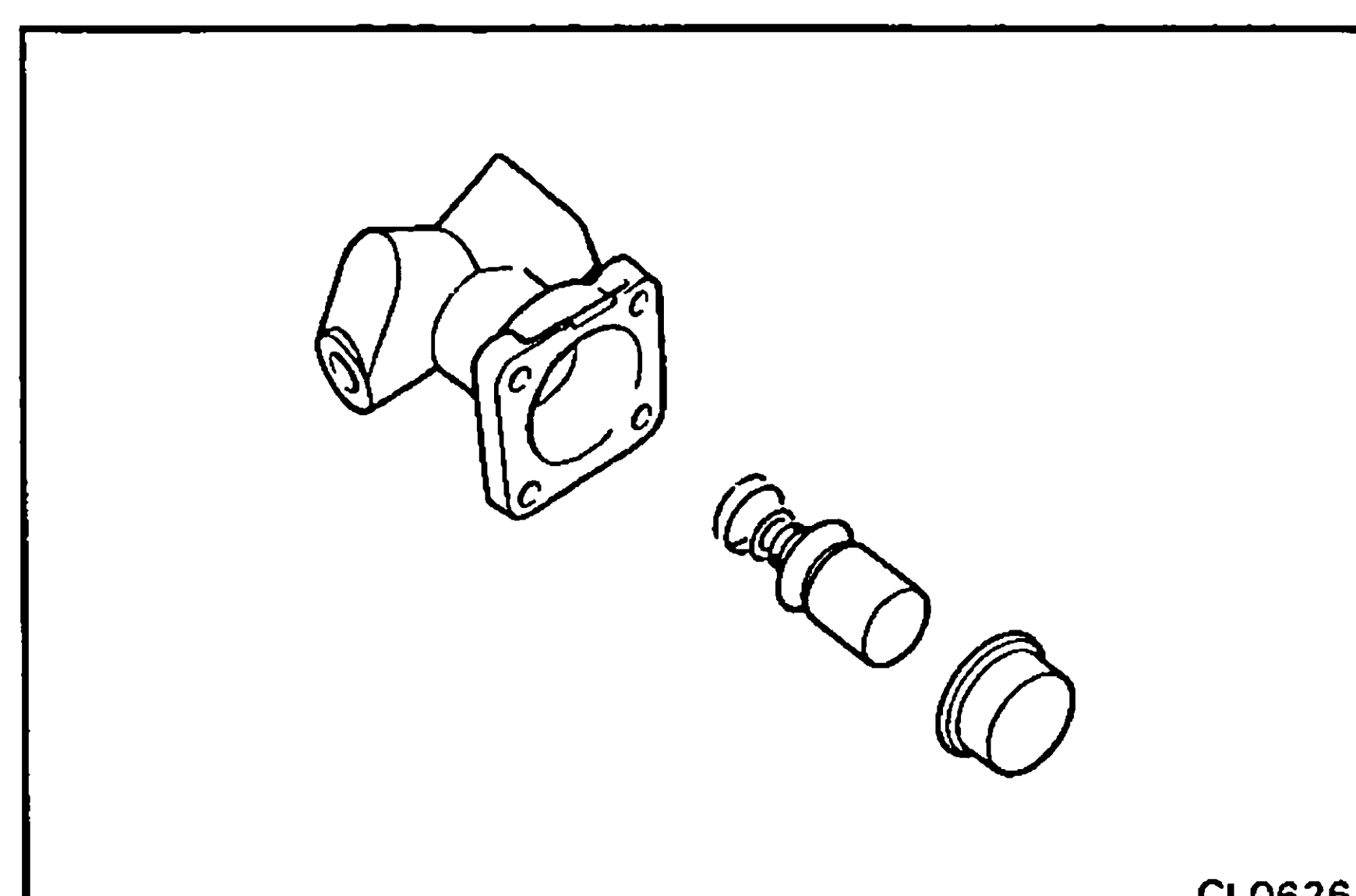
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) (Others)
Install the bracket to the accumulator and tighten the four bolts.

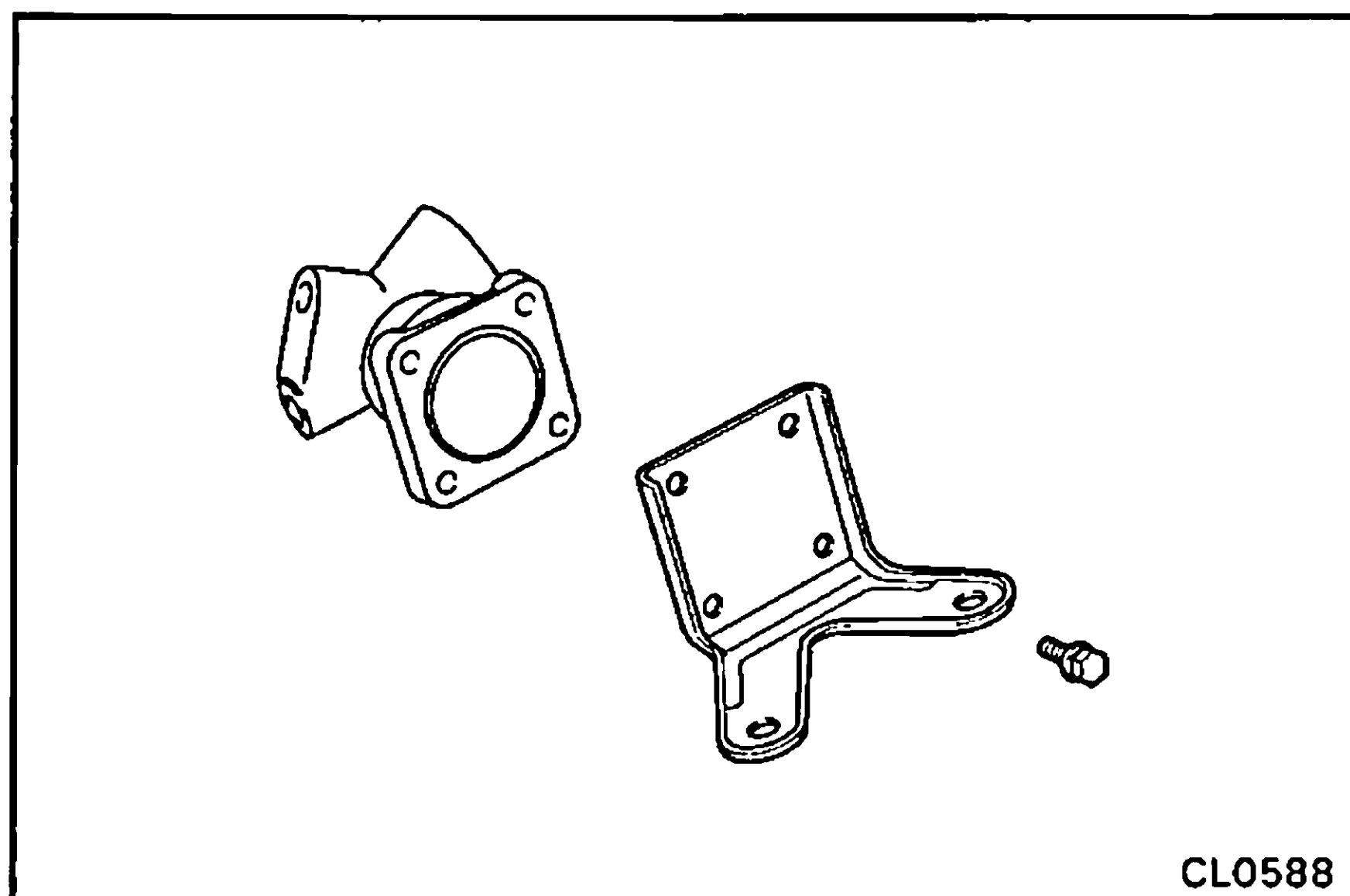
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

**(w/ Clutch Booster)****(See page CL-17)**

4. **COAT PISTON AND ACCUMULATOR BODY WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**



5. **INSTALL SPRING, PISTON AND CUSHION INTO ACCUMULATOR**

**6. INSTALL ACCUMULATOR BRACKET**

- (a) Install a new gasket to the bracket.
- (b) Install the bracket to the accumulator and tighten the four bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

**INSTALLATION OF CLUTCH ACCUMULATOR
(w/o Clutch Booster)**

[2L-T Engine Europe RHD Models]

INSTALL CLUTCH ACCUMULATOR

Install a bolt and the clutch accumulator with bracket to transmission.

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

[Others]

**INSTALL MASTER CYLINDER
(See page CL-6)****(w/ Clutch Booster)****1. INSTALL CLUTCH ACCUMULATOR**

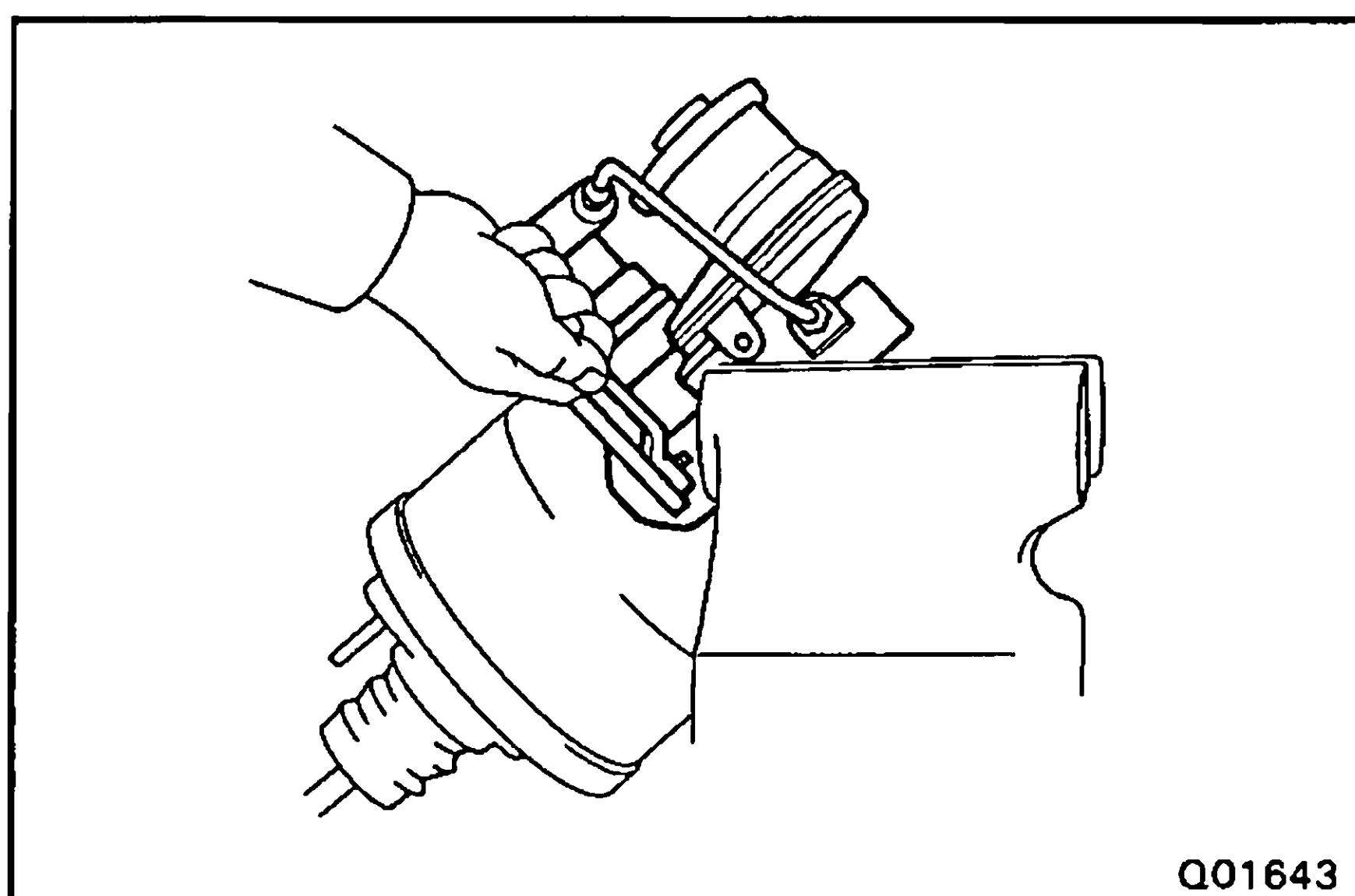
Install two bolts and clutch accumulator with bracket.

2. CONNECT CLUTCH LINE TUBE

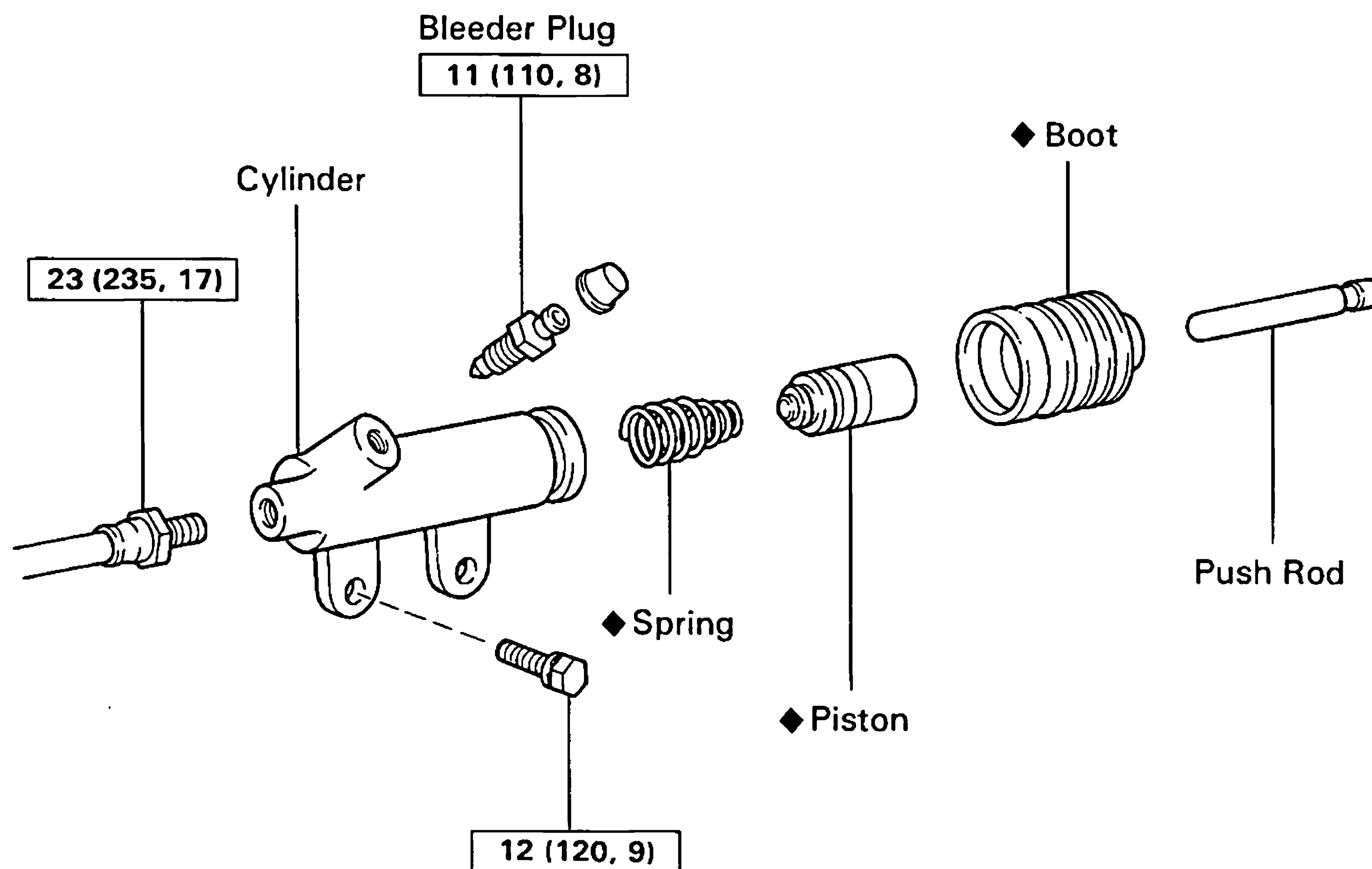
Using SST, connect the clutch line tube.

SST 09751-36011

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

**3. INSTALL MASTER CYLINDER
(See page CL-8)****4. FILL RESERVOIR WITH BRAKE FLUID AND BLEED
CLUTCH SYSTEM****5. CHECK FOR LEAKS**

CLUTCH RELEASE CYLINDER COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

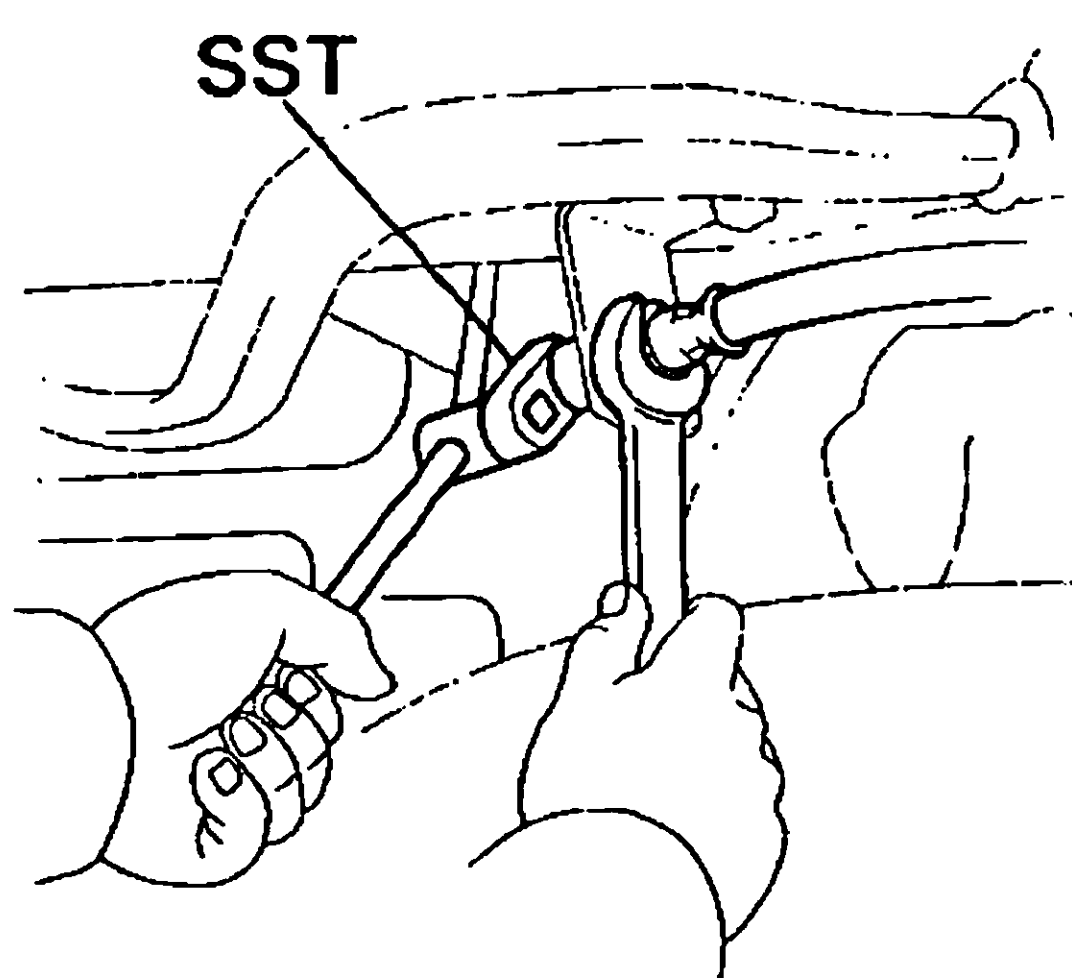
Q01619

REMOVAL OF CLUTCH RELEASE CYLINDER

1. REMOVE FLEXIBLE HOSE

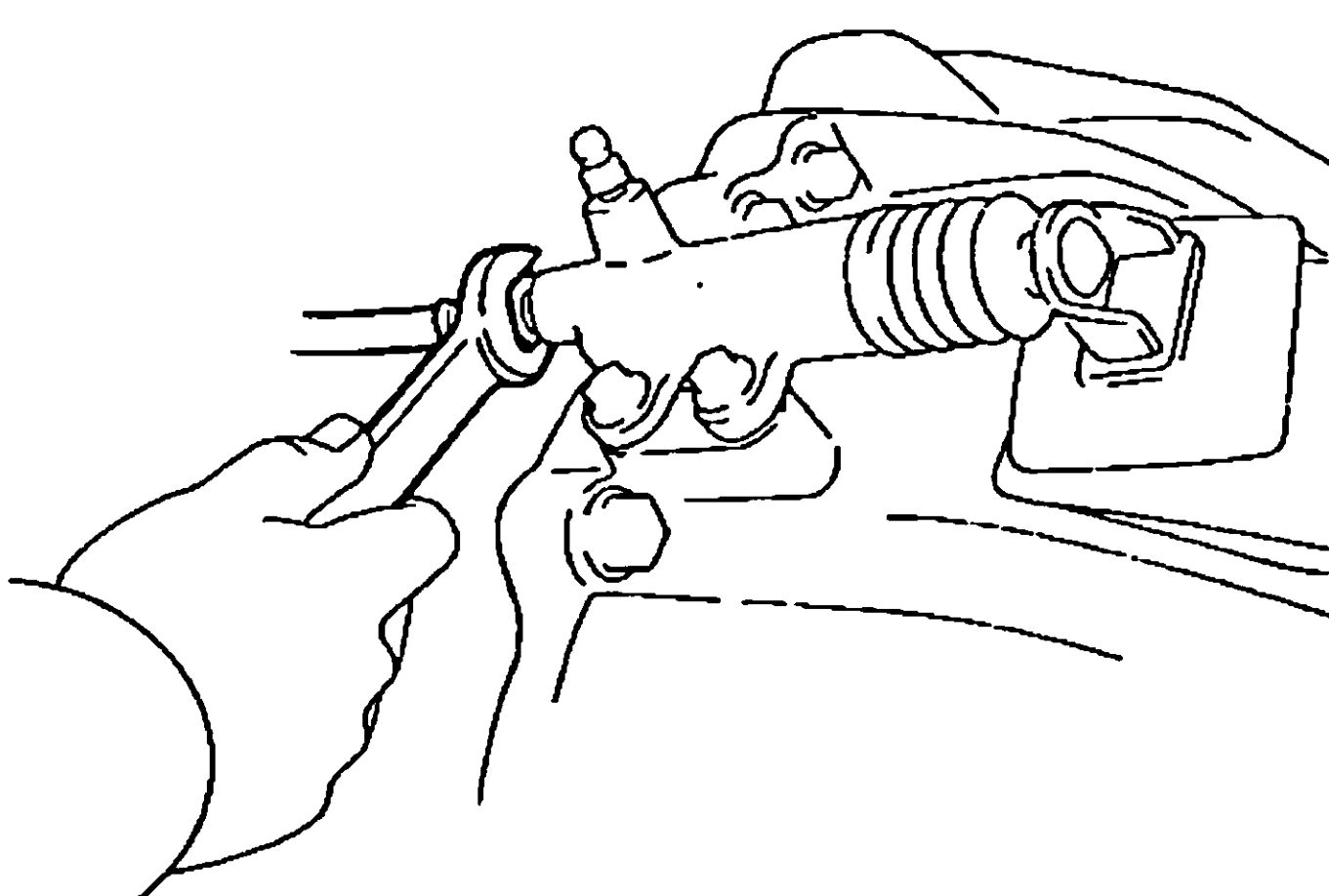
(a) Using SST, disconnect the union.

SST 09023-00100

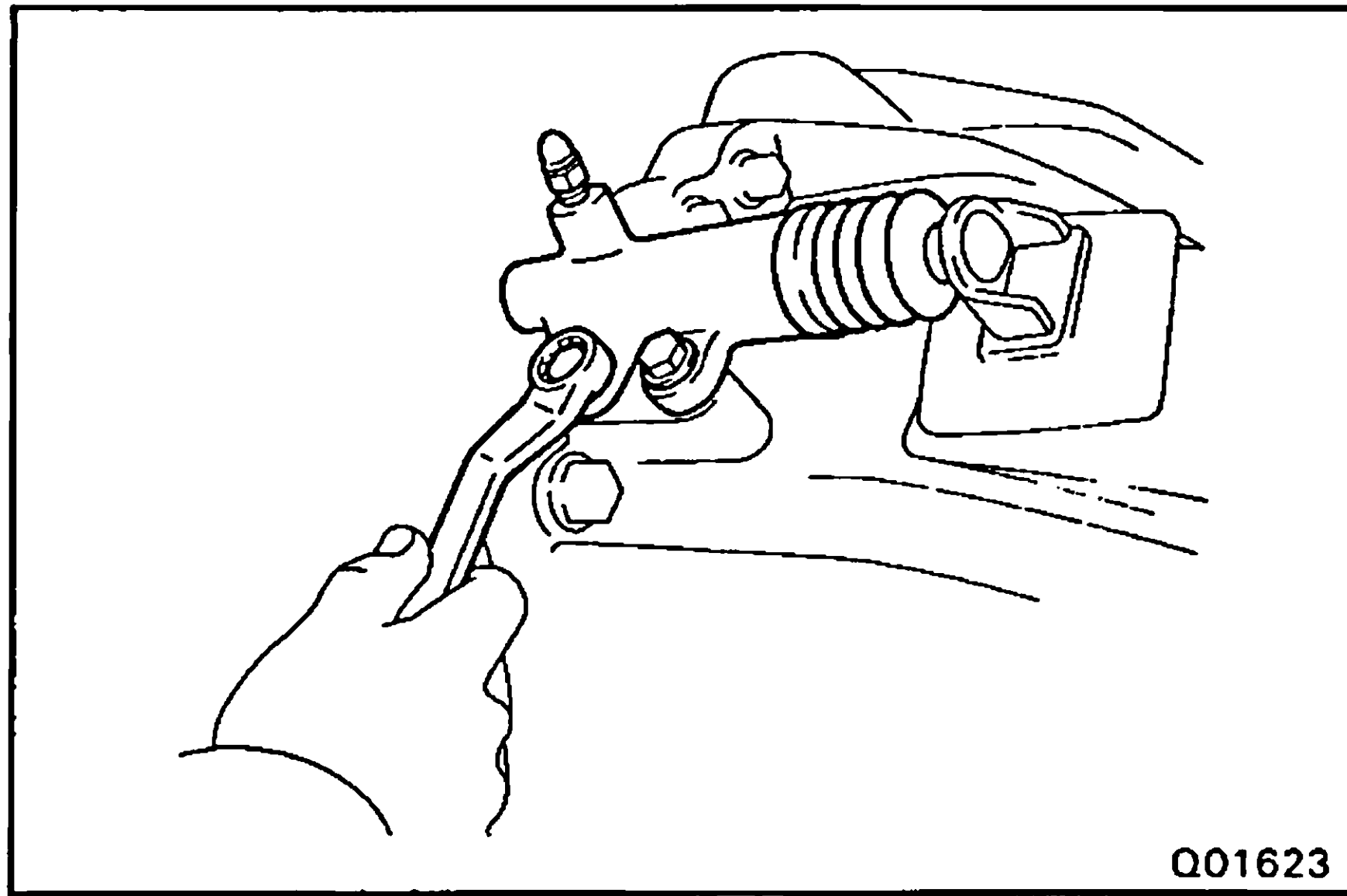


Q01634

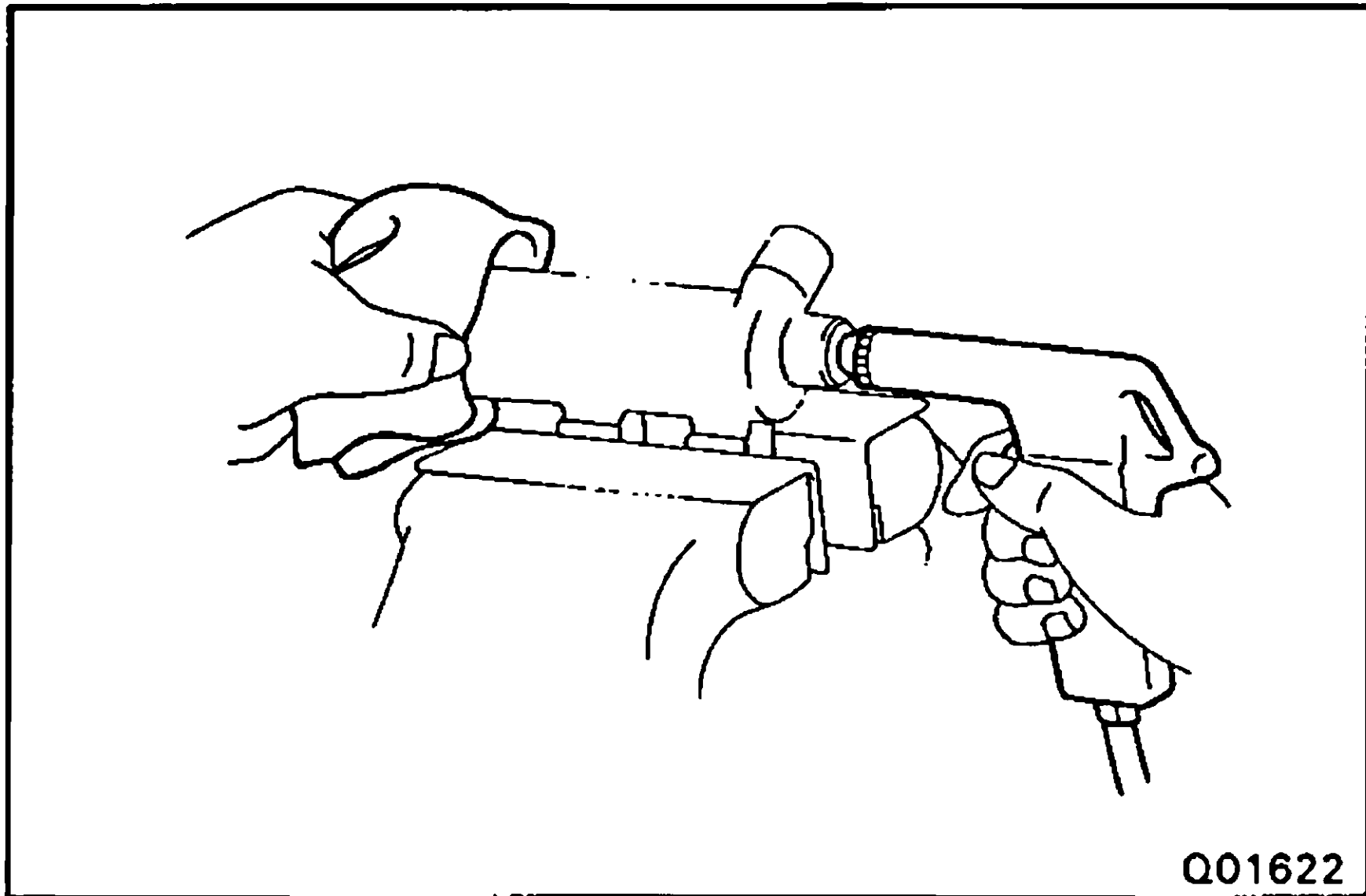
(b) Remove the flexible hose from the release cylinder.



Q01620

**2. REMOVE RELEASE CYLINDER**

Remove the two bolts and pull out the release cylinder.

**DISASSEMBLY OF RELEASE CYLINDER****1. PULL OUT BOOT WITH PUSH ROD****2. REMOVE PISTON WITH SPRING**

Using compressed air remove the piston with the spring from the cylinder.

INSPECTION OF RELEASE CYLINDER

HINT: Clean the disassembled parts with compressed.

1. INSPECT RELEASE CYLINDER BORE FOR SCORING OR CORROSION

If a problem is found clean or replace the cylinder.

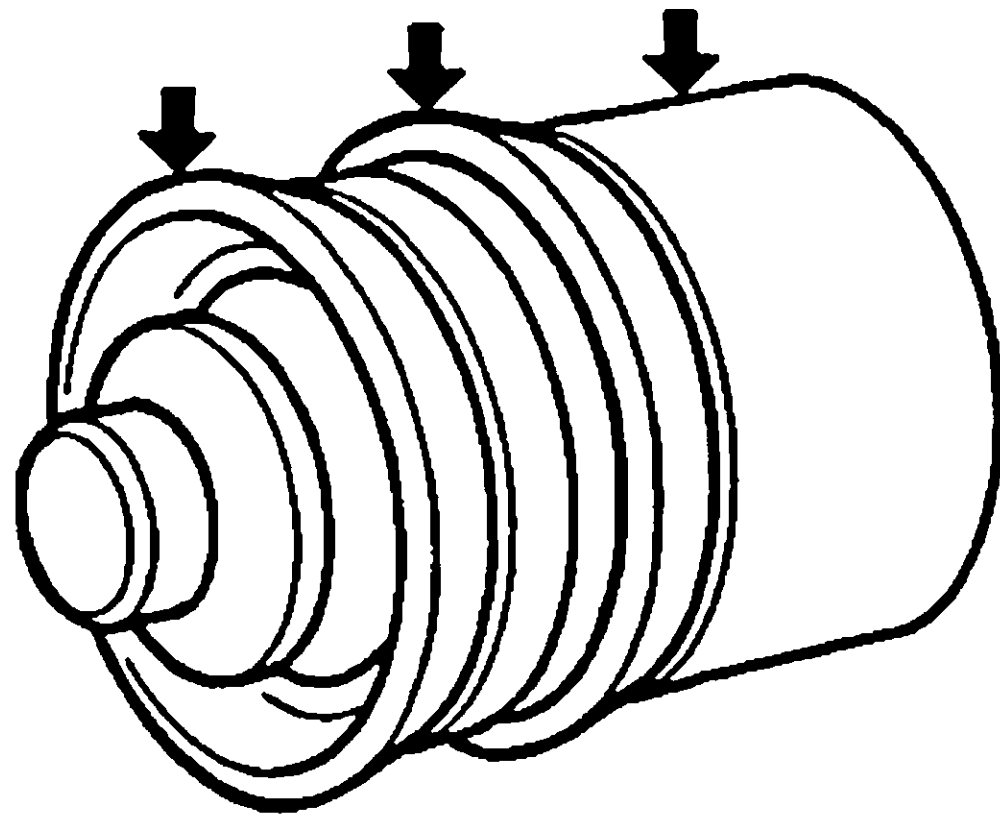
2. INSPECT PISTON AND CUPS FOR WEAR SCORING CRACKS OR SWELLING

If either one requires replacement use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the pushrod.

Lithium Soap Base Glycol Grease



CL0463

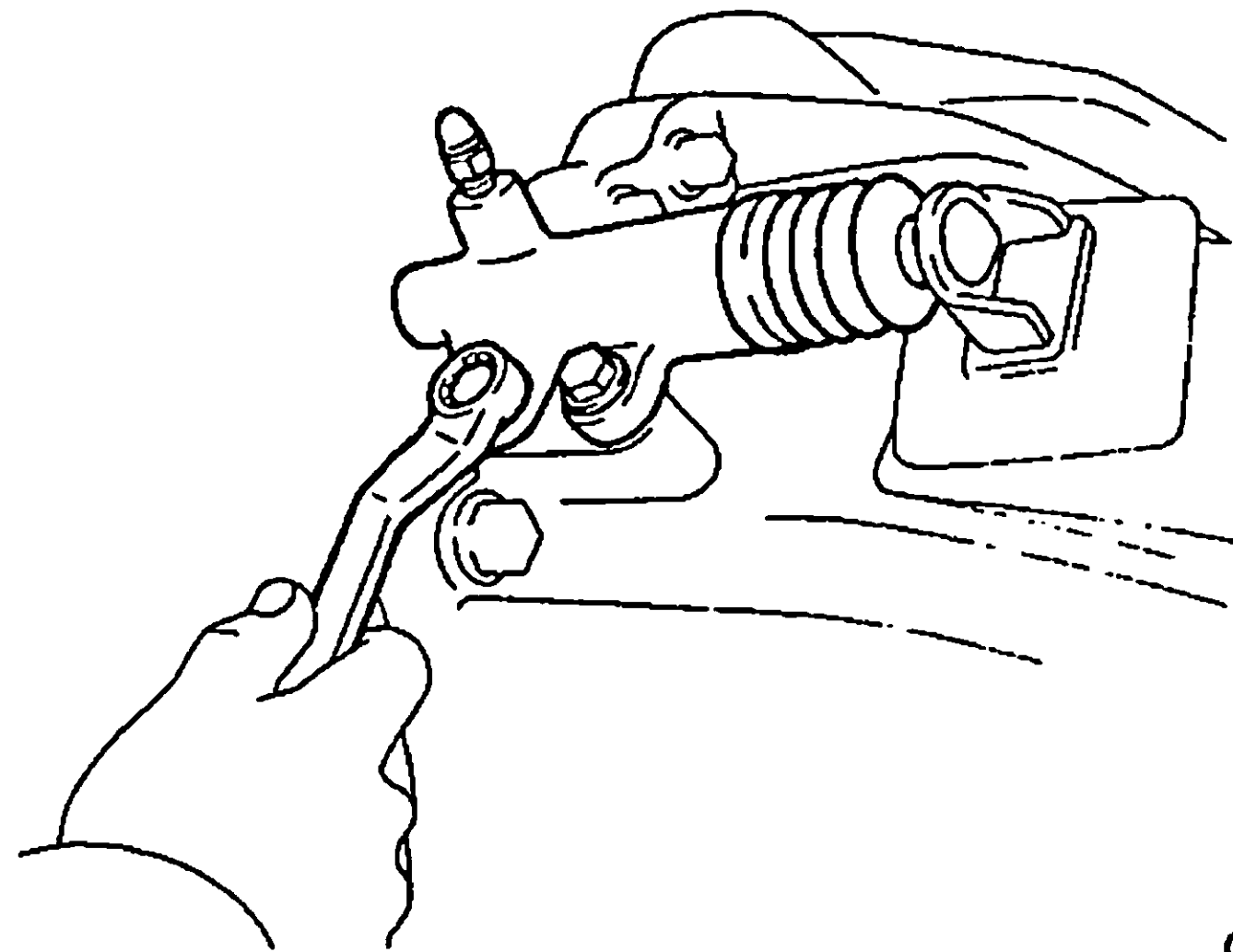
ASSEMBLY OF RELEASE CYLINDER

1. COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN
2. INSTALL PISTON WITH SPRING INTO CYLINDER
3. INSTALL BOOT WITH PUSH ROD TO CYLINDER

INSTALLATION OF CLUTCH RELEASE CYLINDER

1. INSTALL RELEASE CYLINDER WITH TWO BOLTS

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

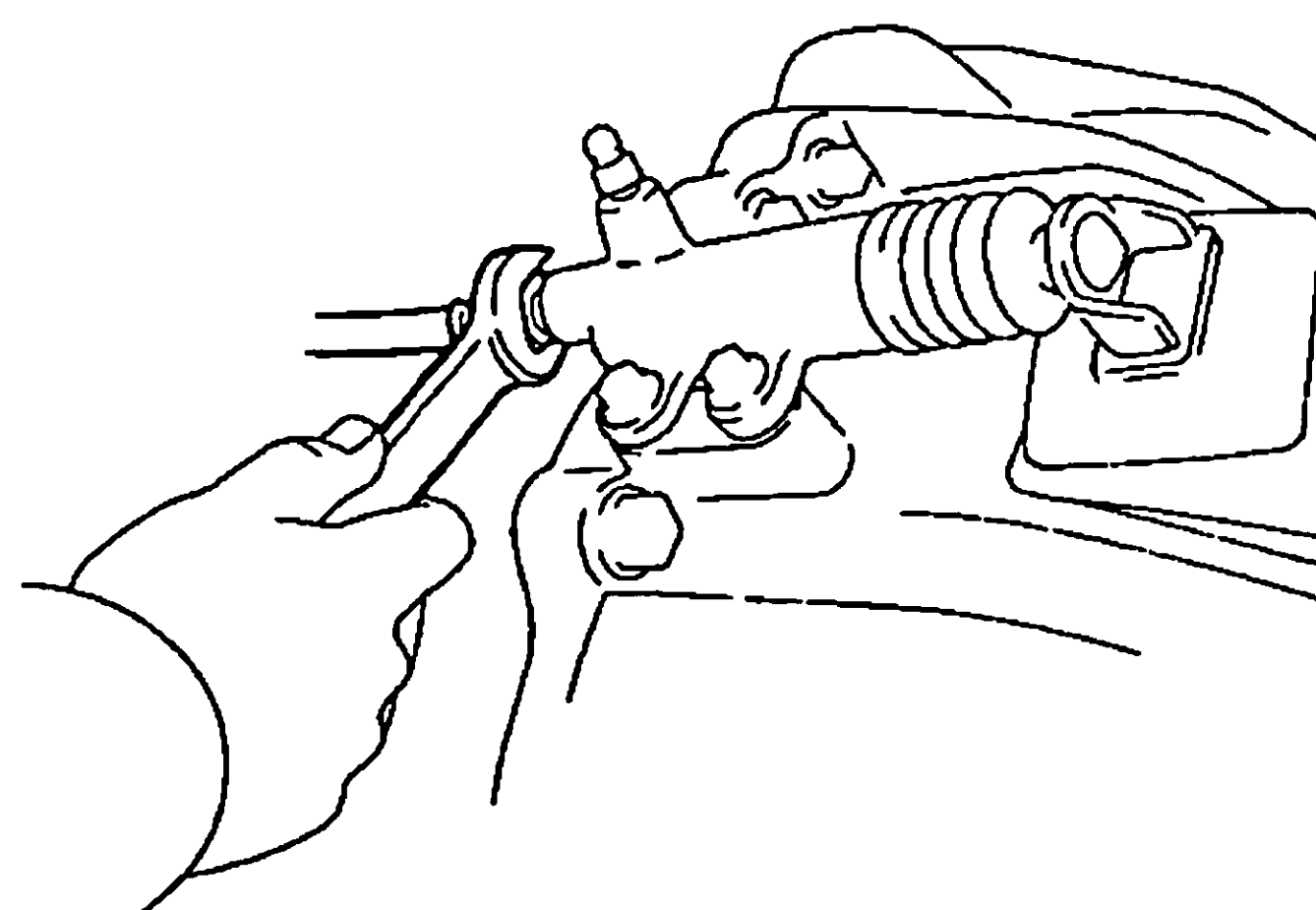


Q01623

2. INSTALL FLEXIBLE HOSE

(a) Install and torque the flexible hose to the release cylinder.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)



Q01620

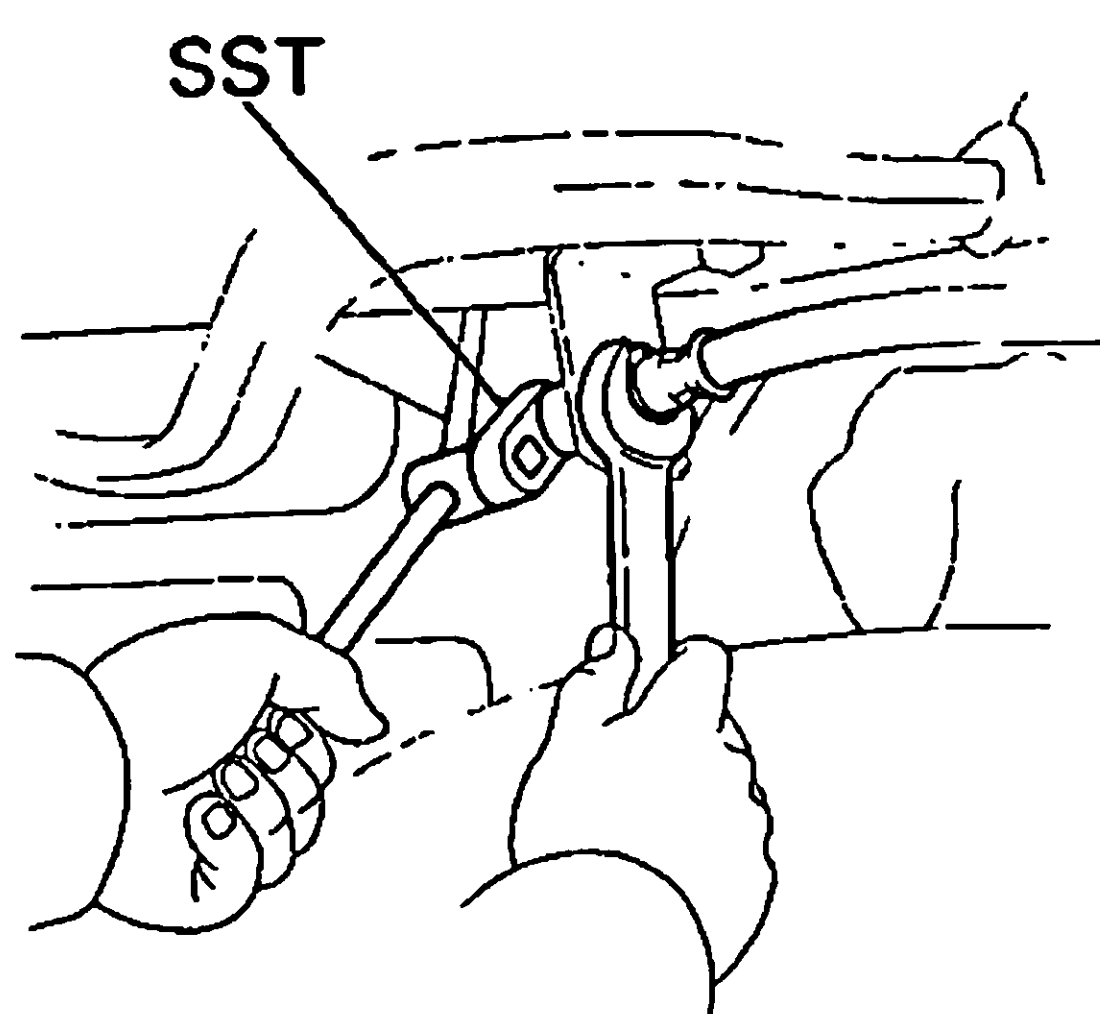
(b) Using SST connect and torque the clutch line union to the flexible hose.

HINT: First finger-tighten and then tighten to specified torque.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

(c) Install the clip.



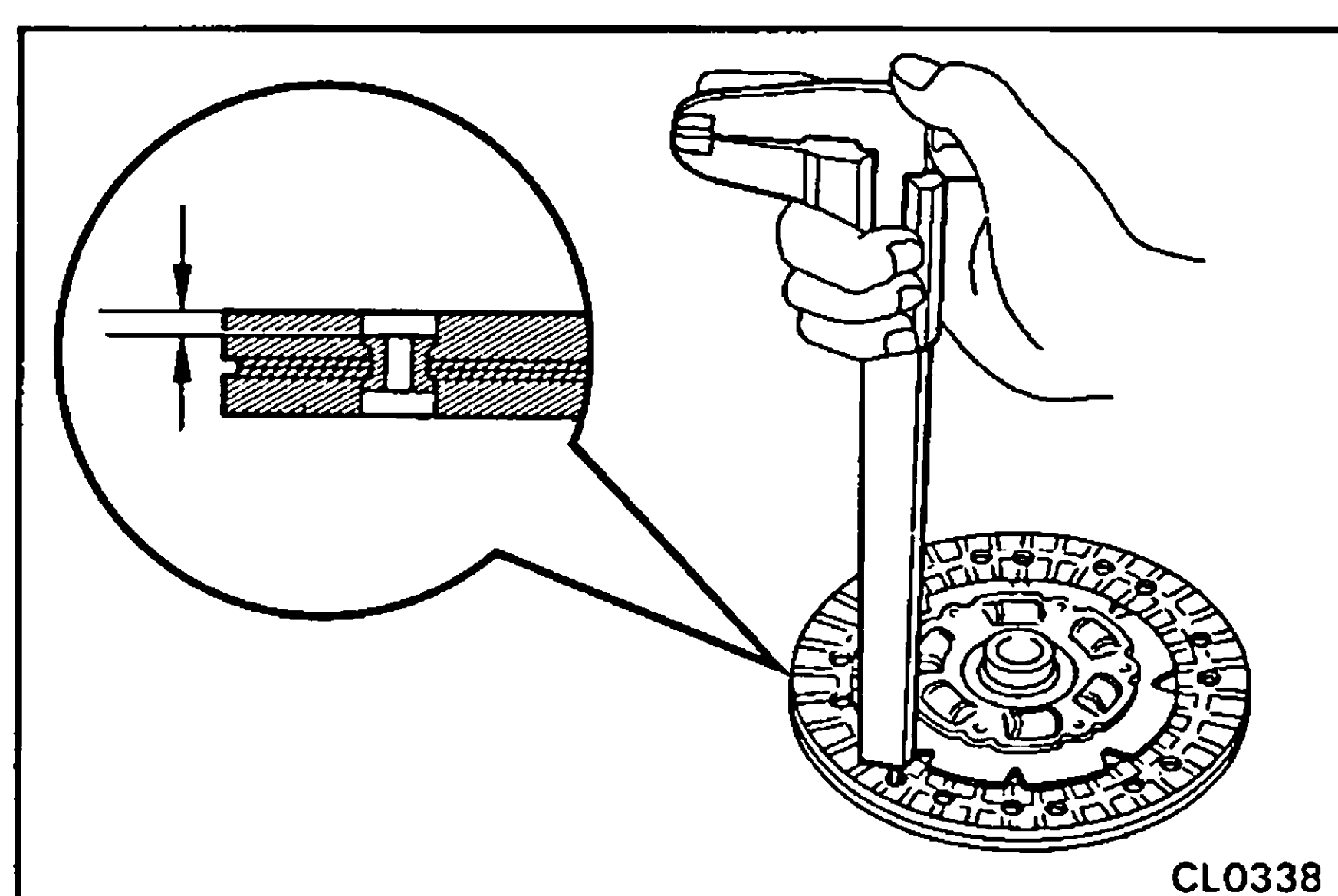
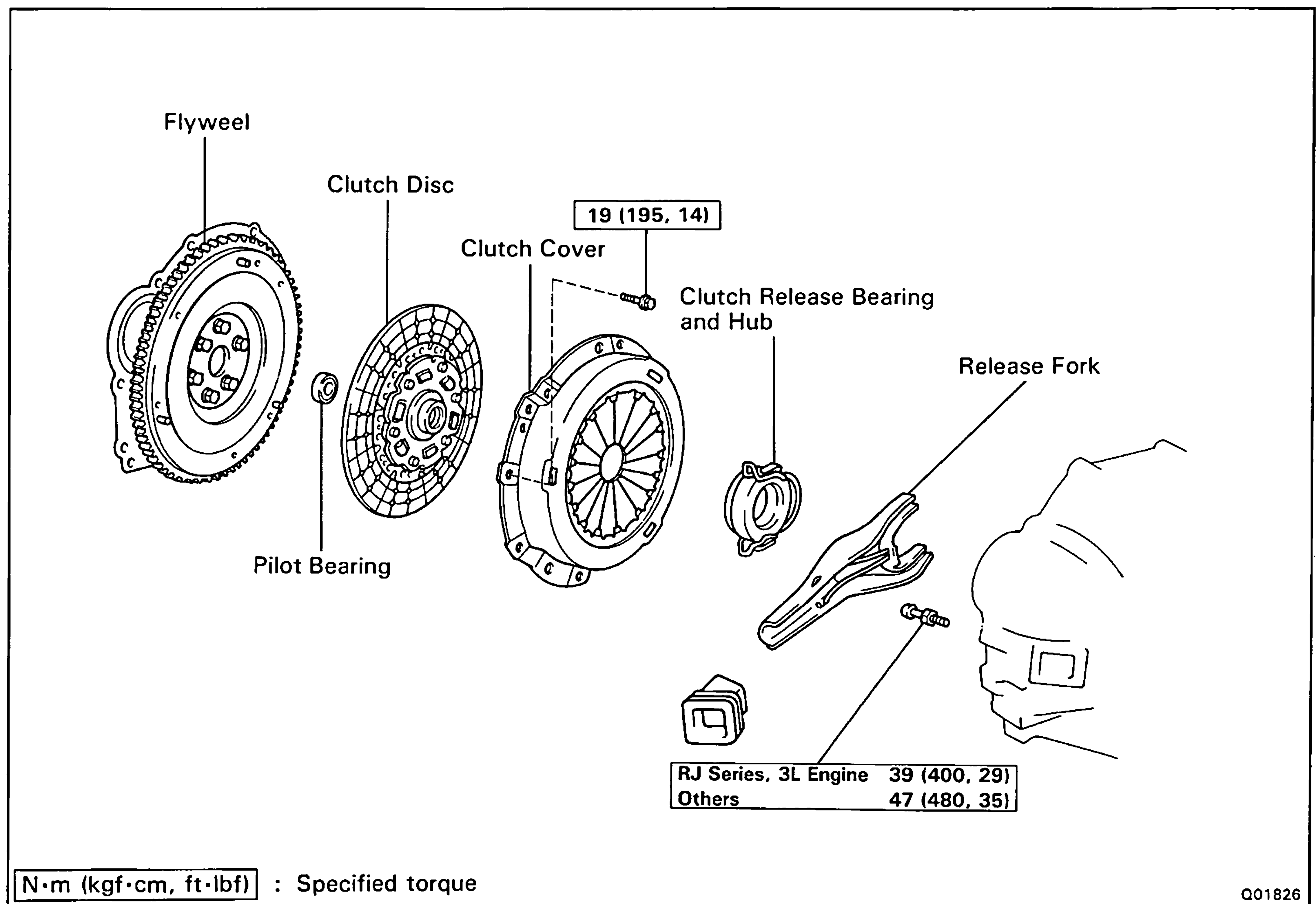
Q01634

3. BLEED CLUTCH SYSTEM
4. CHECK FOR LEAKS

CLUTCH UNIT

REMOVAL OF CLUTCH UNIT

Remove the parts as shown.



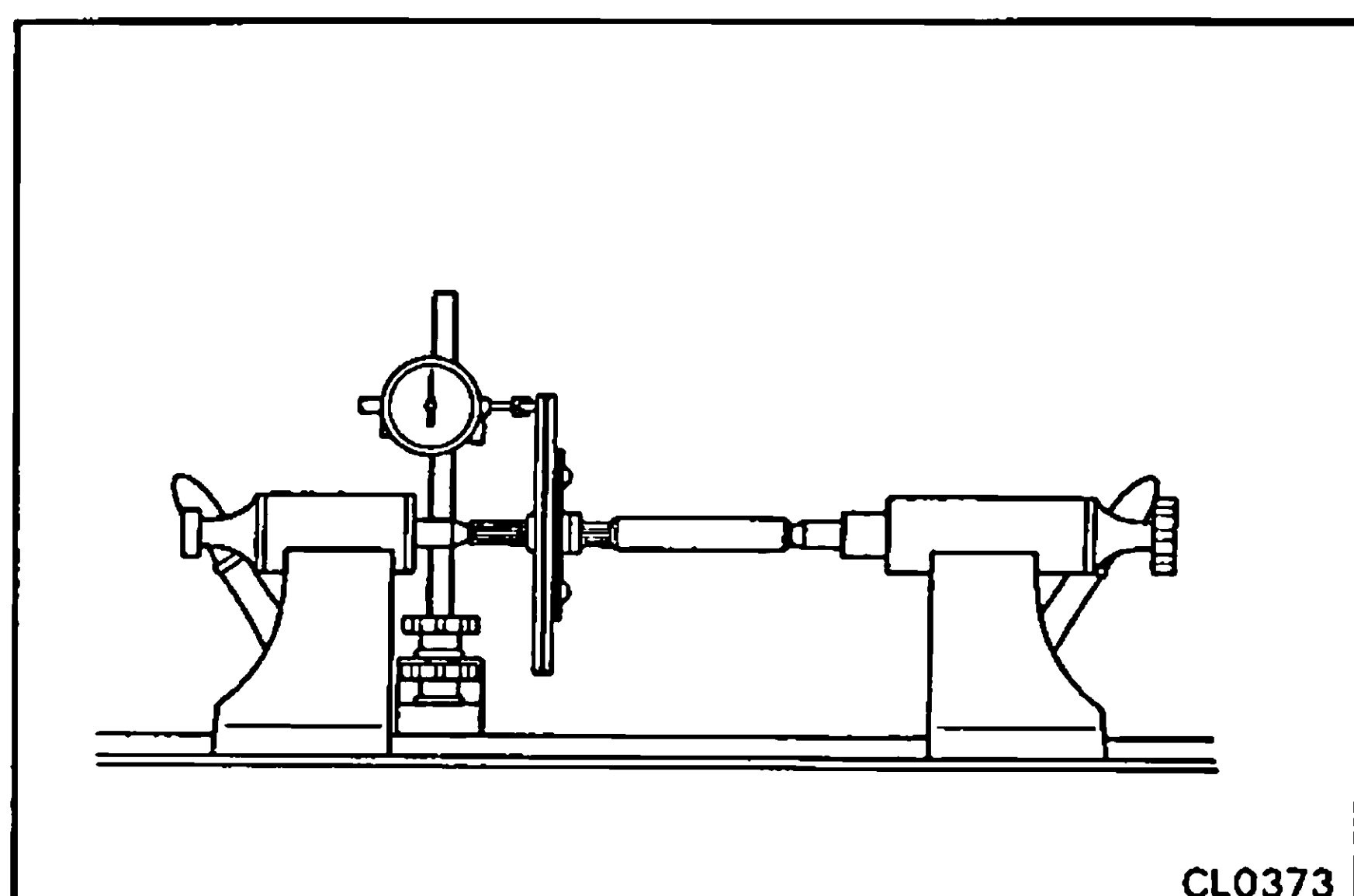
INSPECTION OF CLUTCH PARTS

1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Maximum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, replace the clutch disc.

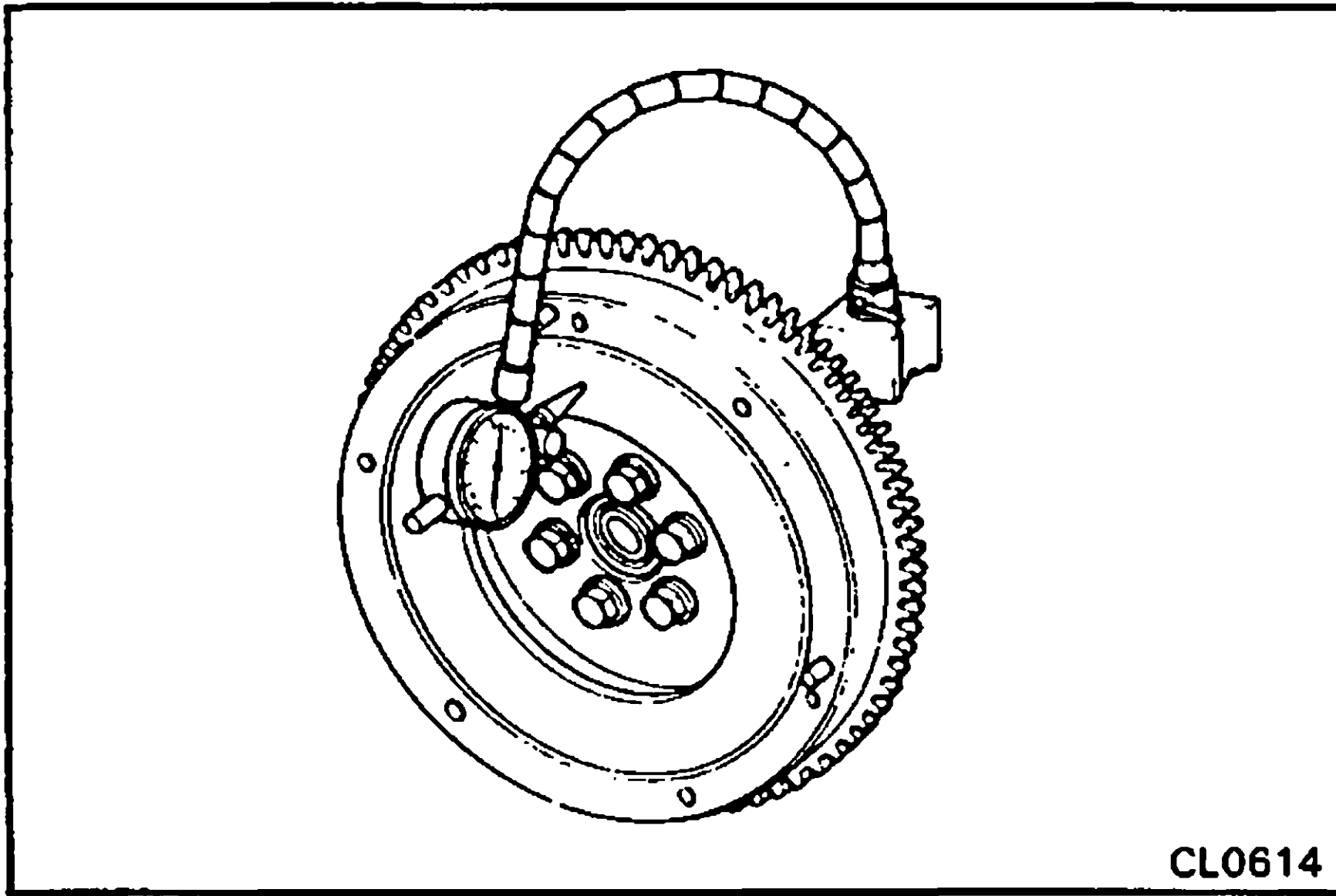


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the clutch disc.

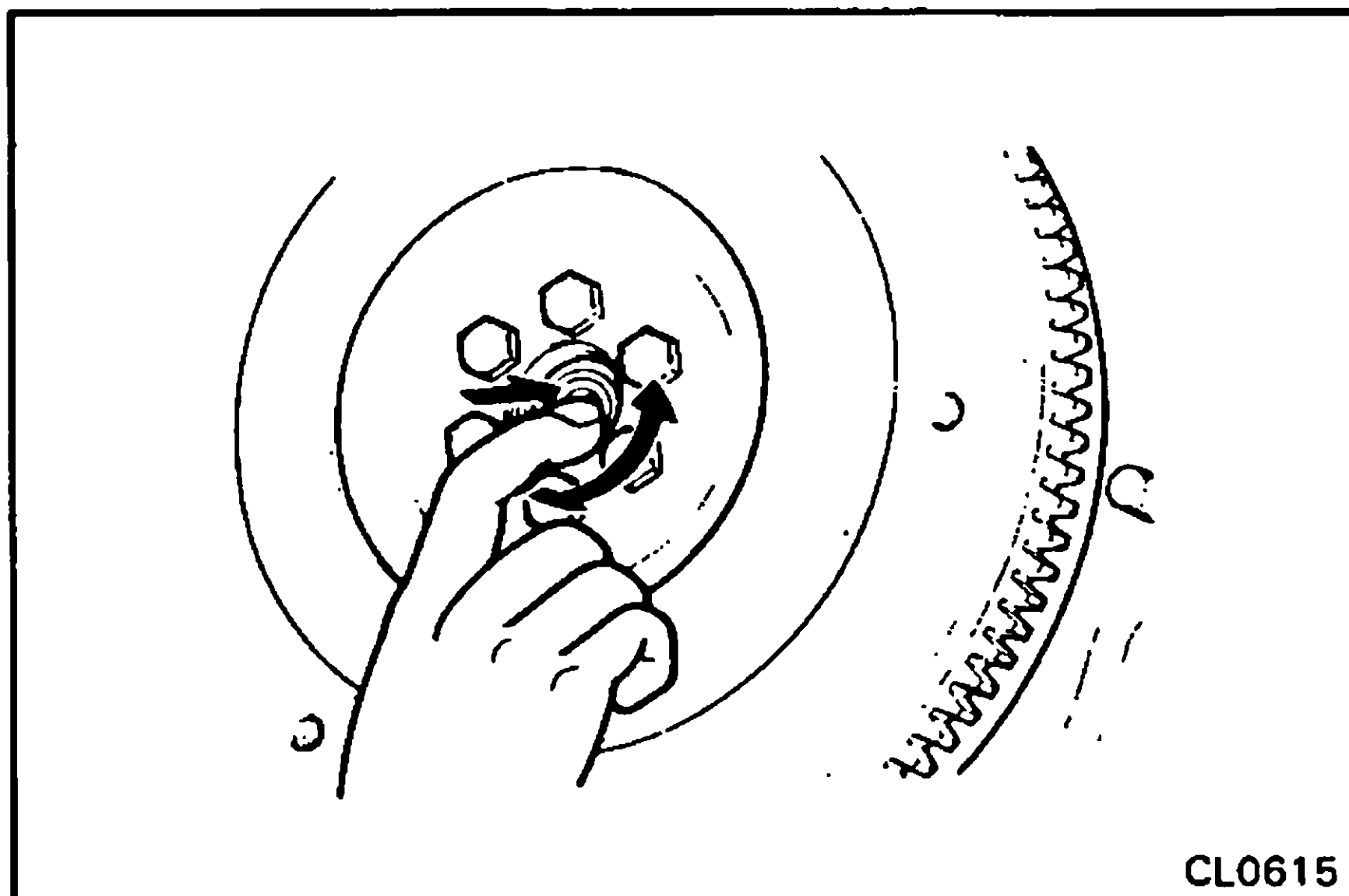


3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.1 mm (0.004 in.)

If runout is excessive, replace the flywheel.

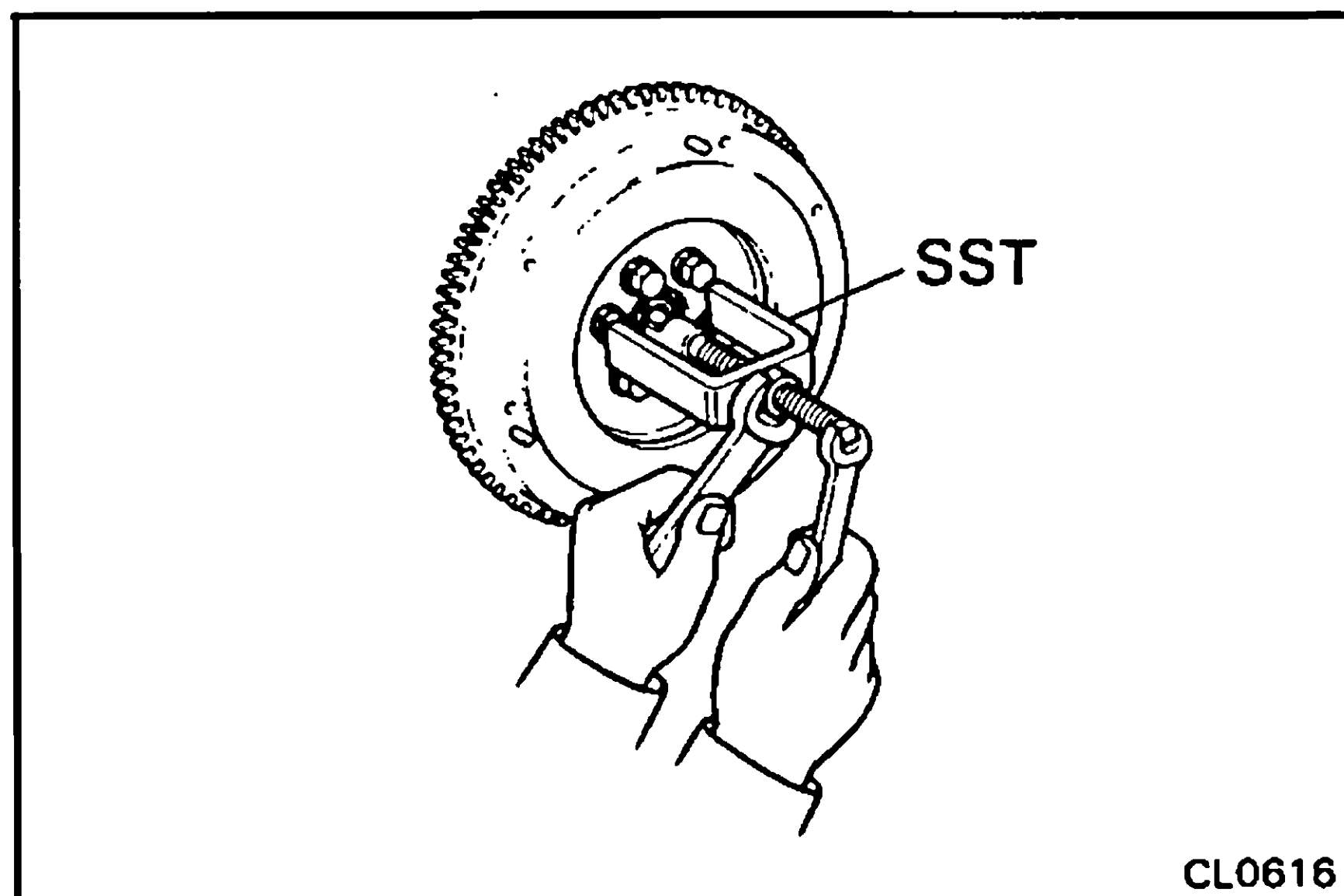


4. INSPECT PILOT BEARING

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

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

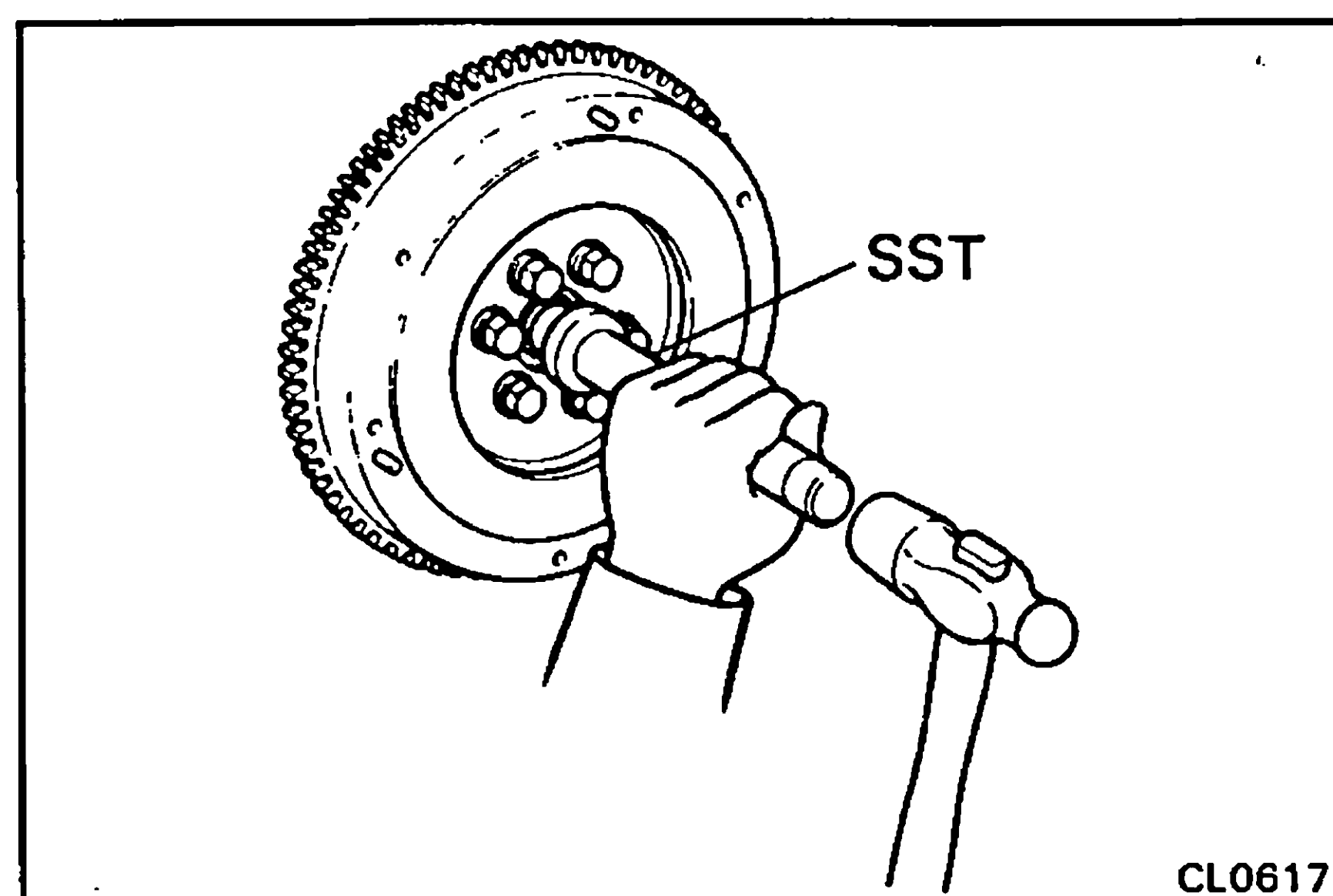
HINT: The bearing is permanently lubricated and requires no cleaning or lubrication.



5. IF NECESSARY, REPLACE PILOT BEARING

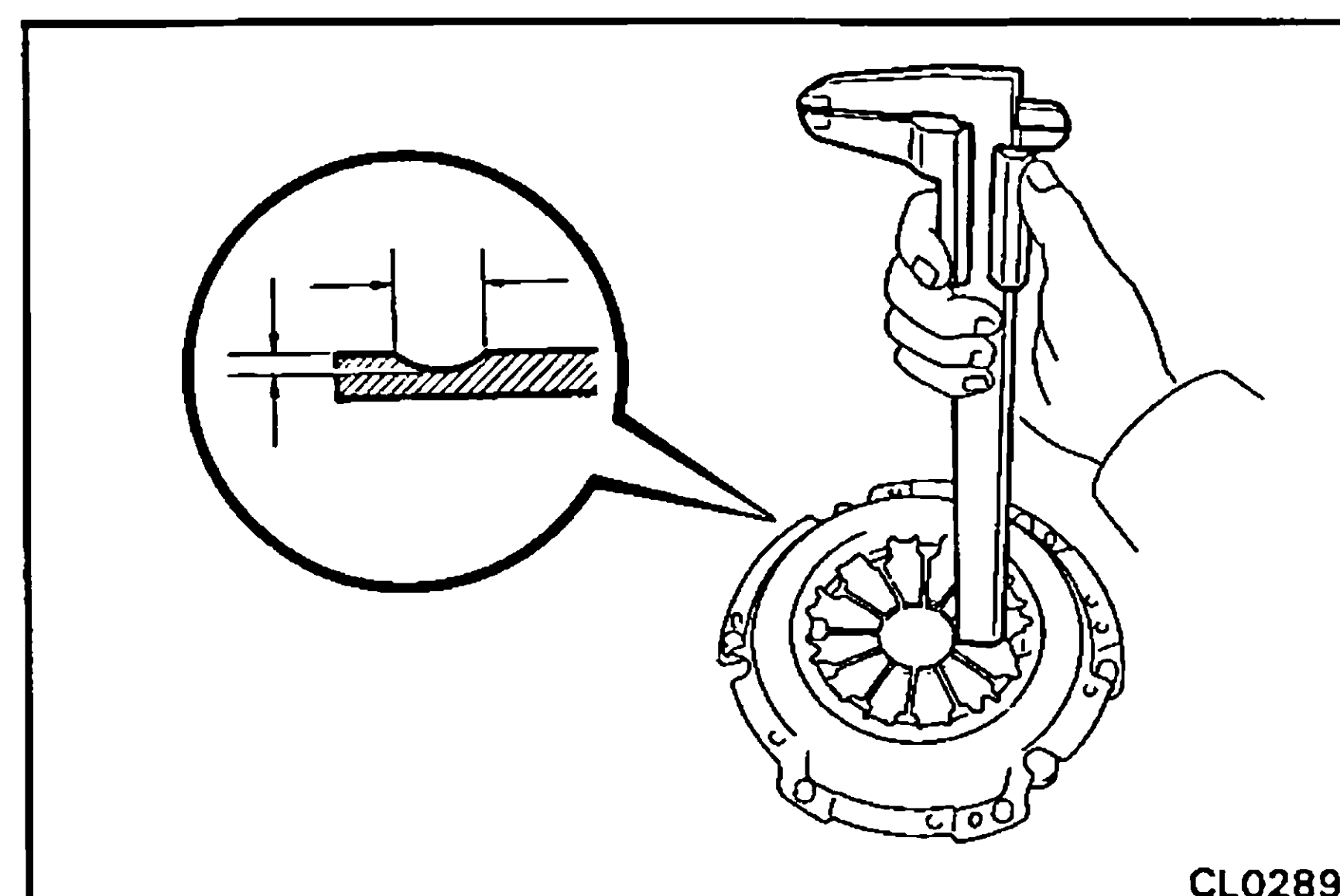
(a) Using SST, remove the pilot bearing.

SST 09303-35011



(b) Using SST, install the pilot bearing.

SST 09304-30012



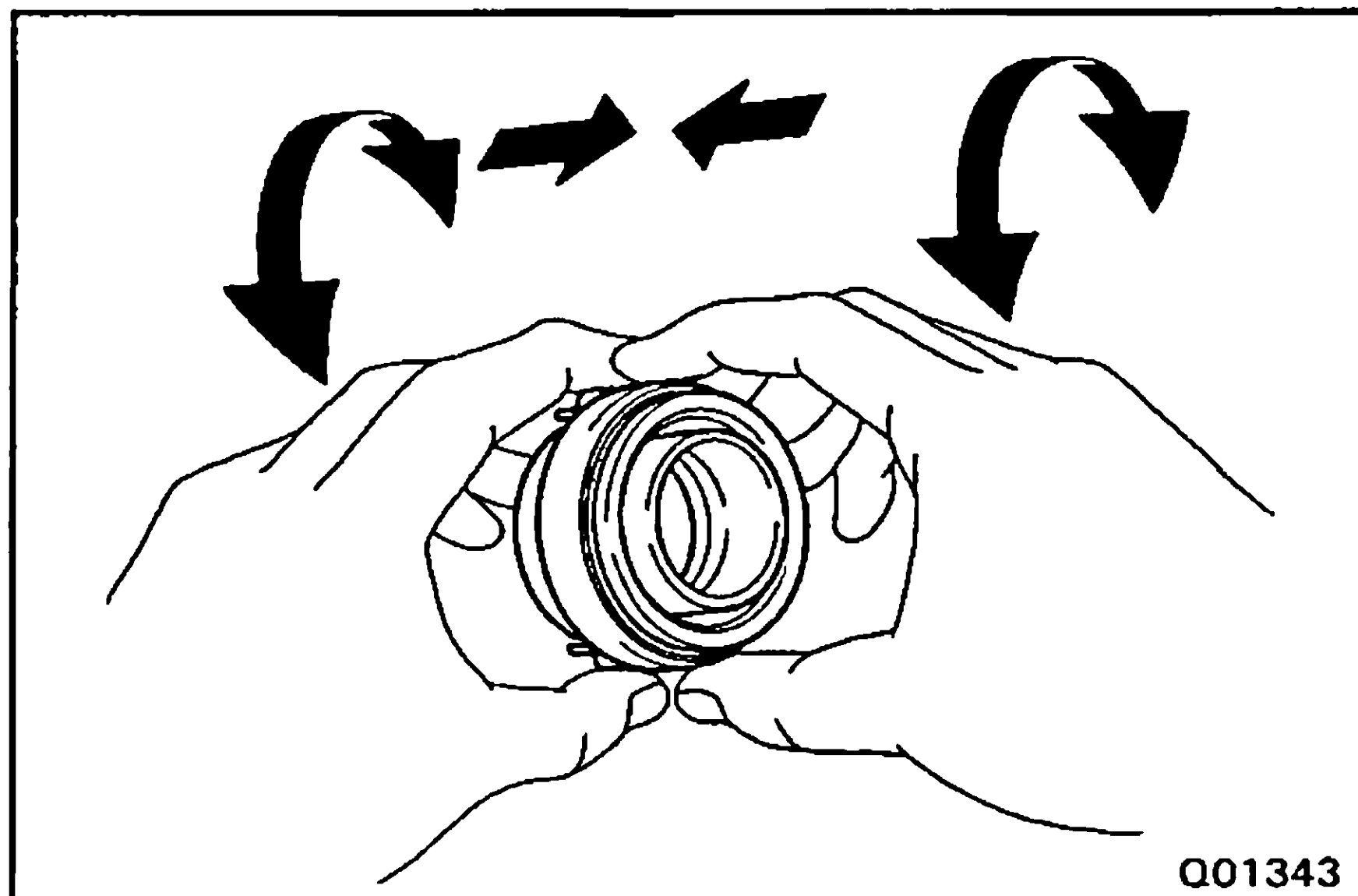
6. INSPECT DIAPHRAGM SPRING FOR WEAR

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.)

If necessary, replace the clutch cover.

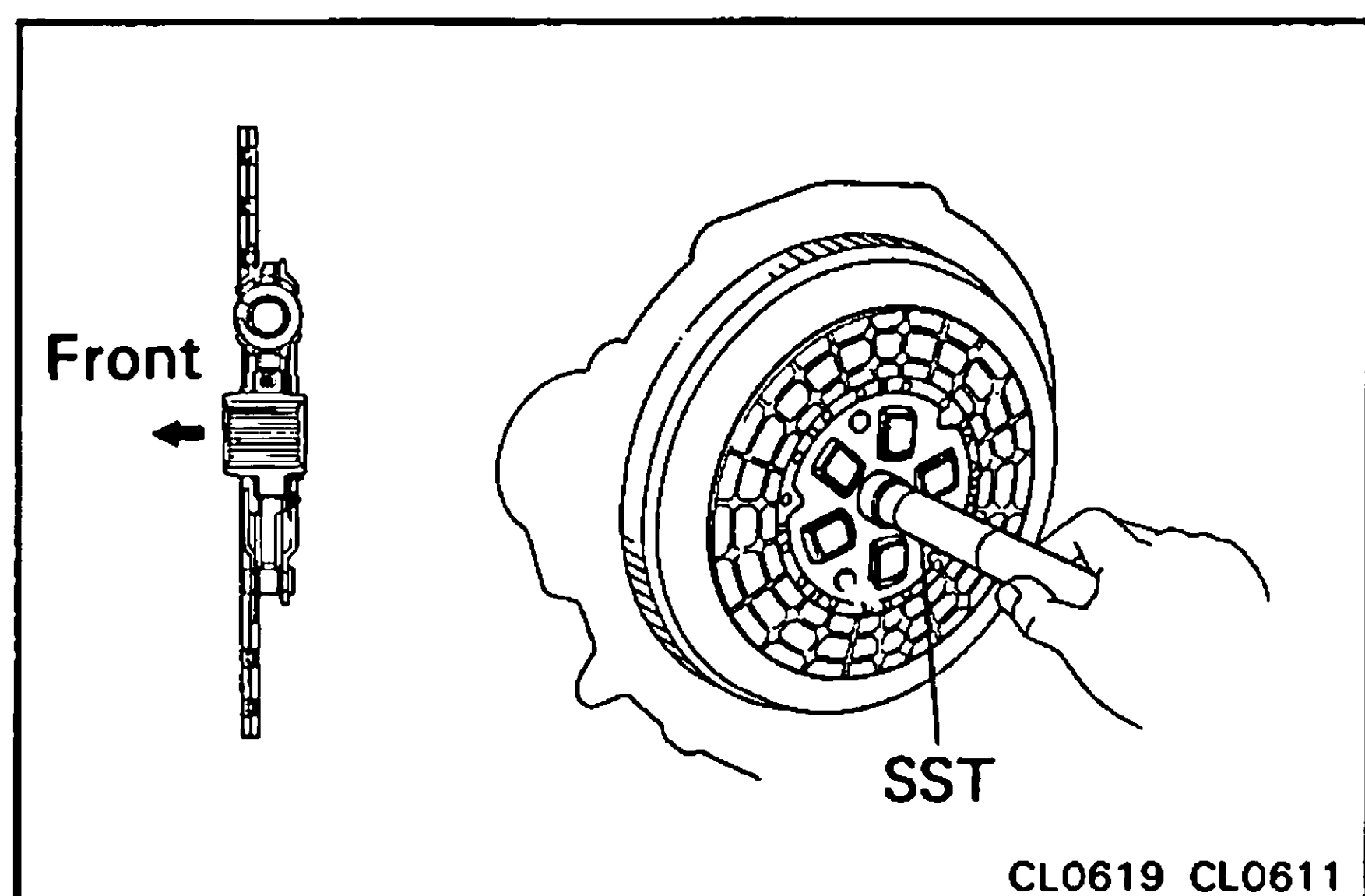


7. INSPECT RELEASE BEARING

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

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

If a problem is found, replace the bearing.



INSTALLATION OF CLUTCH UNIT (MAIN POINT OF INSTALLATION)

1. INSTALL CLUTCH DISC AND COVER ON FLYWHEEL

Insert the SST in the clutch disc, and then set them and the cover in position.

SST 09301-55022

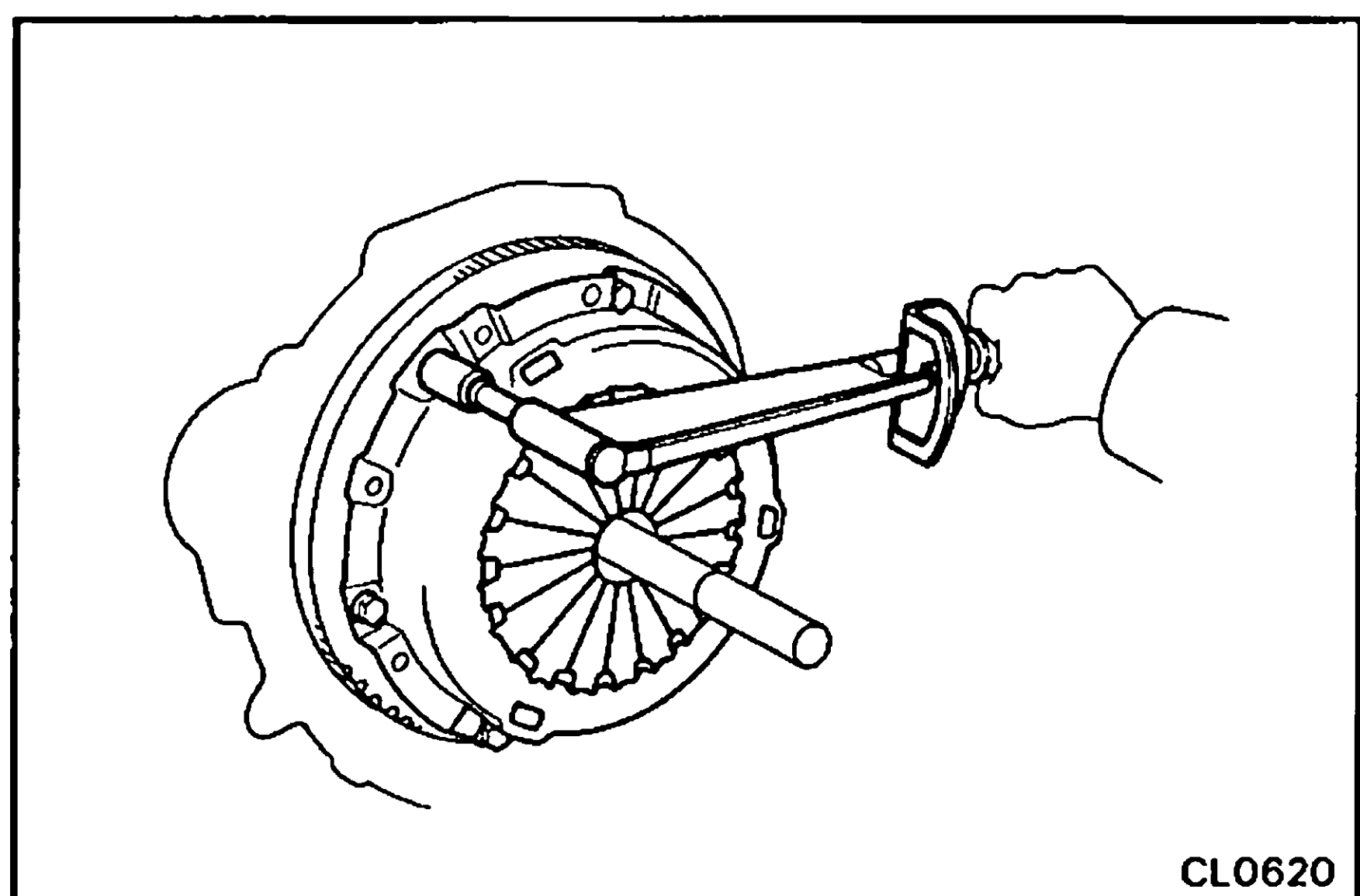
2. INSTALL CLUTCH COVER

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

(b) Torque the bolts on the clutch cover in the order shown.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

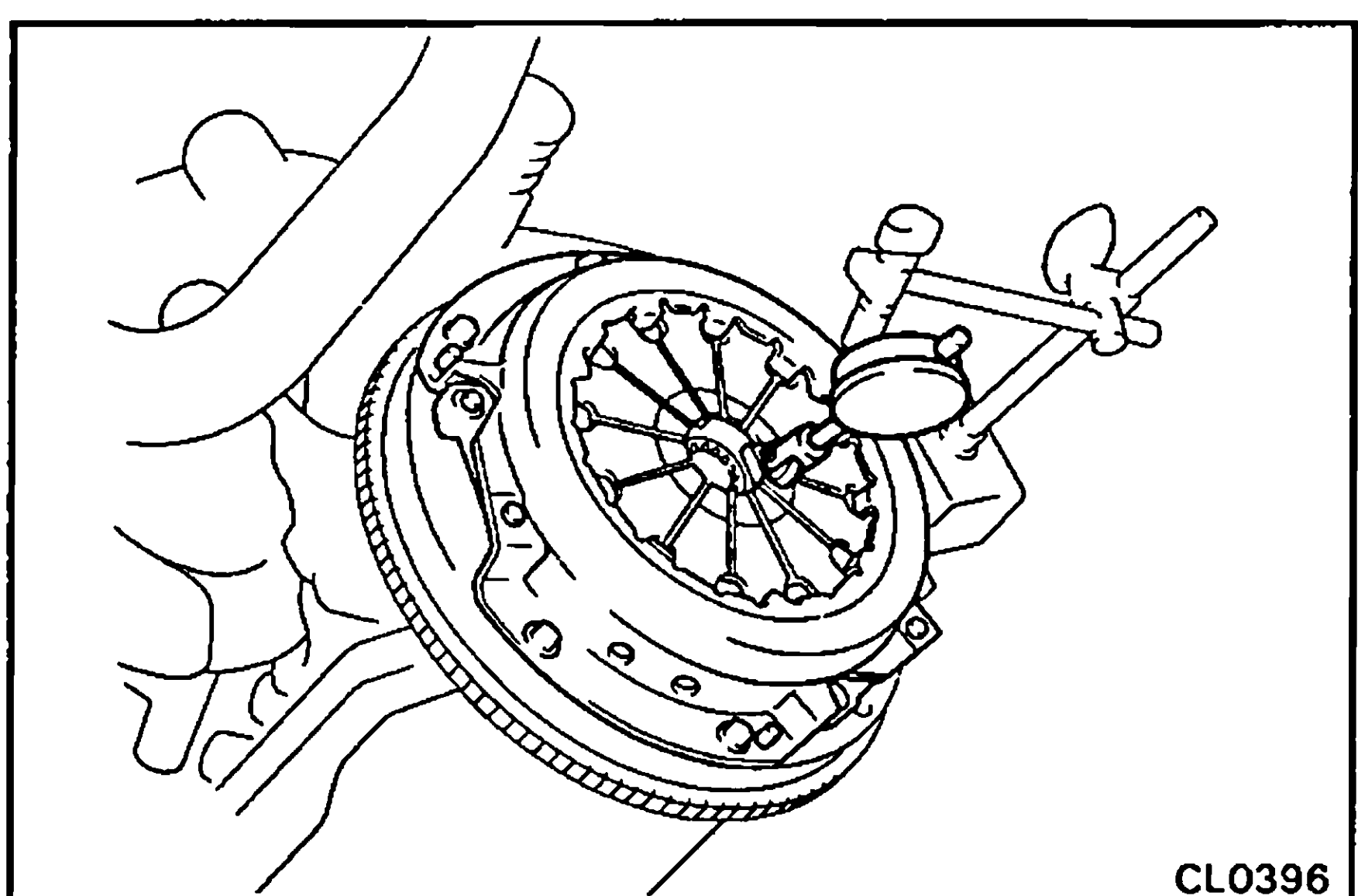
HINT: Temporarily tighten the No.1 and No.2 bolts.



3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

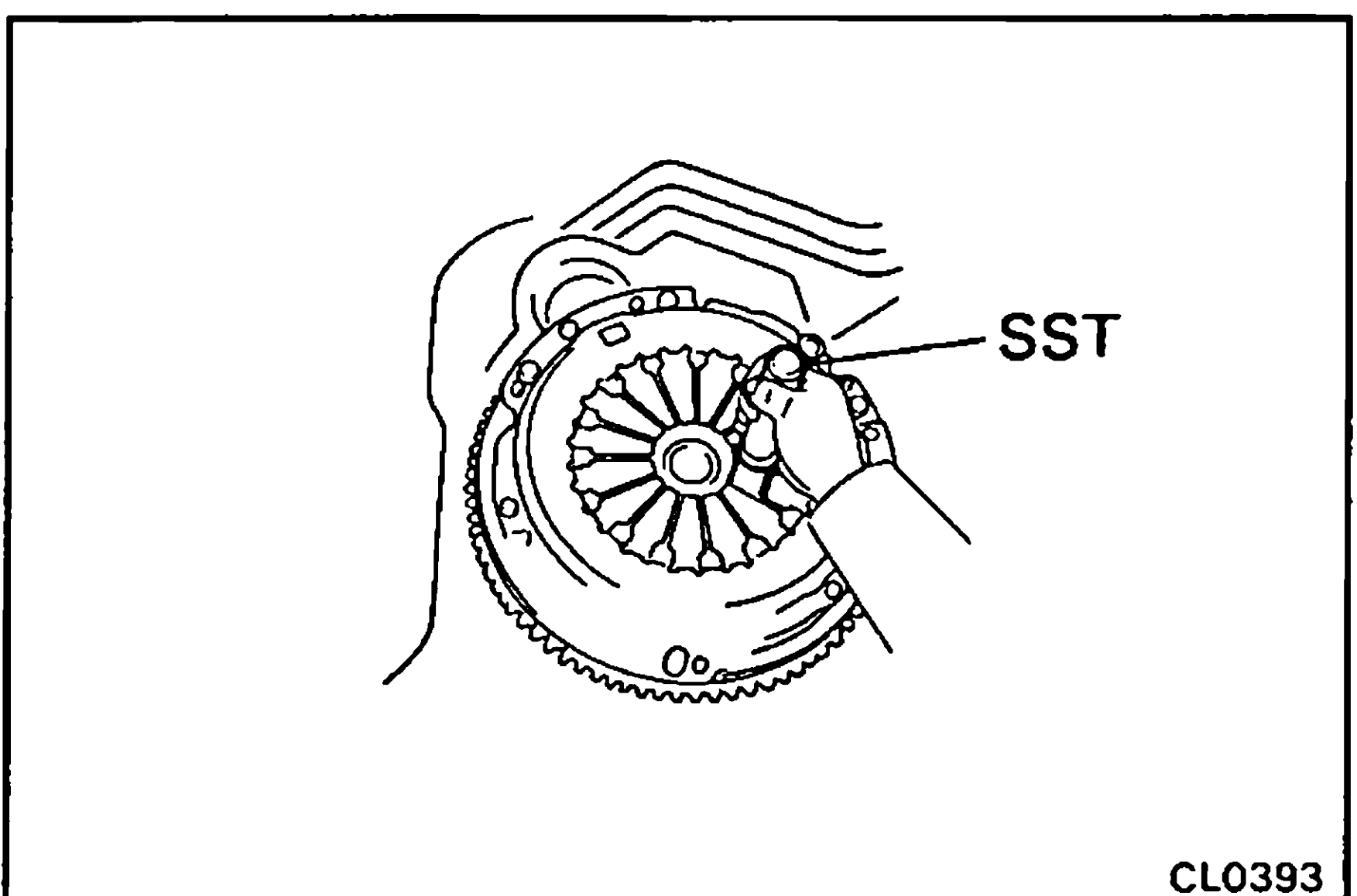
Using dial indicator, check the diaphragm spring tip alignment.

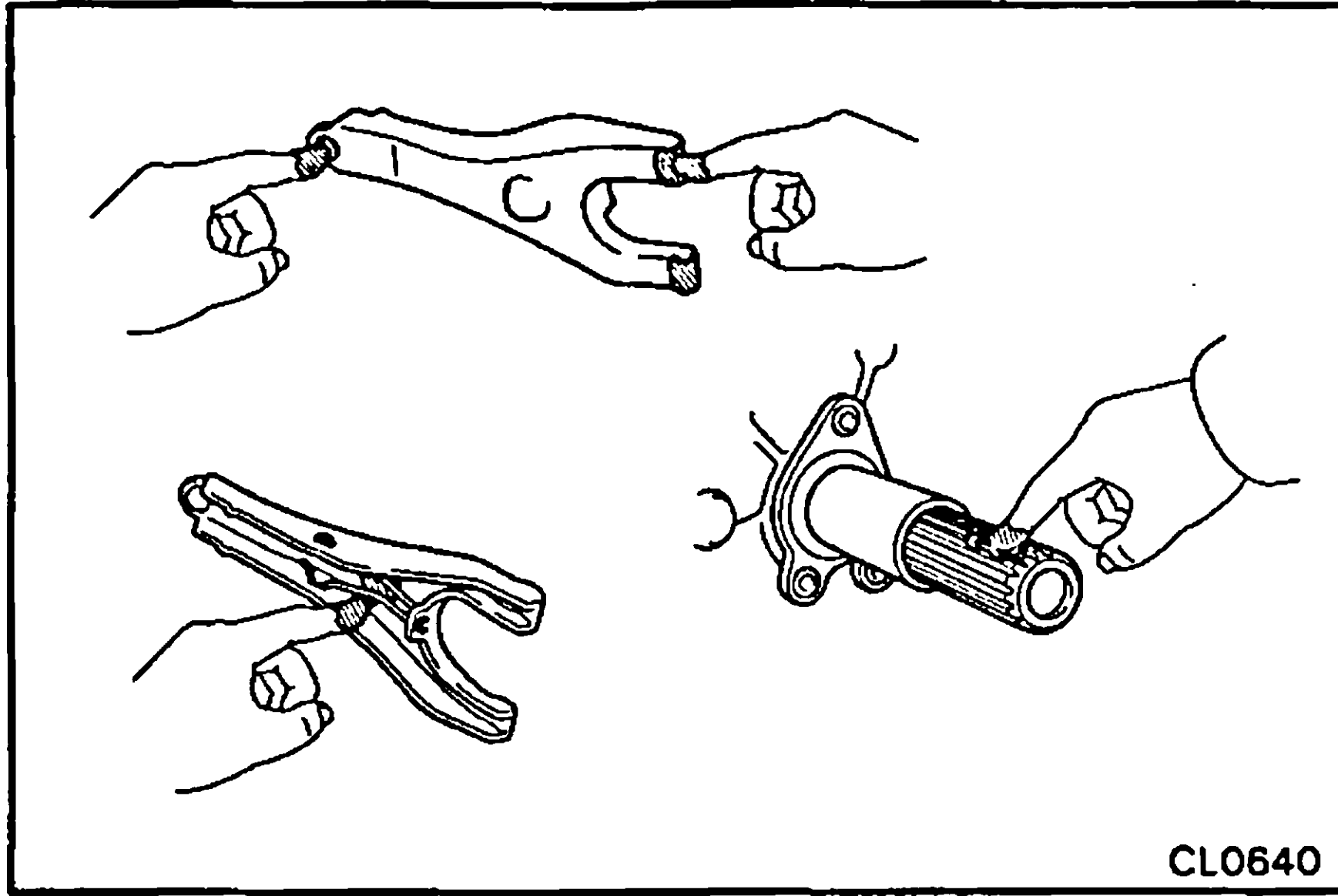
Maximum non-alignment: 0.5 mm (0.020 in.)



If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

SST 09333-00013

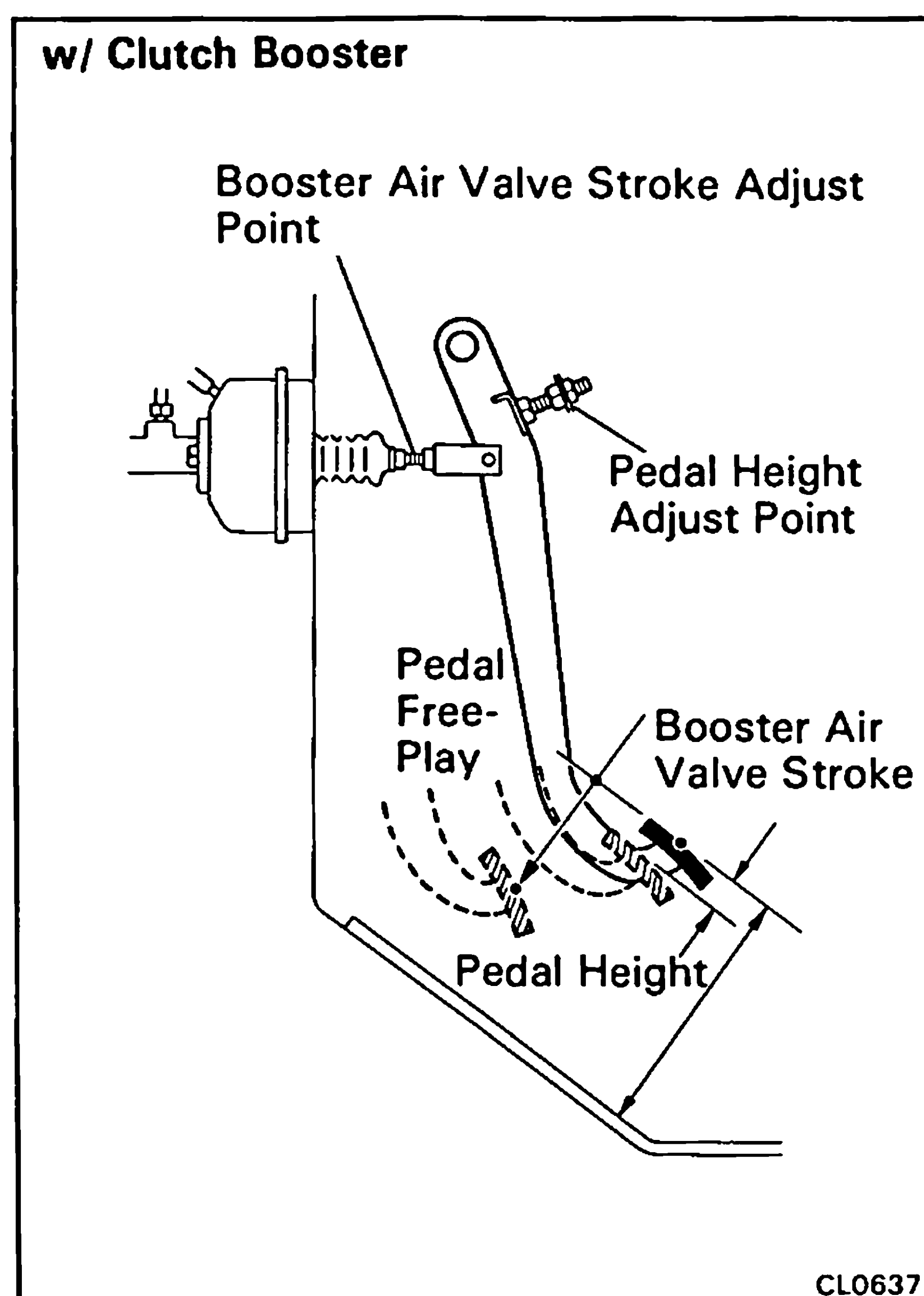
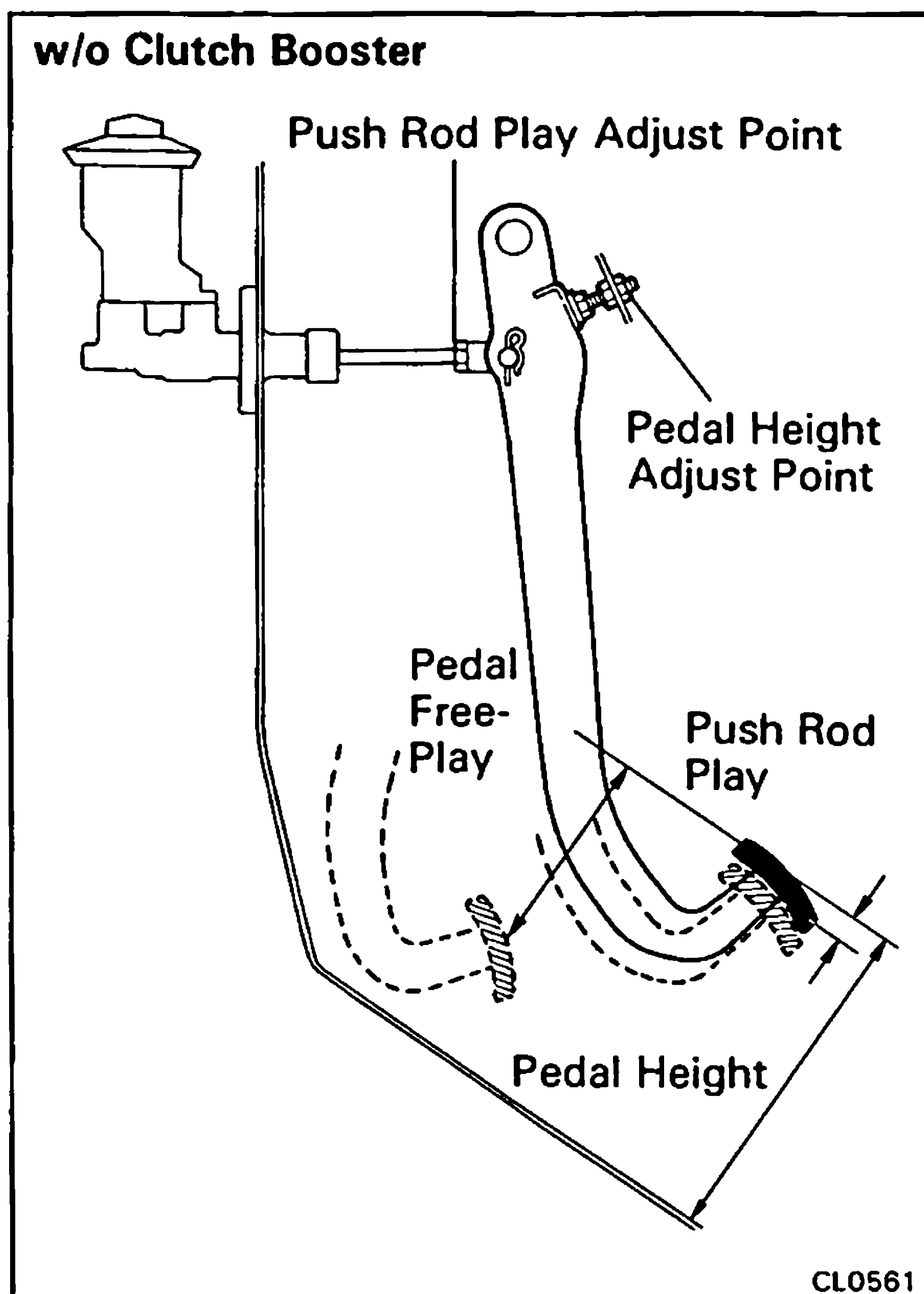




4. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) AS SHOWN

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Clutch pedal freeplay excessive	Adjust pedal freeplay	CL-29
	Clutch booster faulty	Inspect clutch booster	CL-36
	Clutch release cylinder faulty	Repair release cylinder	CL-47
	Clutch master cylinder faulty	Repair master cylinder	CL-32, 34
	Clutch disc out of true, lining greasy or broken	Inspect clutch disc	CL-51
	Splines on input shaft or clutch disc dirty or burred	Repair as necessary	CL-51
	Clutch pressure plate faulty	Replace pressure plate	CL-51
Transmission jumps out of gear	Pilot bearing worn	Replace pilot bearing	CL-51
Clutch slips	Clutch pedal freeplay insufficient	Adjust pedal freeplay	CL-29
	Clutch booster faulty	Inspect clutch booster	CL-36
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-51
	Pressure plate faulty	Replace pressure plate	CL-51
	Release fork binds	Inspect release fork	CL-51
Clutch grabs/chatters	Clutch booster faulty	Inspect clutch booster	CL-36
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-51
	Pressure plate faulty	Replace pressure plate	CL-51
	Clutch diaphragm spring bending	Align clutch diaphragm	CL-51
	Engine mounts loose	Repair as necessary	CL-51
Clutch pedal spongy	Air in clutch lines	Bleed clutch system	CL-31
	Clutch release cylinder faulty	Repair release cylinder	CL-47
	Clutch master cylinder faulty	Repair master cylinder	CL-32, 34
Clutch noisy	Loose part inside housing	Repair as necessary	
	Release bearing worn or dirty	Replace release bearing	CL-51
	Pilot bearing worn	Replace pilot bearing	CL-51
	Release fork or linkage sticks	Repair as necessary	



CHECK AND ADJUSTMENT OF CLUTCH PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet:
173 mm (6.81 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

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

HINT: After adjusting the pedal height, check and adjust the pedal free play and push rod play or booster air valve stroke.

3-1. (w/o Clutch Booster)

CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT

(Pedal Freeplay)

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

Pedal freeplay: 13.0 — 23.0 mm (0.51 — 0.91 in.)

(Push rod play)

Push in on the pedal with a finger softly until the resistance begins to increase a little.

Push rod play at pedal top: 1.0 — 5.0 mm
(0.039 — 0.197 in.)

3-2. (w/ Clutch Booster)

CHECK PEDAL FREEPLAY AND BOOSTER AIR VALVE STROKE

(Pedal Freeplay)

Push in on the pedal until the clutch begins to resist.

Pedal freeplay: 15.0 — 30.0 mm (0.59 — 1.18 in.)

(Booster Air Valve Stroke)

(a) Stop the engine and depress the clutch pedal several times until there is no vacuum left in the clutch booster.

(b) Push in on the pedal with a finger softly until the resistance begins to increase a little.

Booster air valve stroke at pedal top:
5.0 — 9.0 mm (0.20 — 0.35 in.)

HINT: The booster air valve stroke is the amount of the stroke until the booster piston is moved by the booster air valve.

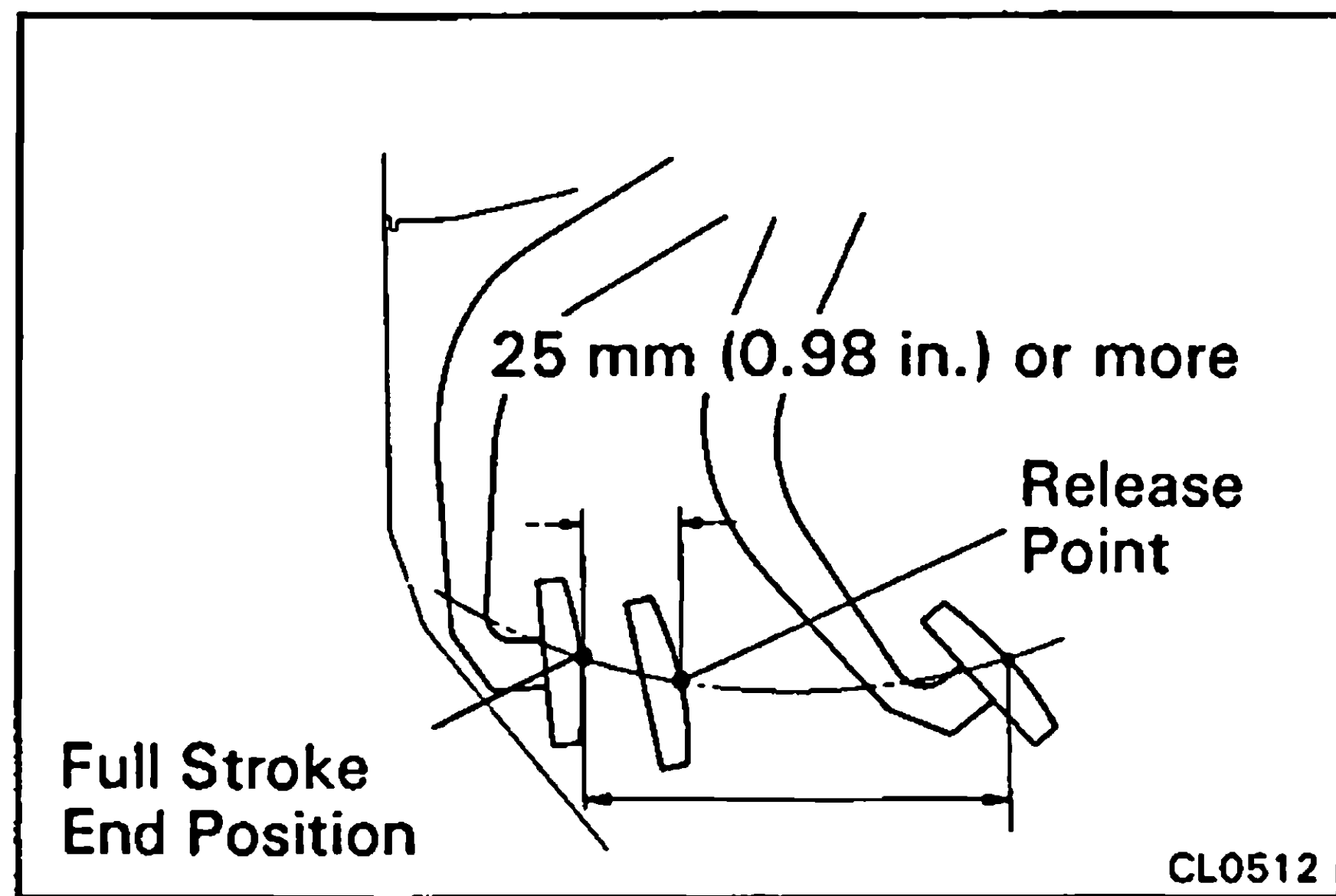
4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY OR BOOSTER AIR VALVE STROKE

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

(b) Tighten the lock nut.

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

(d) Connect the air duct and install the lower finish panel.



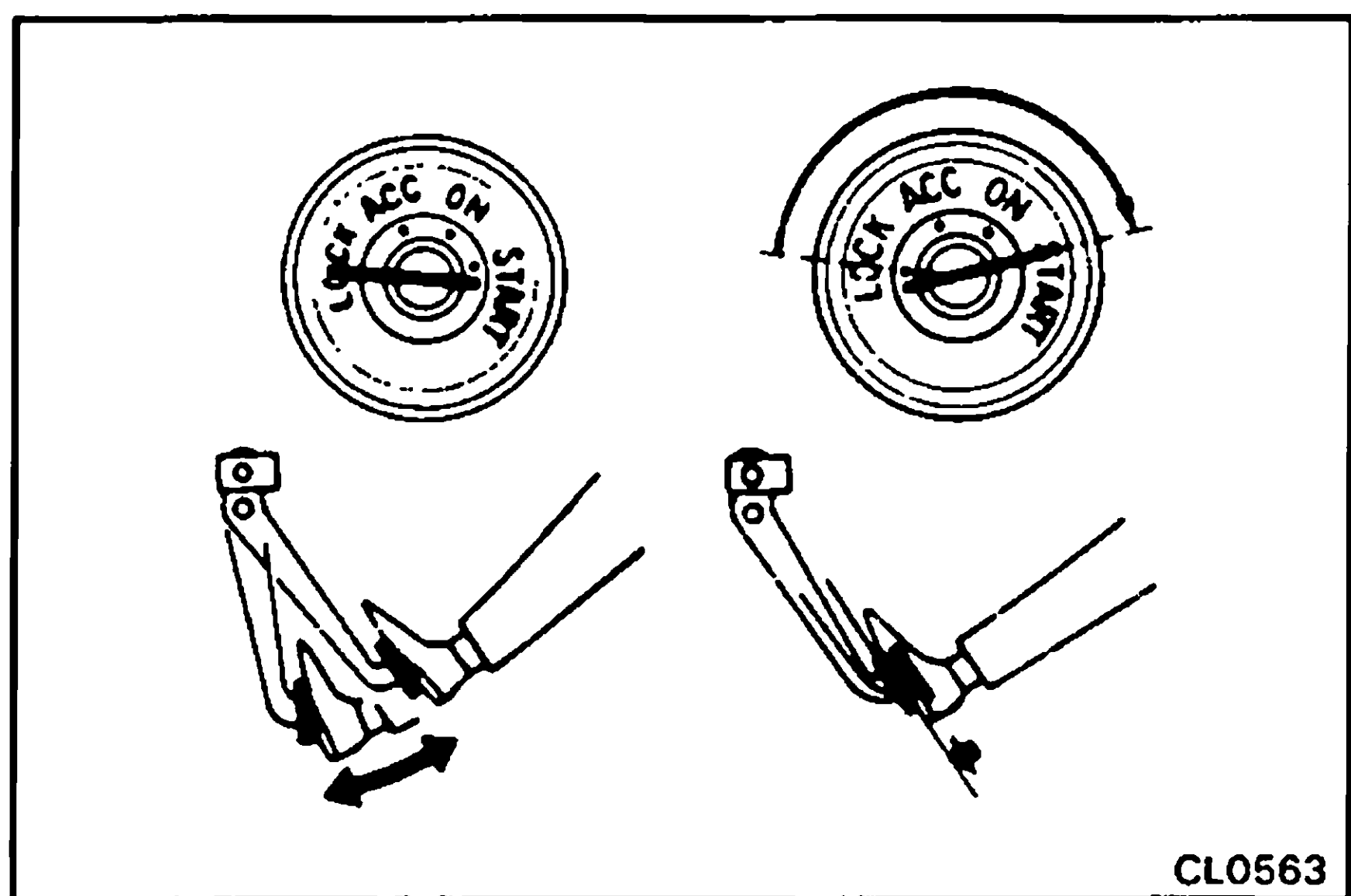
5. INSPECT CLUTCH RELEASE POINT

- (a) Pull the parking brake lever and install wheel stopper.
- (b) Start the engine and idle the engine.
- (c) Without depressing the clutch pedal, slowly shift lever into reverse position until the gears contact.
- (d) Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) up to the full stroke end position.

Standard distance: 25 mm (0.98 in.) or more (From pedal stroke end position to release point)

If the distance not as specified, perform the following operation.

- Inspect pedal height .
- Inspect push rod play and pedal freeplay.
- Bleed the clutch line.
- Inspect the clutch cover and disc.



OPERATIONAL TEST OF CLUTCH BOOSTER

HINT: If there is leakage or lack of vacuum, repair before testing.

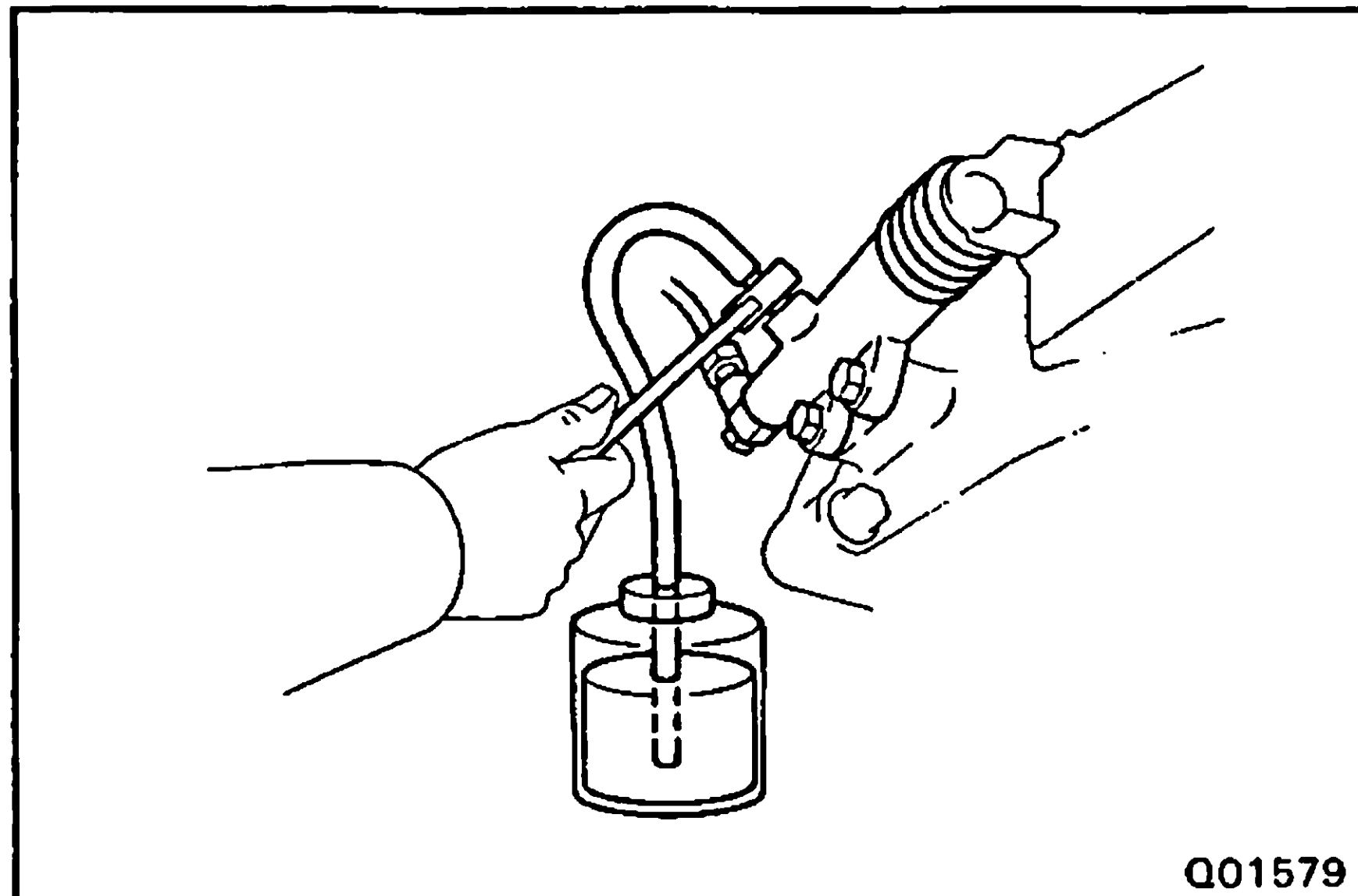
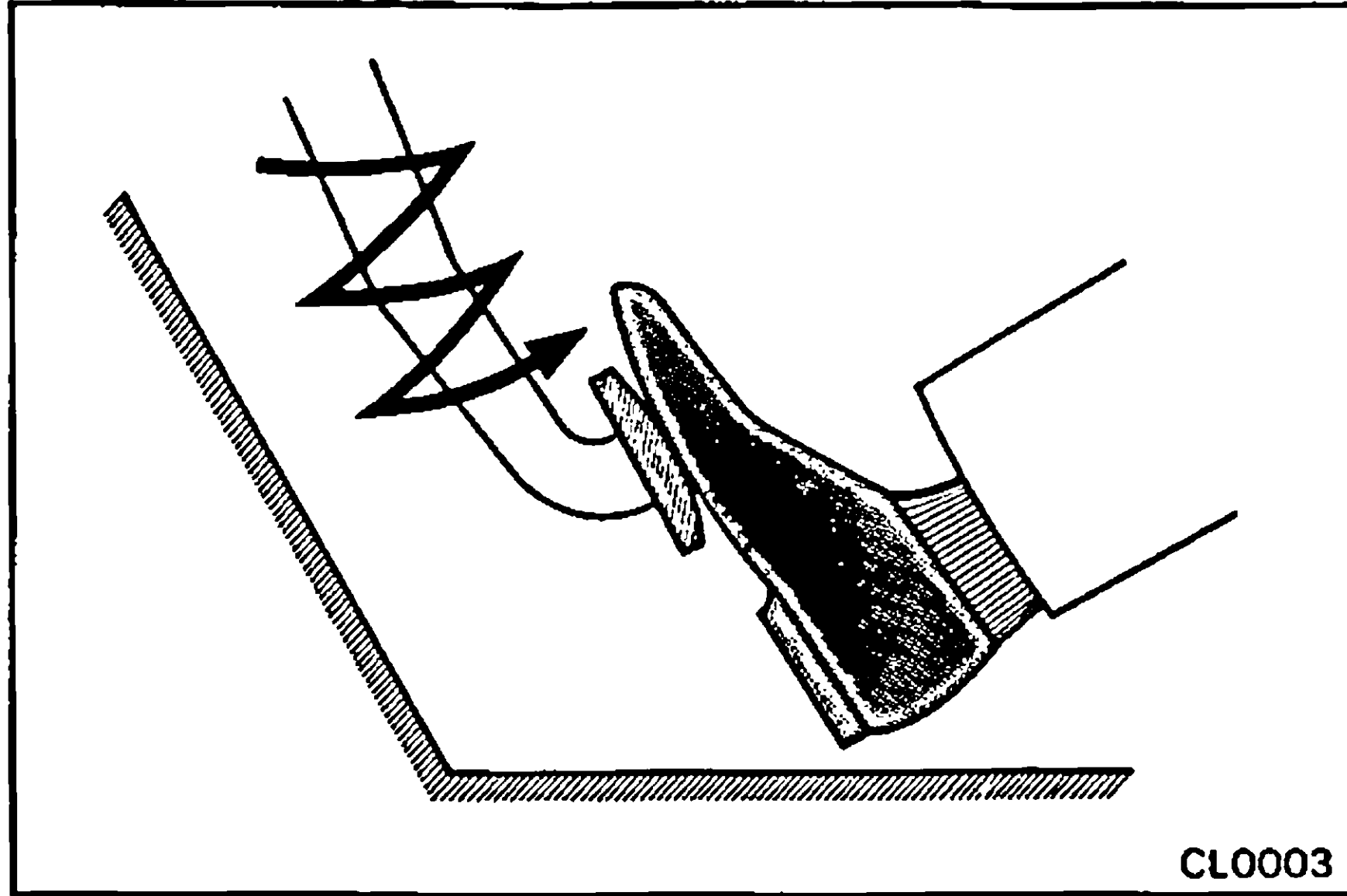
1. OPERATING CHECK

With the engine stopped, depress the clutch pedal several times. Then, with the pedal at the mid point, start the engine and confirm that the pedal sinks down slightly.

2. AIR-TIGHTNESS CHECK

- (a) Depress the clutch pedal several times with the engine stopped. Then, start the engine and depress the clutch pedal and check that there is a light difference in pedal effort.
- (b) Start the engine and turn it off after is sufficient vacuum in the booster. Depress the clutch pedal and confirm that the effort required for at least one time is equal to that with the engine running.

HINT: If (a) and (b) are not as stipulates, inspect the vacuum check valve and, if necessary, the clutch booster also.



BLEEDING OF CLUTCH SYSTEM

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

NOTICE: 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. 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.

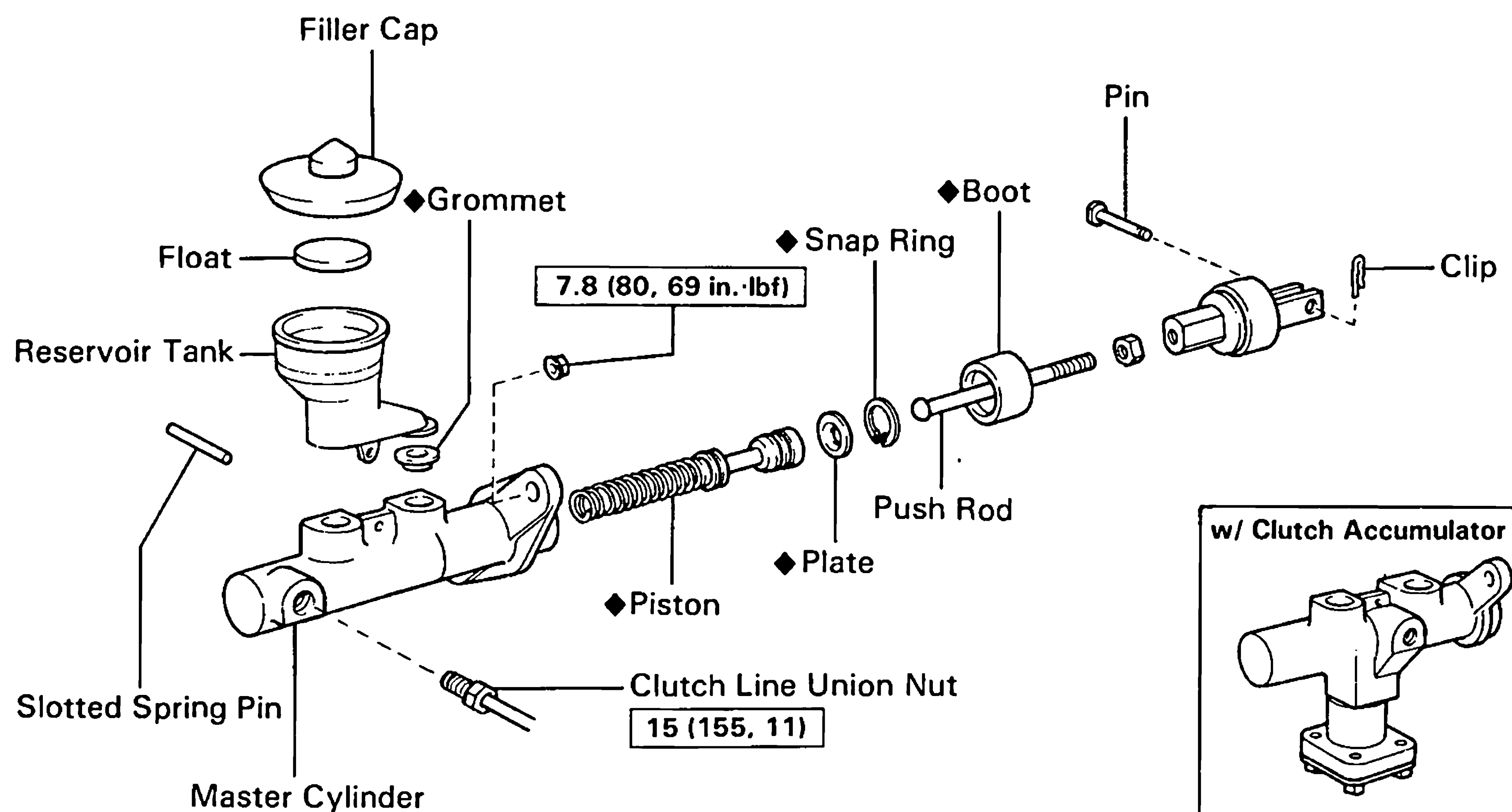
3. BLEED CLUTCH LINE

- (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.

4. TIGHTEN BLEEDER PLUG

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

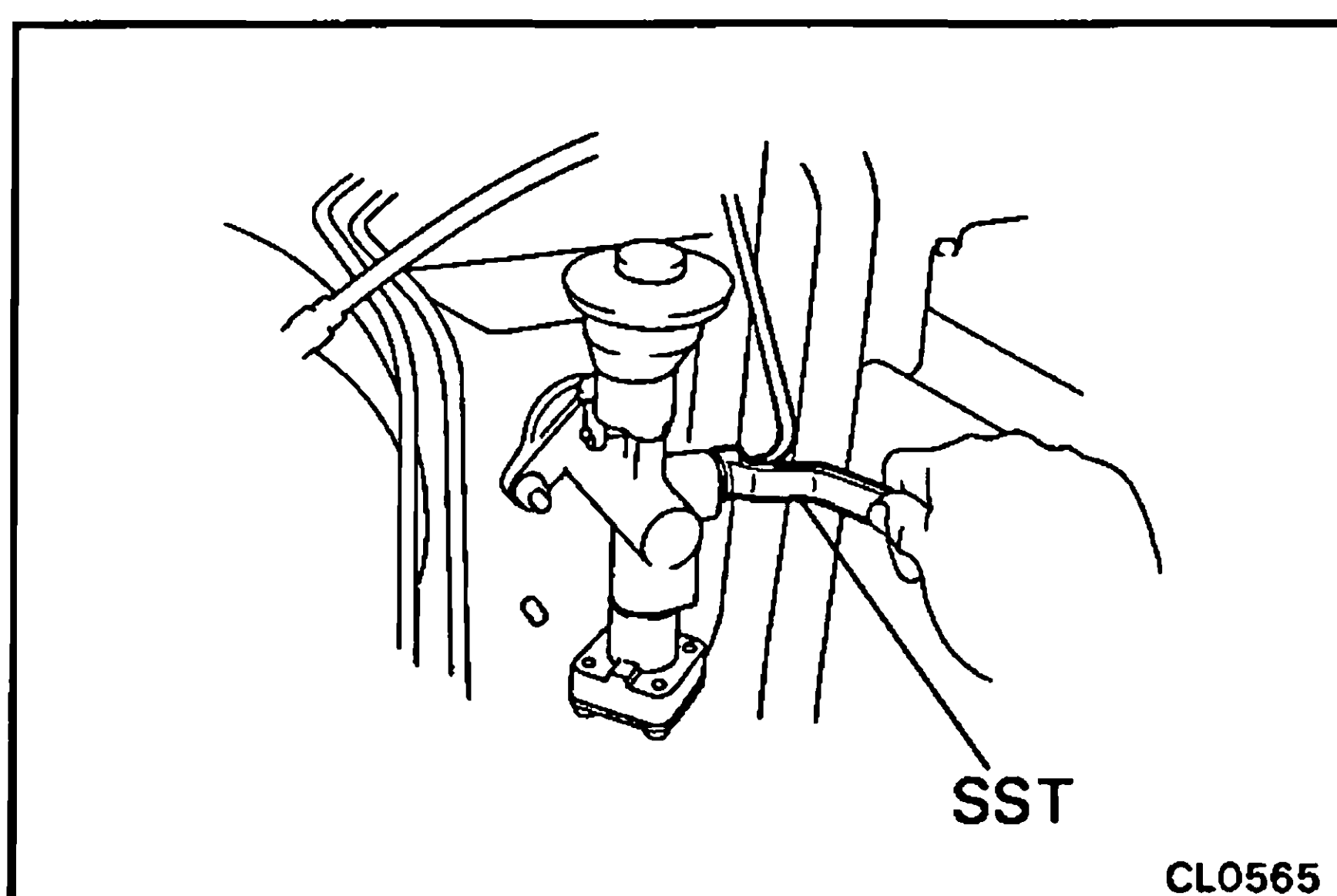
CLUTCH MASTER CYLINDER (w/o Clutch Booster) COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

♦ Non-reusable part

Q01770



REMOVAL AND INSTALLATION OF CLUTCH MASTER CYLINDER

(MAIN POINT OF REMOVAL AND INSTALLATION)

REMOVE MASTER CYLINDER

- Draw out fluid with syringe.
- Using SST, disconnect the clutch tube.
SST 09751-36011
- Remove the clip, clevis pin and return spring.
- Remove the nut from the room side.
- Remove the nut from the engine room side.
- Pull out the master cylinder.

DISASSEMBLY OF MASTER CYLINDER

1. REMOVE RESERVOIR TANK

- (a) Using a pin punch and a hammer, drive out the slotted spring pin.
- (b) Remove reservoir tank and grommet.

2. REMOVE PUSH ROD AND PISTON

INSPECTION OF MASTER CYLINDER

HINT: Clean the disassembled parts with compressed air.

1. INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION

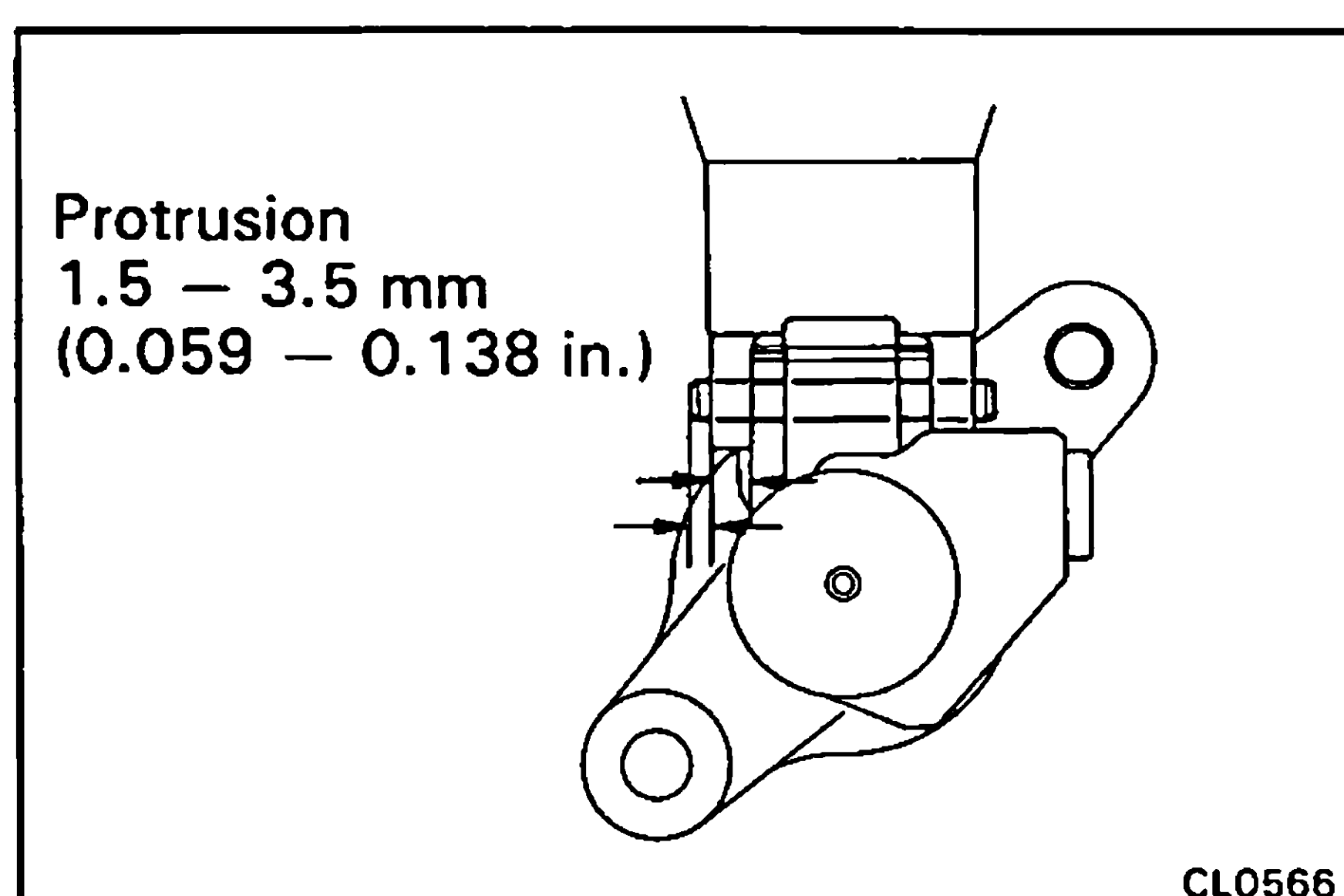
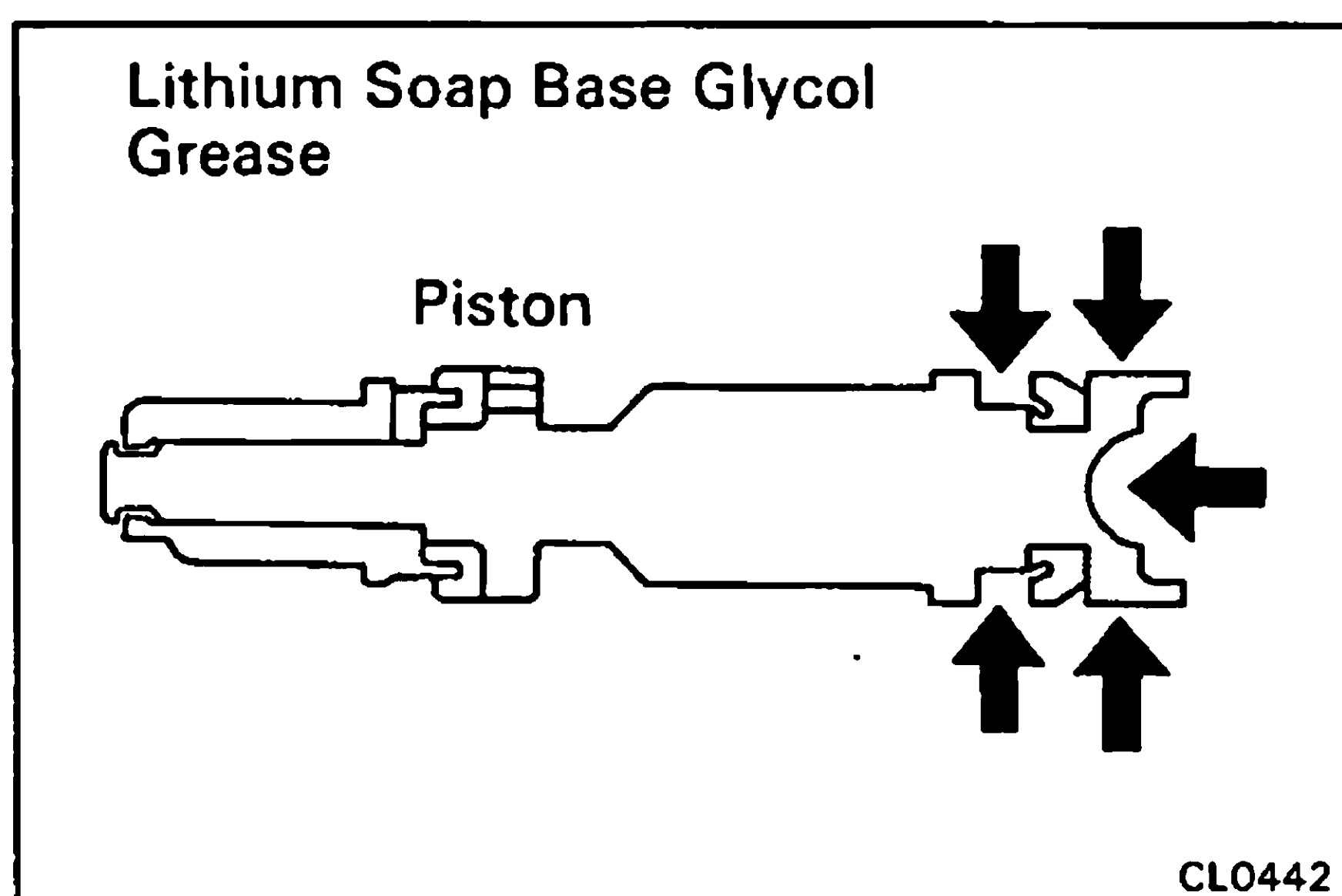
If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the push rod.



ASSEMBLY OF MASTER CYLINDER

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE AS SHOWN

2. INSERT PISTON INTO CYLINDER

3. INSTALL PUSH ROD ASSEMBLY WITH SNAP RING

4. INSTALL RESERVOIR TANK

- (a) Install reservoir tank and new grommet.
- (b) Using a pin punch and a hammer, drive in the slotted spring pin.

INSTALLATION OF MASTER CYLINDER

(See page CL-32)

1. INSTALL MASTER CYLINDER

Install the mounting nut, and torque them.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

2. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

SST 09751-36011

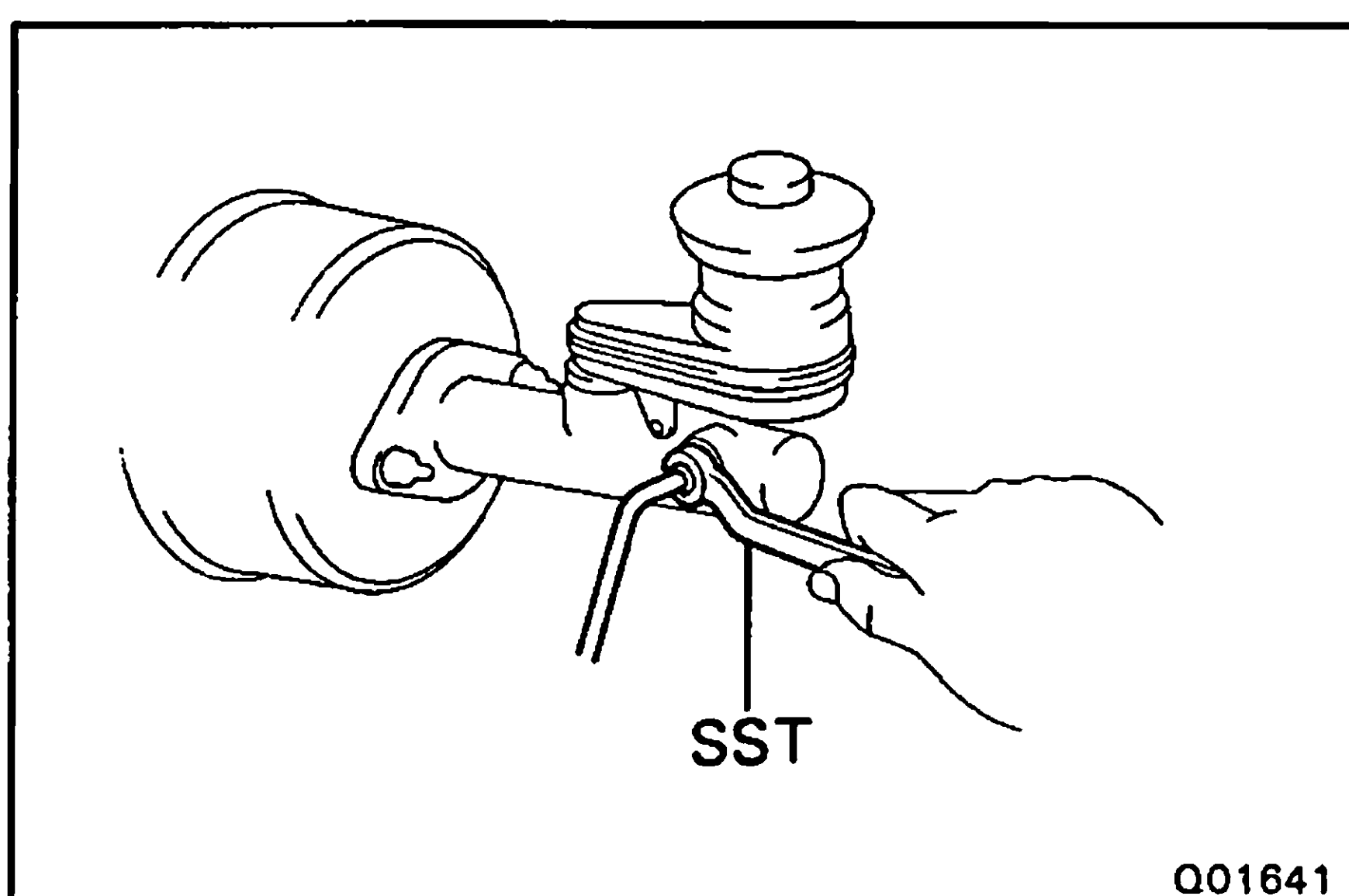
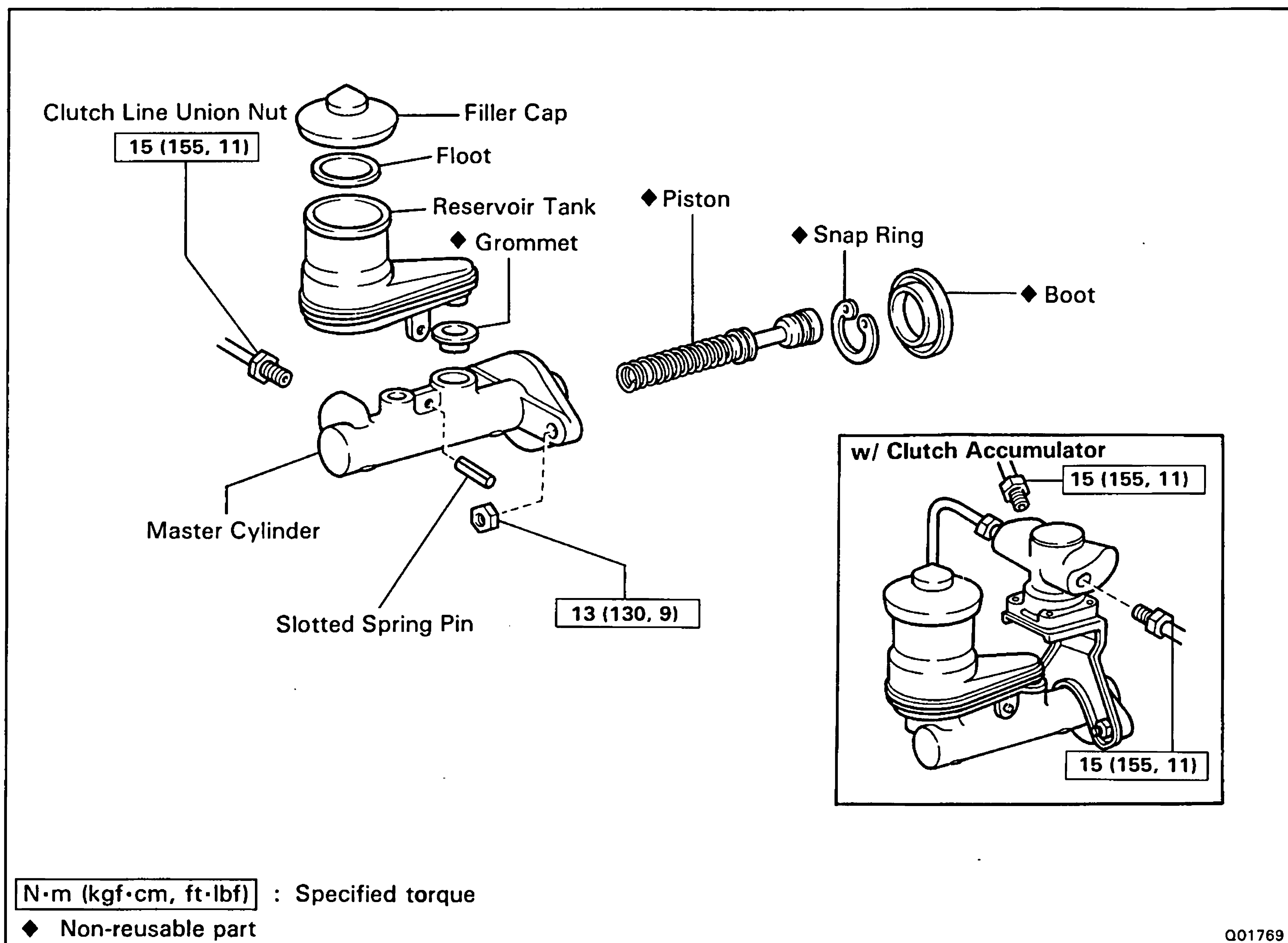
3. CONNECT PUSH ROD AND INSTALL PIN

Install the clip in the push rod pin.

4. BLEED SYSTEM AND ADJUST CLUTCH PEDAL (See page CL-31)

(w/ Clutch Booster)

COMPONENTS



REMOVAL AND INSTALLATION OF CLUTCH MASTER CYLINDER

(MAIN POINT OF REMOVAL AND INSTALLATION)

REMOVE MASTER CYLINDER

- Draw out fluid with syringe.
- Using SST, disconnect the clutch tube.
SST 09751-36011
- Remove the two nuts.
- Pull out the master cylinder.

DISASSEMBLY OF MASTER CYLINDER

1. REMOVE RESERVOIR TANK

- (a) Using a pin punch and a hammer, drive out the slotted spring pin.
- (b) Remove reservoir tank and grommet.

2. REMOVE PISTON

INSPECTION OF MASTER CYLINDER

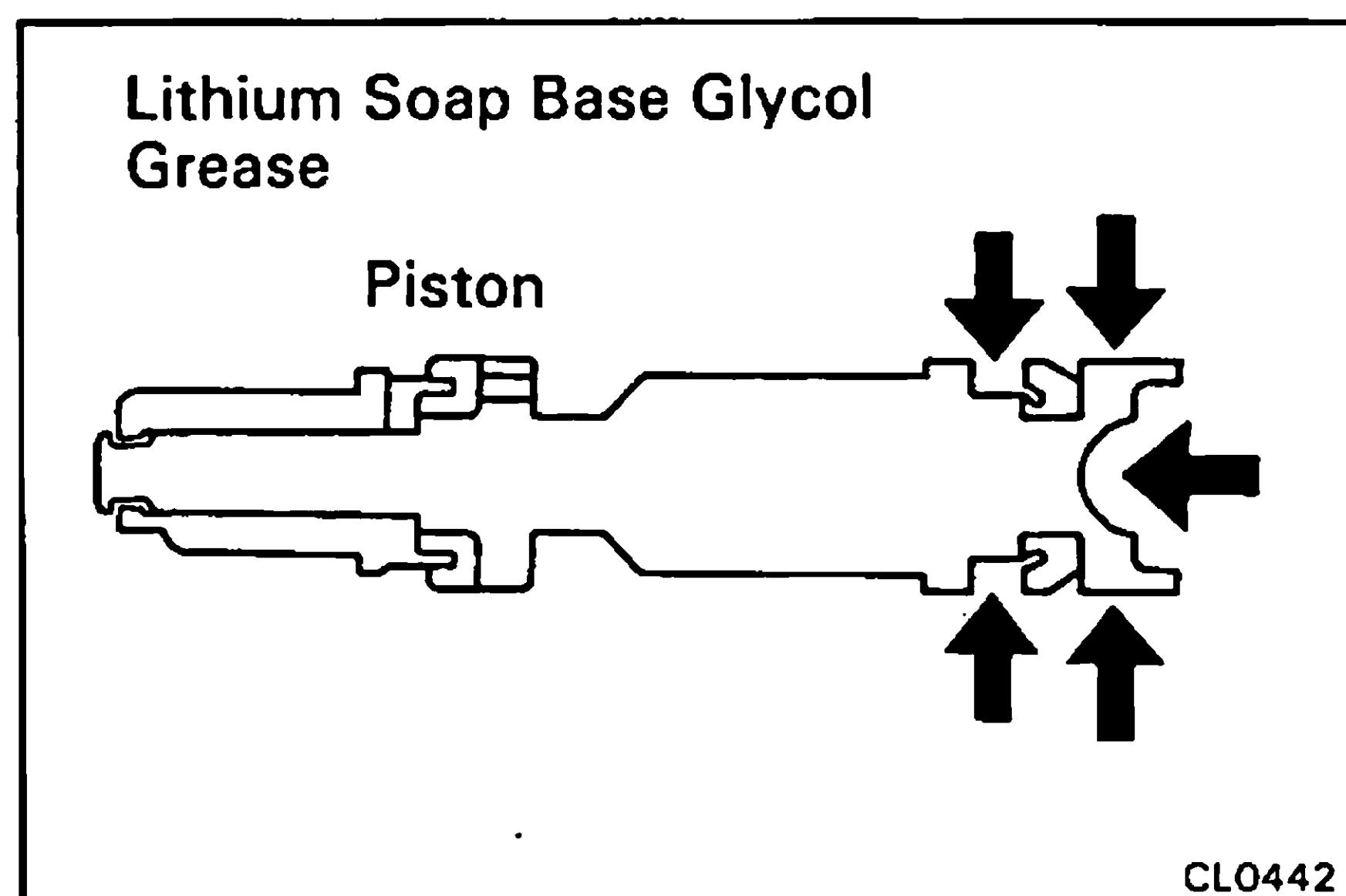
HINT: Clean the disassembled parts with compressed air.

1. INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION

If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

If either one requires replacement, use the parts from the cylinder kit.



ASSEMBLY OF MASTER CYLINDER

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE AS SHOWN

2. INSTALL PISTON INTO CYLINDER

3. INSTALL RESERVOIR TANK

- (a) Install reservoir tank and new grommet.
- (b) Using a pin punch and a hammer, drive in the slotted spring pin.

INSTALLATION OF MASTER CYLINDER

(See page CL-34)

1. ADJUST LENGTH OF CLUTCH BOOSTER PUSH ROD (See step 1 on page CL-42)

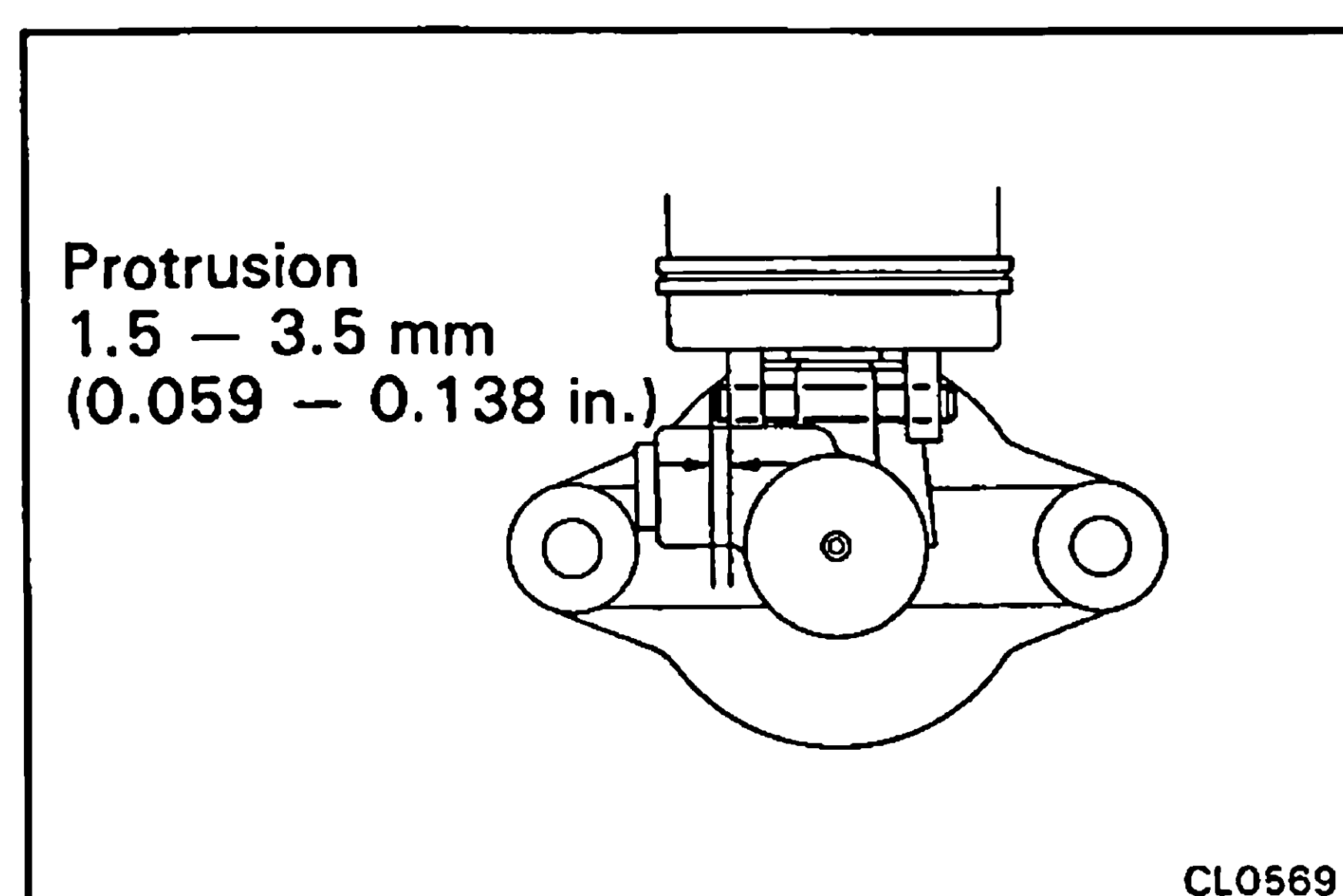
2. INSTALL MASTER CYLINDER WITH MOUNTING NUTS Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

3. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

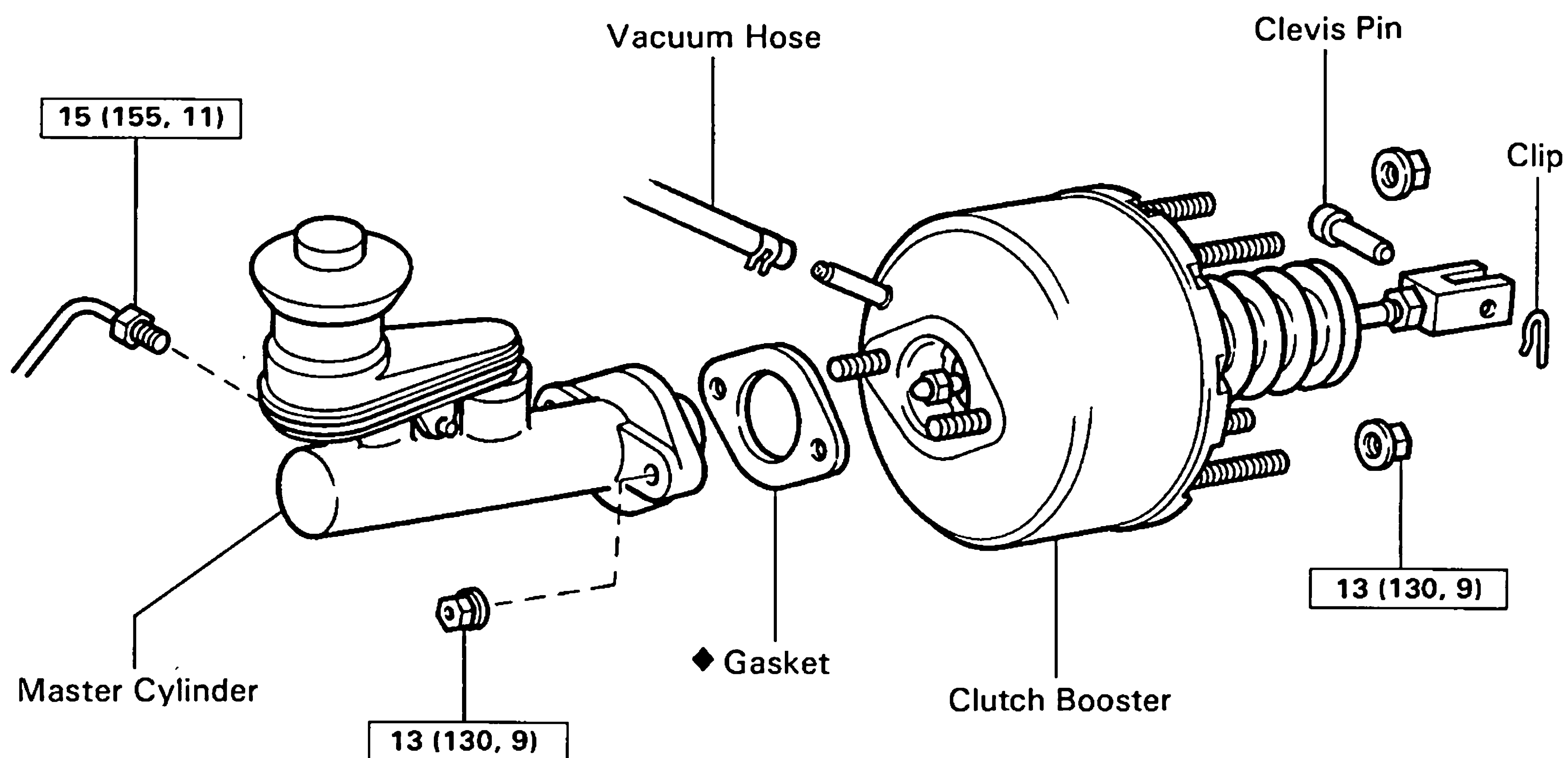
SST 09751-36011

4. BLEED SYSTEM AND ADJUST CLUTCH PEDAL (See page CL-31)



CLUTCH BOOSTER

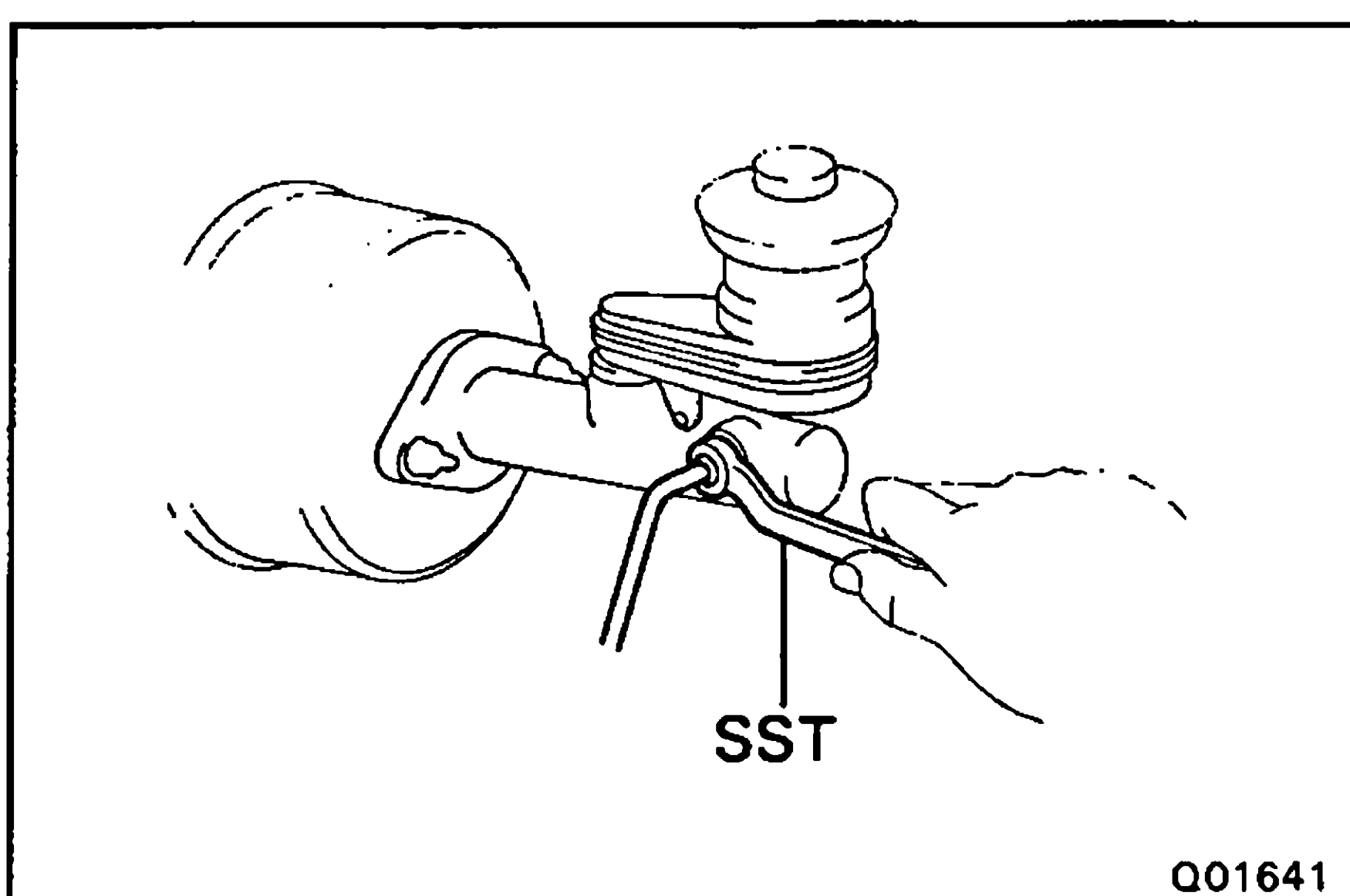
REMOVAL OF CLUTCH BOOSTER



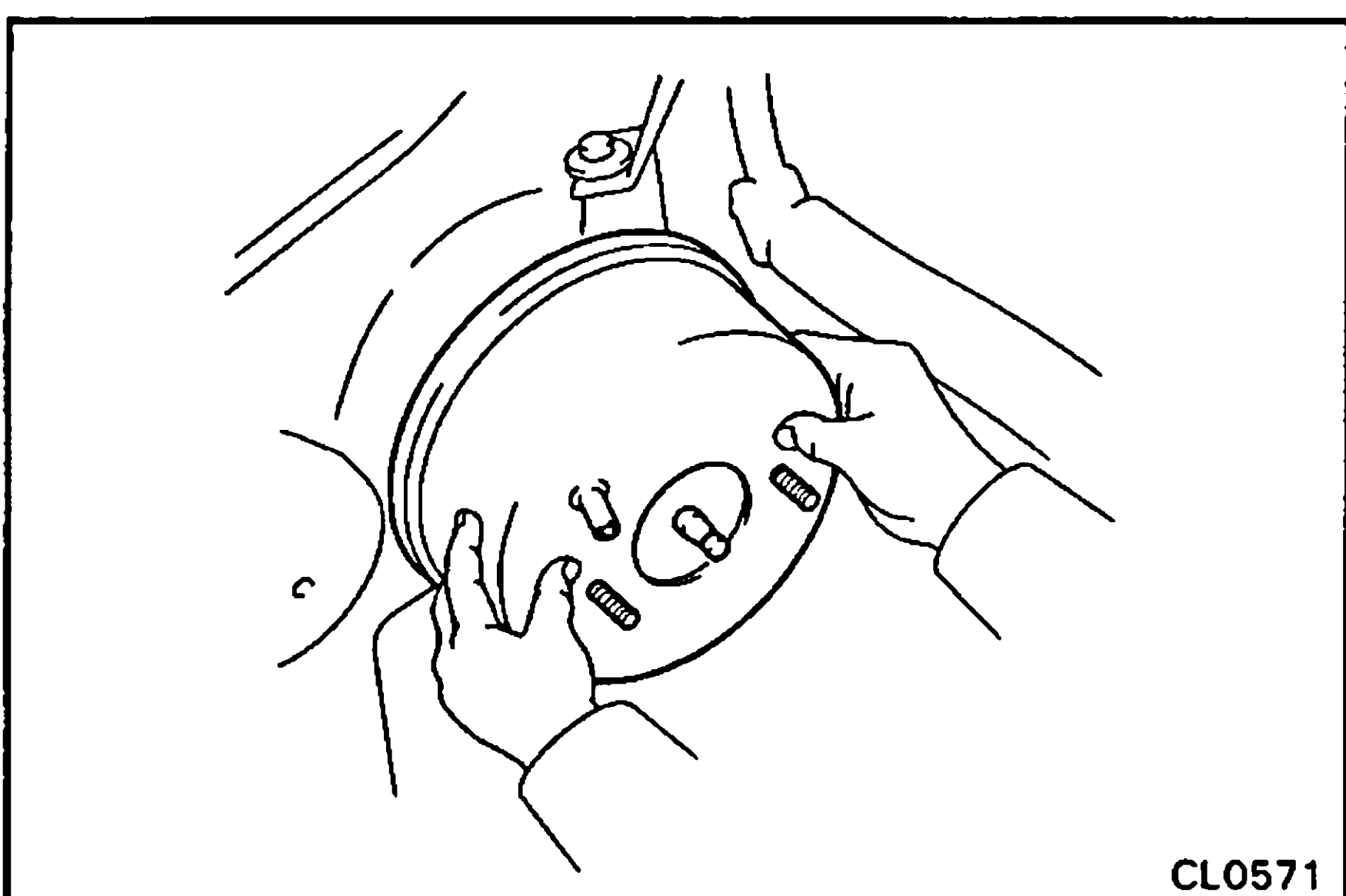
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

Q01642

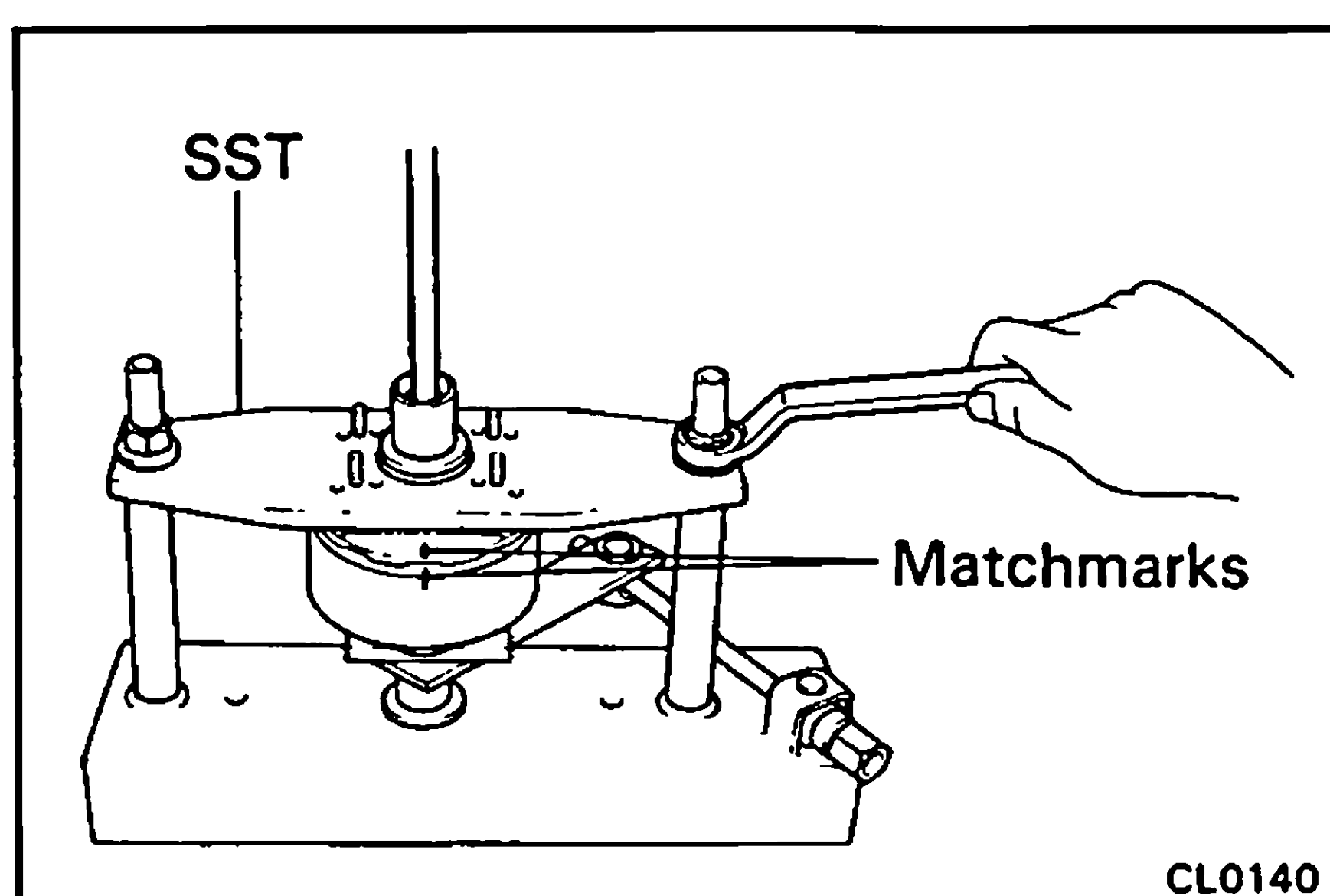
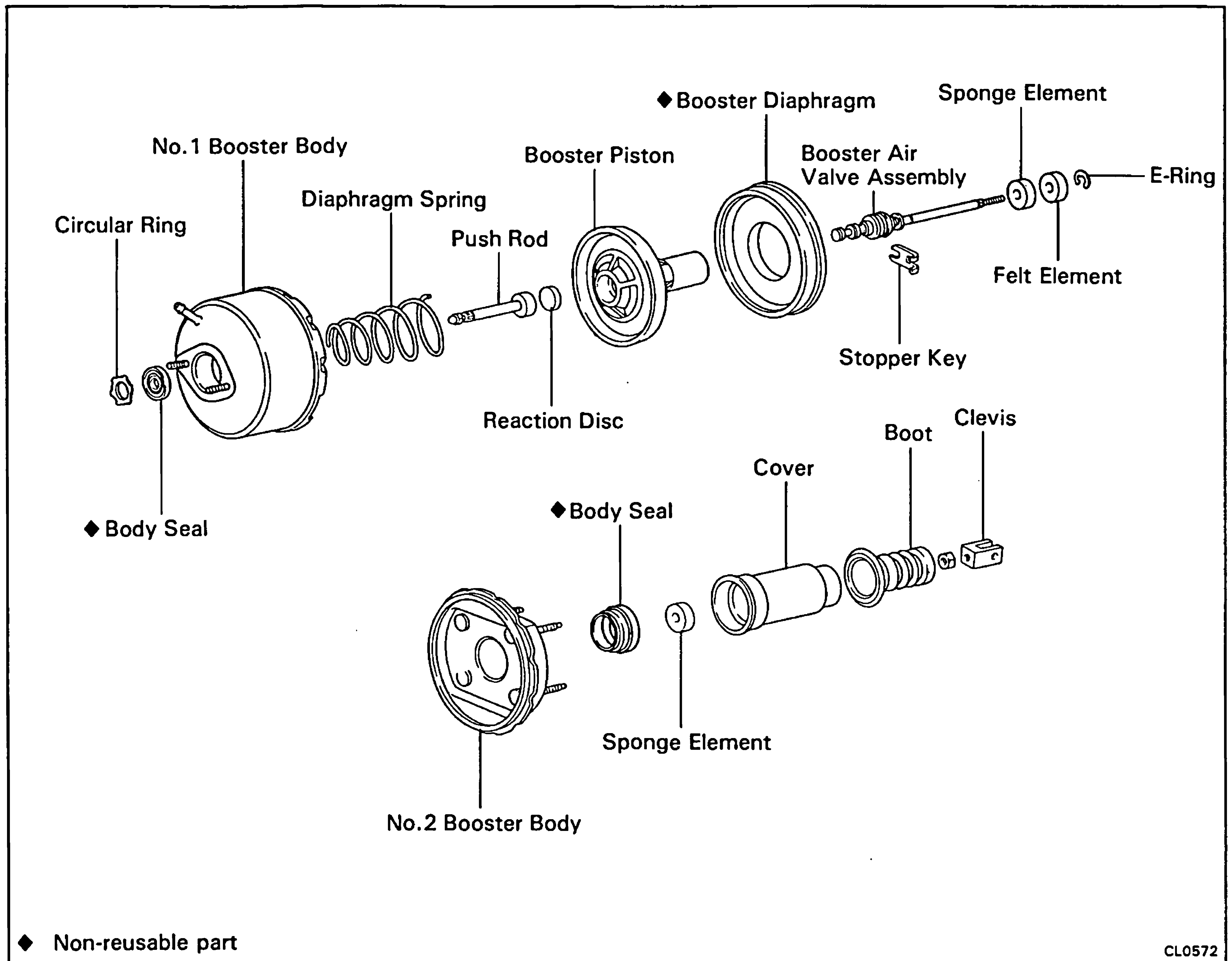


1. REMOVE MASTER CYLINDER
(See page CL-34)
2. DISCONNECT VACUUM HOSE FROM CLUTCH BOOSTER
3. REMOVE CLUTCH PIPE AND VACUUM PIPE CLAMP BOLTS



4. DISCONNECT CLEVIS FROM CLUTCH PEDAL
Remove the clip and clevis pin.
5. REMOVE CLUTCH BOOSTER
 - (a) Remove four nuts from the room side.
 - (b) Pull out the clutch booster from engine room side.

COMPONENTS



DISASSEMBLY OF CLUTCH BOOSTER

1. REMOVE CLEVIS

2. REMOVE PISTON COVER AND BOOT

- (a) Remove the piston cover and boot.
- (b) Remove the sponge element from the boot.

3. REMOVE SPONGE AND FELT ELEMENT

Using screwdriver, remove the E-ring and sponge and felt element.

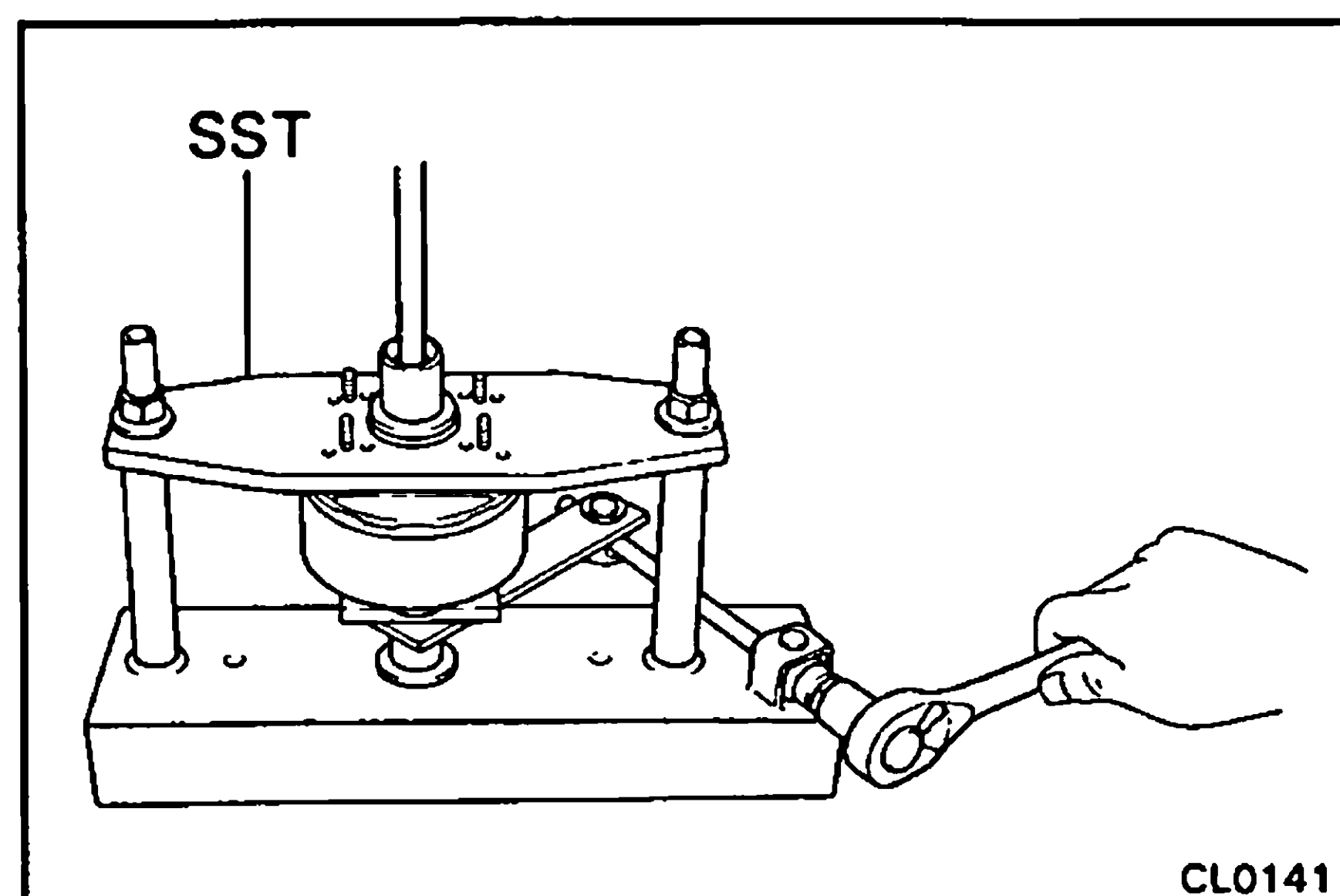
4. SEPARATE NO.1 AND NO.2 BOOSTER BODIES

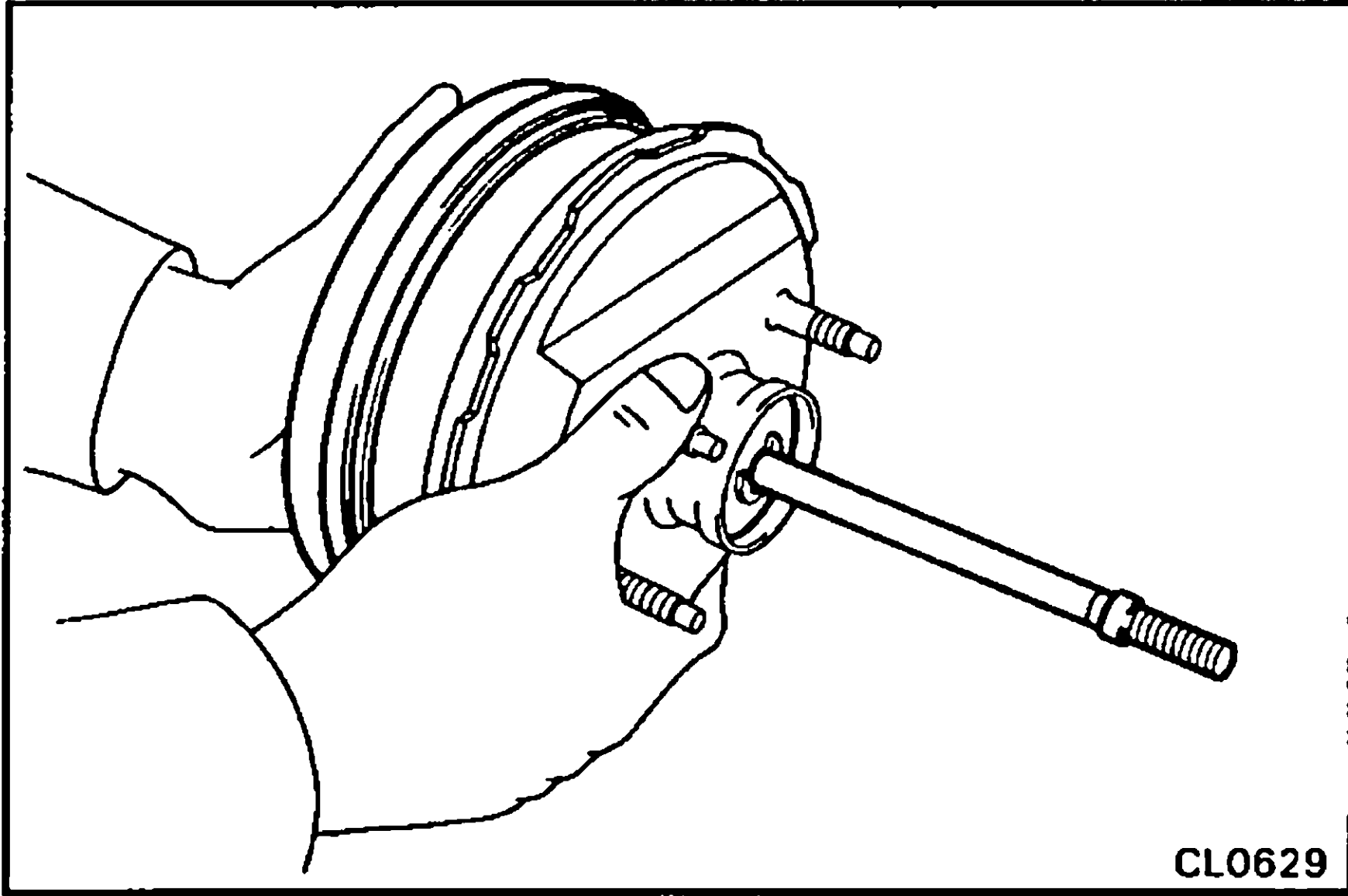
- (a) Put matchmarks on the No.1 and No.2 booster bodies.
- (b) Set the booster in SST.

SST 09753-00013

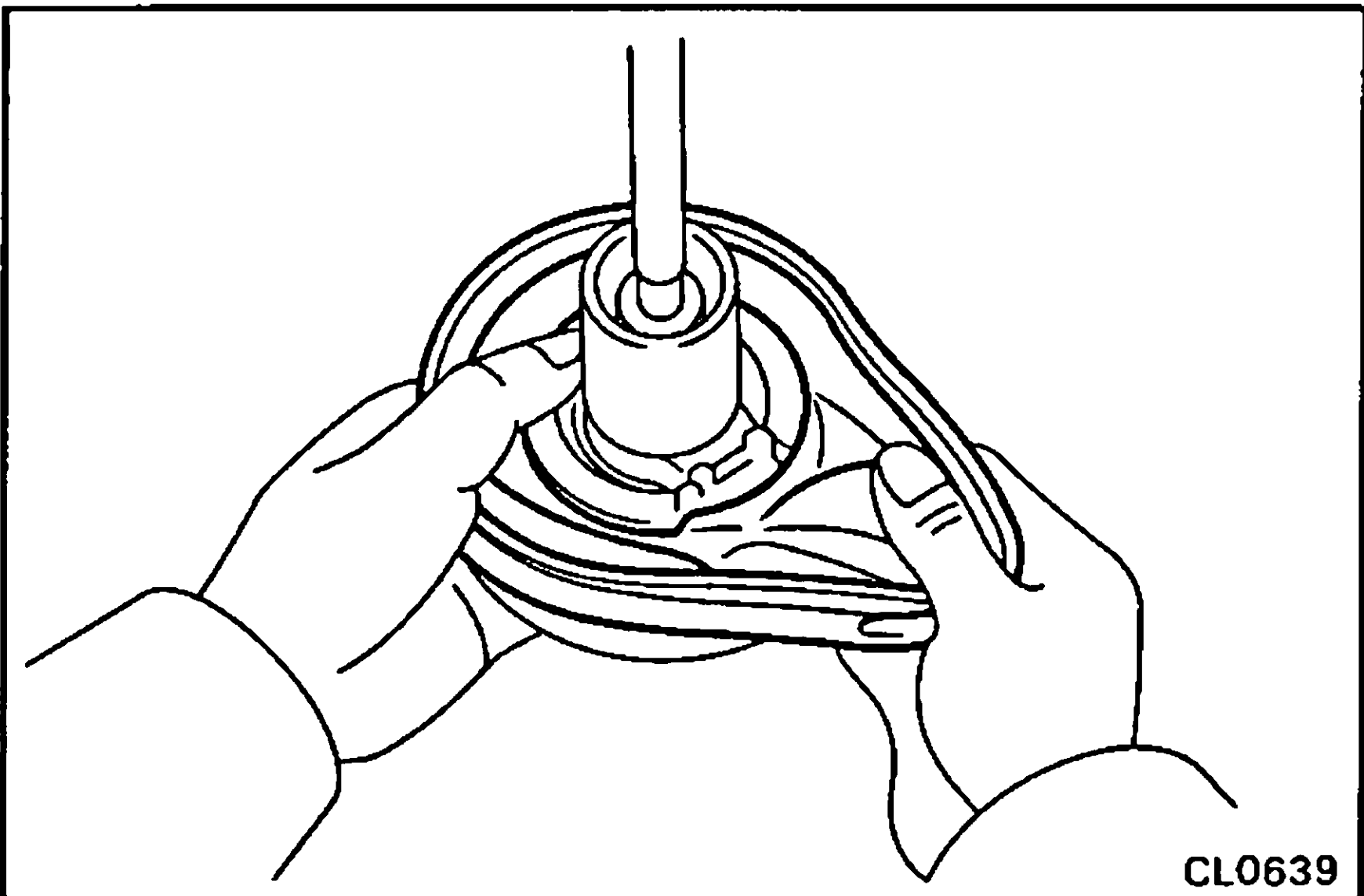
NOTICE: Be careful not to tighten the two nuts of the SST too tightly.

- (c) Turn the No.1 booster body clockwise, until the No.1 and No.2 booster bodies separate.



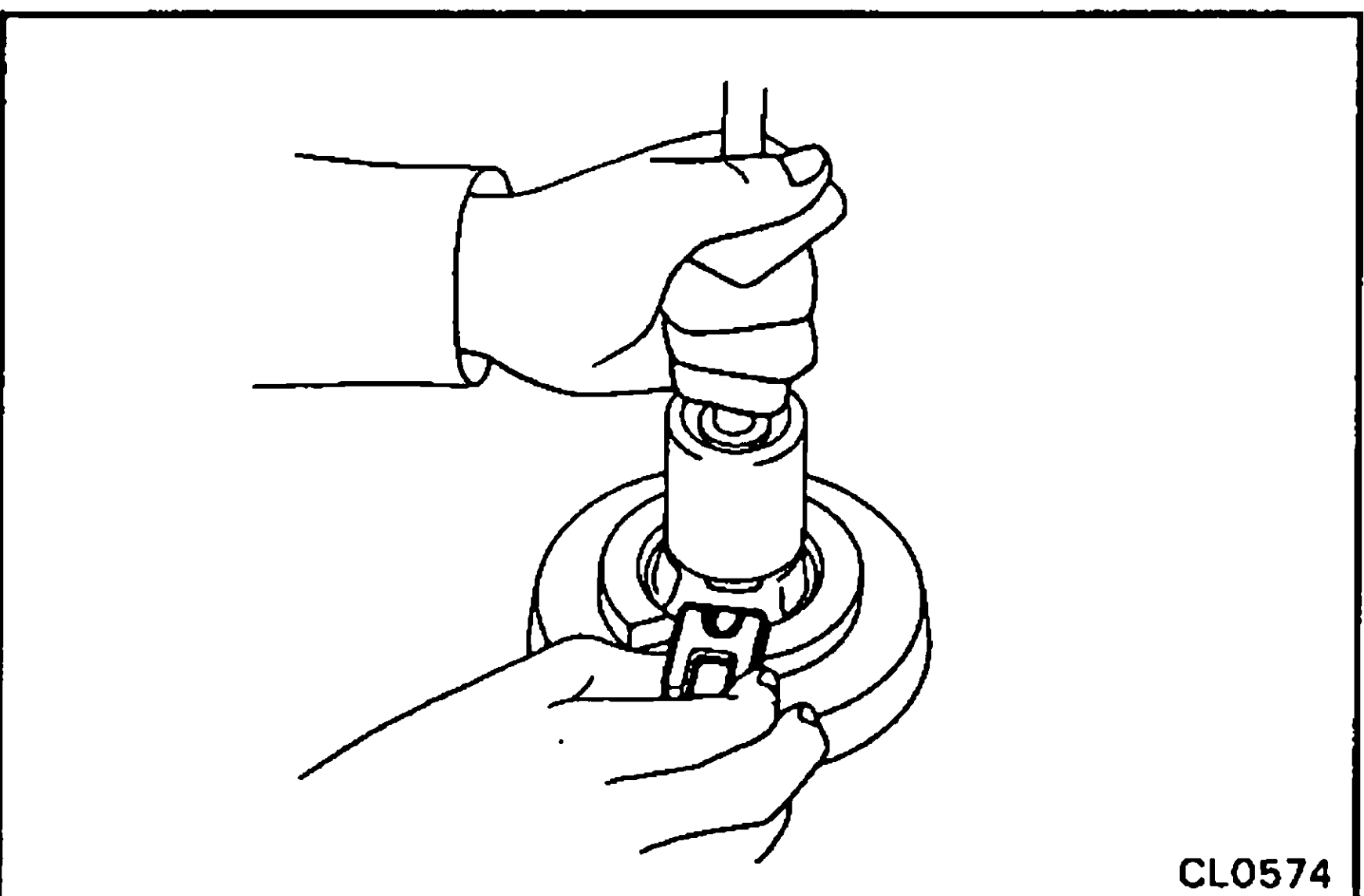


5. REMOVE BOOSTER PISTON ASSEMBLY FROM NO.2 BOOSTER BODY



6. REMOVE BOOSTER DIAPHRAGM FROM BOOSTER PISTON

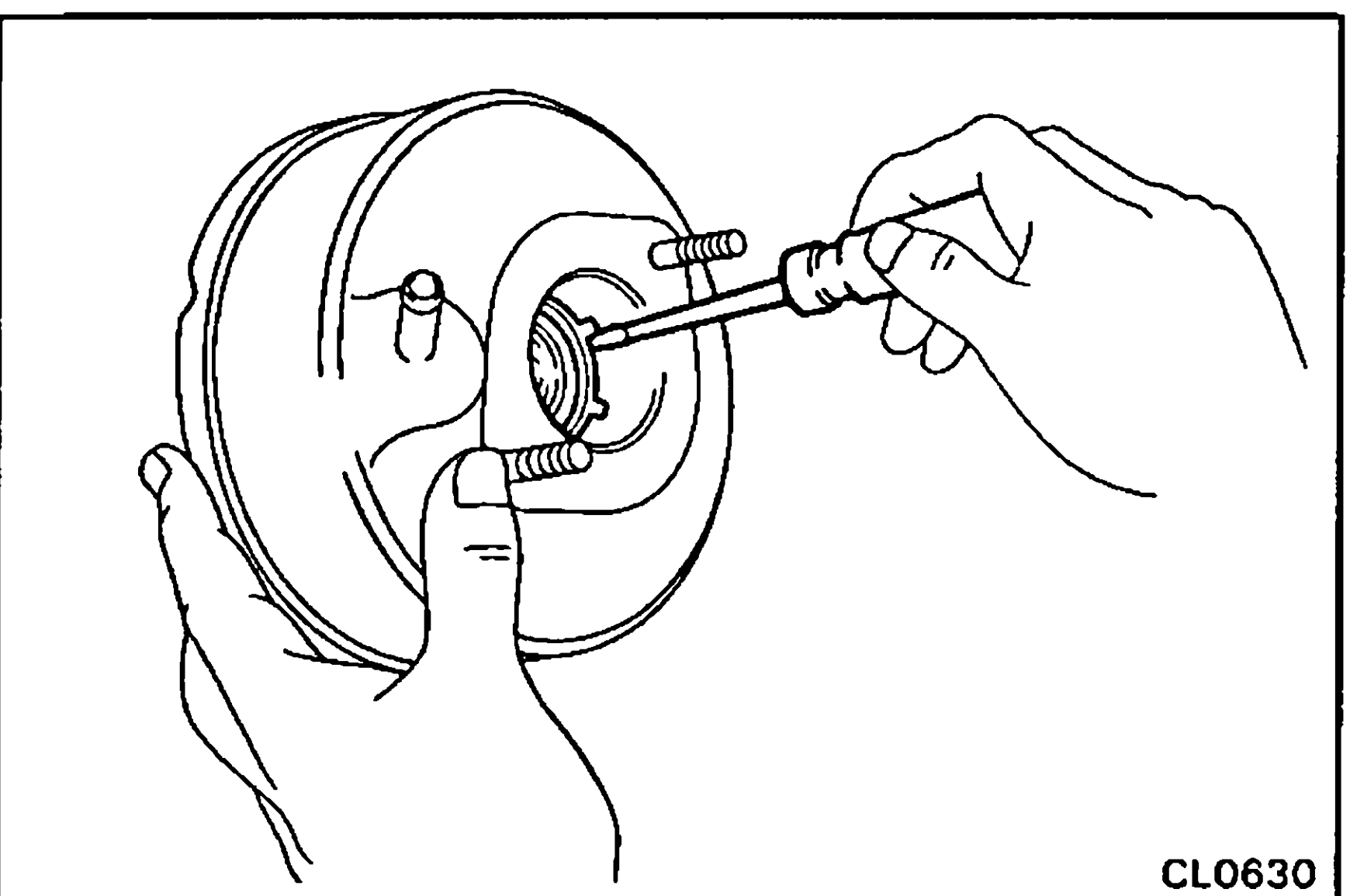
Pull off the diaphragm.



7. REMOVE BOOSTER AIR VALVE ASSEMBLY FROM BOOSTER PISTON

- (a) Push down the booster air valve in the booster piston and remove the stopper key.
- (b) Pull off the booster air valve assembly.

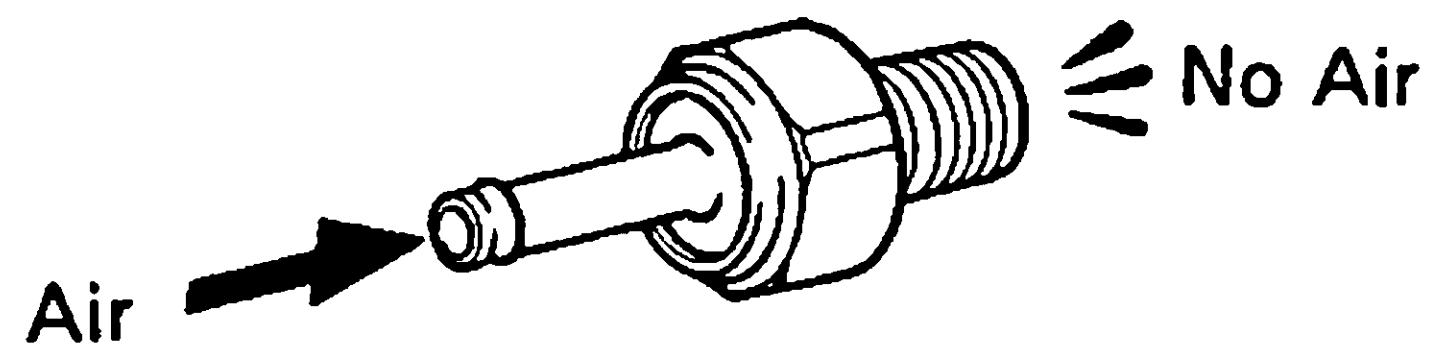
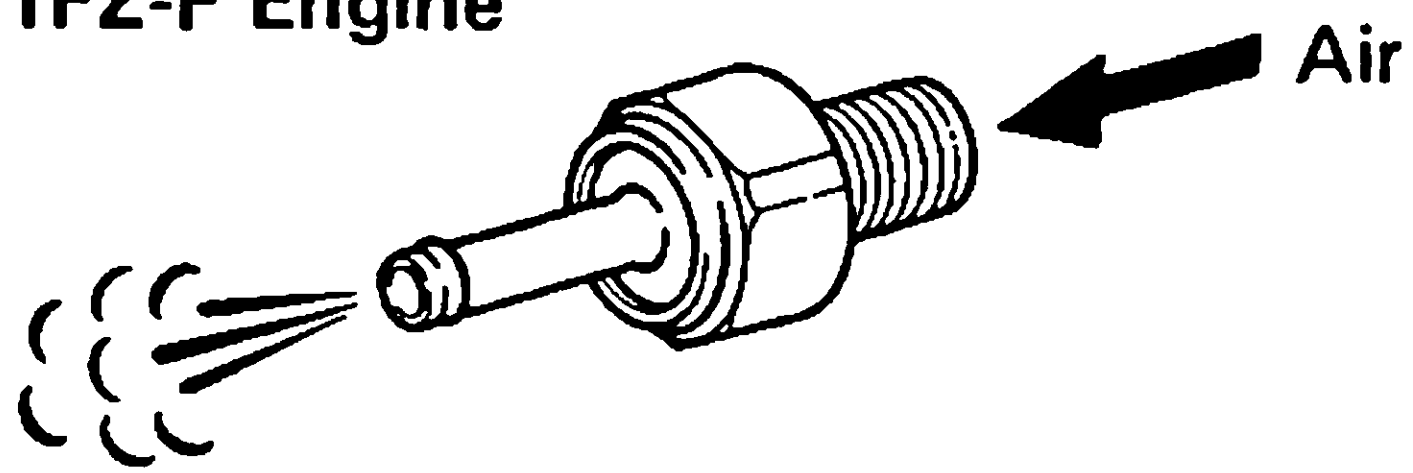
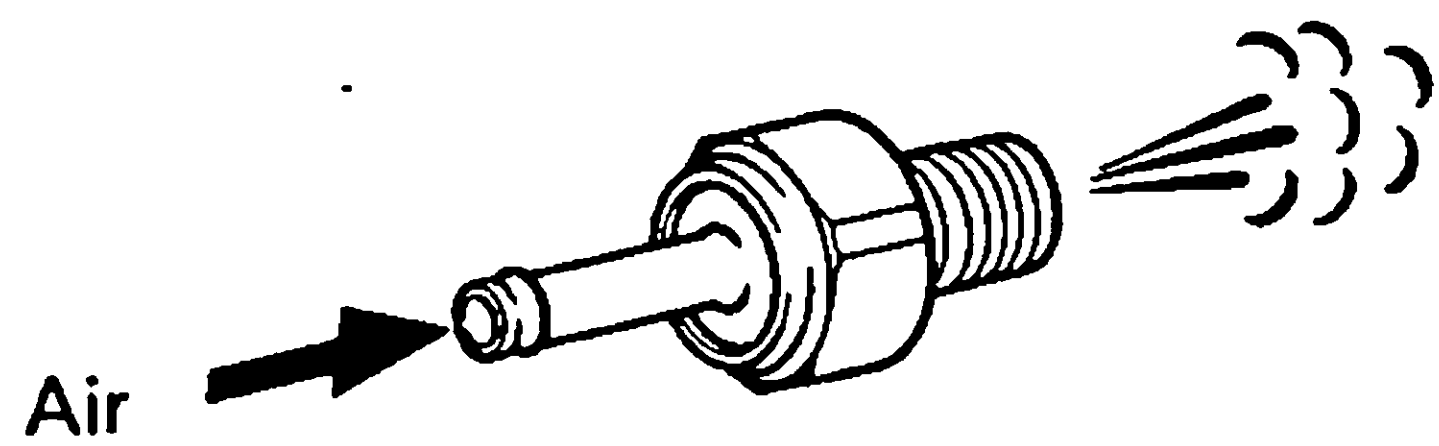
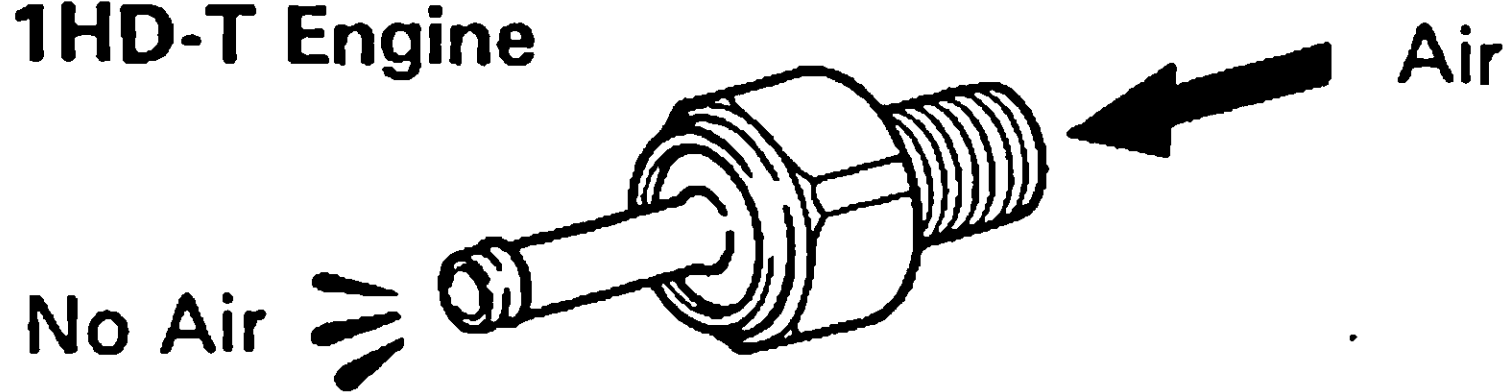
8. REMOVE REACTION DISC FROM BOOSTER PISTON



9. REMOVE BODY SEAL FROM NO.1 BOOSTER BODY

Using a screwdriver, pry out the circular ring and remove the body seal.

3F·1FZ-F Engine

1HZ Engine
1HD-T EngineCL0054
CL0631

INSPECTION AND REPLACEMENT OF CLUTCH BOOSTER

1. INSPECT CHECK VALVE OPERATION

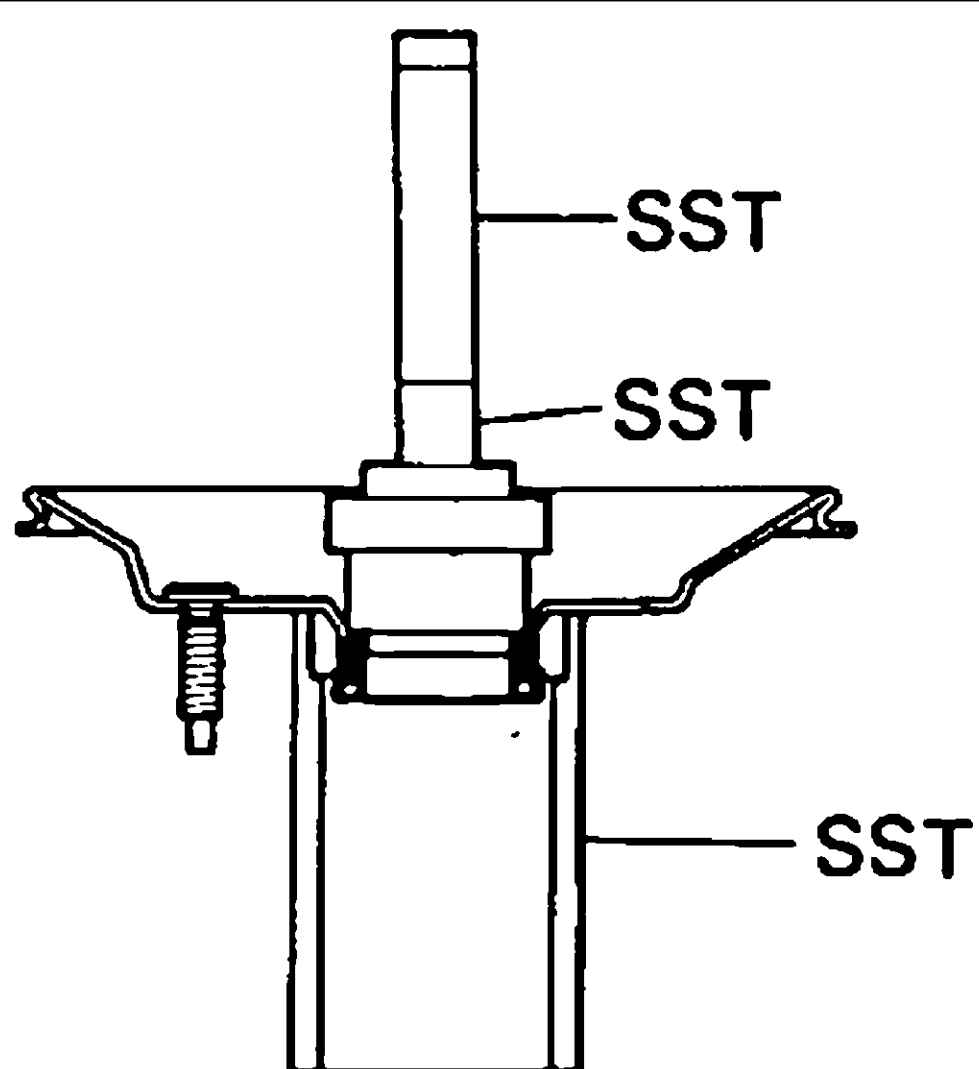
- Check that air flows from the vacuum tank side to the vacuum hose side.
- Check that air does not flow the vacuum hose side to the vacuum tank side.

2. IF NECESSARY, REPLACE BODY SEAL FOR NO.2 BOOSTER BODY

- Using SST, remove the body sealer.

SST 09630-00012 (09631-00060), 09753-30020 and 09612-30012

HINT: Support the No.2 booster body using SST cylinder base only.

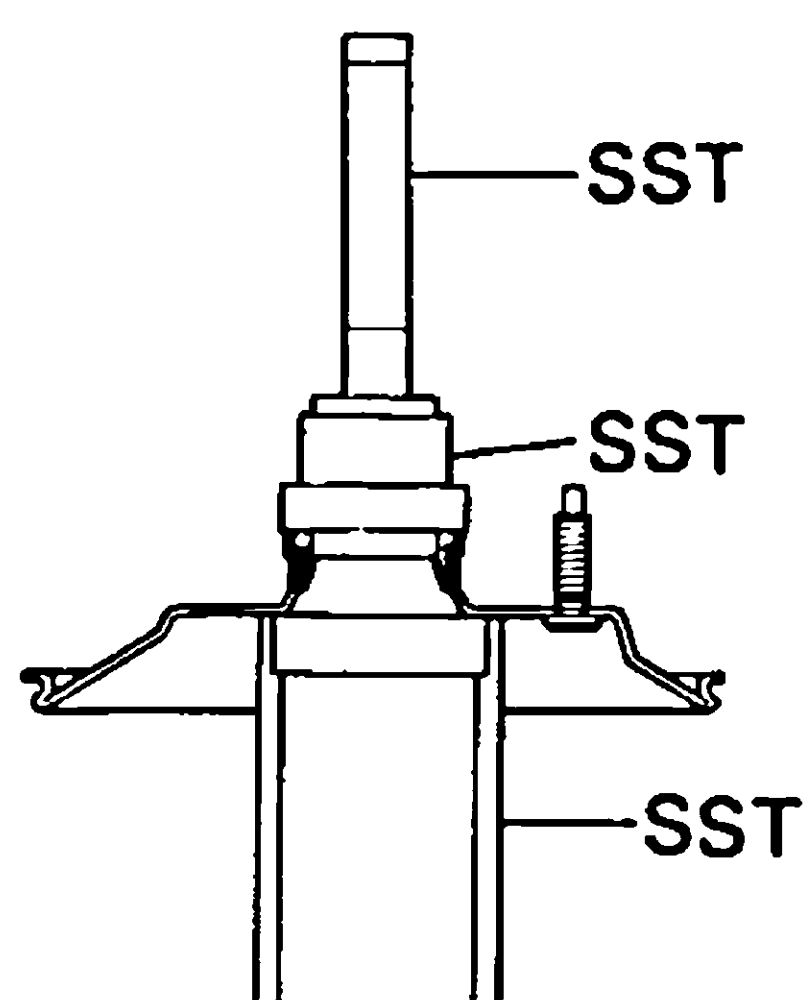


CL0575

- Using SST, drive in the body sealer.

SST 09630-00012 (09631-00060), 09753-30020 and 09612-30012

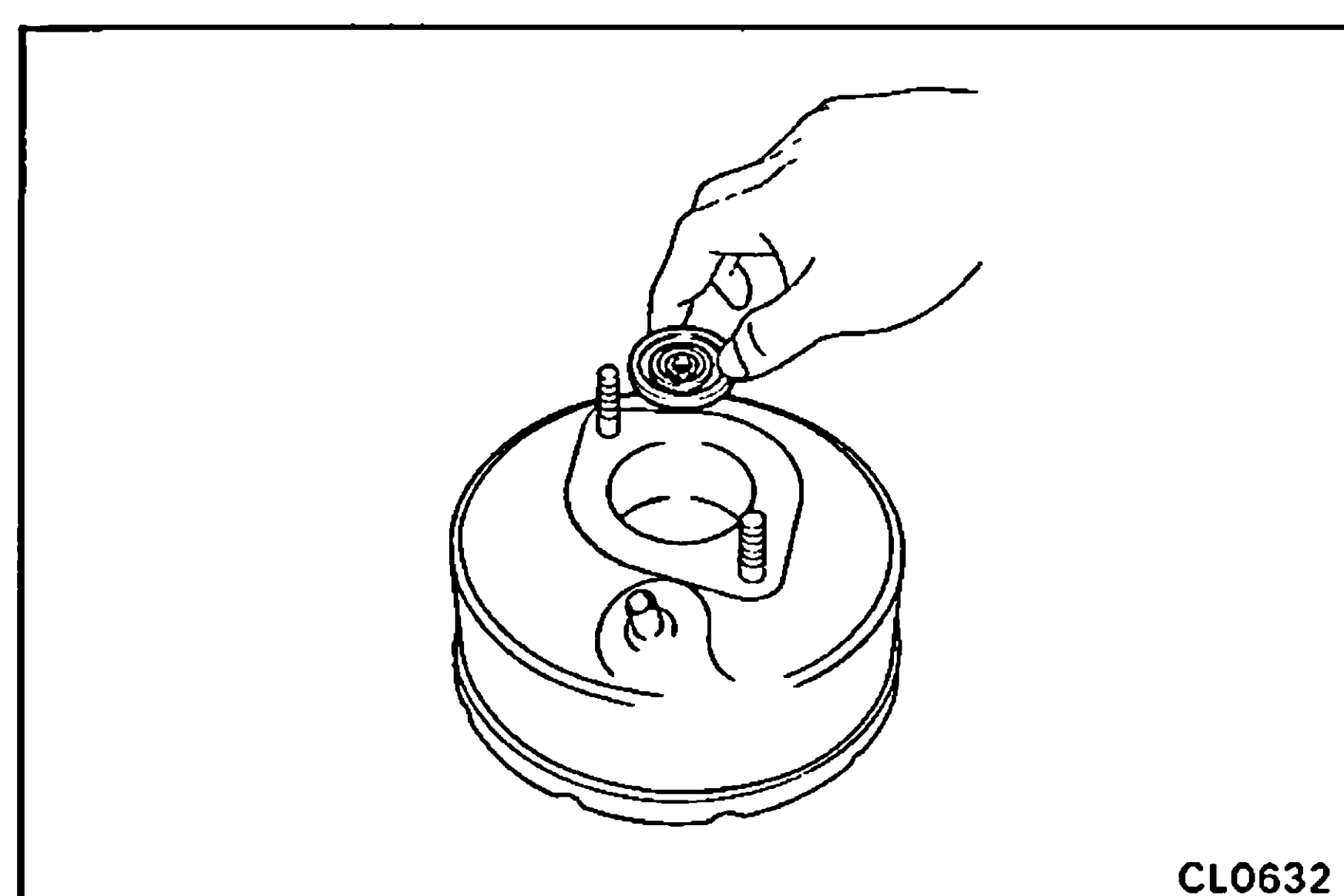
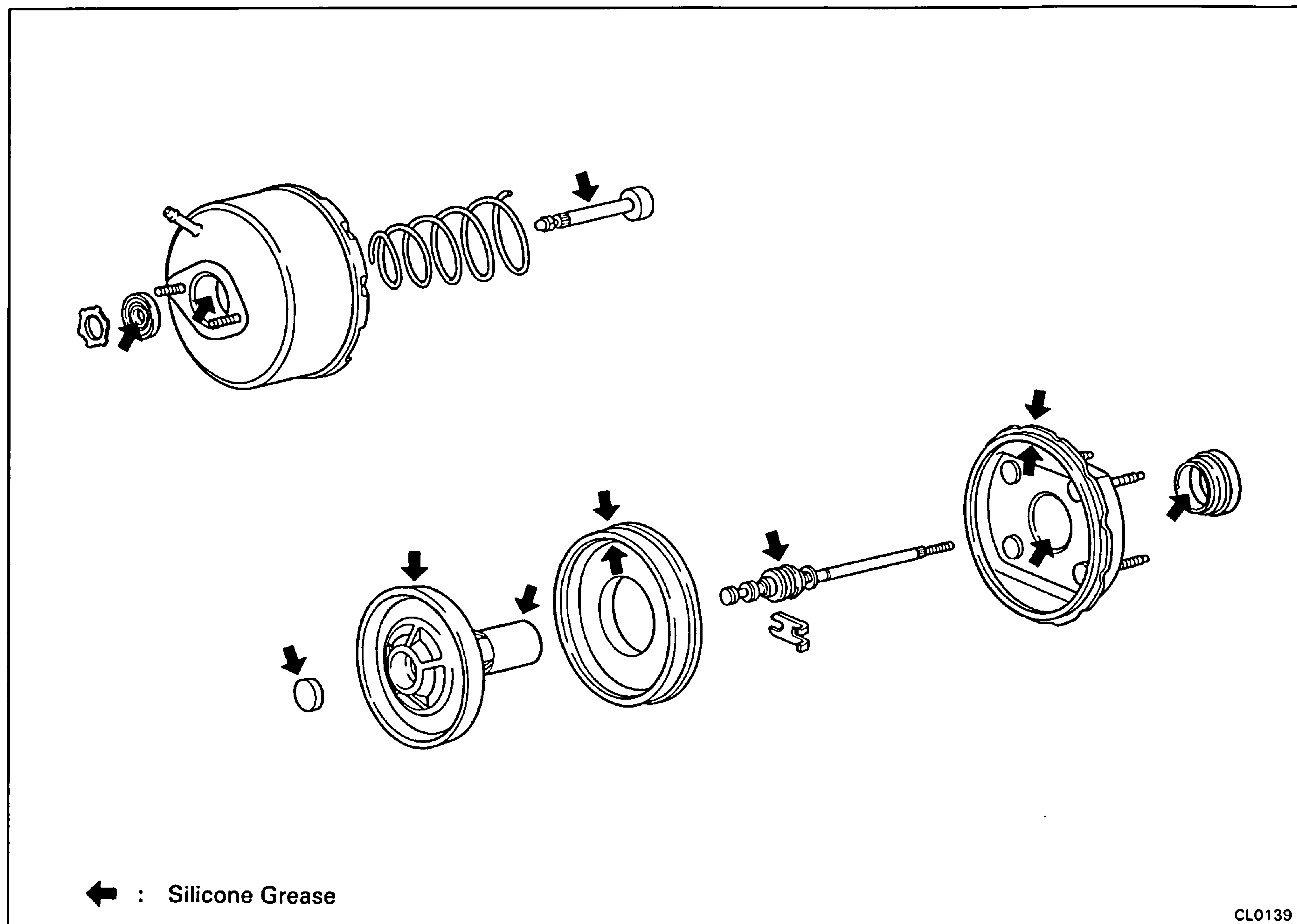
HINT: Support the No.2 booster body using SST cylinder base only.



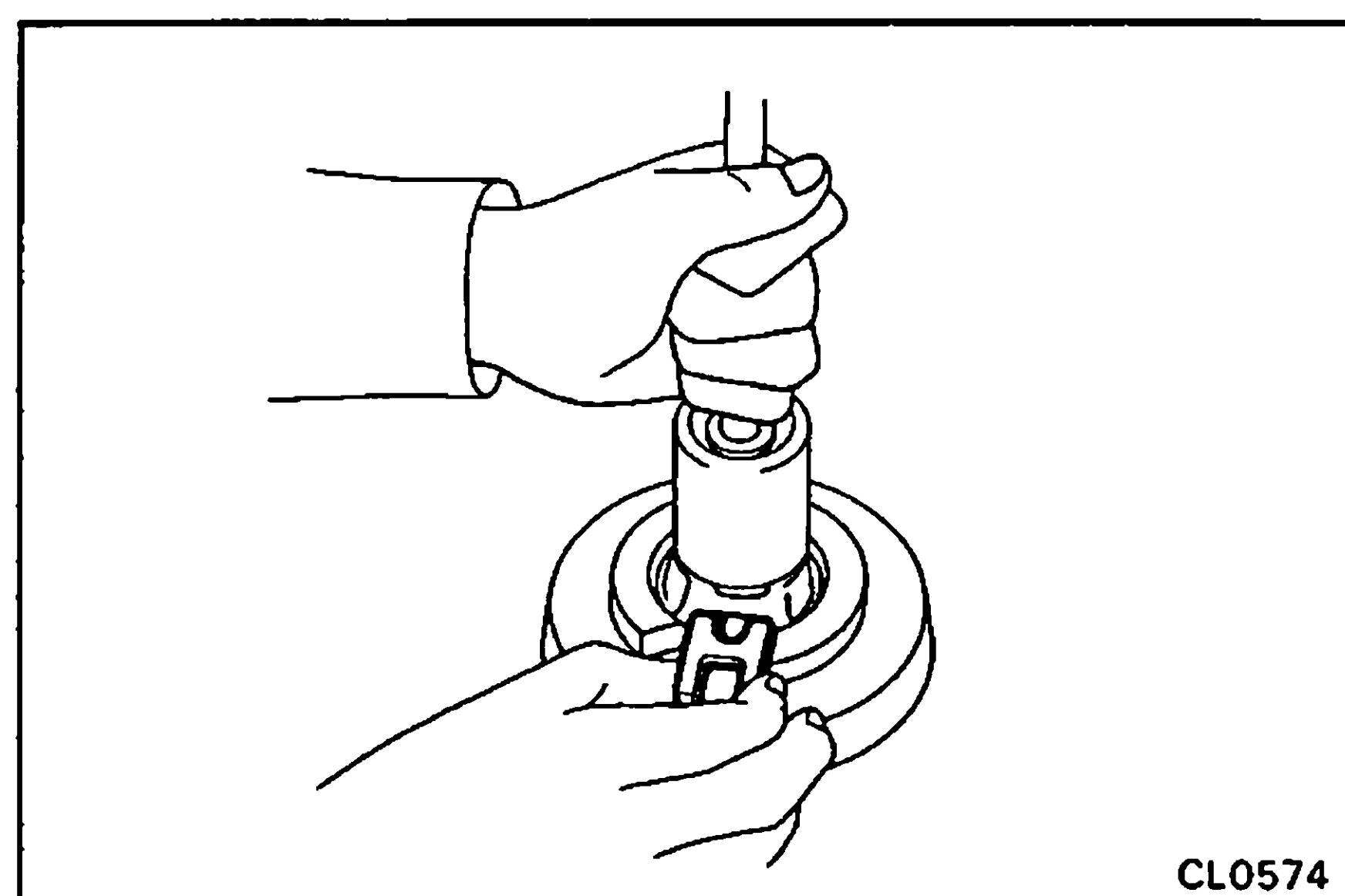
CL0576

ASSEMBLY OF CLUTCH BOOSTER

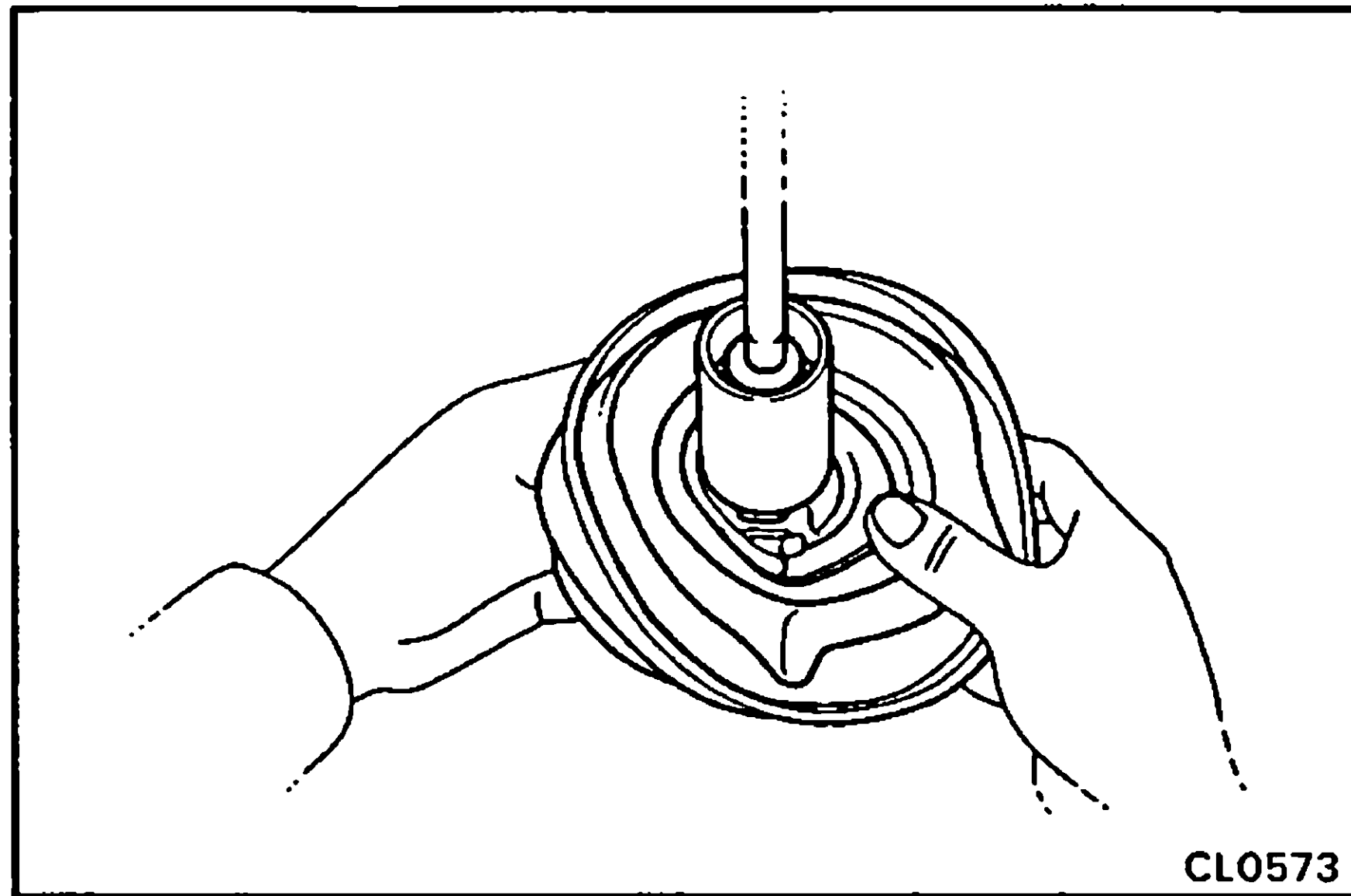
(See page CL-36)

1. APPLY SILICONE GREASE TO PARTS SHOWN BELOW**2. INSTALL BODY SEAL TO NO.1 BOOSTER BODY**

- (a) Place the body seal in position.
- (b) Secure the body seal with the circular ring.

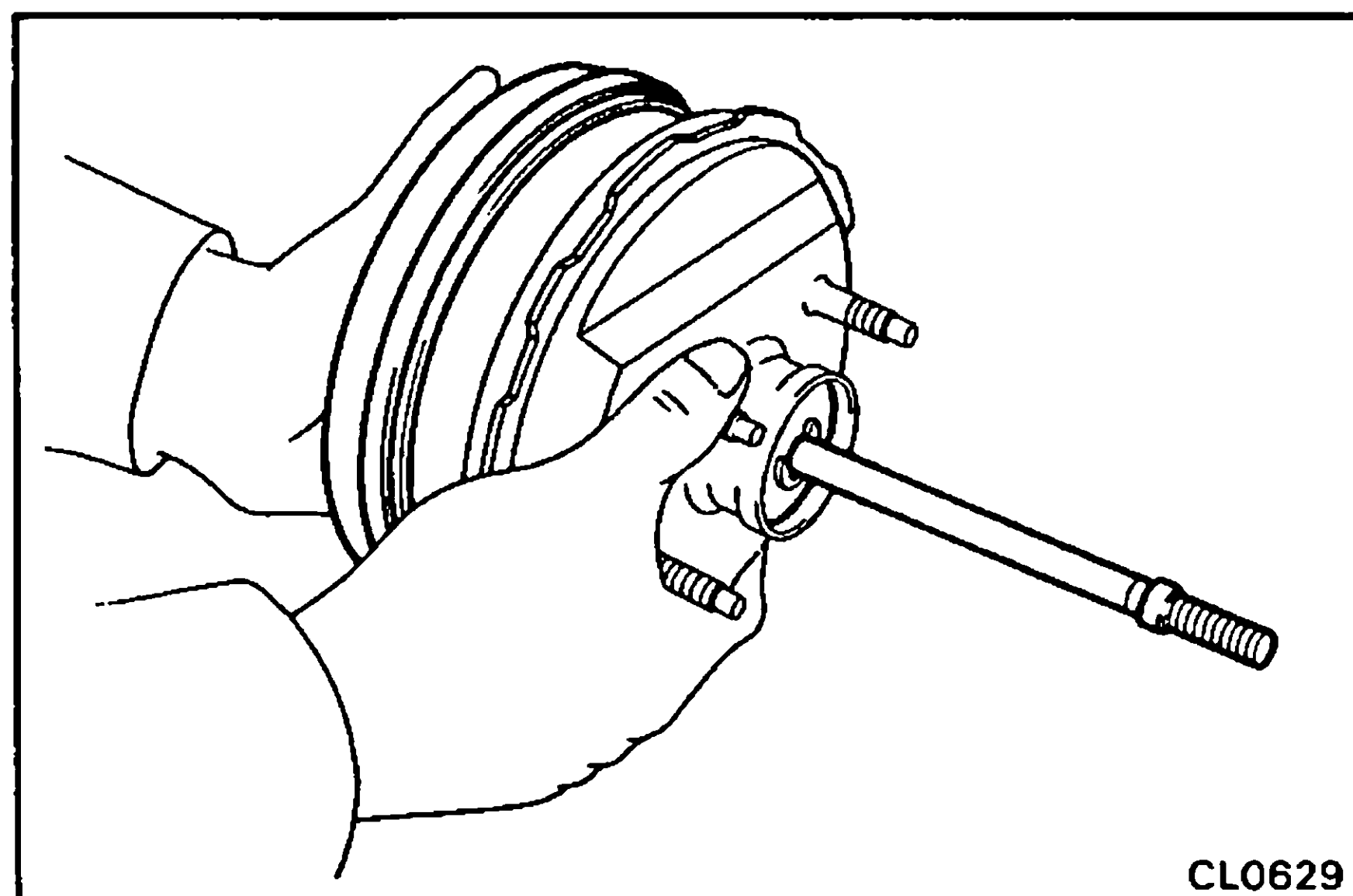
**3. INSTALL BOOSTER AIR VALVE ASSEMBLY TO BOOSTER PISTON**

- (a) Insert the booster air valve in the booster piston.
- (b) Push the booster air valve in the booster piston and install the stopper key.



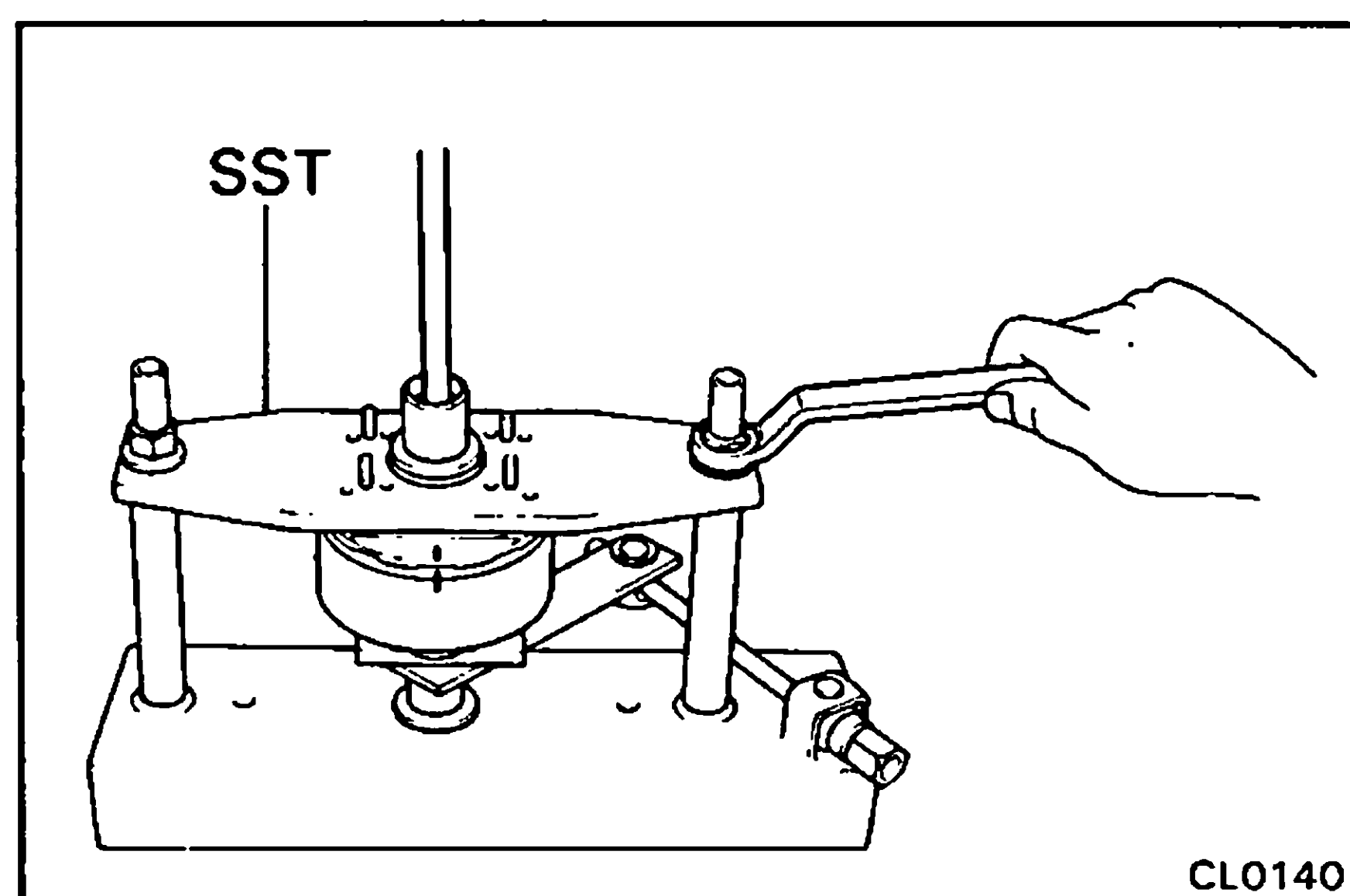
4. INSTALL DIAPHRAGM TO BOOSTER PISTON

Push in the head of the diaphragm.



5. INSTALL BOOSTER PISTON ASSEMBLY TO NO.2 BOOSTER BODY

6. INSTALL REACTION DISC TO BOOSTER PISTON



7. ASSEMBLY NO.1 AND NO.2 BOOSTER BODIES

(a) Place the No.1 booster on SST.

SST 09753-00013

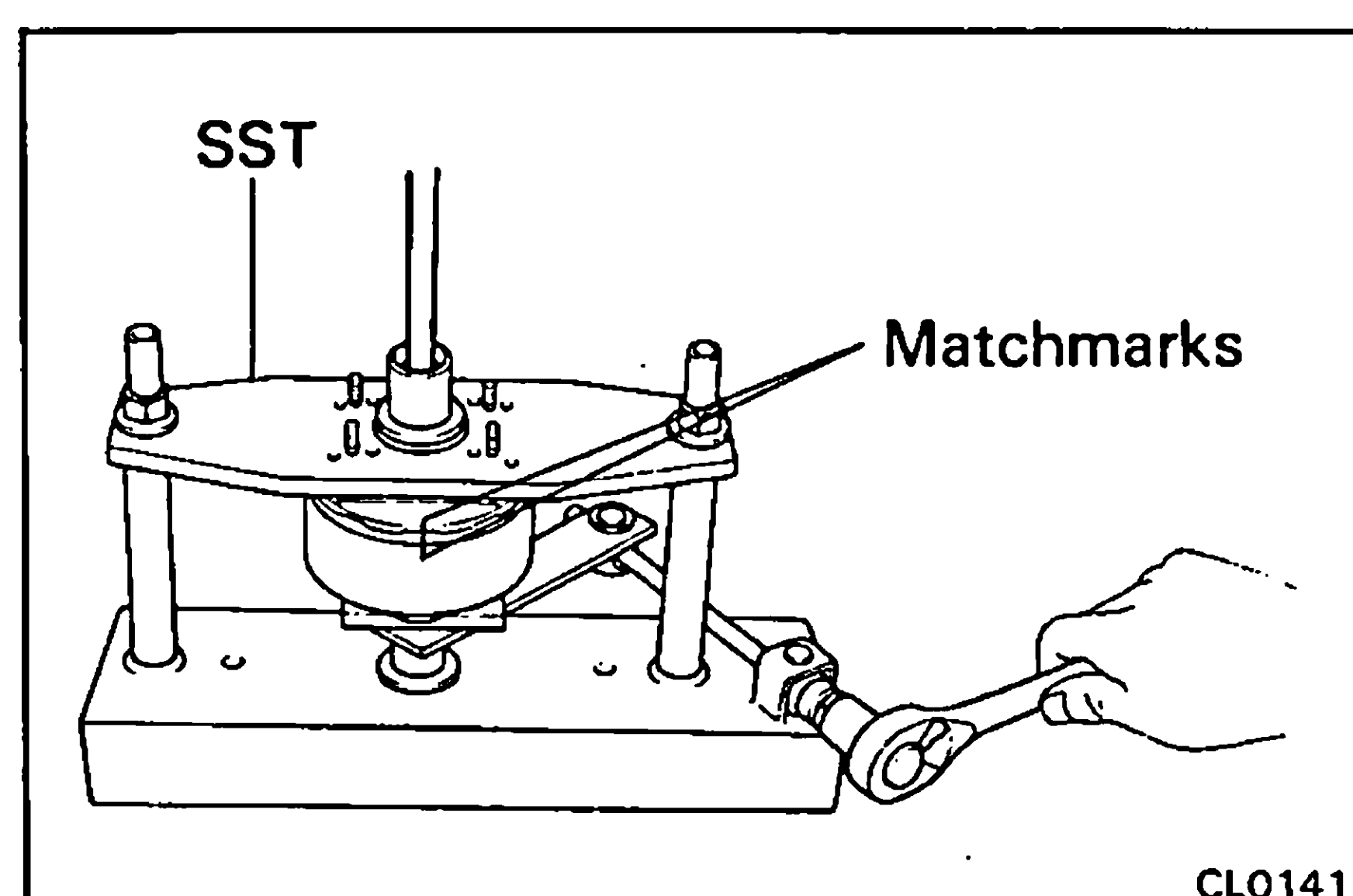
(b) Place the push rod, diaphragm spring and No.2 booster body in the No.1 booster body.

(c) Compress the diaphragm spring between the No.1 and No.2 booster bodies.

NOTICE: Be careful not to tighten the two nuts of the SST too tightly.

(d) Turn the No.1 booster body counterclockwise, until the matchmarks match.

HINT: If the No.1 booster body is too tight to be turned, apply more silicone grease on the diaphragm edge that contacts the No.1 and No.2 booster bodies.



8. INSTALL SPONGE AND FELT ELEMENT

(a) Install the sponge and felt element into the booster.

(b) Install E-ring onto booster air valve assembly.

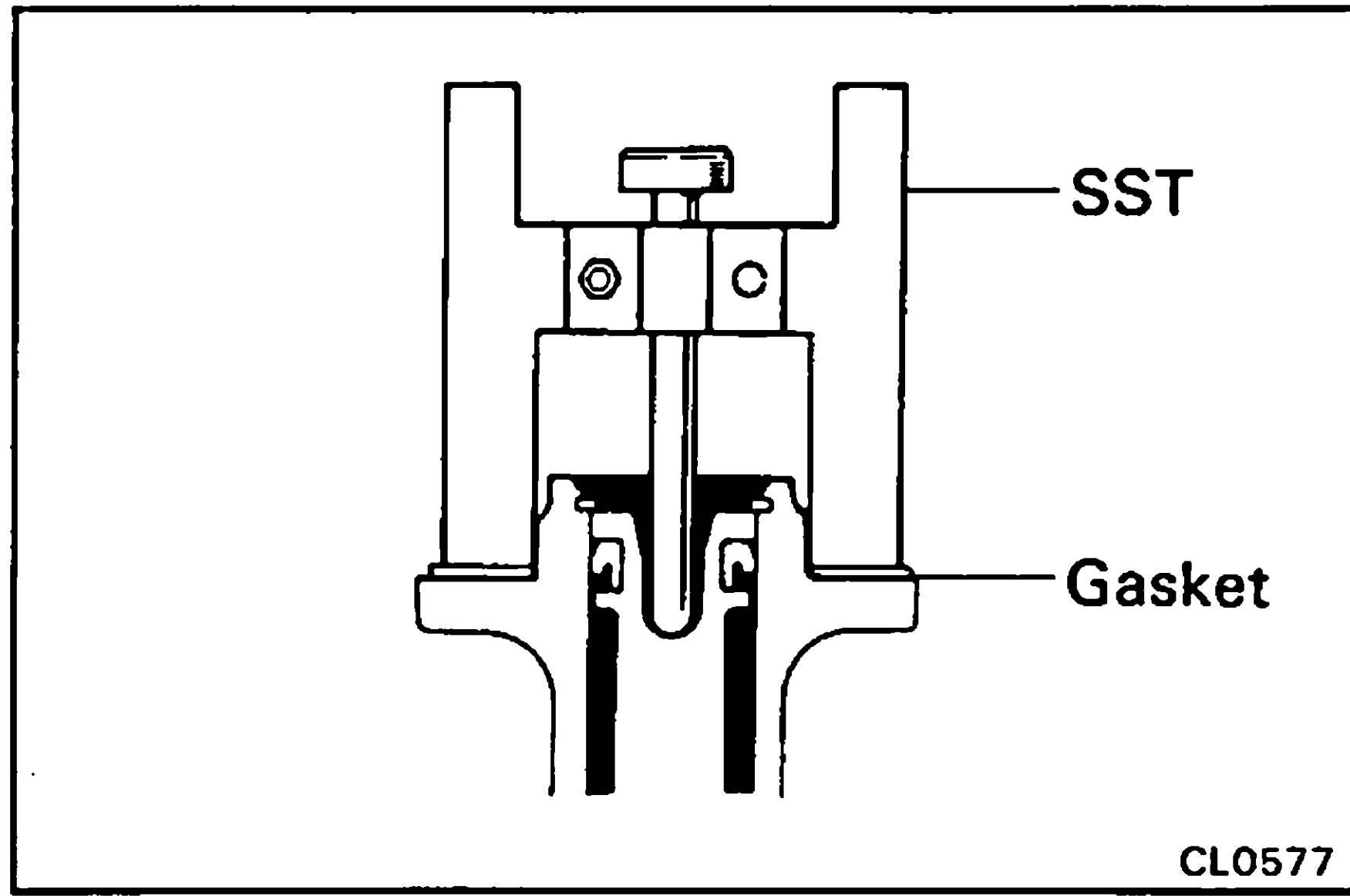
9. INSTALL PISTON COVER WITH BOOT

(a) Install the sponge element into the boot.

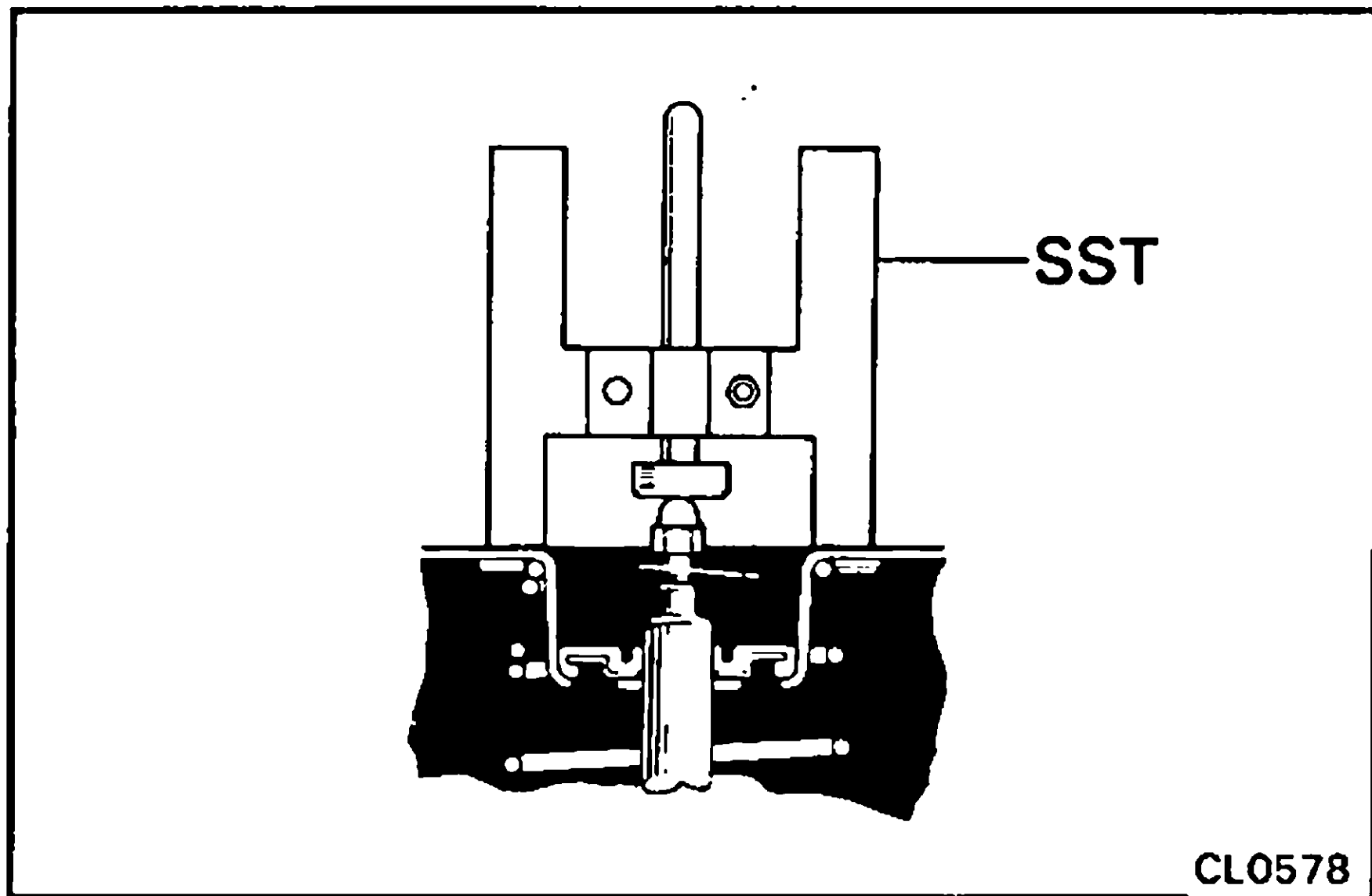
(b) Install the boot to the piston cover.

(c) Install a new gasket onto the booster and the piston cover with the boot.

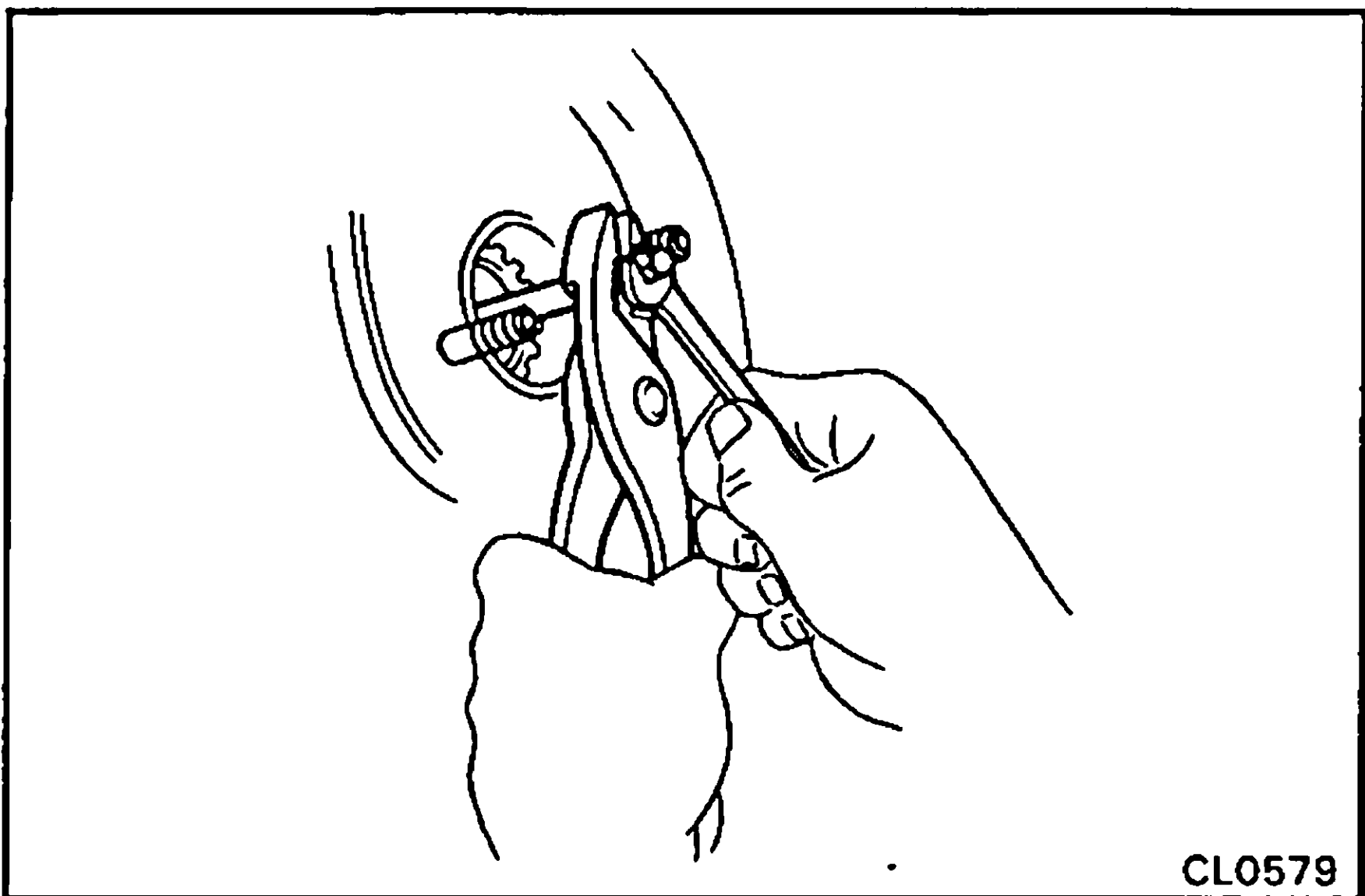
10. INSTALL CLEVIS



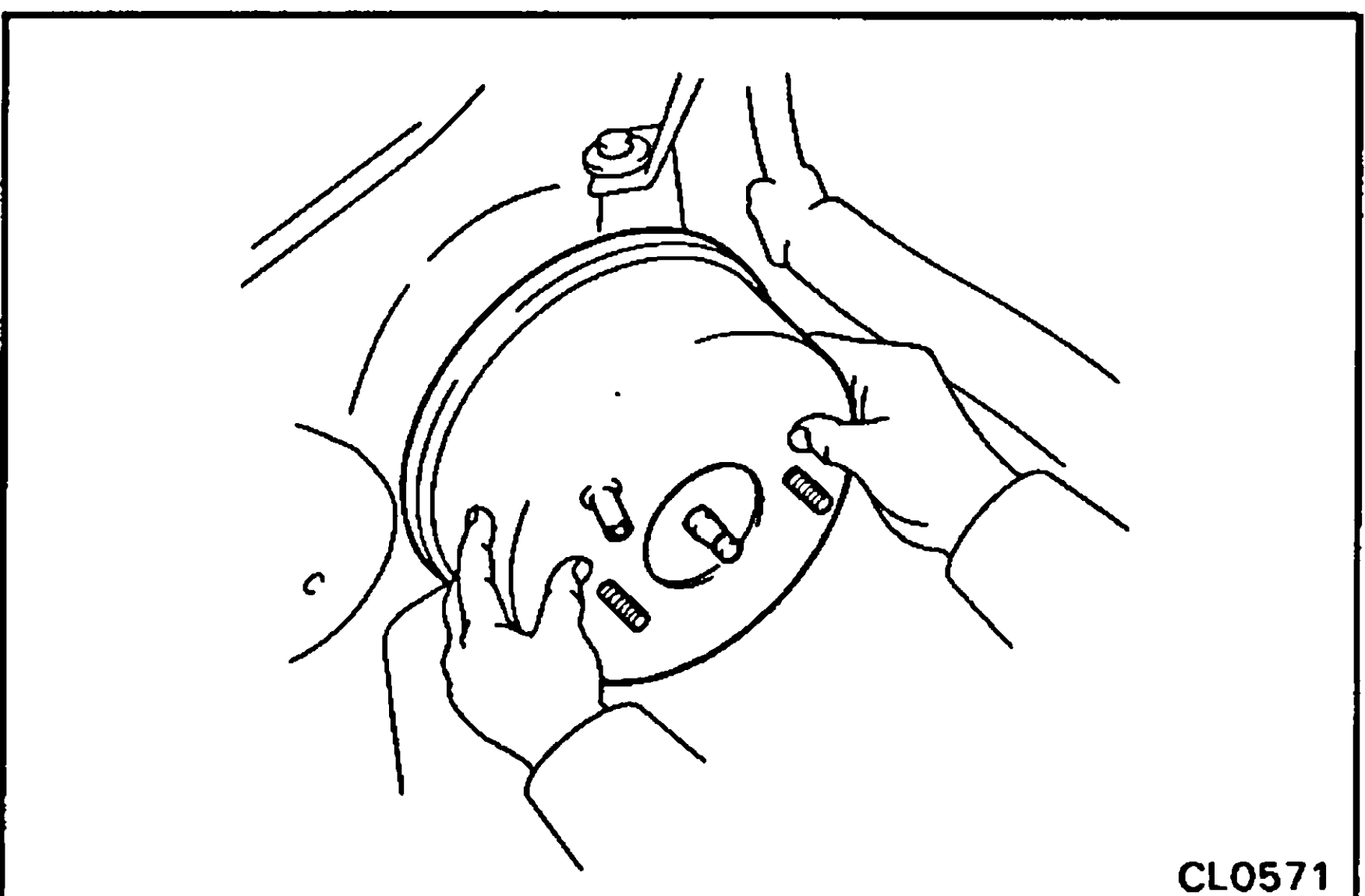
CL0577



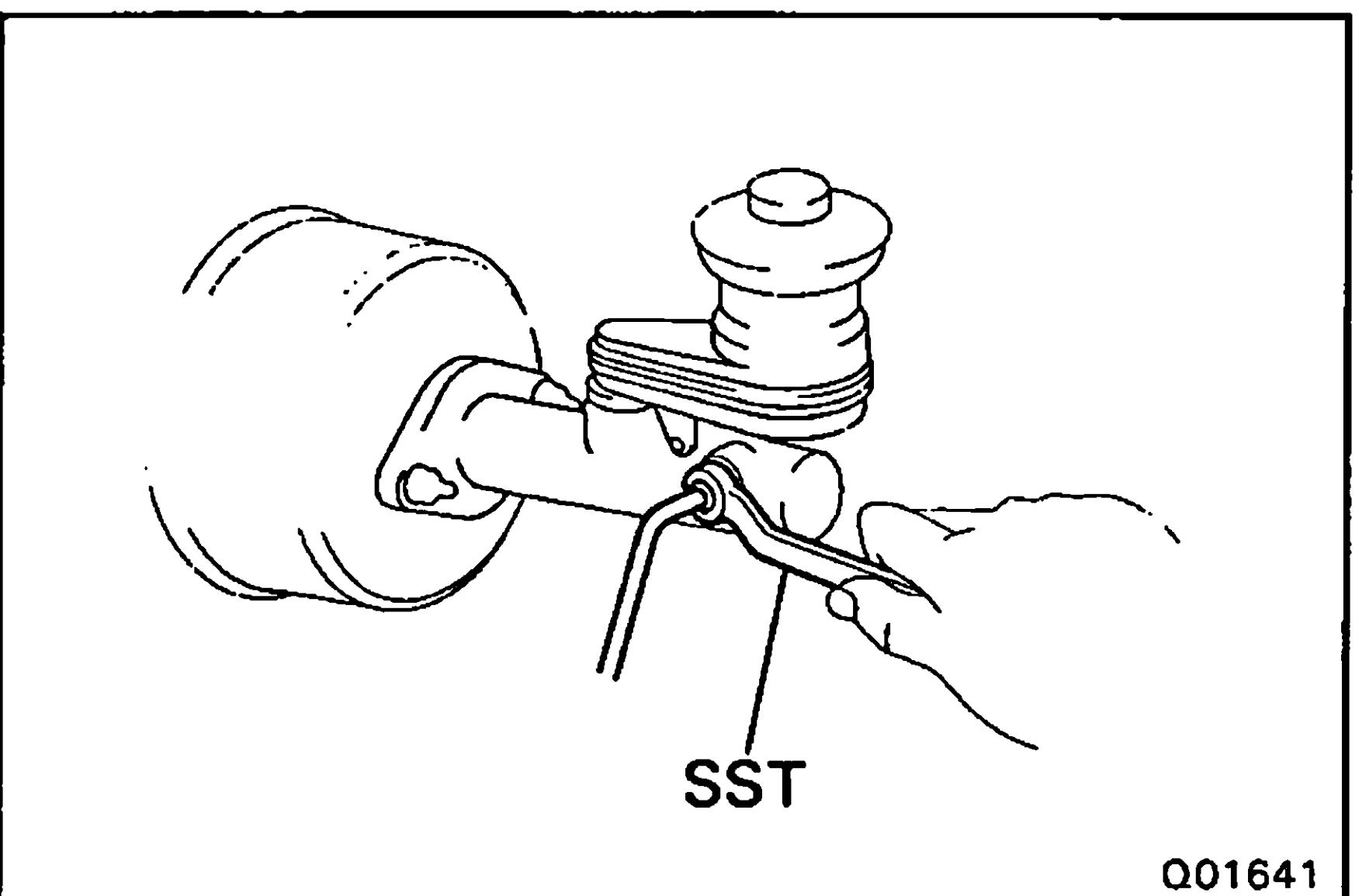
CL0578



CL0579



CL0571



Q01641

INSTALLATION OF CLUTCH BOOSTER

(See page CL-37)

1. ADJUST LENGTH OF BOOSTER PUSH ROD

- (a) Install the gasket on the master cylinder.
- (b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.

SST 09737-00010

- (c) Turn the SST upside down, and set it on the booster.

SST 09737-00010

- (d) Measure the clearance between the booster push rod and pin head (SST).

Clearance: 0 mm (0 in.)

- (e) Adjust the booster push rod length until the push rod lightly touches the pin head.

HINT: When adjusting the push rod, depress the brake pedal enough so that the push rod sticks out.

2. INSTALL CLUTCH BOOSTER

Install four nuts and the clutch booster.

3. CONNECT CLEVIS TO CLUTCH PEDAL

Connect the clevis to the clutch pedal with the clevis pin and clip.

4. INSTALL MASTER CYLINDER TO CLUTCH BOOSTER (See page CL-34)

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

5. CONNECT CLUTCH LINE UNION

Using SST, connect the union.

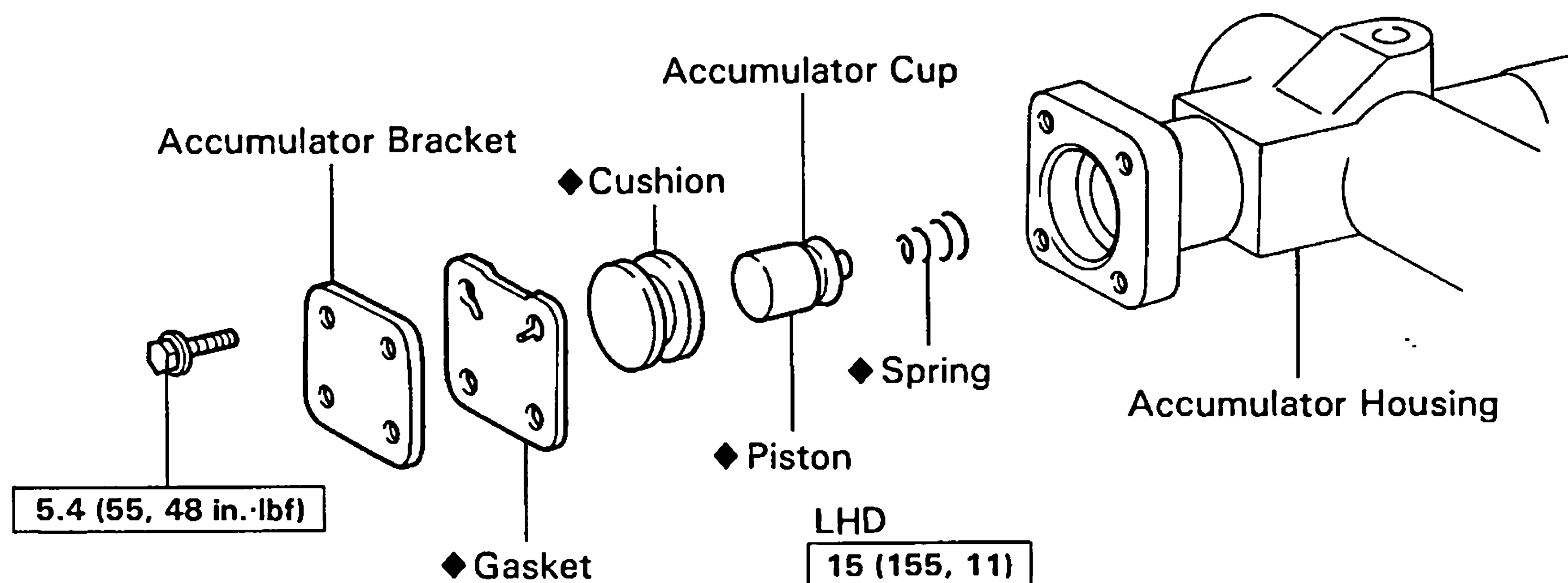
SST 09751-36011

6. CONNECT VACUUM HOSE TO CLUTCH BOOSTER

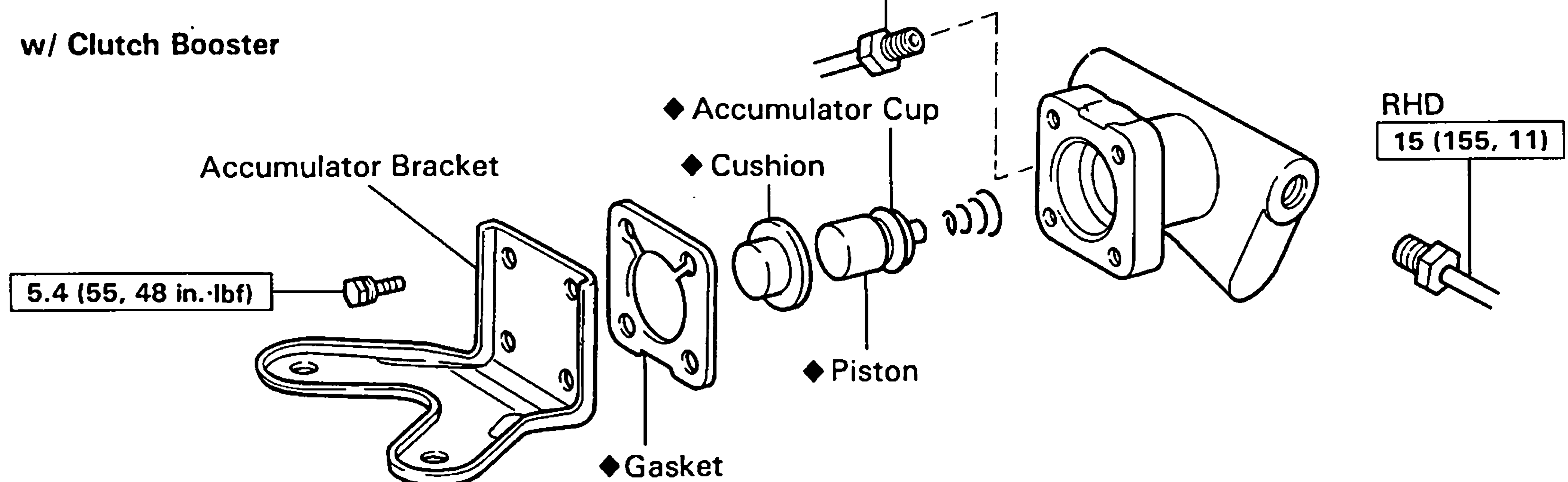
7. ADJUST CLUTCH PEDAL AND BLEED SYSTEM (See page CL-31)

CLUTCH ACCUMULATOR COMPONENTS

• w/o Clutch Booster



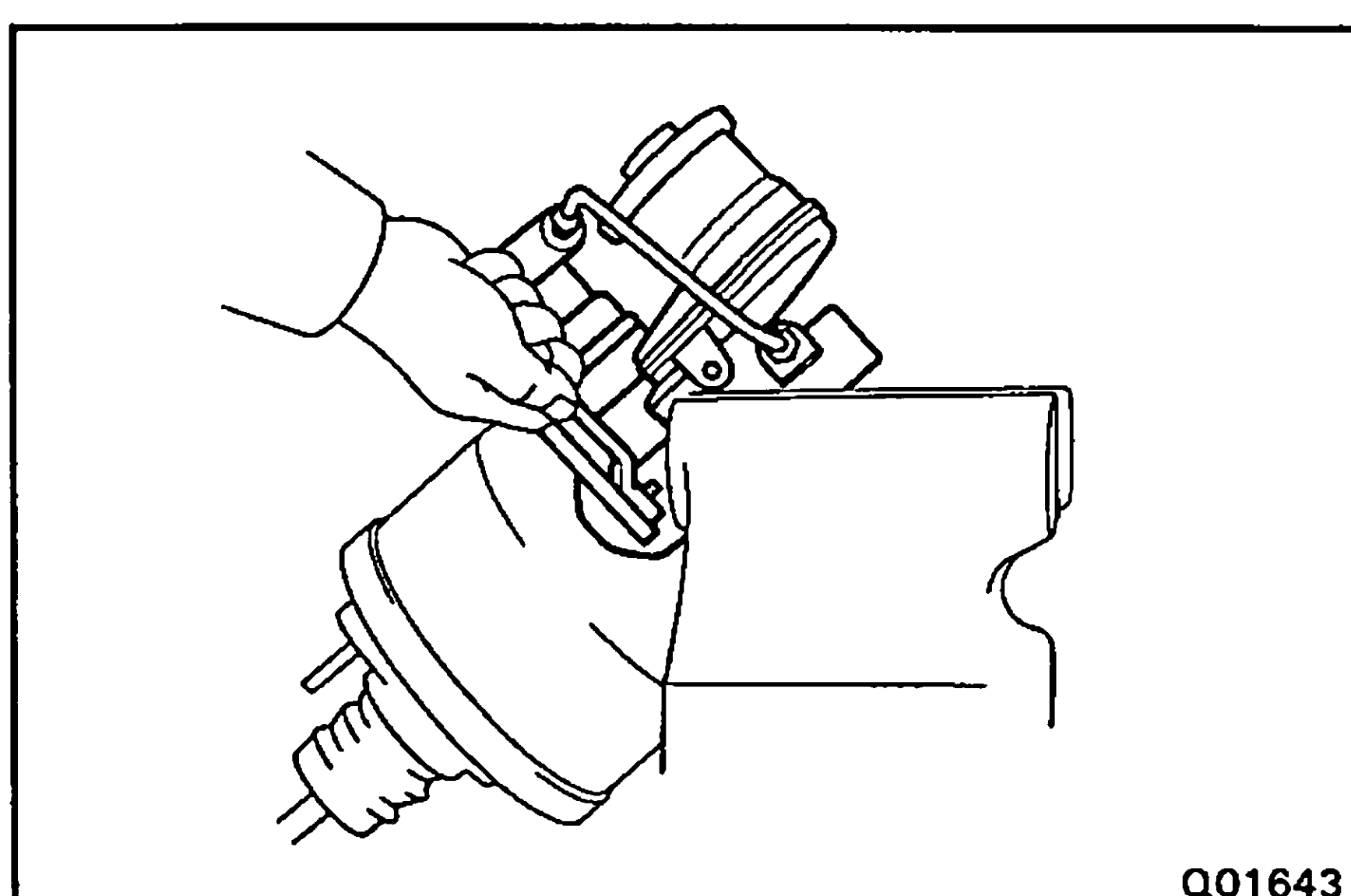
• w/ Clutch Booster



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

Q01645



REMOVAL OF CLUTCH ACCUMULATOR (MAIN POINT OF REMOVAL AND INSTALLATION)

(w/o Clutch Booster)

REMOVE MASTER CYLINDER
(See page CL-32)

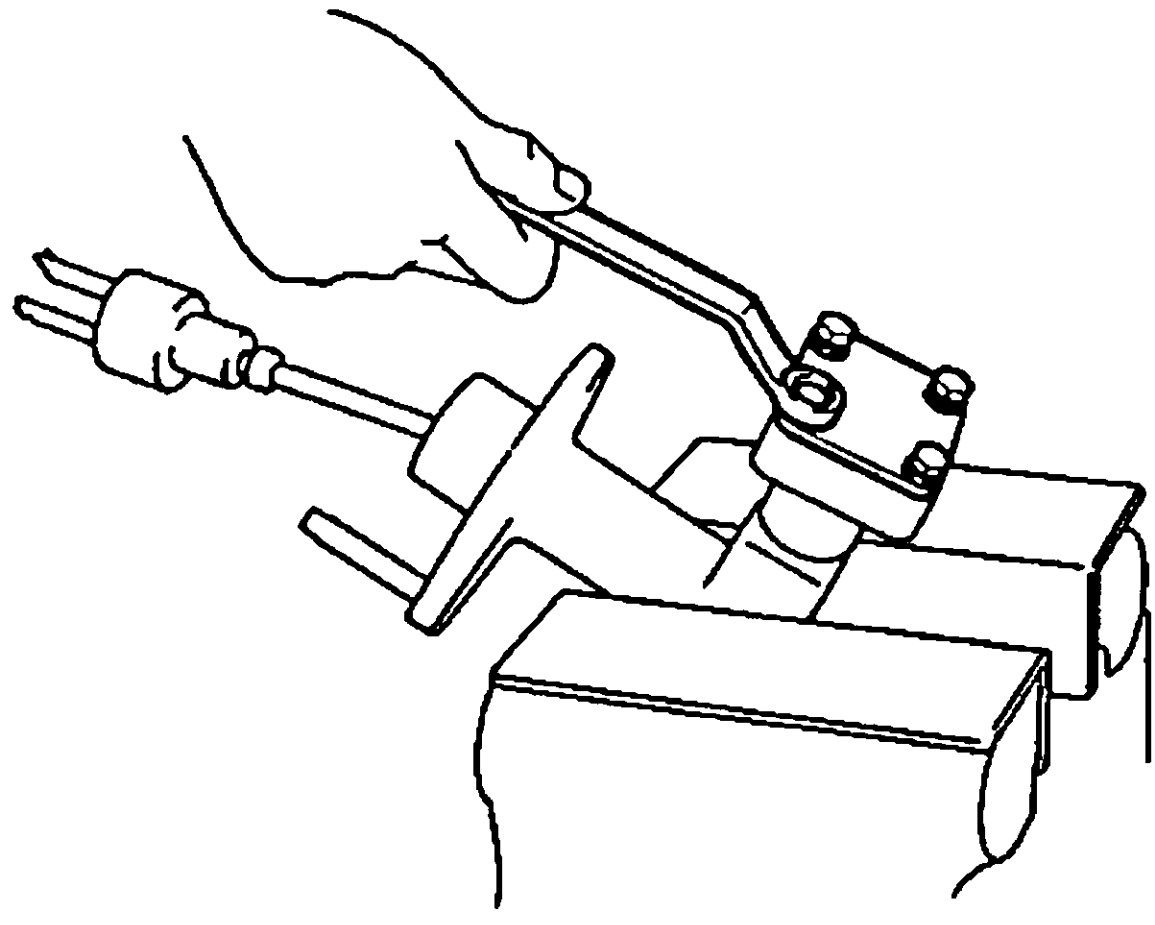
(w/ Clutch Booster)

1. REMOVE MASTER CYLINDER
(See page CL-34)

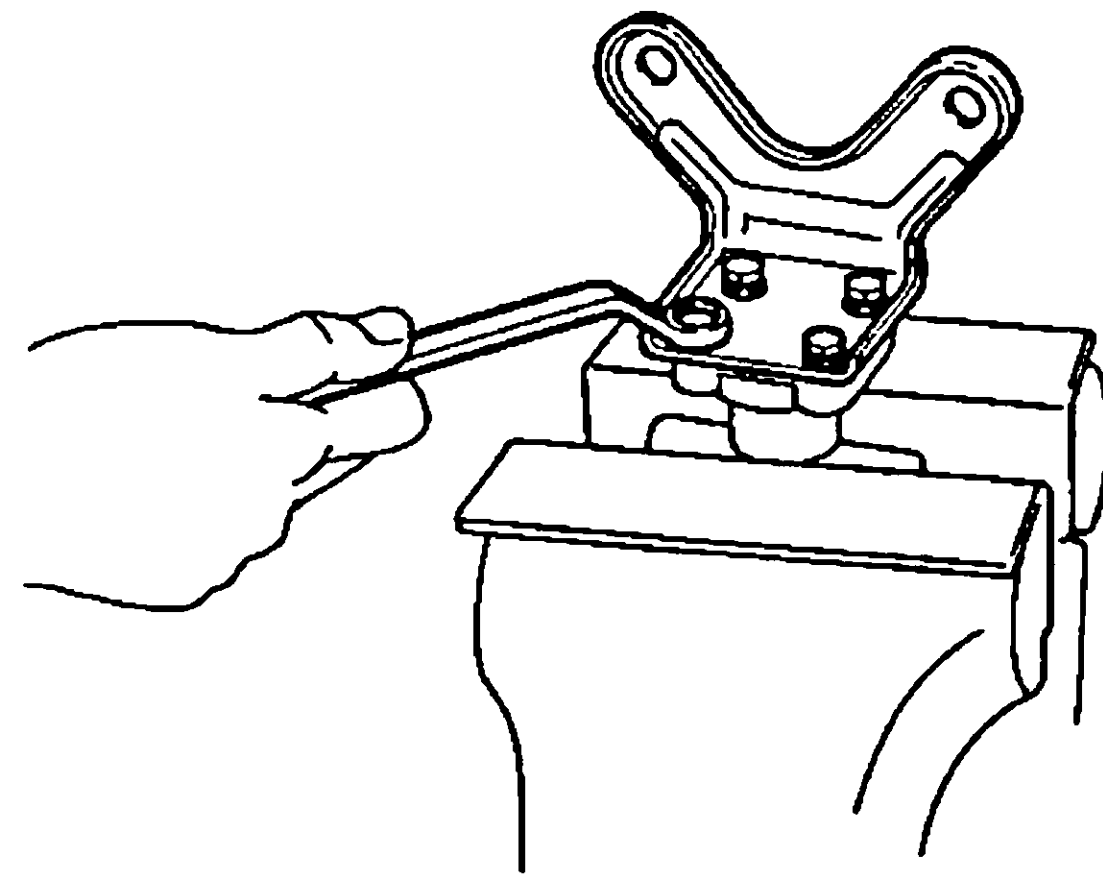
2. REMOVE CLUTCH ACCUMULATOR

Remove two bolts and clutch accumulator with bracket.

w/o Clutch Booster



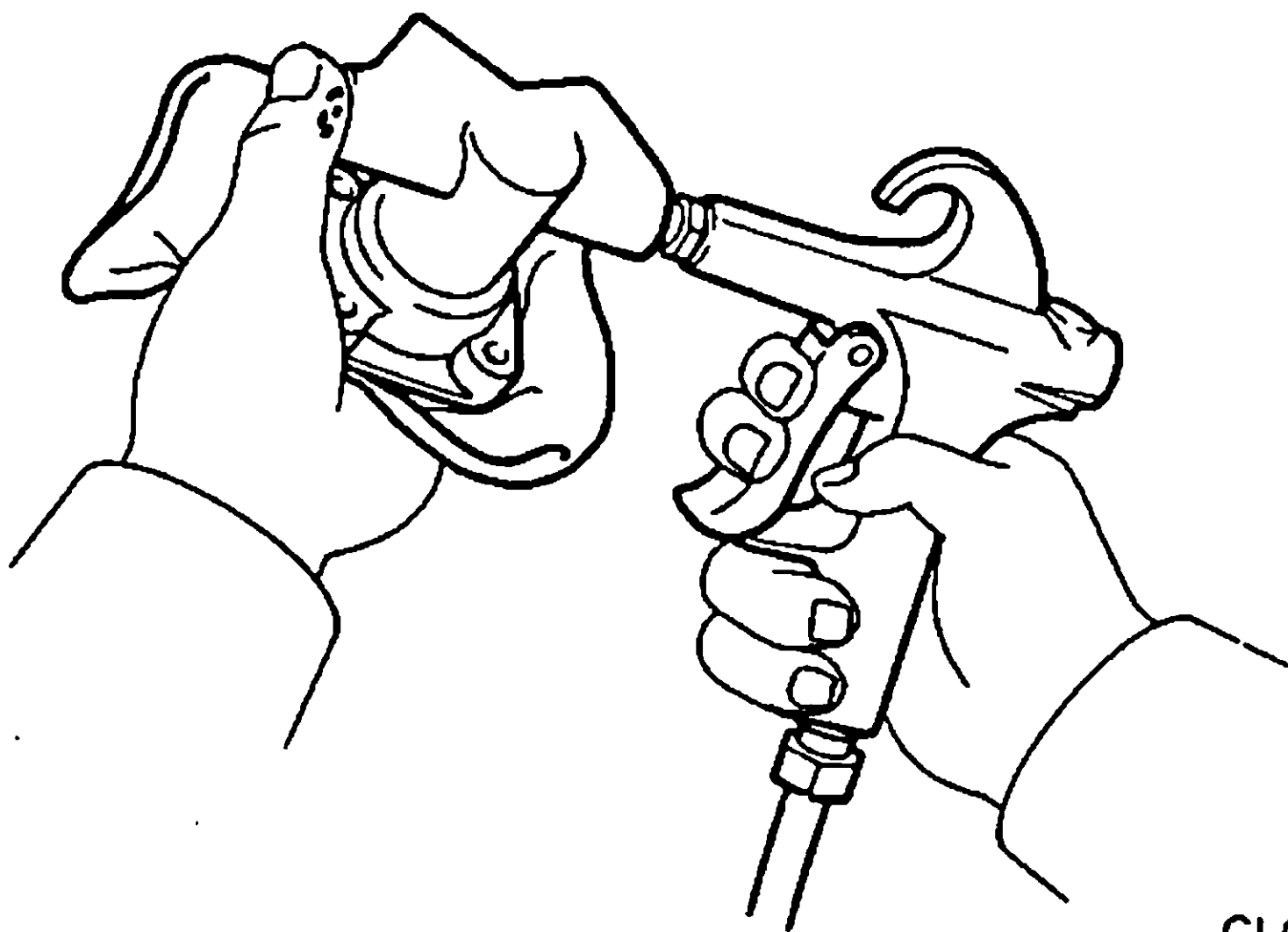
w/ Clutch Booster

CL0583
CL0584**DISASSEMBLY OF CLUTCH ACCUMULATOR**

1. **REMOVE CLUTCH ACCUMULATOR BRACKET**
 - (a) Remove four bolts and the bracket.
 - (b) Remove the gasket from the bracket.
2. **REMOVE CUSHION**

3. **REMOVE PISTON AND SPRING**

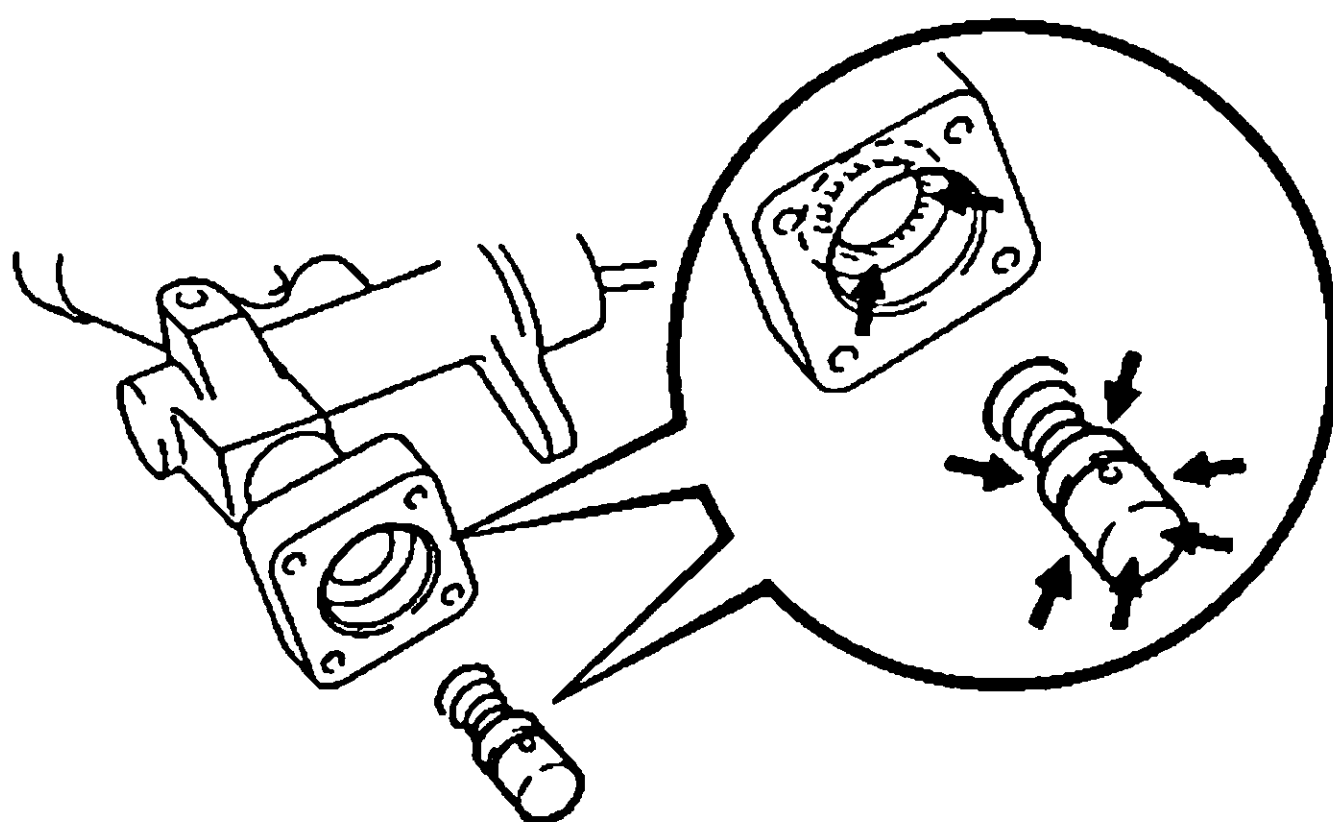
Using compressed air, remove the piston and spring.



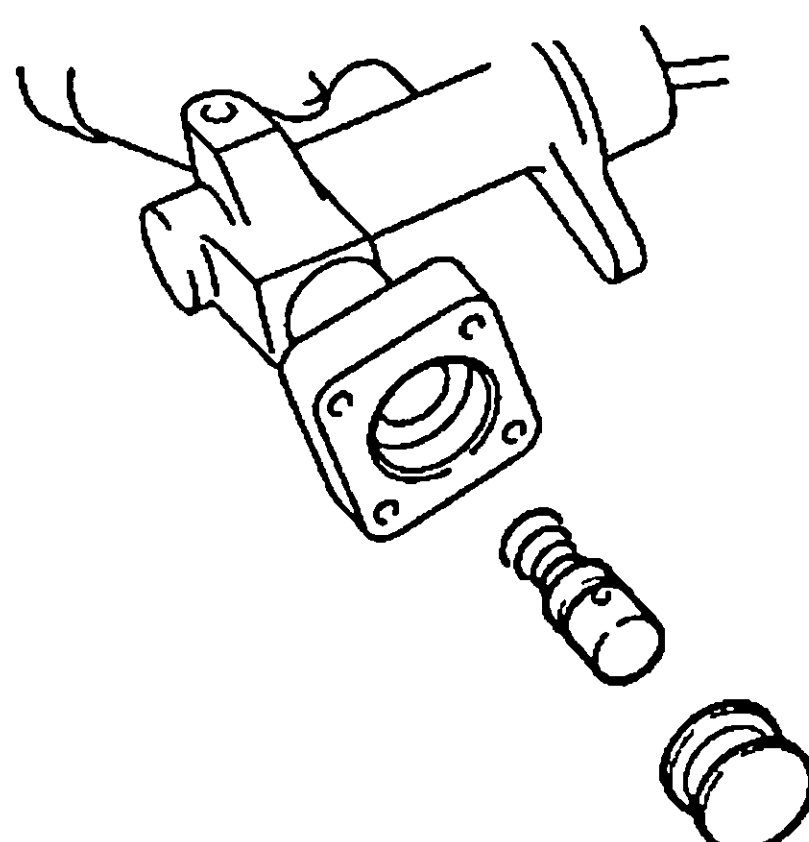
CL0624

ASSEMBLY OF CLUTCH ACCUMULATOR**(w/o Clutch Booster)****(See page CL-43)**

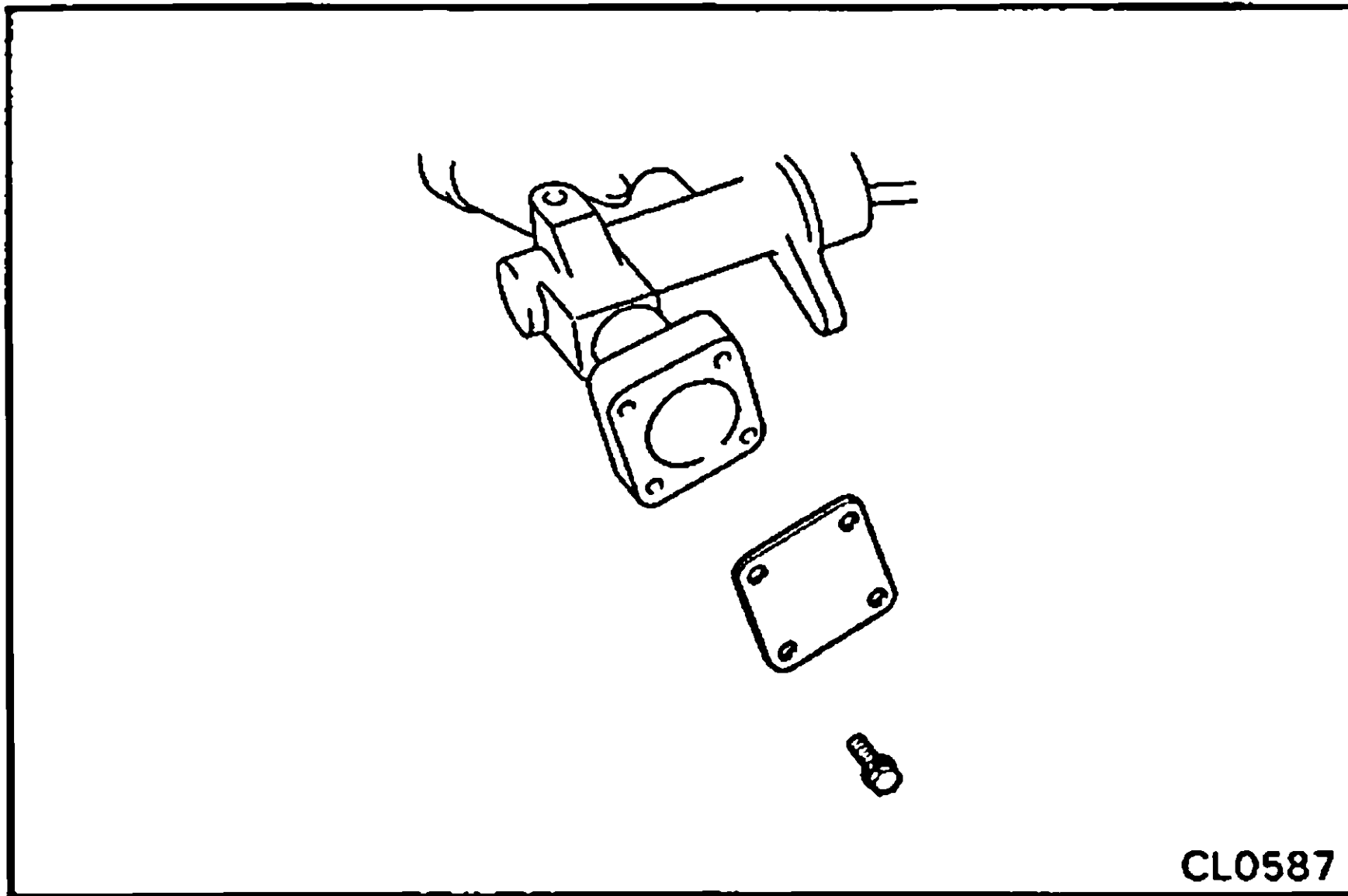
1. **COAT PISTON AND ACCUMULATOR BODY WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**
2. **INSTALL SPRING, PISTON AND CUSHION INTO ACCUMULATOR**



CL0585

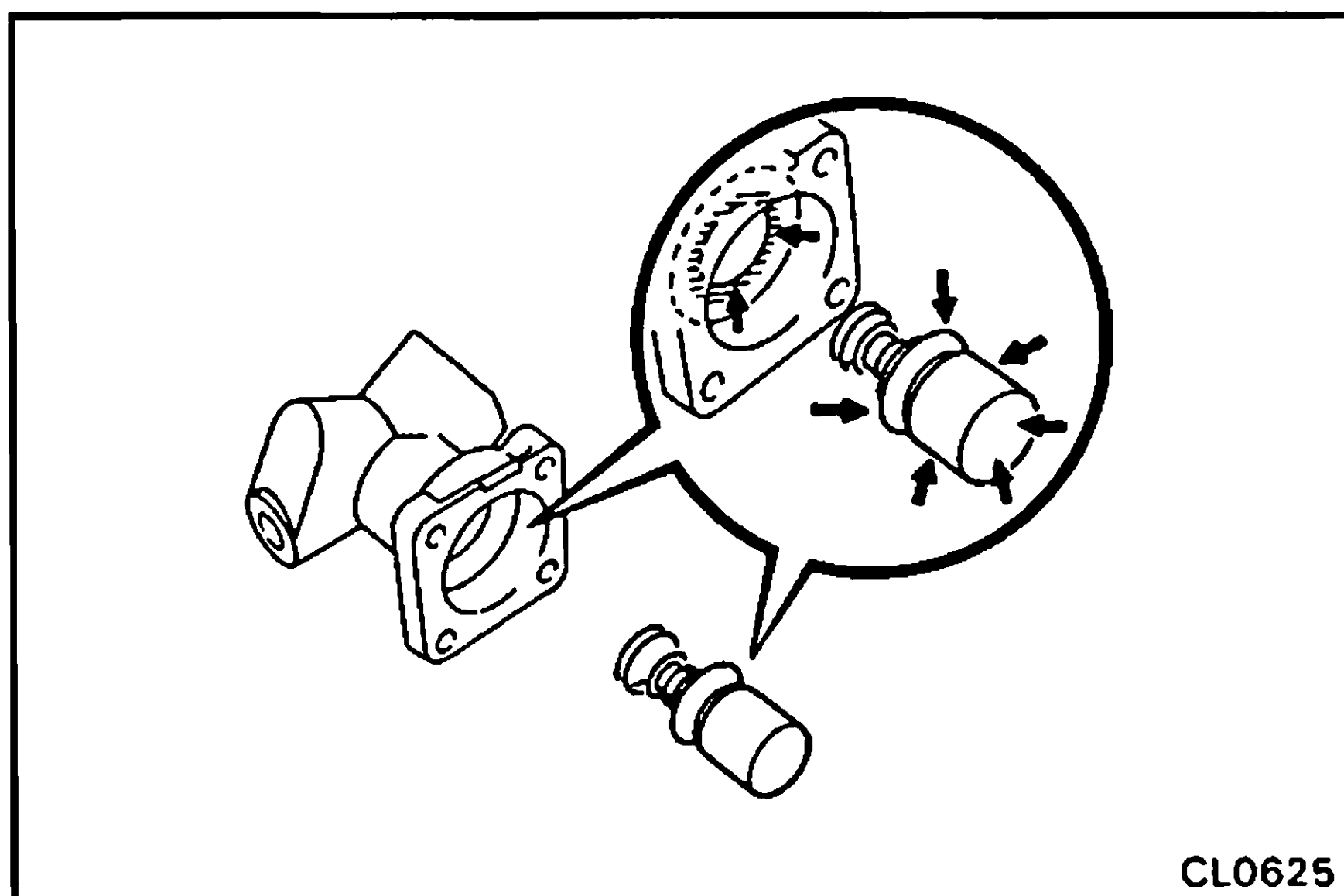


CL0586

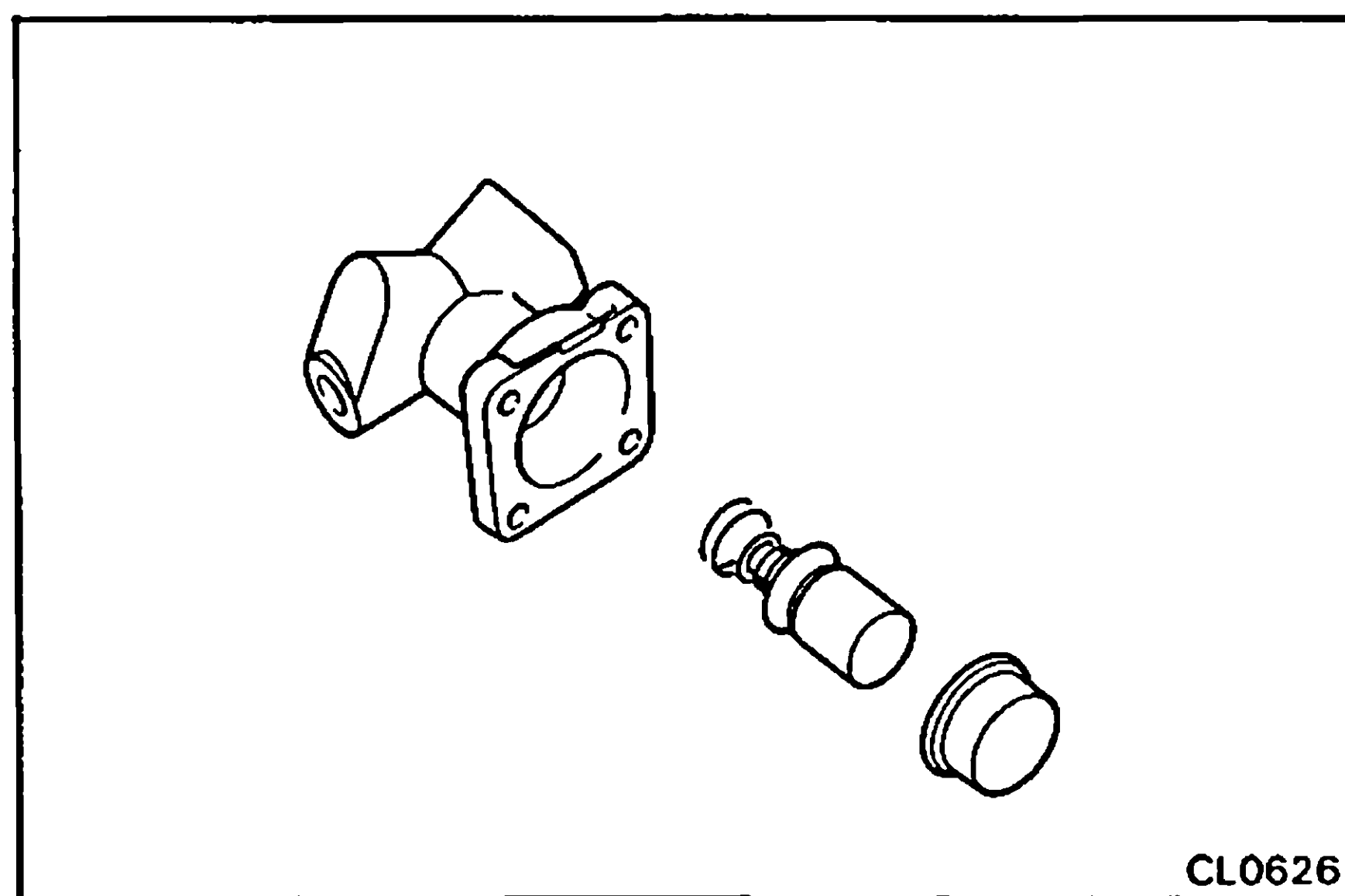
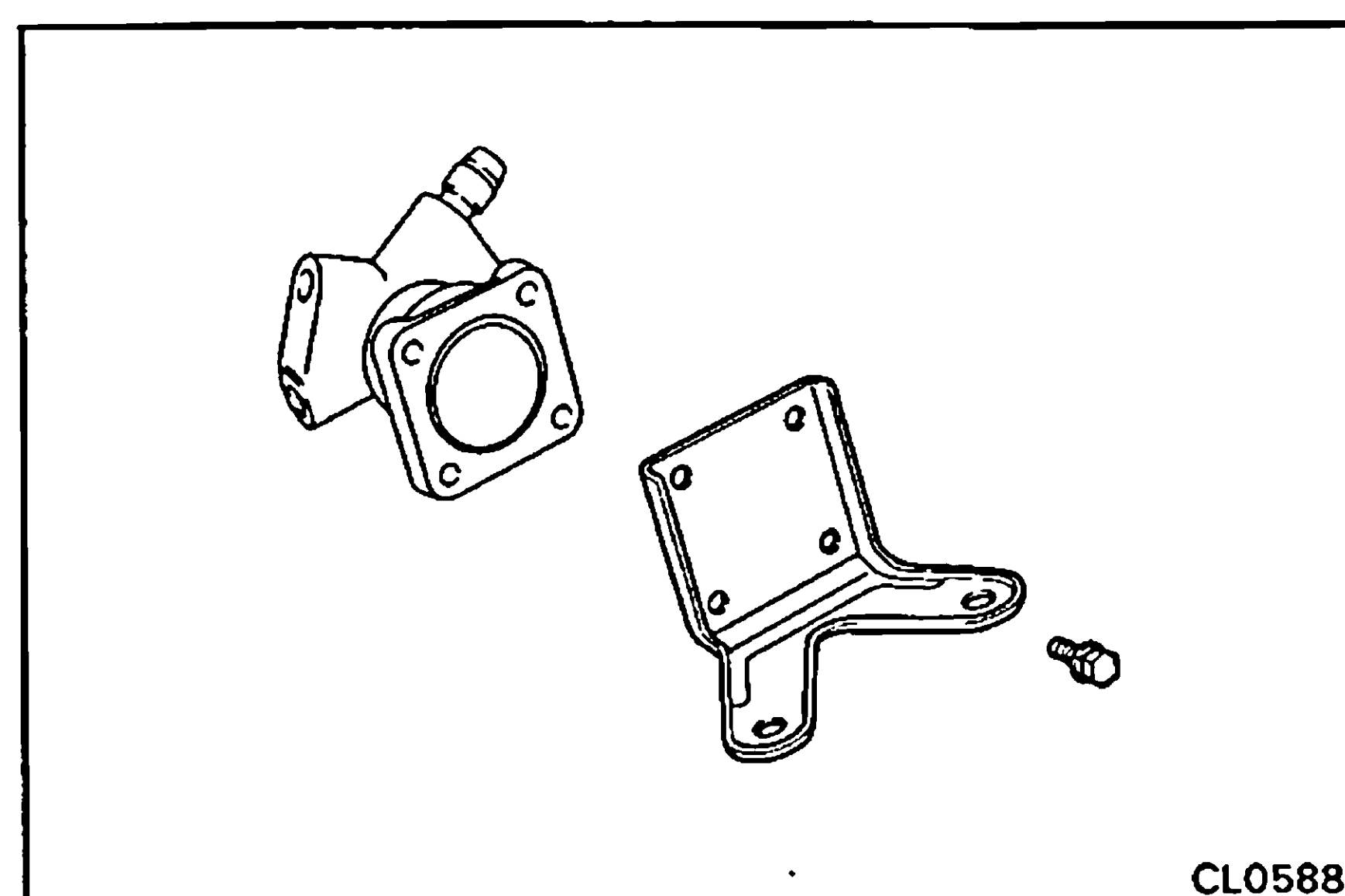
**3. INSTALL ACCUMULATOR BRACKET**

- (a) Install a new gasket to the bracket.
- (b) Install the bracket to the accumulator and tighten the four bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

**(w/ Clutch Booster)**

(See page CL-43)

4. COAT PISTON AND ACCUMULATOR BODY WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**5. INSTALL SPRING, PISTON AND CUSHION INTO ACCUMULATOR****6. INSTALL ACCUMULATOR BRACKET**

- (a) Install a new gasket to the bracket.
- (b) Install the bracket to the accumulator and tighten the four bolts.

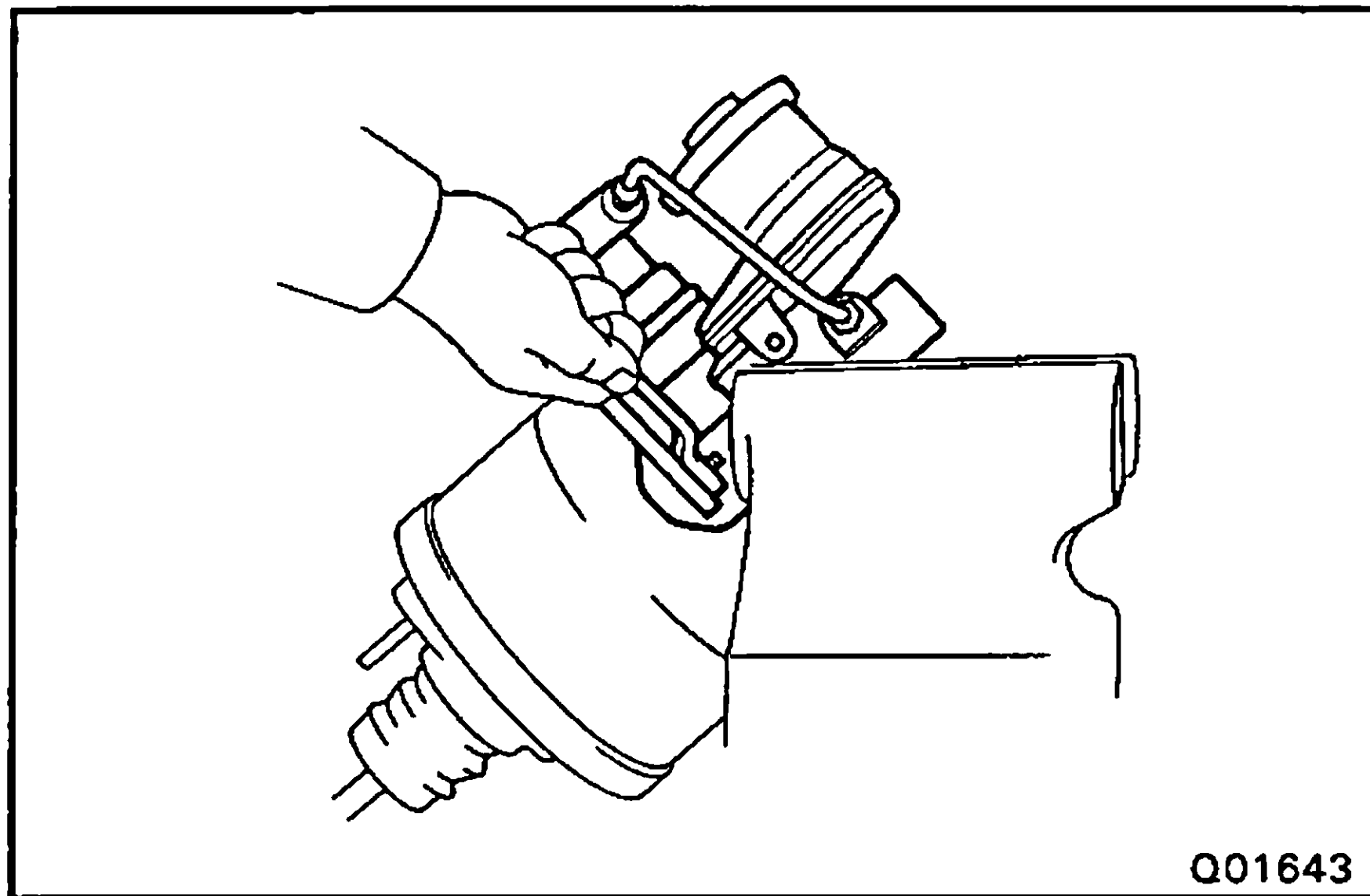
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

INSTALLATION OF CLUTCH ACCUMULATOR (w/o Clutch Booster)

INSTALL MASTER CYLINDER (See page CL-32)

1. INSTALL CLUTCH ACCUMULATOR

Install clutch accumulator with two bolts to clutch booster.



2. CONNECT CLUTCH LINE TUBE

Using SST, connect the clutch line tube.

SST 09751-36011

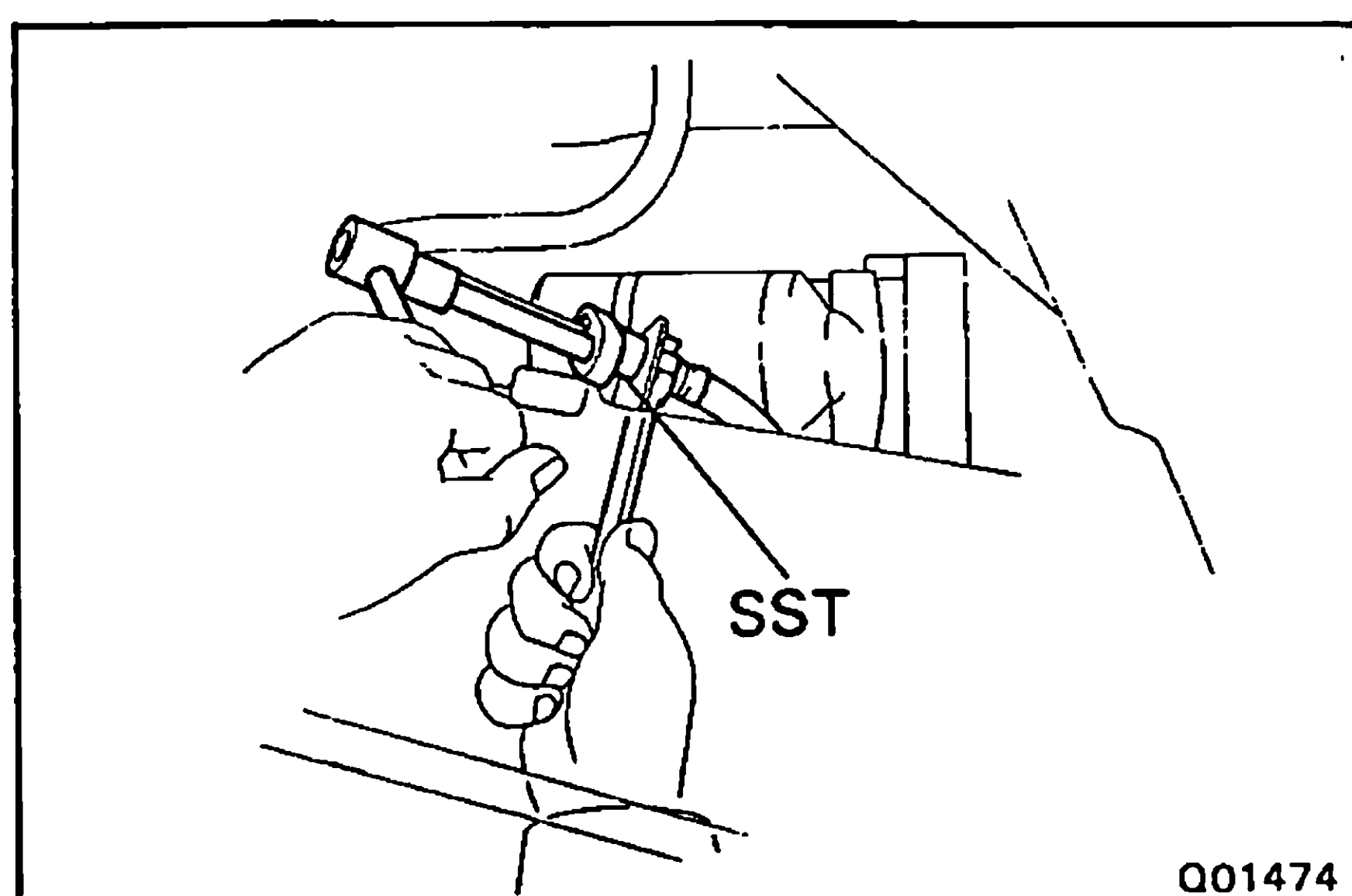
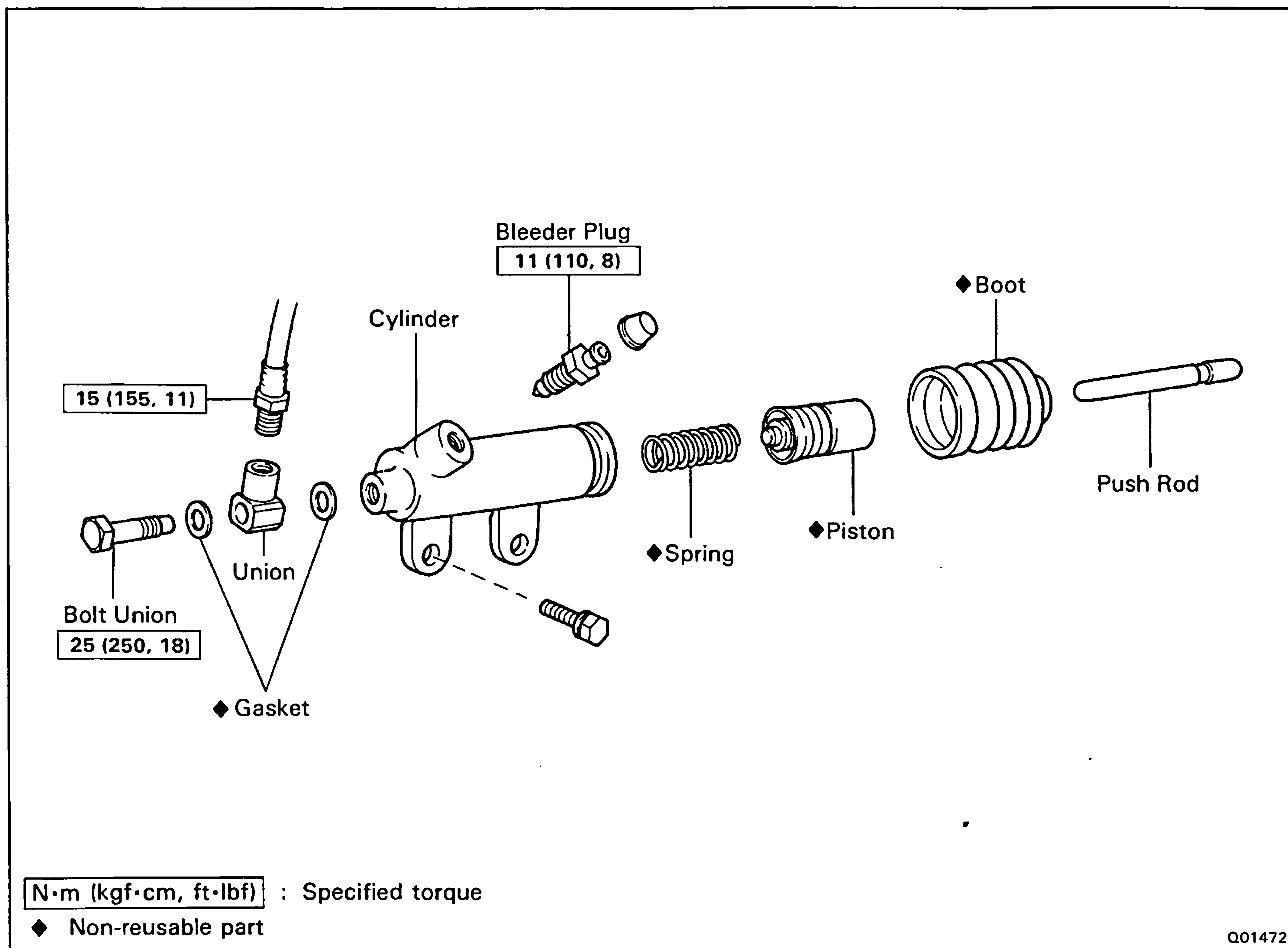
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

3. INSTALL MASTER CYLINDER (See page CL-8)

4. FILL RESERVOIR WITH BRAKE FLUID AND BLEED CLUTCH SYSTEM

5. CHECK FOR LEAKS

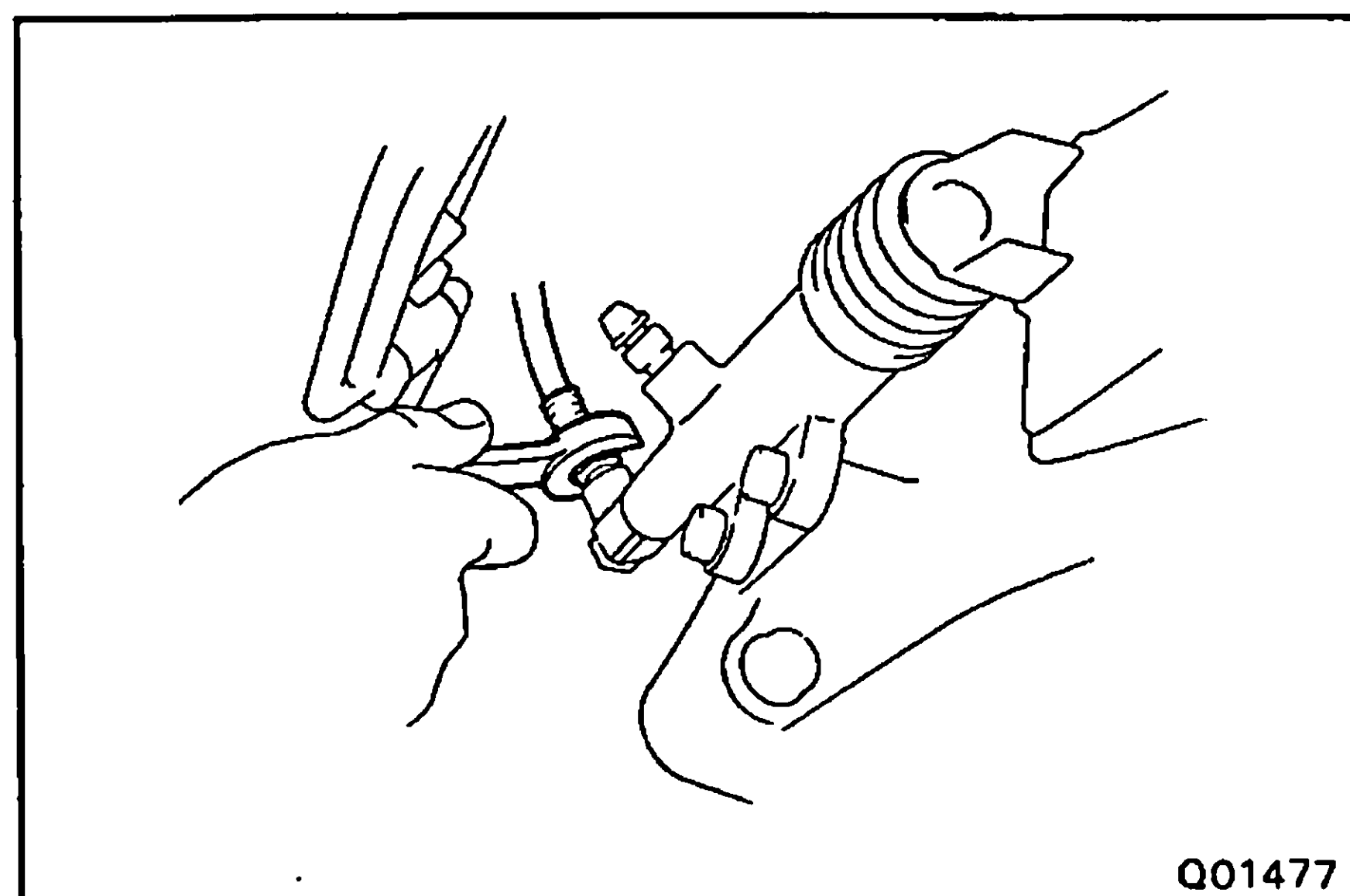
CLUTCH RELEASE CYLINDER COMPONENTS



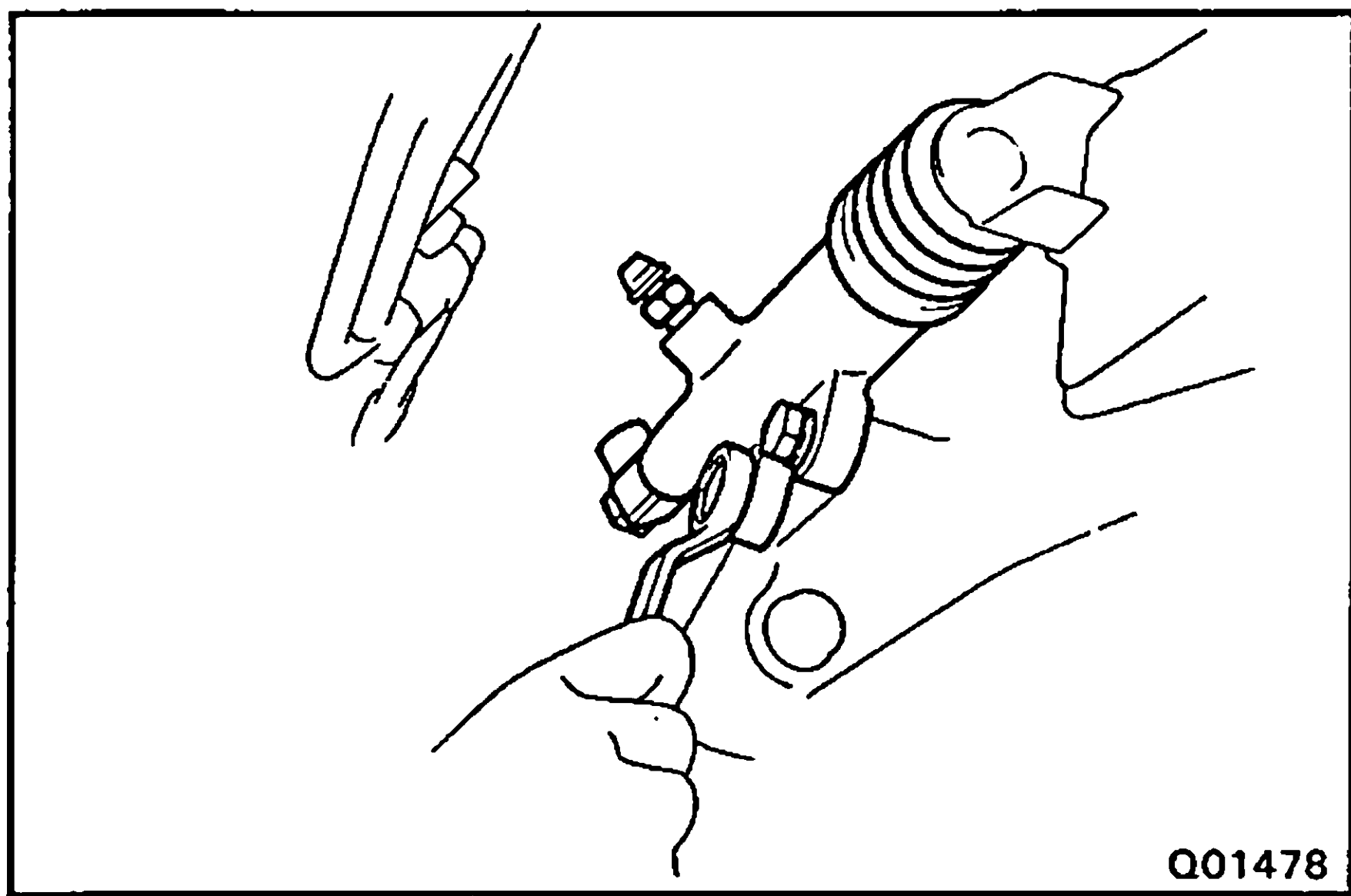
REMOVAL OF CLUTCH RELEASE CYLINDER

1. REMOVE FLEXIBLE HOSE

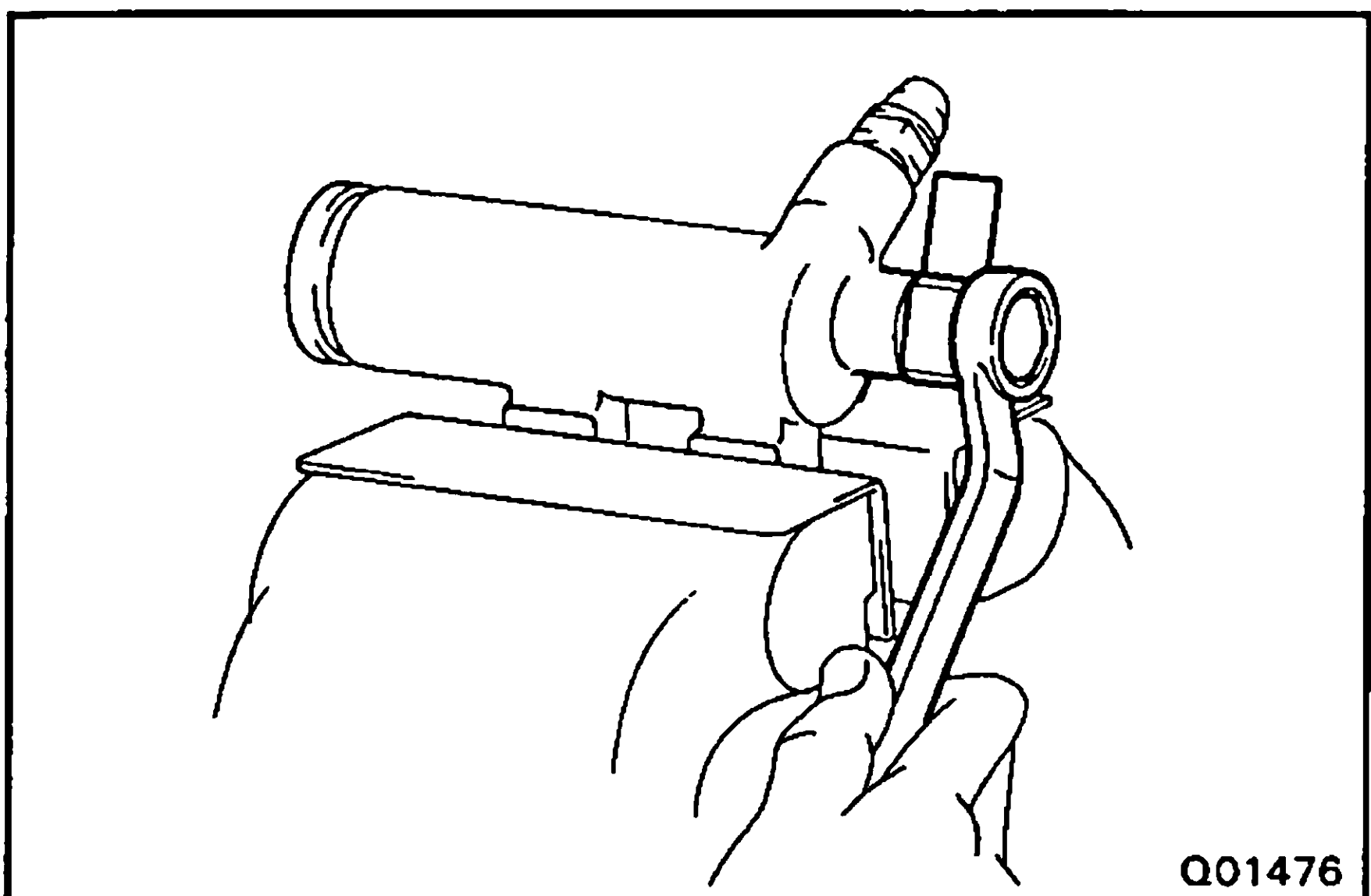
- Using SST, disconnect the union.
SST 09023-00100



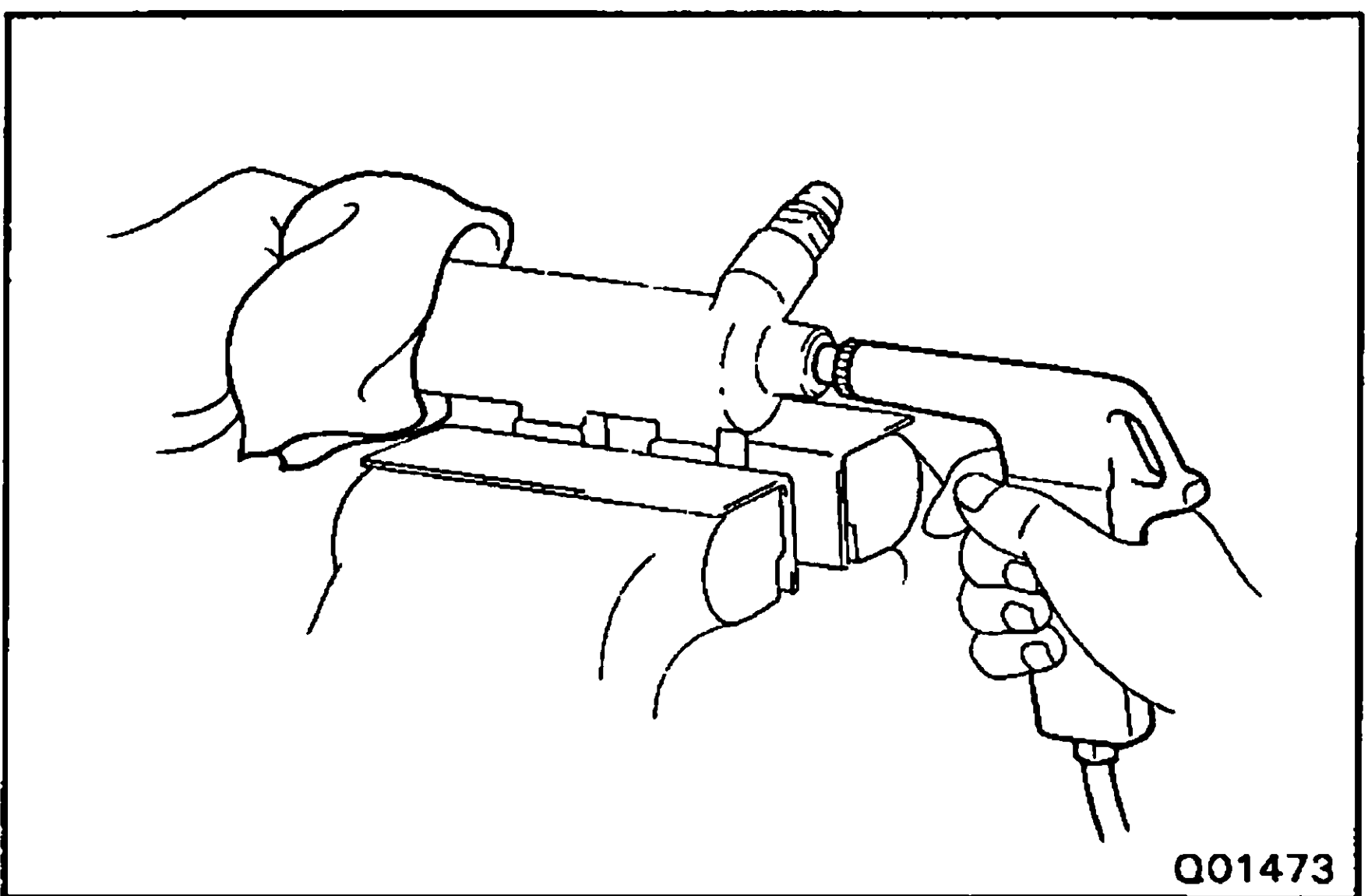
- Remove the flexible hose from the release cylinder.

**2. REMOVE RELEASE CYLINDER**

Remove the two bolts and pull out the release cylinder.

**DISASSEMBLY OF RELEASE CYLINDER****1. REMOVE UNION**

Remove the union bolts, two gaskets and union from the release cylinder.

**2. PULL OUT BOOT WITH PUSH ROD****3. REMOVE PISTON WITH SPRING**

Using compressed air, remove the piston with the spring from the cylinder.

INSPECTION OF RELEASE CYLINDER

HINT: Clean the disassembled parts with compressed.

1. INSPECT RELEASE CYLINDER BORE FOR SCORING OR CORROSION

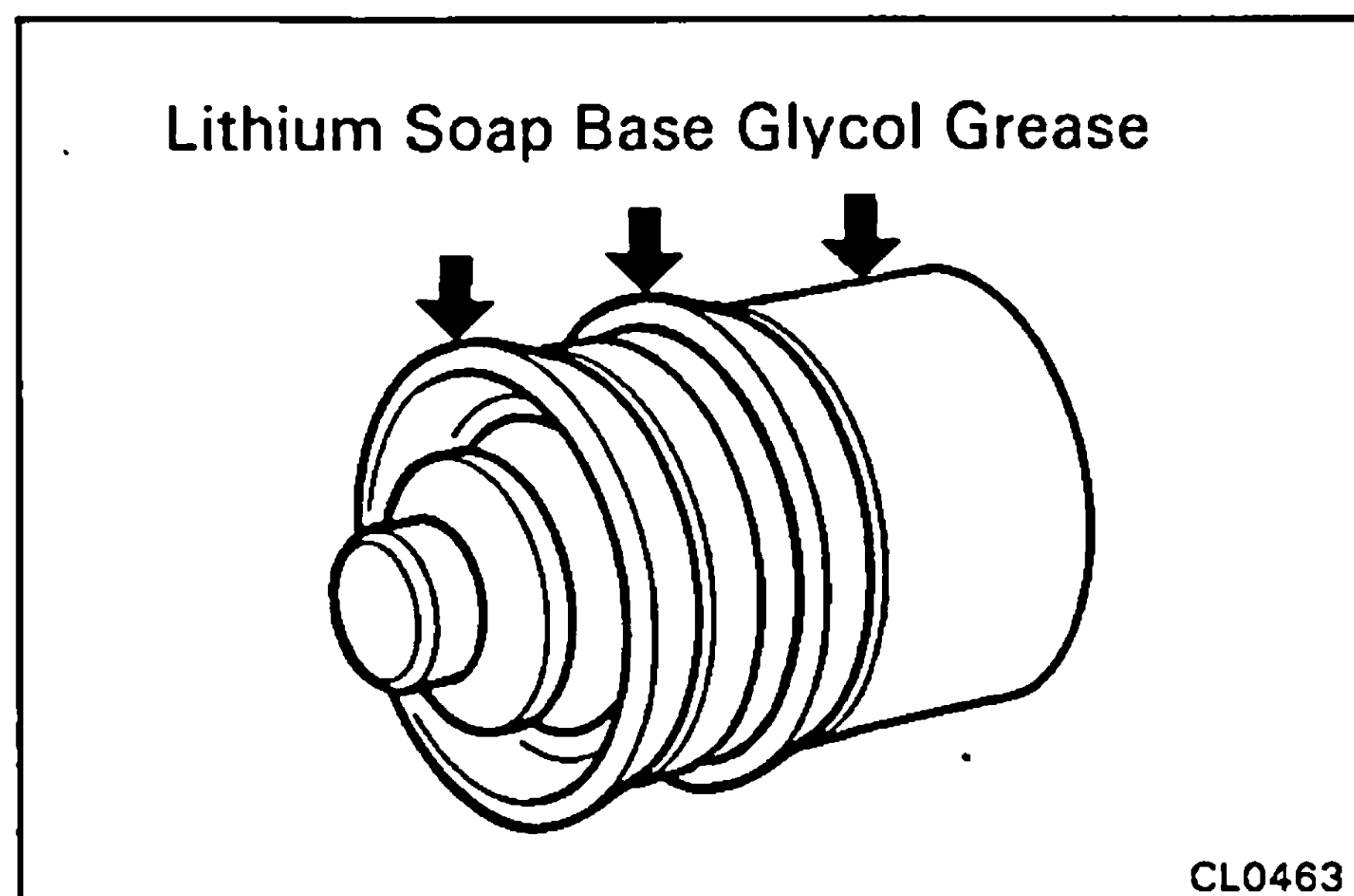
If a problem is found, clean or replace the cylinder.

2. INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING

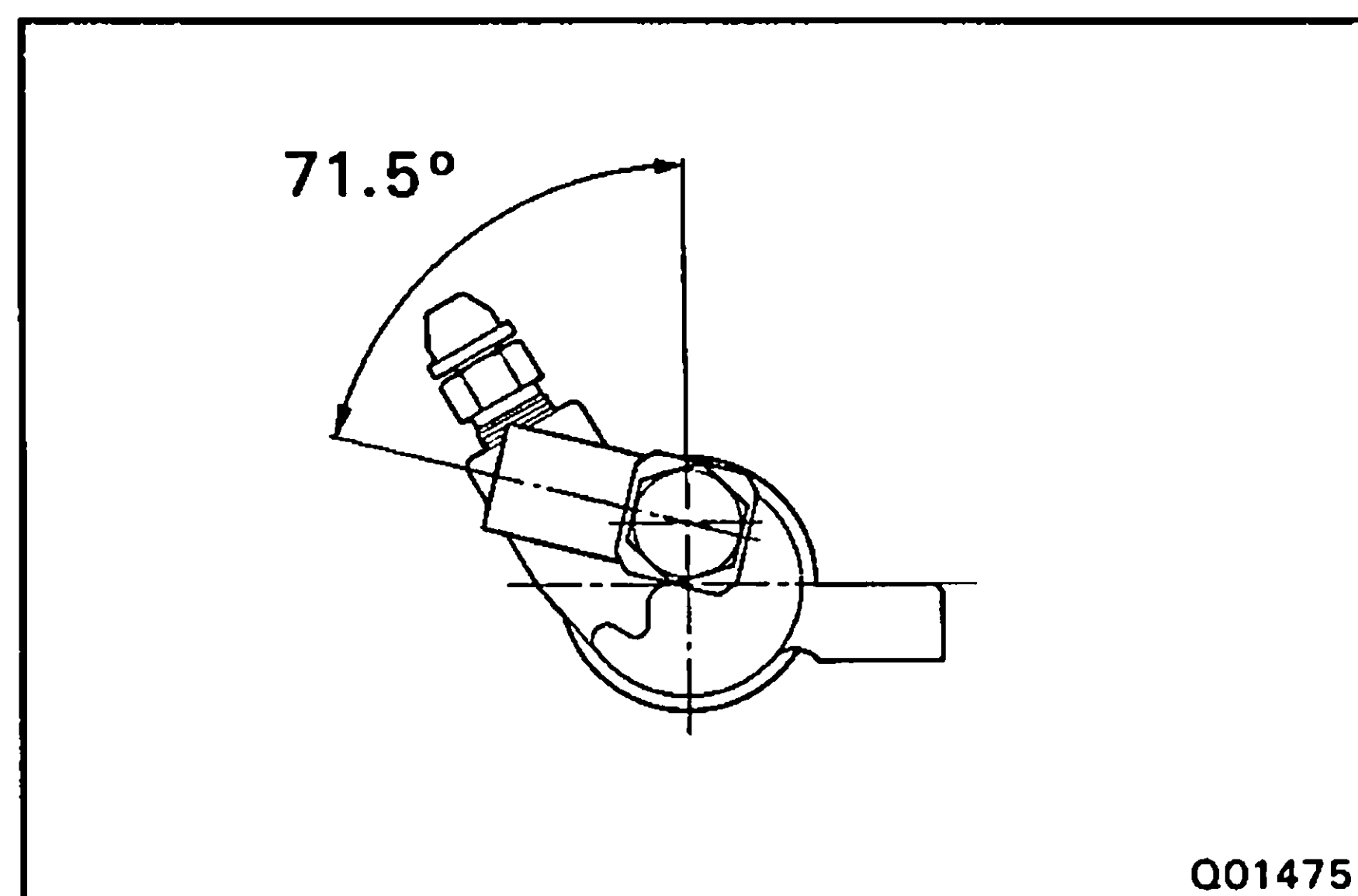
If either one requires replacement, use the parts from the cylinder kit.

3. INSPECT PUSH ROD FOR WEAR OR DAMAGE

If necessary, replace the push rod.

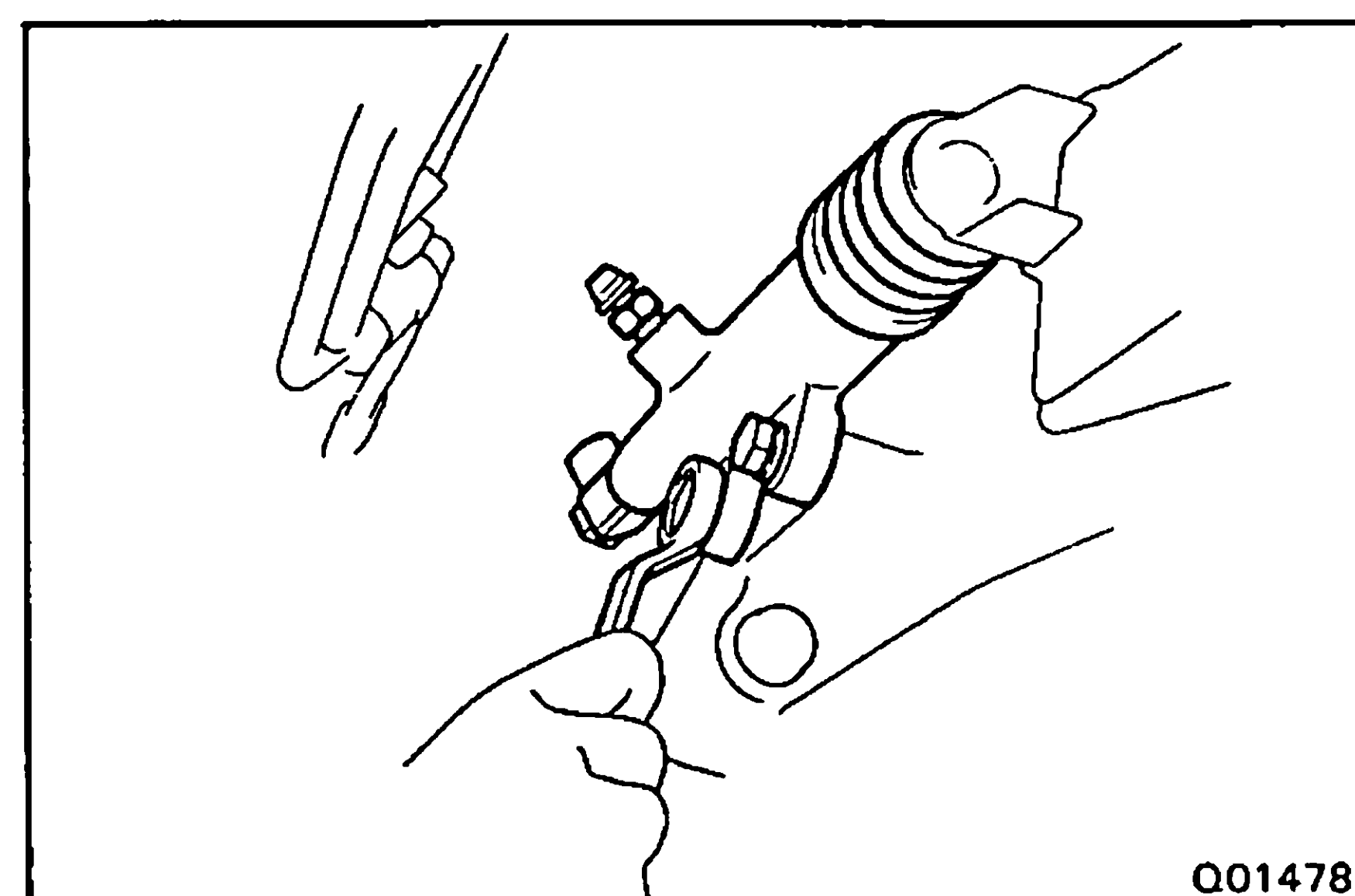
**ASSEMBLY OF RELEASE CYLINDER**

1. COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN
2. INSTALL PISTON WITH SPRING INTO CYLINDER
3. INSTALL BOOT WITH PUSH ROD TO CYLINDER

**4. INSTALL UNION TO RELEASE CYLINDER**

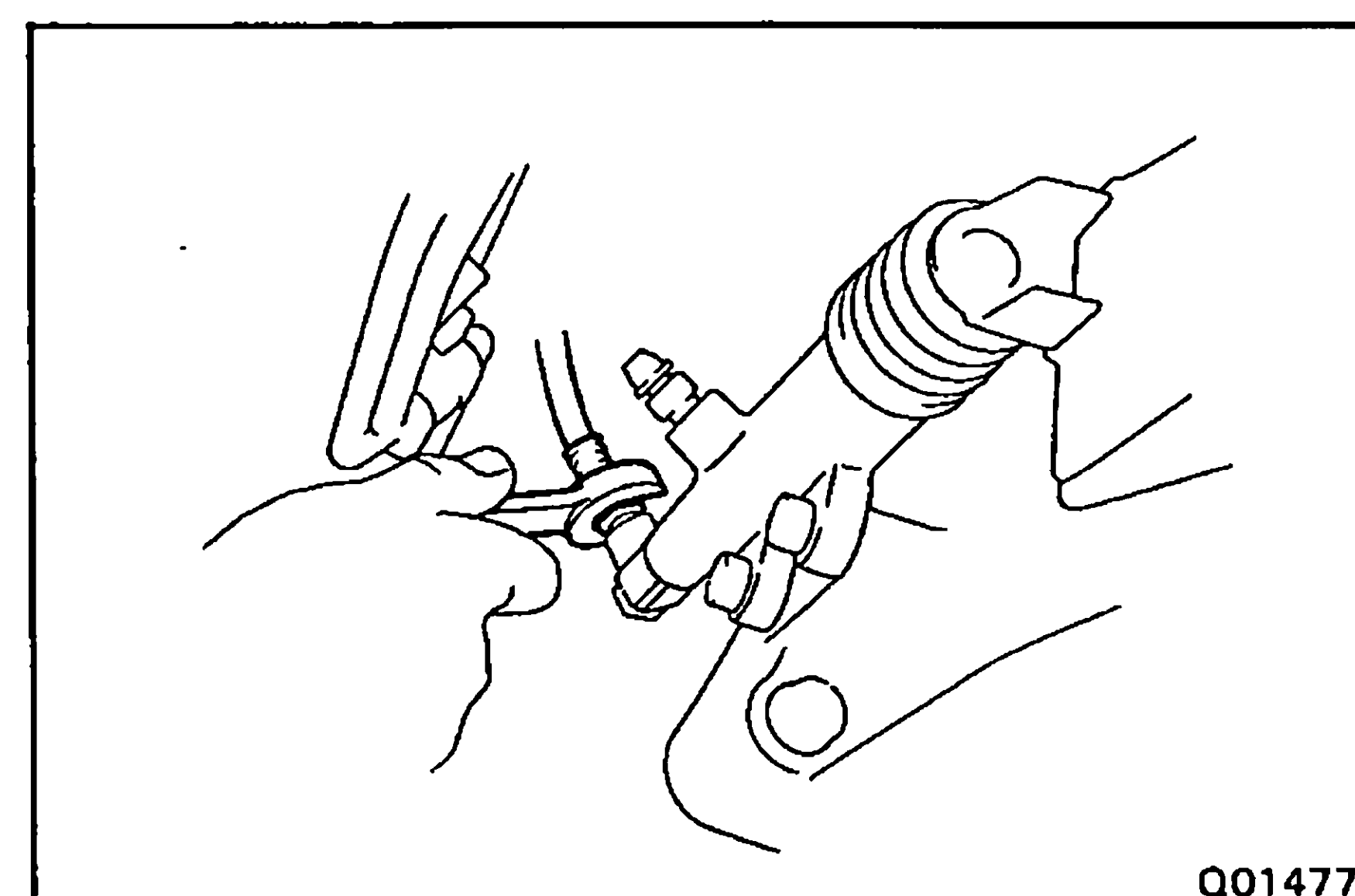
- (a) Adjust the center line of the union is in parallel with release cylinder.
- (b) Install union bolt.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

**INSTALLATION OF CLUTCH RELEASE CYLINDER**

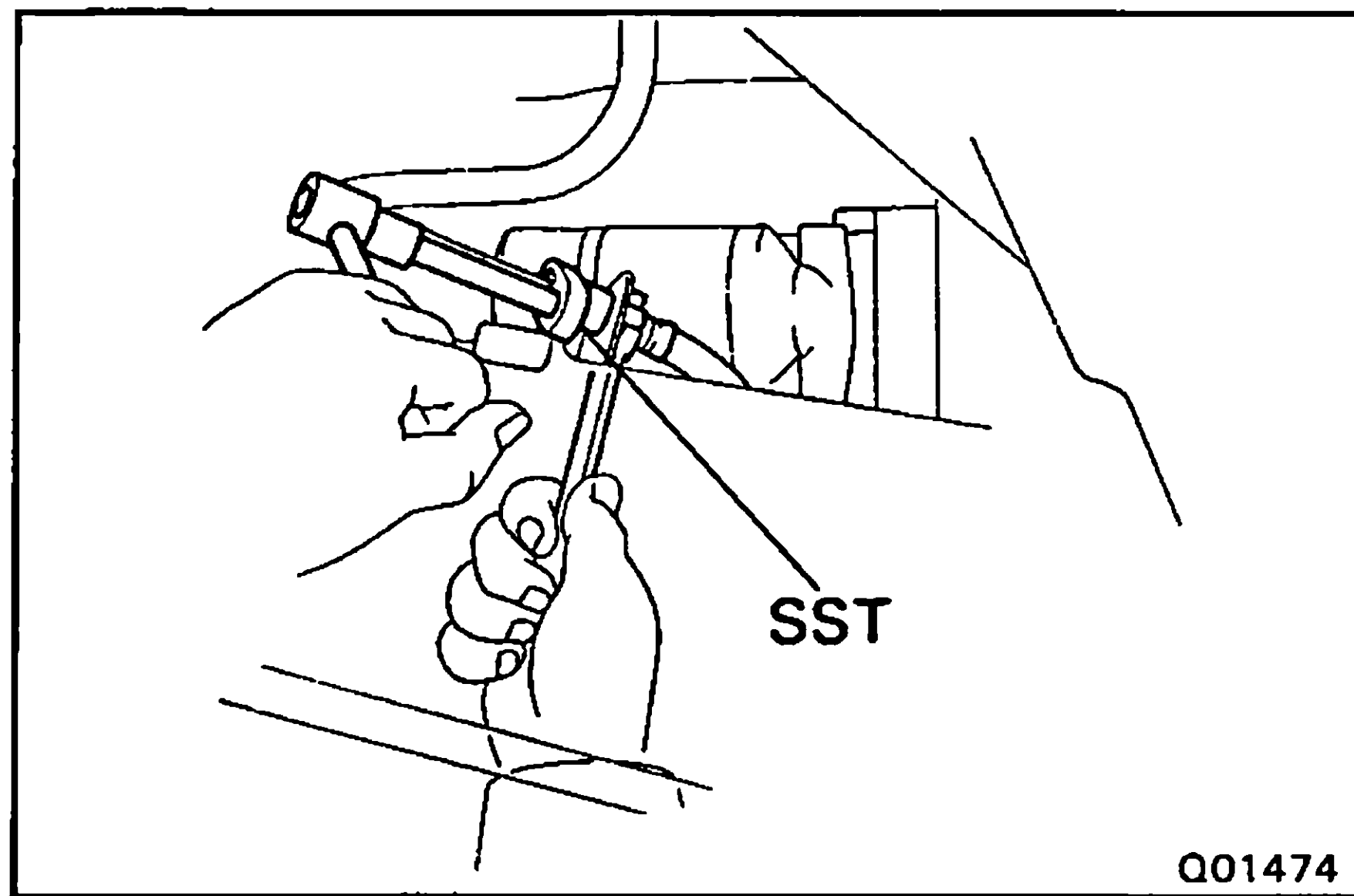
1. INSTALL RELEASE CYLINDER WITH TWO BOLTS

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

**2. INSTALL FLEXIBLE HOSE**

- (a) Install and torque the flexible hose to the release cylinder.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)



(b) Using SST connect and torque the clutch line union to the flexible hose.

HINT: First finger-tighten and then tighten to specified torque.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

(c) Install the clip.

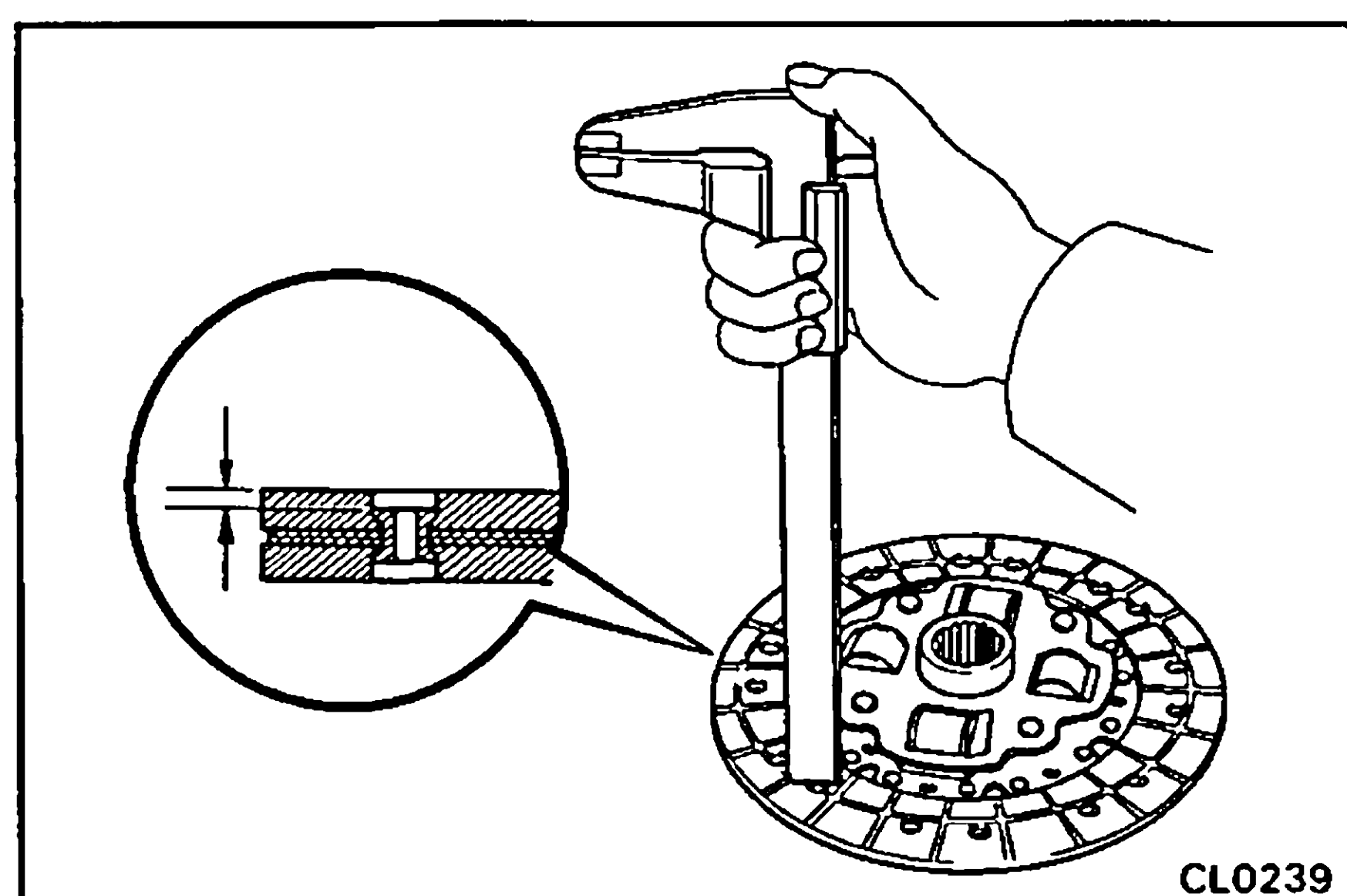
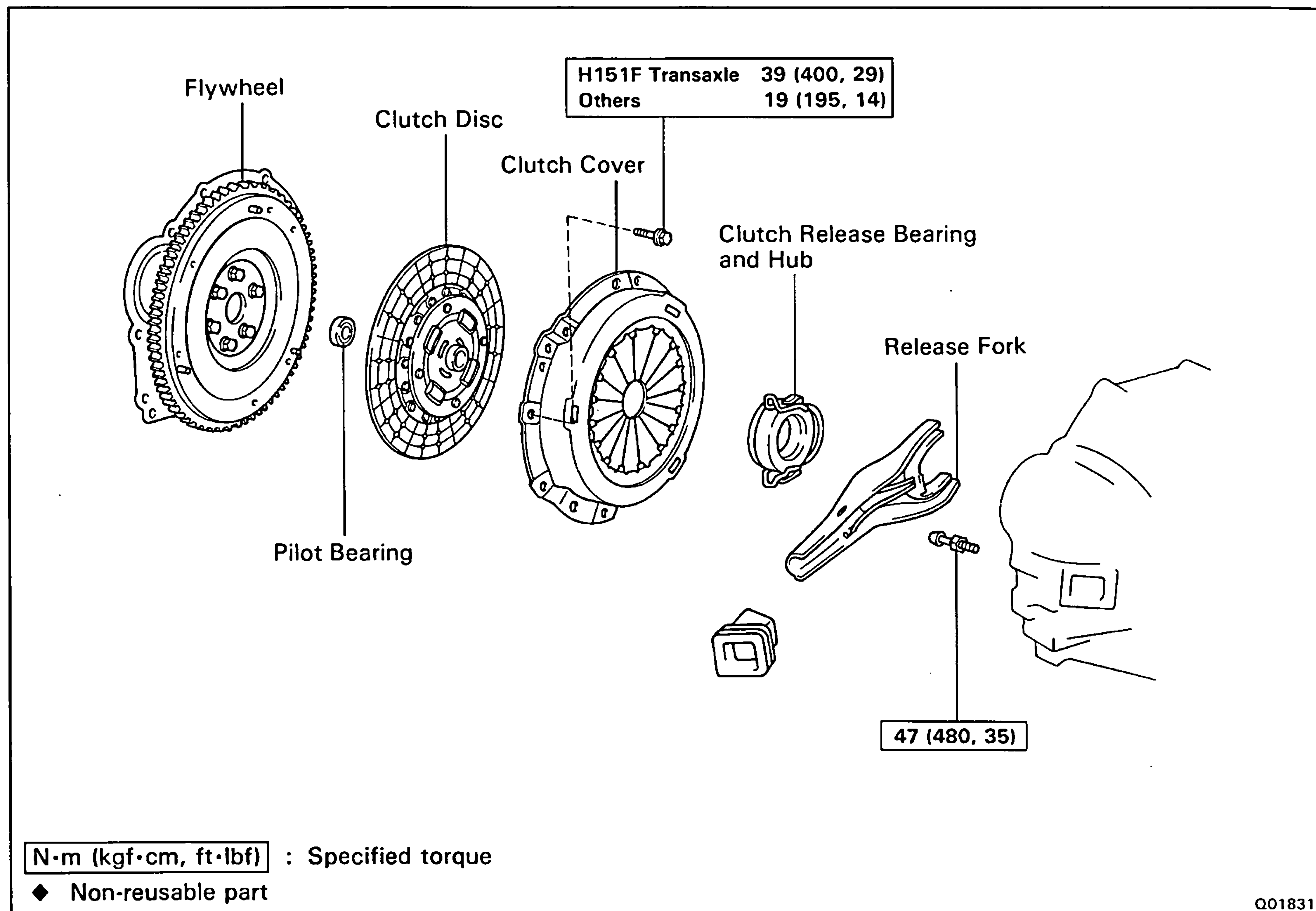
3. BLEED CLUTCH SYSTEM

4. CHECK FOR LEAKS

CLUTCH UNIT

REMOVAL OF CLUTCH UNIT

Remove the parts as shown.



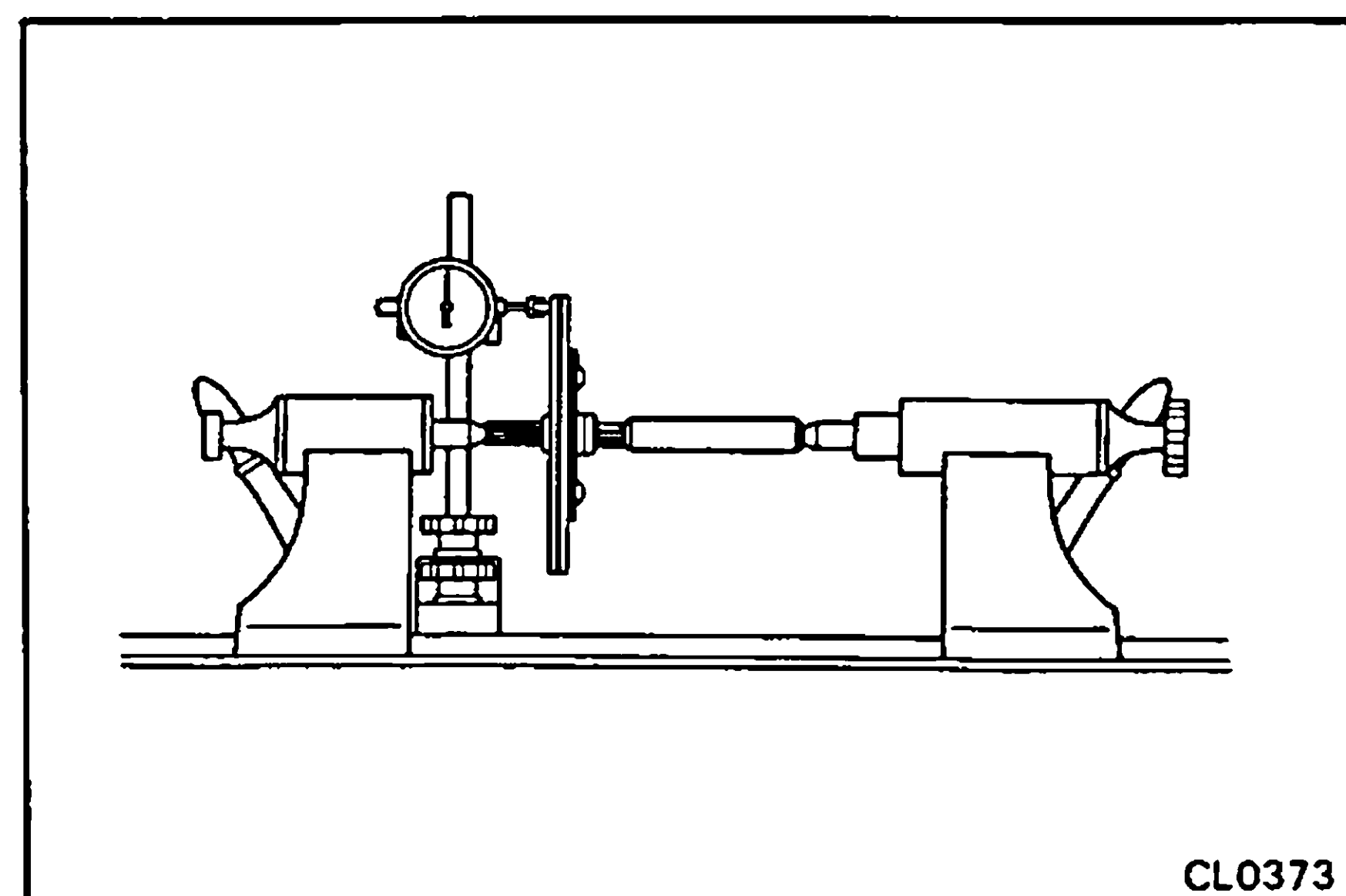
INSPECTION OF CLUTCH PARTS

1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Maximum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, replace the clutch disc.

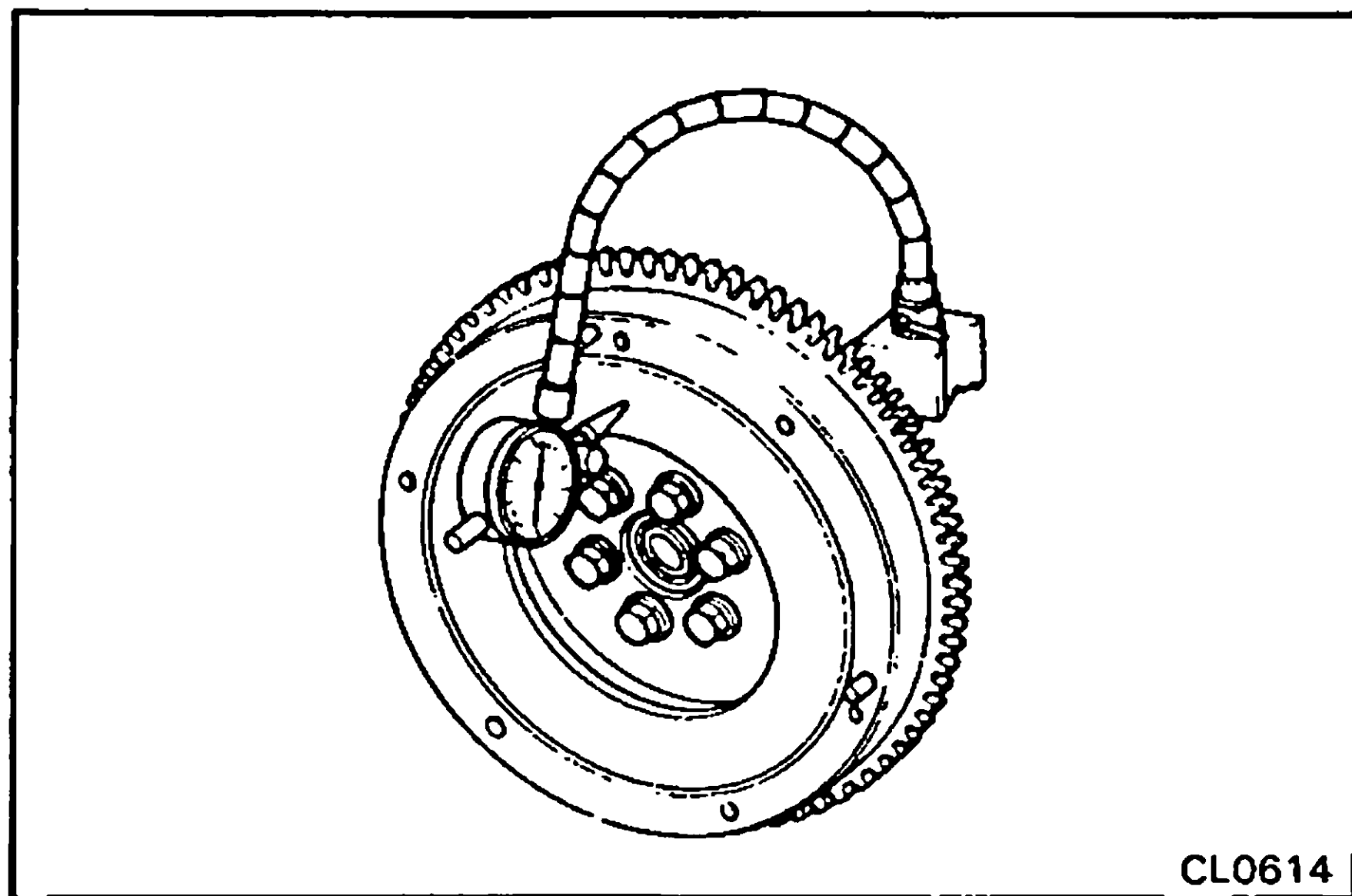


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the clutch disc.

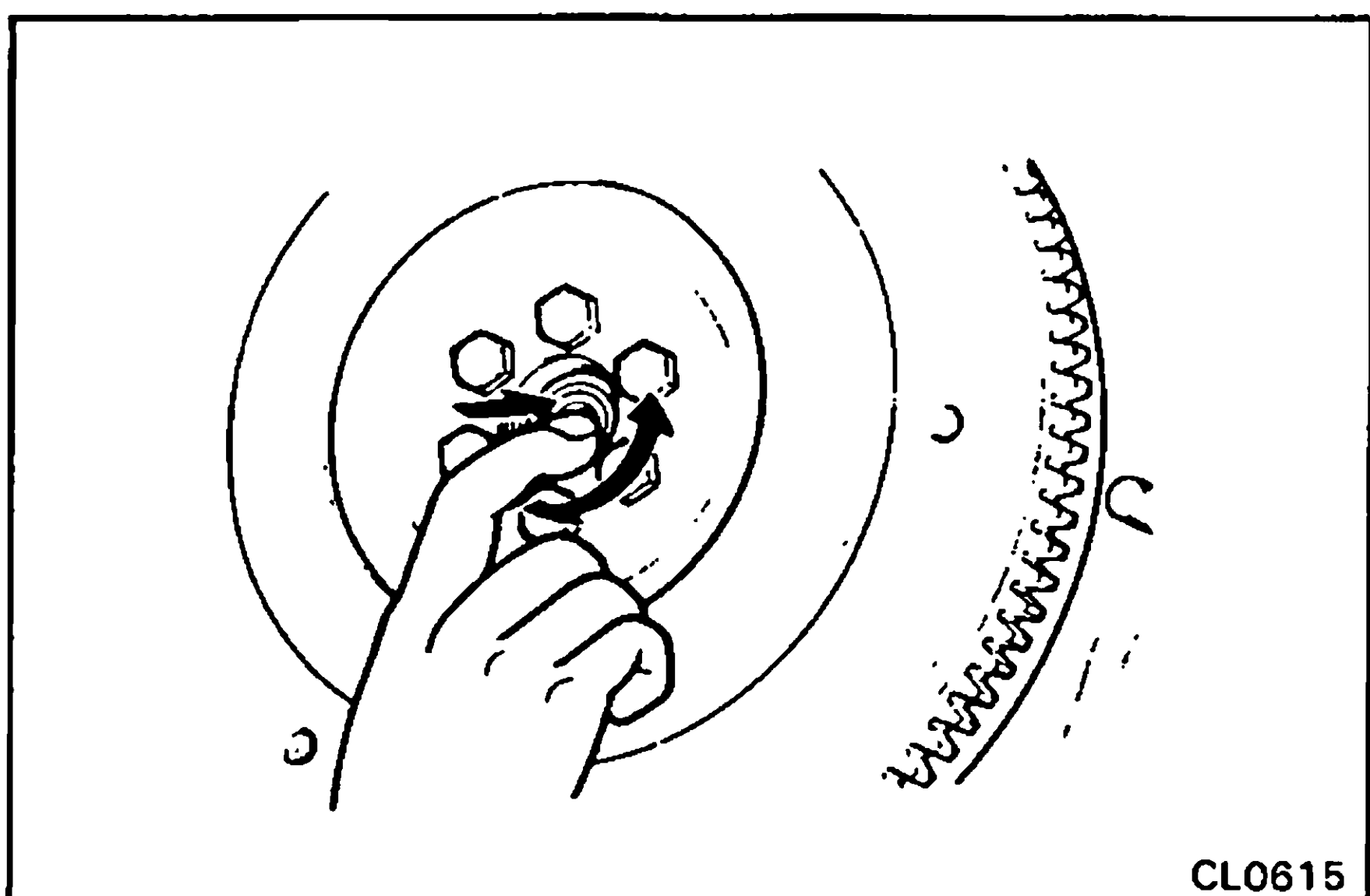


3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.1 mm (0.004 in.)

If runout is excessive, replace the flywheel.

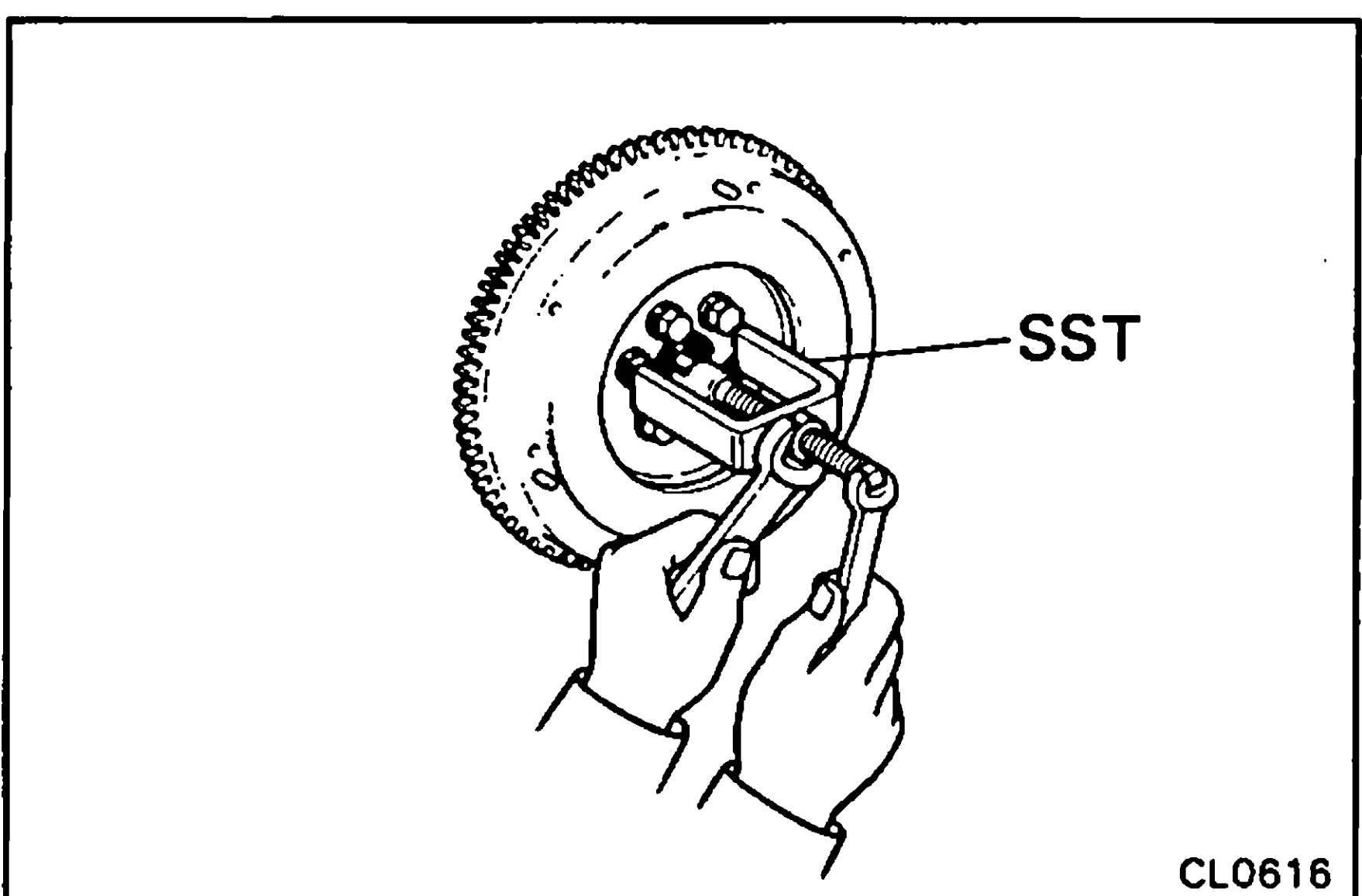


4. INSPECT PILOT BEARING

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

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

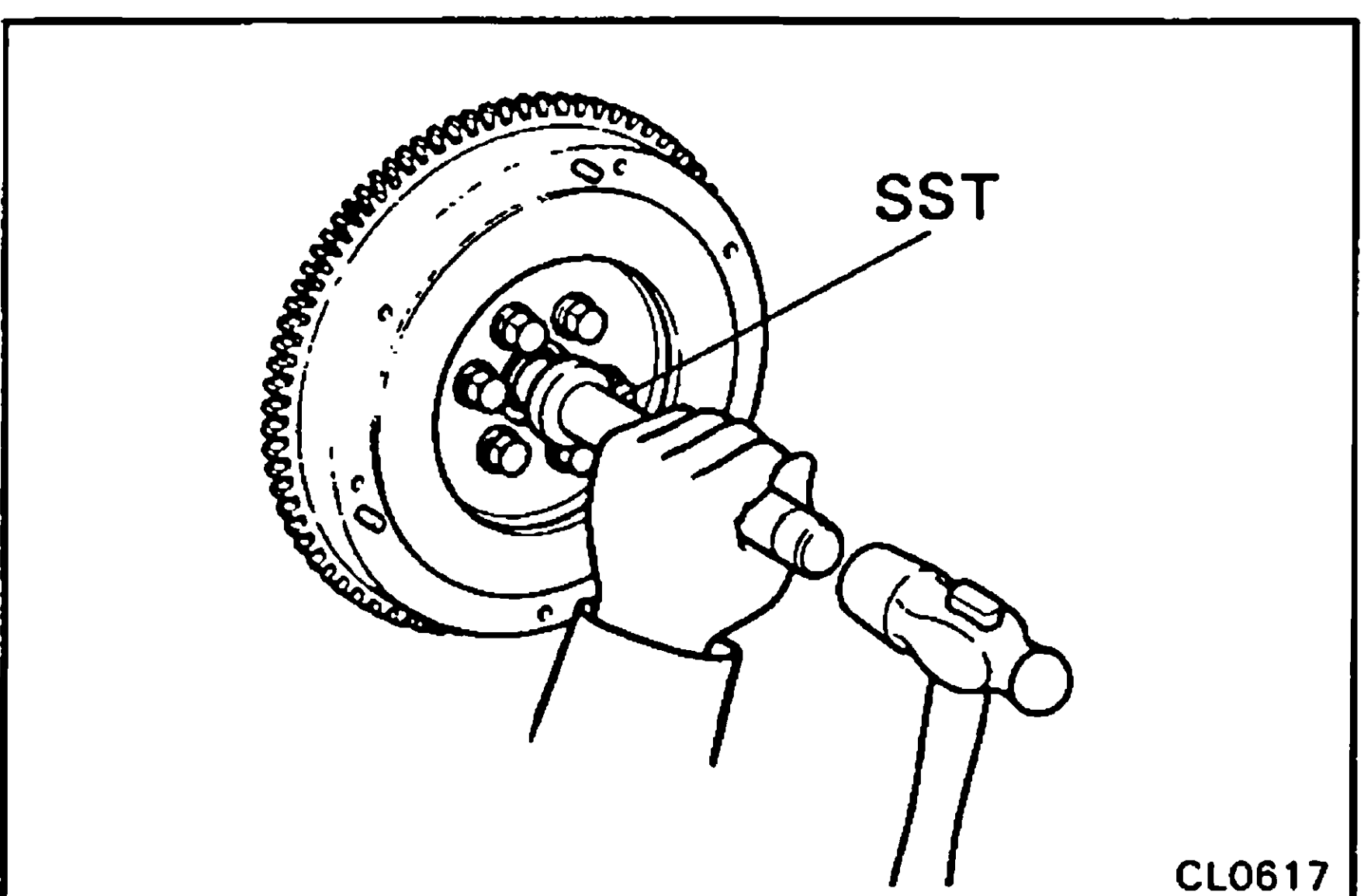
HINT: The bearing is permanently lubricated and requires no cleaning or lubrication.



5. IF NECESSARY, REPLACE PILOT BEARING

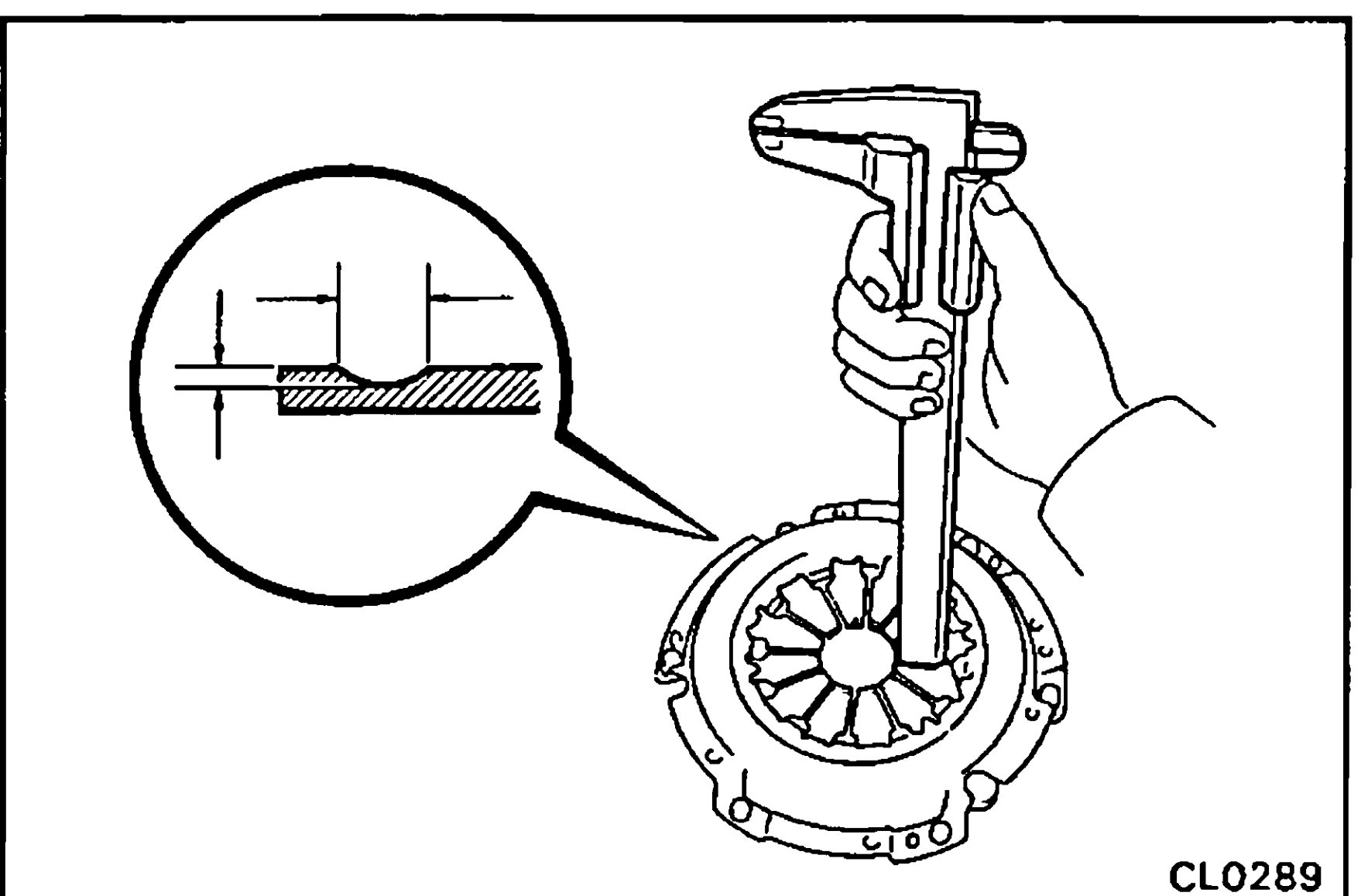
(a) Using SST, remove the pilot bearing.

SST 09303-35011



(b) Using SST, install the pilot bearing.

SST 09304-30012



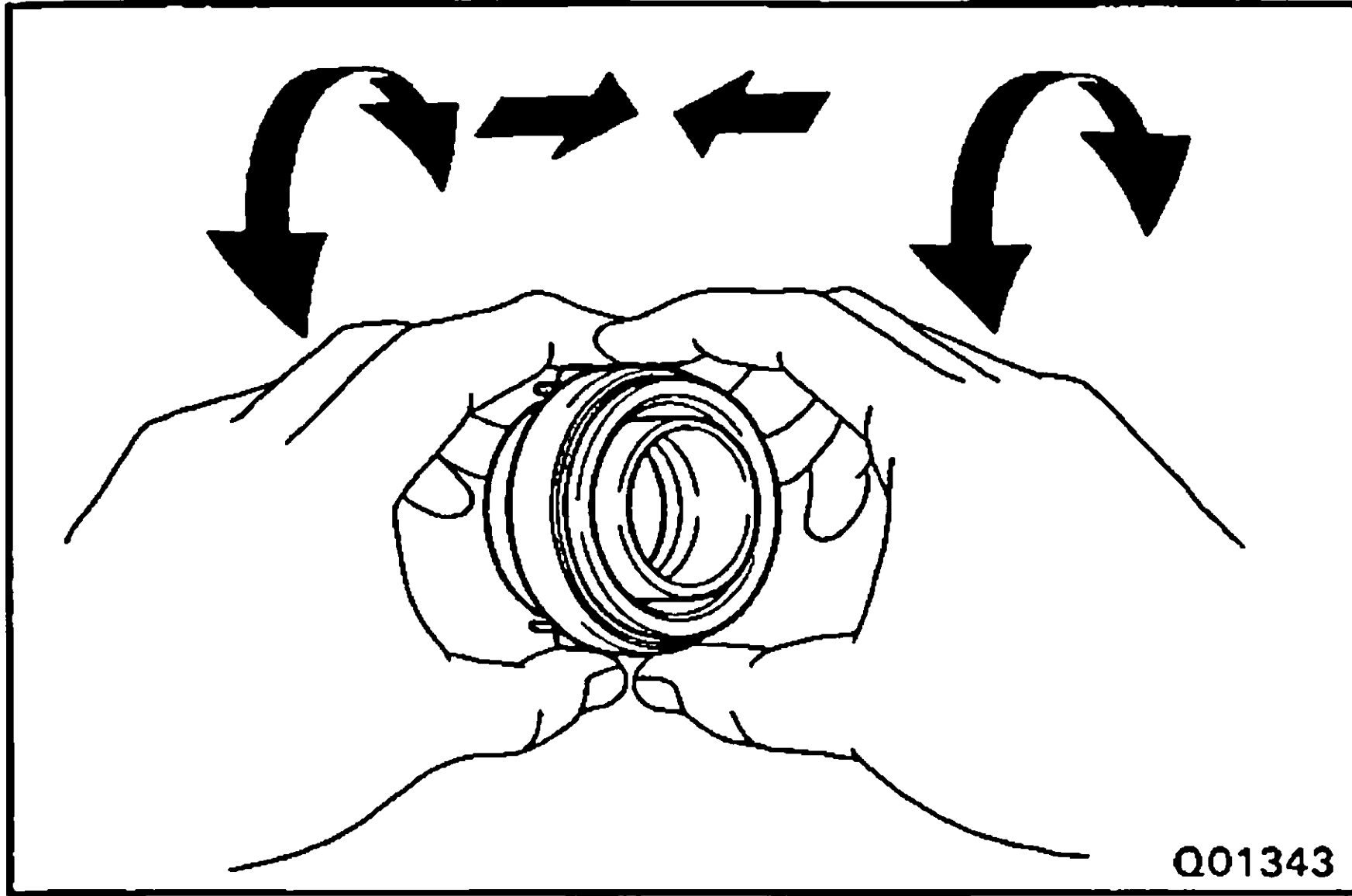
6. INSPECT DIAPHRAGM SPRING FOR WEAR

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.)

If necessary, replace the clutch cover.

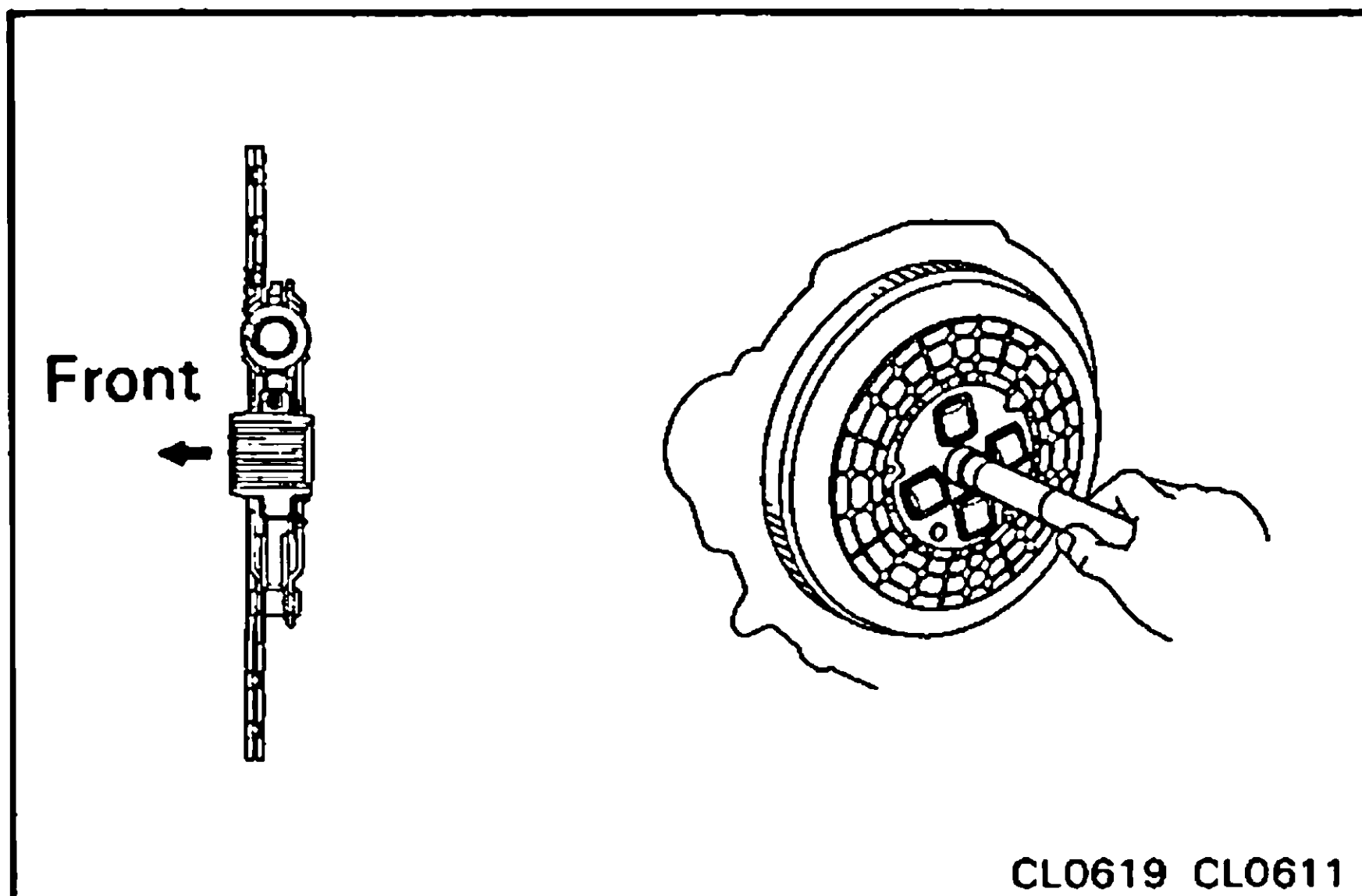


7. INSPECT RELEASE BEARING

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

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

If a problem is found, replace the bearing.

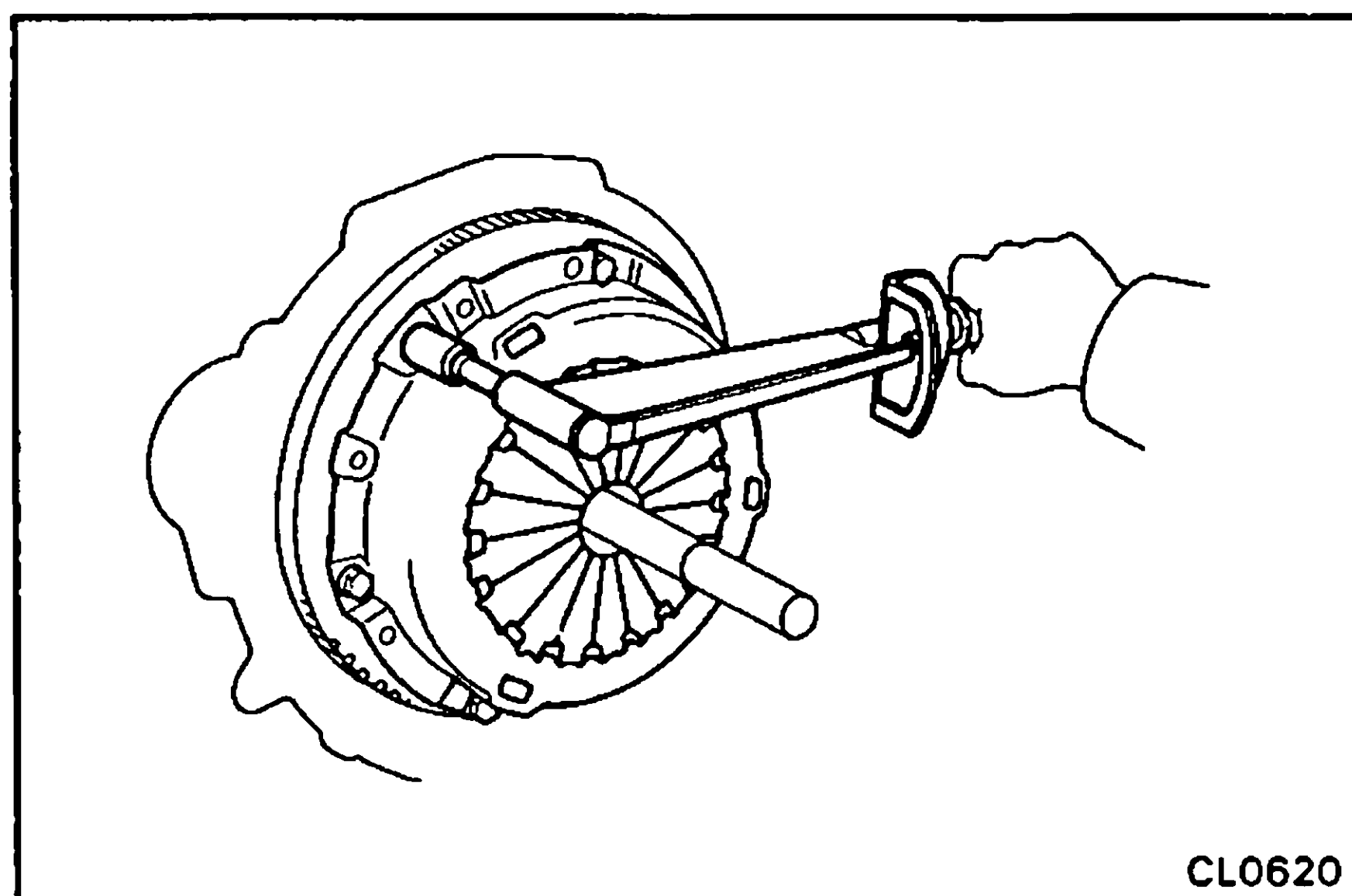


INSTALLATION OF CLUTCH UNIT (MAIN POINT OF INSTALLATION)

1. INSTALL CLUTCH DISC AND COVER ON FLYWHEEL

Insert the SST in the clutch disc, and then set them and the cover in position.

SST 09301-00120



2. INSTALL CLUTCH COVER

- Align the matchmarks on the clutch cover and flywheel.
- Torque the bolts on the clutch cover in the order shown.

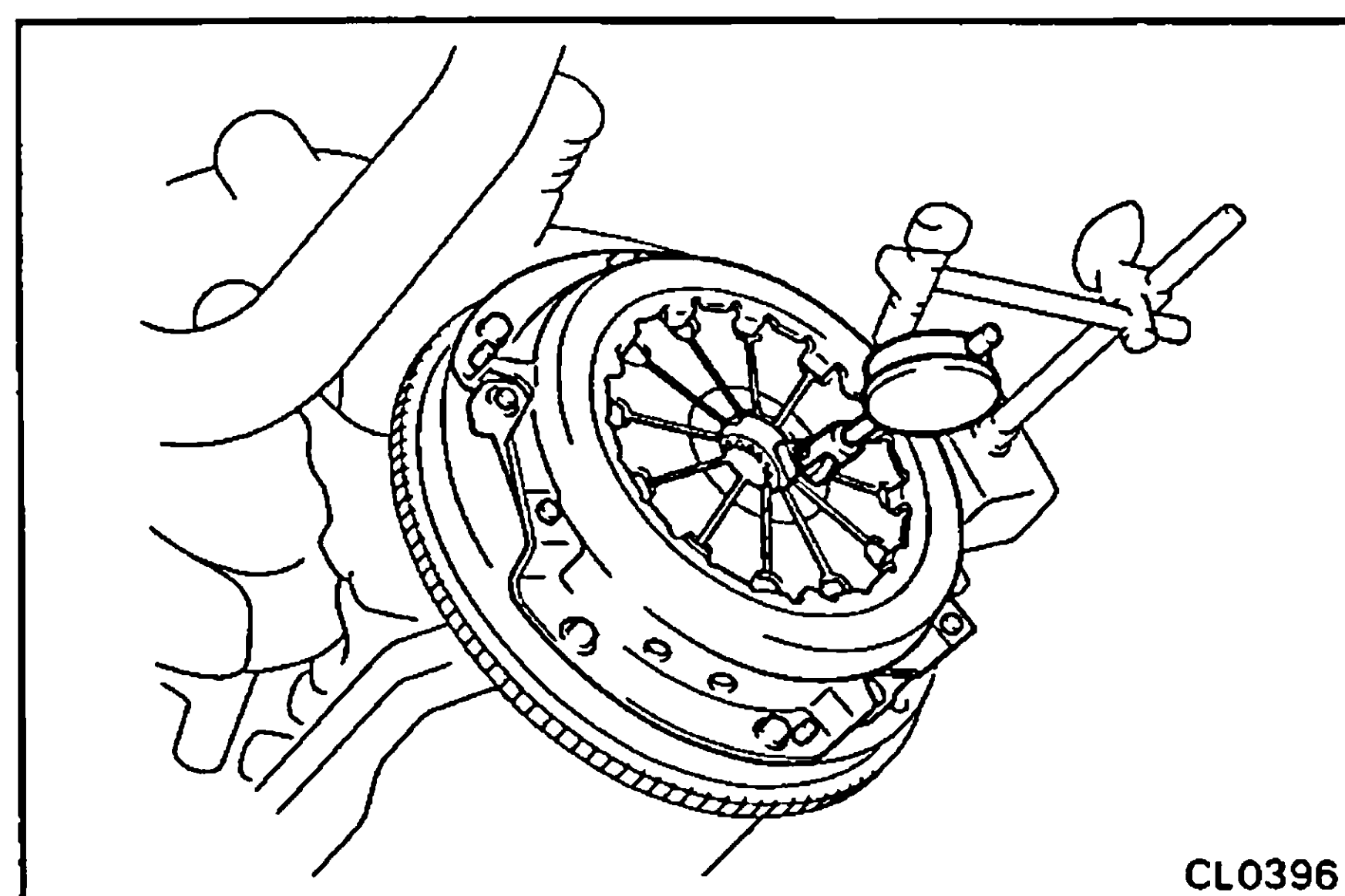
Torque:

H151F Transmission

39 N·m (400 kgf·cm, 29 ft·lbf)

Others 19 N·m (195 kgf·cm, 14 ft·lbf)

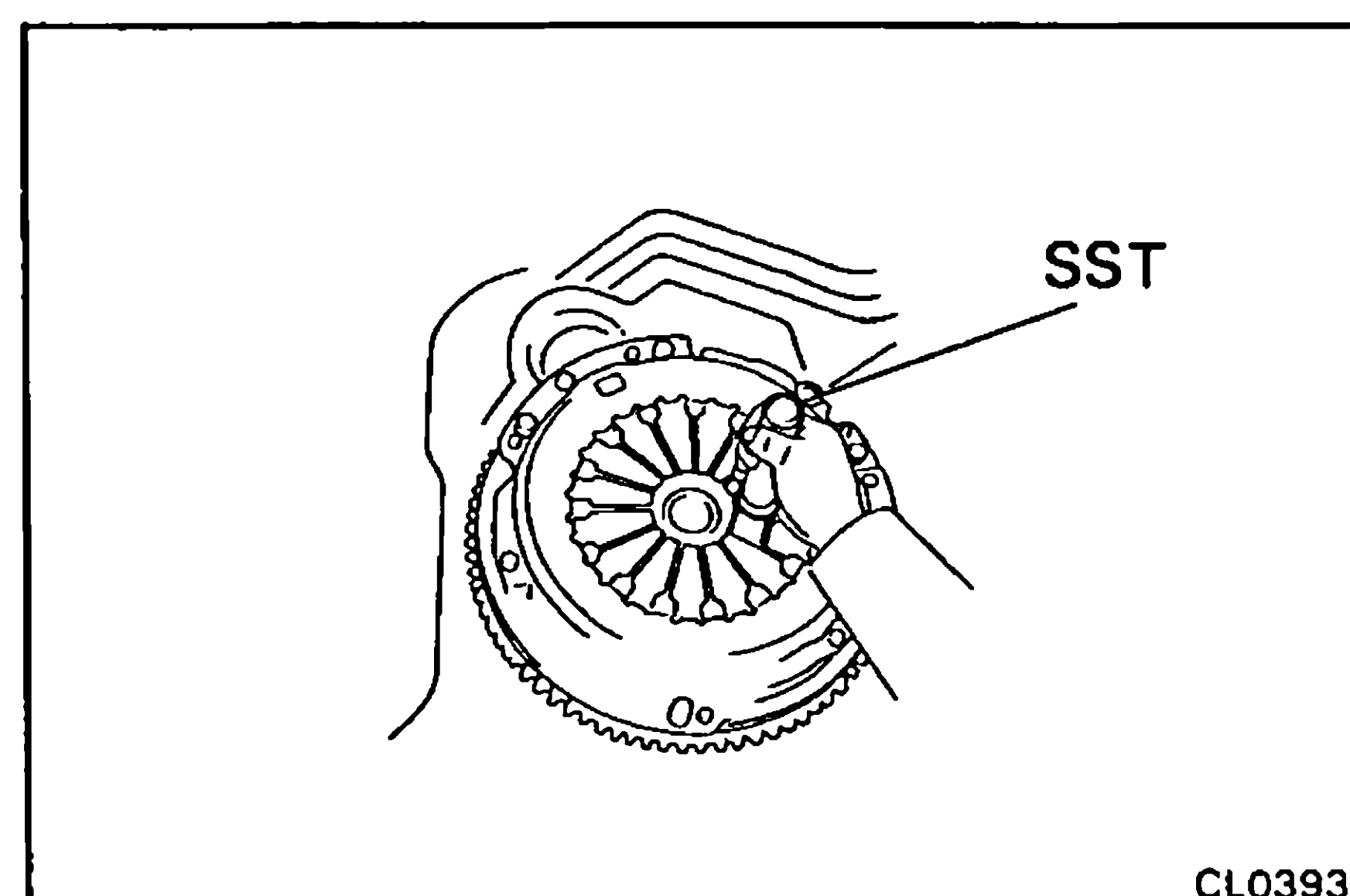
HINT: Temporarily tighten the No.1 and No.2 bolts.



3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

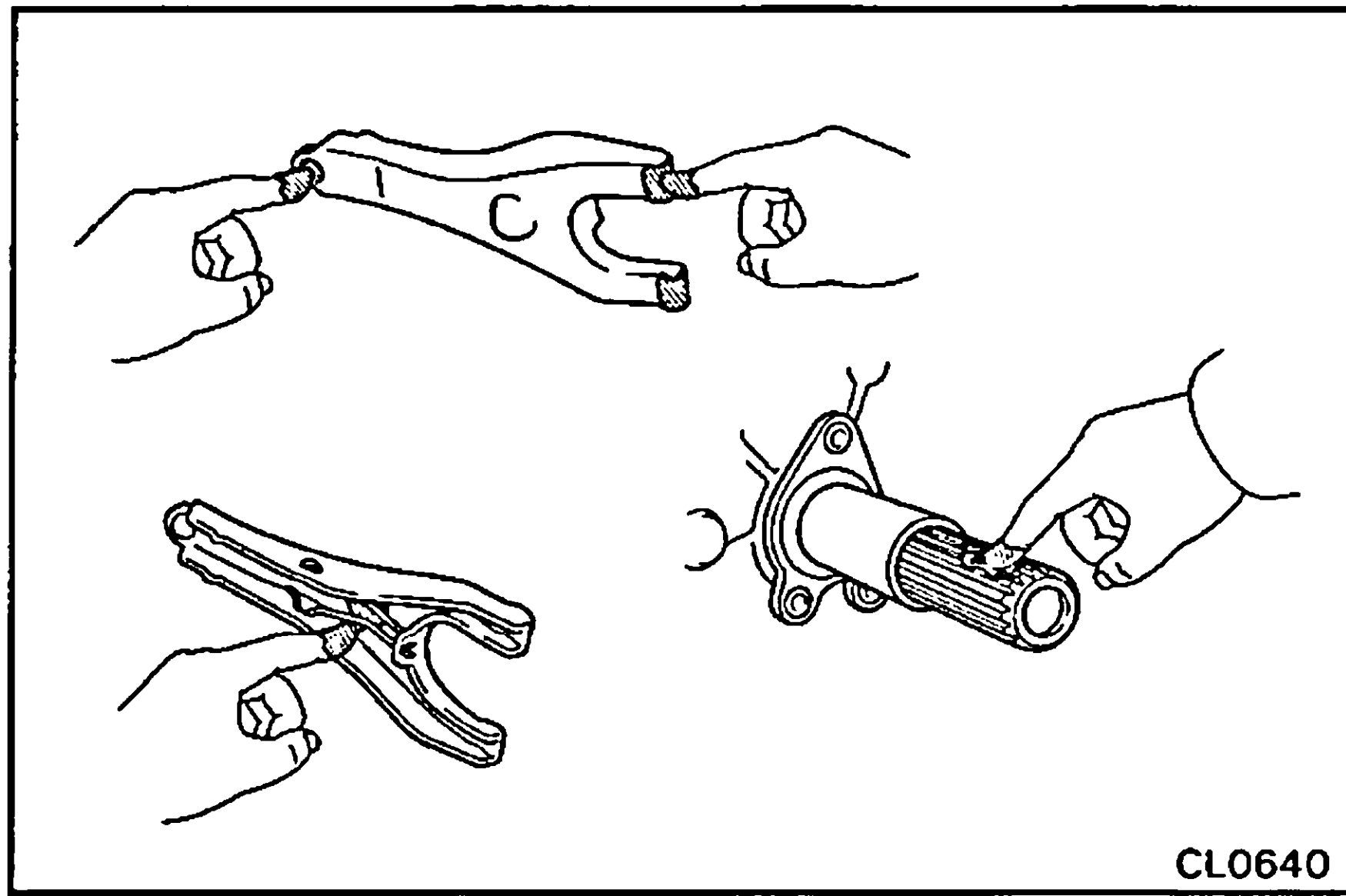
Using SST, check the diaphragm spring tip alignment.

Maximum non-alignment: 0.5 mm (0.020 in.)



If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

SST 09333-00013



4. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) AS SHOWN

MANUAL TRANSMISSION (H151F TRANSMISSION)

(From Aug. 1990)

REFER TO LAND CRUISER (STATION WAGON) REPAIR
MANUAL FOR CHASSIS AND BODY (Pub. No. RM184E)

NOTE: The following pages contain only the points which
differ from the above listed manual.

	Page
(STATION WAGON)	
GENERAL DESCRIPTION	MT-2
DESCRIPTION	MT-2
OPERATION	MT-3
TROUBLESHOOTING	MT-4
COMPONENT PARTS REMOVAL	MT-5
INPUT SHAFT	MT-18
OUTPUT SHAFT	MT-20
COUNTER GEAR AND REVERSE IDLER GEAR	MT-31
FRONT BEARING RETAINER	MT-34
OIL PUMP COVER	MT-35
COMPONENT PARTS INSTALLATION	MT-40

MT

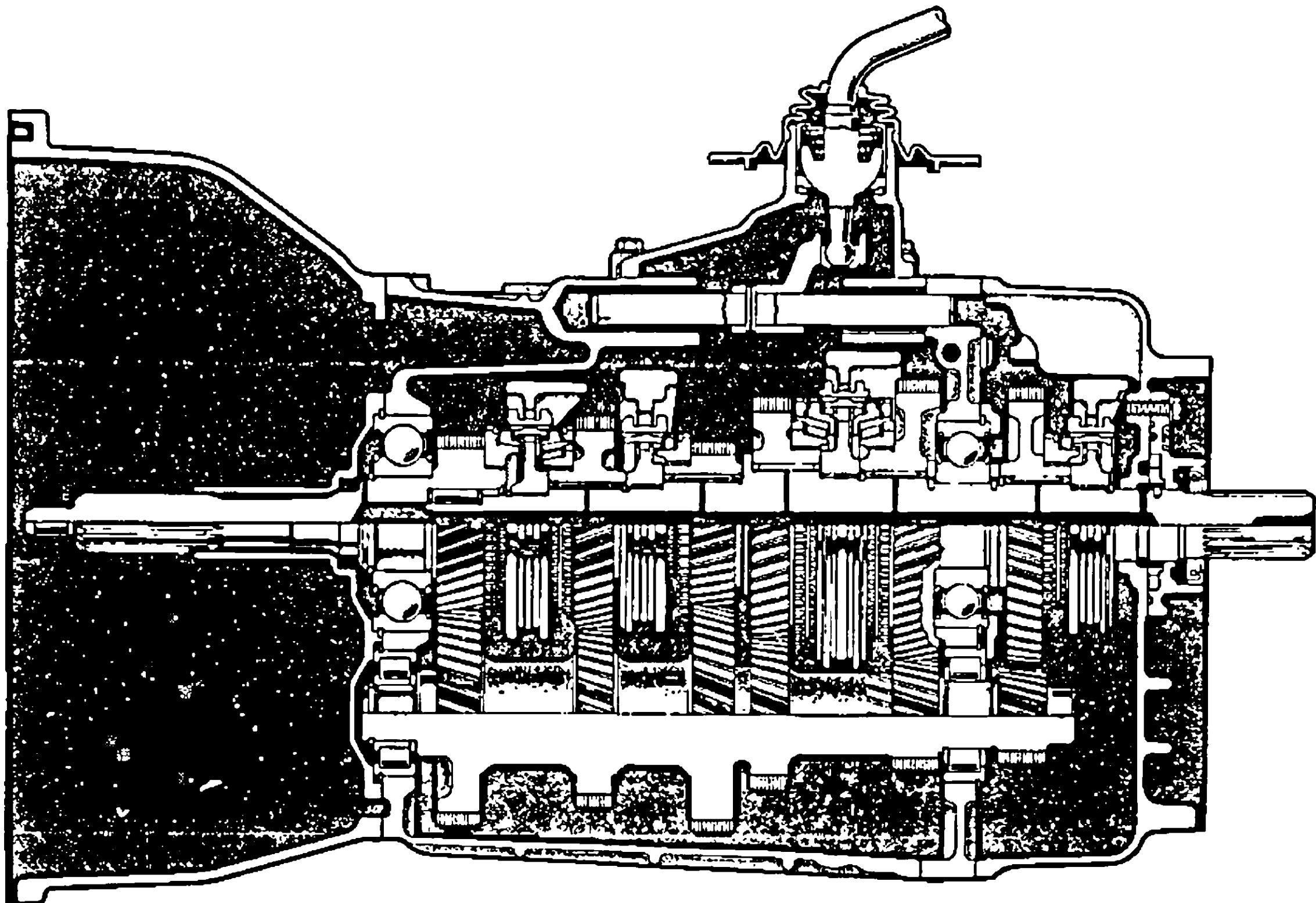
GENERAL DESCRIPTION

When working with FIPG material, you must be observe the following.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply the seal packing in approx. 1 mm (0.04 in.) bead along the sealing surface.
- Parts must be assembly within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

DESCRIPTION

- The H151F manual transmission is a three-shaft type, having an input shaft, output shaft and counter gear. Power is transmitted from the input shaft to the counter gear, and then to the output shaft which is co-axially fitted to the input shaft. The input shaft and the output shaft are engaged directly to each other in the 4th gear position.
- A triple-cone type synchromesh mechanism is used in the H151F type for the 1st to 3rd gears to reduce the shifting force required.

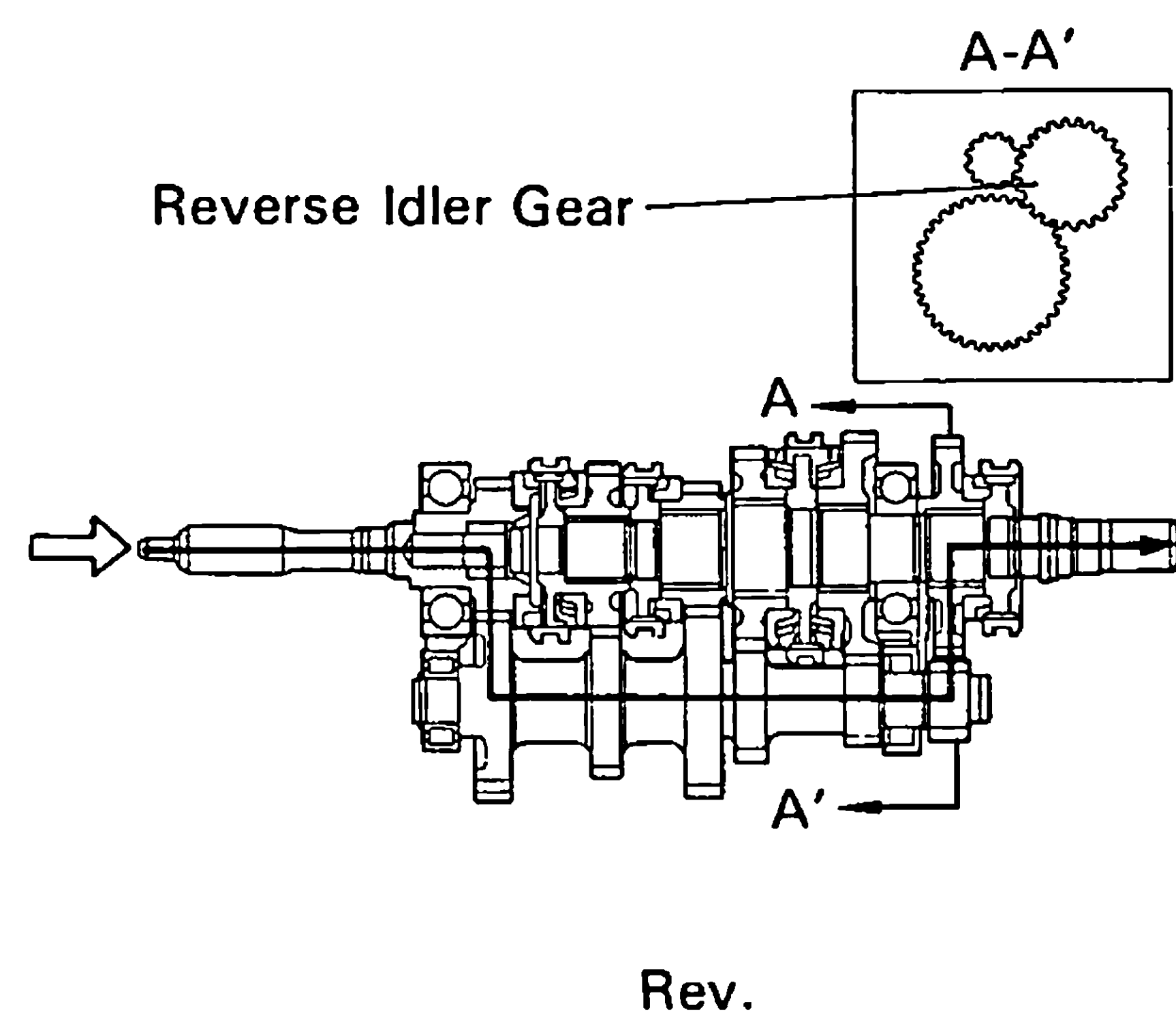
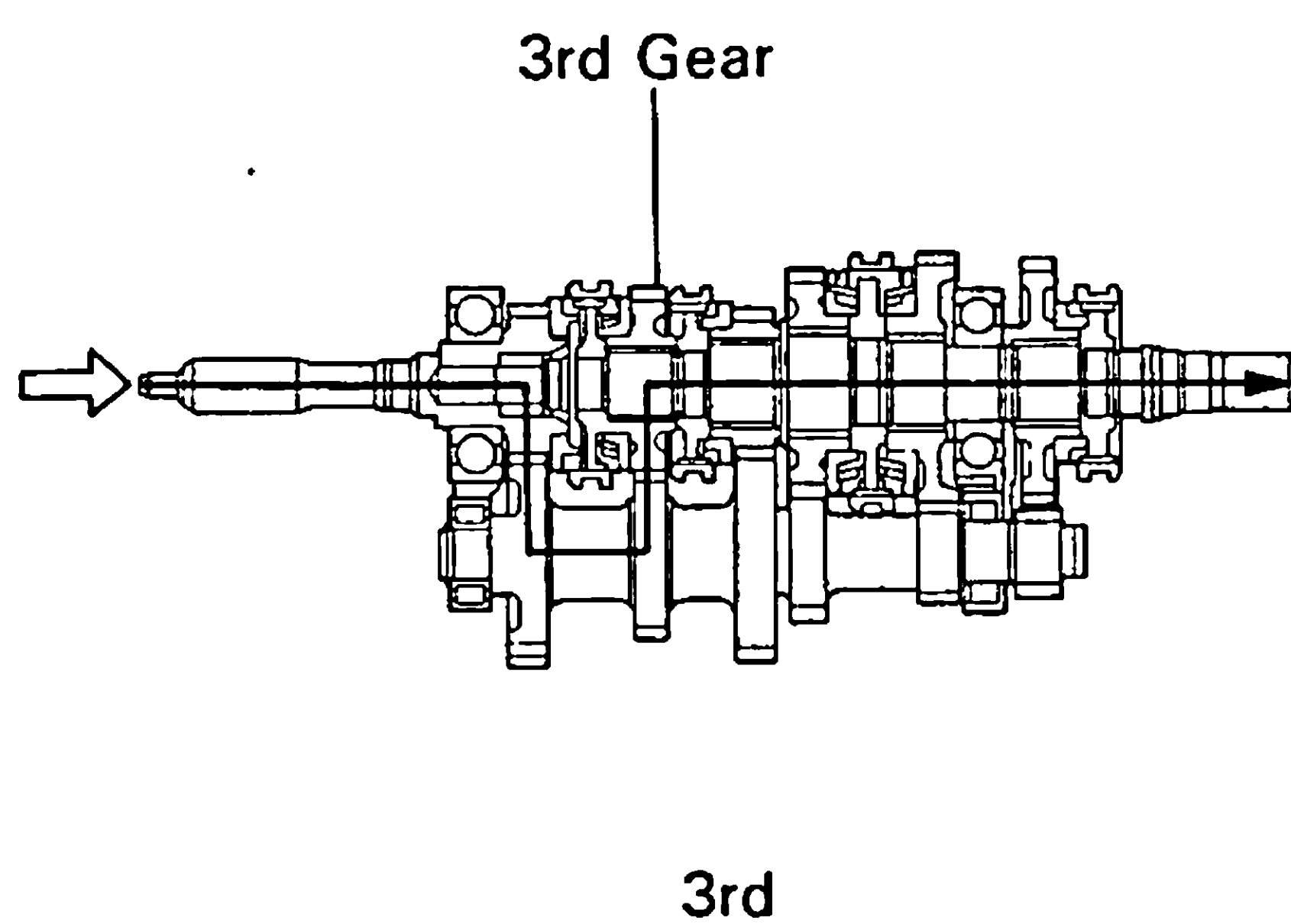
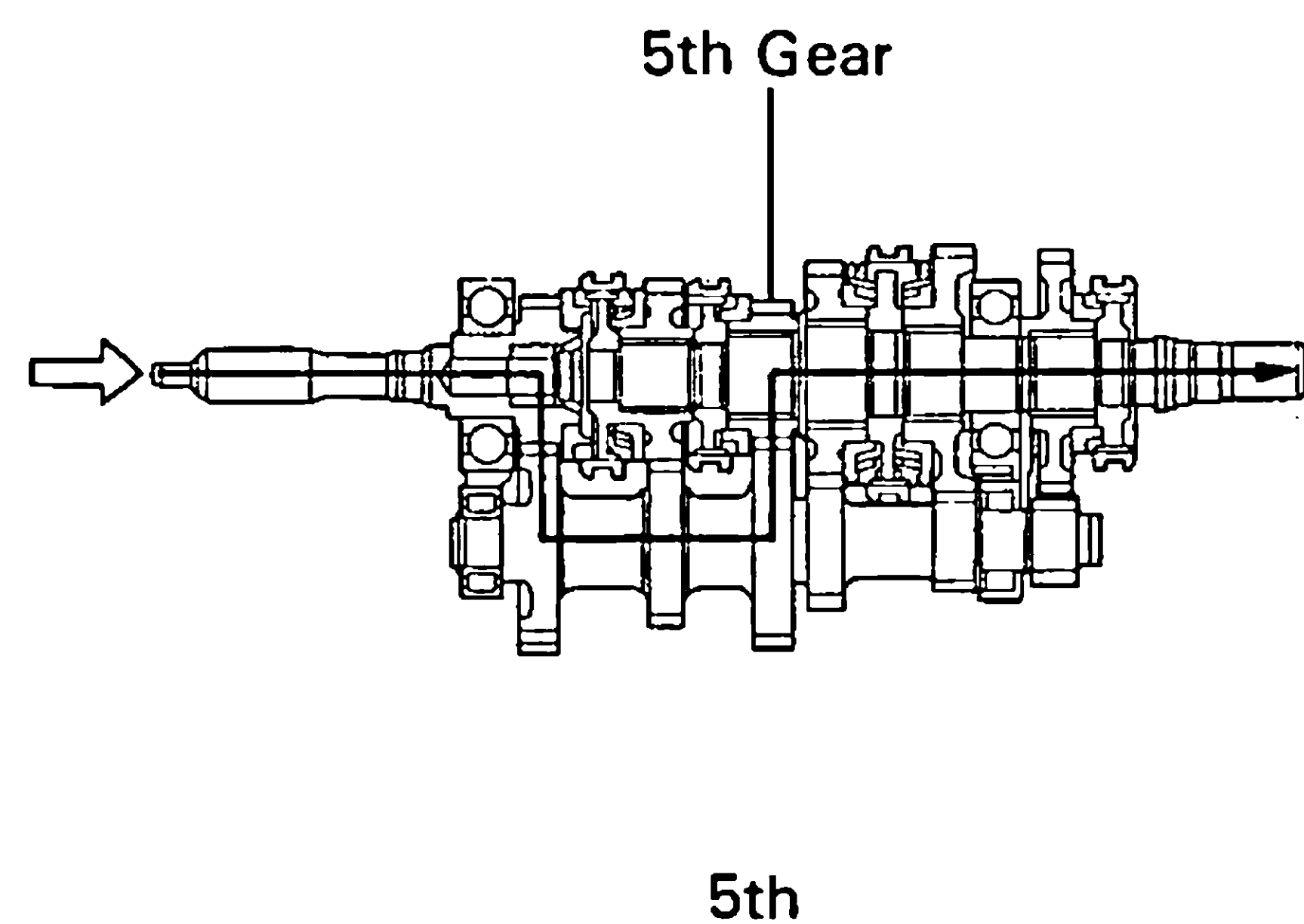
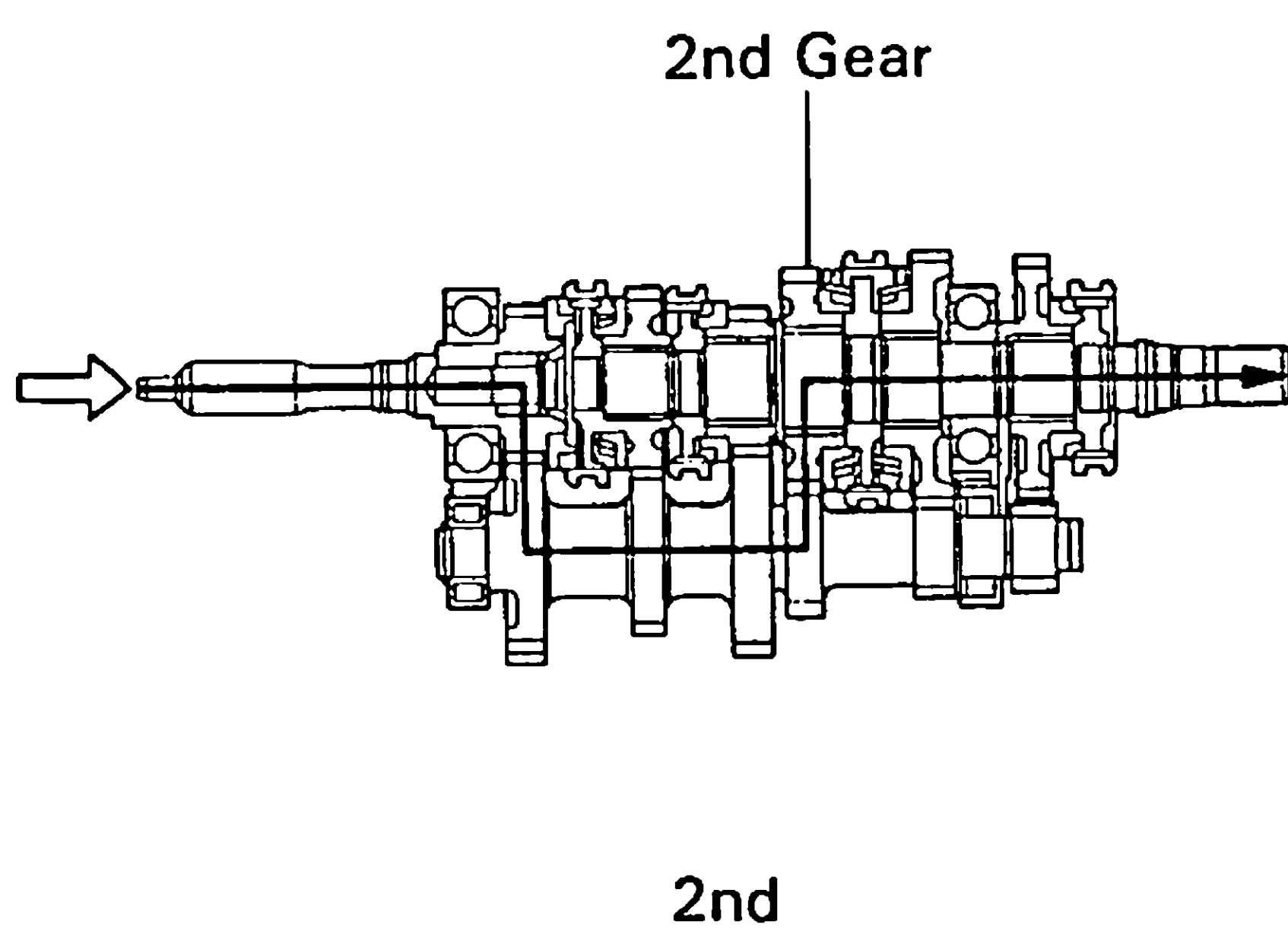
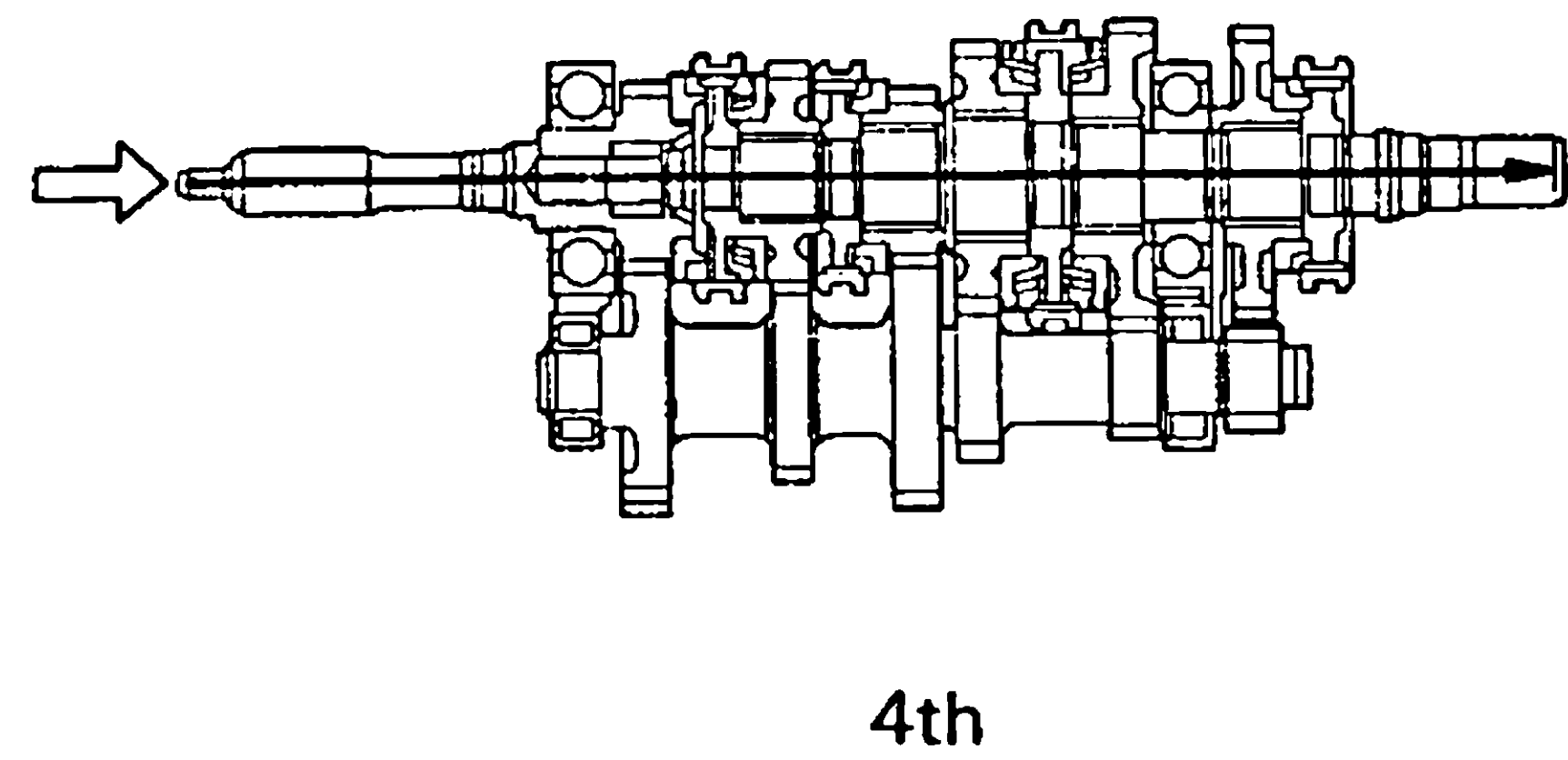
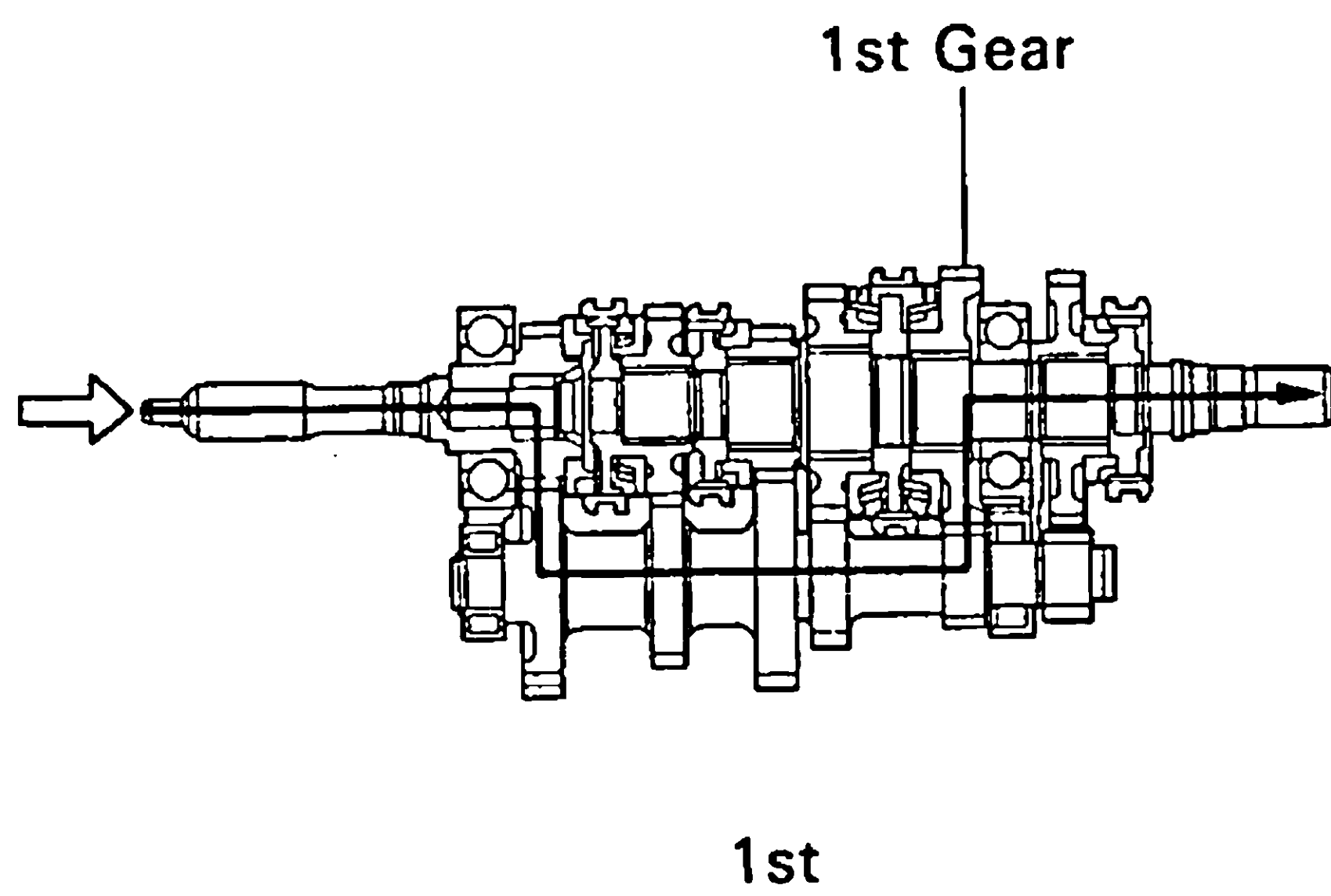


HM0521

Type of Transmission		H151F
Type of Engine		IHD-T, IFZ-F
Item		
Gear Ratio	1st	4.081
	2nd	2.294
	3rd	1.490
	4th	1.000
	5th	0.881
	Reverse	4.313
Oil Capacity		2.6 liters (2.7 US qts., 2.3 Imp. qts)
Oil Viscosity		SAE 75W-90
Oil Grade		API GL-4 or GL-5

OPERATION

- The illustrations below show the engagements of transmission gears.

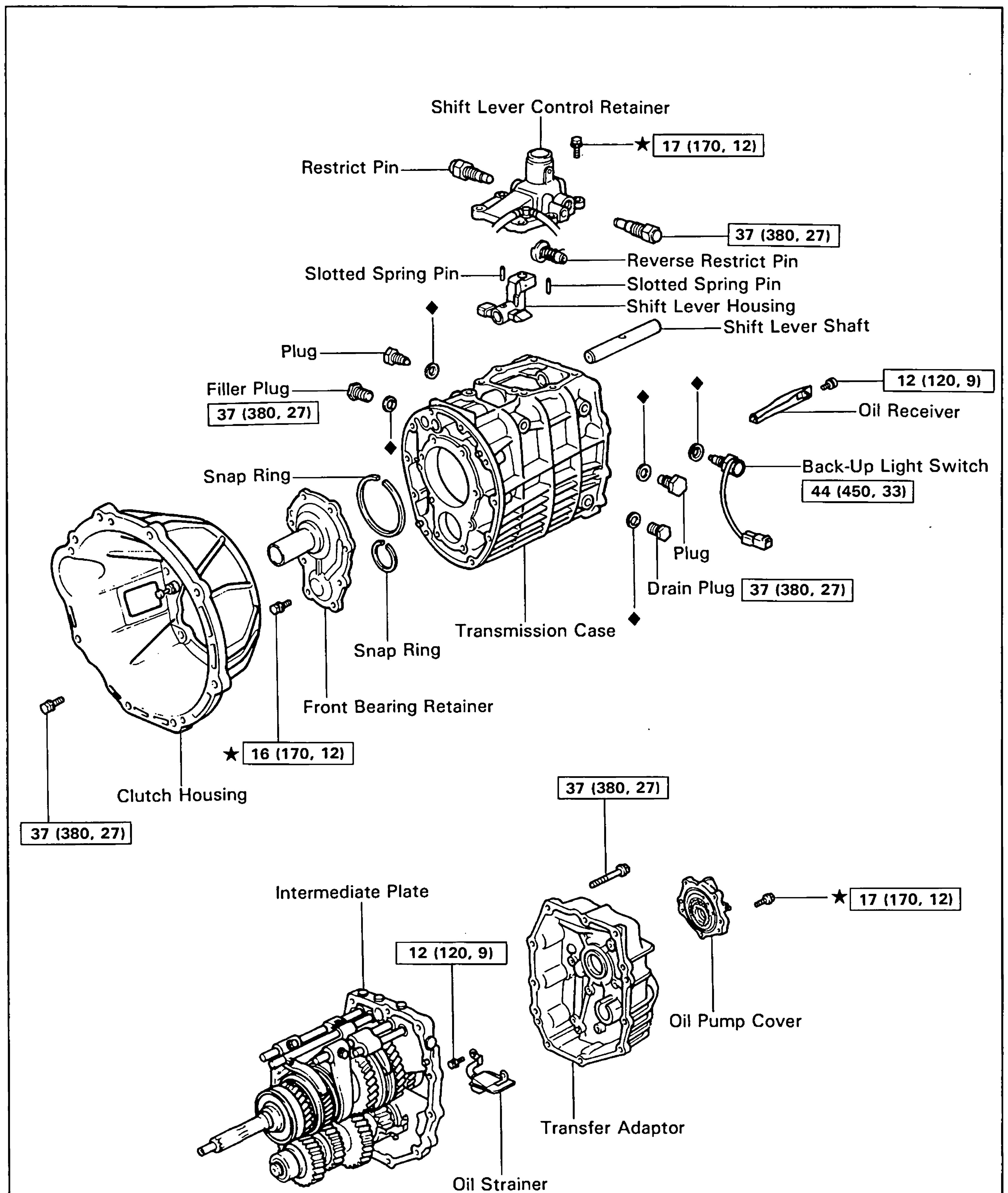


You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order. If necessary, replace these parts.

	Trouble	Parts Name	See page
Noise	1	Oil (Level low)	—
Oil leakage	2	Oil (Wrong)	MT-2
Hard to shift or will not shift	1	Oil (Level too hight)	—
Jumps out of gear	2	Gasket (Damaged)	MT-5
	2	Oil seal (Worn or damaged)	MT-5
	3	O-Ring (Worn or damaged)	MT-5
	1	Locking ball spring (Damaged)	MT-5, 6
	2	Shift fork (Worn)	MT-7
	3	Gear (Worn or damaged)	MT-6
	3	Bearing (Worn or damaged)	MT-6
	2	Synchronizer ring (Worn or damaged)	MT-18, 20
	3	Shifting key spring (Damaged)	MT-18, 20

COMPONENT PARTS REMOVAL

COMPONENTS

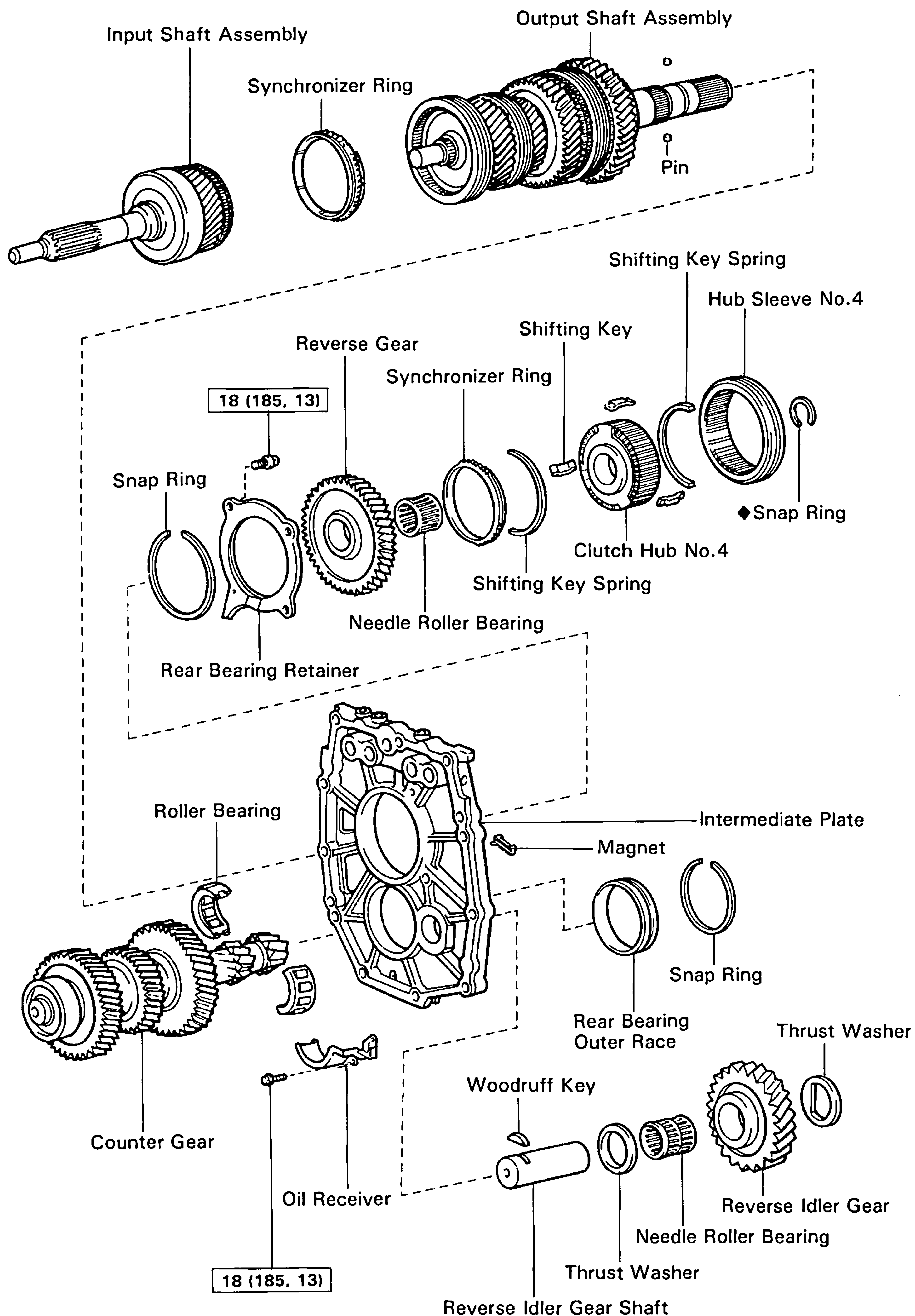


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

★ Precoated part

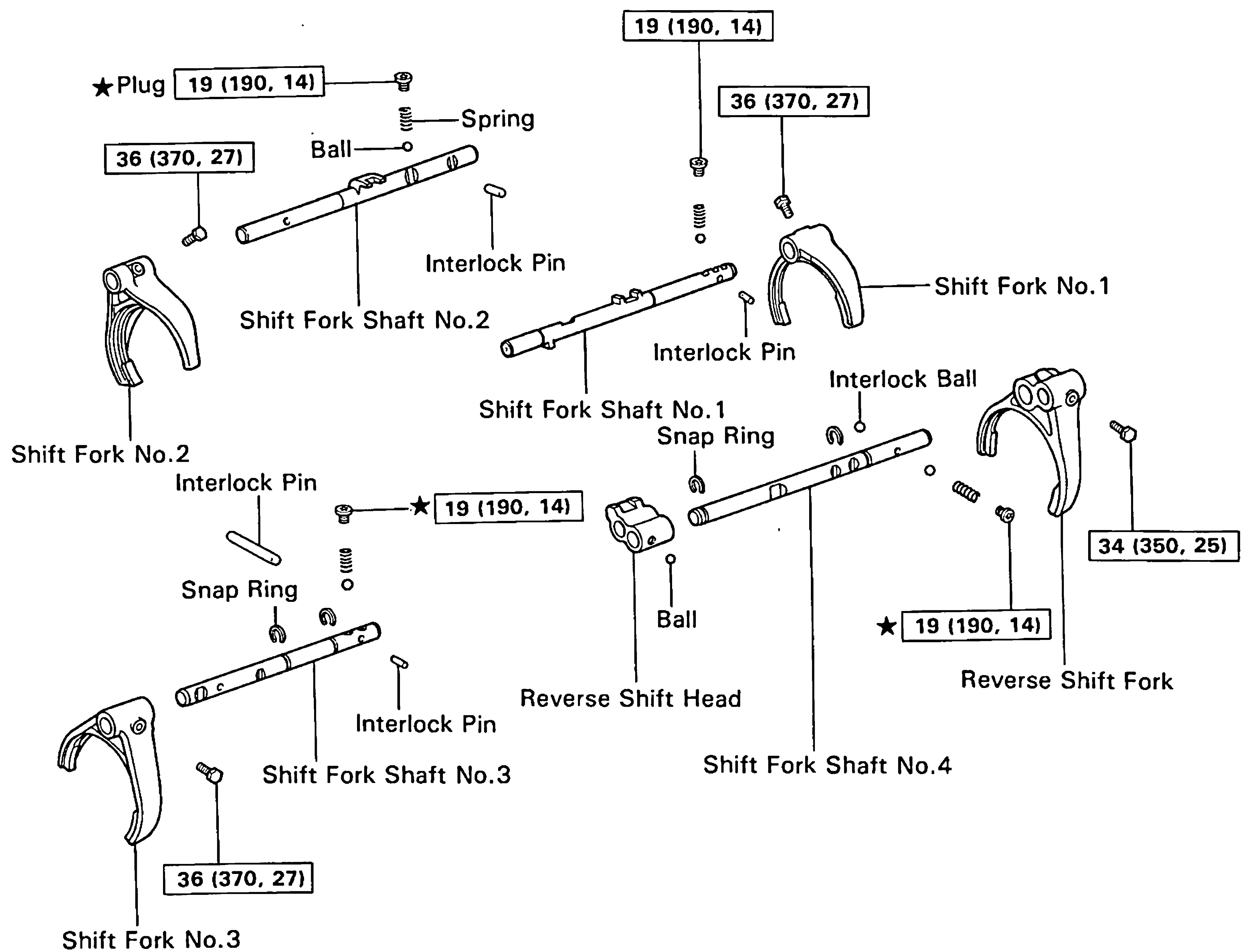
COMPONENTS (Cont'd)



N·m (kgf·cm, ft·lbf) : Specified torque

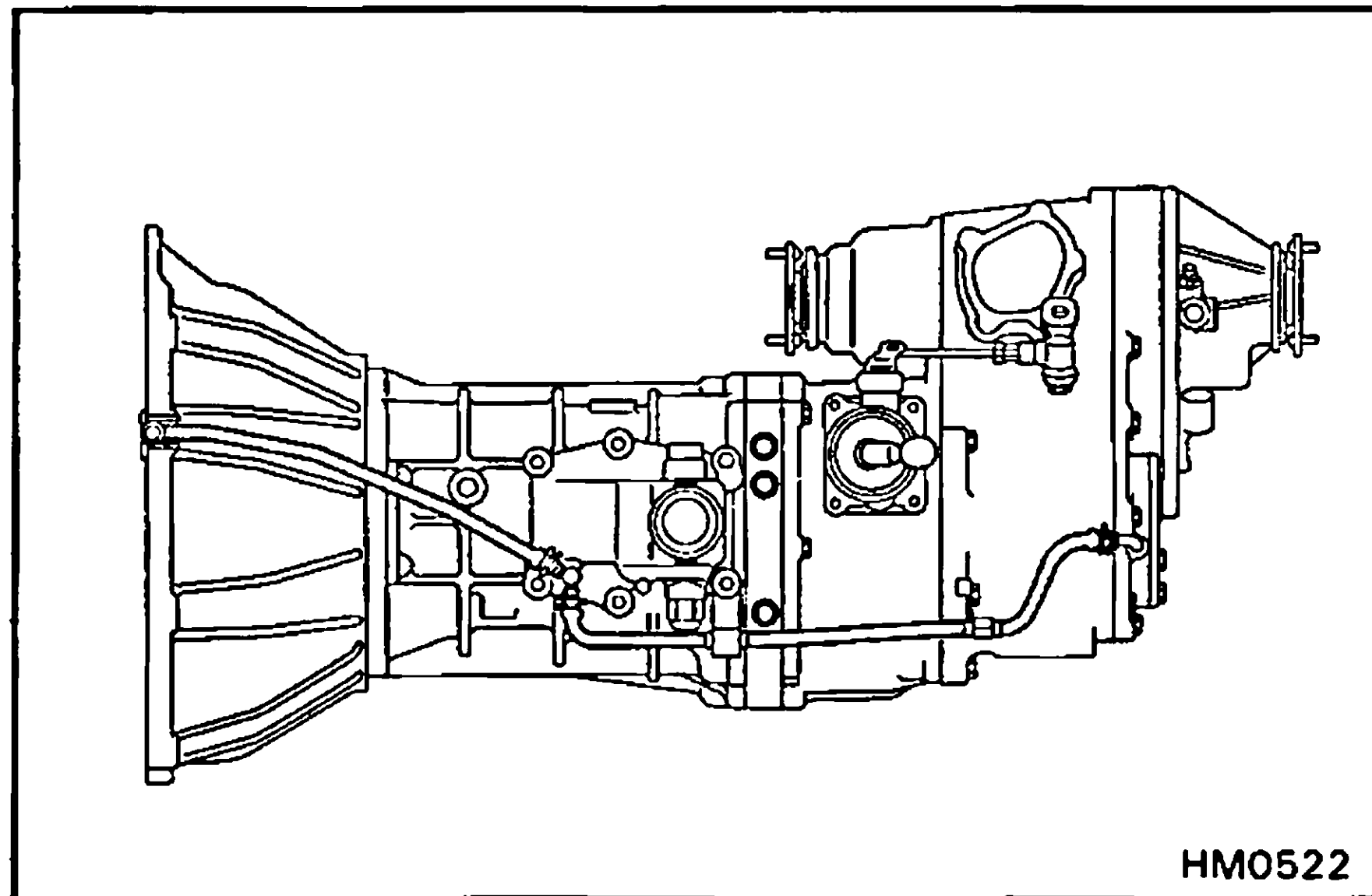
◆ Non-reusable part

COMPONENTS (Cont'd)

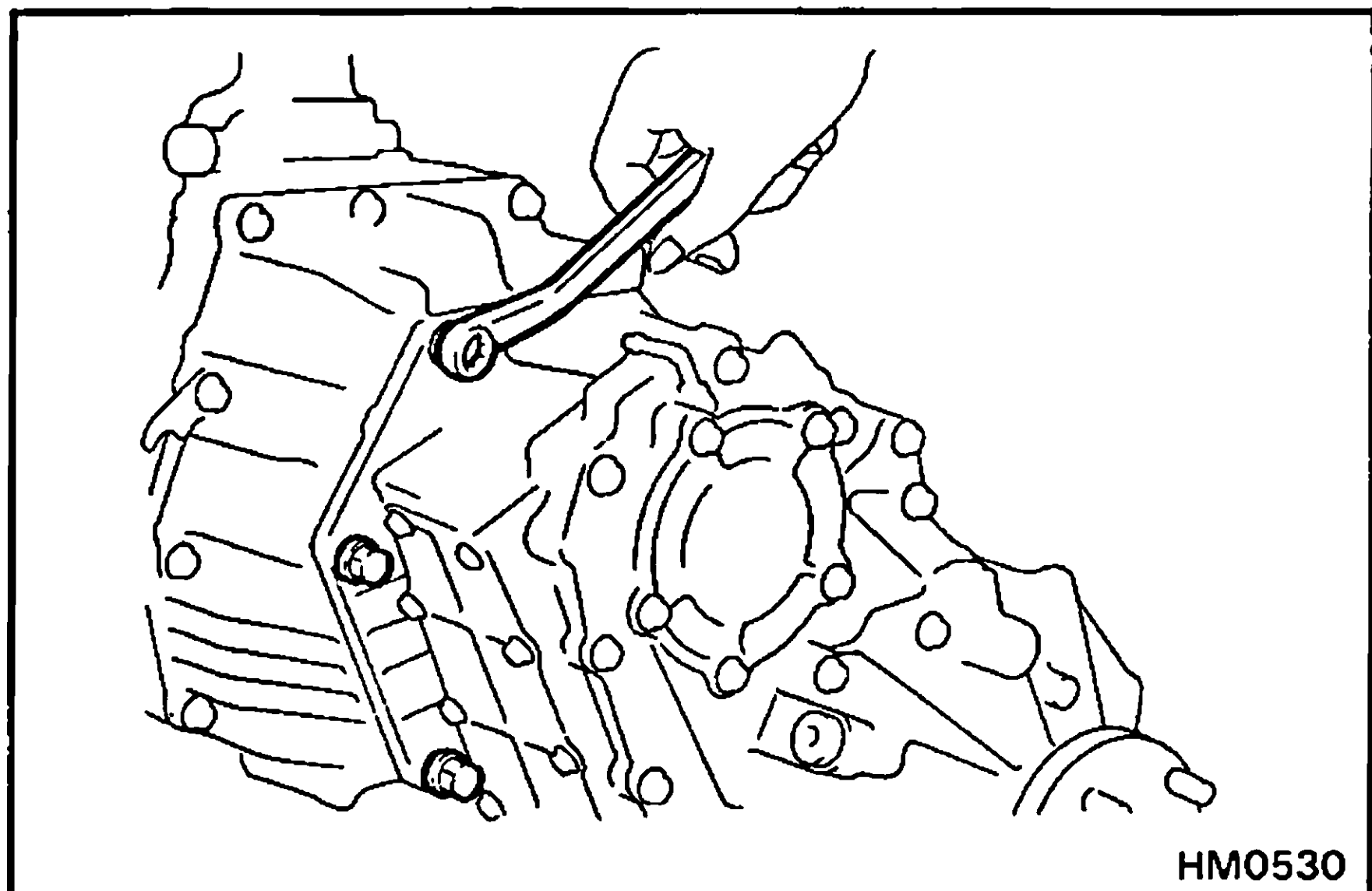


N·m (kgf·cm, ft·lbf) : Specified torque

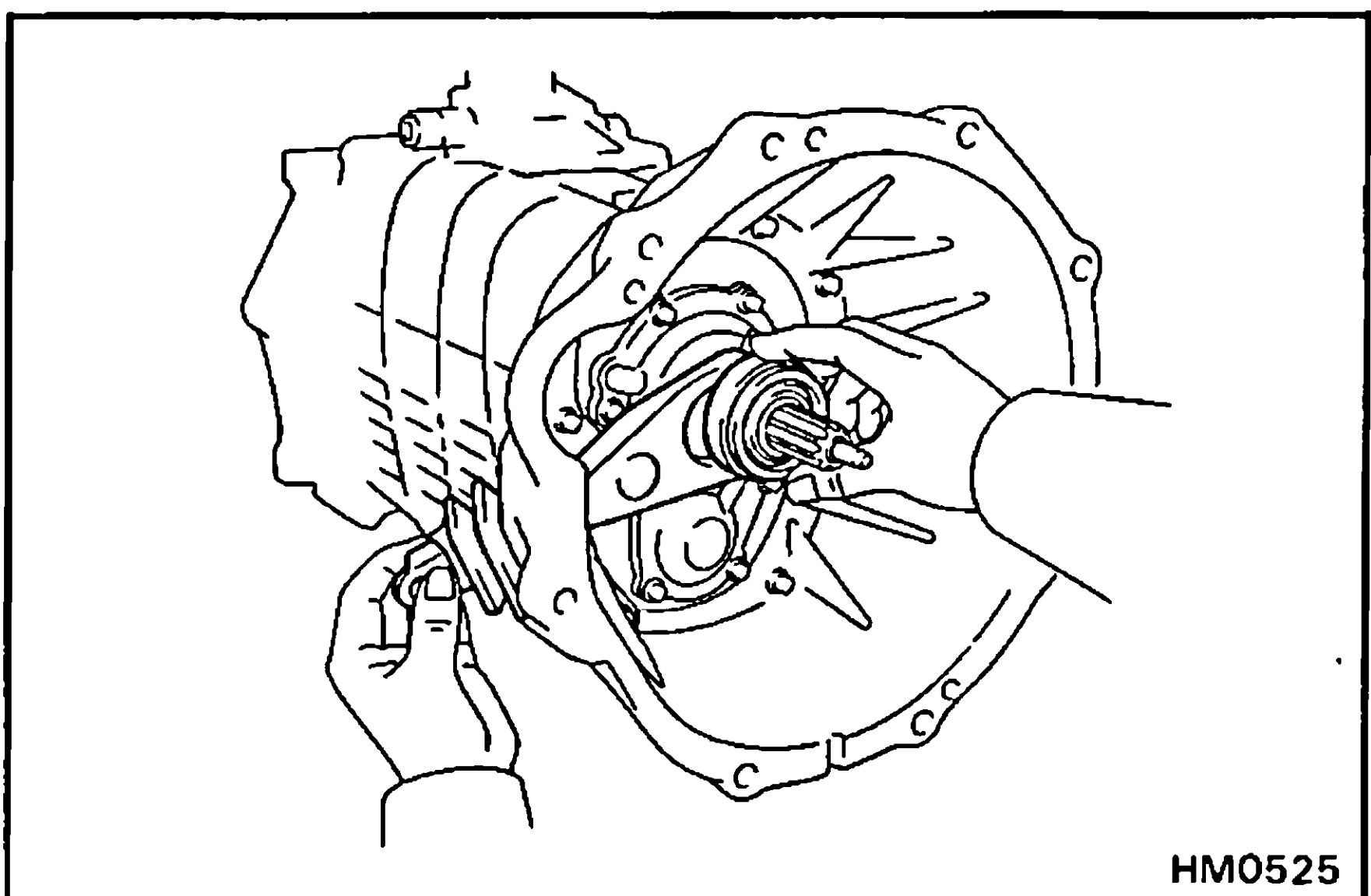
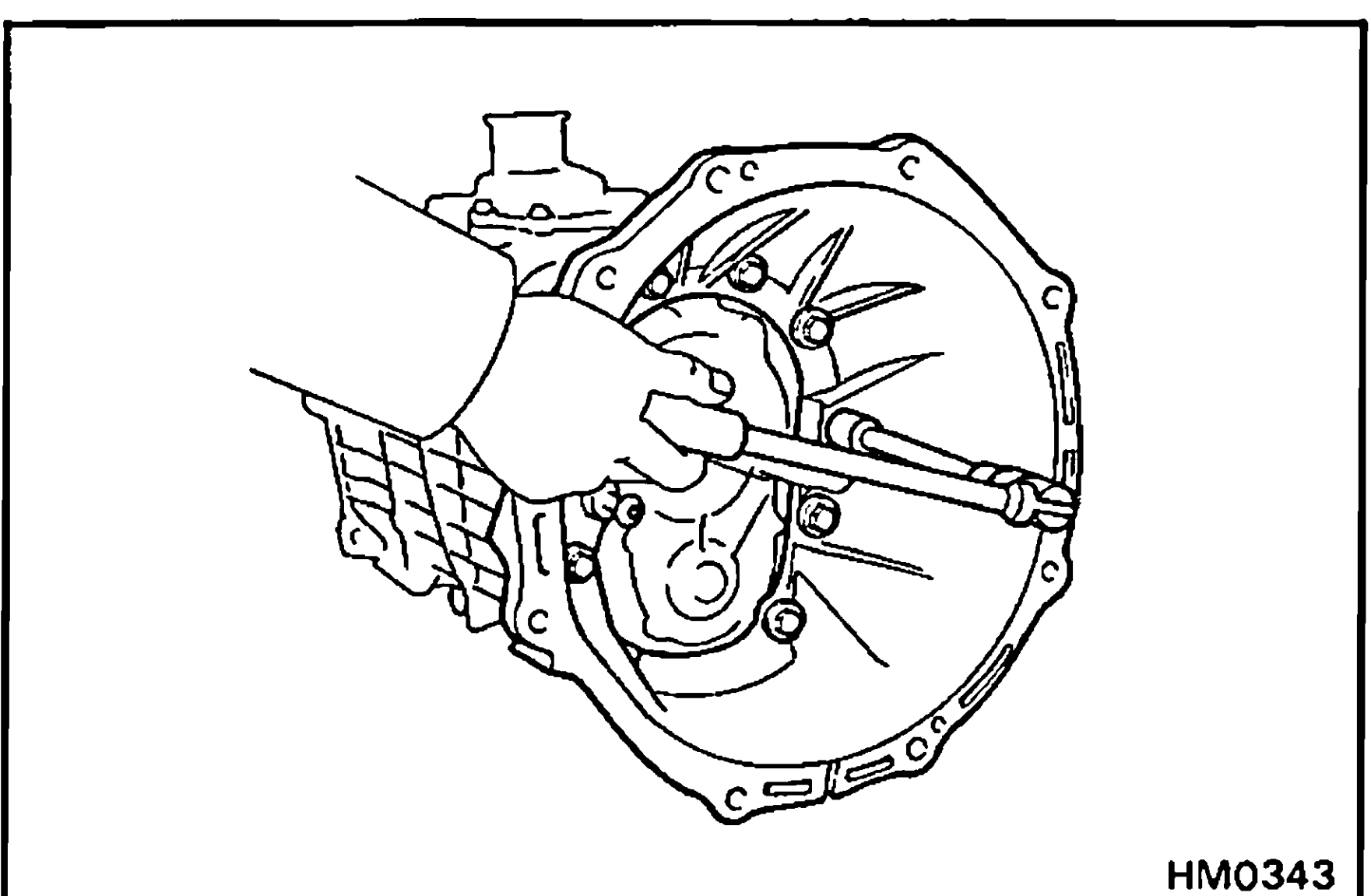
◆ Non-reusable part

**BASIC SUBASSEMBLY SEPARATION**

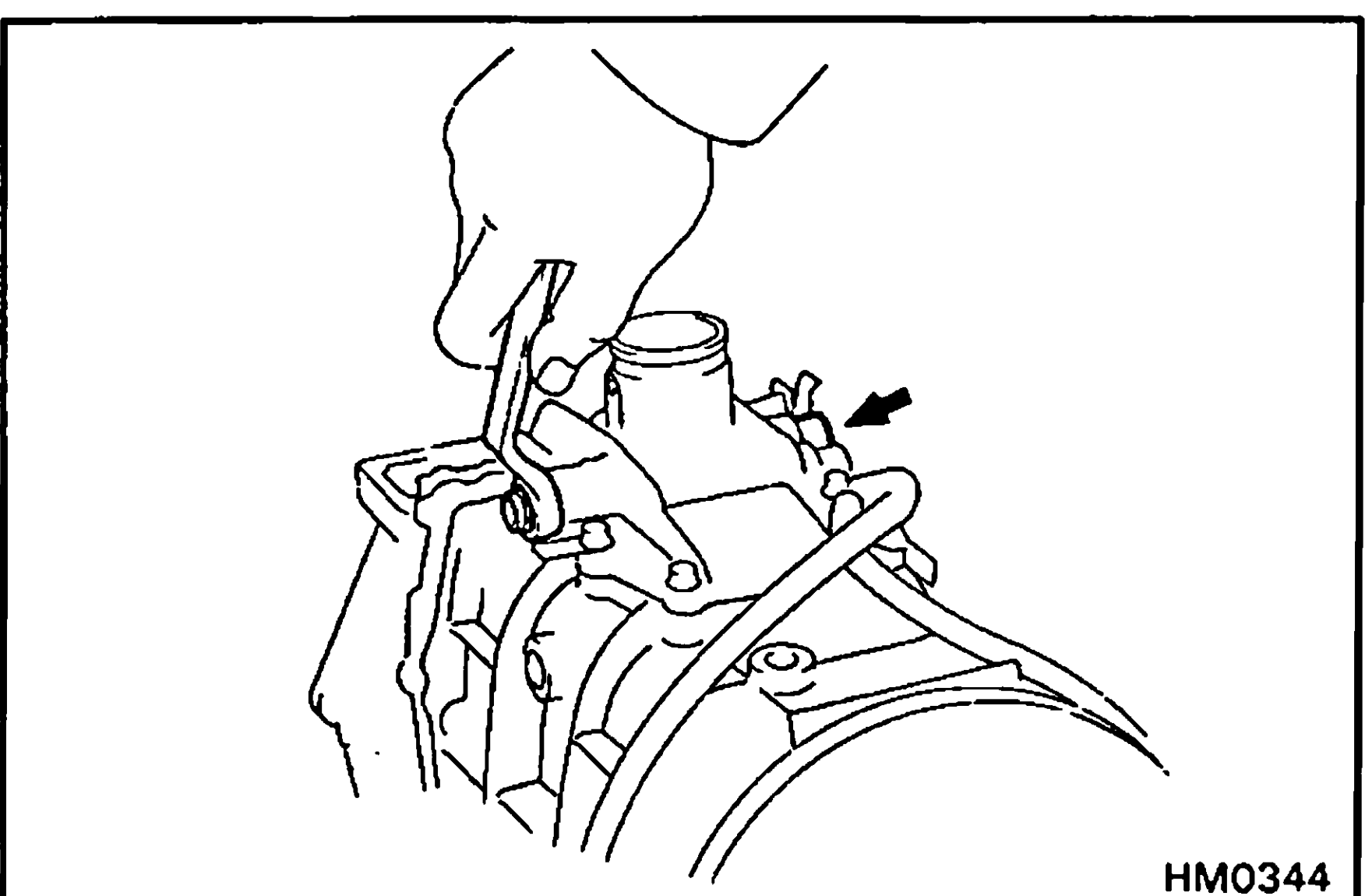
(See pages MT-5 to 7)

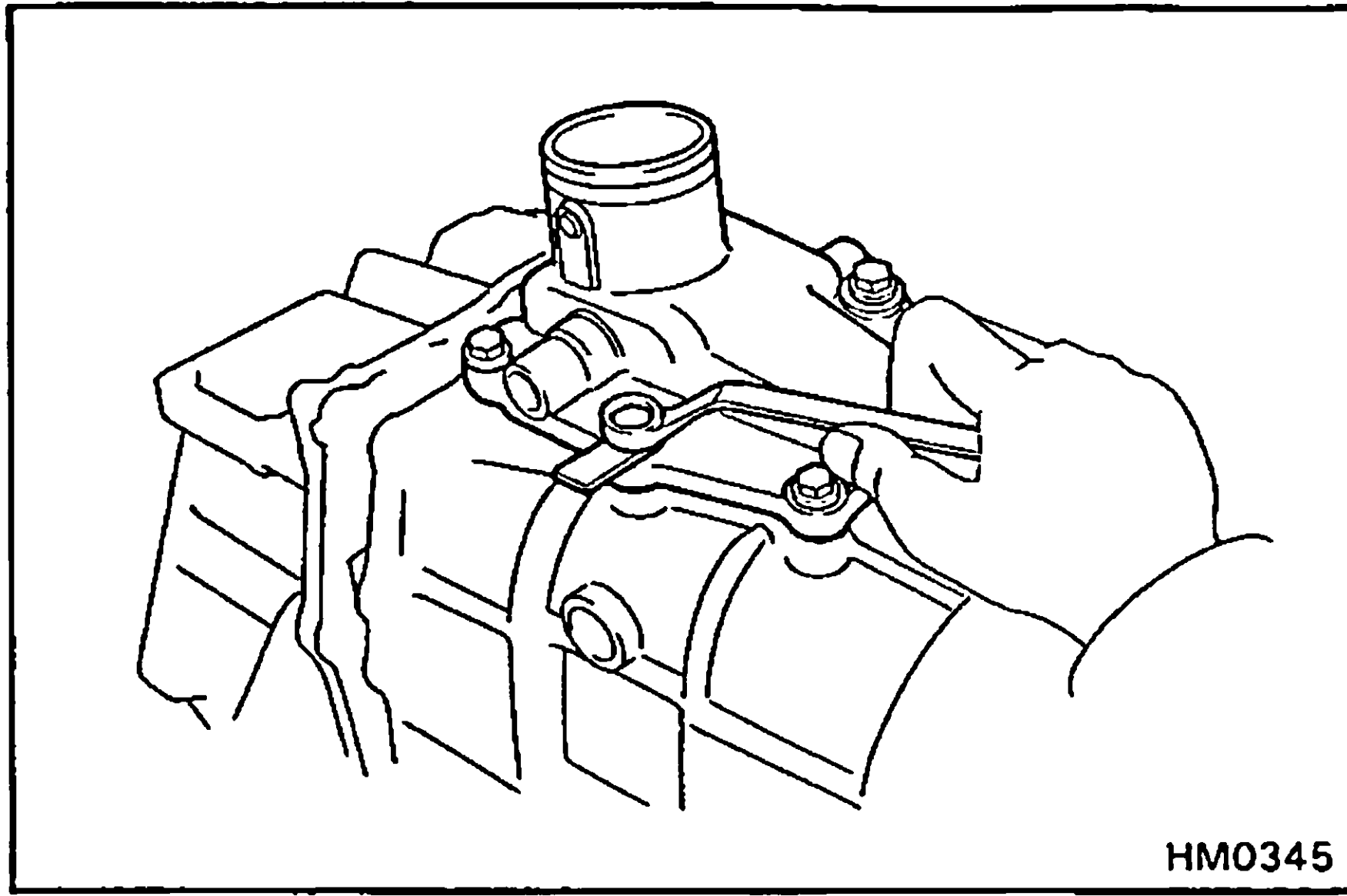
1. REMOVE BREATHER HOSE**2. REMOVE TRANSFER**

Remove the six bolts and transfer from the transfer adaptor.

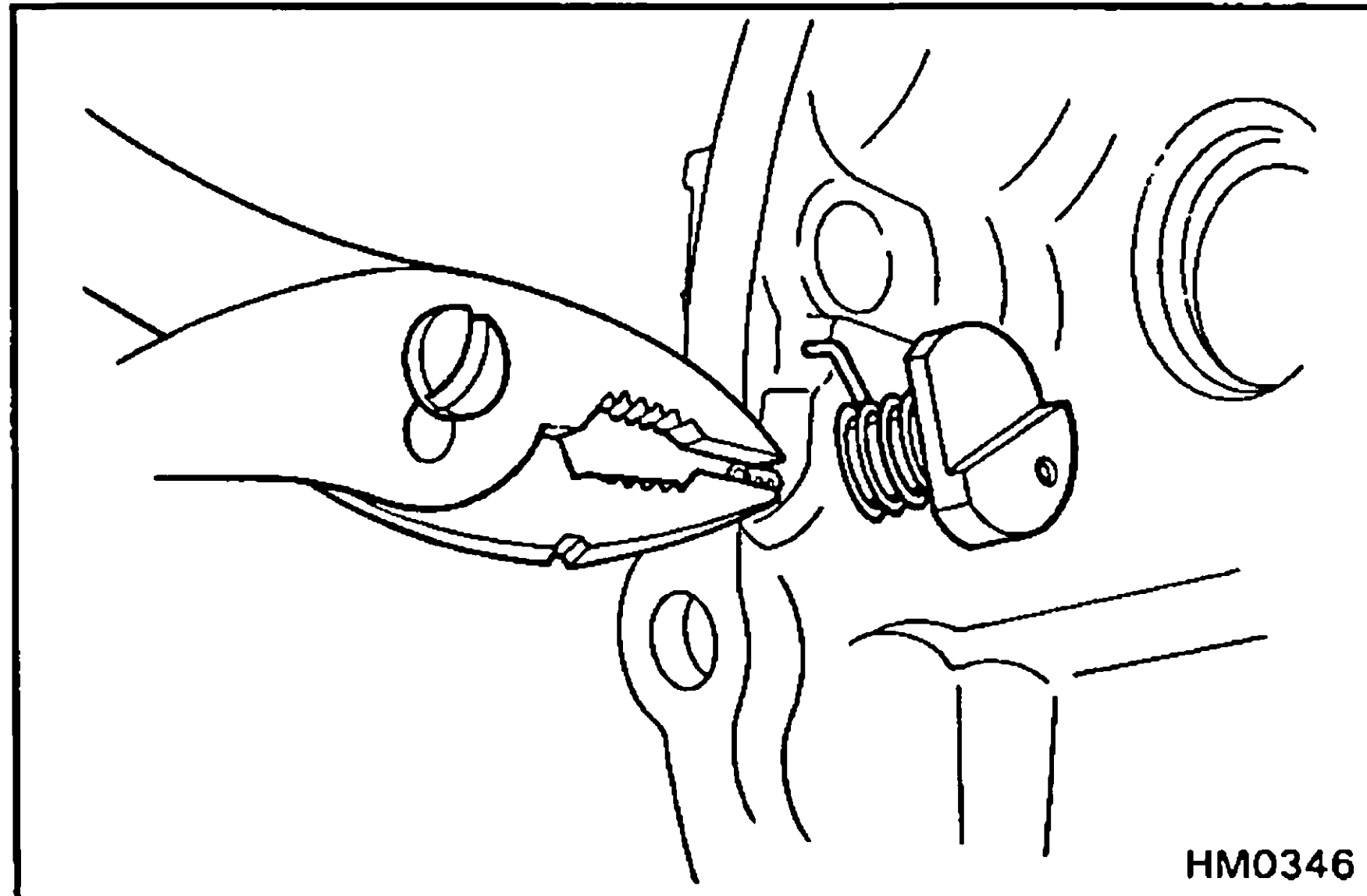
**3. REMOVE RELEASE FORK AND BEARING****4. REMOVE BACK-UP LIGHT SWITCH****5. REMOVE CLUTCH HOUSING FROM TRANSMISSION CASE**

Remove the ten bolts and clutch housing.

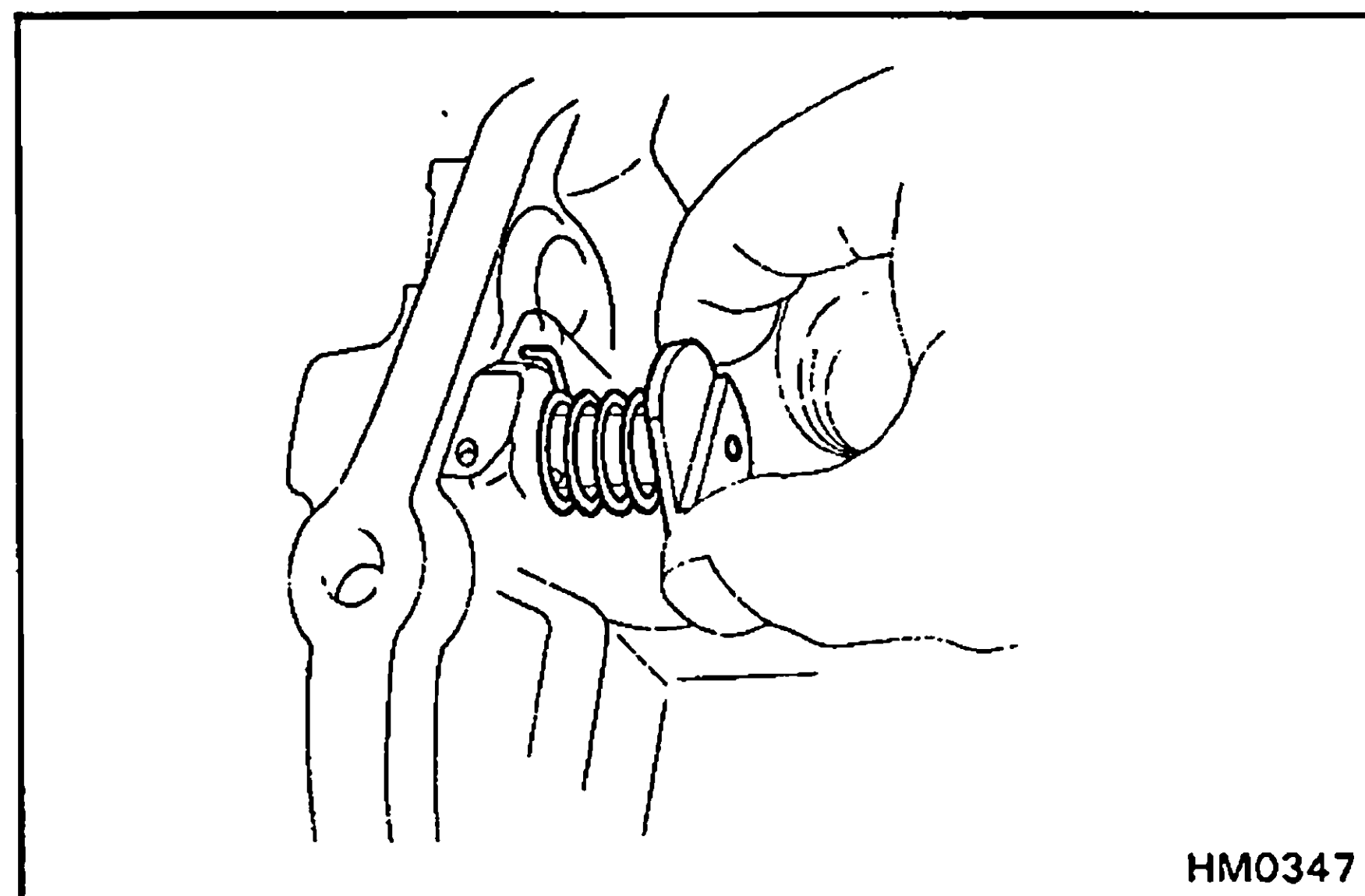
**6. REMOVE TWO RESTRICT PINS****7. REMOVE BREATHER HOSE**

**8. REMOVE SHIFT LEVER CONTROL RETAINER**

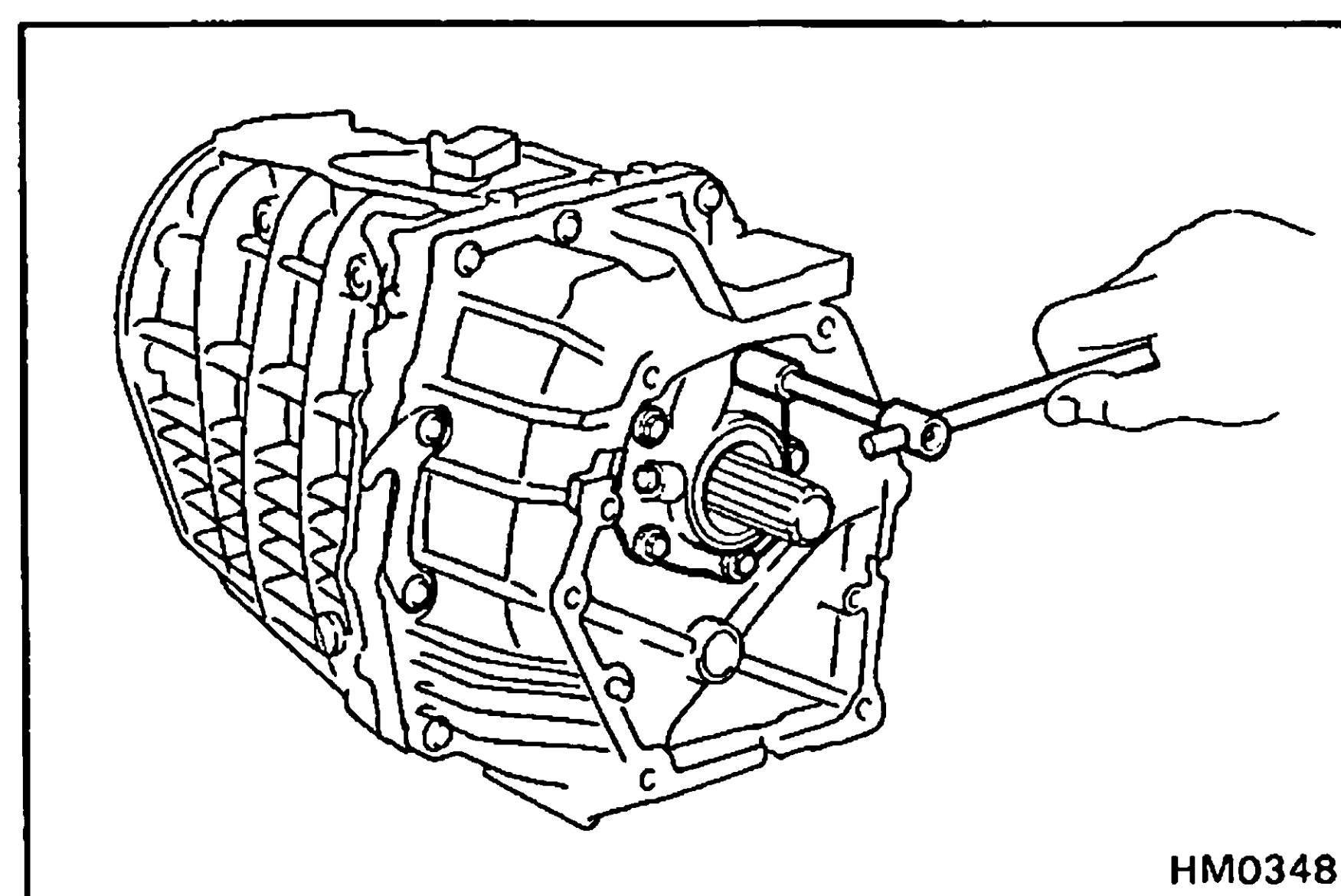
Remove the six bolts and transmission shift lever control retainer.

**9. REMOVE REVERSE RESTRICT PIN**

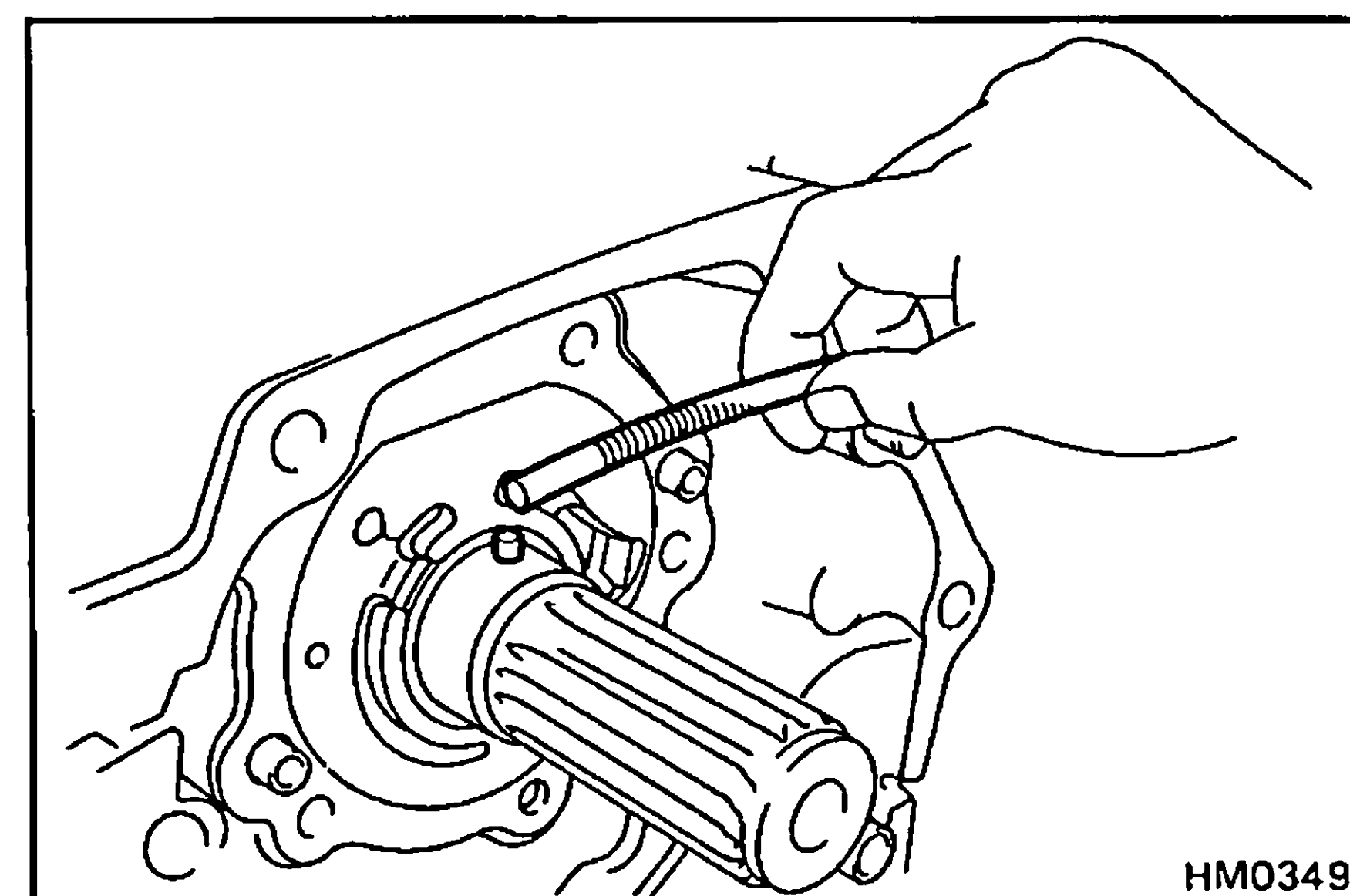
(a) Using pliers, remove the slotted spring pin.



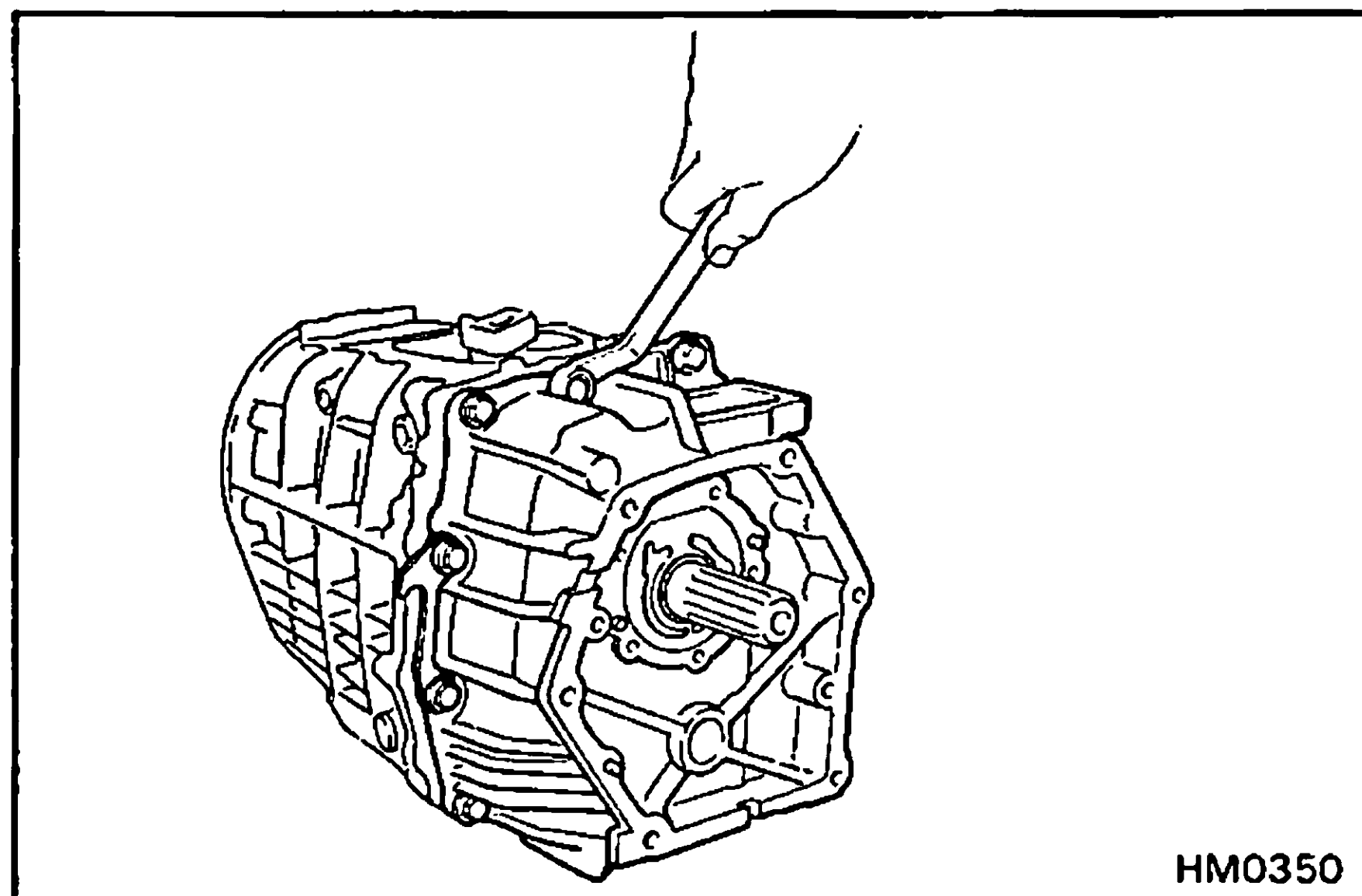
(b) Remove the reverse restrict pin.

**10. REMOVE OIL PUMP COVER ASSEMBLY**

(a) Remove the five bolts and oil pump cover.

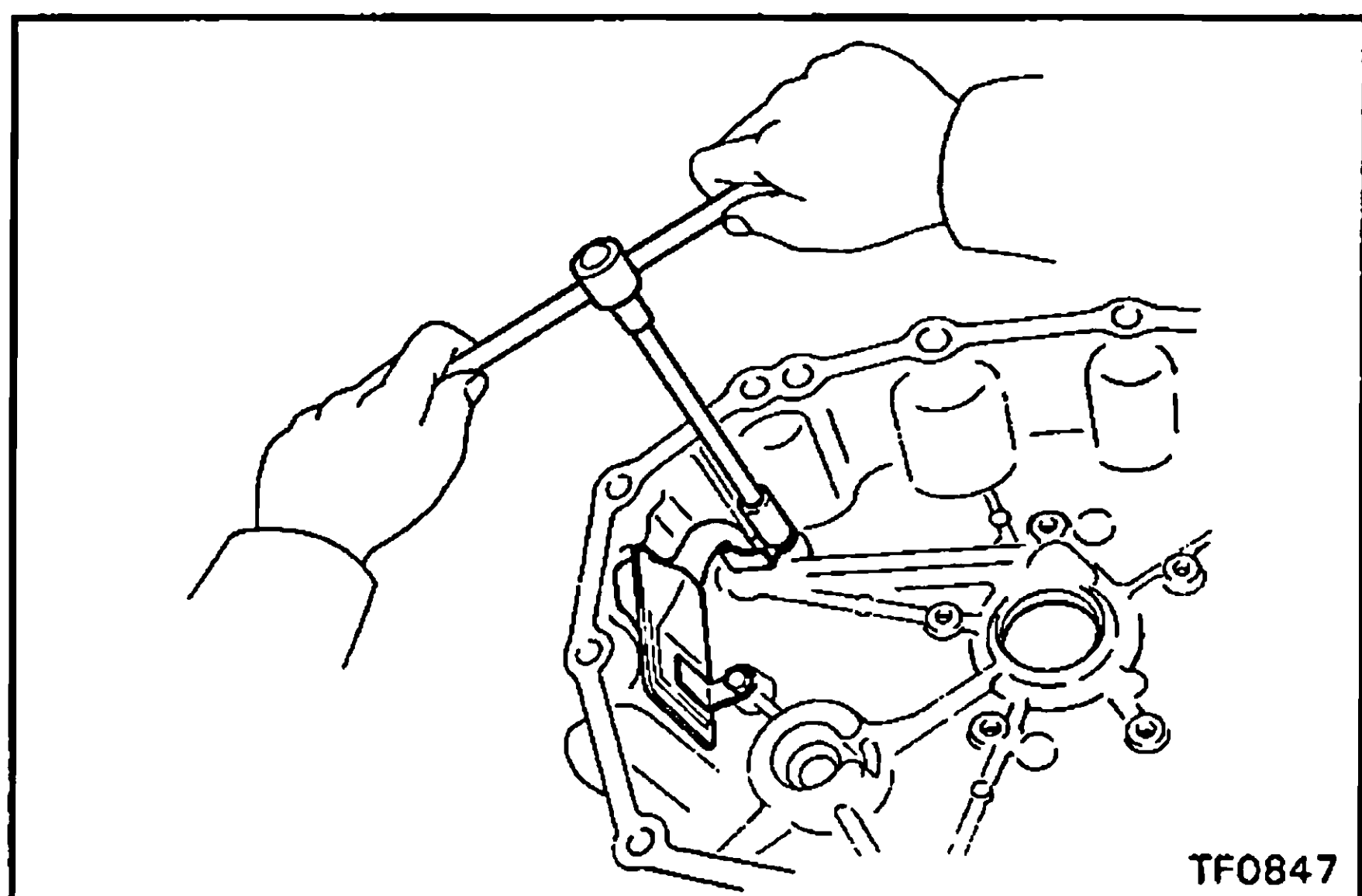


(b) Using a magnetic finger, remove the two straight pins.

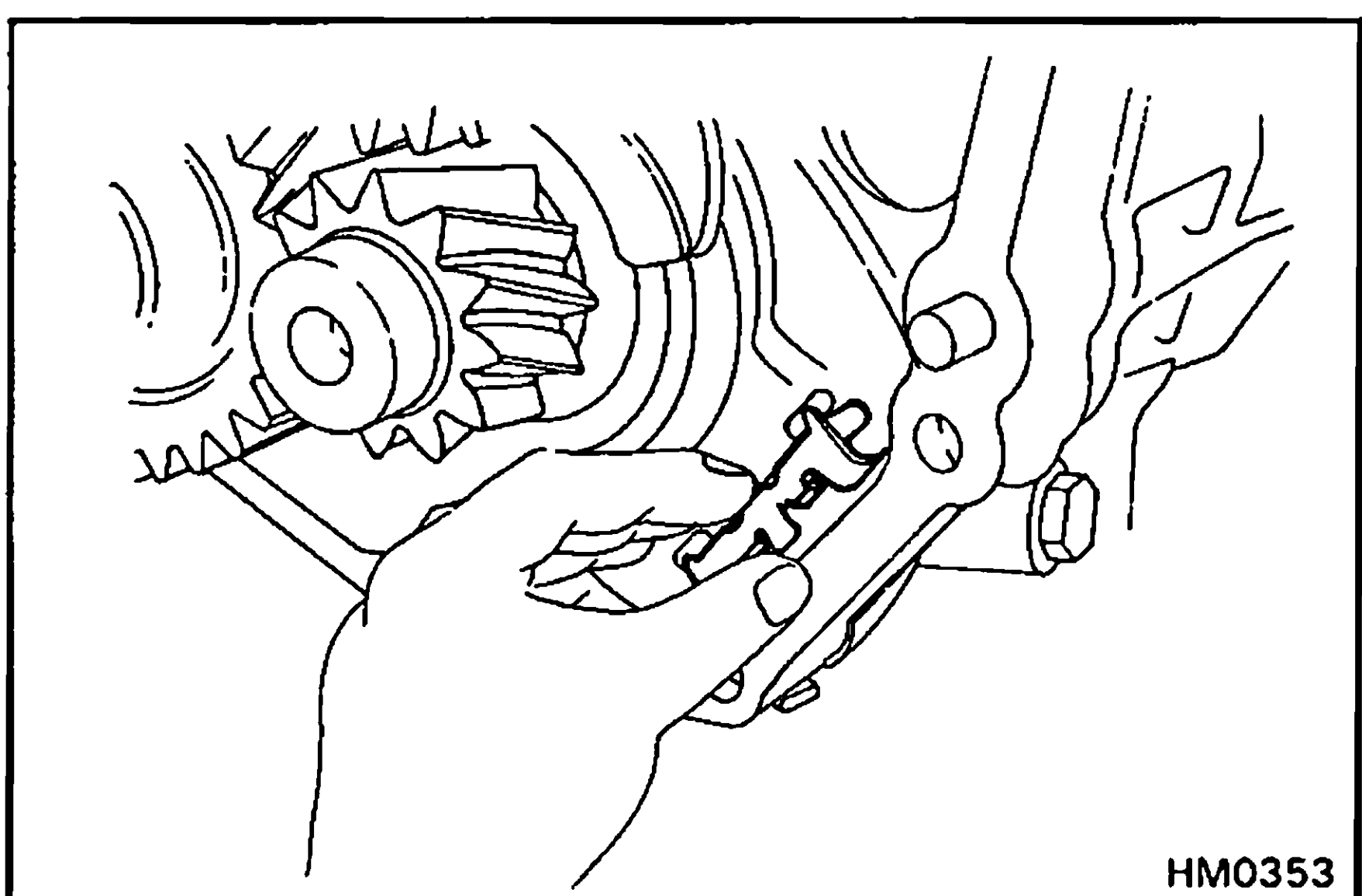
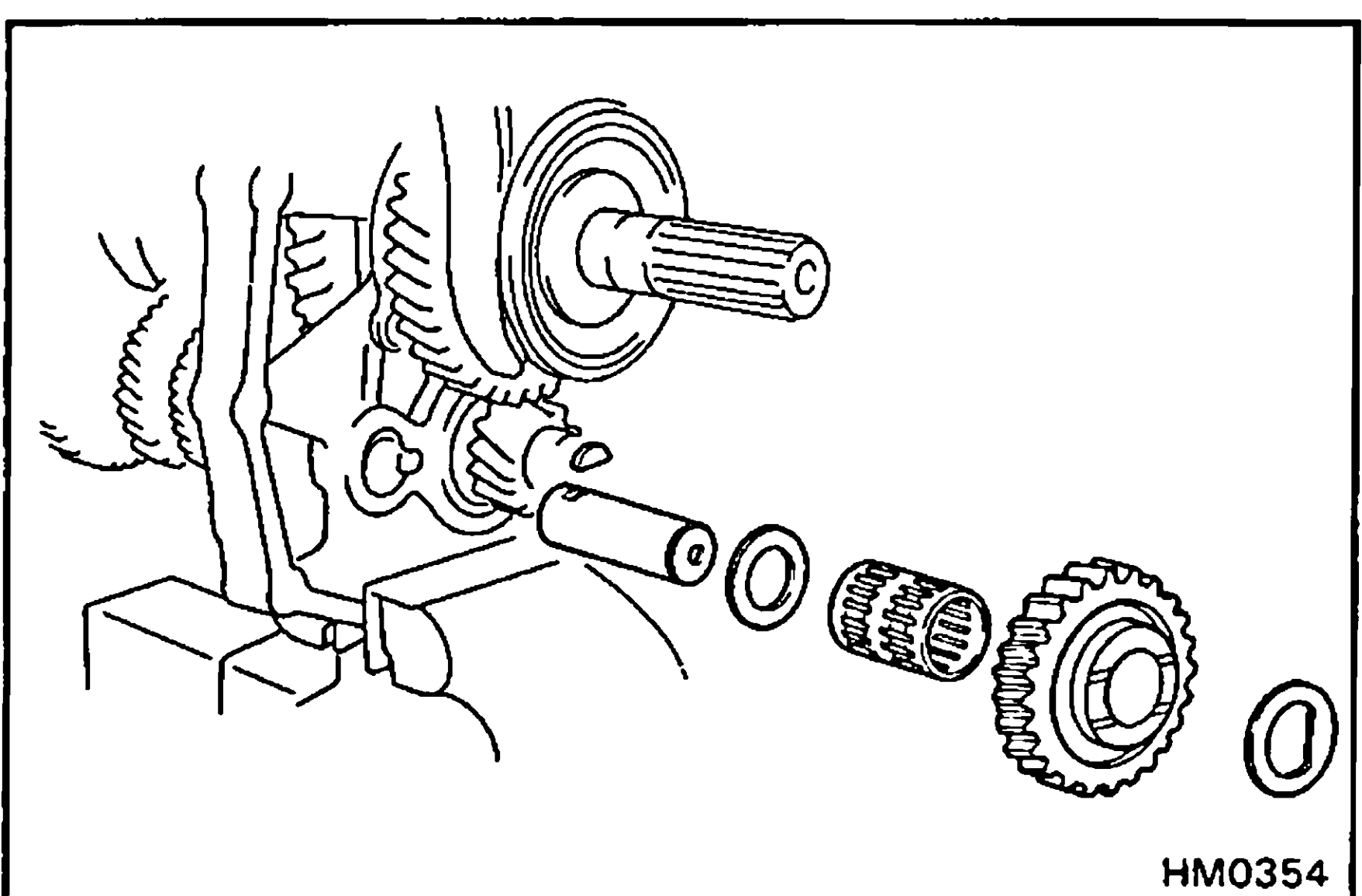
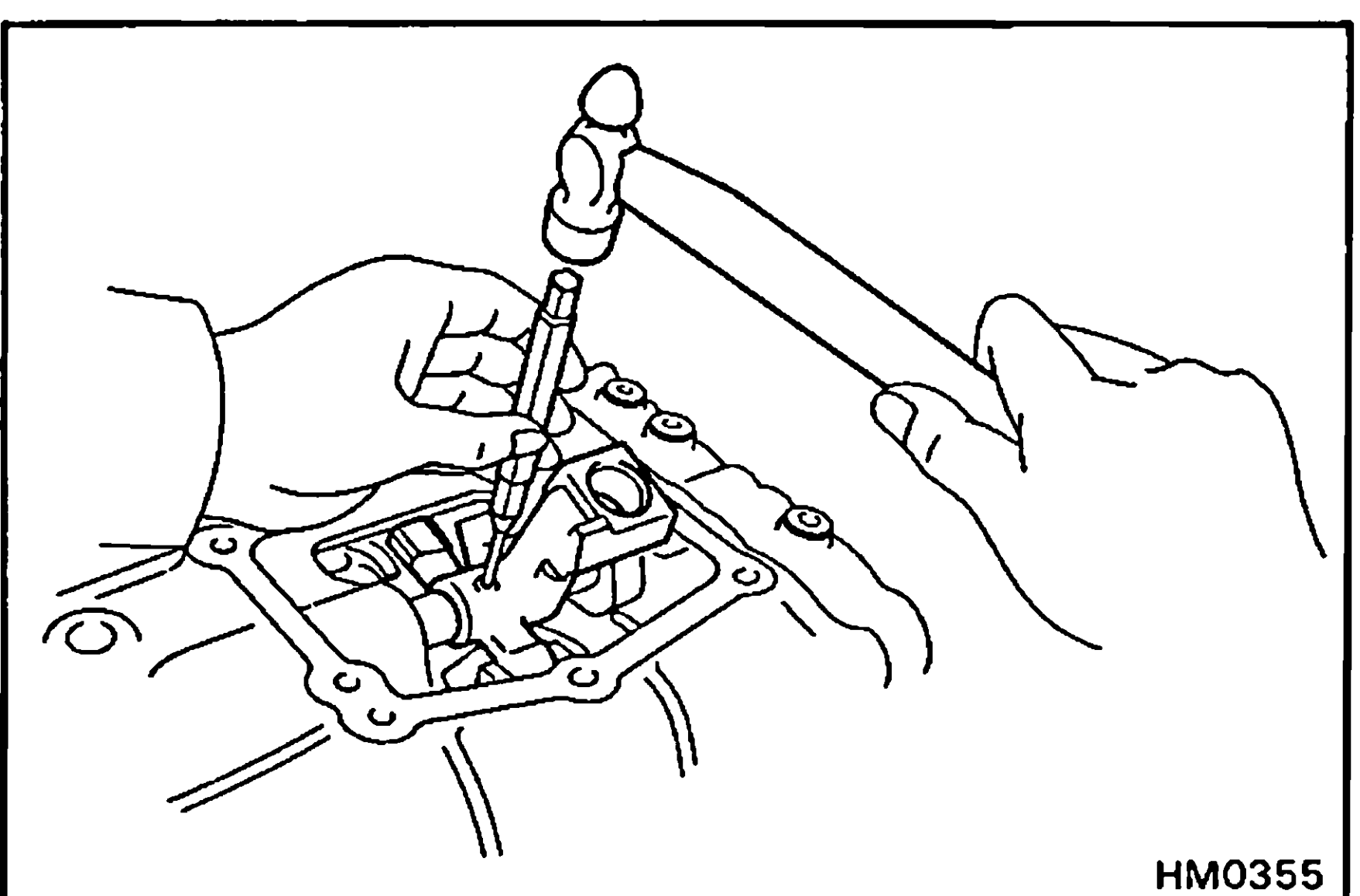
**11. REMOVE TRANSFER ADAPTOR**

Remove the eleven bolts.

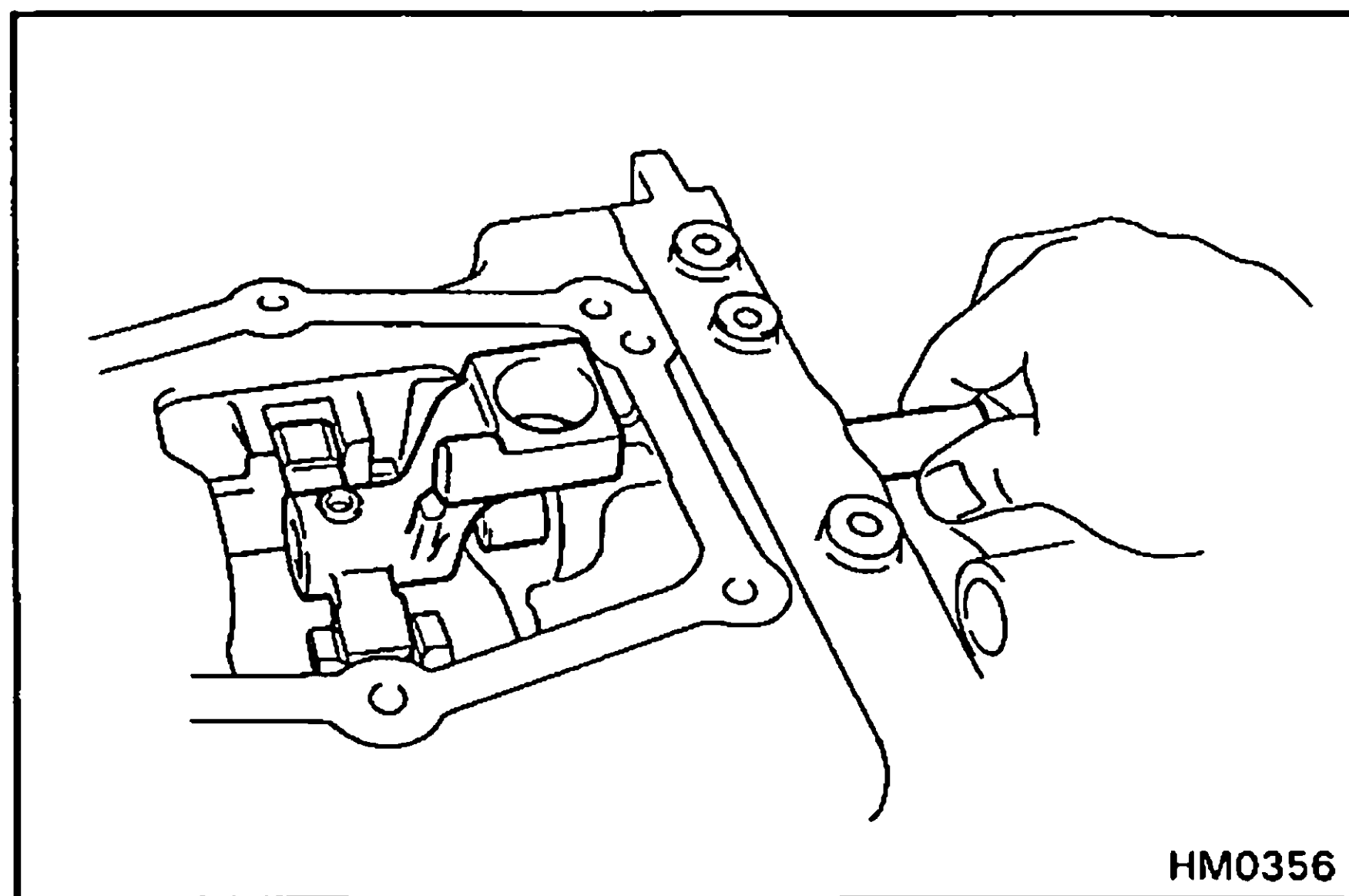
HINT: If necessary, tap the transfer adaptor with a plastic hammer.

**12. REMOVE OIL STRAINER FROM TRANSFER ADAPTOR**

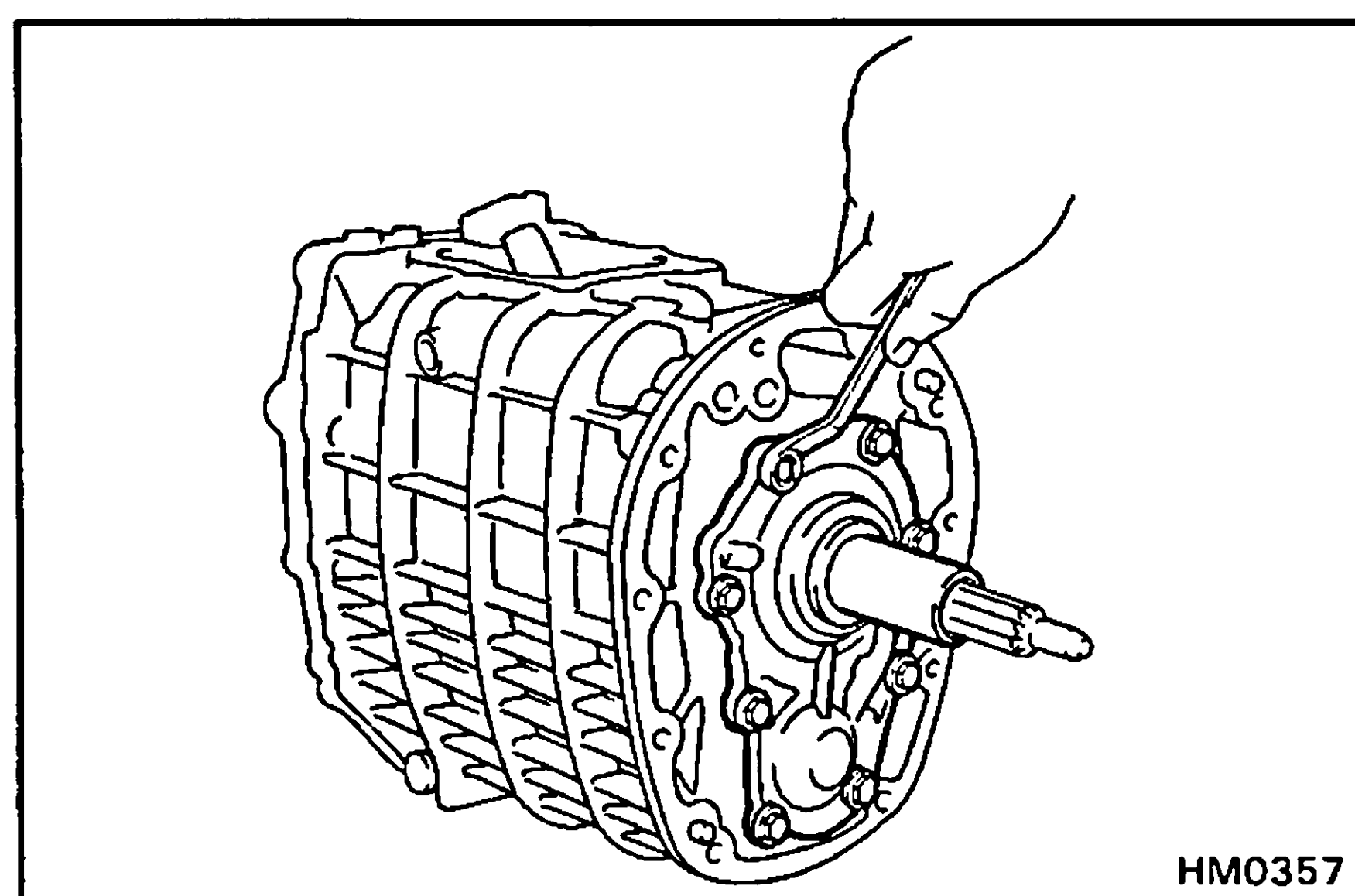
Remove the two bolts and oil strainer.

**13. REMOVE MAGNET FROM INTERMEDIATE PLATE****14. REMOVE REVERSE IDLE GEAR FROM INTERMEDIATE PLATE****15. REMOVE SHIFT LEVER SHAFT AND SHIFT LEVER HOUSING**

- (a) Using a pin punch and a hammer, drive out the slotted spring pin from the shift lever housing.

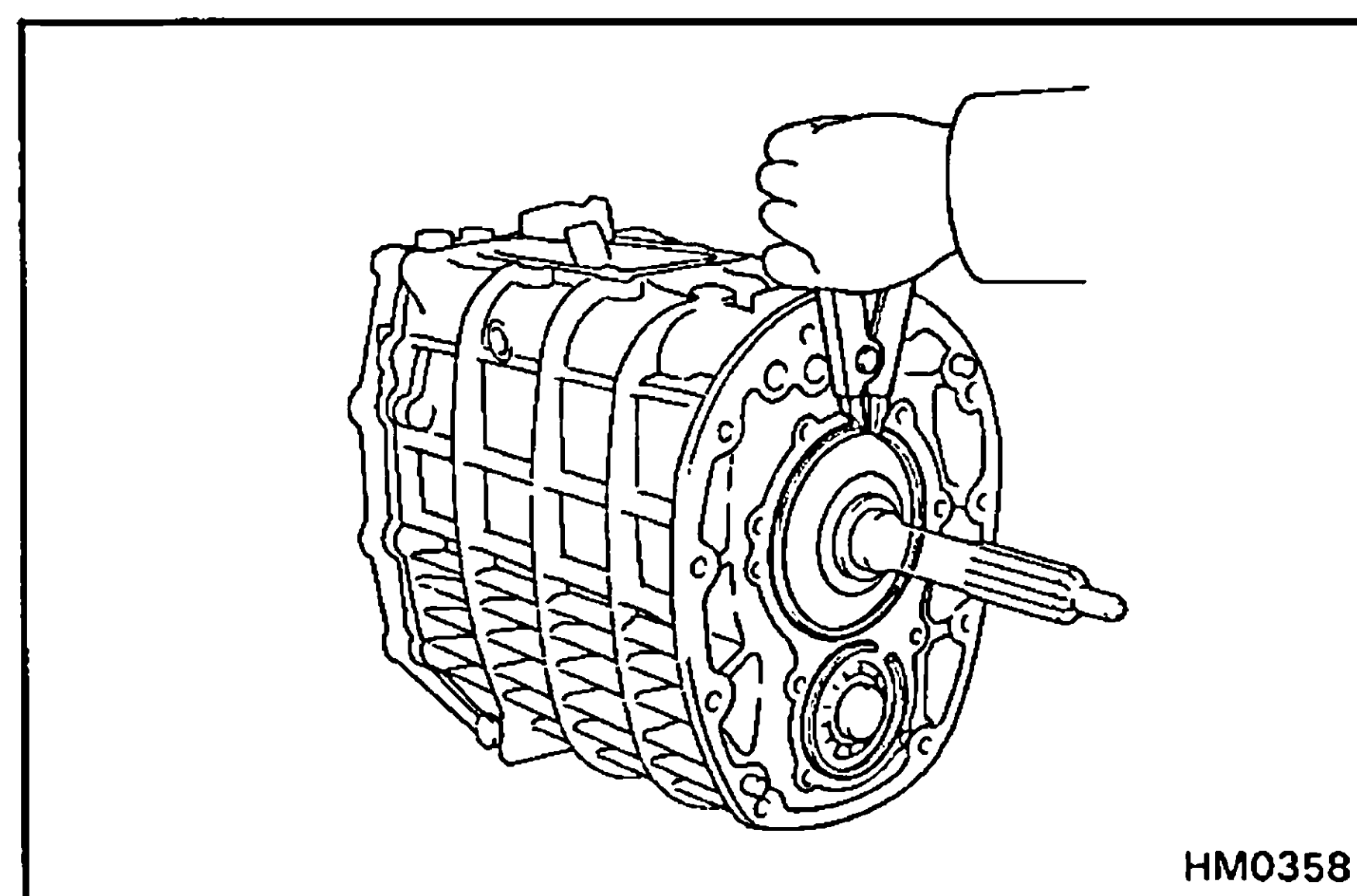


(b) Remove the shift lever shaft and shift lever housing.

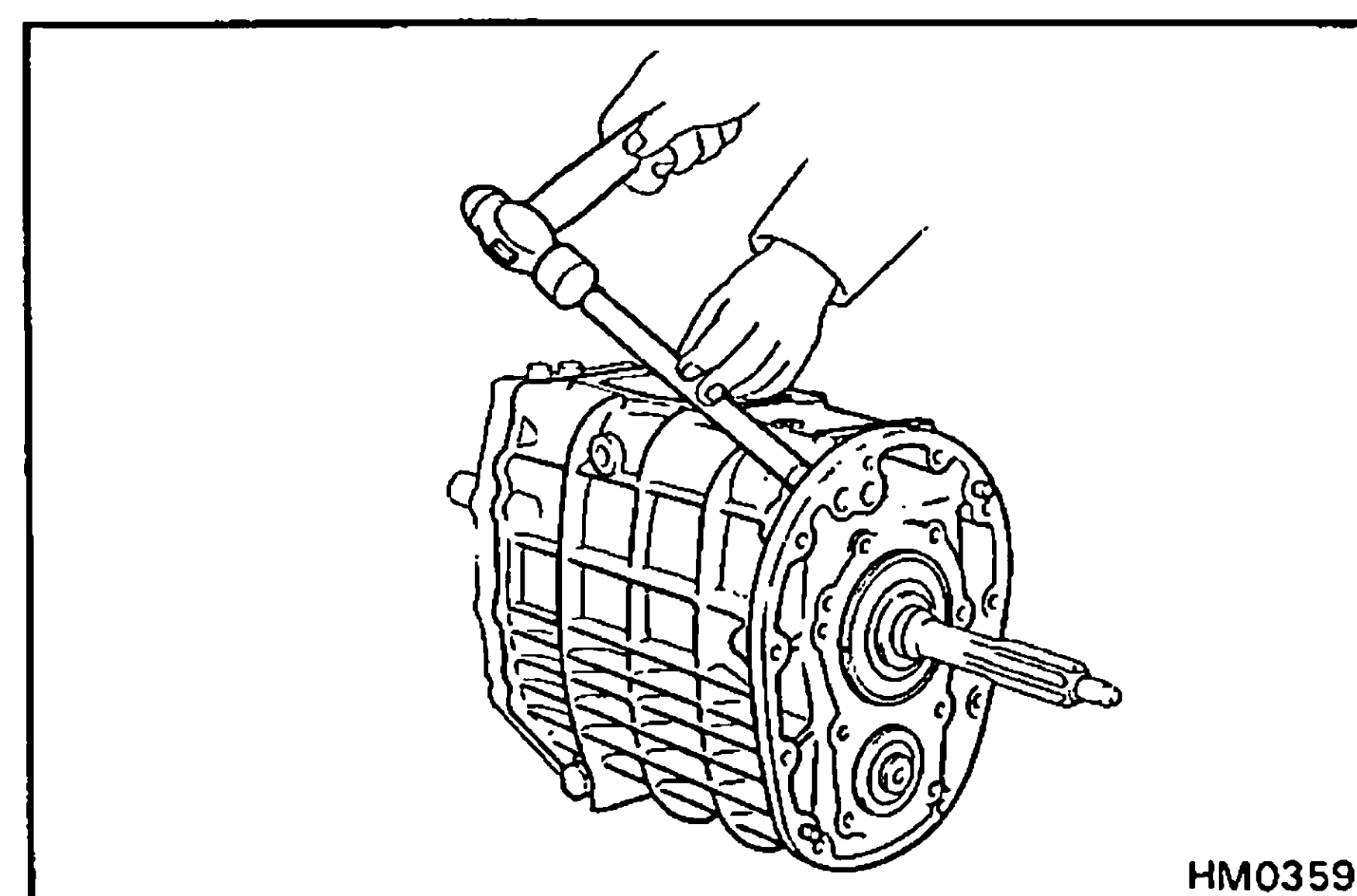


16. REMOVE FRONT BEARING RETAINER

(a) Remove the eight bolts, and front bearing retainer.



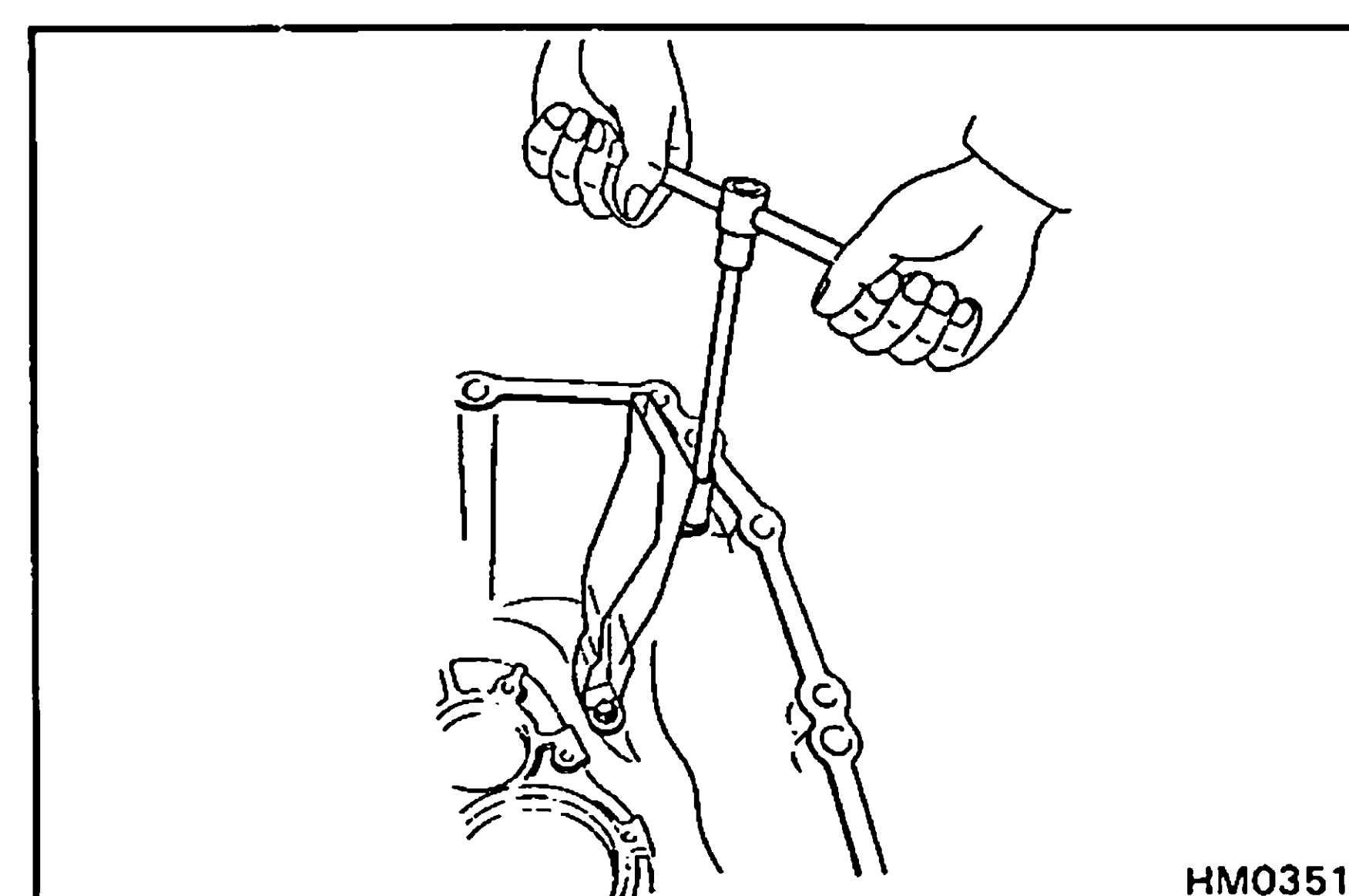
(b) Using a snap ring expander, remove the two snap rings from the input shaft and counter gear.



17. SEPARATE TRANSMISSION CASE FROM INTERMEDIATE PLATE

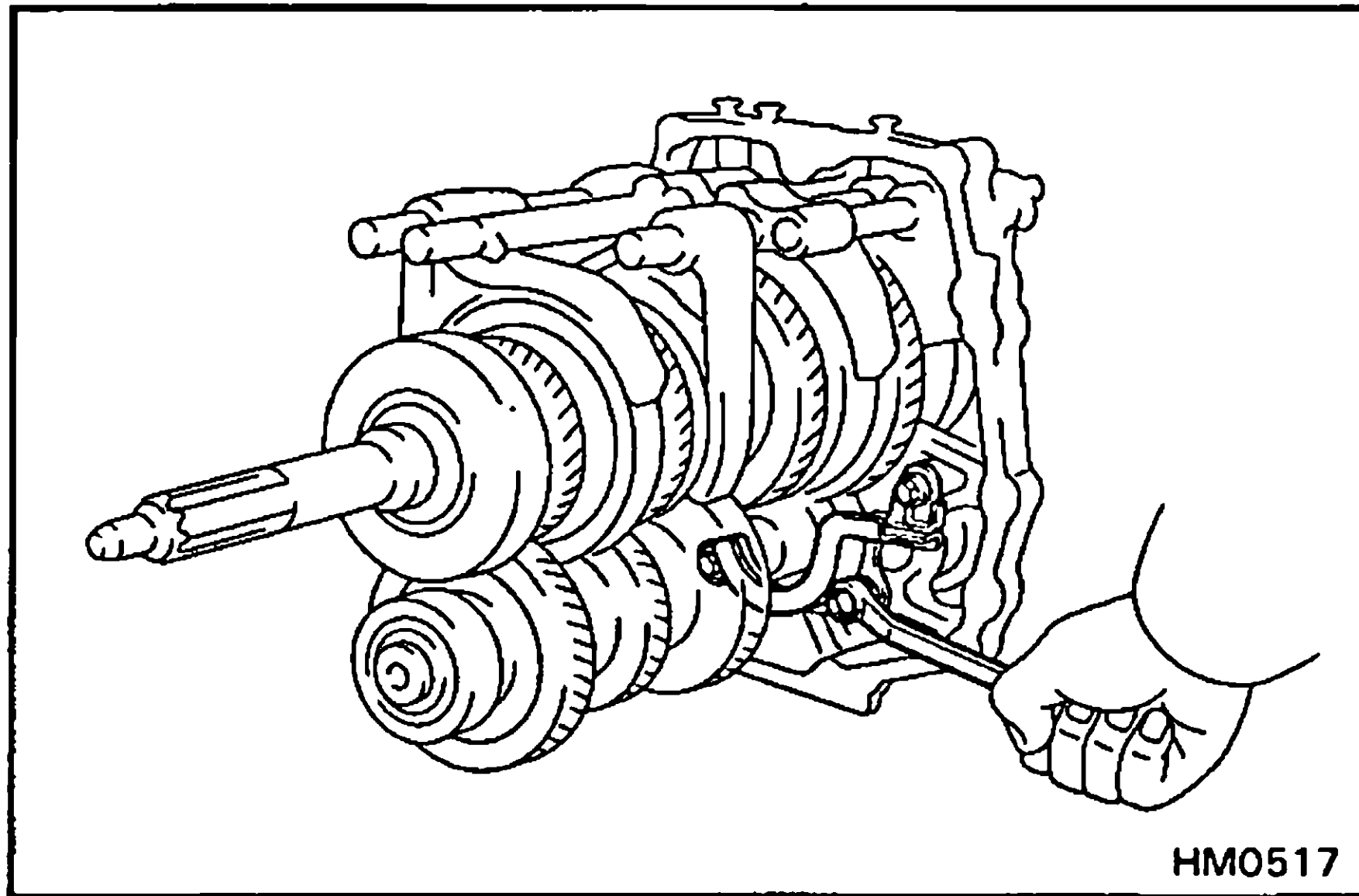
(a) Using a brass bar and a hammer, carefully tap off the transmission case.

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

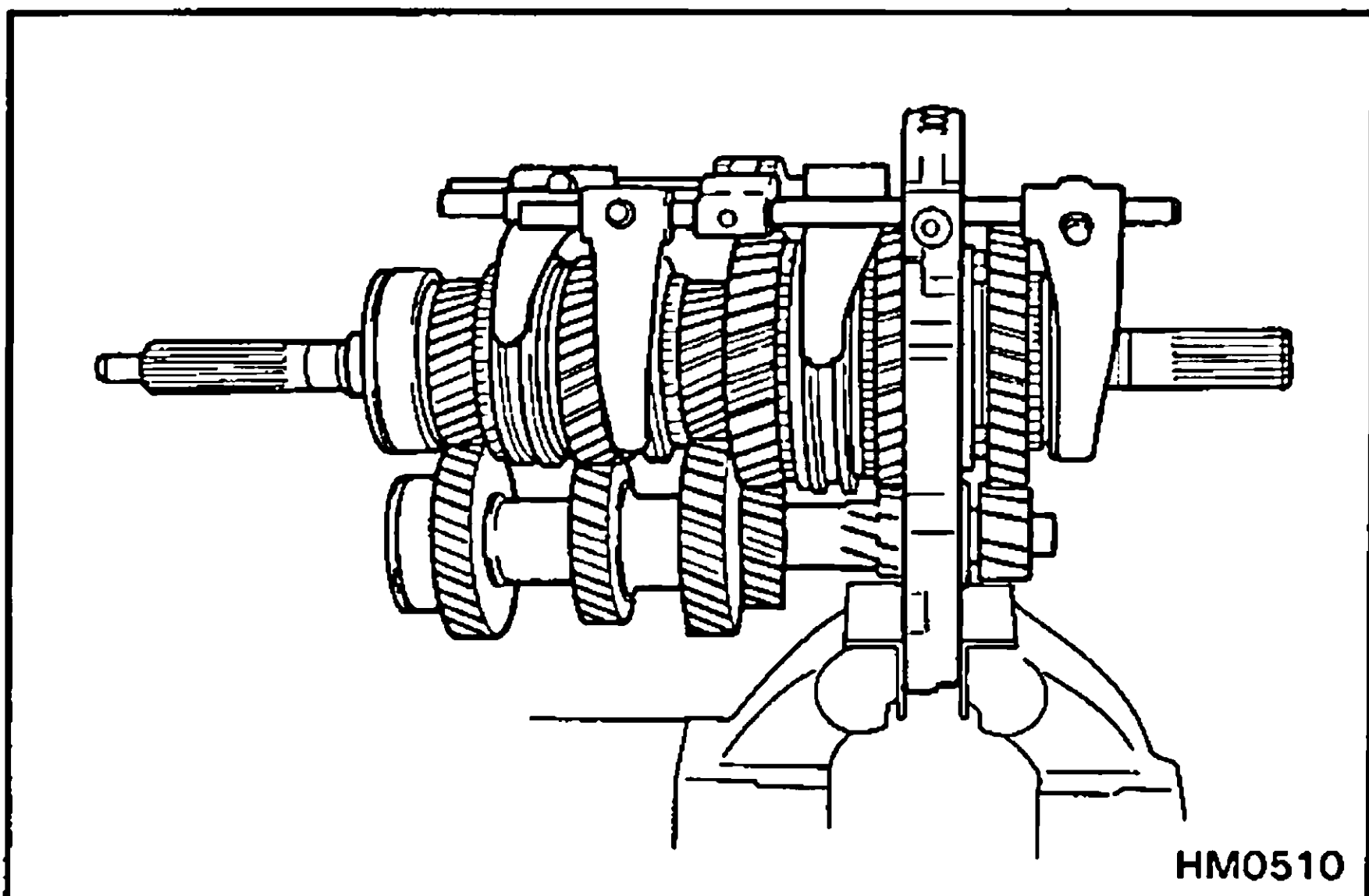
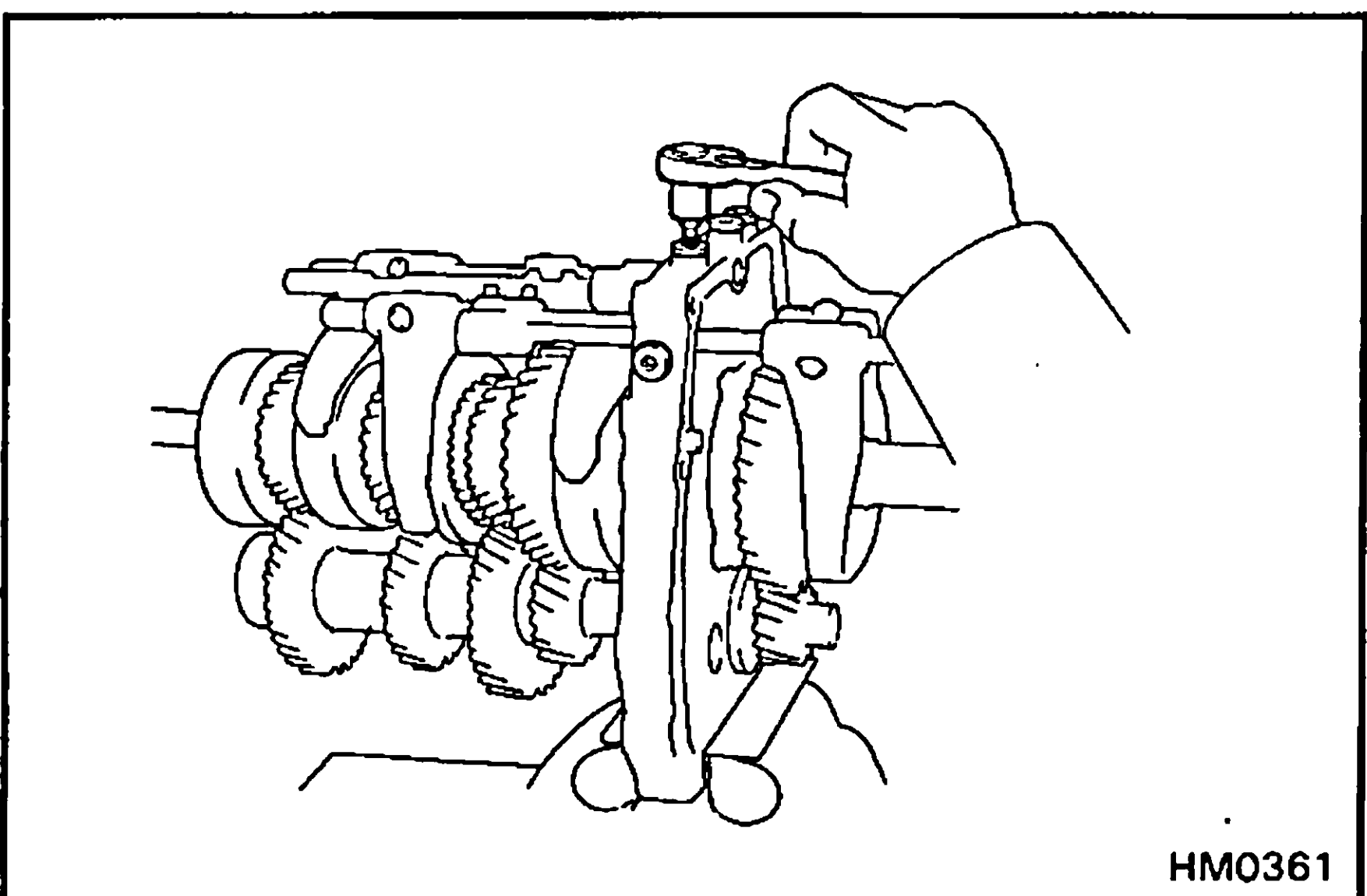


18. REMOVE OIL RECEIVER FROM TRANSMISSION CASE

Remove the two bolts and oil receiver.

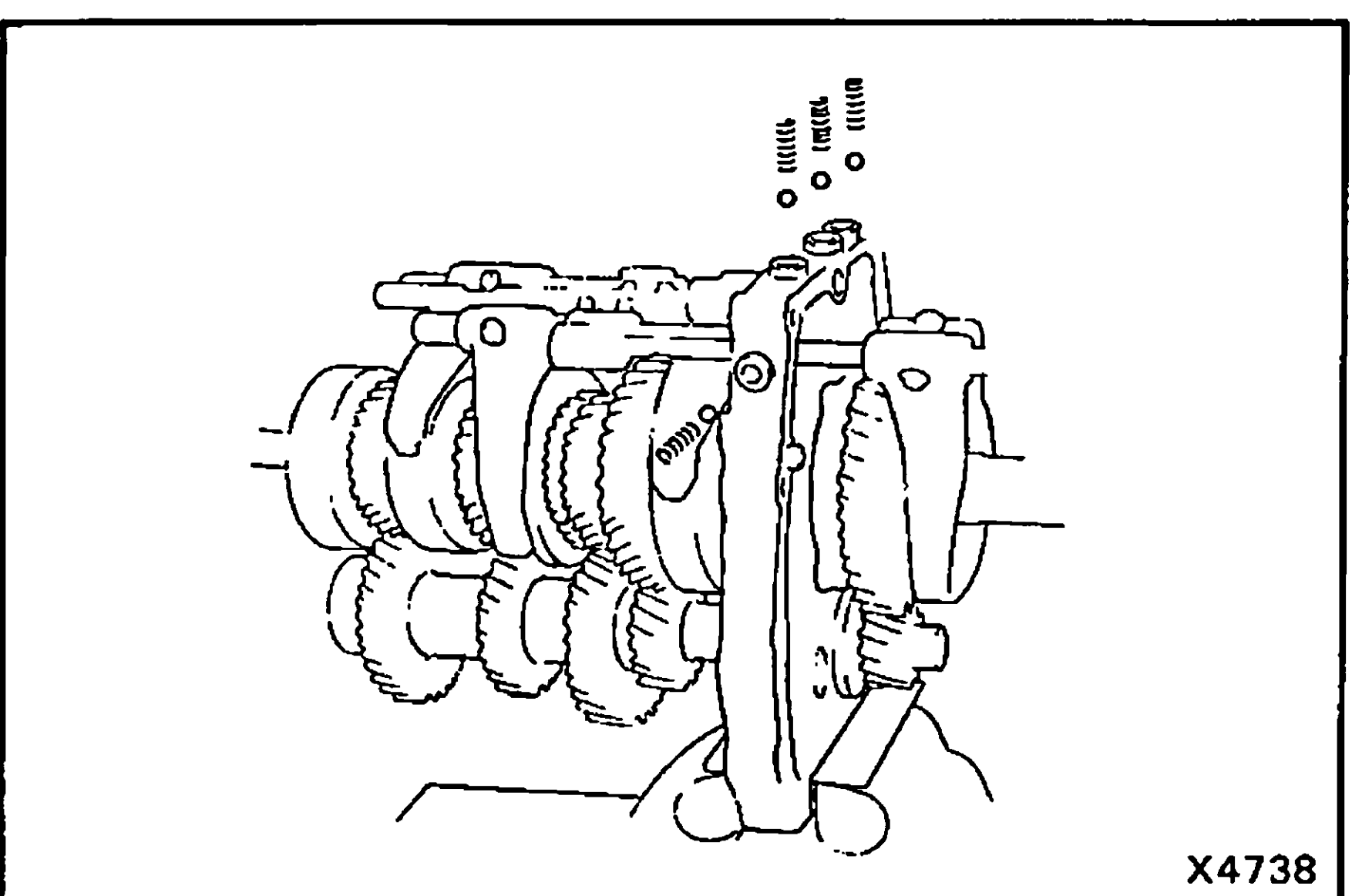
**19. REMOVE OIL RECEIVER FROM INTERMEDIATE PLATE**

Remove the three bolts and oil receiver.

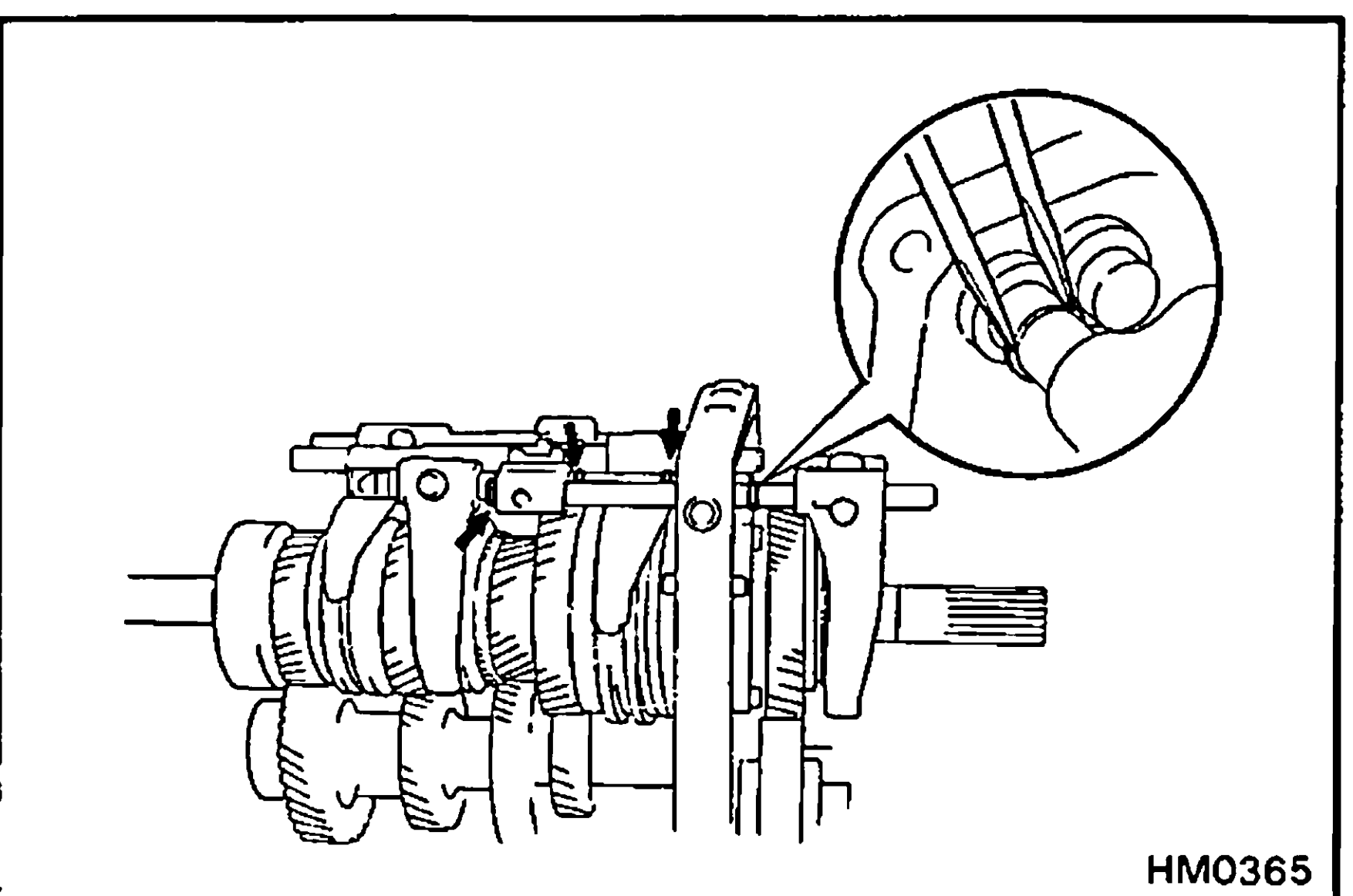
**20. MOUNT INTERMEDIATE PLATE IN VISE****21. REMOVE STRAIGHT SCREW PLUGS, LOCKING BALLS AND SPRINGS**

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

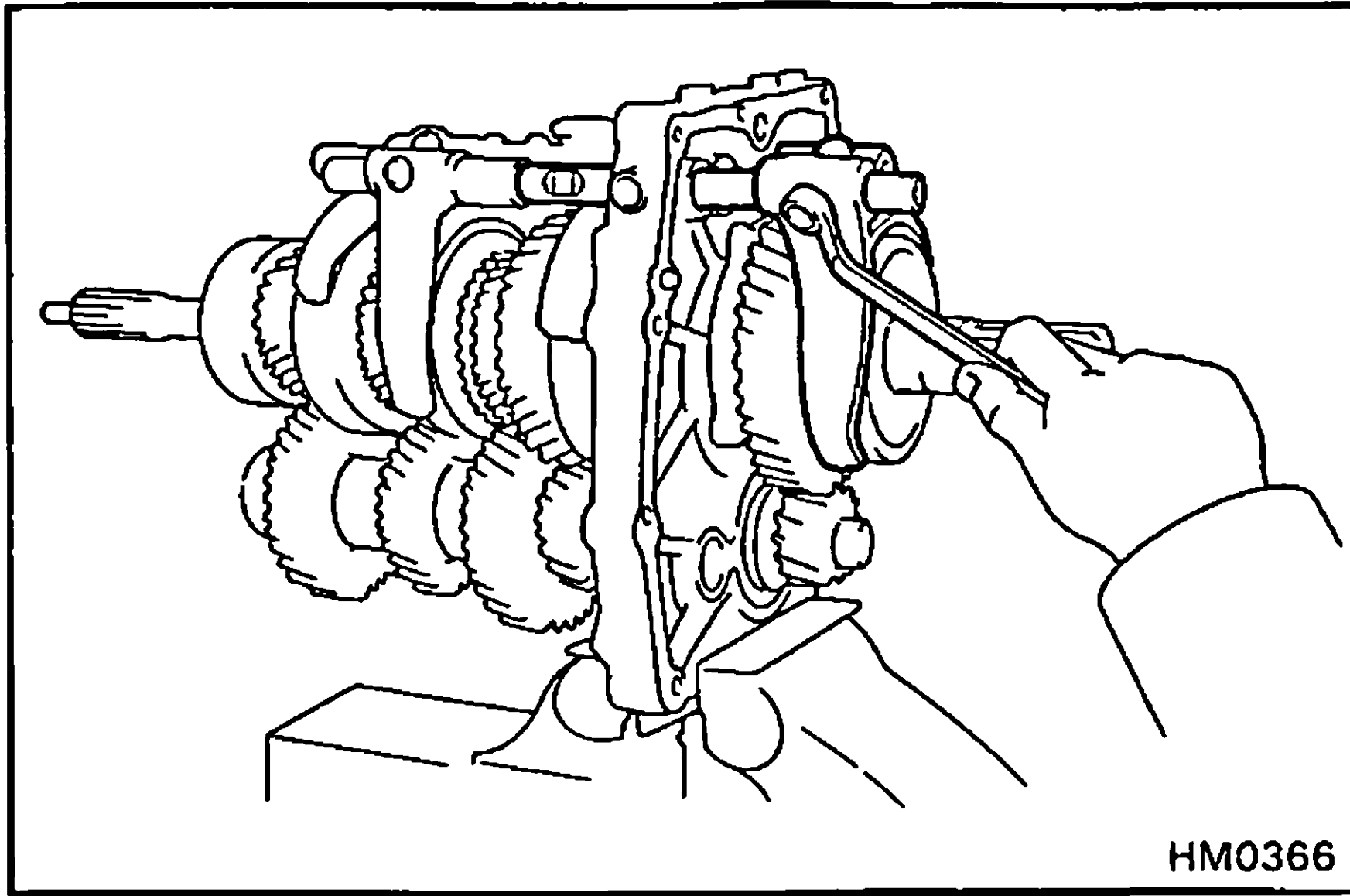
(Torx socket wrench T40 09042-00020)



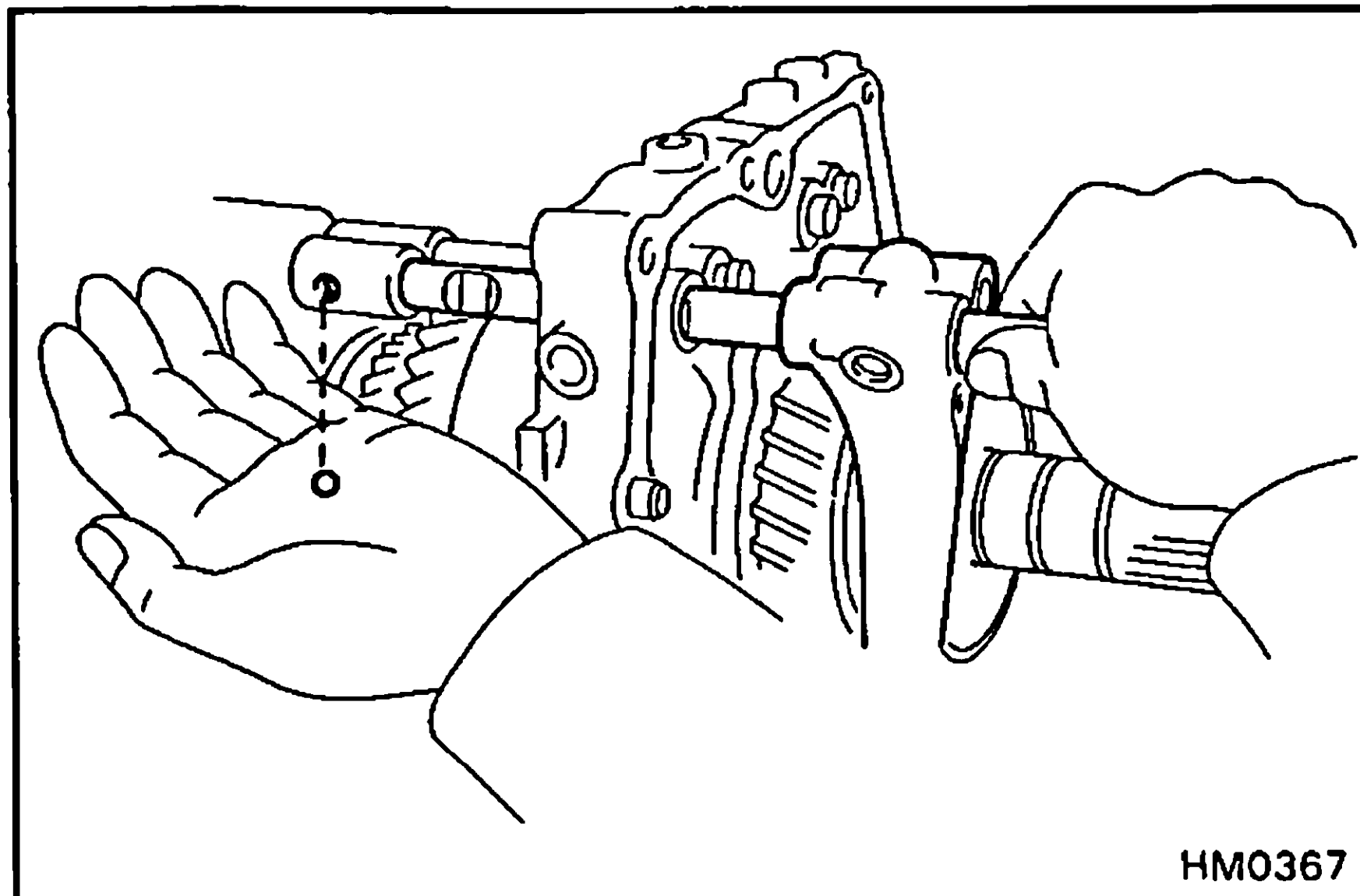
(b) Using a magnetic finger, remove the four springs and balls.

**22. REMOVE FORK SHAFT SNAP RINGS**

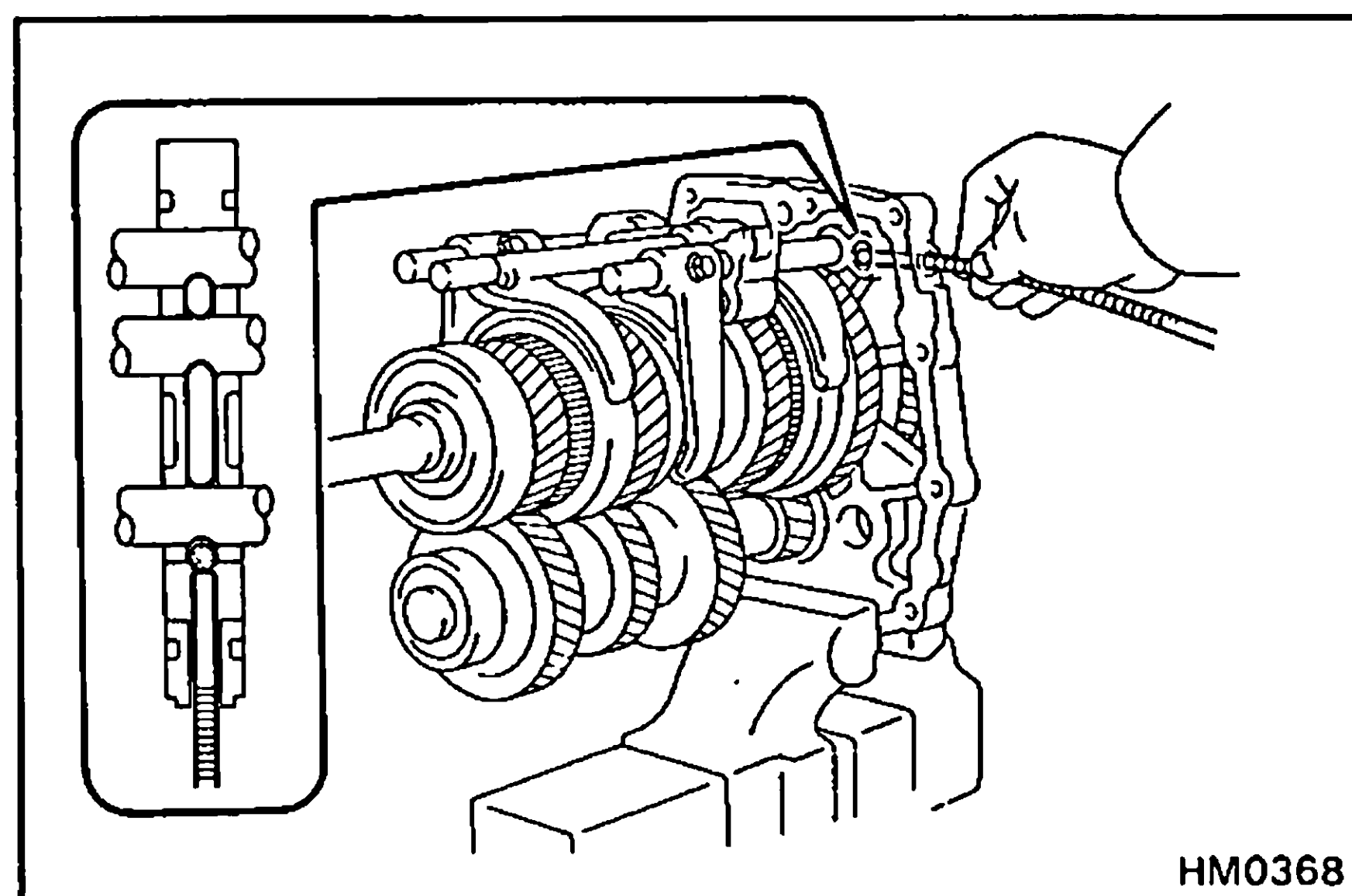
Using two screwdrivers and a hammer, tap out the four snap rings.

**23. REMOVE SHIFT FORK SHAFT NO.4 AND REVERSE SHIFT FORK**

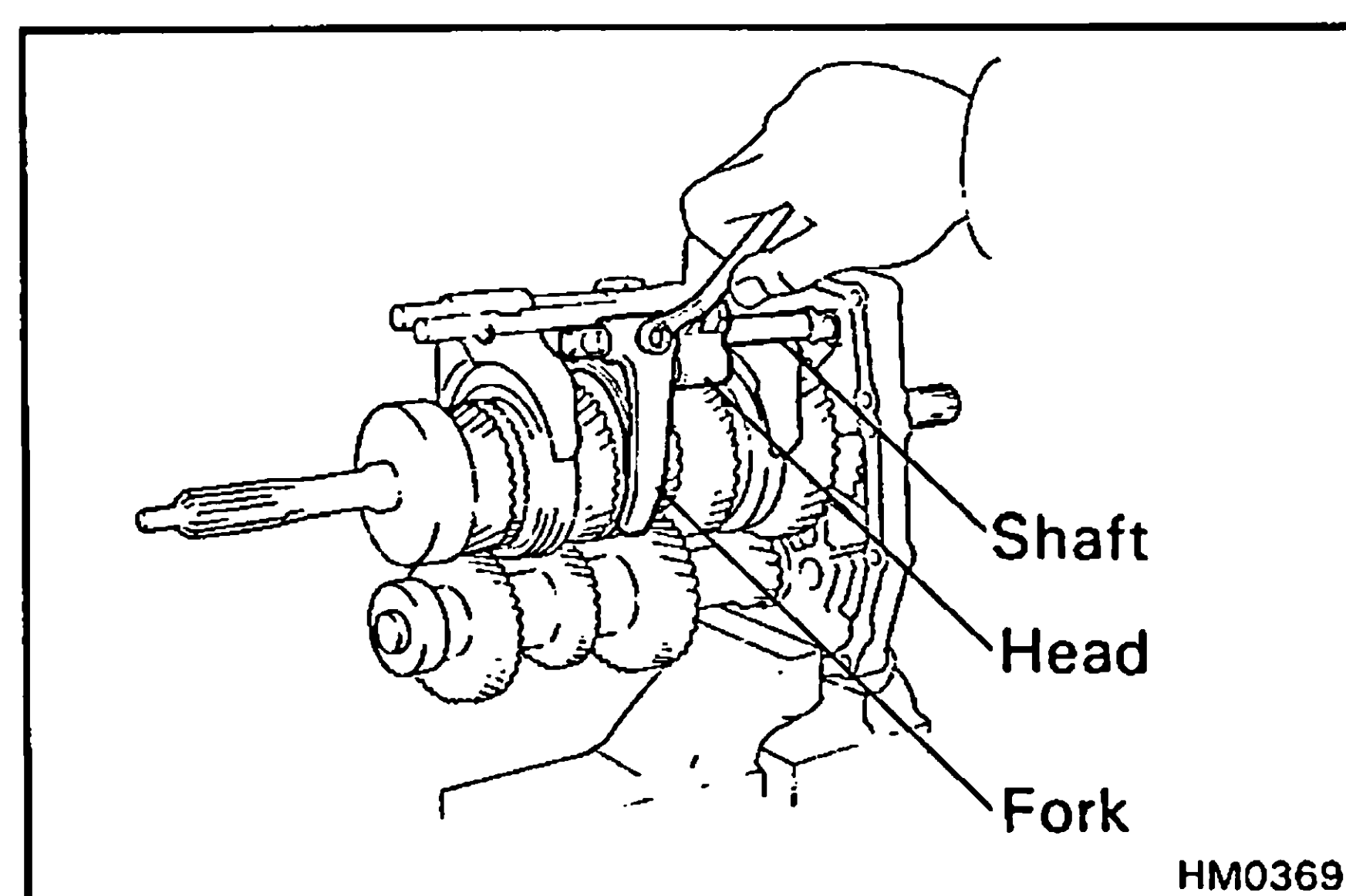
(a) Remove the set bolt.



(b) Remove the shift fork shaft No.4, reverse shift fork and ball.

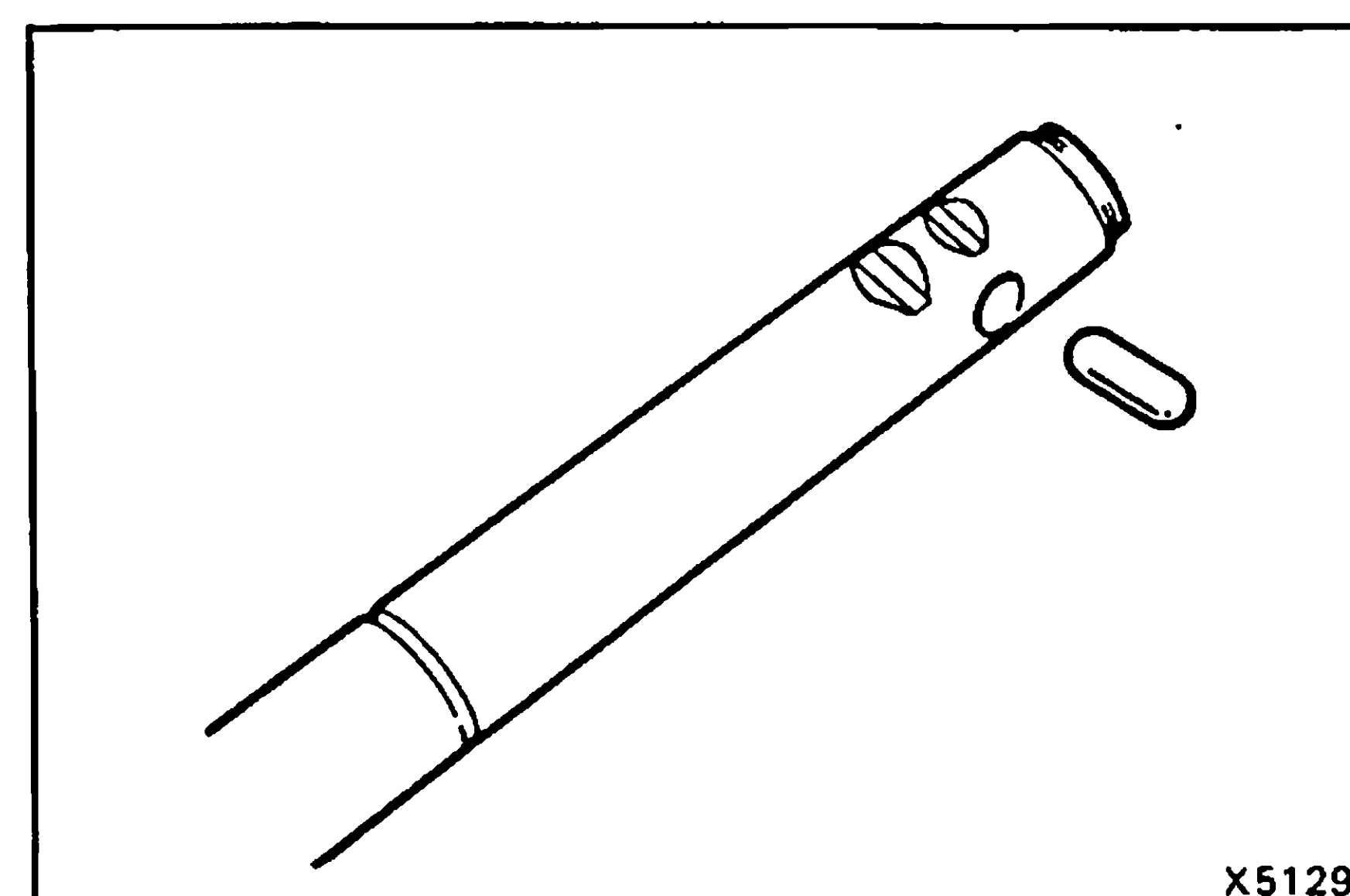
**24. REMOVE SHIFT FORK SHAFT NO.3, SHIFT FORK NO.3 AND REVERSE SHIFT HEAD**

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

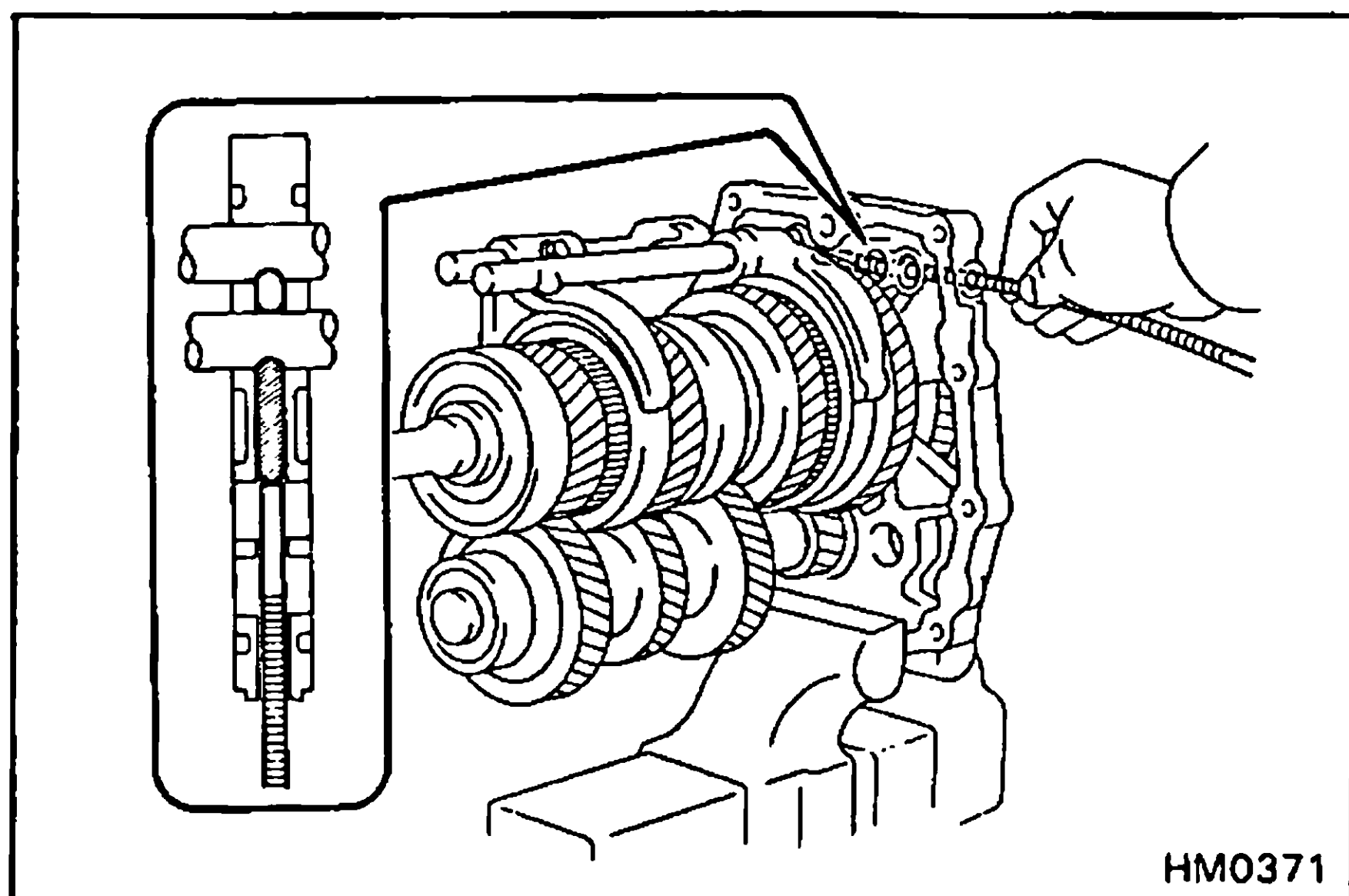


(b) Remove the set bolt.

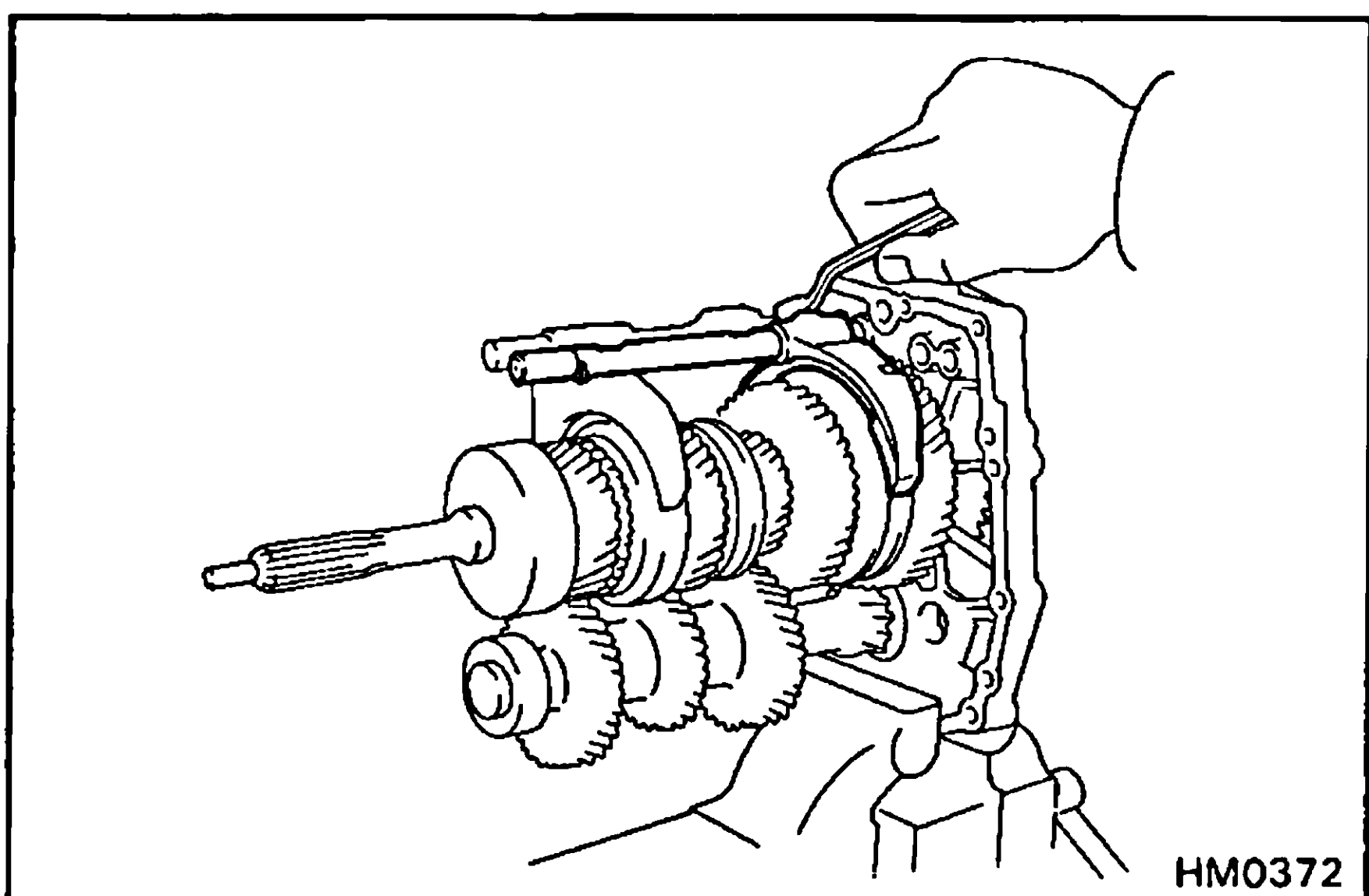
(c) Remove the shift fork shaft No.3, shift fork No.3 and reverse shift head.



(d) Using a magnetic finger, remove the interlock pin from shift fork shaft No.3.

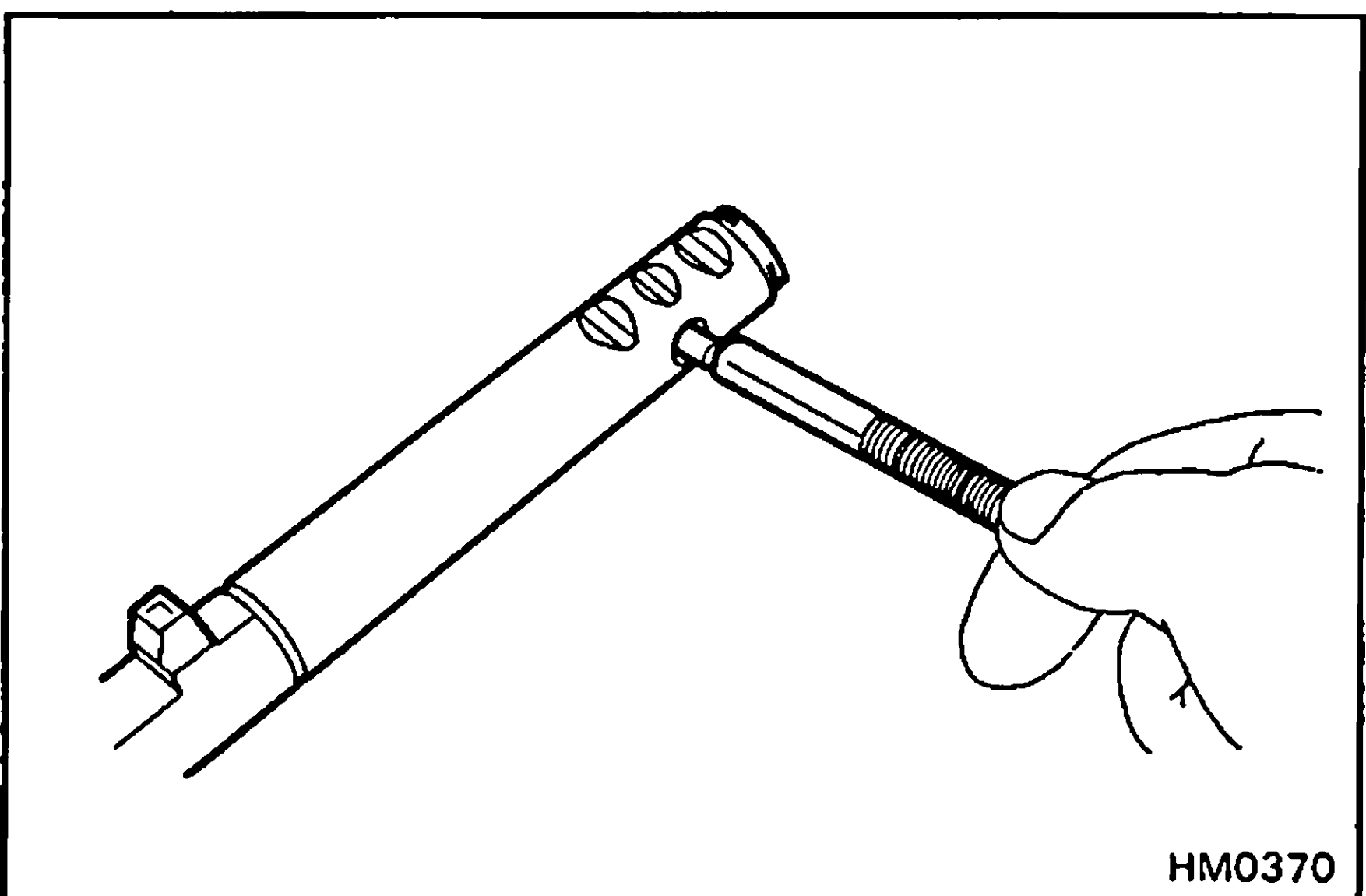
**25. REMOVE SHIFT FORK SHAFT NO.2 AND SHIFT FORK NO.1**

(a) Using a magnetic finger, remove the interlock pin.

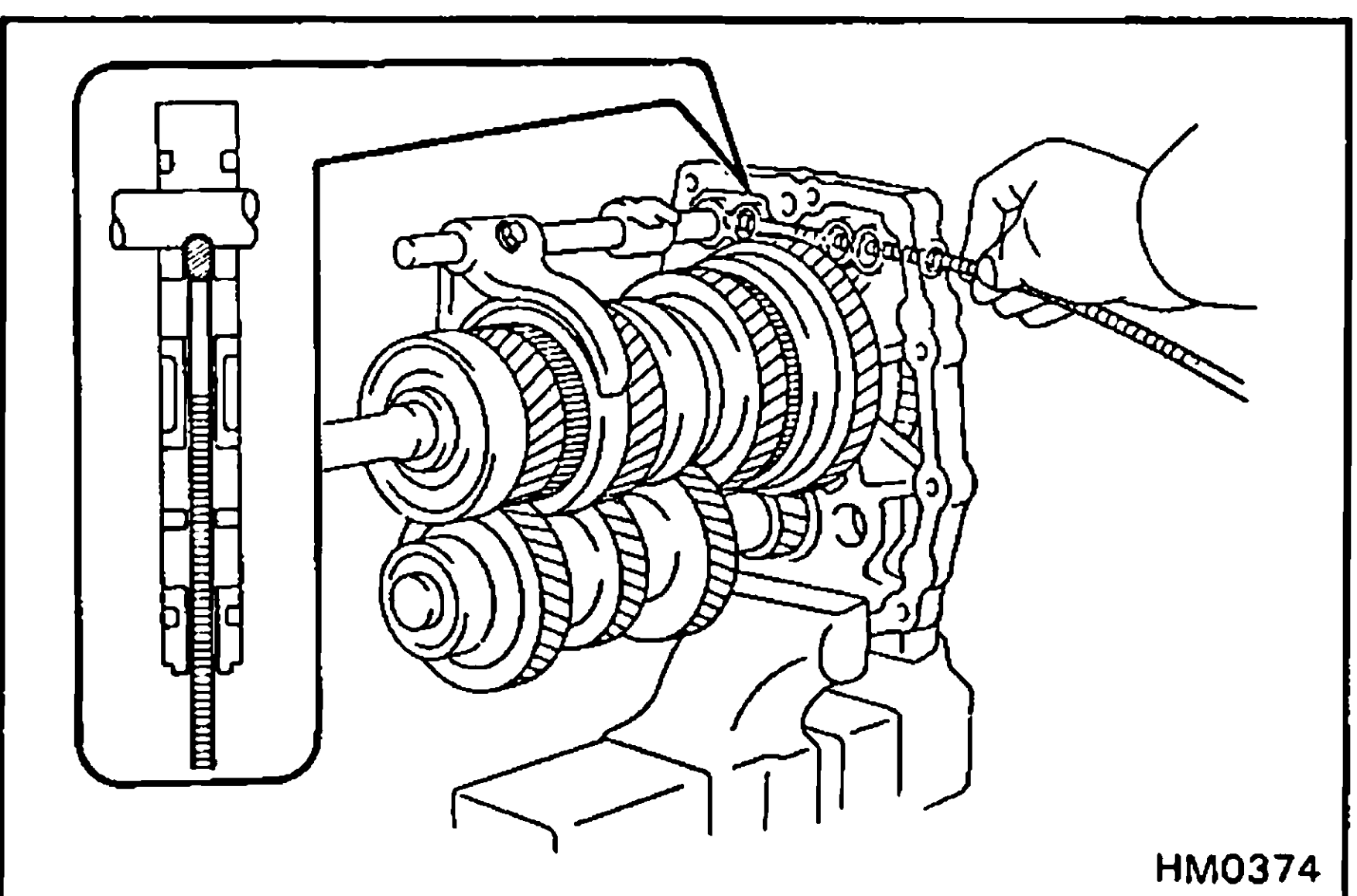


(b) Remove the set bolt.

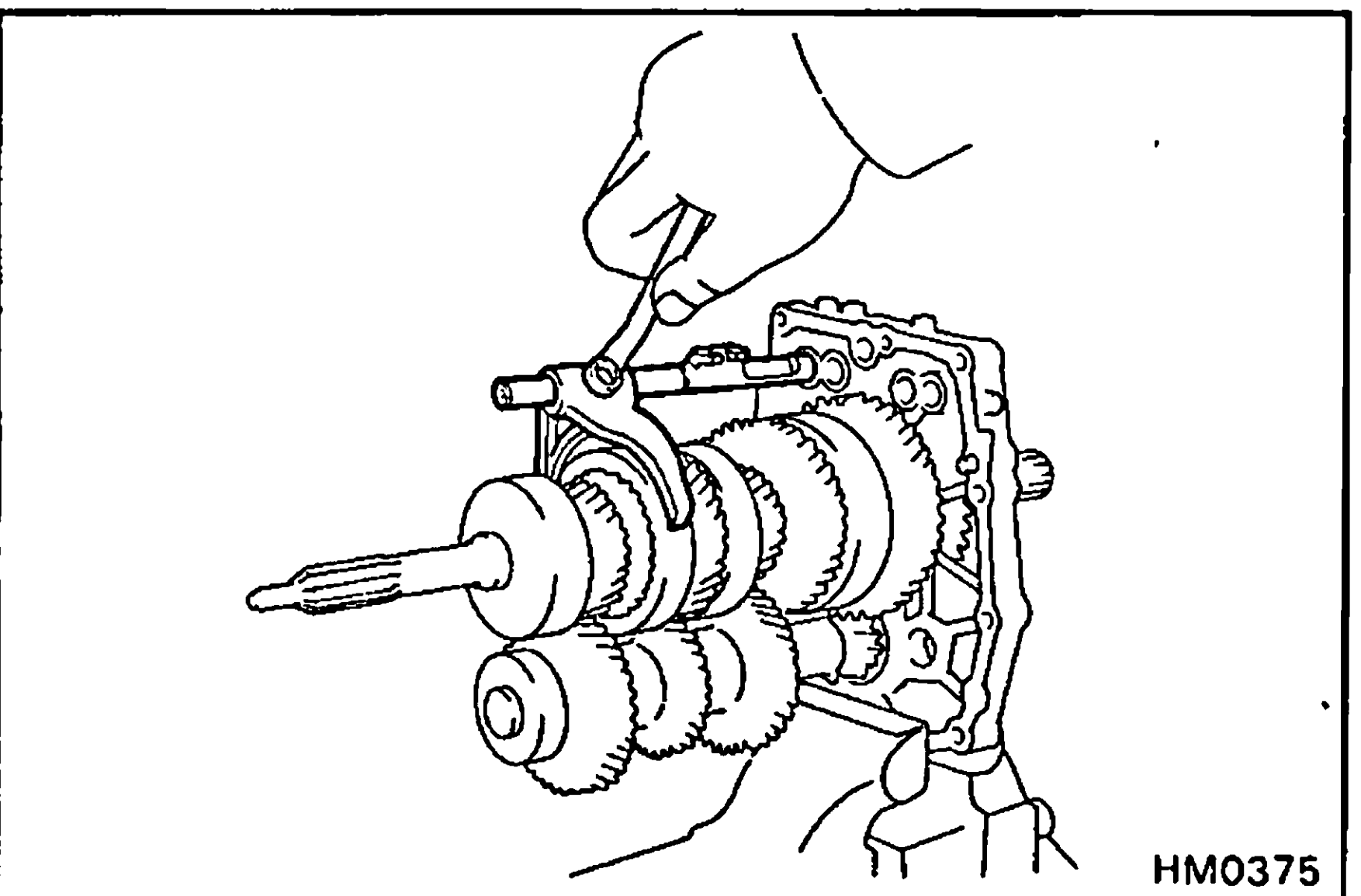
(c) Remove the shift fork shaft No.1 and shift fork No.1.



(d) Using a magnetic finger, remove the interlock pin from shift fork shaft No.1.

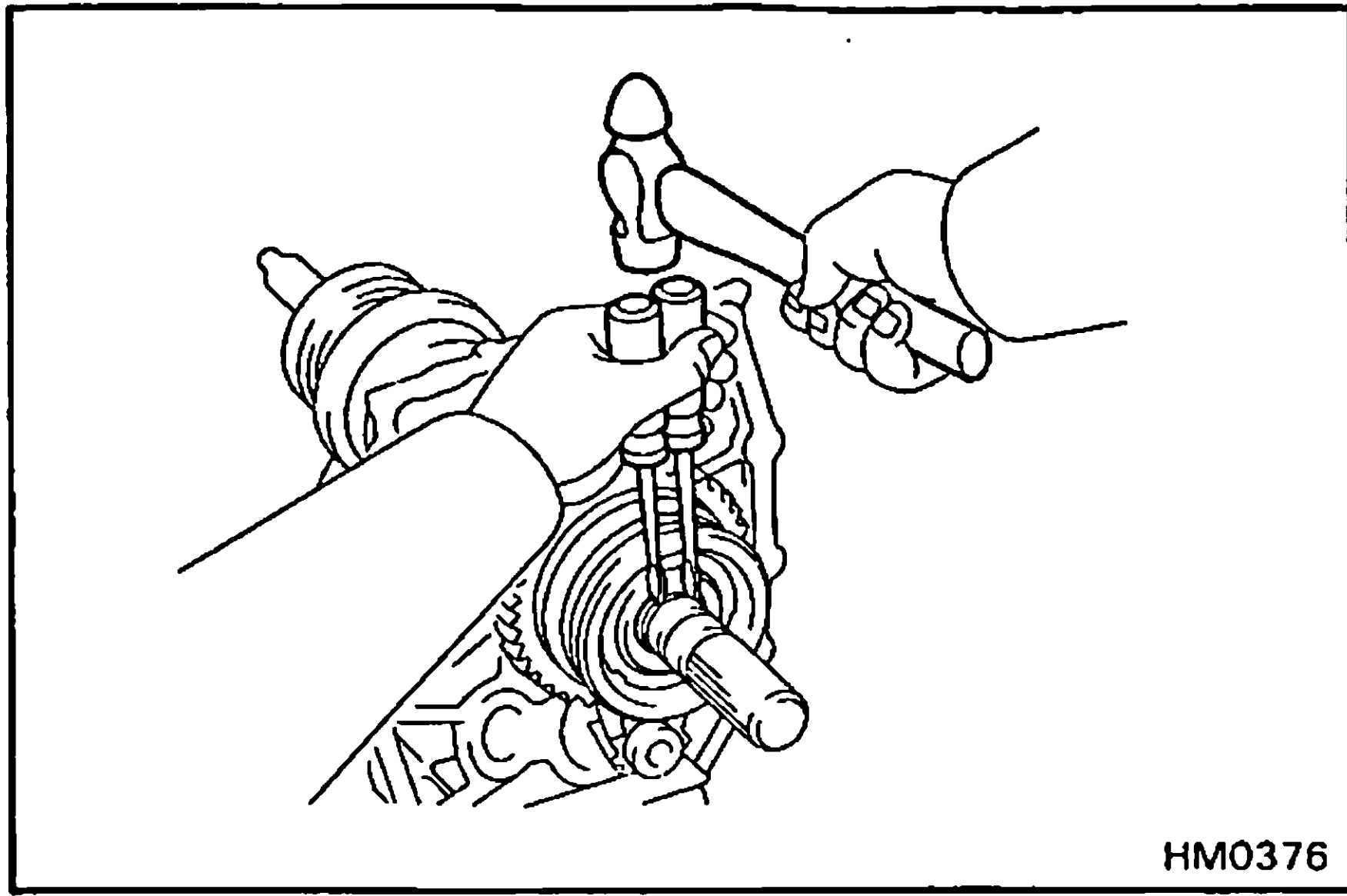
**26. REMOVE SHIFT FORK SHAFT NO.2 AND SHIFT FORK NO.2**

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



(b) Remove the set bolt.

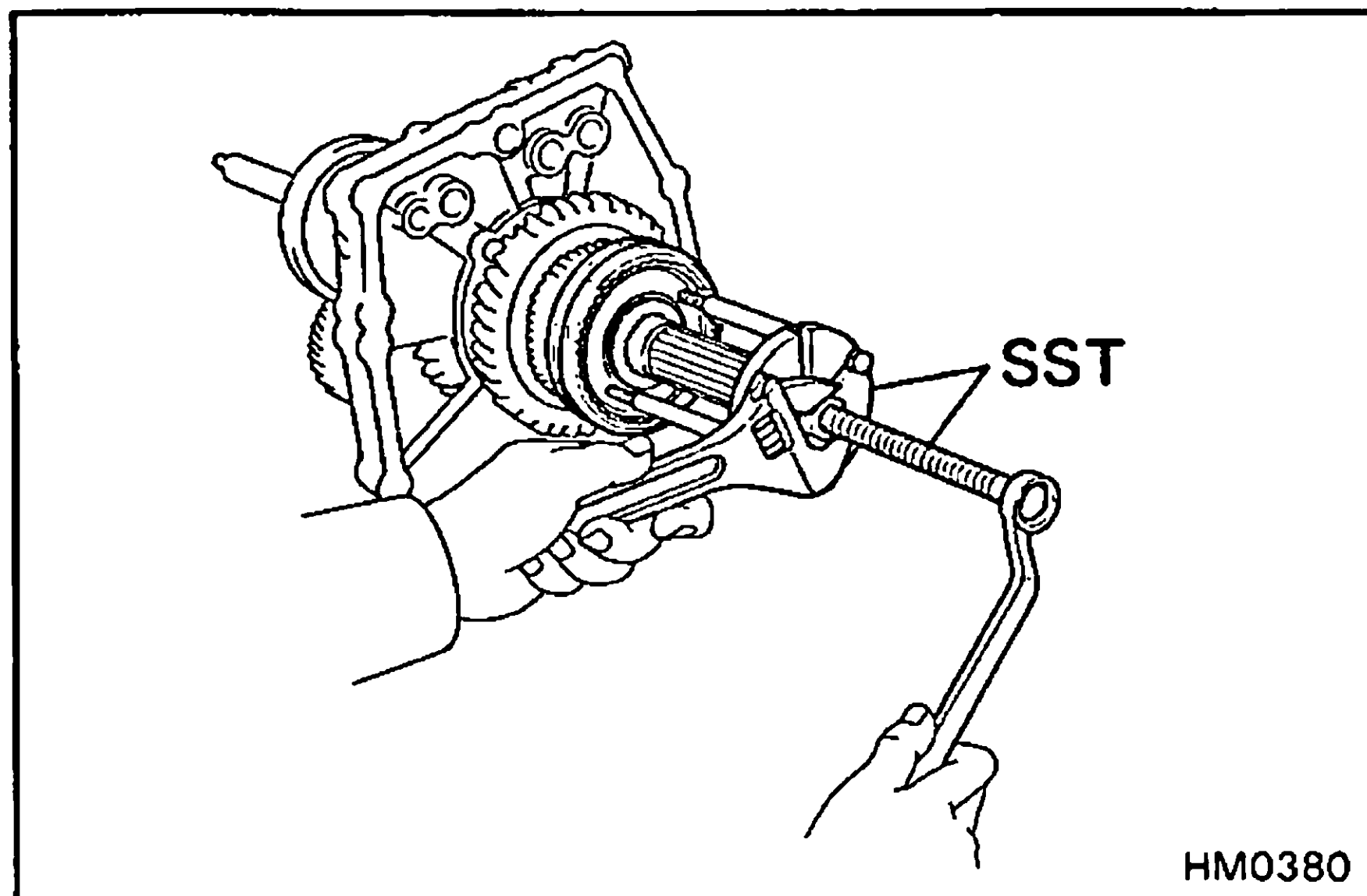
(c) Remove the shift fork shaft No.2 and shift fork No.2.



27. REMOVE REVERSE GEAR AND HUB SLEEVE NO.4 ASSEMBLY

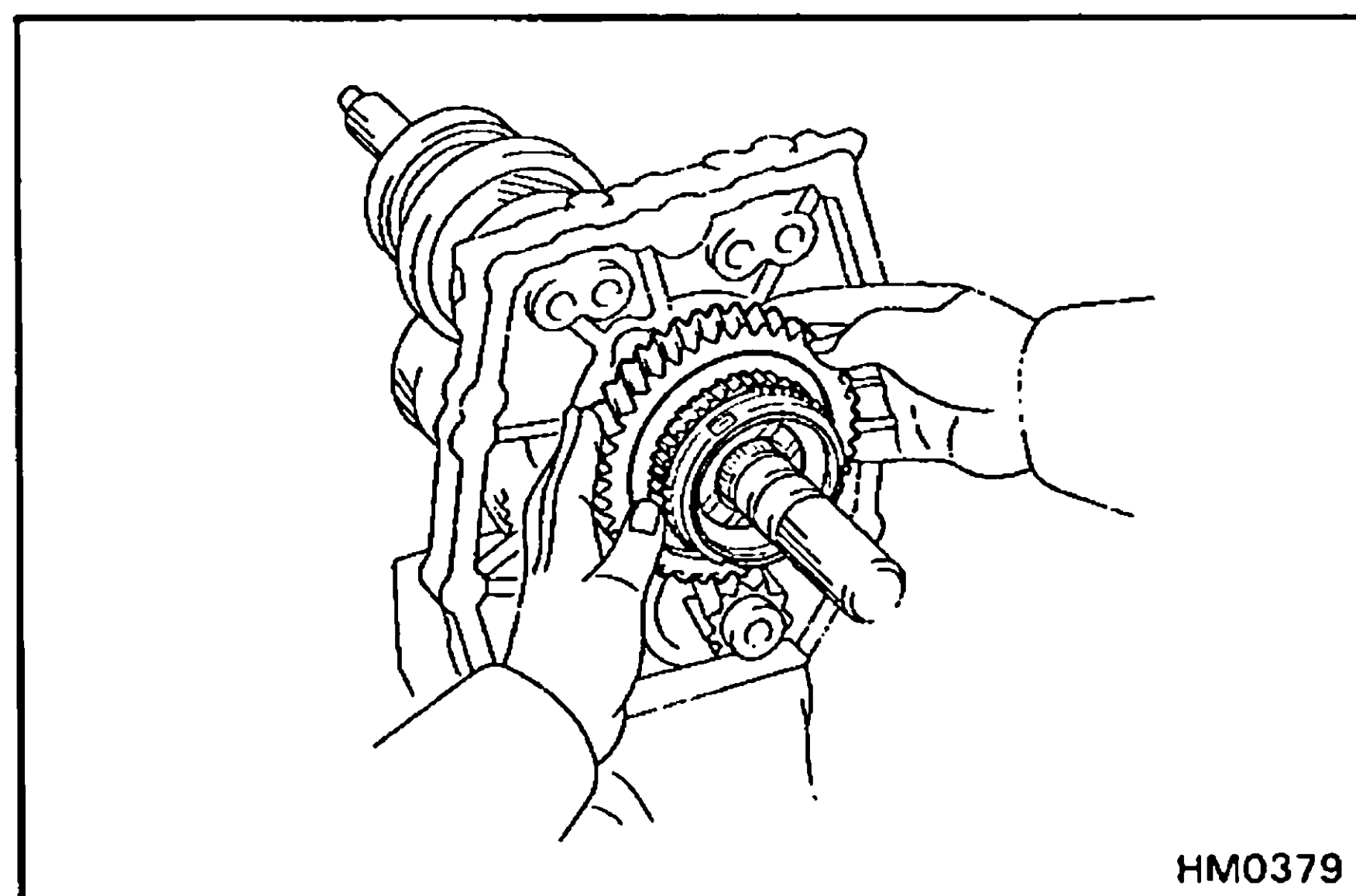
(w/ SERVICE HOLE)

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

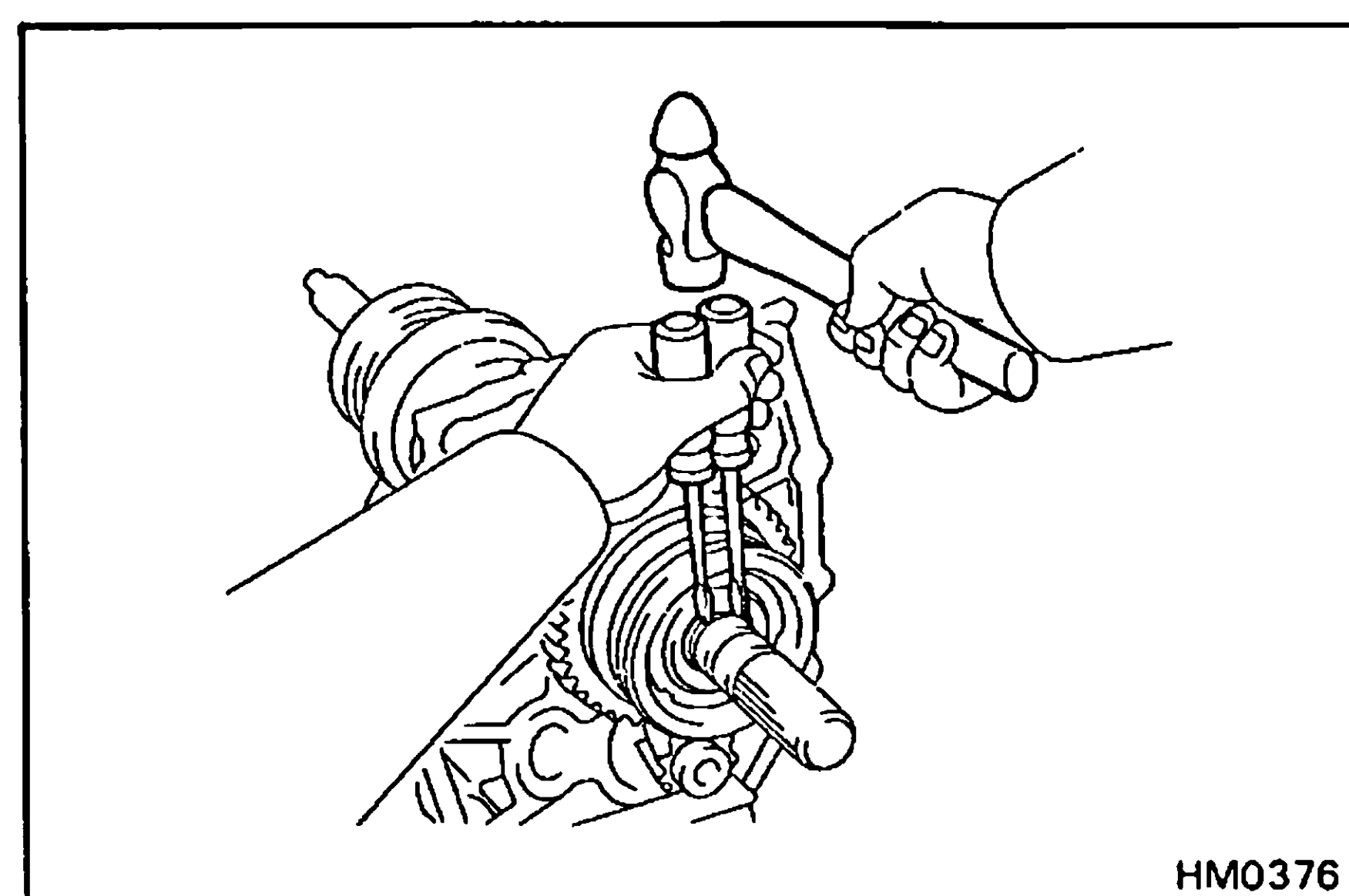


- (b) Using SST and two bolts (90101-08136), remove the hub sleeve No.4 assembly.

SST 09310-17010 (09310-07010, 09310-07020)

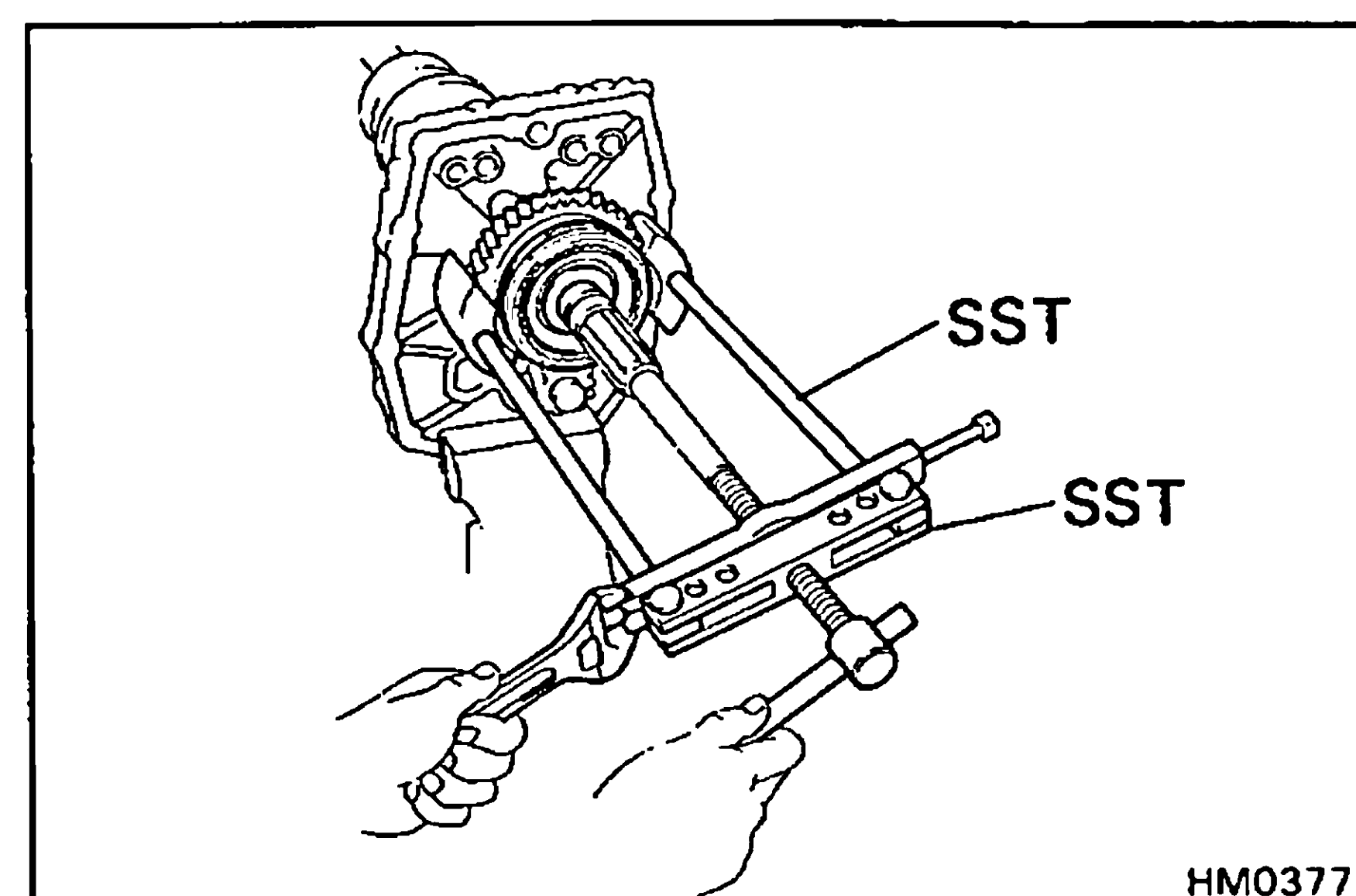


- (c) Remove the synchronizer ring, reverse gear and needle roller bearing.



(w/o SERVICE HOLE)

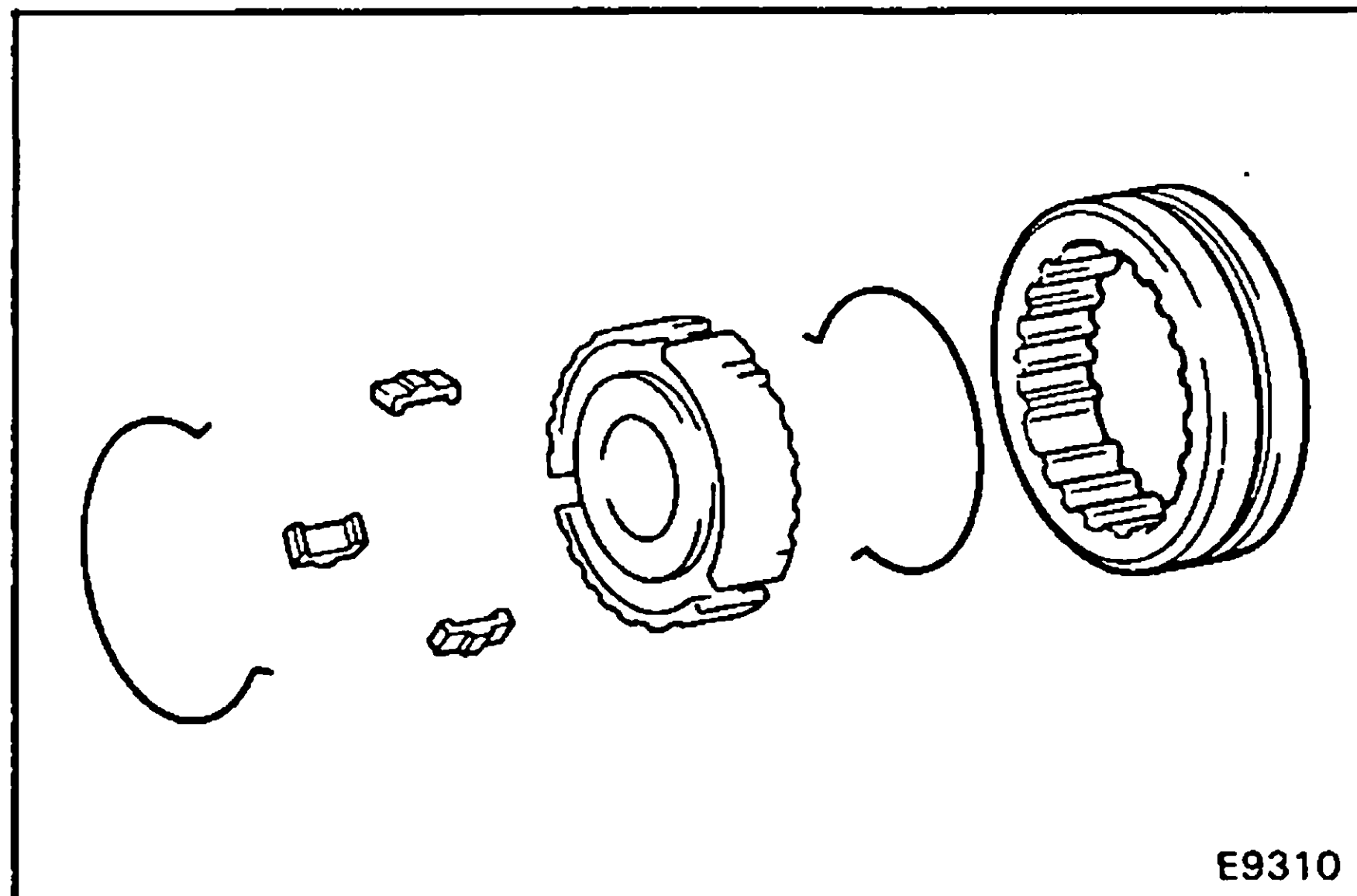
- (a) Using two screwdrivers and a hammer, drive out the snap ring.



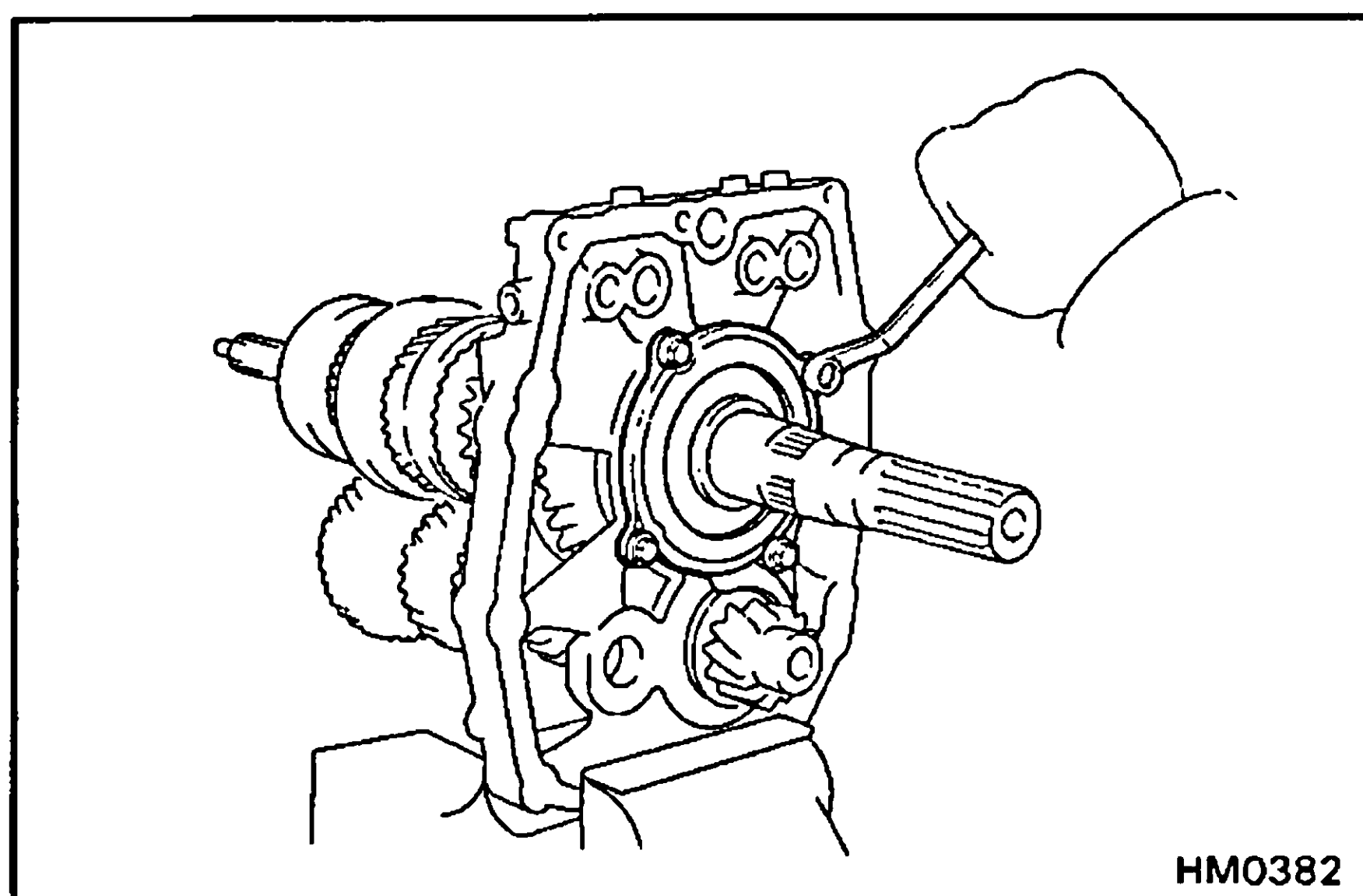
- (b) Using SST, remove the reverse gear with hub sleeve No.4 assembly.

SST 09336-60010, 09950-20017

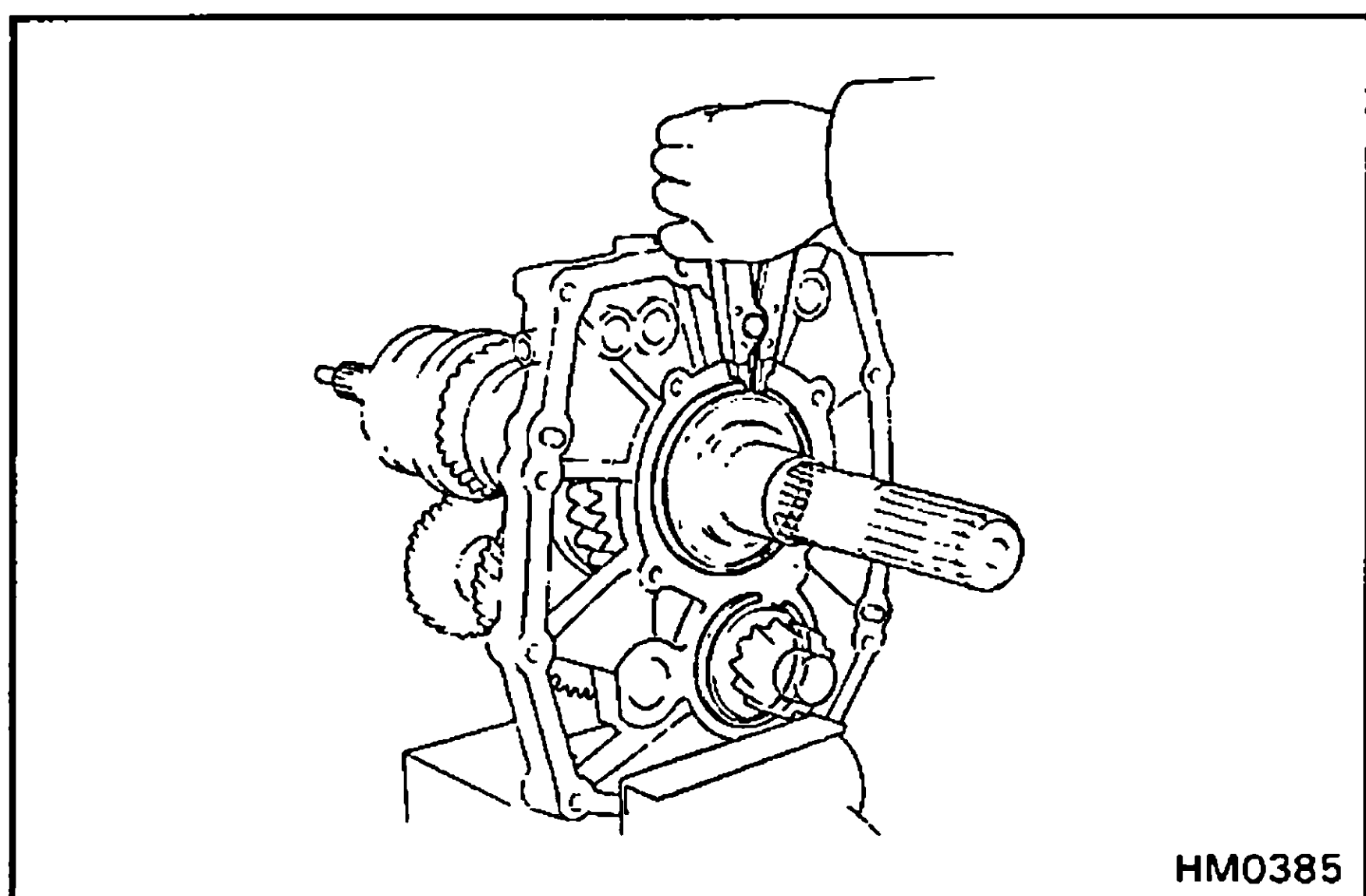
- (c) Remove the needle roller bearing and synchronizer ring.

**28. REMOVE HUB SLEEVE NO.4, SHIFTING KEYS AND SPRINGS FROM CLUTCH HUB NO.3**

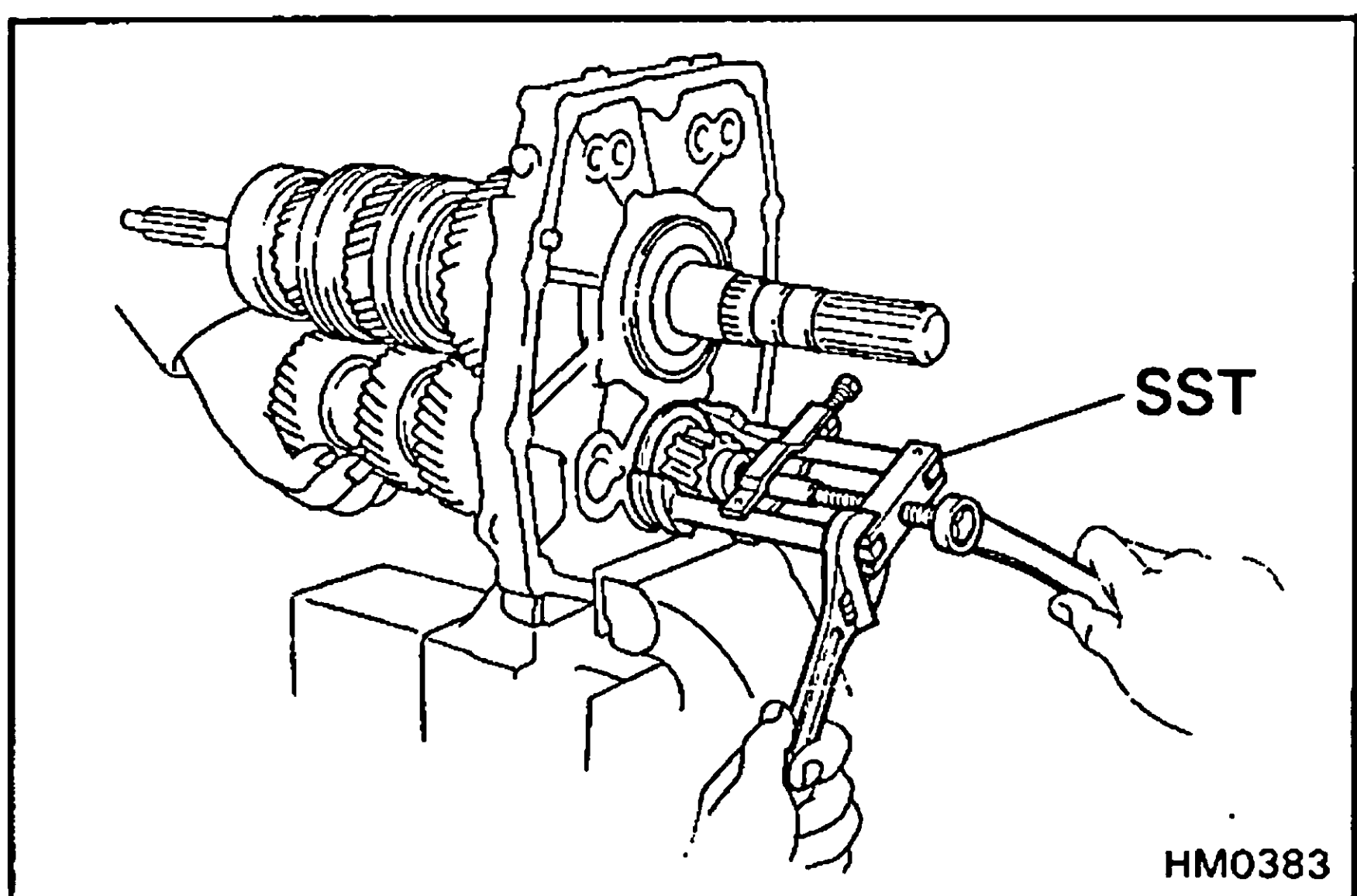
Using a screwdriver, remove the two springs and three shifting keys from clutch hub No.4.

**29. REMOVE REAR BEARING RETAINER**

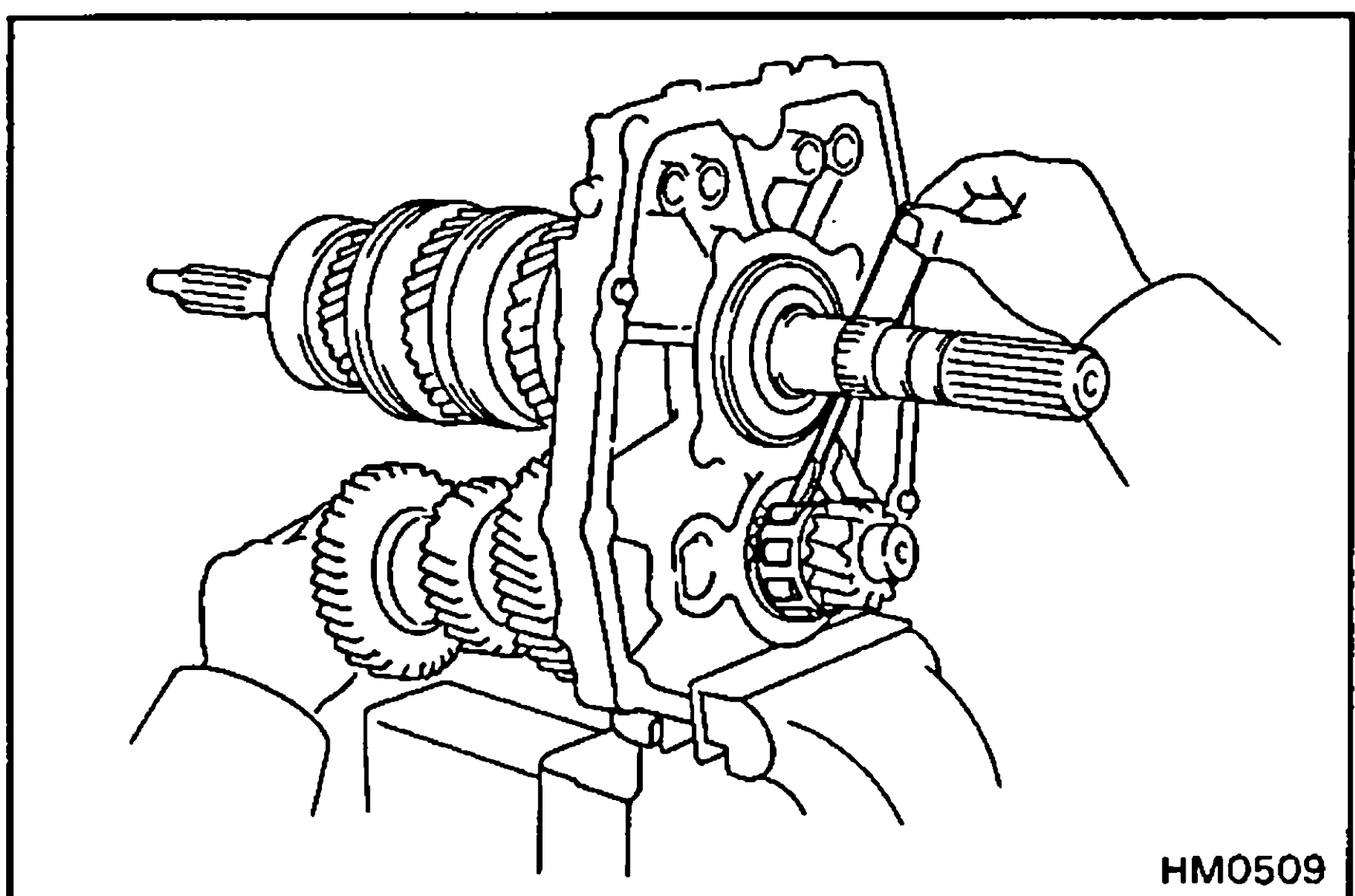
Remove the four bolts, and rear bearing retainer.

**30. REMOVE TWO SNAP RINGS**

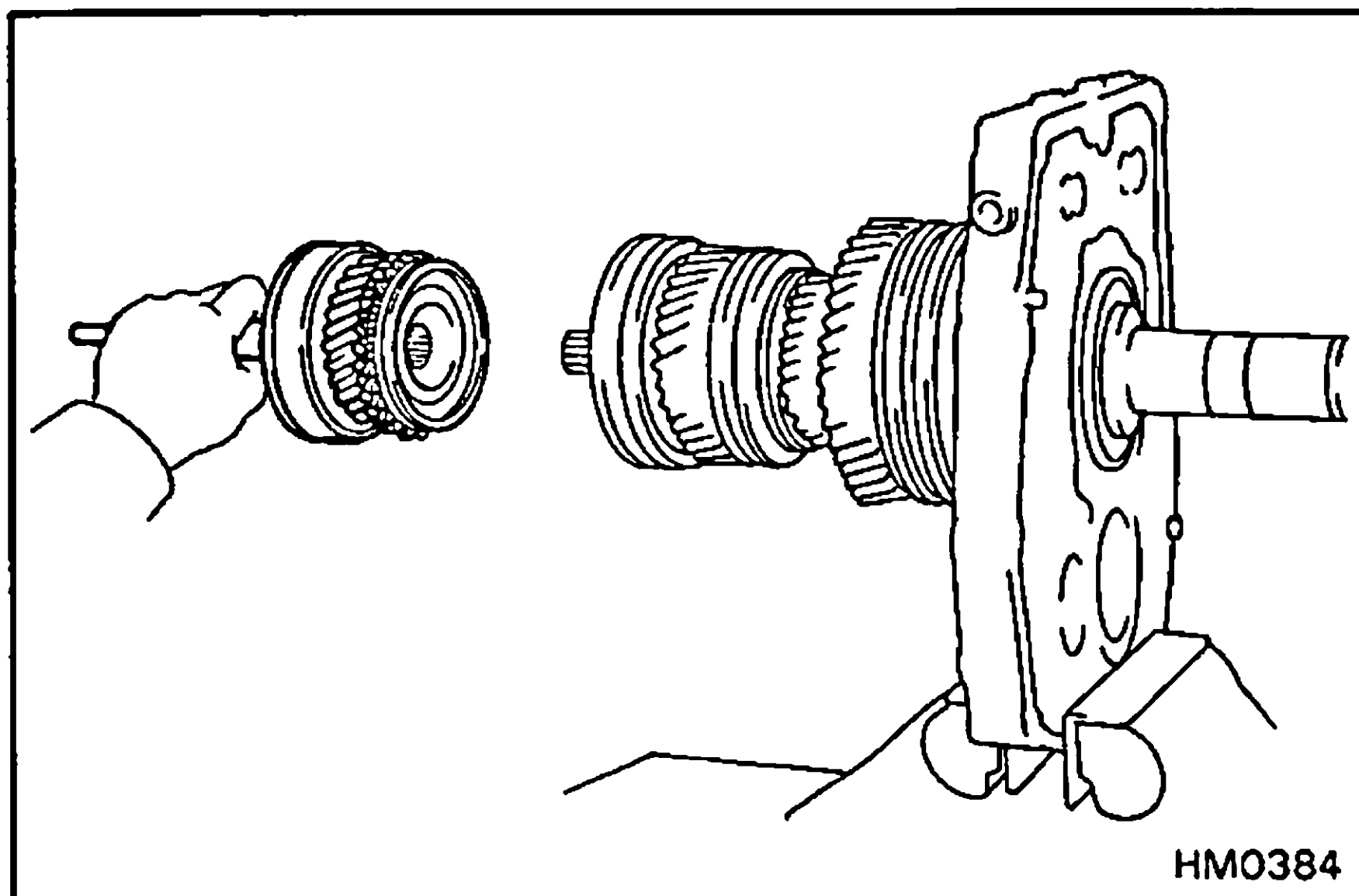
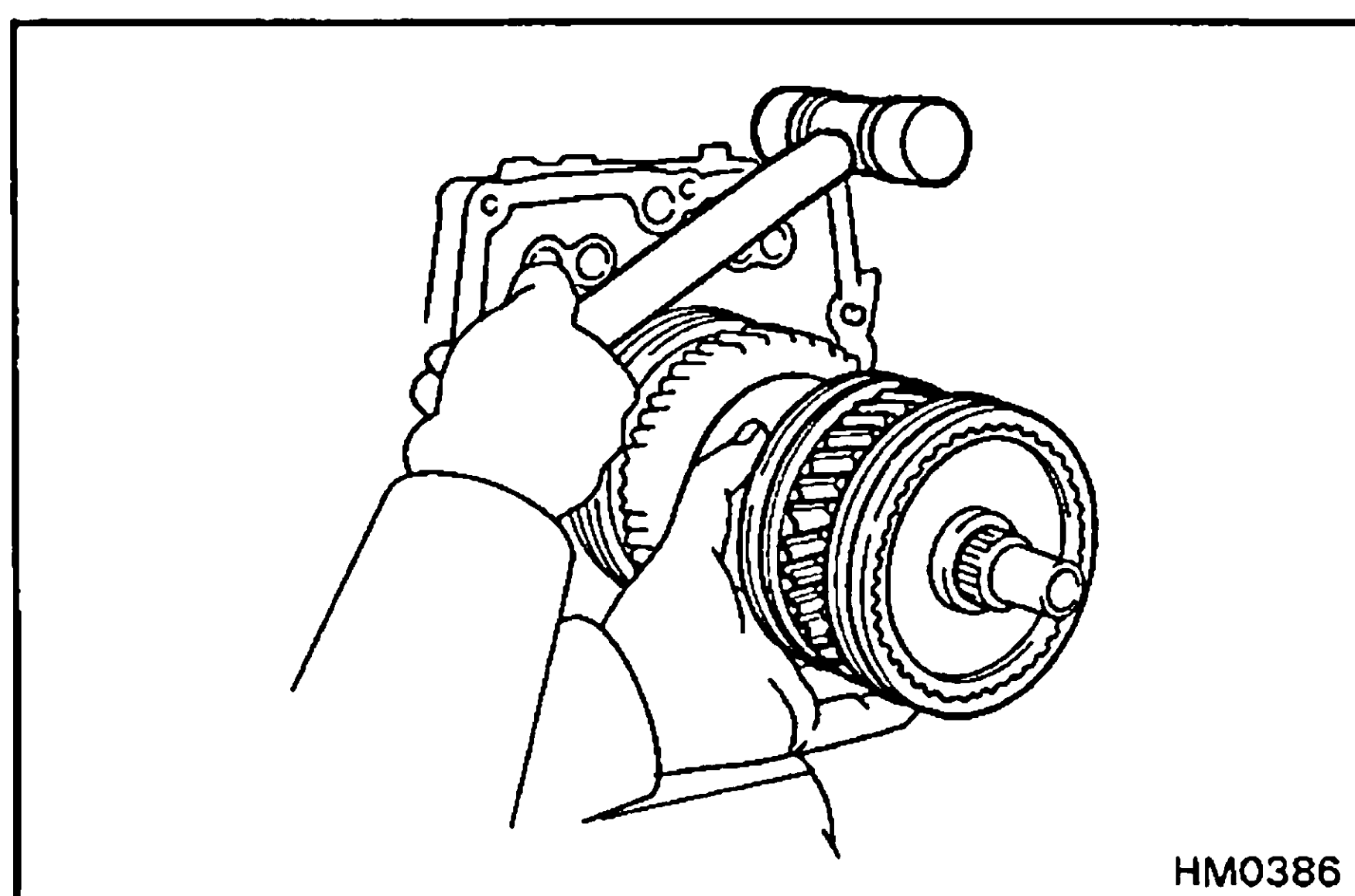
(a) Using snap ring pliers, remove the two snap rings.

**31. REMOVE COUNTER GEAR**

(a) Using SST, remove the rear bearing outer race.
SST 09602-35011

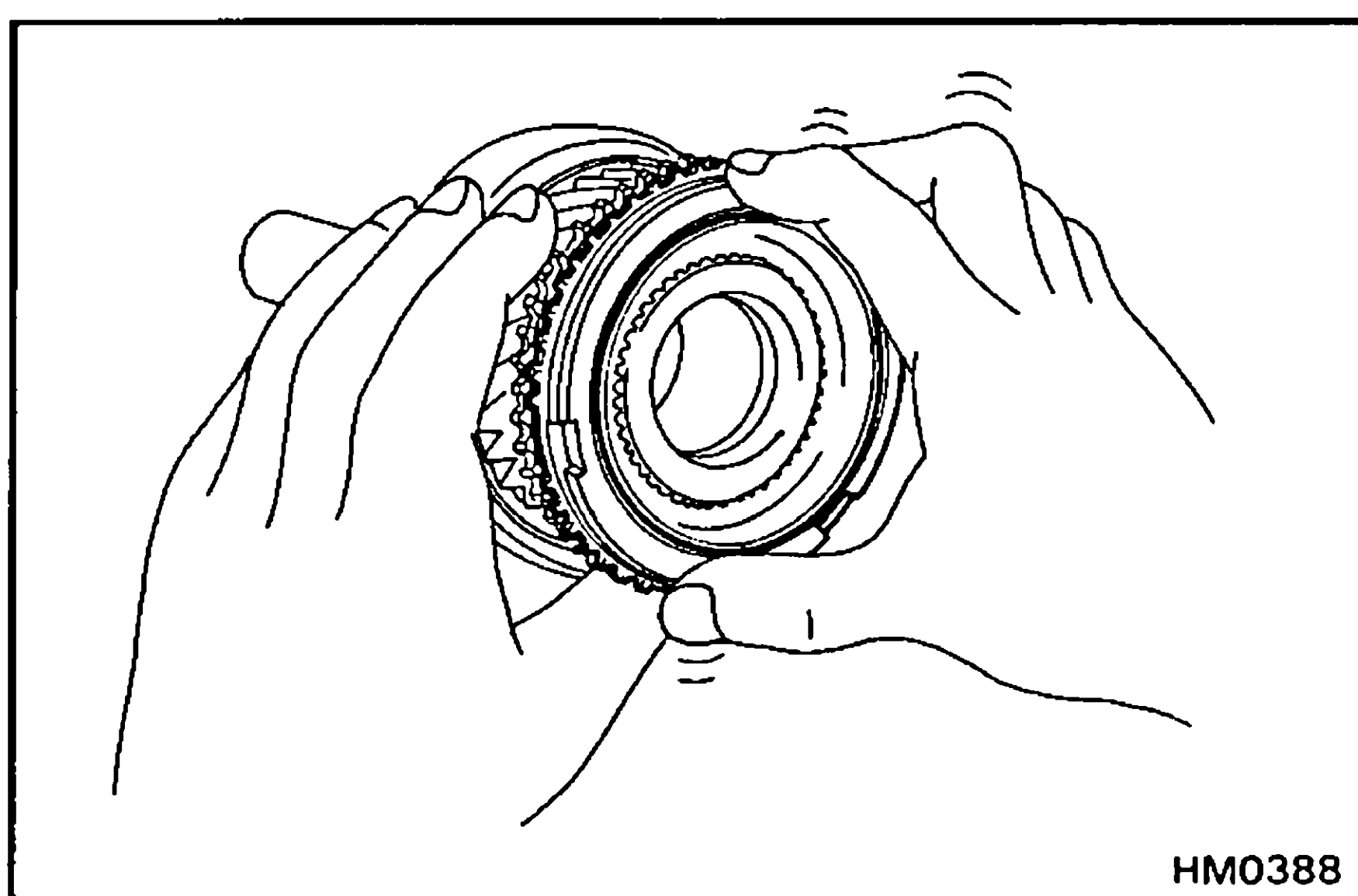
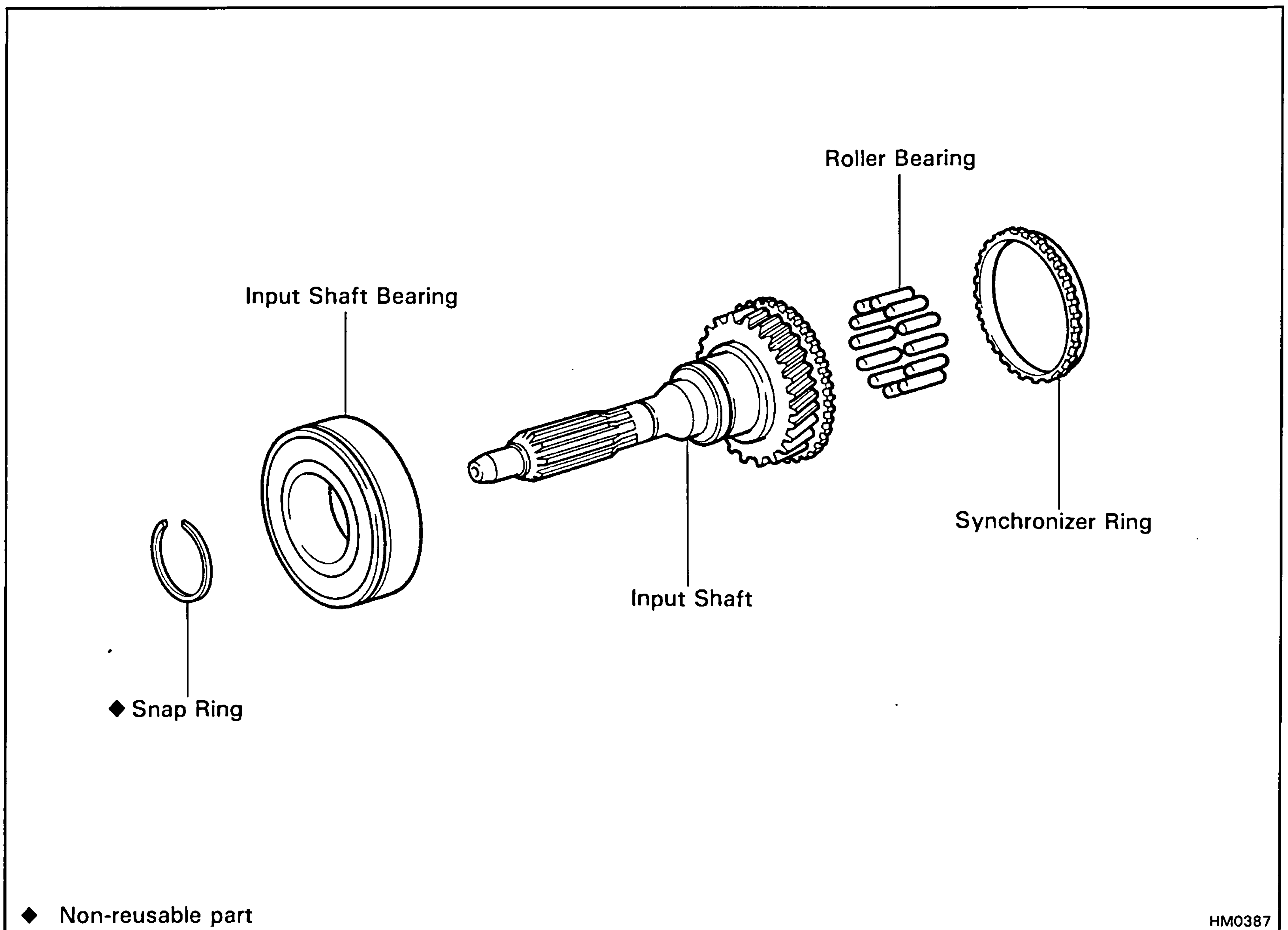


(b) Using a screwdriver, remove the roller bearing and counter gear.

**32. REMOVE INPUT SHAFT****33. REMOVE OUTPUT SHAFT**

Remove the output shaft, from the intermediate plate by pulling on the output shaft and tapping on the intermediate plate with plastic hammer.

INPUT SHAFT COMPONENTS



INPUT SHAFT COMPONENT PARTS INSPECTION

INSPECT SYNCHRONIZER RING

- Check for wear or damage.
- Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone and check that the ring is locked.

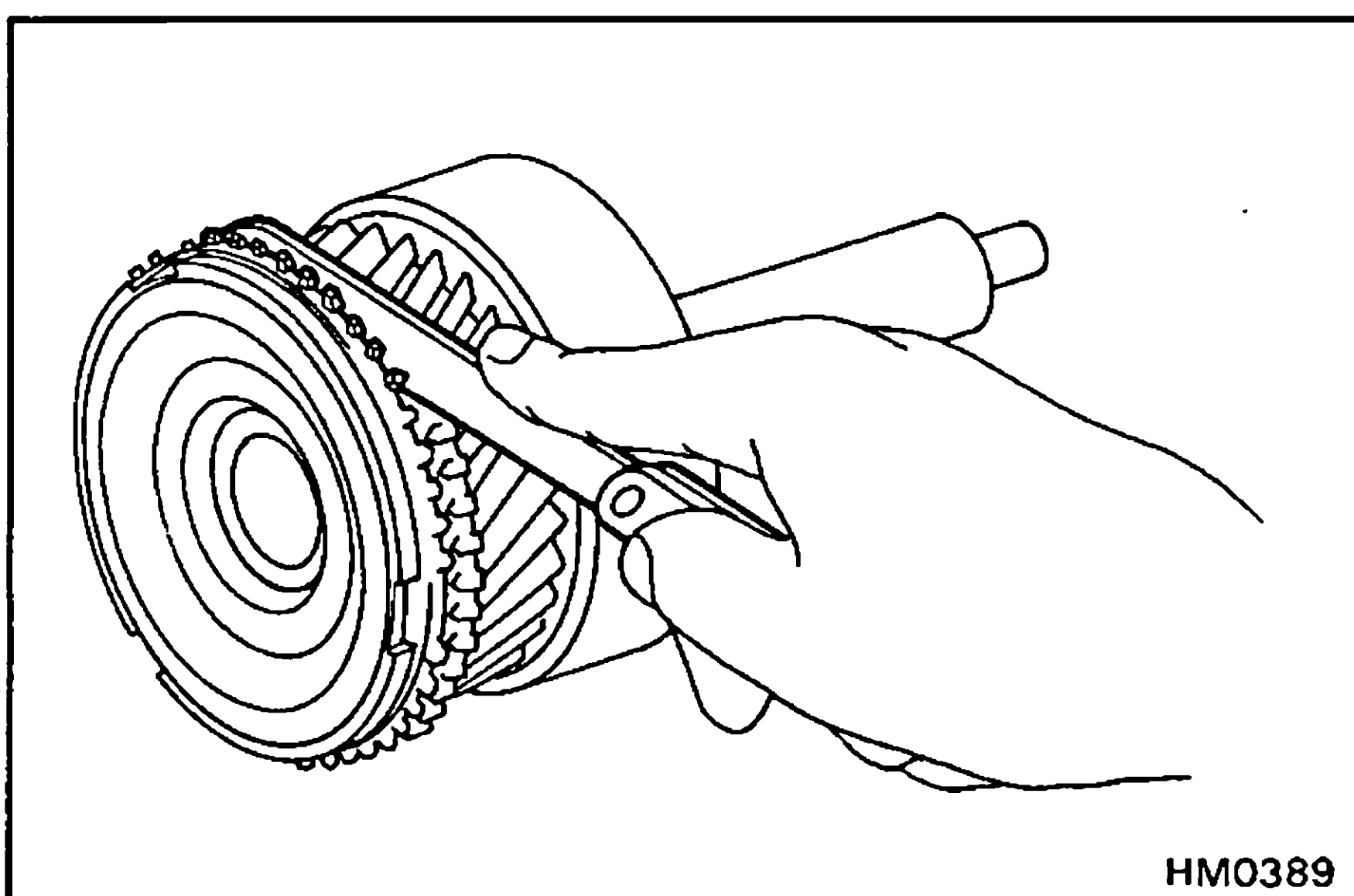
If the braking effect is insufficient, lightly rub the synchronizer ring and gear cone by applying a small amount of fine lapping compound.

NOTICE:

- Wash off completely the fine lapping compound after rubbing.
 - Check again the braking action of the synchronizer ring.
- Measure the clearance between the synchronizer ring back and gear spline end.

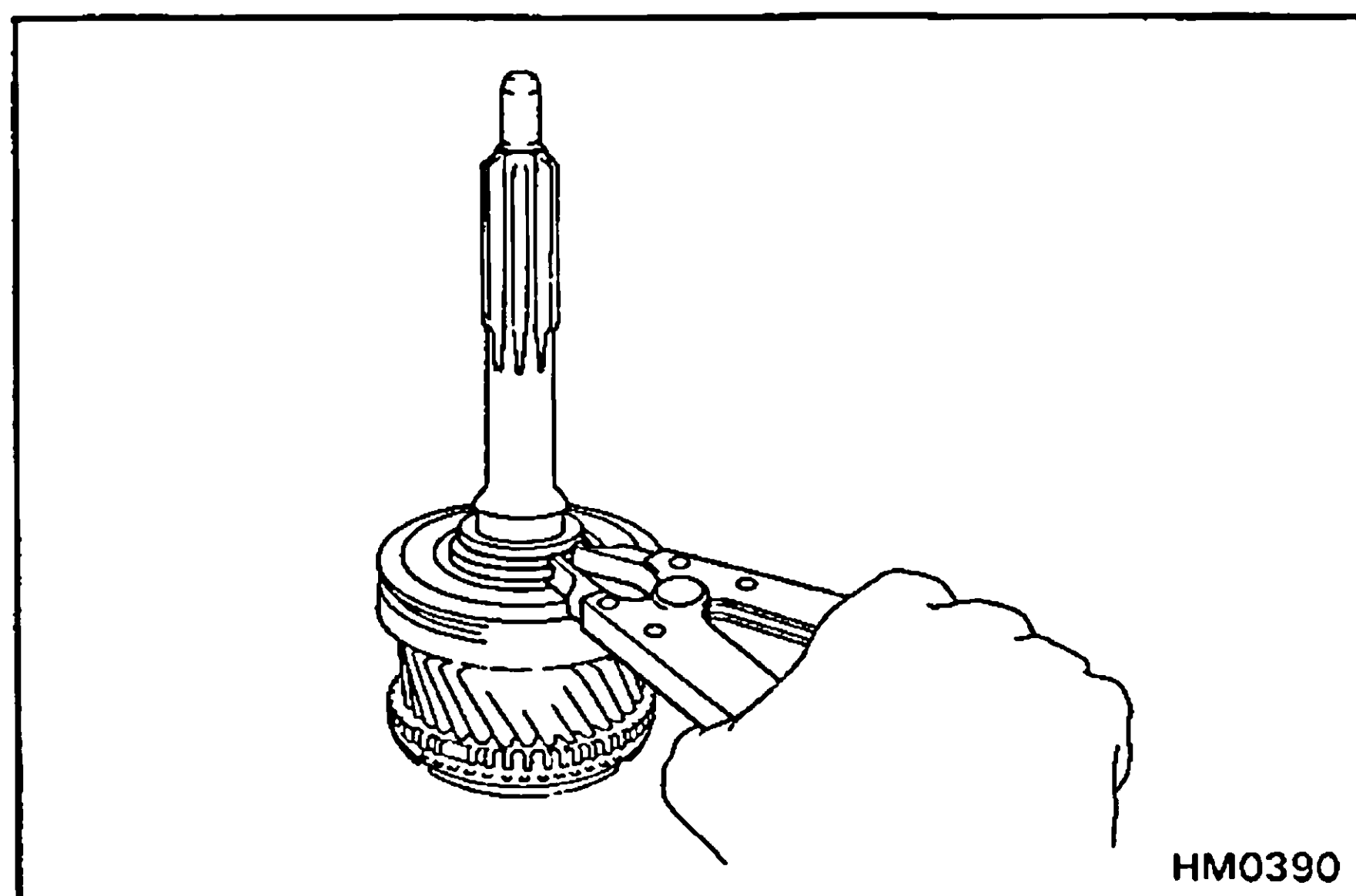
Minimum clearance: 0.6 mm (0.0236 in.)

If the clearance is less than the limit, replace the synchronizer ring.

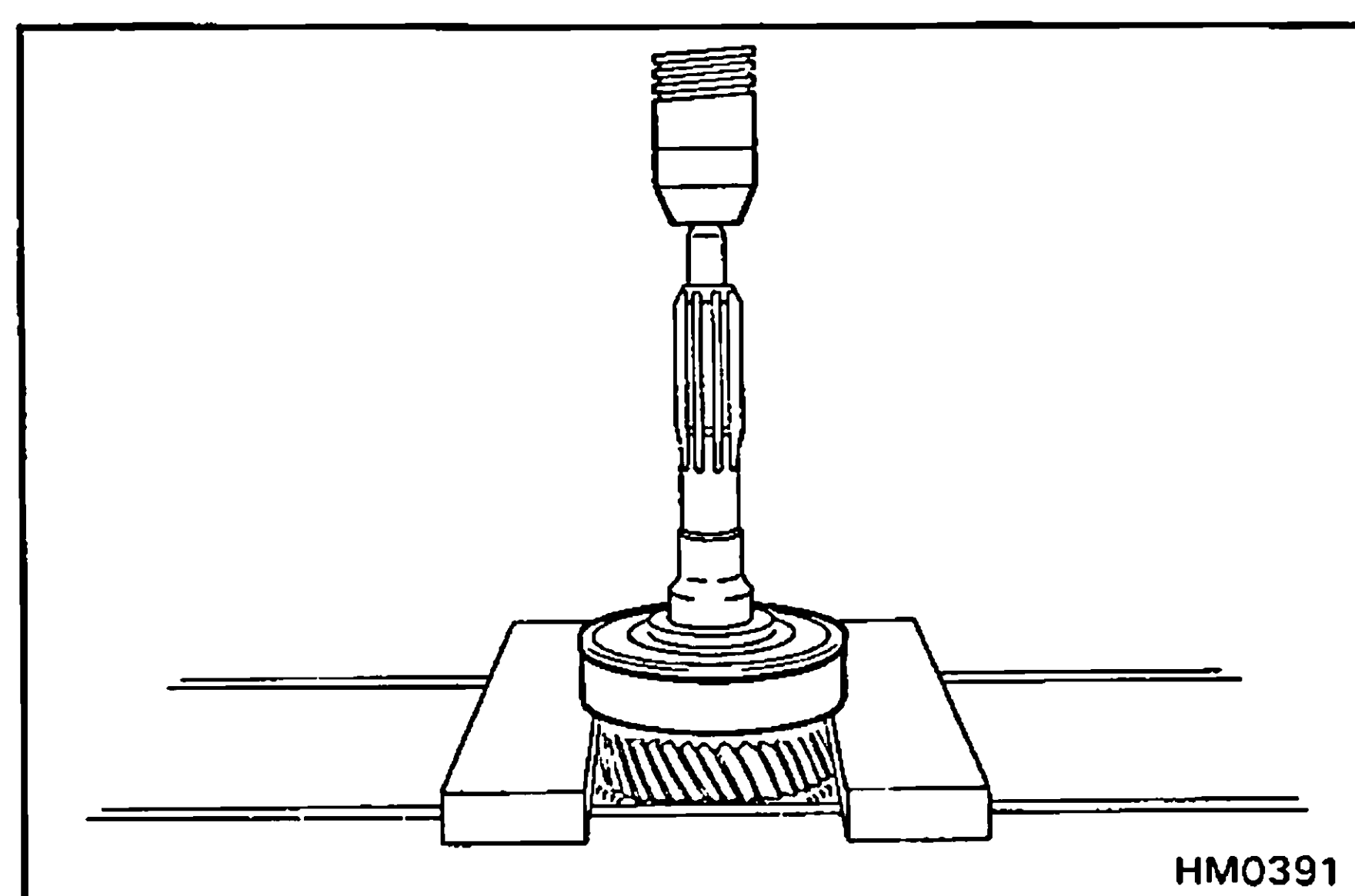


REPLACEMENT OF BEARING**IF NECESSARY, REPLACE INPUT SHAFT BEARING**

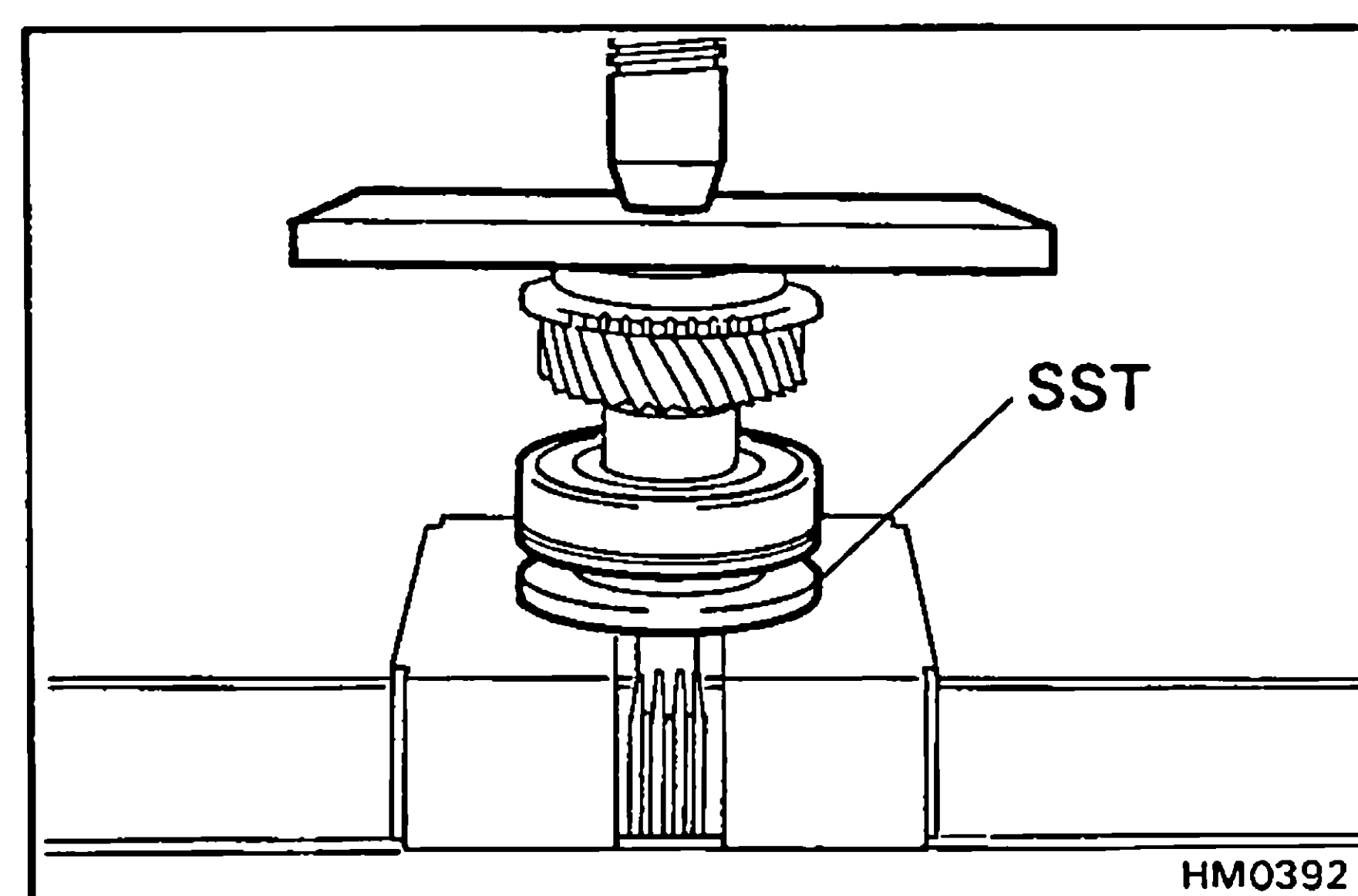
(a) Using a snap ring expander, remove the snap ring.



(b) Using a press, remove the bearing.



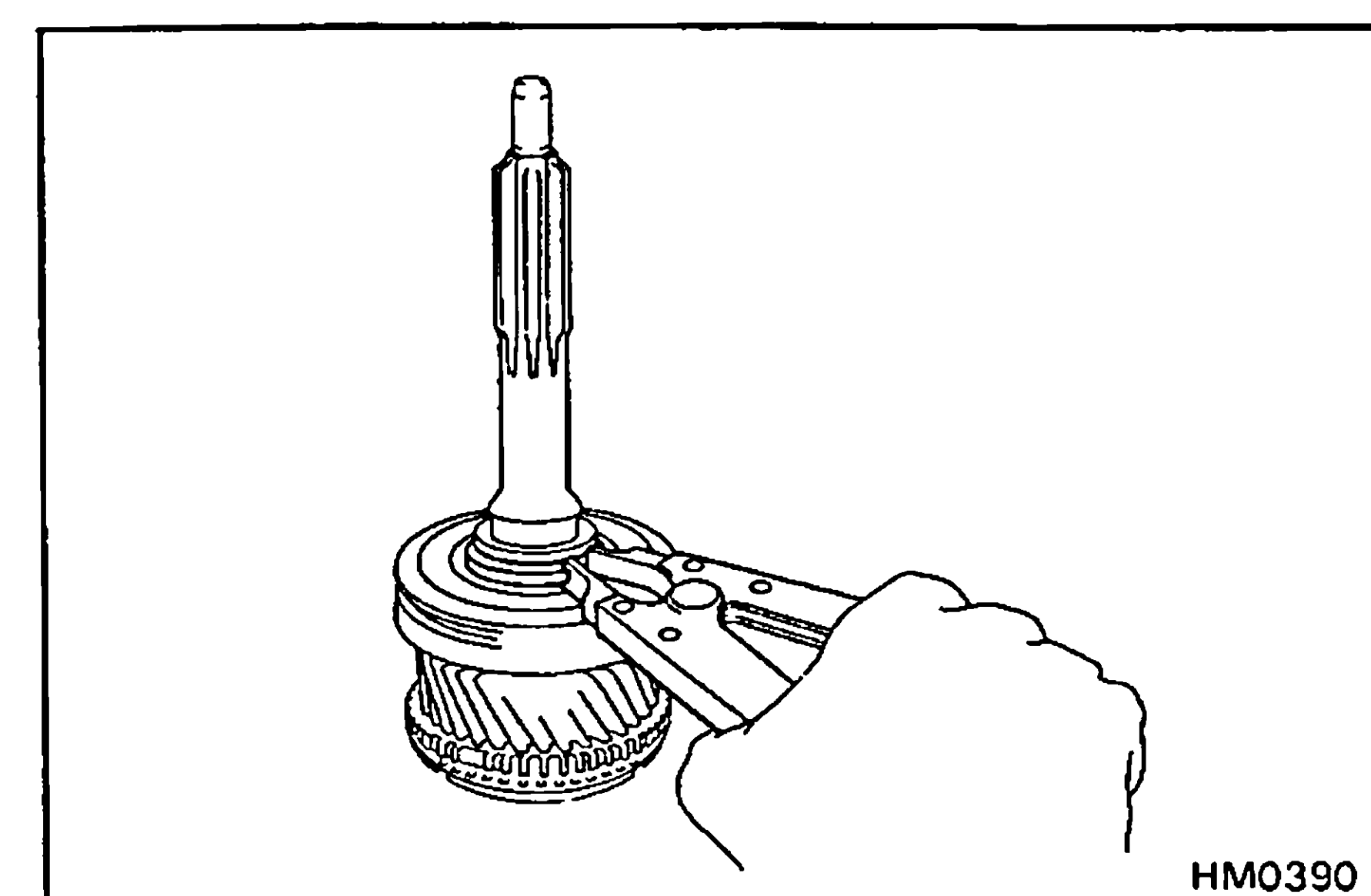
(c) Using SST and a press, install a new bearing.
SST 09316-20011



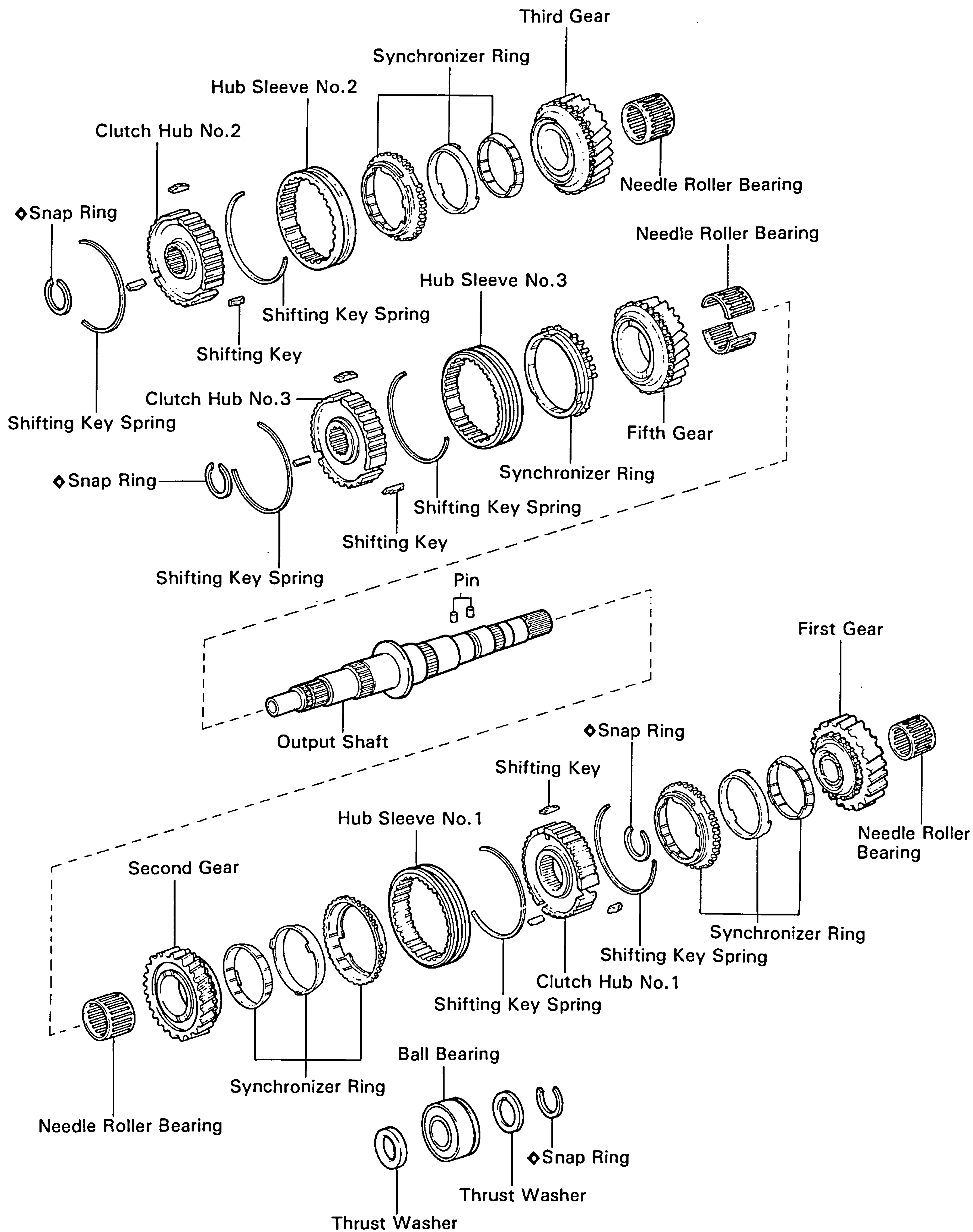
(d) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
A	2.50 — 2.55 (0.0984 — 0.1004)
B	2.55 — 2.60 (0.1004 — 0.1024)
C	2.60 — 2.65 (0.1024 — 0.1043)
D	2.65 — 2.70 (0.1043 — 0.1063)
E	2.70 — 2.75 (0.1063 — 0.1083)
F	2.75 — 2.80 (0.1083 — 0.1102)

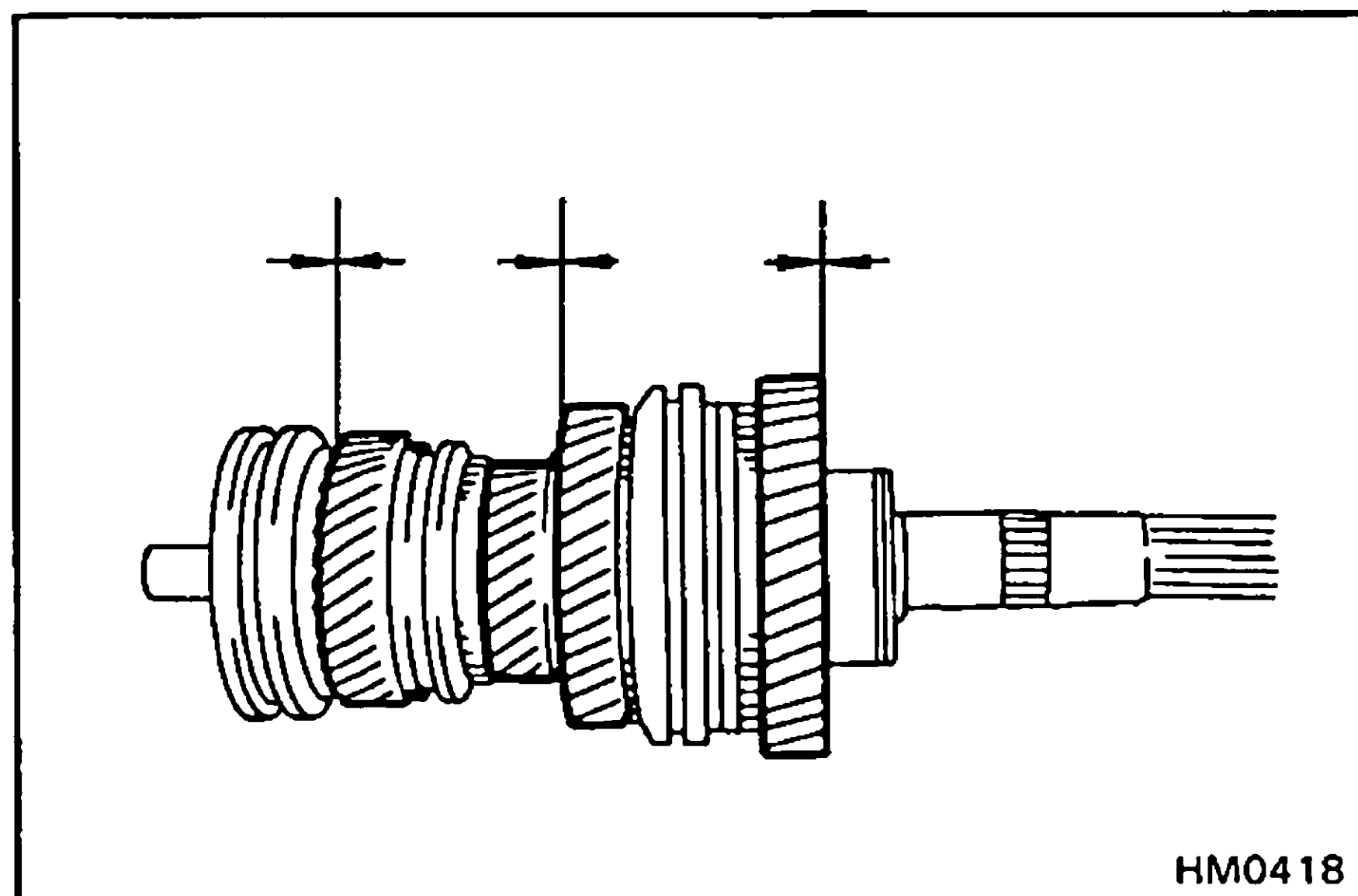
(e) Using a snap ring expander, install the snap ring.



OUTPUT SHAFT COMPONENTS



◆ Non-reusable part



OUTPUT SHAFT DISASSEMBLY

1. MEASURE EACH GEAR THRUST CLEARANCE

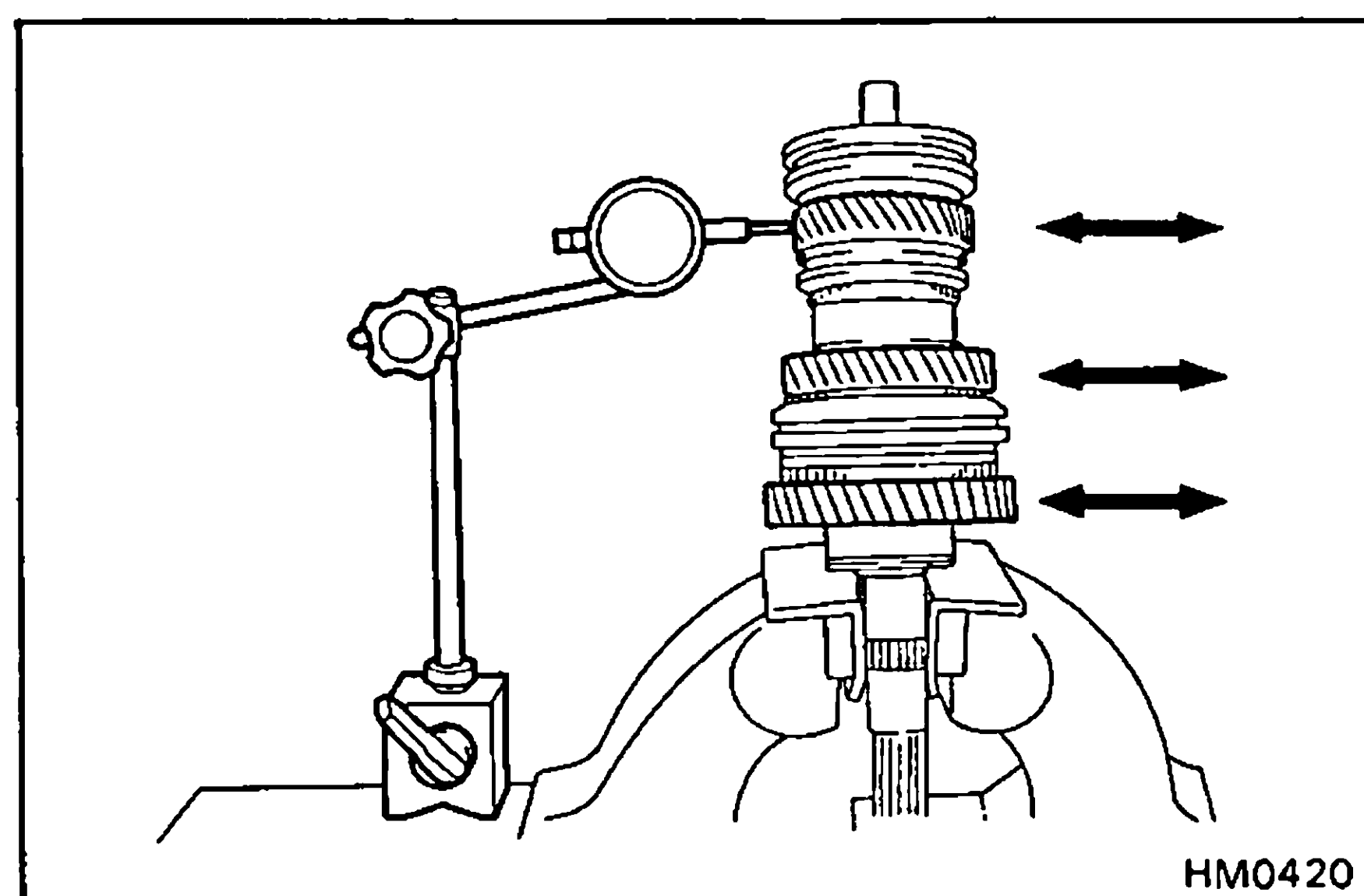
Measure the thrust clearance of each gear.

Standard clearance:

1st and 3rd gear	0.1 — 0.45 mm (0.0039 — 0.0177 in.)
2nd and 5th gear	0.1 — 0.35 mm (0.0039 — 0.0138 in.)

Maximum clearance:

1st and 3rd gear	0.45 mm (0.0177 in.)
2nd and 5th gear	0.35 mm (0.0138 in.)



2. MEASURE EACH GEAR OIL CLEARANCE

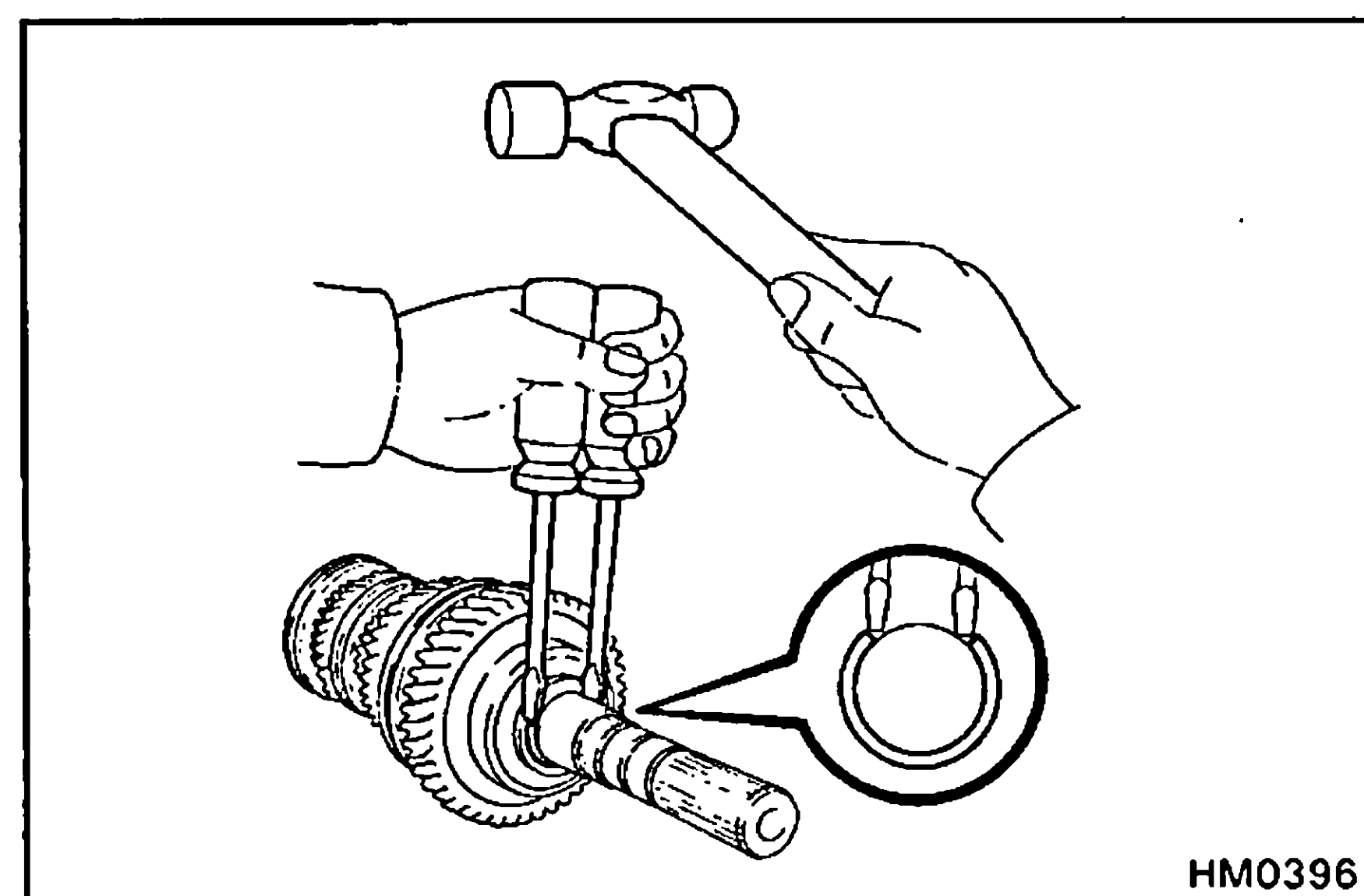
Using a dial indicator, measure the oil clearance of each gear.

Standard clearance:

1st and 3rd gear	0.020 — 0.073 mm (0.0008 — 0.0029 in.)
2nd and 5th gear	0.015 — 0.068 mm (0.0006 — 0.0027 in.)

Maximum clearance:

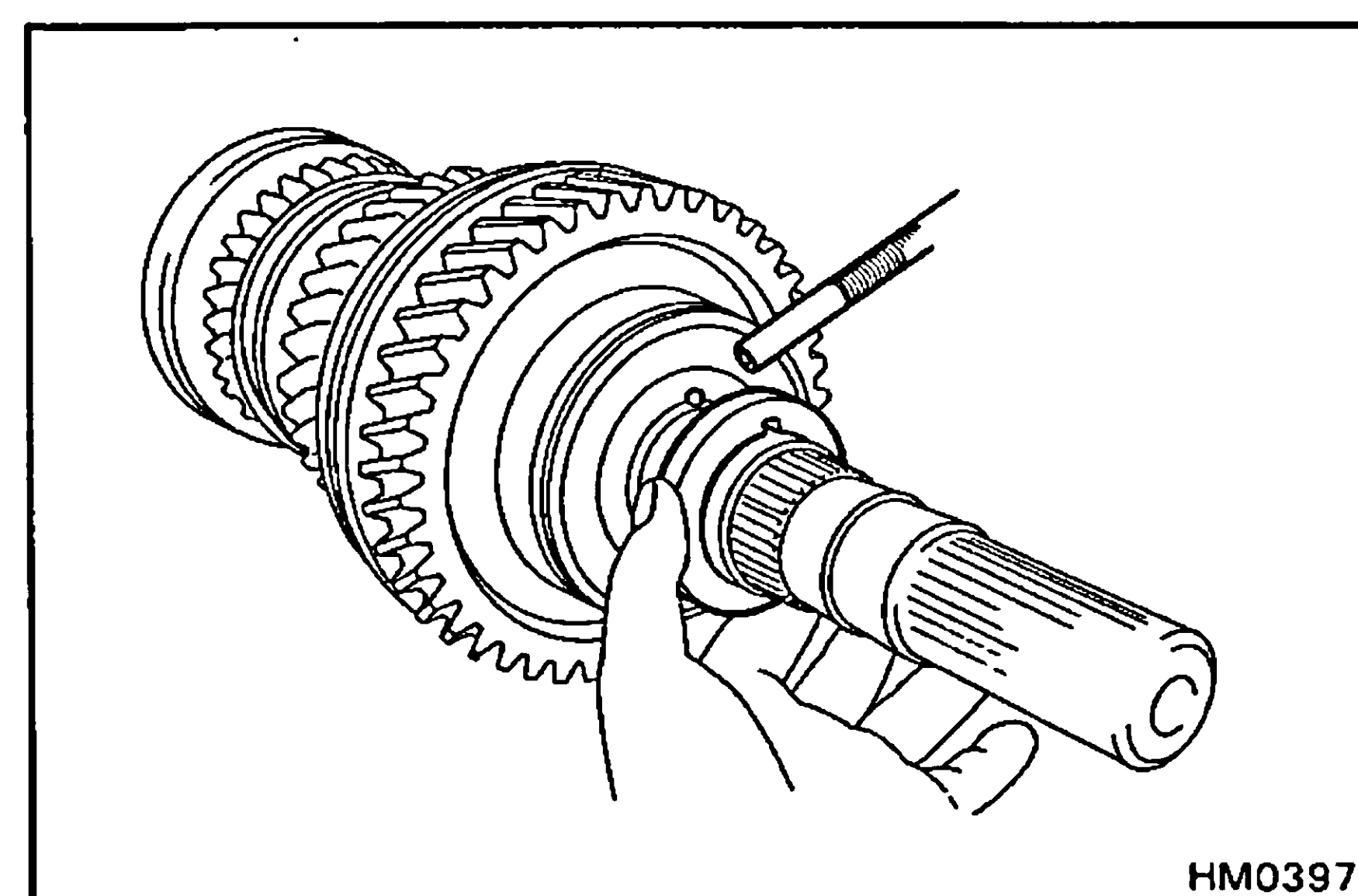
1st and 3rd gear	0.073 mm (0.0029 in.)
2nd and 5th gear	0.068 mm (0.0027 in.)



3. REMOVE BALL BEARING AND FIRST GEAR

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

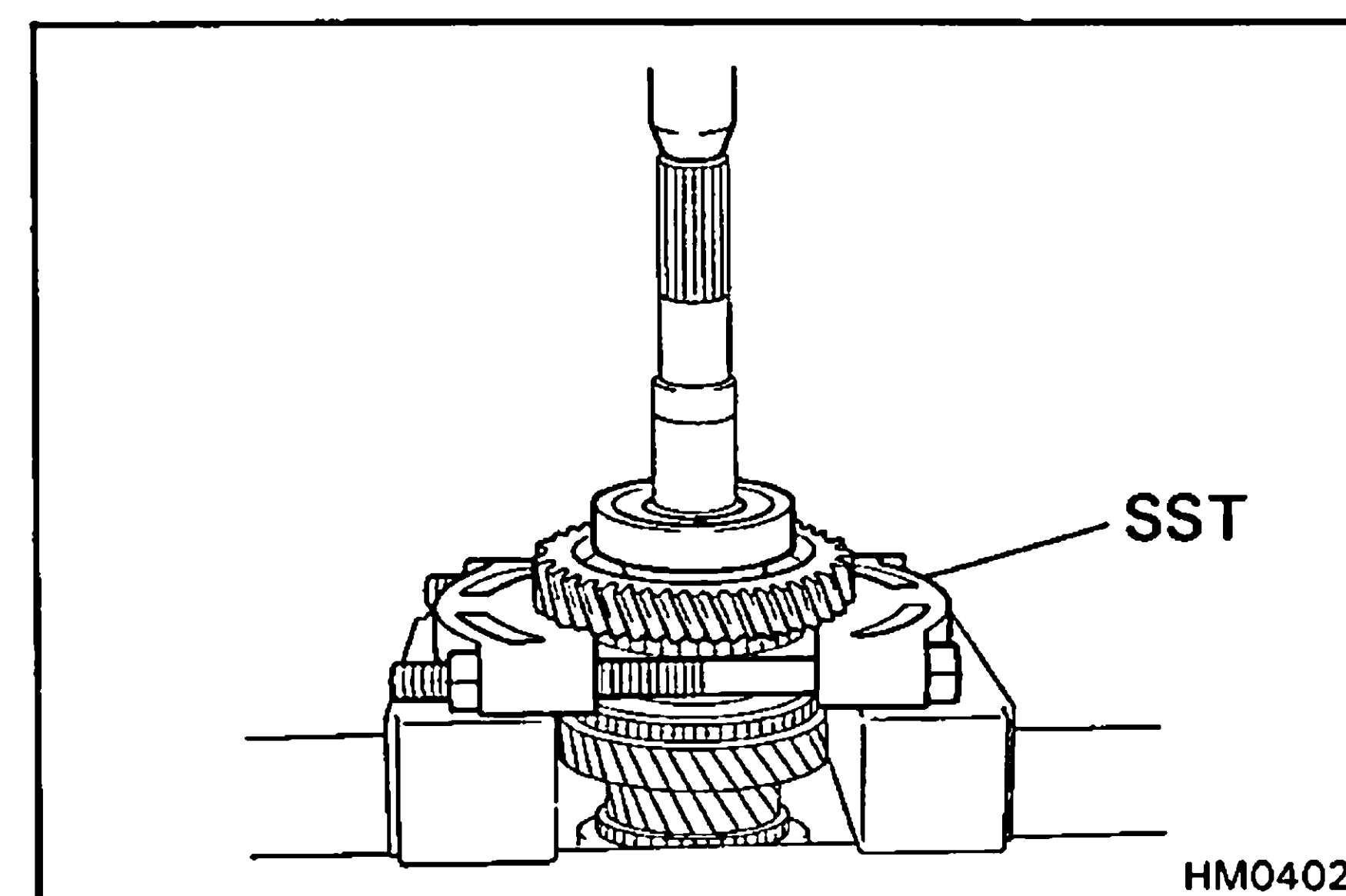
(b) Remove the thrust washer and pin.

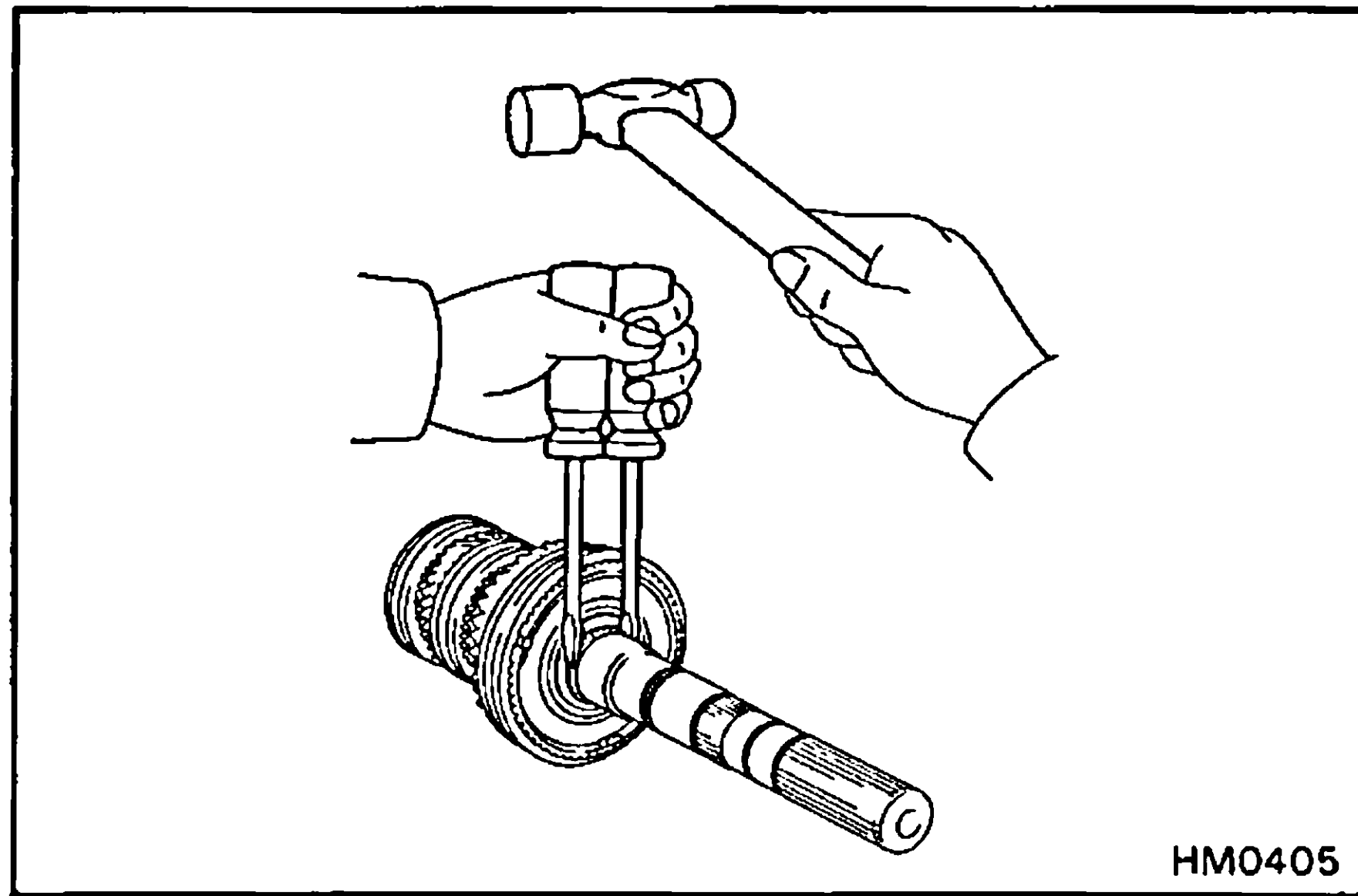


(c) Using SST and a press, remove the ball bearing, thrust washer, first gear and synchronizer rings.

SST 09555-55010

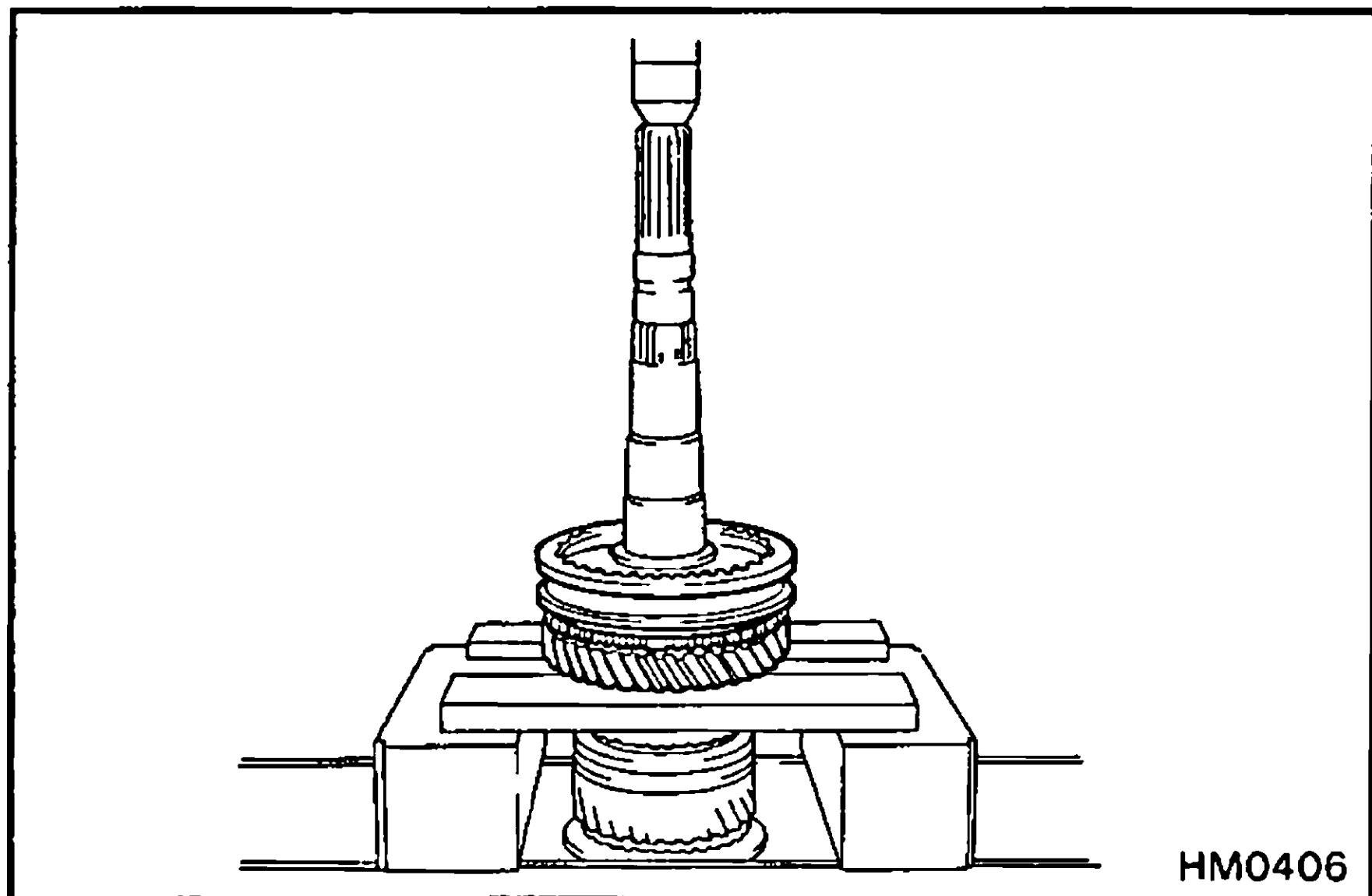
(d) Remove the pin and needle roller bearing.





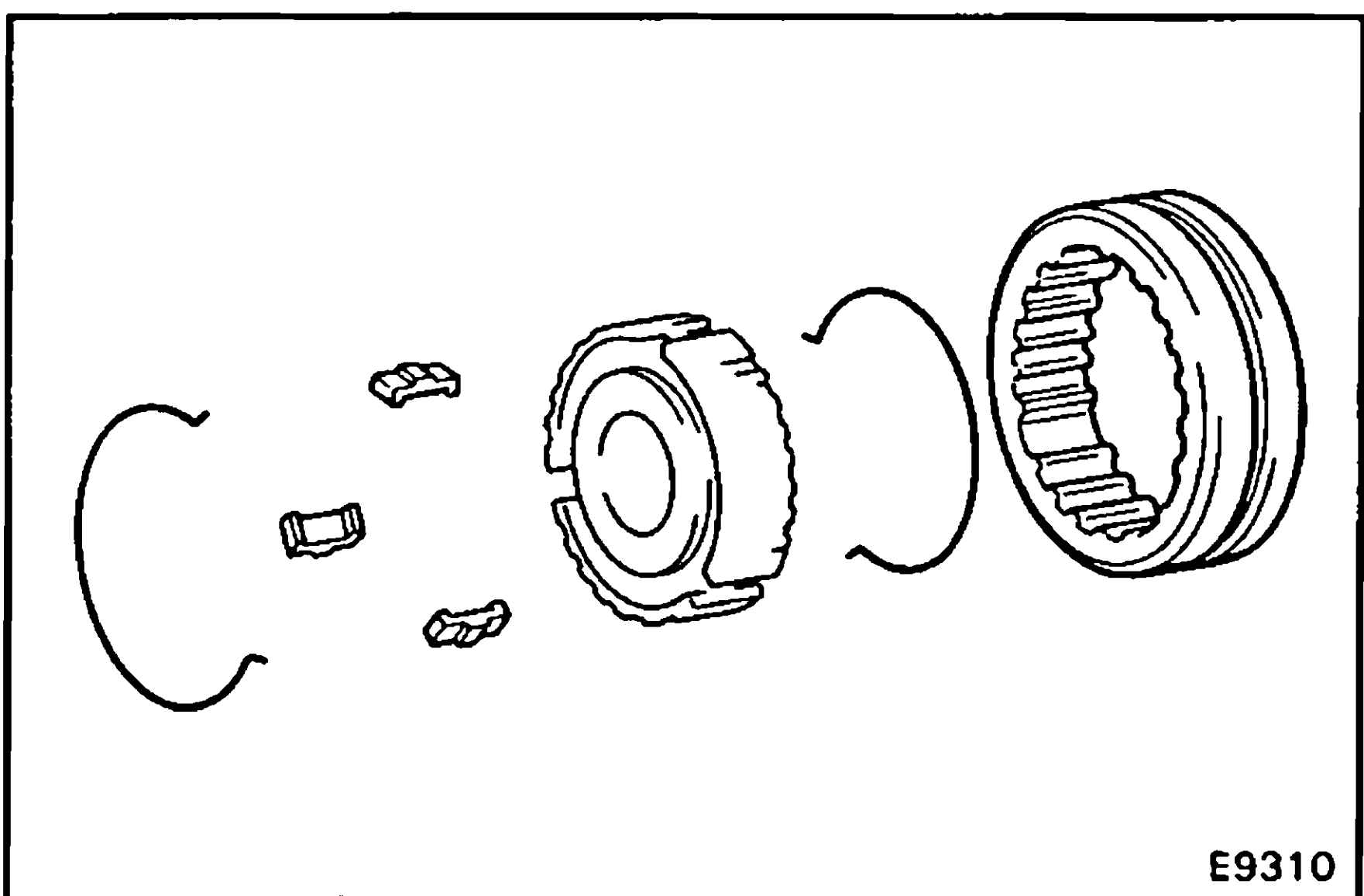
4. REMOVE HUB SLEEVE NO.1 ASSEMBLY, SYNCHRONIZER RING, SECOND GEAR AND NEEDLE ROLLER BEARING

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



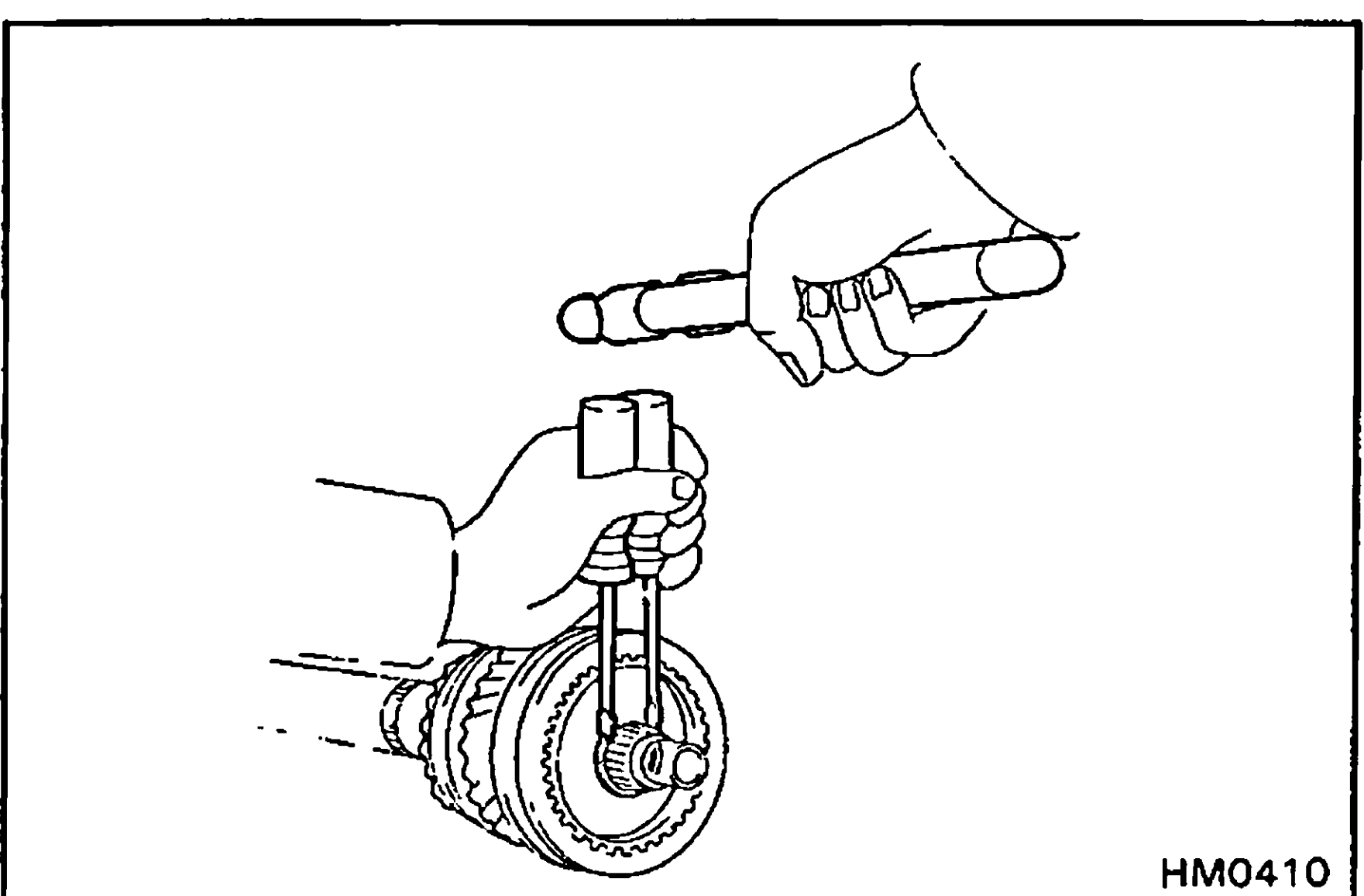
- (b) Using a press, remove the hub sleeve No.1 assembly, synchronizer rings, and second gear.

- (c) Remove the needle roller bearing.



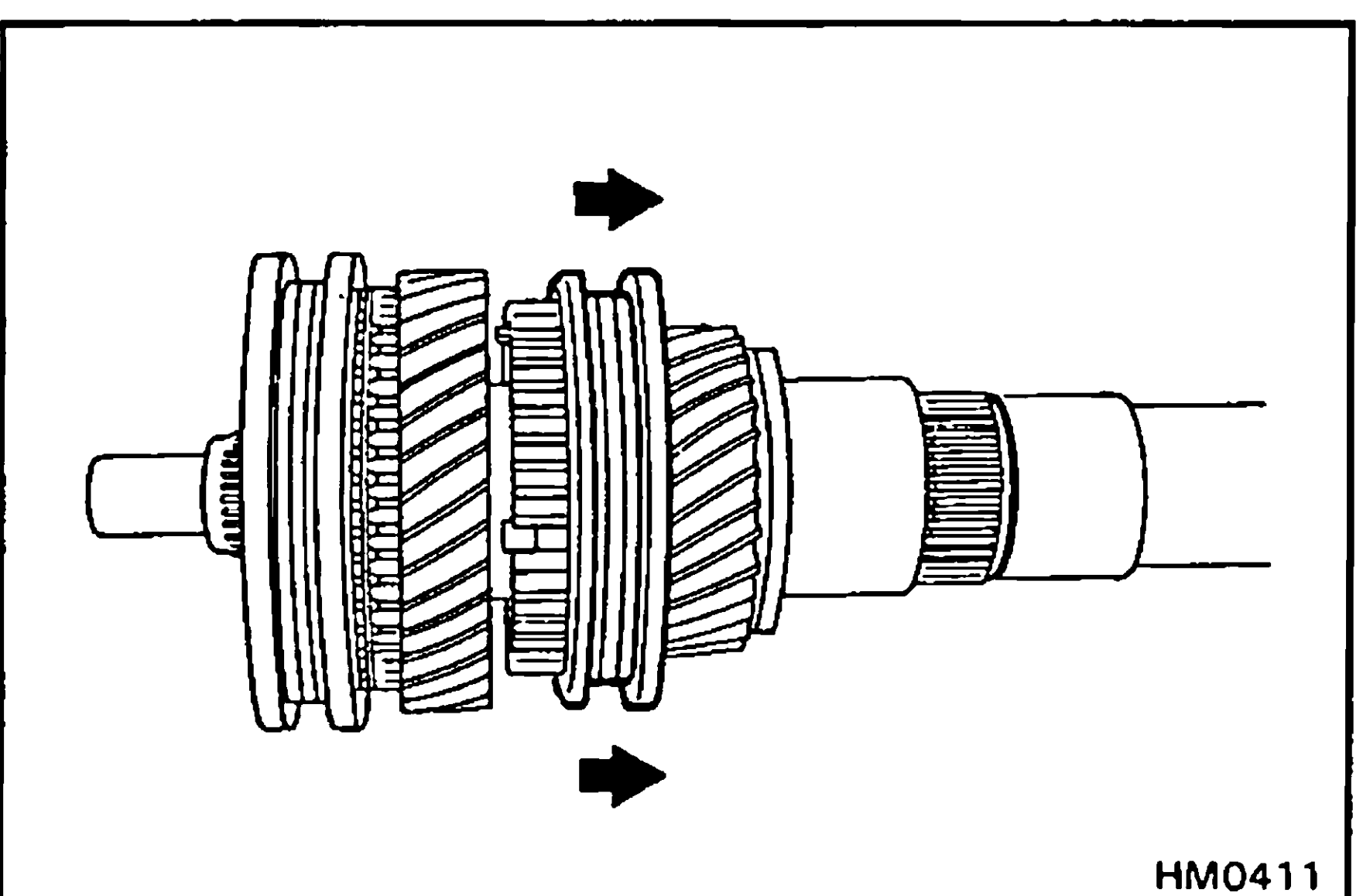
5. REMOVE HUB SLEEVE NO.1, SHIFTING KEYS AND SPRINGS FROM CLUTCH HUB NO.1

Using a screwdriver, remove the three shifting keys and two springs from the clutch hub No.1.

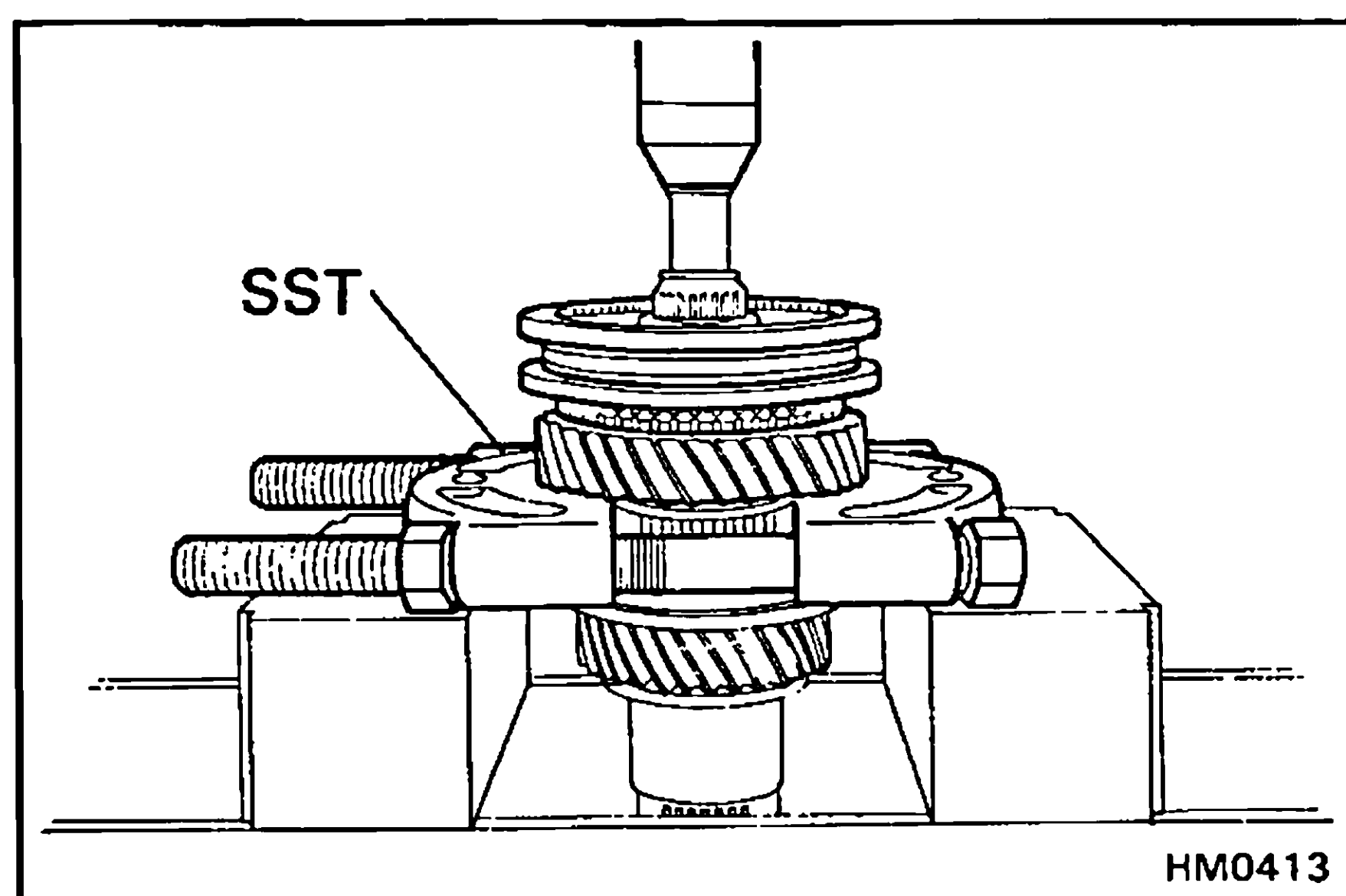


6. REMOVE HUB SLEEVE NO.2 ASSEMBLY, SYNCHRONIZER RINGS, THIRD GEAR AND NEEDLE ROLLER BEARING

- (a) Remove two screwdrivers and a hammer, drive out the snap ring.



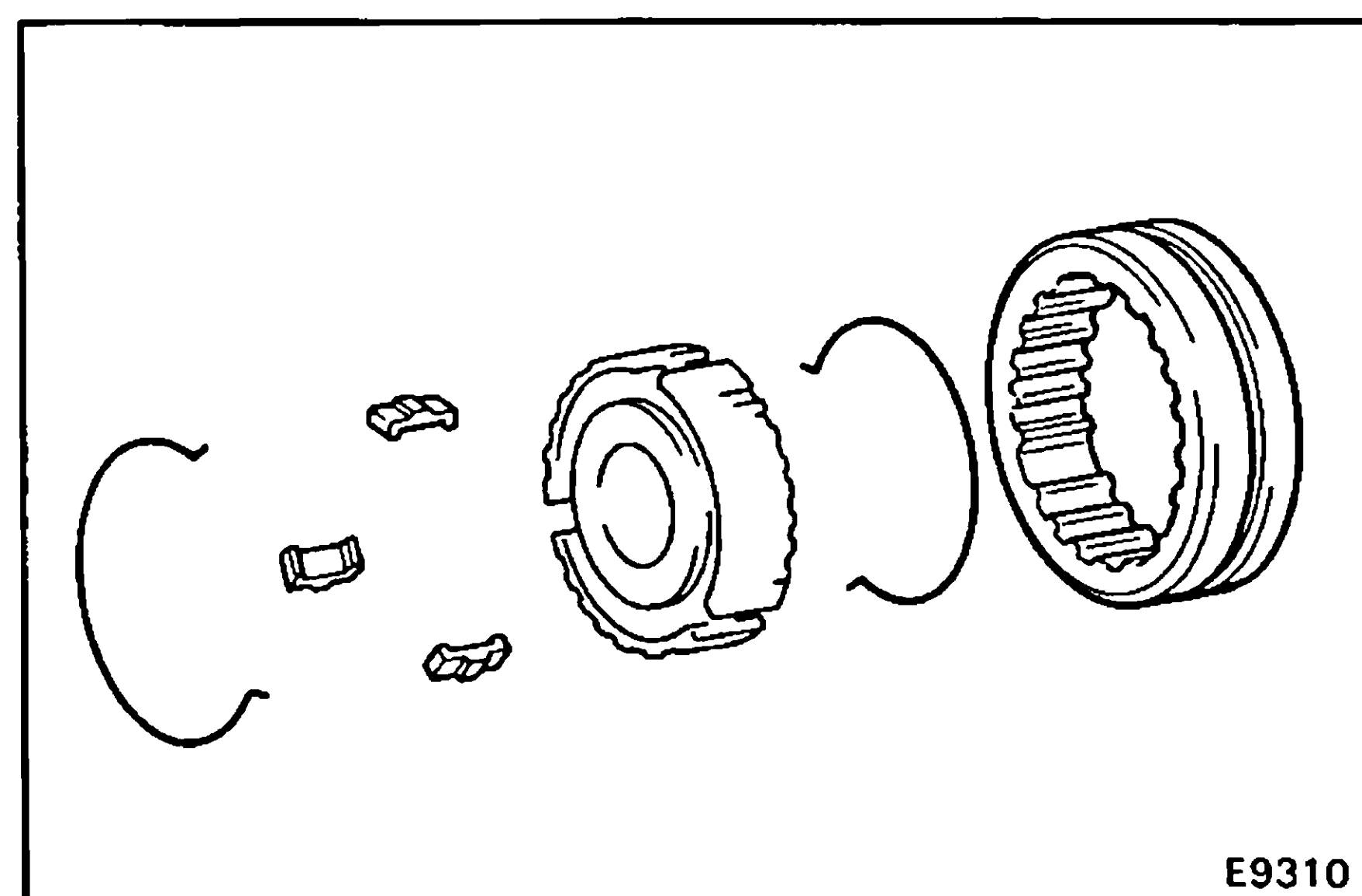
- (b) Shift hub sleeve No.3 onto the fifth gear.



- (c) Using SST and a press, remove the hub sleeve No.2 assembly, synchronizer rings and third gear.

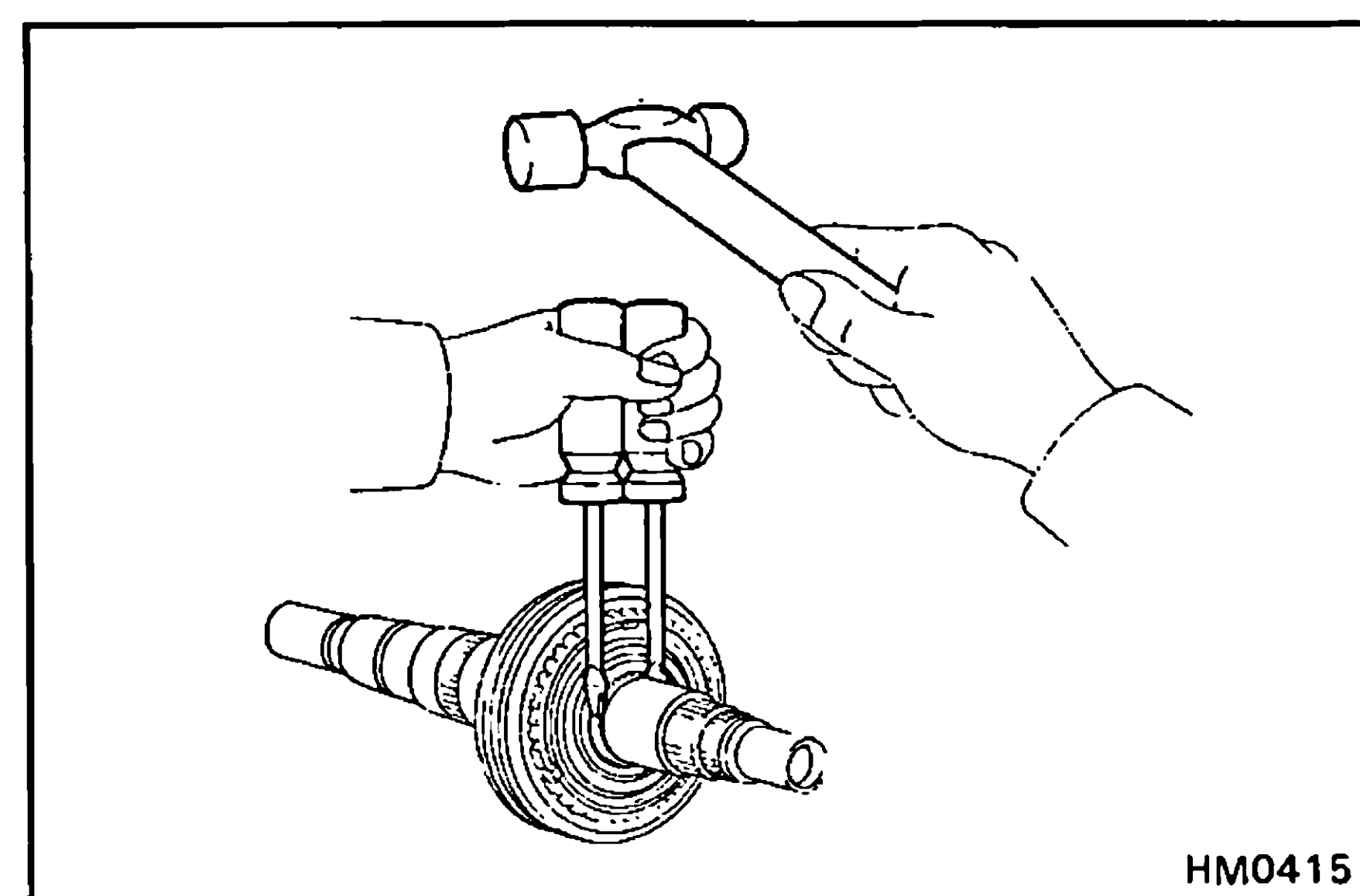
SST 09555-55010

- (d) Remove the needle roller bearing.



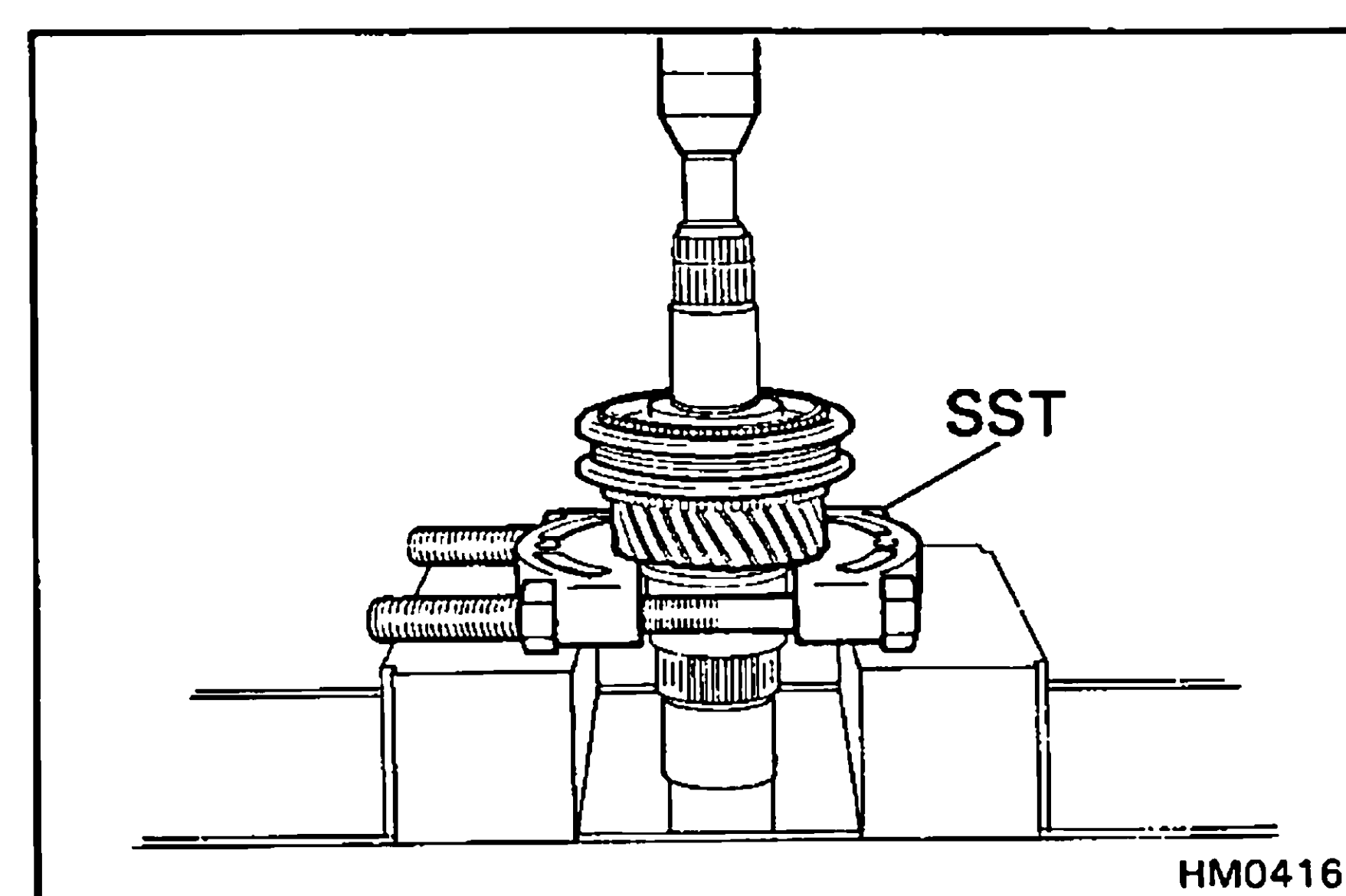
7. REMOVE HUB SLEEVE NO.2, SHIFTING KEYS AND SPRINGS FROM CLUTCH HUB NO.2

Using a screwdriver, remove the three shifting keys and two springs from the clutch hub No.2.



8. REMOVE HUB SLEEVE NO.3 ASSEMBLY, SYNCHRONIZER RING, FIFTH GEAR AND NEEDLE ROLLER BEARING

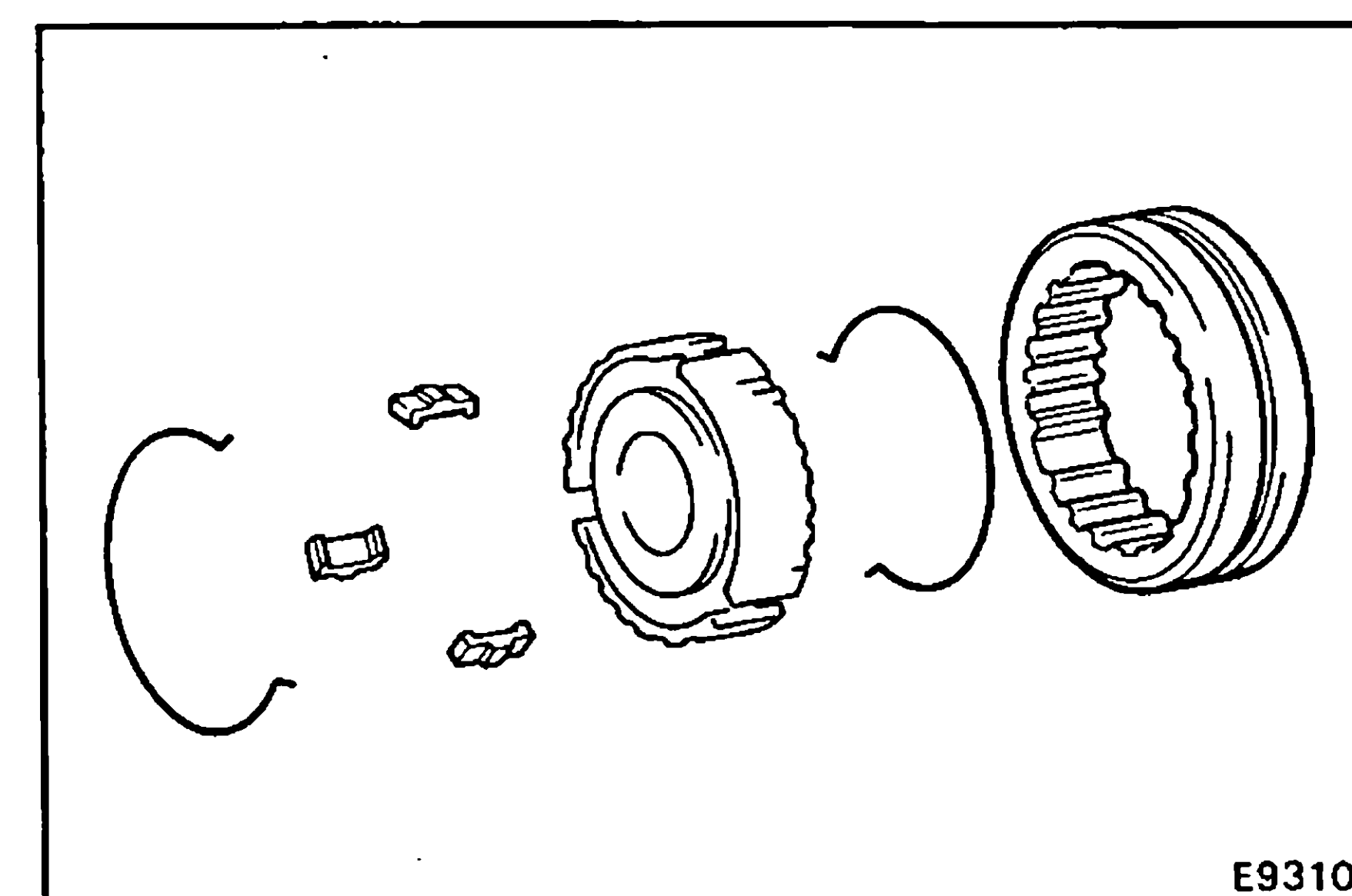
- (a) Using two screwdriver, and a hammer, drive out the snap ring.



- (b) Using SST and a press, remove the hub sleeve No.3 assembly and synchronizer ring.

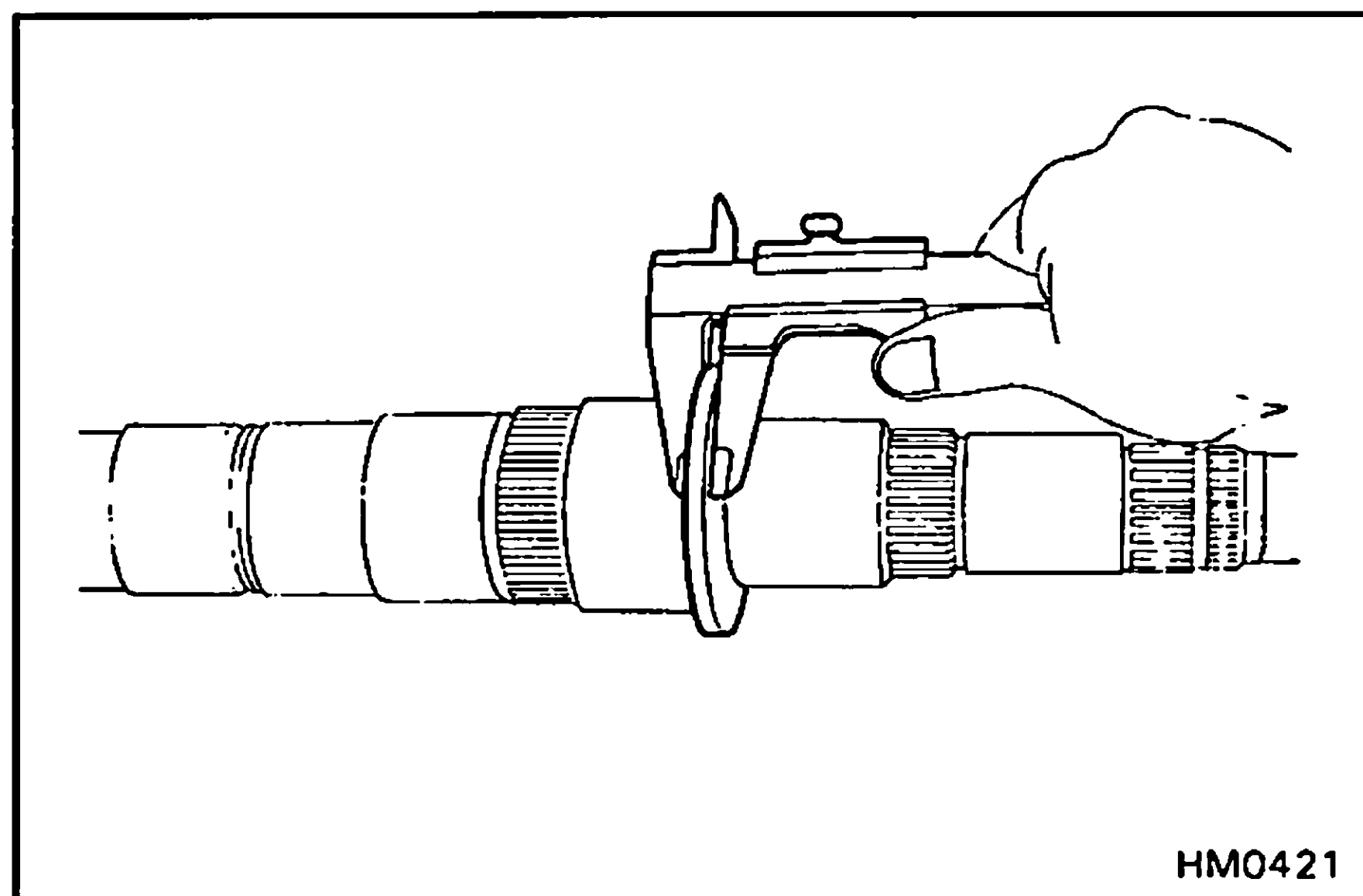
SST 09950-00020

- (c) Remove the needle roller bearing.



9. REMOVE HUB SLEEVE NO.3 SHIFTING KEYS AND SPRINGS FROM CLUTCH HUB NO.3

Using a screwdriver, remove the three shifting keys and two springs from the clutch hub No.3.

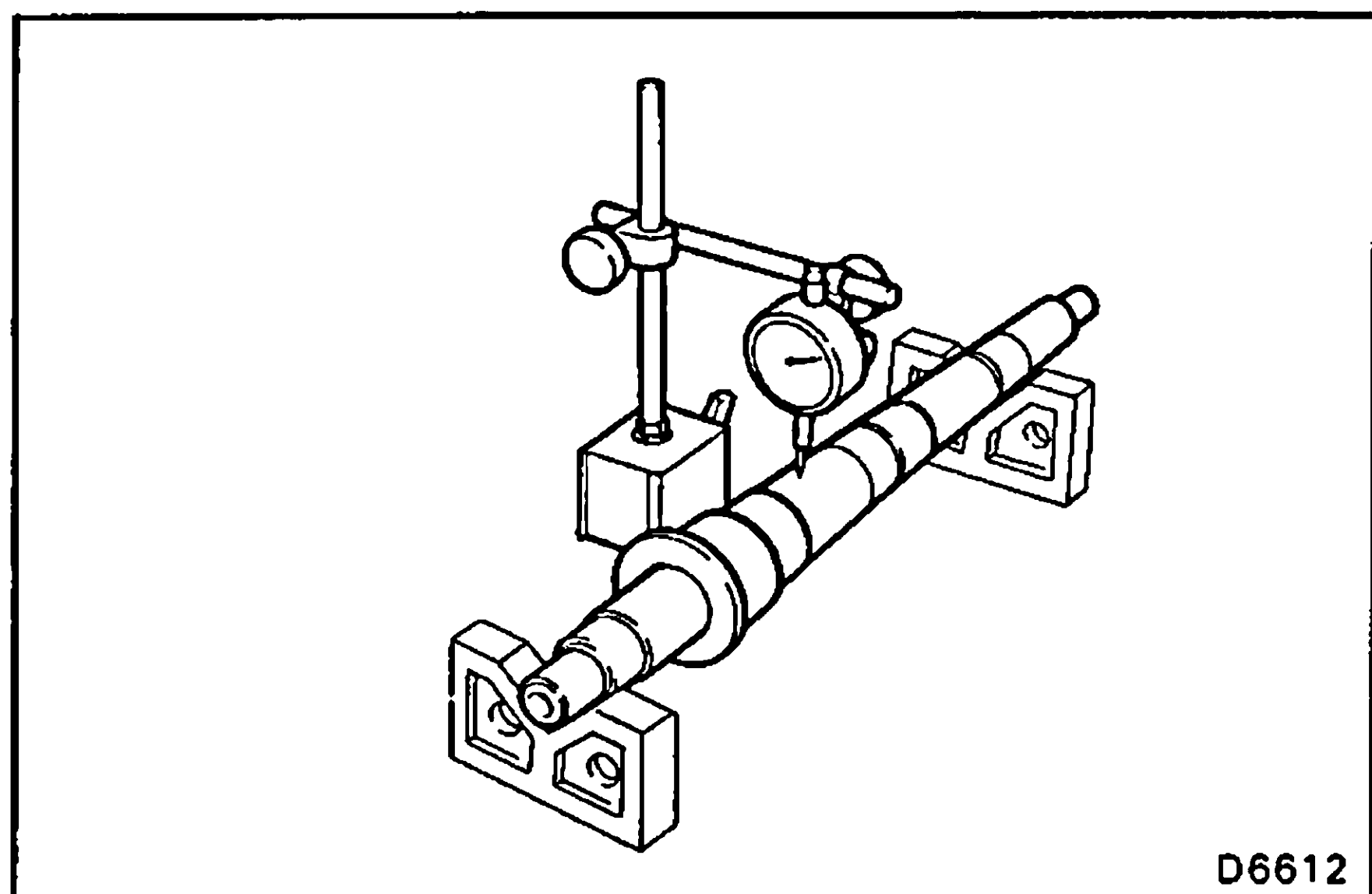


INSPECTION OF OUTPUT SHAFT ASSEMBLY

1. INSPECT OUTPUT SHAFT

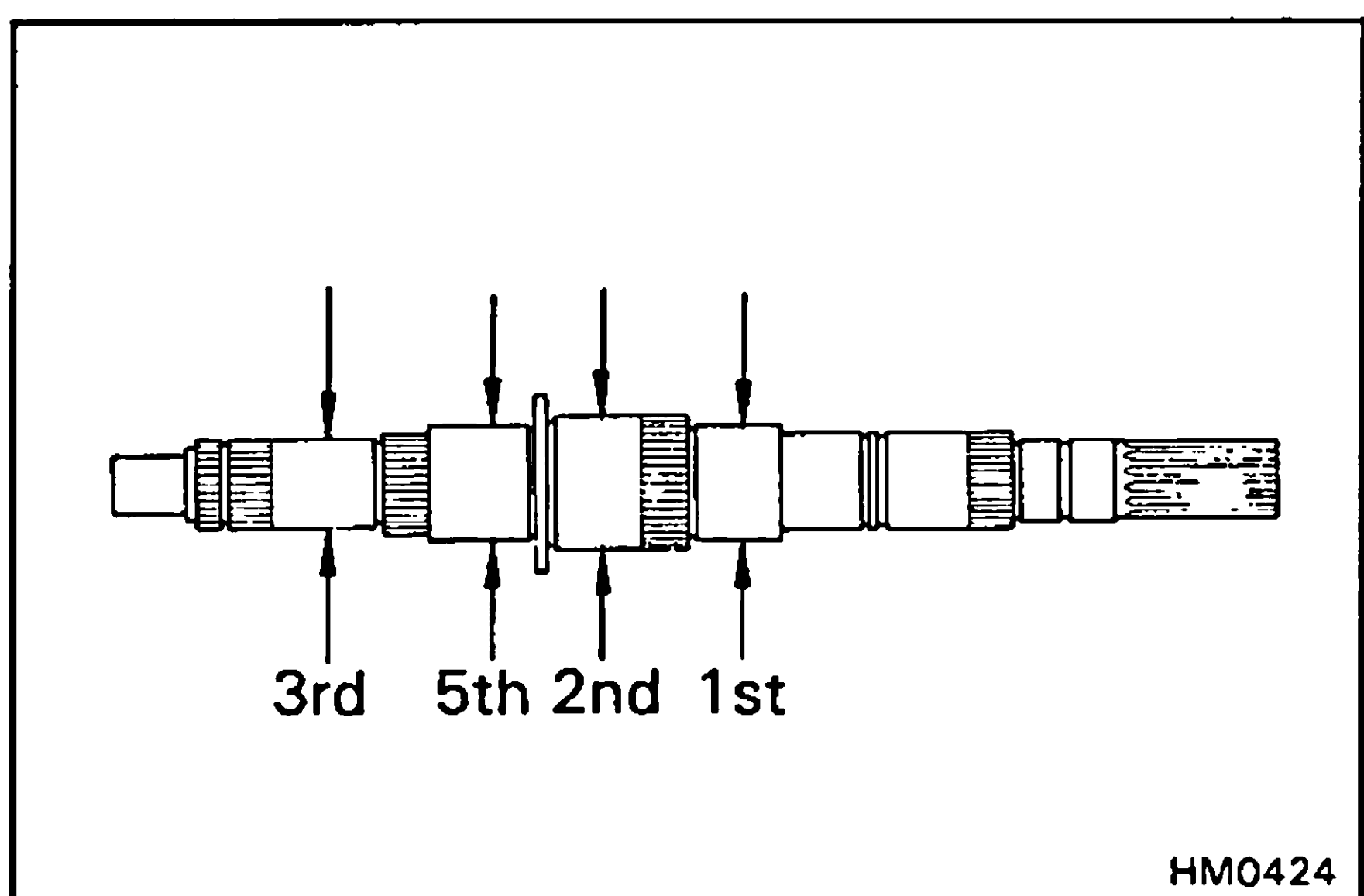
- (a) Using calipers, measure the output shaft flange thickness.

Minimum thickness: 4.725 mm (0.1860 in.)



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

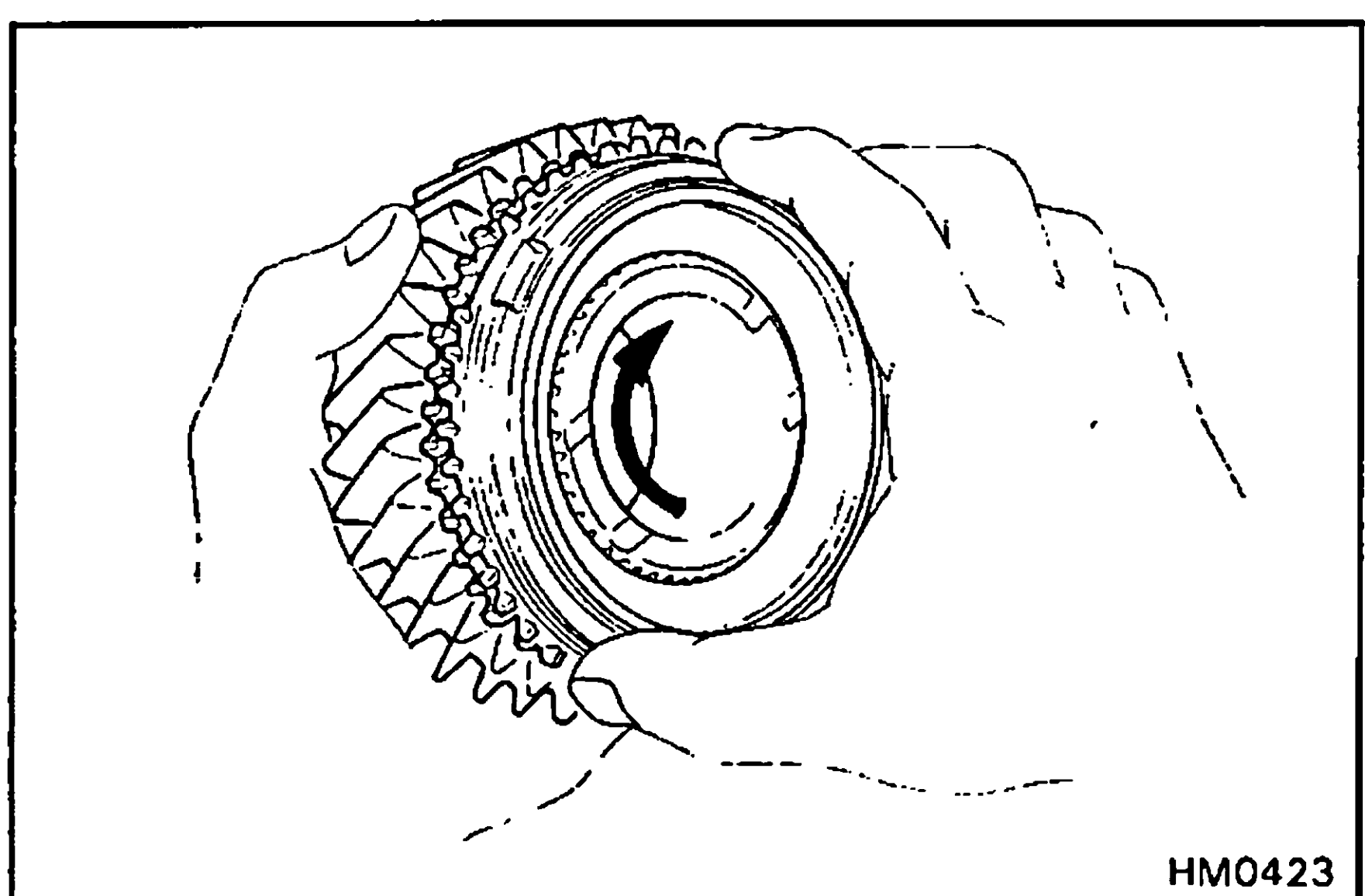
Maximum runout: 0.05 mm (0.0020 in.)



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

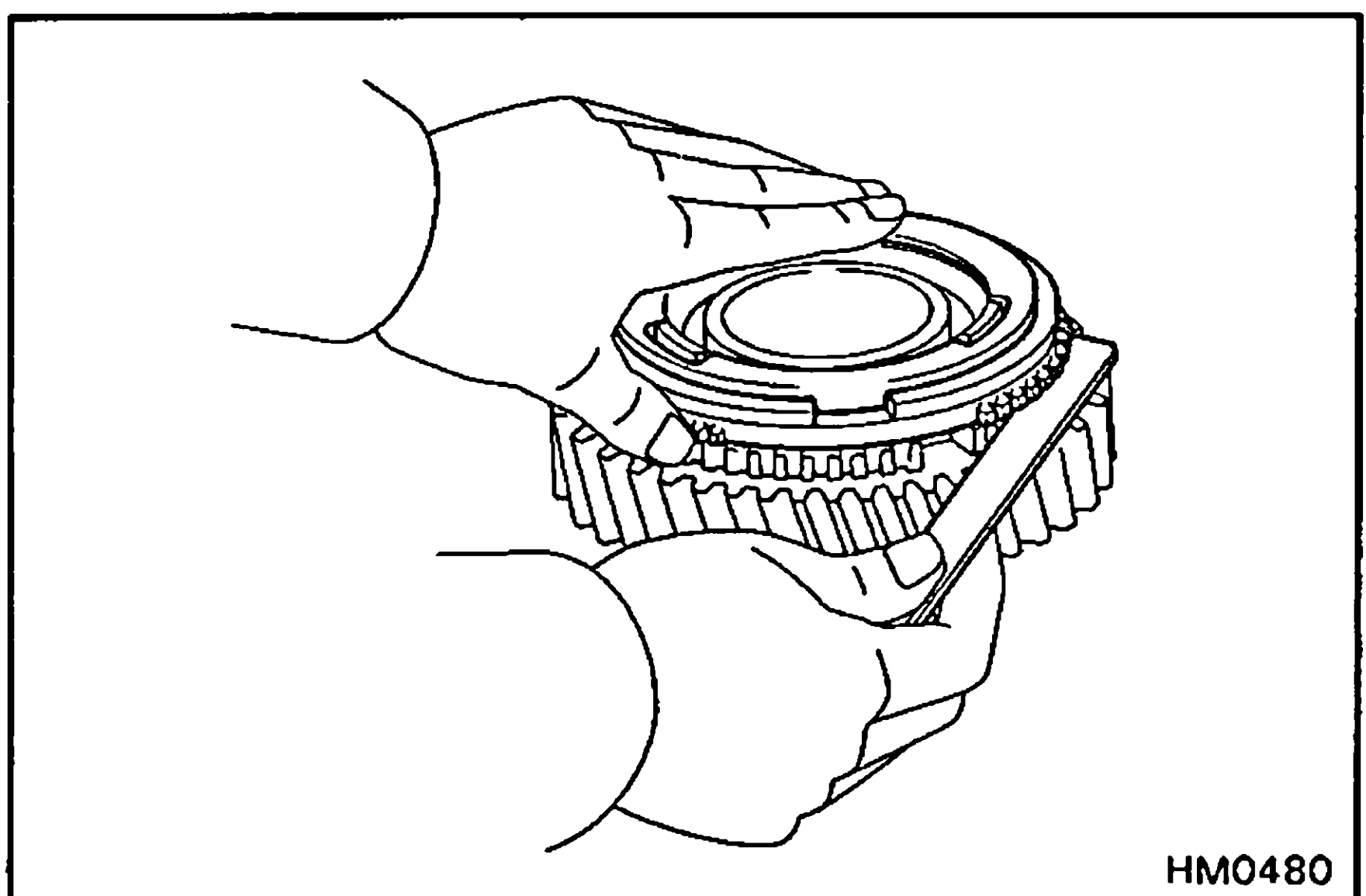
Minimum diameter:

1st	49.979 mm (1.9677 in.)
2nd	57.984 mm (2.2828 in.)
3rd	37.979 mm (1.4952 in.)
5th	45.984 mm (1.8104 in.)



2. INSPECT SYNCHRONIZER RINGS

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



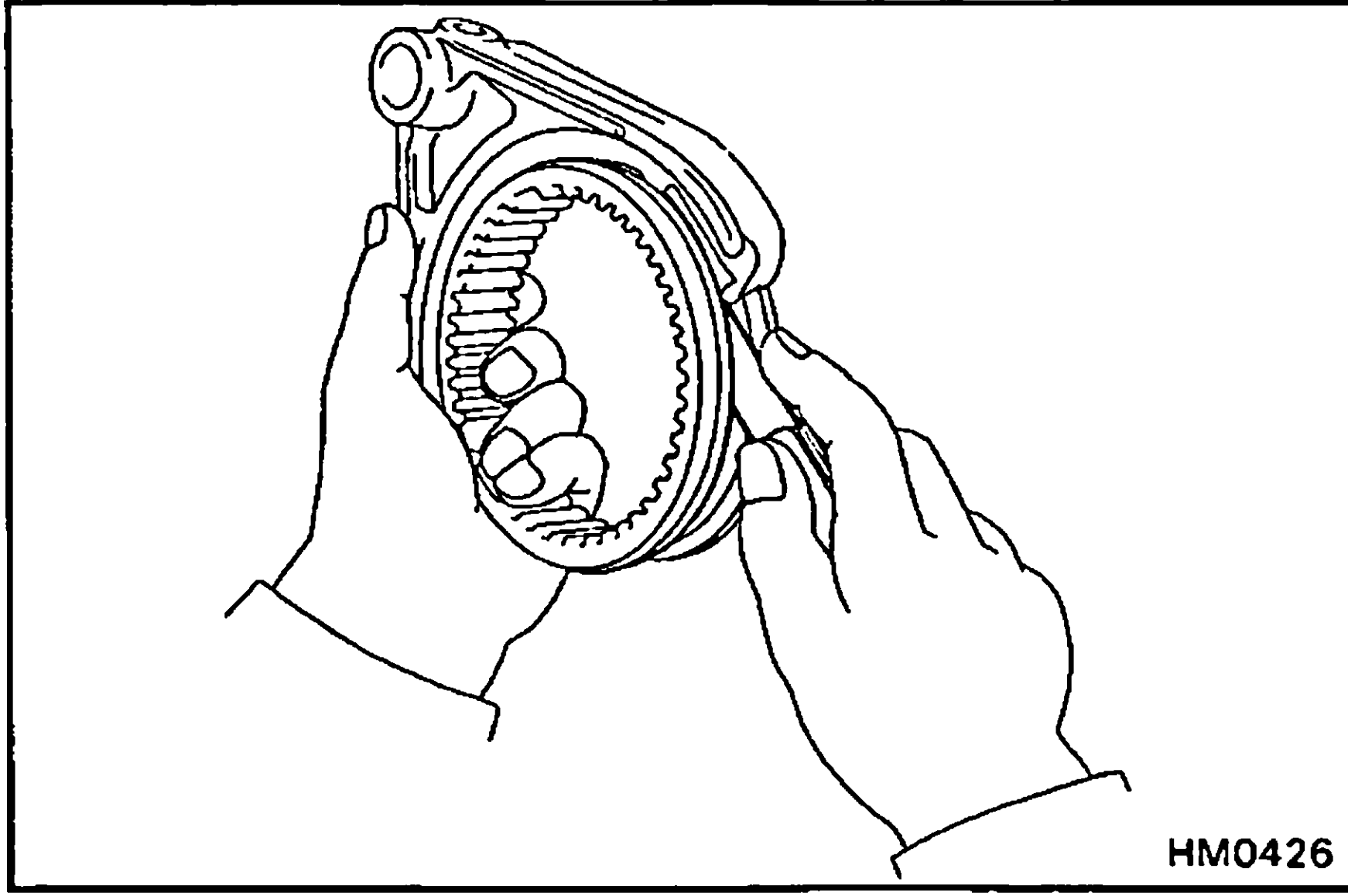
- (b) Measure the clearance between the synchronizer ring back and the gear spline end.

Standard clearance:

1st and 2nd gear	0.85 — 1.4 mm (0.0335 — 0.0551 in.)
3rd gear	0.75 — 1.3 mm (0.0295 — 0.0512 in.)

Minimum clearance:

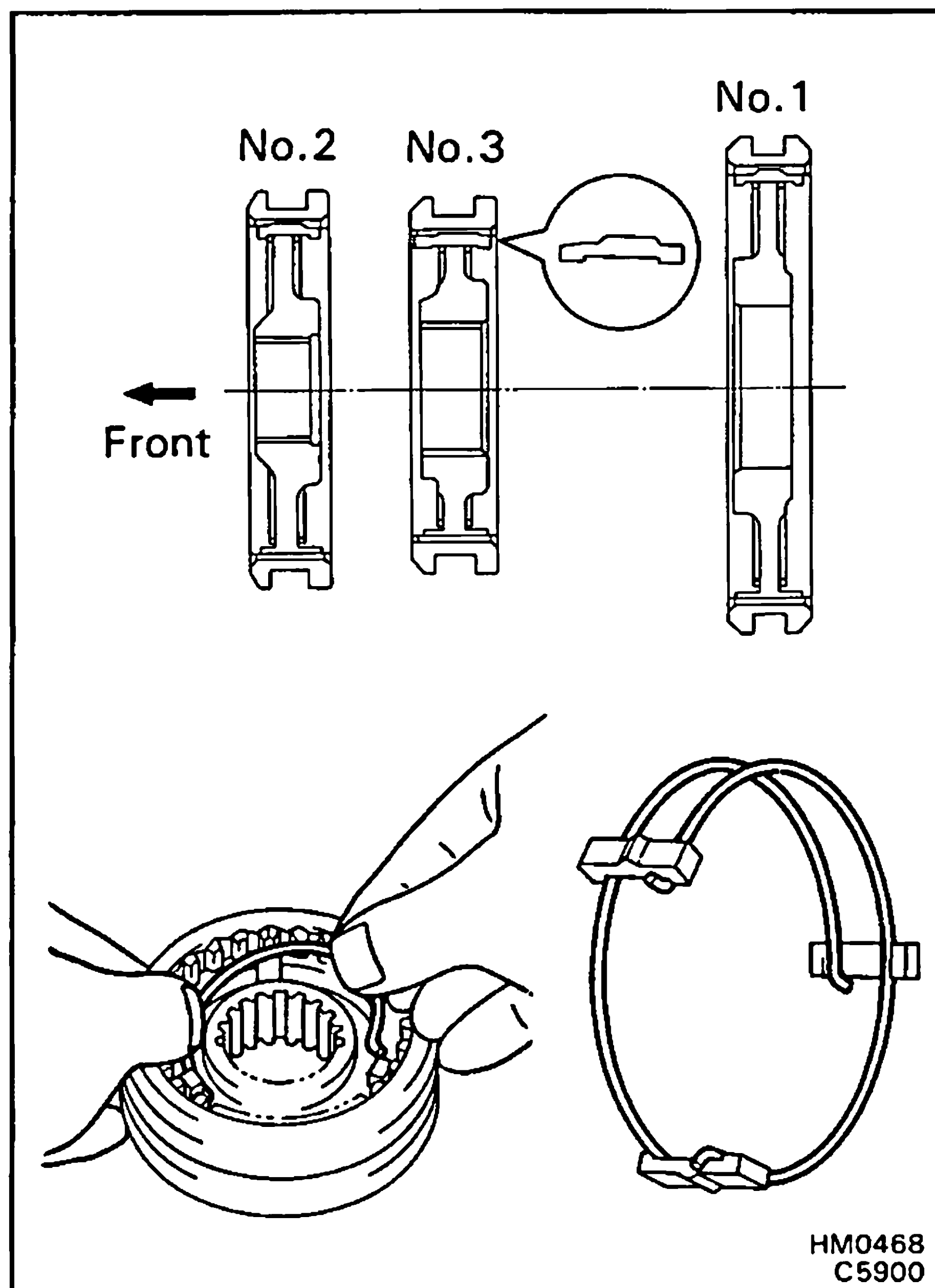
1st and 2nd gear	0.85 mm (0.0335 in.)
3rd gear	0.75 mm (0.0295 in.)



3. MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVES

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

Maximum clearance: 0.35 mm (0.0138 in.)



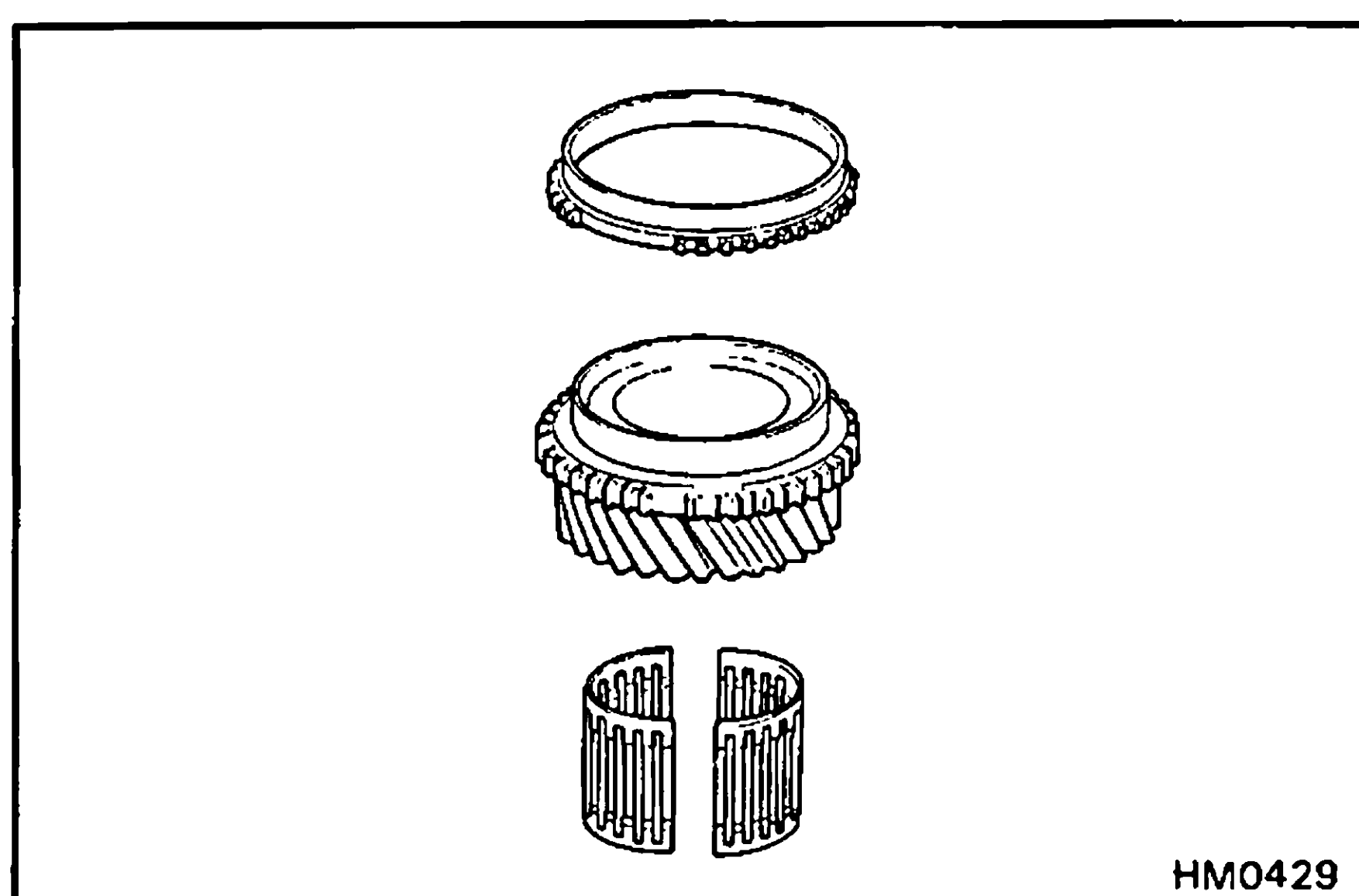
OUTPUT SHAFT ASSEMBLY

1. INSERT CLUTCH HUB NO.1, NO.2 AND NO.3 INTO HUB SLEEVE

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

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

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

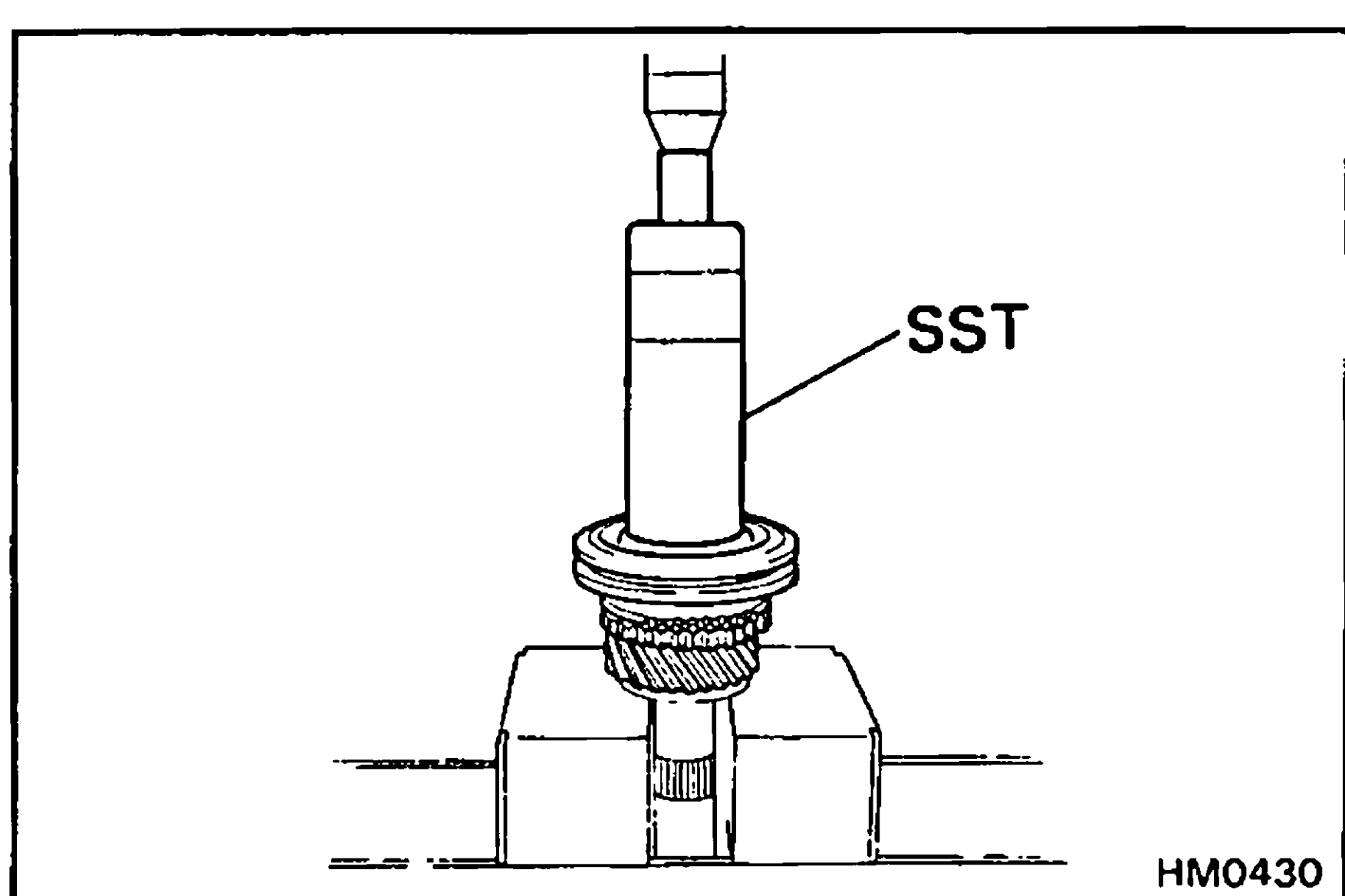


2. INSTALL FIFTH GEAR AND HUB SLEEVE NO.3 ASSEMBLY ON OUTPUT SHAFT

- (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 fifth gear.

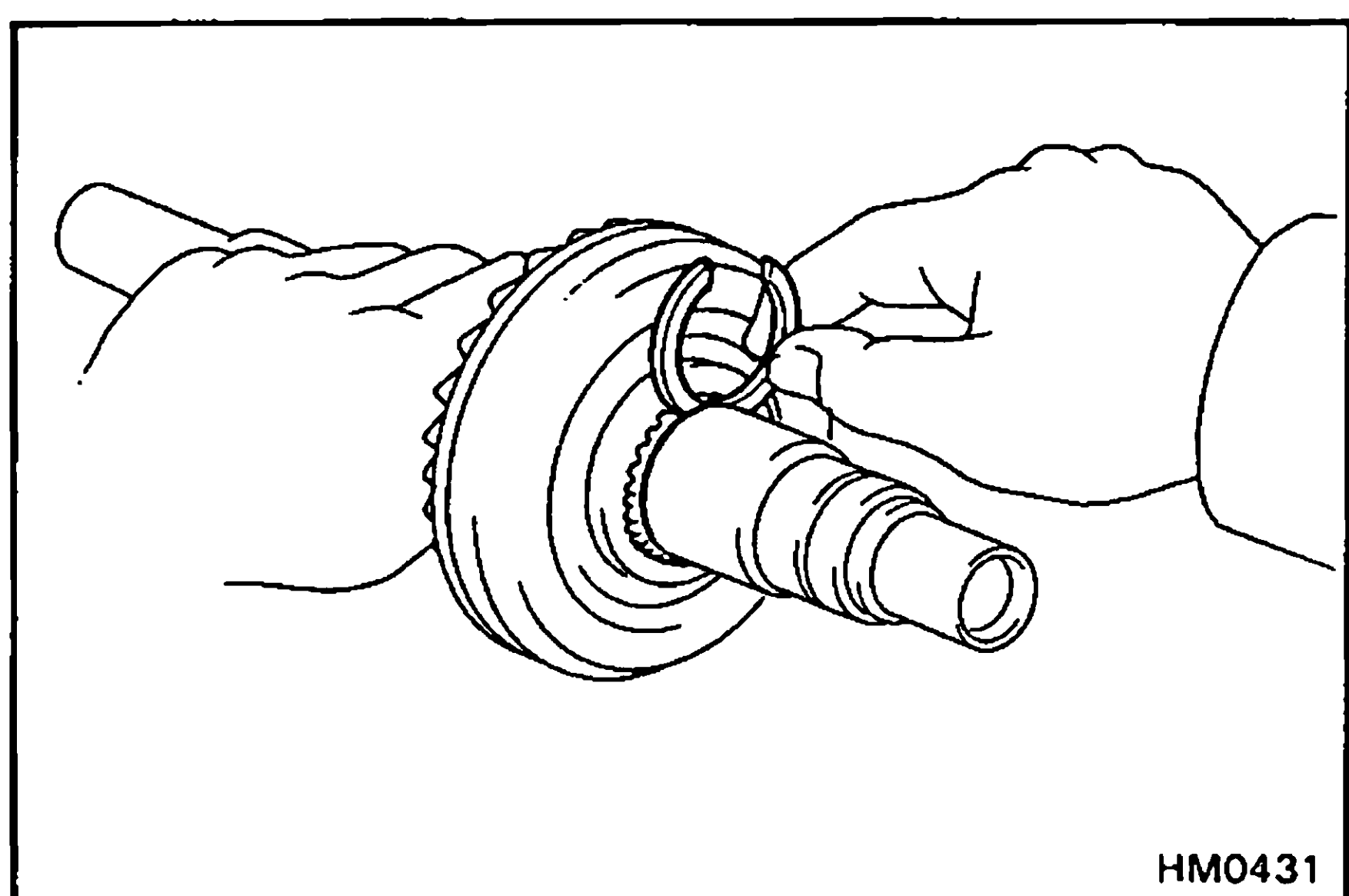
- (d) Using SST and a press, install the fifth gear and hub sleeve No.3.

SST 09316-60010 (09316-00010)

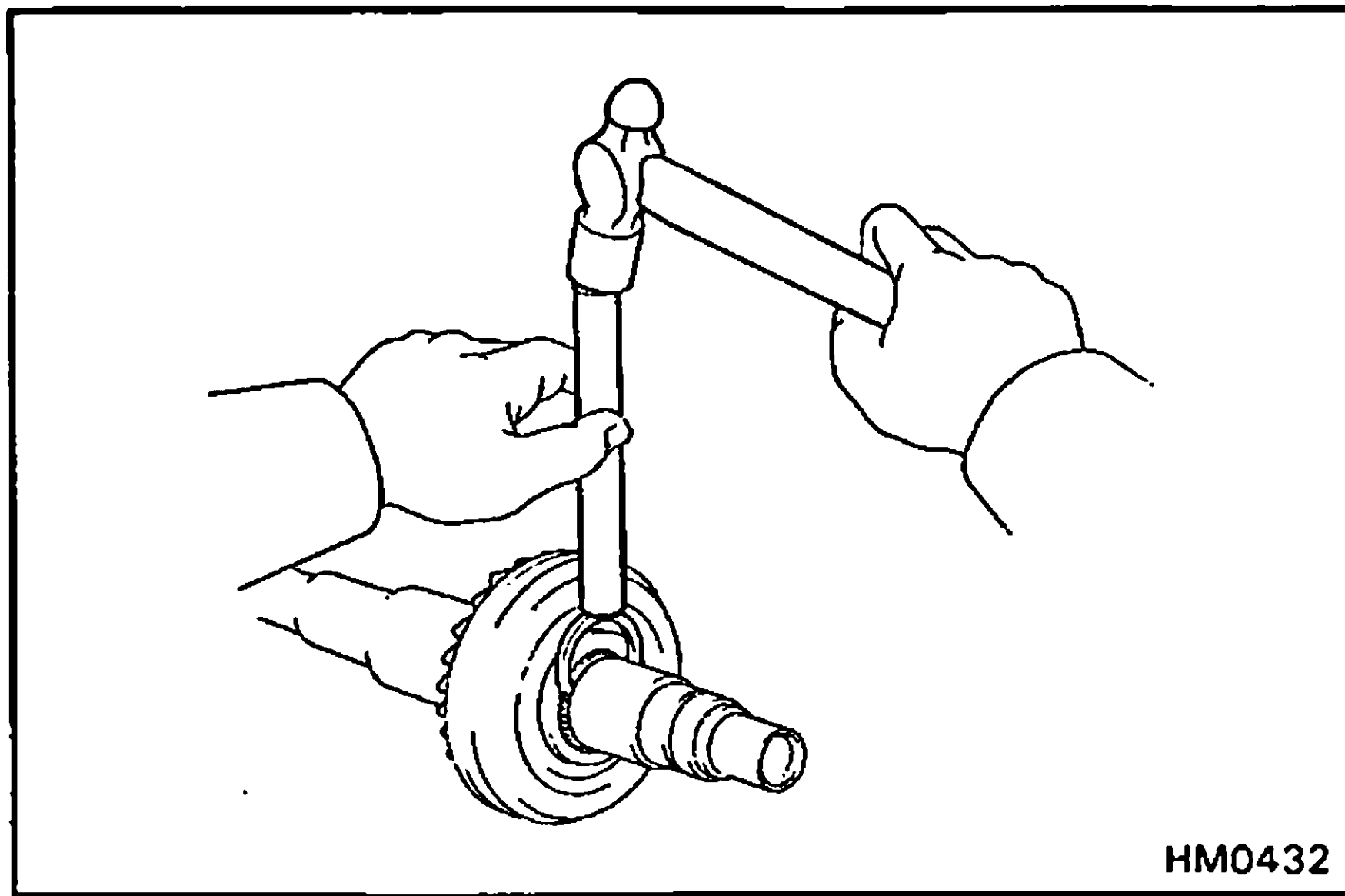


3. INSTALL SNAP RING

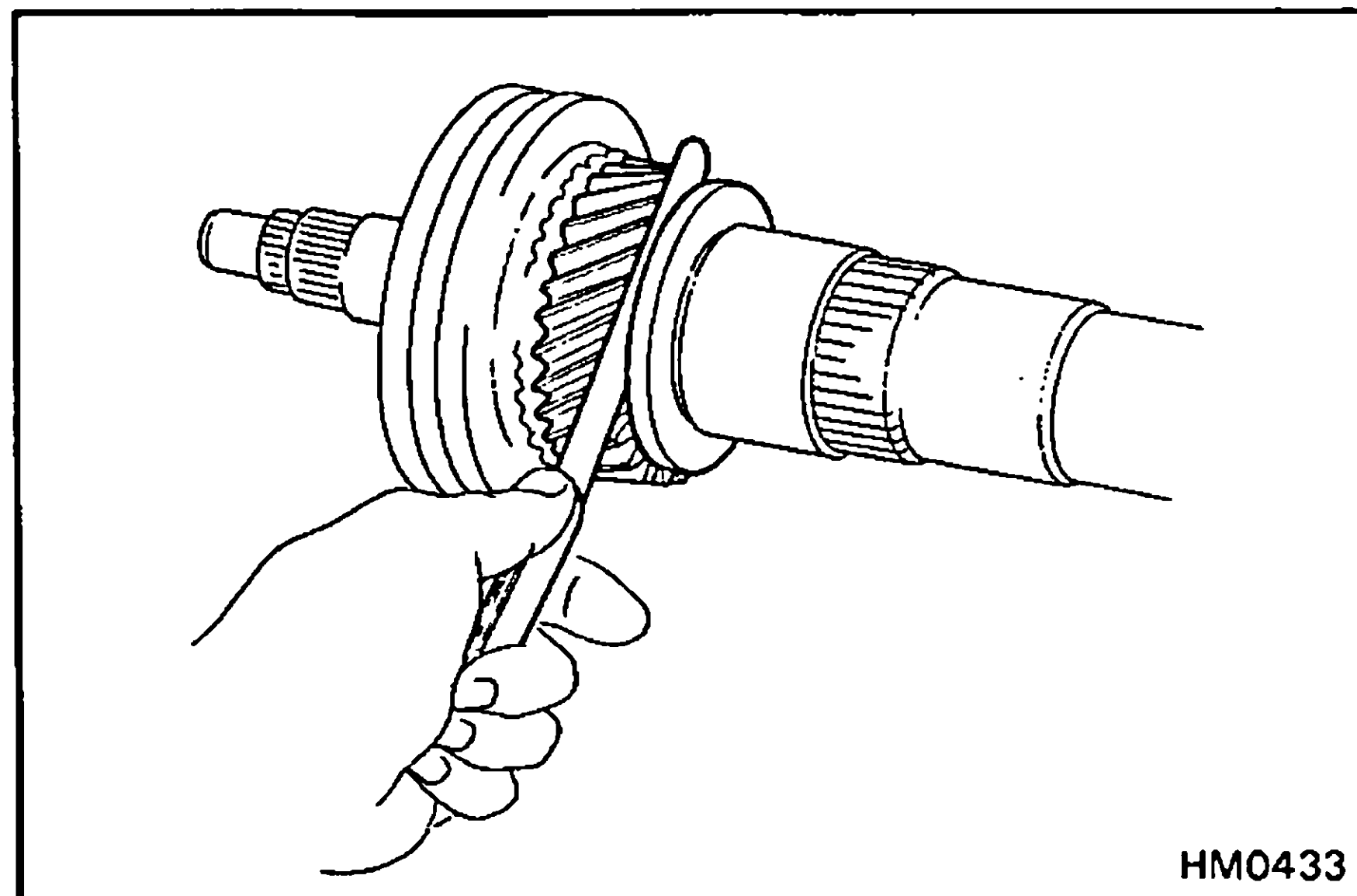
- (a) Select a snap ring that will allow minimum axial play.



Mark	Thickness mm (in.)
A	2.40 — 2.45 (0.0945 — 0.0965)
B	2.45 — 2.50 (0.0965 — 0.0984)
C	2.50 — 2.55 (0.0984 — 0.1004)
D	2.55 — 2.60 (0.1004 — 0.1024)
E	2.60 — 2.65 (0.1024 — 0.1044)
F	2.65 — 2.70 (0.1044 — 0.1063)



(b) Using a brass bar and hammer, drive in the snap ring.

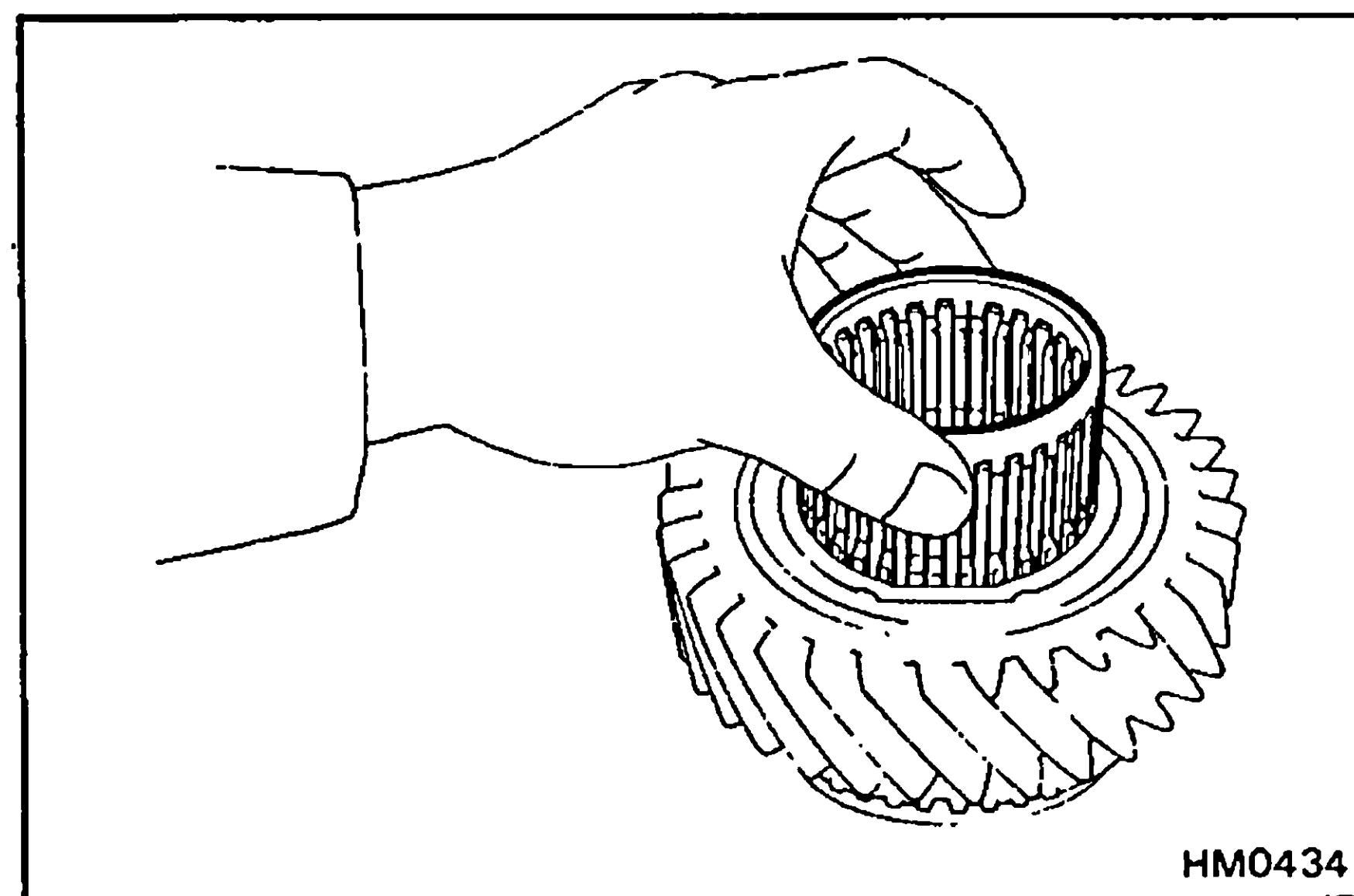


4. MEASURE FIFTH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the fifth gear thrust clearance.

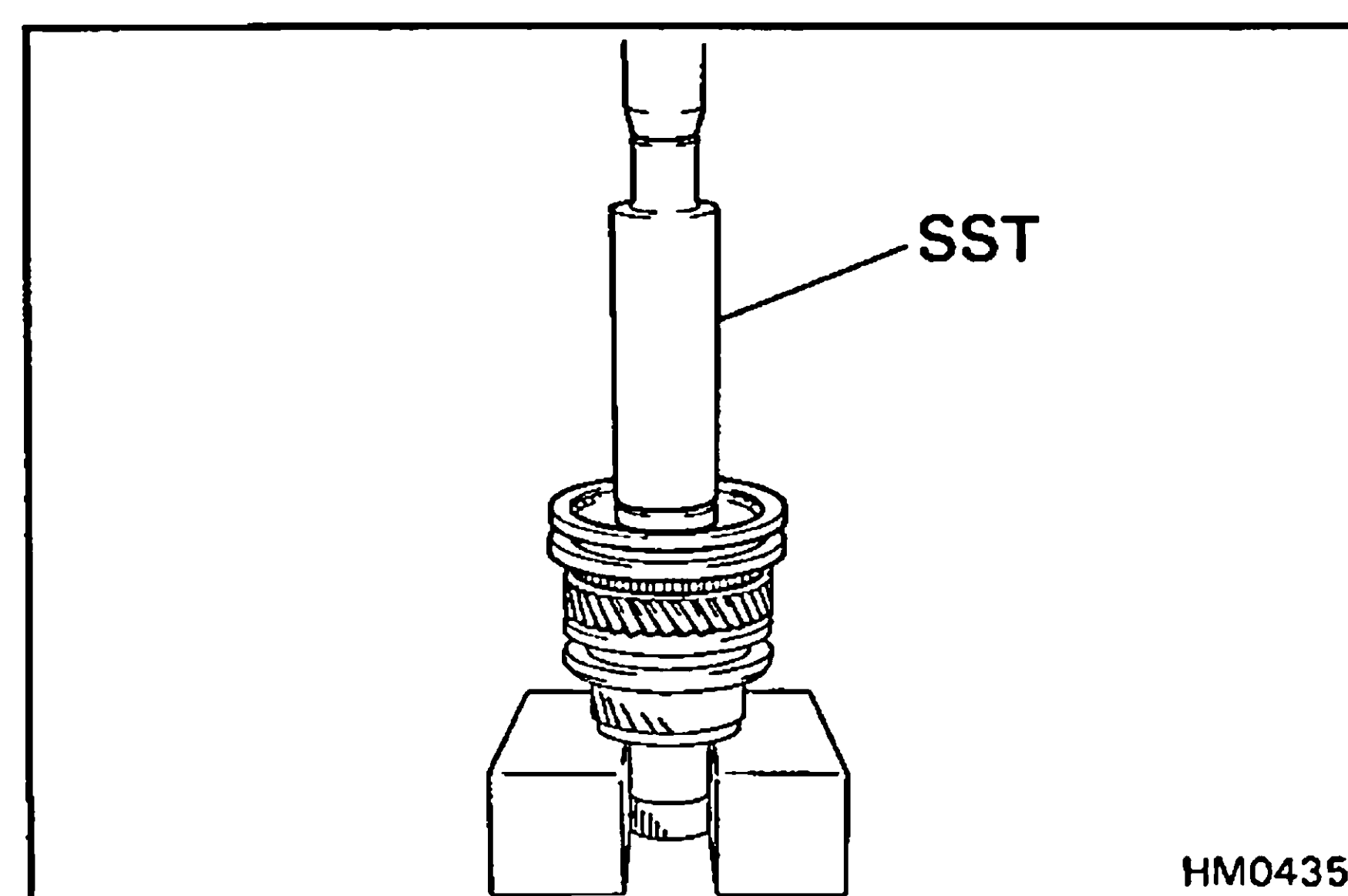
Standard clearance: 0.1 — 0.35 mm
(0.0039 — 0.0138 in.)

Maximum clearance: 0.35 mm (0.0138 in.)



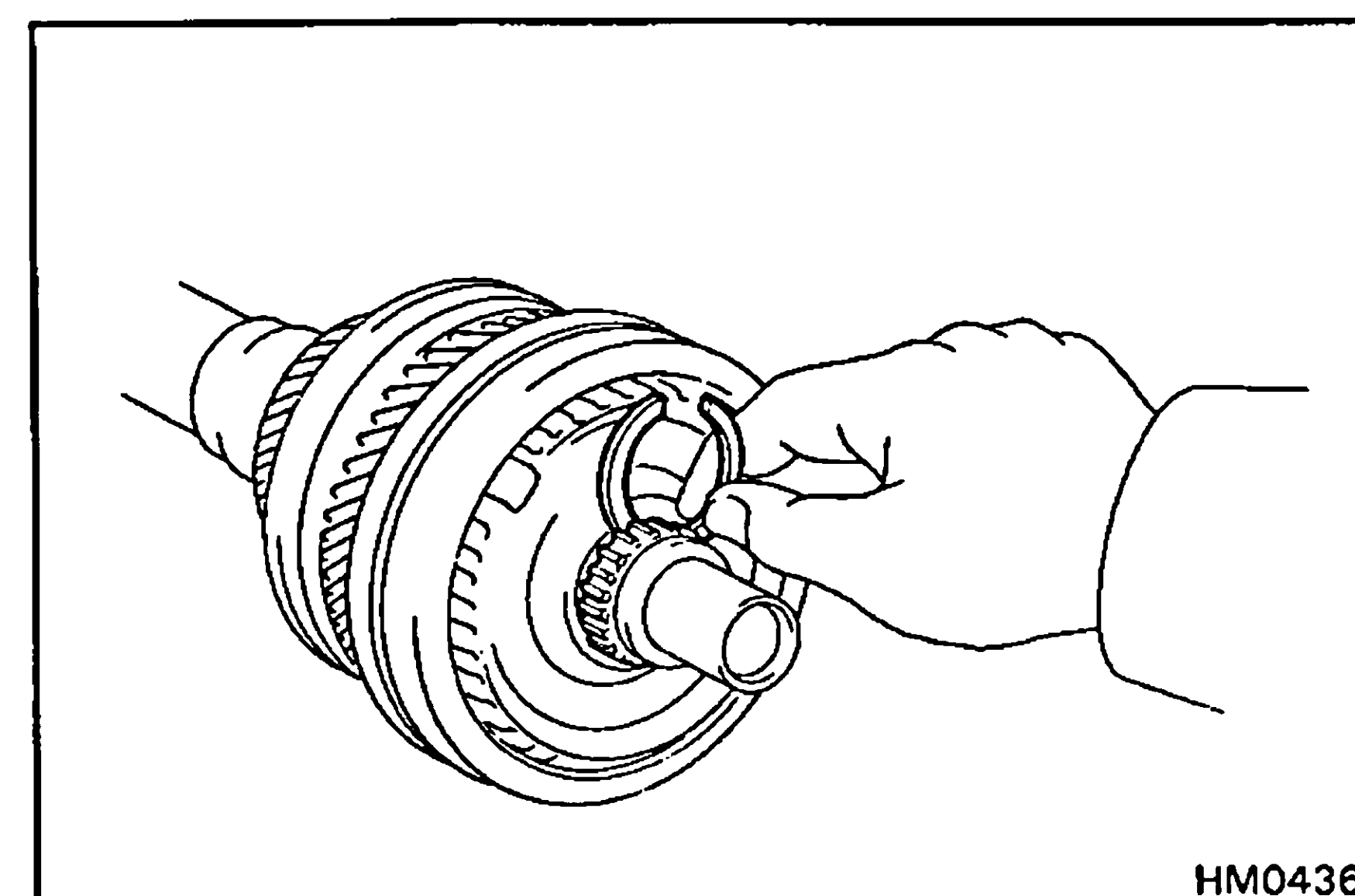
5. INSTALL THIRD GEAR AND HUB SLEEVE NO.2 ASSEMBLY

- (a) Apply gear oil to the shaft and needle roller bearing.
- (b) Place the synchronizer rings on the gear and align the ring slots with the shifting keys.
- (c) Install the needle roller bearing in the third gear.



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

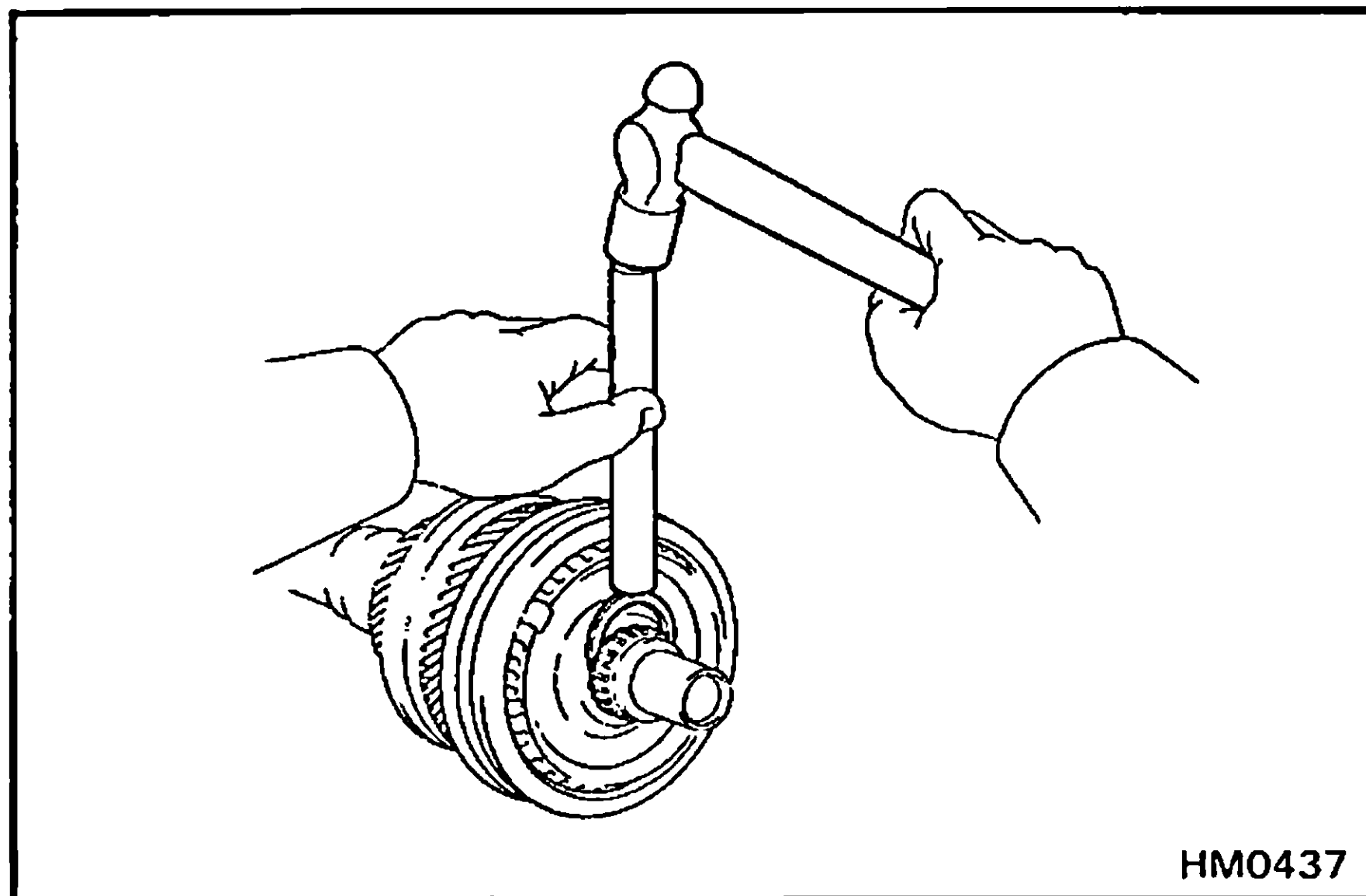
SST 09316-60010 (09316-00010)



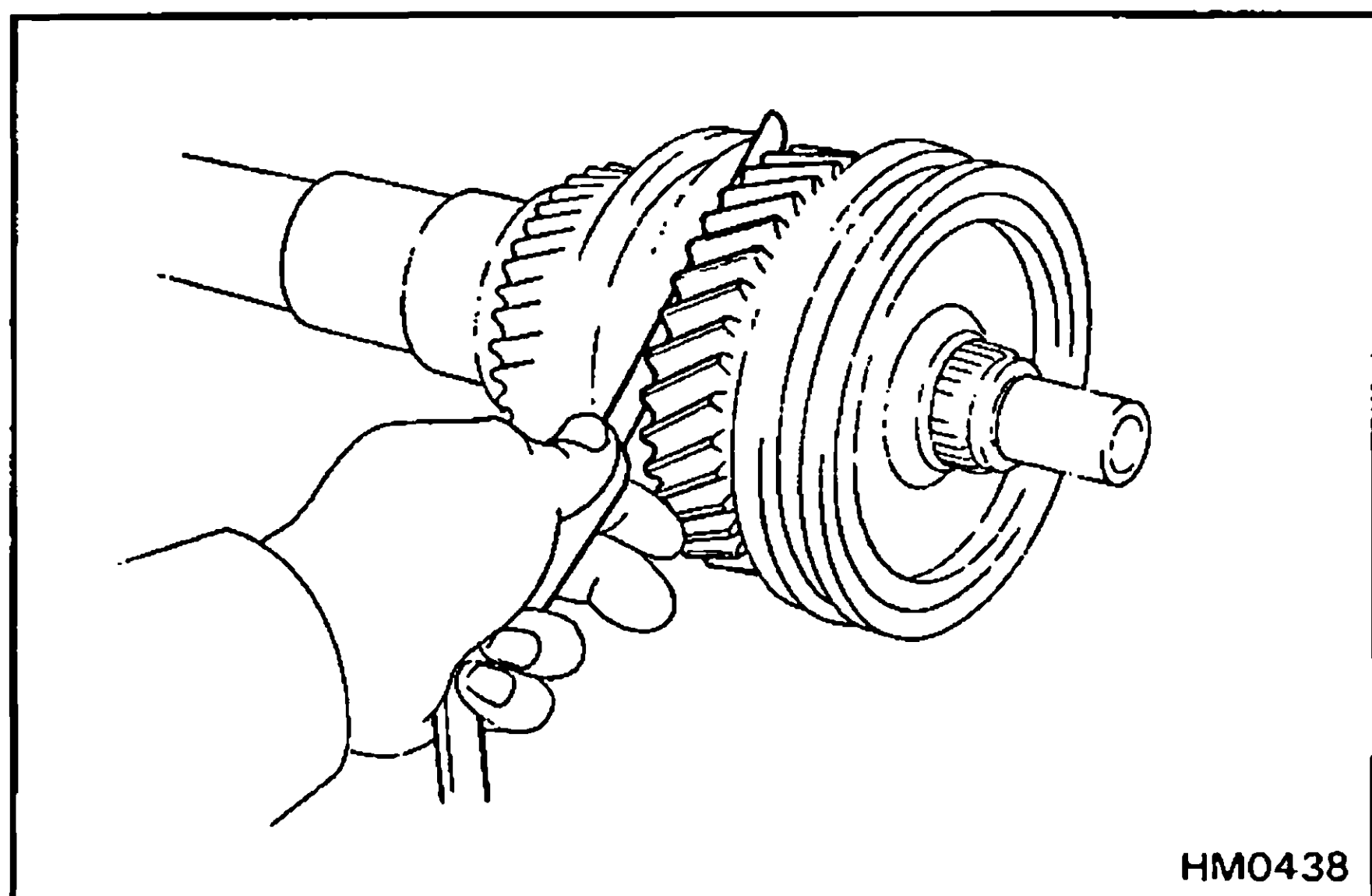
6. INSTALL SNAP RING

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

Mark	Thickness mm (in.)
4	1.90 — 1.95 (0.0748 — 0.0768)
5	1.95 — 2.00 (0.0768 — 0.0787)
6	2.00 — 2.05 (0.0787 — 0.0807)
7	2.05 — 2.10 (0.0807 — 0.0827)
8	2.10 — 2.15 (0.0827 — 0.0847)
9	2.15 — 2.20 (0.0847 — 0.0866)



- (b) Using a brass bar and a hammer, drive in a new snap ring.

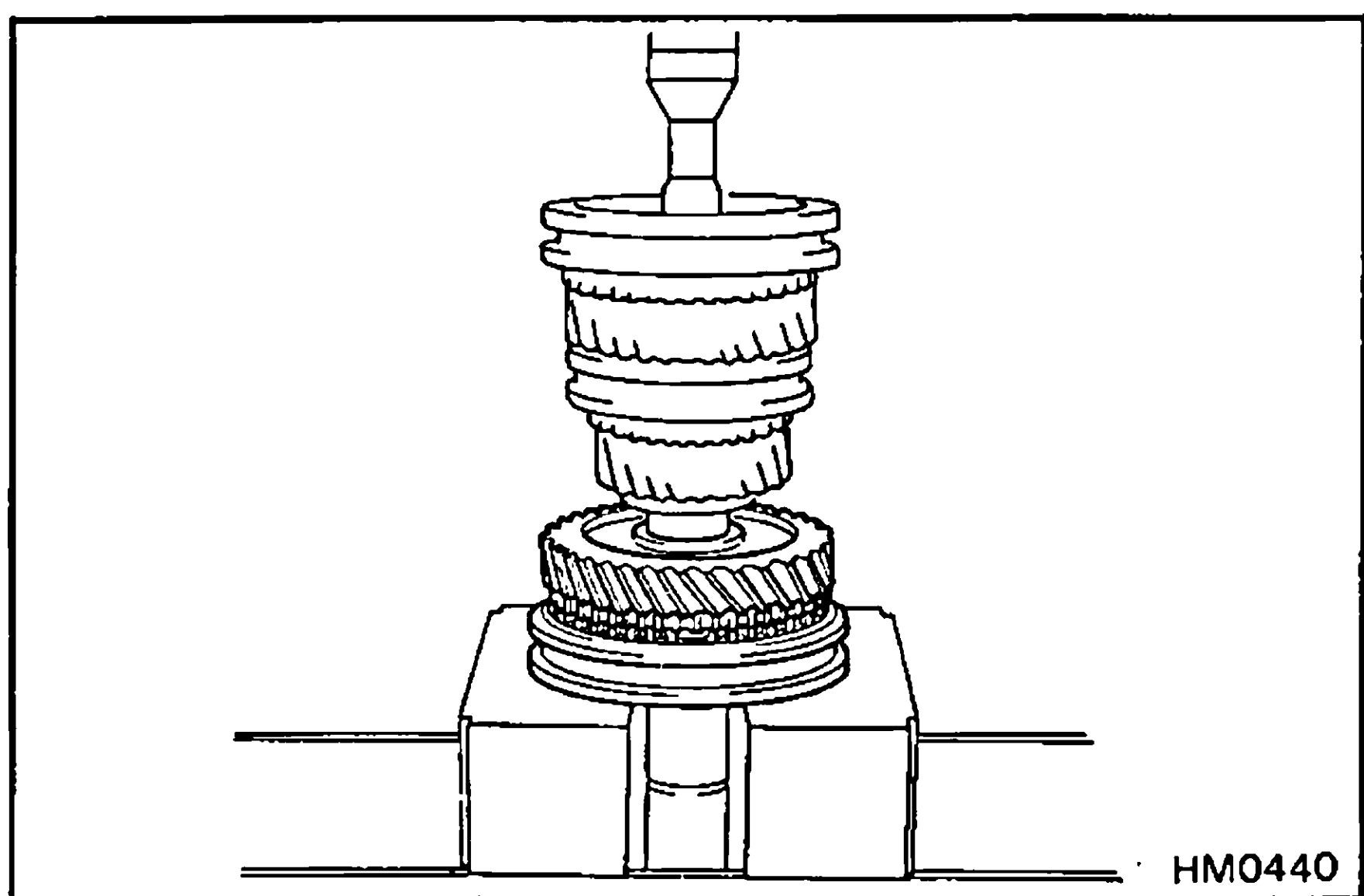


7. MEASURE THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the third gear thrust clearance.

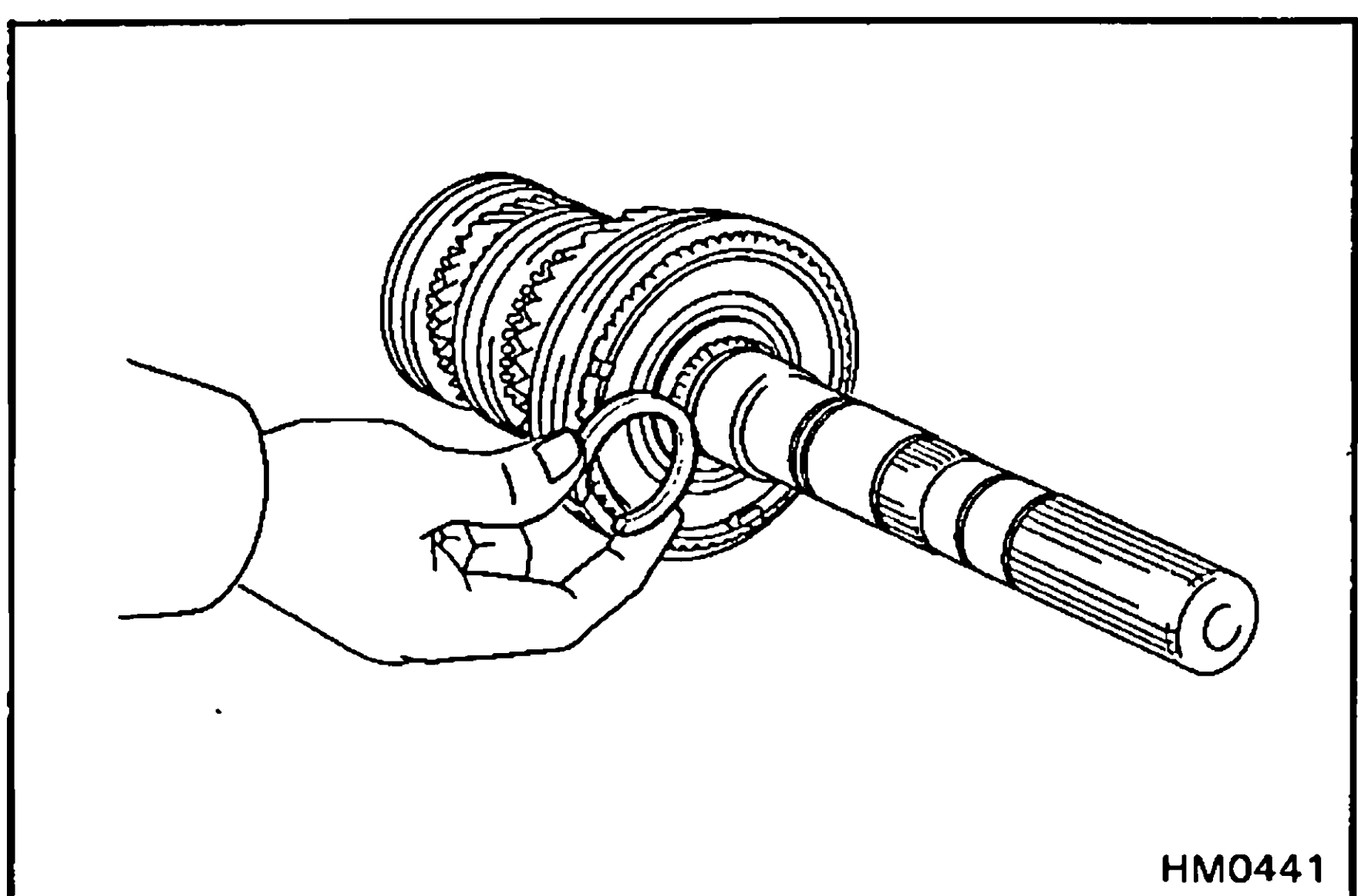
Standard clearance: 0.1 — 0.45 mm
(0.0039 — 0.0138 in.)

Maximum clearance: 0.45 mm (0.0138 in.)



8. INSTALL SECOND GEAR AND HUB SLEEVE NO.1 ASSEMBLY

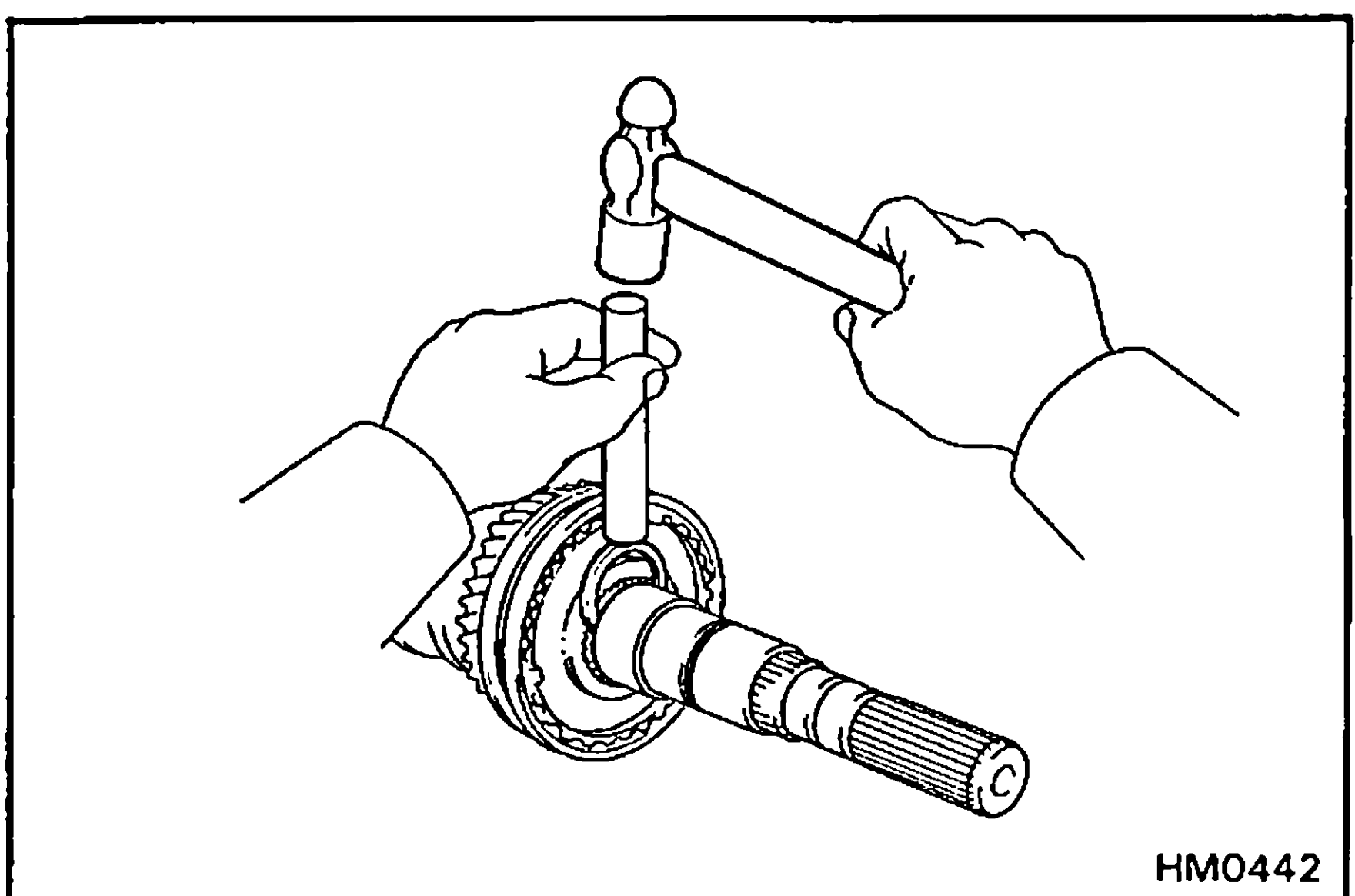
- Apply gear oil to the shaft and needle roller bearing.
- Place the synchronizer rings on the gear and align the ring slots with the shifting keys.
- Install the needle roller bearing in the second gear.
- Using a press, install the second gear and hub sleeve No.1 assembly.



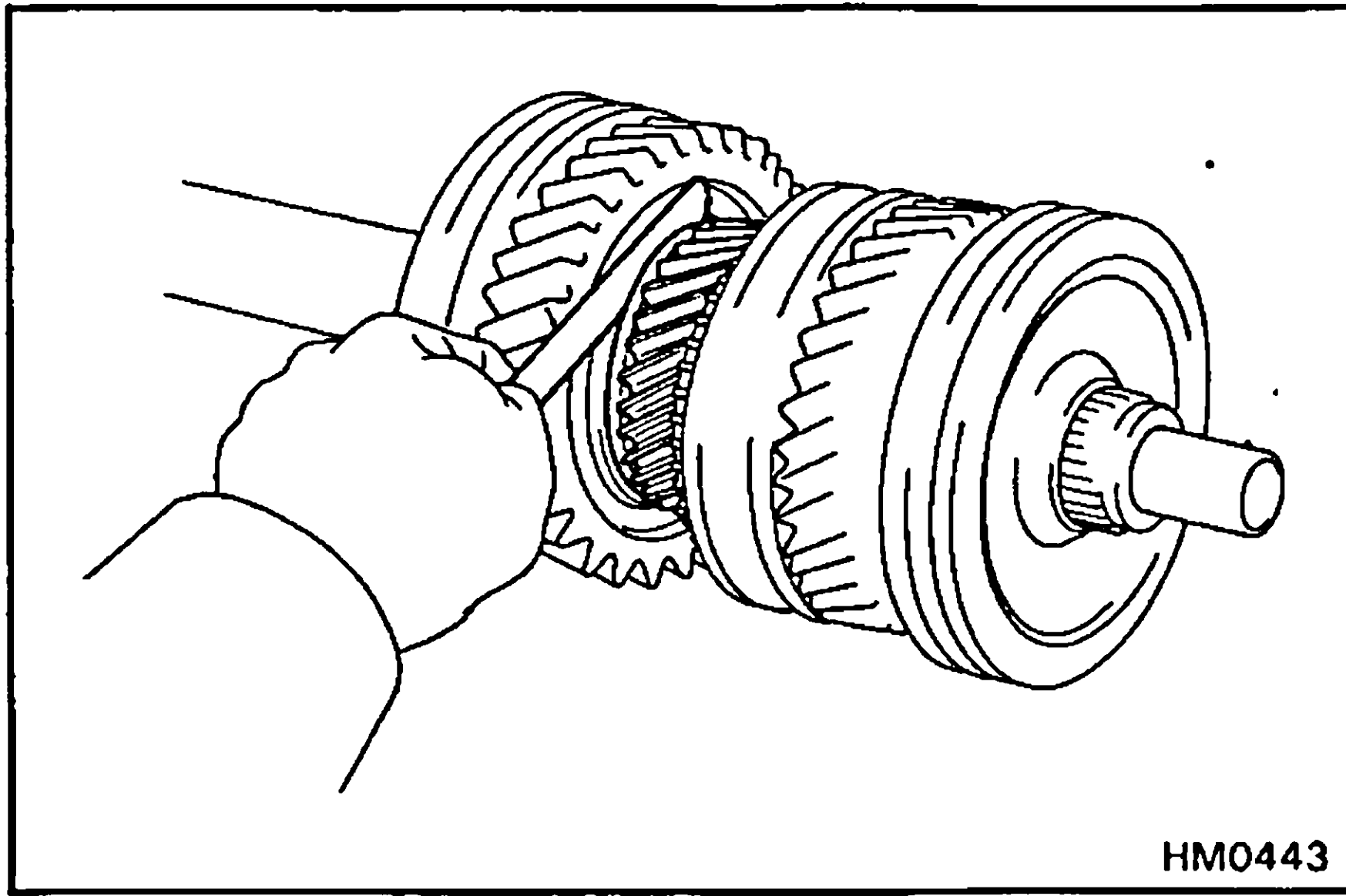
9. INSTALL SNAP RING

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

Mark	Thickness mm (in.)
A	2.90 — 2.95 (0.1142 — 0.1162)
B	2.95 — 3.00 (0.1162 — 0.1181)
C	3.00 — 3.05 (0.1181 — 0.1201)
D	3.05 — 3.10 (0.1201 — 0.1220)
E	3.10 — 3.15 (0.1220 — 0.1240)
F	3.15 — 3.20 (0.1240 — 0.1260)



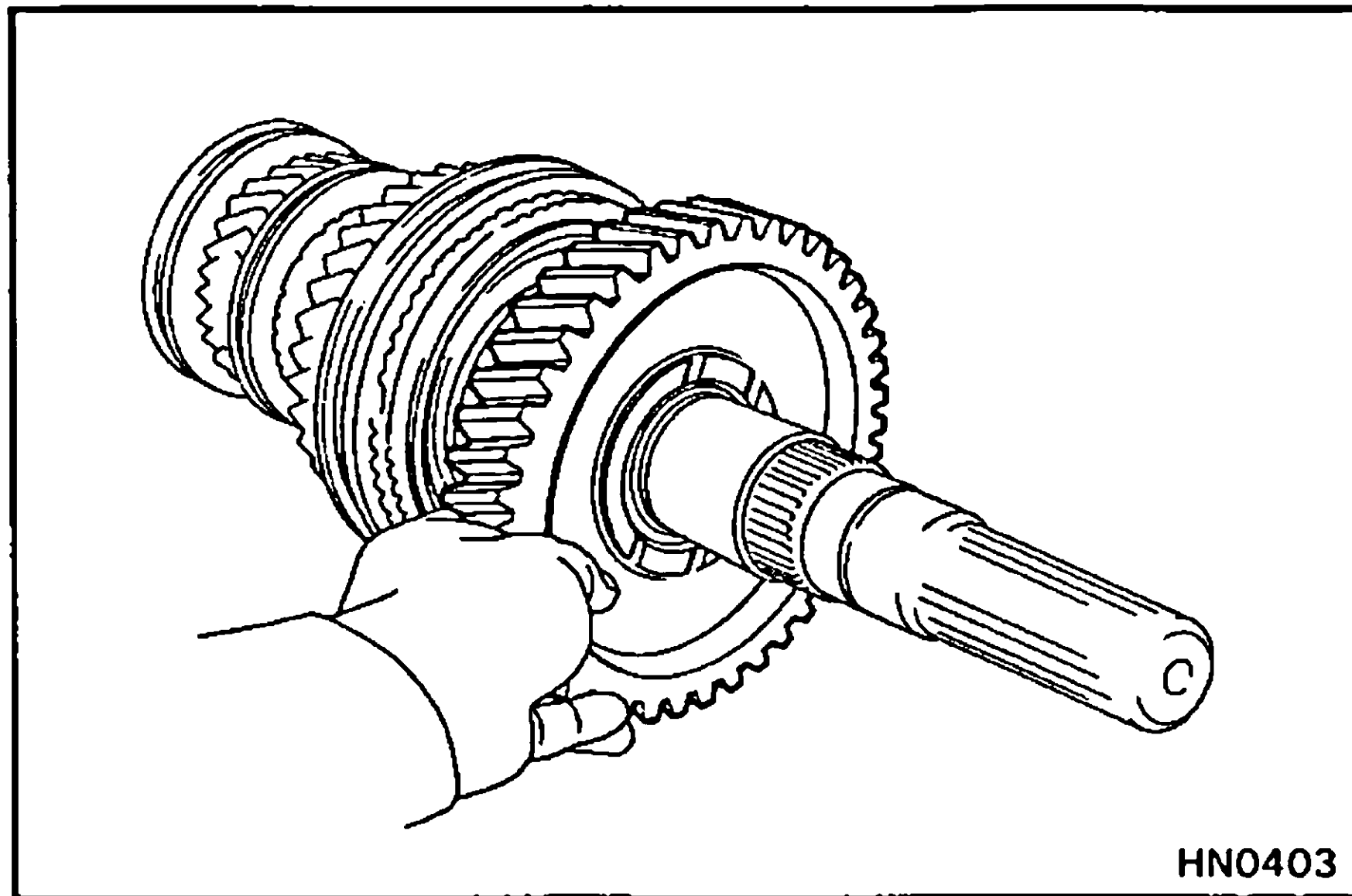
- (b) Using a brass bar and a hammer, drive in a new snap ring.

**10. MEASURE SECOND GEAR THRUST CLEARANCE**

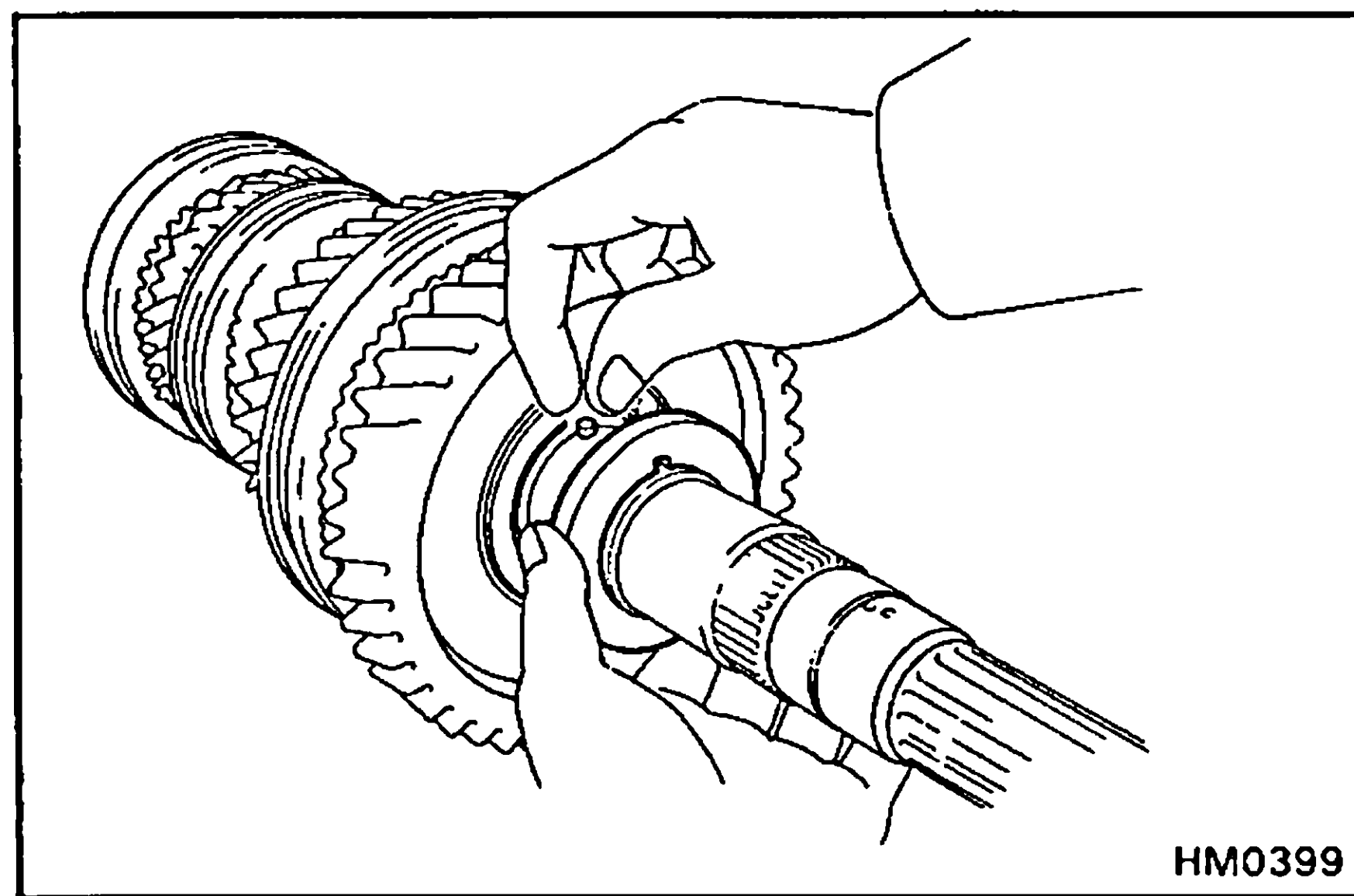
Using a feeler gauge, measure the second gear thrust clearance.

Standard clearance: 0.1 — 0.35 mm
(0.0039 — 0.0138 in.)

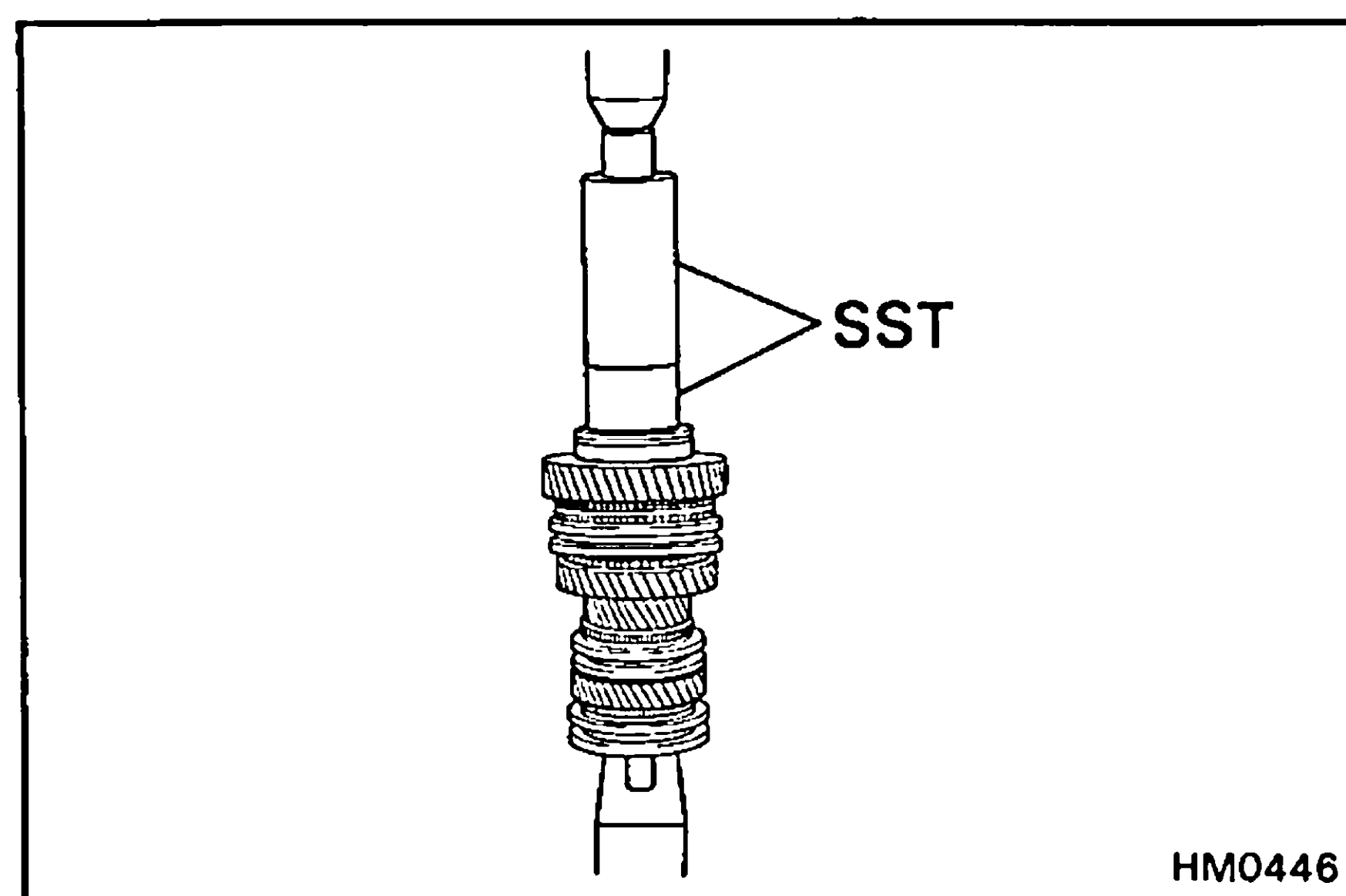
Maximum clearance: 0.35 mm (0.0138 in.)

**11. INSTALL FIRST GEAR**

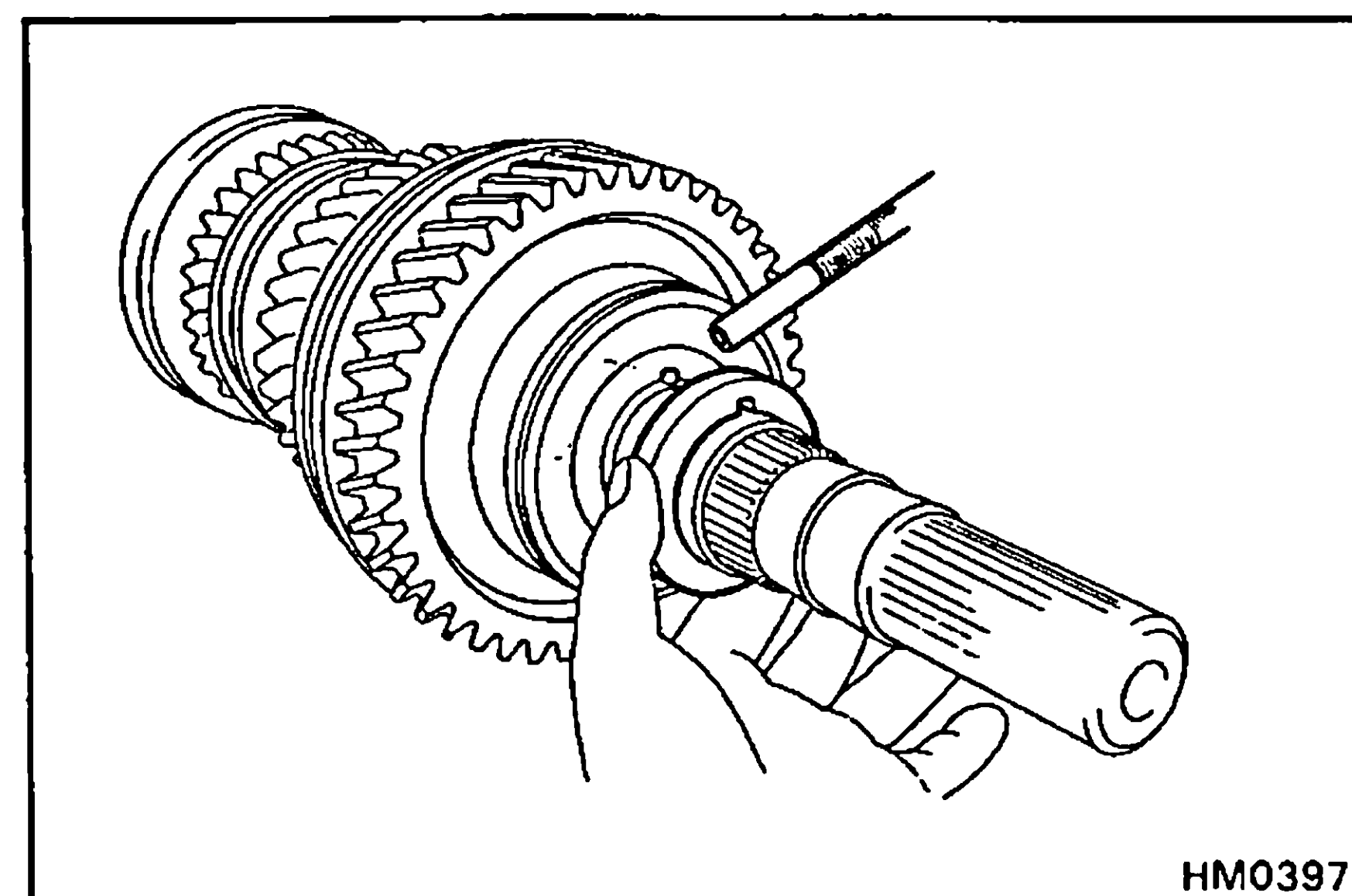
- (a) Apply gear oil to the shaft and needle roller bearing.
- (b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
- (c) Install the needle roller bearing in the first gear.

**12. INSTALL BALL BEARING**

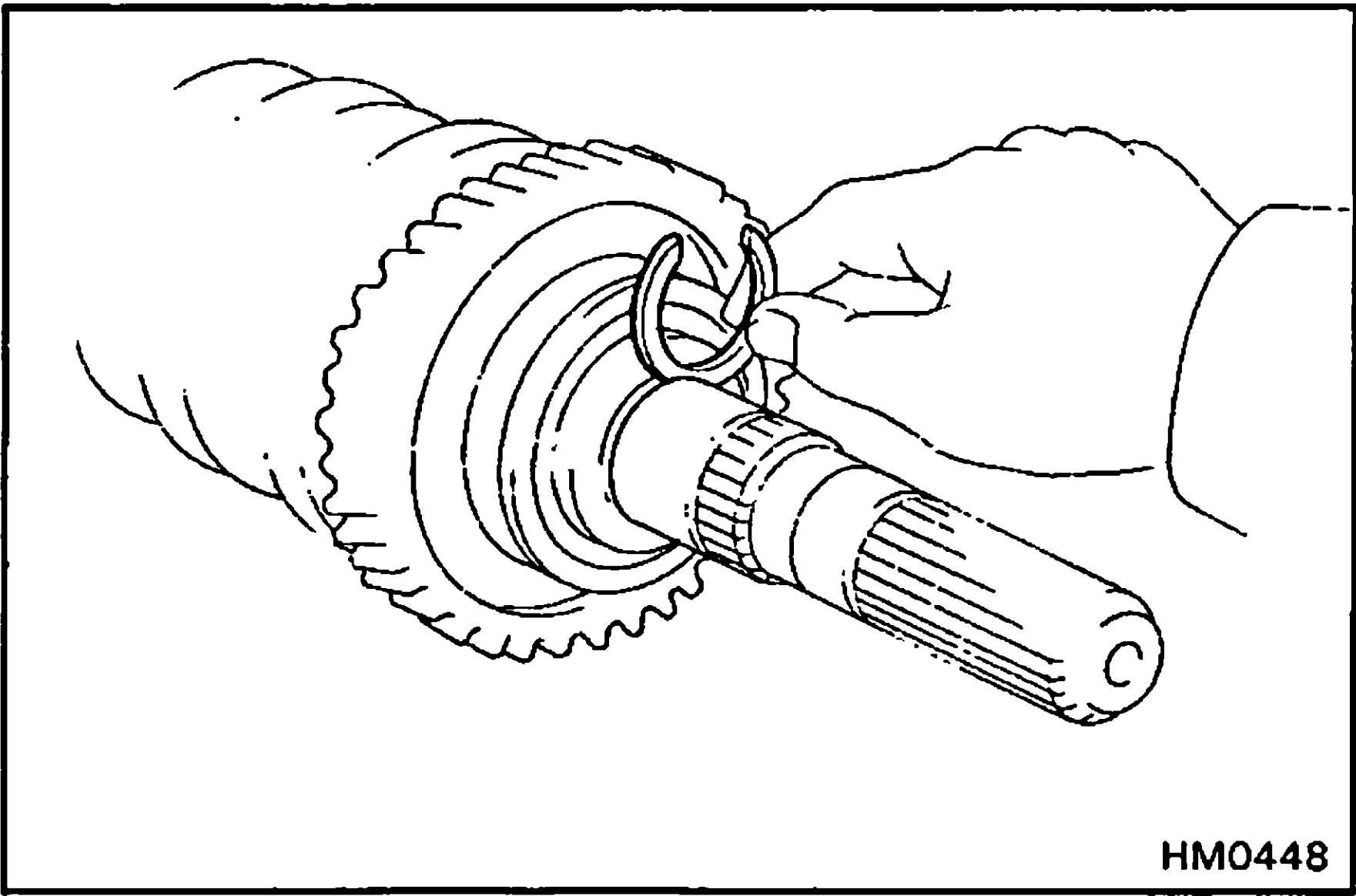
- (a) Install the pin and thrust washer.



- (b) Using SST and a press, install the ball bearing.
SST 09316-60010 (09316-00010), 09523-36010



- (c) Install the pin and thrust washer.

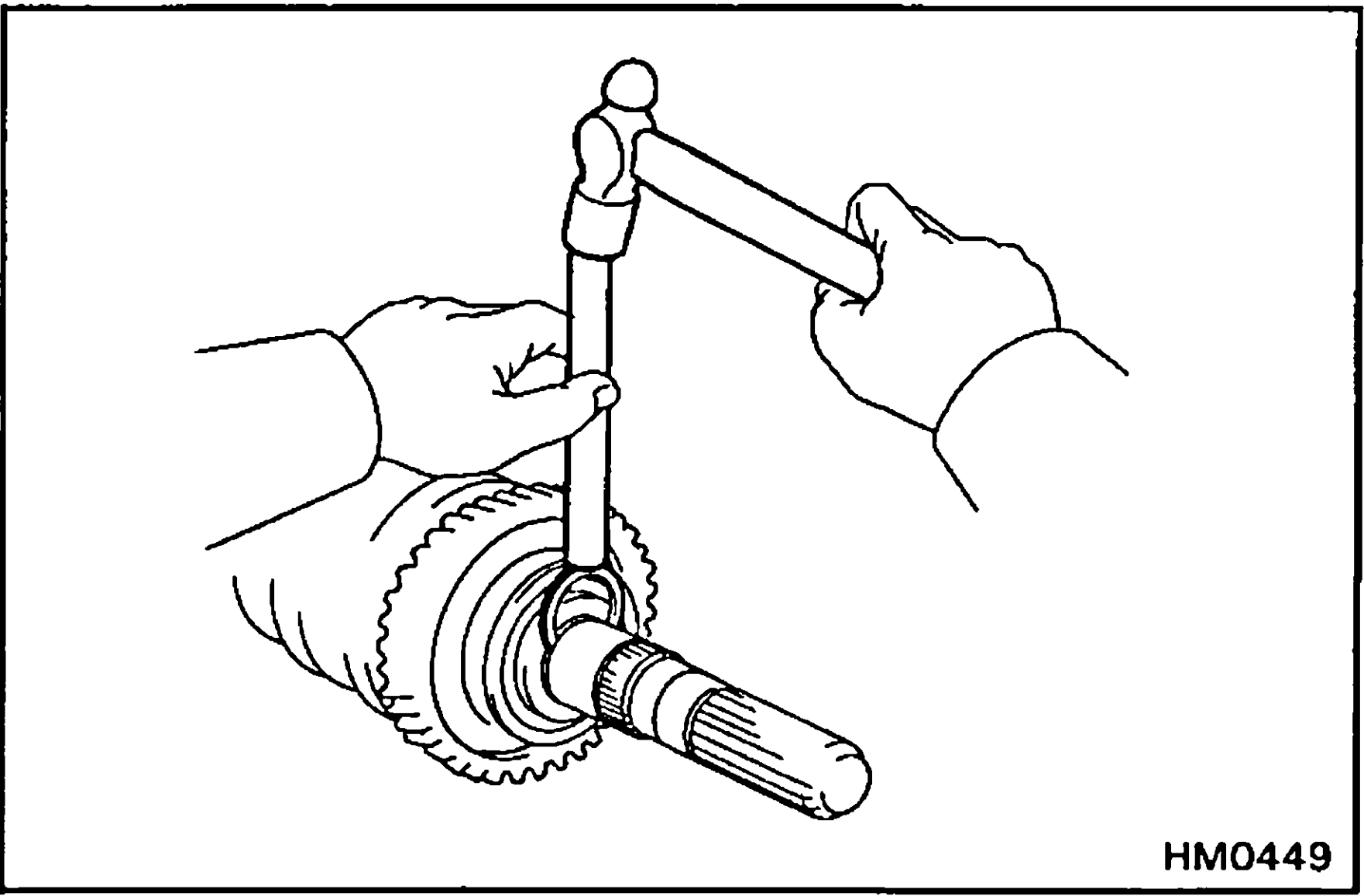


13. INSTALL SNAP RING

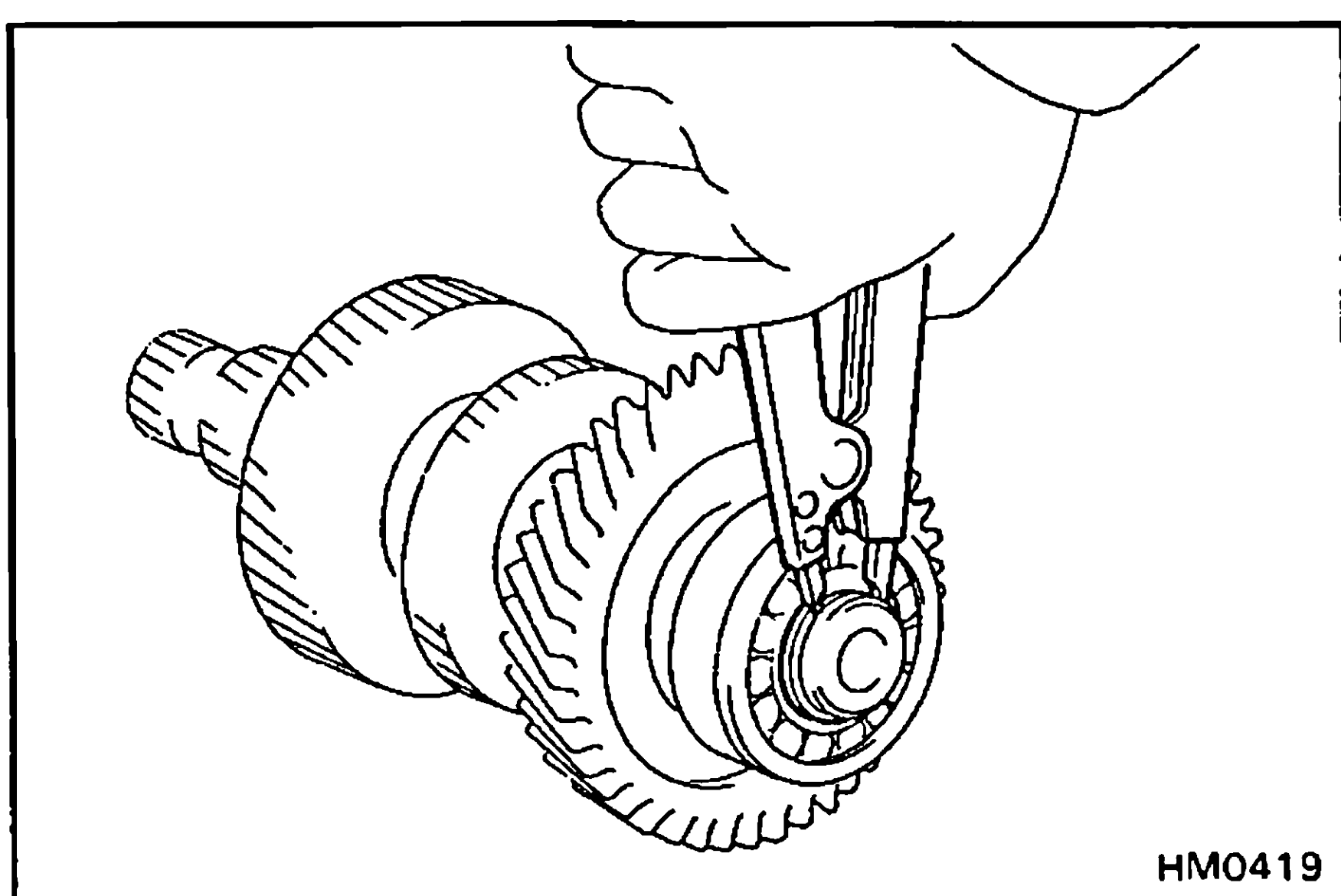
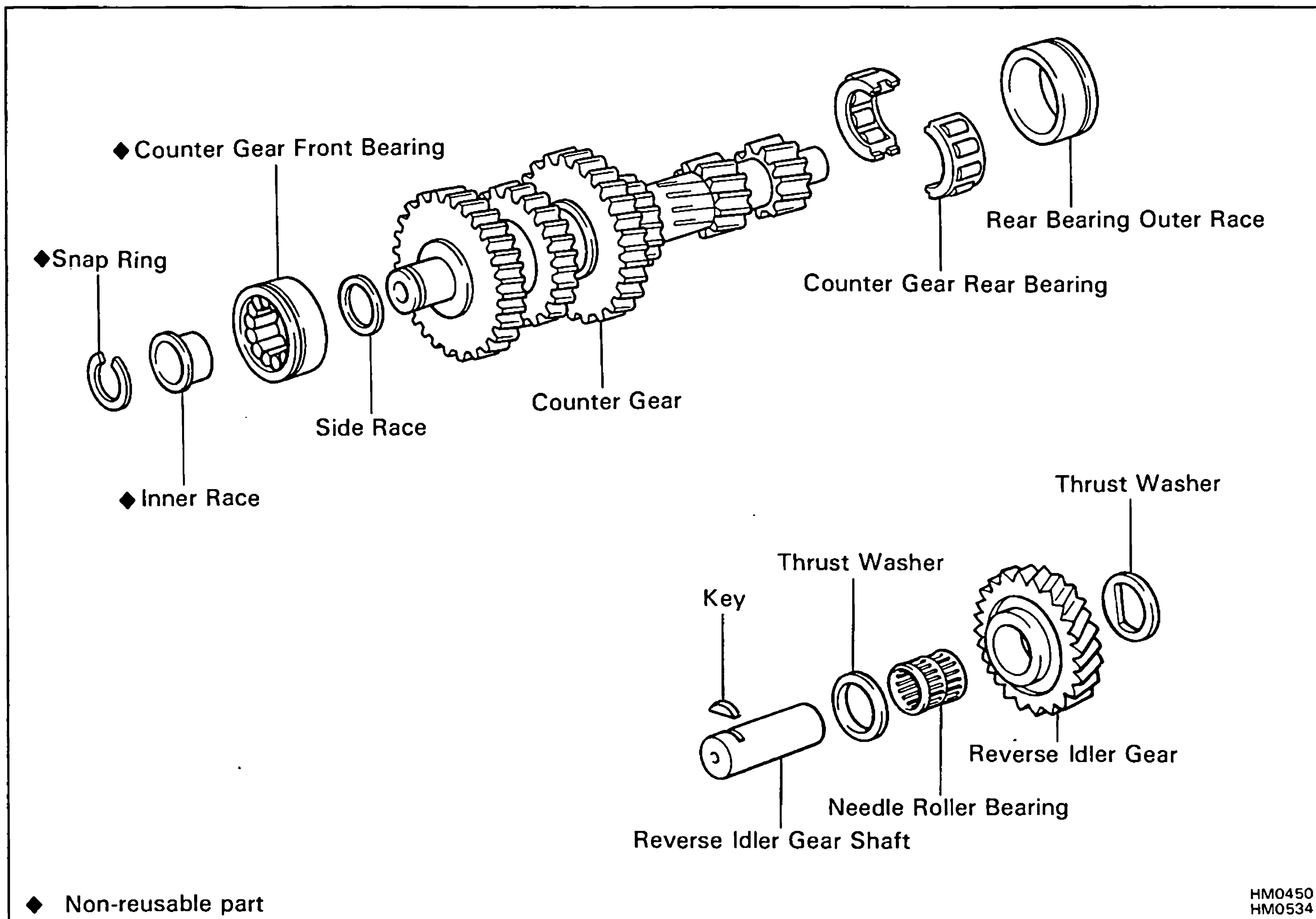
(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
A	2.40 — 2.45 (0.0945 — 0.0965)
B	2.45 — 2.50 (0.0965 — 0.0984)
C	2.50 — 2.55 (0.0984 — 0.1004)
D	2.55 — 2.60 (0.1004 — 0.1024)
E	2.60 — 2.65 (0.1024 — 0.1044)
F	2.65 — 2.70 (0.1044 — 0.1063)
G	2.70 — 2.75 (0.1063 — 0.1083)
H	2.75 — 2.80 (0.1083 — 0.1102)

(b) Using a brass bar and a hammer, drive in a new snap ring.



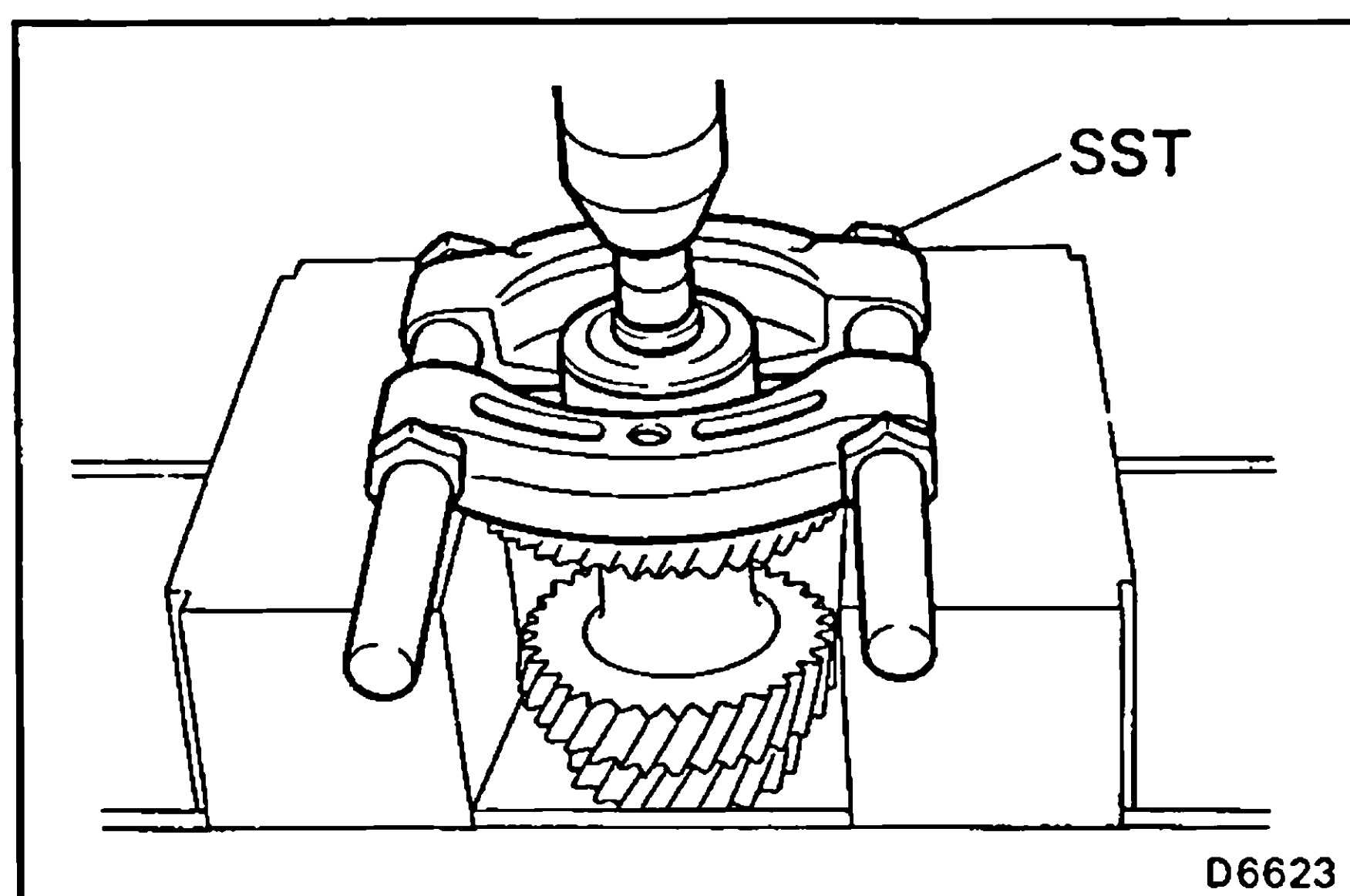
COUNTER GEAR AND REVERSE IDLER GEAR COMPONENTS



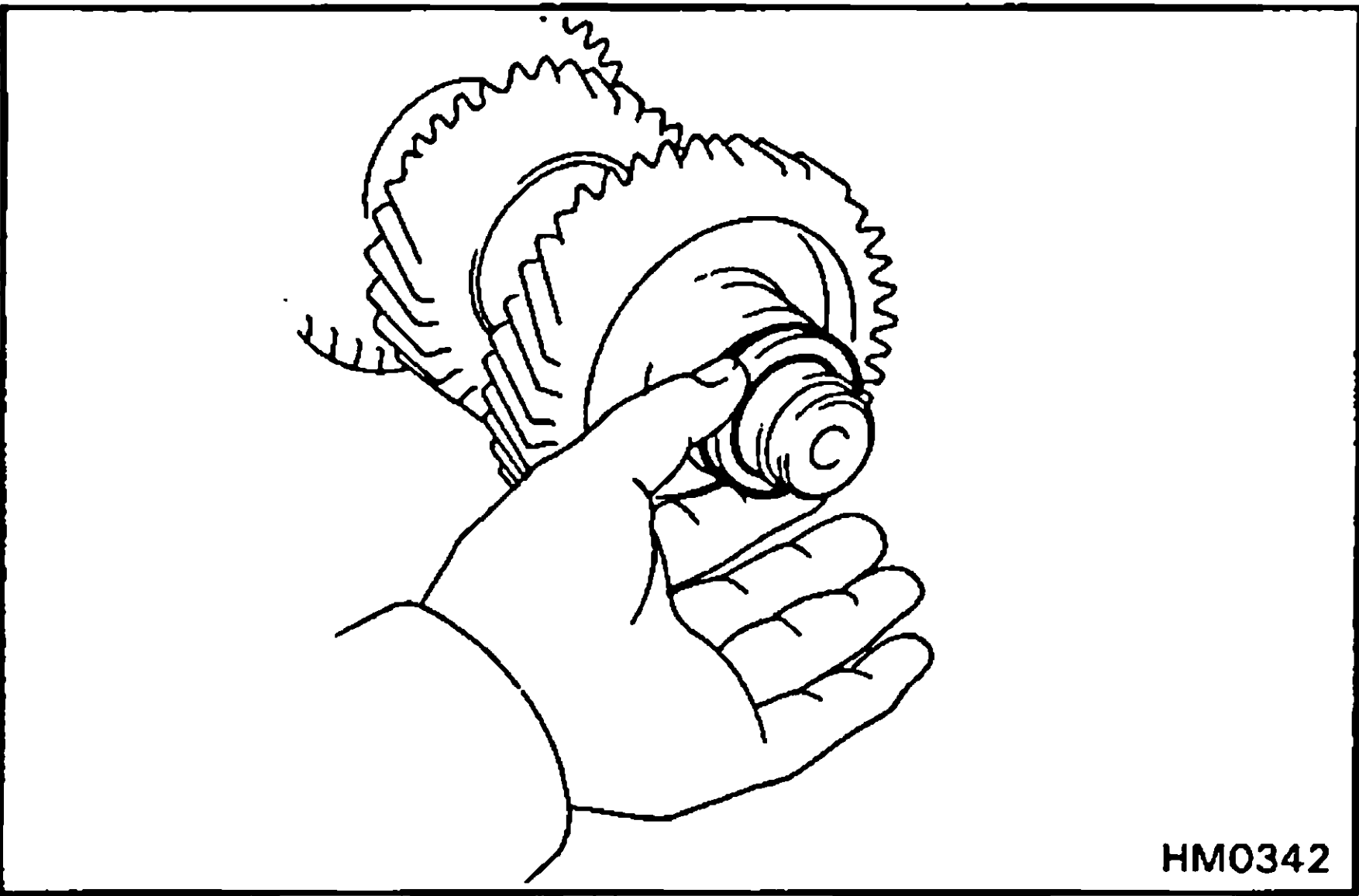
DISASSEMBLY OF COUNTER GEAR ASSEMBLY

IF NECESSARY, REPLACE COUNTER GEAR FRONT BEARING AND SIDE RACE

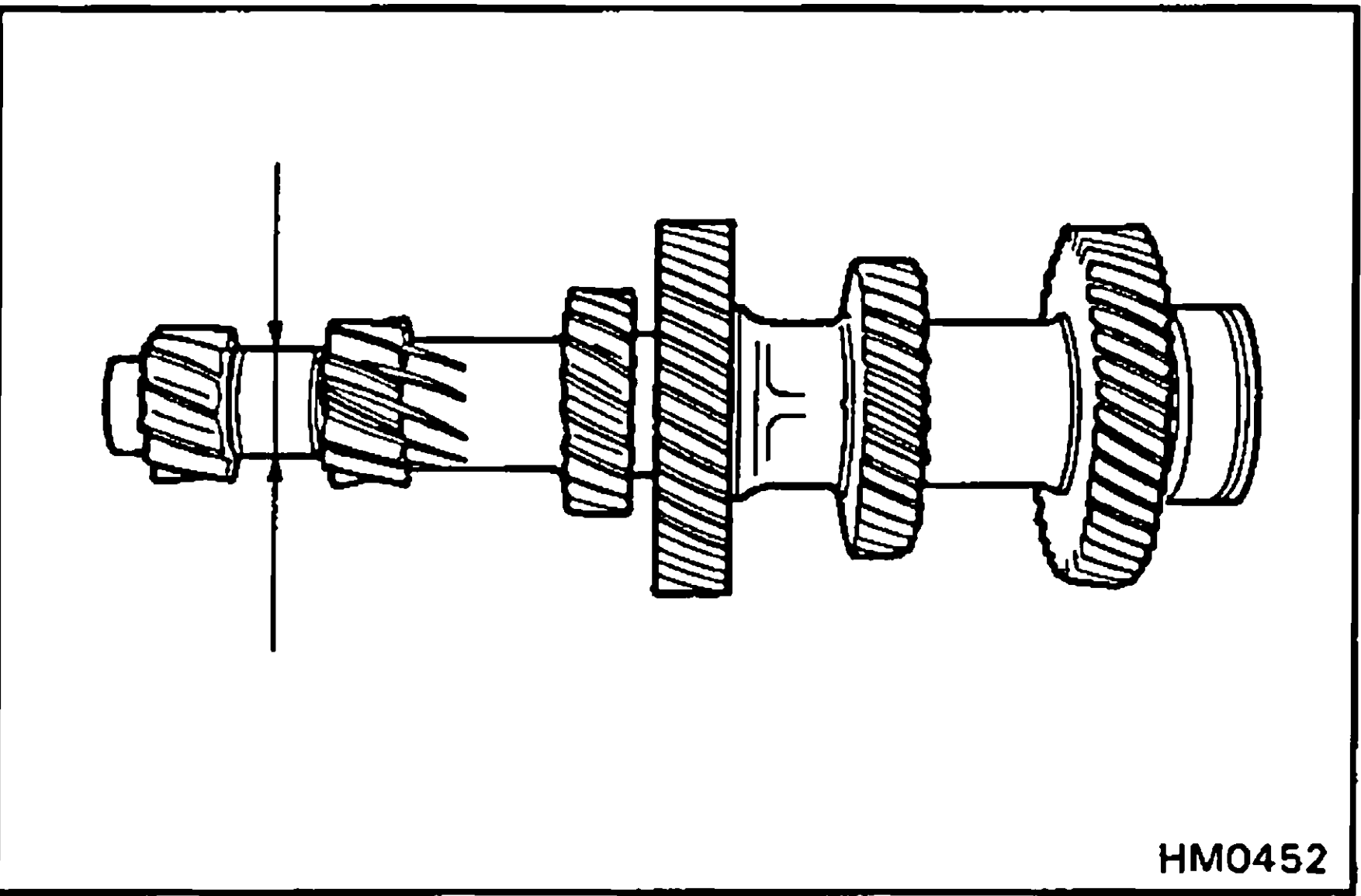
(a) Using a snap ring expander, remove the snap ring.



(b) Using SST and socket wrench, press out the bearing.
SST 09950-00020



(c) Remove the side race.



INSPECTION OF COUNTER GEAR AND REVERSE IDLER GEAR

1. INSPECT COUNTER GEAR

Using a micrometer, measure the outer diameter of needle roller bearing race.

Standard diameter: 35.957 — 35.970 mm
(1.4156 — 1.4161 in.)

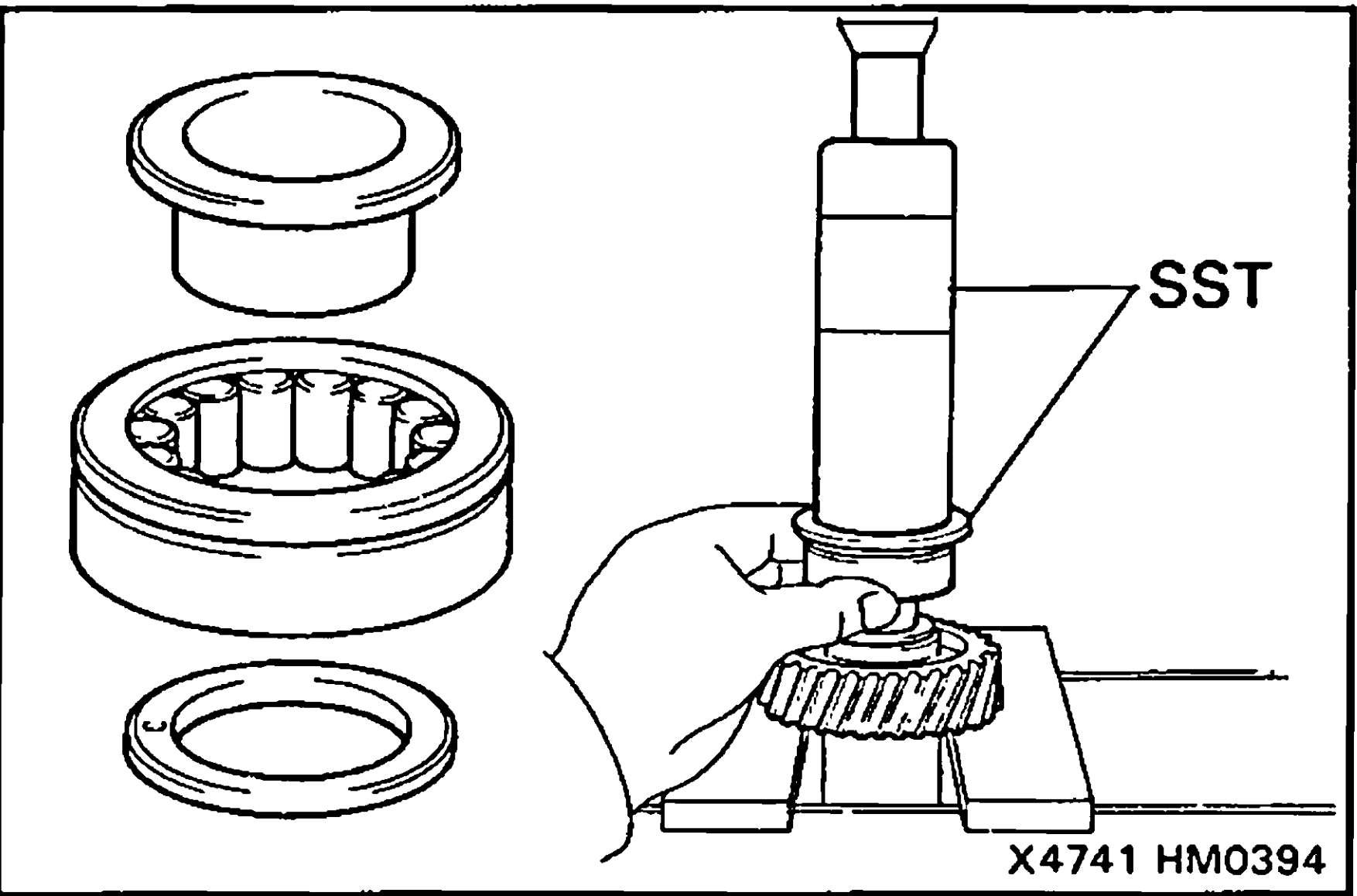
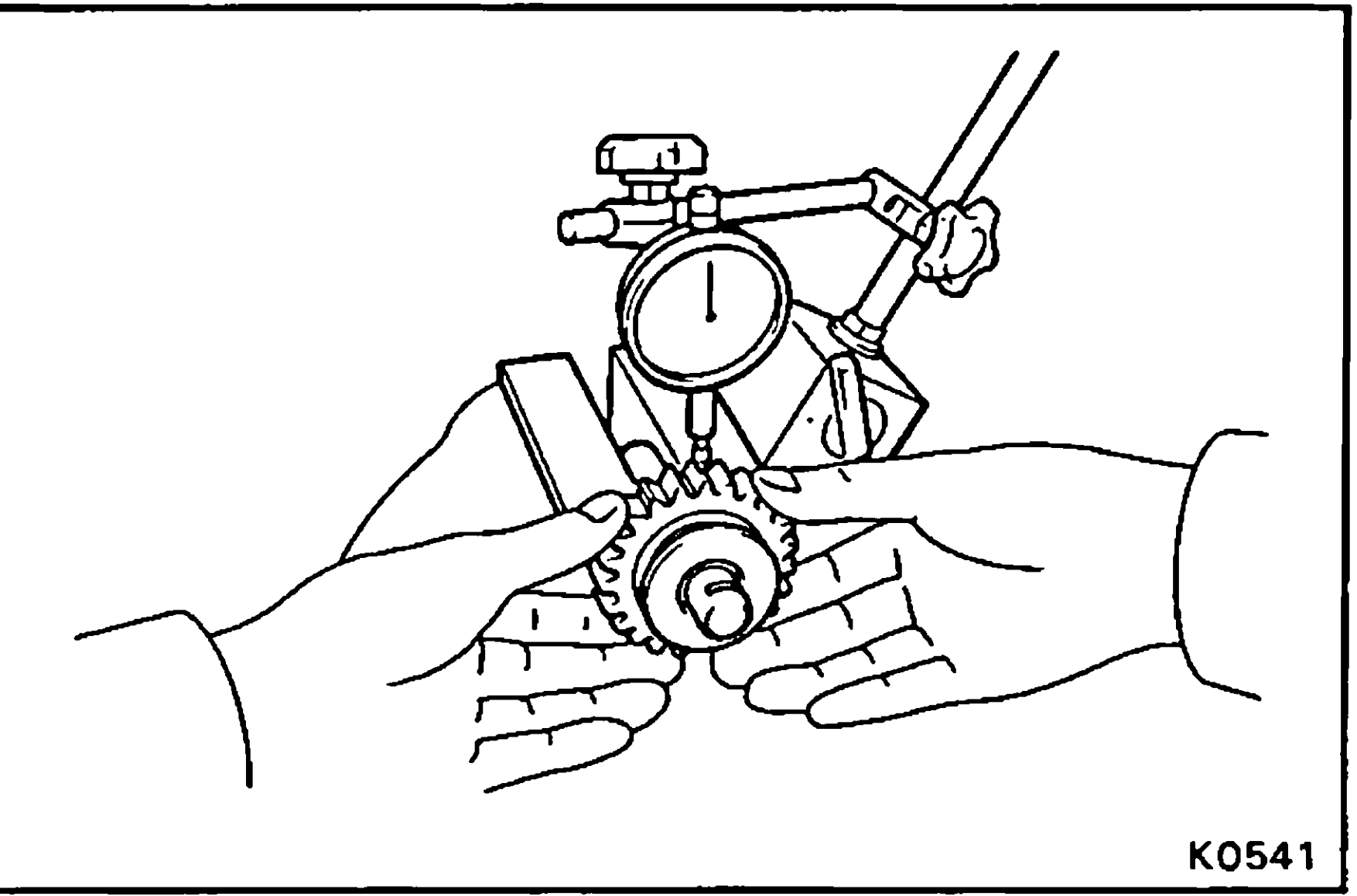
Minimum diameter: 35.957 mm (1.4156 in.)

2. INSTECT REVERSE IDLER GEAR

Using a dial indicator, measure the oil clearance of reverse idler gear.

Standard clearance: 0.015 — 0.059 mm
(0.0006 — 0.0023 in.)

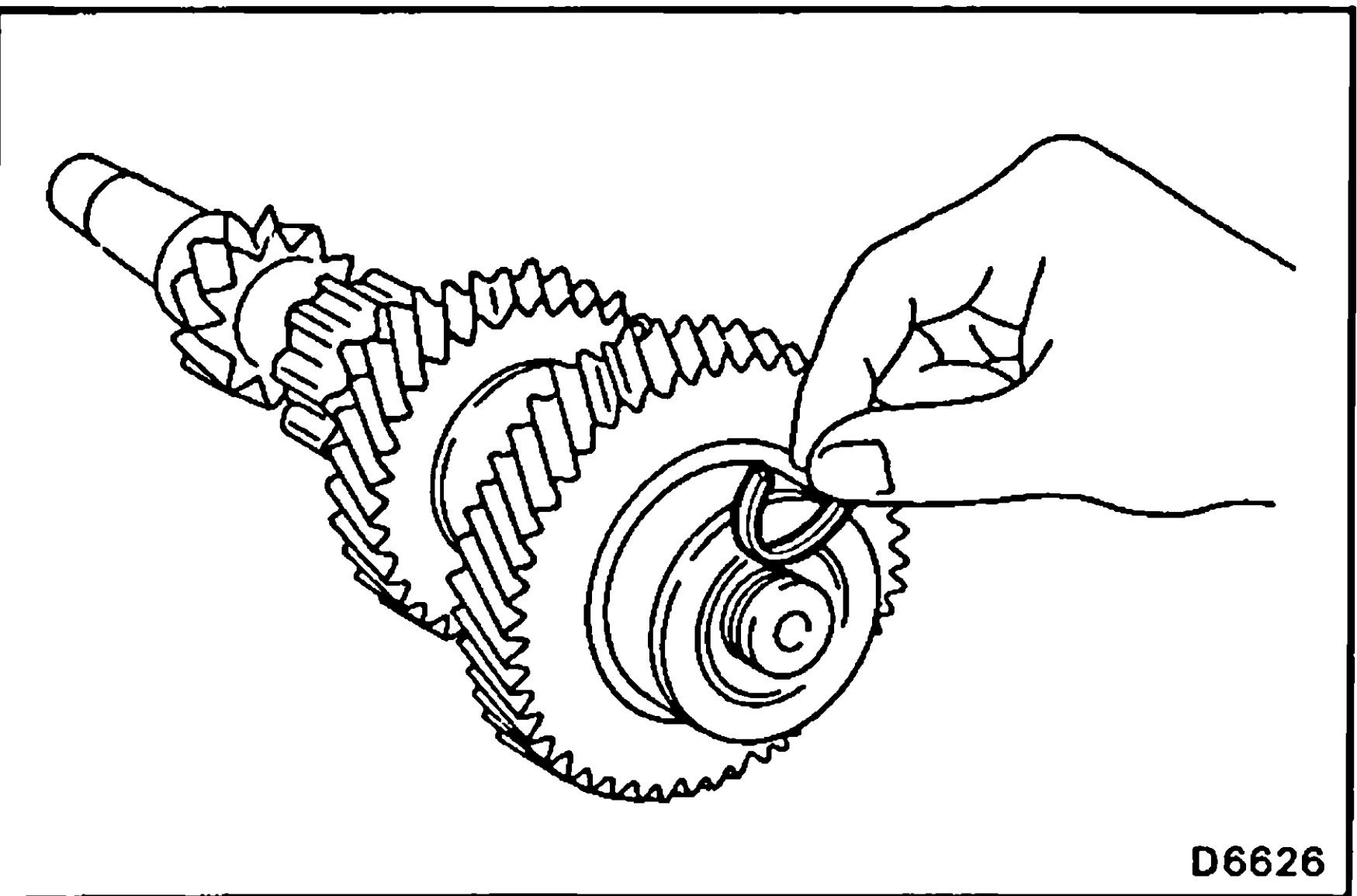
Maximum clearance: 0.059 mm (0.0023 in.)



ASSEMBLY OF COUNTER GEAR ASSEMBLY

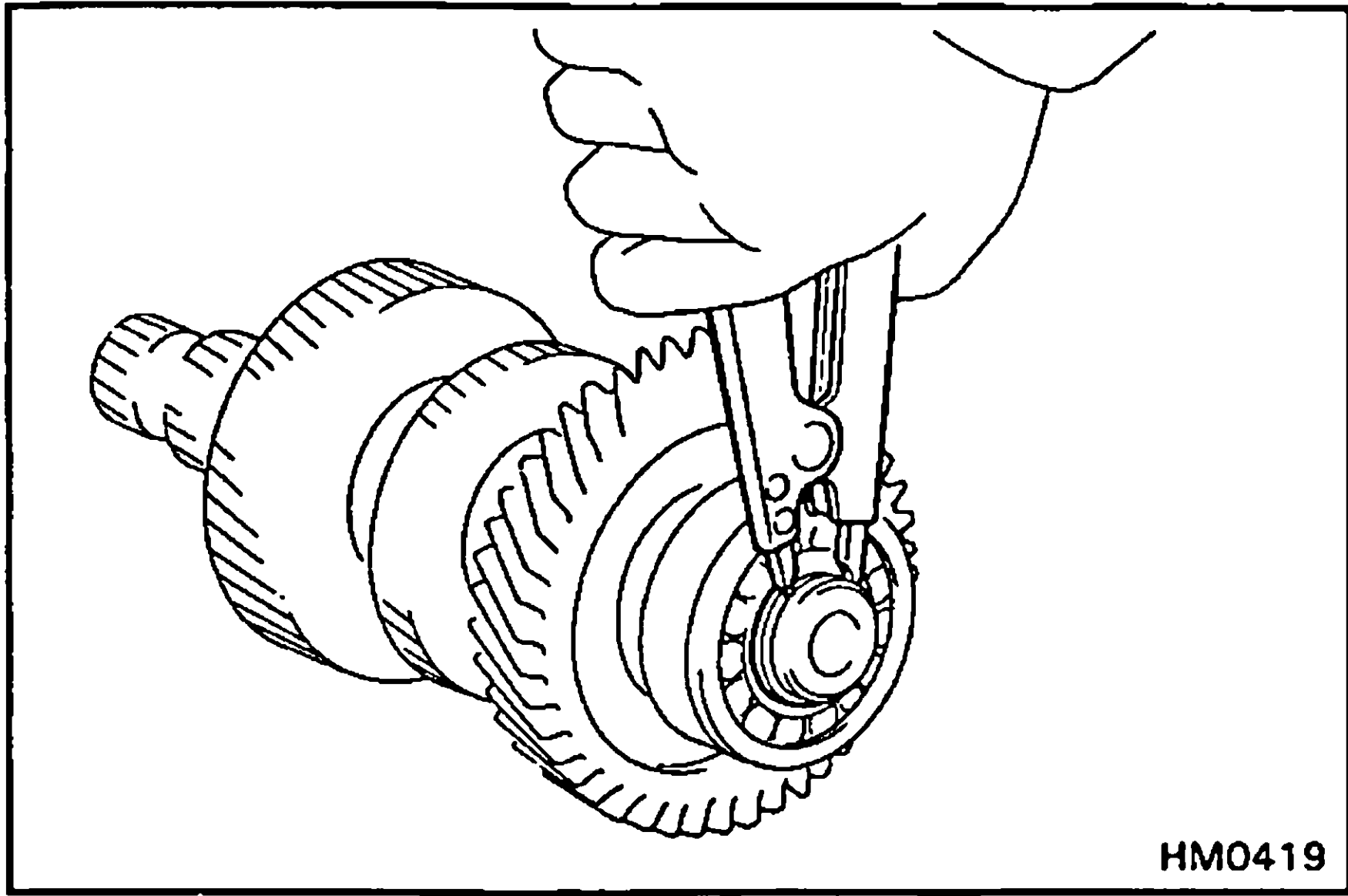
INSTALL SIDE RACE AND COUNTER GEAR FRONT BEARING

- (a) Apply gear oil to the side race.
 - (b) Install the side race.
 - (c) Apply gear oil to the bearing.
 - (d) Using SST and a press, install the bearing.
- SST 09316-60010 (09316-00010, 09316-00020)



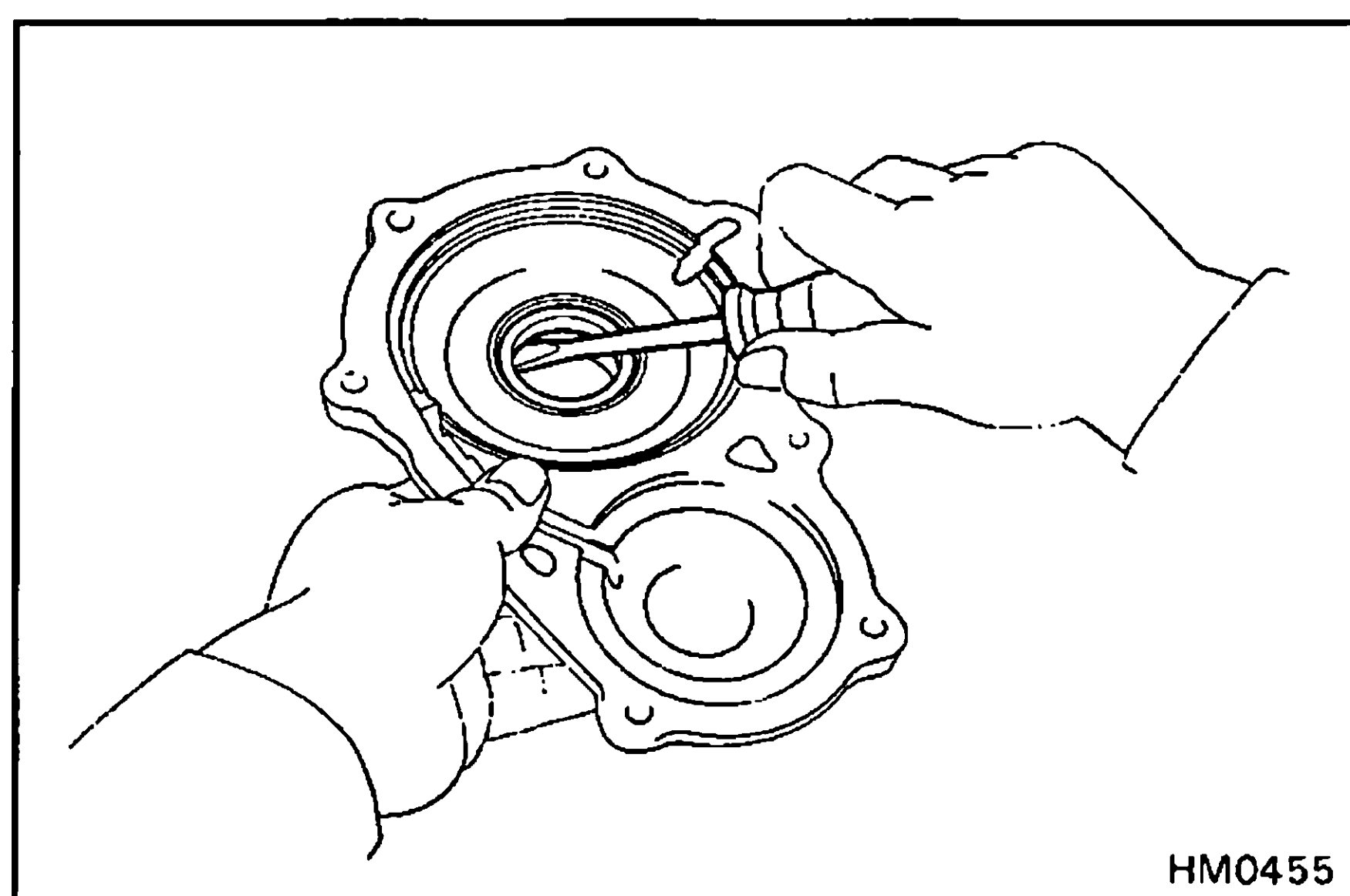
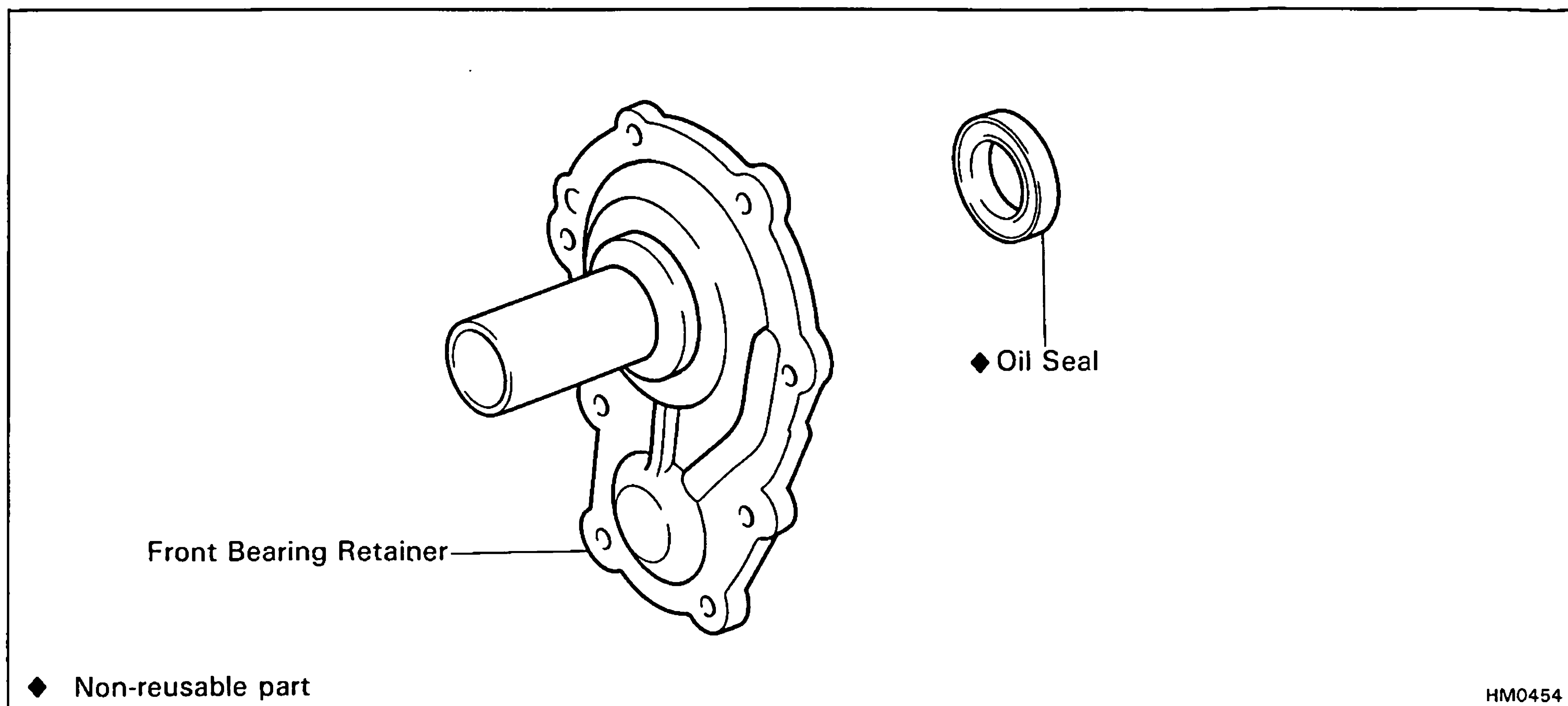
(e) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
A	2.45 — 2.50 (0.0970 — 0.0984)
B	2.50 — 2.55 (0.0984 — 0.1004)
C	2.55 — 2.60 (0.1004 — 0.1024)
D	2.60 — 2.65 (0.1024 — 0.1043)
E	2.65 — 2.70 (0.1043 — 0.1063)
F	2.70 — 2.75 (0.1063 — 0.1083)



(f) Using a snap ring expander, install a new snap ring.

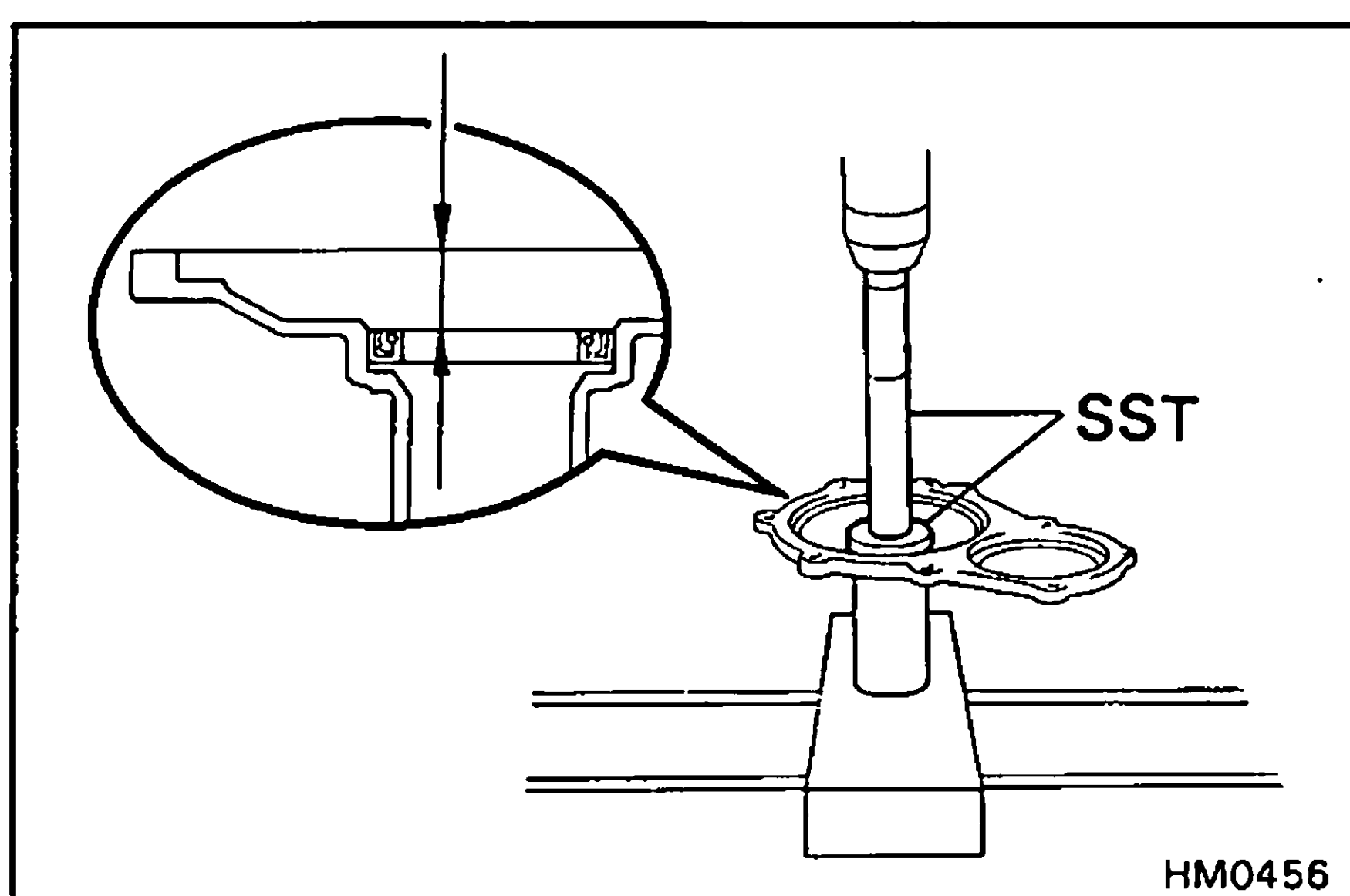
FRONT BEARING RETAINER COMPONENTS



REPLACEMENT OF OIL SEAL

IF NECESSARY REPLACE FRONT BEARING RETAINER OIL SEAL

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

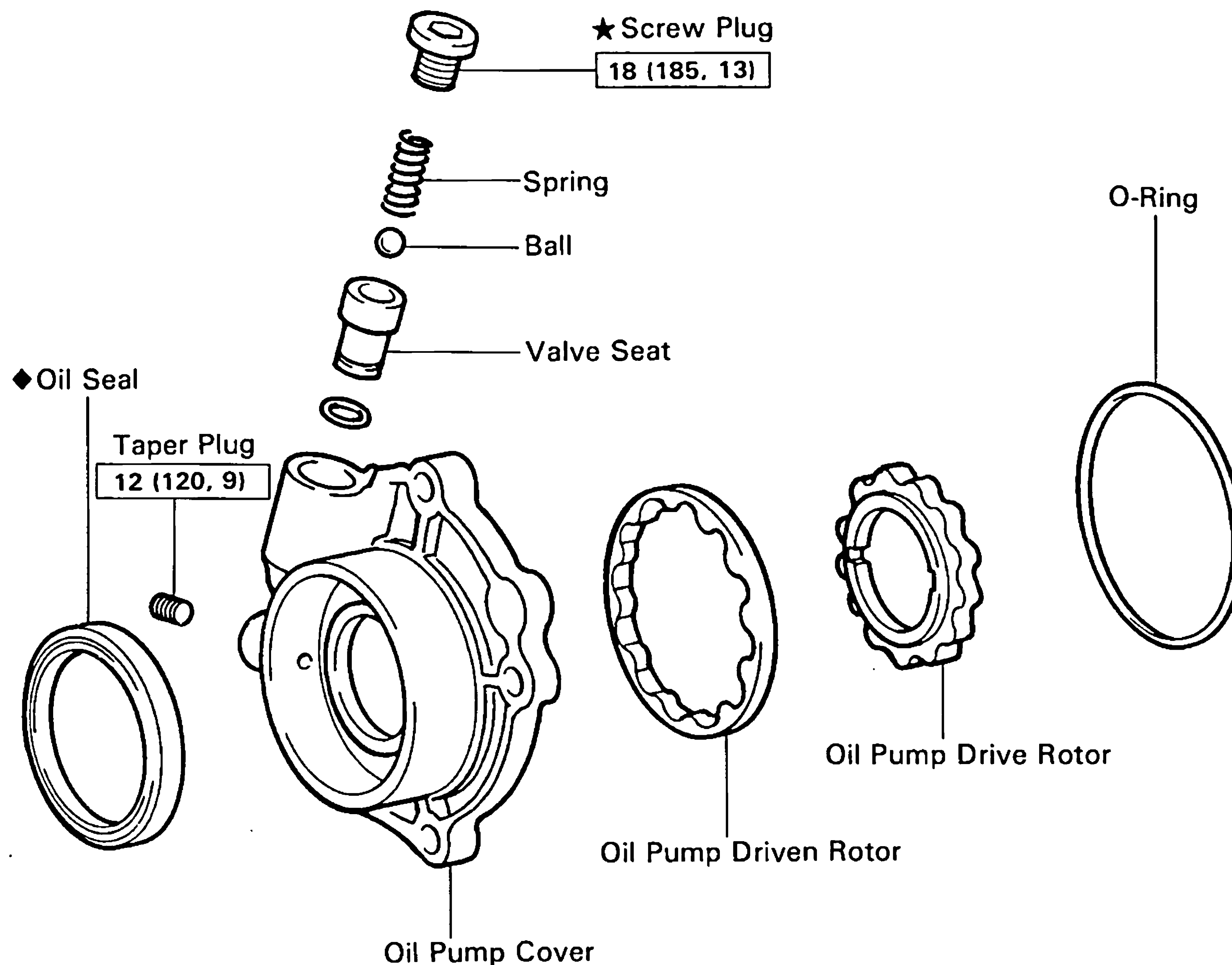


(b) Using SST and a press in a new oil seal.

SST 09608-20012 (09608-03020, 09608-00040)

Oil seal depth: 15.4 — 16.2 mm
(0.606 — 0.638 in.)

OIL PUMP COVER COMPONENTS

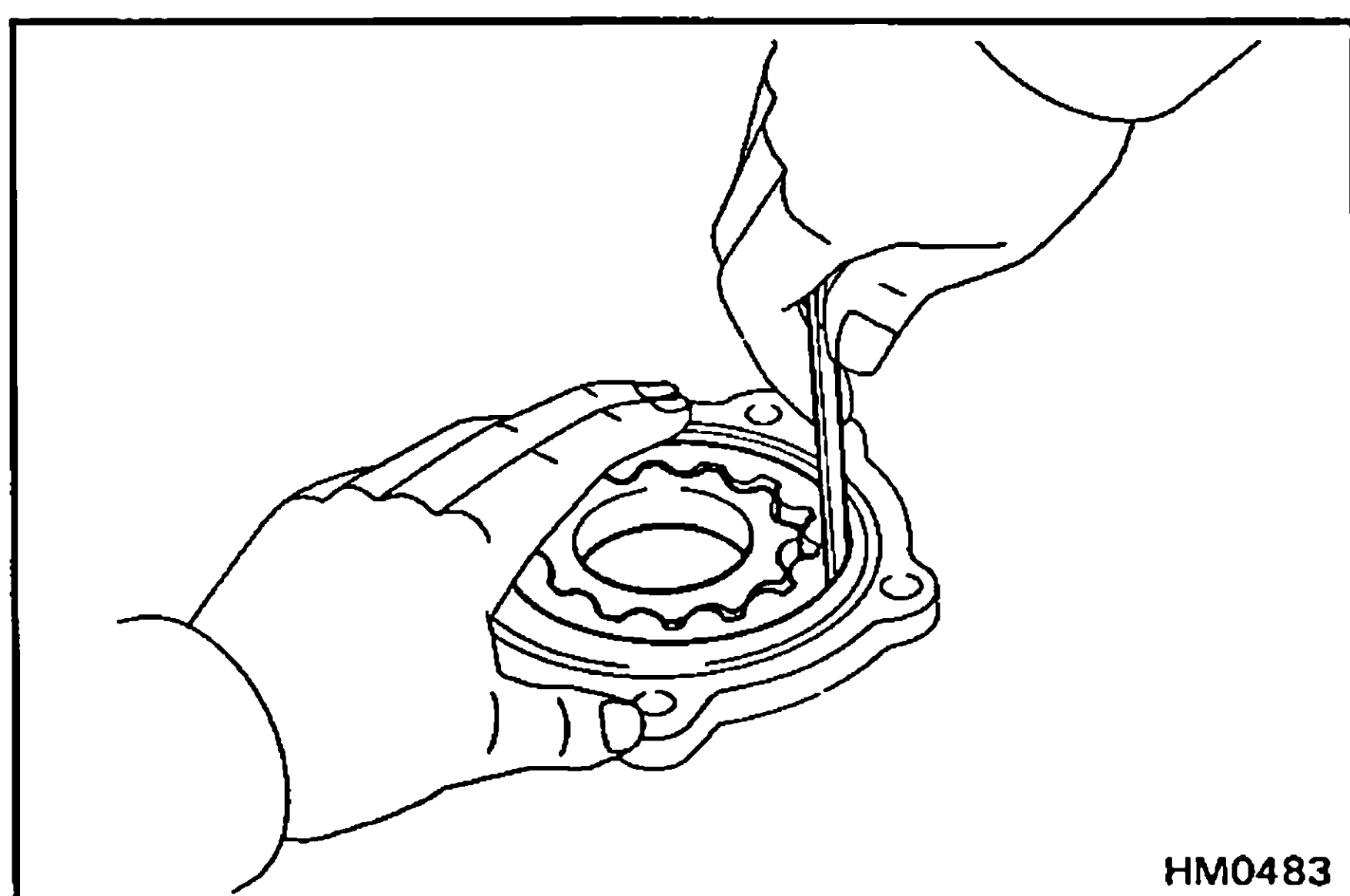


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

★ Precoated part

HM0400



DISASSEMBLY OF OIL PUMP COVER ASSEMBLY

1. CHECK BODY CLEARANCE OF DRIVEN ROTOR

Push the driven rotor to one side of the cover.

Using a feeler gauge, measure the clearance.

Standard clearance: 0.075 — 0.170 mm
(0.0030 — 0.0067 in.)

Maximum clearance: 0.170 mm (0.0067 in.)

If the clearance more than the limit, replace the driven rotor or pump cover.

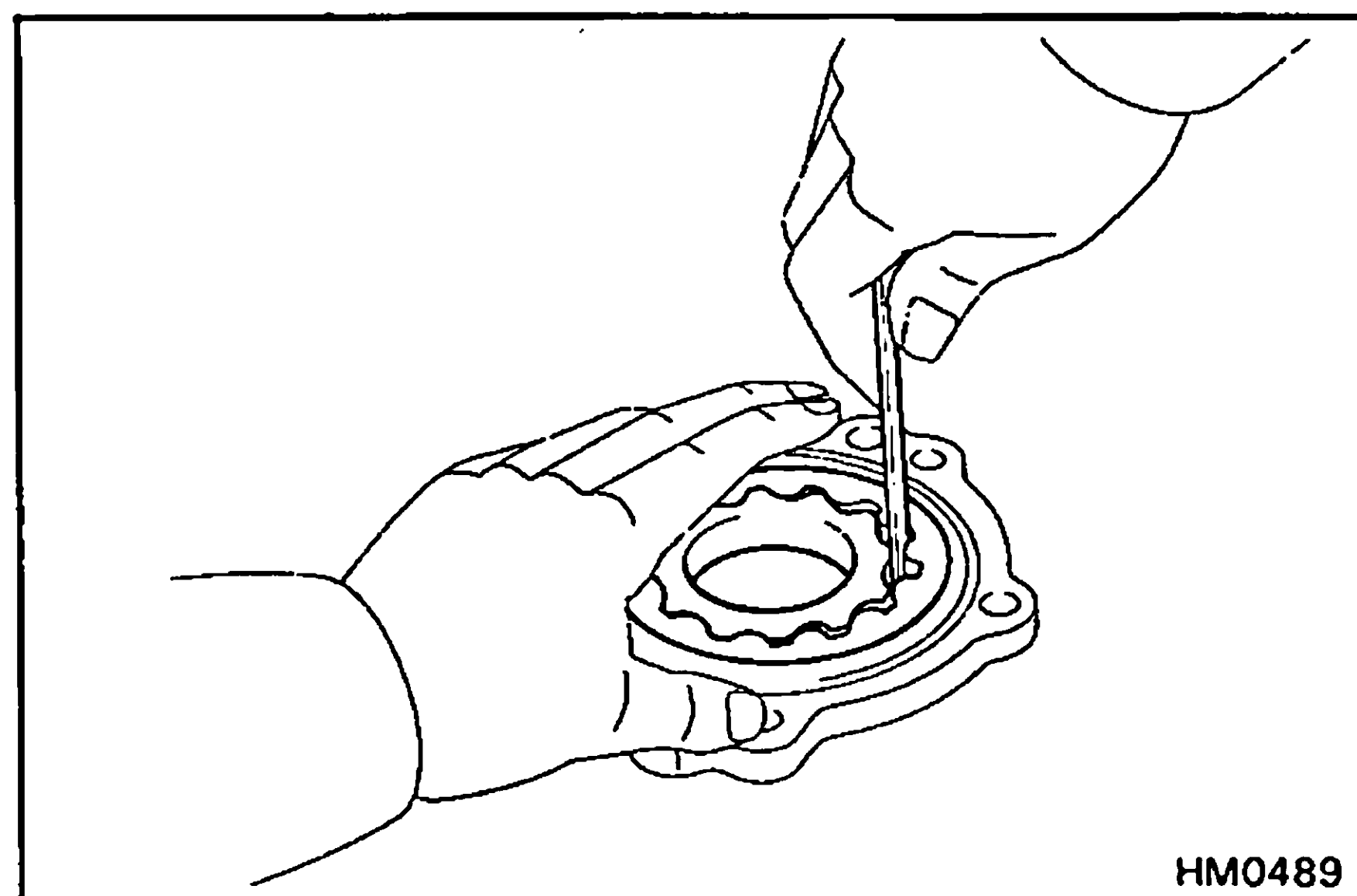
2. CHECK TIP CLEARANCE OF BOTH ROTORS

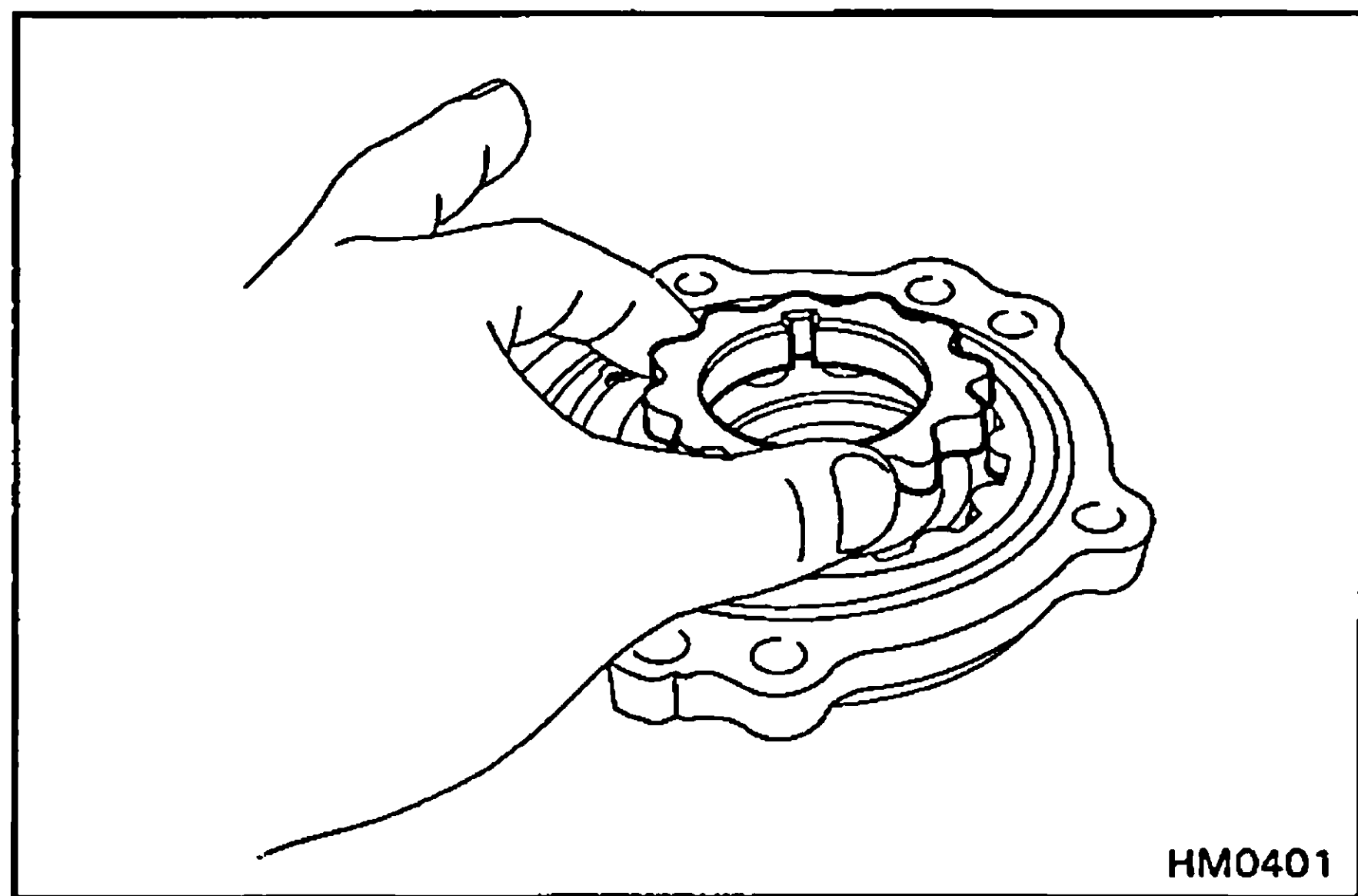
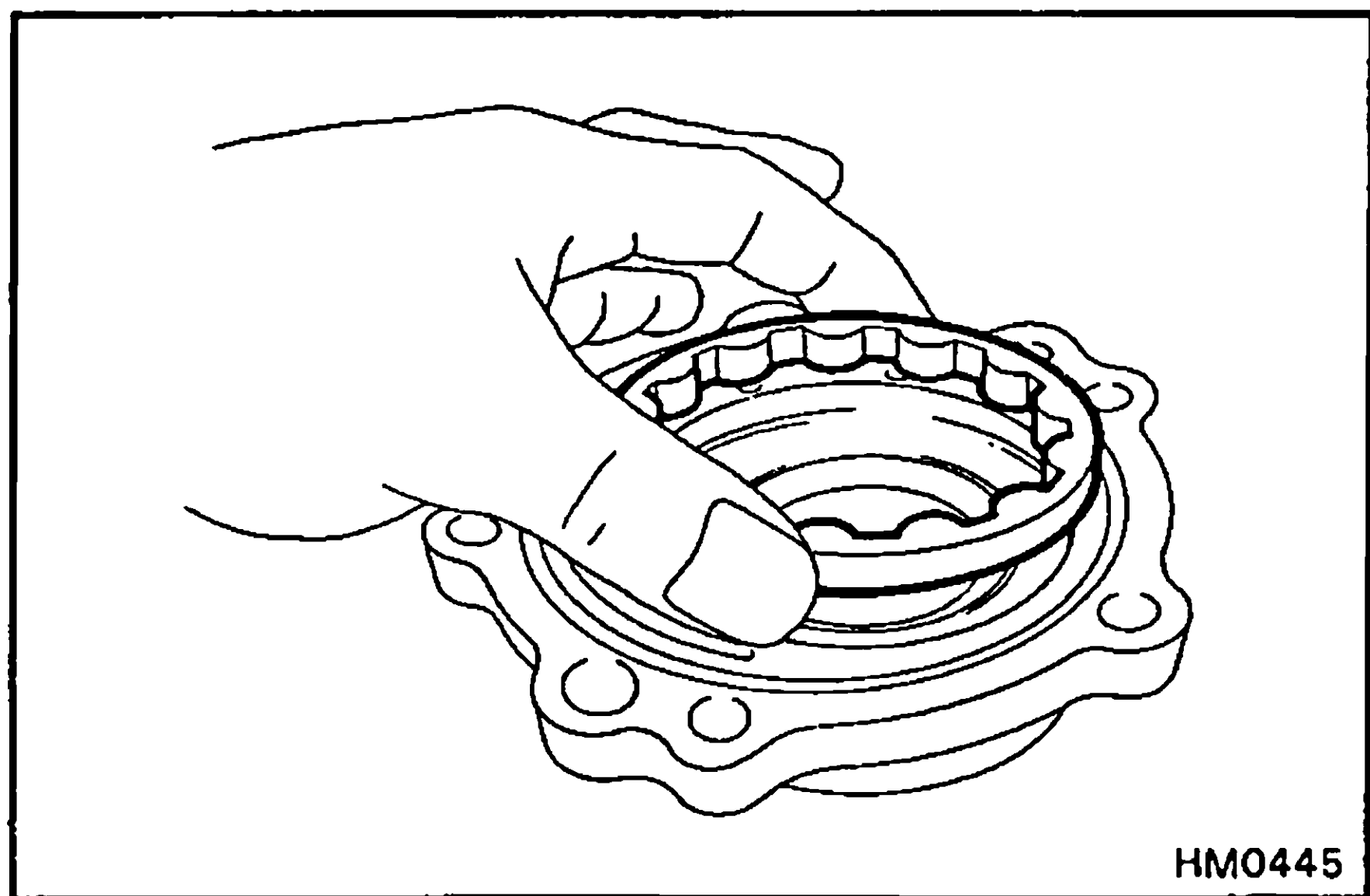
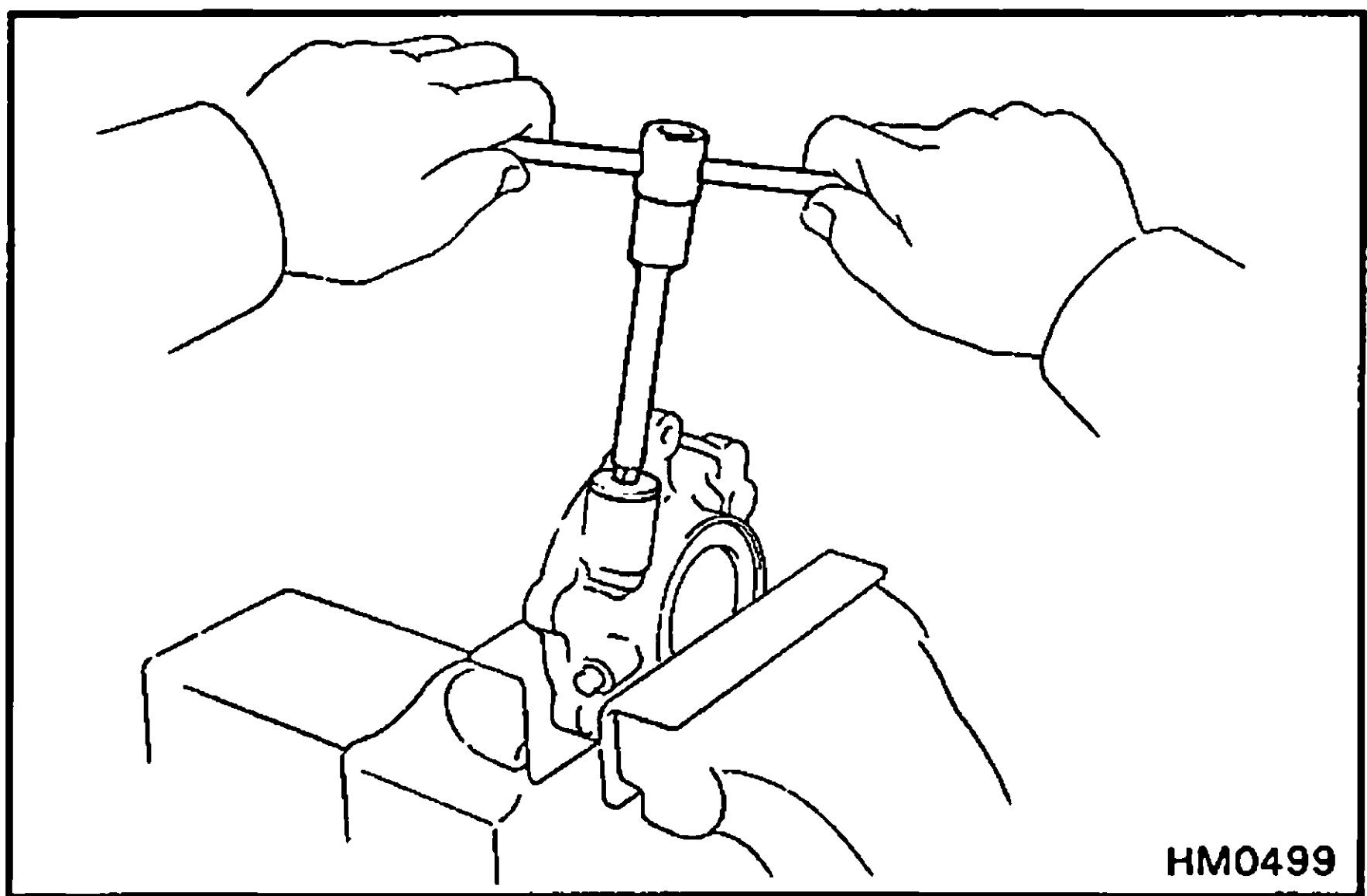
Using a feeler gauge, measure the clearance between both rotor tips.

Standard clearance: 0.10 — 0.22 mm
(0.0039 — 0.0087 in.)

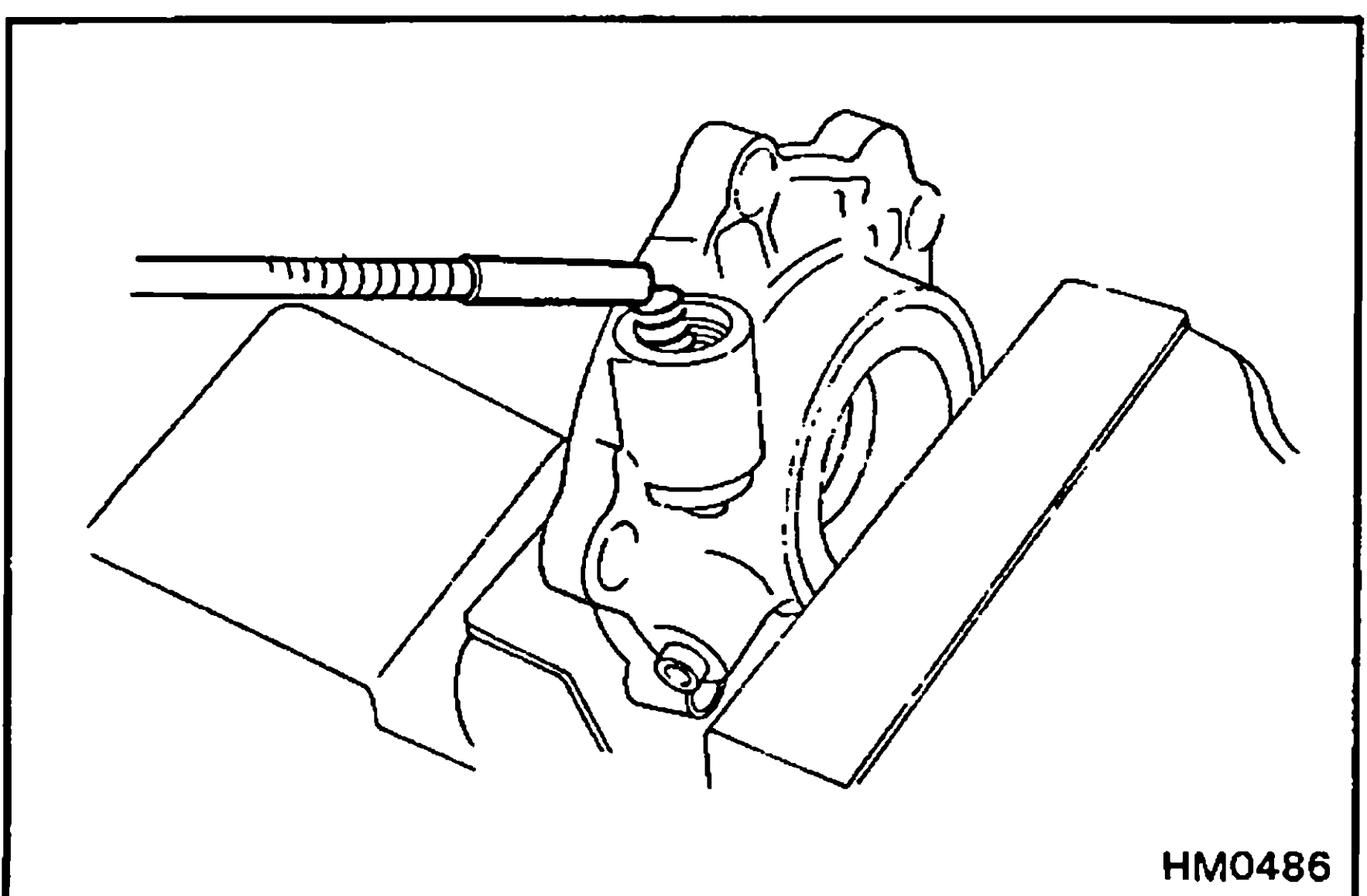
Maximum clearance: 0.22 mm (0.0087 in.)

If the clearance more than the limit, replace the drive rotor or driven rotor.

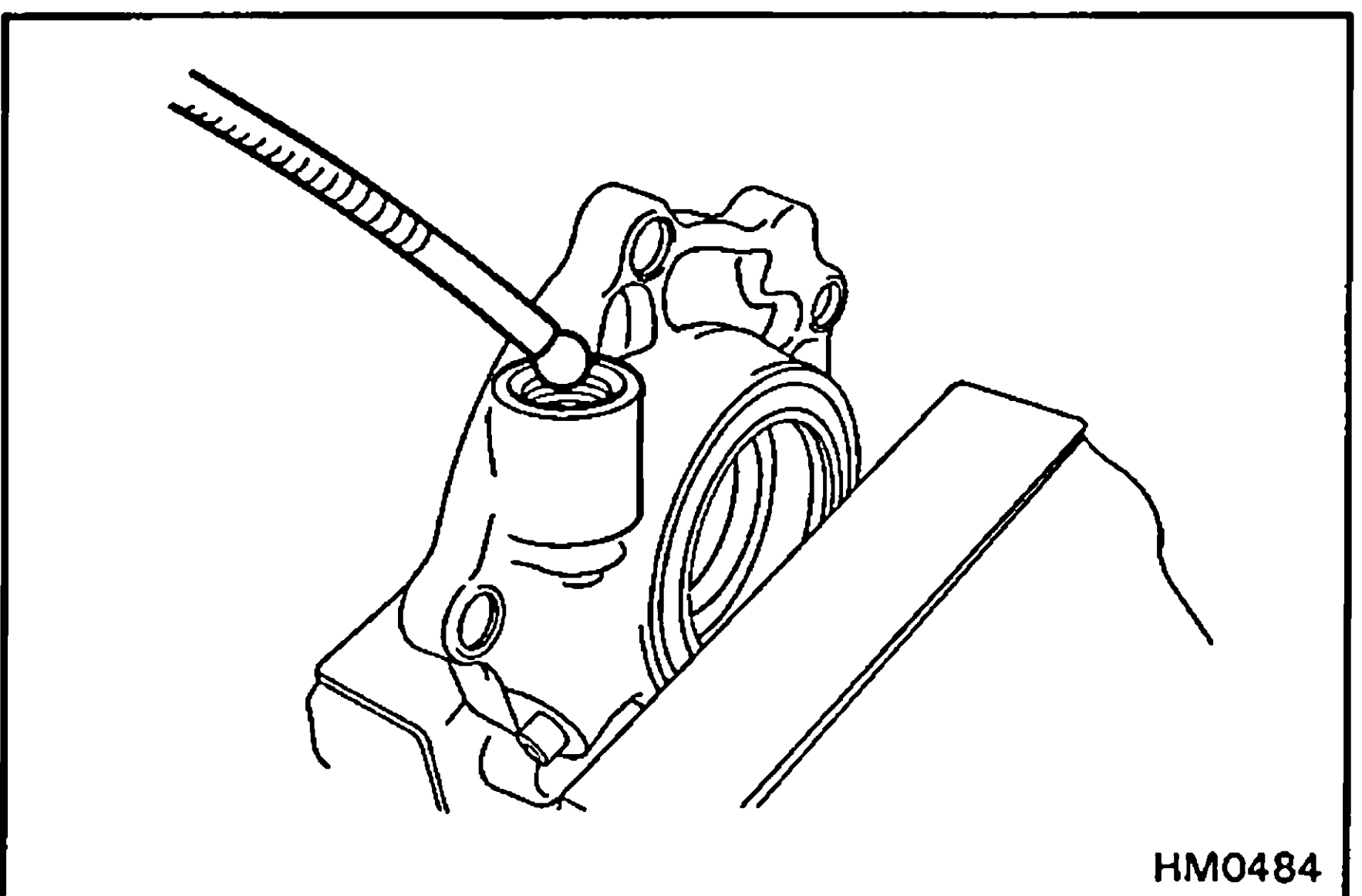


**3. REMOVE OIL PUMP DRIVE ROTOR****4. REMOVE OIL PUMP DRIVEN ROTOR****5. REMOVE O-RING****6. REMOVE SCREW PLUG, SPRING, BALL AND VALVE SEAT**

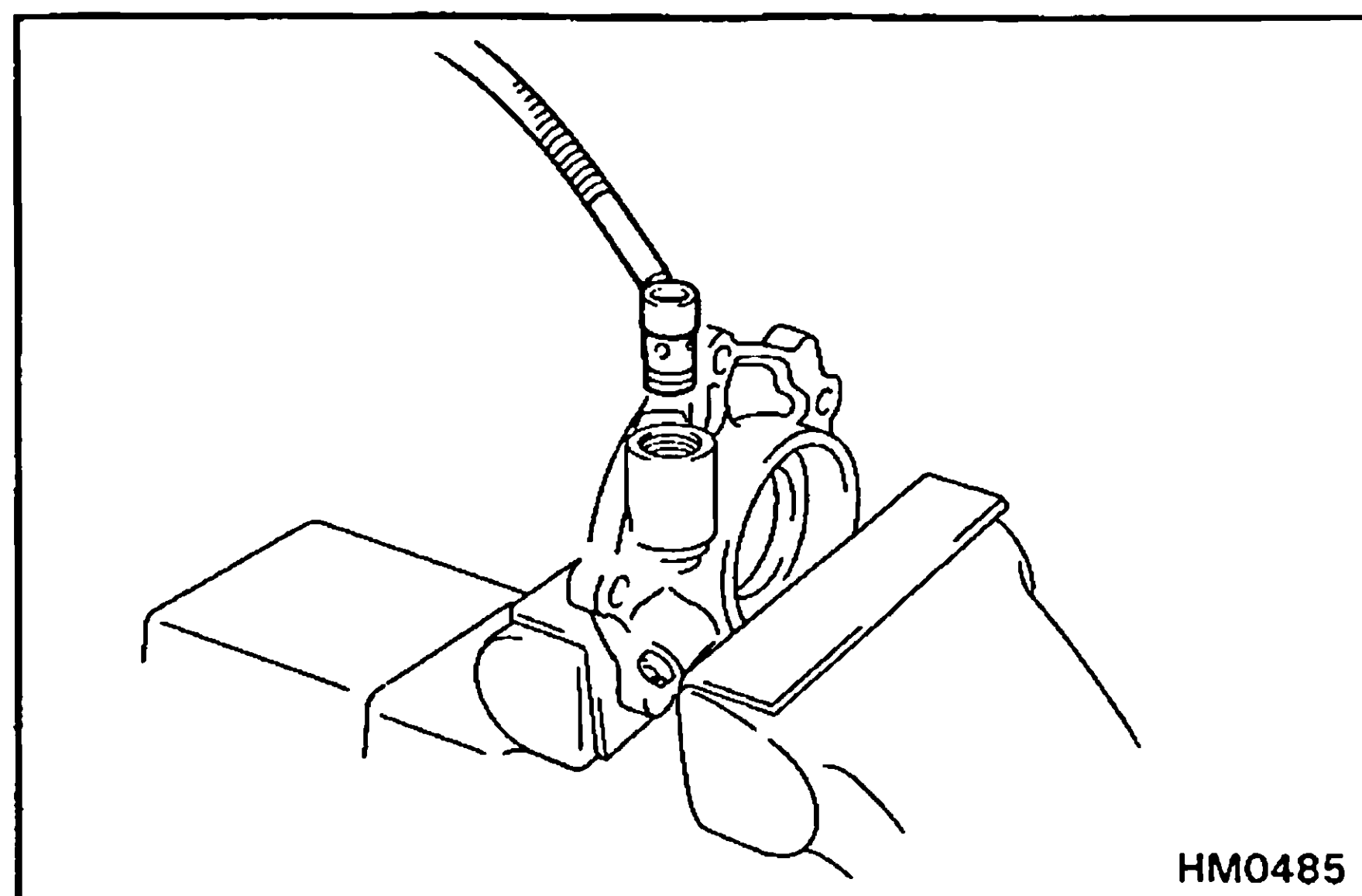
(a) Using a hexagon wrench, remove the screw plug.



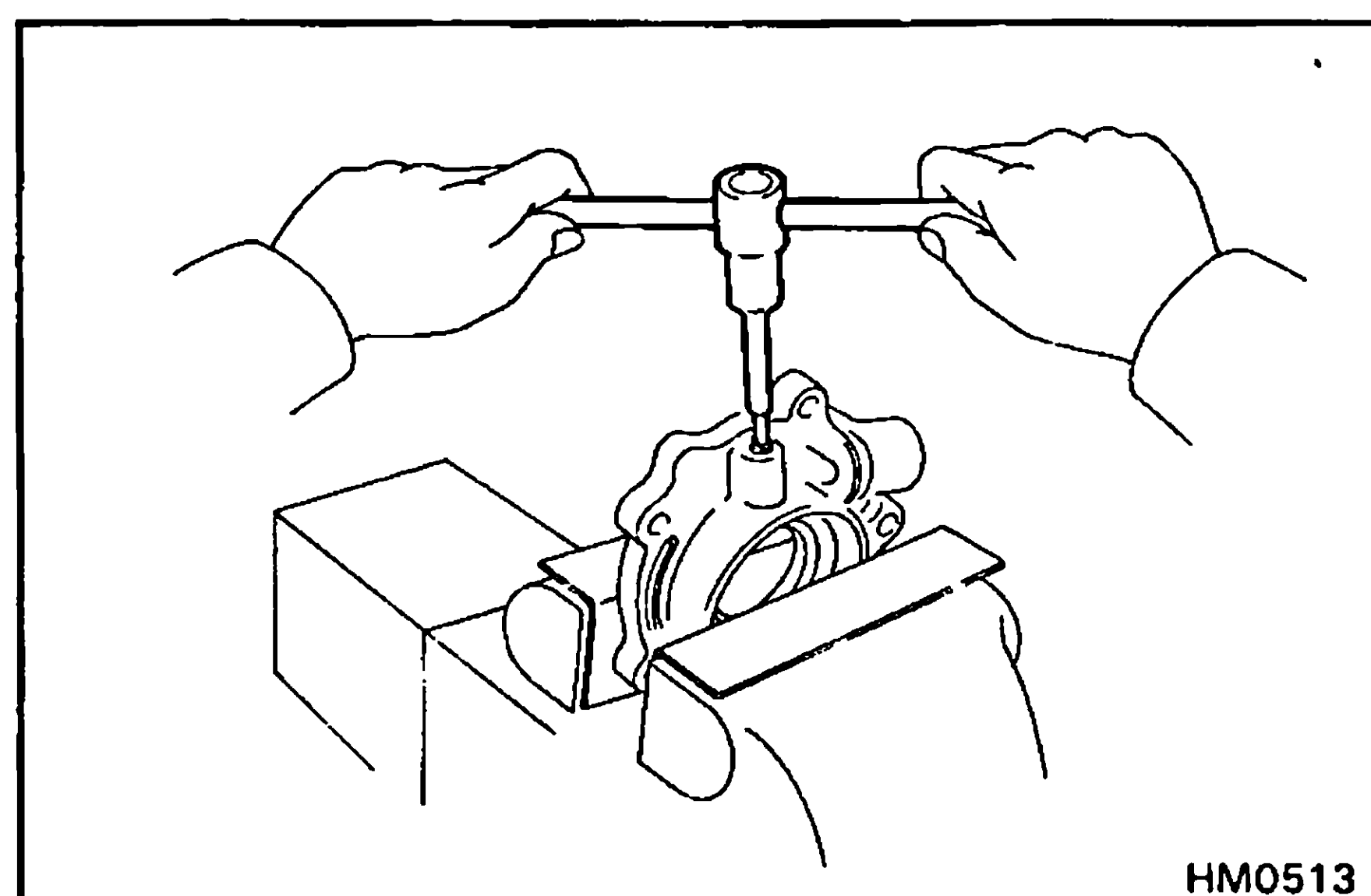
(b) Using a magnetic finger, remove the spring.



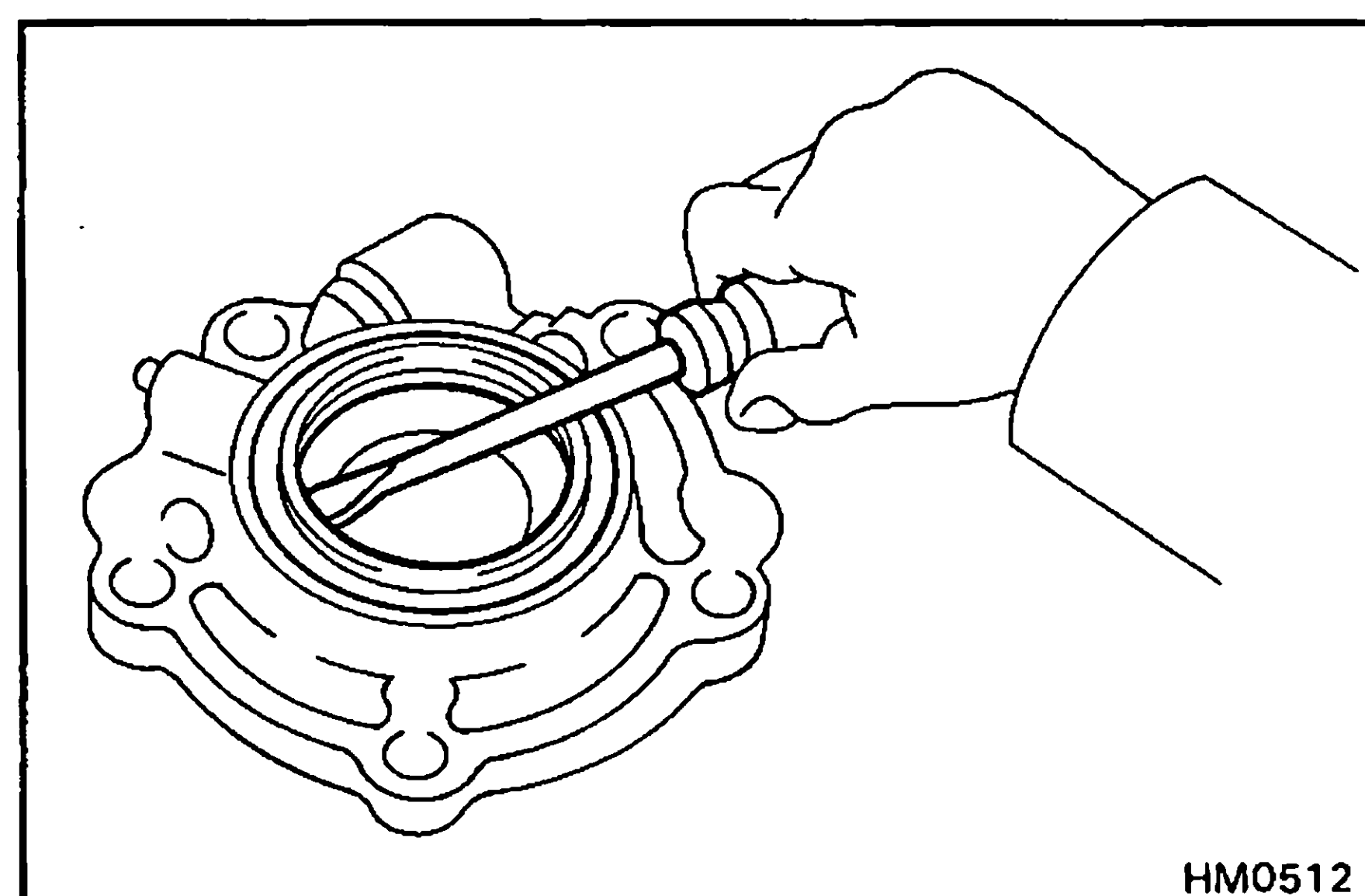
(c) Using a magnetic finger, remove the ball.



- (d) Using a magnetic finger, remove the valve seat.
- (e) Remove the O-ring from the valve seat.

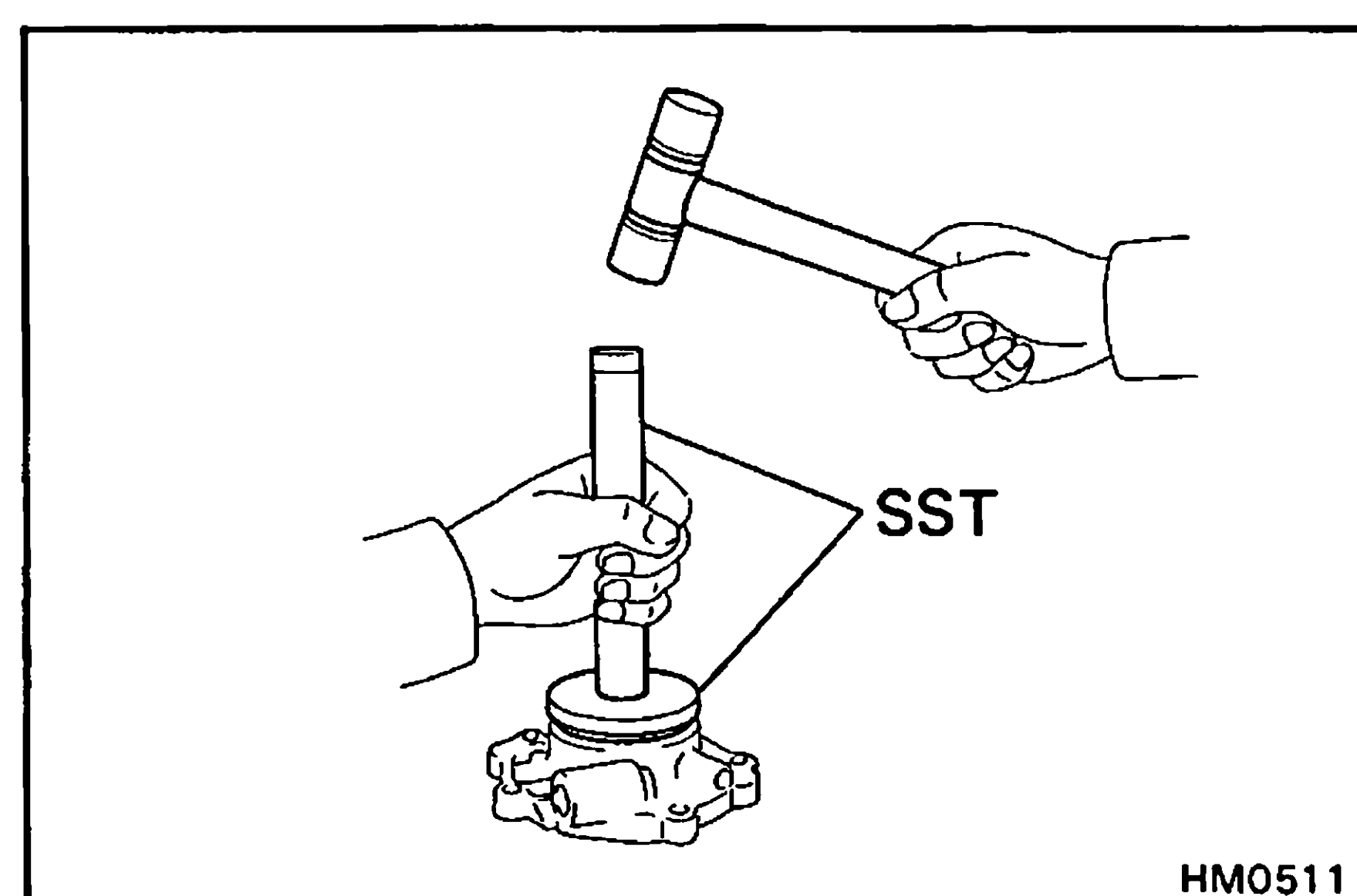


7. REMOVE TAPER PLUG



8. REMOVE OIL SEAL

Using a screwdriver, pry out the oil seal.

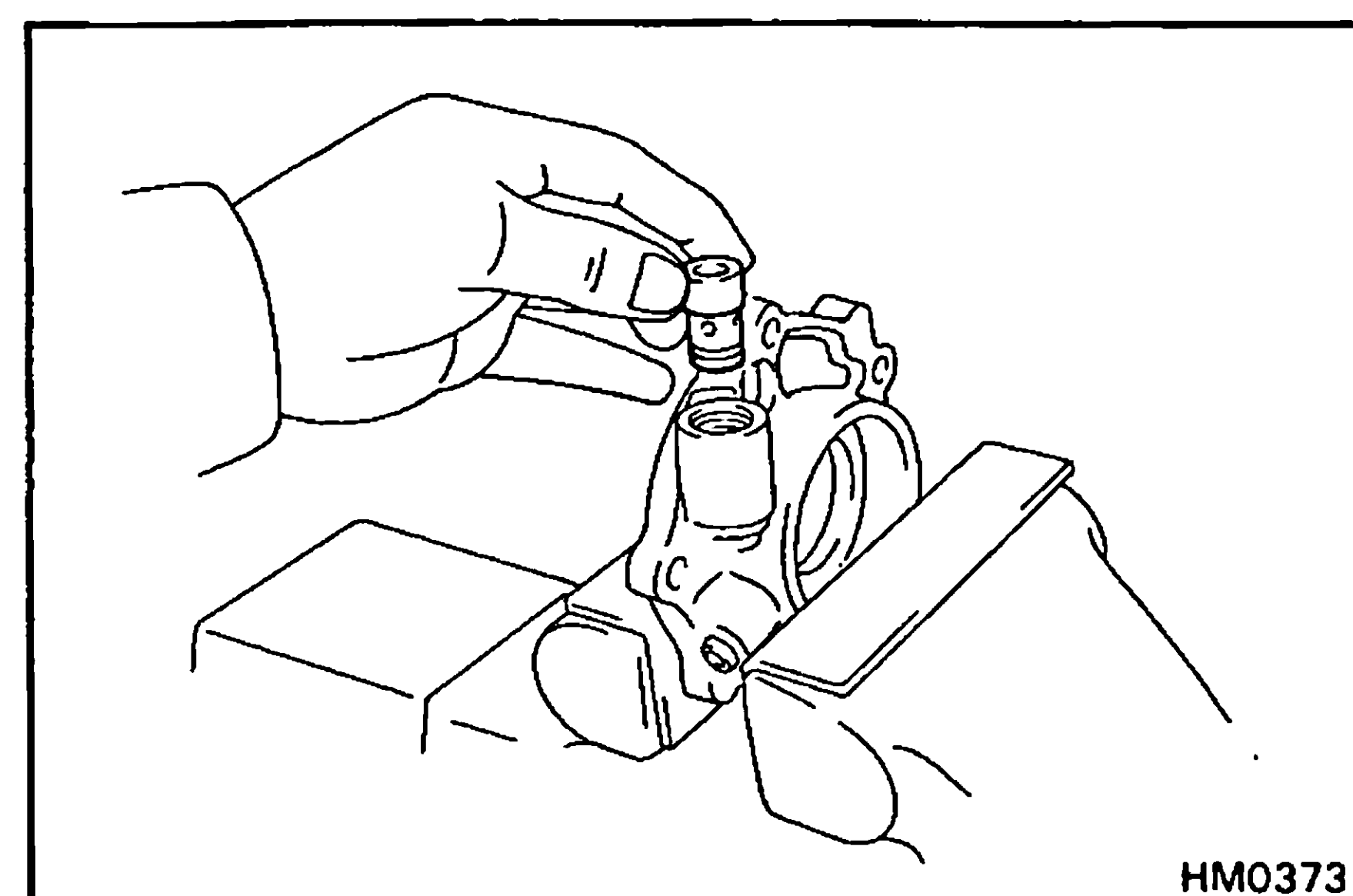


ASSEMBLY OF OIL PUMP COVER ASSEMBLY

1. INSTALL OIL SEAL

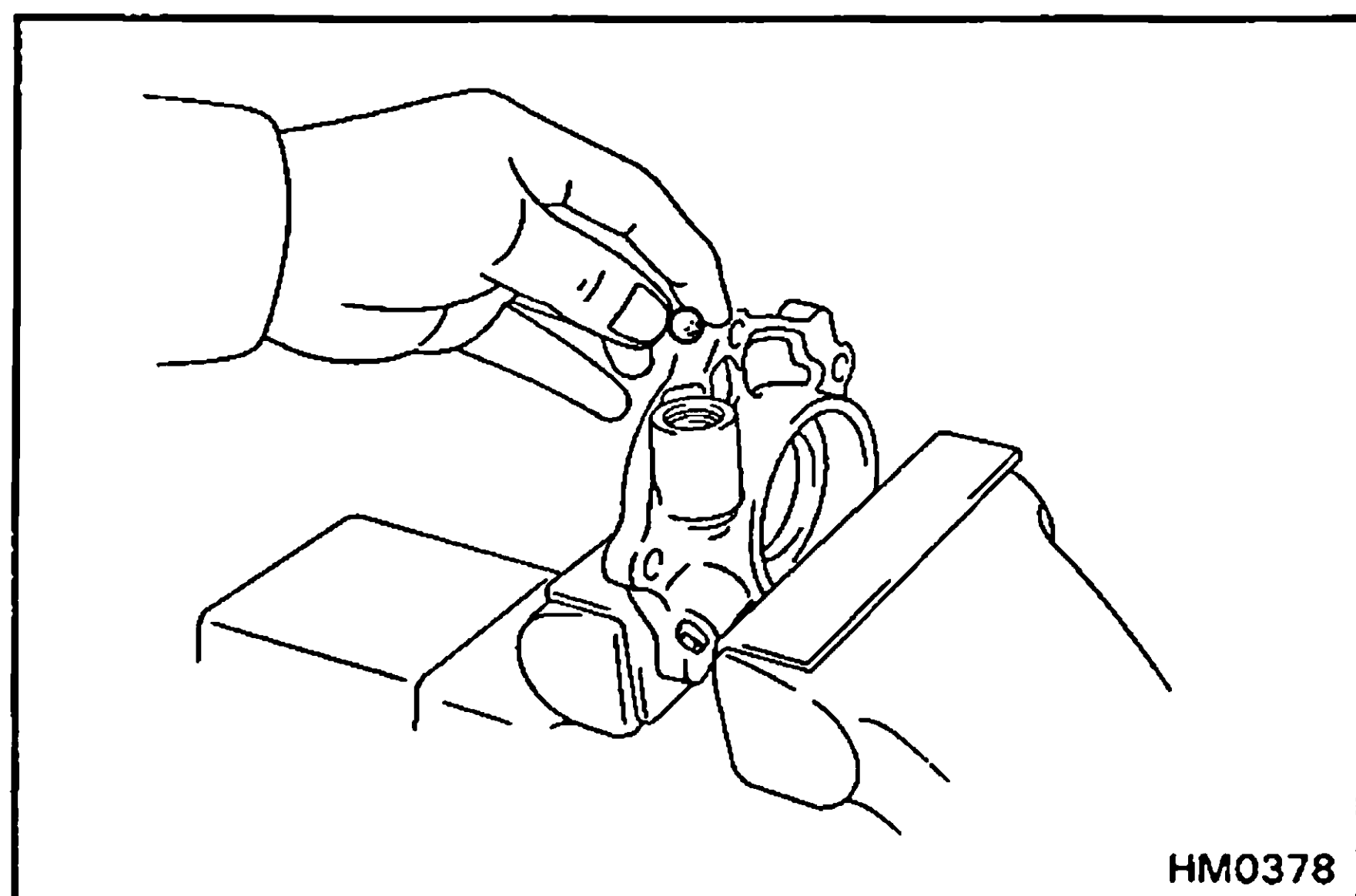
Using SST and a hammer, drive in the oil seal.

SST 09608-12010 (09608-00020, 09608-00060)



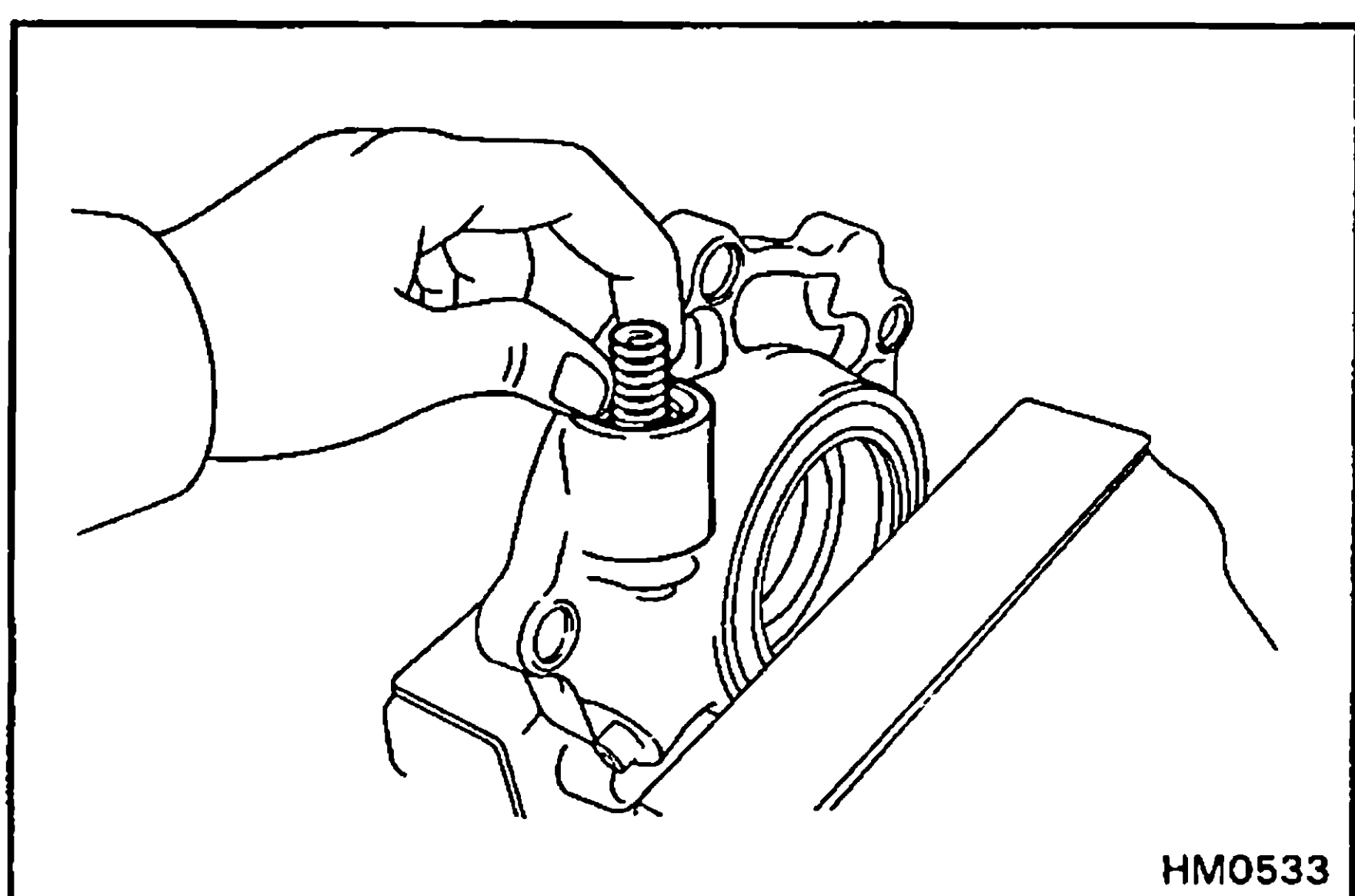
2. INSTALL VALVE SEAT, BALL, SPRING AND SCREW PLUG

- (a) Install the O-ring to valve seat.
- (b) Apply gear oil to the valve seat.
- (c) Install the valve seat.

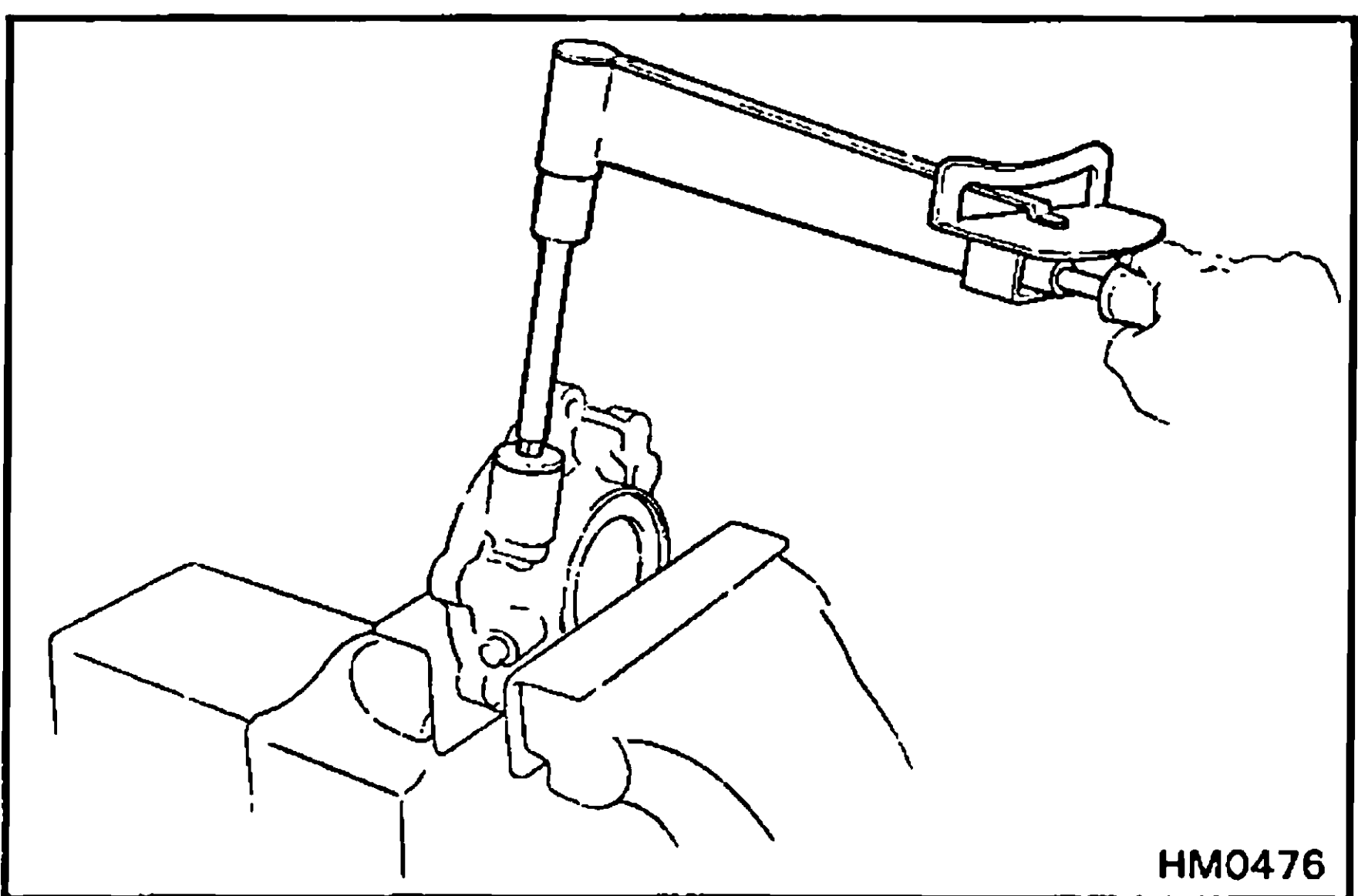


(d) Apply gear oil to the ball.

(e) Install the ball.

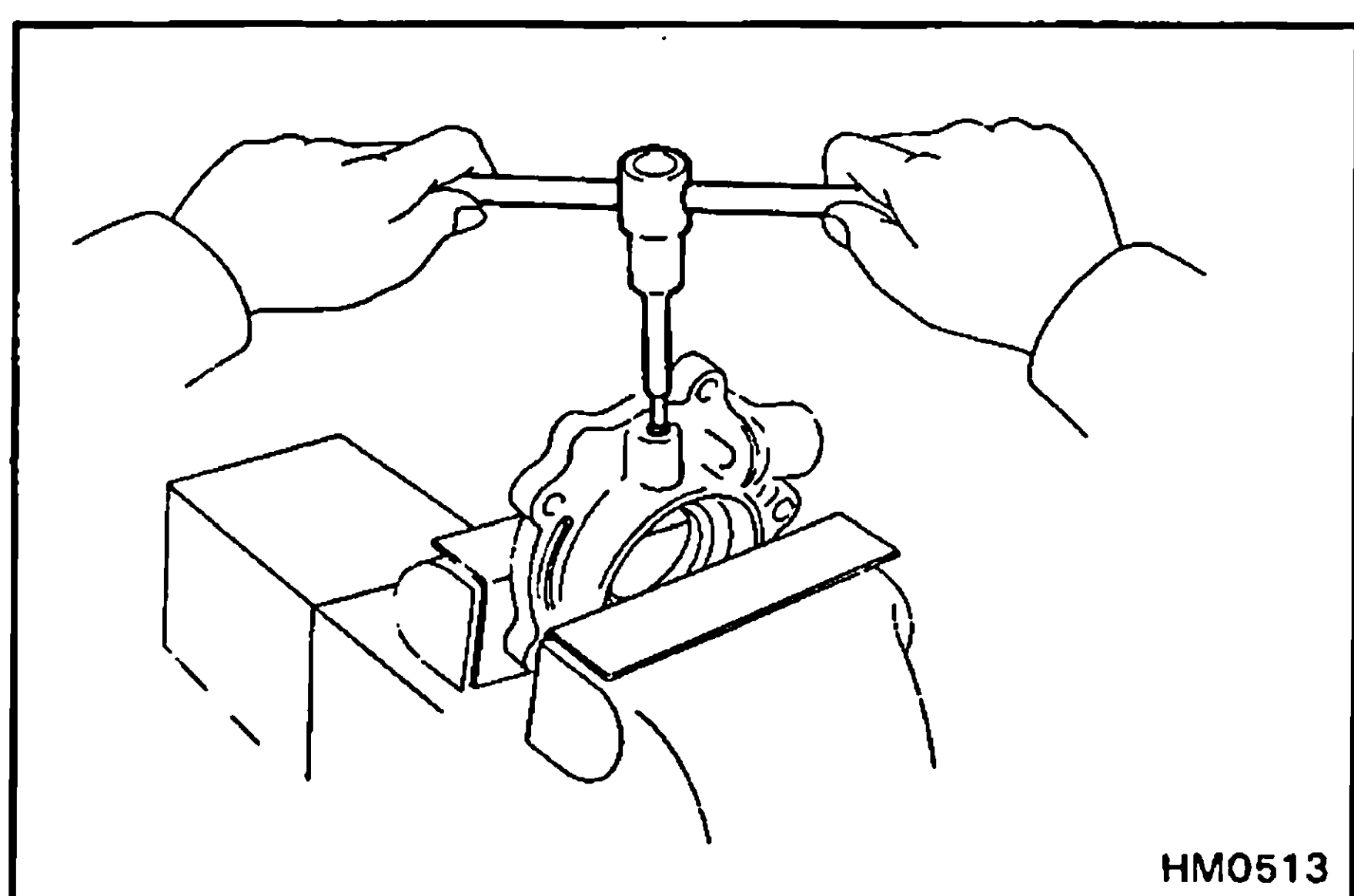


(f) Install the spring.



(g) Using a hexagon wrench, install and torque the screw plug.

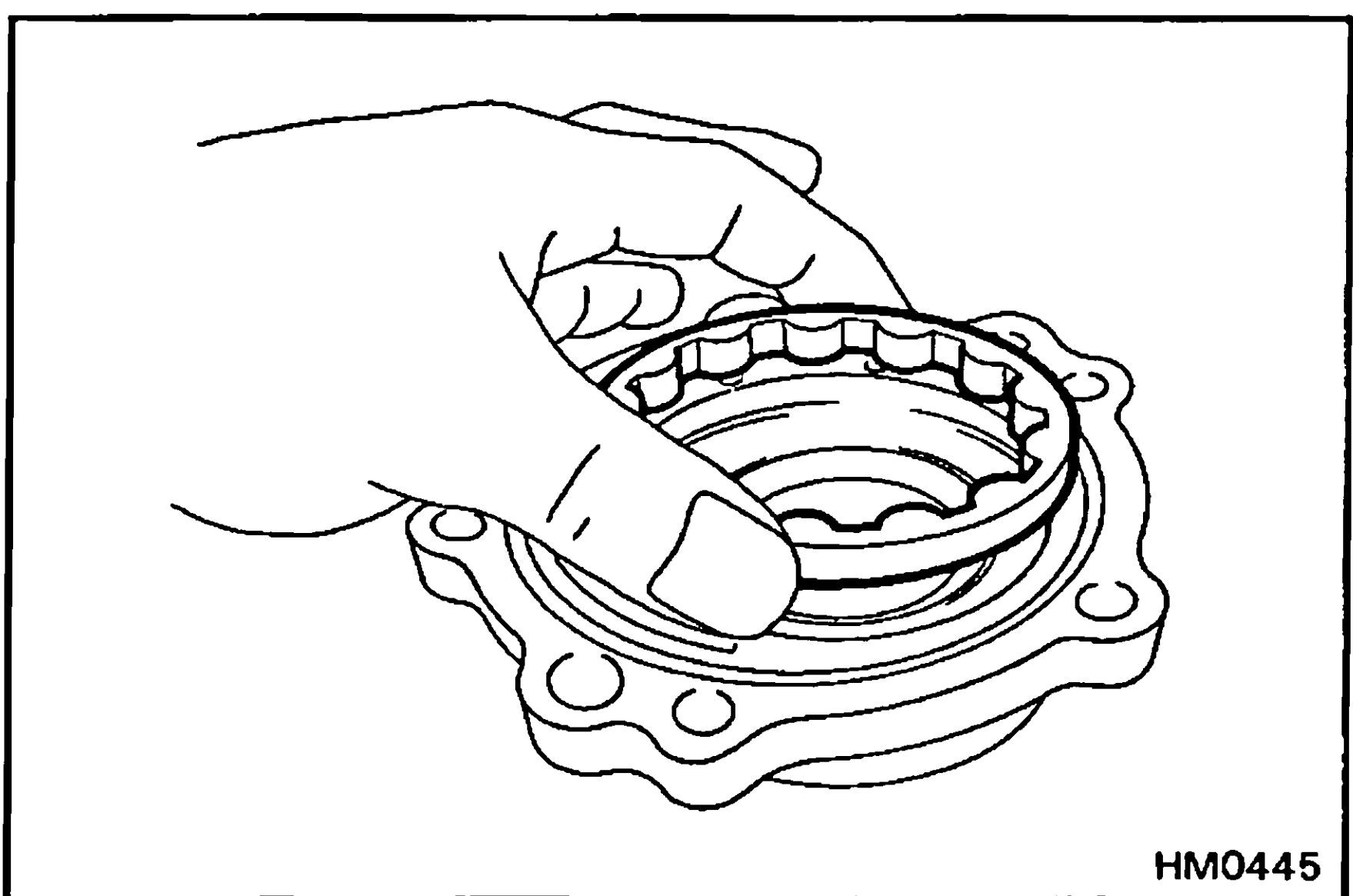
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



3. INSTALL TAPER PLUG

Install and torque the taper plug.

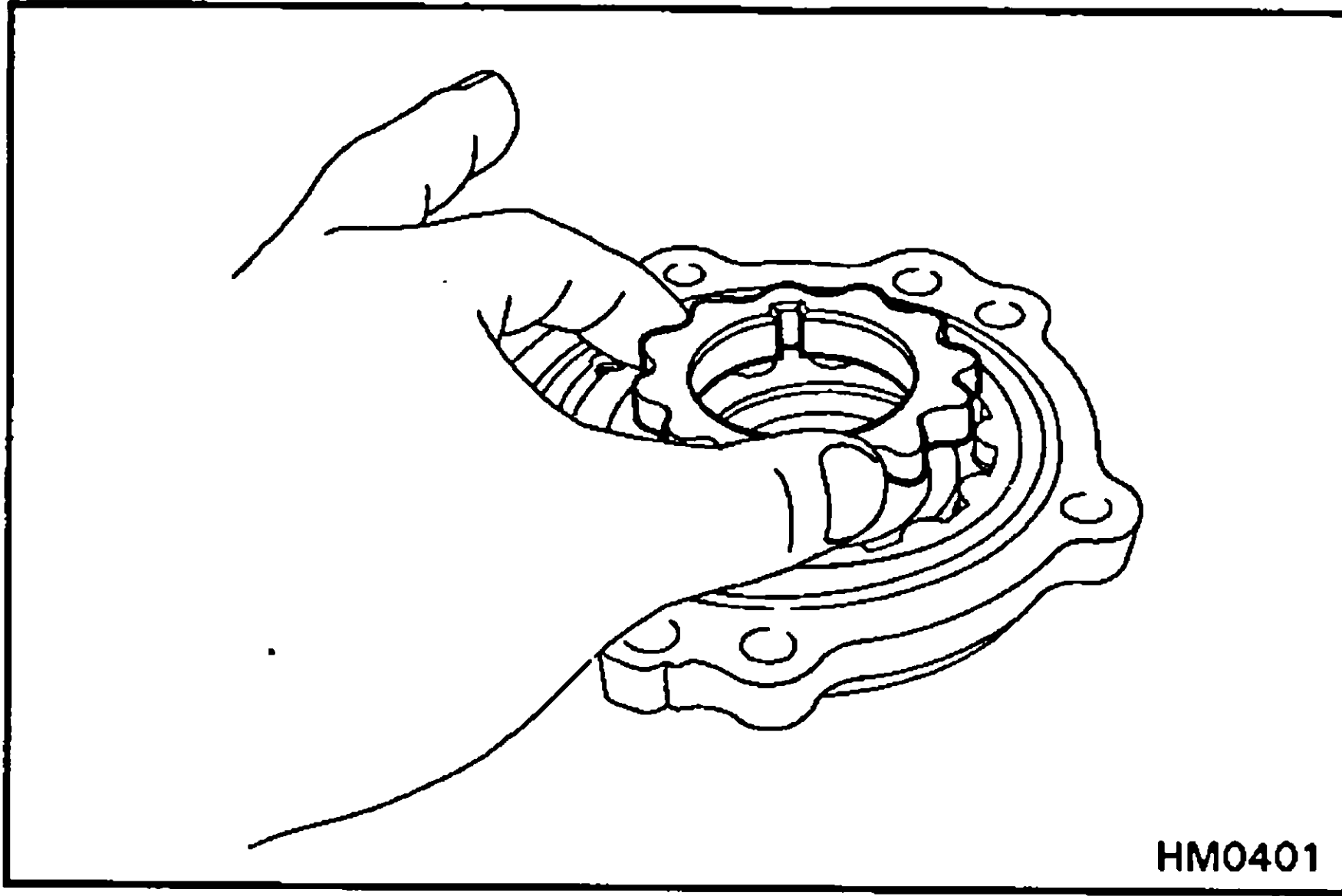
Touque: 12 N·m (120 kgf·cm, 9 ft·lbf)



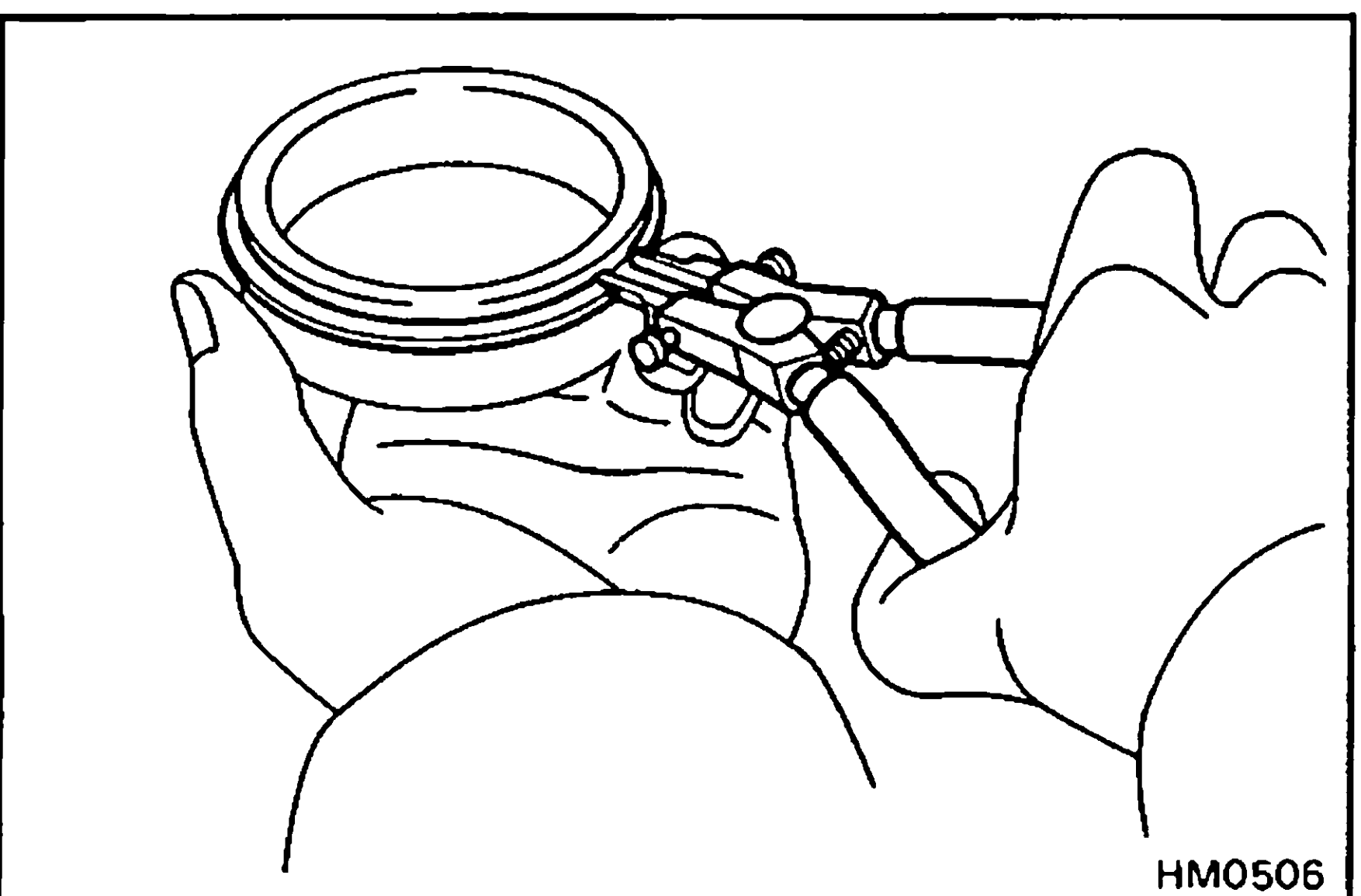
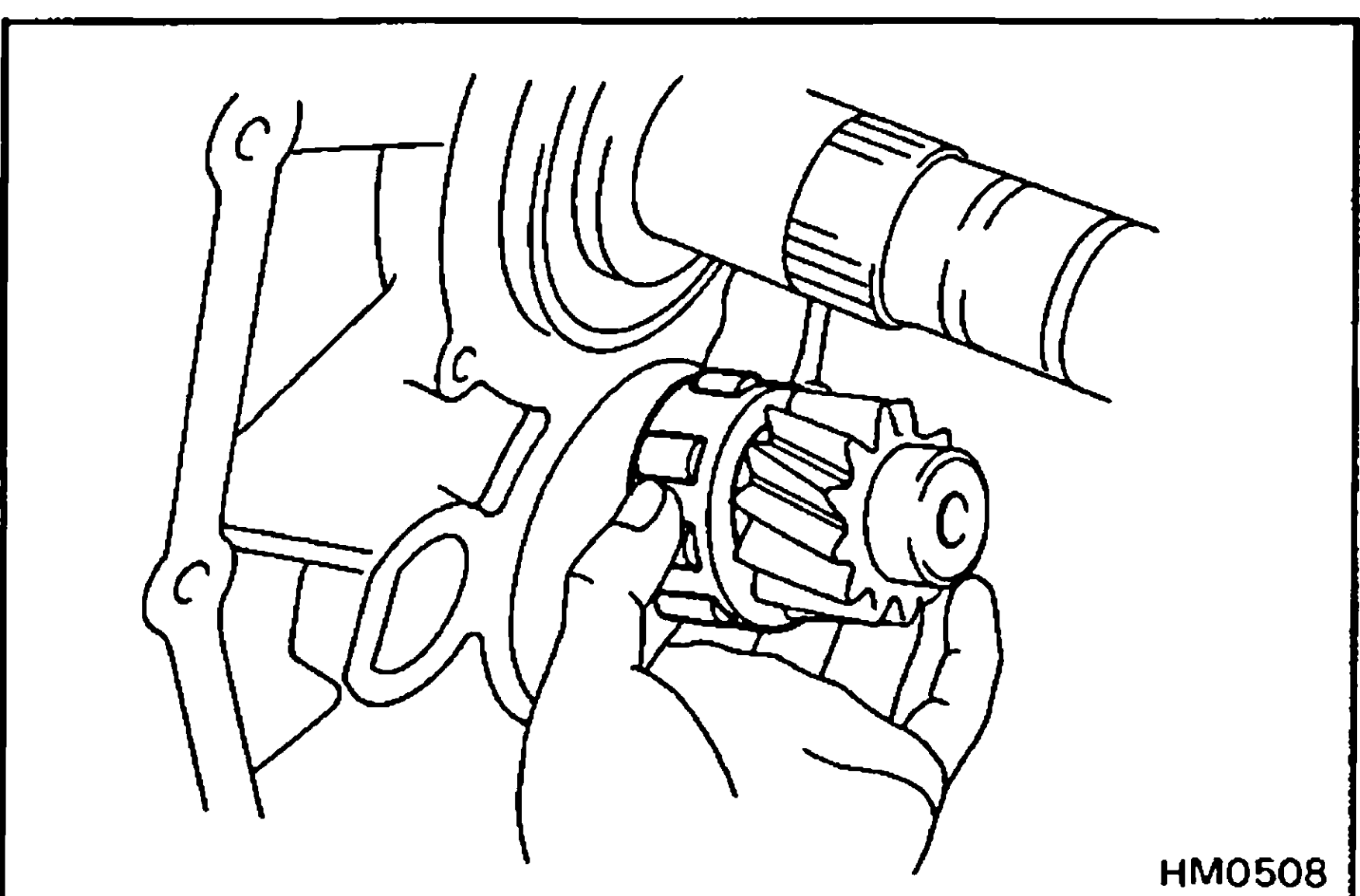
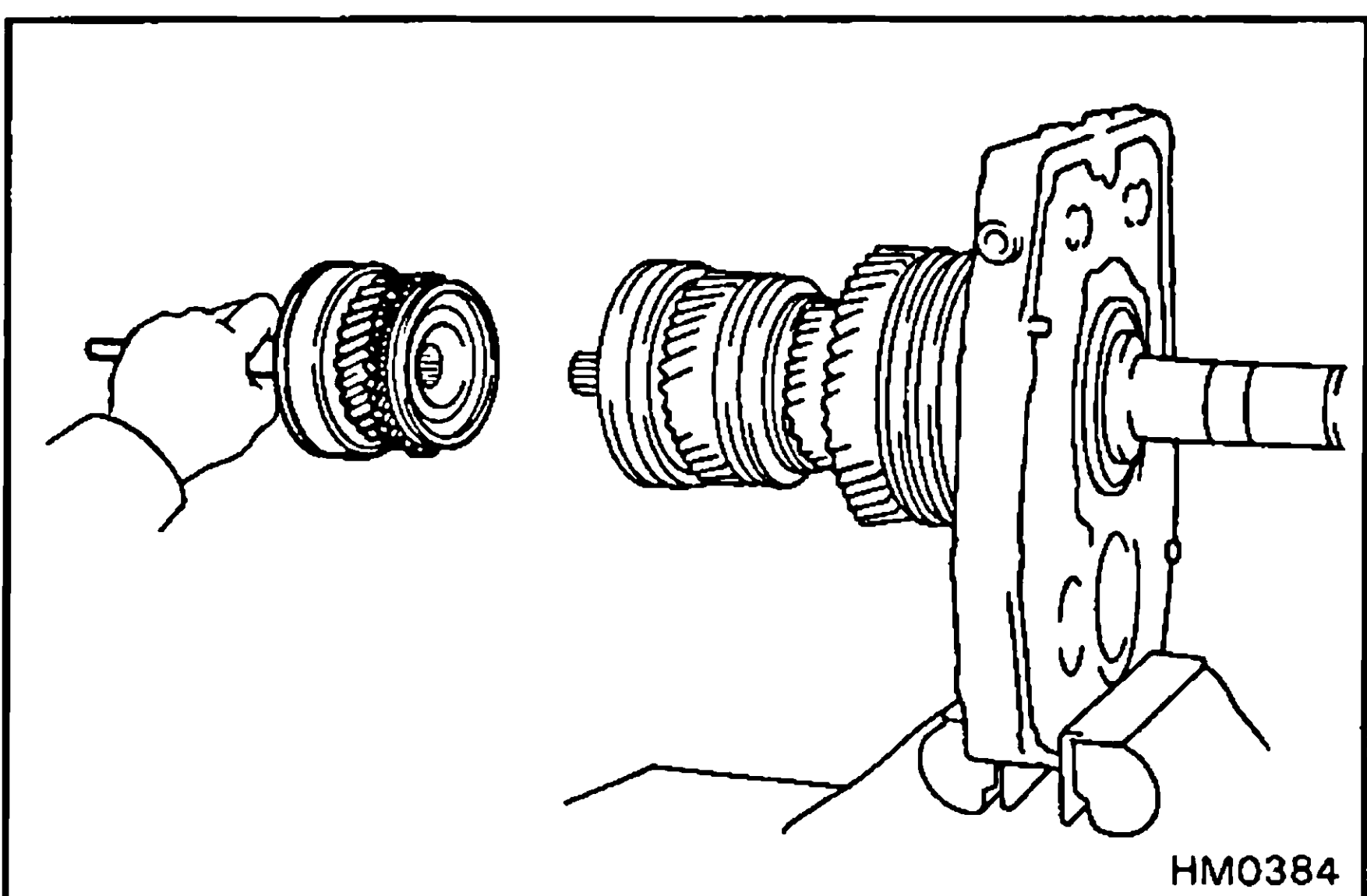
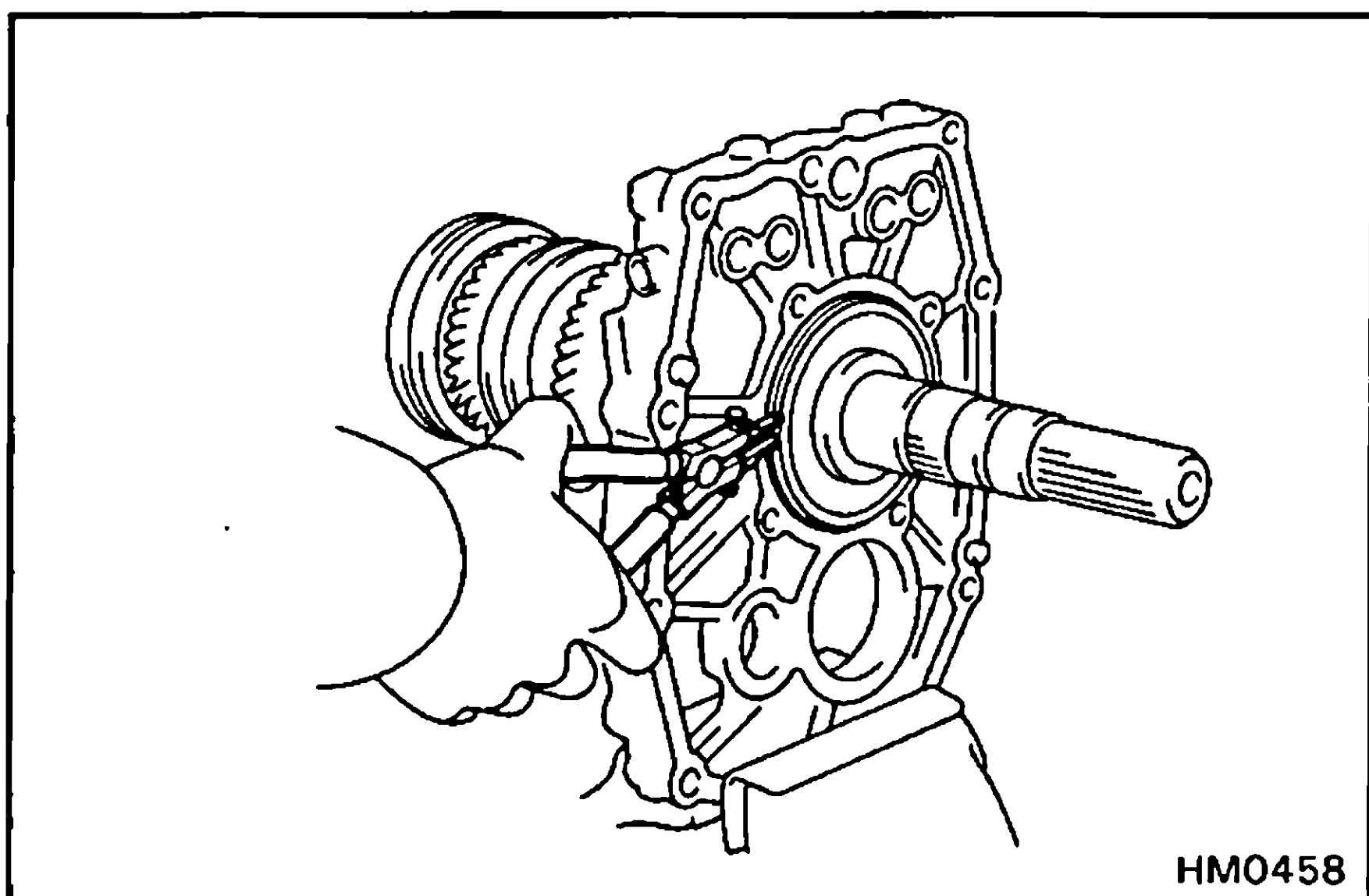
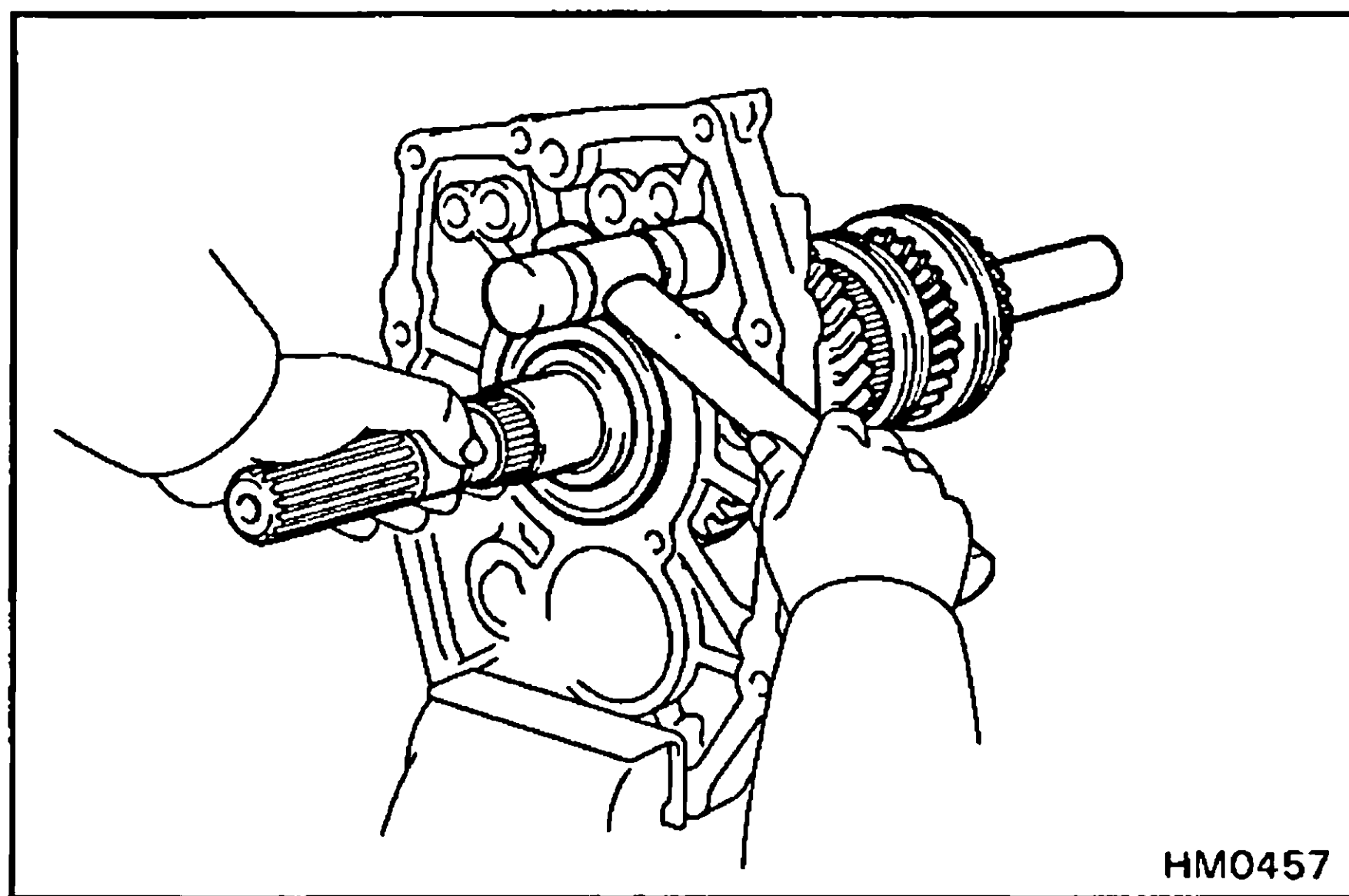
4. INSTALL OIL PUMP DRIVEN ROTOR

(a) Apply gear oil to the driven rotor.

(b) Install the oil pump driven rotor.



5. **INSTALL OIL PUMP DRIVE ROTOR**
 - (a) Apply gear oil to the drive rotor.
 - (b) Install the oil pump drive rotor.
6. **INSTALL NEW O-RING**



COMPONENT PARTS INSTALLATION

BASIC SUBASSEMBLY REASSEMBLY

(See pages MT-5 to 7)

1. INSTALL OUTPUT SHAFT ASSEMBLY TO INTERMEDIATE PLATE

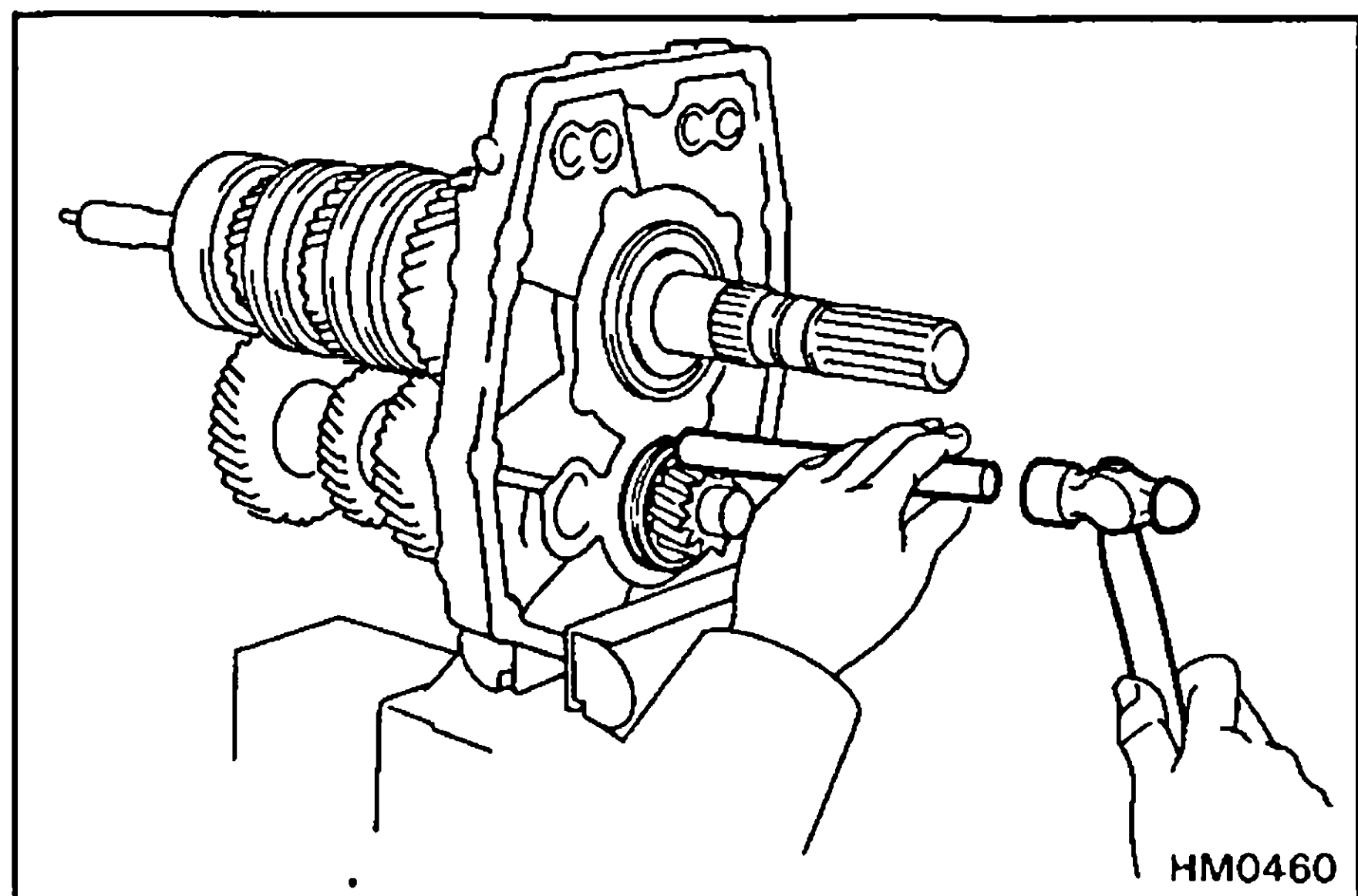
- (a) Install the output shaft assembly into the intermediate plate by pulling on the output shaft assembly and tapping on the intermediate plate.
- (b) Using a snap ring expander, install the snap ring.

2. INSTALL INPUT SHAFT

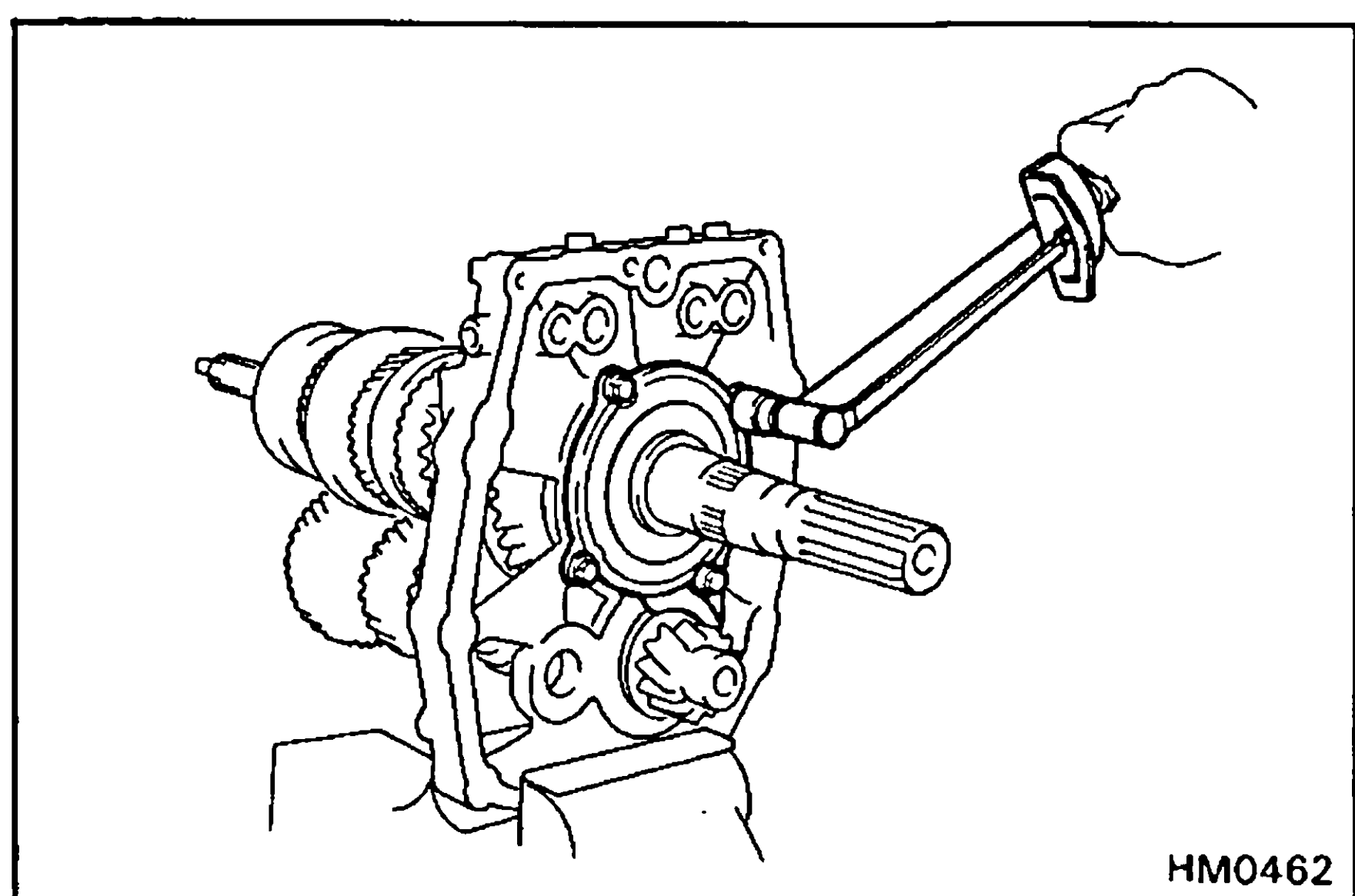
- (a) Apply MP grease to the 12-needle roller bearing and install them into the input shaft.
- (b) Install the input shaft to the output shaft with the synchronizer ring slots aligned with the shifting keys.

3. INSTALL COUNTER GEAR

- (a) Install the counter gear into the intermediate plate and install the roller bearing.
- (b) Using a snap ring expander, install the snap ring to outer race.



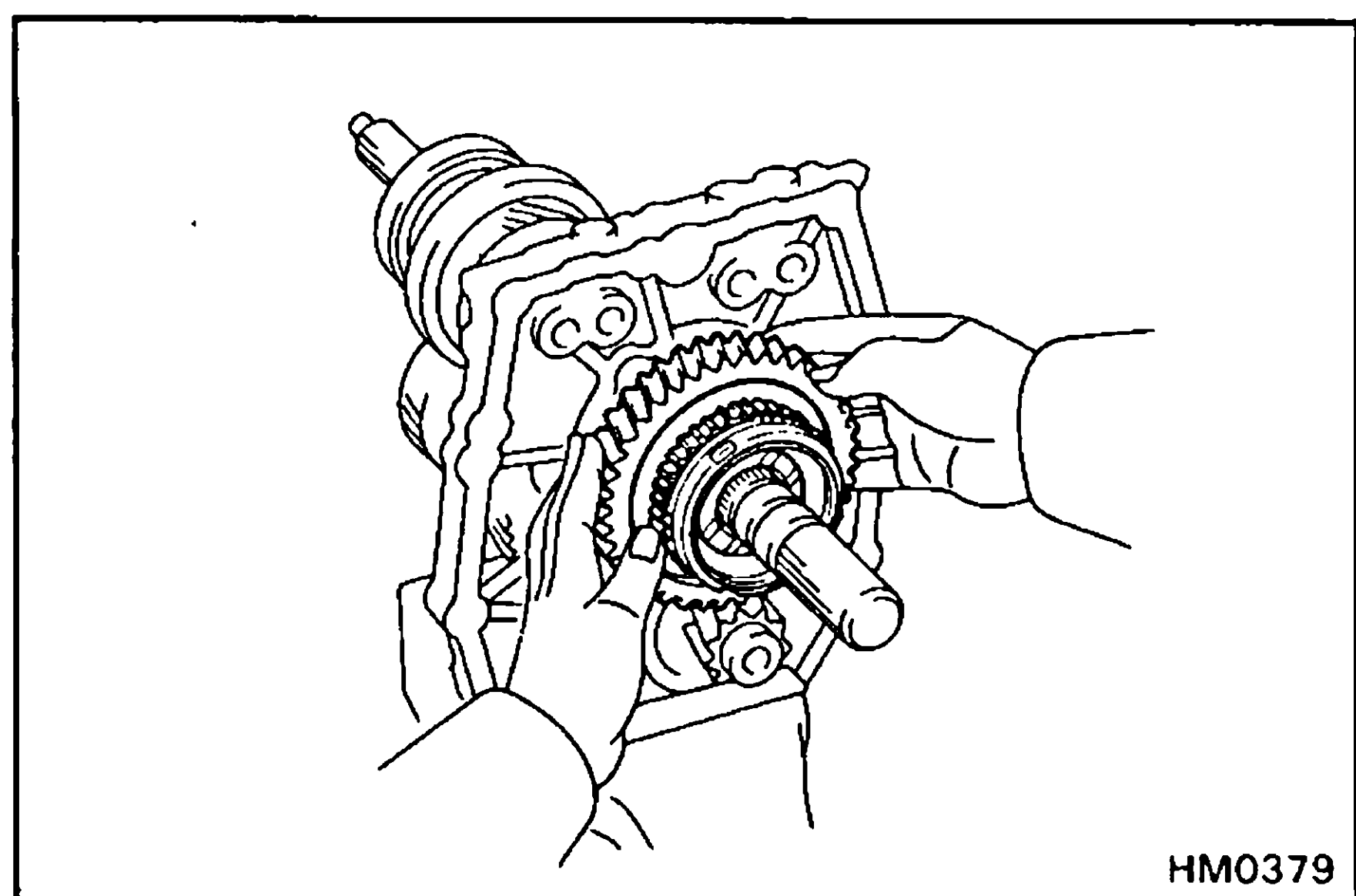
- (c) Install the counter gear rear bearing outer race with a brass bar and hammer.



4. INSTALL REAR BEARING RETAINER

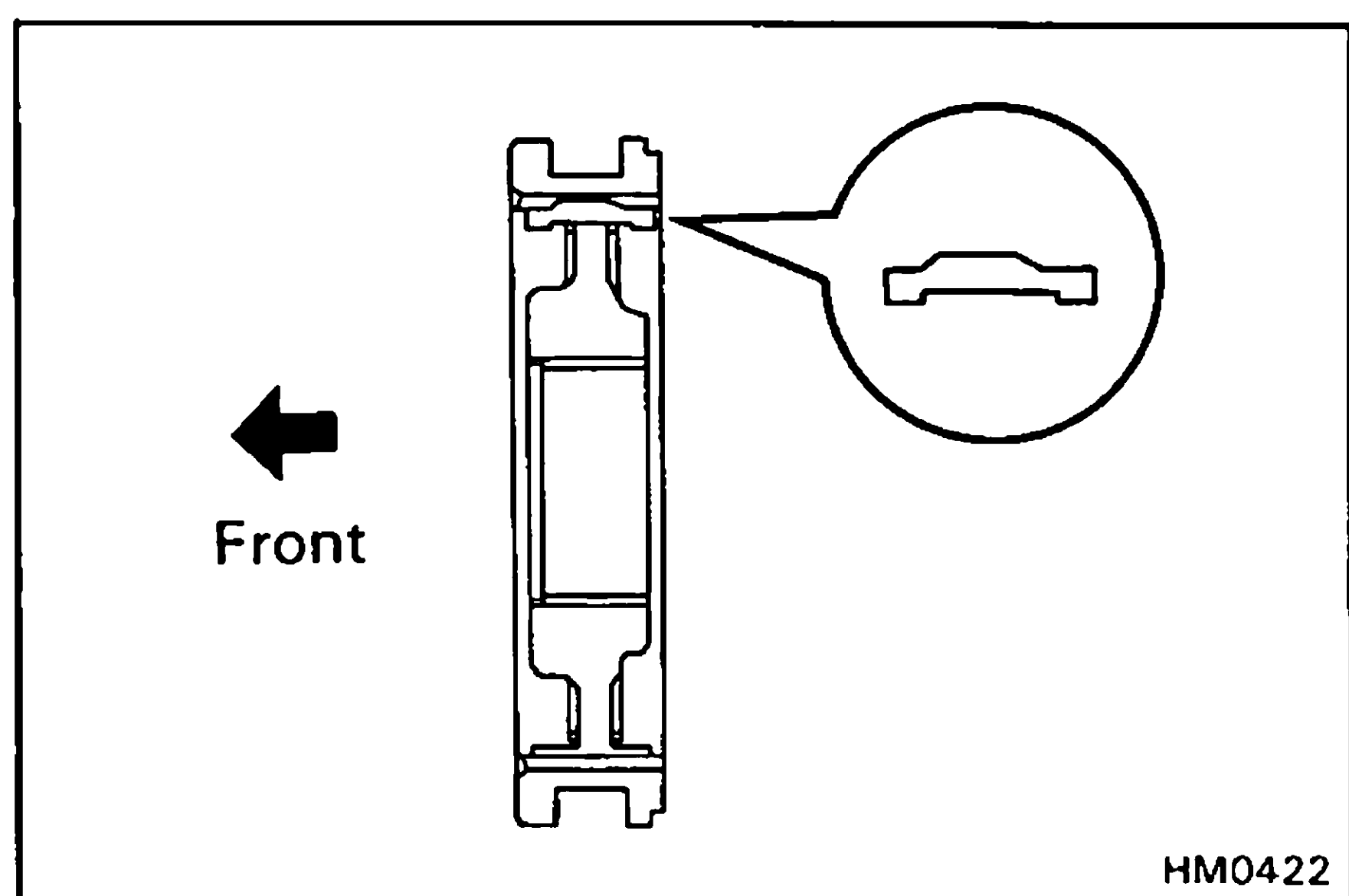
Install and torque the bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



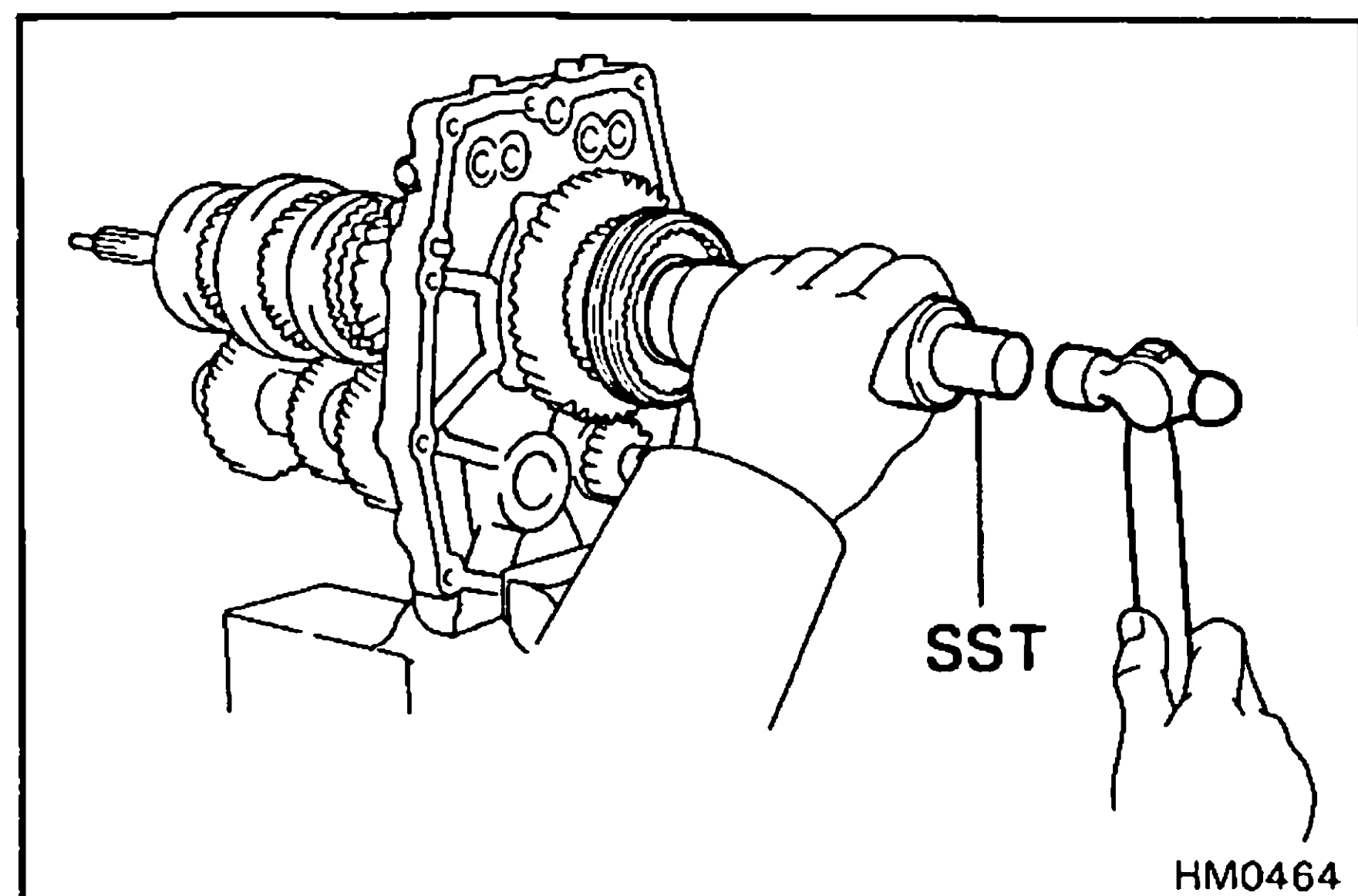
5. INSTALL REVERSE GEAR, HUB SLEEVE NO.4 ASSEMBLY AND NEEDLE ROLLER BEARING

- (a) Apply gear oil to the needle roller bearing.
(b) Install the needle roller bearing and reverse gear with synchronizer ring.



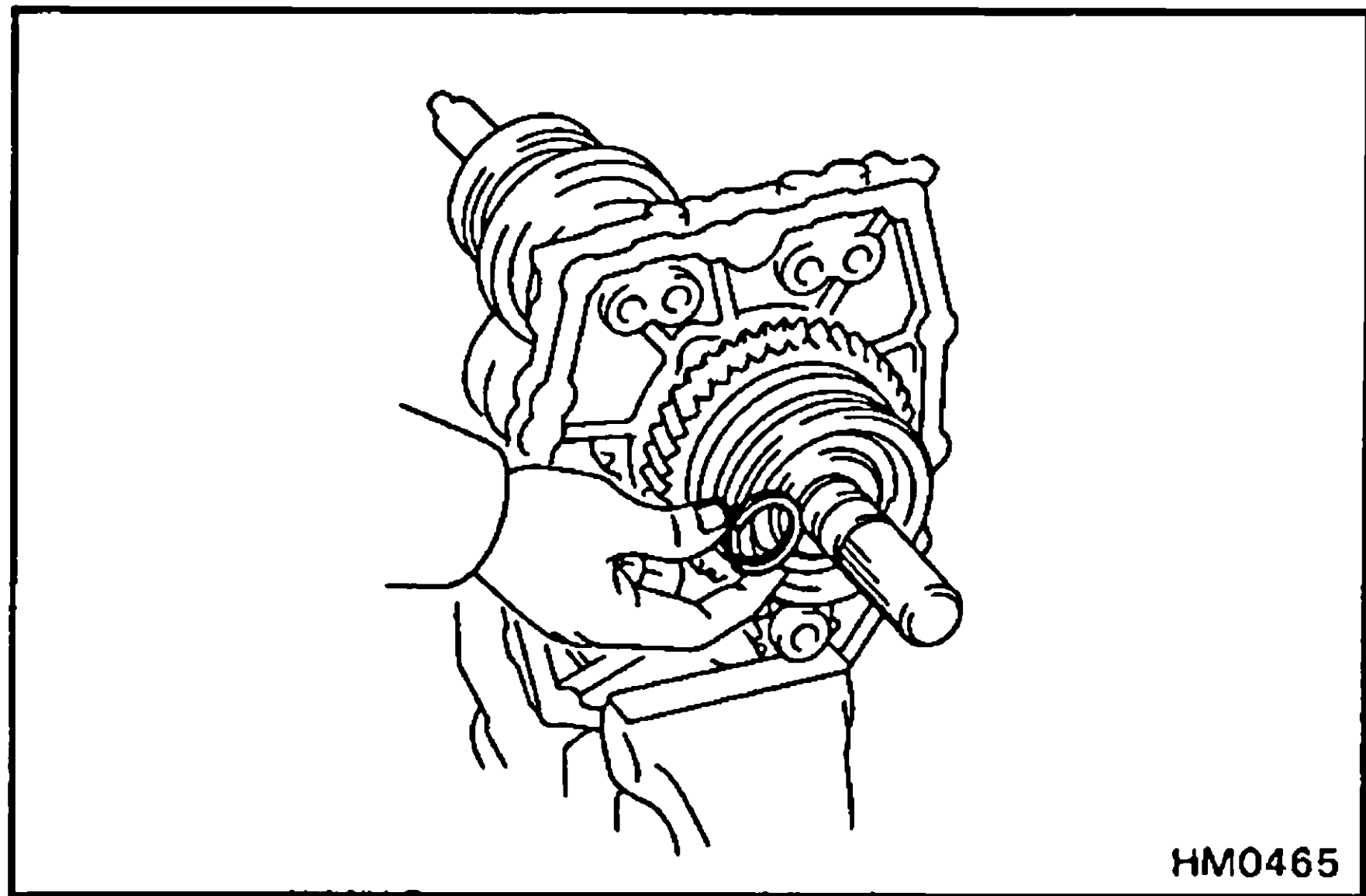
- (c) Install the clutch hub No.4 and shifting keys to the hub sleeve No.4.
(d) Install the spring under the shifting keys.

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



- (e) Using SST and a hammer, install the hub sleeve No.4 assembly.

SST 09316-60010 (09316-00010)

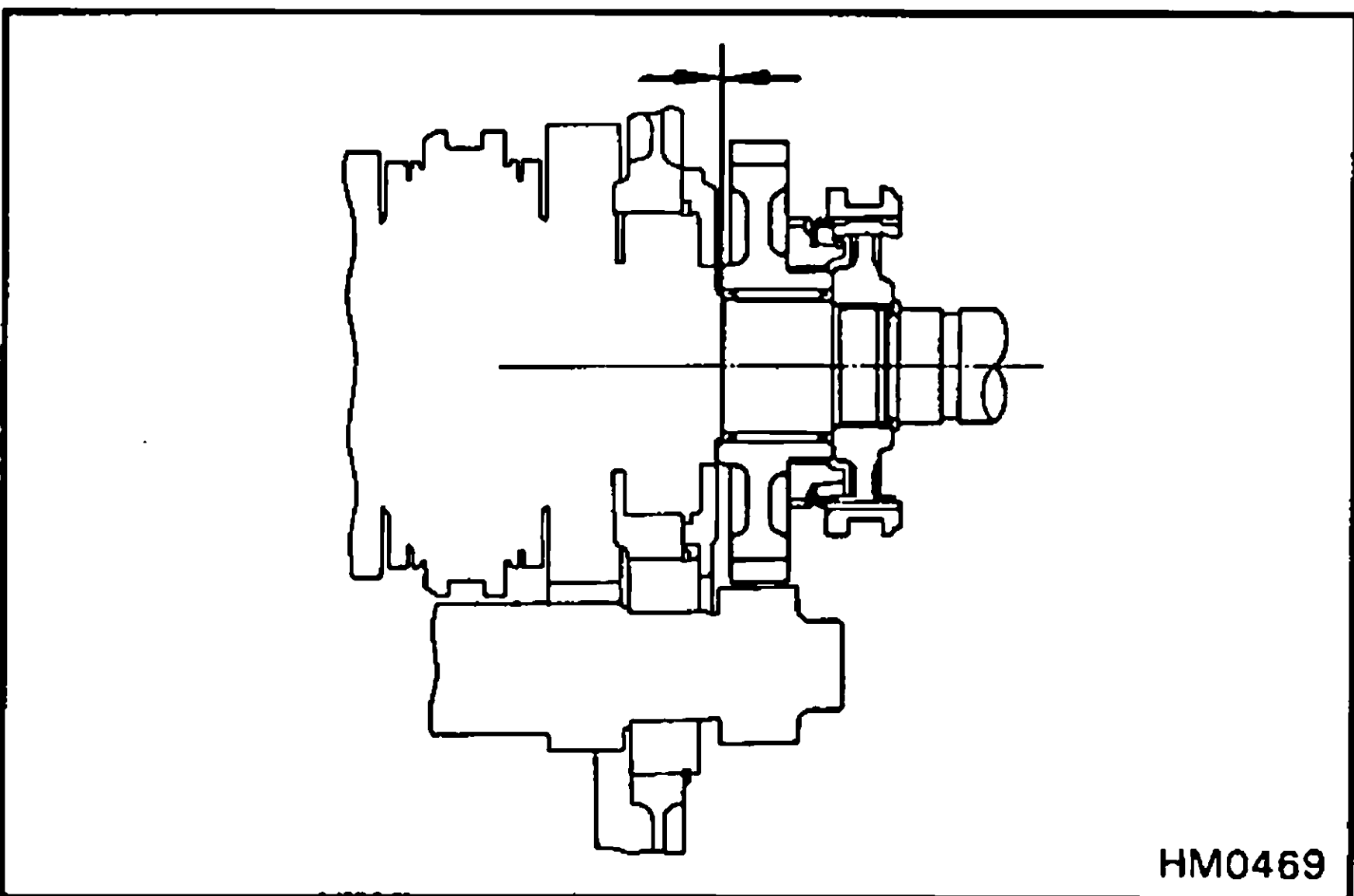
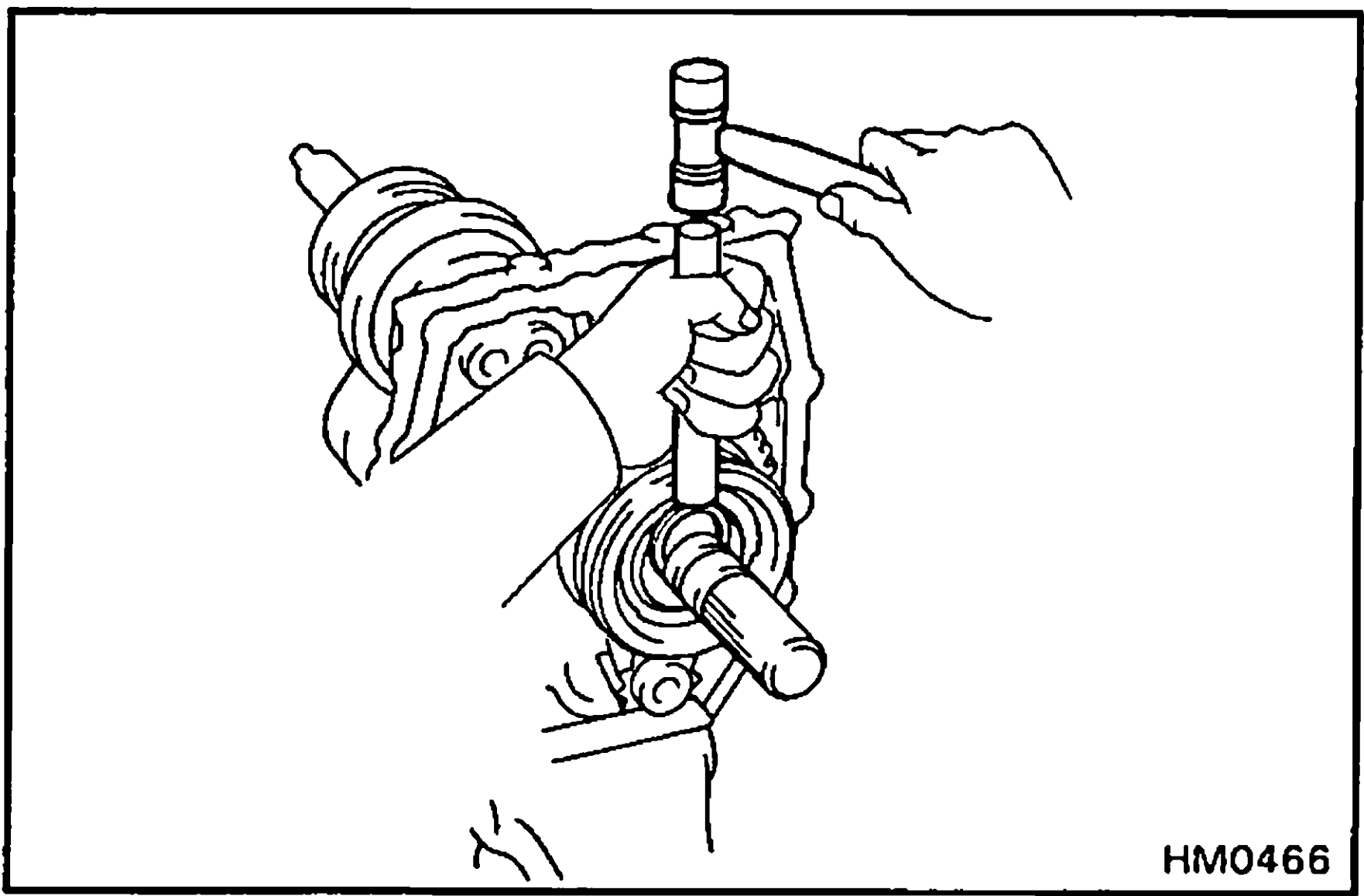


6. INSTALL SNAP RING

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

Mark	Thickness mm (in.)
A	2.40 — 2.45 (0.0945 — 0.0965)
B	2.45 — 2.50 (0.0965 — 0.0984)
C	2.50 — 2.55 (0.0984 — 0.1004)
D	2.55 — 2.60 (0.1004 — 0.1024)
E	2.60 — 2.65 (0.1024 — 0.1044)
F	2.65 — 2.70 (0.1044 — 0.1063)

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

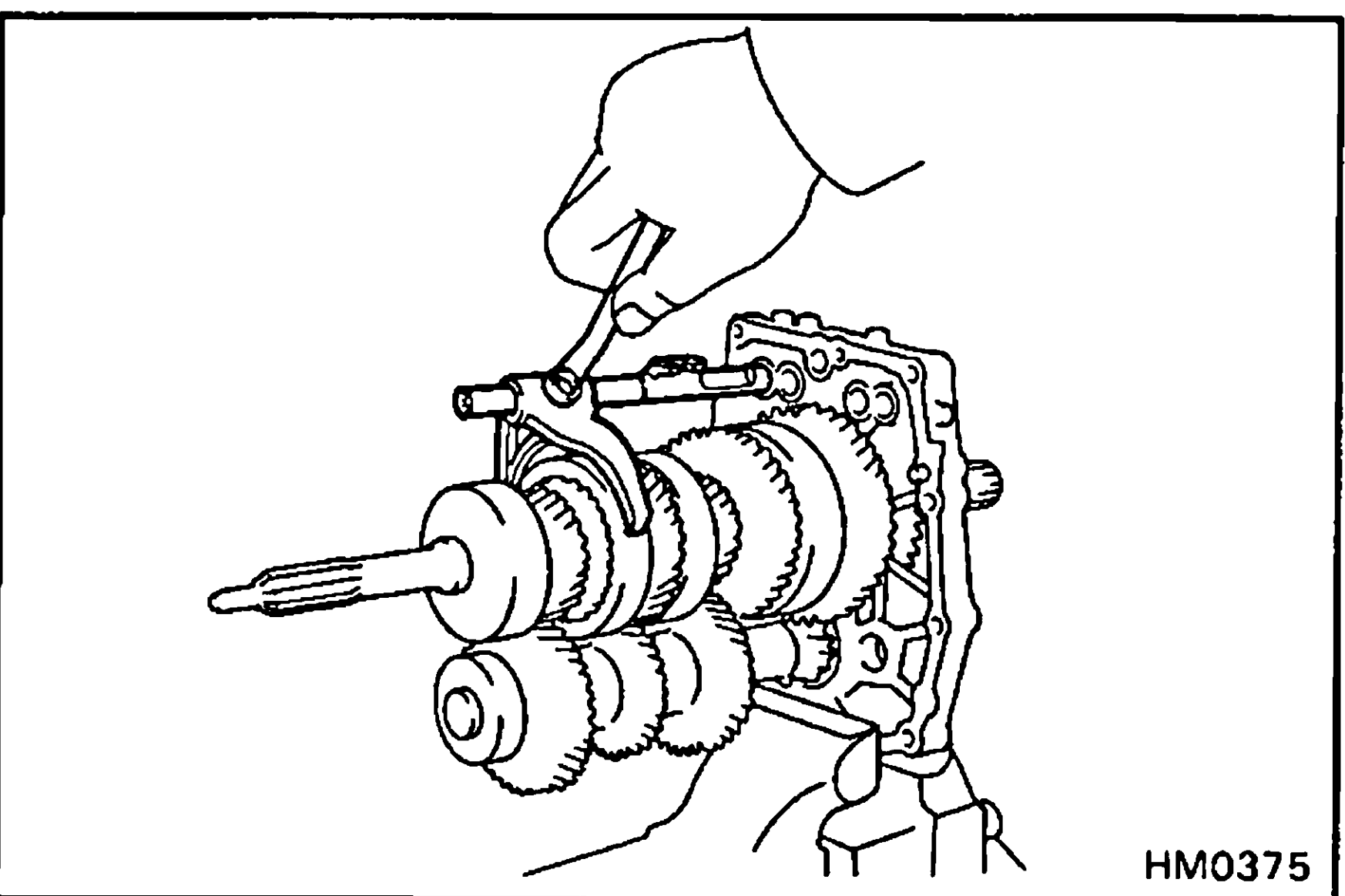


7. MEASURE REVERSE GEAR THRUST CLEARANCE

Using a feeler gauge, measure the reverse gear clearance.

Standard clearance: 0.1 — 0.67 mm
(0.0039 — 0.0264 in.)

Maximum clearance: 0.67 mm (0.0264 in.)



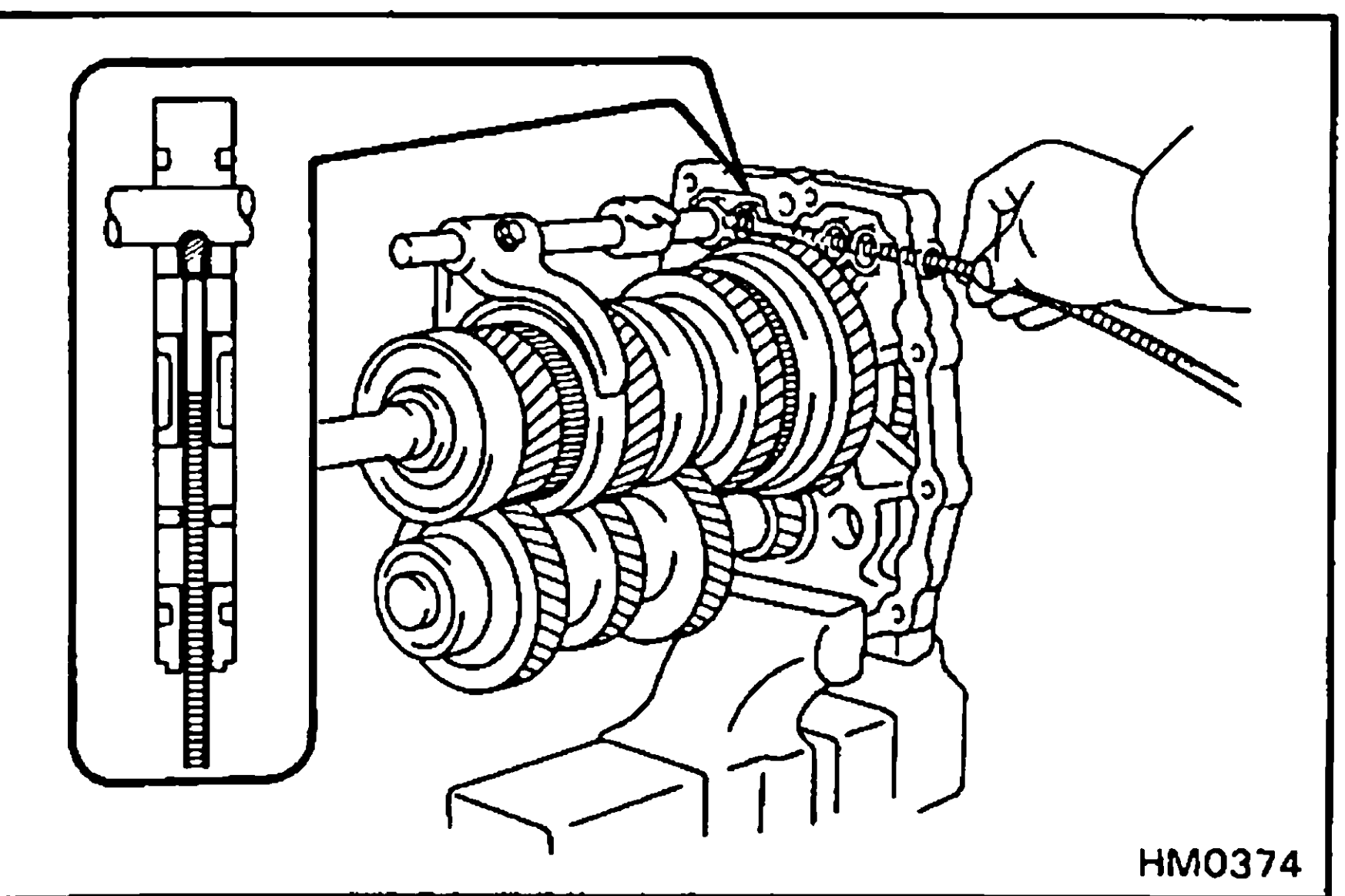
8. INSTALL SHIFT FORK SHAFT NO.2 AND SHIFT FORK NO.2

(a) Place shift fork No.2 into the grove of hub sleeve No.2.

(b) Install shift fork shaft No.2 to shift fork No.2 and intermediate plate.

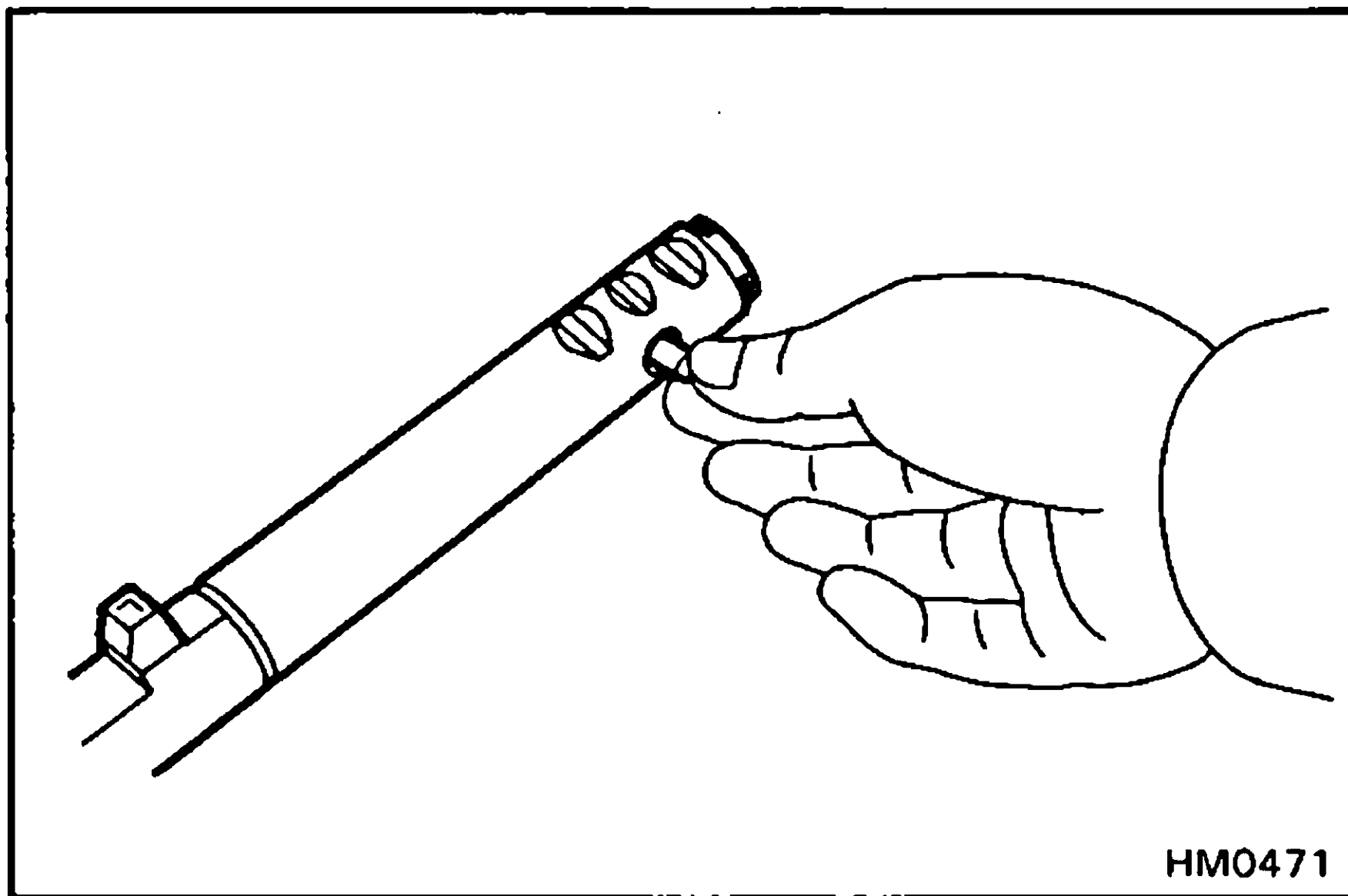
(c) Install and torque the set bolt.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

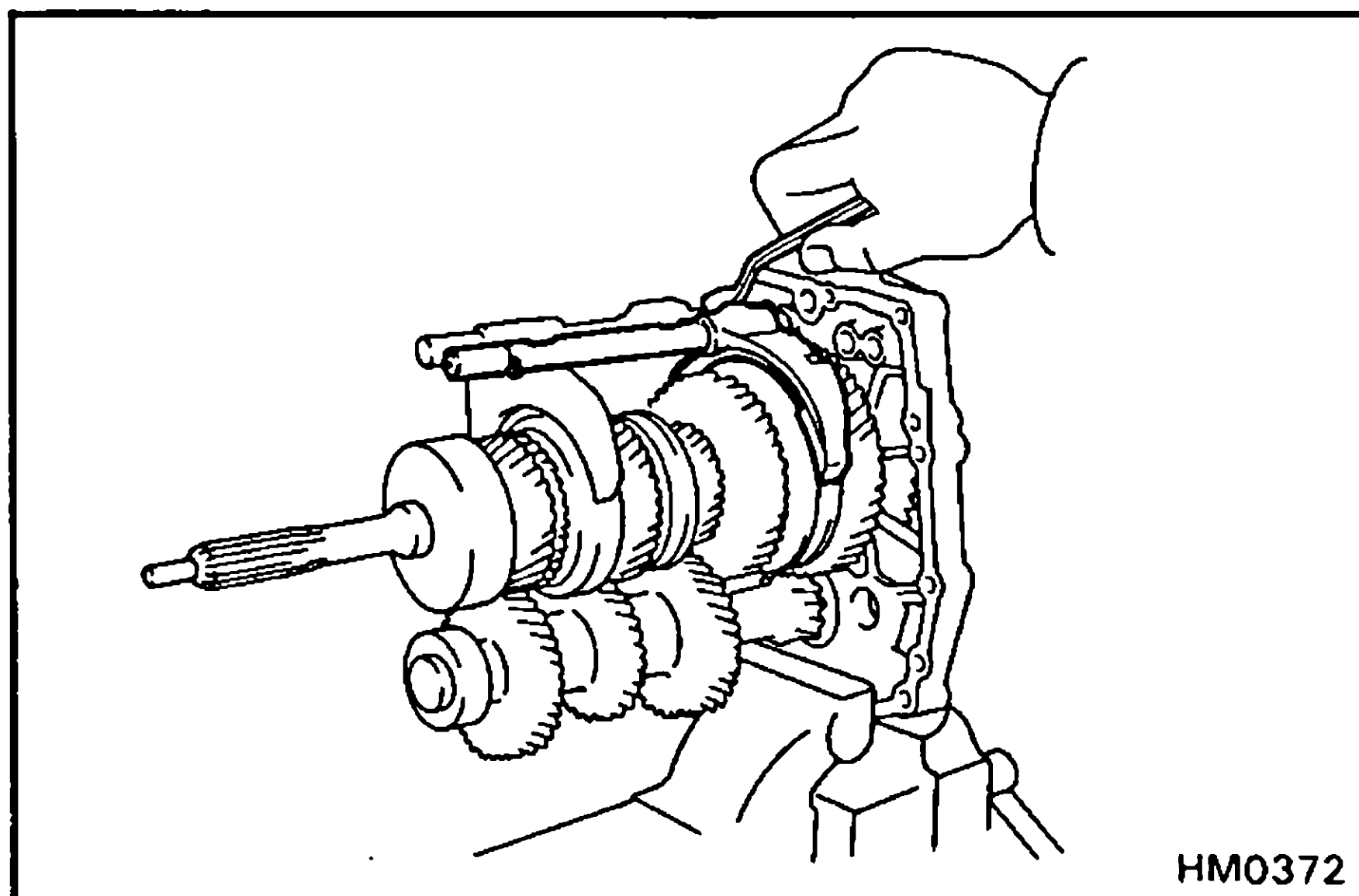


9. INSTALL SHIFT FORK SHAFT NO.1 AND SHIFT FORK NO.1

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



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

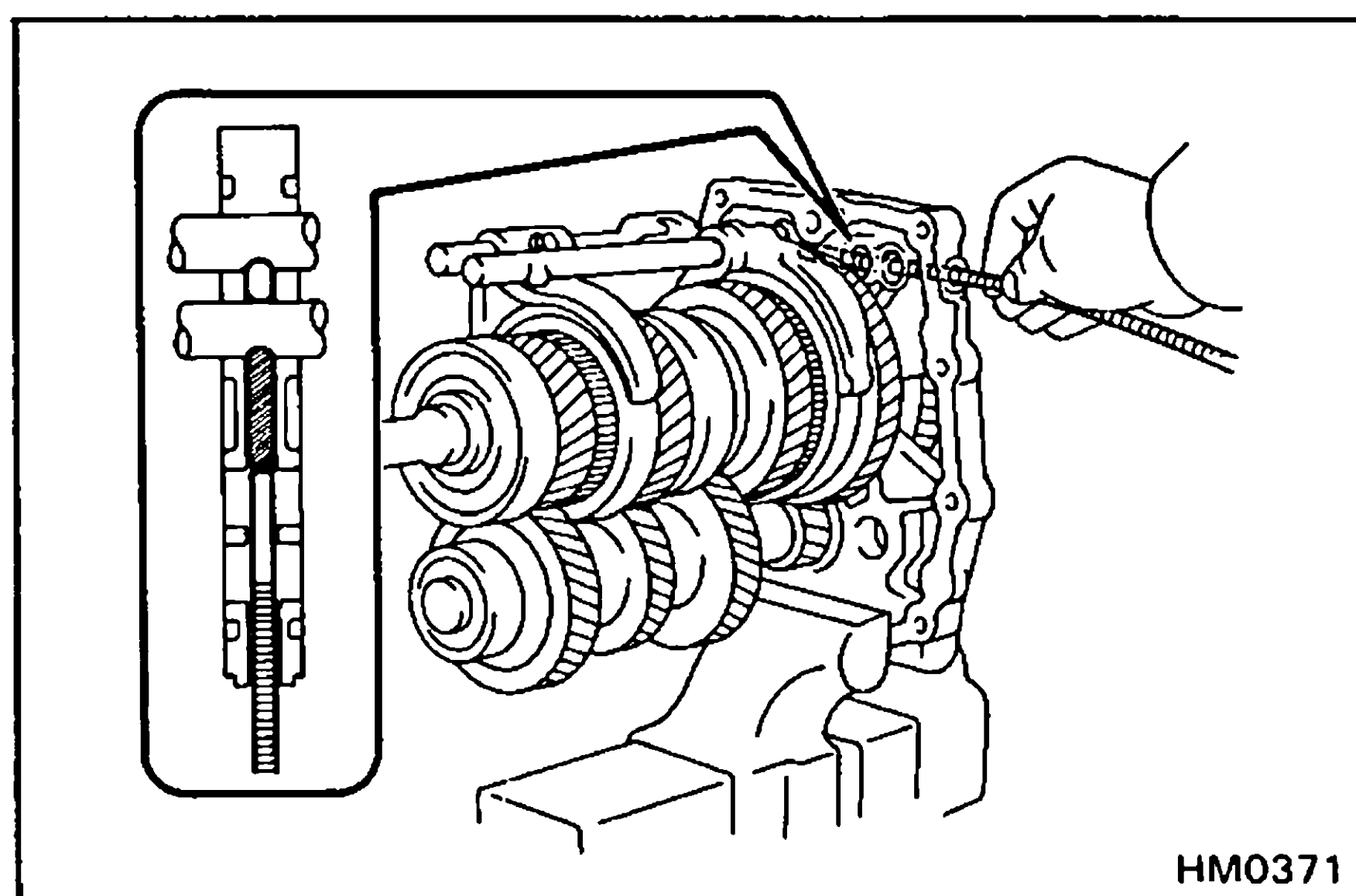


(c) Place shift fork No.1 into the groove of hub sleeve No.1.

(d) Install shift fork shaft No.1 to shift fork No.1 and intermediate plate.

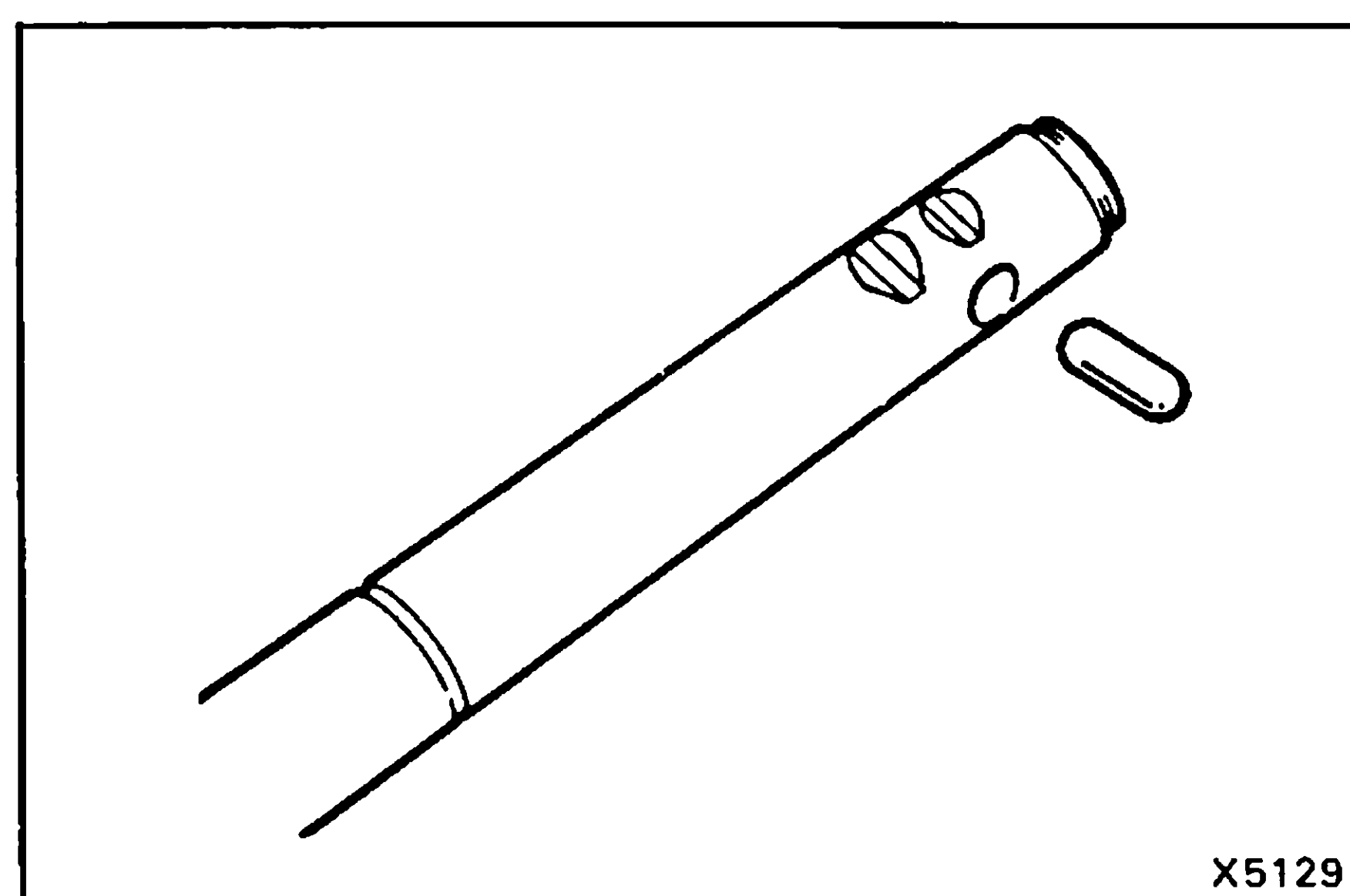
(e) Install and torque the bolt.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

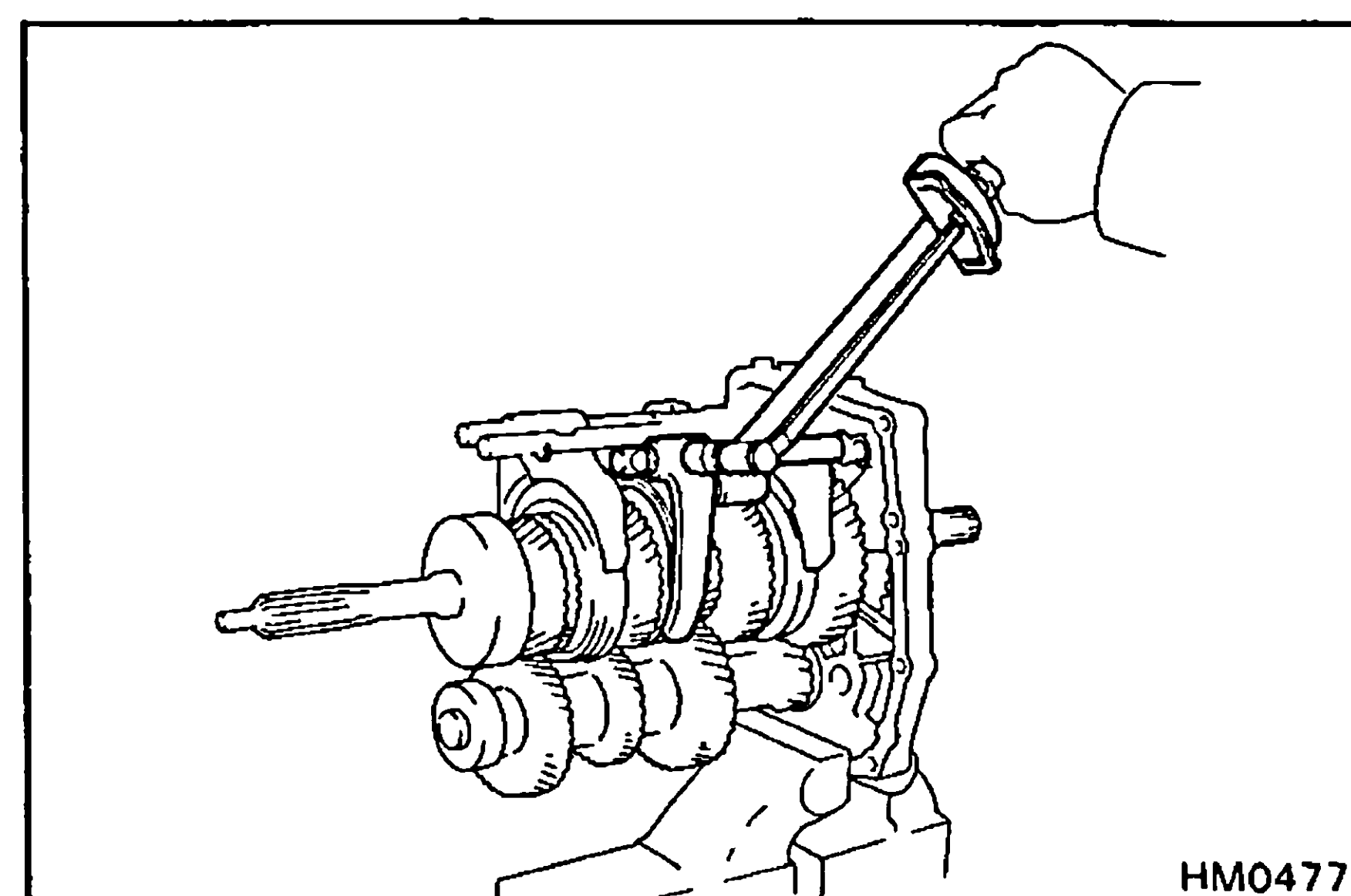


10. INSTALL SHIFT FORK SHAFT NO.3, REVERSE SHIFT HEAD AND SHIFT FORK NO.3

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



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

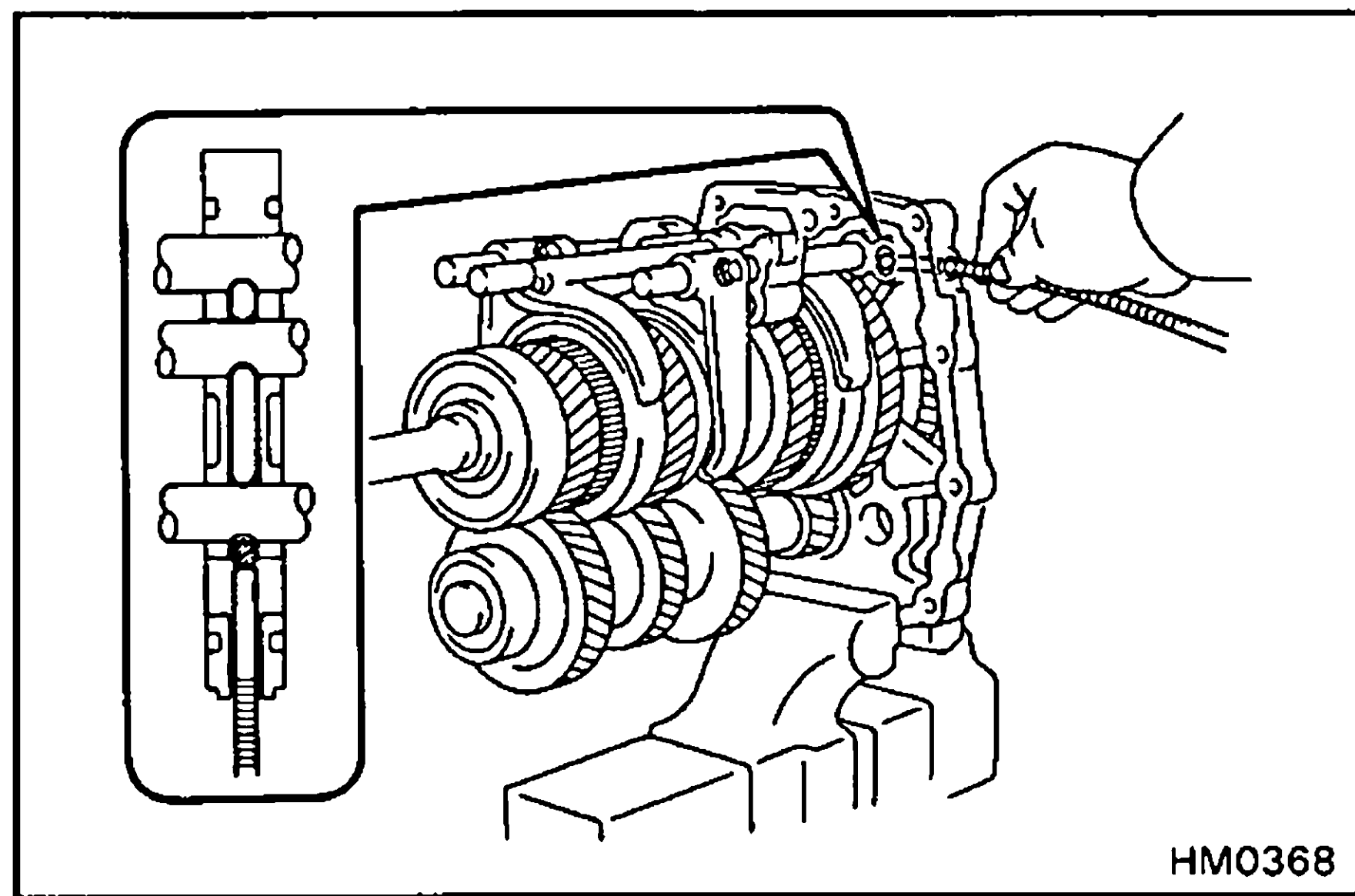


(c) Place shift fork No.3 into the groove of hub sleeve No.3.

(d) Install shift fork shaft No.3 to shift fork No.3, reverse shift head and shift fork through the intermediate plate.

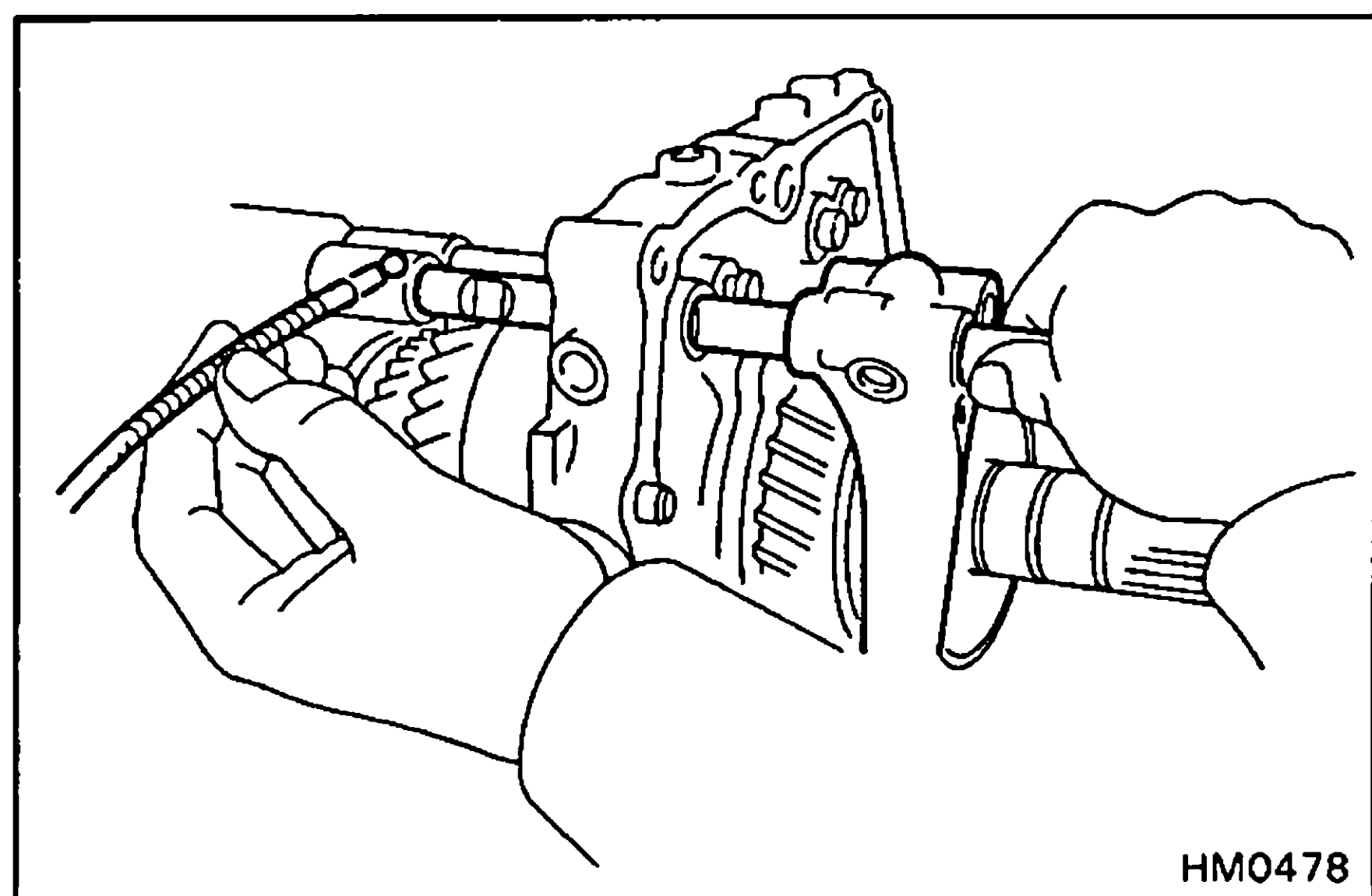
(e) Install and torque the set bolt.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)



11. INSTALL SHIFT FORK SHAFT NO.3 OR NO.4 AND REVERSE SHIFT FORK

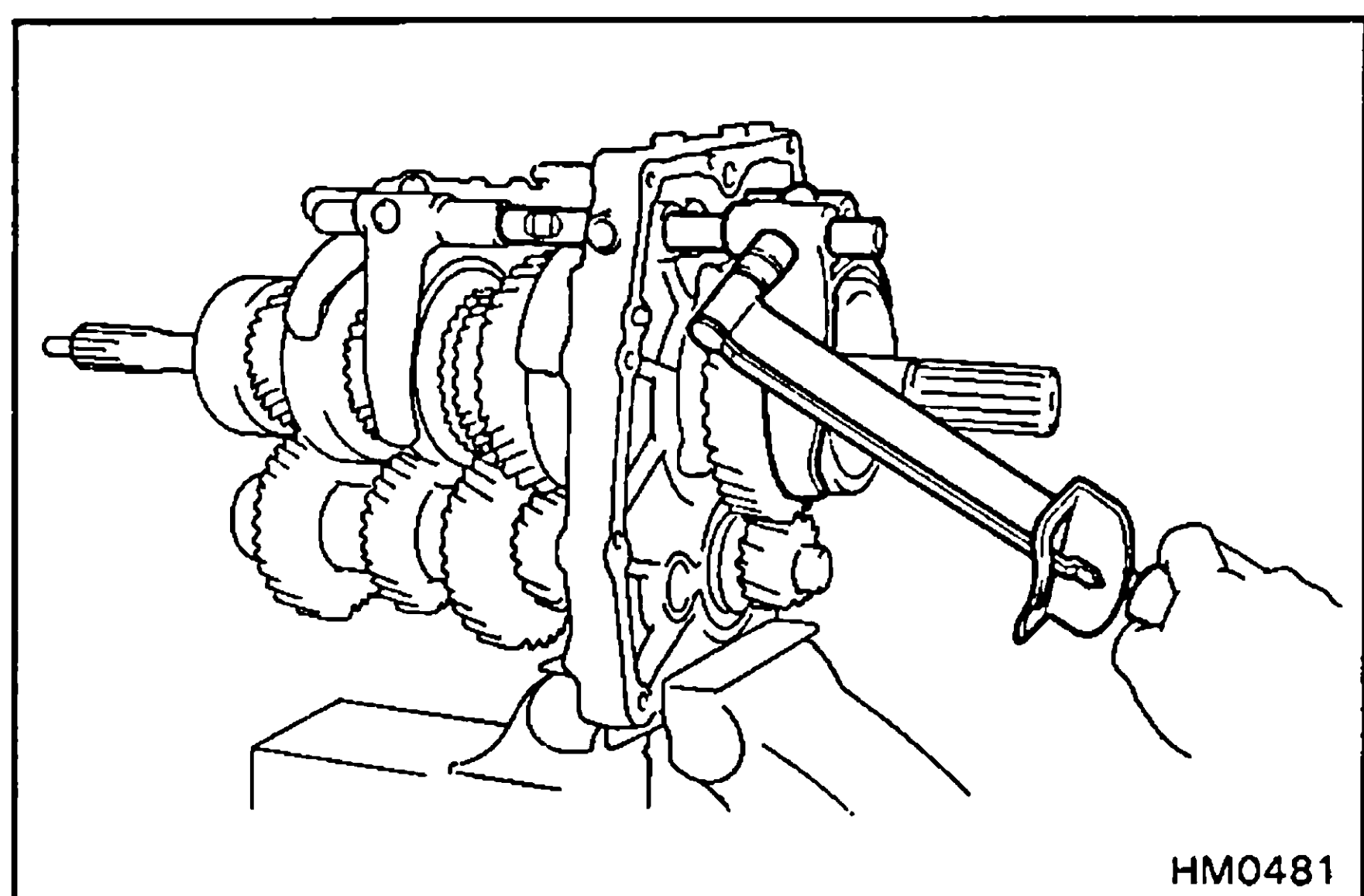
- (a) Using a magnetic finger, install the locking ball into the intermediate plate.



- (b) Place reverse shift fork into the groove of hub sleeve No.3 or No.4.

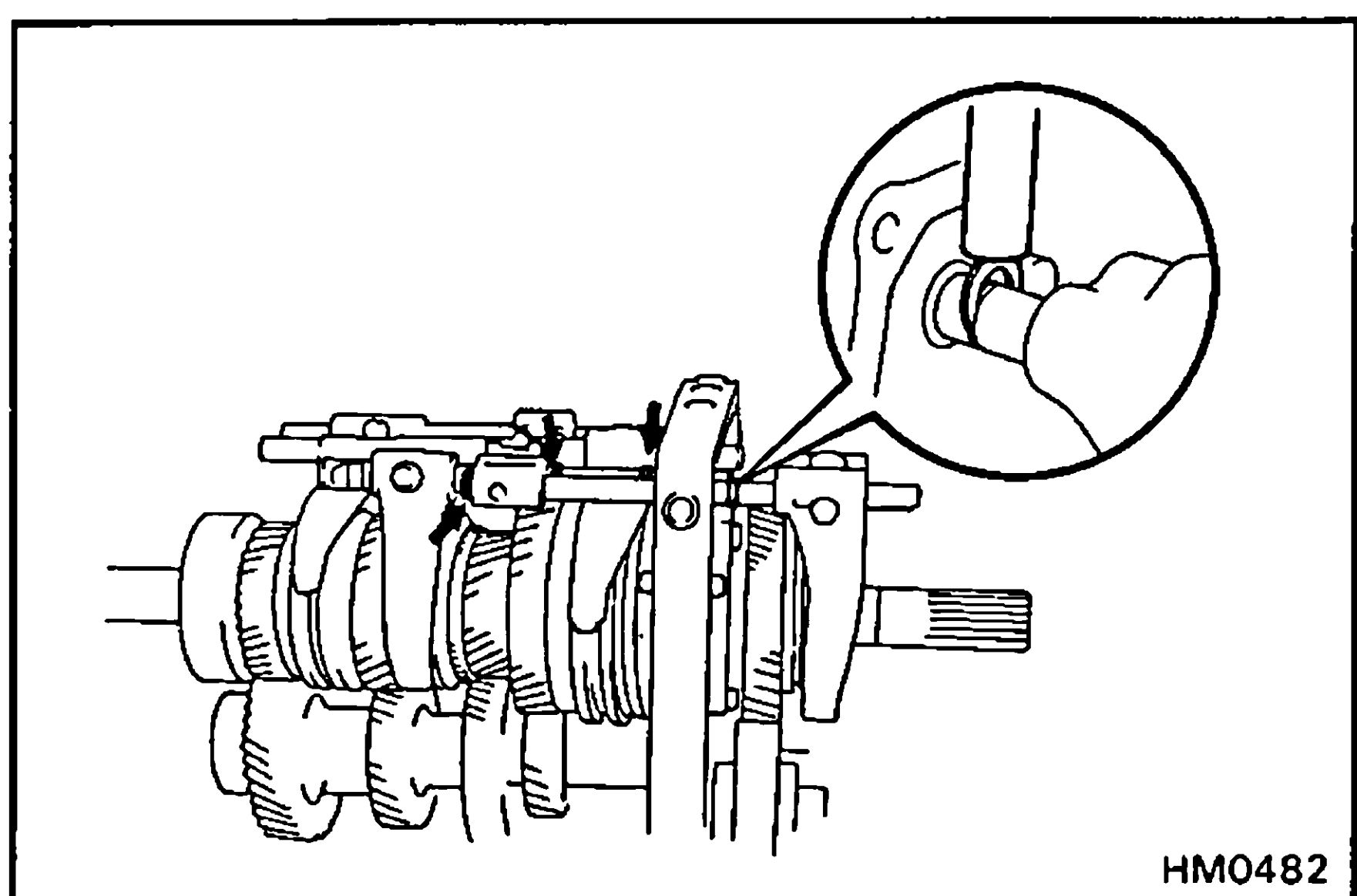
- (c) Install shift fork shaft No.3 or No.4 to reverse shift fork and shift fork through the intermediate plate.

- (d) Using a magnetic finger, install the locking ball into the reverse shift head.



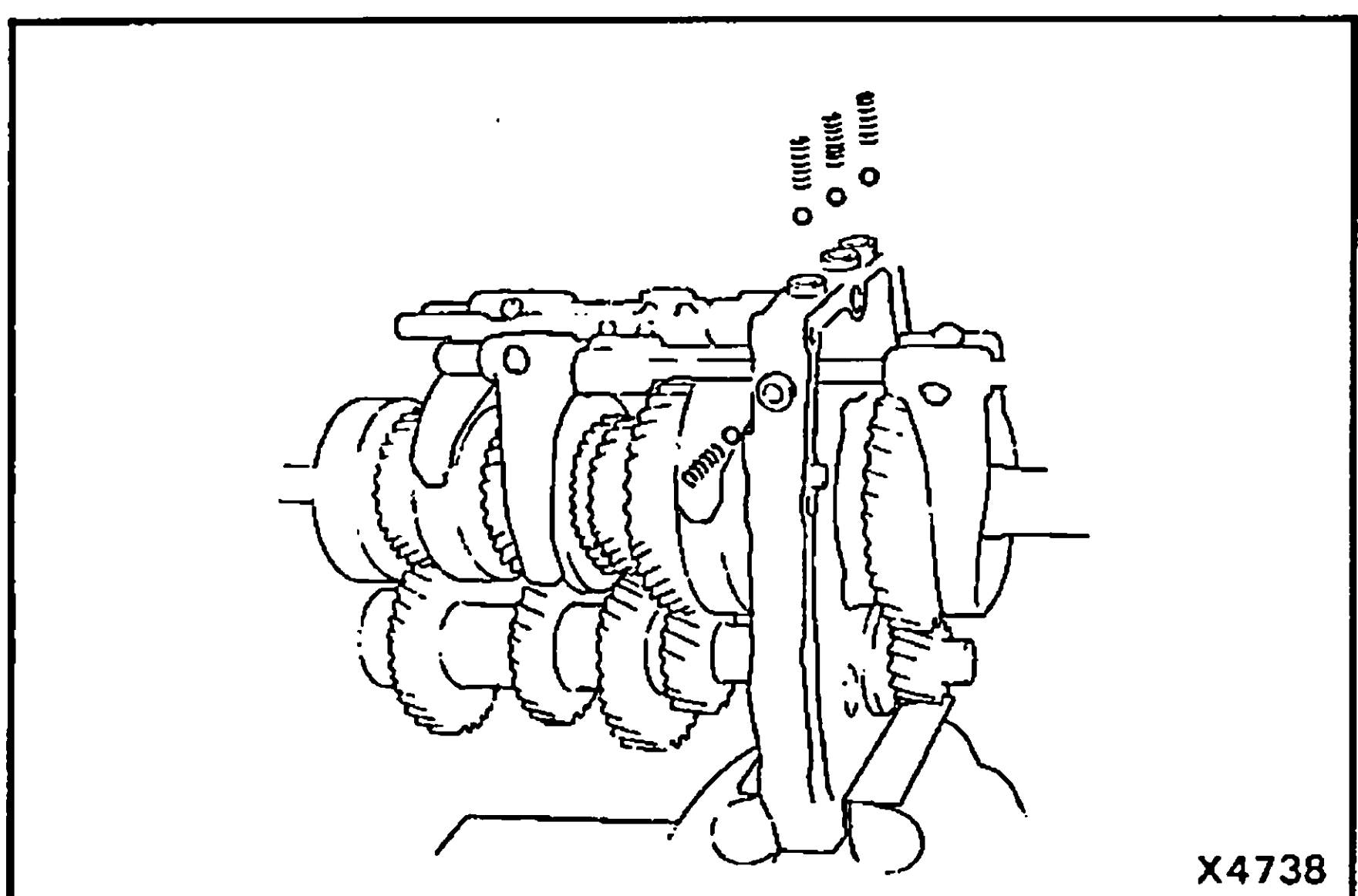
- (e) Install and torque the set bolt.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)



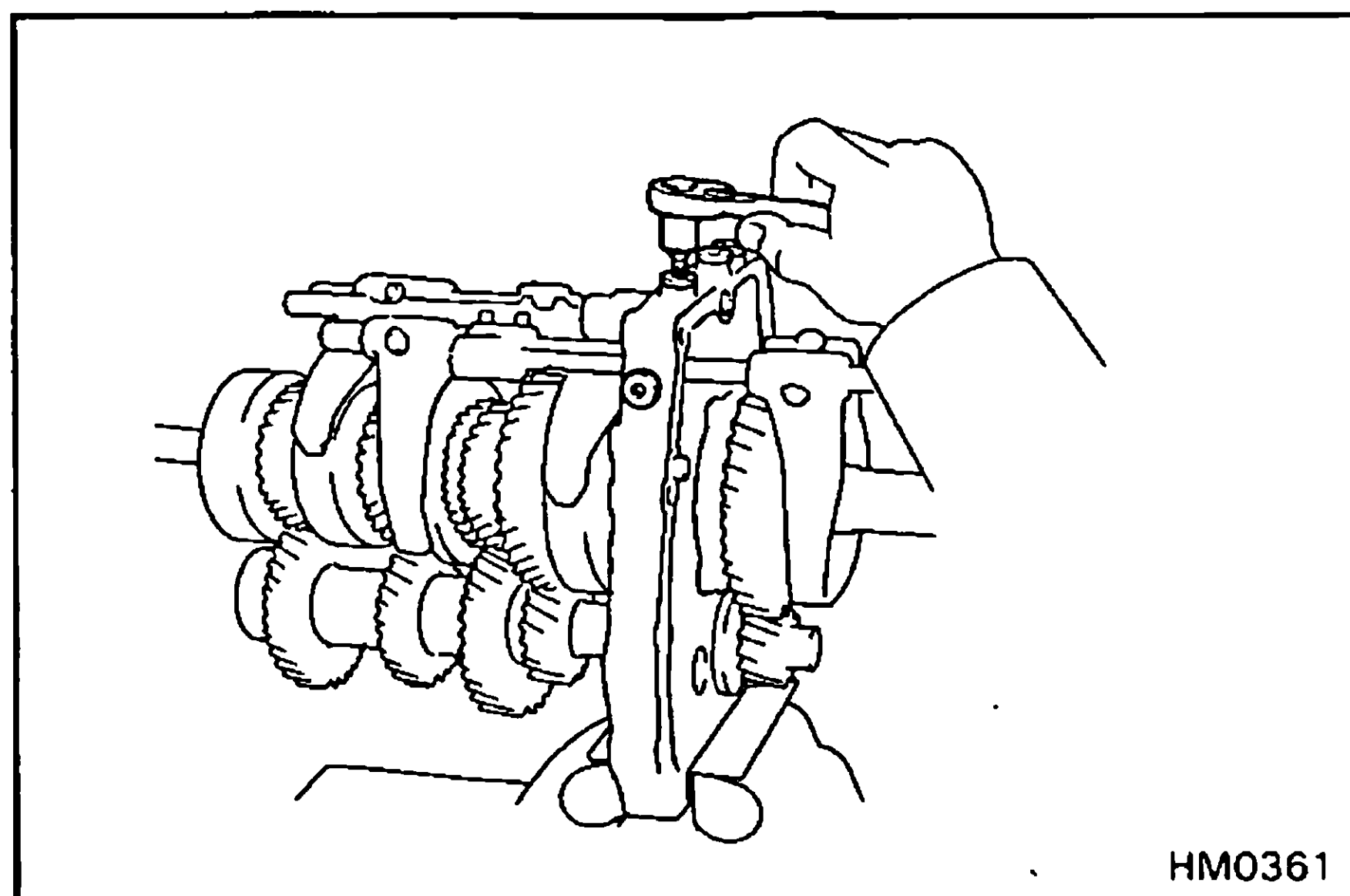
12. INSTALL FORK SHAFT SNAP RINGS

Using a brass bar and hammer, tap in the four snap rings.



13. INSTALL LOCKING BALLS, SPRINGS AND SCREW PLUGS

- (a) Install the four locking balls, springs and screw plugs.

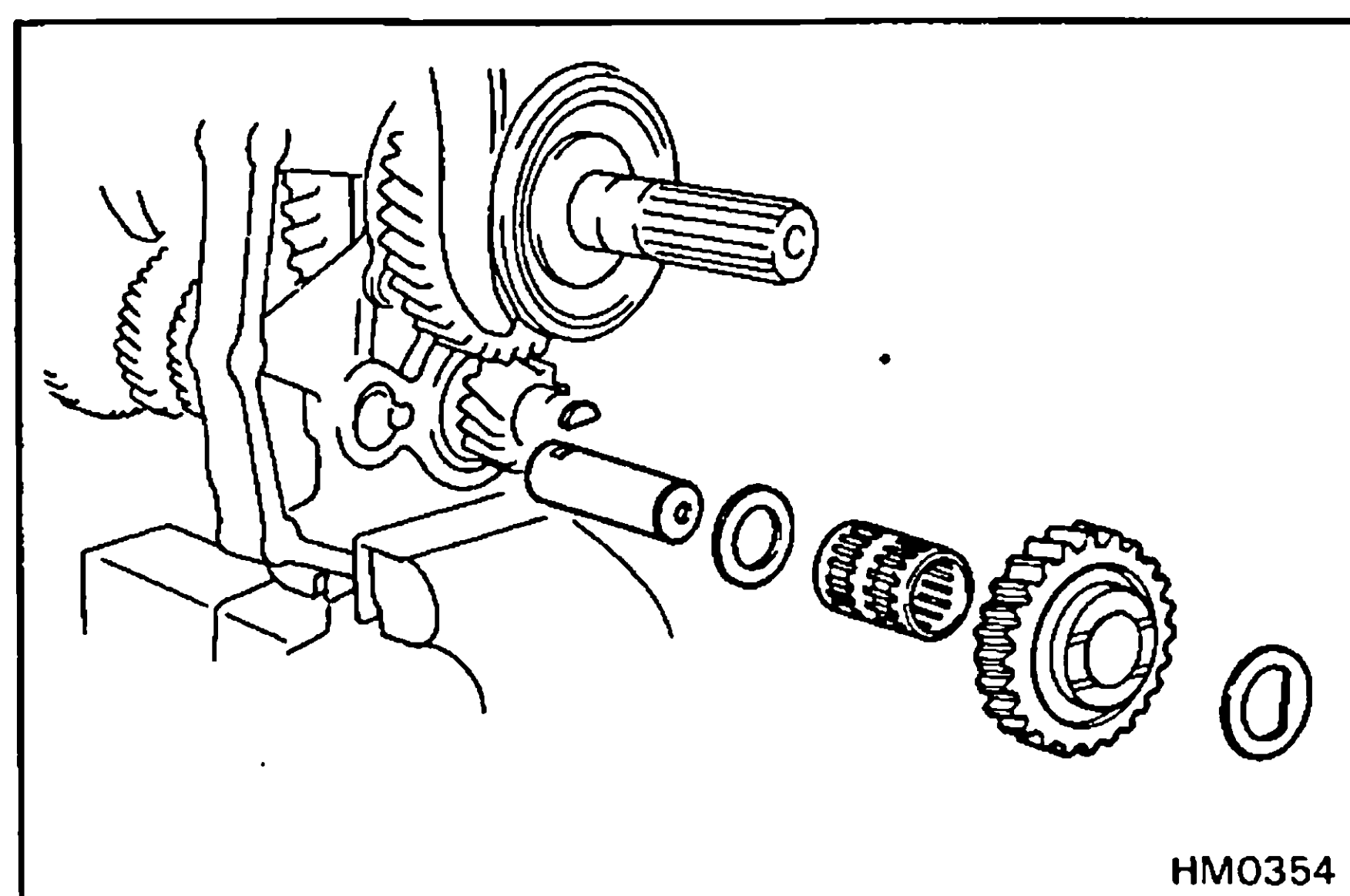


(b) Apply liquid sealer to the plug threads.

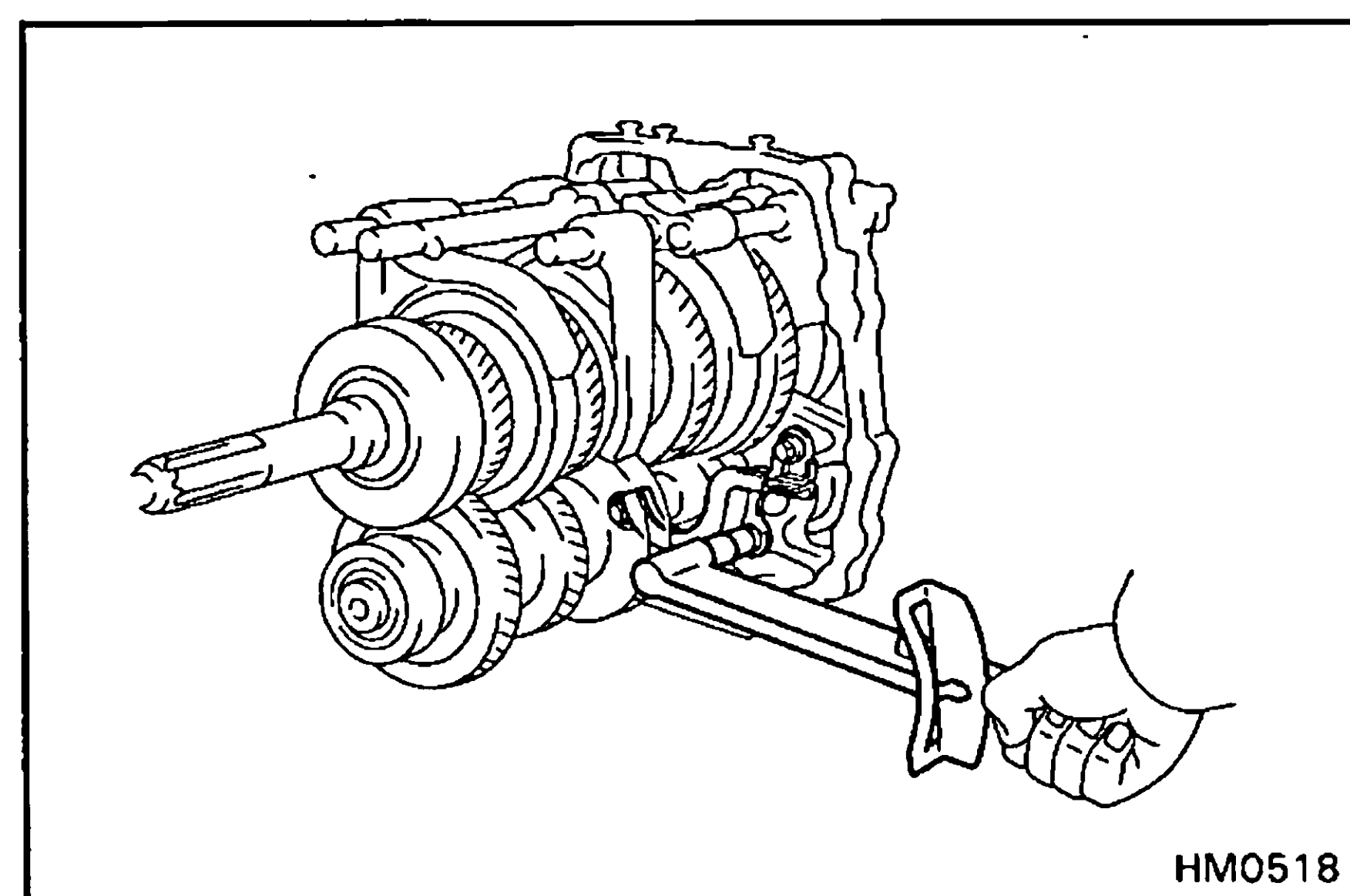
Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using a torx socket wrench, torque the screw plug.
(Torx socket wrench T40 09042-00020)

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



14. INSTALL REVERSE IDLER GEAR TO INTERMEDIATE PLATE



15. DISMOUNT INTERMEDIATE PLATE FROM VISE

(a) Dismount the intermediate plate from the vise.

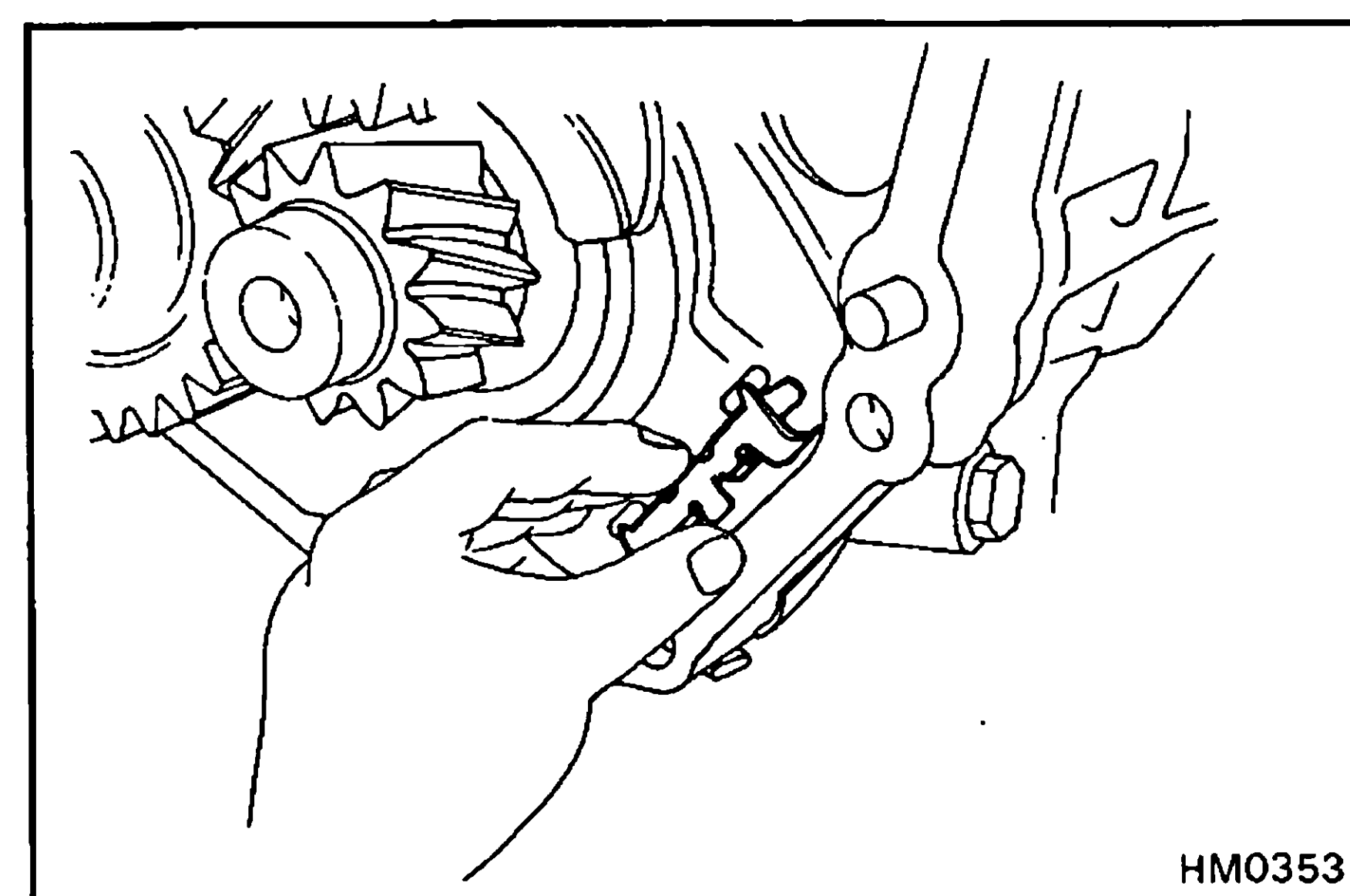
(b) Remove the bolts, nuts and plate washers.

16. INSTALL OIL RECEIVER TO INTERMEDIATE PLATE

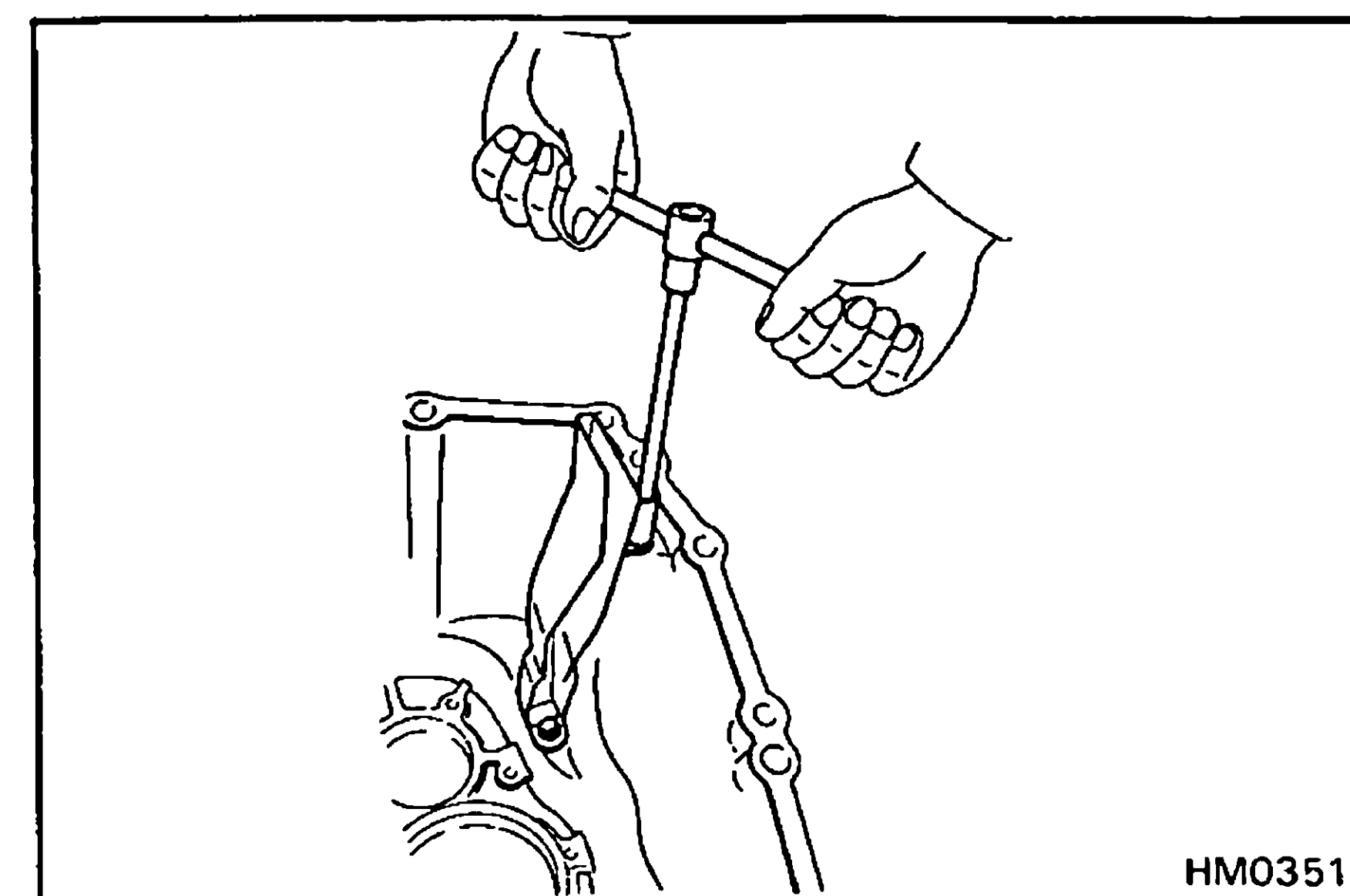
(a) Install the oil receiver.

(b) Install and torque the three bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



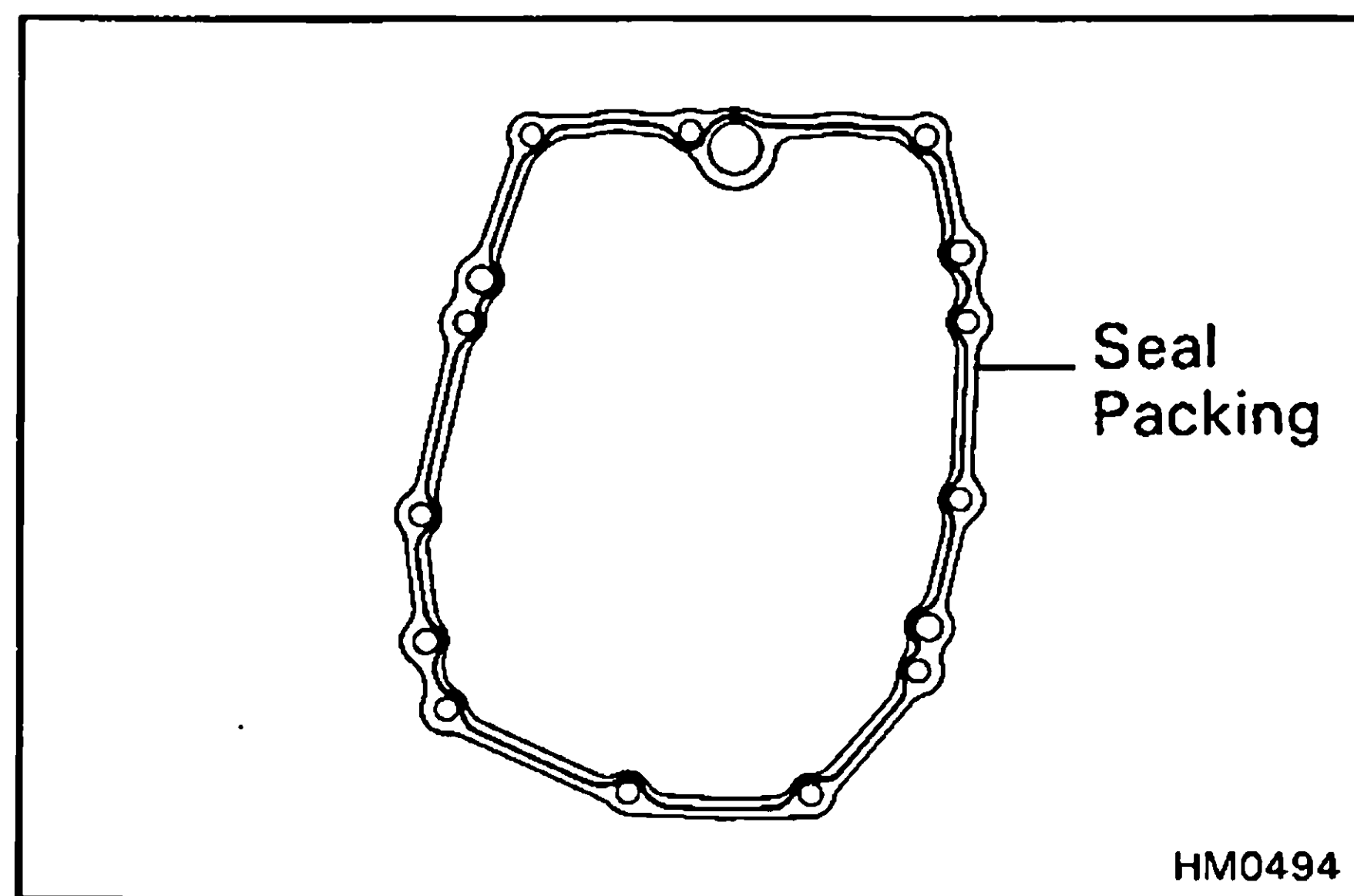
17. INSTALL MAGNET TO INTERMEDIATE PLATE



18. INSTALL OIL RECEIVER TO FRONT CASE

Install and torque the two bolts.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



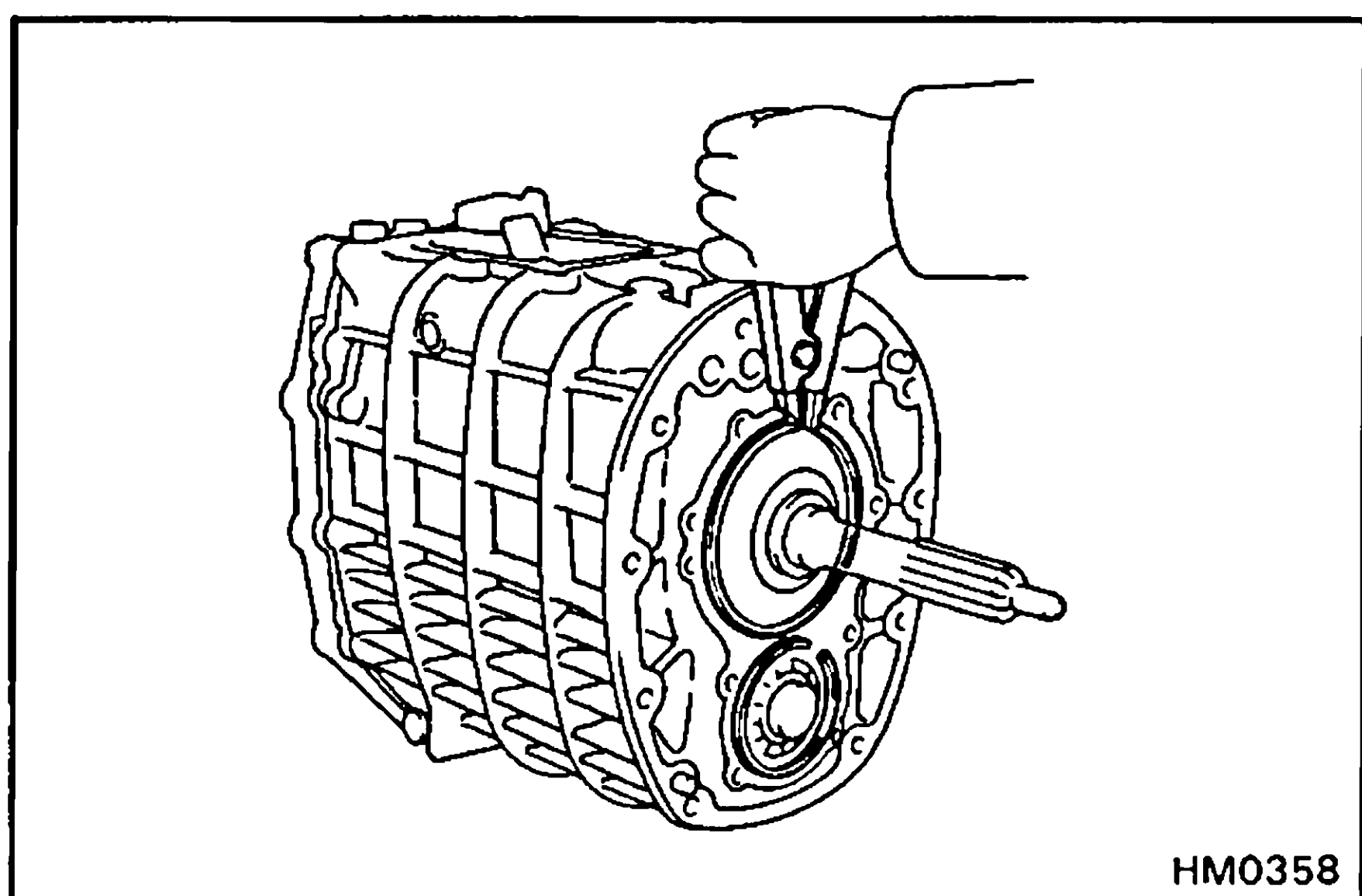
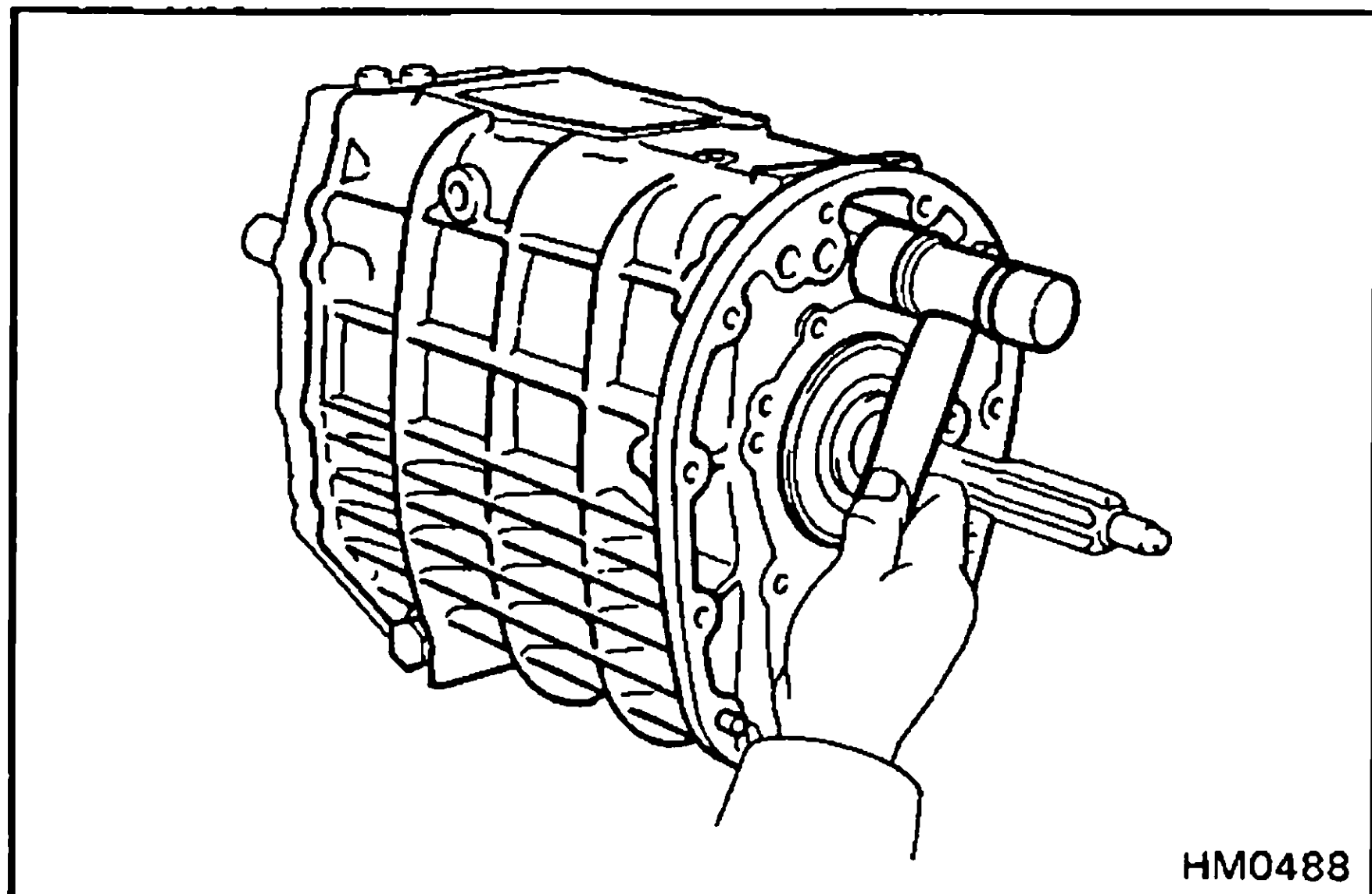
19. ASSEMBLE TRANSMISSION CASE AND INTERMEDIATE PLATE

- Remove any packing material and be careful not to drop oil on the contacting surface of the transmission case.
- Apply seal packing to the transmission case as shown in the figure.

Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent

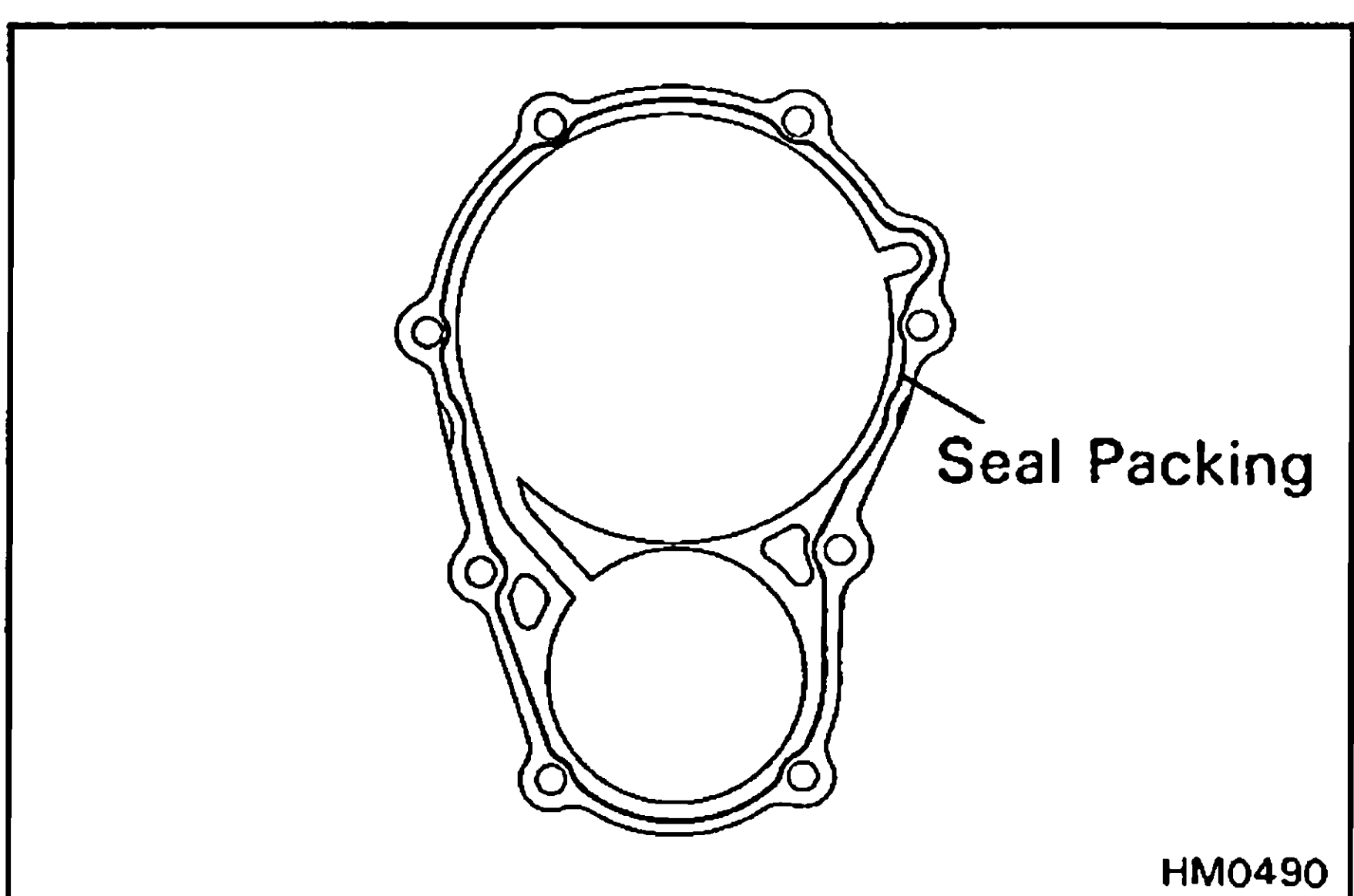
HINT: Install the transmission case as soon as the seal packing is applied.

- Align each bearing outer race, each fork shaft end and reverse idler gear shaft end with the case installation holes, and install the case.
- Using a plastic hammer, tap on the case to install it.



20. INSTALL BEARING SNAP RINGS

Using a snap ring expander, install the two snap rings to the input shaft bearing and counter gear front bearing.



21. INSTALL FRONT BEARING RETAINER

- Remove any packing material and be careful not to drop oil on the contacting surfaces of the front bearing retainer.
- Apply seal packing to the retainer as shown in the figure and install it to the transmission case.

Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent

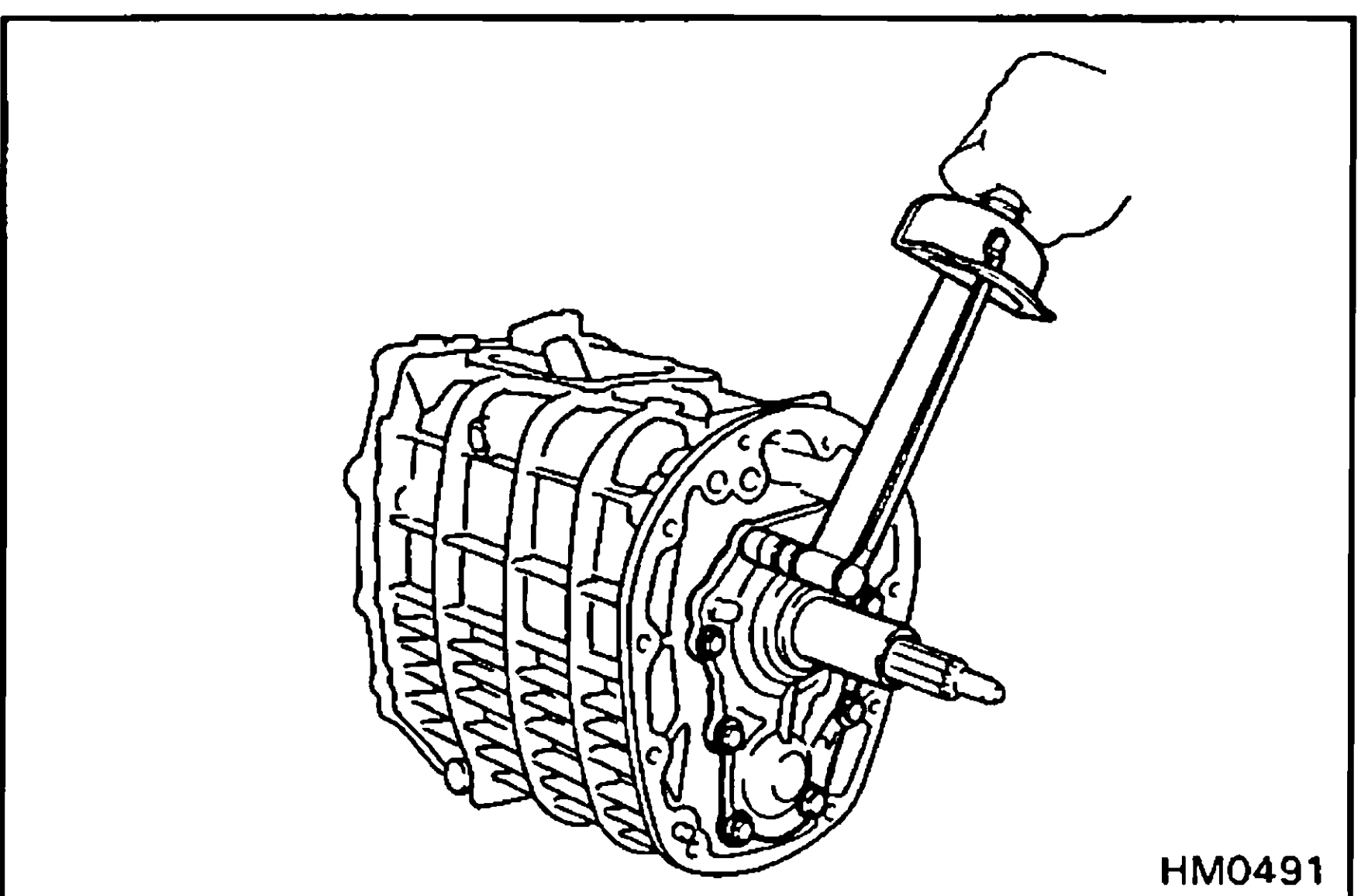
HINT: Install the front bearing retainer as soon as the seal packing is applied.

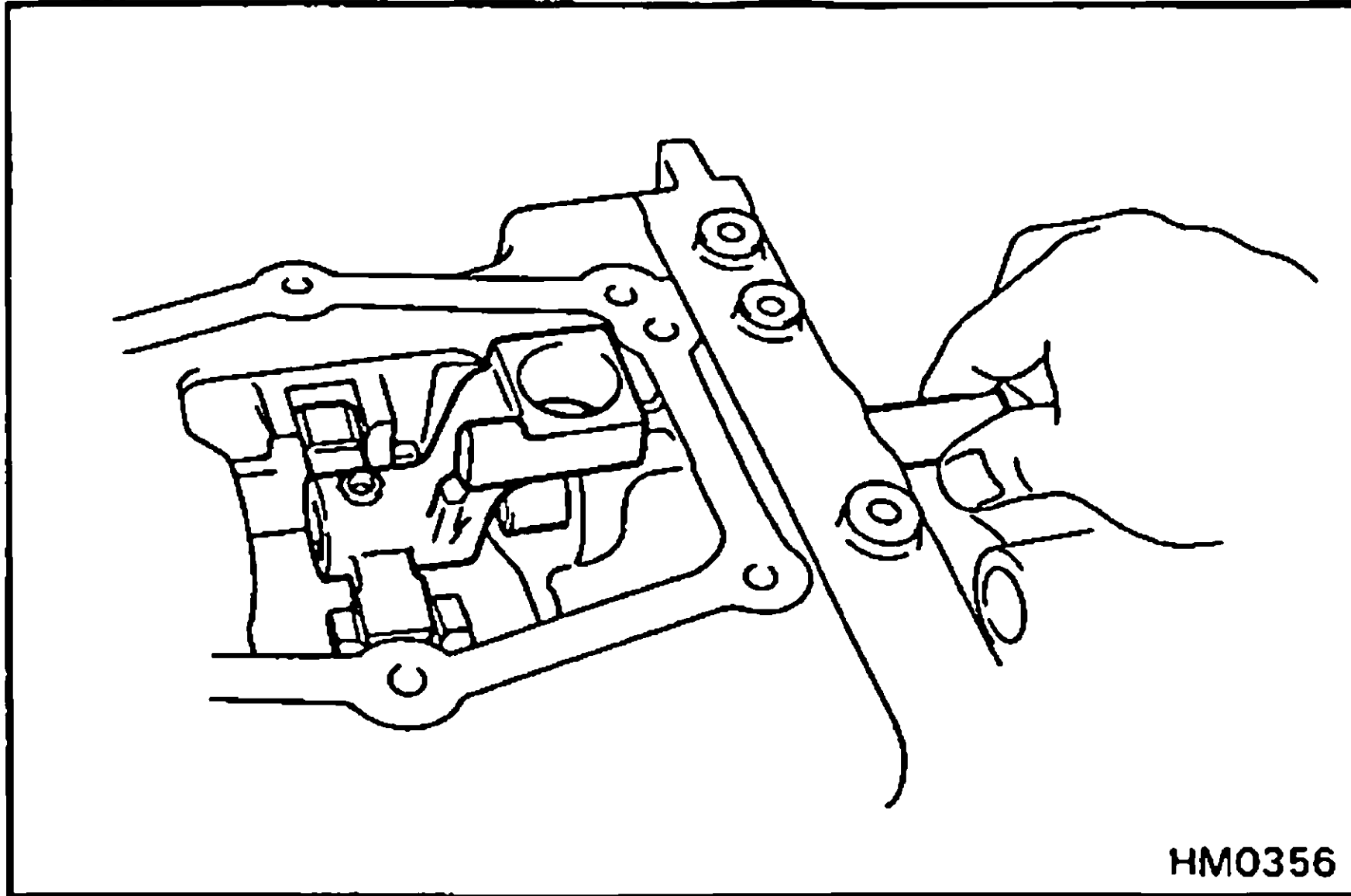
- Apply liquid sealer to the bolt threads.

Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- Install and torque the eight bolts.

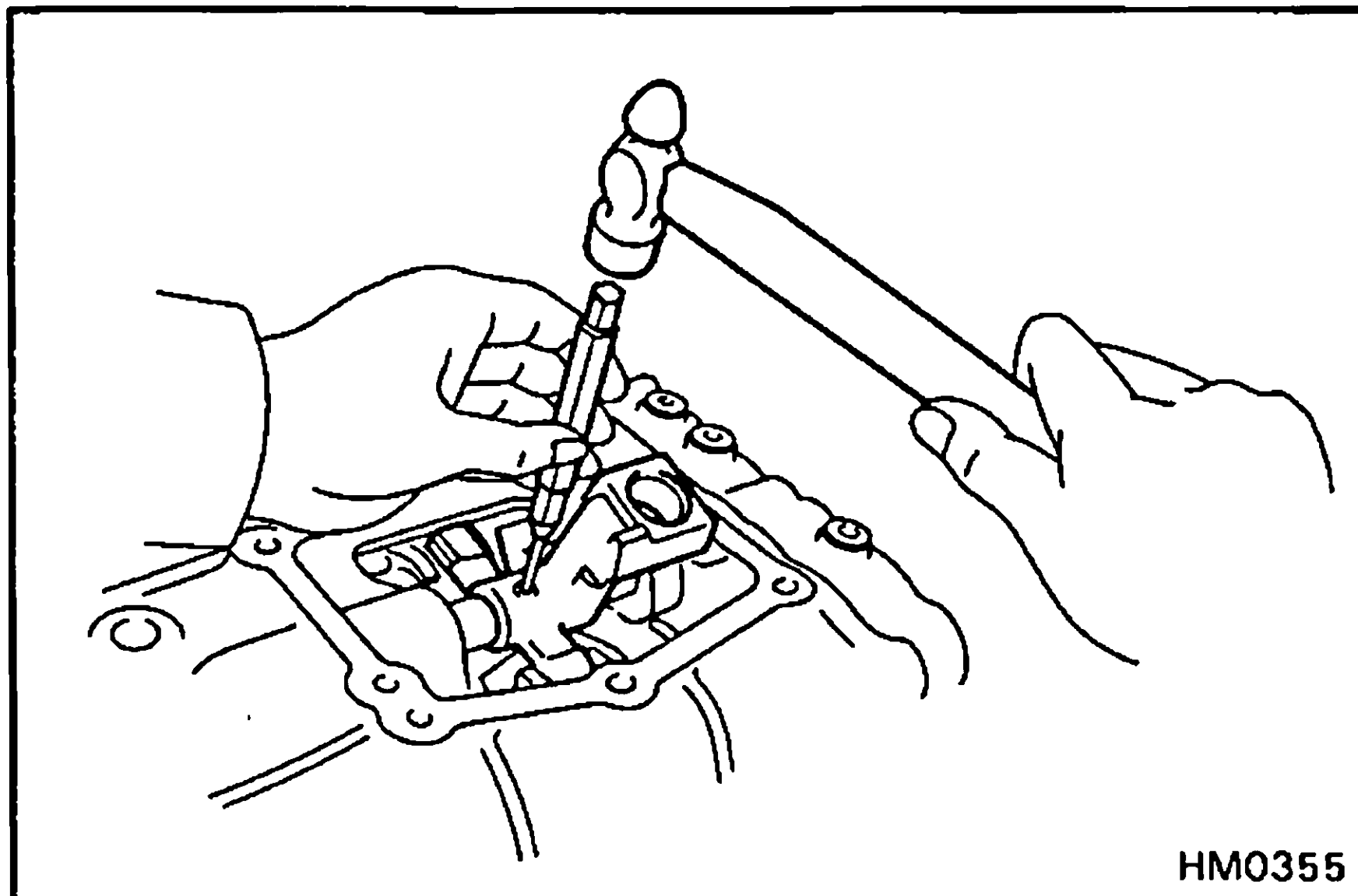
Torque: 16 N·m (170 kgf·cm, 12 ft·lbf)



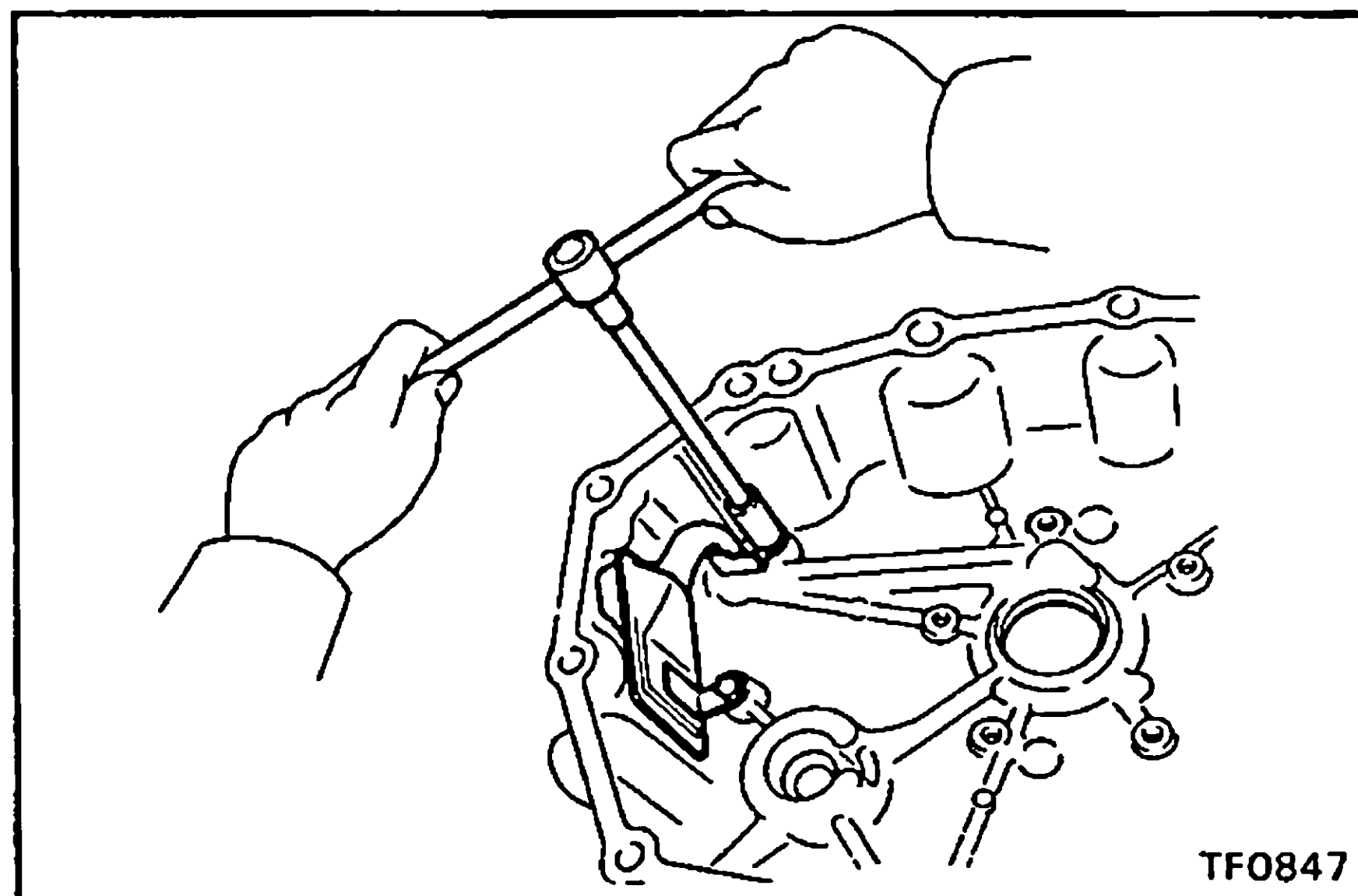


22. INSTALL SHIFT LEVER SHAFT AND SHIFT LEVER HOUSING

(a) Install the shift lever shaft and shift lever housing.



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

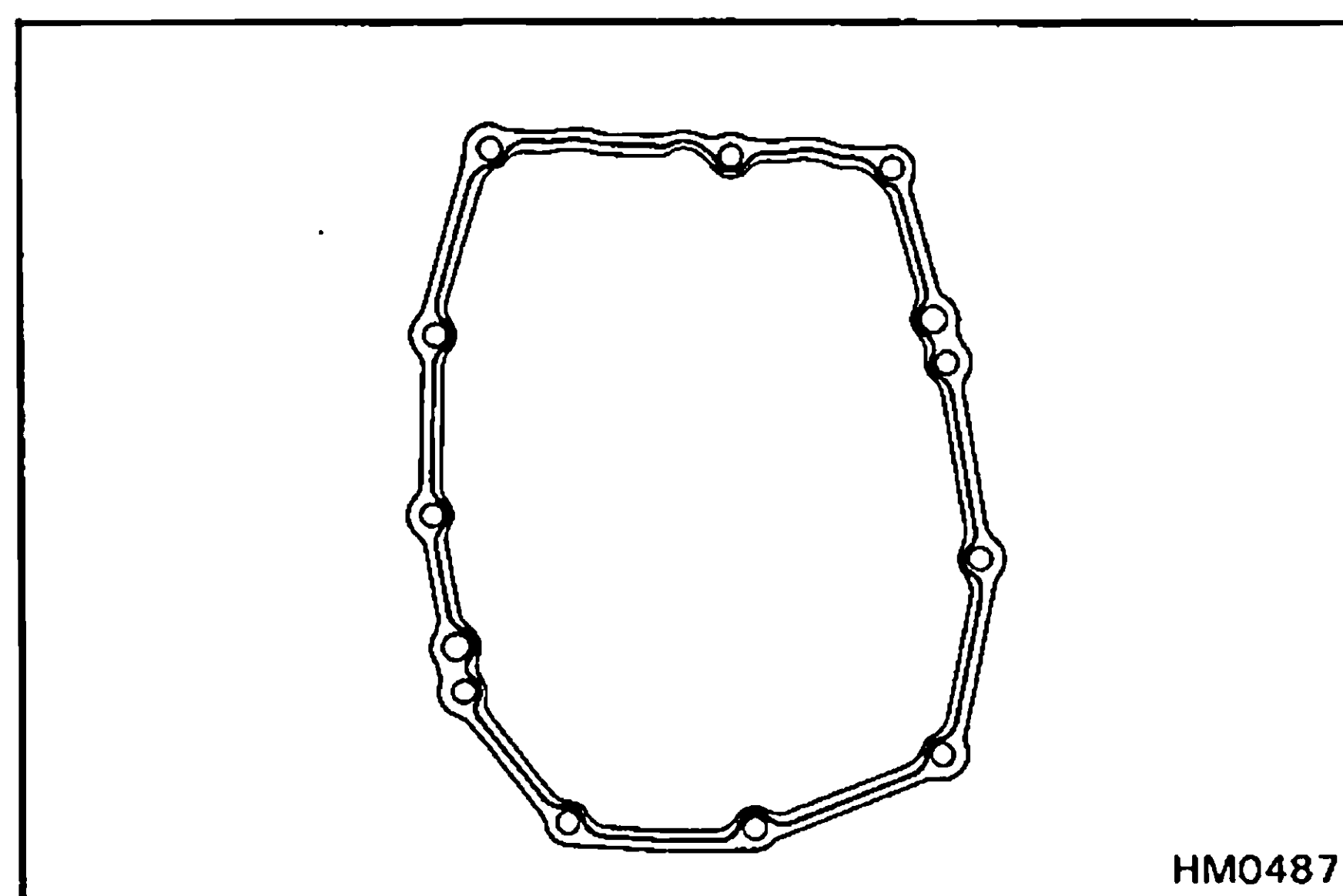


23. INSTALL OIL STRAINER TO TRANSFER ADAPTOR

(a) Install the oil strainer.

(b) Install and torque the two bolts.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



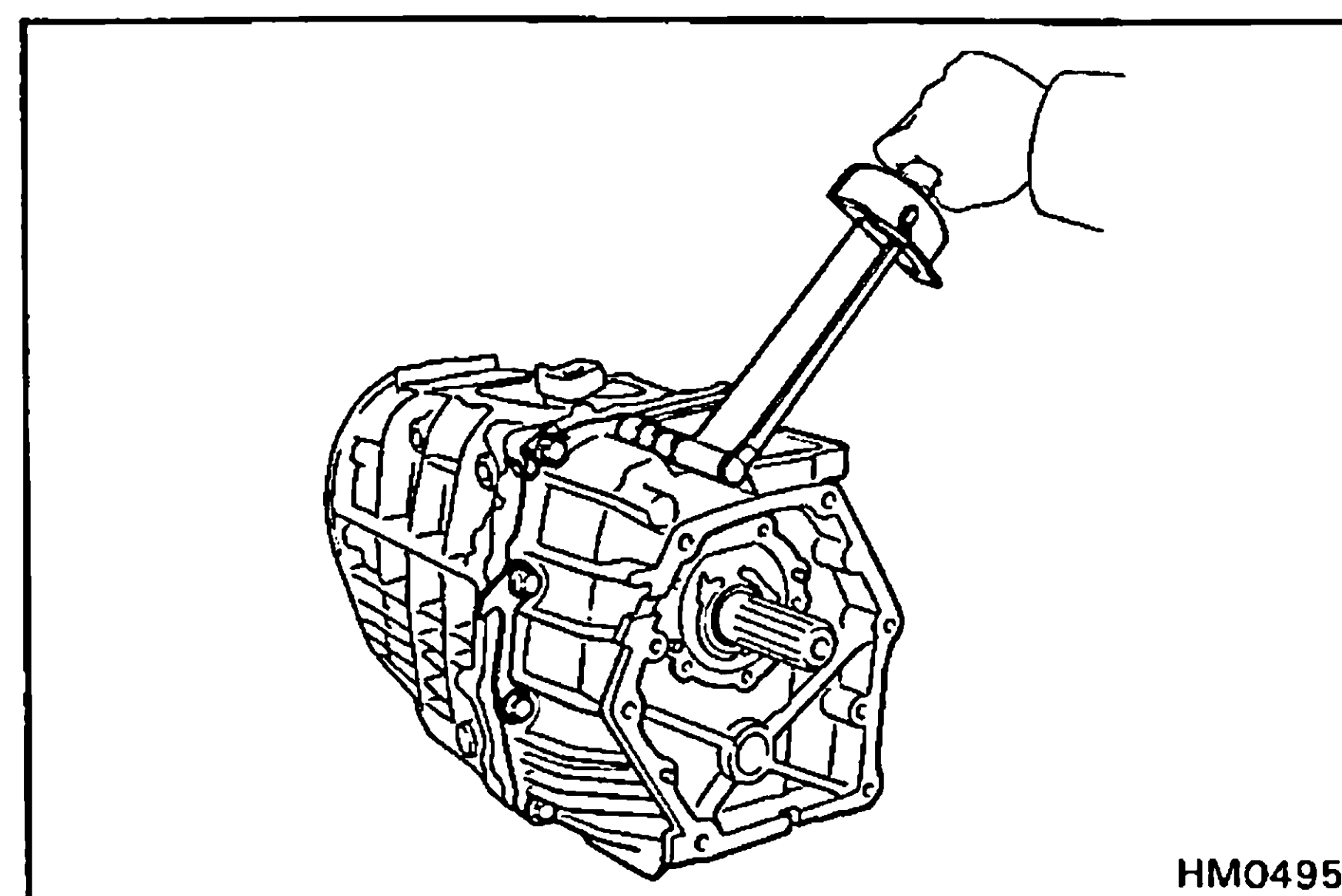
24. INSTALL TRANSFER ADAPTOR

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transfer adaptor.

(b) Apply seal packing to the transfer adaptor as shown.

Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent

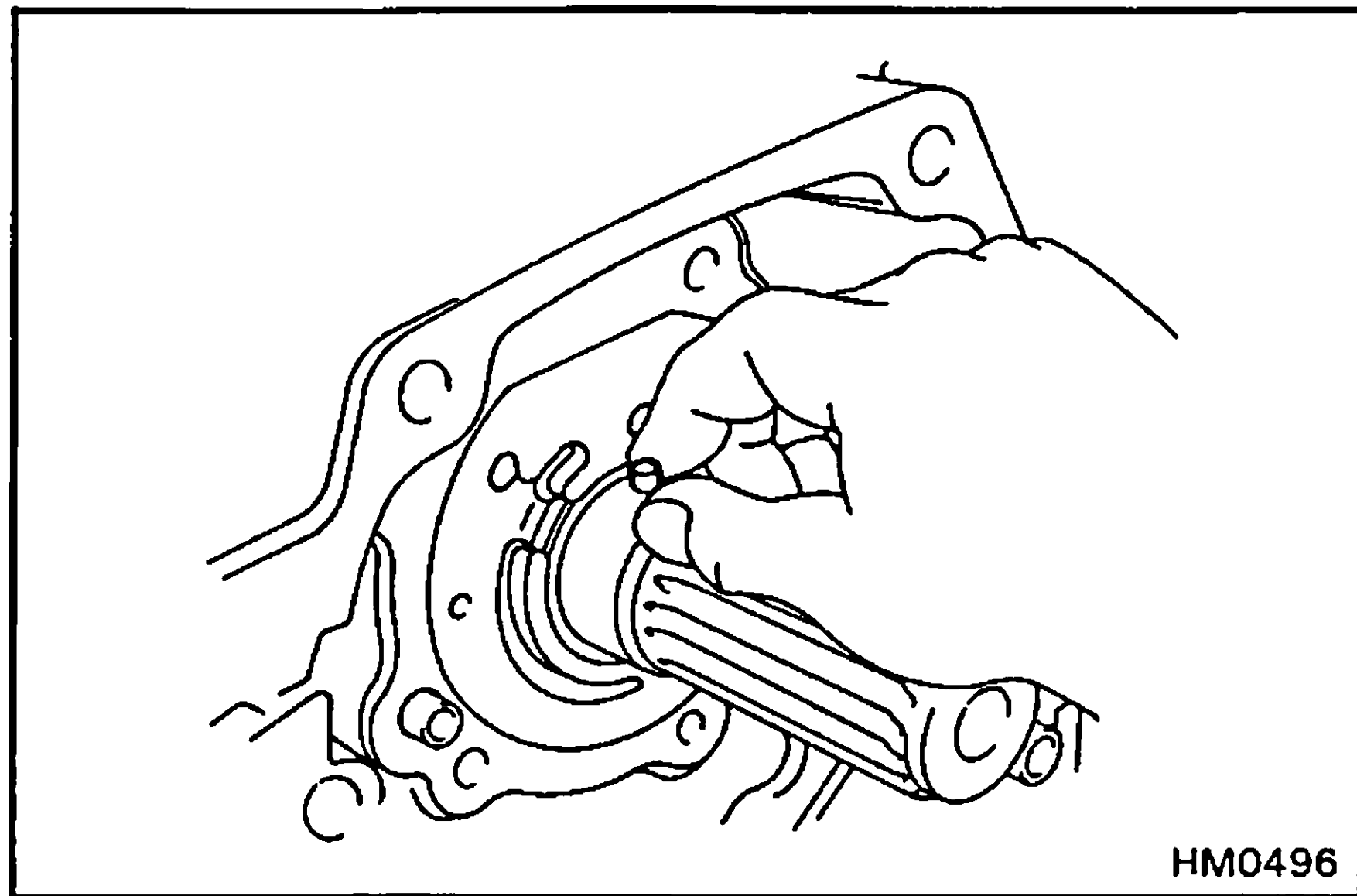
HINT: Install the transfer adaptor as soon as the seal packing is applied.



(c) Install the transfer adaptor.

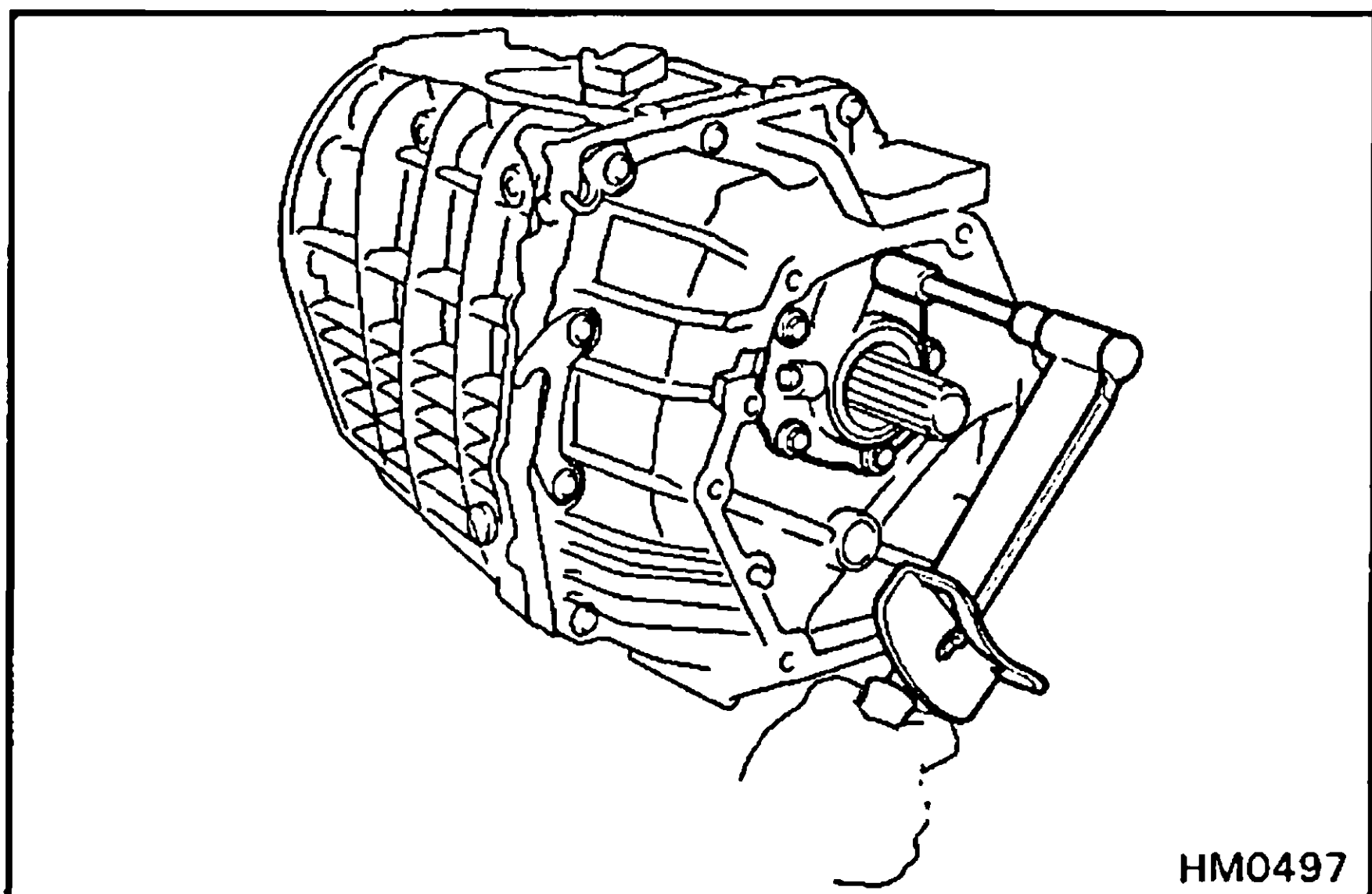
(d) Install and torque the eleven bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



25. INSTALL OIL PUMP BODY

- (a) Apply MP grease to the straight pin.
- (b) Install the two straight pins.

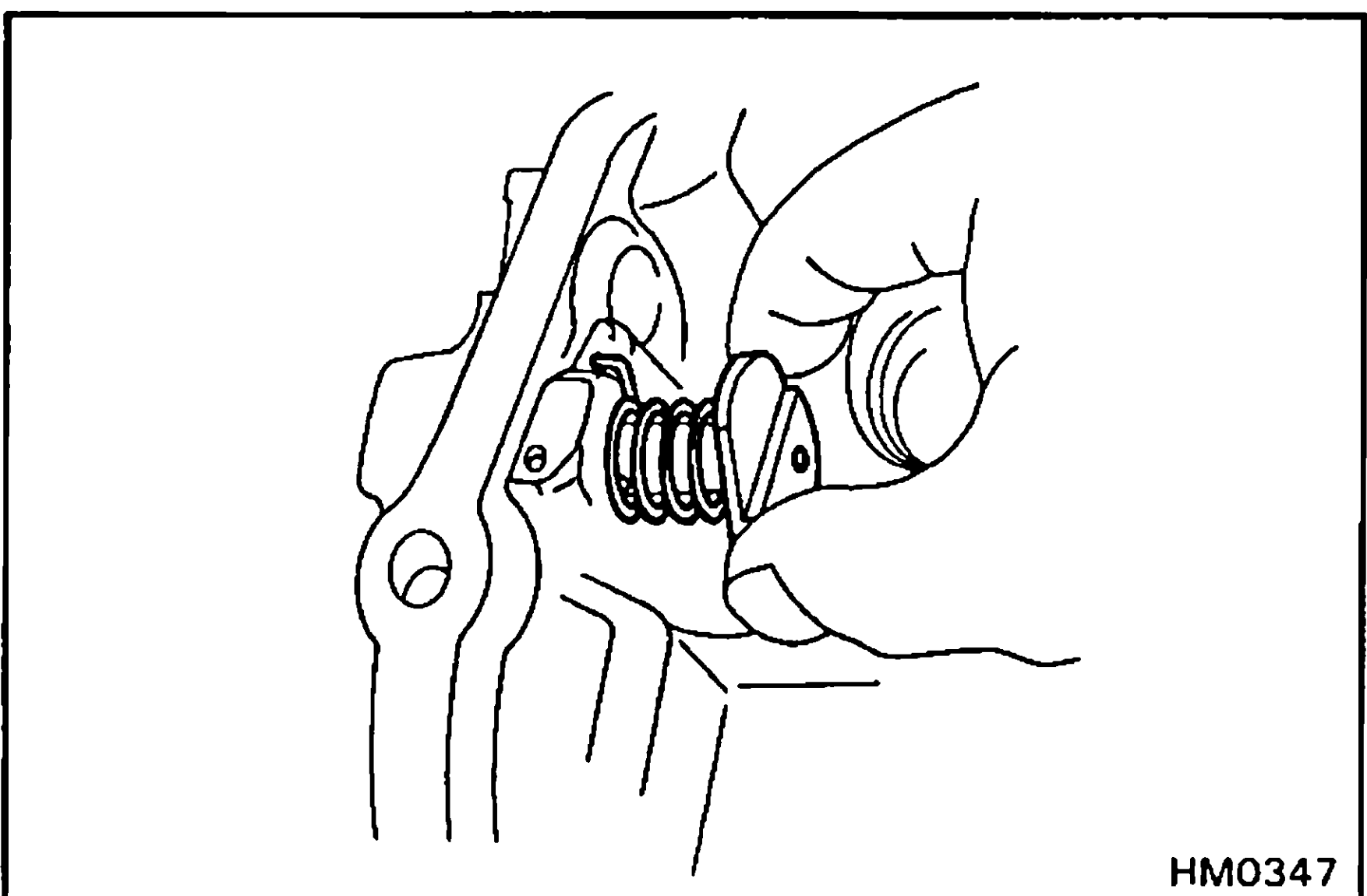


- (c) Install the oil pump body.
- (d) Apply liquid sealer to the bolt threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent.

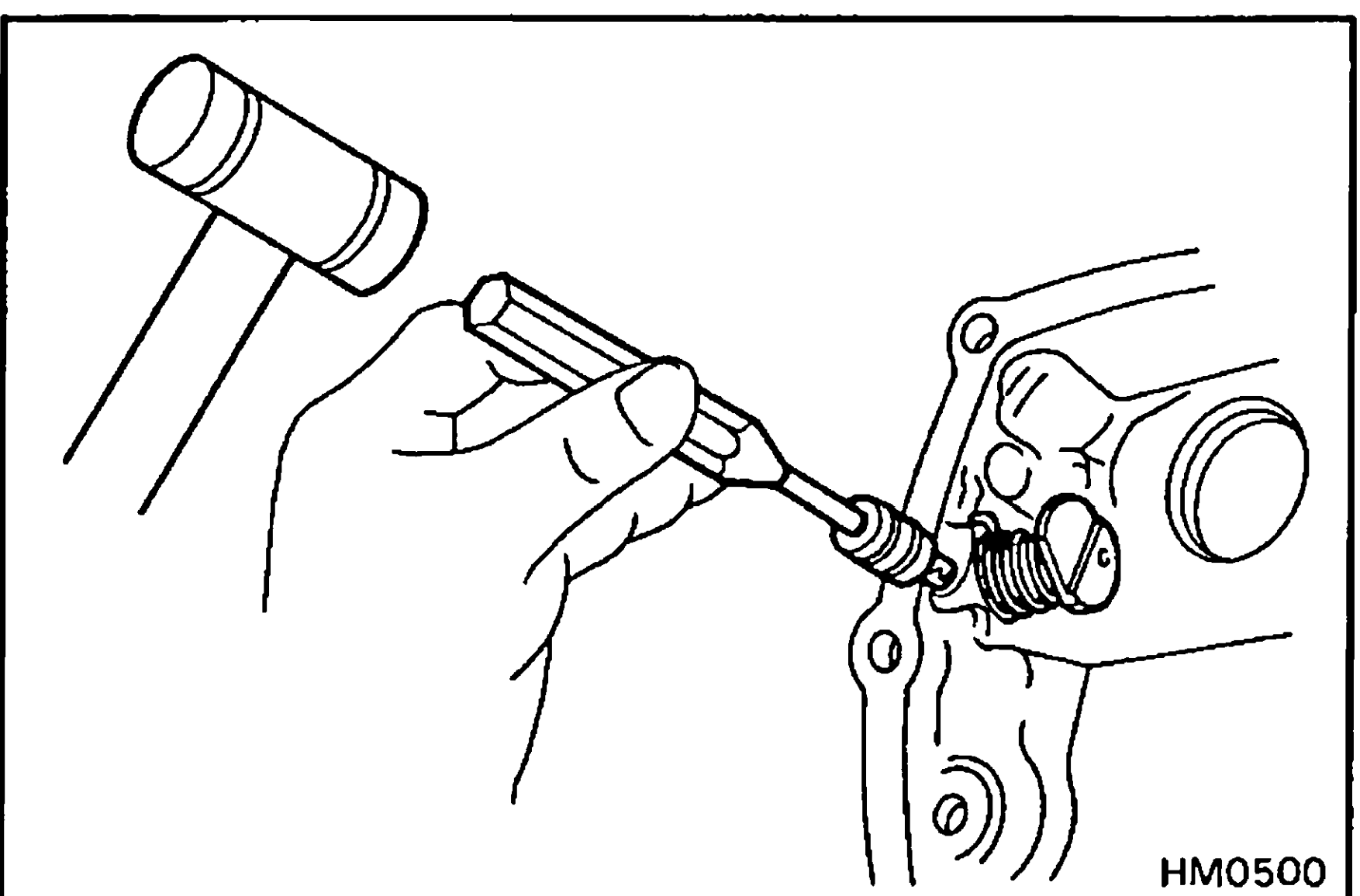
- (e) Install and torque the five bolts.

Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)

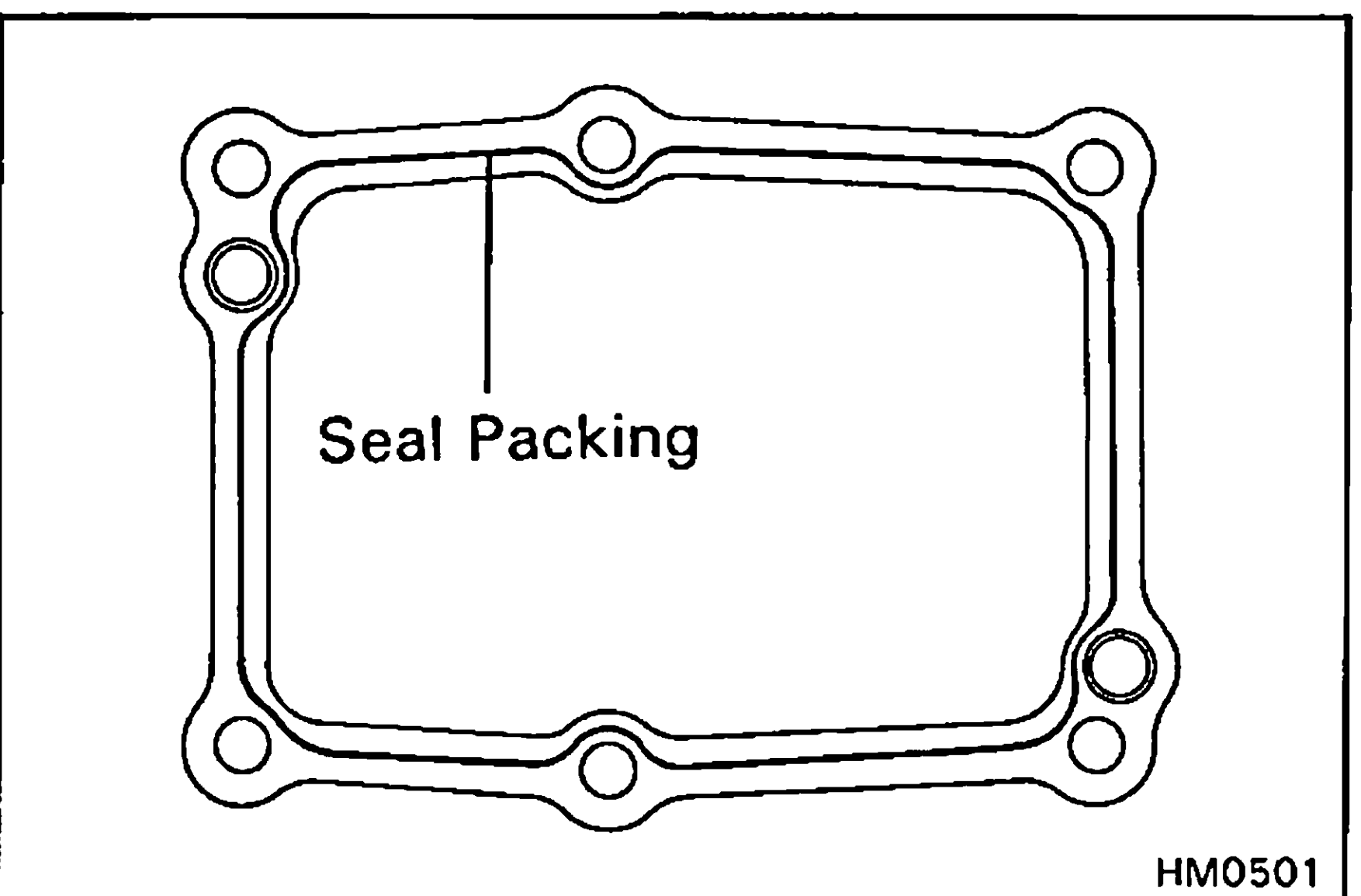


26. INSTALL REVERSE RESTRICT PIN

- (a) Install the reverse restrict pin to the shift control retainer.



- (b) Using a hammer, tap in the slotted spring pin as shown.

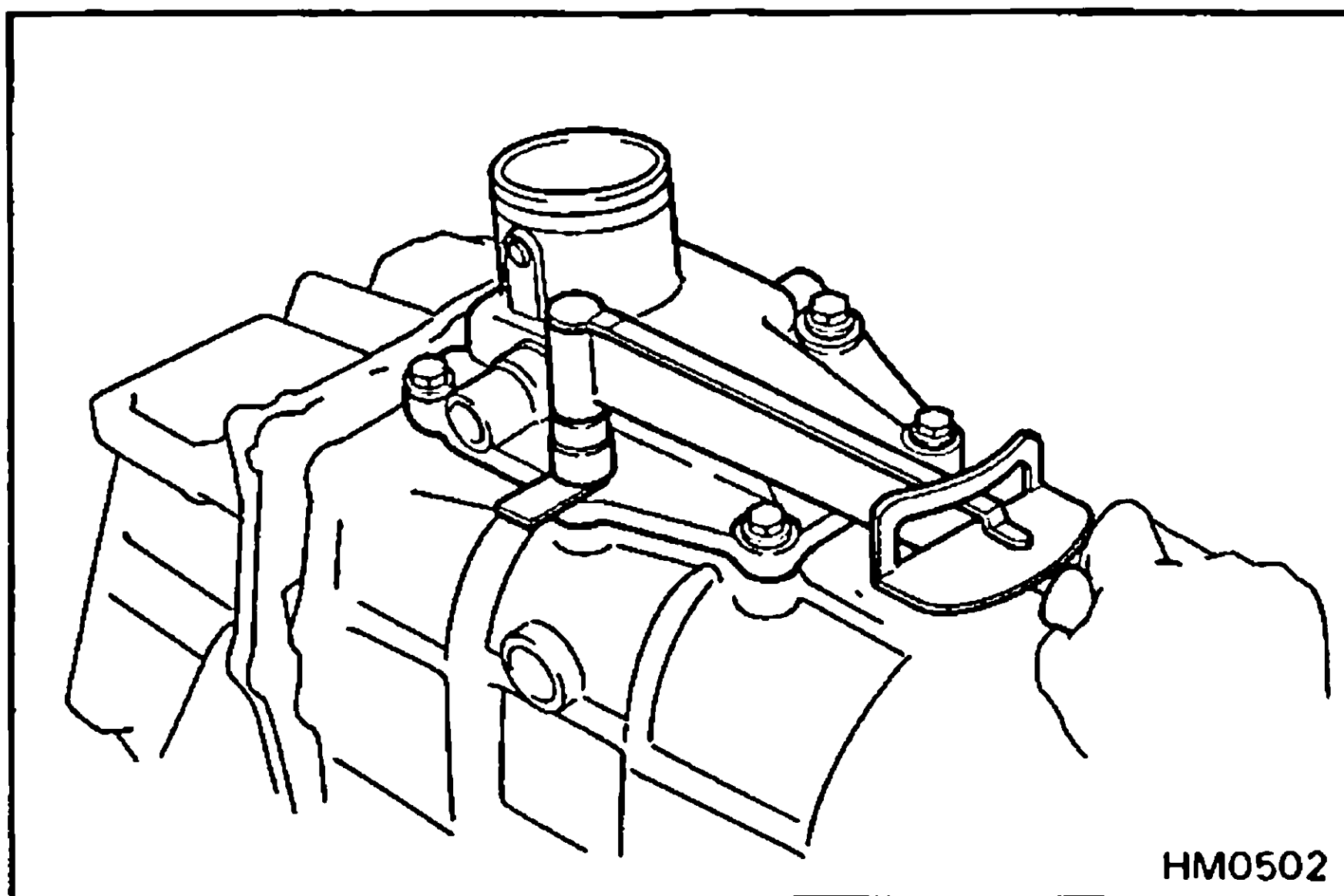


27. INSTALL SHIFT LEVER CONTROL RETAINER

- (a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the shift lever control retainer as shown.

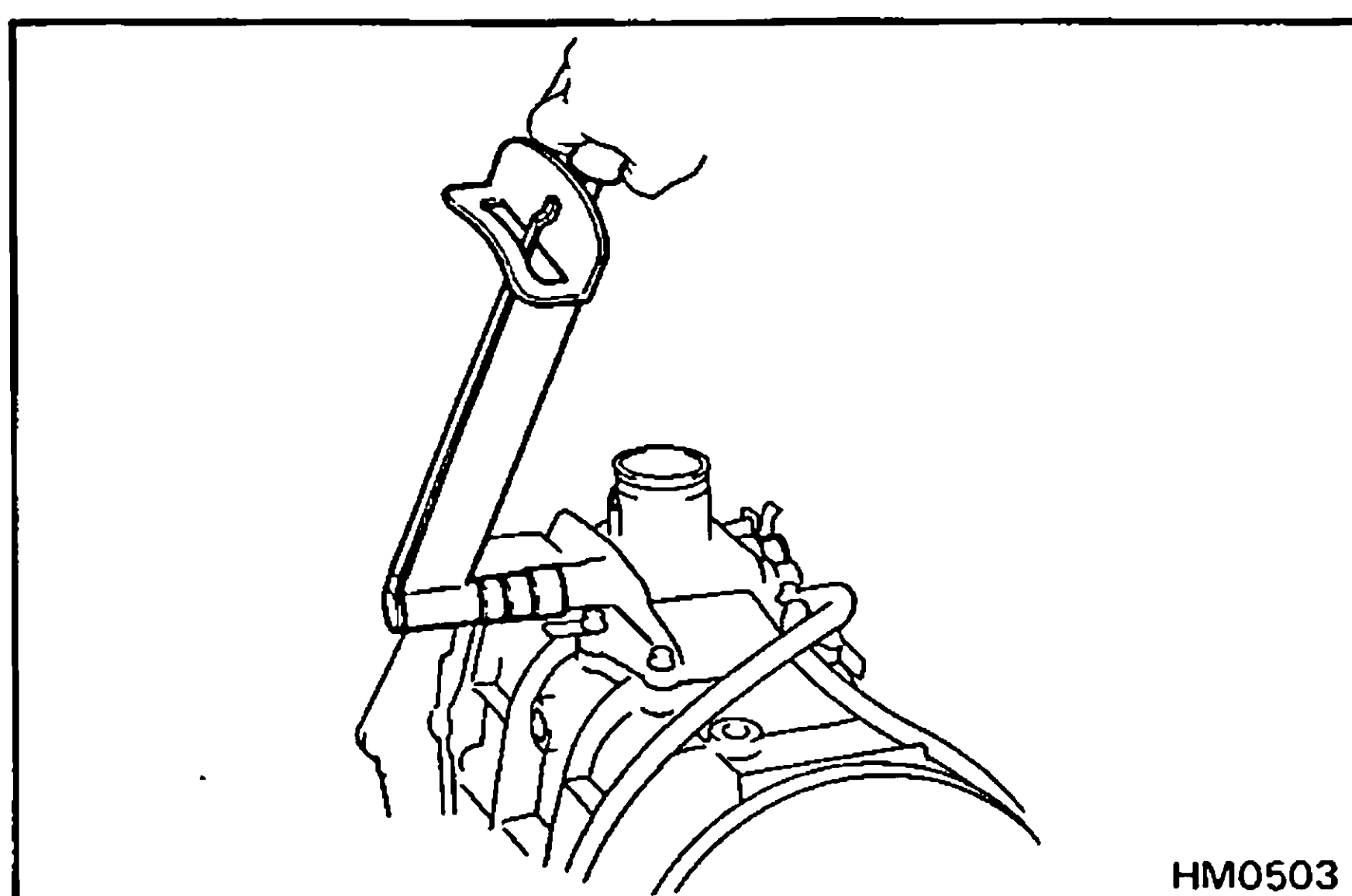
- (b) Apply seal packing to the shift lever control retainer.
Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent

HINT: Install the shift lever control retainer as soon as the seal packing is applied.



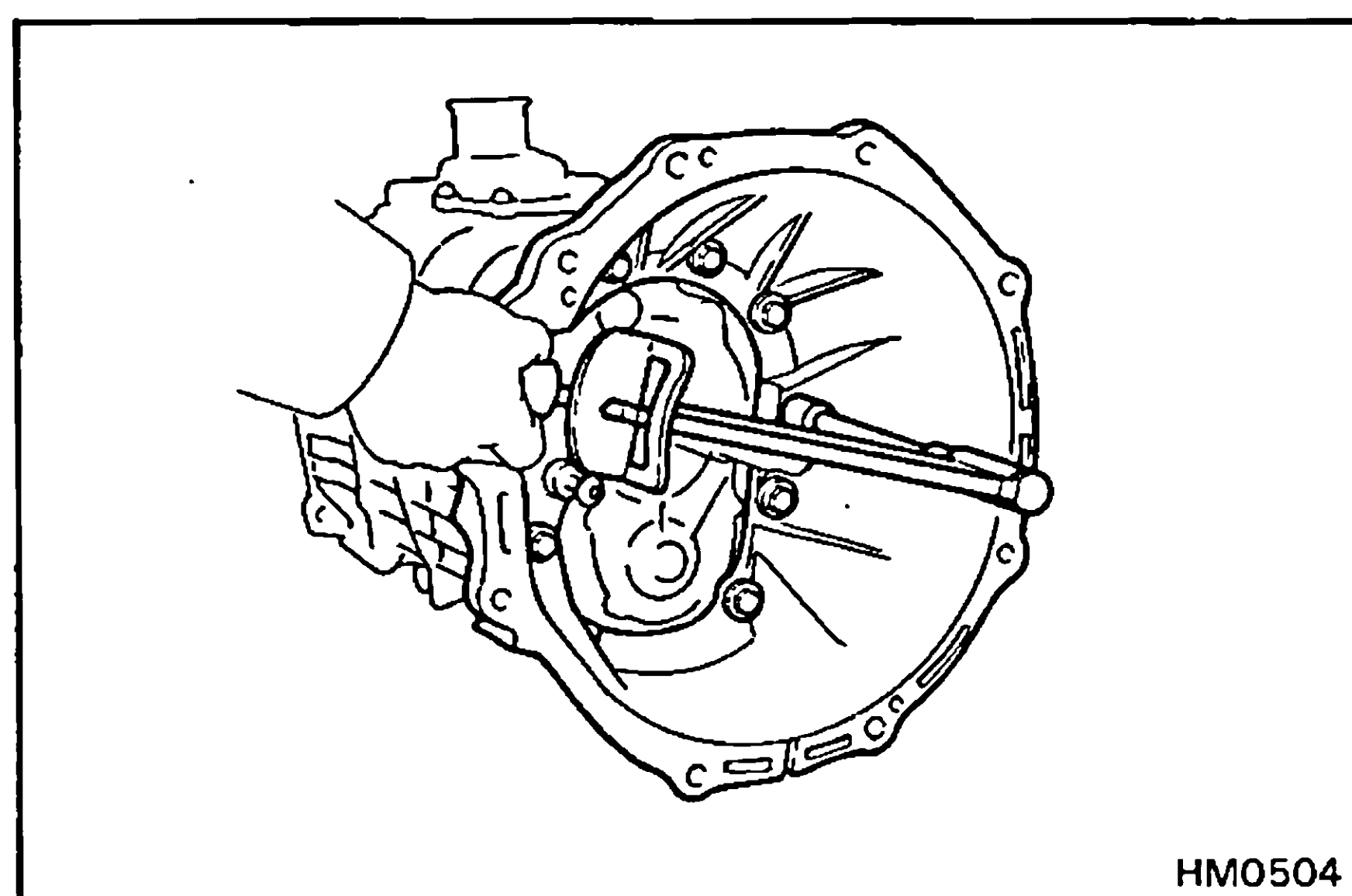
(c) Install and torque the six bolts.

Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)



28. INSTALL TWO RESTRICT PINS

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



29. INSTALL CLUTCH HOUSING

(a) Install the clutch housing.

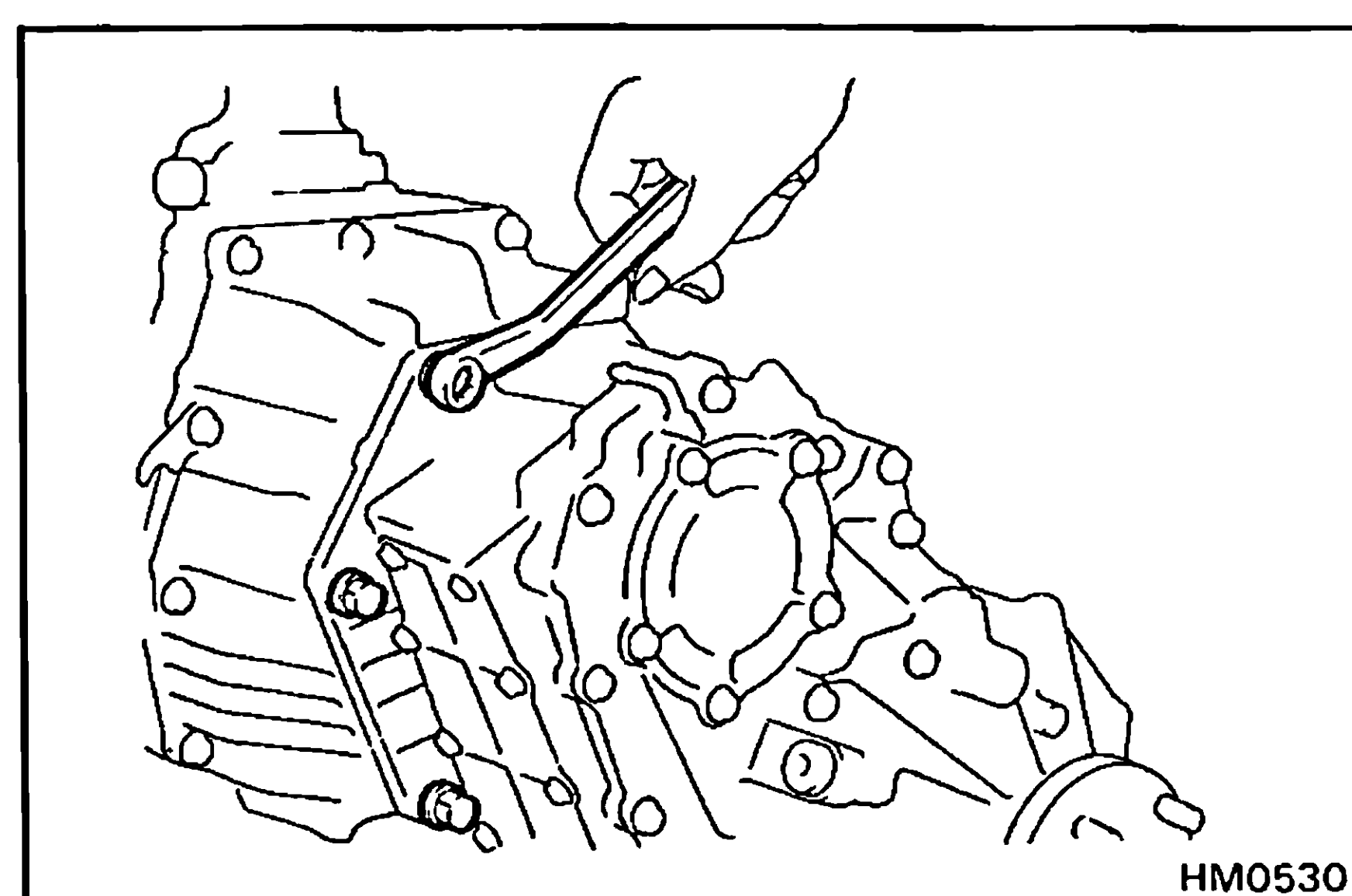
(b) Install and torque the ten bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

30. INSTALL BACK-UP LIGHT SWITCH

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

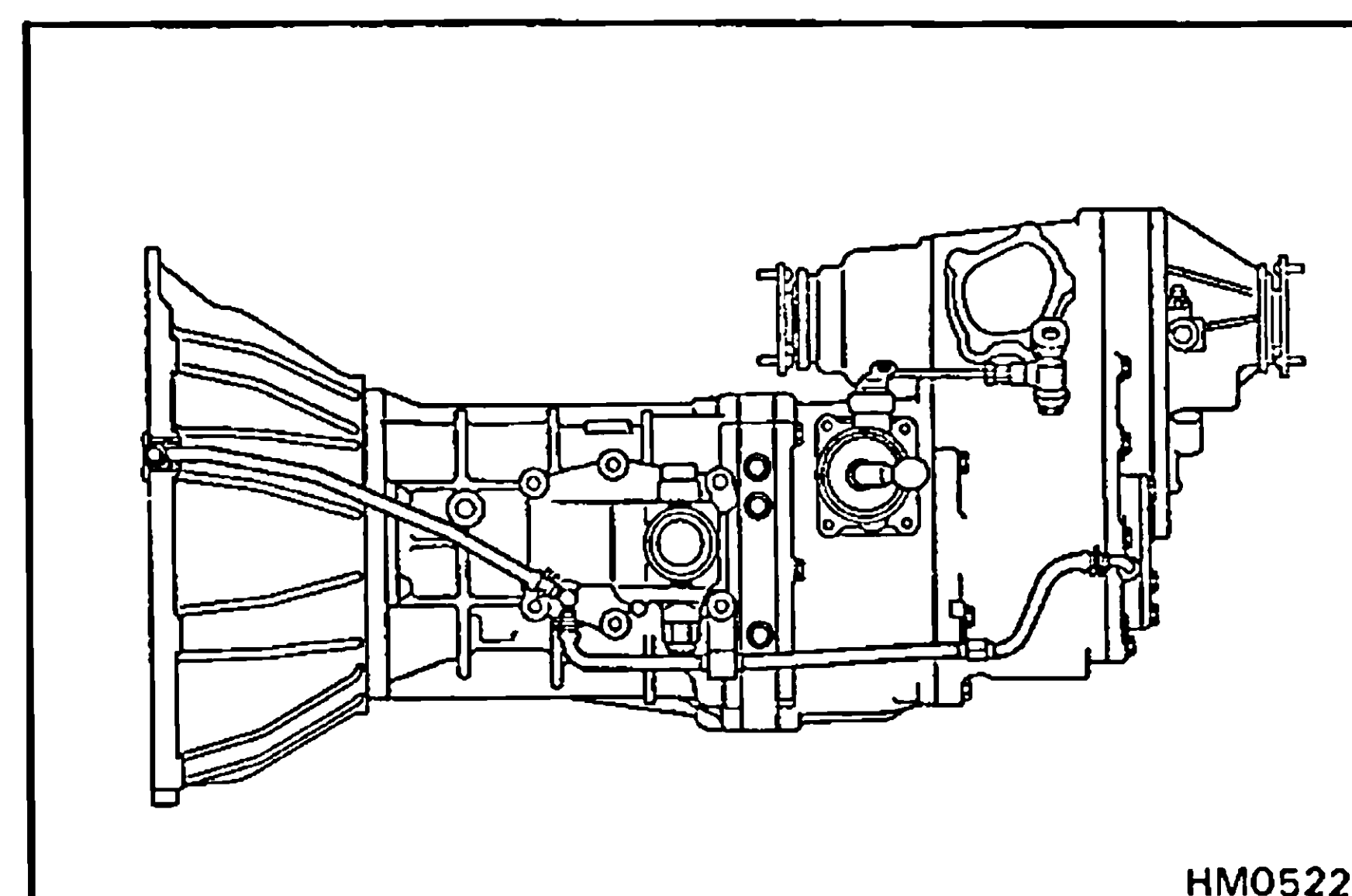
31. INSTALL RELEASE FORK AND BEARING



32. INSTALL TRANSFER TO TRANSFER ADAPTOR

Install the transfer to the transfer adaptor with six bolts.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)



33. INSTALL BREATHER HOSE

TRANSFER

REFER TO LAND CRUISER (HARDTOP AND CANVAS TOP)
REPAIR MANUAL FOR CHASSIS AND BODY (Pub. No.
RM183E)

NOTE: The following pages contain only the points which
differ from the above listed manual.

	Page
(HF1A FOR HARDTOP & CANVAS TOP)	
DESCRIPTION	TF-2
PRECAUTIONS	TF-3
TROUBLESHOOTING	TF-3
COMPONENTS	TF-4
DISASSEMBLY OF TRANSFER	TF-5
COMPONENT PARTS	TF-14
Input Shaft Assembly	TF-14
Idle Gear Assembly	TF-17
Output Shaft Assembly	TF-19
Front Extension Housing Assembly	TF-25
Rear Extension Housing Assembly	TF-29
ASSEMBLY OF TRANSFER	TF-33

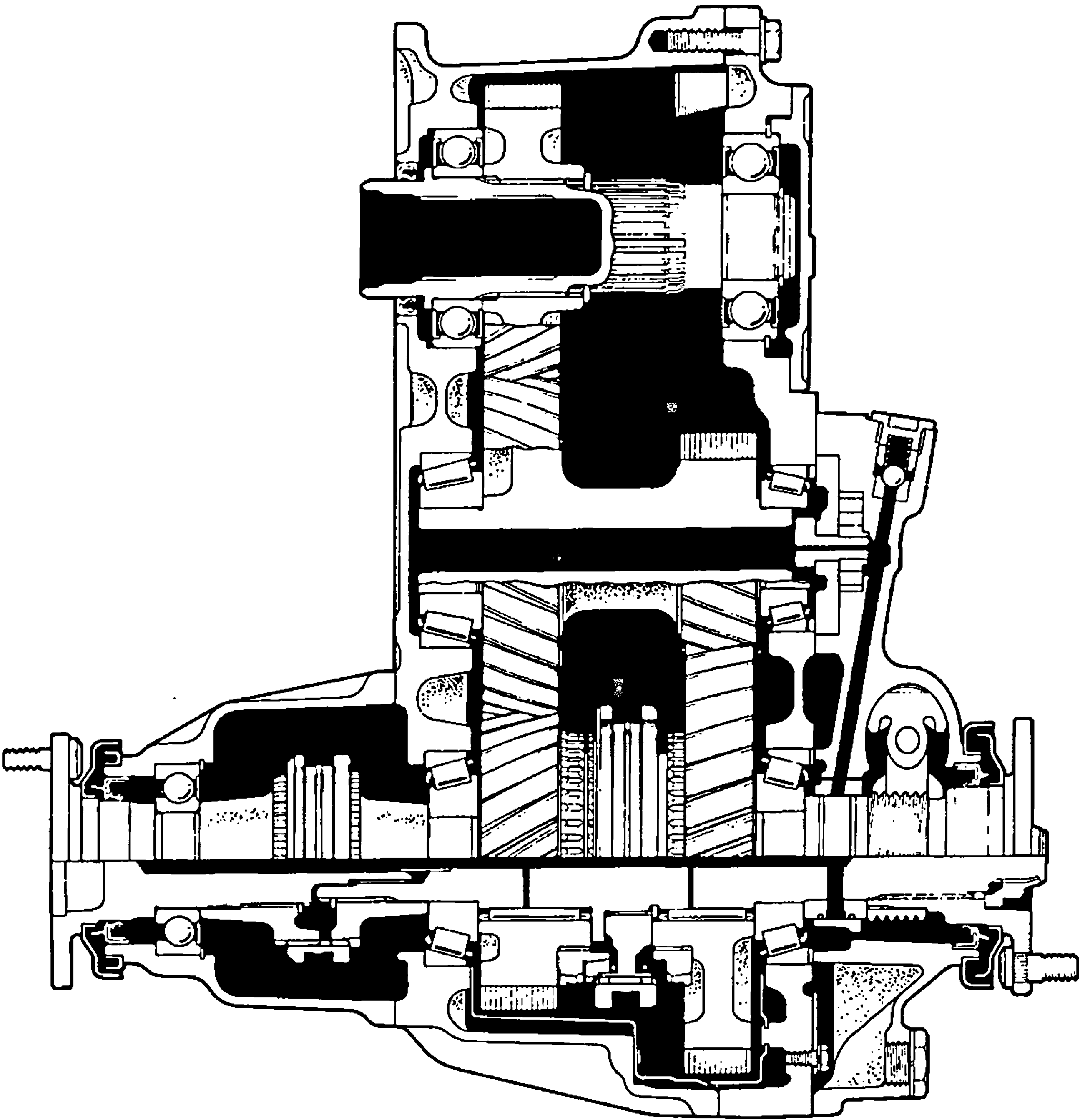
TF

DESCRIPTION

TRANSFER

The transfer transmits the drive force from the transmission to the front wheels, switching between 2WD, 4WD (High) and 4WD (Low).

The specifications and cross-section diagrams are as shown.



TF0105

Specifications

Type of Transfer		HF1A
Type of Transmission		H151F
Type of Engine		1FZ-F
Gear Ratio	High Speed Range	1.000
	Low Speed Range	2.488
Oil Capacity		1.3 liters (1.4 US qts, 1.1 Imp.qts)
Type of oil		API GL-4 or GL-5, SAE 75W-90

PRECAUTIONS

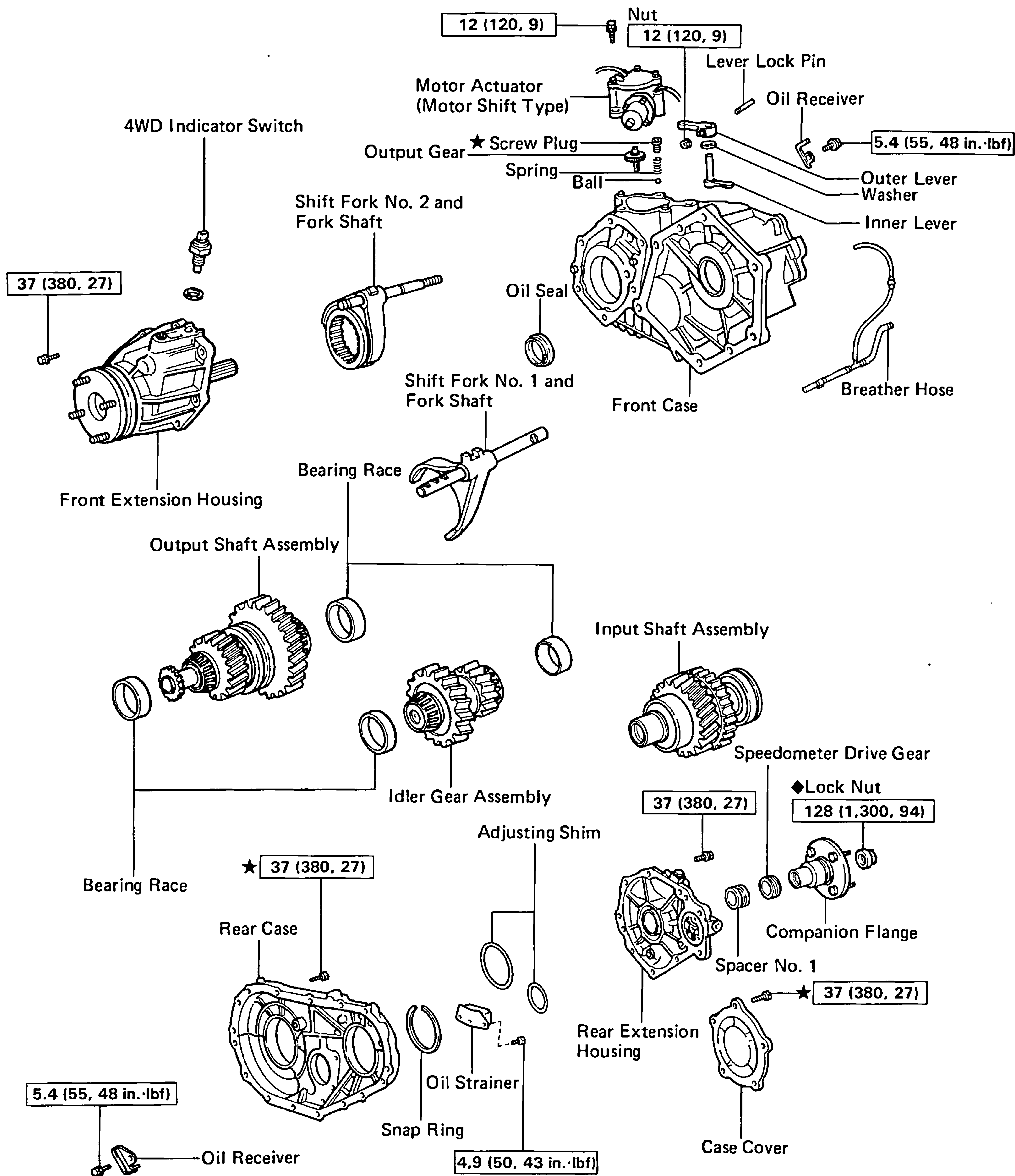
When working with FIPG material, you must be observe the following.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply the seal packing in approx. 1 mm (0.04 in.) bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Transfer taulty	Disassemble and inspect transfer	TF-4
Transfer jumps out of gear	Transfer faulty	Disassemble and inspect transfer	TF-4
Noise	Transfer faulty Wrong oil grade Oil level low	Disassembly and inspect transfer Replace oil Add oil	TF-4
Oil leakage	Oil level too high	Drain oil	

COMPONENTS

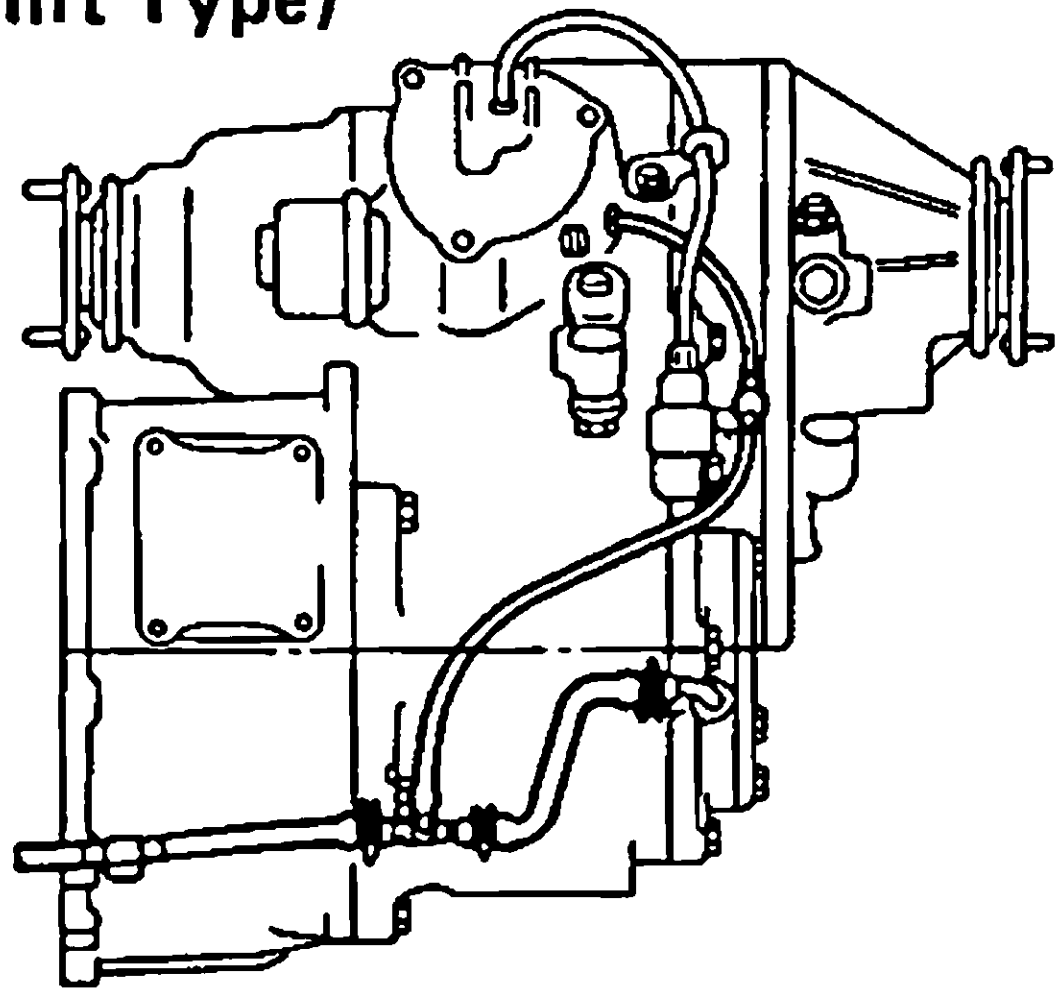


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

★ Precoated part

(Motor Shift Type)



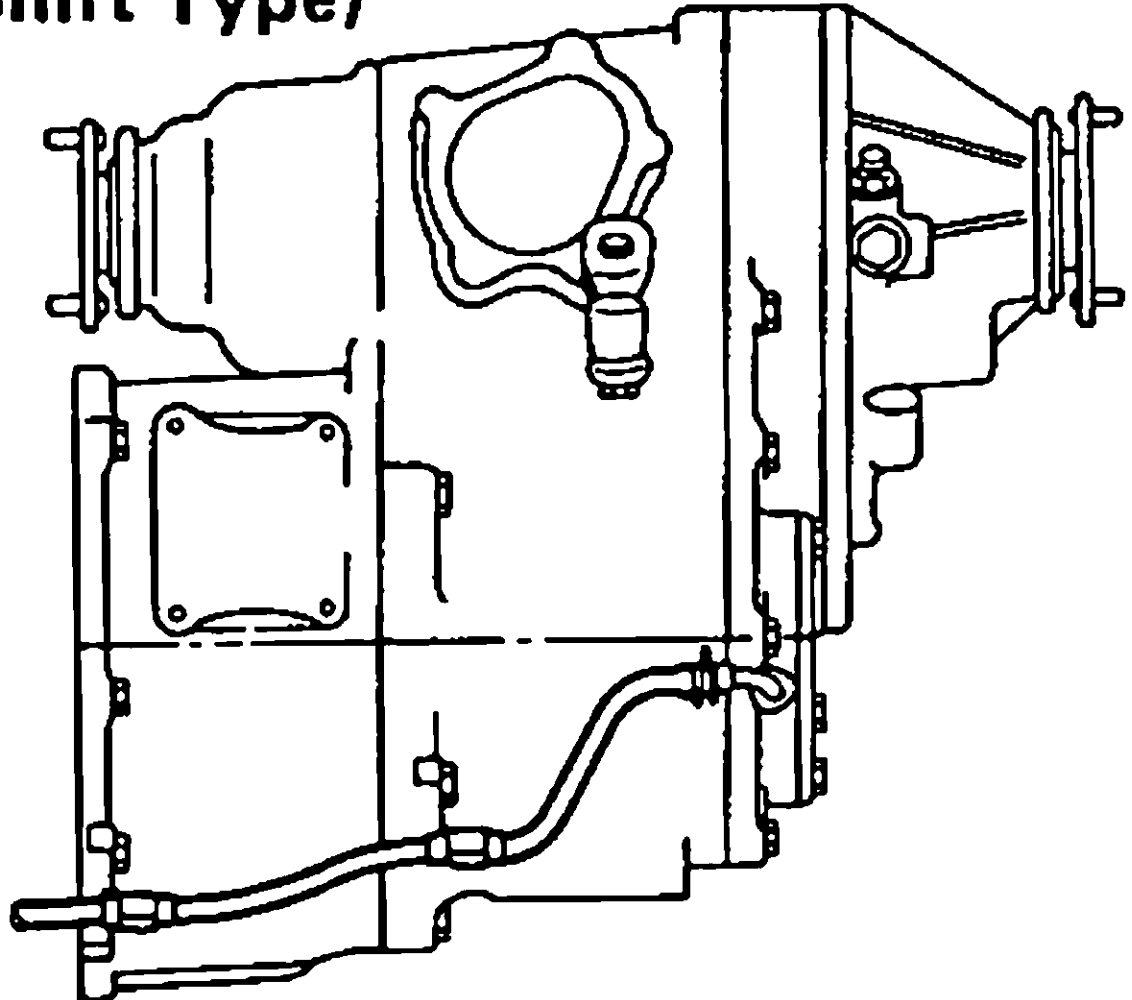
TF0832

DISASSEMBLY OF TRANSFER

(See page TF-4)

1. REMOVE BREATHER HOSE

(Direct Shift Type)

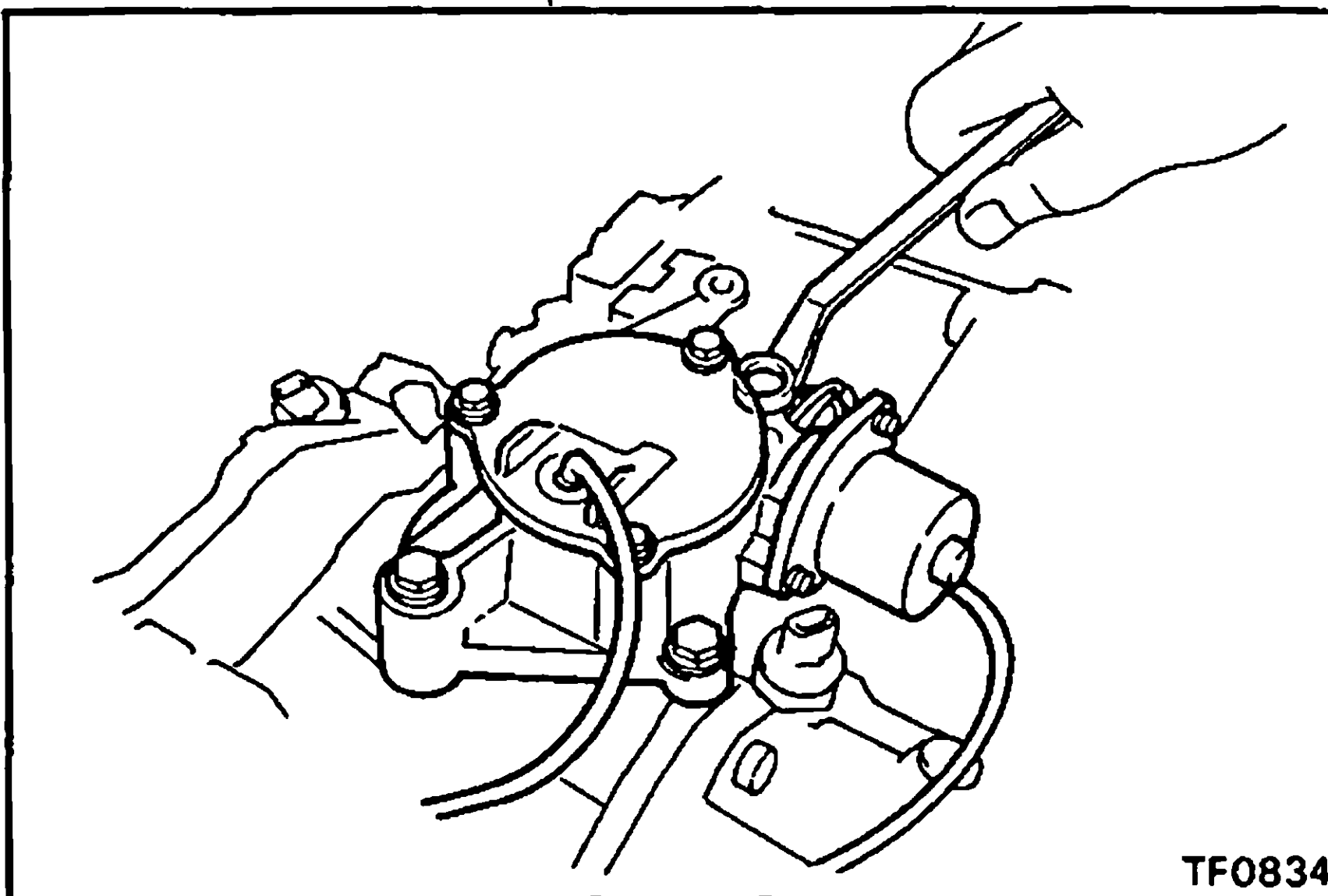


TF0833

2. (MOTOR SHIFT TYPE) REMOVE MOTOR ACTUATOR

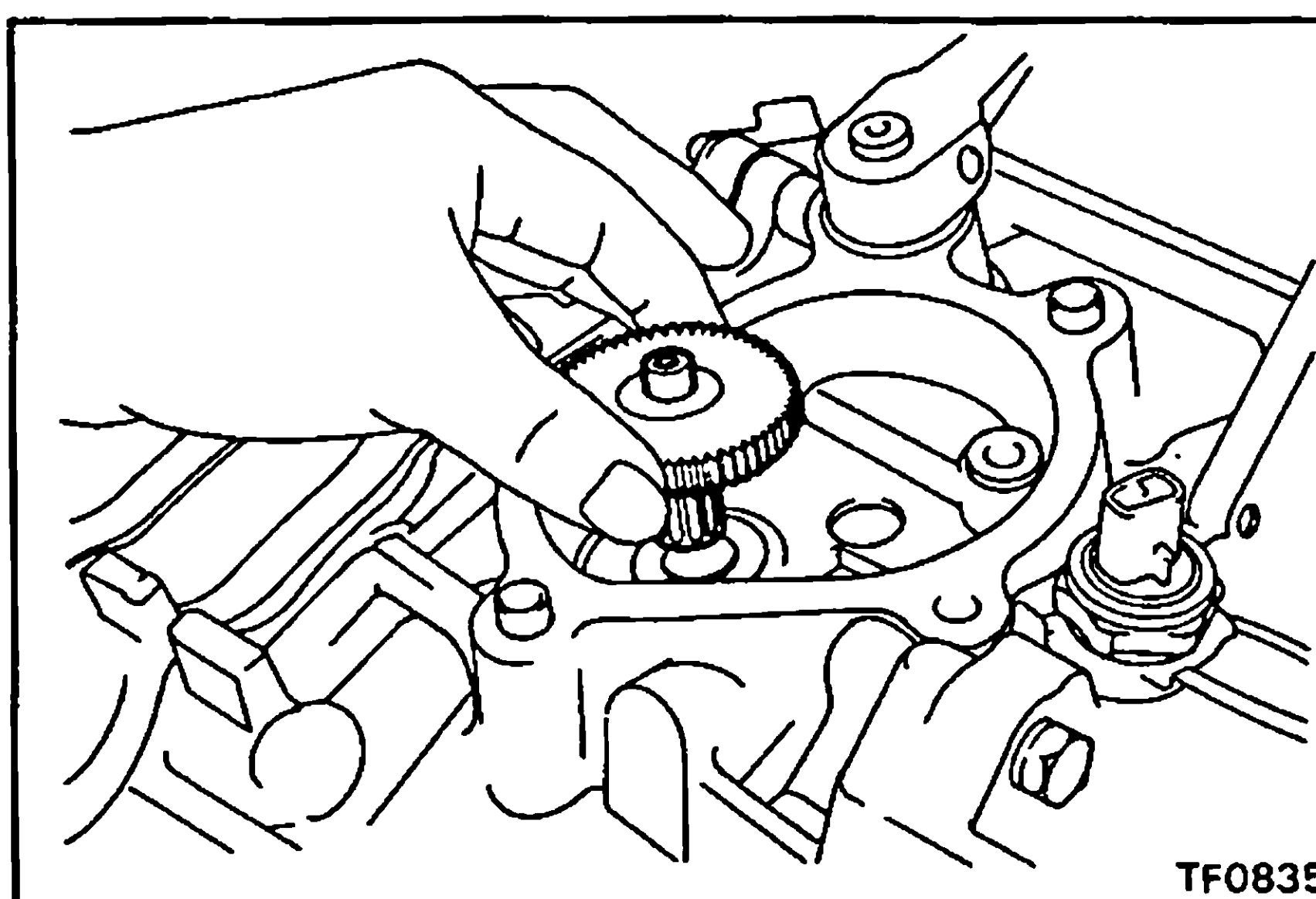
Remove the four bolts and motor actuator.

HINT: Set the motor actuator in differential lock condition.



TF0834

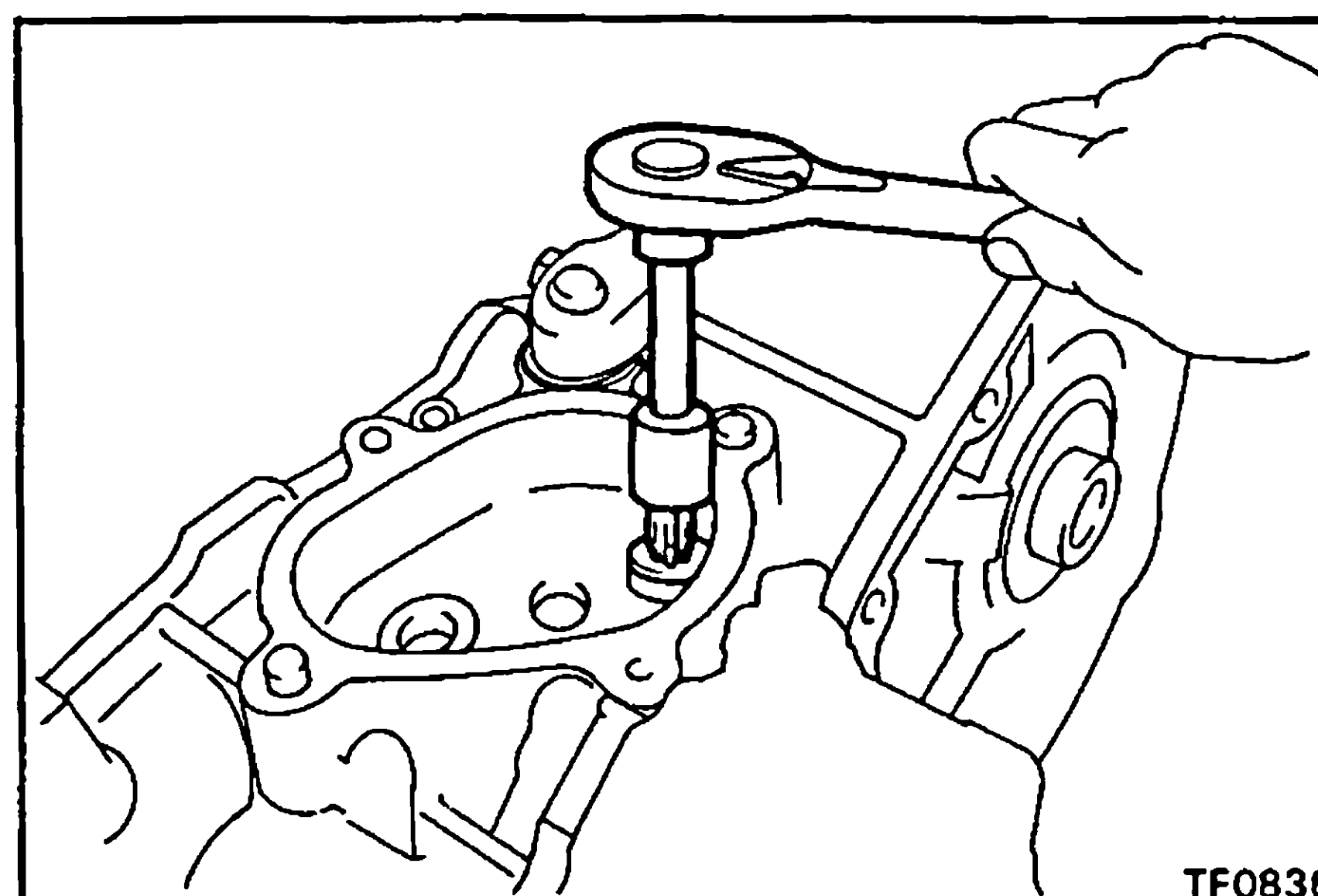
3. (MOTOR SHIFT TYPE) REMOVE OUTPUT GEAR



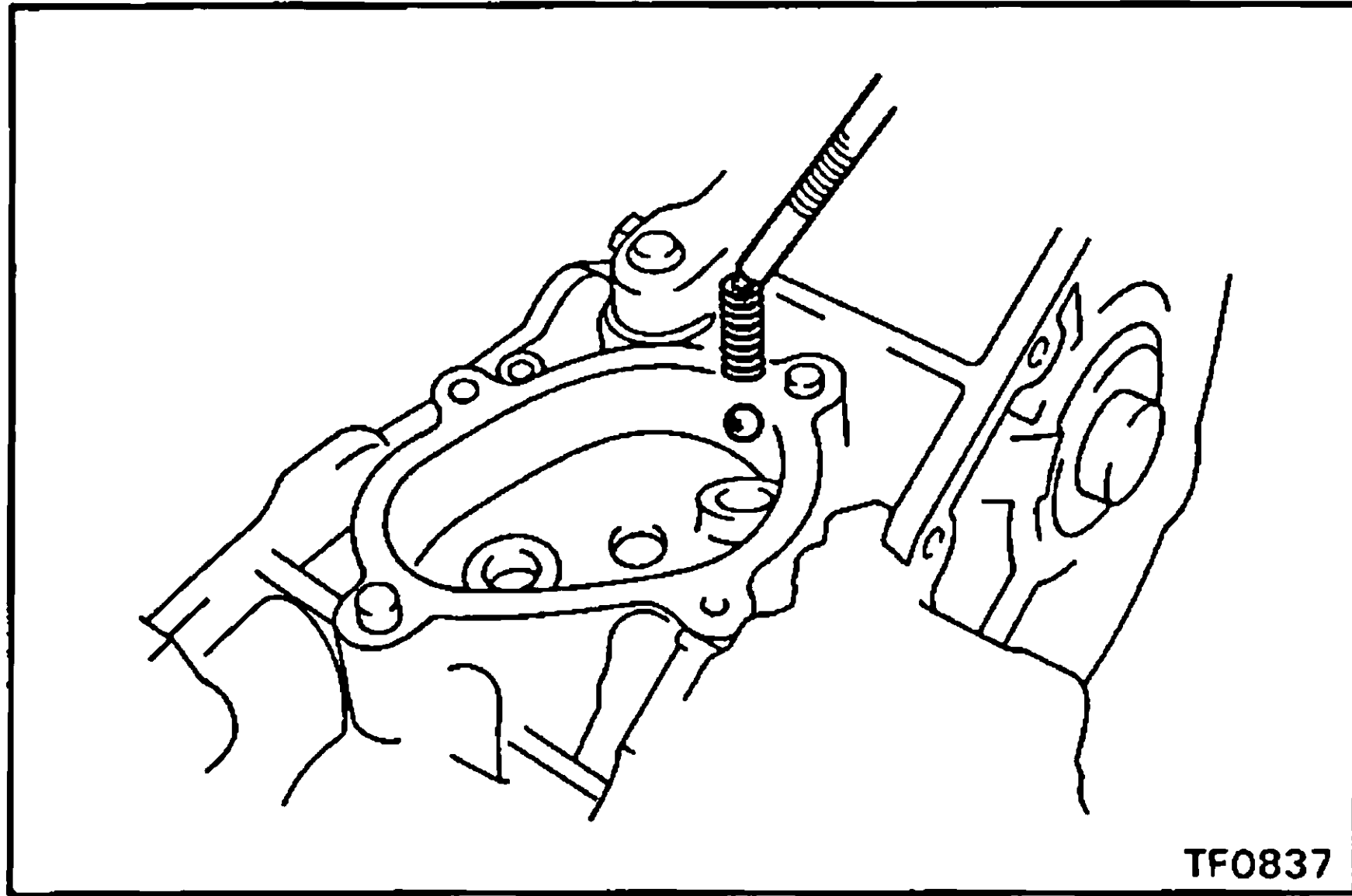
TF0835

4. REMOVE SCREW PLUG, SPRING AND BALL

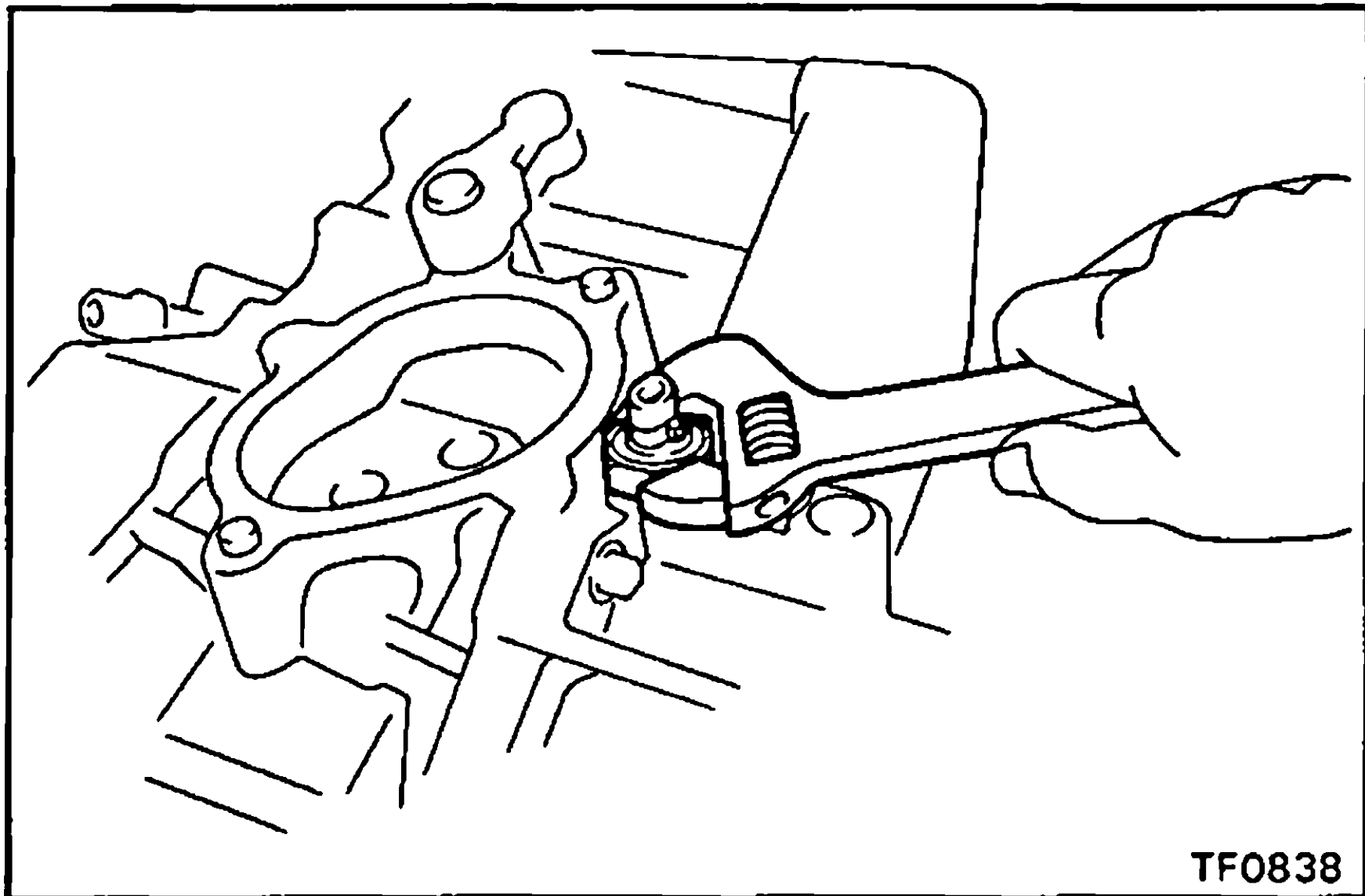
- (a) Using a torx socket wrench, remove the screw plug.
(Torx socket wrench T40 09042-00020)



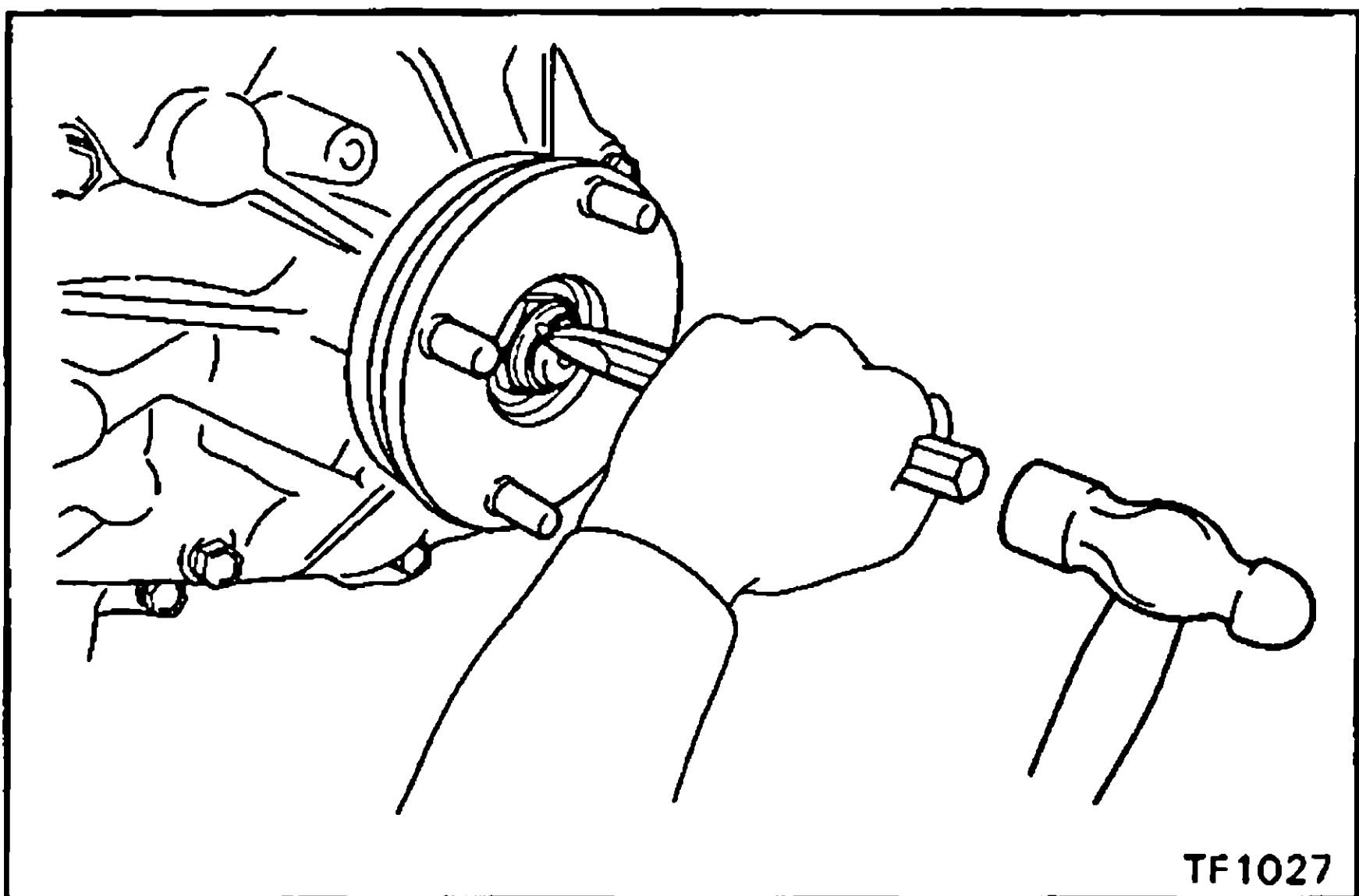
TF0836



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

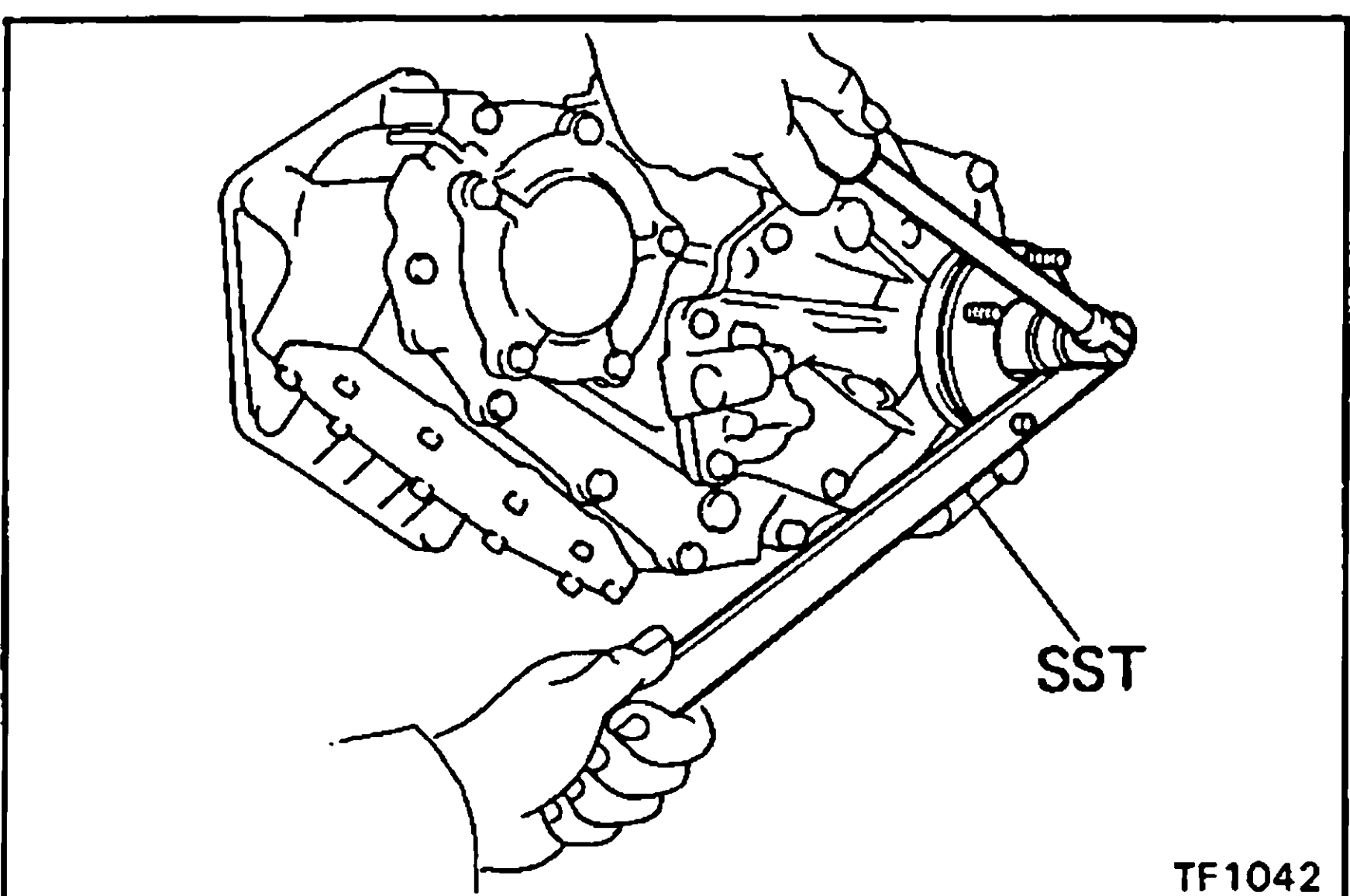


5. REMOVE 4WD INDICATOR SWITCH



6. REMOVE OUTPUT SHAFT COMPANION FLANGE

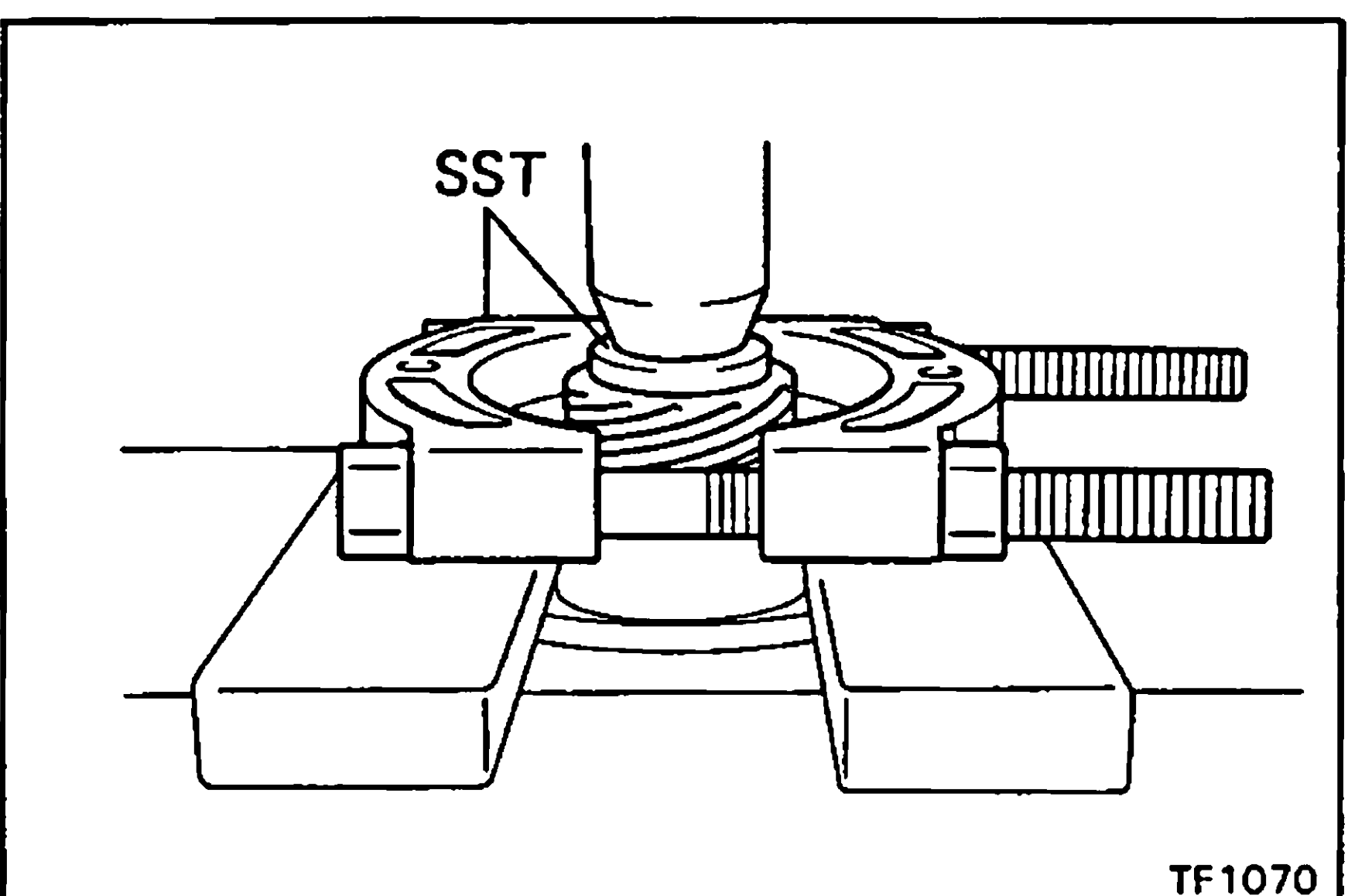
(a) Using a hammer and chisel, loosen the staked part of the nut.



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

SST 09330-00021

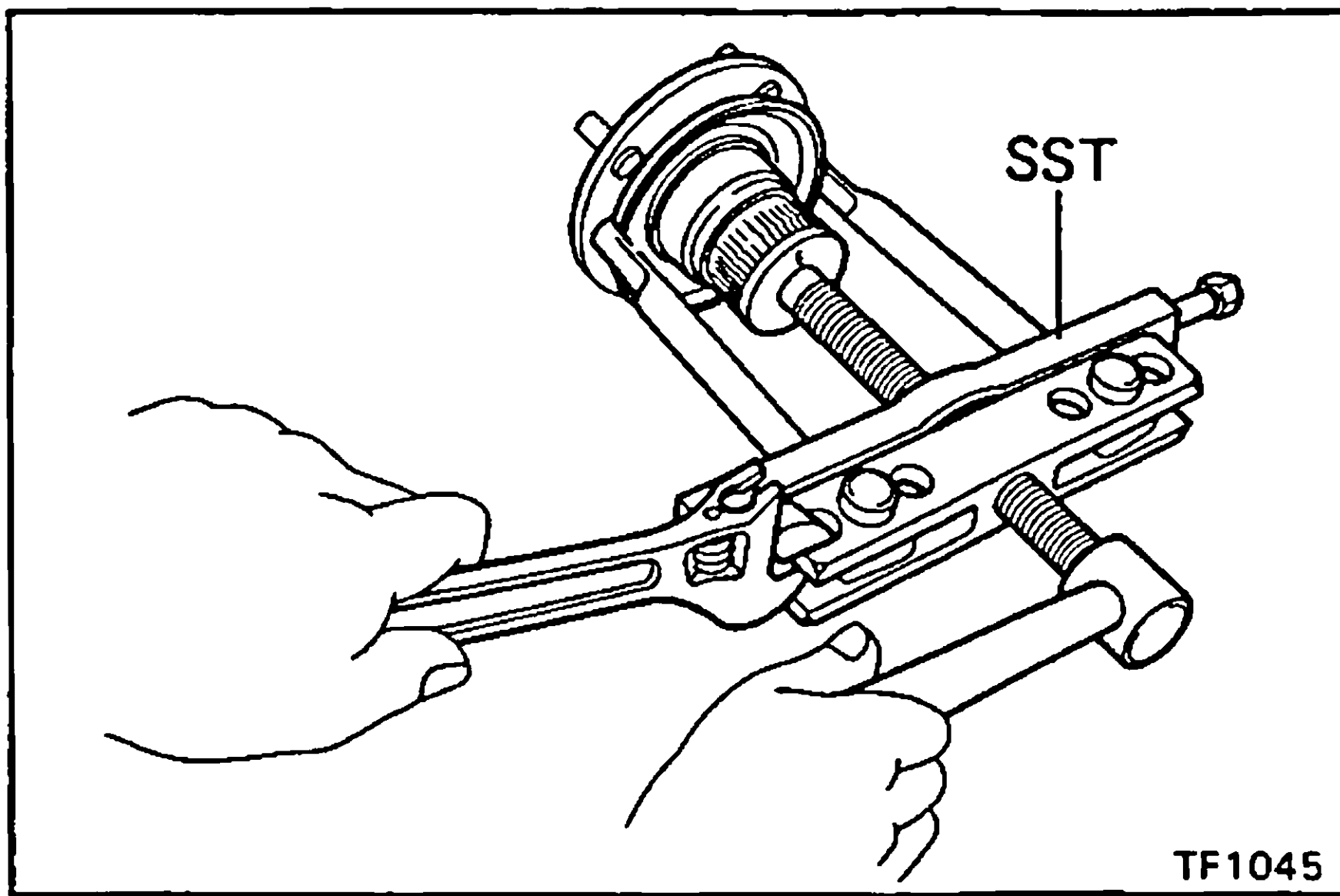
(c) Remove the companion flange.



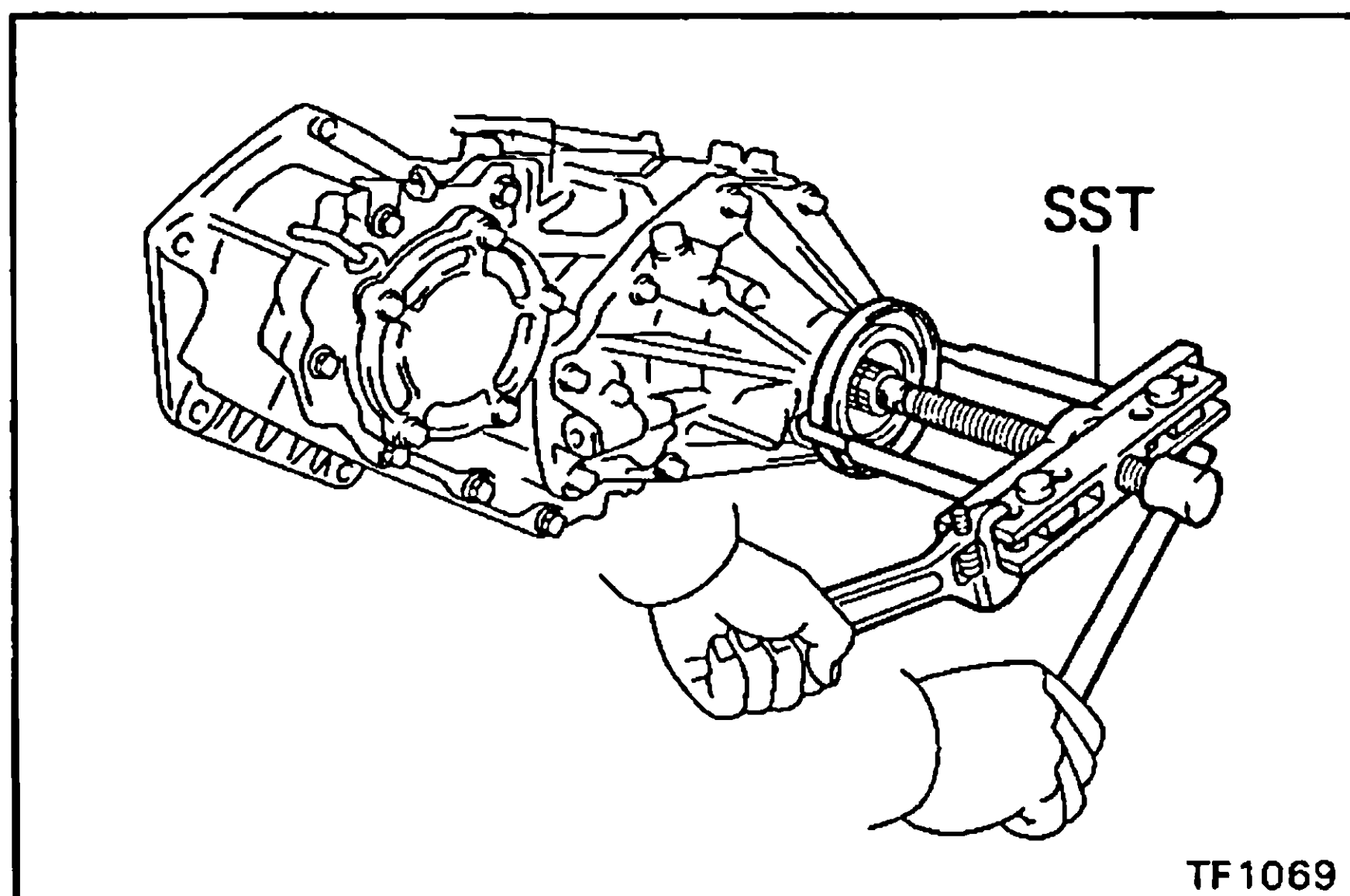
7. REMOVE SPEEDOMETER DRIVE GEAR AND DUST DEFLECTOR FROM OUTPUT SHAFT COMPANION FLANGE

(a) Using SST and a press, remove the speedometer drive gear.

SST 09608-20012 (09608-00040), 09950-00020

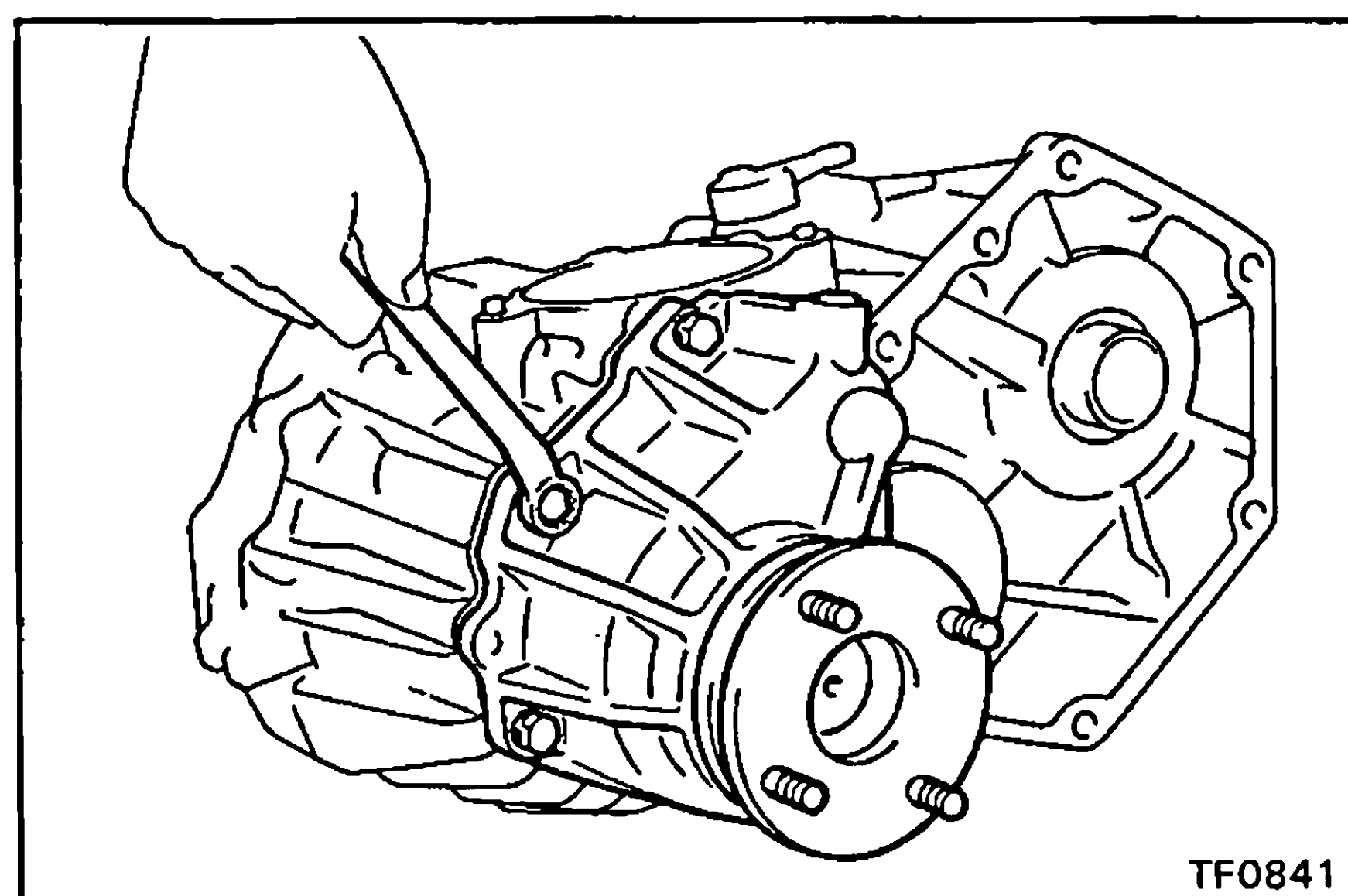


(b) Using SST, remove the dust deflector.
SST 09950-20017



8. REMOVE DUST DEFLECTOR FROM REAR EXTENSION HOUSING

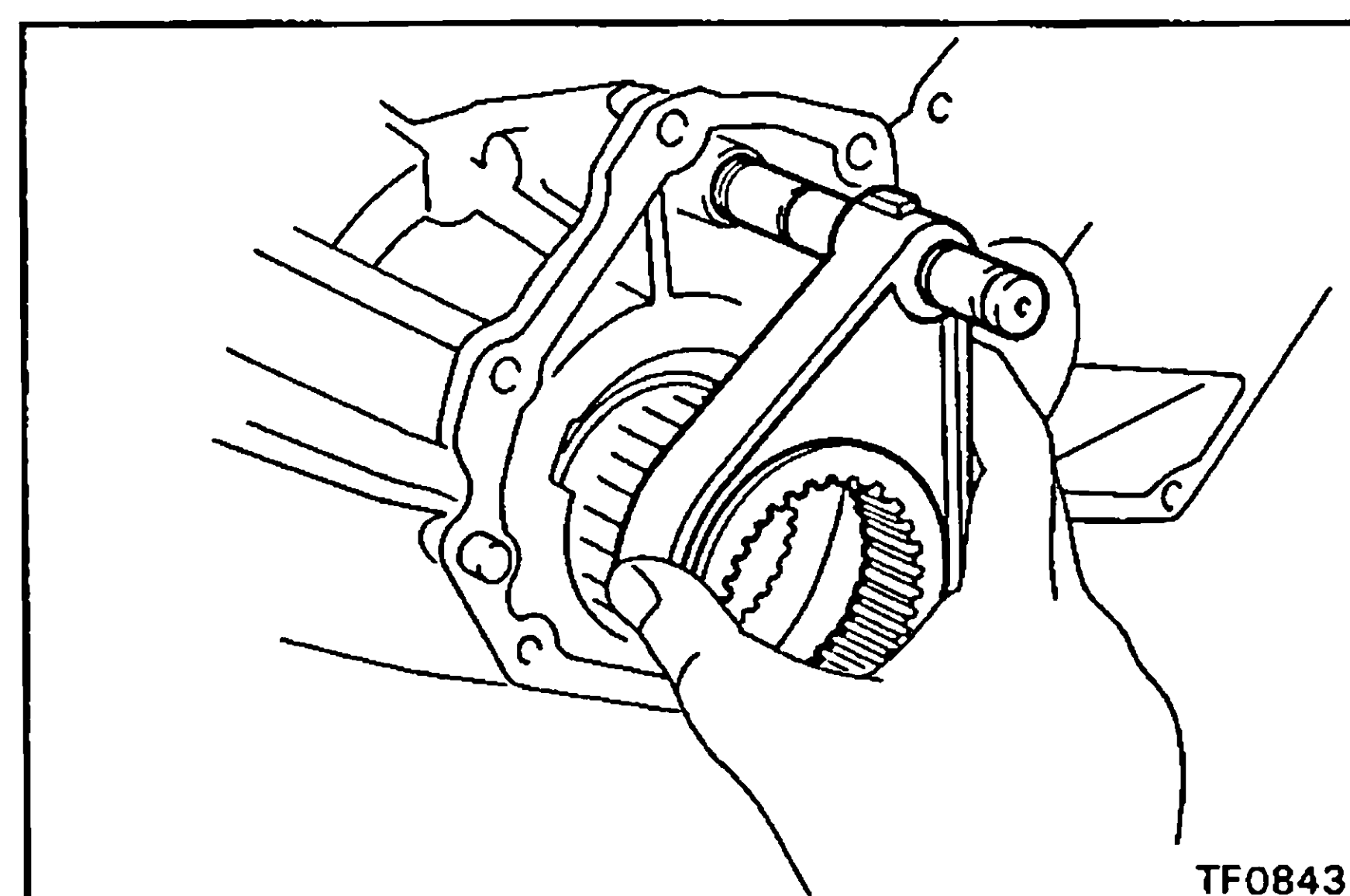
Using SST, remove the dust deflector.
SST 09950-20017



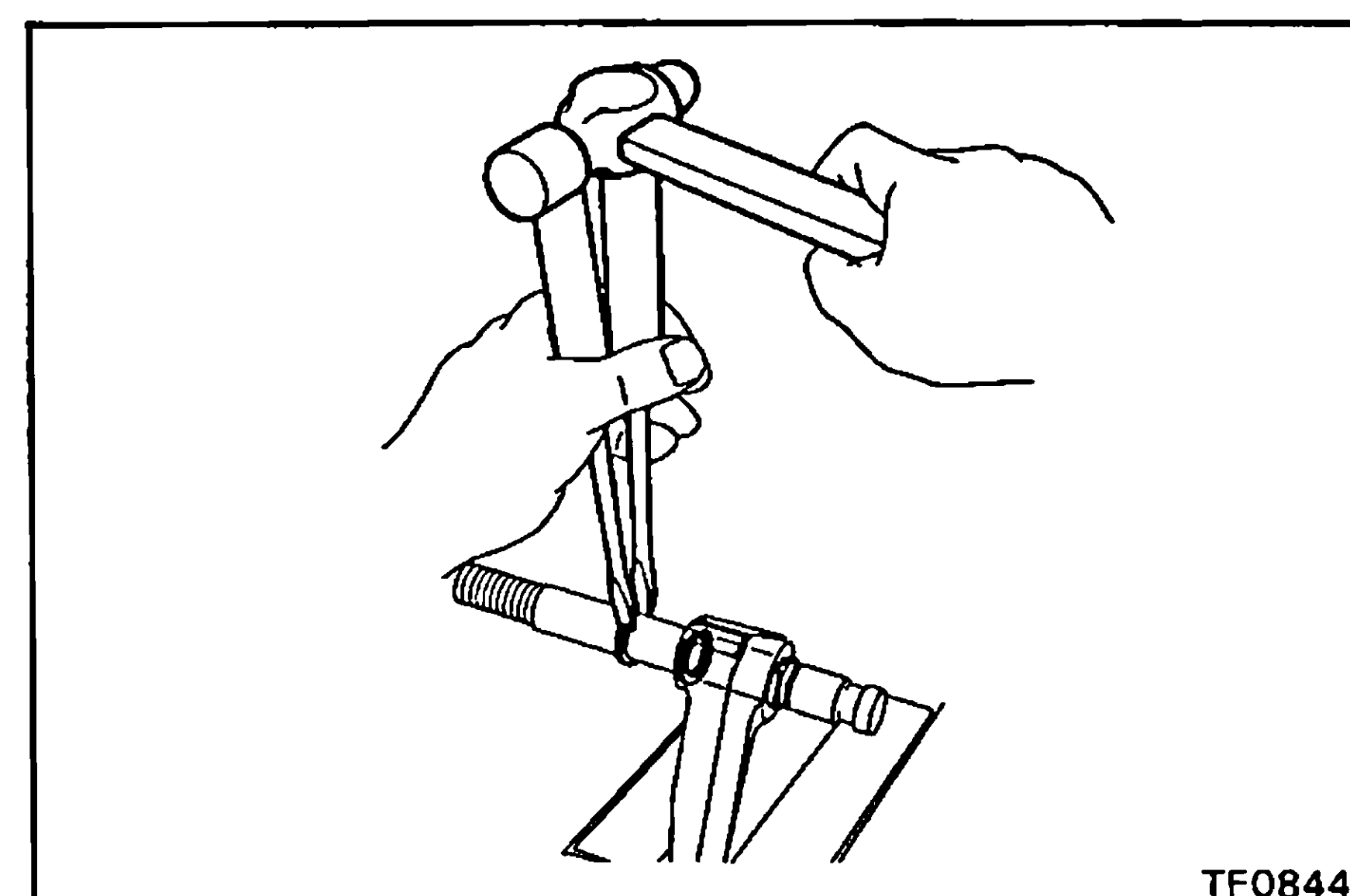
9. REMOVE FRONT EXTENSION HOUSING

Remove the six bolts and front extension housing.

HINT: If necessary, tap the front extension housing with a plastic hammer.



10. REMOVE CLUTCH SLEEVE, SHIFT FORK NO.2 AND FORK SHAFT

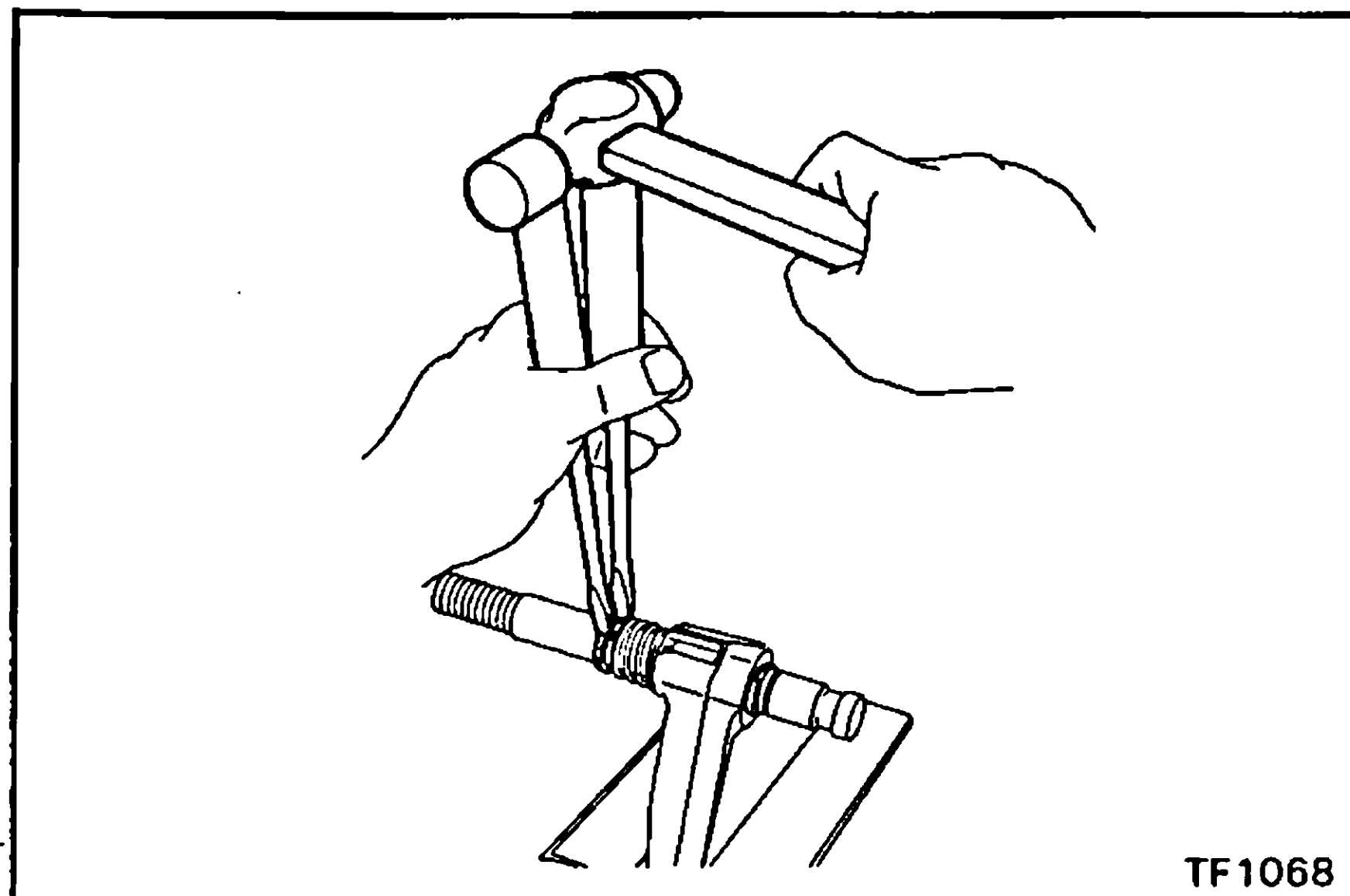


11. SEPARATE SHIFT FORK NO.2 AND FORK SHAFT

(Motor shift type)

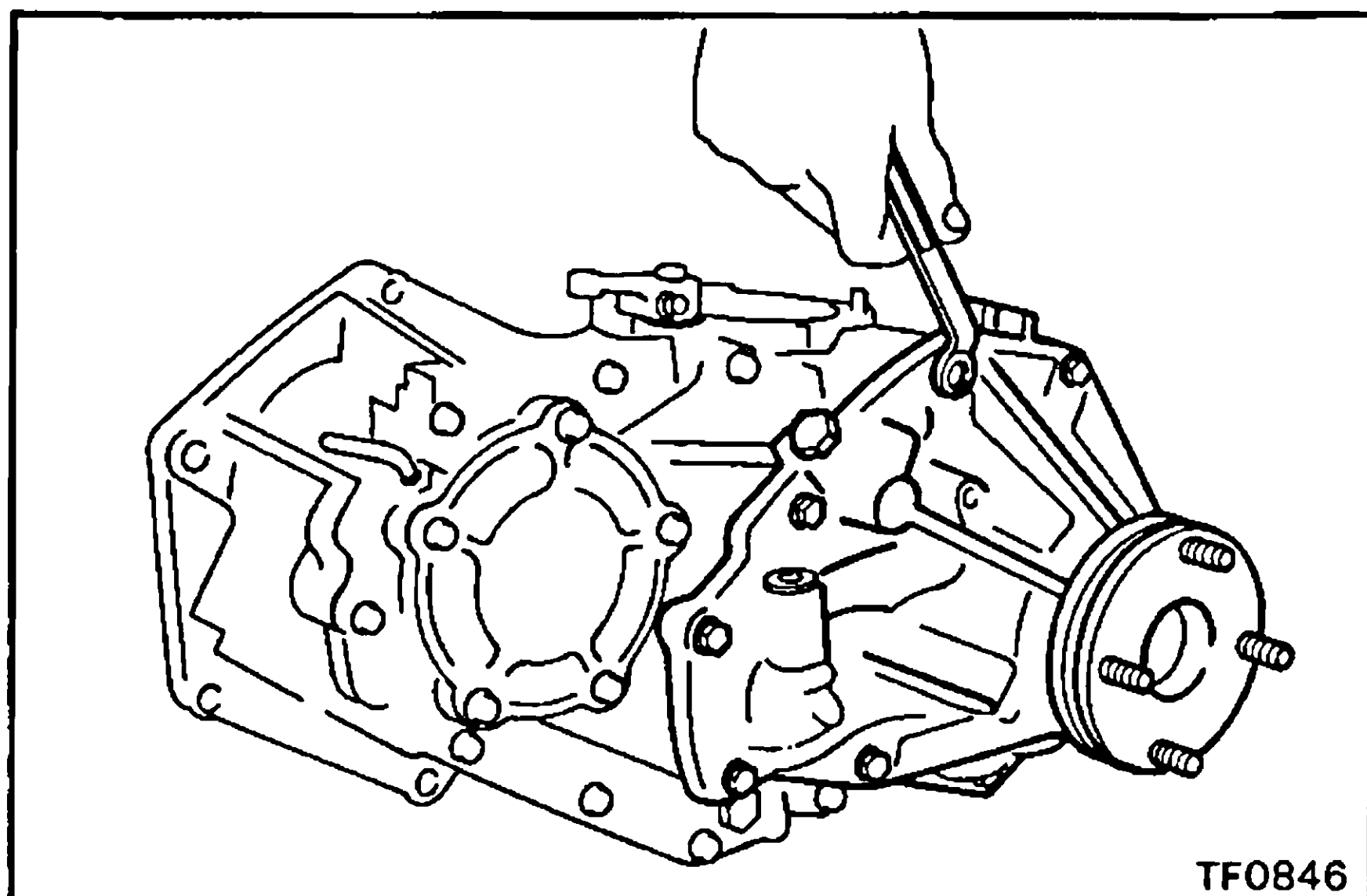
(a) Using two screwdrivers and a hammer, tap out the snap rings.

(b) Separate the shift fork No.2 and fork shaft.



(Direct shift type)

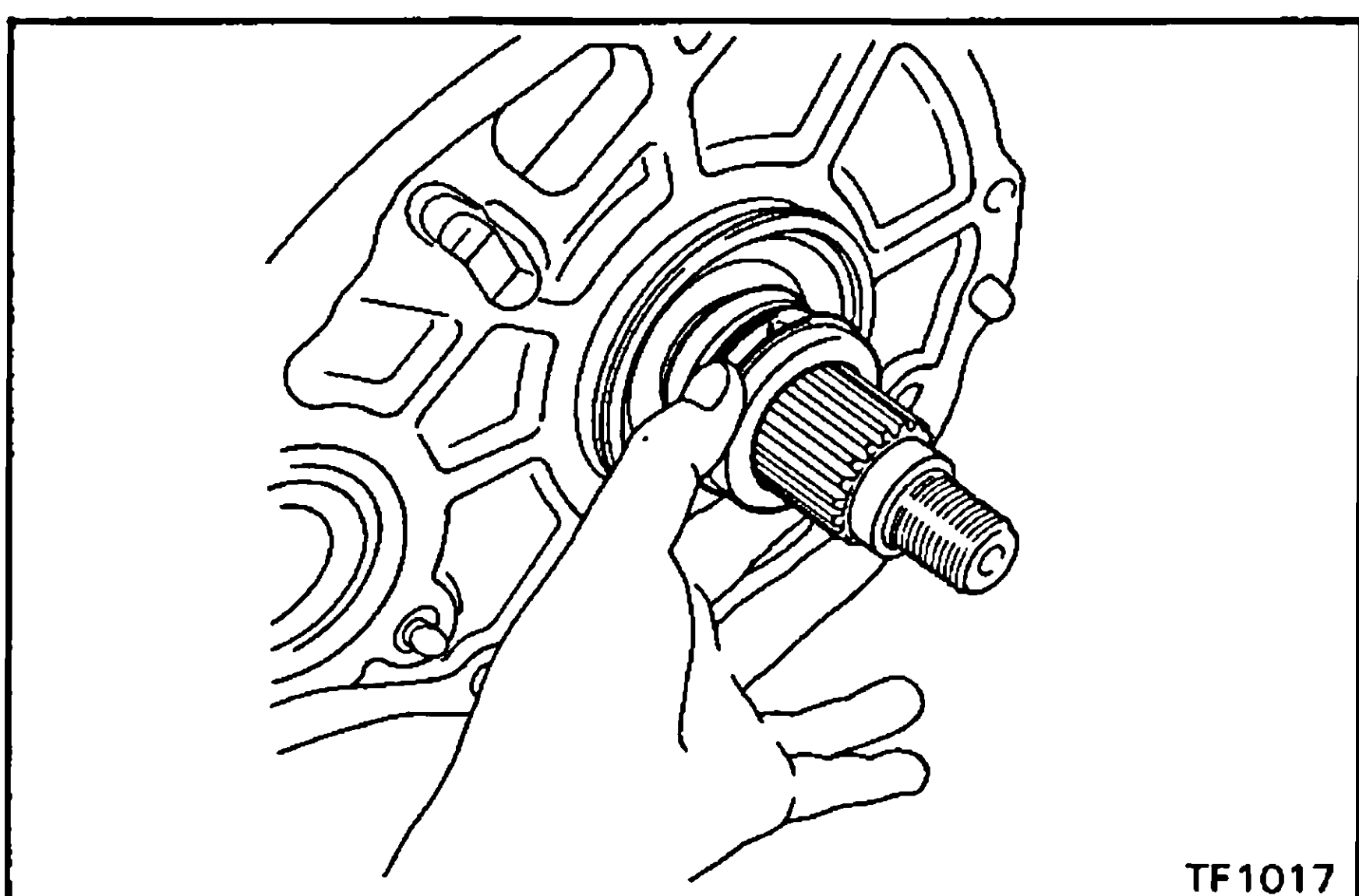
- (a) Using two screwdrivers and a hammer, tap out the snap rings.
- (b) Separate the shift fork No.3, fork shaft and spring.



12. REMOVE REAR EXTENSION HOUSING

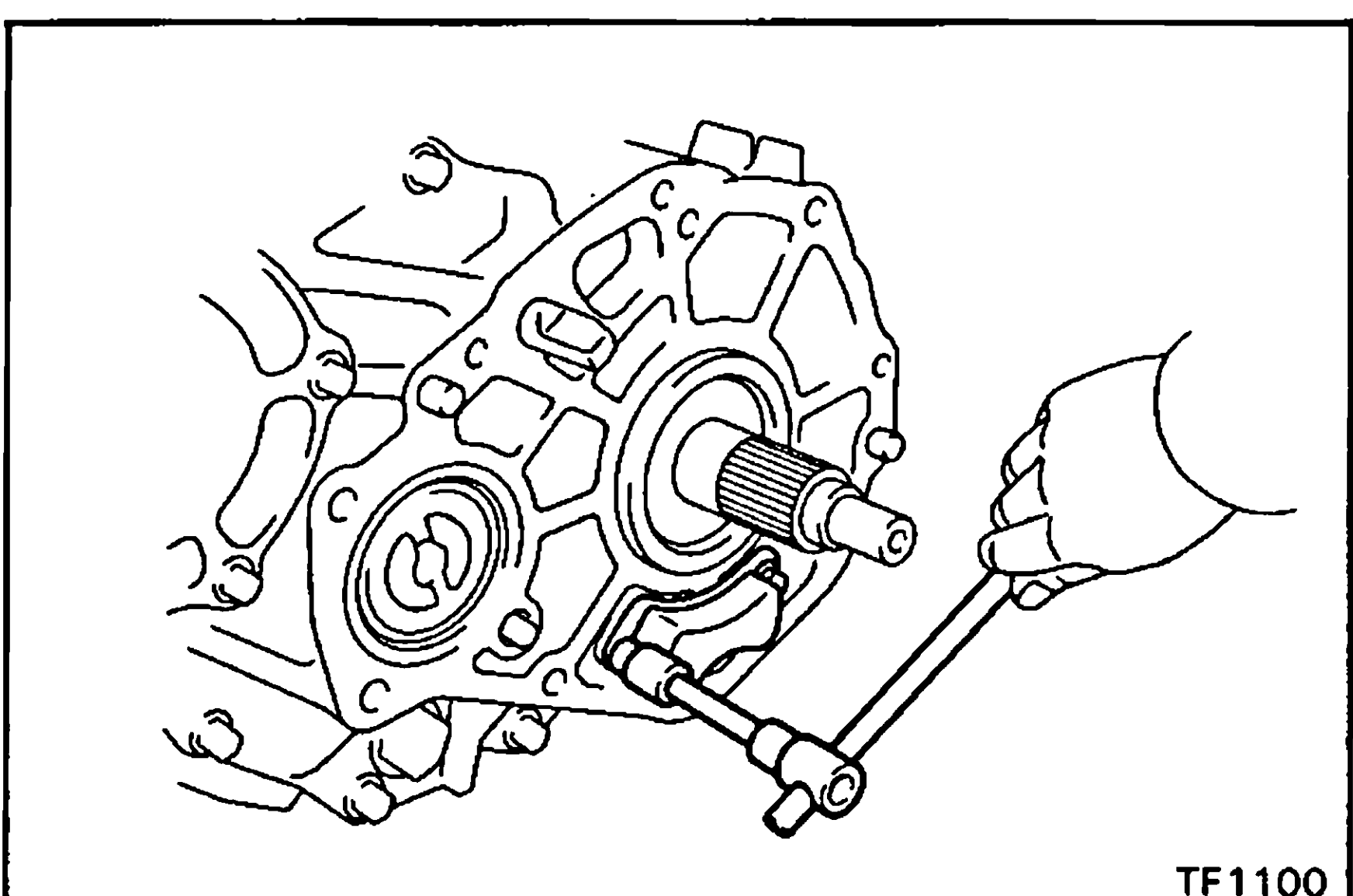
Remove the nine bolts and rear extension housing.

HINT: Using a plastic hammer, tap the rear extension housing and remove it.



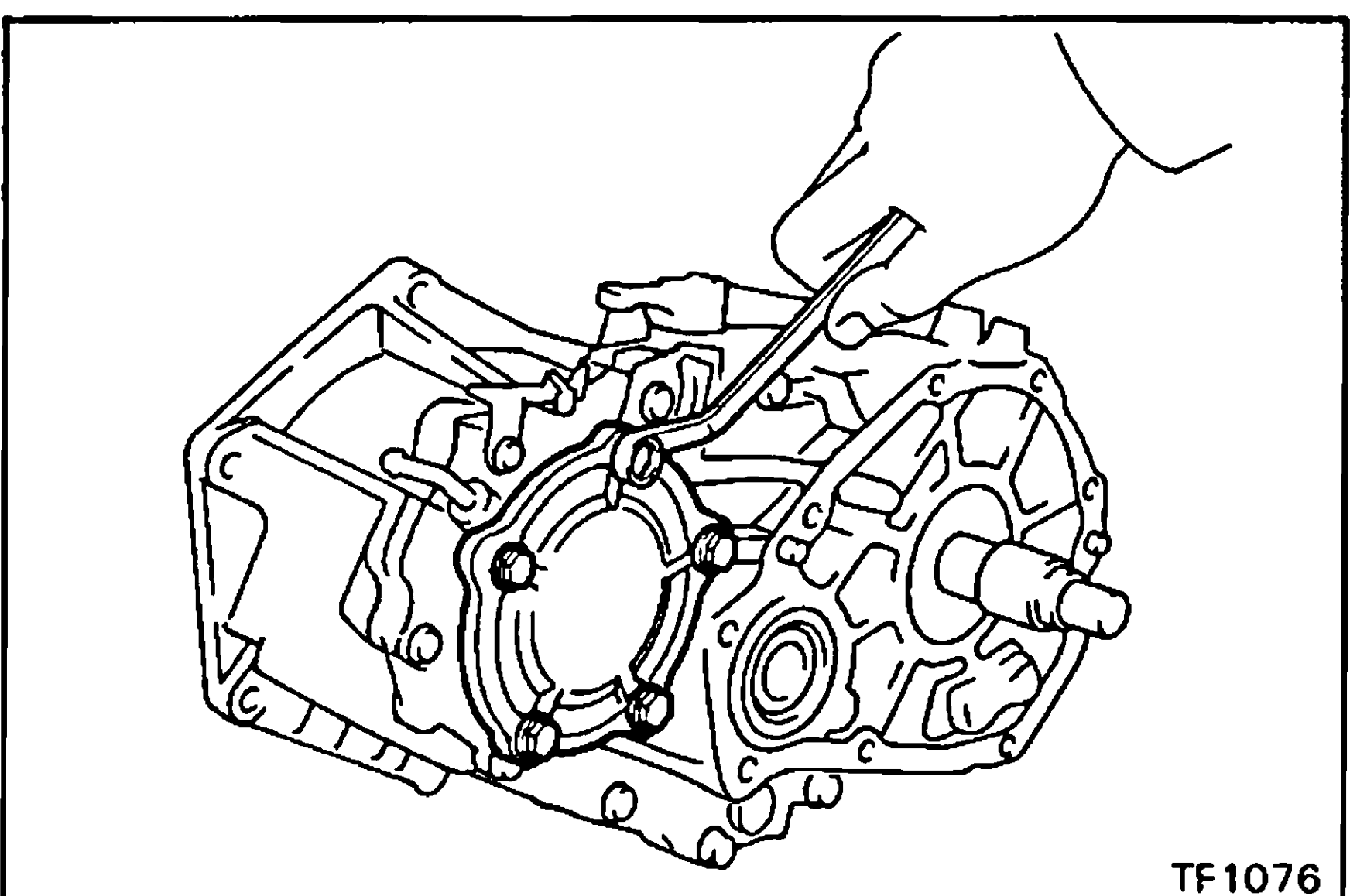
13. REMOVE SPACER NO.1, BALL AND SHIMS

- (a) Remove the spacer No.1.
- (b) Using a magnetic finger, remove the ball.
- (c) Remove the shims.



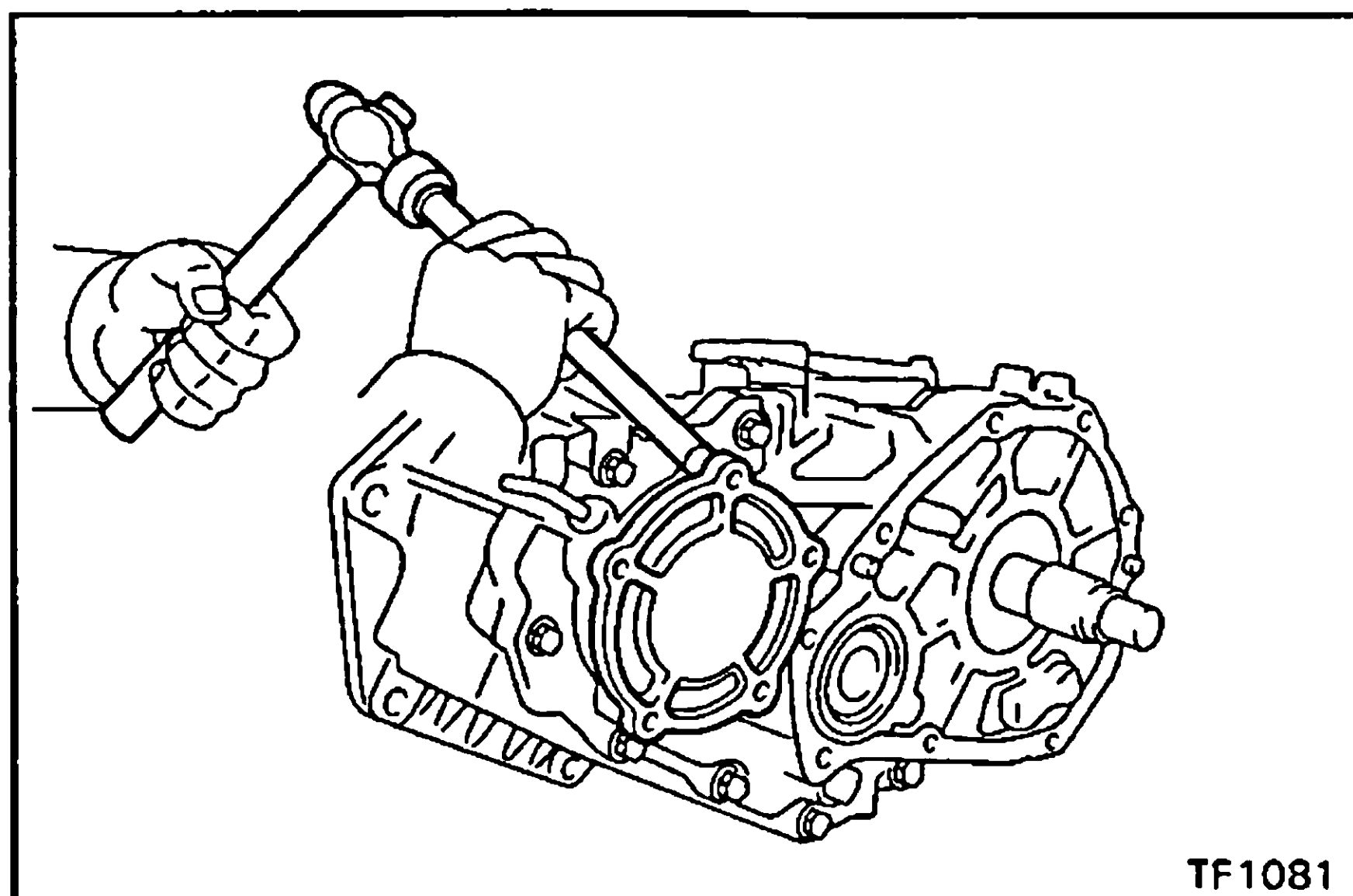
14. REMOVE OIL STRAINER FROM REAR CASE

Remove the two set bolts and oil strainer.

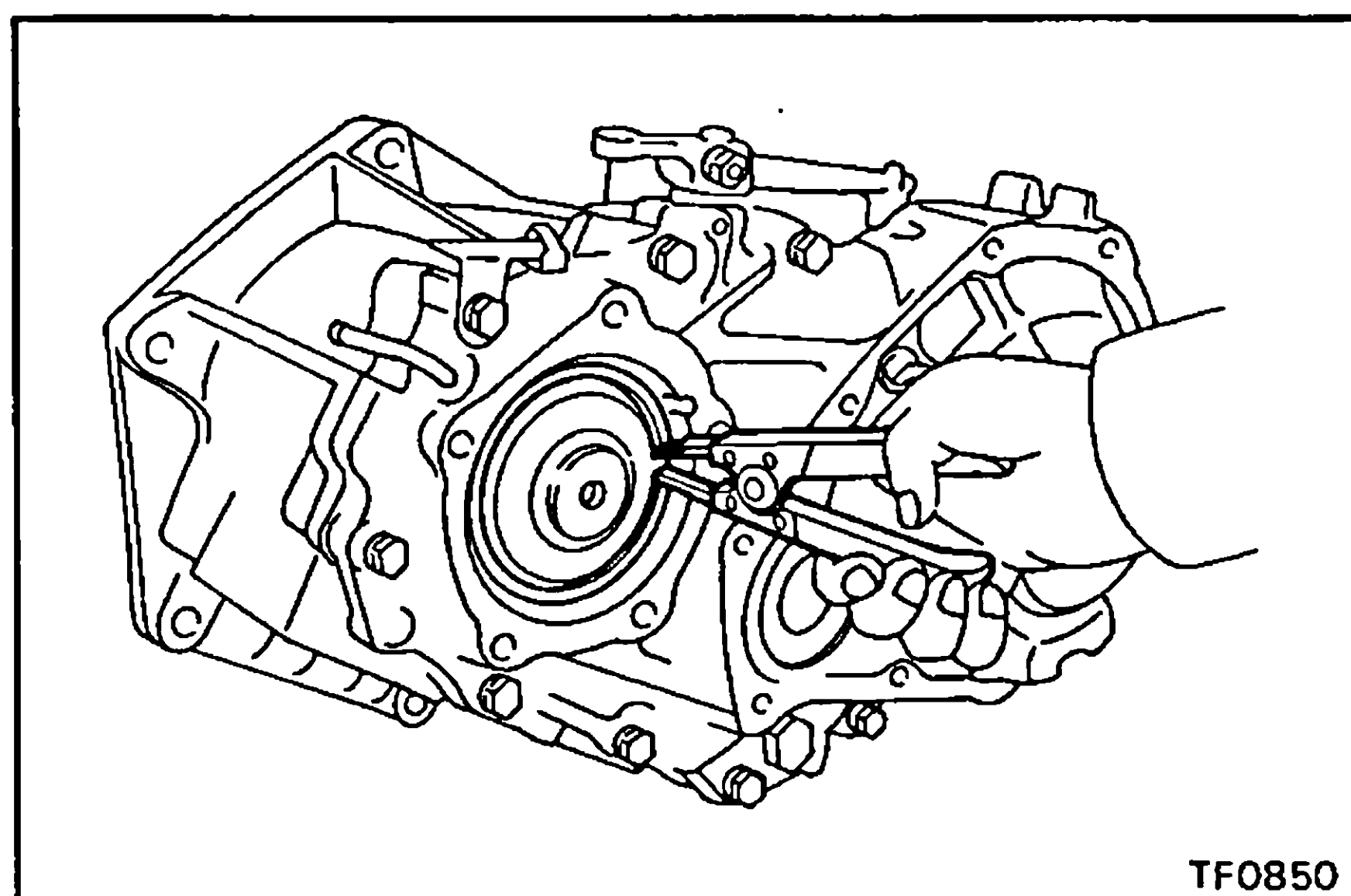


15. REMOVE CASE COVER

- (a) Remove the five bolts.

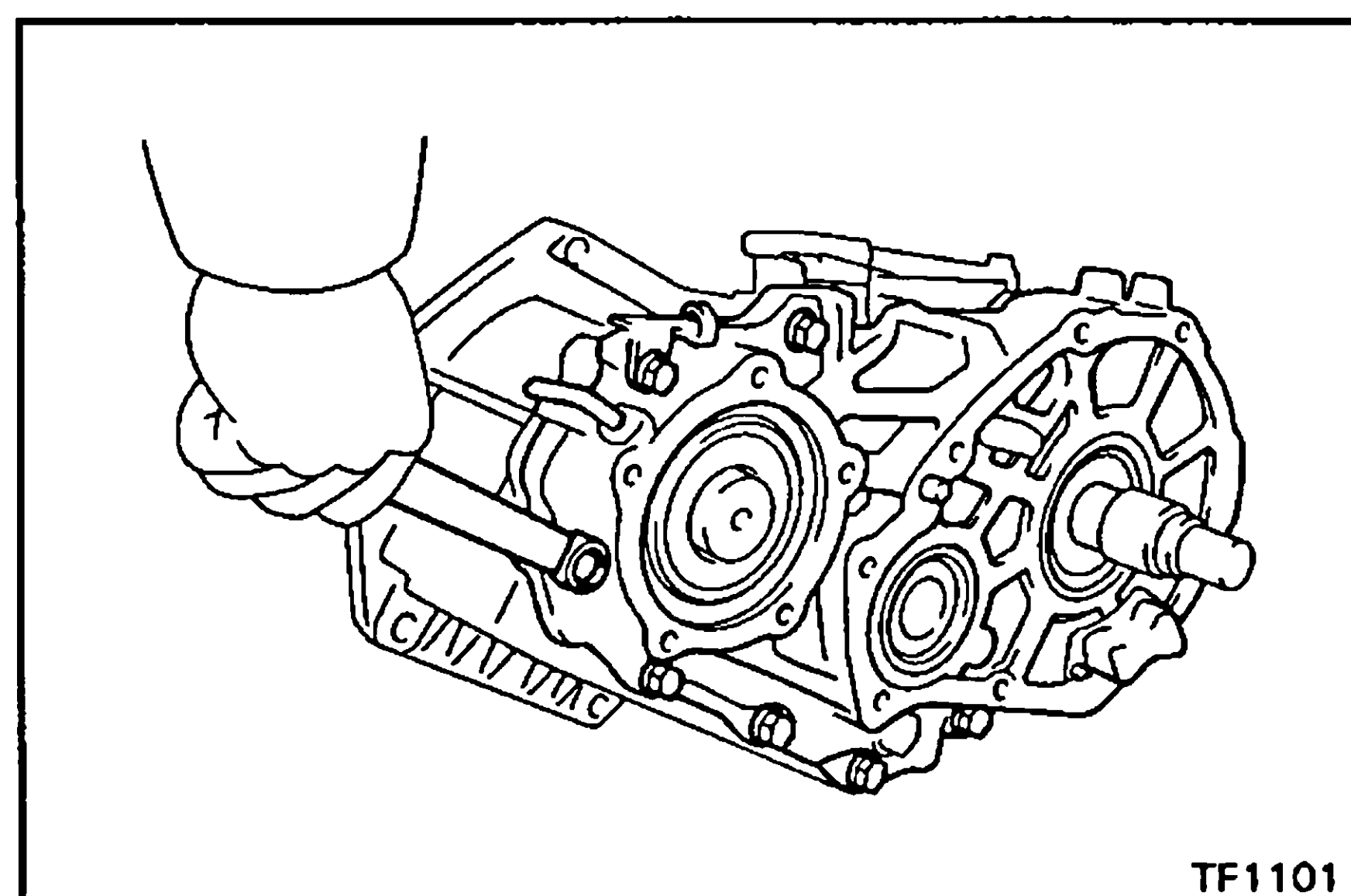


- (b) Using a brass bar and hammer, remove the case cover.

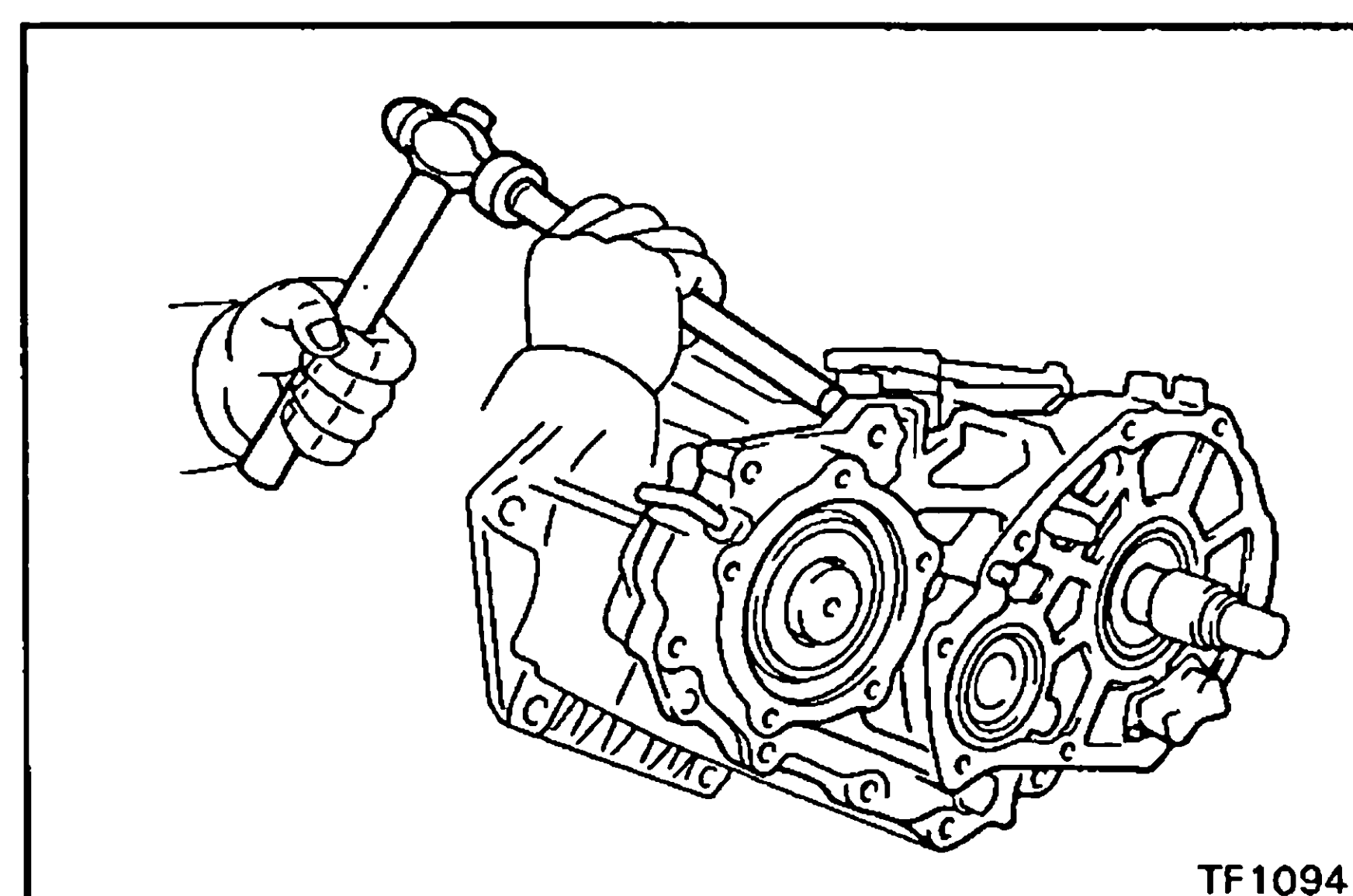


16. SEPARATE FRONT CASE AND REAR CASE

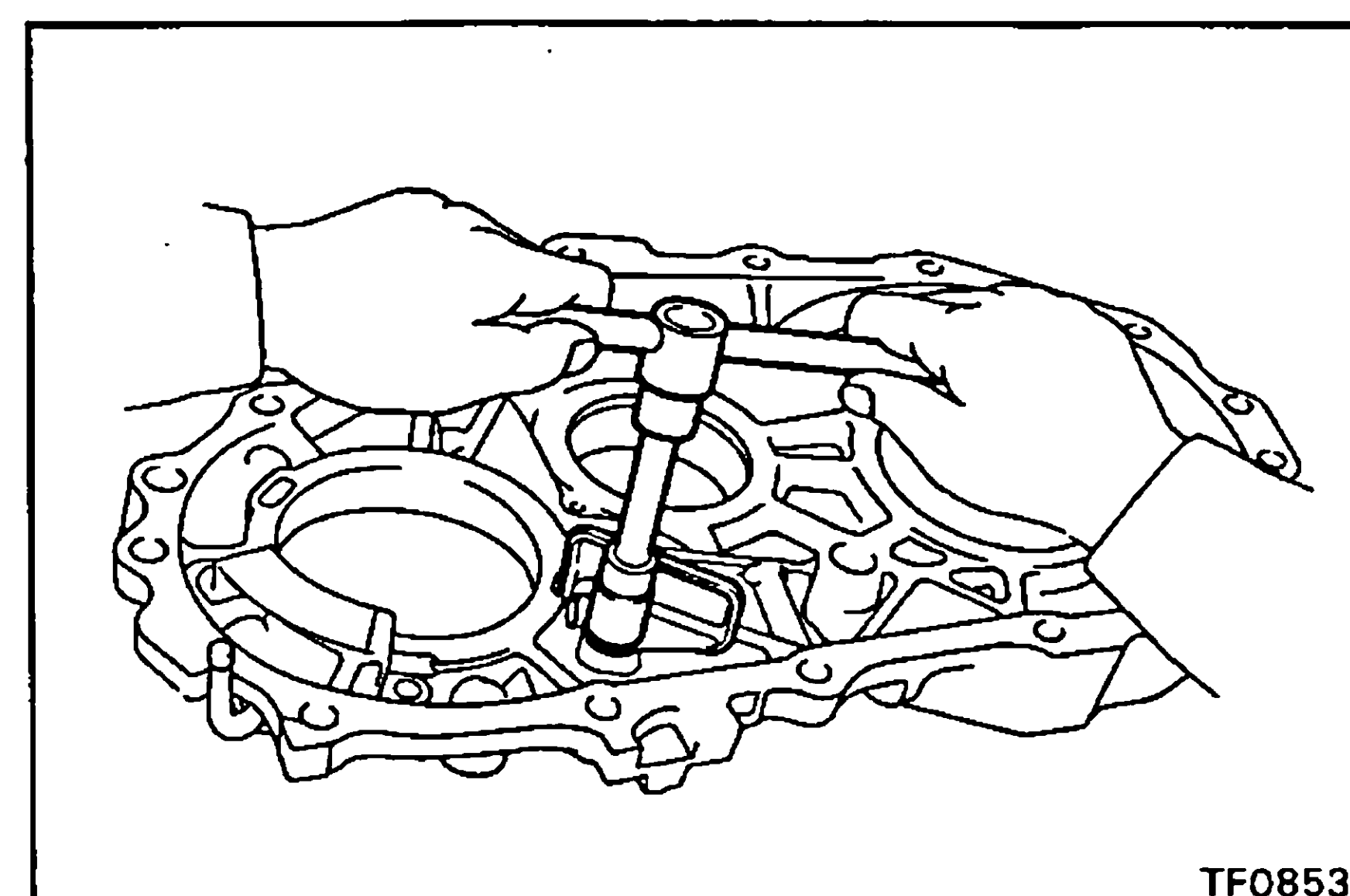
- (a) Using snap ring pliers, remove the snap ring.



- (b) Remove the eight bolts.

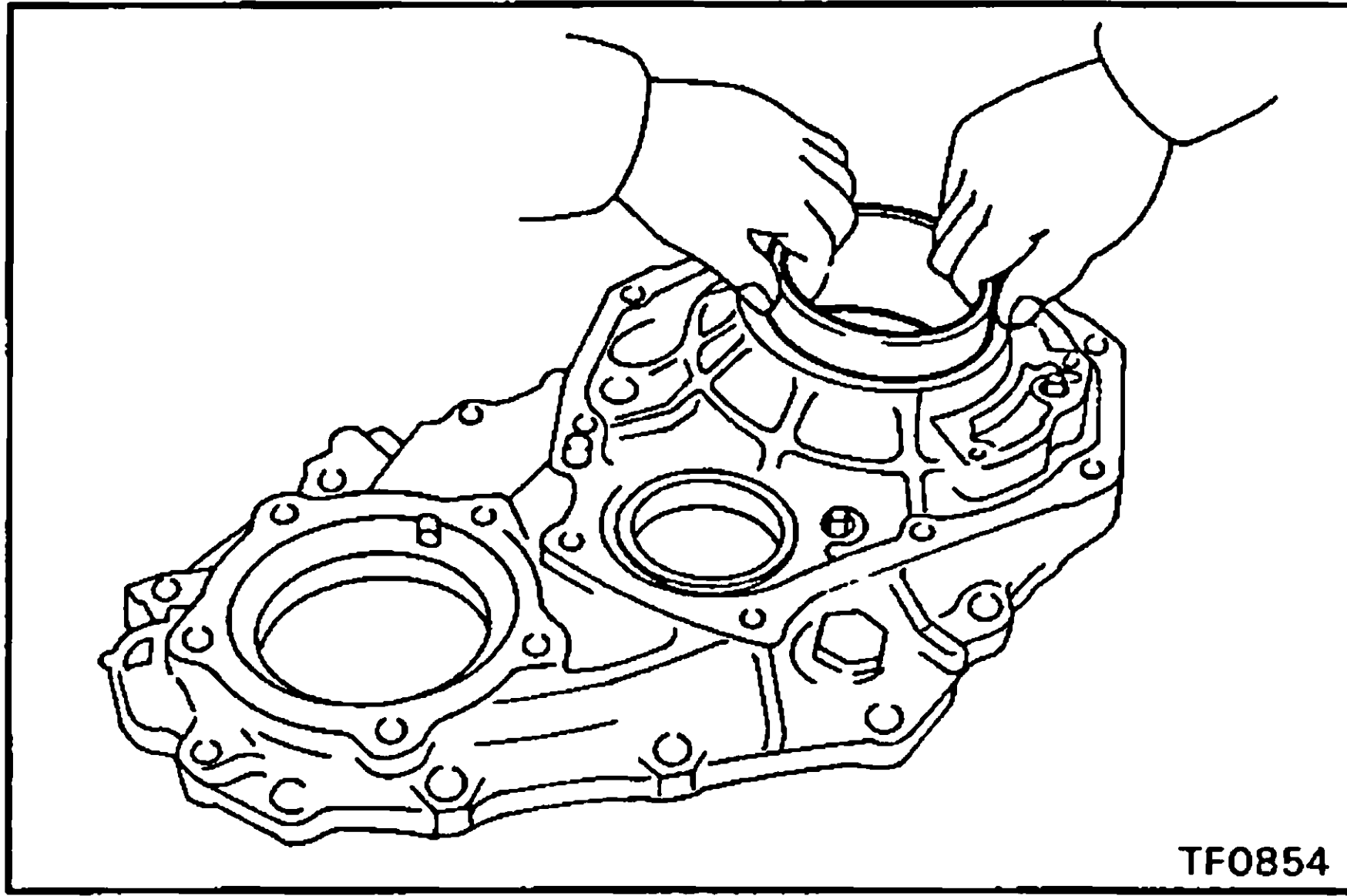
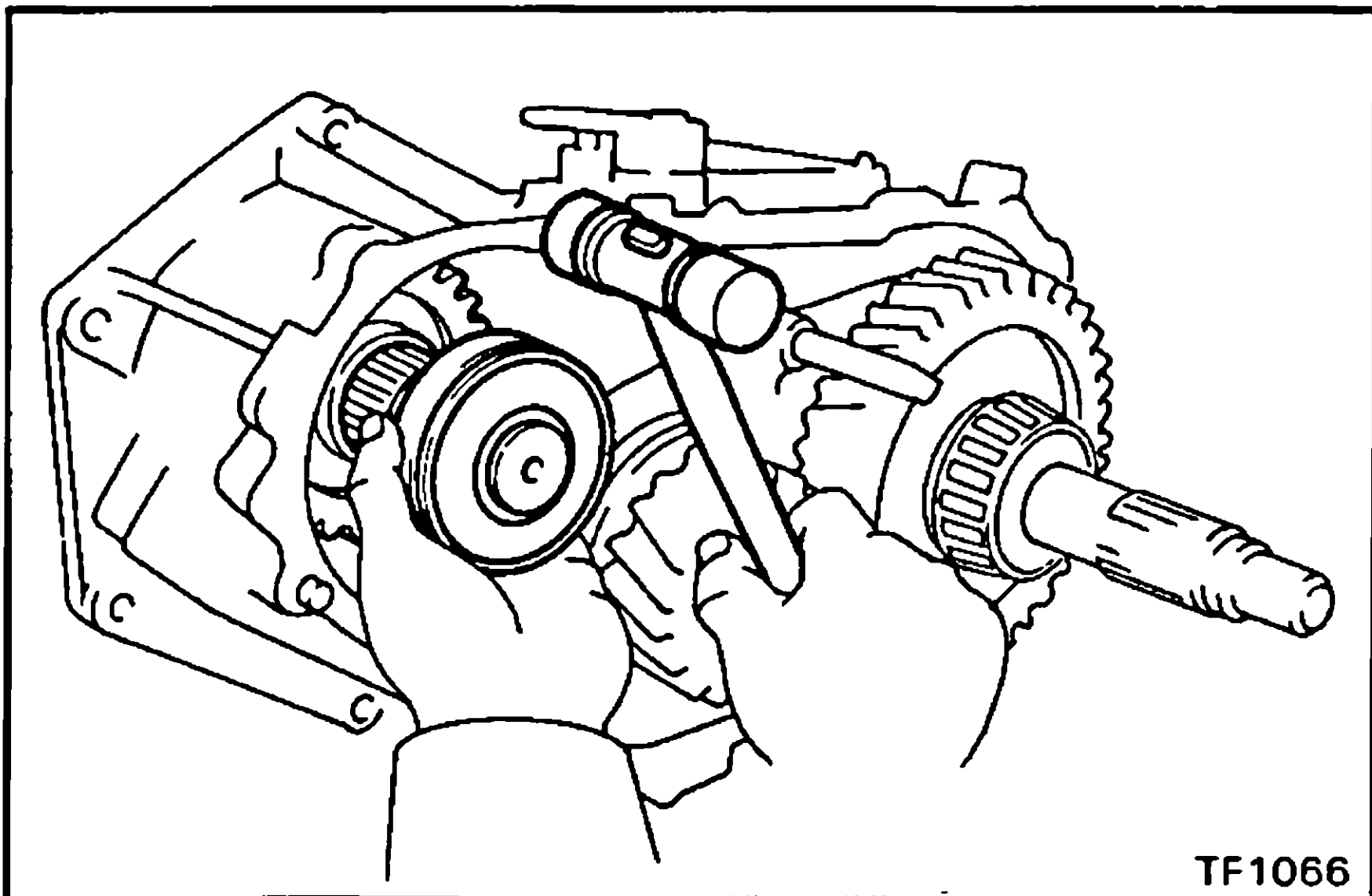


- (c) Using a brass bar and hammer, tap the rear case and separate it.

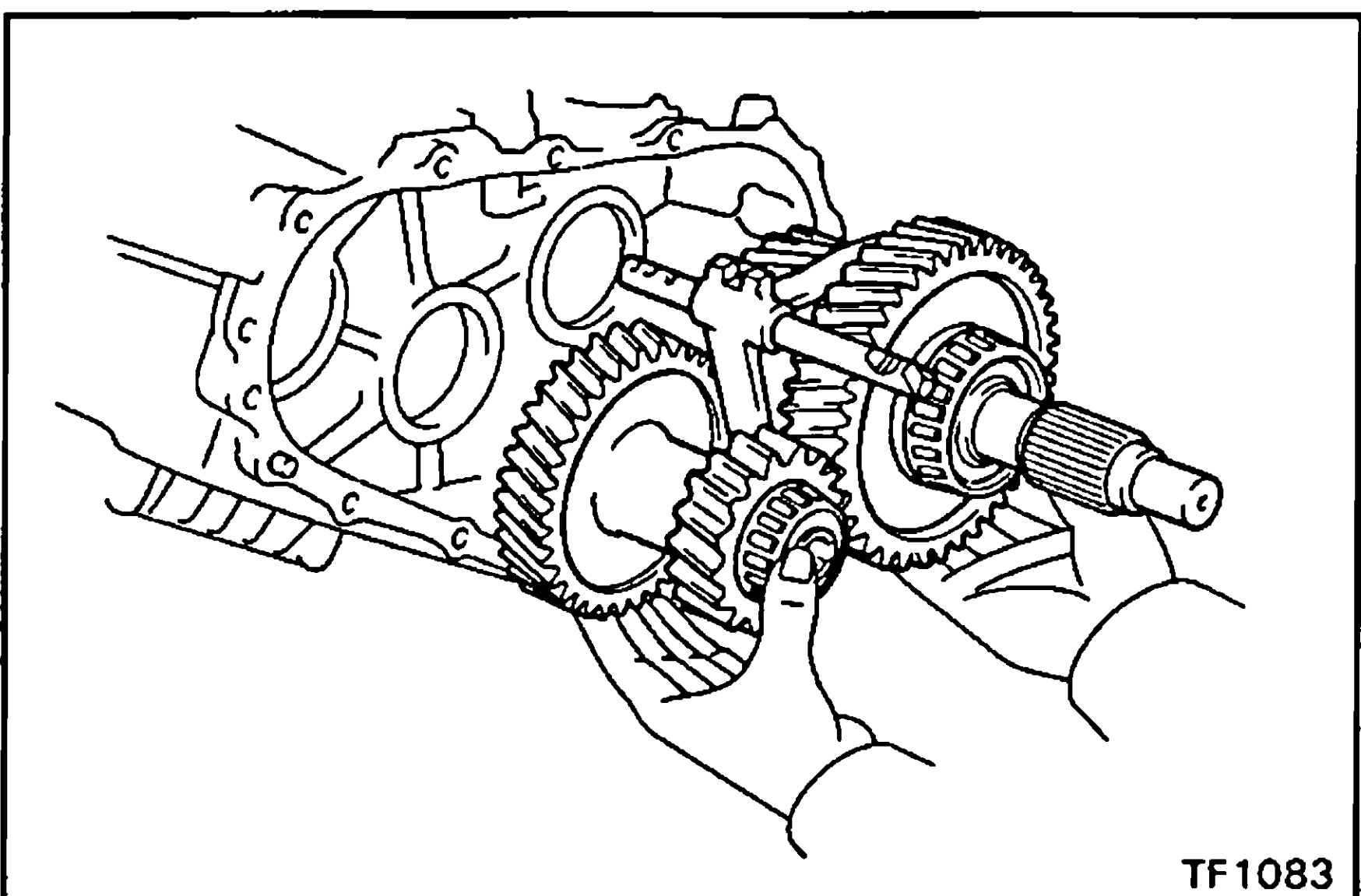
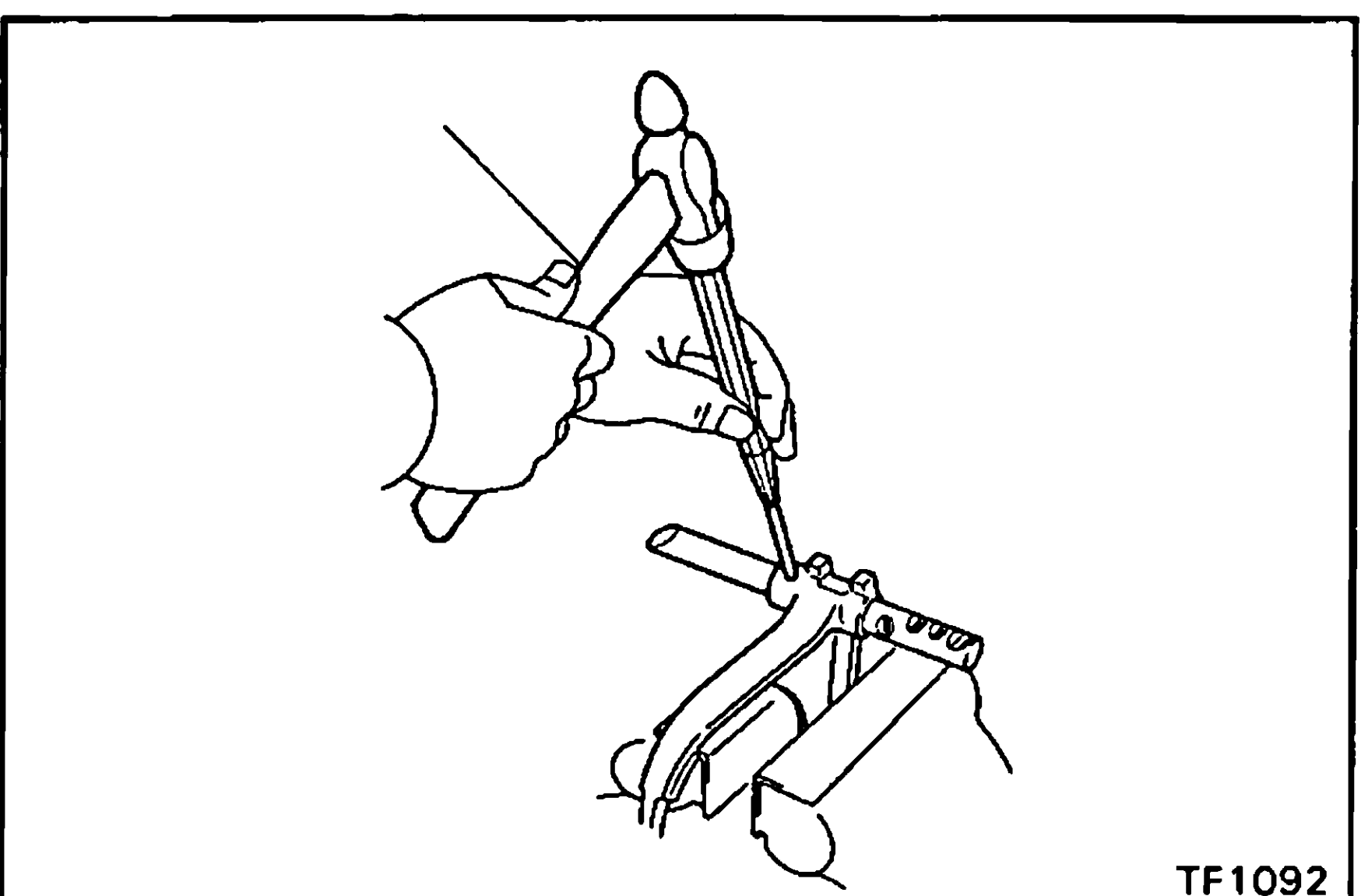


17. REMOVE OIL RECEIVER FROM REAR CASE

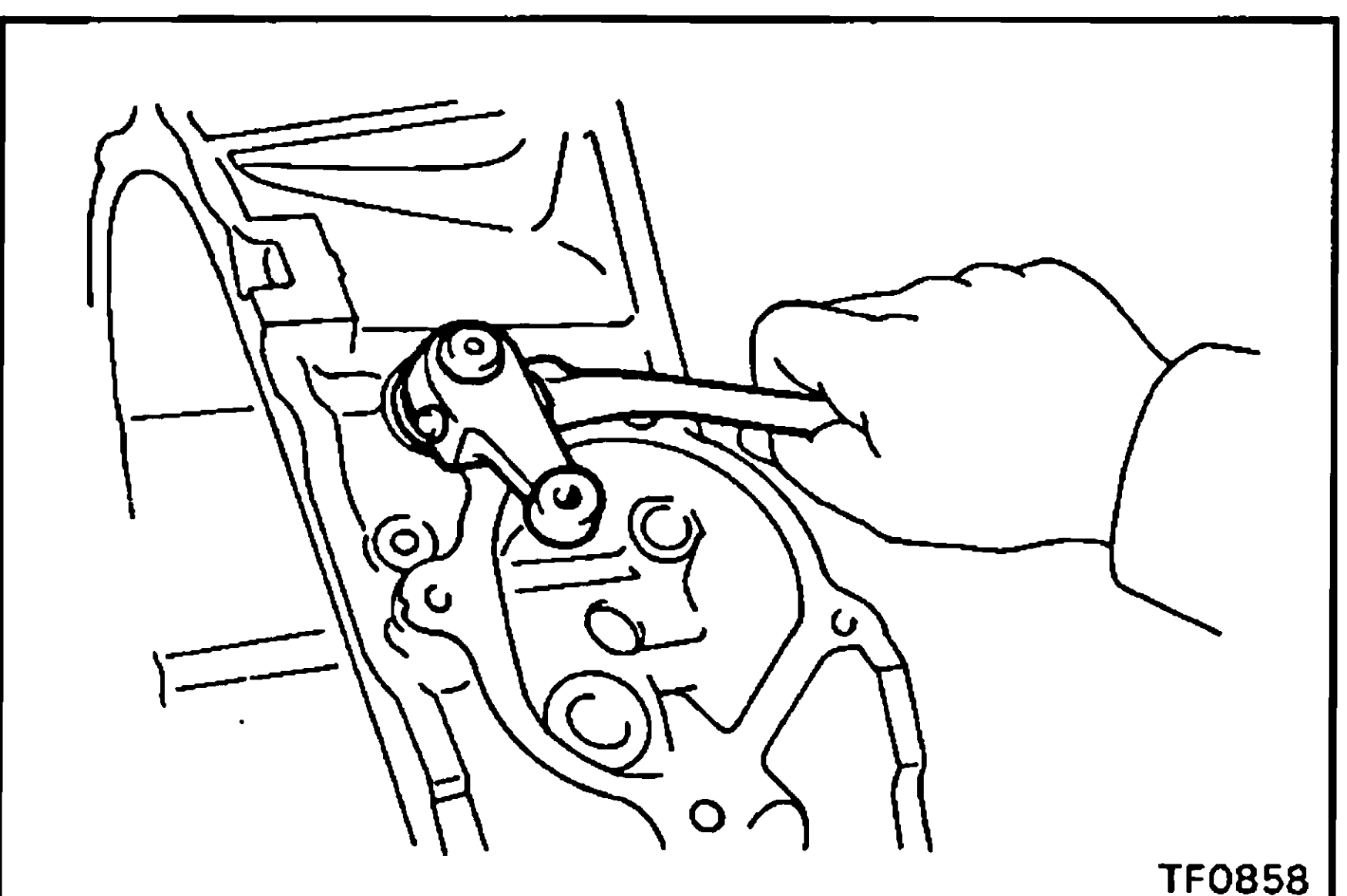
Remove the set bolt and oil receiver.

**18. REMOVE TWO BEARING RACES FROM REAR CASE****19. REMOVE INPUT SHAFT ASSEMBLY**

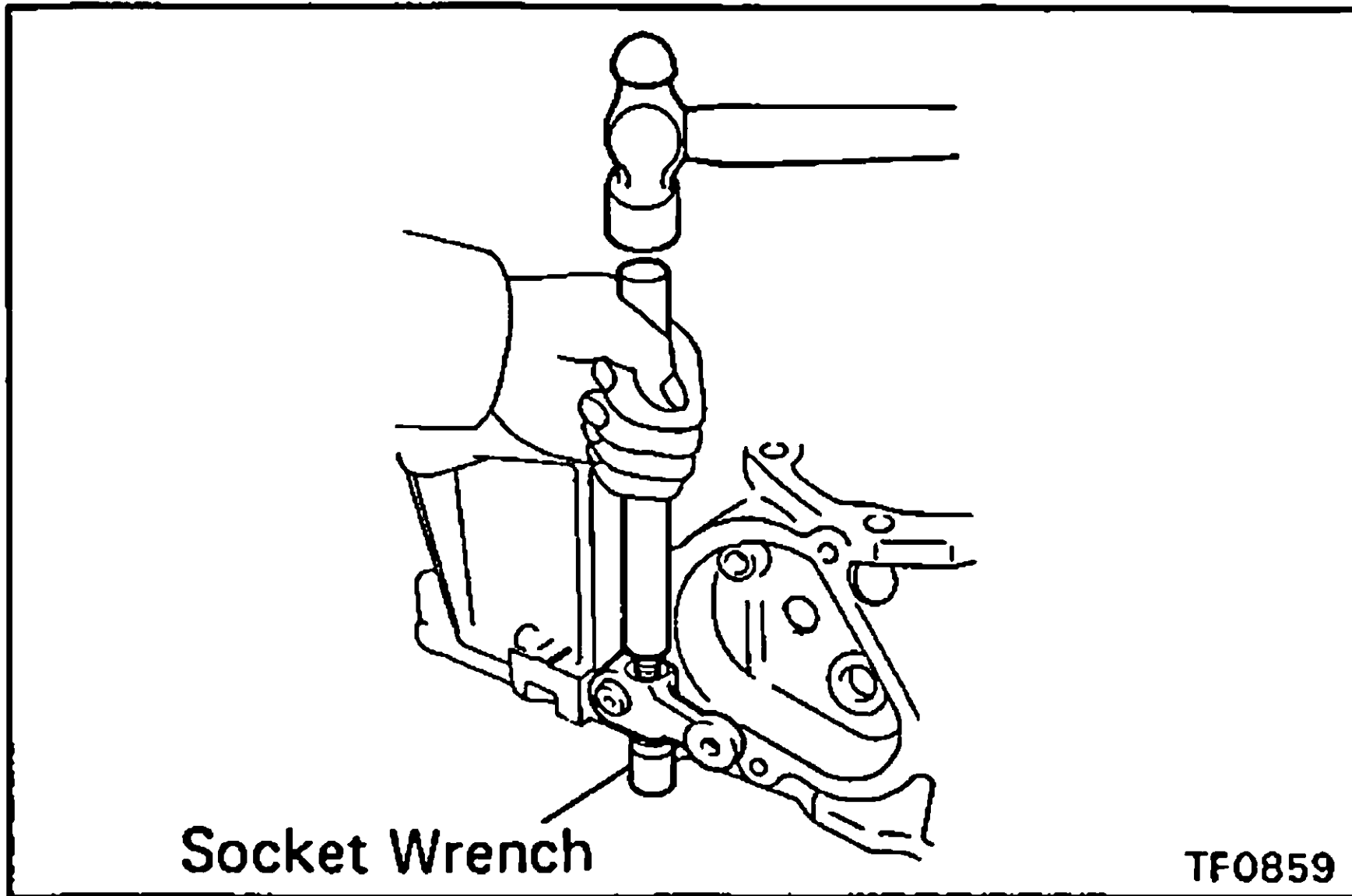
Using a plastic hammer, tap the front case and remove the input shaft.

**20. REMOVE IDLE GEAR ASSEMBLY, OUTPUT SHAFT ASSEMBLY, SHIFT FORK NO.1 AND FORK SHAFT****21. SEPARATE SHIFT FORK NO.1 AND FORK SHAFT**

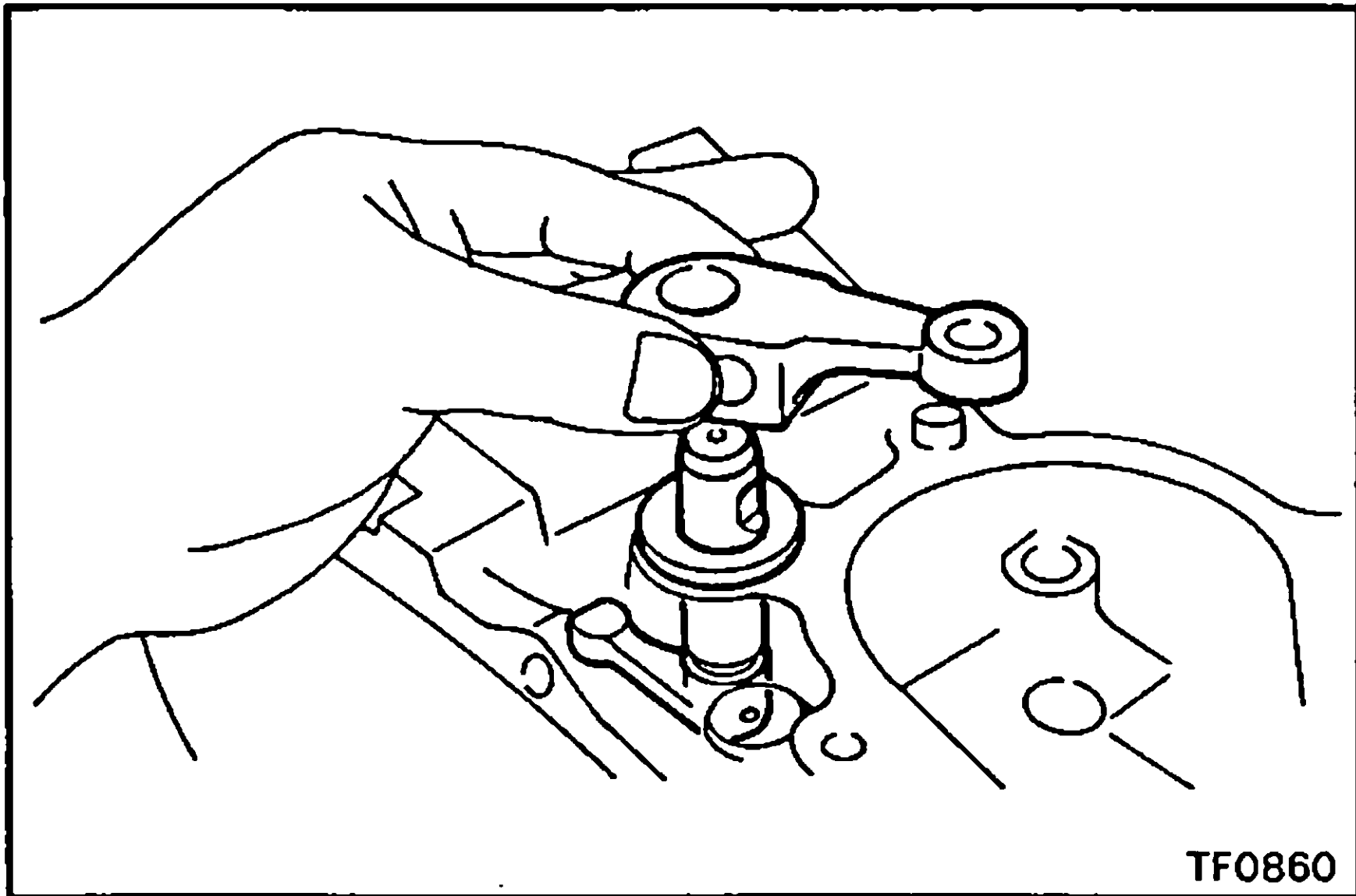
- (a) Using a pin punch and hammer, drive out the slotted spring pin.
- (b) Separate the shift fork No.1 and fork shaft.

**22. REMOVE SHIFT OUTER LEVER AND INNER LEVER**

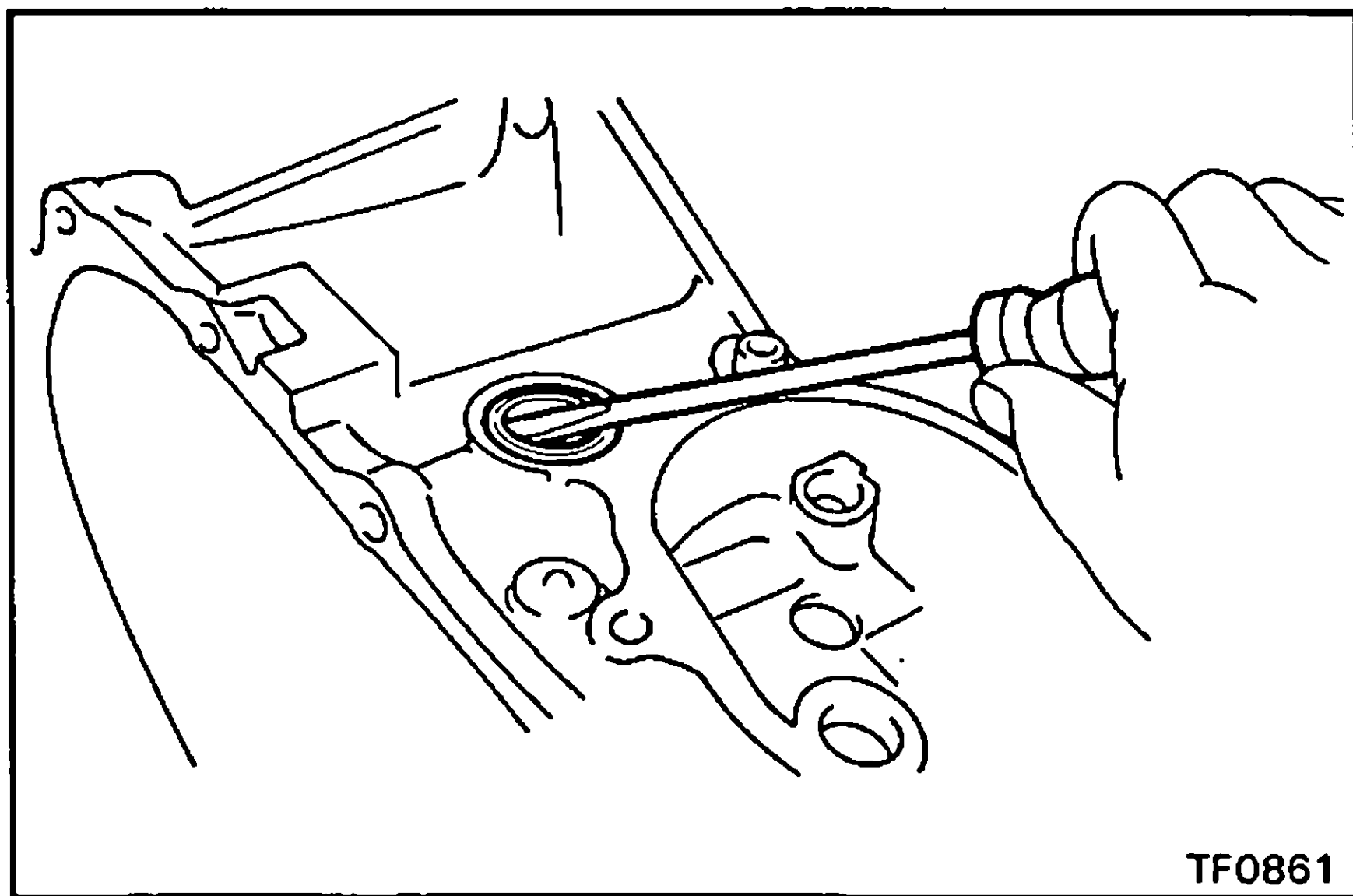
- (a) Remove the nut and washer.



- (b) Using a brass bar and hammer, tap out the lever lock pin.

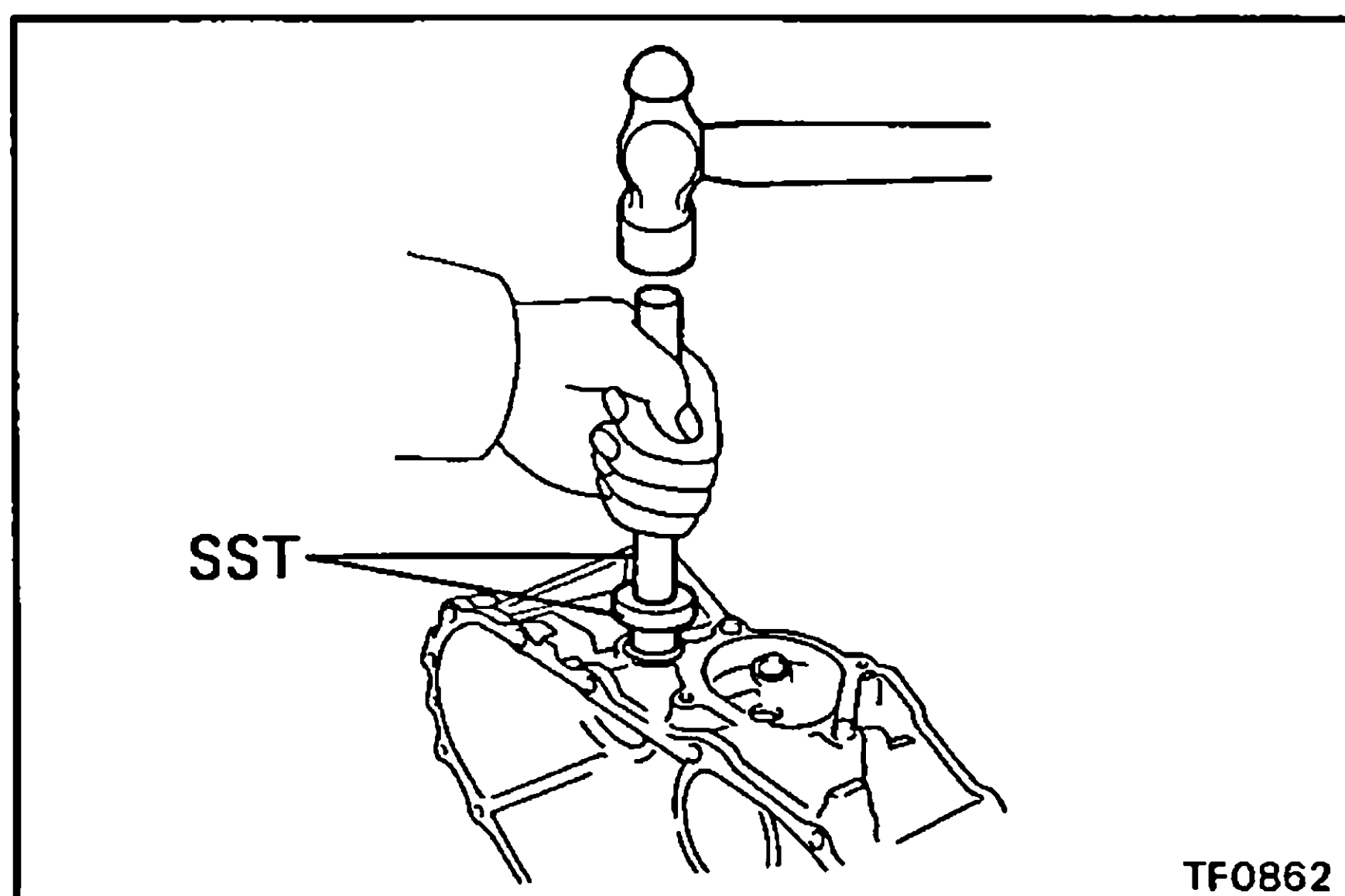


- (c) Remove the shift outer lever and inner lever.

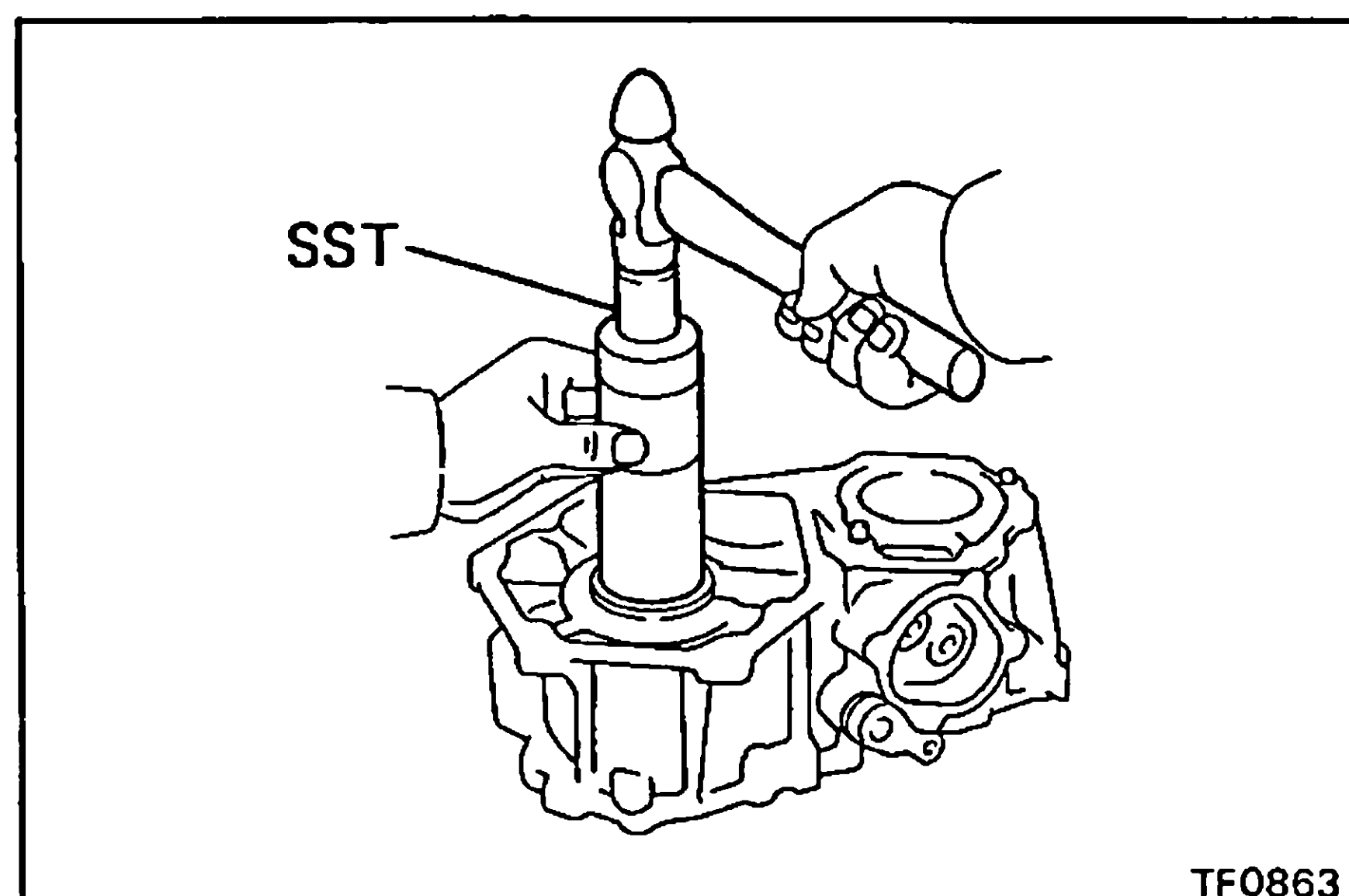


23. IF NECESSARY, REPLACE SHIFT LEVER OIL SEAL

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

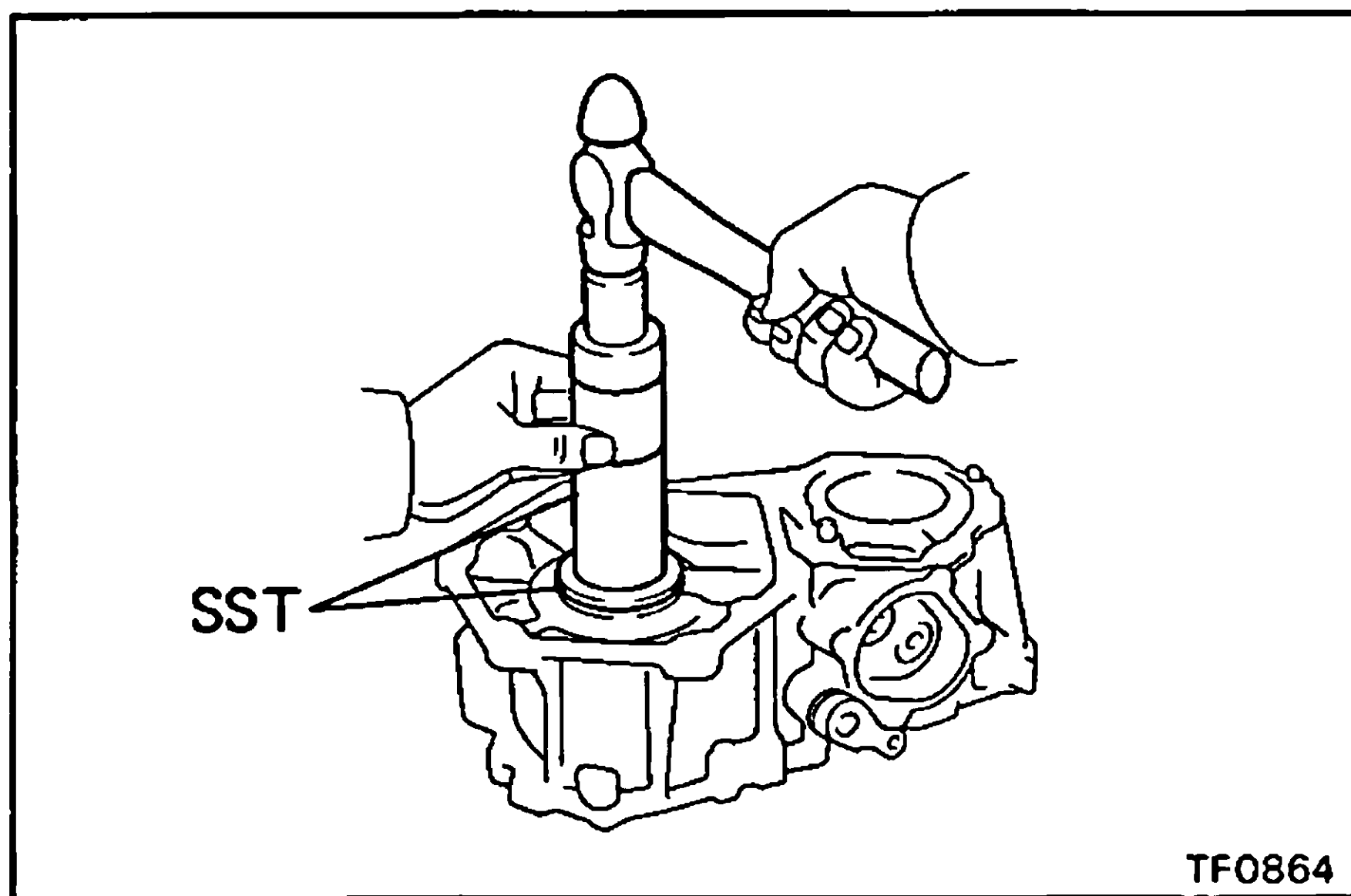


- (b) Using SST and a hammer, drive in a new oil seal.
SST 09608-20012 (09608-00080, 09608-03020)

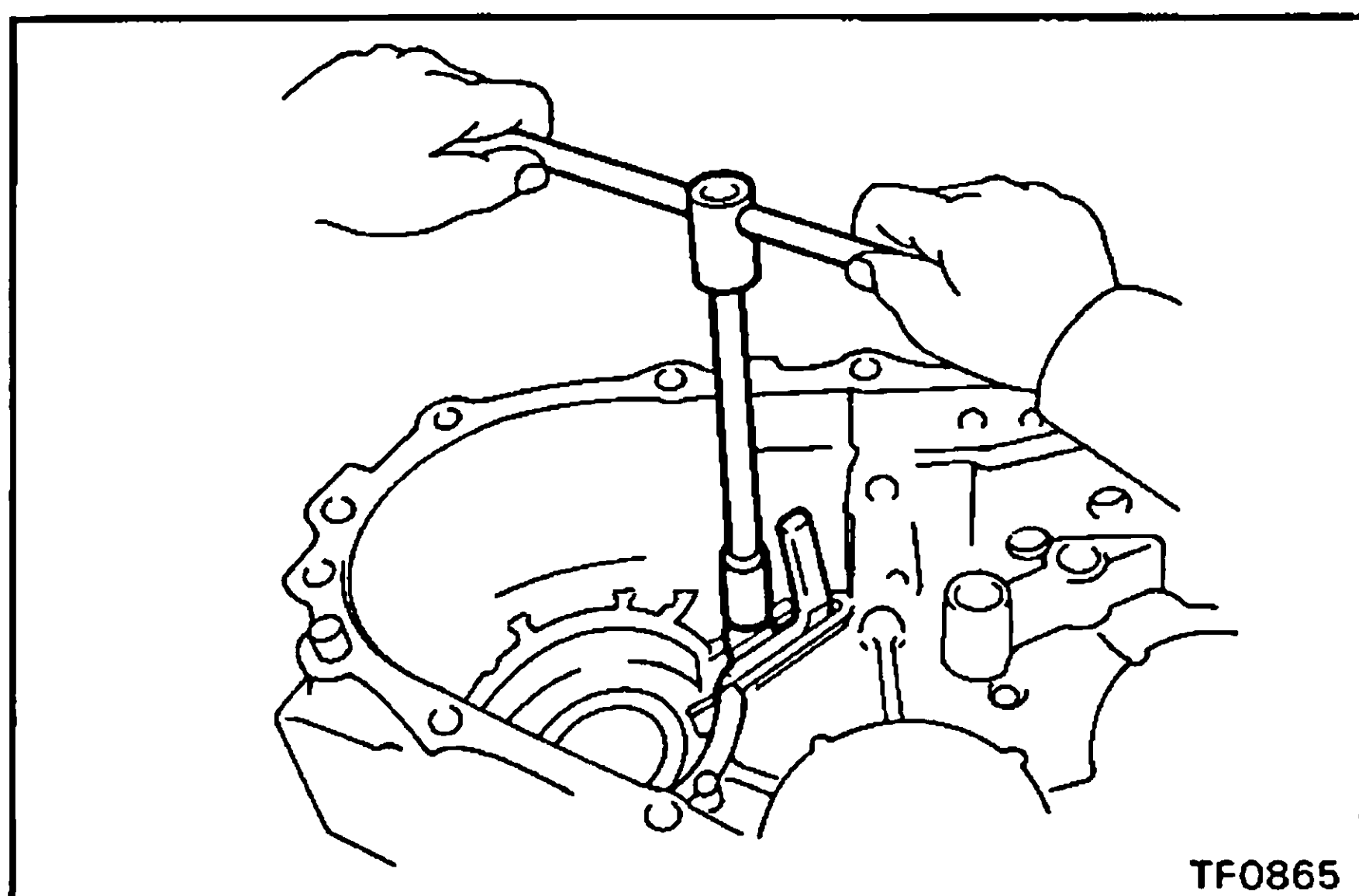


24. IF NECESSARY, REPLACE INPUT SHAFT OIL SEAL

- (a) Using SST and a hammer, drive out the oil seal.
SST 09316-60010 (09316-00010)

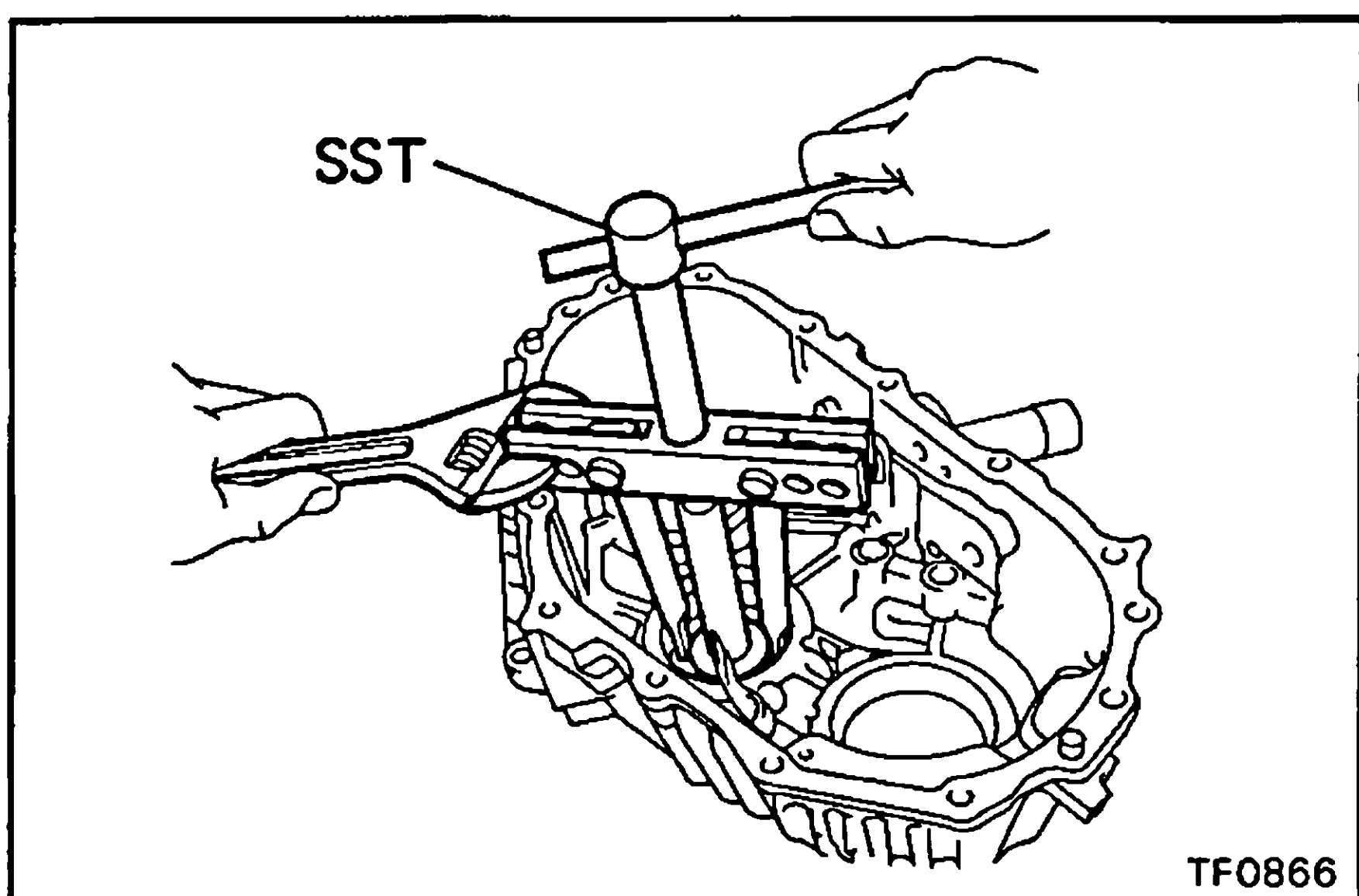


- (b) Using SST and a hammer, drive in a new oil seal.
SST 09316-60010 (09316-00010, 09316-00030)



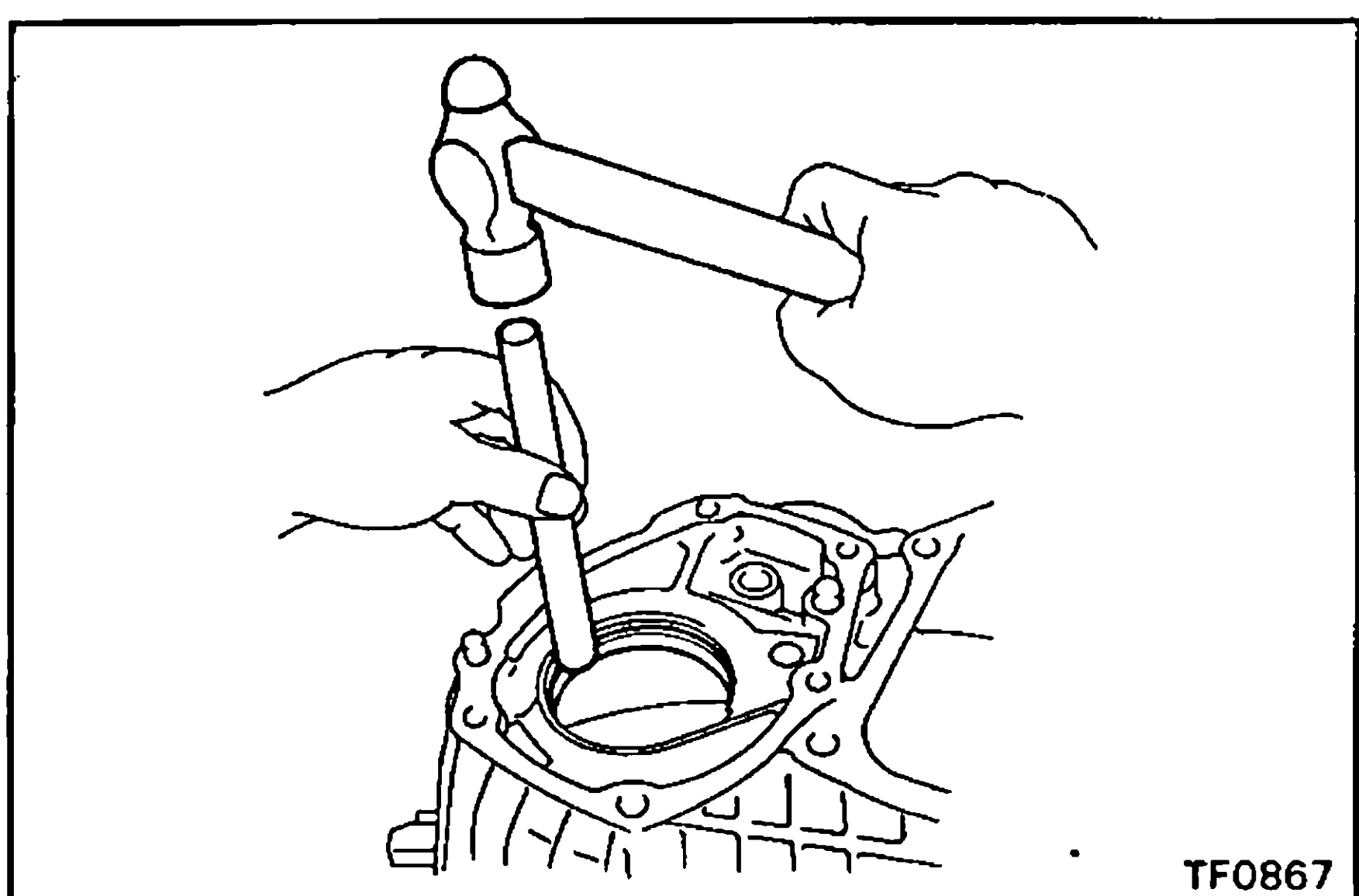
25. REMOVE OIL RECEIVER FROM FRONT CASE

Remove the set bolt and oil receiver.

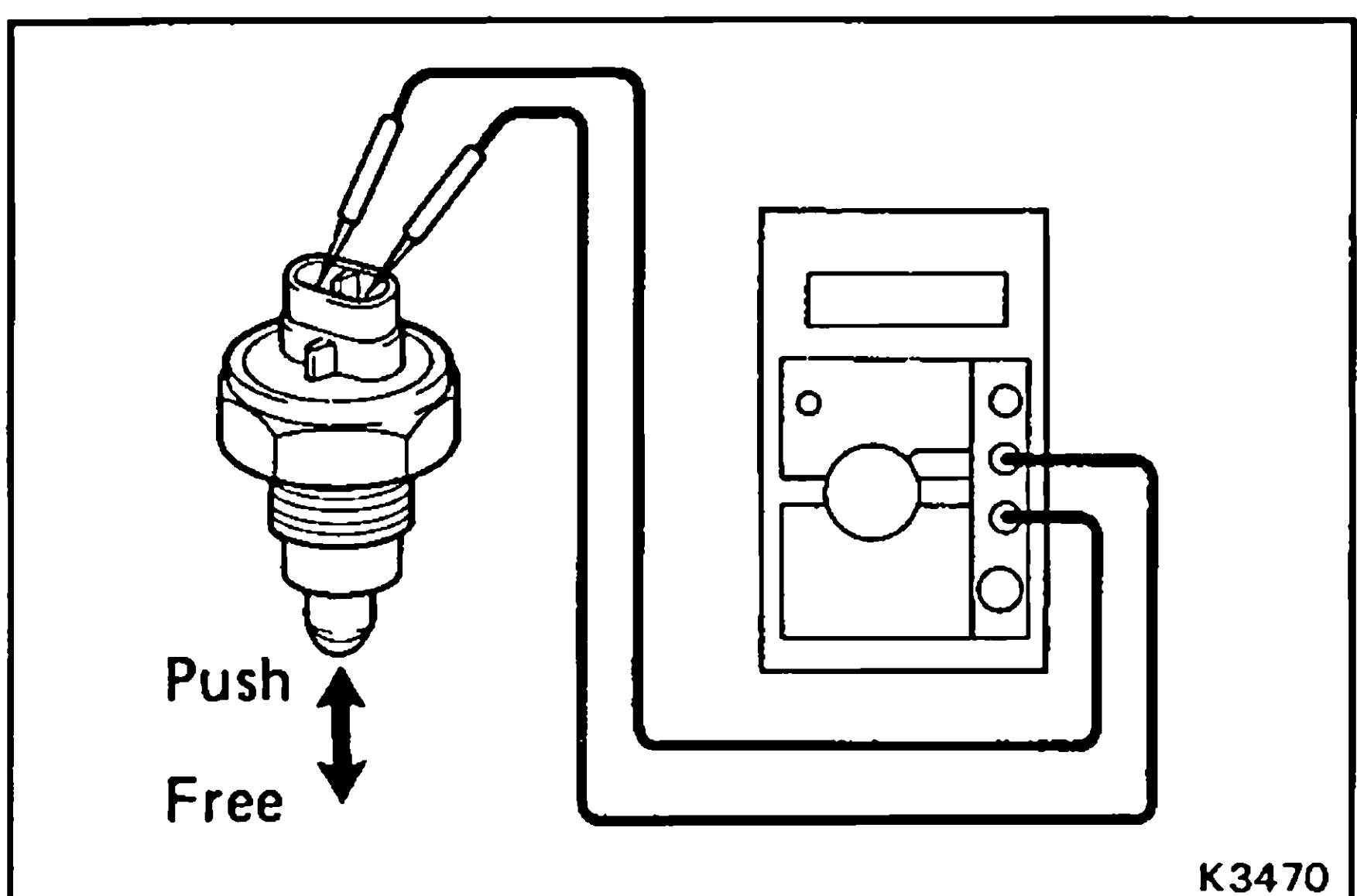


26. REMOVE TWO BEARING RACES FROM FRONT CASE

- (a) Using SST, remove the bearing race.
SST 09950-20017



- (b) Using a brass bar and hammer, remove the bearing race.



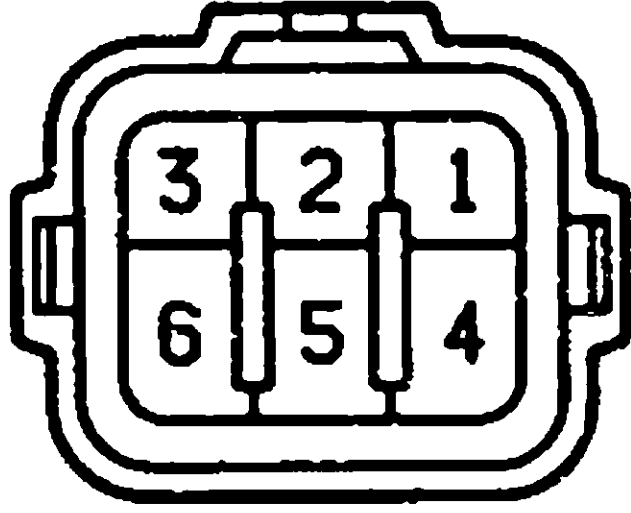
27. INSPECTION OF TRANSFER INDICATOR SWITCH

Check that there is continuity between terminals as shown.

Switch Position	Specified
Push	Continuity
Free	No continuity

If operation is not as specified, replace the switch.

Motor Actuator Side



IS-6-2

28. INSPECT MOTOR ACTUATOR

- (a) Using an ohmmeter, measure the resistance between terminals 2 and 3.

Standard resistance: 0.3 — 100 Ω

- (b) Using an ohmmeter, measure the resistance between terminals 2 or 3 and body ground.

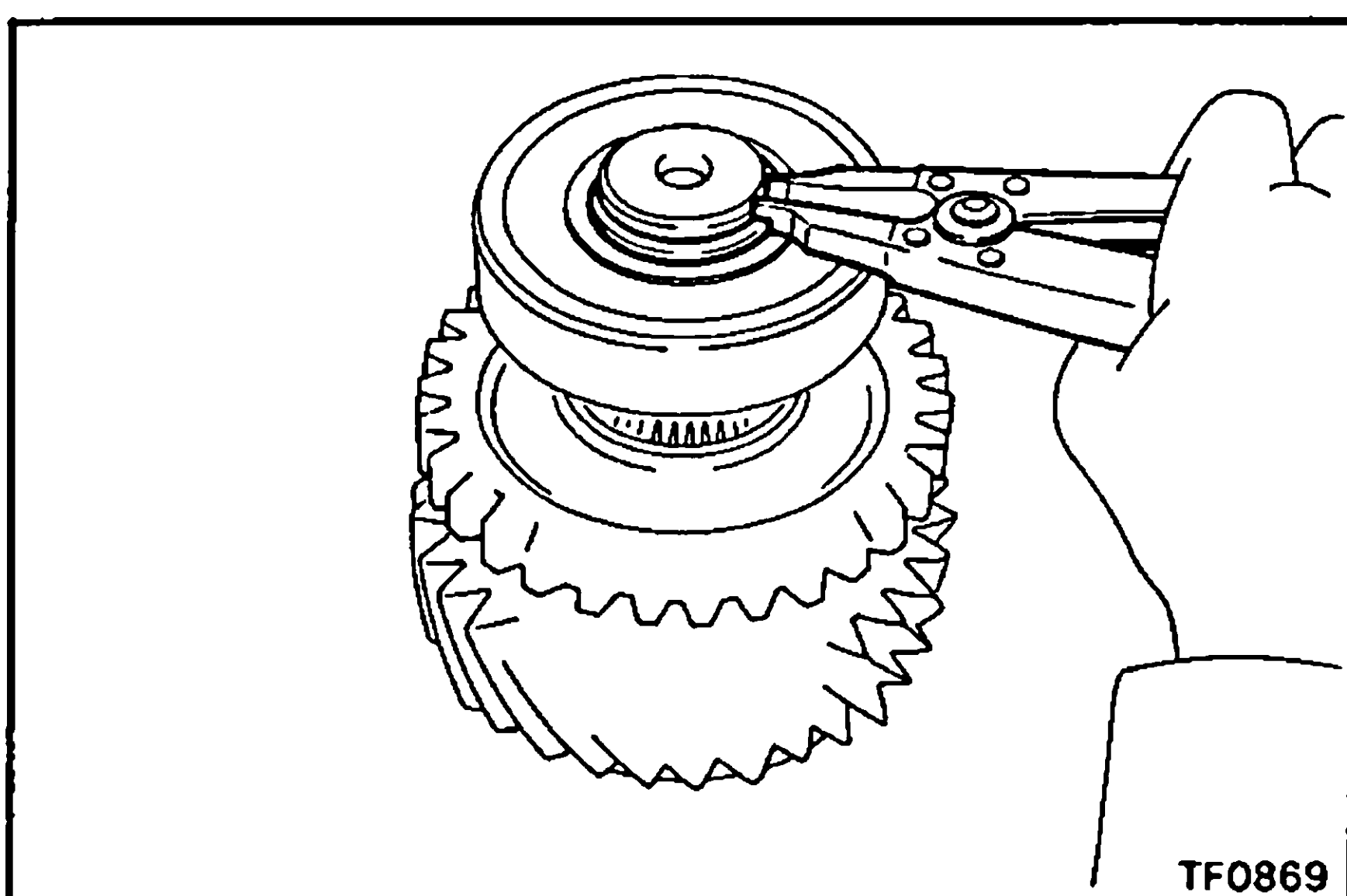
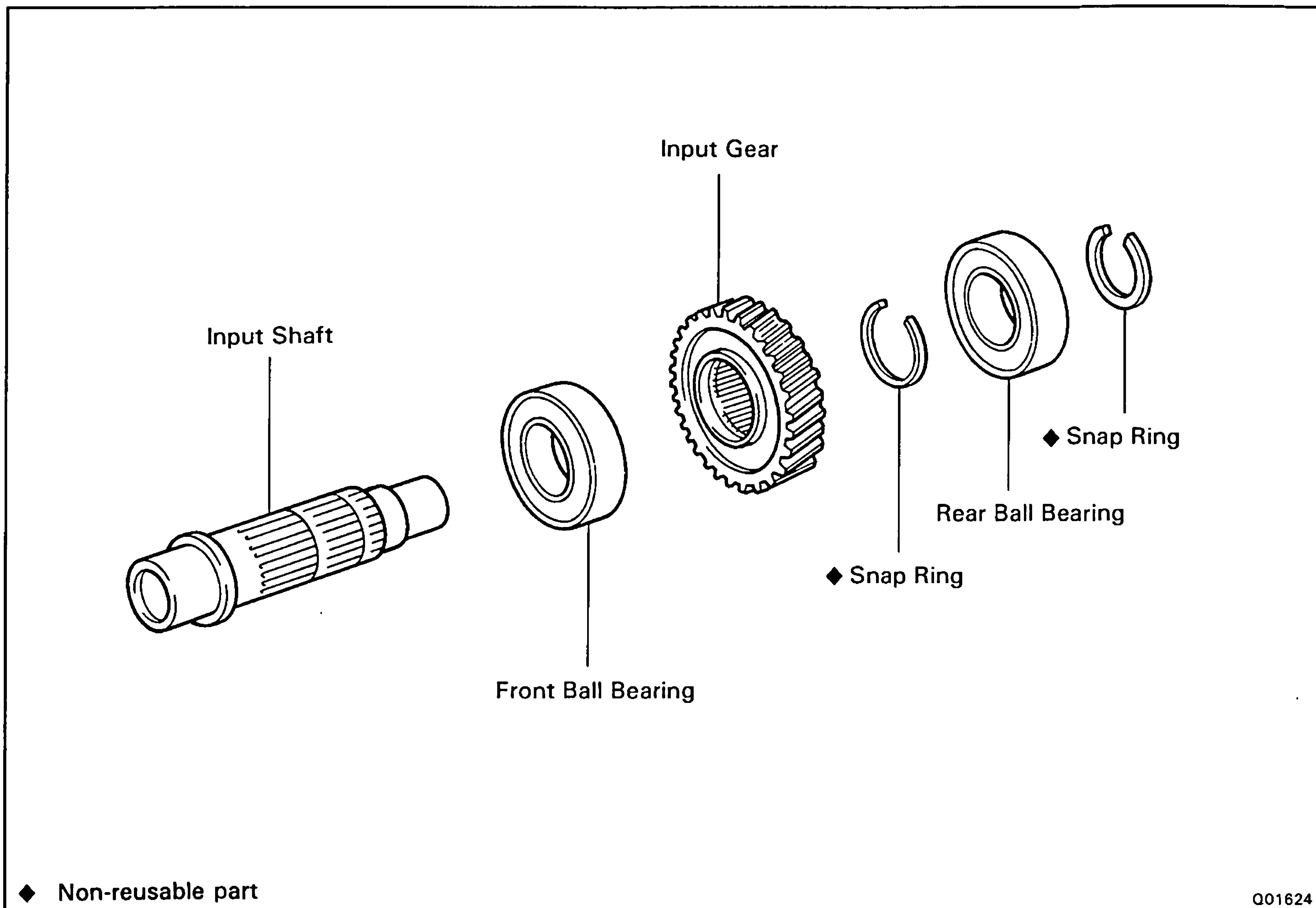
Standard resistance: More than 0.5 M Ω

If resistance value is not as specified, replace the motor actuator.

COMPONENT PARTS

Input Shaft Assembly

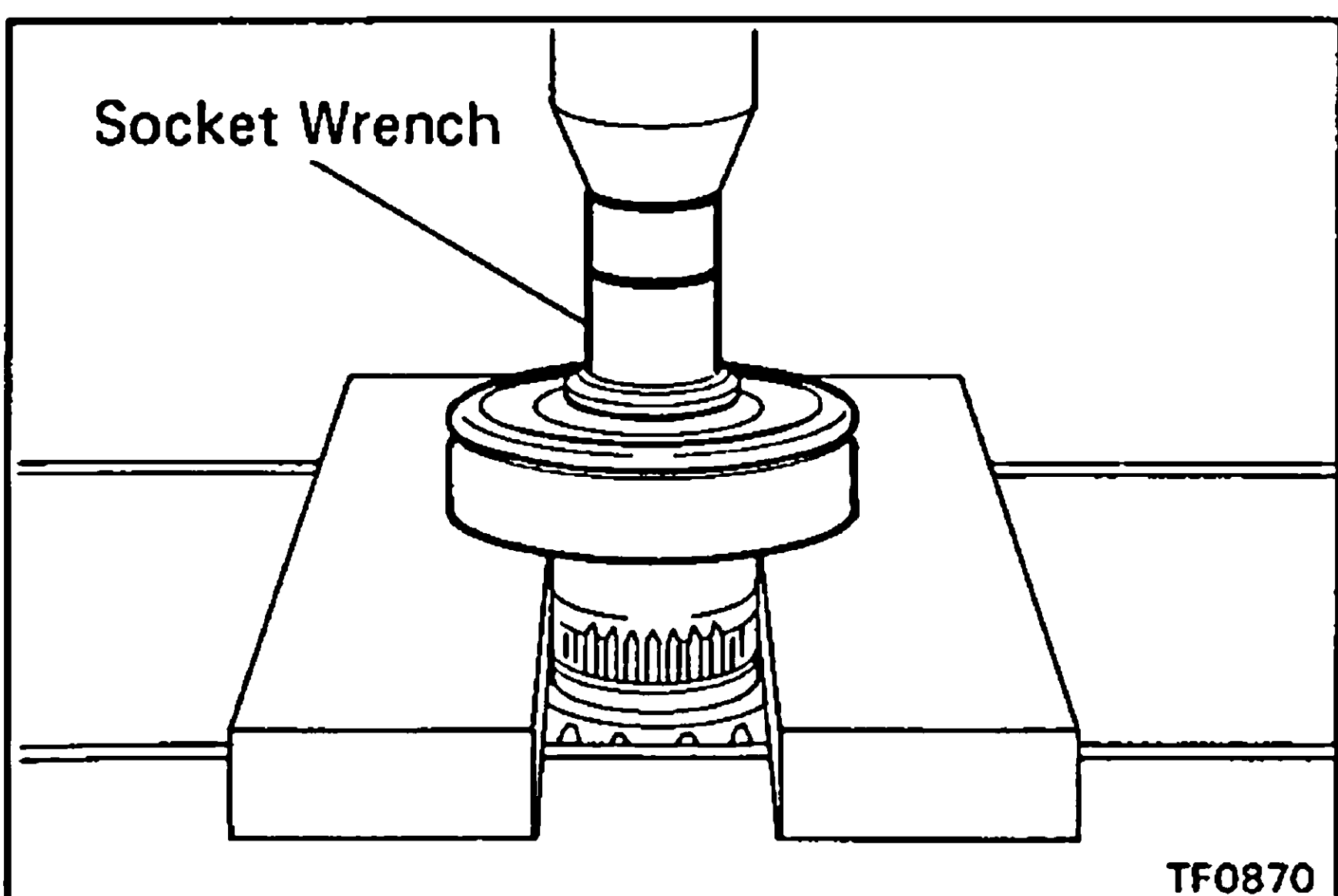
COMPONENTS



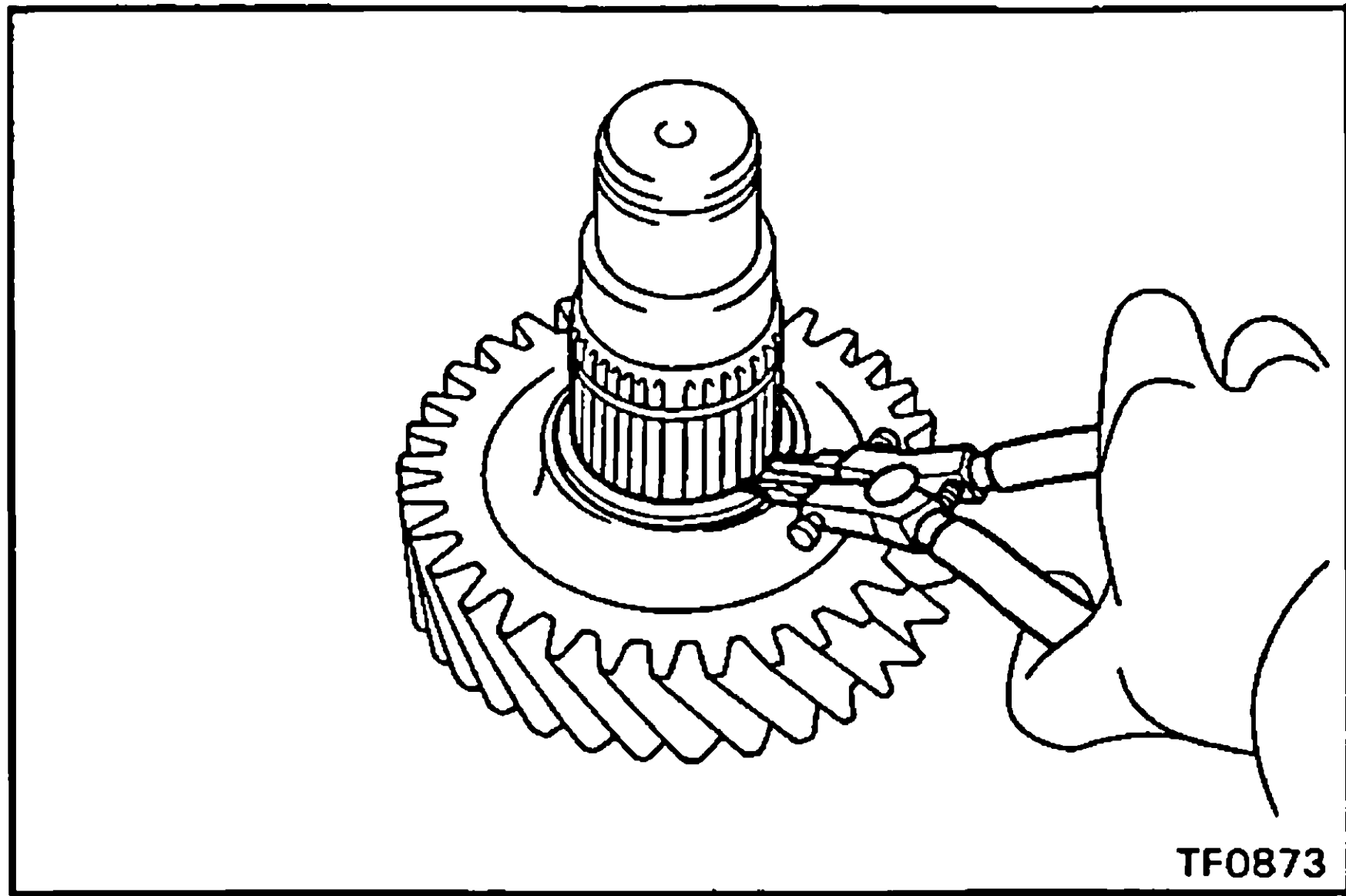
DISASSEMBLY OF INPUT SHAFT ASSEMBLY

1. REMOVE REAR BALL BEARING

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

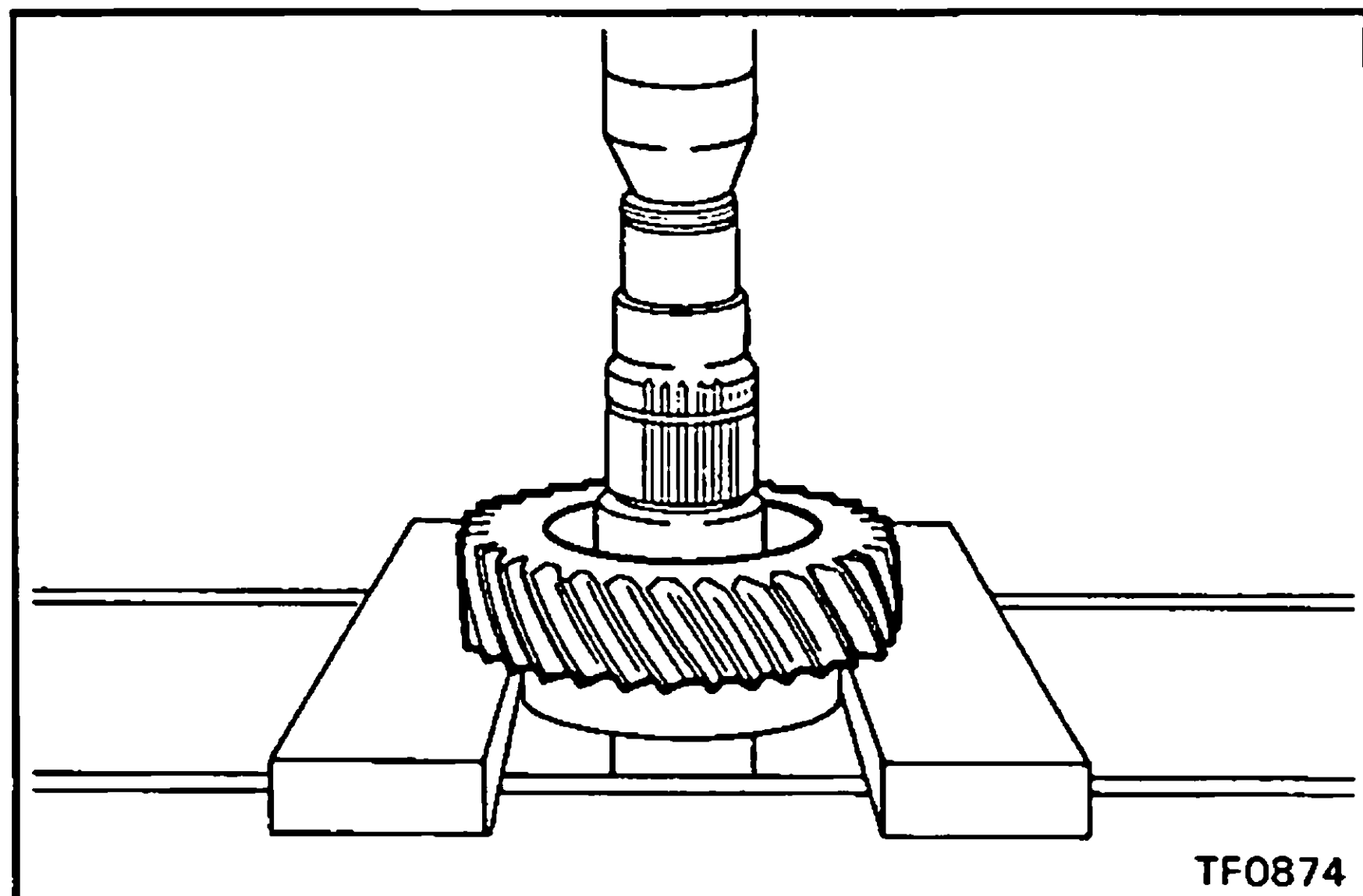


(b) Using a press and socket wrench, remove the rear ball bearing.

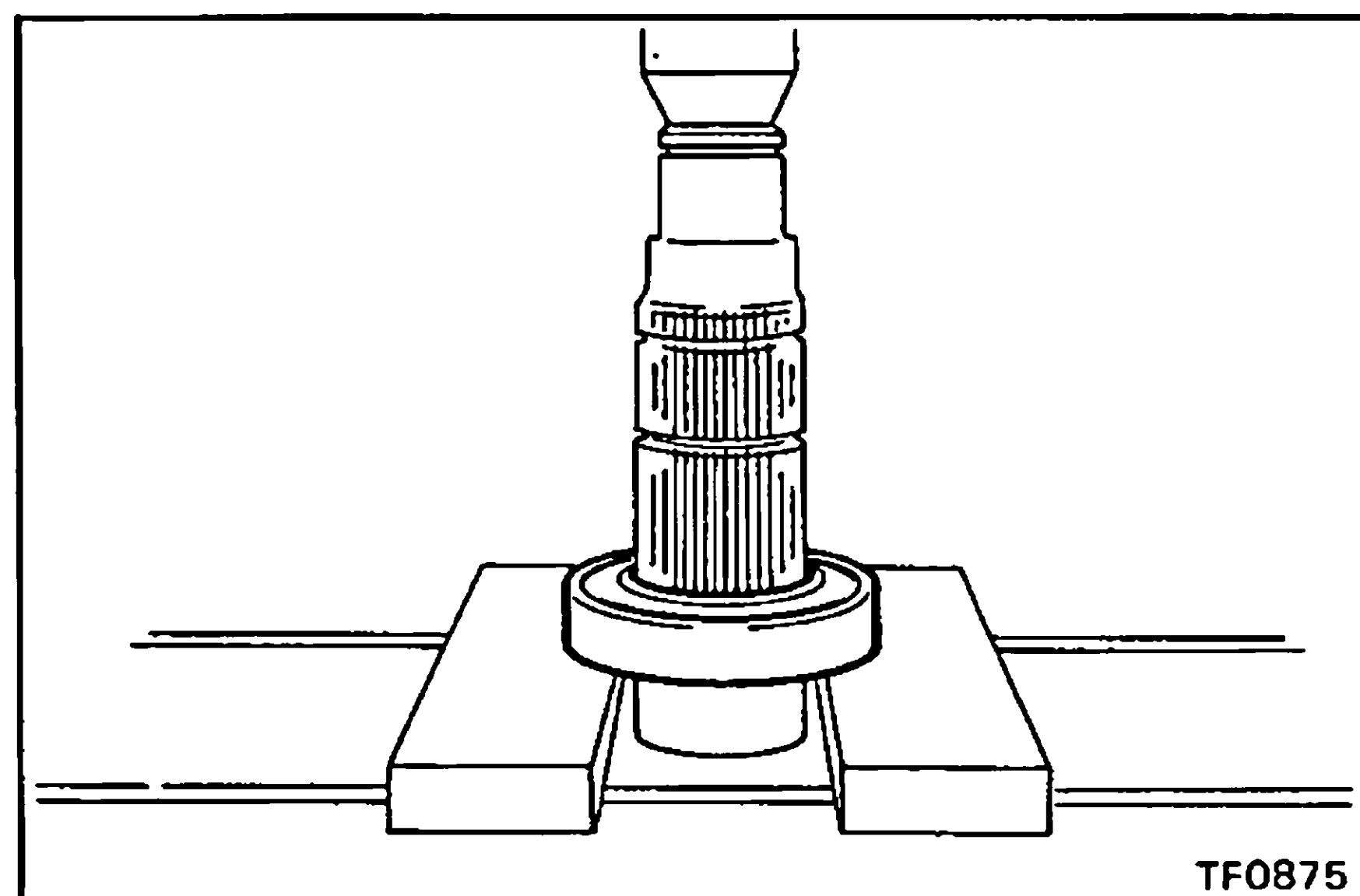


2. REMOVE INPUT GEAR

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

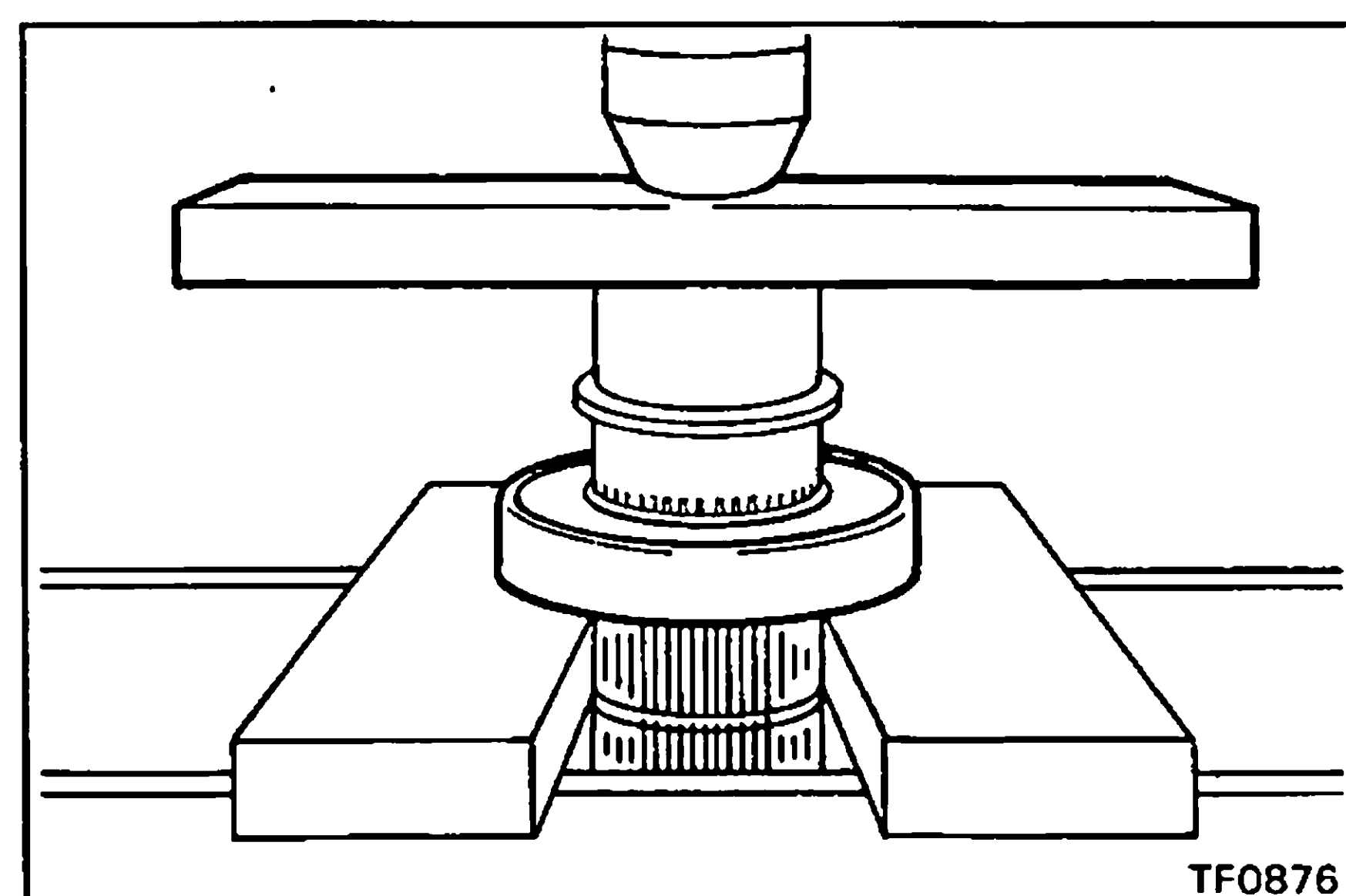


(b) Using a press, remove the input gear.



3. REMOVE FRONT BALL BEARING

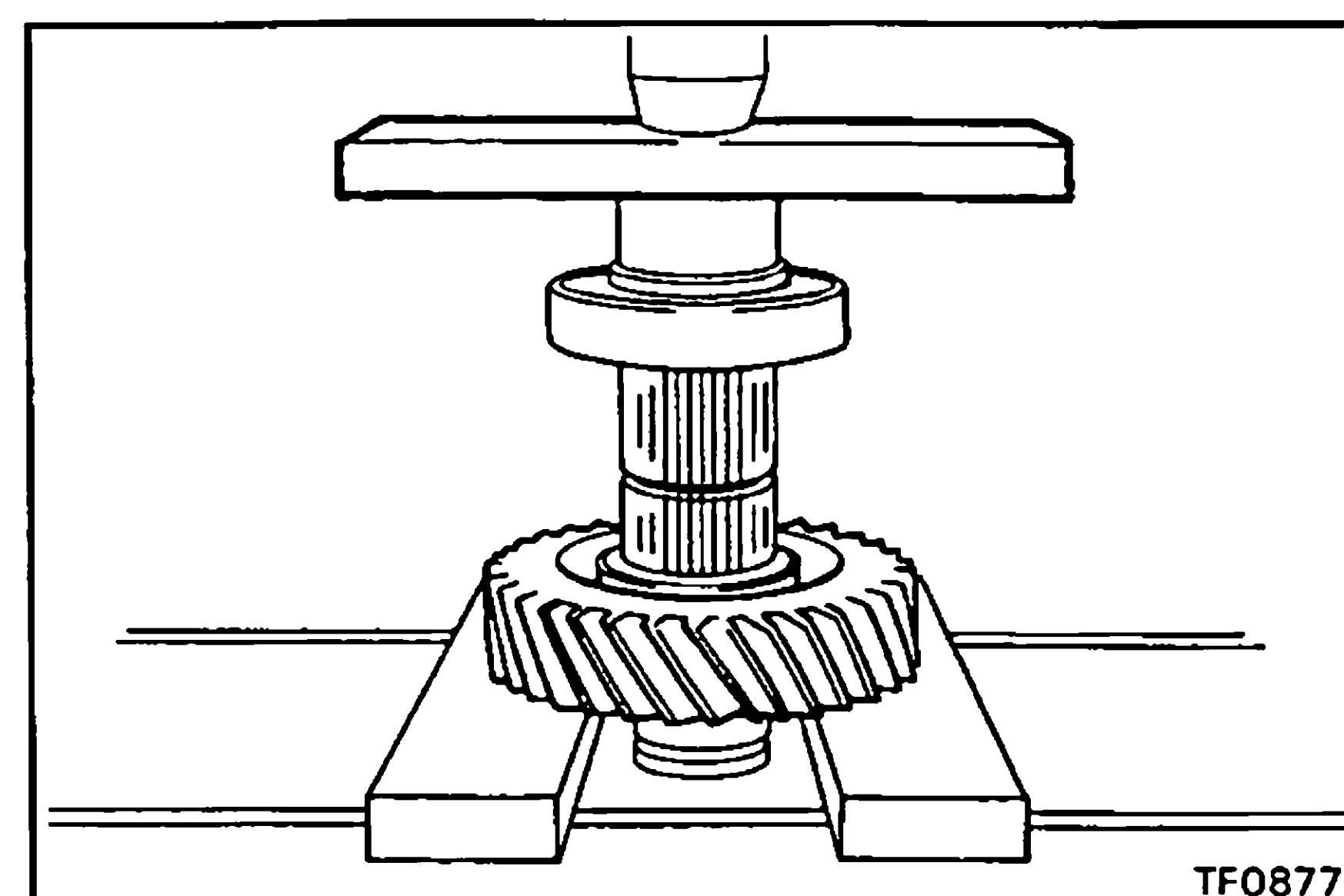
Using a press, remove the front ball bearing.



ASSEMBLY OF INPUT SHAFT ASSEMBLY

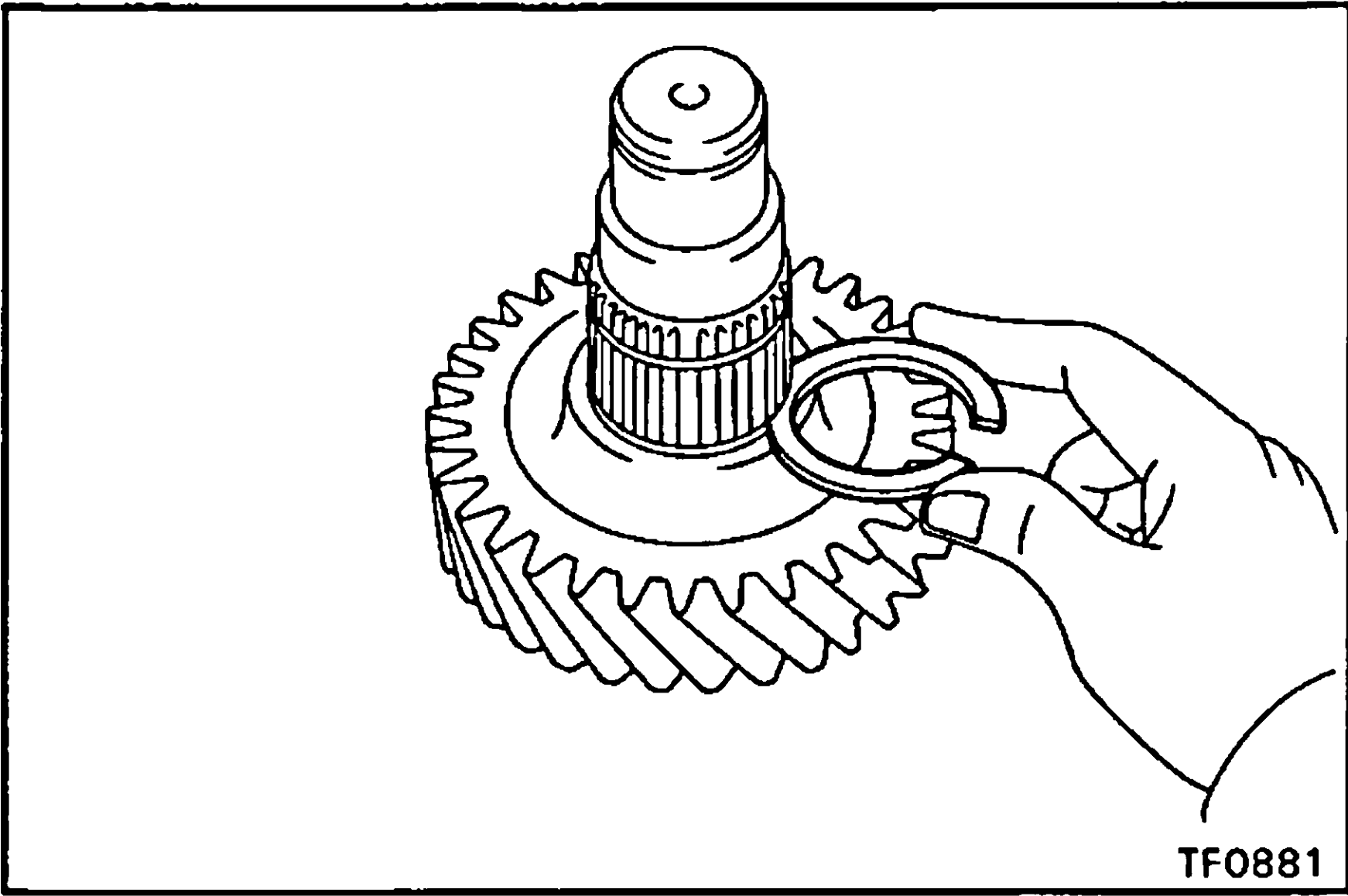
1. INSTALL FRONT BALL BEARING

Using a press, install the front ball bearing.



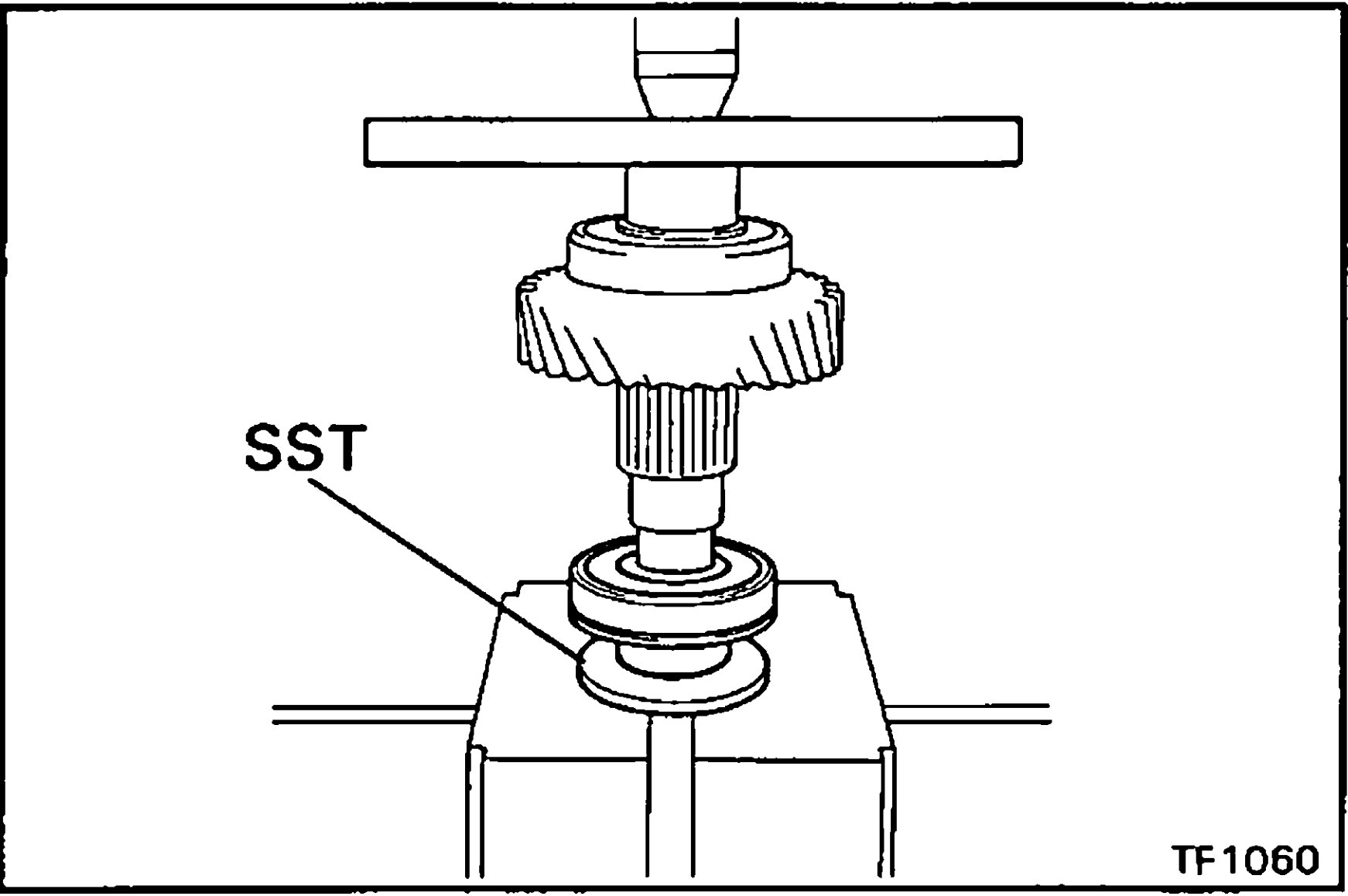
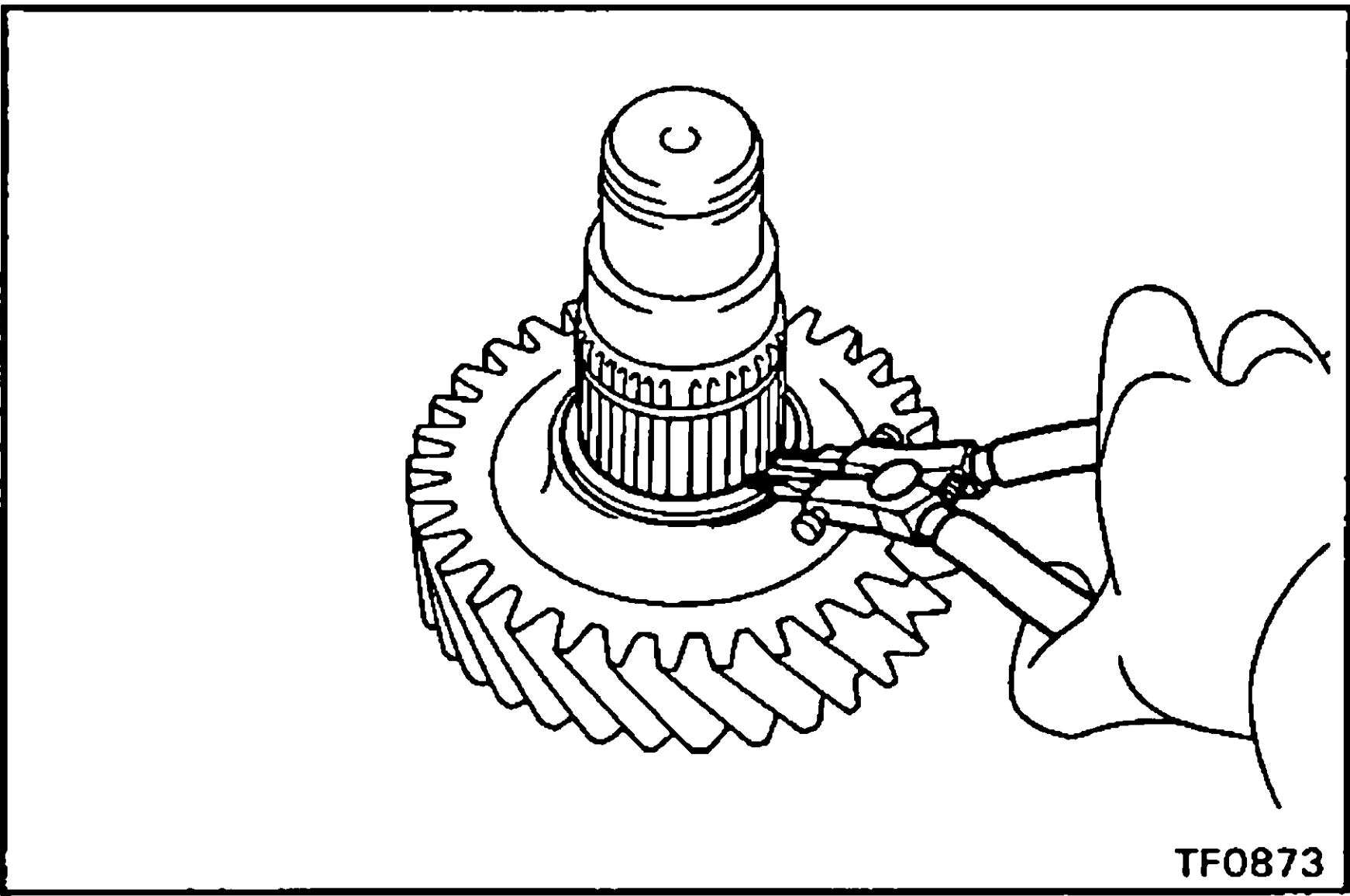
2. INSTALL INPUT GEAR

(a) Using a press, install the input gear.



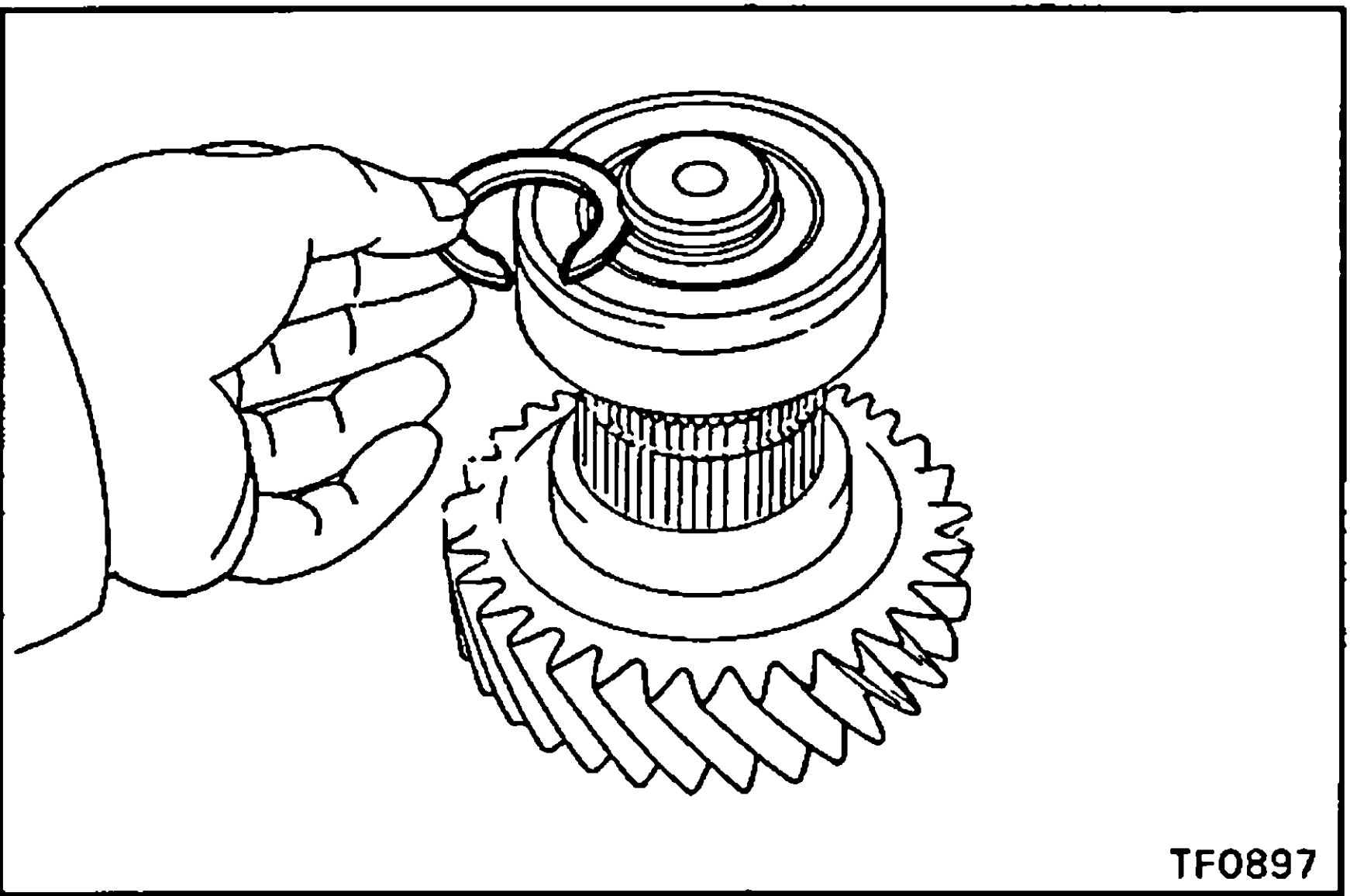
(b) Select a snap ring that will allow minimum axial play and install it on the shaft.

Mark	Thickness mm (in.)
A	2.0 (0.0787)
B	2.1 (0.0827)
C	2.2 (0.0866)
D	2.3 (0.0906)
E	2.4 (0.0945)
F	2.5 (0.0984)
G	2.6 (0.1024)
H	2.7 (0.1063)
J	2.8 (0.1102)



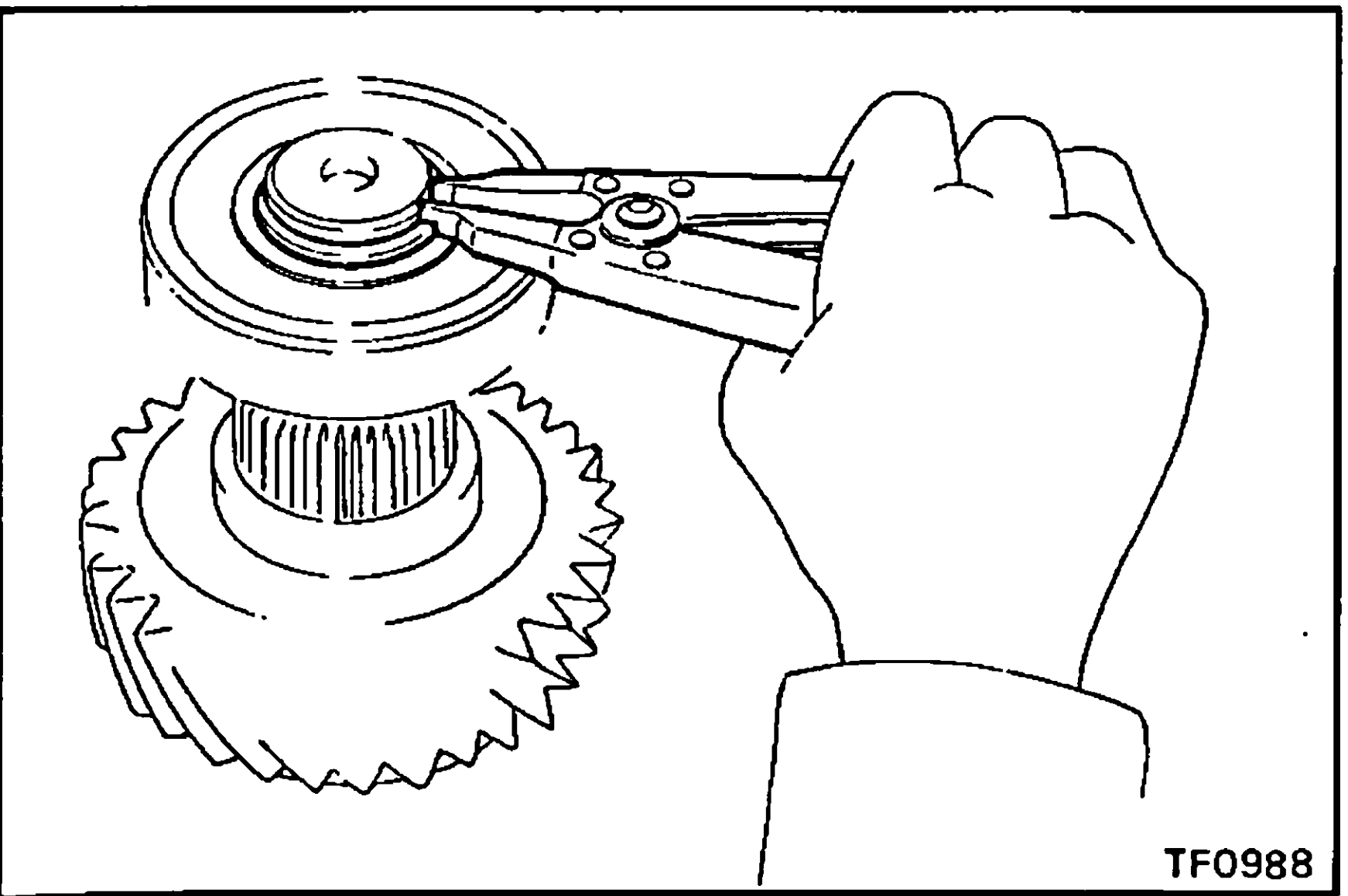
3. INSTALL REAR BALL BEARING

(a) Using SST and a press, install the rear ball bearing. SST 09316-60010 (09316-00030)



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

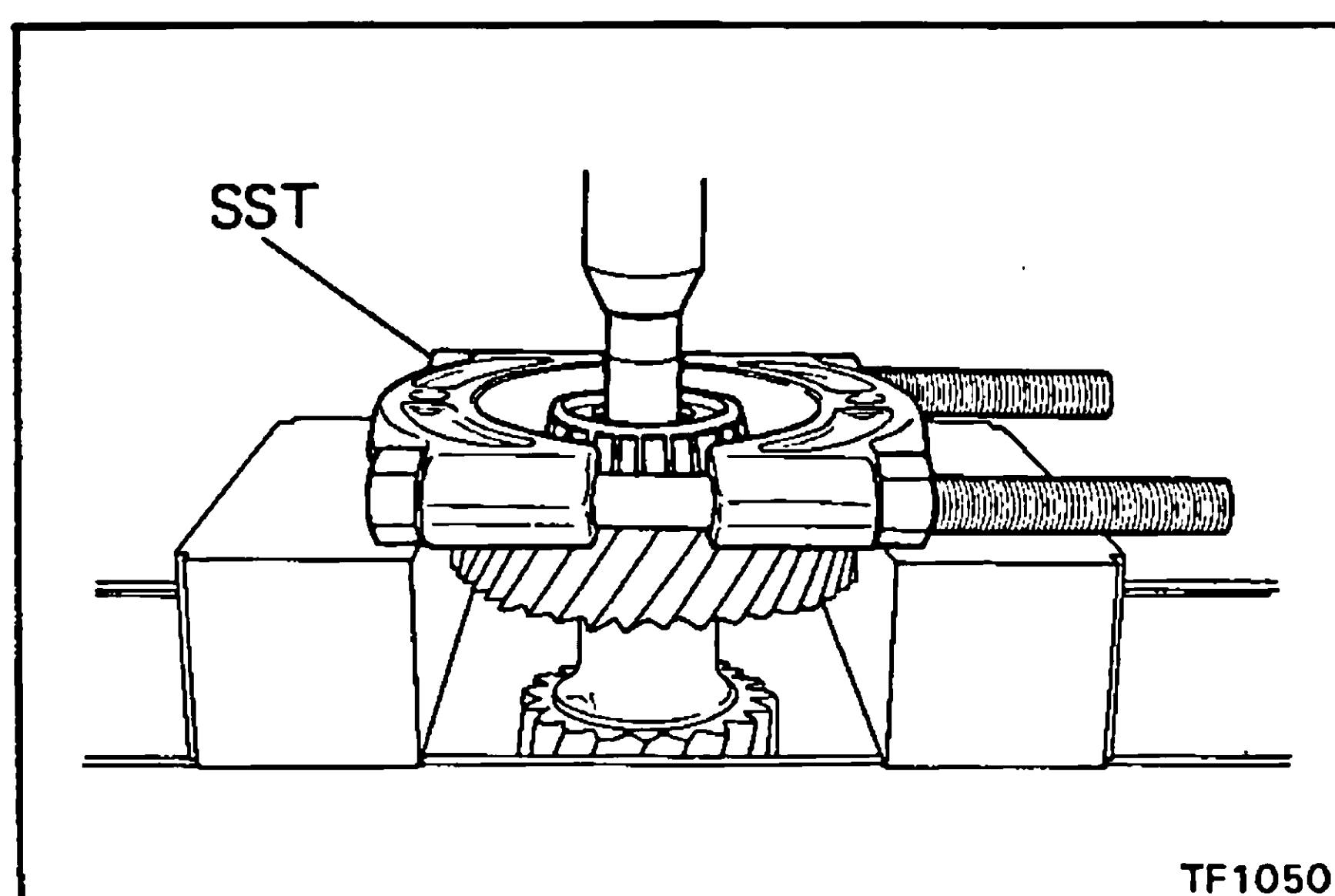
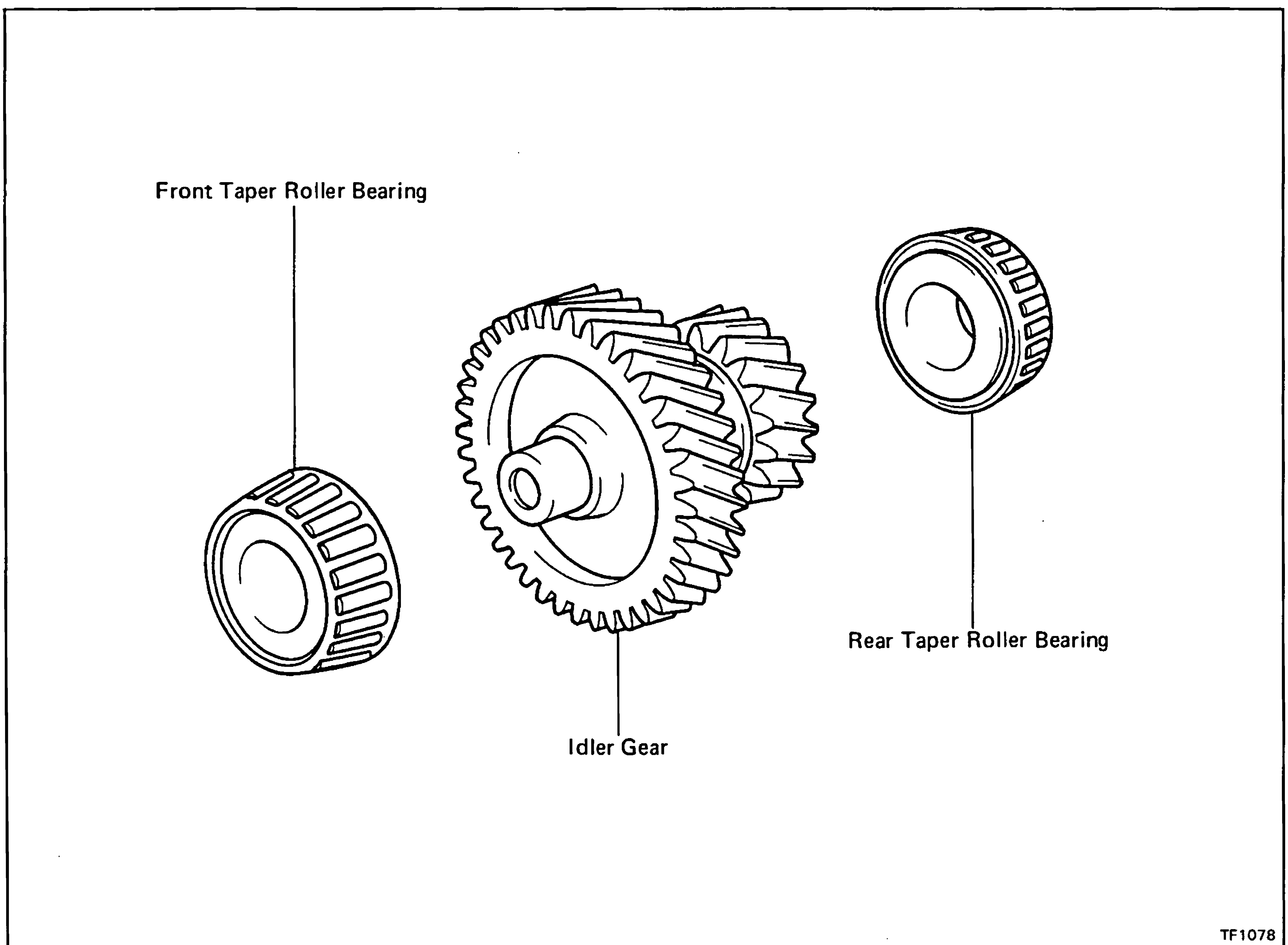
Mark	Thickness mm (in.)
A	2.0 (0.0787)
B	2.1 (0.0827)
C	2.2 (0.0866)
D	2.3 (0.0906)
E	2.4 (0.0945)



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

Idler Gear Assembly

COMPONENTS

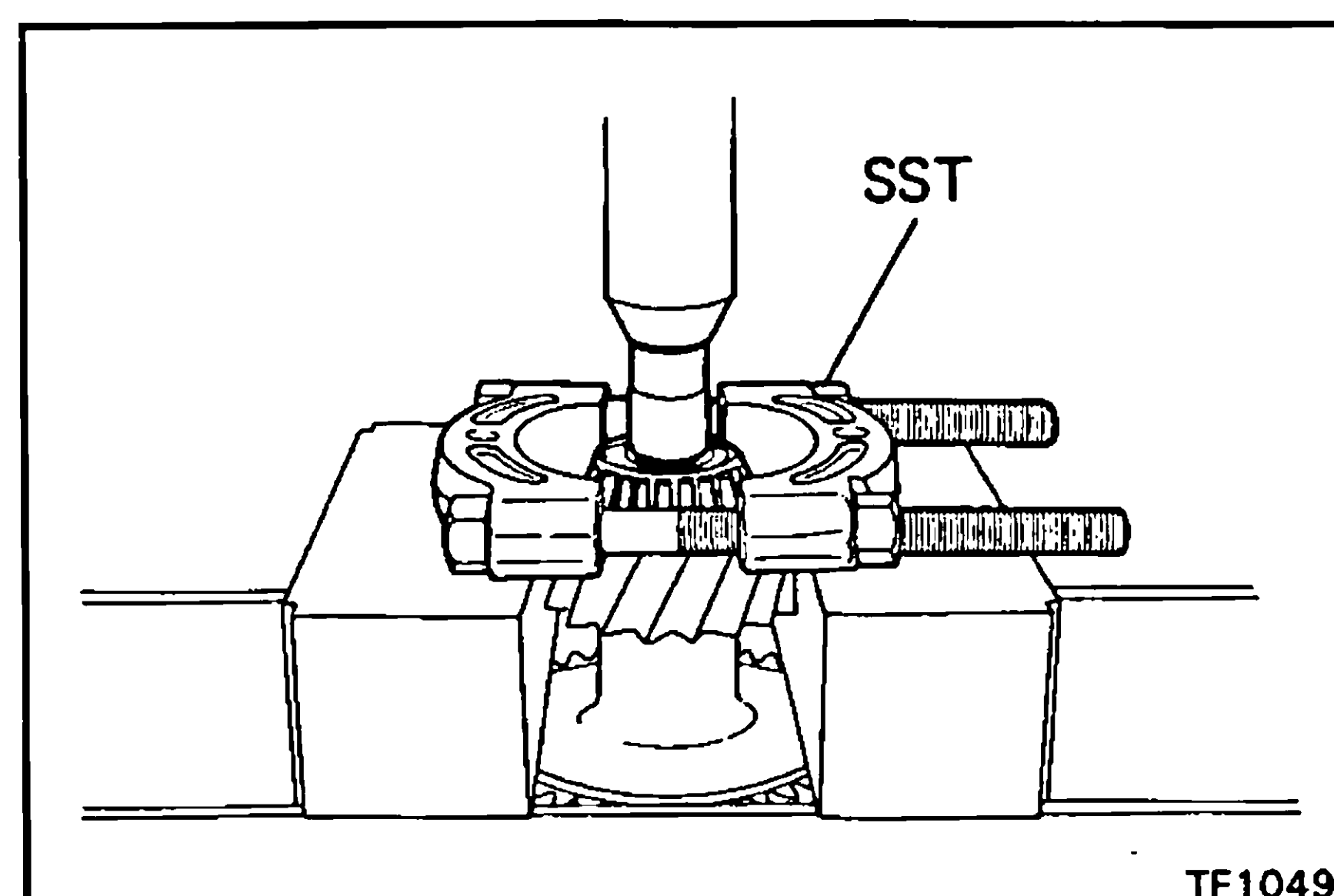


DISASSEMBLY OF IDLER GEAR ASSEMBLY

1. REMOVE FRONT TAPER ROLLER BEARING

Using SST, press and socket wrench, remove the front taper roller bearing.

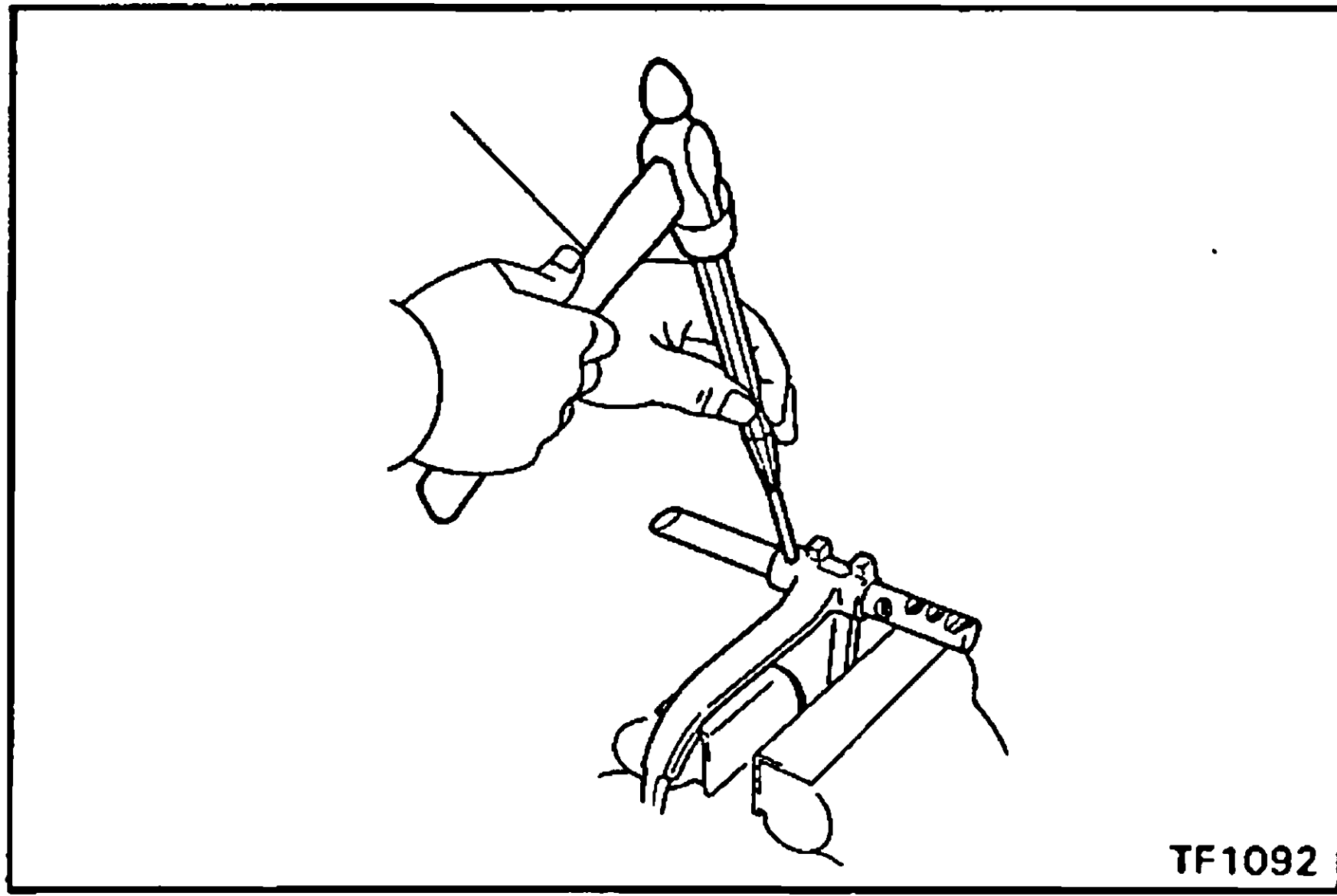
SST 09555-55010



2. REMOVE REAR TAPER ROLLER BEARING

Using SST, press and socket wrench, remove the rear taper roller bearing.

SST 09950-00020

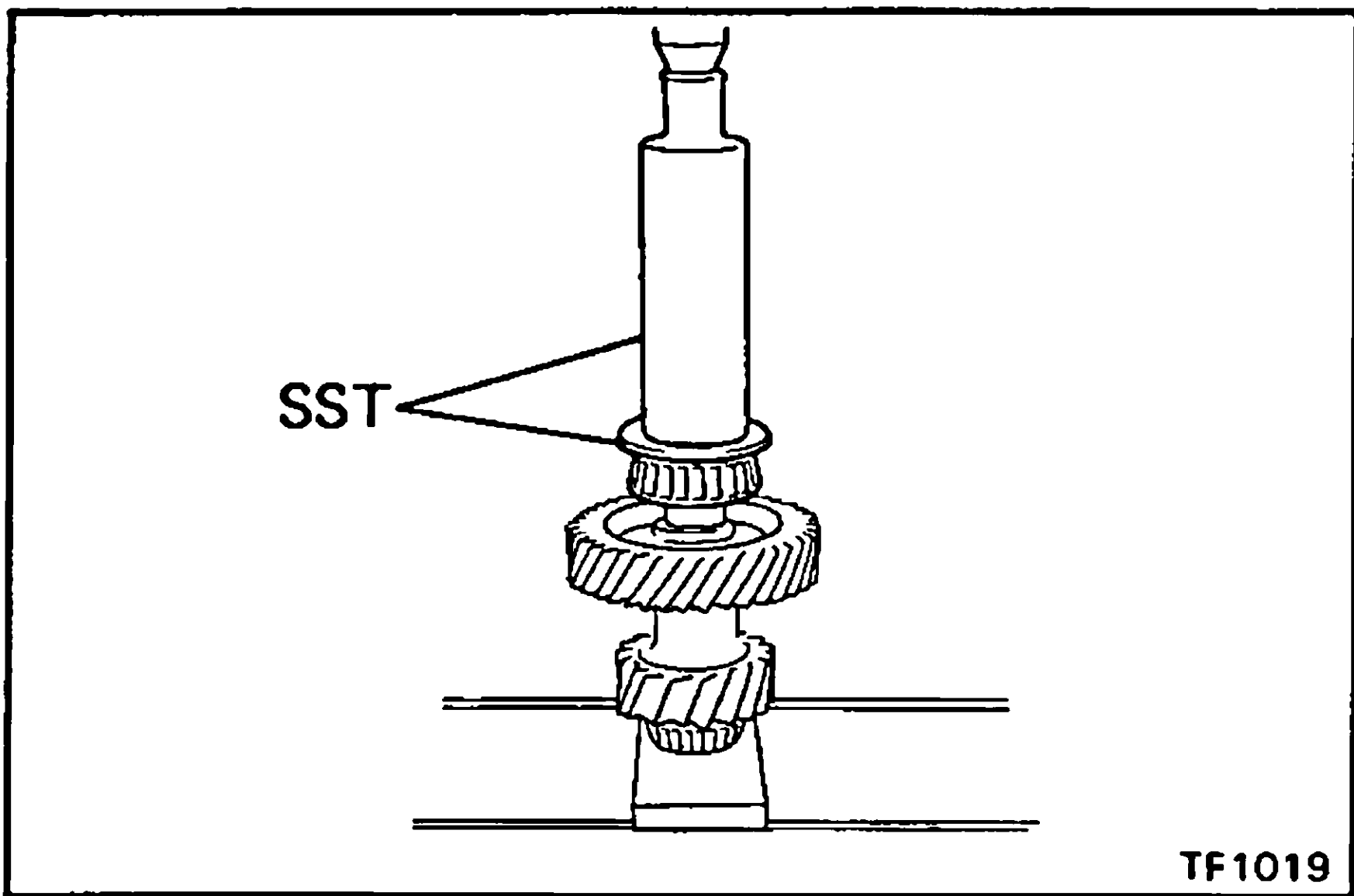


ASSEMBLY OF IDLER GEAR ASSEMBLY

1. INSTALL REAR TAPER ROLLER BEARING

Using SST and a press, install the rear taper roller bearing.

SST 09316-60010 (09316-00010, 09316-00070)



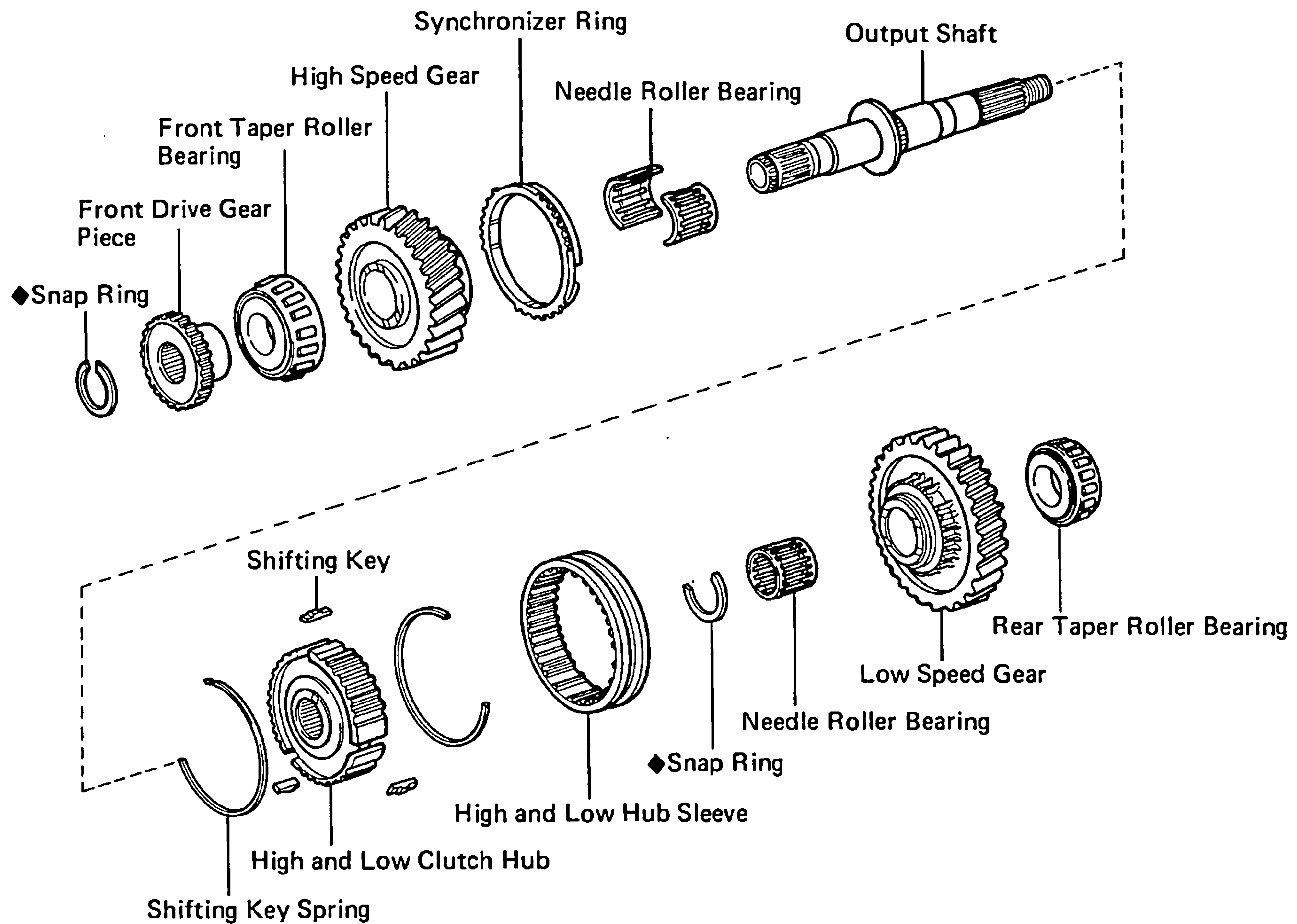
2. INSTALL FRONT TAPER ROLLER BEARING

Using SST and a press, install the front taper roller bearing.

SST 09316-60010 (09316-00010, 09316-00050)

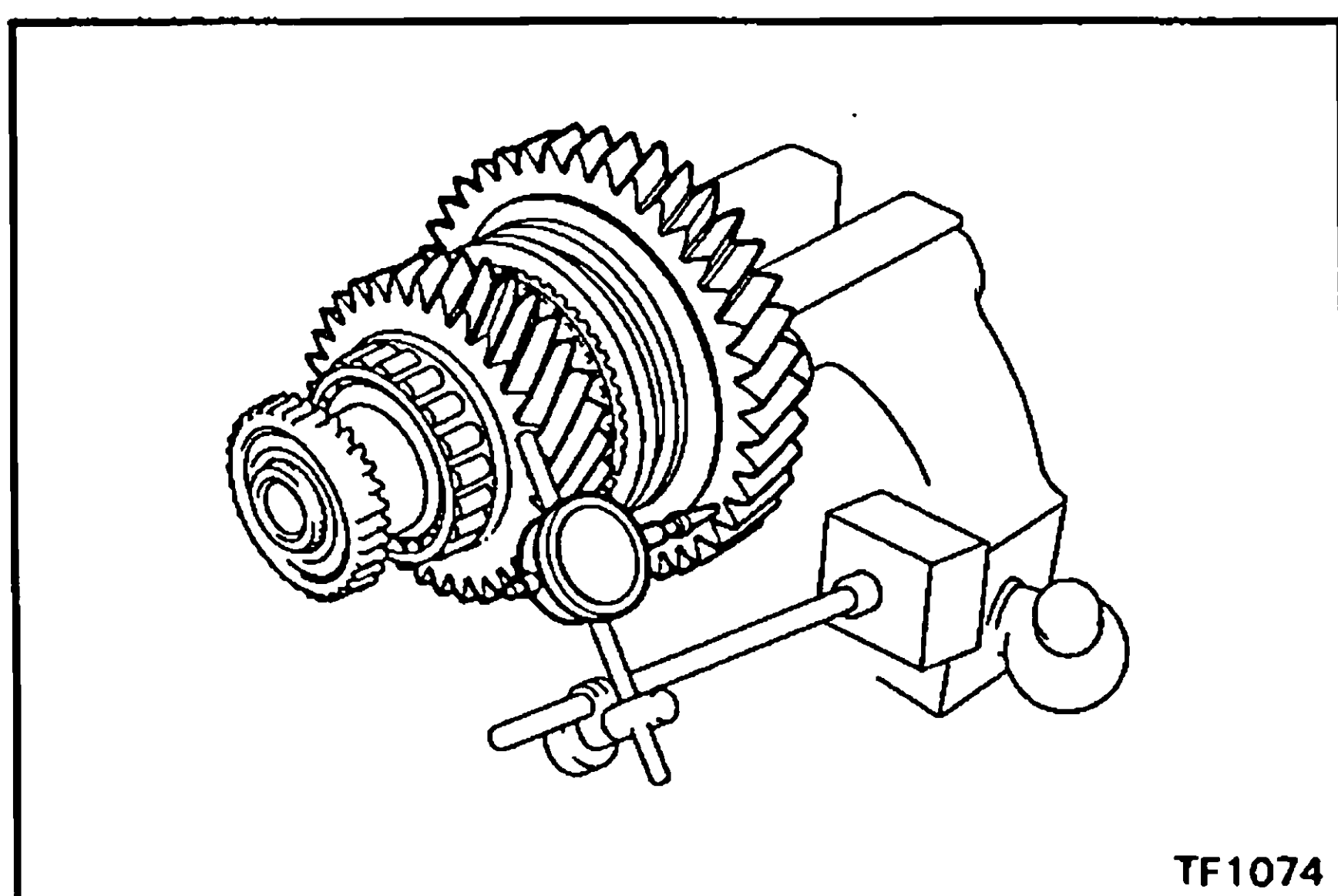
Output Shaft Assembly

COMPONENTS



◆ Non-reusable part

TF1055



TF1074

DISASSEMBLY OF OUTPUT SHAFT ASSEMBLY

1. MEASURE EACH GEAR THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance of high speed gear and low speed gear.

High speed gear

Standard clearance: 0.28 – 0.43 mm
(0.0110 – 0.0169 in.)

Maximum clearance: 0.43 mm (0.0169 in.)

Low speed gear

Standard clearance: 0.20 – 0.45 mm
(0.0079 – 0.0177 in.)

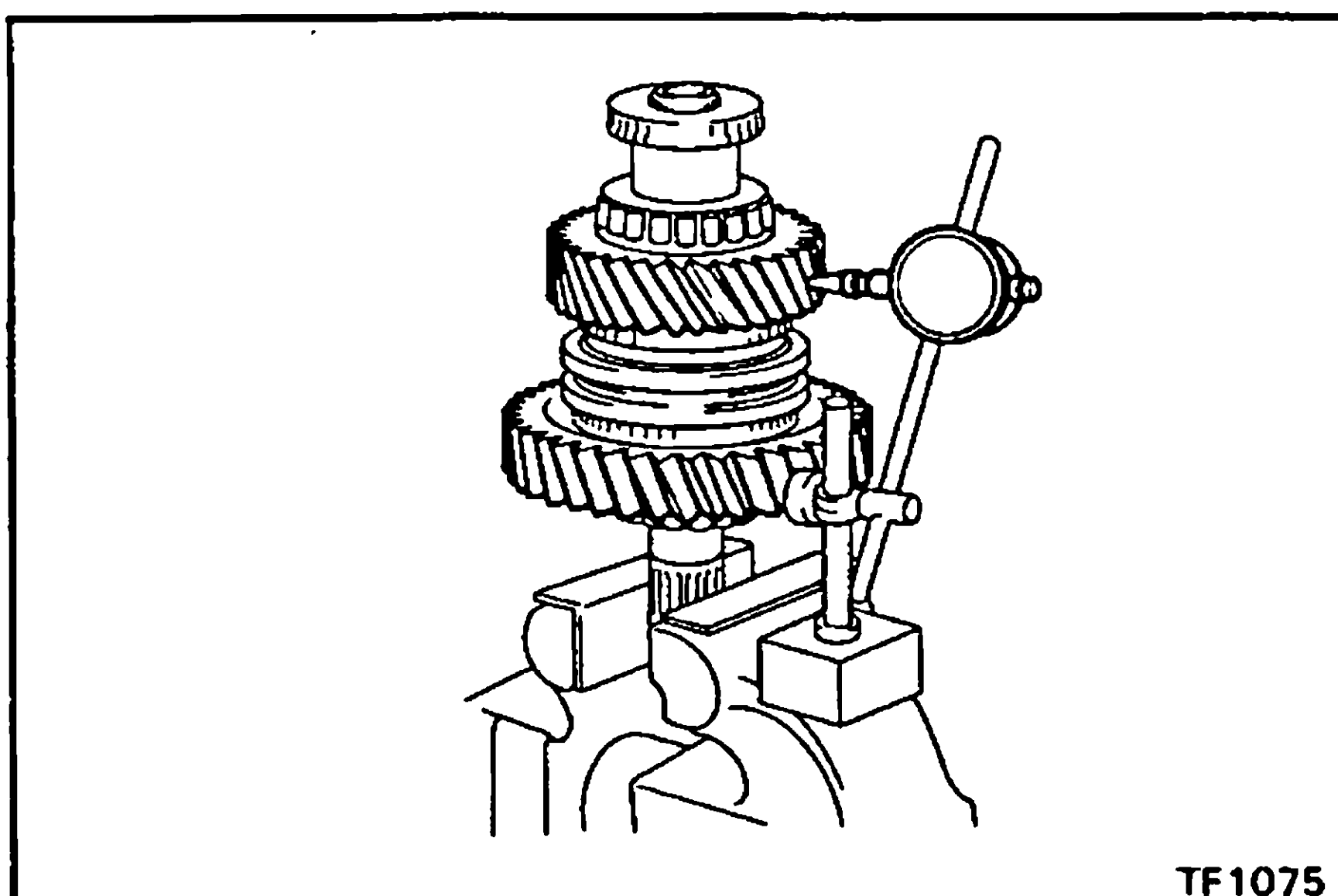
Maximum clearance: 0.45 mm (0.0177 in.)

2. MEASURE EACH GEAR OIL CLEARANCE

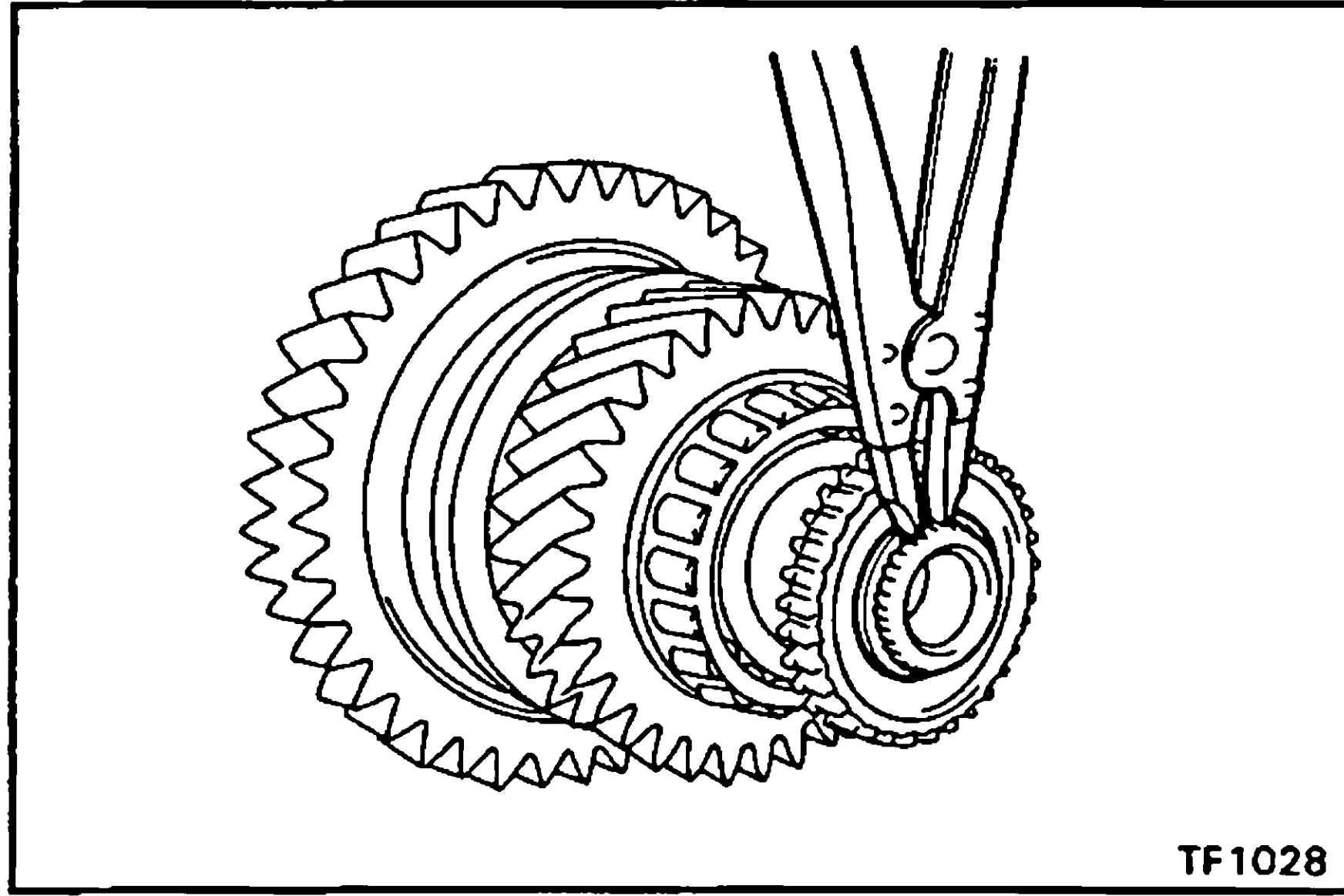
Using a dial indicator, measure the oil clearance of high speed gear and low speed gear.

Standard clearance: 0.0075 – 0.034 mm
(0.0003 – 0.0013 in.)

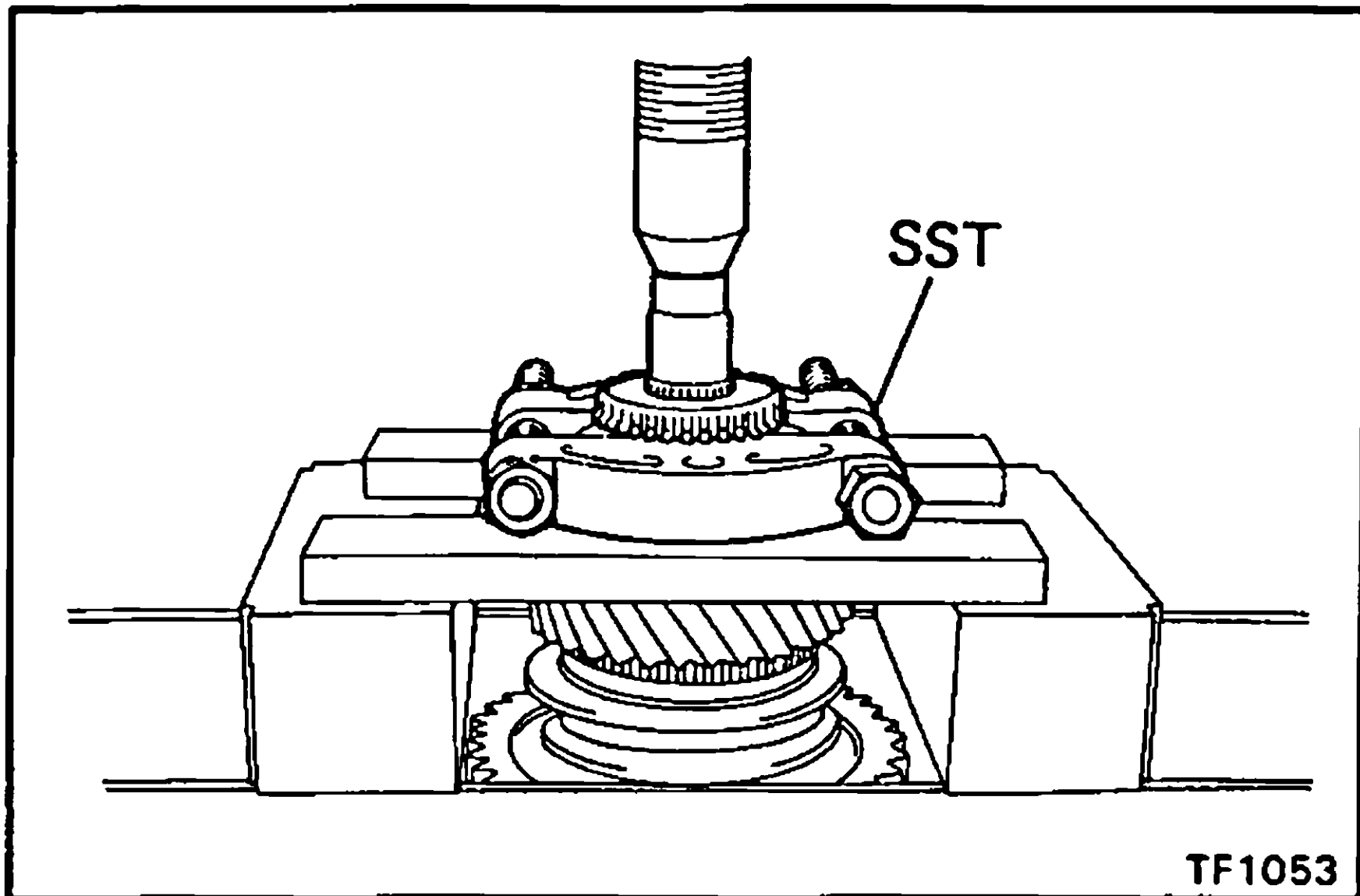
Maximum clearance: 0.034 mm (0.0013 in.)



TF1075

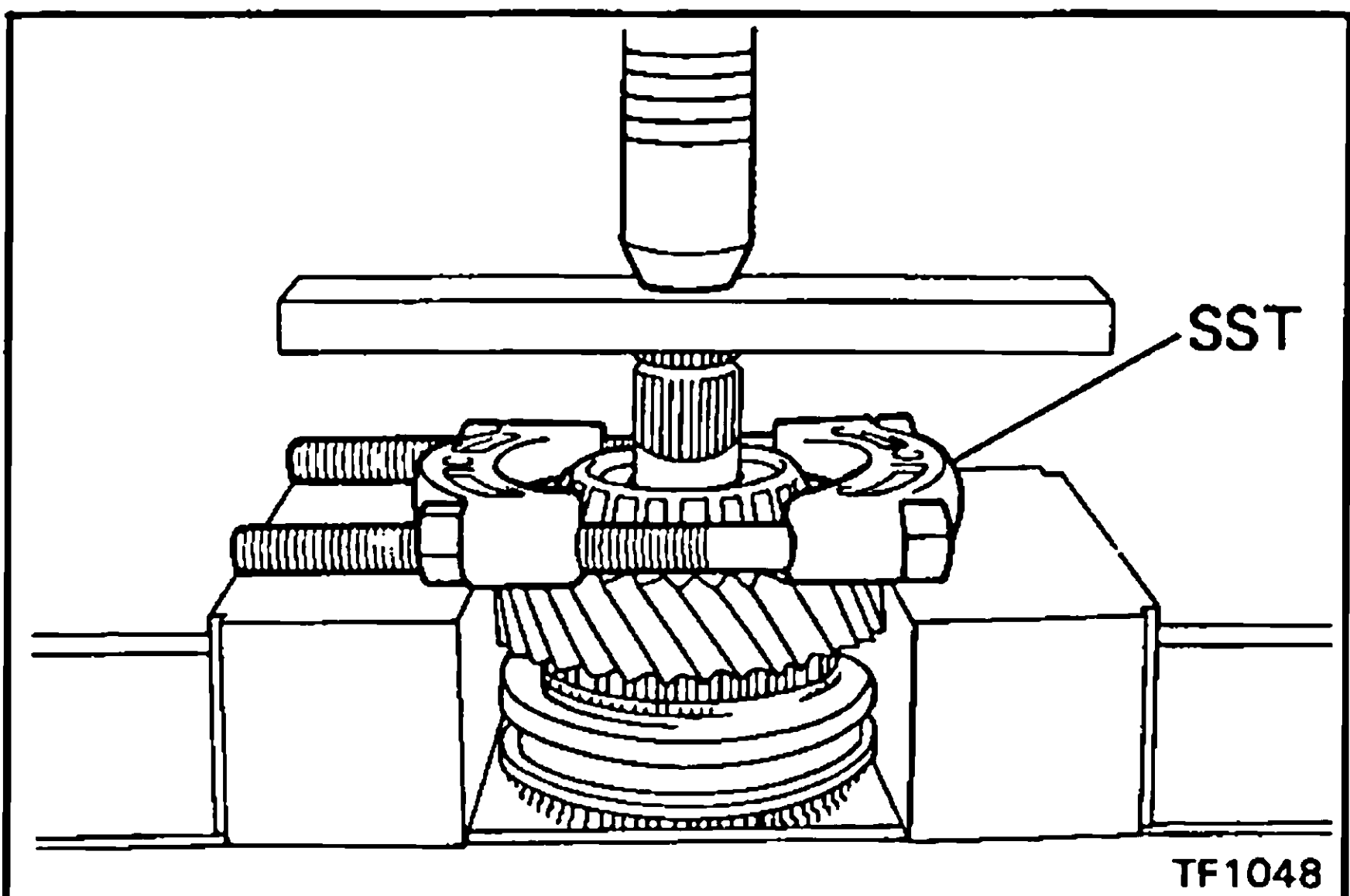
**3. REMOVE FRONT DRIVE GEAR PIECE**

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



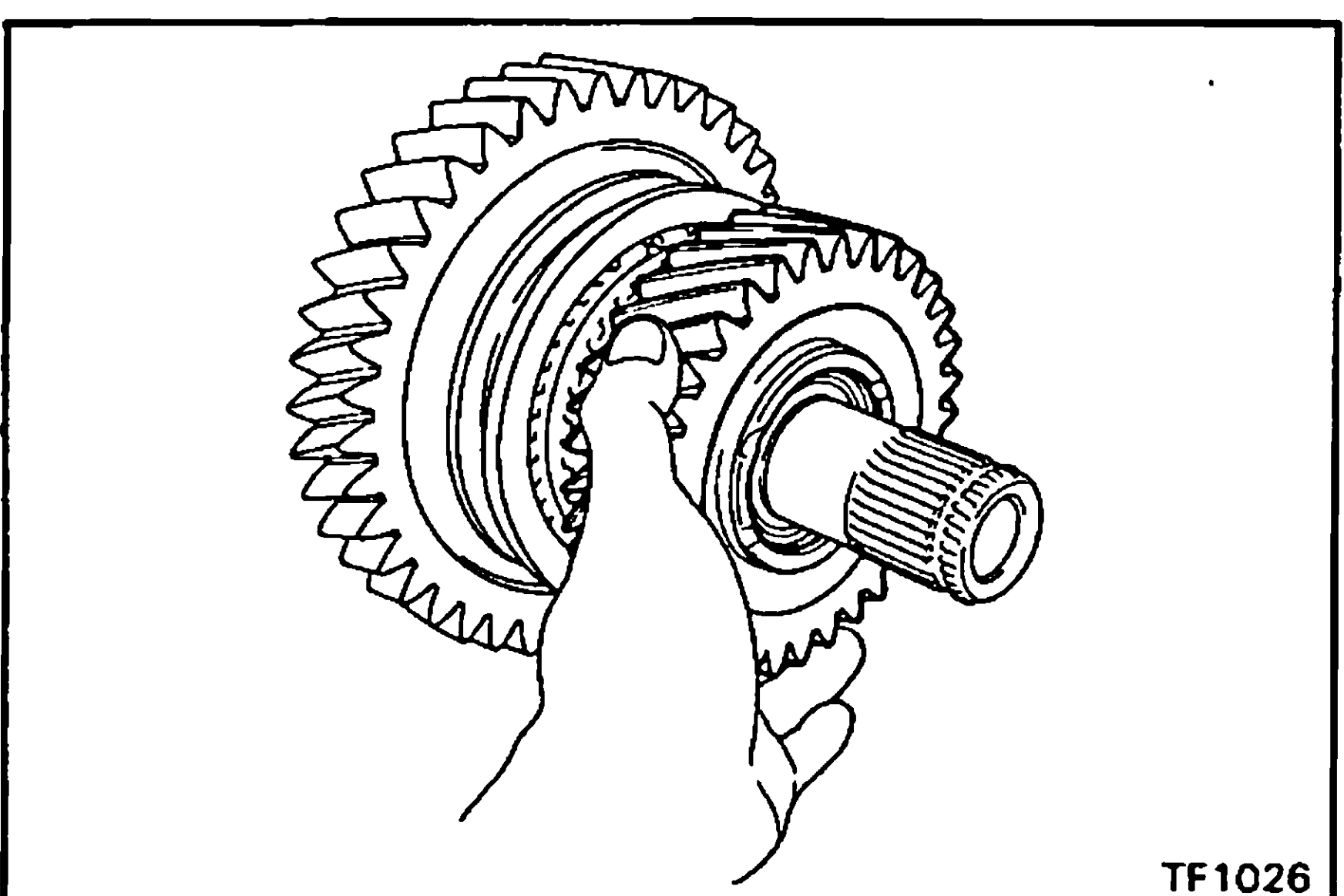
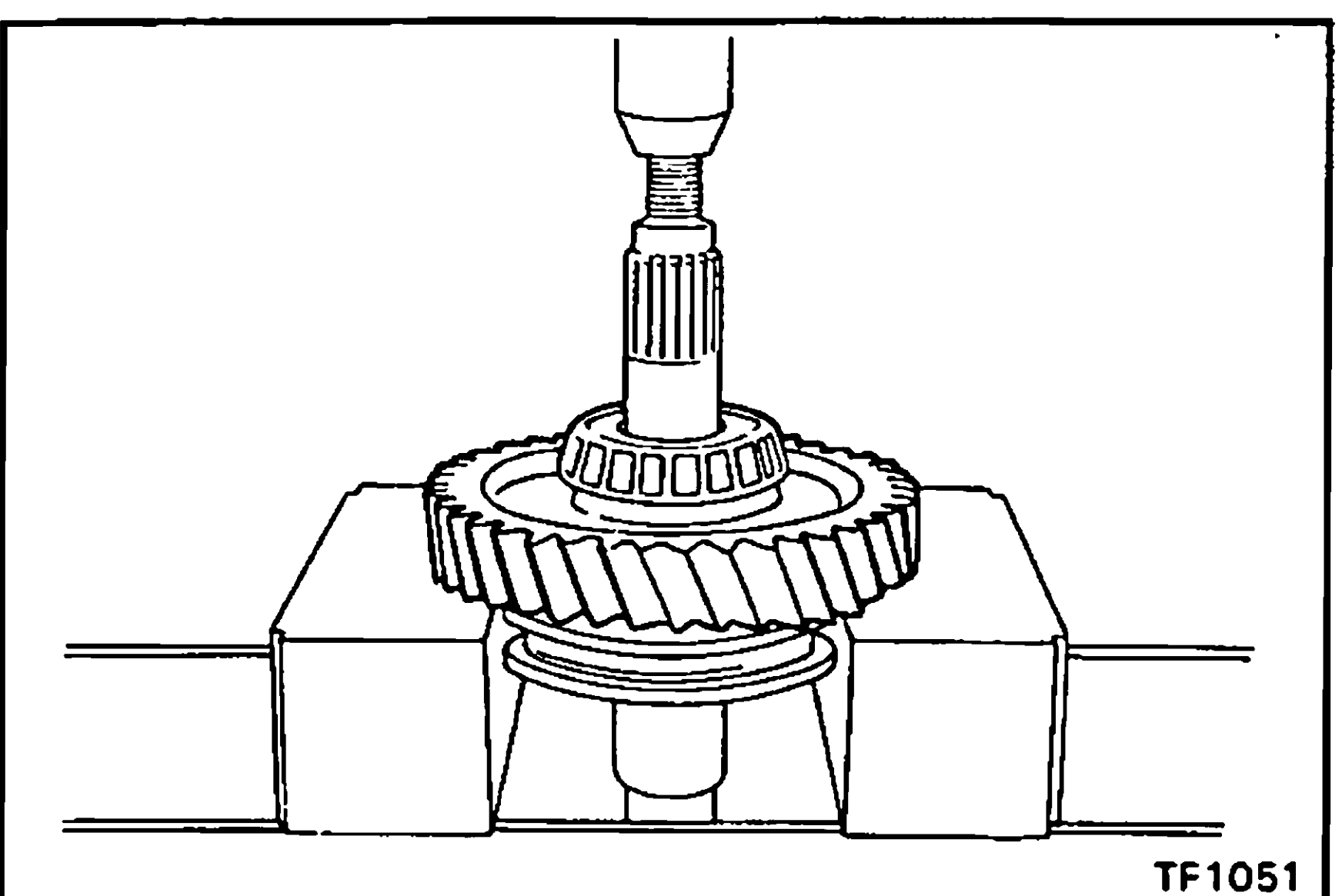
(b) Using SST and socket wrench, remove the front drive gear piece.

SST 09950-00020

**4. REMOVE FRONT TAPER ROLLER BEARING**

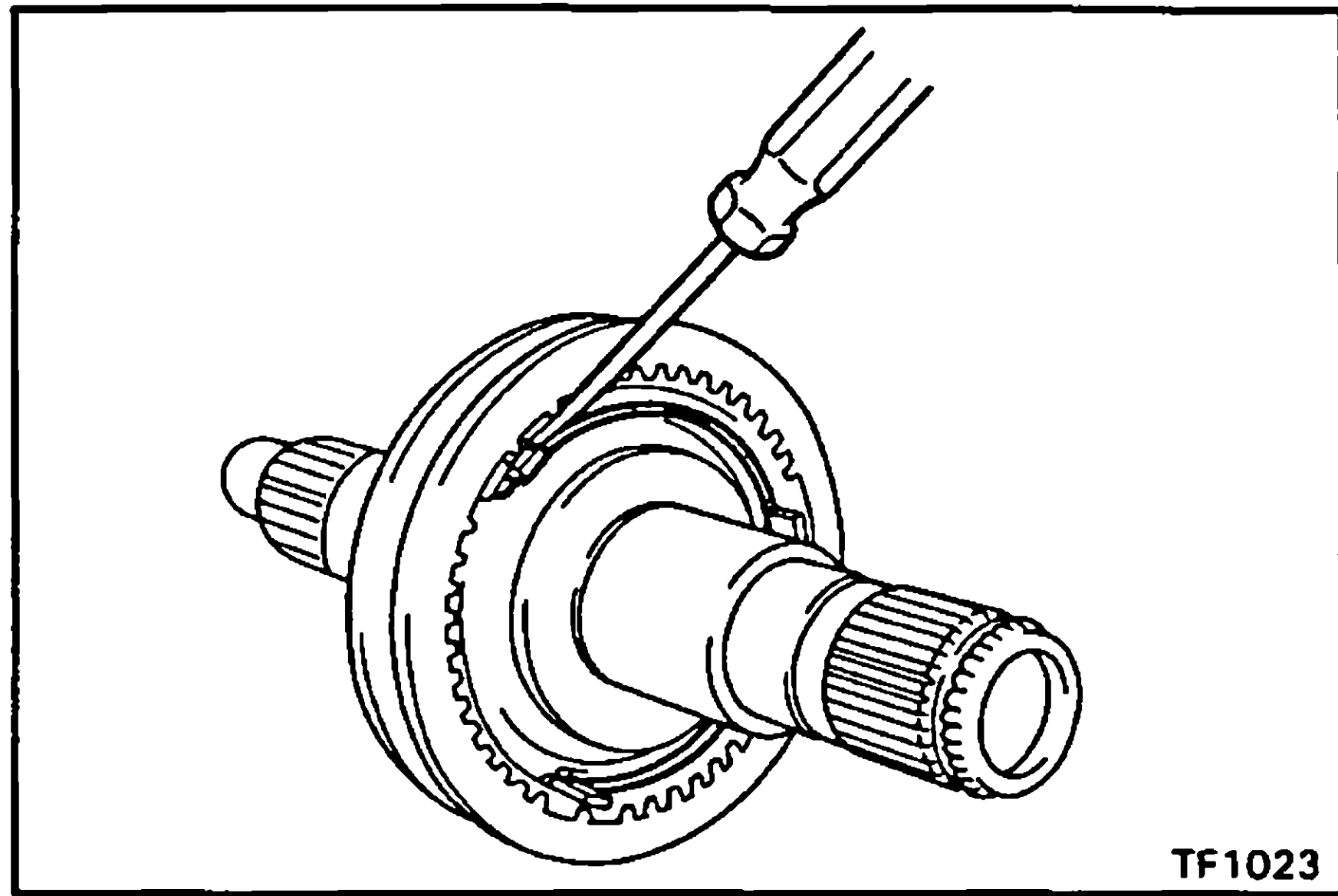
Using SST and a press, remove the front taper roller bearing.

SST 09950-00020

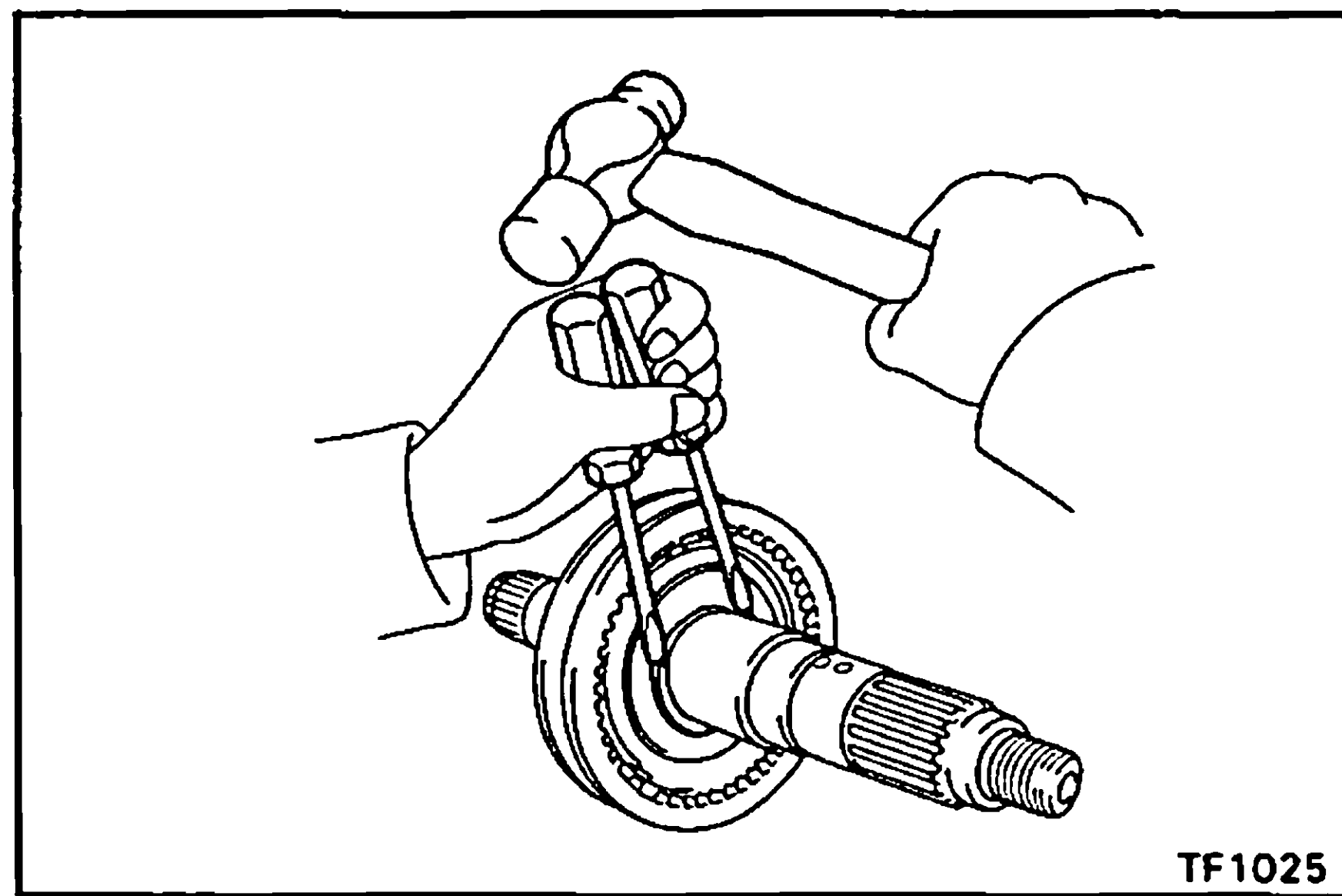
**5. REMOVE HIGH SPEED GEAR, SYNCHRONIZER RING AND NEEDLE ROLLER BEARING****6. REMOVE LOW SPEED GEAR AND REAR TAPER ROLLER BEARING**

(a) Using a press, remove the low speed gear and rear taper roller bearing.

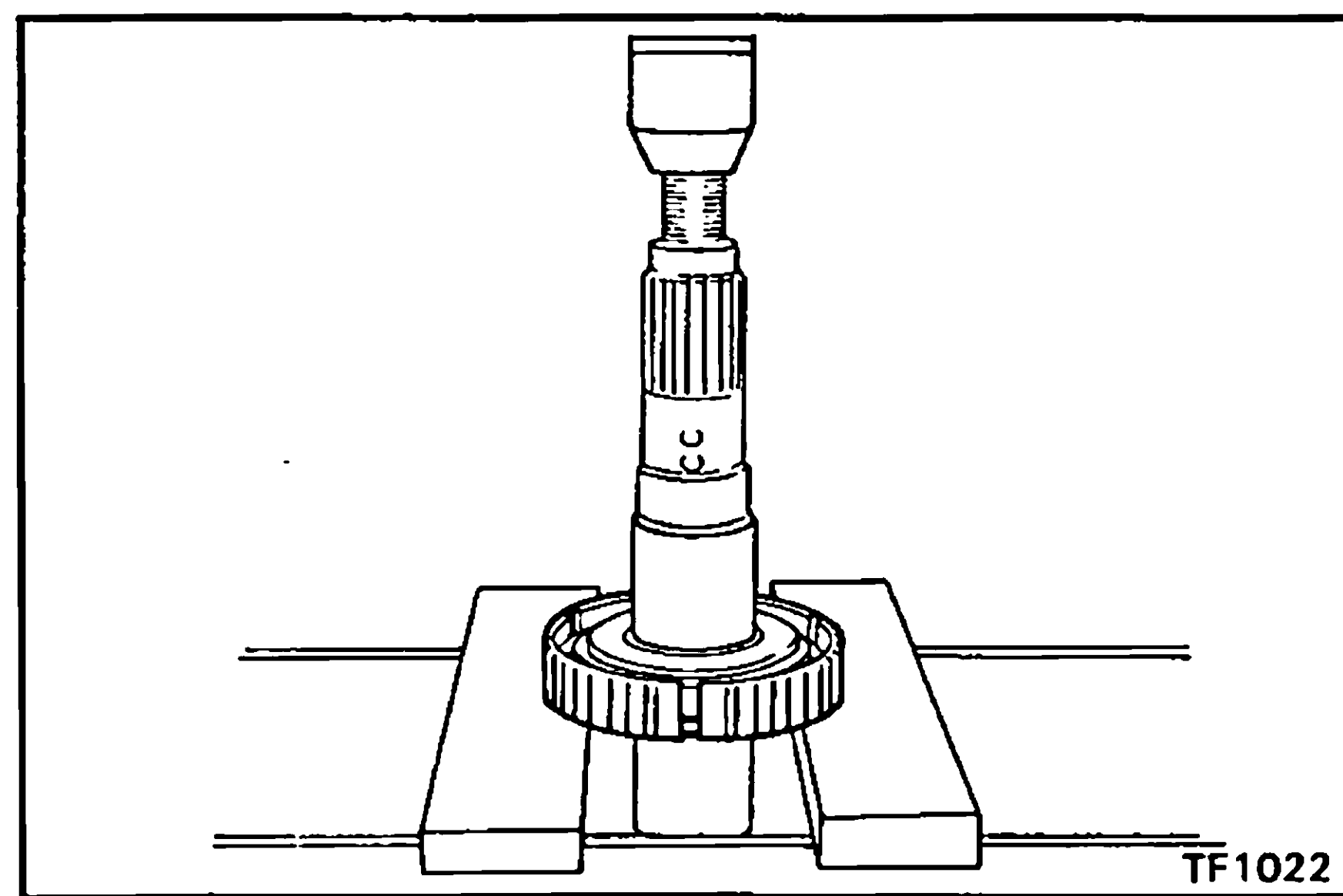
(b) Remove the needle roller bearing.

**7. REMOVE HIGH AND LOW HUB SLEEVE**

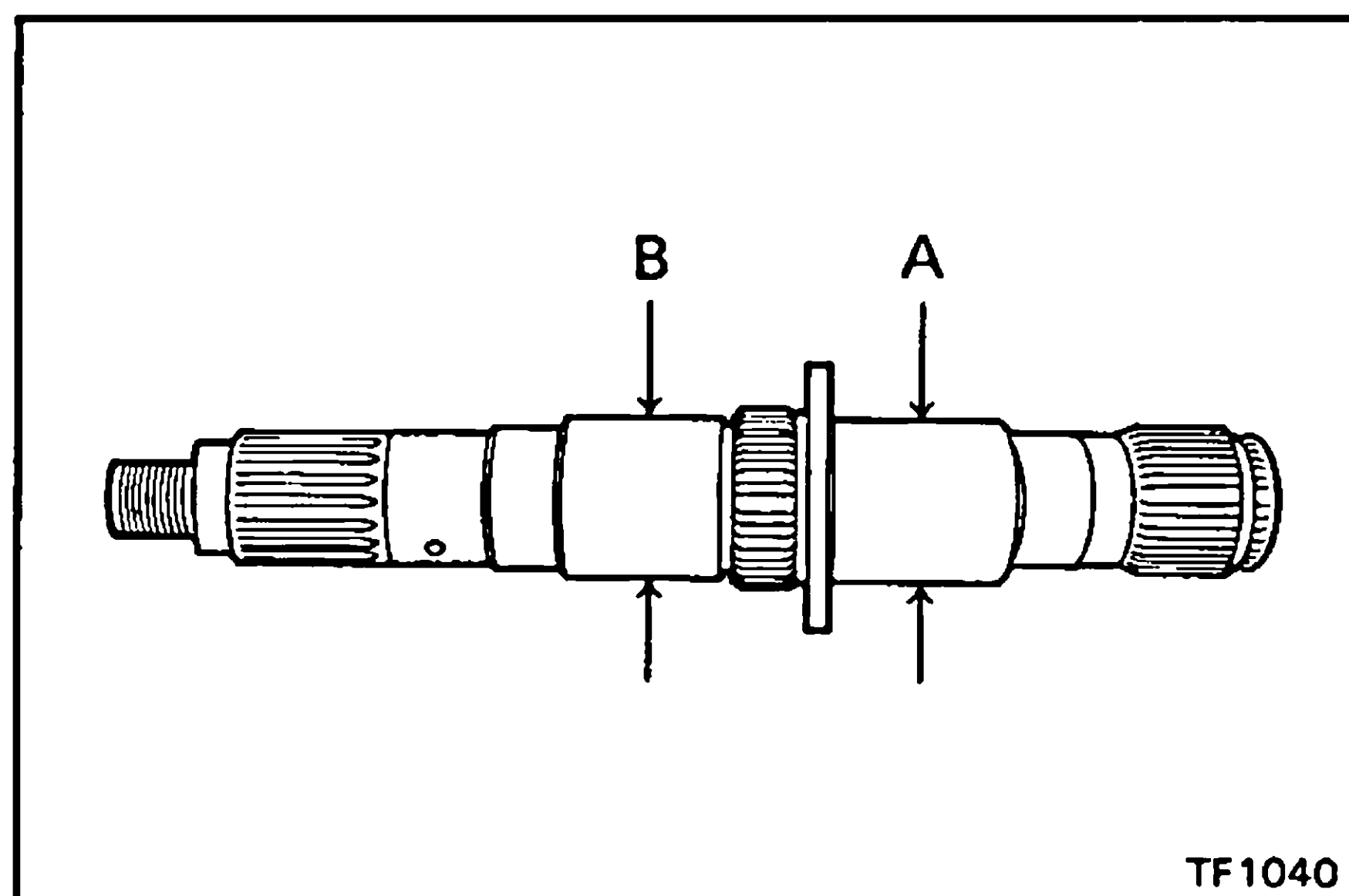
- (a) Using a screwdriver, remove the two springs.
- (b) Remove the high and low hub sleeve and shifting keys.



- (c) Using two screwdrivers and hammer, drive out the snap ring.



- (d) Using a press, remove the clutch hub.



INSPECTION OF OUTPUT SHAFT ASSEMBLY

1. INSPECT OUTPUT SHAFT

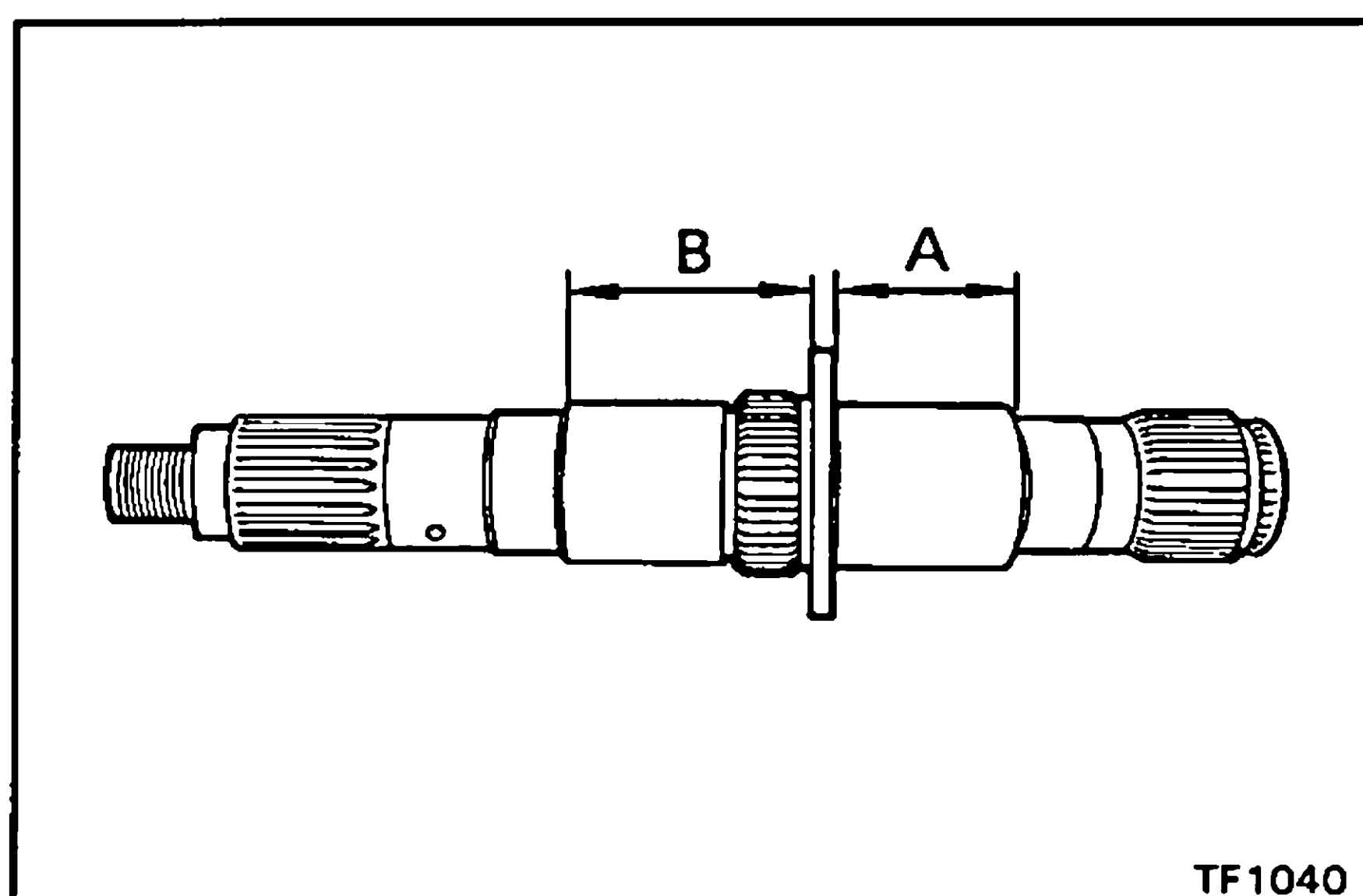
- (a) Using a micrometer, measure the outer diameter of the output shaft journal.

Minimum diameter:

A: High speed gear 41.984 mm (1.6529 in.)

B: Low speed gear 42.984 mm (1.6923 in.)

If the clearance is less than the limit, replace the output shaft.



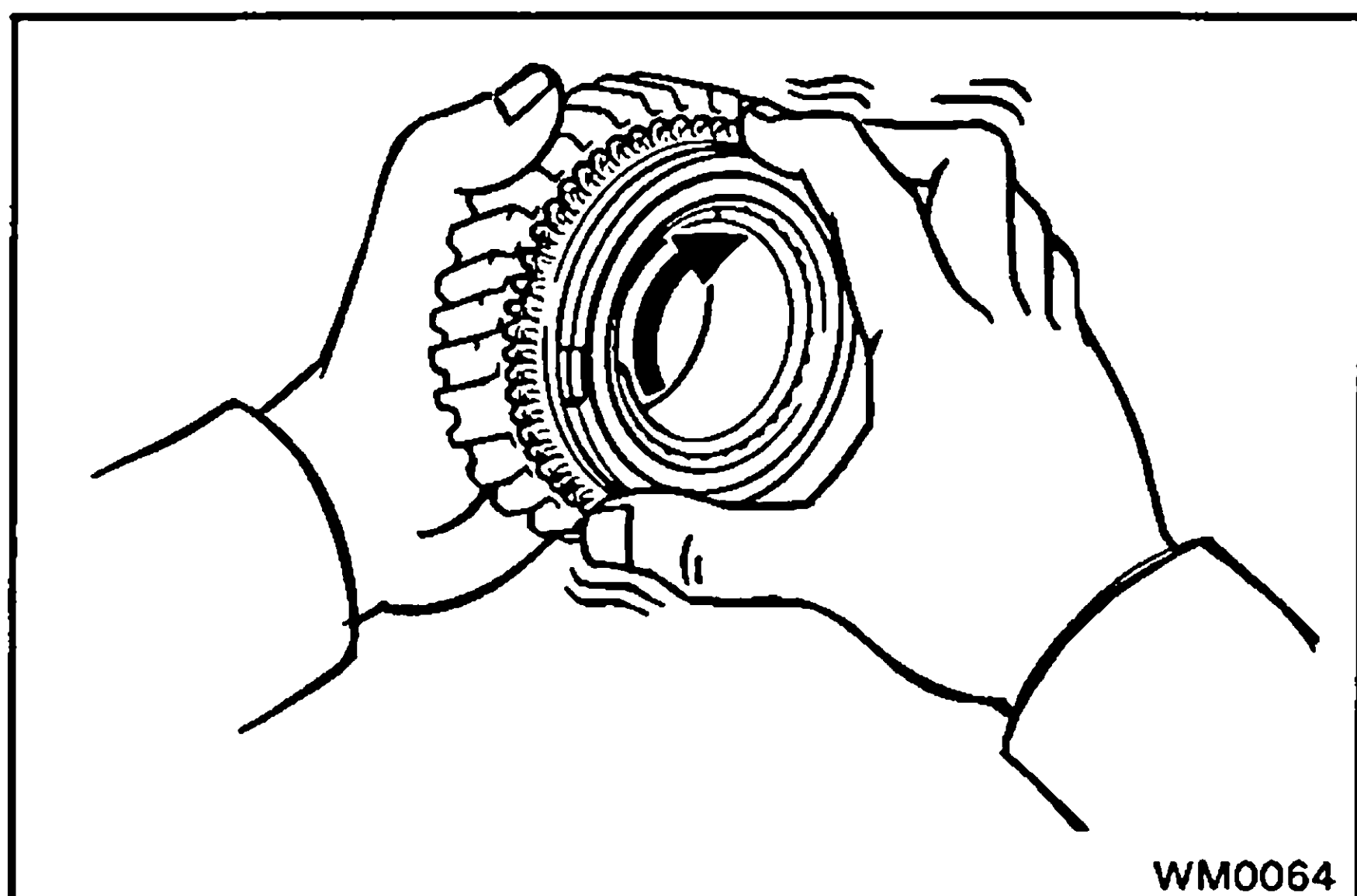
- (b) Using calipers, measure the output shaft journal length.

Maximum length:

A: High speed gear 46.55 mm (1.8327 in.)

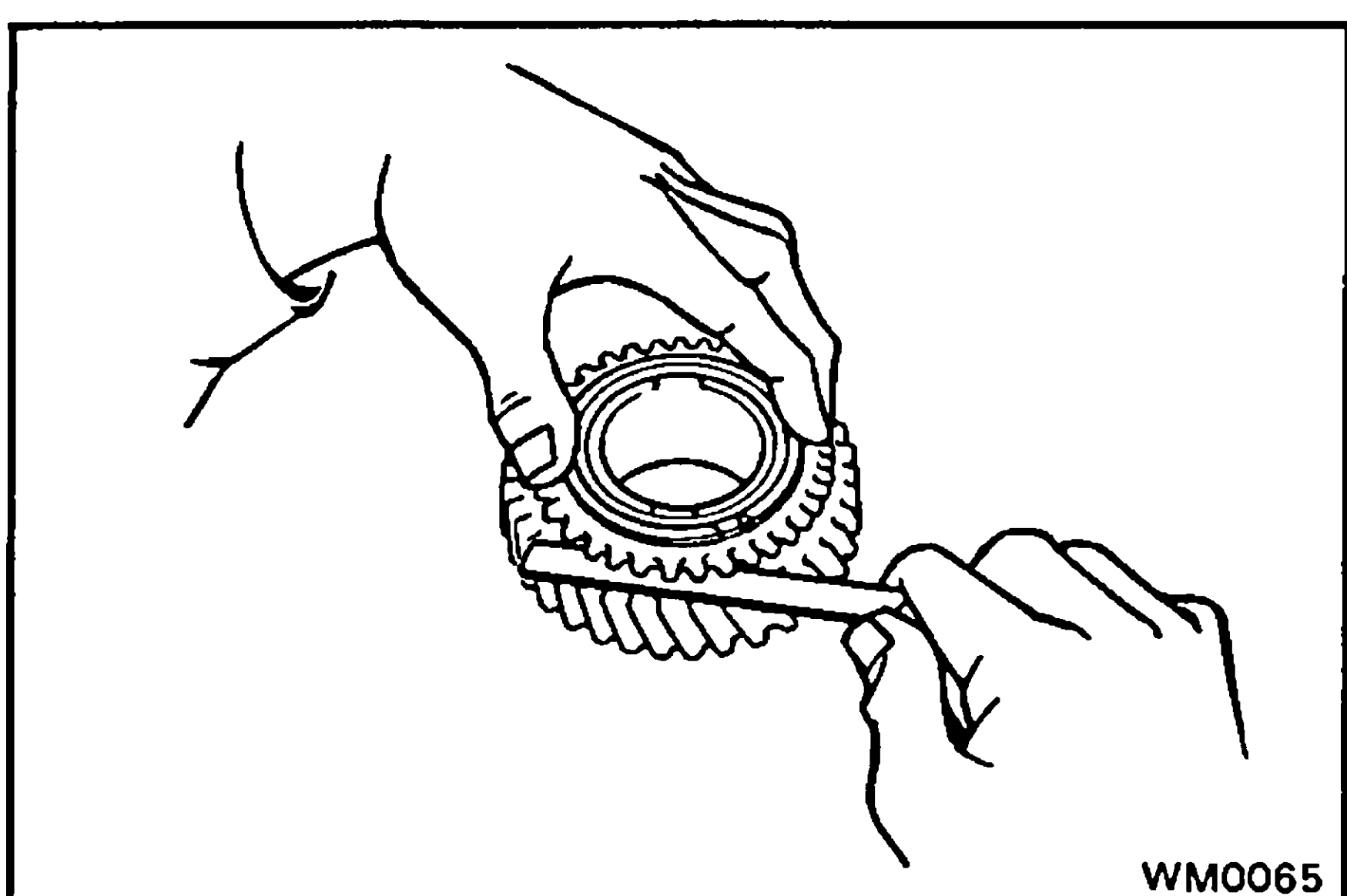
B: Low speed gear 62.35 mm (2.4547 in.)

If the length is less than the limit, replace the output shaft.



2. INSPECT SYNCHRONIZER RINGS

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

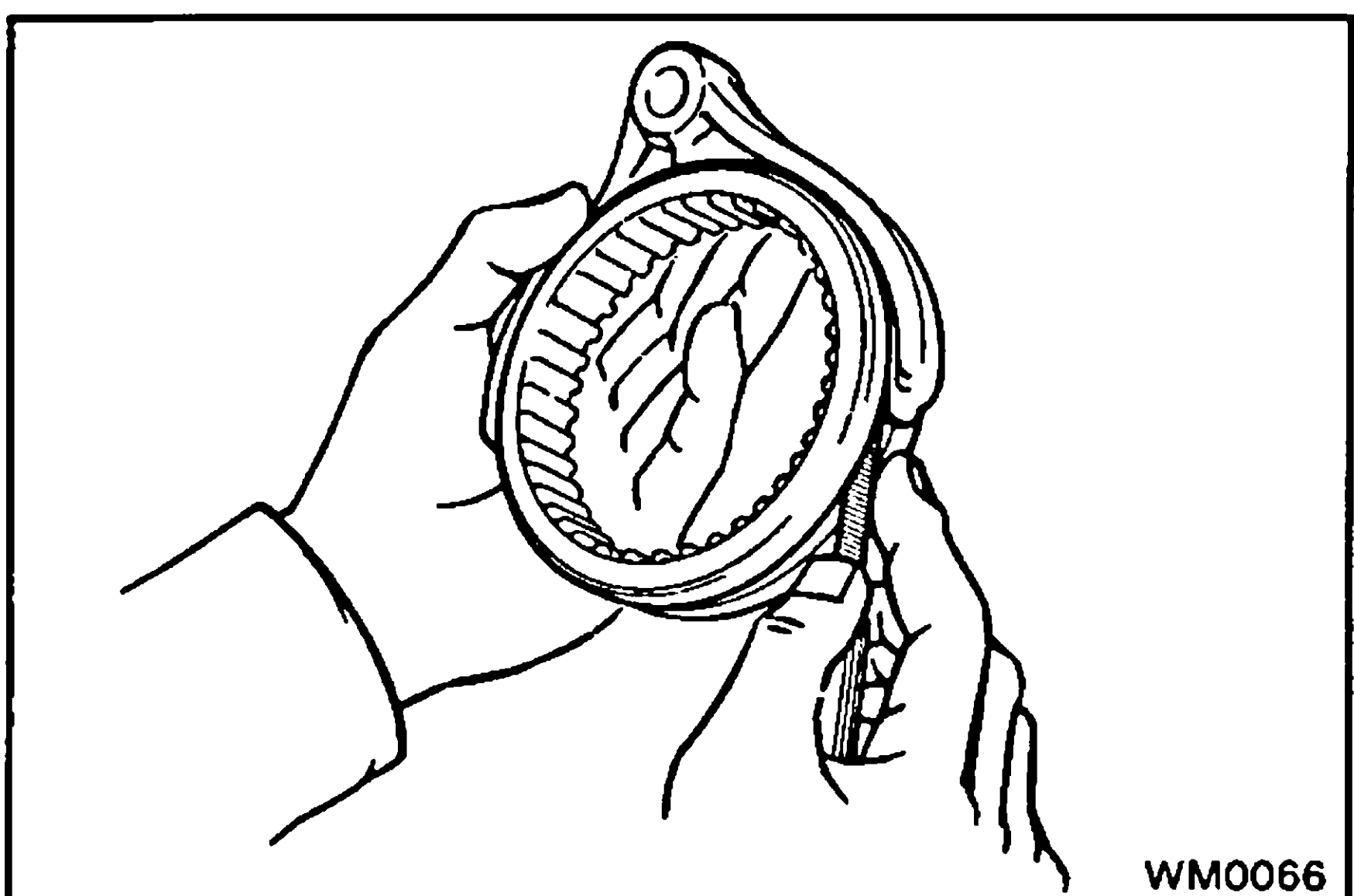


- (b) Measure the clearance between the synchronizer ring back and the gear spline end.

Standard clearance: 0.75 — 1.65 mm
(0.0295 — 0.0650 in.)

Minimum clearance: 0.75 mm (0.0295 in.)

If the clearance is less than the limit, replace the synchronizer ring.



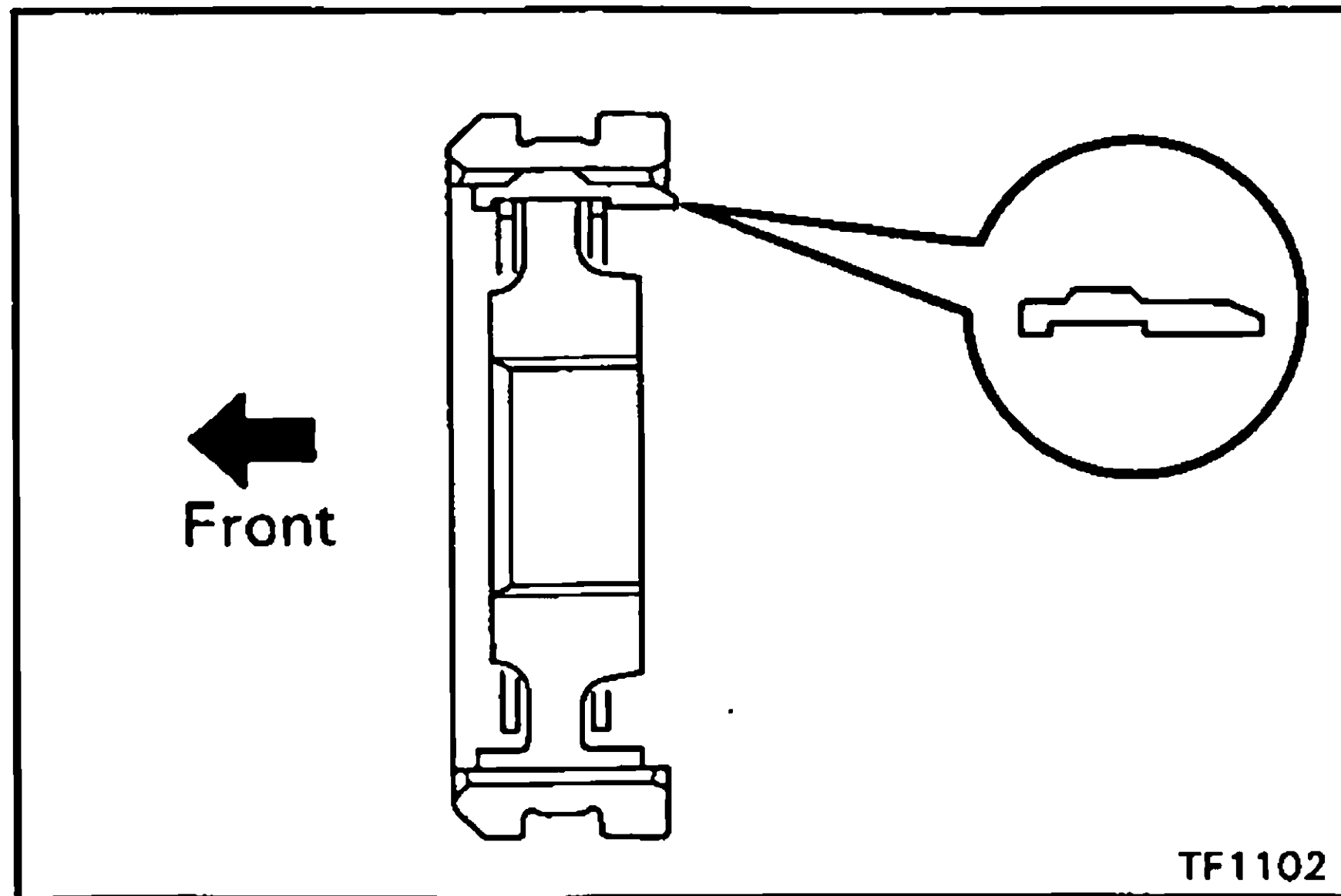
3. MEASURE CLEARANCE OF SHIFT FORK AND SLEEVE

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

Standard clearance: 0.1 — 0.4 mm
(0.0039 — 0.0157 in.)

Maximum clearance: 0.4 mm (0.0157 in.)

If the clearance is more than the limit, replace the shift fork or hub sleeve.

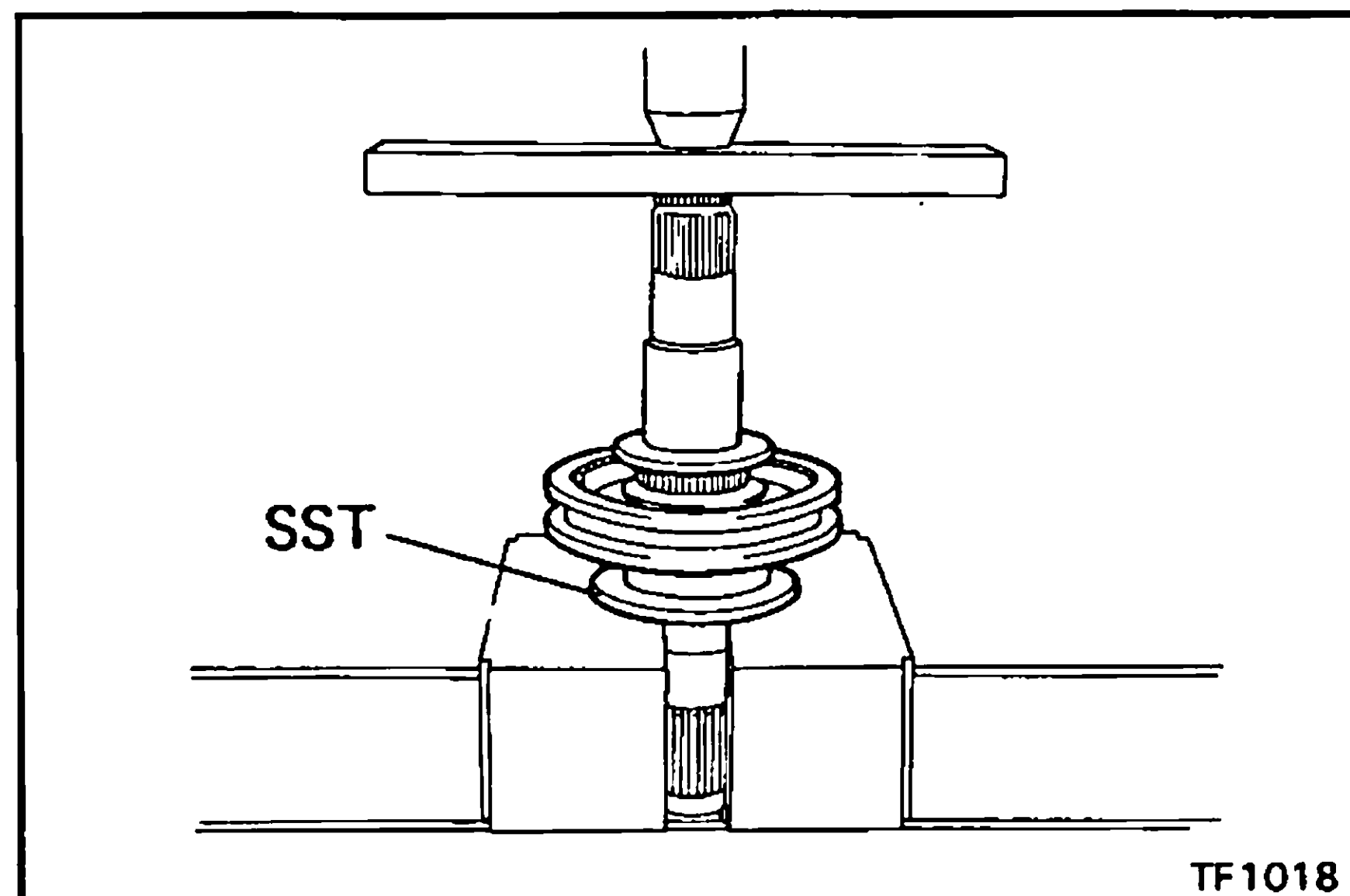


ASSEMBLY OF OUTPUT SHAFT ASSEMBLY

1. INSERT CLUTCH HUB INTO HIGH AND LOW HUB SLEEVE

- Insert the clutch hub and shifting keys to the high and low hub sleeve.
- Install the shifting key springs under the shifting keys.

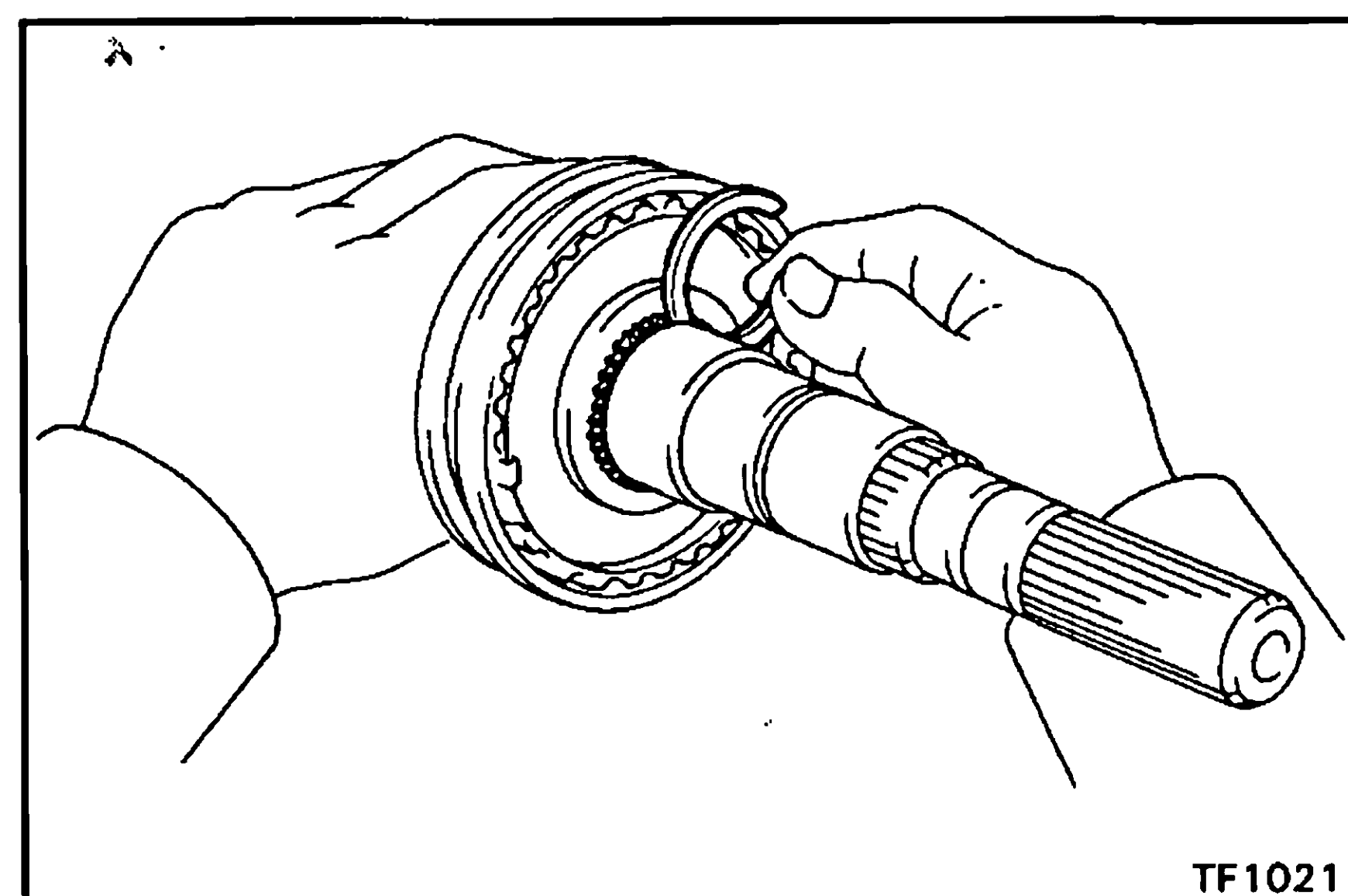
NOTICE: Install the key springs positioned so that their end gaps are not in line.



2. INSTALL HIGH AND LOW HUB SLEEVE

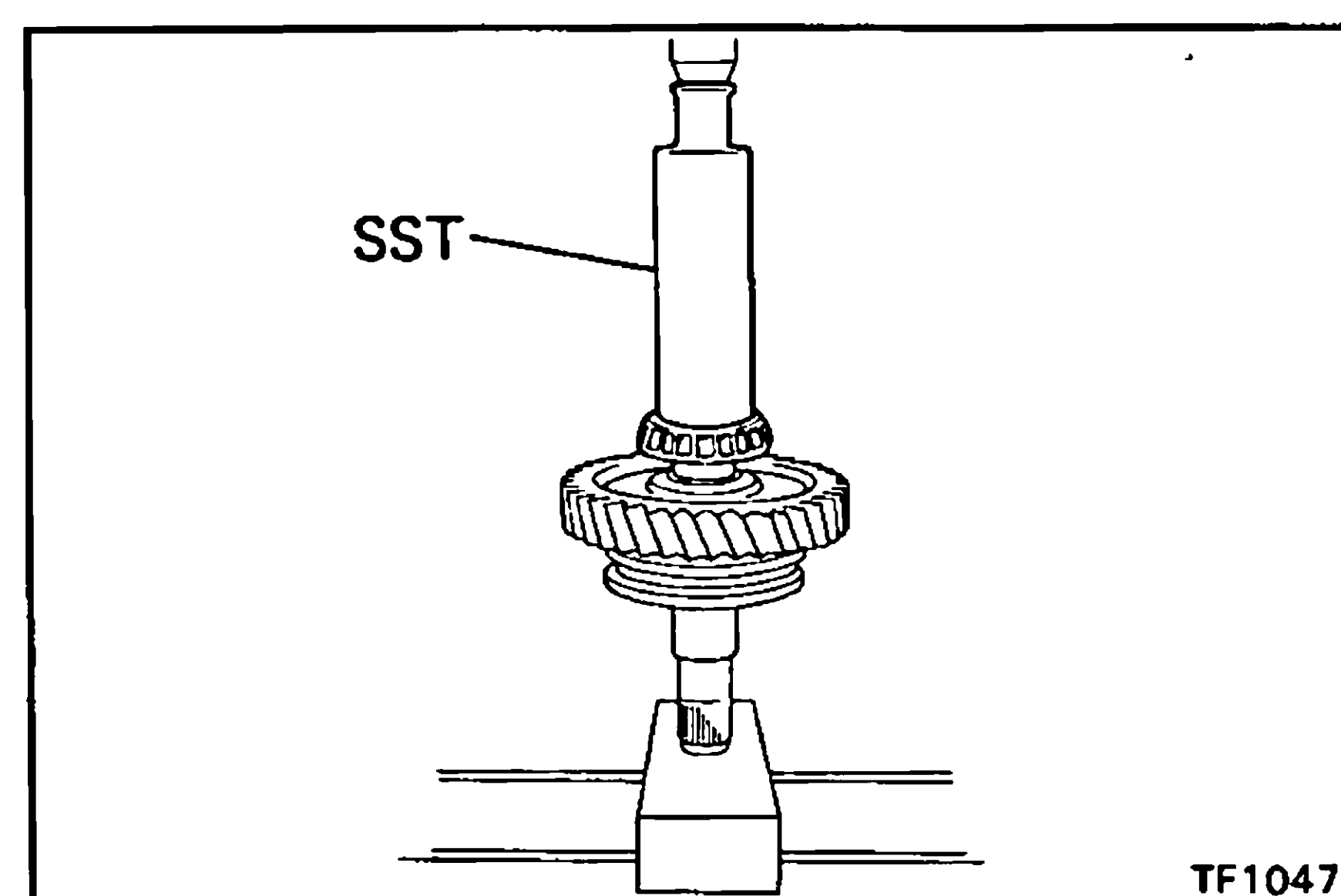
- Using SST and a press, install the high and low hub sleeve.

SST 09316-20011



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

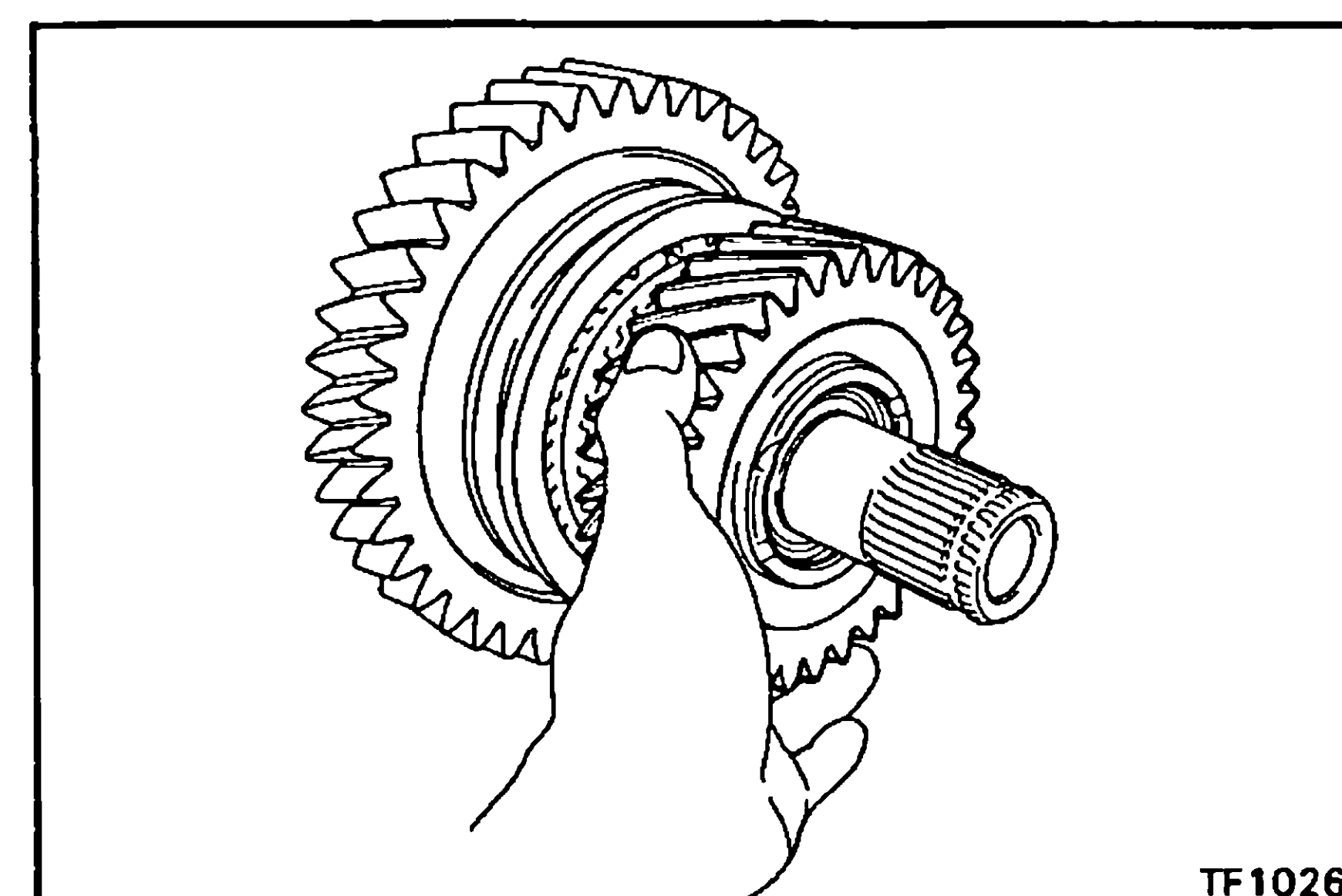
Mark	Thickness mm (in.)
A	2.60 (0.1024)
B	2.65 (0.1043)
C	2.70 (0.1063)
D	2.75 (0.1083)
E	2.80 (0.1102)
F	2.85 (0.1122)
G	2.90 (0.1142)



3. INSTALL NEEDLE ROLLER BEARING, LOW SPEED GEAR AND REAR TAPER ROLLER BEARING

- Apply gear oil to the needle roller bearing.
- Install the needle roller bearing and low speed gear.
- Using SST and a press, install the rear taper roller bearing.

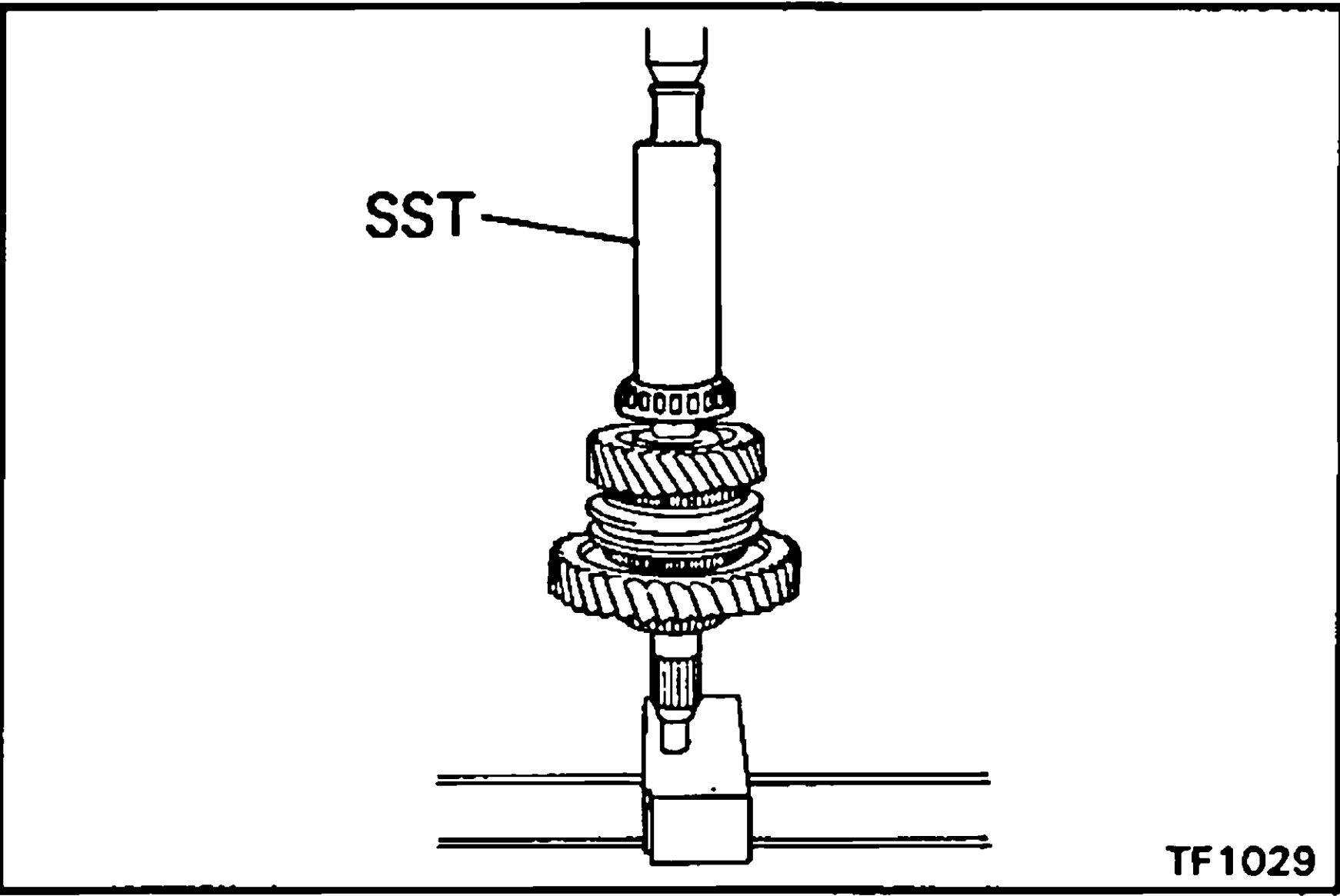
SST 09316-60010 (09316-00010)



4. INSTALL HIGH SPEED GEAR, SYNCHRONIZER RING AND NEEDLE ROLLER BEARING

- Apply gear oil to the needle roller bearing.
- Install high speed gear, synchronizer ring and needle roller bearing.

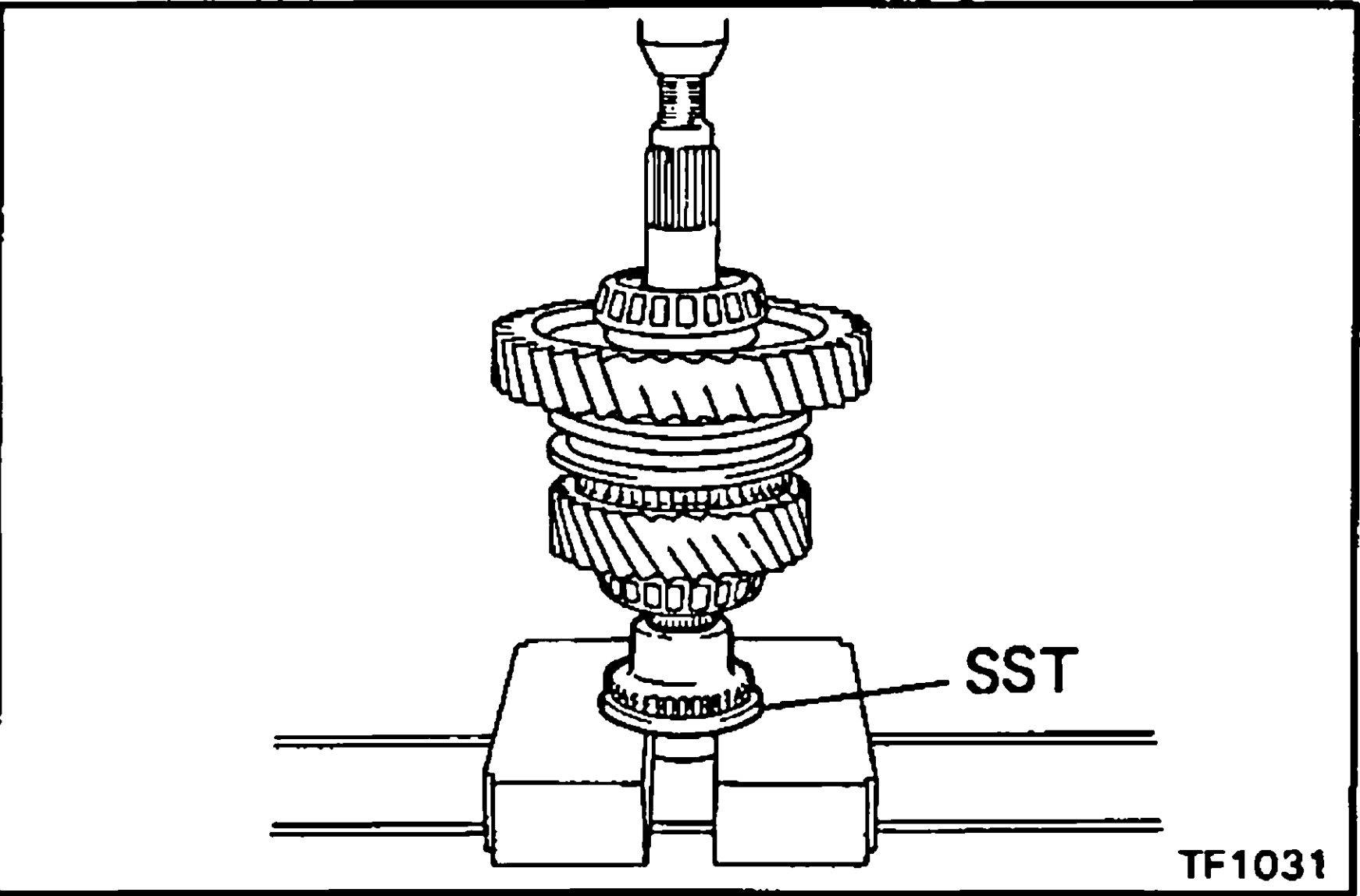
NOTICE: Align the ring slots with the shifting keys.



5. INSTALL FRONT TAPER ROLLER BEARING

Using SST and a press, install the front taper roller bearing.

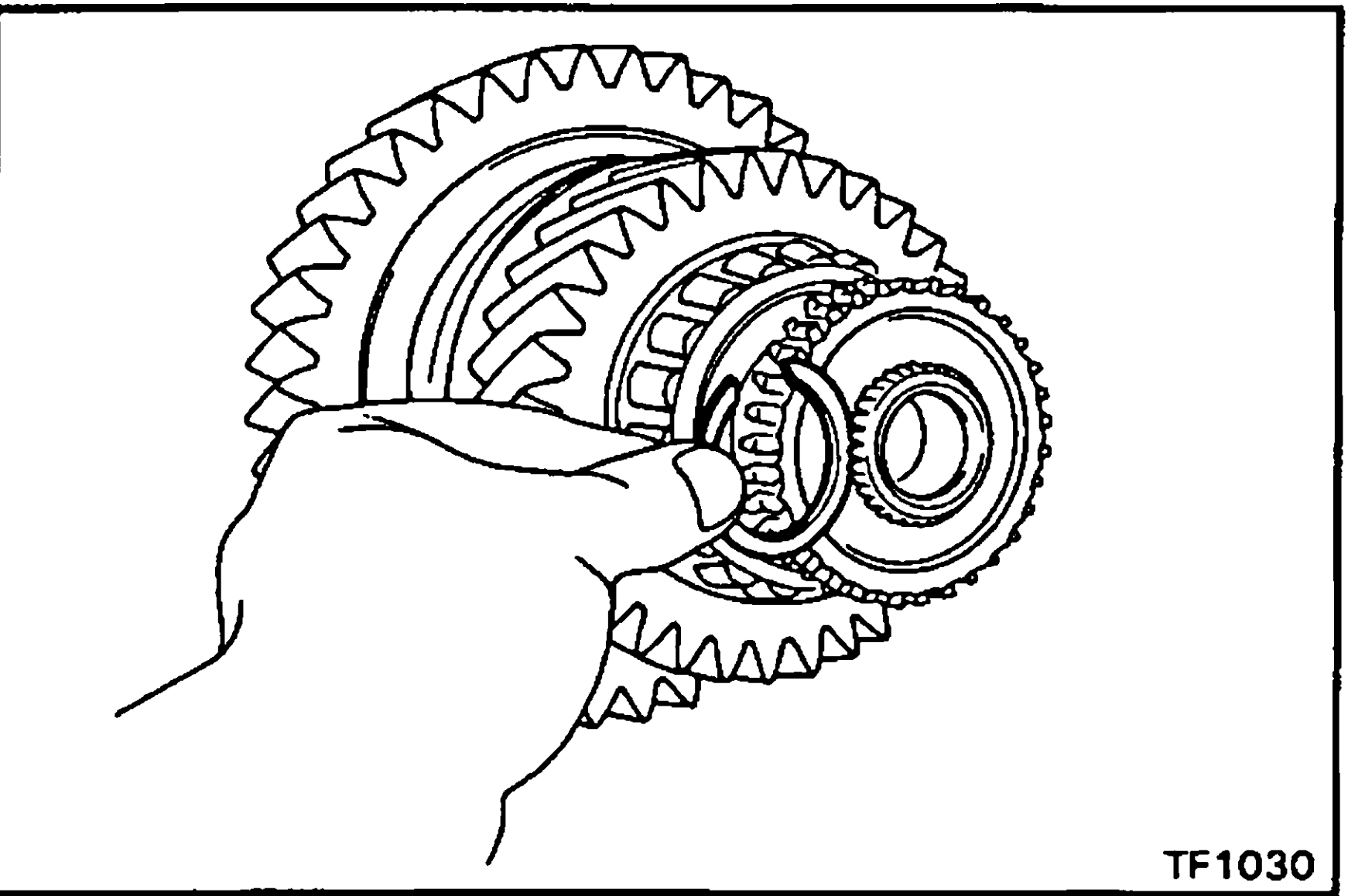
SST 09316-60010 (09316-00010)



6. INSTALL FRONT DRIVE GEAR PIECE

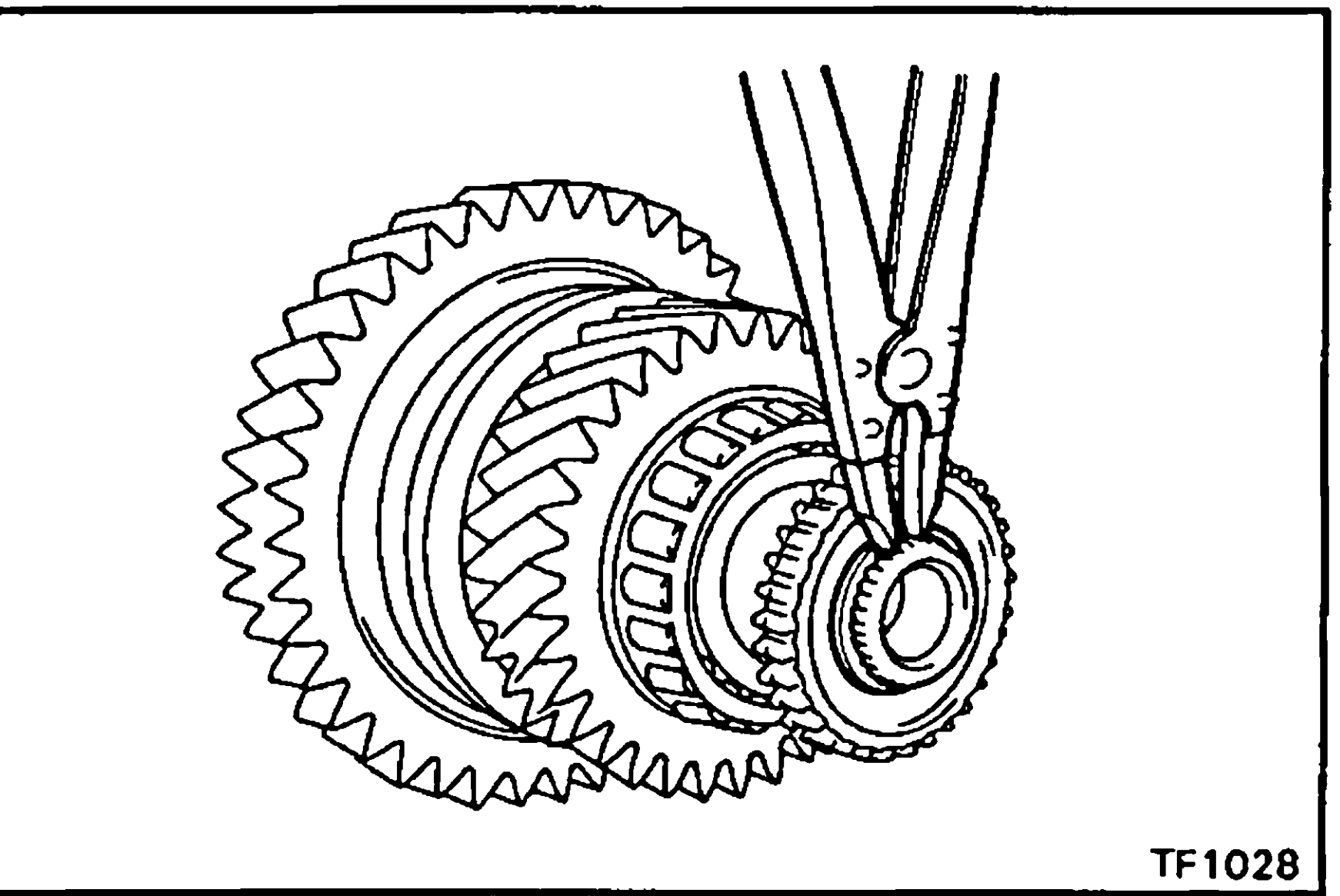
(a) Using SST and a press, install the front drive gear piece.

SST 09316-60010 (09316-00030)



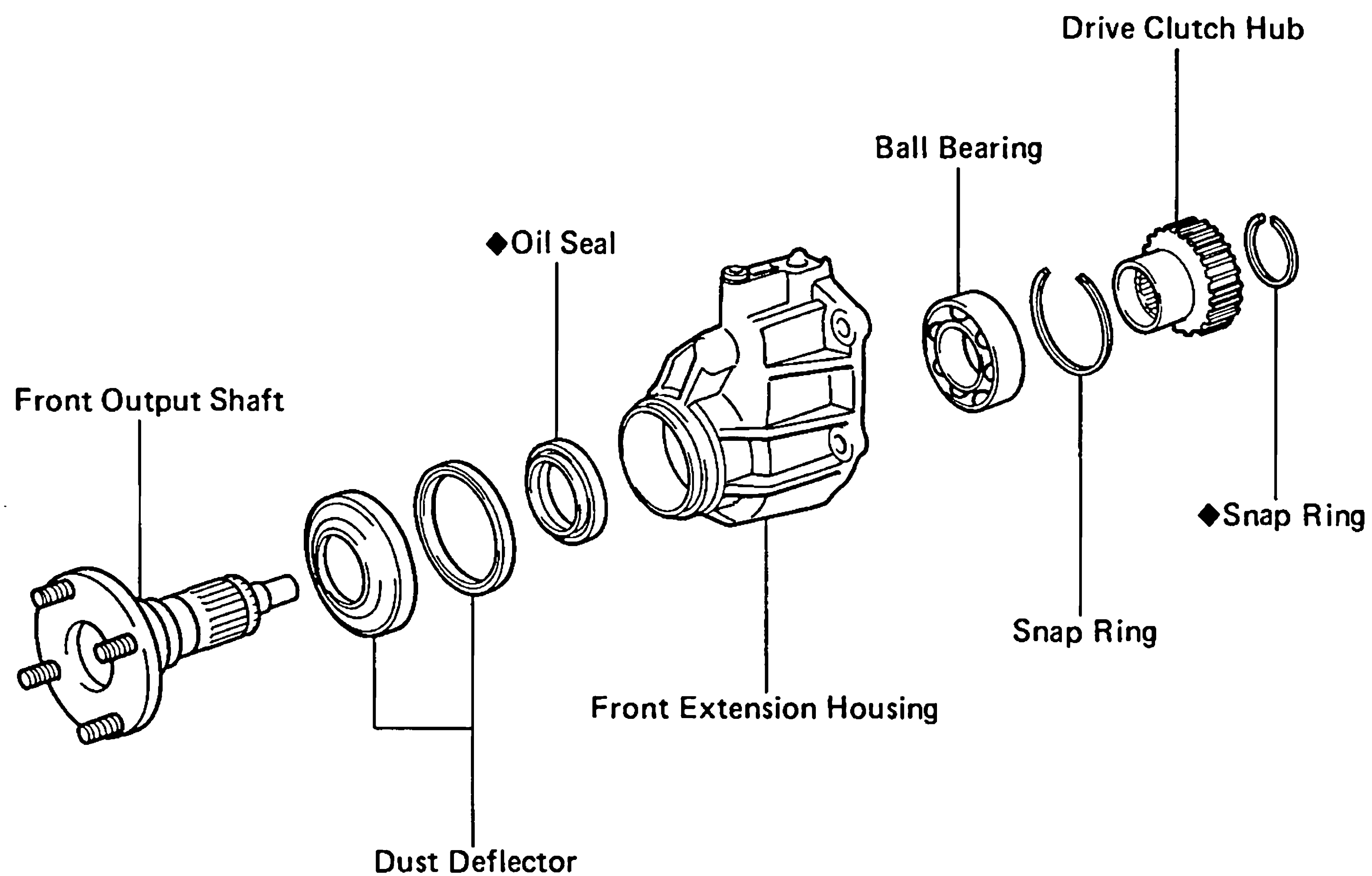
(b) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
A	2.0 (0.0787)
B	2.1 (0.0827)
C	2.2 (0.0866)
D	2.3 (0.0906)
E	2.4 (0.0945)



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

Front Extension Housing Assembly COMPONENTS



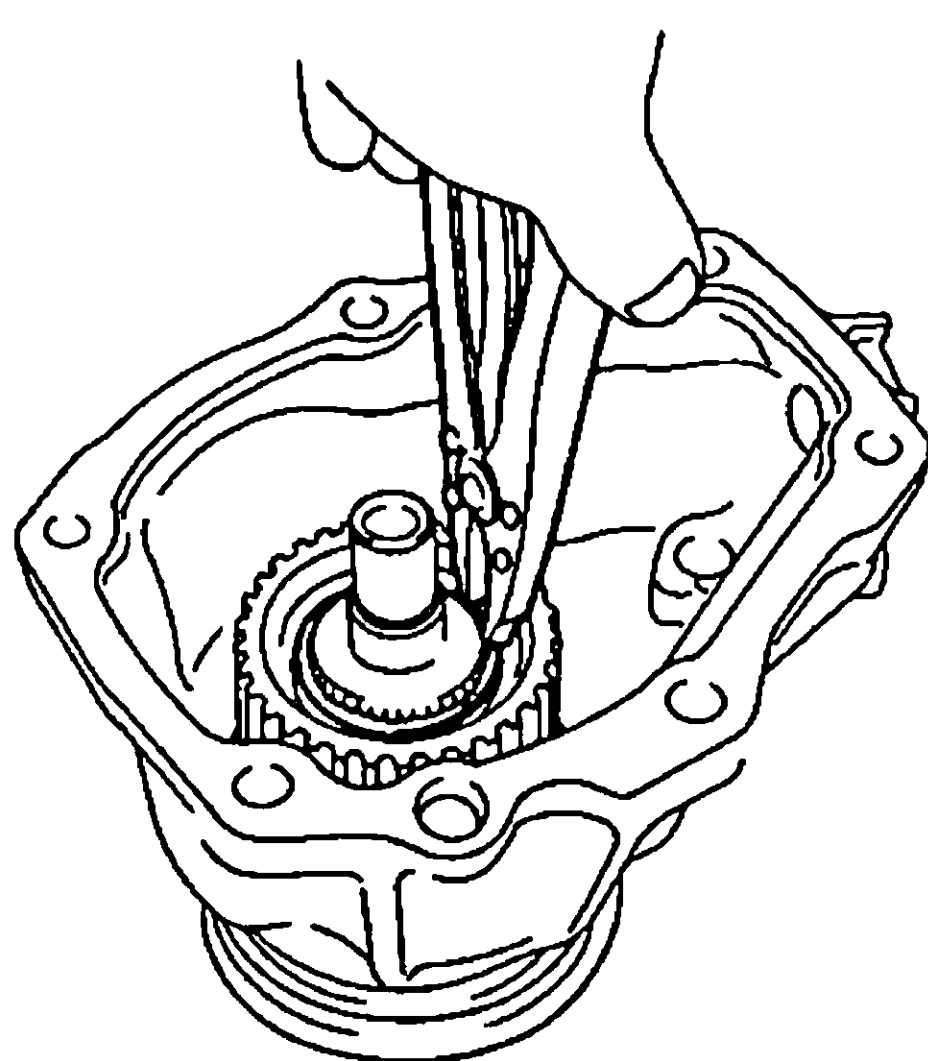
◆ Non-reusable part

TF1084

DISASSEMBLY OF FRONT EXTENSION HOUSING ASSEMBLY

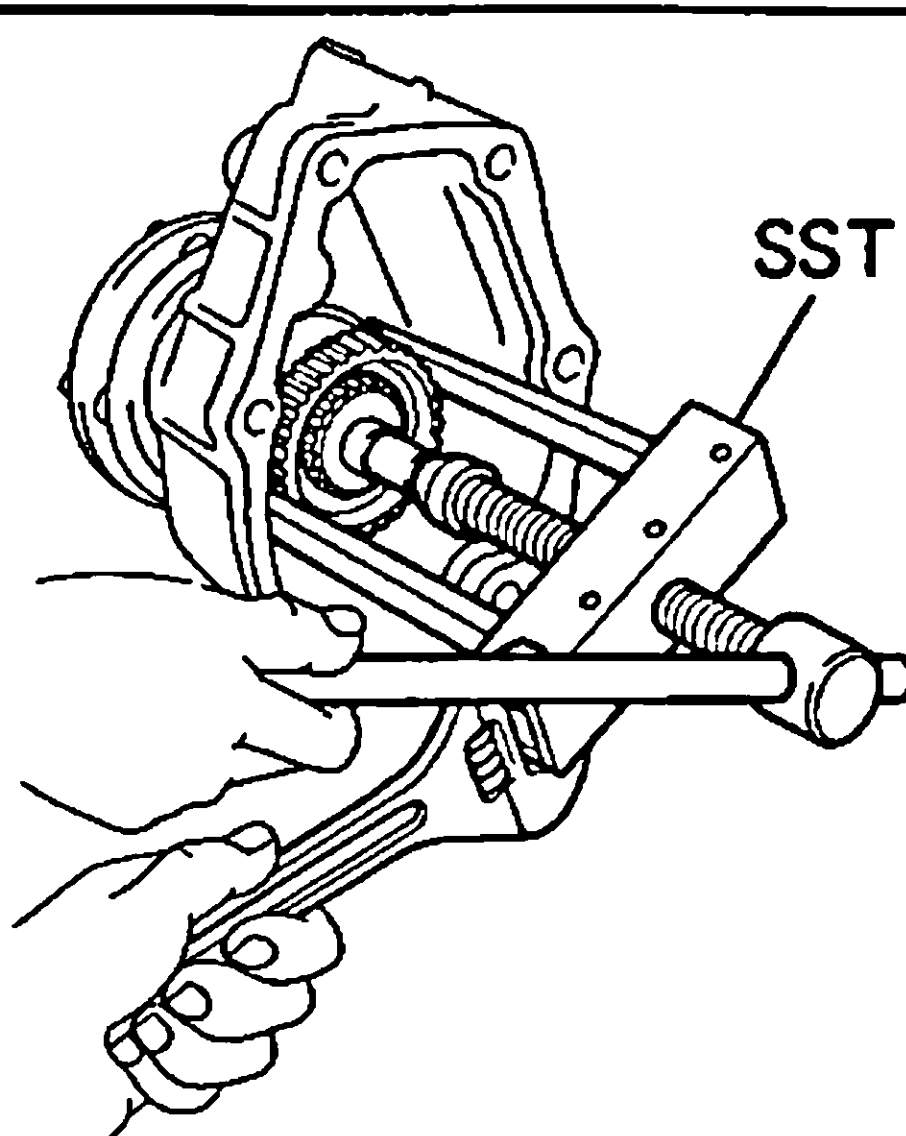
1. REMOVE DRIVE CLUTCH HUB

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

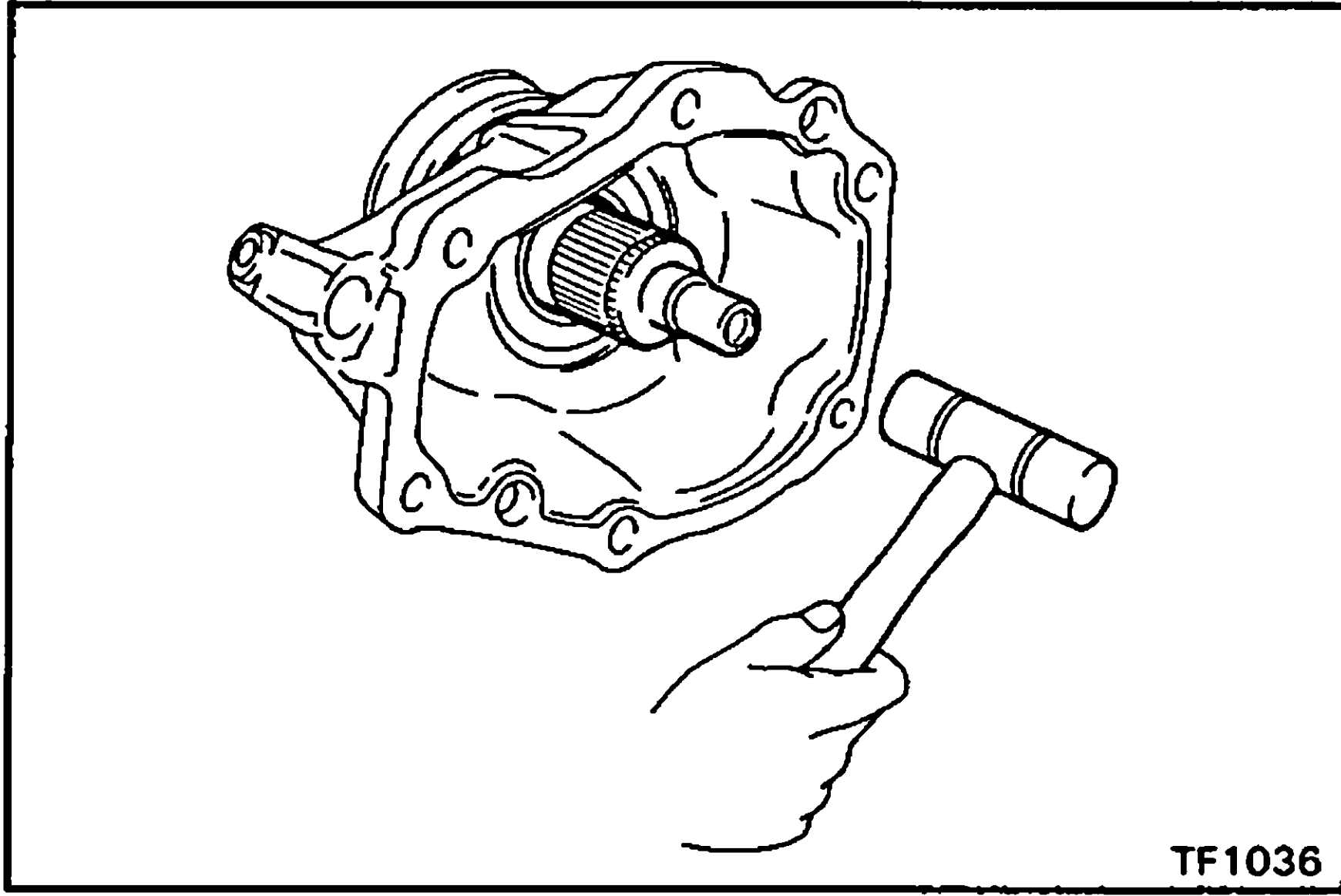


TF1035

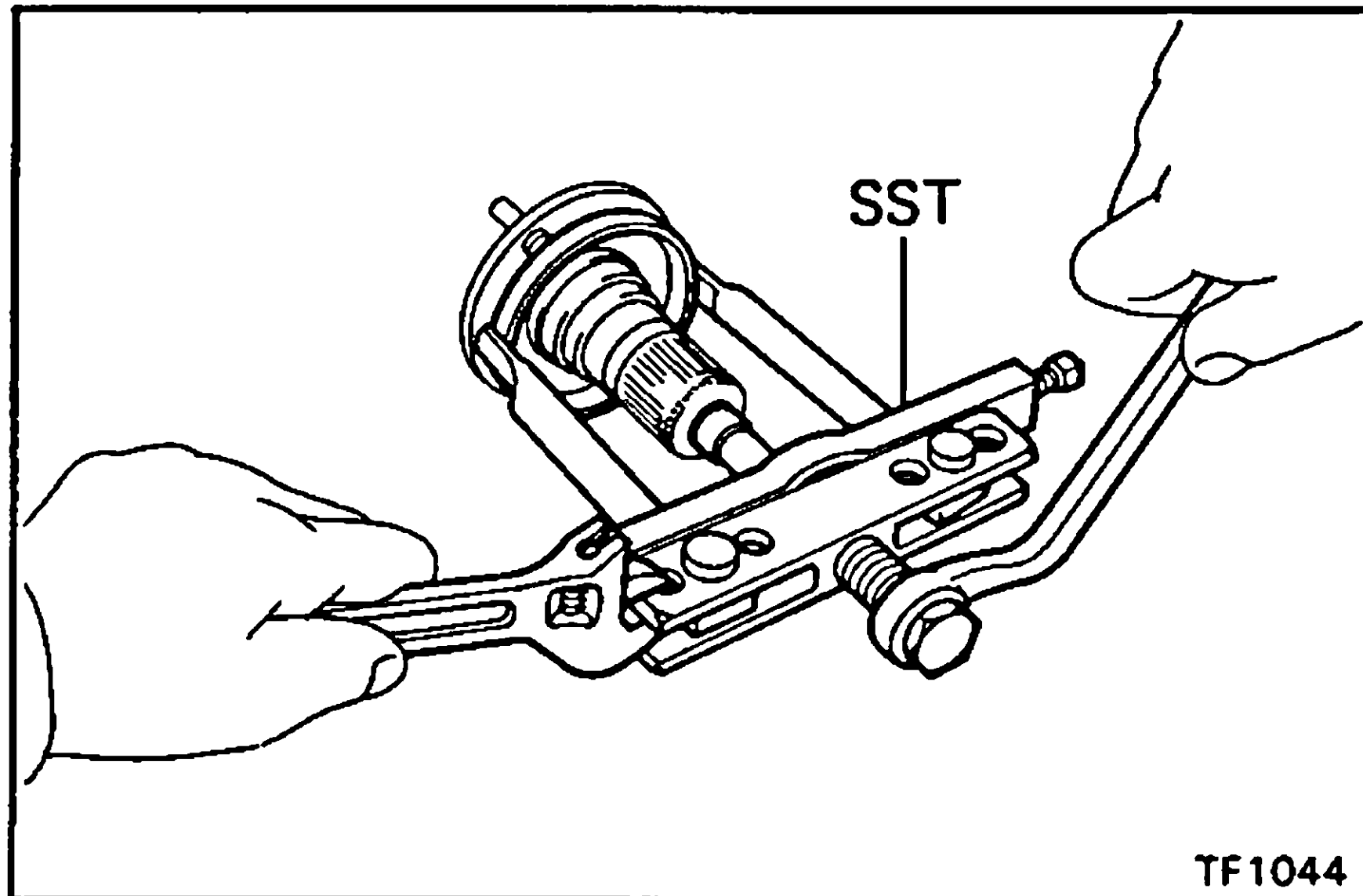
(b) Using SST, remove the drive clutch hub.
SST 09213-27010



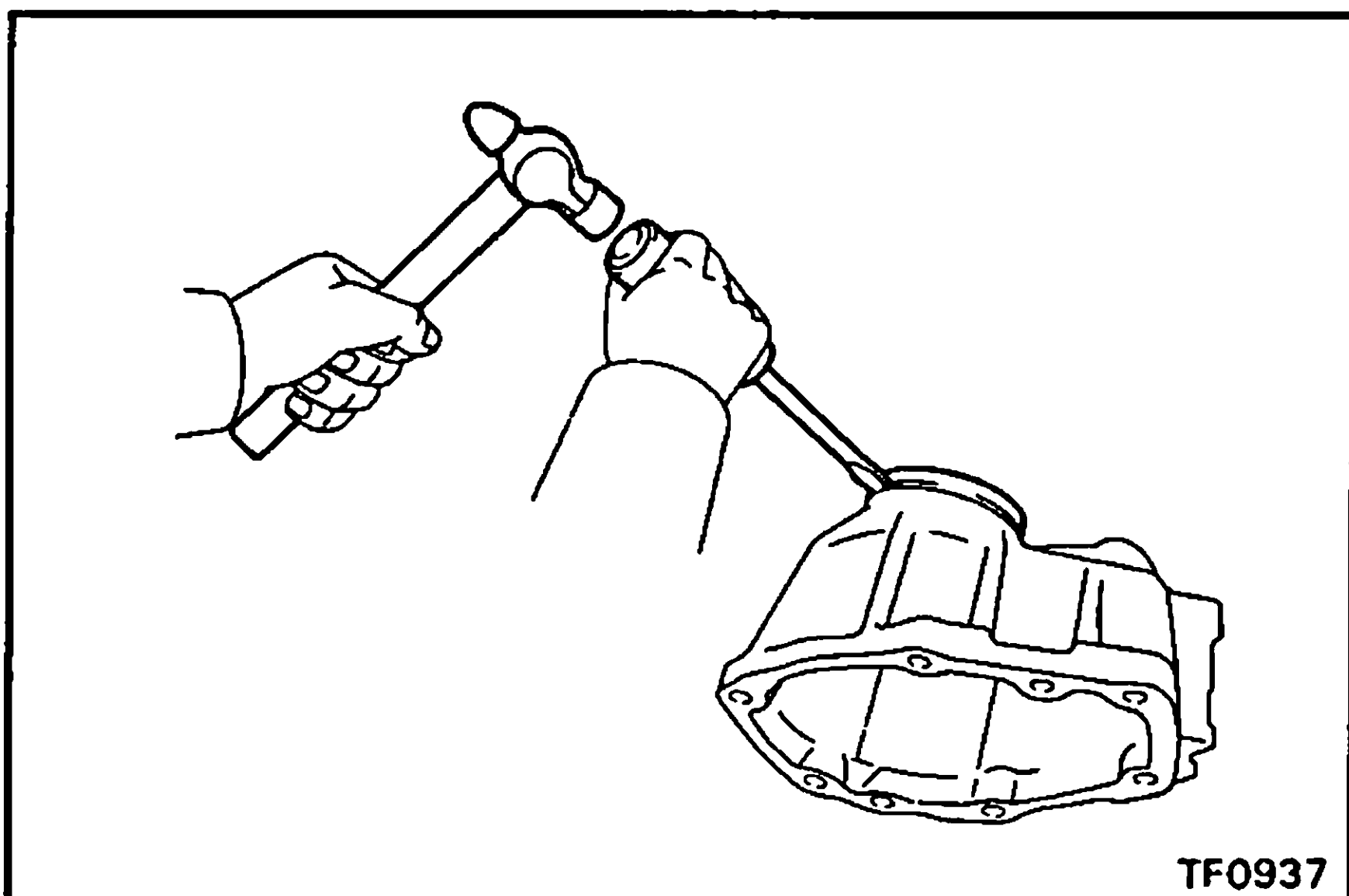
TF1059

**2. REMOVE FRONT OUTPUT SHAFT**

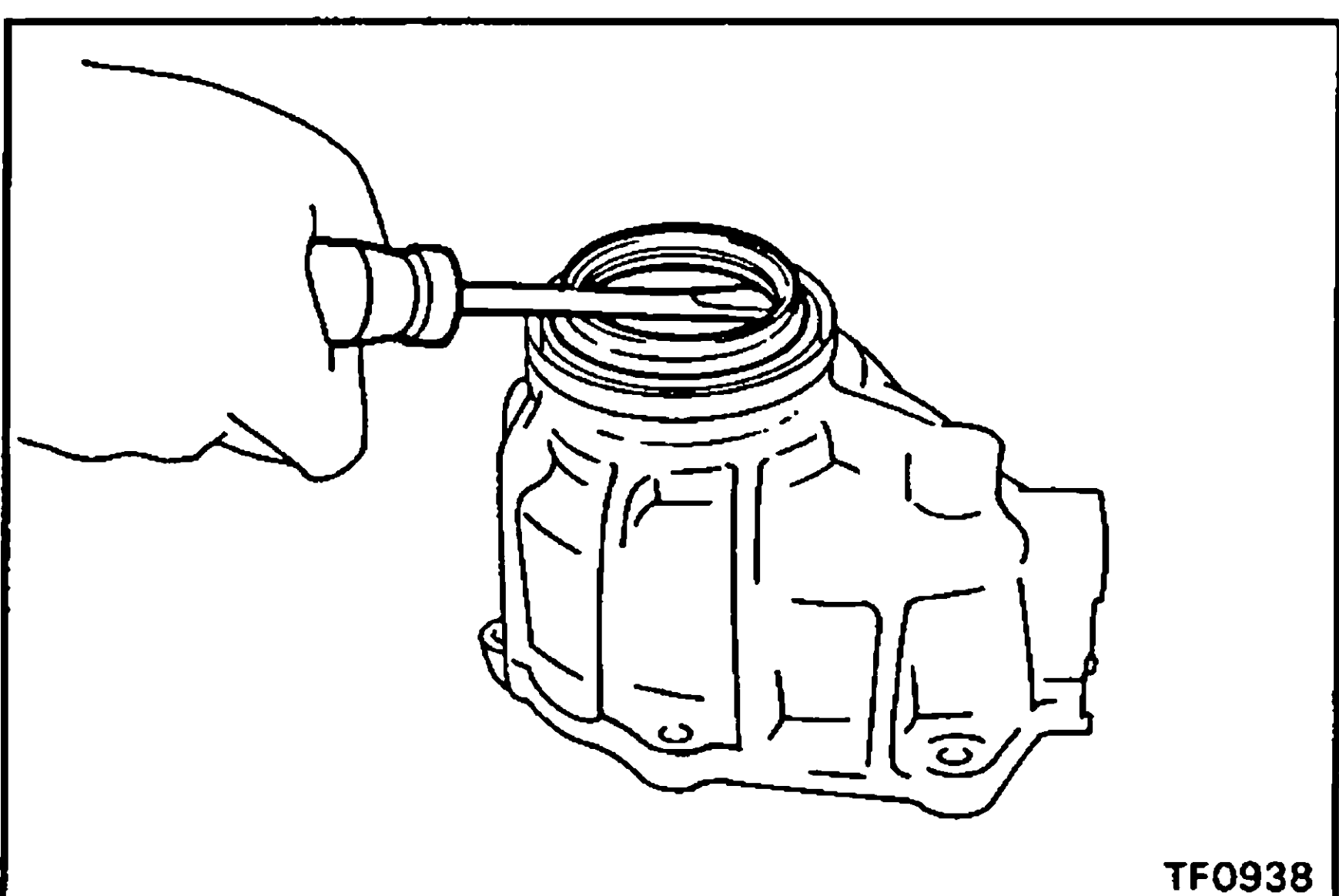
Using a plastic hammer, tap the front output shaft and remove it.

**3. REMOVE DUST DEFLECTORS**

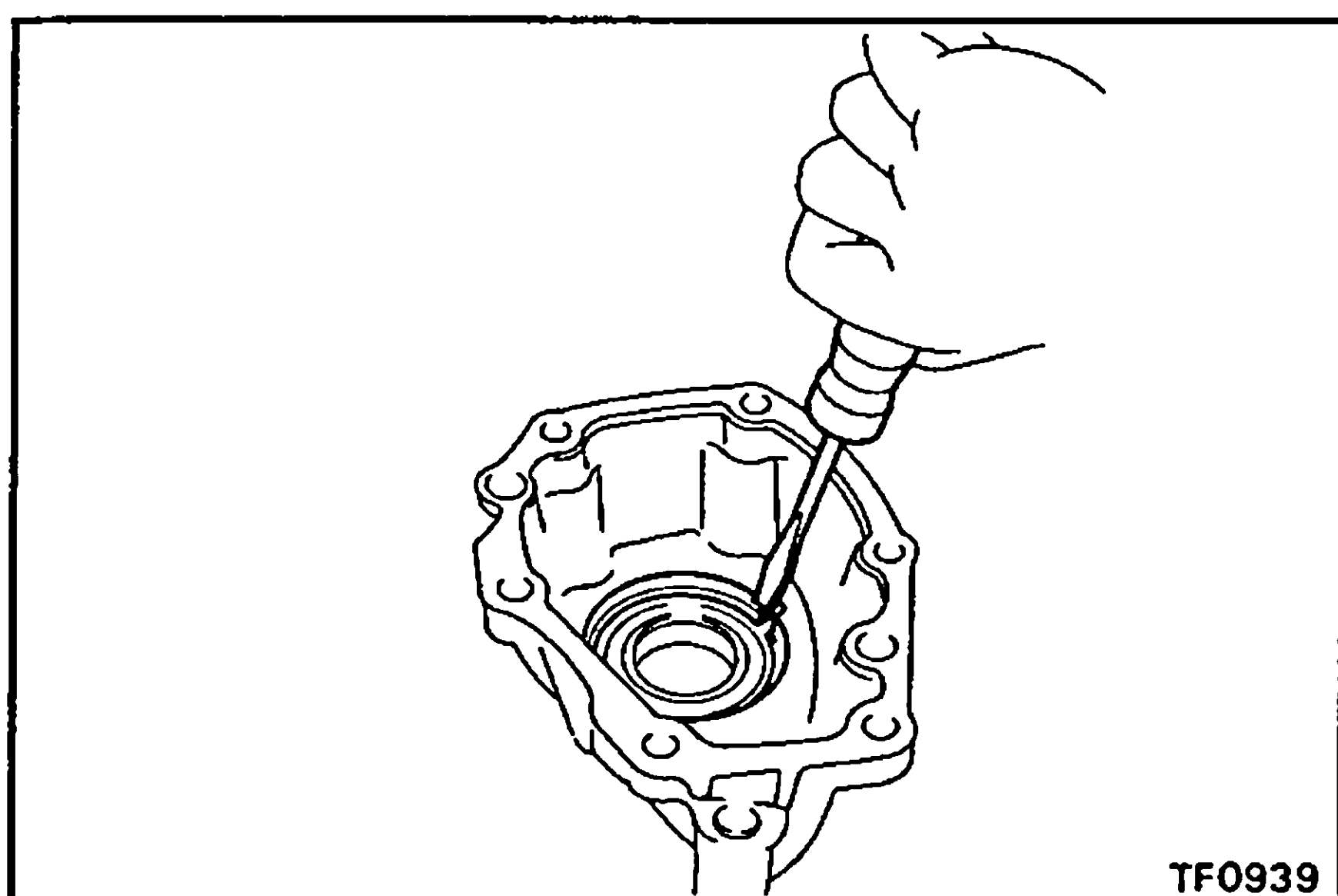
(a) Using SST, remove the dust deflector.
SST 09950-20017



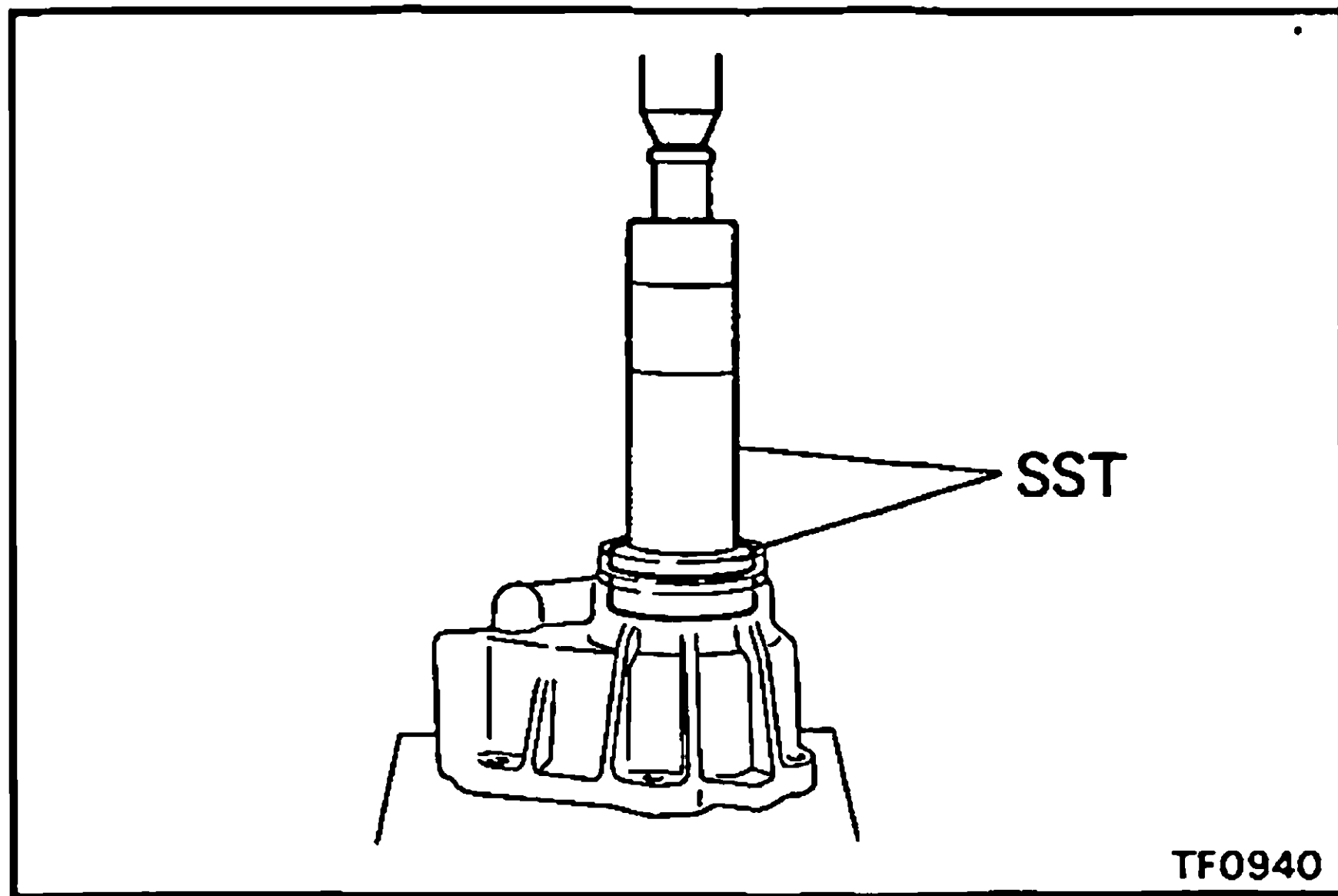
(b) Using a screwdriver and hammer, tap the dust deflector and remove it.

**4. REMOVE OIL SEAL**

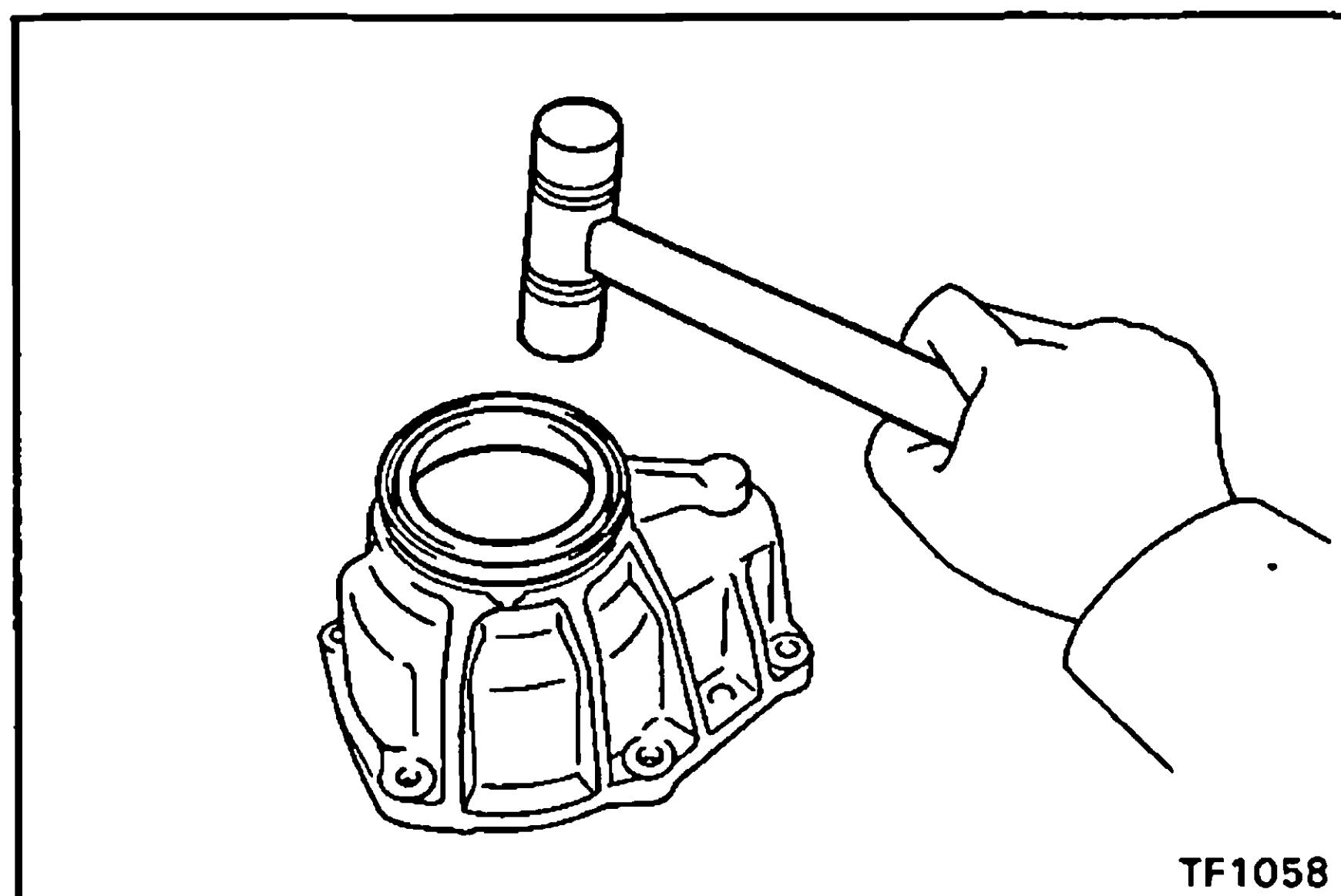
Using a screwdriver, pry out the oil seal.

**5. REMOVE BALL BEARING**

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



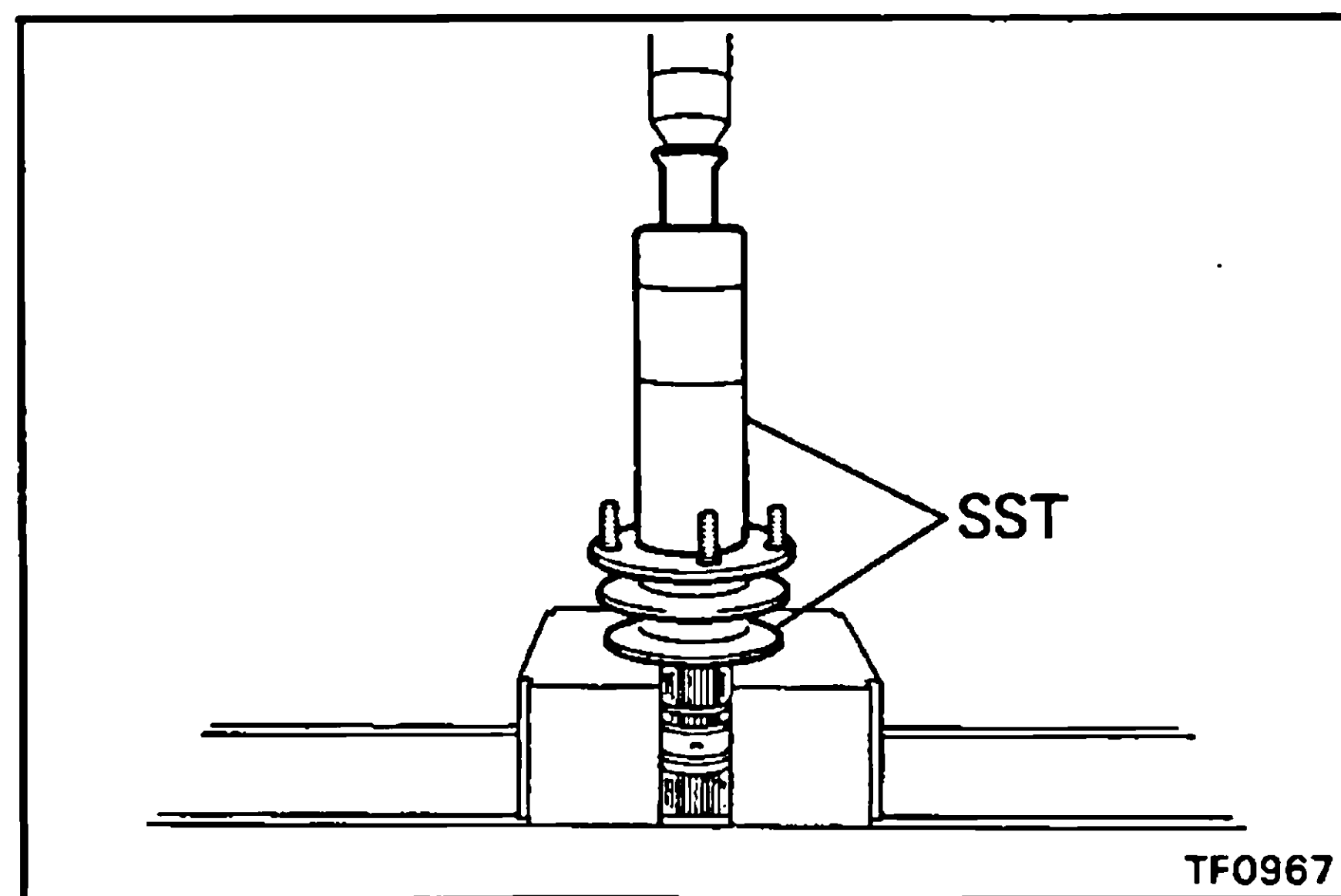
- (b) Using SST and a press, remove the ball bearing.
SST 09316-60010 (09316-00010, 09316-00070)



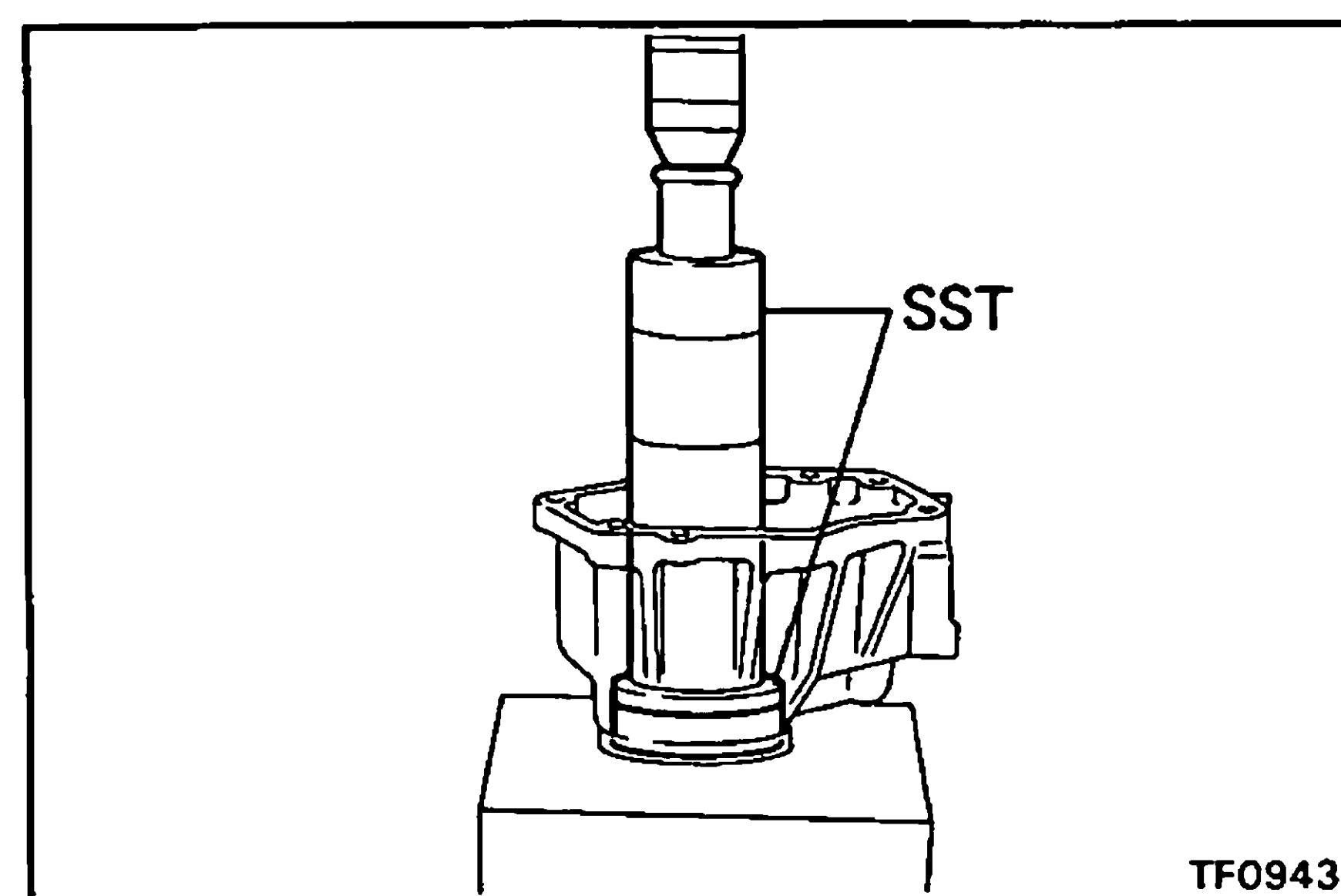
ASSEMBLY OF FRONT EXTENSION HOUSING ASSEMBLY

1. INSTALL DUST DEFLECTORS

- (a) Using a plastic hammer, install the dust deflector.

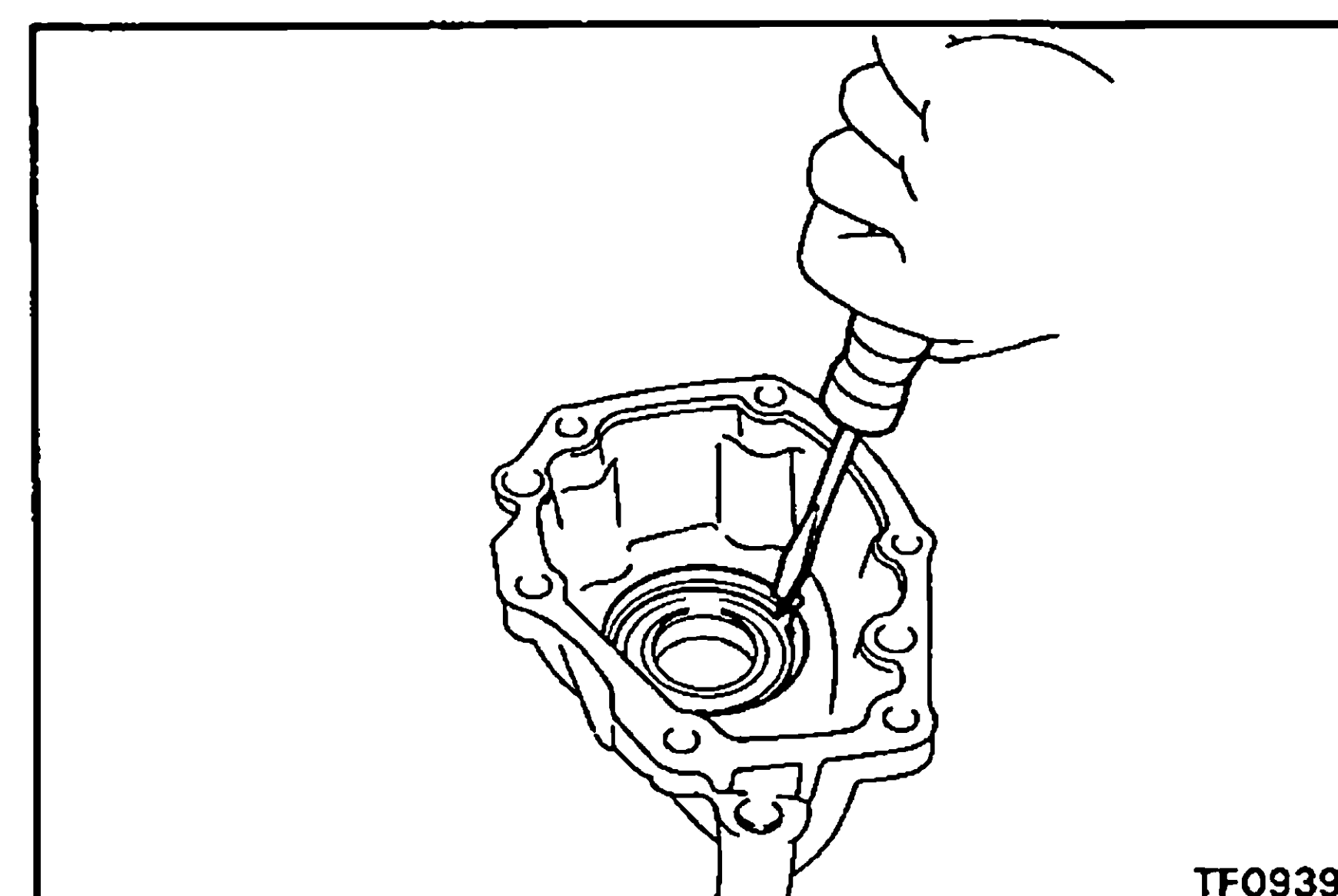


- (b) Using SST and a press, install the dust deflector.
SST 09316-20011, 09316-60010 (09316-00010)



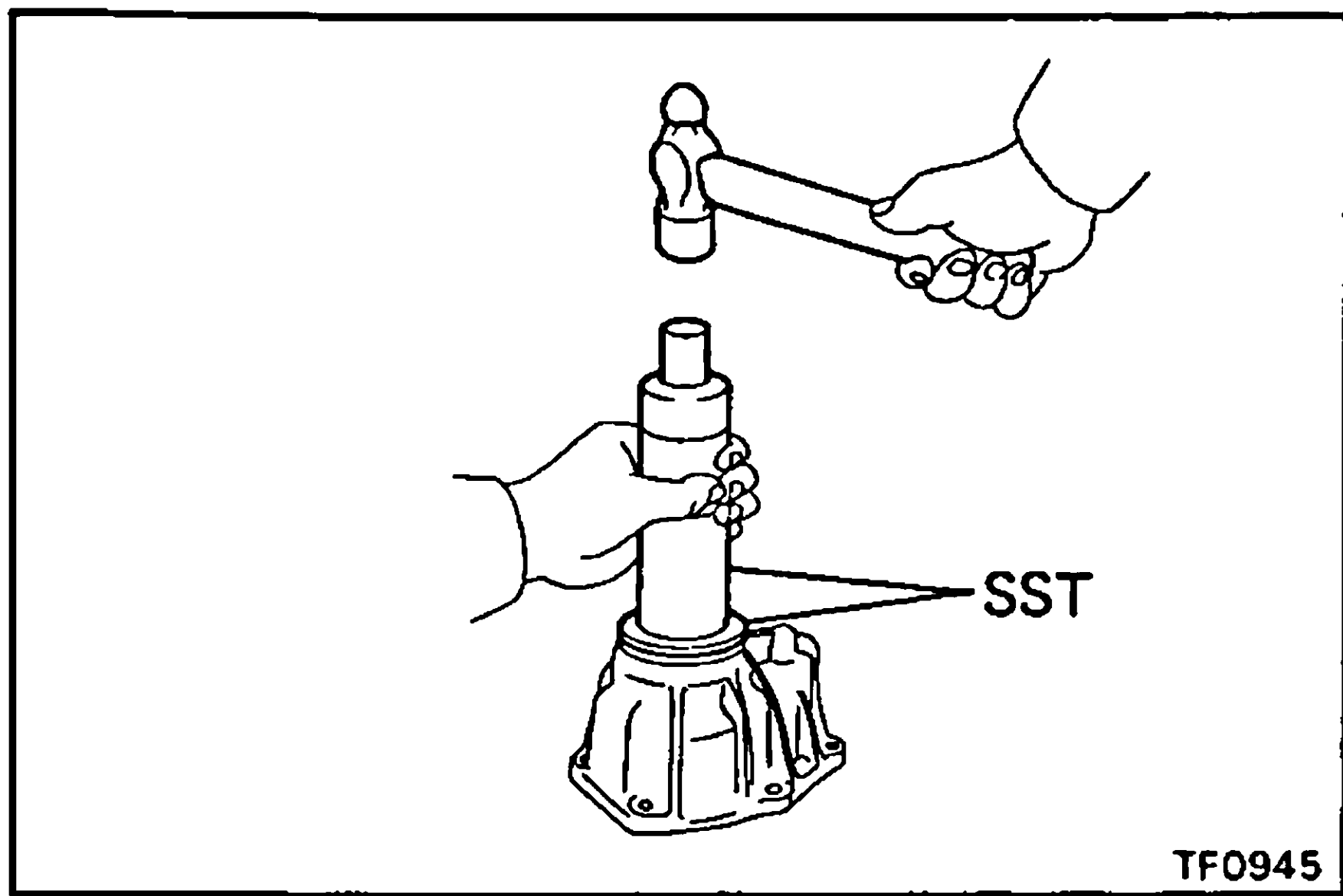
2. INSTALL BALL BEARING

- (a) Using SST and a press, install the ball bearing.
SST 09316-60010 (09316-00010, 09316-00030)



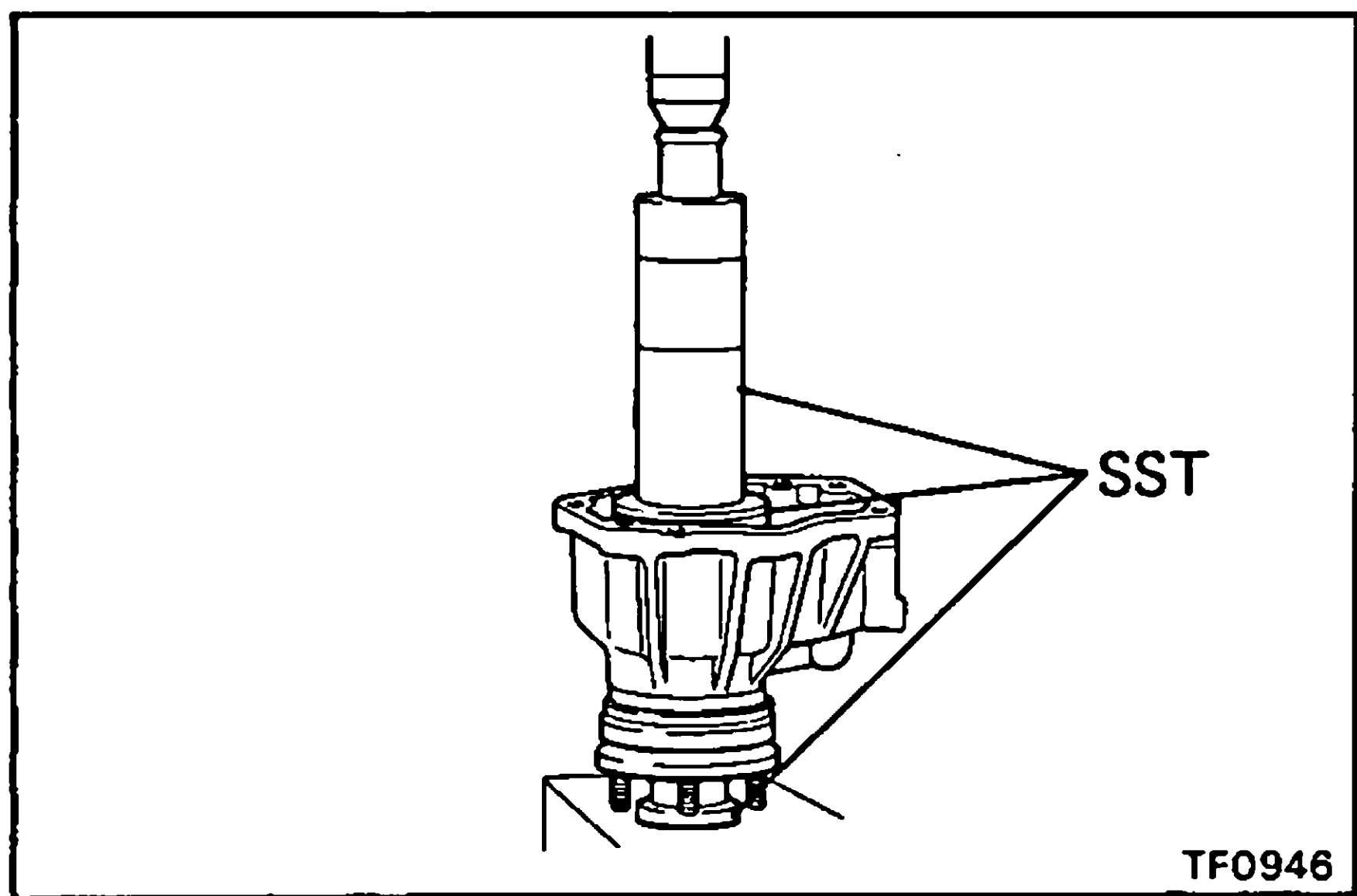
- (b) Select a snap ring that will allow minimum axial play and install it.

Mark	Thickness mm (in.)
A	1.7 (0.0669)
B	1.8 (0.0709)



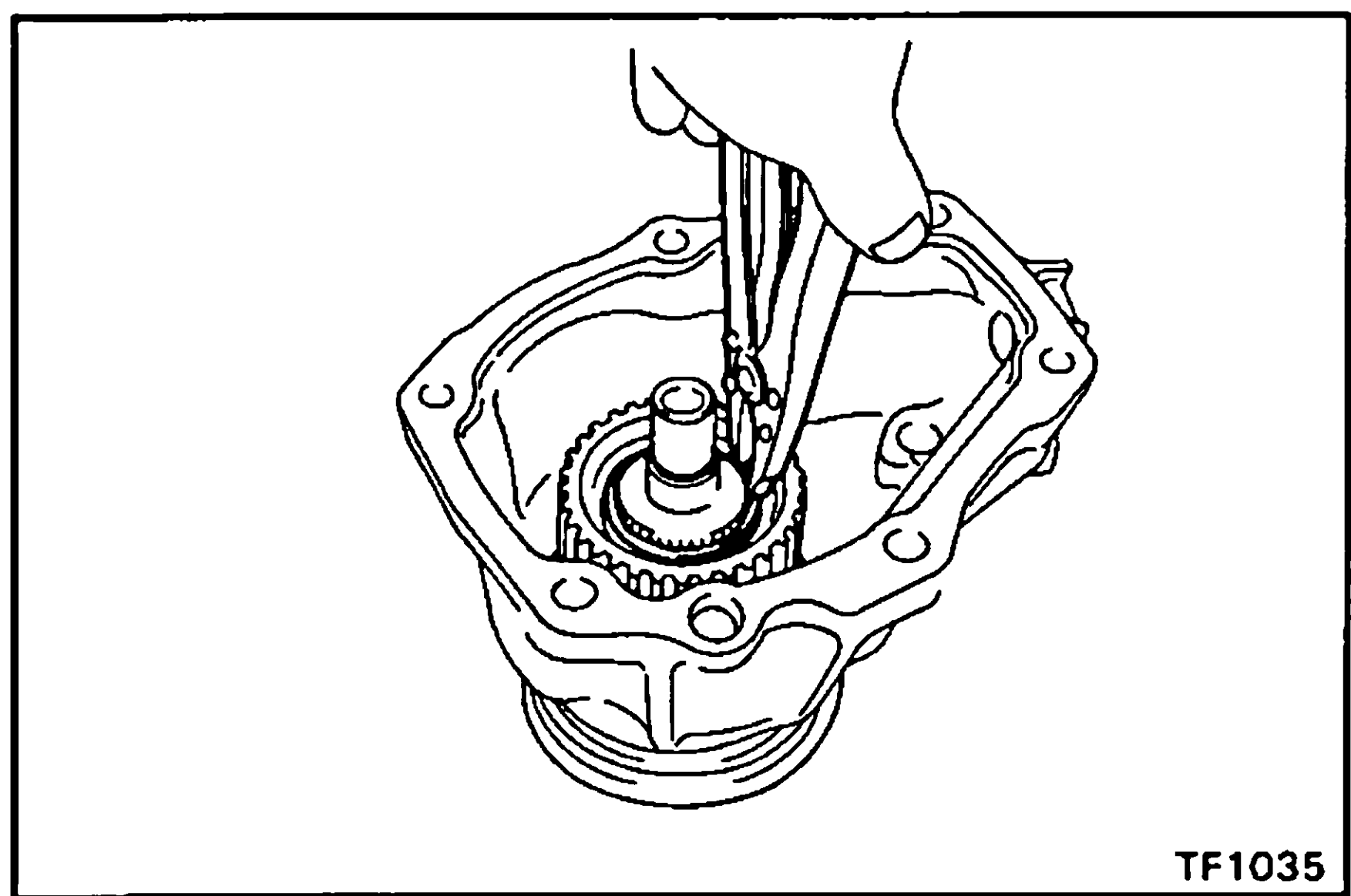
3. **INSTALL OIL SEAL**

Using SST and a hammer, drive in a new oil seal.
SST 09316-60010 (09316-00010, 09316-00060)



4. **INSTALL FRONT OUTPUT SHAFT AND DRIVE CLUTCH HUB**

- (a) Using SST and a press, install the front output shaft and drive clutch hub.
SST 09316-20011, 09316-60010
(09316-00010, 09316-00040, 09316-00070)

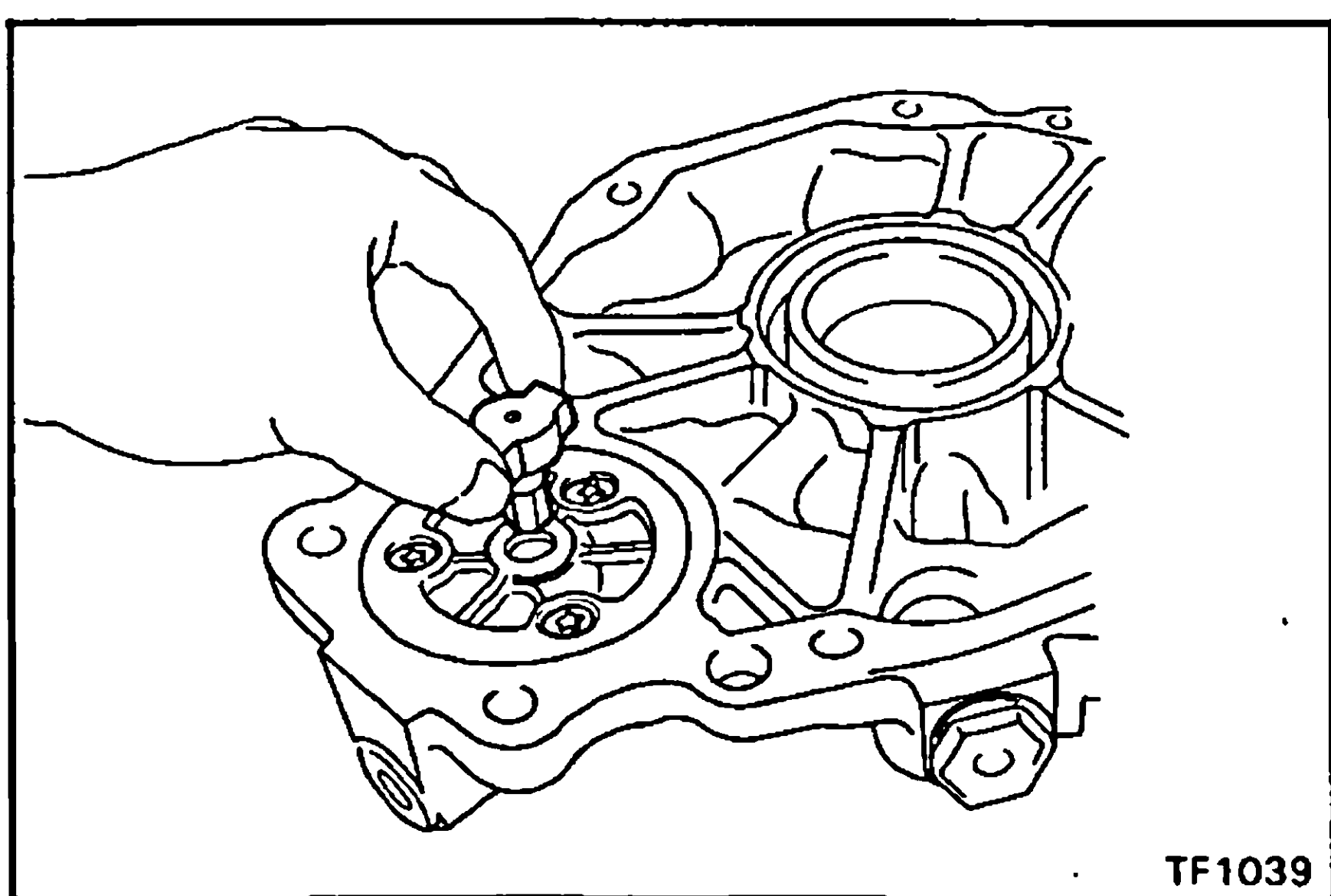
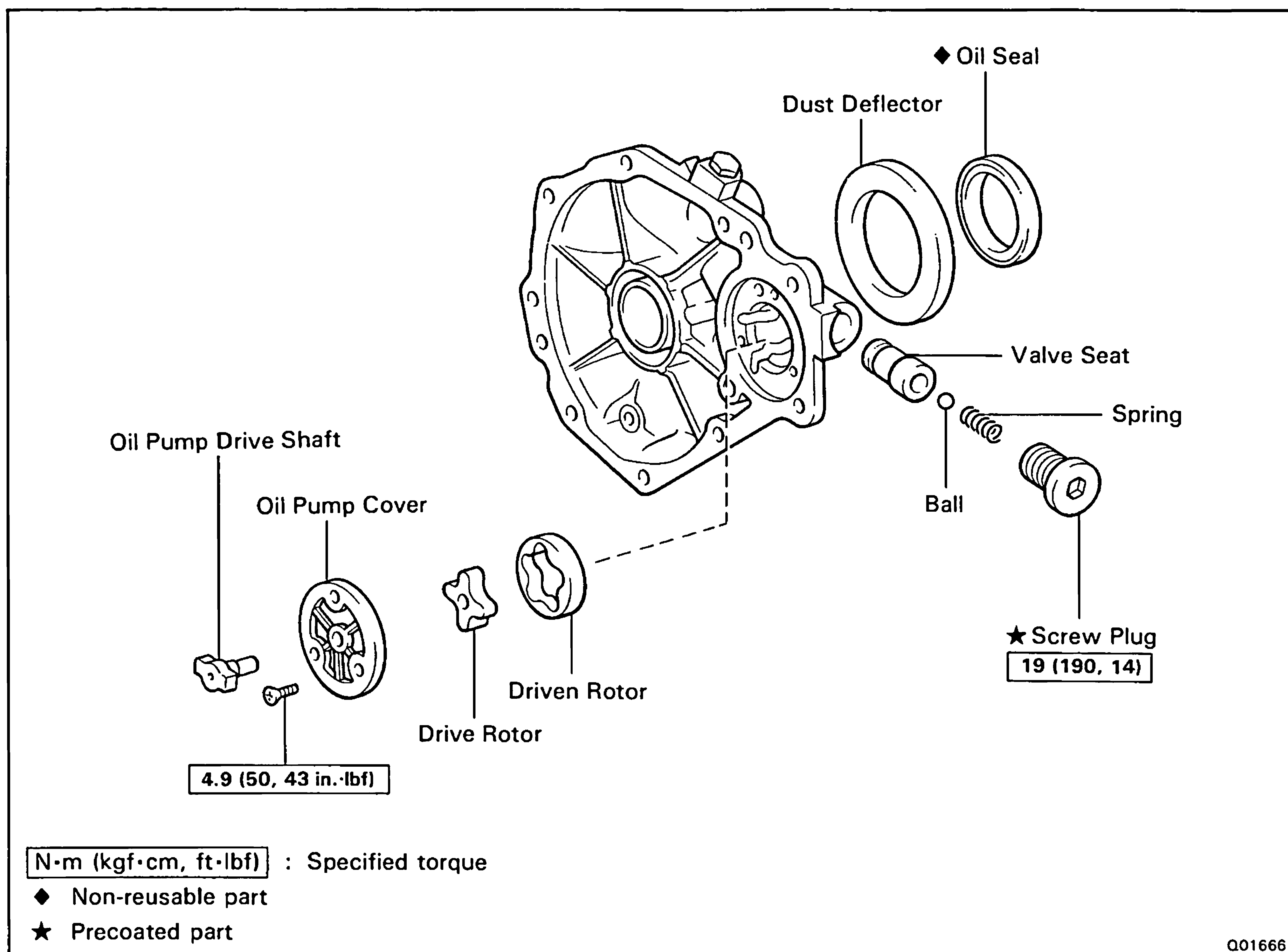


- (b) Select a snap ring that will allow minimum axial play and install it.

Mark	Thickness mm (in.)
A	1.8 (0.0709)
B	1.9 (0.0748)
C	2.0 (0.0787)
D	2.1 (0.0827)
E	2.2 (0.0866)

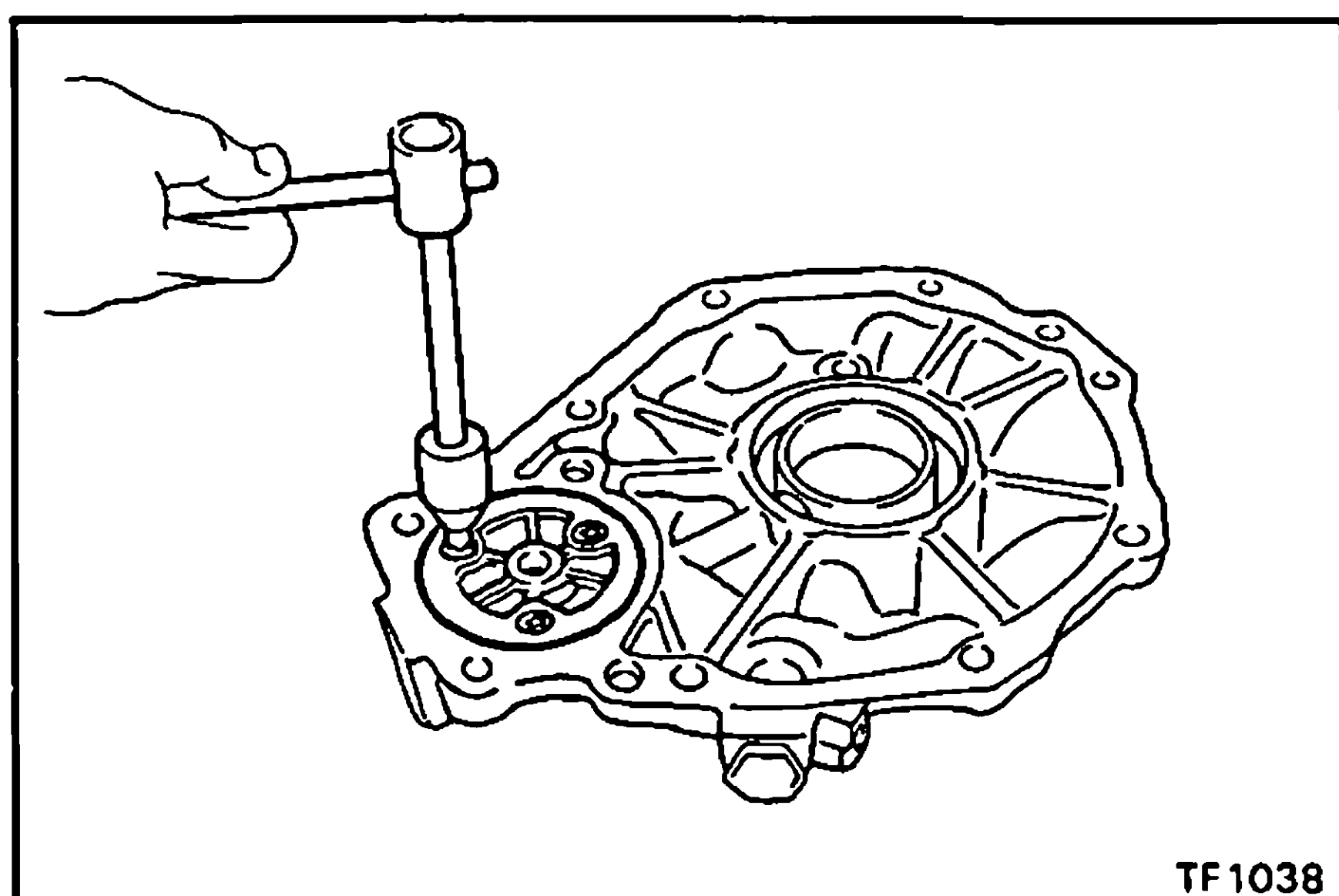
Rear Extension Housing Assembly

COMPONENTS



DISASSEMBLY OF REAR EXTENSION HOUSING ASSEMBLY

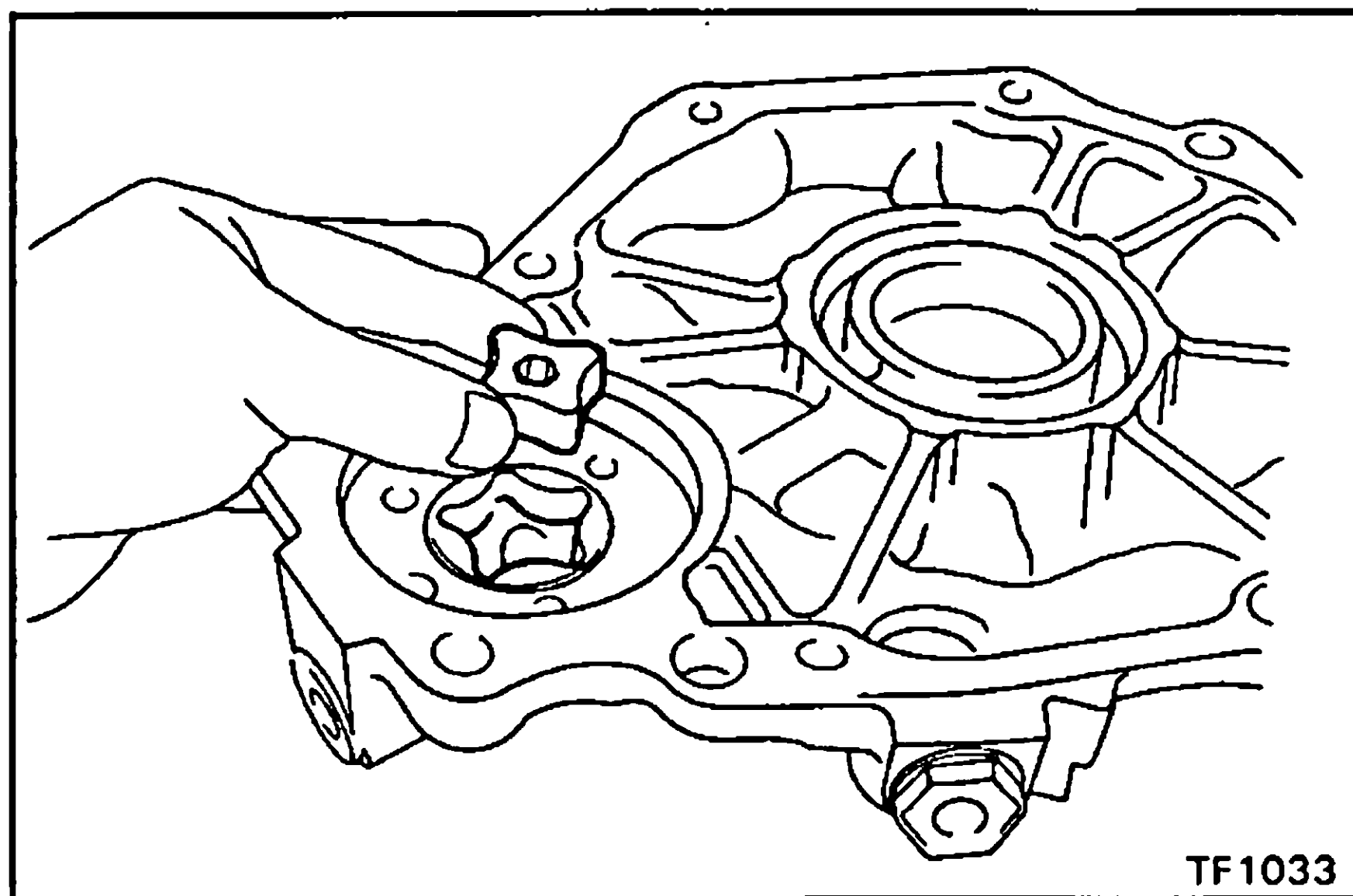
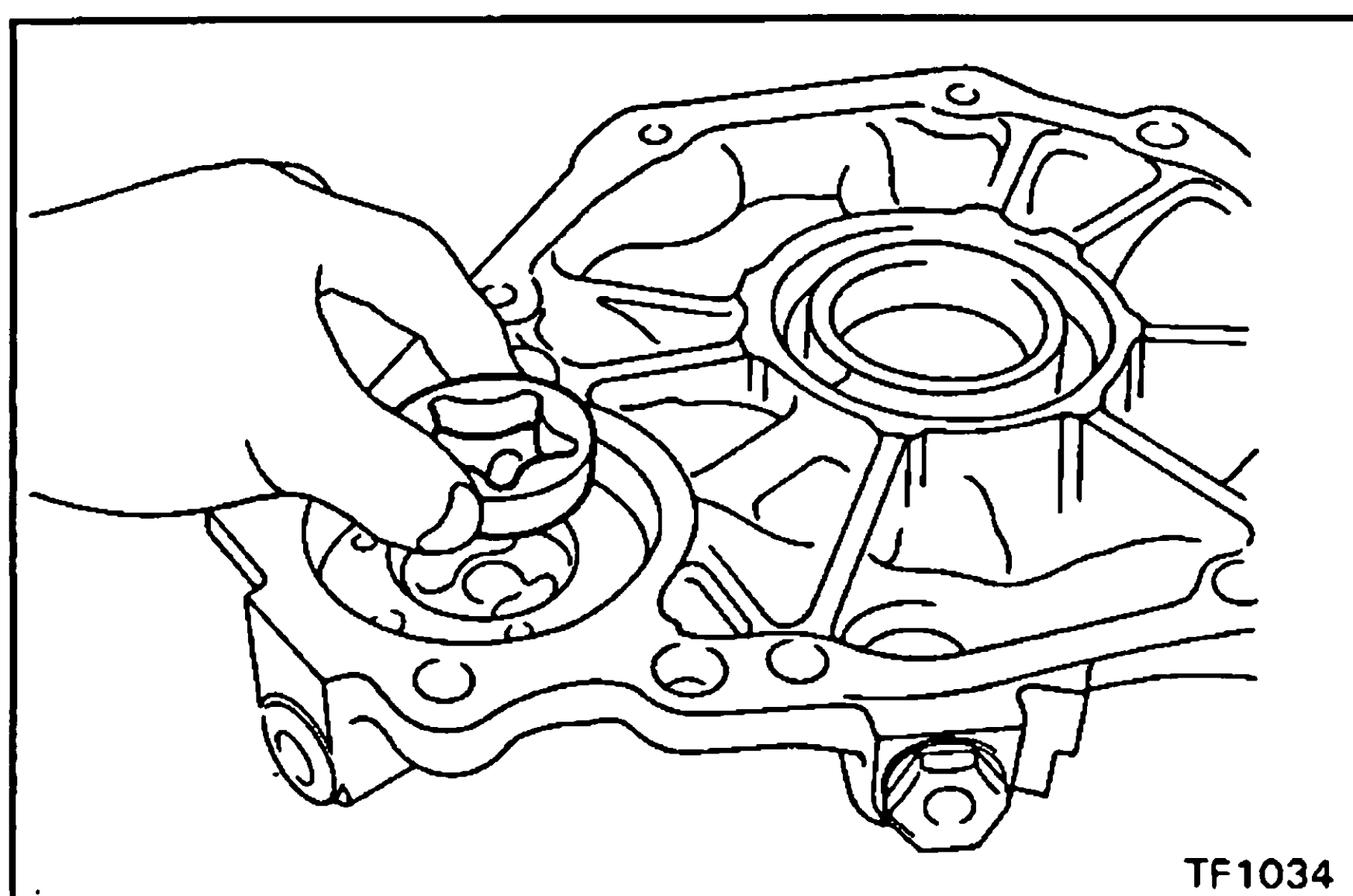
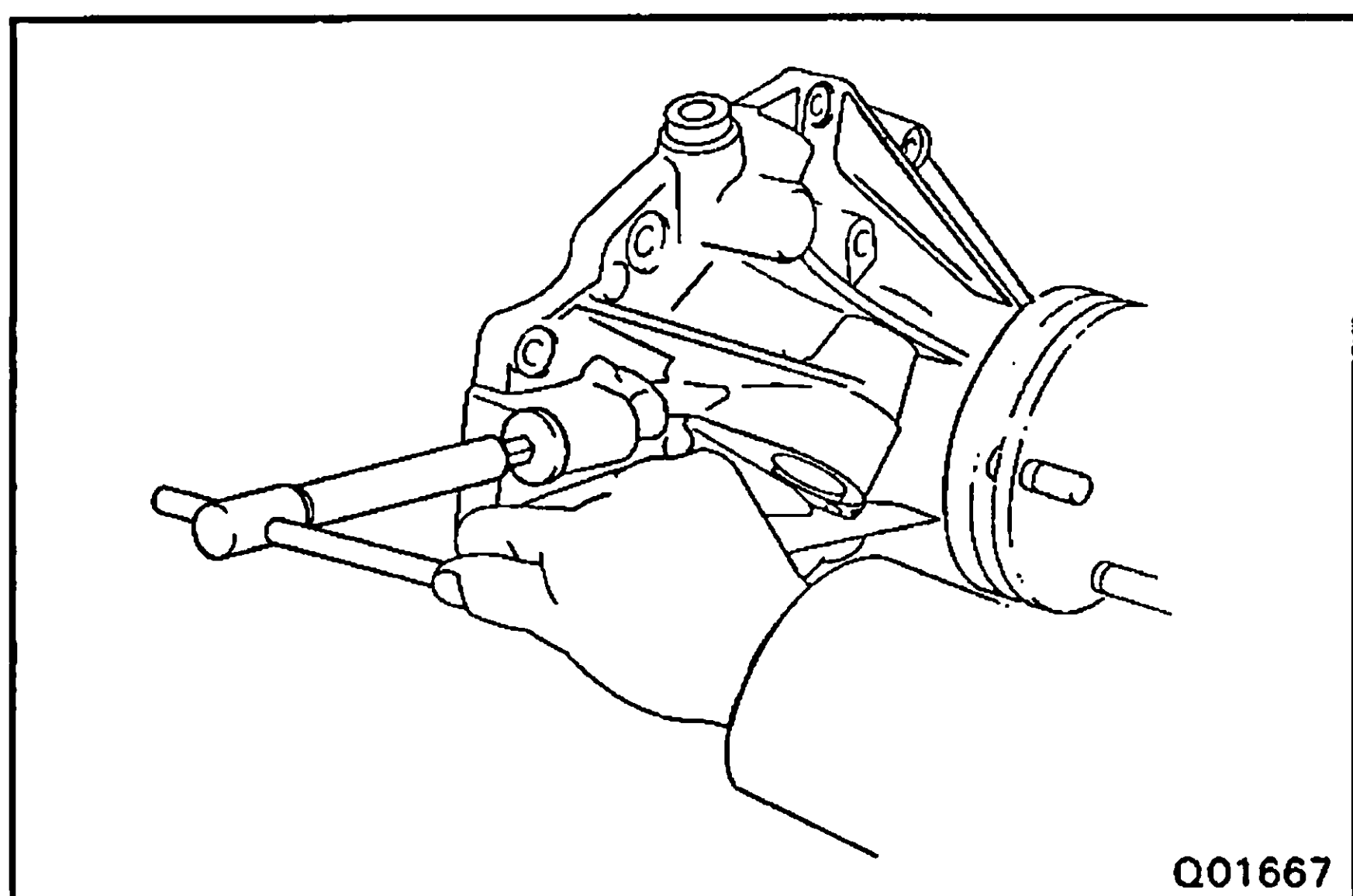
1. REMOVE OIL PUMP DRIVE SHAFT



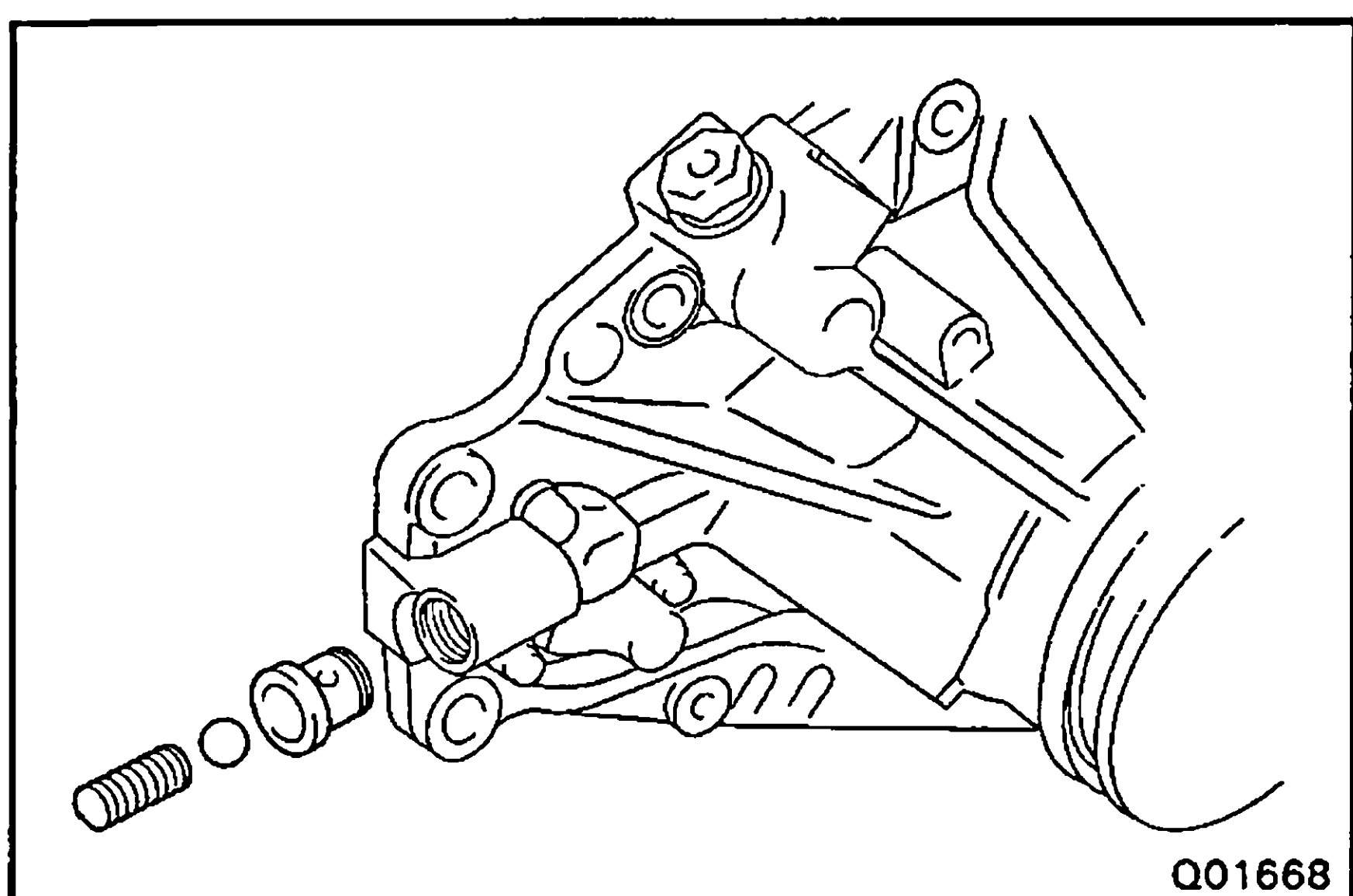
2. REMOVE OIL PUMP COVER

Using a torx socket wrench, remove the three screws and oil pump cover.

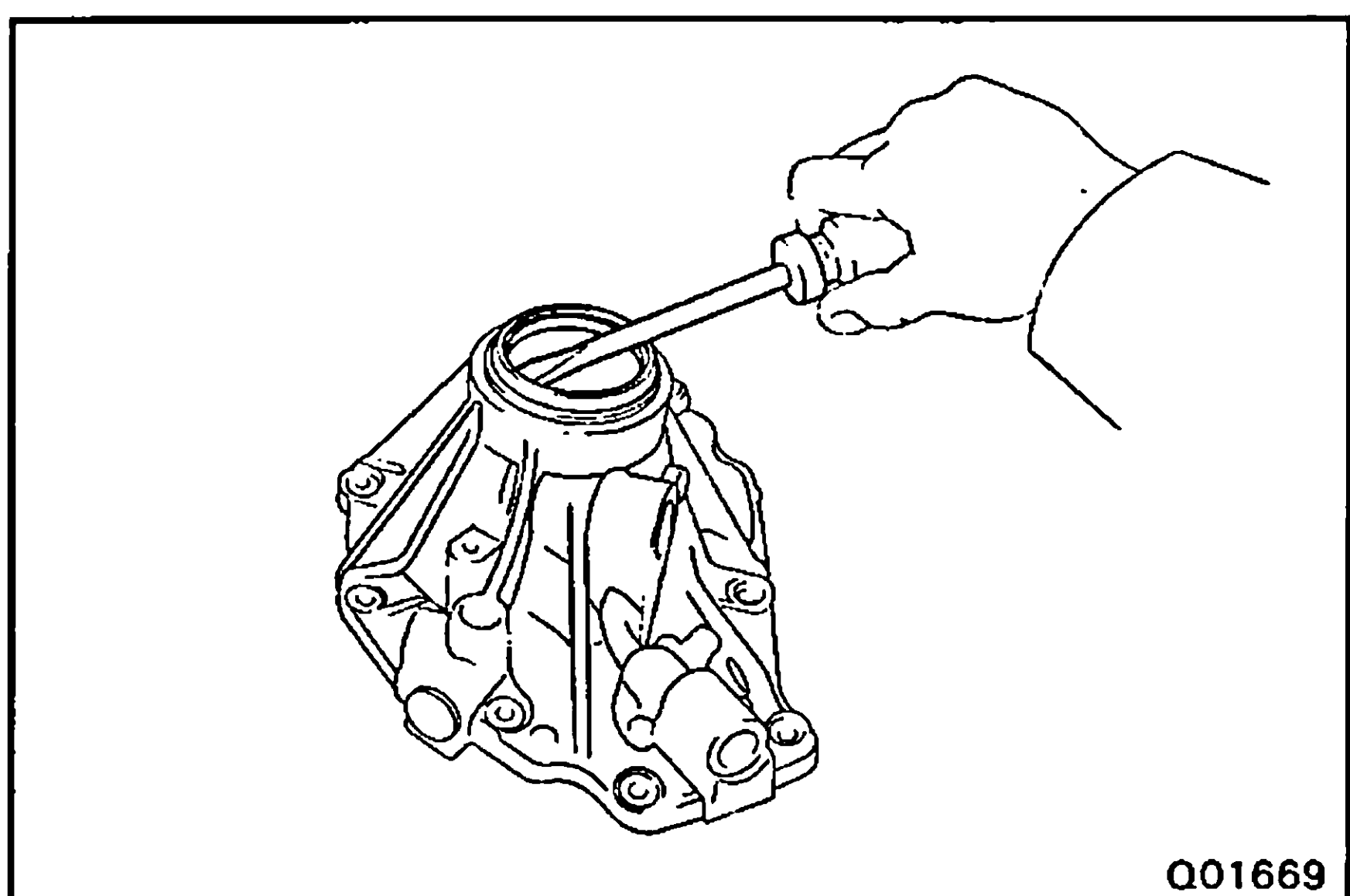
(Torx socket wrench T30 09042-00010)

**3. REMOVE DRIVE ROTOR****4. REMOVE DRIVEN ROTOR****5. REMOVE SCREW PLUG, SPRING, BALL AND VALVE SEAT**

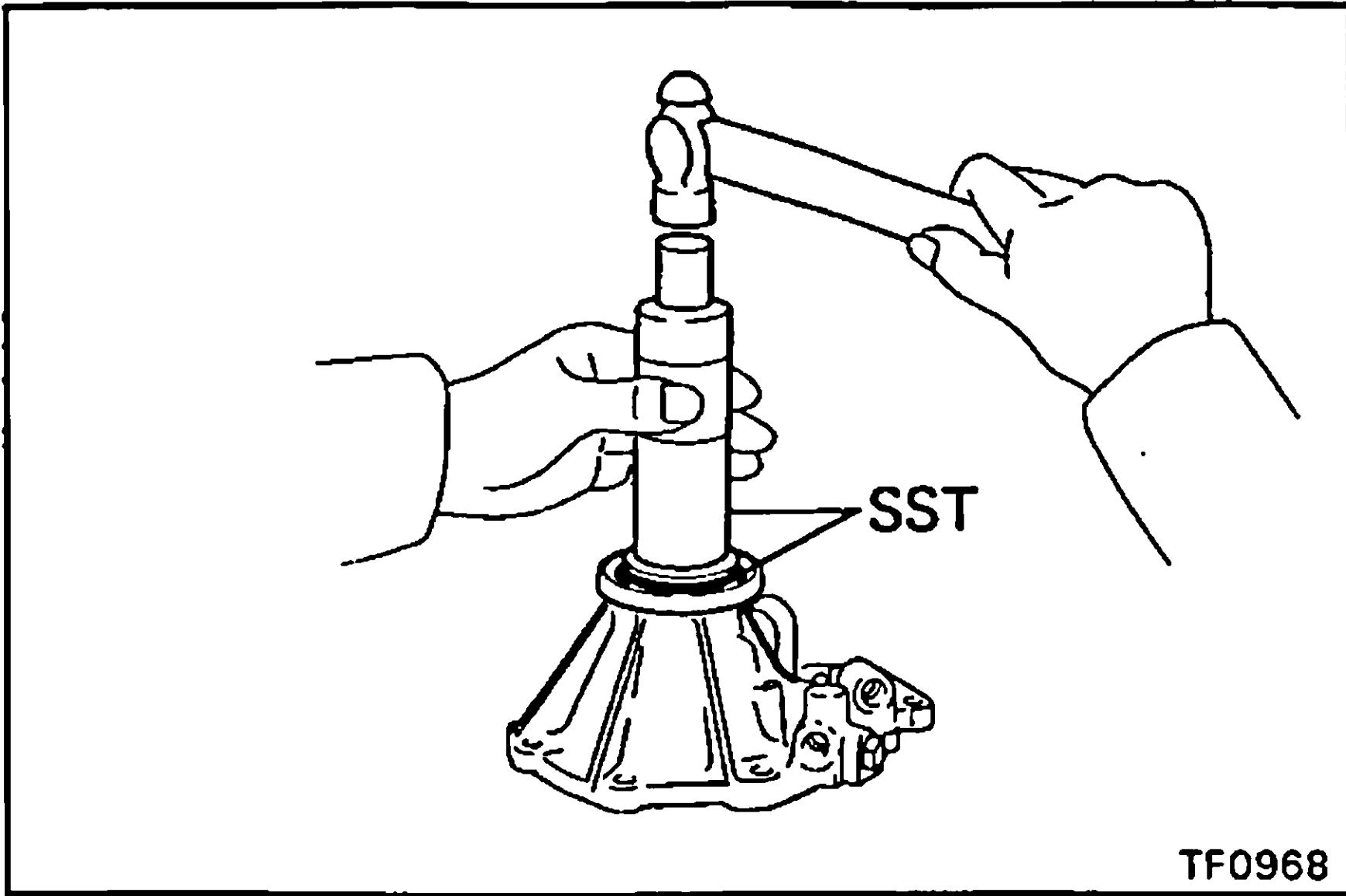
(a) Using a hexagon wrench, remove the screw plug.



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

**6. REMOVE OIL SEAL**

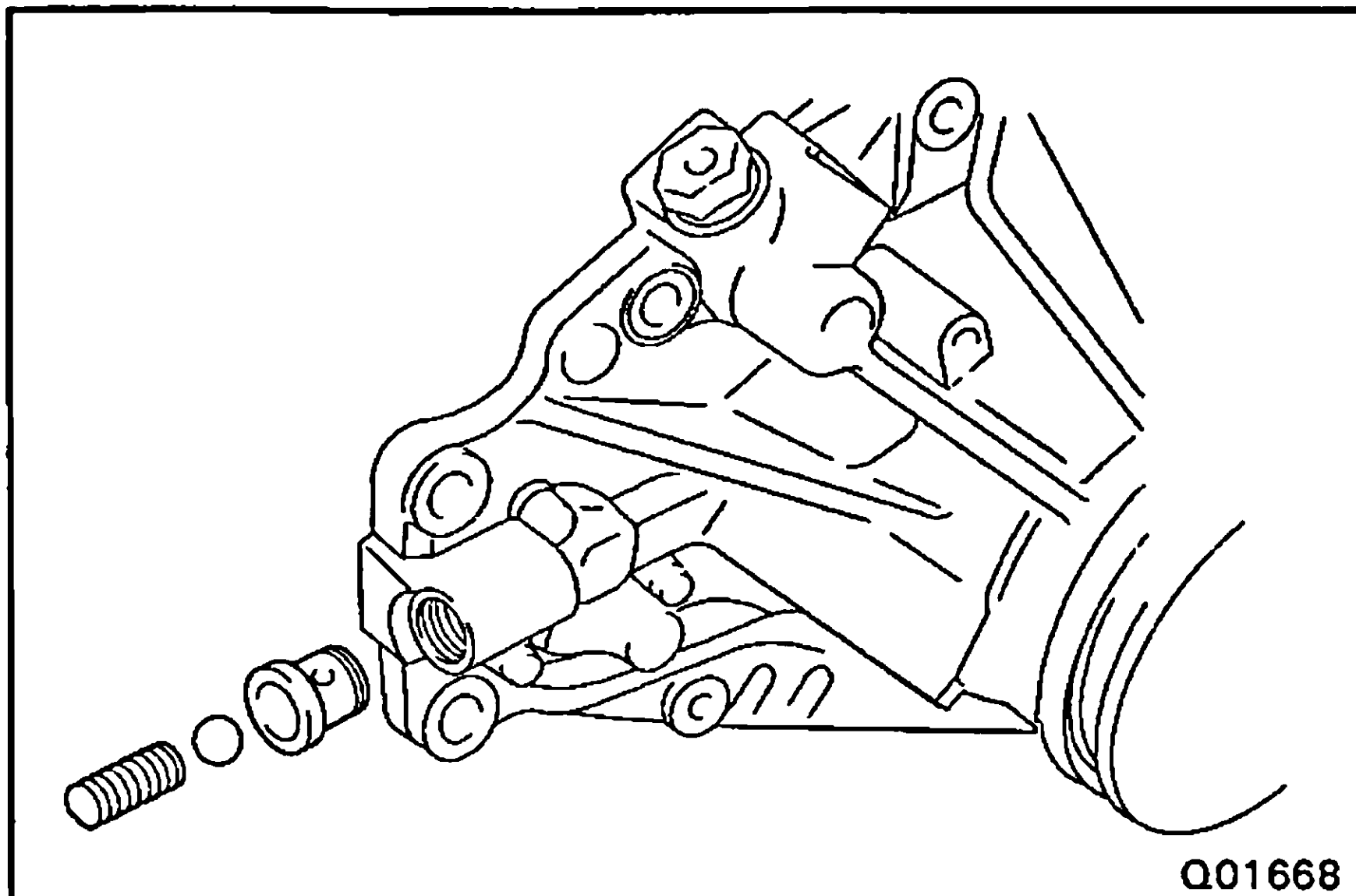
Using a screwdriver, pry out the oil seal.



ASSEMBLY OF REAR EXTENSION HOUSING ASSEMBLY

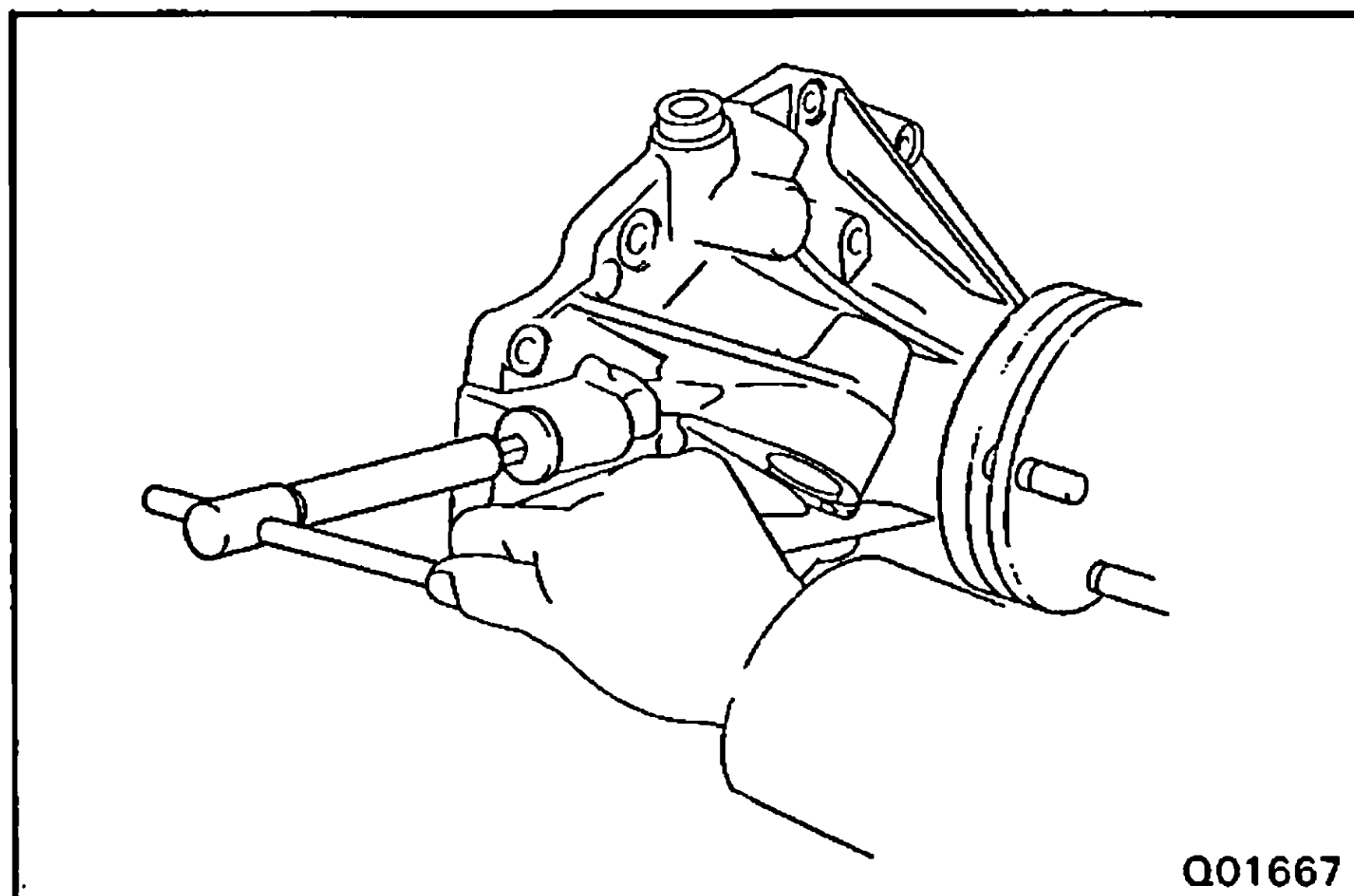
1. INSTALL DUST DEFLECTORS

Using SST and a hammer, install the dust deflector.
SST 09316-60010 (09316-00010, 09316-00040)



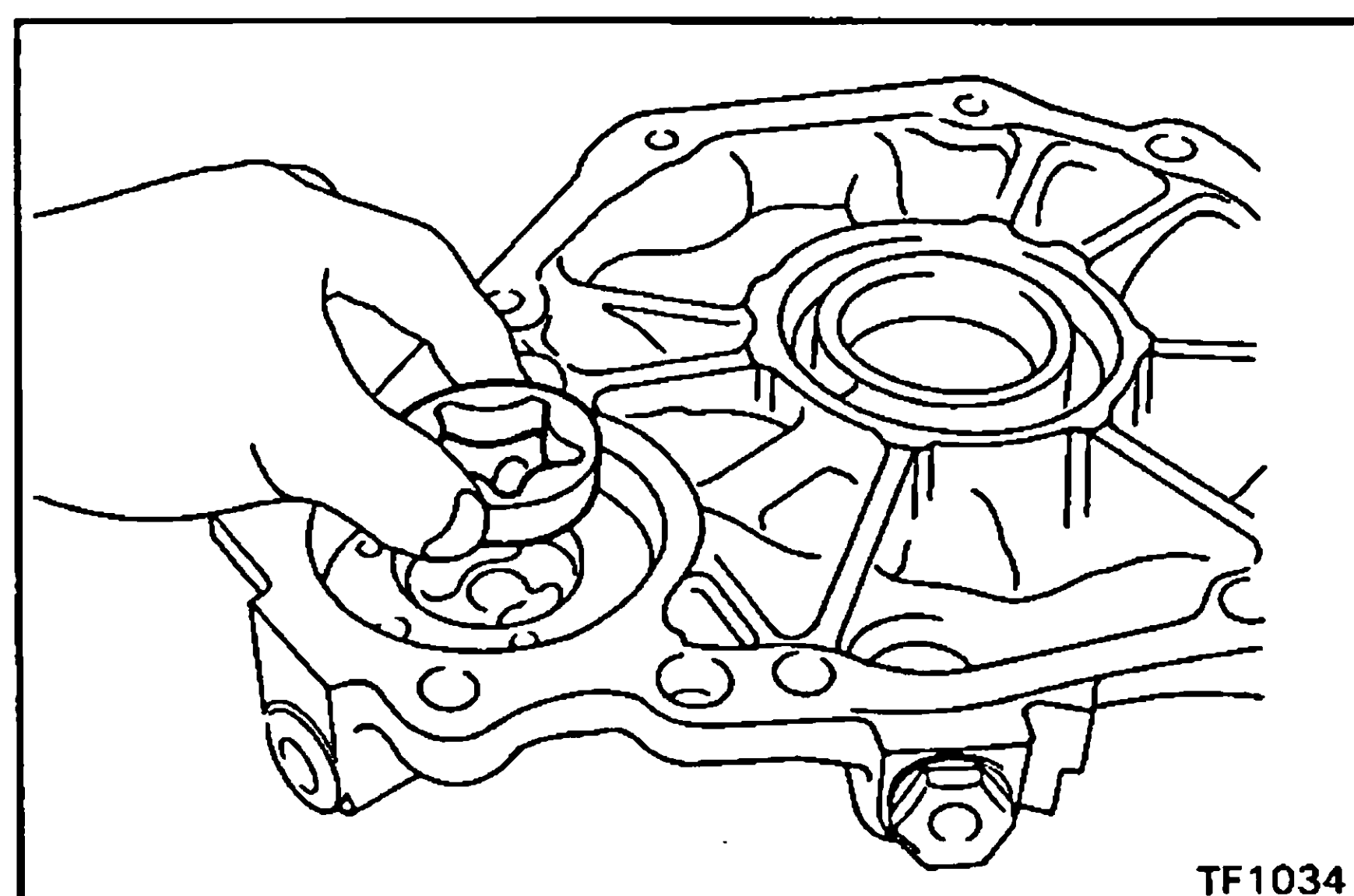
2. INSTALL VALVE SEAT, BALL, SPRING AND SCREW PLUG

- (a) Apply gear oil to the ball.
- (b) Install the valve seat, ball and spring.



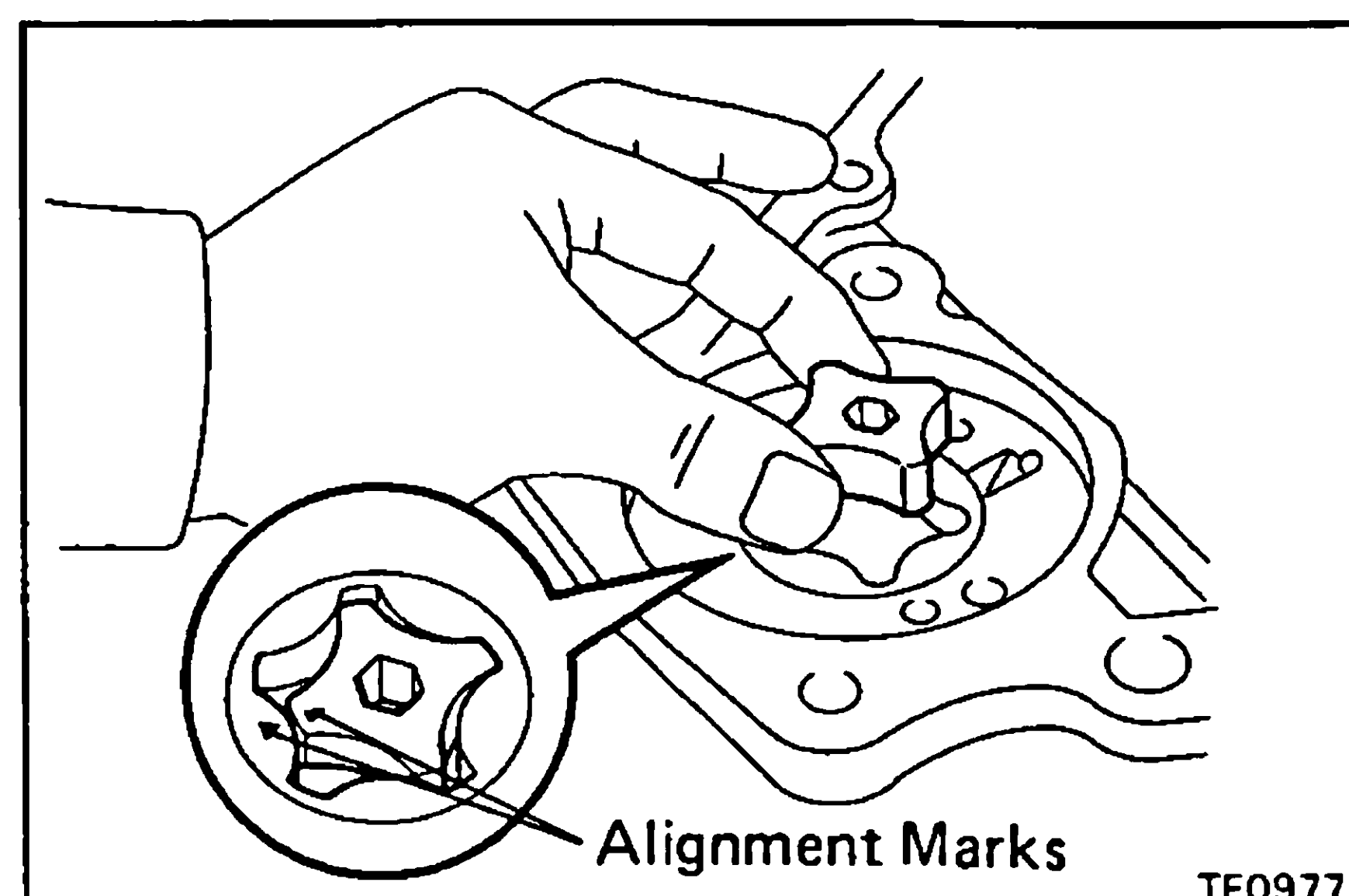
- (c) Install and torque the screw plug.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



3. INSTALL DRIVEN ROTOR

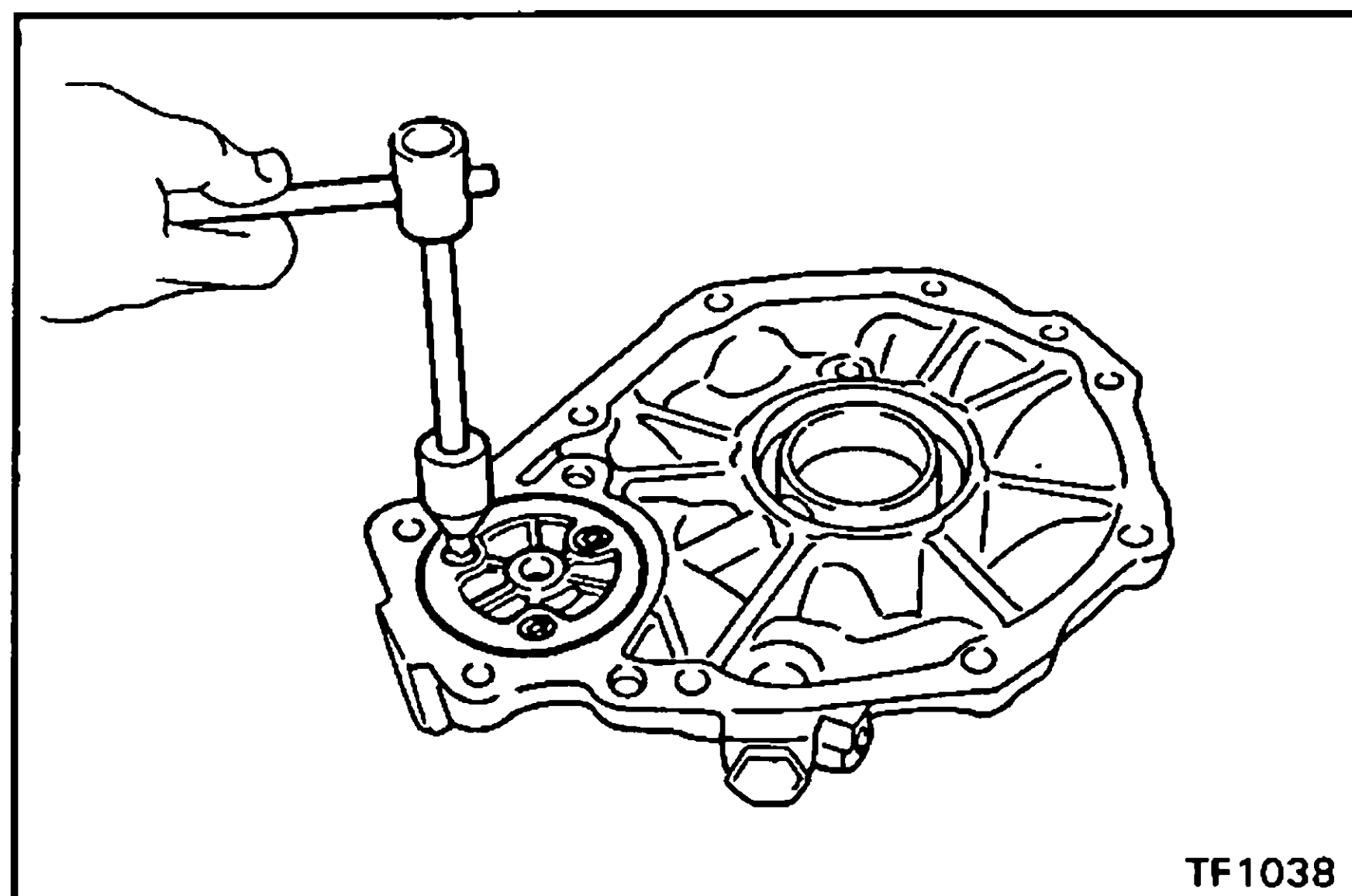
- (a) Apply gear oil to the driven rotor.
- (b) Install the driven rotor.



4. INSTALL DRIVE ROTOR

- (a) Apply gear oil to the drive rotor.
- (b) Install the drive rotor.

HINT: Align the alignment marks.



5. INSTALL OIL PUMP COVER

- (a) Install the oil pump cover.
- (b) Install and torque the three bolts.
(Torx socket wrench T30 09042-00010)

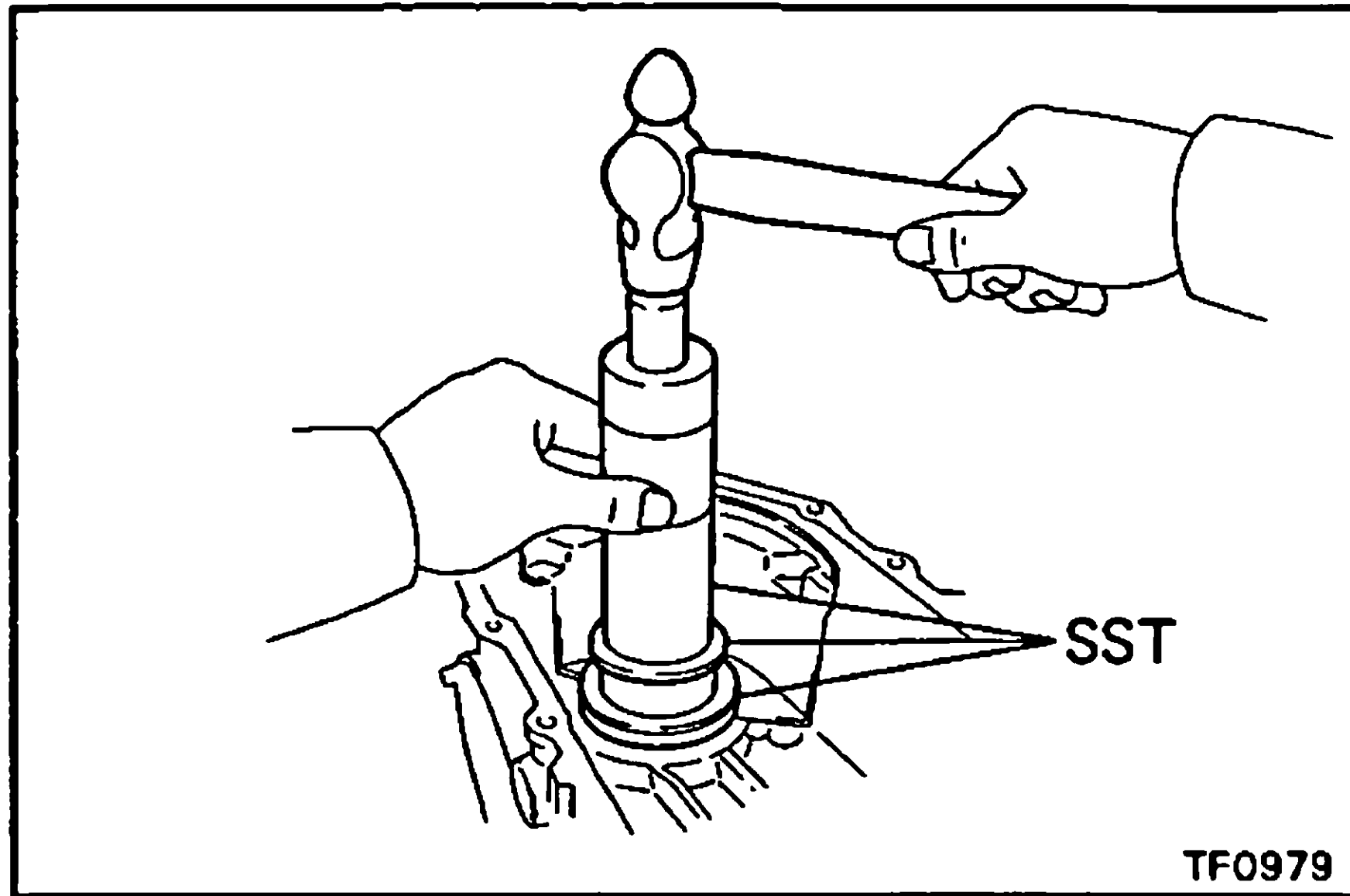
Torque: 4.9 N·m (50 kgf·cm, 43 in·lbf)

ASSEMBLY OF TRANSFER

1. INSTALL TWO BEARING RACES TO FRONT CASE

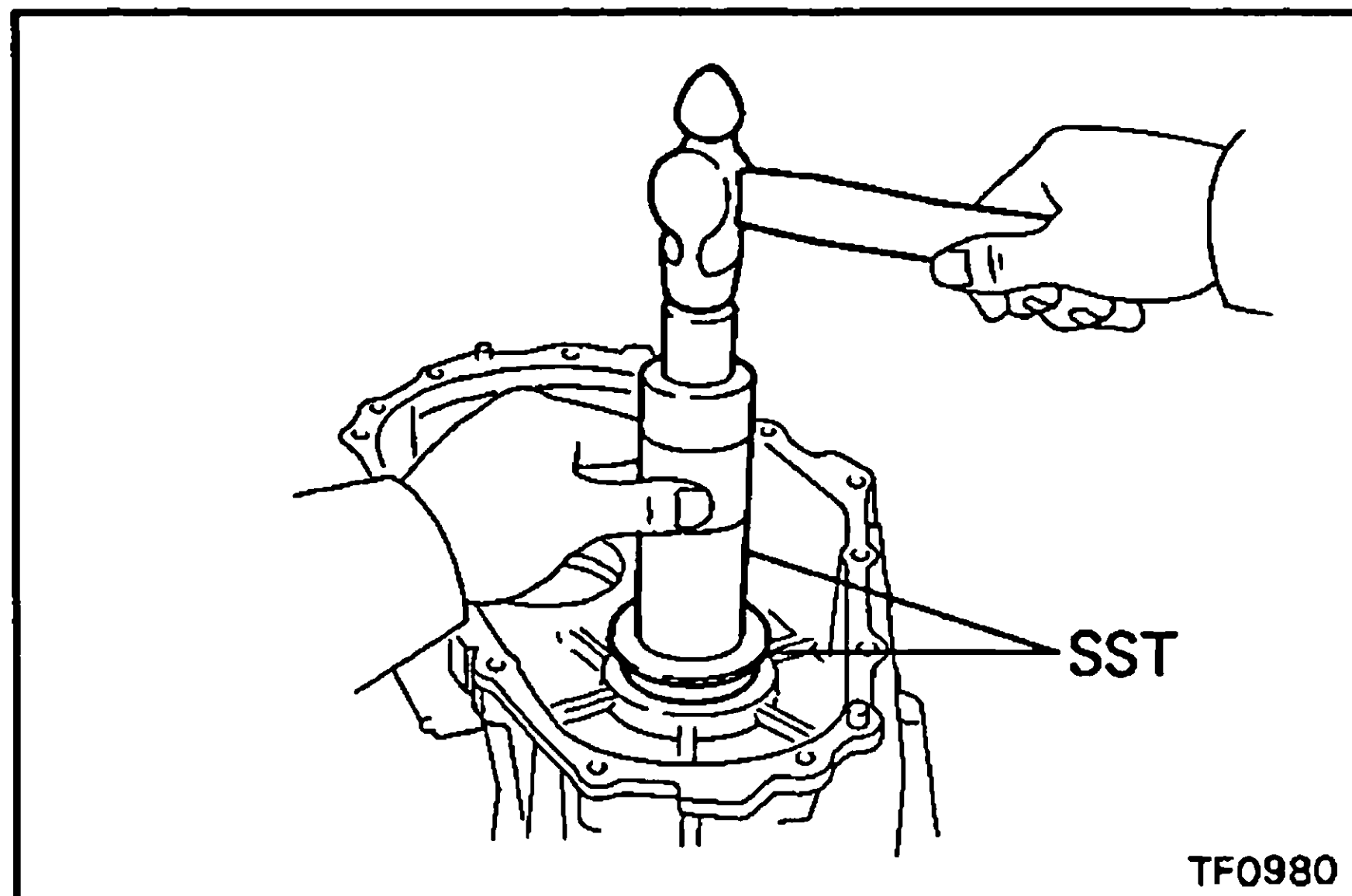
- (a) Using SST and a hammer, install the output shaft bearing race.

SST 09316-20011, 09316-60010 (09316-00010, 09316-00030)



- (b) Using SST and a hammer, install the idle gear bearing race.

SST 09316-60010 (09316-00010, 09316-00040)

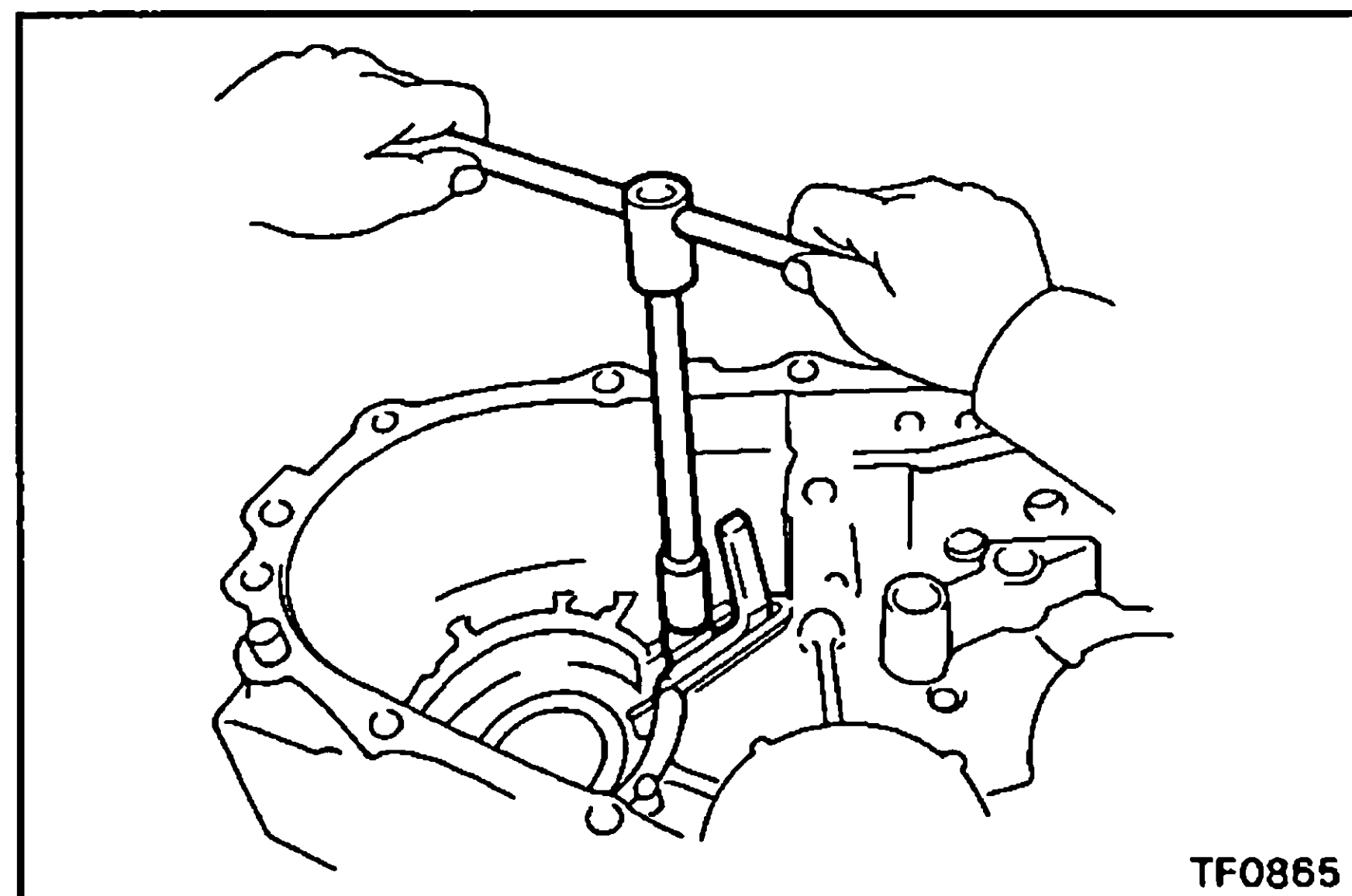


2. INSTALL OIL RECEIVER TO FRONT CASE

- (a) Install the oil receiver.

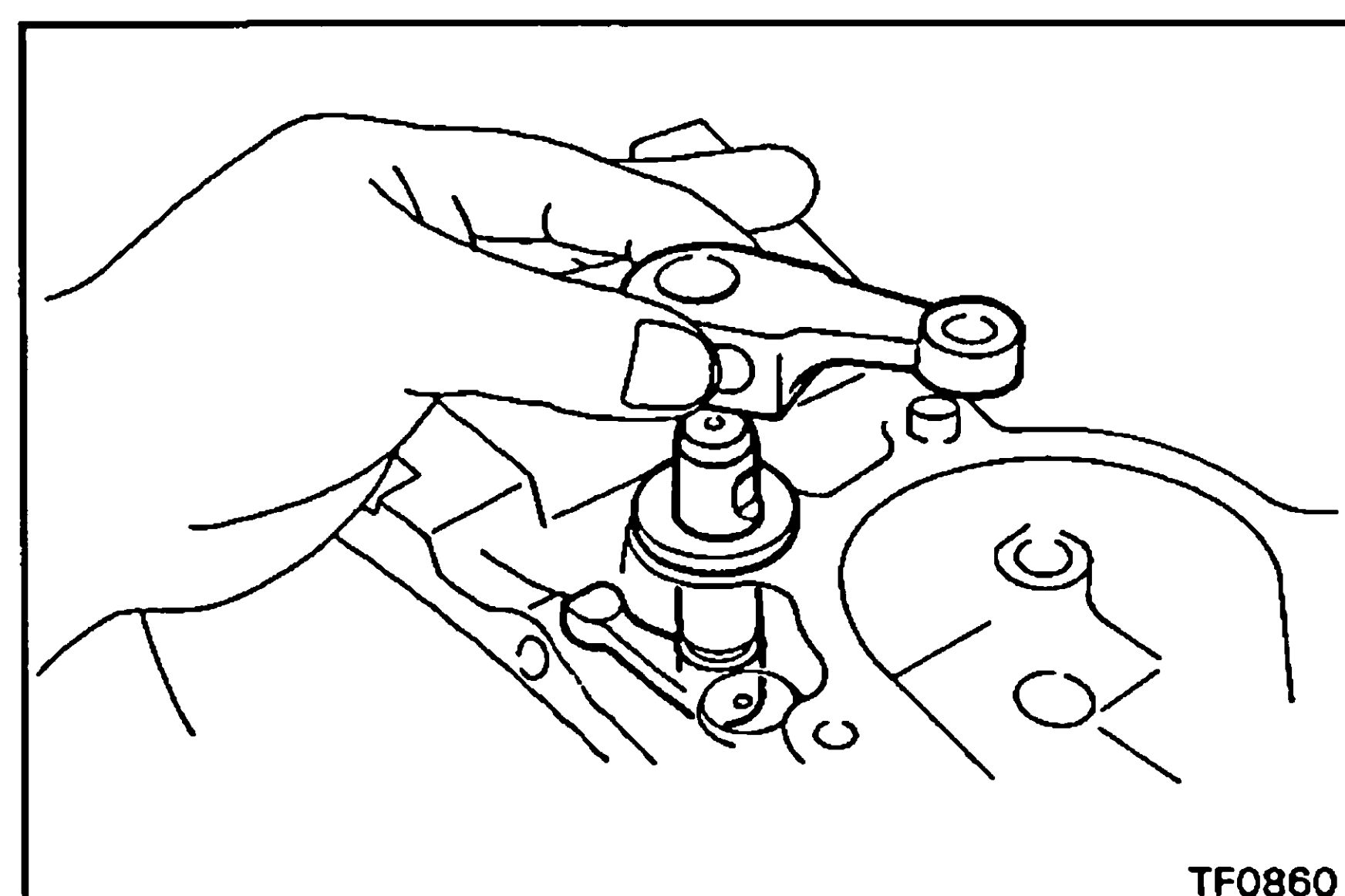
- (b) Install and torque the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

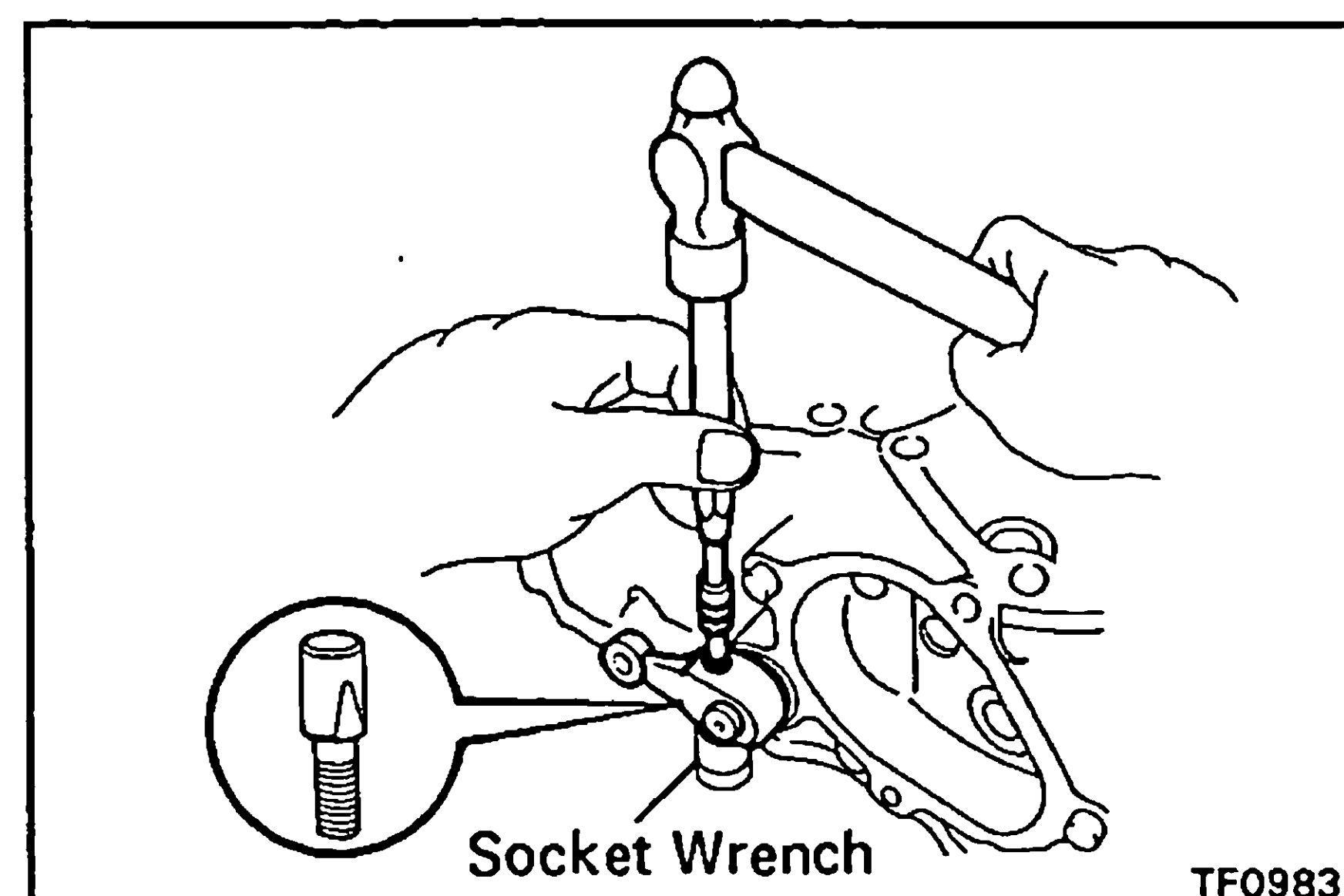


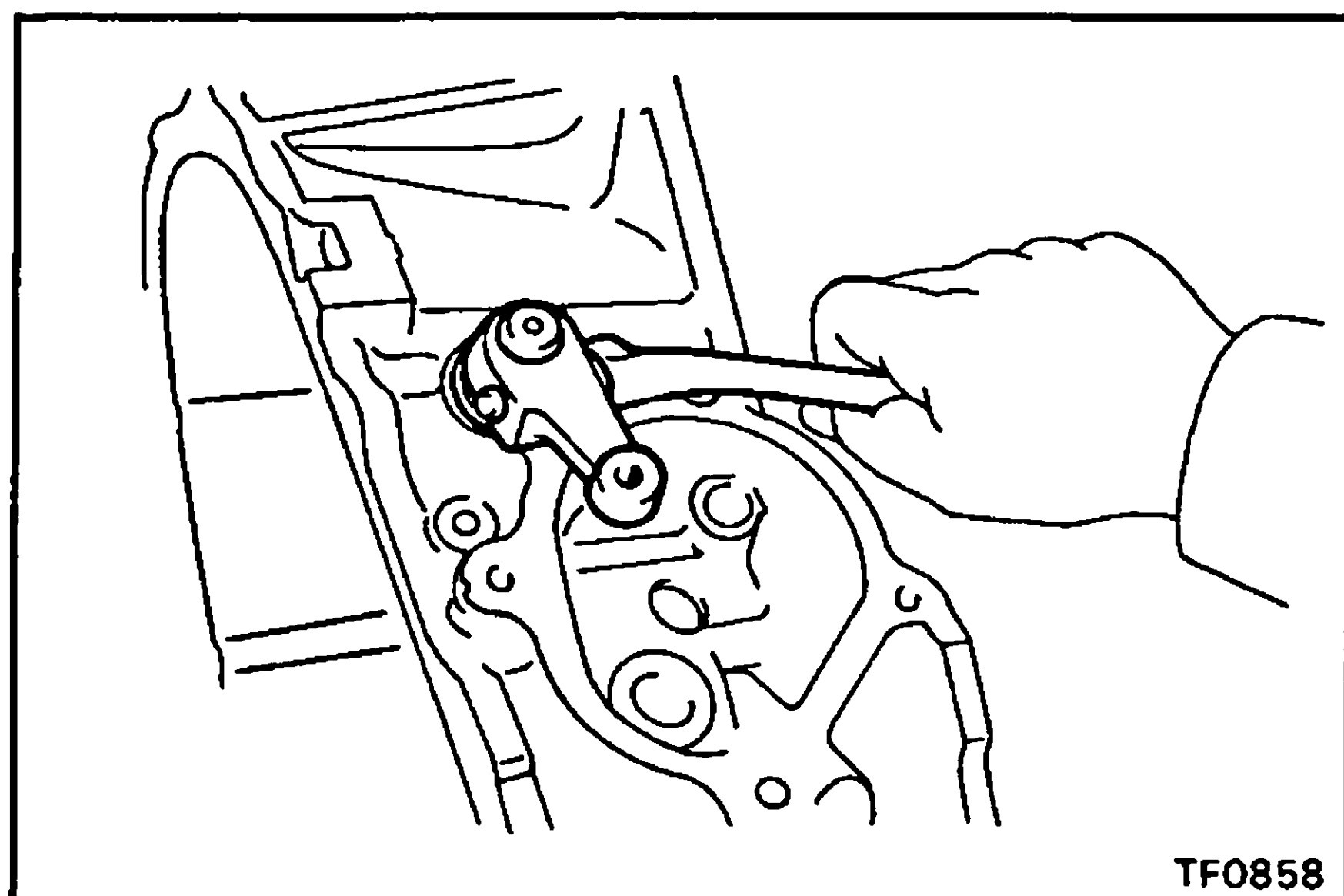
3. INSTALL SHIFT OUTER LEVER AND INNER LEVER

- (a) Install the shift outer lever and inner lever.



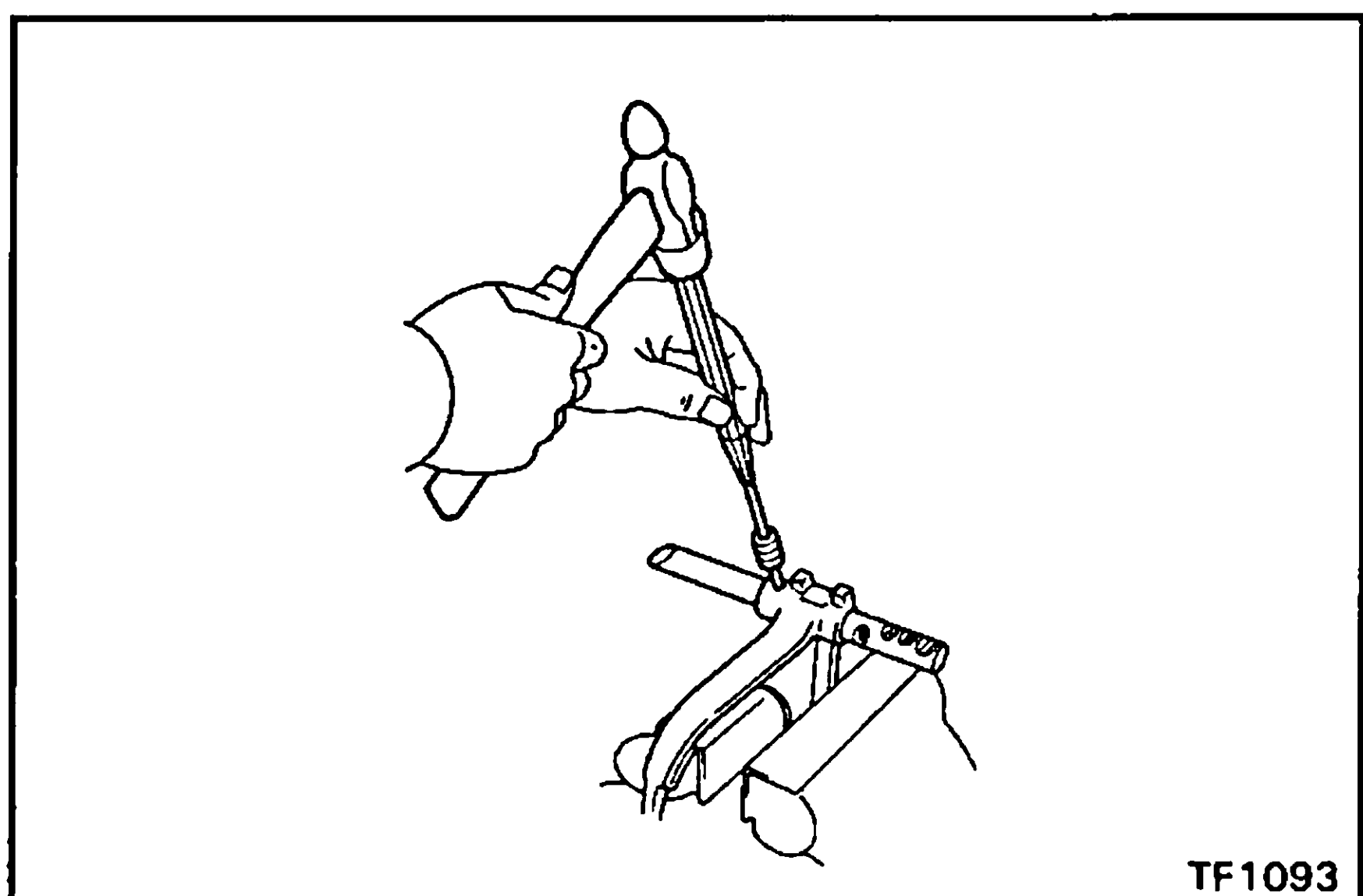
- (b) Using a pin punch and a hammer, tap in the lever lock pin.





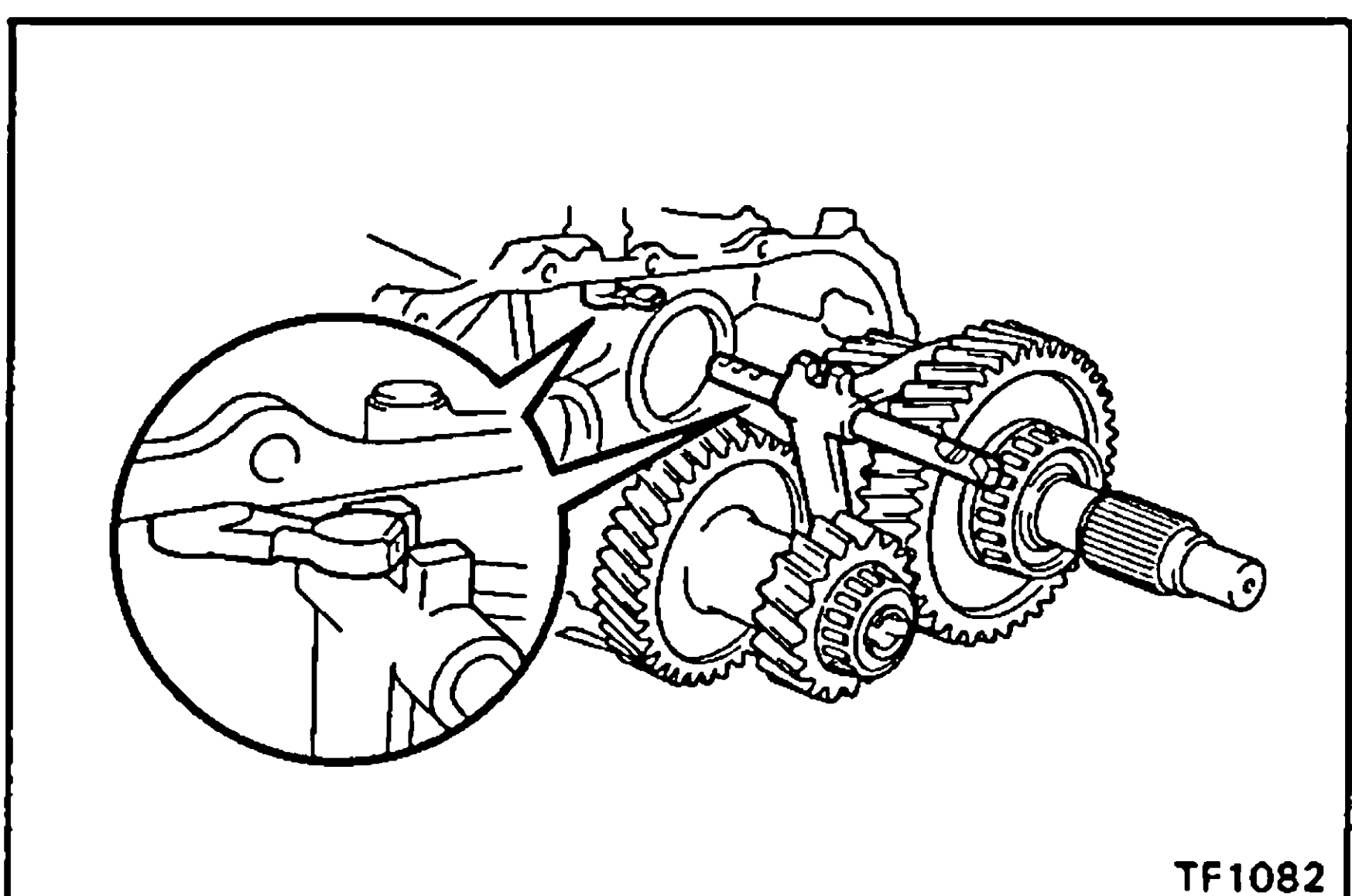
(c) Install the washer and nut.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

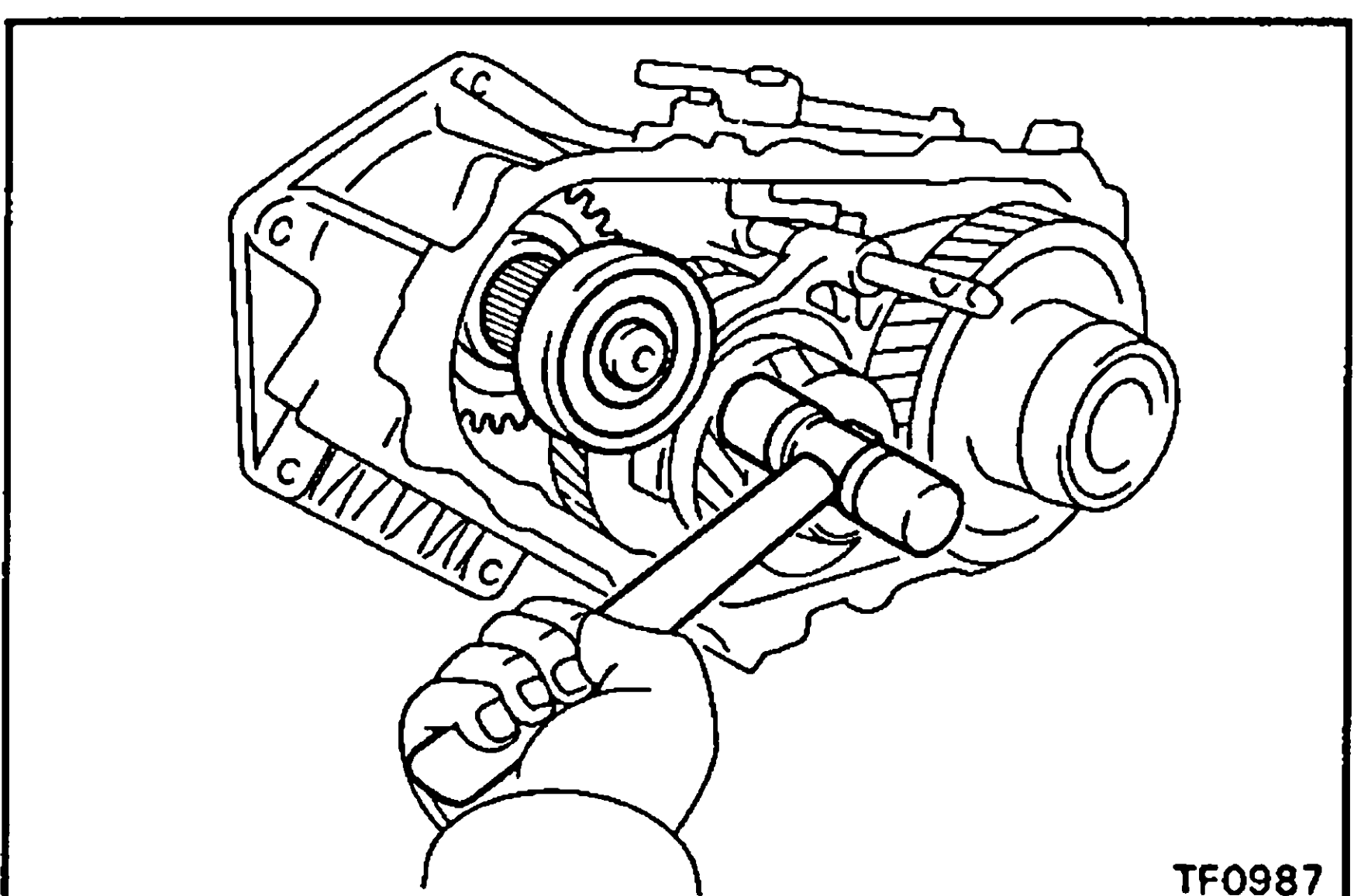


4. ASSEMBLE SHIFT FORK NO.1 AND FORK SHAFT

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

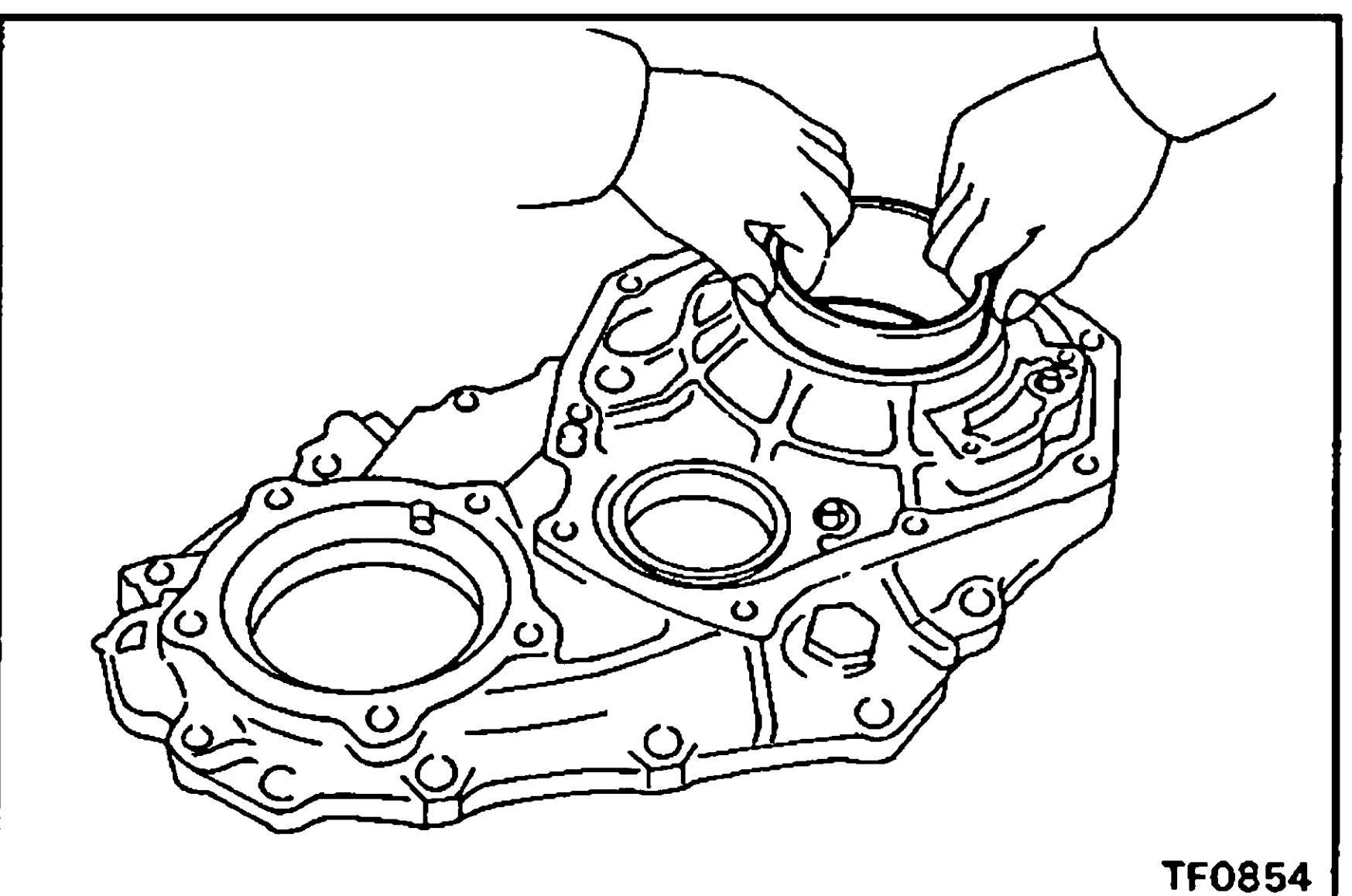


5. INSTALL IDLE GEAR ASSEMBLY, OUTPUT SHAFT ASSEMBLY, SHIFT FORK NO.1 AND FORK SHAFT

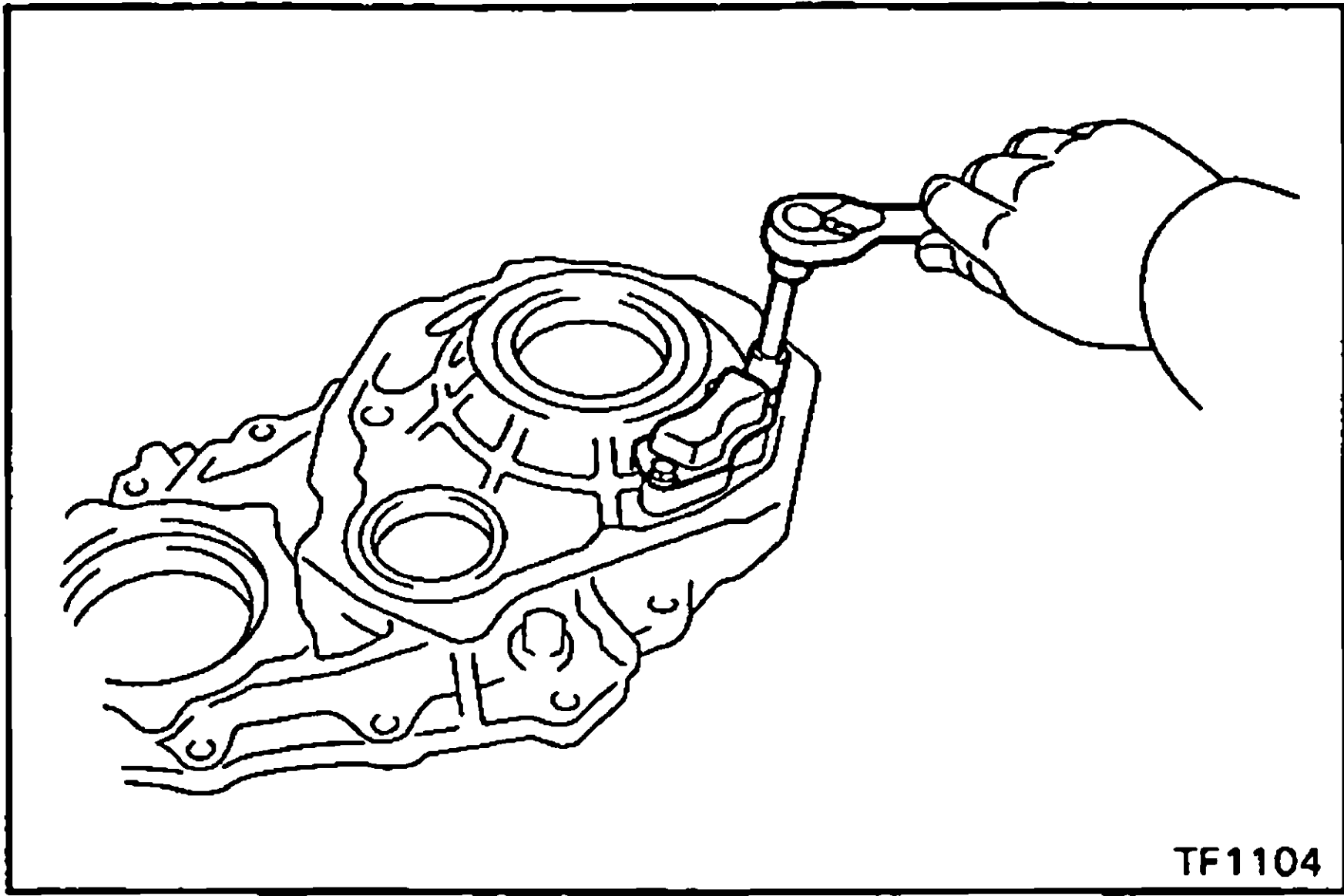


6. INSTALL INPUT SHAFT ASSEMBLY

Using a plastic hammer, tap in the input shaft.

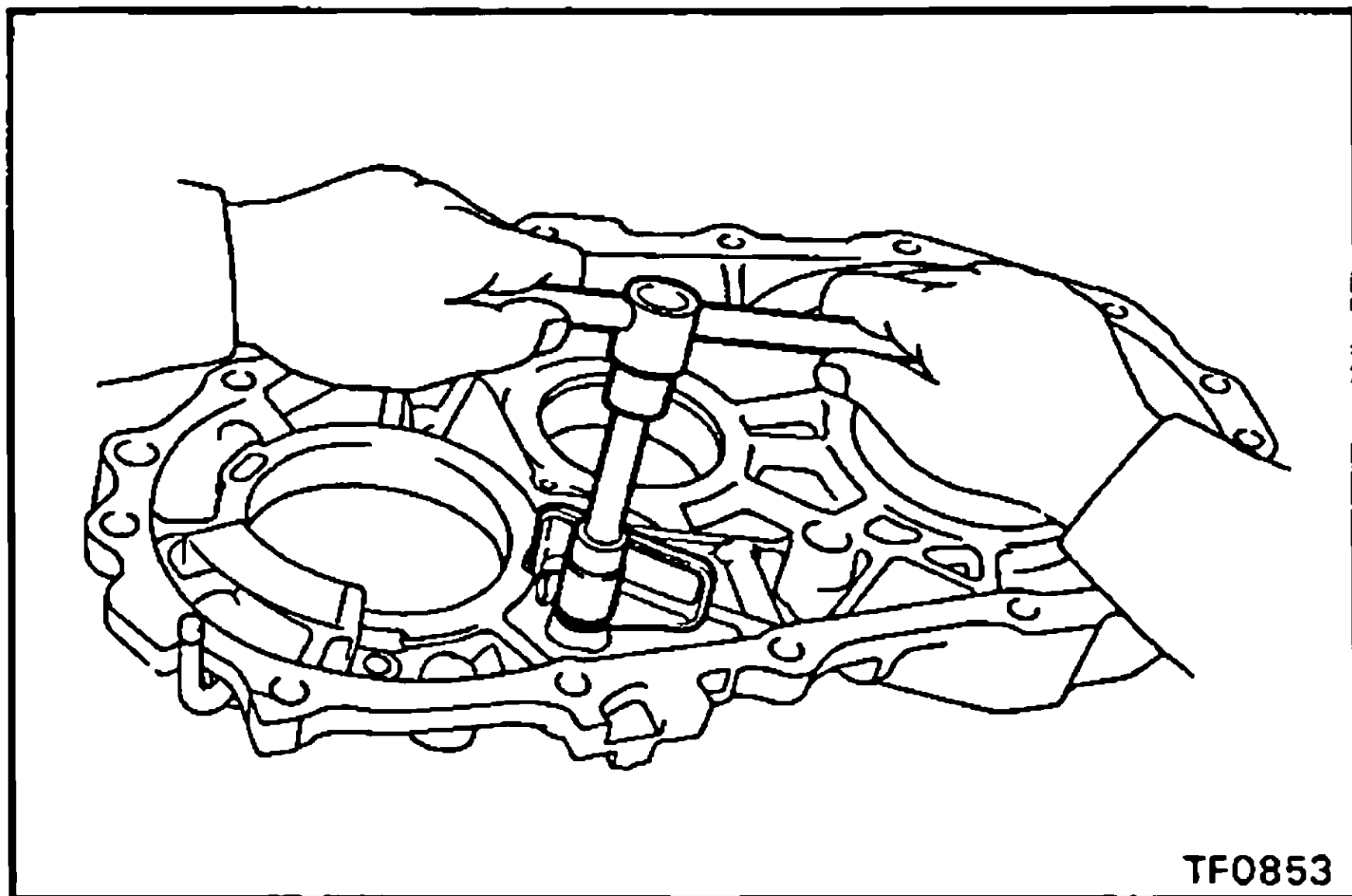


7. INSTALL TWO BEARING RACES FROM REAR CASE

**8. INSTALL OIL STRAINER TO REAR CASE**

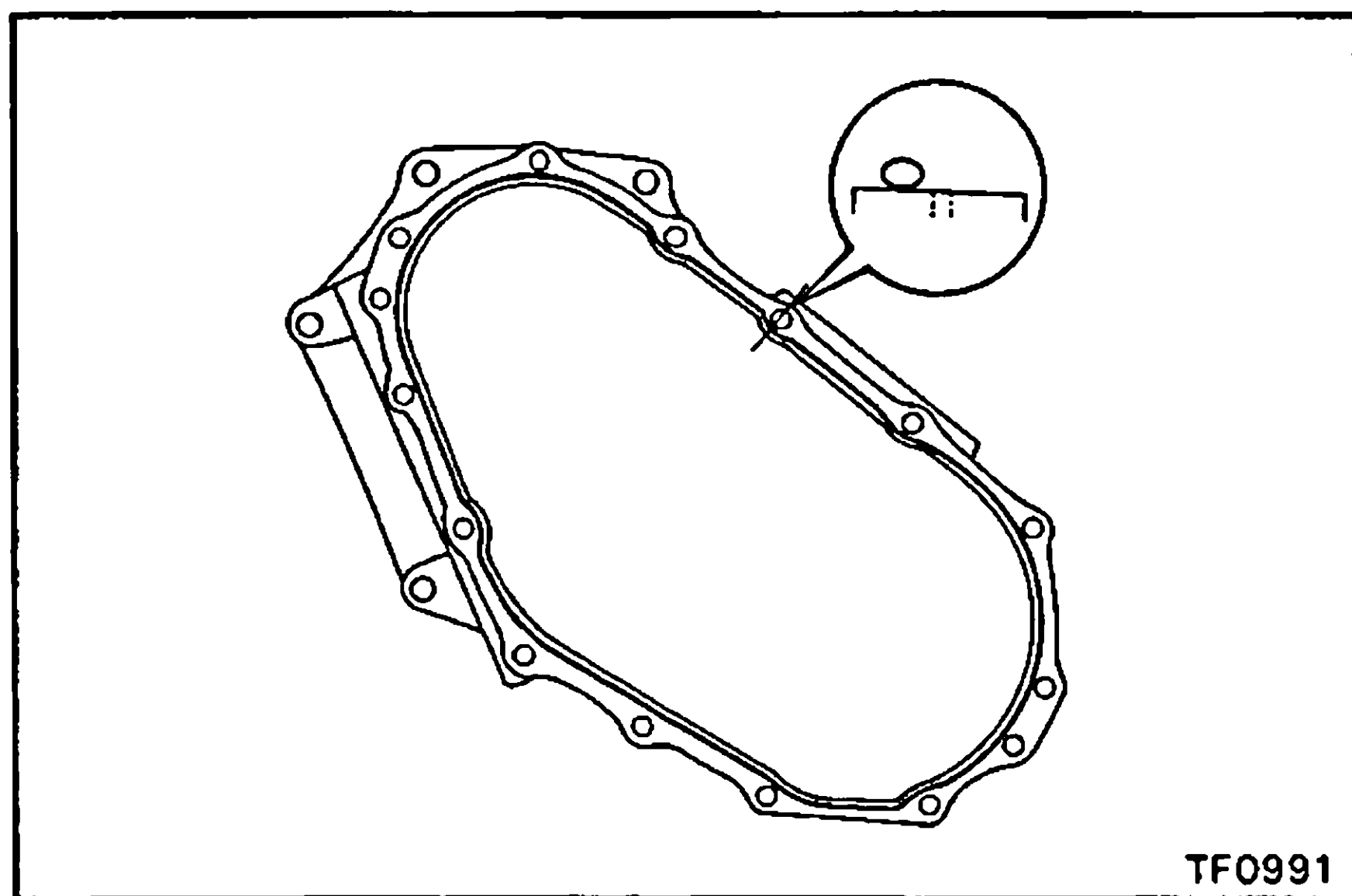
- (a) Install the oil strainer.
- (b) Install and torque the bolts.

Torque: 4.9 N·m (50 kgf·cm, 43 in·lbf)

**9. INSTALL OIL RECEIVER**

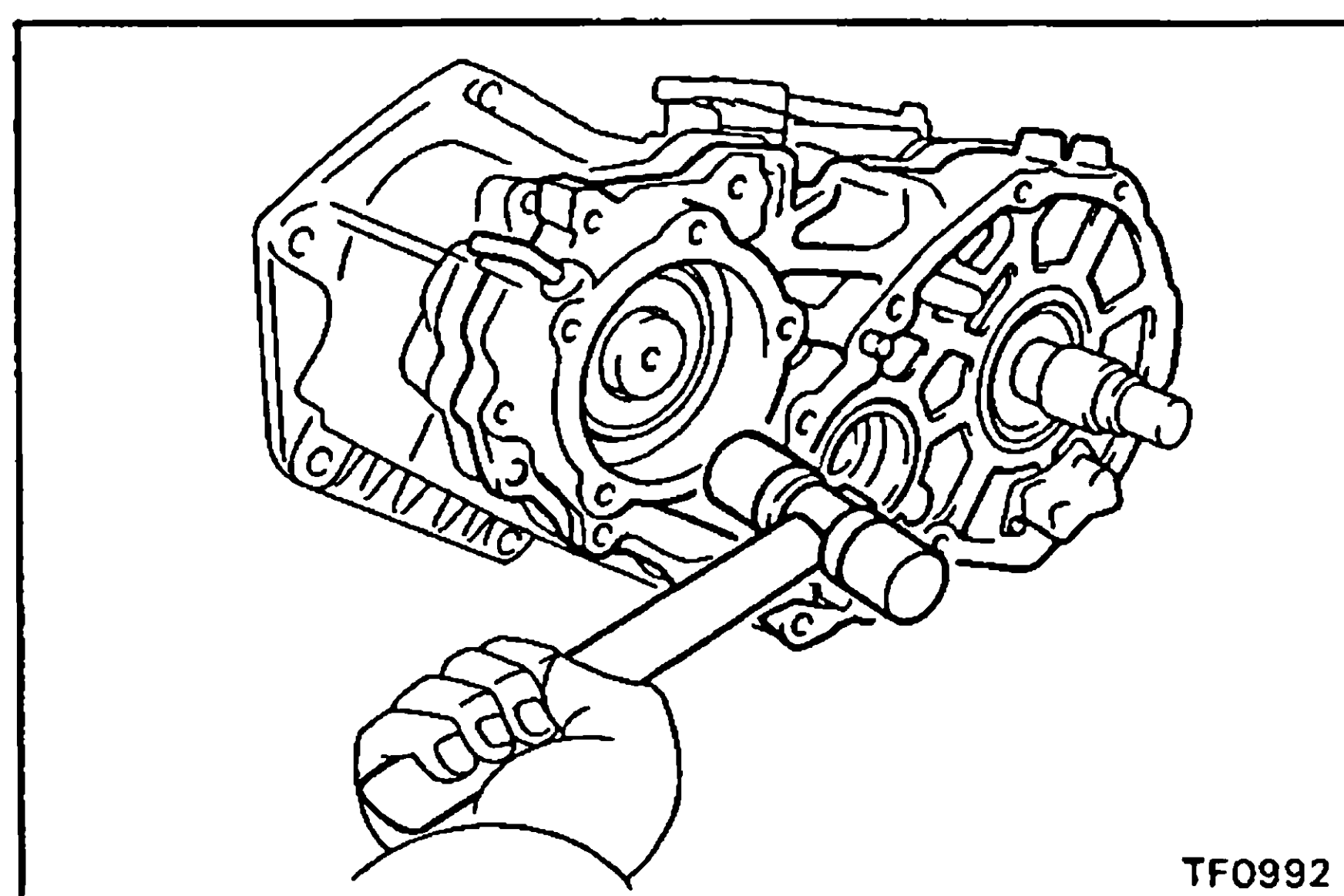
Install the oil receiver with bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

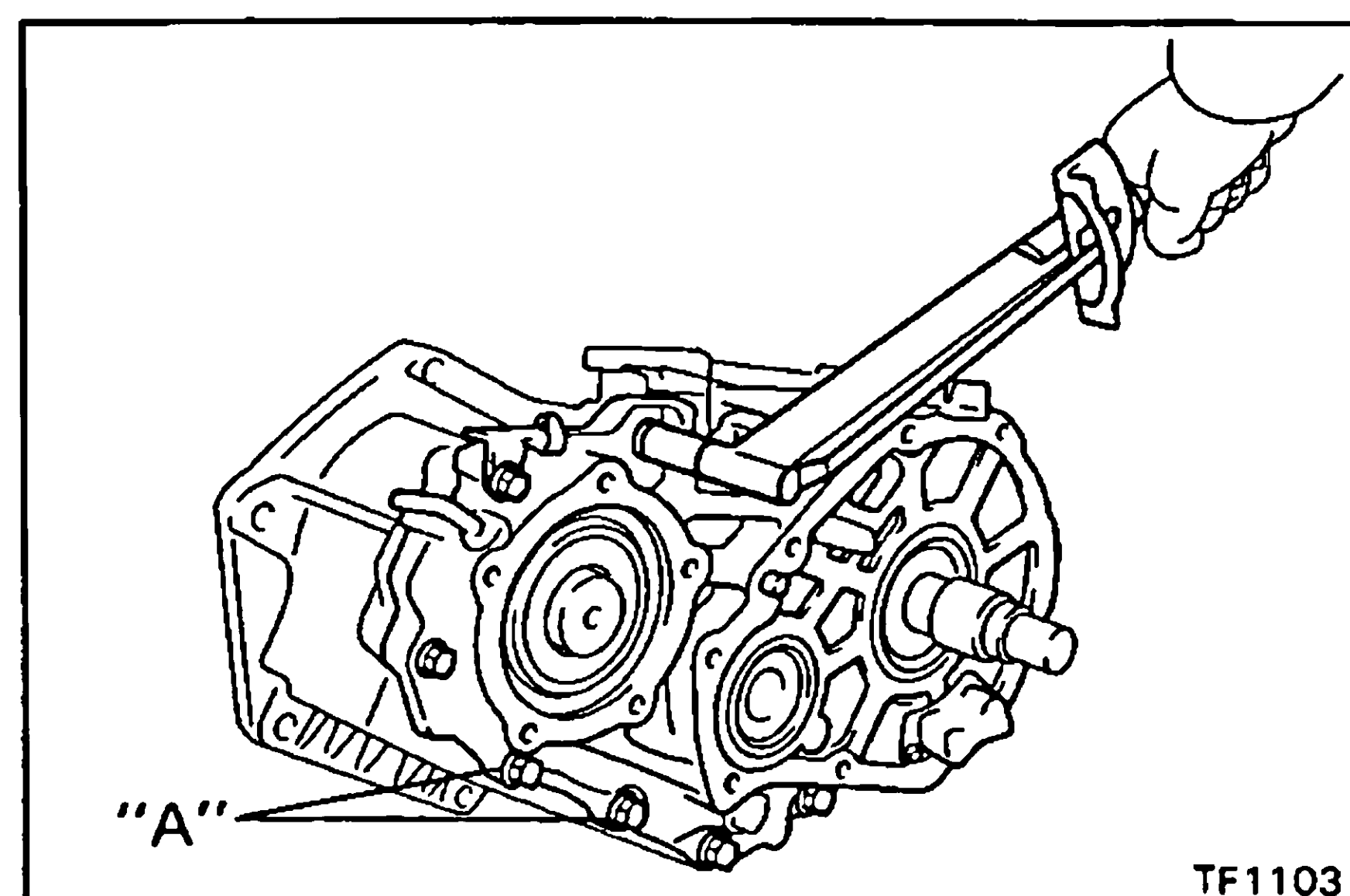
**10. ASSEMBLE FRONT CASE AND REAR CASE**

- (a) Apply seal packing to the front case as shown.

Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent



- (b) Using a plastic hammer, tap the rear case and assemble it.

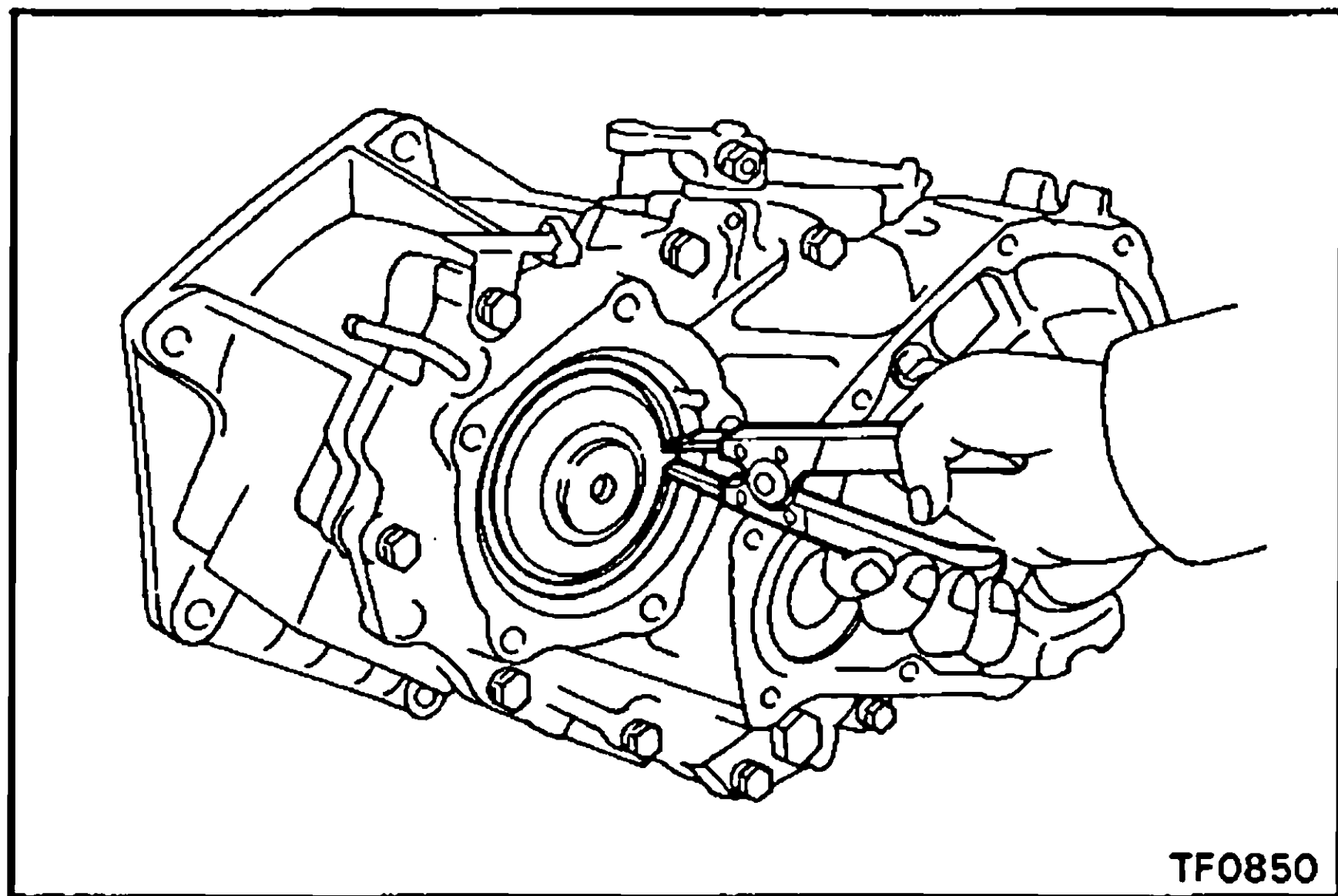


- (c) Apply liquid sealer to the "A" bolt threads.

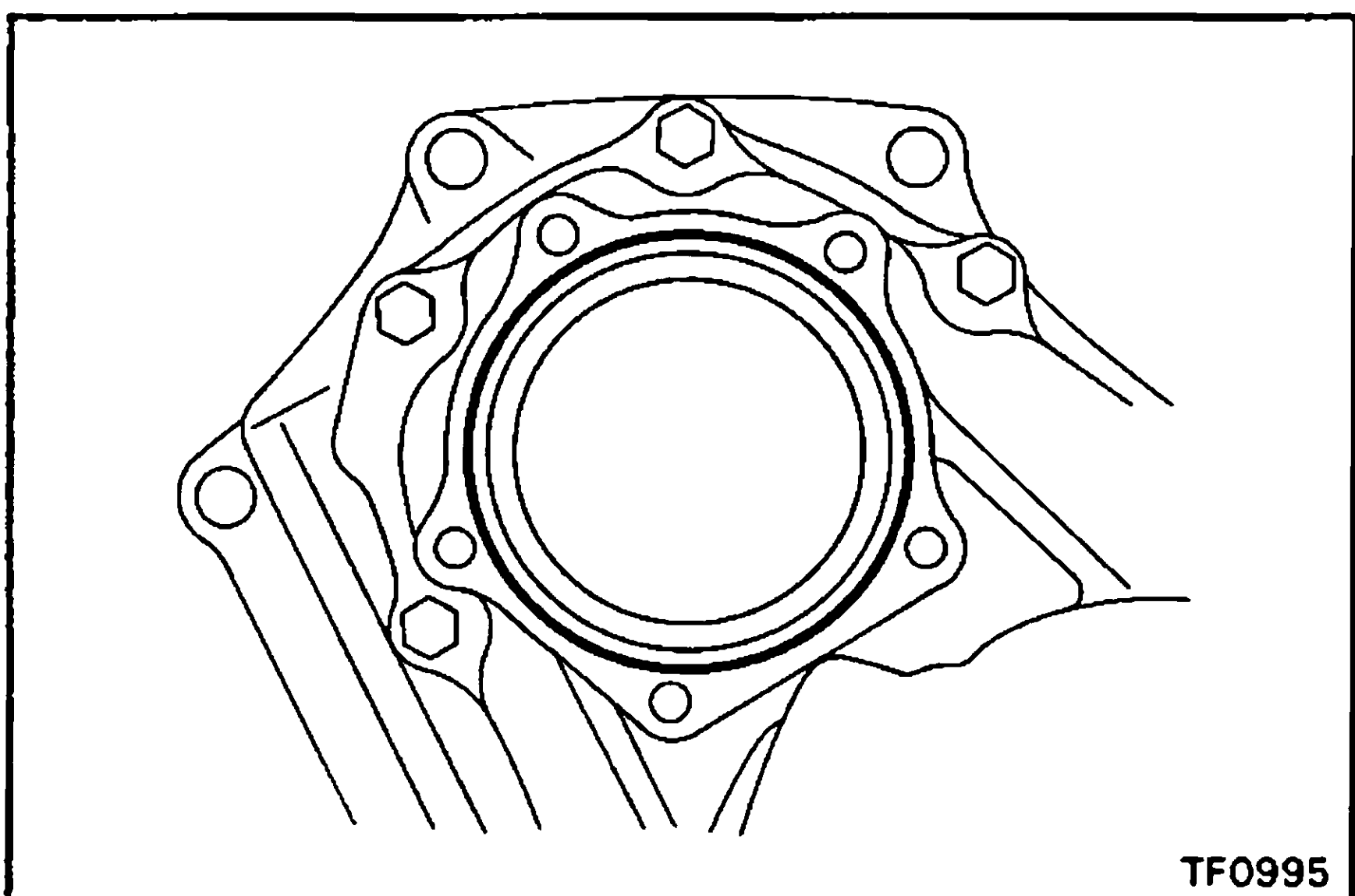
Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (d) Install and torque the eight bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



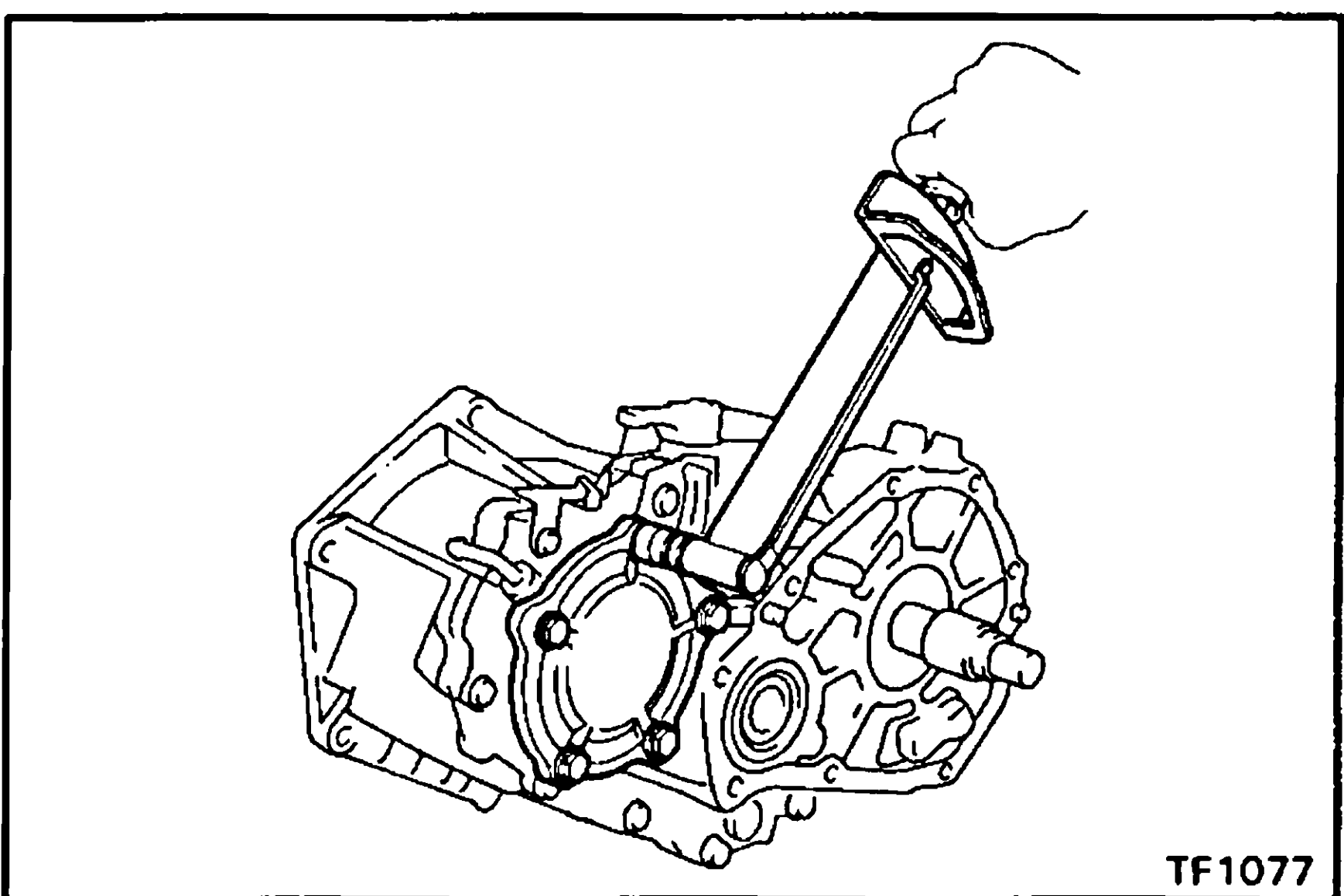
- (e) Using snap ring pliers, install the snap ring.



11. INSTALL CASE COVER

- (a) Apply seal packing to the rear case as shown.

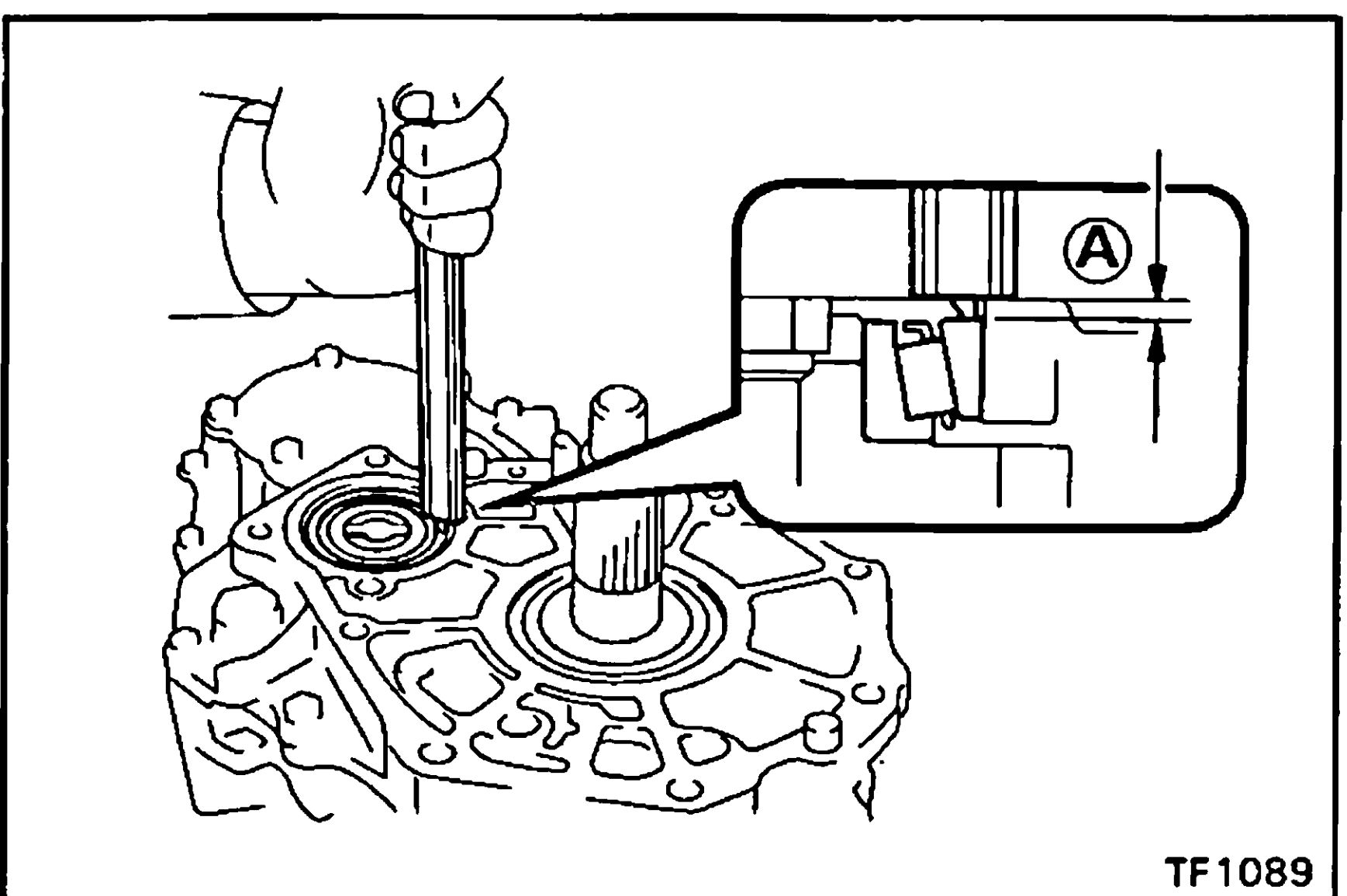
Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent



- (b) Install the case cover.

- (c) Install and torque the five bolts.

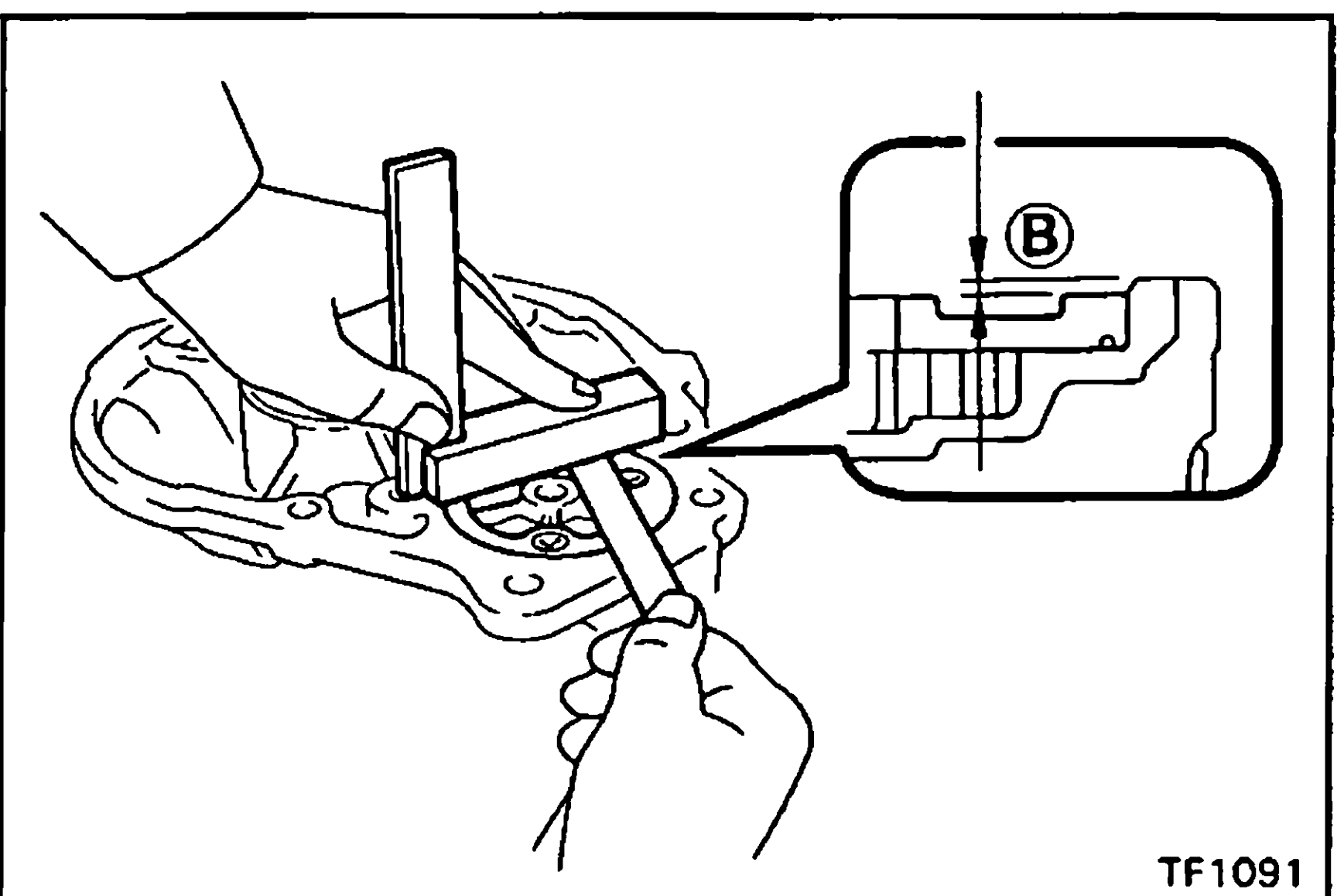
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



12. SELECT ADJUSTING SHIMS FOR IDLER GEAR

- (a) Using a vernier caliper with depth gauge, measure dimension **A**.

HINT: Lightly hold down the bearing outer race in the thrust direction to eliminate any looseness before making the measurement.



- (b) Using a steel straight edge and feeler gauge, measure the clearance of dimension **B**.

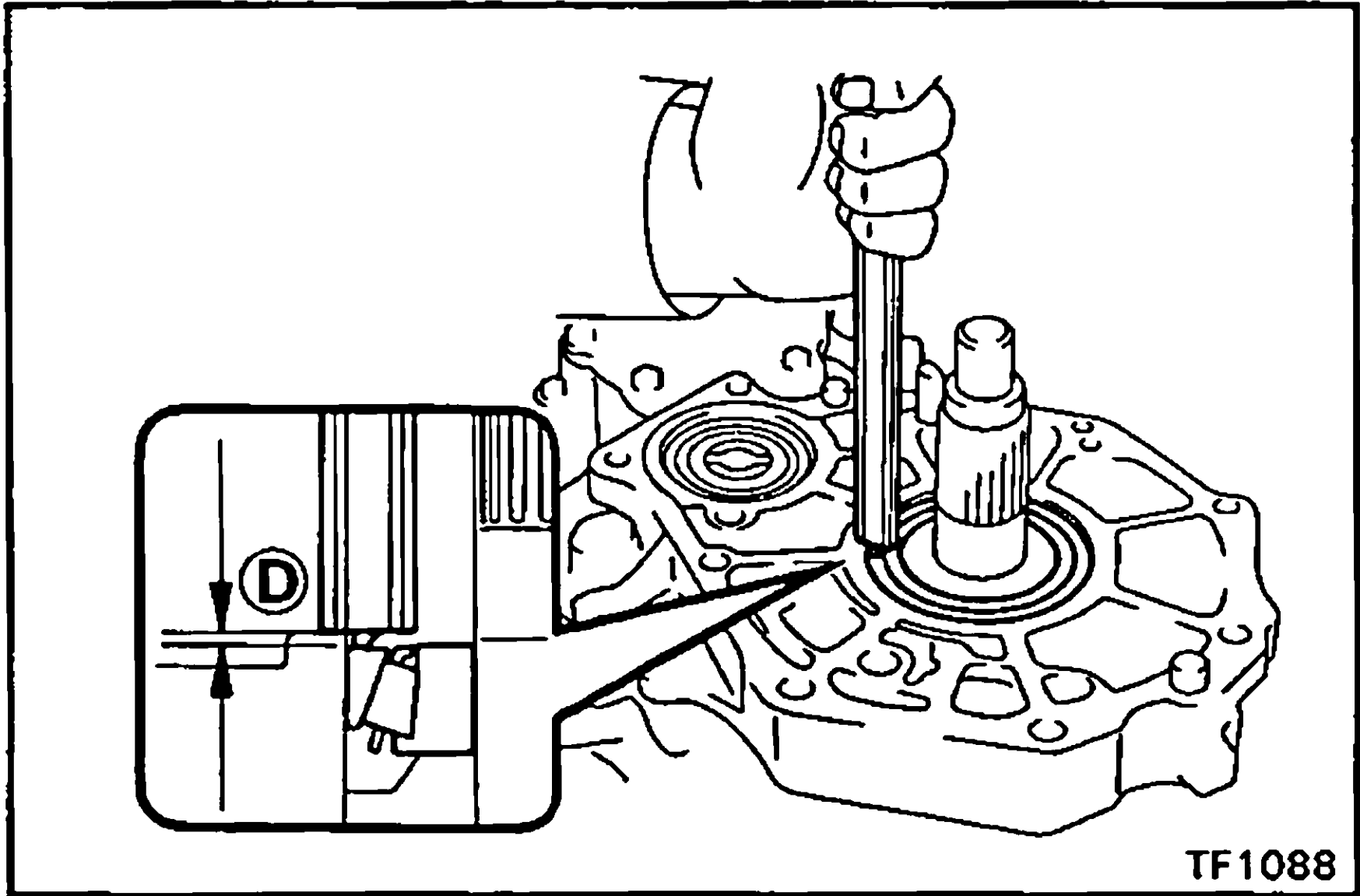
- (c) Calculate the required thickness of the adjusting shim.

Thickness: Dimension **A + Dimension **B** + **C****

****C** 0.02 — 0.07 mm (0.0008 — 0.0028 in.)**

- (d) From the following table, select a shim with a thickness fitting within the range of the calculation in (c).

Mark	Thickness	mm (in.)	Mark	Thickness	mm (in.)
A	0.15	(0.0059)	G	3.00	(0.1181)
B	0.30	(0.0118)	H	3.20	(0.1260)
C	0.45	(0.0177)	J	3.40	(0.1339)
D	2.40	(0.0945)	K	3.60	(0.1417)
E	2.60	(0.1024)	L	3.80	(0.1496)
F	2.80	(0.1102)	M	4.00	(0.1575)



13. SELECT ADJUSTING SHIMS FOR OUTPUT SHAFT TAPER ROLLER BEARING

- (a) Using a vernier caliper with depth gauge, measure dimension **D**.

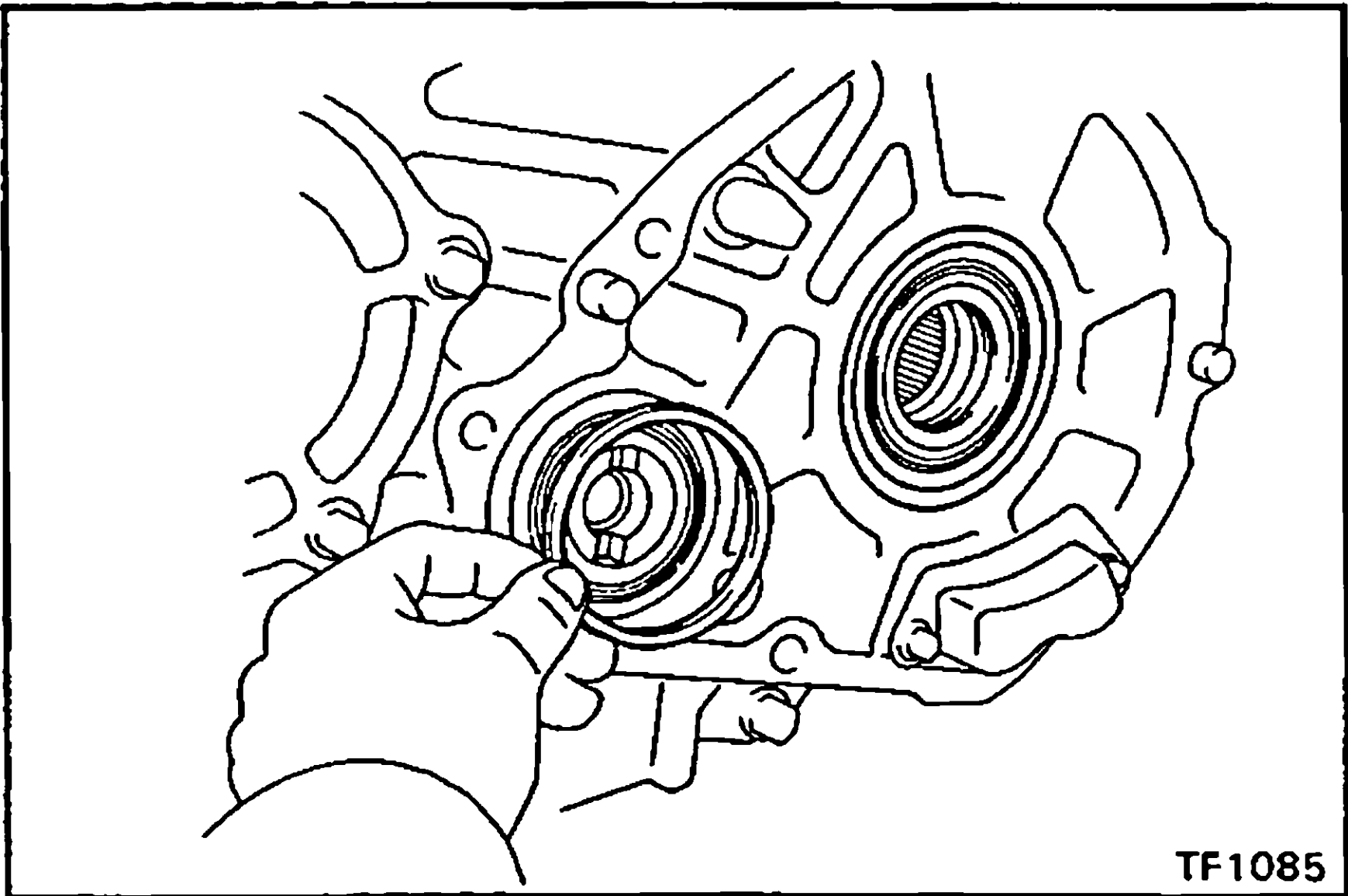
HINT: Lightly hold down the bearing outer race in the thrust direction to eliminate any looseness before making the measurement.

Thickness: Dimension **D** + **E**

E 0.04 — 0.09 mm (0.0016 — 0.0035 in.)

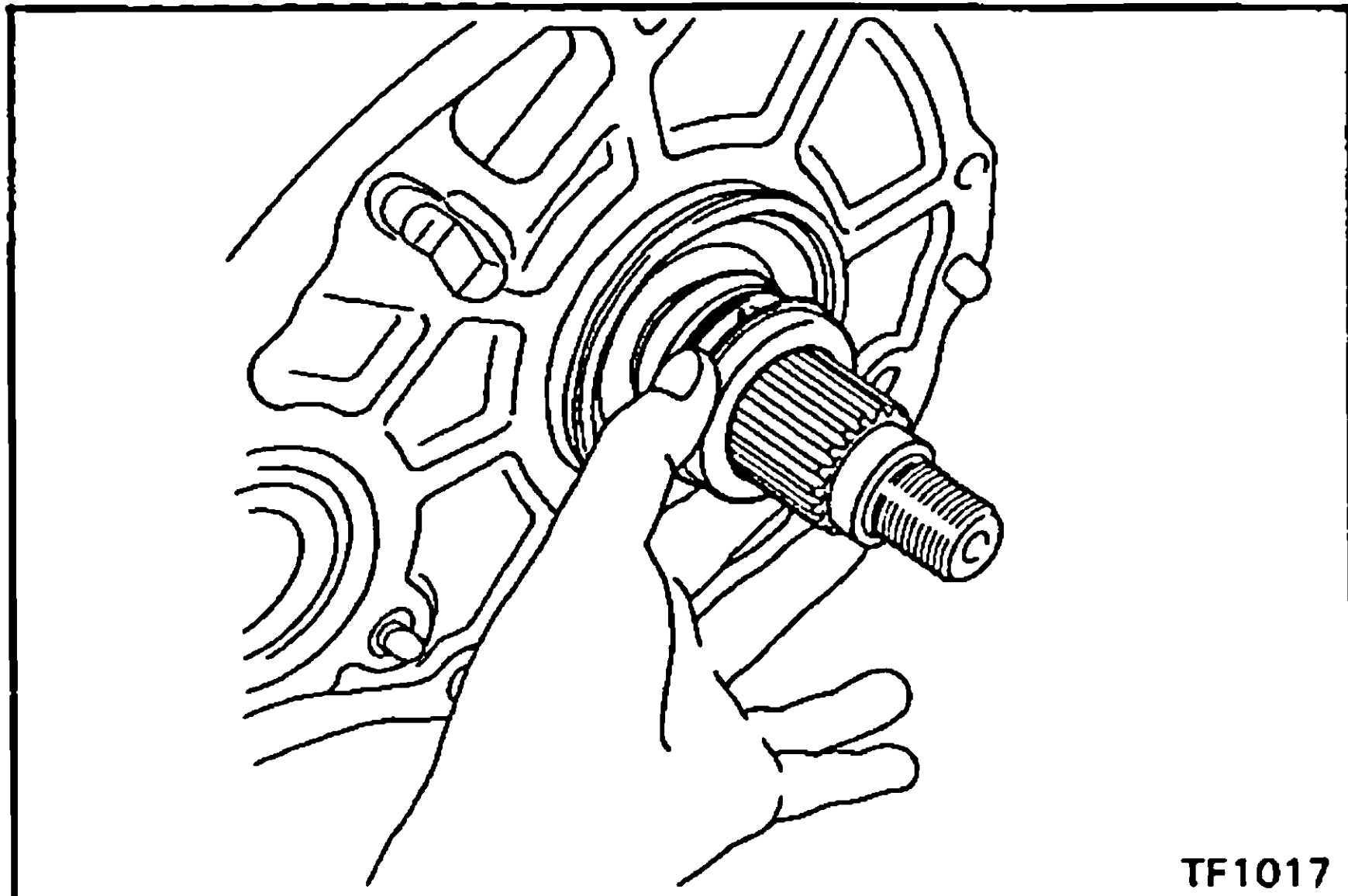
- (b) From the following table, select a shim with a thickness fitting within the range of the calculation in (a).

Mark	Thickness	mm (in.)	Mark	Thickness	mm (in.)
A	0.15	(0.0059)	G	1.60	(0.0630)
B	0.30	(0.0118)	H	1.80	(0.0709)
C	0.45	(0.0177)	J	2.00	(0.0787)
D	1.00	(0.0394)	K	2.20	(0.0866)
E	1.20	(0.0472)	L	2.40	(0.0945)
F	1.40	(0.0551)	M	2.60	(0.1024)



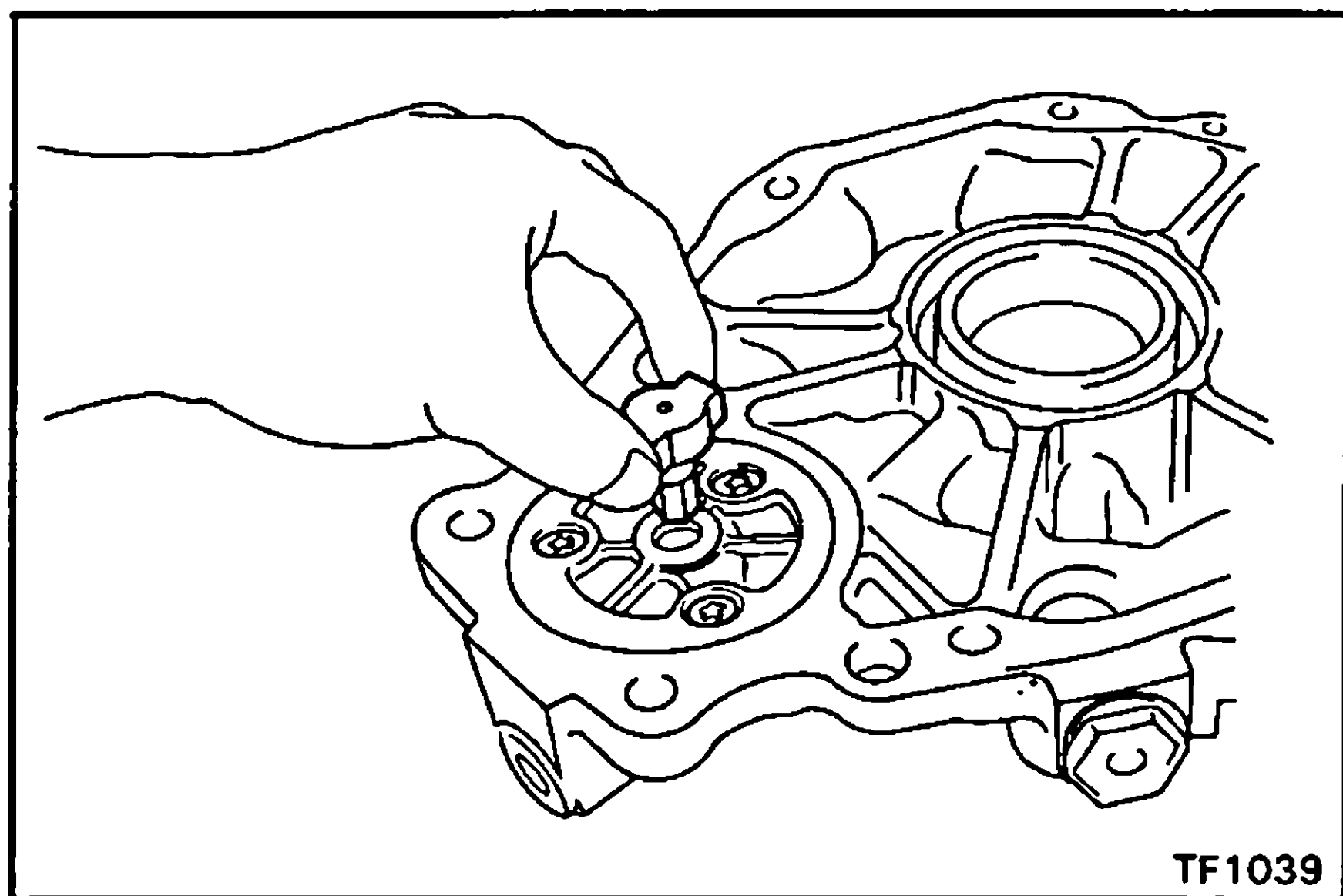
14. INSTALL SHIMS

Apply MP grease to the reuse shims.



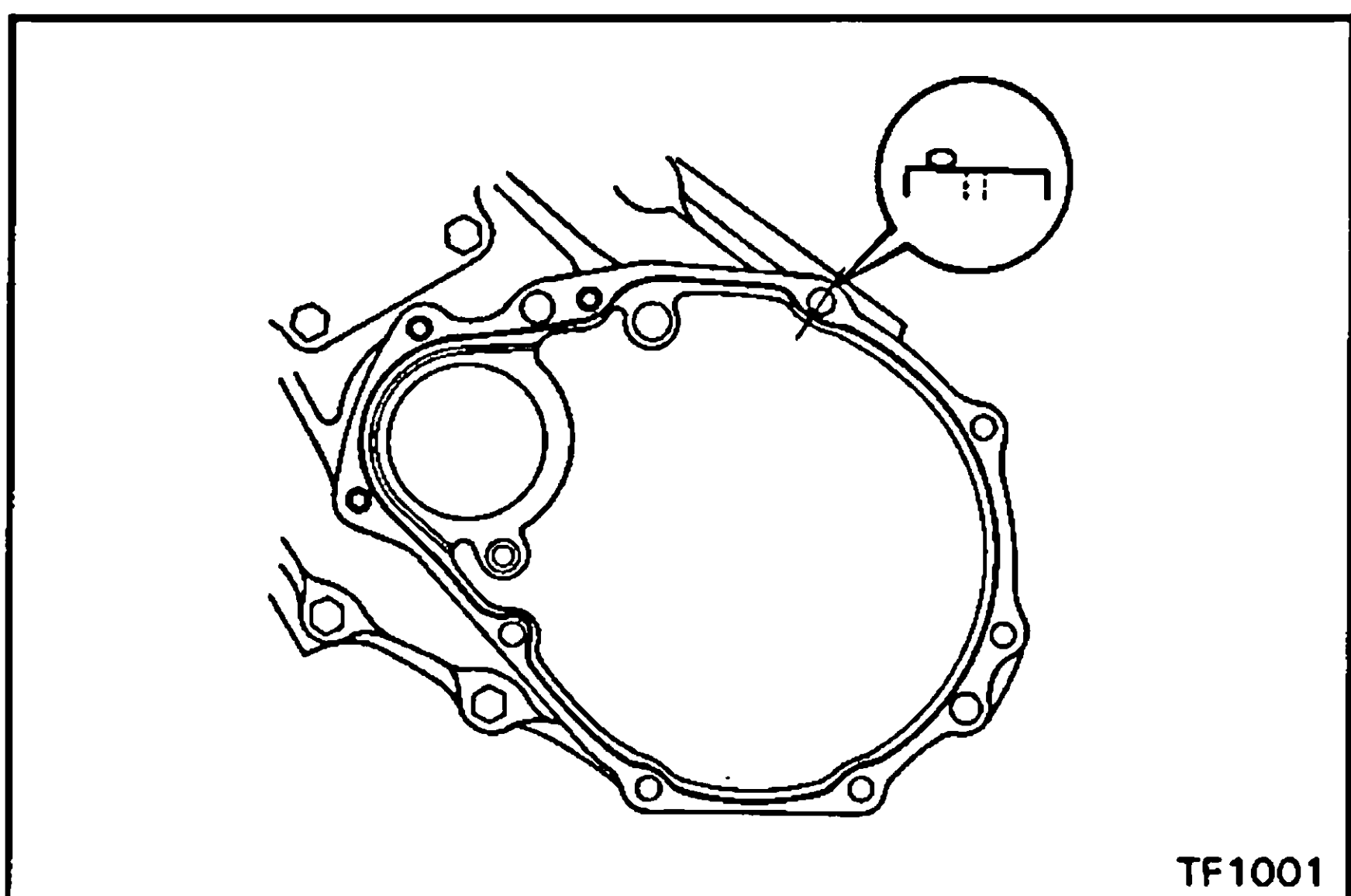
15. INSTALL BALL AND SPACER NO.1

- (a) Apply MP grease to the ball.
(b) Install the ball and spacer No.1.



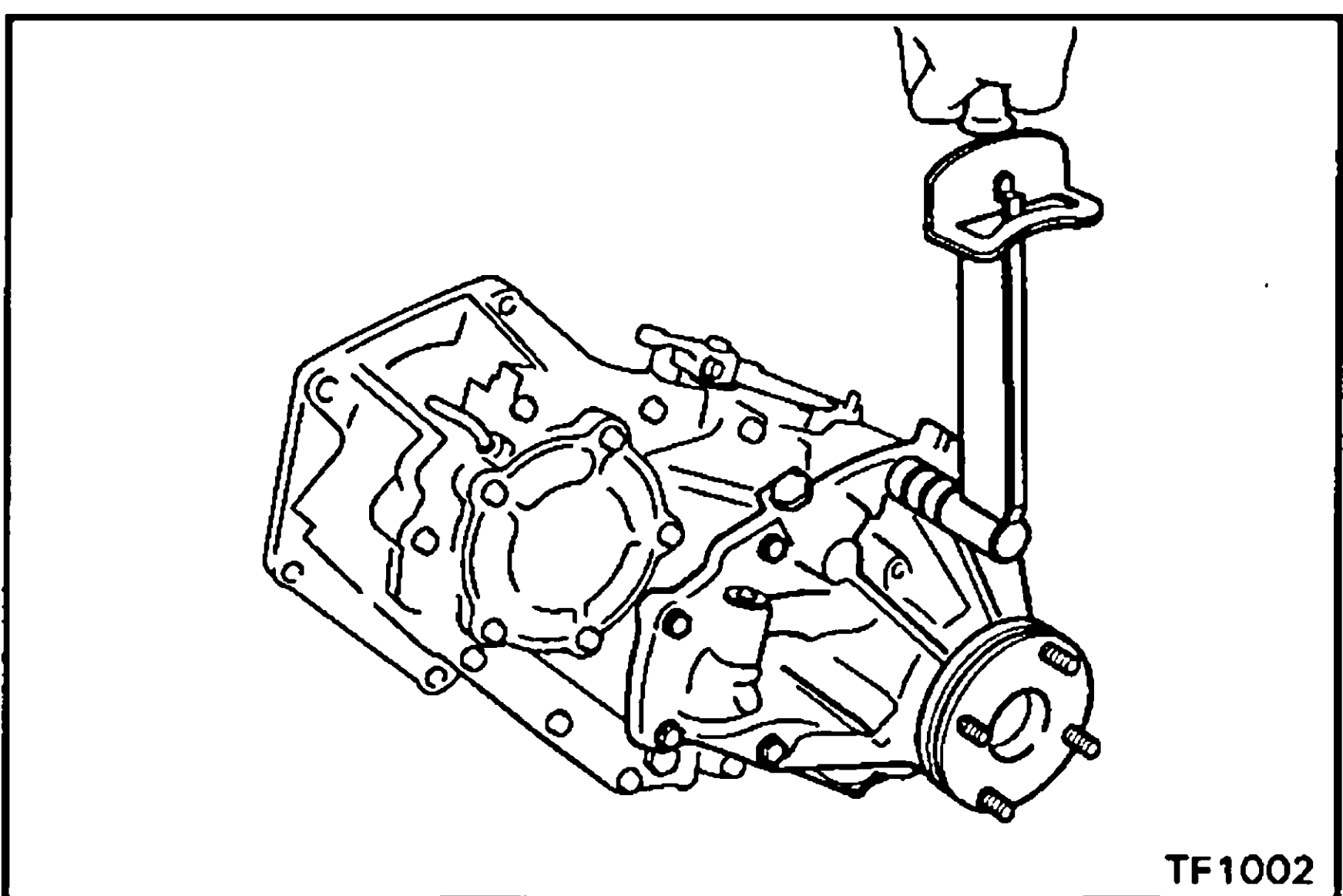
16. INSTALL REAR EXTENSION HOUSING

- (a) Install the oil pump drive shaft.



- (b) Apply seal packing to the rear case as shown.

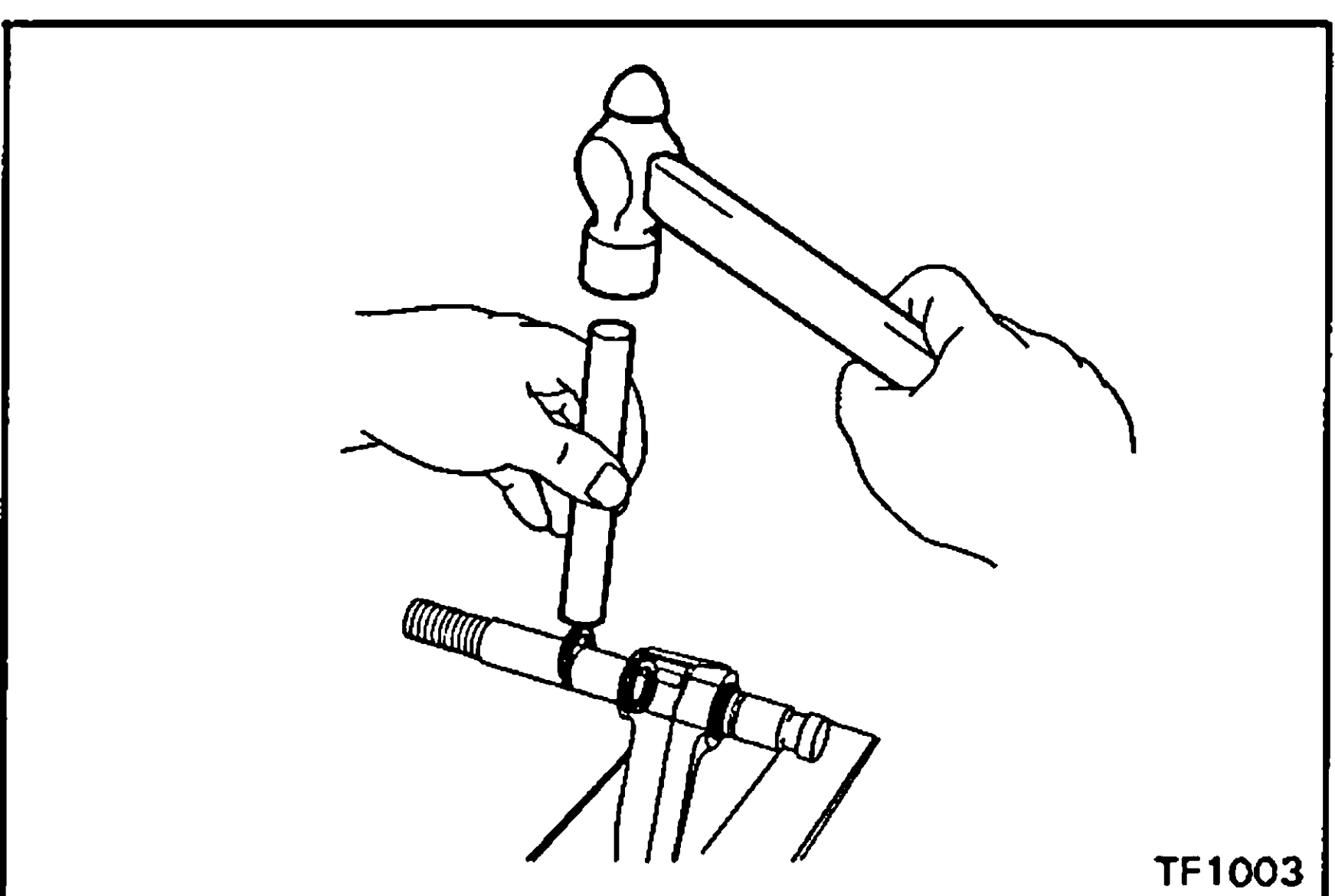
Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent



- (c) Install rear extension housing.

- (d) Install and torque the eight bolts.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

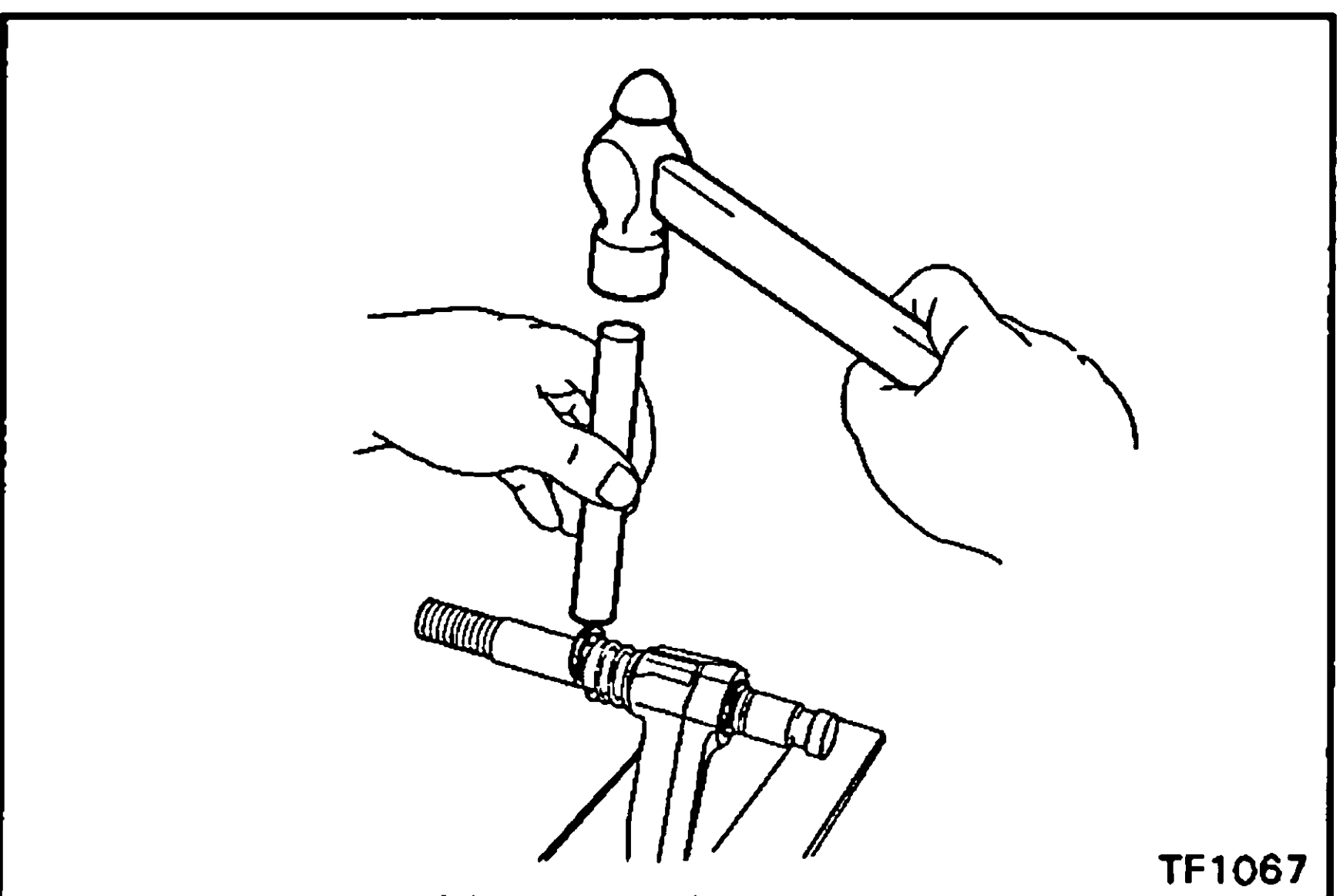


17. ASSEMBLE SHIFT FORK NO.2 AND FORK SHAFT

(Motor shift type)

- (a) Assemble the shift fork No.2 and fork shaft.

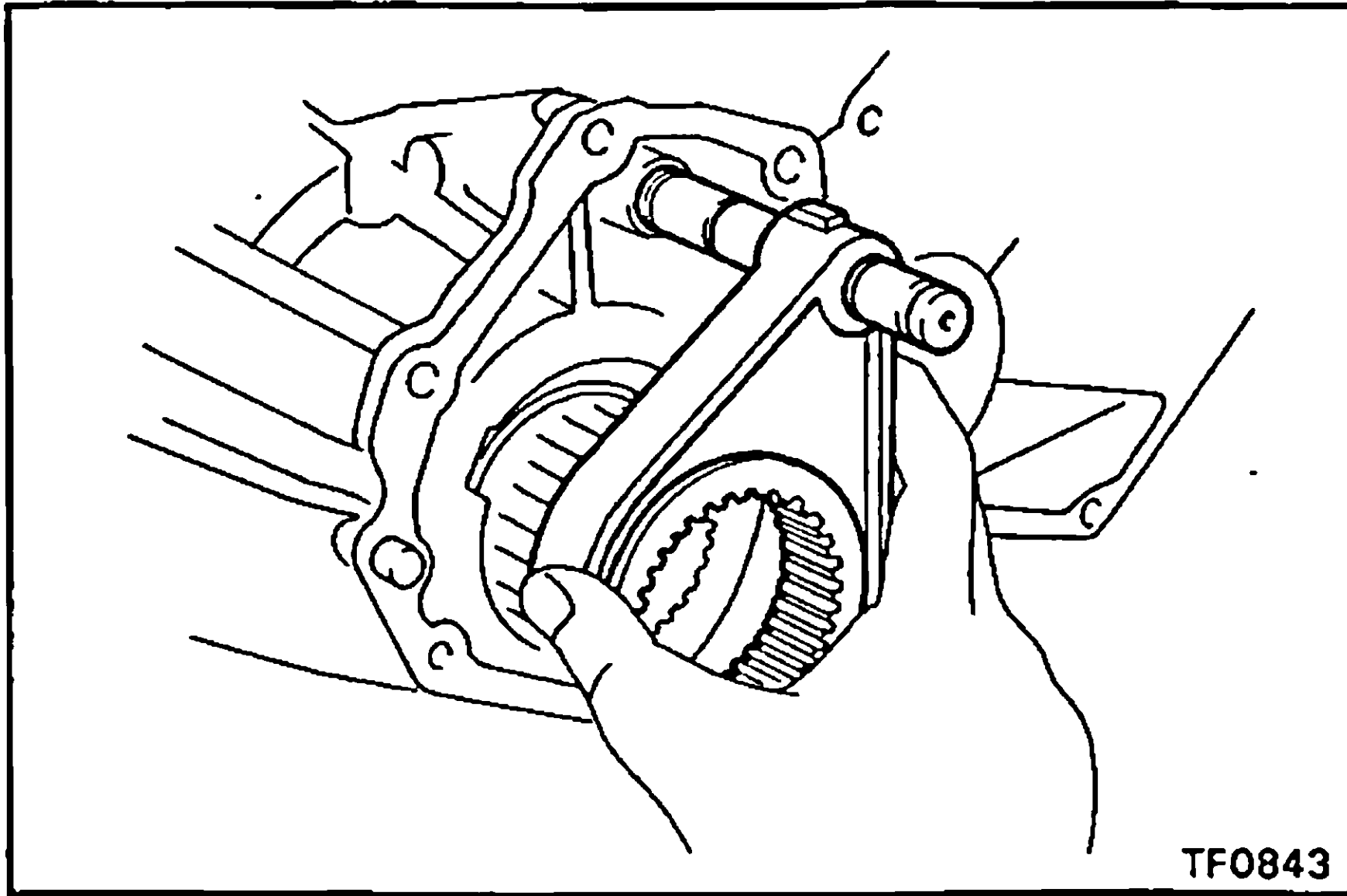
- (b) Using a brass bar and hammer, tap in the snap ring.



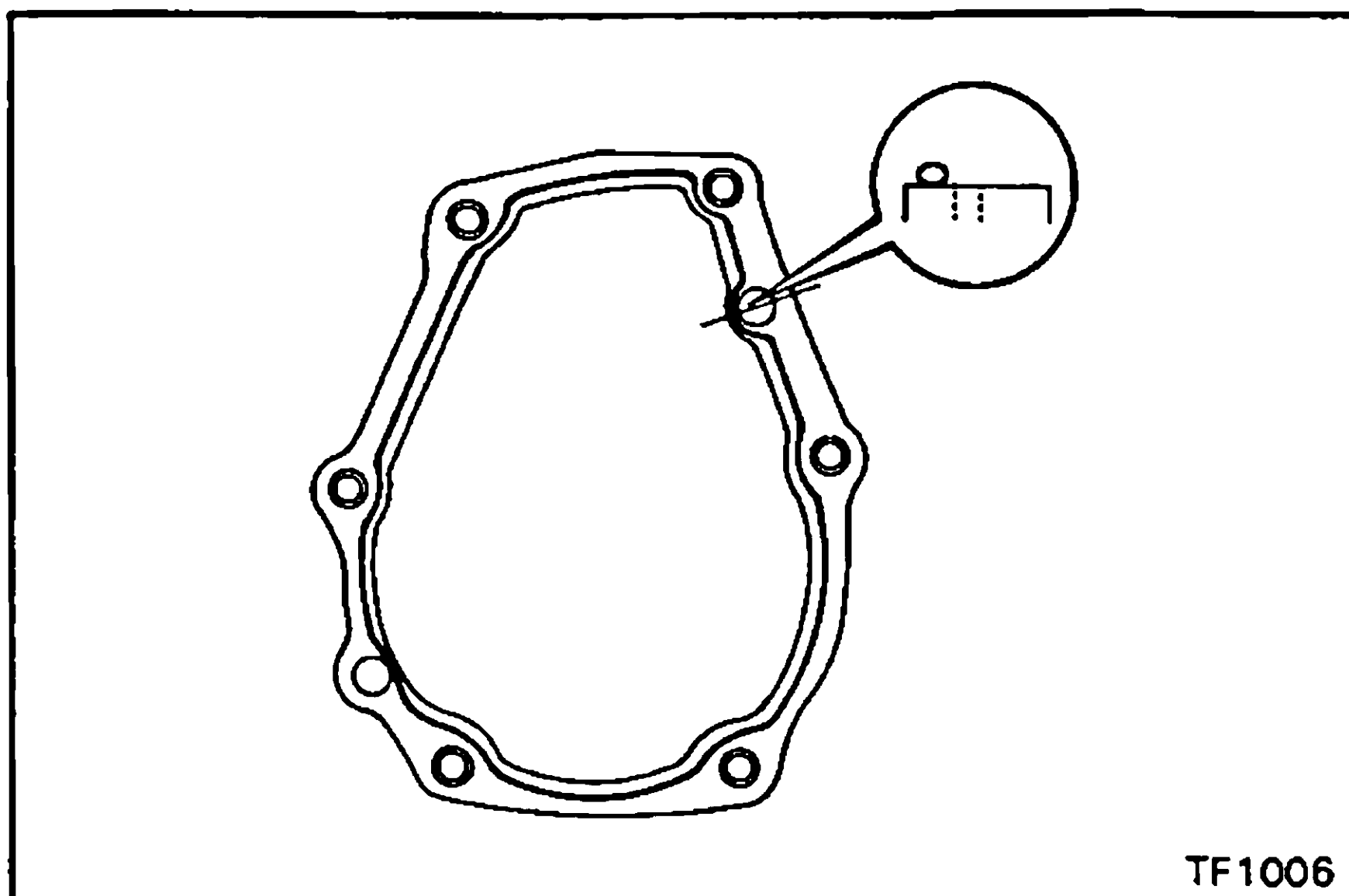
(Direct shift type)

- (a) Assemble the shift fork No.2, fork shaft and spring.

- (b) Using a brass bar and hammer, tap in the snap ring.



18. INSTALL CLUTCH SLEEVE, SHIFT FORK NO.2 AND FORK SHAFT



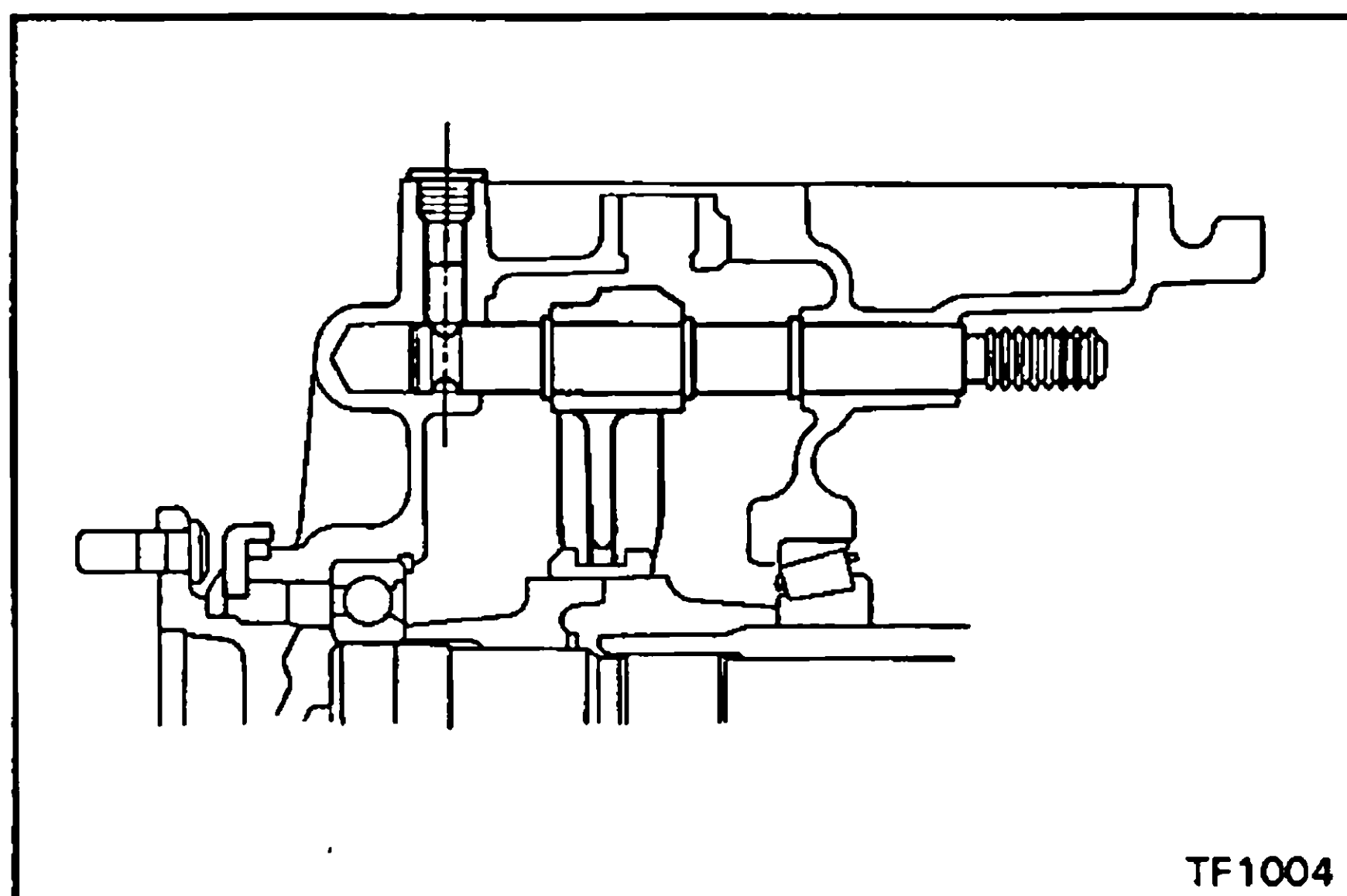
19. INSTALL FRONT EXTENSION HOUSING

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the front case.

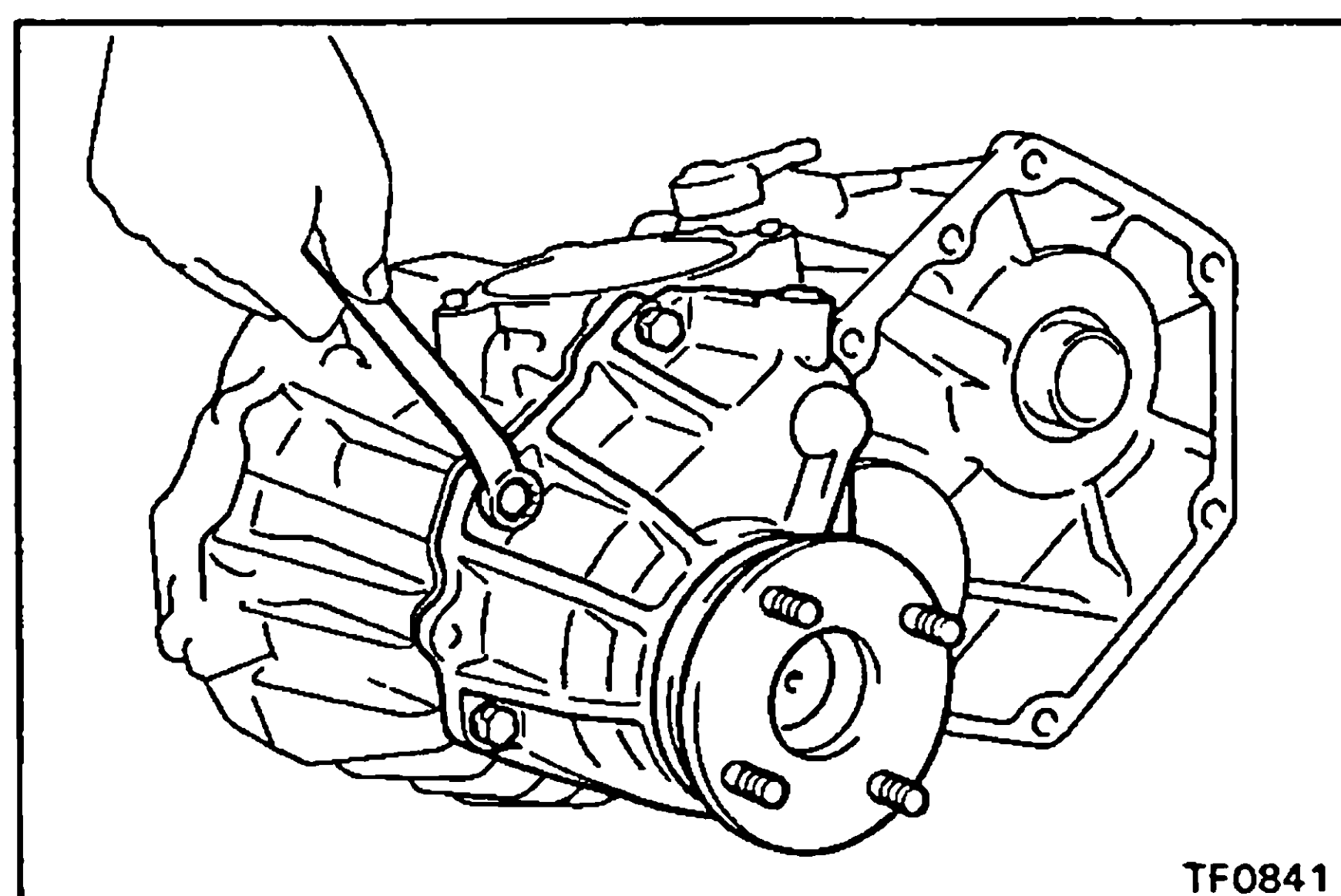
(b) Apply seal packing to the front case as shown.

Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent

HINT: Install the front extension housing as soon as the seal packing is applied.

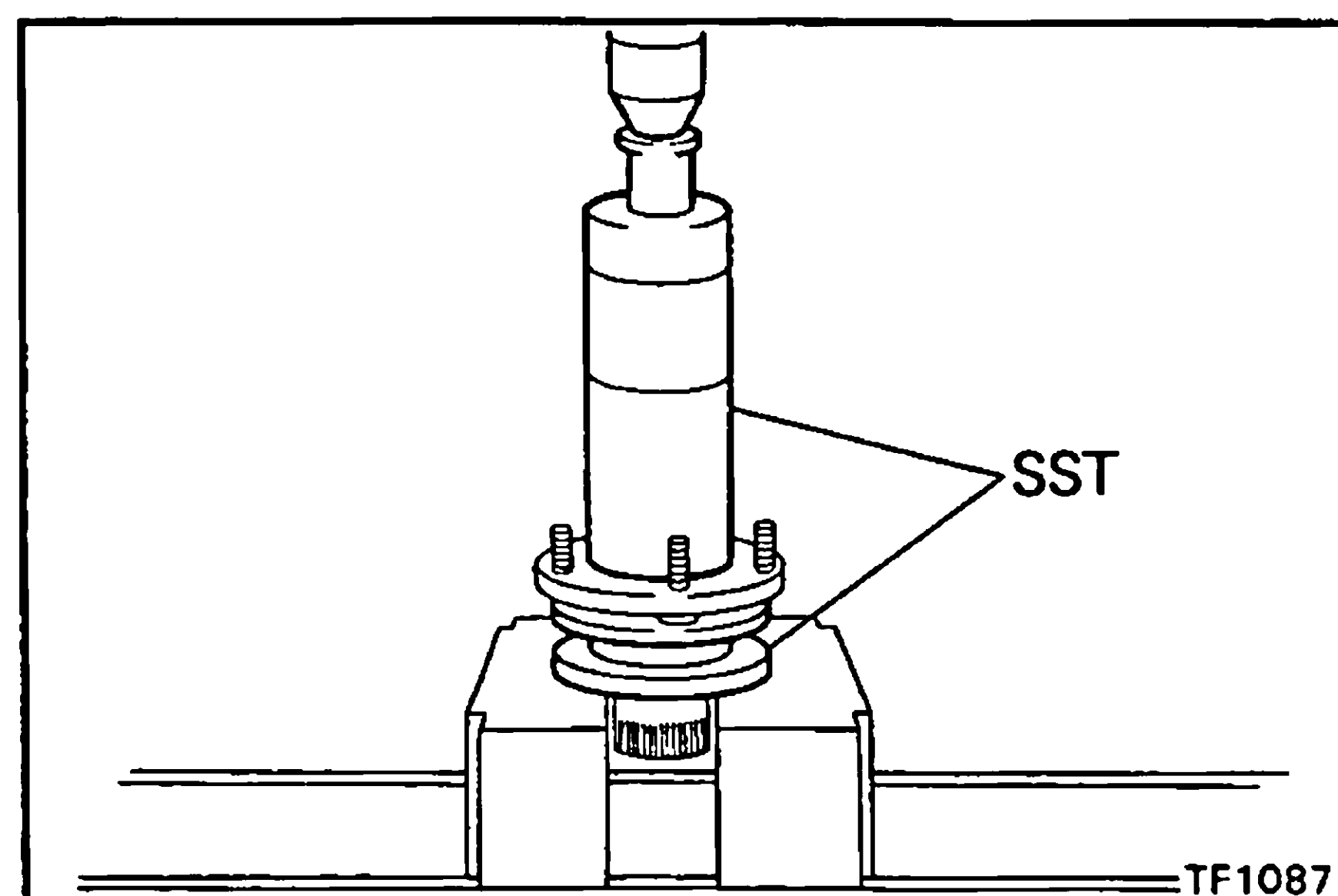


(c) Set the clutch sleeve in 4WD condition, install the front extension housing.



(d) Install and torque the six bolts.

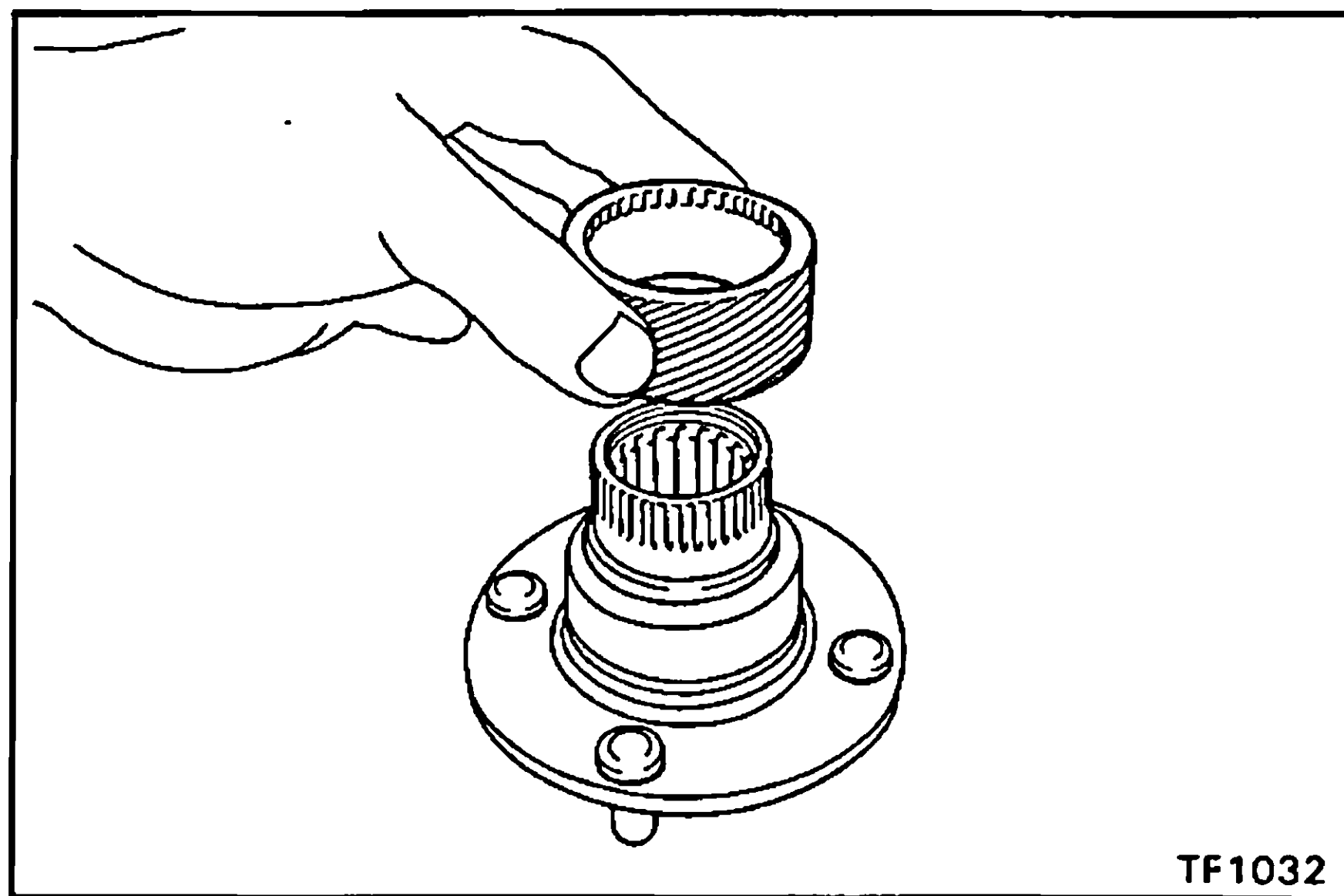
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



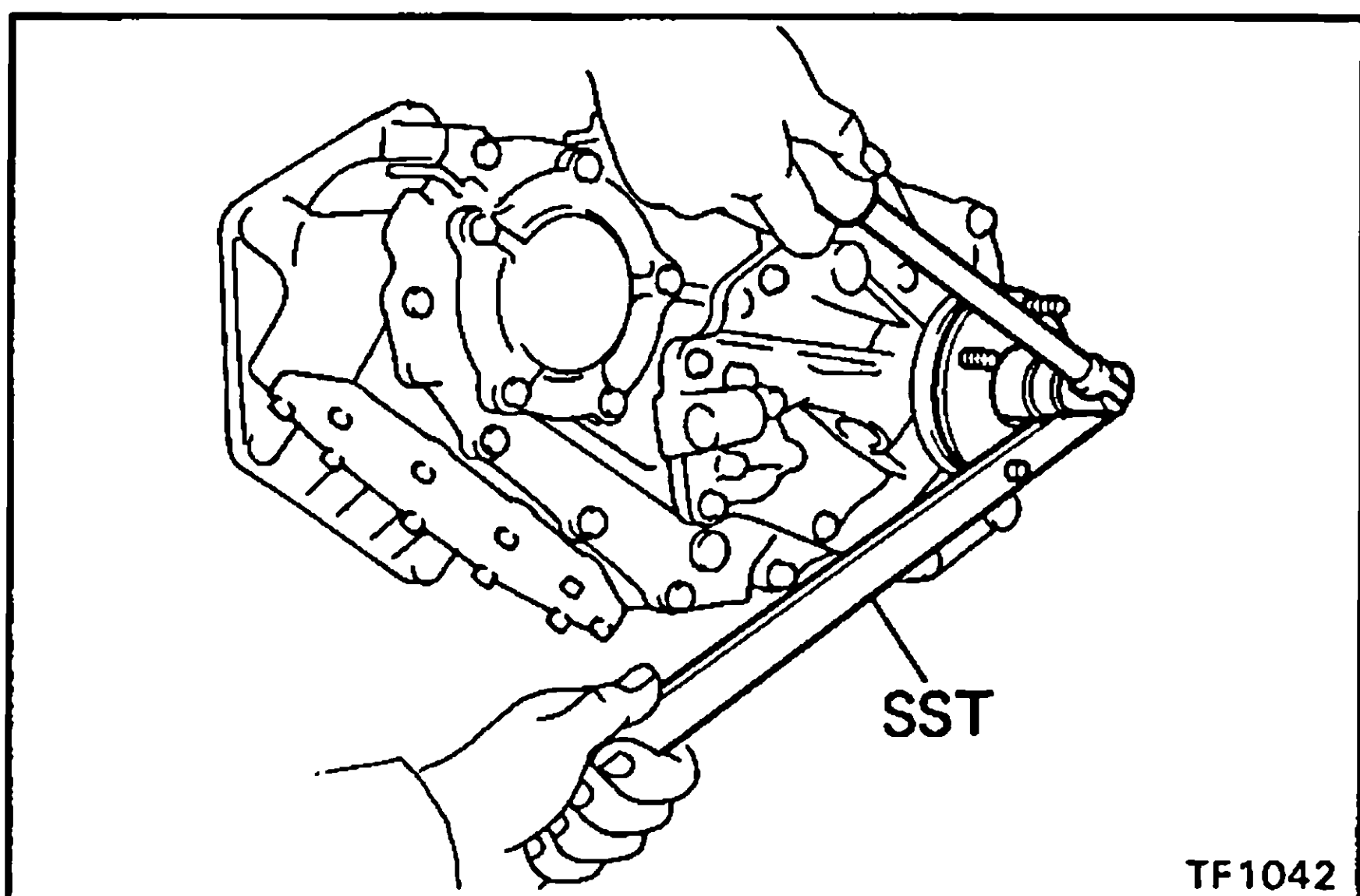
20. INSTALL DUST DEFLECTOR

Using SST and a press, install the dust deflector.

SST 09316-20011, 09316-60010 (09316-00010)

**21. INSTALL OUTPUT SHAFT COMPANION FLANGE**

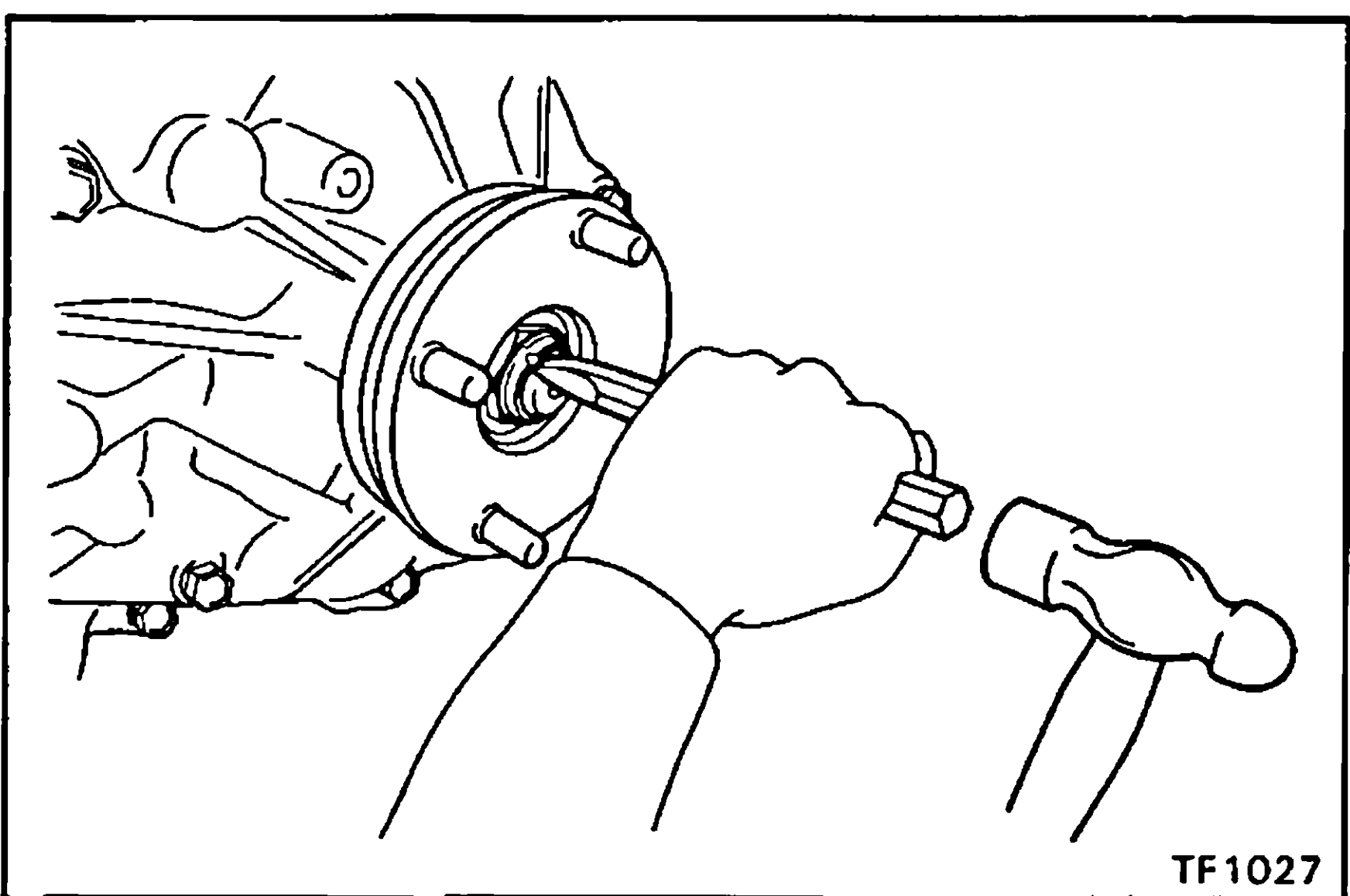
- (a) Install the speedometer drive gear to the output shaft companion flange.



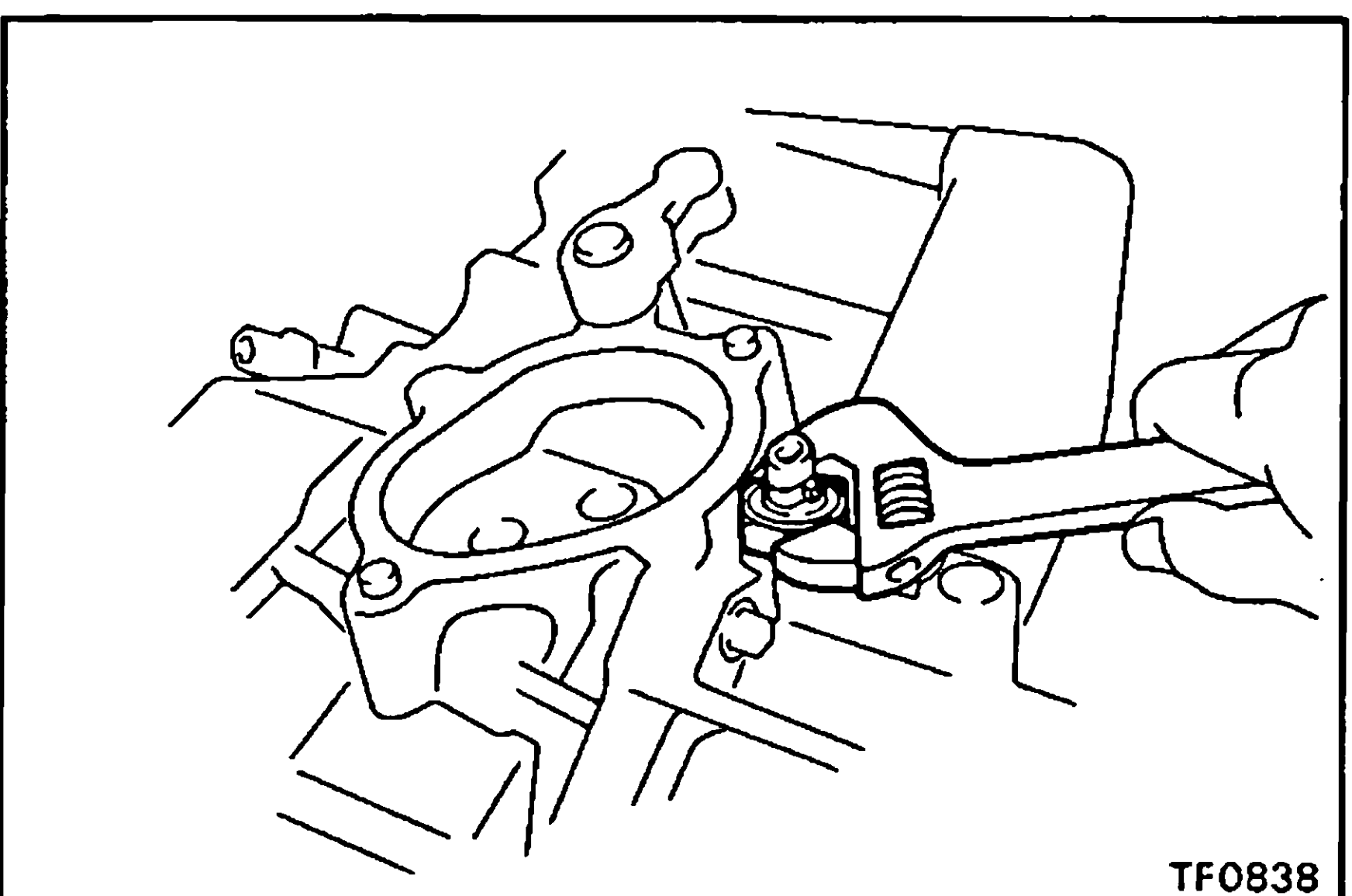
- (b) Install the output shaft companion flange.

- (c) Install and torque the nut.

Torque: 128 N·m (1,300 kgf·cm, 94 ft·lbf)

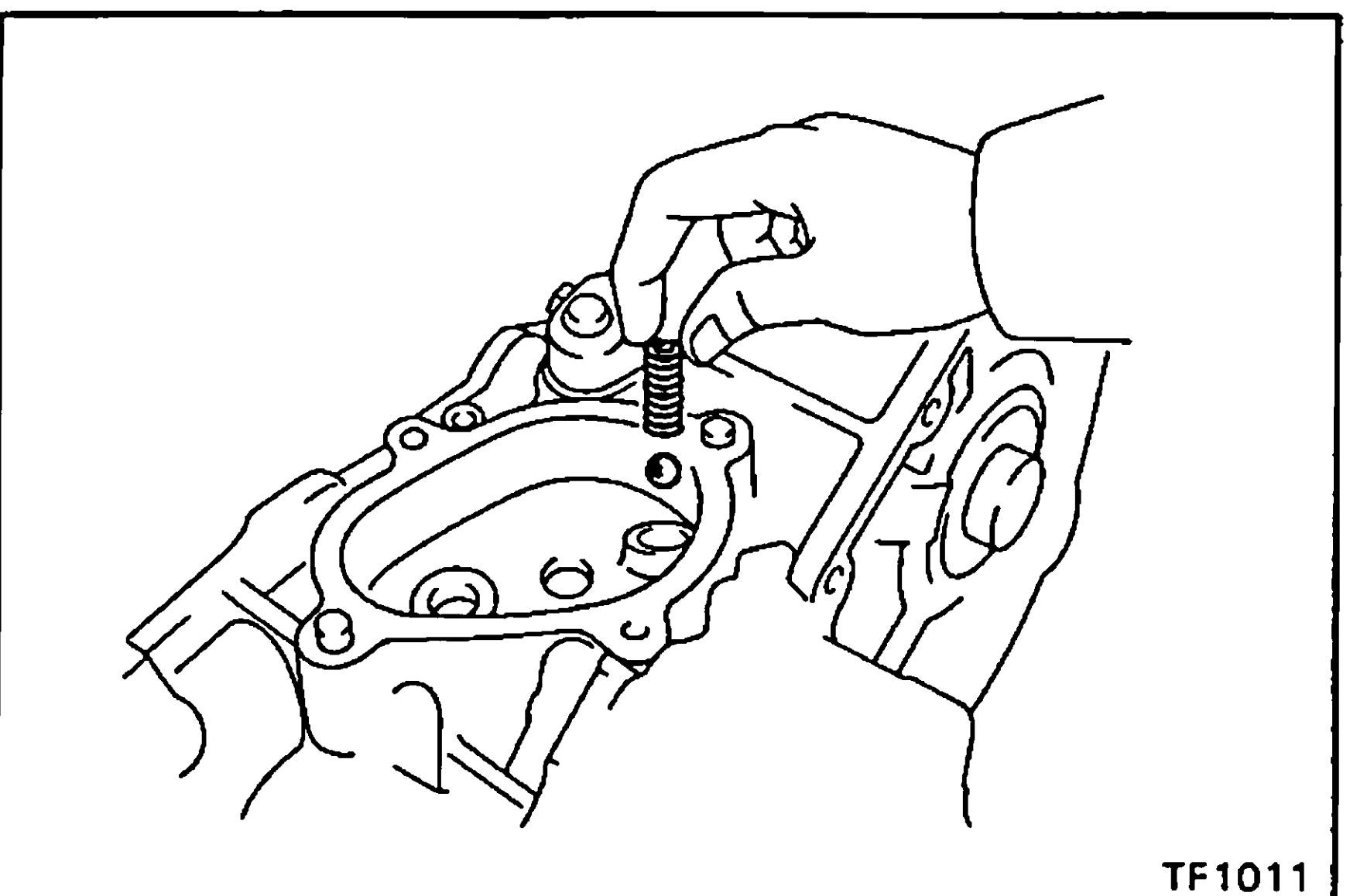


- (d) Stake the nut.

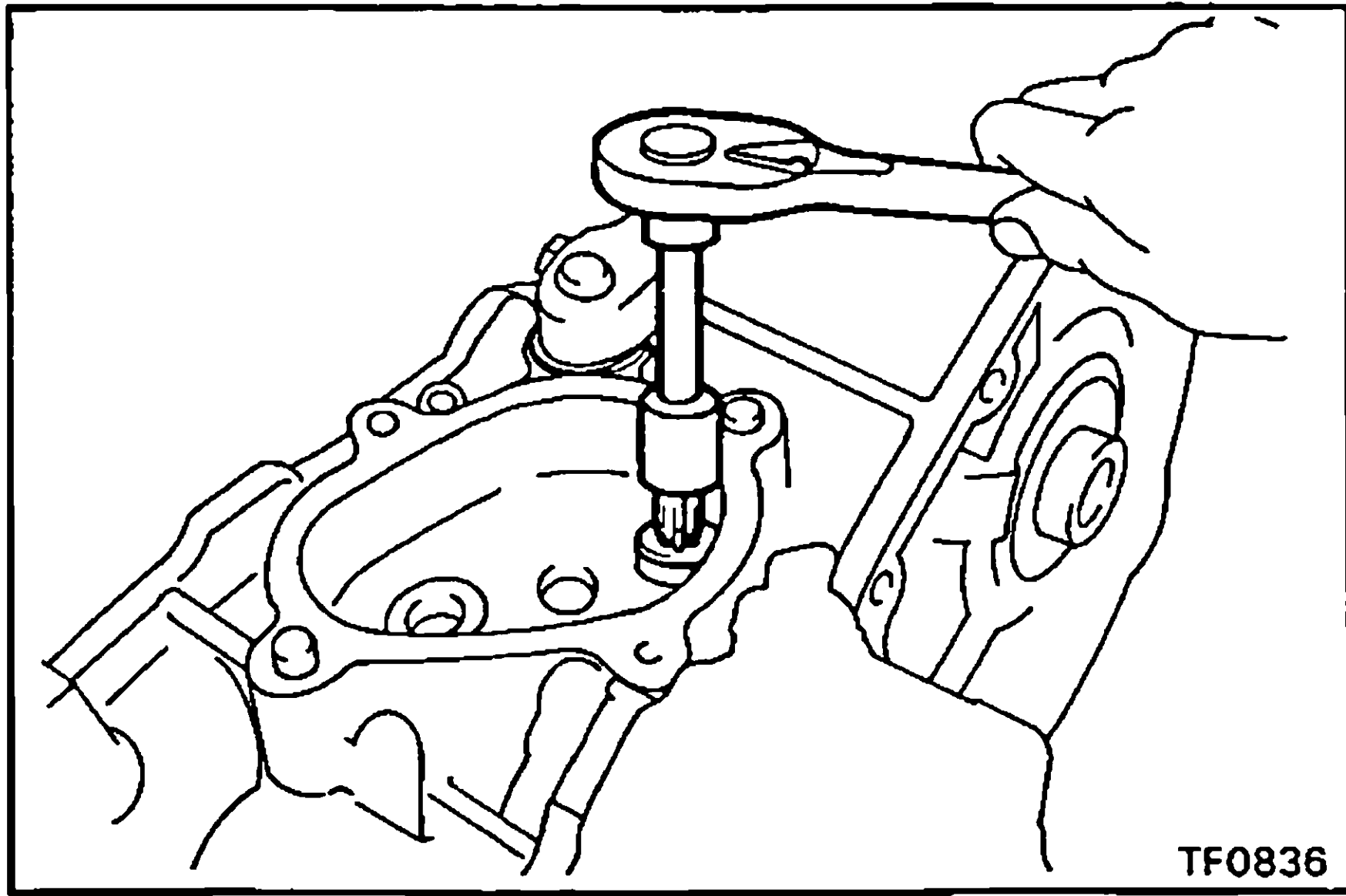
**22. INSTALL 4WD INDICATOR SWITCH**

Install and torque the transfer indicator switch.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

**23. INSTALL BALL, SPRING AND SCREW PLUG**

- (a) Install the ball and spring.

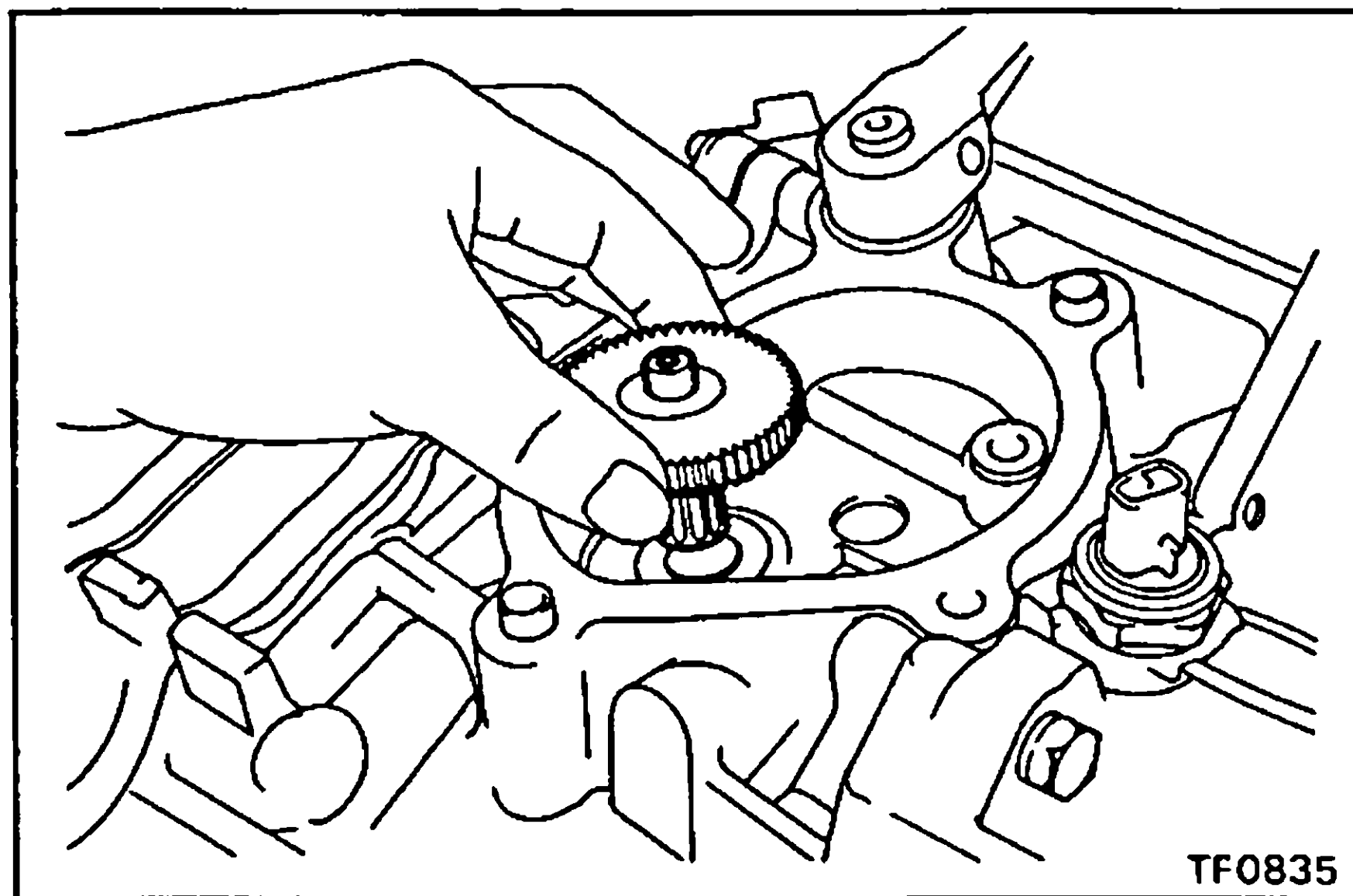


(b) Apply liquid sealer to the screw plug.

Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Install and torque the screw plug.

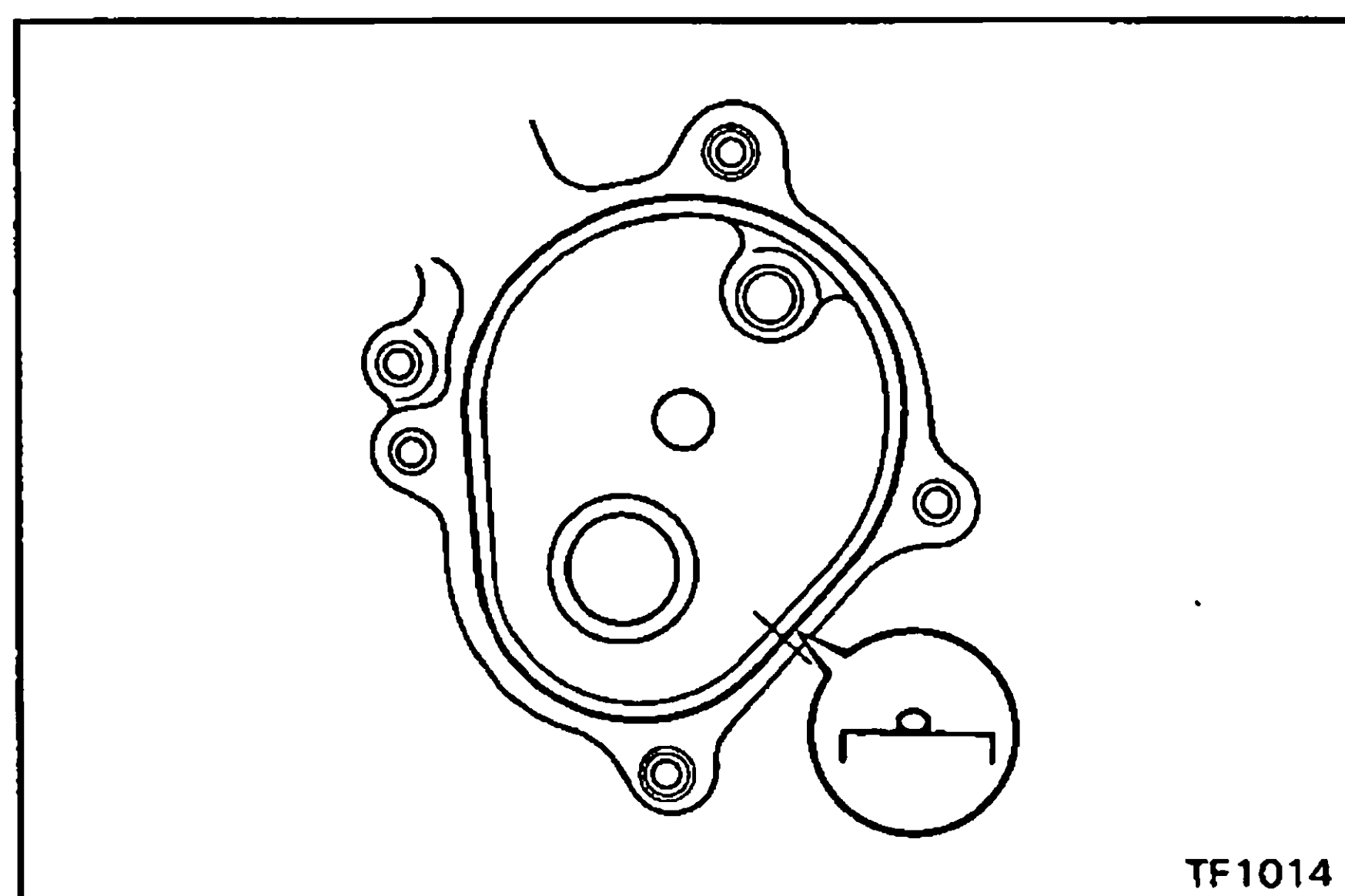
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



24. (MOTOR SHIFT TYPE) INSTALL OUTPUT GEAR

(a) Coat the gear oil as shown.

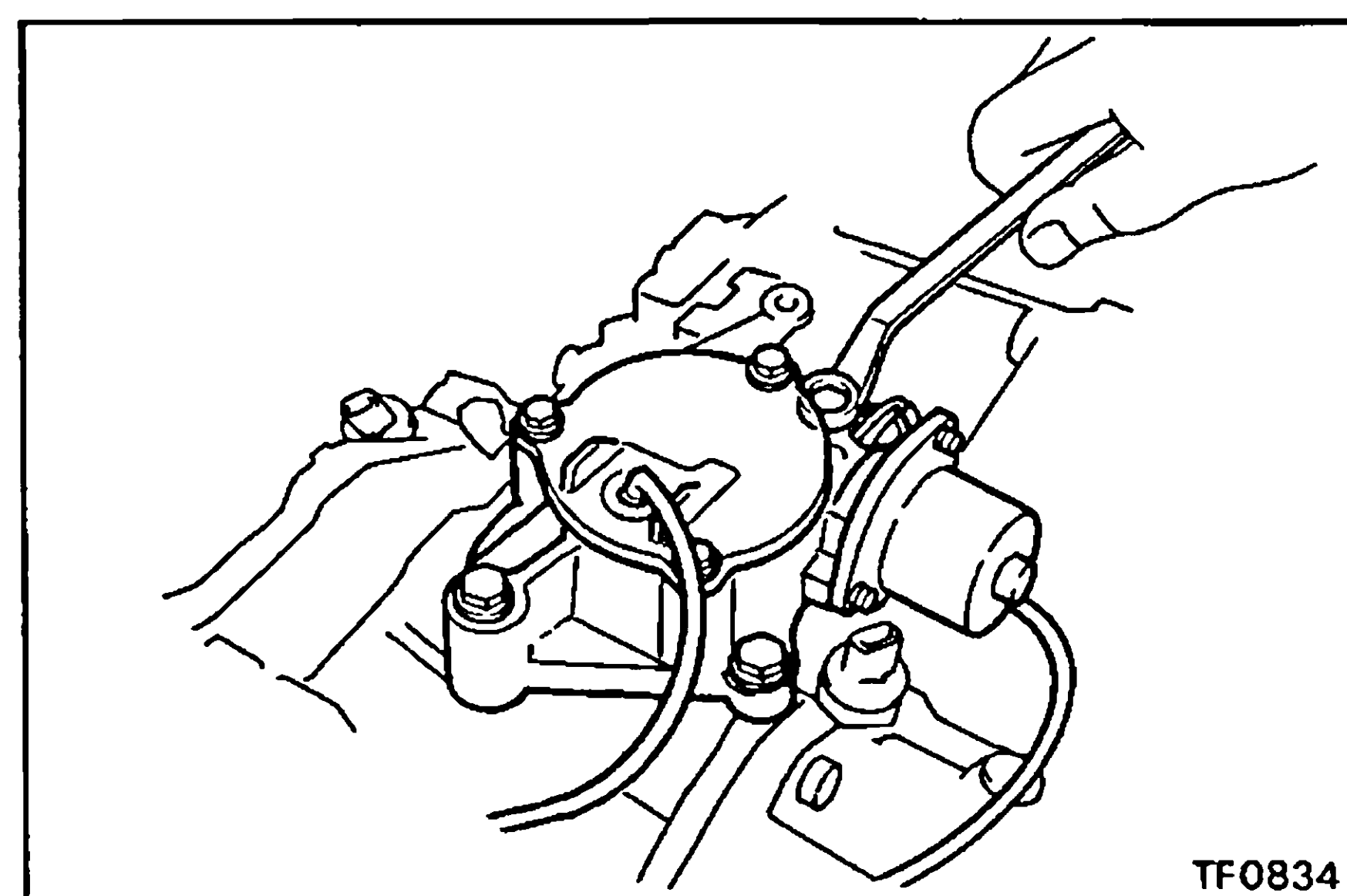
(b) Install the output gear.



25. (MOTOR SHIFT TYPE) INSTALL MOTOR ACTUATOR

(a) Apply seal packing to the front case as shown.

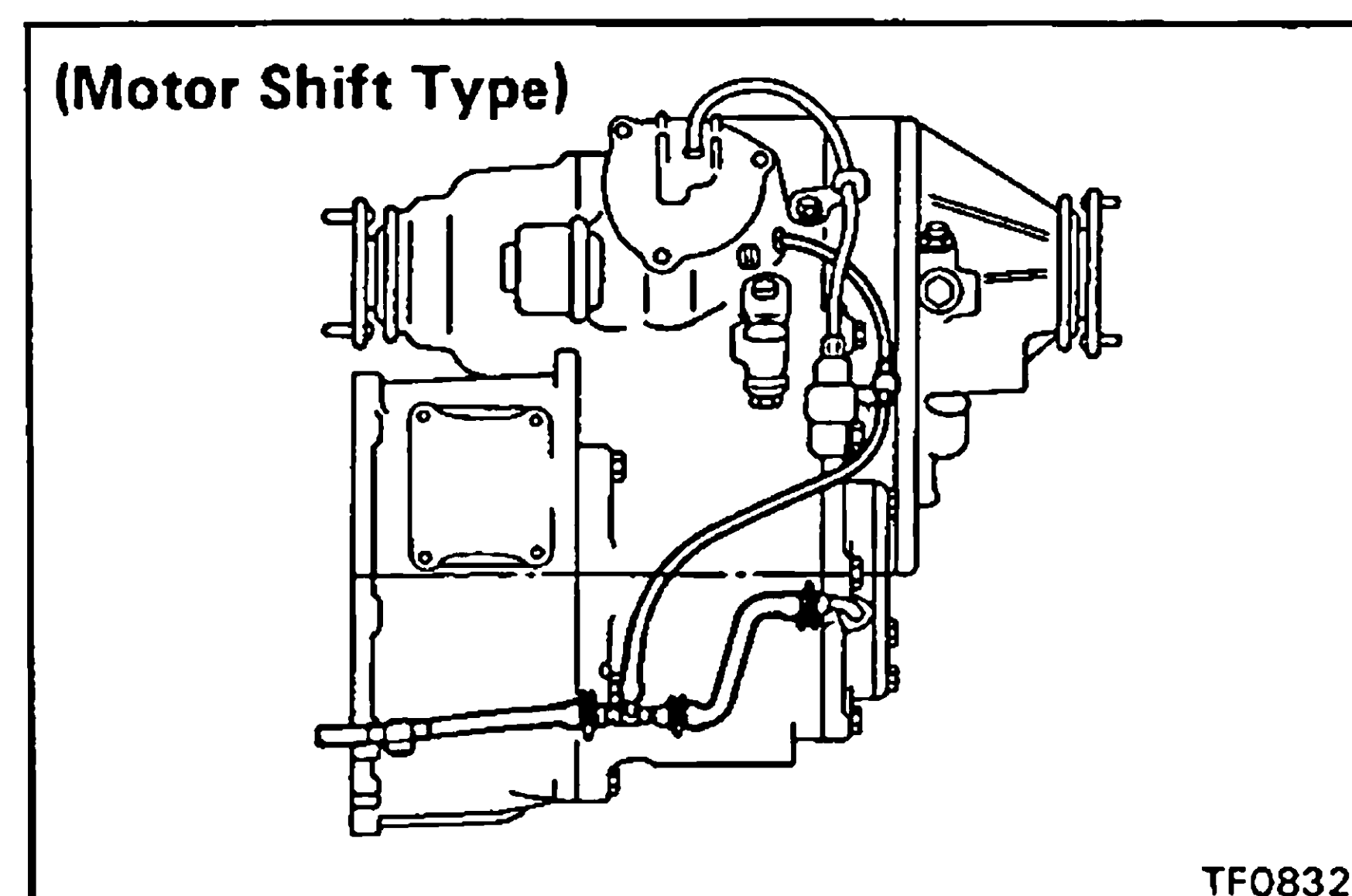
Seal packing: Part No.08826-00090, THREE BOND 1281 or equivalent



(b) Install the motor actuator.

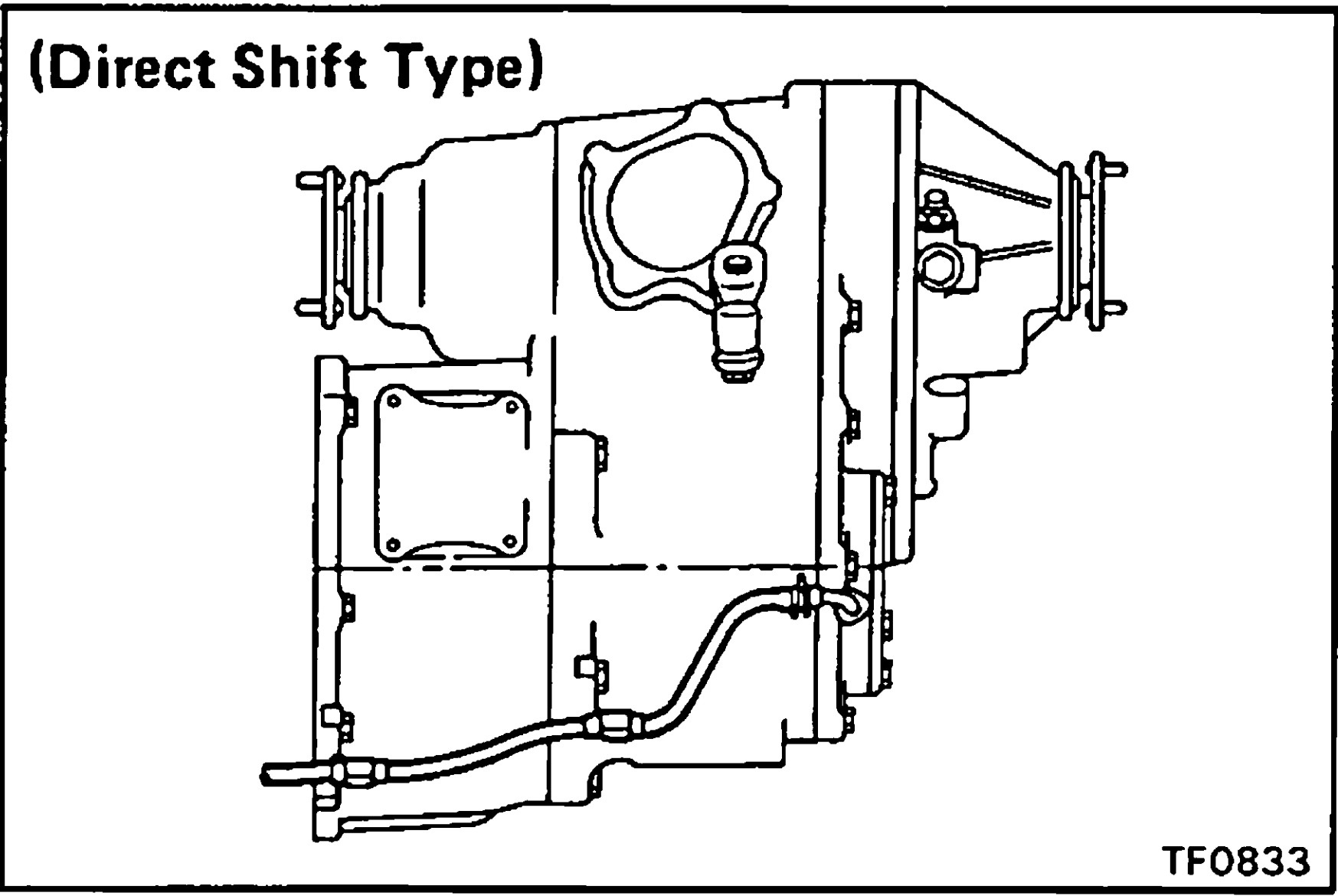
(c) Install and torque the four bolts.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



(Motor Shift Type)

26. INSTALL BREATHER HOSE



SUSPENSION AND AXLE

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

NOTE: The following pages contain only the points which differ from the above listed manuals.

	Page
(HARDTOP & CANVAS TOP)	
WHEEL ALIGNMENT	
Primary Inspection	SA-2
Front Wheel Alignment	SA-3
FREE WHEELING HUB	SA-5
FRONT AXLE HUB	SA-11
STEERING KNUCKLE AND AXLE SHAFT	SA-15
FRONT DIFFERENTIAL	
On-Vehicle Replacement of Rear Oil Seal	SA-16
Removal and Installation of Front Differential	SA-20
Differential Carrier	SA-26
REAR AXLE SHAFT	
(Semi-Floating Type)	SA-47
REAR AXLE SHAFT AND AXLE HUB	
(Full-Floating Type)	SA-48
REAR DIFFERENTIAL/8 INCH TYPE	
On-Vehicle Replacement of Front Oil Seal	SA-52
DIFFERENTIAL LOCKING SYSTEM	
Description	SA-54
Parts Location and System Diagram	SA-54
Wiring and Connector Diagrams	SA-55
Troubleshooting	SA-57
System Inspection	SA-57
Differential Locking System Circuit	SA-59
Differential Lock Actuator	SA-60
Differential Lock Control Switch	SA-66
Indicator Switch	SA-66
Combination Meter	SA-66
LEAF SPRING TYPE REAR SUSPENSION	SA-67
(STATION WAGON)	
WHEEL ALIGNMENT	
Primary Inspection	SA-68
Front Wheel Alignment	SA-69
FREE WHEELING HUB	SA-71
STEERING KNUCKLE AND AXLE SHAFT	SA-77
REAR AXLE SHAFT AND AXLE HUB	
(Full-Floating Type)	SA-81

SA

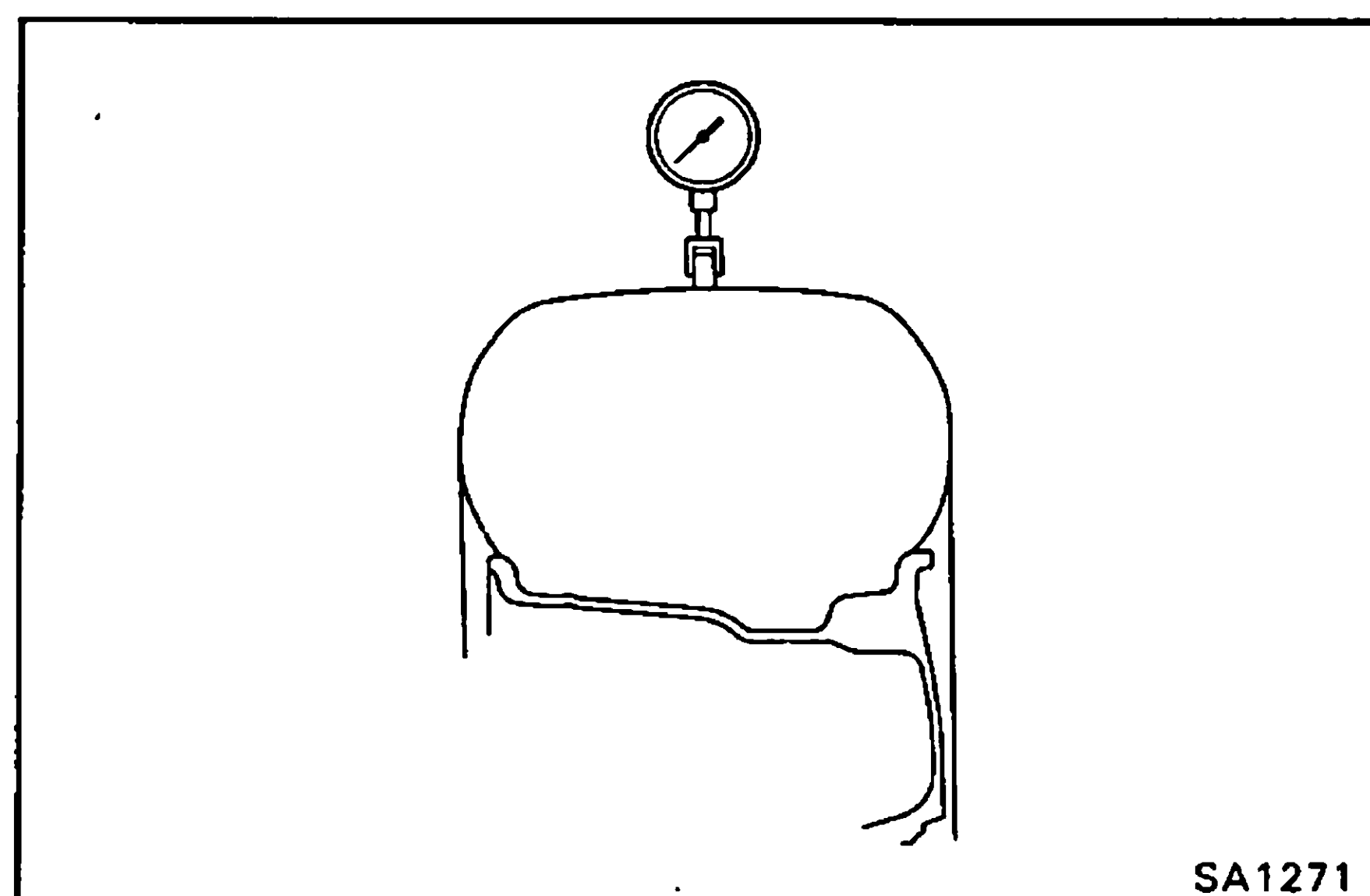
WHEEL ALIGNMENT

Primary Inspection

1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

- (a) Check the tires for wear, size and proper inflation pressure.

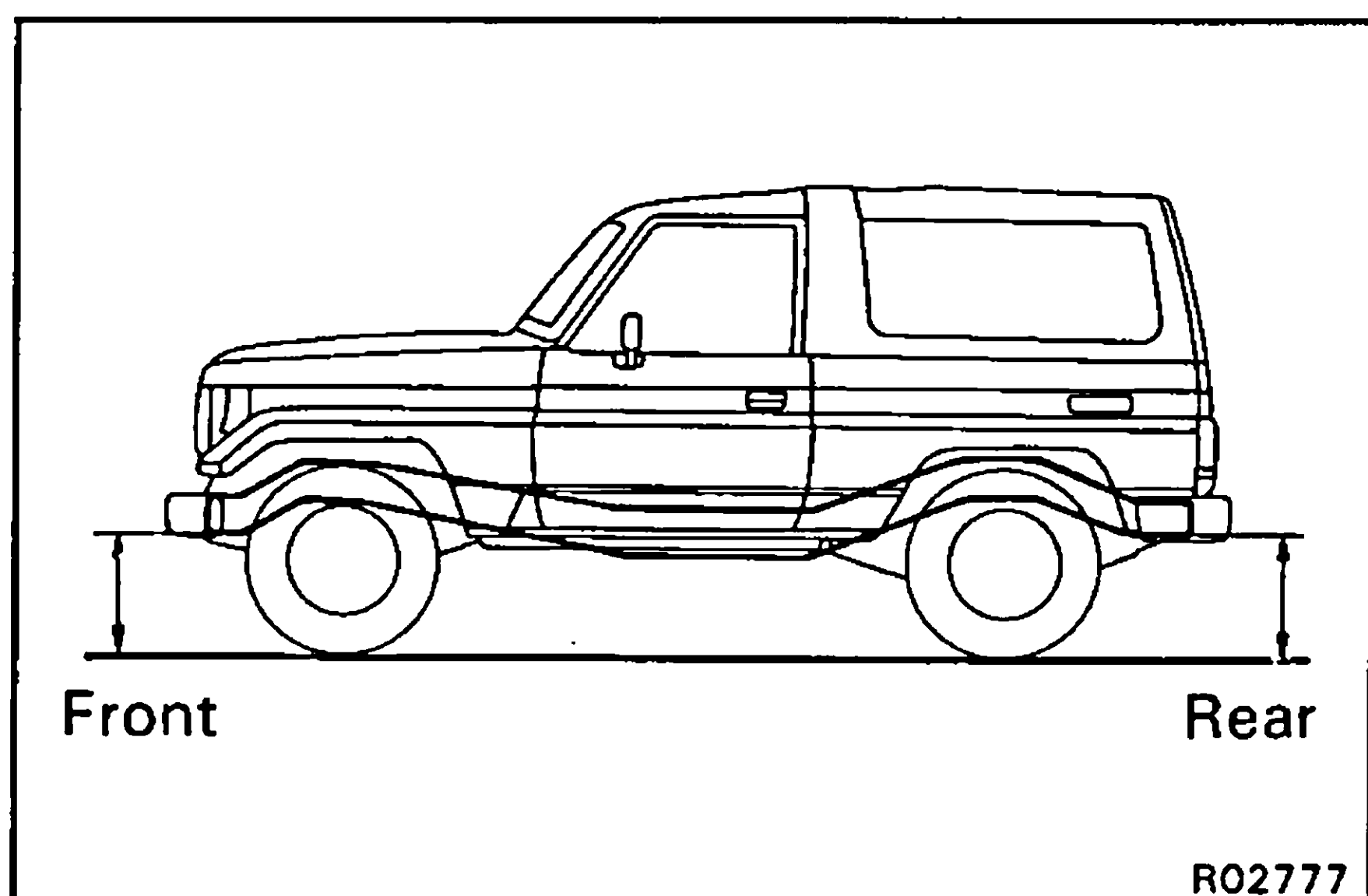
Cold tire inflation pressure: See page A-5, 6



- (b) Check the tire runout.

Tire runout: Less than 3.0 mm (0.118 in.)

- (c) Check the wheel bearings for looseness.
(d) Check the suspension for looseness.
(e) Check the steering linkage for looseness.
(f) Check that the shock absorbers work properly by using the standard bounce test.

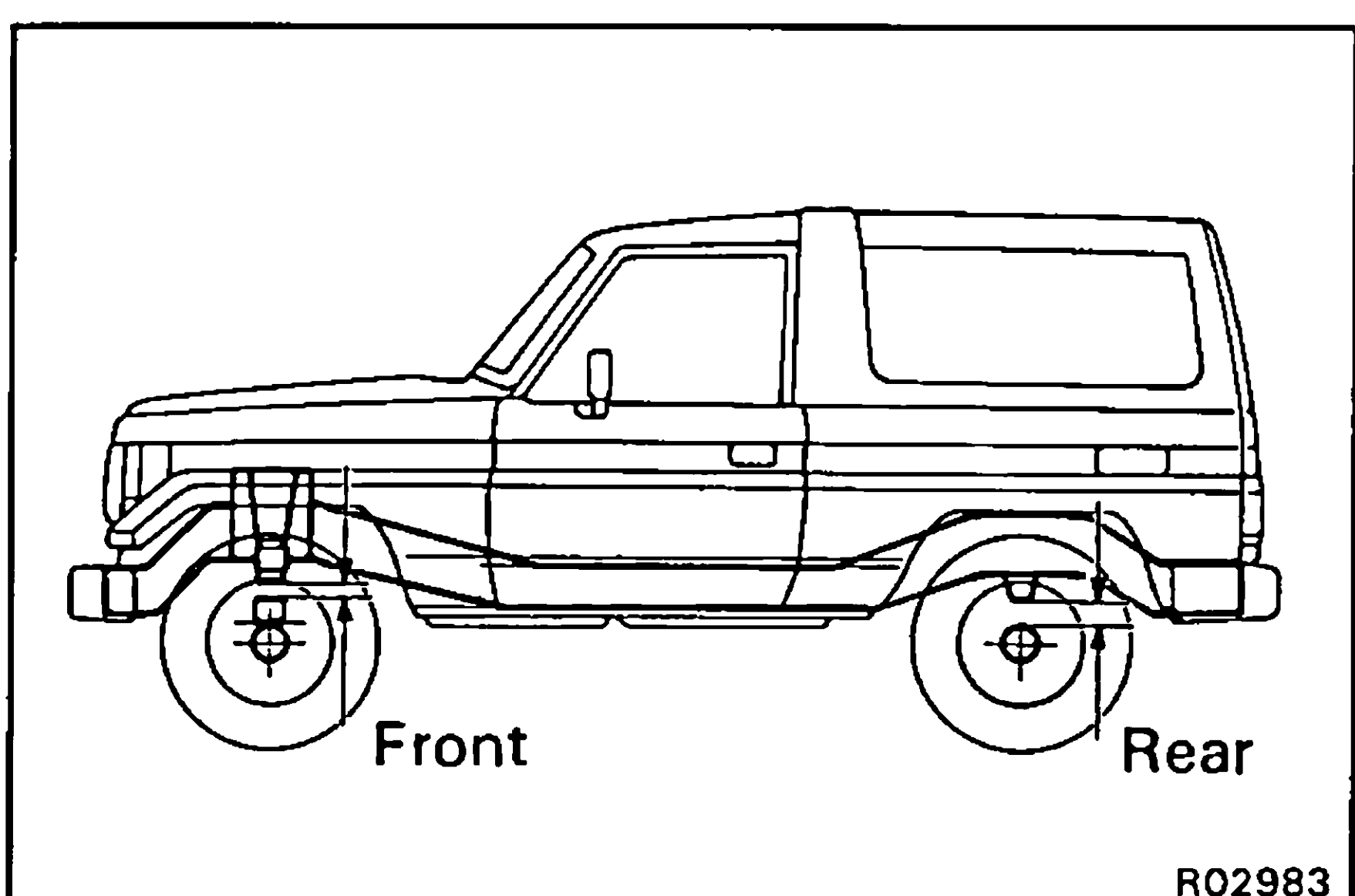


2. (COIL SPRING TYPE) MEASURE CHASSIS GROUND CLEARANCE

Chassis ground clearance: See page A-6

If the clearance of the vehicle is not standard, try to level the vehicle by rocking it down.

If still not correct, check for bad springs or suspension parts.



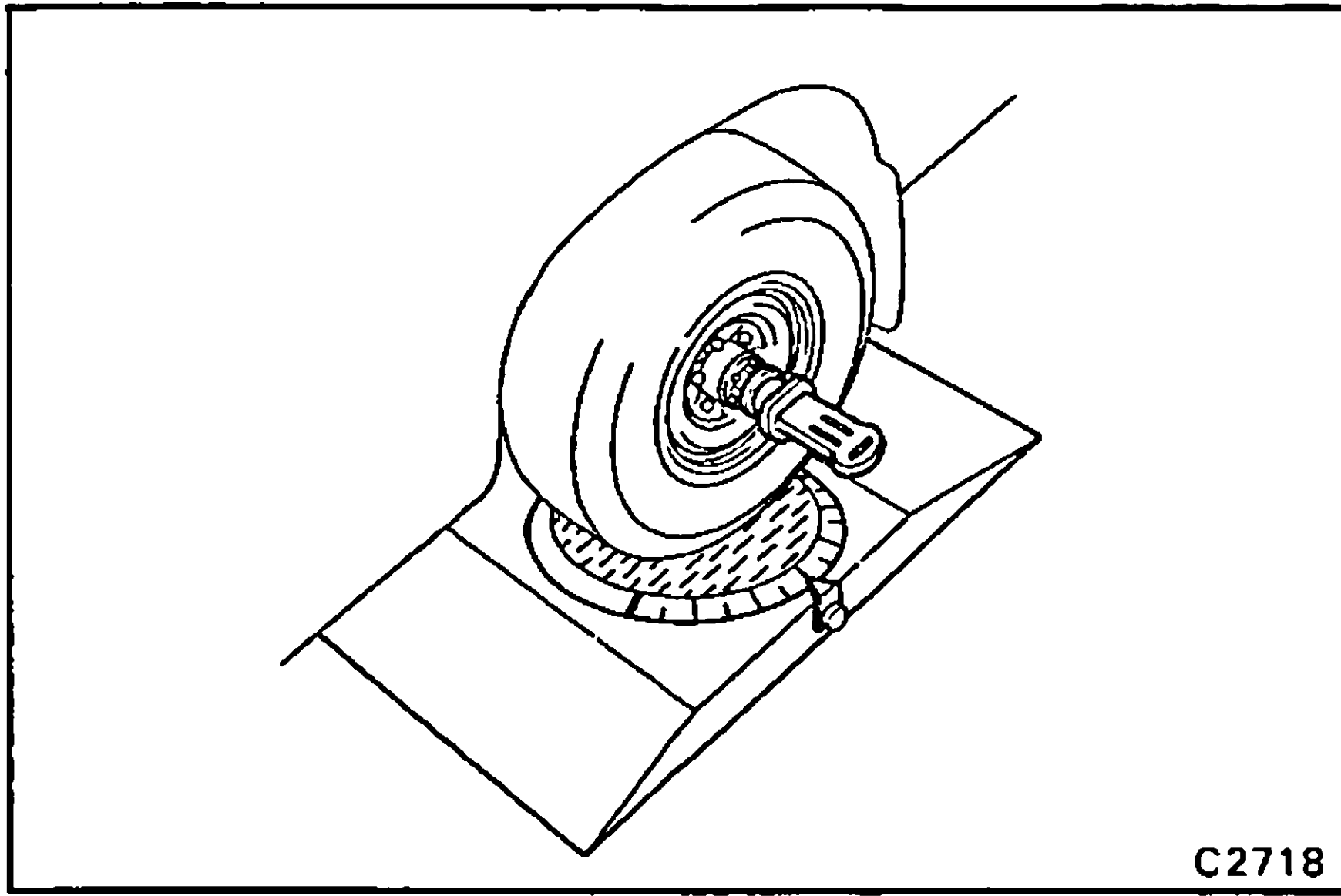
3. (LEAF SPRING TYPE) MEASURE FRONT AND REAR BOUND STOPPER CLEARANCE

Front bound stopper clearance: 43 mm (1.69 in.)

Rear bound stopper clearance: 48 mm (1.89 in.)

If the clearance of the bound stopper is not standard, try to level the vehicle by rocking it down.

If still not correct, check for bad springs or suspension parts.



Front Wheel Alignment

INSPECT AND ADJUSTMENT OF FRONT WHEEL ALIGNMENT

1. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacture.

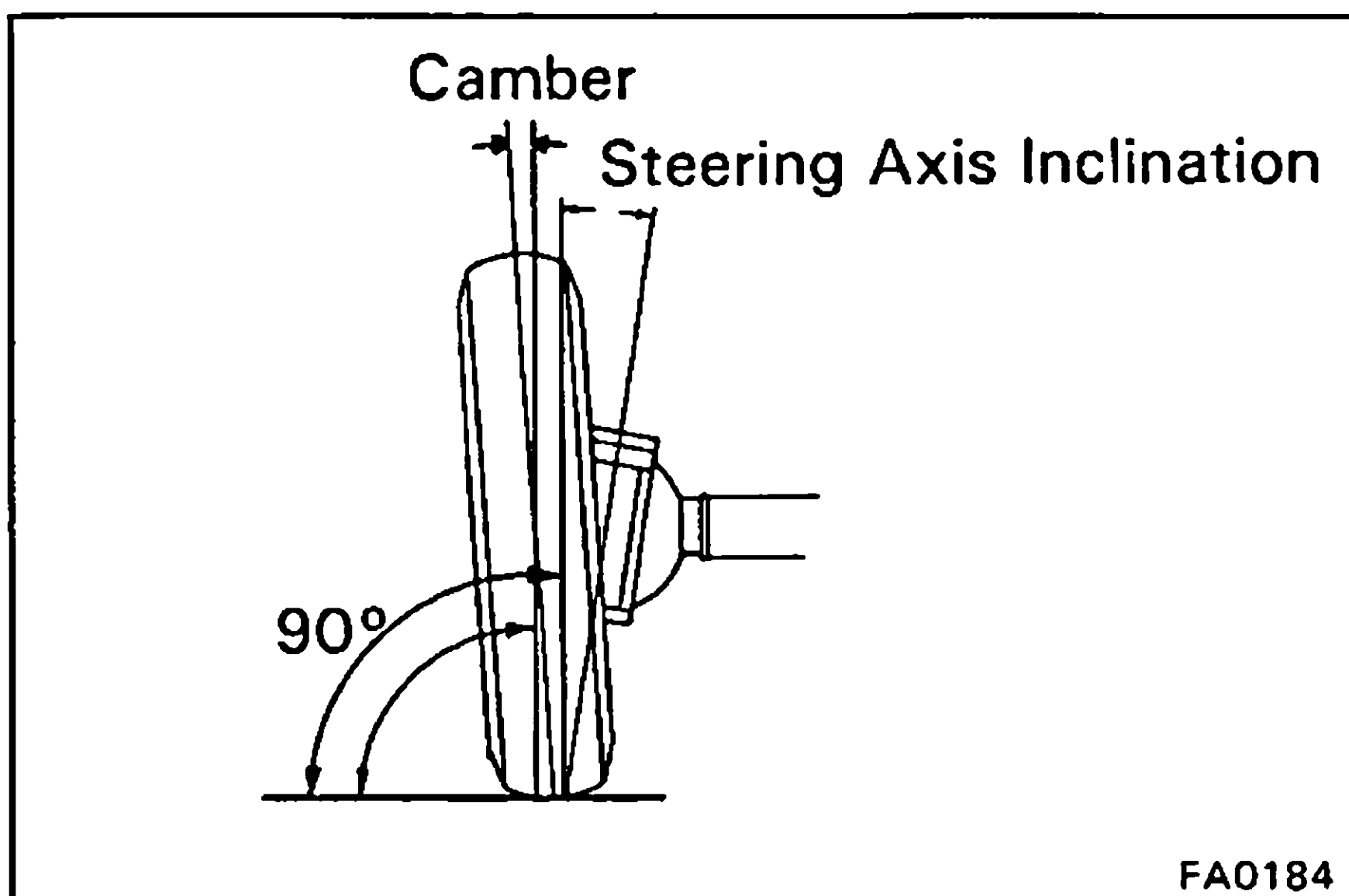
2. INSPECT CAMBER AND STEERING AXIS INCLINATION

Camber: $1^{\circ}00' \pm 45'$

Cross camber: 30' or less

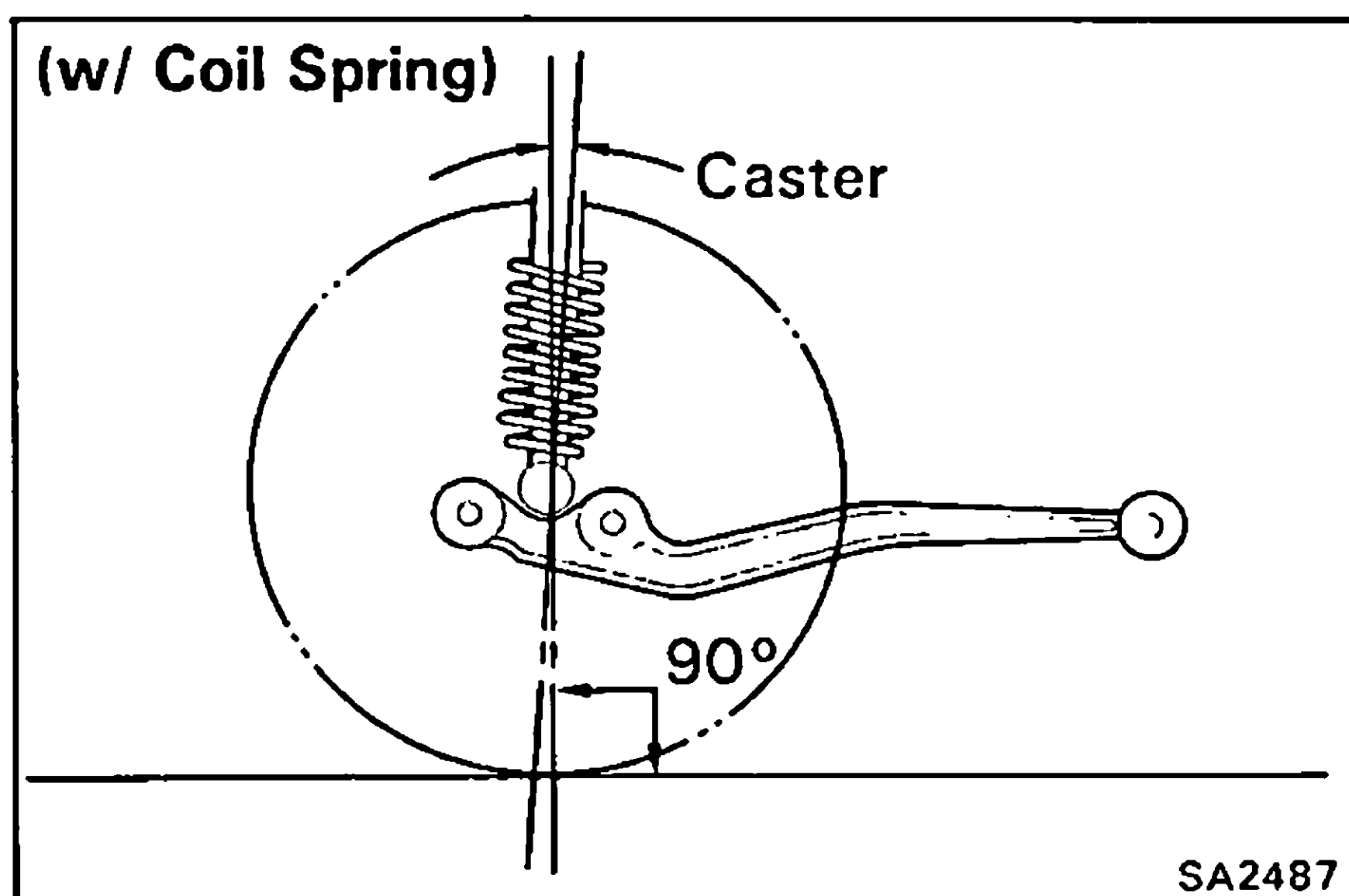
Steering axis inclination: $12^{\circ}00' \pm 45'$

If the steering axis inclination is not as specified after camber have been correctly adjusted, recheck the steering knuckle and front wheel for bending or looseness.



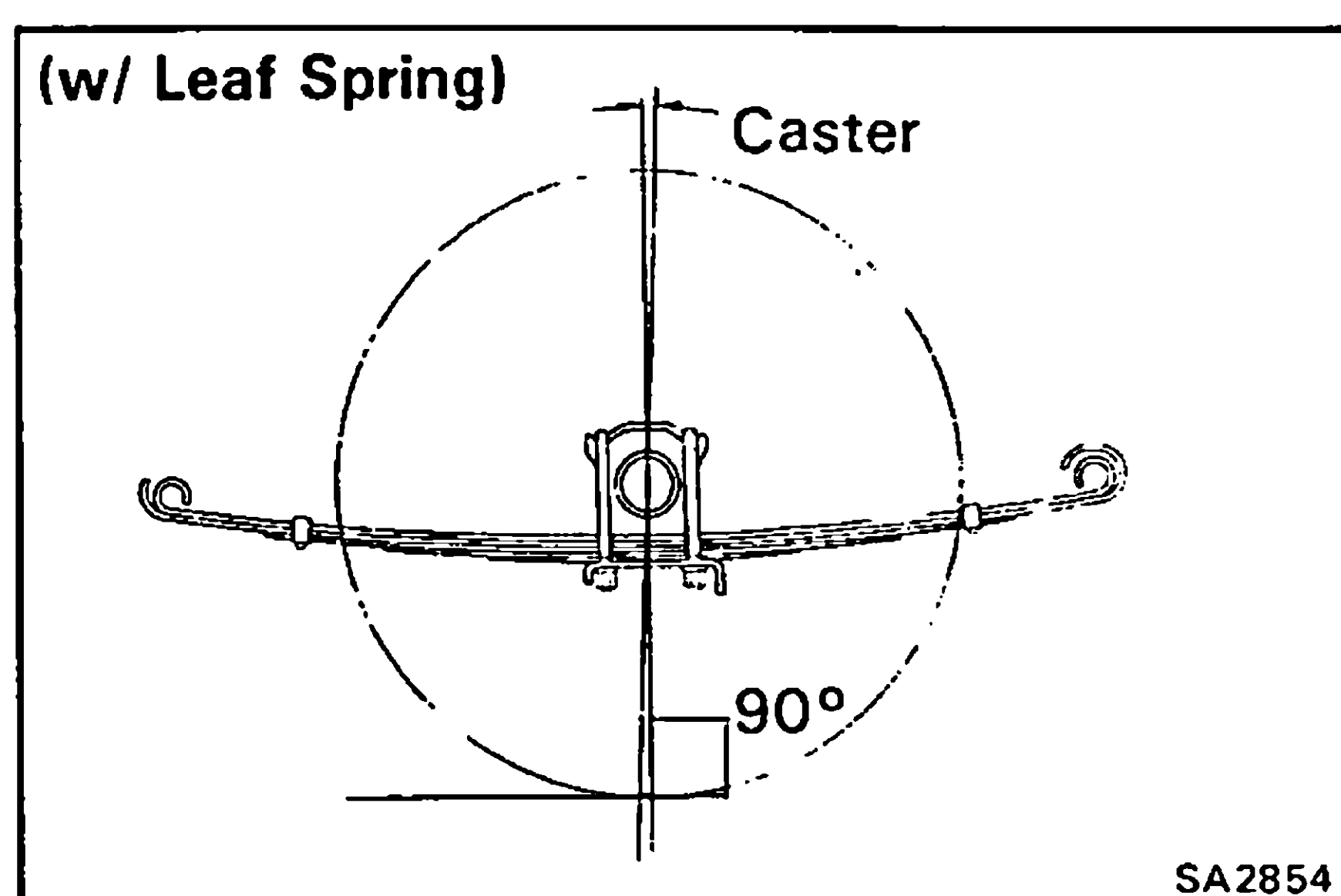
3. (w/ COIL SPRING) CHECK CASTER (See page A-7)

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



4. (w/ LEAF SPRING) CHECK CASTER (See page A-6)

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



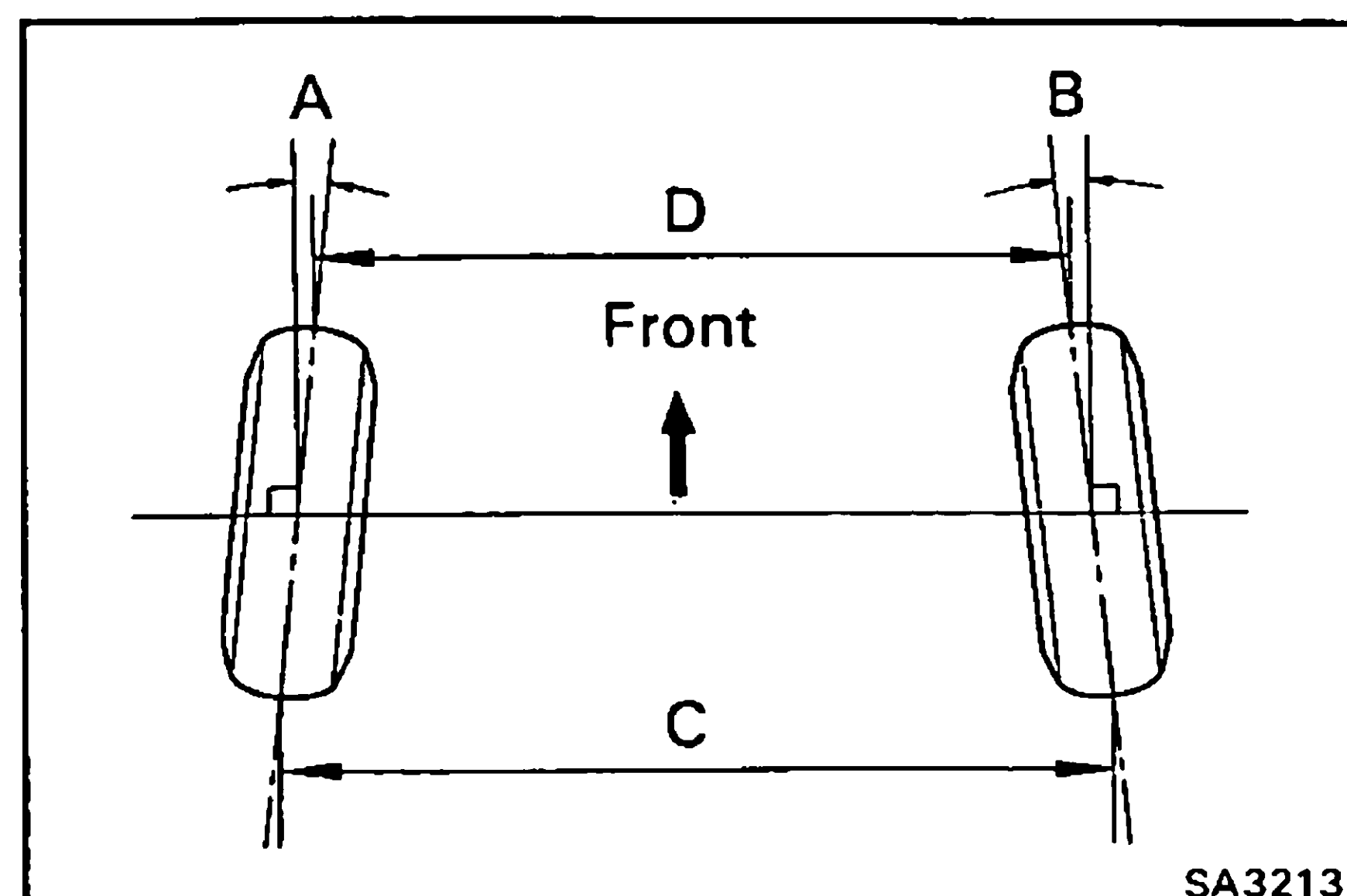
5. INSPECT TOE-IN

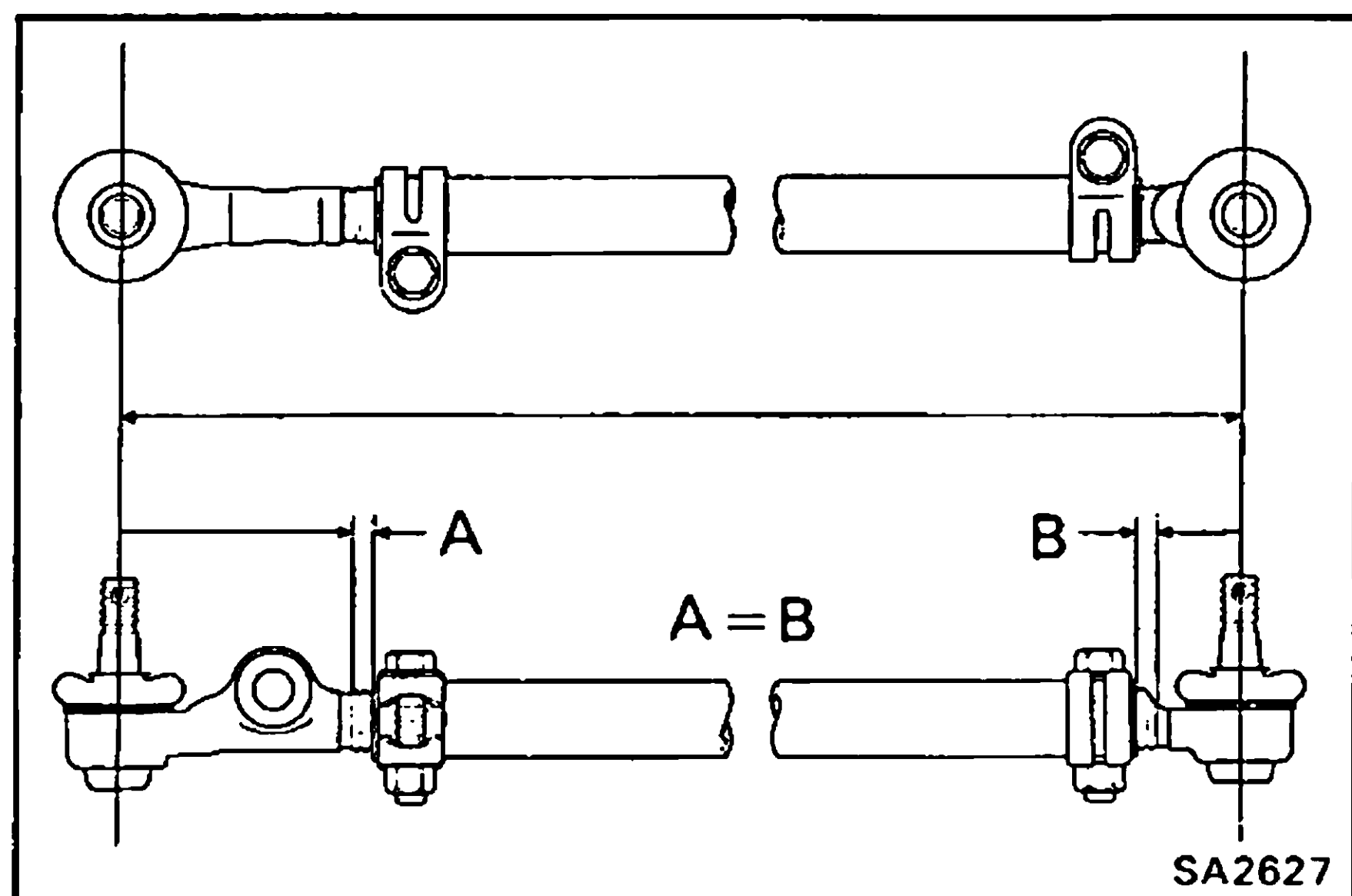
Toe-in (total):

(A + B: See pages A-6, 7)

(C - D: See pages A-6, 7)

If toe-in is not within specification adjust by the tie rod end.



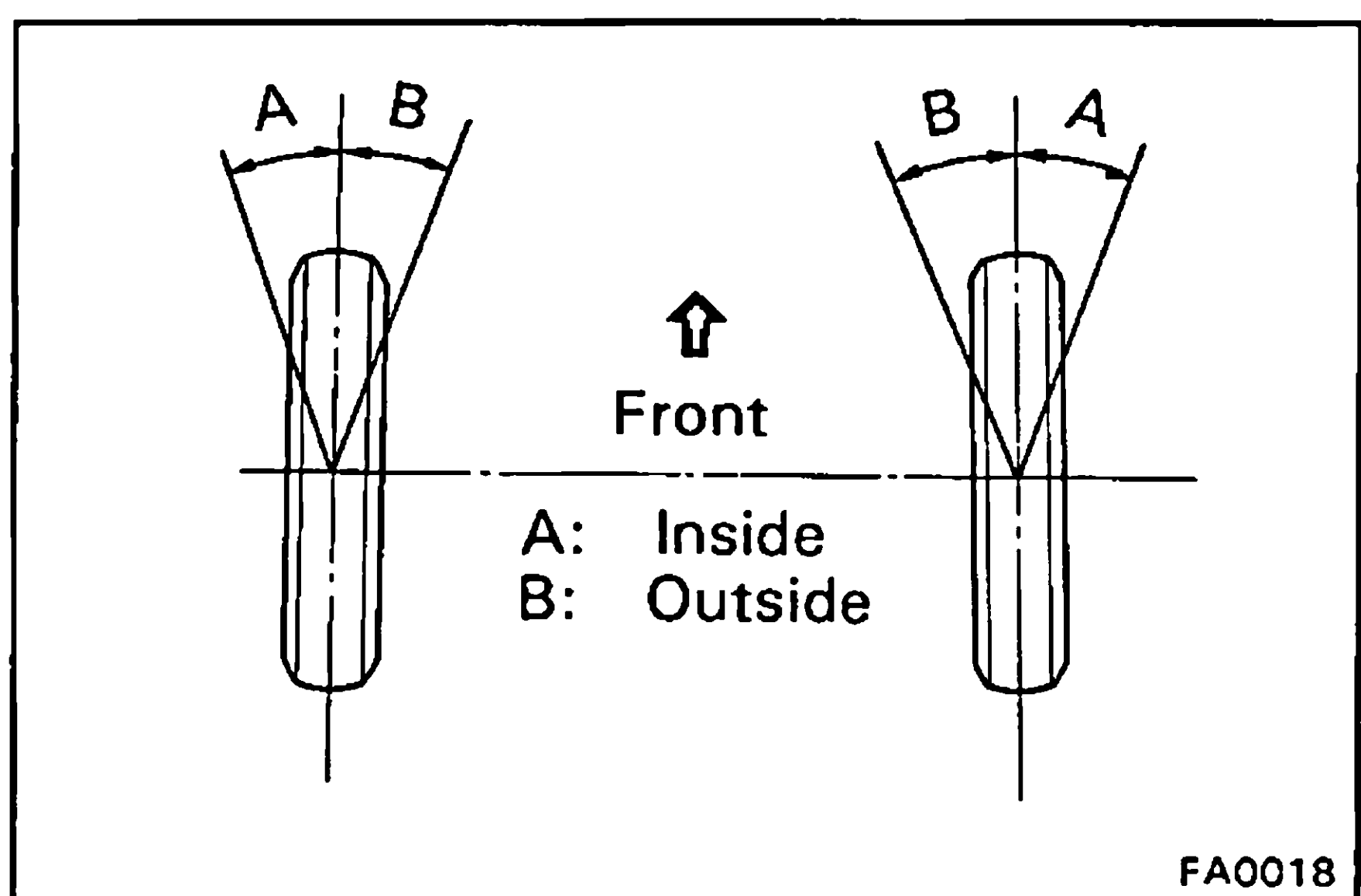
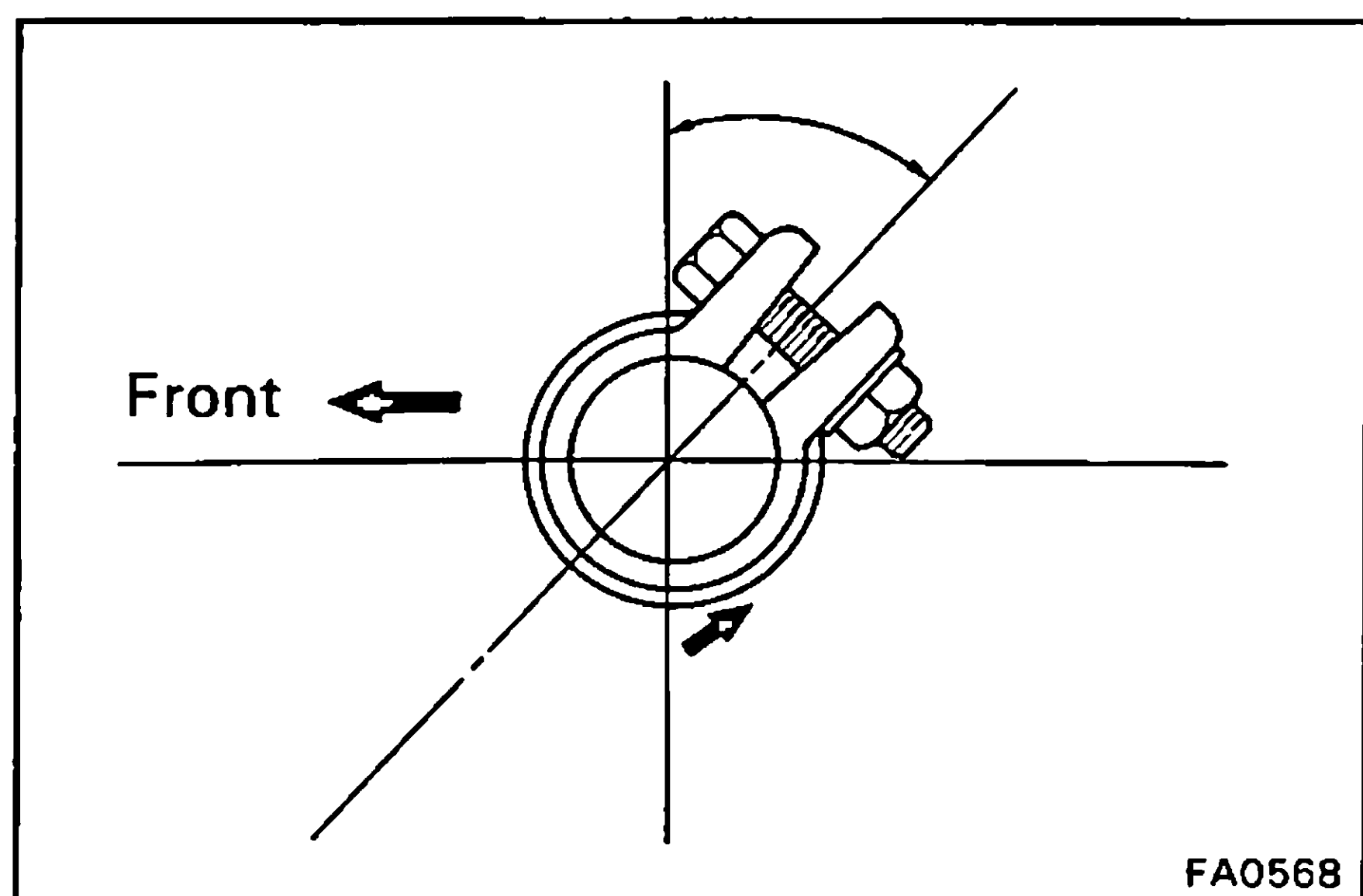


6. ADJUST TOE-IN

- Loosen the nuts holding the clamps to the tie rod.
- Adjust toe-in to the correct value by turning the tie rod.
- Insure that the lengths of the tie rod ends are the same.
- Torque the nuts holding the clamps.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

HINT: The clamps opening must be positioned at the rear of the tie rod and face within 45° from the verticle axis.



7. INSPECT WHEEL ANGLE

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

Wheel angle:

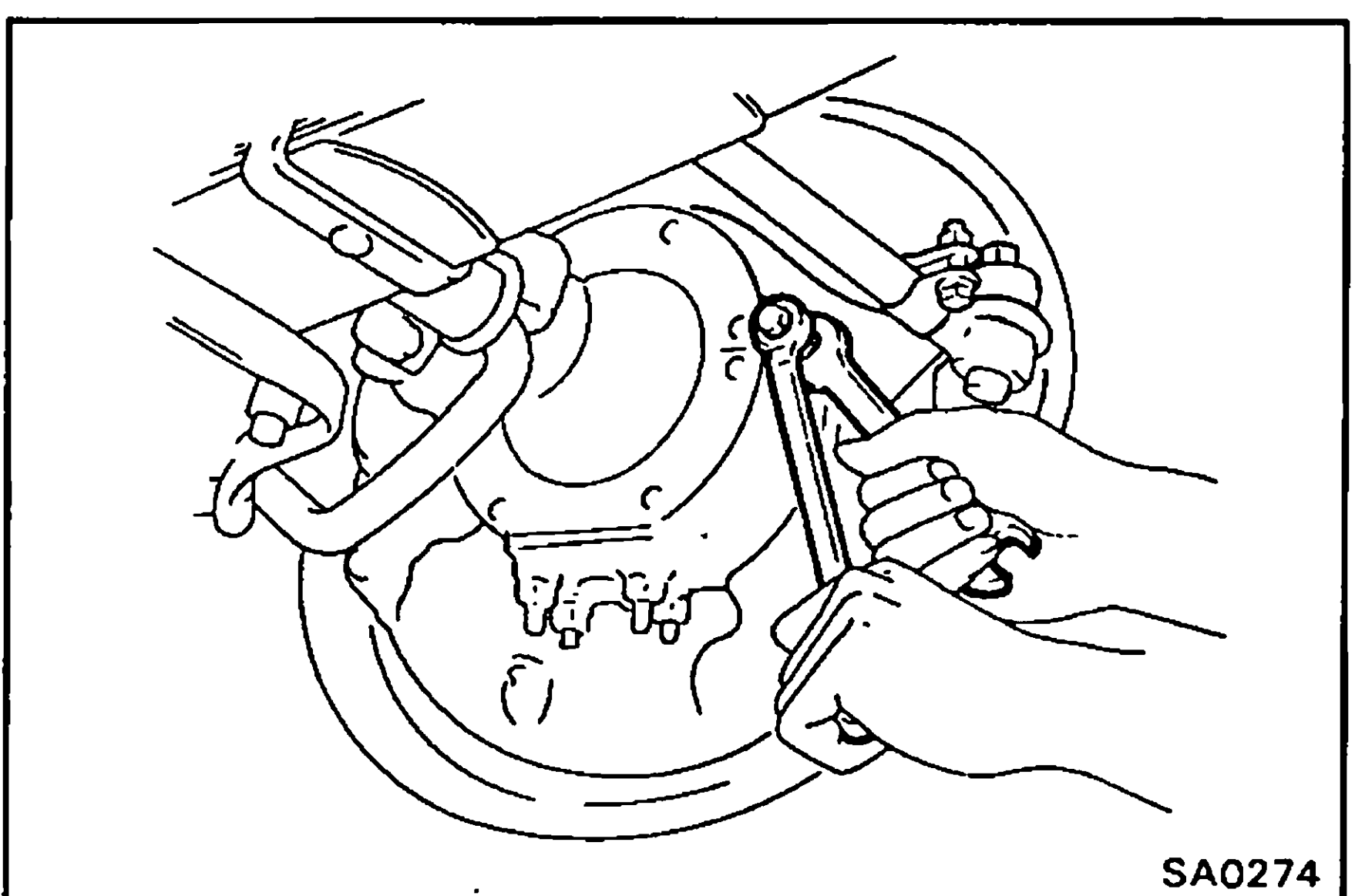
Wheel angle		
Max.	Inside wheel	32° +0° -3°
	Outside wheel	30° (Leaf Spring Type)
		28° (Coil Spring Type)

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

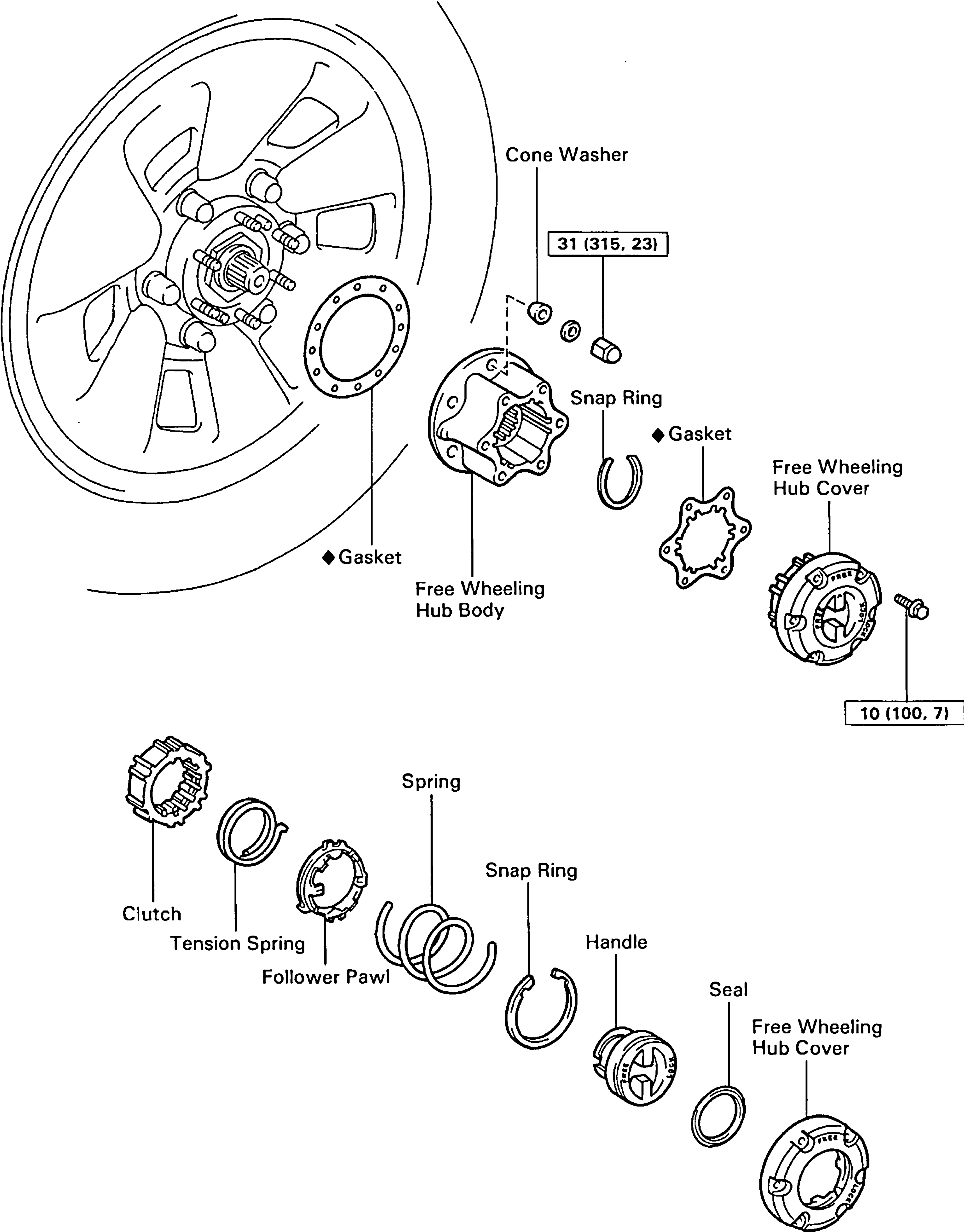
If maximum steering angles differ from the standard value, adjust the wheel angle with the knuckle stopped bolts.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

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

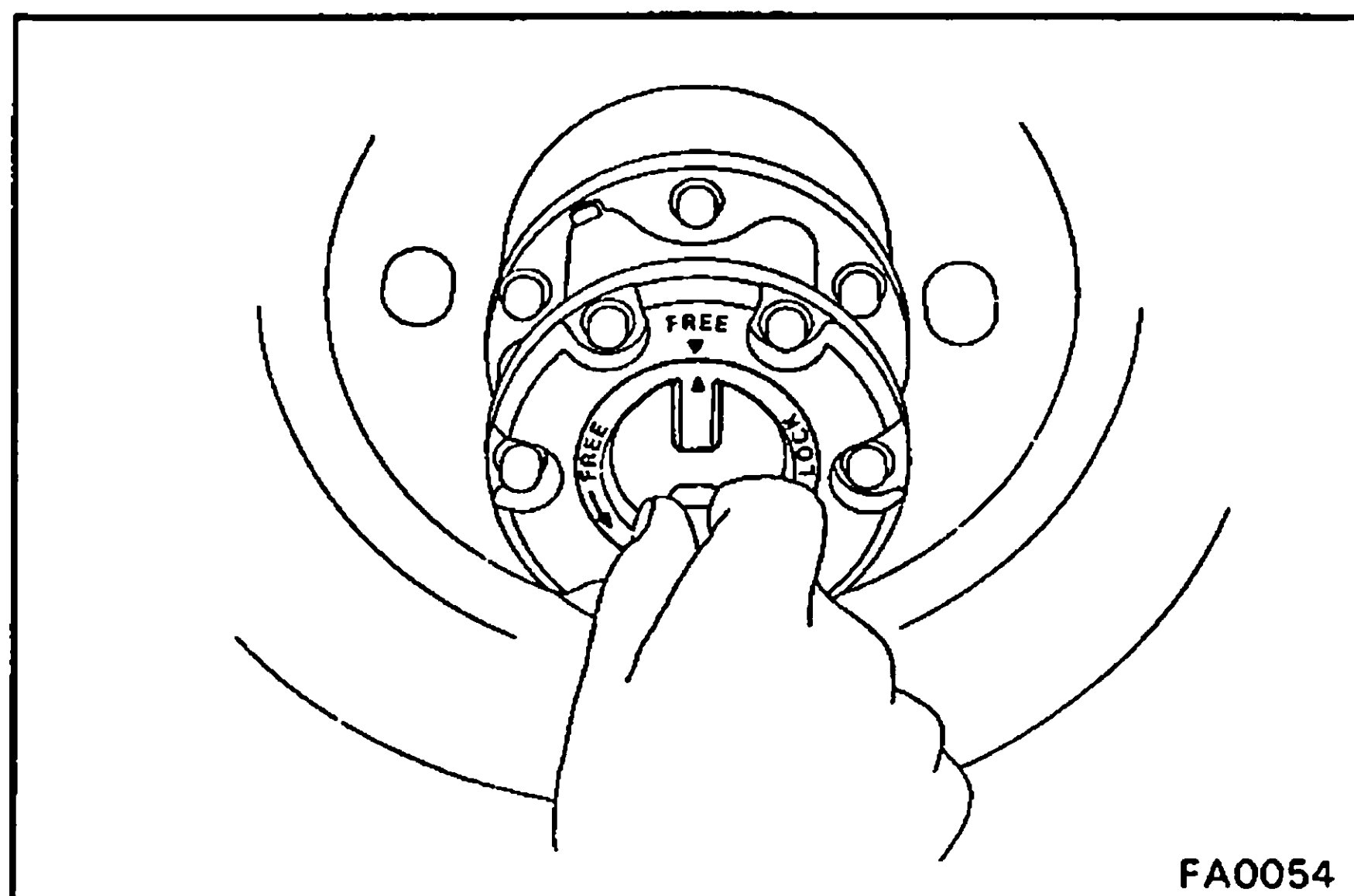


FREE WHEELING HUB
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

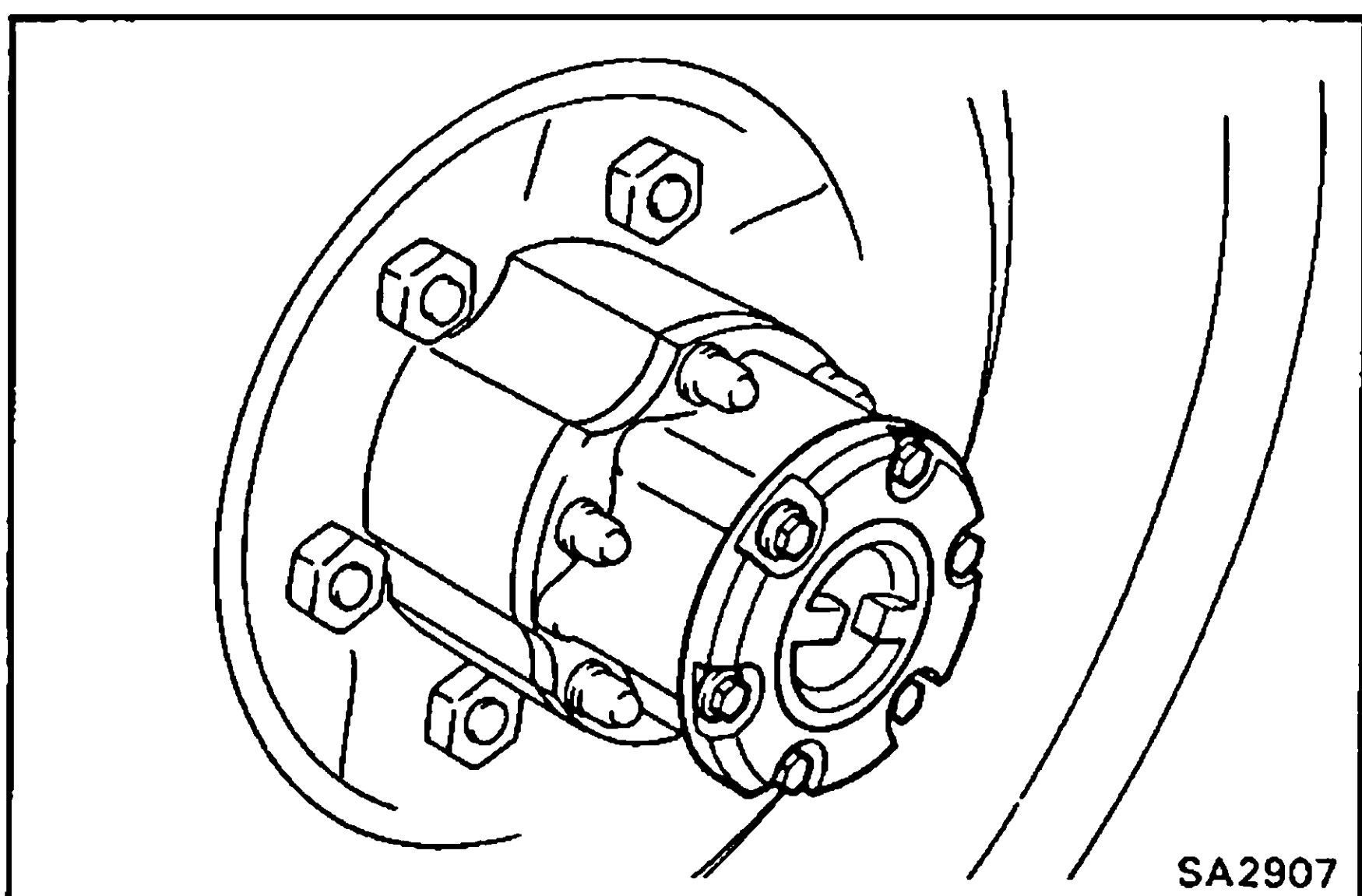


REMOVAL OF FREE WHEELING HUB

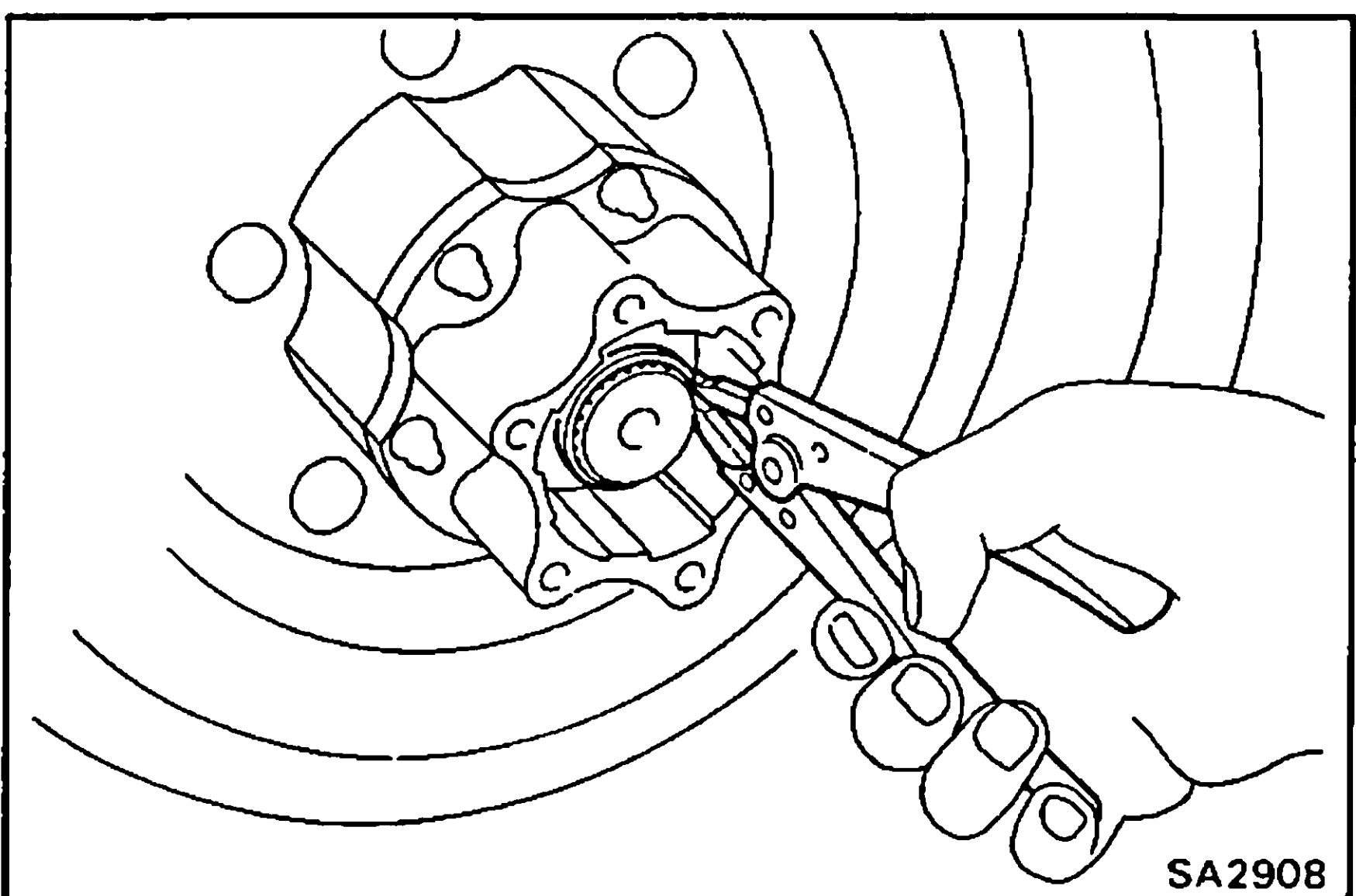
(See page SA-5)

1. REMOVE FREE WHEELING HUB COVER

(a) Set the control handle to FREE.

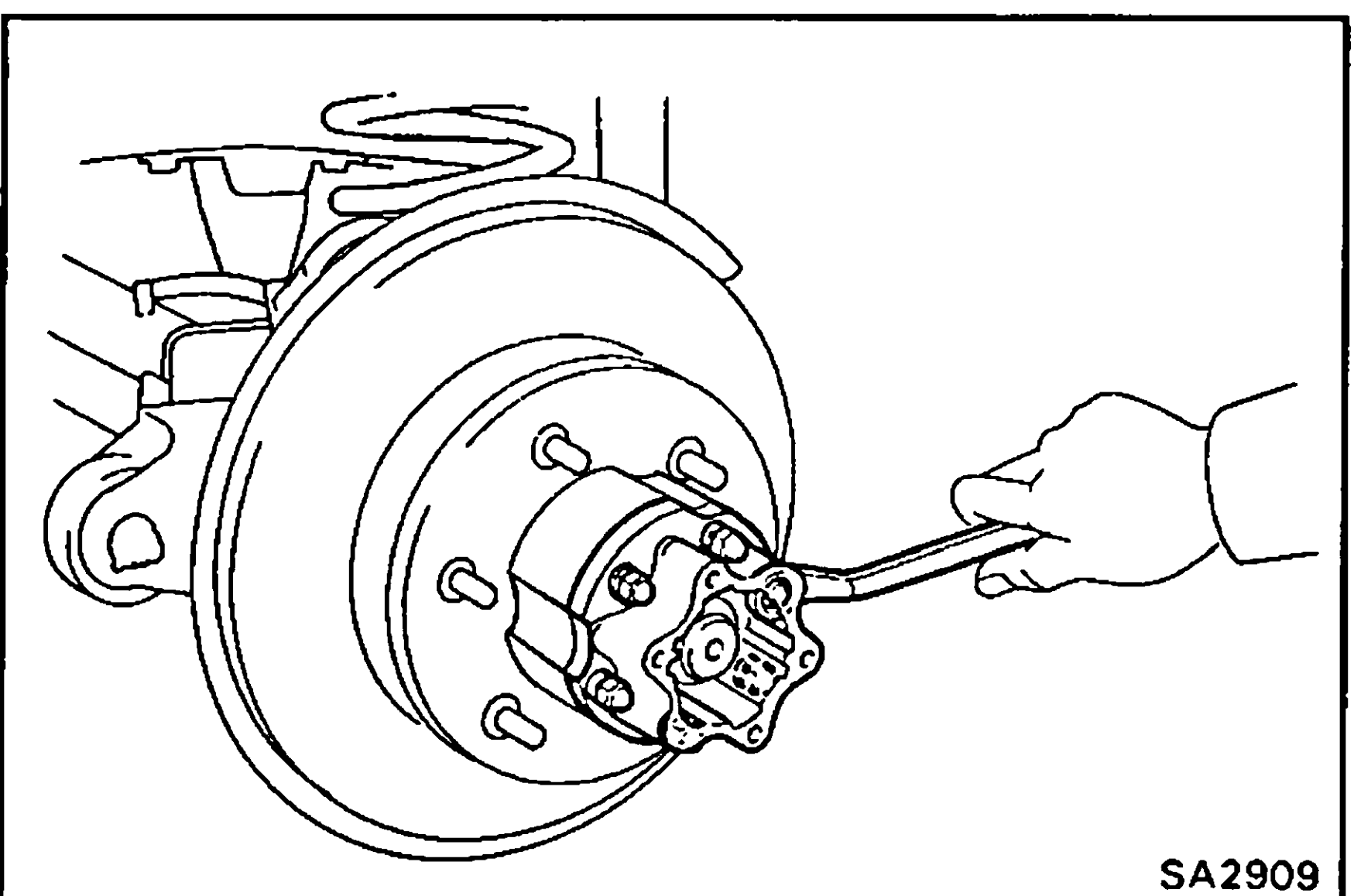


(b) Remove the six cover mounting bolts and pull off the cover.



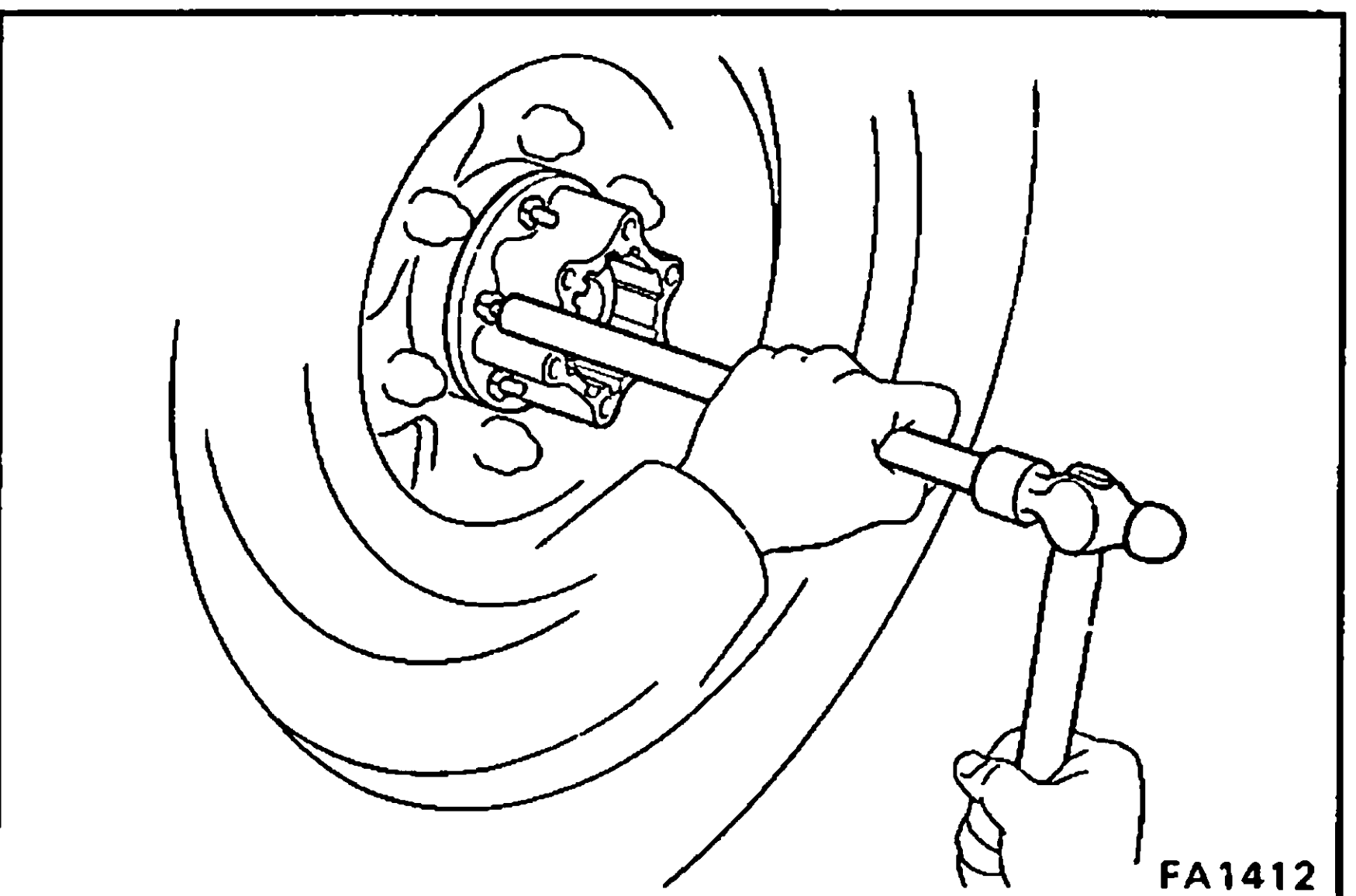
2. REMOVE SNAP RING

Using snap ring pliers, remove the snap ring.



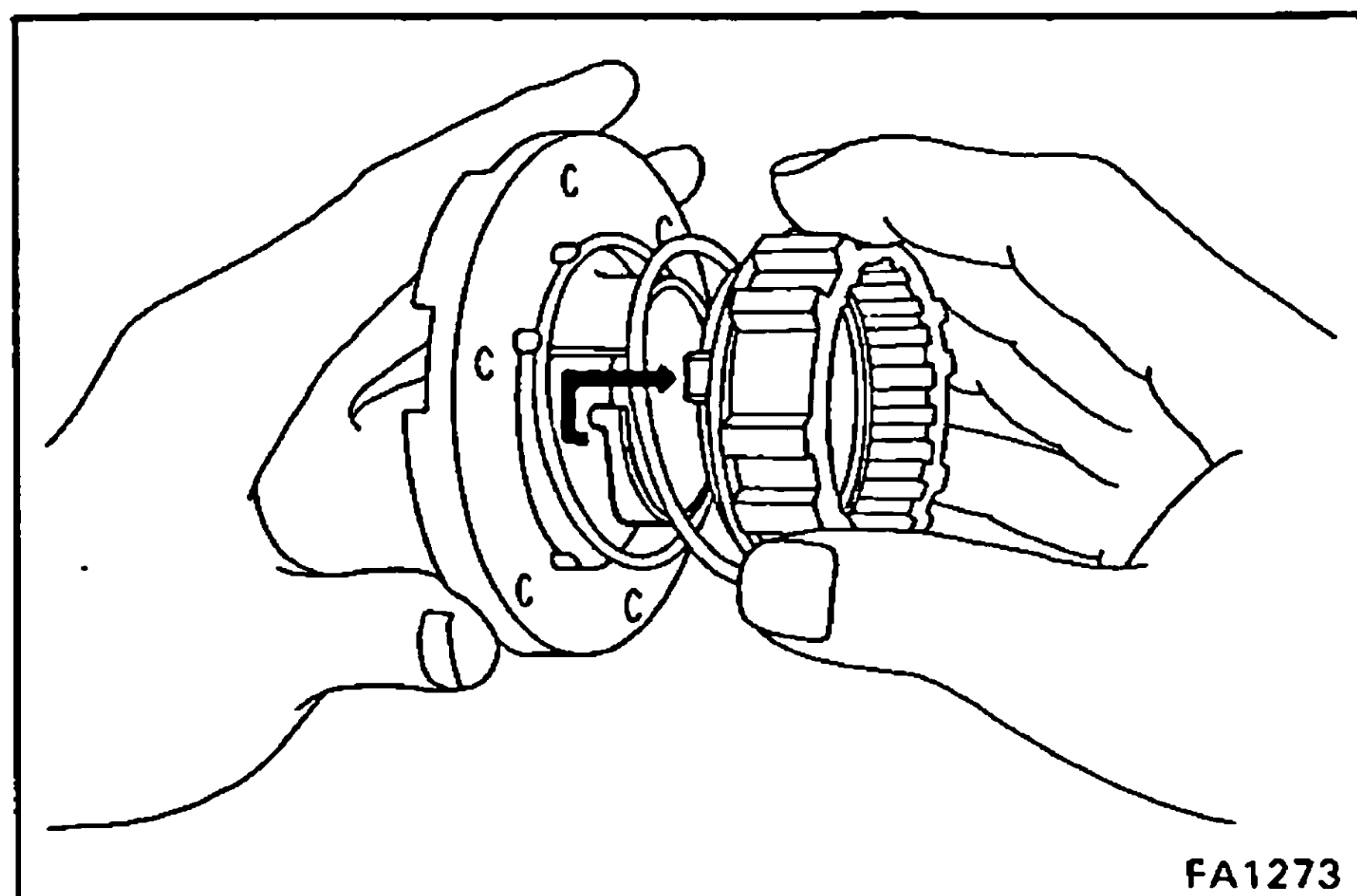
3. REMOVE FREE WHEELING HUB BODY

(a) Remove the six mounting nuts and washers.



(b) Using a brass bar and hammer, tap on the bolts head and remove the six cone washers.

(c) Pull off the free wheeling hub body.

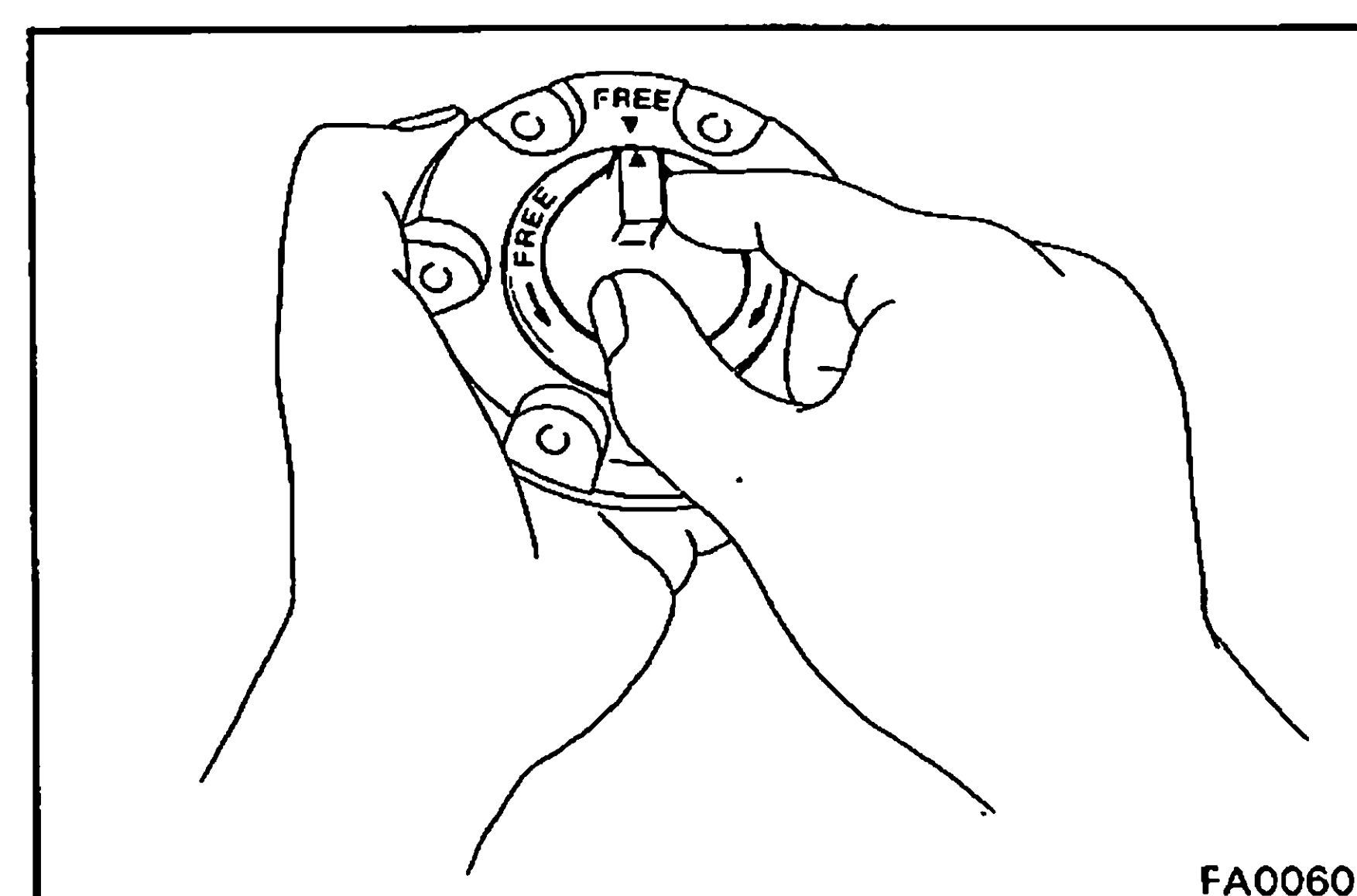
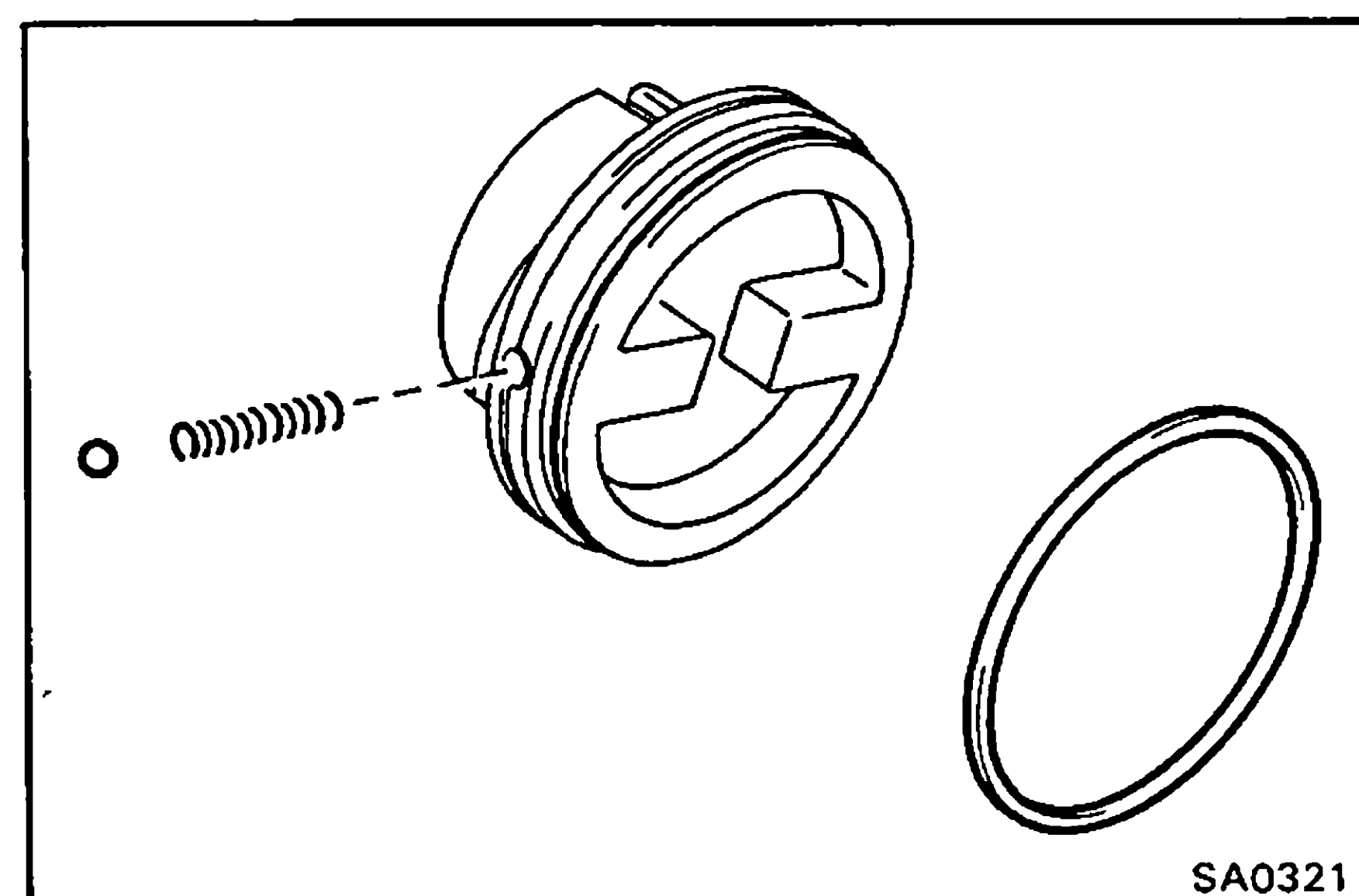
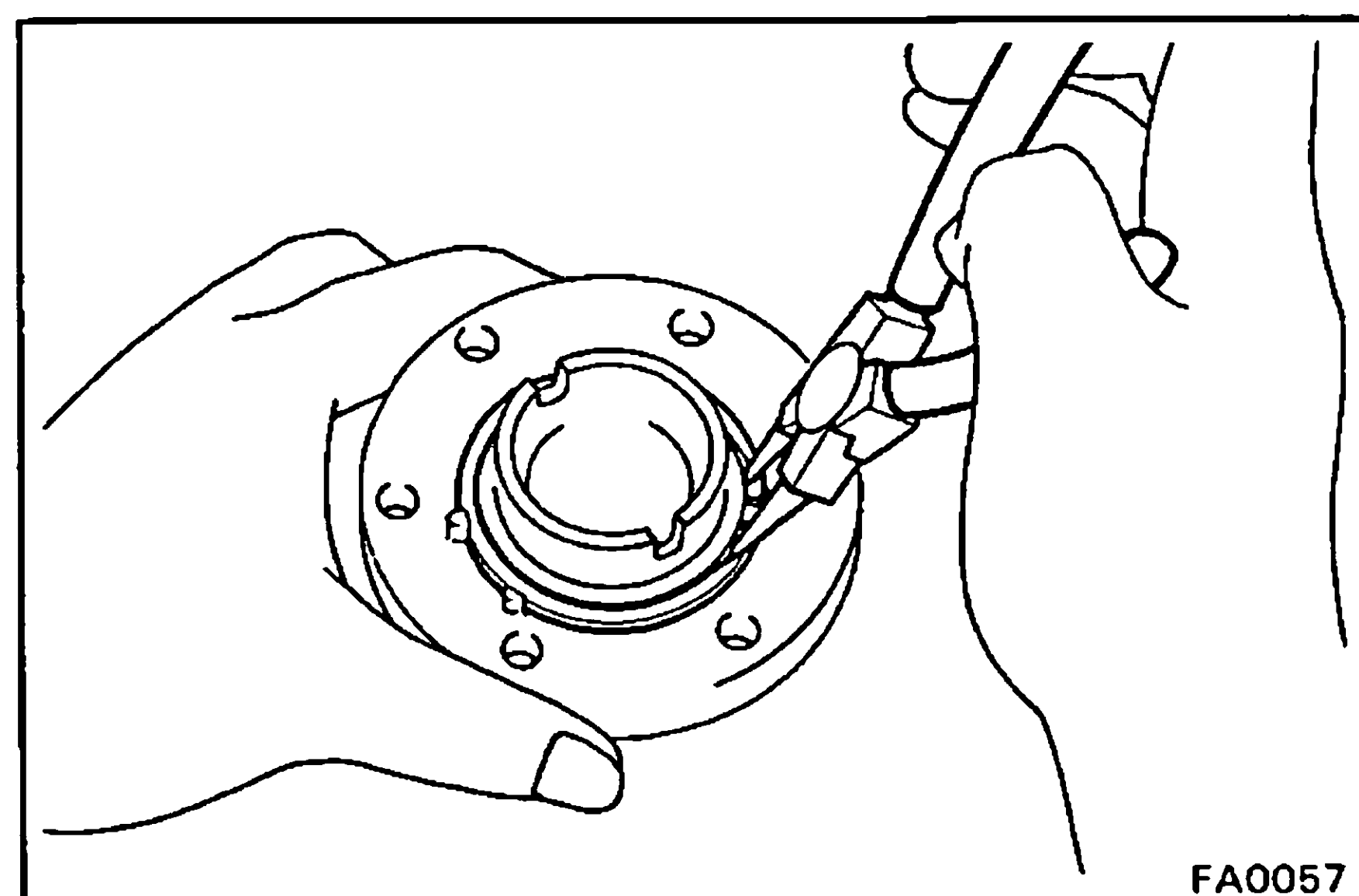


DISASSEMBLY OF FREE WHEELING HUB

(See page SA-5)

REMOVE CONTROL HANDLE FROM FREE WHEELING HUB COVER

- (a) Compressing the spring, remove the pawl tab from the handle cam, and remove the clutch.
- (b) Using snap ring pliers, remove the snap ring from the free wheeling hub cover.
- (c) Remove the control handle from the free wheeling hub cover.
- (d) Remove the steel ball and spring from the control handle.



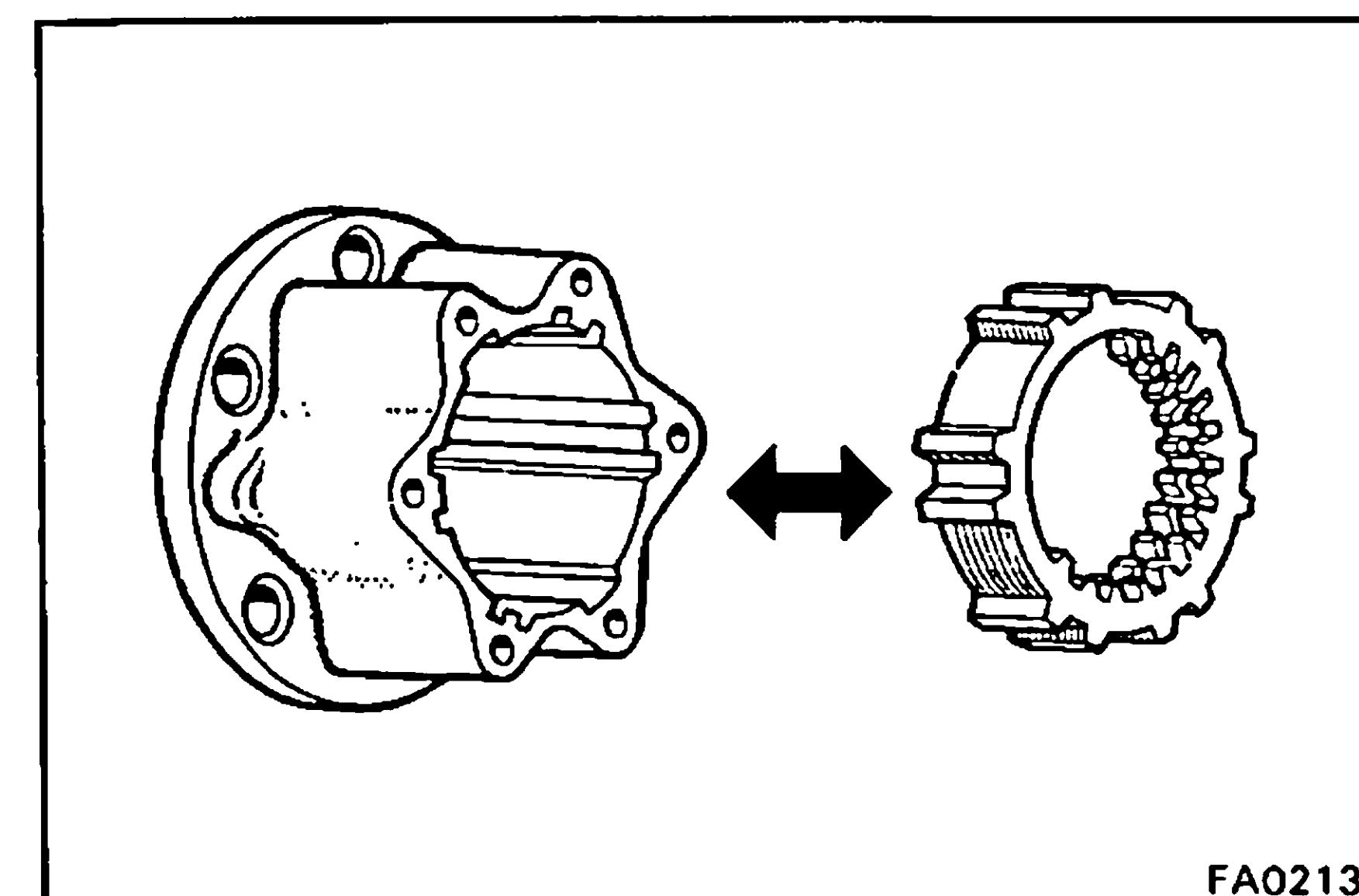
INSPECTION OF FREE WHEELING HUB

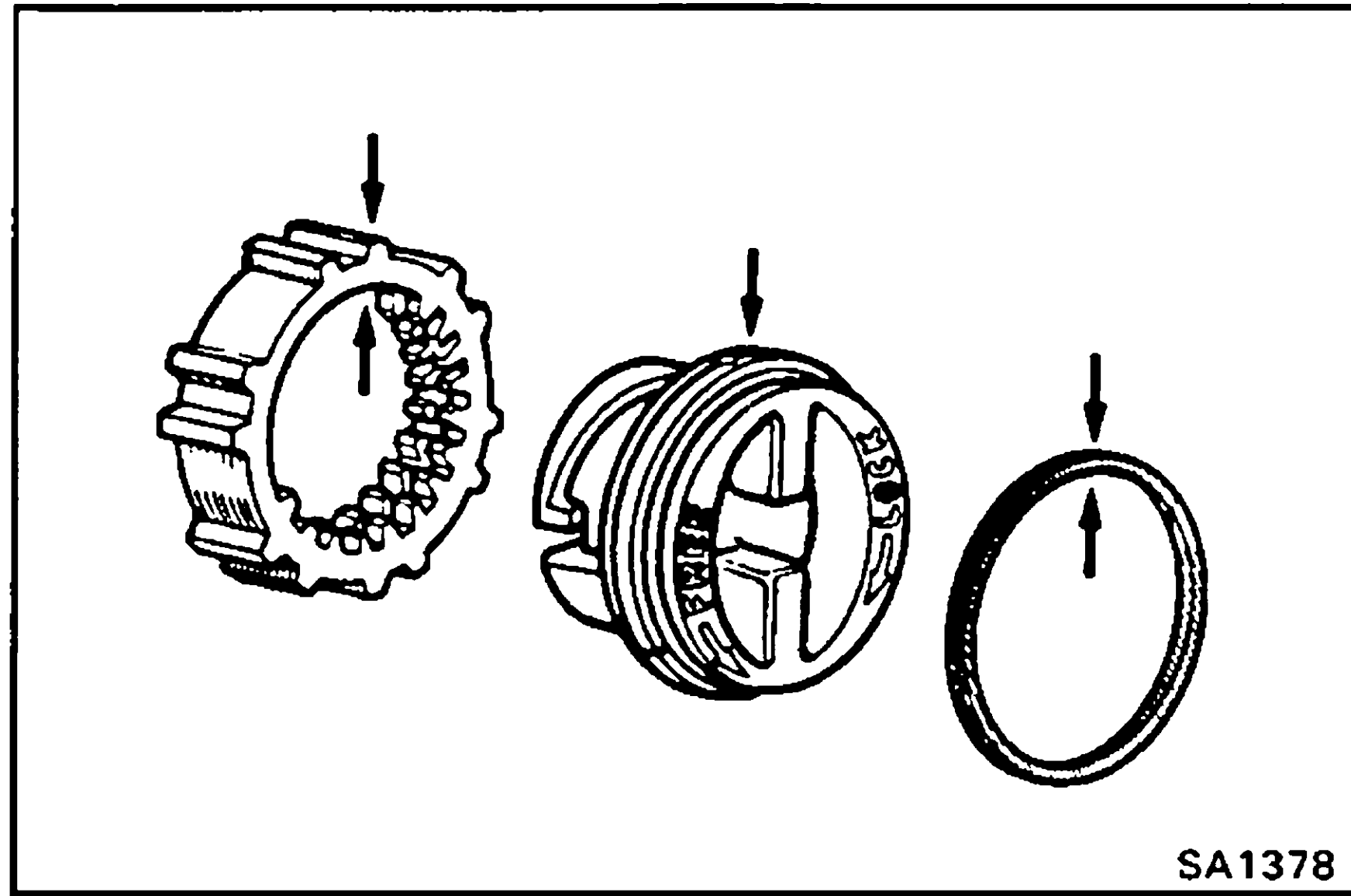
1. INSPECT COVER, HANDLE AND SEAL

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

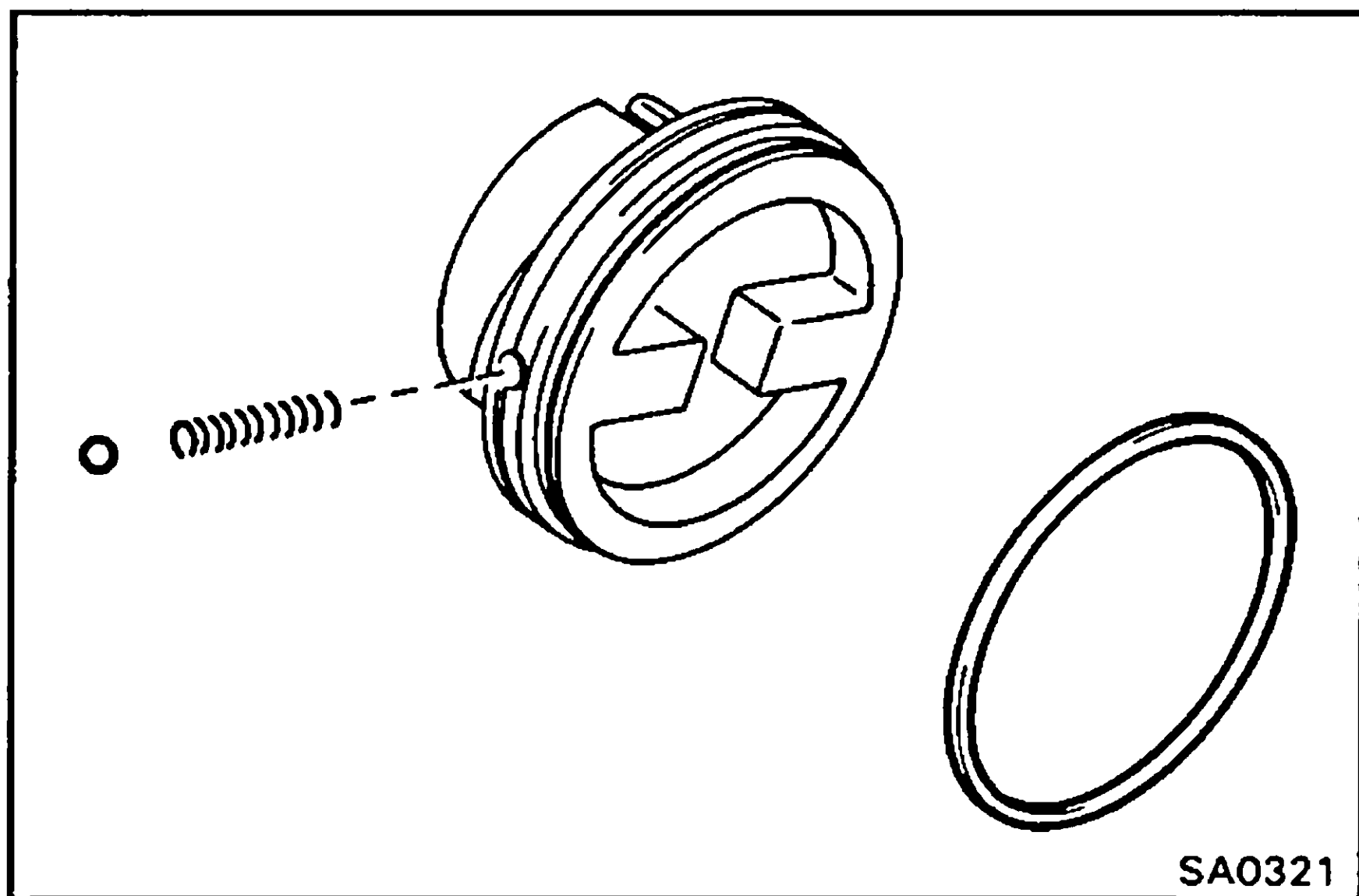
2. INSPECT BODY AND CLUTCH

Check that the clutch moves smoothly in the body.

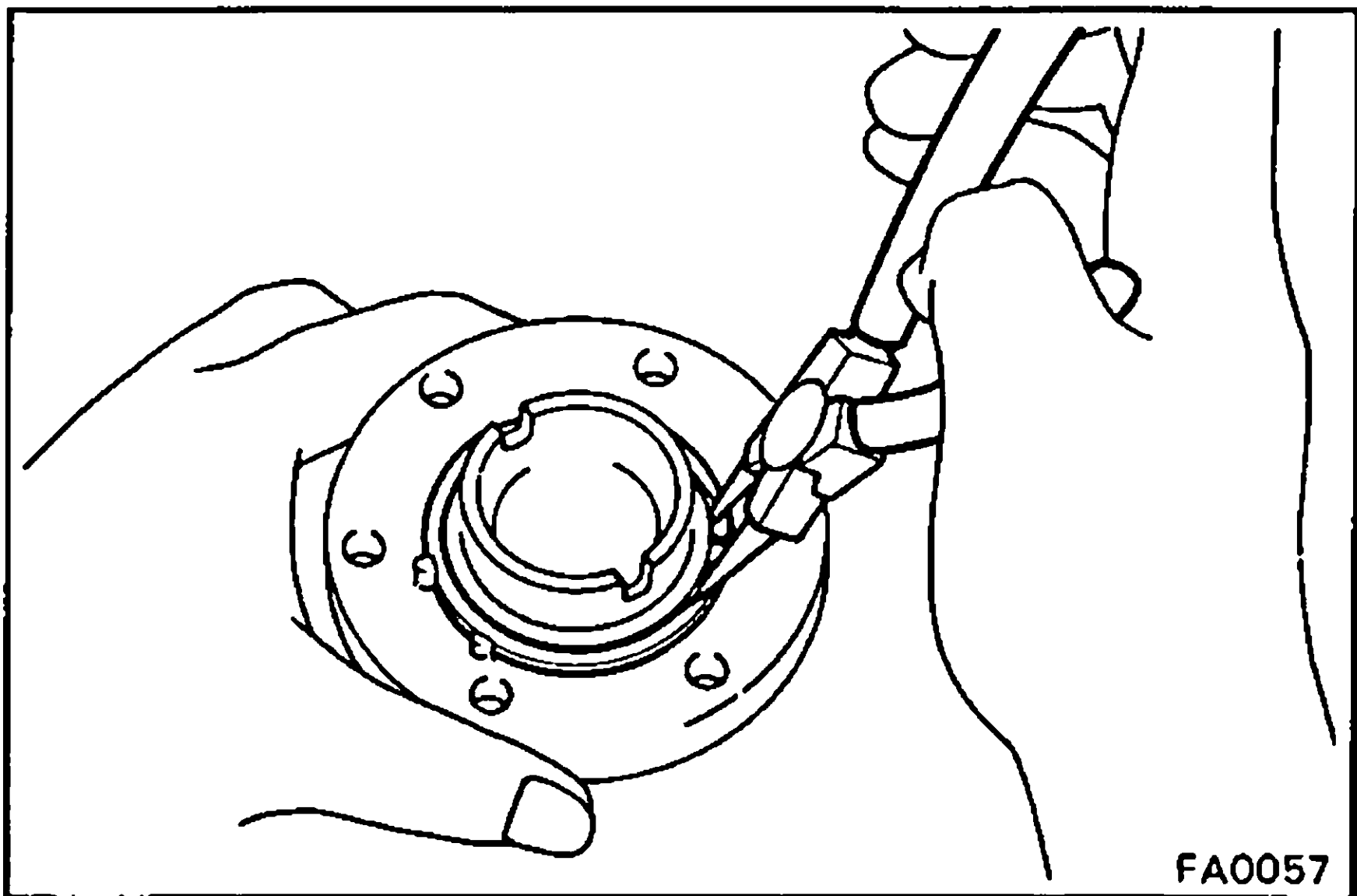


ASSEMBLY OF FREE WHEELING HUB**1. APPLY MP GREASE TO SLIDING SURFACE OF PARTS****2. INSTALL CONTROL HANDLE TO COVER**

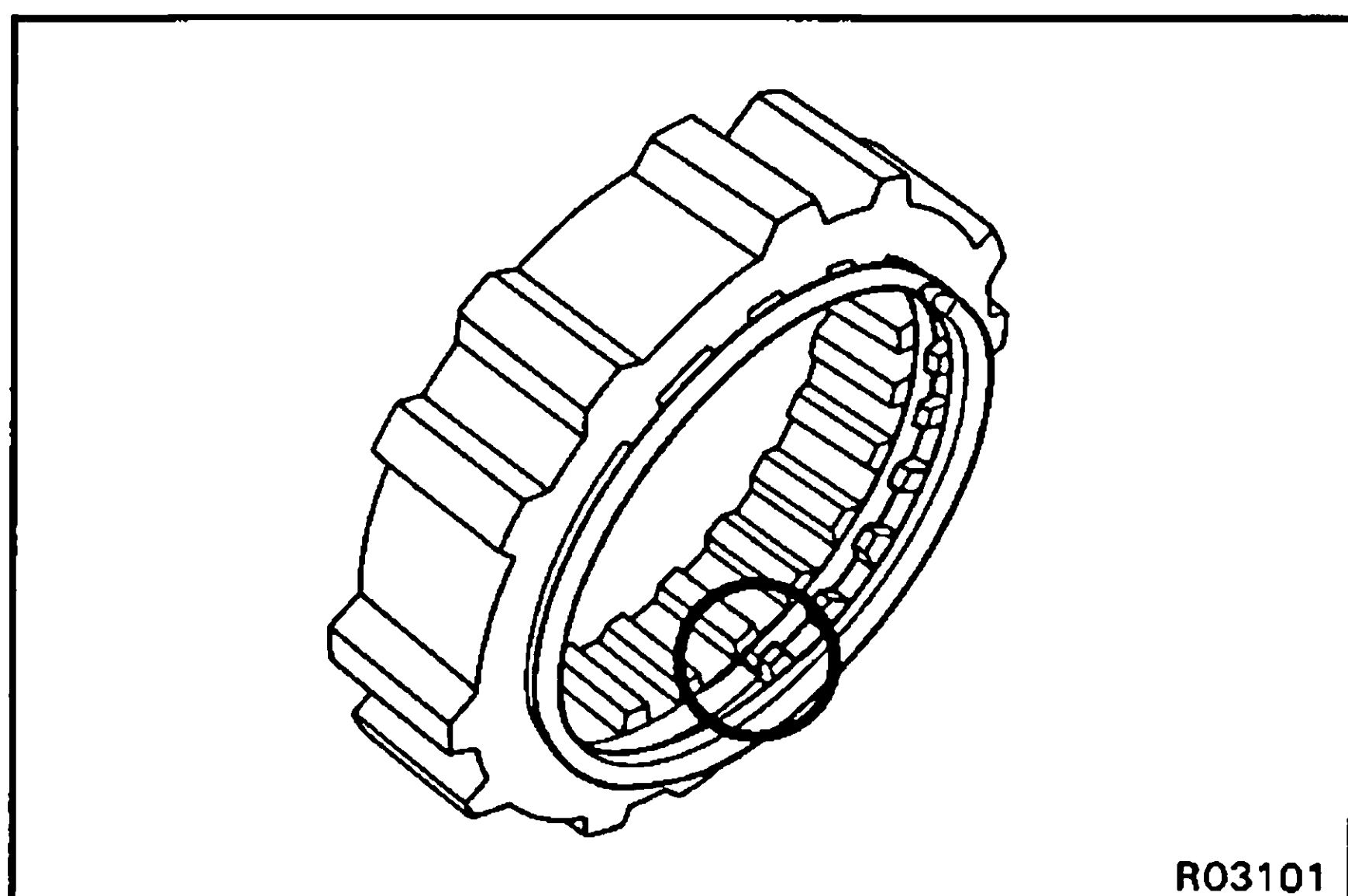
(a) Install the seal, spring and steel ball to the handle.



(b) Install the handle in the cover and snap ring with snap ring pliers.

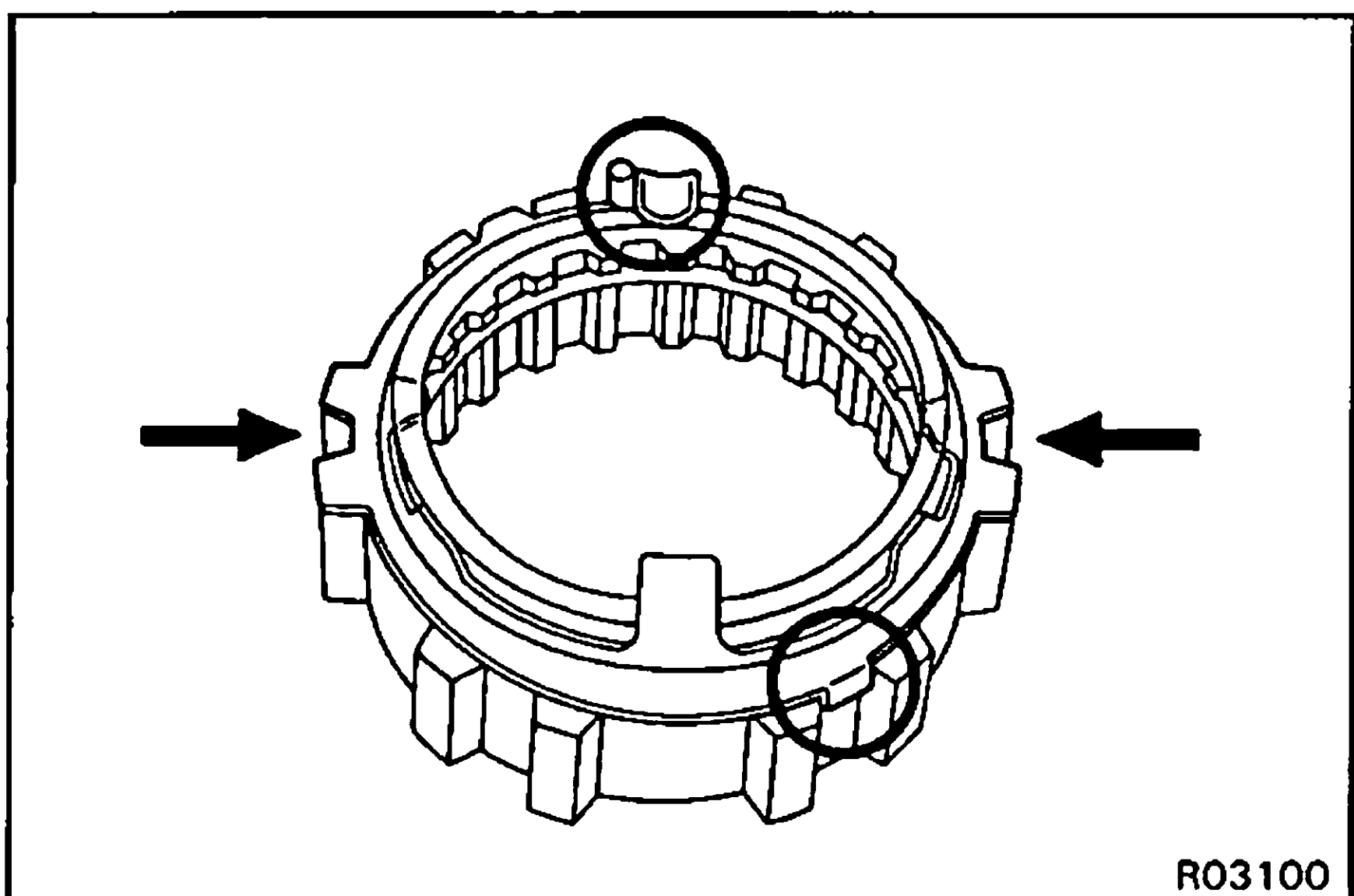
**3. INSTALL TENSION SPRING IN CLUTCH**

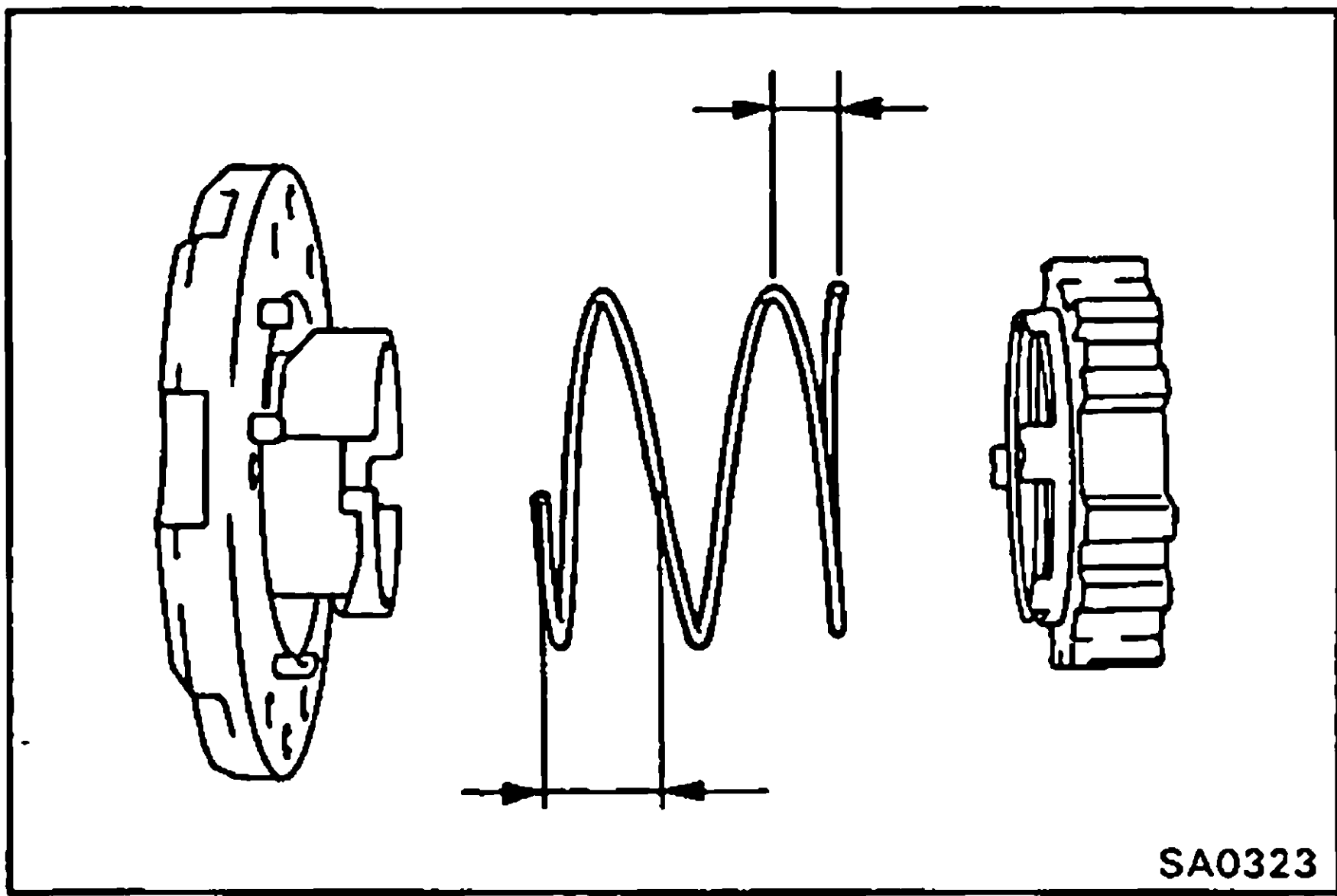
Install the tension spring in the clutch with the spring end aligned with the initial groove.

**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.

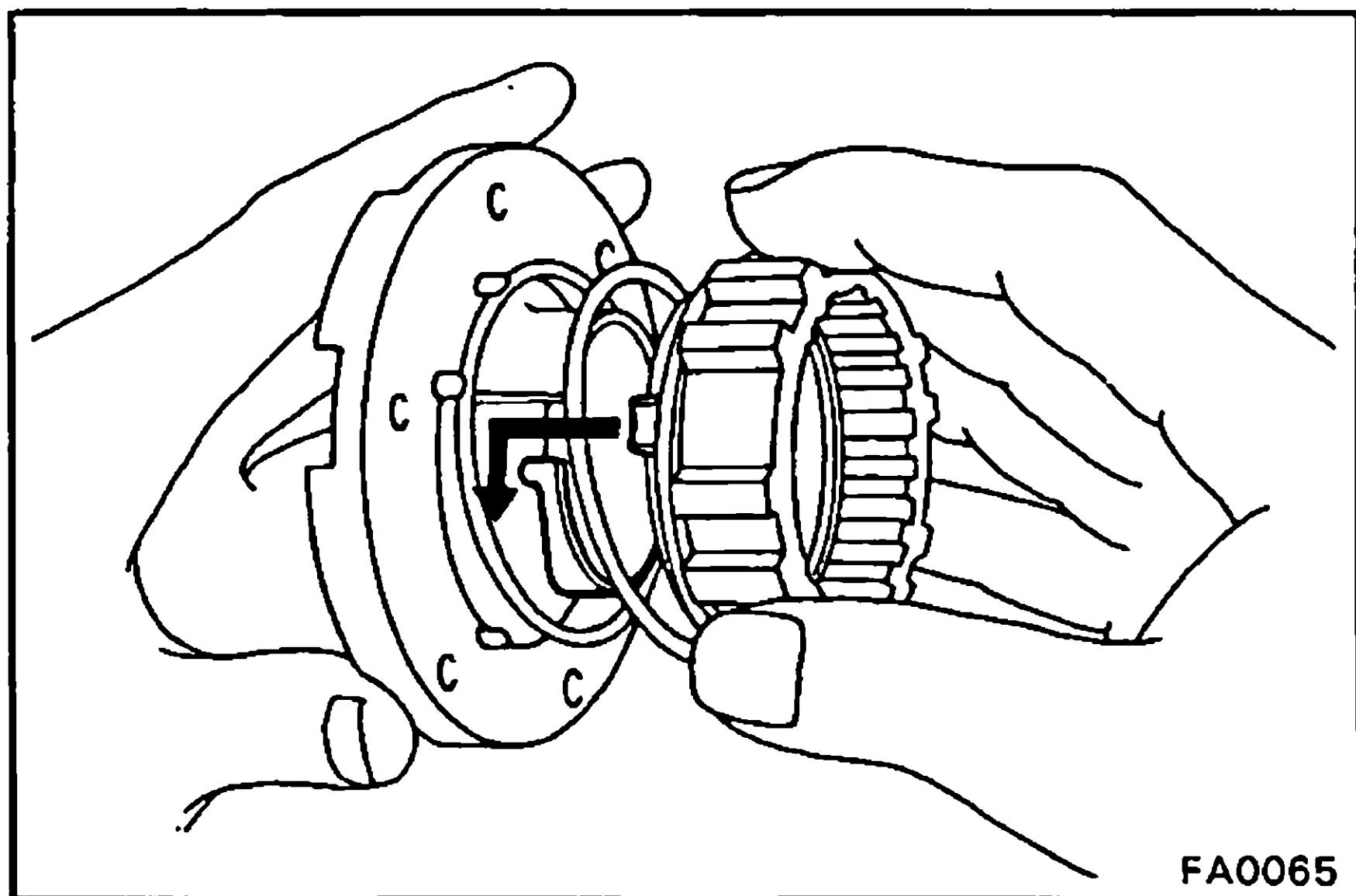
(b) Place the top ring of the spring on the small tabs.



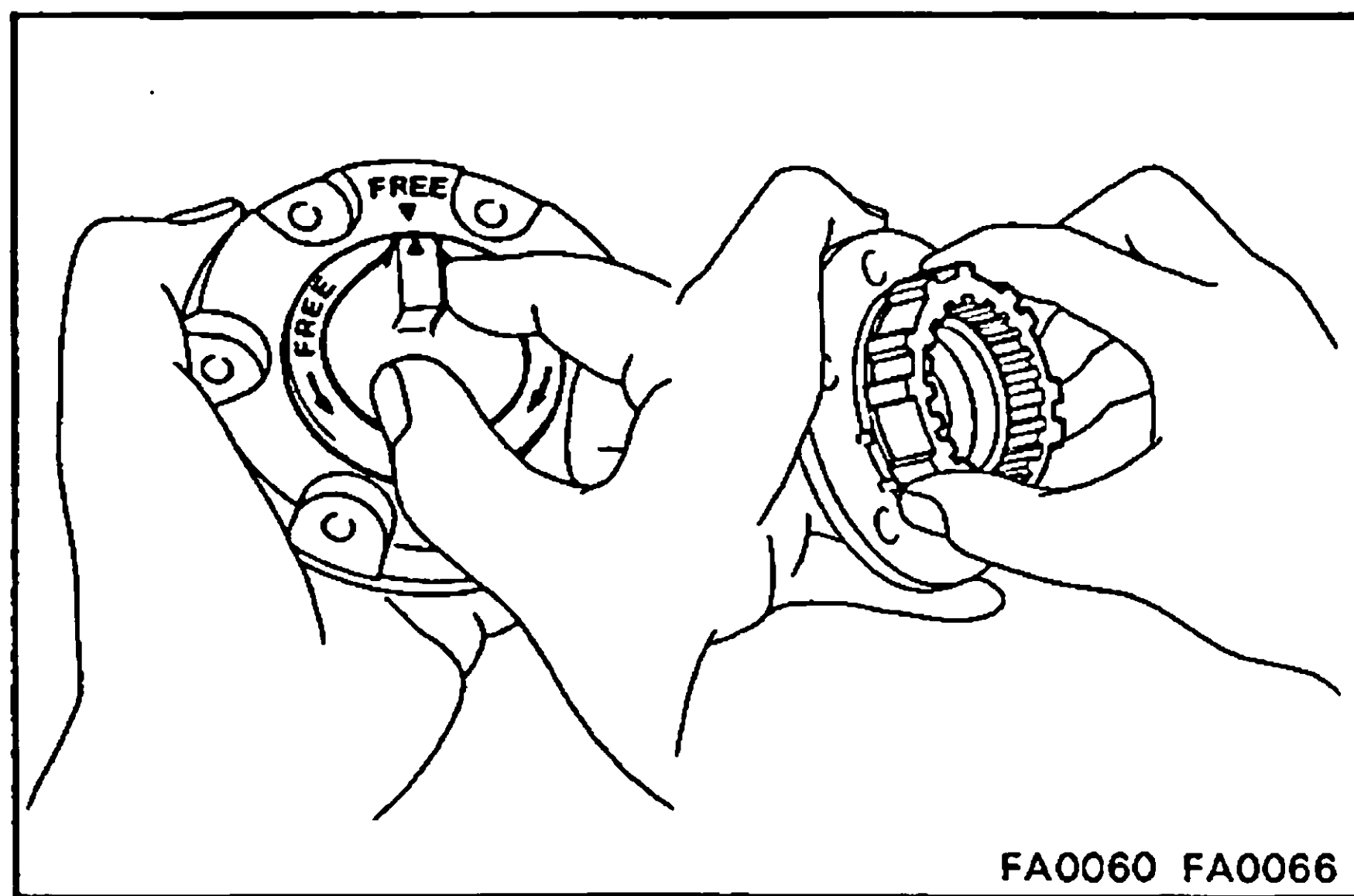


5. INSTALL CLUTCH AND SPRING INTO COVER

- (a) Place the spring between the cover and clutch with the large spring end toward the cover.

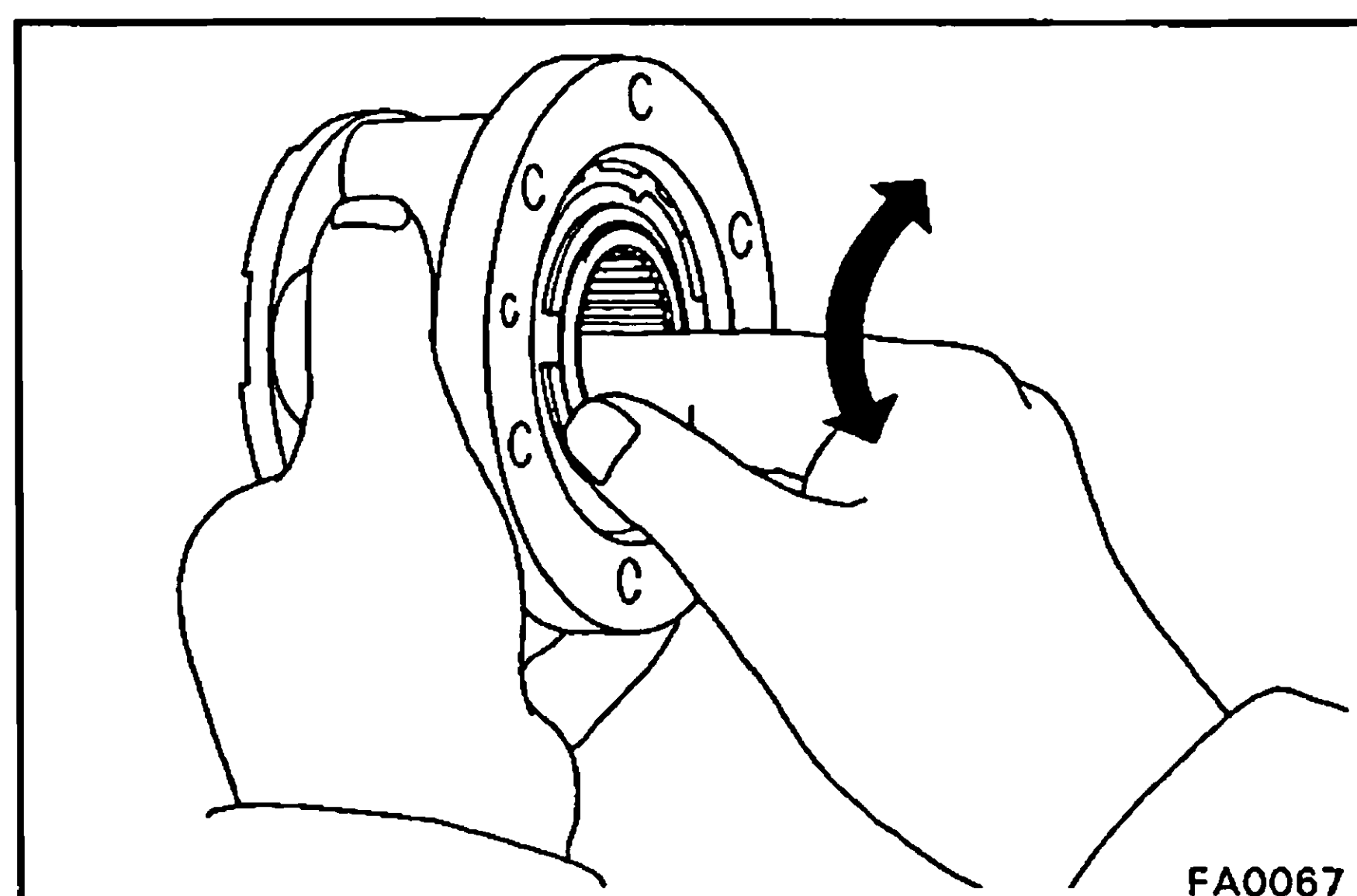


- (b) Compress the spring and install the clutch with the pawl tab fit to the handle cam.



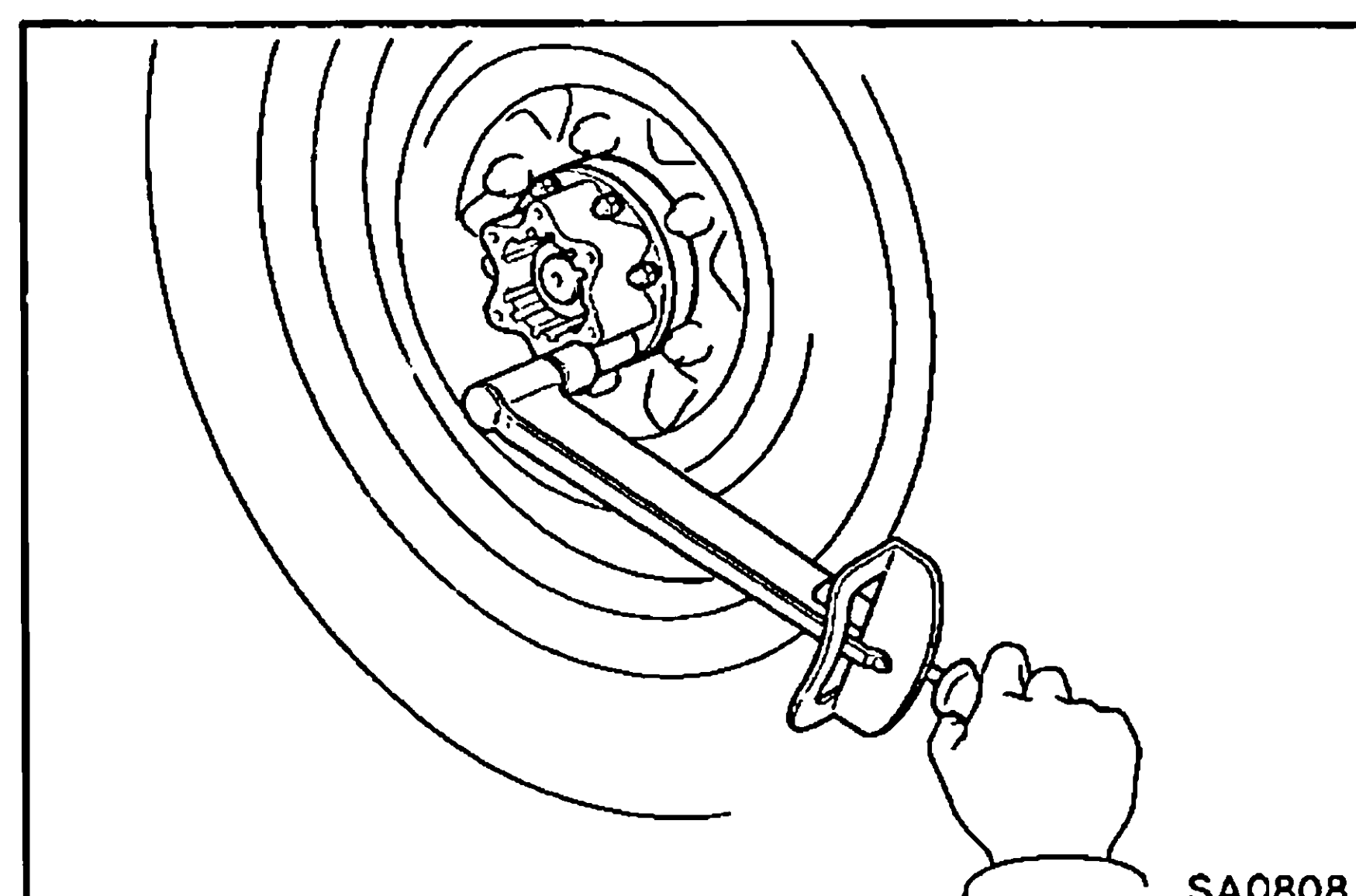
6. TEMPORARILY INSTALL COVER TO BODY AND CHECK FREE WHEELING HUB

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



- (b) Insert the cover to the body and verify that the hub turns smoothly.

- (c) Remove the cover from the body.



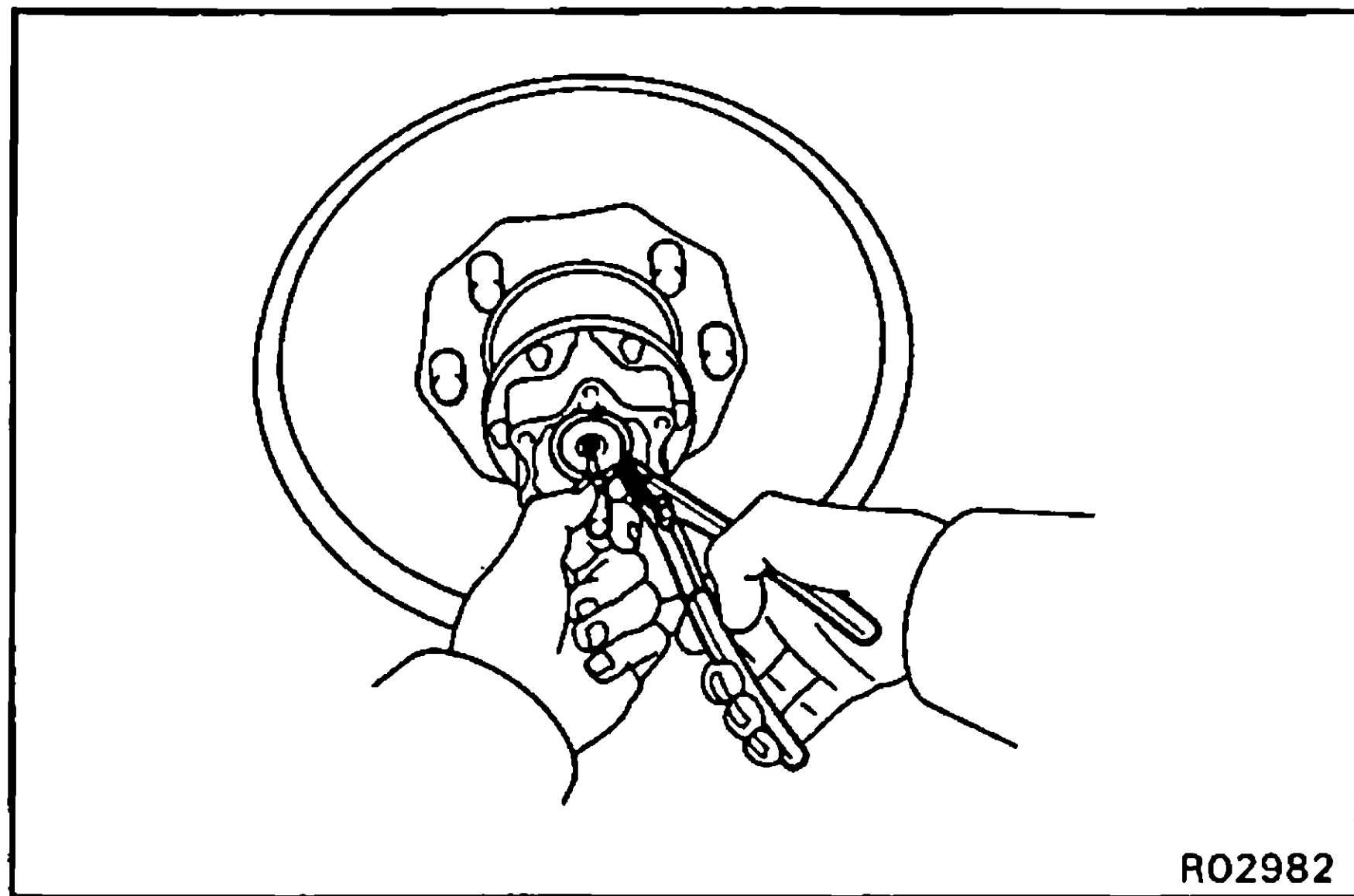
INSTALLATION OF FREE WHEELING HUB

(See page SA-5)

1. INSTALL FREE WHEELING HUB BODY

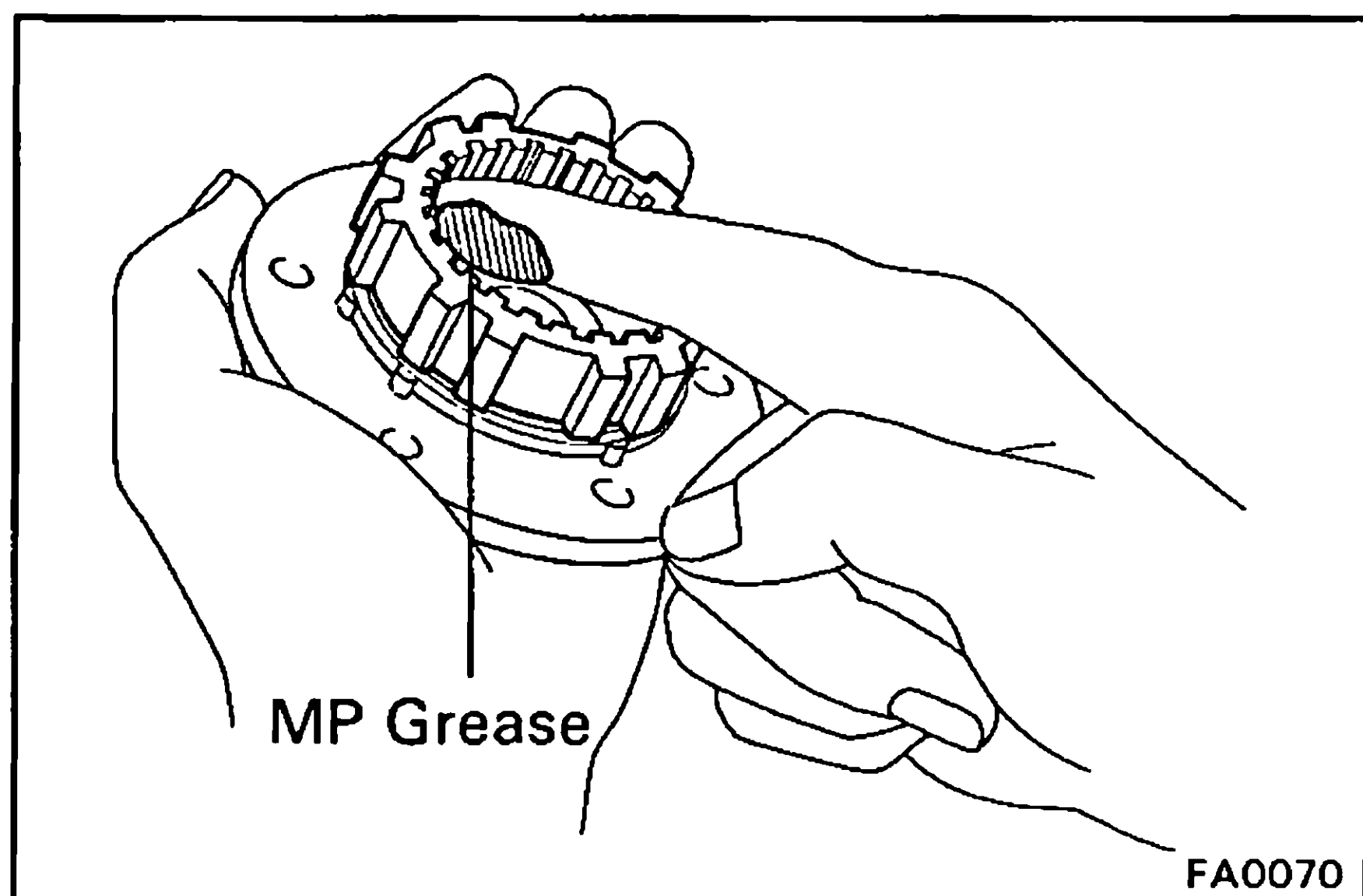
- (a) Place a new gasket in position on the front axle hub.
- (b) Install the free wheeling hub body with six cone washers, washers and nuts. Torque the nuts.

Torque: 31 N·m (315 kgf·cm, 23 ft·lbf)

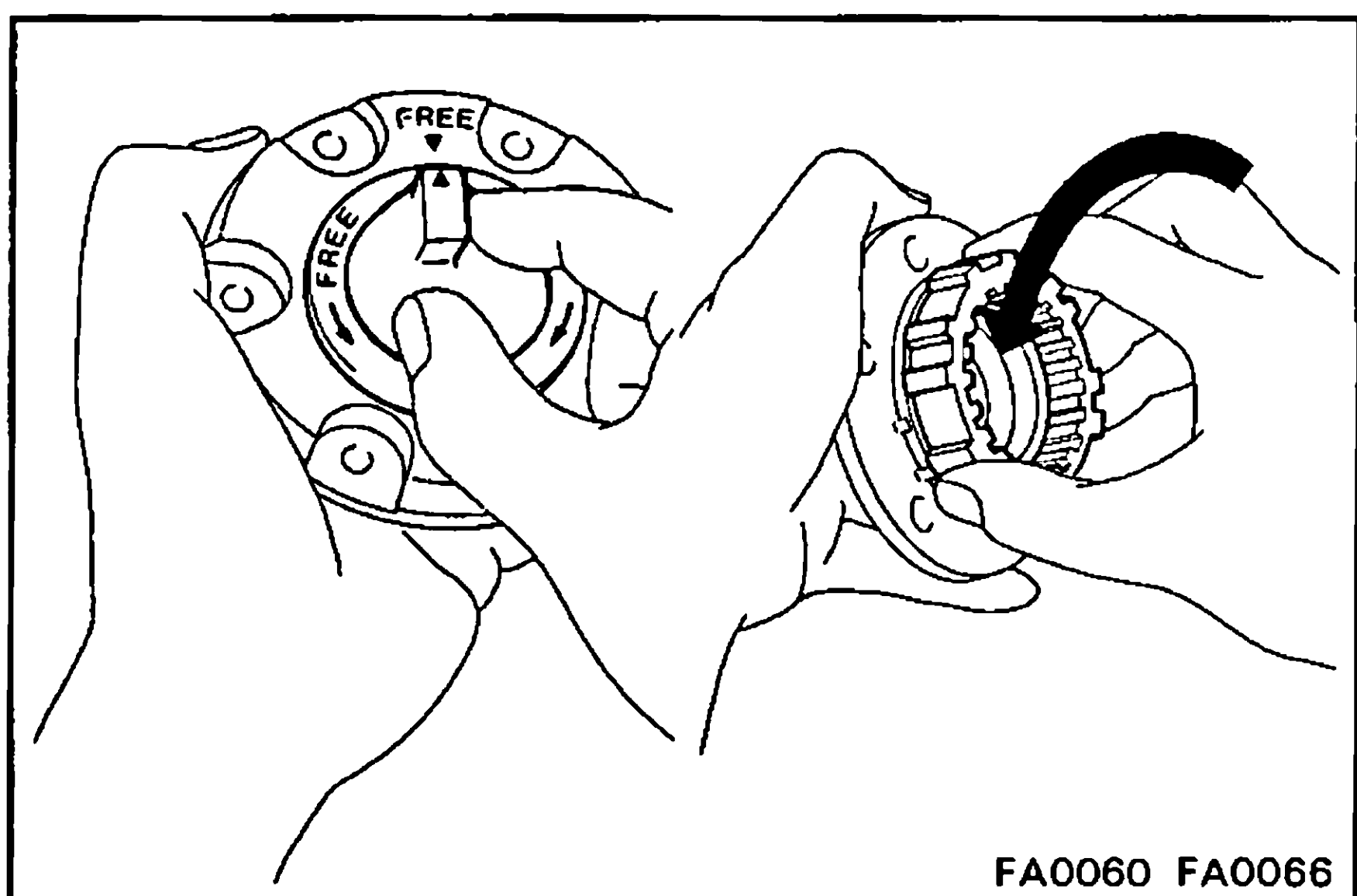


2. INSTALL SNAP RING

- (a) Install a bolt to the axle shaft and pull it out.
- (b) Using snap ring pliers, install the snap ring.
- (c) Remove the bolt.

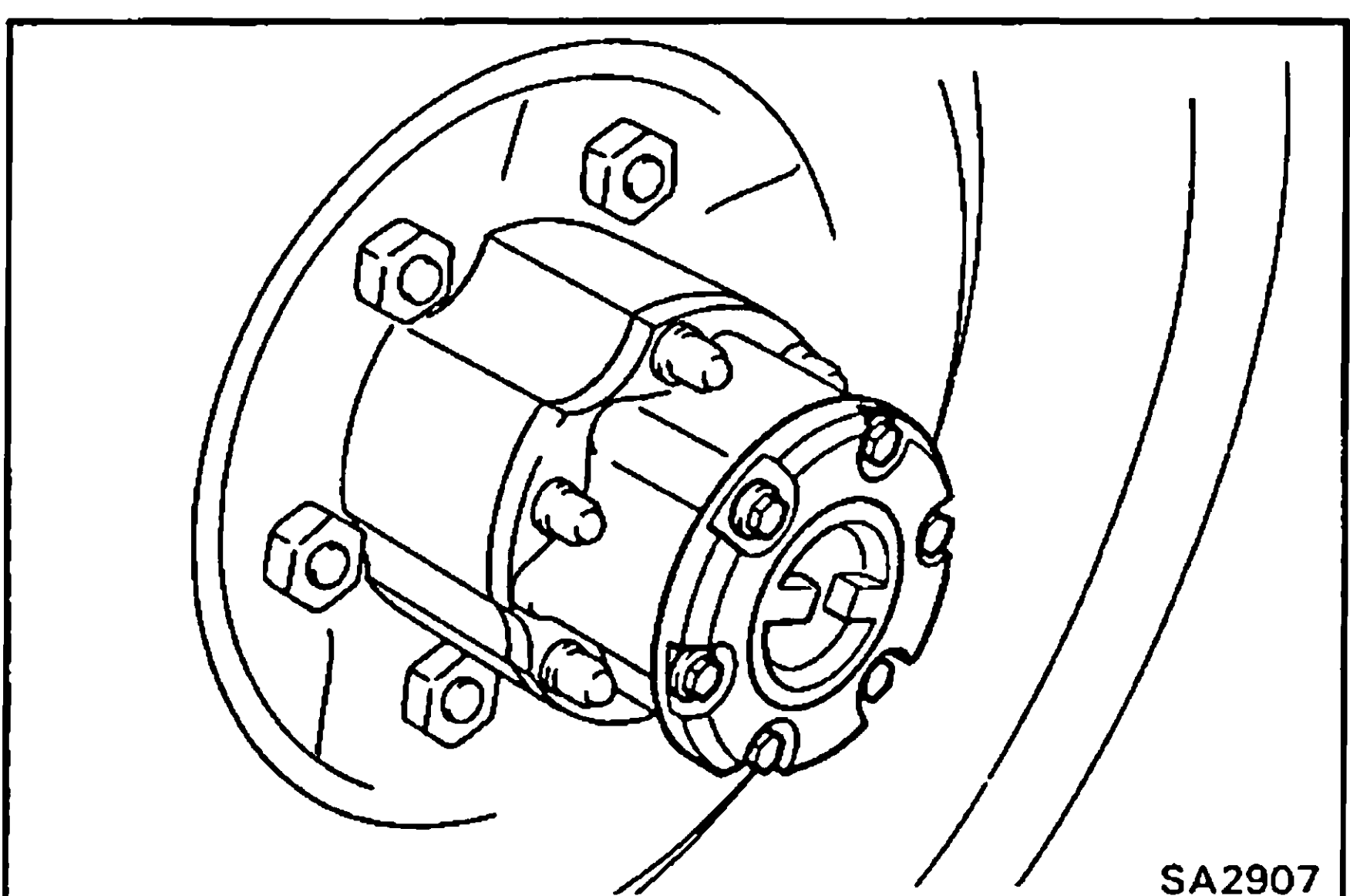
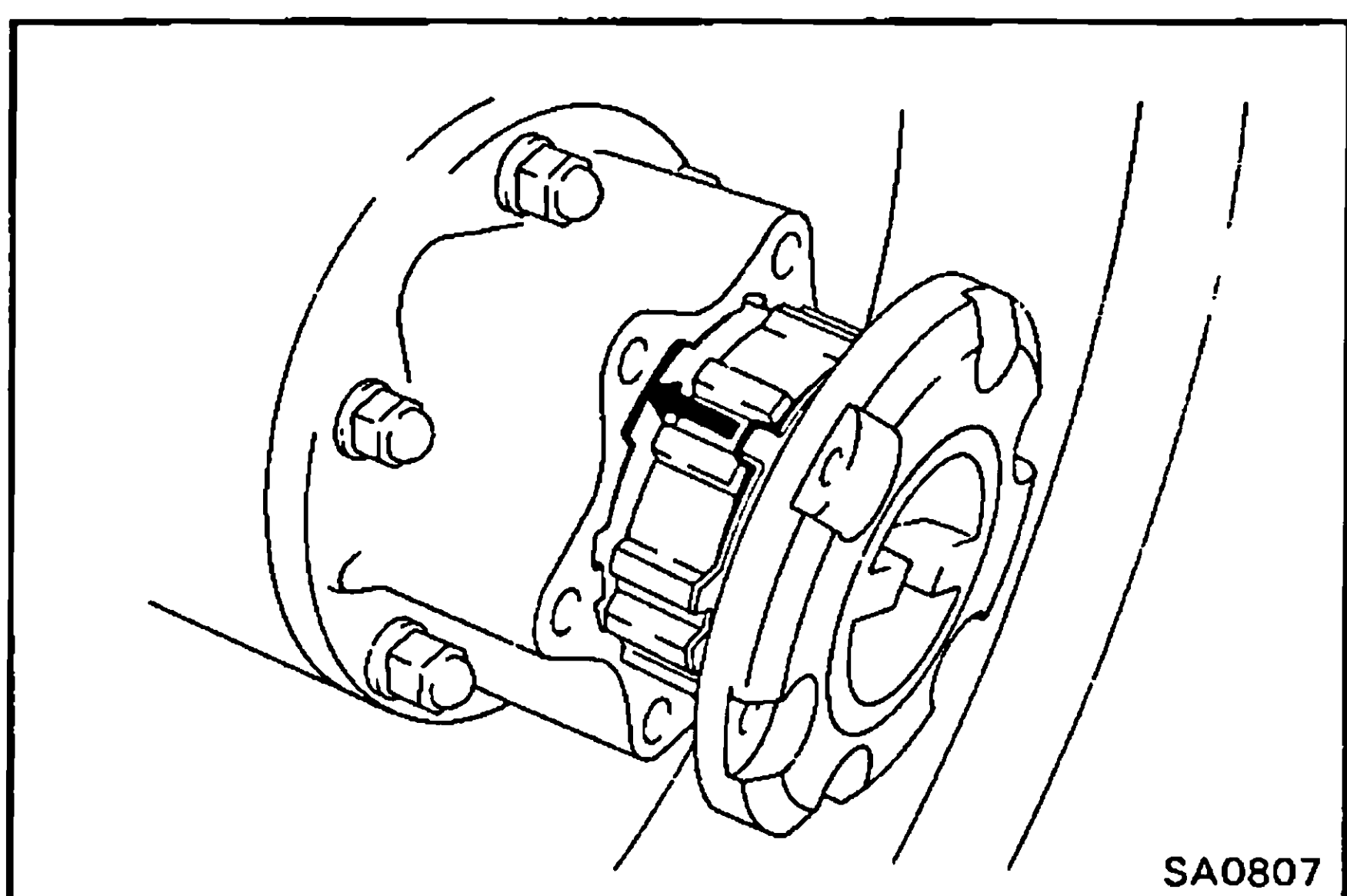


3. APPLY MP GREASE TO INNER HUB SPLINES



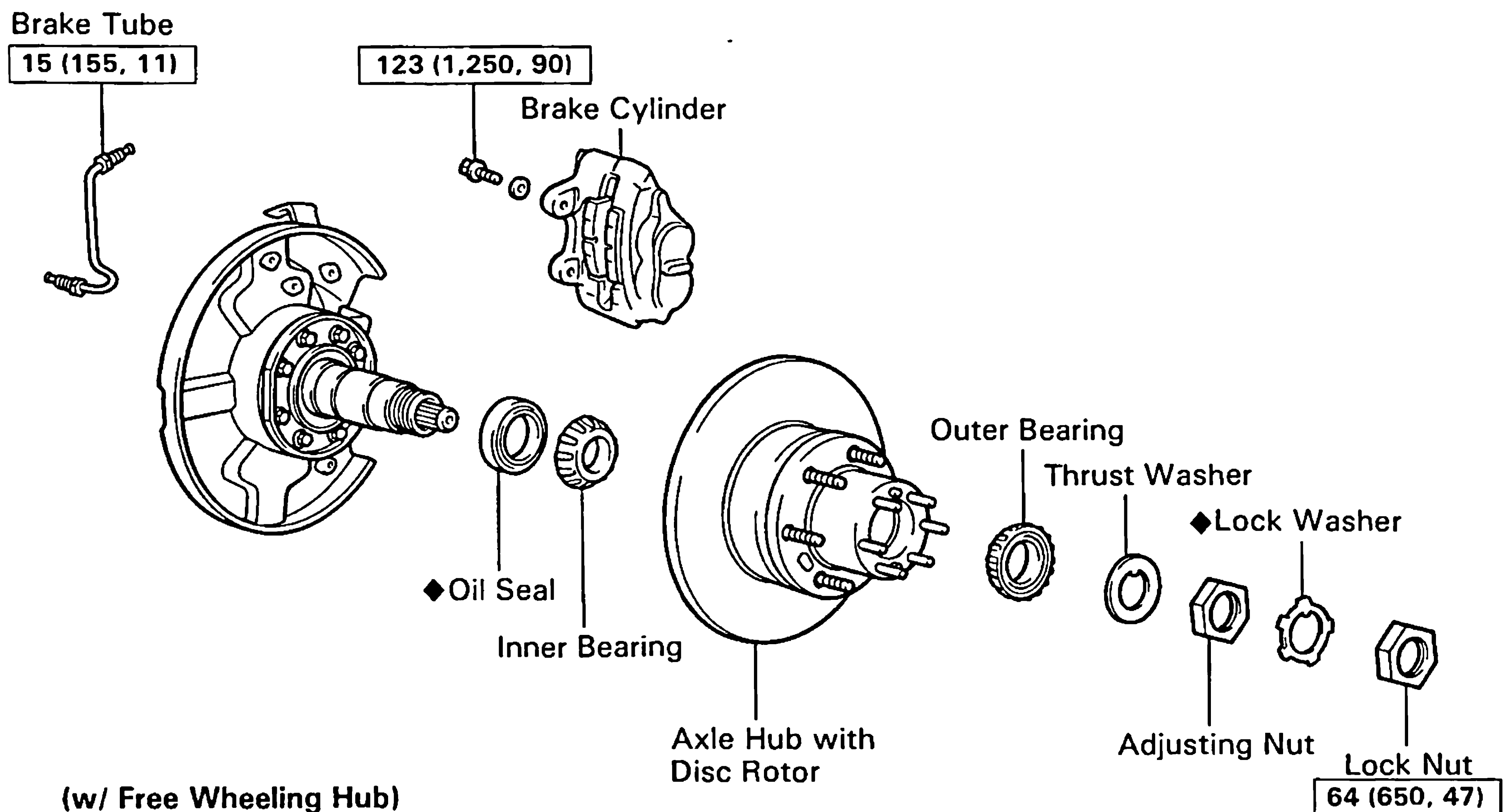
4. INSTALL FREE WHEELING HUB COVER WITH NEW GASKET

- (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.

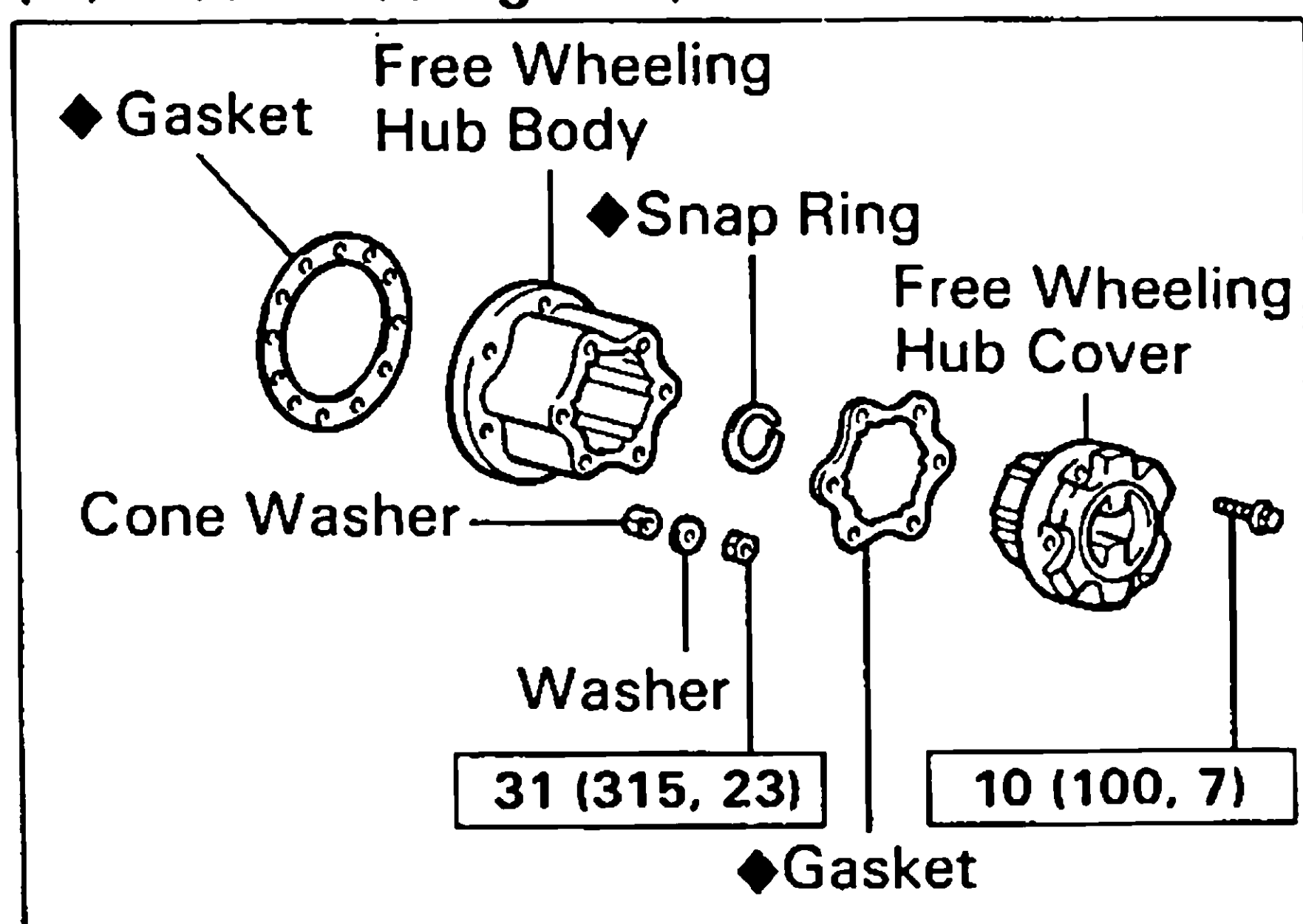


- (d) Install and torque the six cover mounting bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

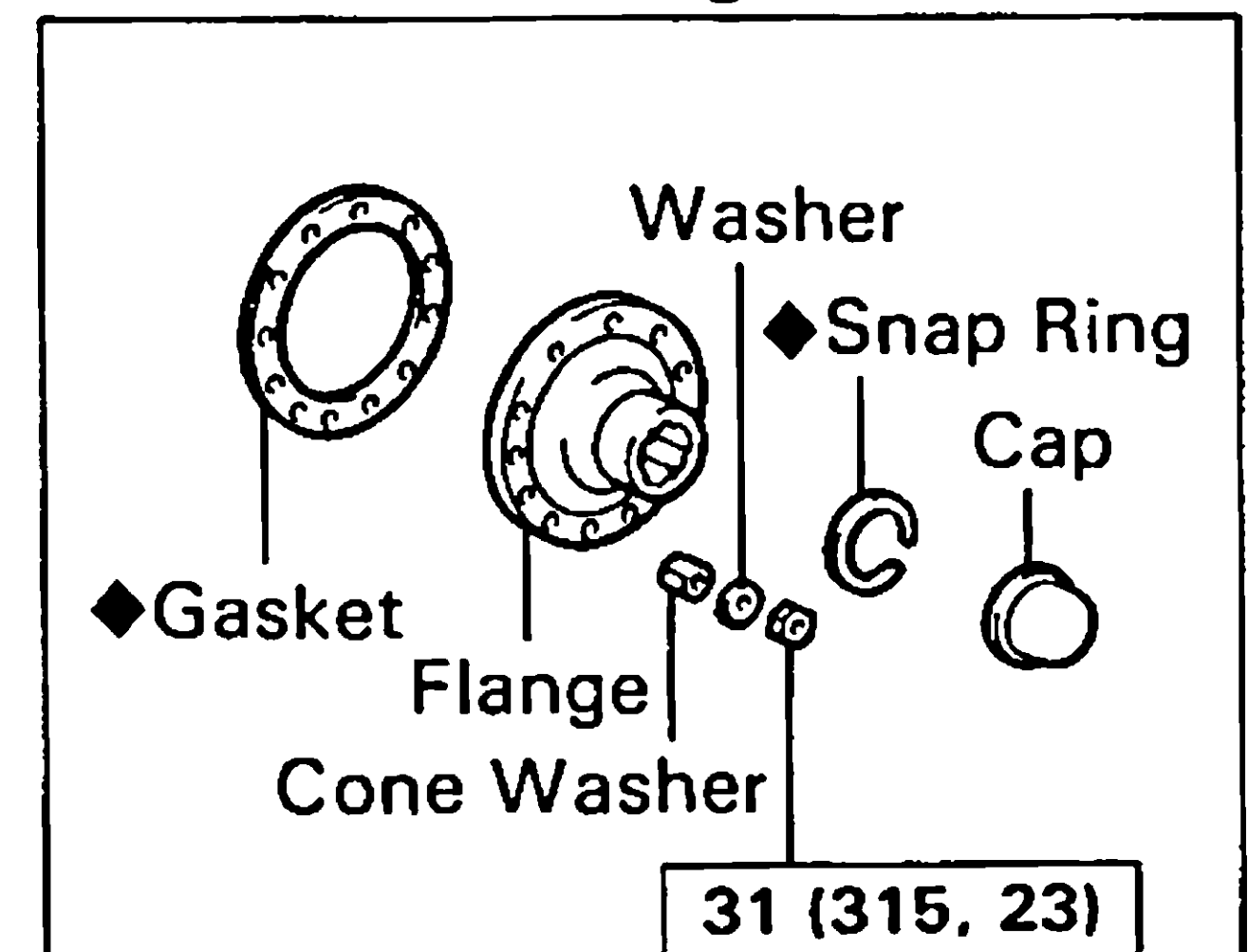
FRONT AXLE HUB COMPONENTS



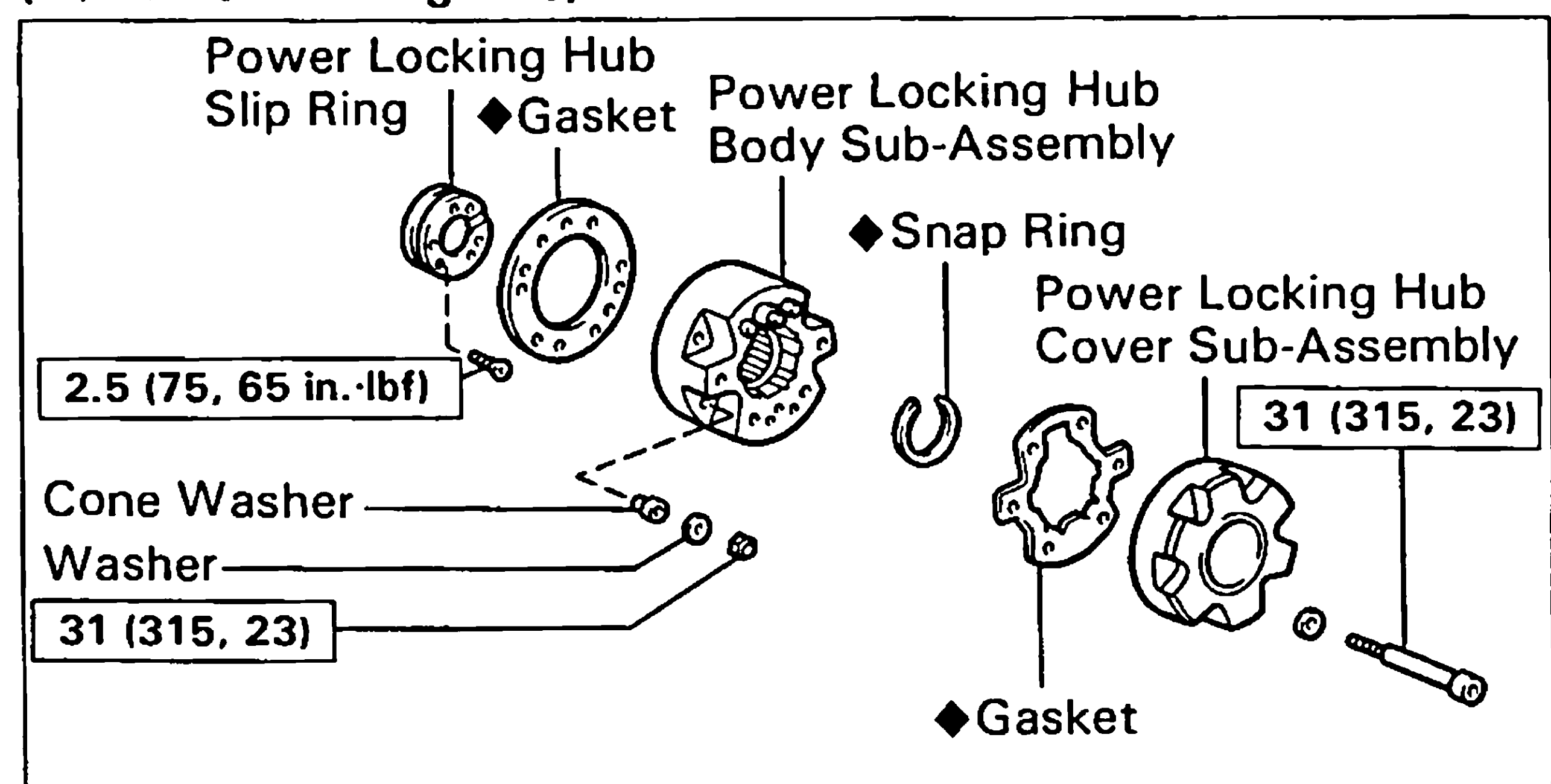
(w/ Free Wheeling Hub)



(w/o Free Wheeling Hub)

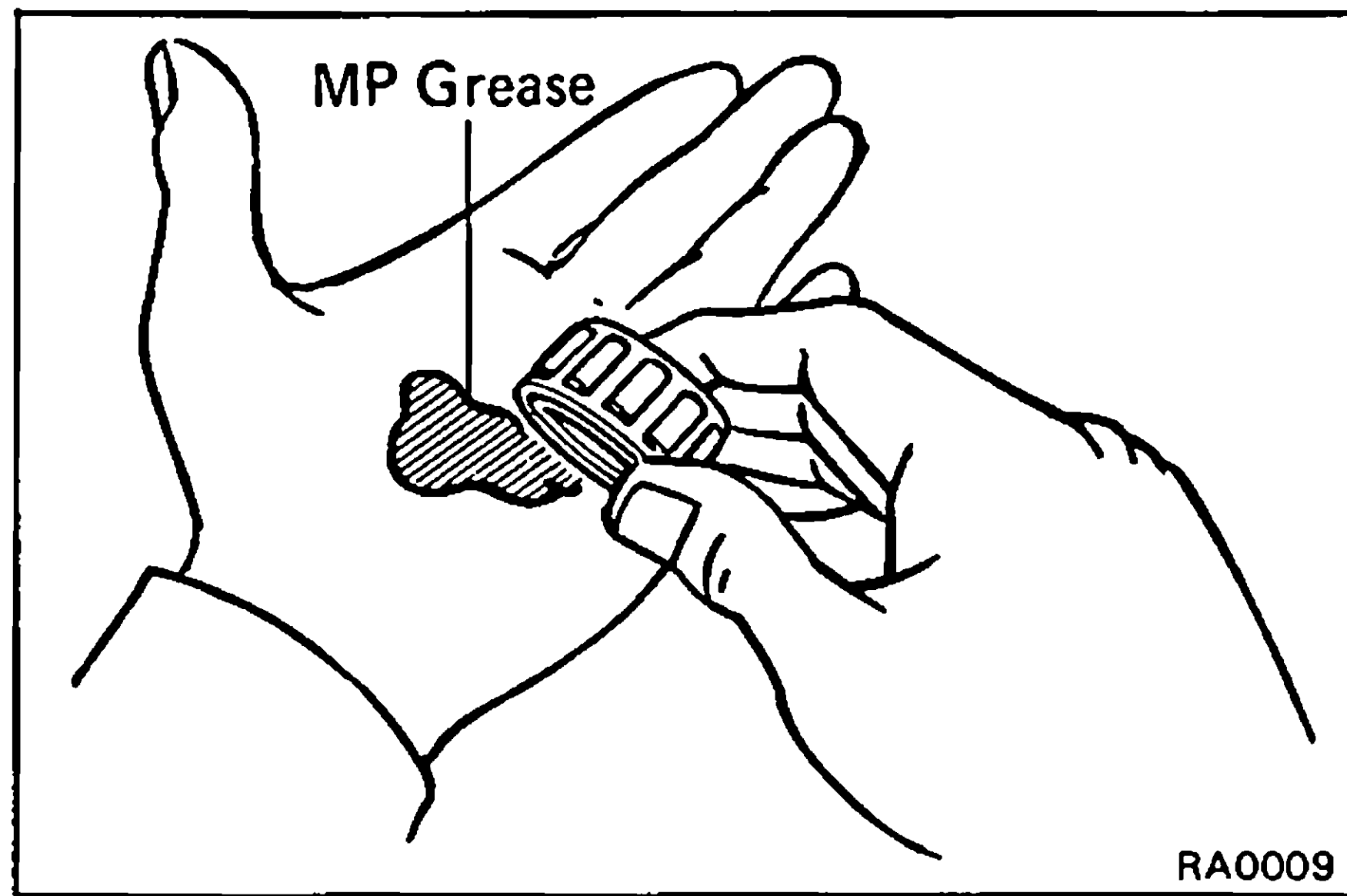


(w/ Power Locking Hub)



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

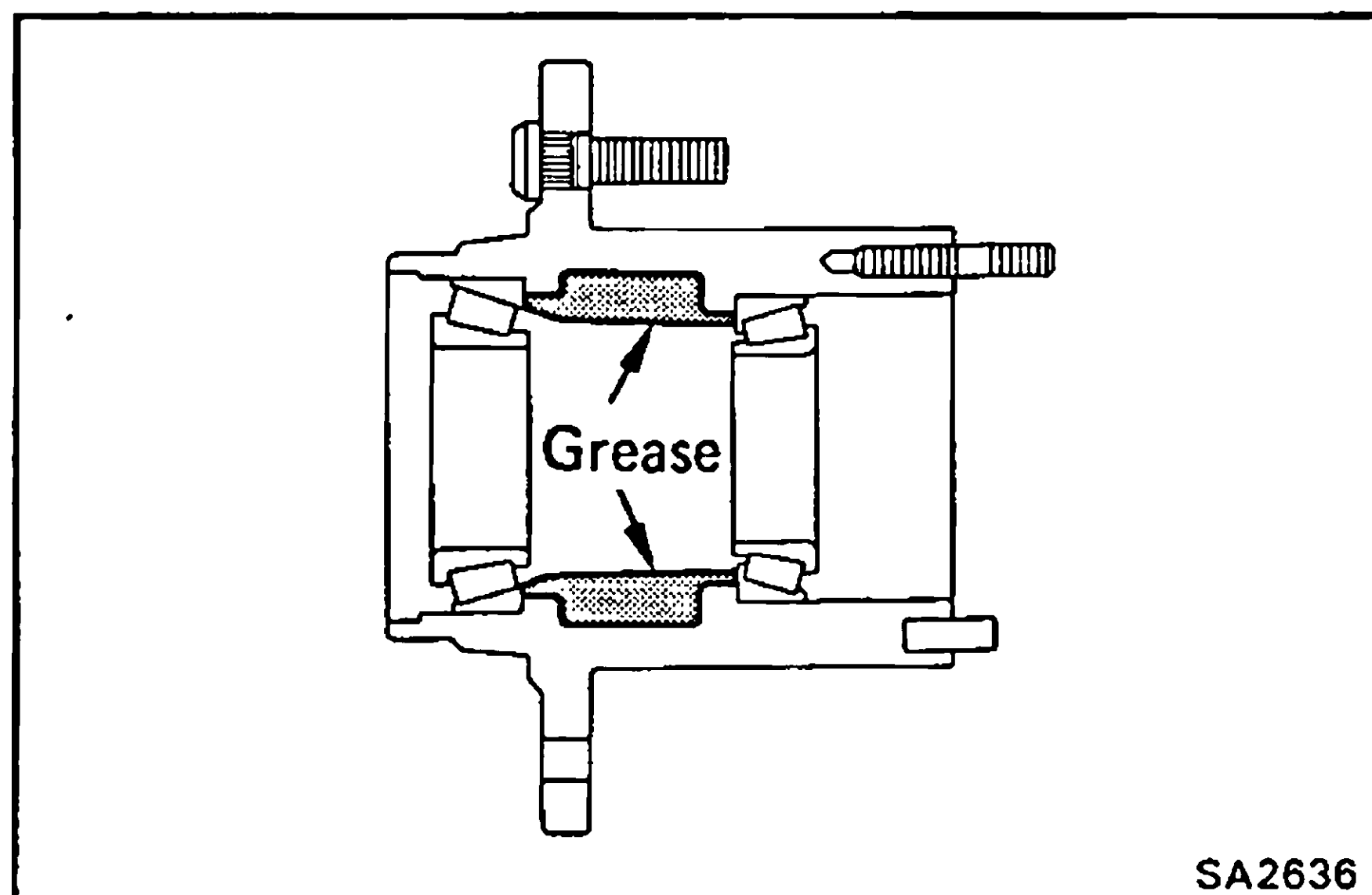


ASSEMBLY OF FRONT AXLE HUB

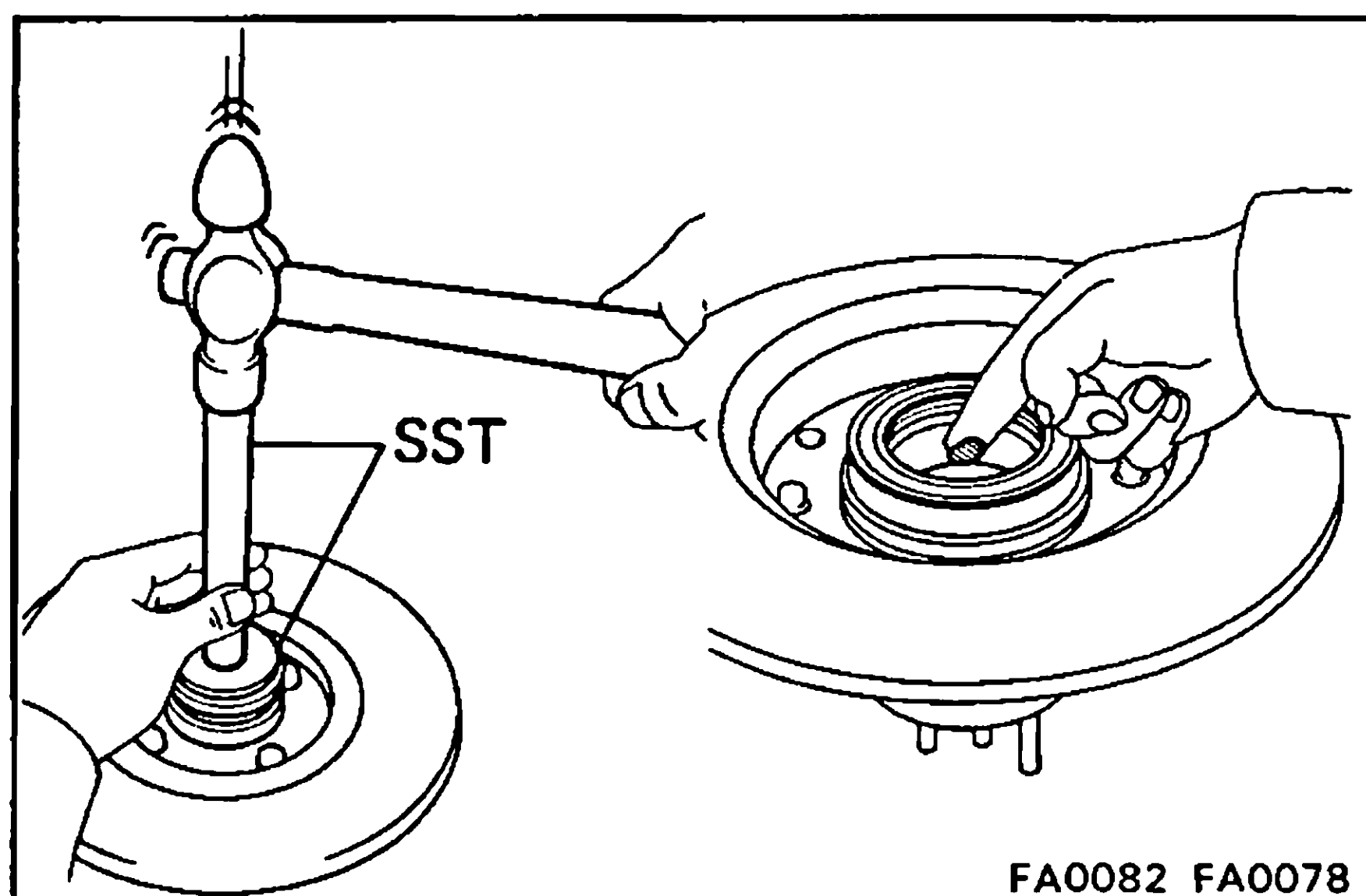
(See page SA-11)

1. PACK BEARINGS WITH MP GREASE

- Place MP grease in the palm of your hand.
- Pack grease into the bearing, continuing until the grease oozes out from the other side.
- Do the same around the bearing circumference.

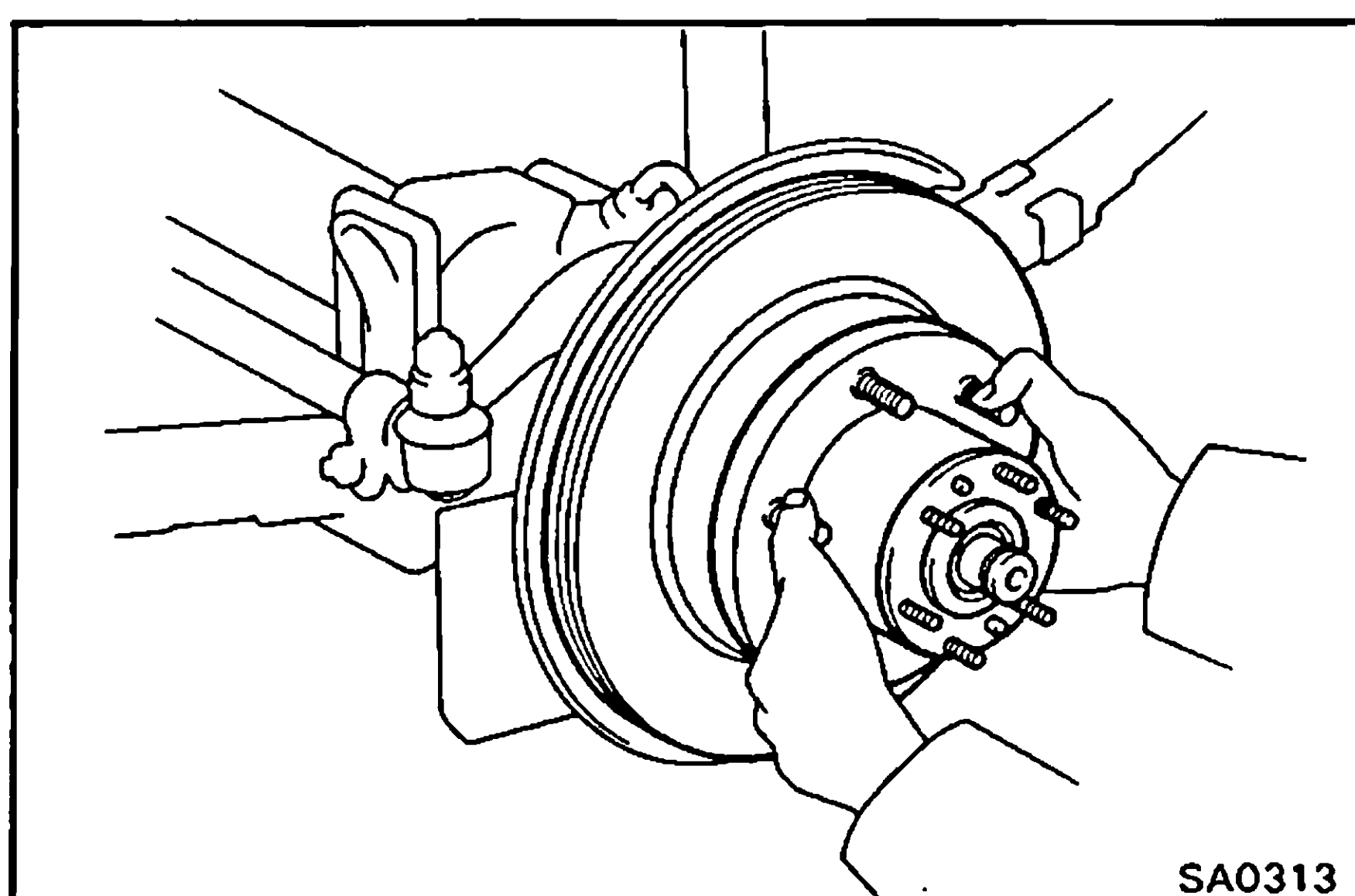


2. PACK INSIDE OF HUB WITH MP GREASE



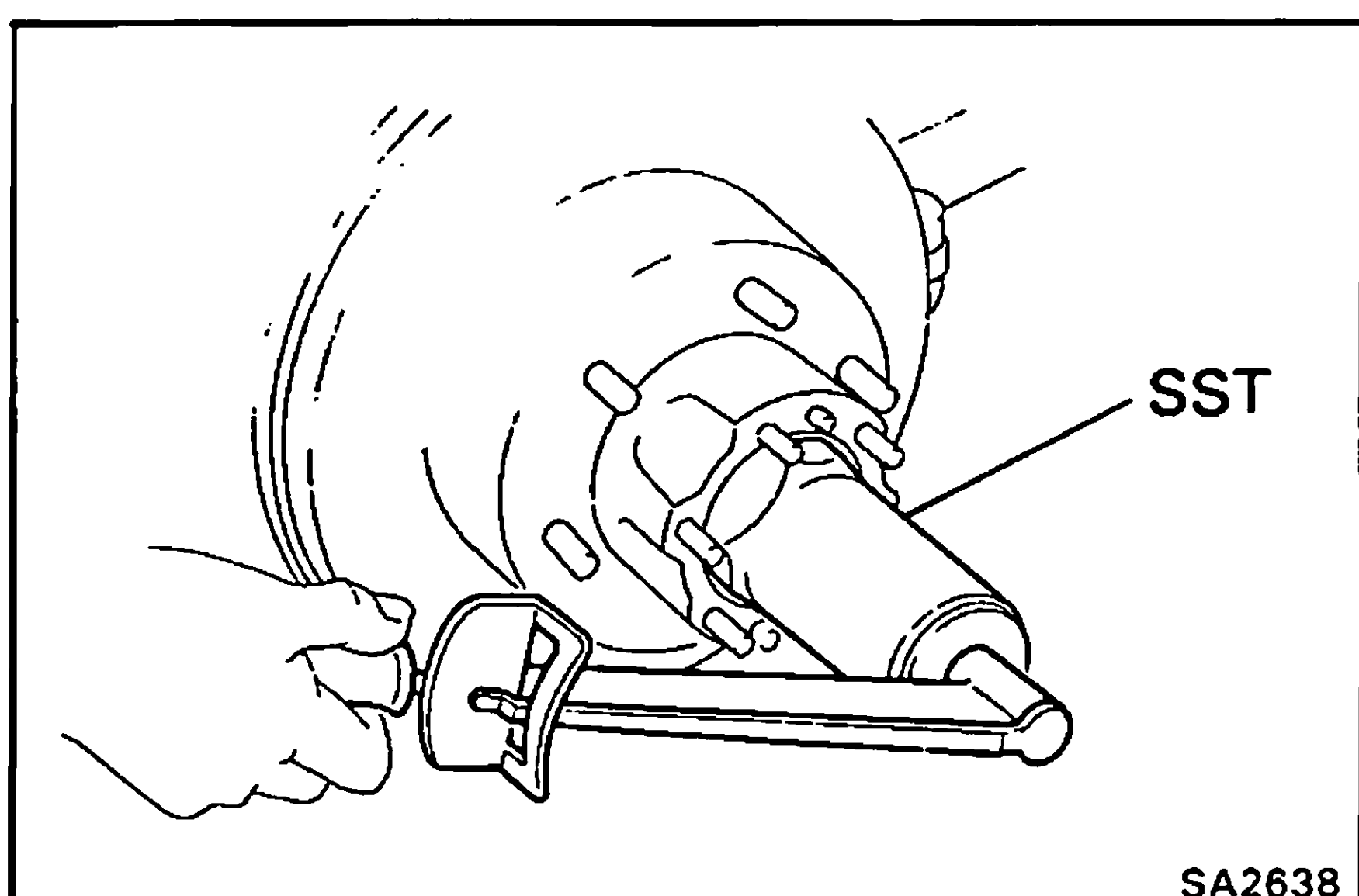
3. INSTALL INNER BEARING AND OIL SEAL

- Place inner bearing into the hub.
- Using SST, drive in the oil seal into the hub.
SST 09608-35014 (09608-06020, 09608-06150)
- Coat the oil seal with MP grease.



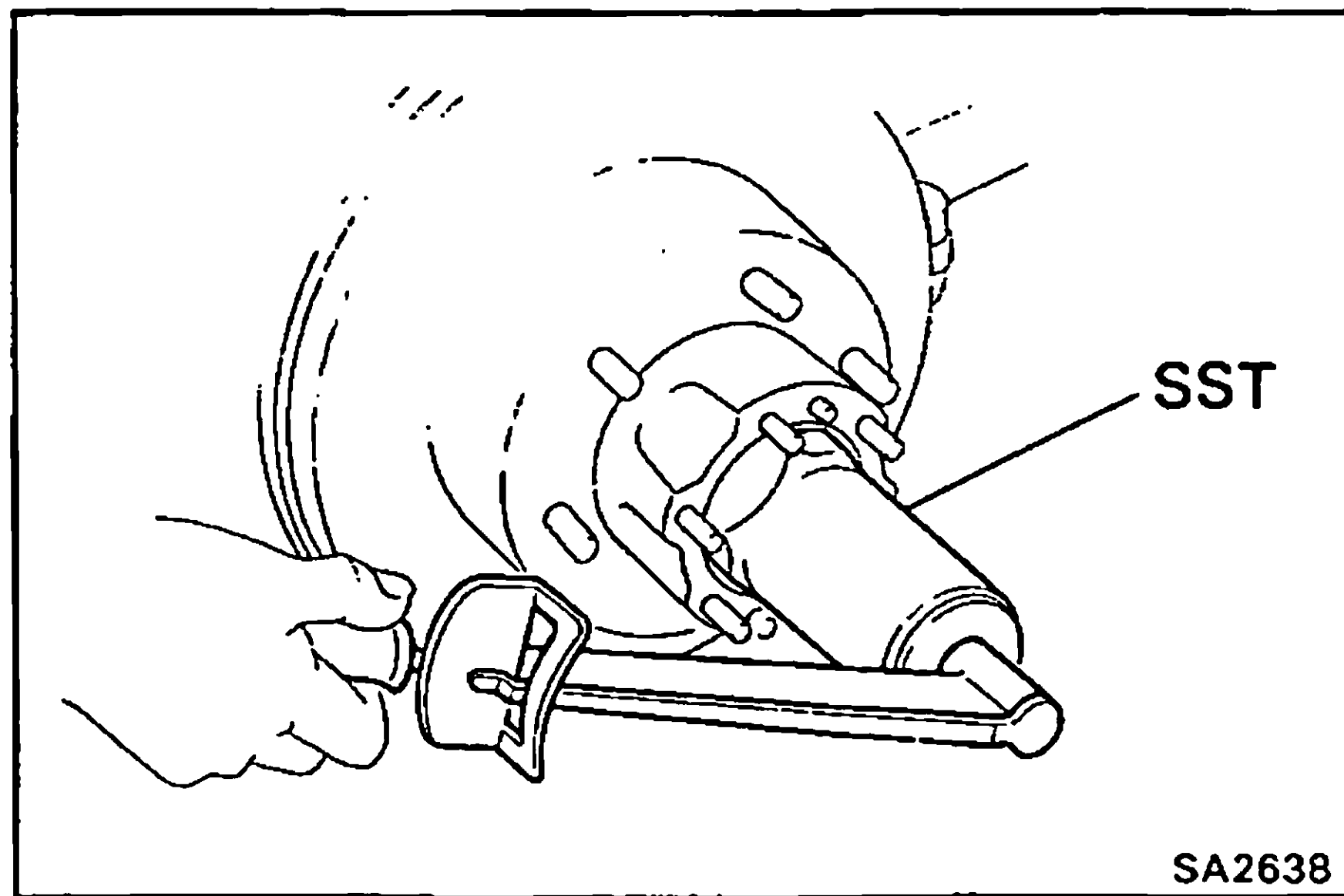
4. INSTALL AXLE HUB ON SPINDLE

- Place the axle hub on the spindle.
- Install the outer bearing and thrust washer.



5. ADJUST PRELOAD

- (w/ Power Locking Hub)
Remove the vinyl tape from the tip of spindle.
- Using SST, torque the bearing adjusting nut.
SST 09607-60020
Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)
NOTICE: Be careful not to damage the oil seal.
- Turn the hub right and left two or three times.

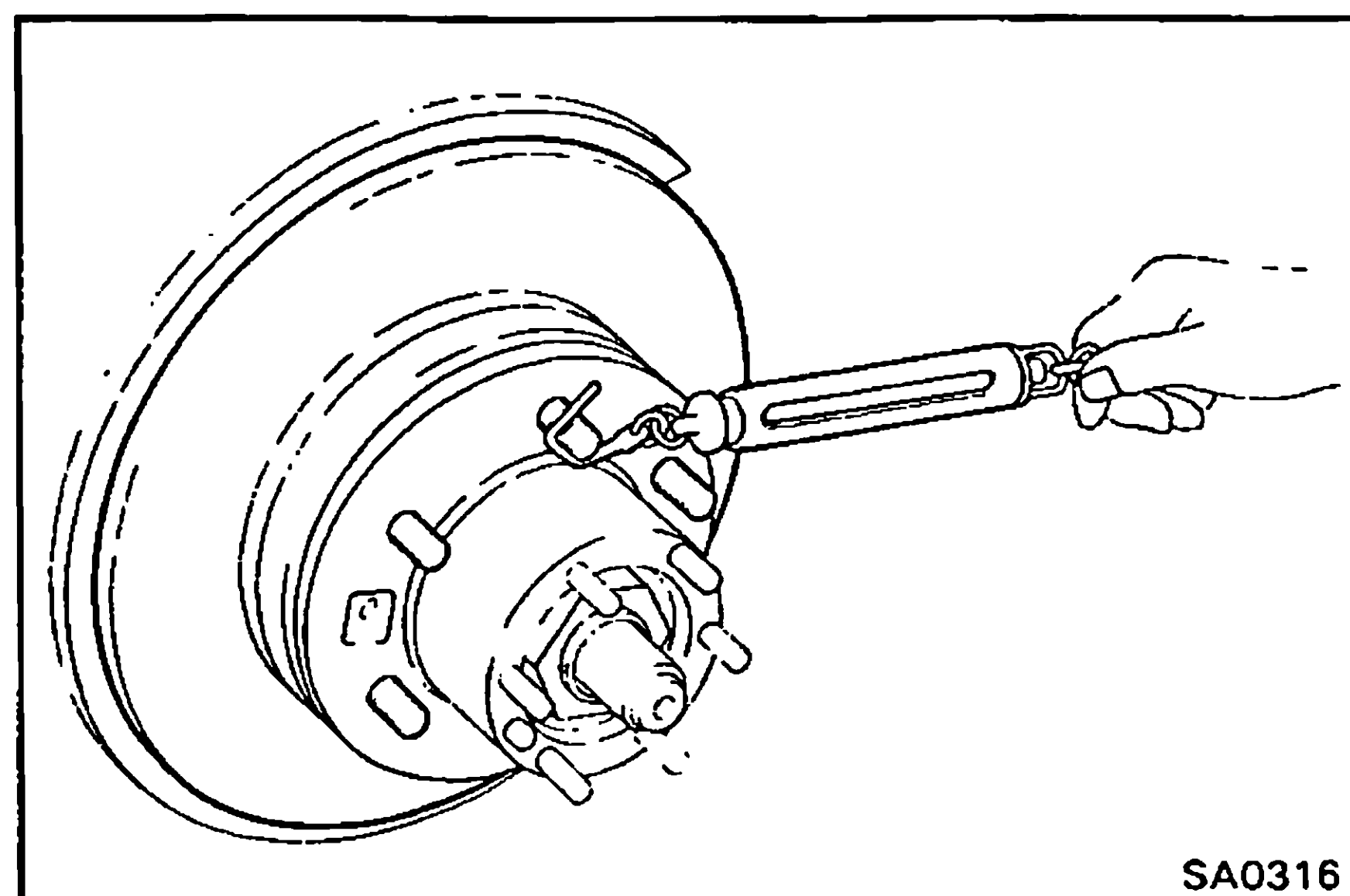


(d) Using SST, torque the bearing adjusting nut.

SST 09607-60020

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

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

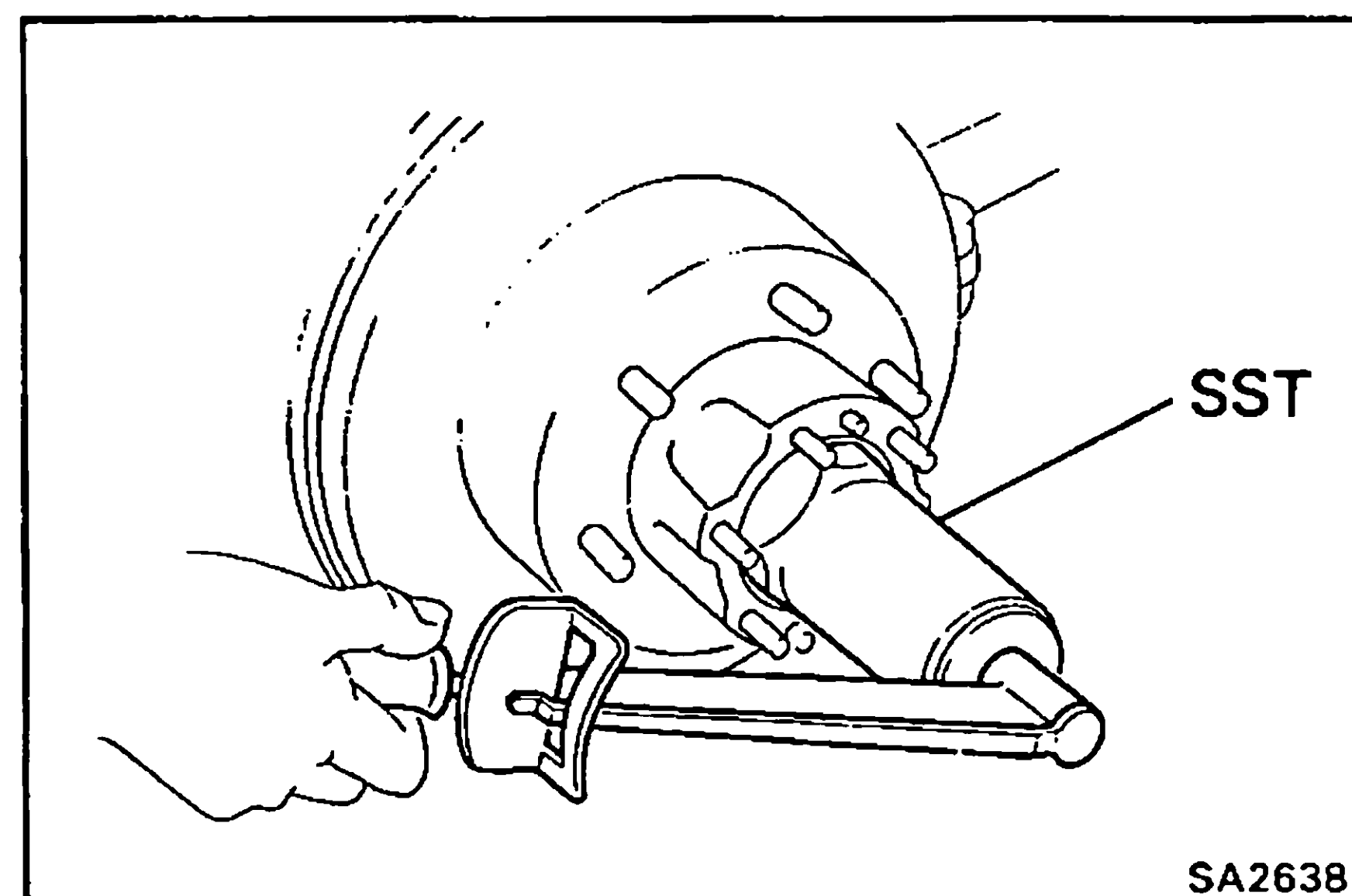


(f) Using a spring tension gauge, measure the preload.

Preload (starting):

Preload 27 — 56 N

(2.8 — 5.7 kgf, 6.2 — 12.6 lbf)



6. INSTALL LOCK WASHER AND LOCK NUT

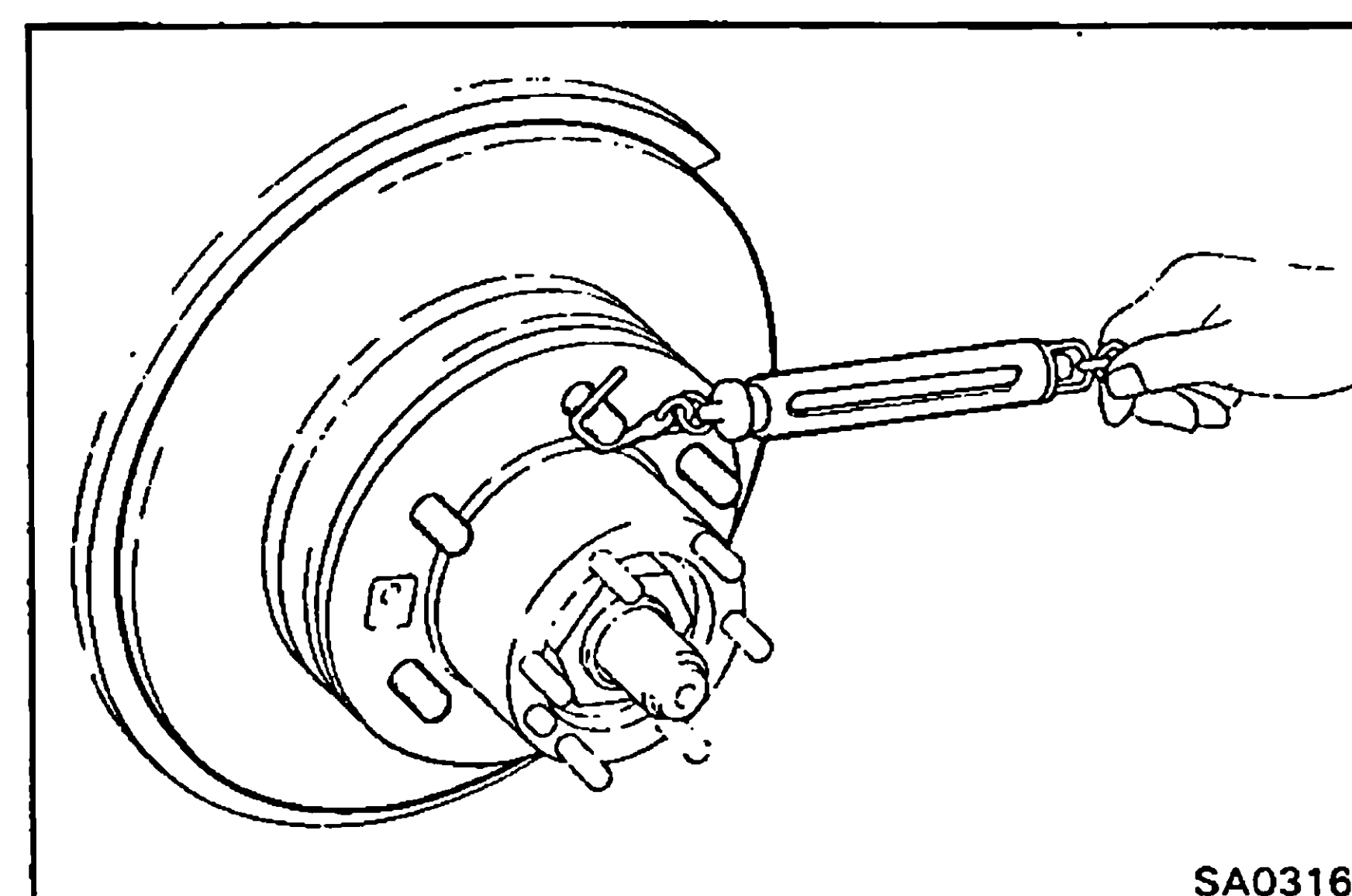
(a) Install the lock washer and lock nut.

(b) Using SST, torque the lock nut.

SST 09607-60020

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

(c) Check that the bearing has no play.



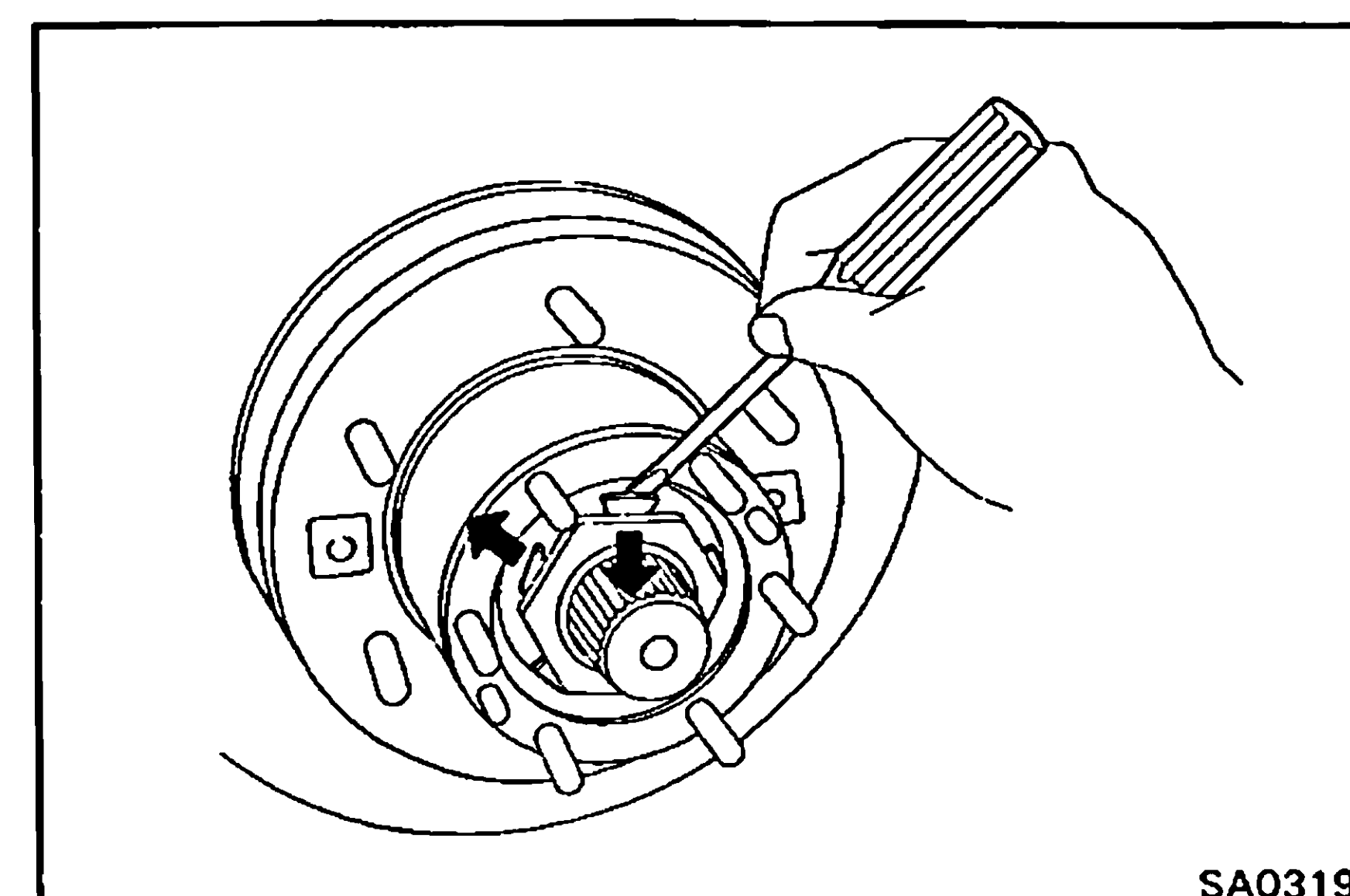
(d) Using a spring tension gauge, check the preload.

Preload (starting):

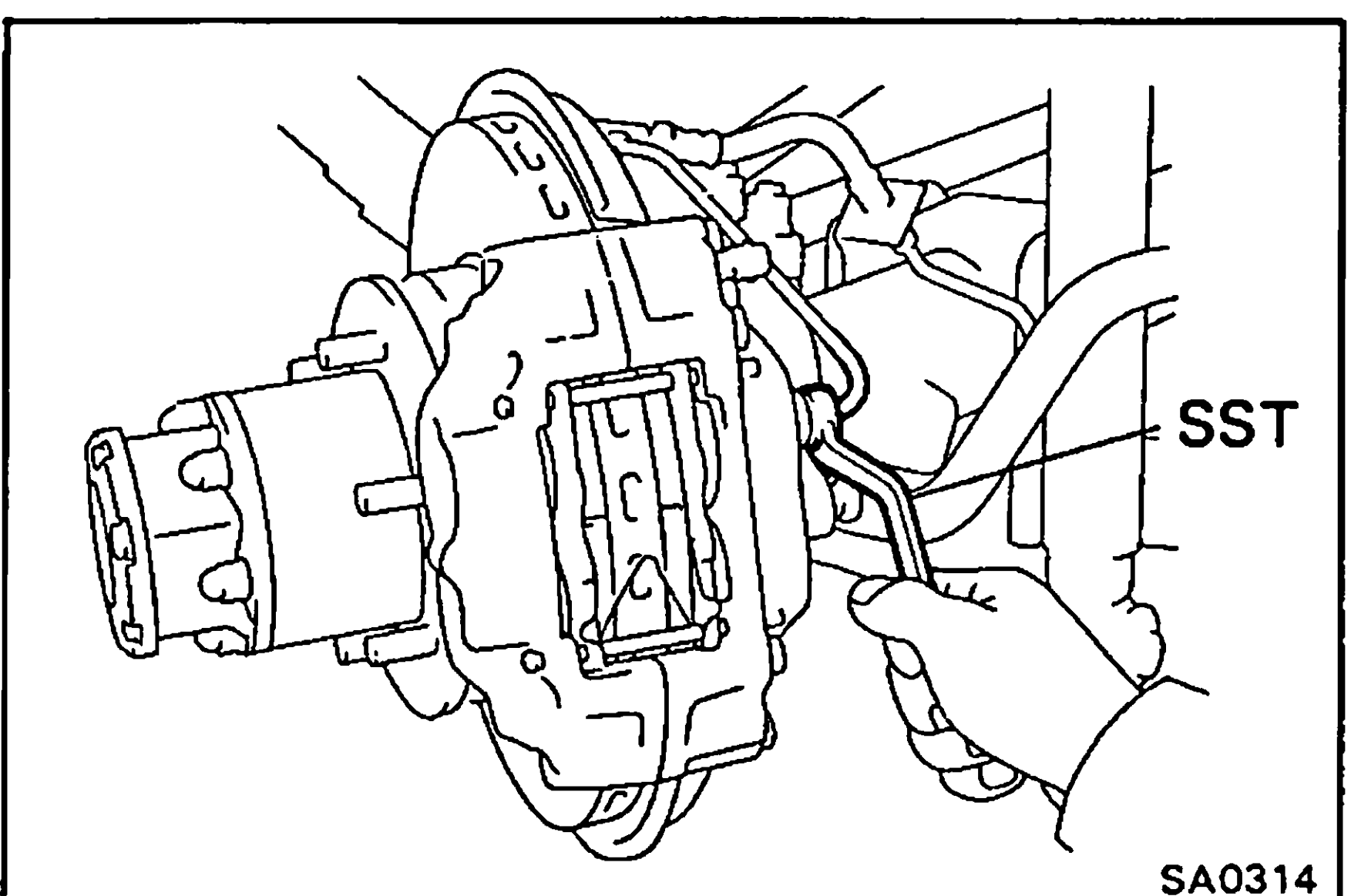
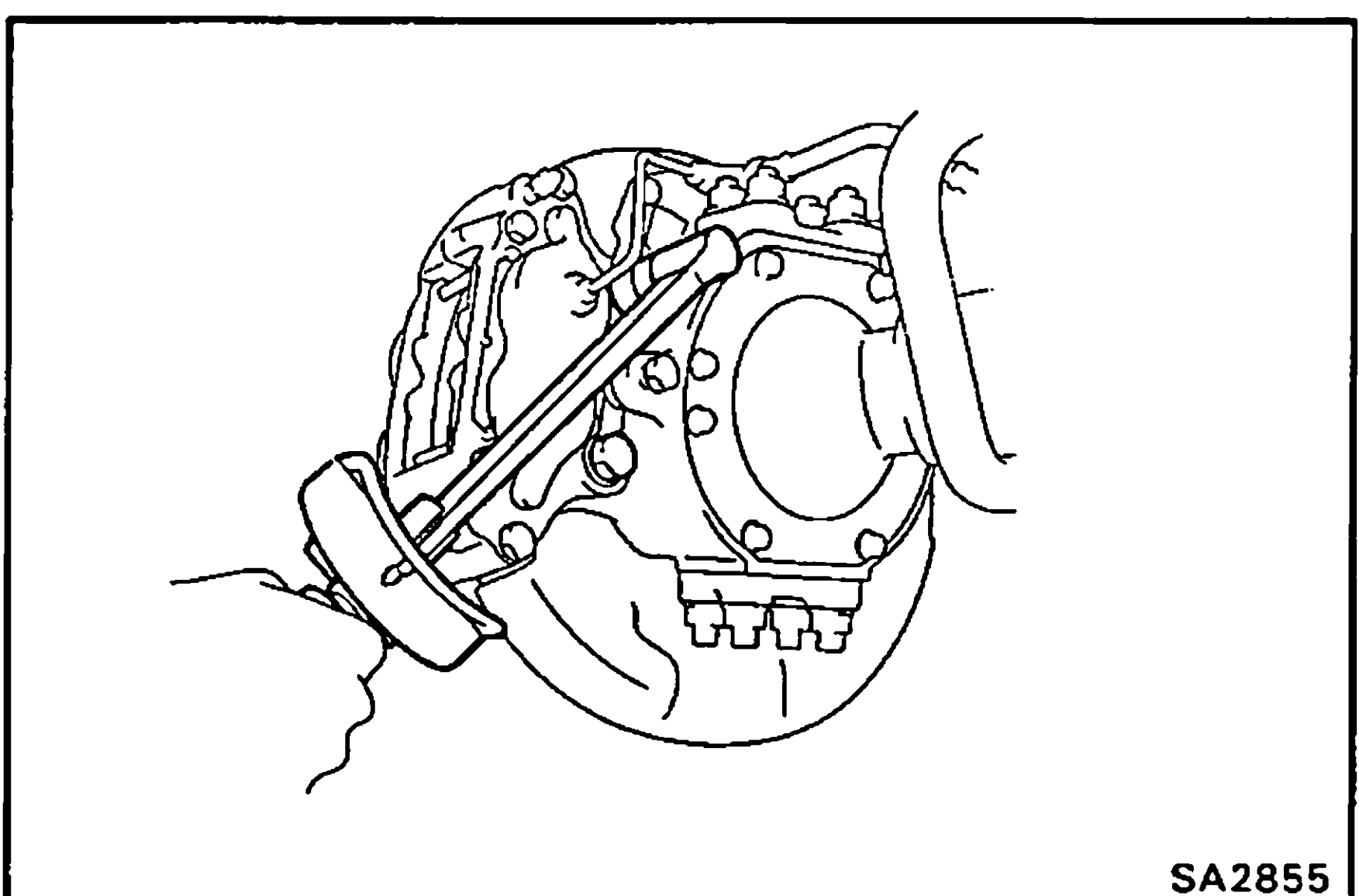
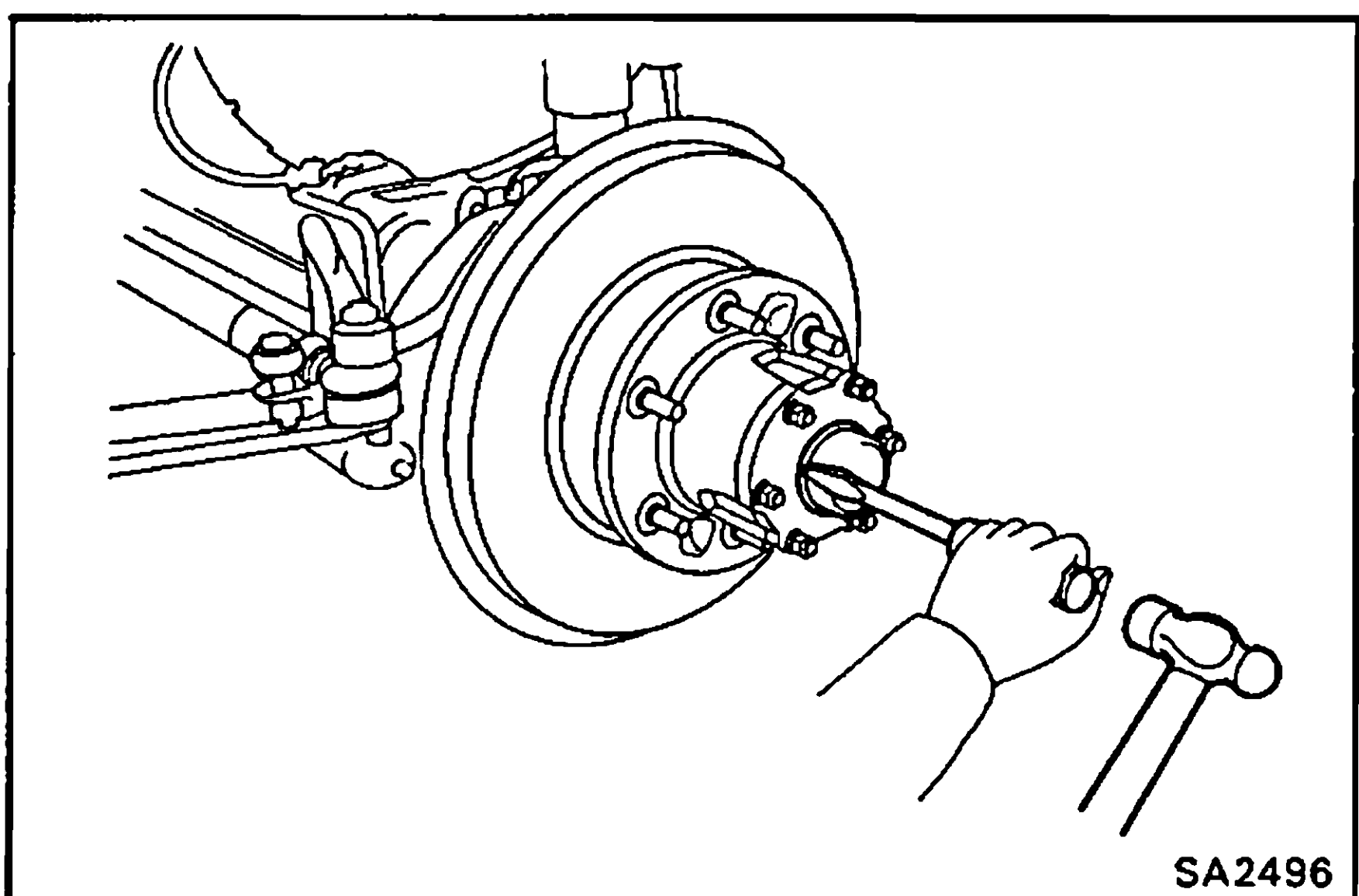
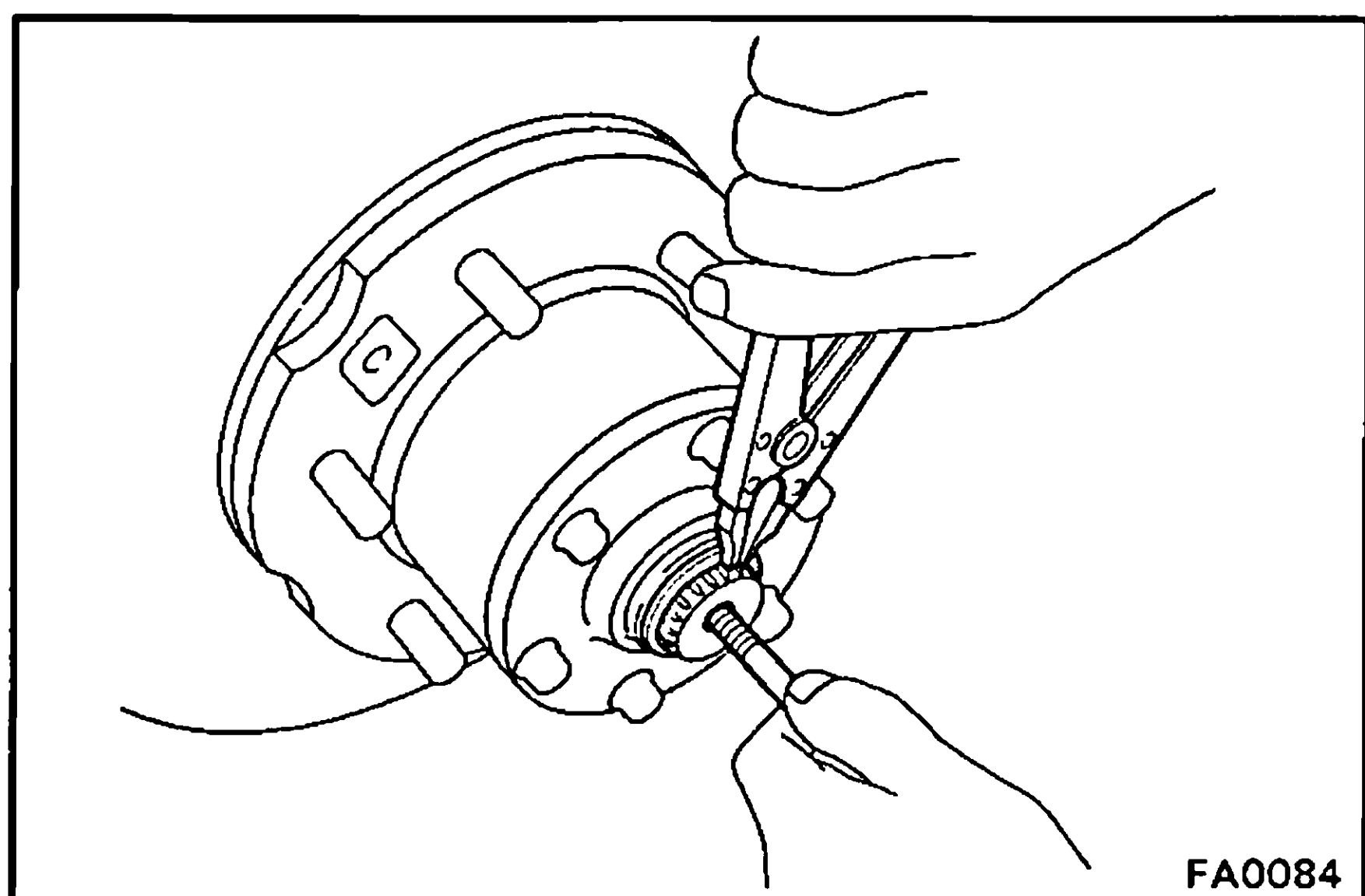
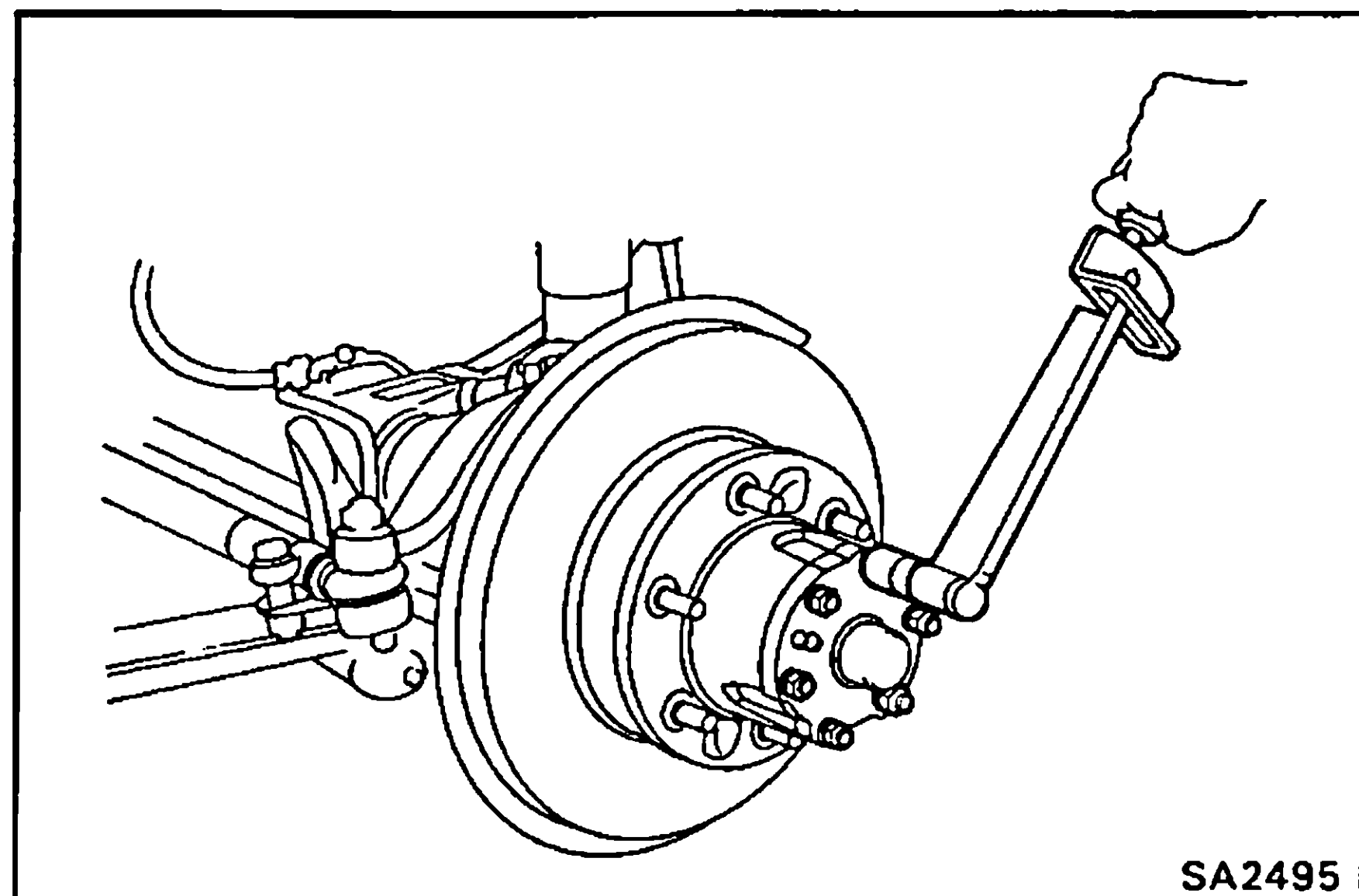
Preload 27 — 56 N

(2.8 — 5.7 kgf, 6.2 — 12.6 lbf)

If not within specification, adjust with the adjusting nut.



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



7. INSTALL FLANGE, FREE WHEELING HUB OR POWER LOCKING HUB

HINT:

- If the vehicle has the free wheeling hub, see page SA-5.
- If the vehicle has the power locking hub, see Pub. No. RM183E, see page SA-26.

- Place a new gasket in position on the axle hub.
- Install the flange to the axle hub.
- Install the six cone washers, washers and nuts. Torque the nuts.

Torque: 31 N·m (315 kgf·cm, 23 ft·lbf)

- Install a bolt to the axle shaft and pull it out.
- Using snap ring pliers, install the snap ring.
- Remove the bolt from the axle shaft.

- Using a hammer and screwdriver, install the cap to the flange.

8. INSTALL BRAKE CYLINDER

- Install the brake cylinder to the steering knuckle with the two bolts. Torque the mounting bolts.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

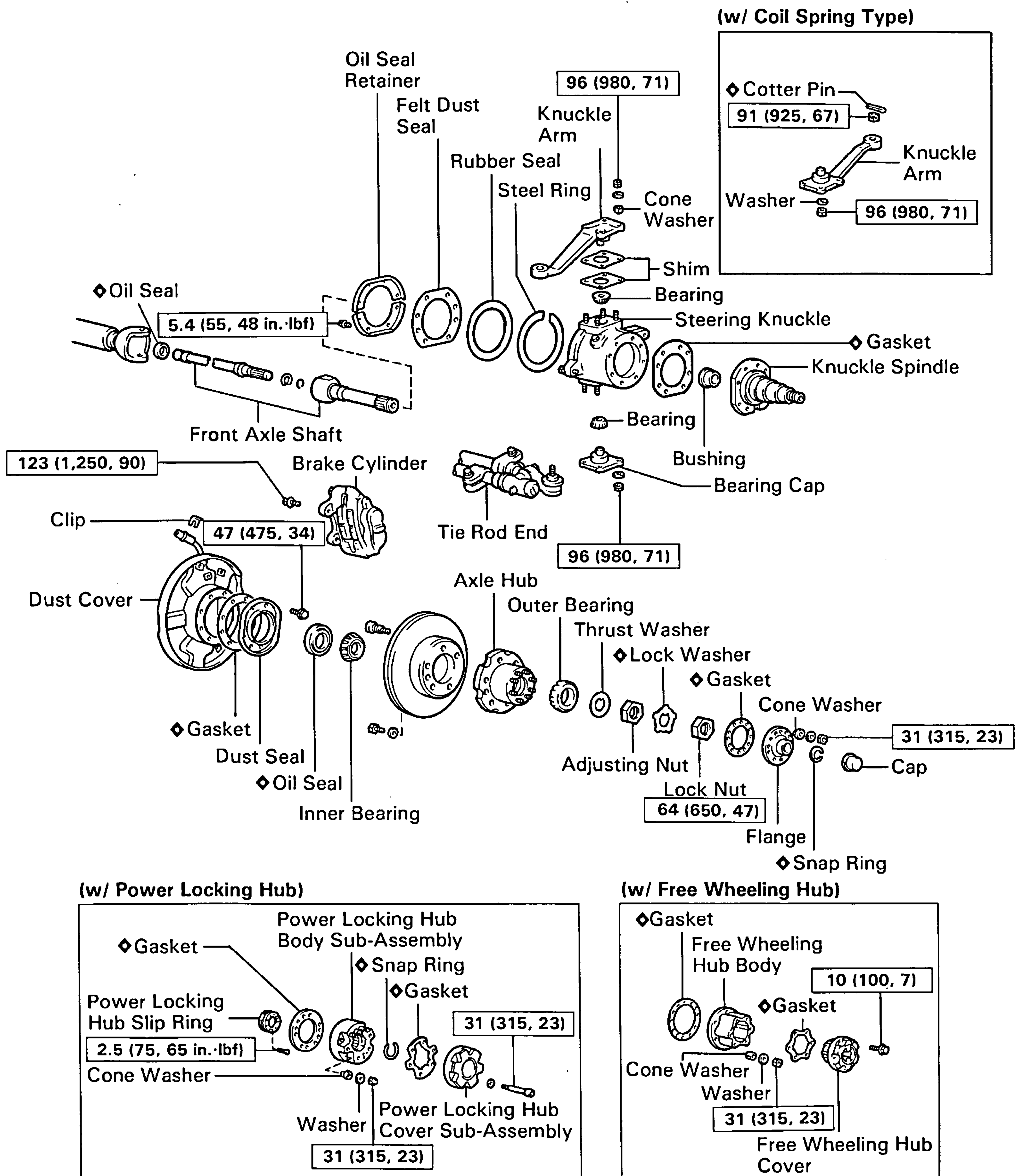
- Using SST, connect the brake tube. SST 09751-36011

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

9. BLEED BRAKE LINE

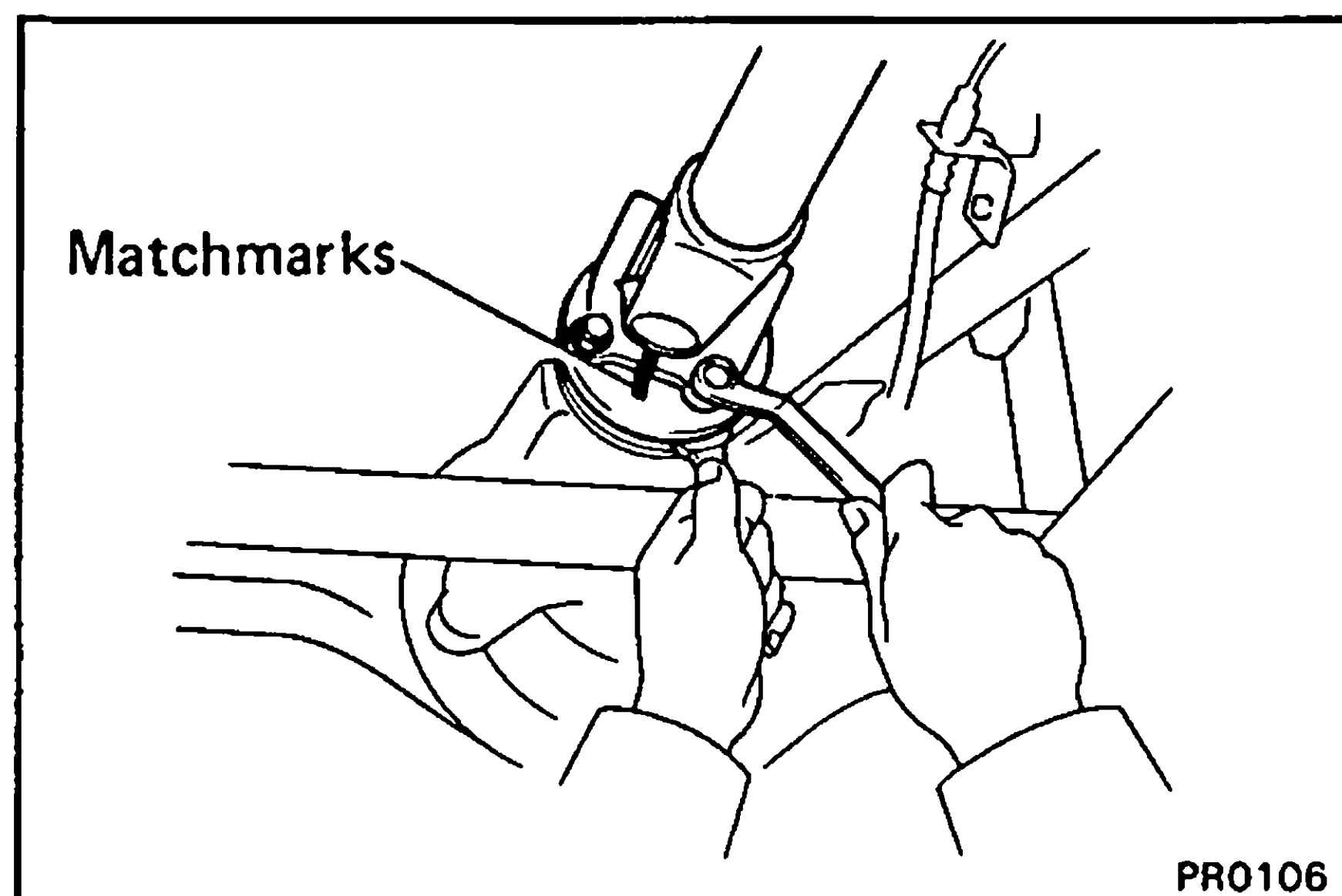
(See Pub. No. RM183E, see page BR-7)

STEERING KNUCKLE AND AXLE SHAFT COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

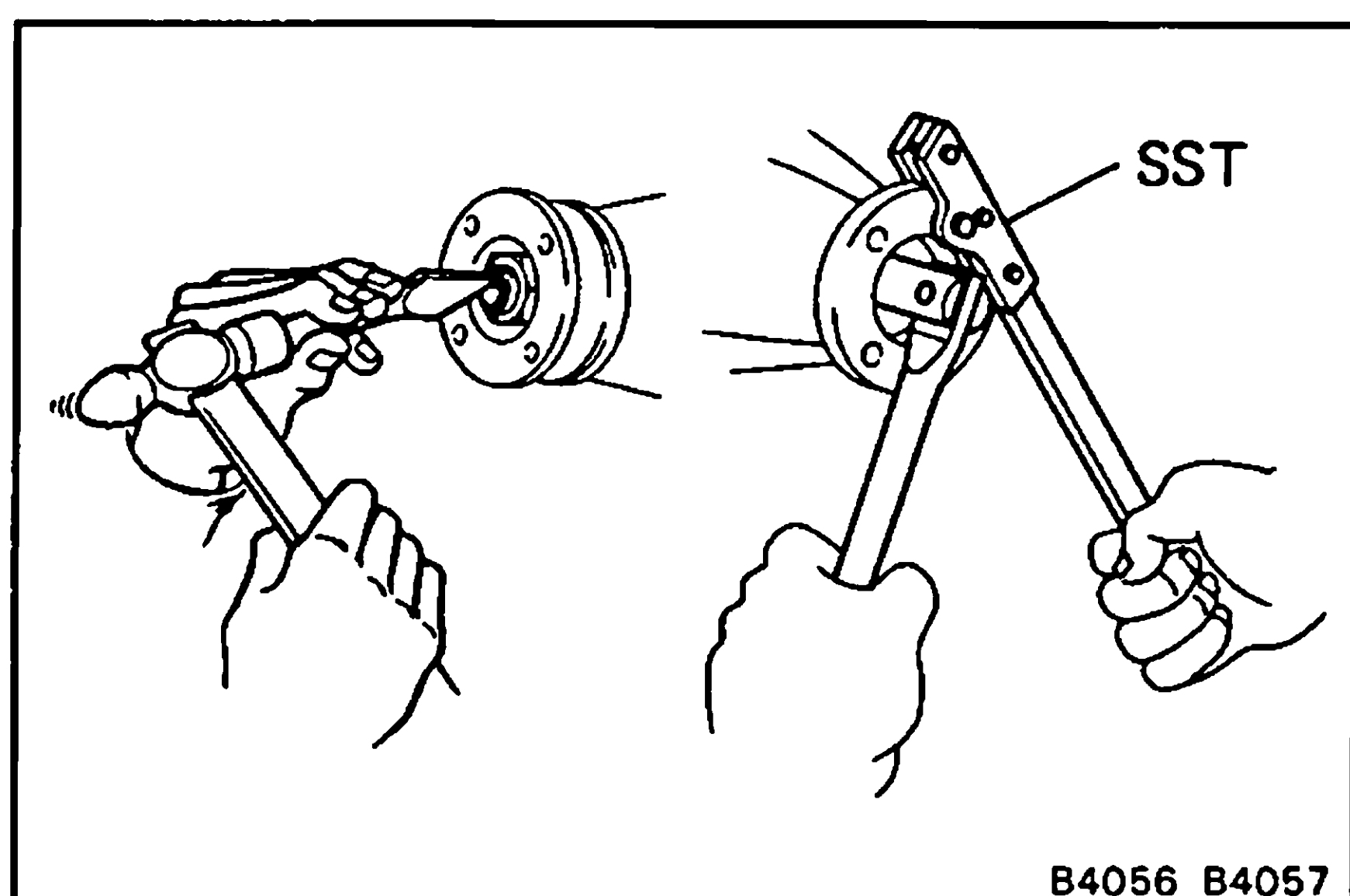


FRONT DIFFERENTIAL

On-Vehicle Replacement of Rear Oil Seal

1. DISCONNECT FRONT PROPELLER SHAFT

- Place matchmarks on the flanges.
- Remove the four bolts and nuts.

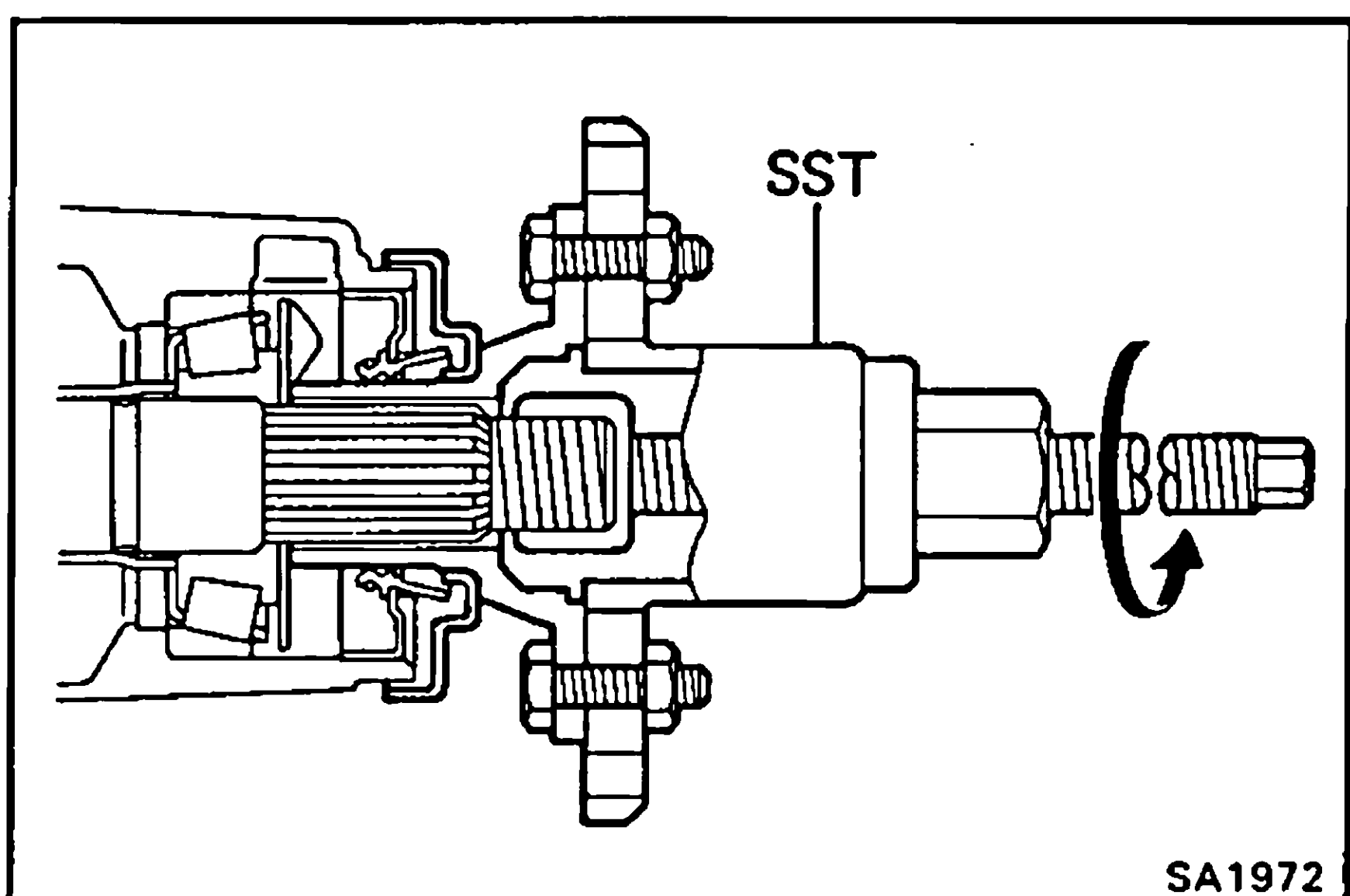


2. REMOVE COMPANION FLANGE

- Using a chisel and hammer, loosen the staked part of nut.
- Using SST to hold the flange, remove the nut and plate washer.

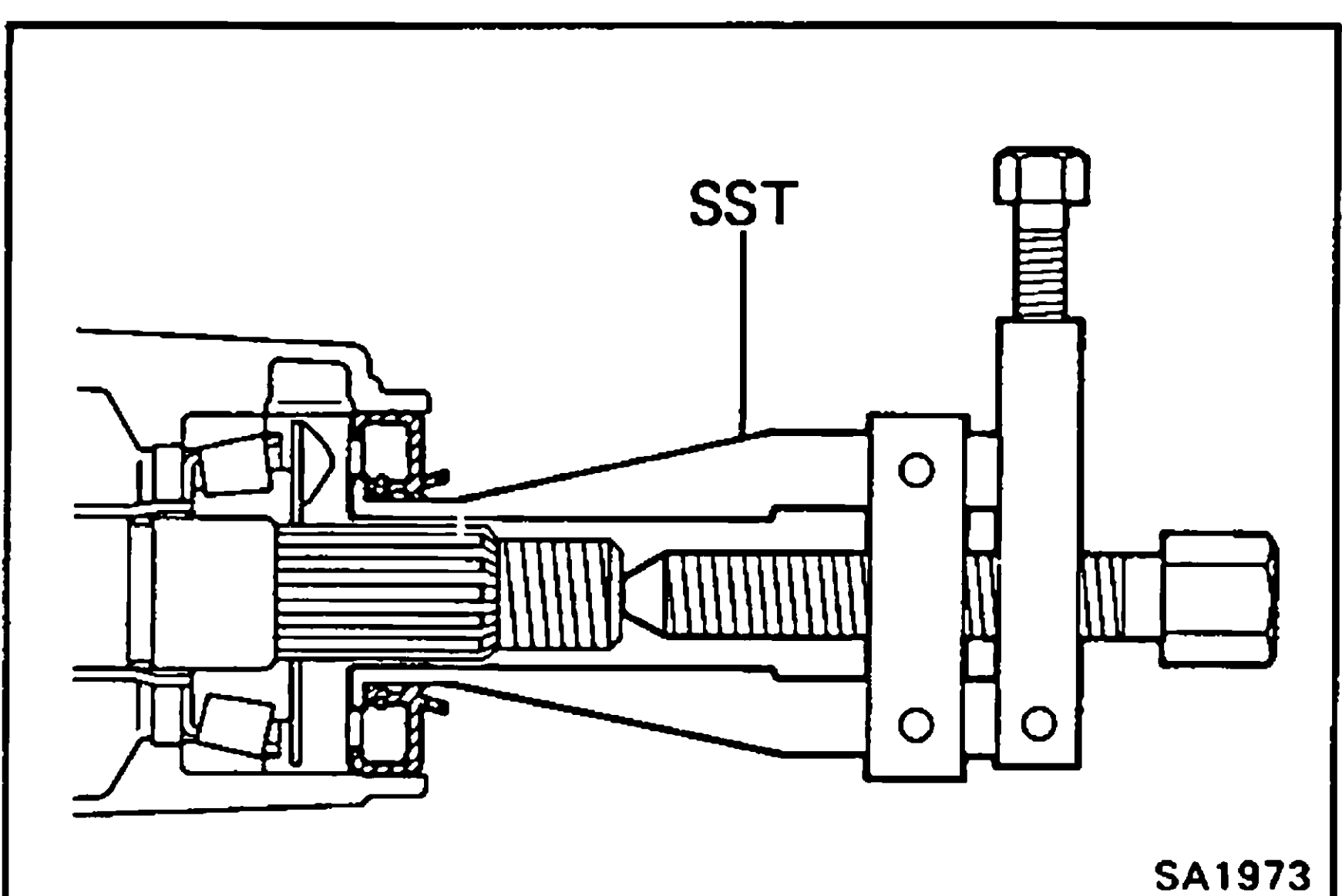
SST 09330-00021

- Using SST, remove the companion flange.
SST 09557-22022 (09557-22050)



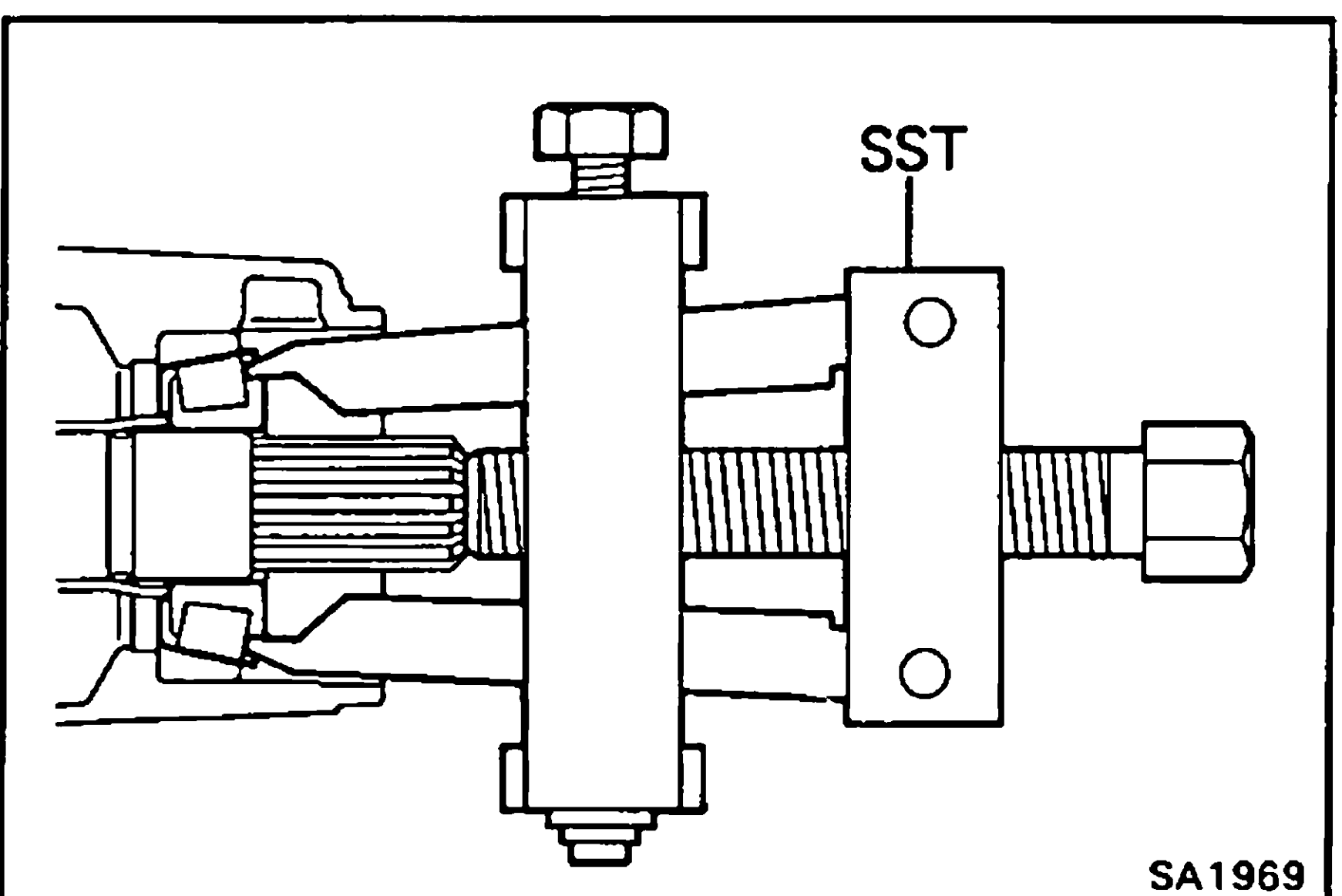
3. REMOVE OIL SEAL AND OIL SLINGER

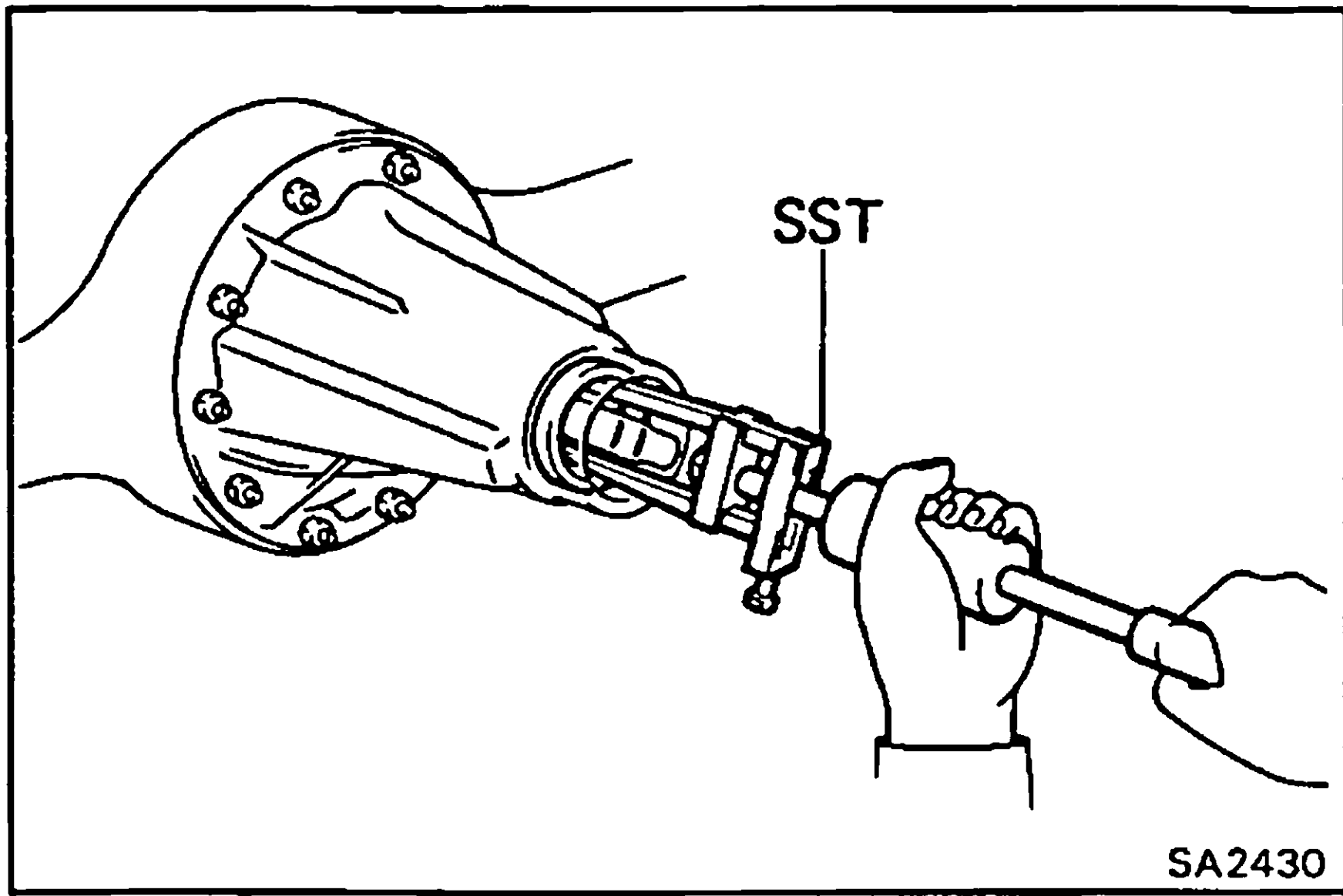
- Using SST, remove the oil seal.
SST 09308-10010
- Remove the oil slinger.



4. REMOVE REAR BEARING

Using SST, remove the rear bearing.
SST 09556-22010

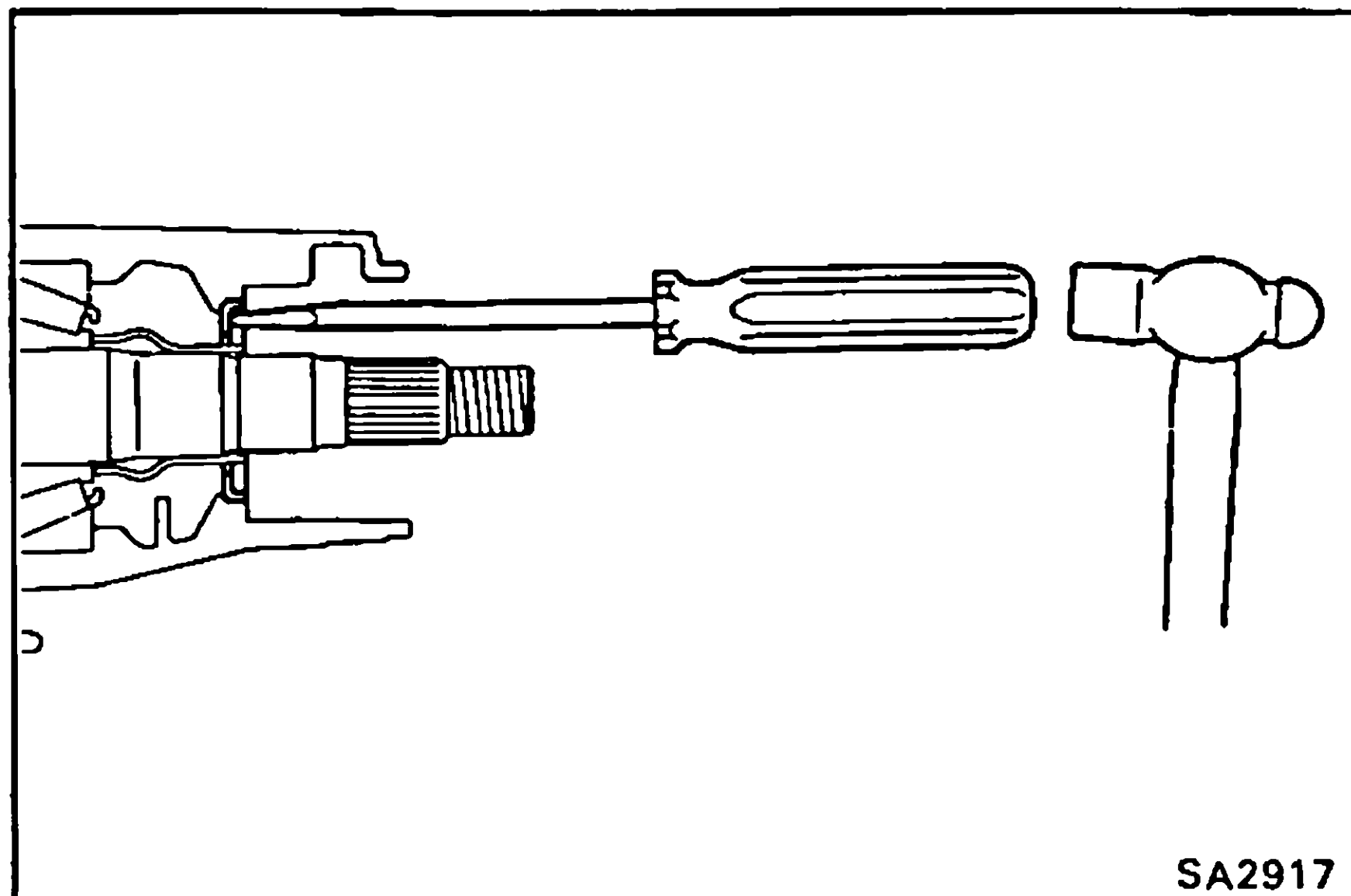


**5. (FJ, PZJ, HZJ, FZJ)****REMOVE BEARING OUTER RACE**

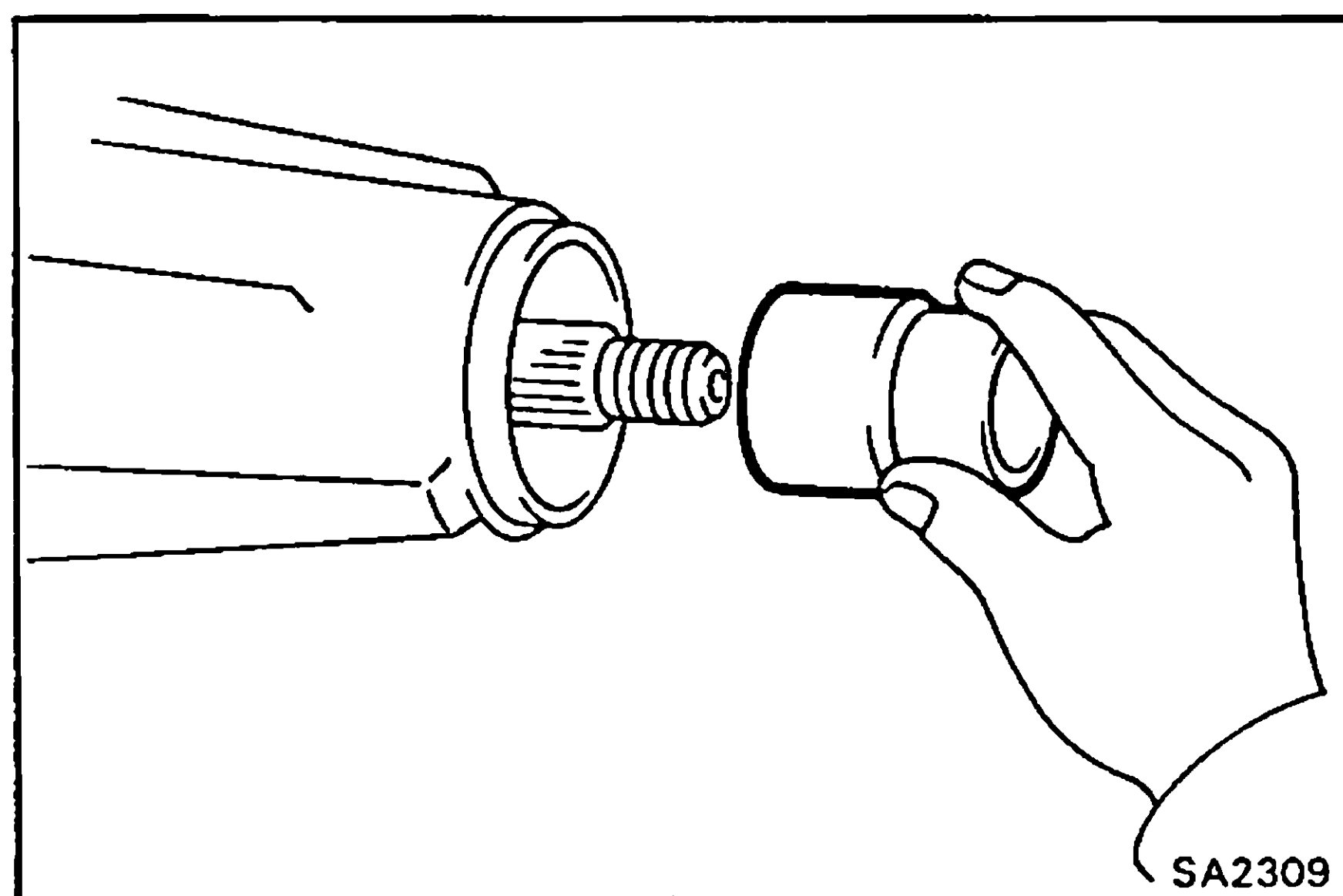
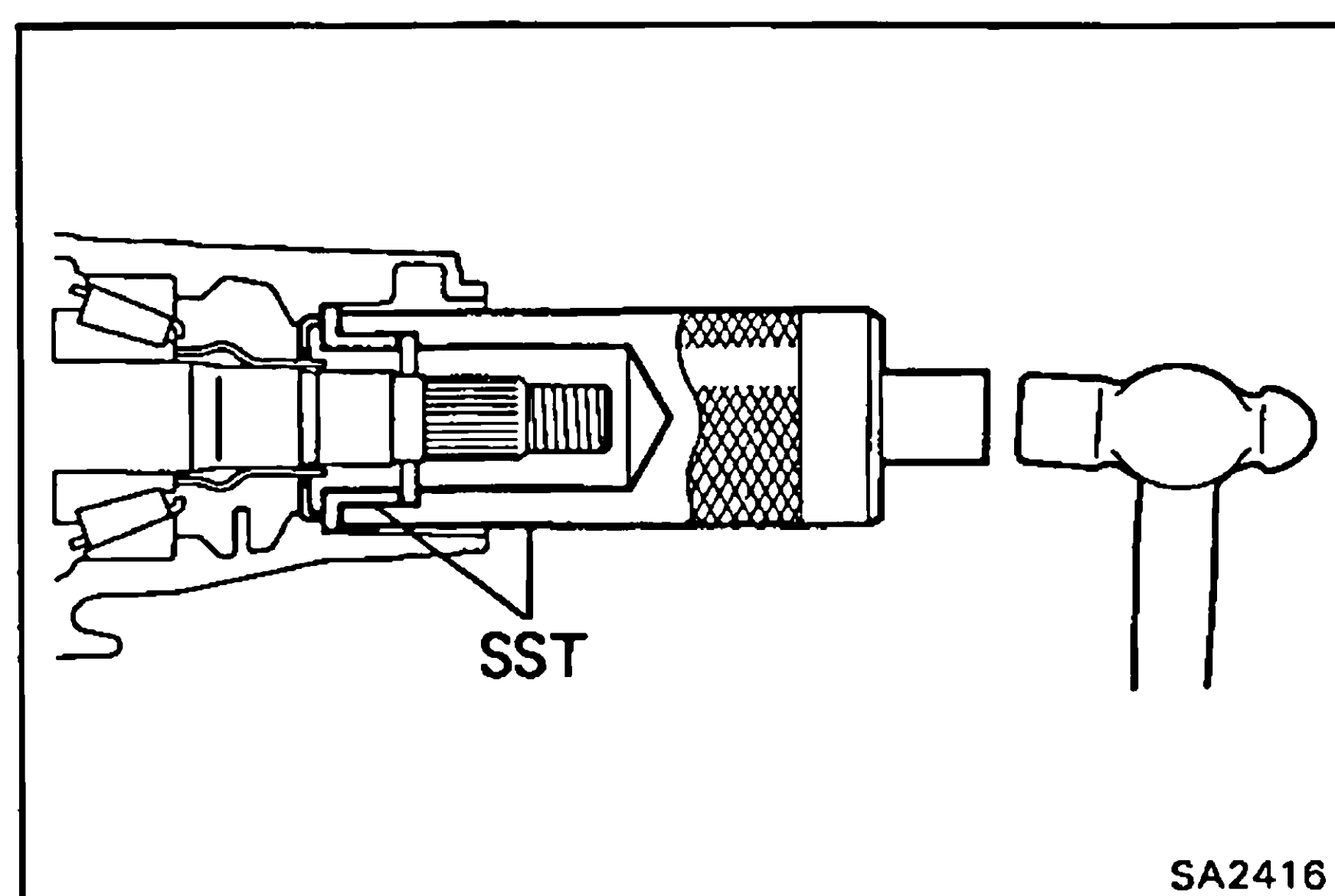
Using SST, remove the bearing outer race.

SST 09308-00010

NOTICE: Do not scratch the taper surface of the outer race.

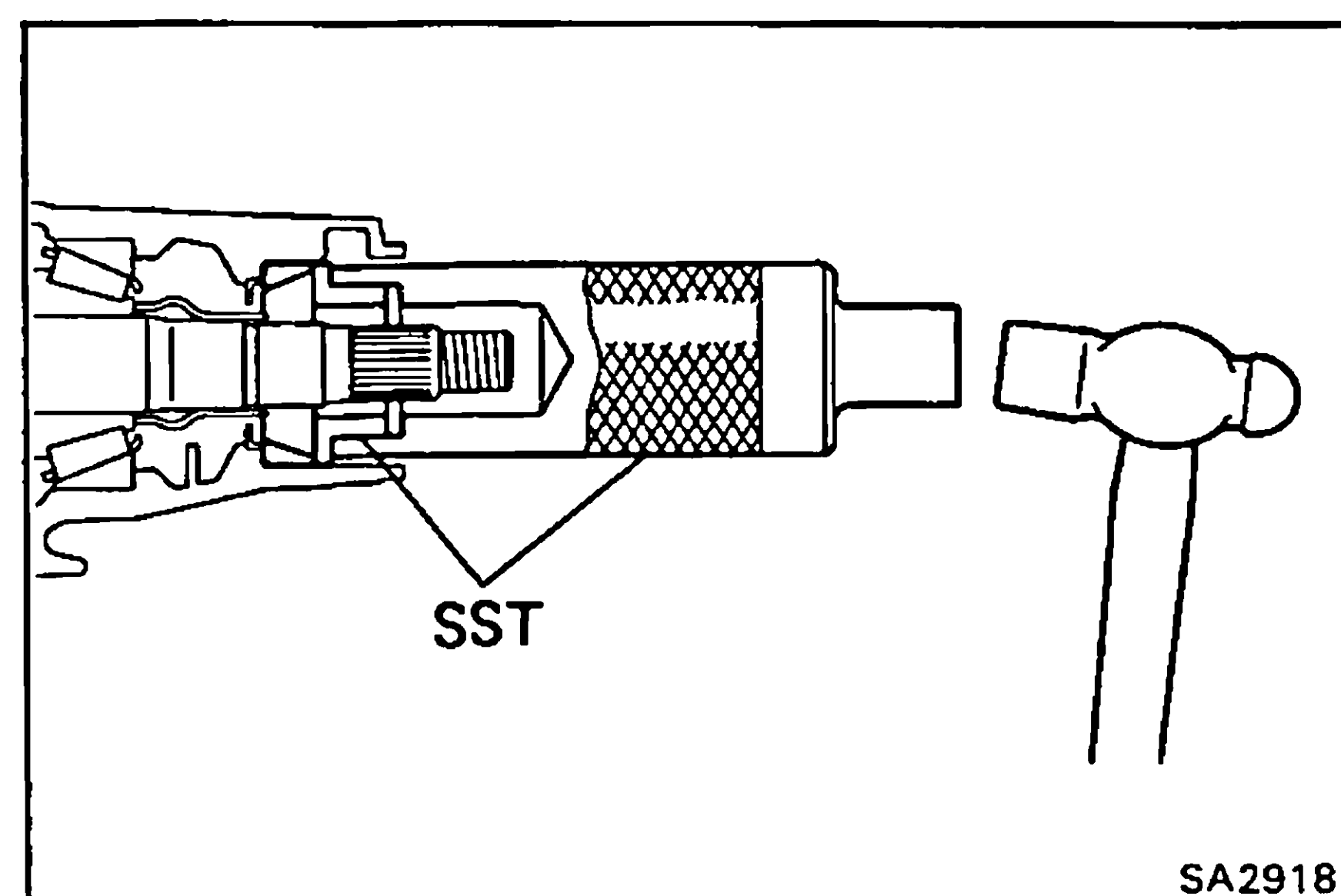
**6. (FJ, PZJ, HZJ, FZJ)****REMOVE OIL STORAGE RING**

Using a screwdriver, bend the oil storage ring and drive it out.

7. REMOVE BEARING SPACER**8. INSTALL NEW BEARING SPACER****9. (FJ, PZJ, HZJ, FZJ)****INSTALL NEW OIL STORAGE RING**

Using SST, drive in a new oil storage ring.

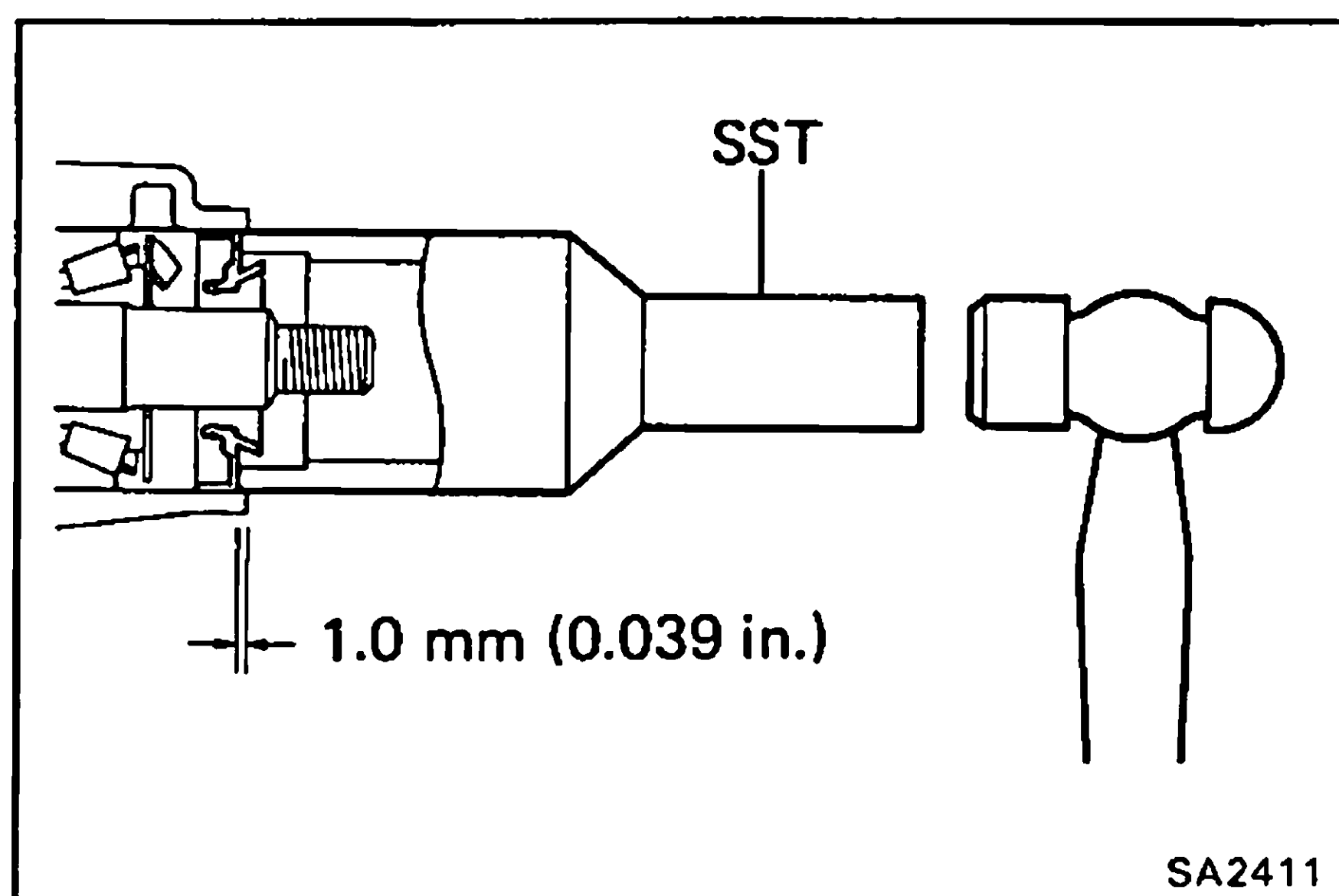
SST 09316-60010 (09316-00010, 09316-00020)

**10. (FJ, PZJ, HZJ, FZJ)****INSTALL BEARING OUTER RACE**

Using SST, drive in the bearing outer race.

SST 09316-60010 (09316-00010, 09316-00020)

11. INSTALL REAR BEARING



12. INSTALL OIL SLINGER AND NEW OIL SEAL

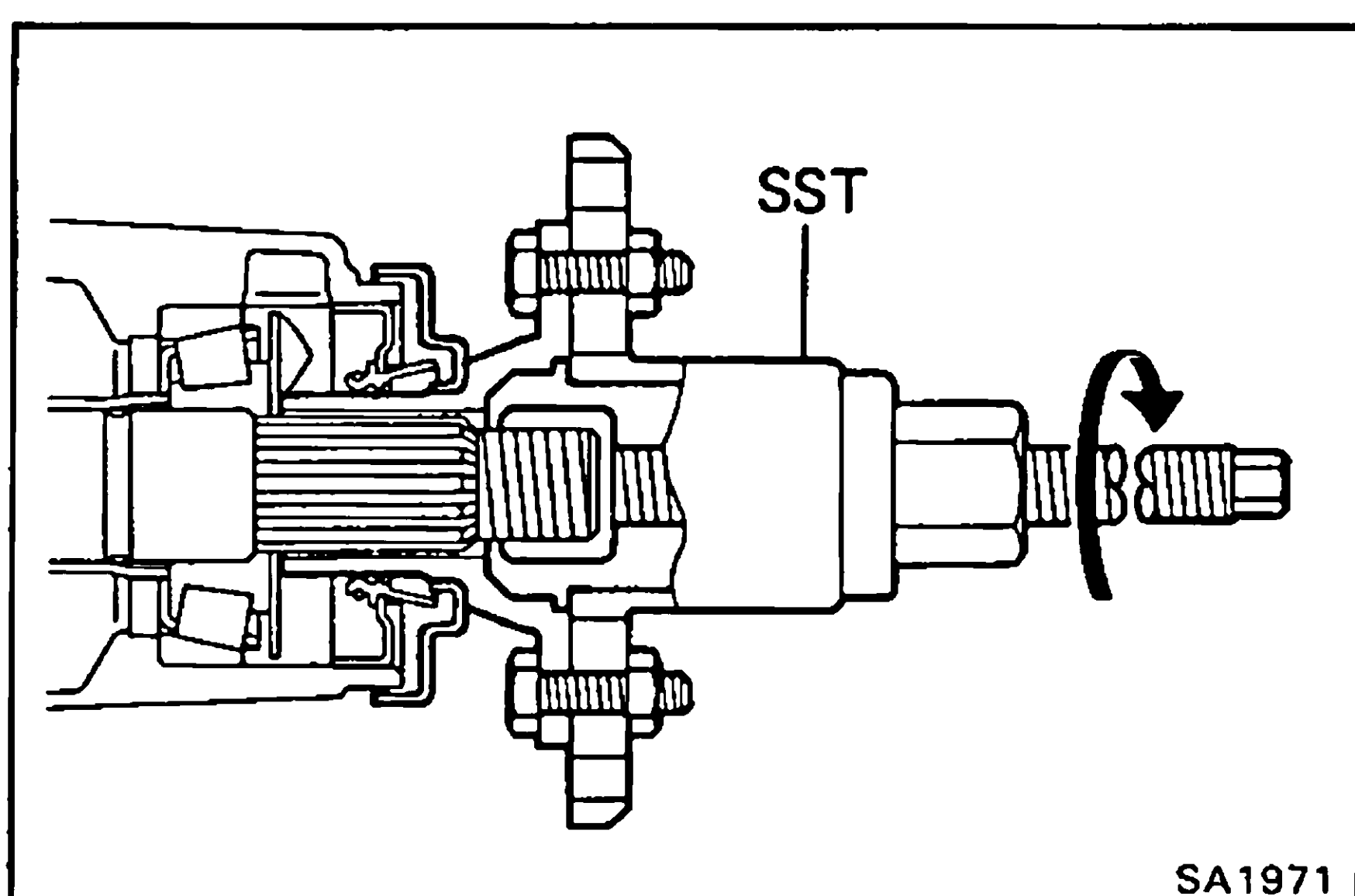
- Install the oil slinger facing as shown.
- Using SST, drive in a new oil seal as shown.

SST 09554-30011 (RJ, LJ)

09214-76011 (FJ, PZJ, HZJ, FZJ)

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

- Coat the lip of the oil seal with MP grease.

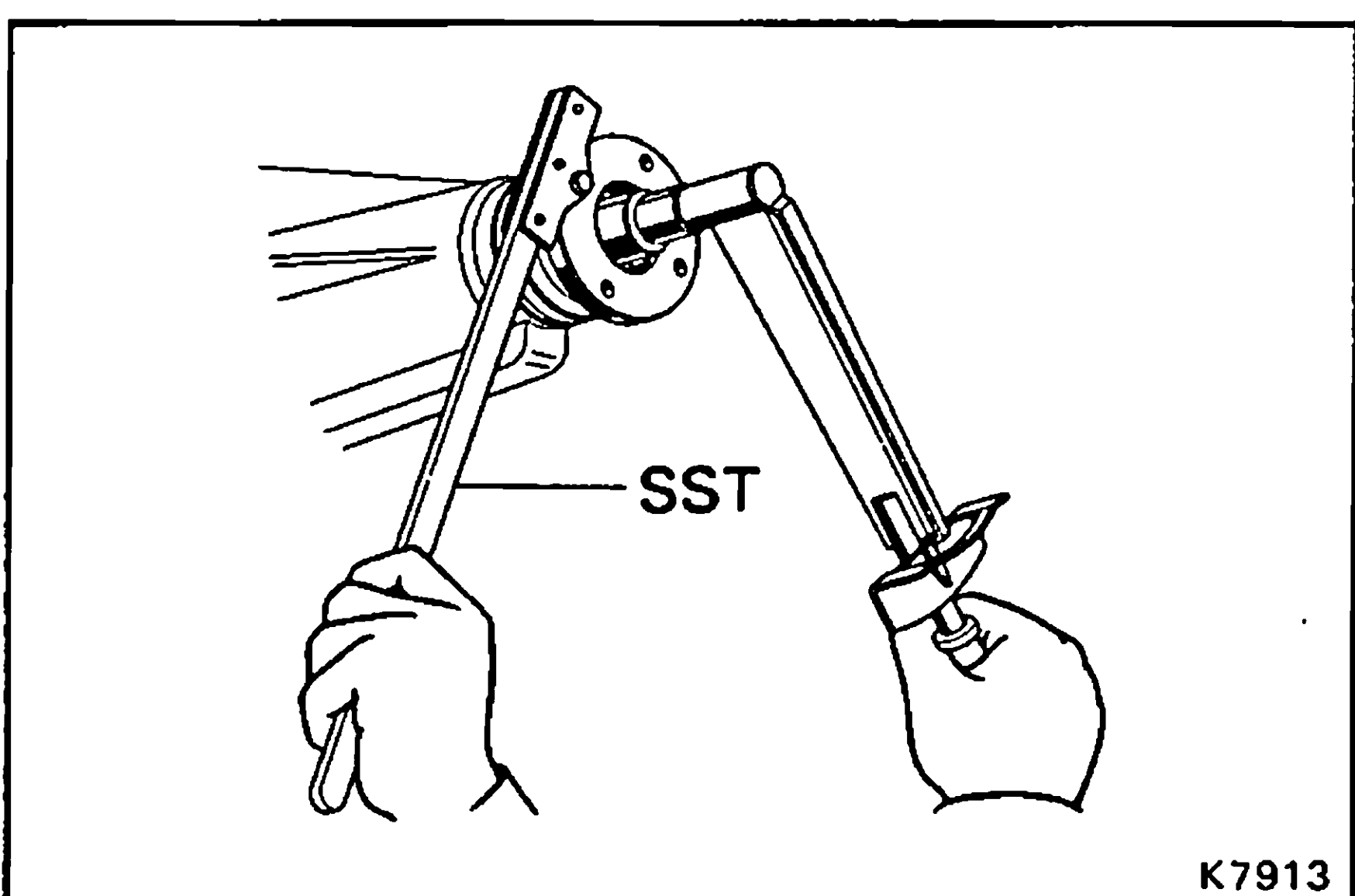


13. INSTALL COMPANION FLANGE

- Using SST, install the companion flange on the drive pinion.

SST 09557-22022 (09557-22050)

- Place the plate washer on the companion flange.

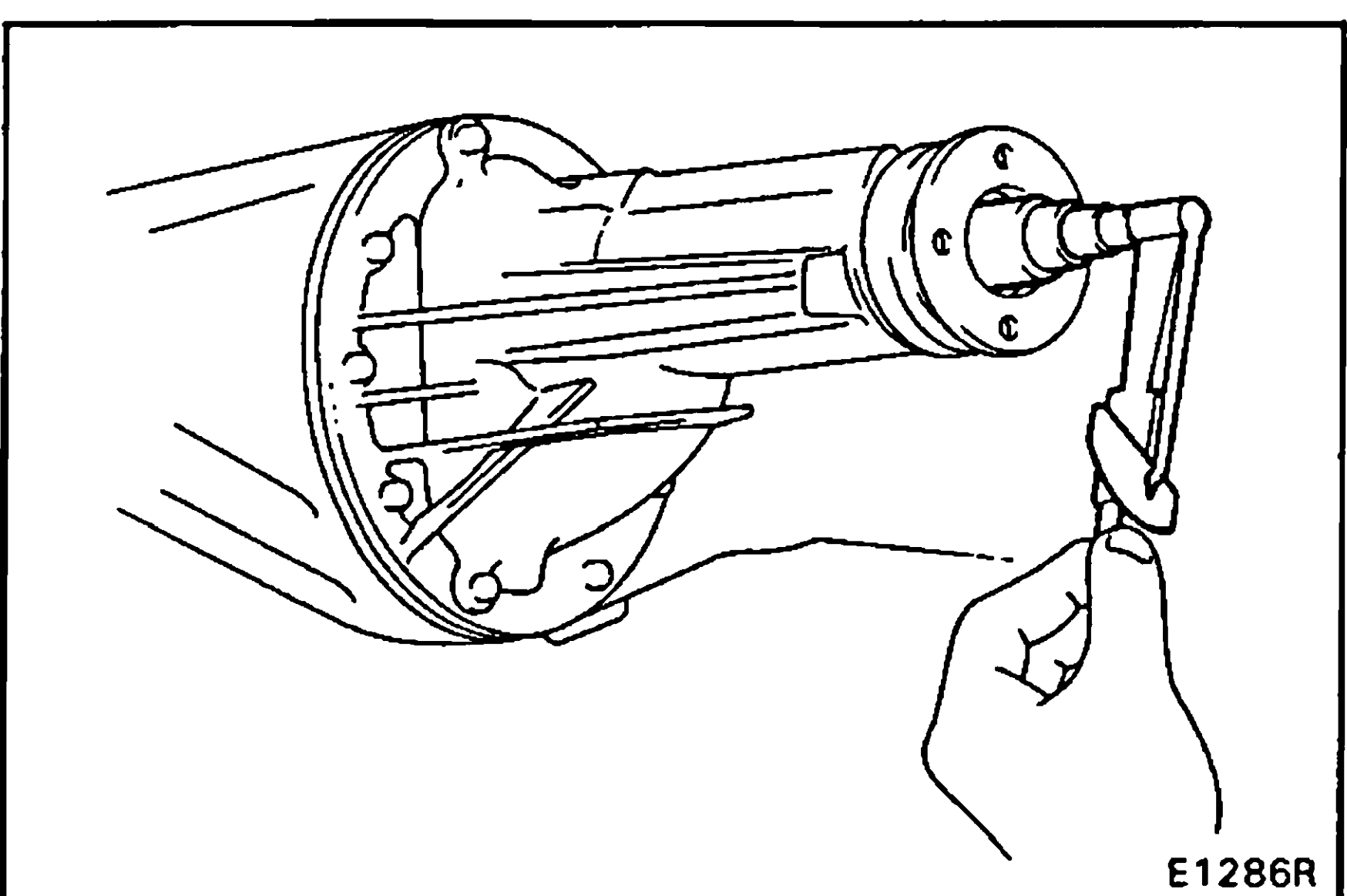


- Apply a light coat of gear oil on the threads of a new companion flange nut.

- Using SST to hold the flange, torque the nut.

SST 09330-00021

Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)



14. CHECK DRIVE PINION PRELOAD

Using a torque meter, measure the preload of the backlash between the drive pinion and ring gear.

Preload (at starting):

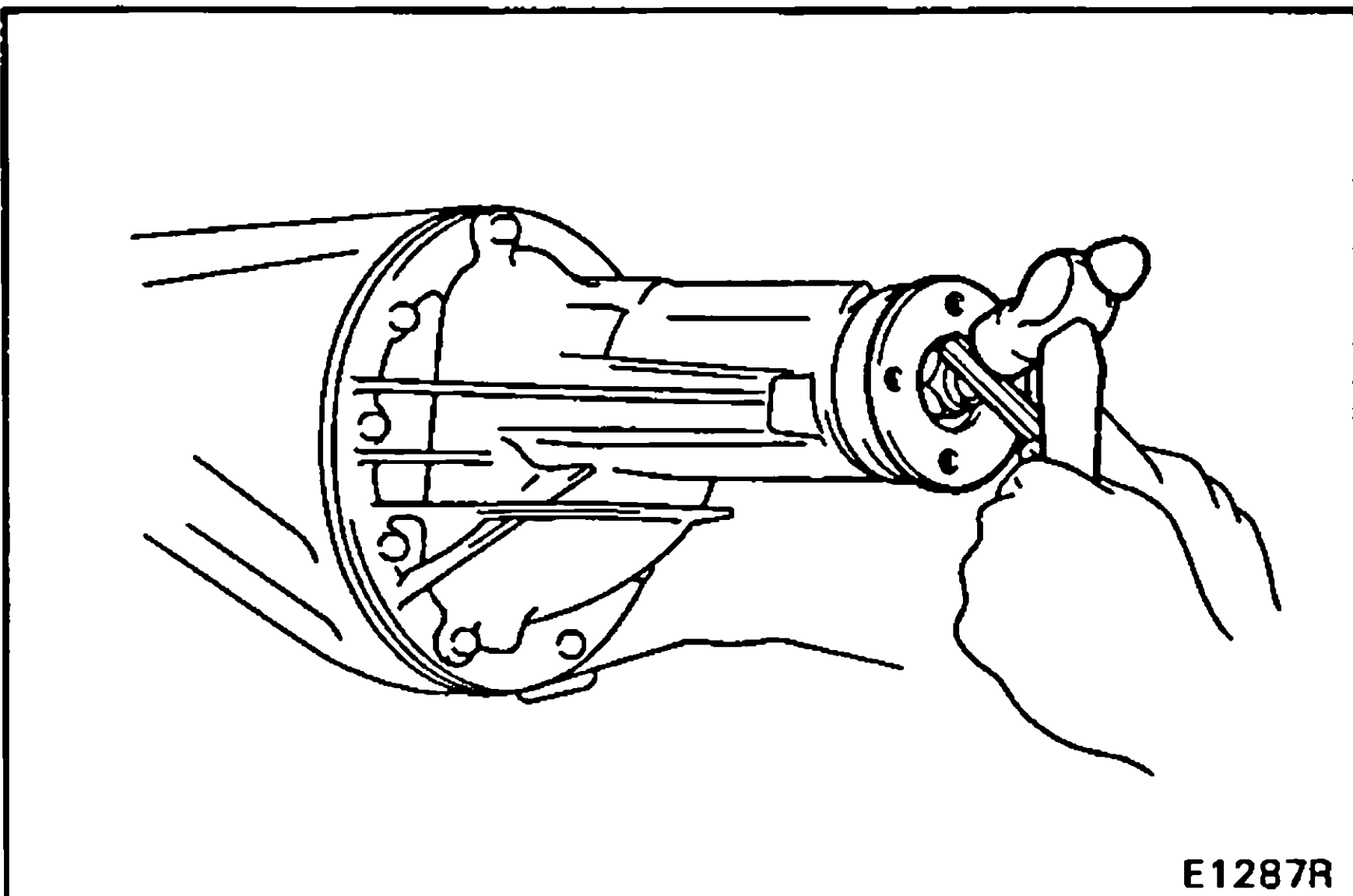
Models	New bearing	Reused bearing
RJ, LJ	1.9 – 2.5 N·m (19 – 26 kgf·cm, 16.5 – 22.6 in.·lbf)	0.9 – 1.3 N·m (9 – 13 kgf·cm, 7.8 – 11.3 in.·lbf)
FJ, PZJ, HZJ, FZJ	0.9 – 1.6 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)	0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

- If the preload is greater than specification, replace the bearing spacer.
- If the preload is less than specification, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) a little at a time until the specified preload is reached.

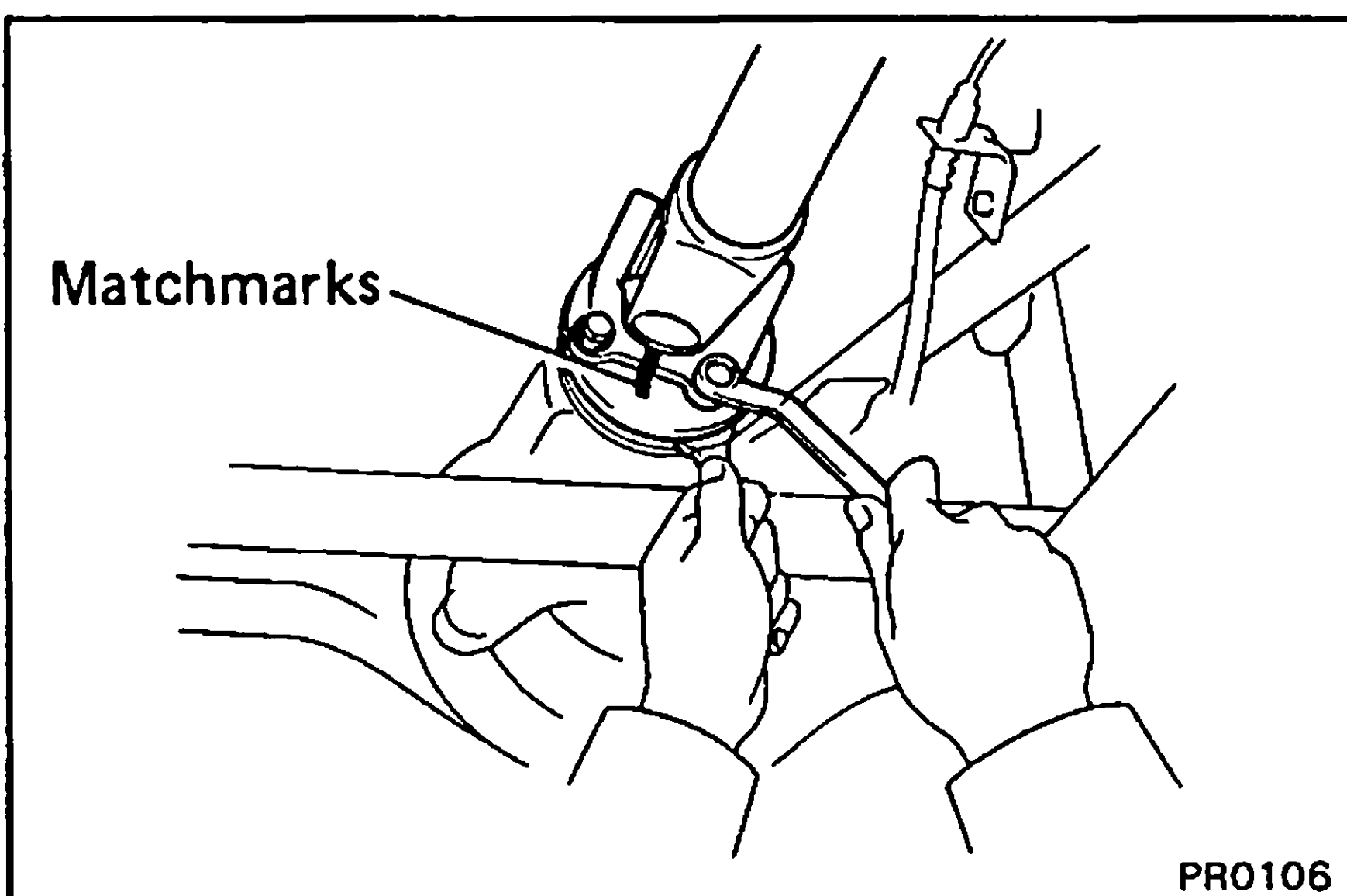
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

Maximum torque: 343 N·m (3,500 kgf·cm, 253 ft·lbf)

If everything is normal, coat the threads with gear oil, then repeat the above operation.



15. STAKE DRIVE PINION NUT

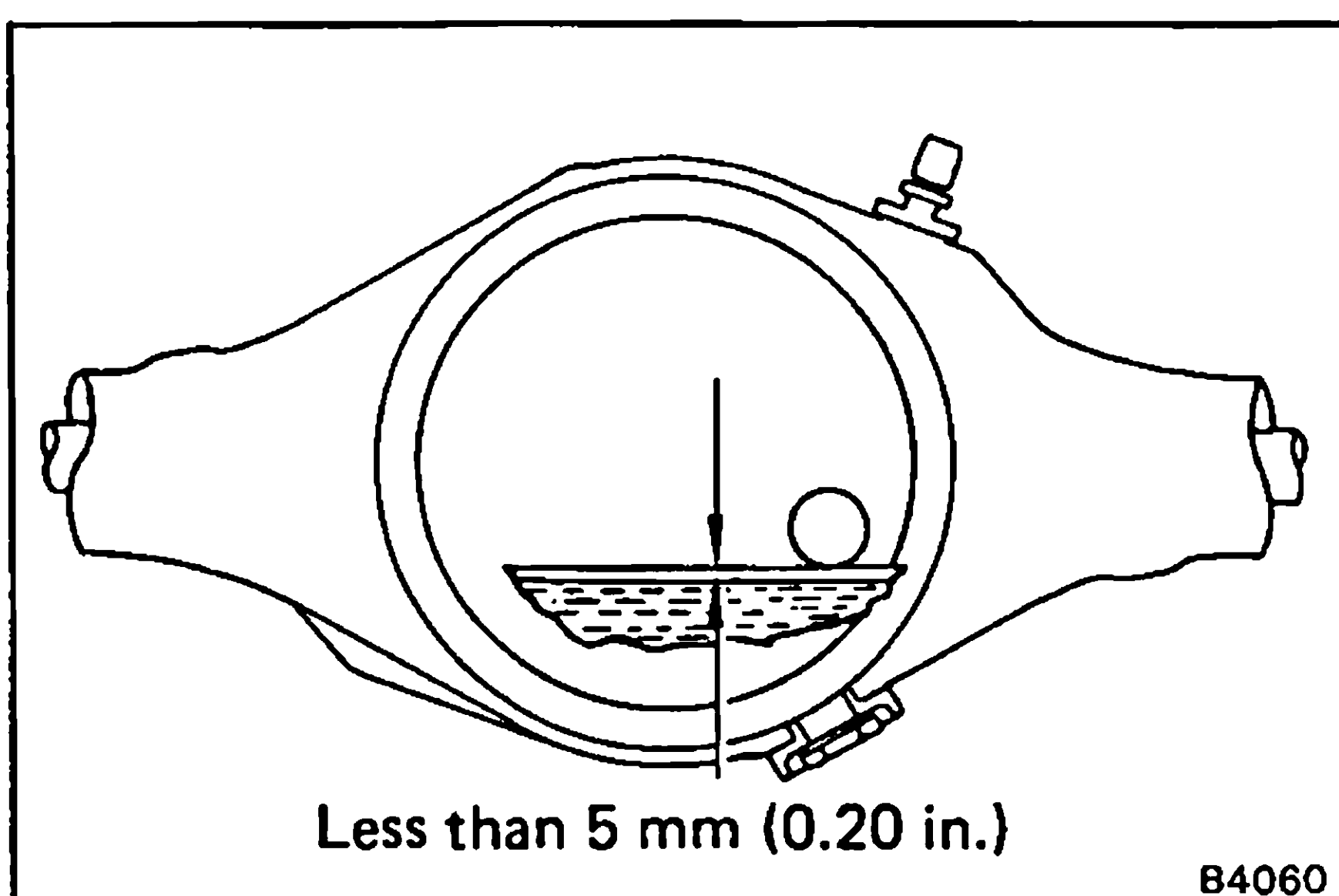


16. CONNECT FRONT PROPELLER SHAFT

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

(b) Torque the bolts and nuts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



17. CHECK DIFFERENTIAL OIL LEVEL

Fill with hypoid gear oil if necessary.

Oil type: Hypoid gear oil API GL-5

Recommended oil viscosity:

Above -18°C (0°F) SAE 90

Below -18°C (0°F) SAE 80W or 80W-90

Capacity:

RJ, LJ

1.9 liters (2.1 US qts, 1.7 Imp.qts)

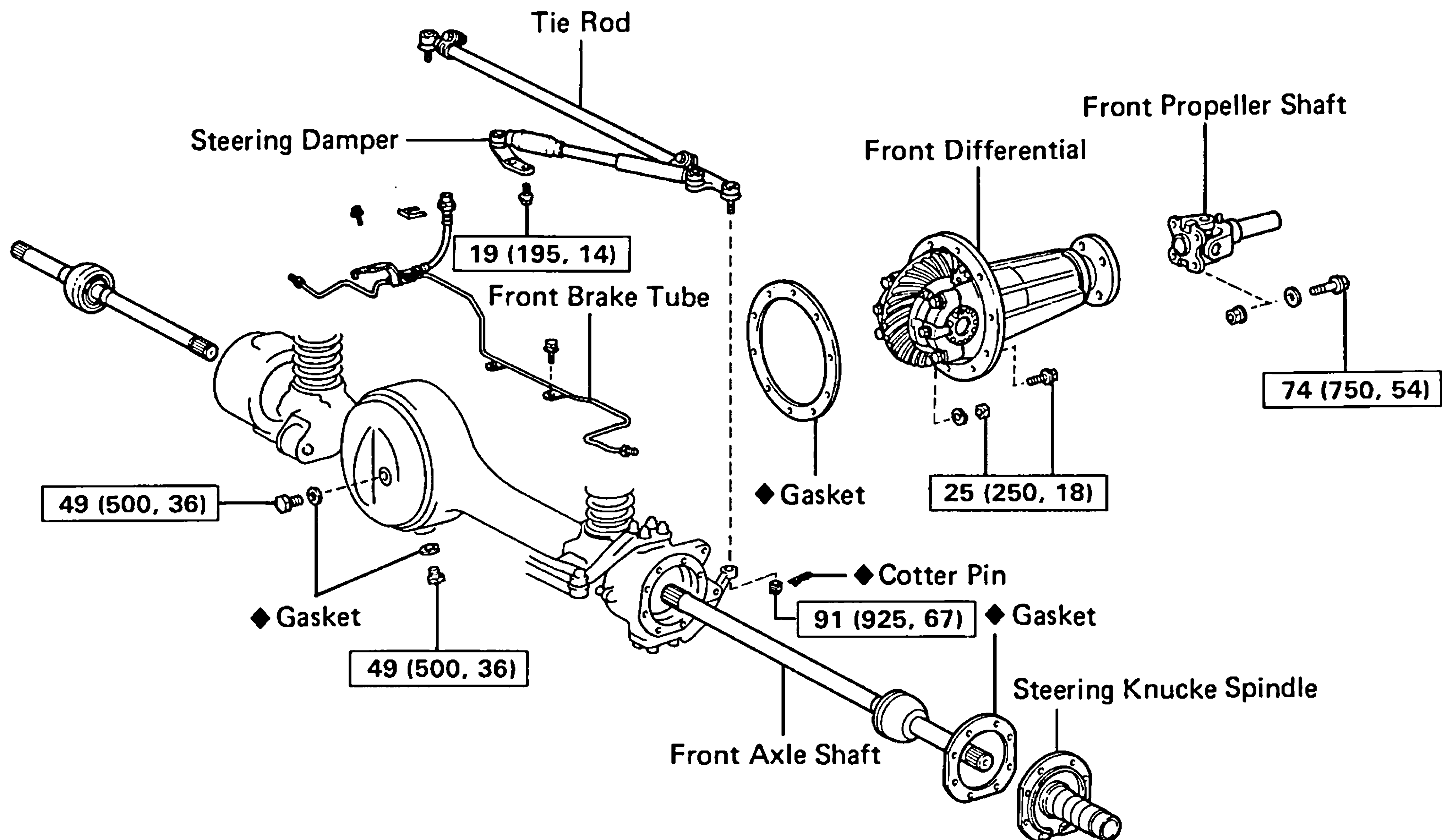
FJ, PZJ, HZJ, FZJ

2.6 liters (2.7 US qts, 2.3 Imp.qts)

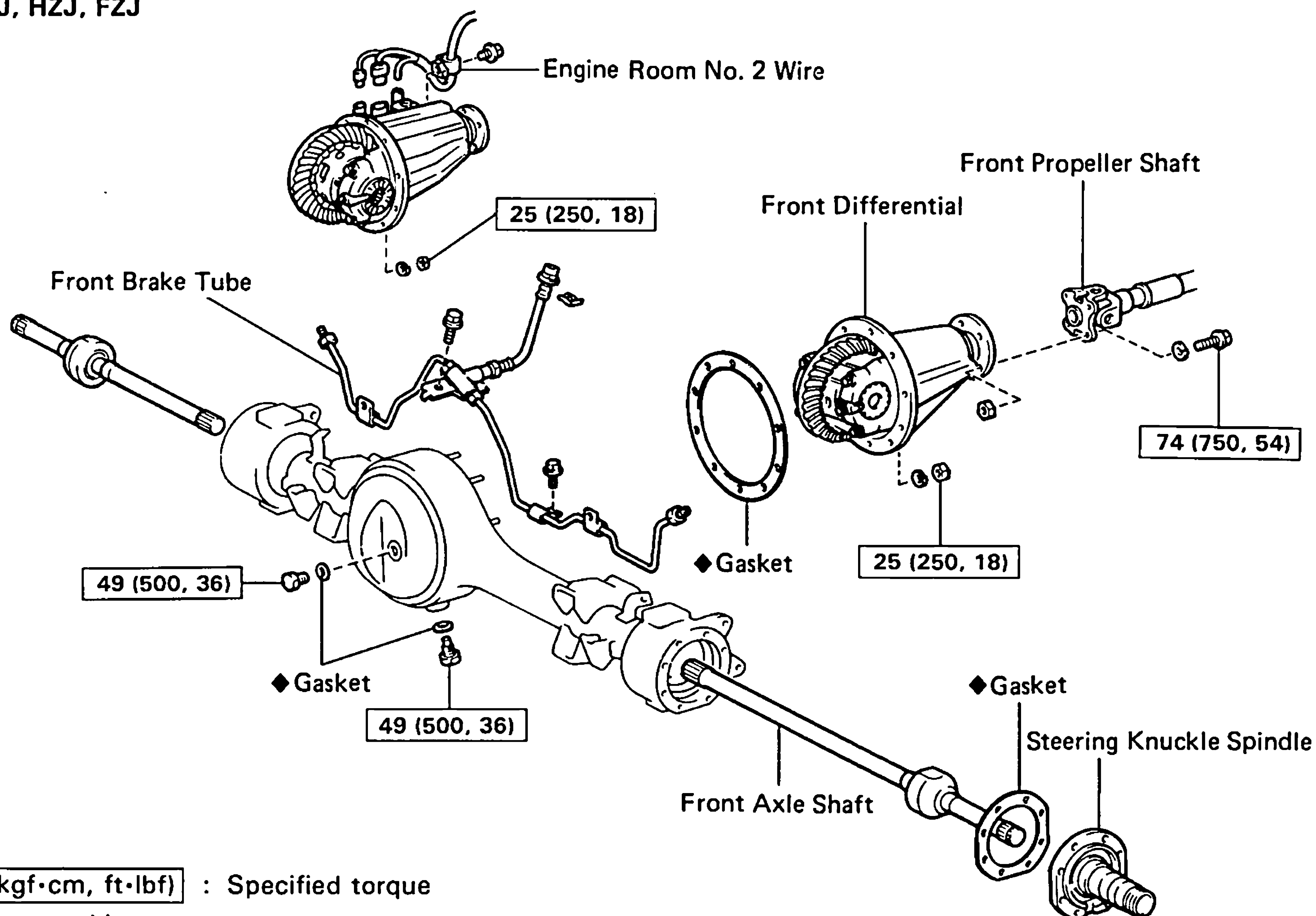
Removal and Installation of Front Differential

COMPONENTS

RJ, LJ



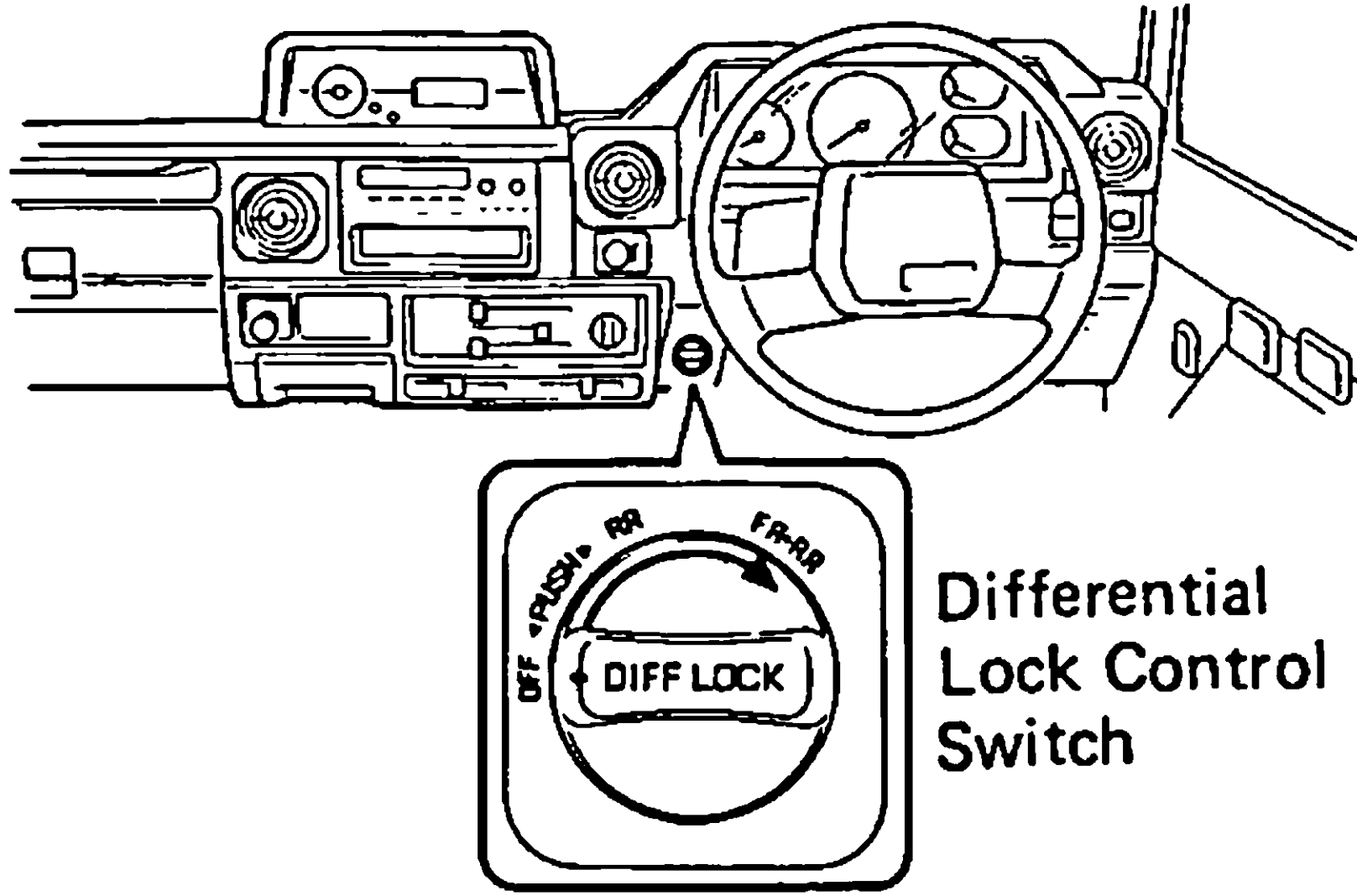
FJ, PZJ, HZJ, FZJ



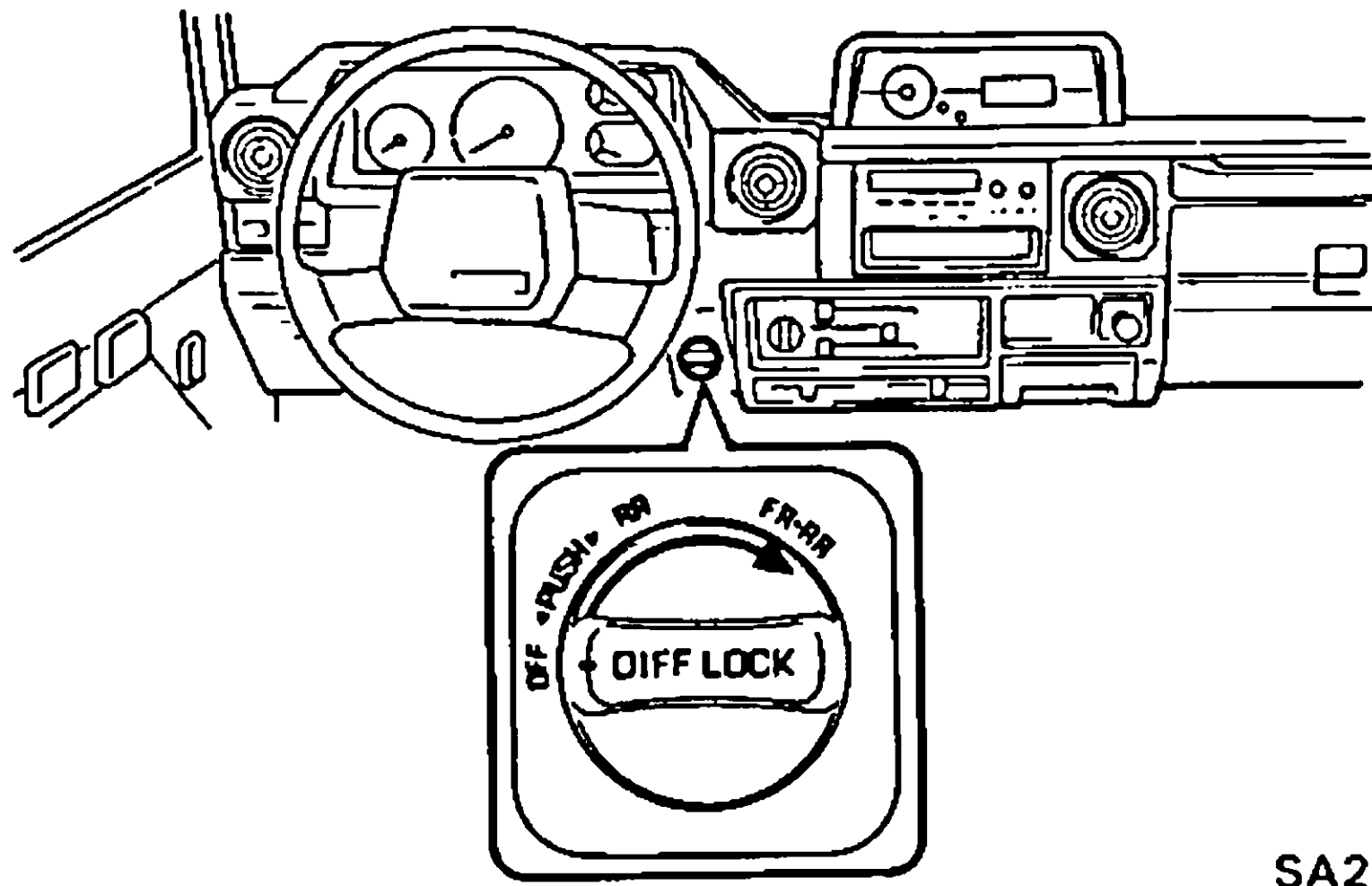
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

RHD Vehicle



LHD Vehicle

SA2919
SA2920**REMOVAL OF FRONT DIFFERENTIAL**

(See page SA-20)

1. (w/ DIFFERENTIAL LOCK)**SHIFTING FRONT DIFFERENTIAL LOCK**

- (a) Turn the ignition switch to ON position.
- (b) Put on the 4WD switch.
- (c) Turn the differential lock control switch to FR-RR position, and lock the front differential.

HINT: Turning round the tires, check the tires, check they are the differential lock condition.

- (d) Disconnect the cable from the negative terminal of the battery.

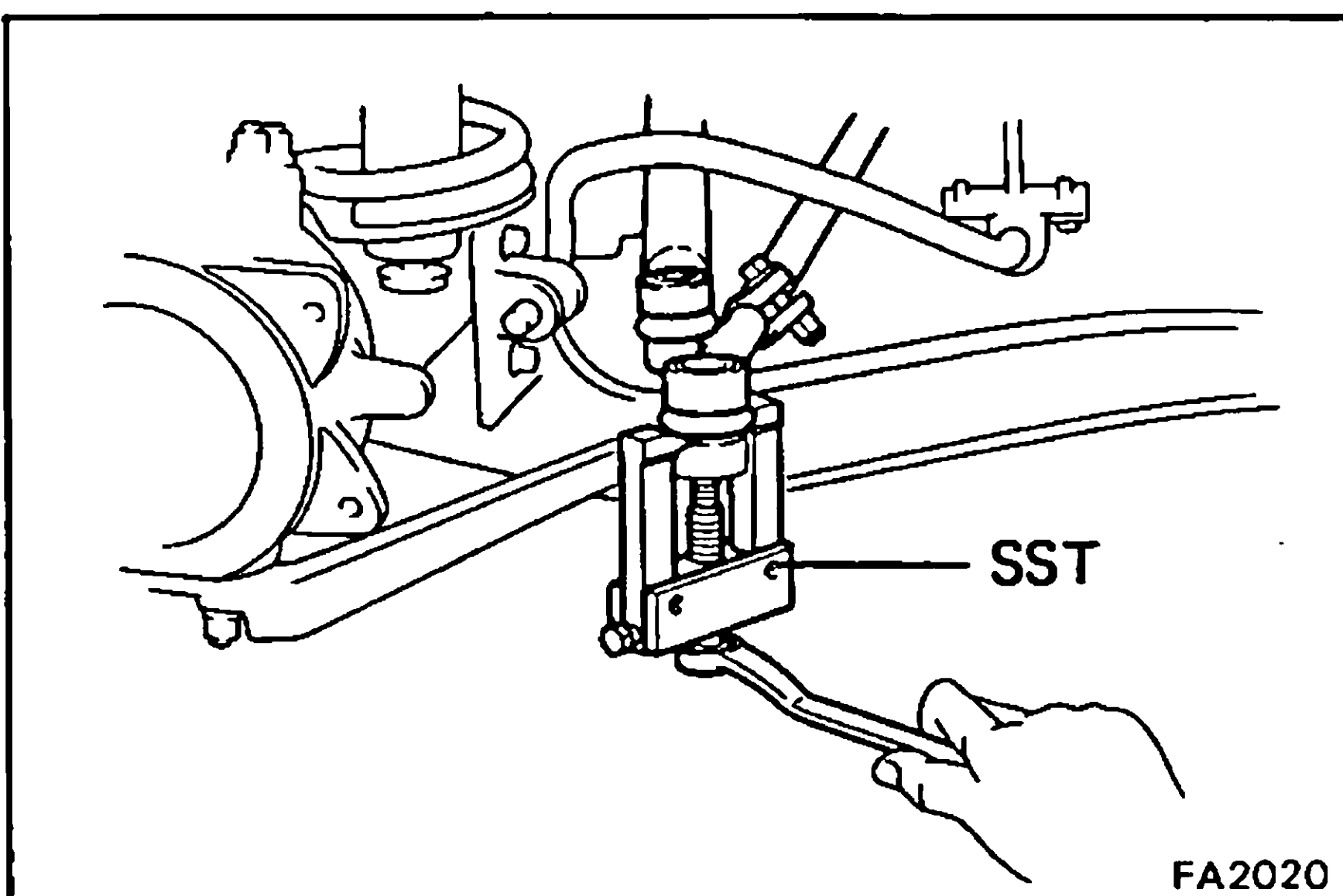
2. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL**3. REMOVE FRONT AXLE SHAFTS**

(See Pub. No. RM183E, see pages SA-39 and SA-40)

4. (RJ, LJ)**REMOVE TIE ROD AND STEERING DAMPER**

- (a) Using SST, disconnect the tie rod from the knuckle arm.

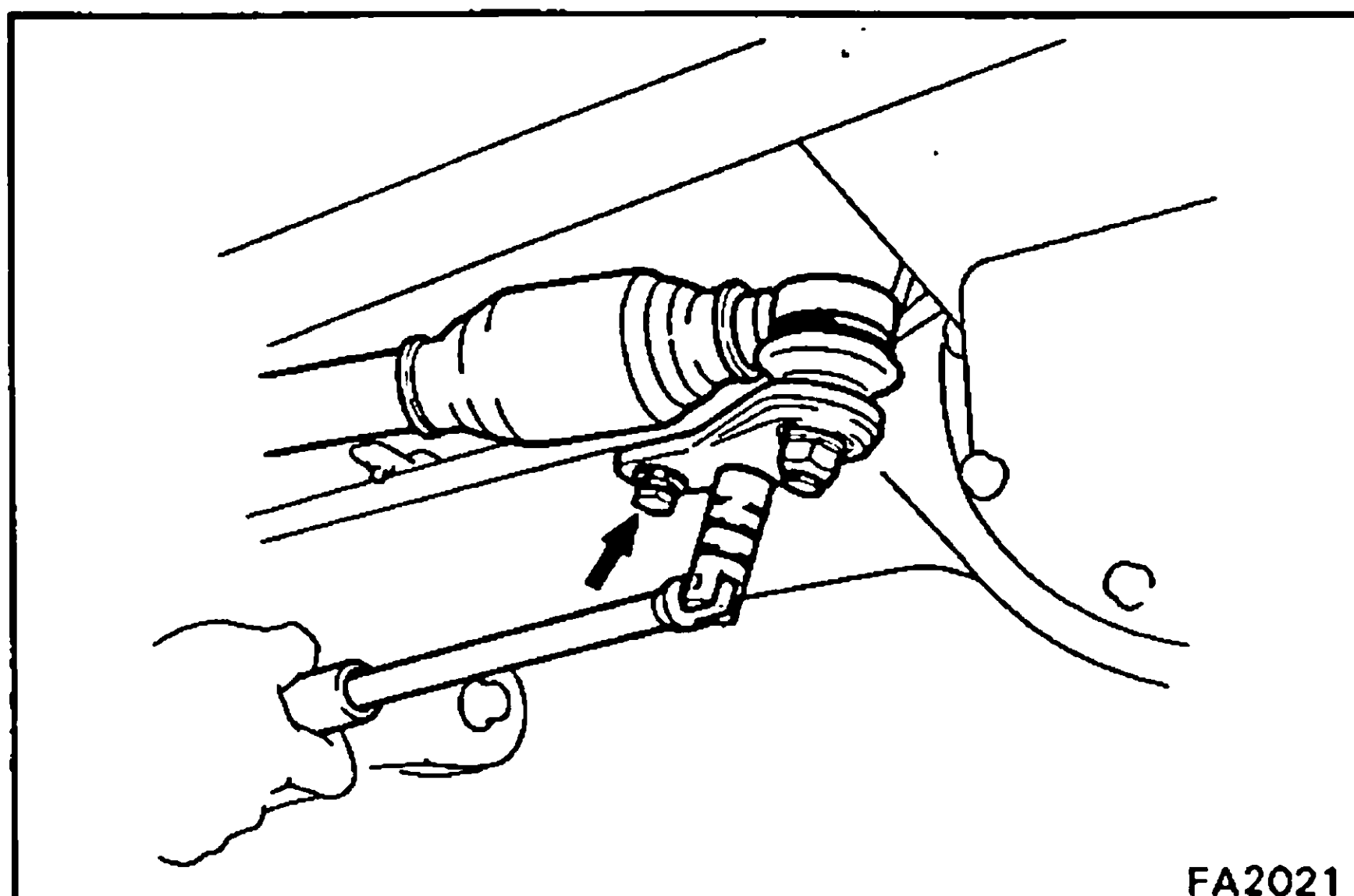
SST 09611-22012

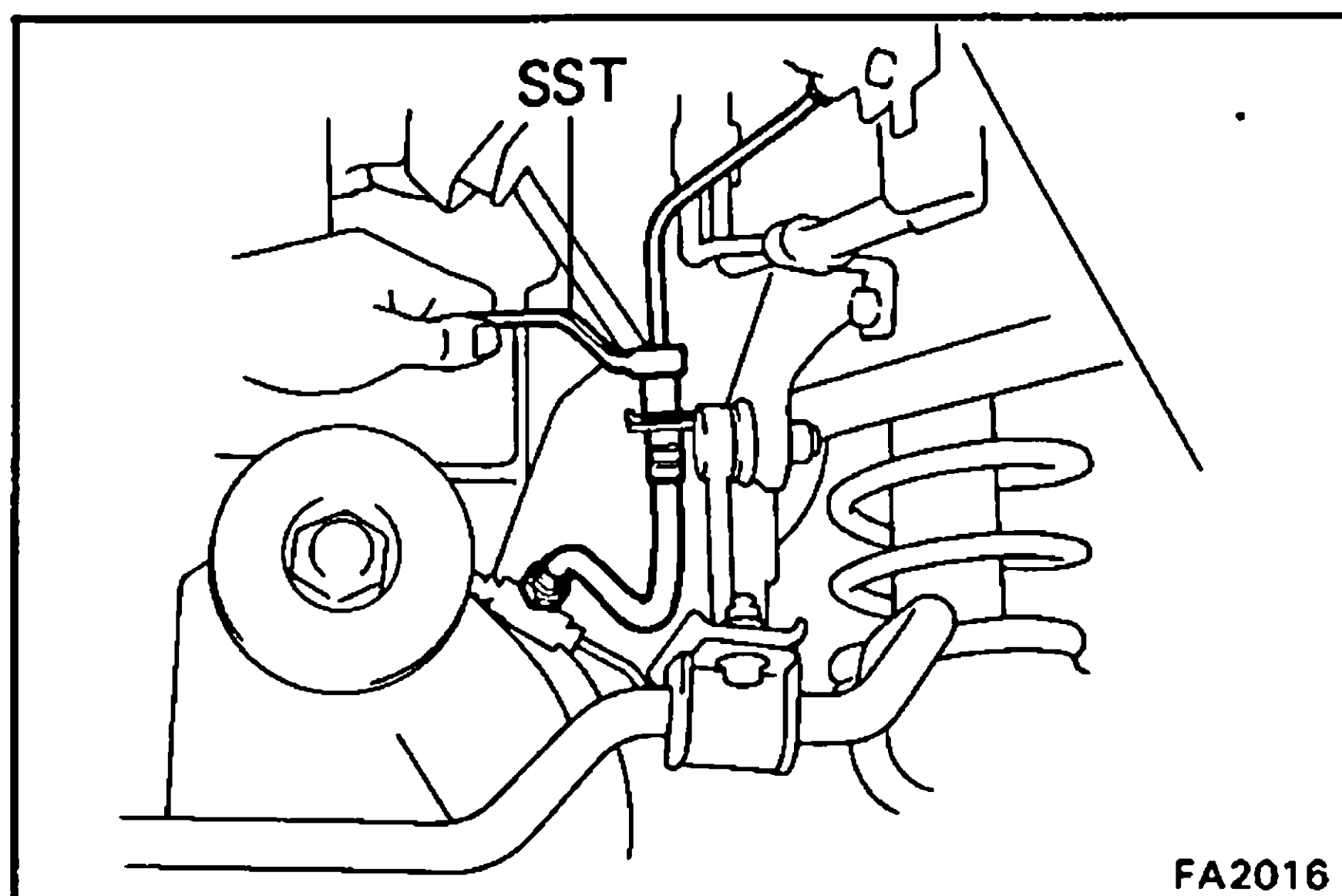


- (b) Remove the two bolts and steering damper.

5. DISCONNECT FRONT PROPELLER SHAFT

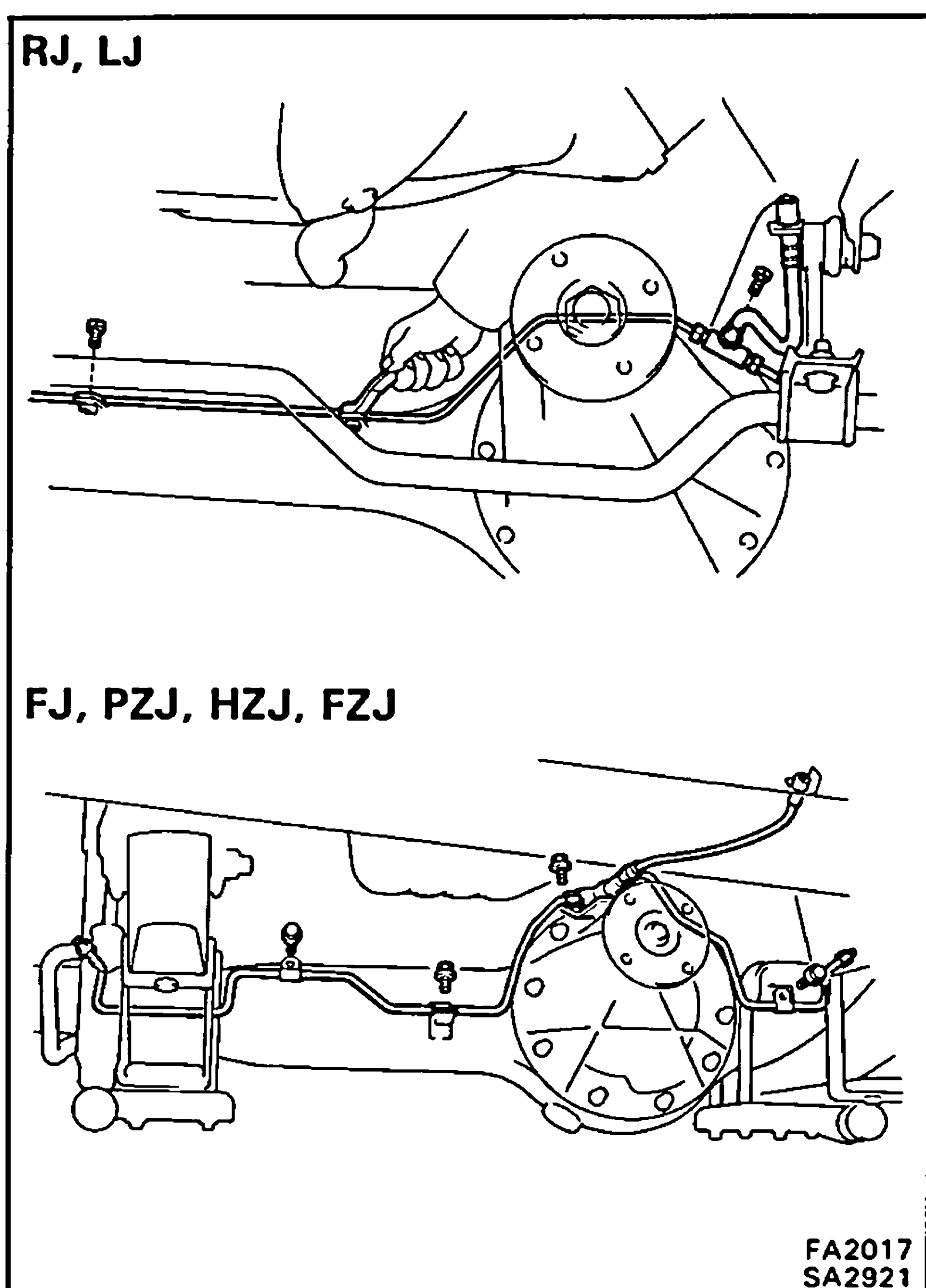
(See step 1 on page SA-16)



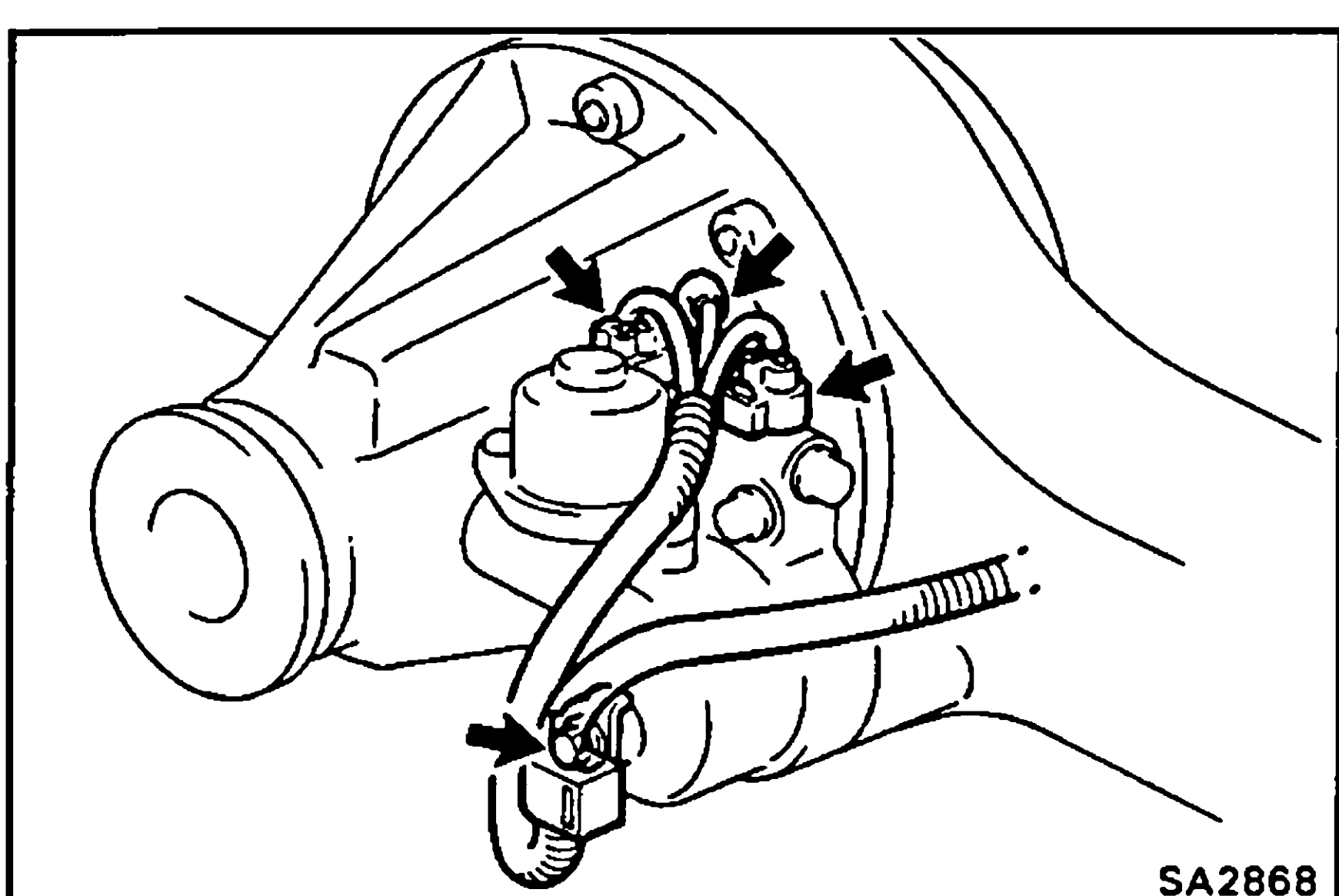
**6. REMOVE FRONT BRAKE TUBE**

- (a) Using SST, disconnect the brake tube at the frame side and remove the clip.

SST 09751-36011

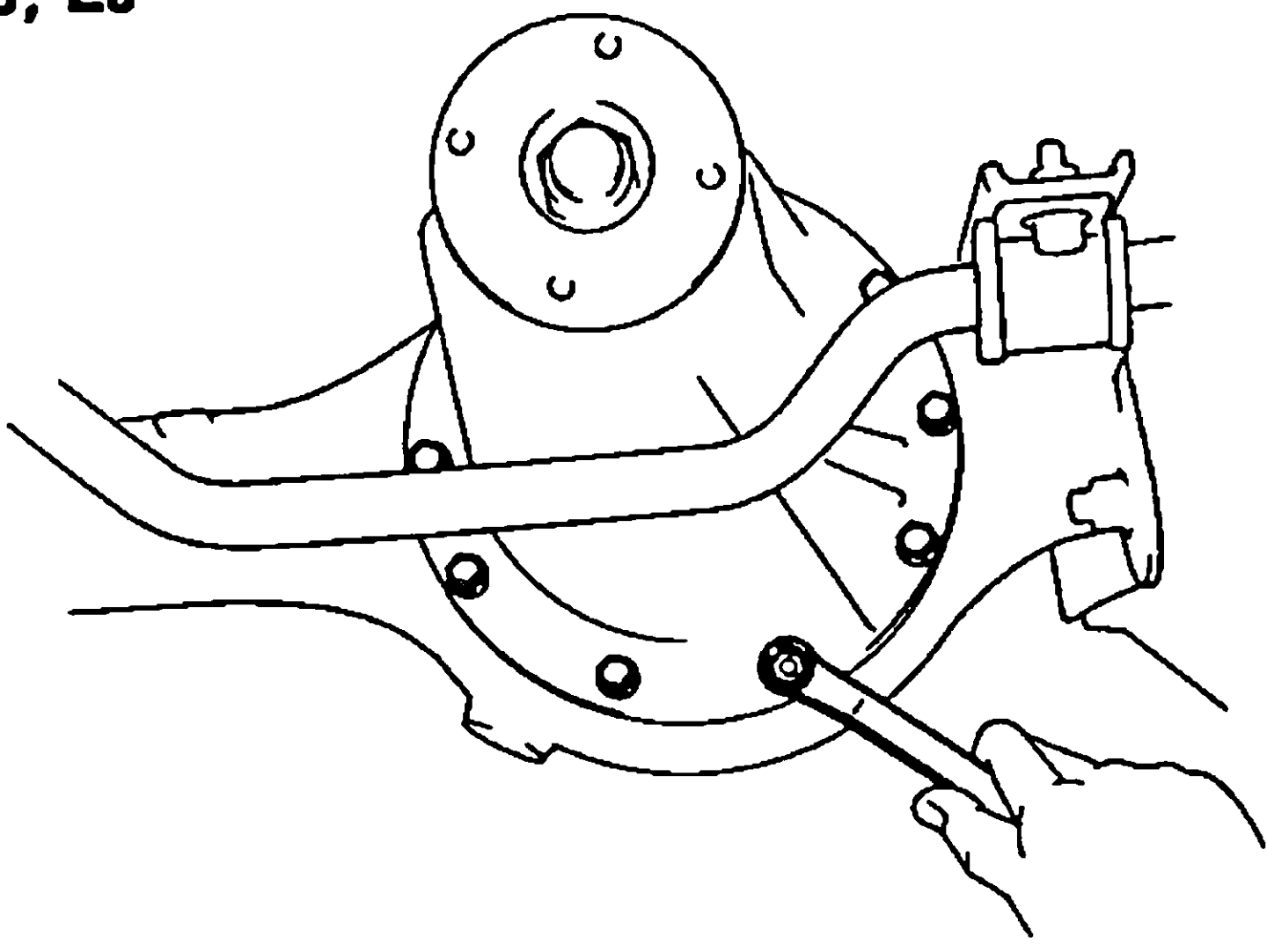


- (b) Remove the clamp bolts, and remove the three-way with the brake hose and tube.

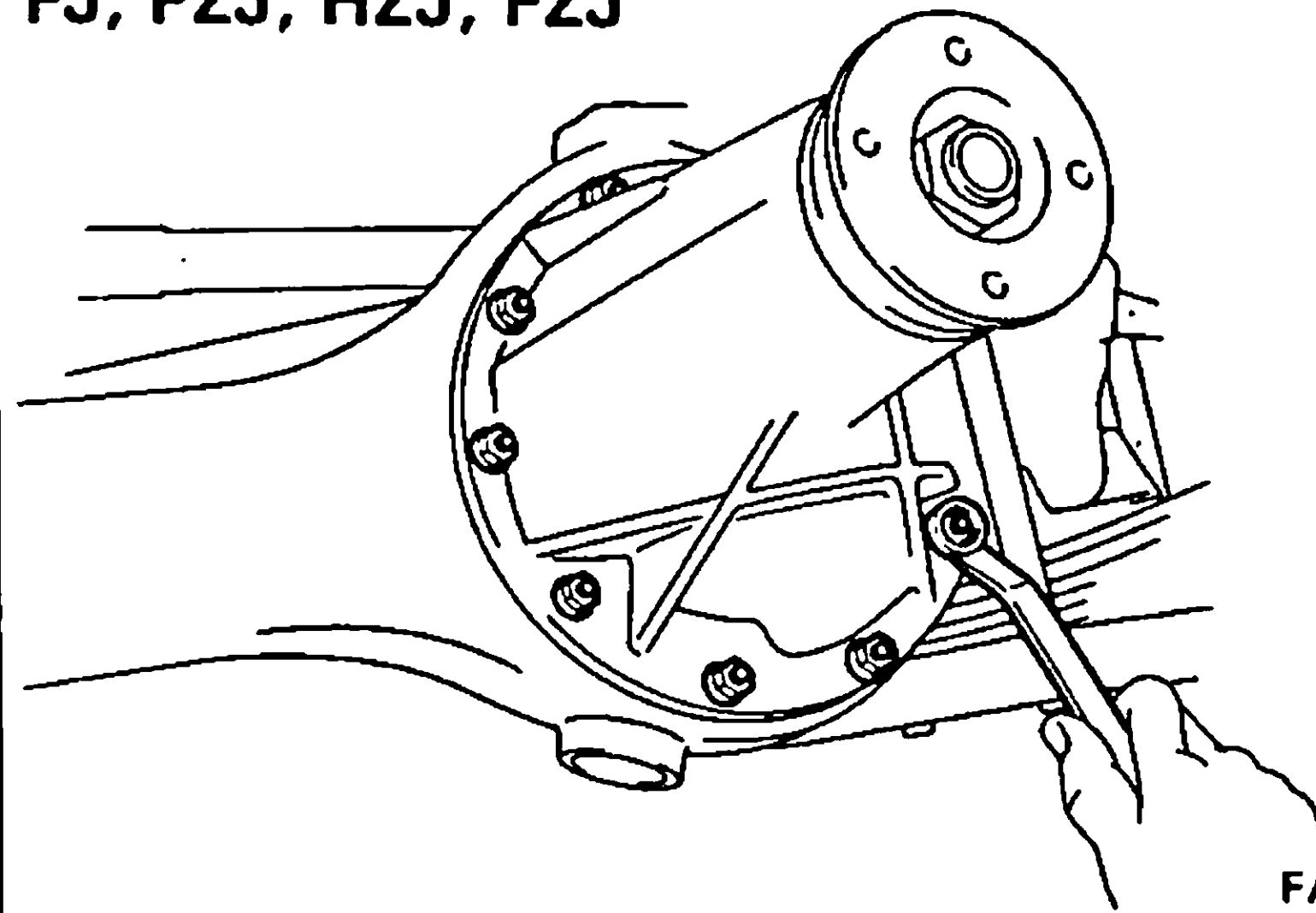
**7. (w/ DIFFERENTIAL LOCK)
DISCONNECT ENGINE ROOM NO.2 WIRE****8. REMOVE DIFFERENTIAL CARRIER ASSEMBLY**

NOTICE: Do not scratch the installation surface.

RJ, LJ



FJ, PZJ, HZJ, FZJ

FA2019
FA2018

INSTALLATION OF FRONT DIFFERENTIAL

(See page SA-20)

1. (w/ DIFFERENTIAL LOCK)

CHECK DIFFERENTIAL LOCK OPERATION

- Connect the connector of the actuator to the connector of the vehicle side, and check that the sleeve is on work with switching over the differential lock control switch.
- After checking the differential, keep it in a lock state.

2. INSTALL A NEW GASKET

3. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

Install the differential carrier assembly in the axle and install the two nuts and eight bolts (RJ, LJ) or two nuts and ten nuts (FJ, PZJ, HZJ, FZJ). Torque the nuts and bolts.

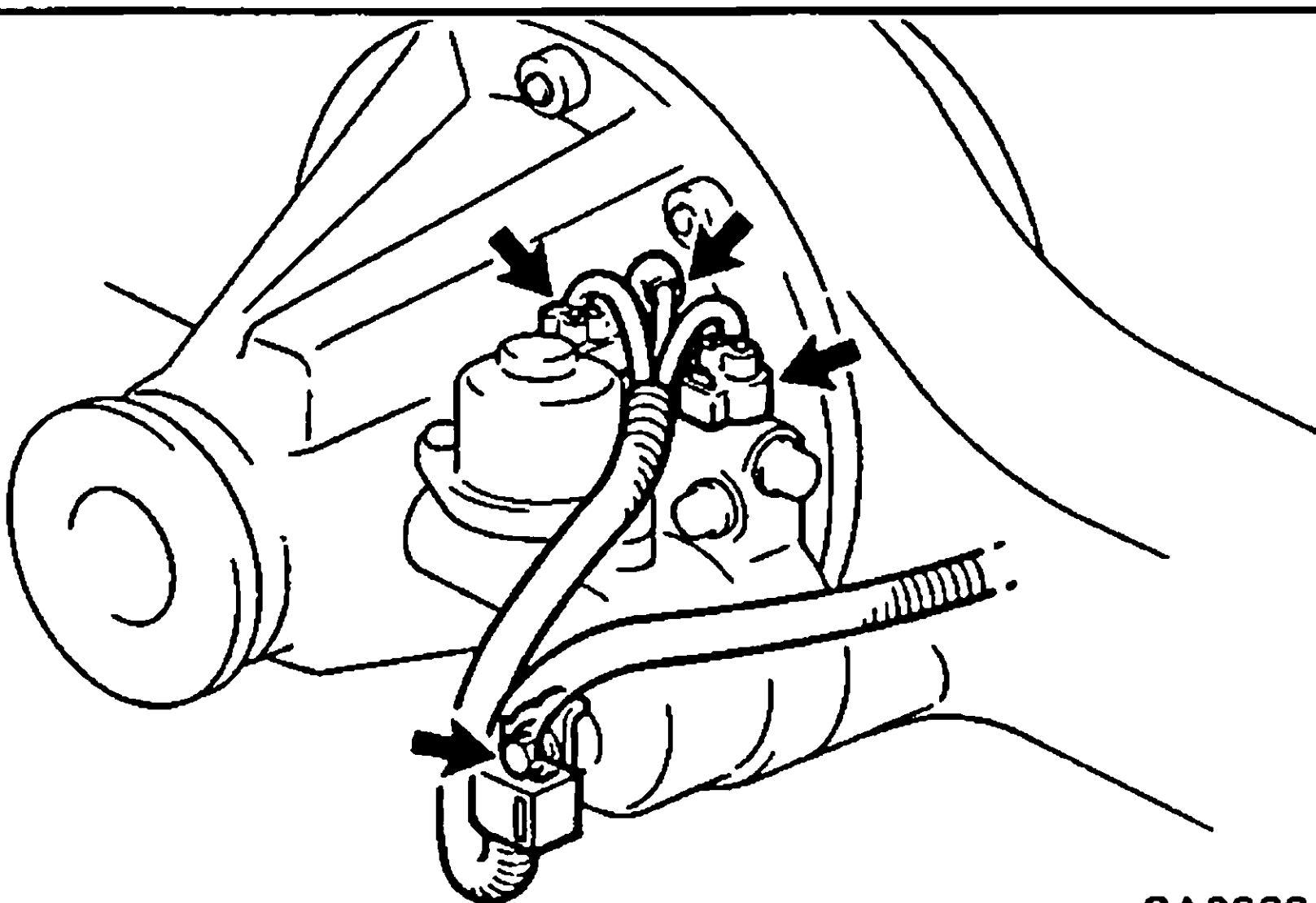
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

4. (w/ DIFFERENTIAL LOCK)

CONNECT ENGINE ROOM NO.2 WIRE

HINT:

- When connecting the bleeder tube of the harness side to the hose of the actuator side, its depth of insertion is approx. 15 mm (0.59 in.).
- Take care that water or the equivalent shall not adhere to the connectors and hose.

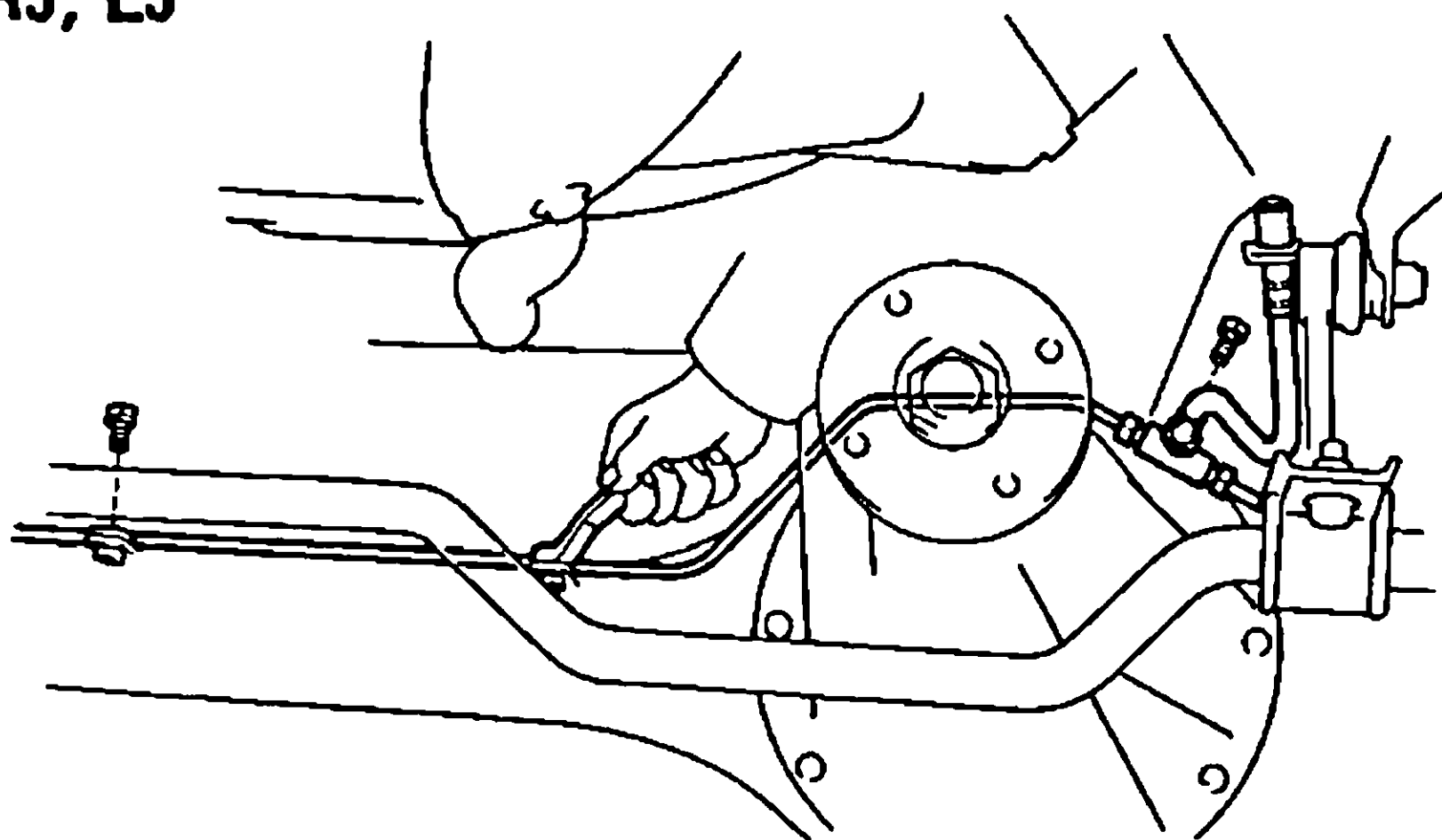


SA2868

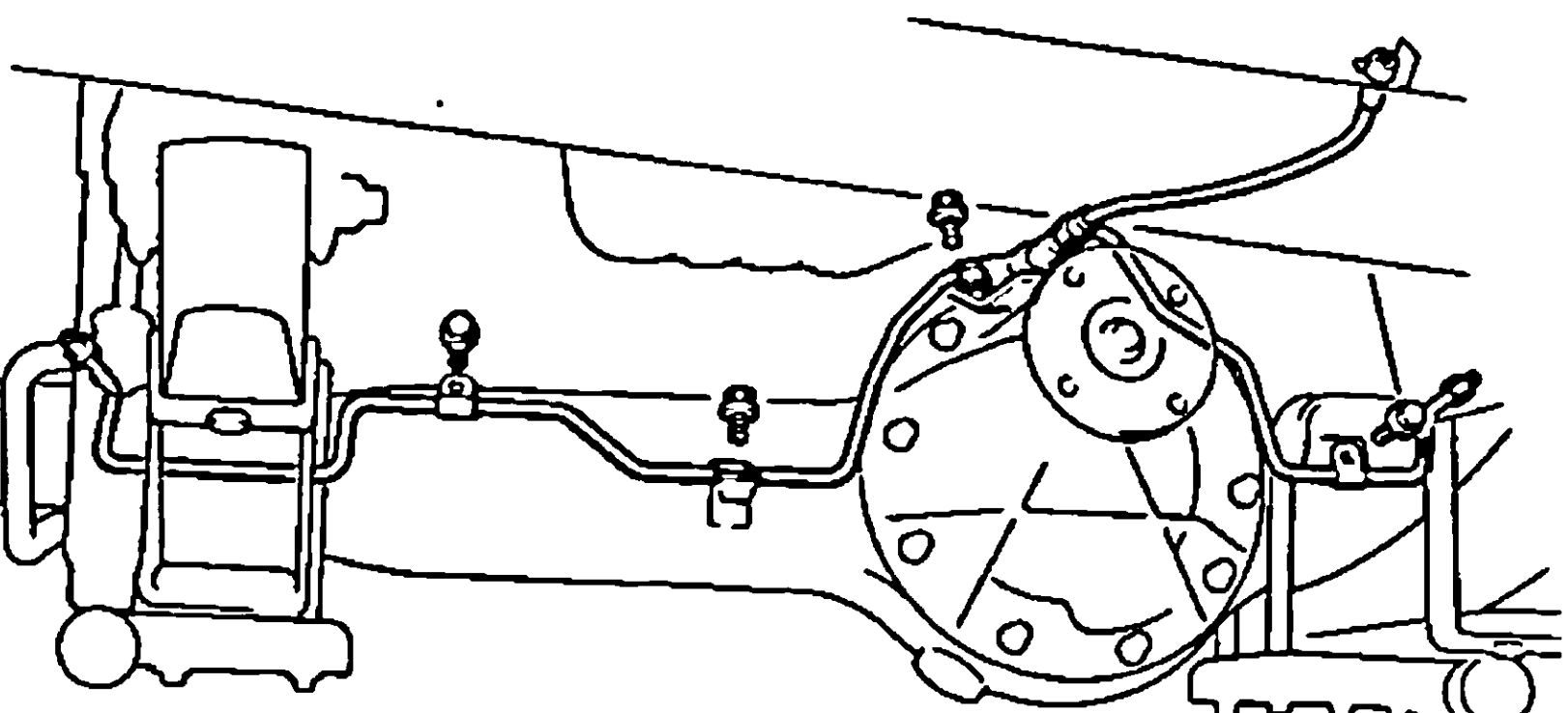
5. INSTALL FRONT BRAKE TUBE

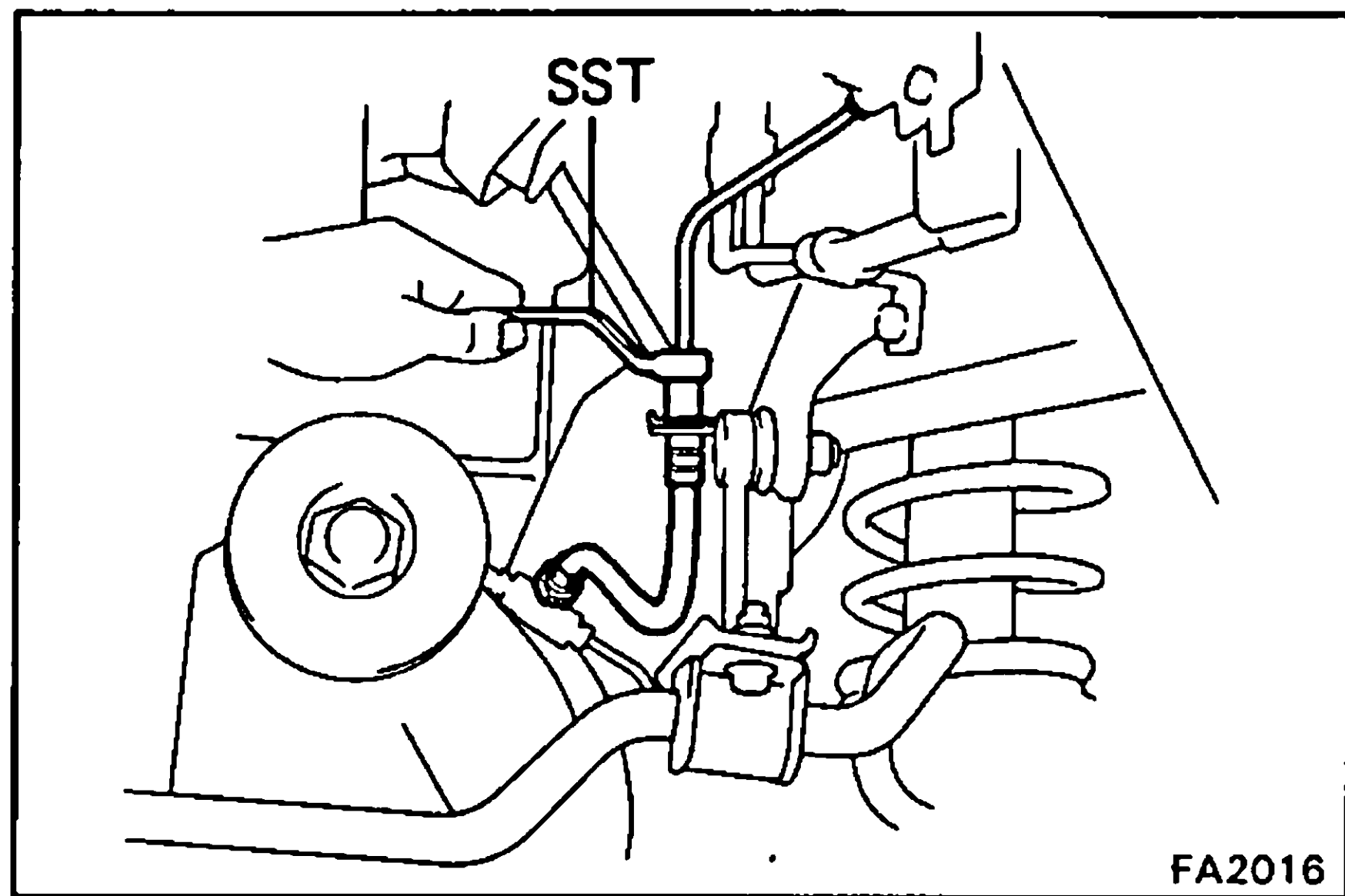
- Install the three-way with the brake hose and tubes to the axle housing.

RJ, LJ



FJ, PZJ, HZJ, FZJ

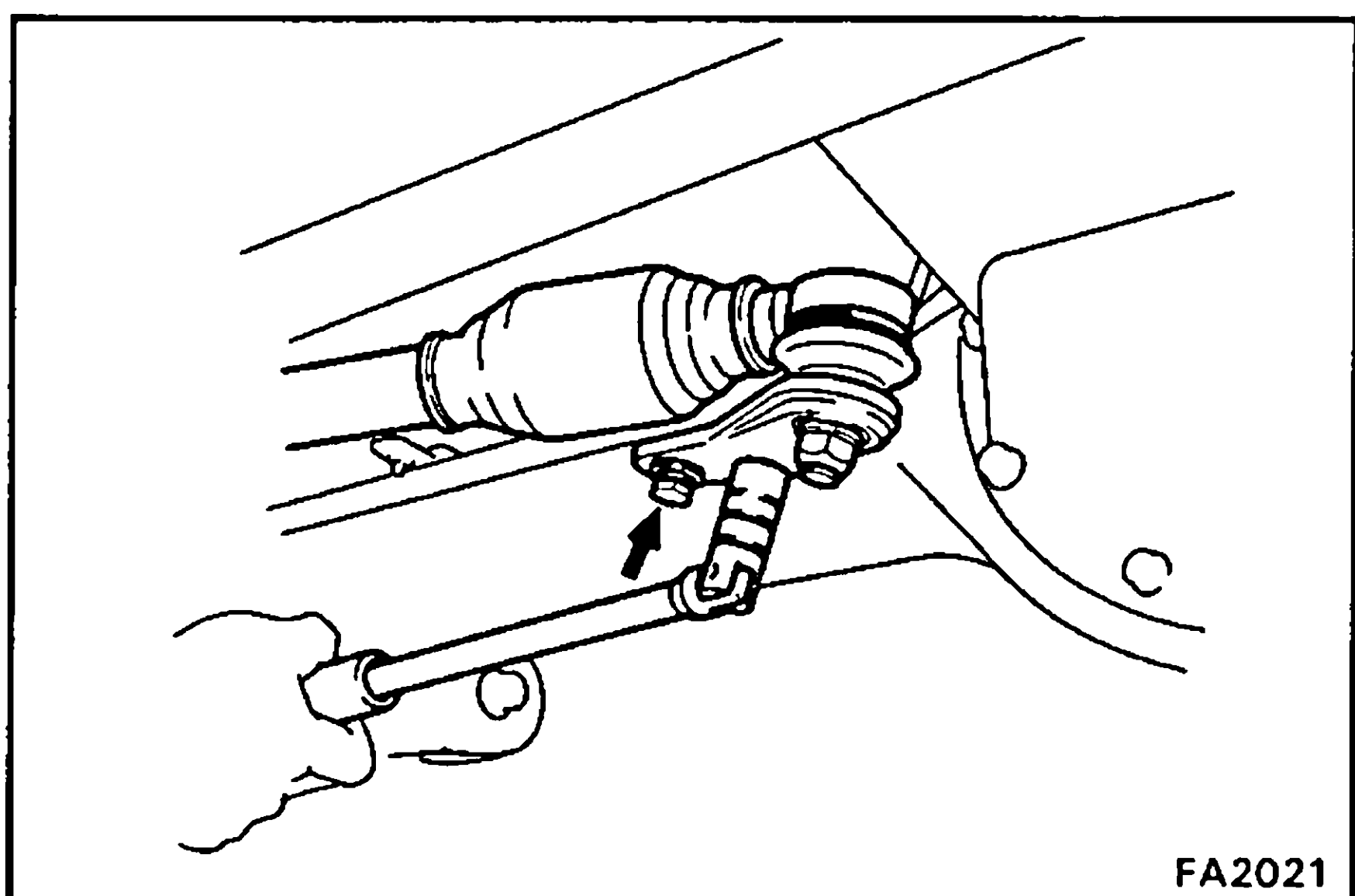
FA2017
SA2921



- (b) Using SST, connect the brake tube at the frame side, and install the clip.

SST 09751-36011

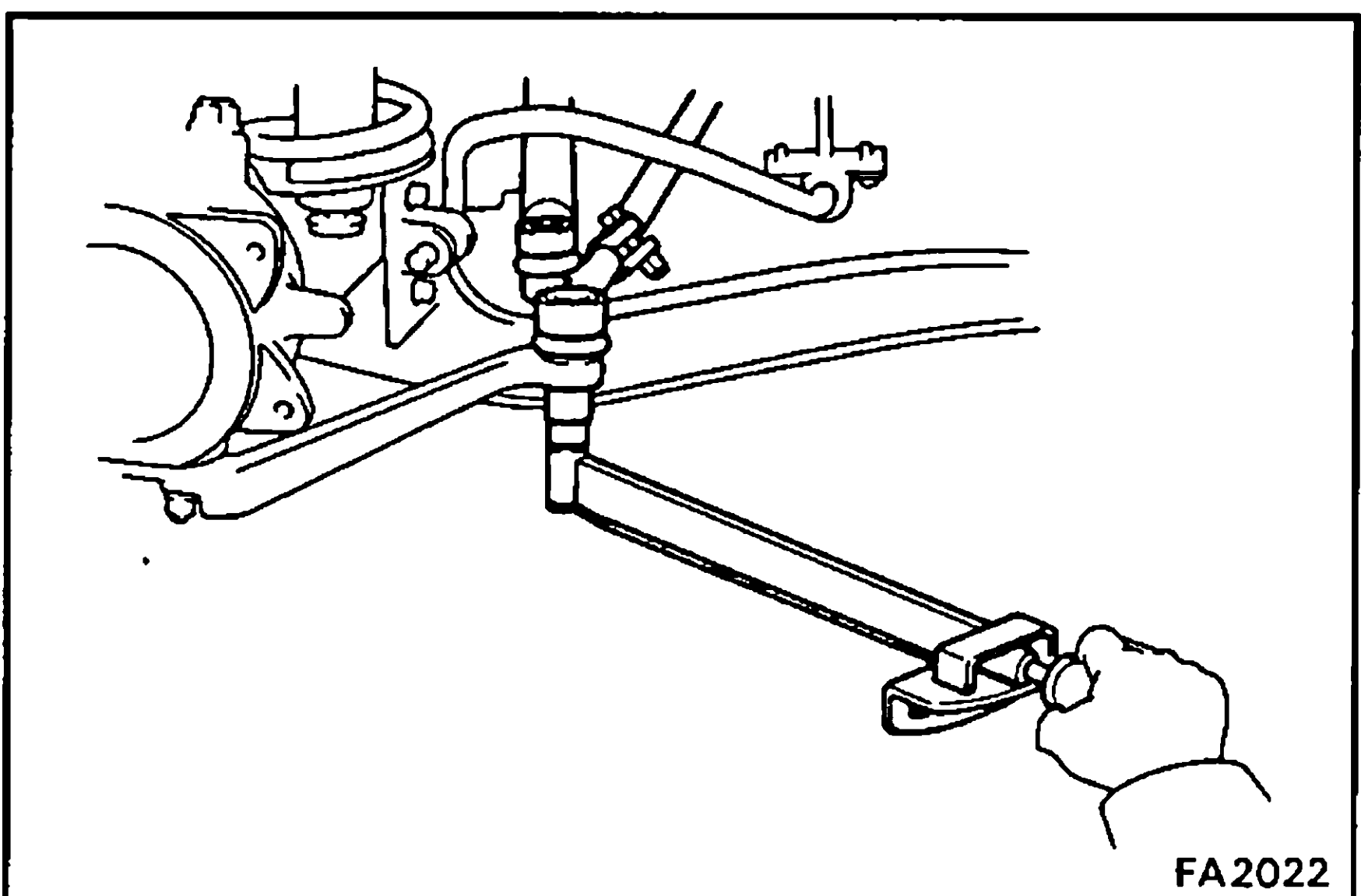
**6. CONNECT FRONT PROPELLER SHAFT
(See step 16 on page SA-19)**



**7. (RJ, LJ)
INSTALL TIE ROD AND STEERING DAMPER**

- (a) Install the steering damper with the two bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



- (b) Torque the castle nut and secure it with a new cotter pin.

Torque: 91 N·m (925 kgf·cm, 67 ft·lbf)

**8. INSTALL FRONT AXLE SHAFTS
(See Pub. No. RM183E, see pages SA-44 and SA-49)**

9. INSTALL DRAIN PLUG

10. FILL DIFFERENTIAL WITH GEAR OIL

Fill with hypoid gear oil.

Oil type: Hypoid gear oil API GL-5

Recommended oil viscosity:

Above -18°C (0°F) SAE 90

Below -18°C (0°F) SAE 80W or 80W-90

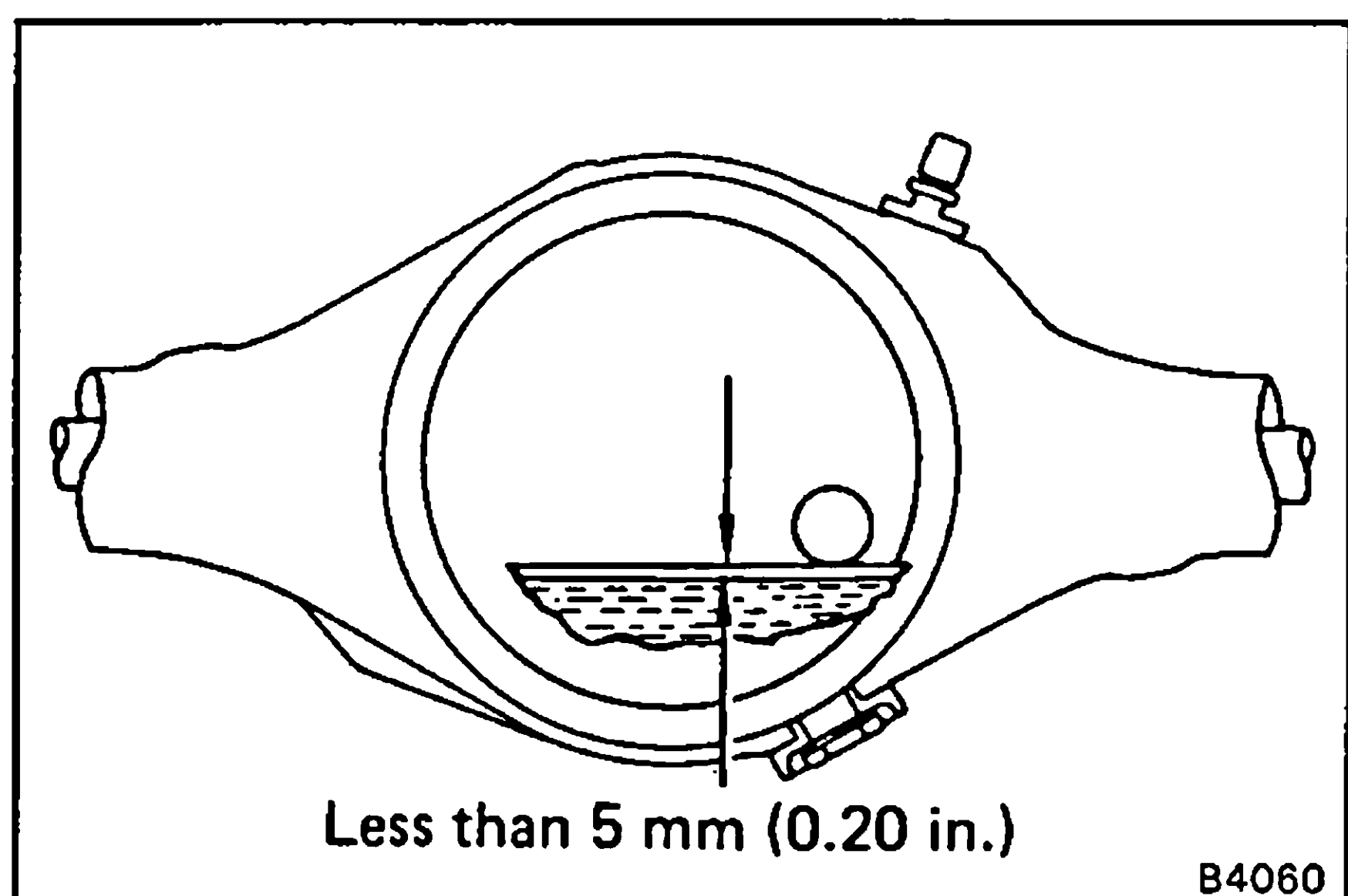
Capacity:

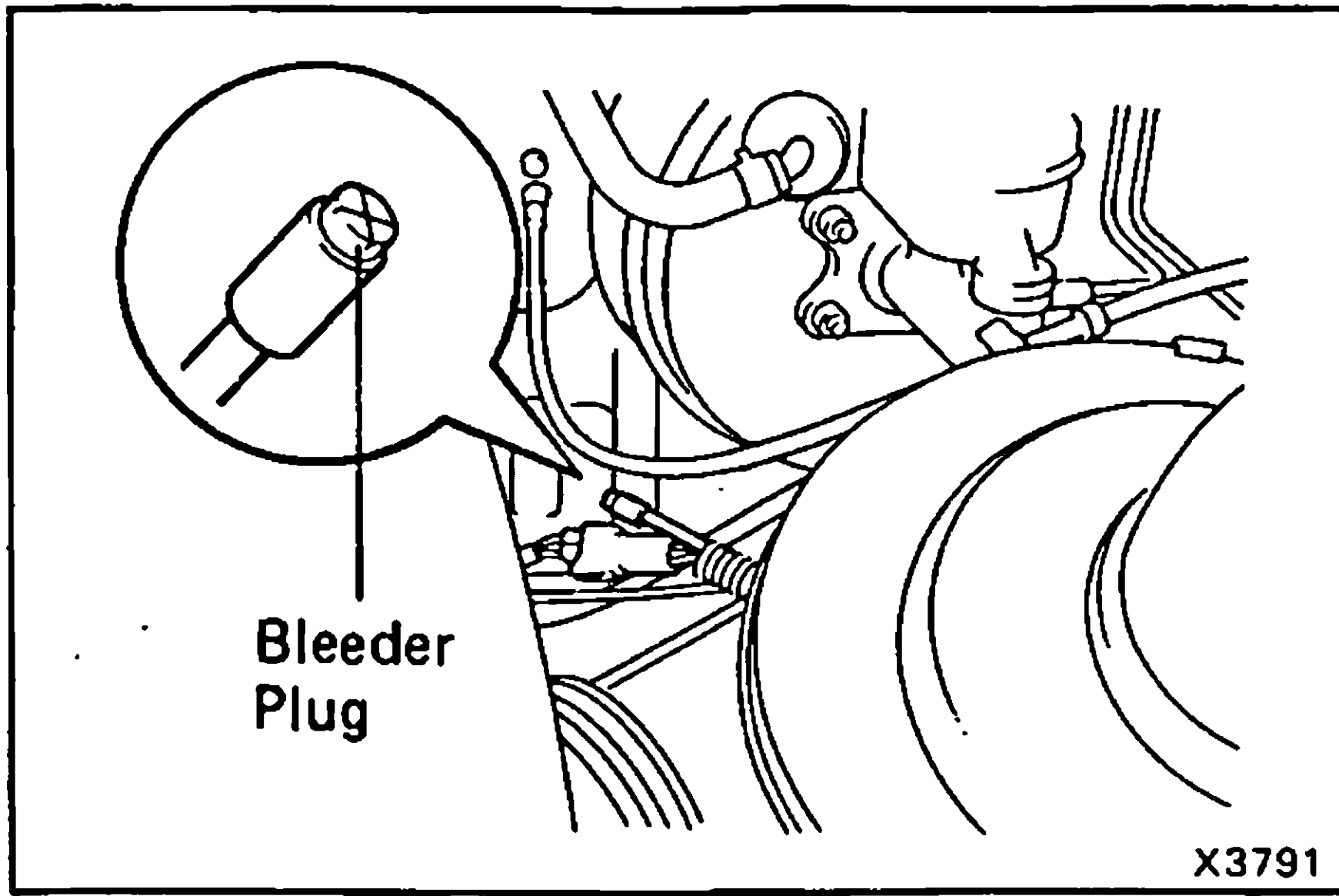
RJ, LJ

1.9 liters (2.1 US qts, 1.7 Imp.qts)

FJ, PZJ, HZJ, FZJ

2.6 liters (2.7 US qts, 2.3 Imp.qts)





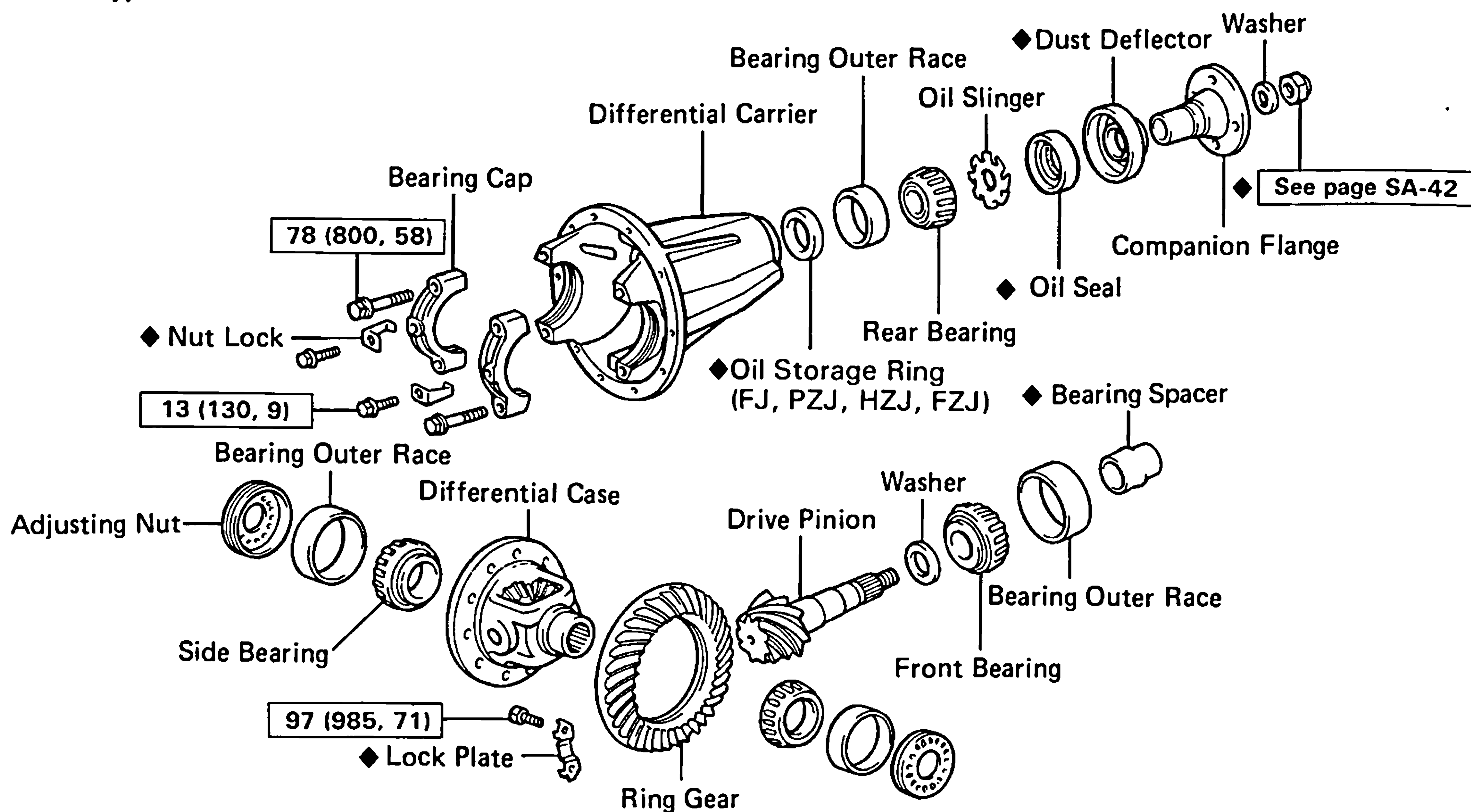
**11. (w/ DIFFERENTIAL LOCK)
CHECK DIFFERENTIAL LOCK OPERATION**
(See page SA-58)

**12. (w/ DIFFERENTIAL LOCK)
CHECK BLEEDER PLUG**

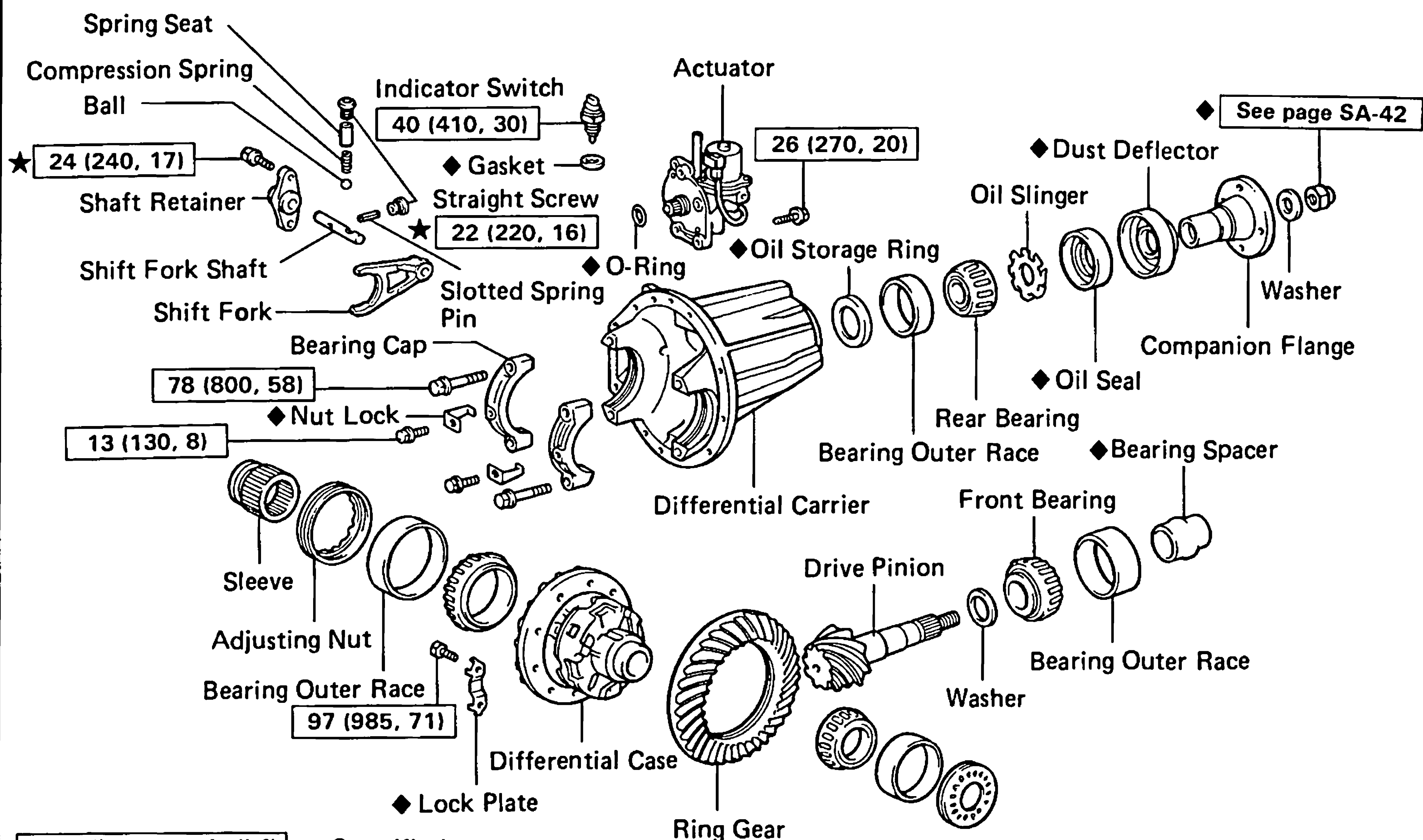
Check that the bleeder plug at the tip of the bleeder tube (inside of the engine room) is not damaged or worn.

Differential Carrier COMPONENTS

2 Pinion Type



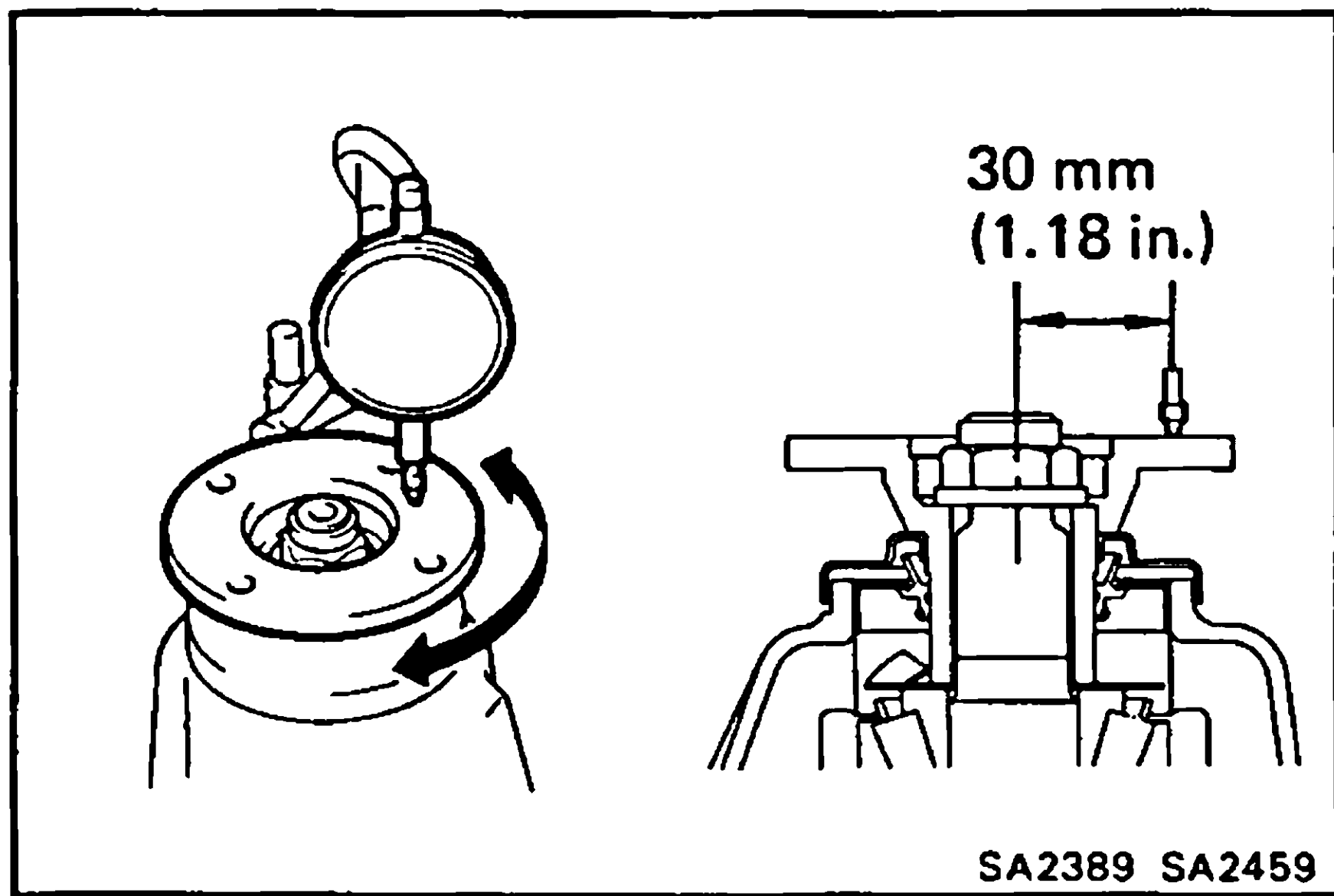
w/ Differential Lock (4 Pinion Type)



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

★ Precoated part



INSPECTION OF DIFFERENTIAL CARRIER

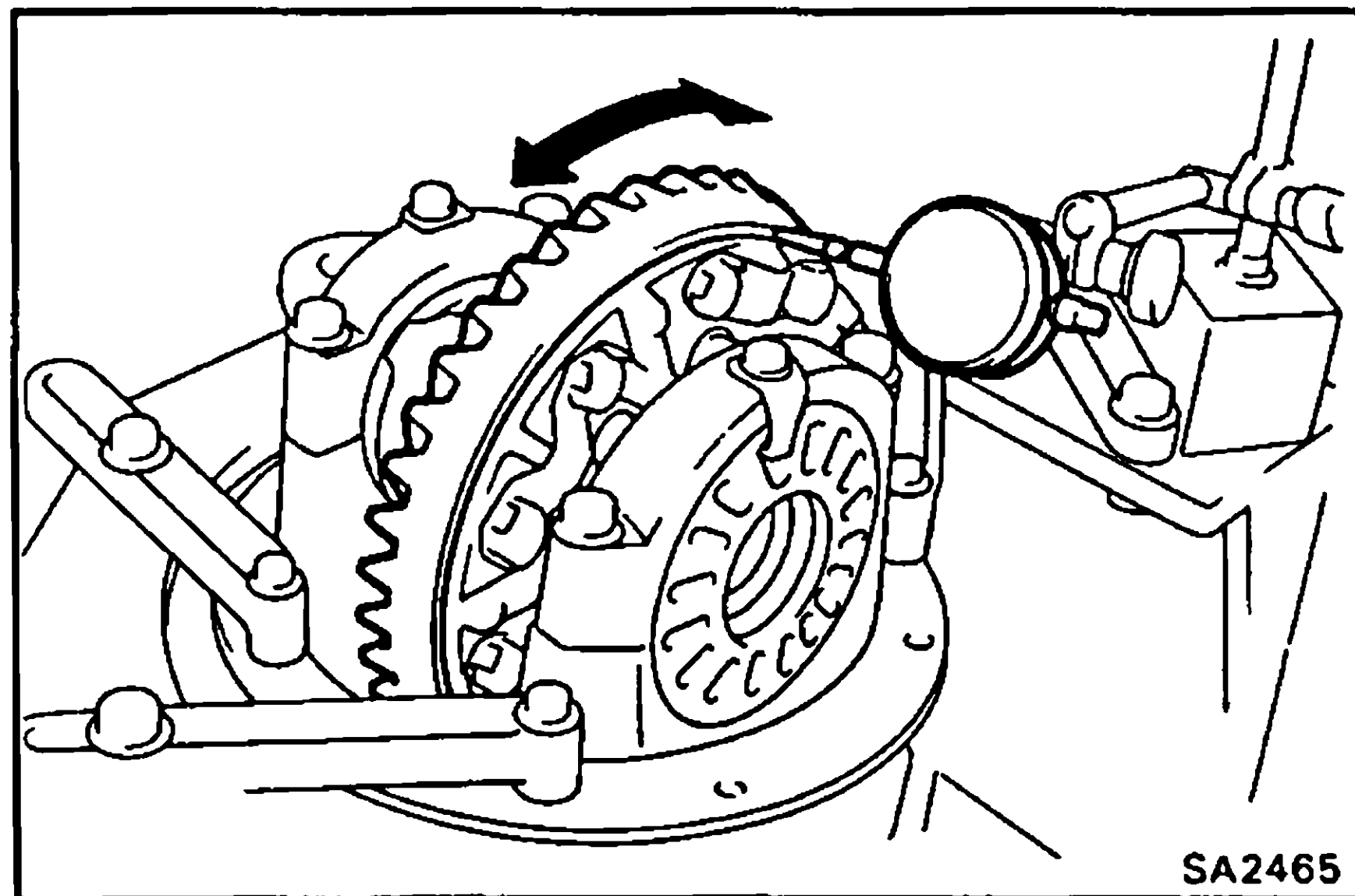
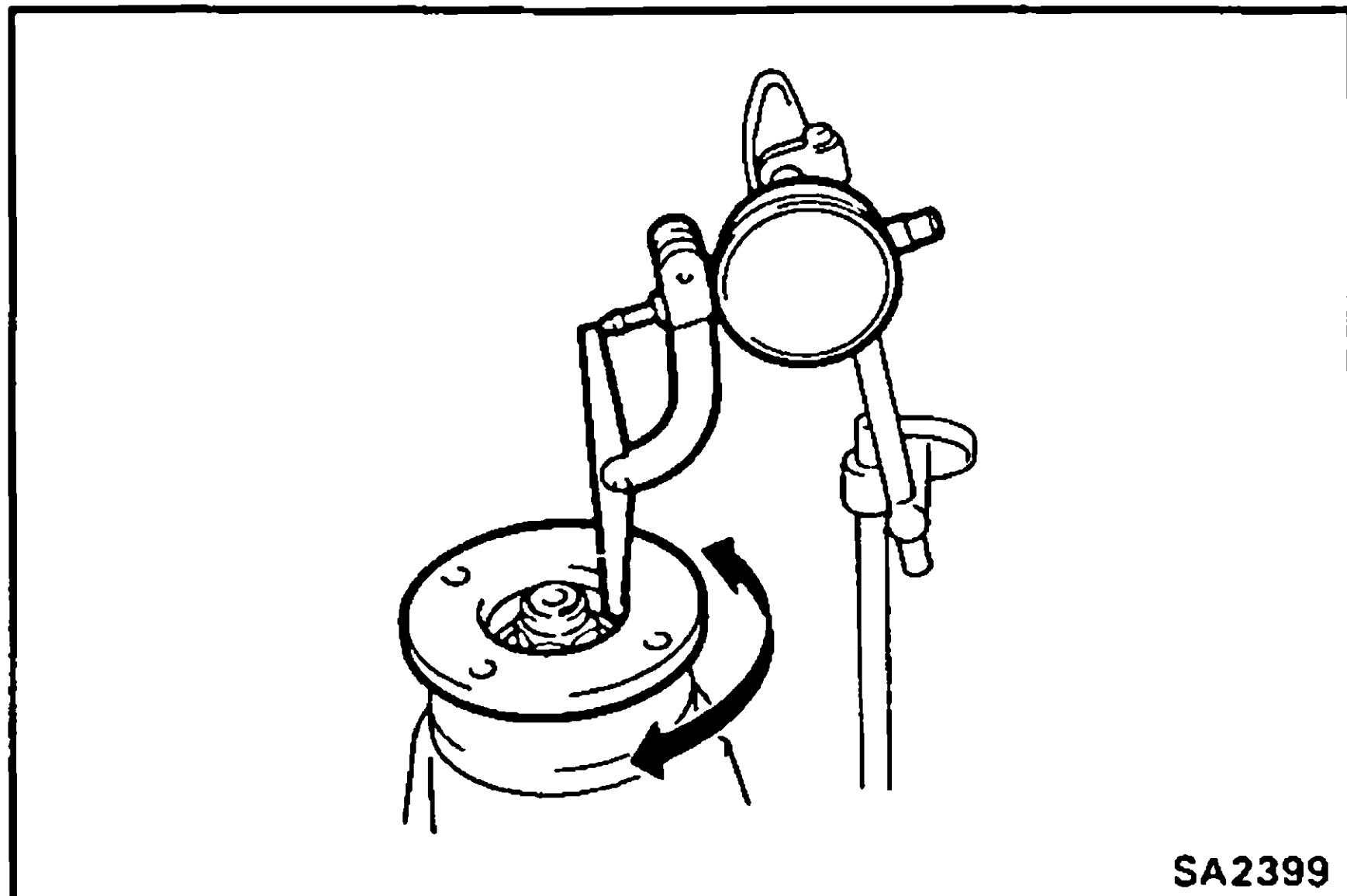
1. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum vertical runout: 0.10 mm (0.0039 in.)

Maximum lateral runout: 0.10 mm (0.0039 in.)

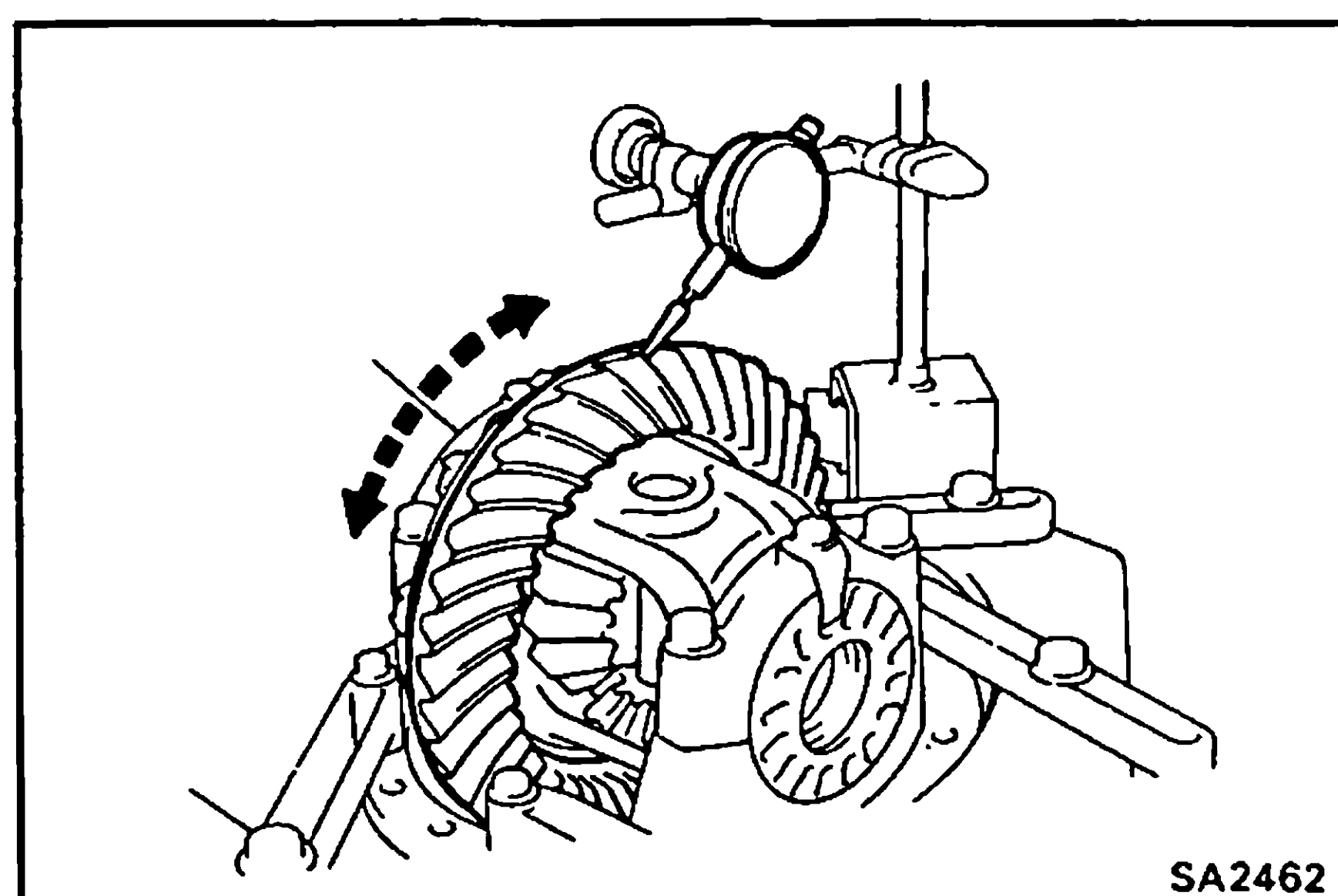
If the runout is greater than the maximum, replace the companion flange.



2. CHECK RING GEAR RUNOUT

If the runout is greater than maximum, replace the ring gear.

Maximum runout: 0.10 mm (0.0039 in.)

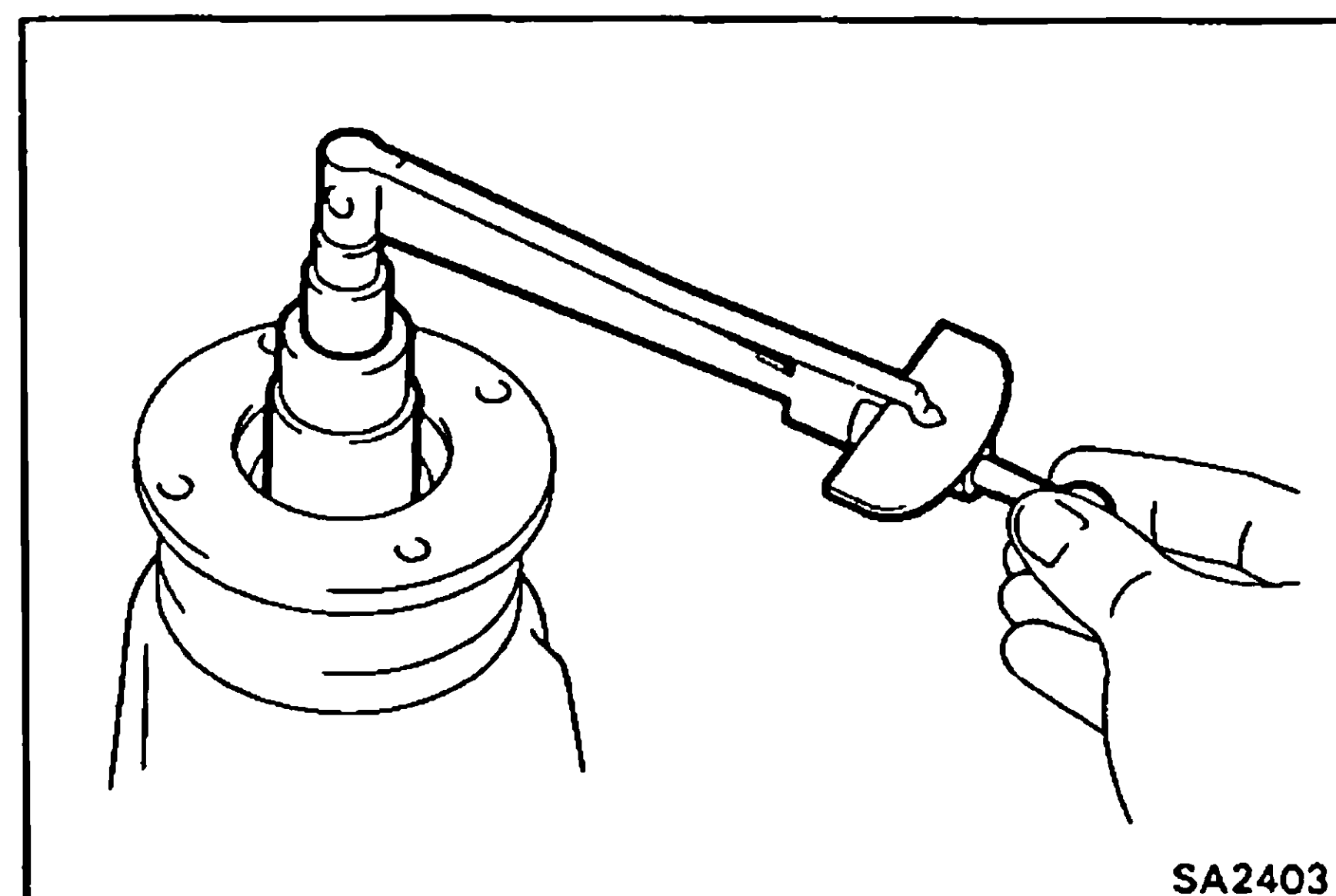


3. CHECK RING GEAR BACKLASH

If the backlash is not within specification, adjust the side bearing preload or repair as necessary.

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

HINT: Perform the measurements at three or more positions around the circumference of the ring gear.



4. MEASURE DRIVE PINION PRELOAD

Measure the drive pinion preload, using the backlash of the drive pinion and ring gear.

Preload (at starting):

RJ, LJ

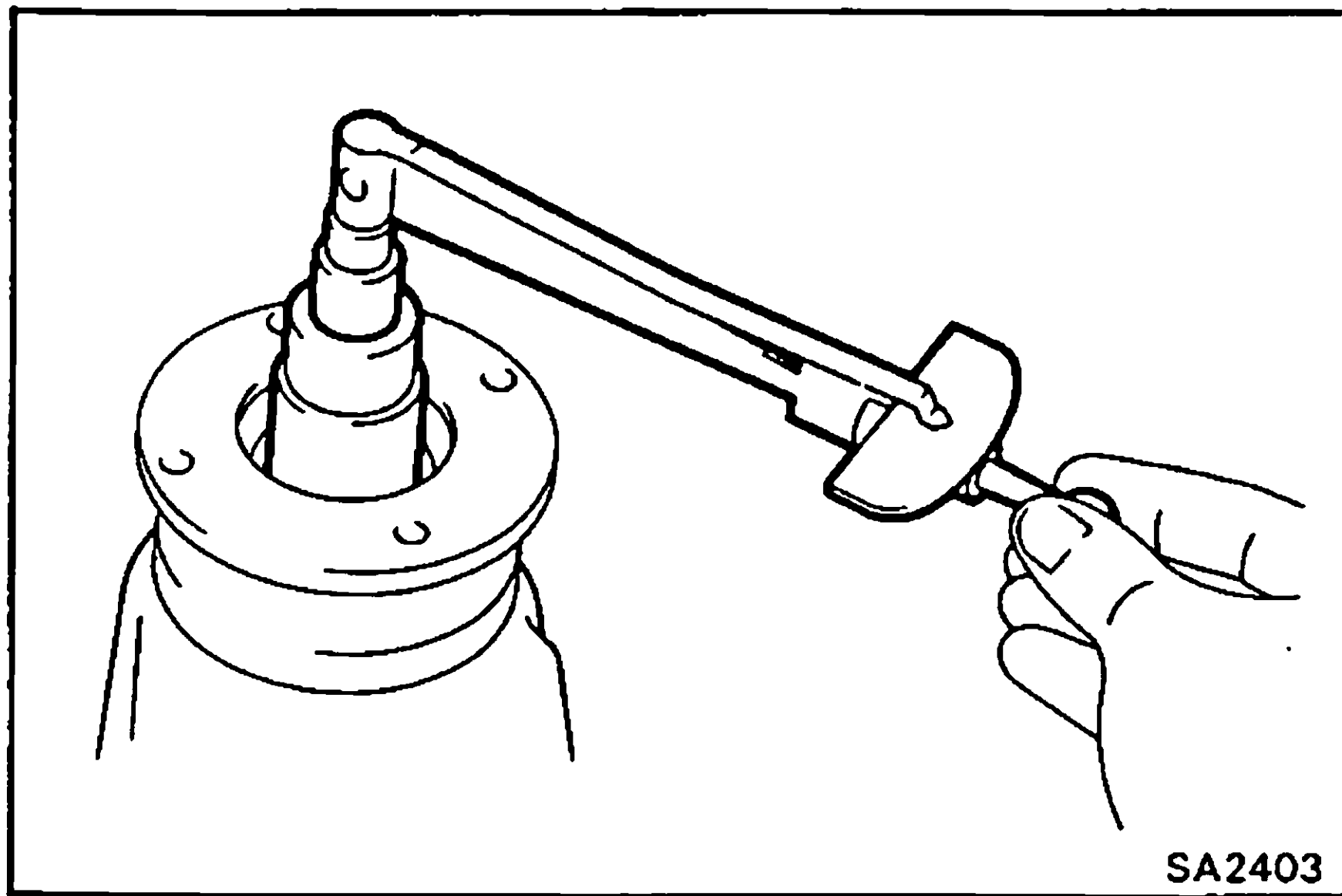
0.9 — 1.3 N·m

(9 — 13 kgf·cm, 7.8 — 11.3 in.·lbf)

FJ, PZJ, HZJ, FZJ

0.5 — 0.8 N·m

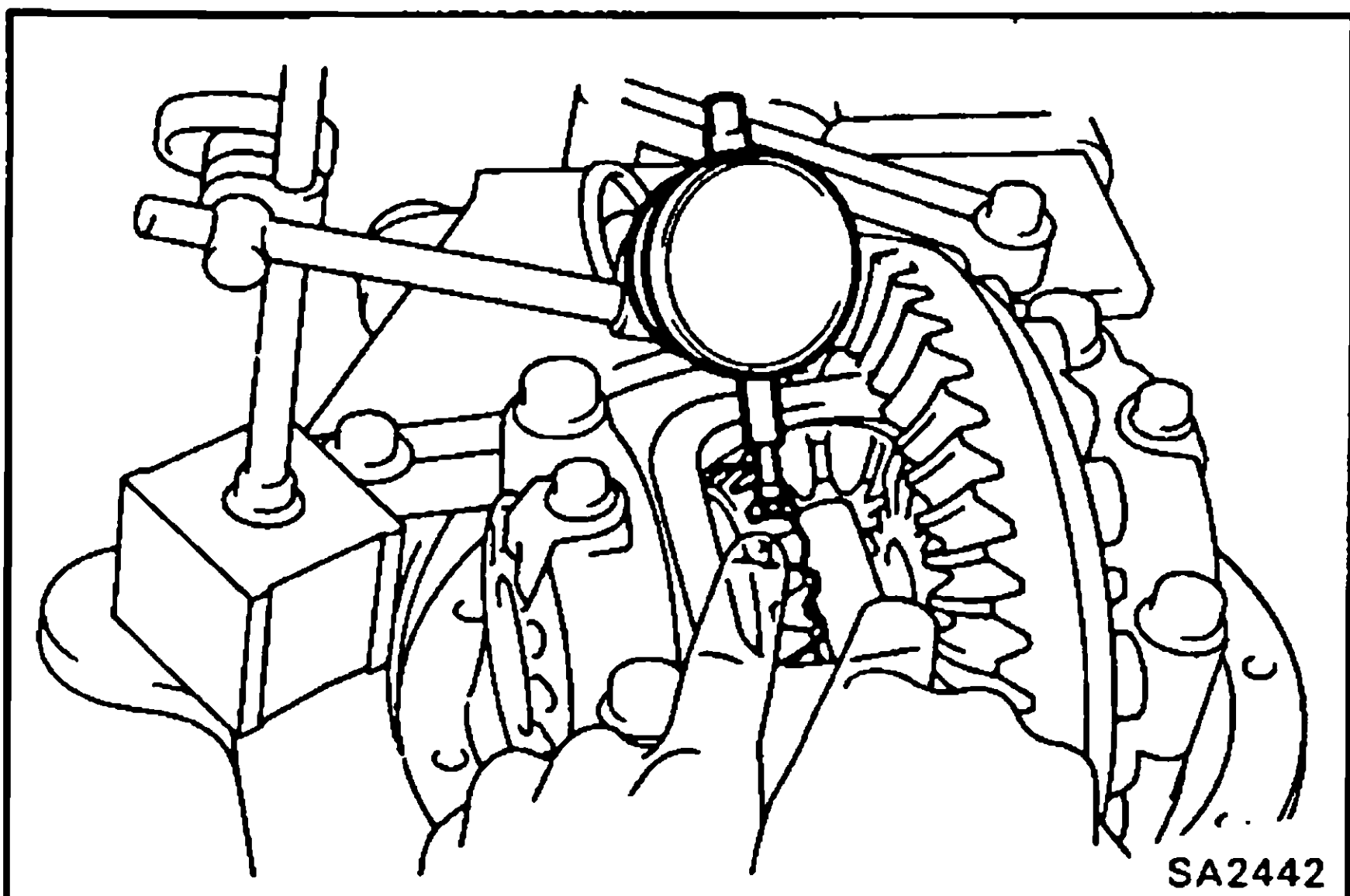
(5 — 8 kgf·cm, 4.3 — 6.9 in.·lbf)

**5. CHECK TOTAL PRELOAD**

Using a torque meter, measure the total preload.

Total preload: In addition to drive pinion preload
0.4 — 0.6 N·m (4 — 6 kgf·cm, 3.5 — 5.2 in.·lbf)

If necessary, disassemble and inspect a differential.

**6. (2 PINION TYPE)
CHECK SIDE GEAR BACKLASH**

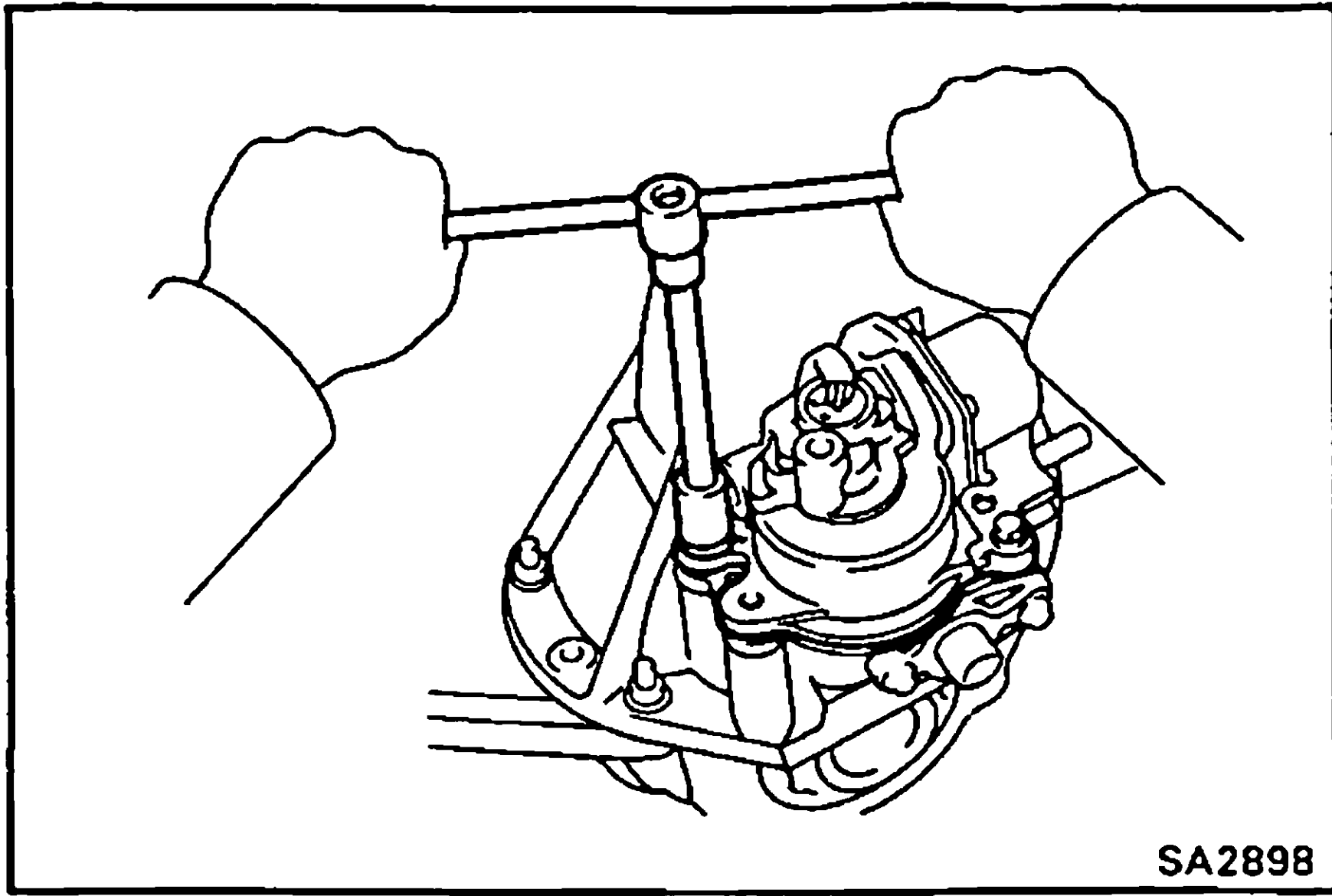
Measure the side gear backlash while holding one pinion gear toward the case.

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

If the backlash is out of specification, install the correct thrust washers. (See page SA-82)

**7. INSPECT TEETH CONTACT BETWEEN RING GEAR AND
DRIVE PINION**

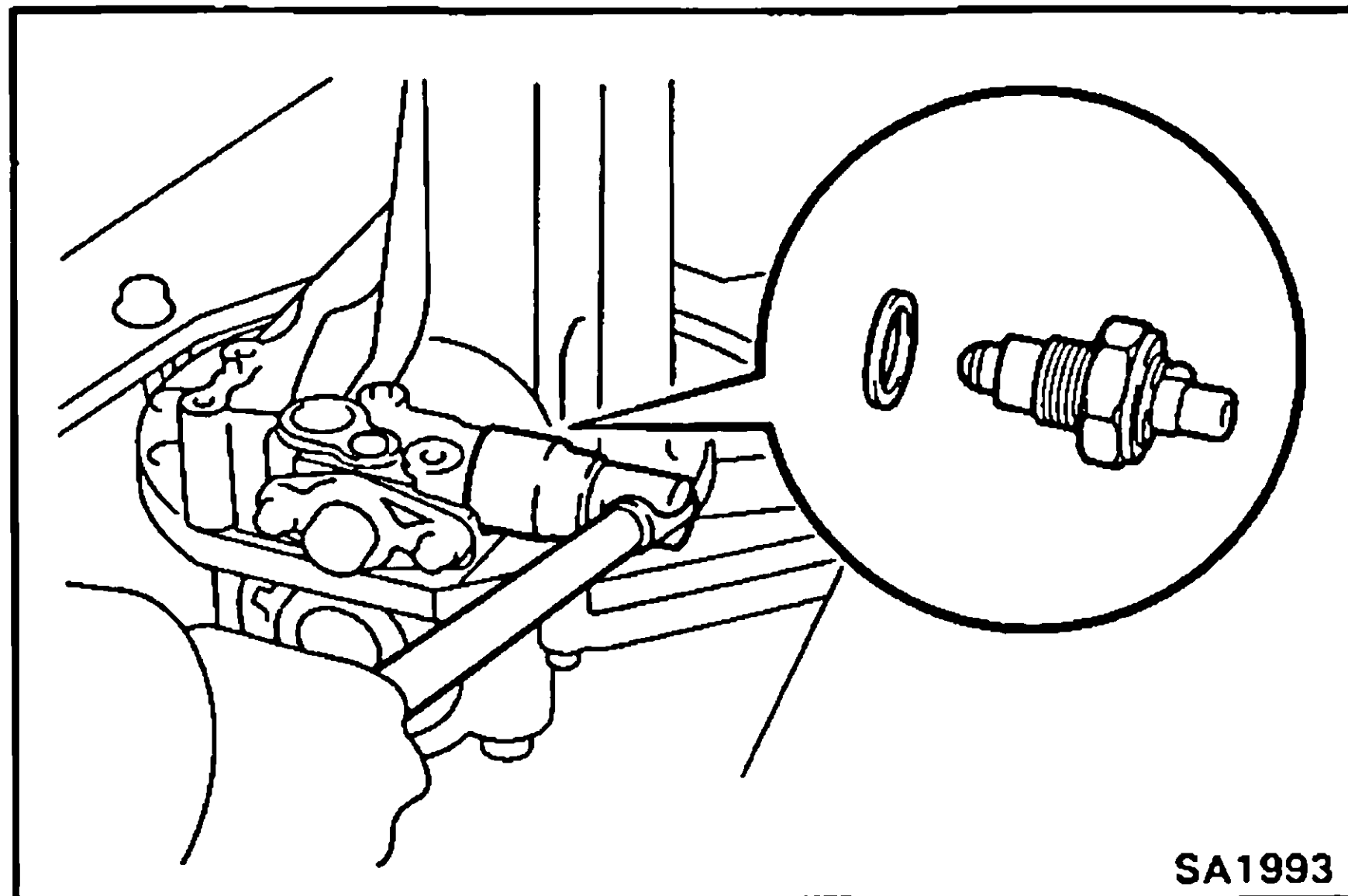
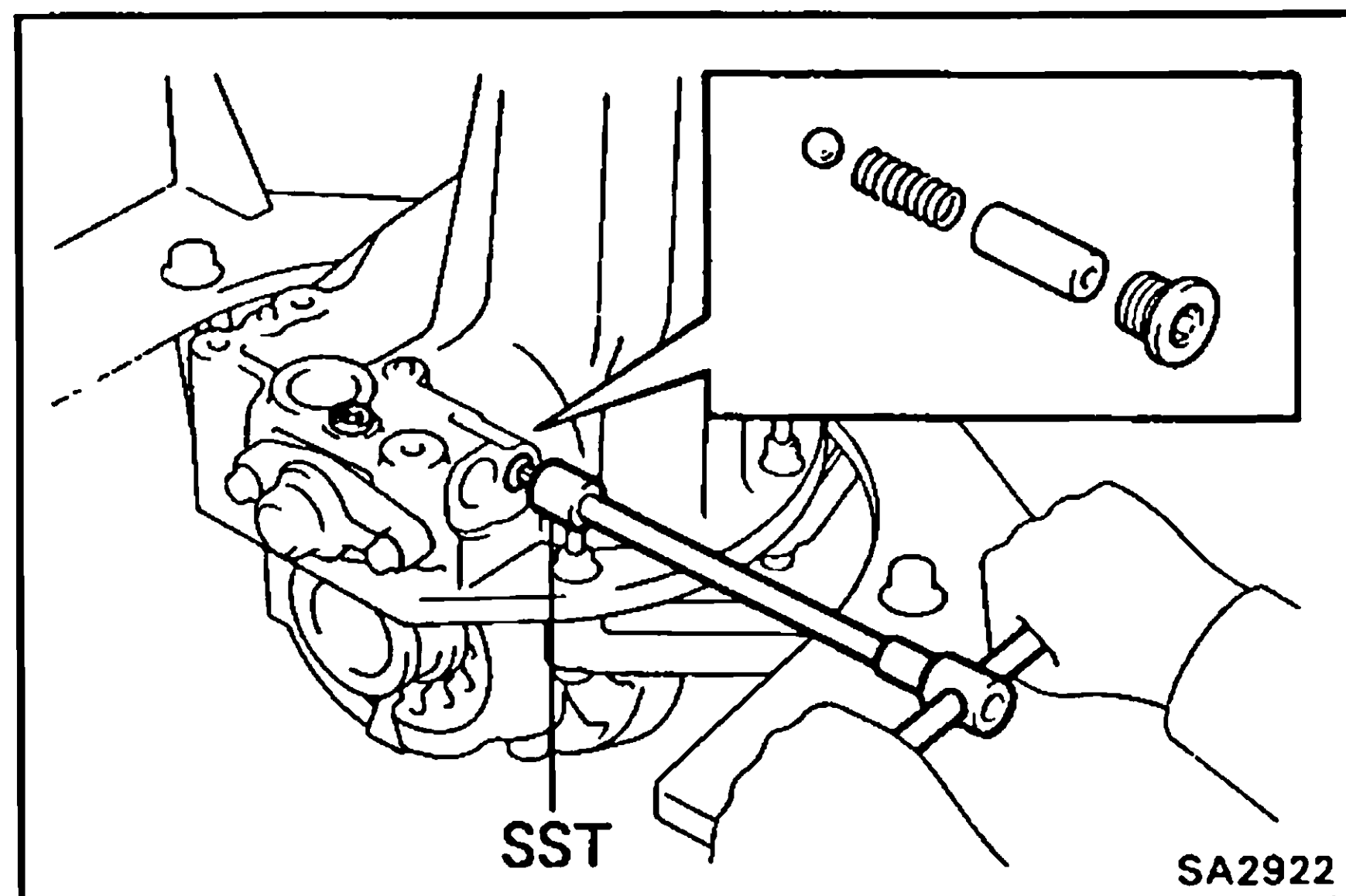
(See step 11 on page SA-44)

**DISASSEMBLY OF DIFFERENTIAL CARRIER**

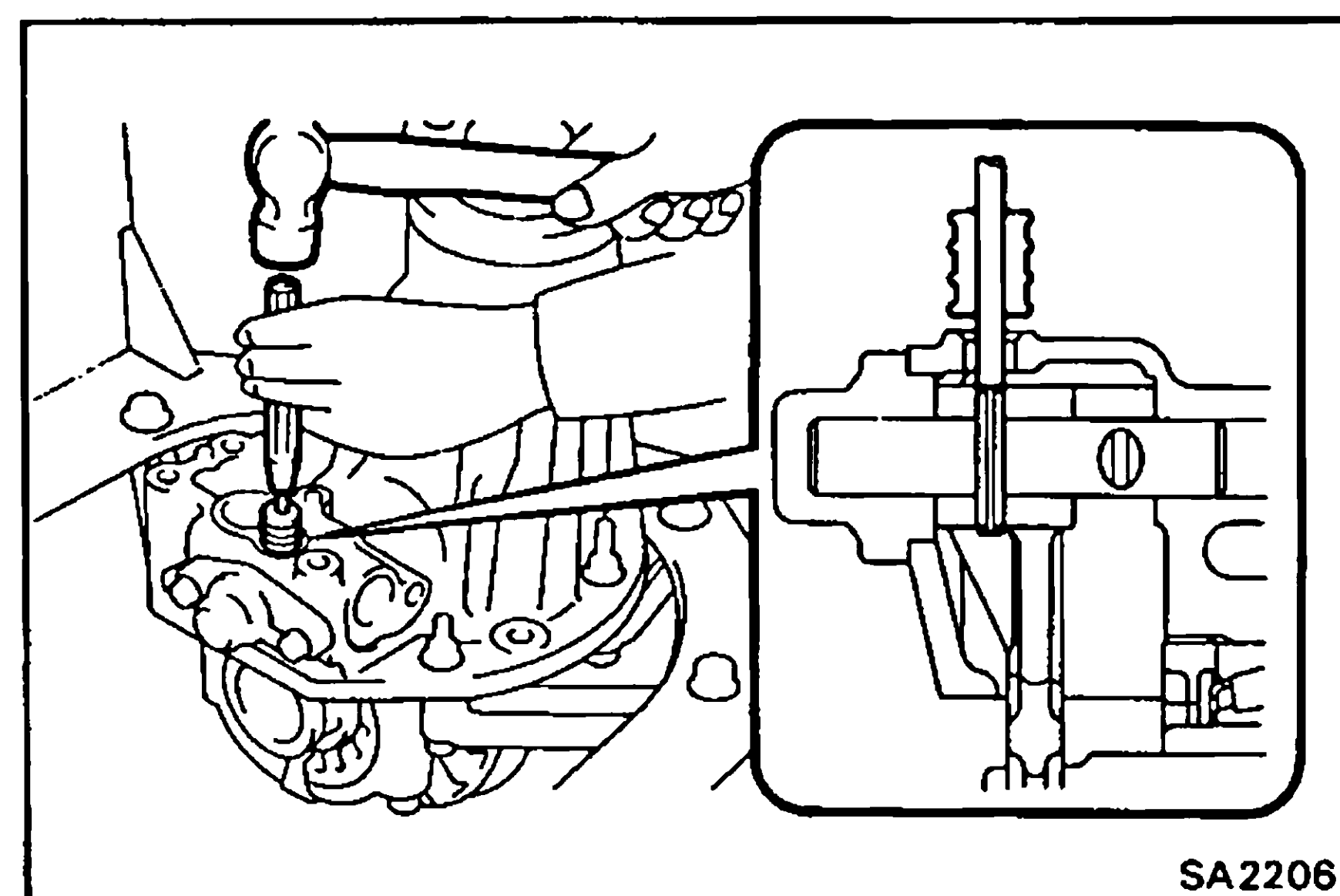
(See page SA-26)

**1. (w/ DIFFERENTIAL LOCK)
REMOVE ACTUATOR**

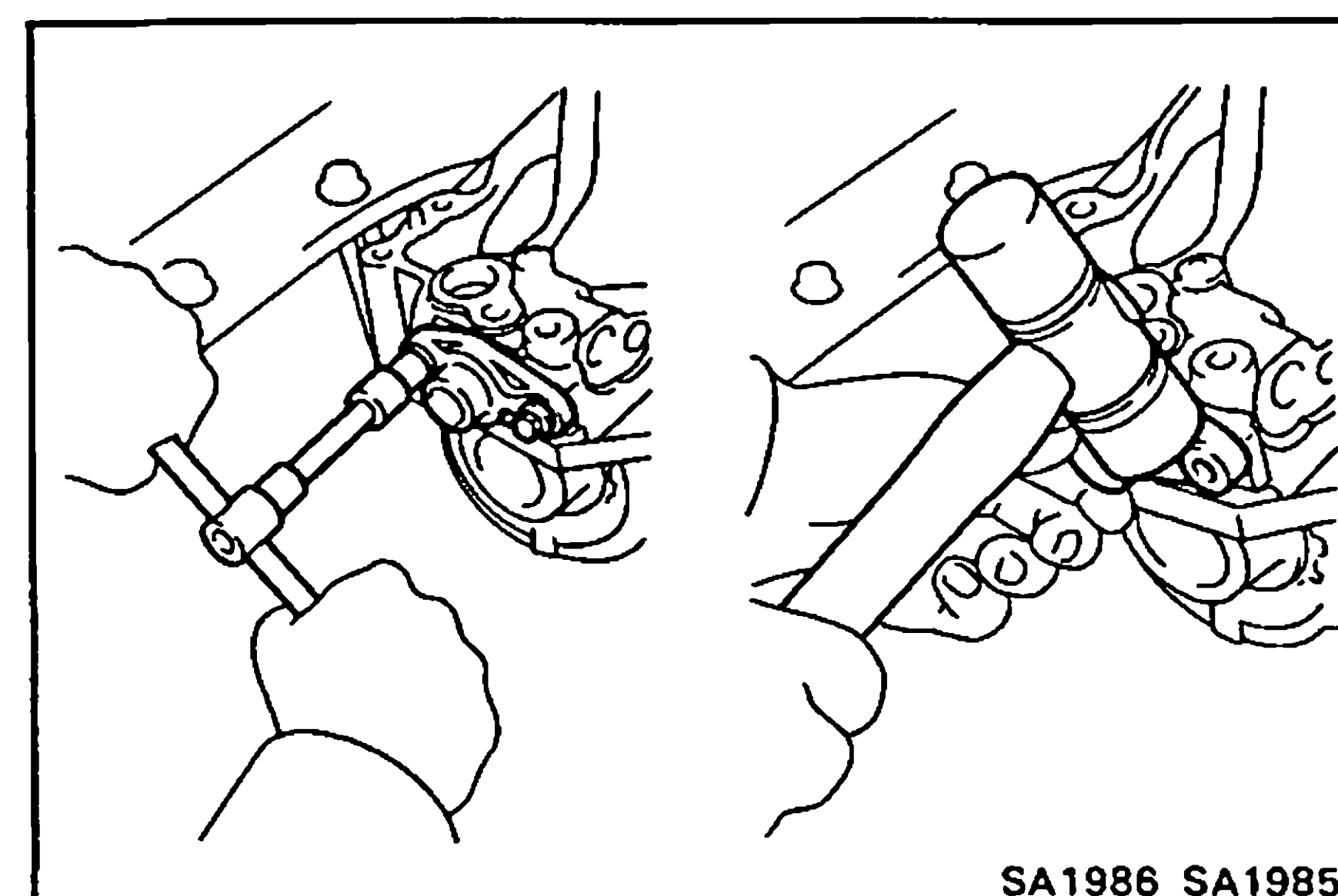
- (a) Remove the bolt and actuator from the differential carrier.
- (b) Remove the O-ring.

**2. (w/ DIFFERENTIAL LOCK)
REMOVE INDICATOR SWITCH****3. (w/ DIFFERENTIAL LOCK)
REMOVE SHIFT FORK SHAFT**

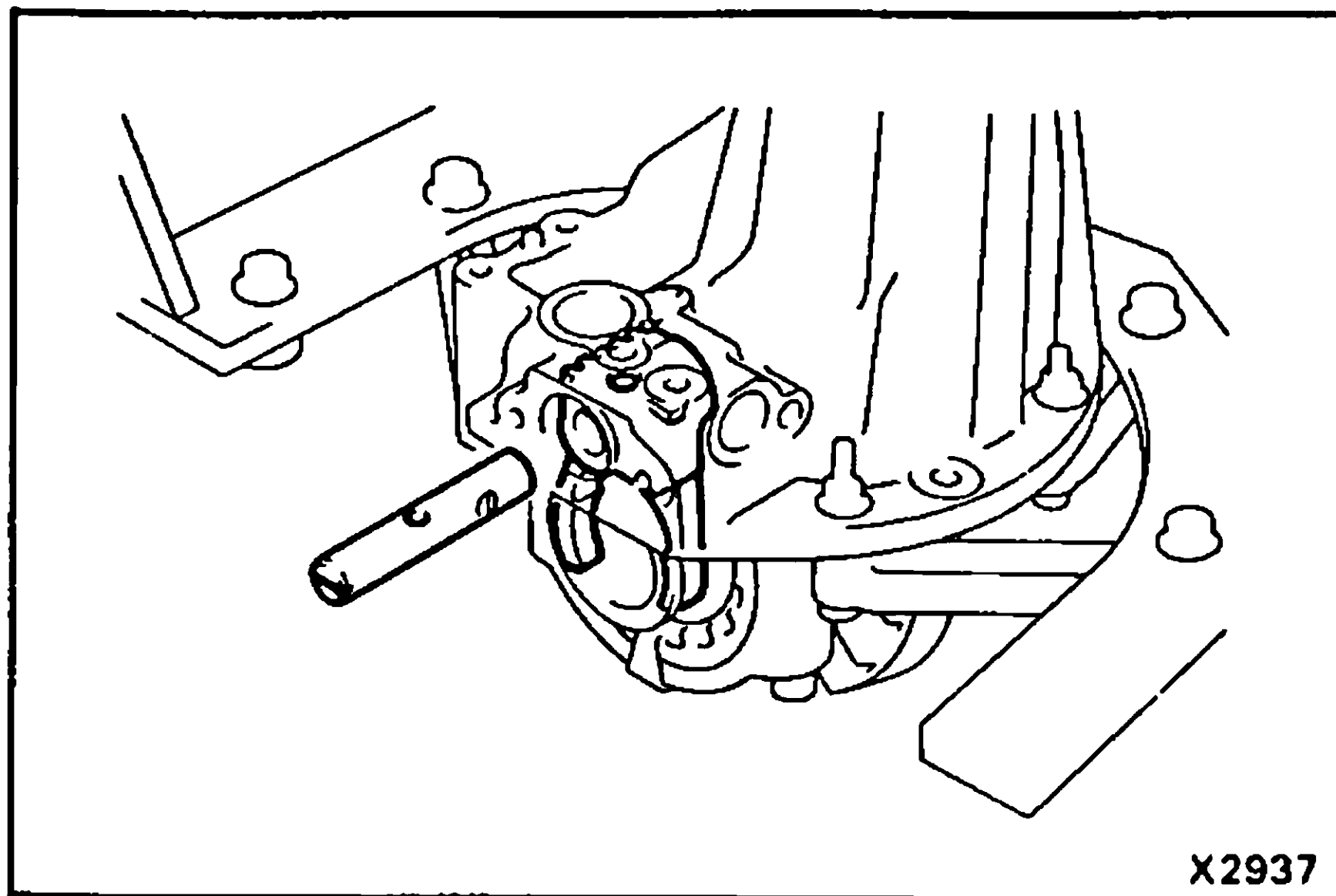
- (a) Using SST, remove the two straight screw plugs.
SST 09313-30021
- (b) Remove the spring seat, compression spring and ball.



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

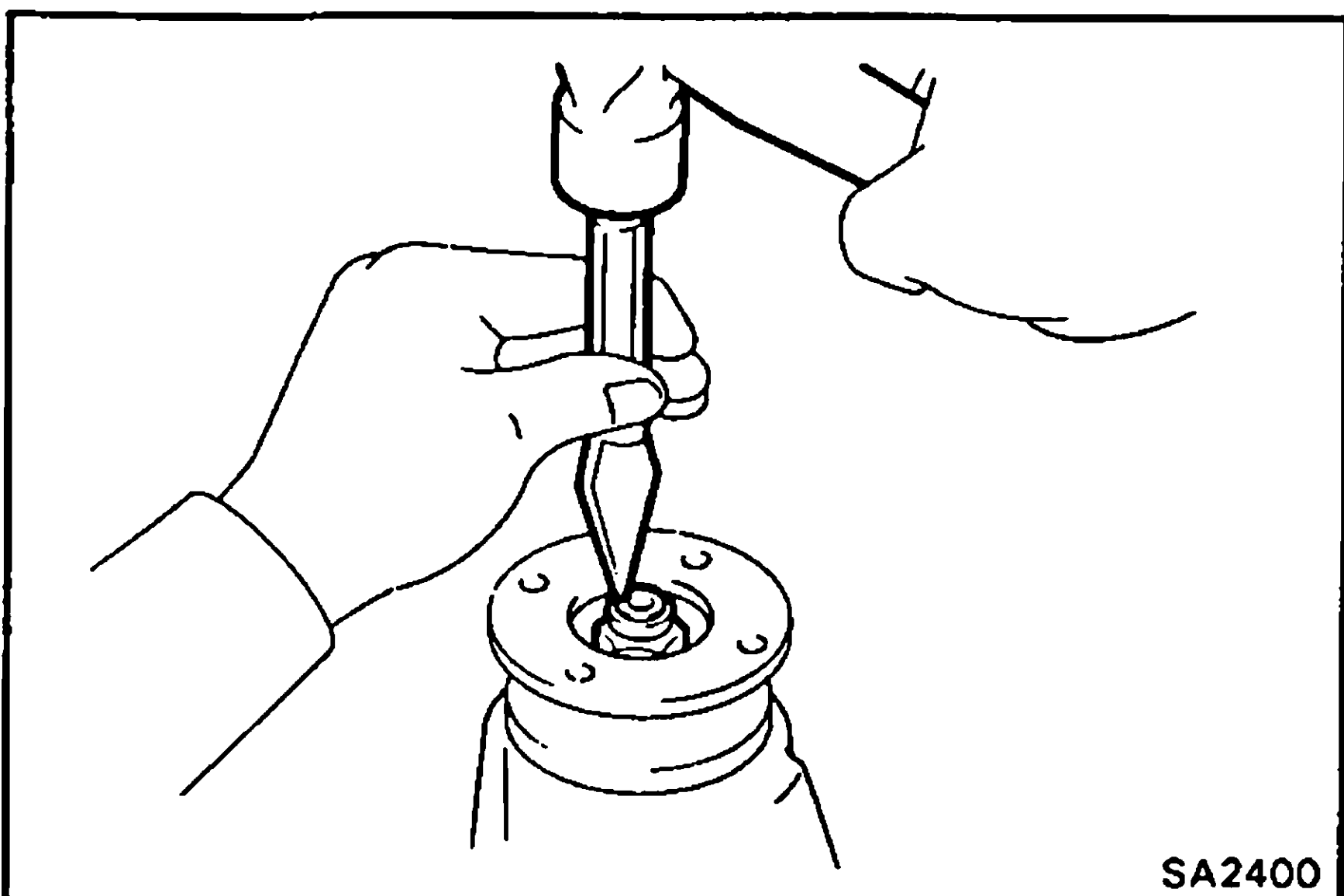


- (d) Remove the two bolts from the shaft retainer.
- (e) Using a plastic hammer, tap out the shaft retainer.



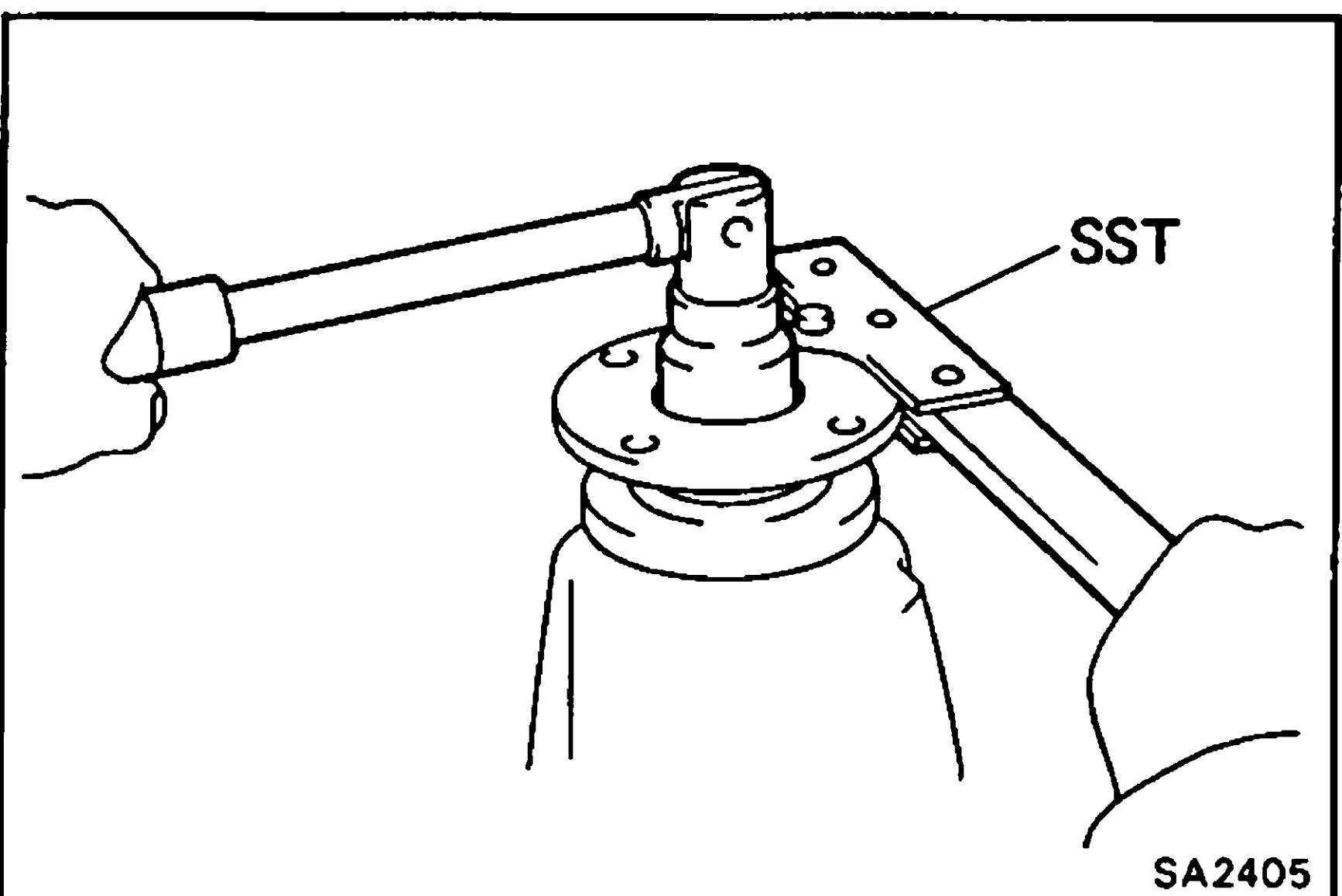
(f) Remove the shift fork shaft.

HINT: Pull out the shift fork shaft with the screwdriver turned round.



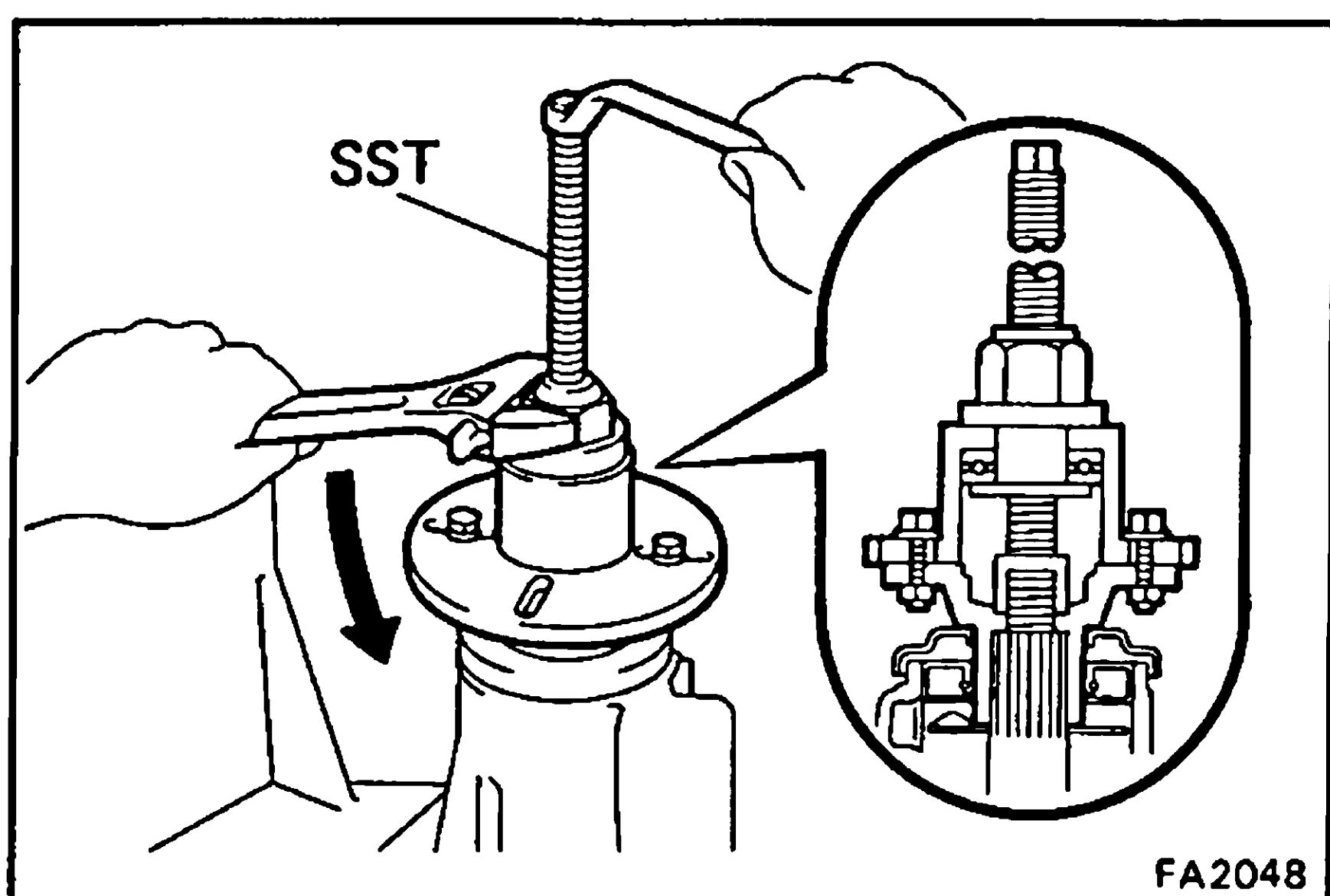
4. REMOVE COMPANION FLANGE

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



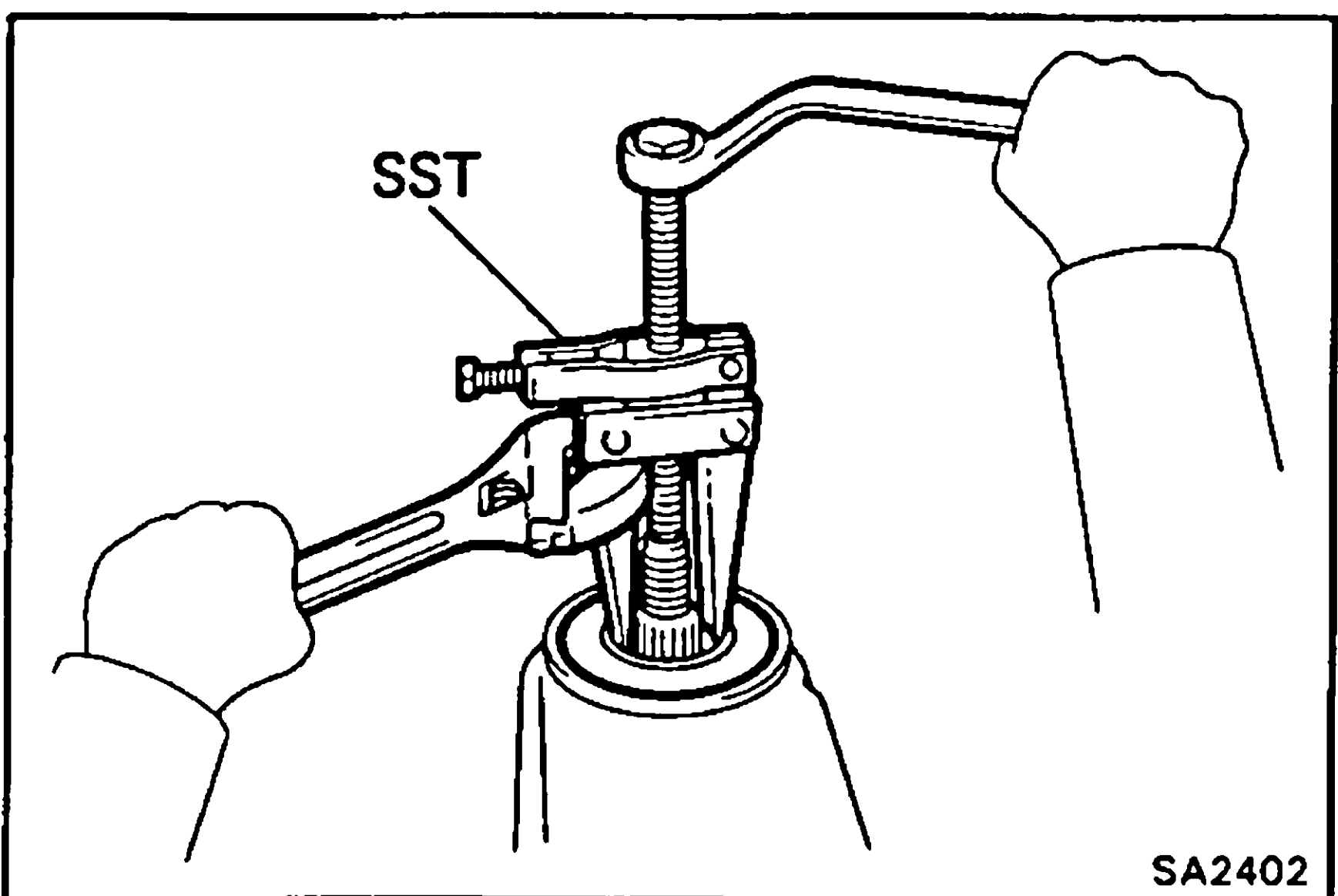
(b) Using SST to hold the flange, remove the nut and plate washer.

SST 09330-00021



(c) Using SST, remove the companion flange.

SST 09557-22022 (09557-22050)

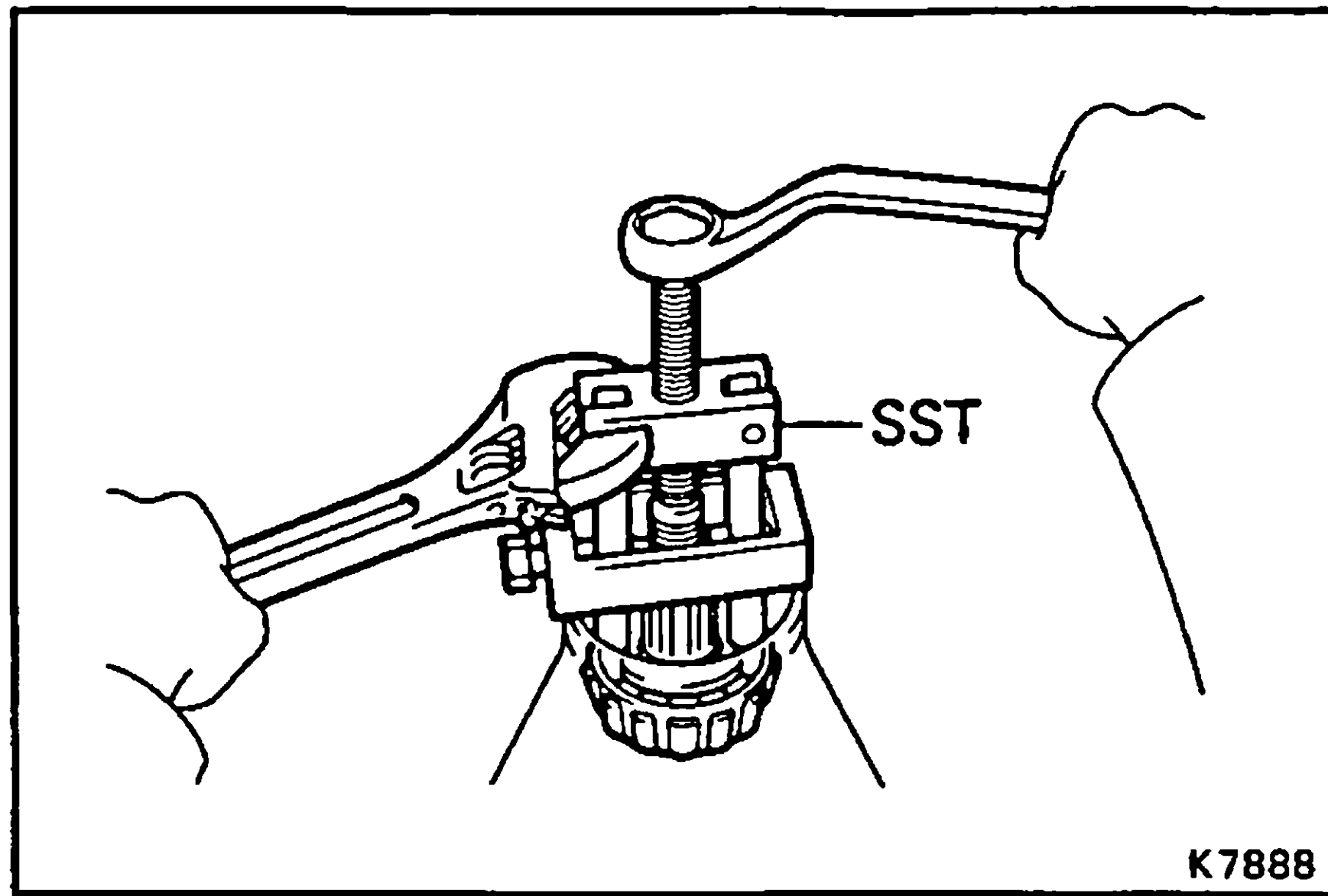


5. REMOVE REAR OIL SEAL AND OIL SLINGER

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

SST 09308-10010

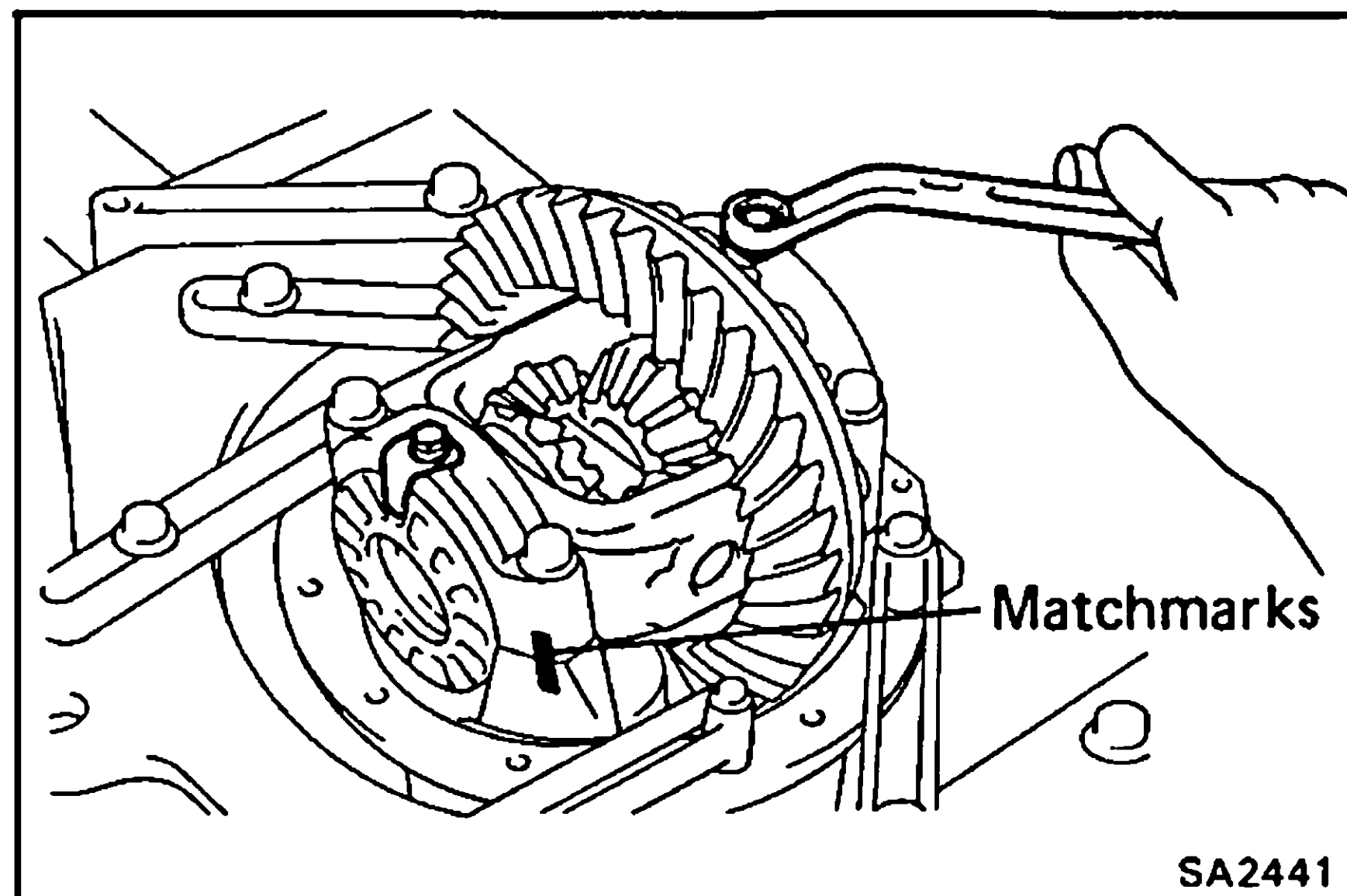
(b) Remove the oil slinger.

**6.-1 (RJ, LJ)****REMOVE REAR BEARING AND BEARING SPACER**

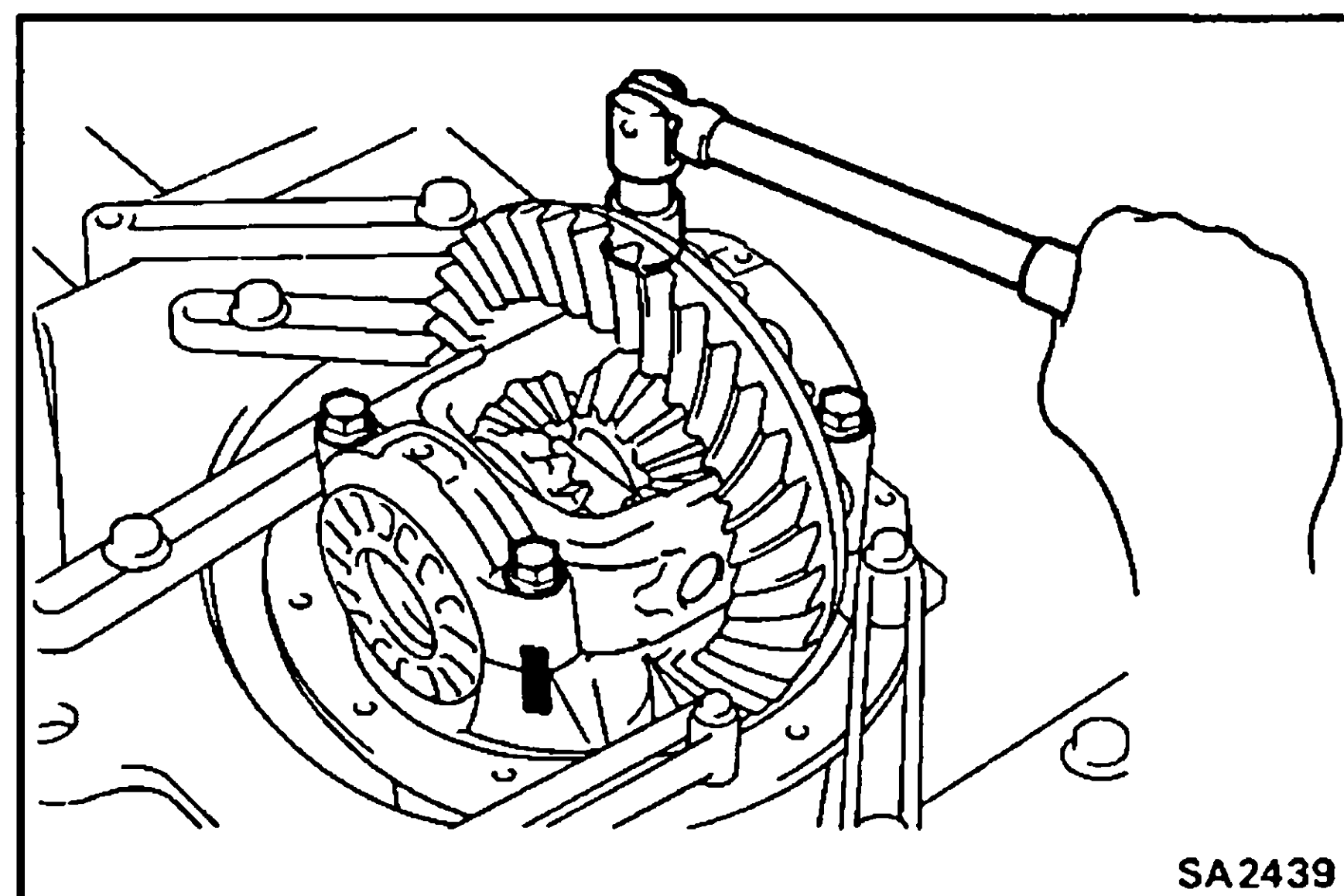
- (a) Using SST, remove the bearing from the housing.
SST 09556-22010
- (b) Remove the bearing spacer.

6.-2 (FJ, PZJ, HZJ, FZJ)**REMOVE REAR BEARING**

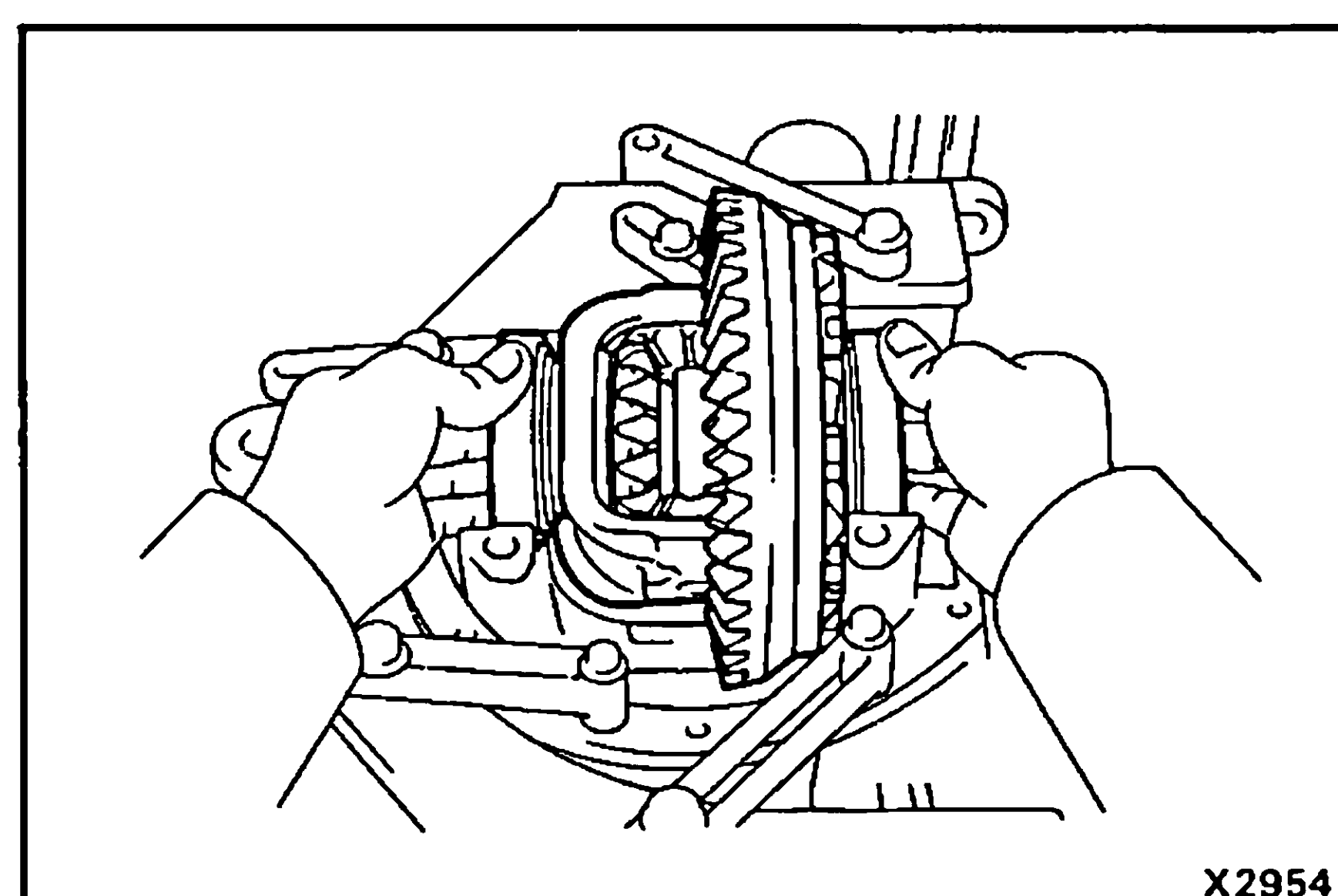
Using SST, remove the bearing from the housing.
SST 09556-22010

**7. REMOVE DIFFERENTIAL CASE**

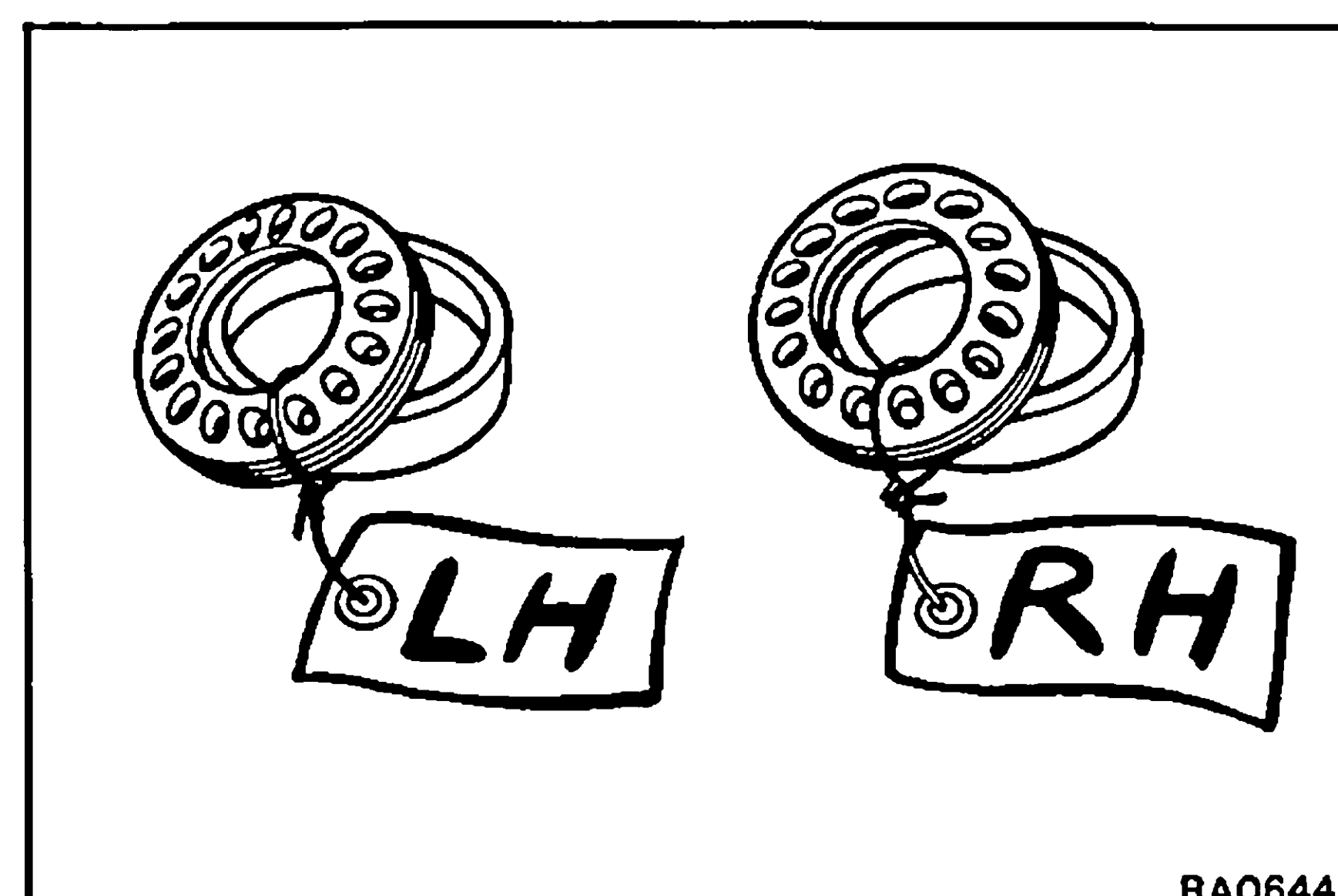
- (a) (2 pinion type only)
Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the two adjusting nut locks.



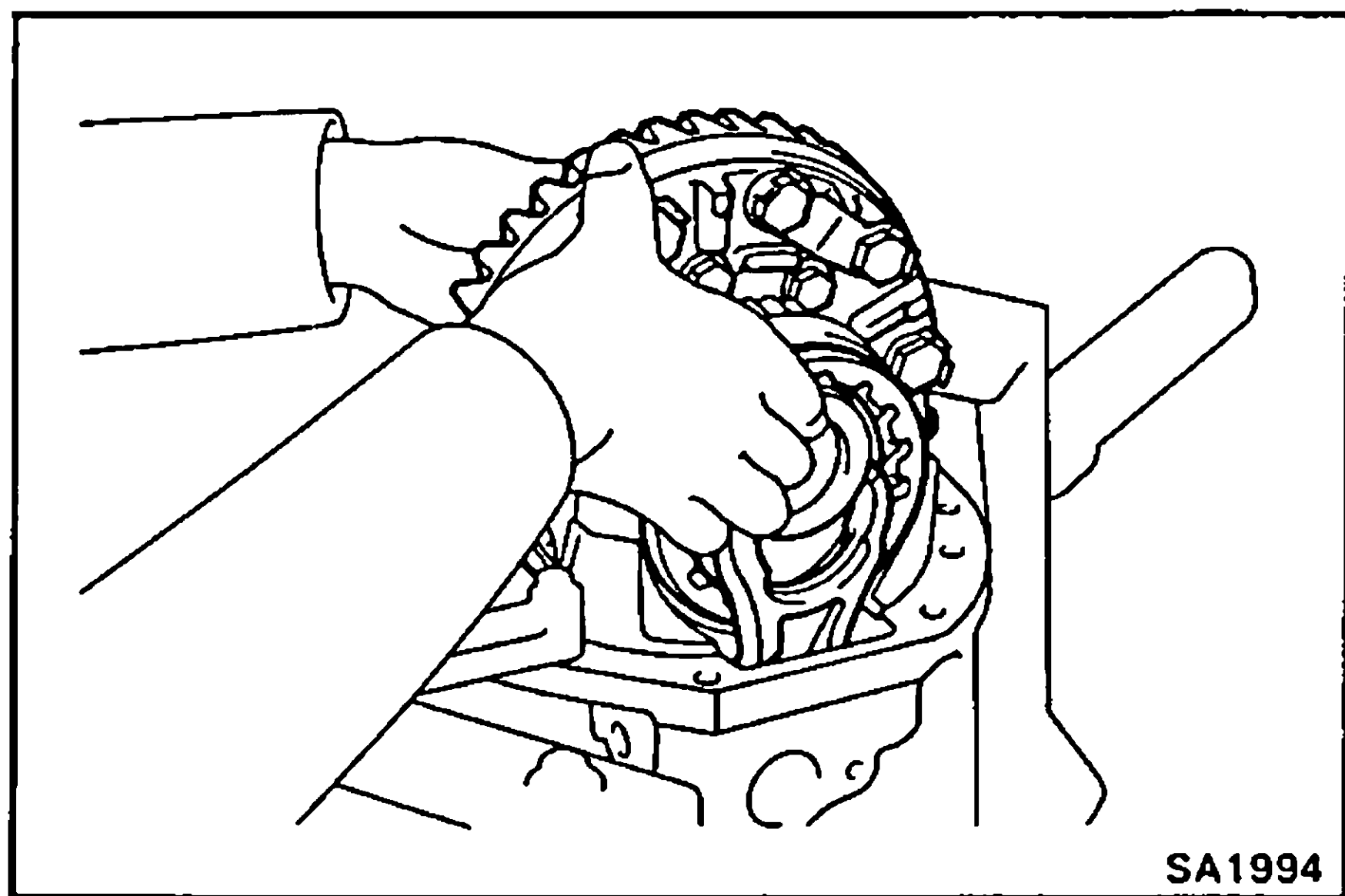
- (c) Remove the four bolts and the two bearing caps.
- (d) (2 pinion type only)
Remove the two adjusting nuts.



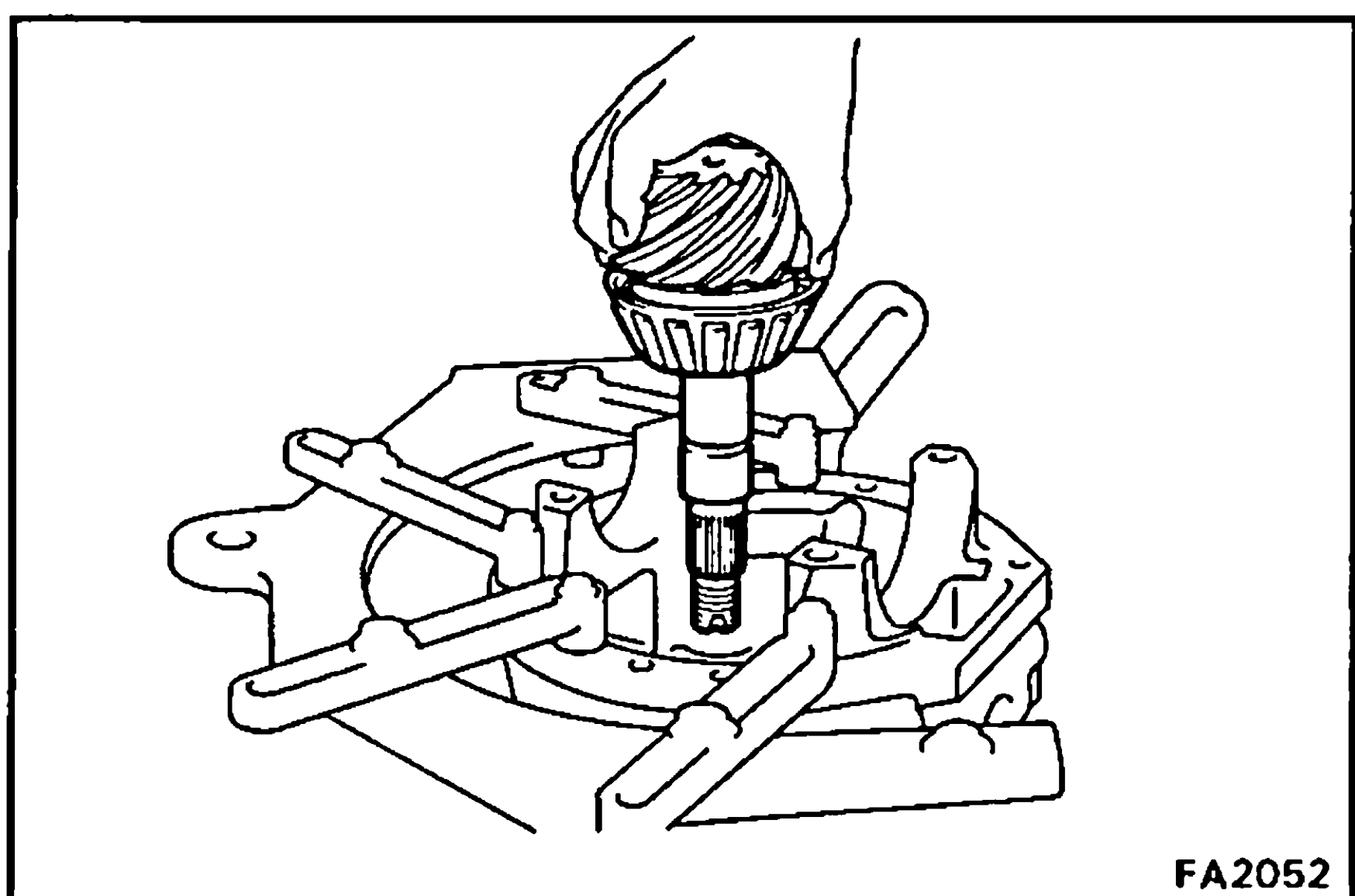
- (e) (2 pinion type only)
Remove the differential case with the side bearing outer races from the differential carrier.



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



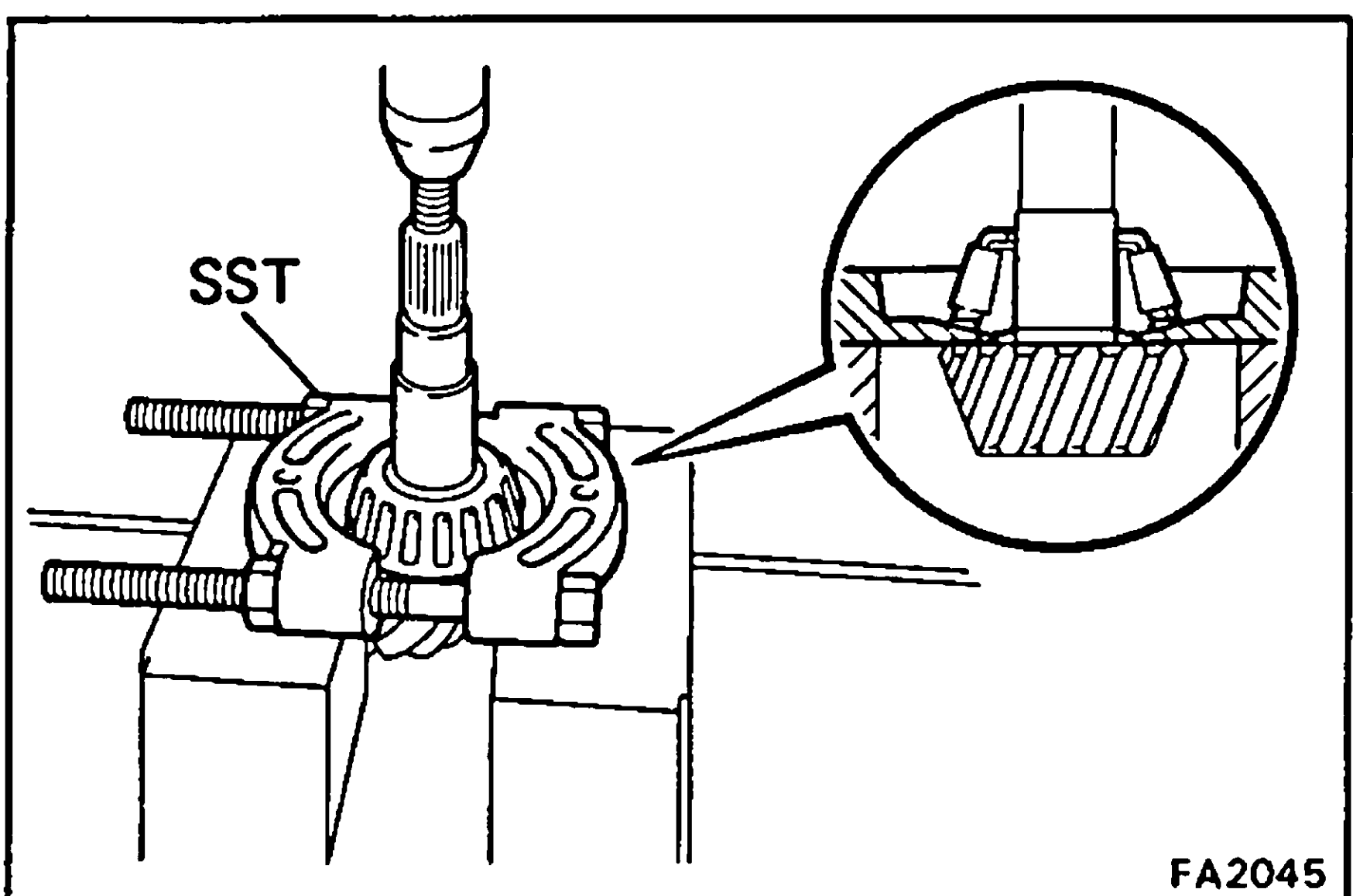
- (f) (w/ Differential lock only)
Remove the differential case with both side bearing outer races, adjusting nuts and sleeve from the differential carrier.
- (g) (w/ Differential lock only)
Remove the shift fork.

**8.-1 (RJ, LJ)****REMOVE DRIVE PINION**

Remove the drive pinion with the front bearing.

8.-2 (FJ, PZJ, HZJ, FZJ)**REMOVE DRIVE PINION AND BEARING SPACER**

- (a) Remove the drive pinion with the front bearing.
- (b) Remove the bearing spacer.

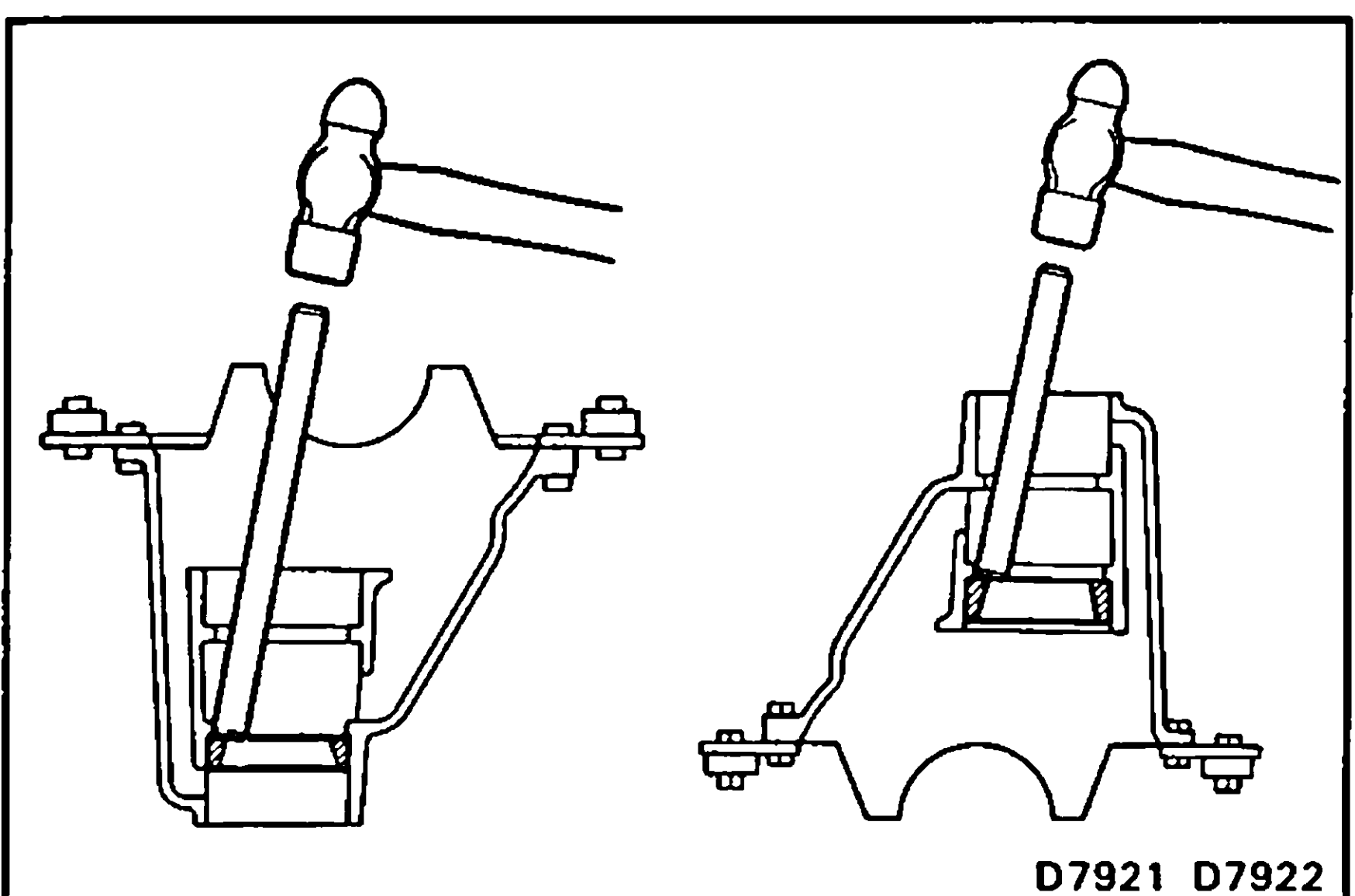
**9. REMOVE DRIVE PINION FRONT BEARING**

- (a) Using SST and a press, remove the bearing from the drive pinion.

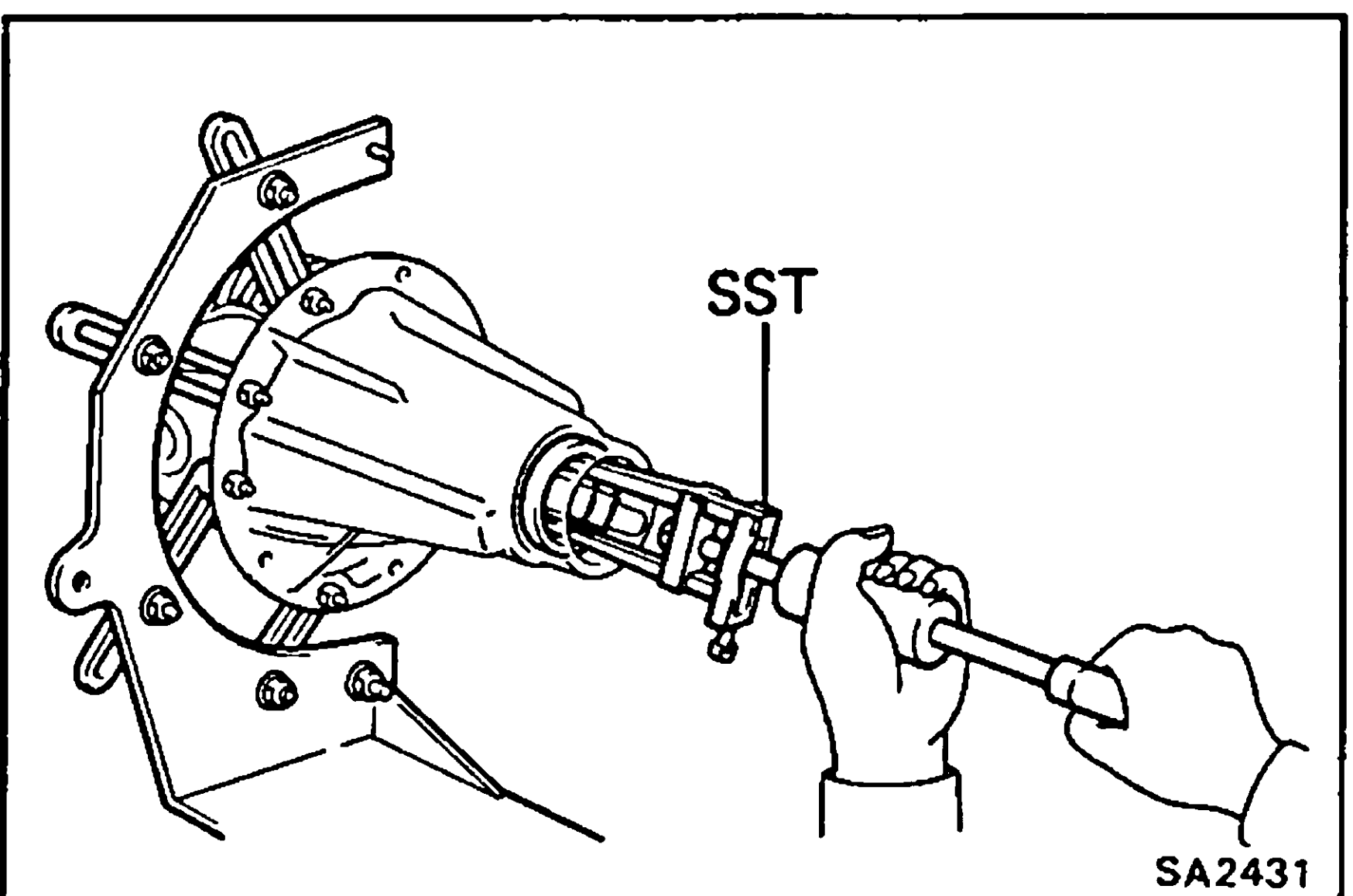
SST 09950-00020

HINT: If the drive pinion or ring gear are damaged, replace them as a set.

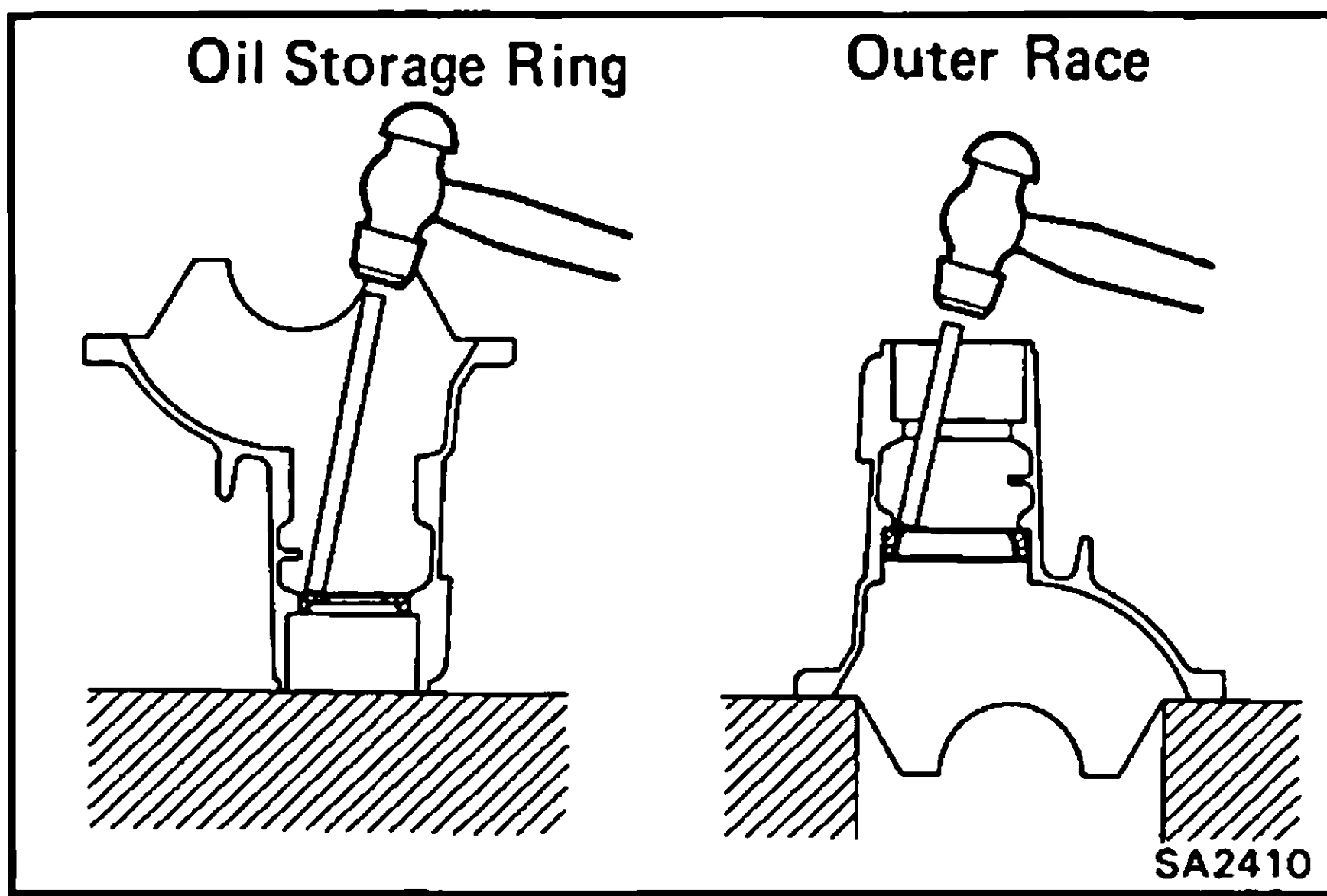
- (b) Remove the washer from the drive pinion.

**10.-1 (RJ, LJ)****REMOVE FRONT AND REAR BEARING OUTER RACES**

Using a hammer and brass bar, drive out the outer race from carrier.

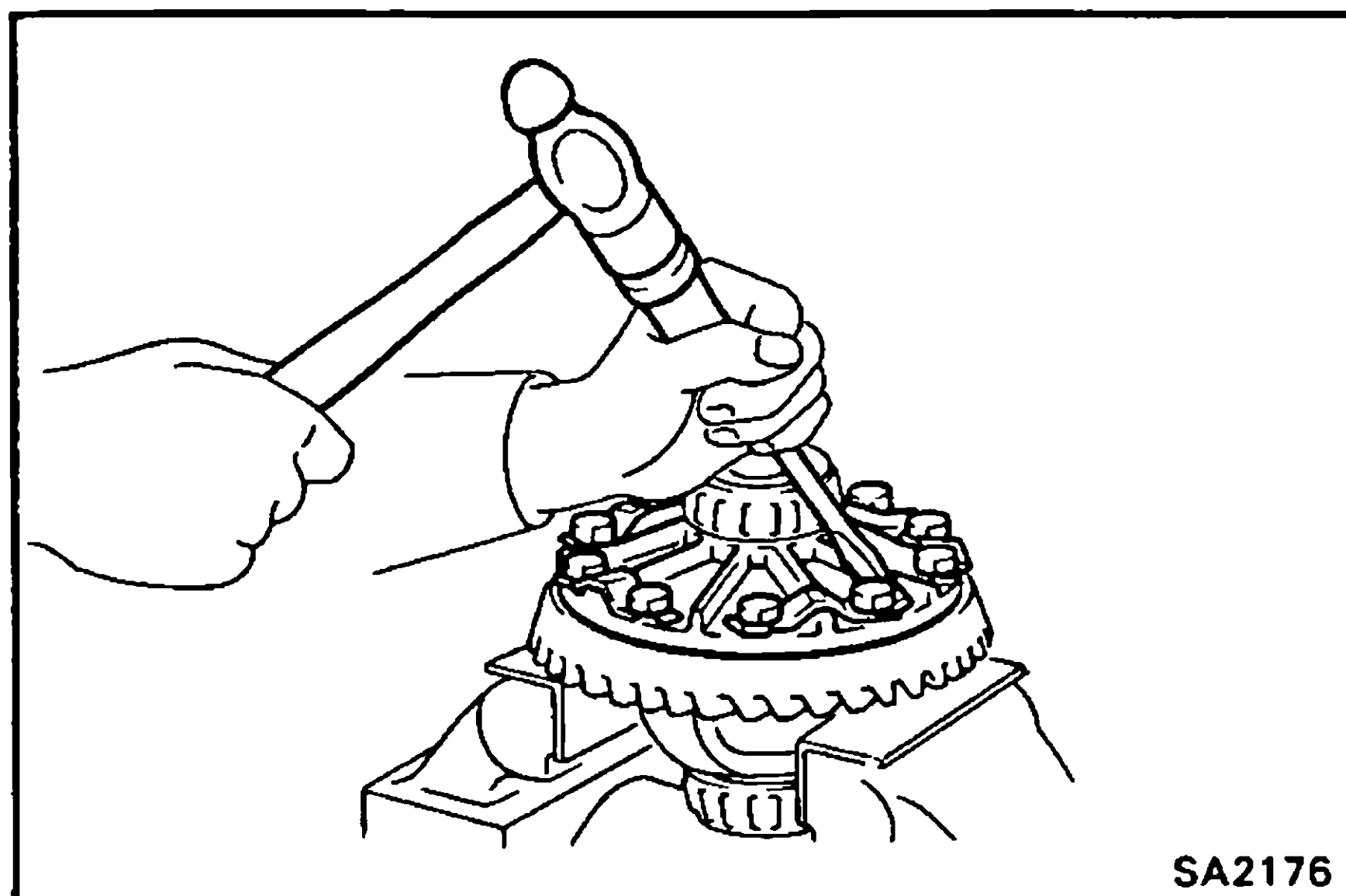
**10.-2 (FJ, PZJ, HZJ, FZJ)****REMOVE FRONT, REAR BEARING OUTER RACES AND OIL STORAGE RING**

- (a) Using SST, remove the bearing outer race.
- SST 09308-00010



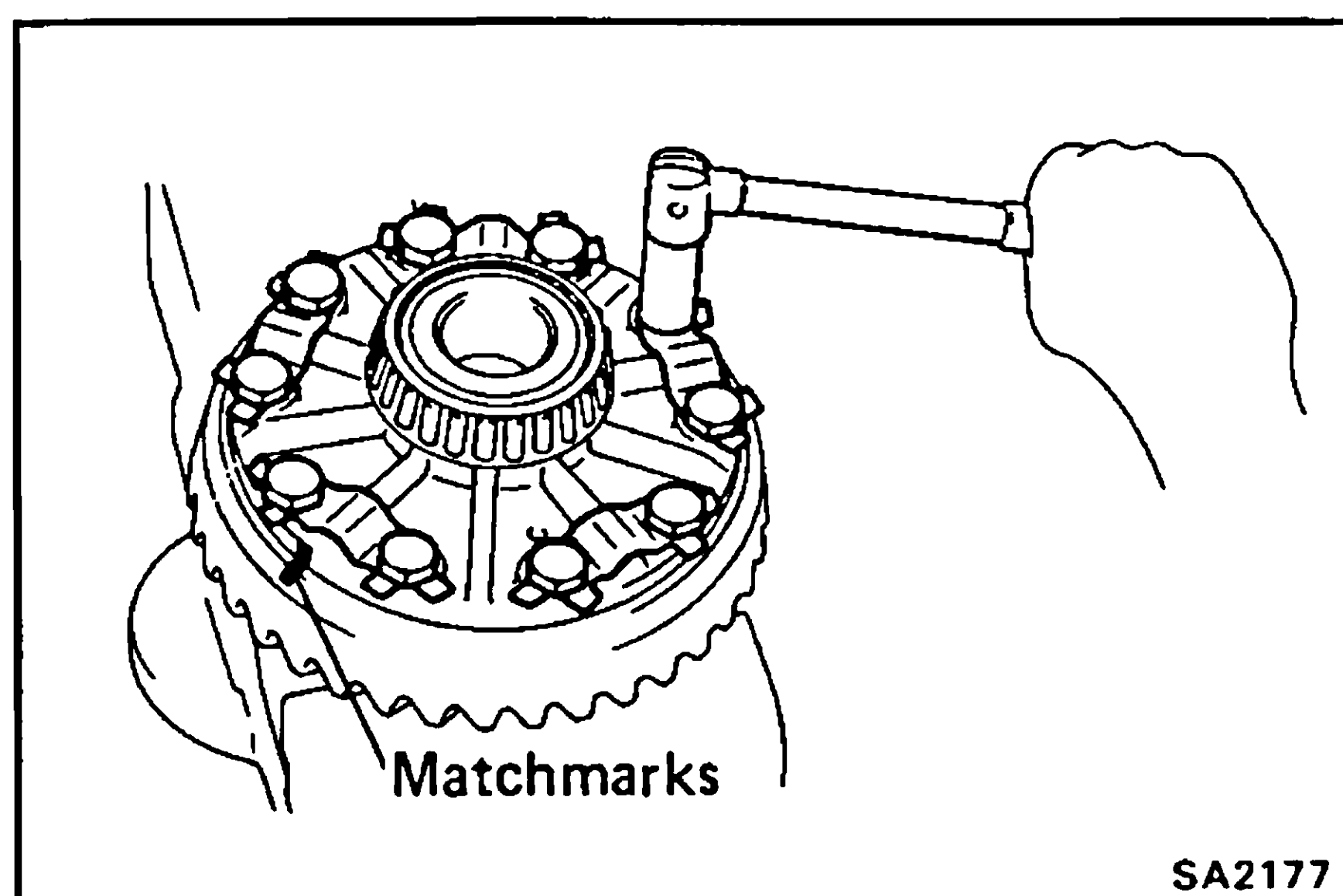
- (b) Using a hammer and brass bar, drive out the oil storage ring and outer race from the carrier.

HINT: Do not remove the oil storage ring unless replacing it with a new one.



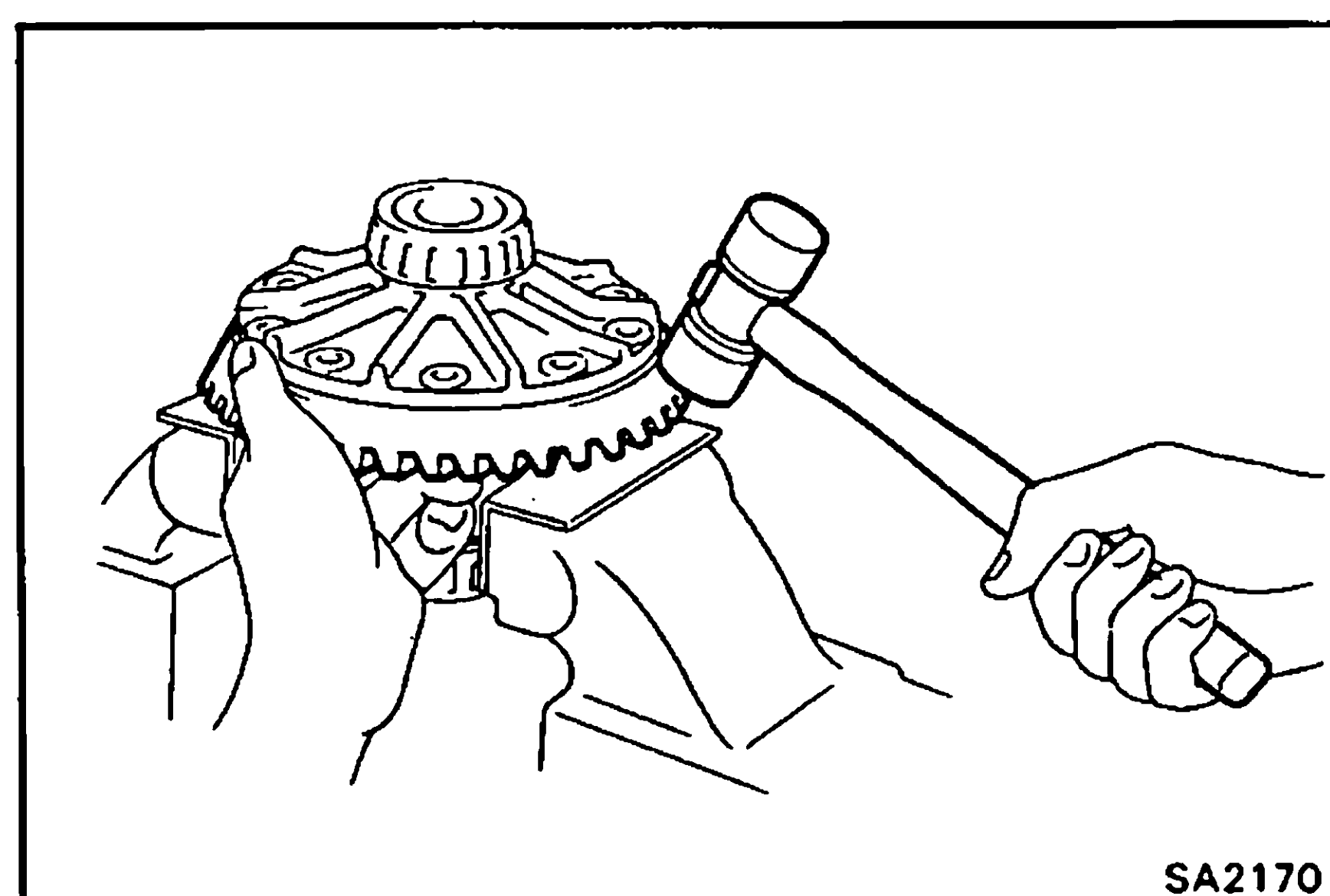
11. REMOVE RING GEAR

- (a) Using a screwdriver, unseat the lock plates.



- (b) Place matchmarks on the ring gear and differential case.

- (c) Remove the ten bolts and five lock plates.



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

12. CHECK DIFFERENTIAL CASE RUNOUT

- (a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.

- (b) Install the differential case in the differential carrier.

- (c) When there is no play left in the side bearings, install the adjusting nuts.

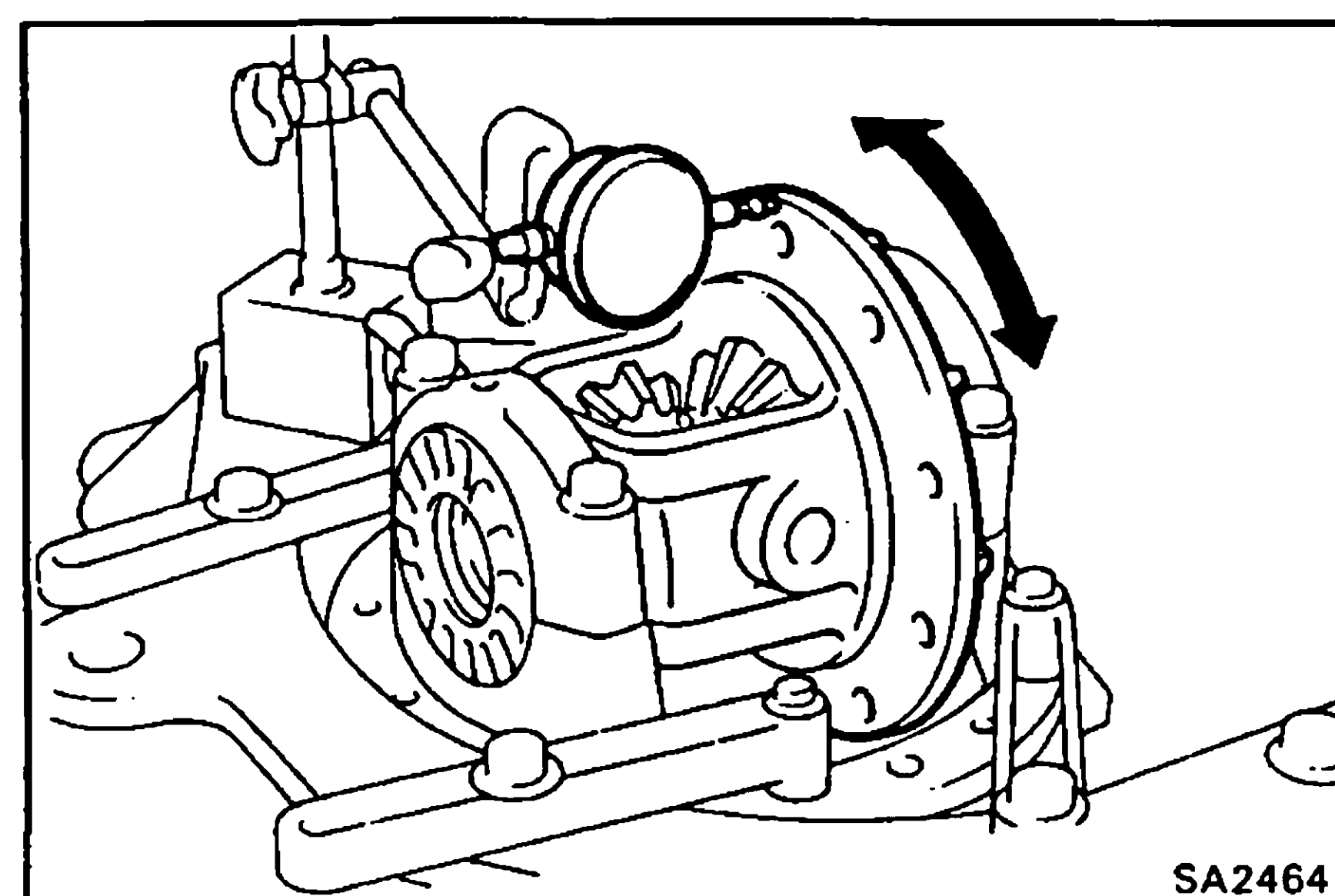
- (d) Align matchmarks on the bearing cap and differential carrier.

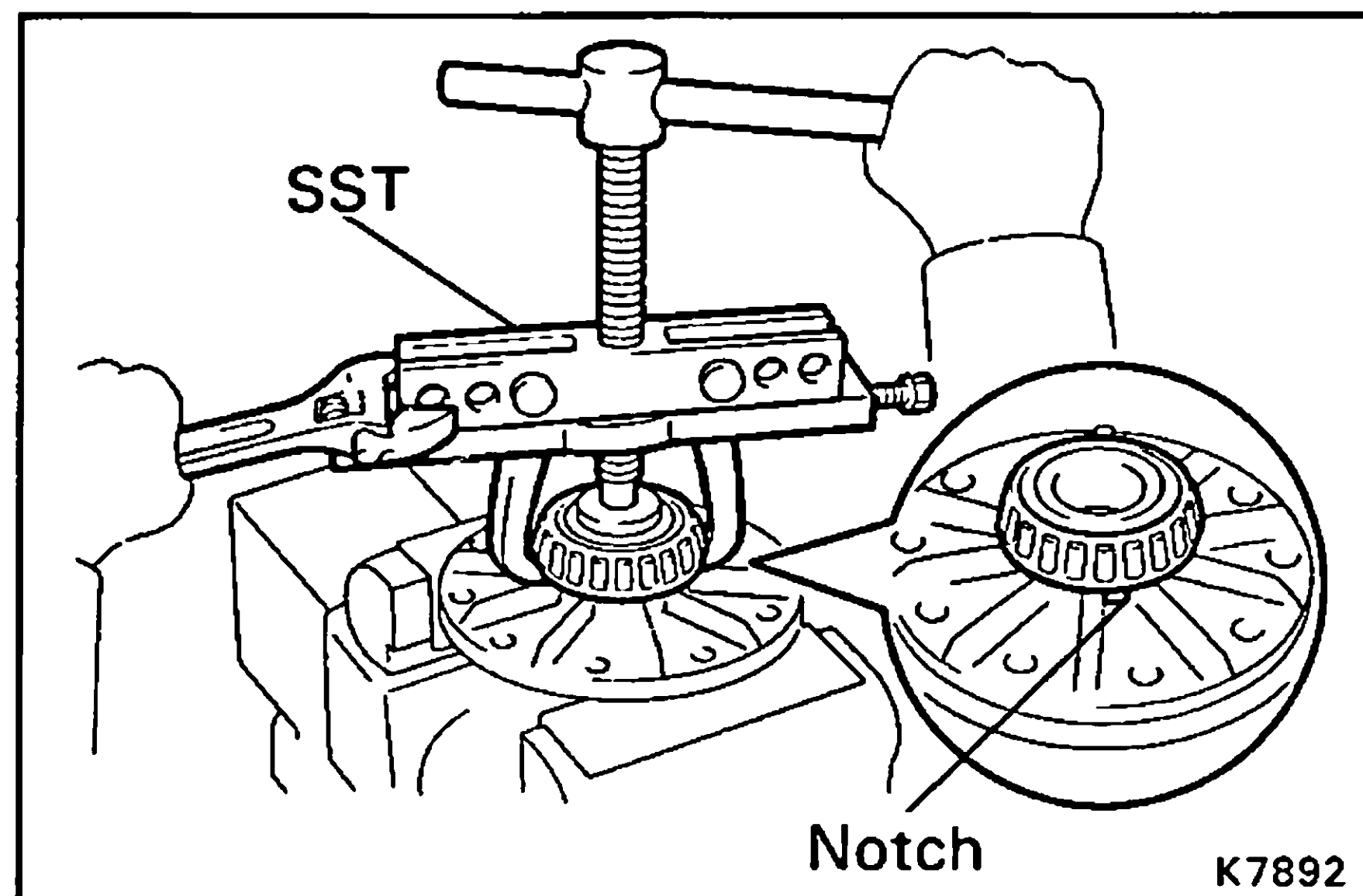
- (e) Install and uniformly tighten the four bearing cap bolts in several passes.

- (f) Using a dial indicator, measure the differential case runout.

Maximum runout: 0.07 mm (0.0028 in.)

- (g) Remove the differential case.
(See step 7 on page SA-28)



**13. REMOVE SIDE BEARINGS**

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

SST 09950-20017

HINT: Fix the claws of SST to the notch in the differential case.

14. DISASSEMBLE DIFFERENTIAL CASE

2 pinion type: See Pub. No. RM183E, see page SA-81
w/ Differential lock (4 pinion type)

: See Pub. No. RM183E, see page SA-86

ASSEMBLY OF DIFFERENTIAL CARRIER

(See page SA-26)

1. INSTALL SIDE BEARINGS

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

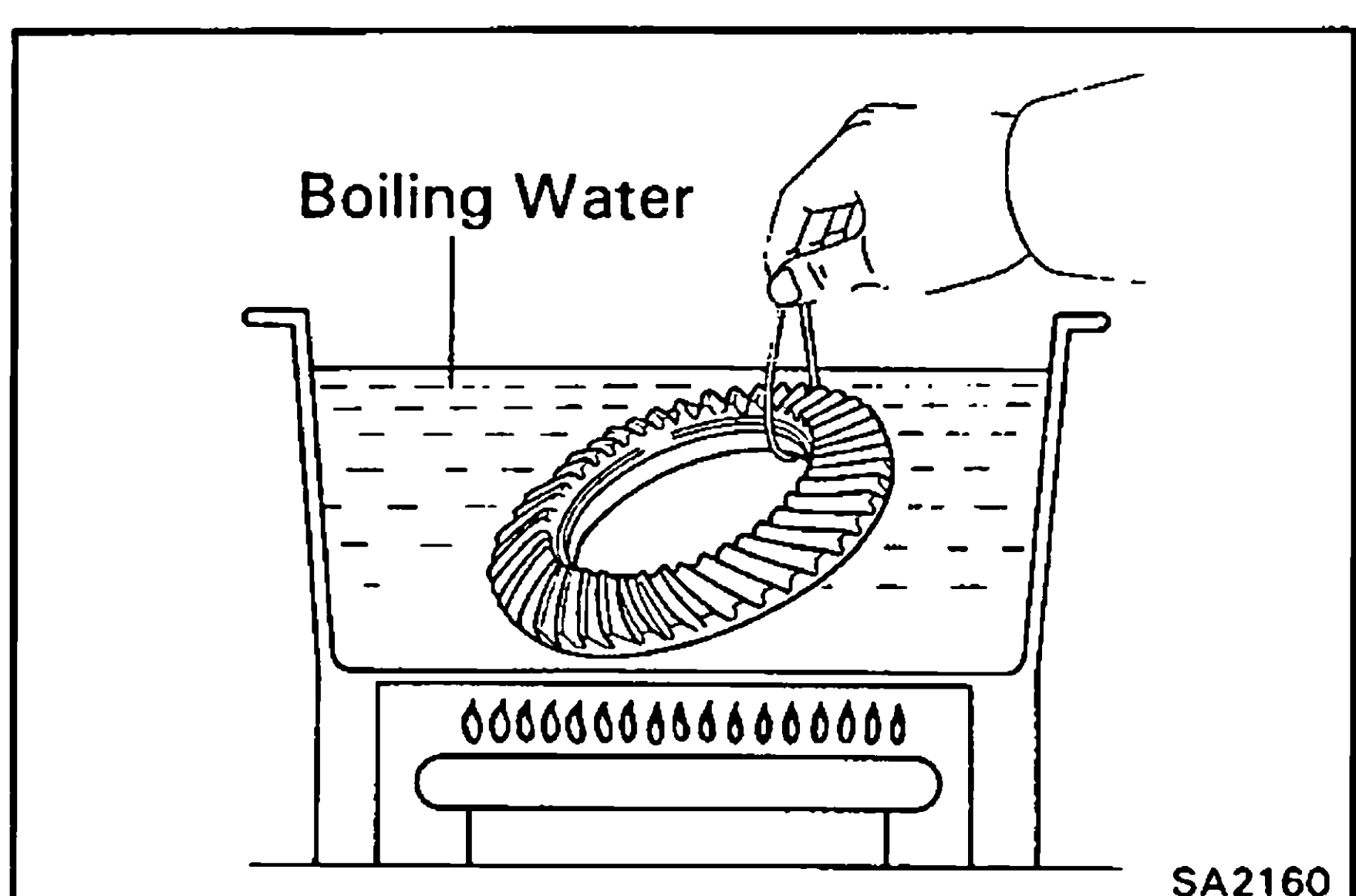
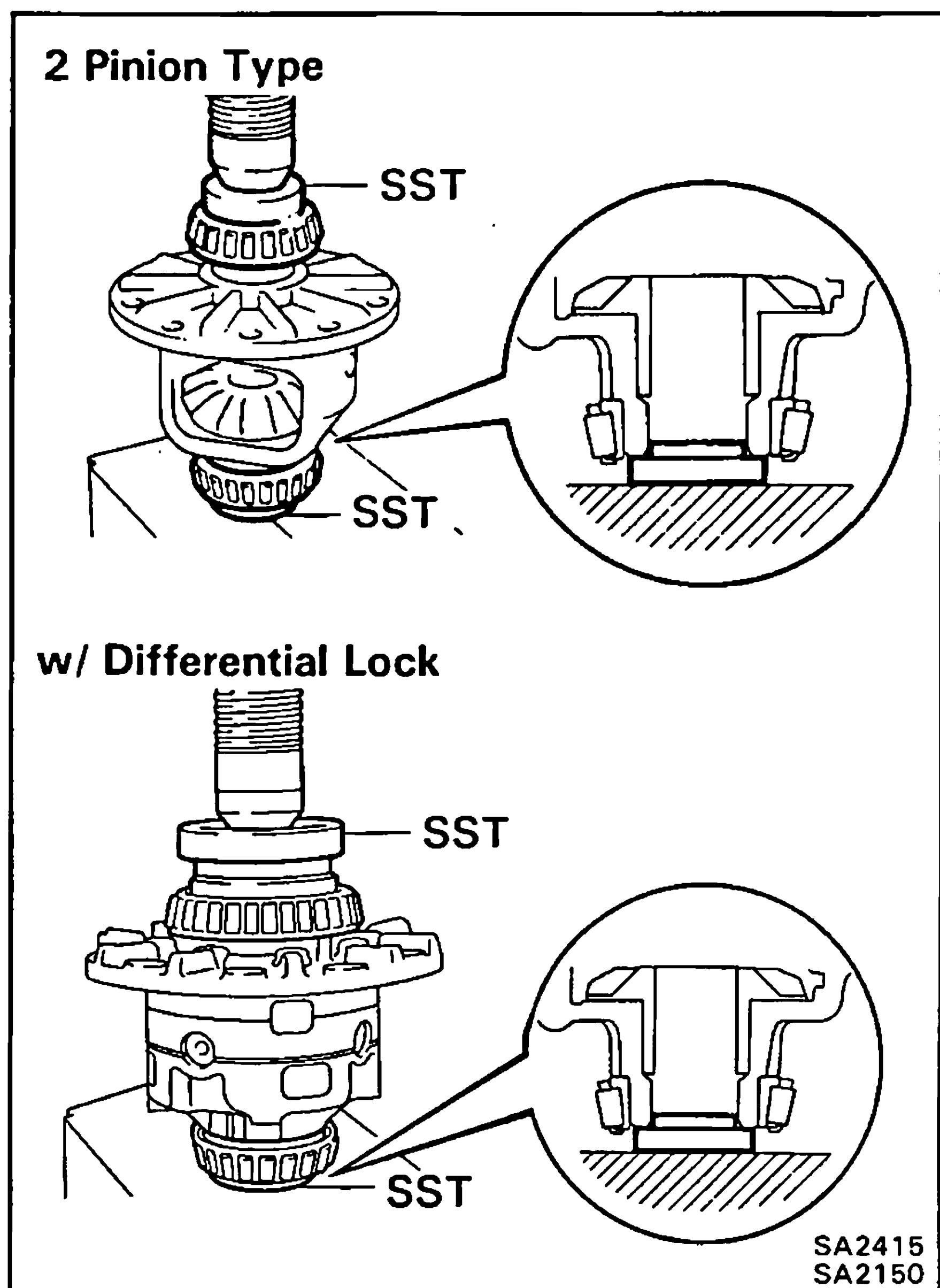
SST

2 pinion type

09608-30012 (09608-00060, 09608-04060)

w/ Differential lock (4 pinion type)

09223-15020, 09608-30012 (09608-04060)

**2. INSTALL RING GEAR ON DIFFERENTIAL CASE**

(a) Clean the contact surfaces of the differential case and ring gear.

(b) Heat the ring gear in boiling water.

(c) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

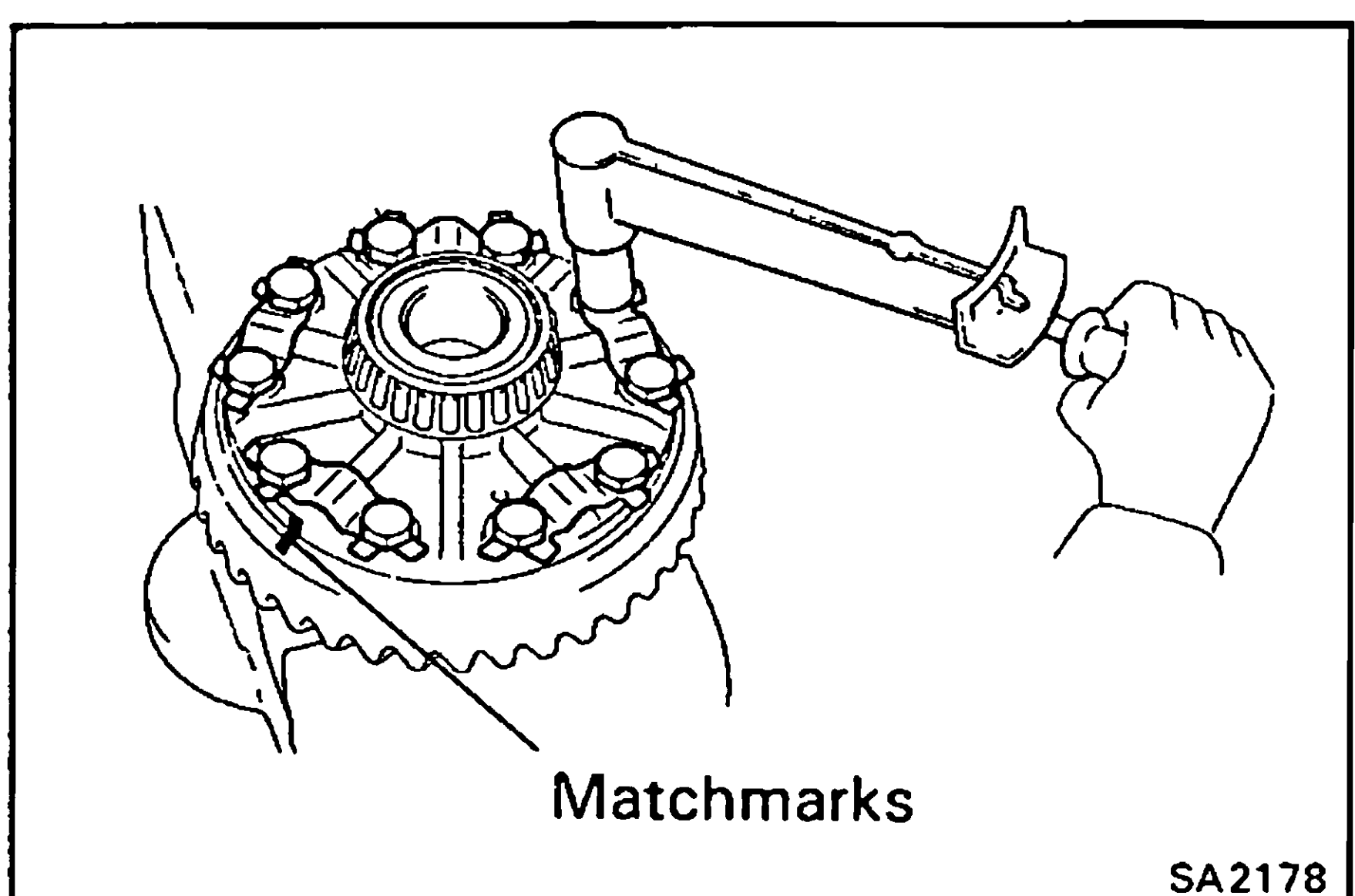
HINT: Align matchmarks on the ring gear and the differential case.

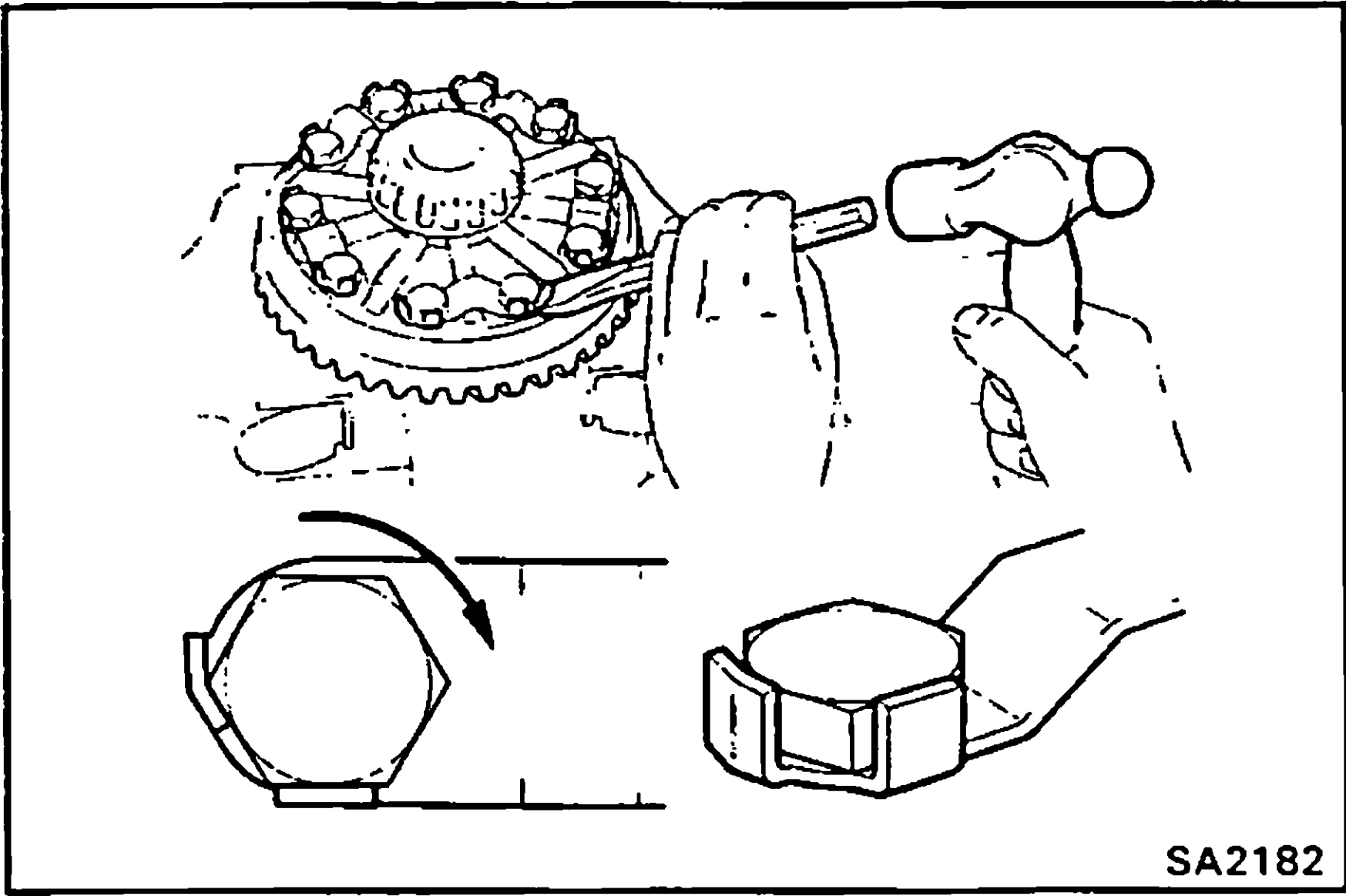
(d) Temporarily install five new lock plates and the ten bolts so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE: The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.

(e) After the ring gear has cooled sufficiently, torque the ring gear set bolts.

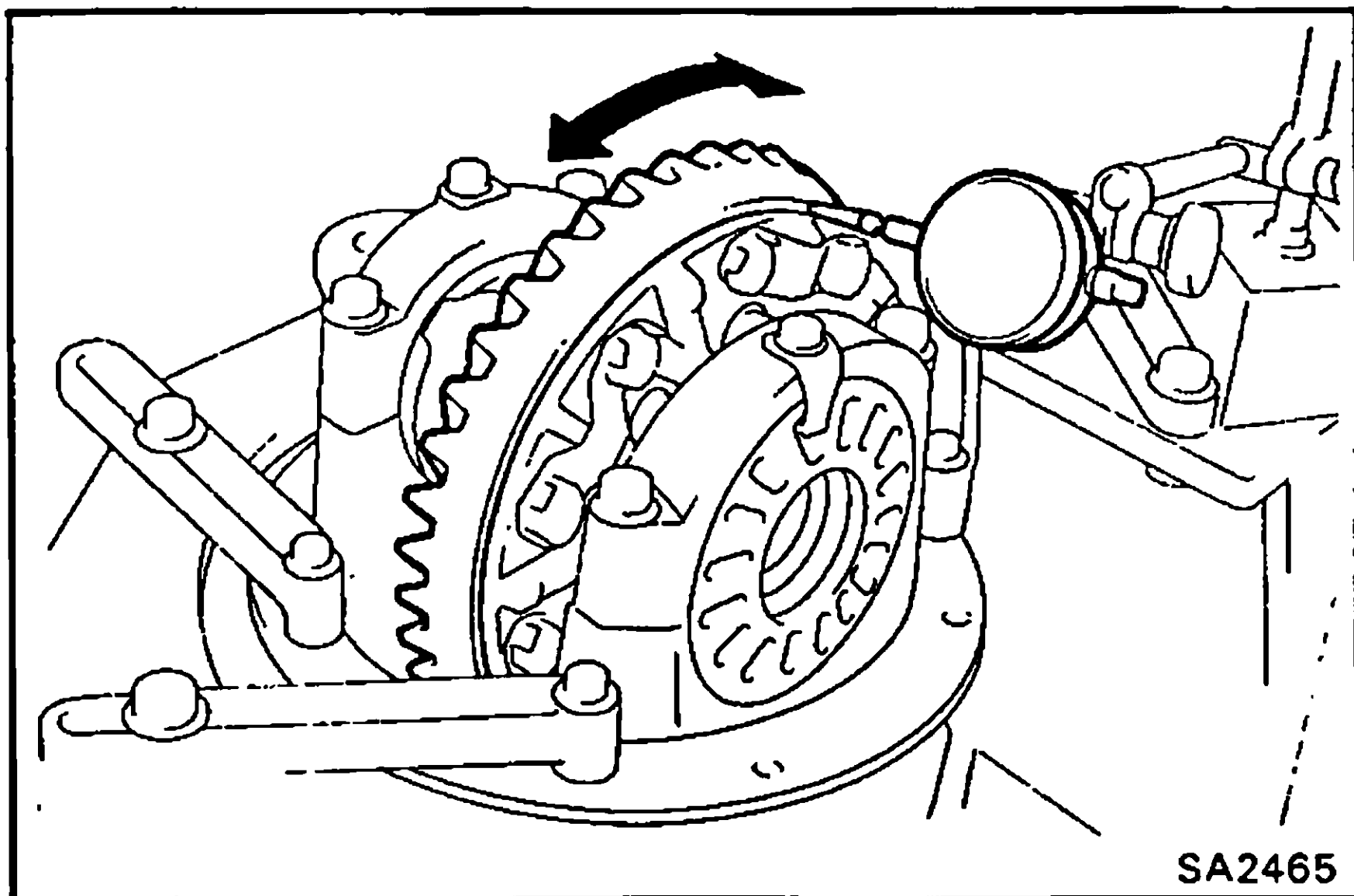
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)





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

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

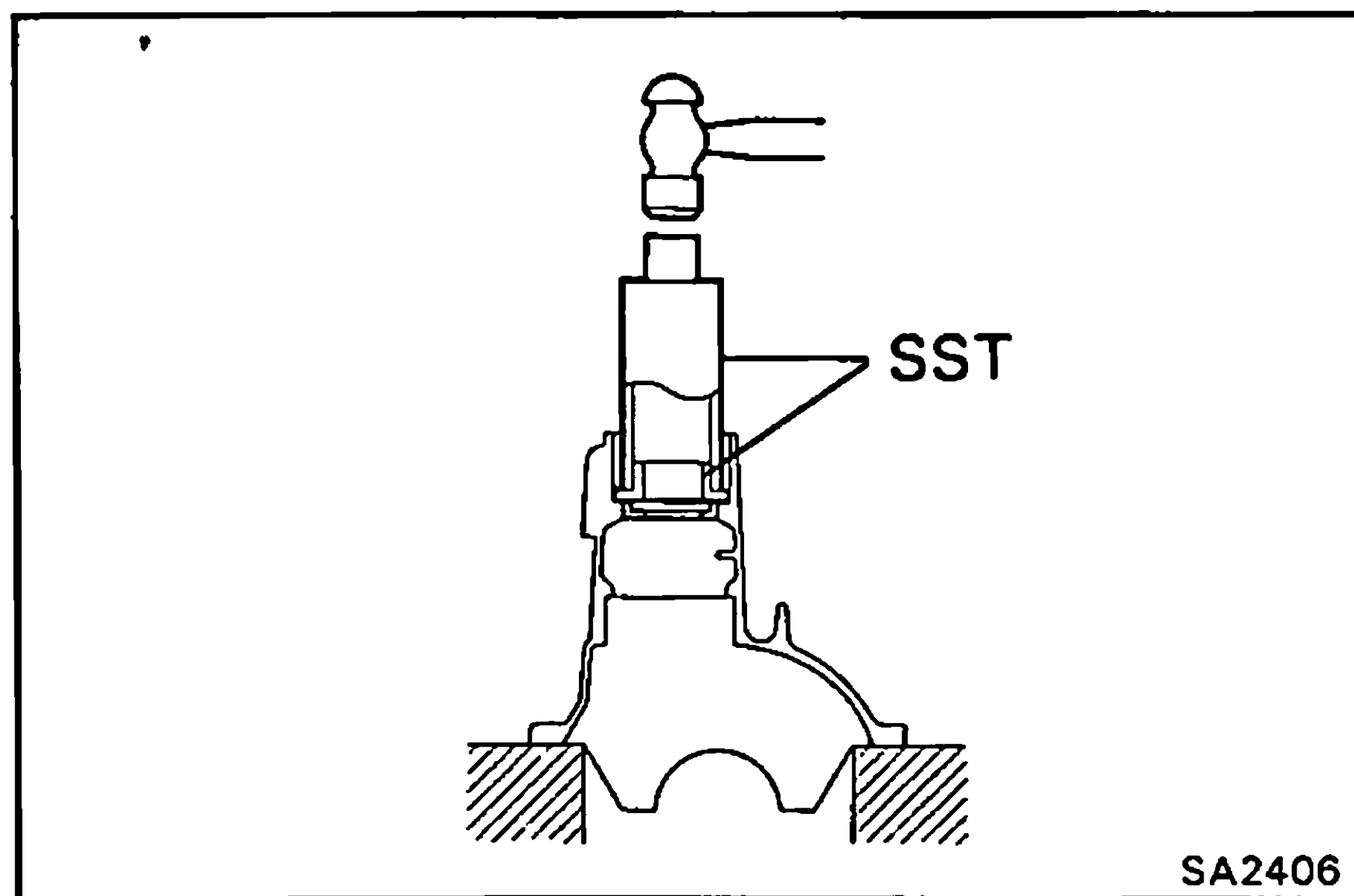


3. CHECK RING GEAR RUNOUT

- Install the differential case onto the carrier.
- Install bearing caps. (See page SA-38)
- Using a dial indicator, measure the runout of ring gear.

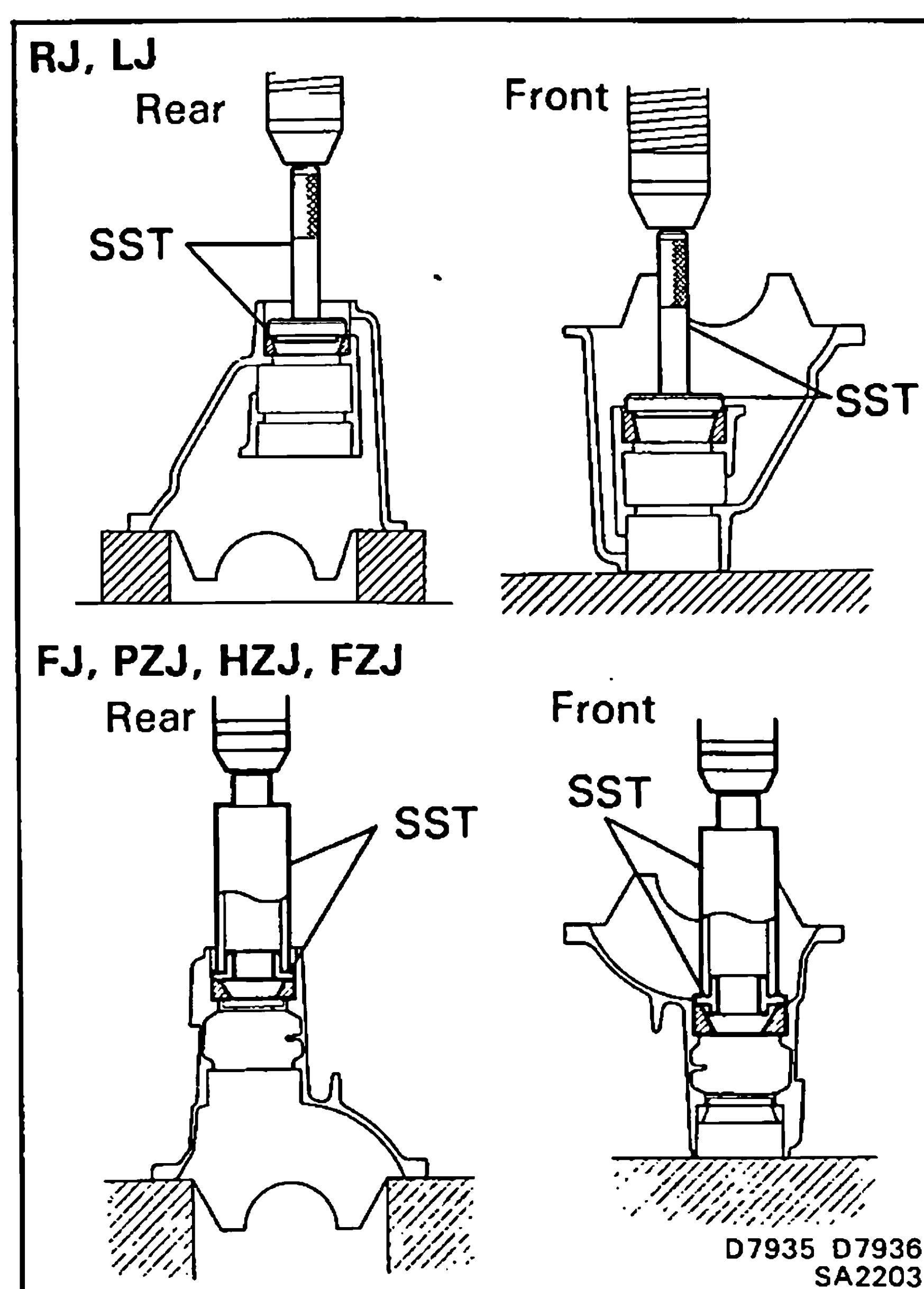
Maximum runout: 0.10 mm (0.0039 in.)

- Remove the differential case.
(See step 7 on page SA-31)



4. (FJ, PZJ, HZJ, FZJ) INSTALL OIL STORAGE RING

Using SST and a hammer, install a new oil storage ring.
SST 09316-60010 (09316-00010, 09316-00020)



5. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

Using SST and a press, install the outer races.

SST 09608-30012 (RJ, LJ)

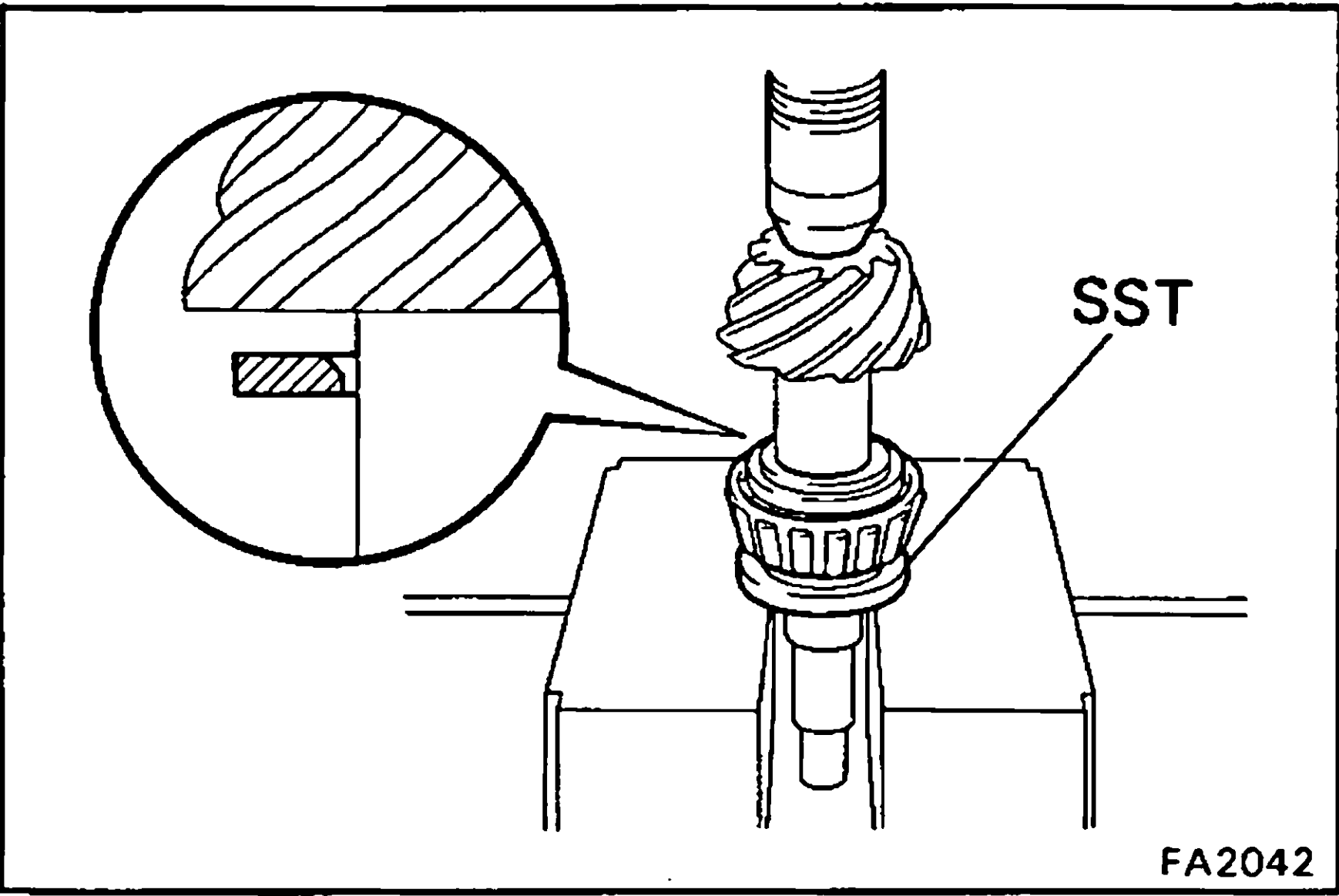
Rear (09608-04020, 09608-04110)

Front (09608-04020, 09608-04100)

09316-60010 (FJ, PZJ, HZJ, FZJ)

Rear (09316-00010, 09316-00020)

Front (09316-00010, 09316-00050)



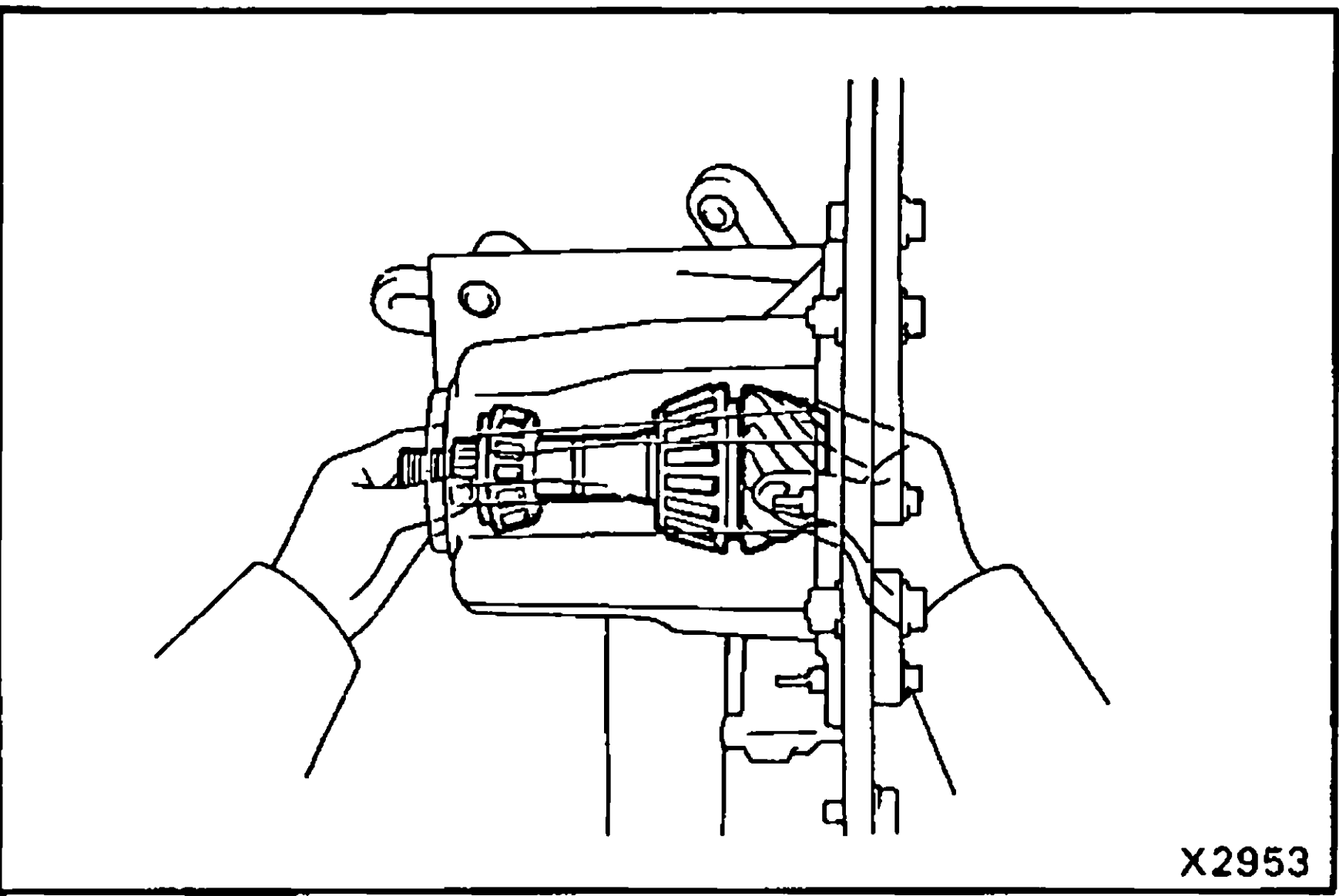
6. INSTALL DRIVE PINION FRONT BEARING

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

HINT: First fit a washer with the same thickness as the washer which was removed, then after checking the teeth contact pattern, replace the washer with one of a different thickness if necessary.

- (b) Using SST, press in the front bearing onto the drive pinion.

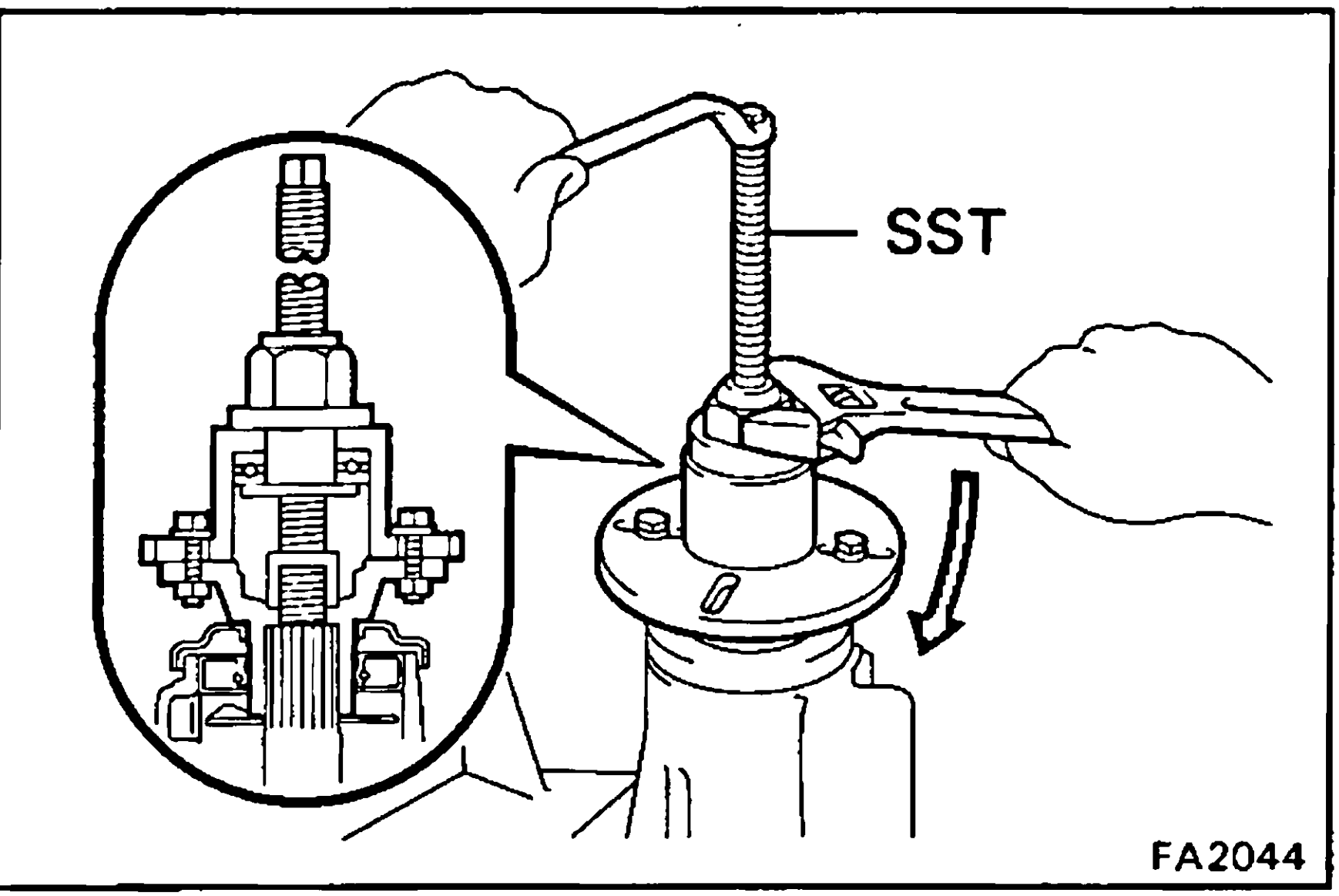
SST 09506-30012



7. TEMPORARILY ADJUST DRIVE PINION PRELOAD

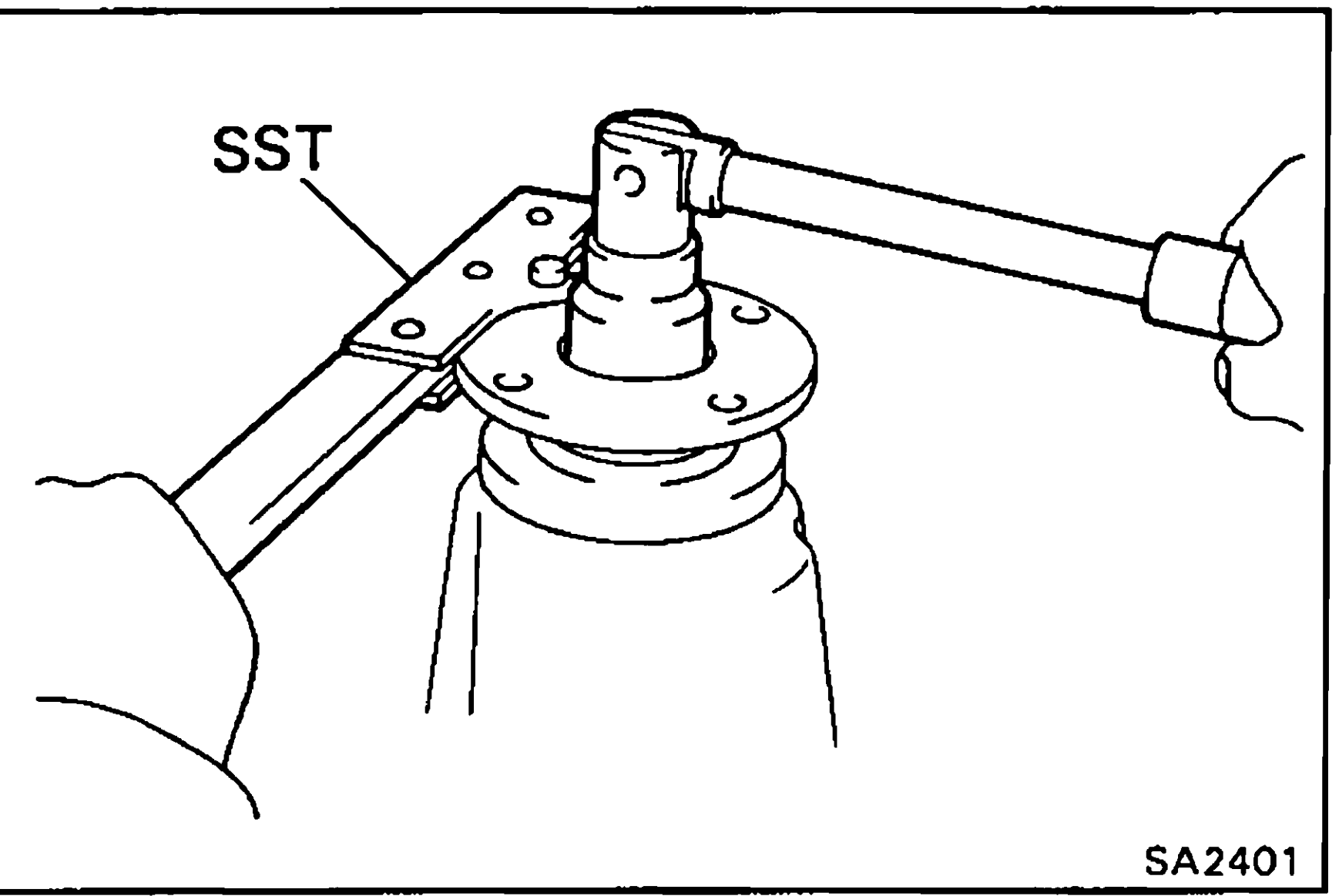
- (a) Install the drive pinion, rear bearing and oil slinger.

HINT: Assemble the spacer and oil seal after adjusting the teeth contact pattern.



- (b) Using SST, install the companion flange.

SST 09557-22022 (09557-22050)

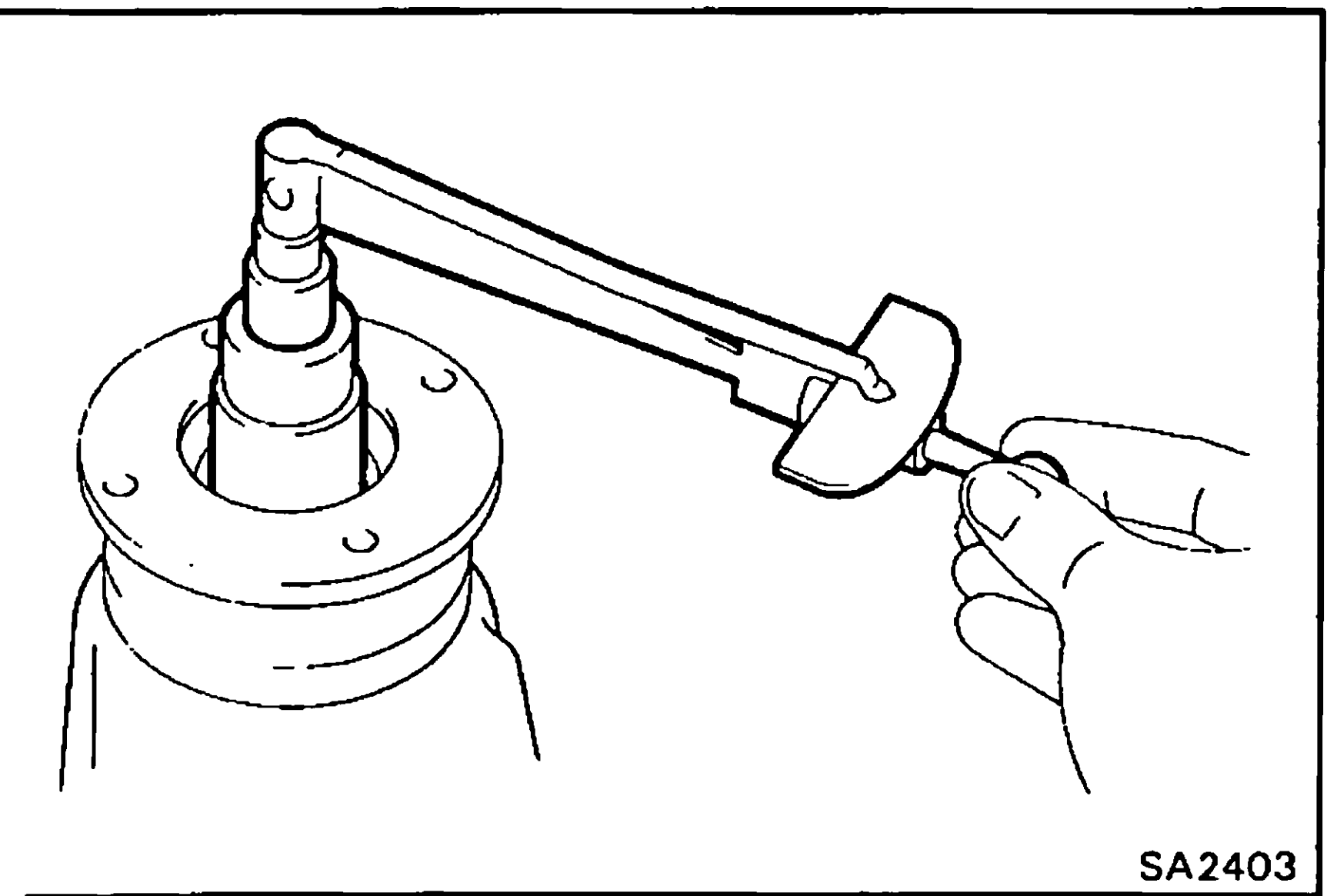


- (c) Adjust the drive pinion preload by tightening the plate washer and companion flange nut.

HINT: Using SST to hold the flange, tighten the nut.

SST 09330-00021

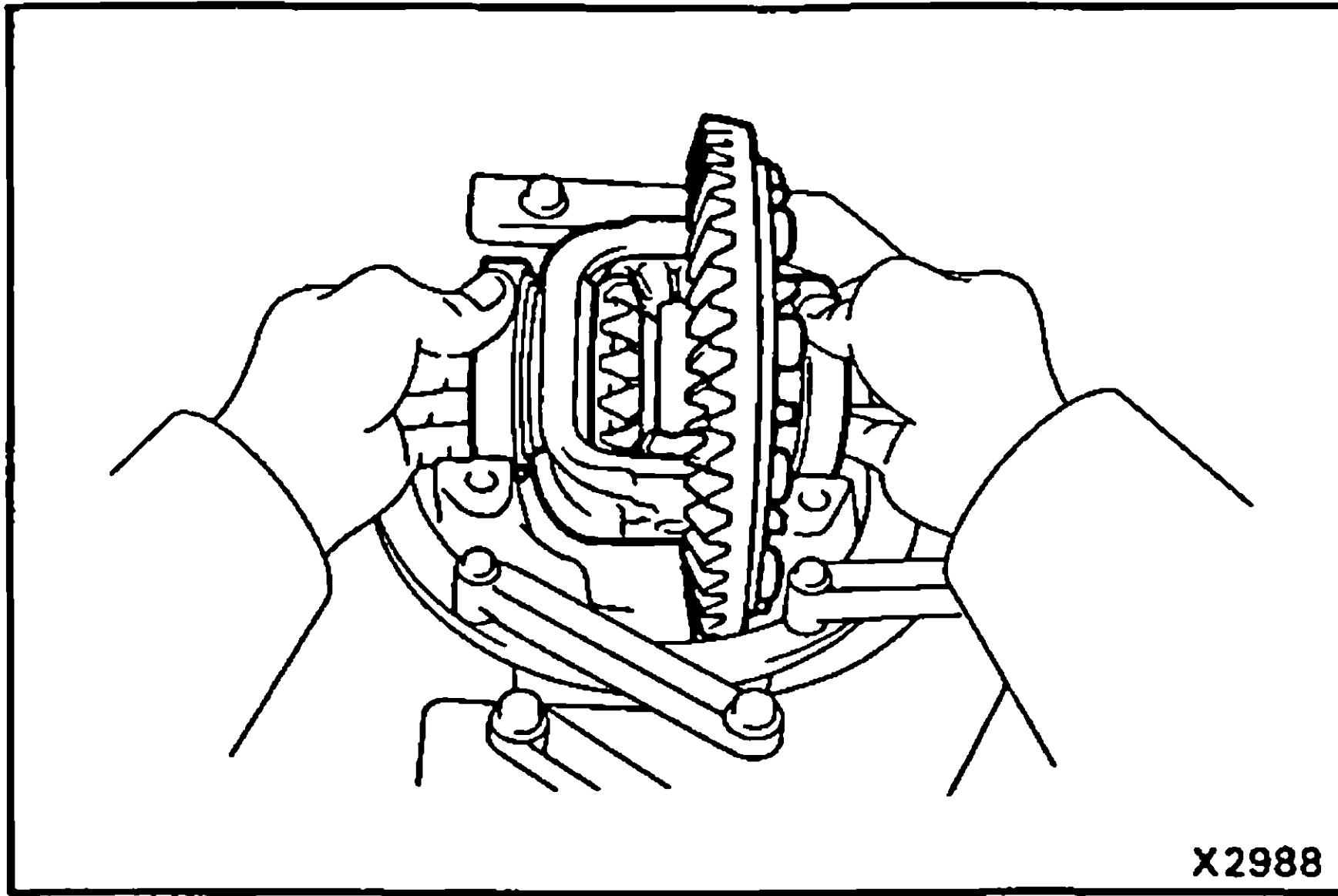
NOTICE: As there is no spacer, tighten the nut a little at a time, being careful not to overtighten it.



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

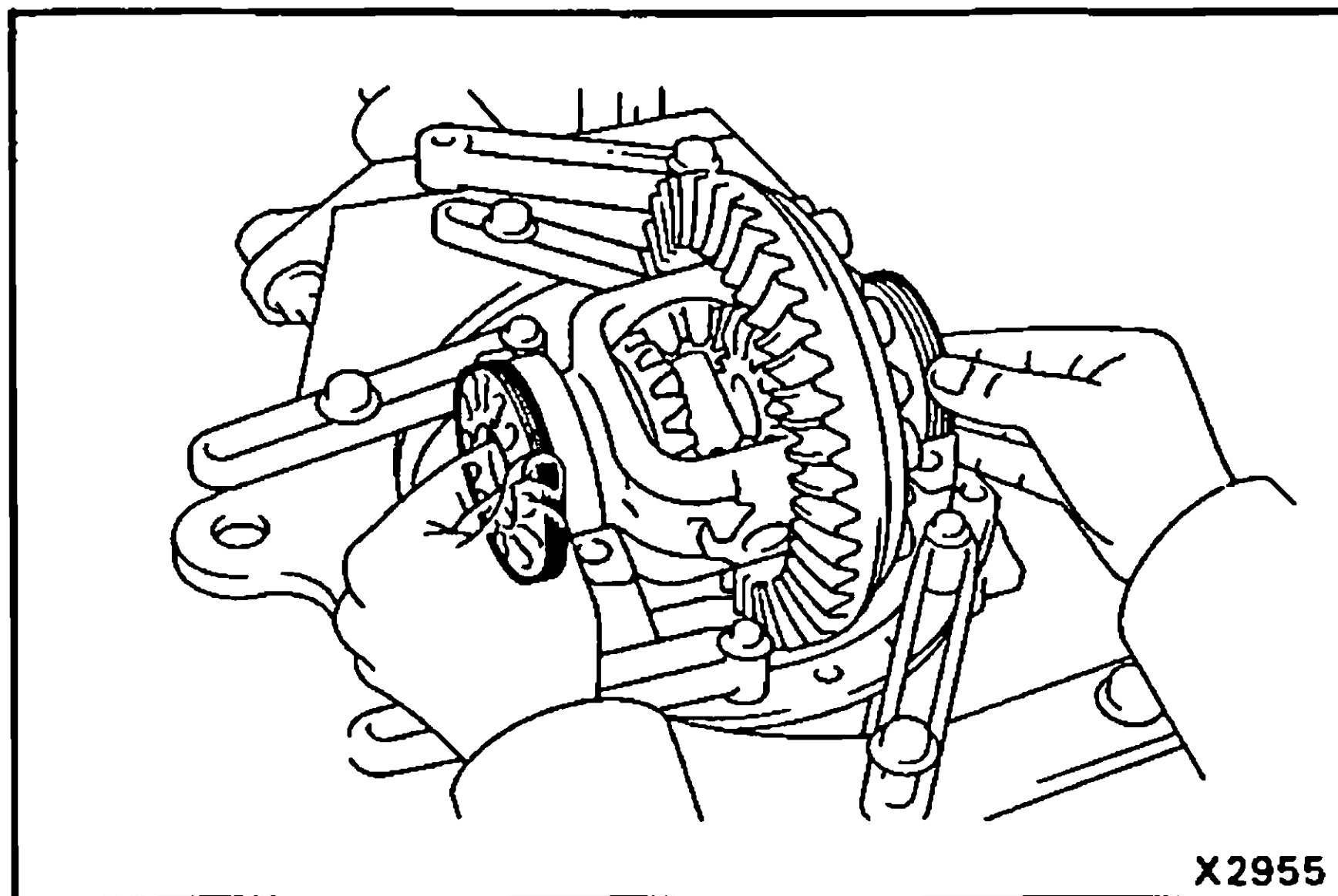
Preload (at starting):

Models	New bearing	Reused bearing
RJ, LJ	1.9 – 2.5 N·m (19 – 26 kgf·cm,) (16.5 – 22.6 in.·lbf)	0.9 – 1.3 N·m (9 – 13 kgf·cm,) (7.8 – 11.3 in.·lbf)
FJ, PZJ, HZJ, FZJ	0.9 – 1.6 N·m (10 – 16 kgf·cm,) (8.7 – 13.9 in.·lbf)	0.5 – 0.8 N·m (5 – 8 kgf·cm,) (4.3 – 6.9 in.·lbf)

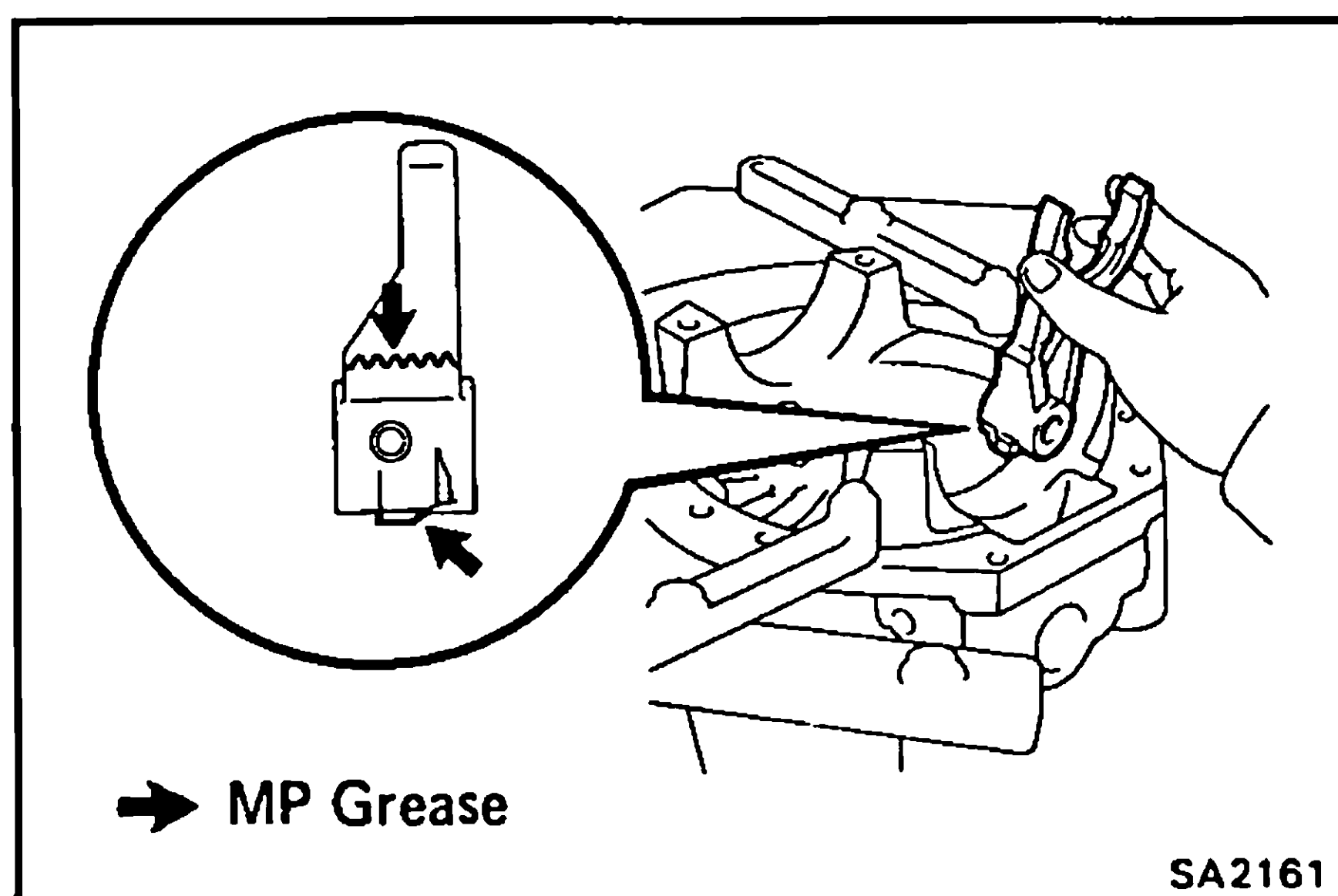
**8. INSTALL DIFFERENTIAL CASE AND ADJUSTING NUTS (2 PINION TYPE)**

- (a) Place the bearing outer races on their respective bearings. Make sure that the left and right outer races are not interchanged.
- (b) Install the case in the carrier.

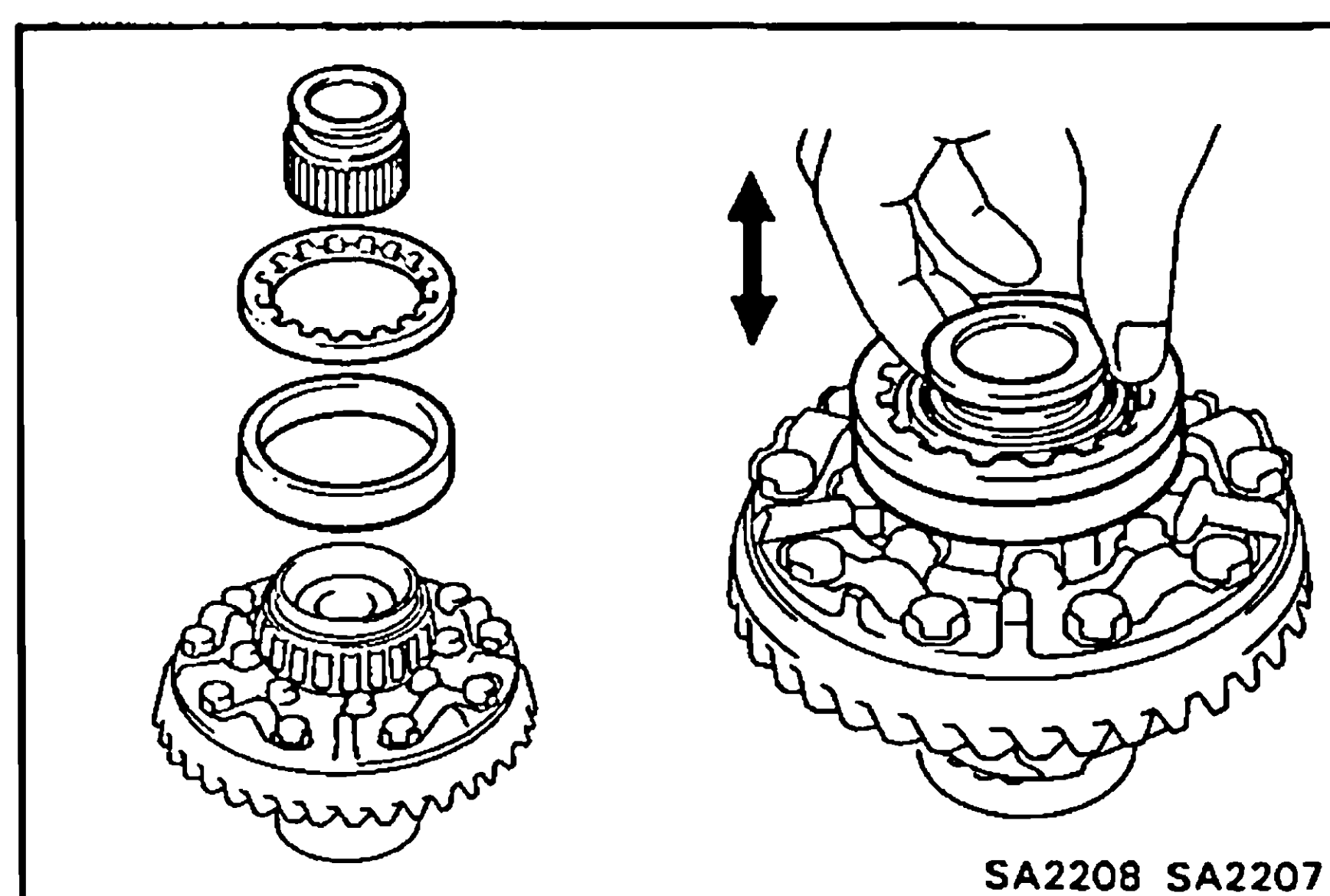
HINT: Make sure that there is backlash between the ring gear and drive pinion.



- (c) Install the adjusting nuts on the carrier, making sure that the nuts are threaded properly.

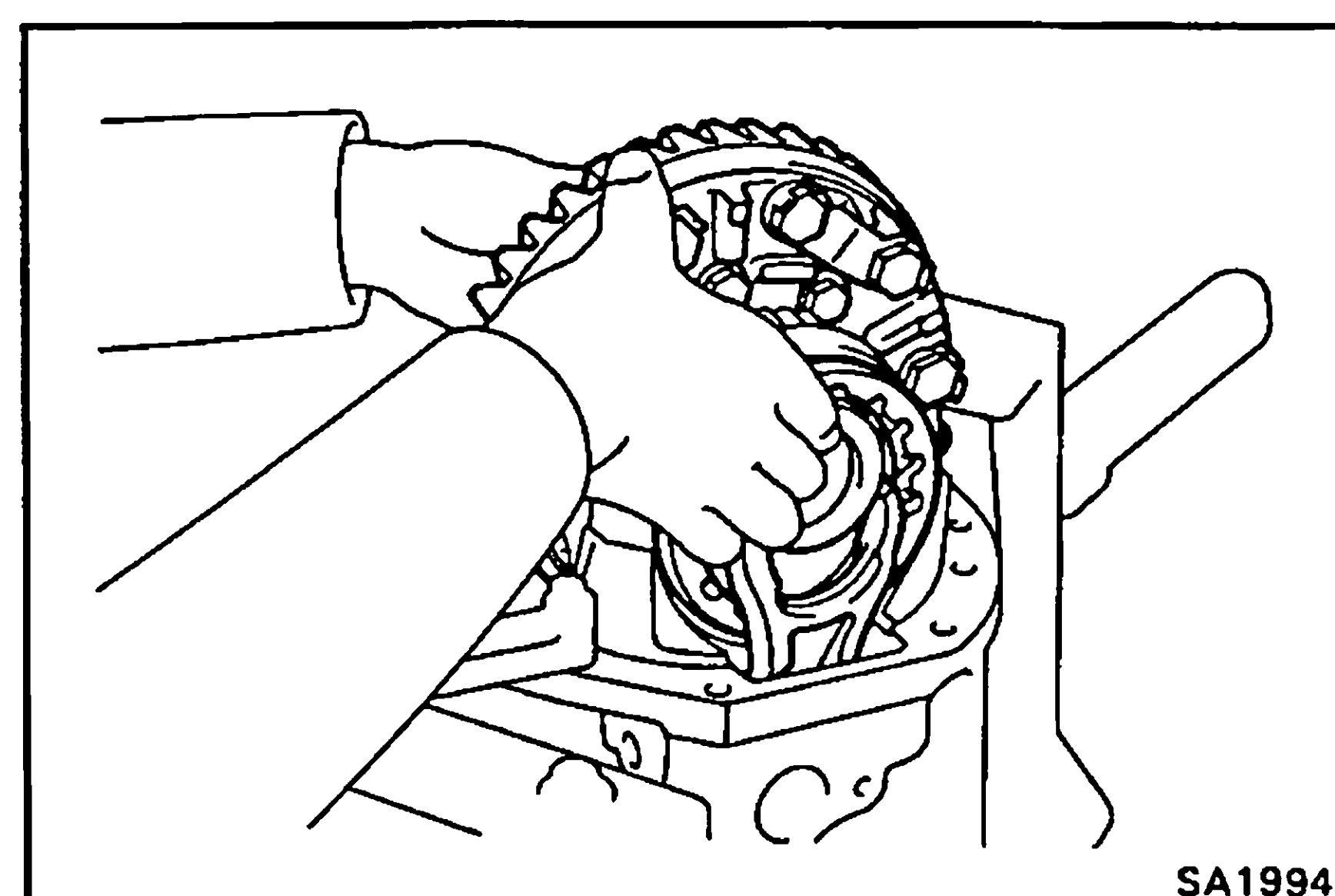
**(w/ DIFFERENTIAL LOCK)**

- (a) Apply MP grease on the rack of the shift fork and connecting part of the indicator switch.
- (b) Insert the shift fork into the differential carrier as shown.



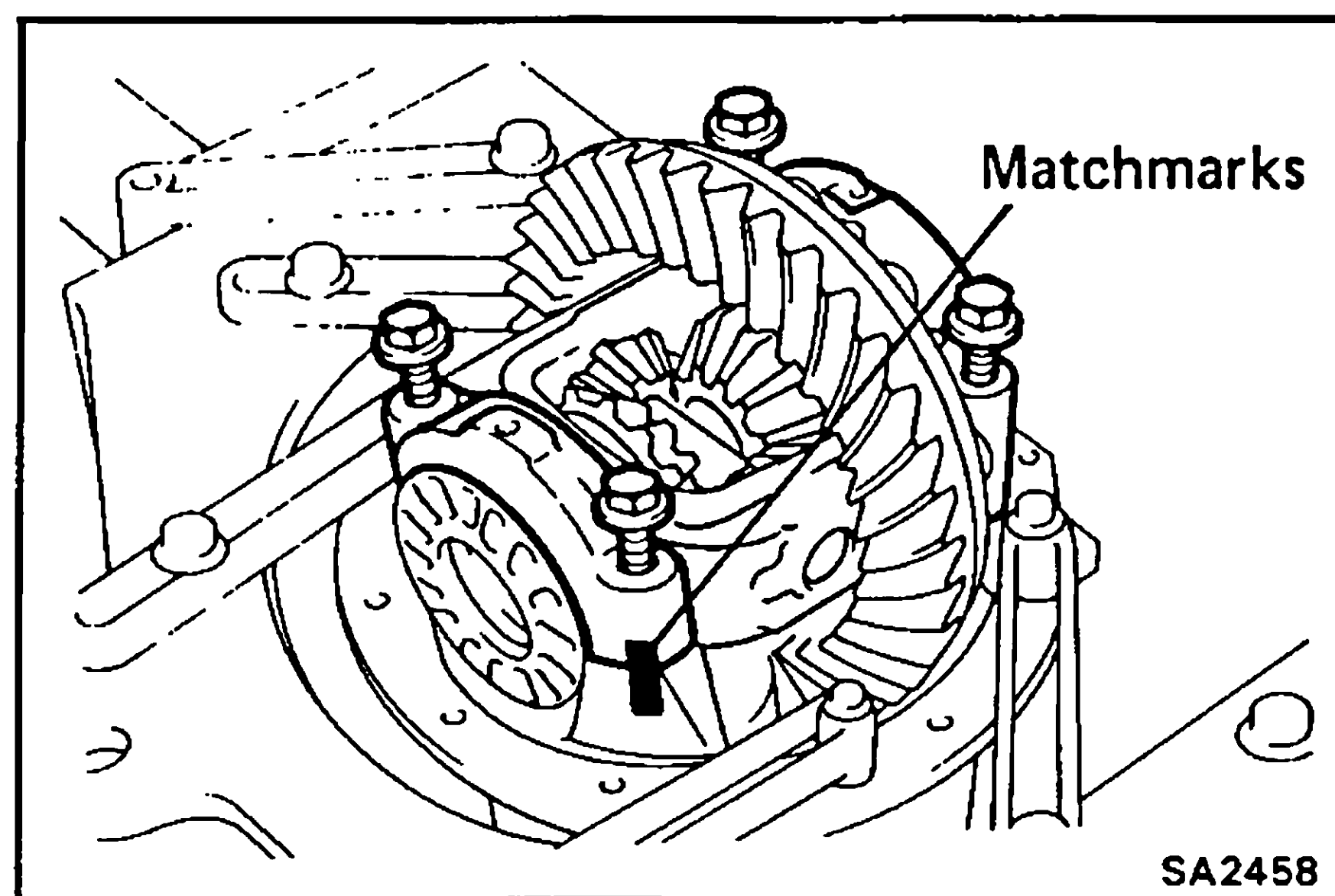
- (c) Install both bearing outer races, adjusting nuts and sleeve to the differential case.

HINT: Check that the sleeve moves smoothly.



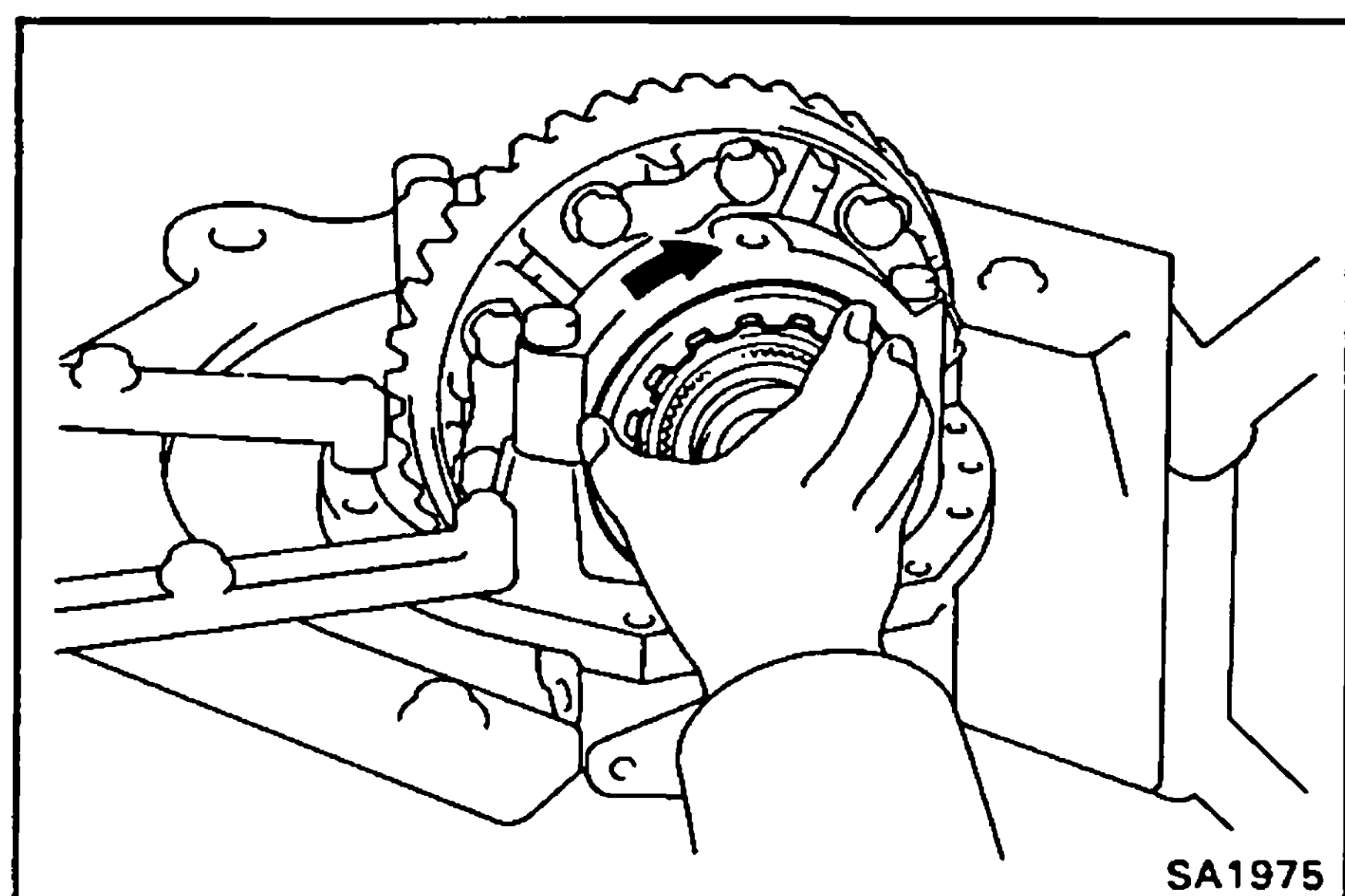
- (d) Install the shift fork in the groove of the sleeve, holding it by hand, install the case in the carrier.

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

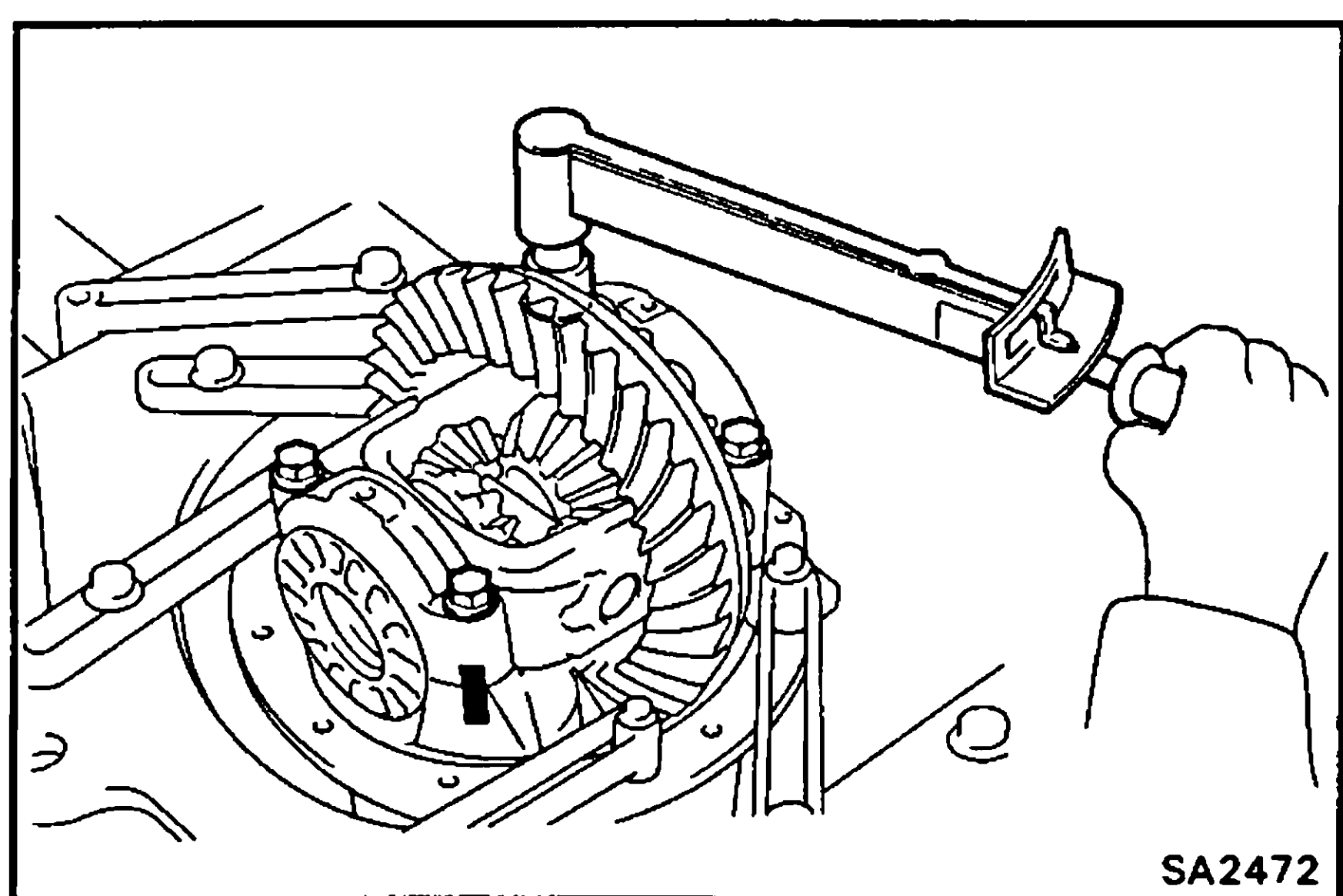


9. INSTALL BEARING CAPS

Align matchmarks on the cap and carrier. Screw in the two bearing cap bolts two or three turns and press down the bearing cap by hand.



HINT: If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly. Reinstall the adjusting nuts if necessary.

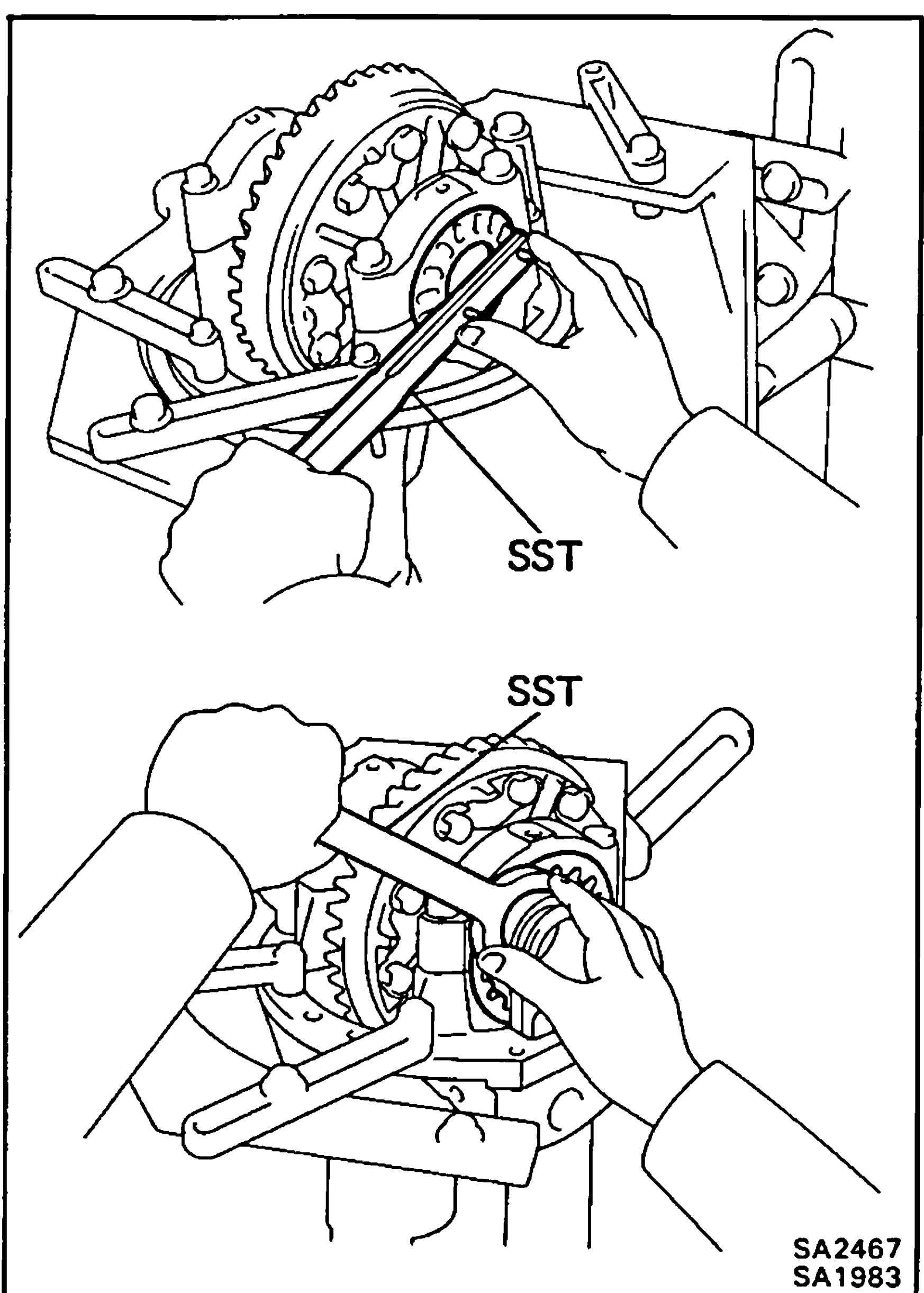


10. ADJUST SIDE BEARING PRELOAD

- (a) Tighten the four bearing cap bolts to the specified torque, then loosen them to the point where they can be turned by hand.

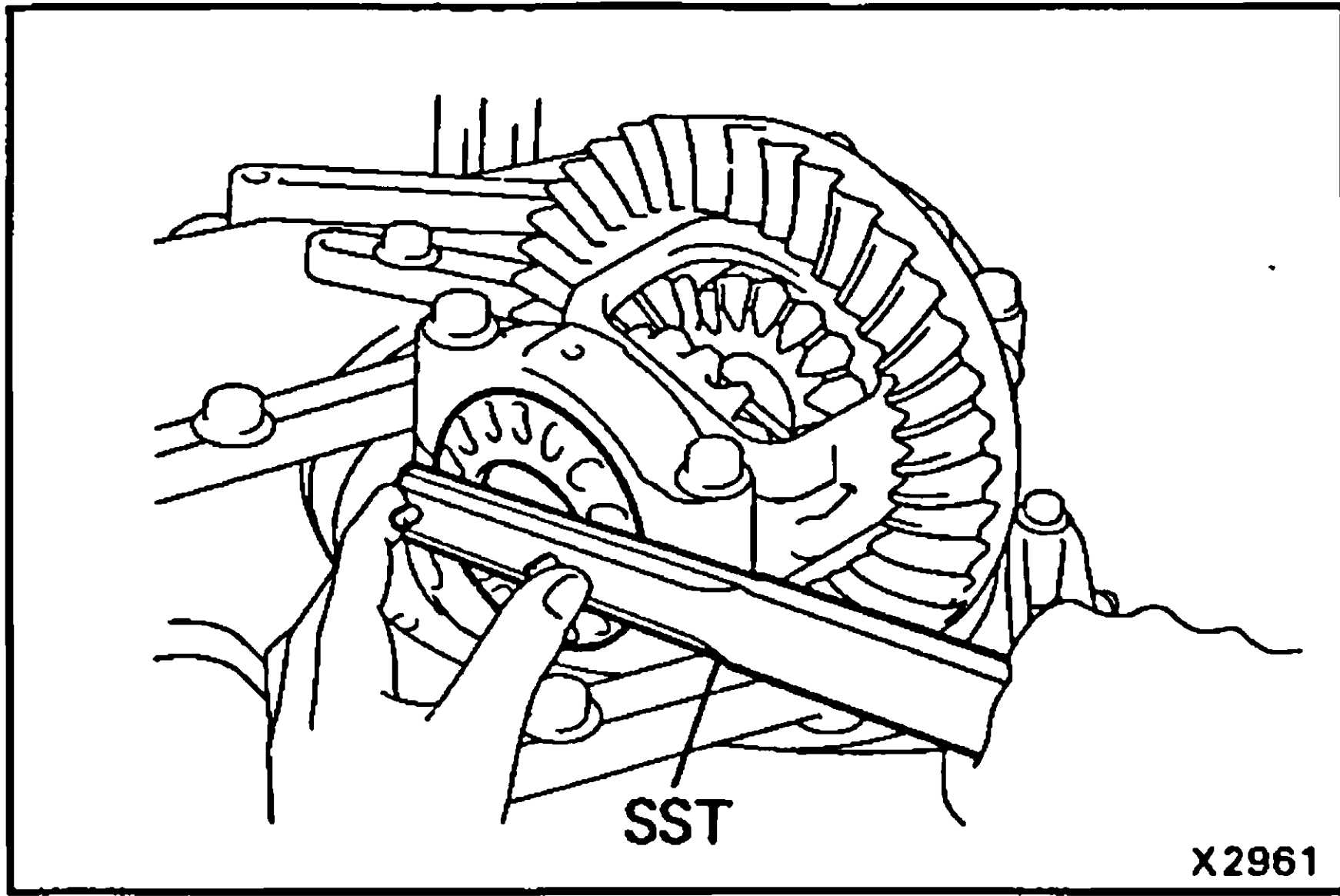
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

- (b) Fully tighten the four bearing cap bolts by hand.



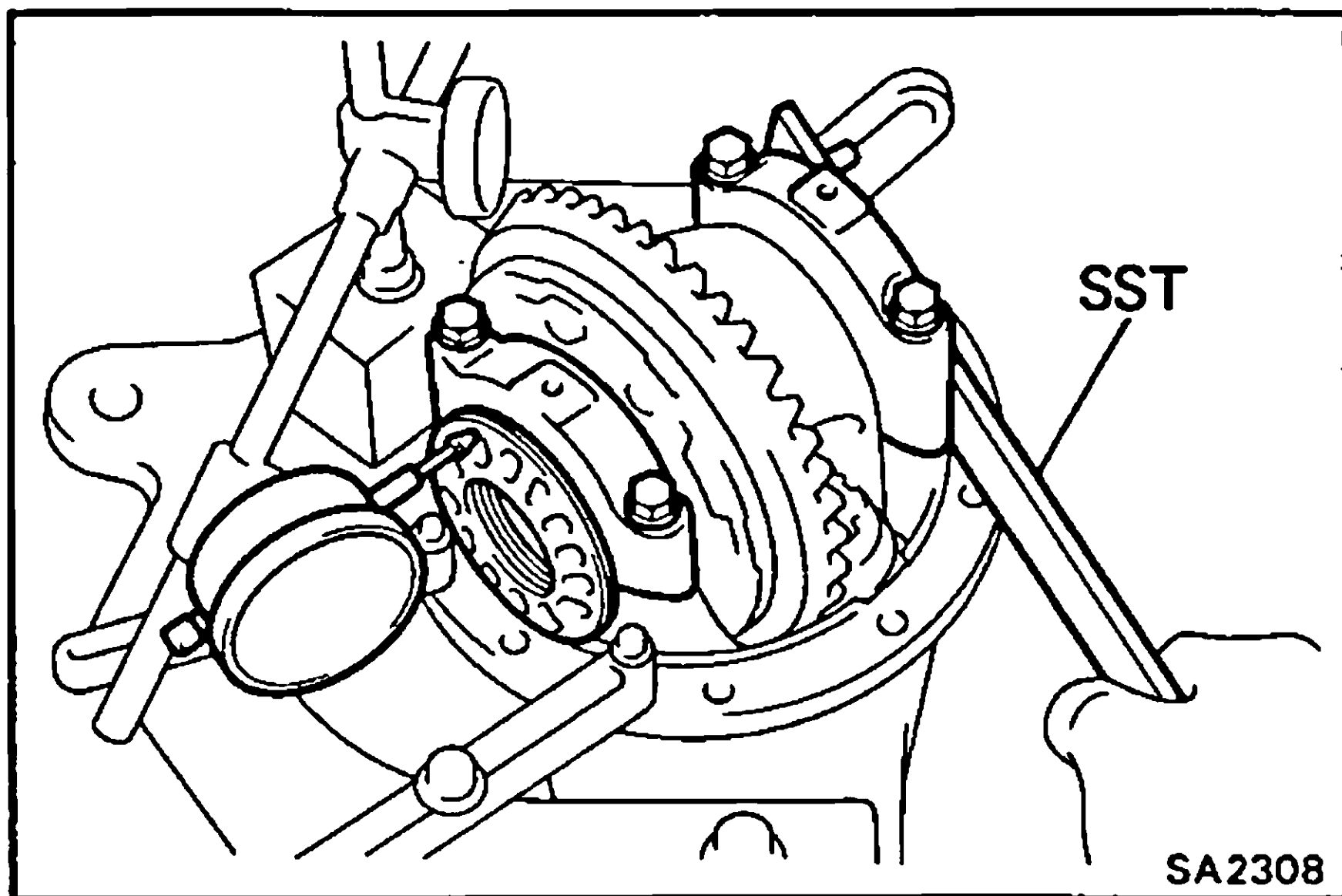
- (c) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

SST 09504-00011 or 09616-30020

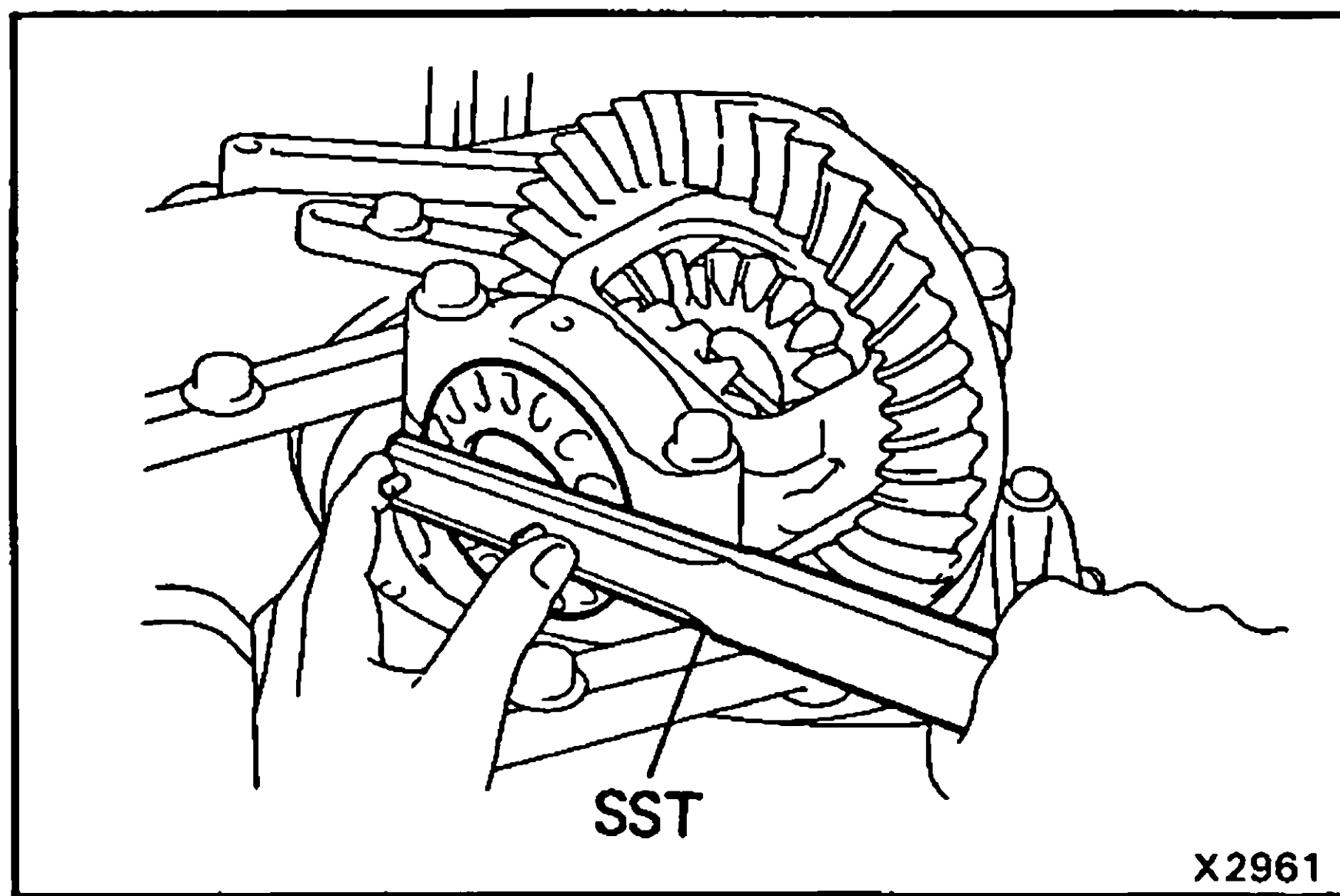


- (d) While turning the ring gear, use SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.

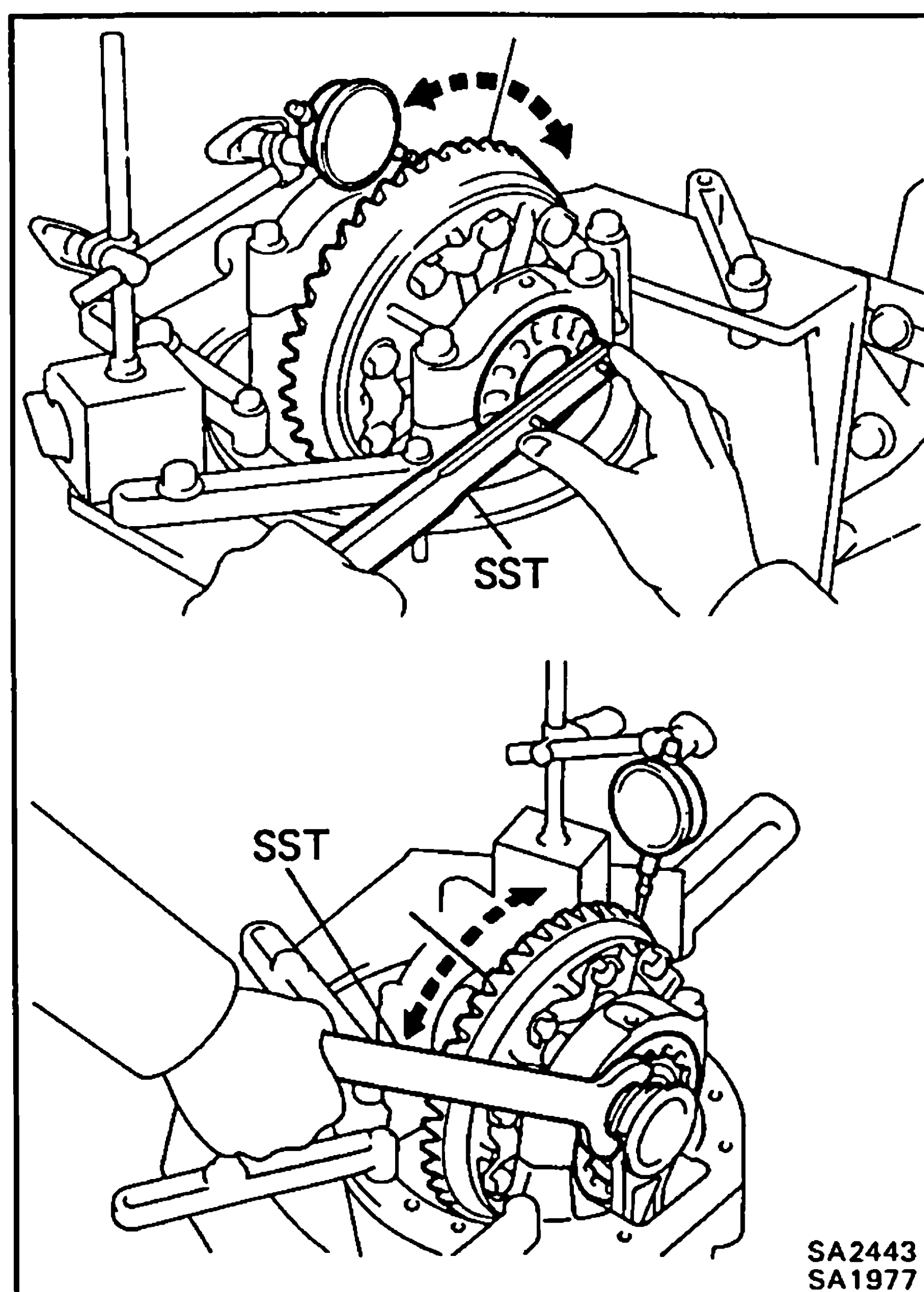
SST 09504-00011



- (e) Place a dial indicator on the top of the adjusting nut 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.



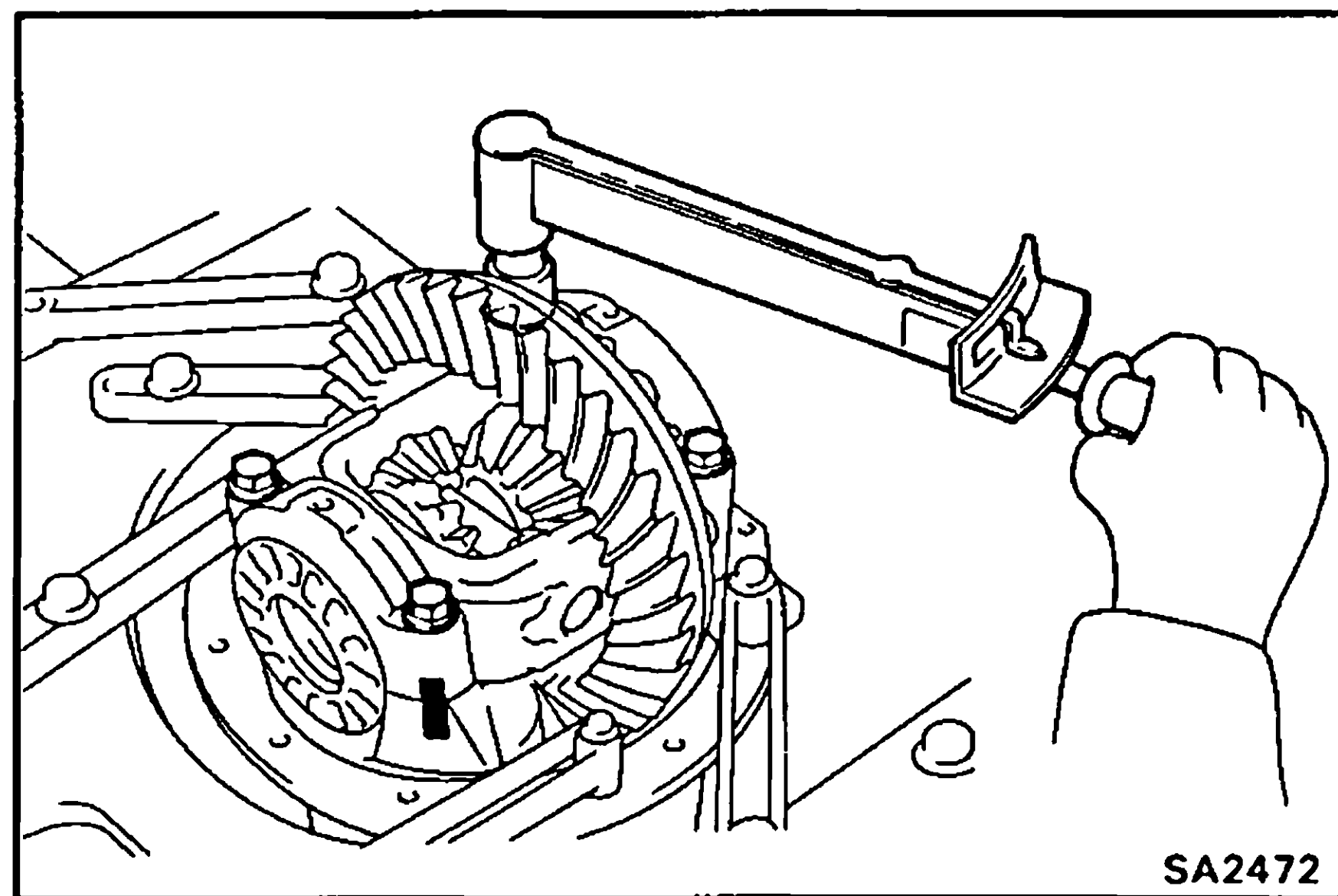
- (g) Tighten the adjusting nut 1 - 1 1/2 notches from the zero preload position.



- (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.)

HINT: 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.

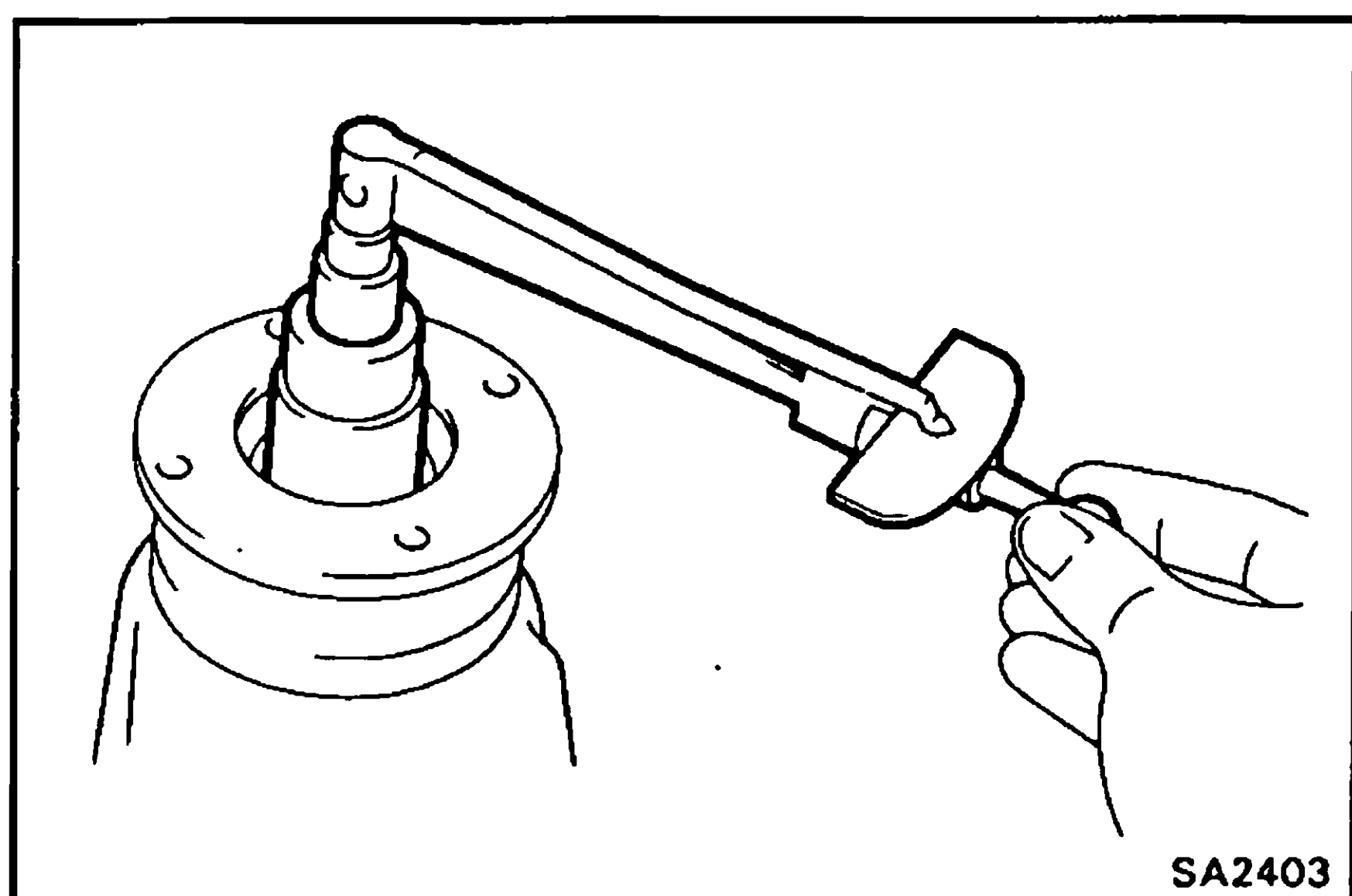


(i) Torque the bearing cap bolts.

Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

(j) Recheck the ring gear backlash.

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



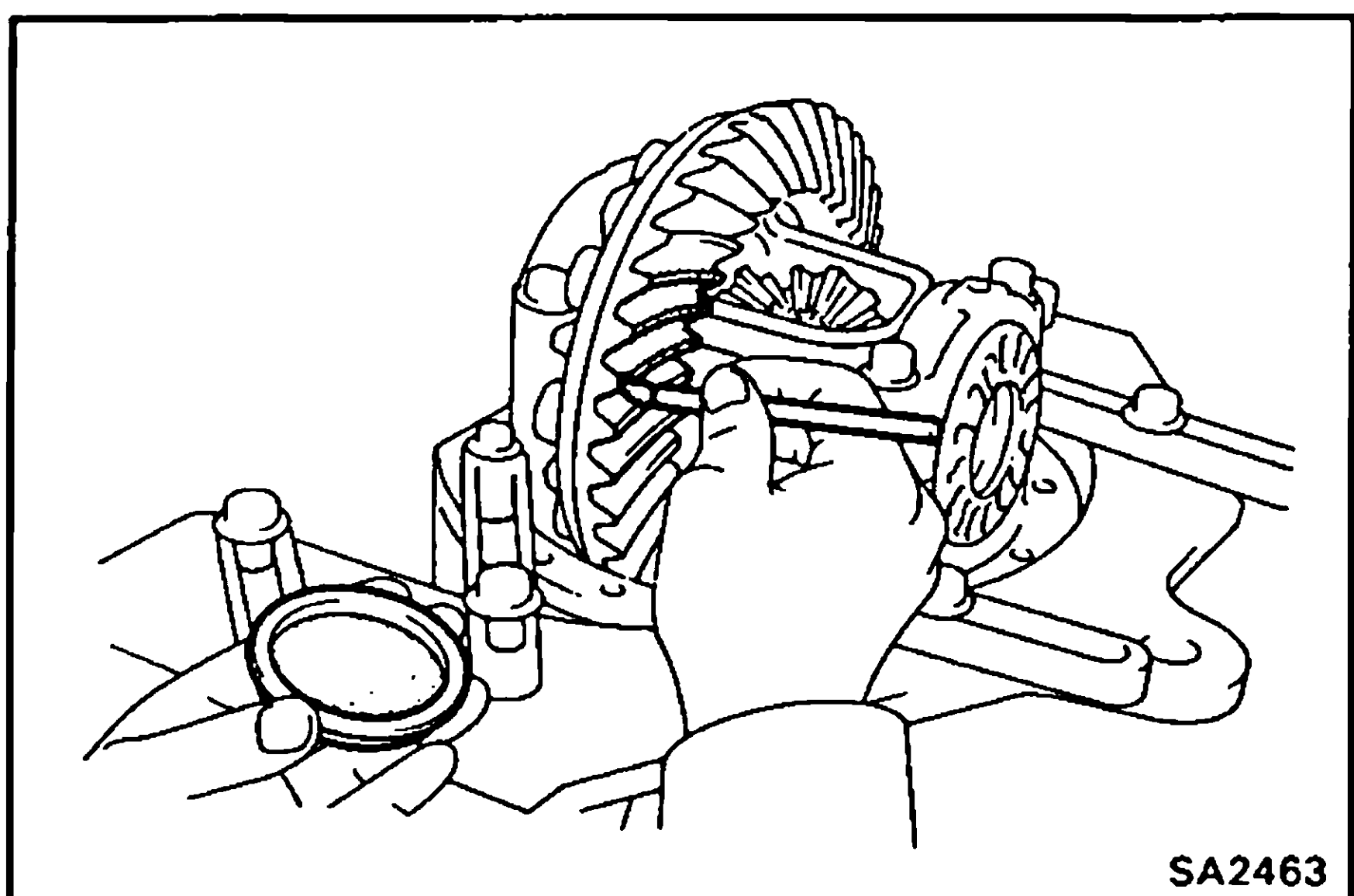
(k) Using a torque meter, measure the total preload.

Total preload (at starting):

Add drive pinion preload

0.4 — 0.6 N·m

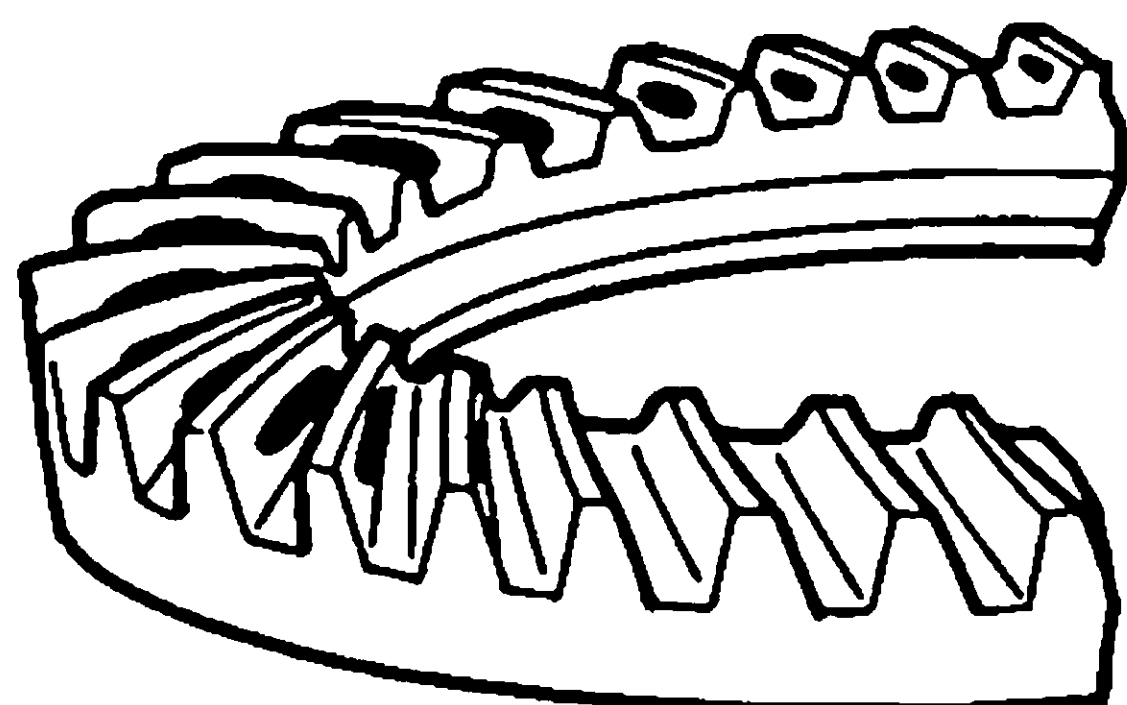
(4 — 6 kgf·cm, 3.5 — 5.2 in.·lbf)



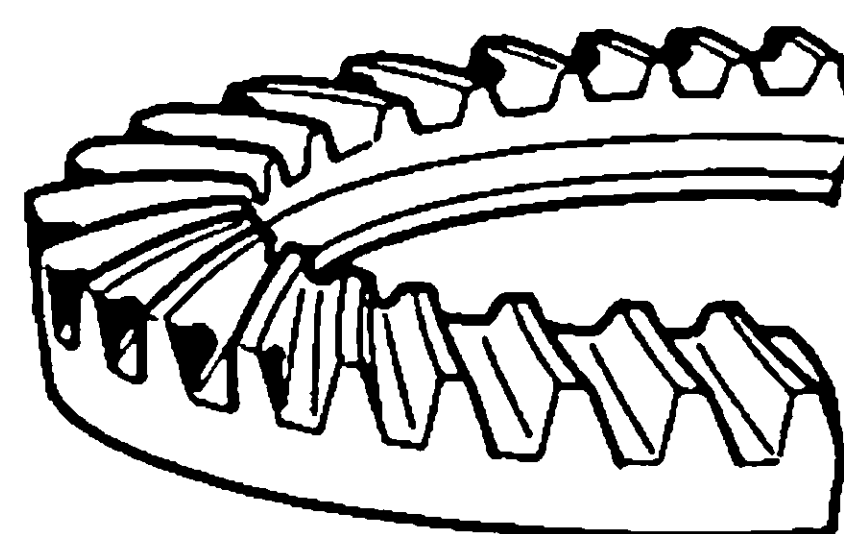
11. INSPECT TEETH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- Coat 3 or 4 teeth at three different positions on the ring gear with red lead.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the teeth pattern.

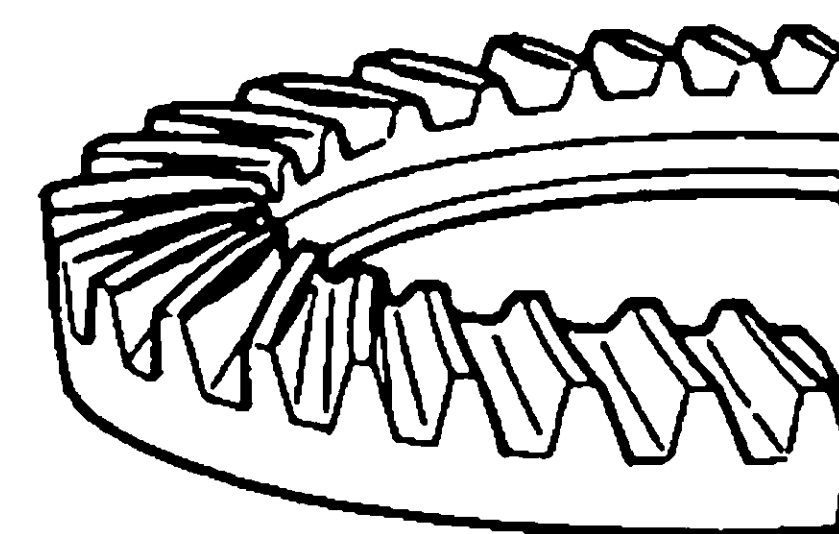
Proper Contact



Heel Contact

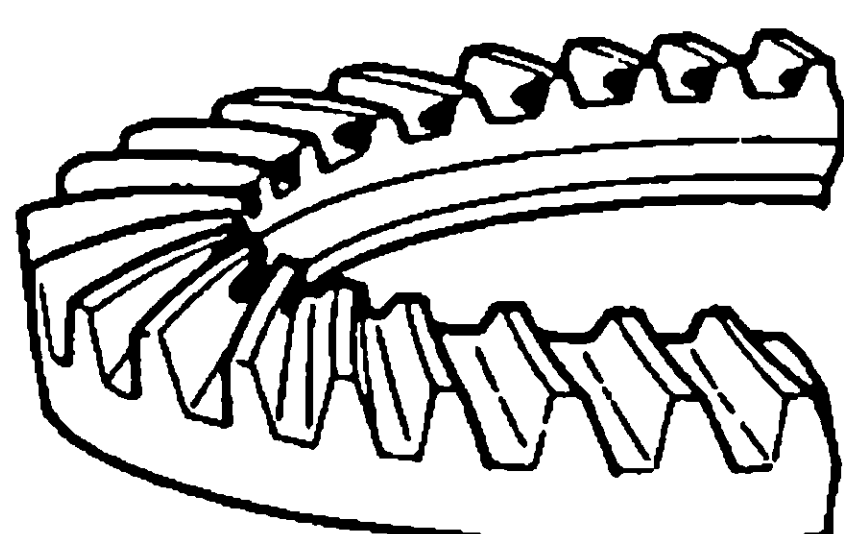


Face Contact

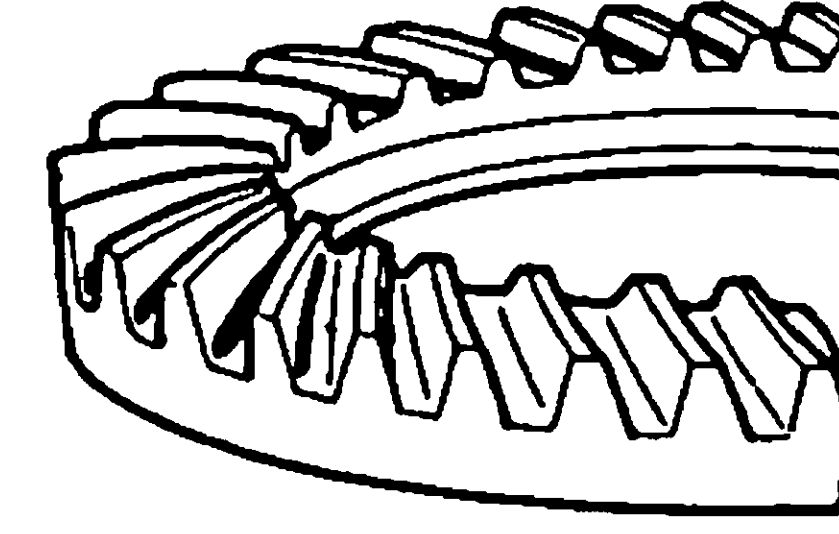


Select an adjusting washer that will bring the drive pinion closer to the ring gear.

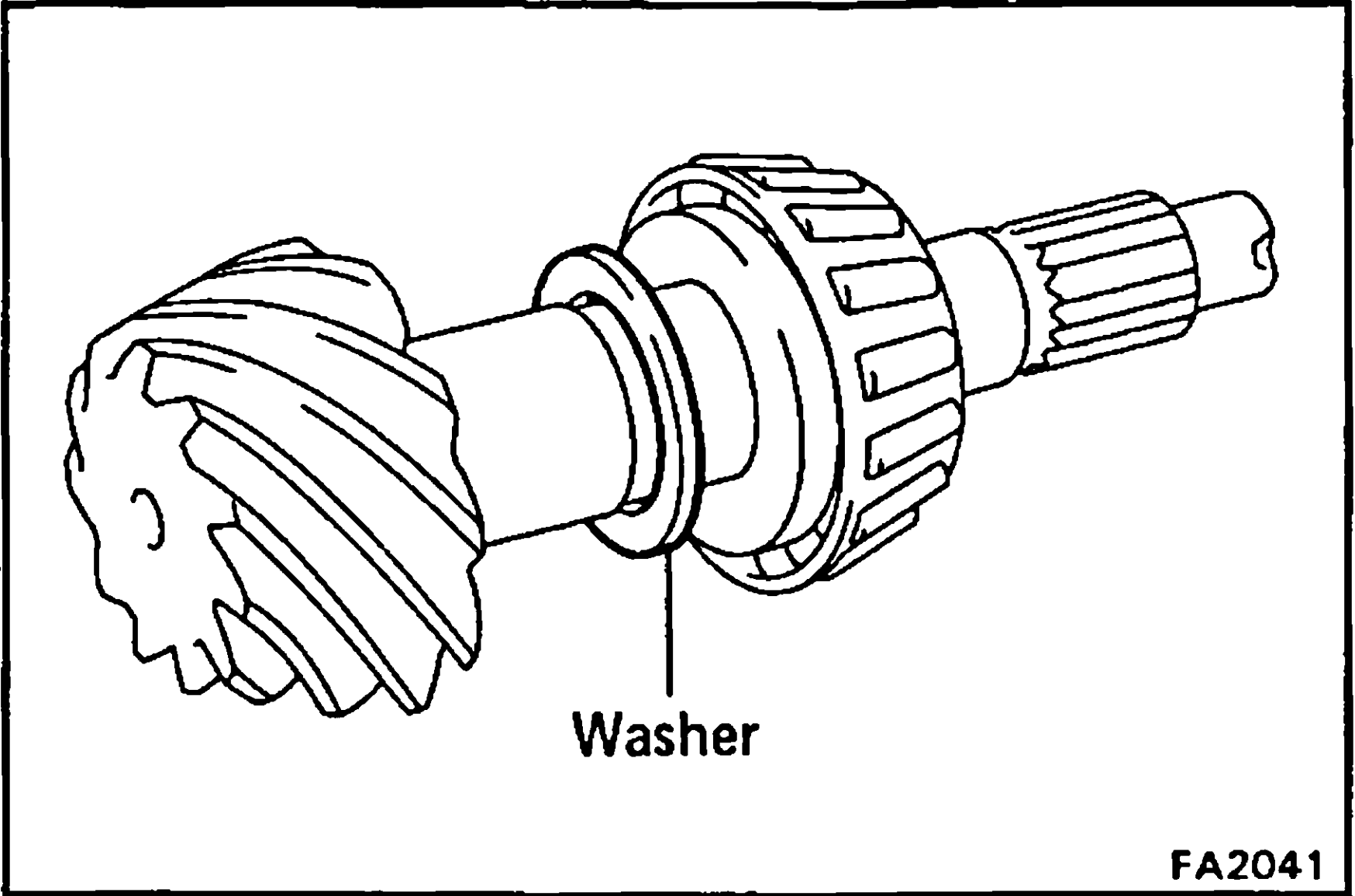
Toe Contact



Flank Contact



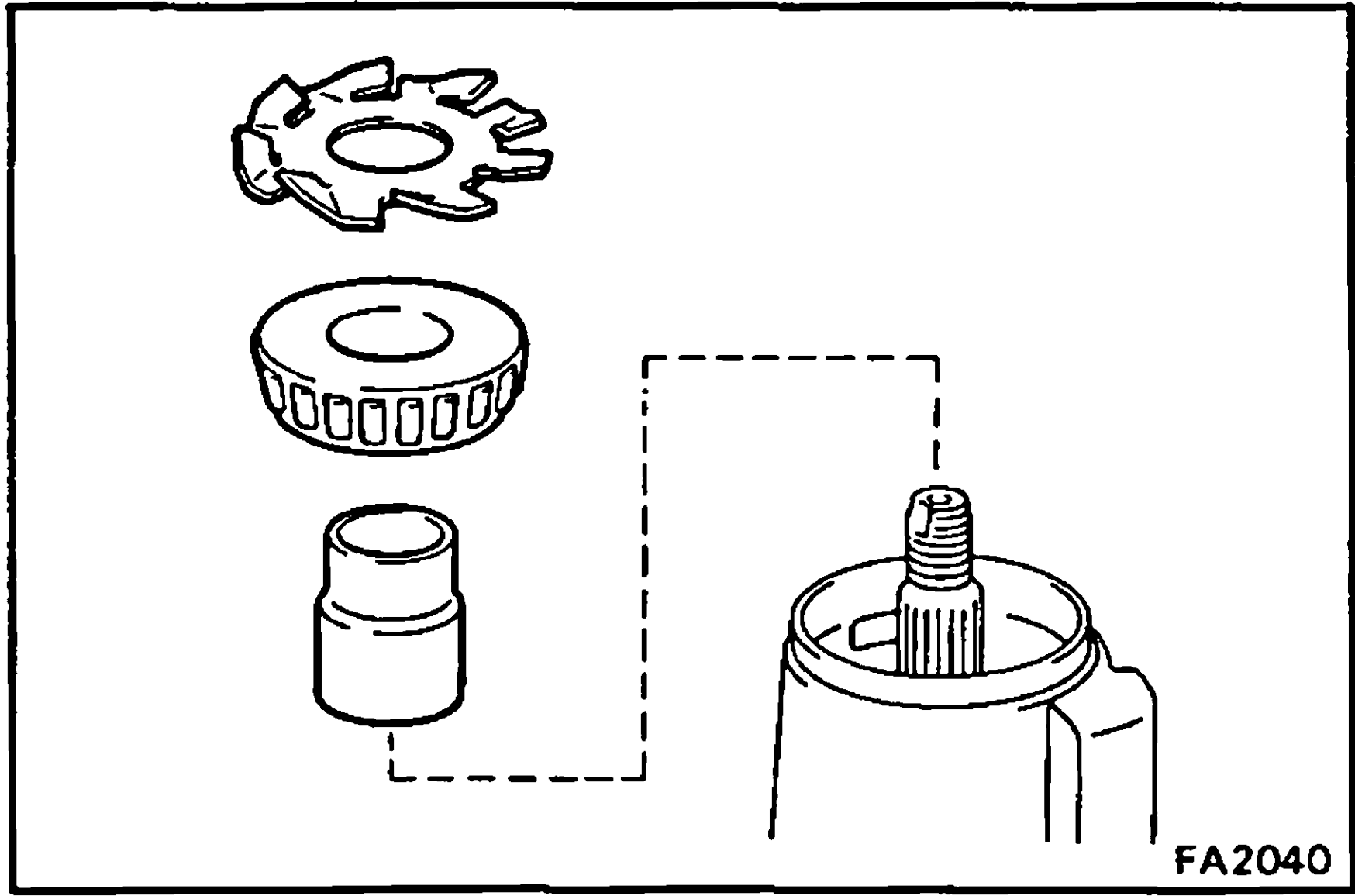
Select an adjusting washer that will shift the drive pinion away from the ring gear.



If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

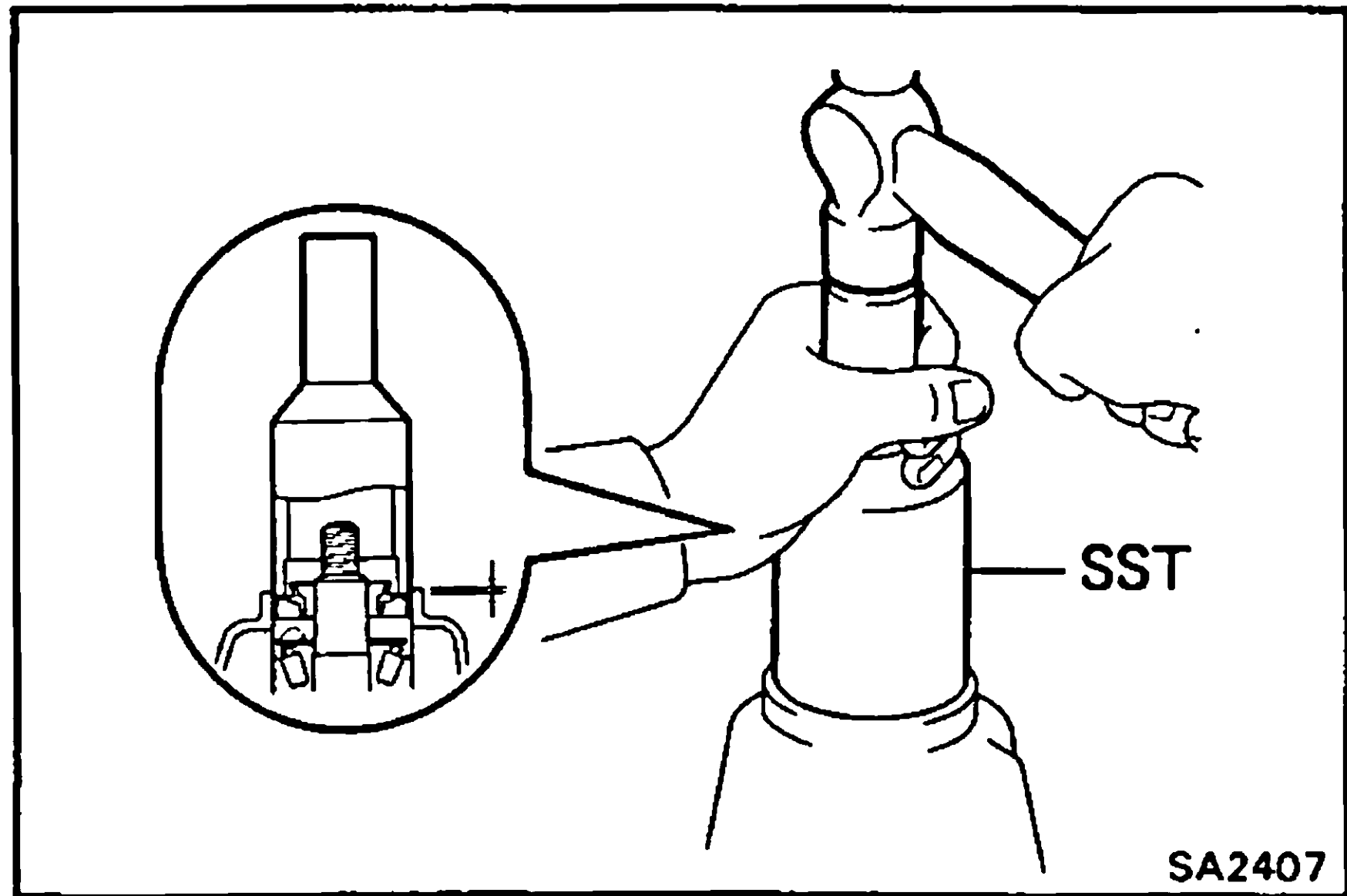
HINT: In the case of face contact or flank contact, it may be possible to make the adjustment within the back-lash specification limits.

Washer 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)	



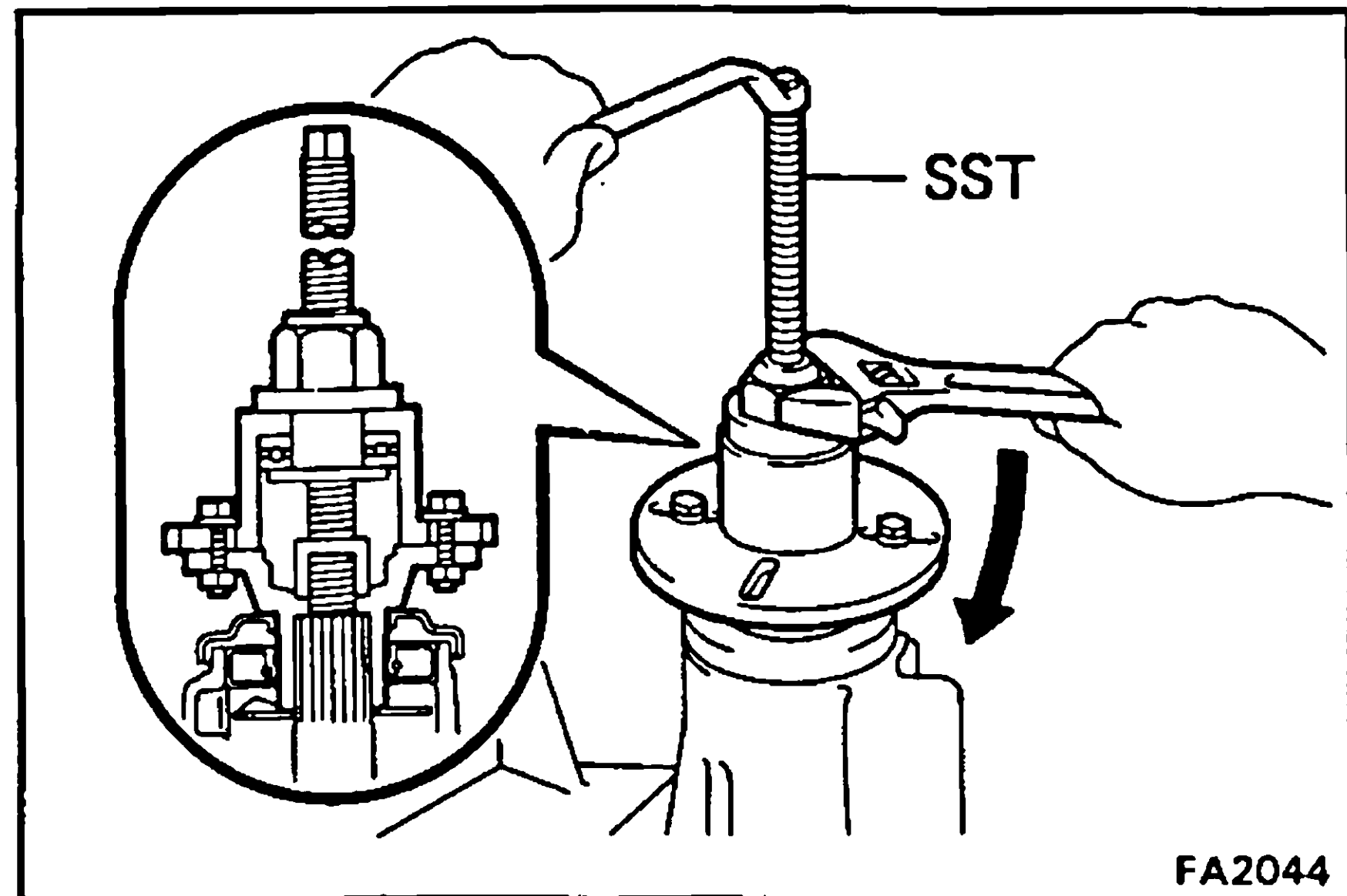
12. INSTALL NEW BEARING SPACER

- (a) Remove the companion flange.
(See step 4 on page SA-30)
- (b) Remove the oil slinger and rear bearing.
(See steps 5, 6 on pages SA-30, 31)
- (c) Install a new bearing spacer.
- (d) Install the rear bearing and oil slinger.



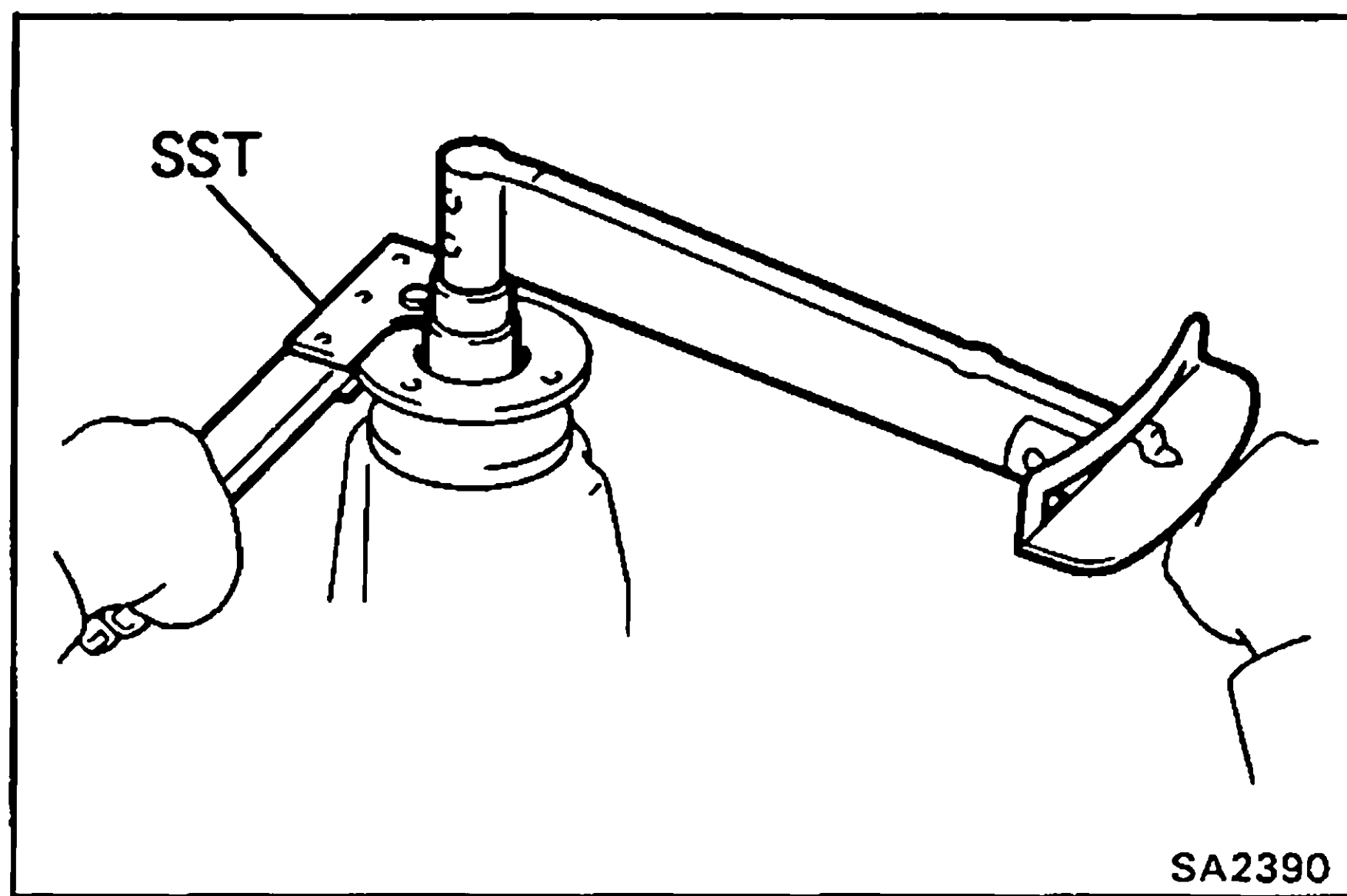
13. INSTALL OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.
SST 09554-30011 (RJ, LJ)
09214-76011 (FJ, PZJ, HZJ, FZJ)
Oil seal drive in depth: 1.0 mm (0.039 in.)
- (b) Coat the lip of oil seal with MP grease.



14. INSTALL COMPANION FLANGE

- (a) Using SST, install the companion flange.
SST 09557-22022 (09557-22050)



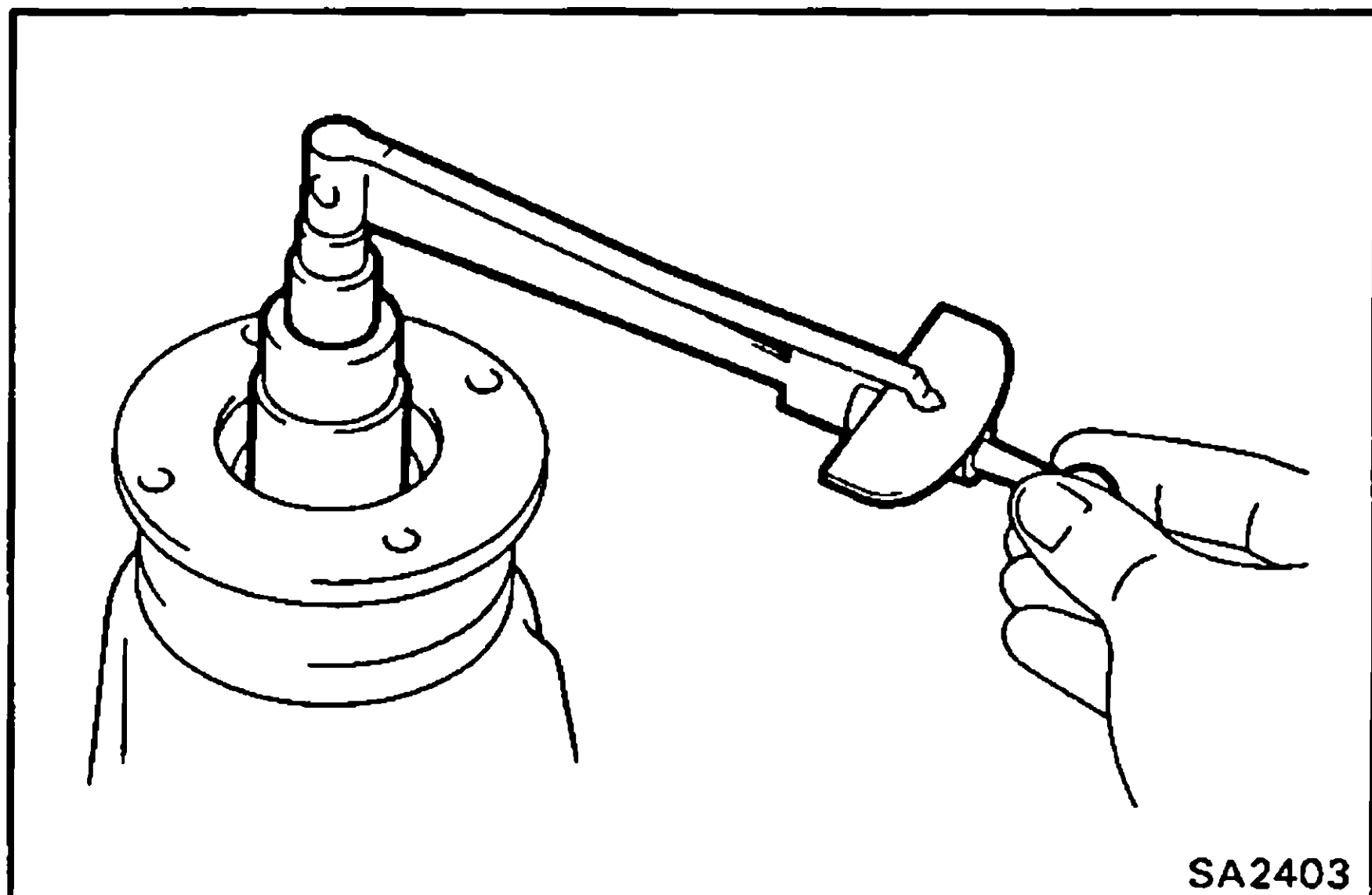
(b) Install the plate washer and a new nut.

HINT: Coat the threads of nut with gear oil.

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

SST 09330-00021

Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)



15. ADJUST DRIVE PINION PRELOAD

Using a torque meter, measure the preload of the backlash between the drive pinion and ring gear.

Preload (at starting):

Models	New bearing	Reused bearing
RJ, LJ	1.9 – 2.5 N·m (19 – 26 kgf·cm, 16.5 – 22.6 in·lbf)	0.9 – 1.3 N·m (9 – 13 kgf·cm, 7.8 – 11.3 in·lbf)
FJ, PZJ, HZJ, FZJ	0.9 – 1.6 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in·lbf)	0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in·lbf)

- If the preload is greater than specification, replace the bearing spacer.
- If the preload is less than specification, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) a little 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: 343 N·m (3,500 kgf·cm, 253 ft·lbf)

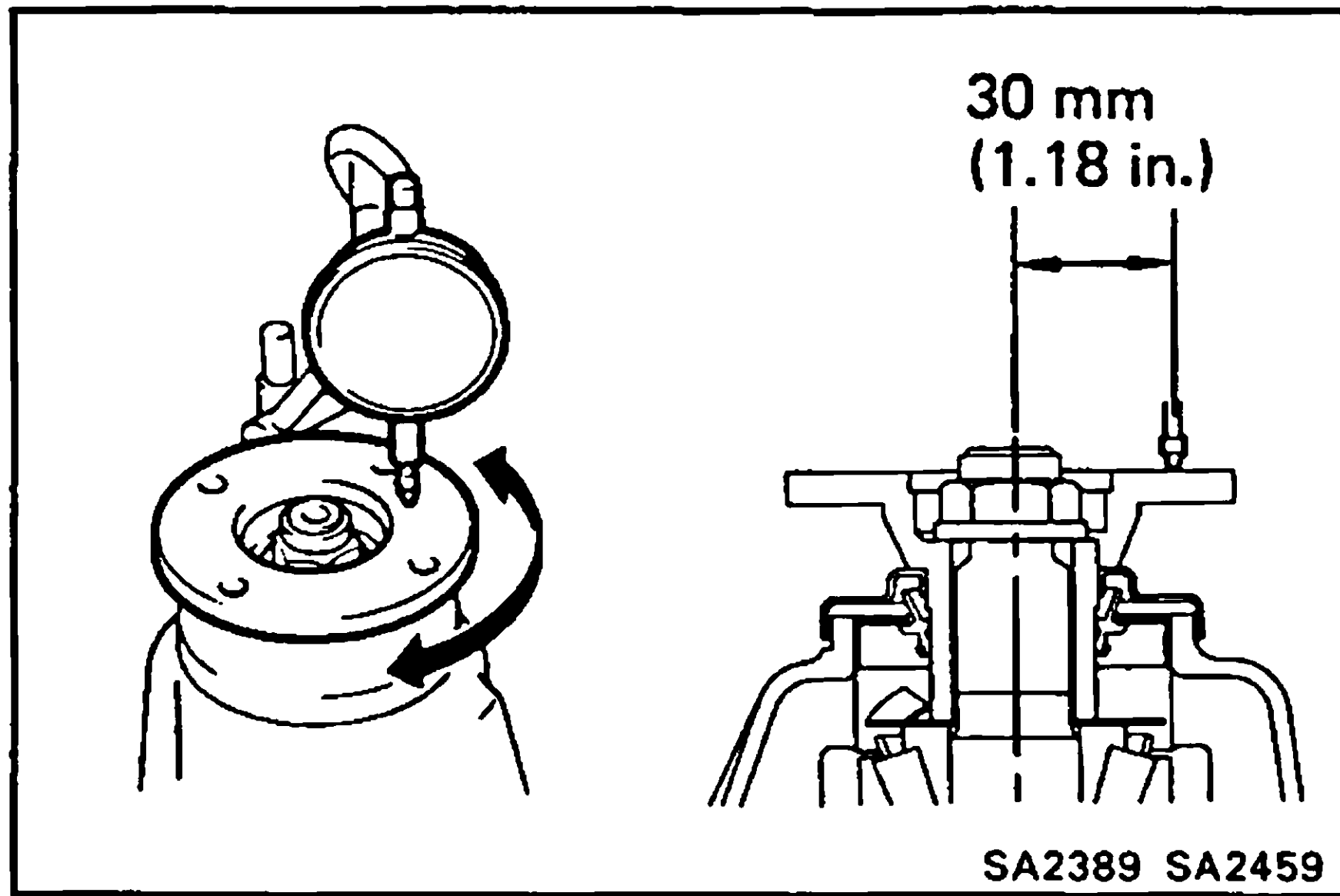
If everything is normal, coat the threads with gear oil, then repeat the above operation.

16. RECHECK RING GEAR BACKLASH

(See step 3 on page SA-27)

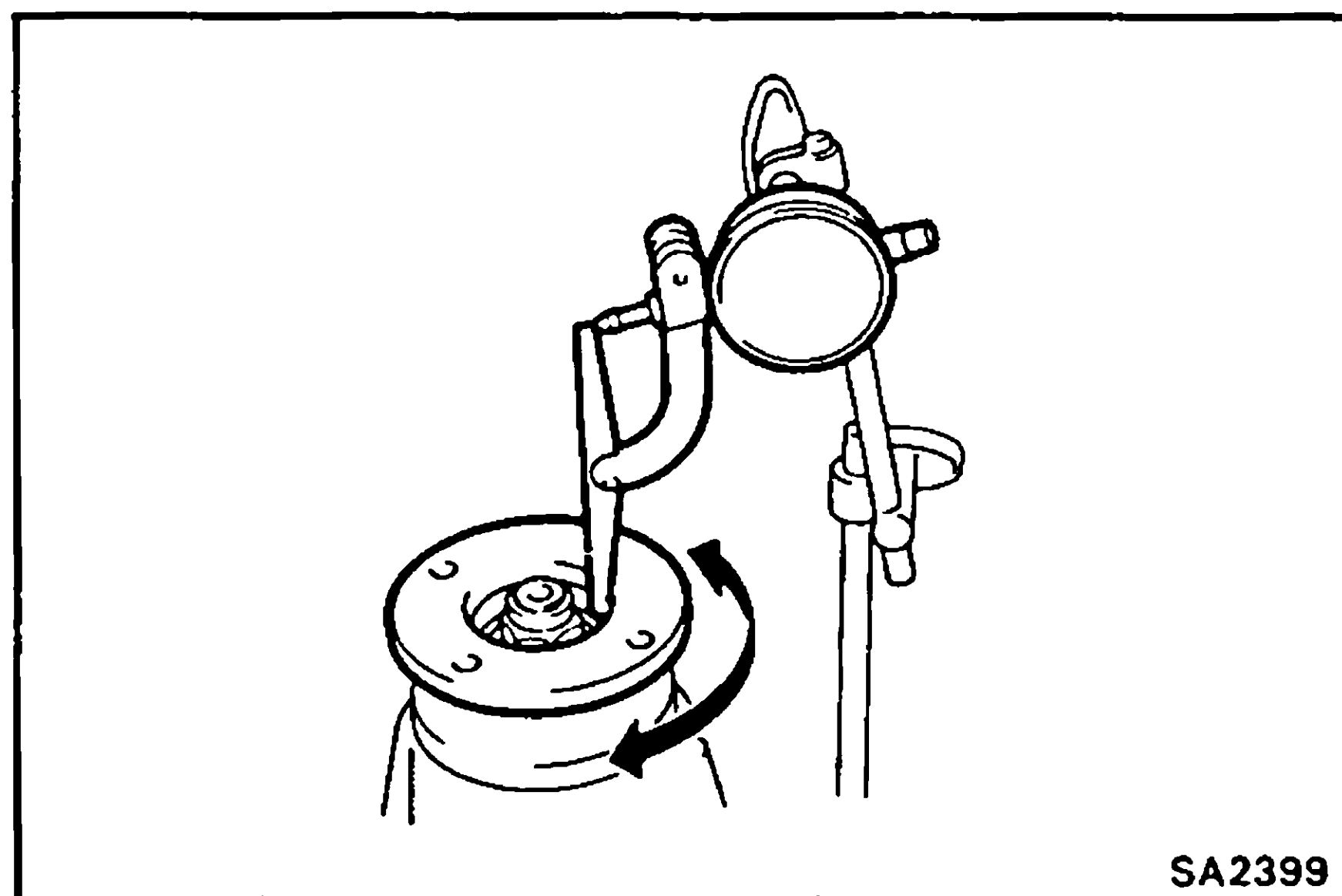
17. RECHECK TEETH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(See step 11 on page SA-40)

**18. CHECK RUNOUT OF COMPANION FLANGE**

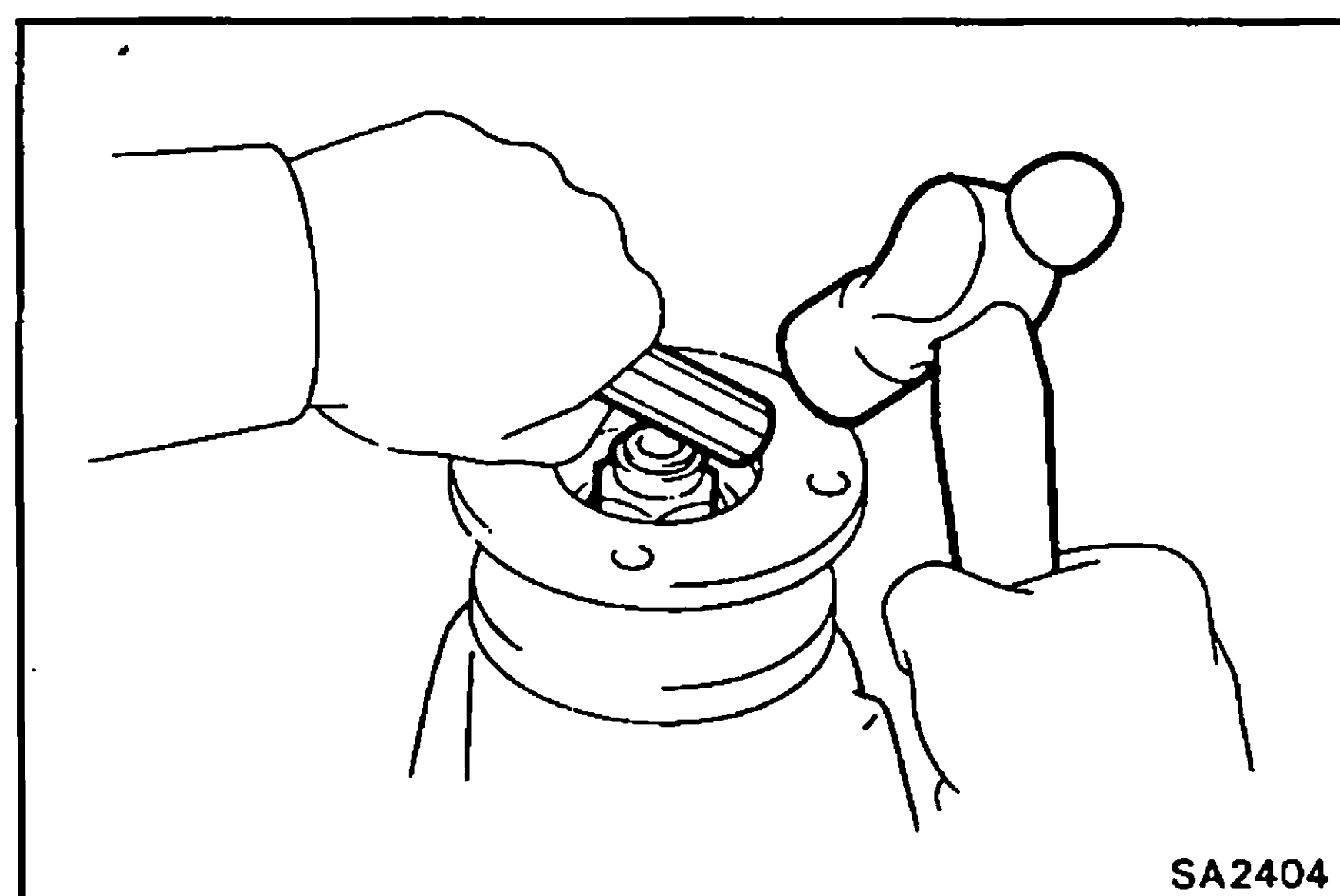
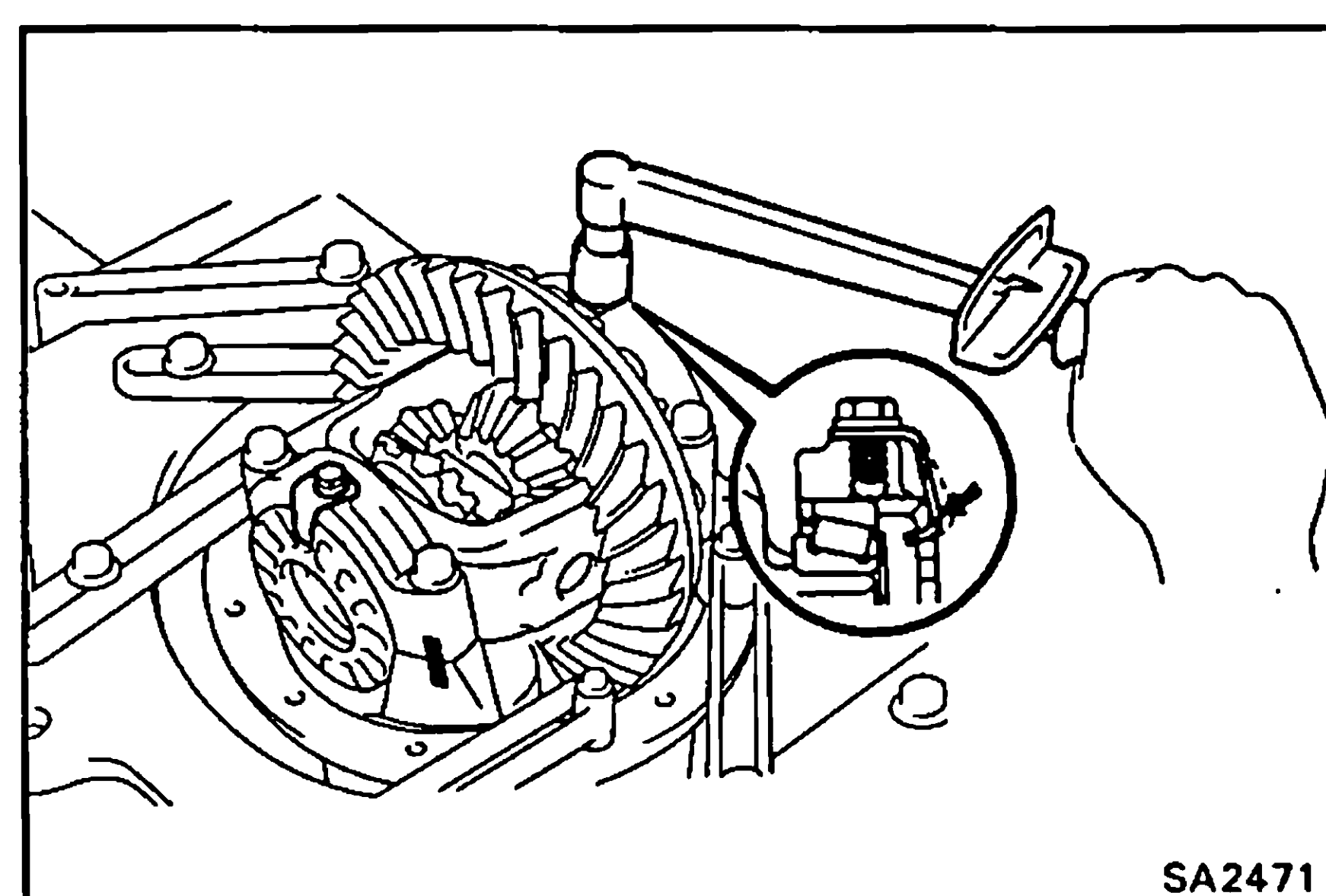
Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum vertical runout: 0.10 mm (0.0039 in.)



Maximum lateral runout: 0.10 mm (0.0039 in.)

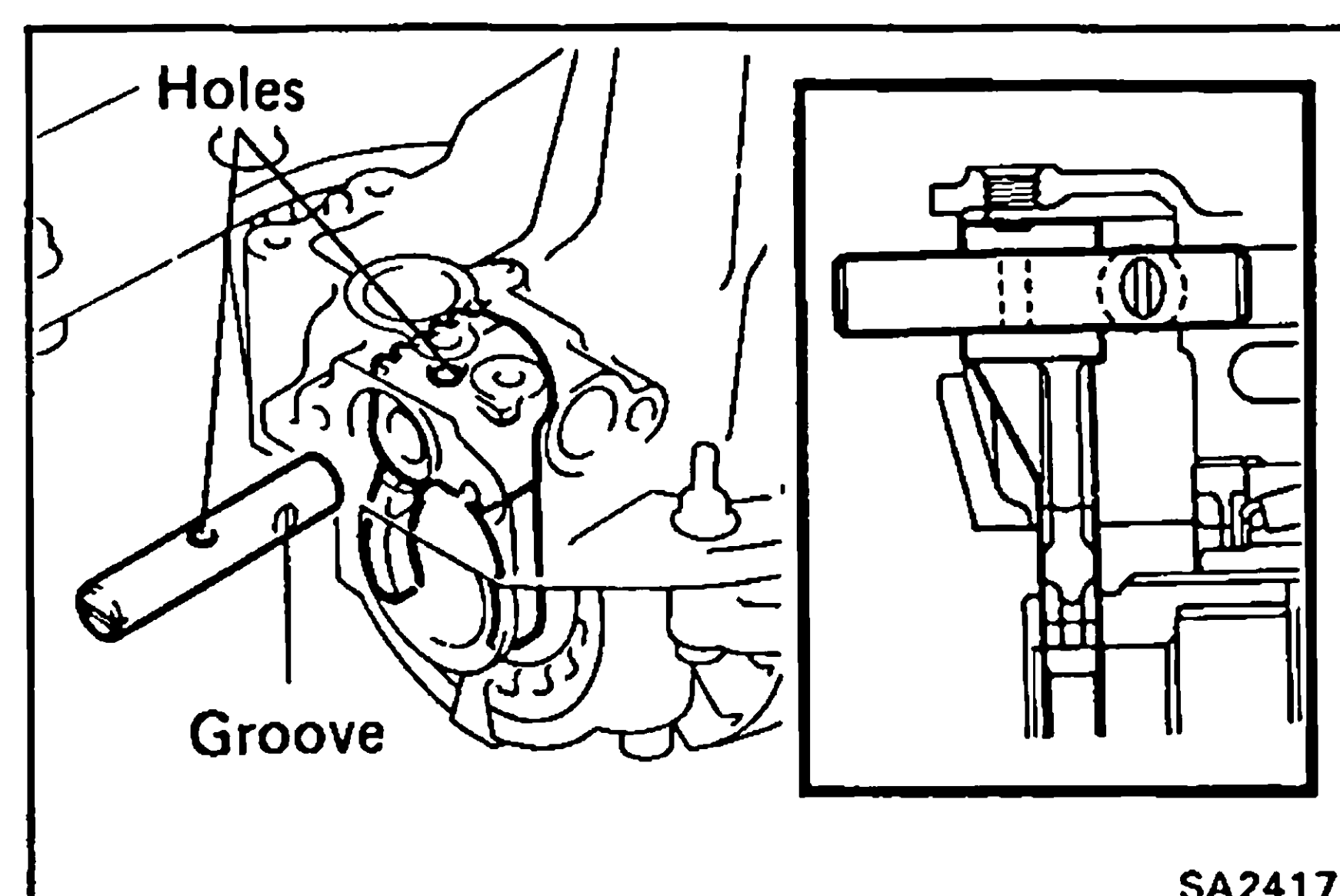
If the runout is greater than the maximum, inspect the bearing.

**19. STAKE DRIVE PINION NUT****20. INSTALL ADJUSTING NUT LOCKS**

(a) Install two new nut locks on the bearing caps.

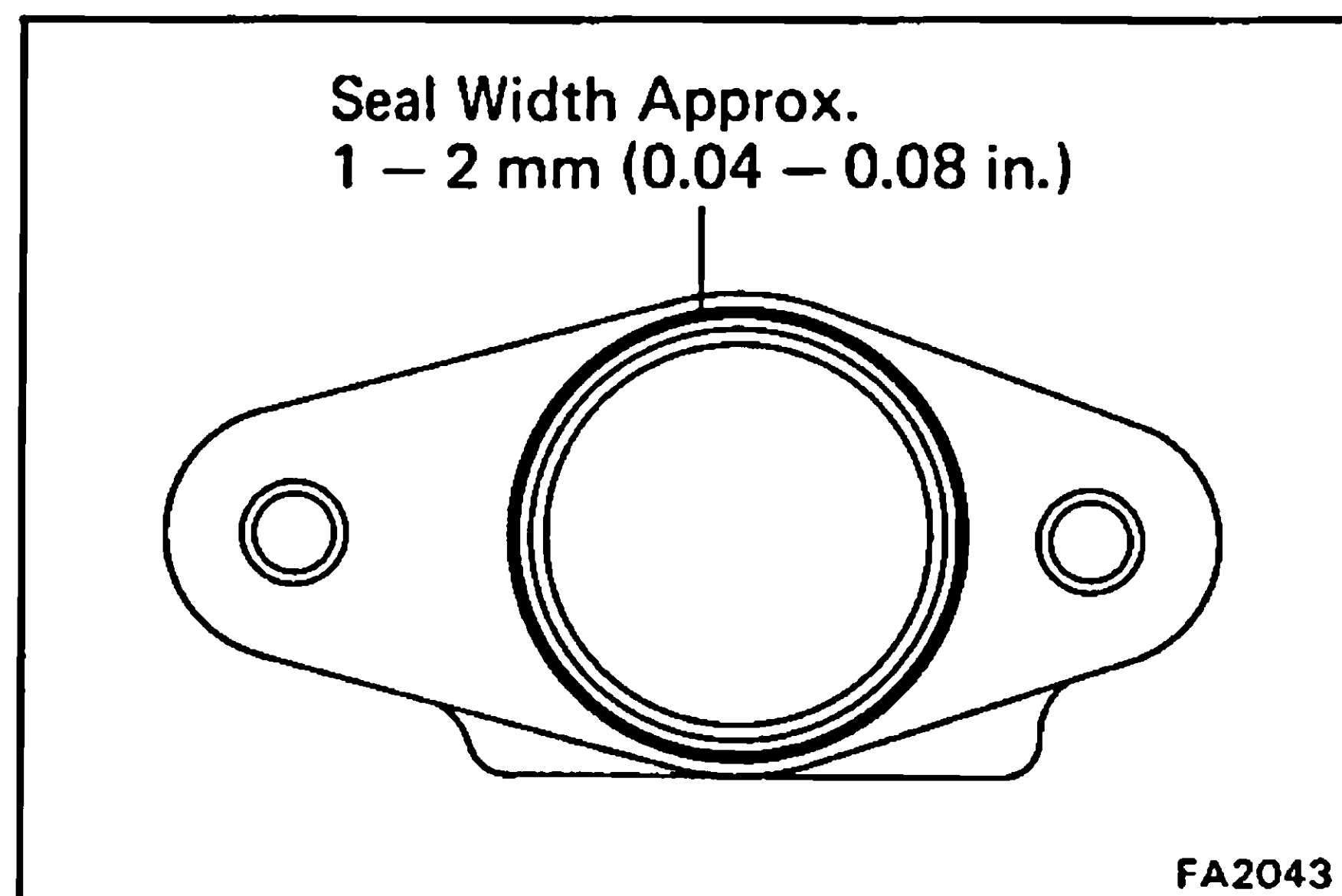
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) After tightening the bolts, bend the nut locks.

**21. (w/ DIFFERENTIAL LOCK)
INSTALL SHIFT FORK SHAFT**

(a) Apply MP grease onto the outer circuit of the fork shaft.

(b) Install the fork shaft to match the hole of the shift fork and that of the shift fork shaft.

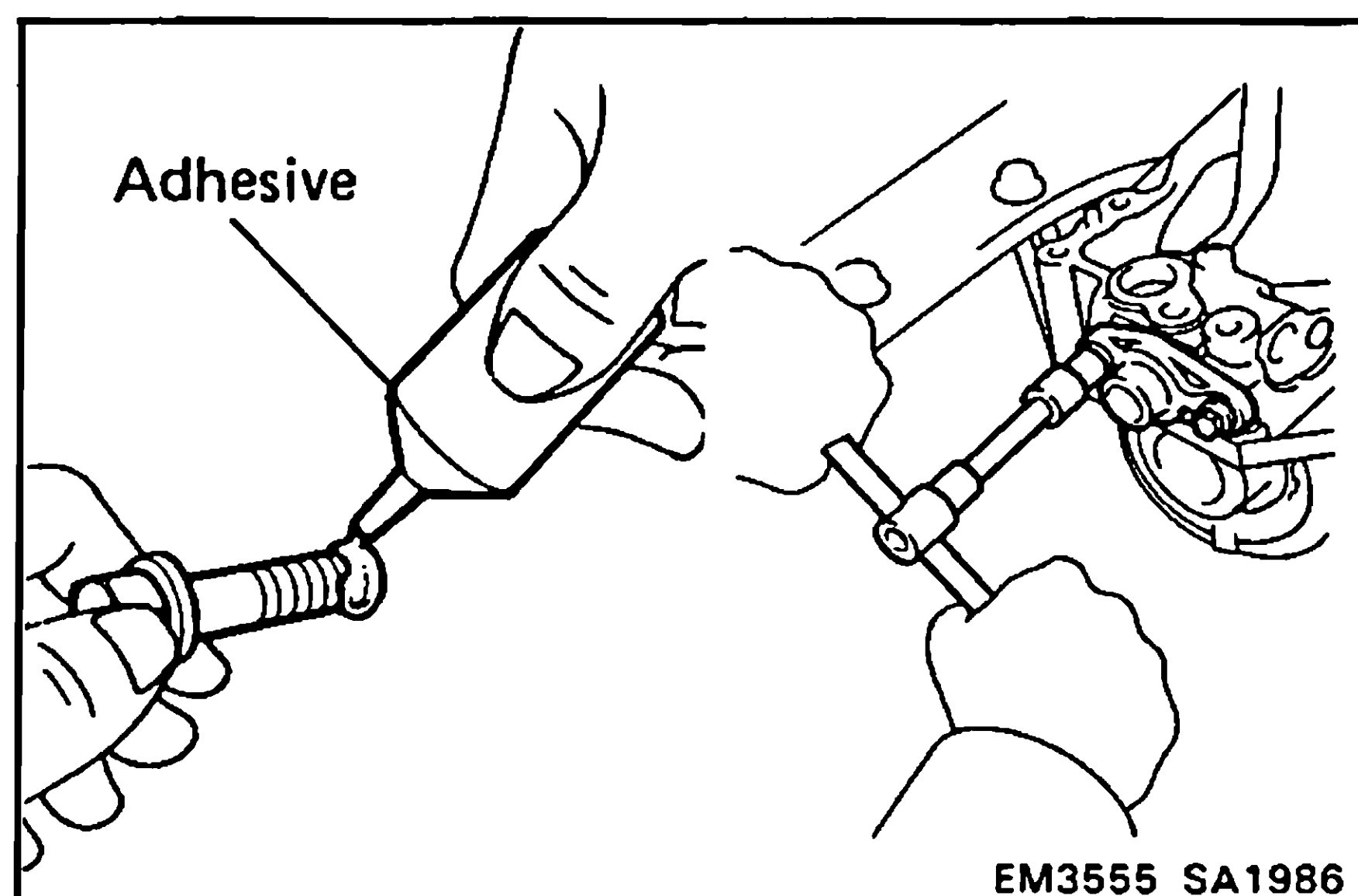


(c) Remove any packing material and be careful not to drop oil on the contacting surface of the differential carrier and shaft retainer.

(d) Apply seal packing to the carrier as shown.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the shaft retainer within ten minutes after applying seal packing.



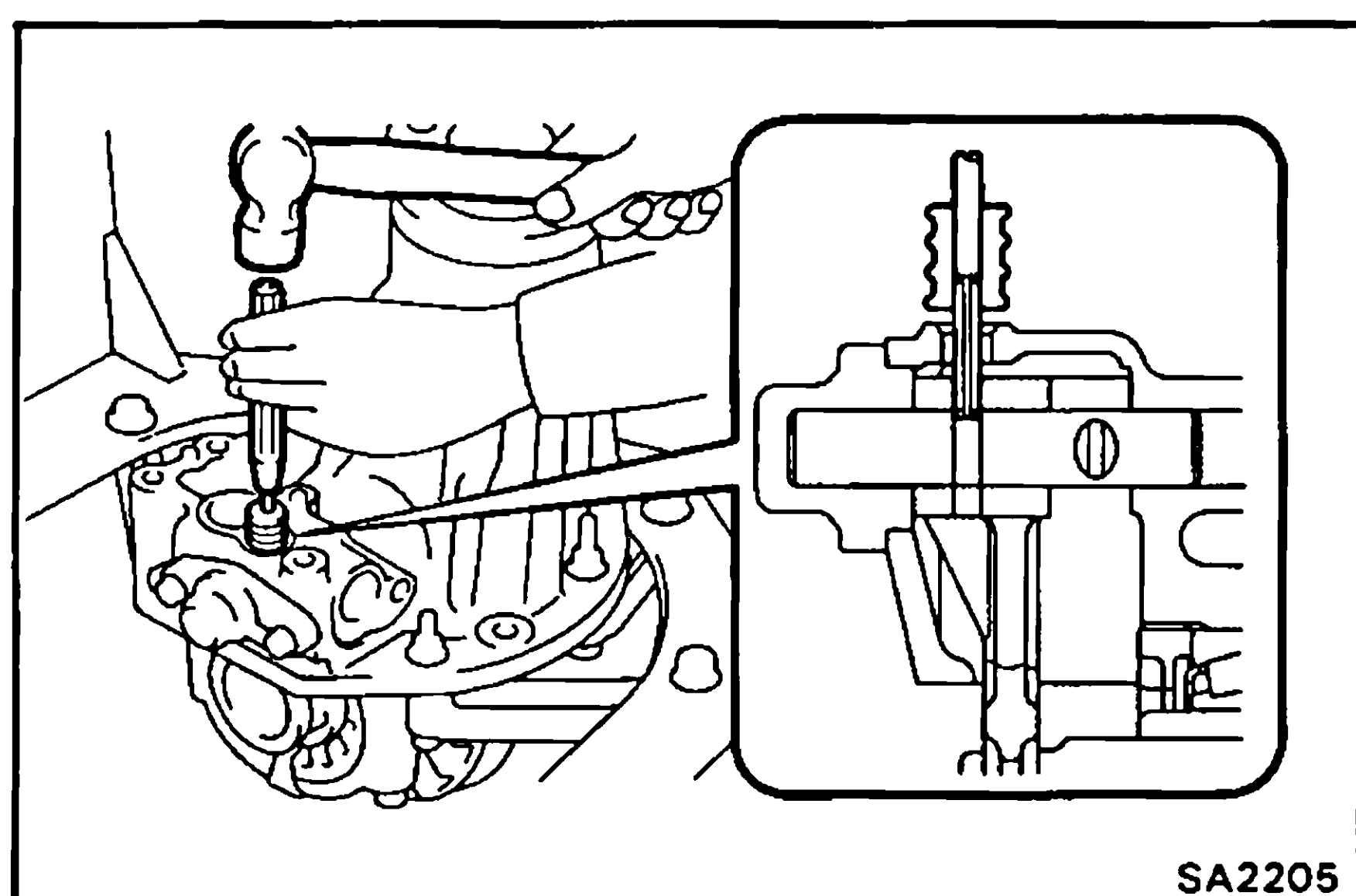
(e) Clean the threads of the bolts and retainer bolts holes with toluene or trichloroethylene.

(f) Apply adhesive to the bolt threads.

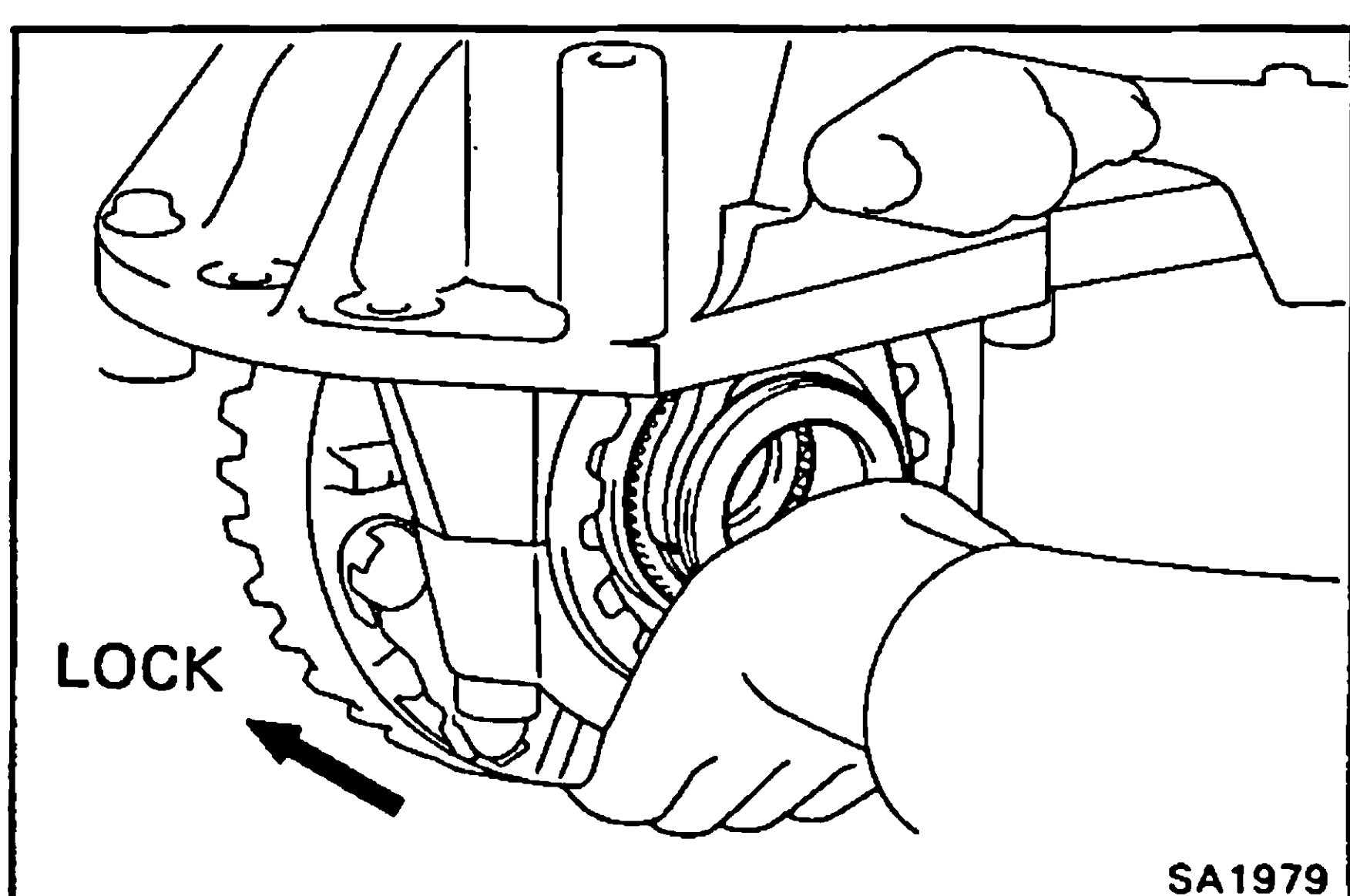
Adhesive: Part No. 08833-00080, THREE BOND 1344 LOCTITE 242 or equivalent

(g) Tighten the shaft retainer with the two bolts.

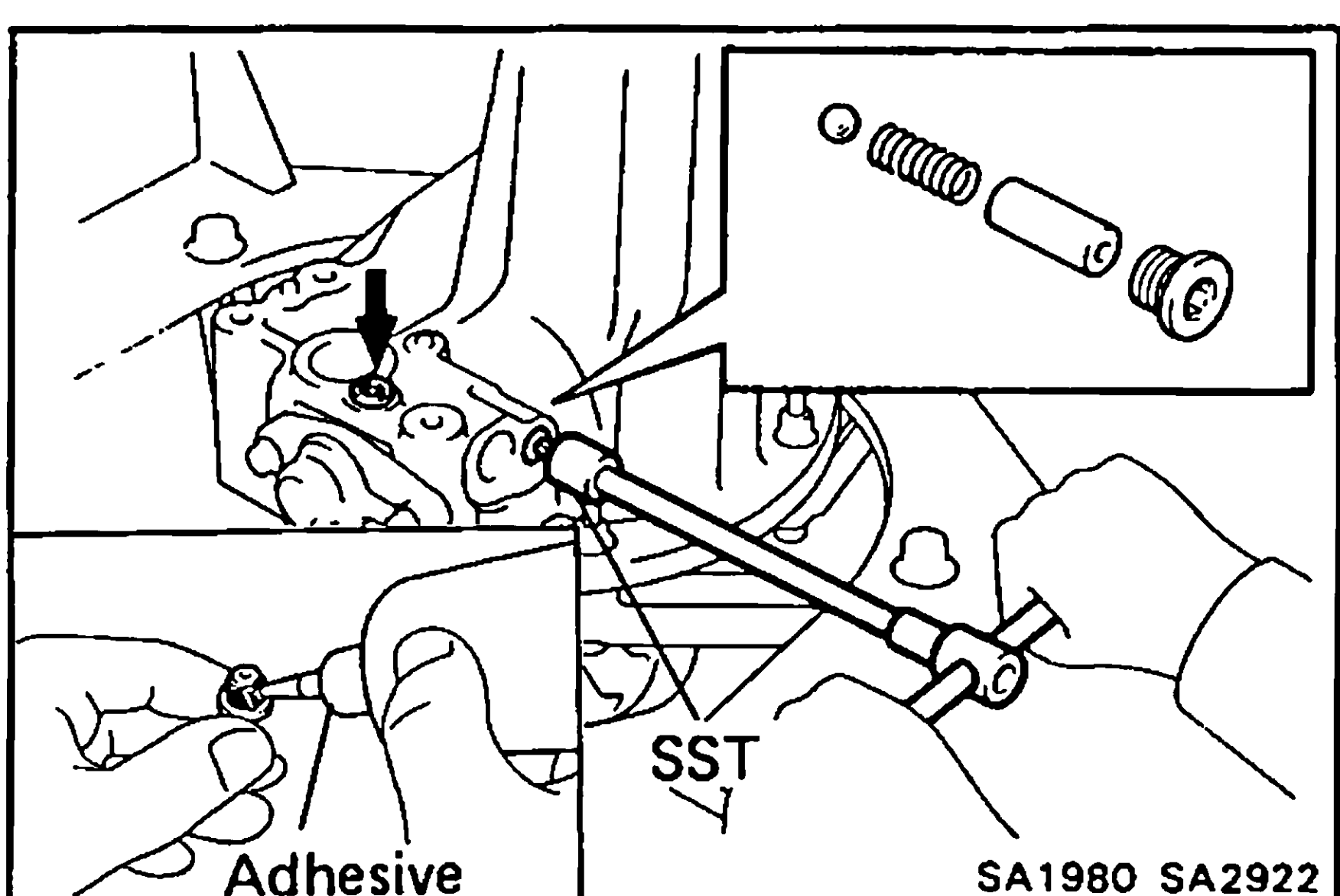
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)



(h) Using a pin punch and hammer, drive in the slotted spring pin to the shift fork.



(i) Shift the shift fork deeply and keep the differential lock condition.



(j) Clean the threads of the plugs and plug holes with toluene or trichloroethylene.

(k) Install the ball, compression spring and spring seat.

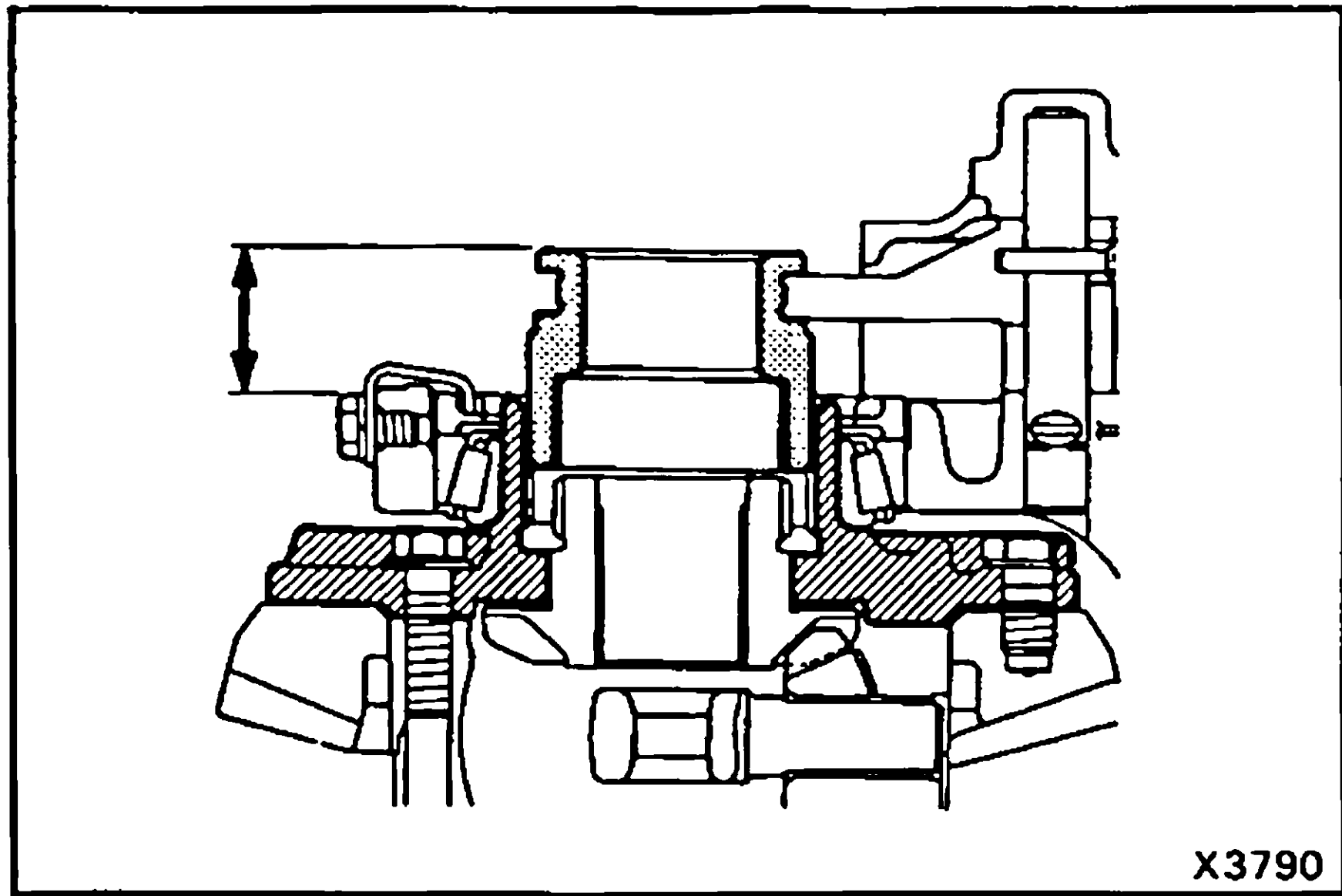
(l) Apply adhesive to the plug threads.

Adhesive: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(m) Using SST, install and tighten the screw plugs.

SST 09313-30021

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

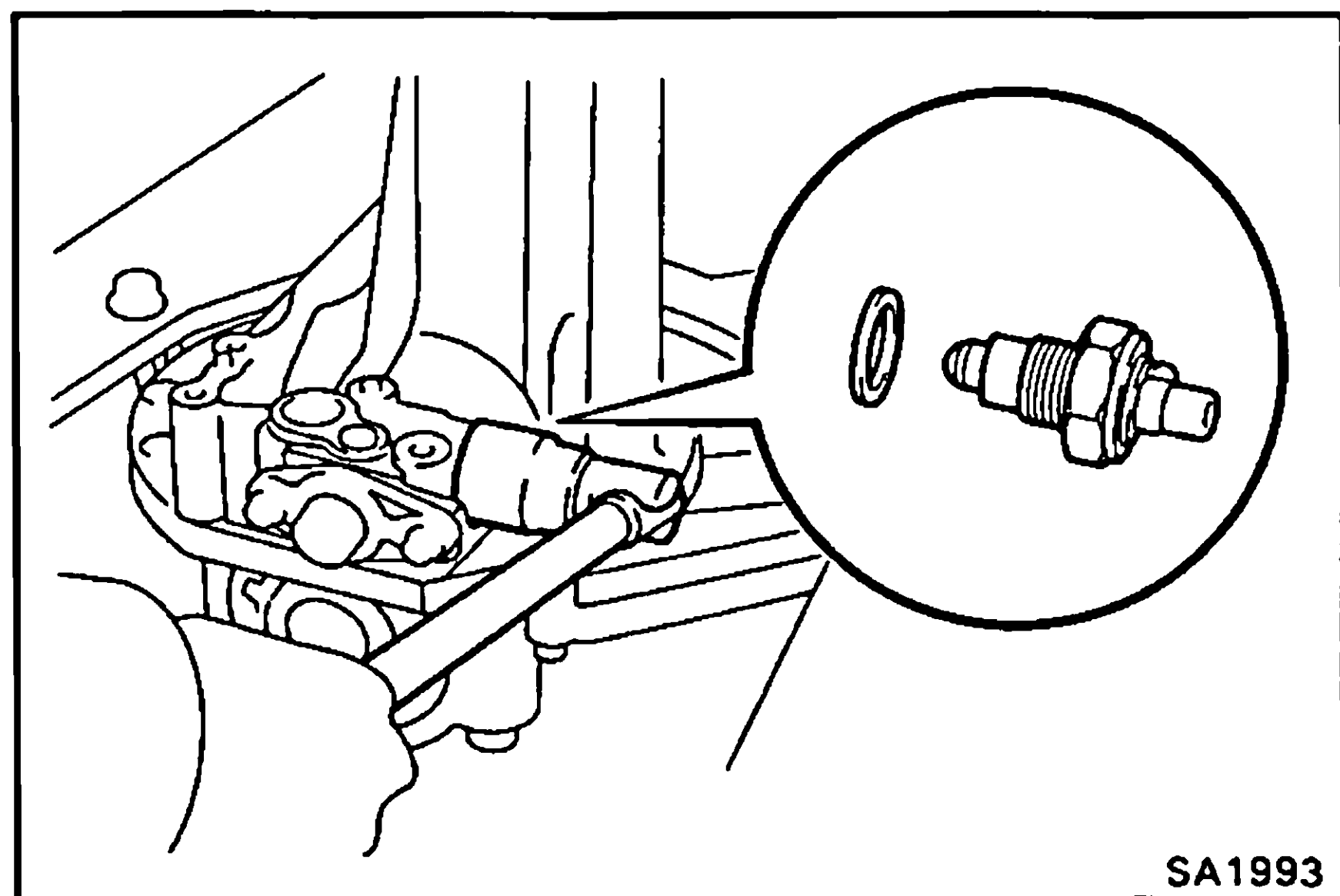


**22. (w/ DIFFERENTIAL LOCK)
MEASURE DISTANCE BETWEEN SLEEVE AND DIFFERENTIAL CASE END SIDE**

Measure the distance between the sleeve and the tip of the differential case when differential is free and locked.

Standard distance:

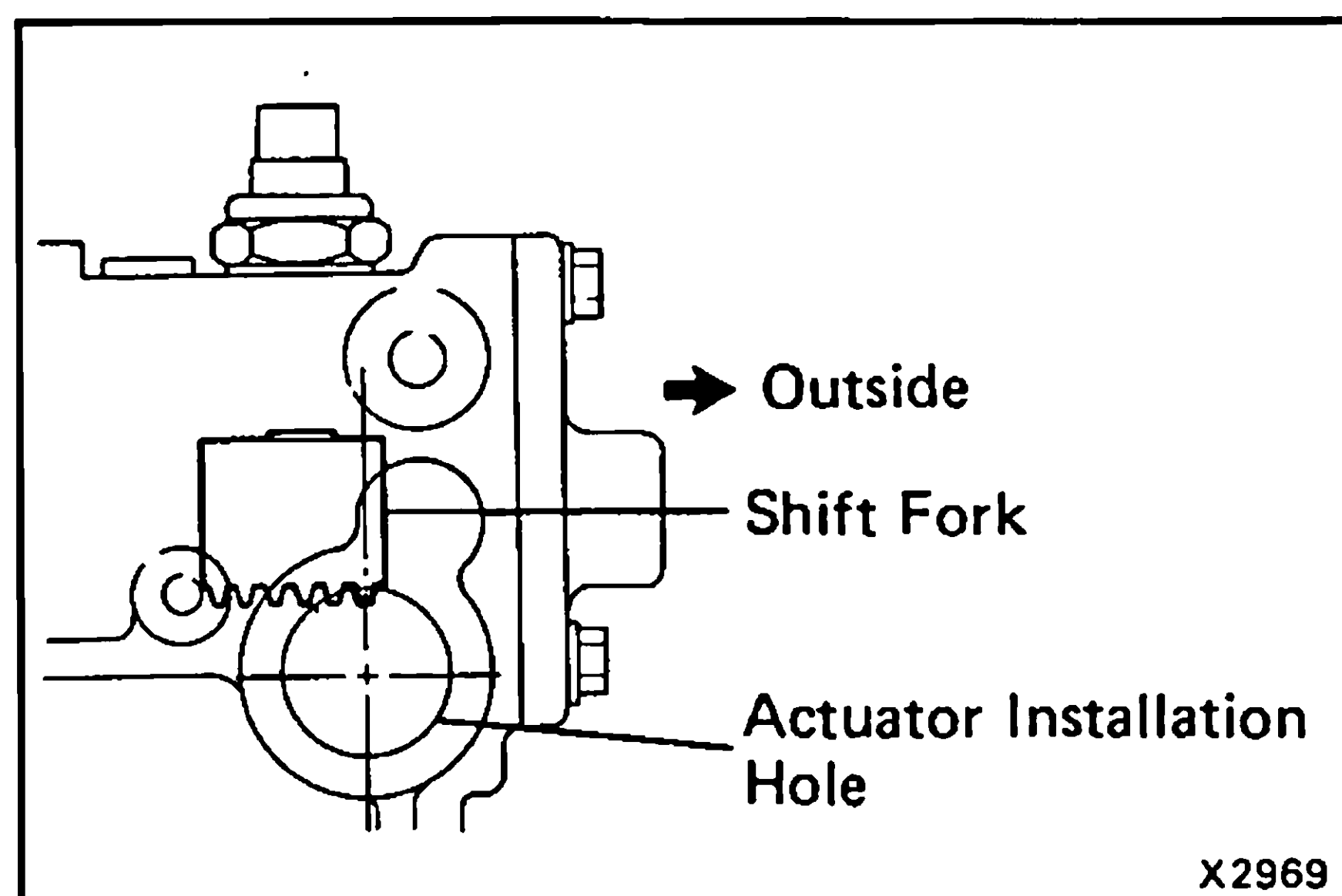
LOCK	32.40 – 33.90 mm (1.2756 – 1.3346 in.)
FREE	17.44 – 18.86 mm (0.6866 – 0.7425 in.)



**23. (w/ DIFFERENTIAL LOCK)
INSTALL INDICATOR SWITCH**

Install the indicator switch with a new gasket.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)



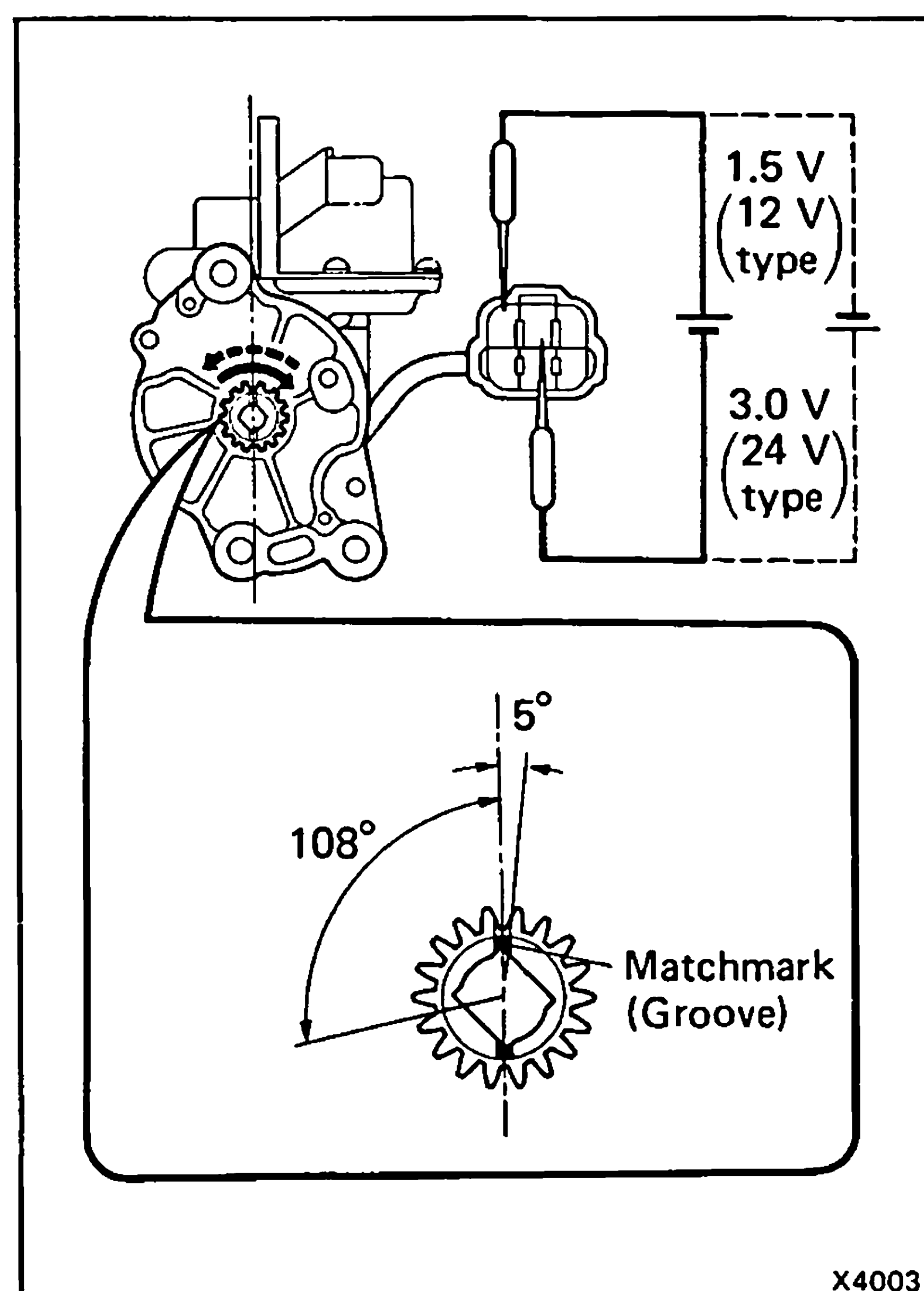
**24. (w/ DIFFERENTIAL LOCK)
INSTALL ACTUATOR**

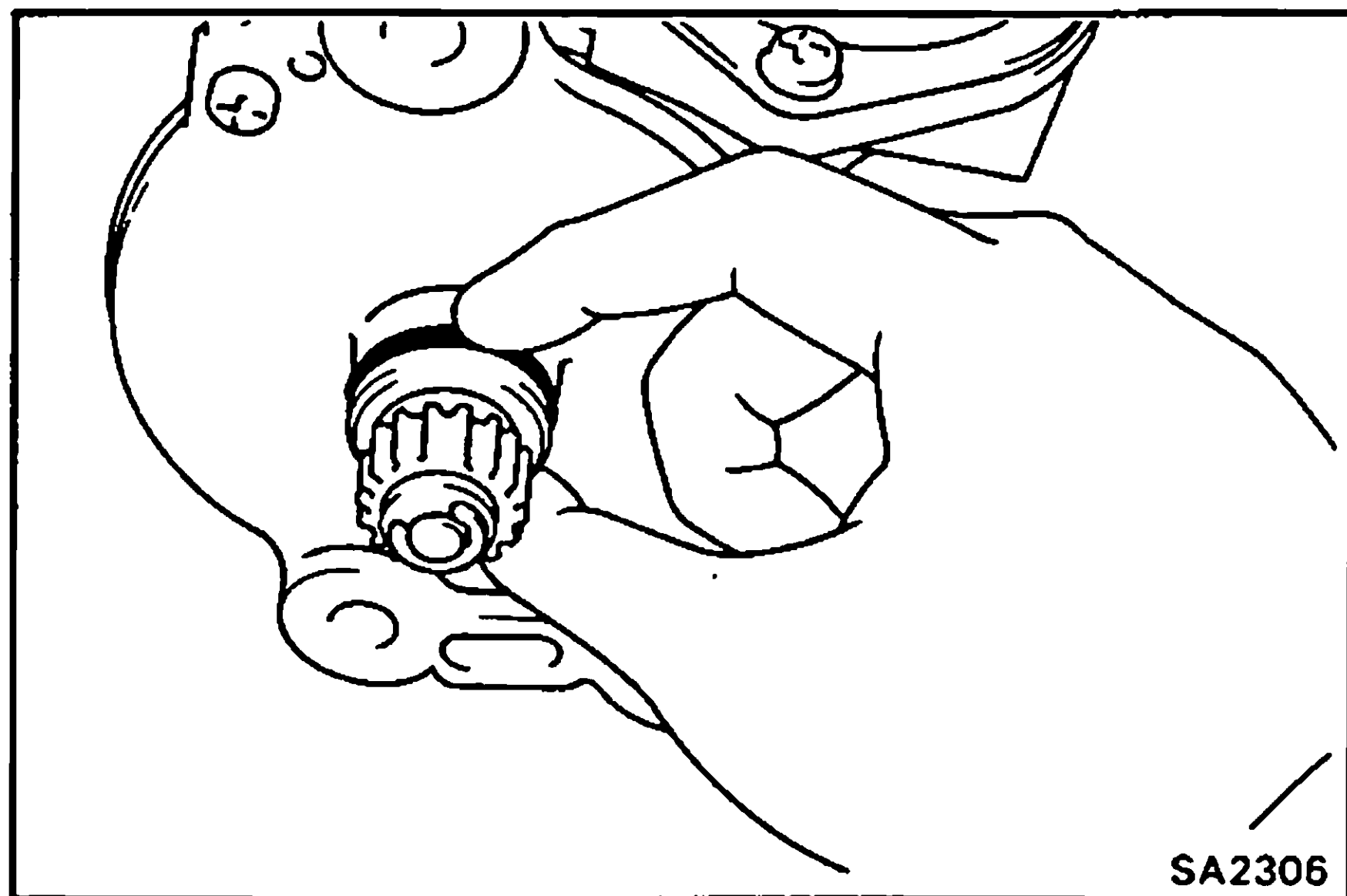
- (a) Check that the outermost rack tooth of the shift fork is virtually above the center line of the actuator installation hole.

- (b) Make sure that the matchmark of the pinion on the actuator is in between 0° to 5° degrees clockwise from the center line of the actuator.

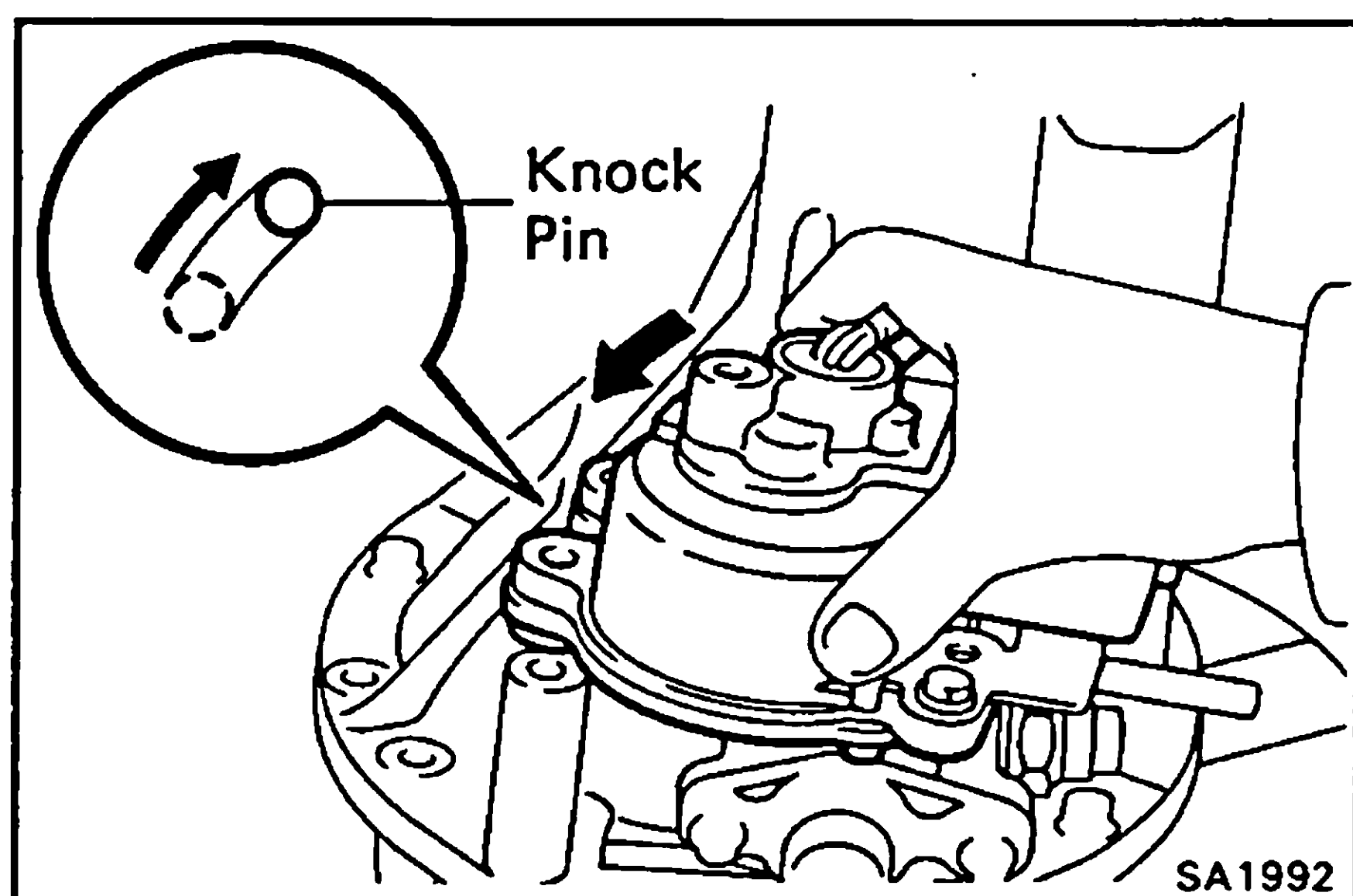
HINT:

- Using a dry cell battery (12 V type is 1.5 V, 24 V type is 3.0 V), fit the matchmark on the actuator pinion to the center line of the actuator.
- Do not add battery voltage directly between terminals.
- When the matchmark comes to the end of rotation, do not electrify any longer.





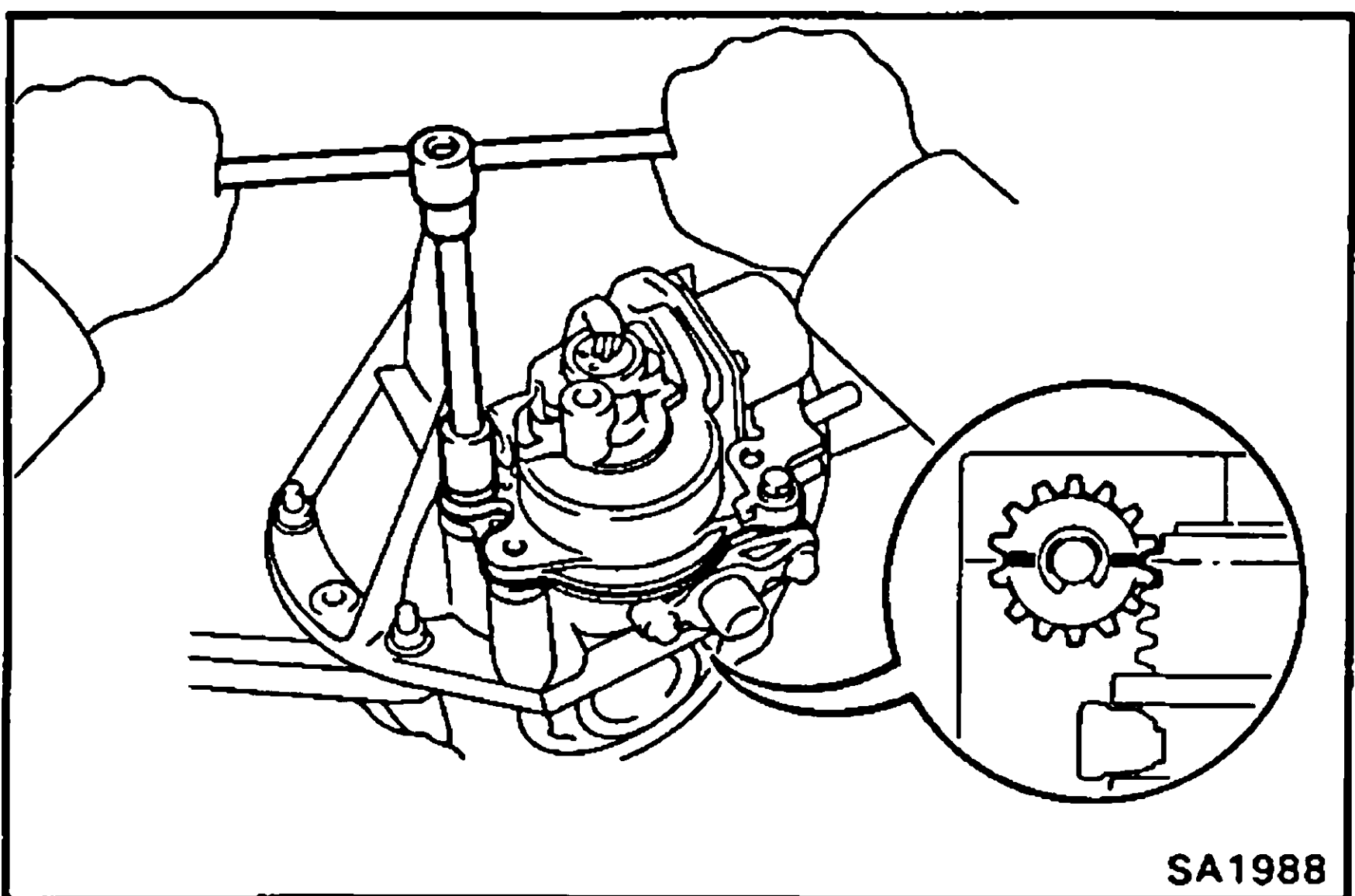
- (c) Install a new O-ring to the actuator.
- (d) Apply a light coat of gear oil on the O-ring.
- (e) Apply MP grease to the gear part.



- (f) Insert the actuator so that the long hole on the actuator side fits with the knock pin on the carrier side.

HINT: Do not damage the O-ring of the actuator.

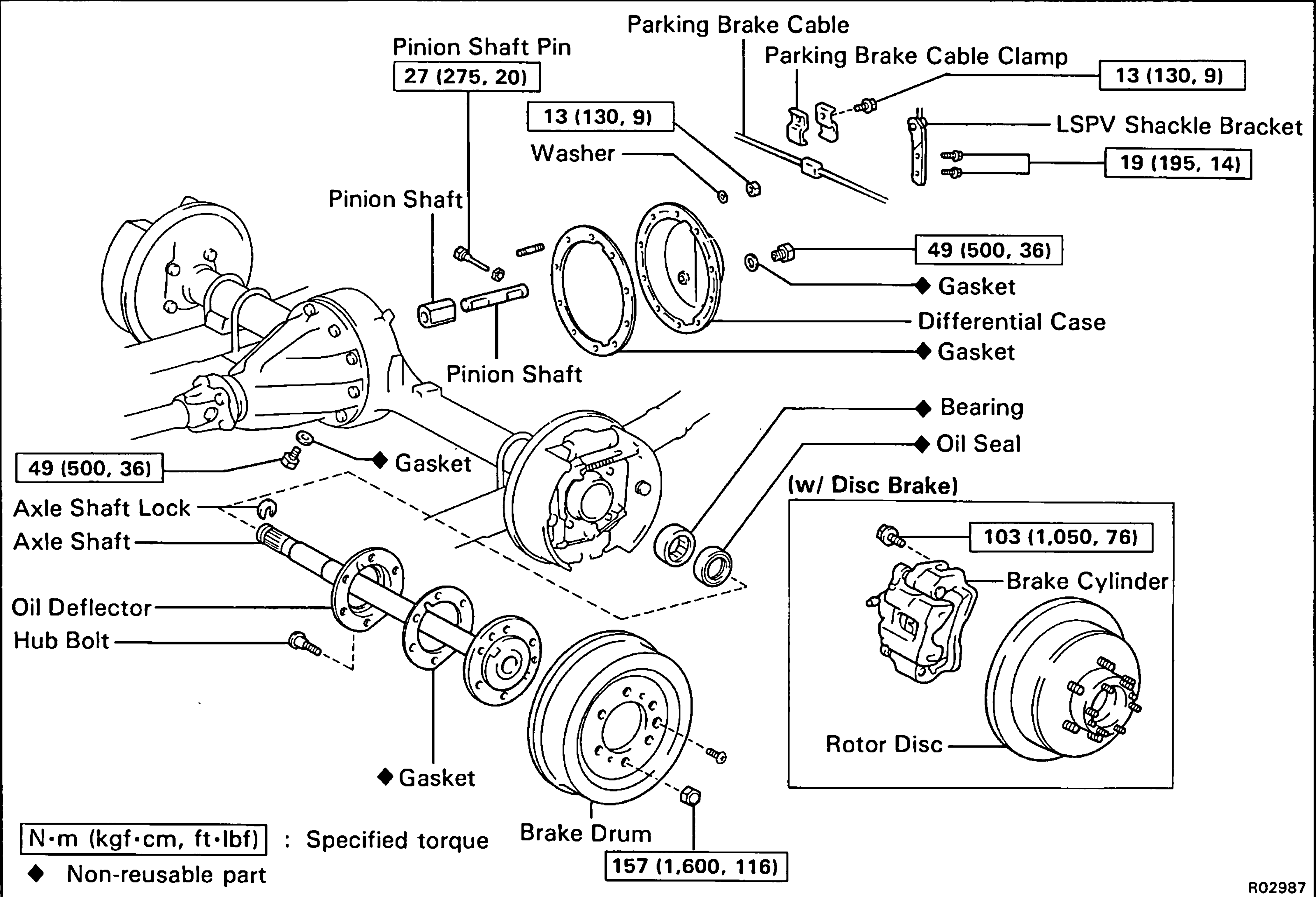
- (g) Align the actuator with the long hole and rotate the actuator counterclockwise when the knock pin reaches the right-hand side.



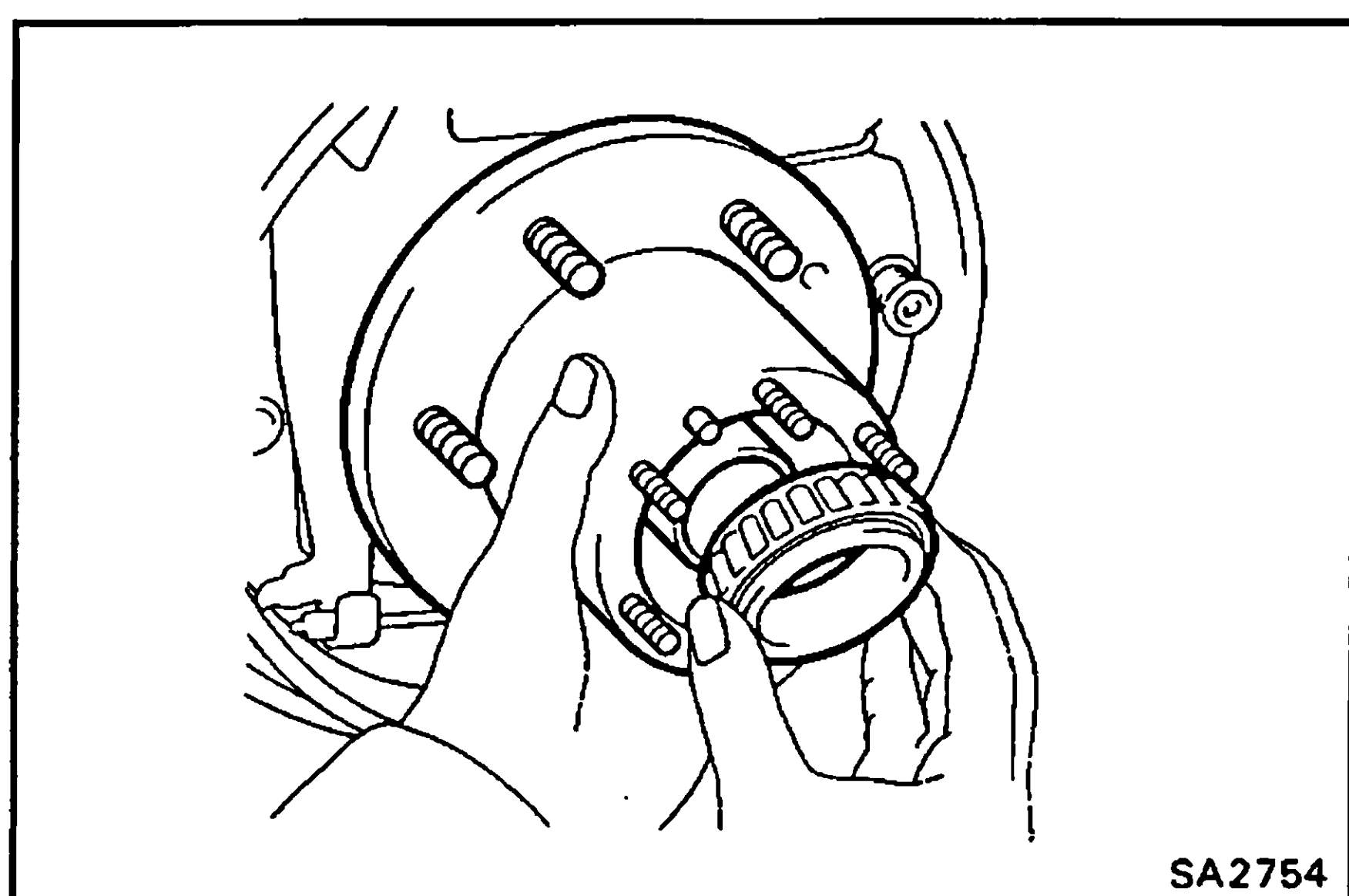
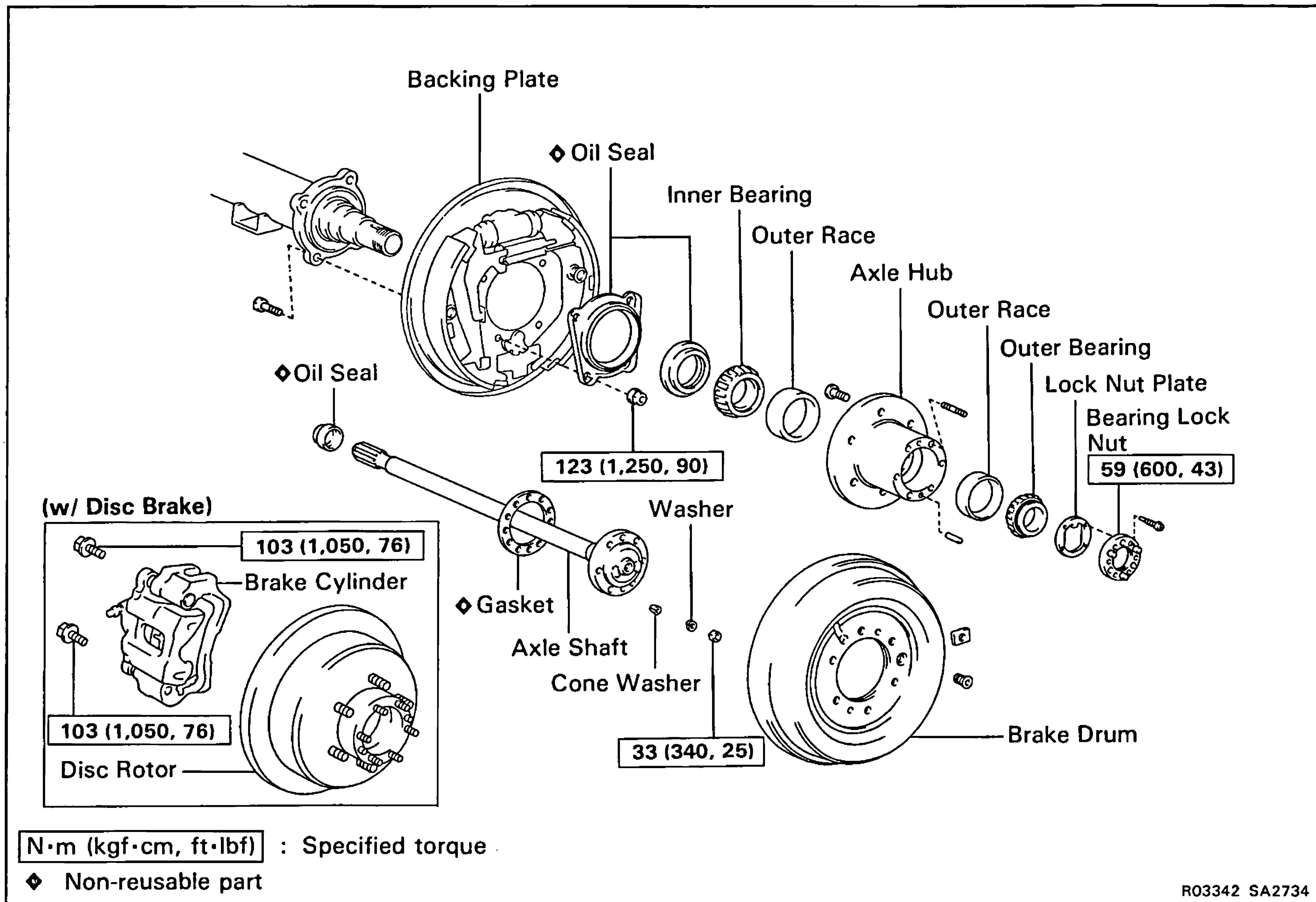
- (h) Install the actuator to the differential carrier with bolt so that the outermost rack tooth of the shift fork shall fit the matchmark of the pinion of the actuator.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

REAR AXLE SHAFT
(Semi-Floating Type)
COMPONENTS



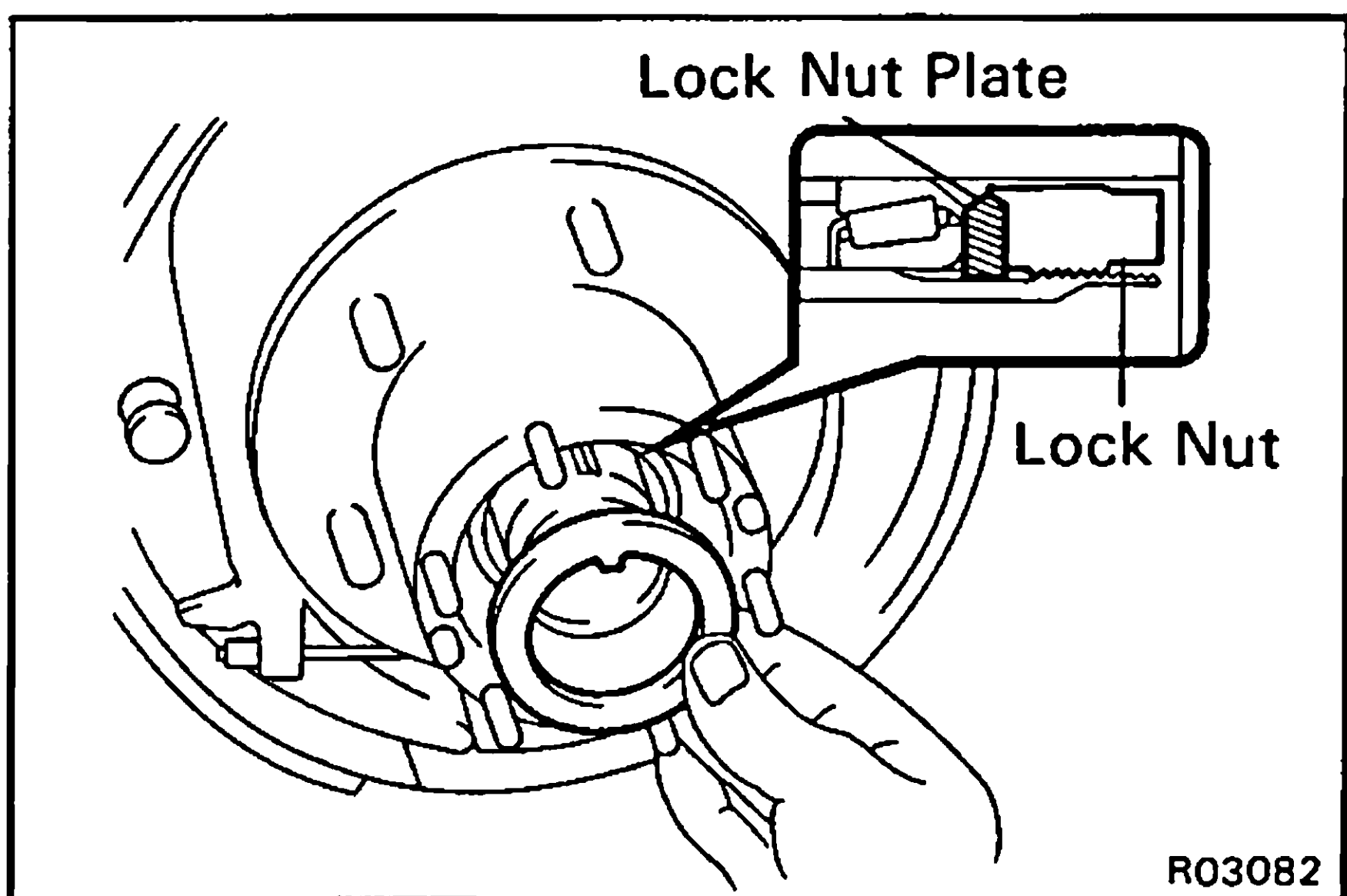
REAR AXLE SHAFT AND AXLE HUB (Full-Floating Type) COMPONENTS



INSTALLATION OF REAR AXLE HUB

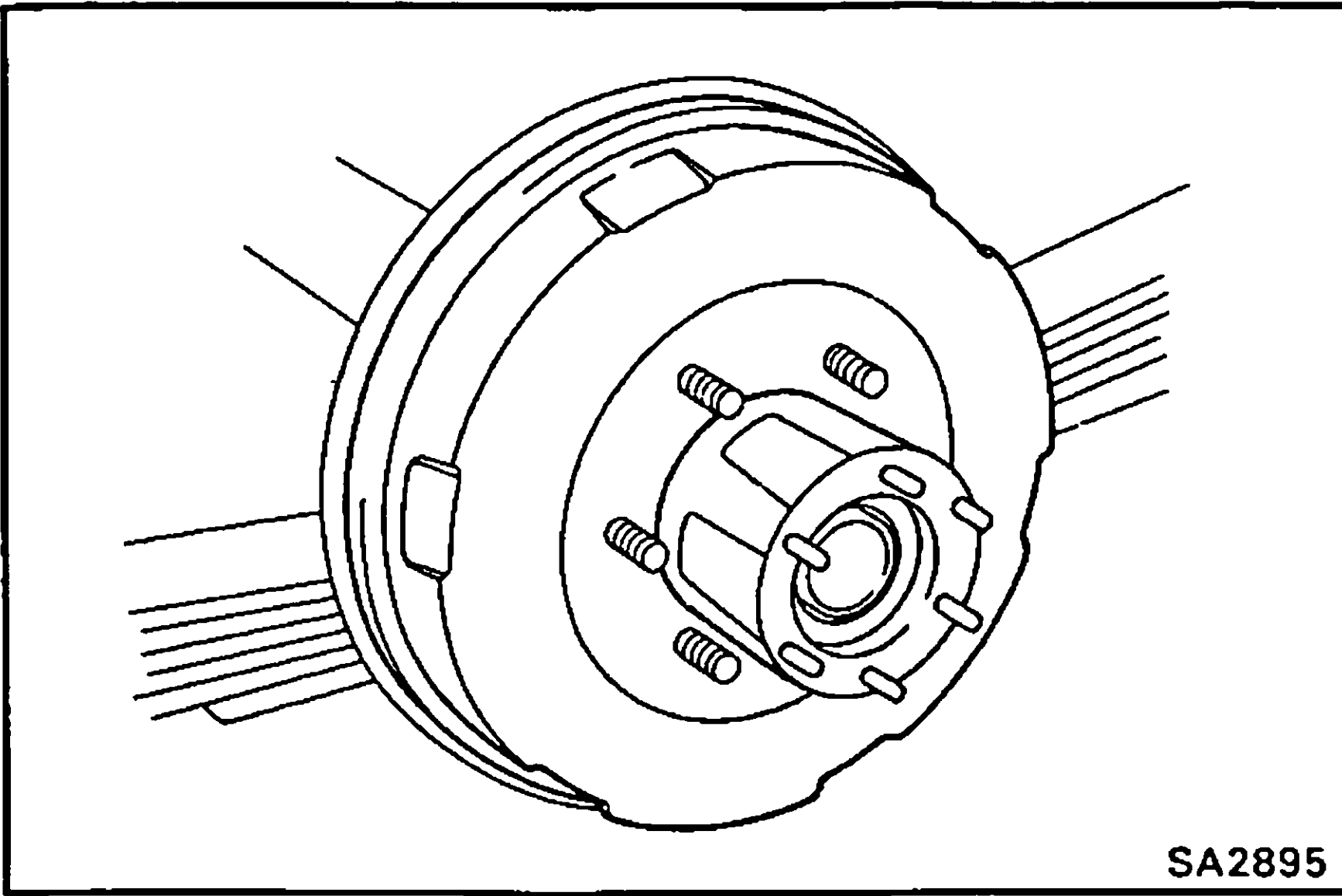
1. INSTALL AXLE HUB

- Install the backing plate and oil seal to the axle housing with the four bolts and nuts.
 - Install the axle hub to the axle housing.
- NOTICE:** Be careful not to damage the oil seal.
- Install the outer bearing.



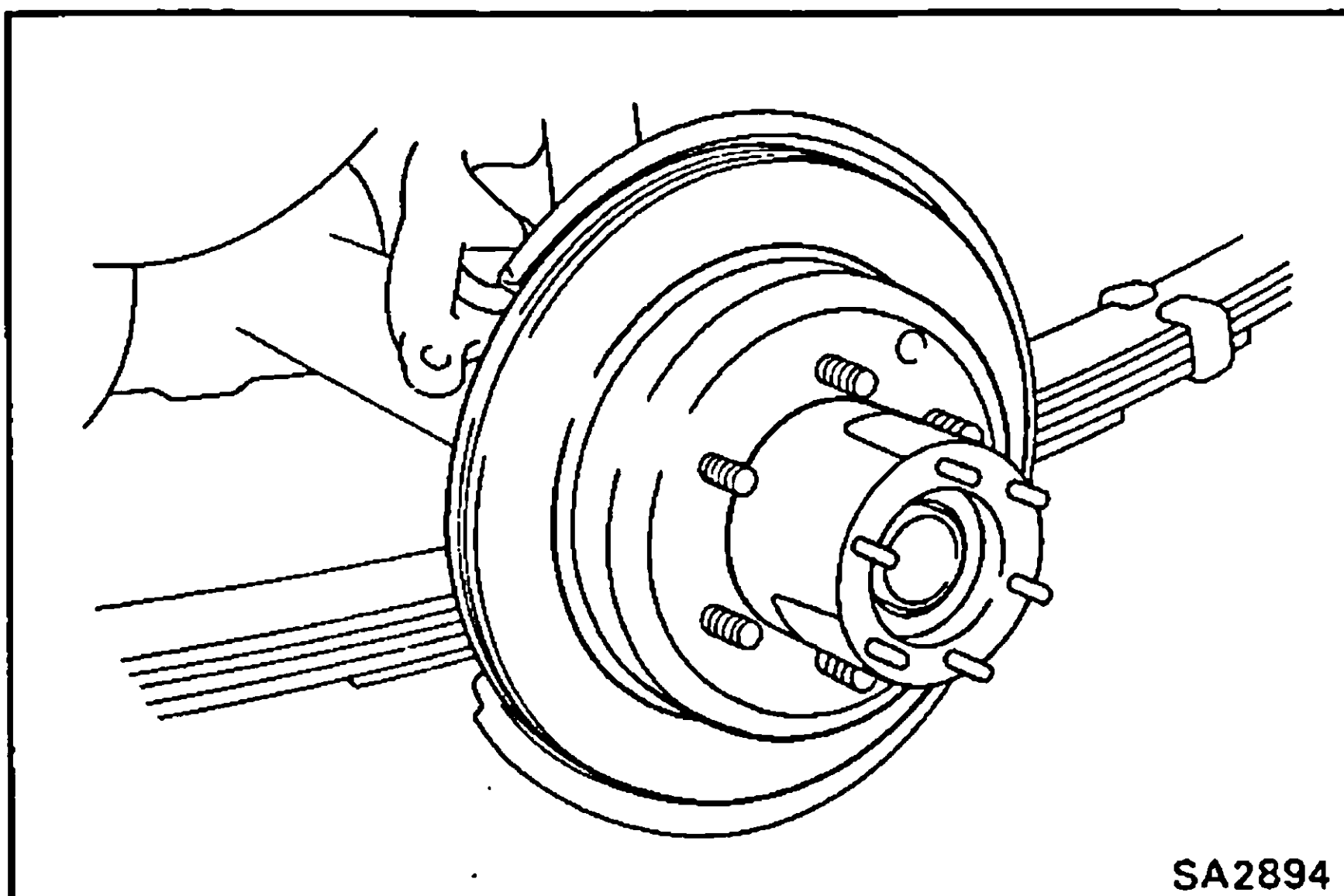
2. INSTALL LOCK NUT PLATE AND BEARING LOCK NUT

- After fully pushing in the outer bearing, position the protrusion of the lock nut plate into the axle housing groove.
- Temporarily install the bearing lock nut.



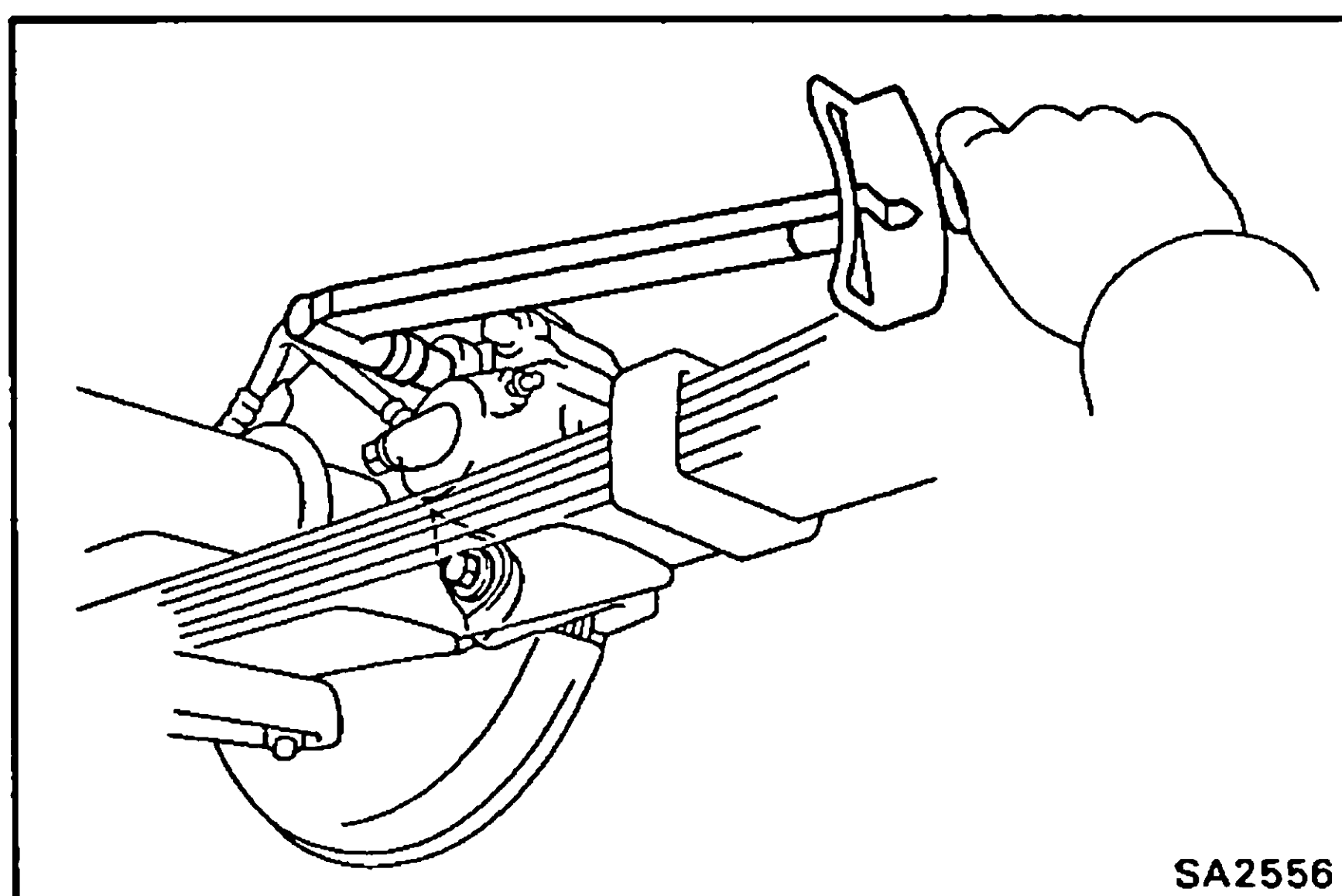
**3. (w/ DRUM BRAKE TYPE)
INSTALL BRAKE DRUM**

- (a) Install the brake drum to the axle hub.
- (b) Install the screw to the brake drum.



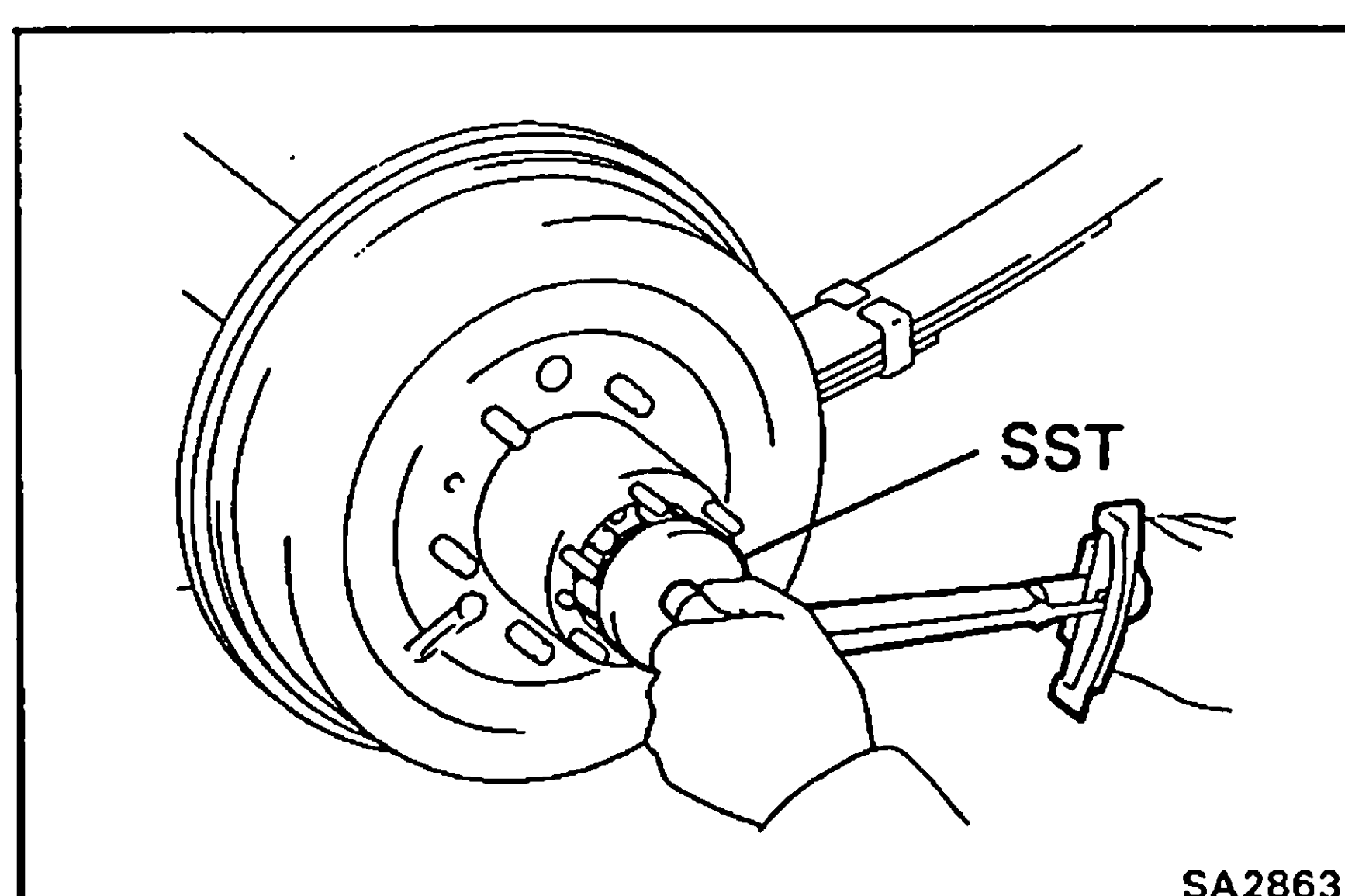
**4. (w/ DISC BRAKE TYPE)
INSTALL ROTOR DISC**

- (a) Install the rotor disc to the axle hub.



- (b) Install the brake cylinder with torque plate to the dust cover with the two bolts.

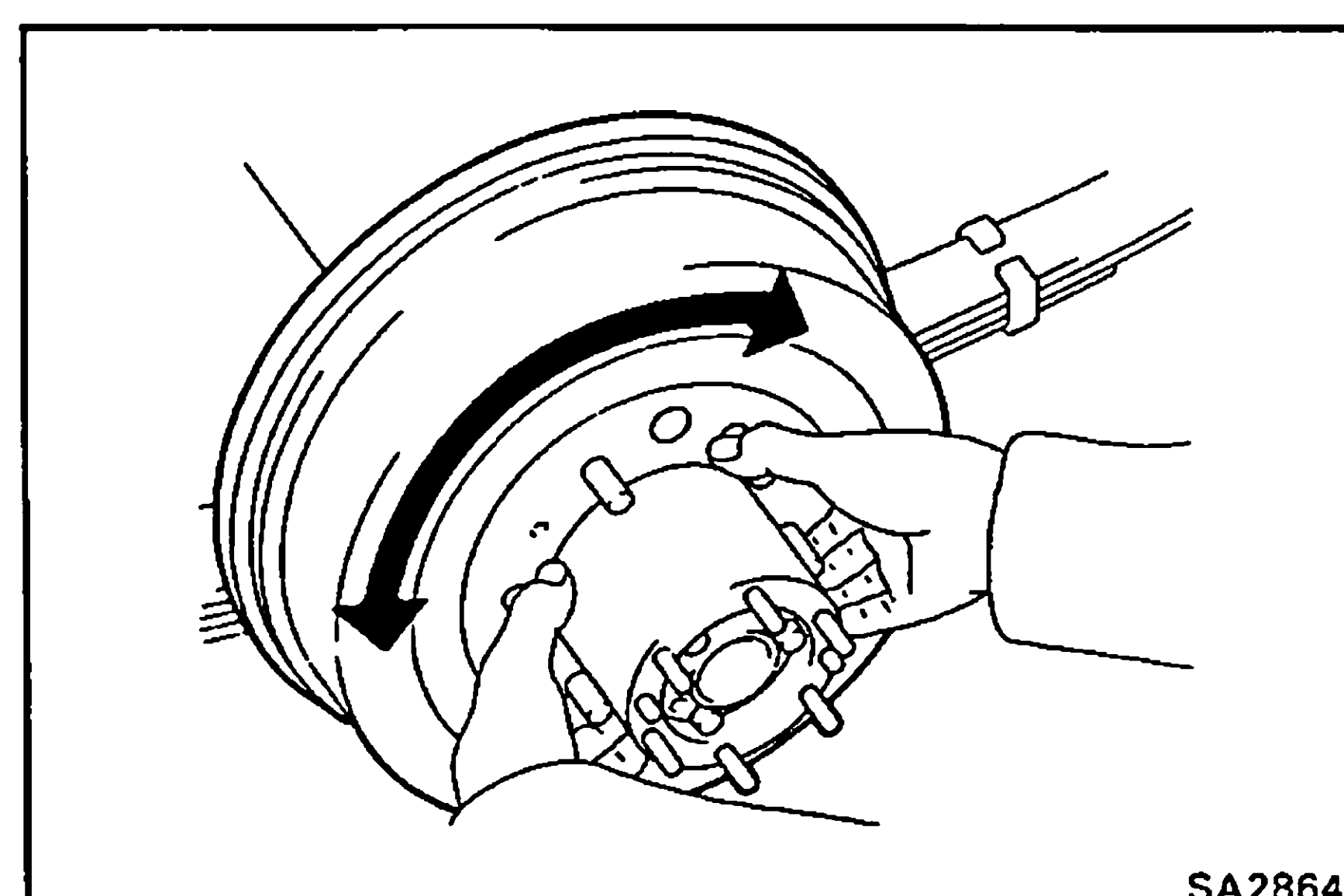
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



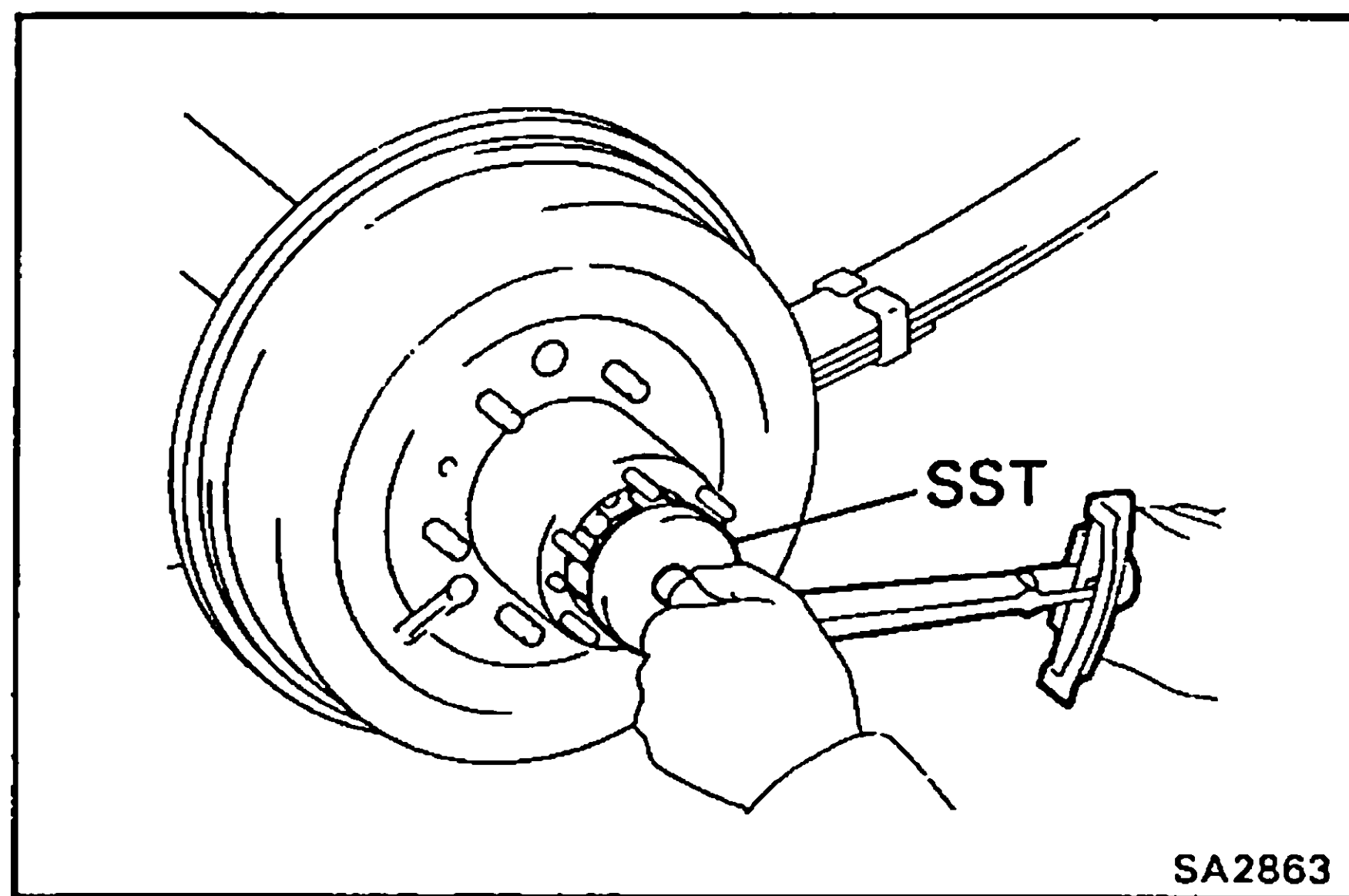
5. ADJUST PRELOAD

- (a) Using SST, torque the bearing lock nut.
SST 09509-25011

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



- (b) Snug down the bearing by turning the hub several times.



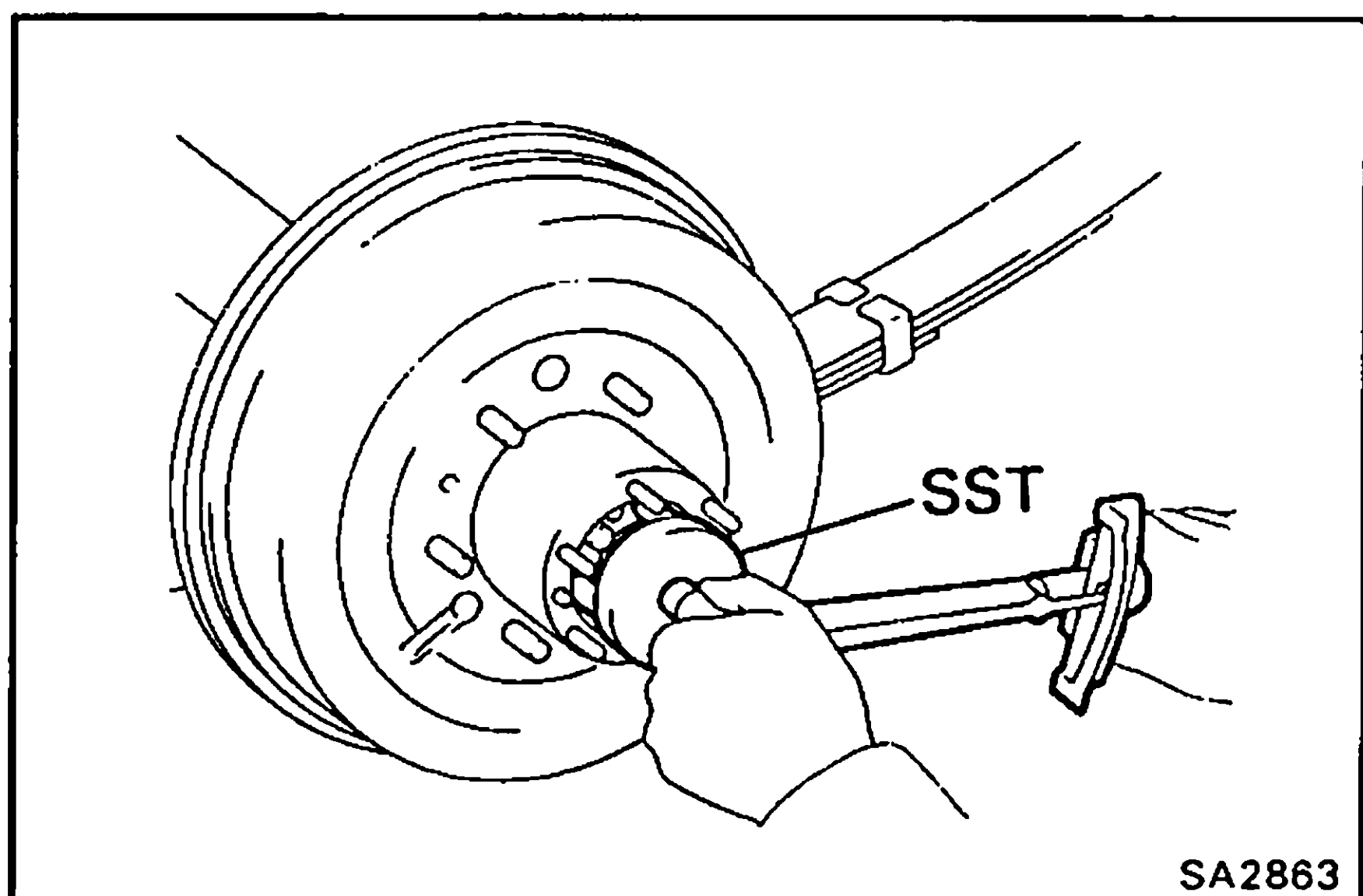
(c) Using SST, tighten the bearing lock nut.

SST 09509-25011

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

(d) Using SST, loosen the bearing lock nut until you can rotate it by hand.

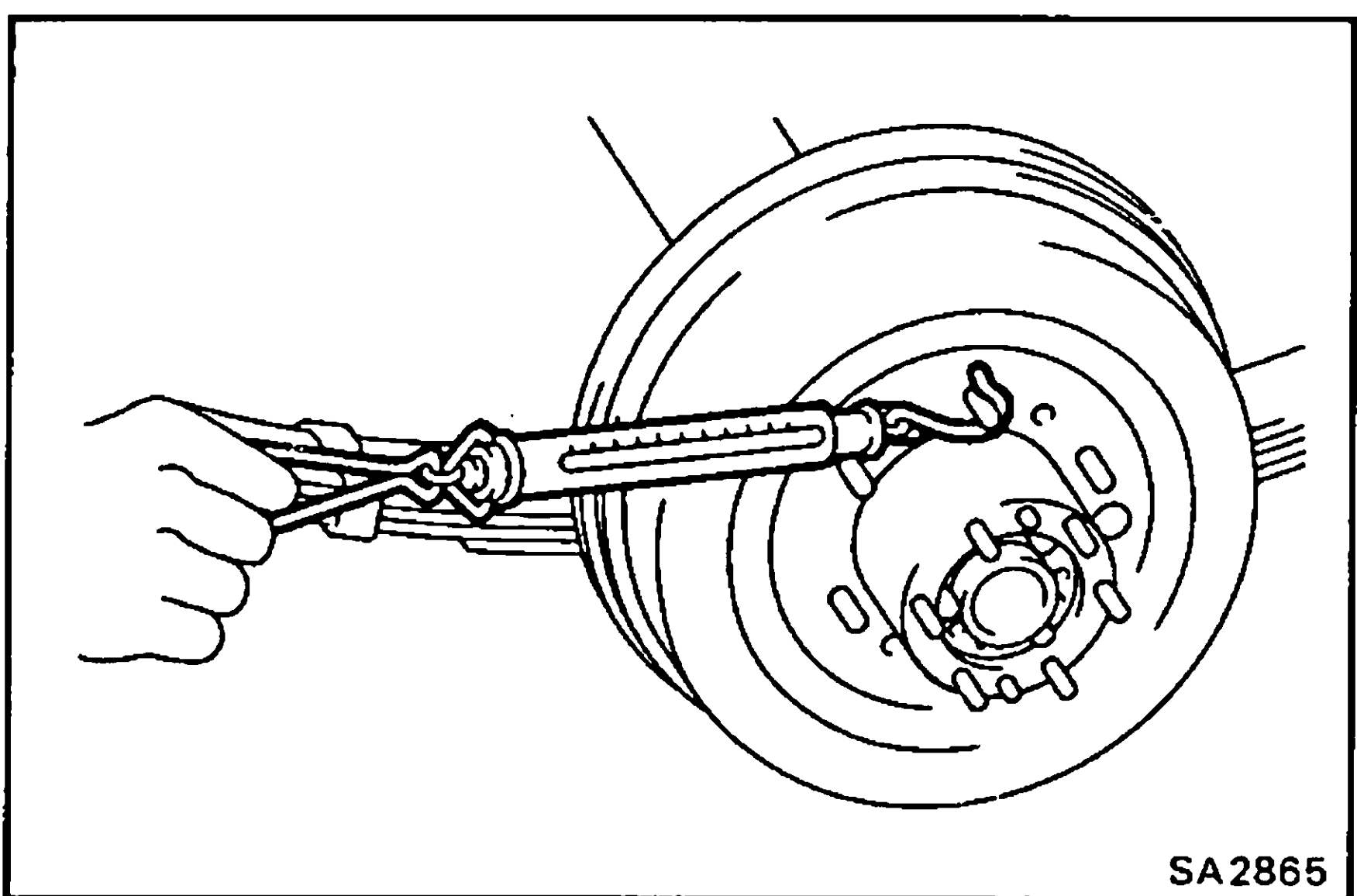
SST 09509-25011



(e) Using SST, retighten the bearing lock nut.

SST 09509-25011

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

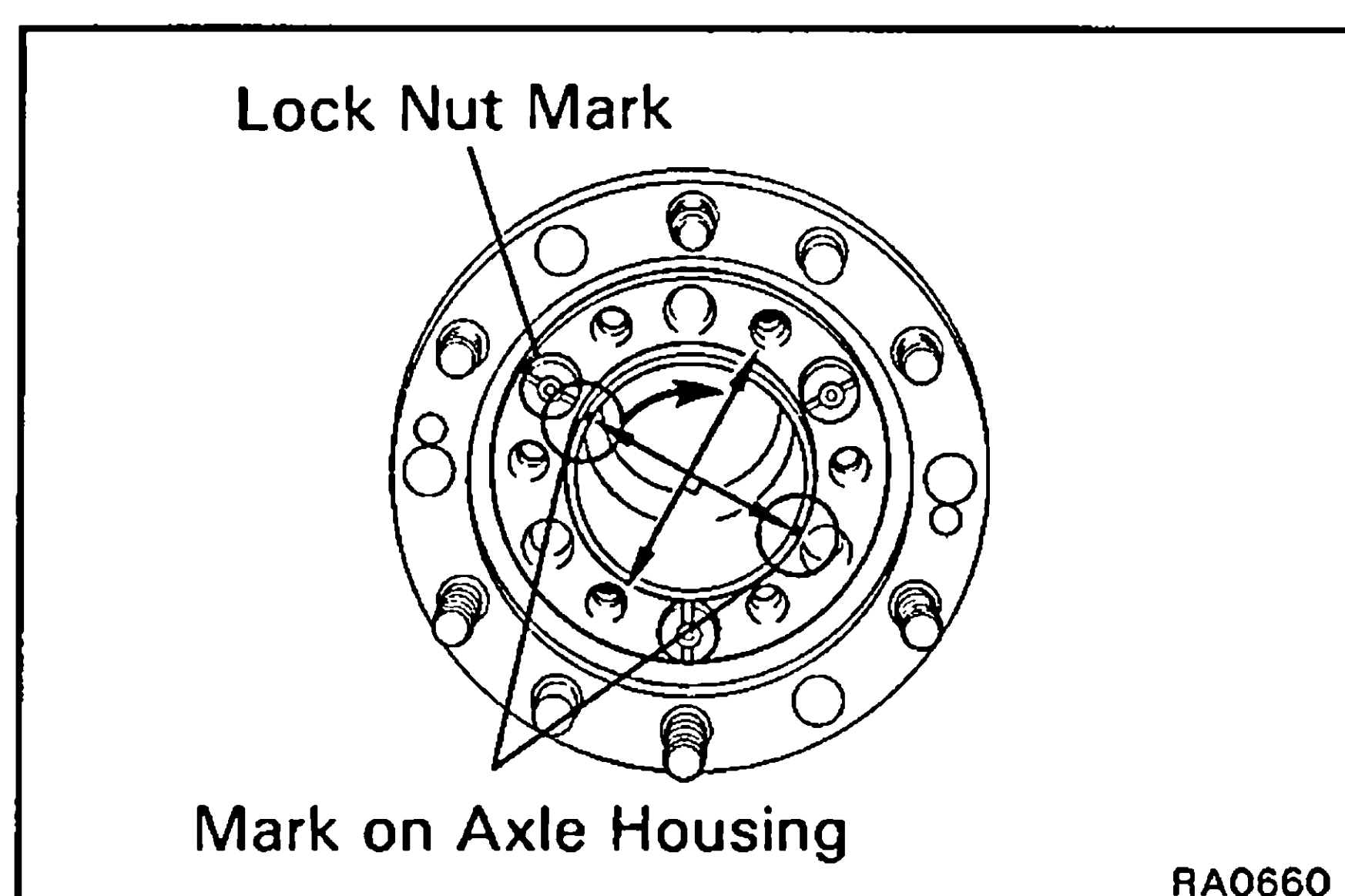


(f) Using a spring tension gauge, measure the preload at the hub bolt.

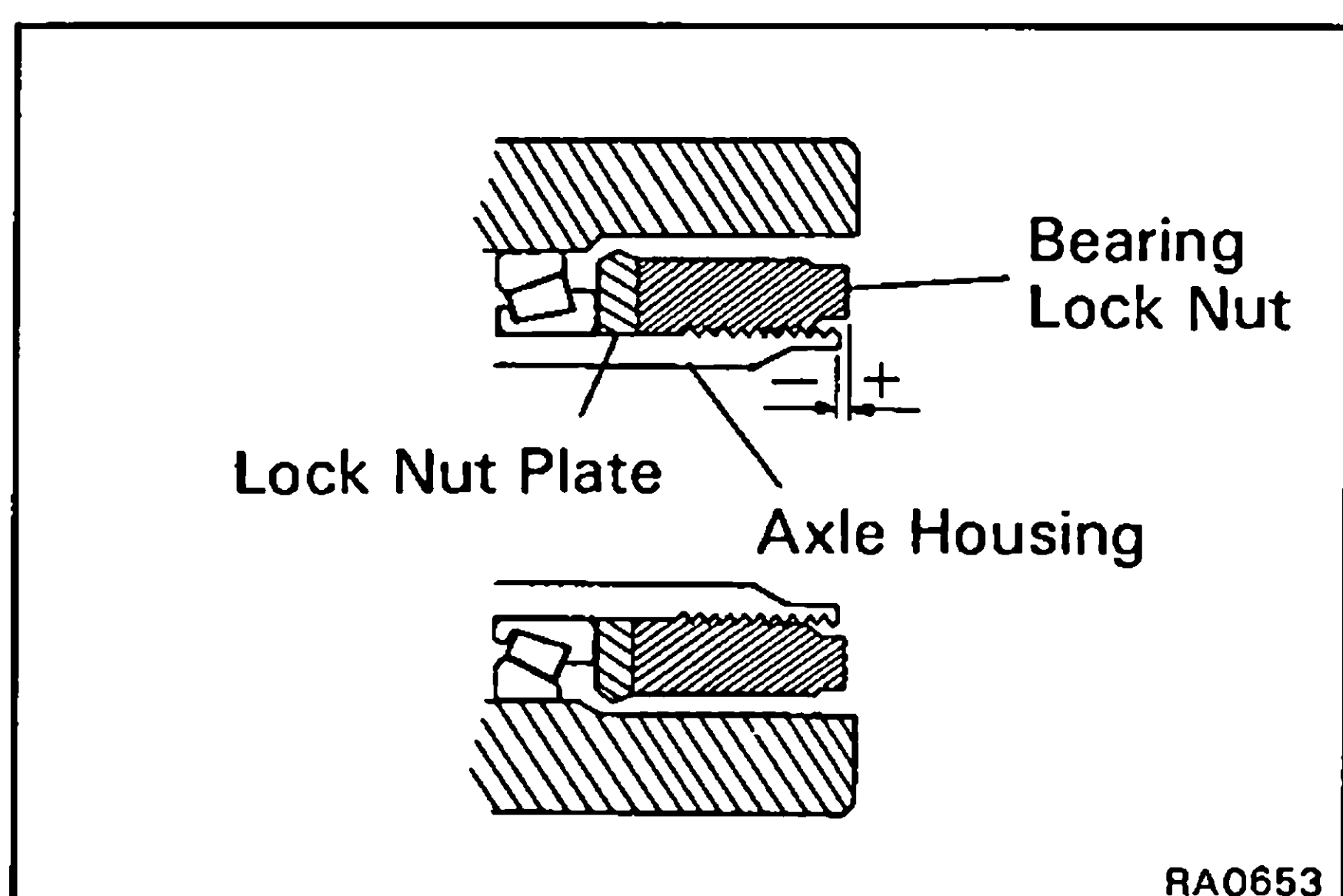
Rear wheel bearing preload (at starting):

25 – 56 N (2.6 – 5.7 kgf, 5.7 – 12.6 lbf)

If preload is not within specification, the procedure above must be repeated.



(g) Align the lock nut mark with one of the marks on the axle housing, and place lock screws in the holes at right angles to the lock nut.

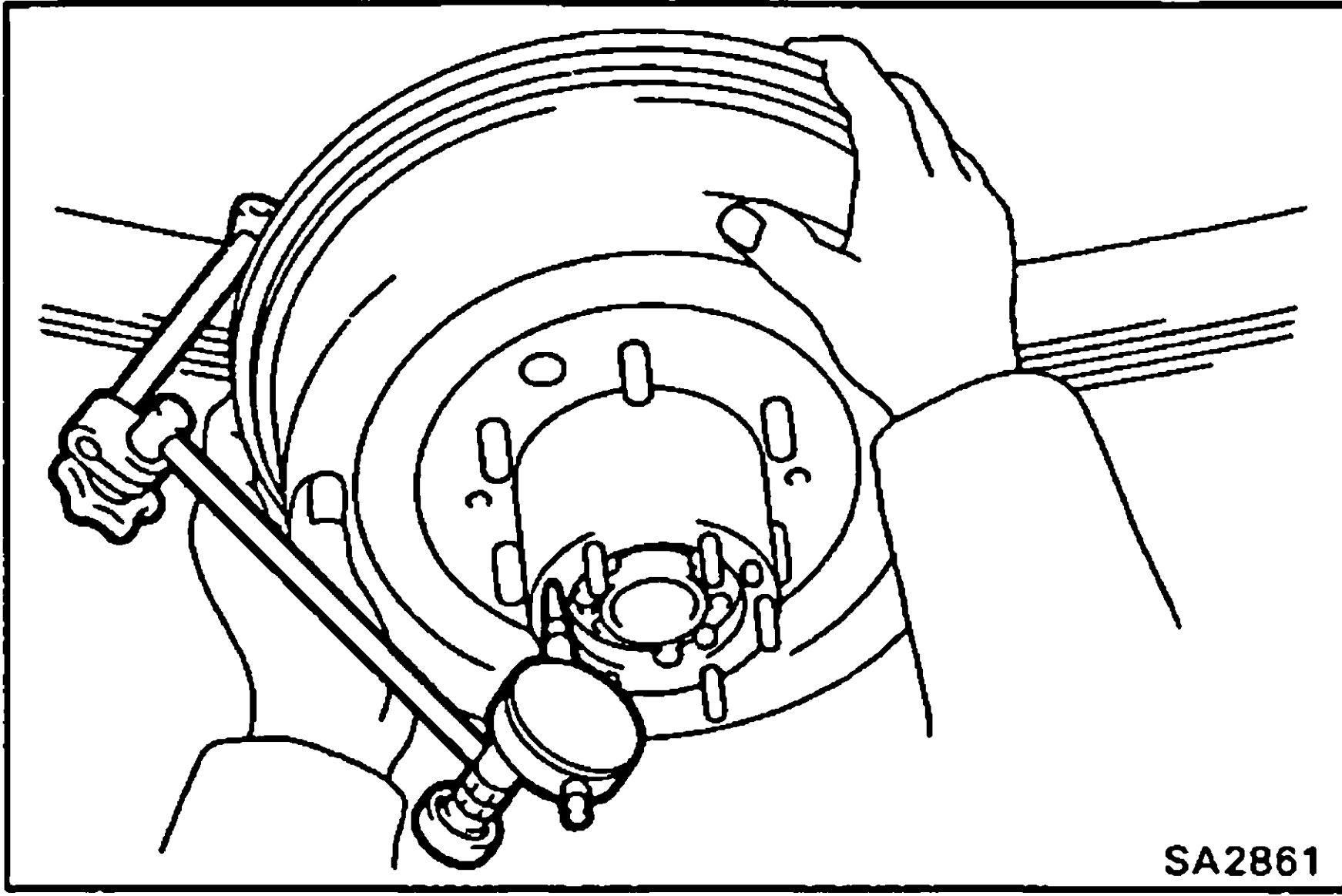


(h) Measure the distance between the top surface of axle housing and the lock nut.

Standard distance:

–0.2 – 0.9 mm (–0.008 – 0.035 in.)

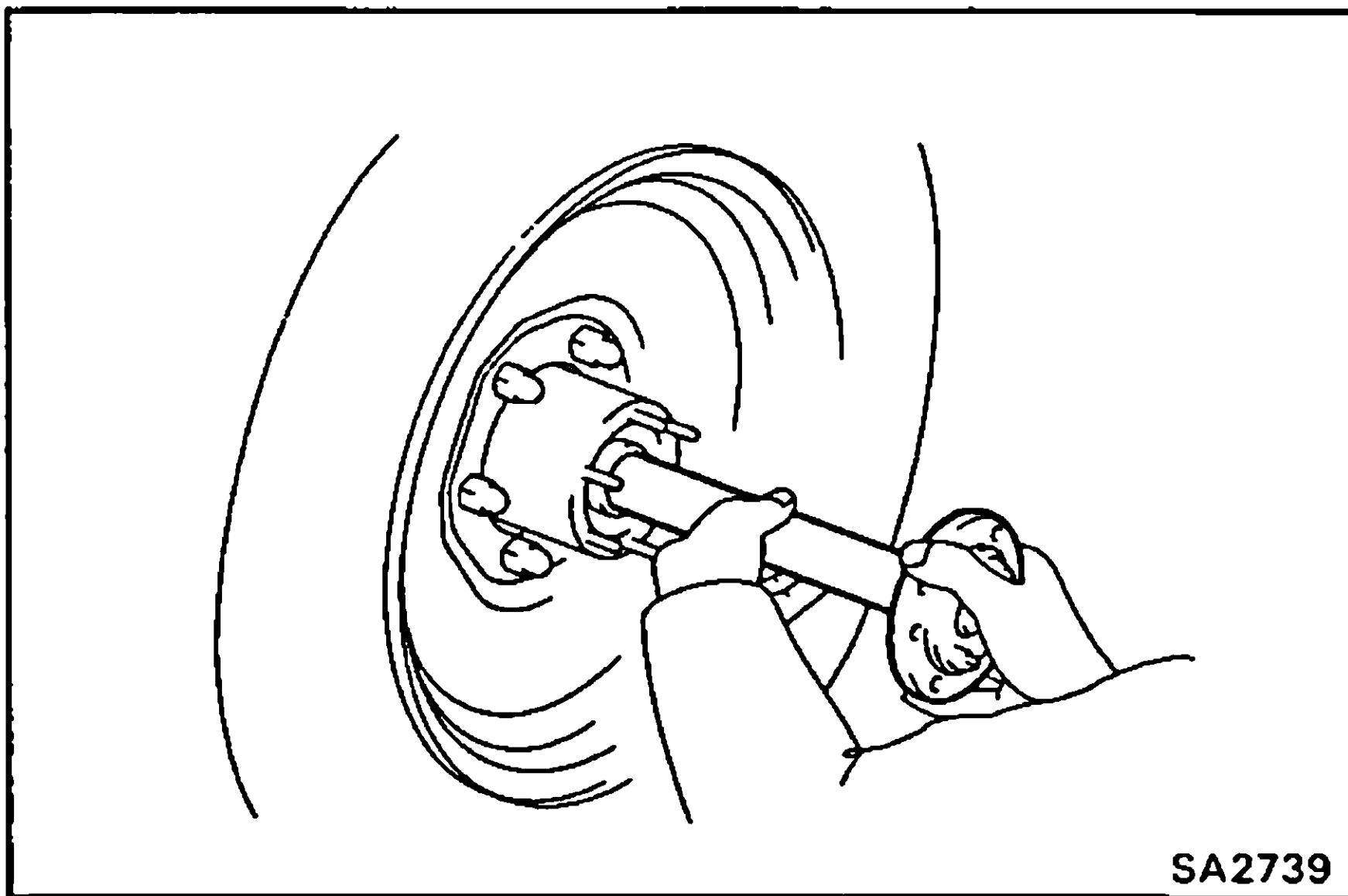
If not within specification, reinstall the axle hub.



(i) Check the movement of the drum or disc rotor.

(j) Check the hub axial play.

Hub axial play: Less than 0.1 mm (0.004 in.)

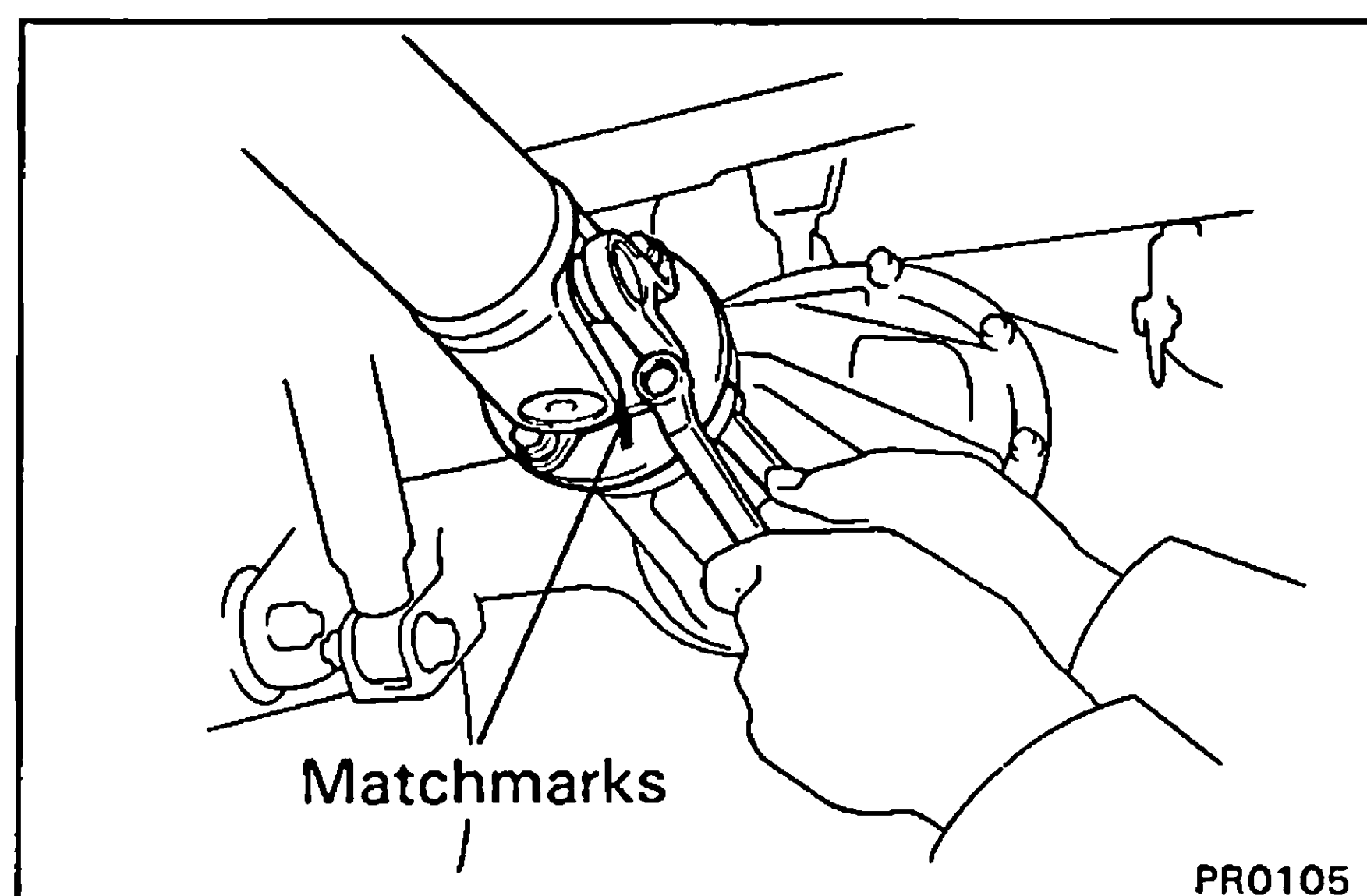


6. INSTALL REAR AXLE SHAFT
(See Pub. No. RM183E, see page SA-120)

7. INSTALL WHEEL AND LOWER VEHICLE

REAR DIFFERENTIAL / 8 INCH TYPE

On-Vehicle Replacement of Front Oil Seal



1. DISCONNECT REAR PROPELLER SHAFT

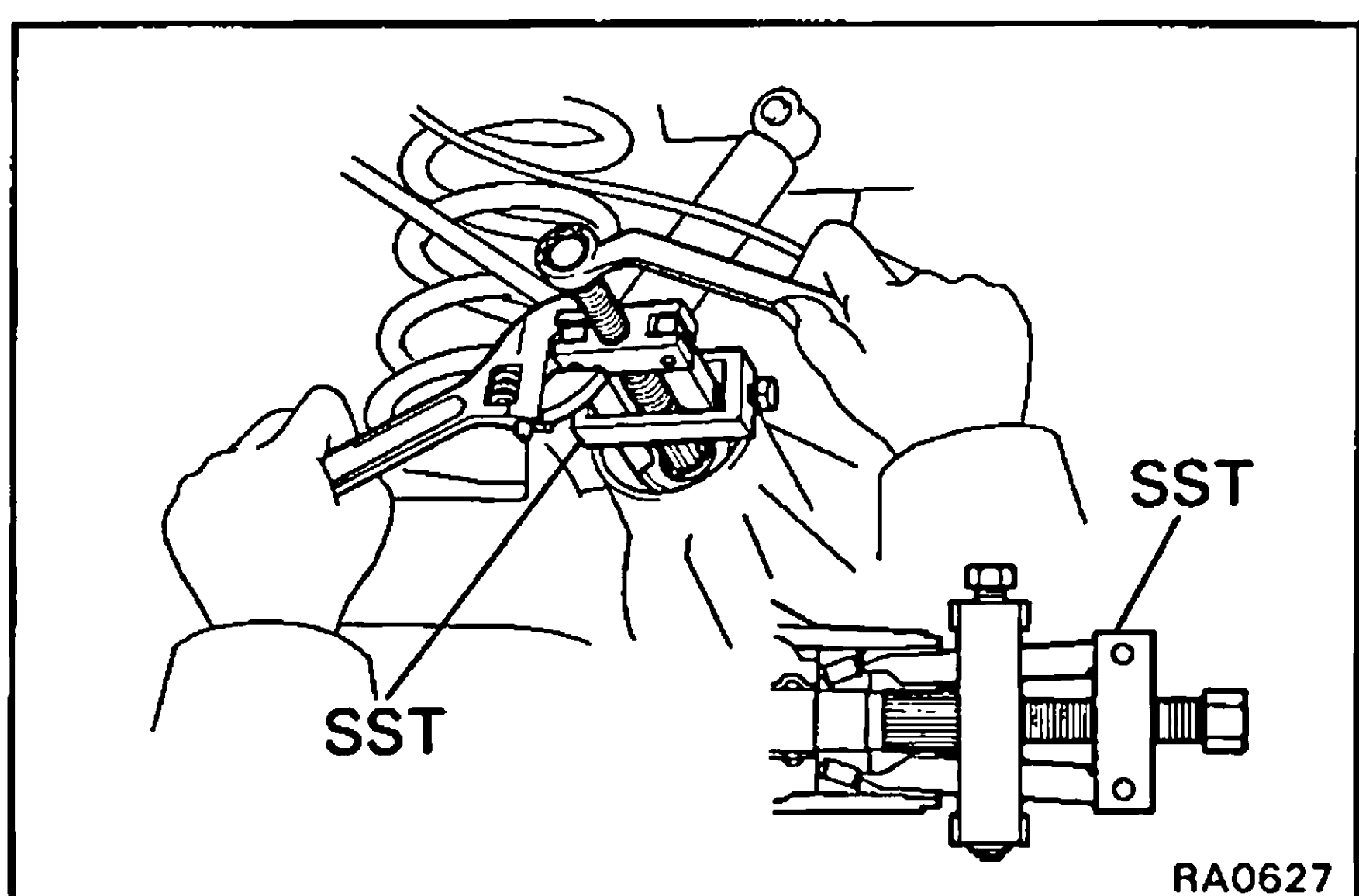
- Place matchmarks on the flanges.
- Remove the four bolts and nuts.

2. REMOVE COMPANION FLANGE

(See Pub. No. RM183E, See page SA-52)

3. REMOVE OIL SEAL AND OIL SLINGER

(See Pub. No. RM183E, See page SA-52)



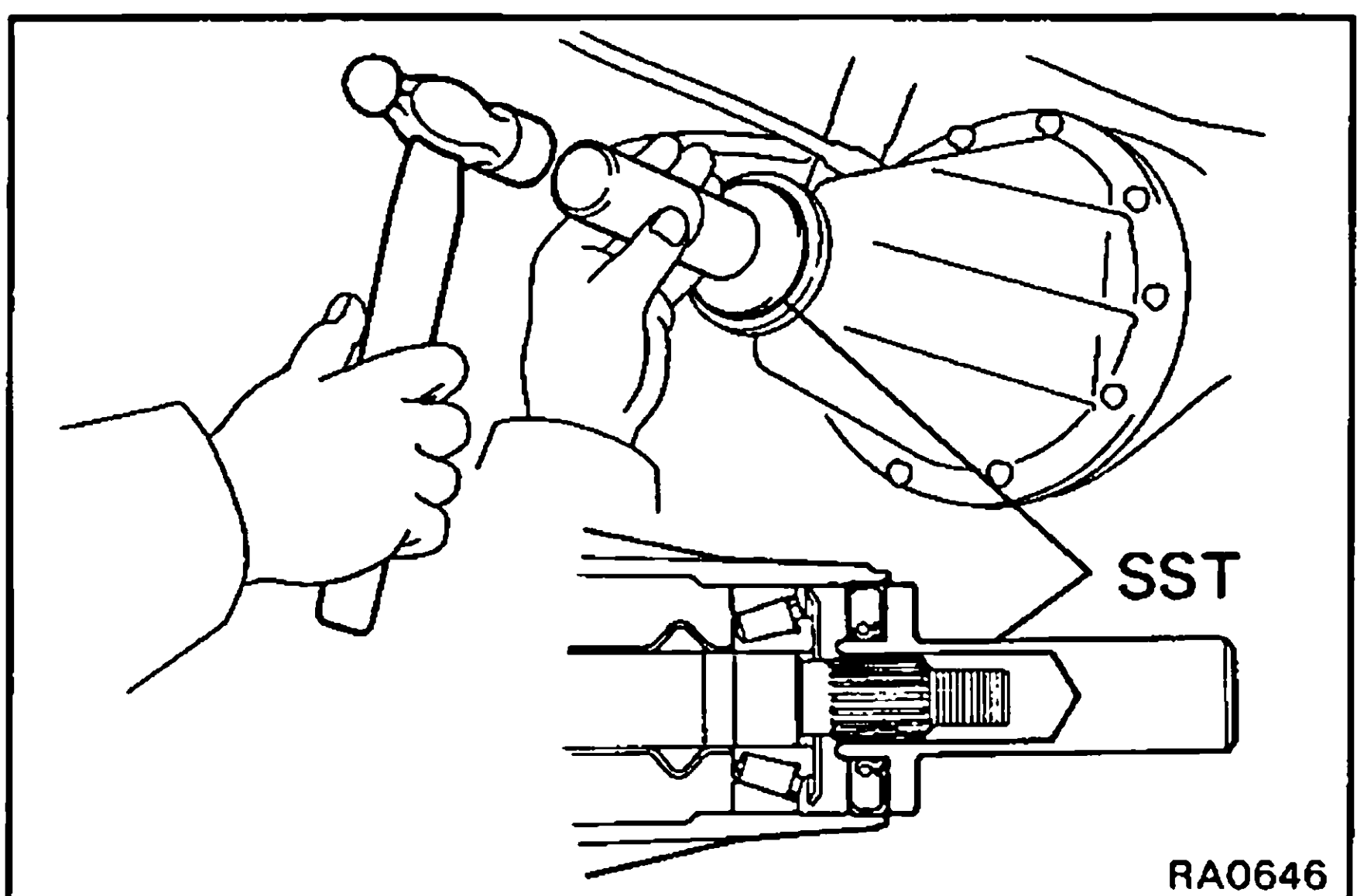
4. REMOVE FRONT BEARING AND BEARING SPACER

- Using SST, remove the front bearing from the drive pinion.

SST 09556-22010

- Remove the bearing spacer.

5. INSTALL NEW BEARING SPACER AND FRONT BEARING



6. INSTALL OIL SLINGER AND NEW OIL SEAL

- Install the oil slinger facing as shown.
- Using SST, drive in a new oil seal as shown.

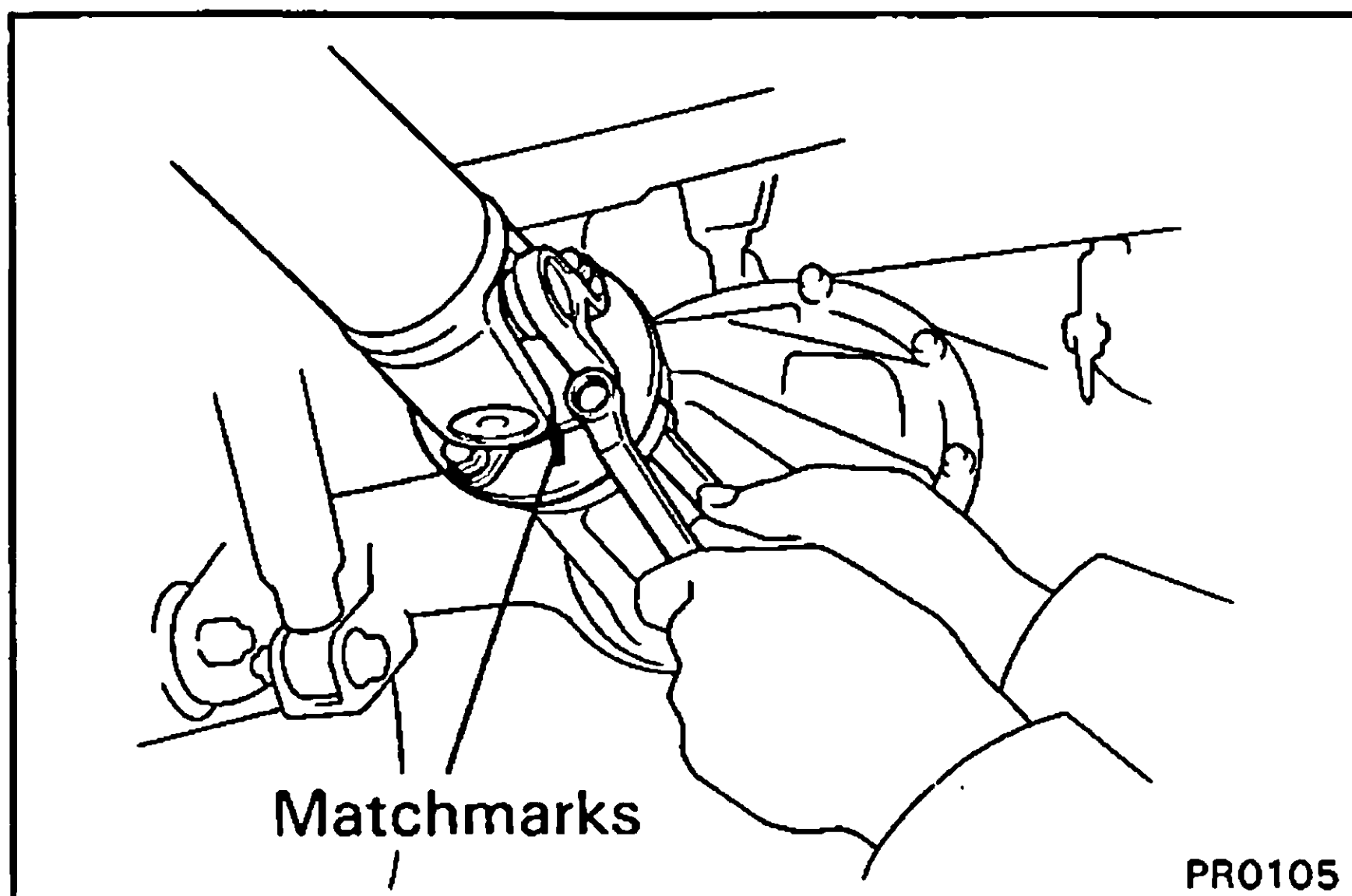
SST 09554-30011 (w/o Differential Lock)

09214-76011 (w/ Differential Lock)

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

- Apply MP grease to the oil seal lip.

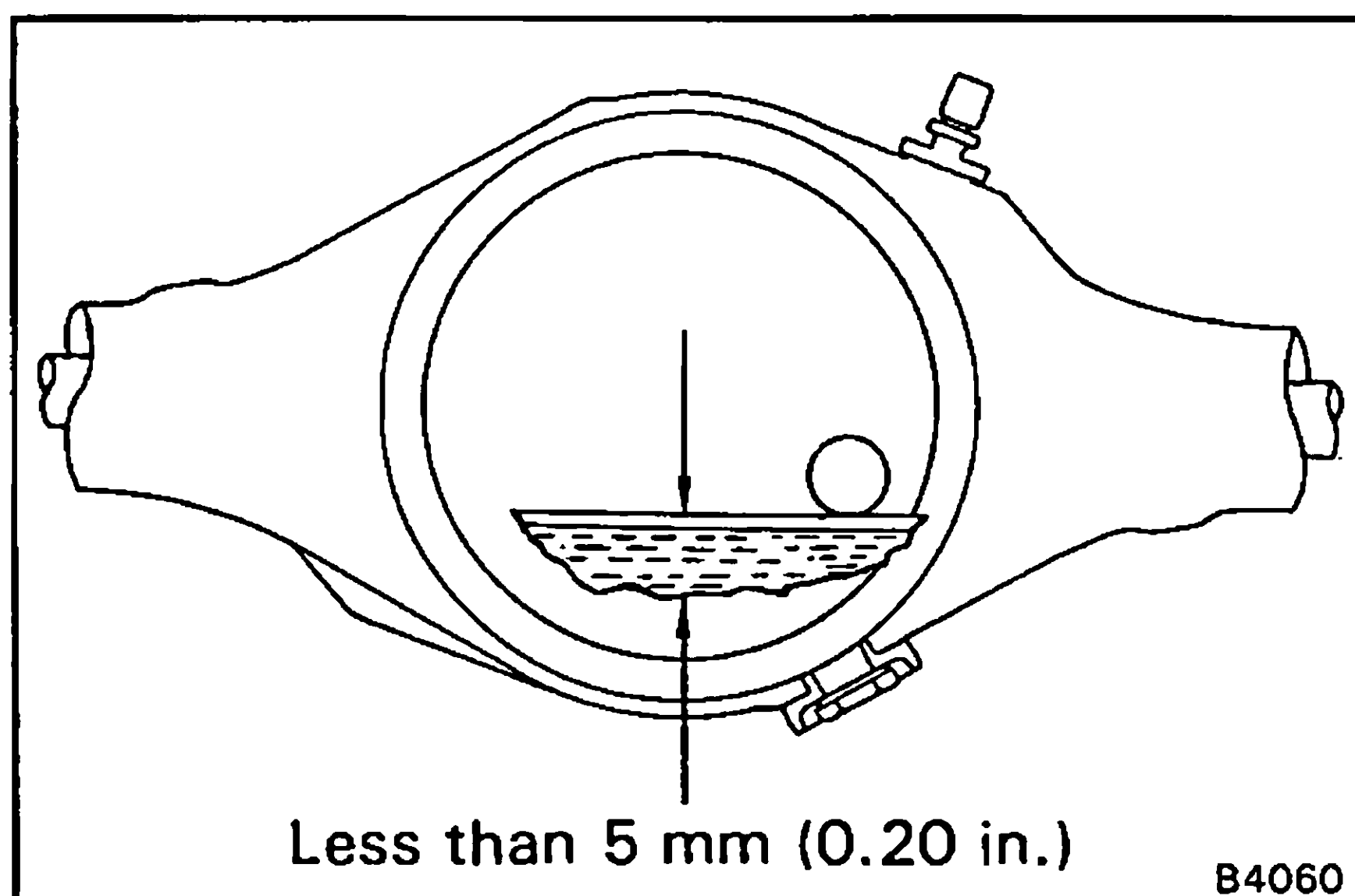
7. **INSTALL COMPANION FLANGE**
(See Pub. No. RM183E, See page SA-54)
8. **CHECK DRIVE PINION PRELOAD**
(See Pub. No. RM183E, See page SA-54)
9. **STAKE DRIVE PINION NUT**



10. CONNECT REAR PROPELLER SHAFT

- (a) Align matchmarks on the flanges and connect the flanges with four bolts, spring washers and nuts.
- (b) Torque the bolts and nuts.

Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)



11. CHECK DIFFERENTIAL OIL LEVEL

Fill with hypoid gear oil if necessary.

Oil type:

w/o LSD API GL-5

w/ LSD API GL-5 for LSD

Recommended oil viscosity:

Above — 18°C (0°F) SAE 90

Below — 18°C (0°F) SAE 80W or 80W-90

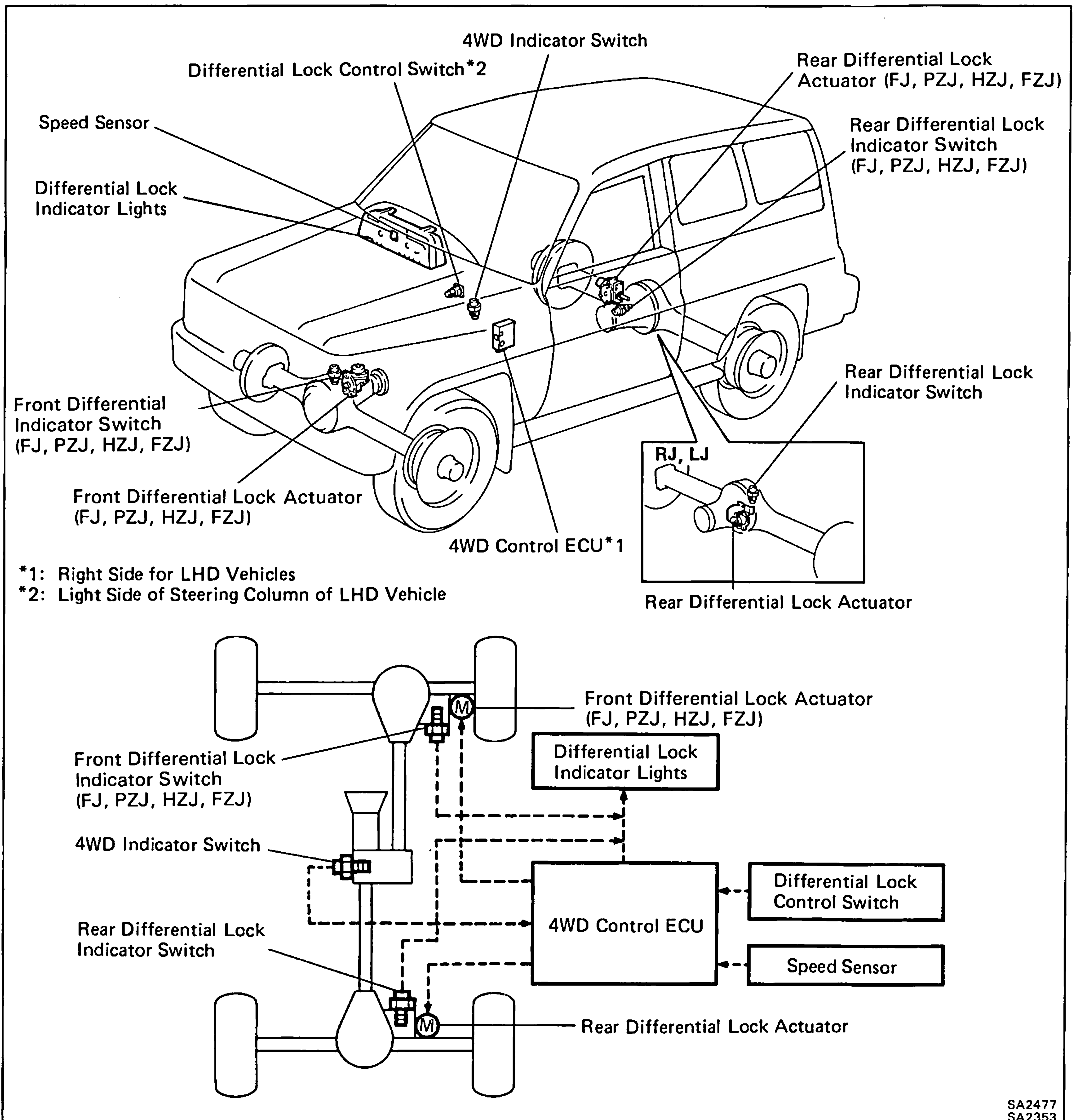
Capacity: 1.85 liters (2.0 US qts, 1.6 Imp. qts)

DIFFERENTIAL LOCKING SYSTEM

Description

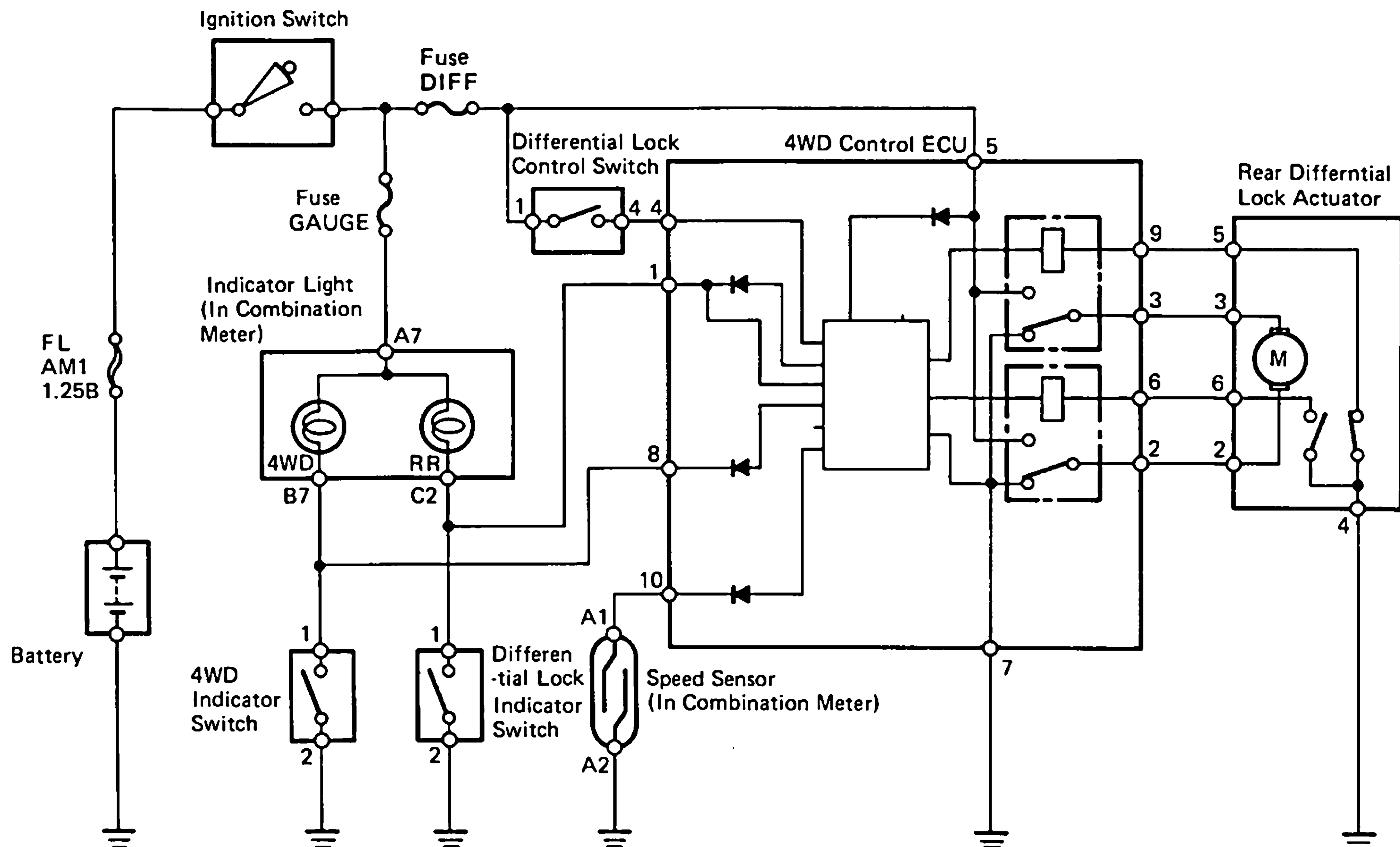
- The differential locking system slides the differential lock sleeve which is meshed to the axle shaft, and by meshing with the differential case, restricts the operation of the differential.
 - In the vehicles, an electric motor is used to slide the differential lock sleeve. Driving of the motor is accomplished by the ECU (Electronic Control Unit) in accordance with signals from the differential lock control switch on the instrument panel and from various other switches and sensors. This motor is built into the differential lock actuator.
- For RJ and LJ series, the locking system is adopted only into the rear differential.

Parts Location and System Diagram

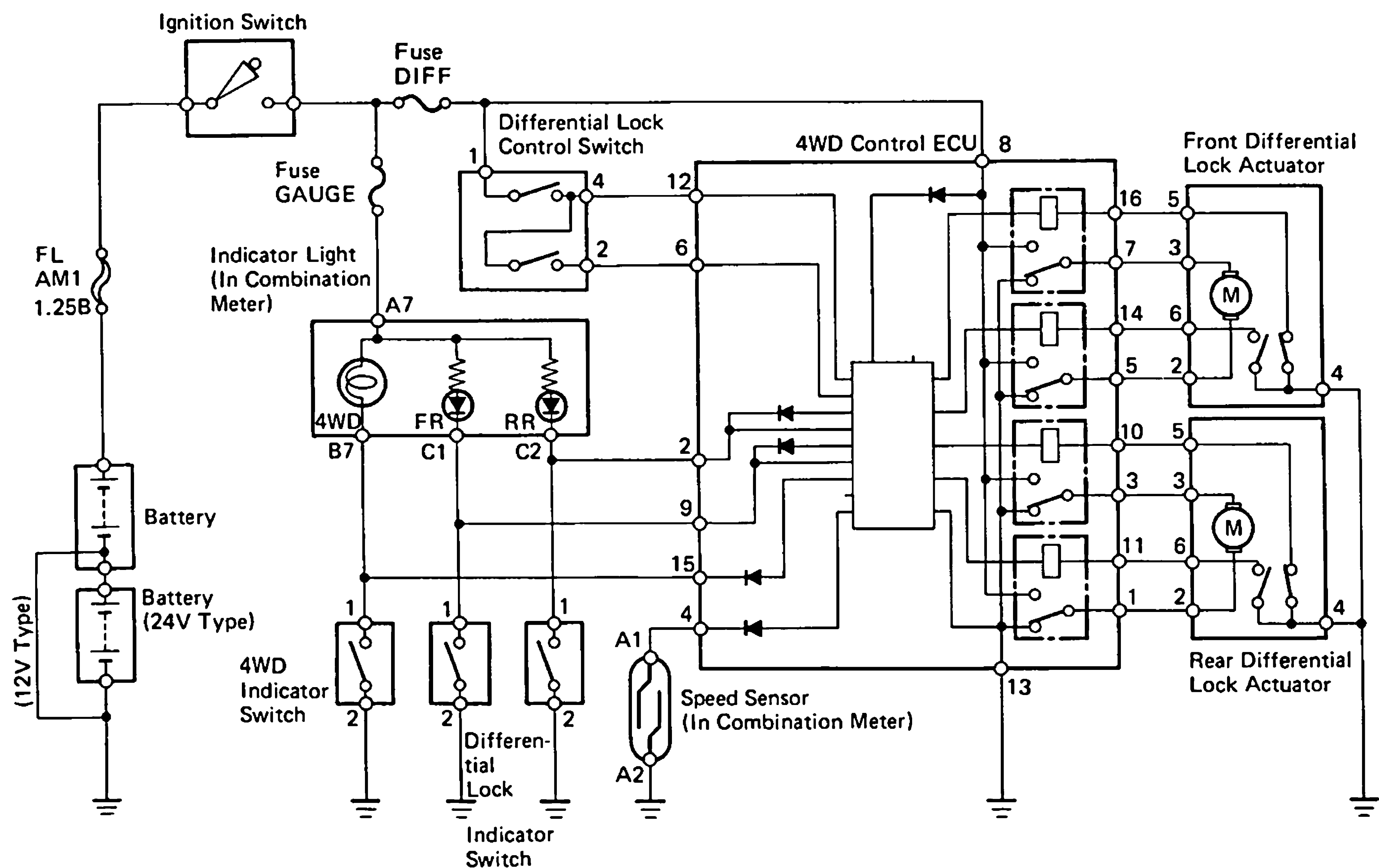


Wiring and Connector Diagrams

RJ, LJ



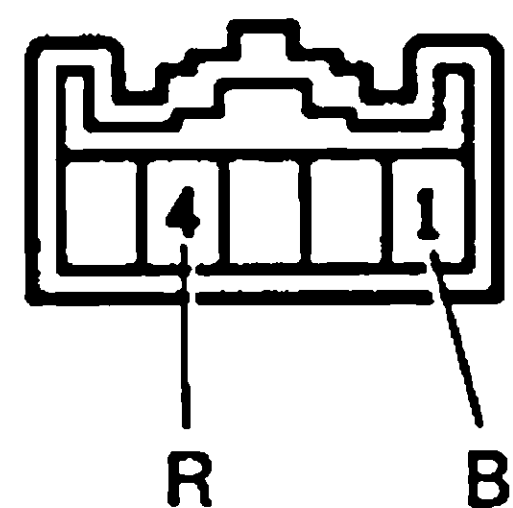
FJ, PZJ, HZJ, FZJ



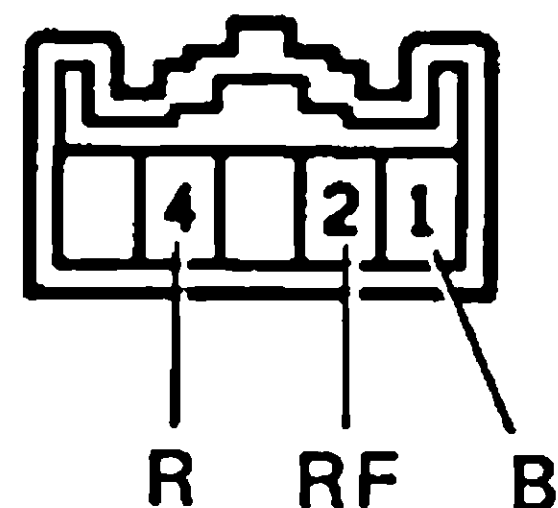
Wiring and Connector Diagrams (Cont'd)

Differential Lock Control Switch

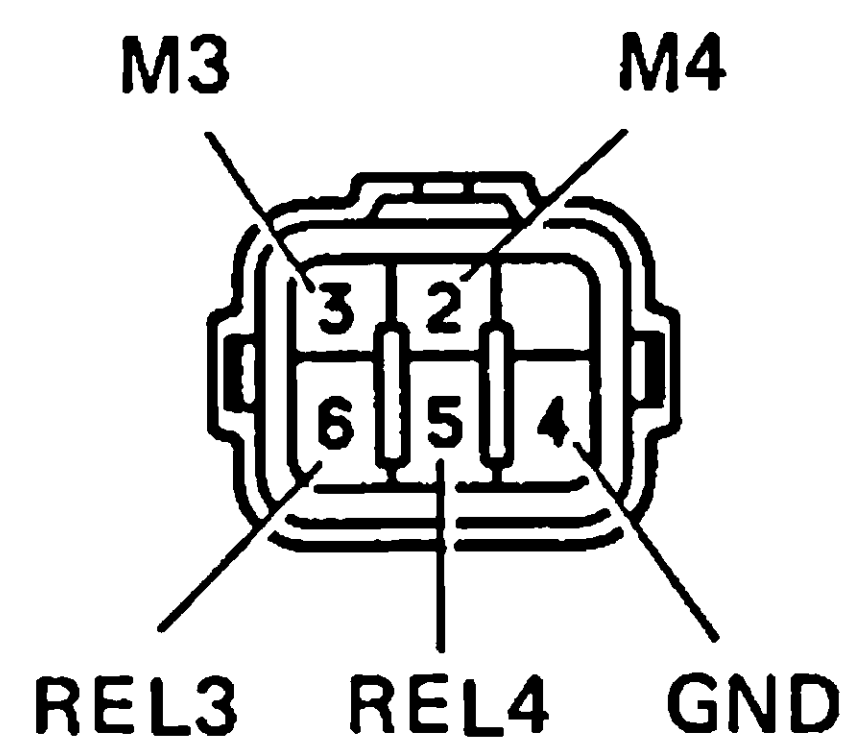
(RJ, LJ)



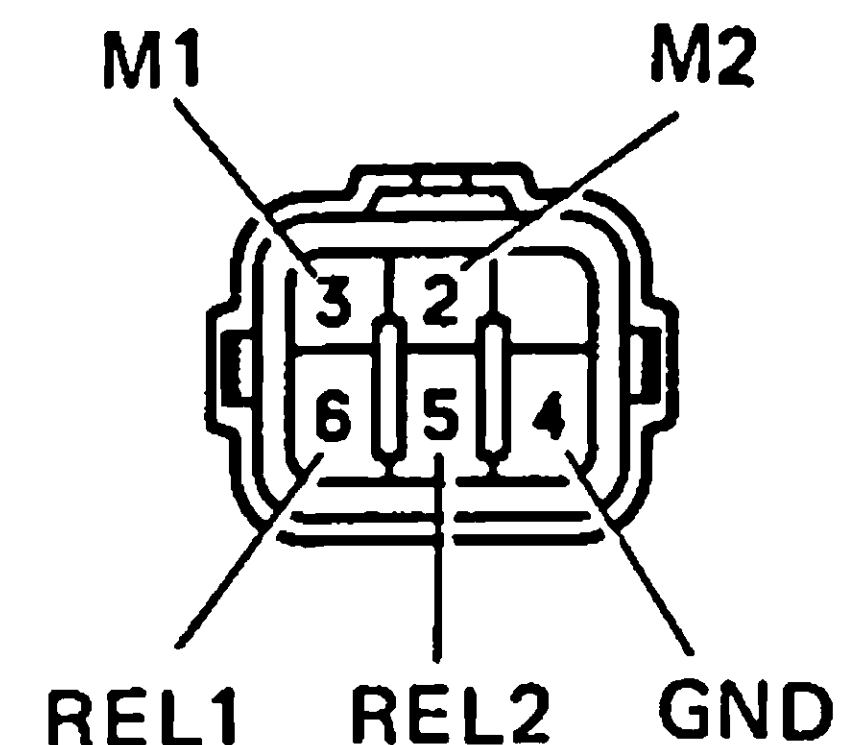
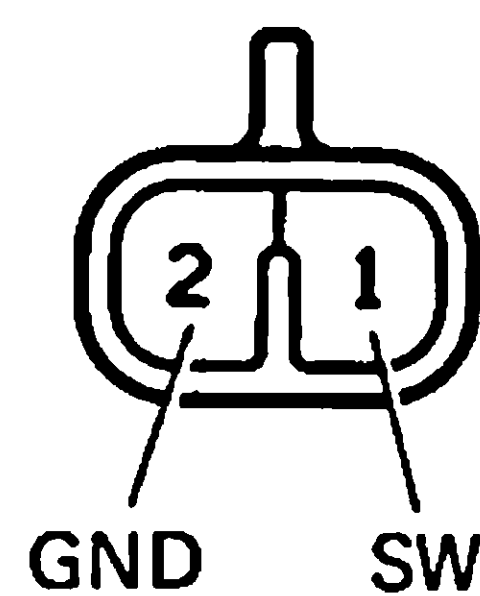
(FJ, PZJ, HZJ, FZJ)



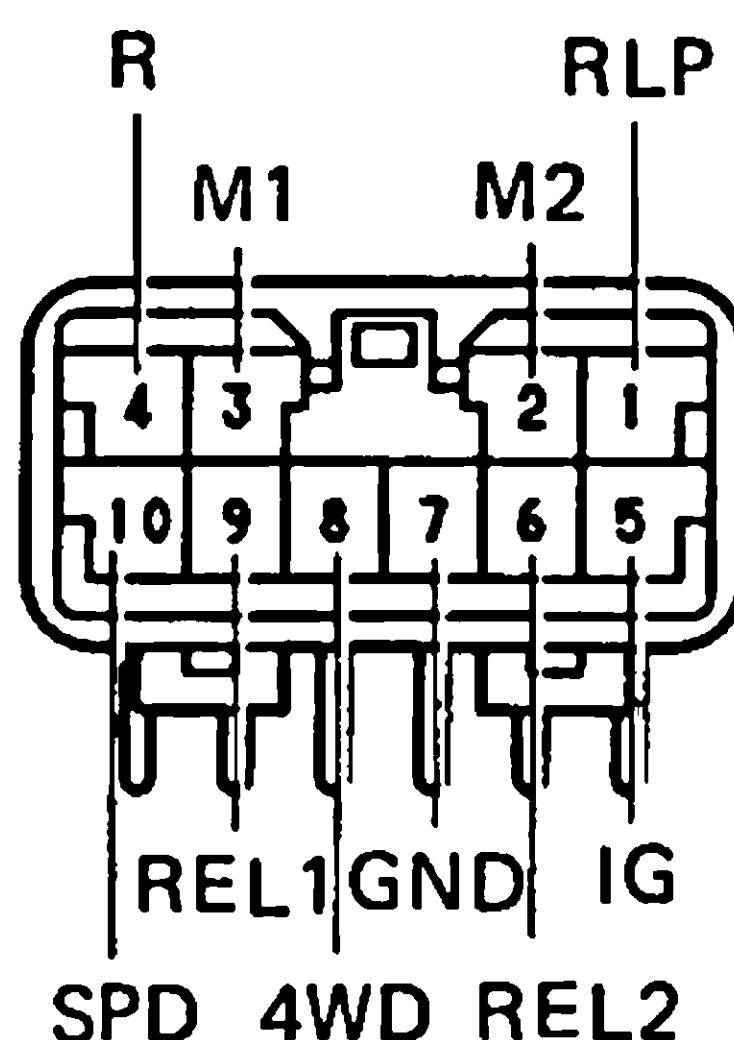
Front Differential Lock Actuator



Rear Differential Lock Actuator

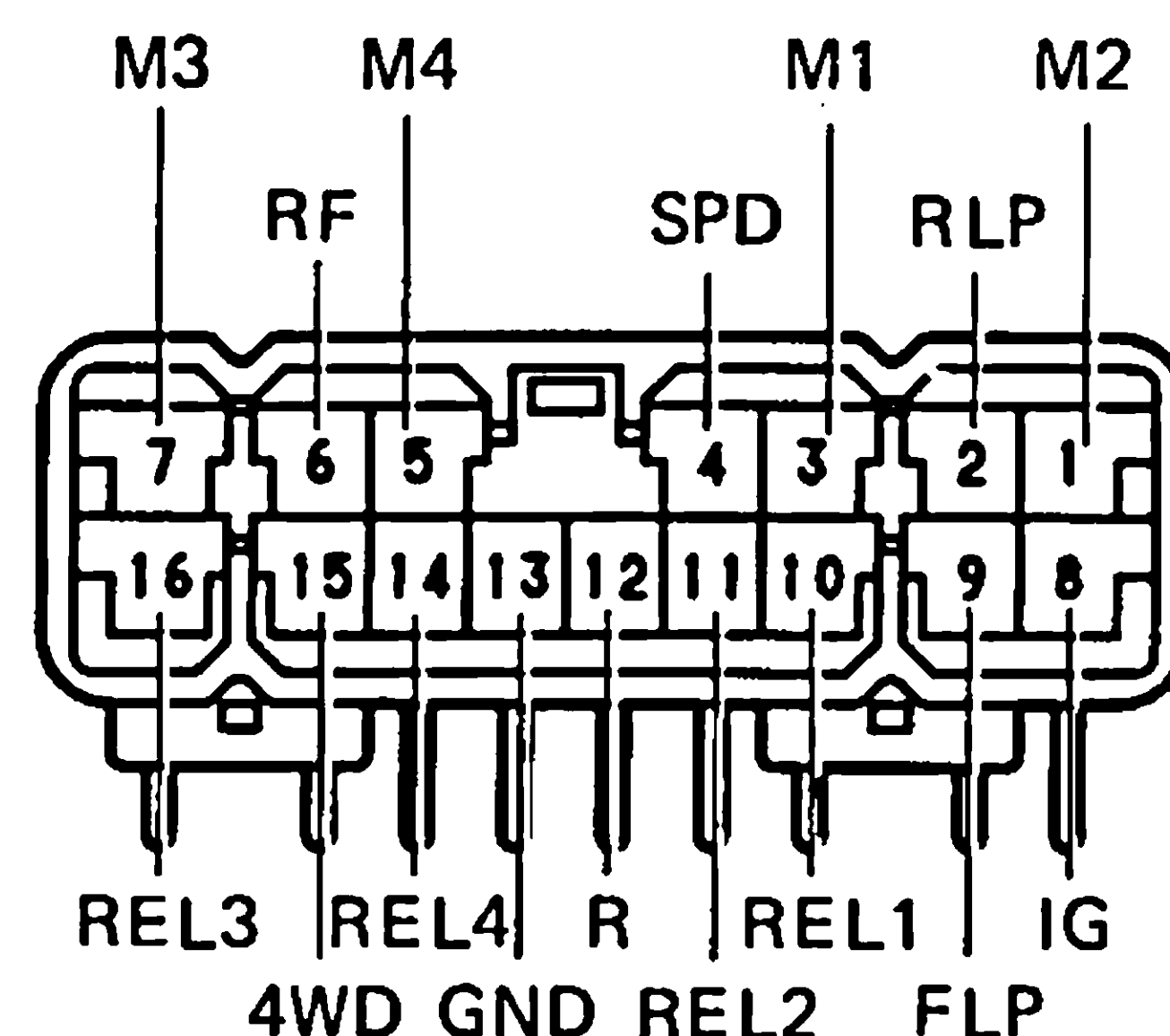
4WD Indicator Switch
Differential Lock Indicator Switch

(RJ, LJ)



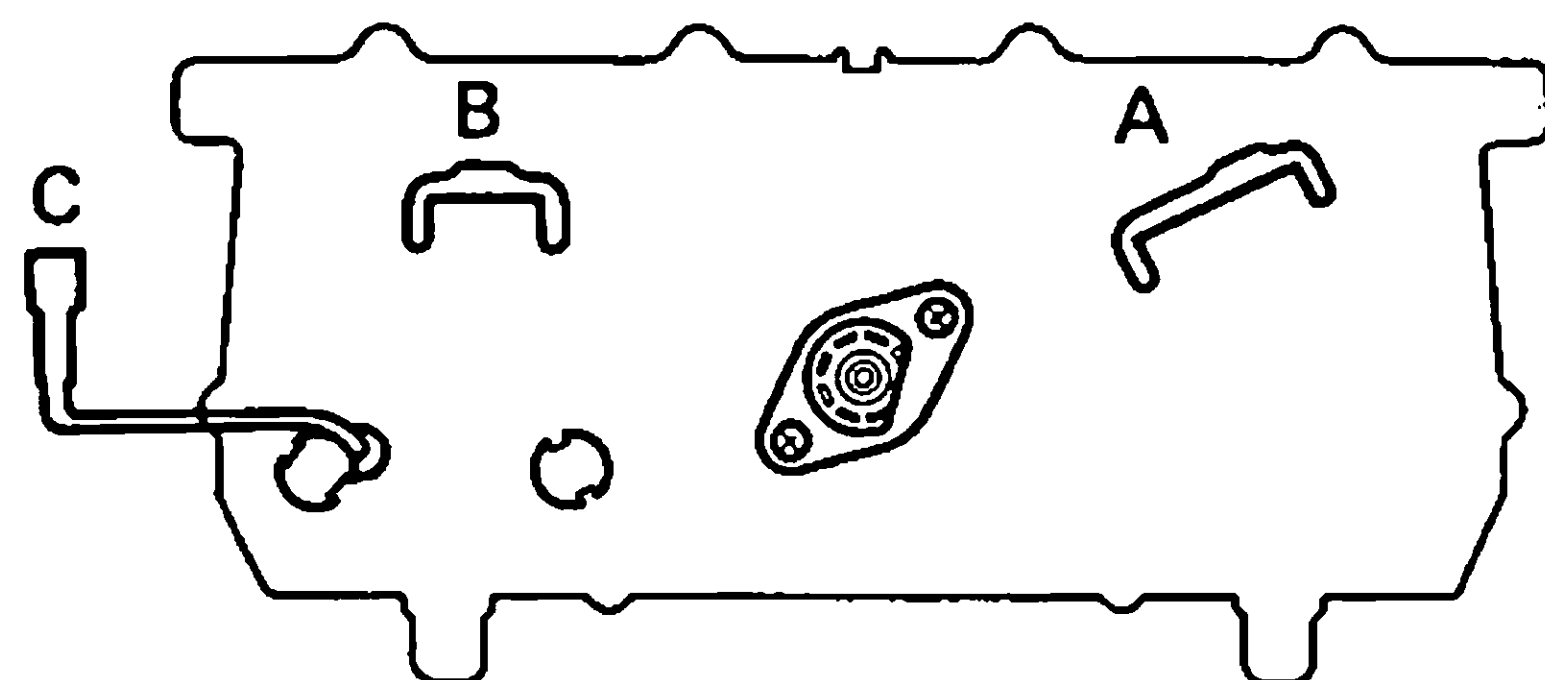
4WD Control ECU

(FJ, PZJ, HZJ, FZJ)

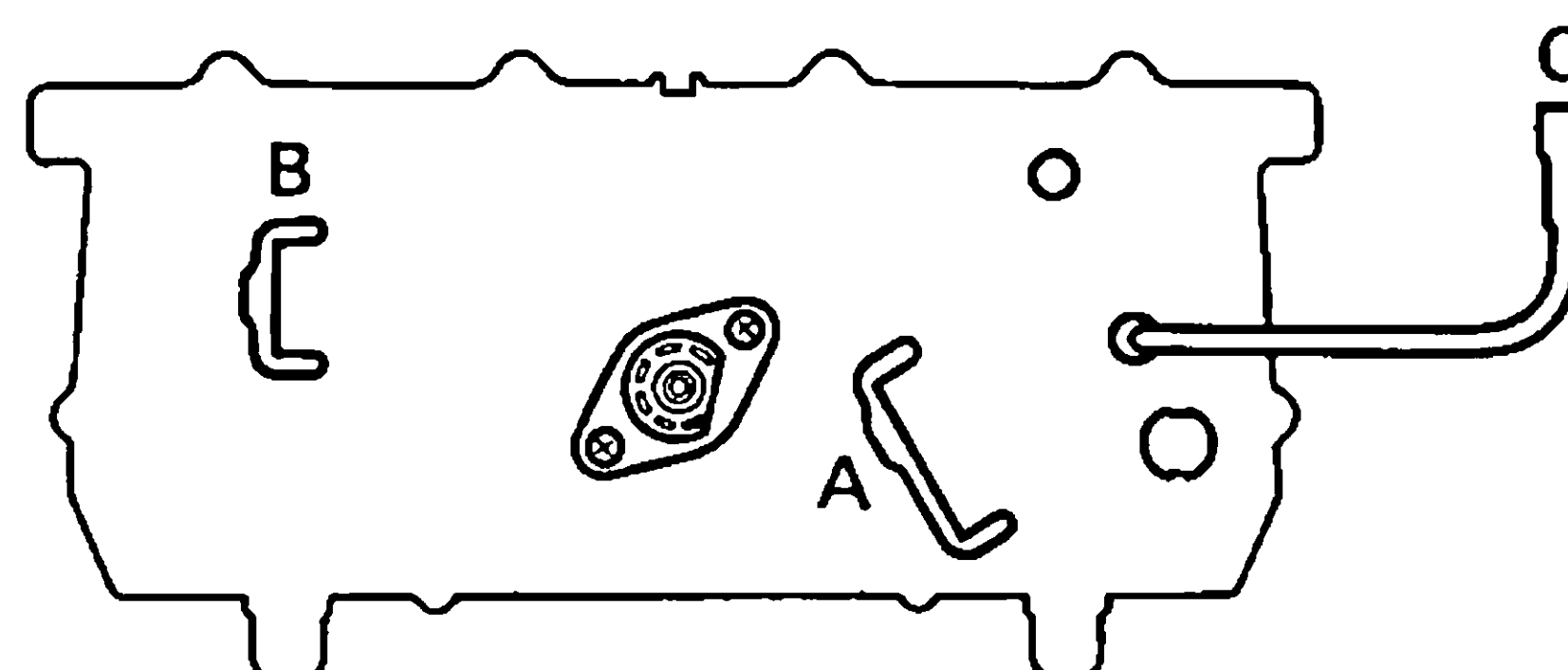


Combination Meter

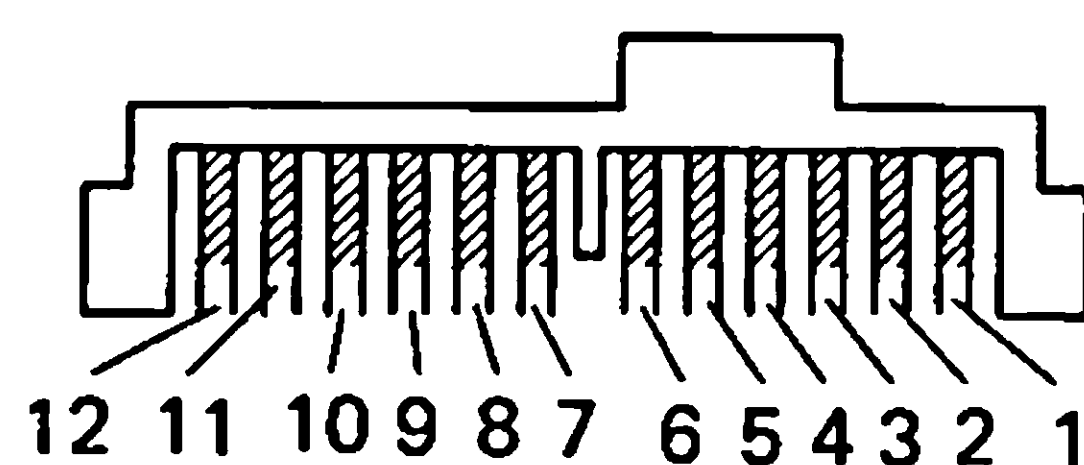
(w/o Tachometer)



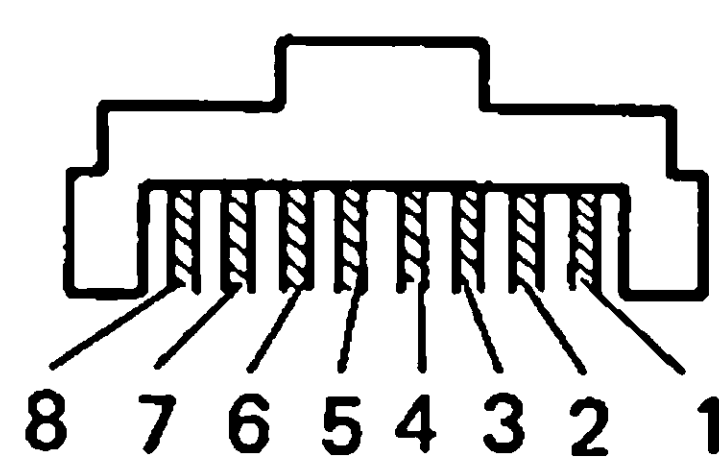
(w/ Tachometer)



Connector "A"



Connector "B"



Connector "C"



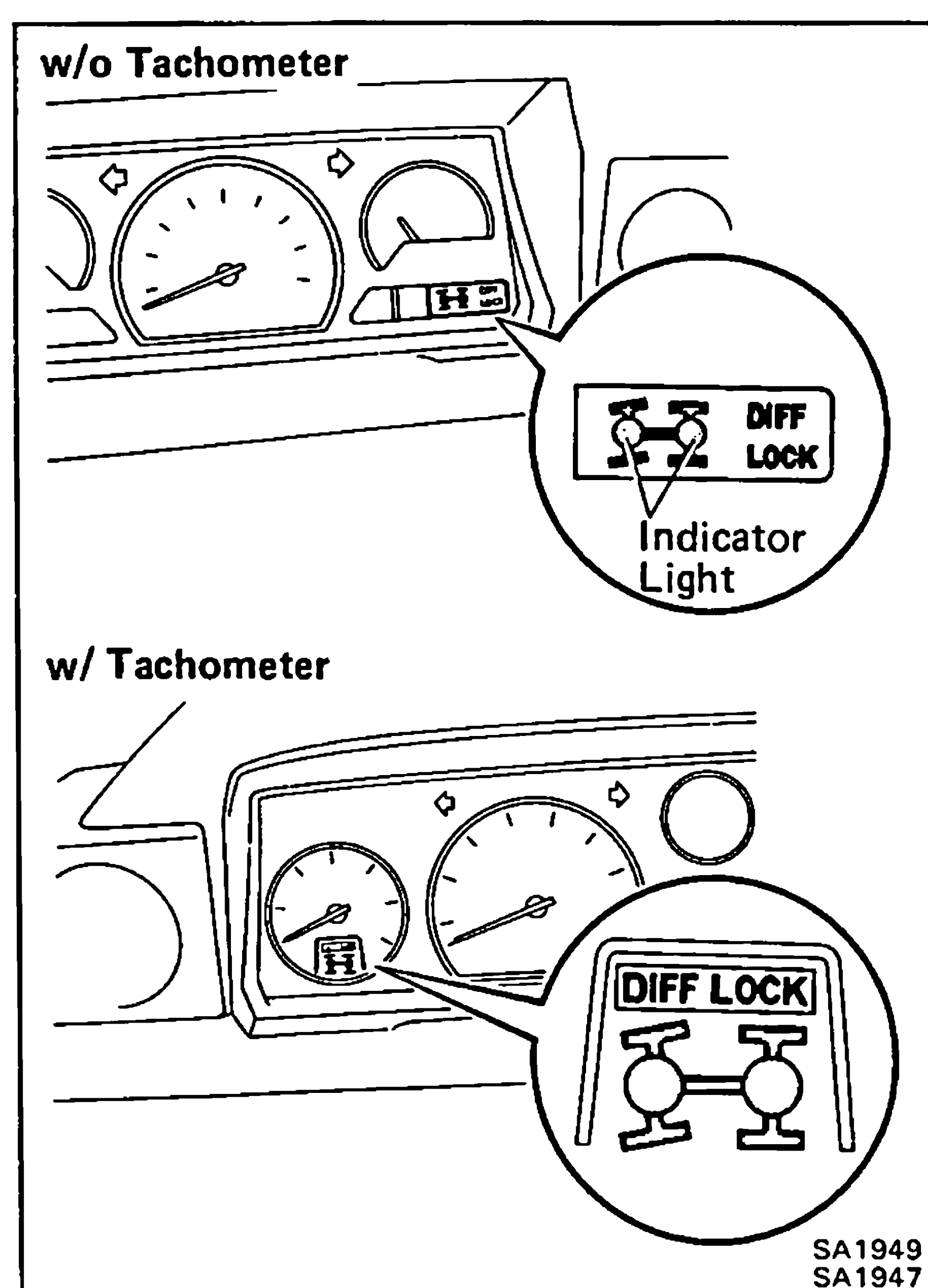
Troubleshooting

NOTICE:

- Make sure that 4WD mode is set.
- When switching differential Free ↔ Lock, the indicator lamp will blink if the gears of the differential lock sleeve are not meshed. If this occurs, when the tires are rotated to apply differential power to the differential, the differential locks and the indicator lamp light up.

Problem	Possible cause	Remedy	Page
Indicator lights do not light up.	Fusible link blown	Replace fusible link	
	GAUGE fuse blown	Replace fuse and check for short	
	Bulb burned out	Replace bulb	
	Wiring or ground faulty	Repair as necessary	
Indicator lights do not light up (Differential lock control switch RR or FR-RR position).	DIFF fuse blown	Replace fuse and check for short	
	Differential lock switch control switch	Check switch	SA-66
	4WD control ECU faulty	Check ECU	SA-58, 60
	Wiring or ground faulty	Repair as necessary	
DIFF LOCK does not operate.	Differential lock indicator switch faulty	Check switch	SA-66
	Differential lock actuator faulty	Check actuator	SA-60
	4WD control ECU faulty	Check ECU	SA-58, 60
	Differential carrier faulty	Repair as necessary	
	Wiring or ground faulty	Repair as necessary	
After DIFF LOCK, lock not released when vehicle speed higher than approx. 8 km/h (5 mph).	Speed sensor faulty	Check sensor	*
	4WD control ECU faulty	Check ECU	SA-59, 61
	Wiring or ground faulty	Repair as necessary	

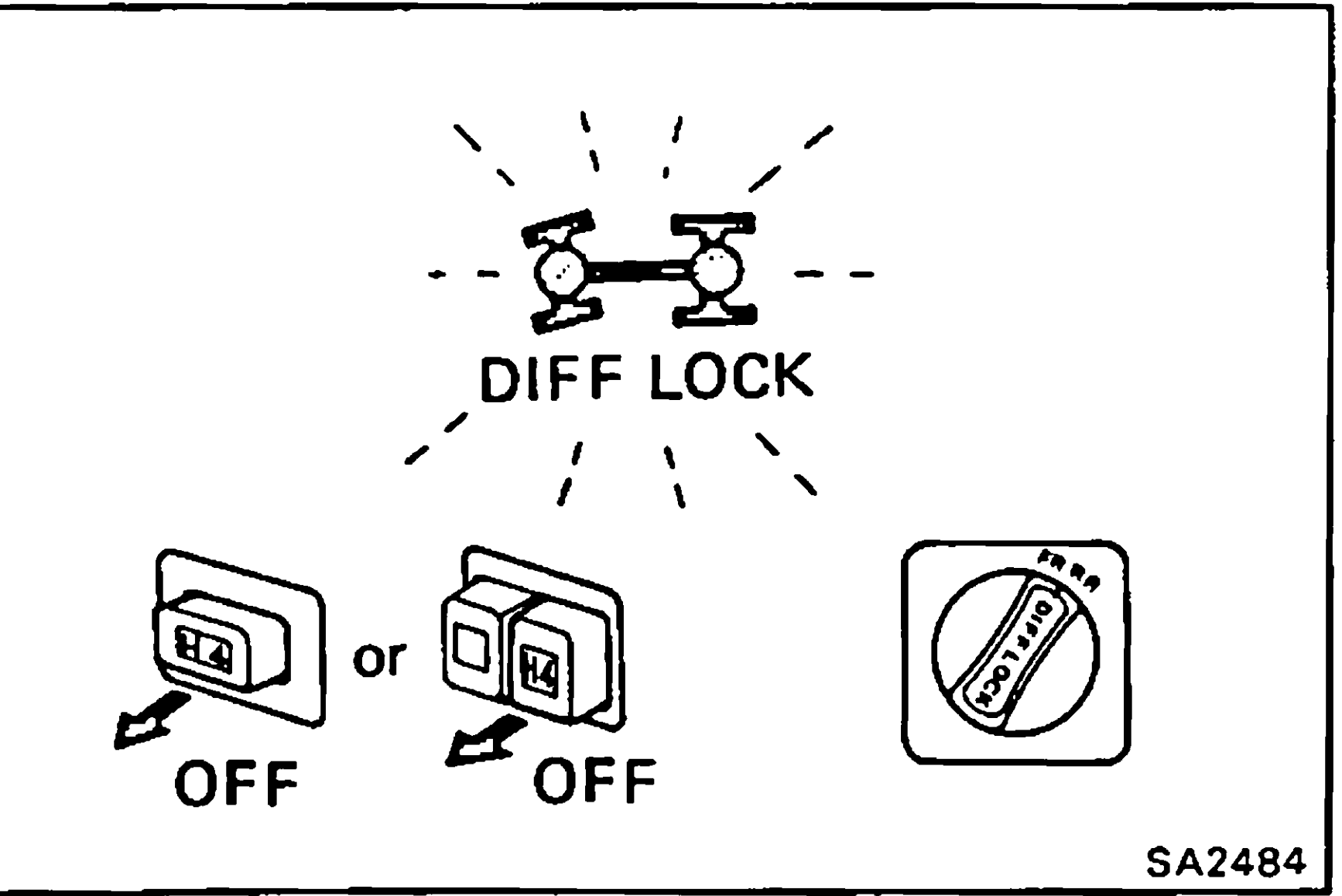
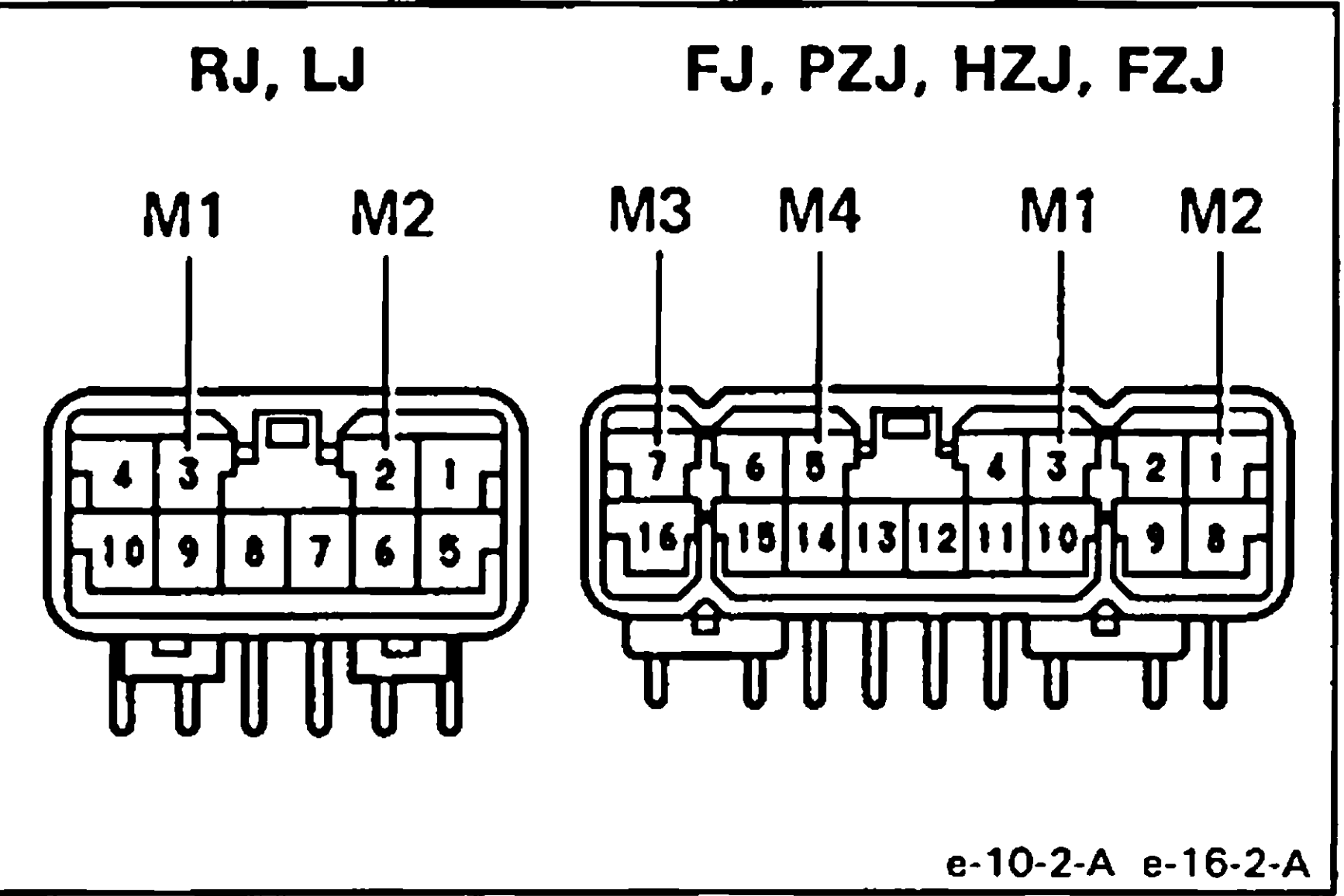
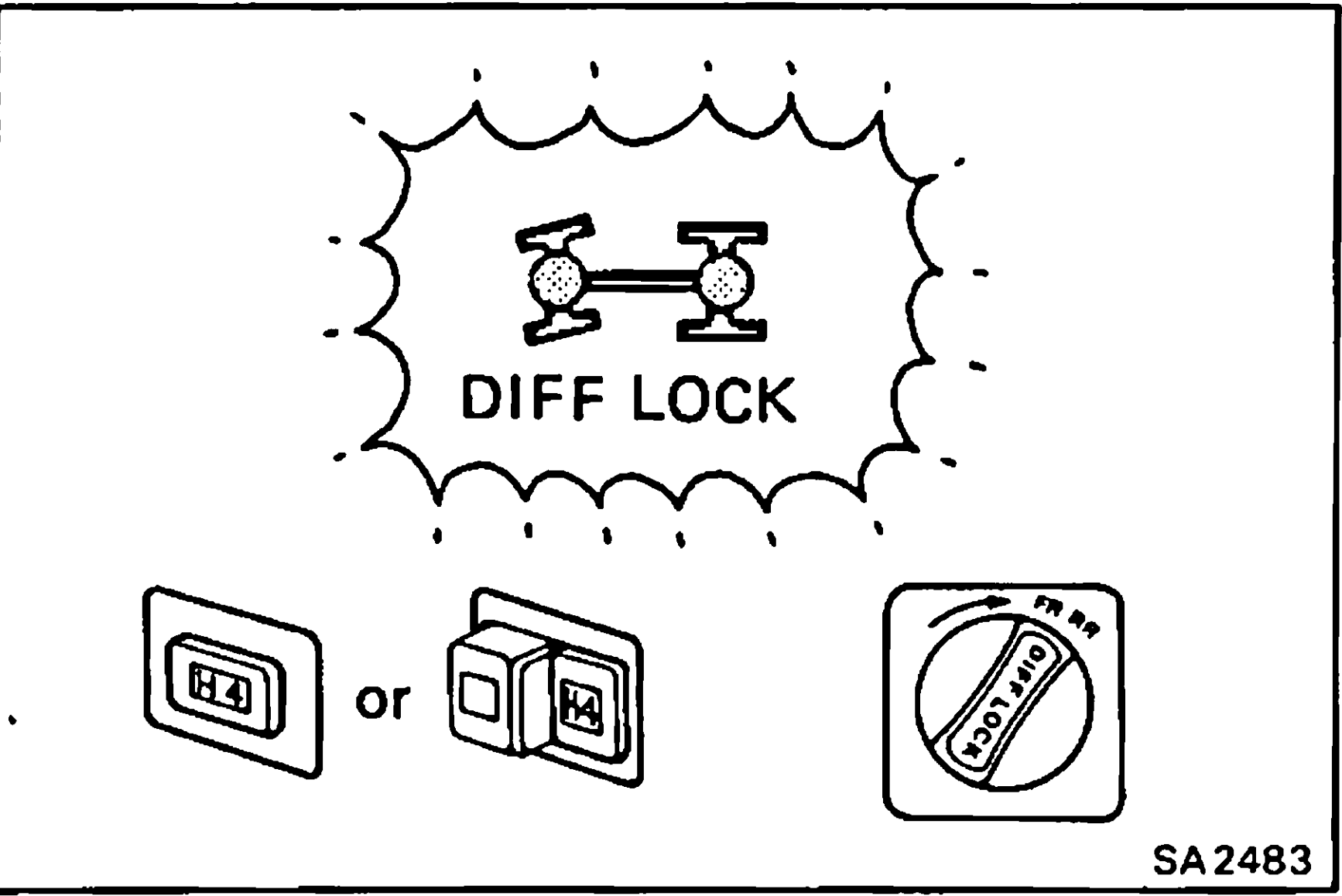
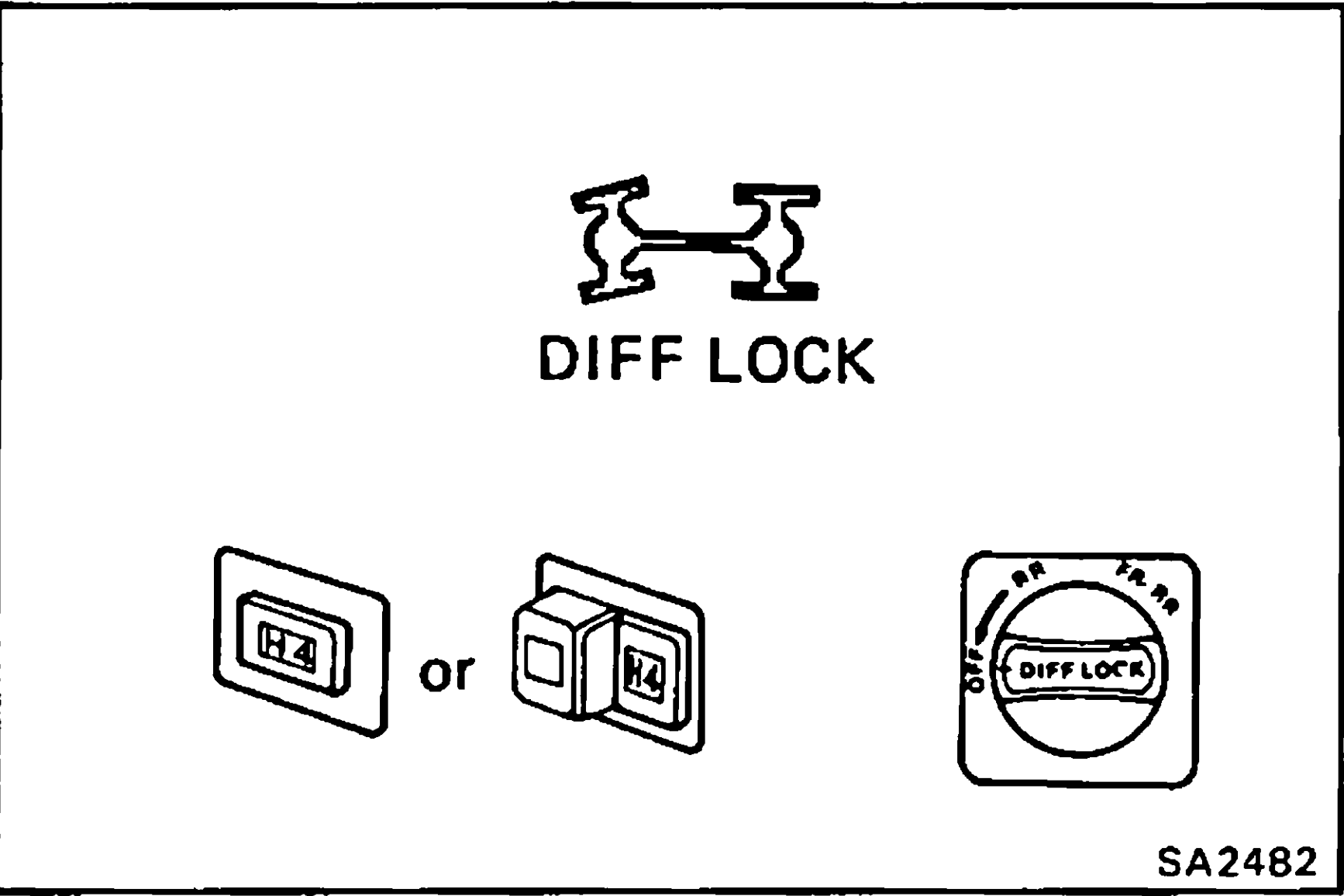
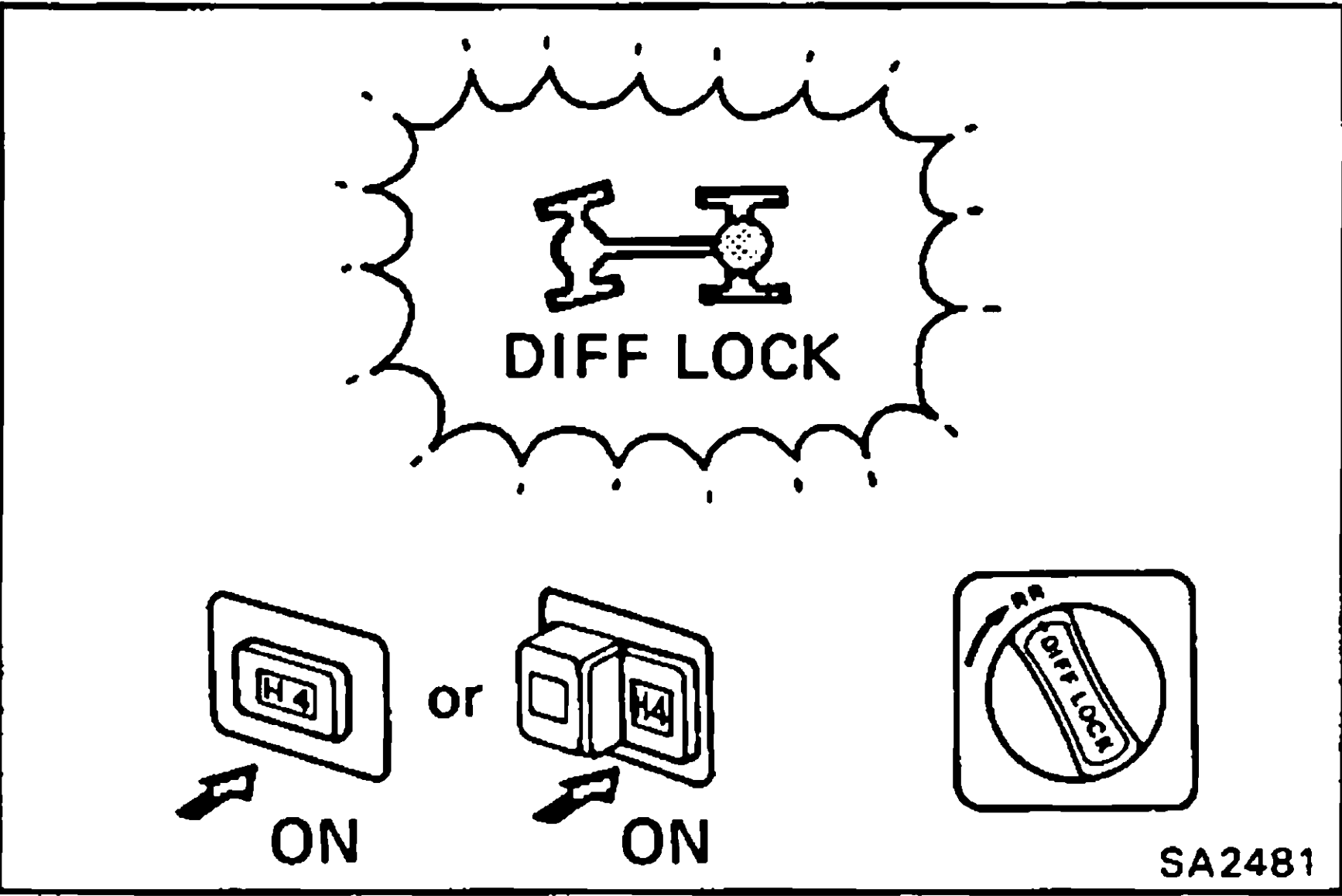
*: See Pub. No. RM183E, see page BE-57



System Inspection

1. INSPECT INDICATOR LIGHTS

Check that the indicator lights (front side and rear side) light up for approx. one second when the ignition switch is turned ON.



2. INSPECT DIFFERENTIAL LOCK OPERATION

HINT: Put the shift lever on neutral.

- (a) Jack up the vehicle and then start the engine.
- (b) Put on the 4WD switch.
- (c) When the differential lock control switch is set to RR position, the indicator light (rear side) is turned on. Differential lock is applied to the rear wheel at this time.

HINT: If the gears of the differential lock system are not meshed, the indicator light remains blinking, so rotate the tires to mesh the gears.

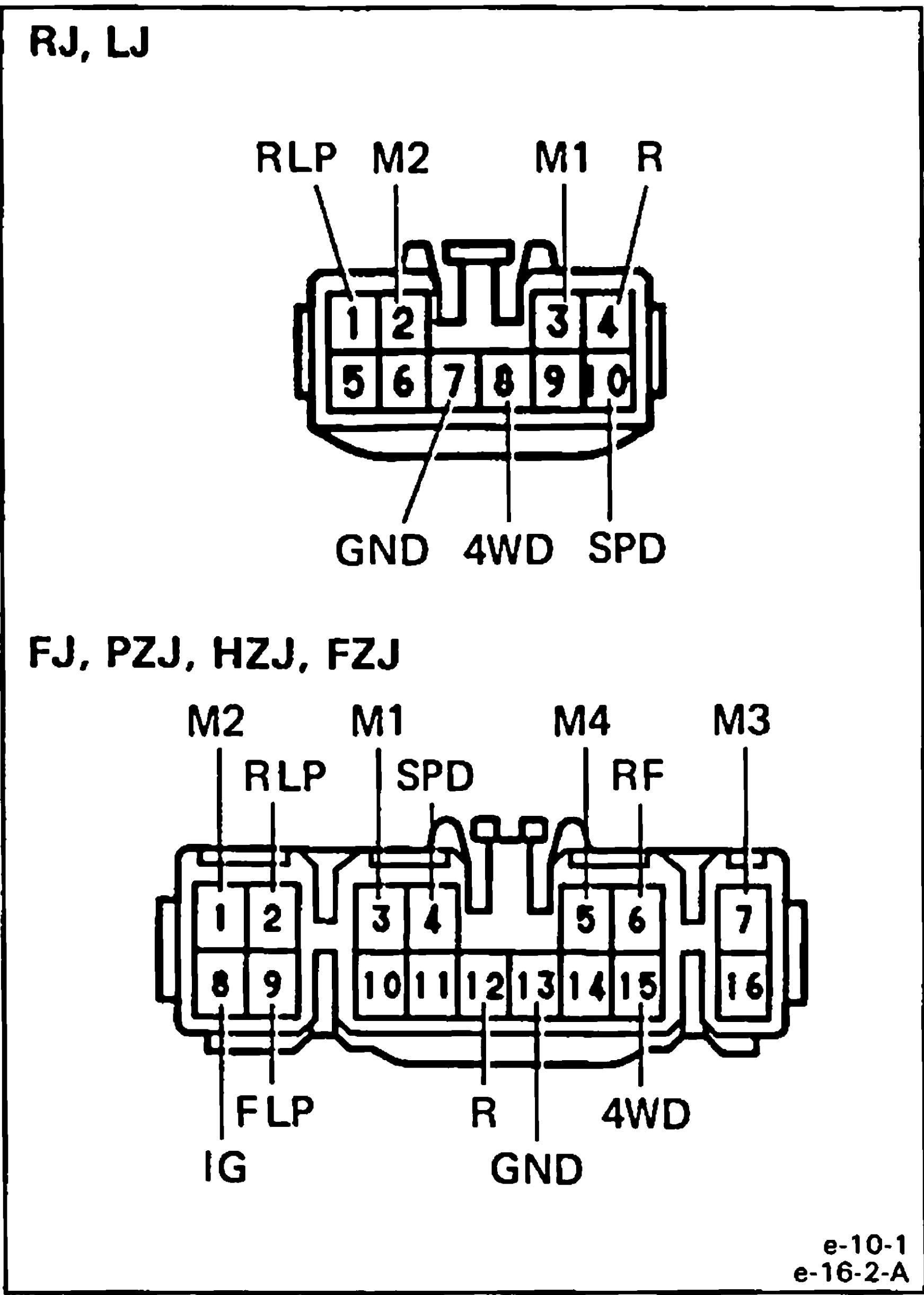
- (d) When the differential lock control switch is at OFF position, the indicator light goes off. Differential lock is released for the rear wheel at this time.

- (e) When the differential lock control switch is set to FR-RR position, the indicator lights (front side and rear side) are turned on. Differential lock is applied to both the front wheels and rear wheels at this time.

- (f) Check the voltage between the terminals of the 4WD control ECU when switching the lock control switch with the speedometer registering approx. 8 km/h (5 mph) or more.

Diff. lock control switch	Terminal	Specified value
OFF → RR	M1 — M2	0.5 V or less (no change)
RR → FR-RR	M3 — M4	0.5 V or less (no change)

- (g) Check that the indicator lights blink when 2WD mode is set. Differential lock is released for both the front wheels and rear wheels at this time.
- (h) Return the differential lock control switch to OFF.
- (i) Stop the engine and jack down the vehicle.



Differential Locking System Circuit

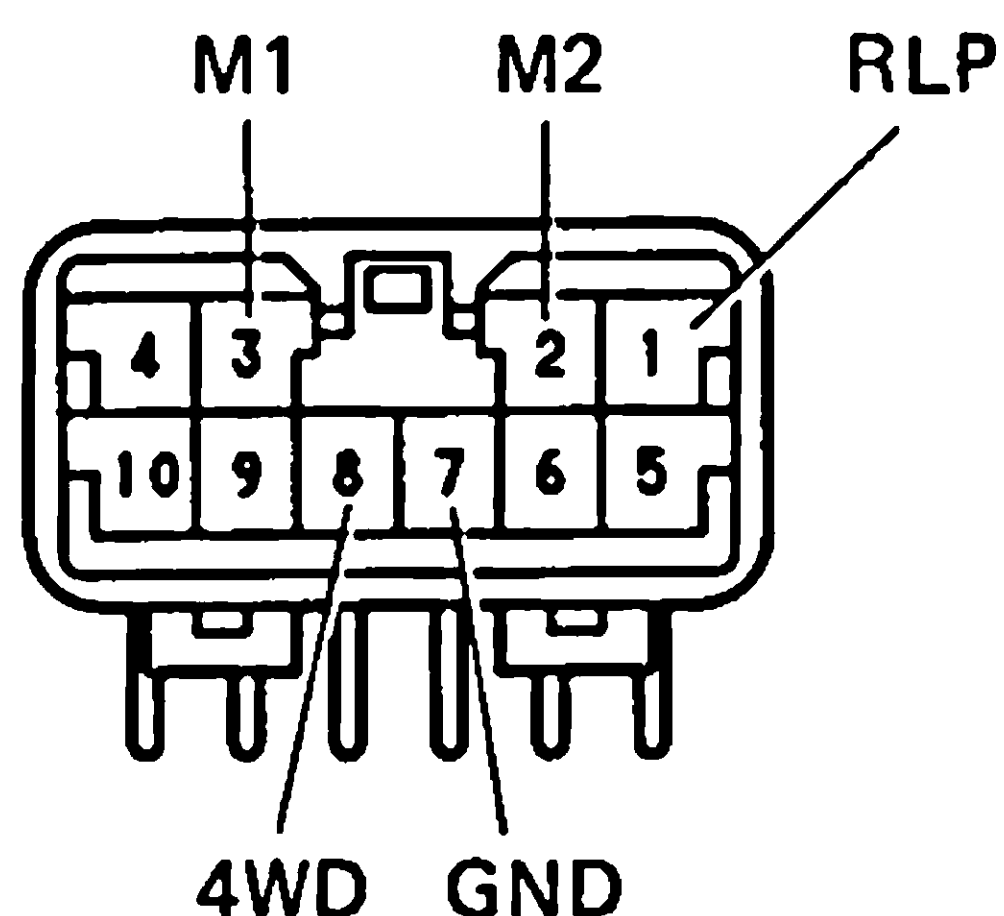
INSPECTION OF SYSTEM CIRCUIT

1. INSPECT SYSTEM CIRCUIT WITH CONNECTOR DISCONNECTED
- Disconnect the connector from the 4WD control ECU and inspect the connector on the wire harness side as shown in the chart.
- HINT: (FJ, PZJ, HZJ, FZJ) When a signal enters the ECU to LOCK the front differential and set the rear differential to FREE (when battery voltage is inputted to terminal RF of ECU and about 0 V is inputted to terminal R), or a signal to FREE both the front and rear differentials, the indicator lights keep blinking until the ignition switch is turned off. (Fail-safe function)

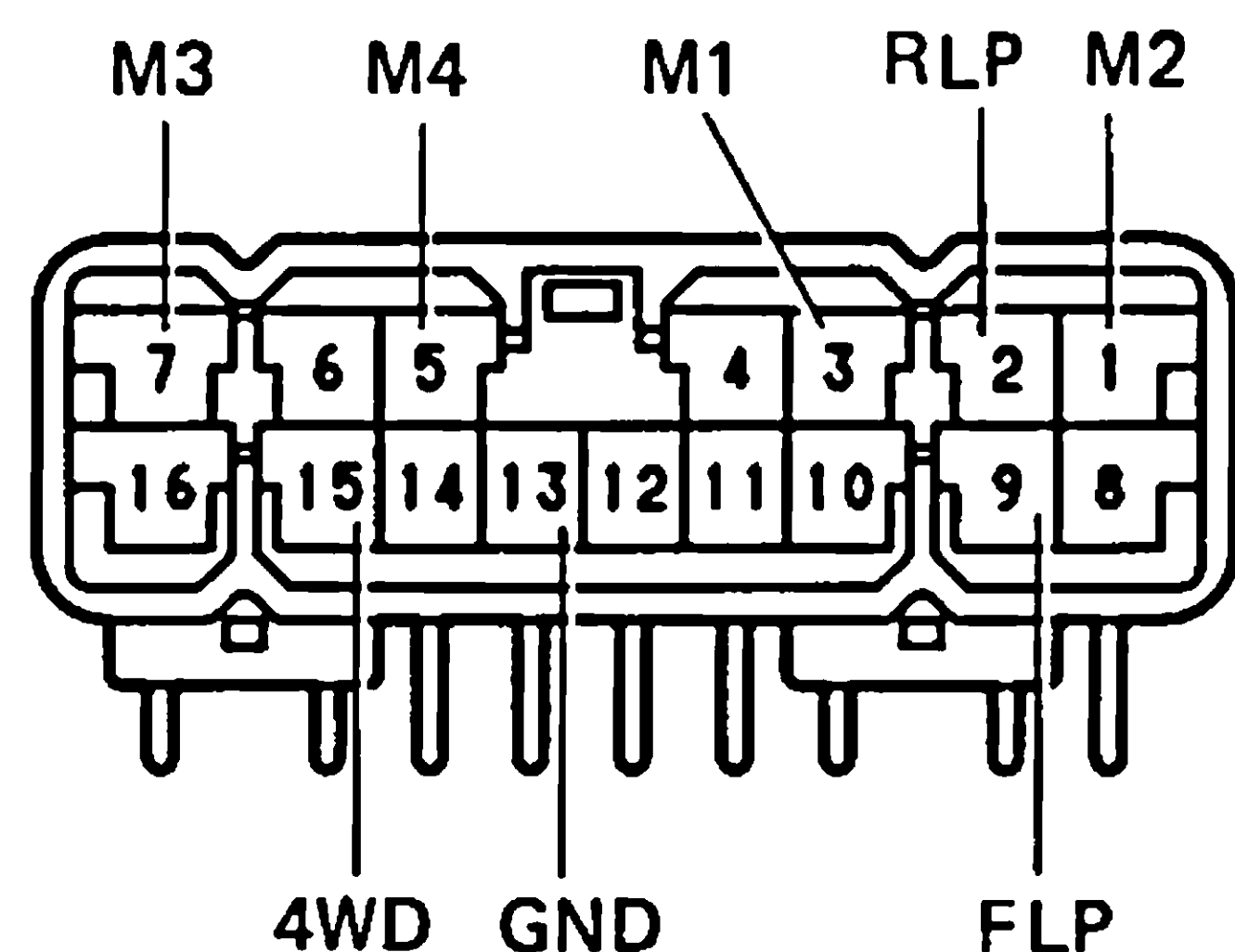
Trouble Part	Tester Connection	Check item	Condition		Specified Value
Rear Differential Lock Actuator	M1 — M2	Resistance	—		Less than 100 Ω
Front Differential Lock Actuator	M3 — M4				Less than 100 Ω
Body Ground	GND — Body ground	Continuity	Vehicle moving slowly		Continuity
Speed Sensor	SPD — Body ground				1 pulse each 40 cm (15.75 in.)
DIFF Fuse	IG — Body ground	Voltage	Ignition Switch ON	—	Battery voltage
Rear Differential Lock Indicator Switch	RLP — Body ground			Indicator light (Rear) ON	About 0 V
				Indicator light (Rear) OFF	Battery voltage
Front Differential Lock Indicator Switch	FLP — Body ground			Indicator light (Front) ON	About 0 V
				Indicator light (Front) OFF	Battery voltage
4WD Indicator Switch	4WD — Body ground			Indicator light (4WD) ON	About 0 V
				Indicator light (4WD) OFF	Battery voltage
Differential Lock Control Switch	R — Body ground			Differential lock control switch RR or FR·RR	Battery voltage
				Differential lock control switch OFF	About 0 V
	RF — Body ground			Differential lock control switch FR·RR	Battery voltage
				Differential lock control switch OFF or RR	About 0 V

If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.

RJ, LJ



FJ, PZJ, HZJ, FZJ

e-10-2-A
e-16-2-A**2. INSPECT BATTERY OF VOLTAGE**

Battery voltage: 12 V Type 10 – 14.5 V
24 V Type 20 – 29 V

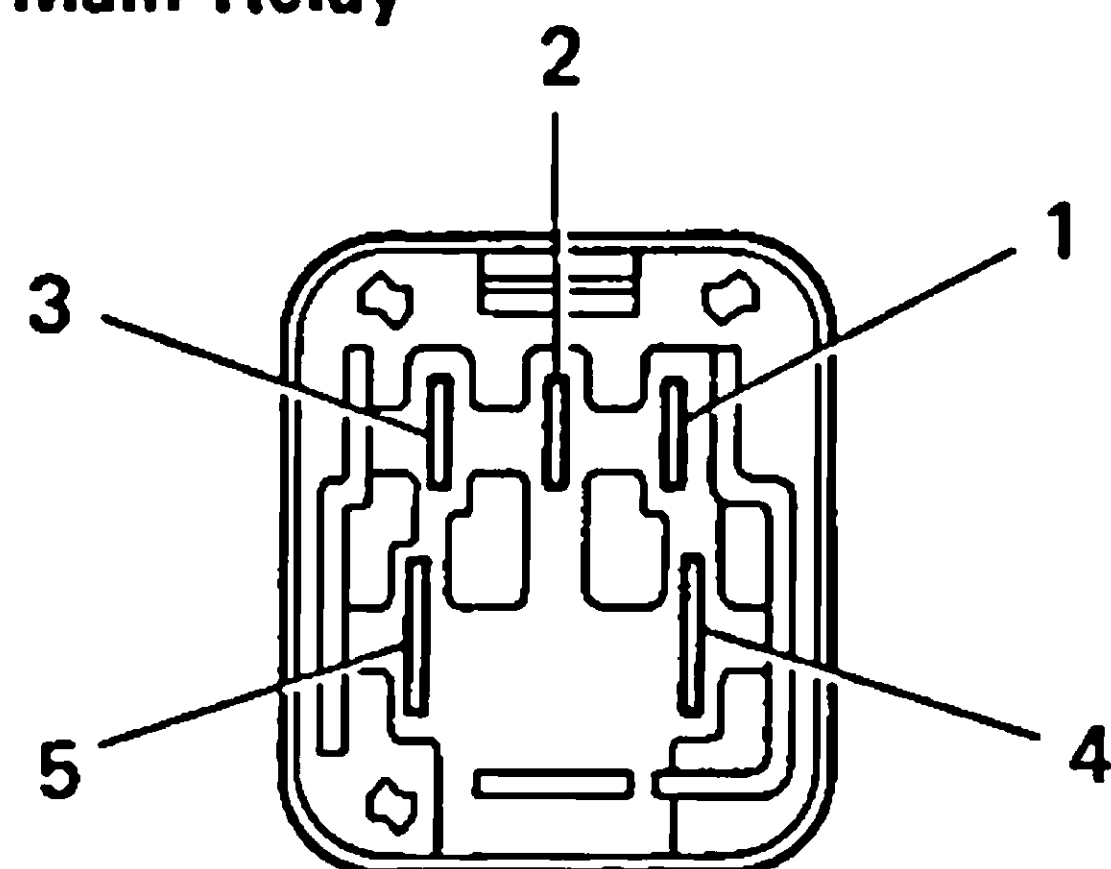
3. INSPECT SYSTEM CIRCUIT WITH CONNECTOR CONNECTED

- Turn the ignition switch to ON position.
- Put on the 4WD switch.
- Remove the 4WD control ECU.
- Using voltmeter, measure the voltage when the differential lock control switch is in the positions as shown below.

Tester Connection ⊕ — ⊖	Switch position	Specified value
4WD — GND	—	0.5 V or less
FLP — GND	FR·RR	
RLP — GND	RR or FR·RR	
M1 — M2	OFF → RR	0.5 V or less ↓ Battery voltage (Approx. 1 sec.) ↓ 0.5 V or less
M2 — M1	RR → OFF	
M3 — M4	OFF or RR → FR·RR	0.5 V or less ↓ Battery voltage (Approx. 1 sec.) ↓ 0.5 V or less
M4 — M3	FR·RR → RR or OFF	

If the circuit is not as specified, replace the ECU.

Heater Main Relay



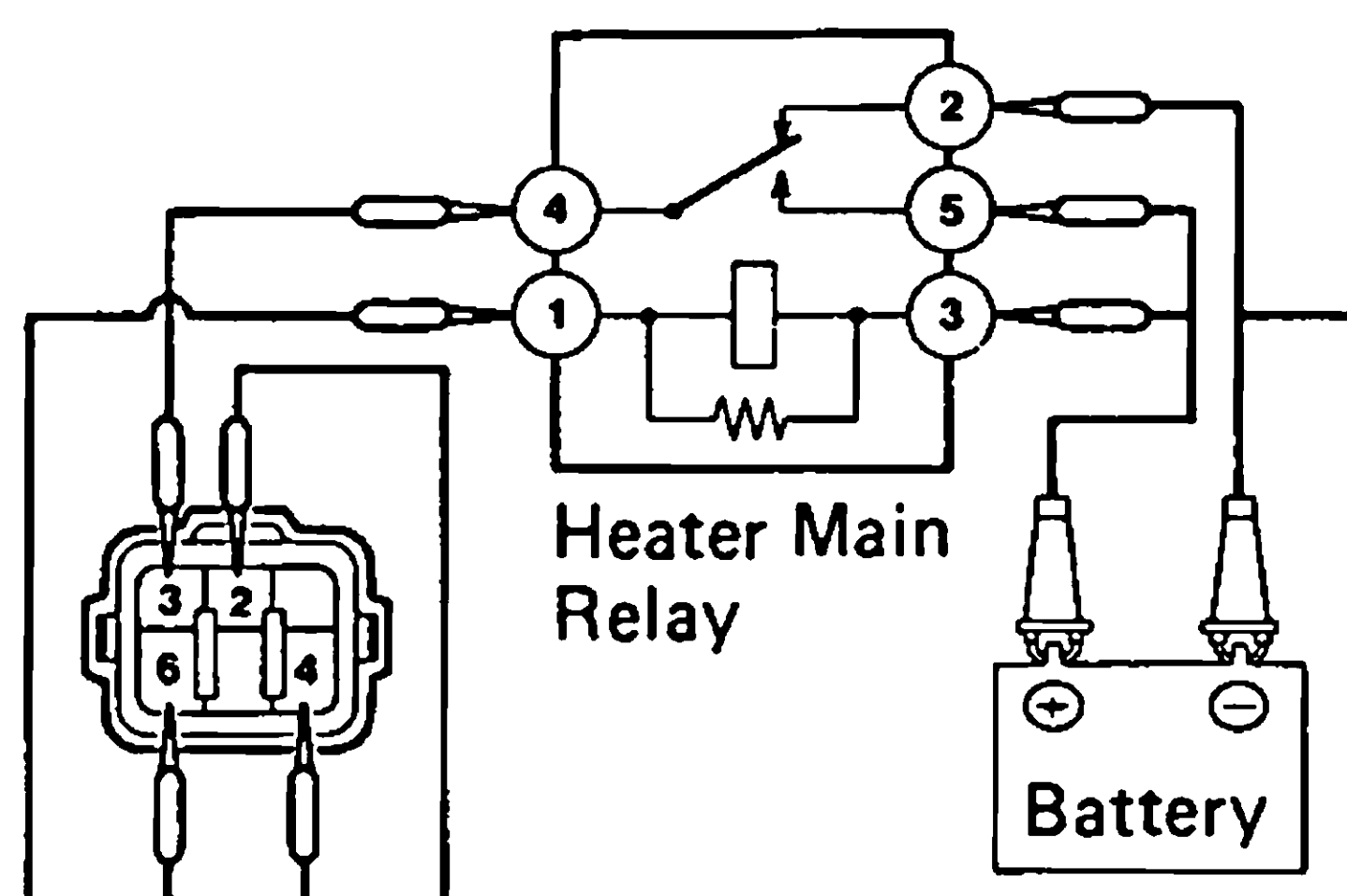
BE1013

Differential Lock Actuator**INSPECTION OF ACTUATOR****INSPECT RELAY OPERATION**

- Jack up the vehicle.
- Use the heater main relay and connect it as shown below.
- Rotate the tire and check that differential lock has occurred.

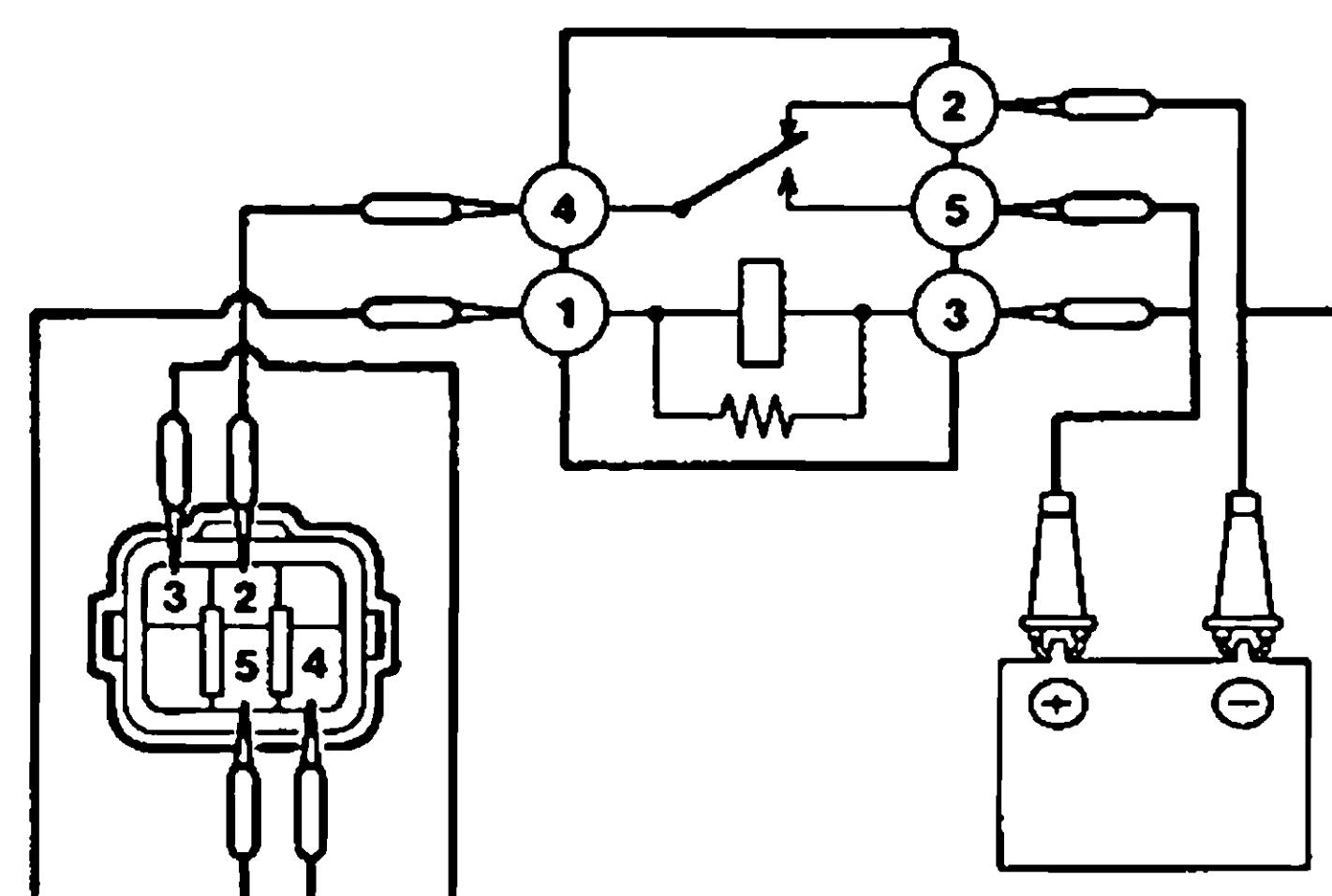
If operation is not as specified, replace the actuator.

Free → Lock

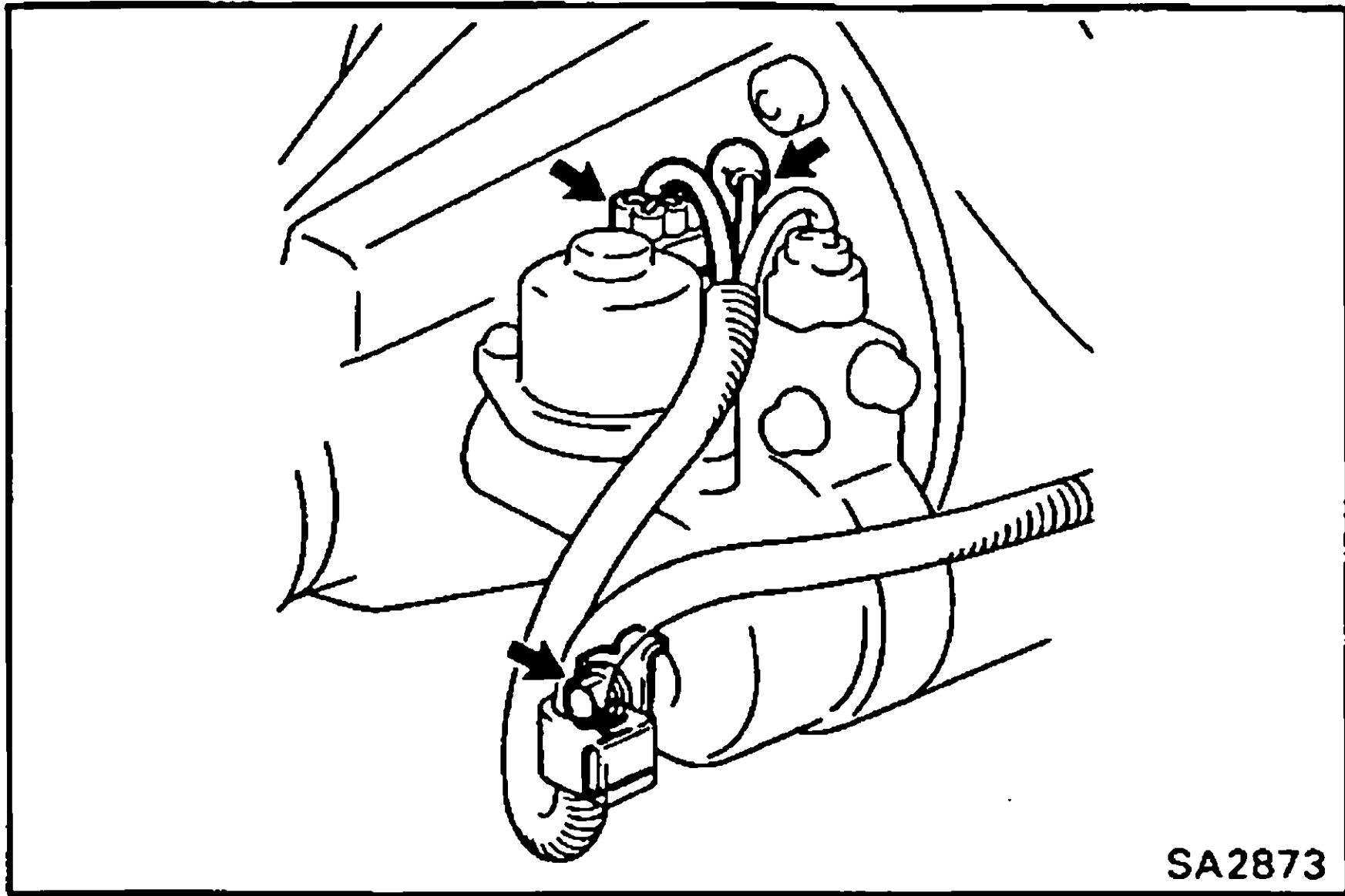


K7972

Lock → Free



K7973

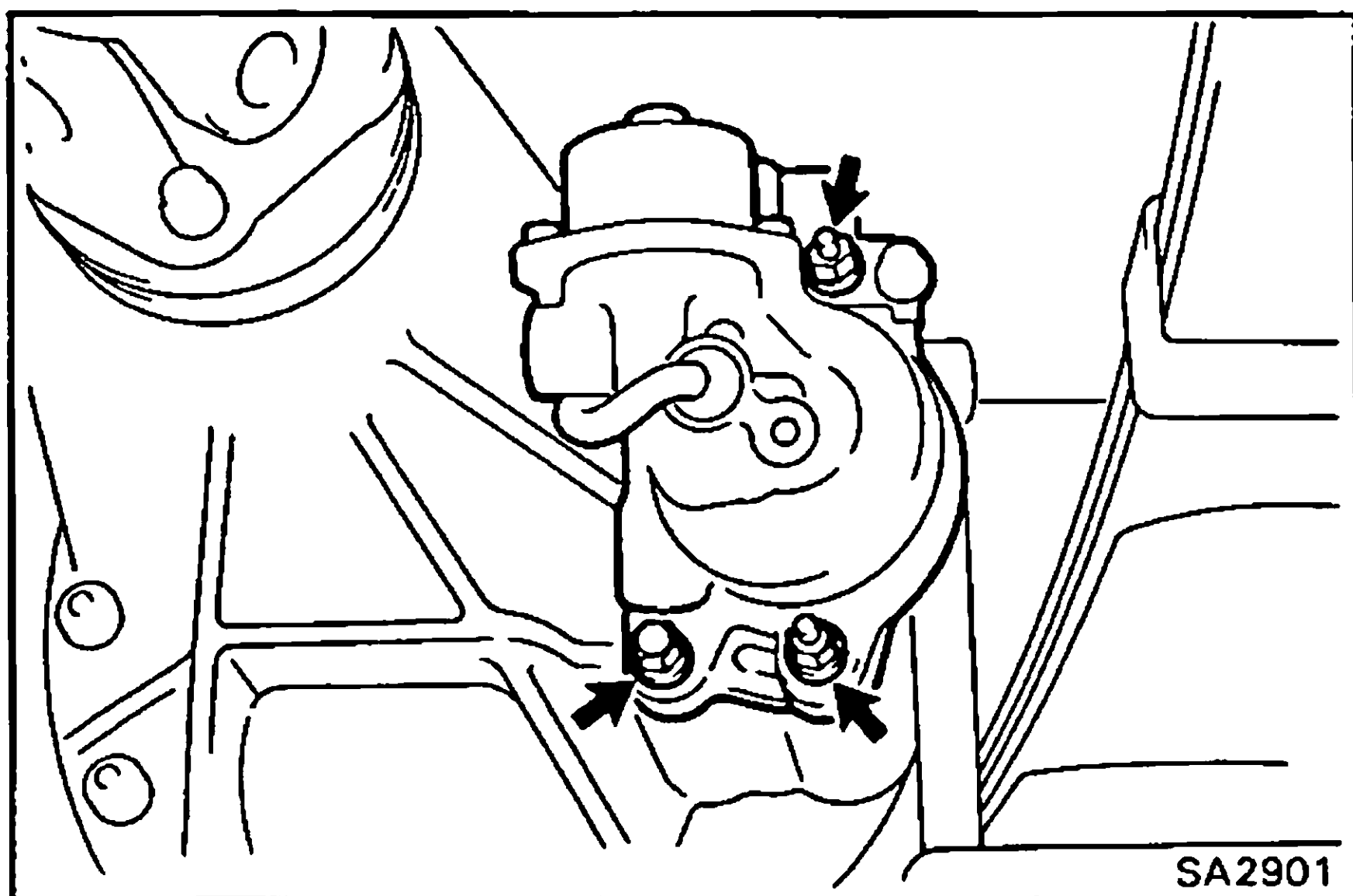


REMOVAL AND INSTALLATION OF FRONT ACTUATOR

1. SHIFTING FRONT DIFFENTIAL LOCK (See step 1 on page SA-21)

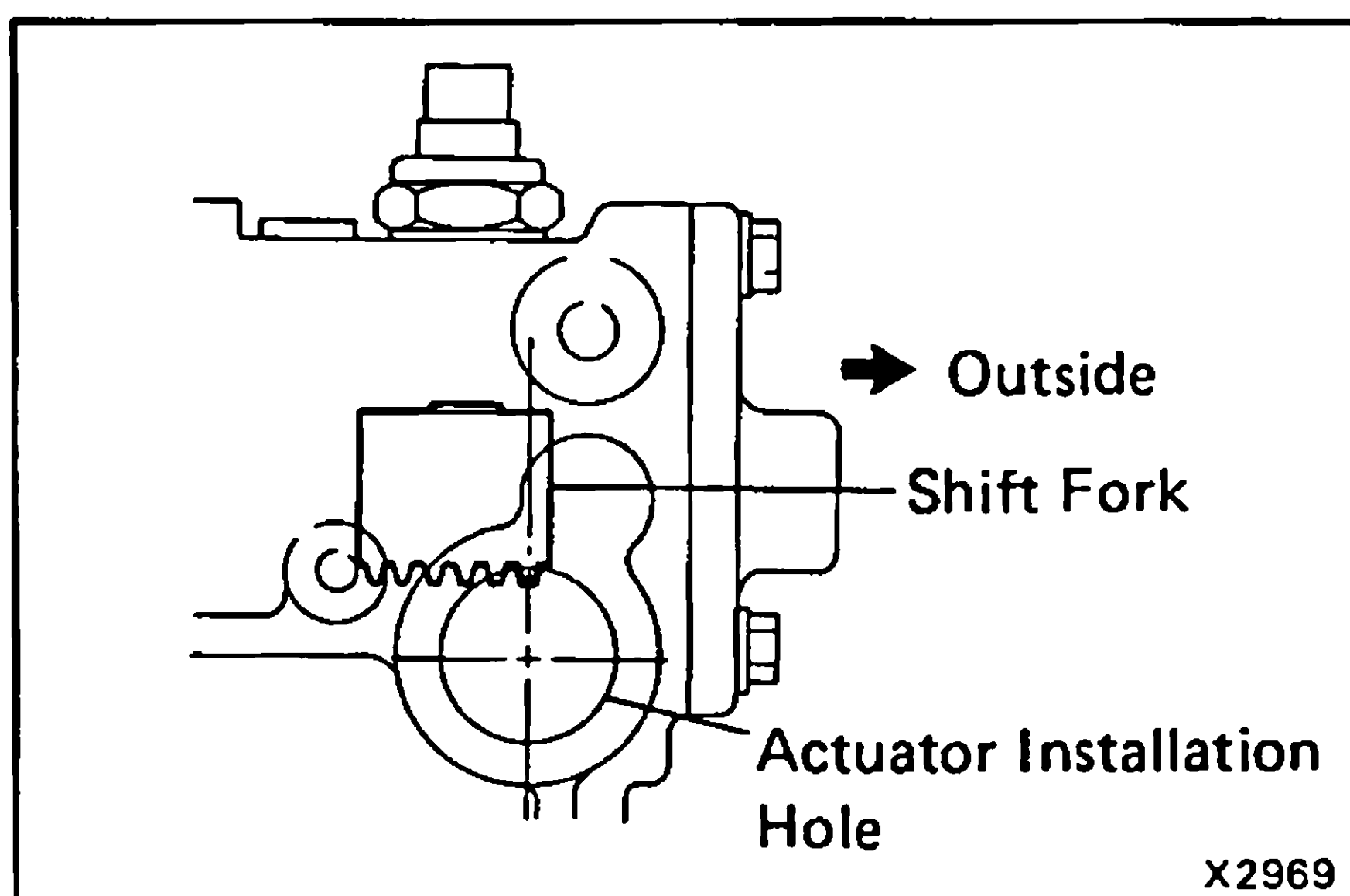
2. REMOVE ACTUATOR

- Disconnect the connector, tube and wire clamp bolts.
- Remove the two nuts, bolt and actuator.
- Remove the O-ring from the actuator.



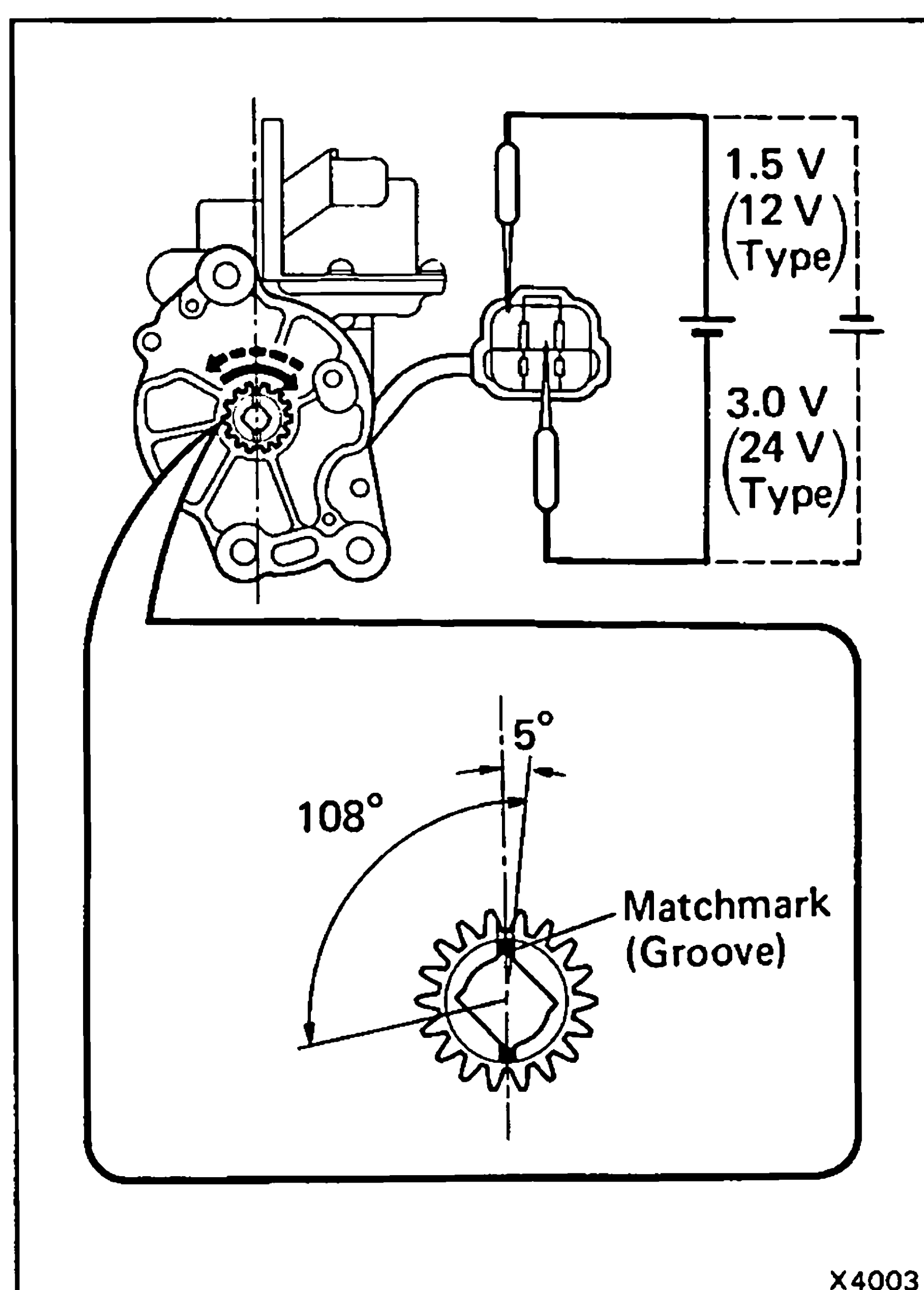
3. INSTALL ACTUATOR

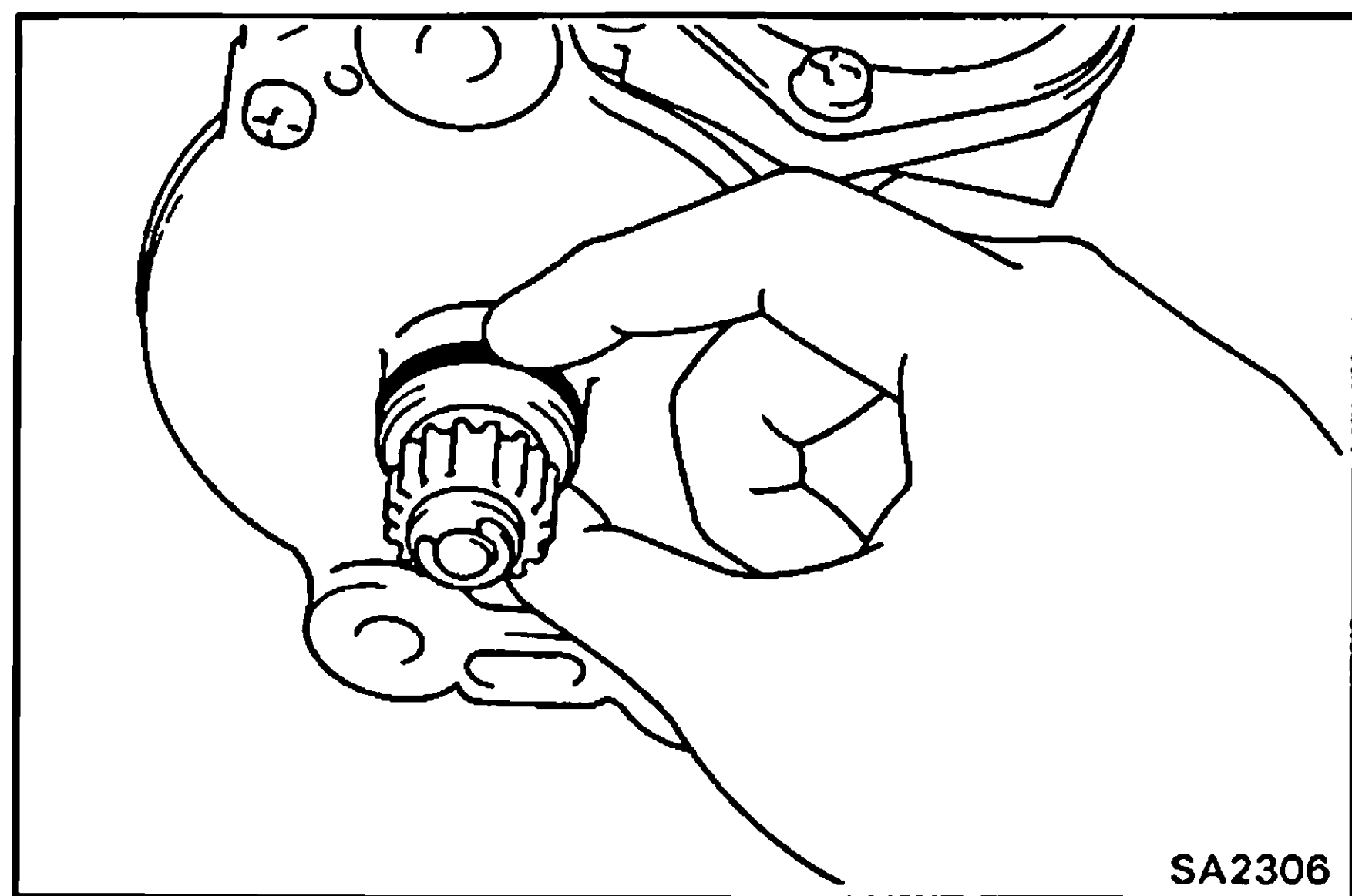
- Check that the outermost rack tooth of the shift fork is virtually above the center line of the actuator installation hole.
- Using dry cell battery (12 V type is 1.5 V, 24 V type is 3.0 V), align the matchmark on the actuator pinion with the center line of the actuator.



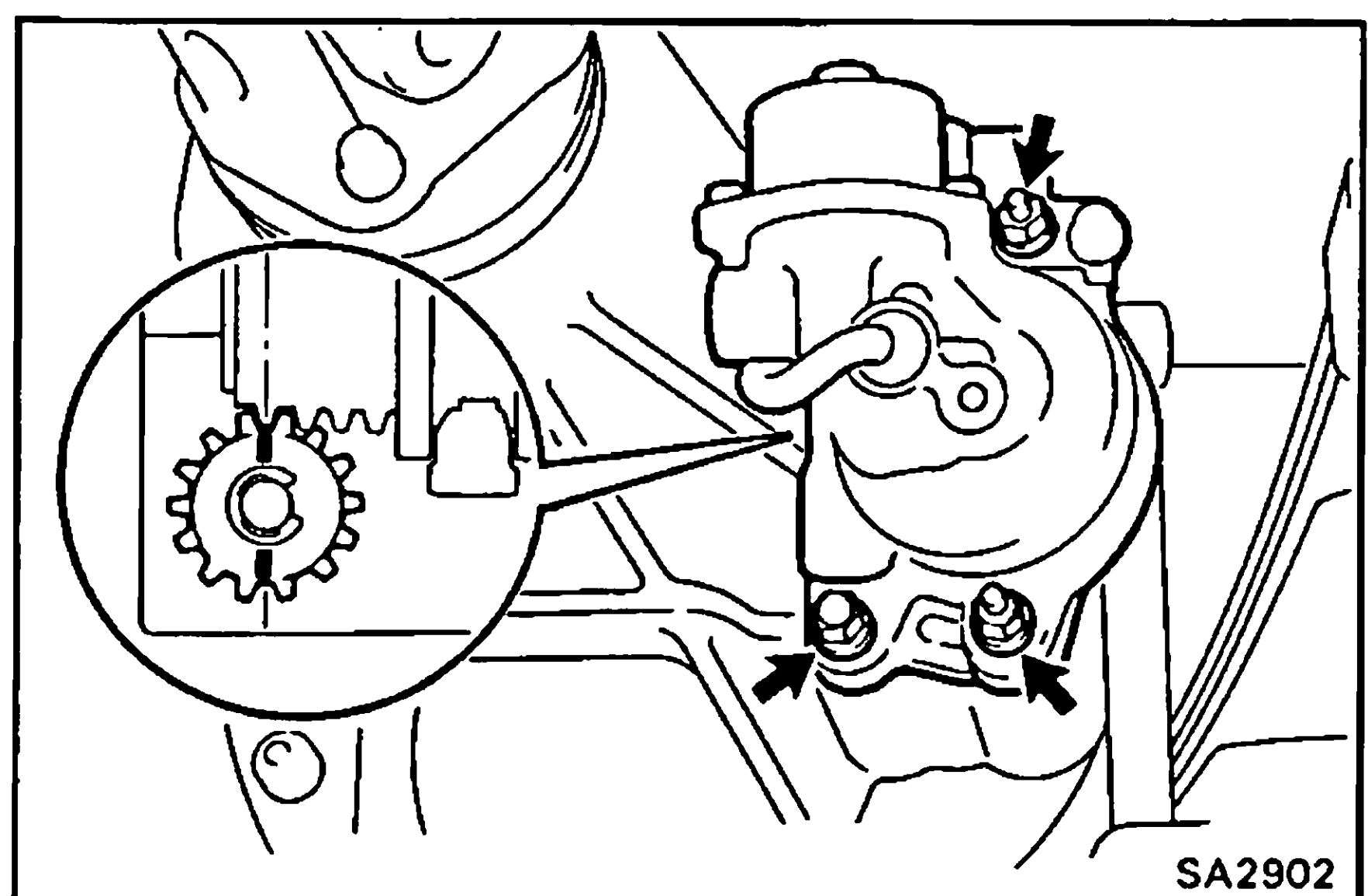
NOTICE:

- If the pinion of the actuator is not in the specified place, the actuator is difficult to be installed.
- Don't supply the battery voltage between terminals.
- If the matchmark comes to the extension limit of the rotation, don't electrify moreover.





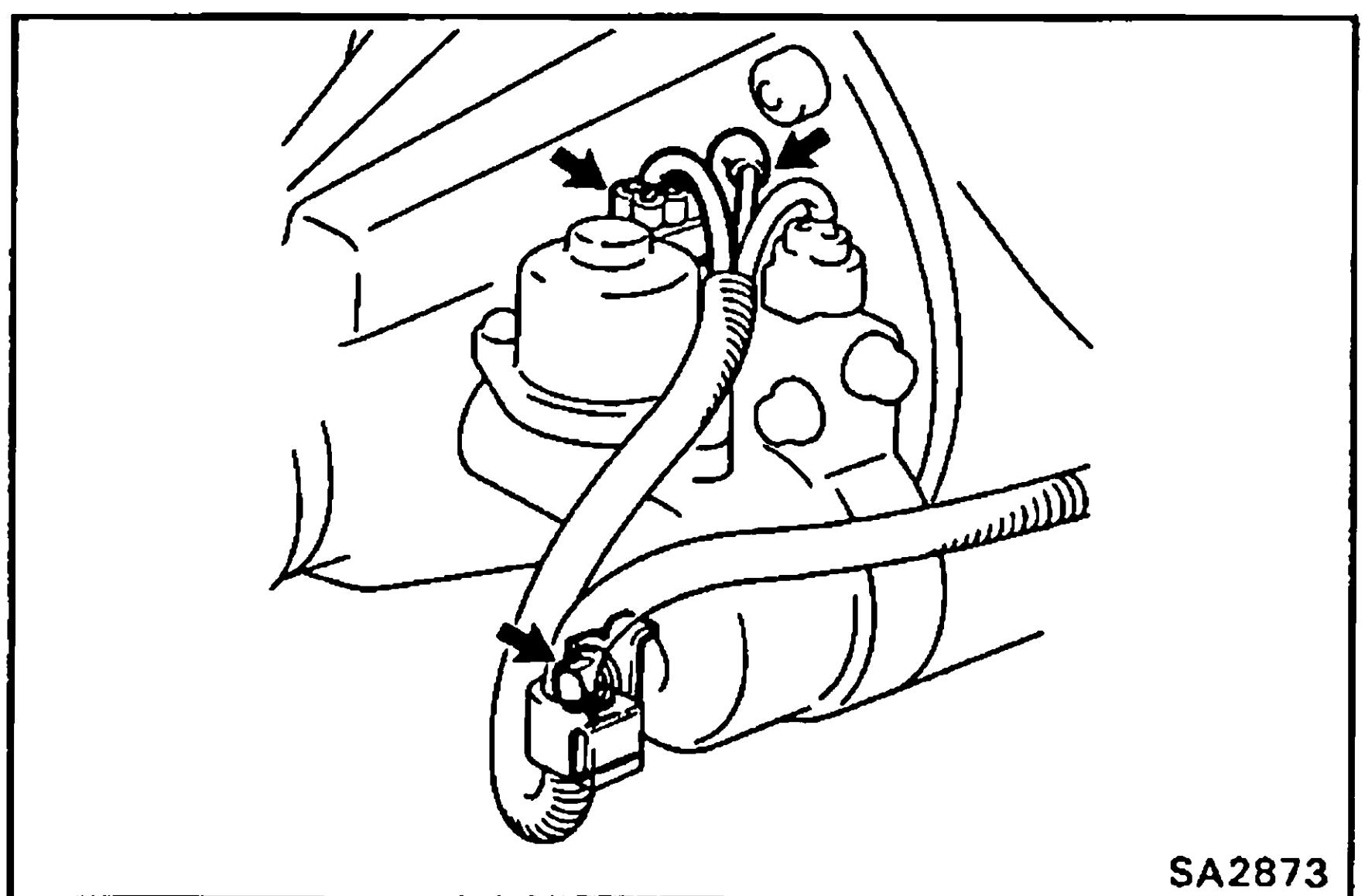
- (c) Install a new O-ring to the actuator.
- (d) Apply a light coat of gear oil on the O-ring.
- (e) Apply MP grease to the gear part of the actuator.



- (f) Install the actuator to the differential with two nuts and bolt, so that the outermost rack tooth of the shift fork shall fit matchmark of the pinion of the actuator.

HINT: Do not damage the O-ring of the actuator.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)



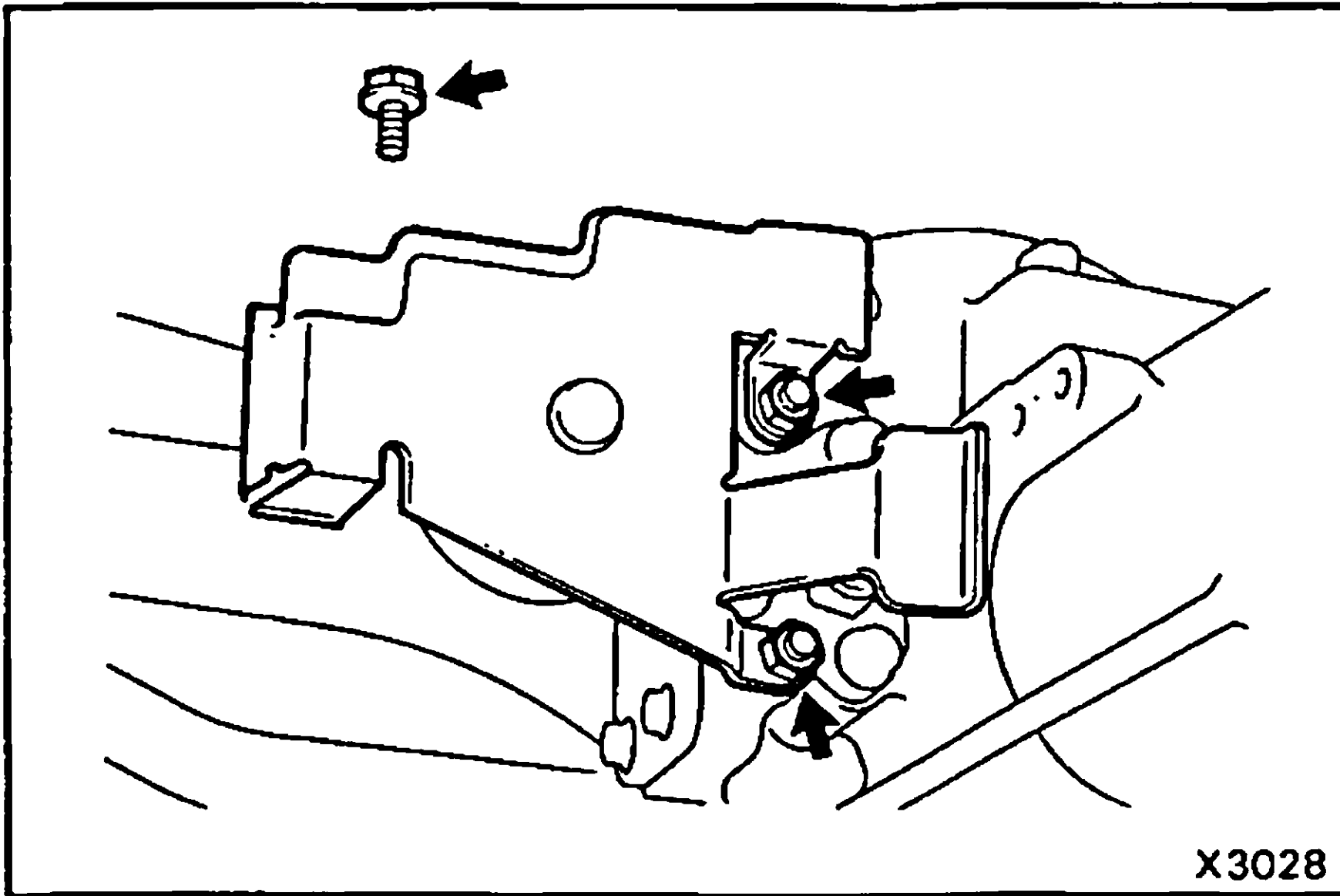
- (g) Connect the wire clamp bolt, connector and tube.

HINT:

- The depth of the insertion of the bleeder tube into the hose is approx. 15 mm (0.59 in.).
- Take care that water or the equivalent shall not adhere to the connector and hose.

4. CANCEL FRONT DIFFERENTIAL LOCK

With the ignition switch ON, turn the differential lock control switch to OFF to cancel the differential lock.

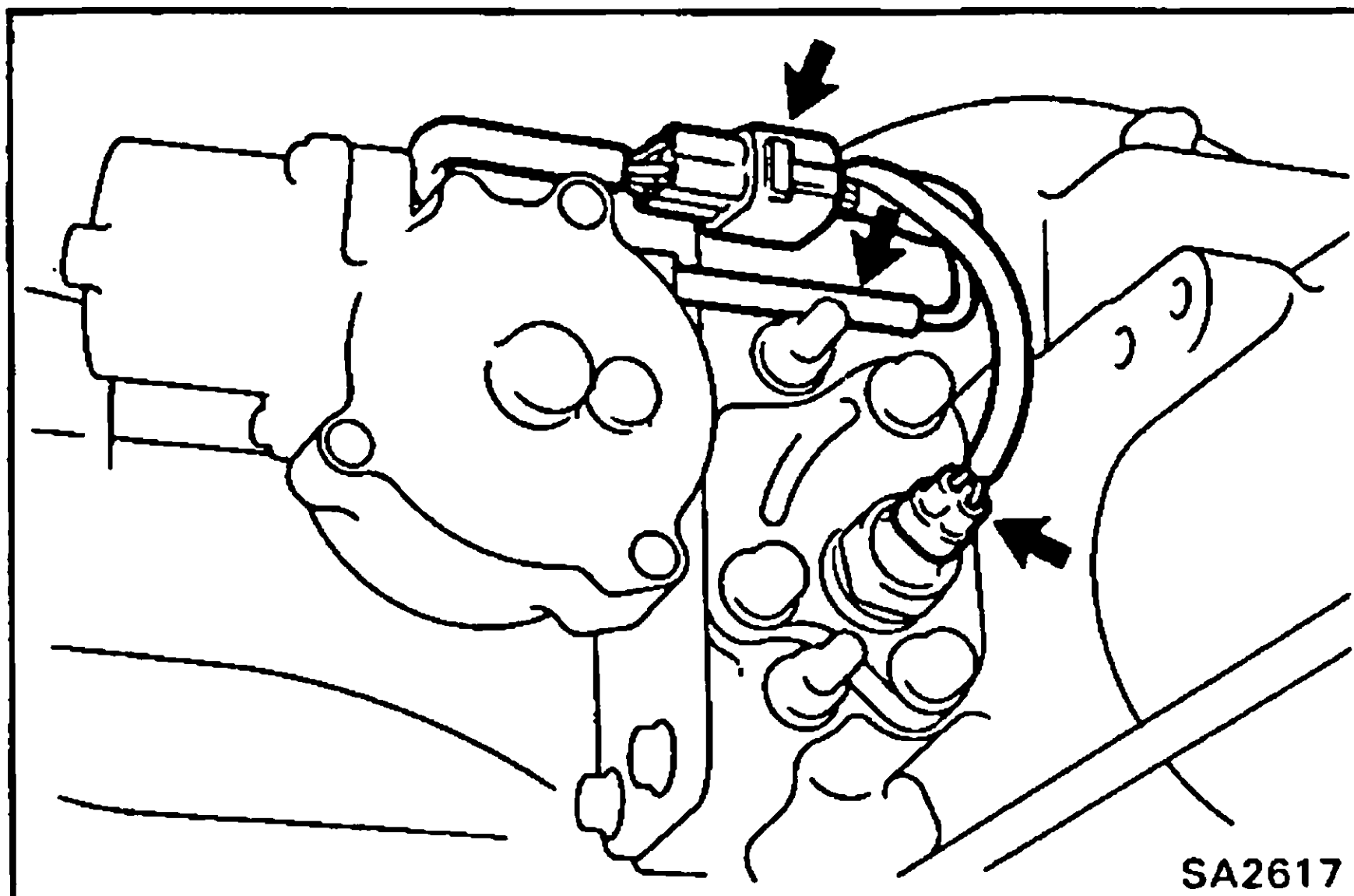


REMOVAL AND INSTALLATION OF REAR ACTUATOR (FJ, PZJ, HZJ, FZJ)

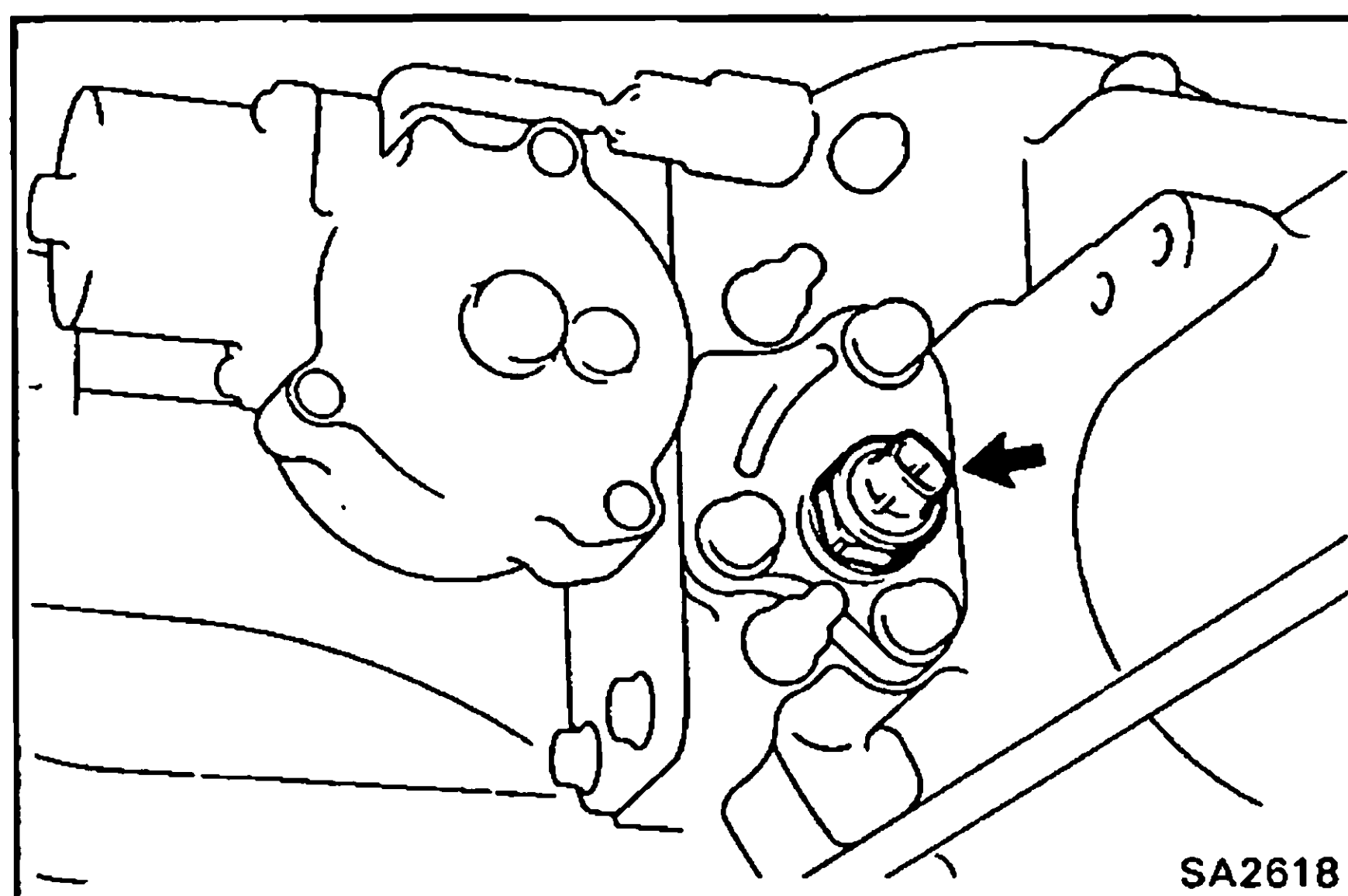
1. **SHIFTING REAR DIFFERENTIAL LOCK**
(See Pub. No. RM183E, see page SA-129)

2. **REMOVE ACTUATOR PROTECTOR**

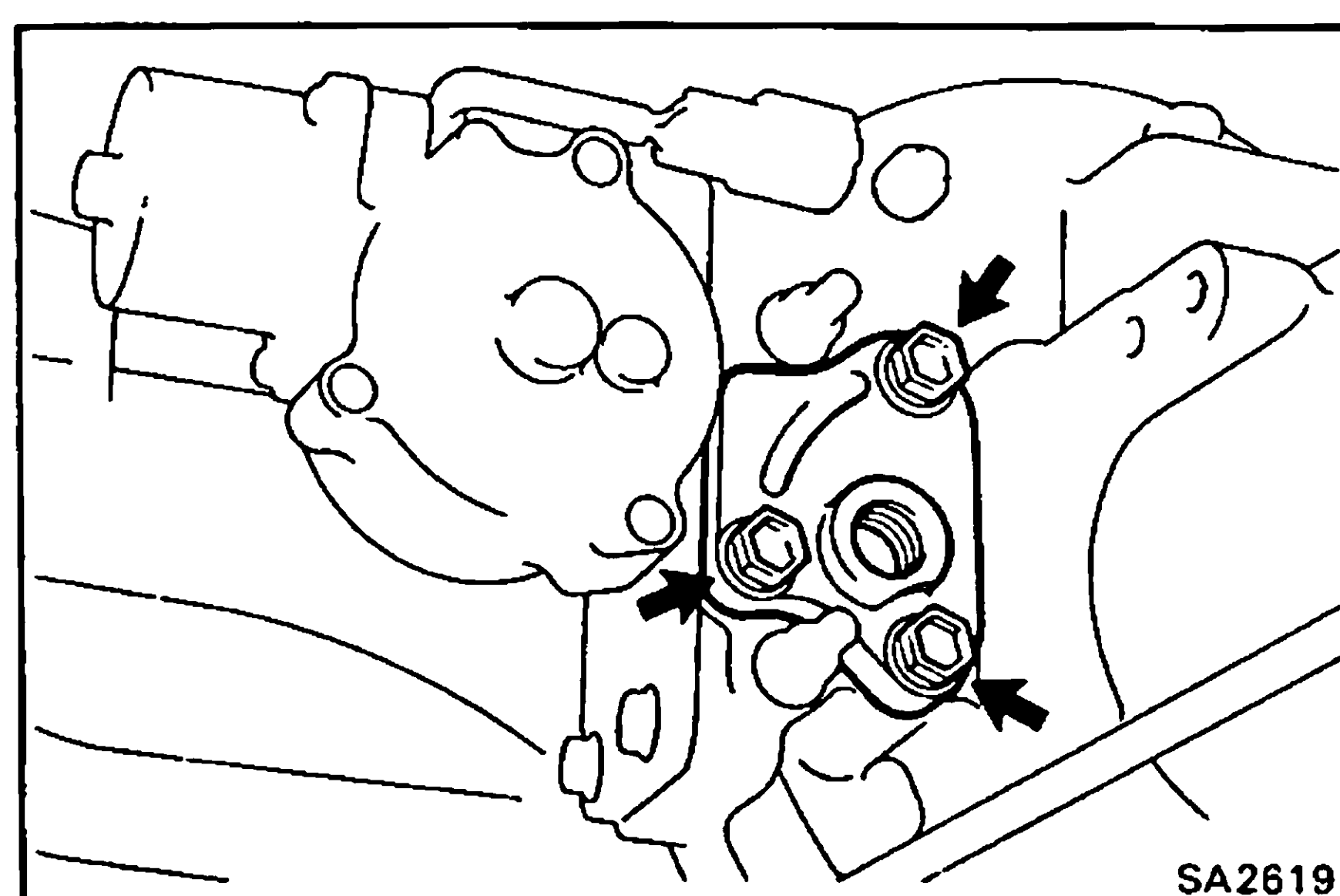
Remove the two nuts, bolt and protector.



3. **DISCONNECT CONNECTORS AND TUBE**



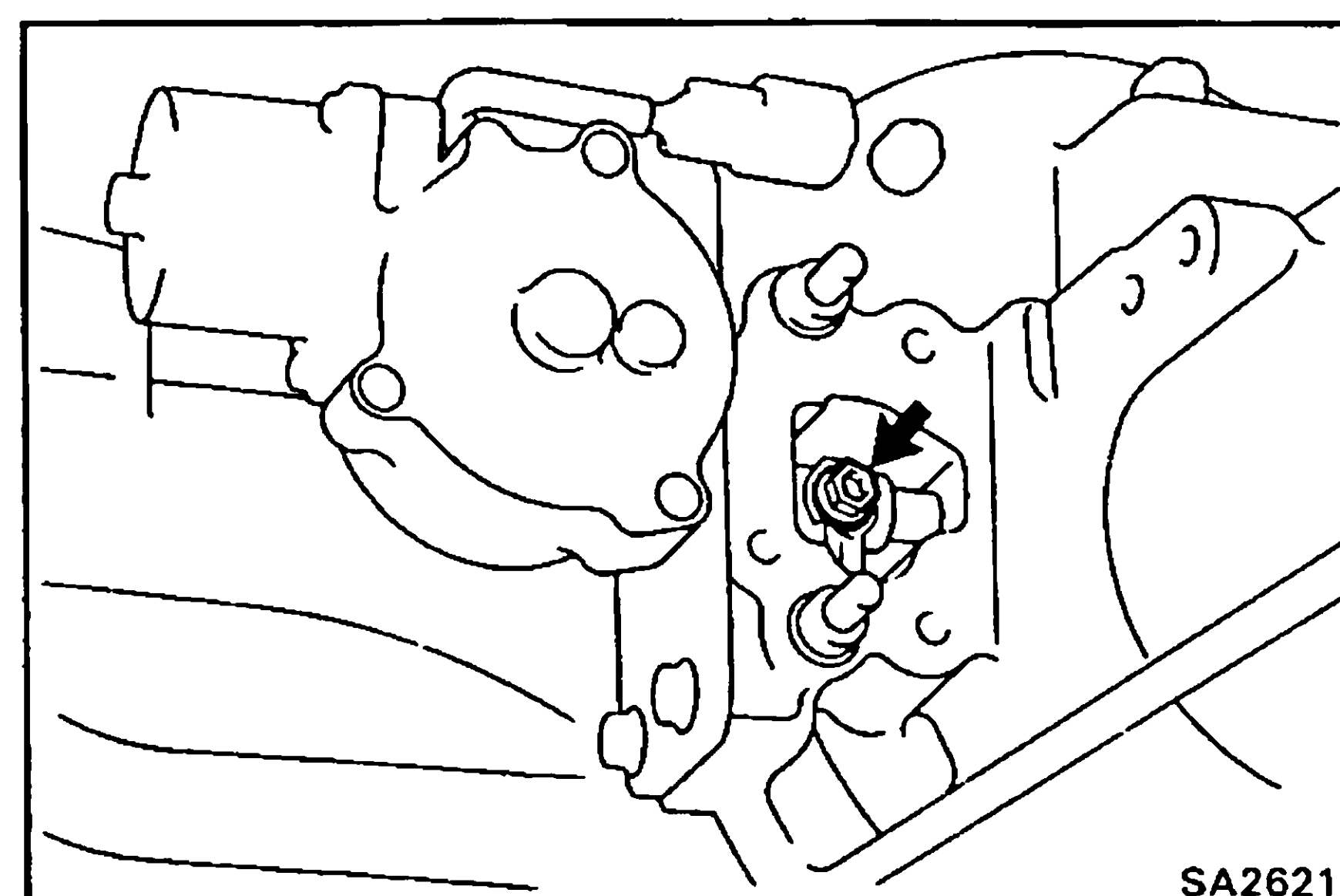
4. **REMOVE INDICATOR SWITCH**



5. **REMOVE COVER**

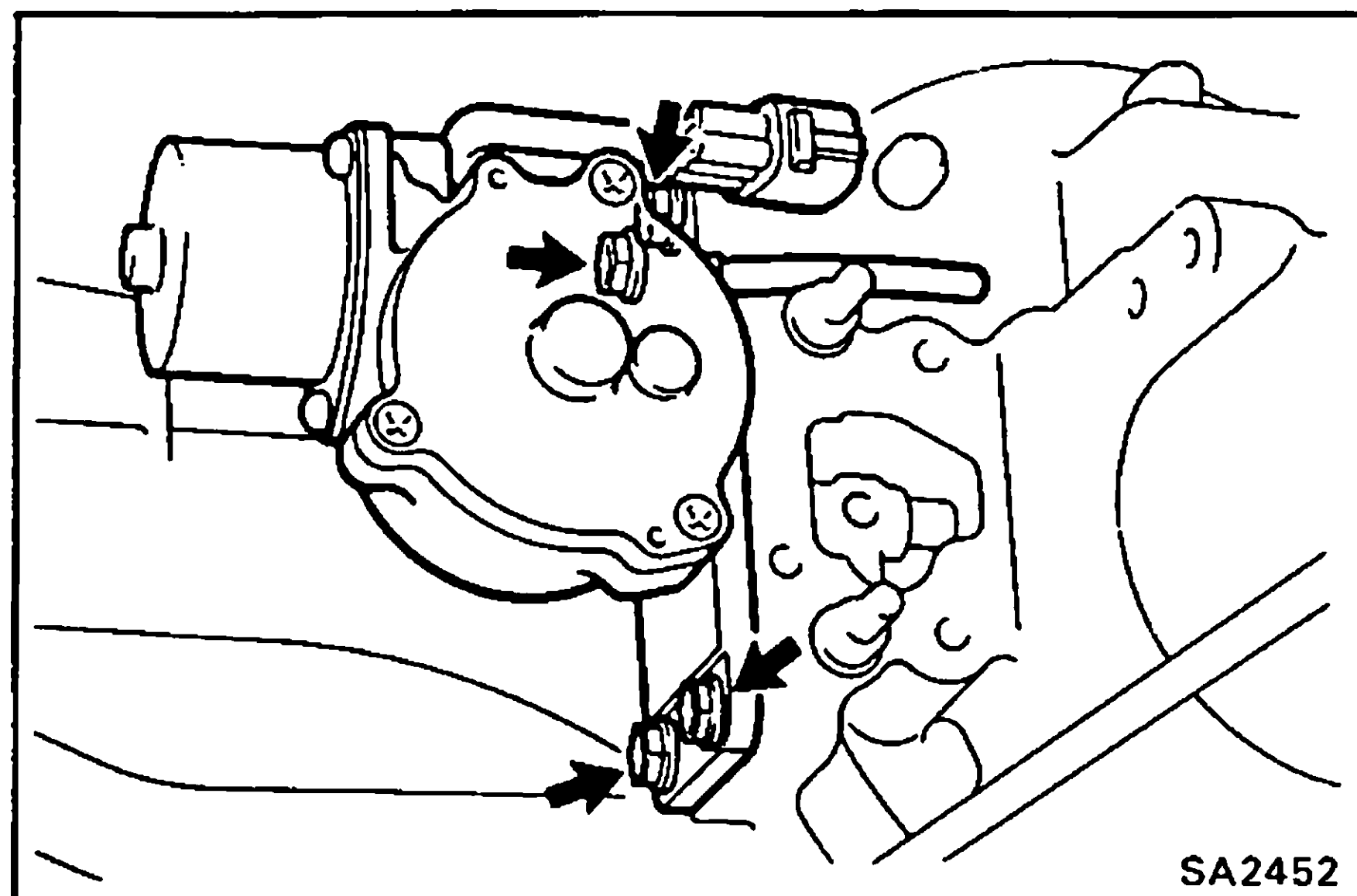
(a) Remove the three bolts.

(b) Using a brass bar and hammer, remove the cover.

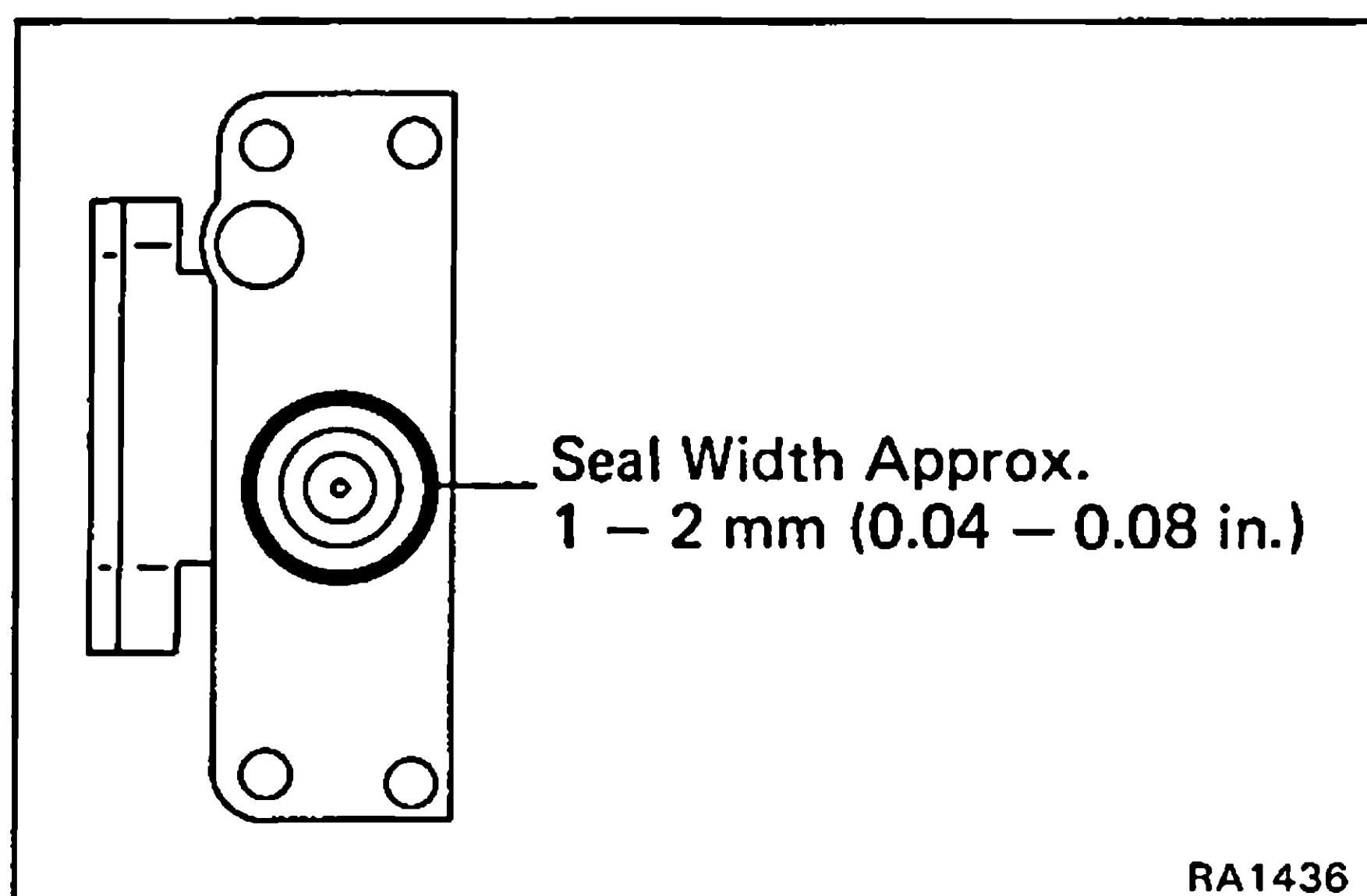


6. **REMOVE ACTUATOR**

(a) Remove the shift fork shaft bolt.



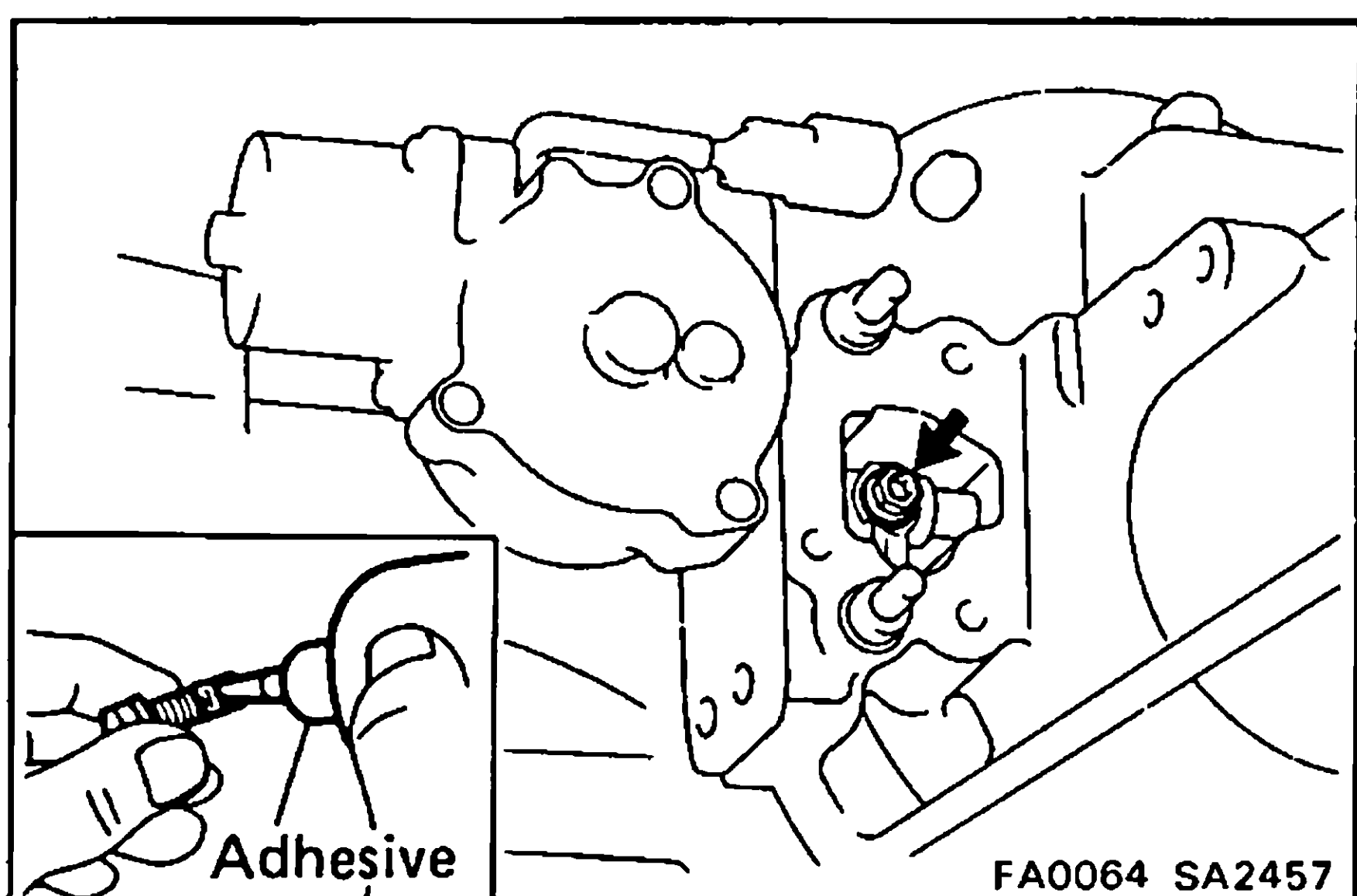
- (b) Remove the four bolts.
- (c) Using a screwdriver, pry out the actuator.



7. INSTALL ACTUATOR

- (a) Clean contacting surfaces of any residual packing material using gasoline or alcohol.
 - (b) Apply seal packing to the actuator.
- Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent**

HINT: Install the actuator within ten minutes after applying seal packing.

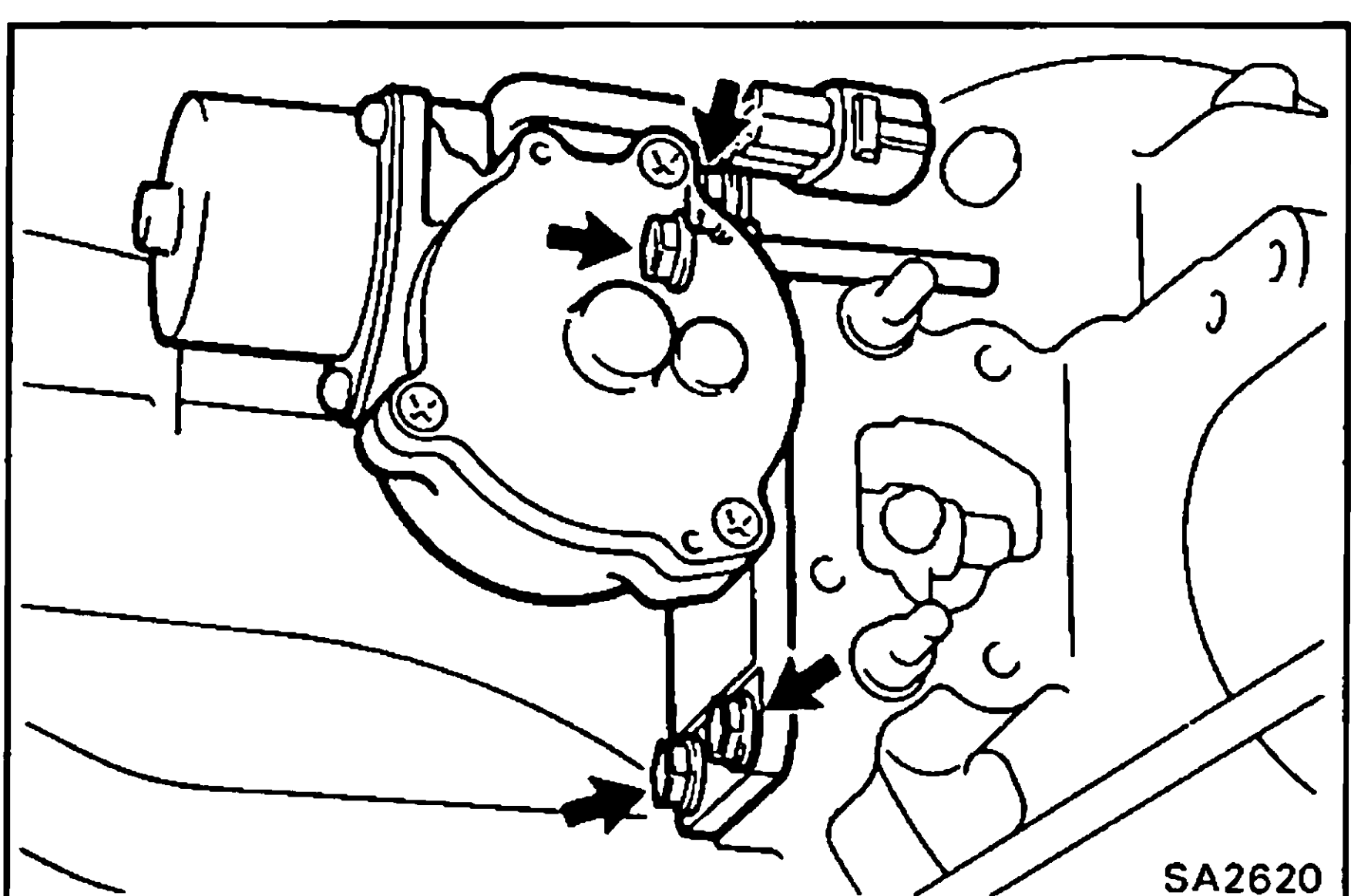


- (c) Install the actuator to the differential and match the shaft with the shaft fork hole.
- (d) Clean the threads of the set bolt and fork shaft with the white gasoline.
- (e) Coat the threads of the set bolt with adhesive.

Sealer: Part No. 08833-00070, THREE BOND 1324 or equivalent

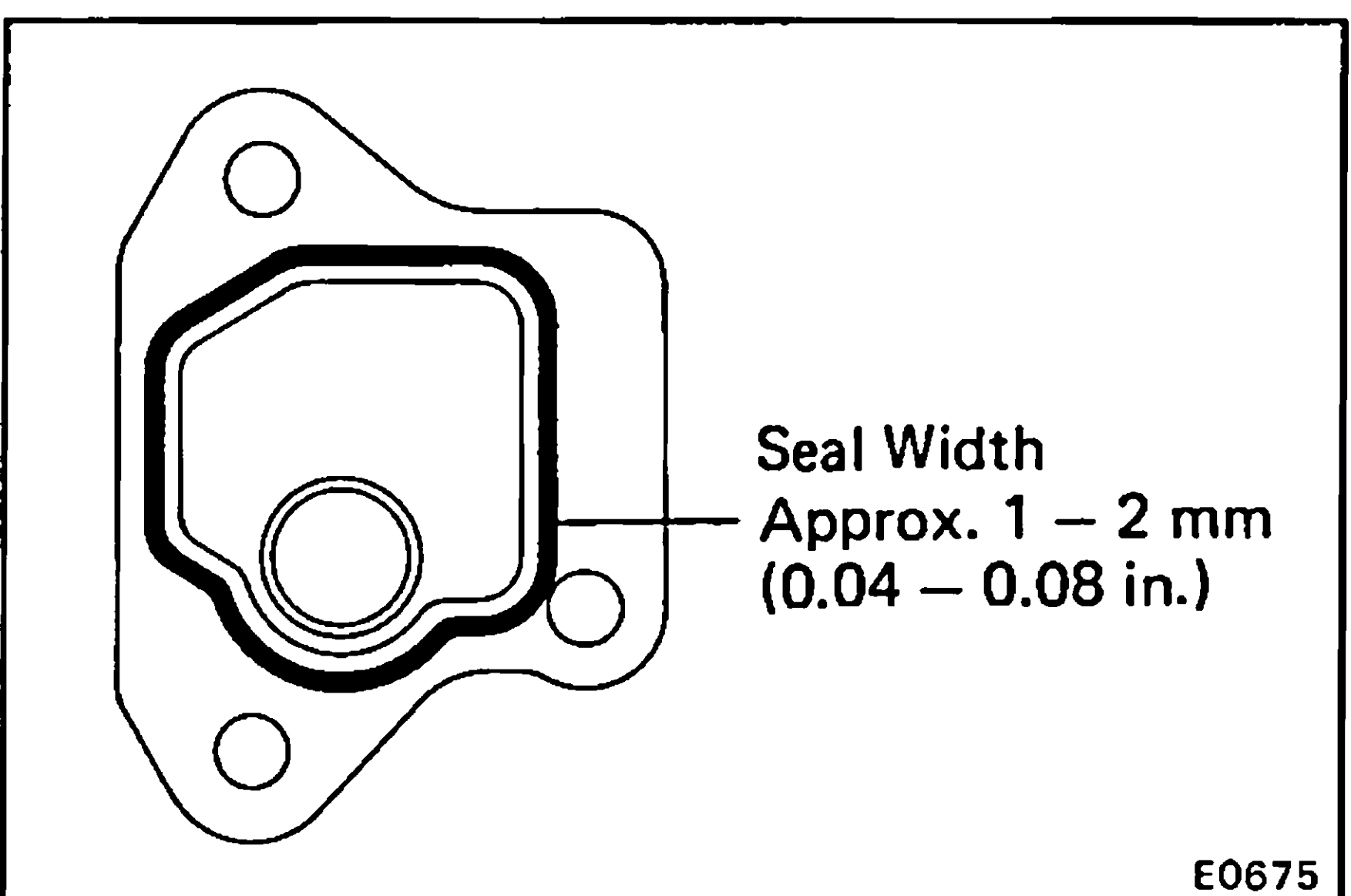
- (f) Tighten the shift fork set bolt.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



- (g) Tighten the four bolts uniformly, a little at a time.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

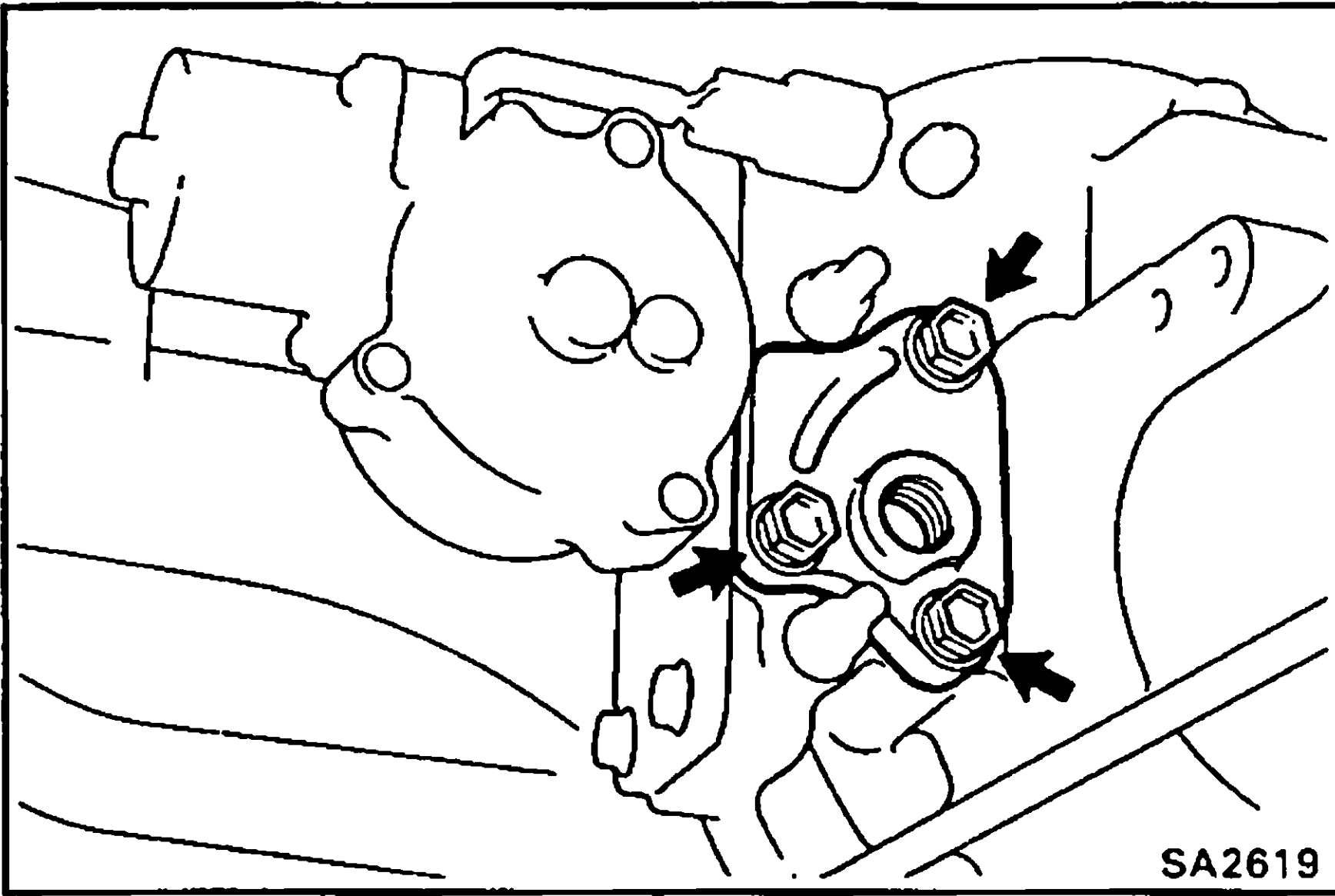


8. INSTALL COVER

- (a) Clean contacting surfaces of any residual packing material using gasoline or alcohol.
- (b) Apply seal packing to the cover.

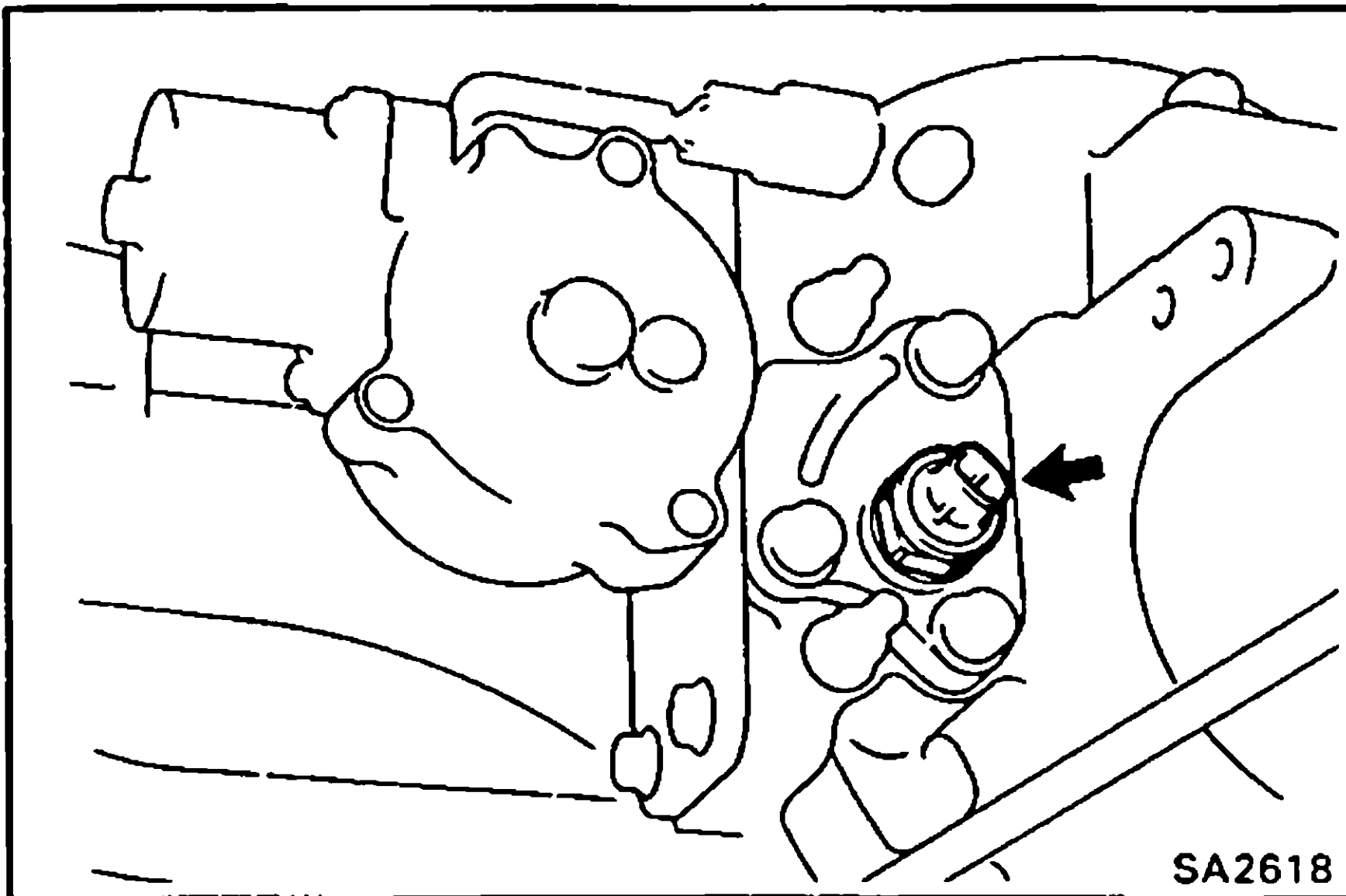
Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the cover ten minutes after applying seal packing.



(c) Tighten the three bolts.

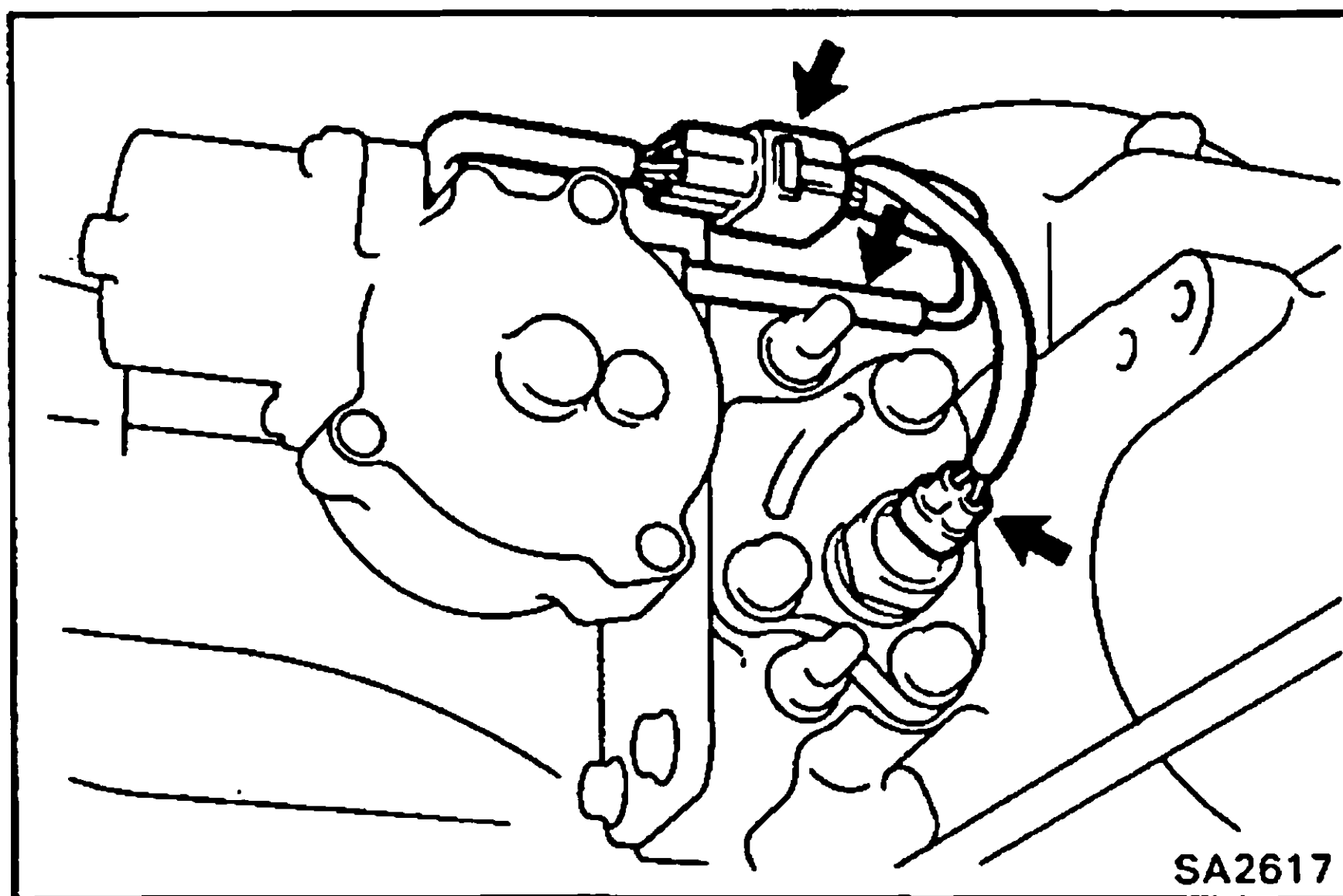
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



9. INSTALL INDICATOR SWITCH

Install the indicator switch with a new gasket.

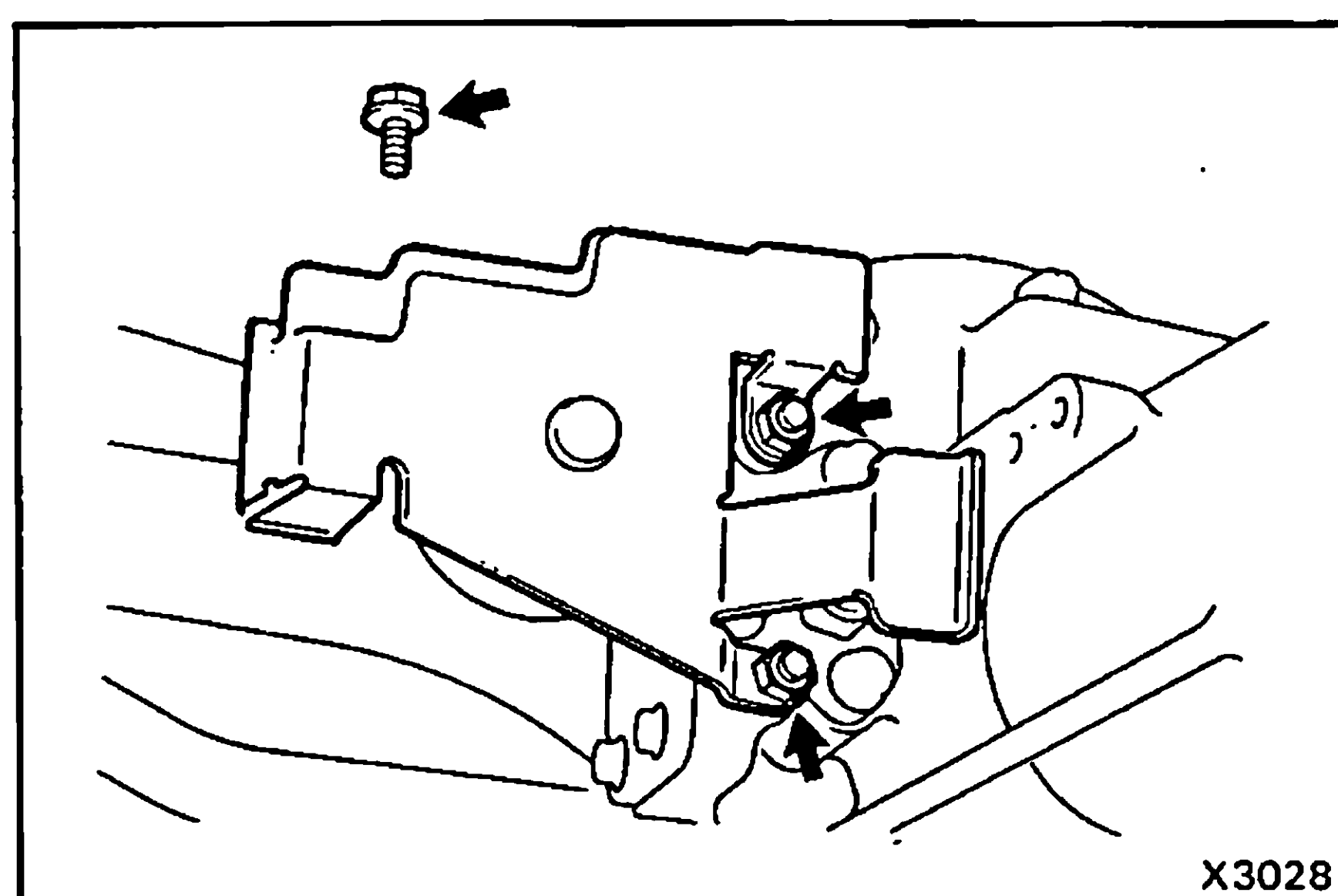
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)



10. CONNECT CONNECTORS AND TUBE

HINT:

- The depth of the insertion of the bleeder tube into the hose is approx. 15 mm (0.59 in.).
- Take care the water or equivalent shall not adhere to the connectors and hose.



11. INSTALL ACTUATOR PROTECTOR

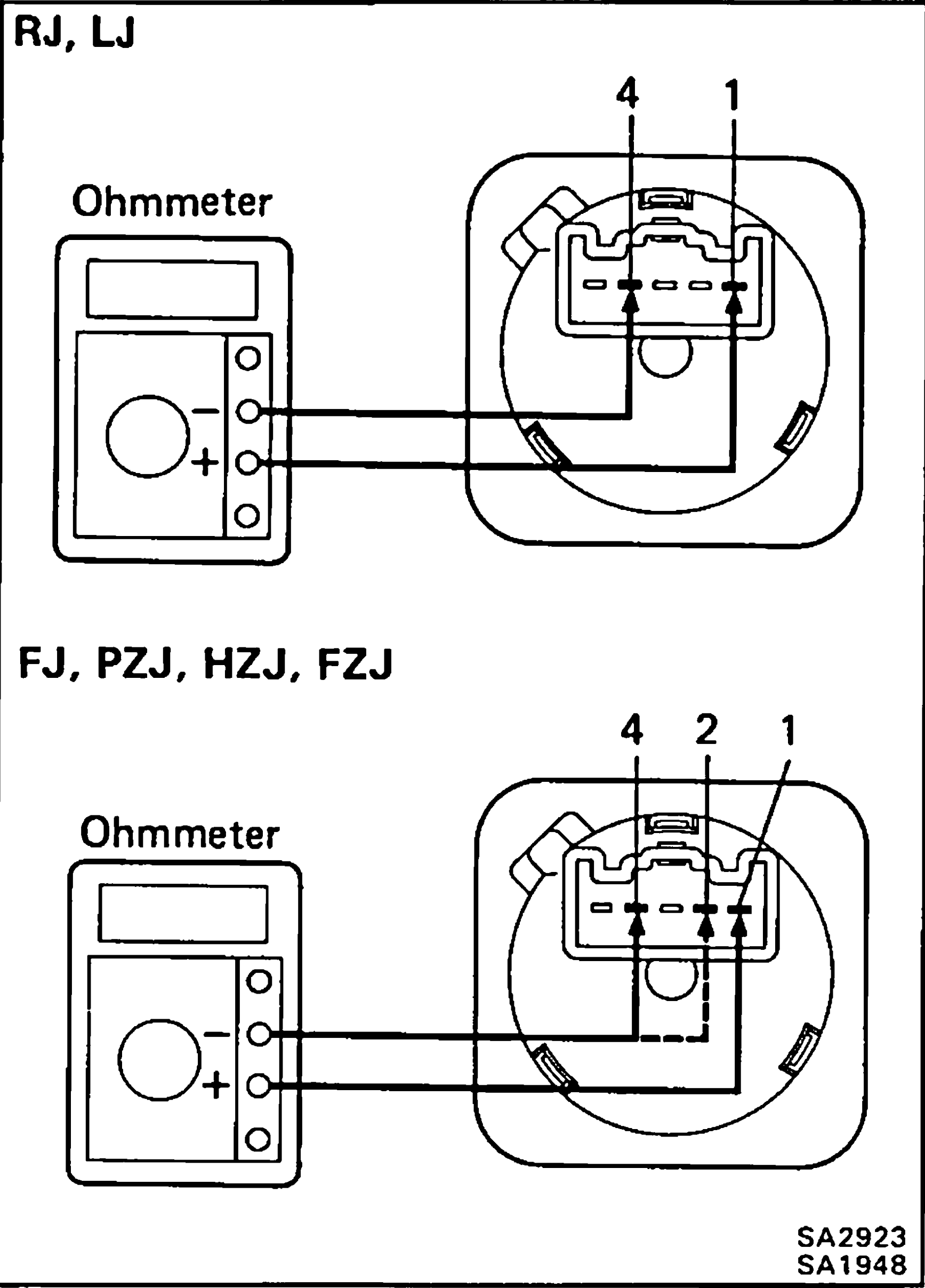
Install the protector with the two nuts and bolt.

Torque: Nut 35 N·m (360 kgf·cm, 26 ft·lbf)

Bolt 20 N·m (200 kgf·cm, 14 ft·lbf)

12. CANCEL REAR DIFFERENTIAL LOCK

With the ignition switch ON, turn the differential lock control switch to OFF to cancel to differential lock.



Differential Lock Control Switch

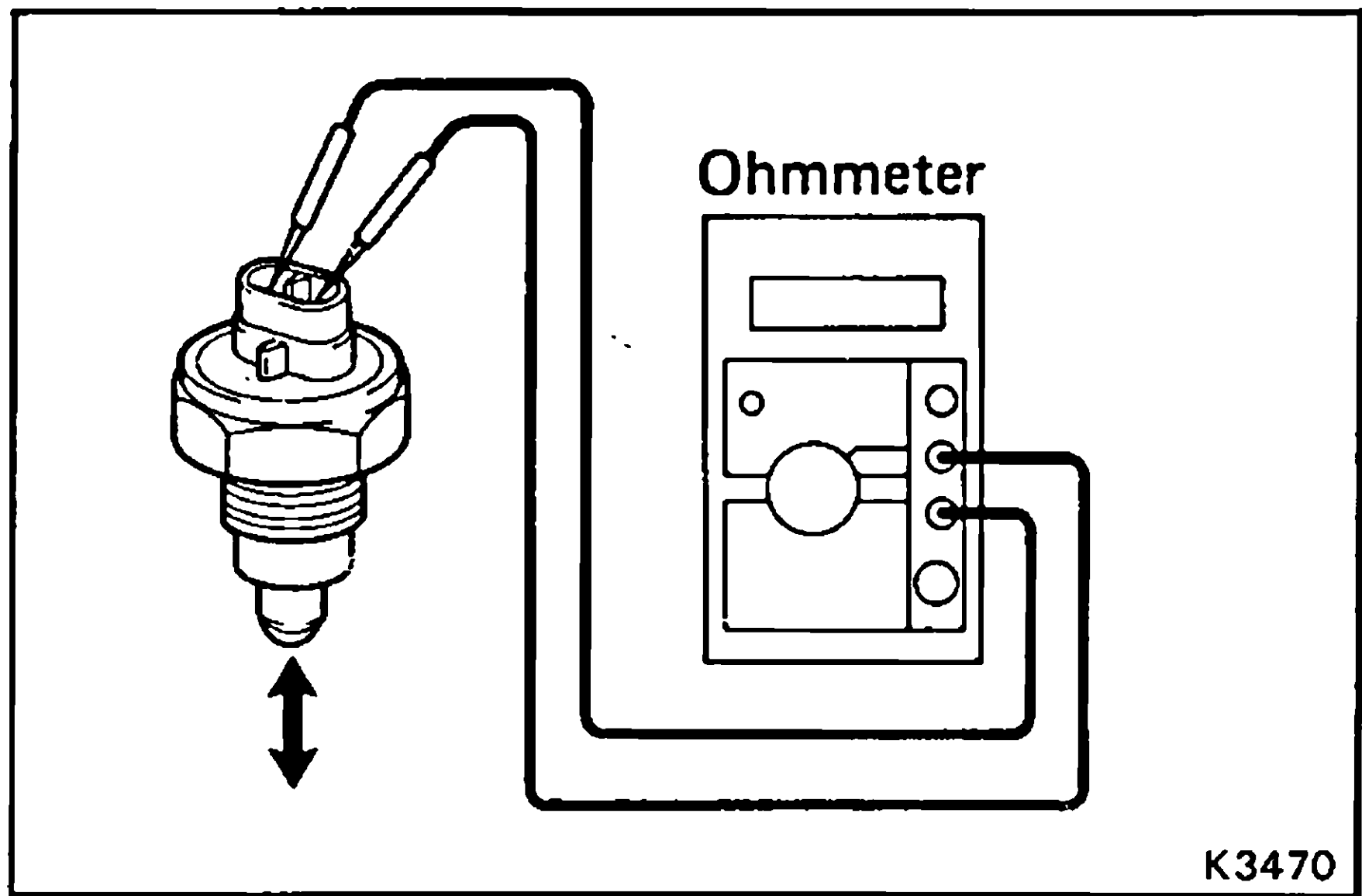
INSPECTION OF DIFFERENTIAL LOCK CONTROL SWITCH

INSPECT SWITCH CONTINUITY

Inspect switch continuity between terminals as shown.

Terminal	1	2	4
Switch position	(B)	(RF)	(R)
OFF			
RR	○		○
FR-RR	○	○	○

If continuity is not as specified, replace the switch.



Indicator Switch

INSPECTION ON INDICATOR SWITCH

1. INSPECT DIFFERENTIAL LOCK INDICATOR SWITCH (FRONT AND REAR)

- Check that there is continuity between terminals when the switch is pushed (differential connected position).
- Check that there is no continuity when the switch is free (differential disconnected position).

If operation is not as specified, replace the switch.

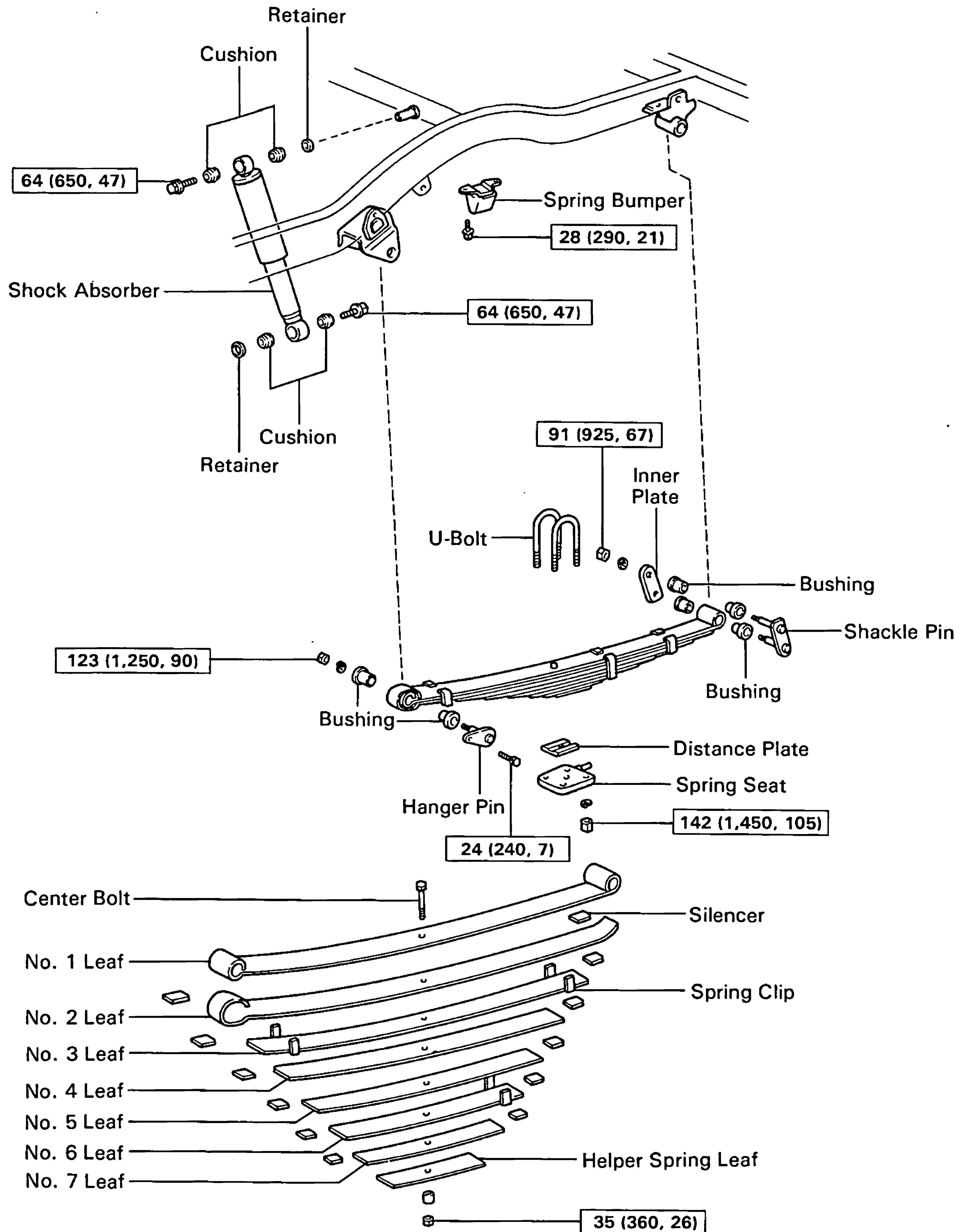
2. INSPECT 4WD INDICATOR SWITCH (See page TF-36)

Combination Meter

INSPECTION OF SPEED SENSOR AND INDICATOR LIGHT

- INSPECT SPEED SENSOR
(See page BE-57)
- INSPECT INDICATOR LIGHT

LEAF SPRING TYPE REAR SUSPENSION COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

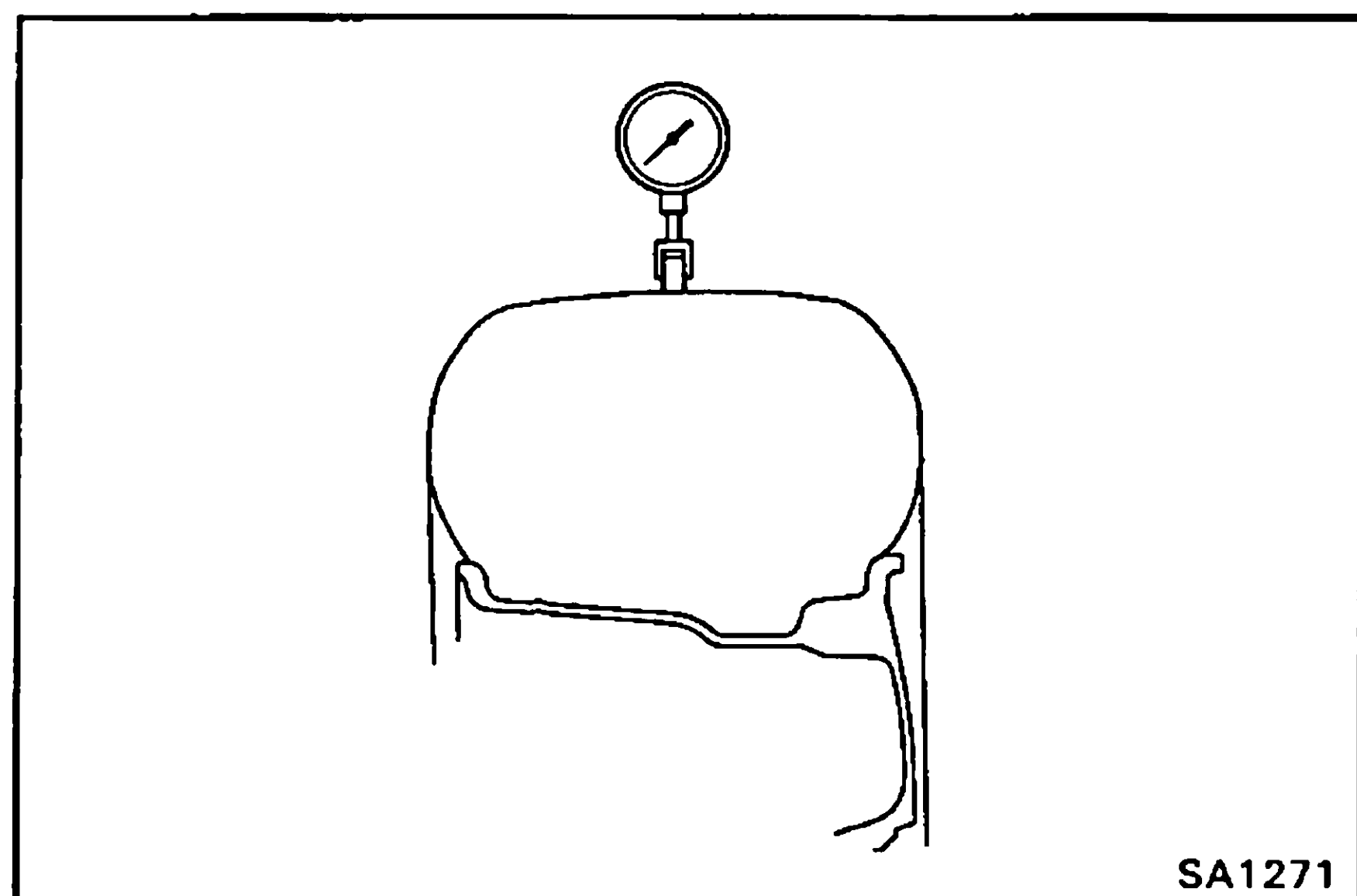
WHEEL ALIGNMENT

Primary Inspection

1. MAKE FOLLOW CHECKS AND CORRECT ANY PROBLEMS

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

Cold tire inflation pressure: See page A-13



- (b) Check the tire runout.

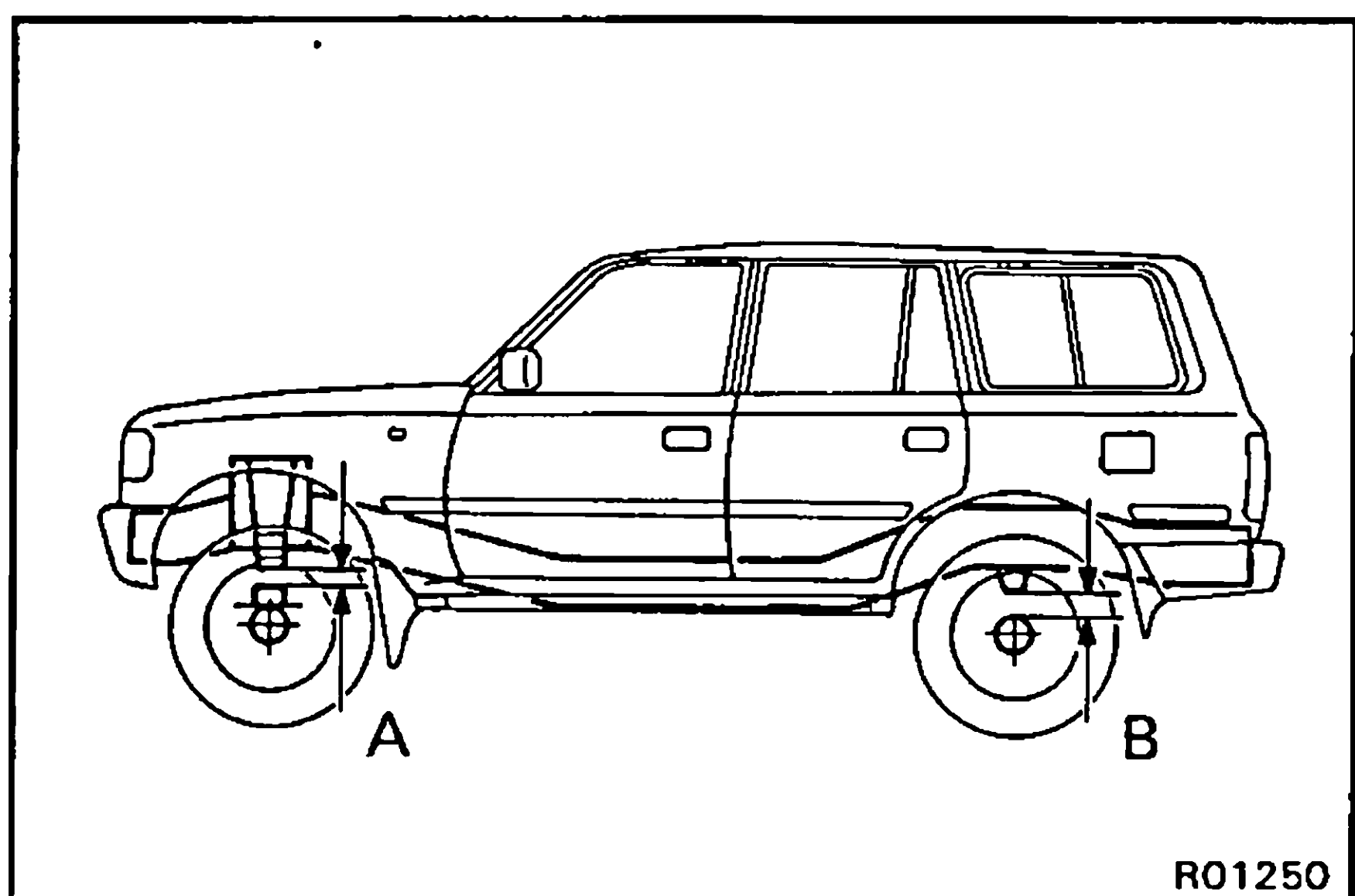
Tire runout: 3.0 mm (0.118 in.) or less

- (c) Check the wheel bearings for looseness.

- (d) Check the suspension for looseness.

- (e) Check the steering linkage for looseness.

- (f) Check that the absorbers work properly by using the standard bounce test.



2. MEASURE FOLLOW SPRING CLEARANCE AND BUMPER STOPPER CLEARANCE

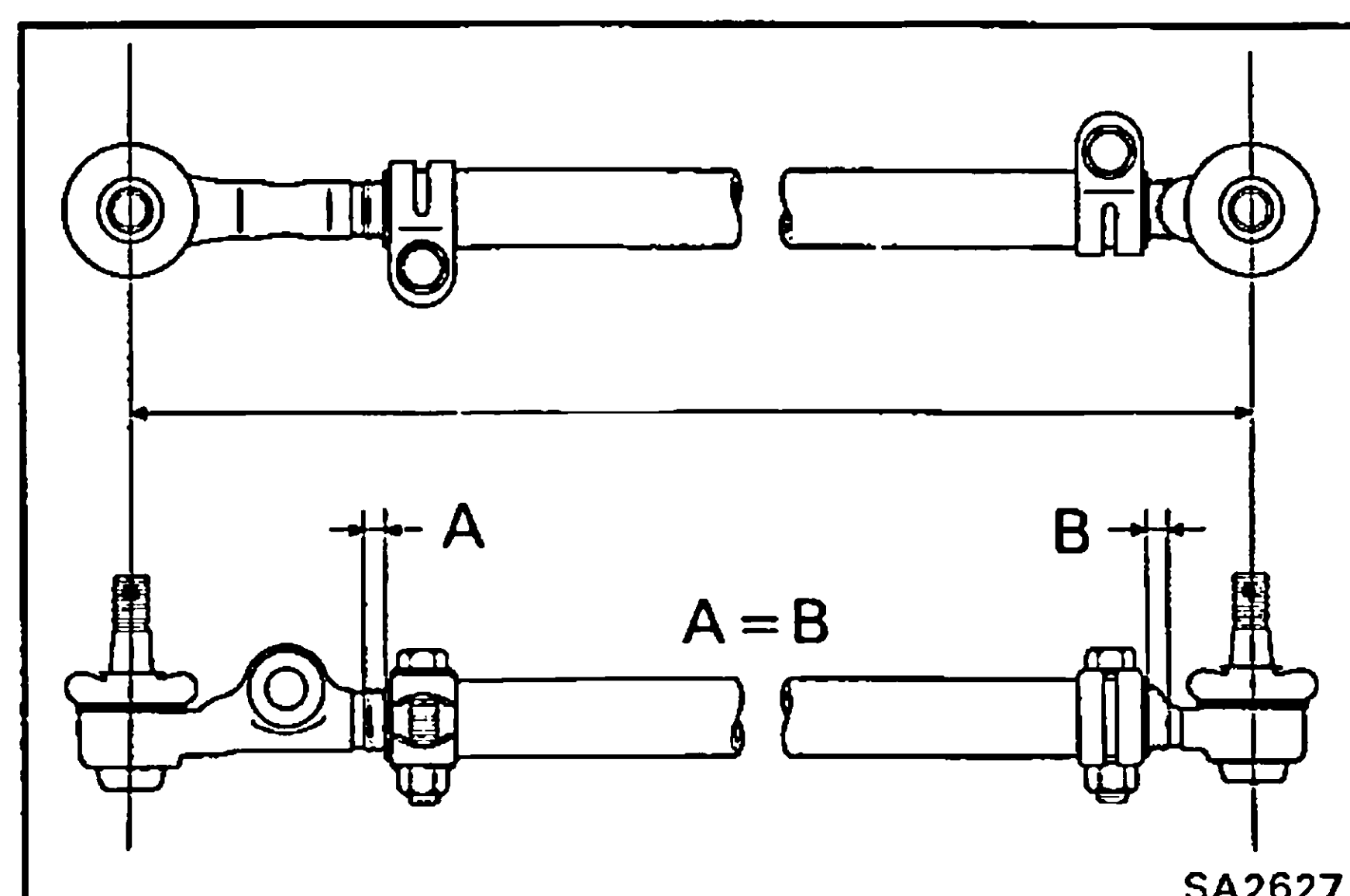
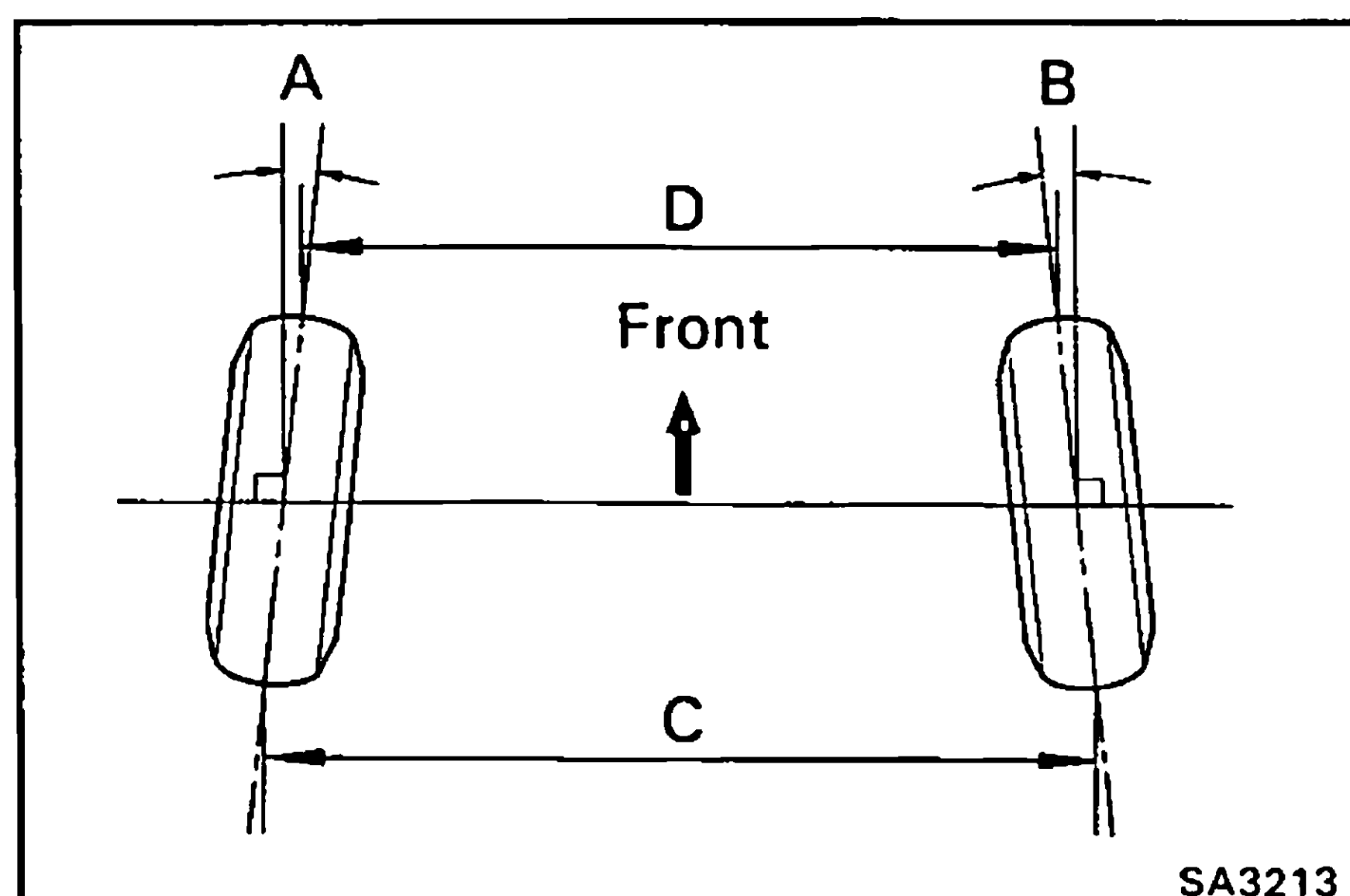
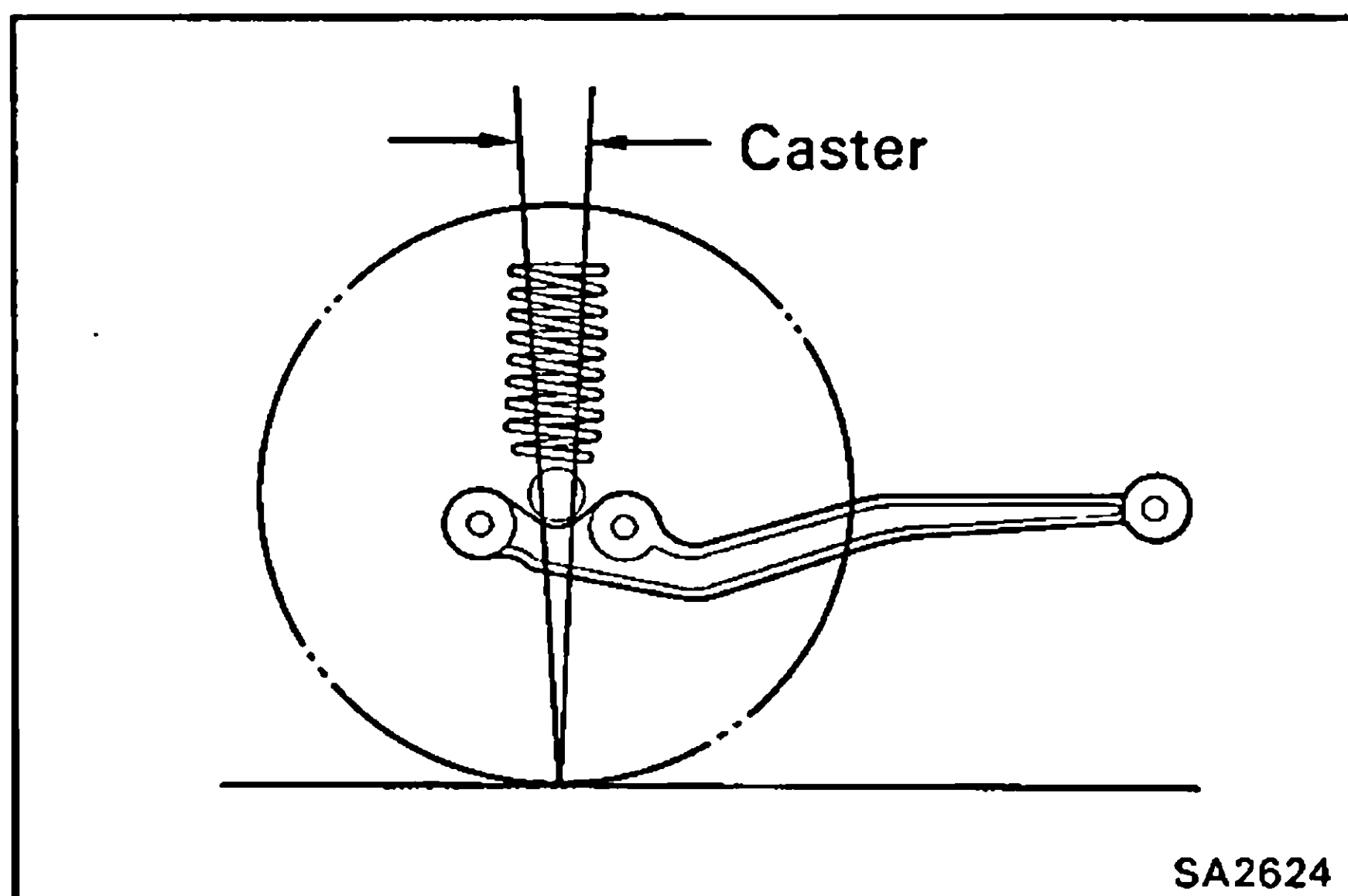
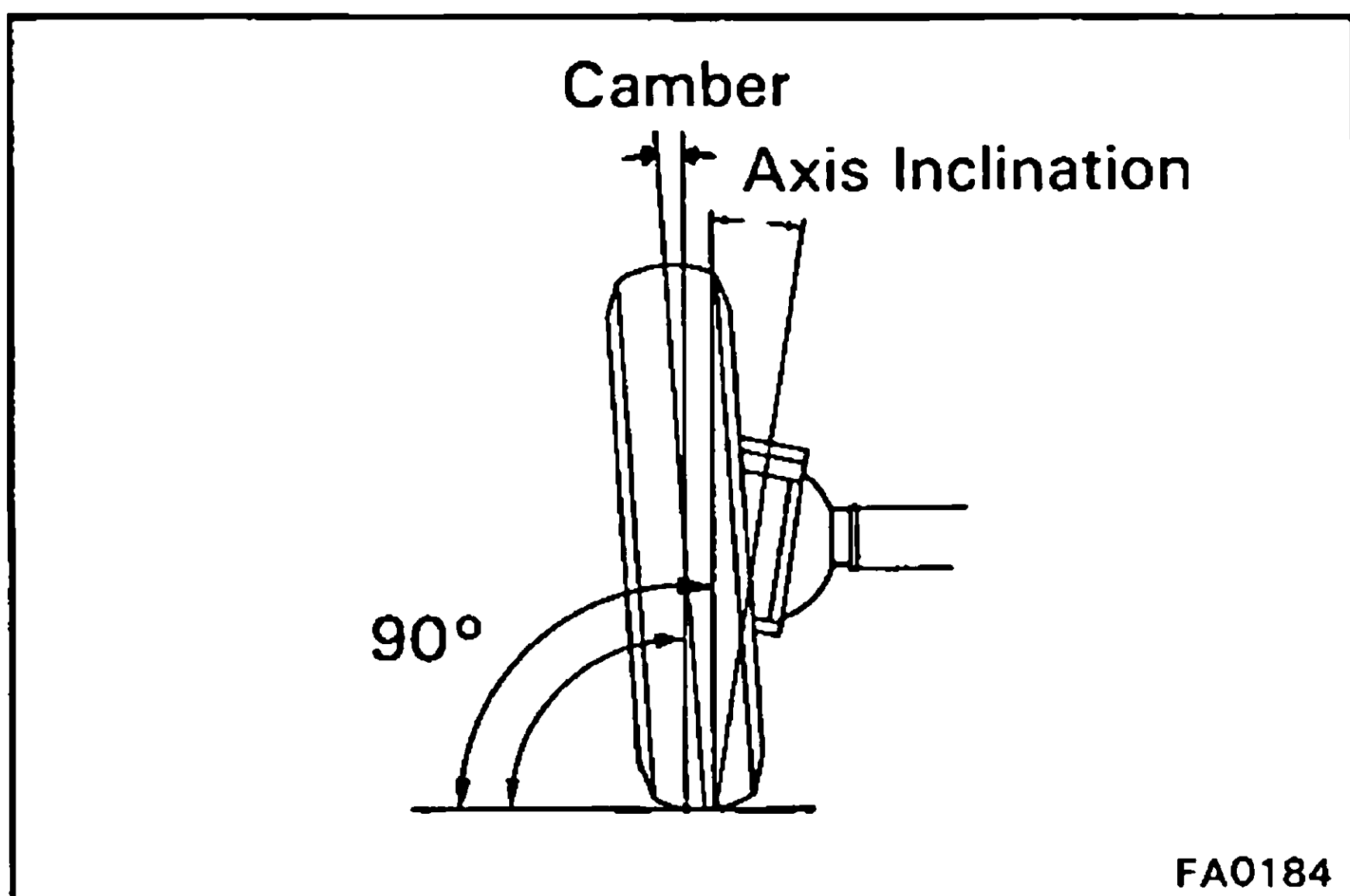
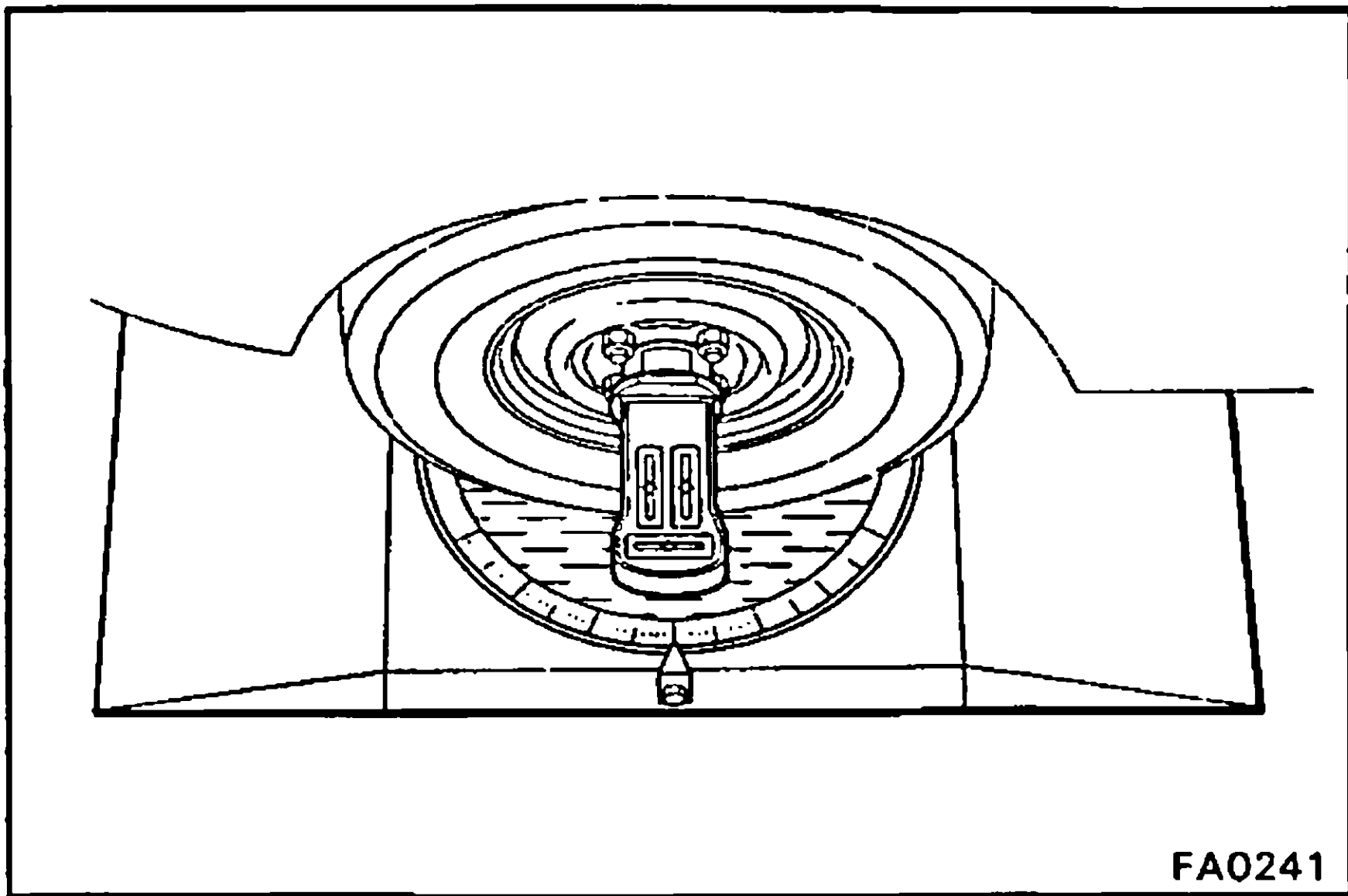
A (Follow spring clearance): 25 mm (0.98 in.)

B (Bumper stopper clearance): 45 mm (1.77 in.)

If the clearance of the vehicle is not standard, try to level the vehicle by rocking it down.

If still not correct, check for bad springs or suspension parts.

HINT: When measuring the chassis ground clearance, measure from the ground to the center of the lower suspension arm front mounting bolt.



Front Wheel Alignment

INSPECT AND ADJUSTMENT OF FRONT WHEEL ALIGNMENT

1. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.

2. INSPECT CAMBER AND STEERING AXIS INCLINATION

Camber: **1°00' ± 45'**

Cross camber: 30' or less

Steering axis inclination: 13°00' ± 45'

If the steering axis inclination is not as specified after camber have been correctly adjusted, recheck the steering knuckle and front wheel for bending or looseness.

3. INSPECT CASTER

Tire size	Caster
31 × 10.50R15LT-6 265/75R15	1°40' ± 45'
Others	3°00' ± 45'

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

4. INSPECT TOE-IN

Toe-in (total):

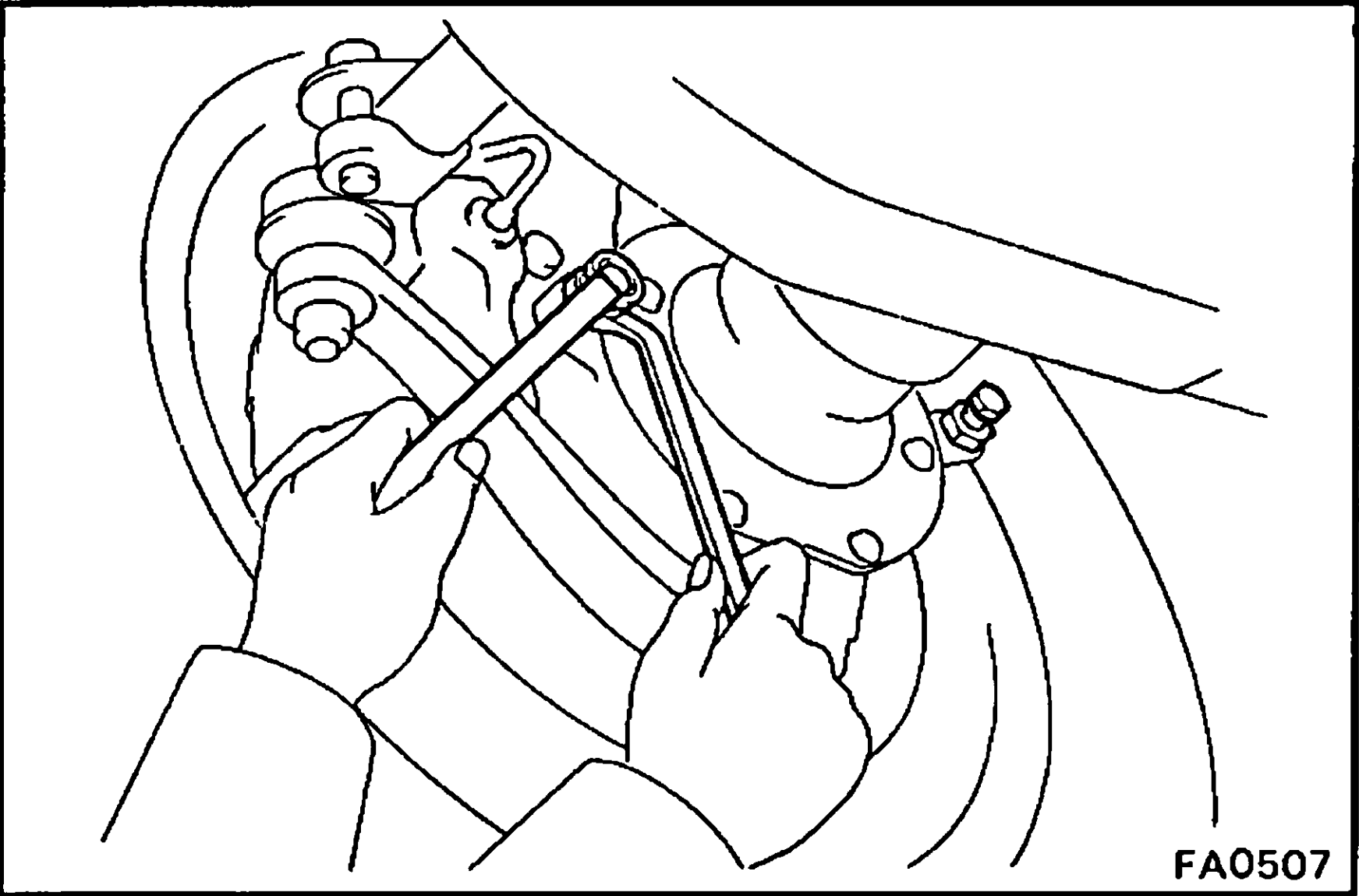
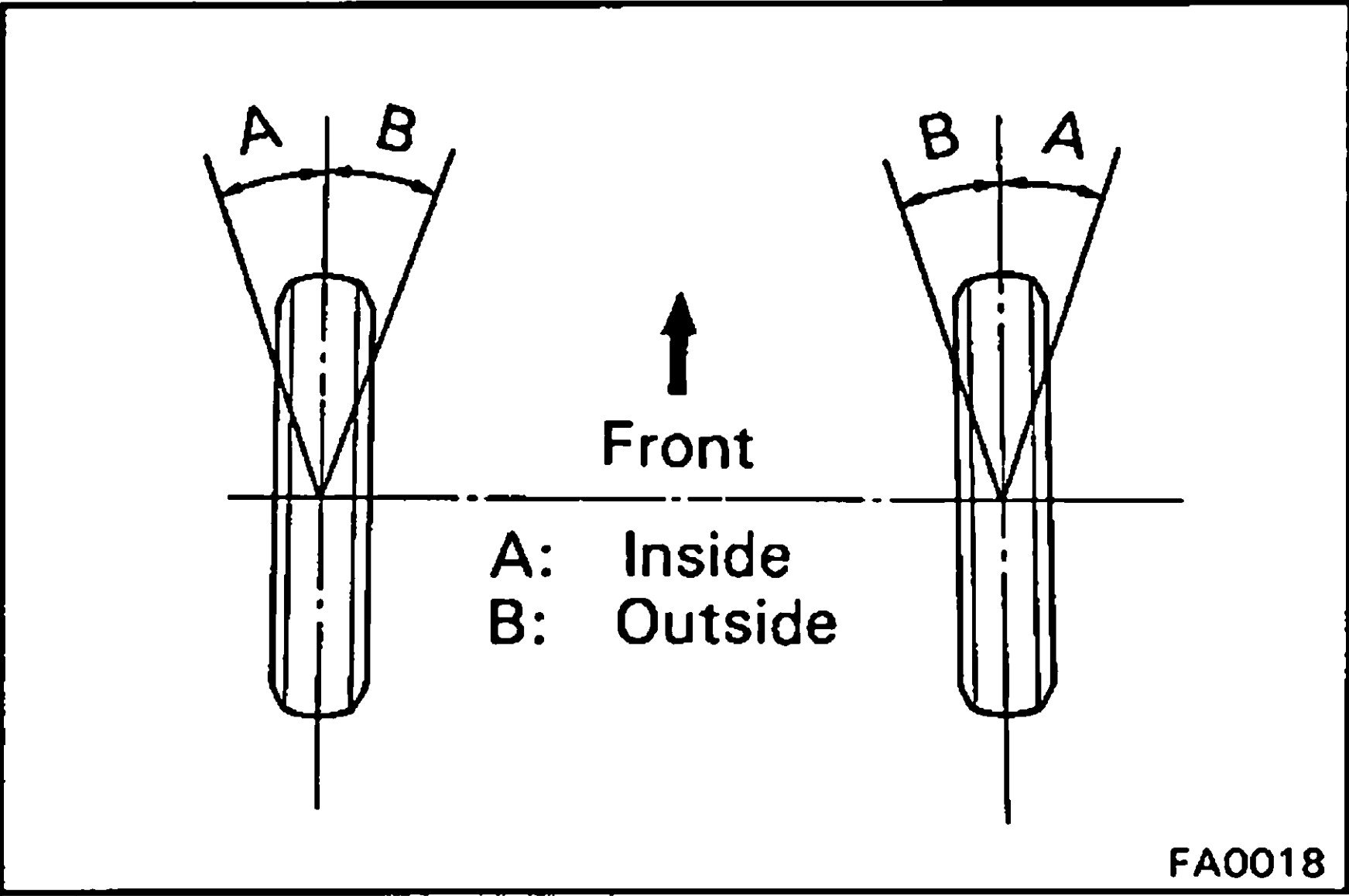
Tire type	A + B	C - D
Bias tire	$0.4^\circ \pm 0.2^\circ$	4 ± 2 mm (0.16 ± 0.08 in.)
Radial tire	$0.2^\circ \pm 0.2^\circ$	2 ± 2 mm (0.08 ± 0.08 in.)

If toe-in is not specification, adjust by left and right tie rods.

5. ADJUST TOE-IN

- (a) Loosen the clamp bolts and nuts.
- (b) Adjust toe-in by turning the left and right tie rod tubes an equal amount.
- (c) Insure that the lengths of the tie rod ends are the same.
- (d) Torque the tie rod, clamp bolts.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)



6. ADJUST WHEEL ANGLE

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

Wheel Angle			
Steering Type		PS	MS
Max.	Inside Wheel	$35^{\circ} + 0^{\circ}$ $- 3^{\circ}$	$32^{\circ} + 0^{\circ}$ $- 3^{\circ}$
	Outside Wheel	31°	29°

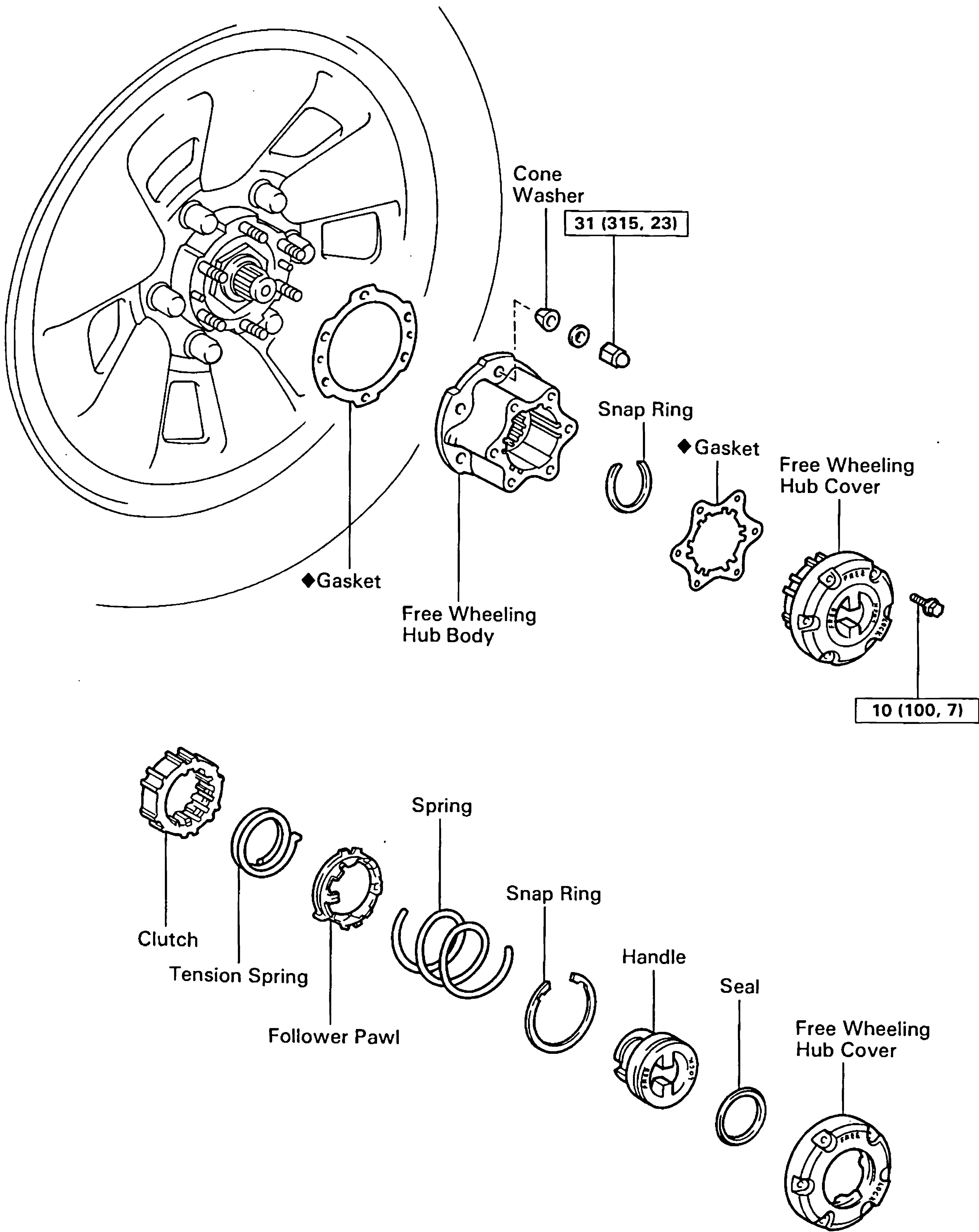
HINT: When the steering wheel is fully turned, make sure that the wheel is not touching the body or brake flexible hose.

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

Torque: 44 N·m (480 kgf·cm, 33 ft·lbf)

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

FREE WHEELING HUB
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

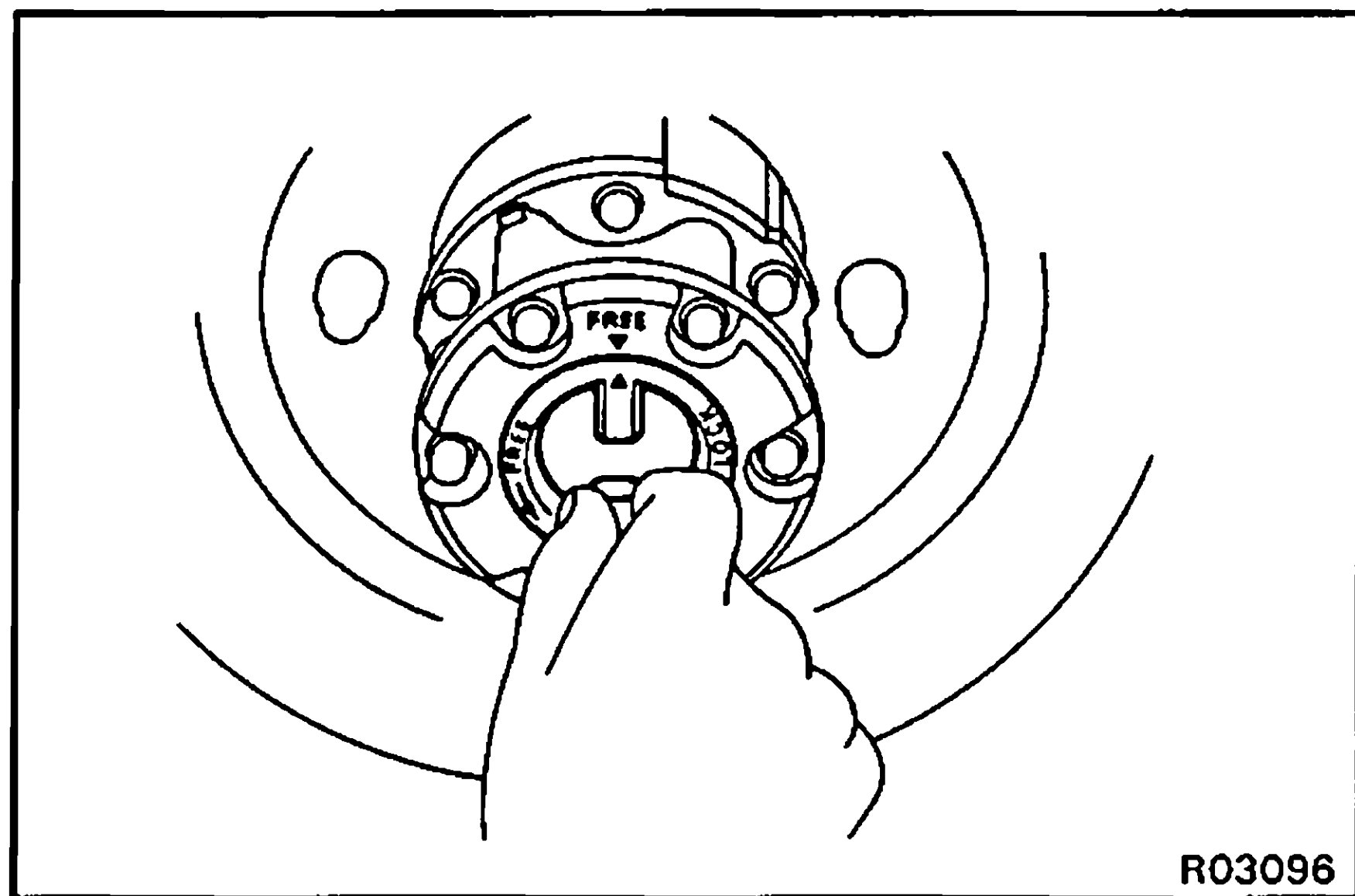
◆ Non-reusable part

REMOVAL OF FREE WHEELING HUB

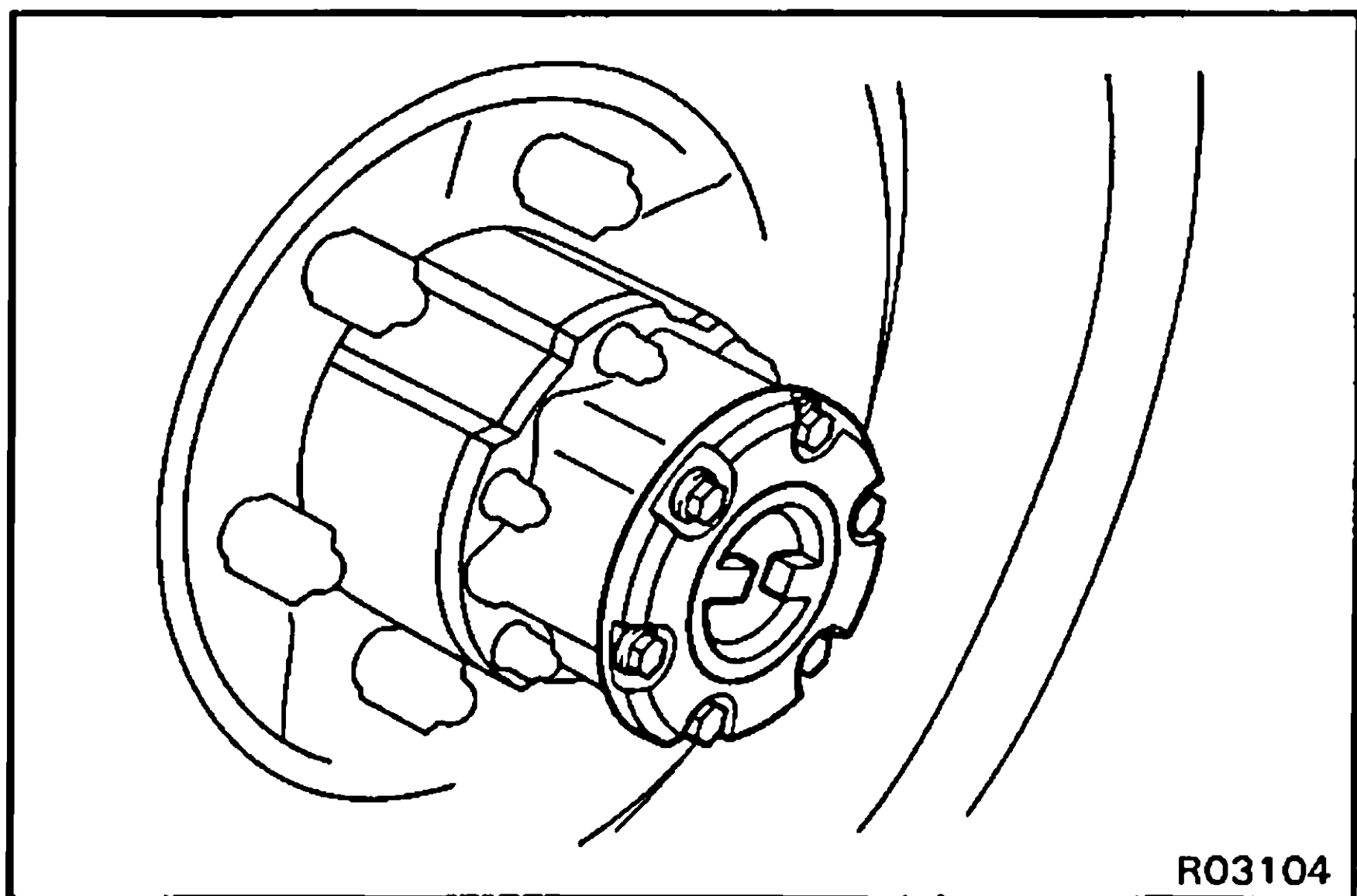
(See page SA-71)

1. REMOVE FREE WHEELING HUB COVER

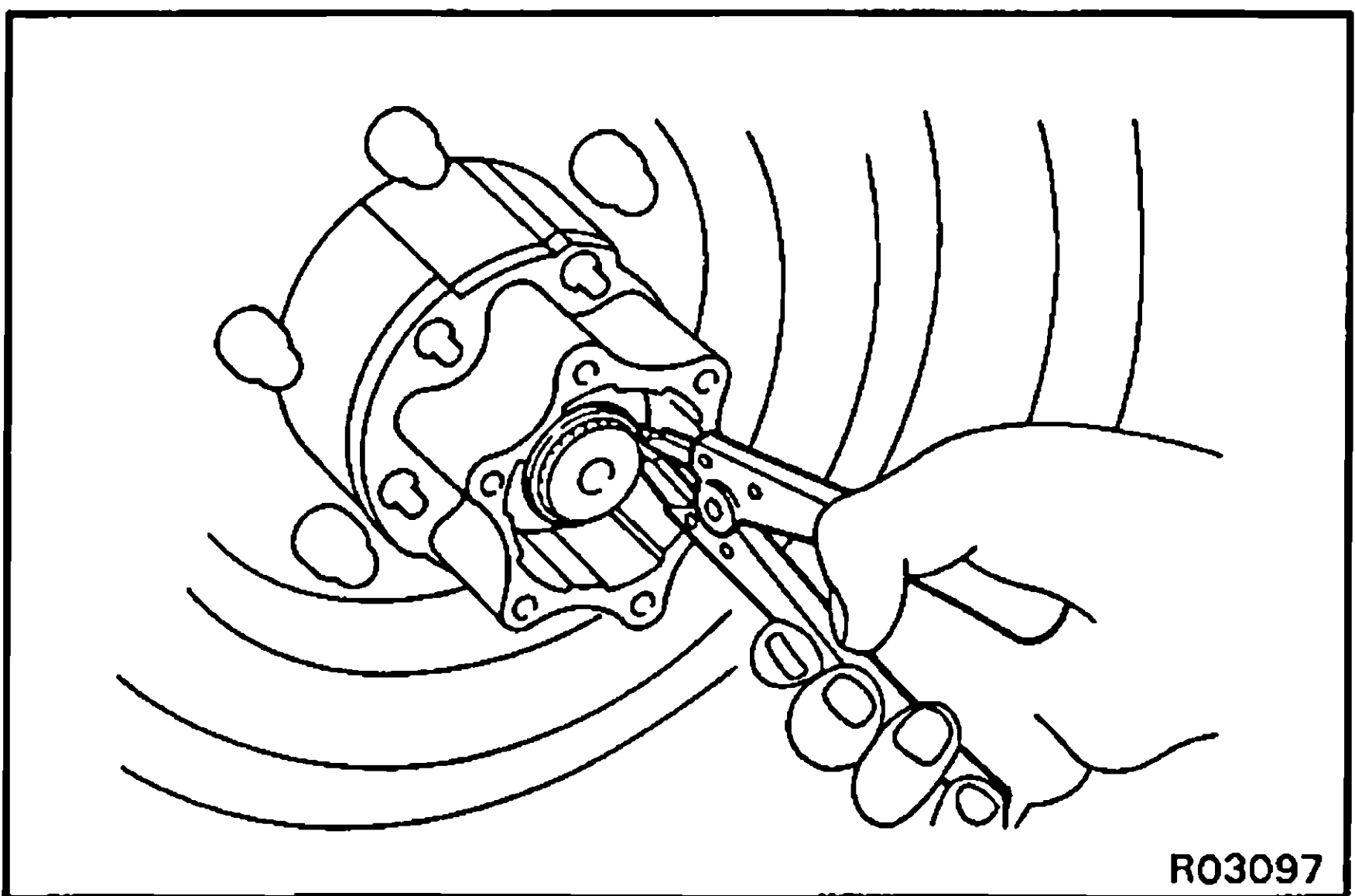
(a) Set the control handle to FREE.



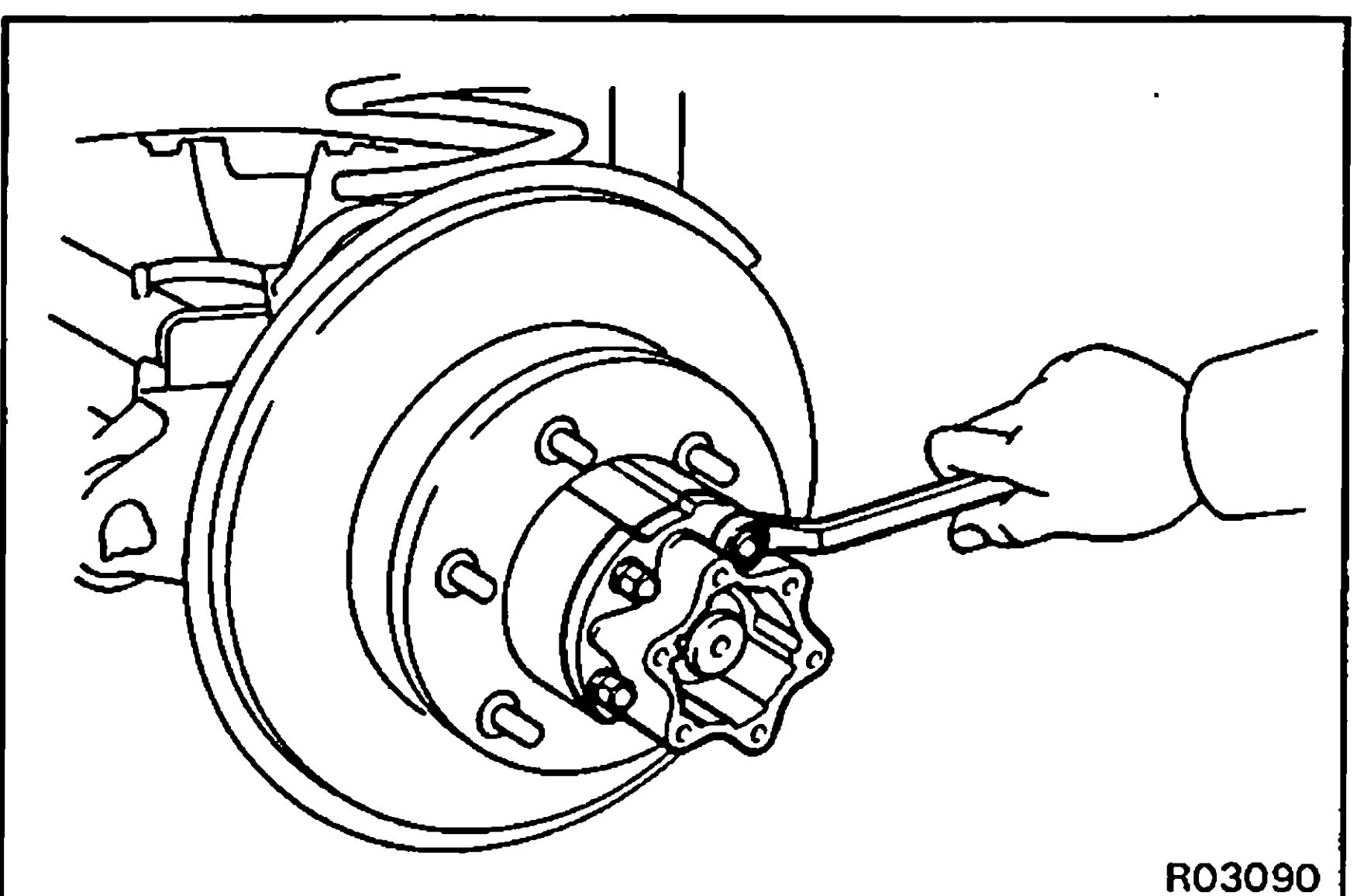
(b) Remove the six cover mounting bolts and pull off the cover.

**2. REMOVE SNAP RING**

Using snap ring pliers, remove the snap ring.

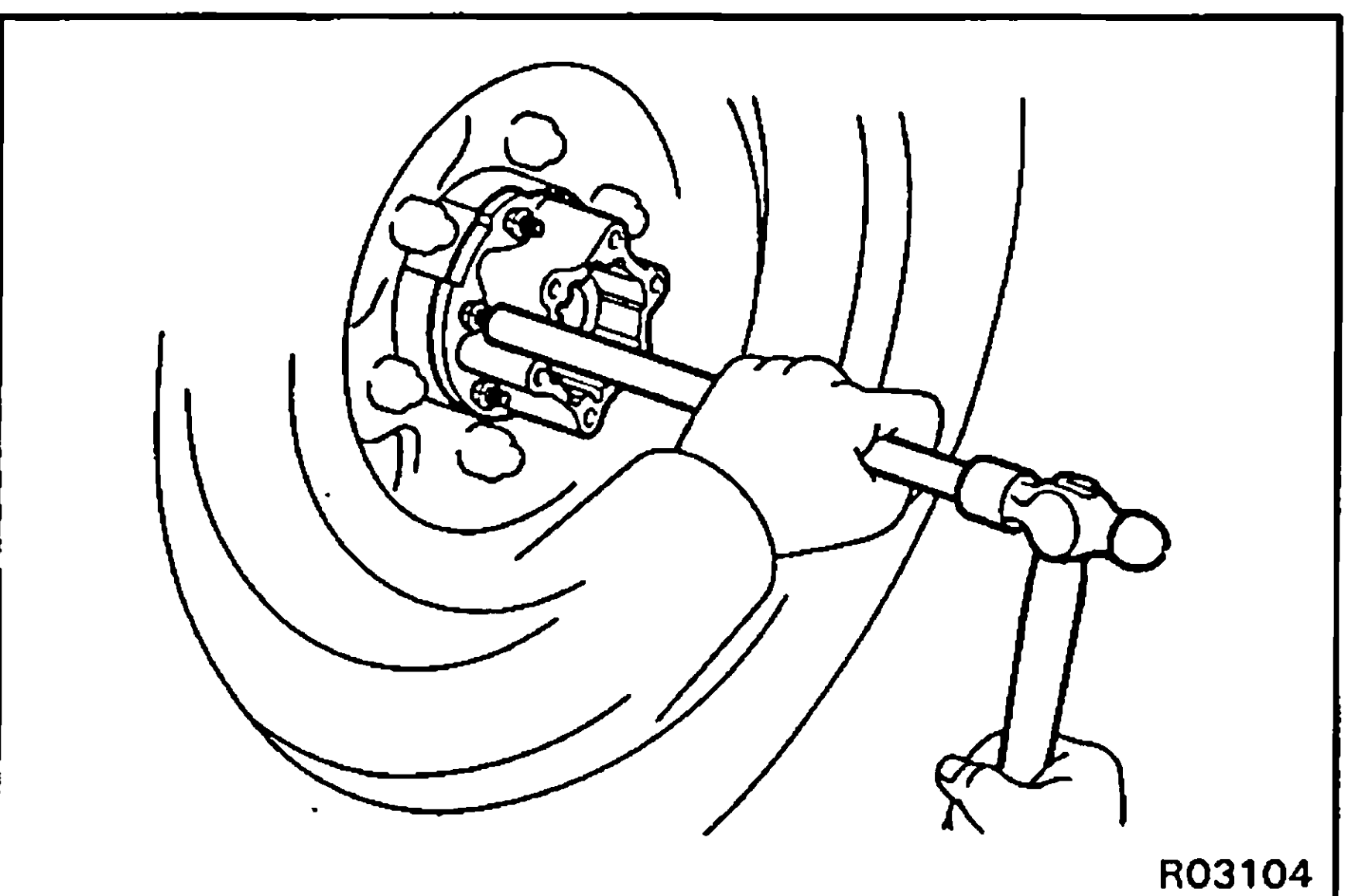
**3. REMOVE FREE WHEELING HUB BODY**

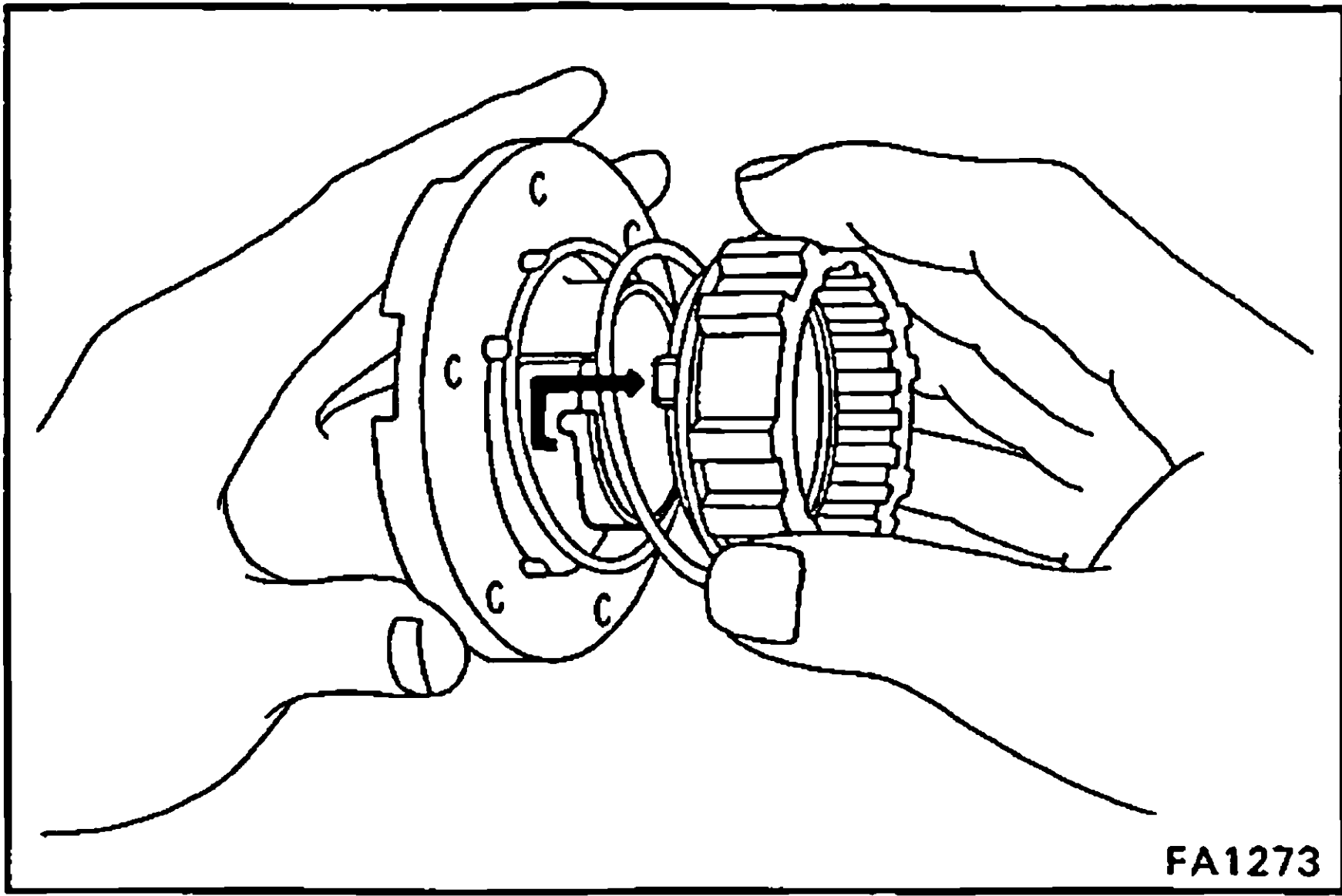
(a) Remove the six mounting nuts and washers.



(b) Using a brass bar and hammer, tap on the bolts head and remove the six cone washers.

(c) Pull off the free wheeling hub body.



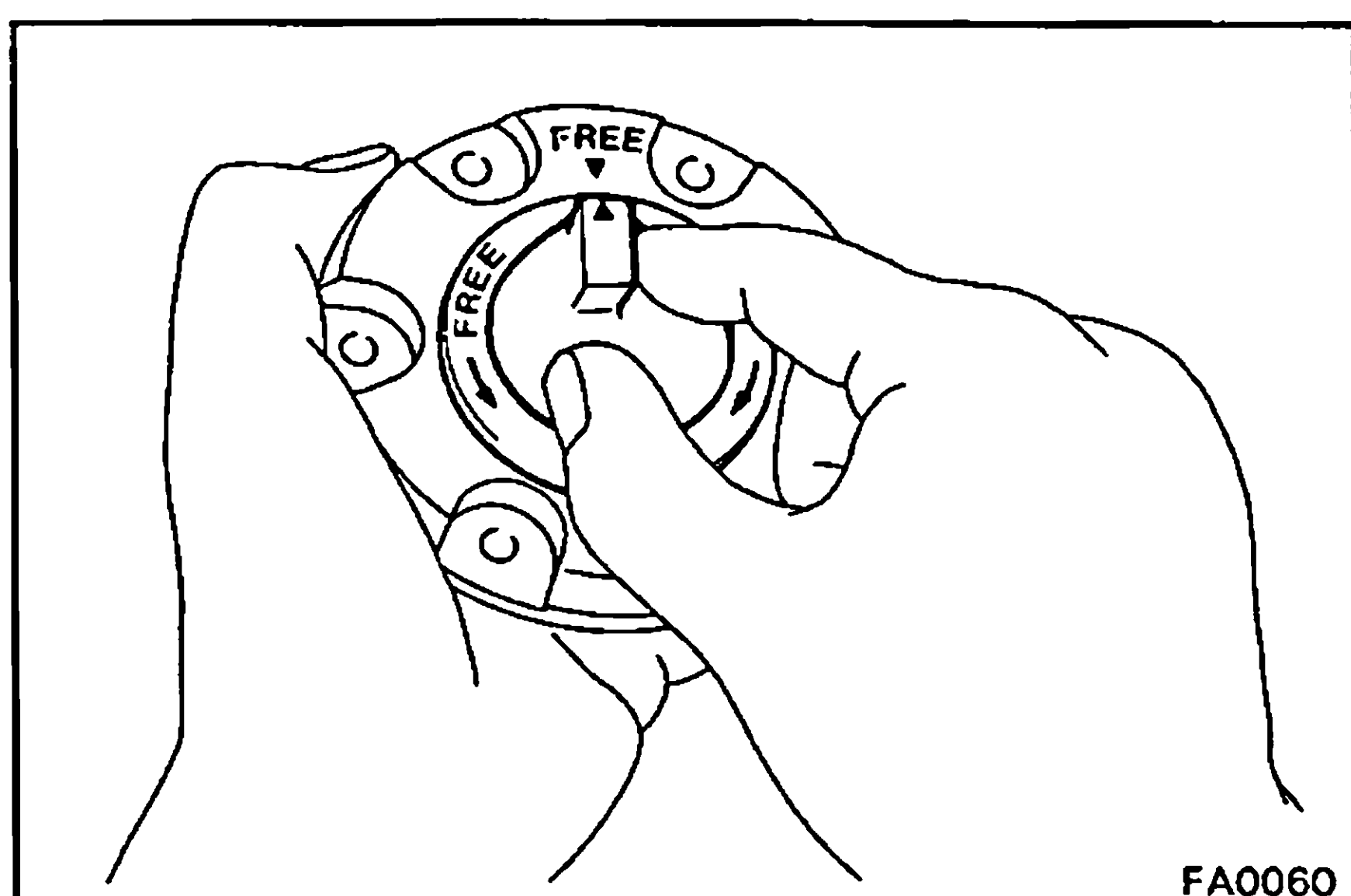
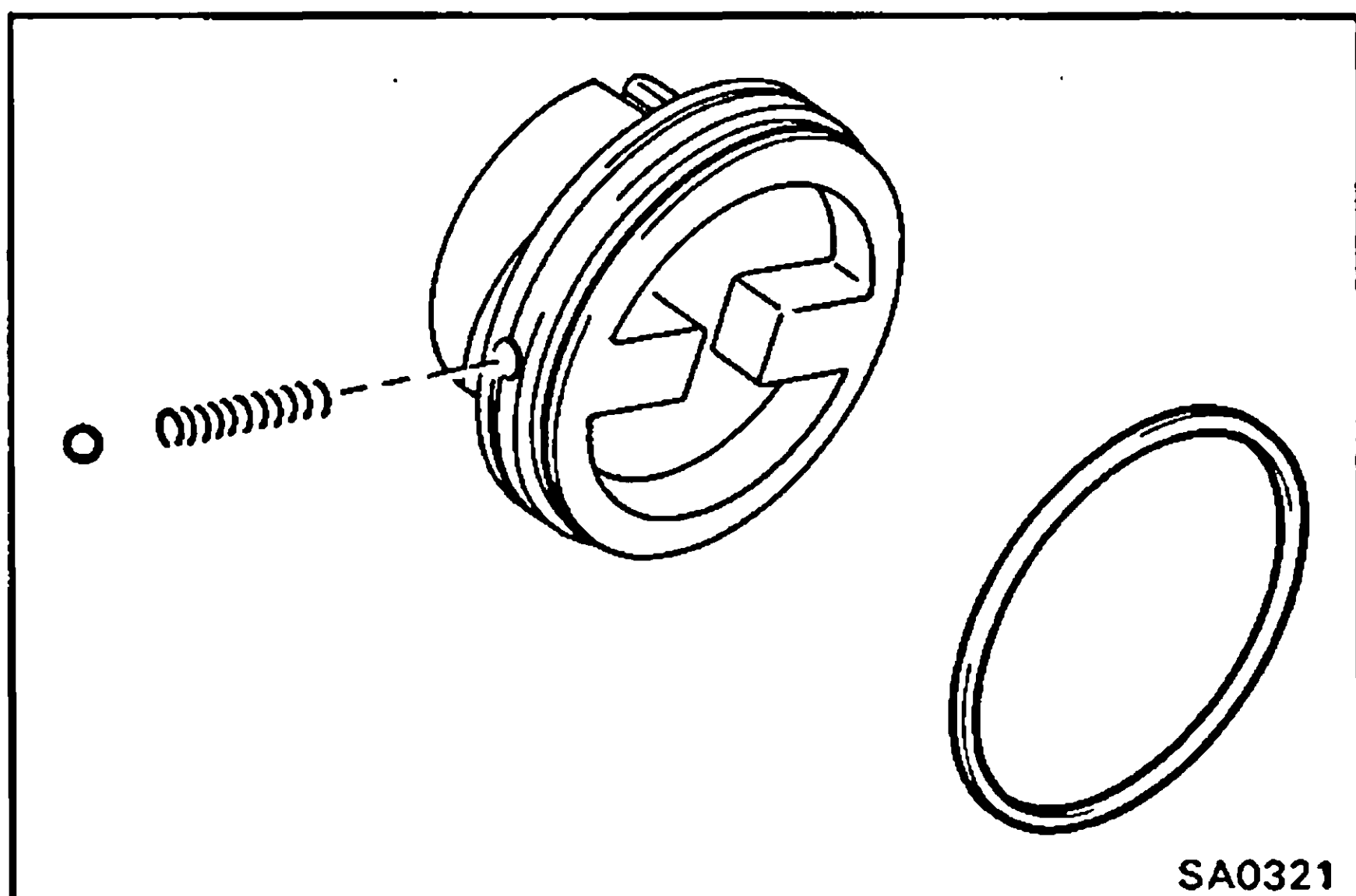
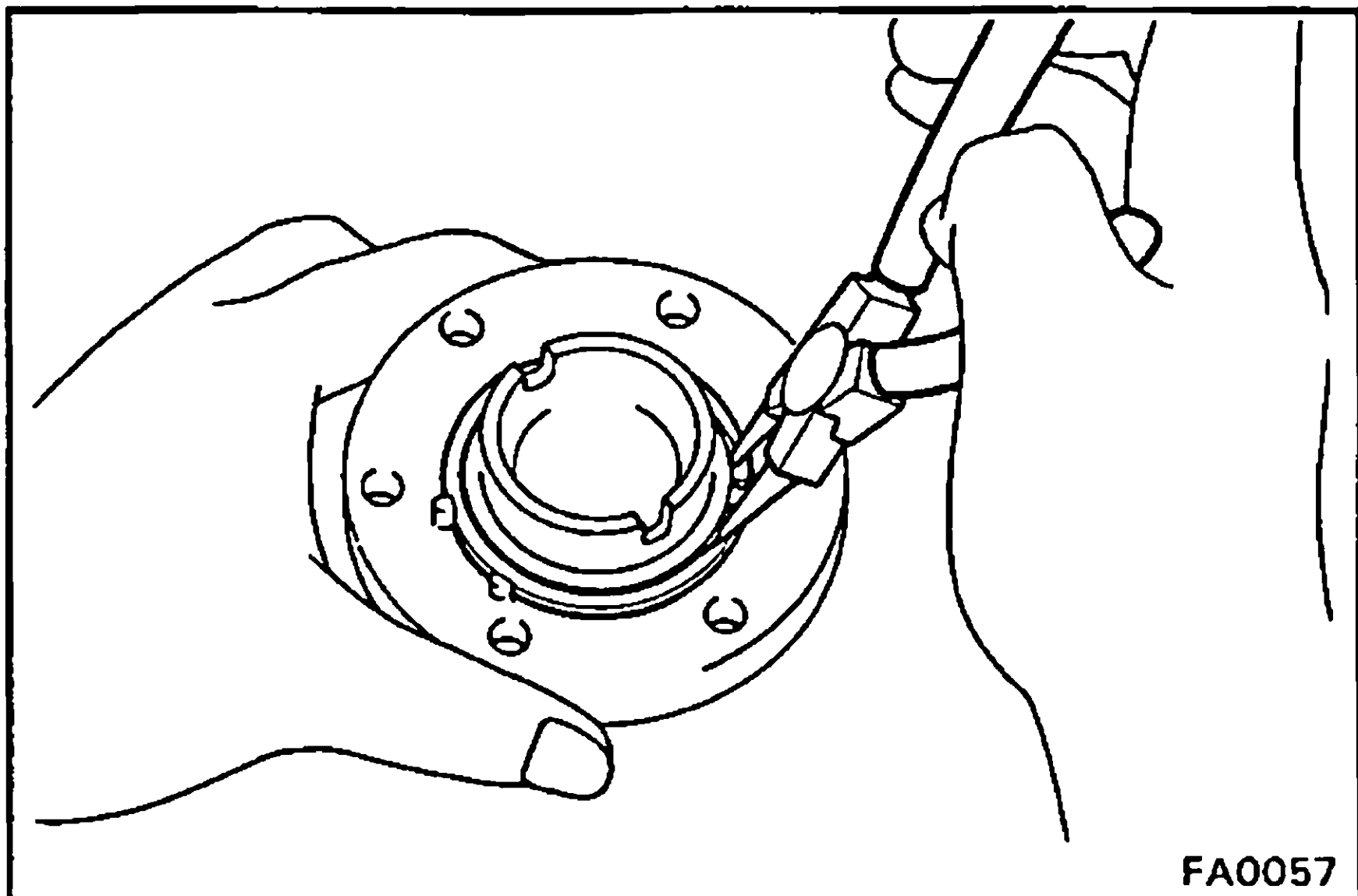


DISASSEMBLY OF FREE WHEELING HUB

(See page SA-71)

REMOVE CONTROL HANDLE FROM FREE WHEELING HUB COVER

- (a) Compressing the spring, remove the pawl tab from the handle cam, and remove the clutch.
- (b) Using snap ring pliers, remove the snap ring from the free wheeling hub cover.
- (c) Remove the control handle from the free wheeling hub cover.
- (d) Remove the steel ball and spring from the control handle.



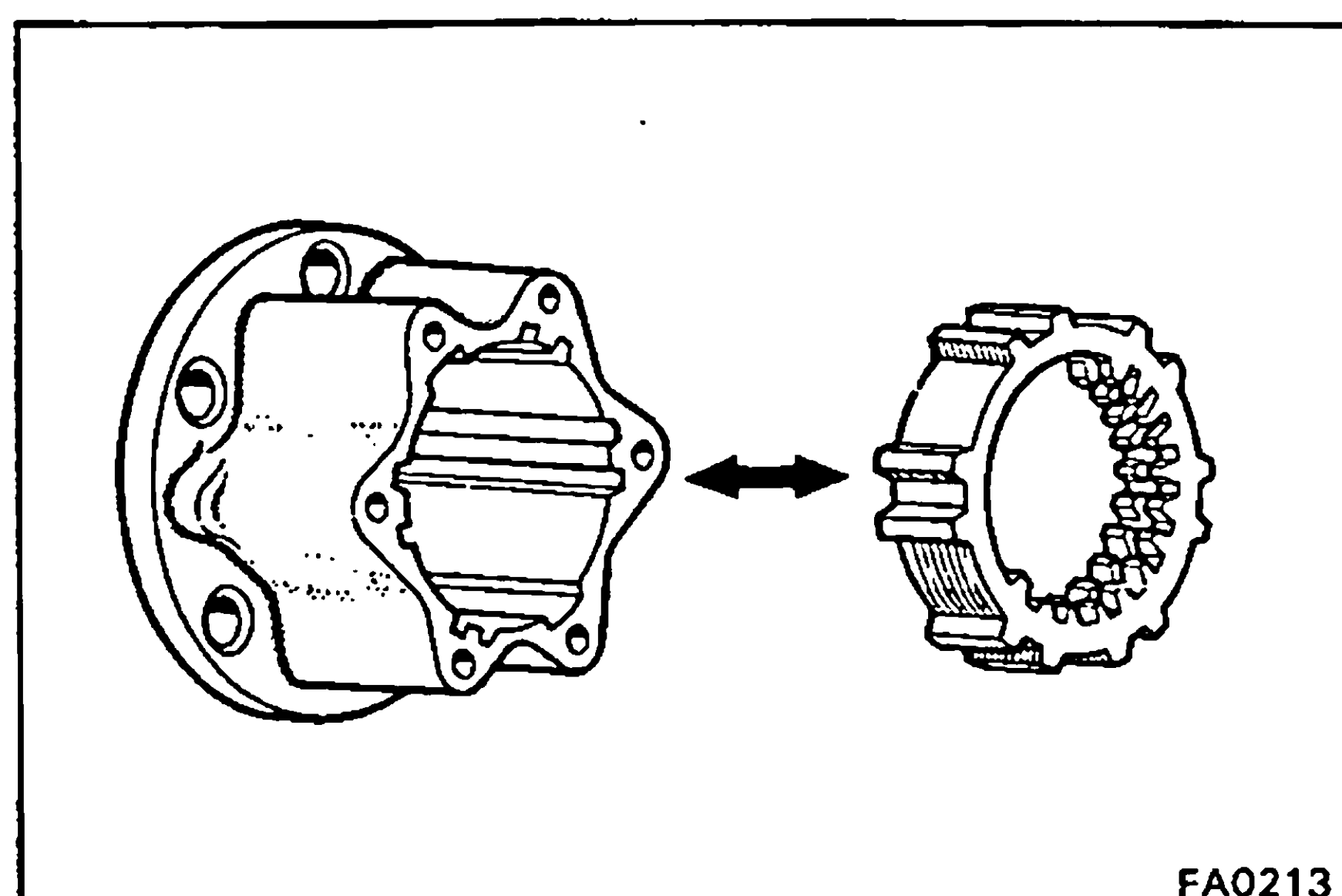
INSPECTION OF FREE WHEELING HUB

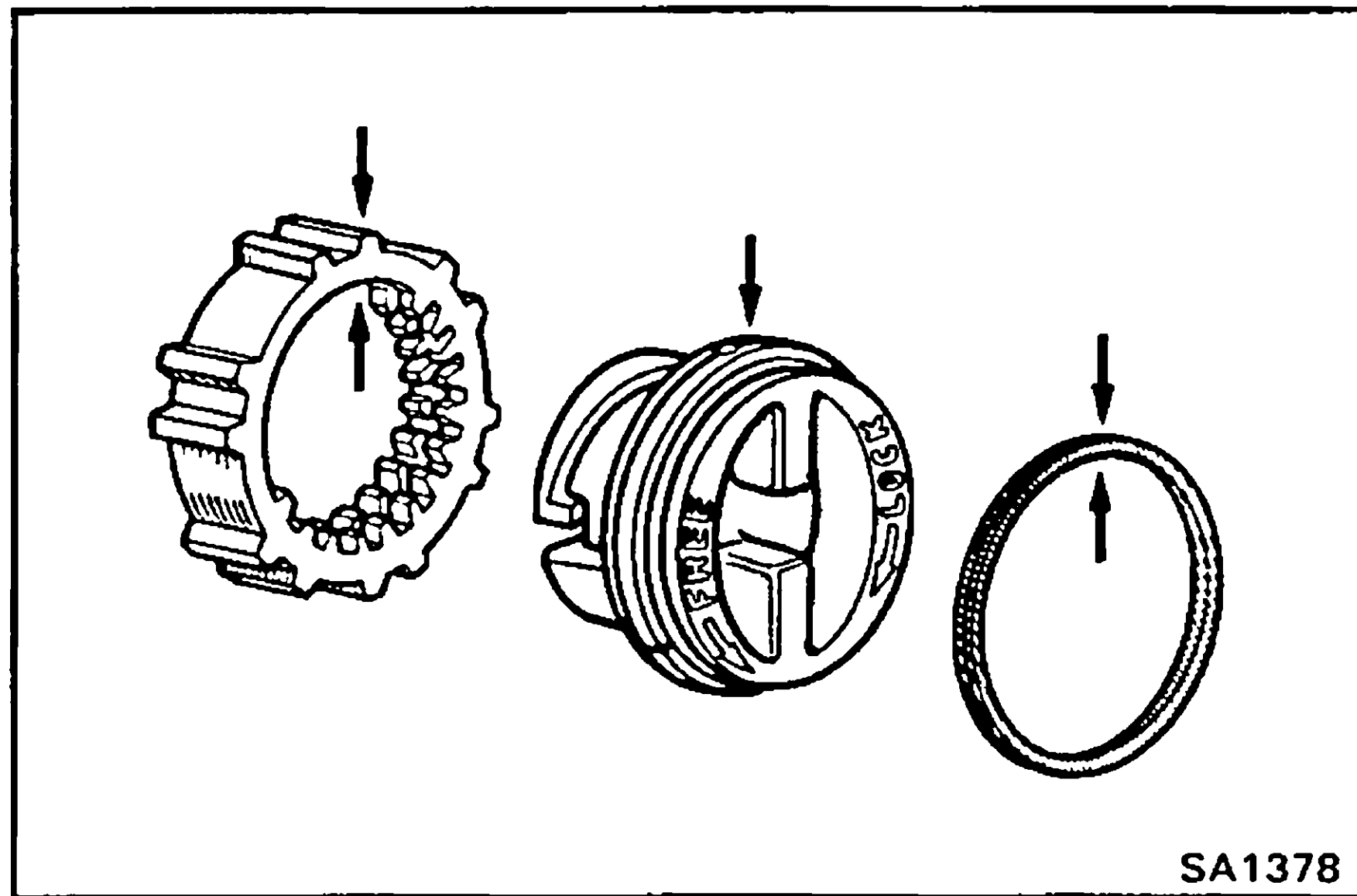
1. INSPECT COVER, HANDLE AND SEAL

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

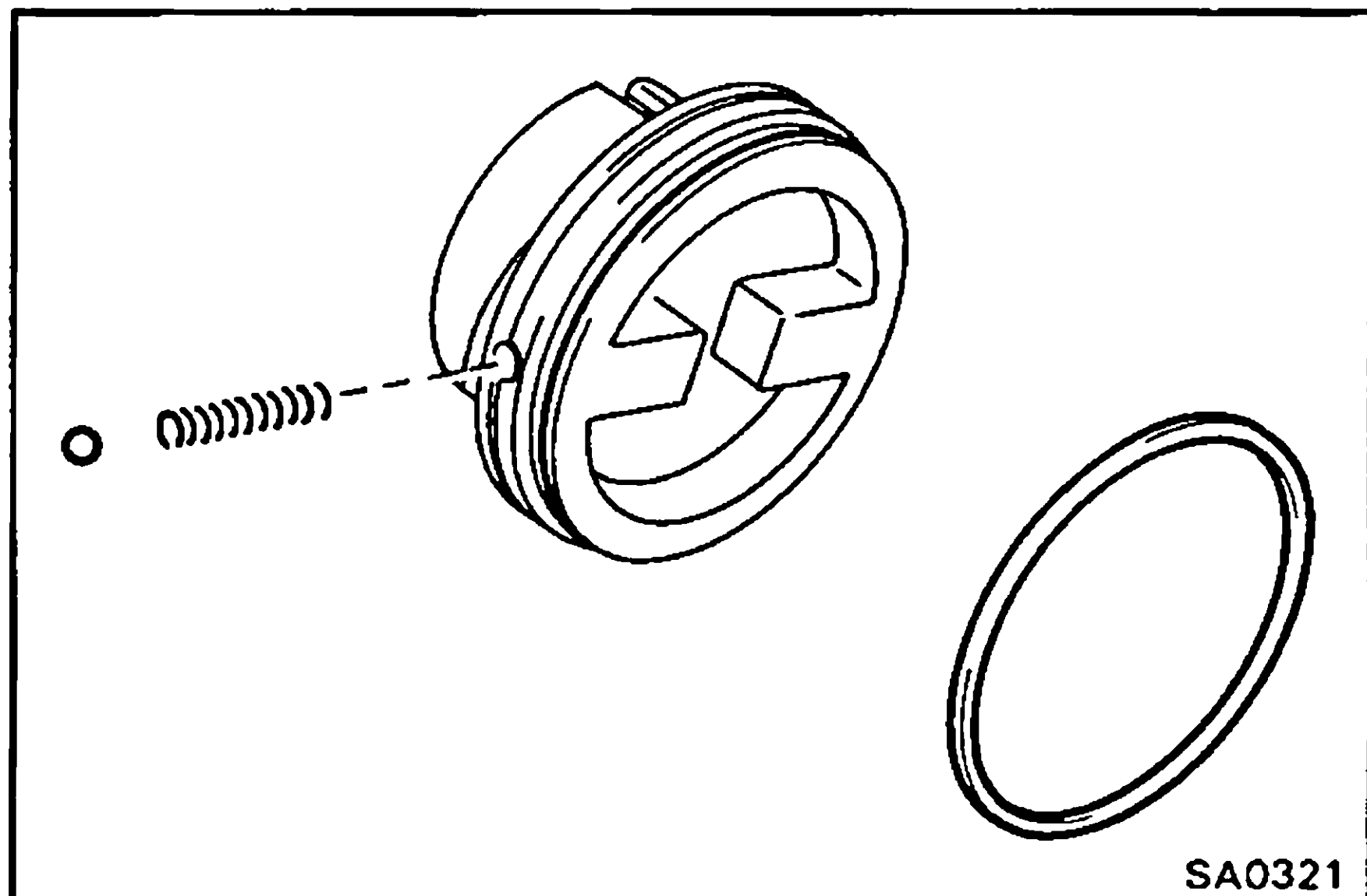
2. INSPECT BODY AND CLUTCH

Check that the clutch moves smoothly in the body.

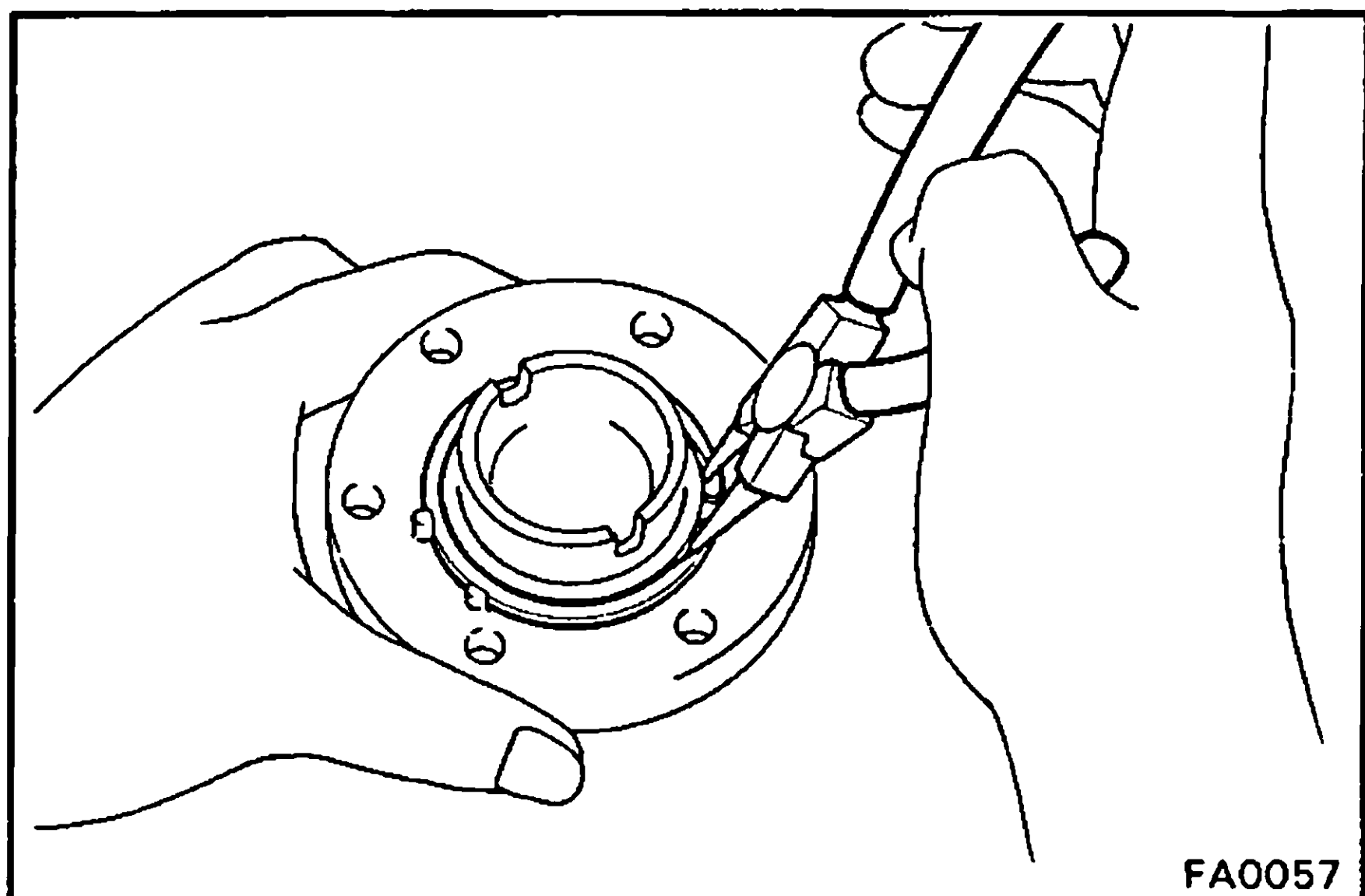


ASSEMBLY OF FREE WHEELING HUB**1. APPLY MP GREASE TO SLIDING SURFACE OF PARTS****2. INSTALL CONTROL HANDLE TO COVER**

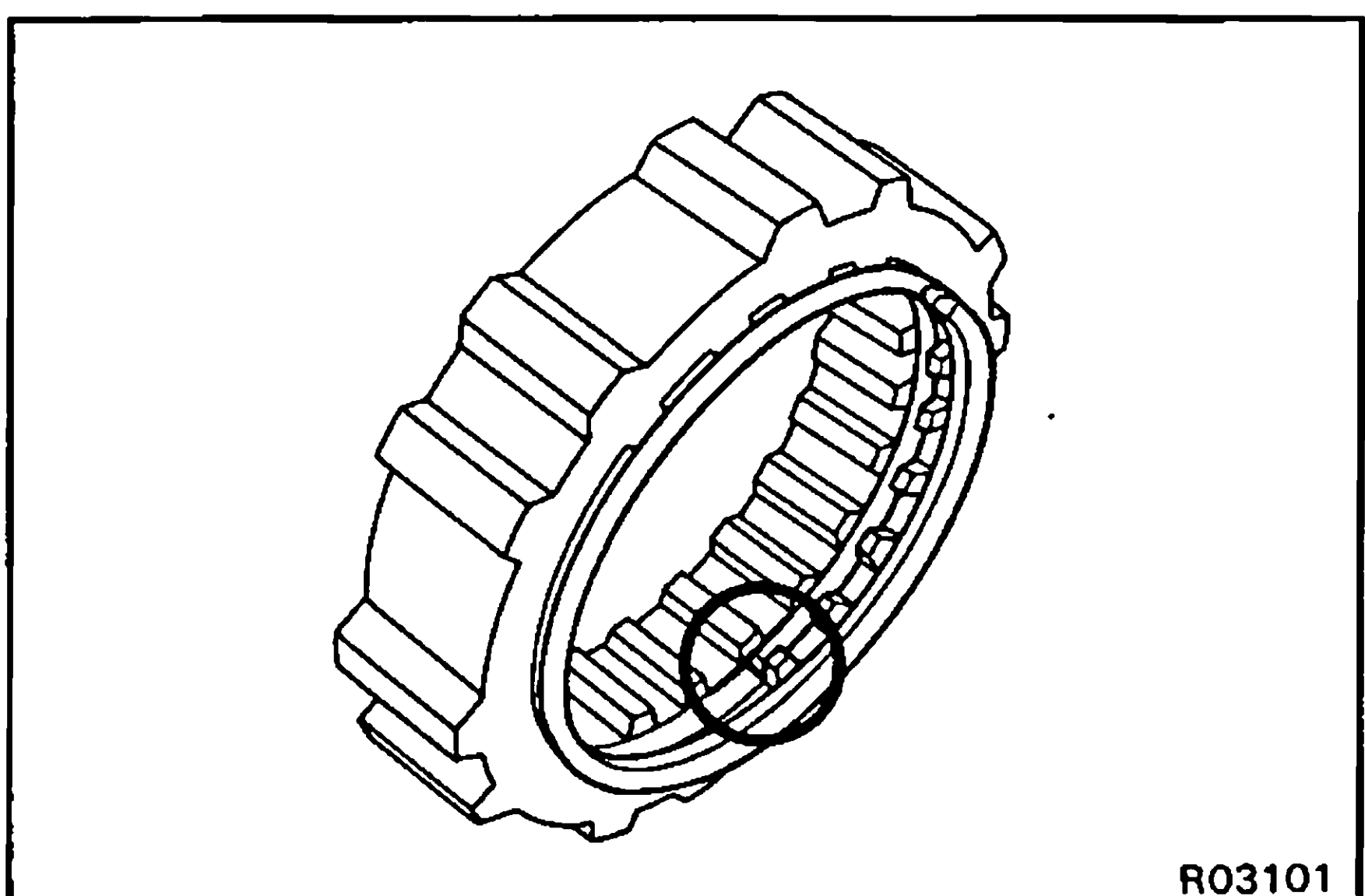
(a) Install the seal, spring and steel ball to the handle.



(b) Install the handle in the cover and snap ring with snap ring pliers.

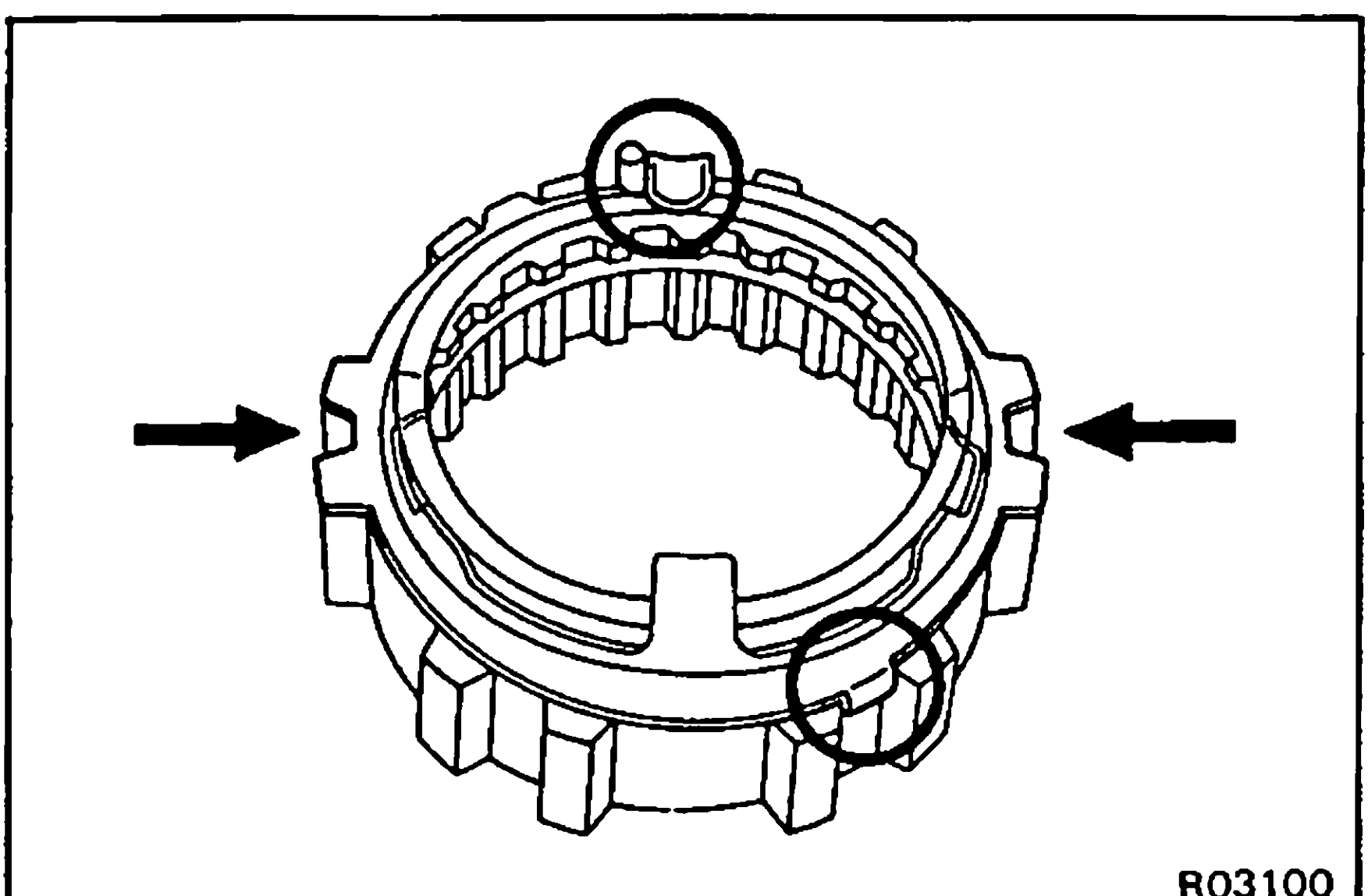
**3. INSTALL TENSION SPRING IN CLUTCH**

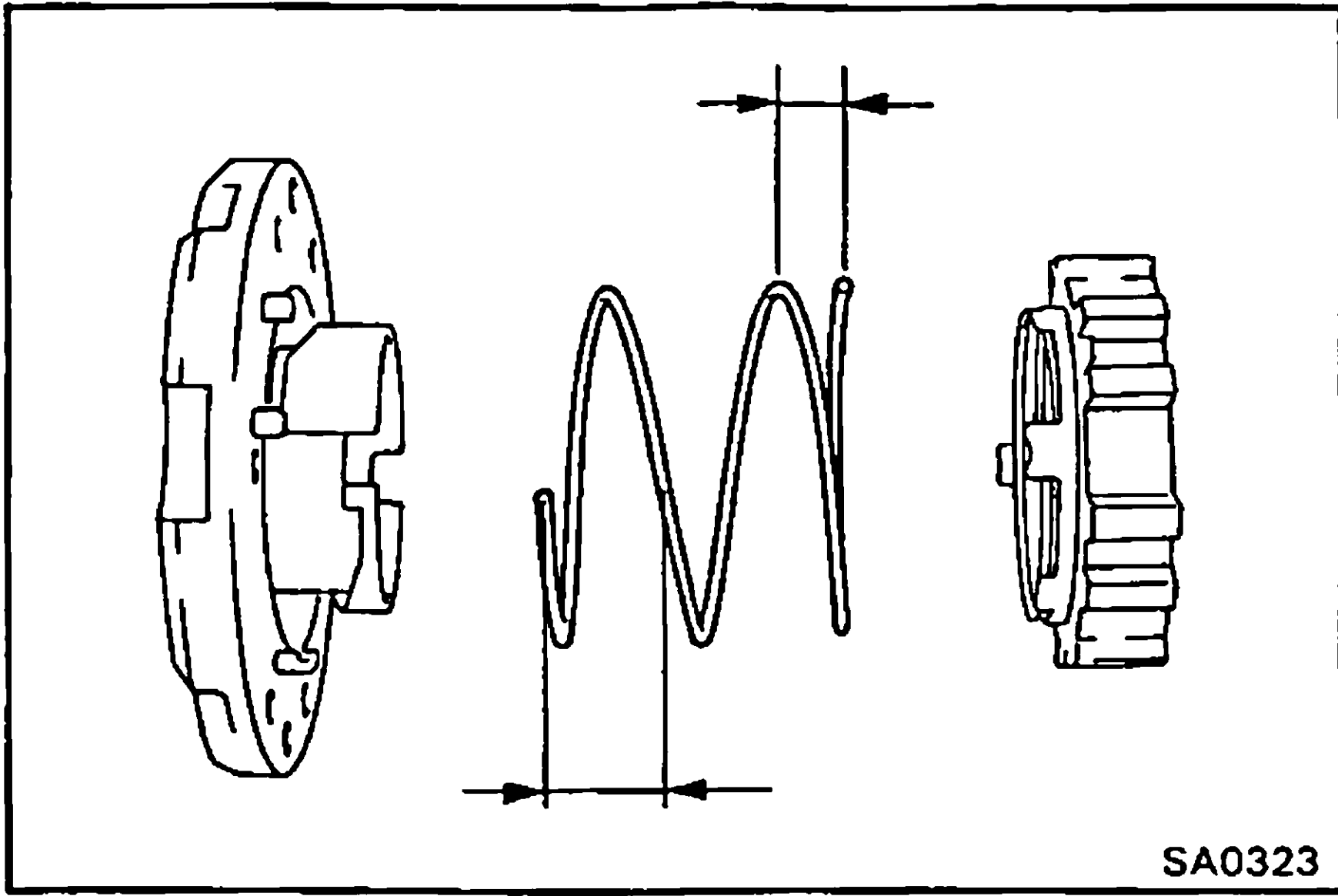
Install the tension spring in the clutch with the spring end aligned with the initial groove.

**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.

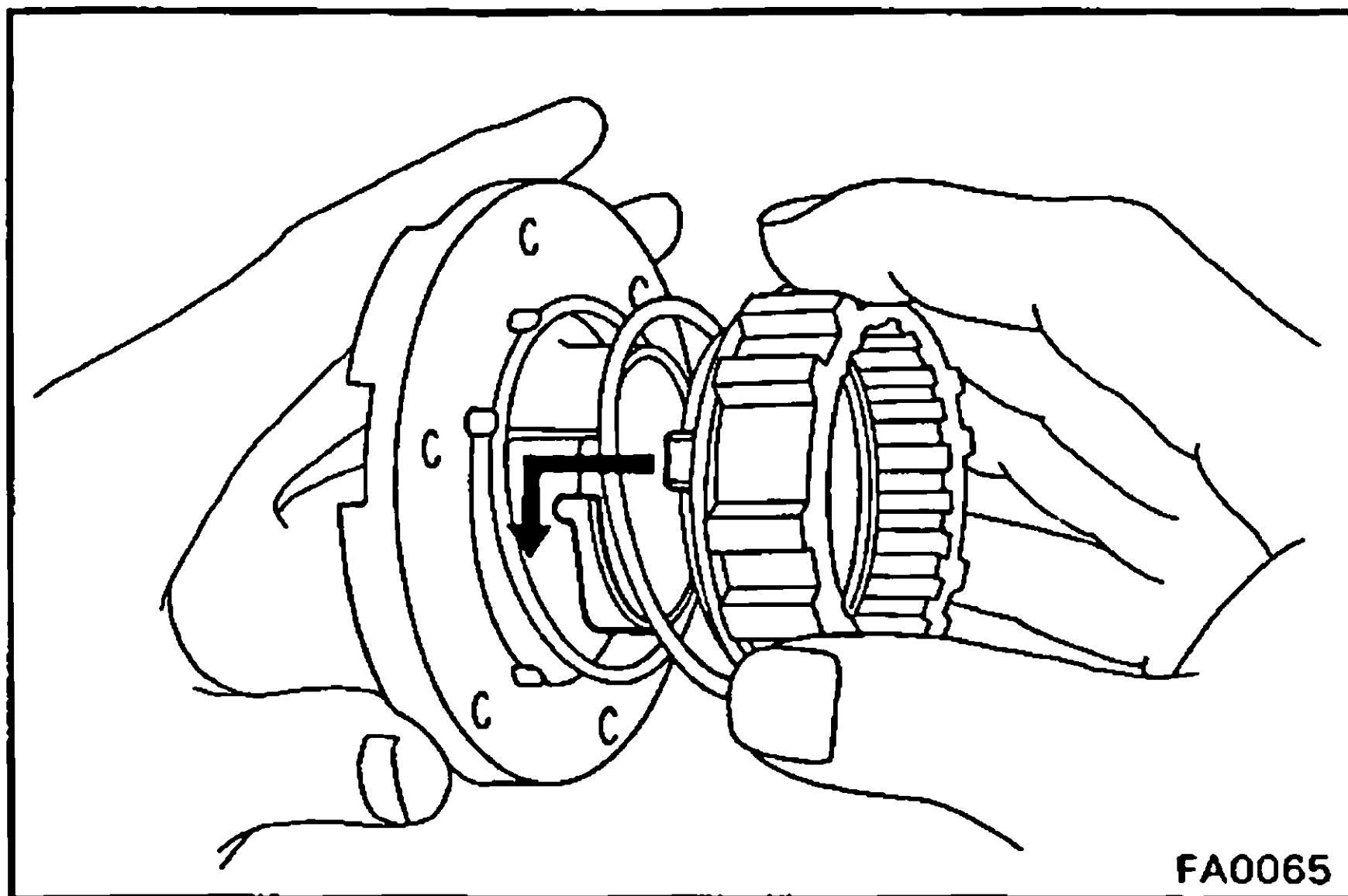
(b) Place the top ring of the spring on the small tabs.



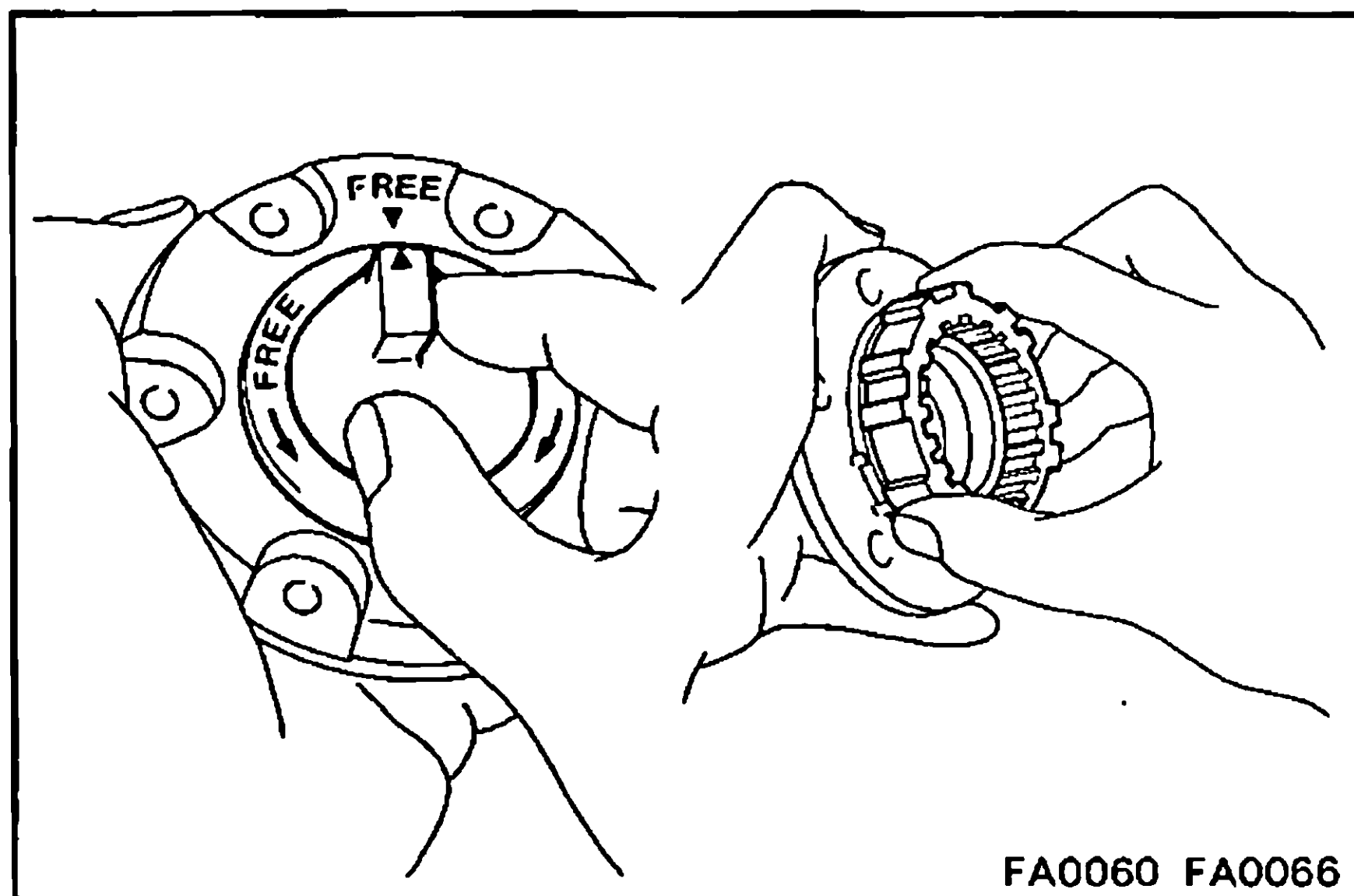


5. INSTALL CLUTCH AND SPRING INTO COVER

- (a) Place the spring between the cover and clutch with the large spring end toward the cover.

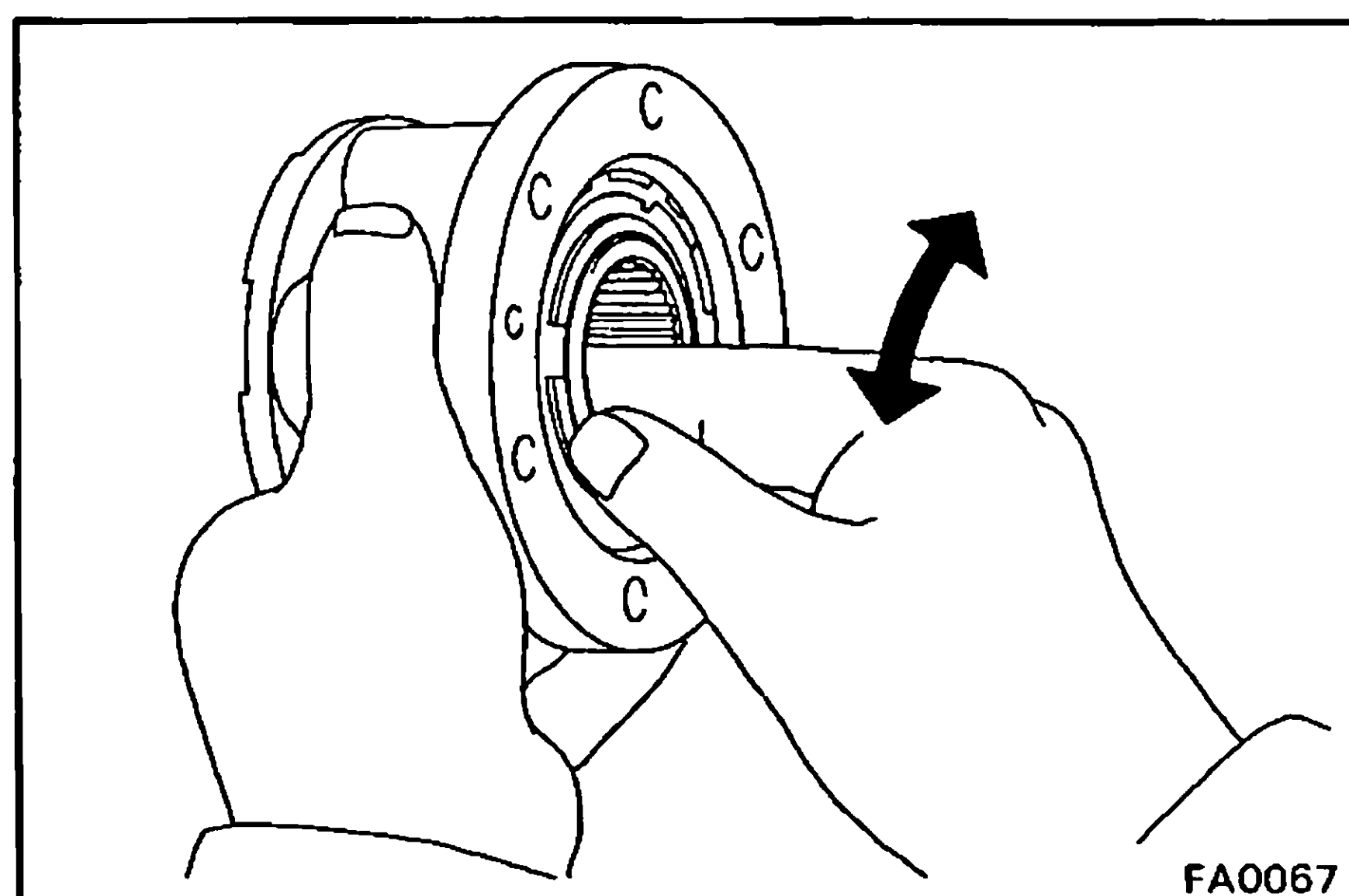


- (b) Compress the spring and install the clutch with the pawl tab fit to the handle cam.



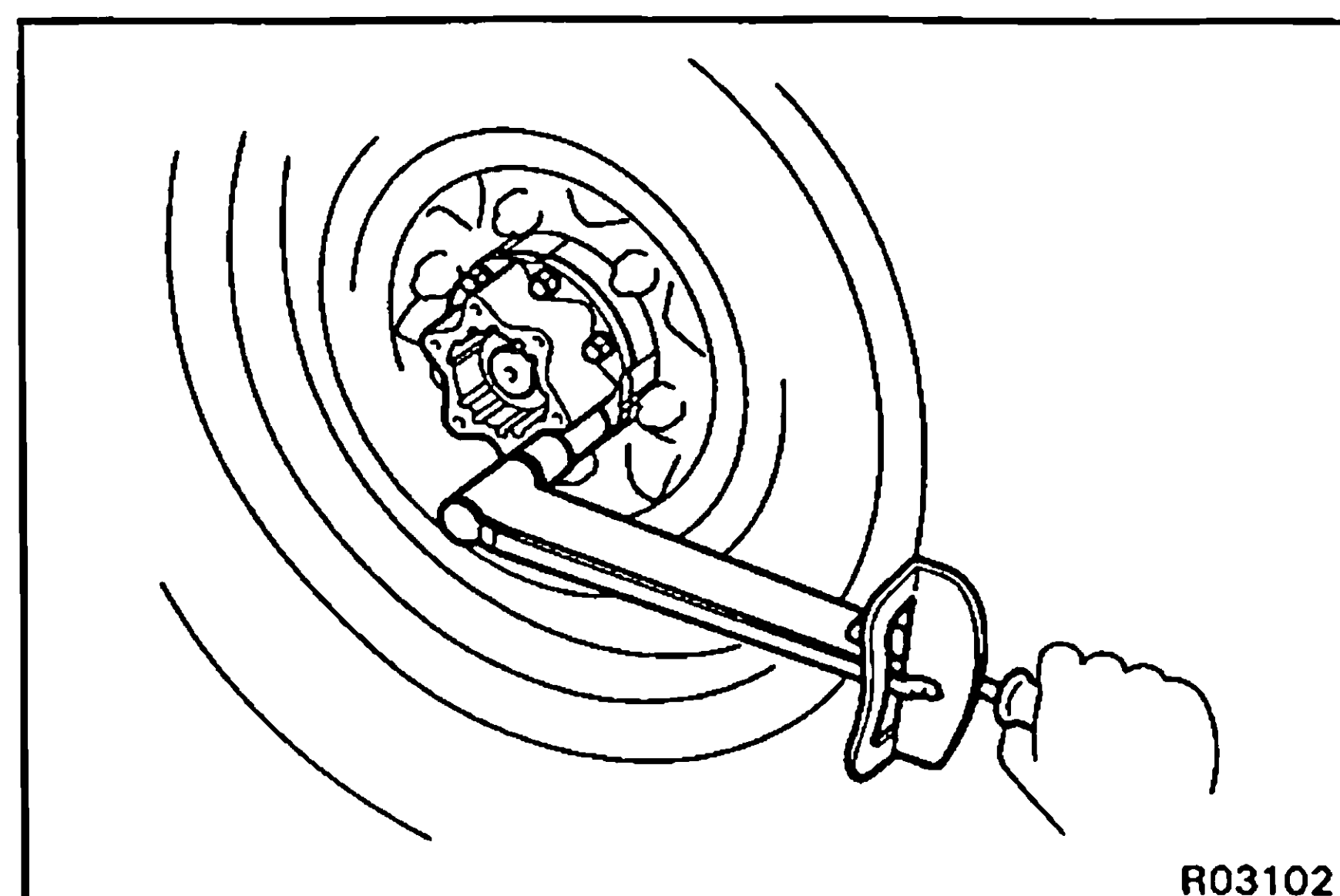
6. TEMPORARILY INSTALL COVER TO BODY AND CHECK FREE WHEELING HUB

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



- (b) Insert the cover to the body and verify that the hub turns smoothly.

- (c) Remove the cover from the body.



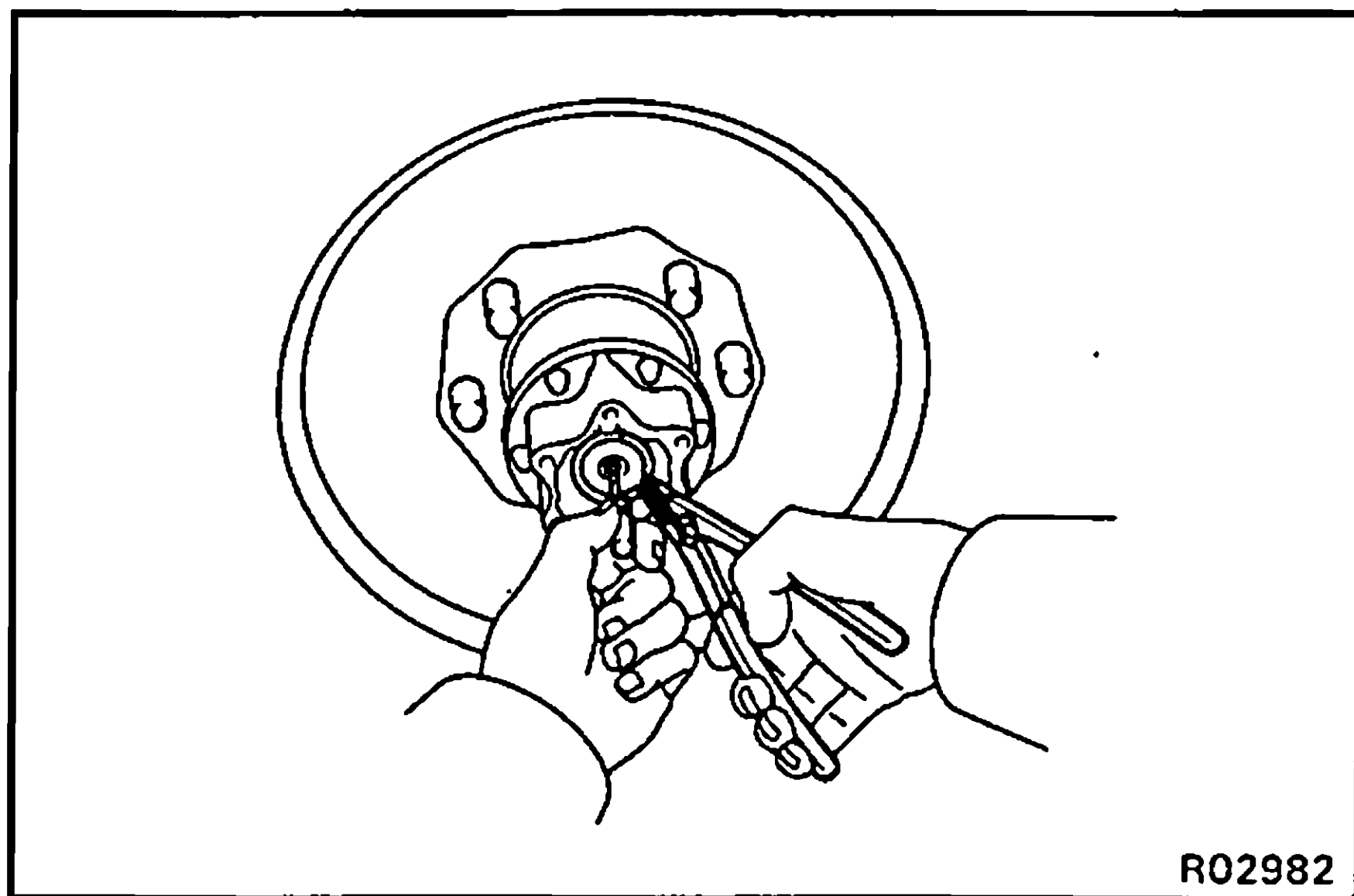
INSTALLATION OF FREE WHEELING HUB

(See page SA-71)

1. INSTALL FREE WHEELING HUB BODY

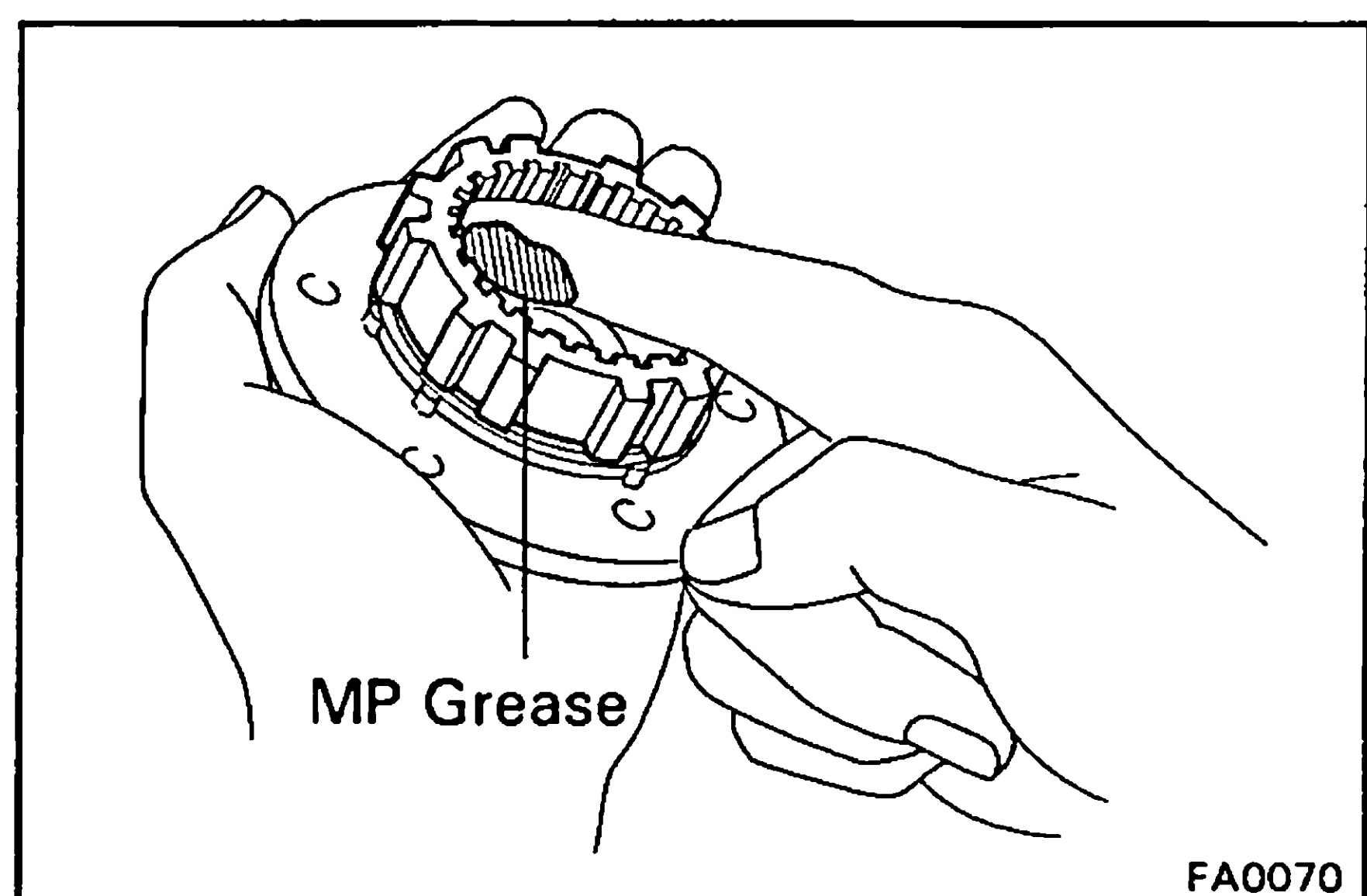
- (a) Place a new gasket in position on the front axle hub.
- (b) Install the free wheeling hub body with six cone washers, washers and nuts. Torque the nuts.

Torque: 31 N·m (315 kgf·cm, 23 ft·lbf)

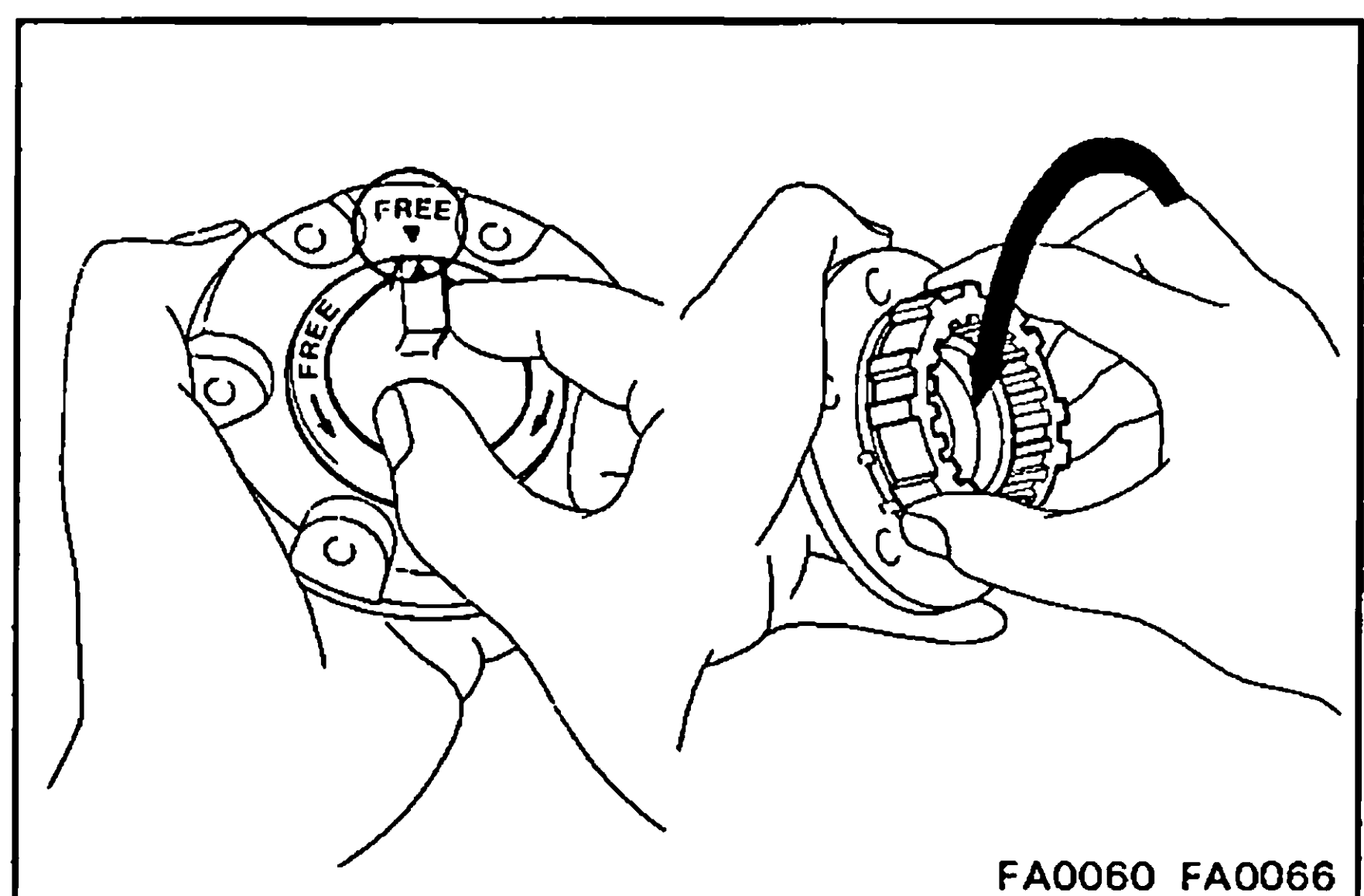


2. INSTALL SNAP RING

- (a) Install a bolt to the axle shaft and pull it out.
- (b) Using snap ring pliers, install the snap ring.
- (c) Remove the bolt.

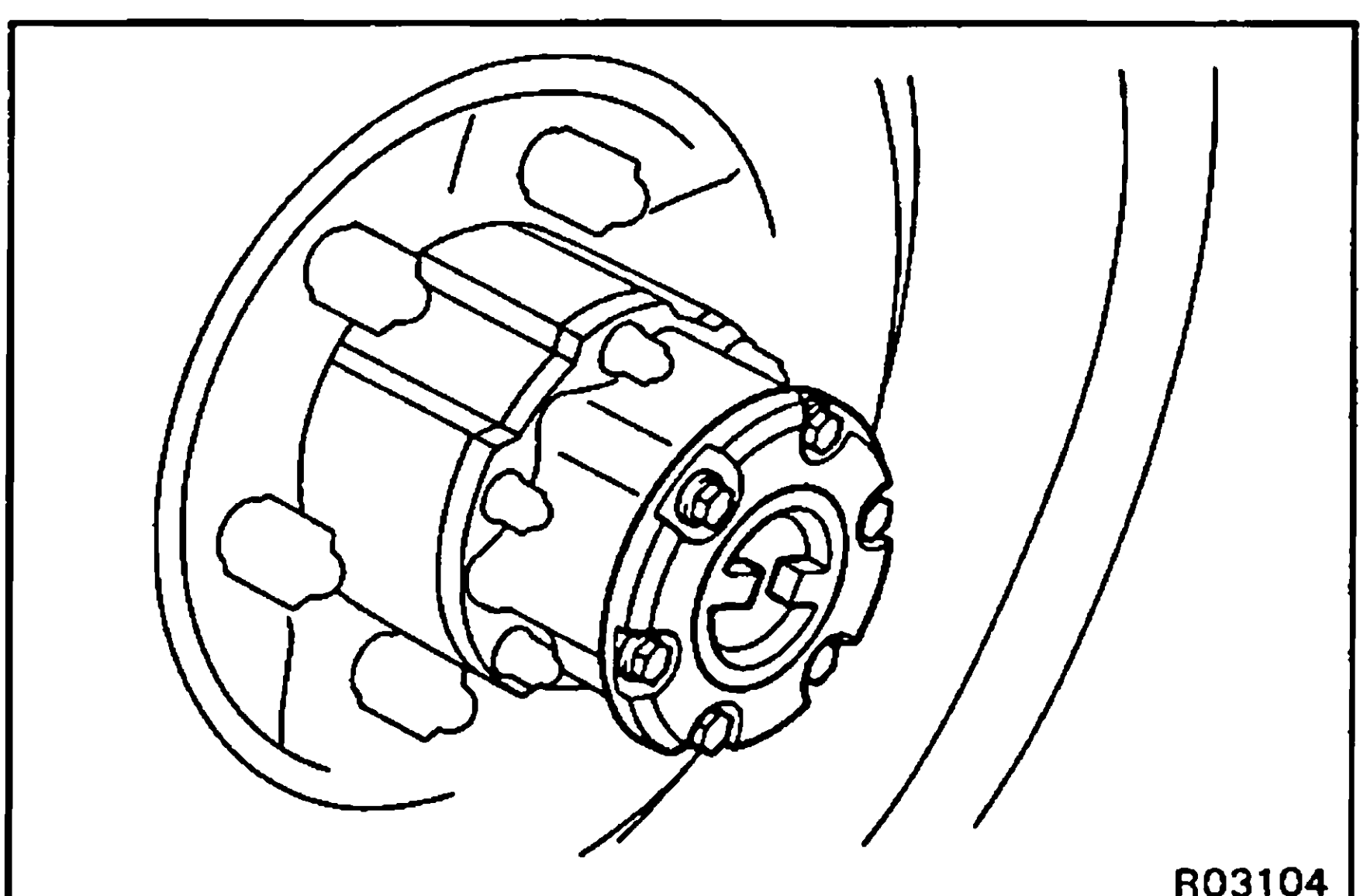
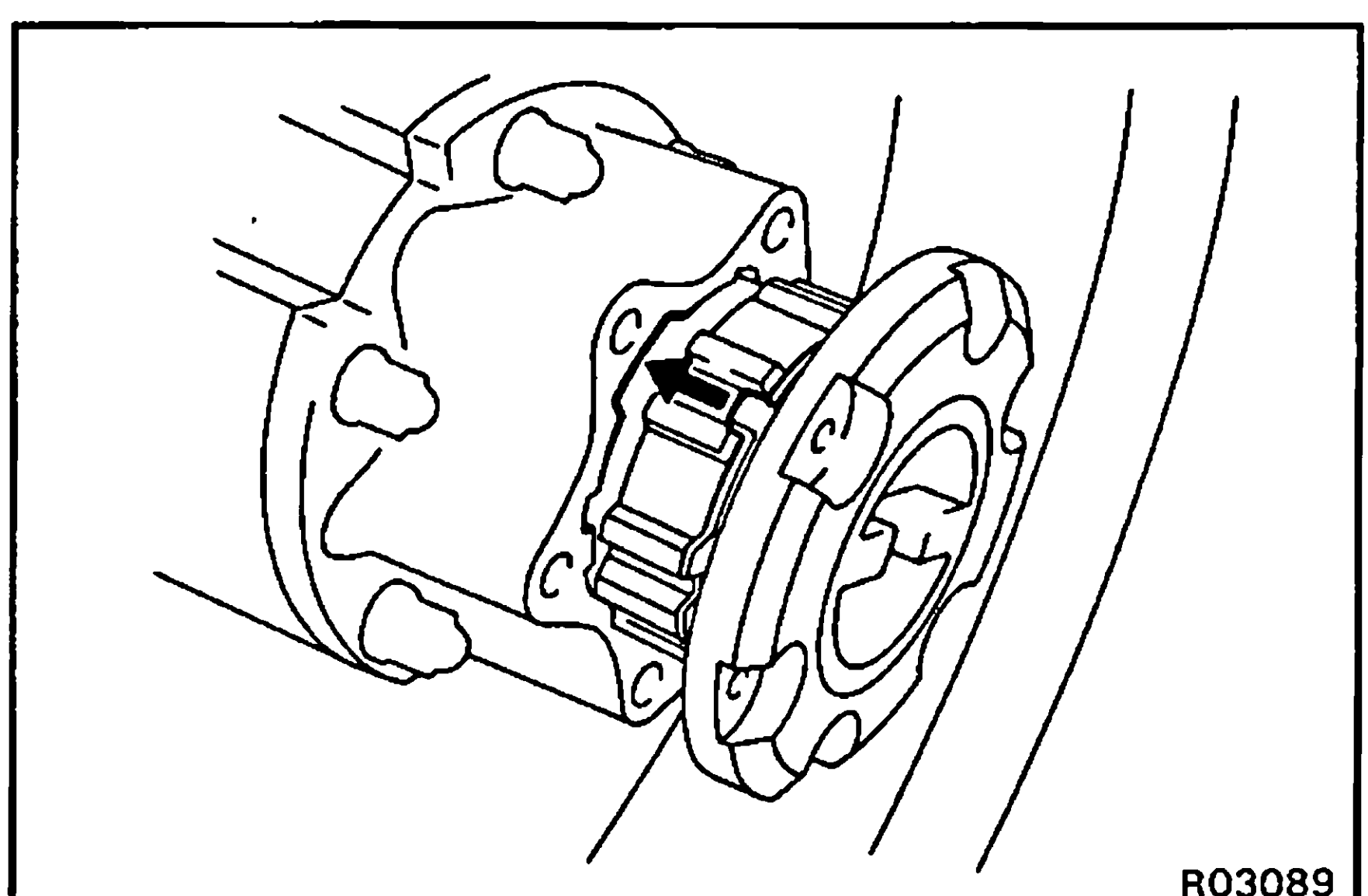


3. APPLY MP GREASE TO INNER HUB SPLINES



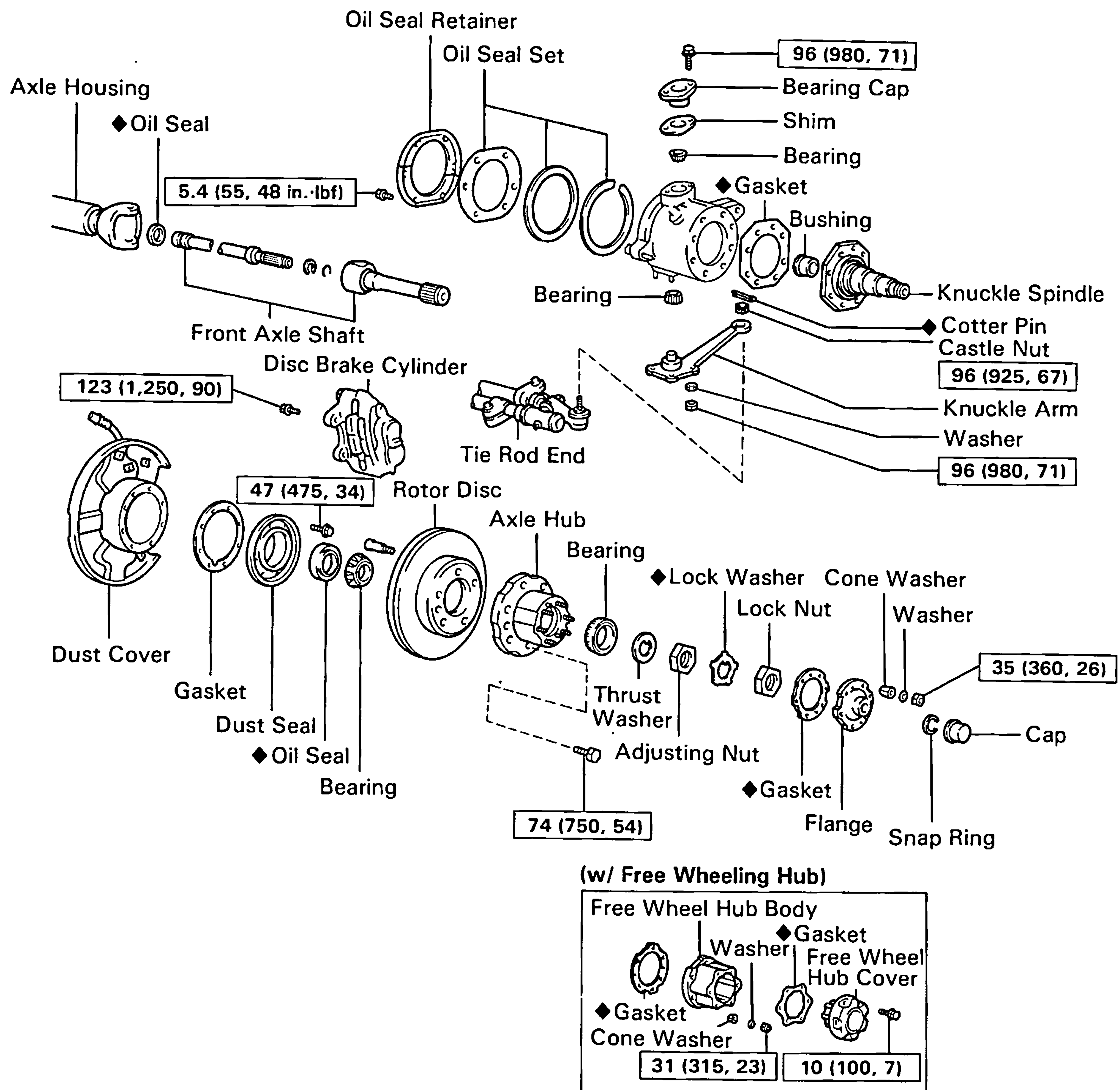
4. INSTALL FREE WHEELING HUB COVER WITH NEW GASKET

- (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.



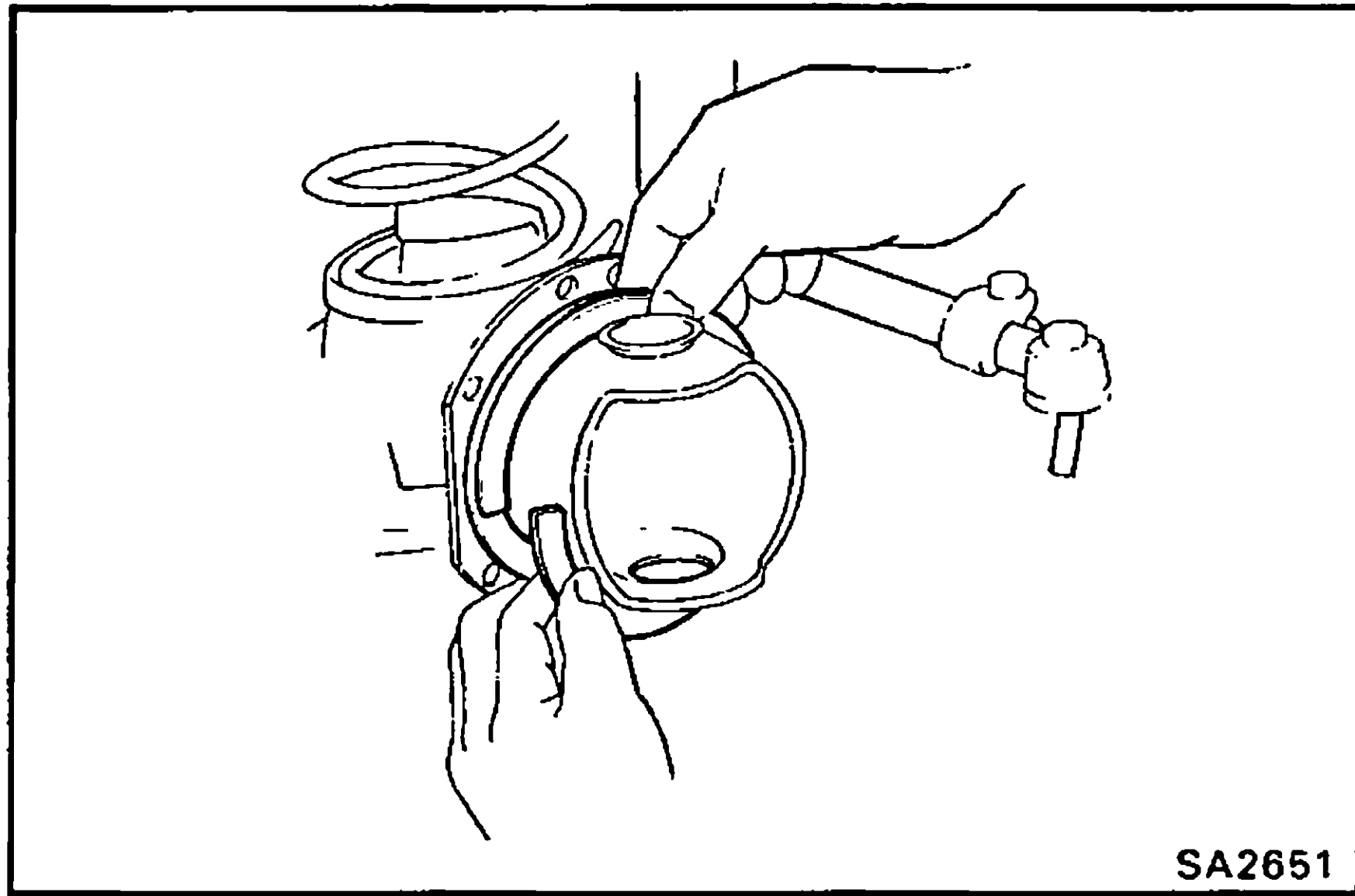
- (d) Install and torque the six cover mounting bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

STEERING KNUCKLE AND AXLE SHAFT COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part



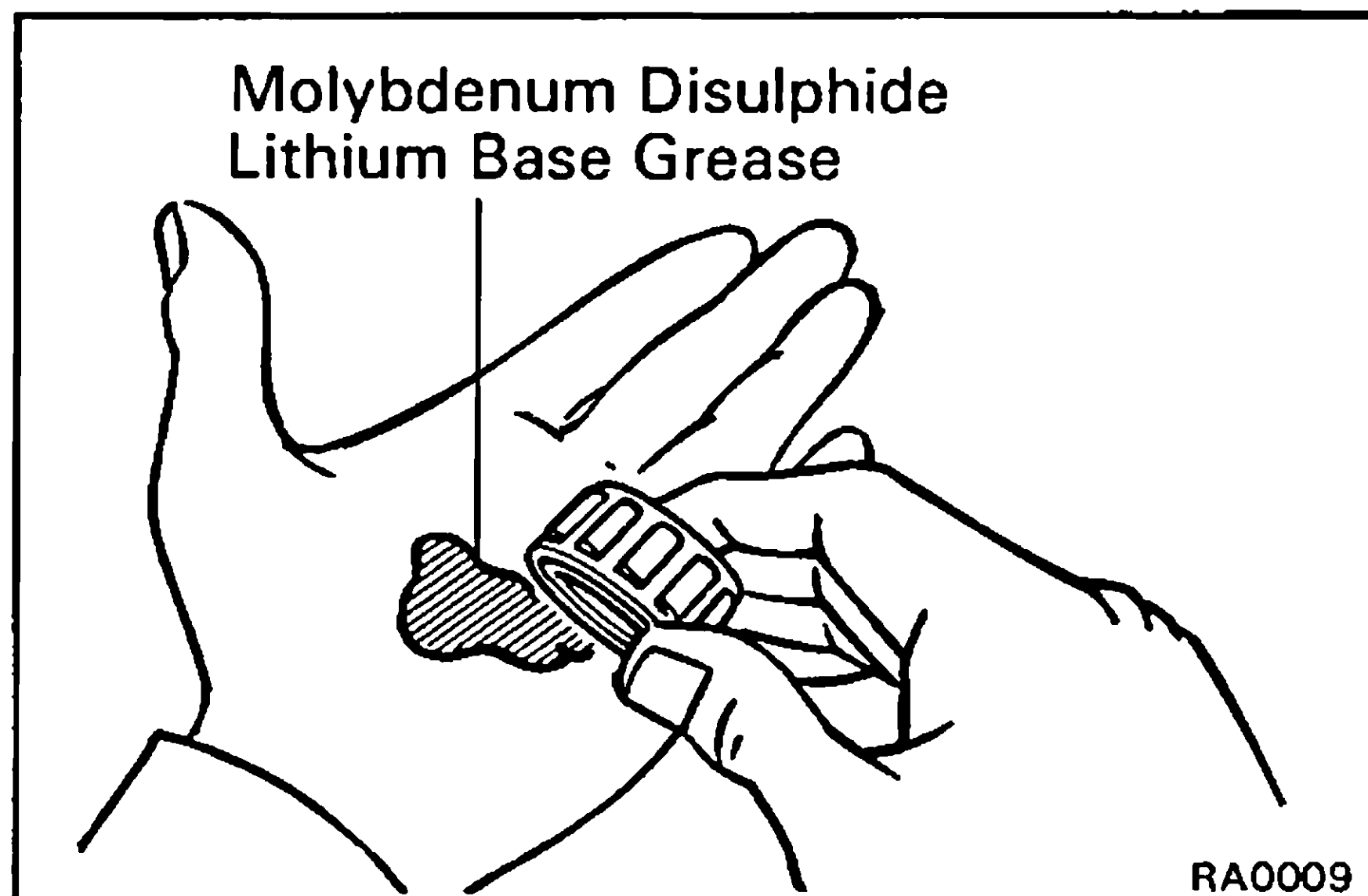
ASSEMBLY OF STEERING KNUCKLE AND AXLE SHAFT

(See page SA-77)

1. INSTALL OIL SEAL SET END RETAINER

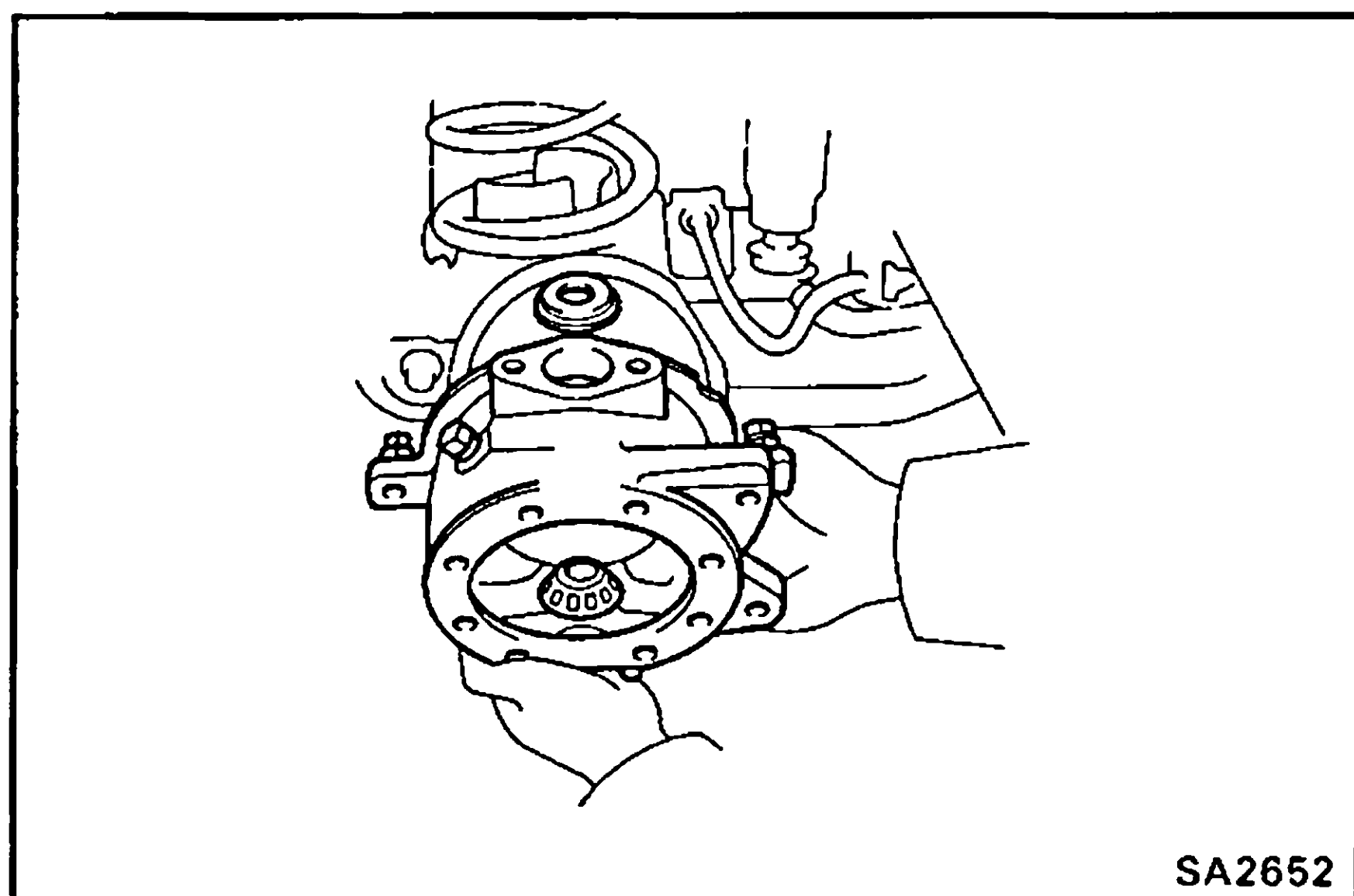
Install the parts in the following order.

- (a) Felt dust seal
- (b) Rubber seal
- (c) Steel ring



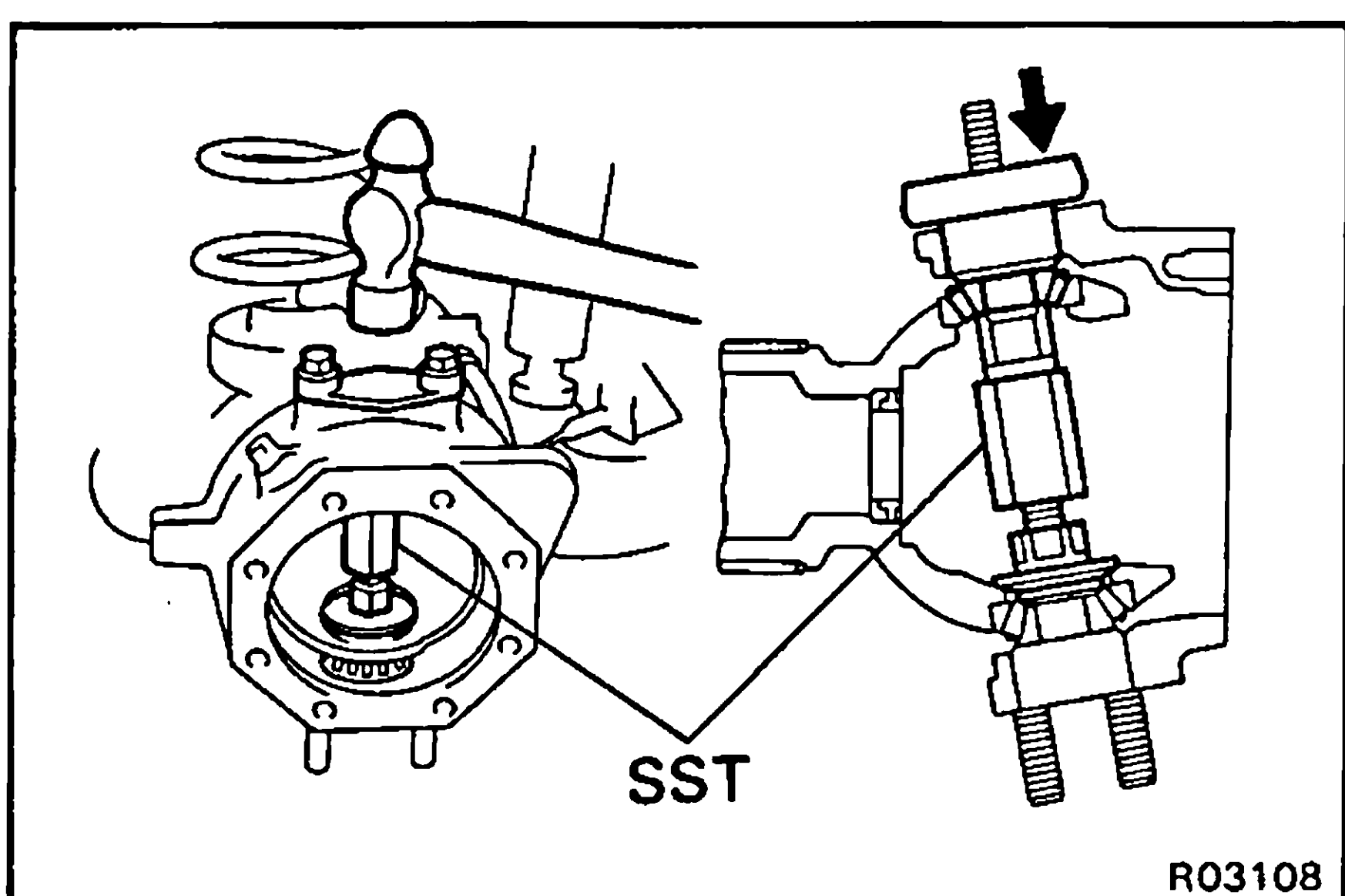
2. PACK BEARINGS WITH MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE

- (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.



3. 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.

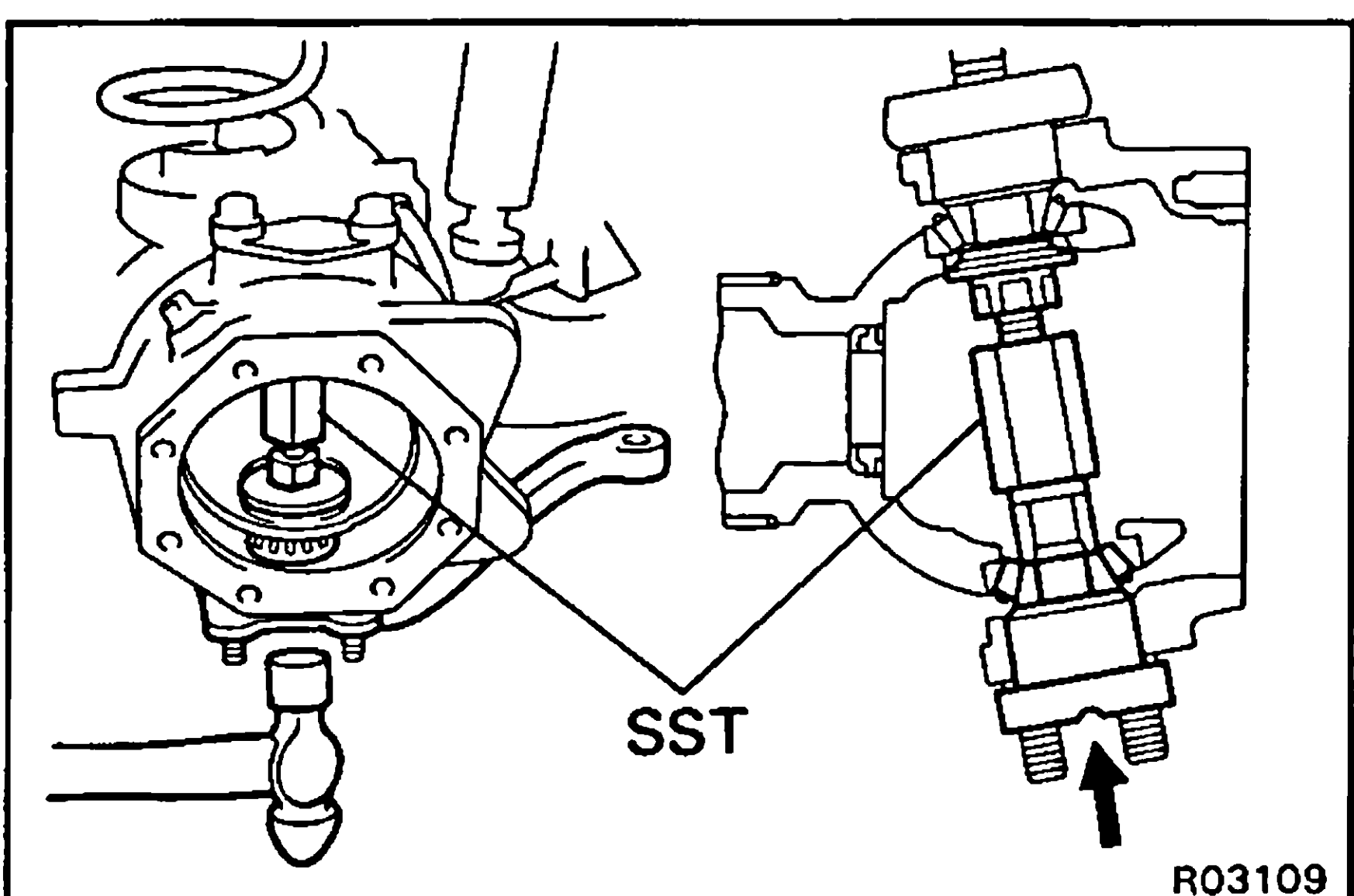


4. INSTALL KNUCKLE ARM AND BEARING CAP

- (a) Using SST, support the upper bearing inner race.
SST 09606-60020

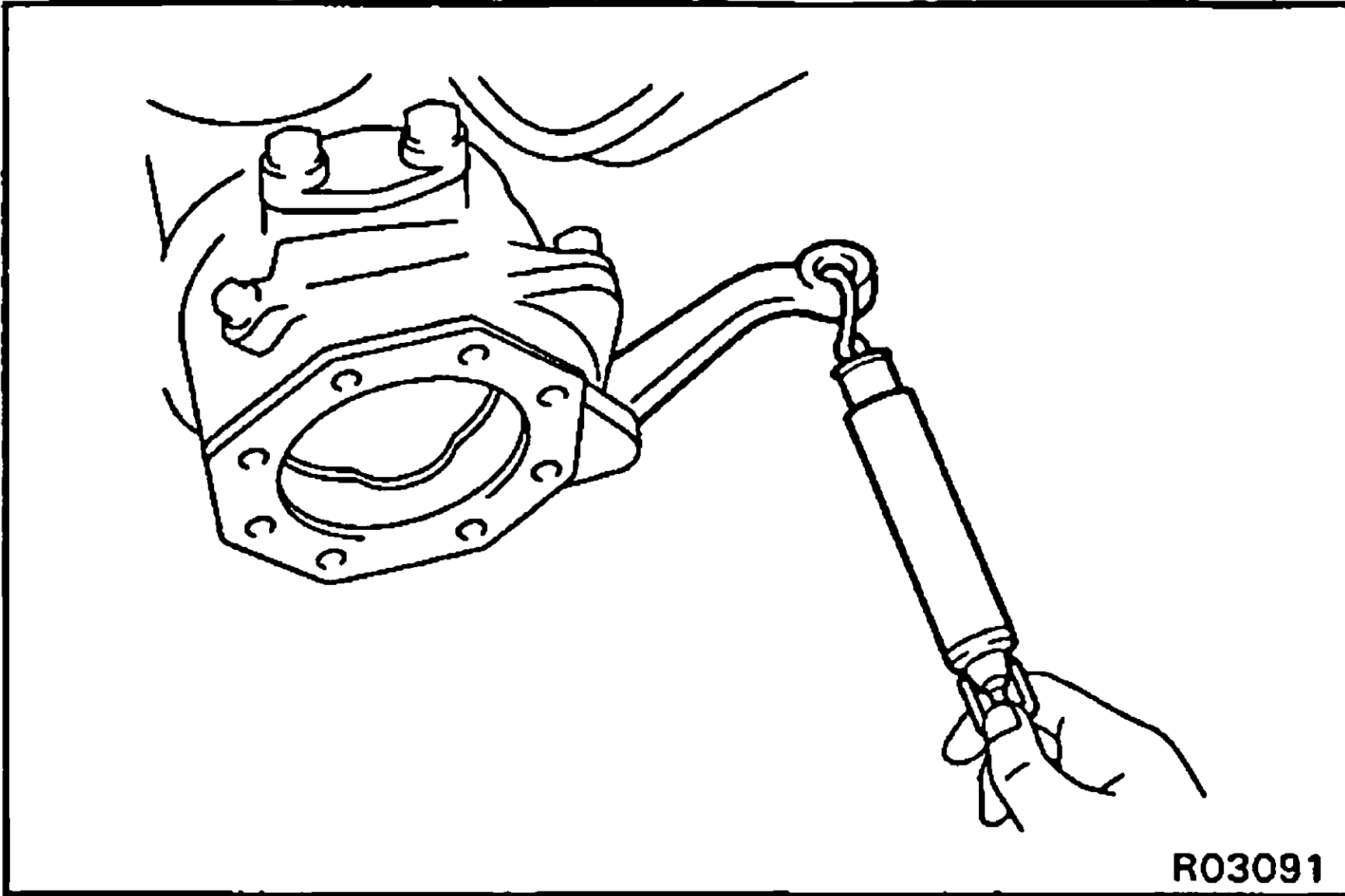
HINT: Use SST with a collar.

- (b) Install the bearing cap or the third arm over the shims that were originally used or were selected as described in the adjustment operations.
- (c) Using a hammer, tap the bearing cap into the bearing inner race.



- (d) Using SST, support the lower bearing inner race.
SST 09606-60020

- (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.
SST 09606-60020



5. MEASURE BEARINGS PRELOAD

Using a spring tension gauge, measure the preload.

Preload (starting): 25 — 44 N
(2.5 — 4.5 kgf, 5.6 — 9.9 lbf)

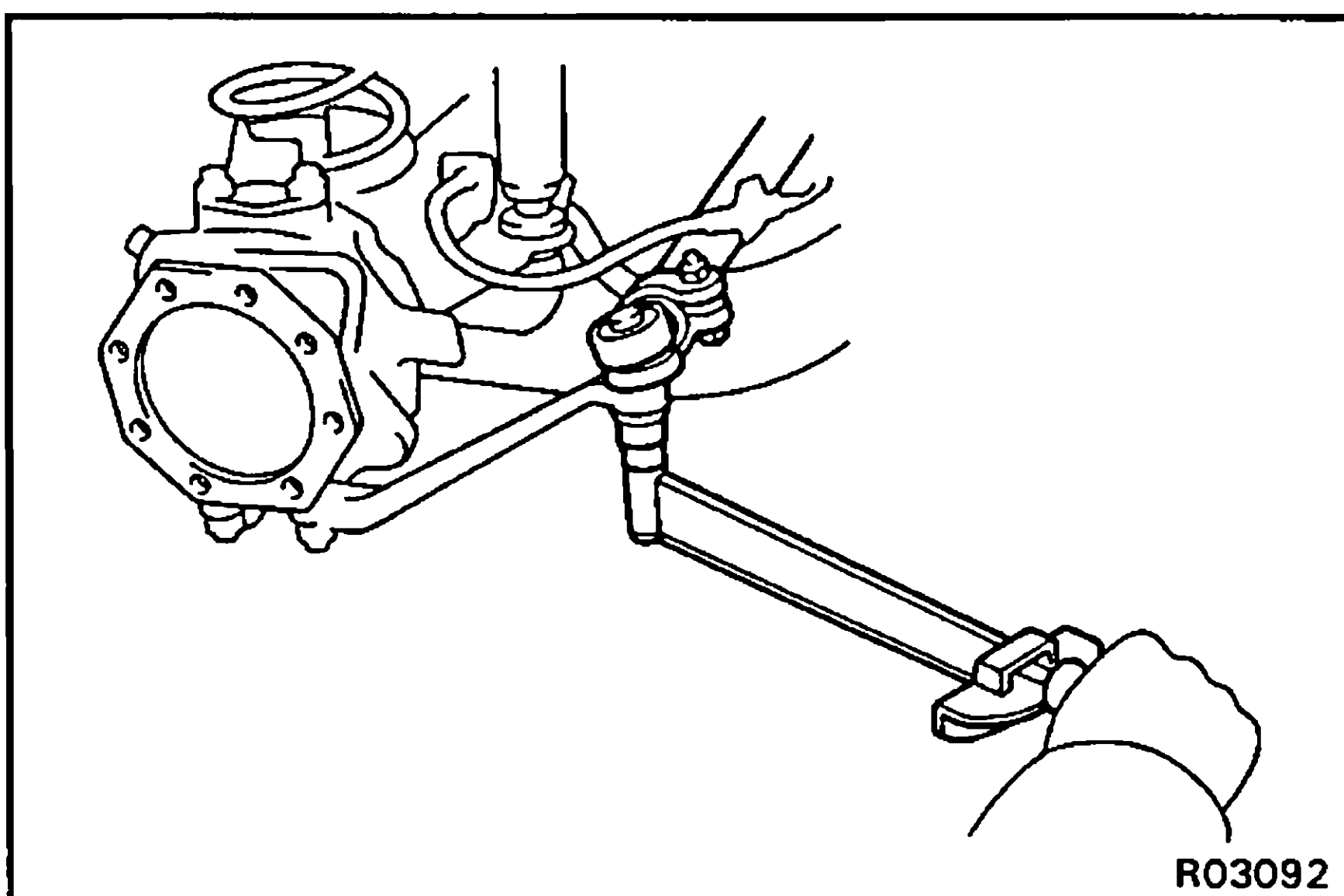
6. ADJUST BEARING PRELOAD

- (a) Remove the bearing cap and the knuckle arm.
(See Pub. No. RM184E, see page SA-15)
- (b) Select the adjusting shims.

Adjusting shim thickness

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

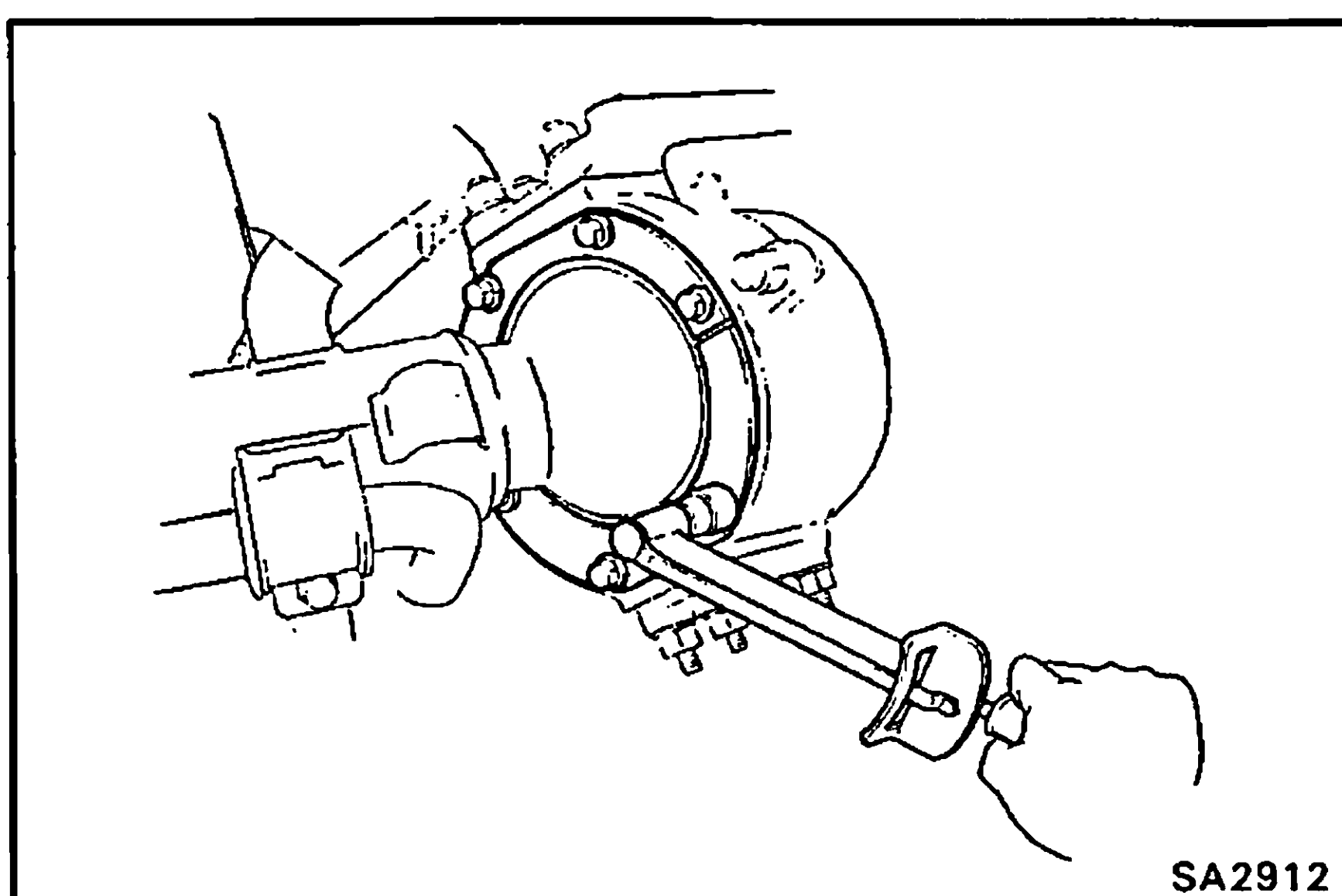
- (c) Install the bearing cap and knuckle arm.
(See Pub. No. RM184E, see page SA-19)



7. CONNECT TIE ROD TO KNUCKLE ARM

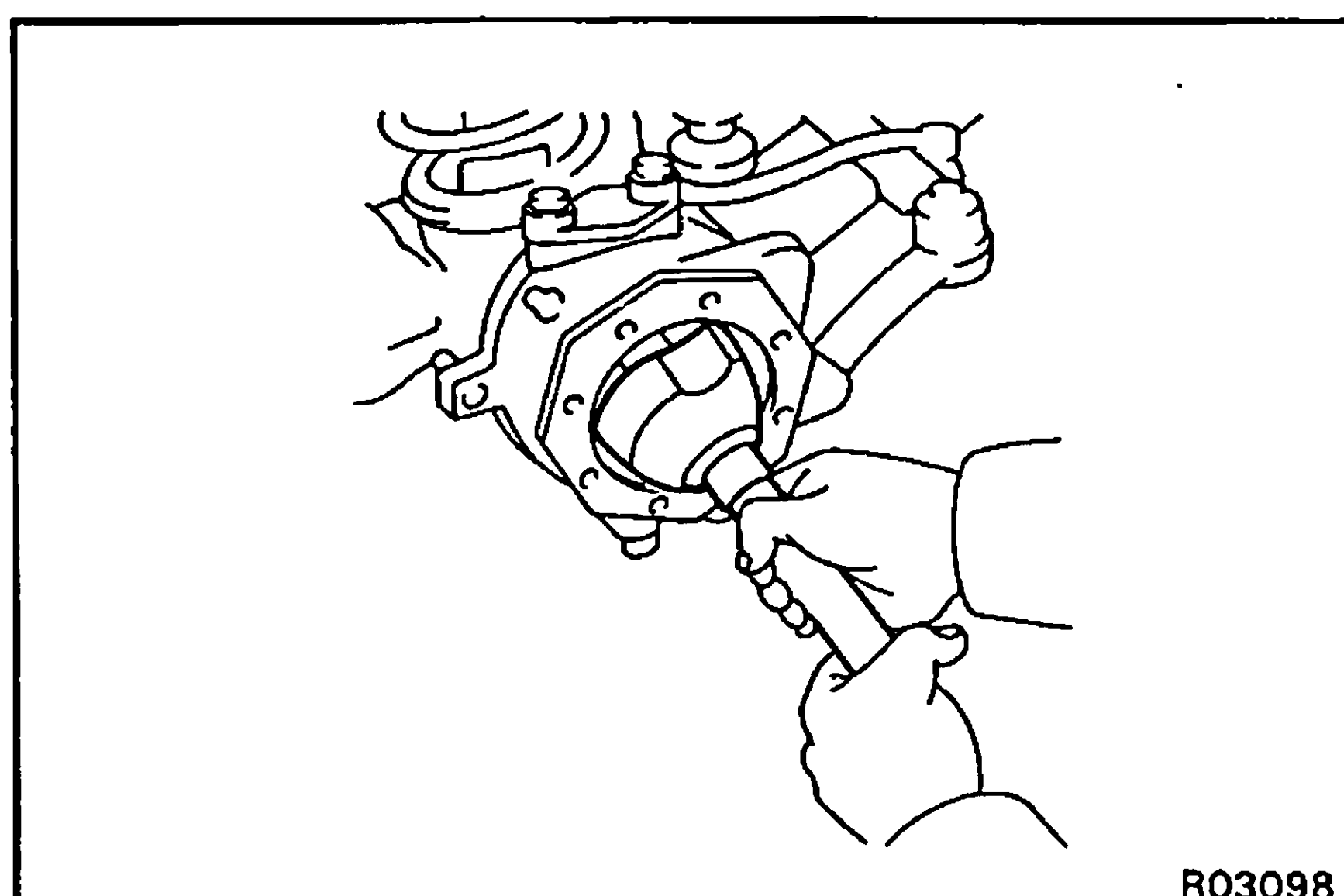
Torque the castle nut and secure it with a cotter pin.

Torque: 91 N·m (925 kgf·cm, 67 ft·lbf)



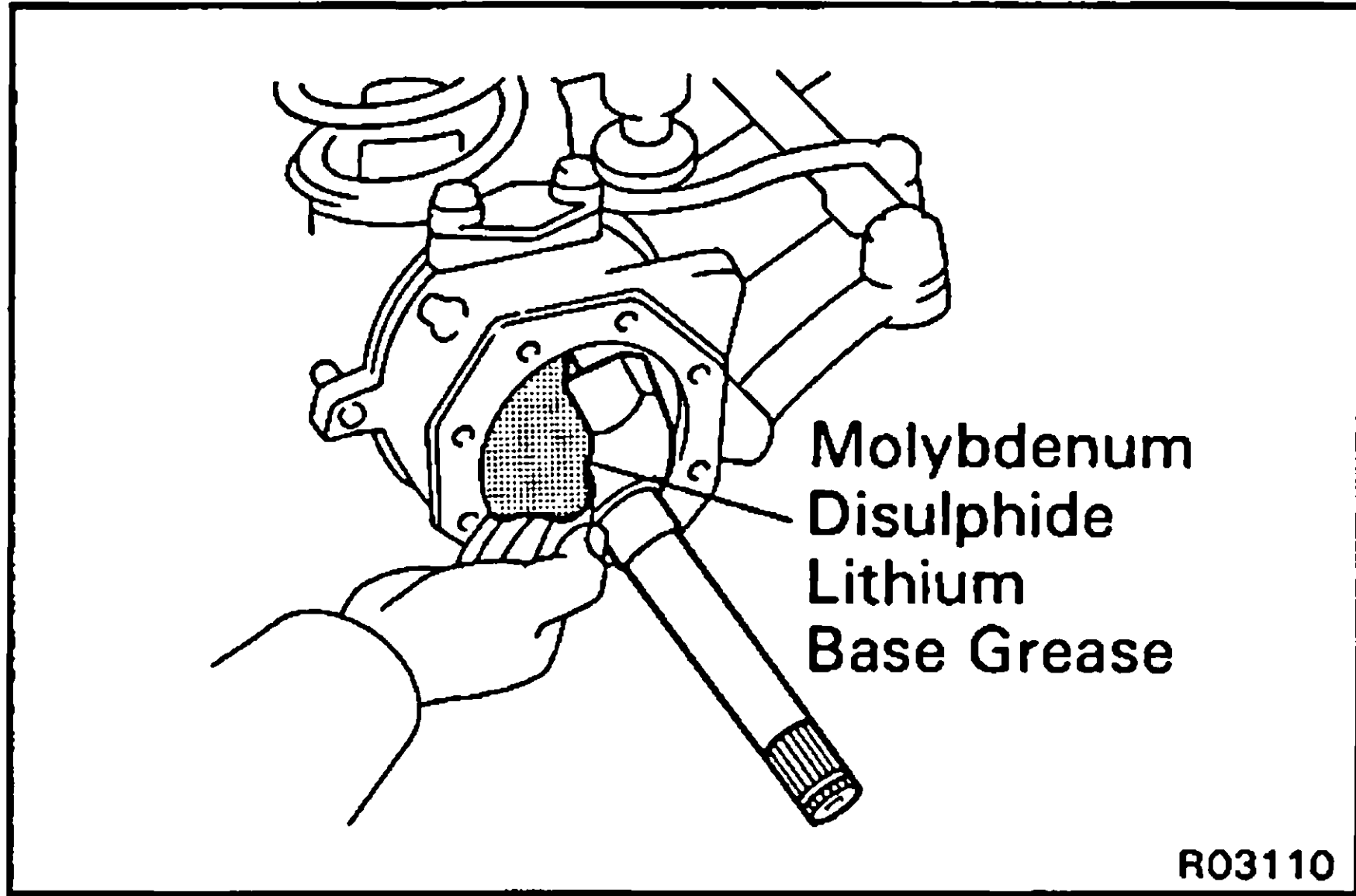
8. INSTALL OIL SEAL SET RETAINER TO KNUCKLE

Install the oil seal set retainer to steering knuckle with the six bolts.



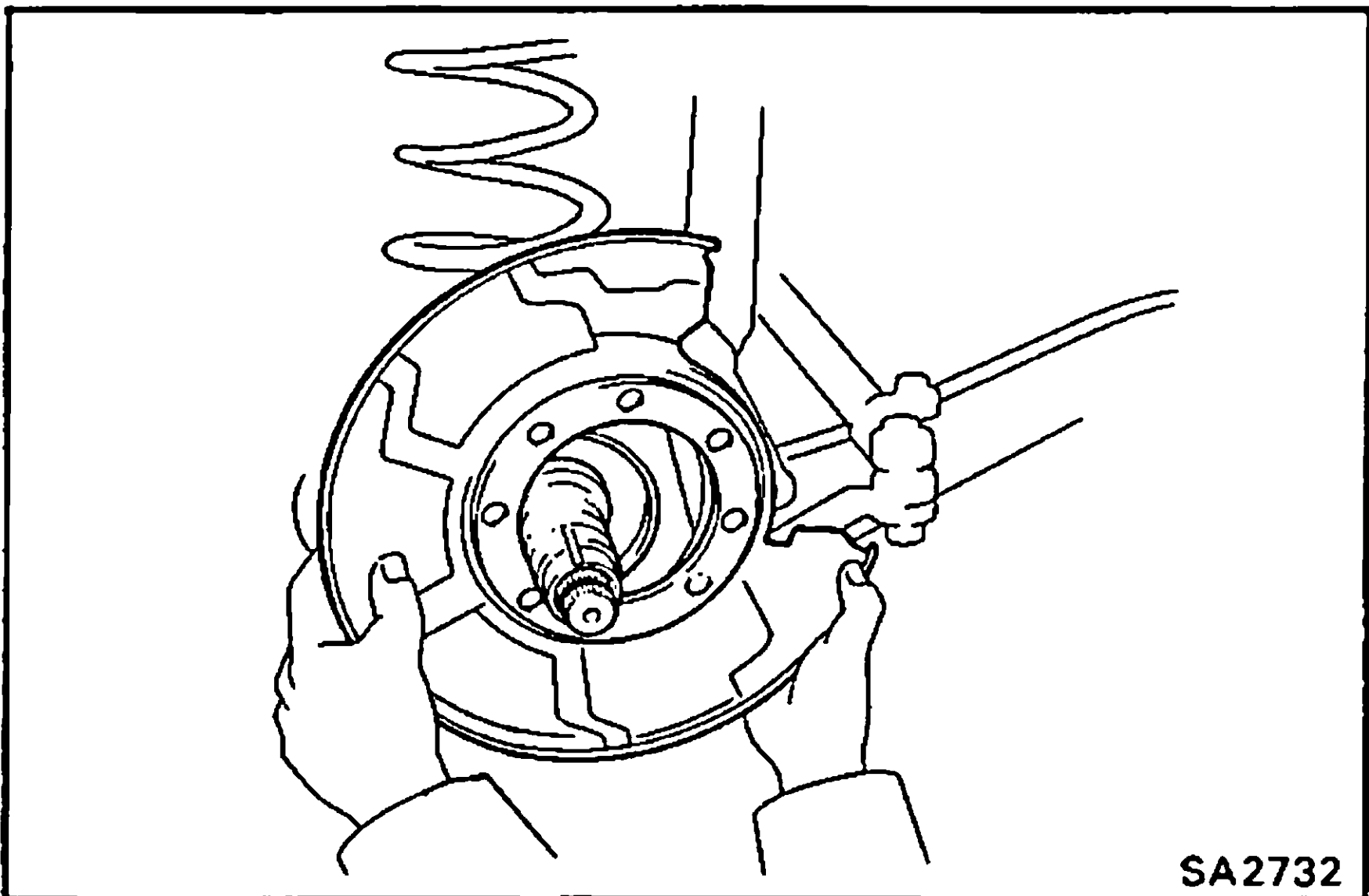
9. INSTALL AXLE SHAFT

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



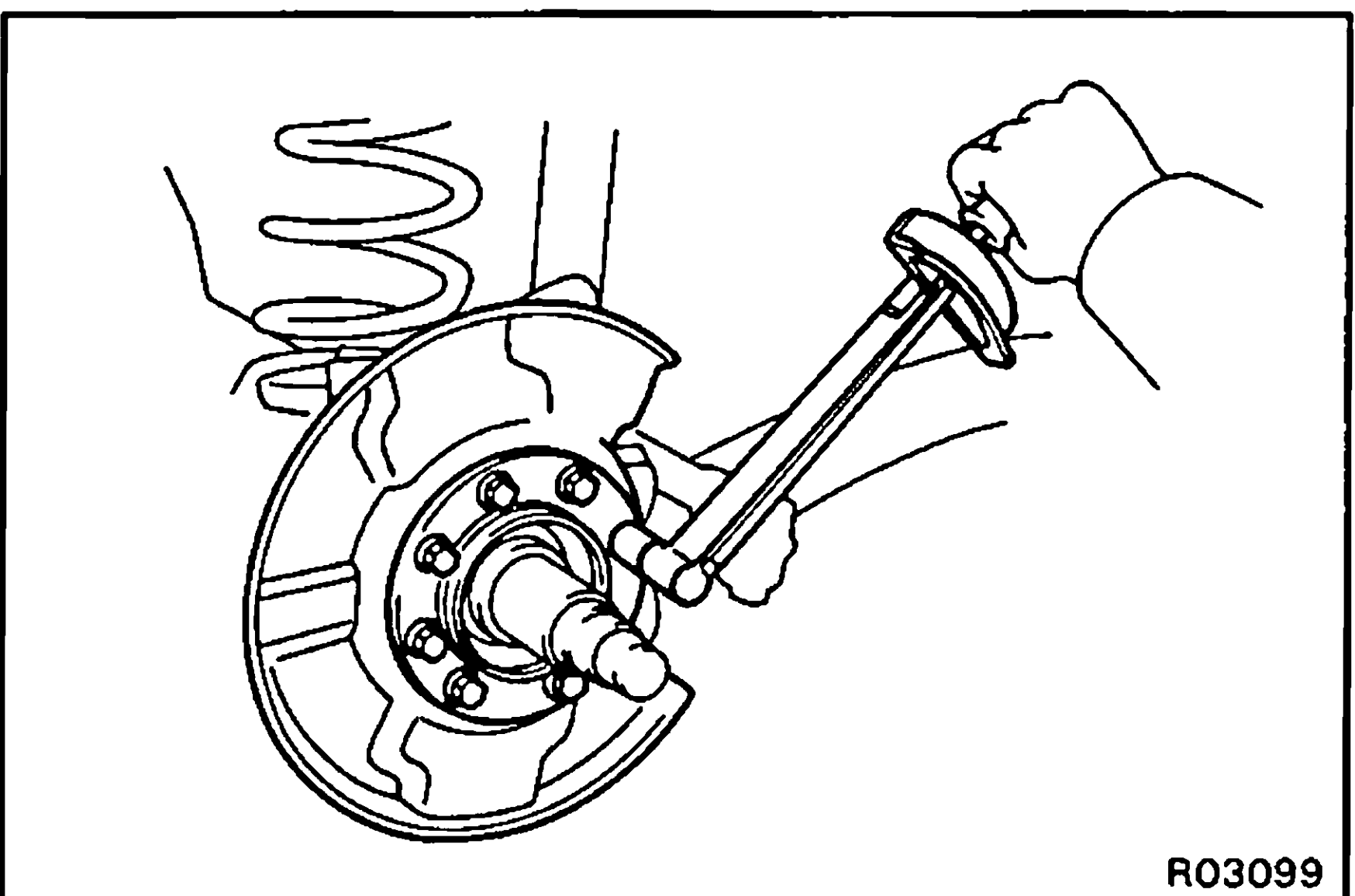
10. PACK MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE

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



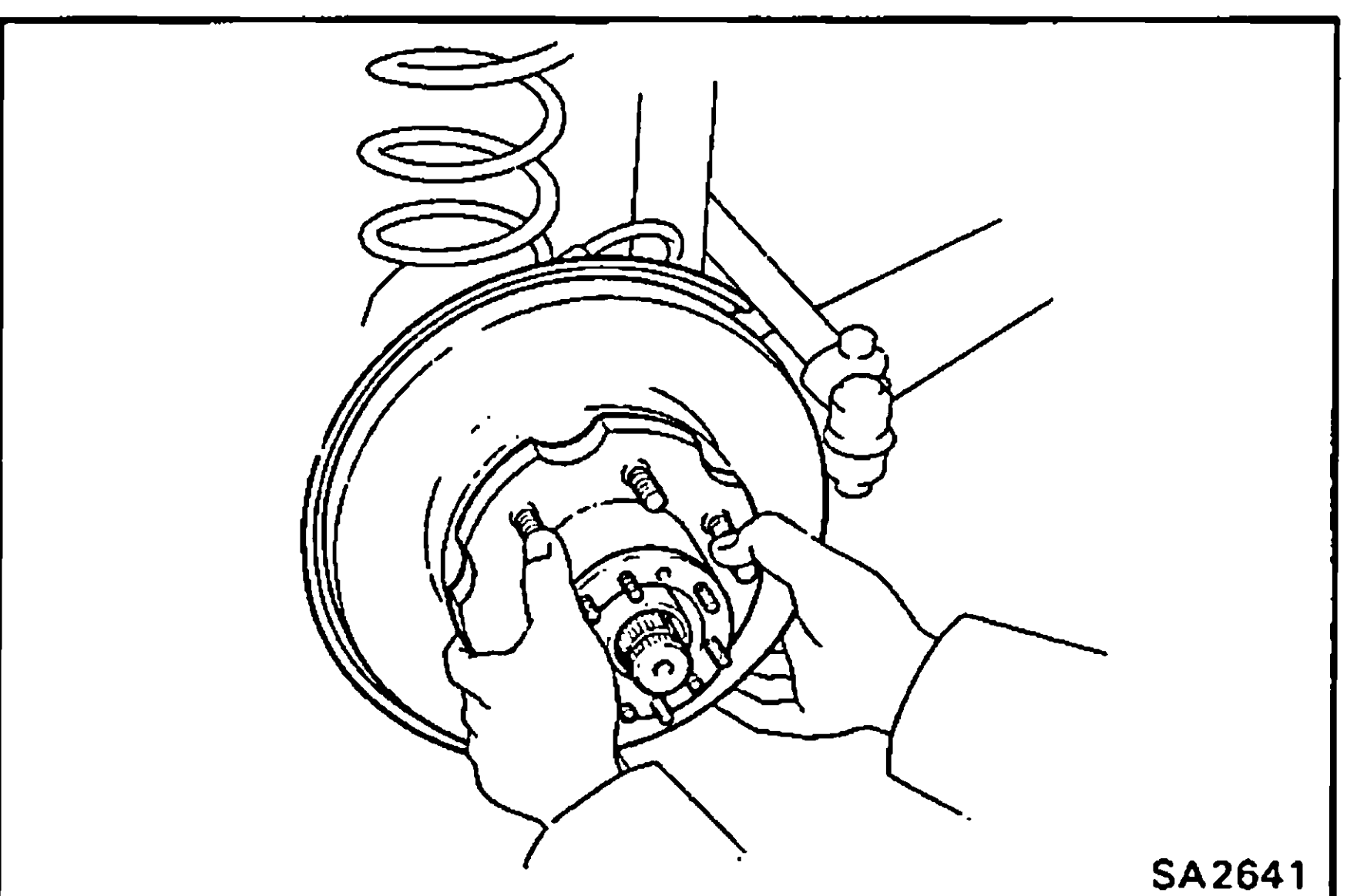
11. INSTALL KNUCKLE SPINDLE DUST COVER WITH NEW GASKETS AND DUST SEAL

- (a) Place a new gasket in the position on the knuckle and install the spindle.
- (b) Place the gasket, dust cover and seal on the spindle.



- (c) Install and torque the spindle mounting bolts.

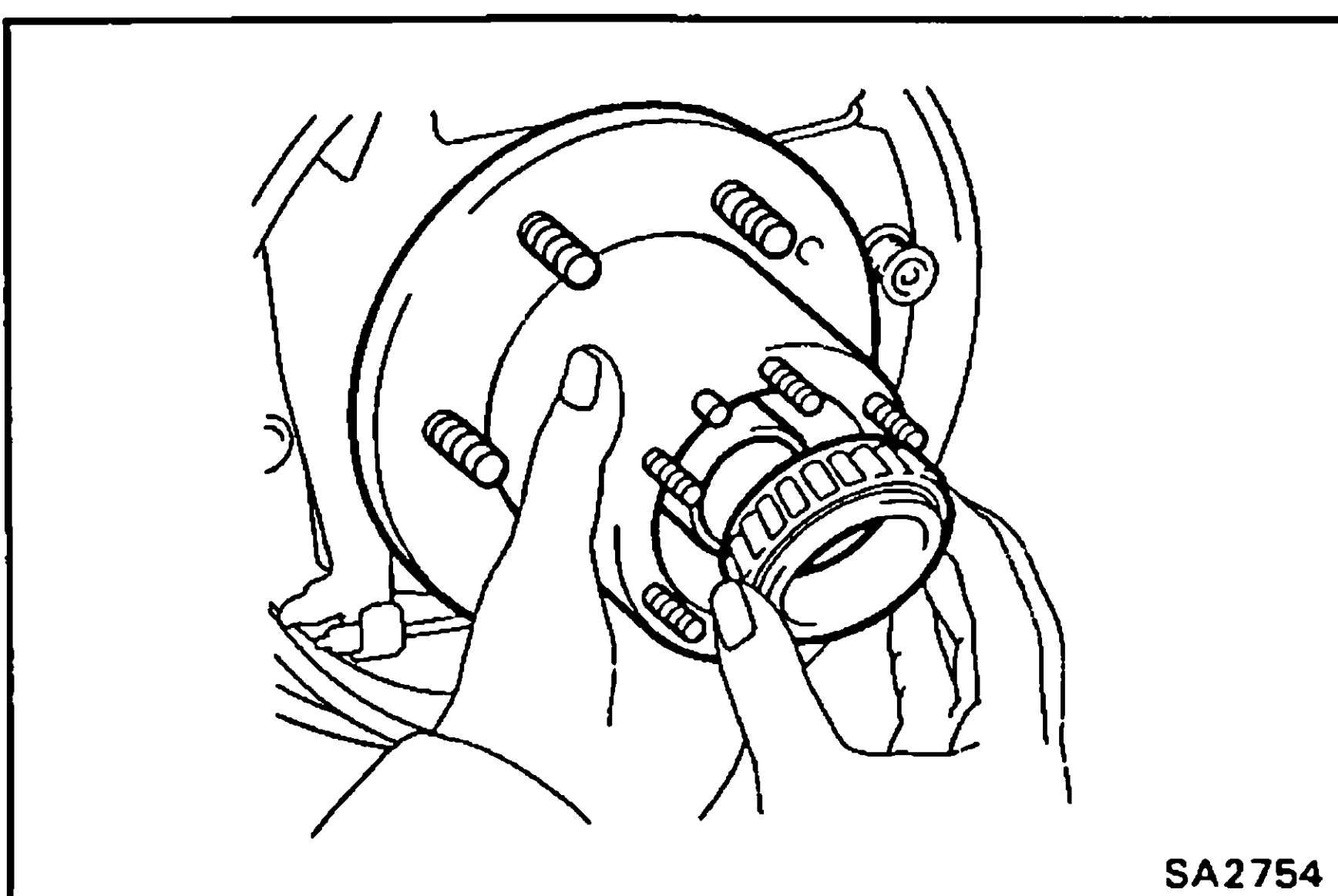
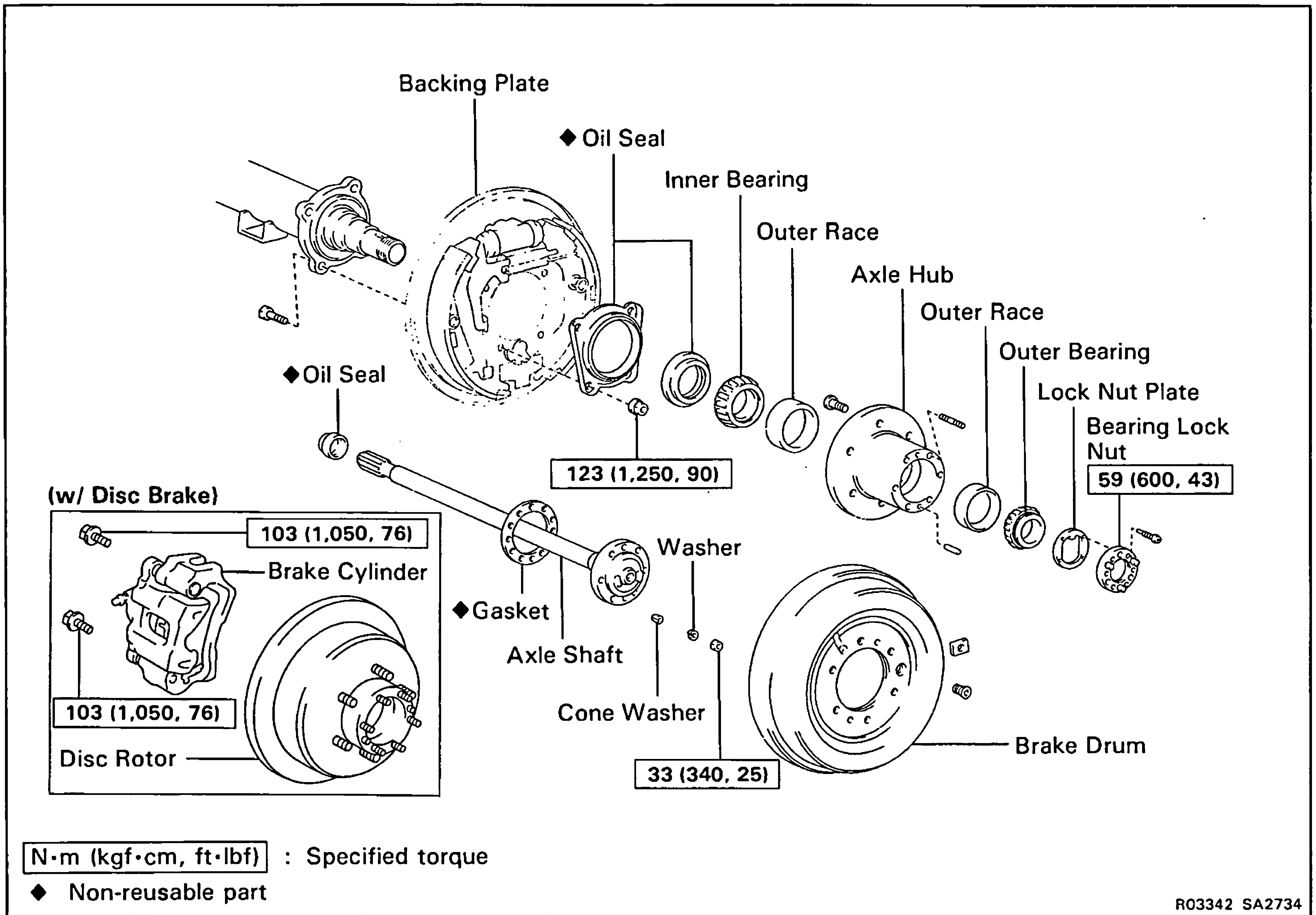
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)



12. INSTALL AXLE HUB

(See Pub. No. RM184E, see page SA-15)

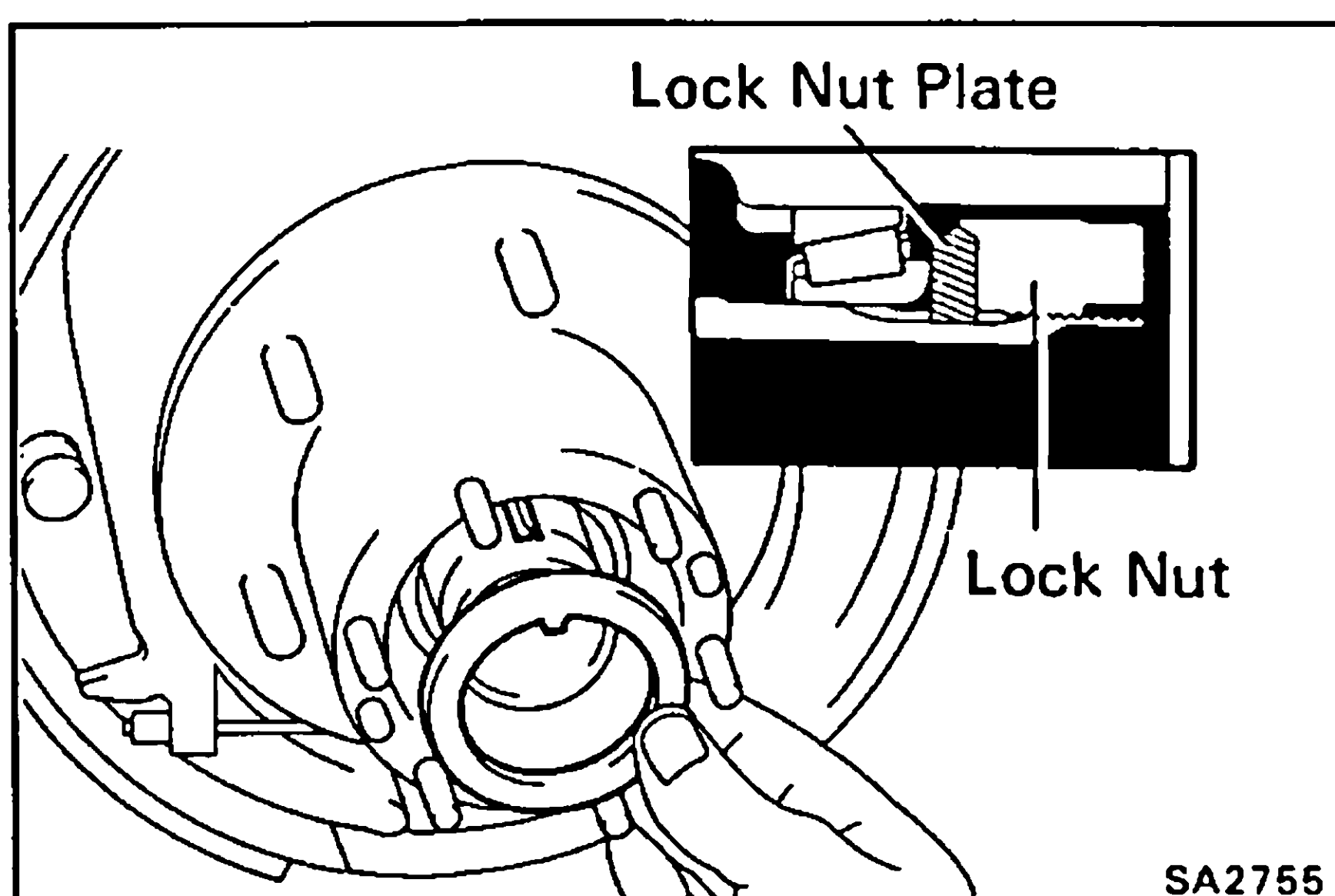
REAR AXLE SHAFT AND AXLE HUB (Full-Floating Type) COMPONENTS



INSTALLATION OF REAR AXLE HUB

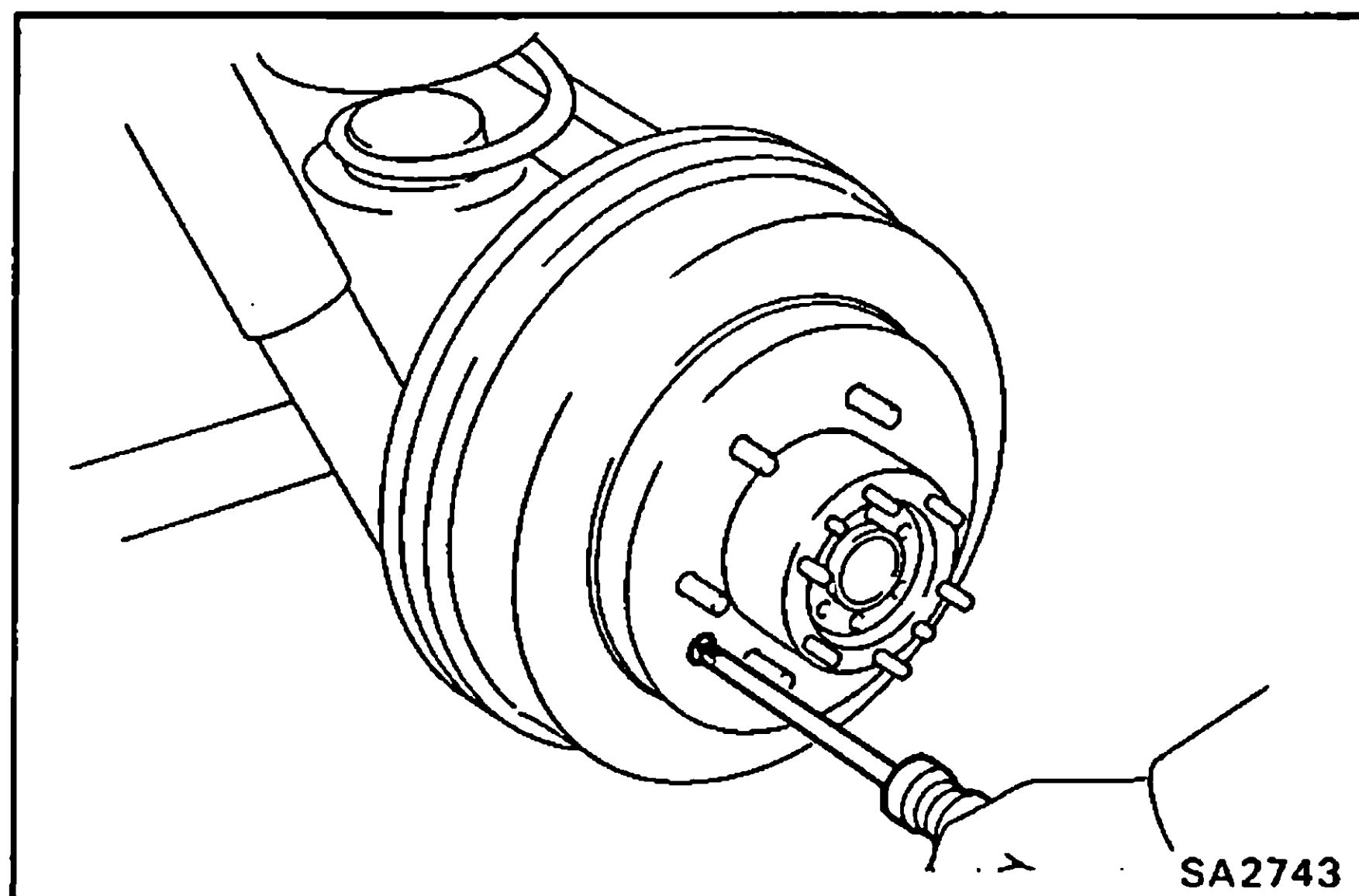
1. INSTALL AXLE HUB

- Install the backing plate and oil seal to the axle housing with the four bolts and nuts.
 - Install the axle hub to the axle housing.
- NOTICE:** Be careful not to damage the oil seal.
- Install the outer bearing.



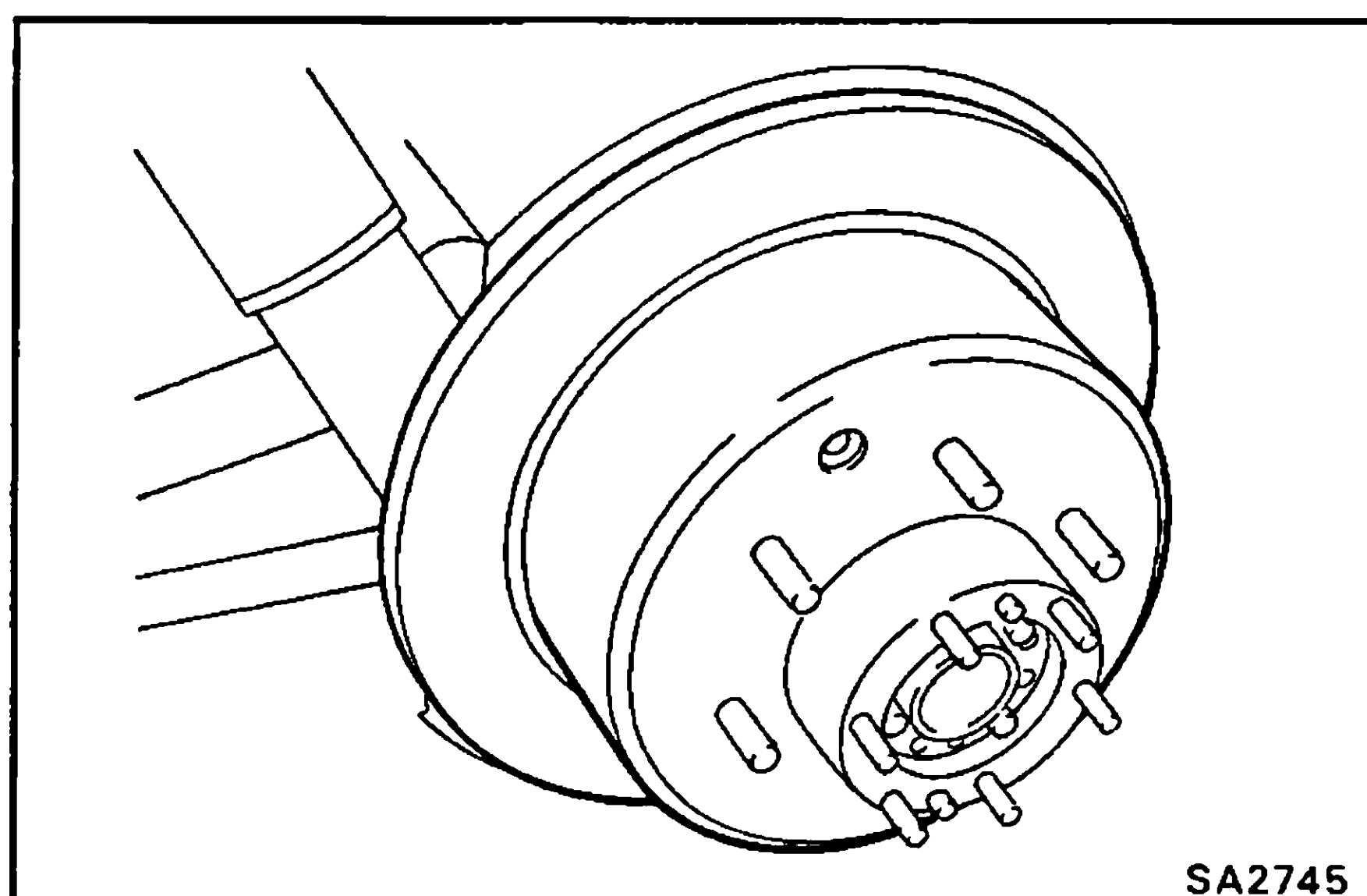
2. INSTALL LOCK NUT PLATE AND BEARING LOCK NUT

- After fully pushing in the outer bearing, position the protrusion of the lock nut plate into the axle housing groove.
- Temporarily install the bearing lock nut.



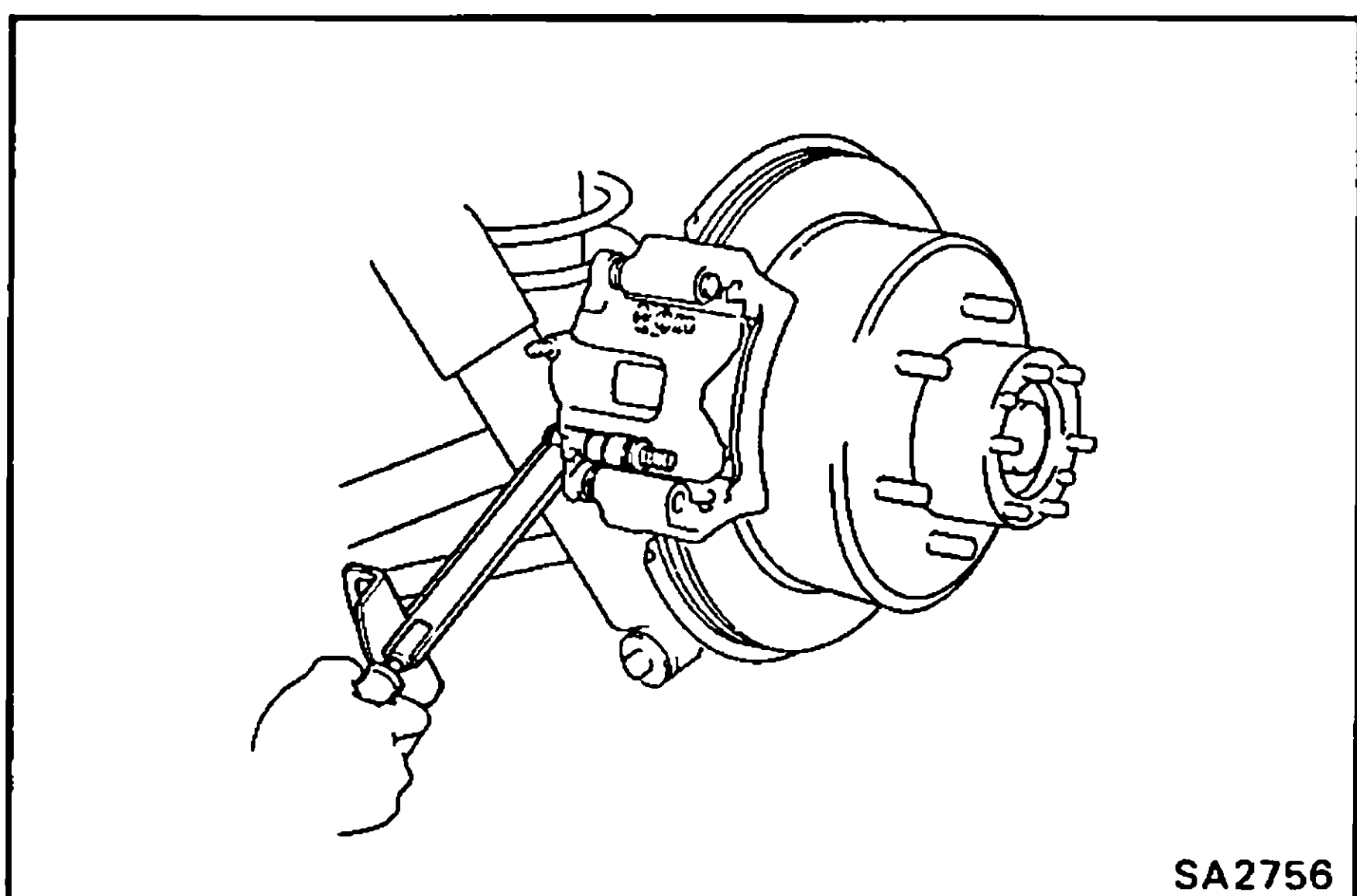
**3. (w/ DRUM BRAKE TYPE)
INSTALL BRAKE DRUM**

- (a) Install the brake drum to the axle hub.
- (b) Install the screw to the brake drum.



**4. (w/ DISC BRAKE TYPE)
INSTALL ROTOR DISC**

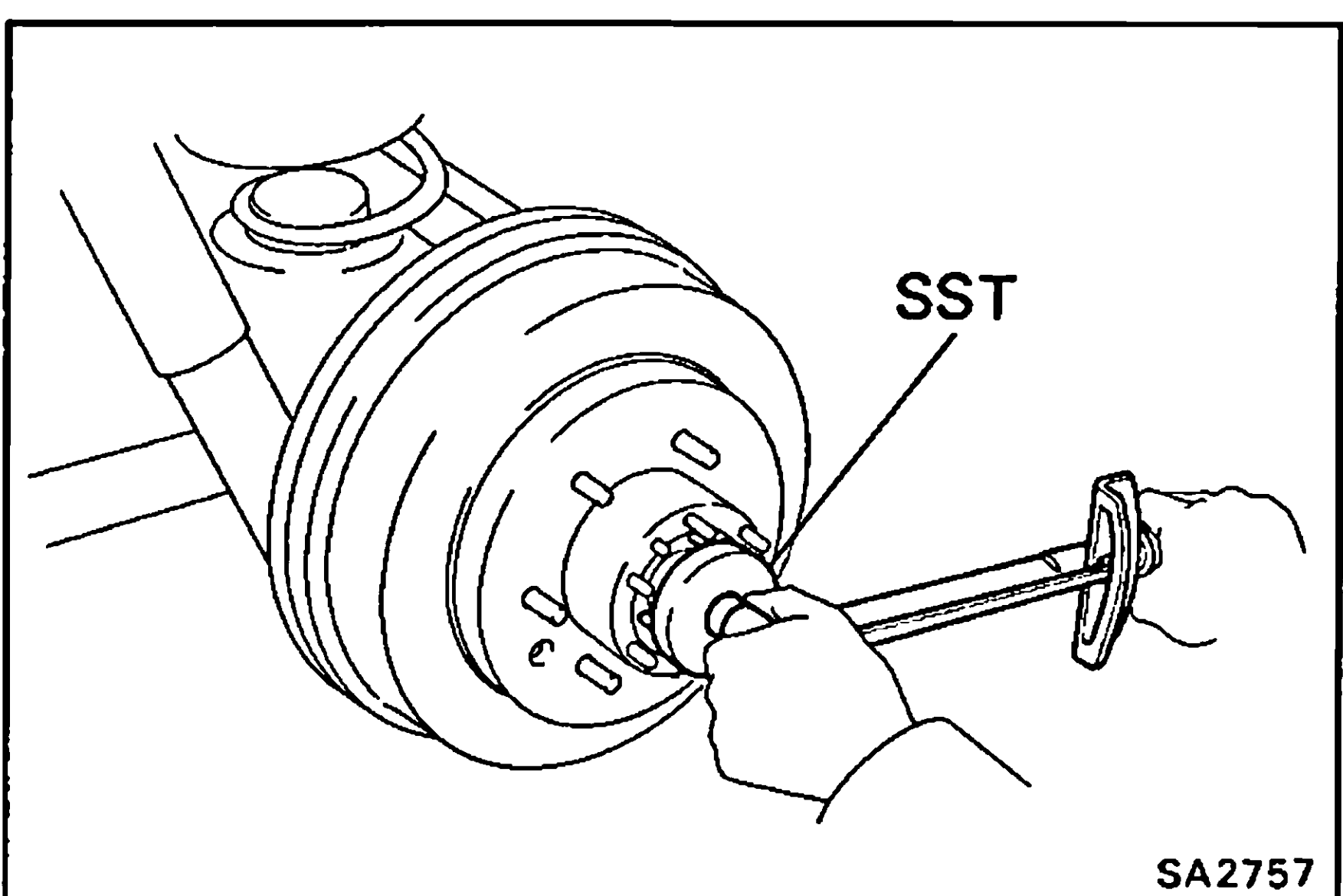
Install the rotor disc to the axle hub.



**5. (w/ DISC BRAKE TYPE)
INSTALL DISC BRAKE ASSEMBLY**

Install the brake cylinder with torque plate to the rear carrier with the two bolts.

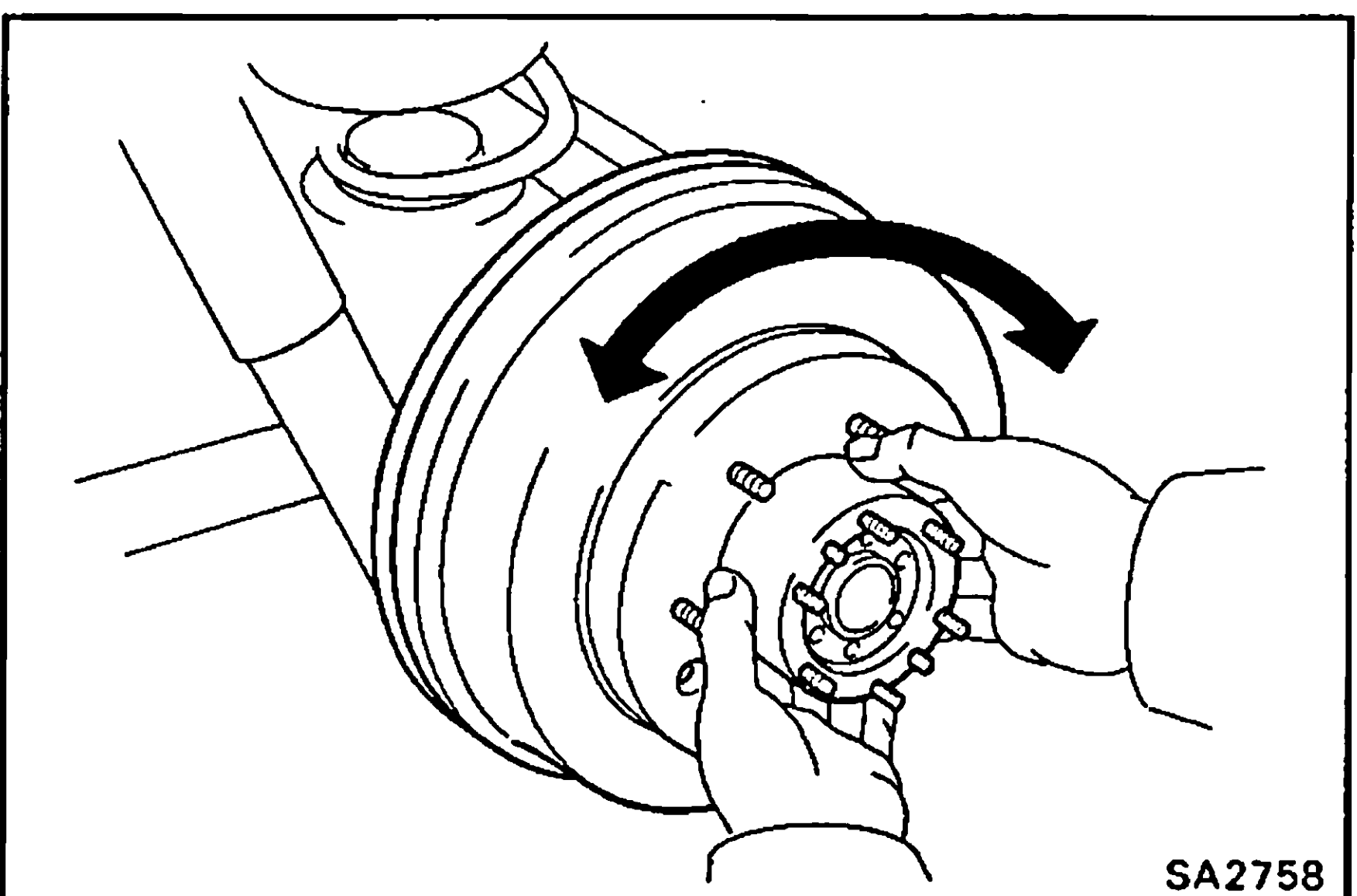
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



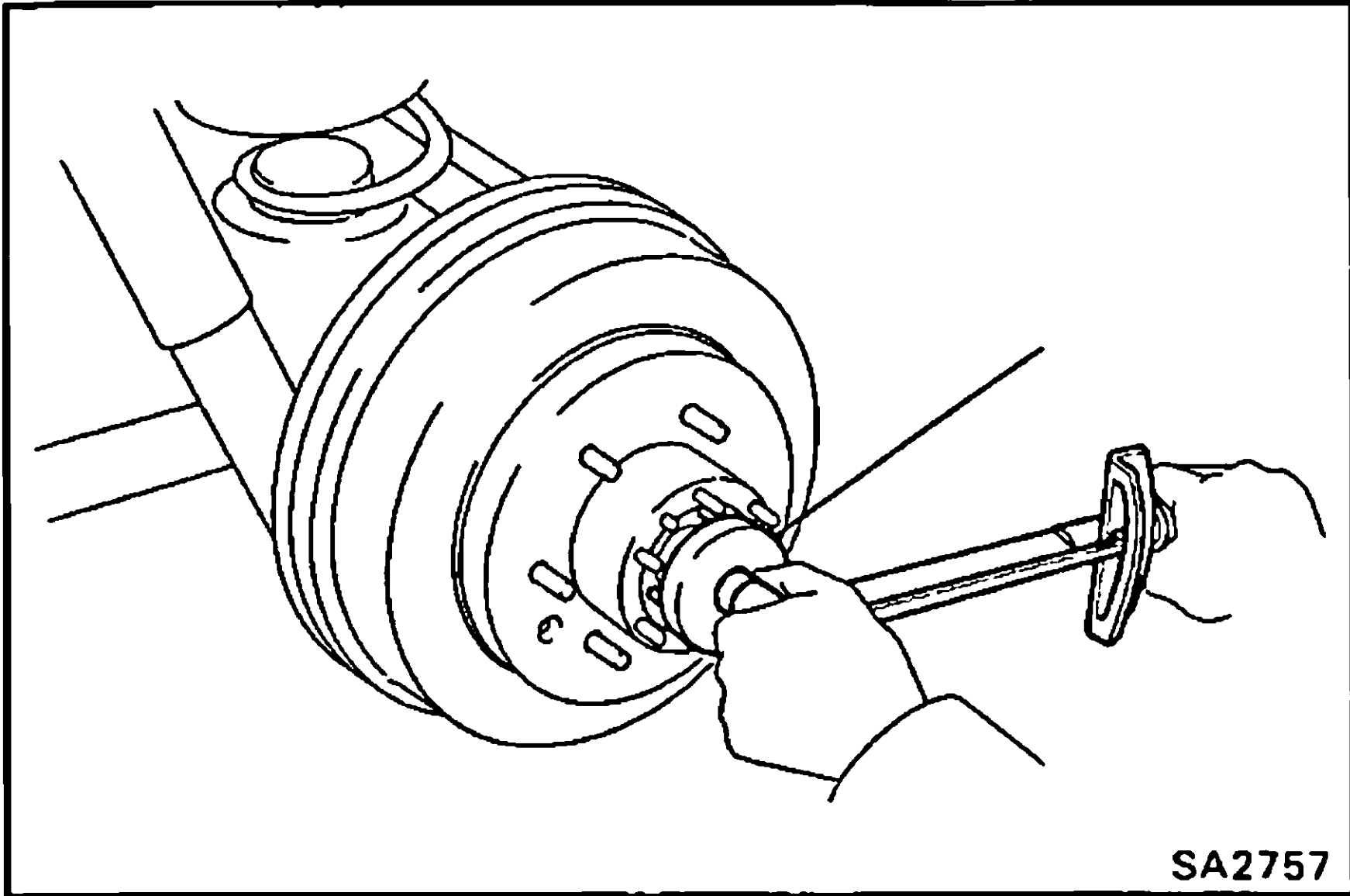
6. ADJUST PRELOAD

- (a) Using SST, torque the bearing lock nut.
SST 09509-25011

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



- (b) Snug down the bearing by turning the hub several times.



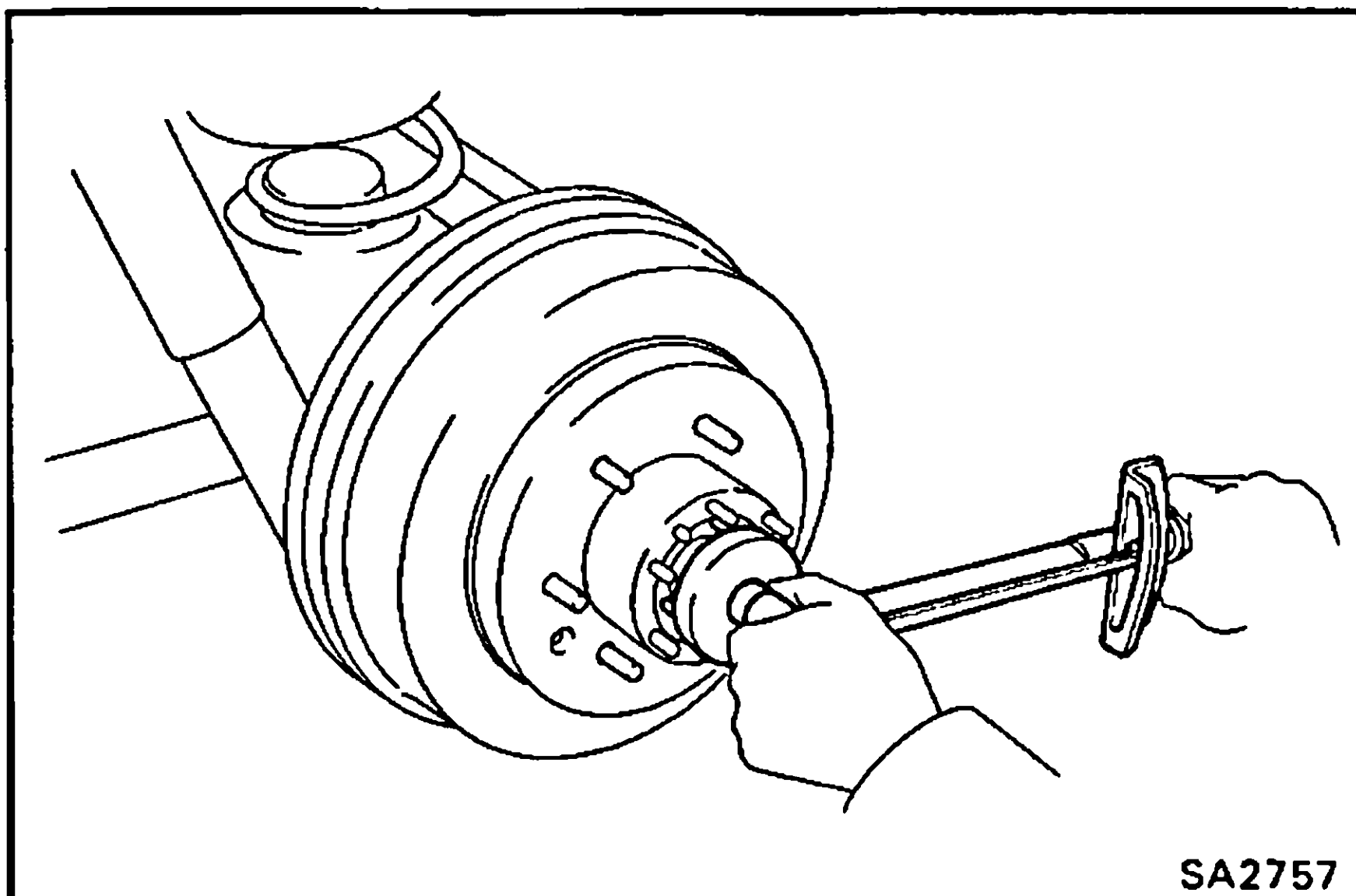
(c) Using SST, tighten the bearing lock nut.

SST 09509-25011

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

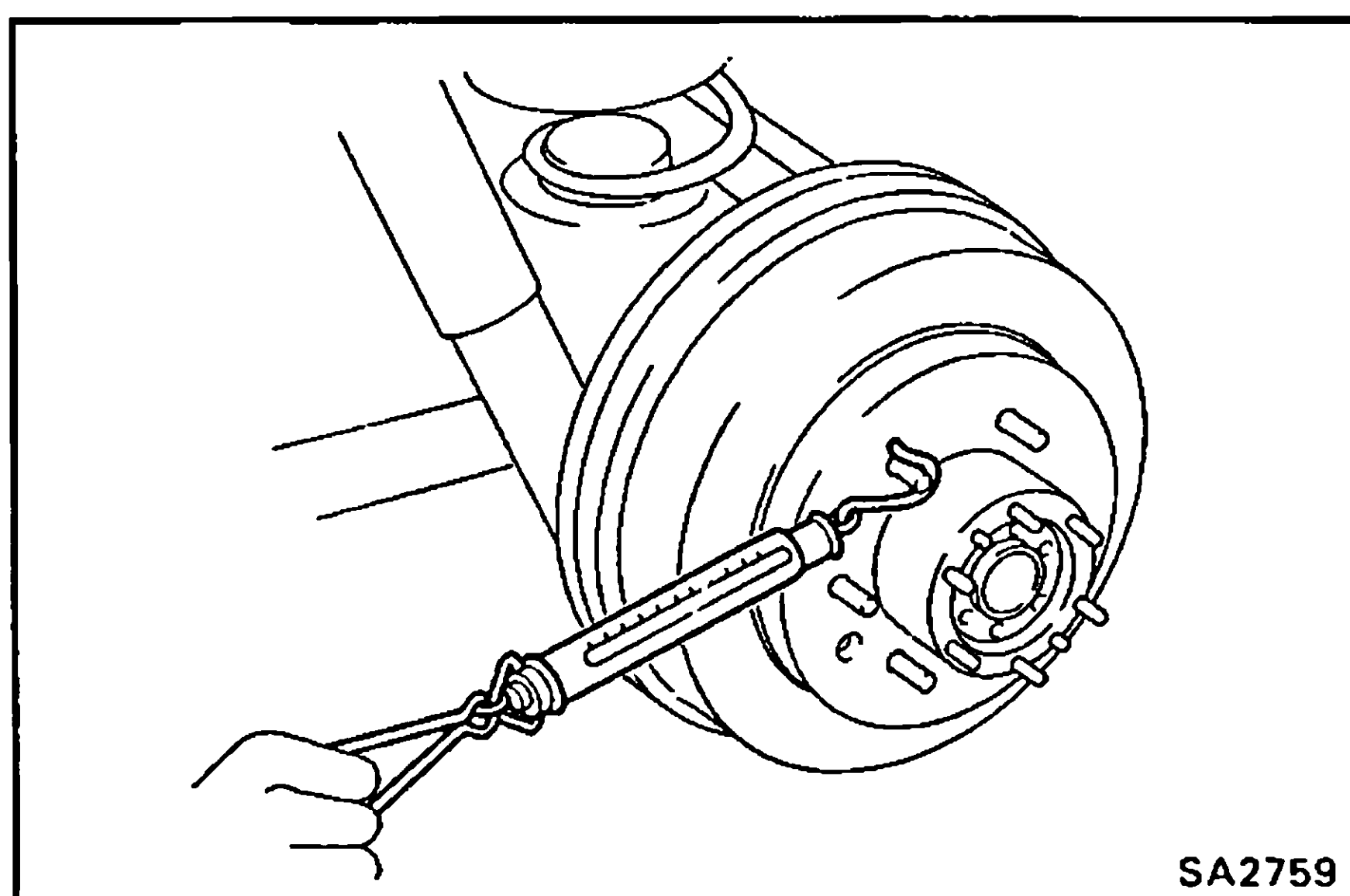
(d) Using SST, loosen the bearing lock nut until you can rotate it by hand.

SST 09509-25011



(e) Using SST, retighten the bearing lock nut.

SST 09509-25011

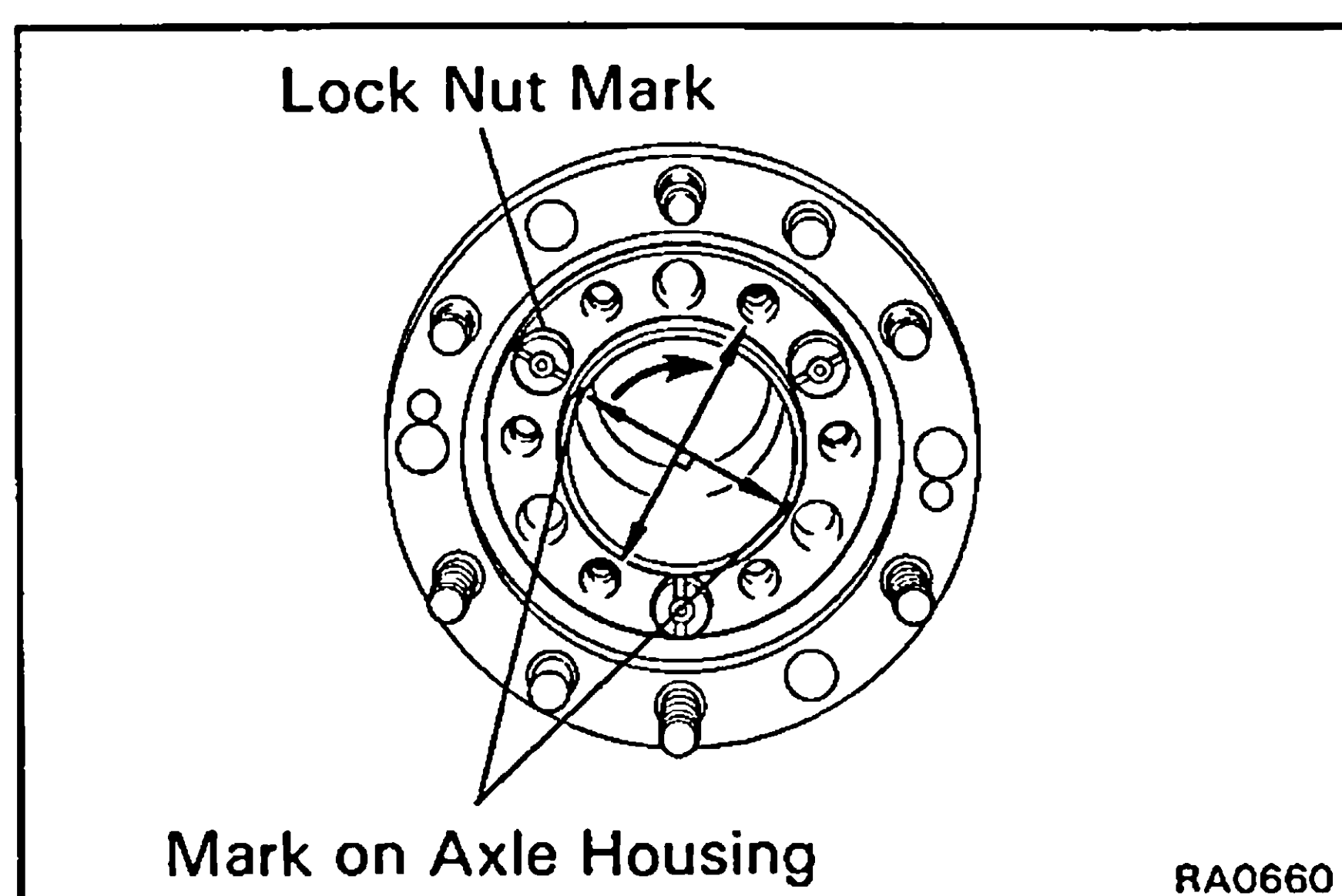


(f) Using a spring tension gauge, measure the preload at the hub bolt.

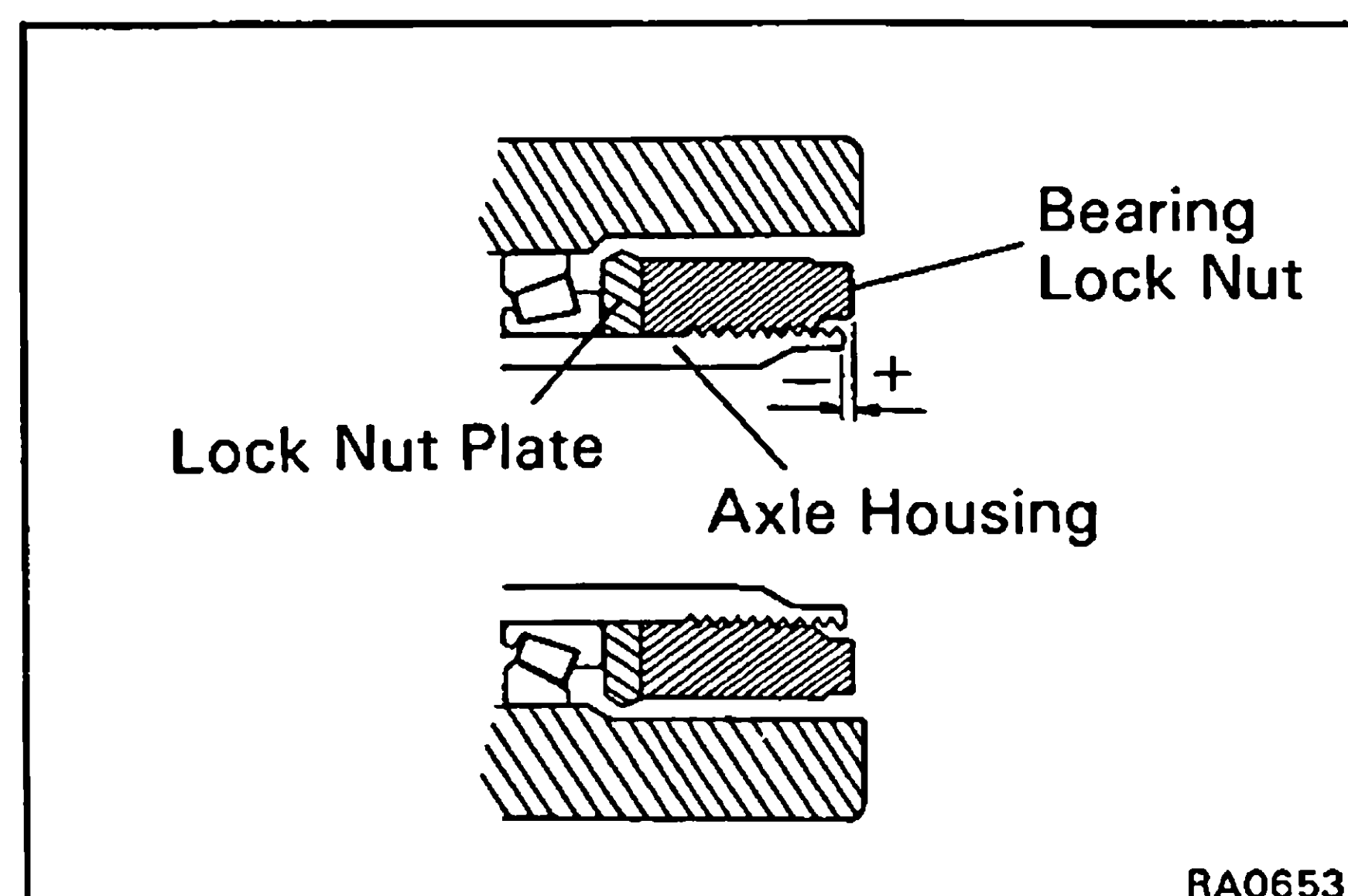
Rear wheel bearing preload (at starting):

25.4 – 55.9 N (2.6 – 5.7 kgf, 5.7 – 12.6 lbf)

If preload is not within specification, the procedure above must be repeated.



(g) Align the lock nut mark with one of the marks on the axle housing, and place lock screws in the holes at right angles to the lock nut.

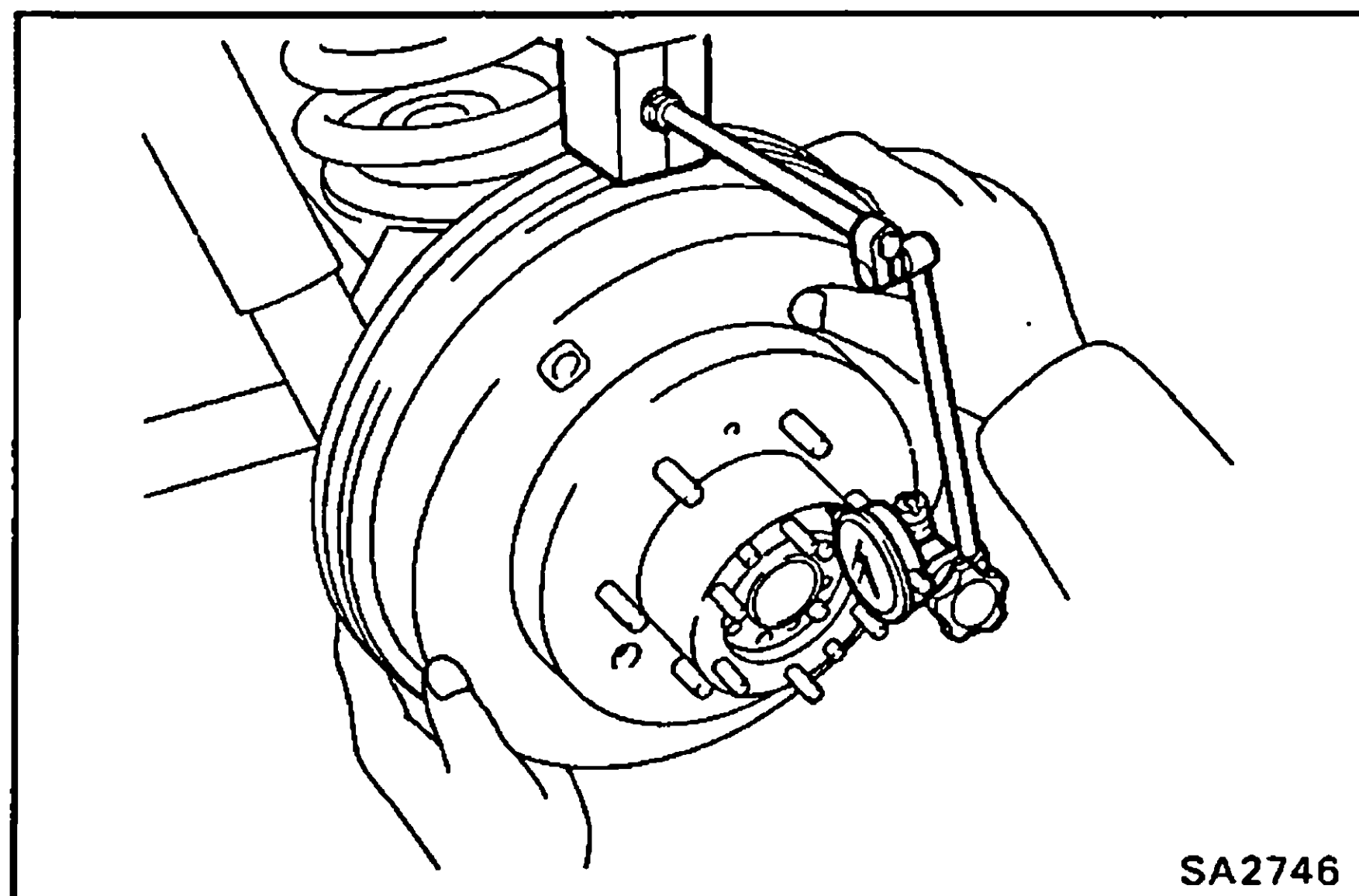


(h) Measure the distance between the top surface of axle housing and the lock nut.

Standard distance: –0.2 – 0.9 mm

(–0.008 – 0.035 in.)

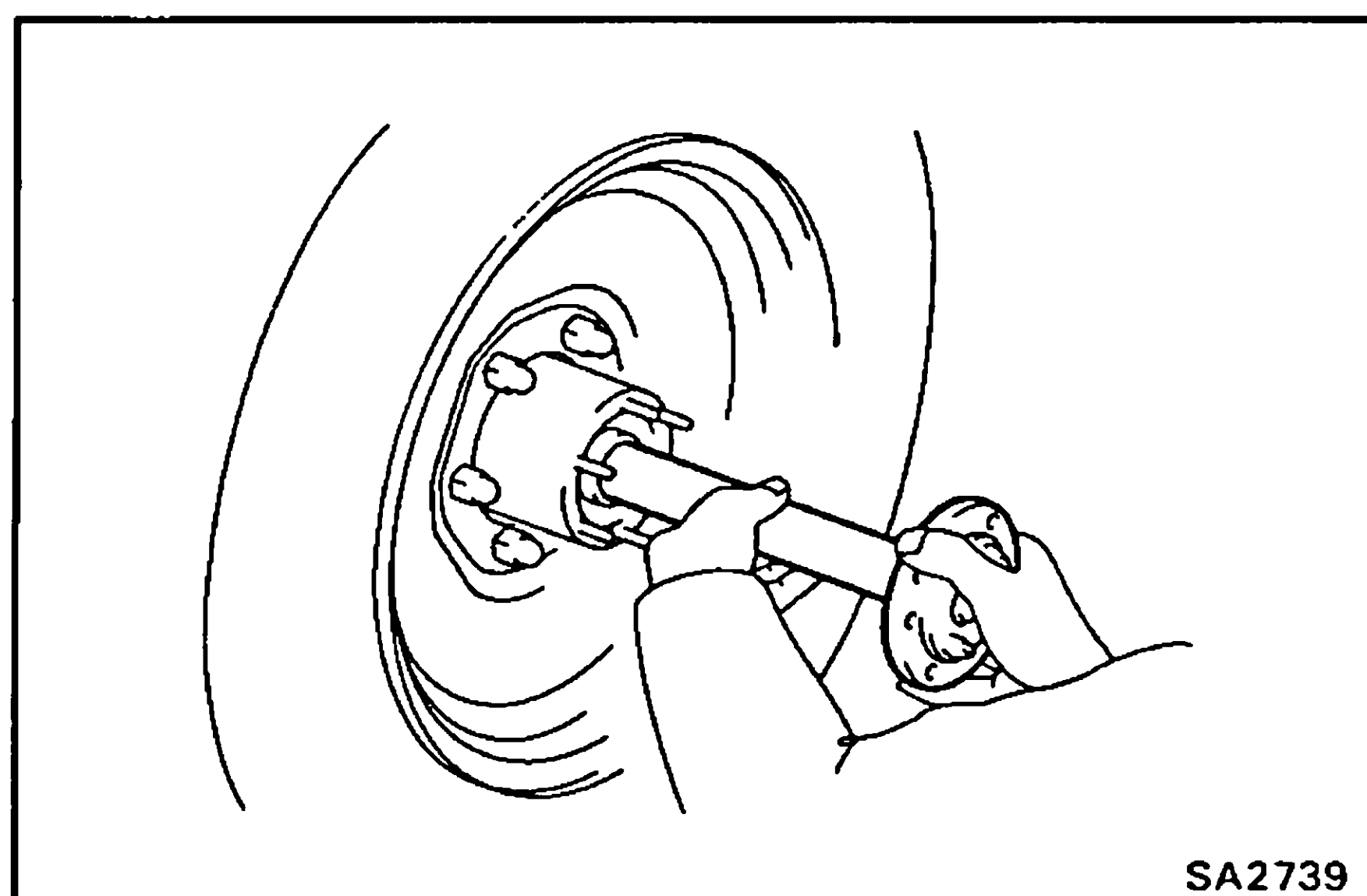
If not within specification, reinstall the axle hub.



(i) Check the movement of the drum.

(j) Check the hub axial play.

Hub axial play: Less than 0.1 mm (0.004 in.)



7. **INSTALL REAR AXLE SHAFT**
(See Pub. No. RM184E, see page SA-83)

8. **INSTALL WHEEL AND LOWER VEHICLE**

BODY ELECTRICAL SYSTEM

REFER TO FOLLOWING REPAIR MANUALS:

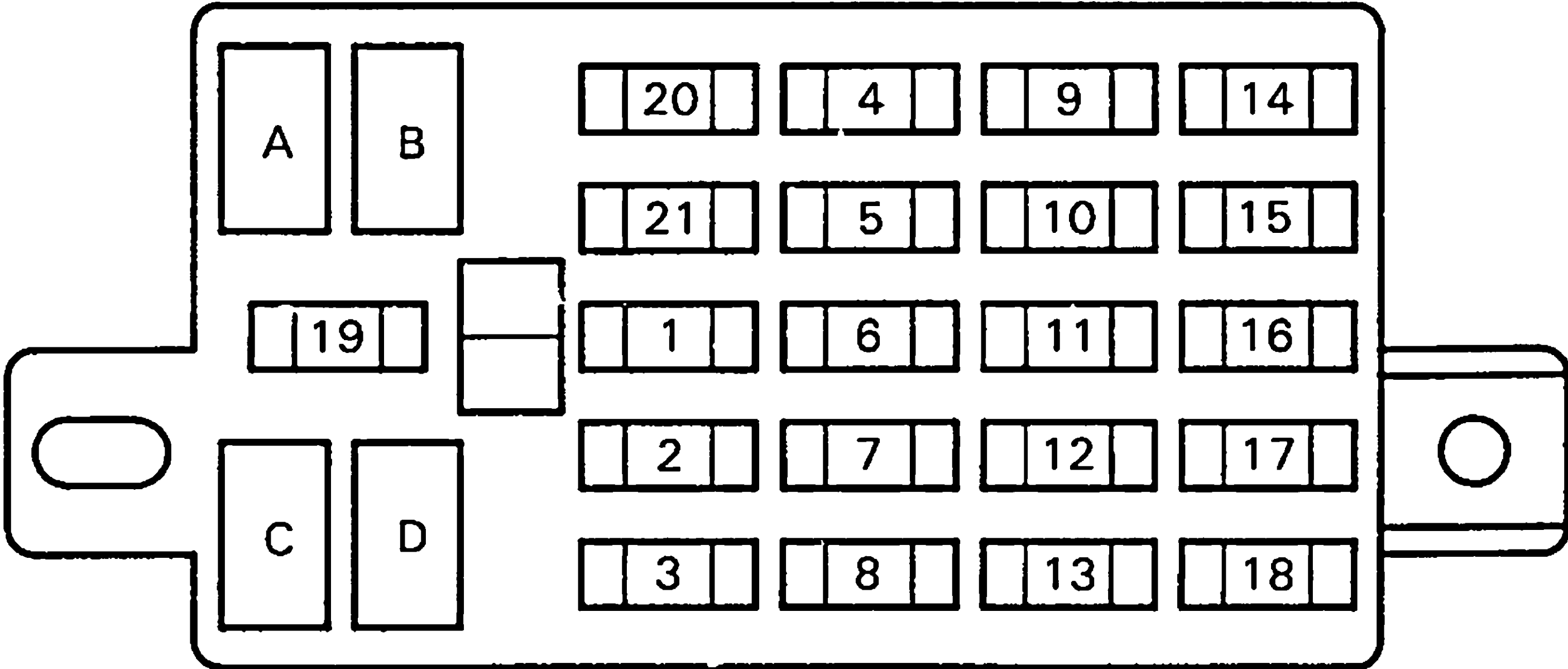
Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

NOTE: The following pages contain only the points which differ from the above listed manuals.

	Page
(HARDTOP & CANVAS TOP)	
POWER SOURCE	BE-2
LIGHTING SYSTEM	BE-3
WIPER AND WASHER SYSTEM	BE-8
COMBINATION METER	BE-12
FUEL TRANSFER SYSTEM	BE-20
AUDIO SYSTEM	BE-21
(STATION WAGON)	
LIGHTING SYSTEM	BE-25
WIPER AND WASHER SYSTEM	BE-30
COMBINATION METER	BE-32
POWER SEAT CONTROL SYSTEM	BE-39
SEAT HEATER SYSTEM	BE-40
CRUISE CONTROL SYSTEM	BE-41
AUDIO SYSTEM	BE-52

(HARDTOP & CANVAS TOP)
POWER SOURCE
Parts Location

Fuse Block



Fuses

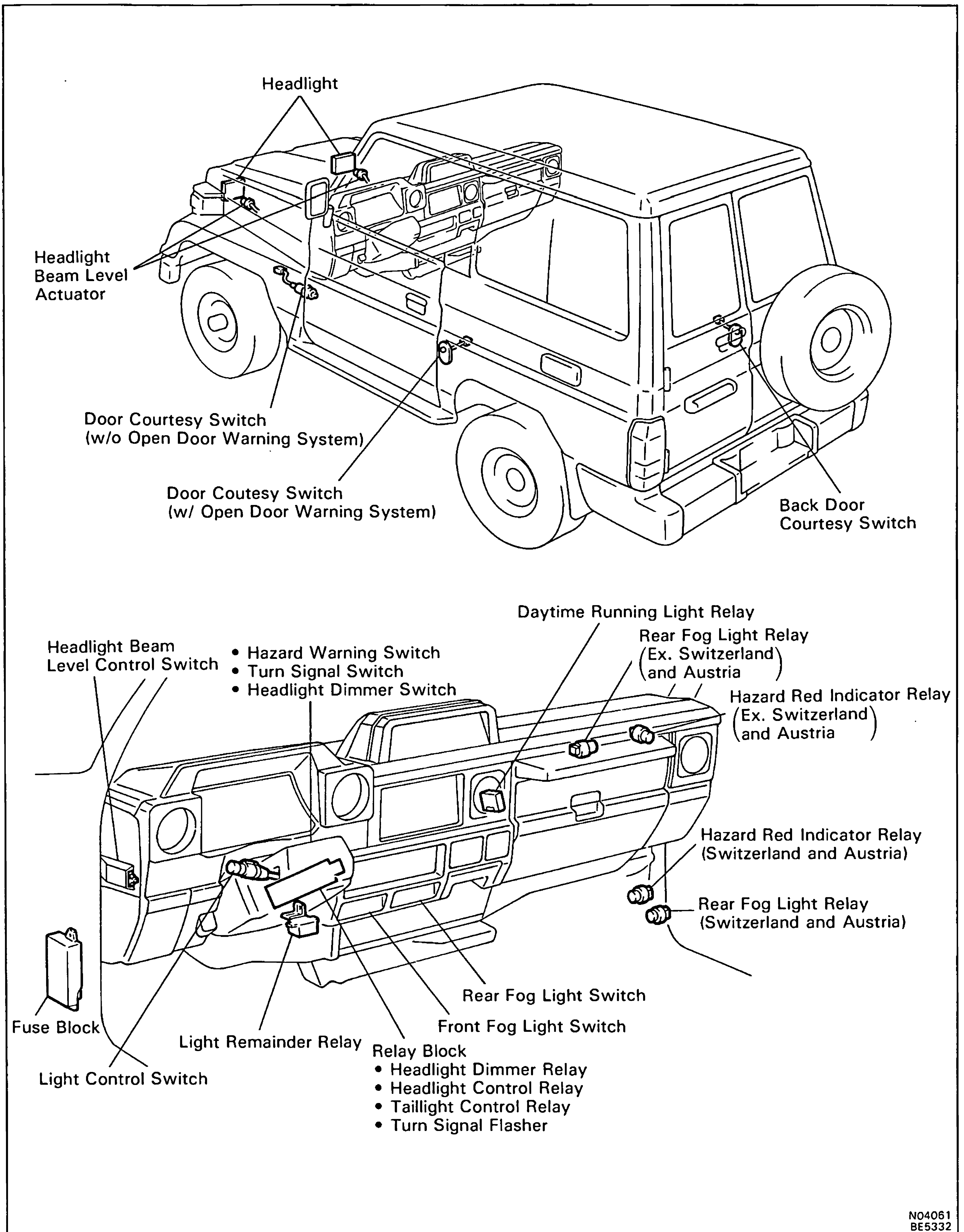
1. CHARGE	7.5A
2. CIG	15A
3. EFI (Gasoline)	15A
ECD (Diesel)	15A
4. A.C.	10A
5. TURN (Europe)	7.5A
TURN (Ex.Europe)	10A
6. DEFOG	15A
7. WIPER	20A
8. ENGINE	15A
9. ST (Diesel)	7.5A
10. STOP	10A
11. DOME	7.5A
12. HEAD LH-LWR (Europe)	10A
RADIO (Ex.Europe)	10A
13. HEAD RH-LWR	10A
14. TAIL LH (Europe)	10A
TAIL (Ex.Europe)	20A
15. TAIL RH (Europe)	10A
GOVERNOR	
(Ex.Europe Gasoline)	30A
GLOW	
(Ex.Europe Diesel)	7.5A
16. HAZ-HORN	15A
17. HEAD LH-UPR (Europe)	10A
HEAD LH (Ex.Europe)	10A
18. HEAD RH-UPR (Europe)	10A
HEAD RH (Ex.Europe)	10A
19. IGN (Gasoline)	7.5A
FUEL-HTR (Diesel)	15A
20. SPARE	7.5A
21. SPARE	15A

Medium Current Fuses

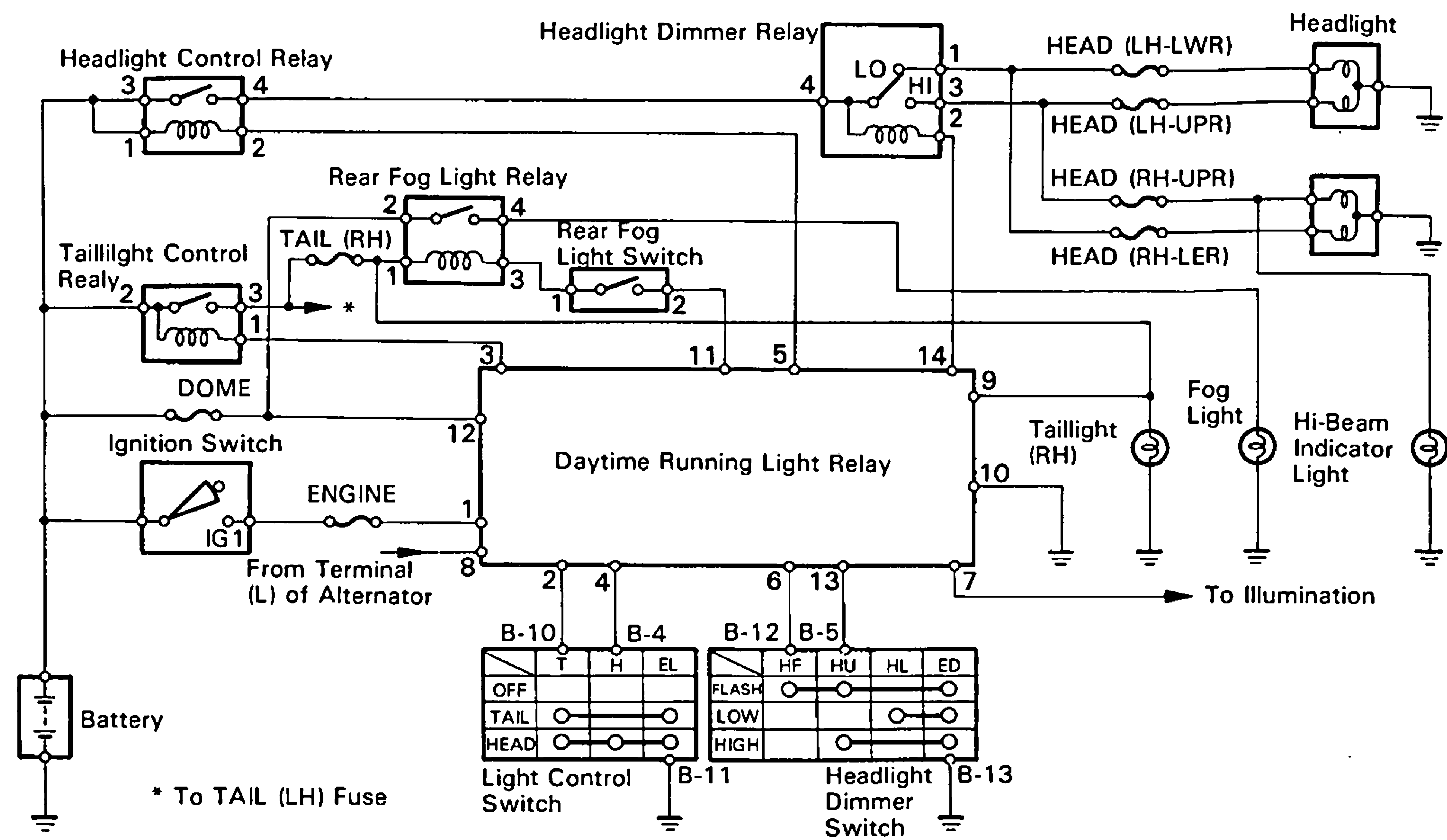
A. DOOR	30A
B. HEATER	30A
C. POWER	30A
D. DIFF.	30A

LIGHTING SYSTEM

Parts Location

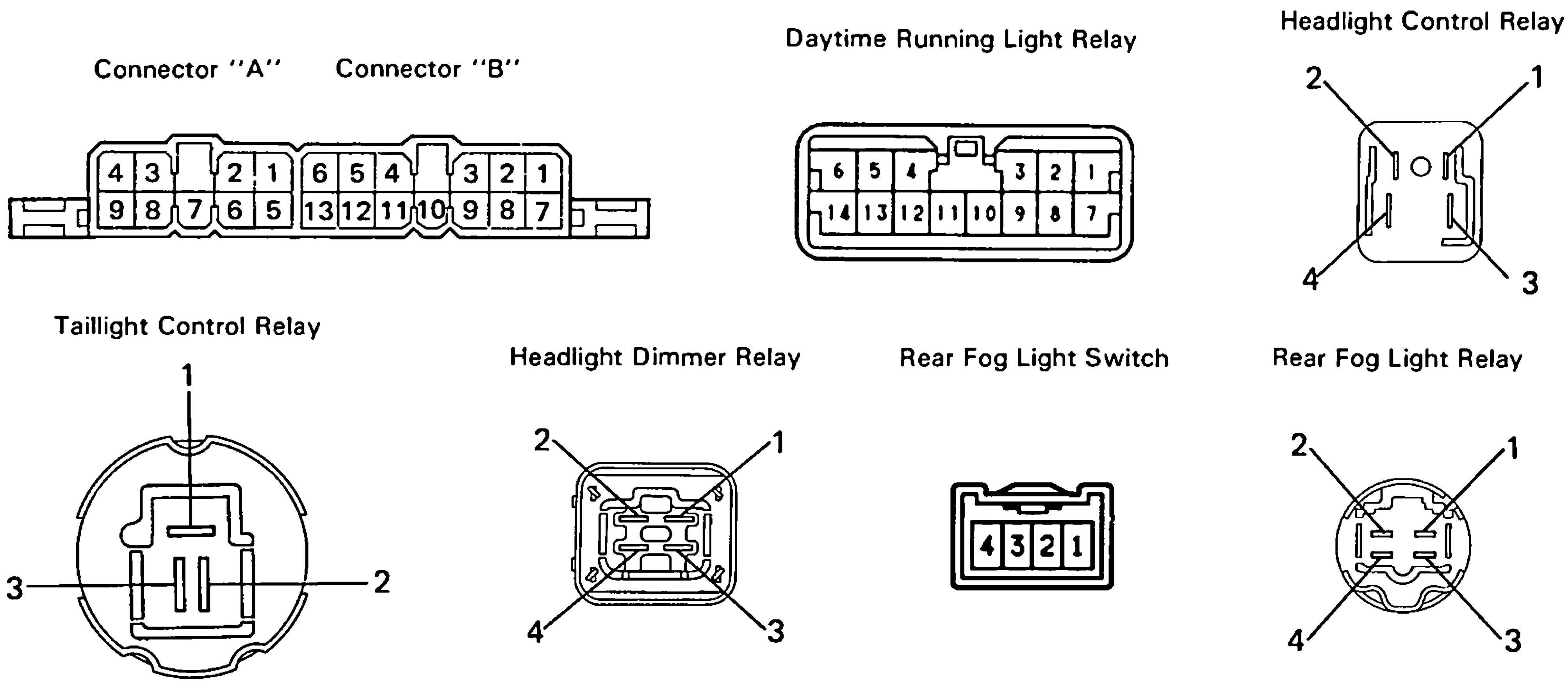


• w/Daytime Running Light System (with Rear Fog Light System)

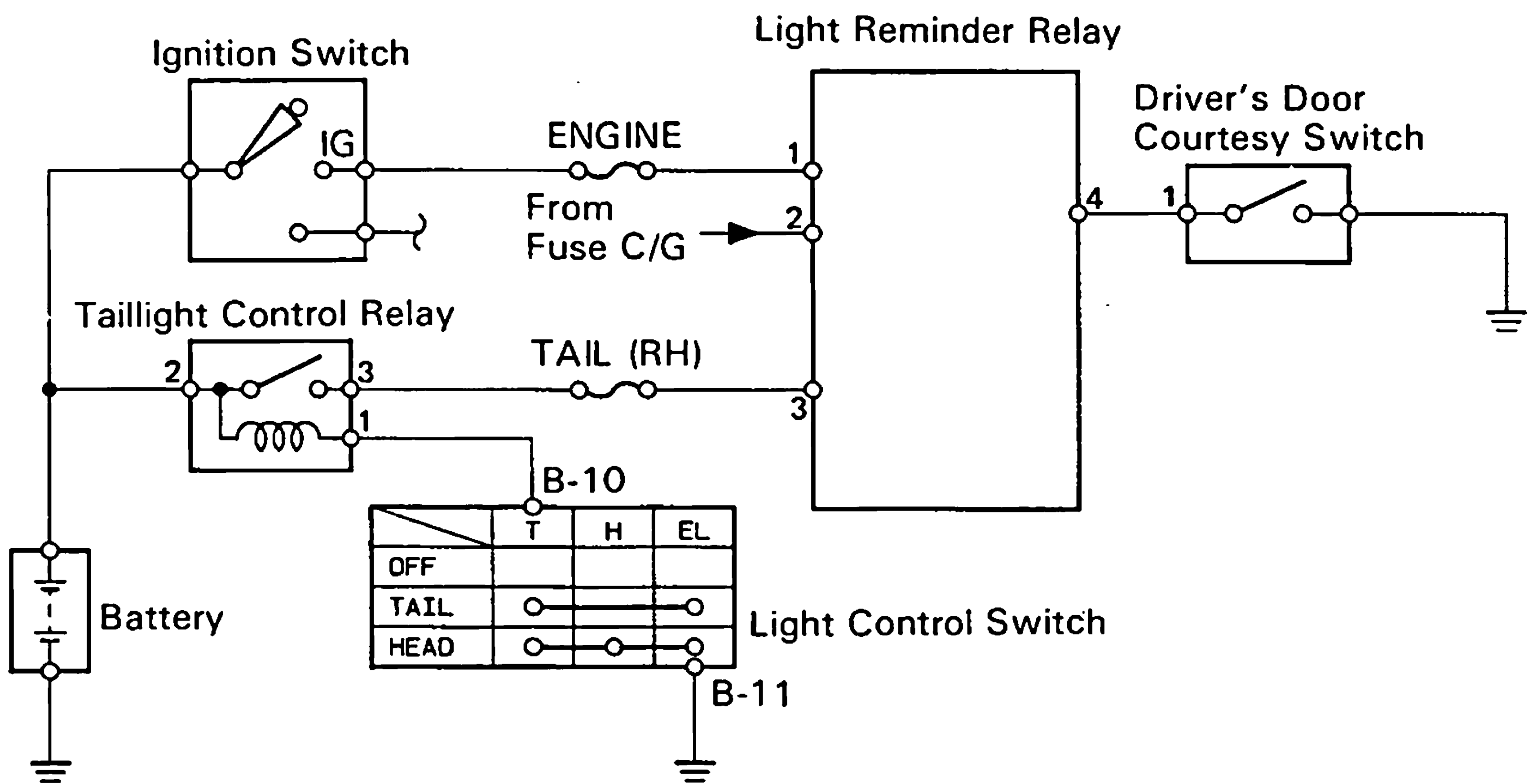


The POWER SOURCE CIRCUIT has been simplified. For full details, see pub.No.RM183E, page BE-10,11,12.

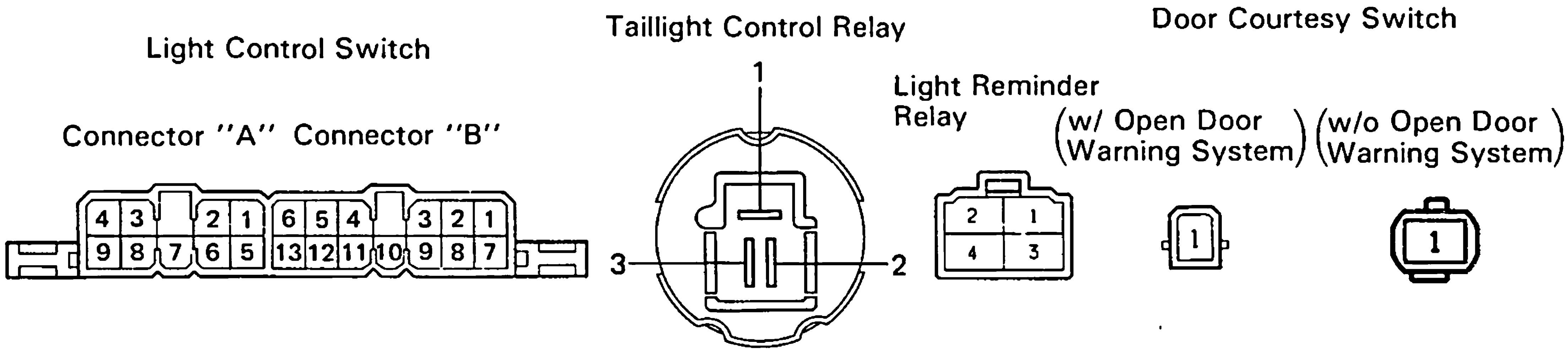
- Light Control Switch
- Dimmer Switch

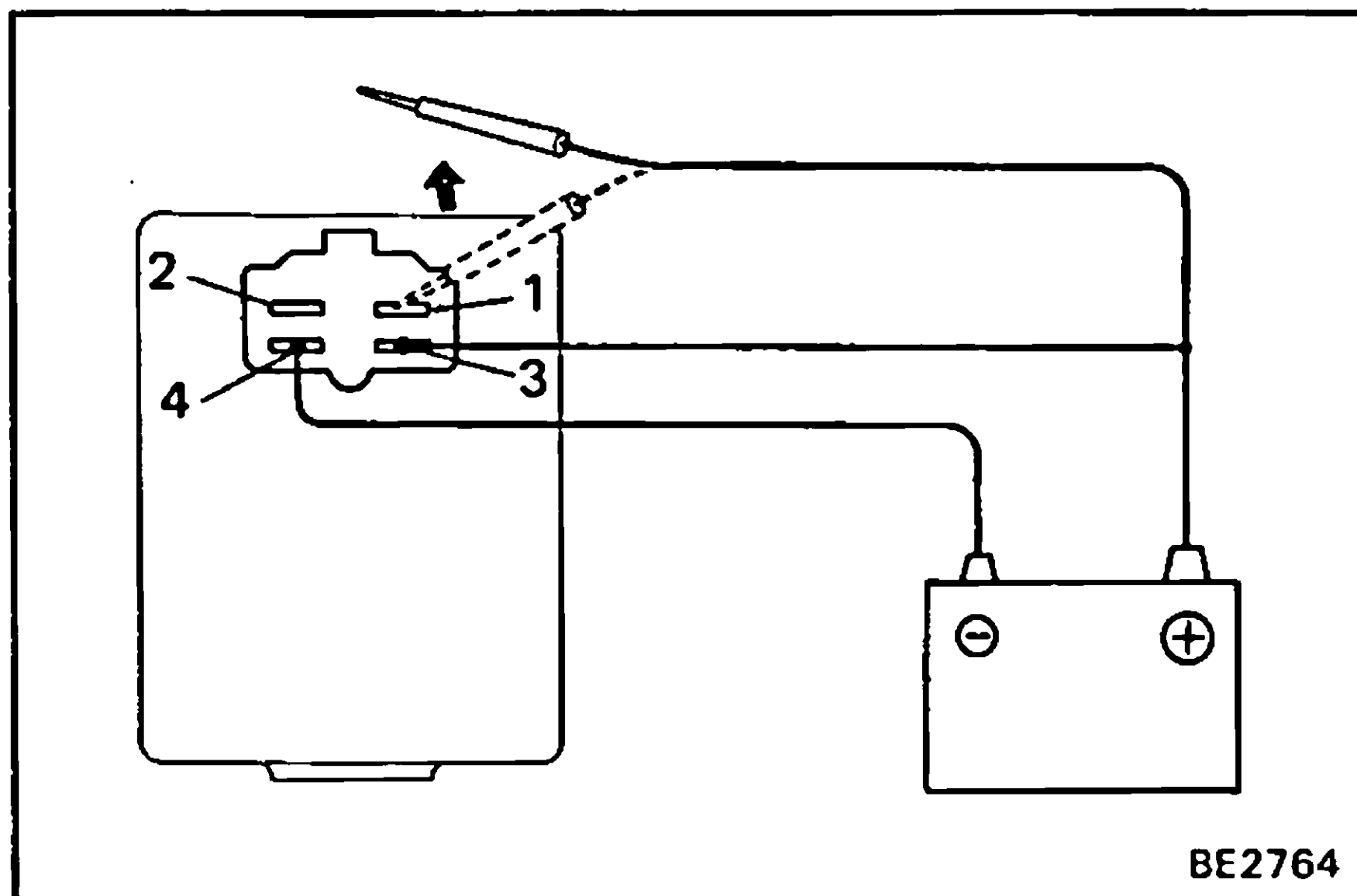
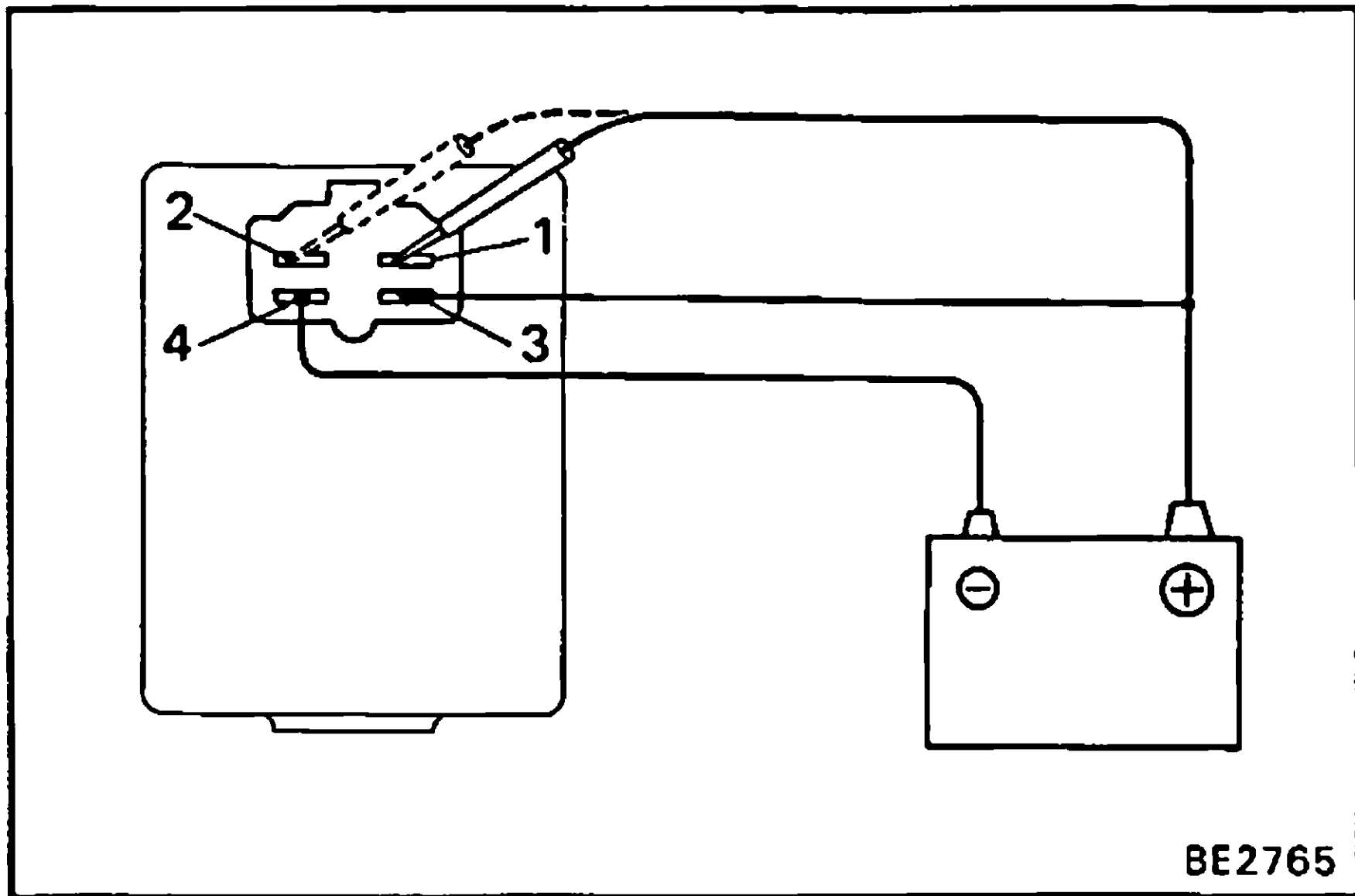


Lights-On Warning System

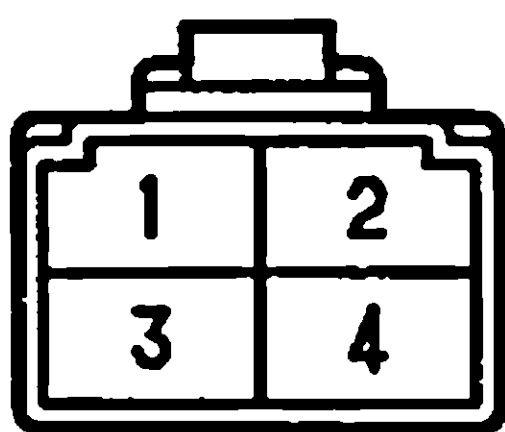


The POWER SOURCE CIRCUIT has been simplified. For full details, see pub.No.RM183E, pages BE-10,11,12.





Wire Harness Side



Lights-On Warning System

1. INSPECT LIGHT REMAINDER RELAY

(Operation)

- Connect the positive (+) lead from the battery to terminal 3 and the negative (—) lead to terminal 4.
- Check that the buzzer does not sound when connected terminal 1 or 2 from the positive (+) lead.
- Check that the buzzer sounds when disconnecting terminal 1 or 2 from the positive (+) lead.

If operation is not as specified, replace the relay.

(Relay Circuit)

Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	4 — Ground	Driver's door position	Closed (Courtesy switch OFF)	No continuity
			Opened (Courtesy switch ON)	Continuity
Voltage	1 — Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	2 — Ground	Ignition switch position	LOCK	No voltage
			ON or ACC	Battery voltage
	3 — Ground	Light control switch	OFF	No voltage
			TAIL or HEAD	Battery voltage

If circuit is as specified, replace the relay.

2. INSPECT DRIVER'S DOOR COURTESY SWITCH

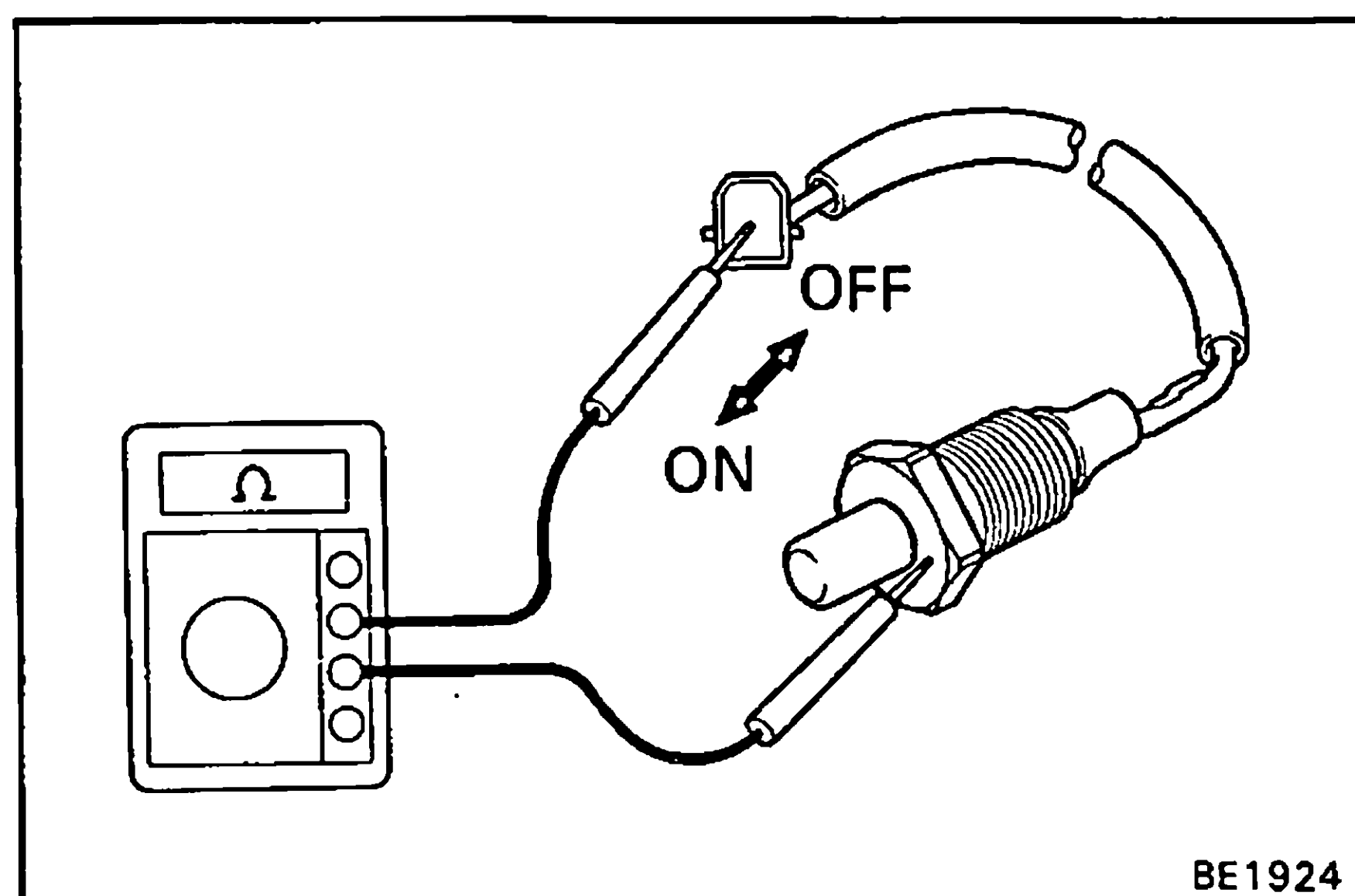
(w/o Open Door Warning System)

- Check that there is continuity between terminal and the switch body with the switch ON (switch pin released).
- Check that there is no continuity between terminal and the switch body with the switch OFF (switch pin pushed in).

If operation is not as specified, replace the switch.

(w/ Open Door Warning System)

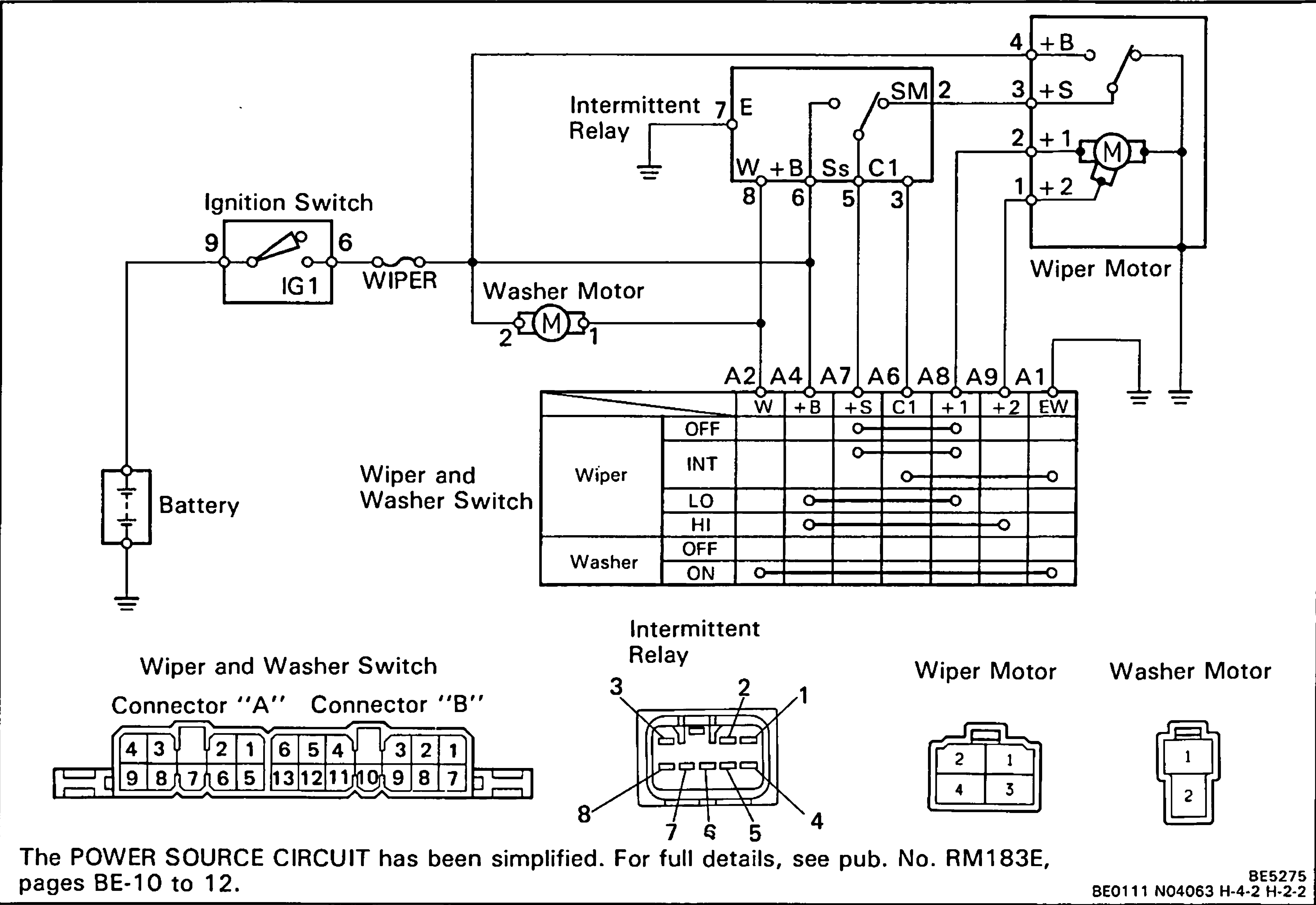
See pub.No. RM183E, Open Door Warning System on page BE-65.



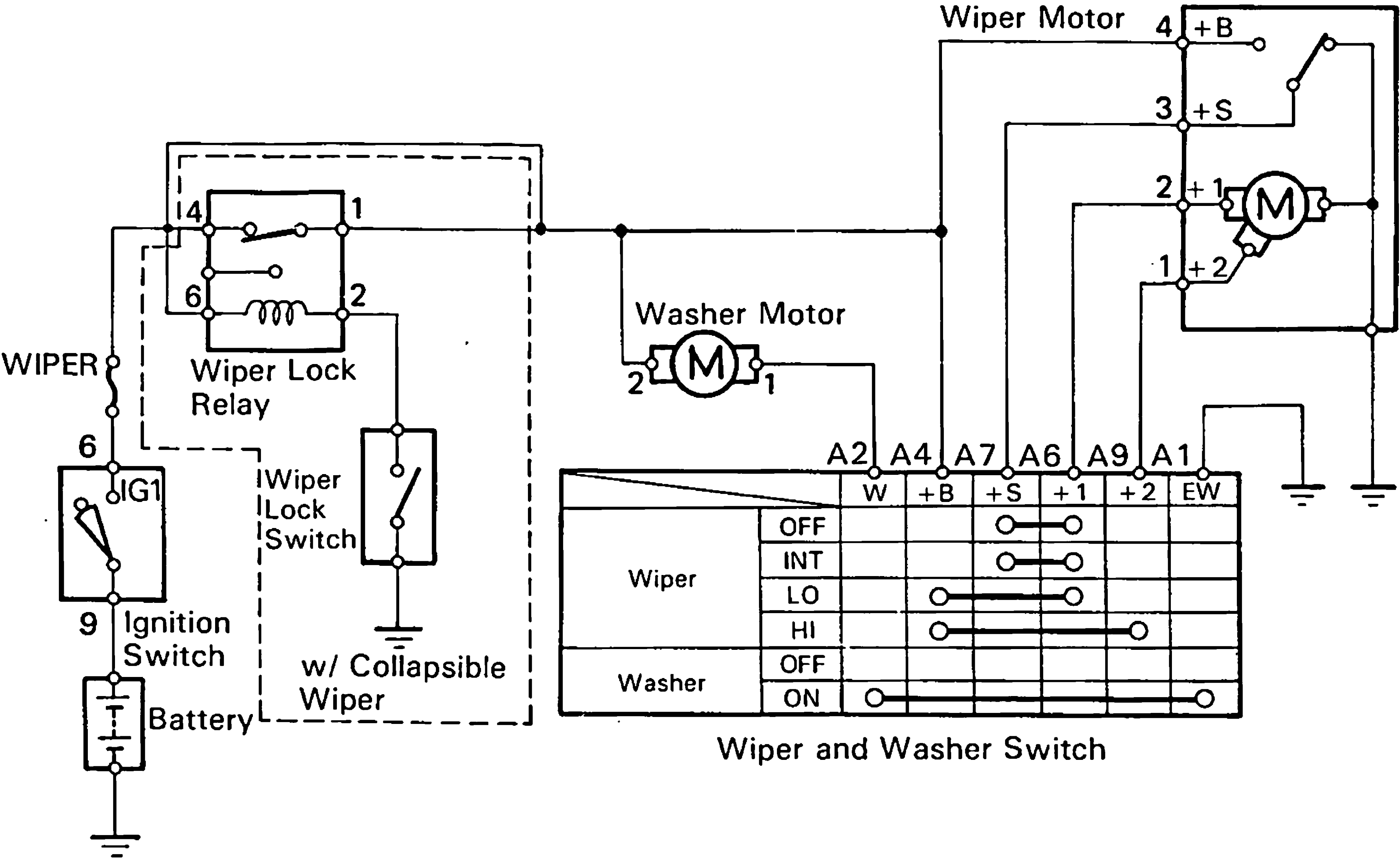
WIPER AND WASHER SYSTEM

Wiring and Connector Diagram

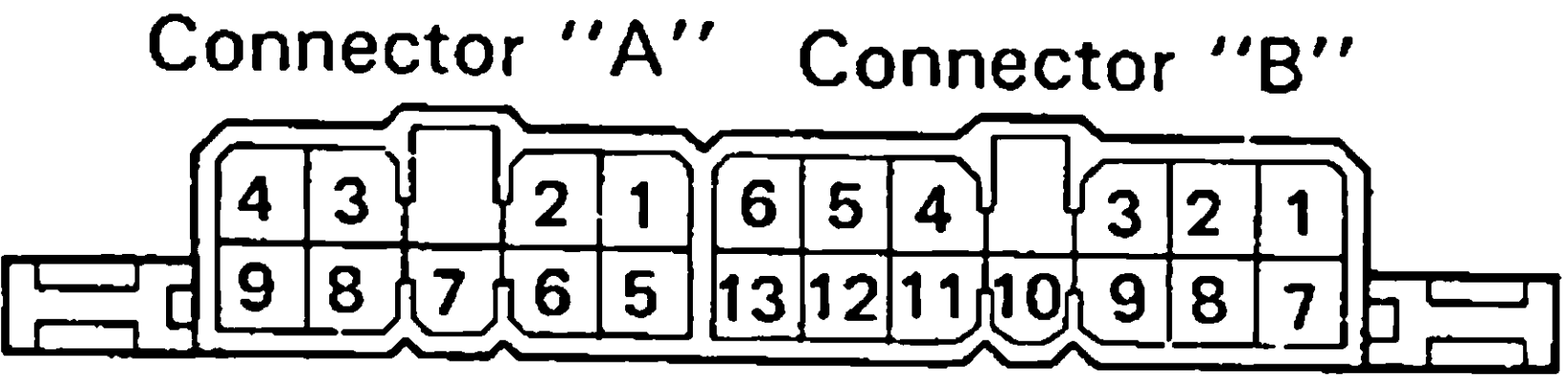
(Front: Intermittent Type w/ Washer Linked)



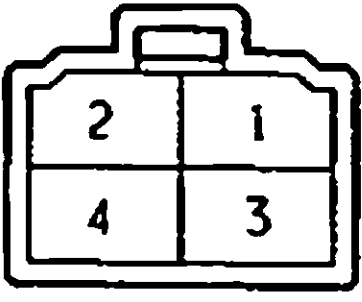
(Front: Intermittent w/o Washer Linked)



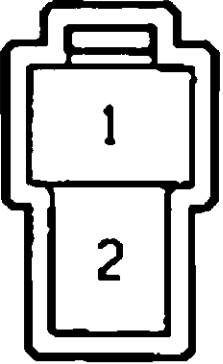
Wiper and Washer Switch



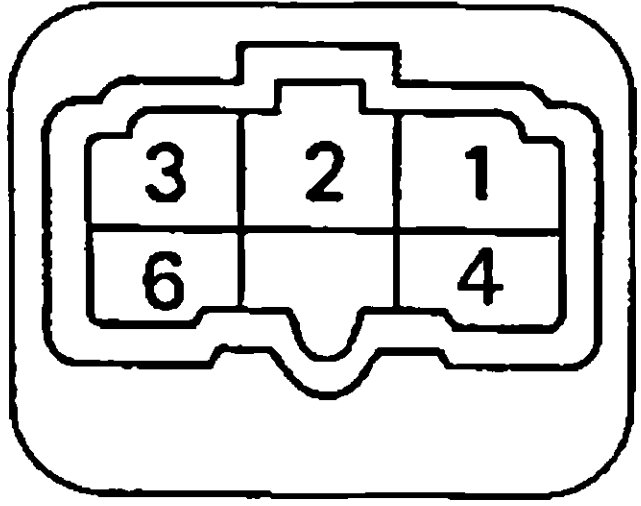
Wiper Motor



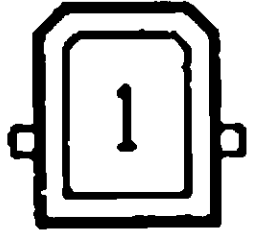
Washer Motor



Wiper Lock Relay
(w/ Collapsible Wiper)

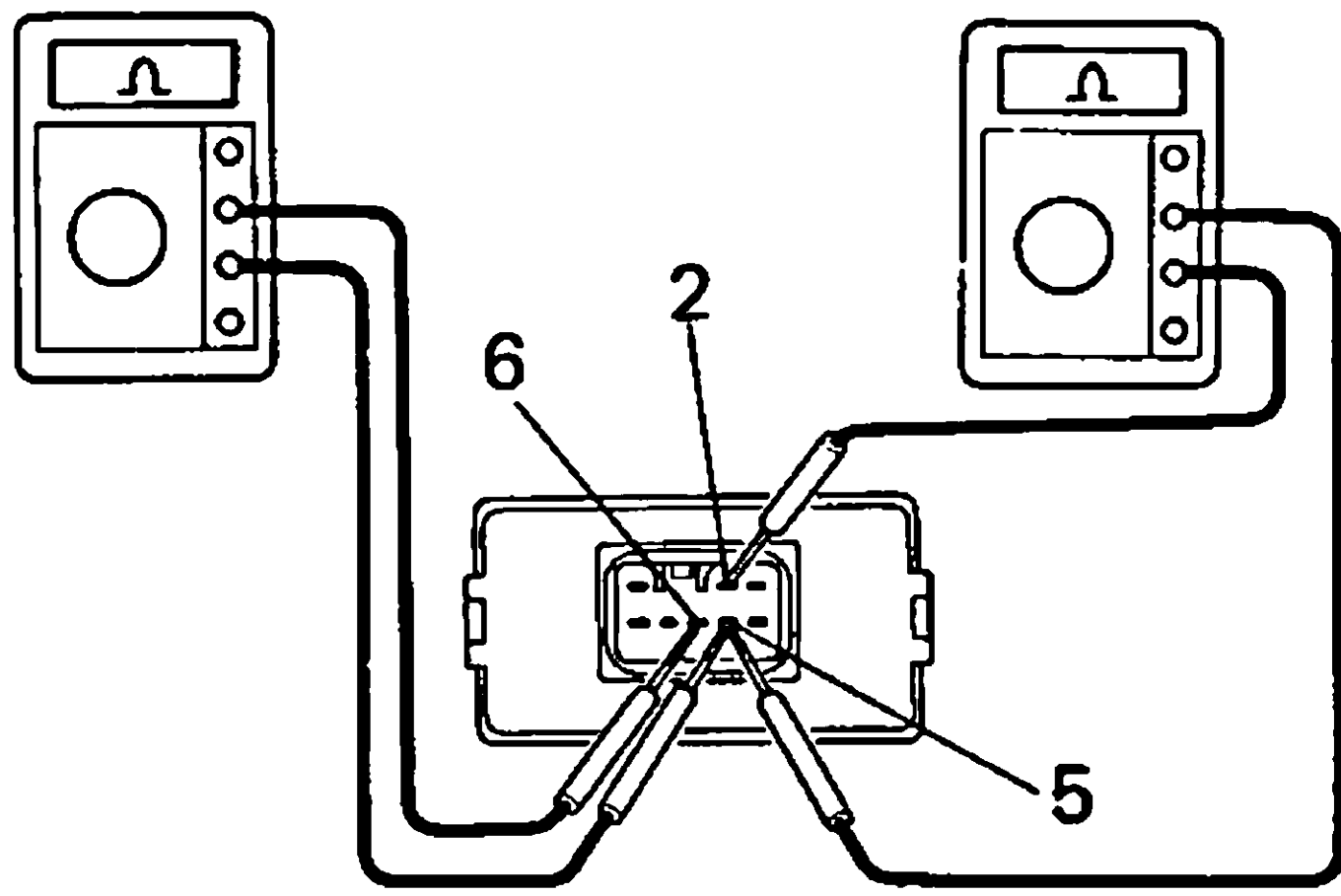
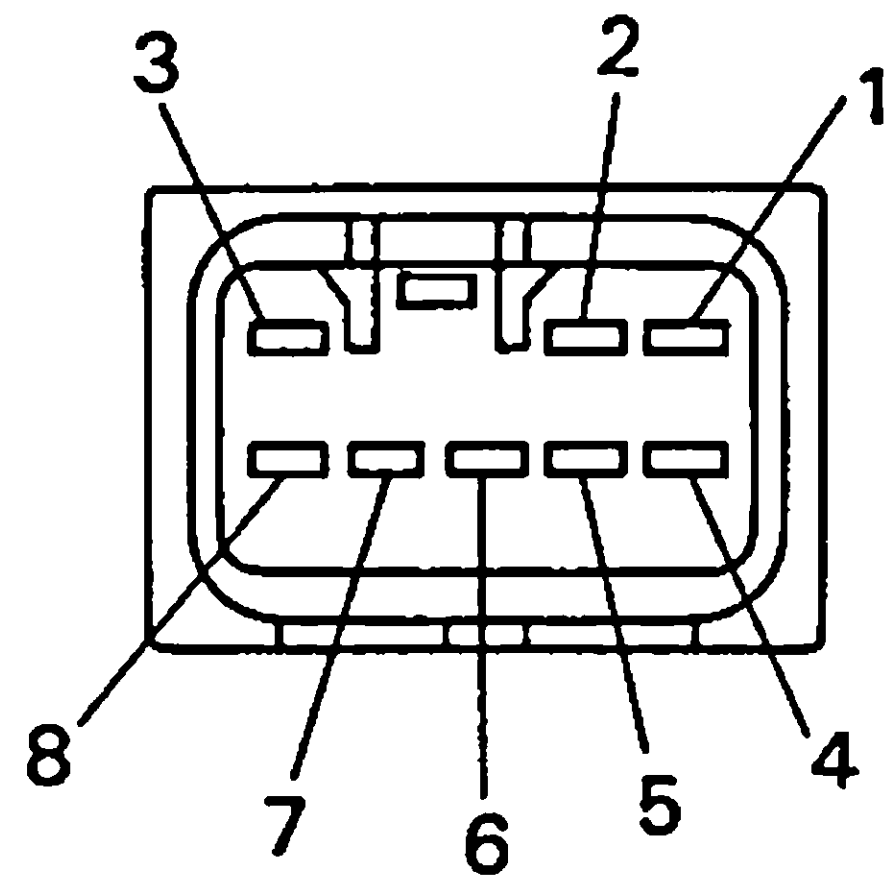


Wiper Lock Switch
(w/ Collapsible Wiper)



The POWER SOURCE CIRCUIT has been simplified. For full details, see pub.No.RM183E pages BE-10 to 12.

Relay Side



N04065
N04066

Parts Inspection

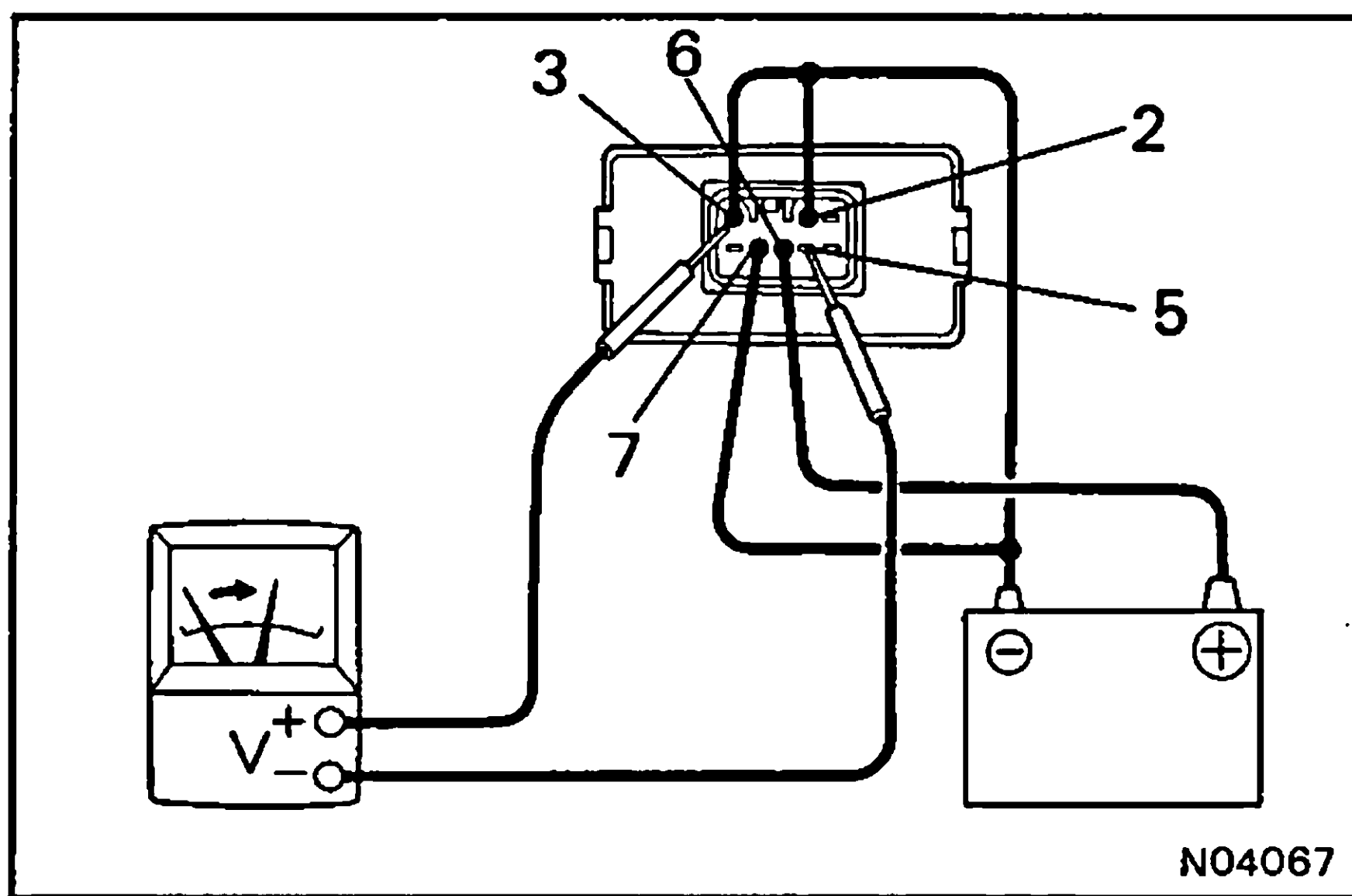
INSPECT RELAYS

(Front Wiper Relay: w/ Washer Linked)

(Continuity)

- Check that there is no continuity between terminals 5 and 6.
- Check that there is continuity between terminals 2 and 5.

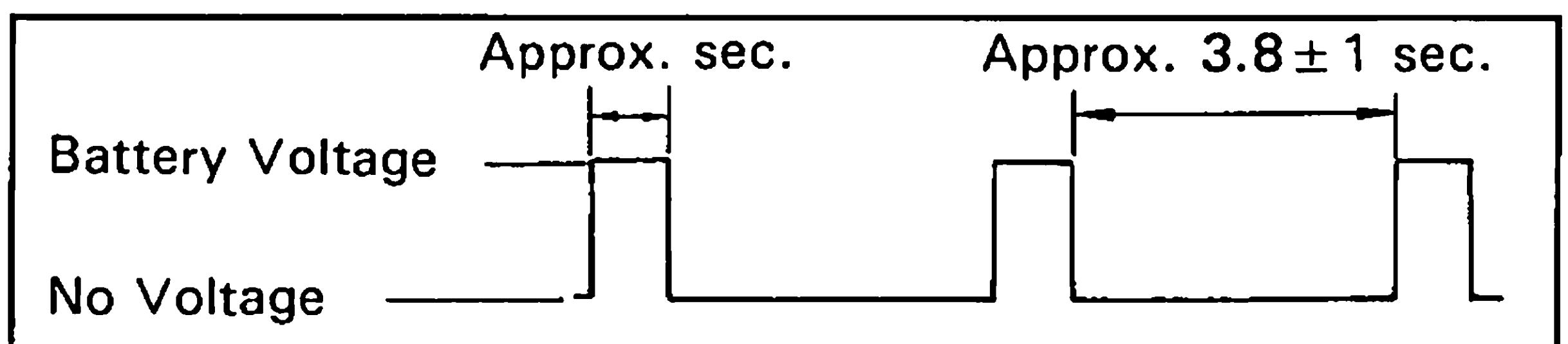
If continuity is not as specified, replace the relay.



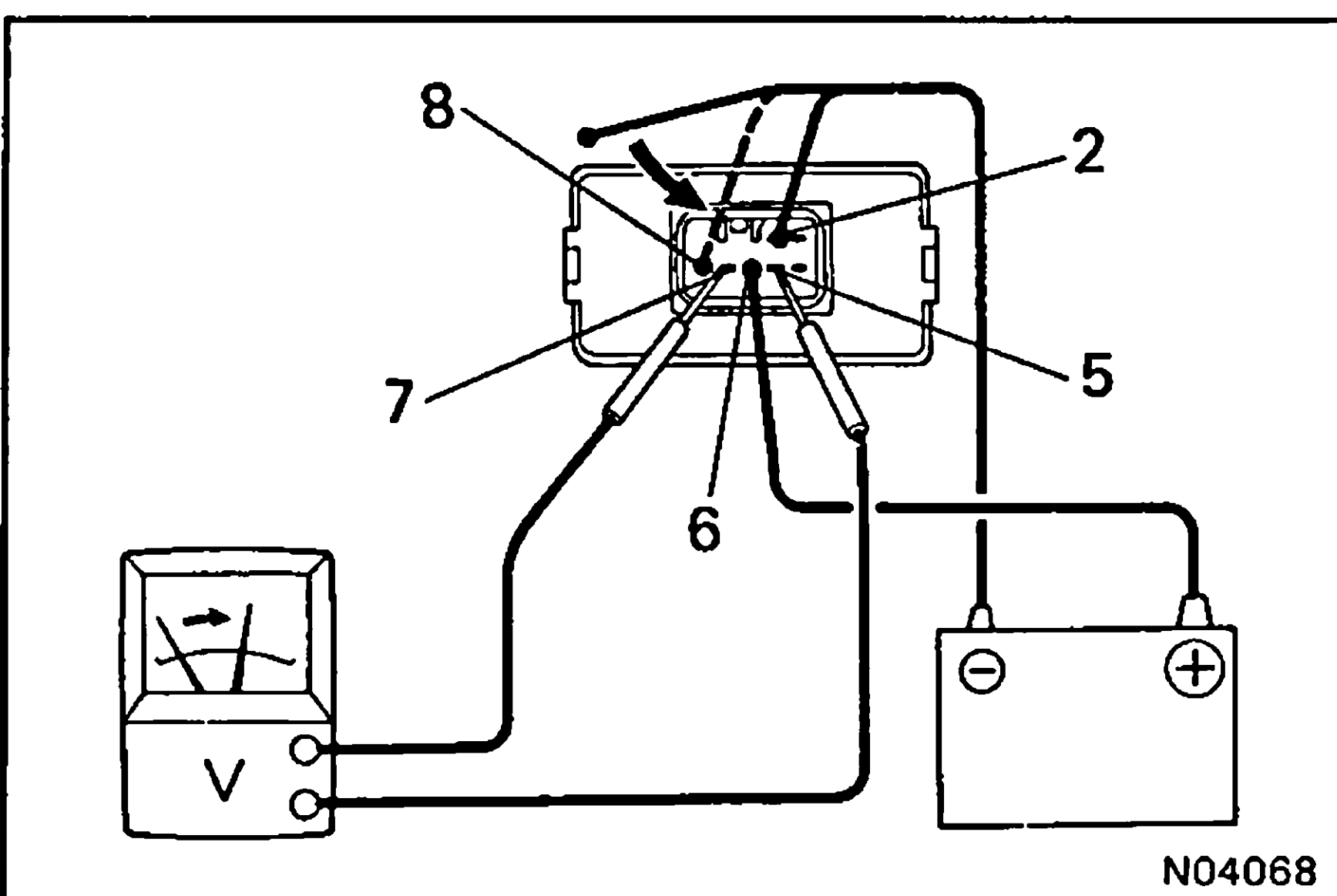
N04067

(Operation at Intermittent)

- Connect the positive (+) lead from the battery to terminal 6 and the negative (—) lead to terminal 3, 2 and 7.
- Connect the positive (+) lead from the voltmeter to terminal 5 and the negative (—) lead to terminal 3.
- Check that the voltage changes as shown in the table.



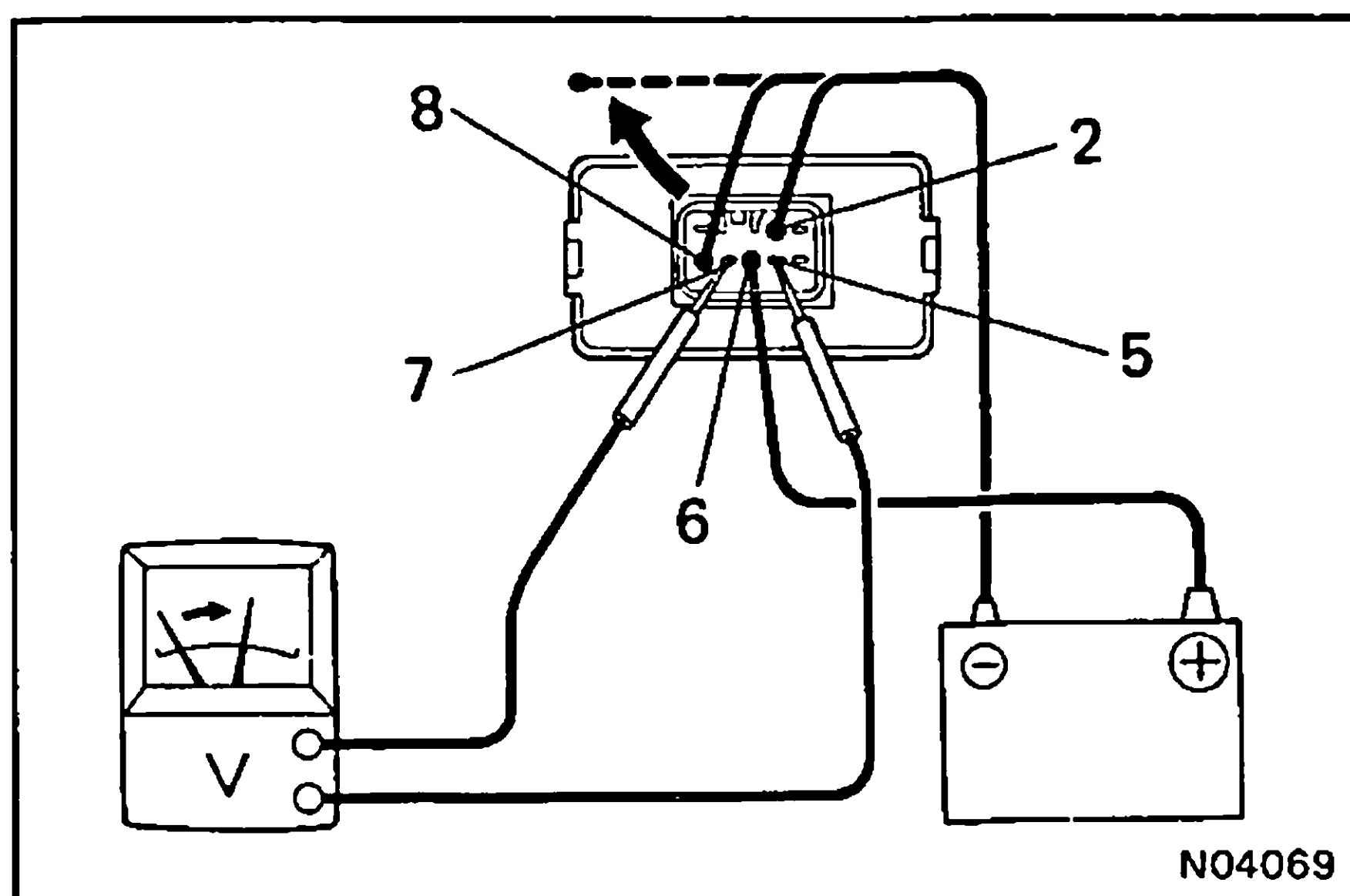
If operation is not as specified, replace the switch.



N04068

(Operation at Washer Linked)

- Connect the positive (+) lead from the battery to terminal 6 and the negative (—) lead to terminal 7 and 2.
- Connect the positive (+) lead from the voltmeter to terminal 5 and the negative (—) lead to terminal 7.
- Connect the negative (—) lead from the battery to terminal 8, check that the voltage changes soon to battery voltage from to voltage.

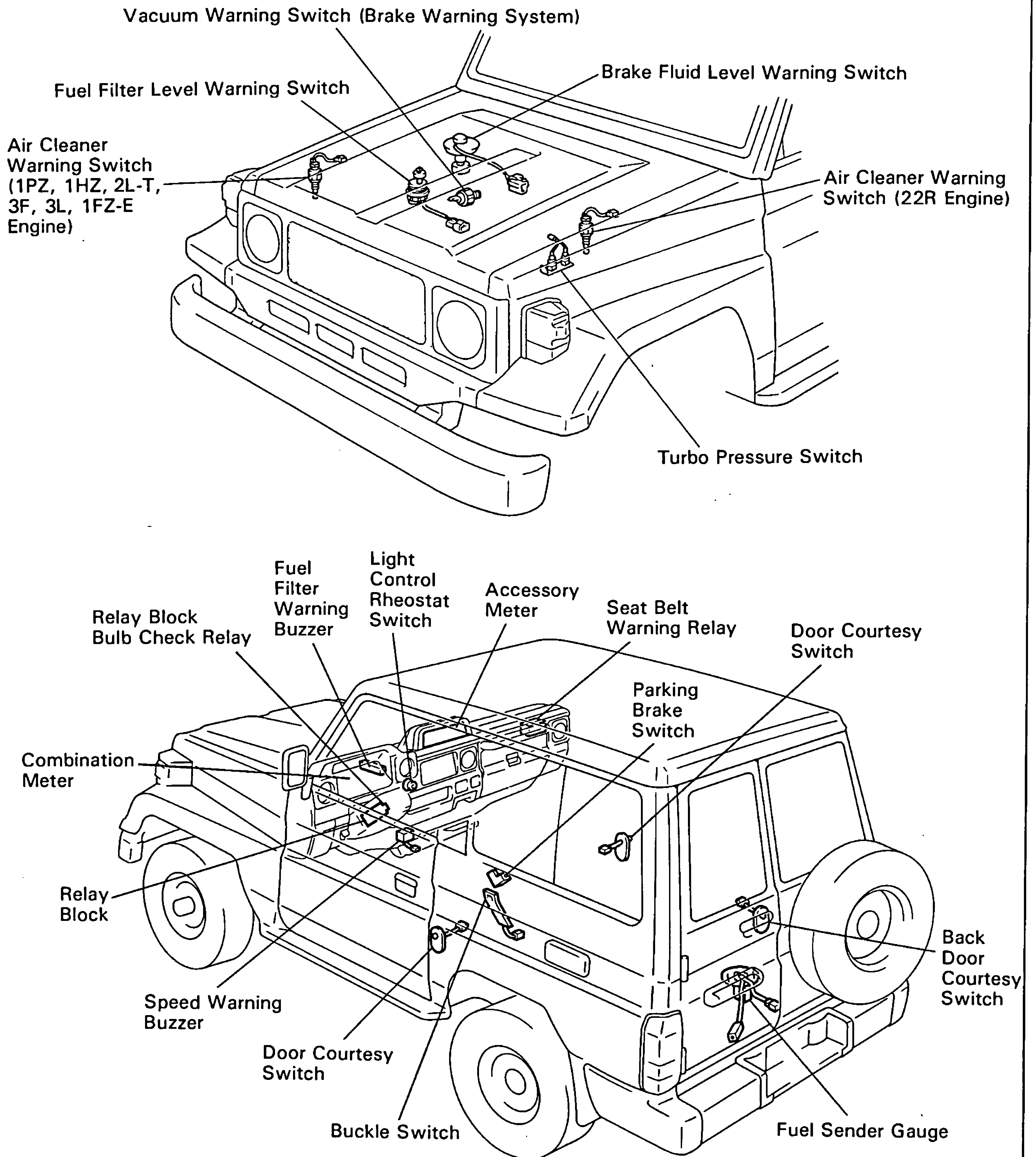


- (d) Disconnect the negative (—) lead from terminal 8, check that the voltage changes to no voltage from battery voltage approximately 2.5 seconds later.

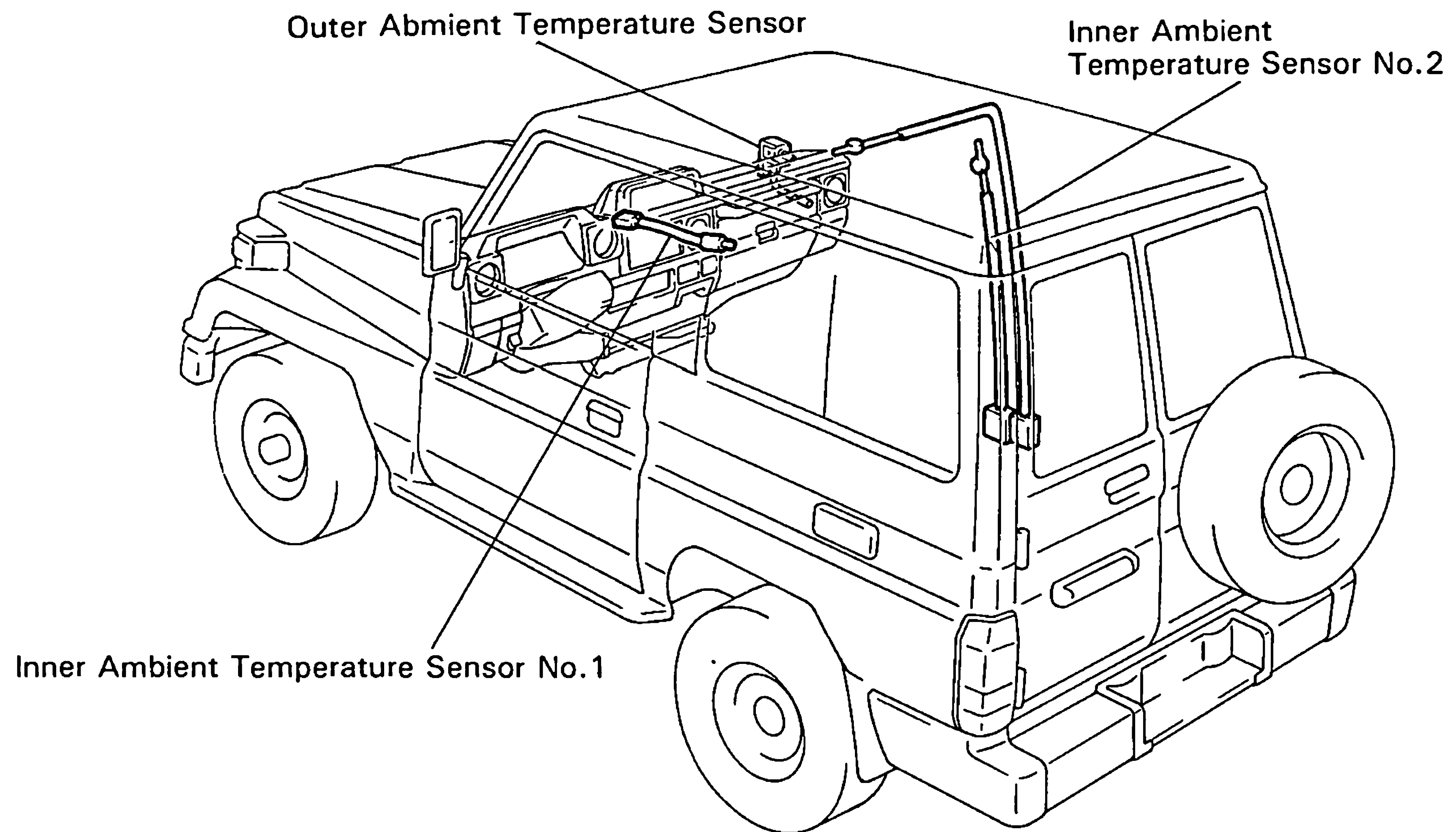
If operation is not as specified, replace the relay.

COMBINATION METER

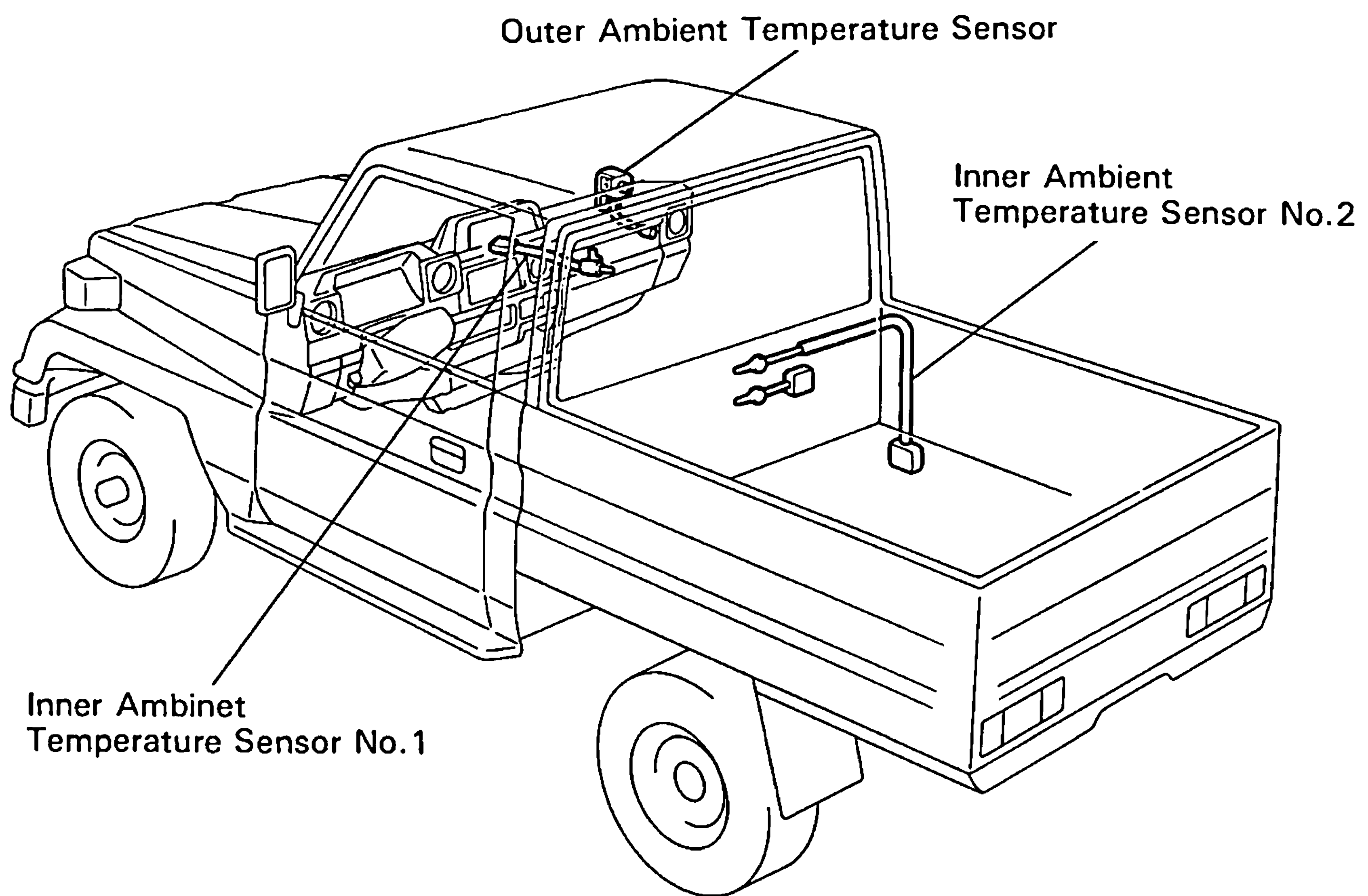
Parts Location



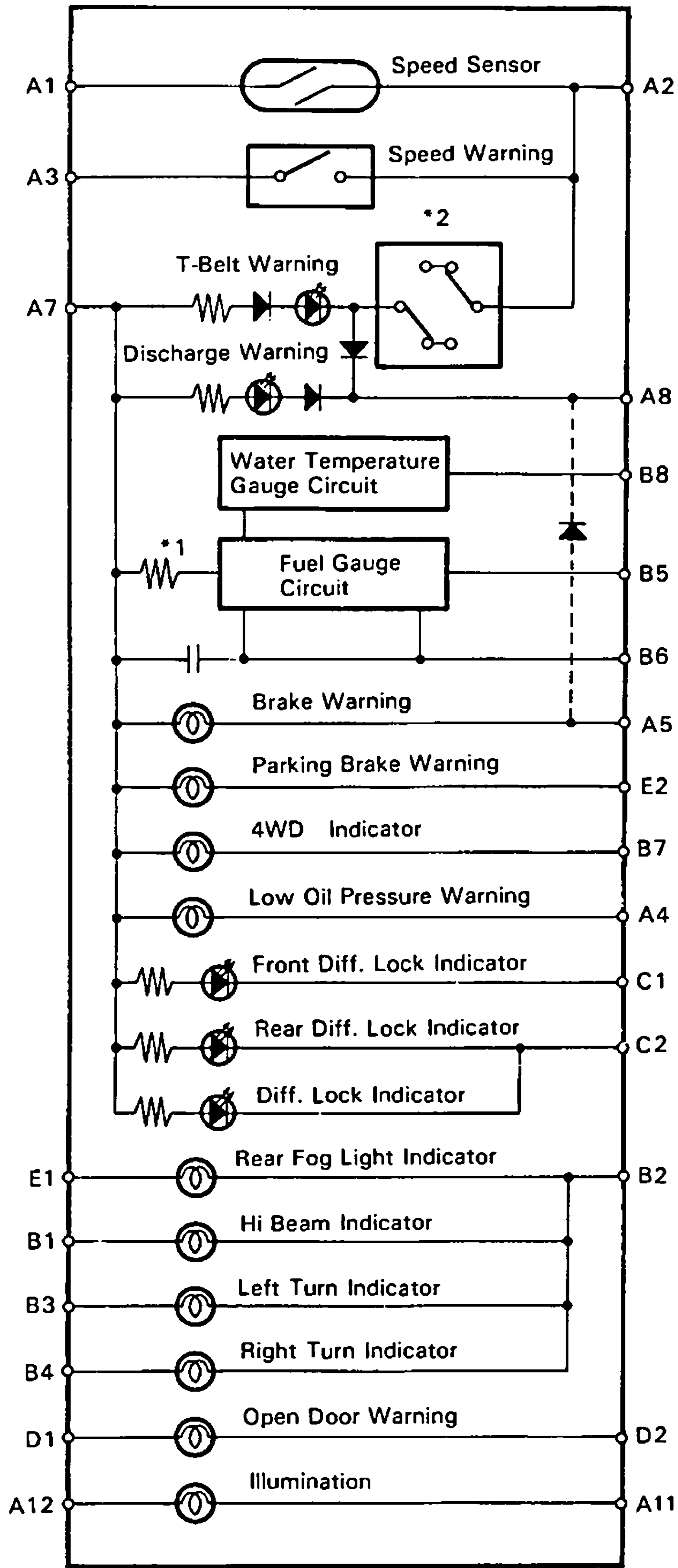
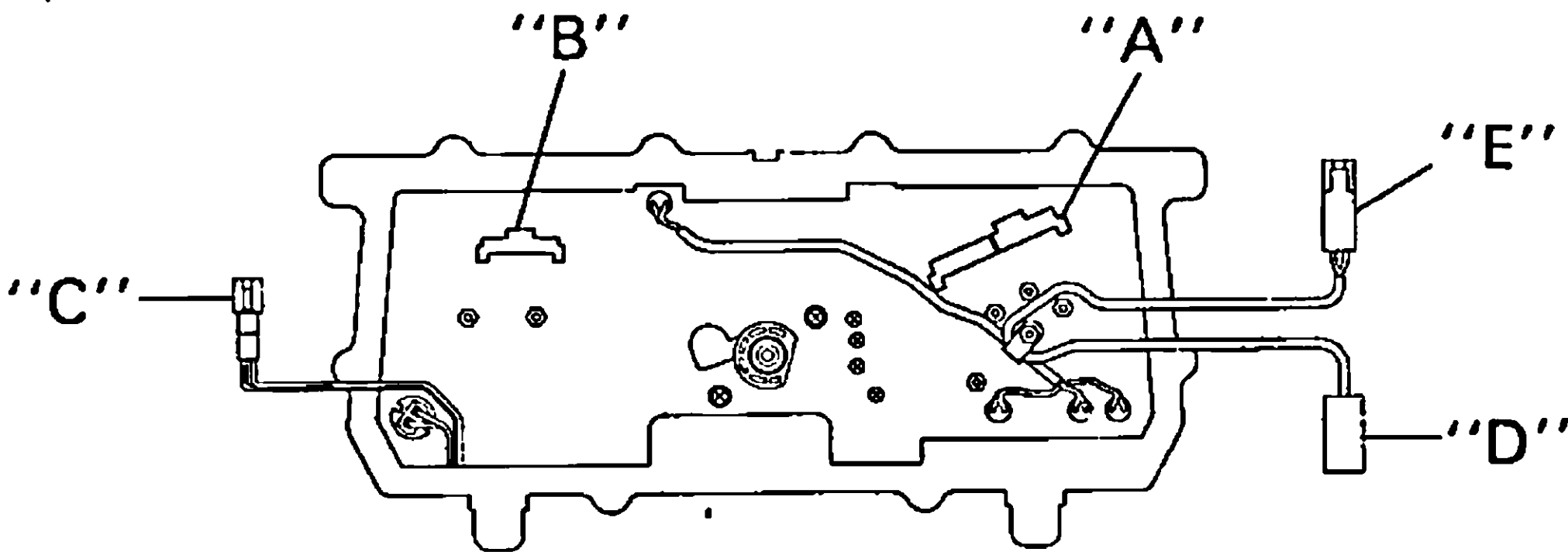
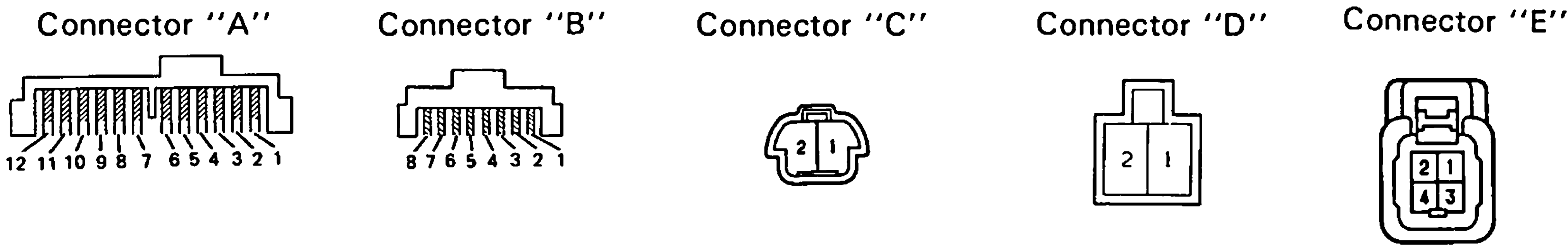
Hard Top



Pick UP



Meter Circuit
(w/o Tachometer)

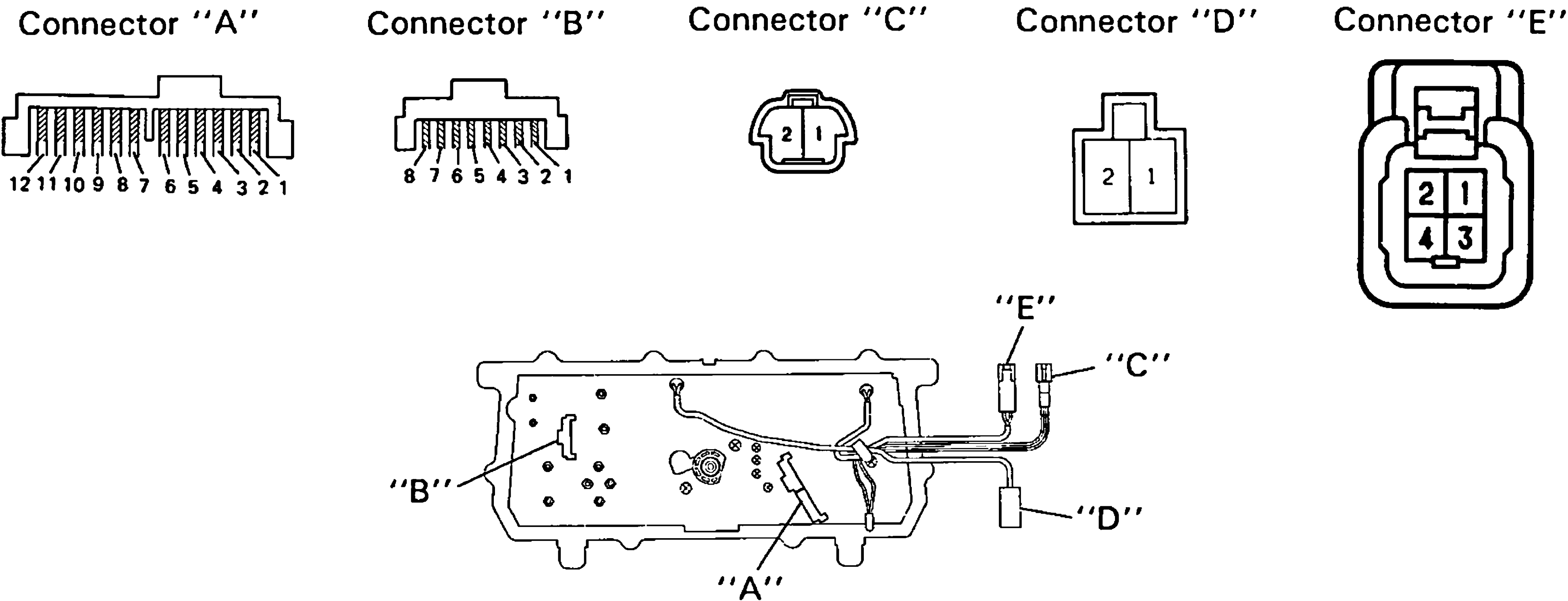


BE1267 BE2639 S-2-2-G N-2-2 e-4-2
BE5355

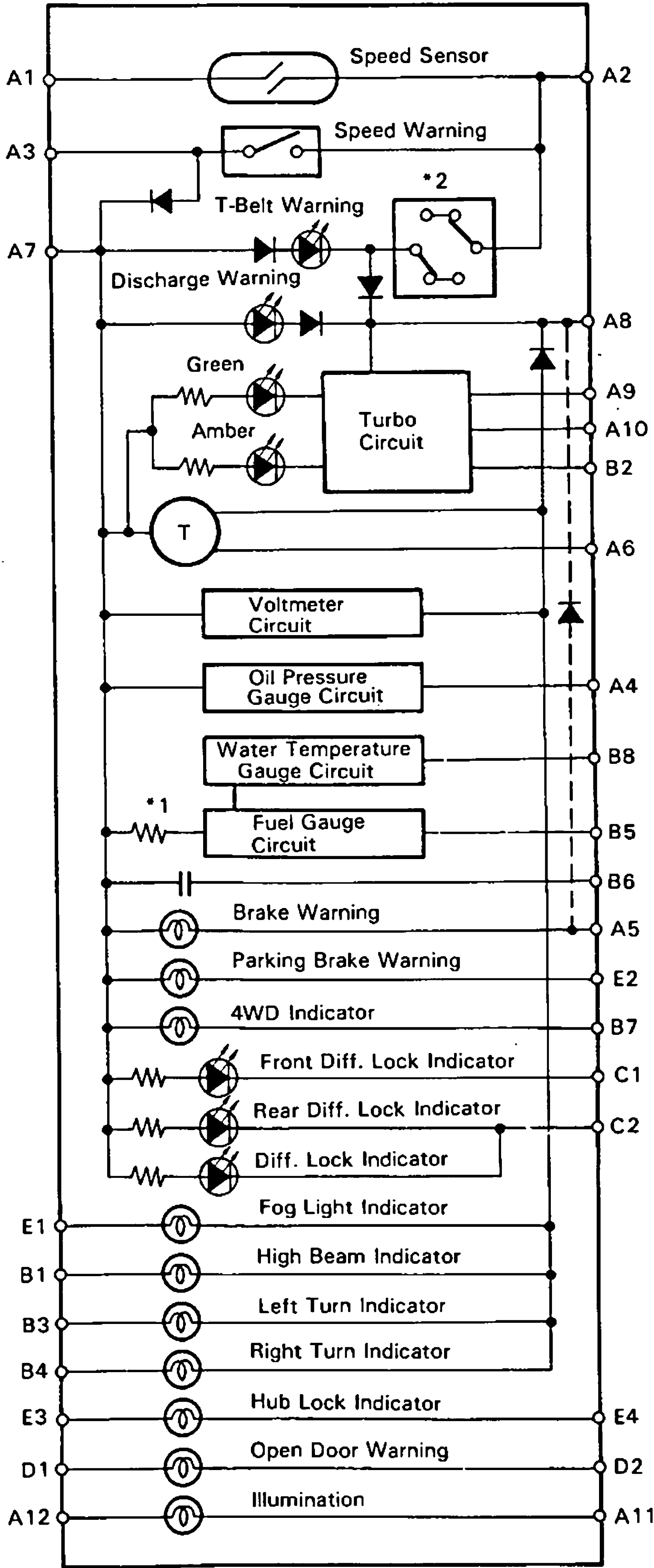
No.		Wiring connector side
A	1	Emission ECU
	2	Ground
	3	Speed Warning Buzzer
	4	Low Oil Pressure Warning Switch
	5	Brake Fluid Level Warning Switch, Vacuum Switch (Diesel Engine) and Parking Brake Switch (Ex. Europe)
	7	ENGINE Fuse
	8	CHARGE Fuse
	11	Light Control Rheostat or Ground
B	12	TAIL Fuse
	1	Headlight Dimmer Switch
	2	Ground
	3	Turn Signal Switch (Left)
	4	Turn Signal Switch (Right)
	5	Fuel Sender Gauge
	6	Ground
	7	4WD Switch
C	8	Water Temperature Sender Gauge
C	1	Front Diff. Lock Switch
	2	Rear Diff. Lock Switch
D	1	DOME Fuse
	2	Door Courtesy Switch
E	1	Rear Fog Light Switch (Europe)
	2	Parking Brake Switch (Europe)

* 1: 24V Vehicles
* 2: Cancel Switch and Warning Switch
----: Europe

(w/ Tachometer)



BE1267 BE2639 S-2-2-G N-2-2 e-4-2
BE5357



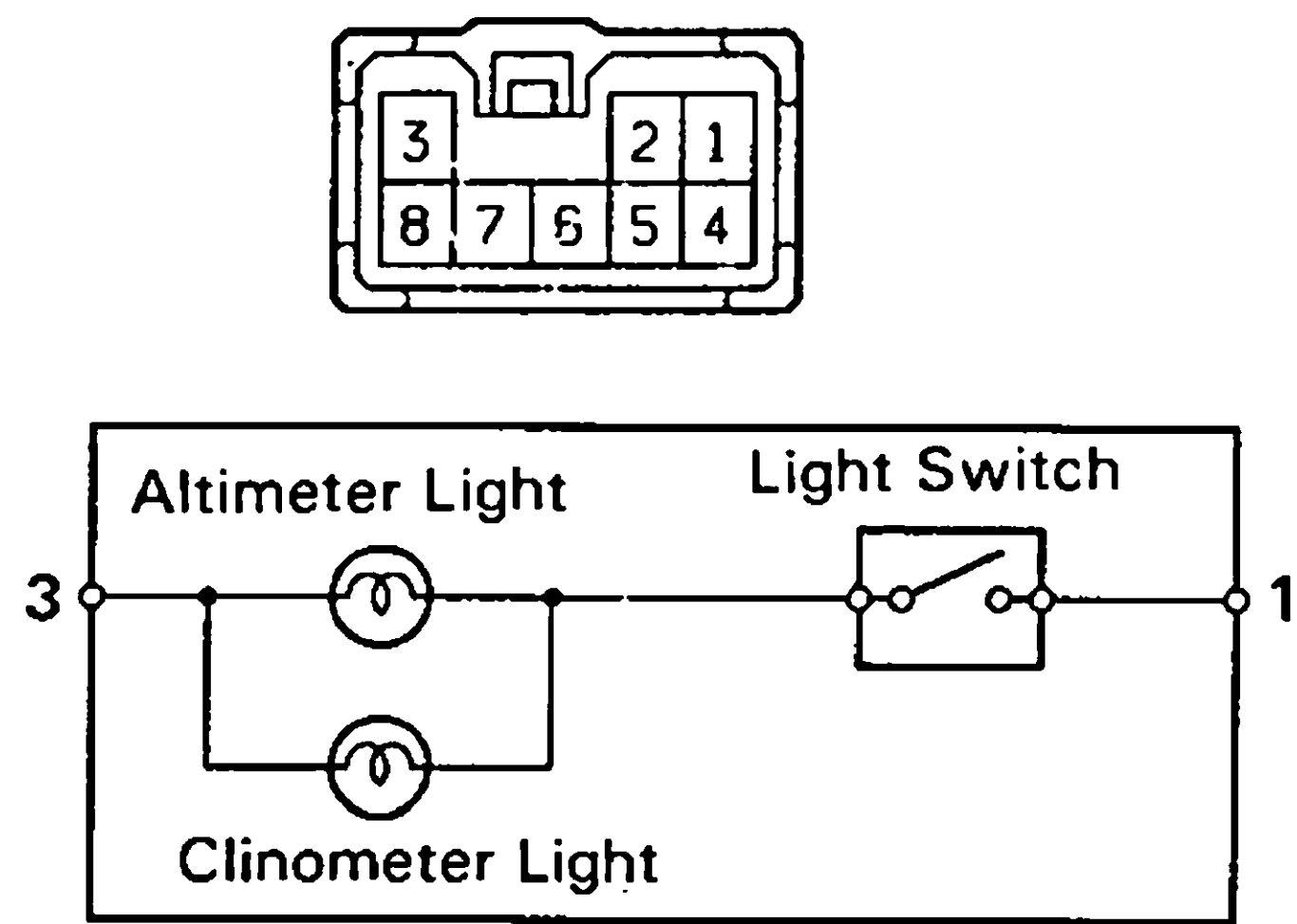
* 1: 24V Vehicles
* 2: Cancel Switch and Warning Switch
---: Europe

N04073

No.		Wiring connector side
A	1	Emission ECU
	2	Ground
	3	Speed Warning Buzzer
	4	Oil Pressure Sender Gauge
	5	Brake Fluid Level Warning Switch, Vacuum Switch (Diesel Engine), Parking Brake Switch (Ex. Europe) and Bulb Check Relay (Australia)
	6	Ignition Coil (Gasoline Engine) or Tacho Pick Sensor (Diesel Engine)
	7	ENGINE Fuse
	8	CHARGE Fuse
	9	Turbo Pressure Switch-terminal 2
	10	Turbo Pressure Switch-terminal 1
	11	Light Control Rheostat or Ground
	12	TAIL Fuse
B	1	Headlight Dimmer Switch
	2	Ground
	3	Turn Signal Switch (Left)
	4	Turn Signal Switch (Right)
	5	Fuel Sender Gauge
	6	Ground
	7	4WD Switch
	8	Water Temperature Sender Gauge
C	1	Front Diff. LOCK Switch
	2	Rear Diff. LOCK Switch
D	1	DOME Fuse
	2	Door Courtesy Switch
E	1	Rear Fog Light Switch
	2	Parking Brake Switch (Europe)
	3	ENGINE Fuse
	4	Free Wheel Hub ECU

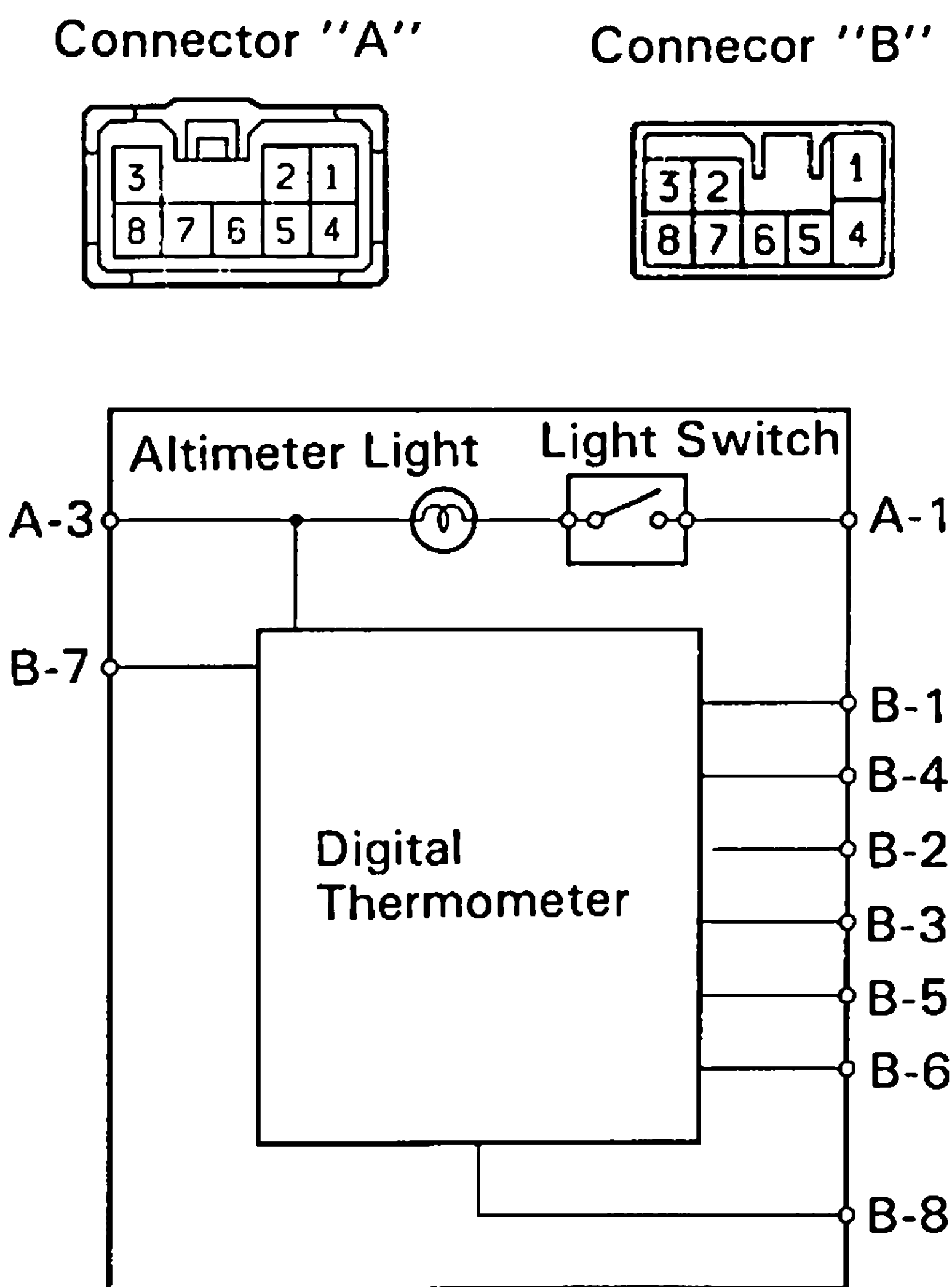
(Accessory Meter/Over Head Console)

• Altimeter and Clinometer



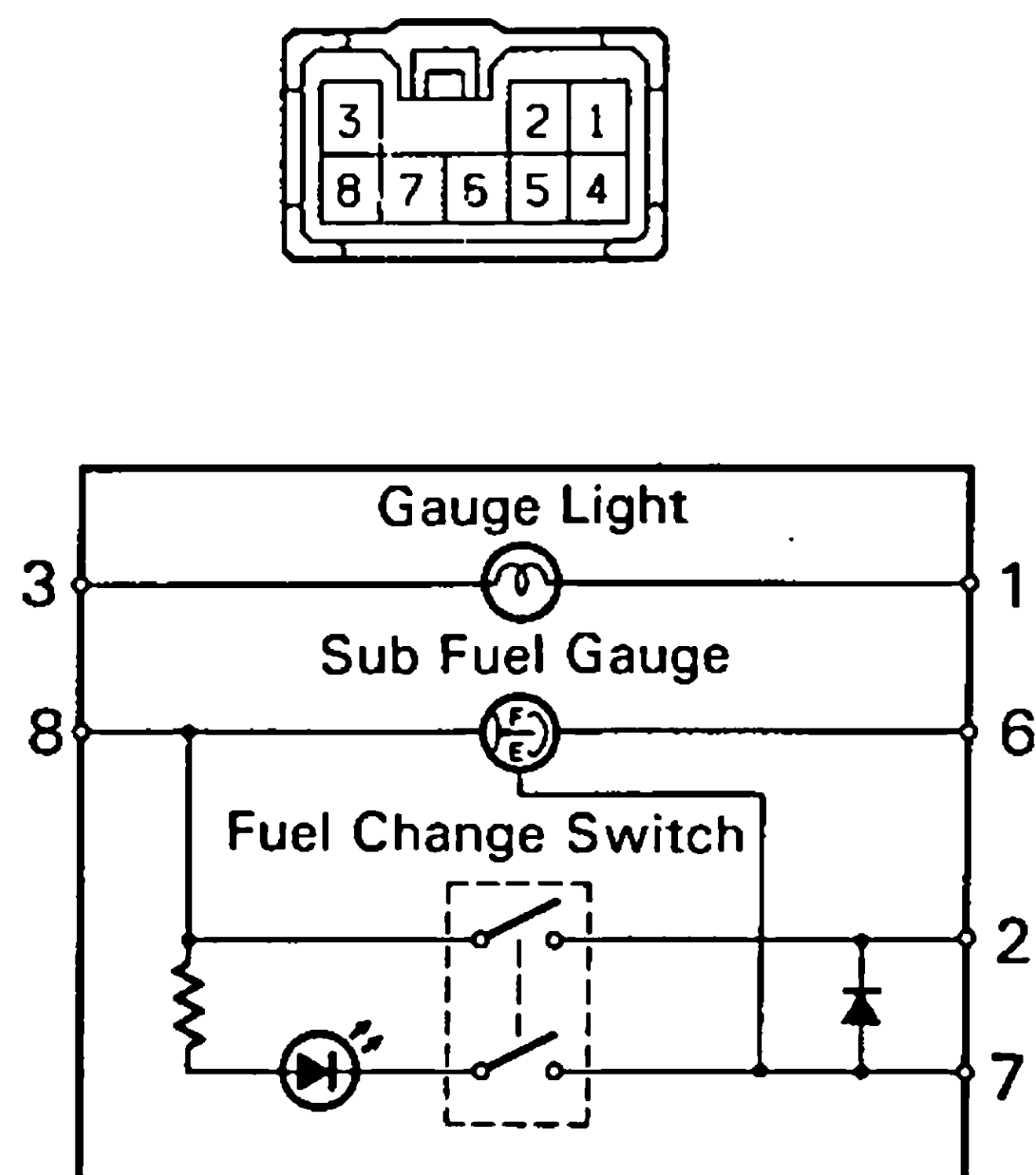
No.	Wiring connector side
1	Ground
3	TAIL Fuse

• Thermometer and Altimeter



No.	Wiring connector side
A	1 Ground
	3 TAIL Fuse
B	1 Inner Ambient Temperature Sensor No.2
	2 Inner Ambient Temperature Sensor No.1
	3 Inner Ambient Temperature Sensor No.1
	4 Inner Ambient Temperature Sensor No.2
	5 Outer Ambient Temperature Sensor
	6 Outer Ambient Temperature Sensor
	7 ENGINE Fuse
	8 Ground

• Sub Fuel Gauge



No.	Wiring connector side
1	Ground
2	Fuel Transfer Solenoid Valve
3	TAIL Fuse
6	Sub Fuel Sender Gauge
7	Ground
8	ENGINE Fuse

(km/h)

Standard indication	Allowable range	
	Ex. Australia	Australia
20	21 — 25	(17.5 — 21.5)
40	41.5 — 46	38 — 42
60	62.5 — 67	58 — 63
80	83 — 88	78 — 84
100	104 — 109	99 — 104.5
120	125 — 130.5	119.5 — 125.5
140	145.5 — 151.5	139.5 — 146.5
160	(166 — 173)	(159.5 — 167.5)
Figures in brackets are not official, they are for reference only.		

(mph)

Standard indication	Allowable range
20	21 — 23.5
40	41.5 — 44
60	62.5 — 66
80	83 — 87
100	104 — 108.5

(rpm)

DC 13 V 25°C (77°F)/12 V Vehicles
DC 26 V 25°C (77°F)/24 V Vehicles

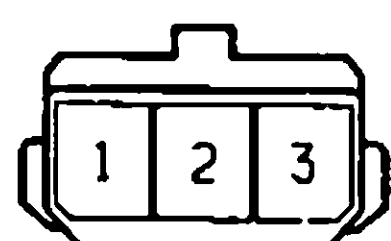
Standard	Allowable range
1000	900 — 1100
(2000)	(1875 — 2125)
3000	2850 — 3150
(4000)	(3850 — 4150)
5000	4850 — 5150
(6000)	(5820 — 6180)

Figures in brackets are not official, they are for reference only.

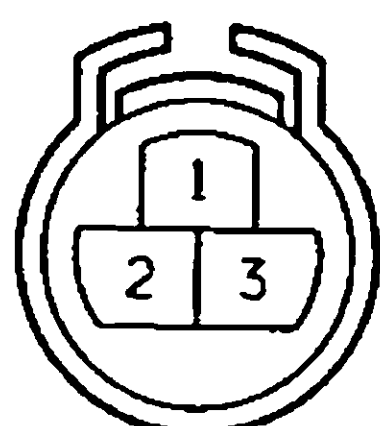
Inner Ambient Temperature Sensor No.1
(Instrument Panel Side)



Inner Ambient Temperature Sensor No.2
(Roof or Back Panel Side)



Outer Ambient Sensor



GA-2-2-C
GA-3-1
IH-3-1

Parts Inspection

Speedometer System

INSPECT SPEEDOMETER (ON-VEHICLE)

- (a) Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT: Tire wear and tire over or under inflation will increase the indication error.

If error is excessive, replace the speedometer.

- (b) Check the speedometer for pointer vibration and abnormal noise.

HINT: Pointer vibration can be caused by a loose speedometer cable.

Tachometer System

INSPECT TACHOMETER (ON-VEHICLE)

- (a) Connect a tune-up test tachometer, and start the engine.

NOTICE:

- 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.

If error is excessive, replace the tachometer.

Thermometer System

INSPECT INNER AND OUTER AMBIENT TEMPERATURE SENSOR

Measure the resistance between terminals 1 and 2.

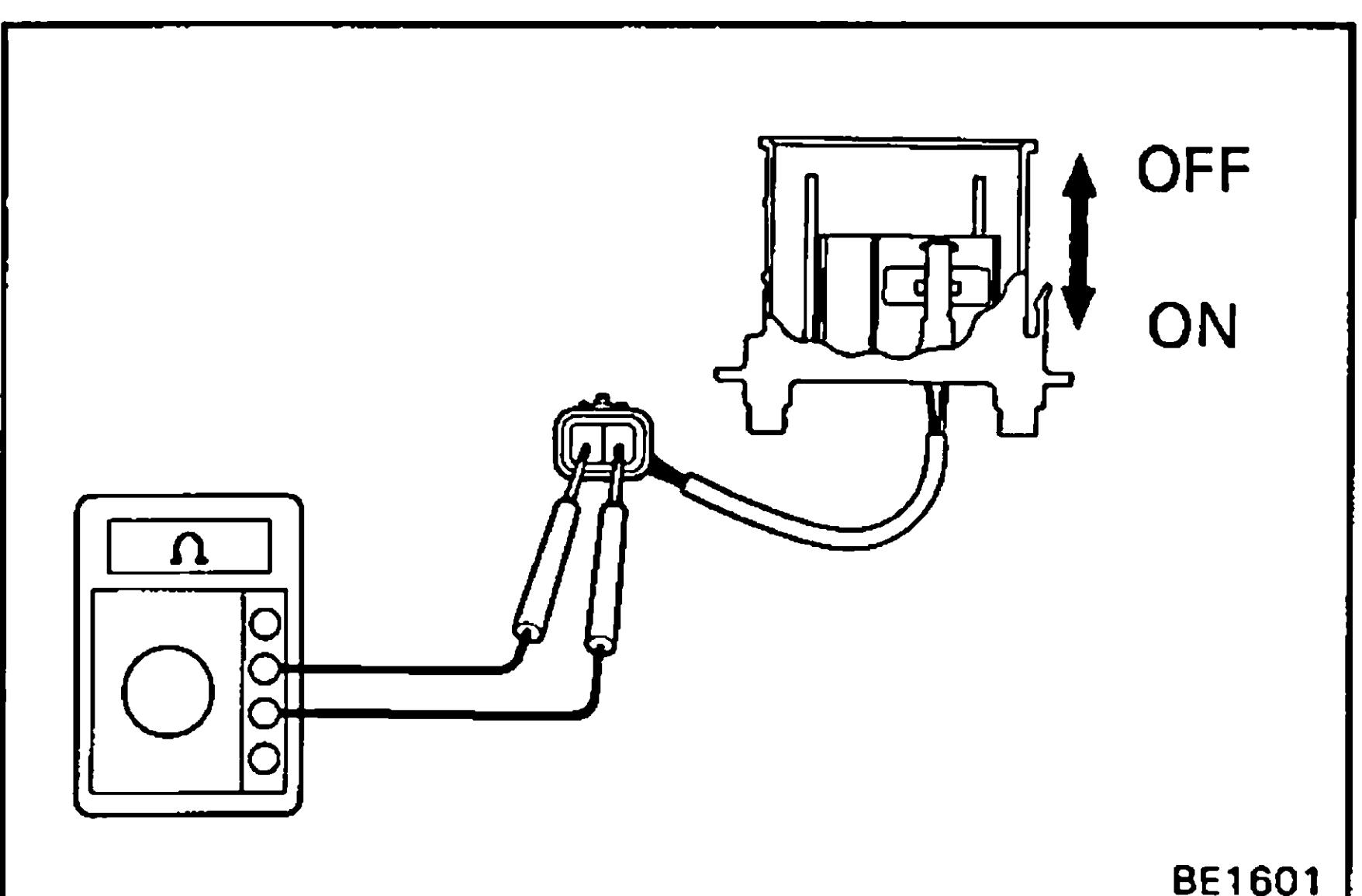
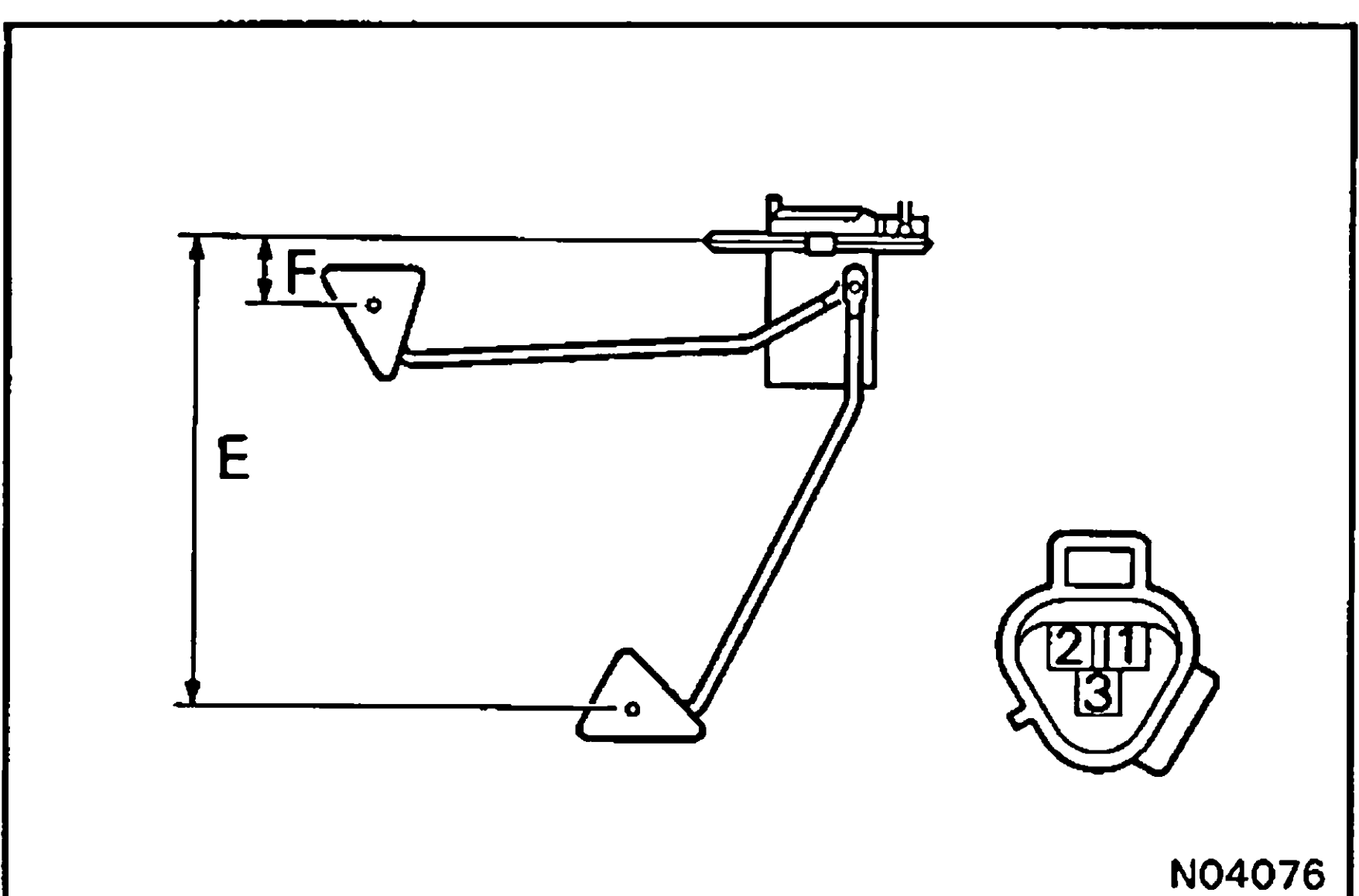
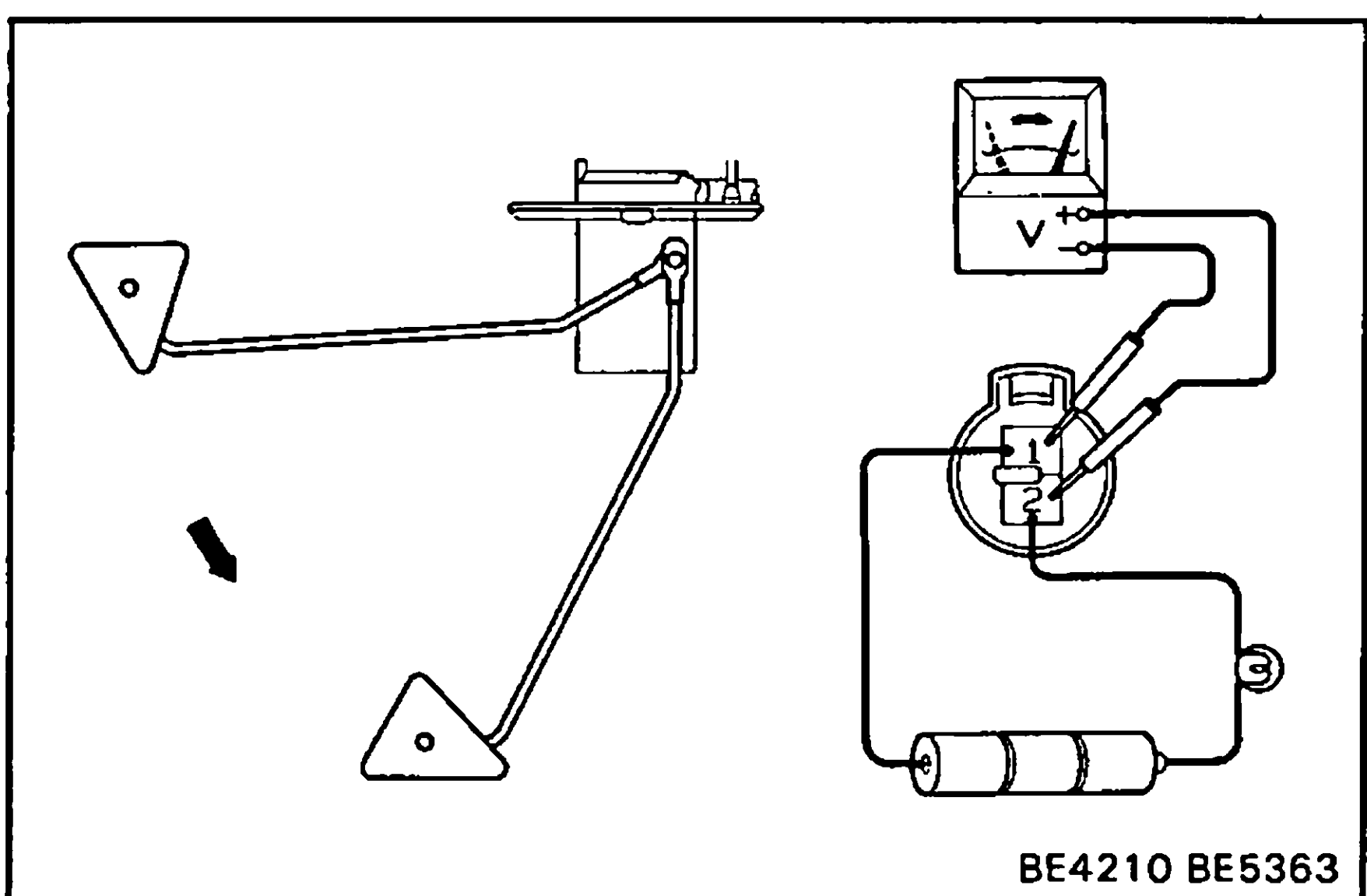
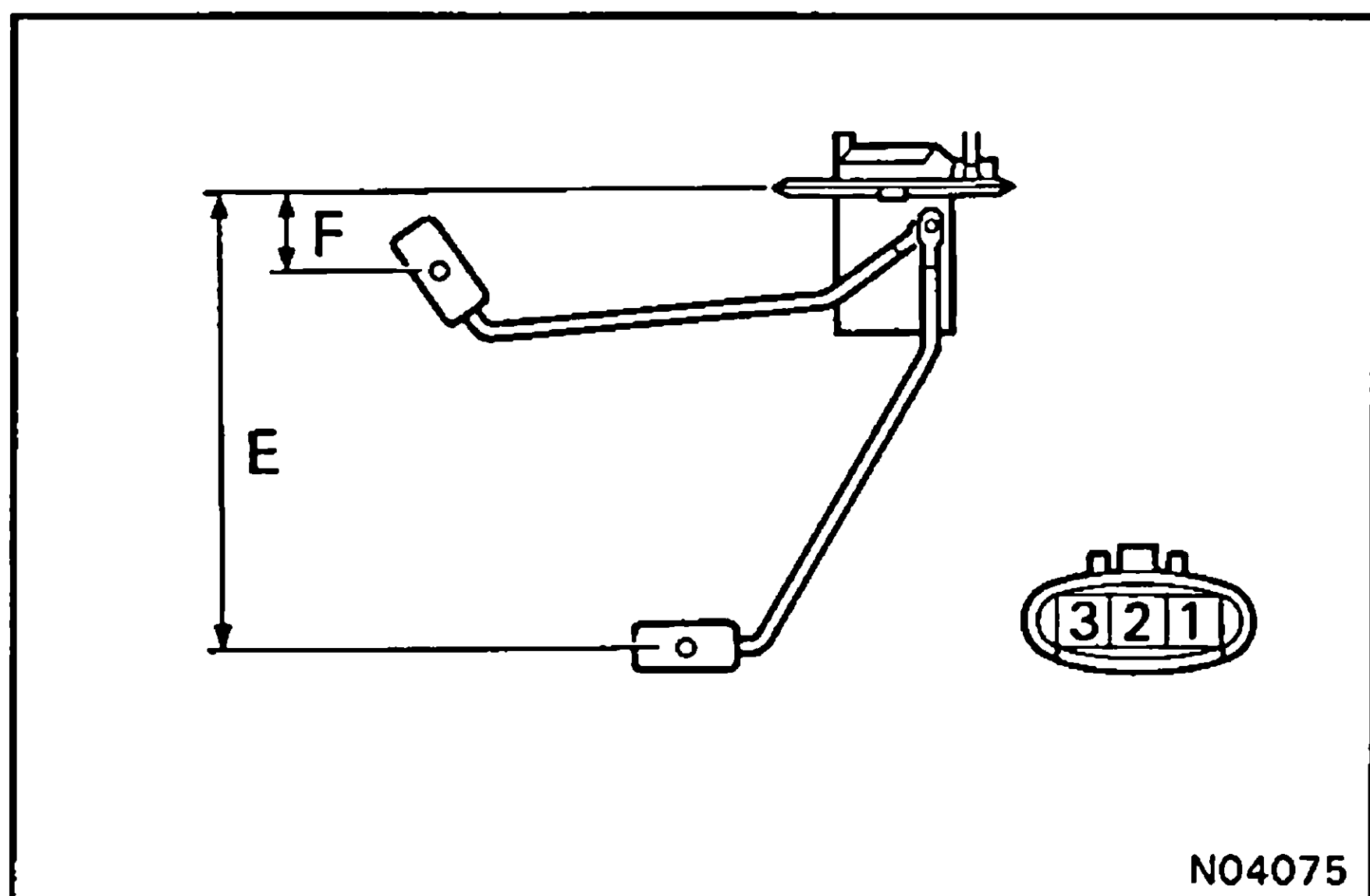
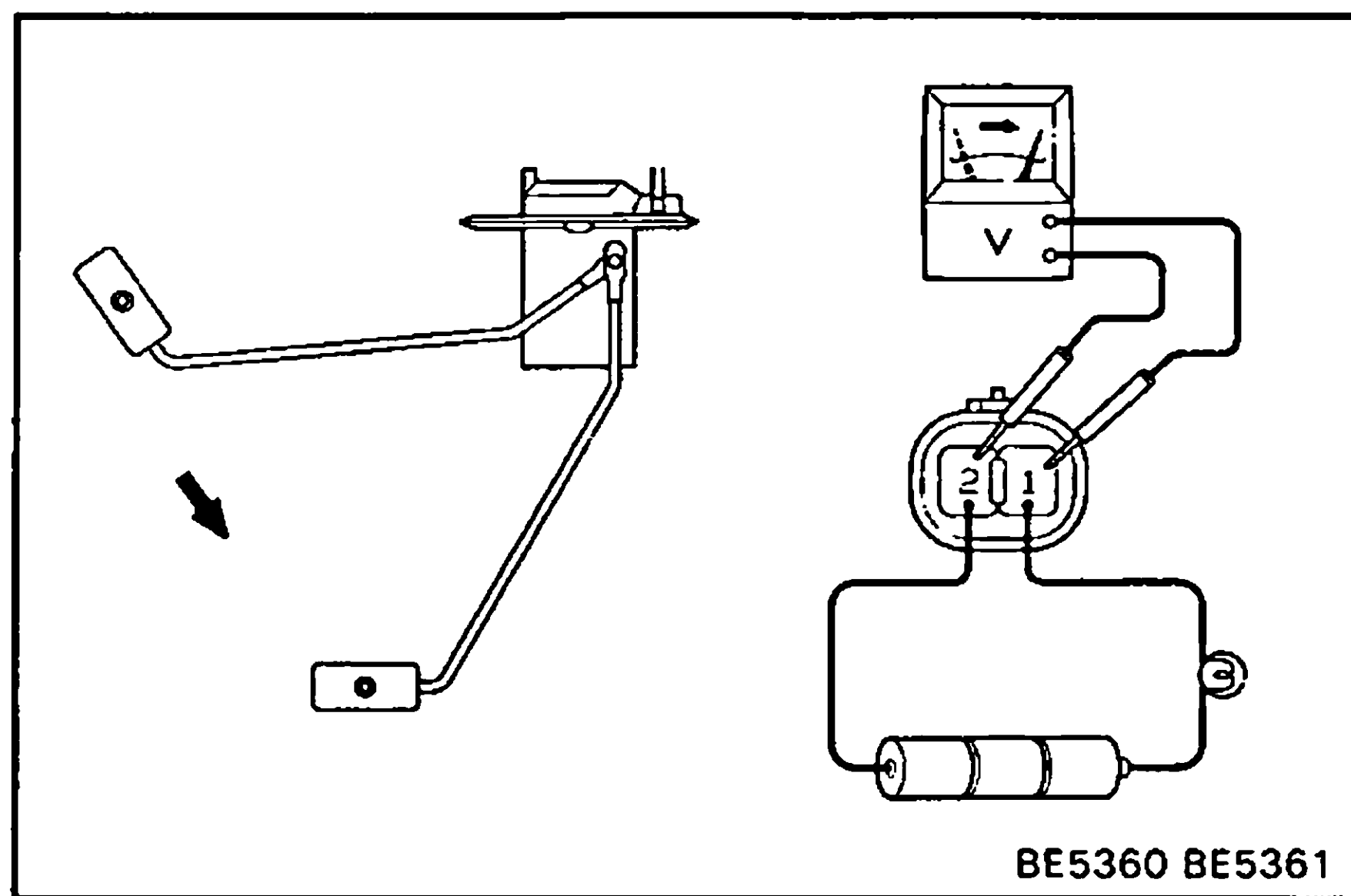
(Inner)

Temperature (°C)	-30	-20	-10	0	10	20	30	40	50	60	70
Resistance (kΩ)	6.24	3.68	2.25	1.41	0.92	0.61	0.41	0.29	0.20	0.15	0.11

(Outer)

Temperature (°C)	-30	-20	-10	0	10	20	30	40	50	60	70
Resistance (kΩ)	12.47	7.36	4.49	2.83	1.83	1.22	0.83	0.57	0.41	0.29	0.21

If resistance is not specified, replace inner or outer ambient temperature sensor.



Fuel Gauge

INSPECT SENDER GAUGE

Except FJ75, PZJ75, HZJ75 and FZJ75
(Operation)

- Connect a series of three 1.5 V dry cell batteries.
- Connect the positive (+) lead from the dry cell batteries to terminal 2 through a 3.4 W test bulb and the negative (—) lead to terminal 1.
- Check that the voltage rises between terminals 1 and 2 as the float is moved from the top to bottom position.

(Resistance)

Measure the resistance between terminals 1 and 2 for each float position.

Float position	mm (in.)	Resistance (Ω)
F	Approx. 76.7 (3.020)	Approx. 3
E	Approx. 302.4 (11.905)	Approx. 110

If resistance value is not as specified, replace the sender gauge.

FJ75, PZJ75, HZJ75 and FZJ75
(Operation)

- Connect a series of three 1.5 V dry cell batteries.
- Connect the positive (+) lead from the dry cell batteries to terminal 2 through a 3.4 W test bulb and the negative (—) lead to terminal 1.
- Check that the voltage rises between terminals 1 and 2 as the float is moved from the top to bottom position.

(Resistance)

Measure the resistance between terminals 1 and 2 for each float position.

Float position	mm (in.)	Resistance (Ω)
F	Approx. 56 (2.20)	Approx. 3
E	Approx. 259.1 (10.201)	Approx. 110

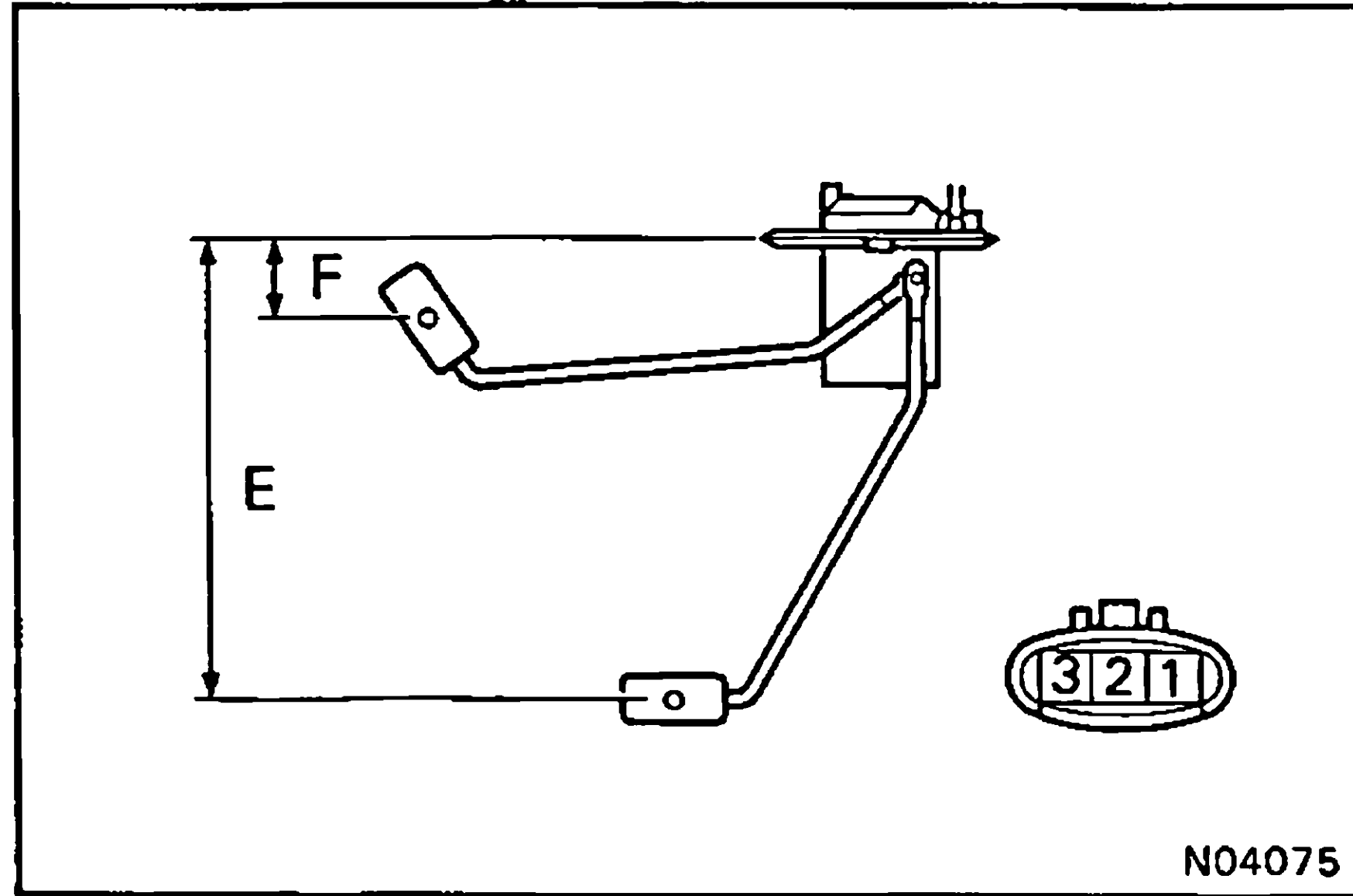
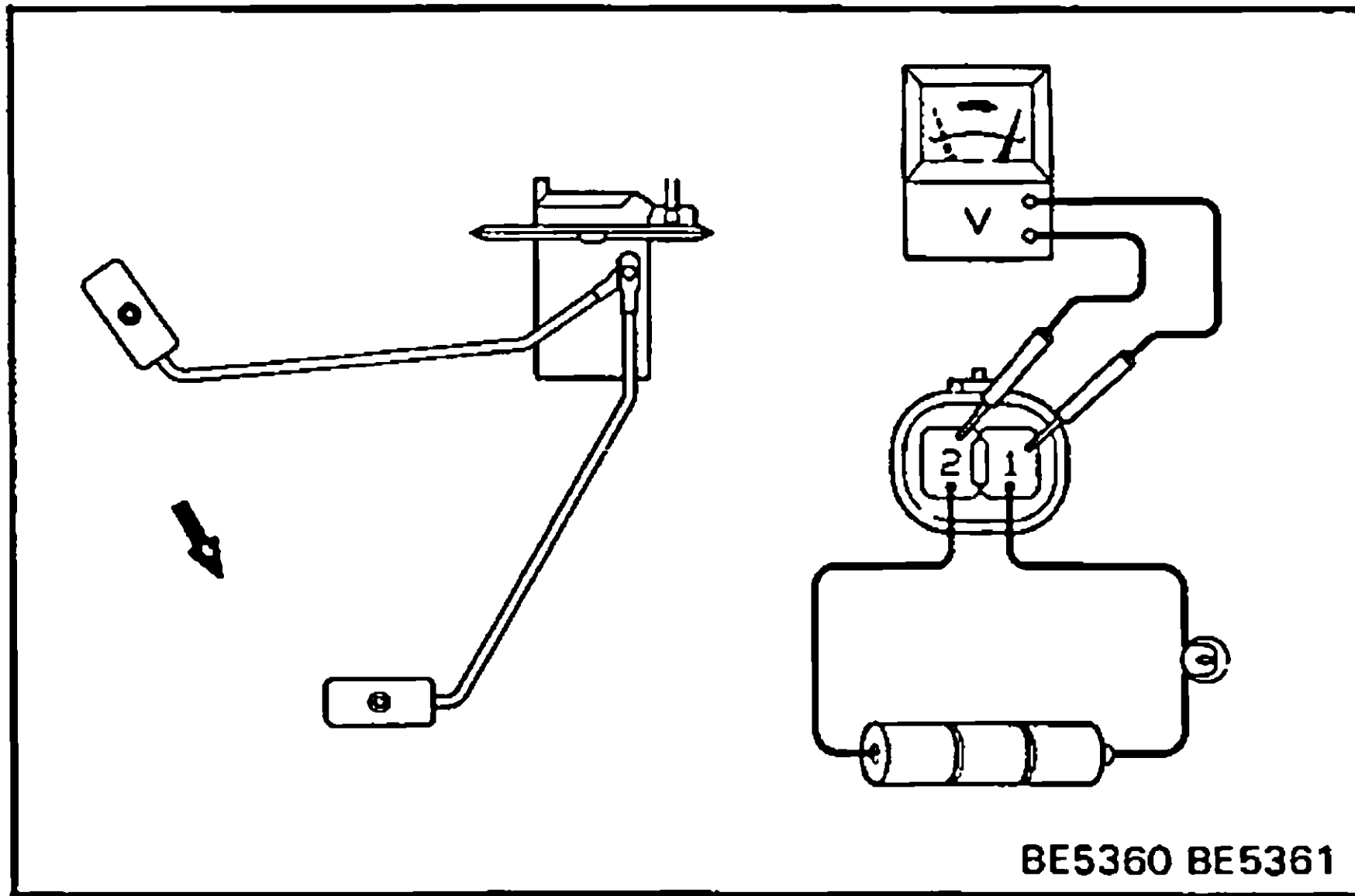
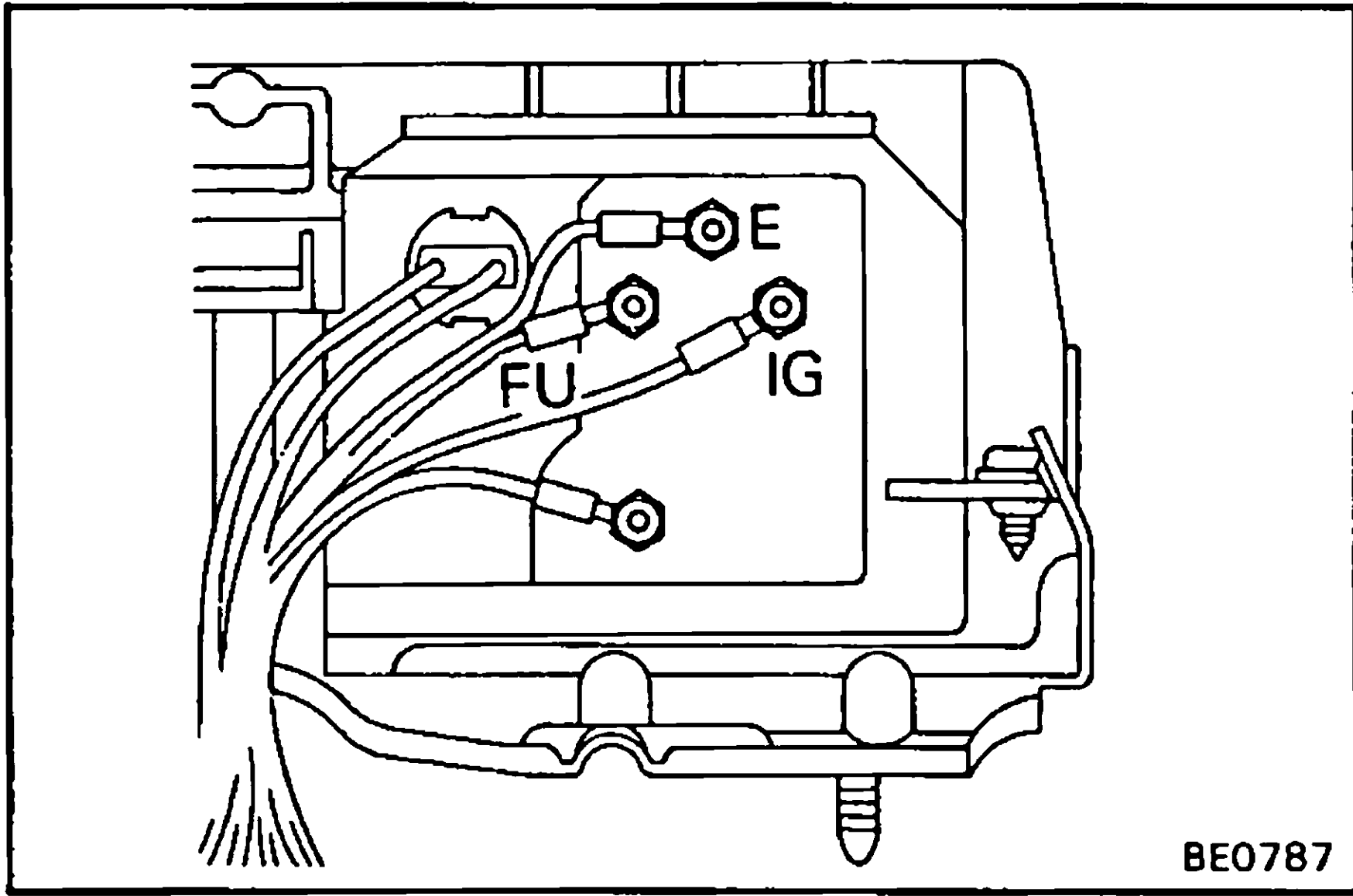
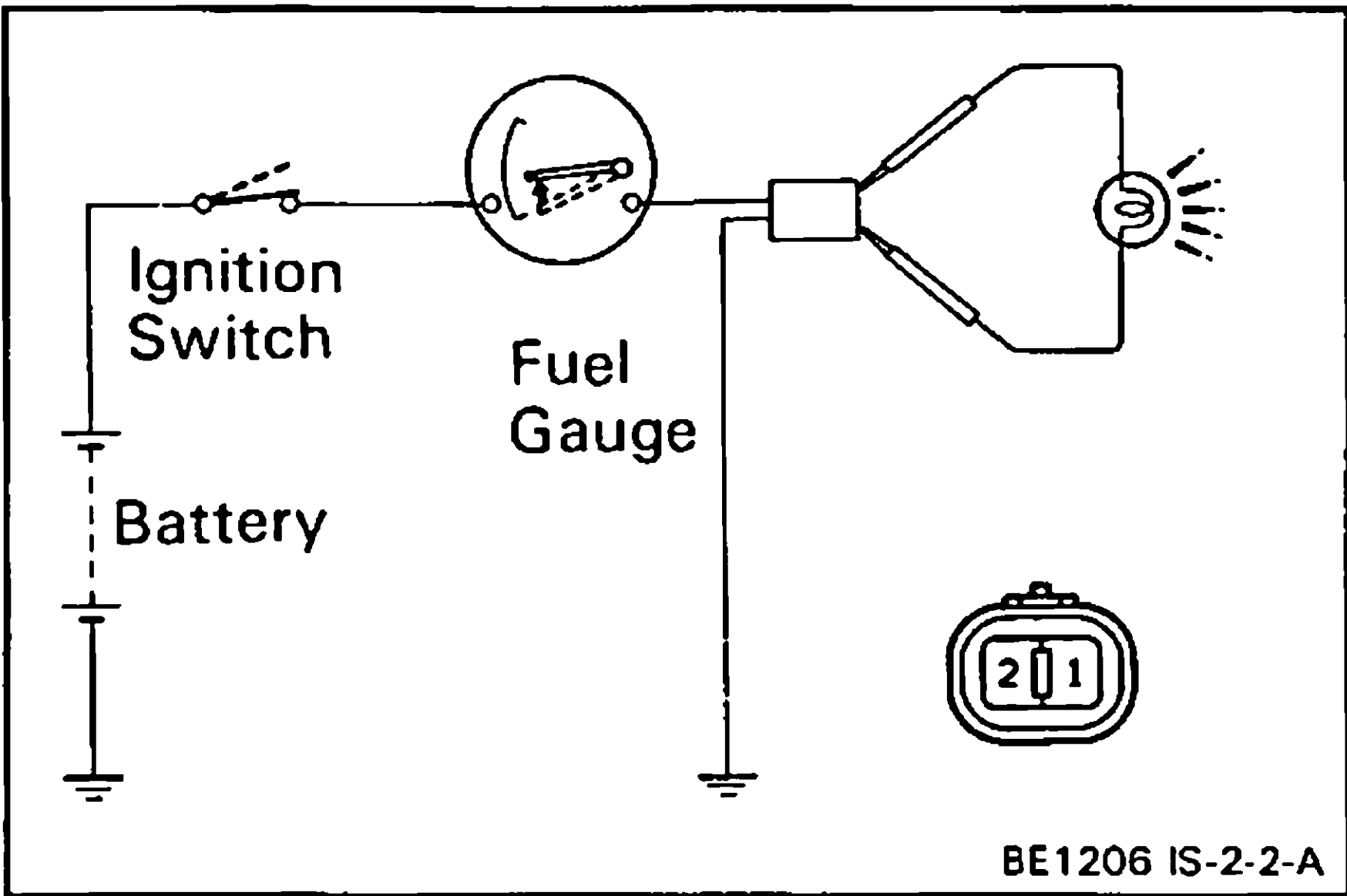
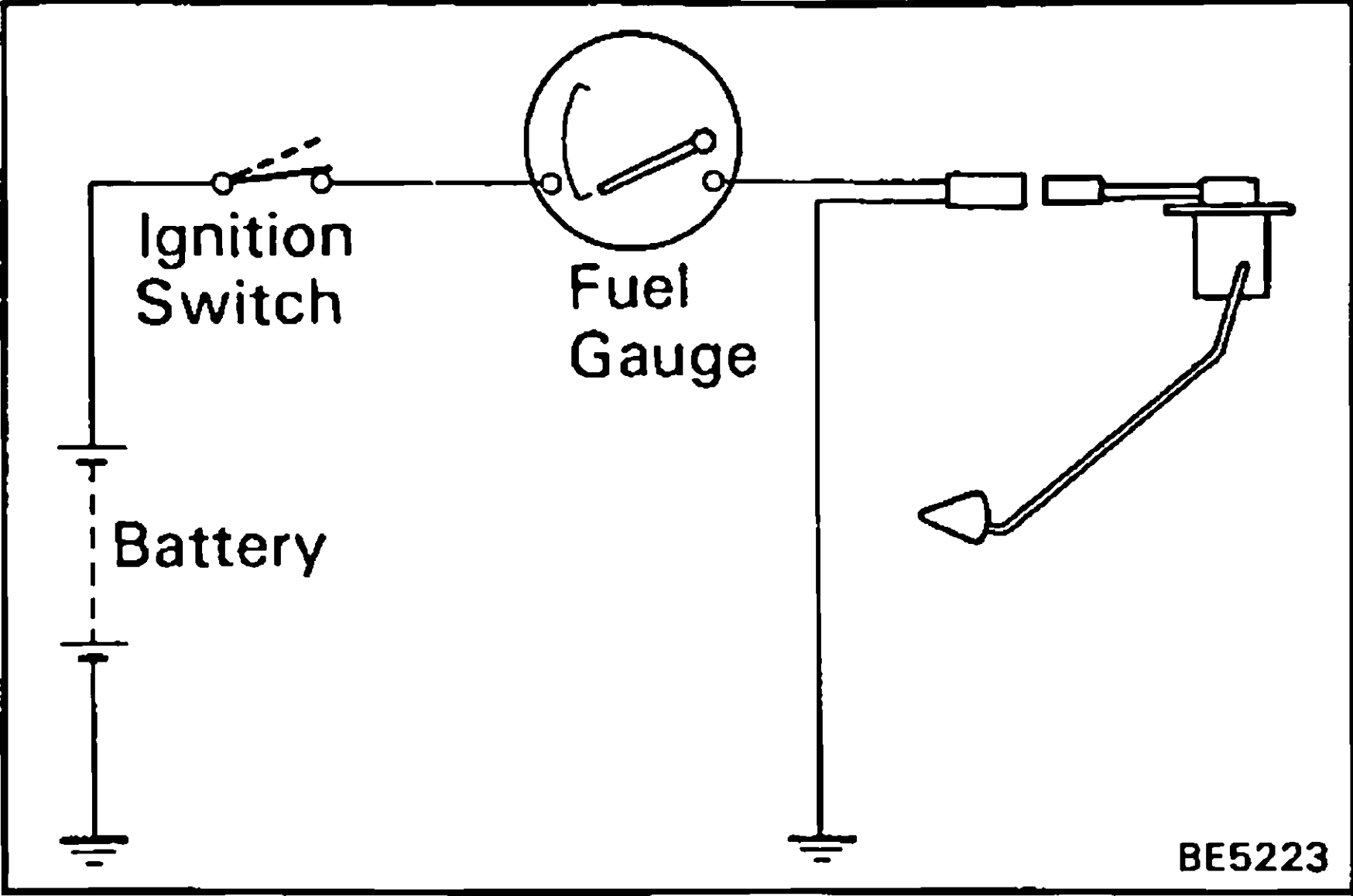
If resistance value is not as specified, replace the sender gauge.

Brake Warning System

PZJ75, HZJ75 and FZJ75
(Brake Fluid Level Warning Switch)

- Check that there is no continuity between terminals with the switch OFF (float up).
- Check that there is continuity between terminals with the switch ON (float down).

If operation is not as specified, replace the switch.



Sub Fuel Gauge System

1. INSPECT RECEIVER GAUGE

(Operation)

- (a) Disconnect the connector from the sender gauge.
- (b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

- (c) Connect terminals 1 and 2 on the wire harness side connector through a 3.4 W test bulb.

- (d) Turn the ignition switch ON, check that the bulb lights up and receiver gauge needle moves toward the full side.

HINT: Because of the silicon oil in the gauge, it will take a short time for the needle stabilize.

If operation is not as specified, inspect the receiver gauge resistance.

(Resistance)

Measure the resistance between terminals.

Between terminals	Resistance (Ω)
IG — FU	Approx. 86
FU — E	Approx. 155
IG — E	Approx. 241

If resistance value is not as specified, replace the receiver gauge.

2. INSPECT SENDER GAUGE

(Operation)

- (a) Connect a series of three 1.5 V dry cell batteries.
- (b) Connect the positive (+) lead from the dry cell batteries to terminal 2 a through 3.4 W test bulb and the negative (—) lead to terminal 1.
- (c) Check that the voltage rises between terminals 1 and 2 as the float is moved from the top to bottom position.

(Resistance)

Measure the resistance between terminals 1 and 2 for each float position.

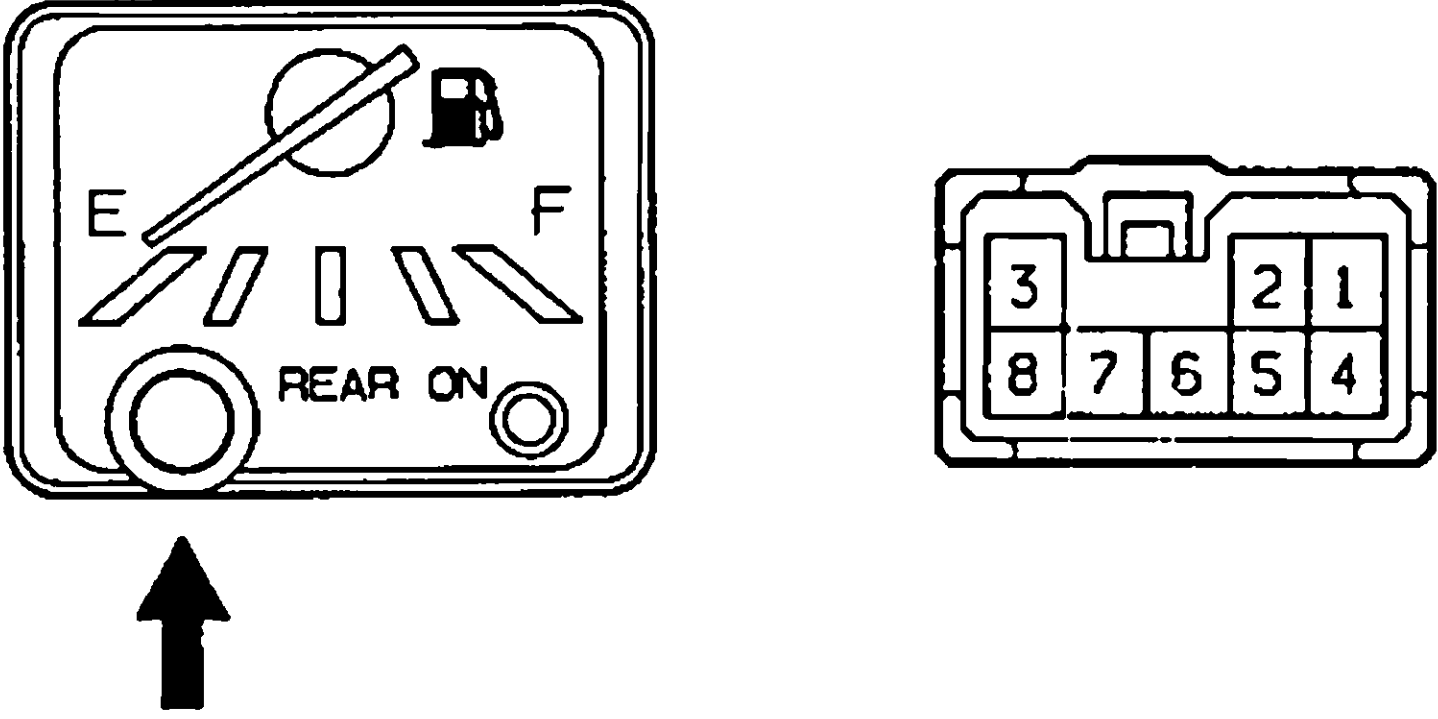
Float position	mm (in.)	Resistance (Ω)
F	Approx. 76.7 (3.020)	Approx. 3
E	Approx. 302.4 (11.905)	Approx. 110

If resistance value is not as specified, replace the sender gauge.

FUEL TRANSFER SYSTEM

Parts Inspection

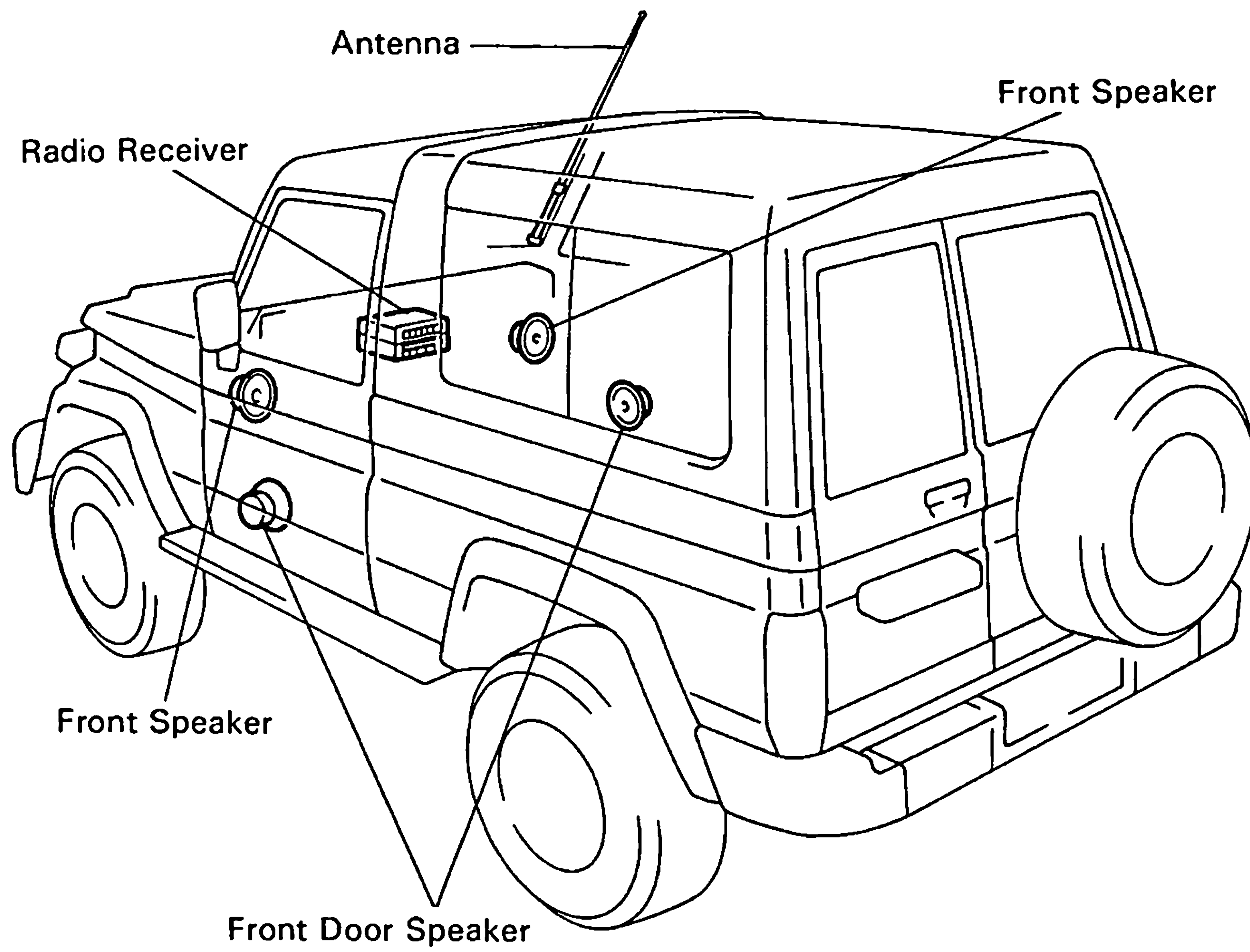
INSPECT ACCESSORY METER (Continuity)

 BE5310 S-8-2	Terminal Switch position		8	2	Illumination	
					1	3
	OFF					
ON						

If continuity is not as specified, check the bulb or replace the switch.

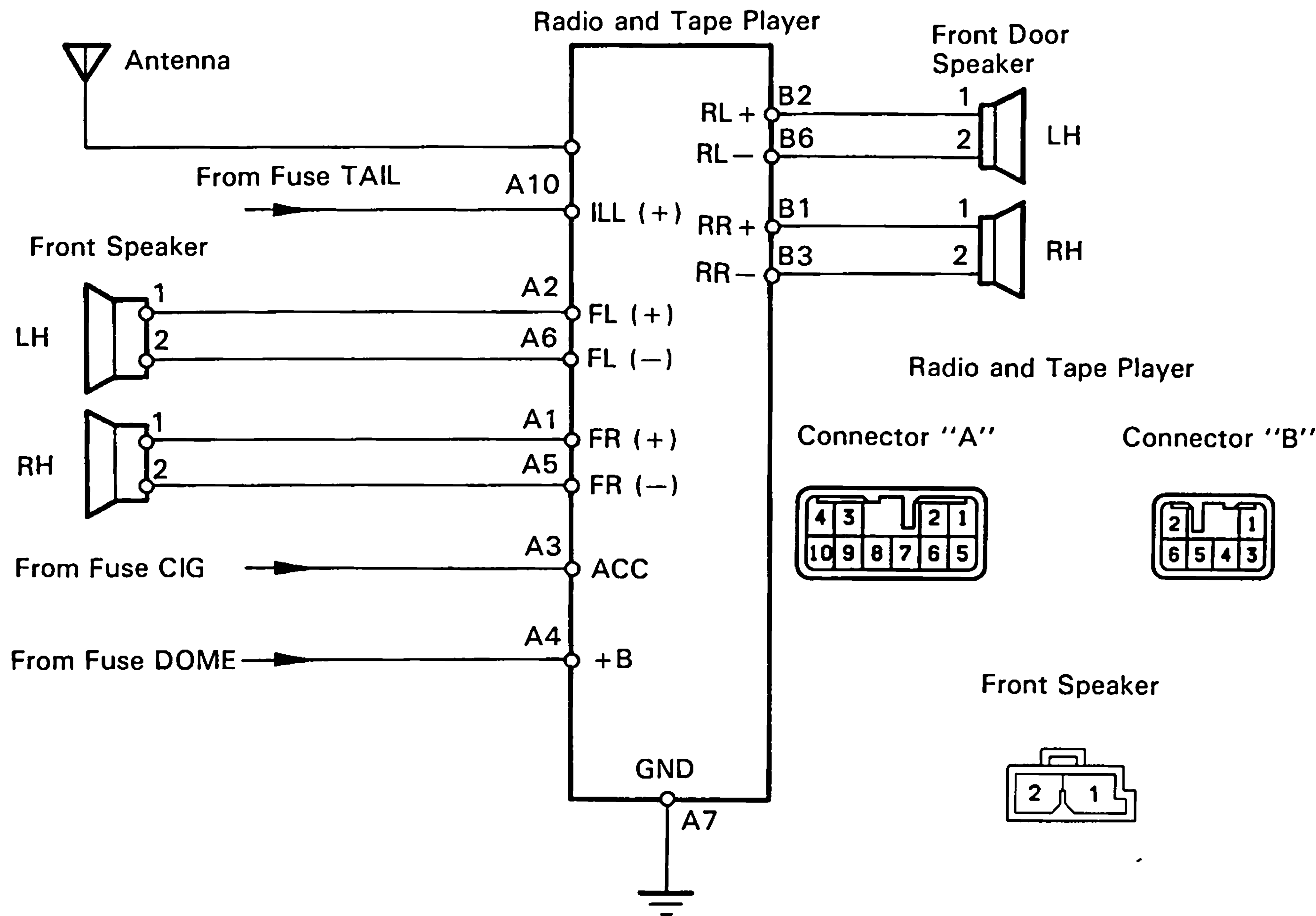
AUDIO SYSTEM

Parts Location



Wiring and Connector Diagrams

• Radio — Tape Player, 2 Speaker: Symbol U



The POWER SOURCE CIRCUIT has been simplified. For full details, see pub. No. RM183E, pages BE-10, 11, 12.

System Description

RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

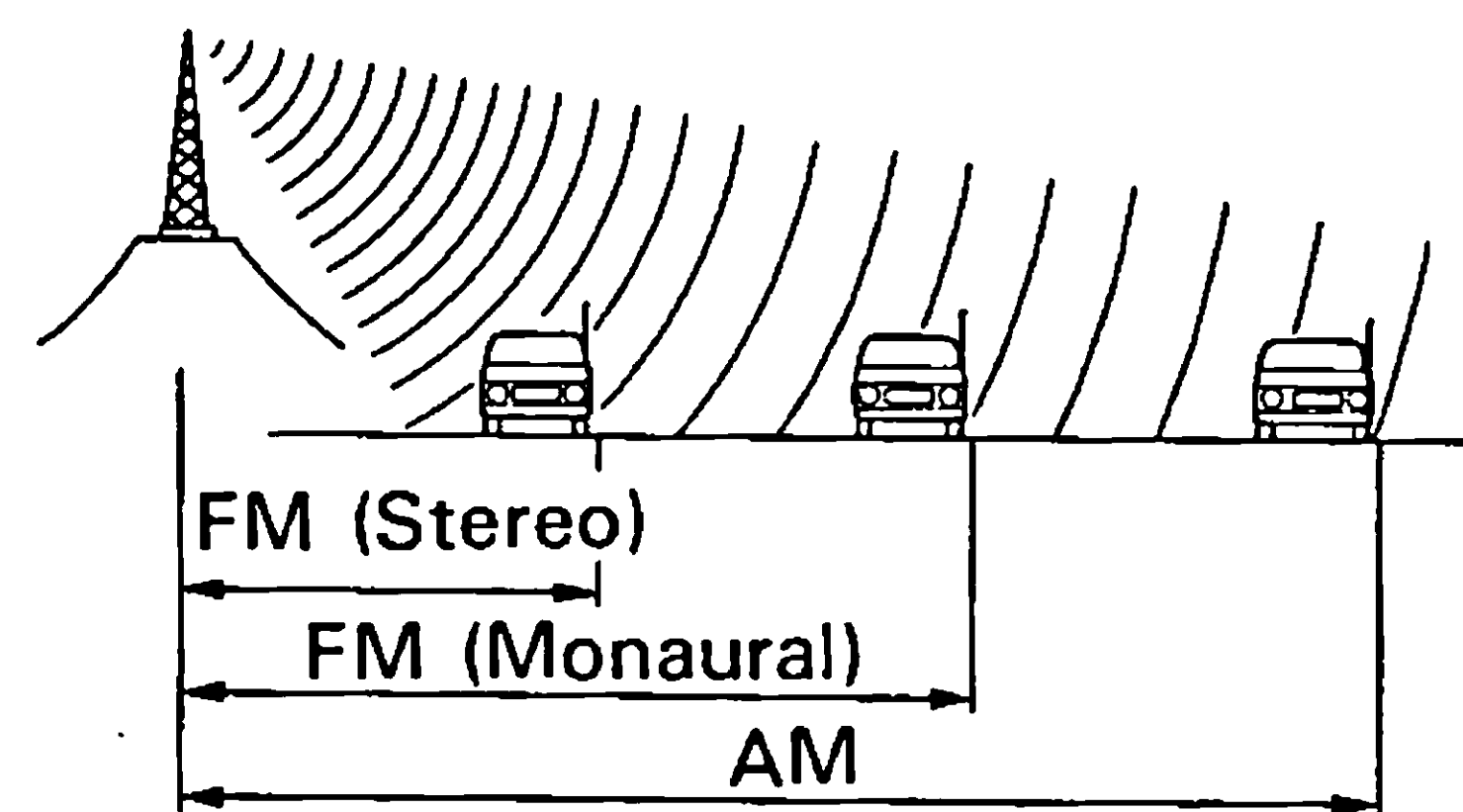
Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave	LW ↔	AM (MW) ↔	SW ↔	FM (UKW) ↔	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low Frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

HINT: In this section, the term "AM" includes LW, MW and SW, and the term "FM" includes UKW.

SERVICE AREA

There is great difference in the size of the service area for AM, FM monaural, and FM stereo broadcasting. Thus it may happen that FM broadcast cannot be received even though AM comes in very clearly. Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") the most easily.



BE2818

RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called "fading", "multipath", and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.

Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".

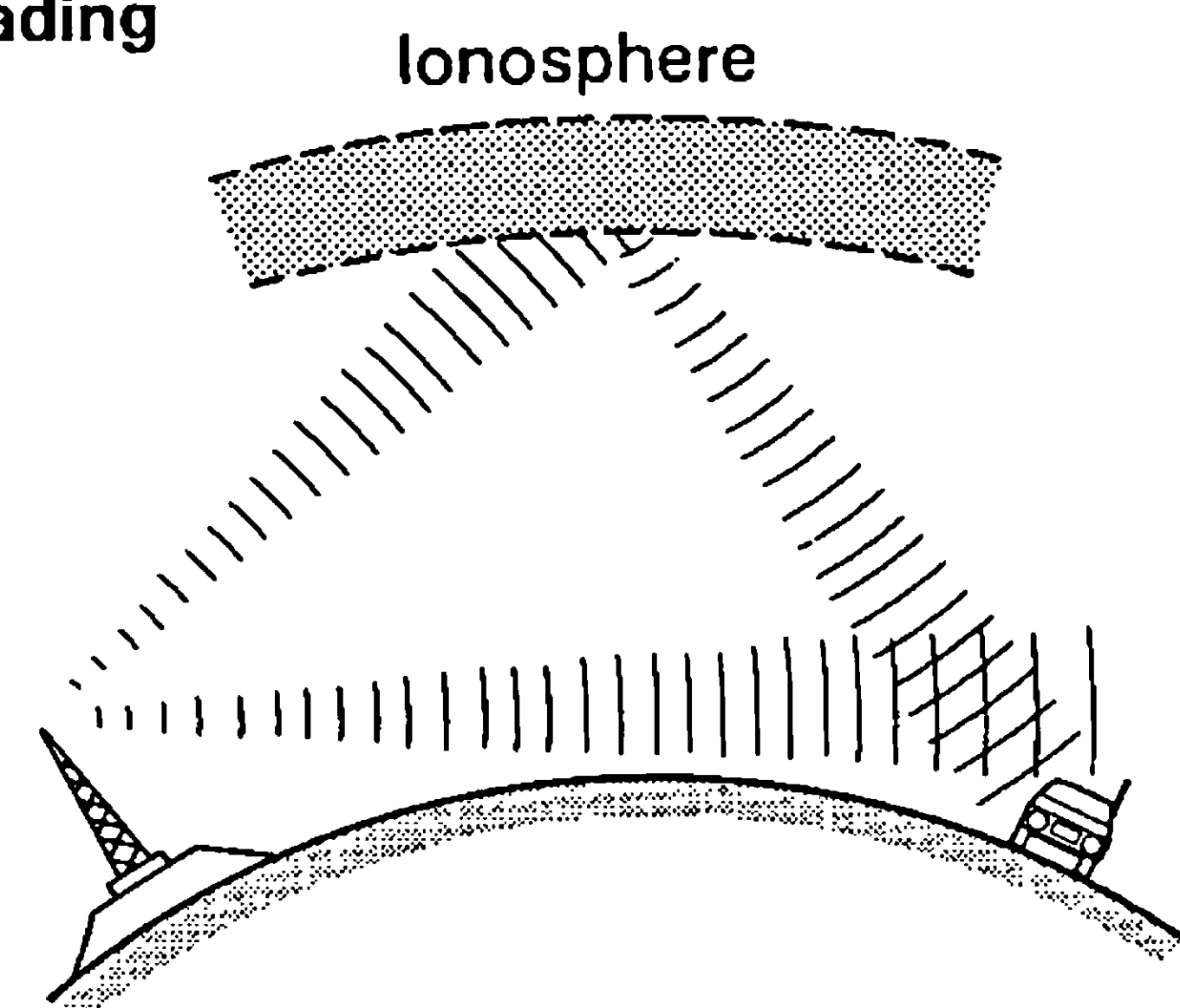
Multipath

One type of interference caused by the bouncing of radio waves off the obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off of buildings and mountains and interferes with the signal that is received directly.

Fade Out

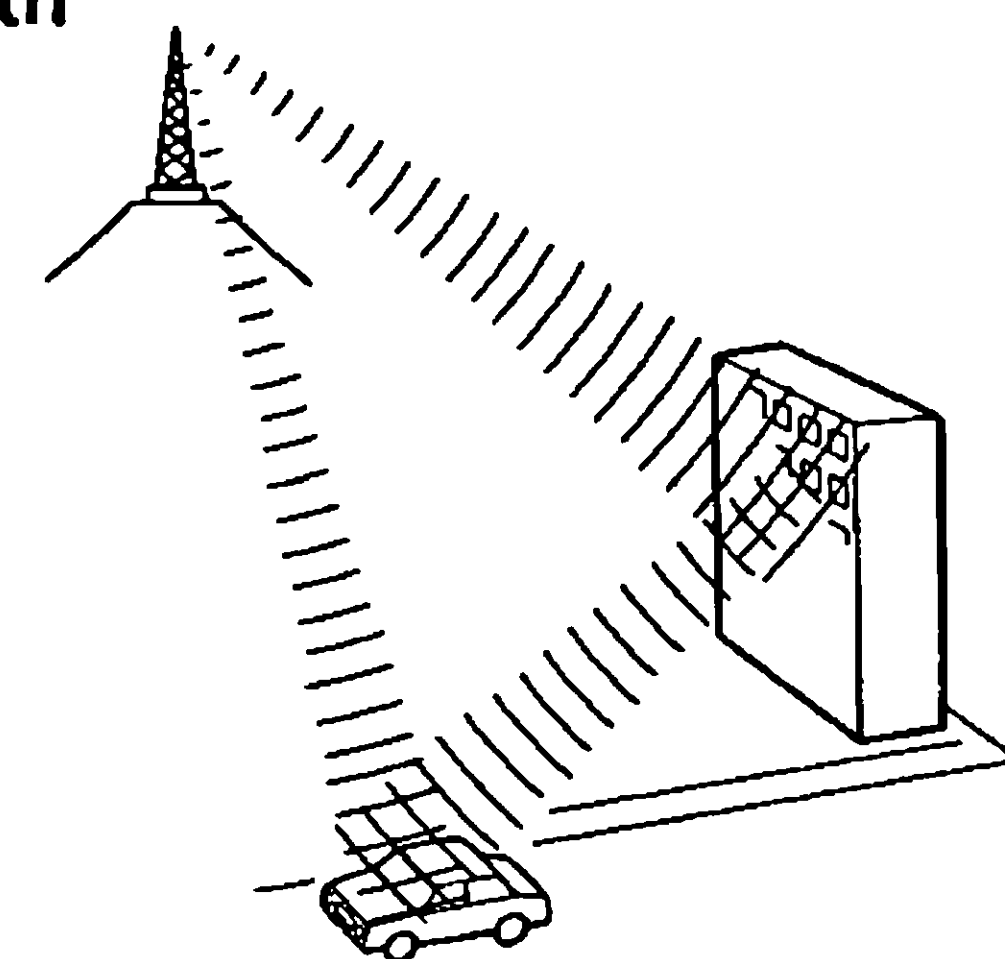
Because FM radio waves are of higher frequencies than AM radio waves, they bounce off the buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called "fade out".

Fading



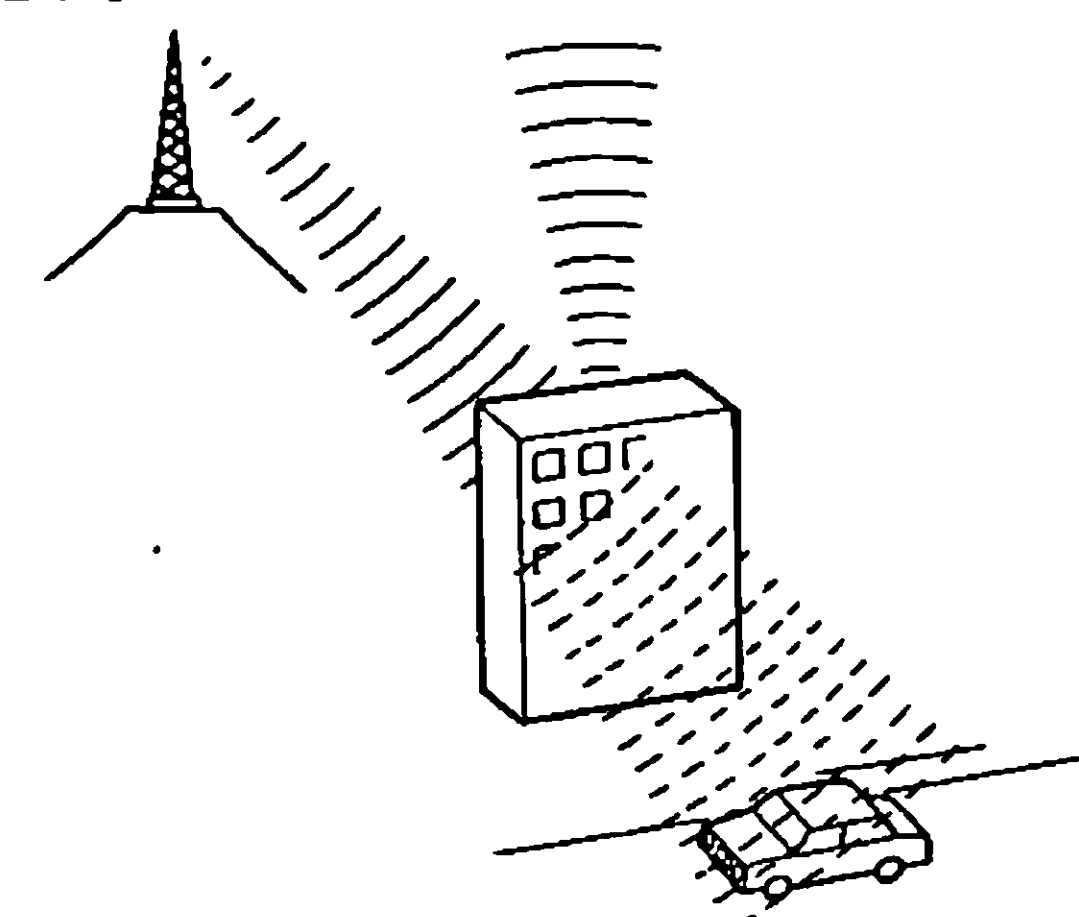
BE2819

Multipath



BE2820

Fade Out



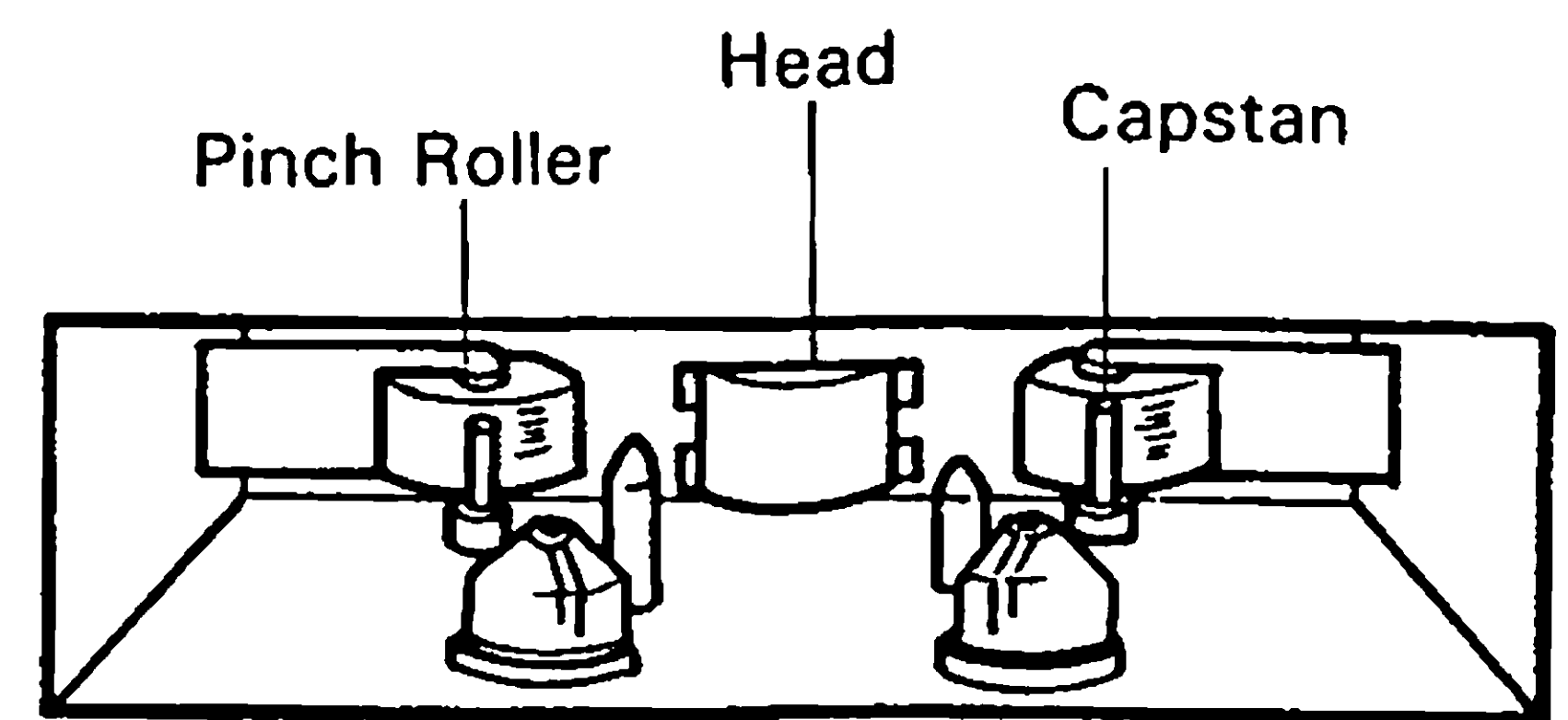
BE2821

MAINTENANCE OF TAPE PLAYER

Head Cleaning

- (a) Raise the cassette door with your finger.
Next using a pencil or like object, push in the guide.
- (b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.

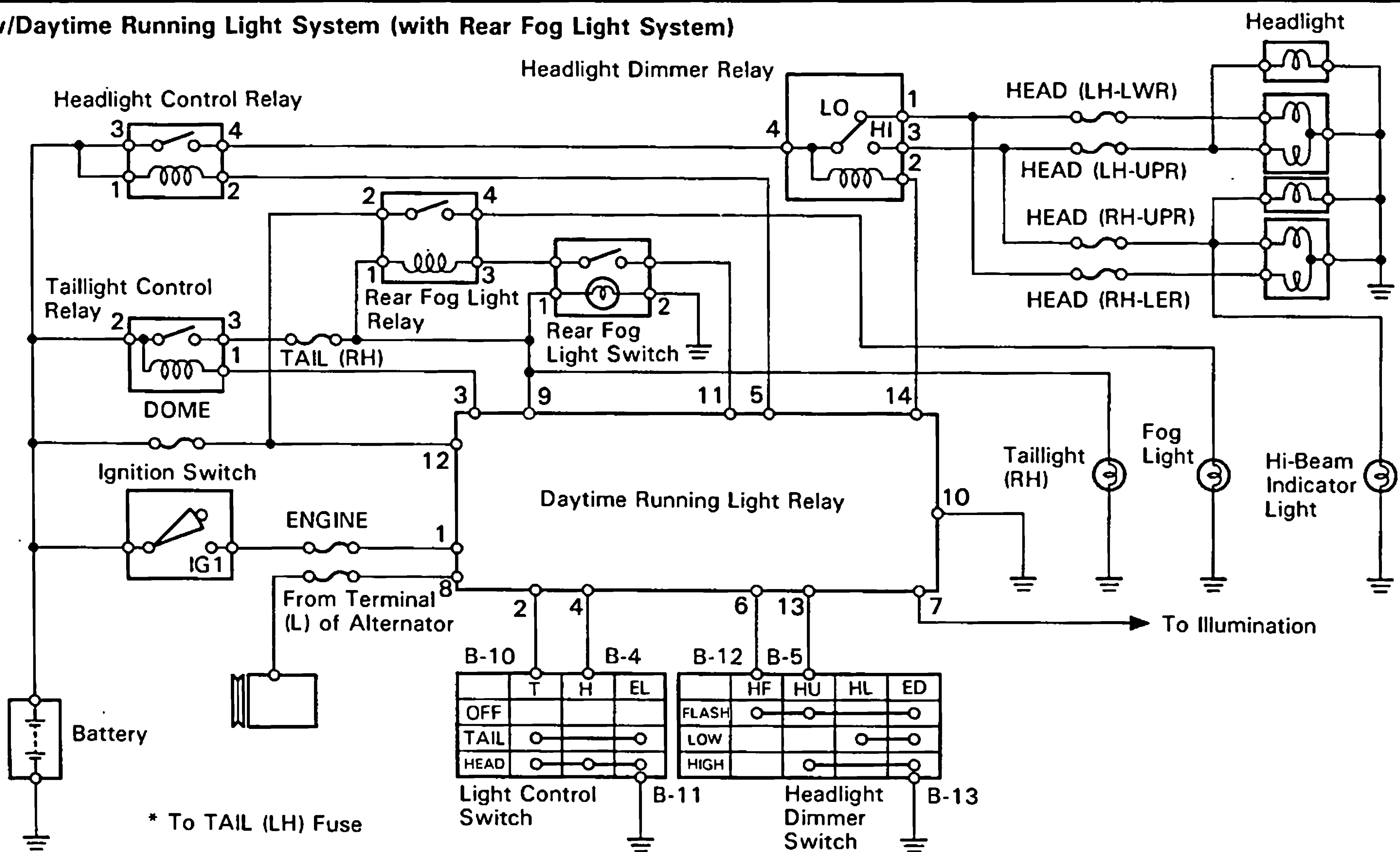
Example:



C0192

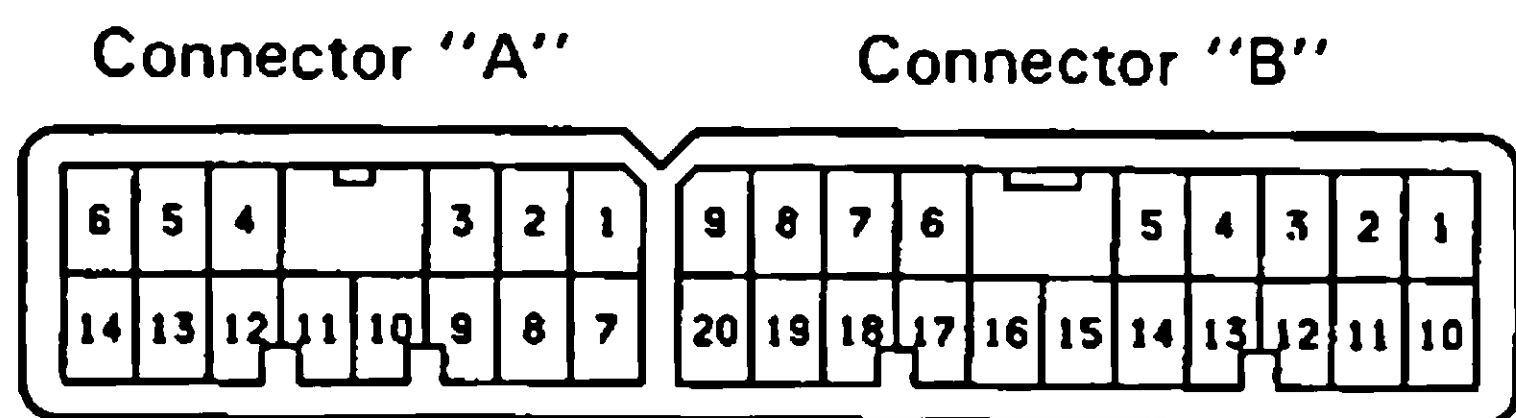
(STATION WAGON) LIGHTING SYSTEM Wiring Diagram

- w/Daytime Running Light System (with Rear Fog Light System)

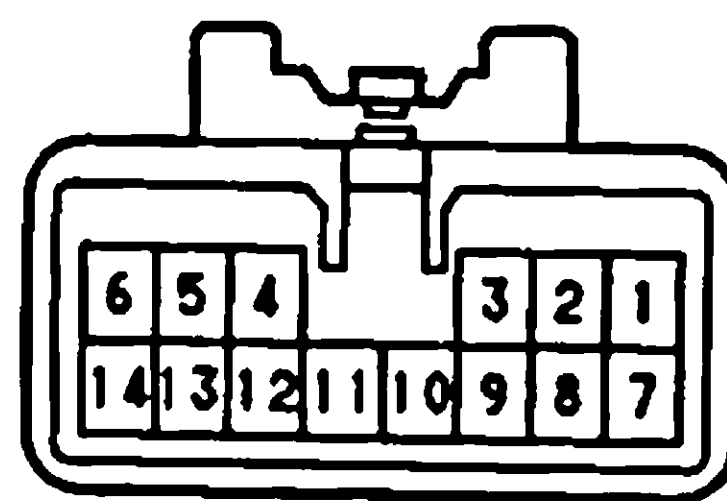


The POWER SOURCE CIRCUIT has been simplified. For full details, see pub.No.RM183E, pages BE-10, 11, 12.

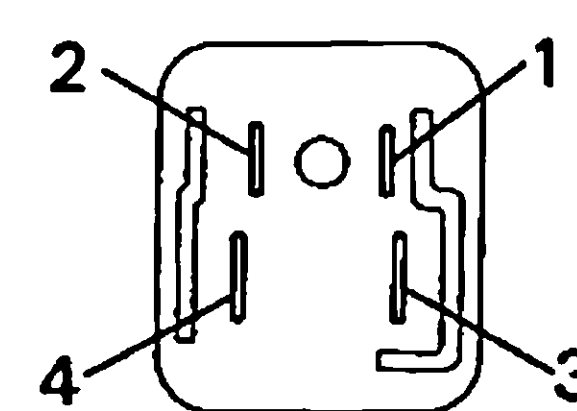
- Light Control Switch
- Dimmer Switch



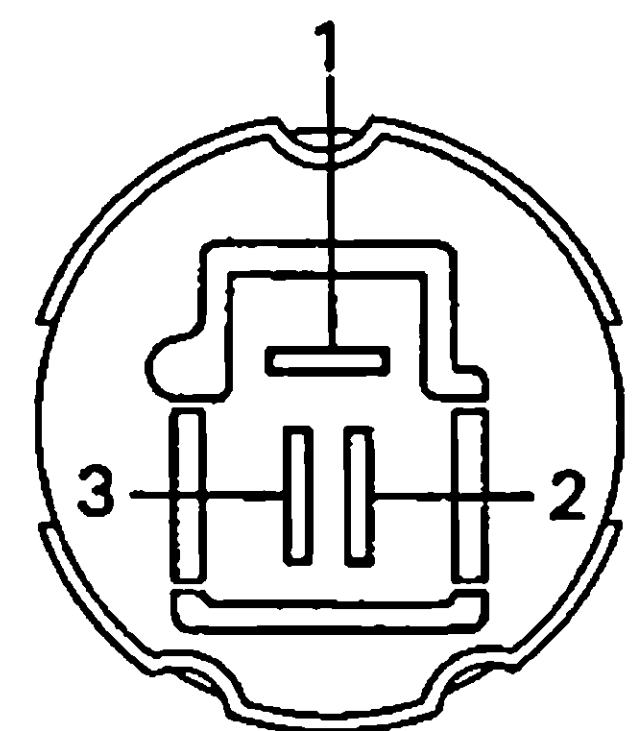
Daytime Running Light Relay



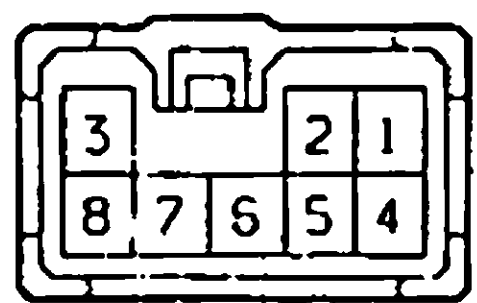
Headlight Control Relay



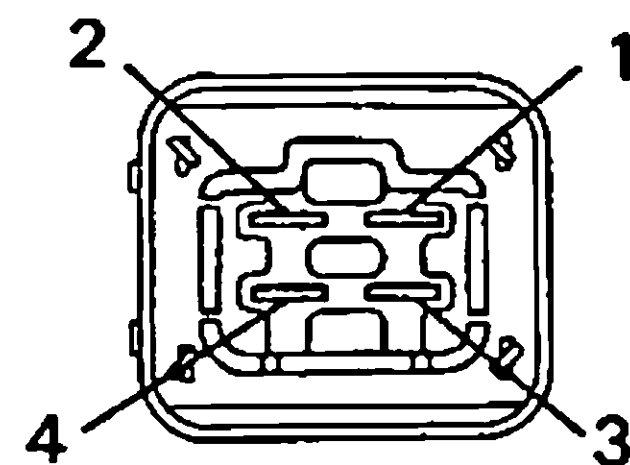
Taillight Control Relay



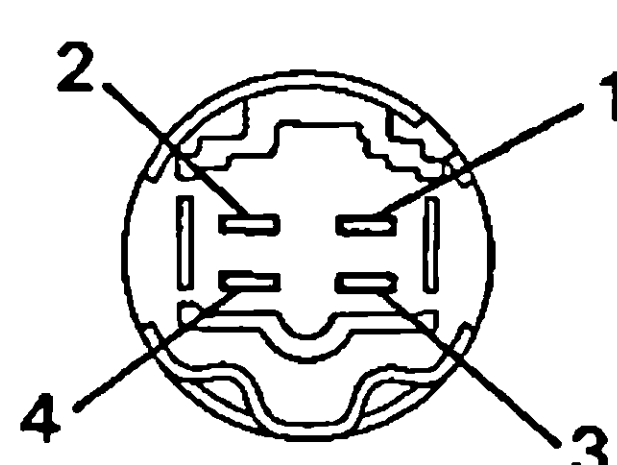
Rear Fog Light Switch



Headlight Dimmer Relay



Rear Fog Light Relay

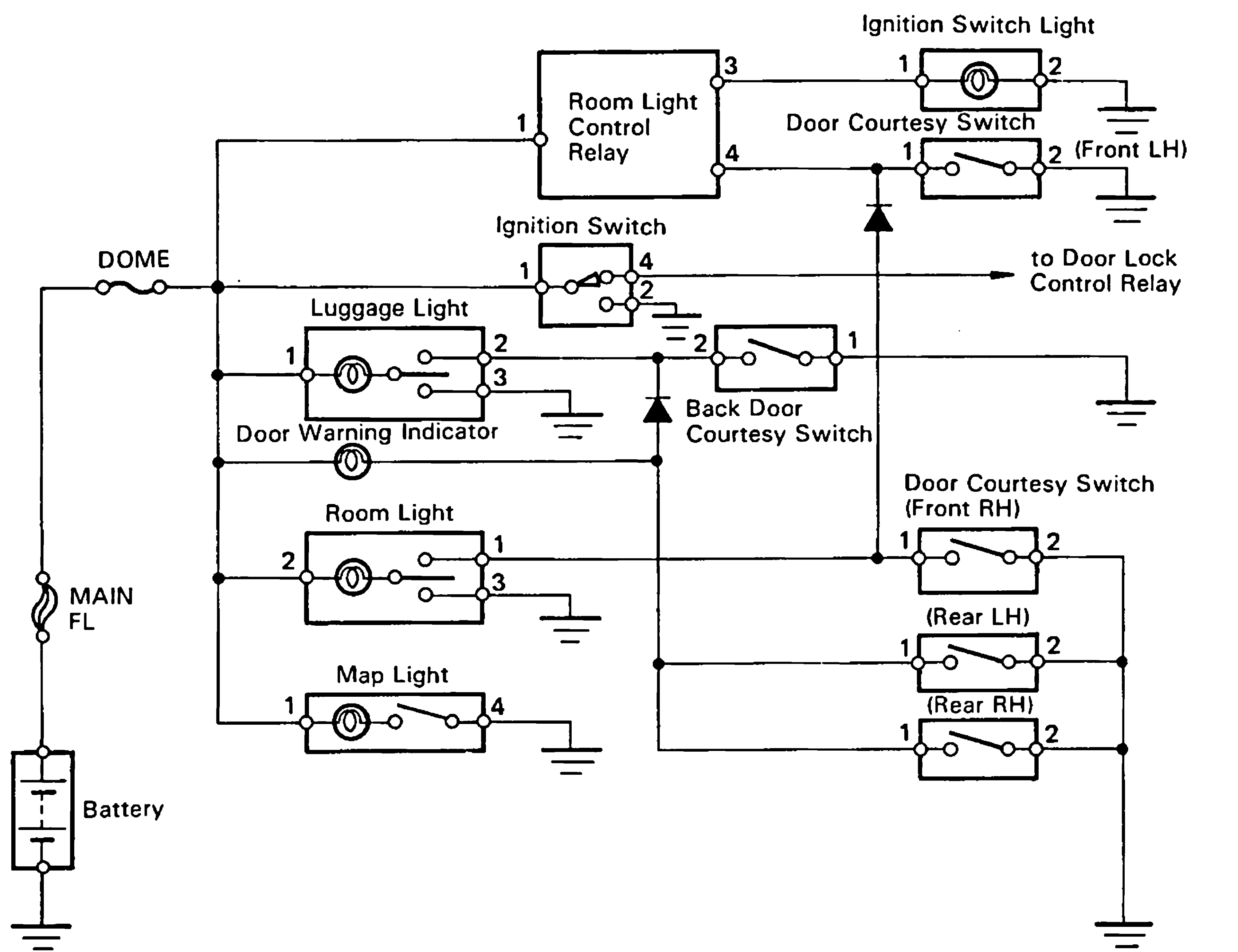


The POWER SOURCE CIRCUIT has been simplified. For full details, see pages BE-10, 11.

BE5023
V-34-2 e-14-2-A BE1838 BE2763
S-8-2 BE1839 BE1647

(Illuminated Entry System)

(STD)

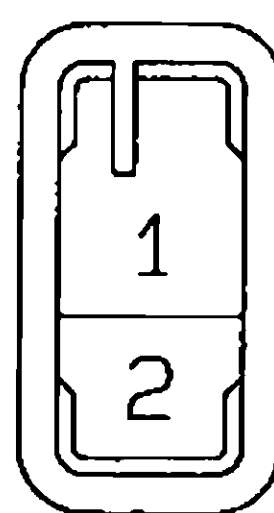
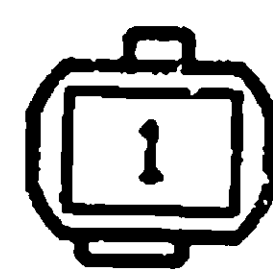
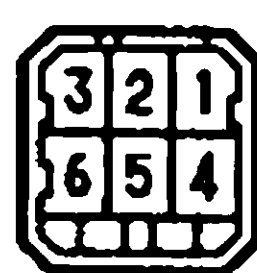
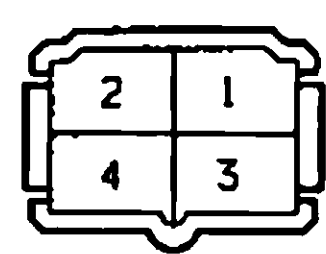


Room Light Control Relay

Map Light

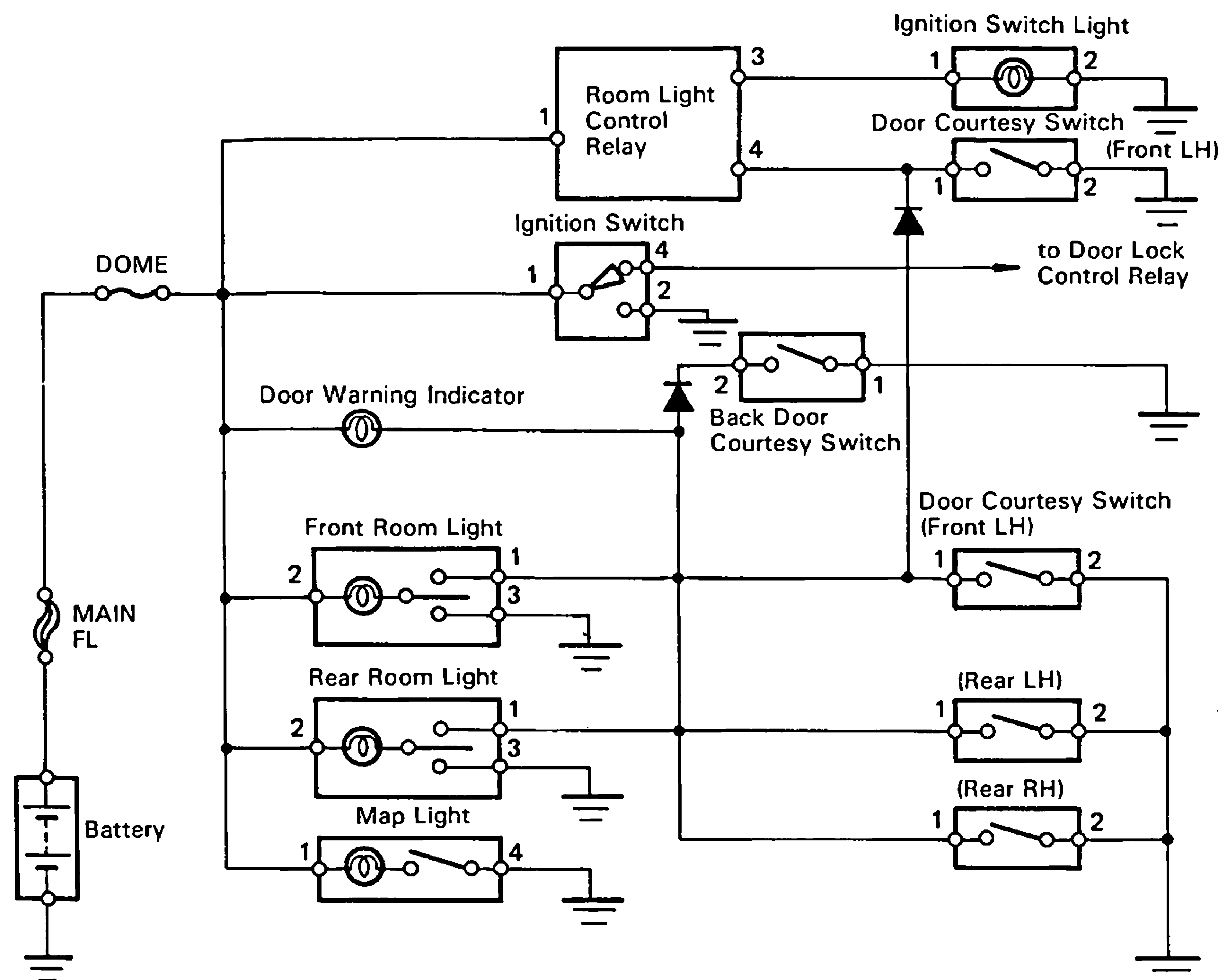
Door Courtesy Switch

Room Light



The POWER SOURCE CIRCUIT has been simplified.
For full details, see pub. No. RM184E pages BE-10, 11.

(with No.2 Rear Seat)

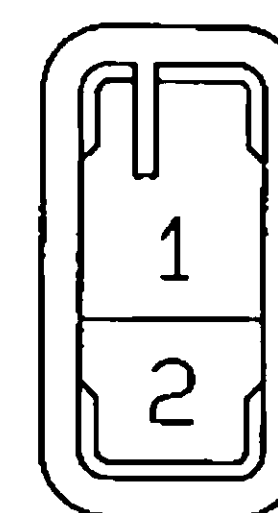
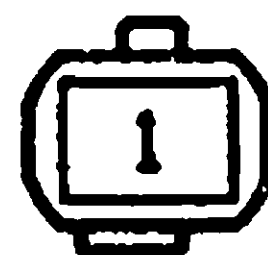
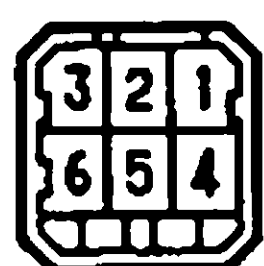
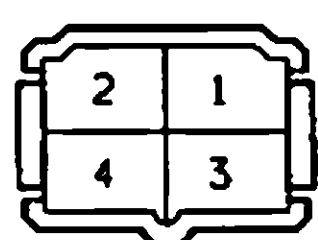


Room Light Control Relay

Map Light

Door Courtesy Switch

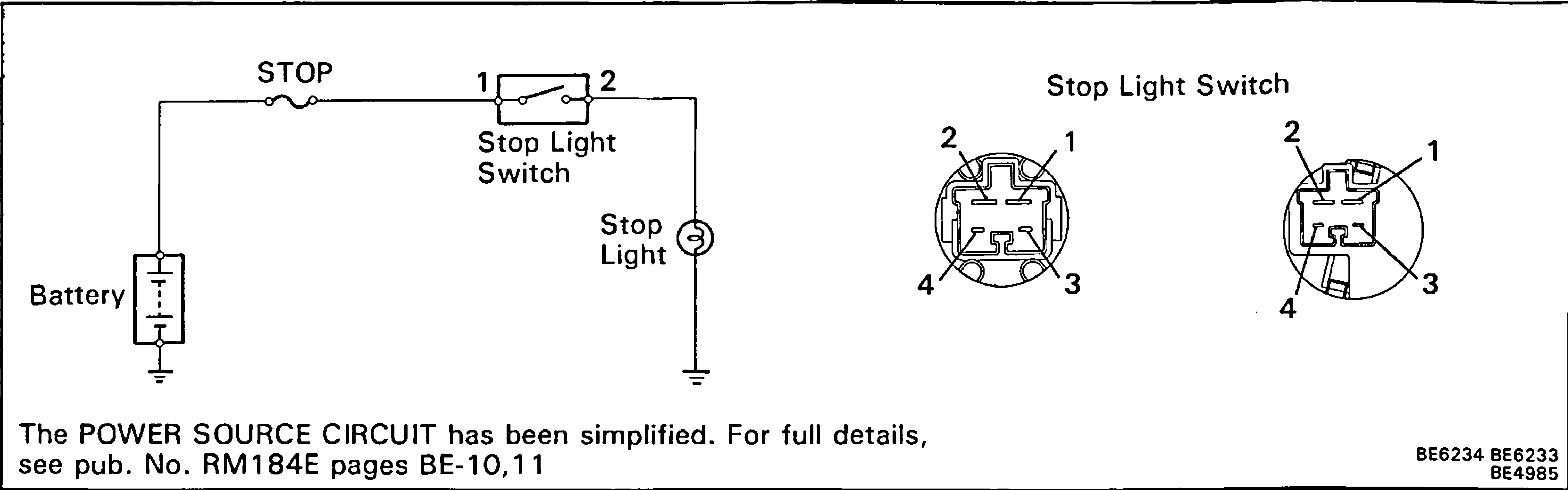
Room Light



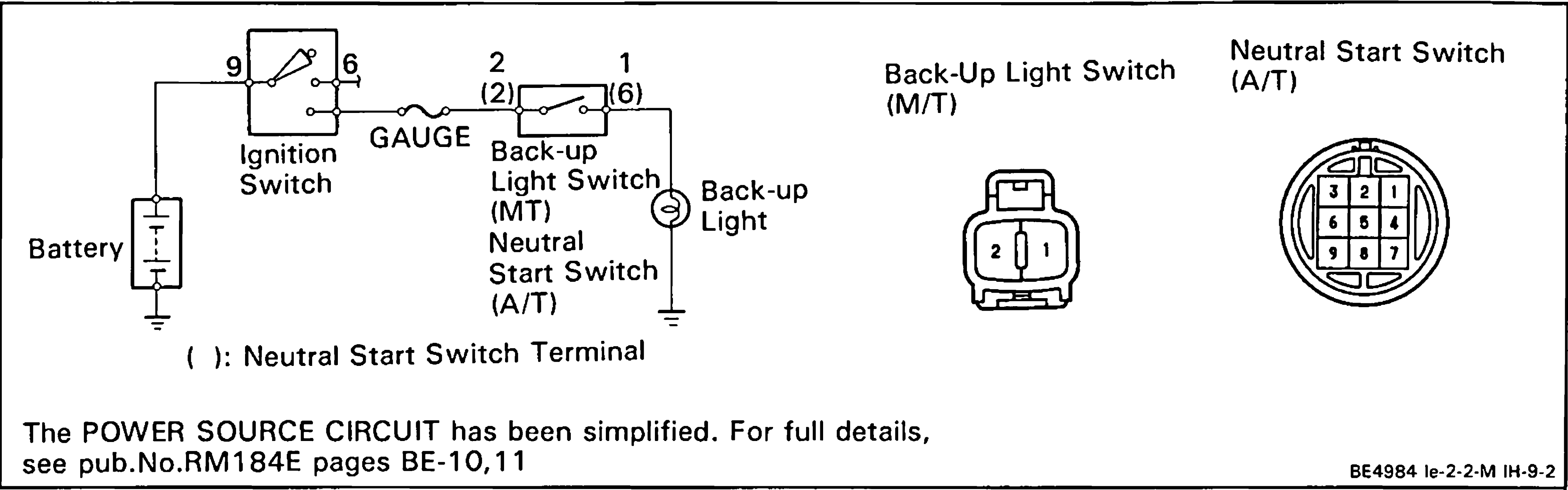
The POWER SOURCE CIRCUIT has been simplified.
For full details, see pub. No. RM184E pages BE-10, 11.

NO4080
D-4-2 S-6-2-B S-1-1-B BE4123

(Stop Light System)



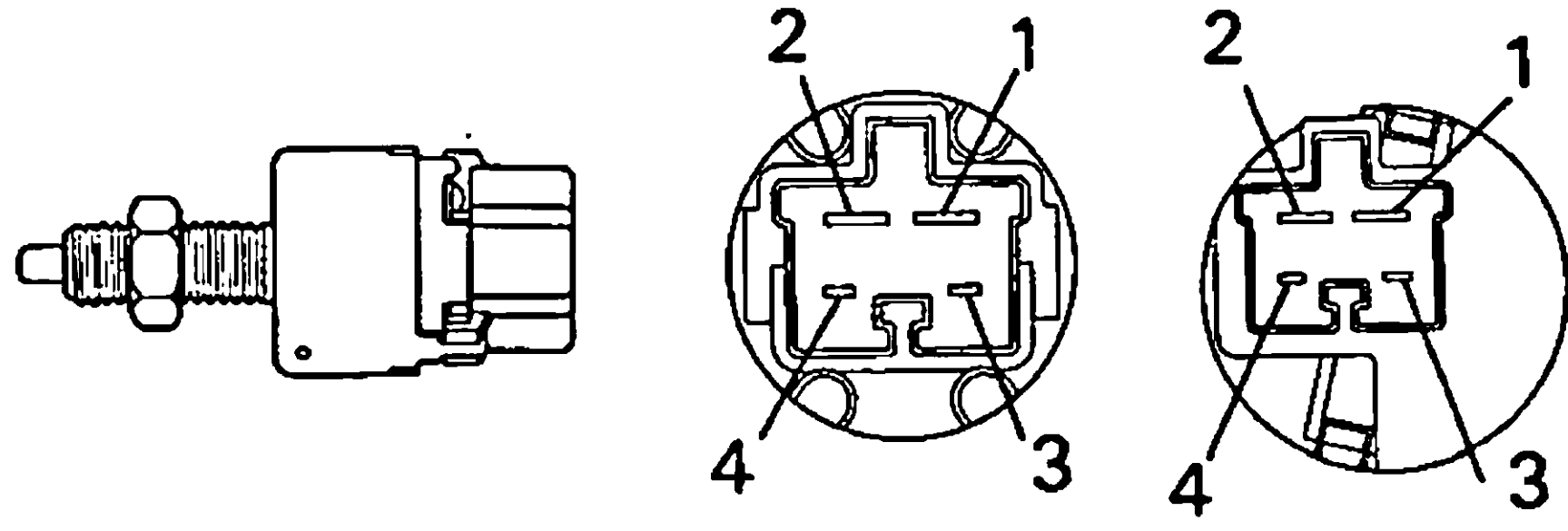
(Back-up Light System)



Stop Light System

INSPECT SWITCH
(Stop Light Switch/Continuity)

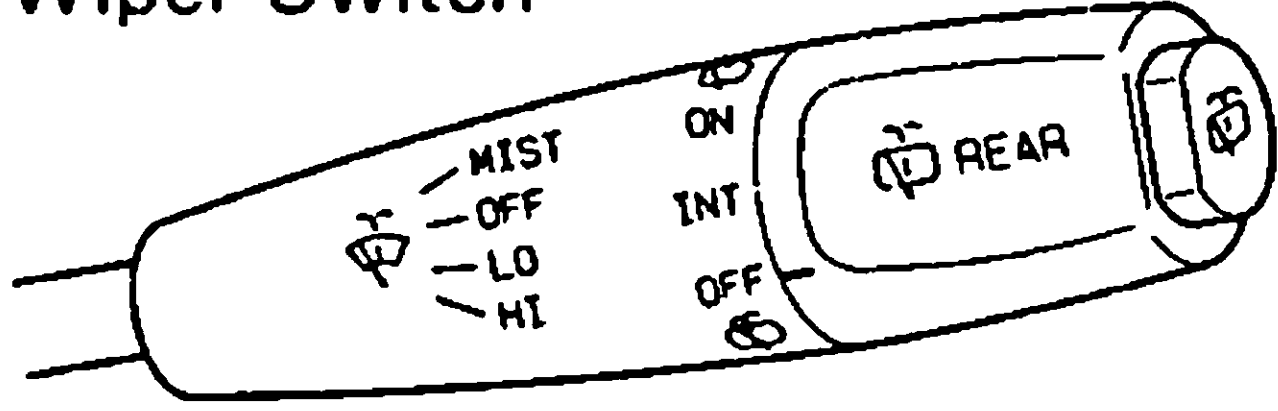
CCS: Cruise Control System

 BE1444 BE6234 BE6233	Terminal		w/CCS	
	Switch position		3	4
	Switch pin free (Brake pedal depressed)			
	Switch pin pushed in (Brake pedal released)			

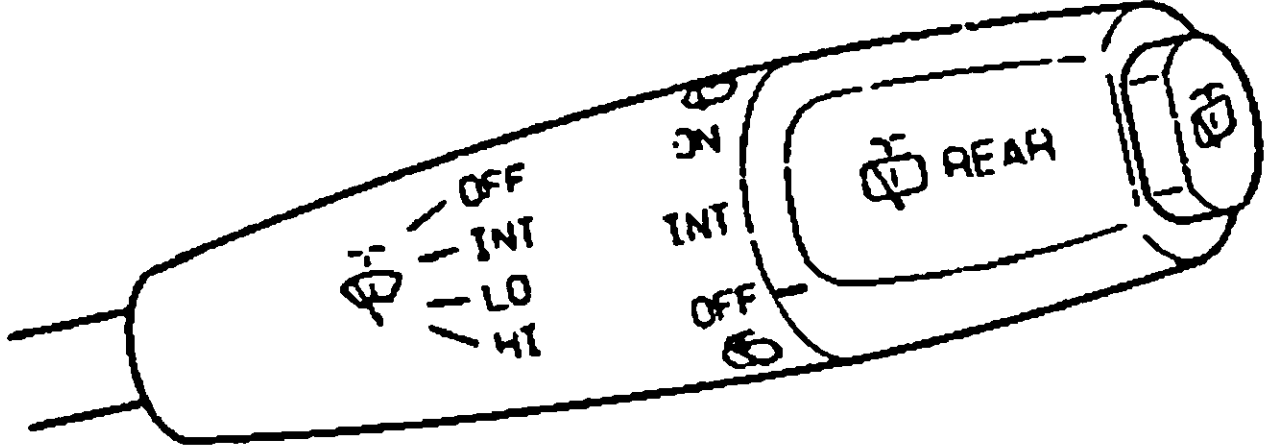
If continuity is not as specified, replace the switch.

Reference: LHD Vehicles

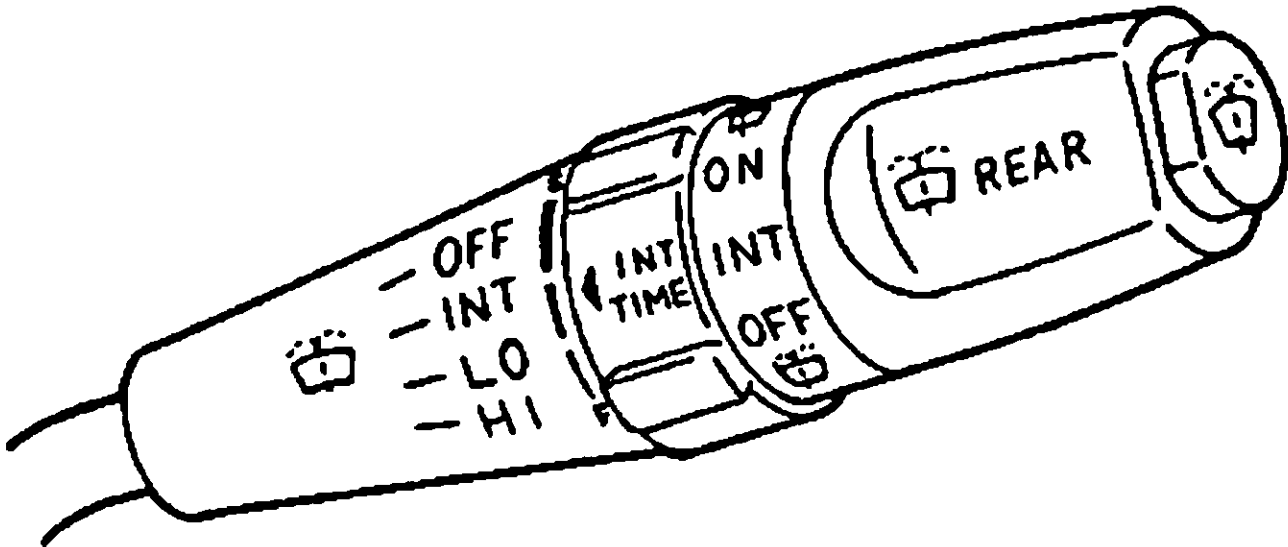
Mist Wiper Switch



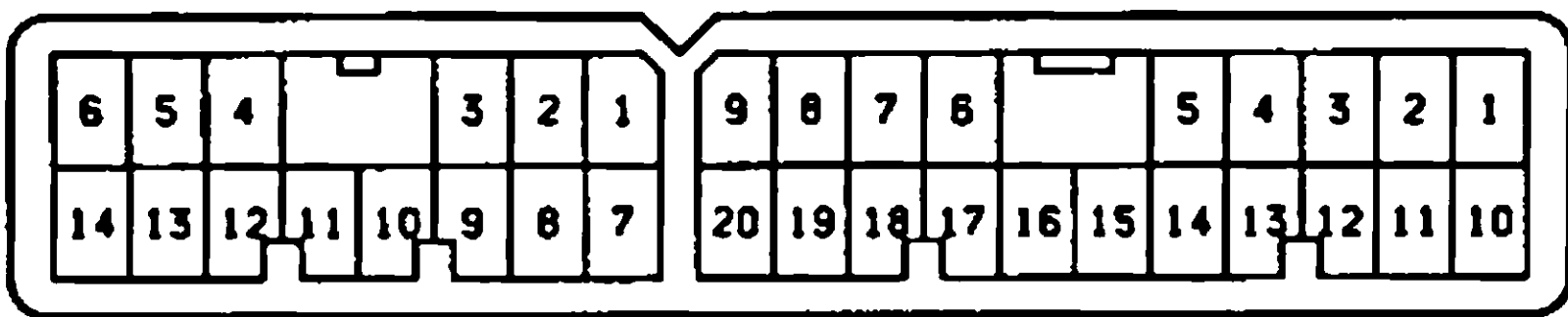
Intermittent Wiper Switch
(w/o Interval Adjuster)



(Wiper with Intermitten and time
adjuster)



Connector "A" Connector "B"



Reference: For RHD vehicles, the switches
are always symmetrically opposite to
those of LHD vehicles.

BE4177
BE4178
NO3146
V-34-2

WIPER AND WASHER SYSTEM

Parts Inspection

Wiper System

1. INSPECT SWITCHES
- (Front Wiper and Washer Switch/Continuity)
- (Mist Wiper)

Terminal (Color) Switch Position		B4 (L-R)	B7 (L-B)	B8 (L)	B13 (L-O)	B16 (B)	B18 (L-W)
Wiper	OFF		○				○
	MIST	○	○				
	LO		○				○
	HI				○		○
Washer	OFF						
	ON			○		○	

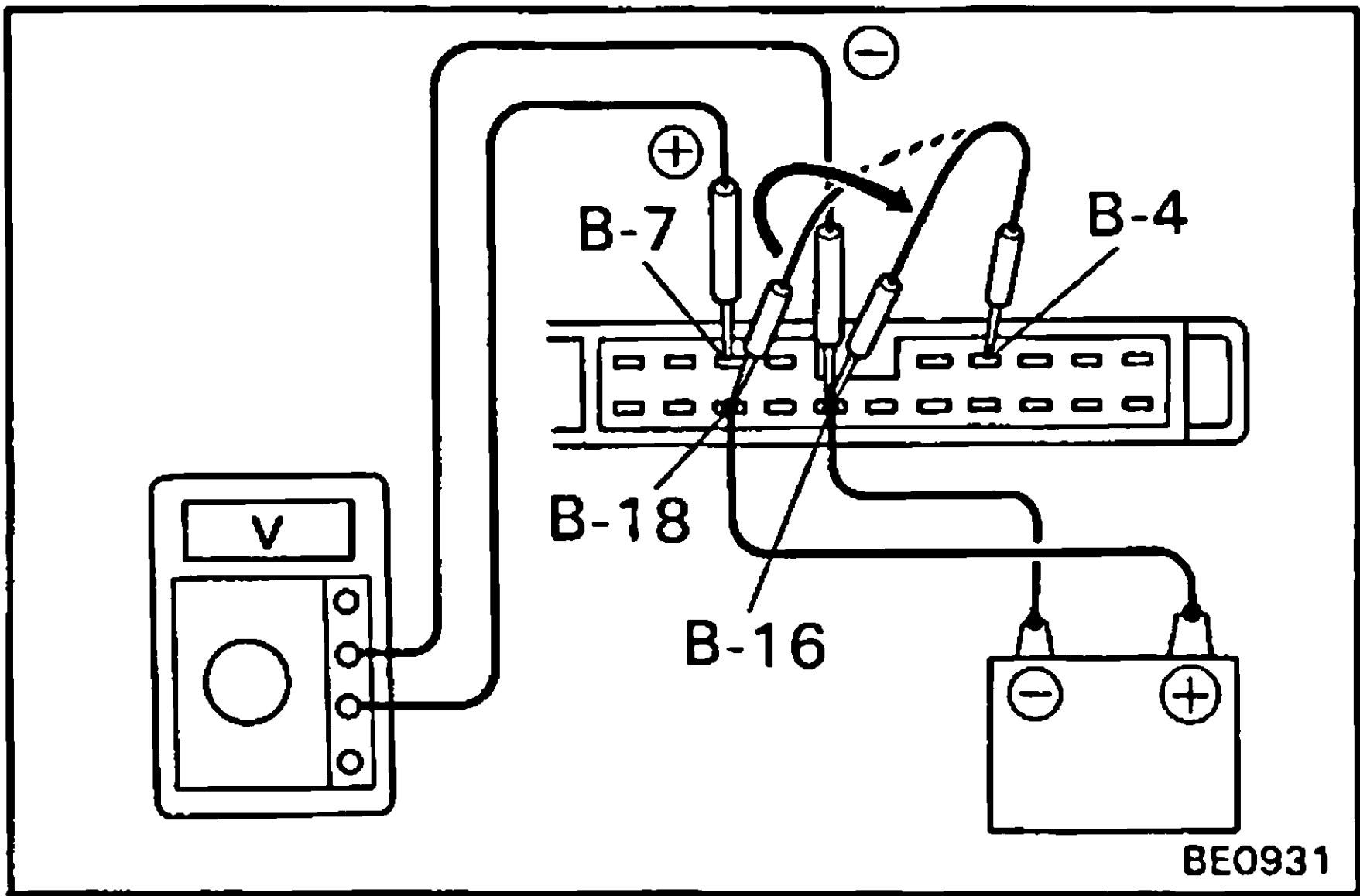
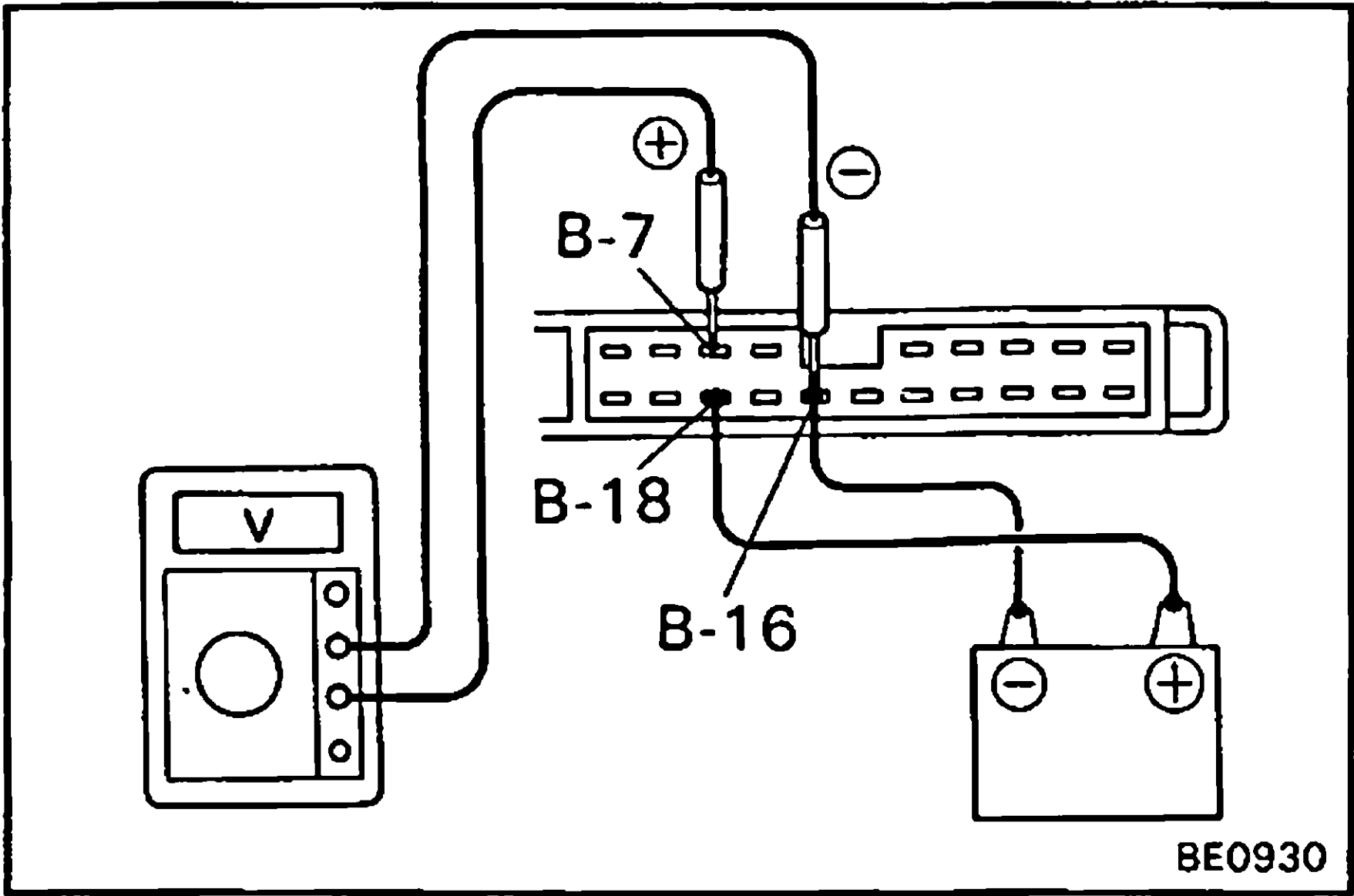
(Intermittent Wiper)

Terminal (Color) Switch position		B4 (L-R)	B7 (L-B)	B8 (L)	B12 (Y-B)	13 (L-O)	B16 (B)	B18 (L-W)
Wiper	OFF	○	○					
	INT	○	○					
	LO		○					○
	HI					○		○
Washer	OFF							
	ON			○			○	

(Rear Wiper and Washer Switch/Continuity)

Terminal (Color) Switch position		B1 (G)	B2 (V)	B10 (O)	B16 (B)
Washer	ON		○		○
Wiper	OFF				
	INT			○	○
	ON	○			○
Washer	ON	○	○		○

If continuity is not as specified, replace the switch.

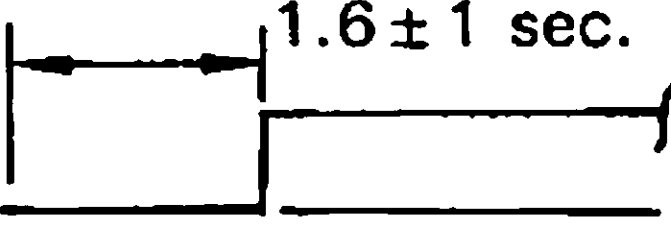
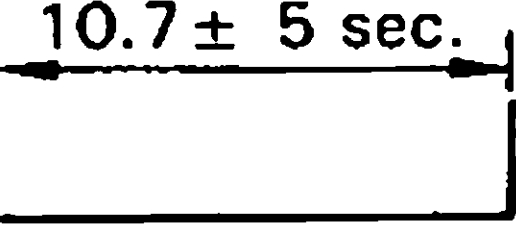
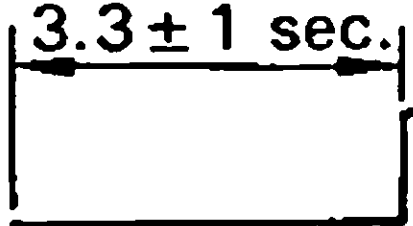


2. INSPECT FRONT WIPER RELAY

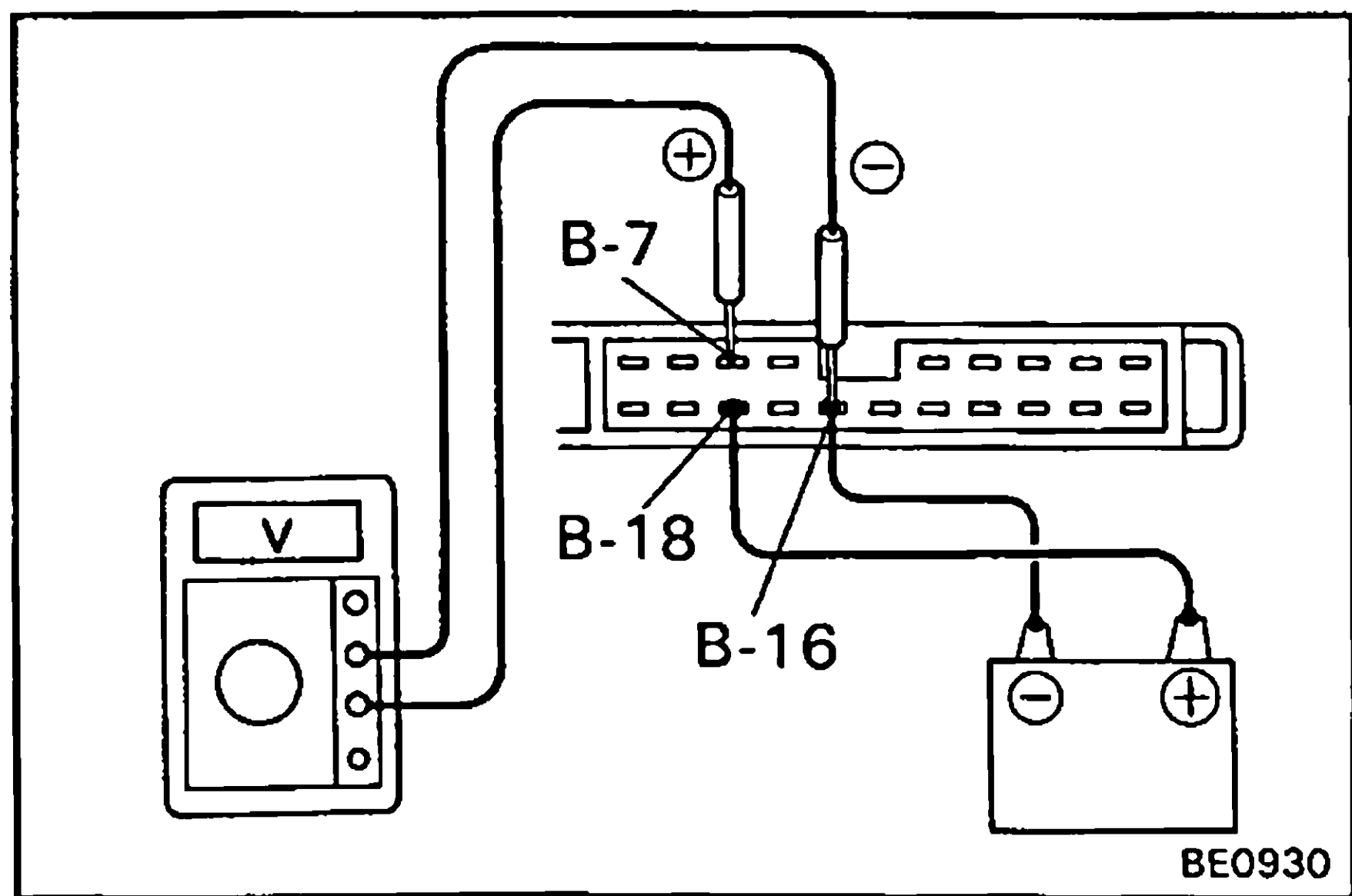
(Intermittent wiper: Front)

(Operation at Intermittent)

- (a) Turn the wiper switch to INT position.
- (b) (Variable Type)
Turn the intermittent time control switch to FAST position.
- (c) Connect the positive (+) lead from the battery to terminal B-18 and the negative (—) lead to terminal B-16.
- (d) Connect the positive (+) lead from the voltmeter to terminal B-7 and the negative (—) lead to terminal B-16, check that the meter needle indicates battery voltage.
- (e) After connecting terminal B-4 to terminal B-18, connect to terminal B-16.
Then, check that the voltage rises from 0 volts to battery voltage within the times as shown in the table.

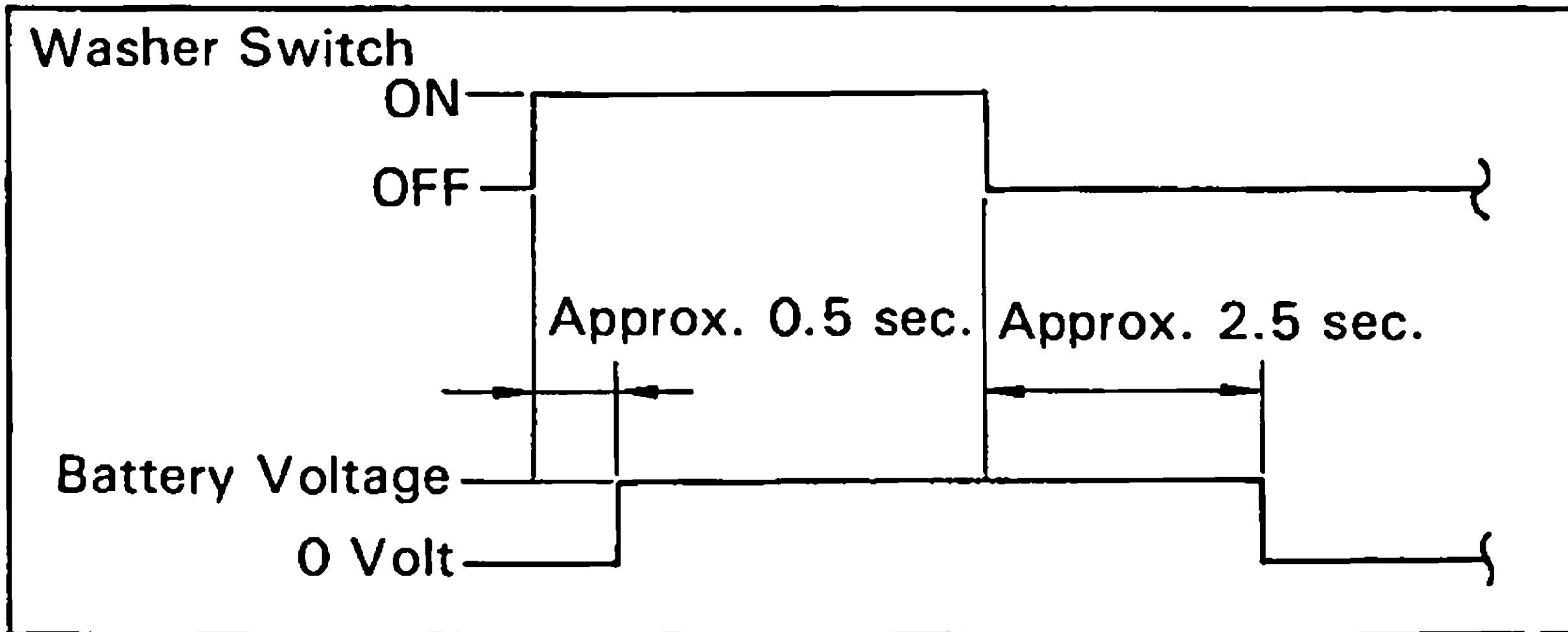
INT time control switch position	Voltage
FAST	 Battery voltage 0 volts
SLOW	 Battery voltage 0 volts
Non variable type	 Battery voltage 0 volts

If operation is not as specified, replace the switch.



(Operation at Washer Linked)

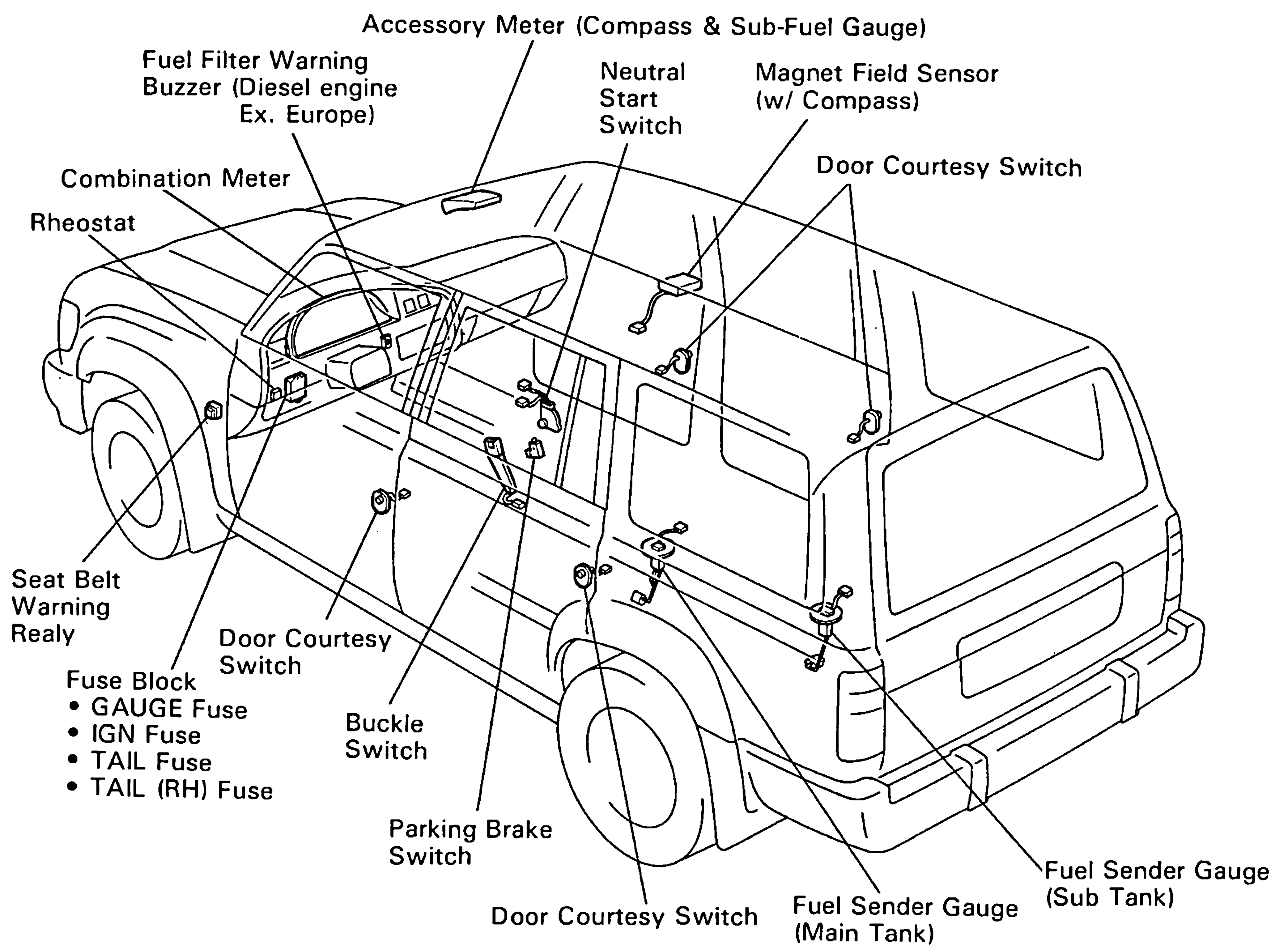
- (a) Connect the positive (+) lead from the battery to terminal B 18 and the negative (—) lead to terminal B16.
- (b) Connect the positive (+) lead from the voltmeter to terminal B7 and the negative (—) lead to terminal B16.
- (c) Push in the washer switch. Check that the voltage changes as shown in the table.



If operation is not as specified, replace the switch.

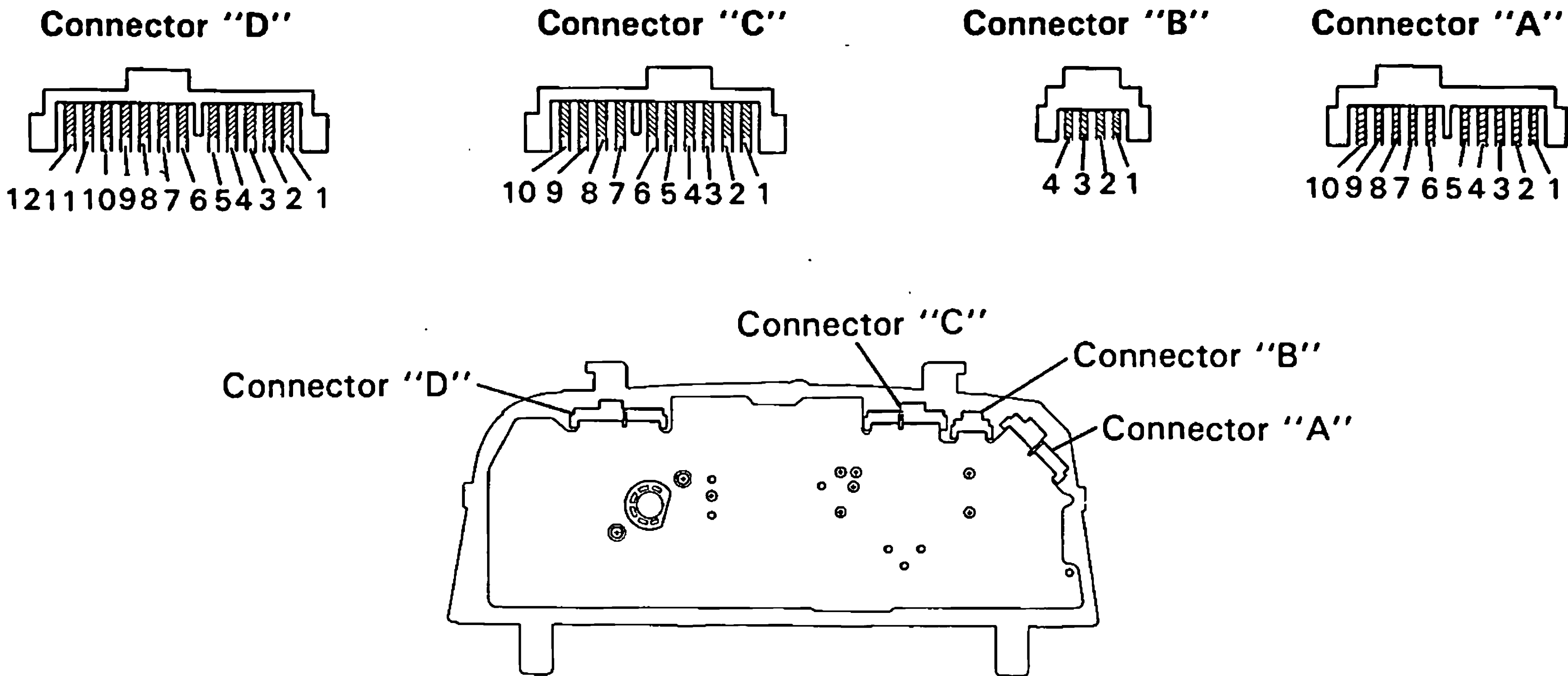
COMBINATION METER

Parts Location

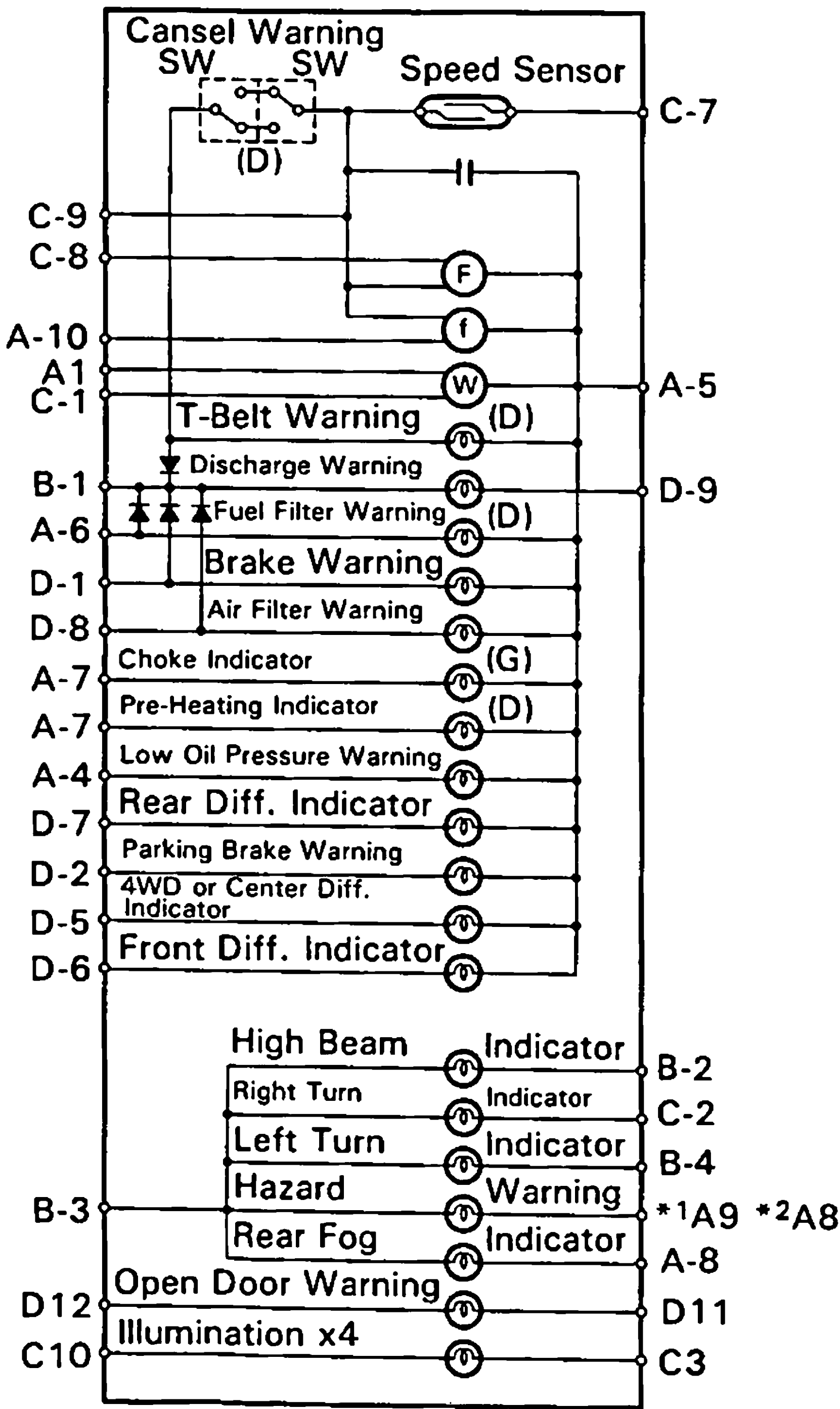


Meter Circuit

(w/o Tachometer: Except G.C.C.)



BE1266 BE1270 BE5017 BE2576
BE5117

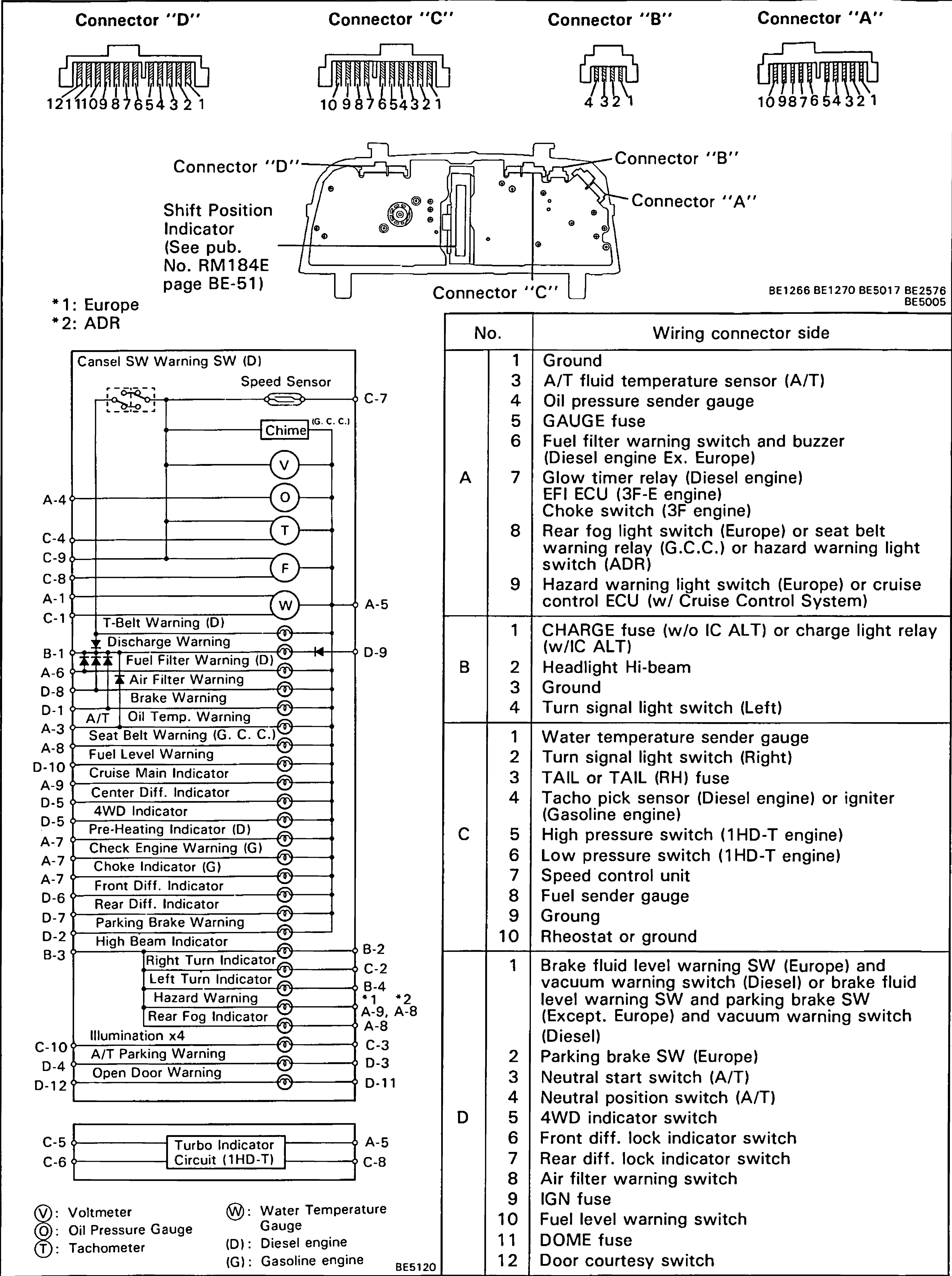


(F) : Fuel Gauge
(f) : Fuel Gauge (for Sub-Tank)
(W) : Water Temperature Gauge
(D) : Diesel engine
(G) : Gasoline engine

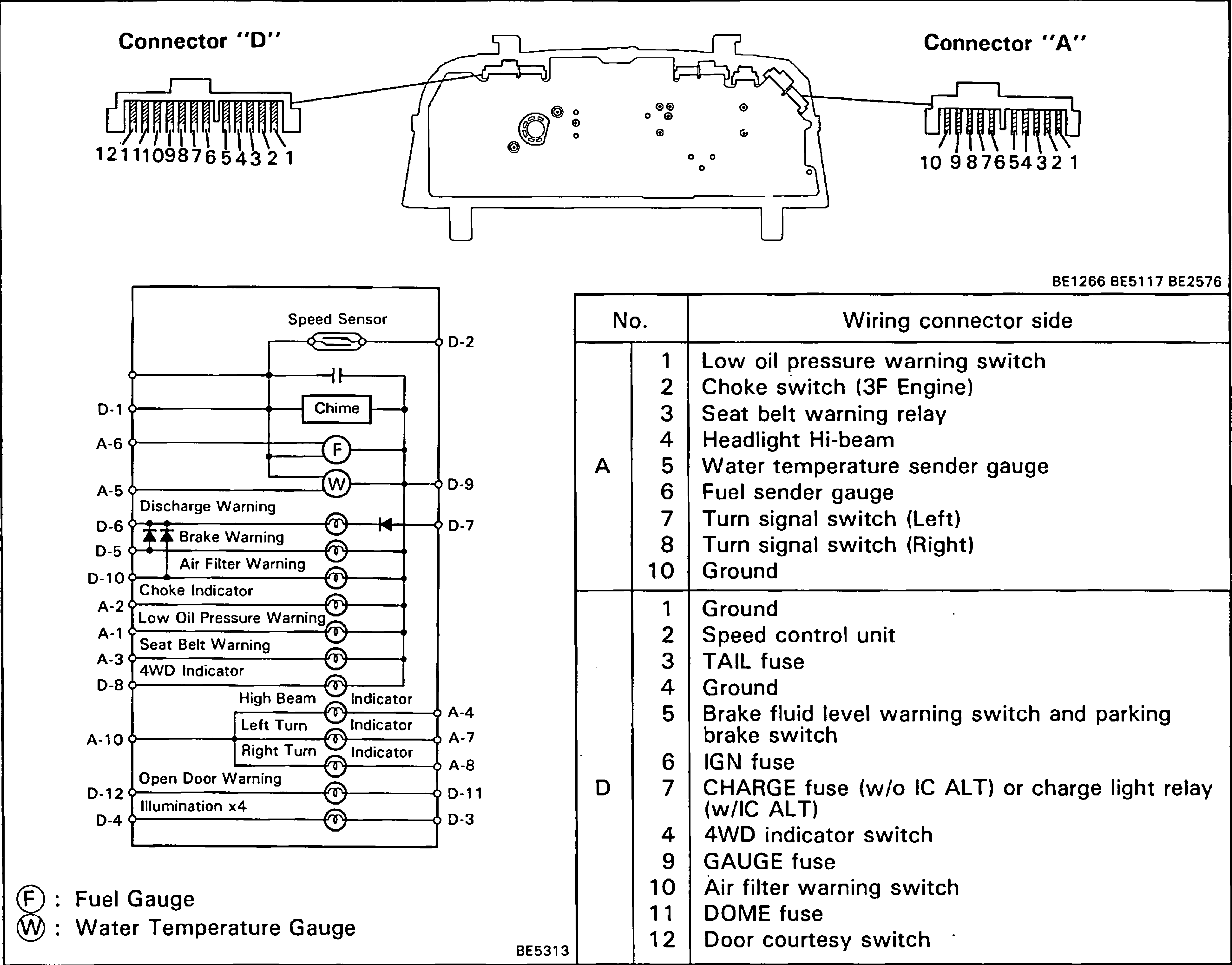
*1 : Europe
*2 : ADR

No.		Wiring connector side
A	1	Ground
	4	Low oil pressure warning switch
	5	GAUGE fuse
	6	Fuel filter warning switch and buzzer (Diesel engine)
	7	Choke switch (Gasoline engine) or glow timer relay (Diesel engine)
	8	Rear fog light switch (Europe) Hazard warning light switch (ADR)
	9	Hazard warning light switch (Europe)
	10	Fuel sender gauge (Sub-Tank)
B	1	CHARGE fuse (w/o IC ALT) or charge light relay (w/IC ALT)
	2	Headlight Lo-beam
	3	Ground
	4	Turn signal light switch (Left)
C	1	Water temperature sender gauge
	2	Turn signal light switch (Right)
	3	TAIL fuse or TAIL (RH) fuse
	7	Speed control unit
	8	Fuel sender gauge (Main-Tank)
	9	Ground
D	10	Ground of rheostat
	1	Brake fluid level warning switch (Europe) and vacuum warning switch (Diesel) Brake fluid level warning switch (Except Europe) and parking brake switch (Except Europe) and vacuum warning switch (Diesel)
	2	Parking brake switch (Europe)
	5	4WD indicator switch
	6	Front diff. lock indicator switch
	7	Rear diff. lock indicator switch
	8	Air filter warning switch
	9	IGN fuse
	11	DOME fuse
	12	Door courtesy switch

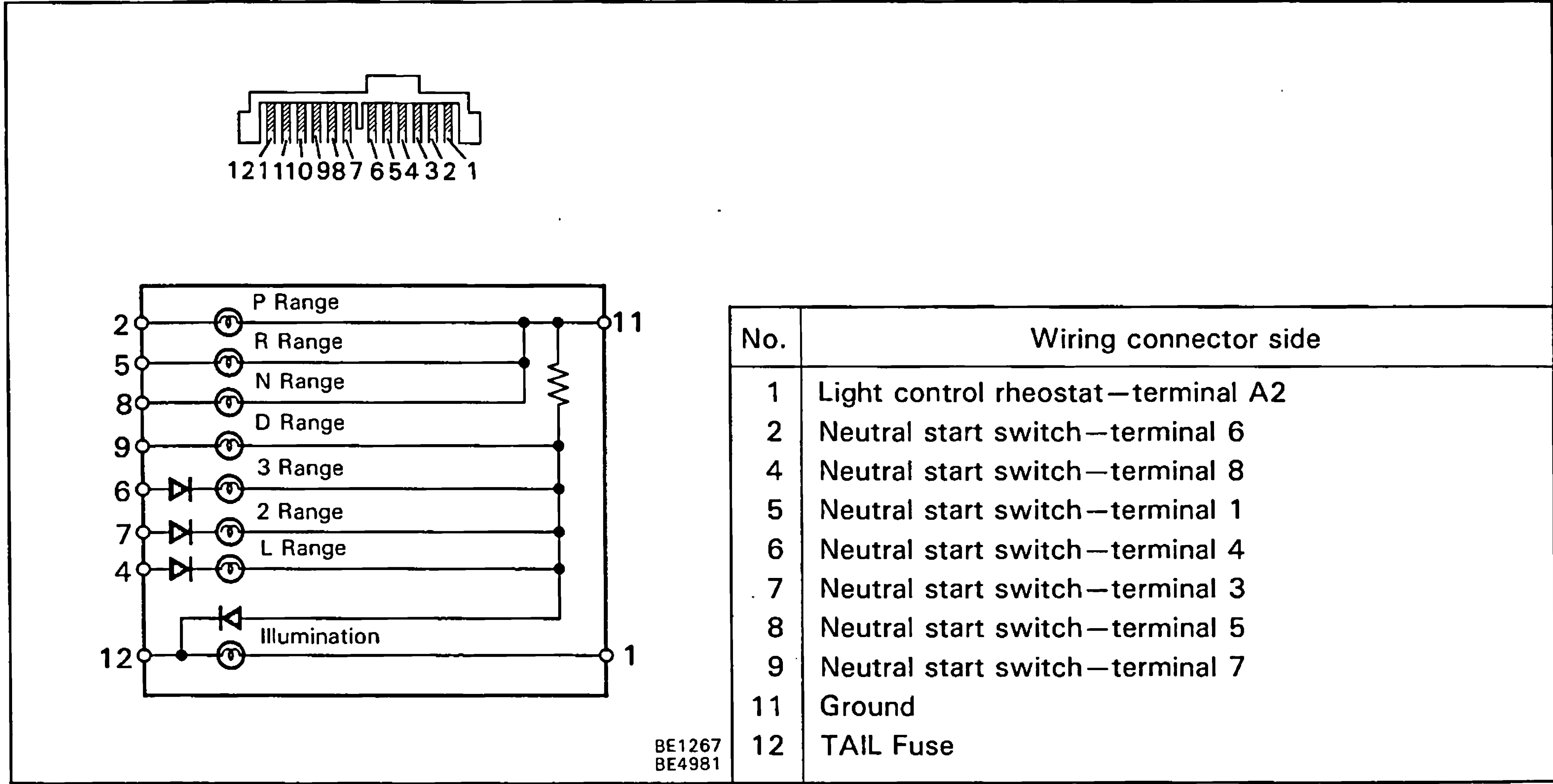
(w/ Tachometer)



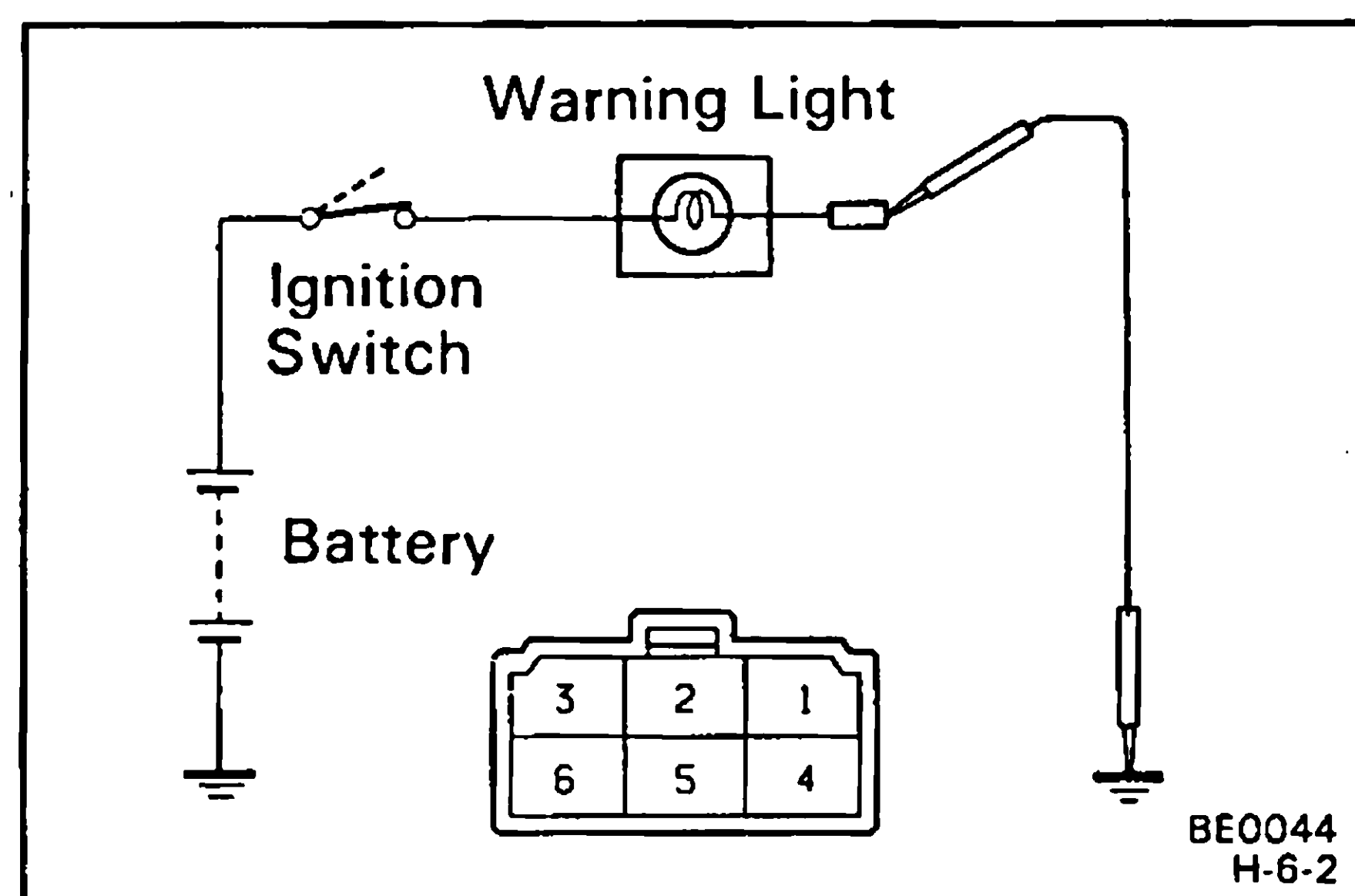
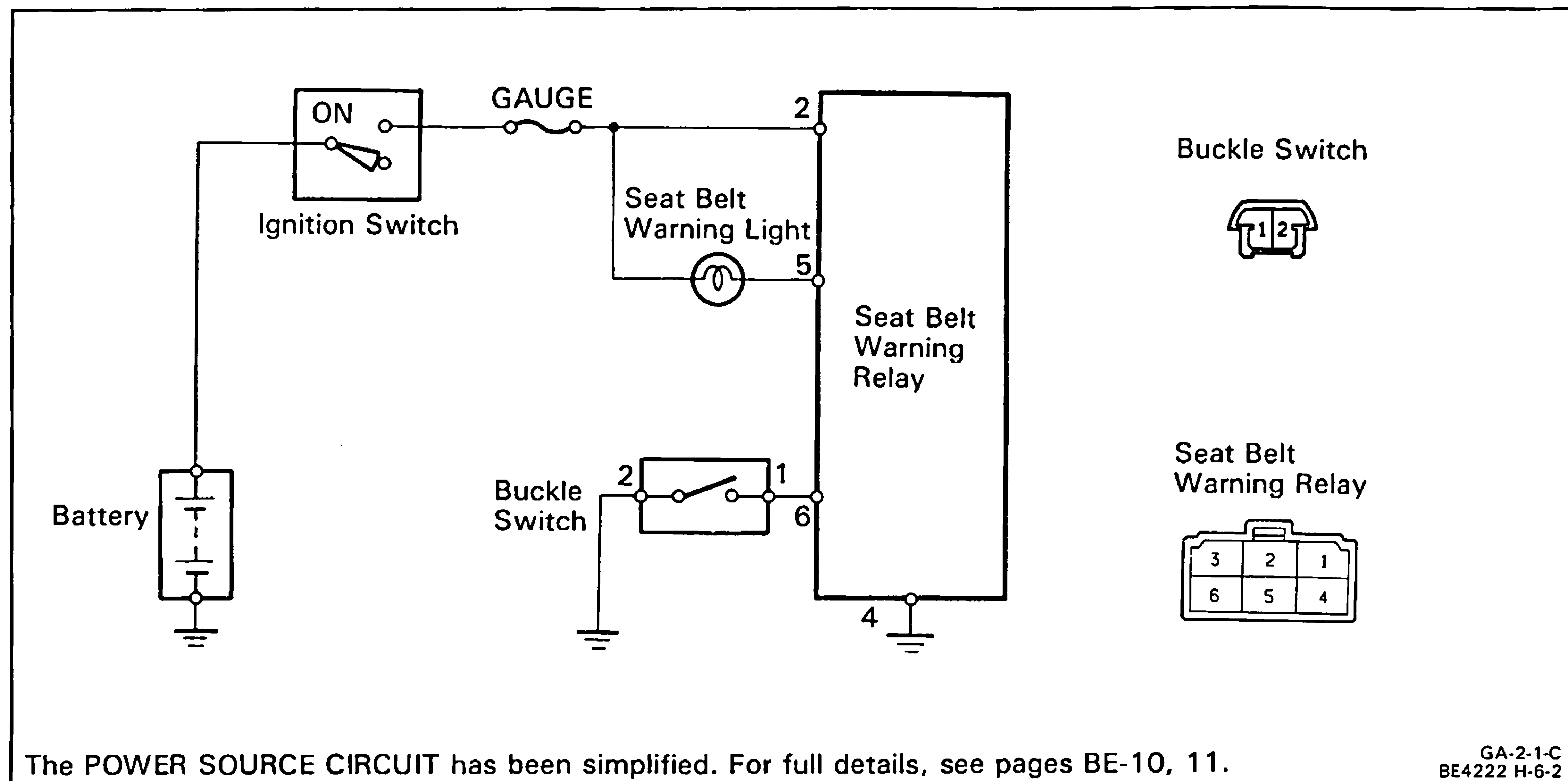
(w/ Tachometer: G.C.C.)



(Shift Position Indicator)



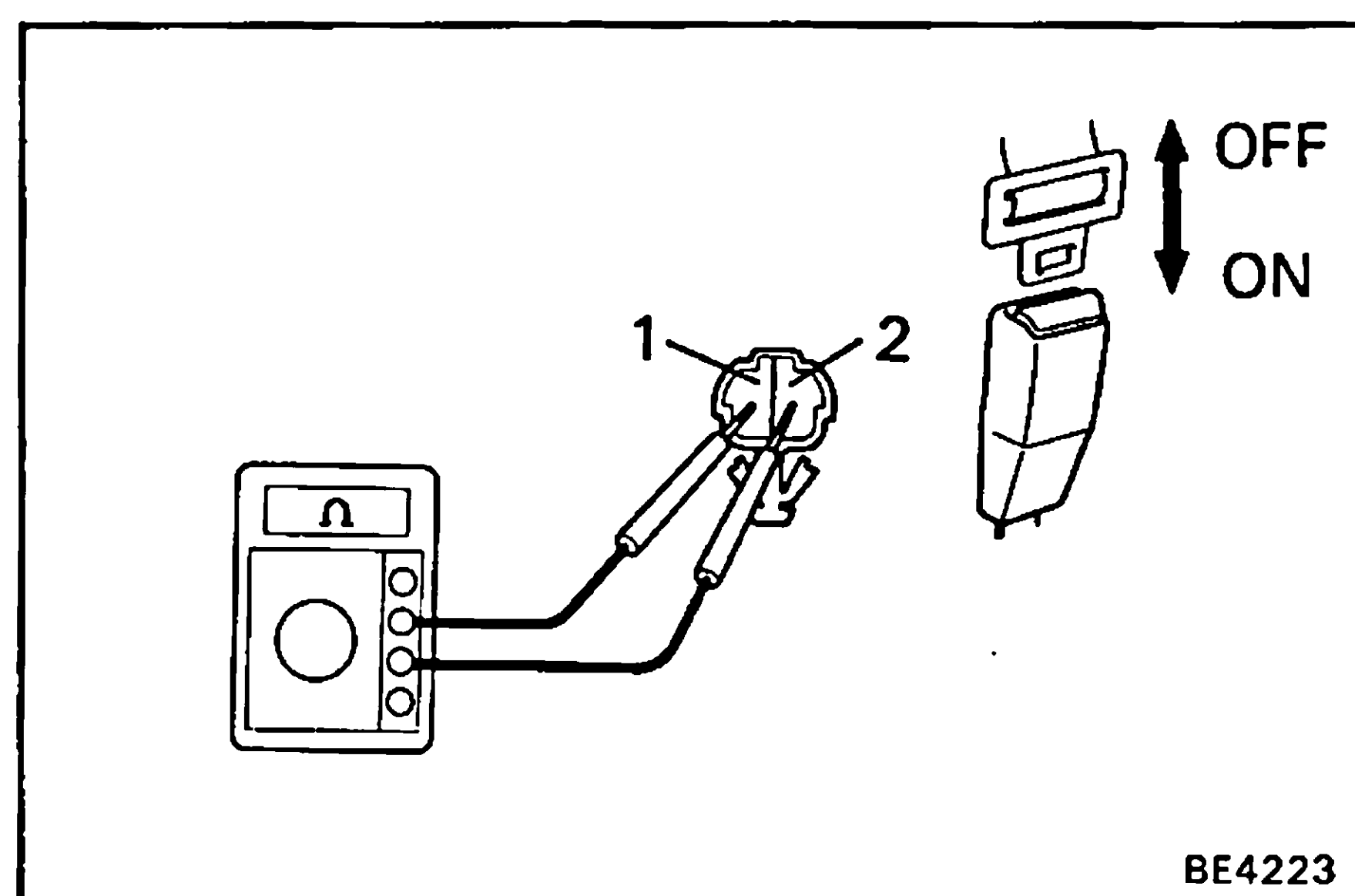
Seat Belt Warning System



1. INSPECT WARNING LIGHT

- Disconnect the connector from the seat belt warning relay.
- Ground terminal 5 on the wire harness side connector.
- Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light, test the bulb.

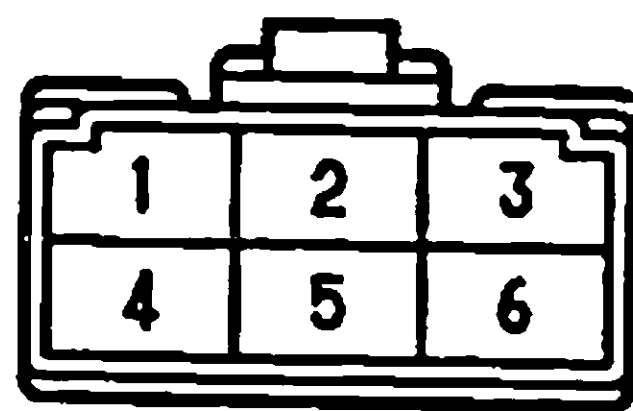


2. INSPECT SWITCHES (Buckle Switch)

- Check that there is no continuity between terminals with the switch OFF (belt unfastened).
- Check that there is continuity between terminals with the switch ON (belt fastened).

If operation is not as specified, replace the seat belt inner.

Wire Harness Side



H-6-1

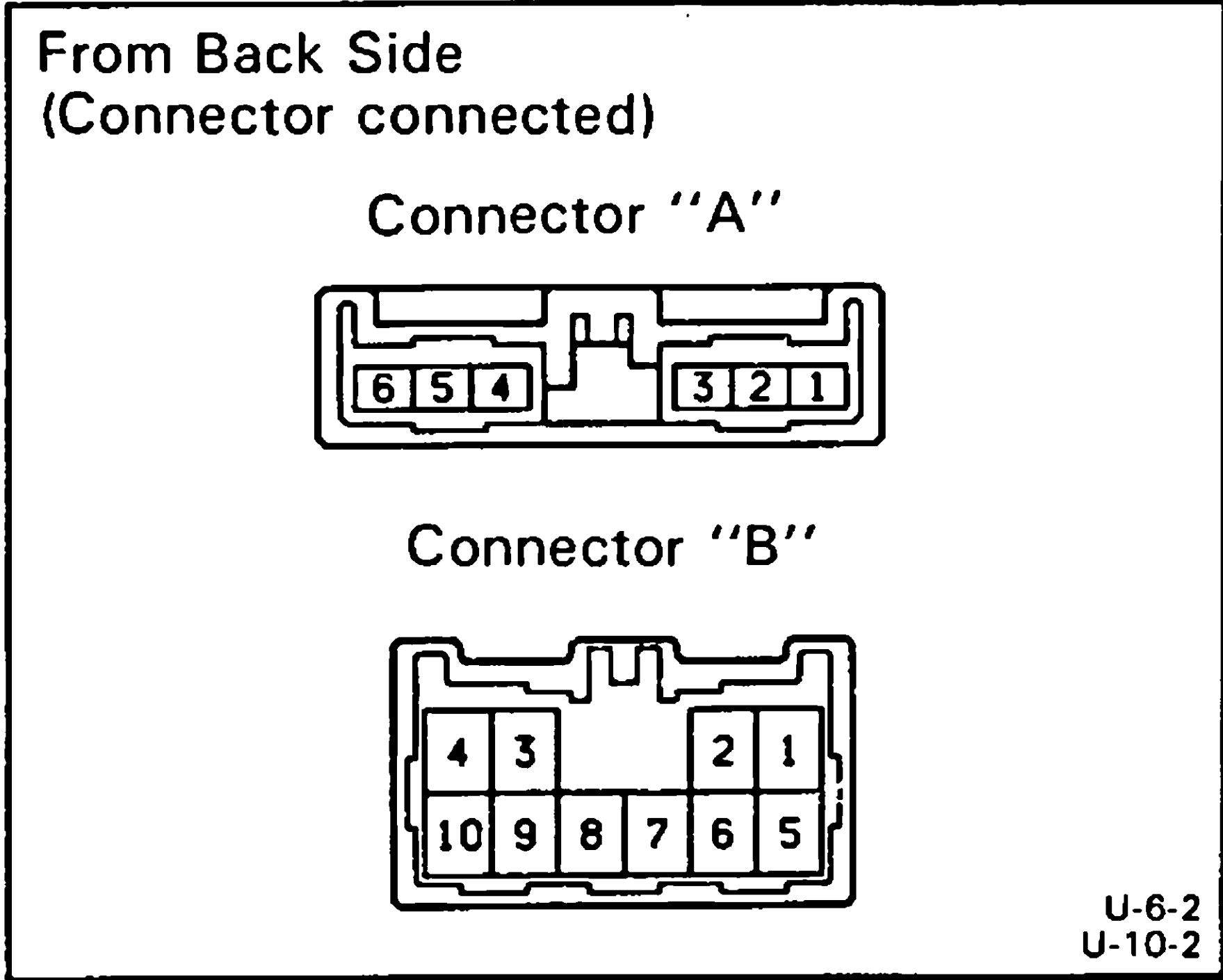
3. INSPECT SEAT BELT RELAY
(Relay Circuit)

Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	4 — Ground	Constant		Continuity
	6 — Ground	Buckle switch position	ON (Belt fastened)	Continuity
			OFF (Belt unfastened)	No continuity
Voltage	2 — Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	5 — Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage

If circuit is as specified, replace the relay.

If circuit is not as specified, refer to pub. No. RM184E page BE-65 wiring diagram and inspect the circuits connected to other parts.



Compass System

INSPECT ACCESSORY METER
(Circuit)

Connect connector "A" and "B" to accessory meter and inspect connectors from the back side as shown in the chart.

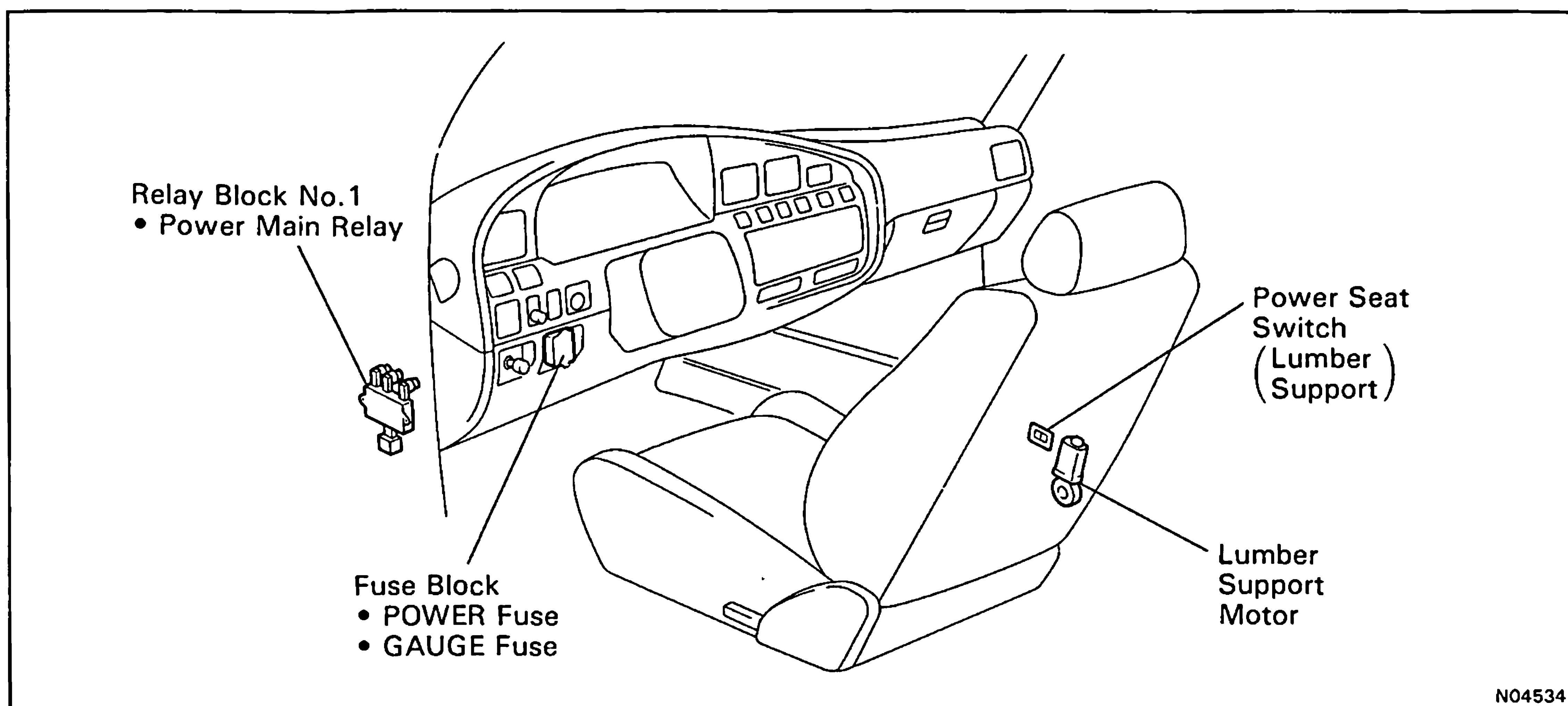
NOTICE: Perform the inspection in a place free from mag-
netic influence.

Terminal Name	Check for	Tester connection	Condition		Specified value
ACC	Voltage	A1 — A4	Ignition switch turned to ACC or ON		10 — 14 V
TAIL		A3 — A4	Light control switch turned to TAIL or HEAD		10 — 14 V
GROUND	Continuity	A4 — Ground	Constant		Continuity
GND		B4 — Ground	Constant		Continuity
ACC	Voltage	B6 — B4	Ignition switch turned to ACC or ON		10 — 14 V
HX1		B5 — B4	Knob “N” position	Turned fully counter clockwise	6.2 — 6.8 V
				Neutral	3.7 — 4.3 V
				Turned full clockwise	1.2 — 1.8 V
			Knob “E” turned to clockwise and knob “N” turned to neutral position		3.7 — 4.3 V
HY2		B8 — B4	Knob “E” position	Turned fully counter clockwise	0.54 — 0.56 V
				Neutral	0.53 — 0.55 V
				Turned fully clockwise	0.49 — 0.51 V
			Knob “N” turned to clockwise and knob “E” turned to neutral position		0.53 — 0.55 V
HX2		B9 — B4	Knob “N” position	Turned fully counter clockwise	0.54 — 0.56 V
				Neutral	0.53 — 0.55 V
				Turned fully clockwise	0.49 — 0.51 V
			Knob “E” turned to clockwise and knob “N” turned to neutral position		0.53 — 0.55 V
HY1		B10 — B4	Knob “E” position	Turned fully counter clockwise	6.2 — 6.8 V
				Neutral	3.7 — 4.3 V
				Turned fully clockwise	1.2 — 1.8 V
			Knob “N” turned to clockwise and knob “E” turned to neutral position		3.7 — 4.3 V

If the circuit is not as specified, refer to pub. No. RM184E
page BE-51 wiring diagram and inspect the circuits con-
nected to other parts or wire harness.

POWER SEAT CONTROL SYSTEM

Parts Location



N04534

SEAT HEATER SYSTEM

System Description

HINT: The number in () is for the right side.

Standby Operation

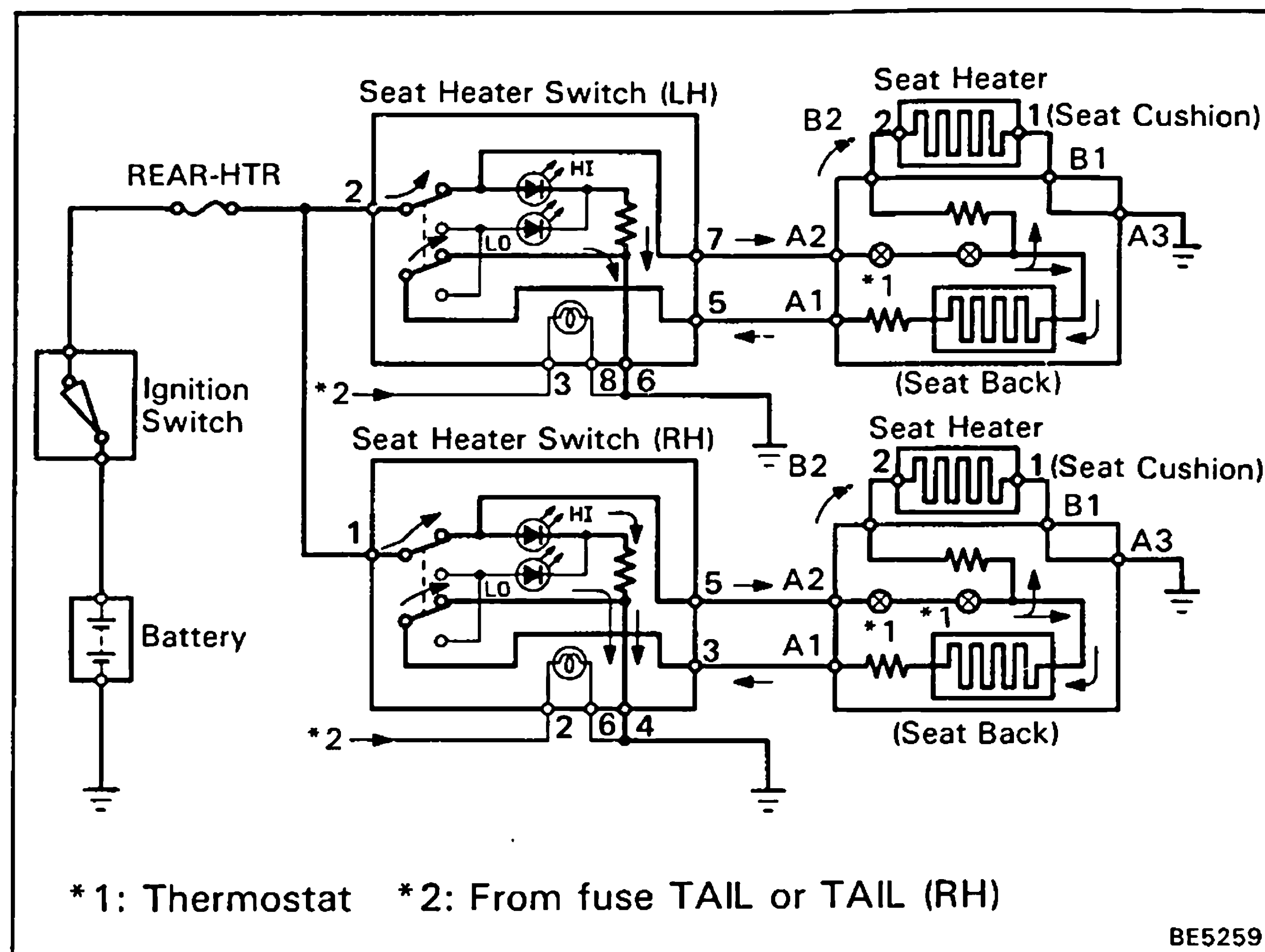
- When the Ignition Switch is on, current flows from the battery to terminal 2 (1) of the Seat Heater Switch.

Operation

"HI" Operation

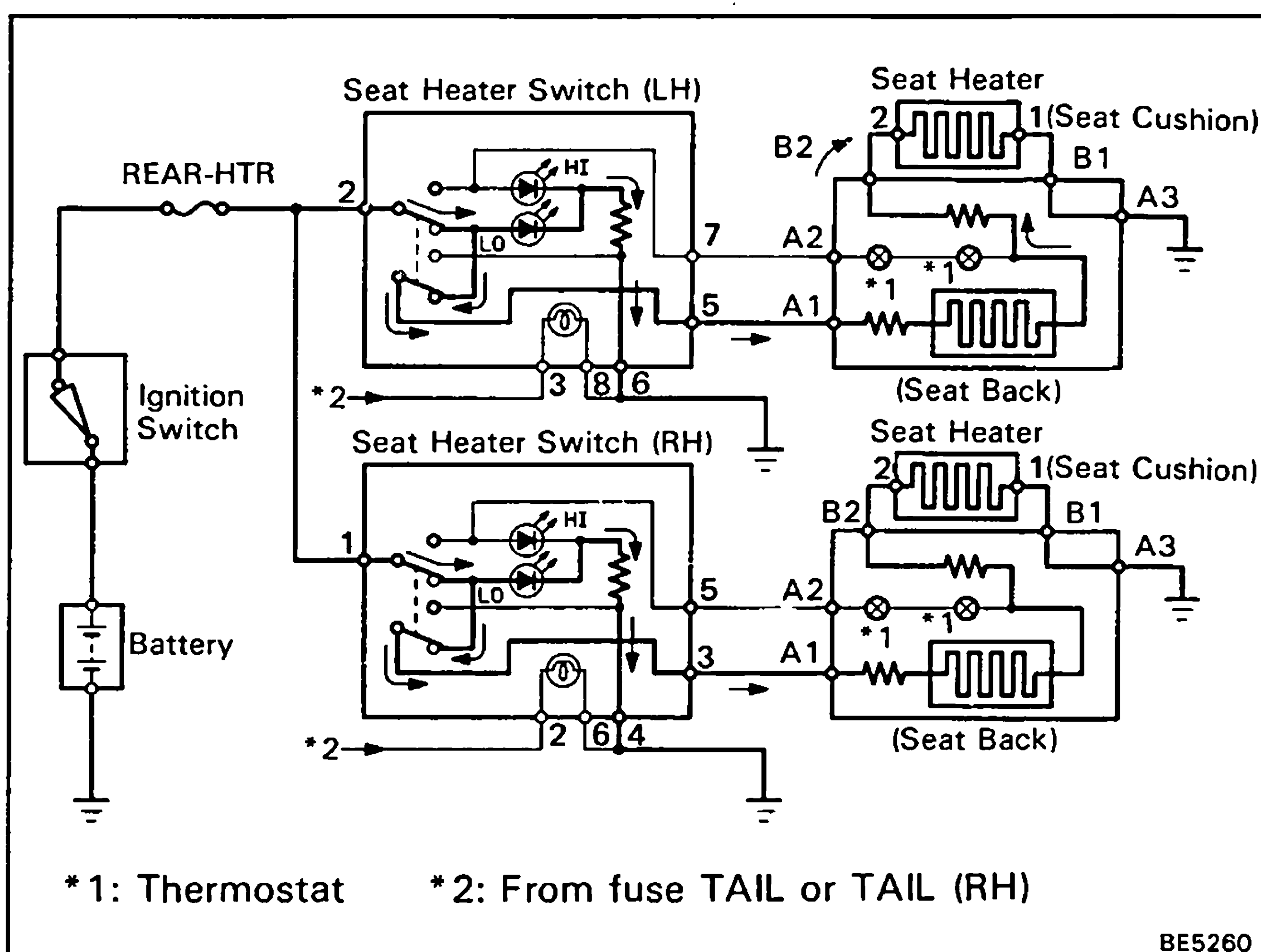
When the Seat Heater Switch is set to the "HI" position, current flows through terminal 2 (1) of the Seat Heater Switch → terminal 7 (5) of the Seat Heater Switch → terminal A2 (A2) of the seat back side → the seat back, where it is divided into a parallel circuit. Then current flows through terminal B2 (B2) of the seat back → terminal 2 (2) of the seat cushion → terminal 1 (1) of the seat cushion → terminal B1 (B1) of the seat back → terminal A3 (A3) of the seat back → ground, so that the seat cushion can be warmed. At the same time, current also flows through terminal A1 (A1) of the seat back → terminal 5 (3) of the Seat Heater Switch → terminal 6 (4) of the Seat Heater Switch → ground, so that the seat back can be warmed.

When the seat surface temperature reaches over approx. 40°C (104°F), current is shut off by the thermostat so that the temperature cannot increase any more. When it decreases below approx. 30°C (86°F), the contact is made again by the thermostat so that the seat can be warmed.



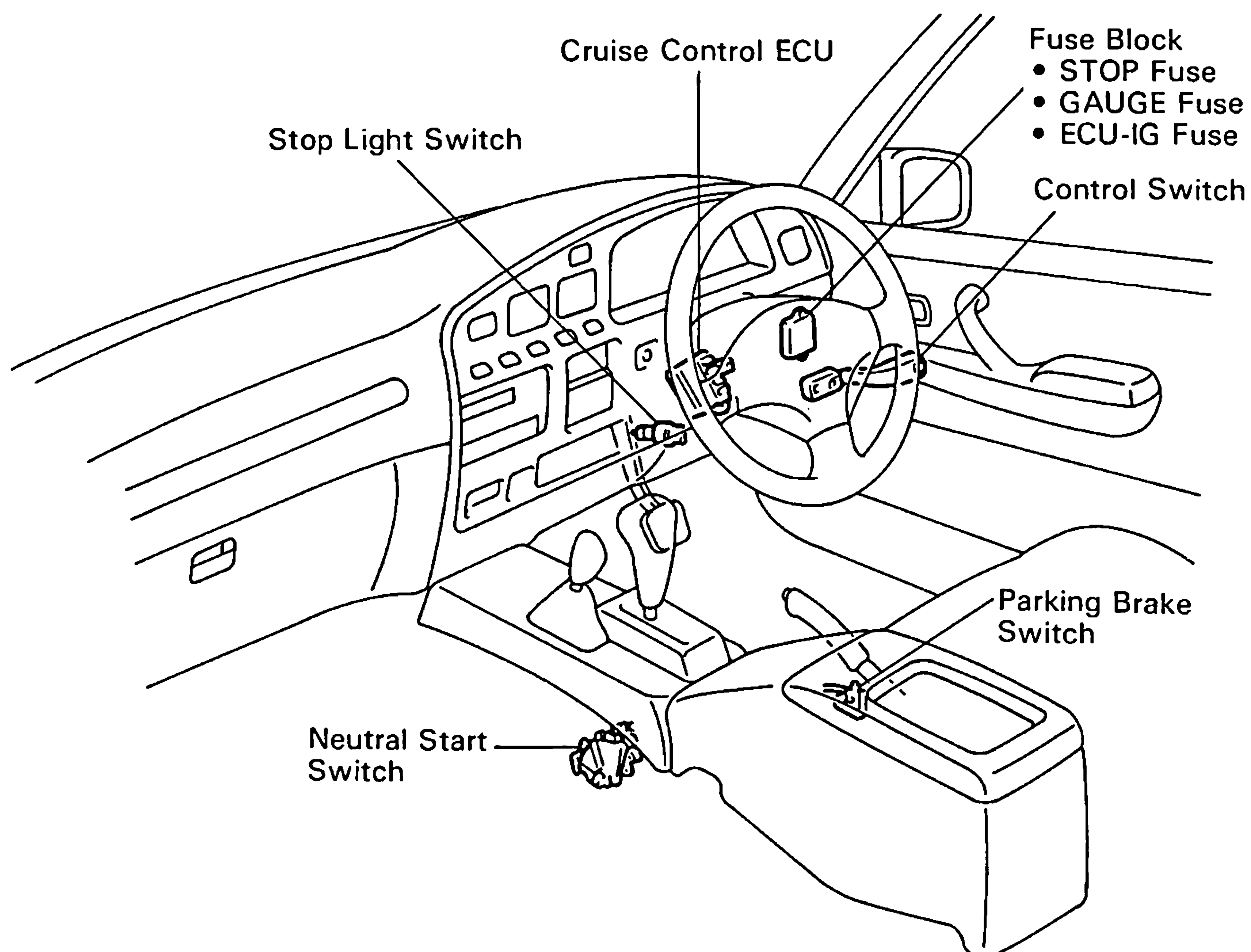
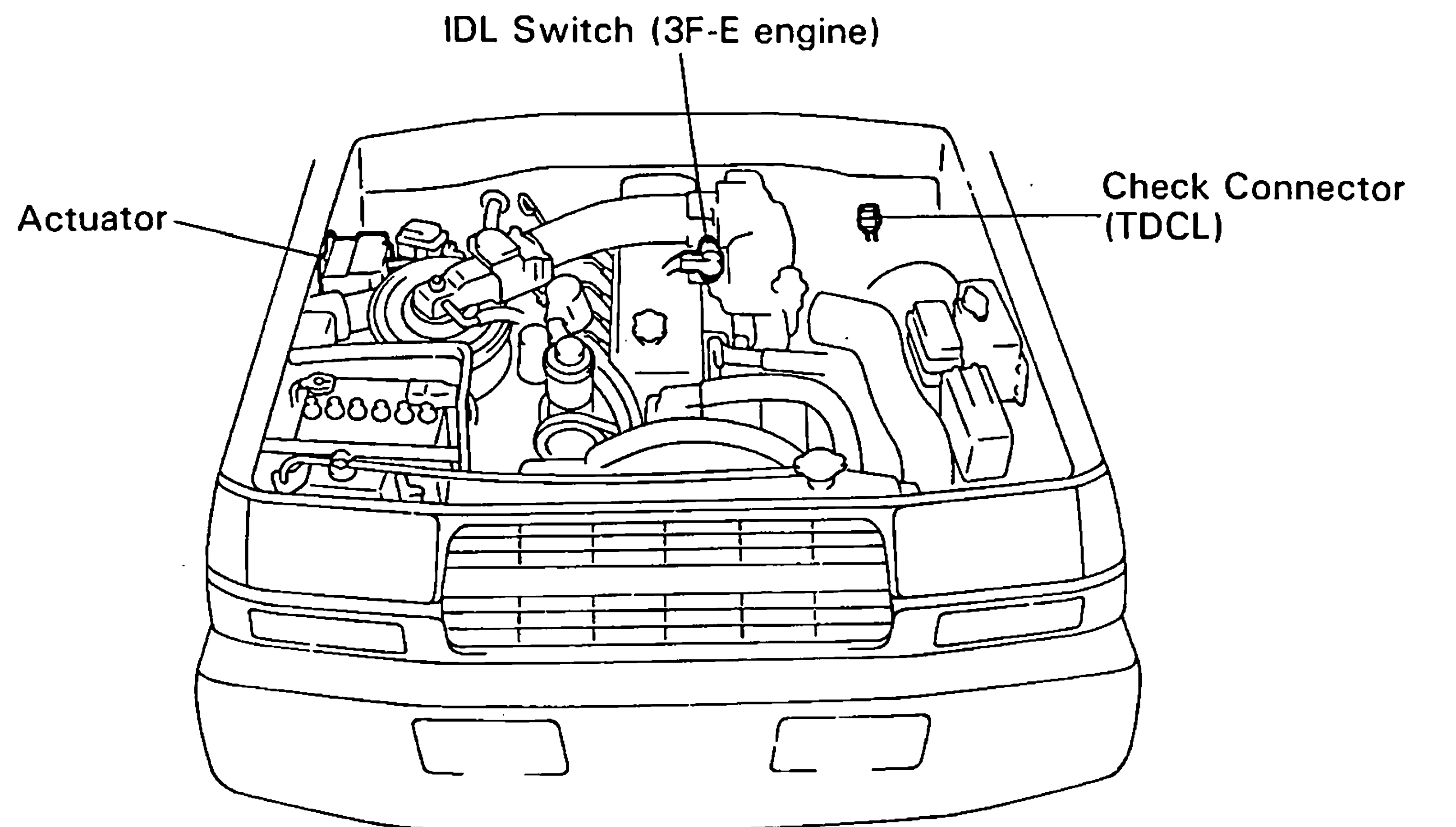
"LO" Operation

When the Seat Heater Switch is set to the "LO" position, current flows in series through terminal 2 (1) of the Seat Heater Switch → terminal 5 (3) of the Seat Heater Switch → terminal A1 (A1) of the seat back → terminal B2 (B2) of the seat back → terminal 2 (2) of the seat cushion → terminal 1 (1) of the seat cushion → terminal B1 (B1) of the seat back → terminal A3 (A3) of the seat back → ground, so that the seat cushion and back can be warmed.

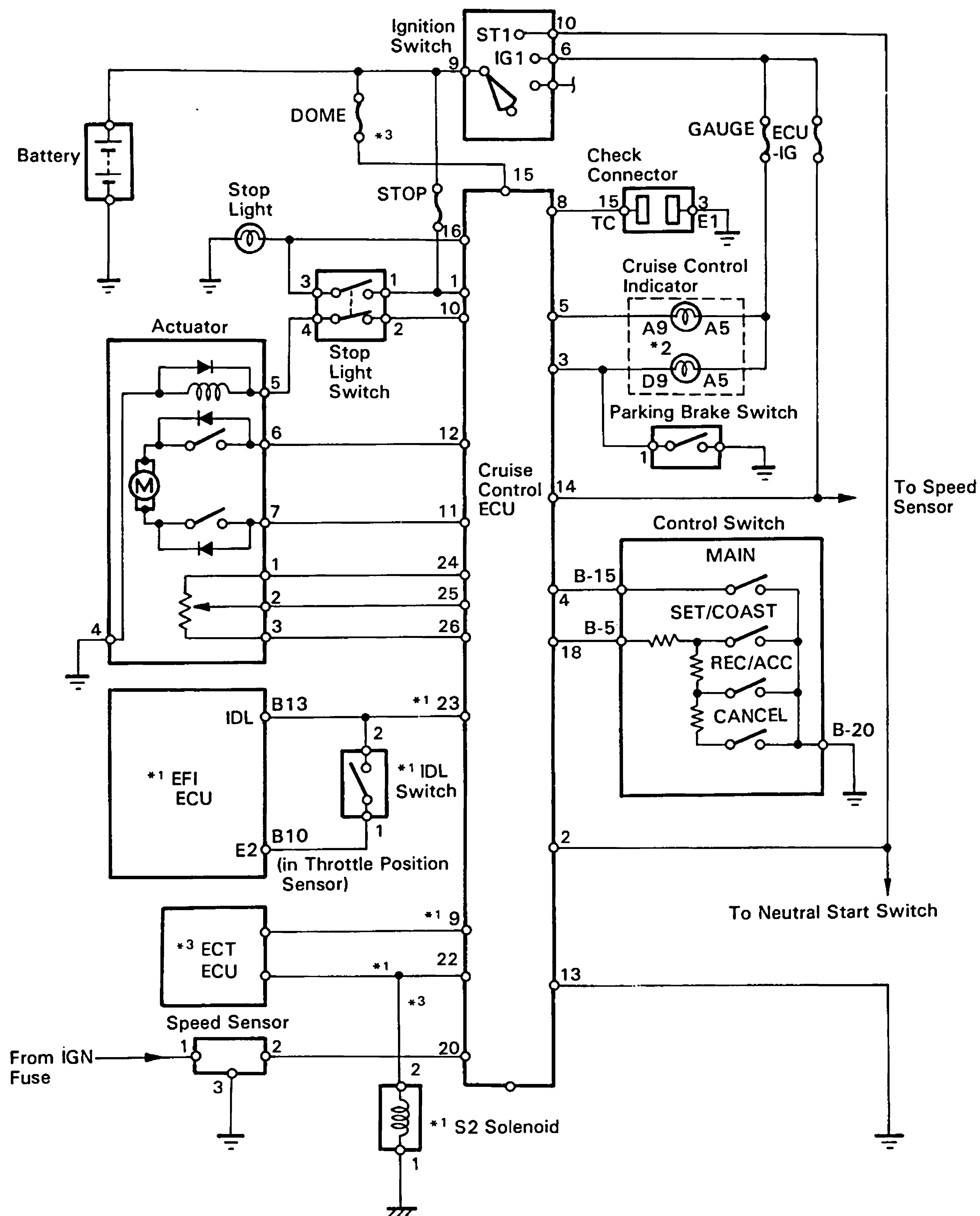


CRUISE CONTROL SYSTEM

Parts Location



Wiring Diagram

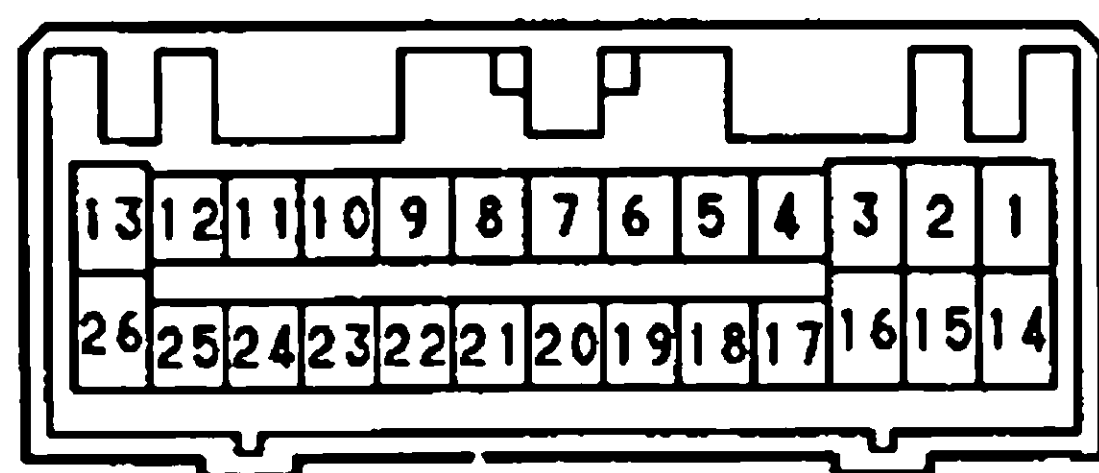


- *1: 3F-E Engine
- *2: Brake Warning Light
- *3: 1FZ-FE Engine
- : Combination Meter

The POWER SOURCE CIRCUIT has been simplified. For full details, see pub. No. RM184E, pages BE-10, 11.

Connector Diagrams

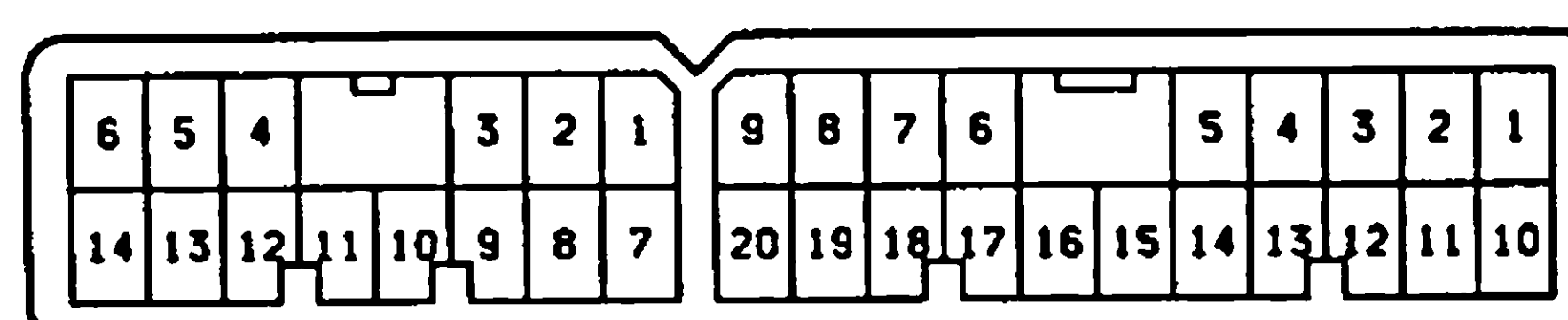
Cruise Control ECU



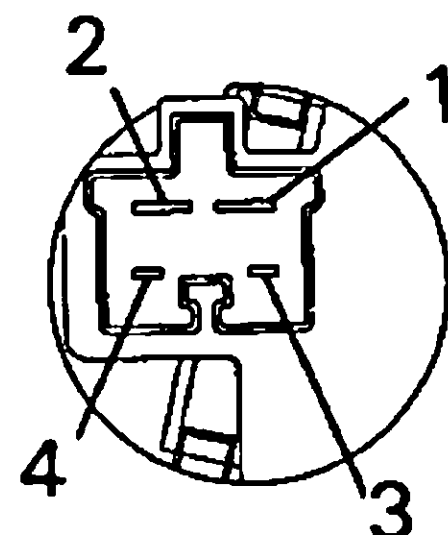
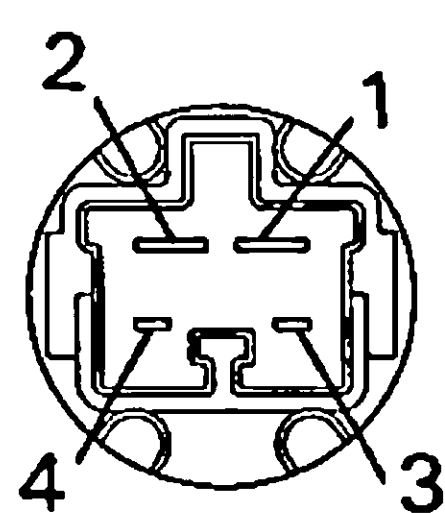
Control Switch (in Combination Switch)

Connector "A"

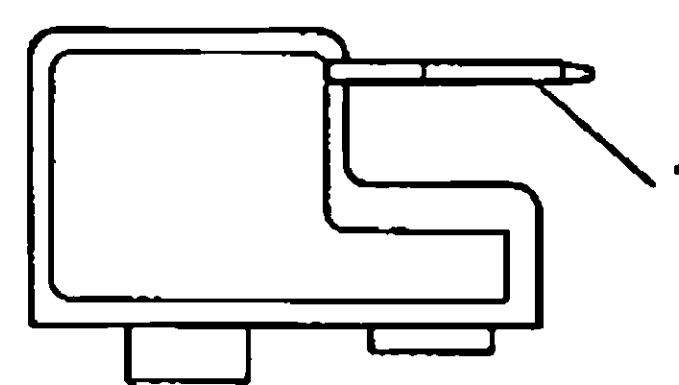
Connector "B"



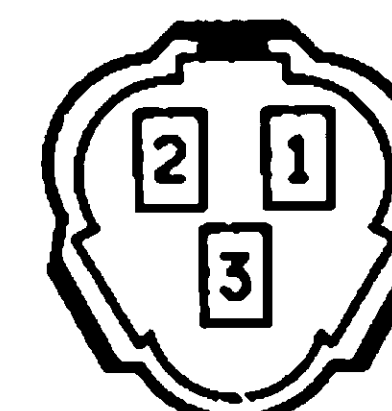
Stop Light Switch



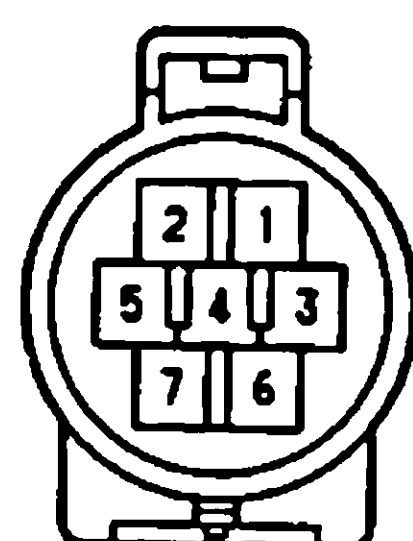
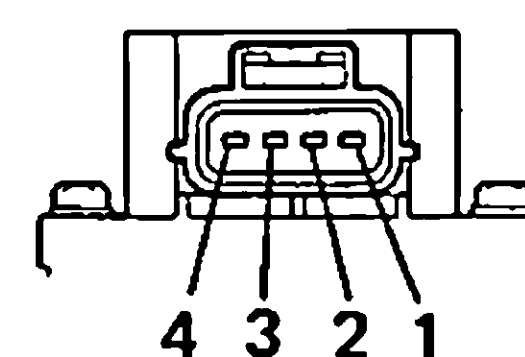
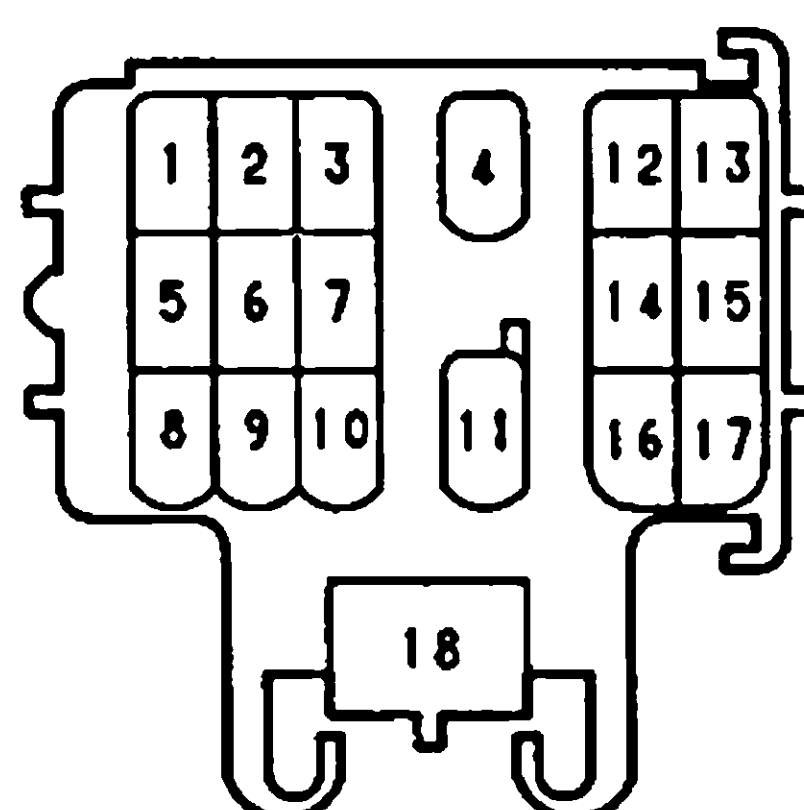
Parking Brake Switch



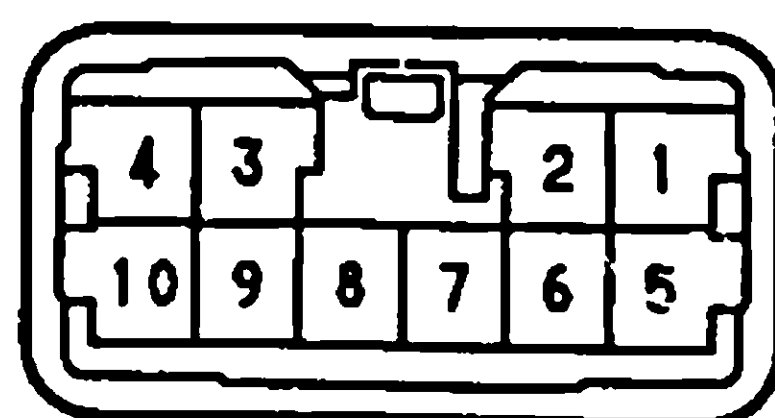
Speed Sensor



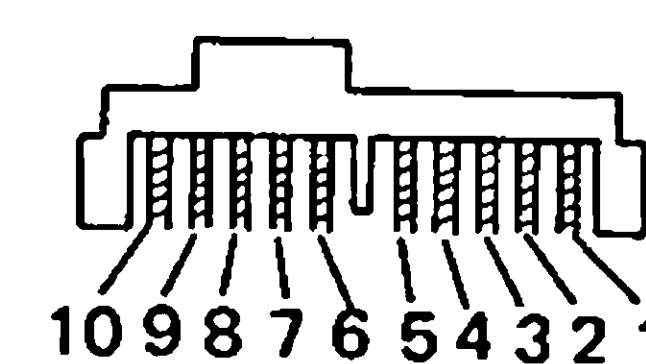
Actuator

Throttle Position Sensor
(1FZ-FE)Check Connector
(TDCL)

Ignition Switch

Combination Meter
(Cruise Control Indicator)

Connector "A"

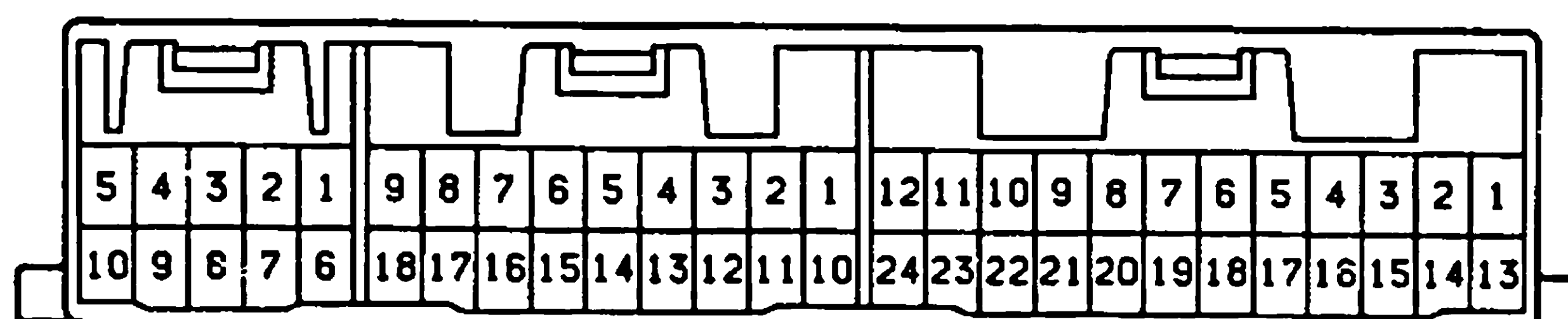


EFI ECU (3F-E)

Connector "C"

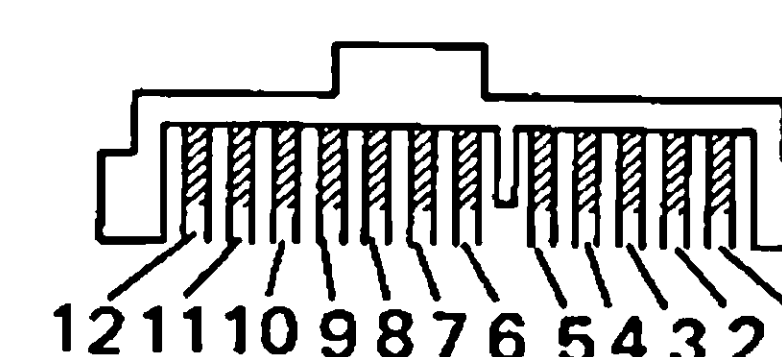
Connector "B"

Connector "A"



(Brake Warning)

Connector "D"



System Description

- When the ignition switch is turned ON, current flows from the battery to terminal 14 of the cruise control (CC) ECU.
- Terminal 13 of the CC ECU is always grounded.

Basic Operation

HINT: For all explanations below, the ignition switch is in the ON position.

1. CONTROL SWITCH OPERATION

- The CC switch controls MAIN switch, SET/COAST, RESUME/ACCEL and CANCEL functions.

(a) MAIN switch

When the main switch is pushed ON, current flows from terminal 4 of the CC ECU → terminal 5 of the control switch → terminal 3 of the switch → ground.

As a result, the CC ECU is on standby and terminal 5 of the CC ECU is grounded. Therefore the CC indicator lights up.

(b) SET/COAST, RESUME/ACCEL and CANCEL switch

The control switch controls the SET, COAST, RESUME, ACCEL and CANCEL functions. When the control switch is turned to each position, current flows from terminal 18 of the CC ECU → terminal 4 of the control switch → (each resistance) → terminal 3 of the switch → ground.

In the way, the CC ECU detects each position the control switch is turned to, and starts operation.

HINT: The SET function is detected by the CC ECU when the control switch released from SET/COAST.

2. SPEED CONTROL OPERATION

When the vehicle speed is set by the control switch, the ECU sends signal from terminal 10 → terminal 2 of the stop light switch → terminal 4 of the switch → terminal 5 of the actuator → (safety magnetic clutch) → terminal 4 of the actuator → ground.

At the same time, the CC ECU sends the signal from terminal 24 → terminal 1 of the actuator → (position sensor) → terminal 3 of the actuator → terminal 26 of the CC ECU. When the occurs, the position sensor sends the position of the actuator arm as a signal (voltage) from terminal 2 of the actuator to terminal 25 of the CC ECU.

When the actual vehicle speed drops below the set speed, the CC ECU sends a signal (voltage) from terminal 12 → terminal 6 of actuator → (motor) → terminal 7 of actuator → terminal 11 of CC ECU. This causes the motor to rotate the actuator arm in the throttle opening direction, increasing the vehicle speed. Then, when the arm reaches the prescribed angle, the CC ECU detects this at terminal 25 and stops the signal from 12.

When the actual vehicle speed rises above the set speed, the CC ECU sends a signal from terminal 11, turning the motor in the opposite direction so that the vehicle speed is reduced.

3. MANUAL CANCEL OPERATION

The CC system has the following methods of cancellation:

- **Speed Control Switch (CANCEL)**

When the control switch is turned to CANCEL position.

- **Parking Brake Switch**

When the parking brake lever is pulled, the parking brake switch is turned ON and sends a cancellation signal (ground voltage) to terminal 3 of the CC ECU.

- **Neutral Start Switch (A/T)**

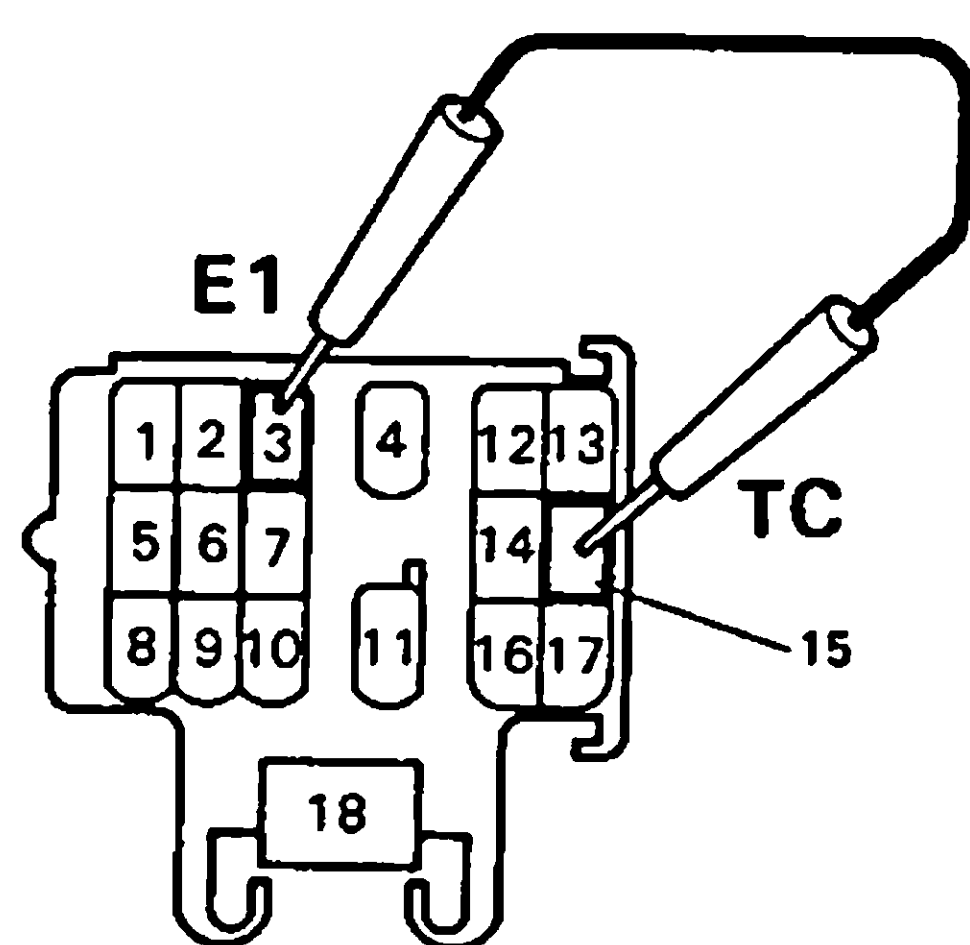
When the shift lever is set to "N" or "P" range, the neutral start switch is turned ON and sends a cancellation signal (ground voltage) to terminal 2 of the CC ECU.

- **Stop Light Switch**

When the brake pedal is depressed, SW B of the stop light switch is turned OFF, the safety magnetic clutch (in actuator) is released, and SW A of the stop light switch is turned ON and sends a cancellation signal (battery voltage) to terminal 16 of the CC ECU.

When the CC ECU detects any of the above signals, it stops output of signals to the actuator, and cancels cruise control.

Diagnosis Check Connector



BE2026

DIAGNOSTIC SYSTEM

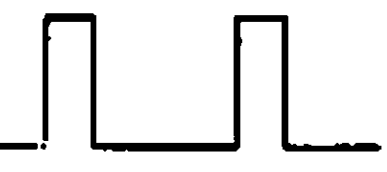
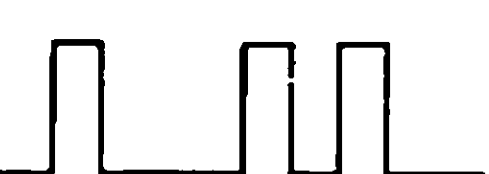
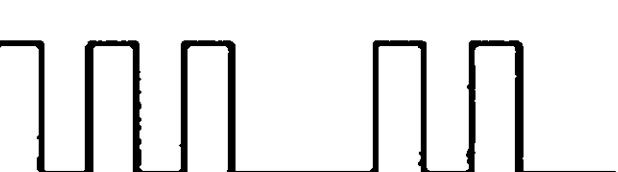
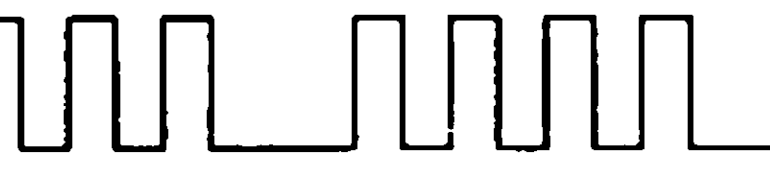
(Type B)

- If while driving with the cruise control on, the system is canceled by a malfunction in either the actuator, speed sensor or speed control switch circuit, the cruise control indicator light "CRUISE" will blink 5 times.
- While stopped, connect terminals 3 and 15 of the check connector.

HINT: If the ignition switch is turned off, the diagnostic code will be erased from the computer memory.

- Read the diagnostic code on the indicator light "CRUISE".

DIAGNOSTIC CODE

Code No.	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
—	ON OFF  BE3931	Normal
11	ON OFF  BE3931	- Duty ratio of 100% output to motor acceleration side. - Overcurrent (short) in motor circuit.
12	ON OFF  BE3931	- Overcurrent (short) in magnet clutch circuit. - Open in magnet clutch circuit for 0.8 sec.
13	ON OFF  BE3931	- Open in actuator motor circuit. - Position sensor detects abnormal voltage. - Position sensor signal value does not change when the motor operates.
21	ON OFF  BE3932	Speed signal is not input to the ECU while cruise control is set.
*23	ON OFF  BE3932	Actual vehicle speed has dropped by 16 km/h (10 mph) or more below the set speed.
32	ON OFF  BE3933	Short in control switch circuit.
34	ON OFF  BE3933	Voltage abnormality in control switch.
41	ON OFF  BE3937	When 41 code is indicated, replace the cruise control ECU.

HINT: When two or more codes are indicated, the lowest numbered code will be displayed first.

(*) When the vehicle speed is reduced on uphill roads, the speed can be set again and driving continued. (This is not a malfunction.)

Troubleshooting

You will find the source of the trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown.

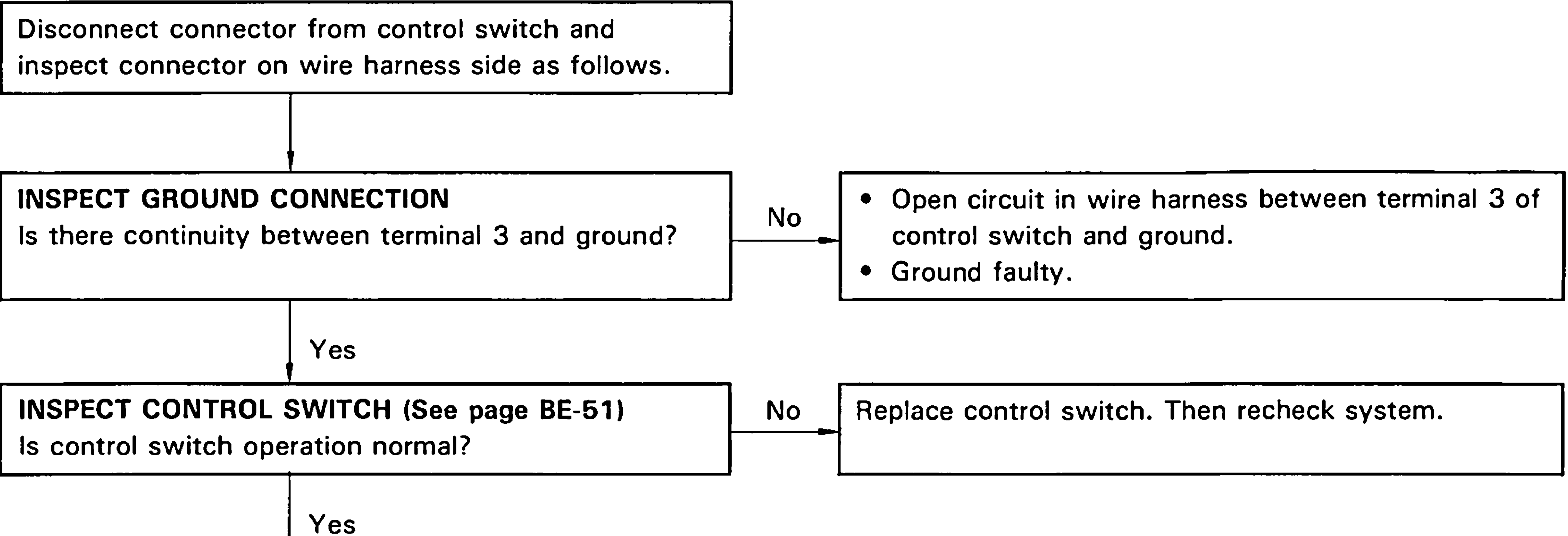
Chart No.					D	C	C	F	H	G	E	I	J		
Inspection Item															
Diagnosis Code															
Problem		Type B	Type A	CC ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop Light Switch	Neutral Start Switch	Parking Brake Switch	Speed Sensor, or Speedometer Cable	ECT Solenoid No.2 Circuit	Throttle Position Sensor (1FZ-FE engine)	Speed Control Cable and Control Link	Other Parts
• "CRUISE" indicator light blinks 5 times. • Cruise control system does not set. • Cruise control system does not operate.		11		2	1										
		12		3	1			2							
		21		2							1				
		23			3						2			1	
		32		2			1								
		34		2			1								
		41		1											
		Normal	4	OK	8	7	1	2	3	4	5				6
		NG	2							1					
Set speed deviates on high or low side.				4	3						1			2	
Large speed increase or speed drop when the speed control switch turned to SET.				3	2								1		
Vehicle speed fluctuates when speed control switch turned to SET.				4	3						1			2	
Set speed does not cancel when brake pedal depressed.		3	OK	3	1			2							
			NG	2				1							
Set speed does not cancel when parking brake lever pulled.		3	OK	2	1										
			NG	2						1					
Set speed does not cancel when shifted to "N" range.		3	OK	2	1										
			NG	2					1						
Vehicle speed does not decrease when speed control switch turned to COAST.		1	OK	4	1						3			2	
			NG	2			1								
Vehicle speed does not accelerate when speed control switch turned to ACCEL.		2	OK		1						3			2	
			NG	2			1								
Vehicle speed does not return to memorized speed when control switch turned on RESUME.		2	OK	4	1						3			2	
			NG	2			1								
Set speed does not cancel when speed control switch turned to CANCEL.		3	OK	2	1										
			NG	2			1								
Speed can be set below about 40 km/h (25 mph).		4	OK	2	1										
			NG	2							1				
Cruise control will not disengage even at about 40 km/h (25 mph).		4	OK	2	1										
			NG	2							1				
During autodrives operation, shift operation occurs frequently without control				2								1			
Acceleration response is sluggish when speed control switch turned to "ACCEL" or "RESUME".				6	3		1						5	2	
*: Inspect the wire harness.															

C

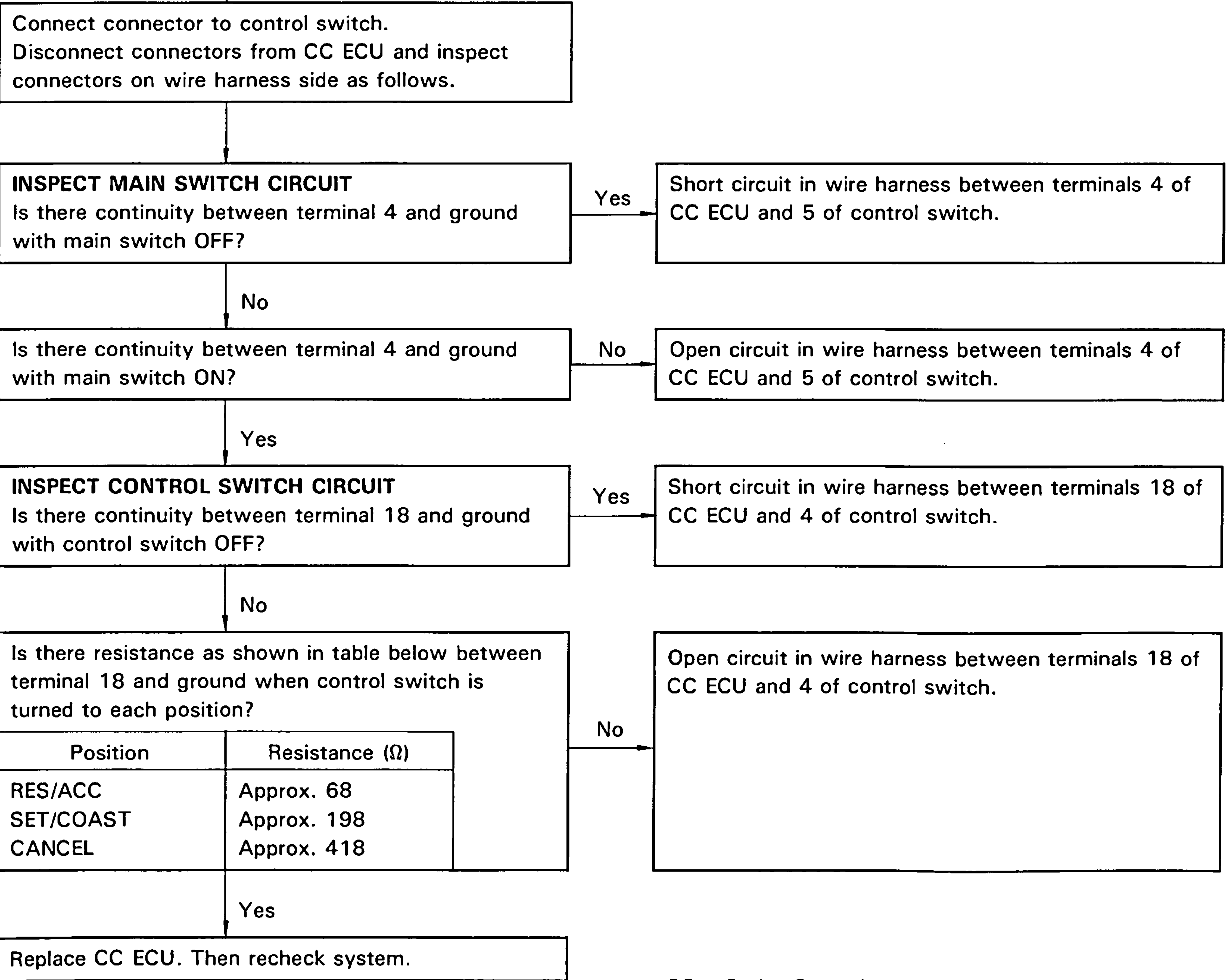
CONTROL SWITCH CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH



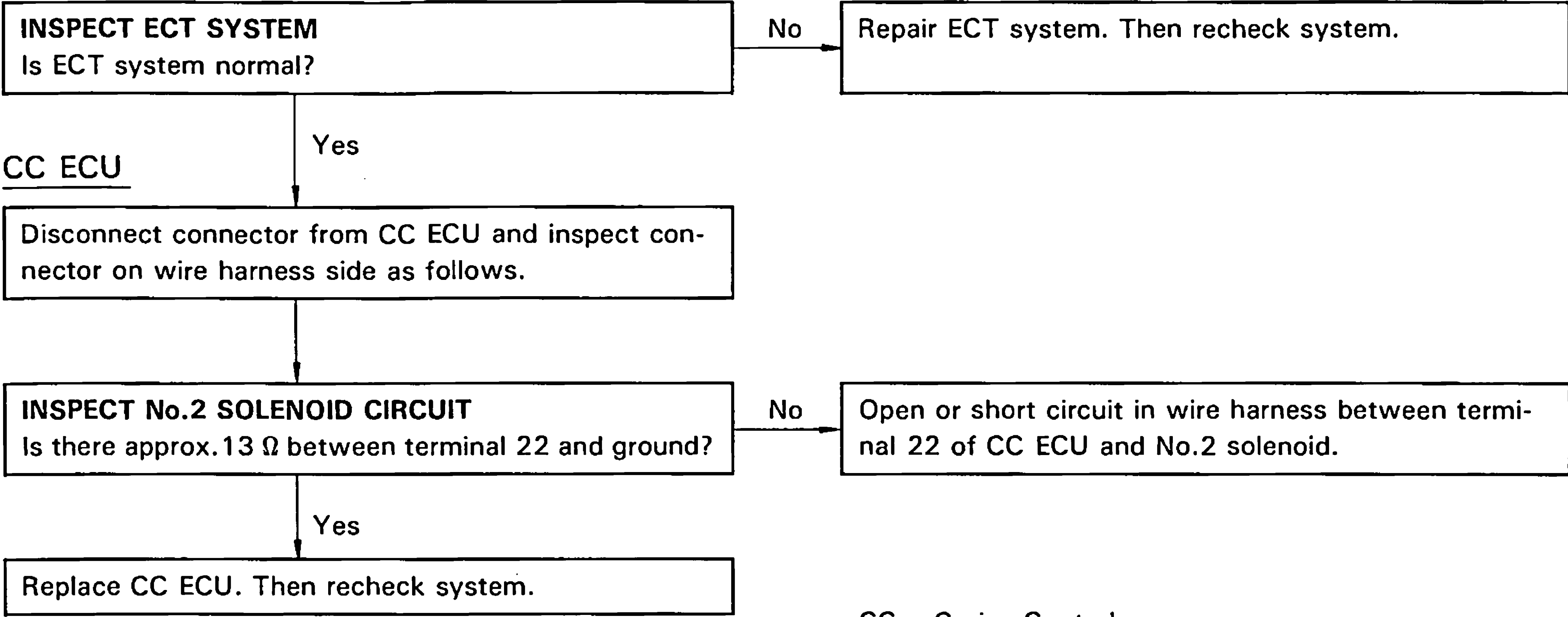
CC ECU

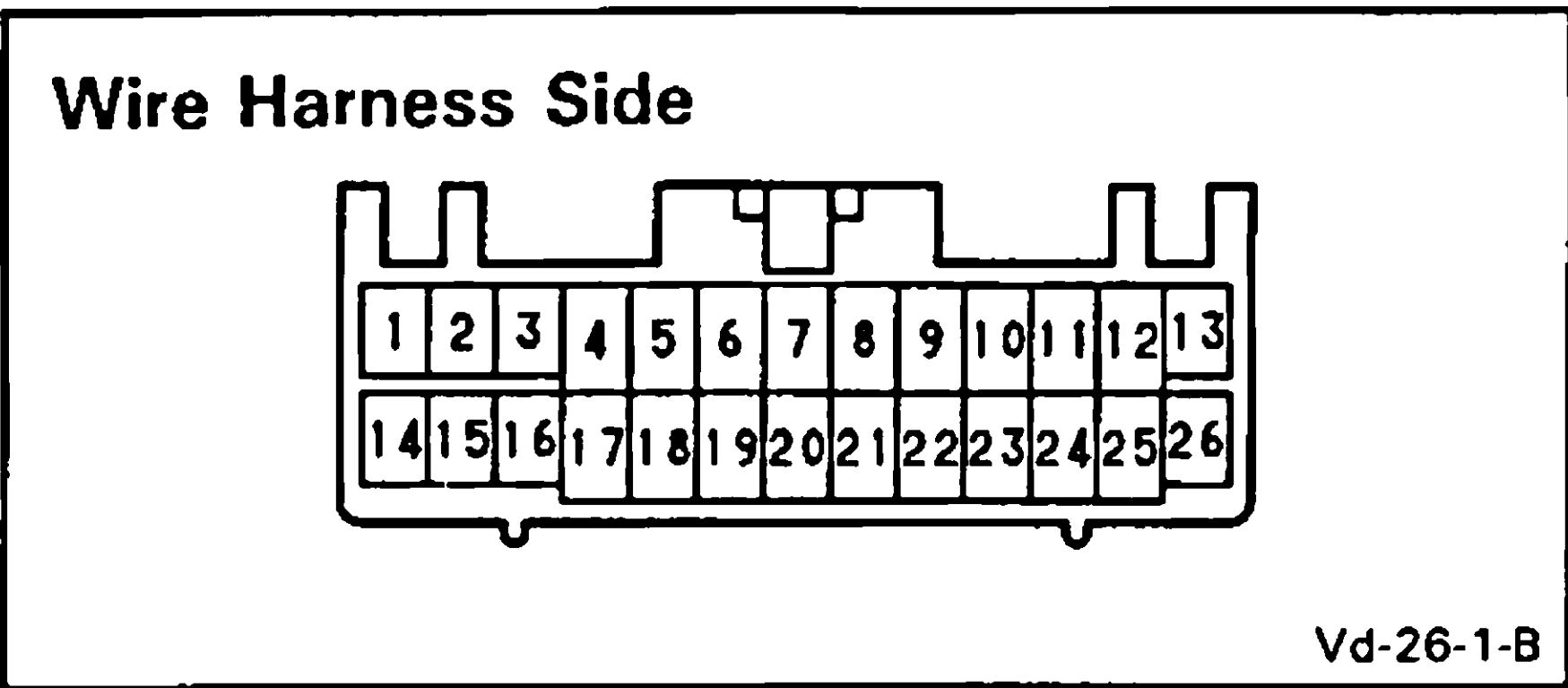


I

ECT SOLENOID No.2 CIRCUIT (with A/T)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.





Cruise Control ECU Circuit

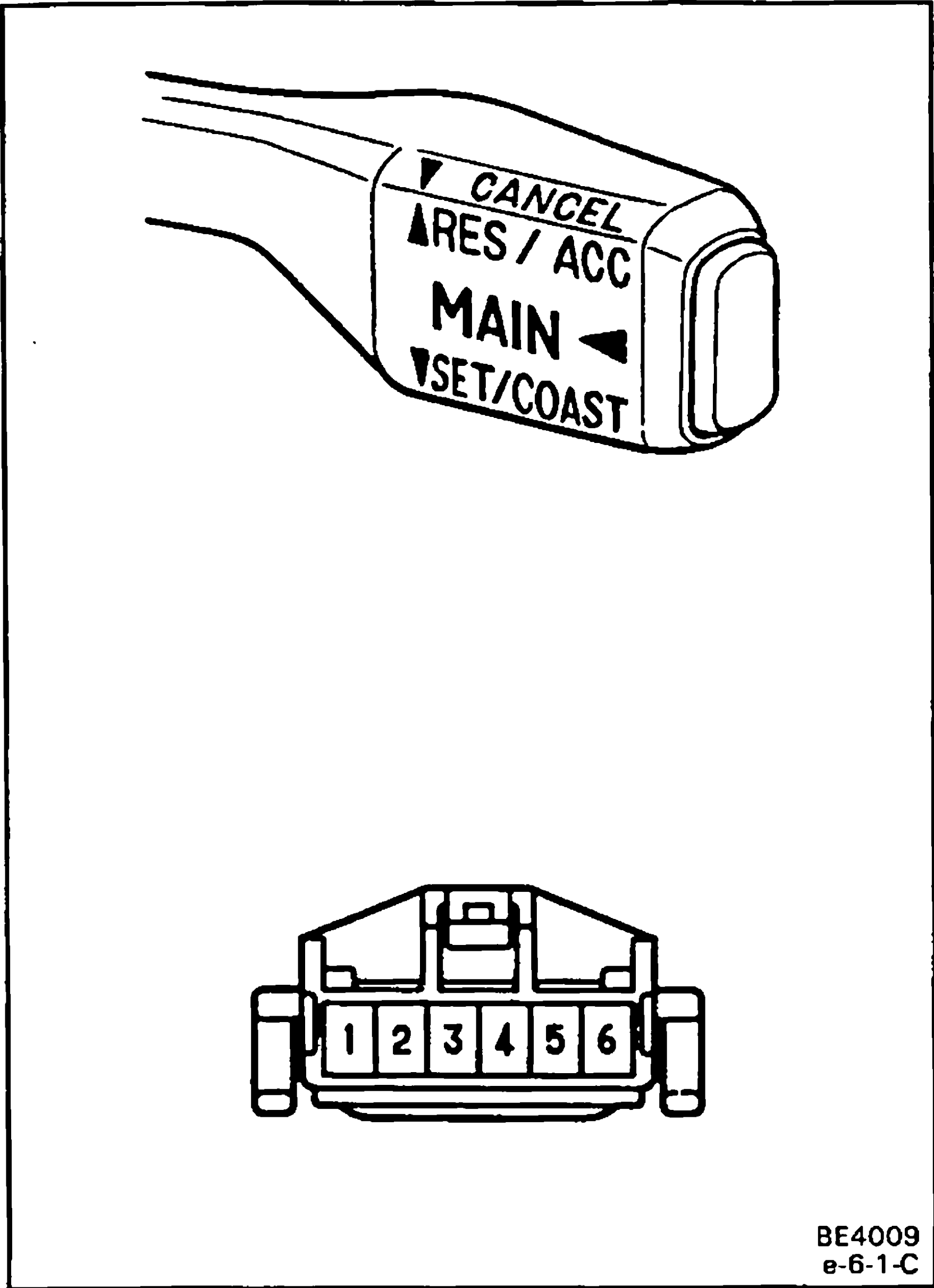
INSPECT ECU CIRCUIT

Disconnect connector and inspect connector on wire harness side as shown in the chart.

Check for	Measured item	Tester connection	Condition			Specified value
Continuity	Neutral start switch	2 — ground	Shift lever position	N or P	Continuity	
				L, 2, D or R	No continuity	
	Parking brake switch	3 — ground	Parking brake lever position	released	No continuity	
				pulled	Continuity	
	Control switch	4 — ground	Main switch position	OFF	No continuity	
				ON	Continuity	
	Ground connection	13 — ground	Constant			Continuity
	Actuator (motor)	*11 — 12	Actuator arm position	max. OPEN	(12 → 11) Continuity	
				max. CLOSE	(11 → 12) Continuity	
				any position except above position	(12 → 11) Continuity	
	TDCL circuit	8 — ground	Constant			No continuity
			Terminals Tc and E1 connected			Continuity
	Throttle position sensor (IDL: 1FZ-FE Engine)	23 — ground	Acceleration pedal position	released	Continuity	
				depressed	No continuity	
	Speed sensor	20 — ground	With ignition switch ON, speedometer shaft or speed sensor shaft turned.			Continuity ↑ No continuity
Resistance	Actuator (position sensor)	24 — 26	Constant			Approx. 2 kΩ
		24 — 25	Actuator arm turned		Resistance change even	
	Actuator (Safety magnetic clutch)	10 — ground	Brake pedal position	released	Approx. 38.5 Ω	
				depressed	No continuity	
	Control switch	18 — ground	Control switch position	OFF	No continuity	
				RES/ACC	Approx. 68 Ω	
				SET/COAST	Approx. 198 Ω	
				CANCEL	Approx. 418 Ω	
	ECT No.2 solenoid valve (A/T)	22 — ground	Constant			Approx. 13 Ω
Voltage	Power source	14 — ground	Ignition switch position	LOCK or ACC	No voltage	
				ON	Battery voltage	
	STOP fuse	1 — ground	Constant			Battery voltage
	Stop light	16 — ground	Brake pedal position	released	No voltage	
				depressed	Battery voltage	

*: This circuit includes the diode. If the circuit shown no continuity, change the positive and negative probes and recheck system.

If circuit is as specified, try another ECU.
If circuit is not as specified, refer to BE-42 wiring diagram and inspect the circuits connected to other parts.



Parts Inspection

INSPECT SWITCHES

(Control Switch)

(a) Check continuity between terminals 3 and 5.

Main switch position	Condition
OFF	No continuity
ON	Continuity

(b) Measure resistance between terminals 3 and 4.

Control switch position	Resistance (Ω)
OFF	∞ (No continuity)
RES/ACC	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

If resistance value is not as specified, replace the control switch.

(Stop Light Switch/Continuity)

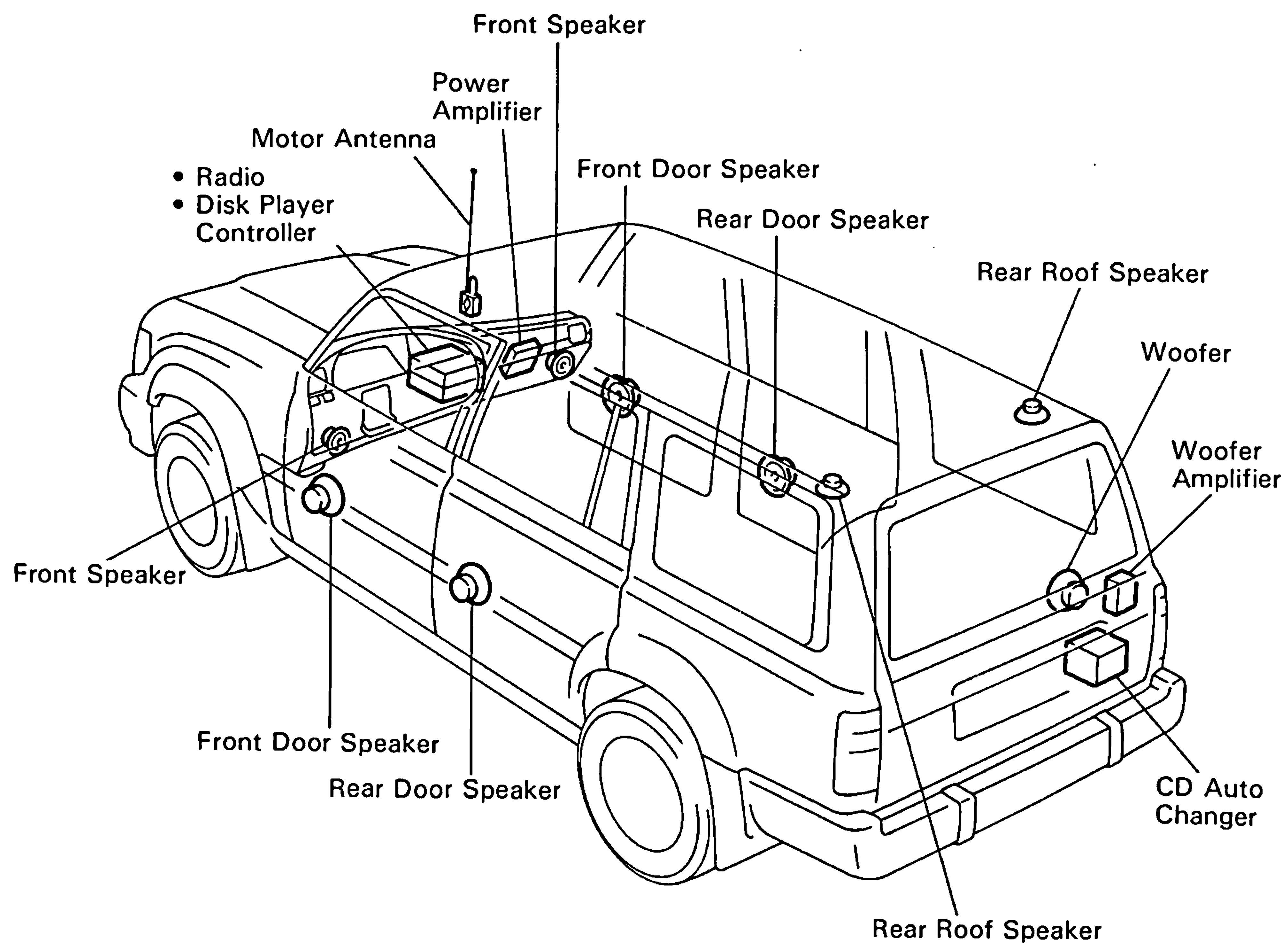
Terminal Switch position	1	2	w/ CCS	
			3	4
Switch pin free (Brake pedal depressed)				
Switch pin pushed in (Brake pedal released)				

BE1444 BE6234 BE6233

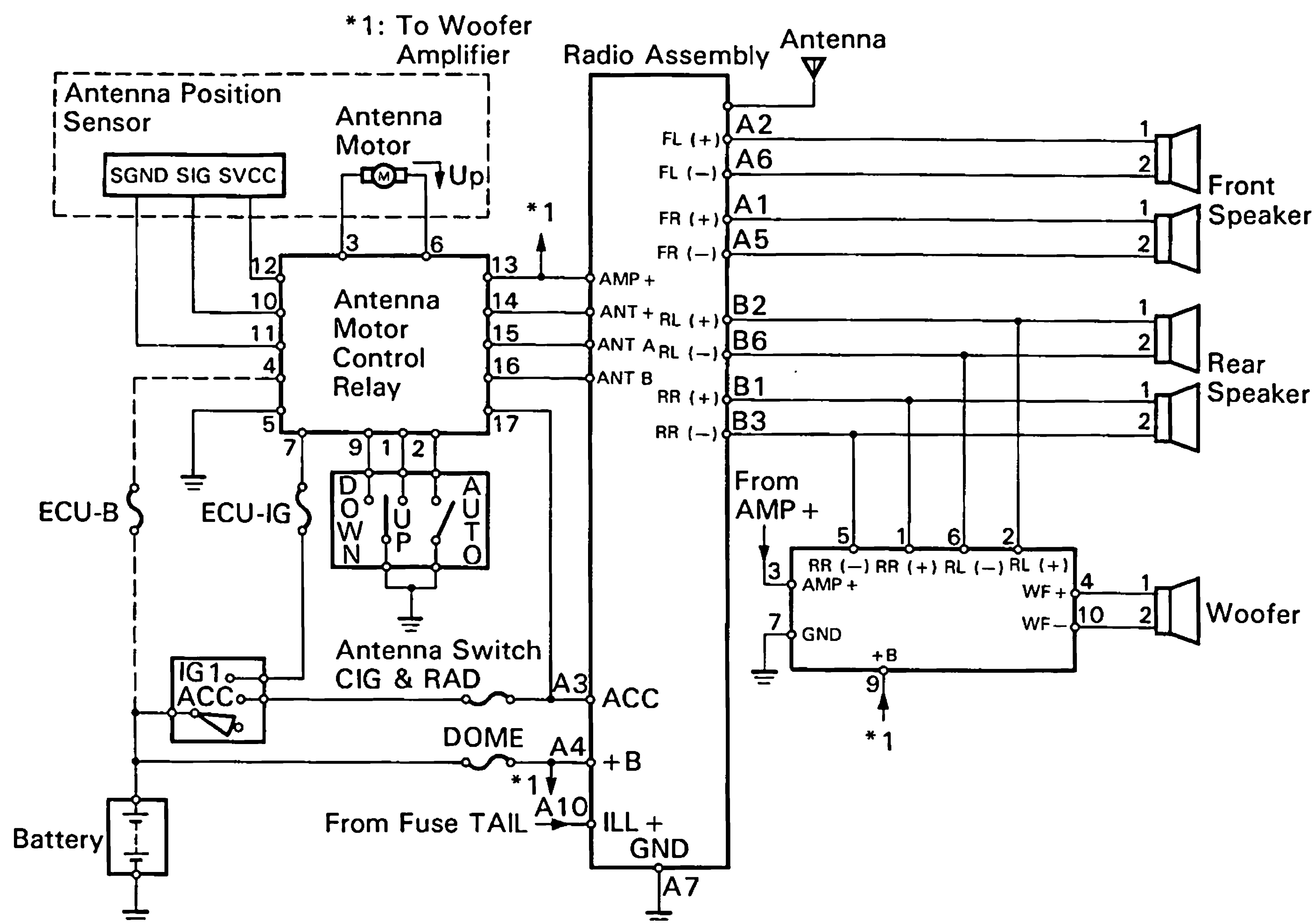
If continuity is not as specified, replace the switch.

AUDIO SYSTEM

Parts Location



Radio-Tape Player, 5 Speaker, w/Radio Linked Motor Antenna: Symbol **U**



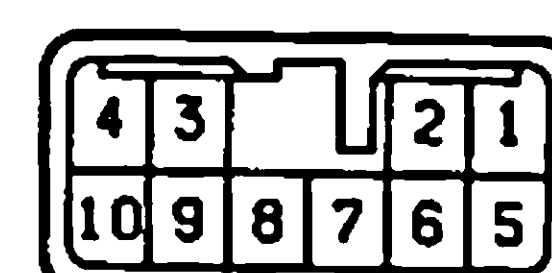
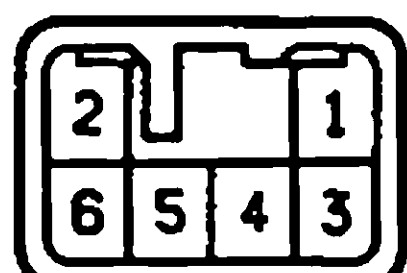
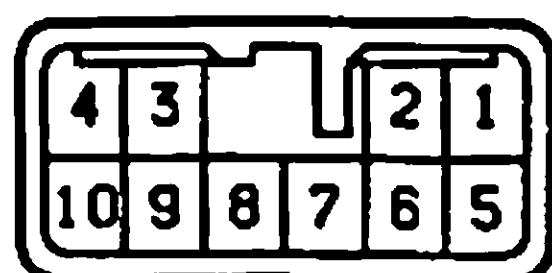
The POWER SOURCE CIRCUIT has been simplified. For full details, see pub. No. RM184E, pages BE-10,11.

Radio Assembly Connector "A"

Connector "B"

Connector "C"

Woofer Amplifier

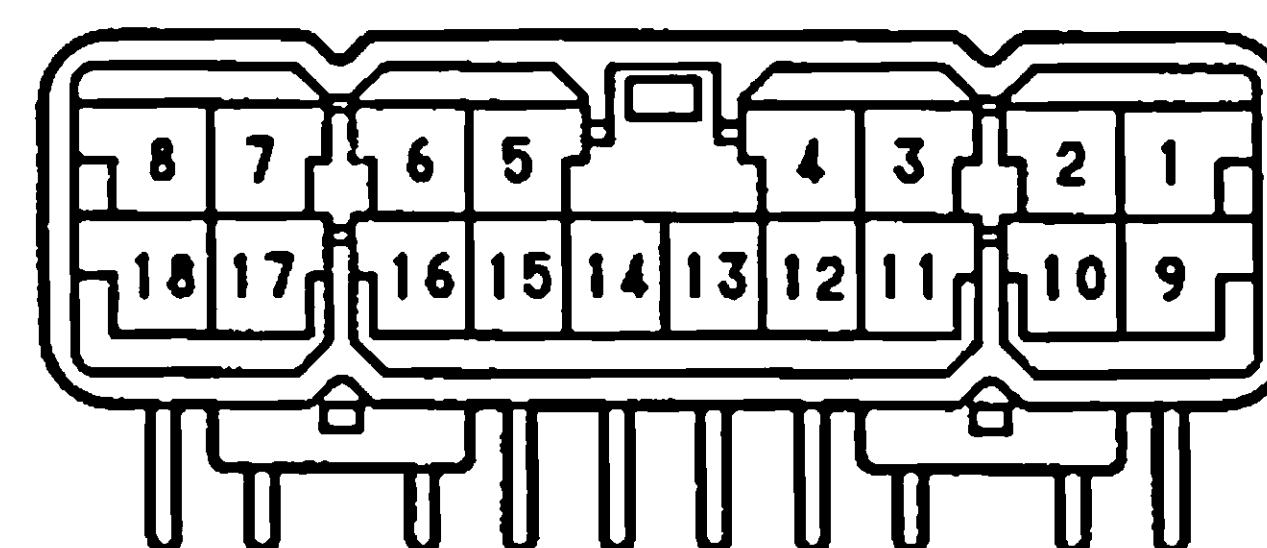
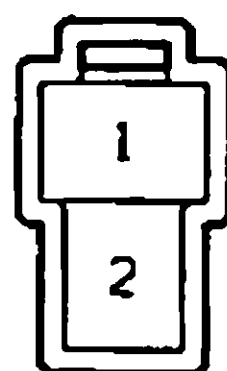
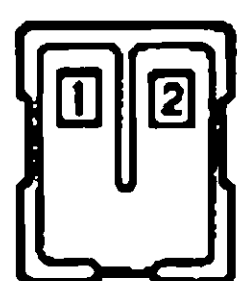


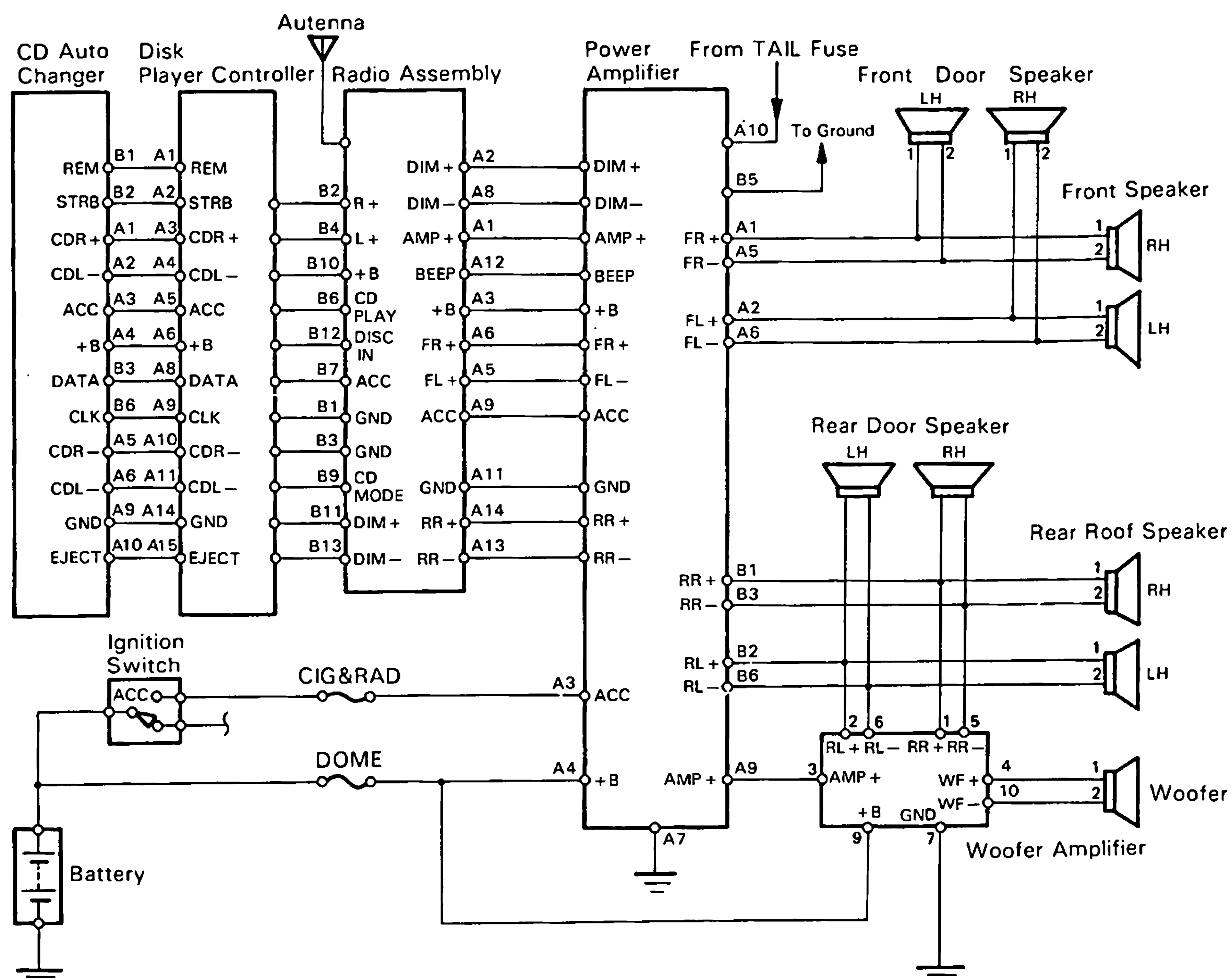
Front Speaker

Rear Speaker

Woofer

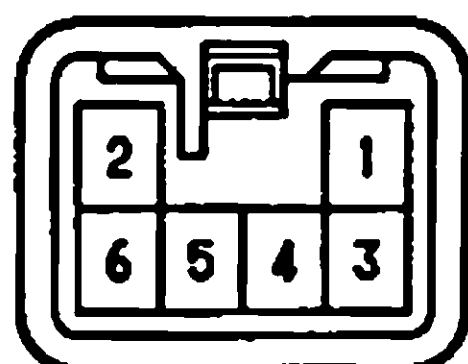
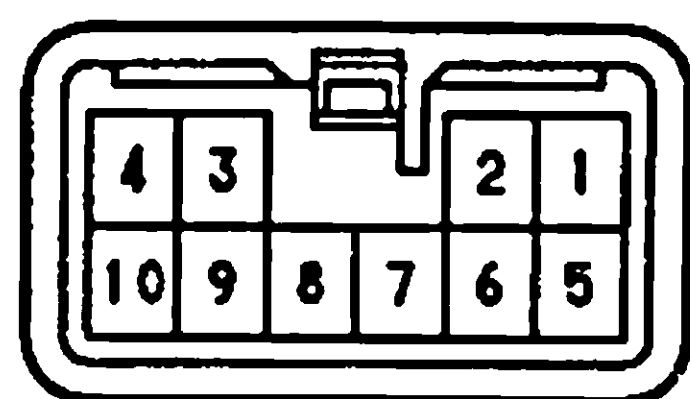
Antenna Motor Control Relay



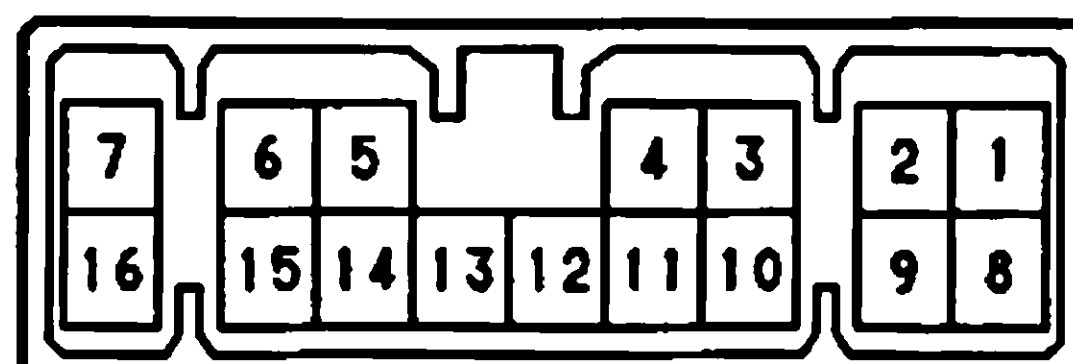
Radio-Tape Player, 9 Speaker + CD Auto Changer: Symbol **A**

The POWER SOURCE CIRCUIT has been simplified. For full details, see pub. No.RM184E, page BE-10,11.

CD Auto Changer
Connector "A" Connector "B"

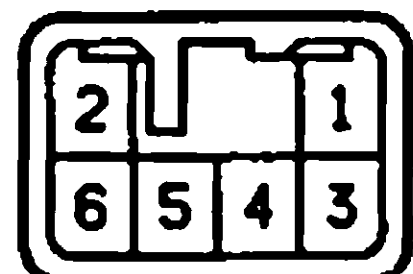
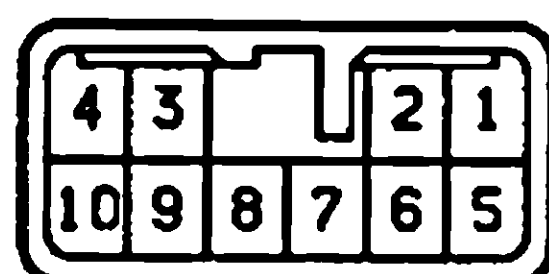


Disk Player Controller
Connector "A"



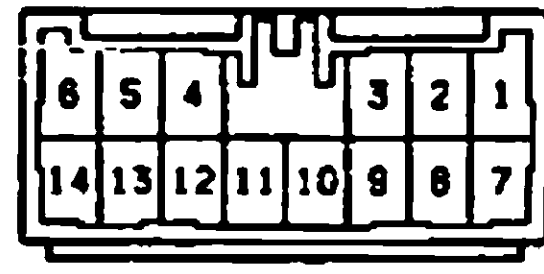
Power Amplifier

Connector "A" Connector "B"

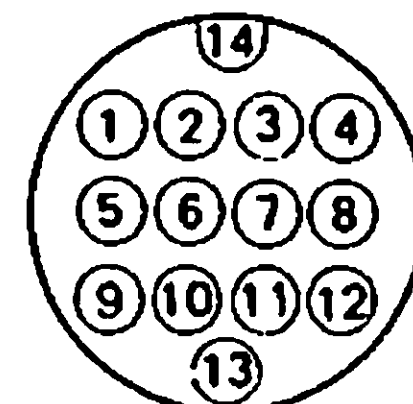


Radio Assembly

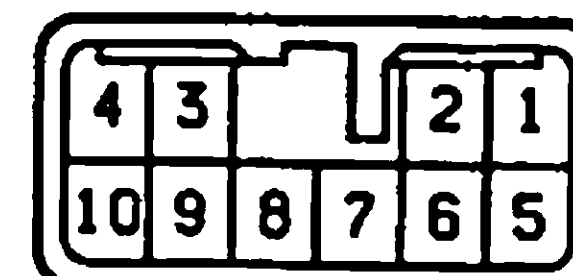
Connector "A"



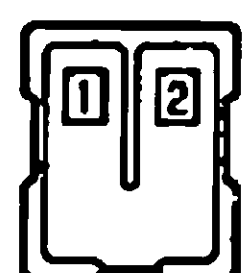
Connector "B"



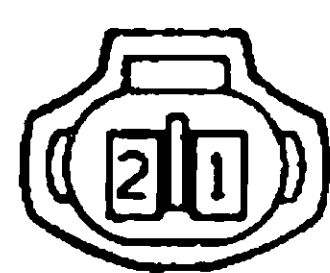
Woofer Amplifier



Front Speaker



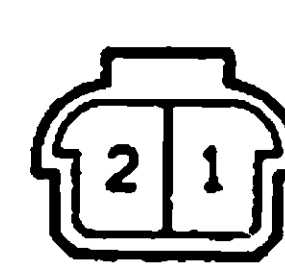
Front Door Speaker



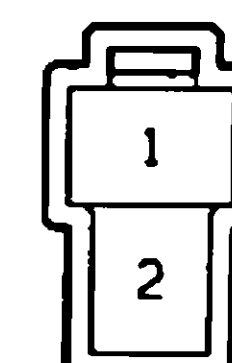
Rear Door Speaker



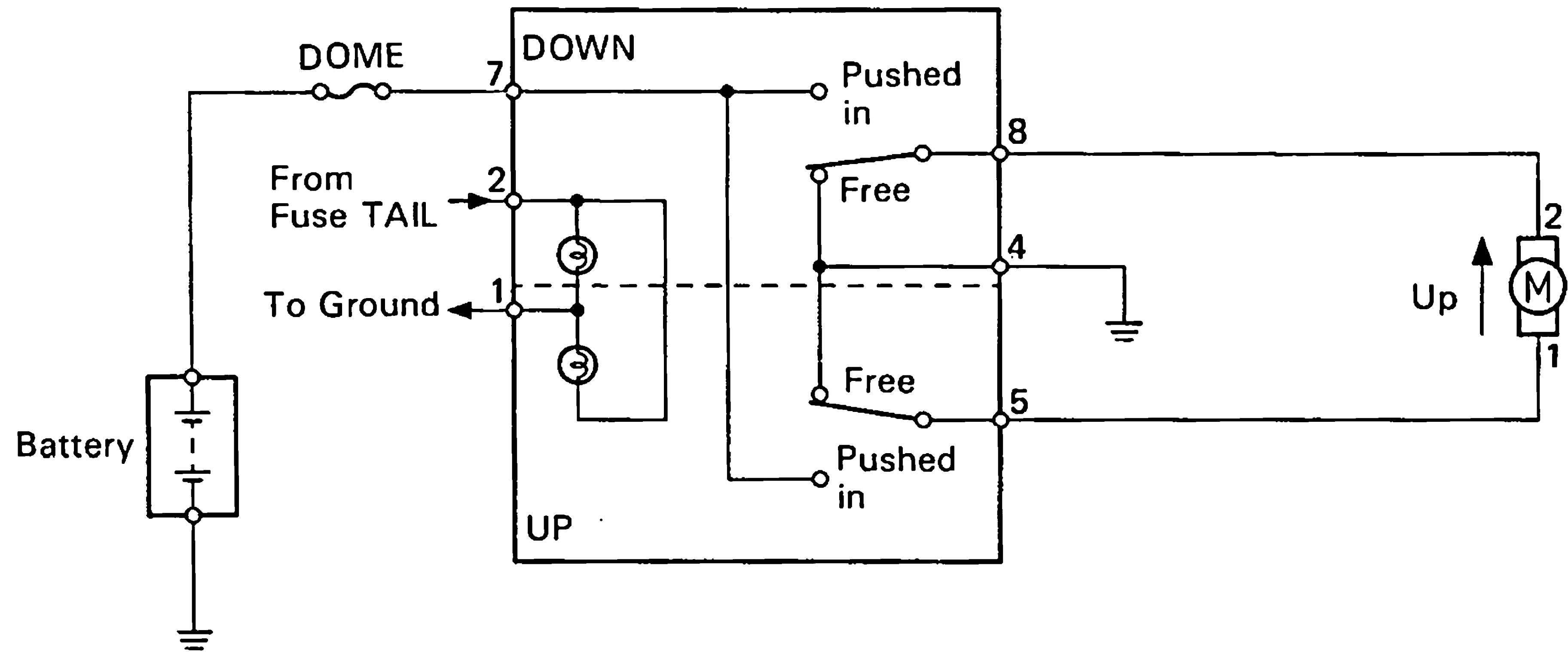
Rear Roof Speaker



Woofer

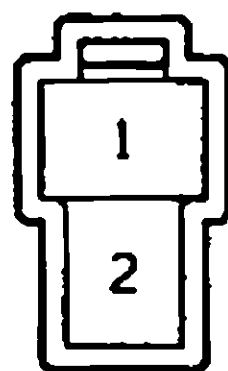
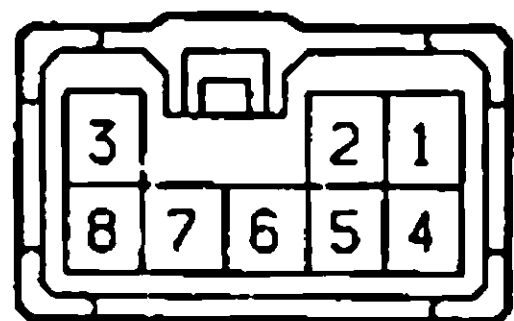


**Motor Antenna
(w/o AUTO Switch Type)**

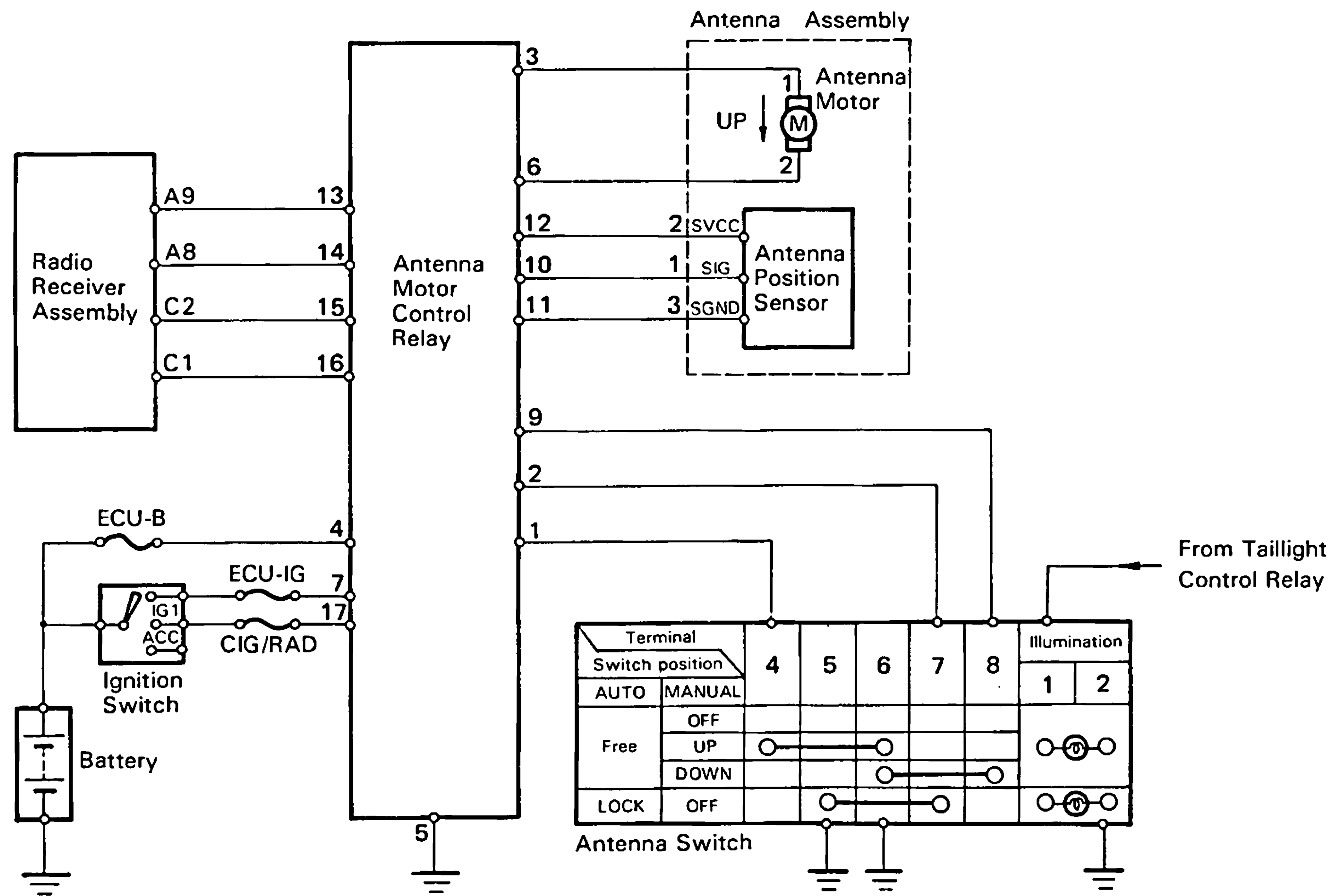


Antenna Switch

Antenna Motor

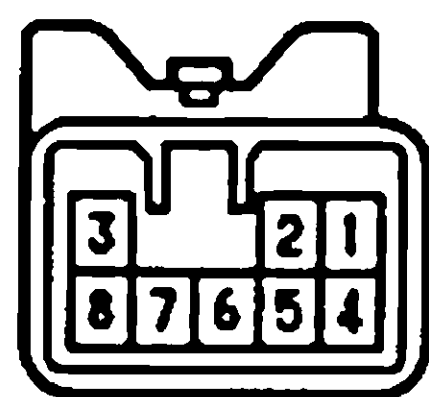


Motor Antenna
(w/ Auto Switch Type)

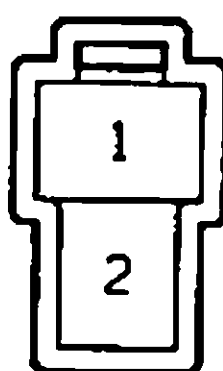


The POWER SOURCE CIRCUIT has been simplified. For full details, see pub, No. RM184E page BE-10, 11.

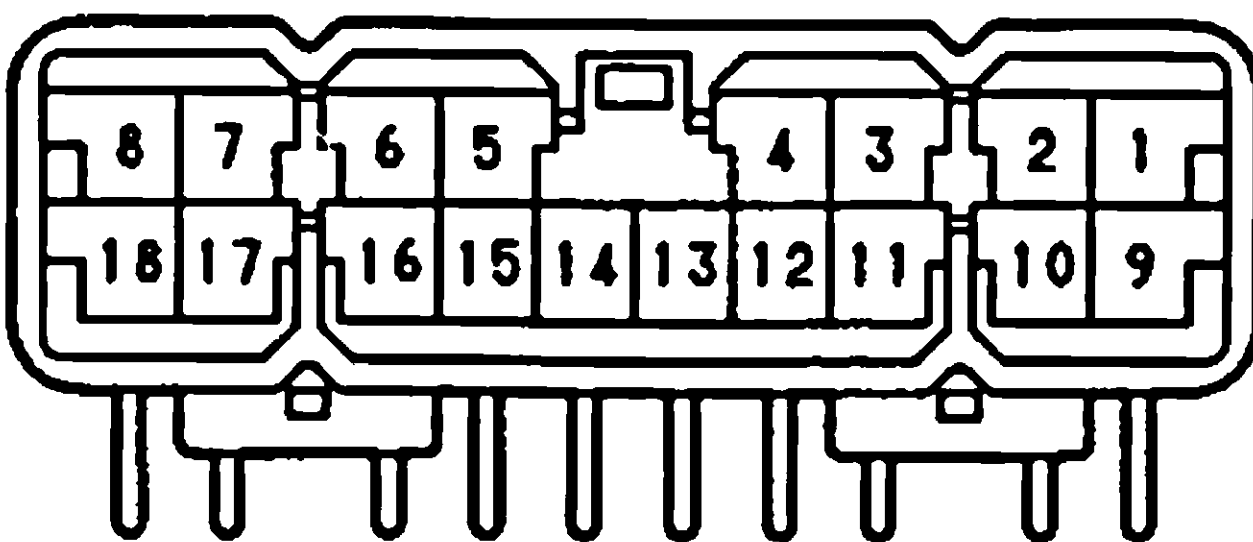
Antenna Switch



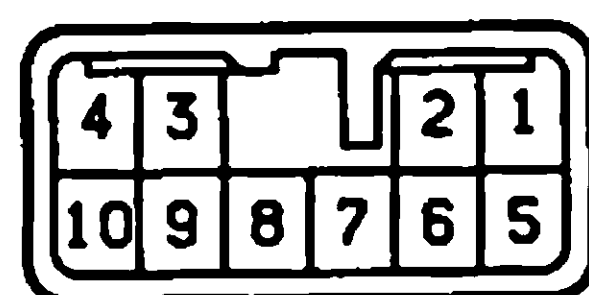
Antenna Motor



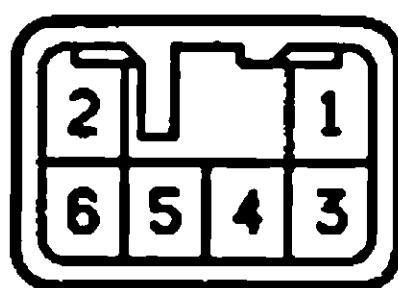
Antenna Motor Control Relay



Radio Assembly
Connector "A"



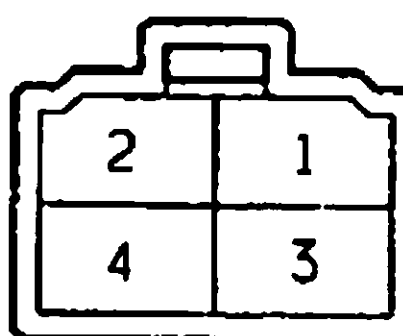
Connector "B"



Connector "C"



Antenna Position Sensor



System Description

RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave	LW ↔	AM (MW) ↔	SW ↔	FM (UKW) ↔	
Modulation method	Amplitude modulation			Frequency modulation	

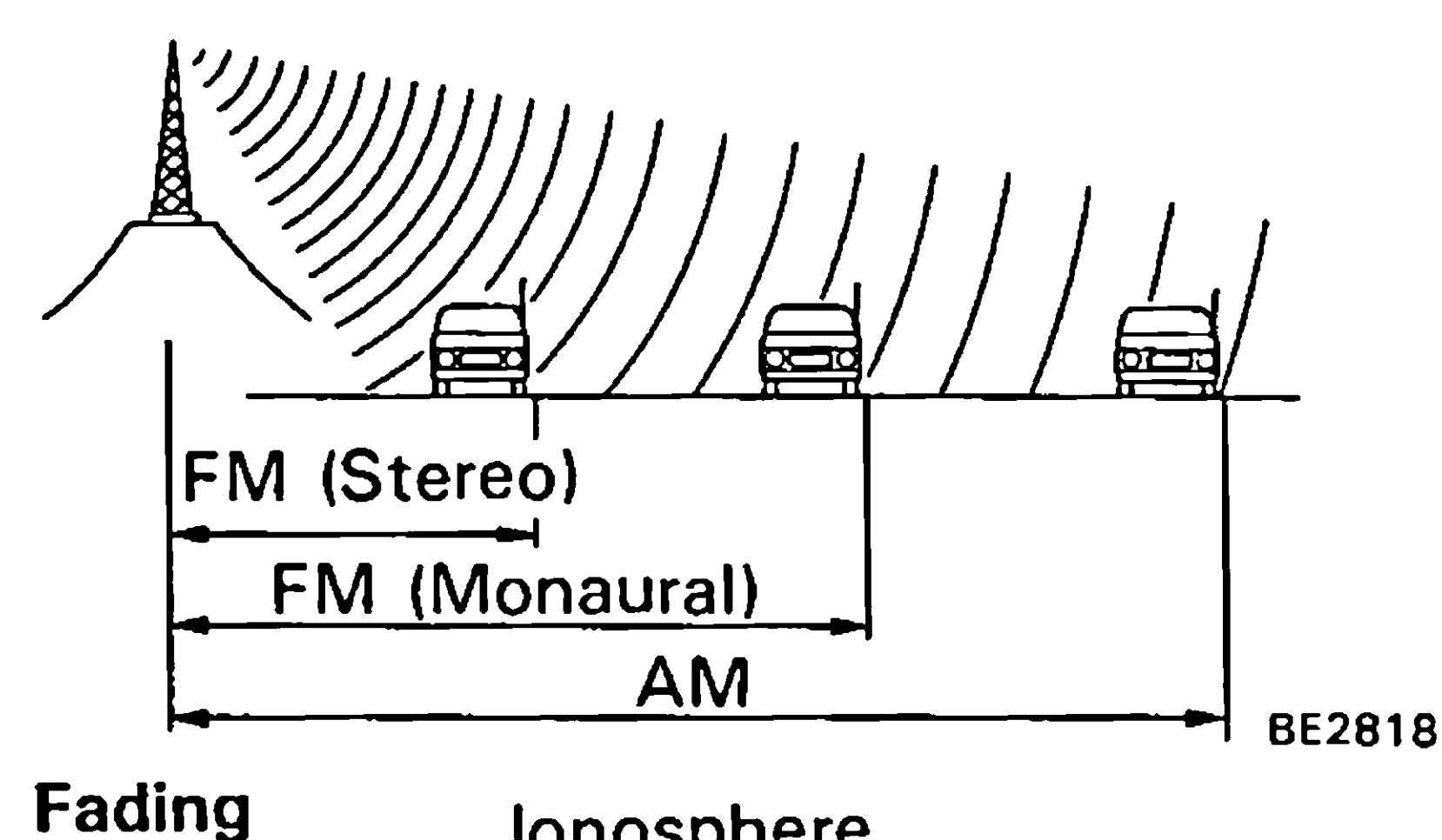
LF: Low Frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

HINT: In this section, the term "AM" includes LW, MW and SW, and the term "FM" includes UKW.

SERVICE AREA

There is great difference in the size of the service area for AM, FM monaural, and FM stereo broadcasting. Thus it may happen that FM broadcast cannot be received even though AM comes in very clearly.

Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") the most easily.



RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called "fading", "multipath", and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.

Fading

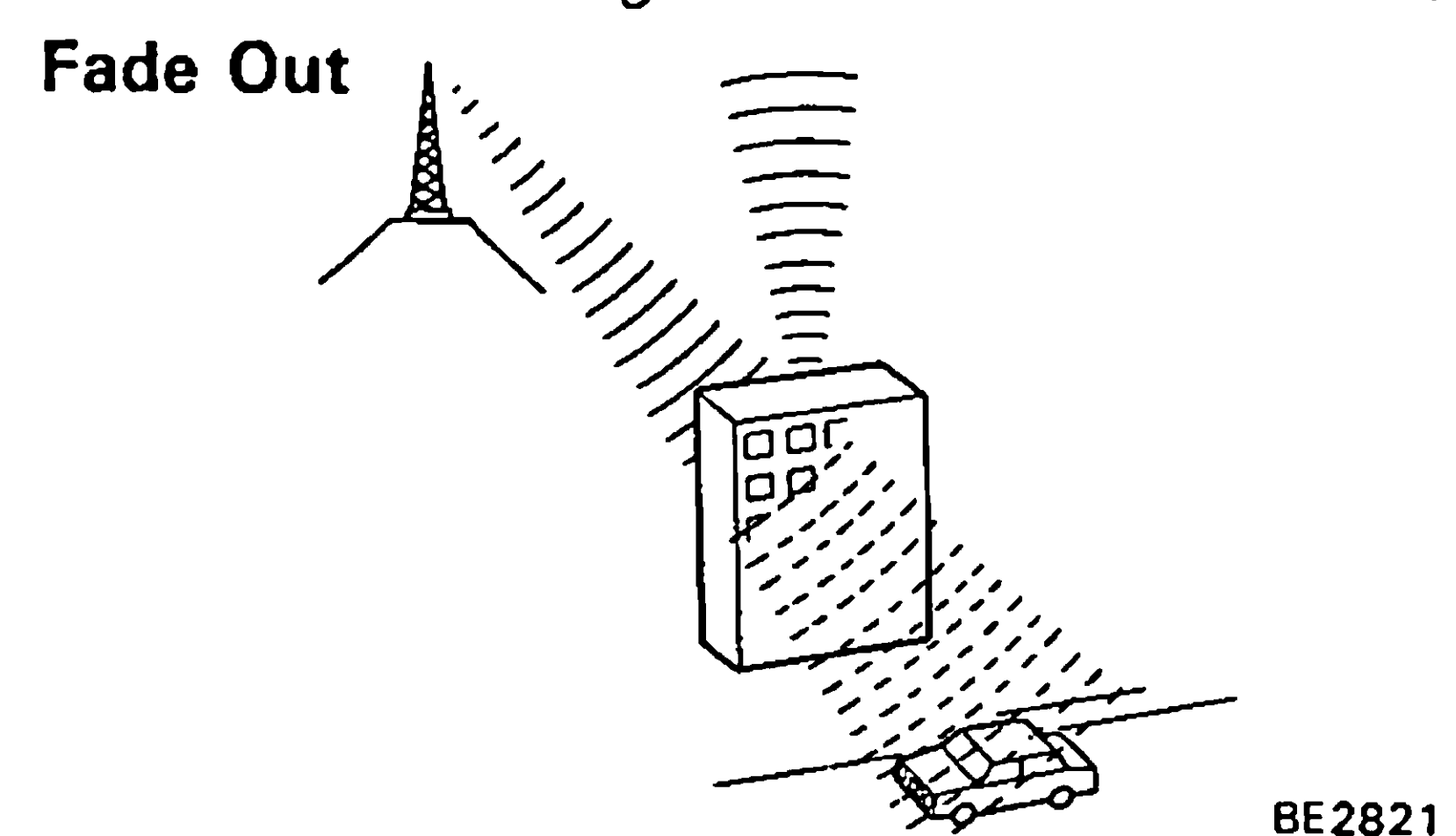
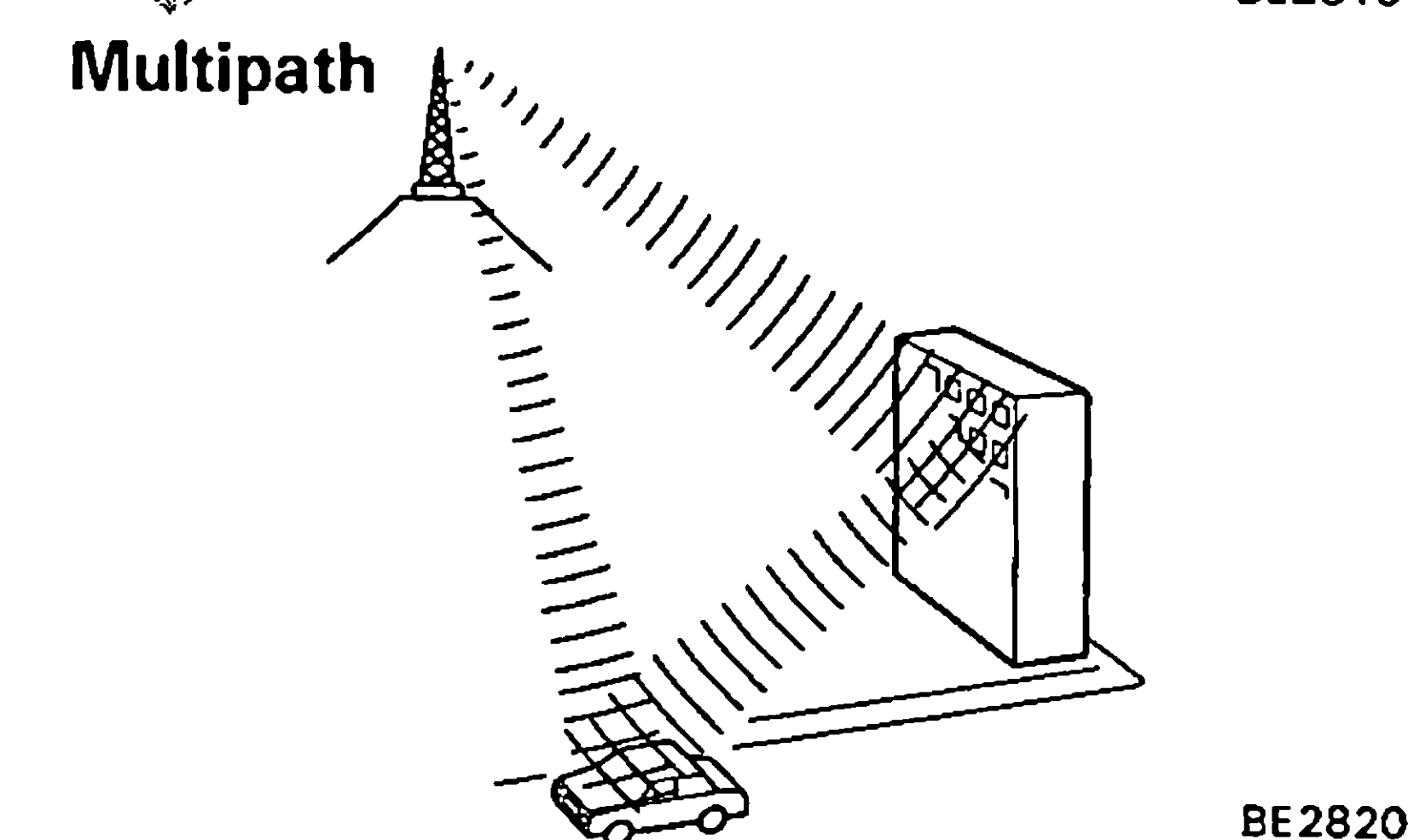
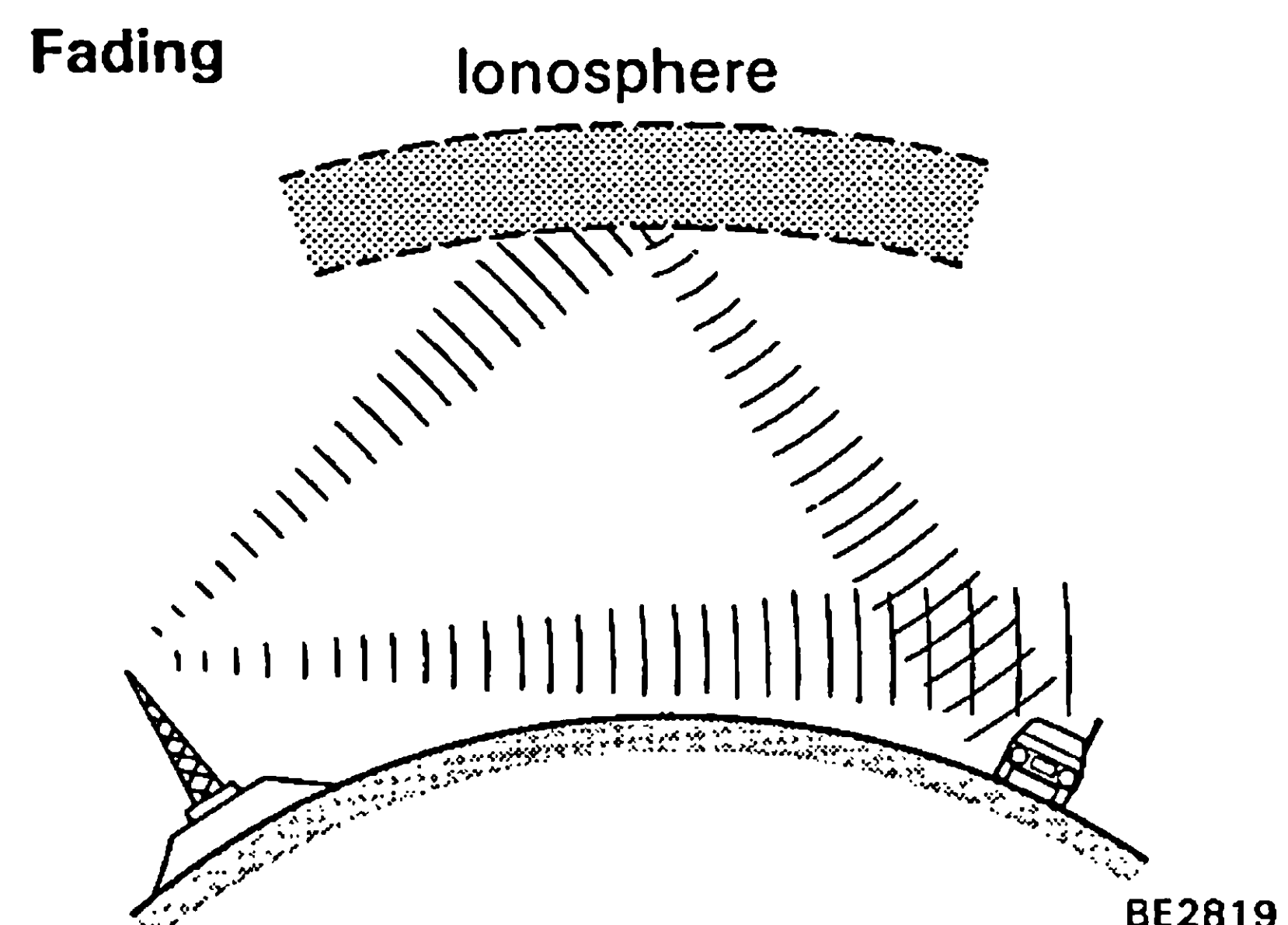
Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".

Multipath

One type of interference caused by the bouncing of radio waves off of obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off of buildings and mountains and interferes with the signal that is received directly.

Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off of buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called "fade out".



COMPACT DISC PLAYER

Compact Disc (hereafter called "CD") players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) CD available.

HINT: Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the slot.

NOTICE: CD players use invisible laser beam which could cause hazardous radiation exposure if directed. Be sure to operate the player correctly as instructed.

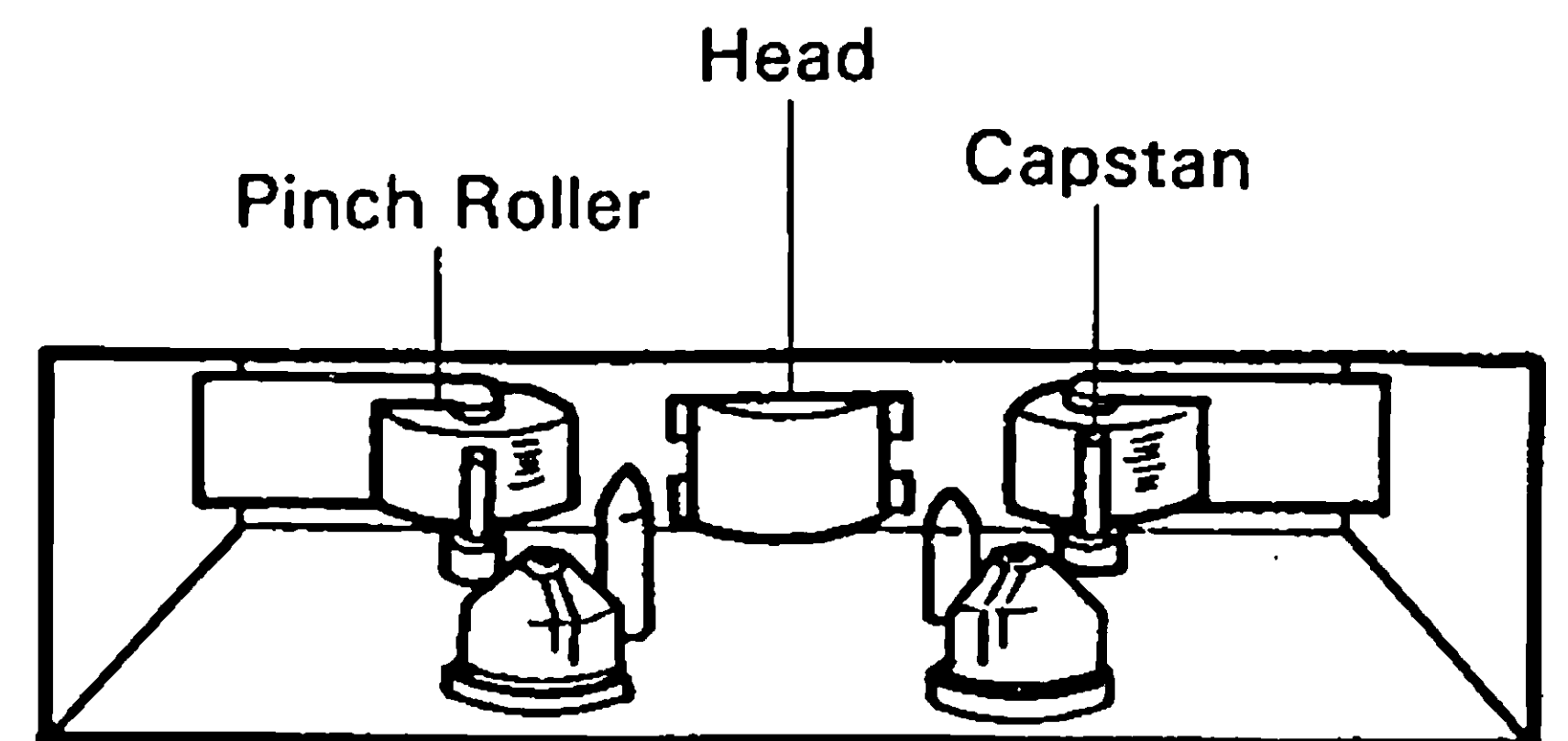
MAINTENANCE

(Tape Player)

Head Cleaning

- (a) Raise the cassette door with your finger.
Next using a pencil or like object, push in the guide.
- (b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.

Example:



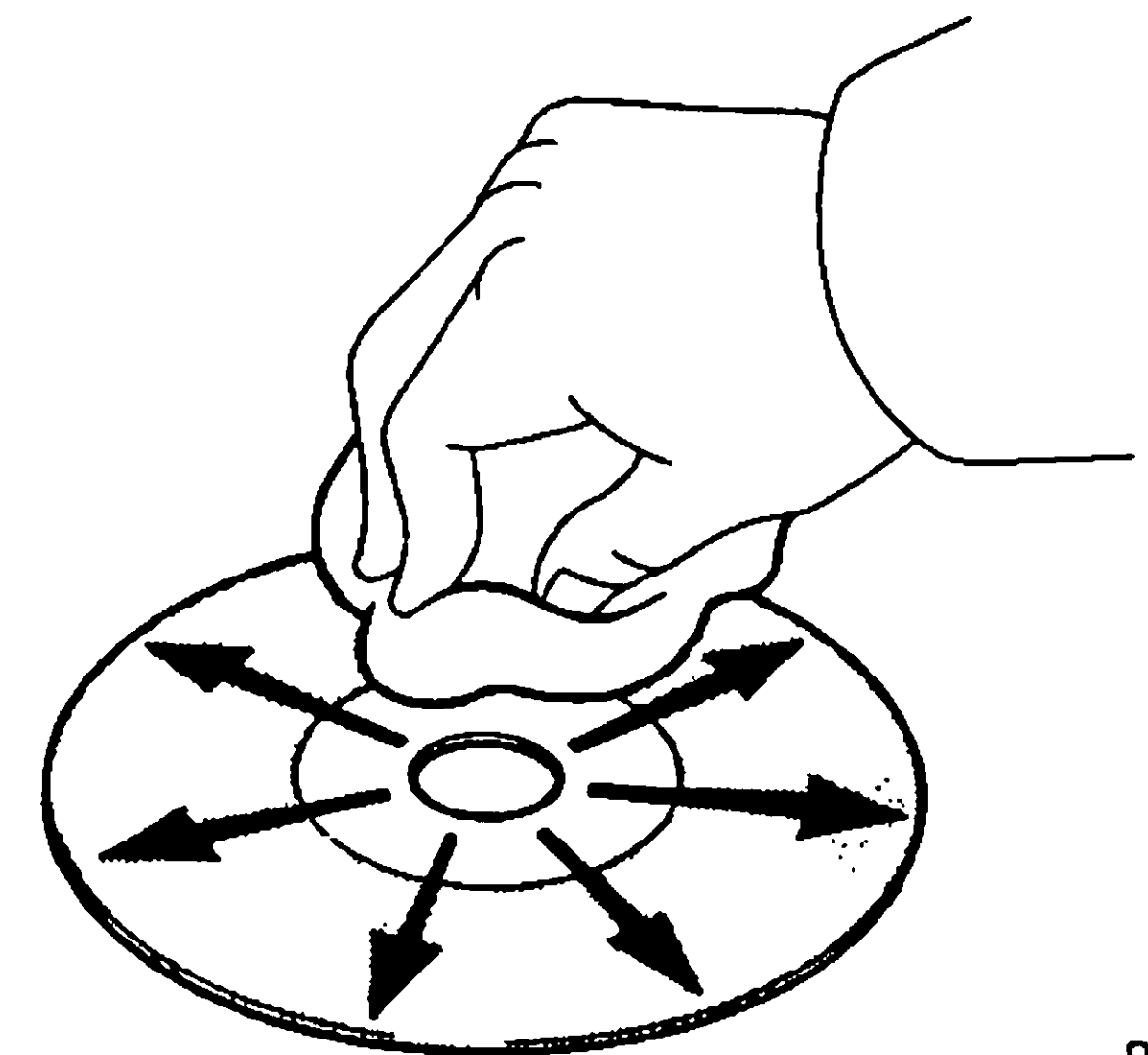
C0192

(CD Player)

Disc Cleaning

If the Disc gets dirty, clean the Disc by wiping the surfaces from the center to outside in the radial directions with a soft cloth.

NOTICE: Do not use a conventional record cleaner or anti-static record preservative.



BE4331

Troubleshooting

NOTICE: When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT: This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault
- For audio systems with anti-theft system, troubleshooting items marked (*) indicate that "Troubleshooting for ANTI-THEFT SYSTEM" should be carried out first.

Problem		No.
Radio	No power coming in.	*1
	Power coming in, but radio not operating.	*2
	Noise present, but AM-FM not operating.	3
	Either speaker does not work.	4
	Either AM or FM does not work.	5
	Reception poor (Volume faint).	5
	Few preset tuning bands.	5
	Sound quality poor.	6
	Auto-Radio Information (ARI) not received.	7
	Cannot set station select button.	8
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserts, but no power.	*10
	Power coming in, but tape player not operating.	11
	Either speaker does not work.	12
	Sound quality poor (Volume faint).	13
	Tape jammed, malfunction with tape speed or auto-reverse.	14
	APS, SKIP, RPT buttons not operating.	15
	Cassette tape will not eject.	*16
CD Player	CD cannot be inserted.	17
	CD inserts, but no power.	18
	Power coming in, but CD player not operating.	19
	Sound jumps.	20
	Sound quality poor (Volume faint).	21
	Either speaker does not work.	22
	CD will not eject.	23
CD Auto Changer	Magazine cannot be inserted into CD auto changer.	24
	Magazine inserts, but no power.	25
	Power coming in, but CD auto changer not operating.	26
	Sound jumps.	27
	Sound quality poor (Volume faint).	28

CD Auto Changer (Cont'd)	Any speaker does not work	29
	Woofer speaker does not work	30
	Magazine will not eject	31
Antenna	Antenna-related.	32
Noise	Noise produced by vibration or shock while driving.	33
	Noise produced when engine starts.	34

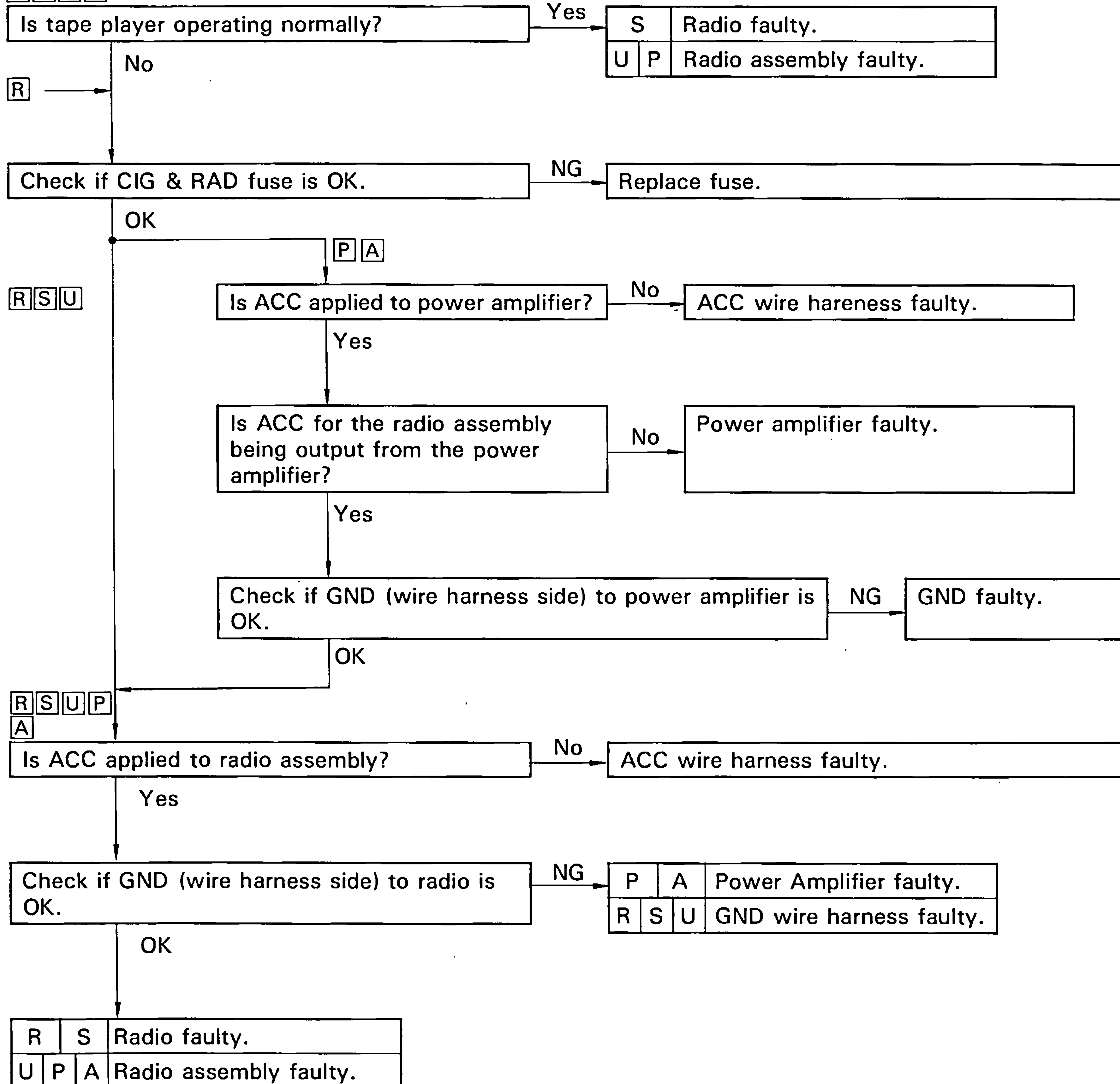
1	Radio	NO POWER COMING IN
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[R] : Radio [S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)

[P] : Radio—Tape Player (Separate Power Amplifier)

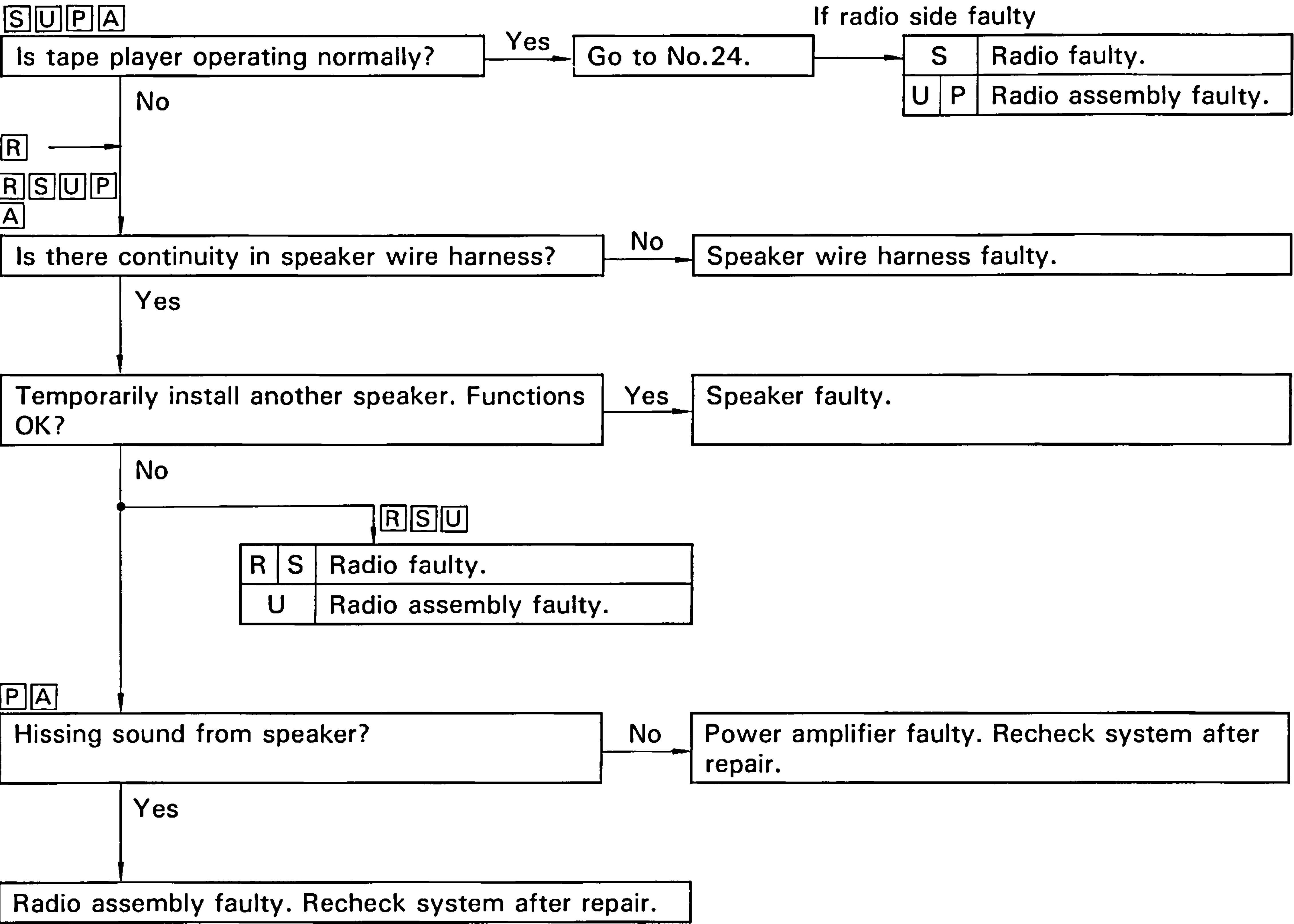
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

[S][U][P][A]



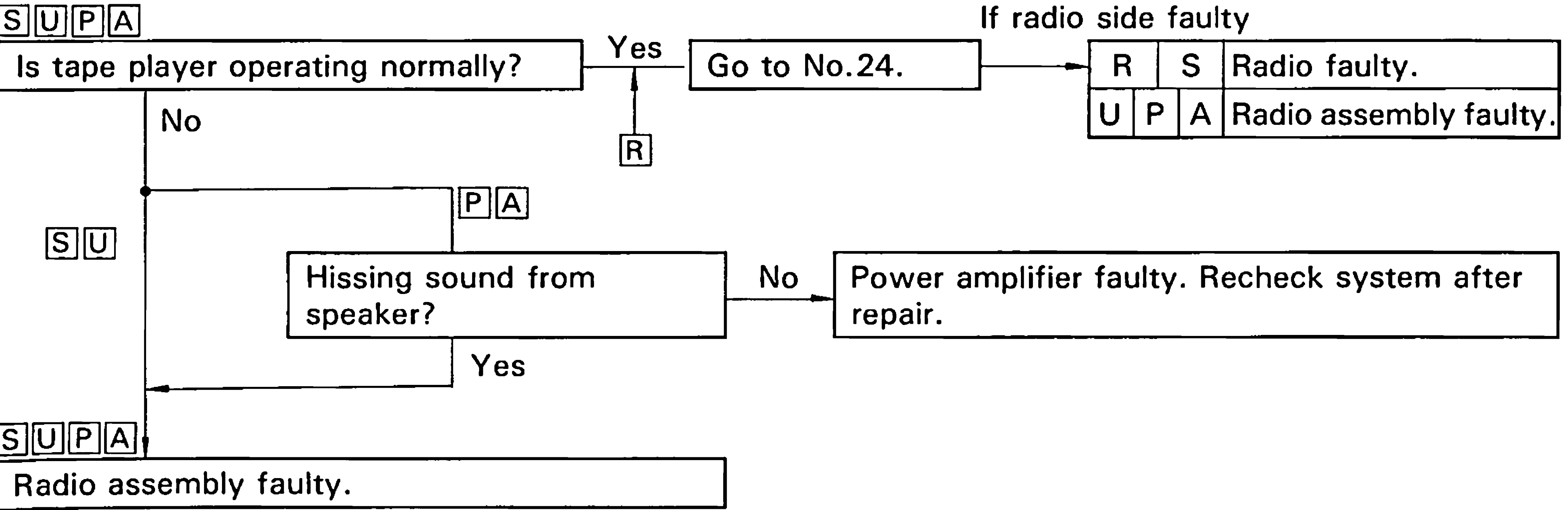
2	Radio	POWER COMING IN, BUT RADIO NOT OPERATING
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[R] : Radio [S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



3	Radio	NO PRESENT, BUT AM-FM NOT OPERATING
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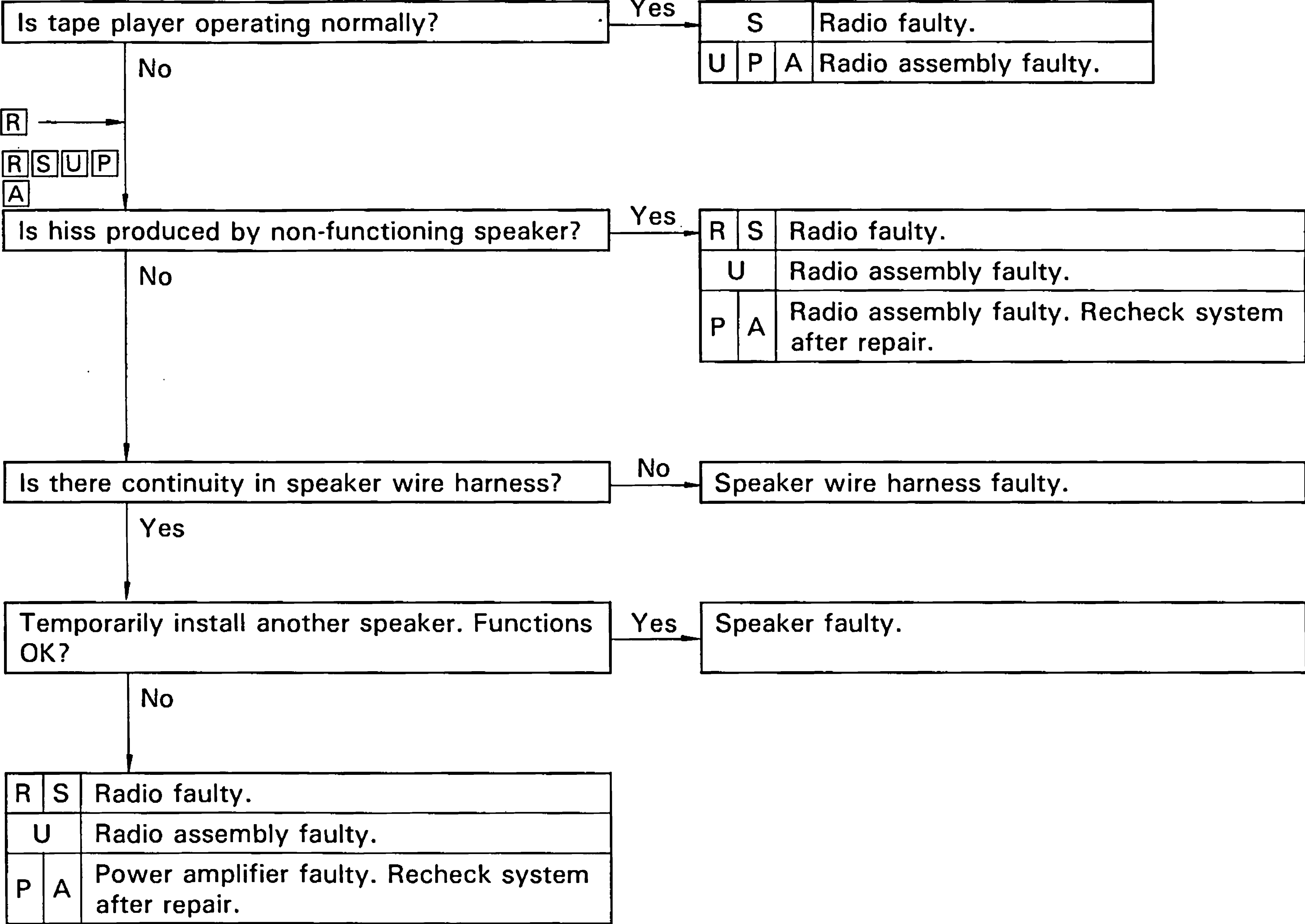
[R] : Radio [S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



4	Radio	EITHER SPEAKER DOES NOT WORK
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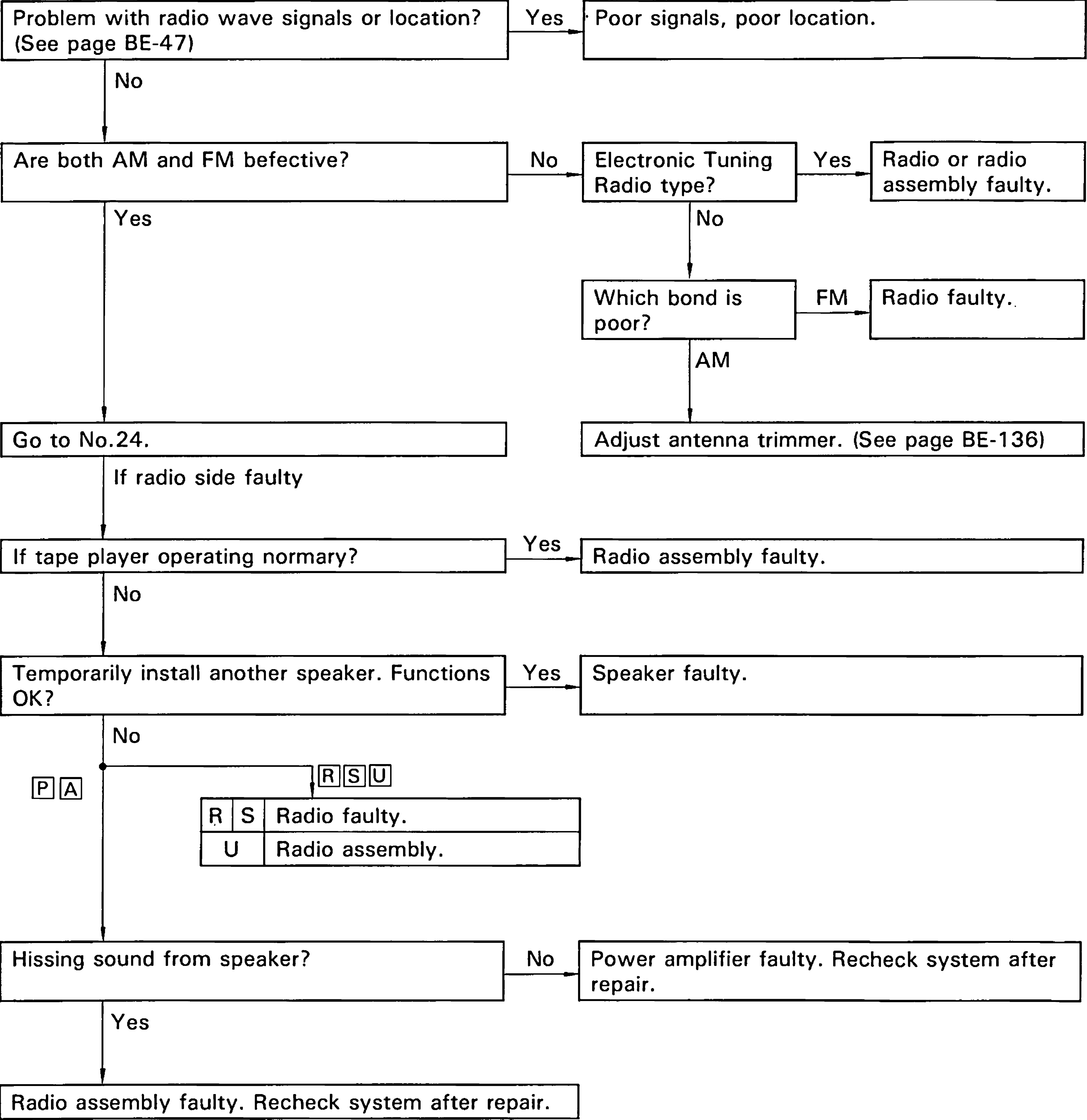
[R] : Radio [S] : Radio+Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

[S][U][P][A]



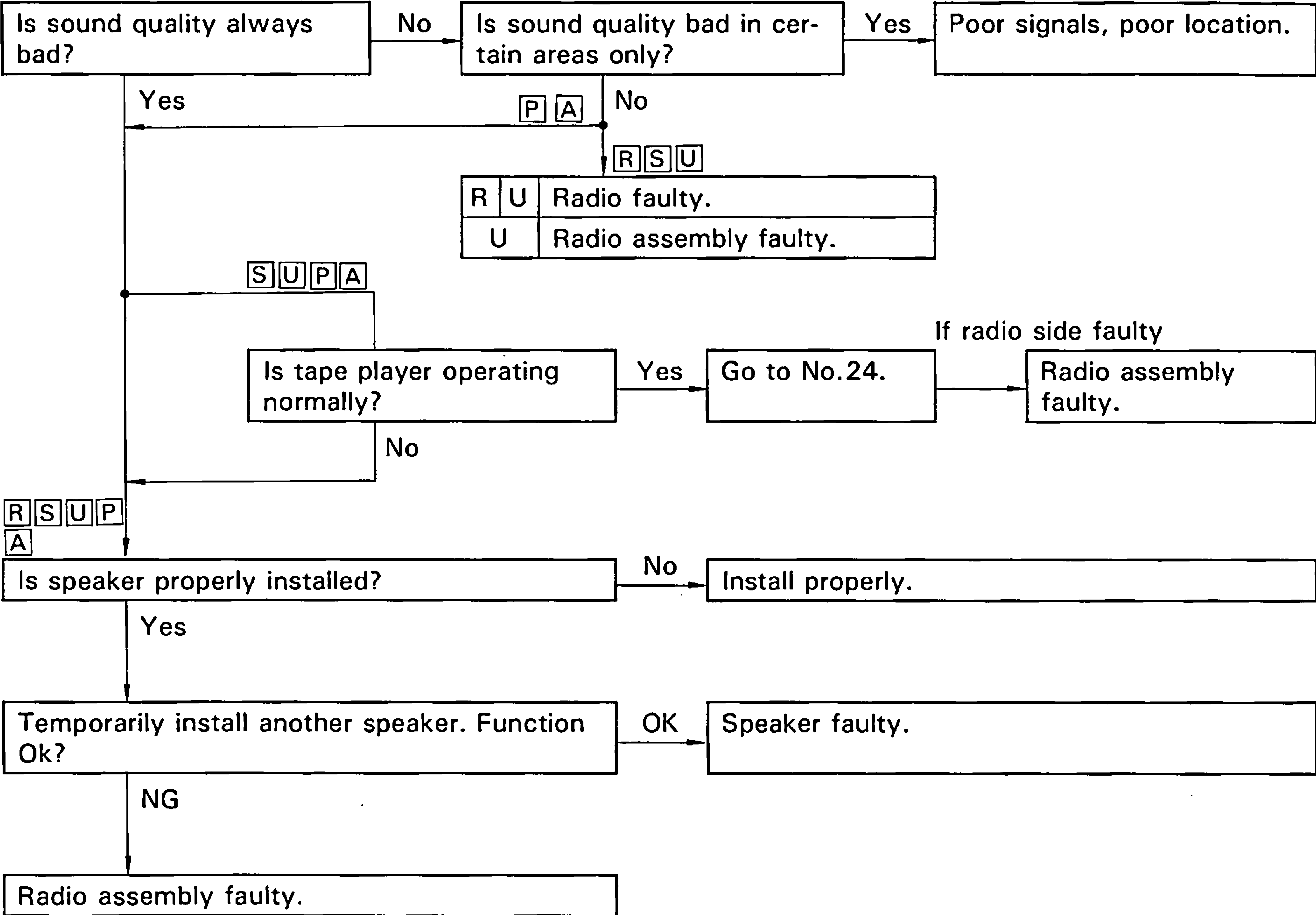
5	Radio	EITHER AM OR FM DOES NOT WORK, RECEPTION POOR (VOLUME FAINT), FEW PRESET TUNING BANDS
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[R] : Radio **[S]** : Radio + Tape Player **[U]** : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

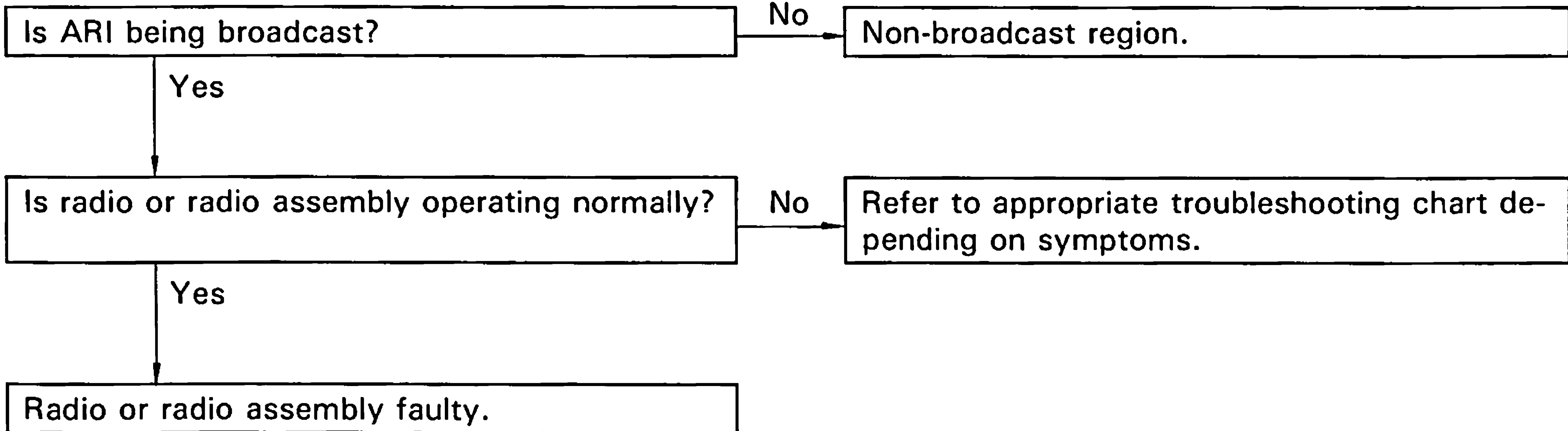


6	Radio	SOUND QUALITY POOR
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[R] : Radio [S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



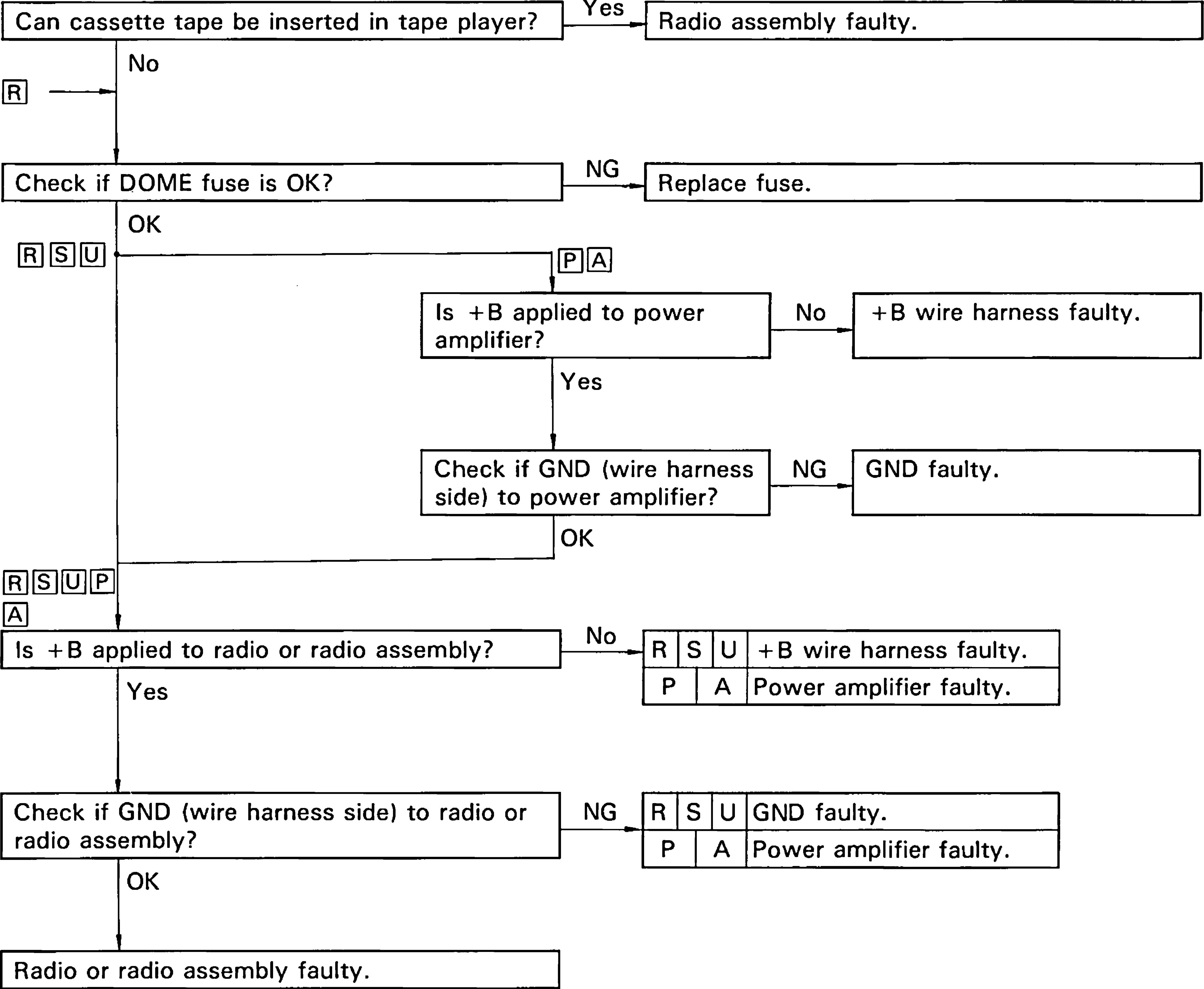
7	Radio	AUTO-RADIO INFORMATION (ARI) NOT RECEIVED
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8	Radio	CANNOT SET STATION SELECT BUTTON, PRESET MEMORY DISAPPEARS
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[R] : Radio [S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

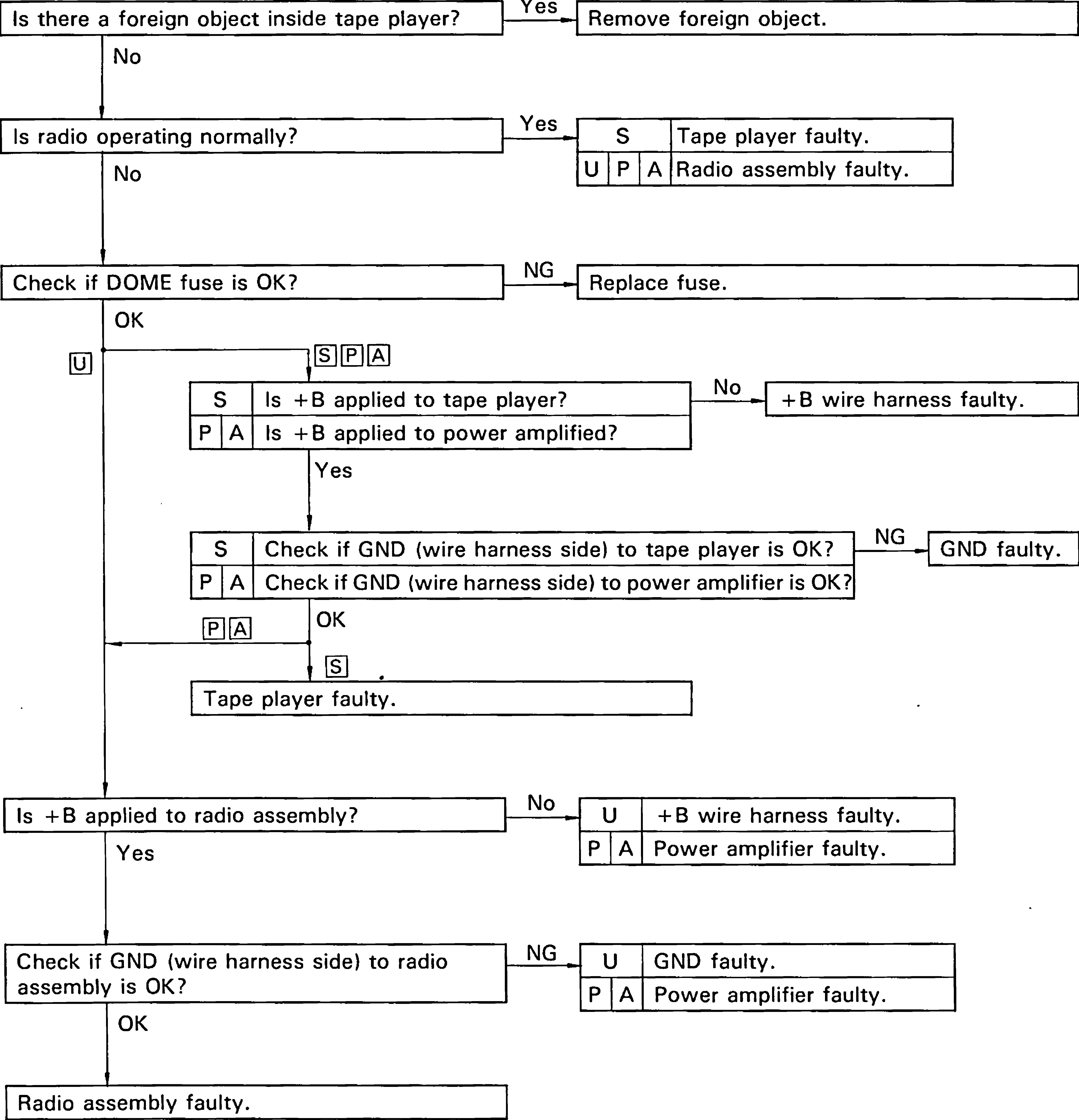
[S][U][P][A]



9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED
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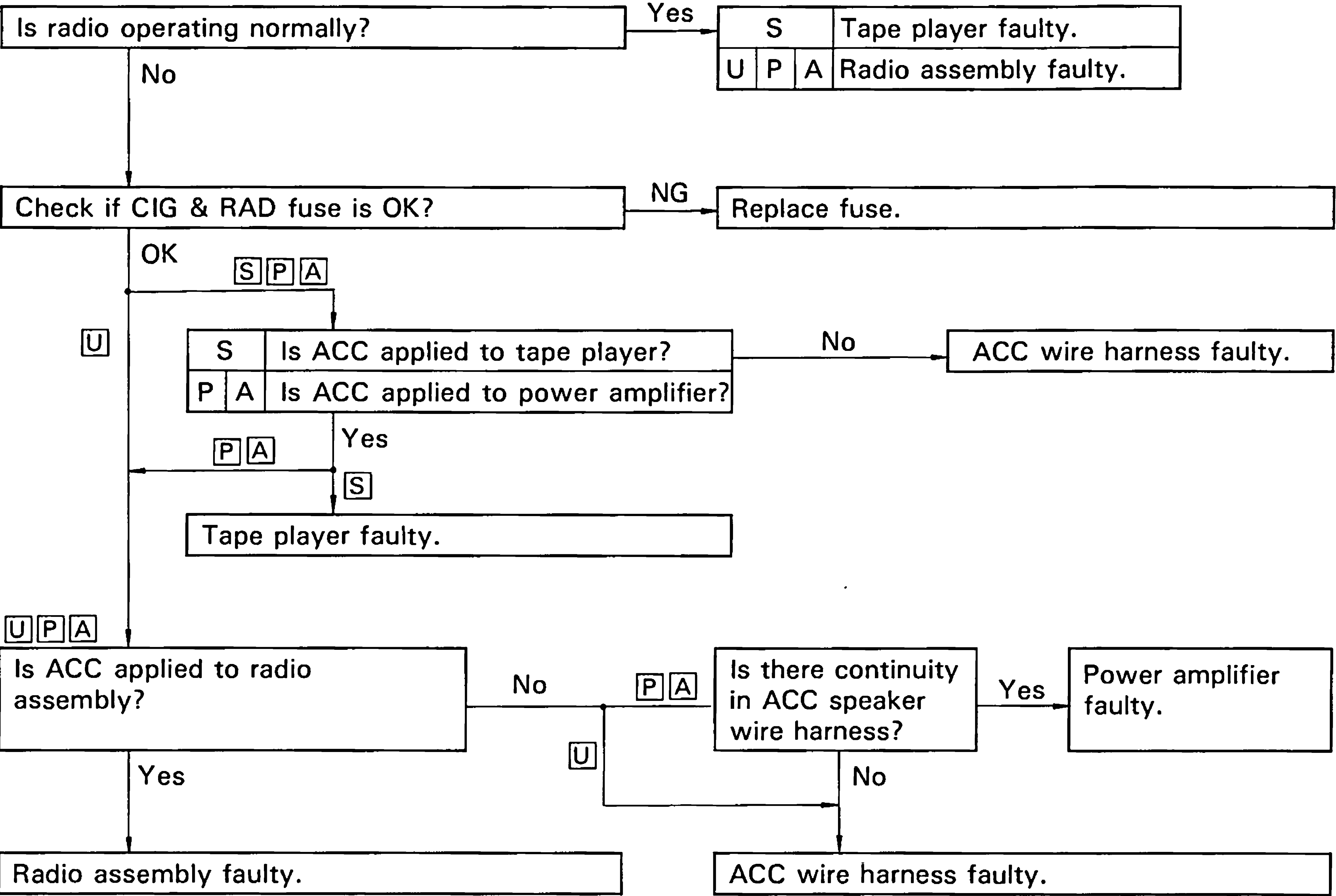
[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

[S][U][P][A]



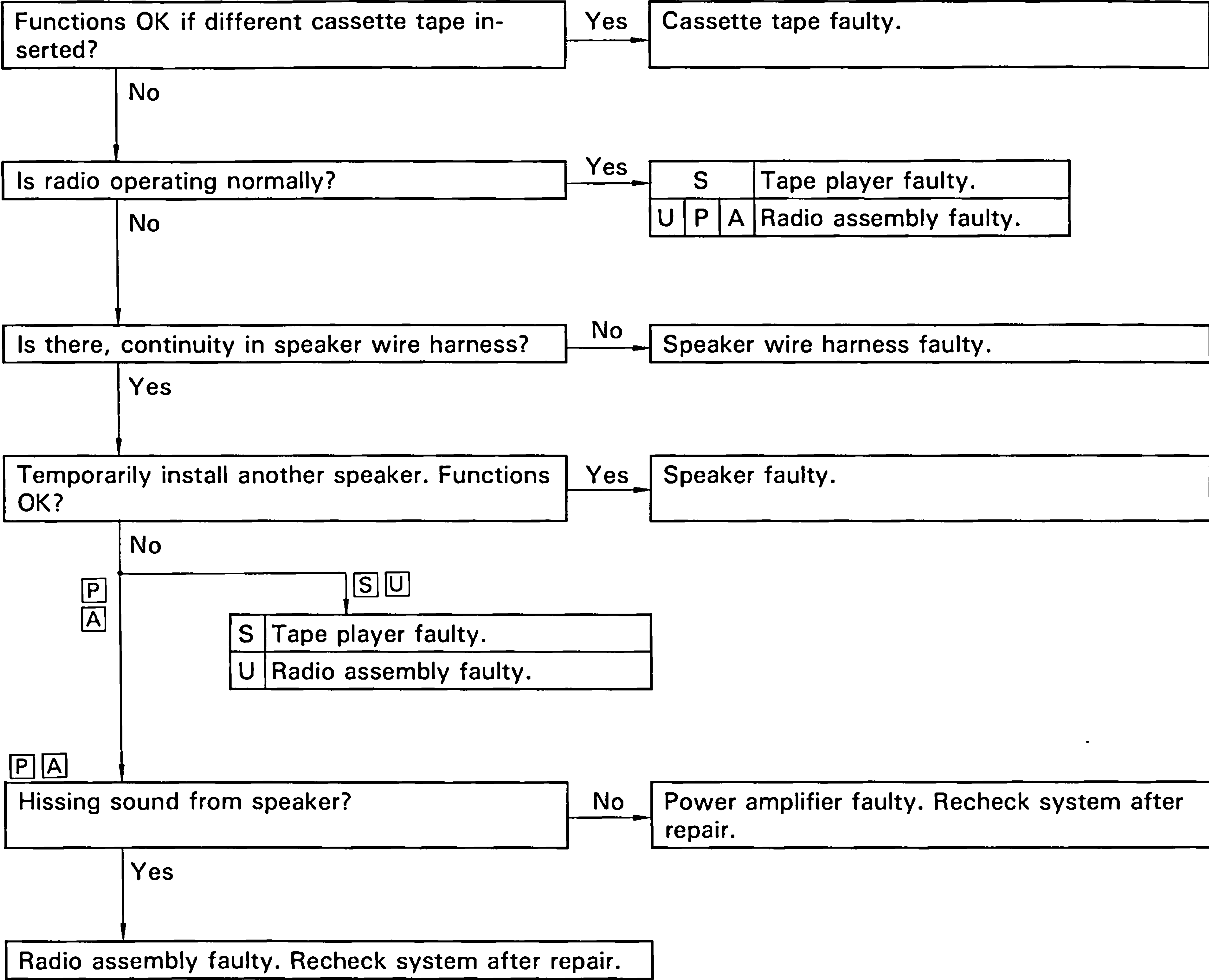
10	Tape Player	CASSETTE TAPE INSERTS, BUT NO POWER
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[S]: Radio + Tape Player [U]: Radio—Tape Player (Built-in Power Amplifier)
[P]: Radio—Tape Player (Separate Power Amplifier)
[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



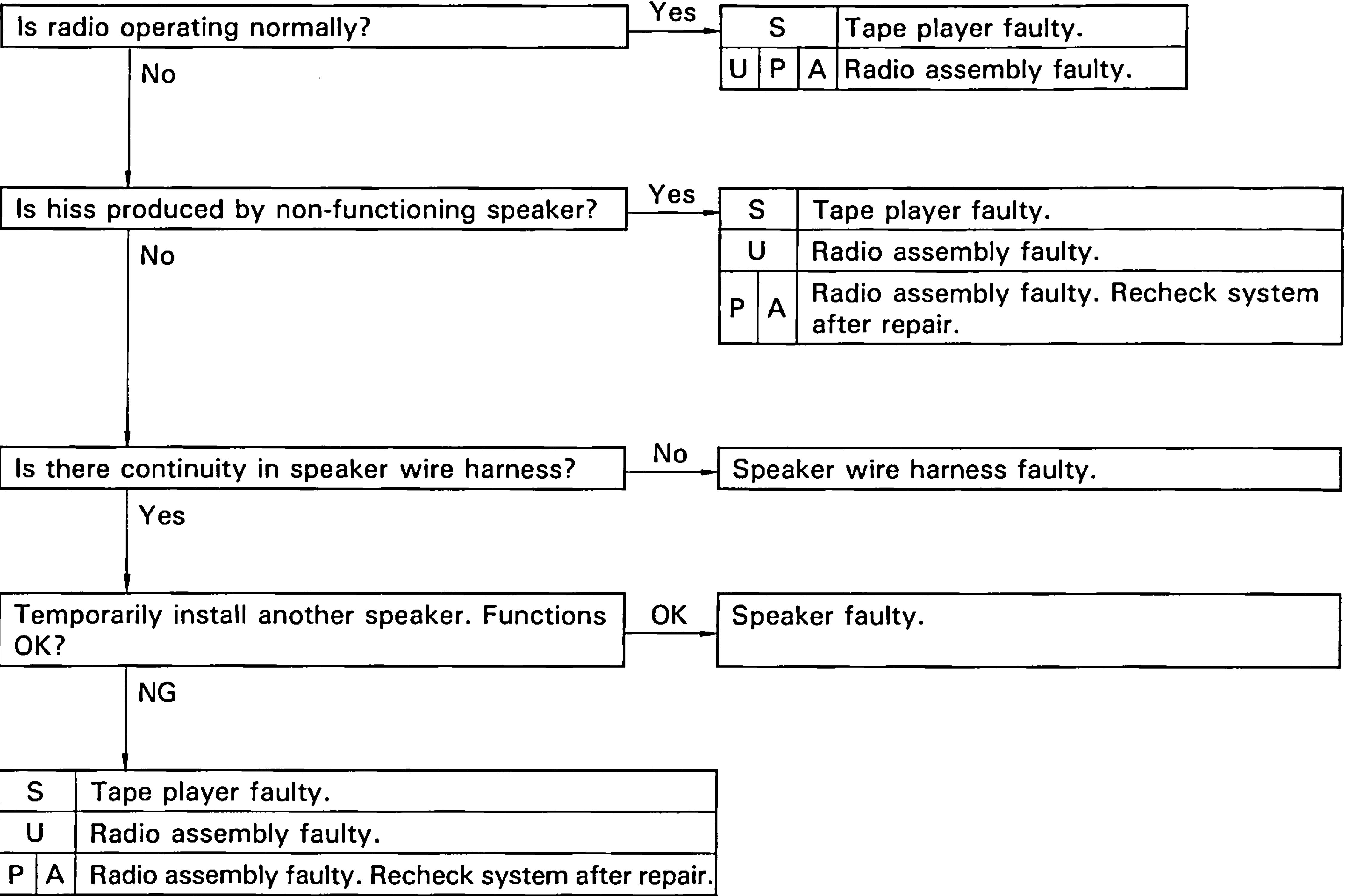
11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING
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[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



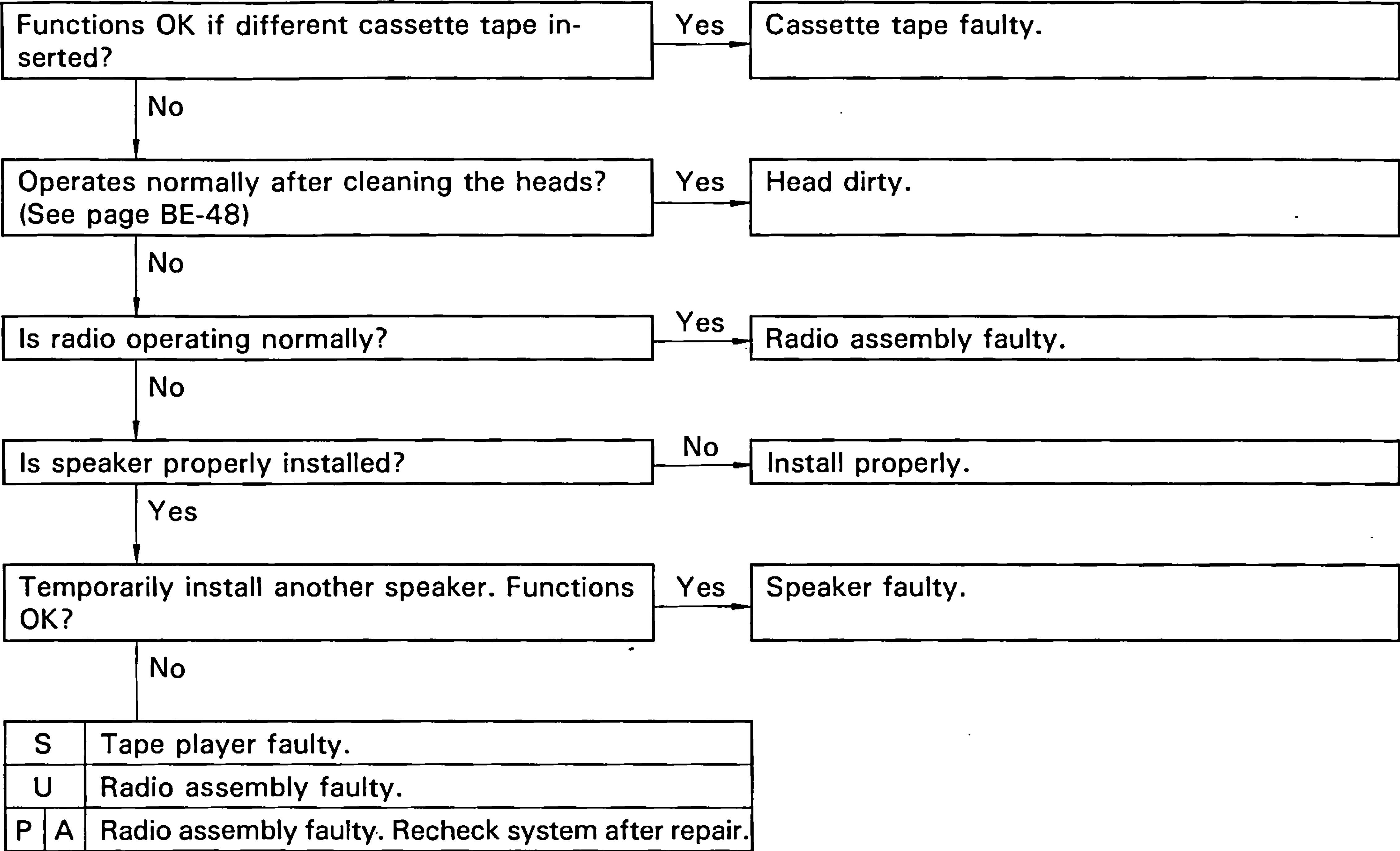
12	Tape Player	EITHER SPEAKER DOES NOT WORK
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[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



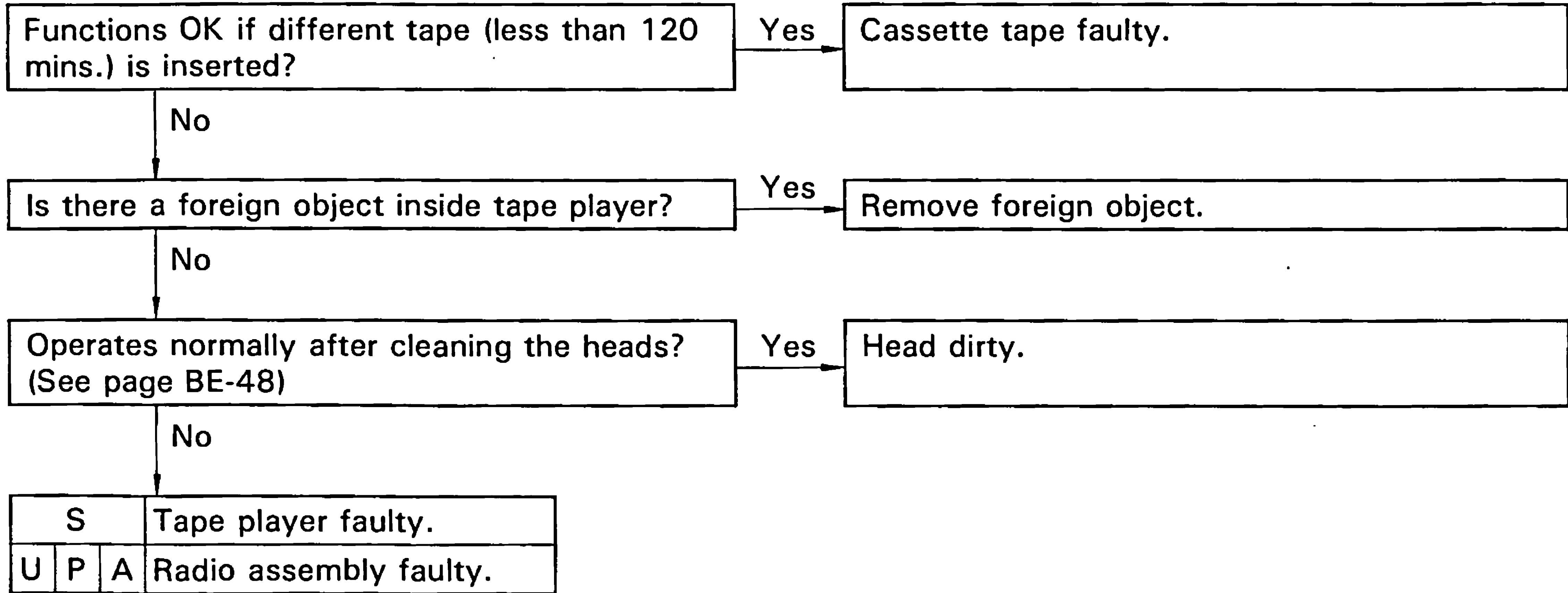
13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)
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[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



14	Tape Player	TAPE JAMMED, MALFUNCTION WITH TAPE SPEED OR AUTO-REVERSE
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[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

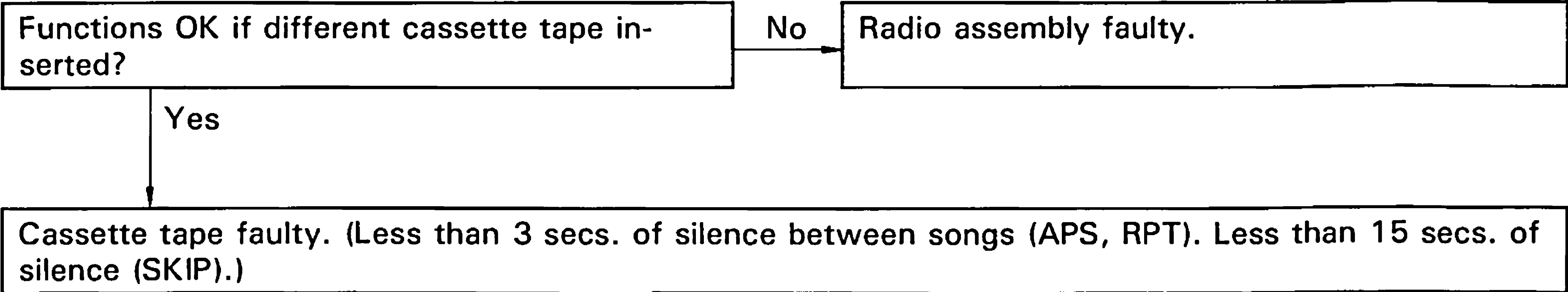


15

Tape Player

APS, SKIP, RPT BUTTONS NOT OPERATING

[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

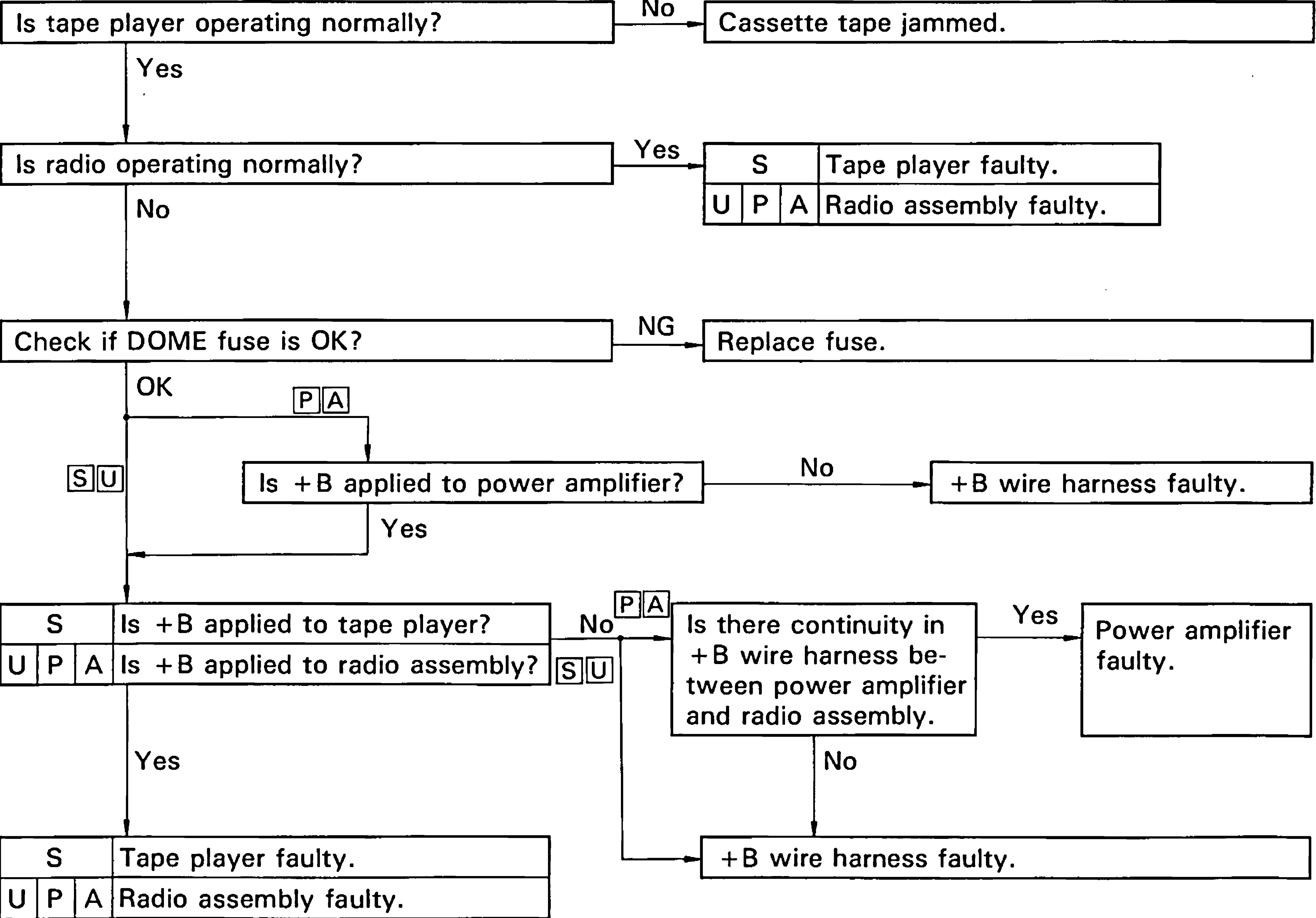


16

Tape Player

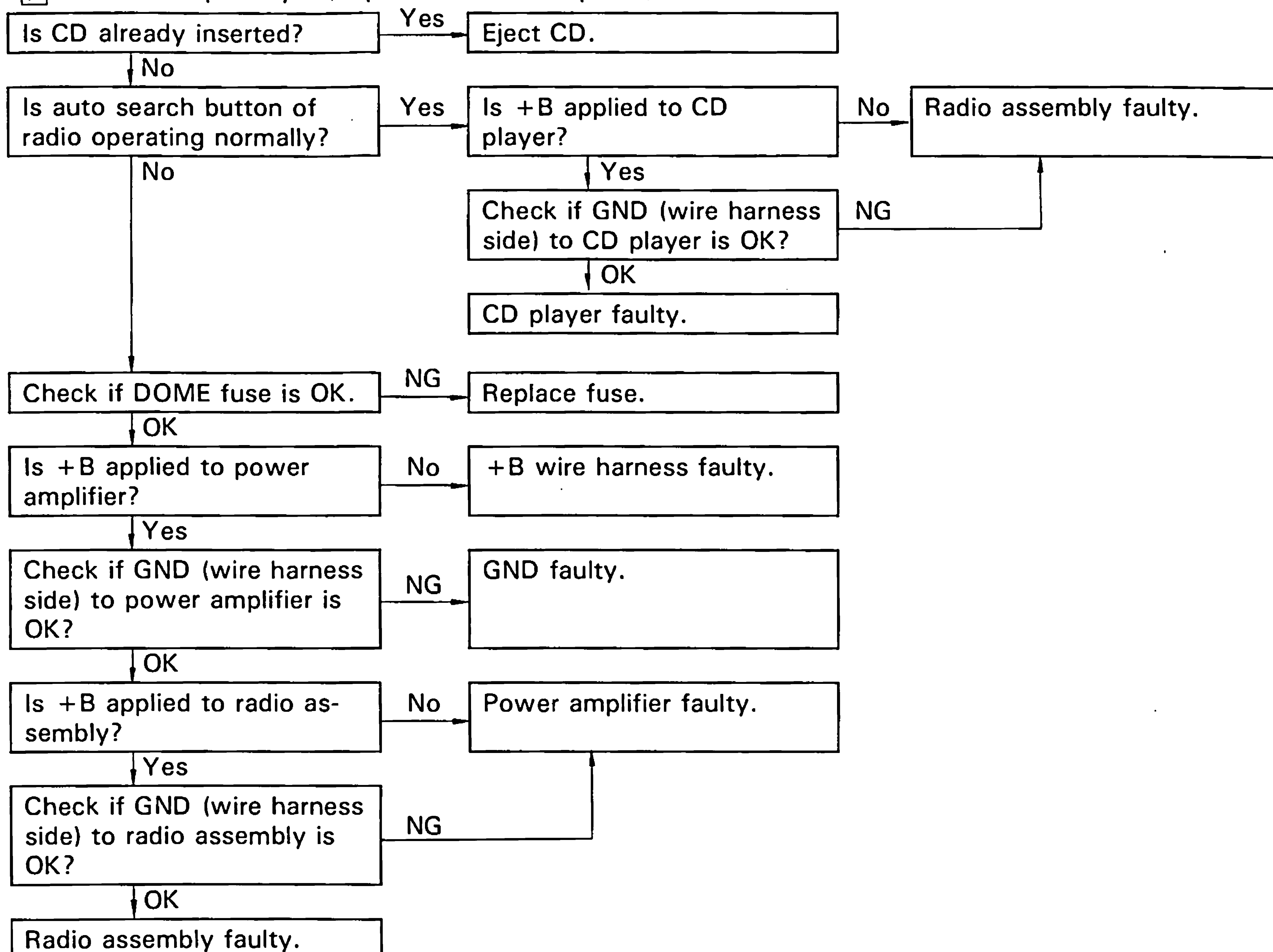
CASSETTE TAPE WILL NOT EJECT

[S] : Radio + Tape Player [U] : Radio—Tape Player (Built-in Power Amplifier)
[P] : Radio—Tape Player (Separate Power Amplifier)
[A] : Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



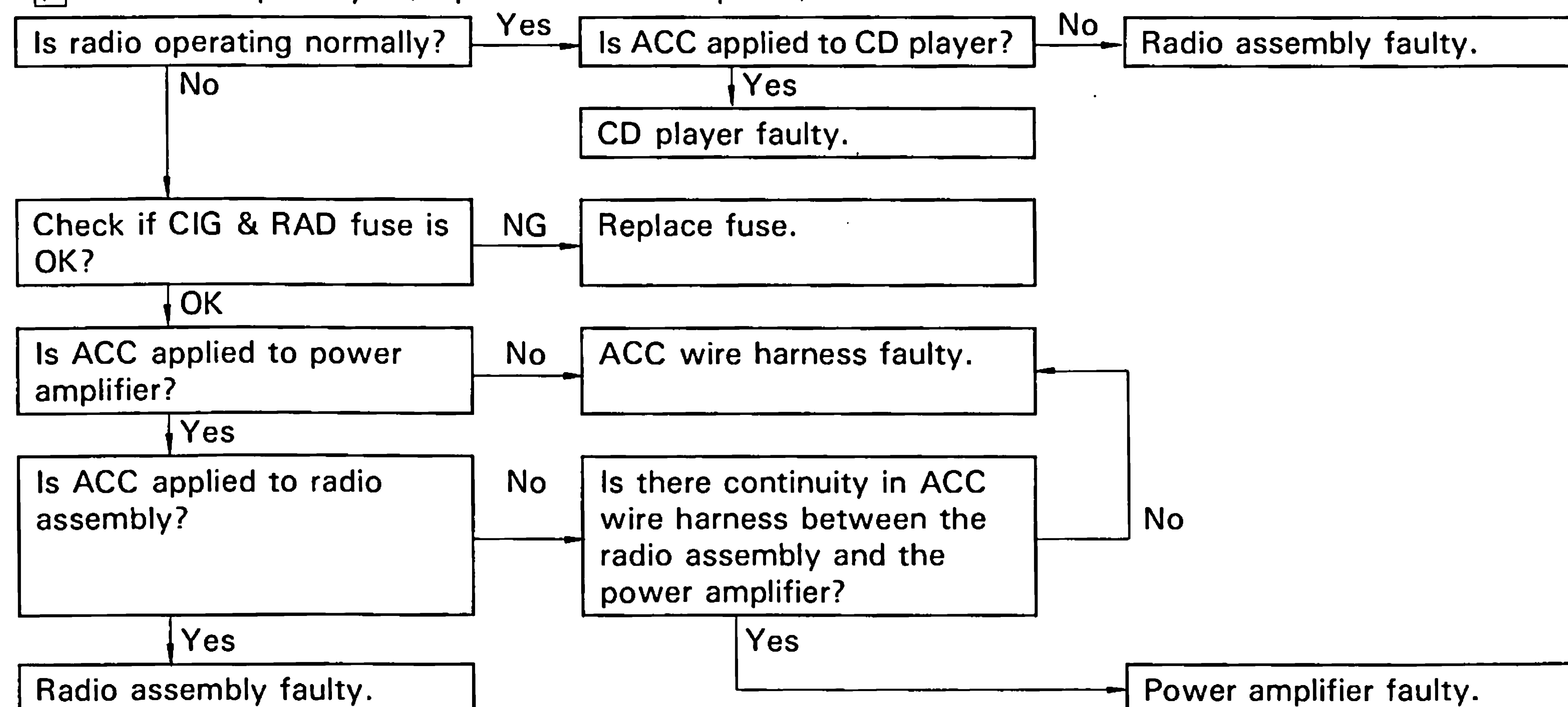
17	CD Player	CD CANNOT BE INSERTED
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[P]: Radio—Tape Player (Separate Power Amplifier)



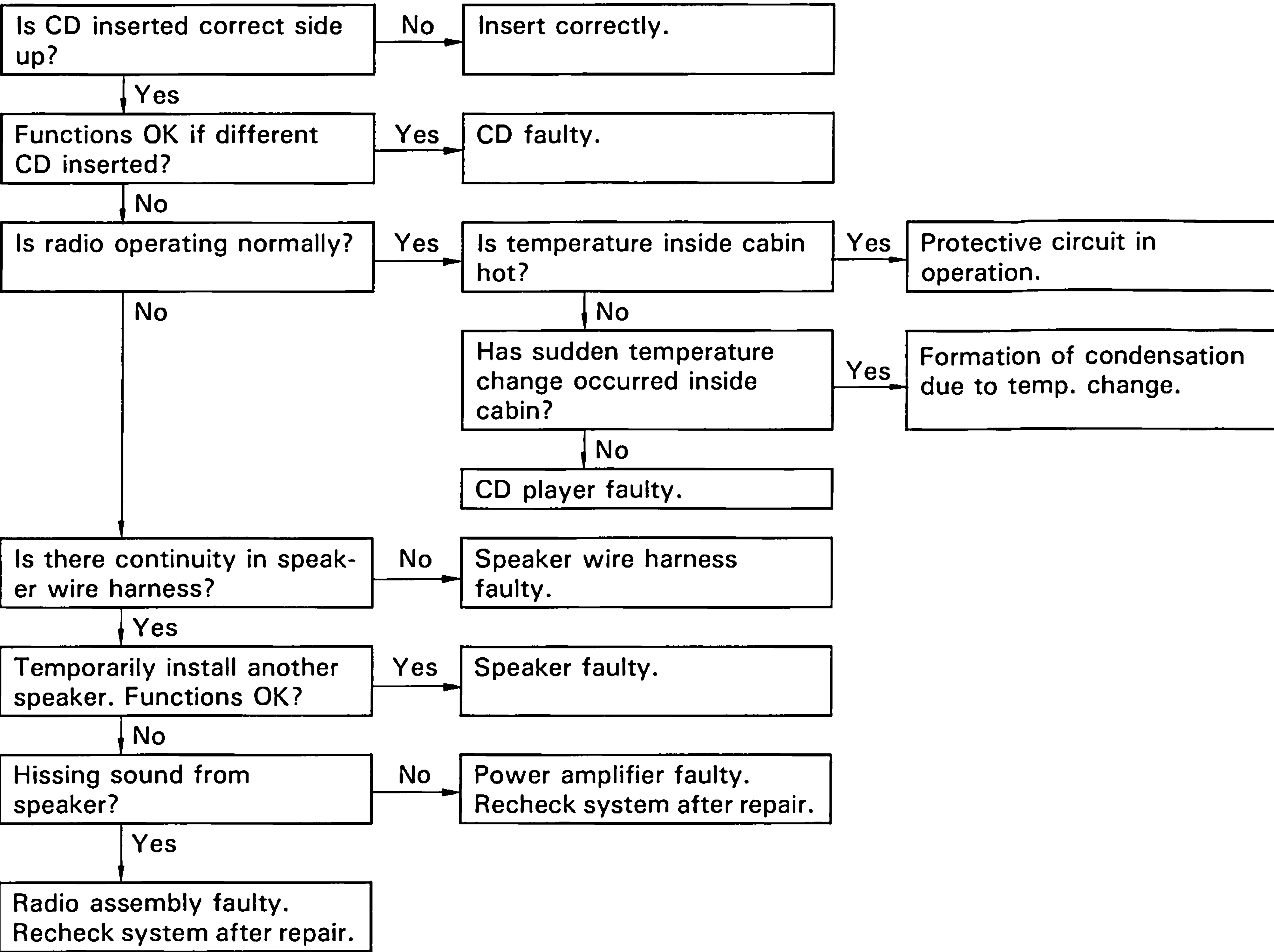
18	CD Player	CD INSERTS, BUT NO POWER
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[P]: Radio—Tape Player (Separate Power Amplifier)



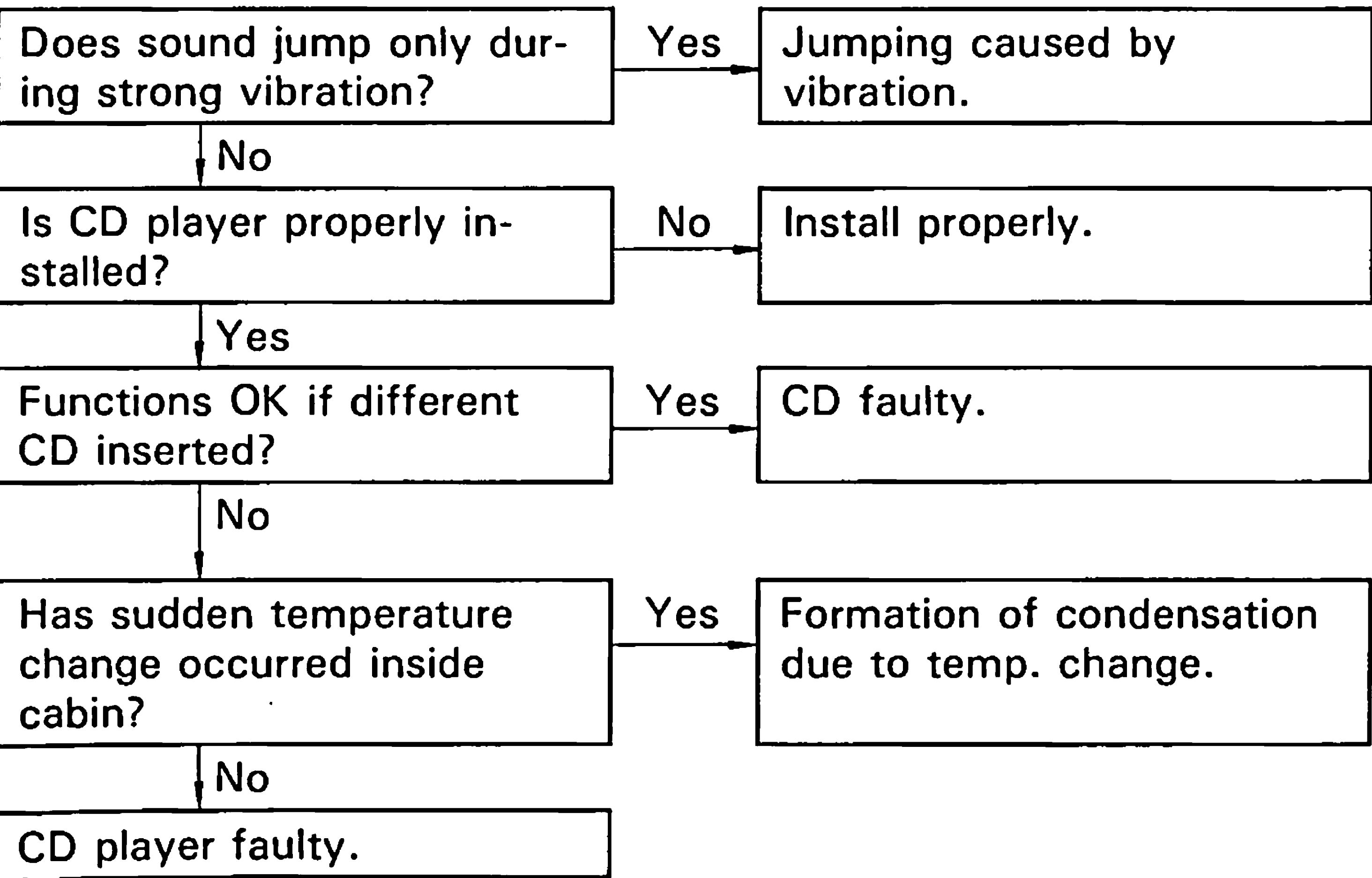
19	CD Player	POWER COMING IN, BUT CD PLAYER NOT OPERATING
----	-----------	--

[P]: Radio—Tape Player (Separate Power Amplifier)



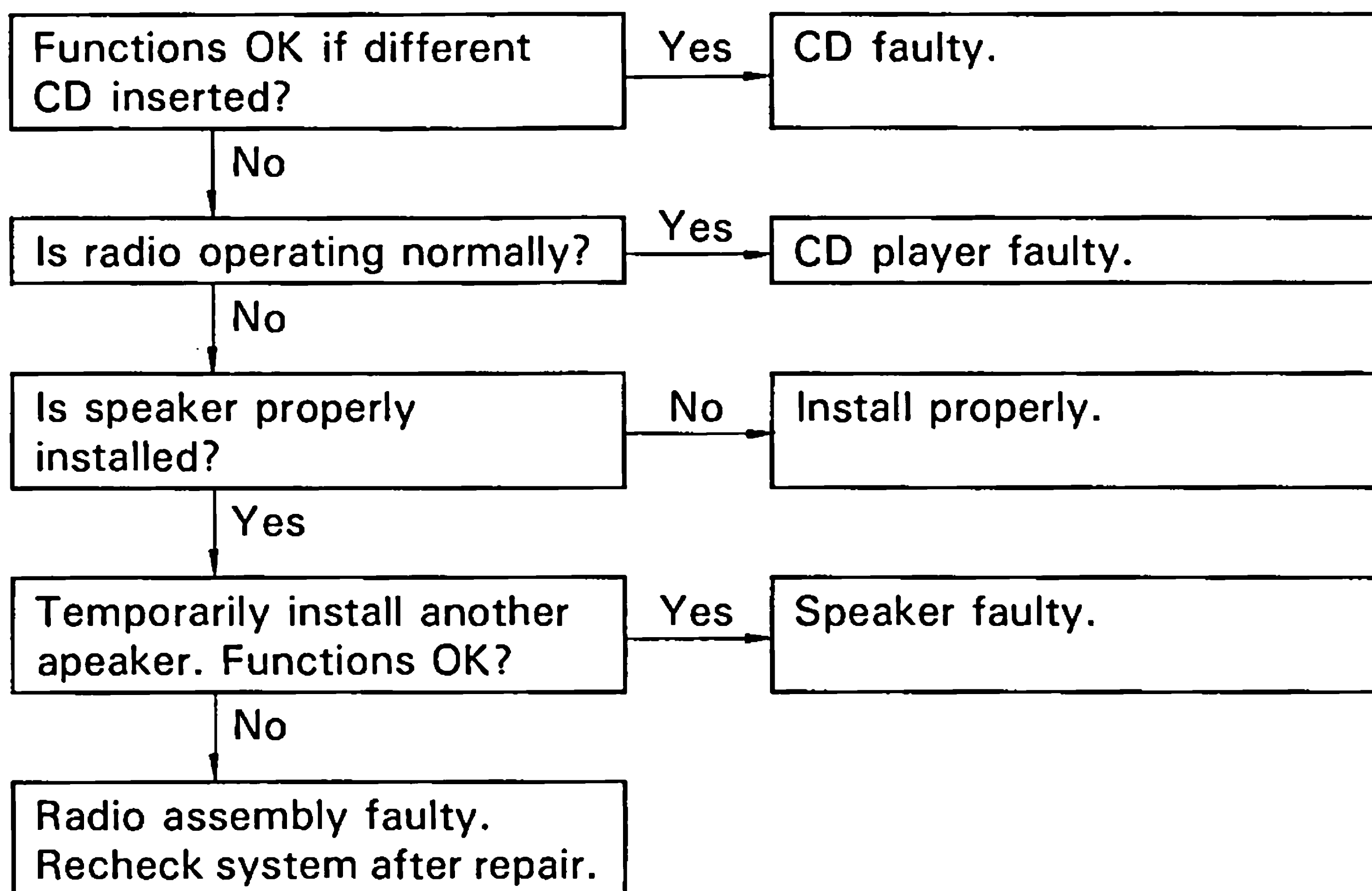
20	CD Player	SOUND JUMPS
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[P]: Radio—Tape Player (Separate Power Amplifier)



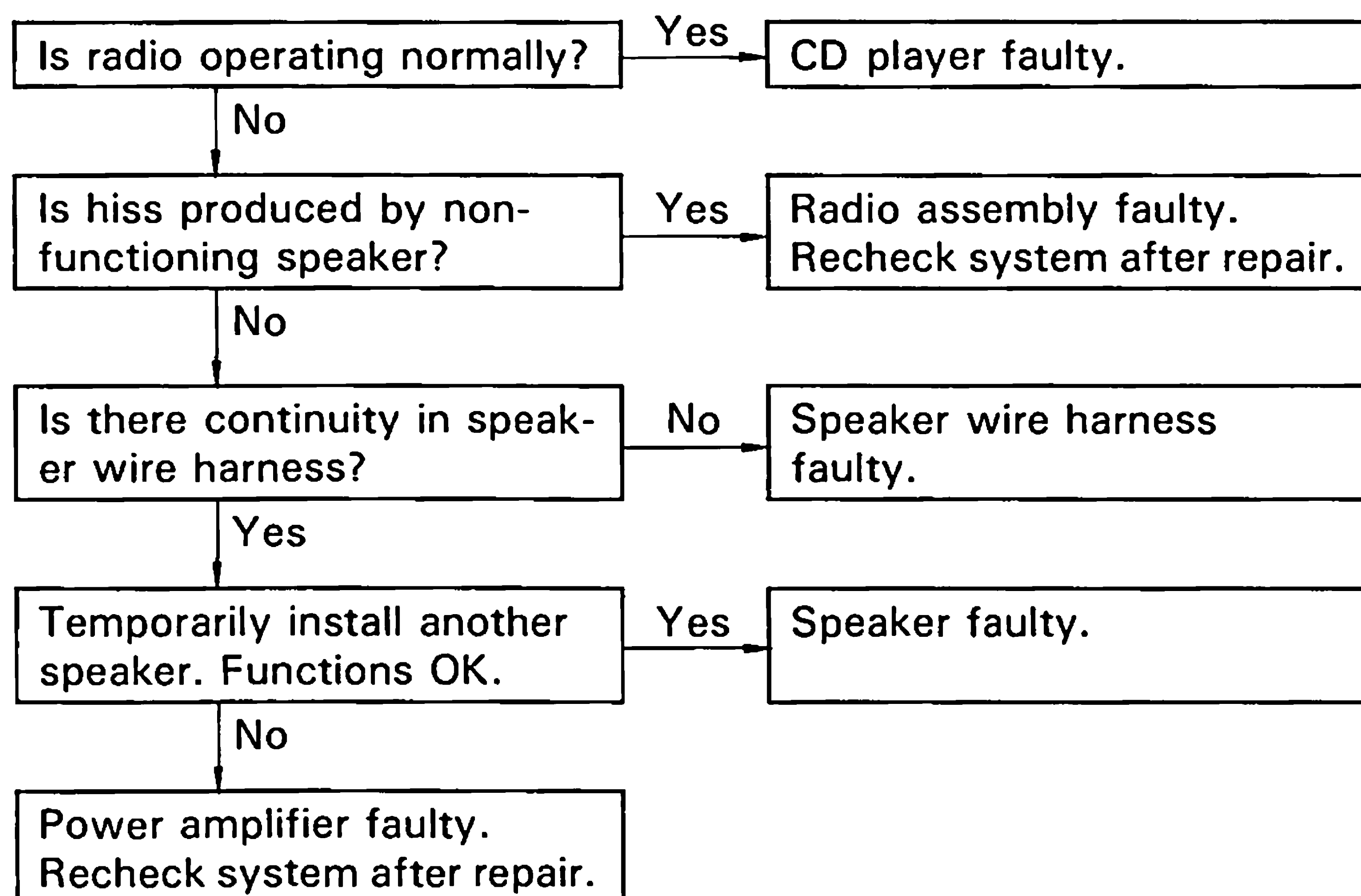
21	CD Player	SOUND QUALITY POOR (VOLUME FAINT)
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[P]: Radio—Tape Player (Separate Power Amplifier)



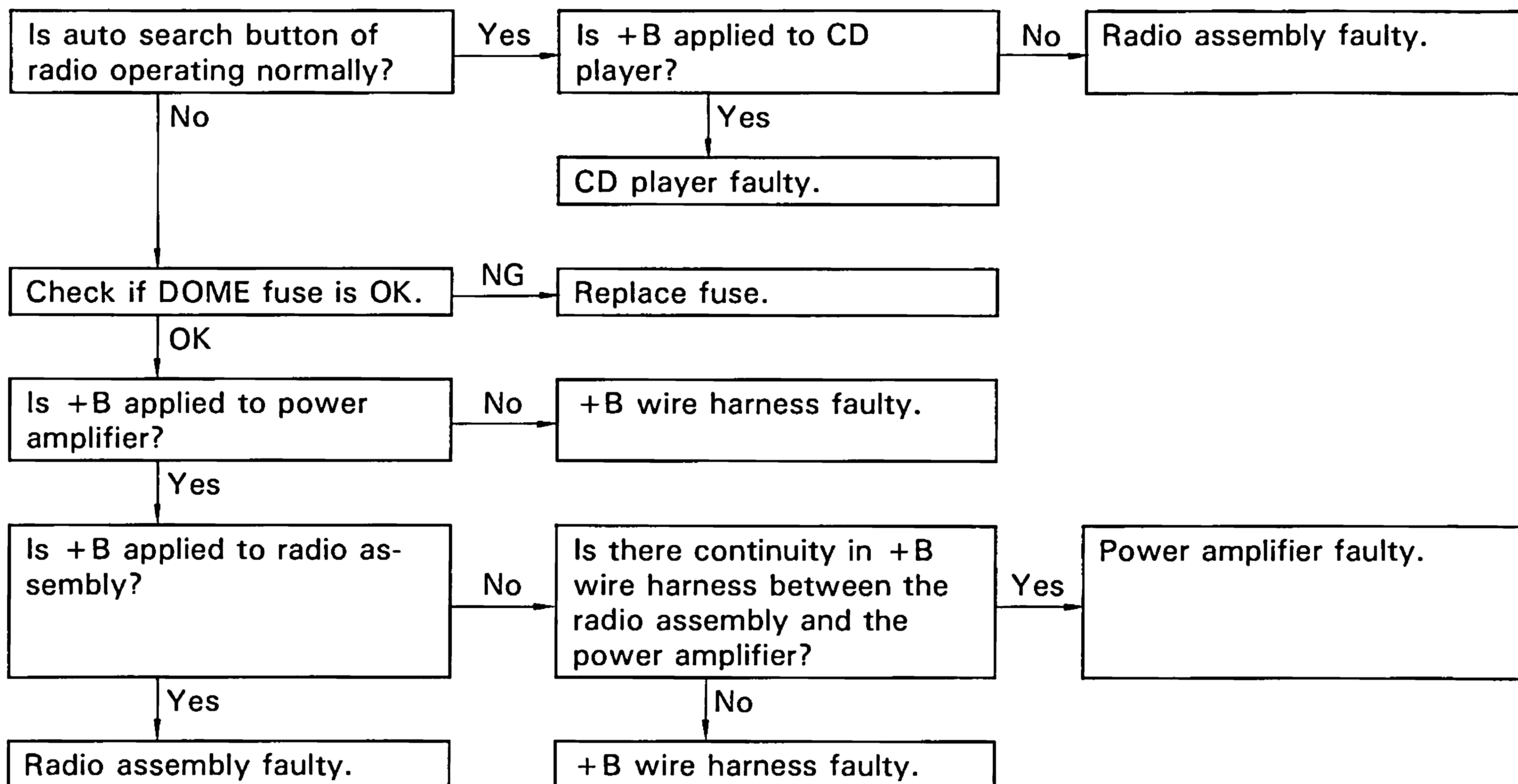
22	CD Player	EITHER SPEAKER DOES NOT WORK
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[P]: Radio—Tape Player (Separate Power Amplifier)



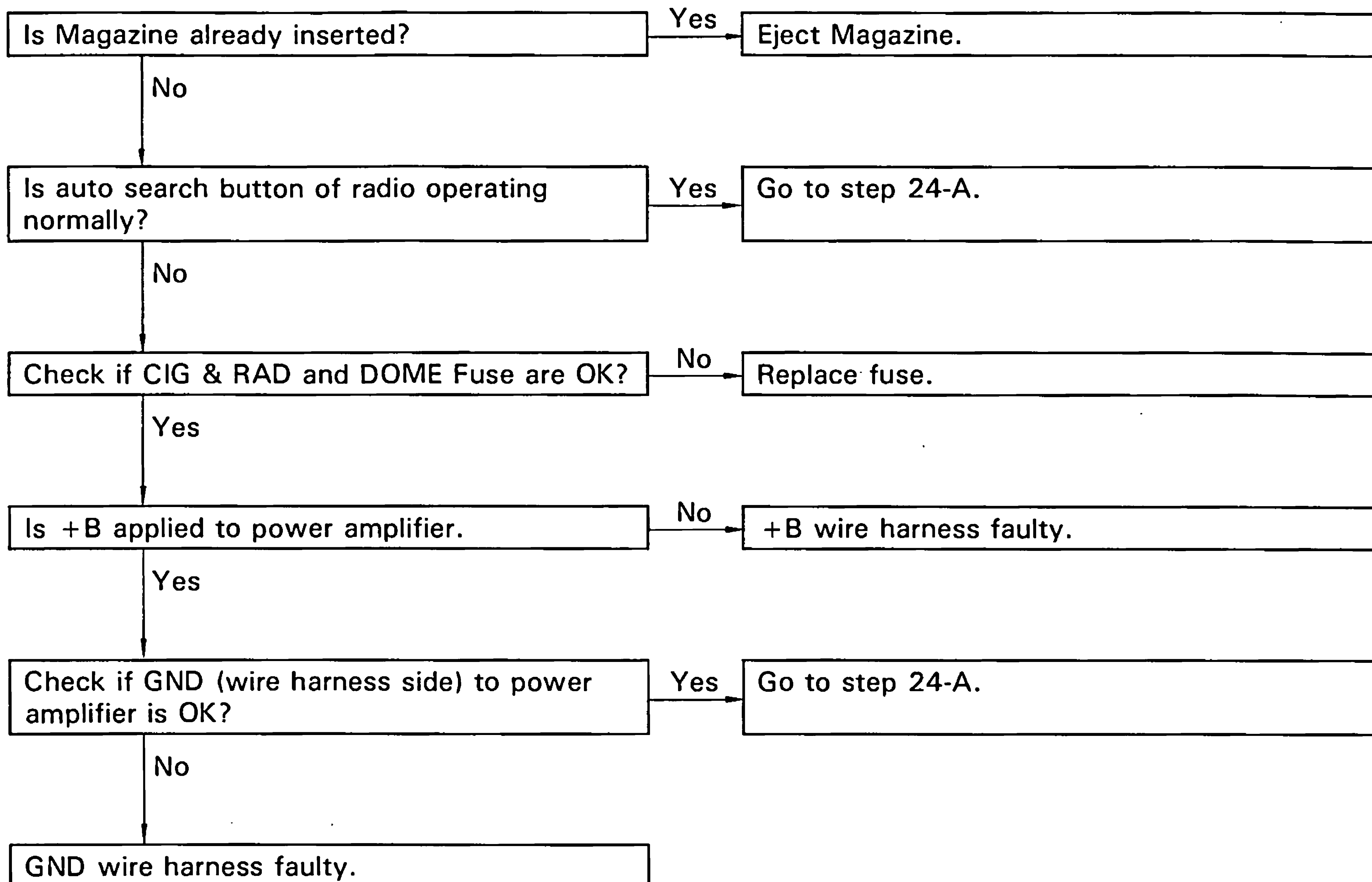
23	CD Player	CD WILL NOT EJECT
----	-----------	-------------------

[P]: Radio—Tape Player (Separate Power Amplifier)

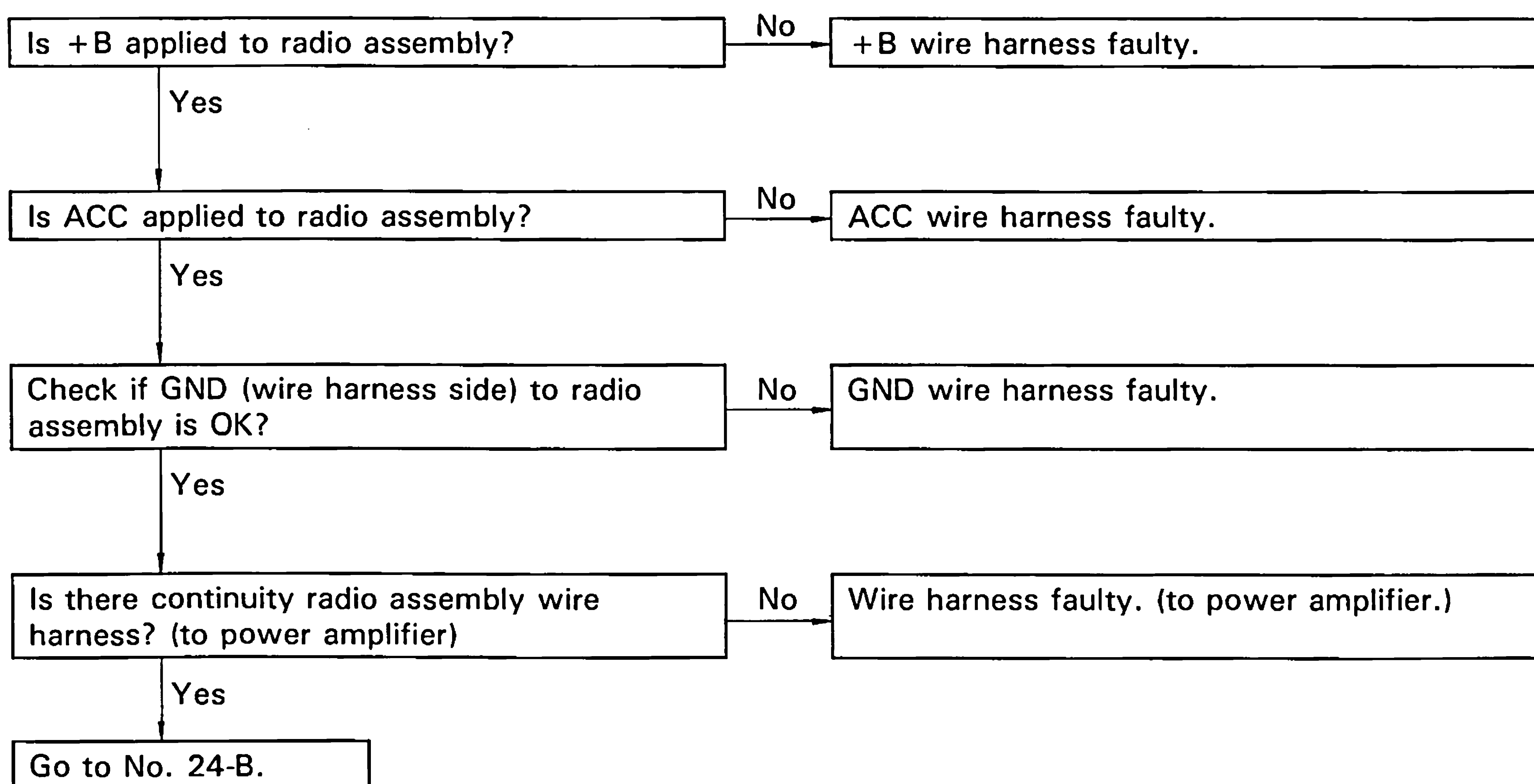


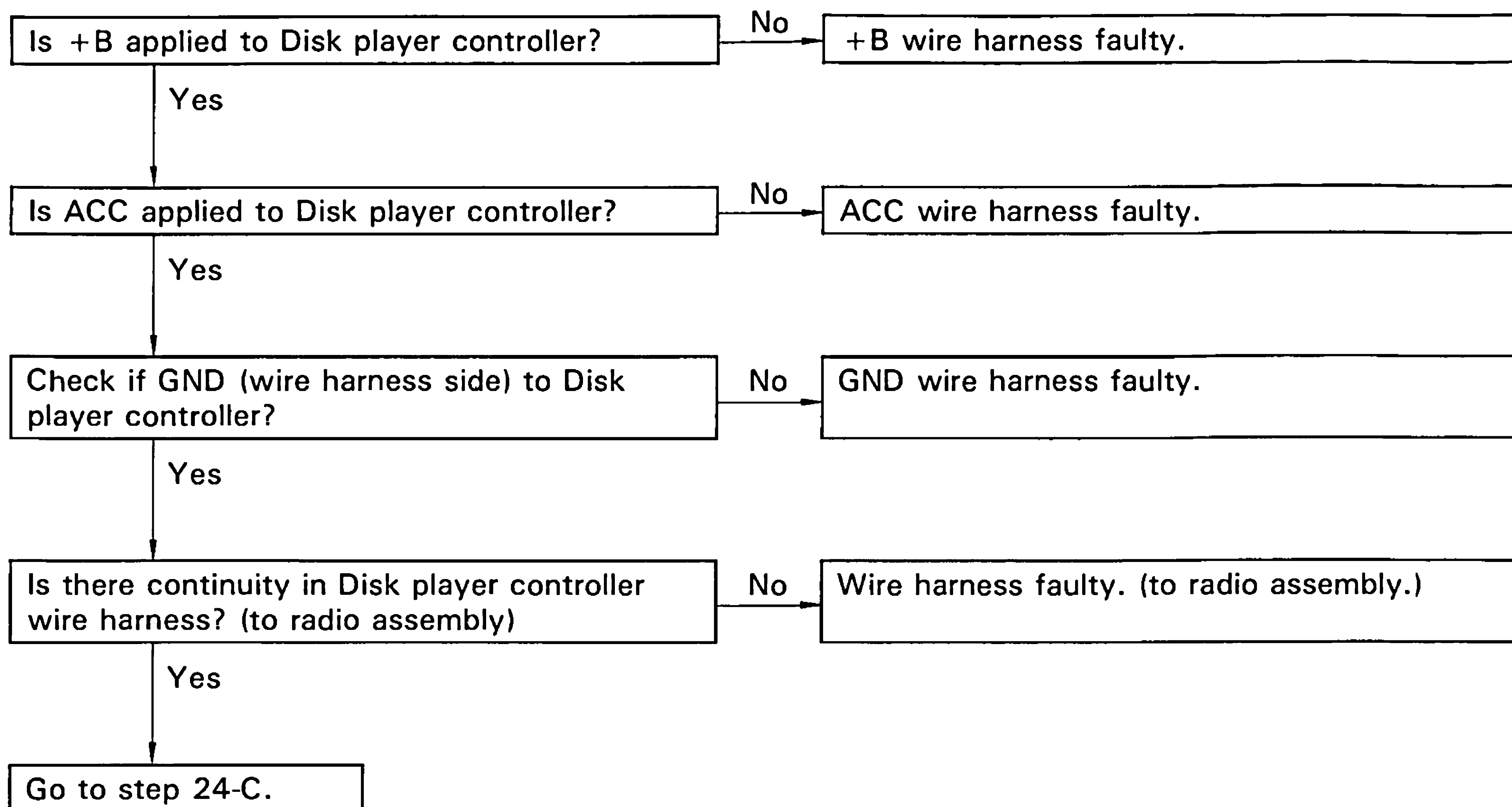
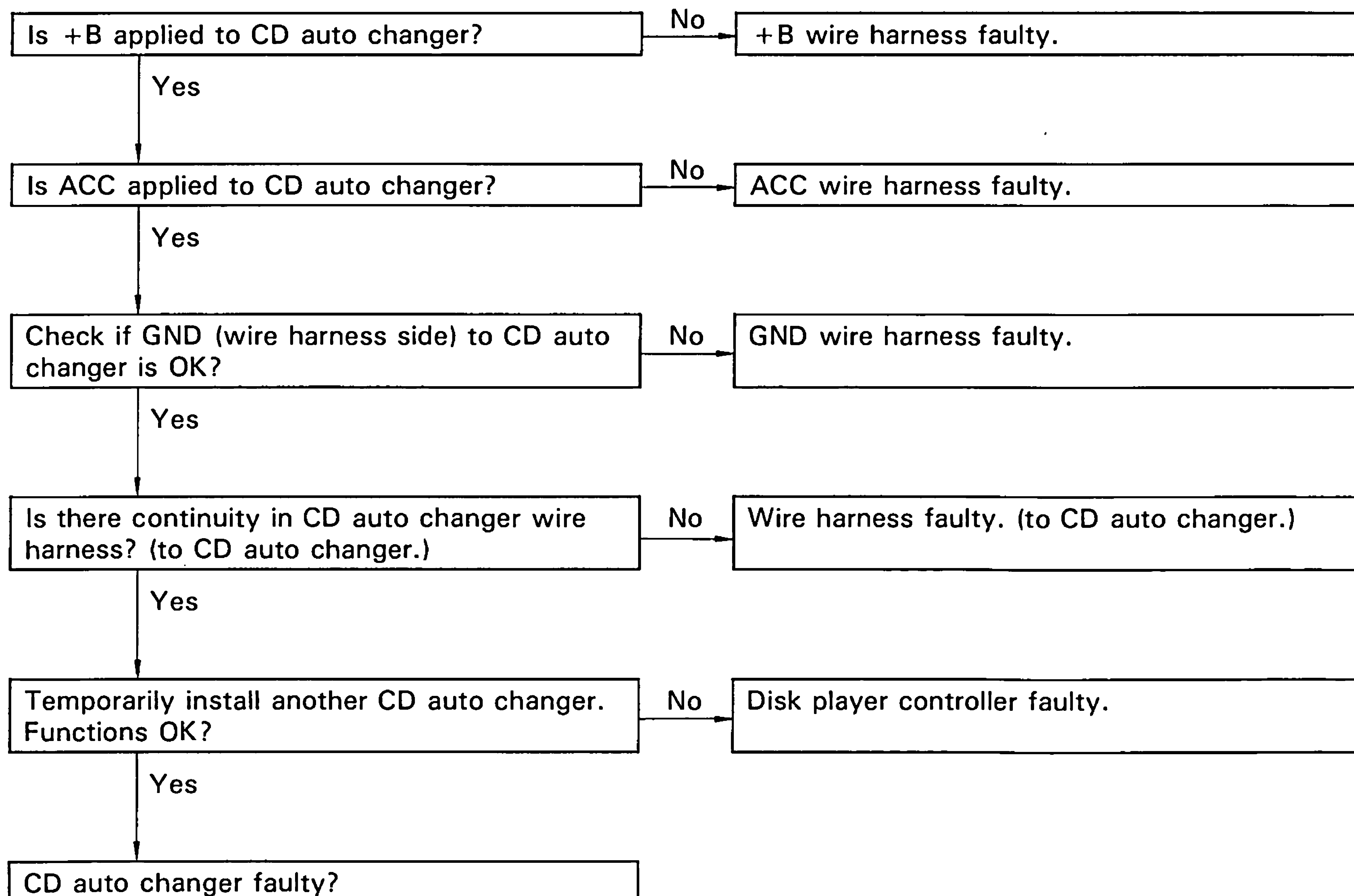
24	CD Auto Changer	MAGAZINE CANNOT BE INSERTED INTO CD AUTO CHANGER
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[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



24-A.



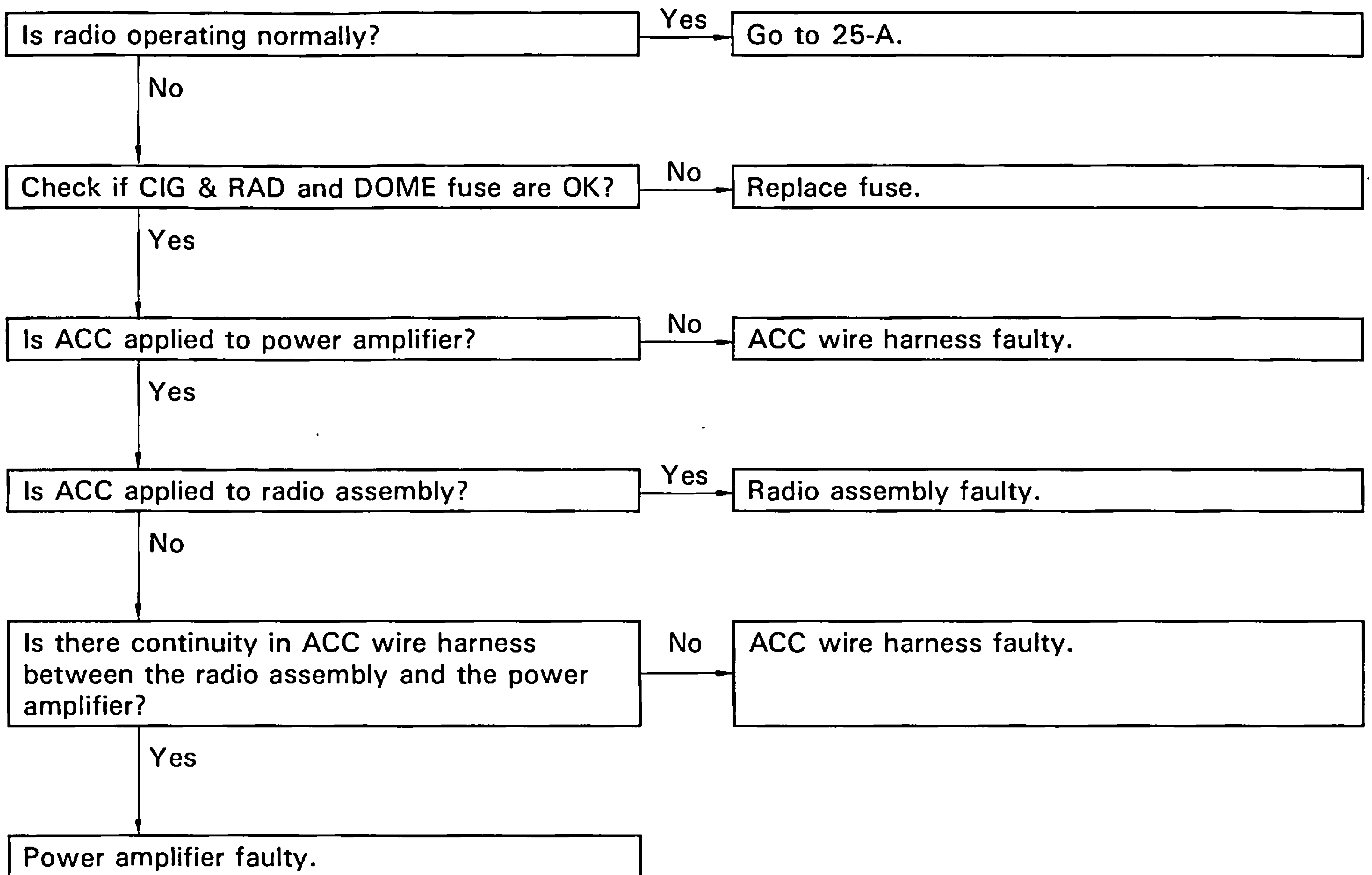
24-B.24-C.

25

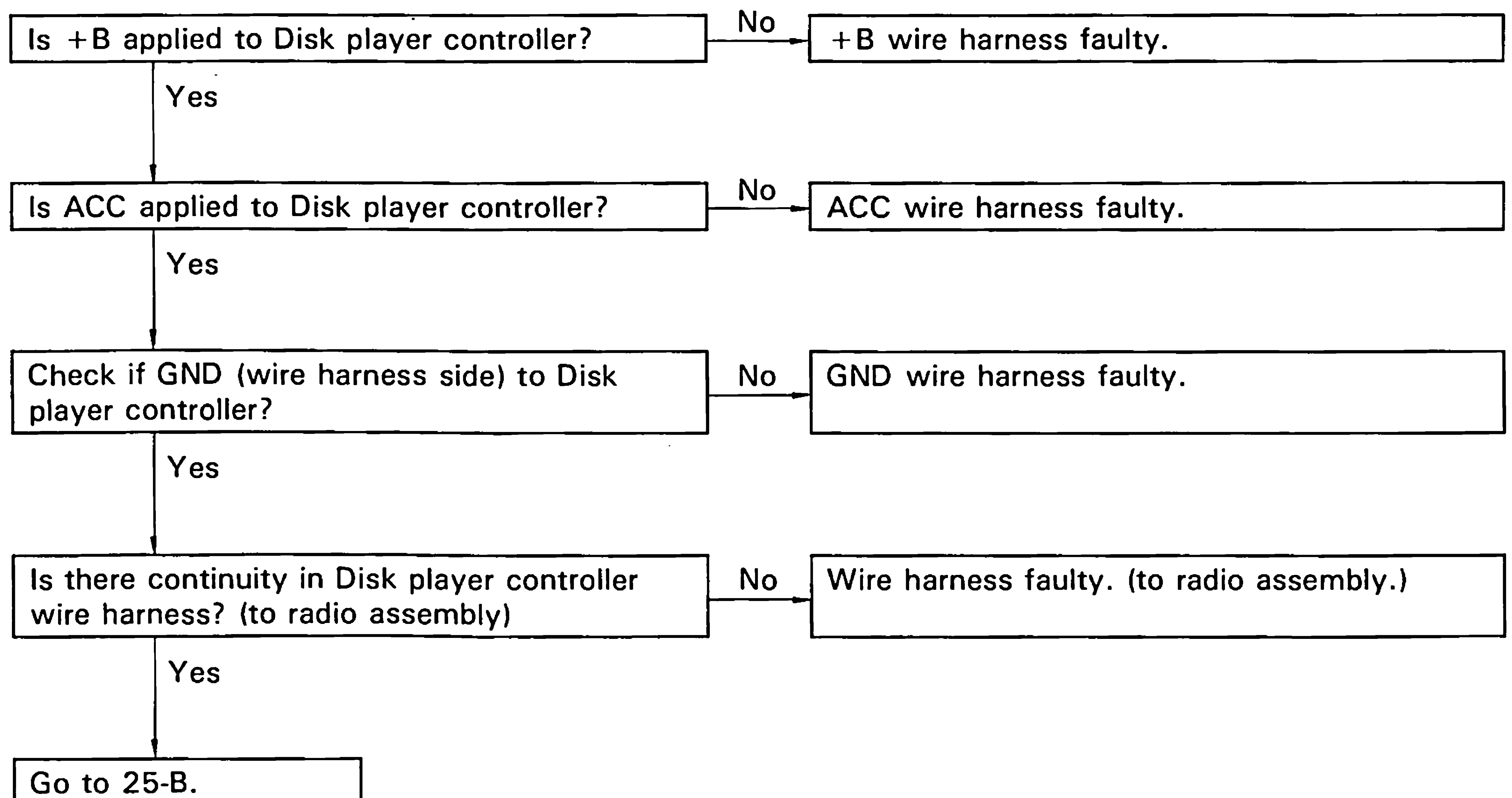
CD Auto
Changer

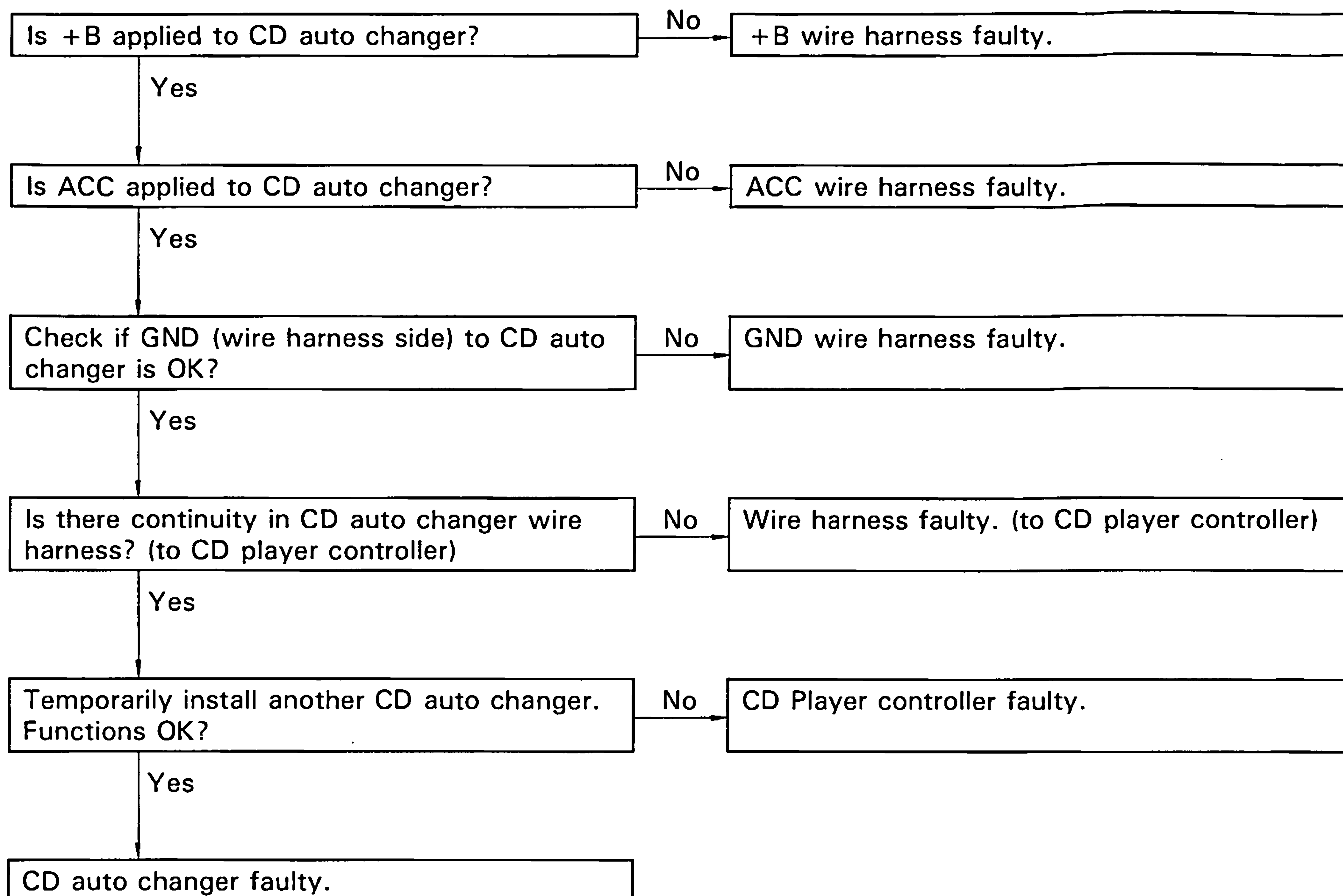
MAGAZINE INSERTS, BUT NO POWER

A: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



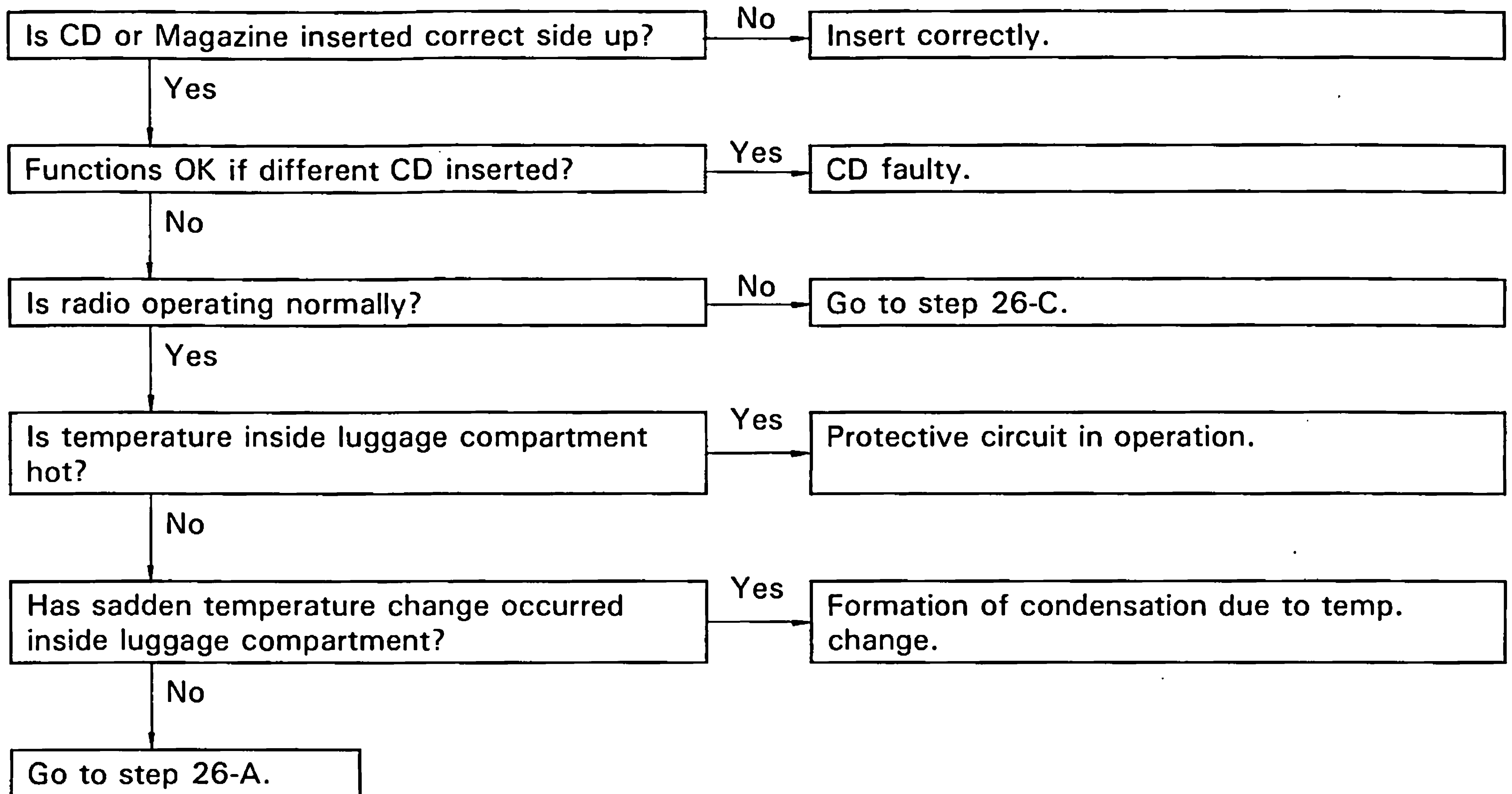
25-A.



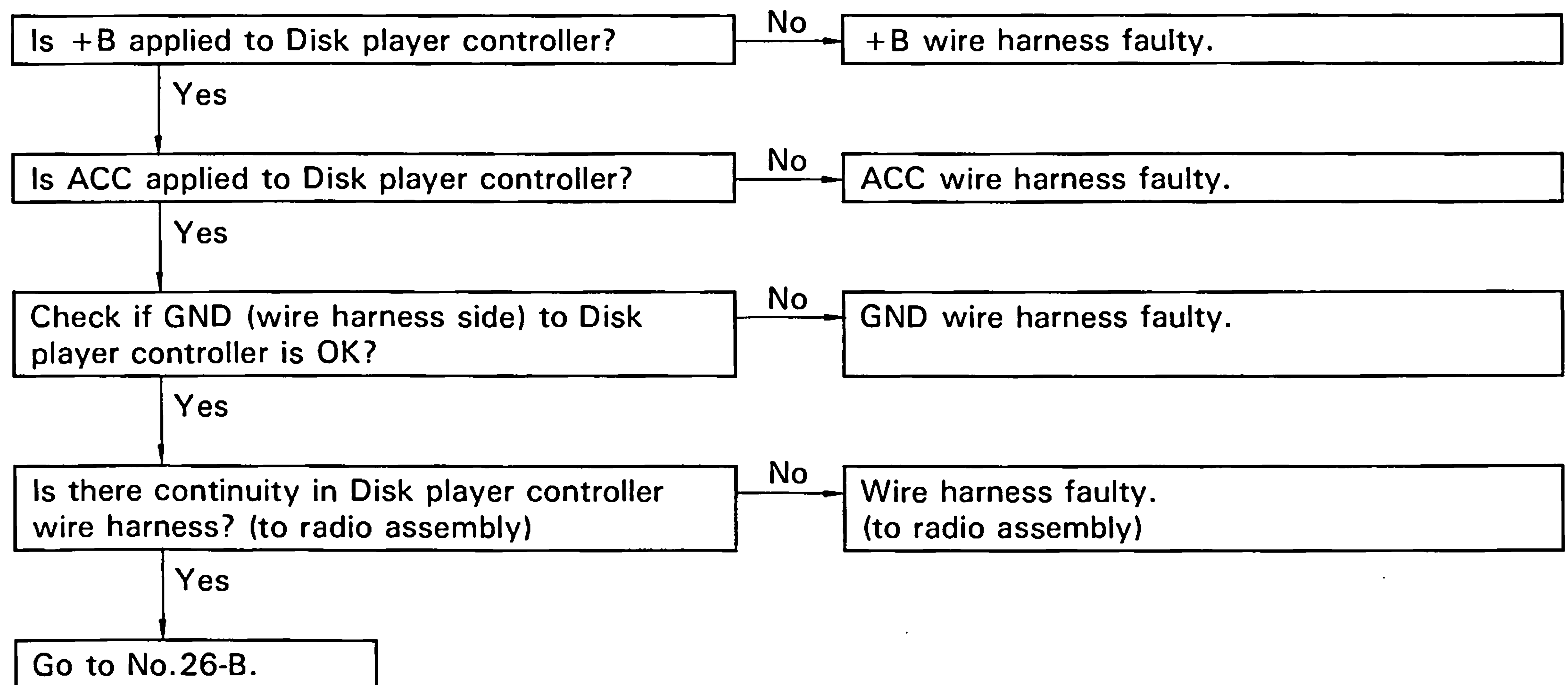
25-B.

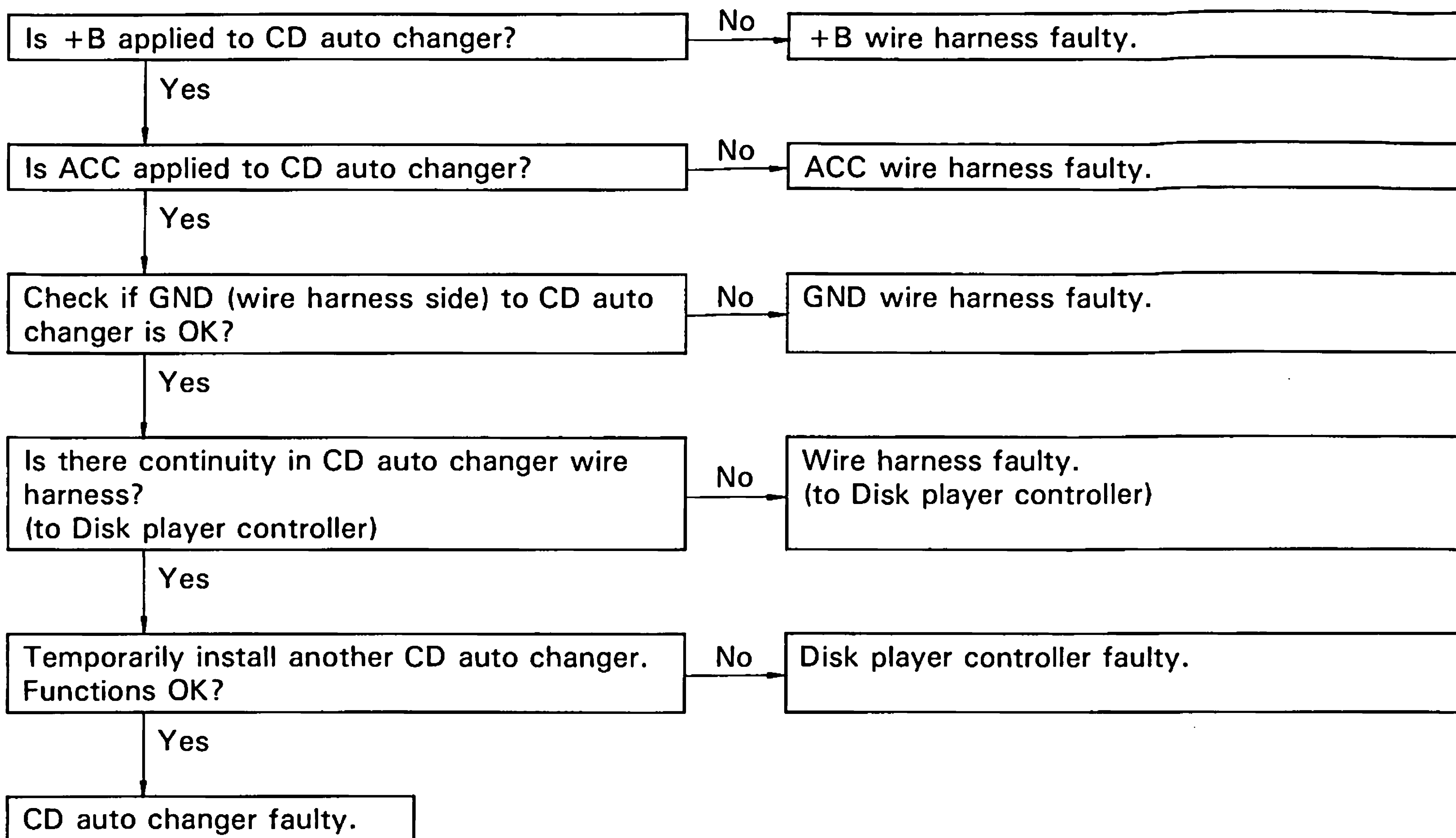
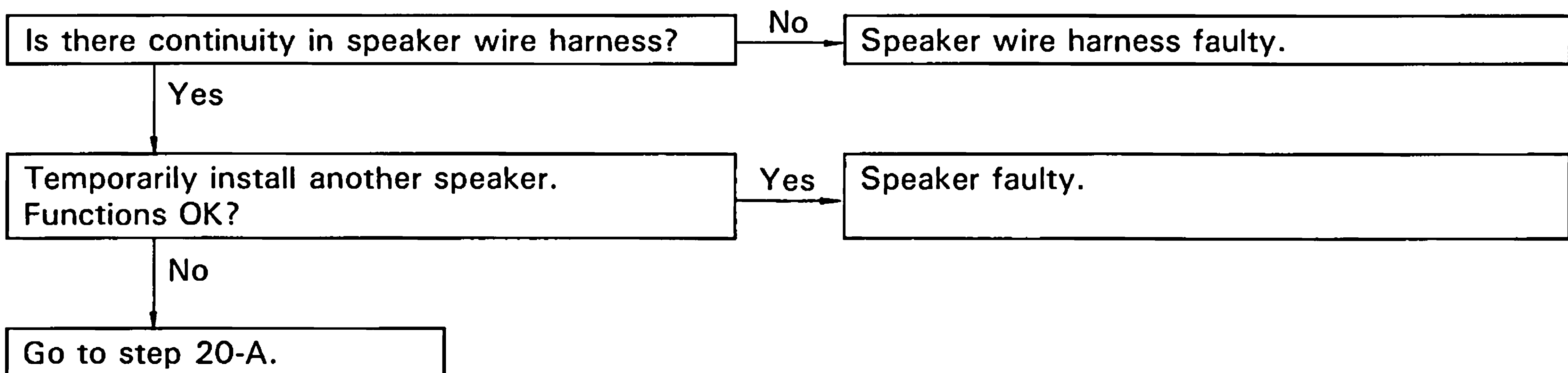
26	CD Auto Changer	POWER COMING IN, BUT CD AUTO CHANGER NOT OPERATING
----	-----------------	--

[A]: Radio—Tape Player (Separate Power Amplifier) + CD auto changer



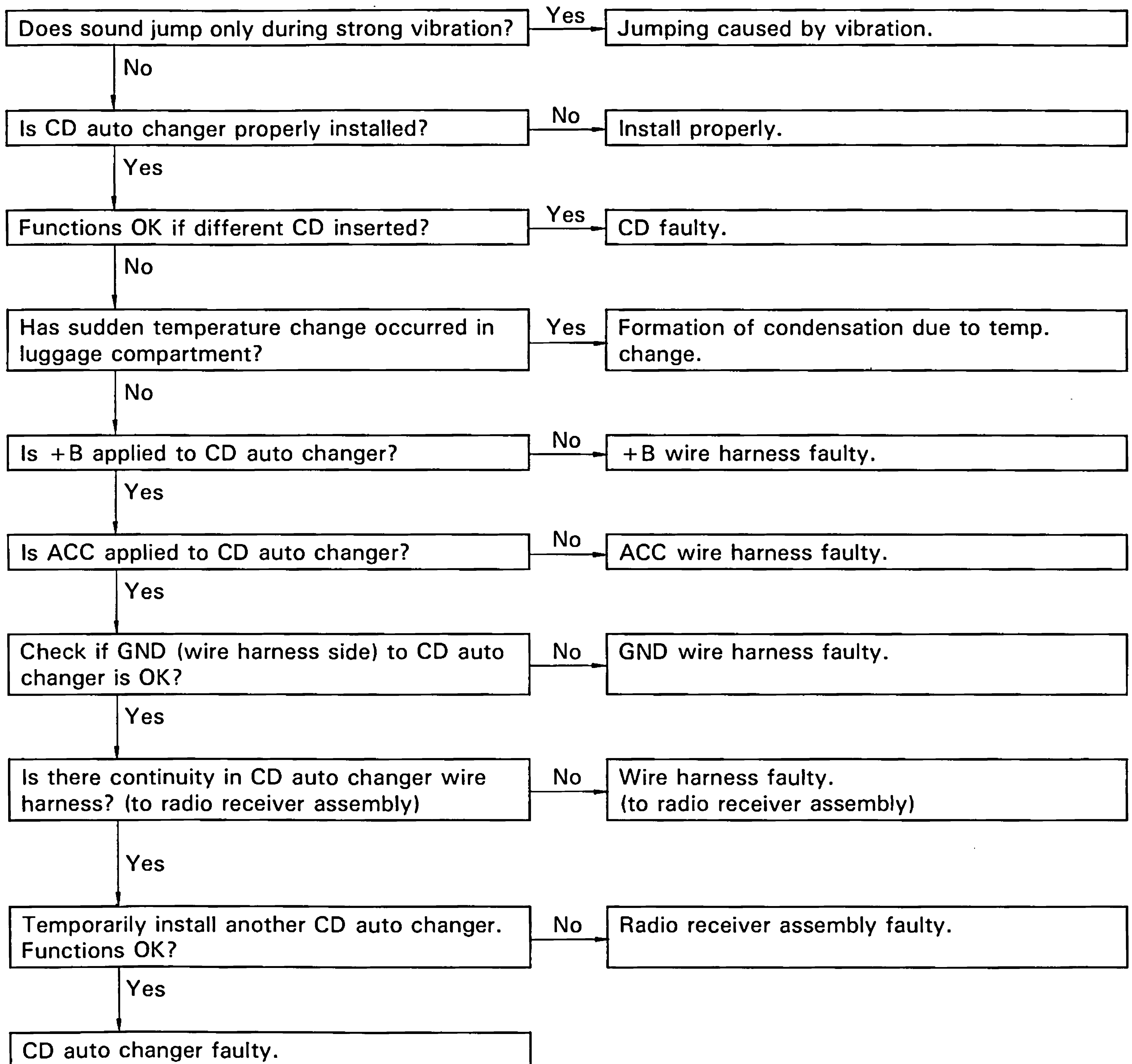
26-A.



26-B.26-C.

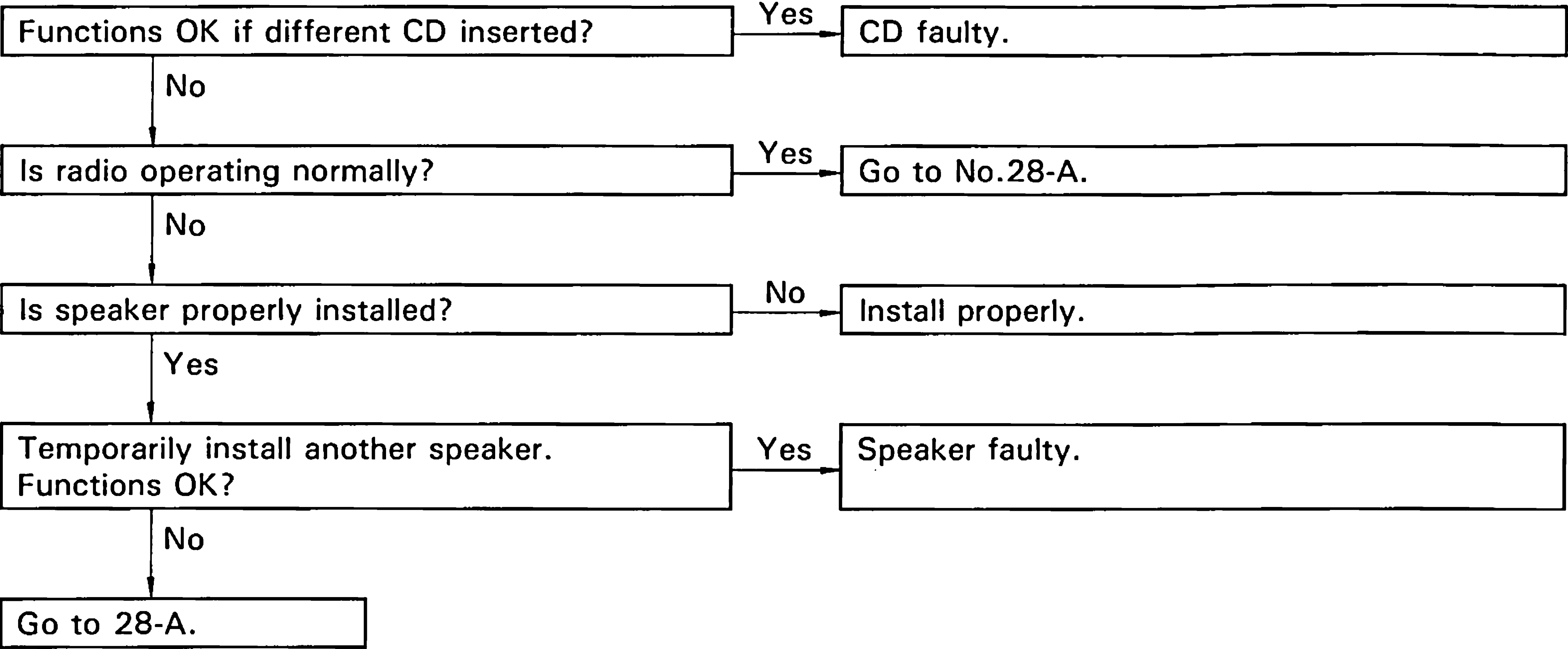
27	CD Auto Changer	SOUND JUMPS
----	-----------------	-------------

[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer

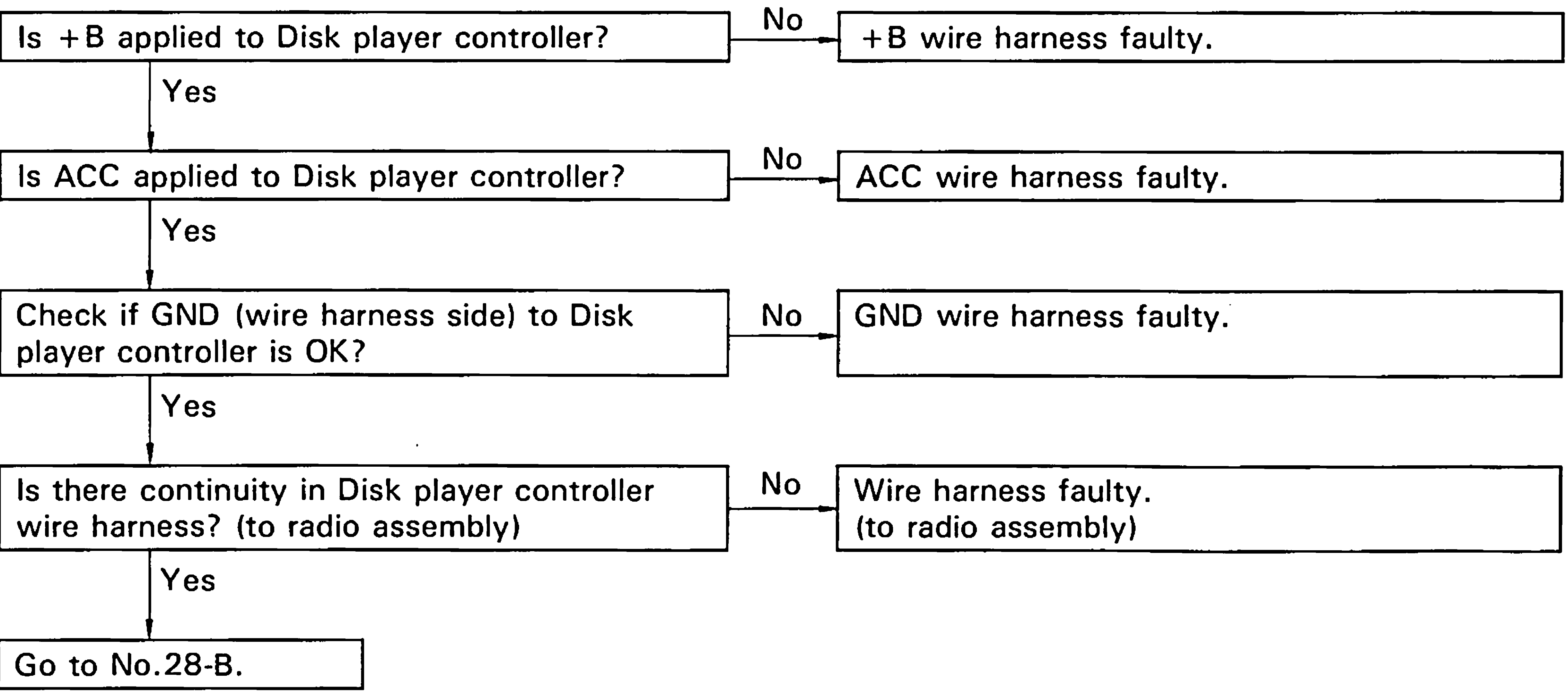


28	CD Auto Changer	SOUND QUALITY POOR (VOLUME FAINT)
----	-----------------	-----------------------------------

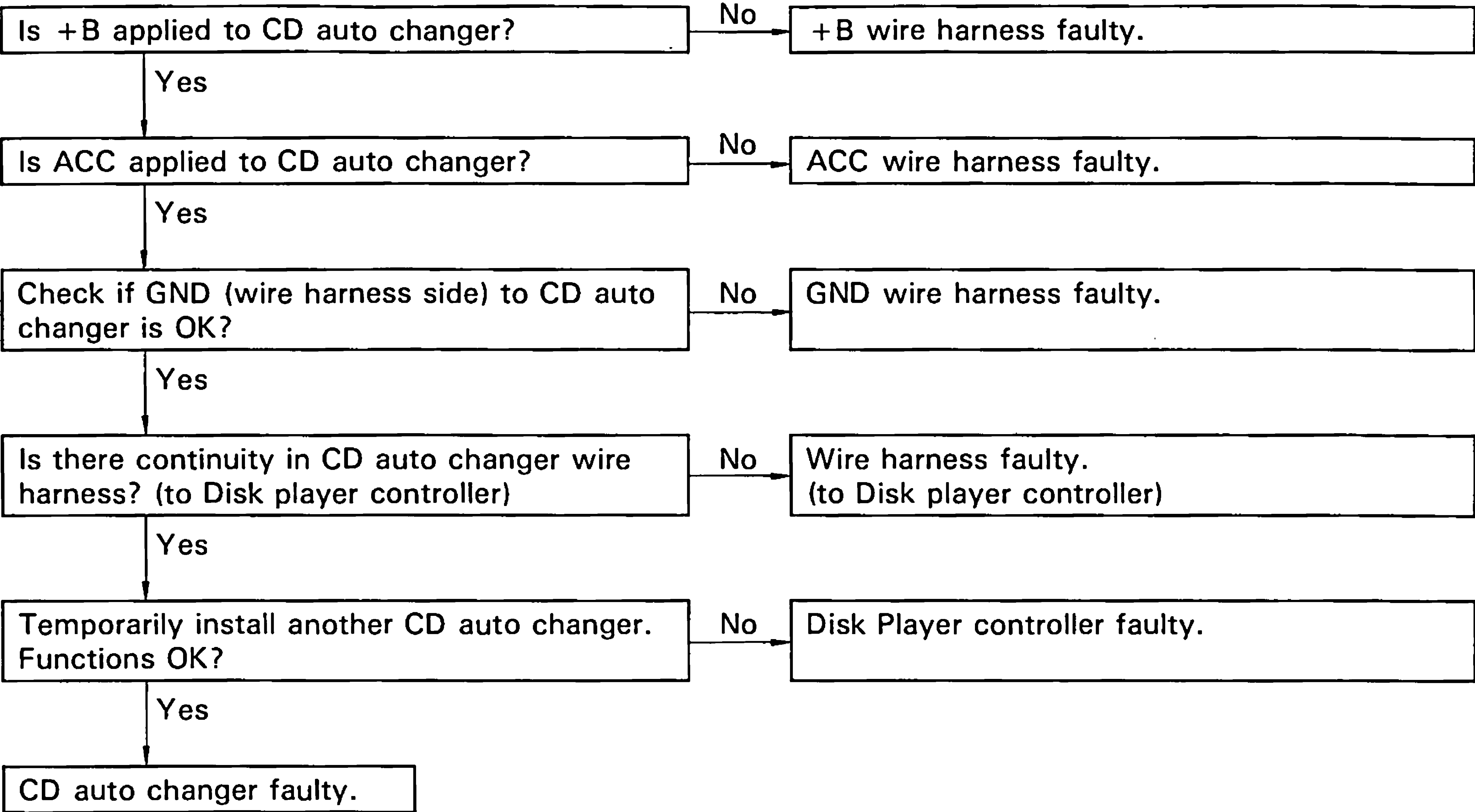
[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



28-A.

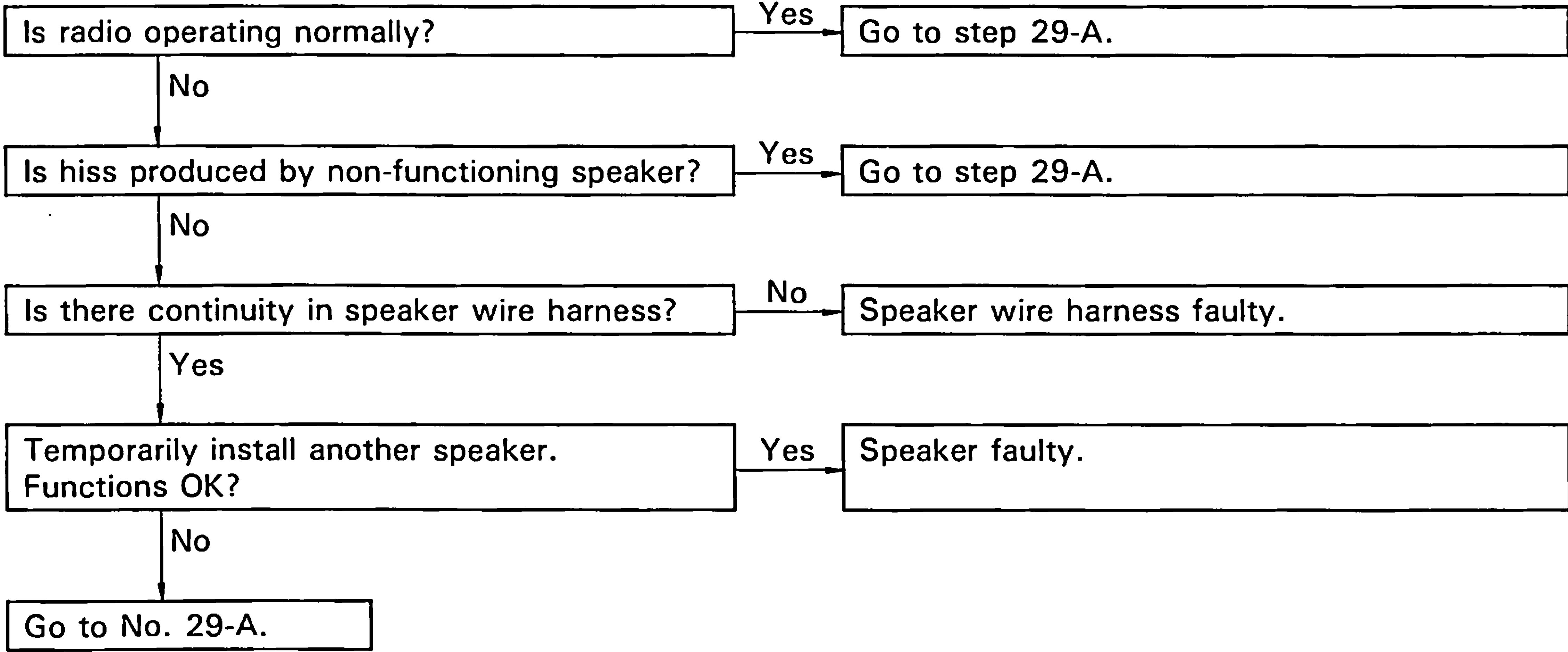


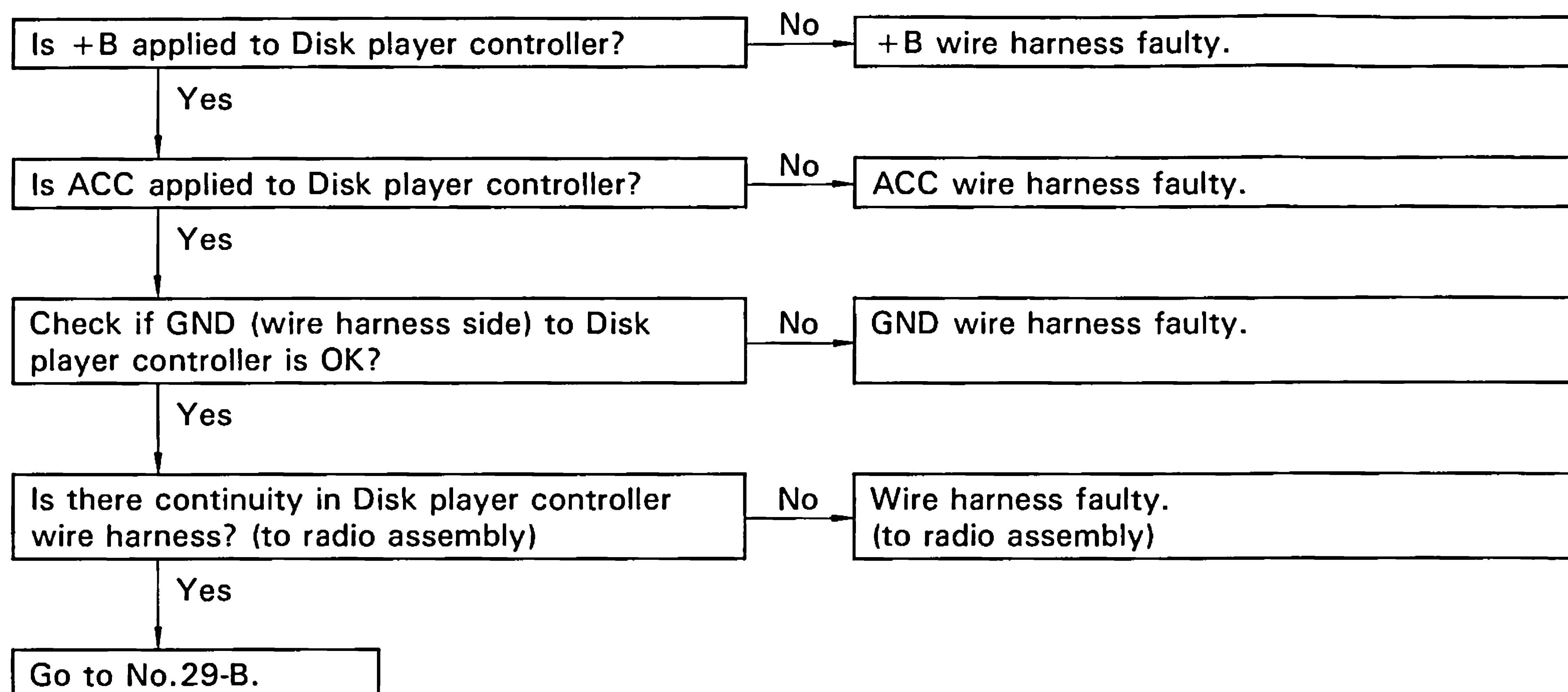
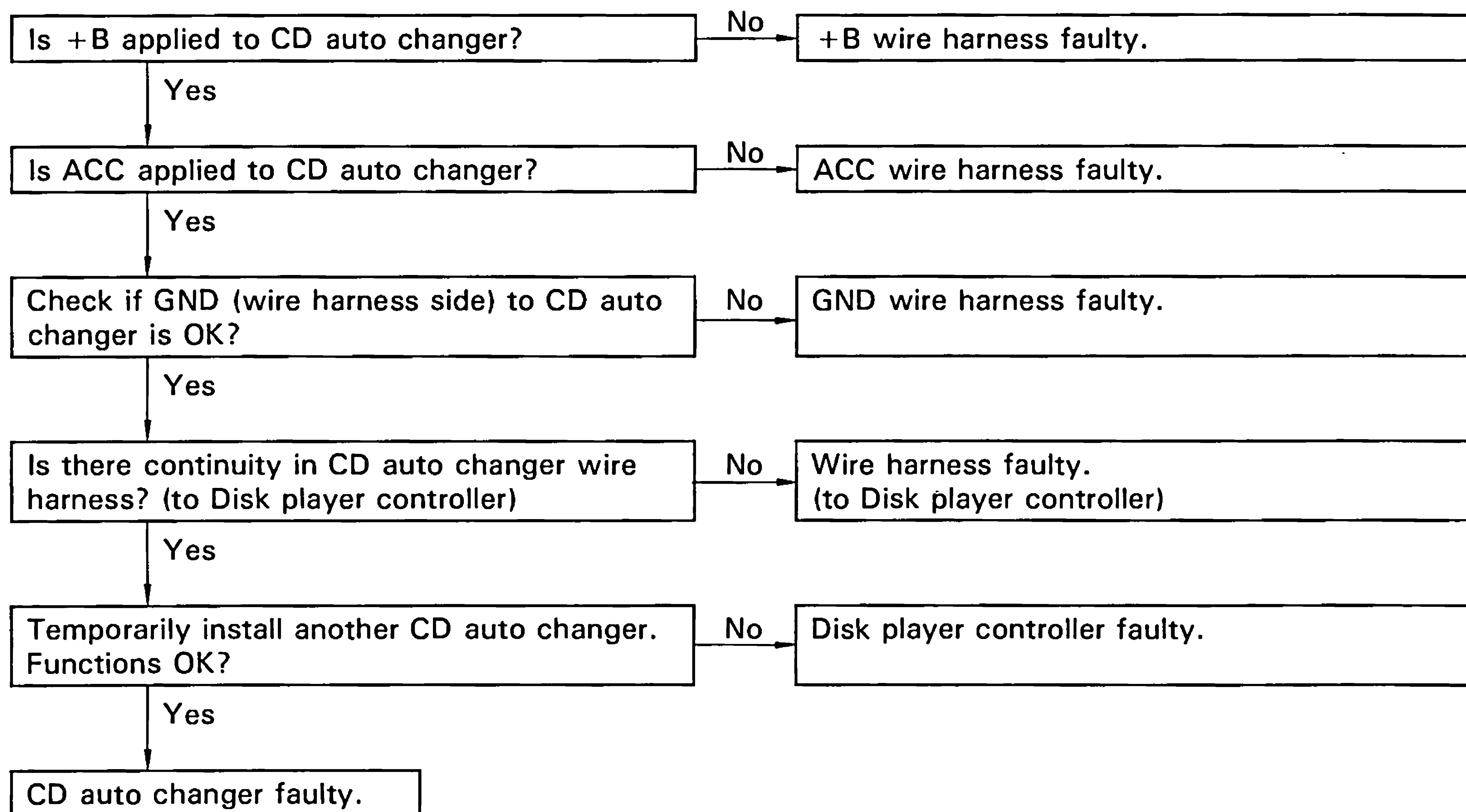
28-B.



29	CD Auto Changer	ANY SPEAKER DOES NOT WORK
----	-----------------	---------------------------

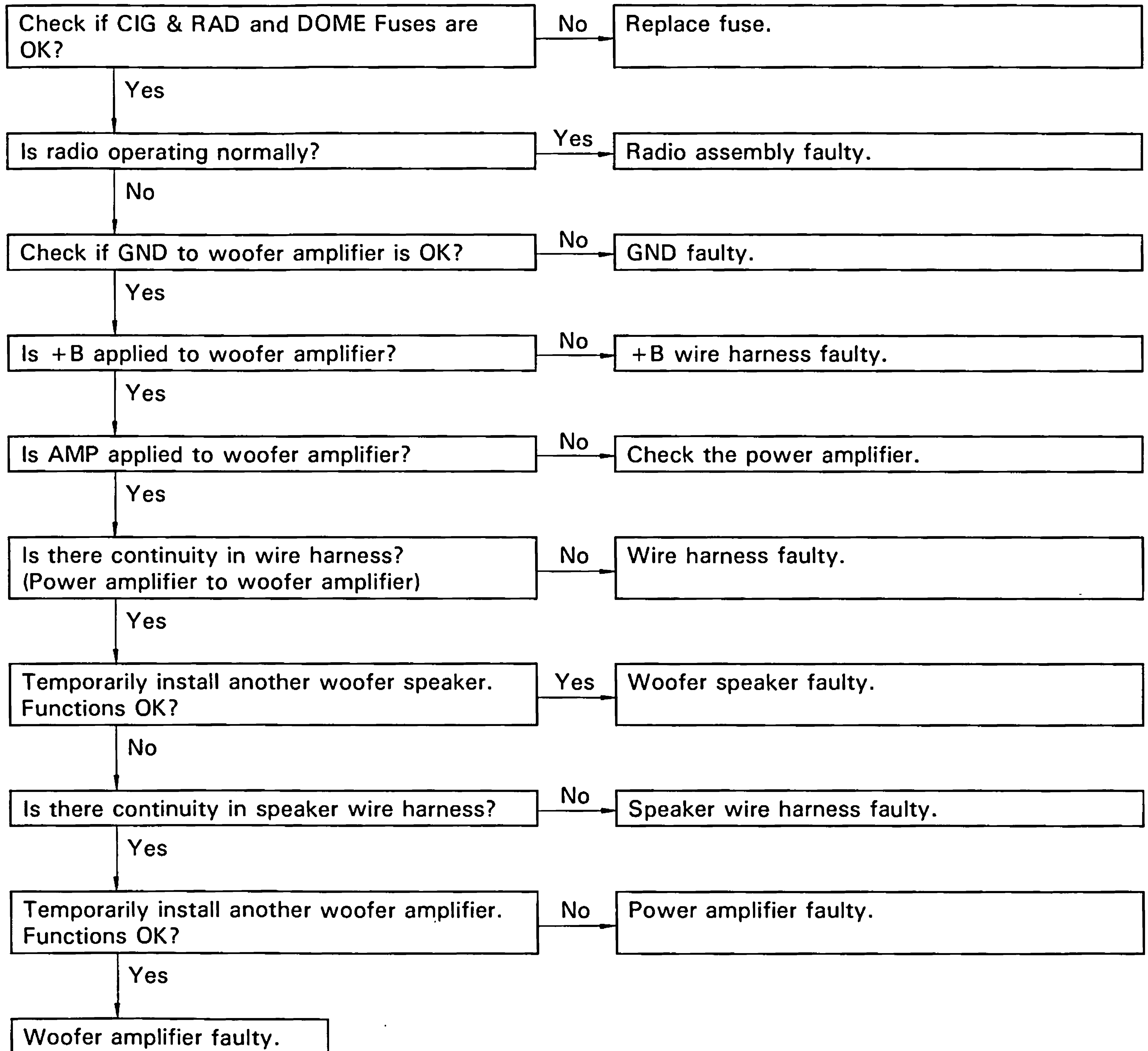
[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



29-A.29-B.

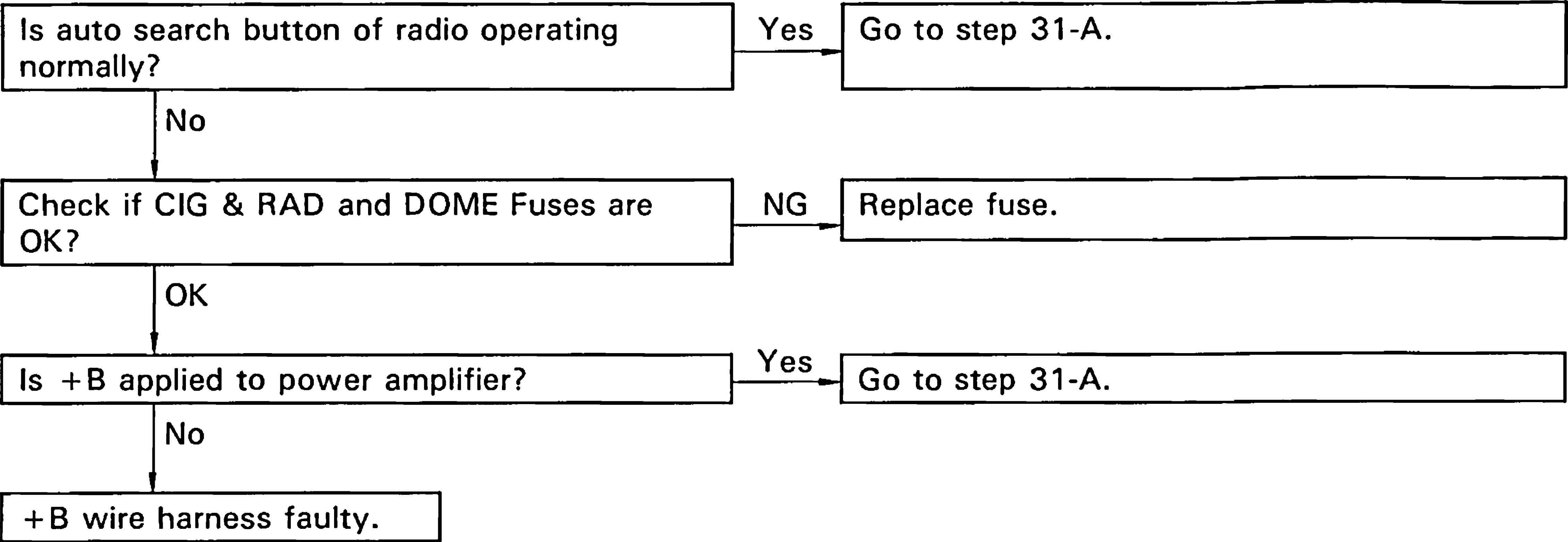
30	CD Auto Changer	WOOFER SPEAKER DOES NOT WORK
----	-----------------	------------------------------

[A]: Radio-Tape Player (Separate Power Amplifier) + CD Auto Changer

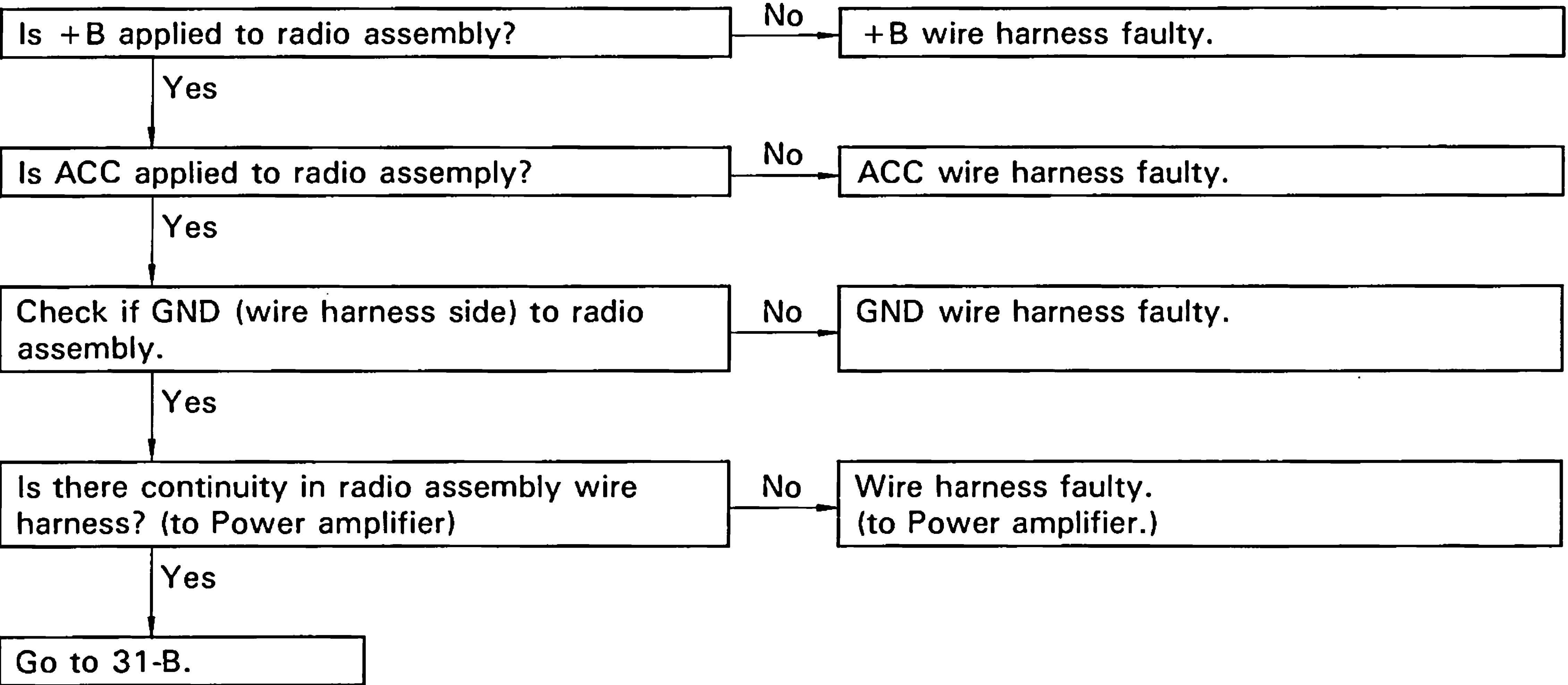


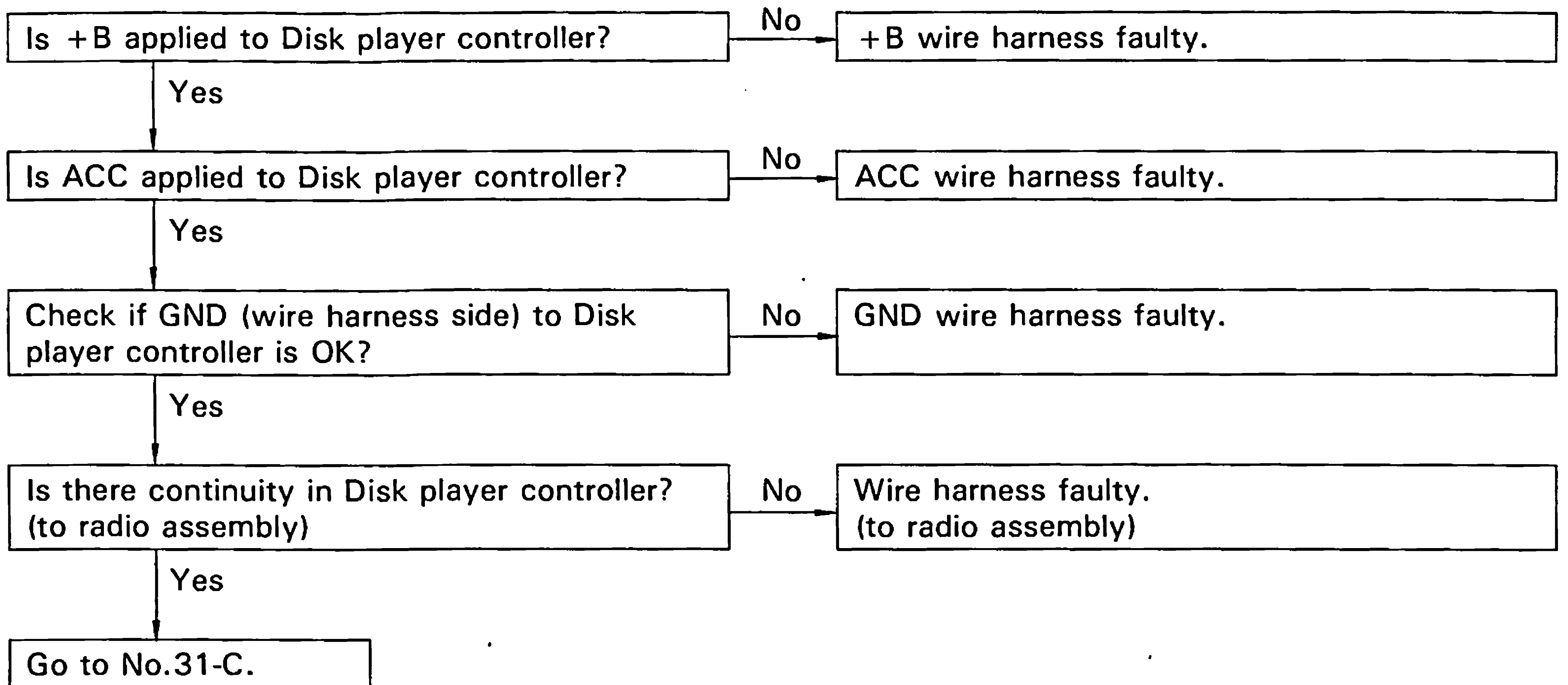
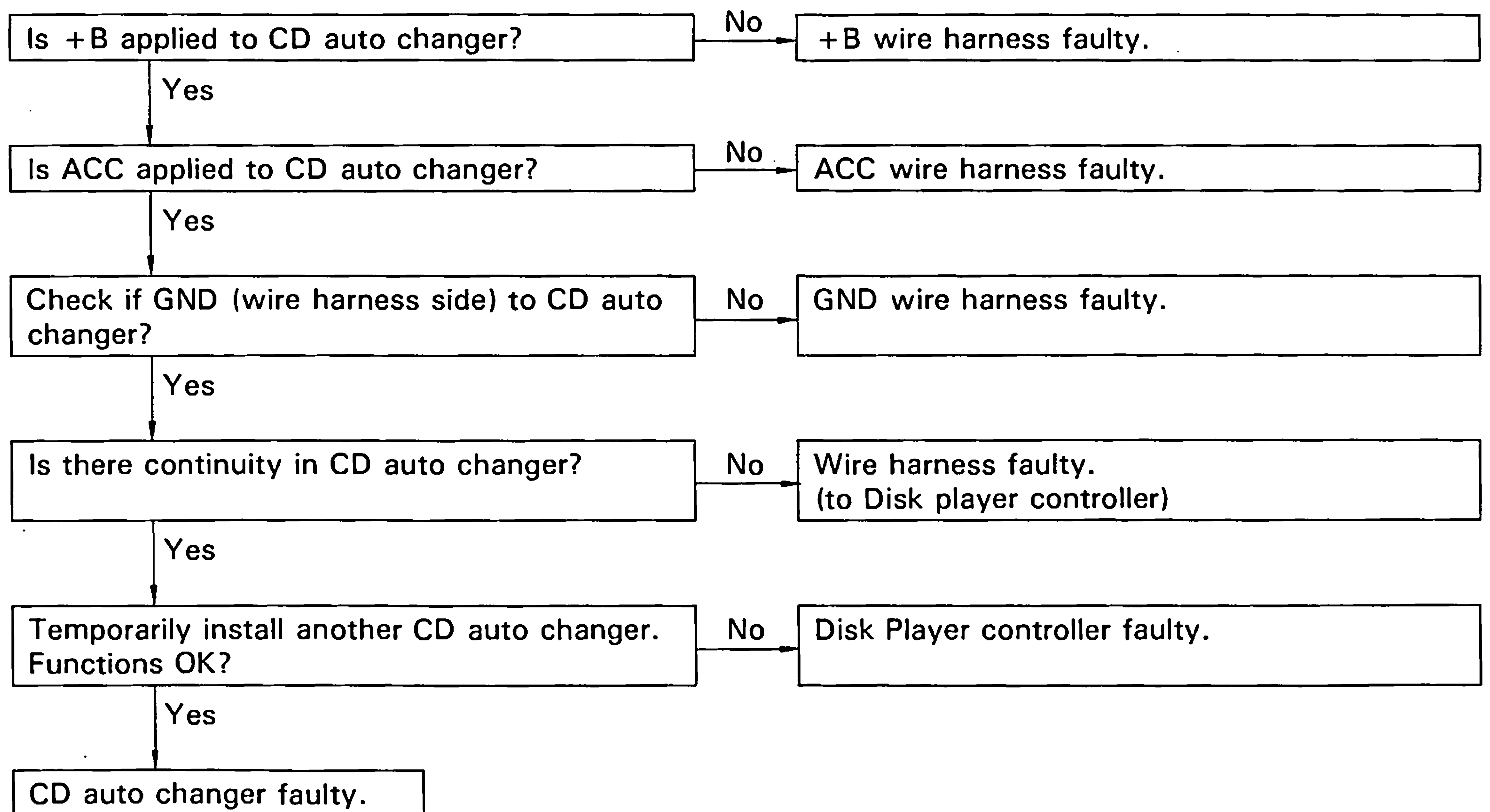
31	CD Auto Changer	MAGAZINE WILL NOT EJECT
----	-----------------	-------------------------

[A]: Radio—Tape Player (Separate Power Amplifier) + CD Auto Changer



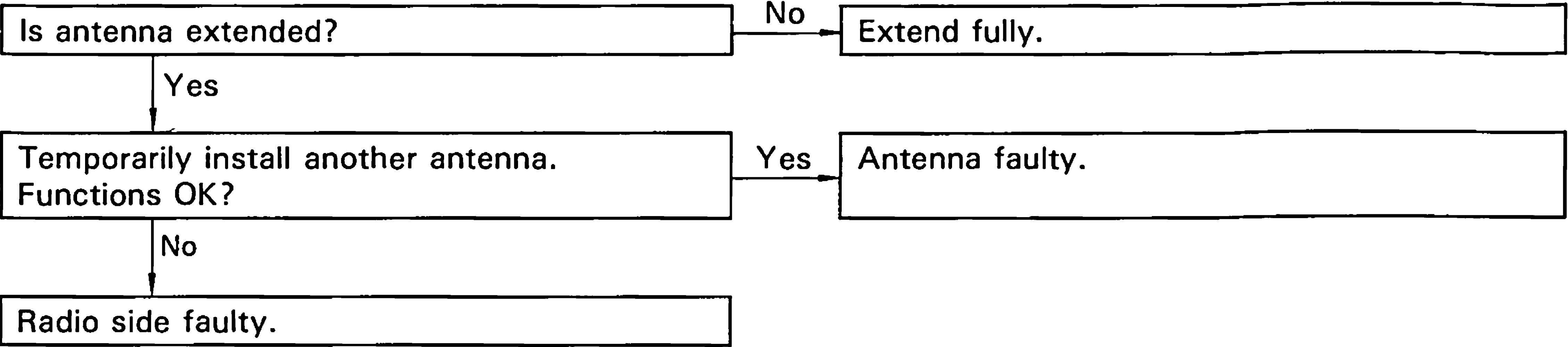
31-A.



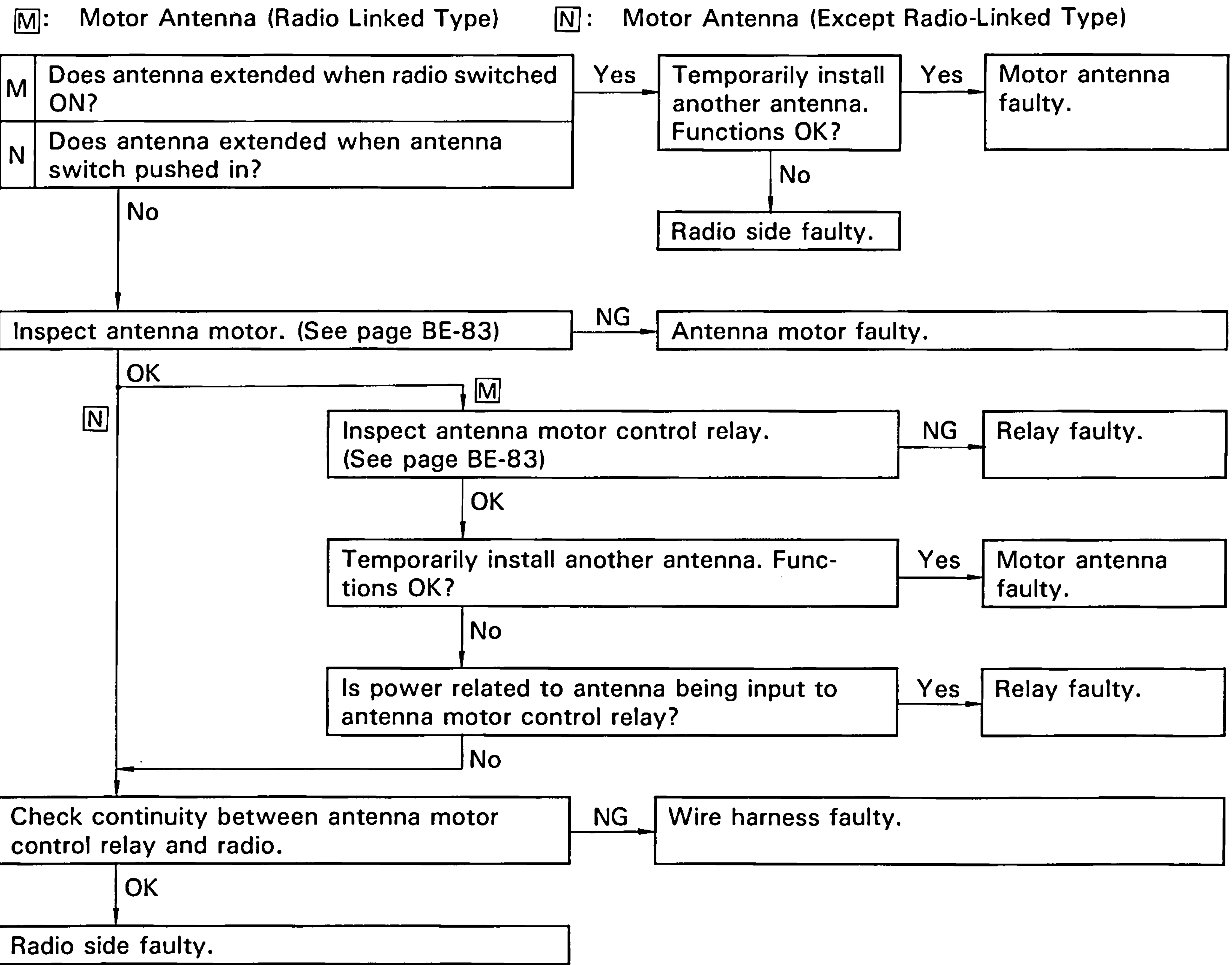
31-B.31-C.

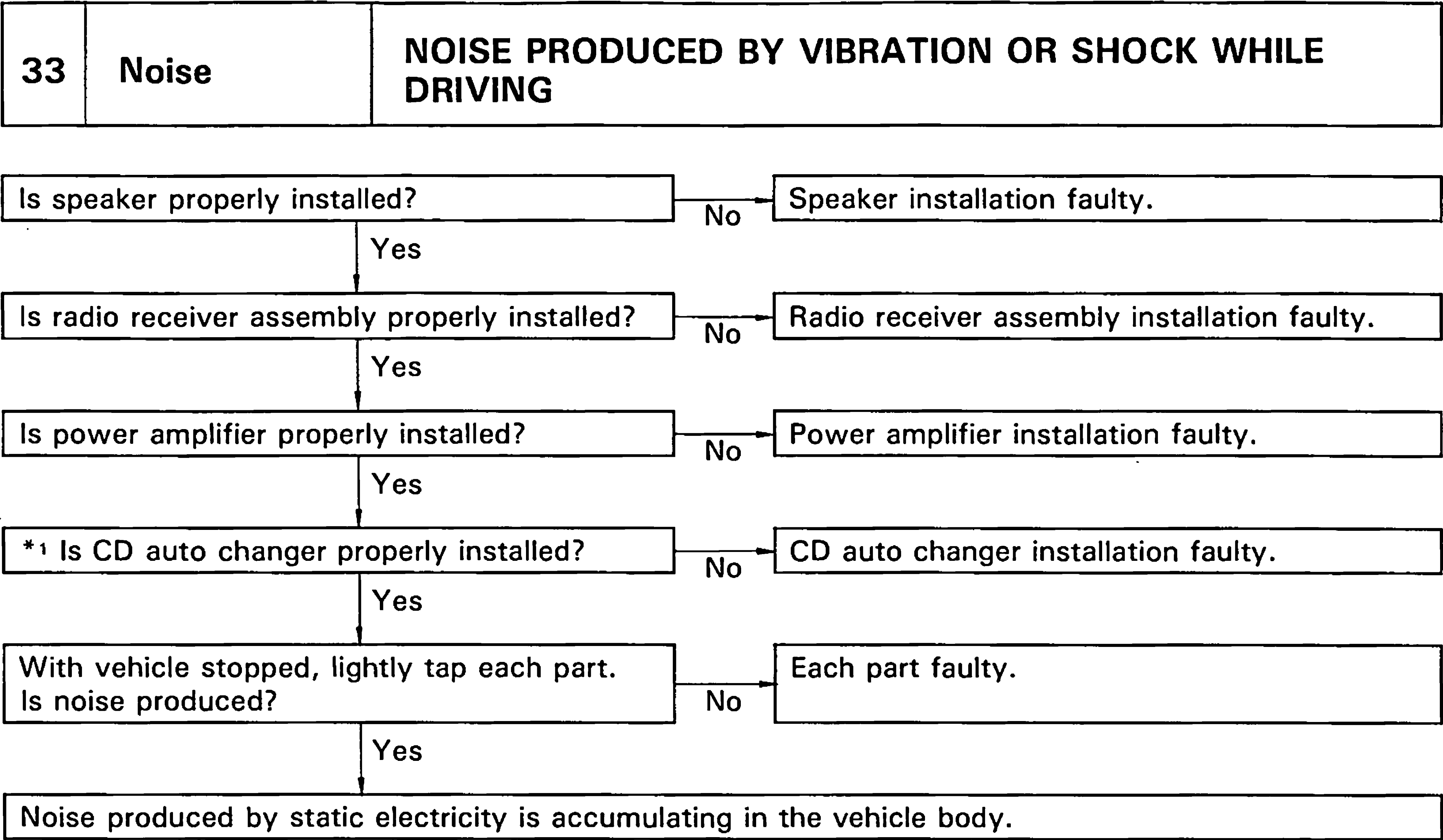
32	Antenna	ANTENNA-RELATED
----	---------	-----------------

32-a: Pole Antenna



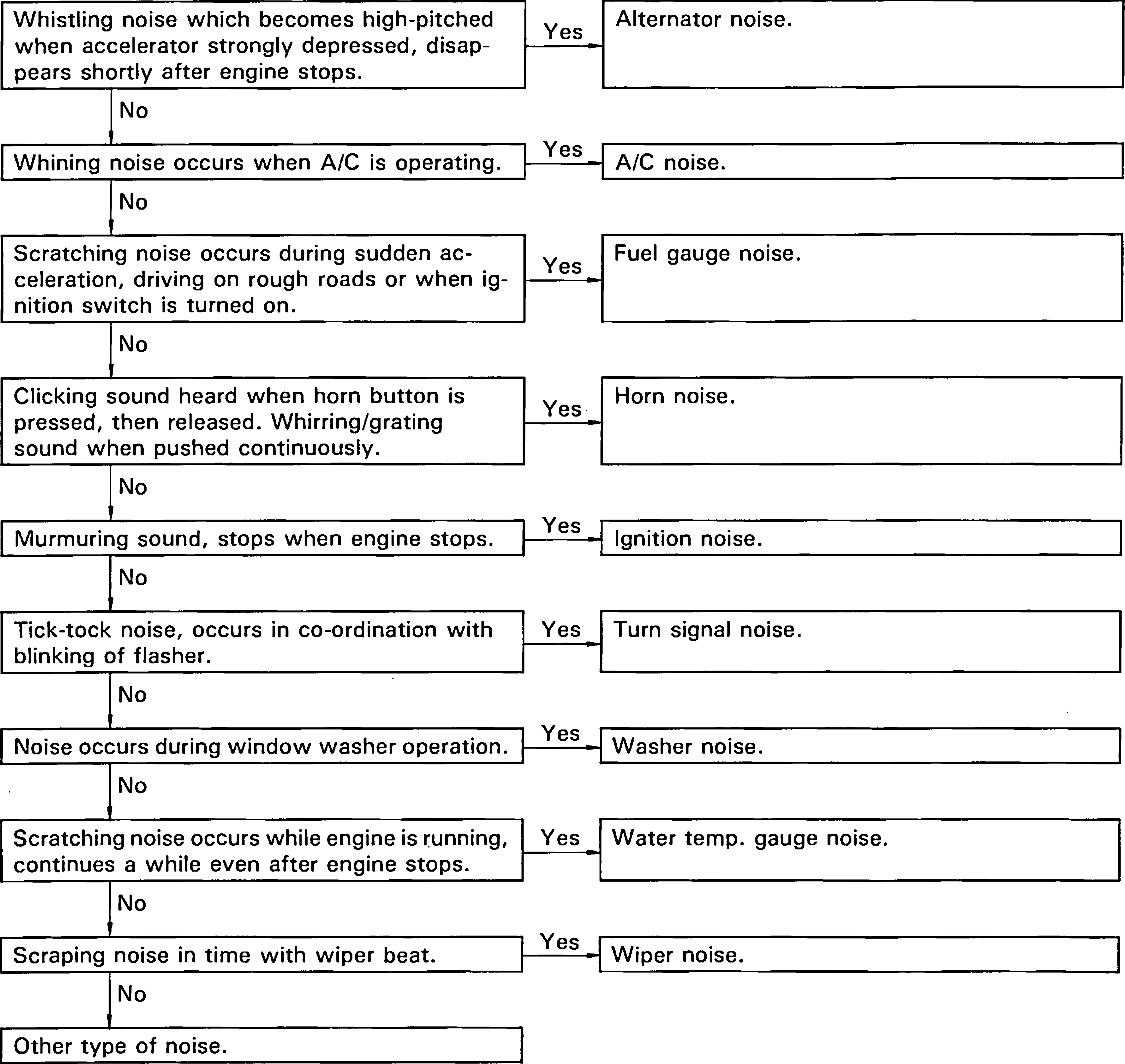
32-b: Motor Antenna





*1: only for vehicles with CD player.

34	Noise	NOISE PRODUCED WHEN ENGINE STARTS
----	-------	-----------------------------------

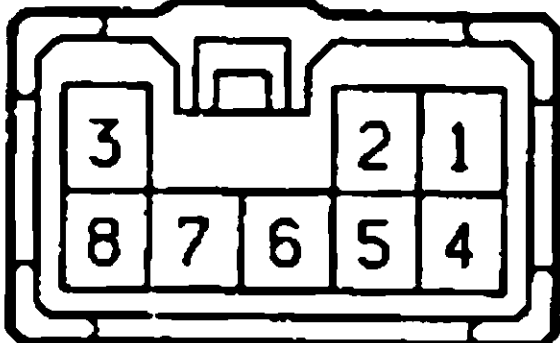
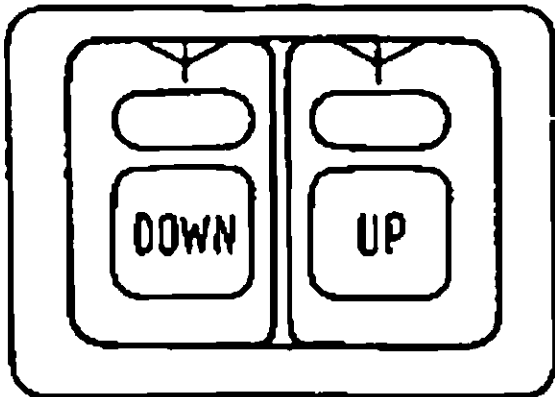


Parts Inspection

(with Motor Antenna)

1. INSPECT ANTENNA SWITCH
(w/o AUTO Switch Type/Continuity)

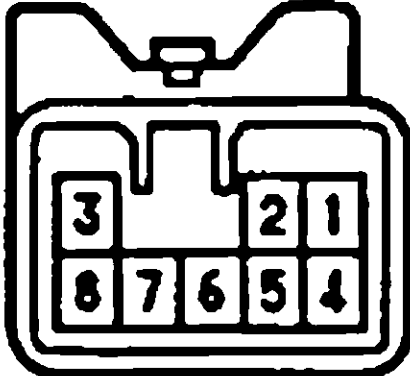
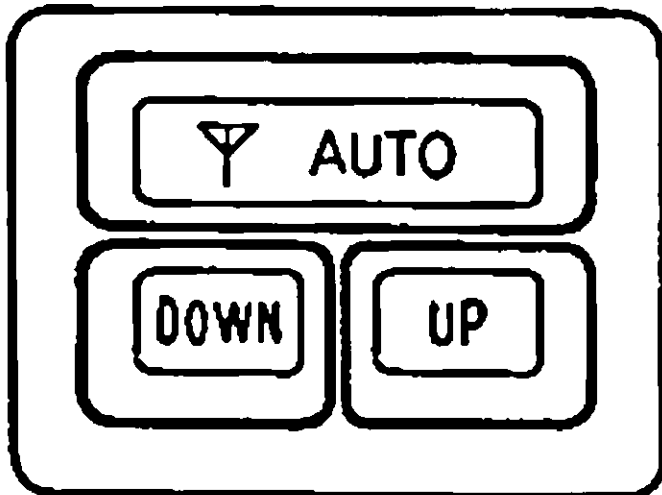
Terminal Switch position		4	5	7	8	Illumination	
						1	2
UP Button	Free						
	Pushed in						
DOWN Button	Free						
	Pushed in						



BE4972 S-8-2

(w/ AUTO Switch Type/Continuity)

Terminal Switch position		4	5	6	7	8	Illumination	
							1	2
AUTO	MANUAL							
Free	OFF							
	UP							
	DOWN							
Lock	OFF							



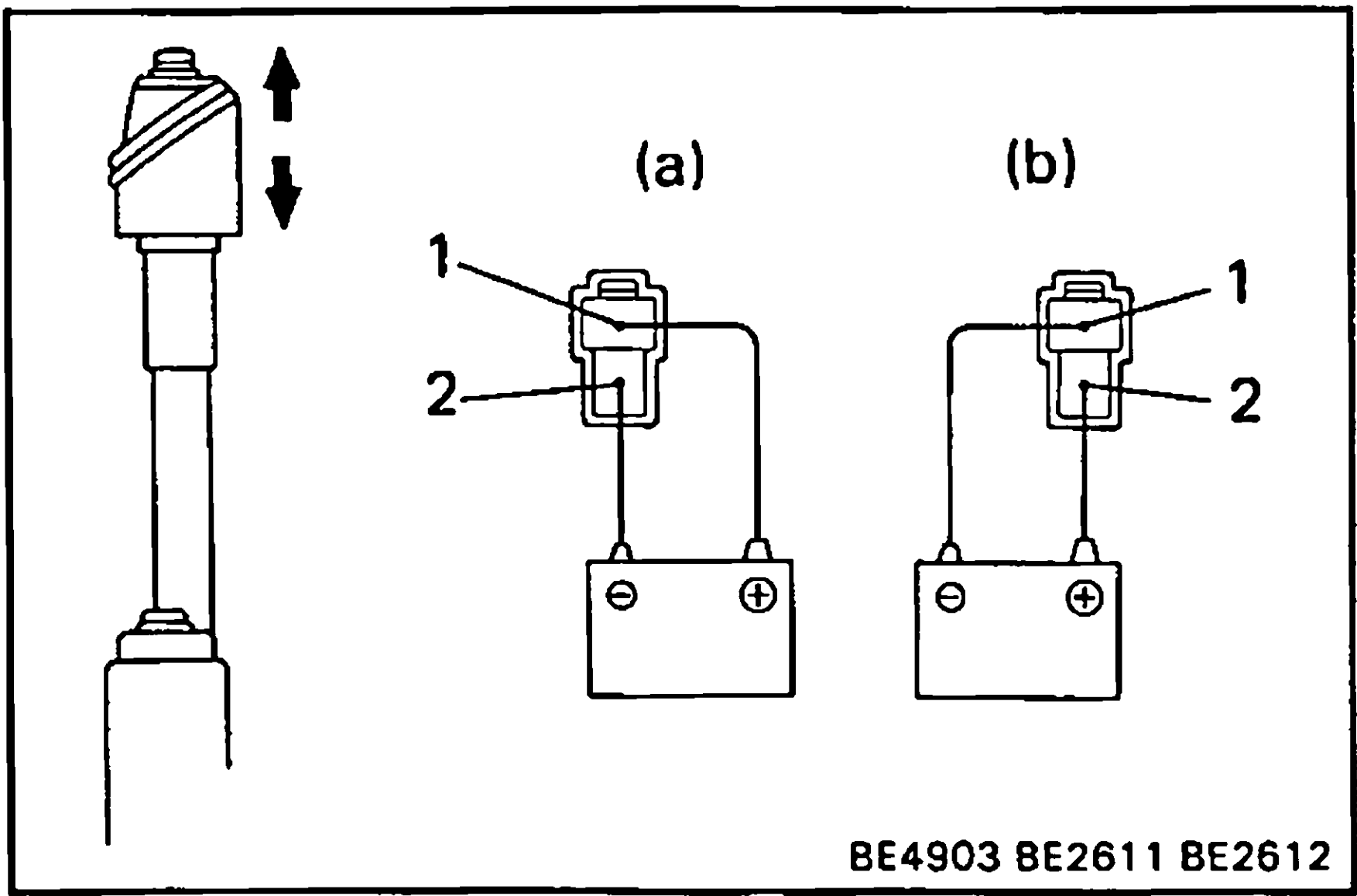
NO4087 e-8-2

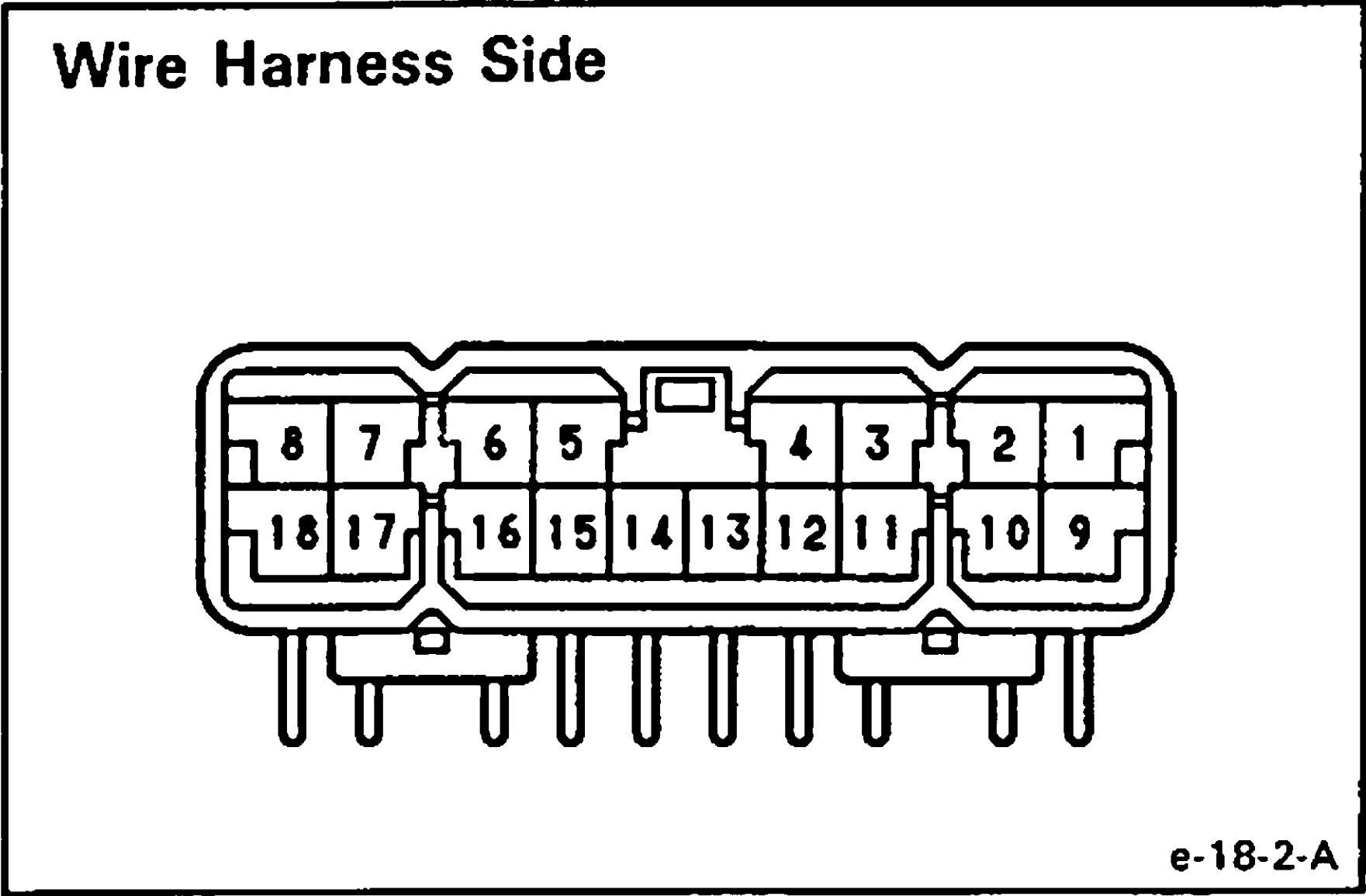
If continuity is not as specified, replace the switch.

2. INSPECT ANTENNA MOTOR

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (−) lead to terminal 2, check that the motor turns (moves upward.)
- (b) Then reverse the polarity, check that the motor turns the opposite way (moves downward.)

If operation is not as specified, replace the motor.





3. INSPECT ANTENNA MOTOR CONTROL RELAY

Disconnect the connector from the relay and inspect the connector on wire harness side as shown in the chart.

Check for	Tester connetion	Condition		Specified value
Continuity	3 — 6	Constant		Continuity
	5 — Ground	Constant		Continuity
Voltage	4 — Ground	Constant		Battery voltage
	7 — Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	17 — Ground	Ignition switch position	LOCK	No voltage
			ACC or ON	Battery voltage

Check for	Tester connection	Condition				Specified value
		Ignition SW	Radio SW	Radio band	Cassette	
Voltage	13 — Ground	LOCK	—	—	—	No voltage
		ACC or ON	OFF	—	OFF	No voltage
		ACC or ON	ON	—	—	Battery voltage
		ACC or ON	—	—	ON	Battery voltage
	14 — Ground	LOCK	—	—	—	No voltage
		ACC or ON	OFF	—	—	No voltage
		ACC or ON	ON	—	OFF	Battery voltage
		ACC or ON	ON	—	ON	No voltage
	15 — Ground	LOCK	—	—	—	No voltage
		ACC or ON	OFF	—	—	No voltage
		ACC or ON	ON	AM	OFF	Battery voltage
		ACC or ON	ON	AM	ON	No voltage
		ACC or ON	ON	FM	OFF	No voltage
	16 — Ground	LOCK	—	—	—	No voltage
		ACC or ON	OFF	—	—	No voltage
		ACC or ON	ON	—	OFF	Battery voltage
		ACC or ON	ON	—	ON	No voltage

If continuity is not as specified, replace the relay.

BODY

REFER TO FOLLOWING REPAIR MANUALS:

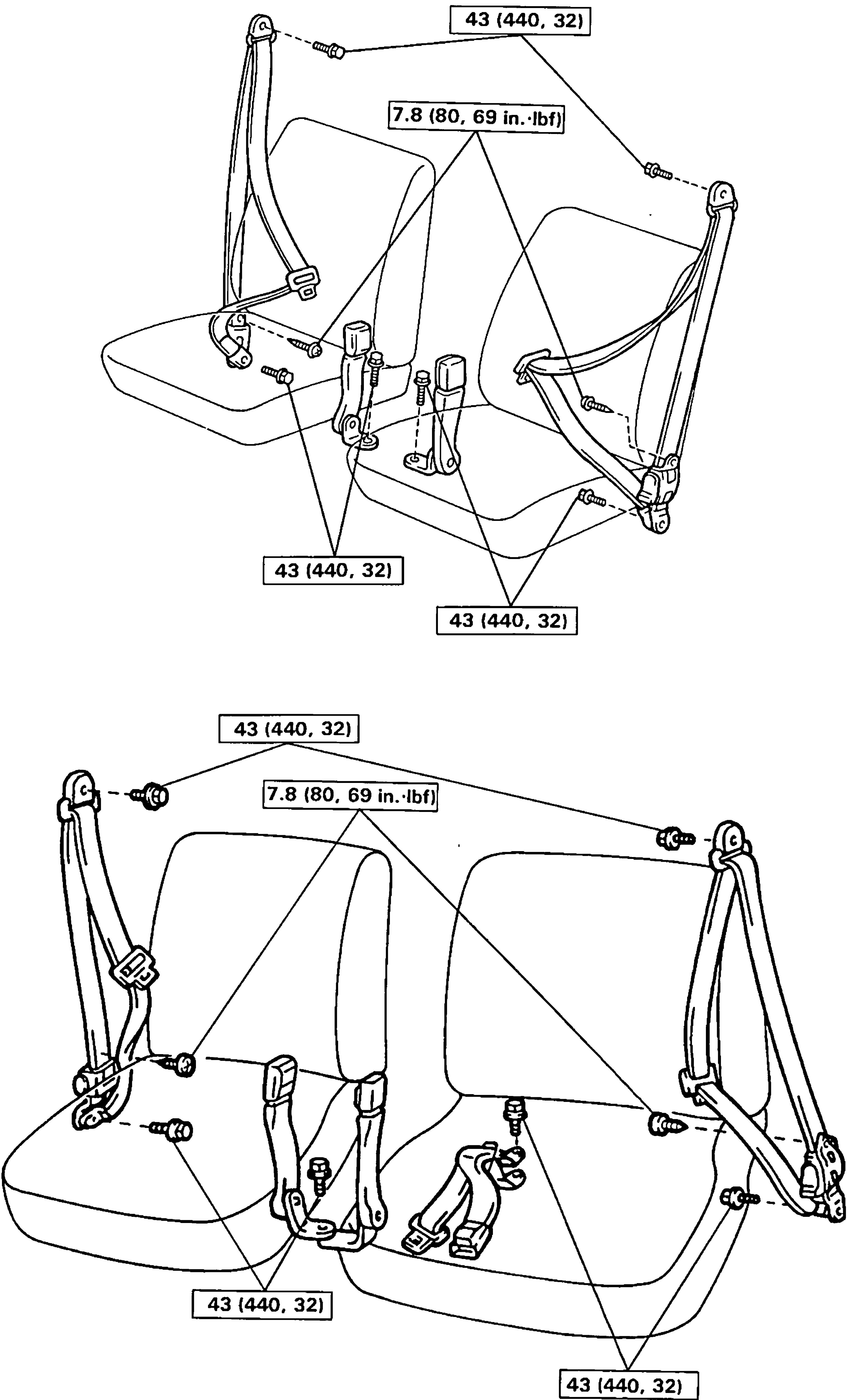
Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (4-Door Hardtop) Chassis and Body Repair Manual Supplement	RM192E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

NOTE: The following pages contain only the points which differ from the above listed manuals.

	Page
(HARDTOP & CANVAS TOP)	
SEAT BELTS	BO-2
FUEL TANK AND LINE	BO-7
(STATION WAGON)	
SEAT	BO-12
SEAT BELTS	BO-15
FUEL TANK AND LINE	BO-18

SEAT BELTS
COMPONENTS

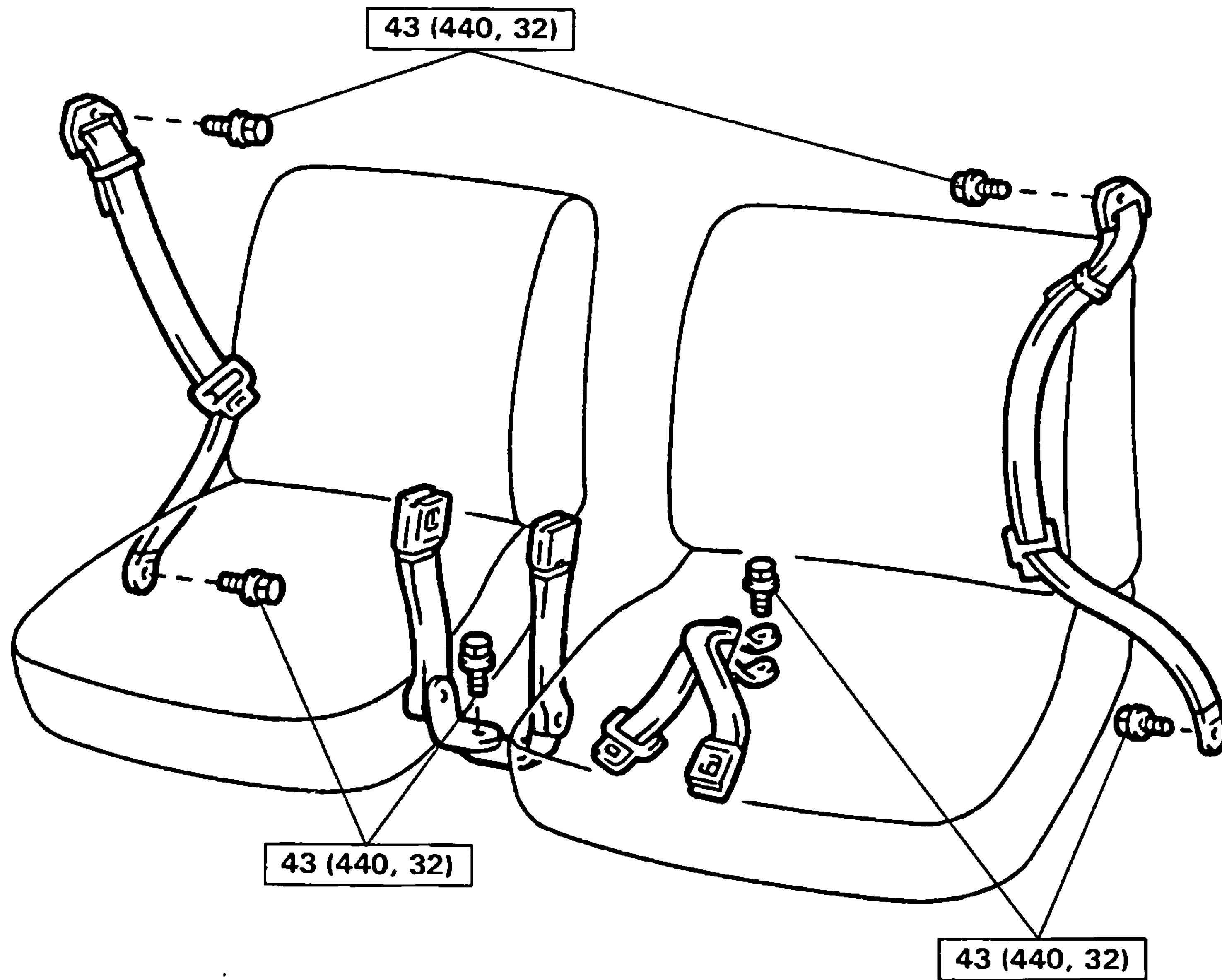
Front Seat Belts



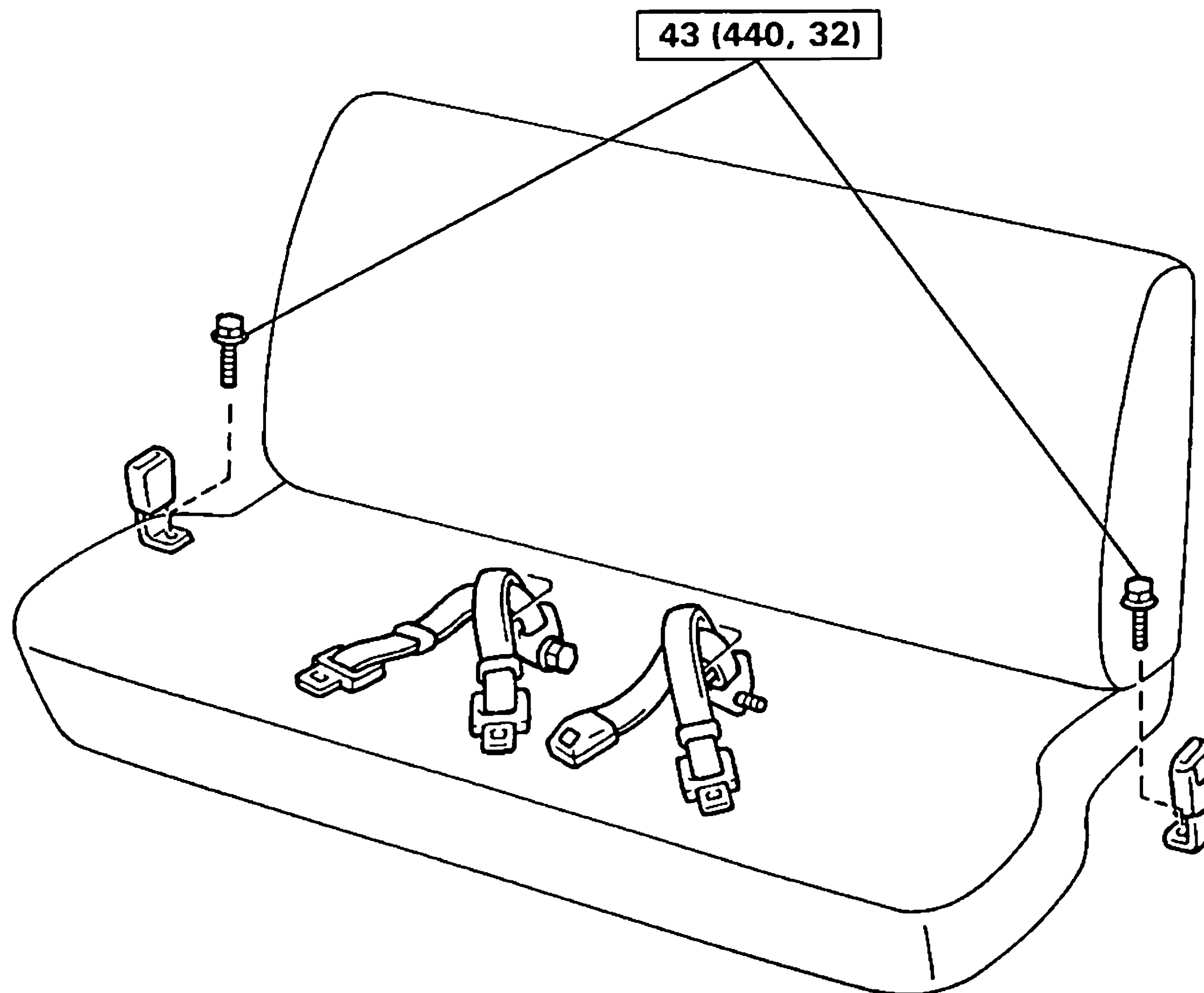
N·m (kgf·cm, ft·lbf) : Specified torque

COMPONENTS (Cont'd)

Front Seat Belts

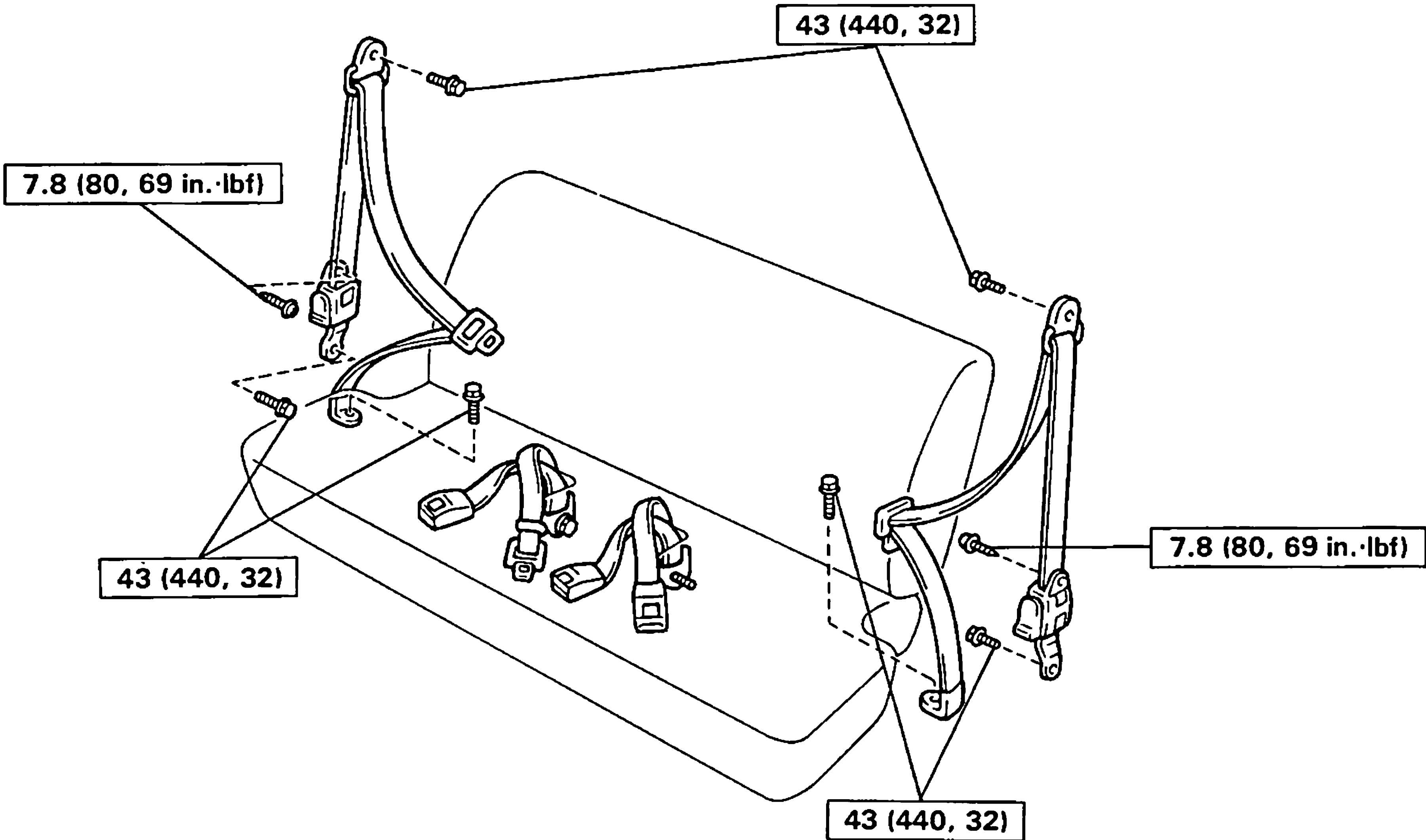


Rear No.1 Seat Belts

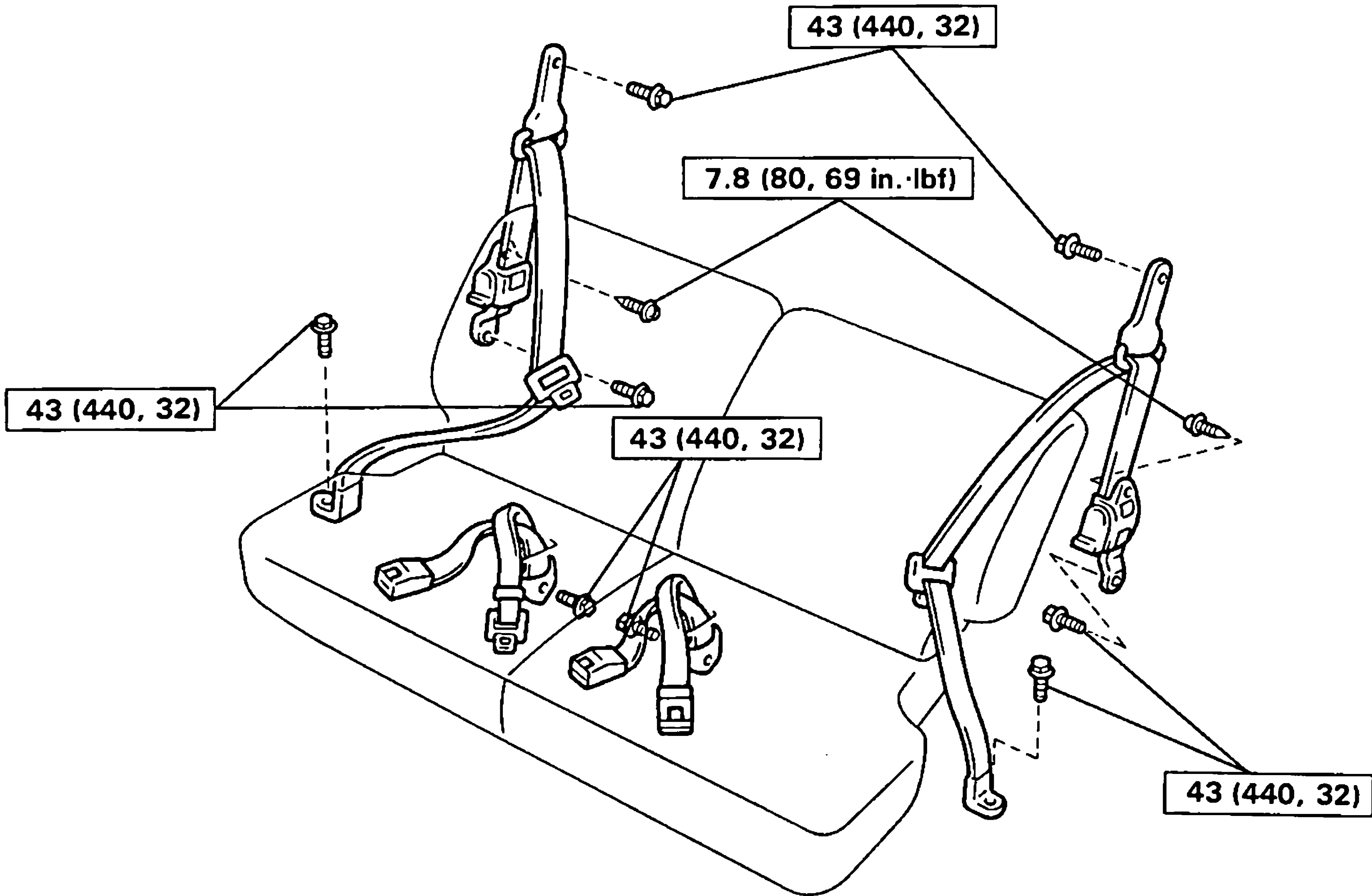


COMPONENTS (Cont'd)

Rear No. 1 Seat Belts



Rear No.2 Seat Belts

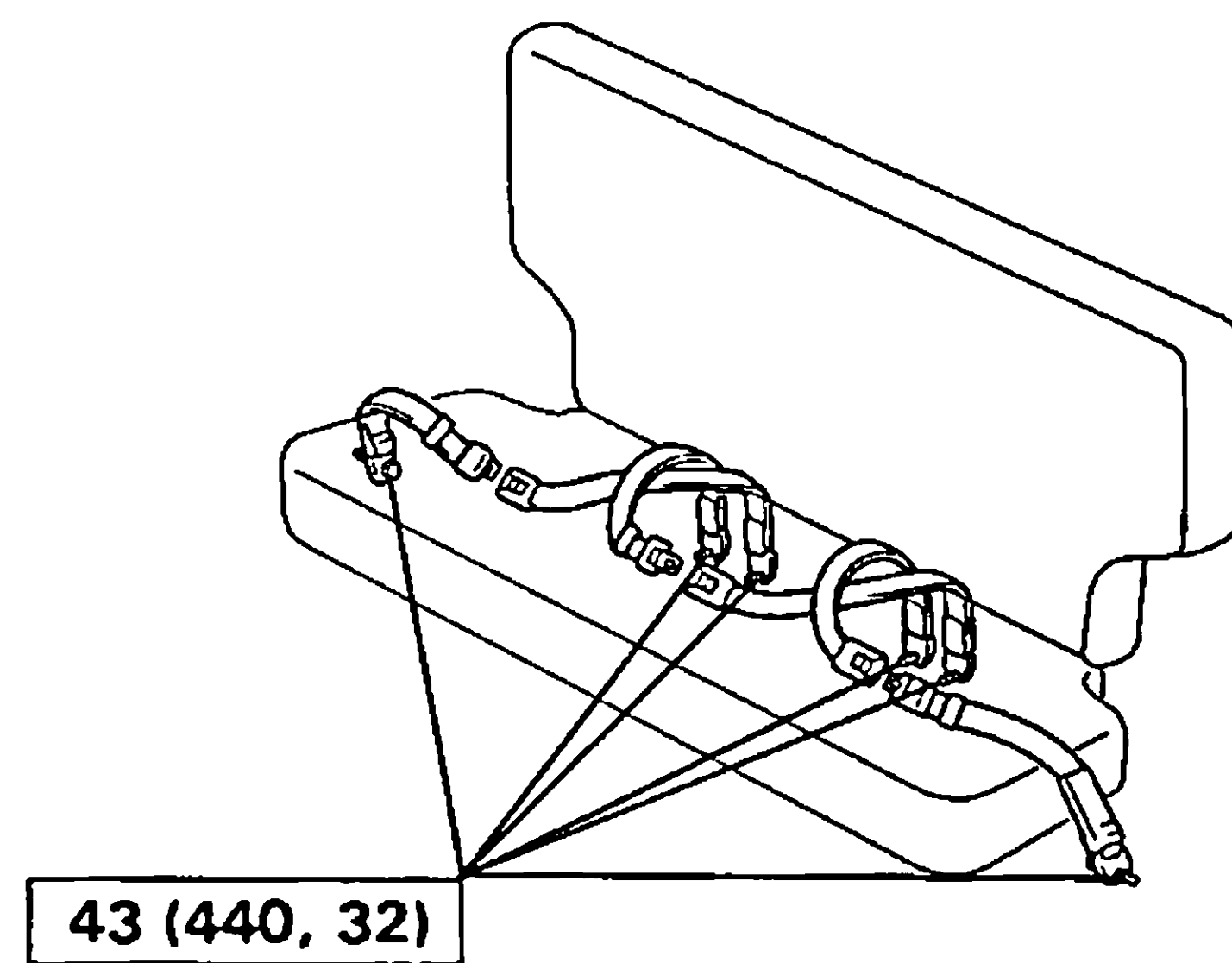
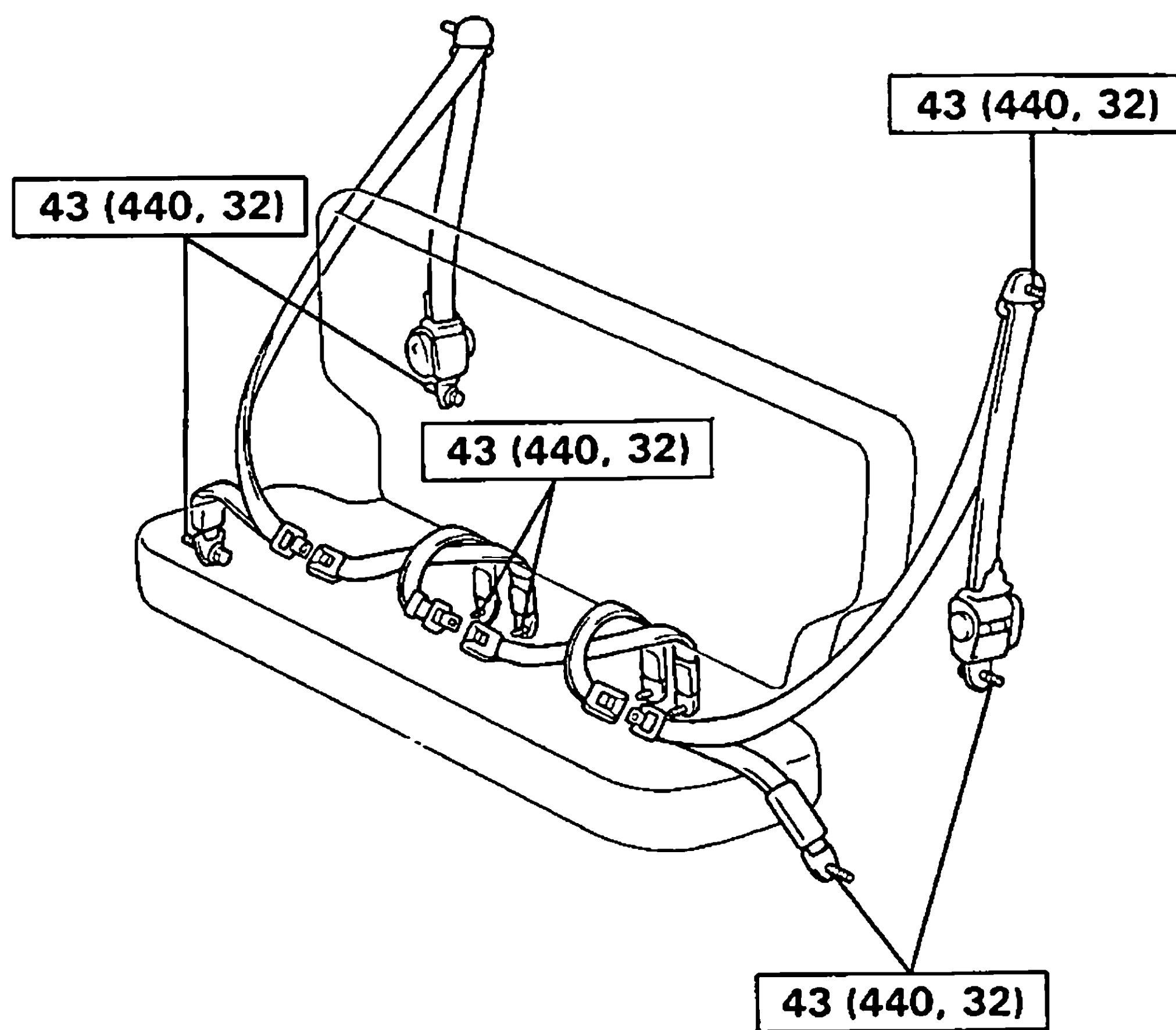


N·m (kgf·cm, ft·lbf) : Specified torque

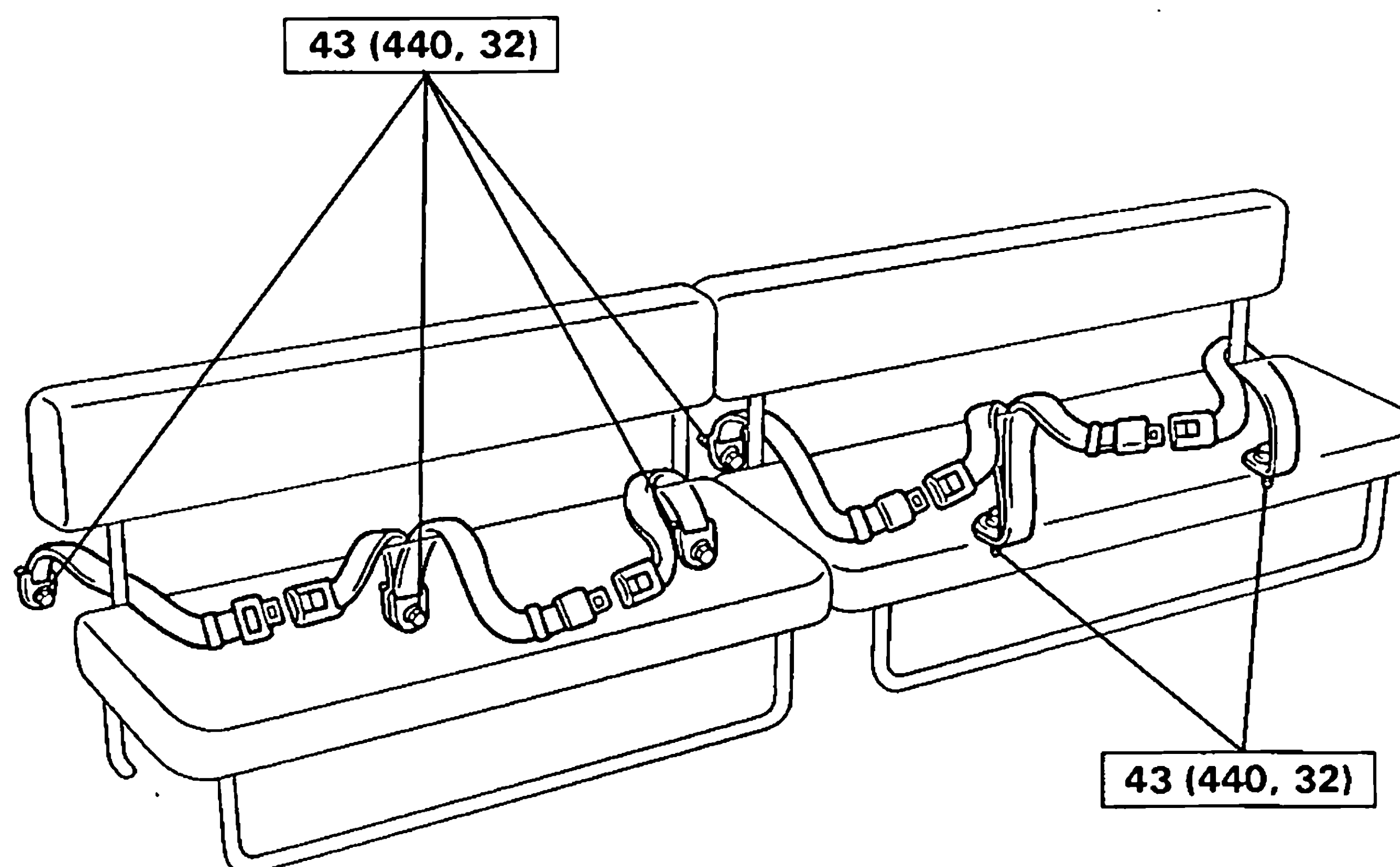
COMPONENTS (Cont'd)

Rear Seat Belts
(ELR type)

(NR type)

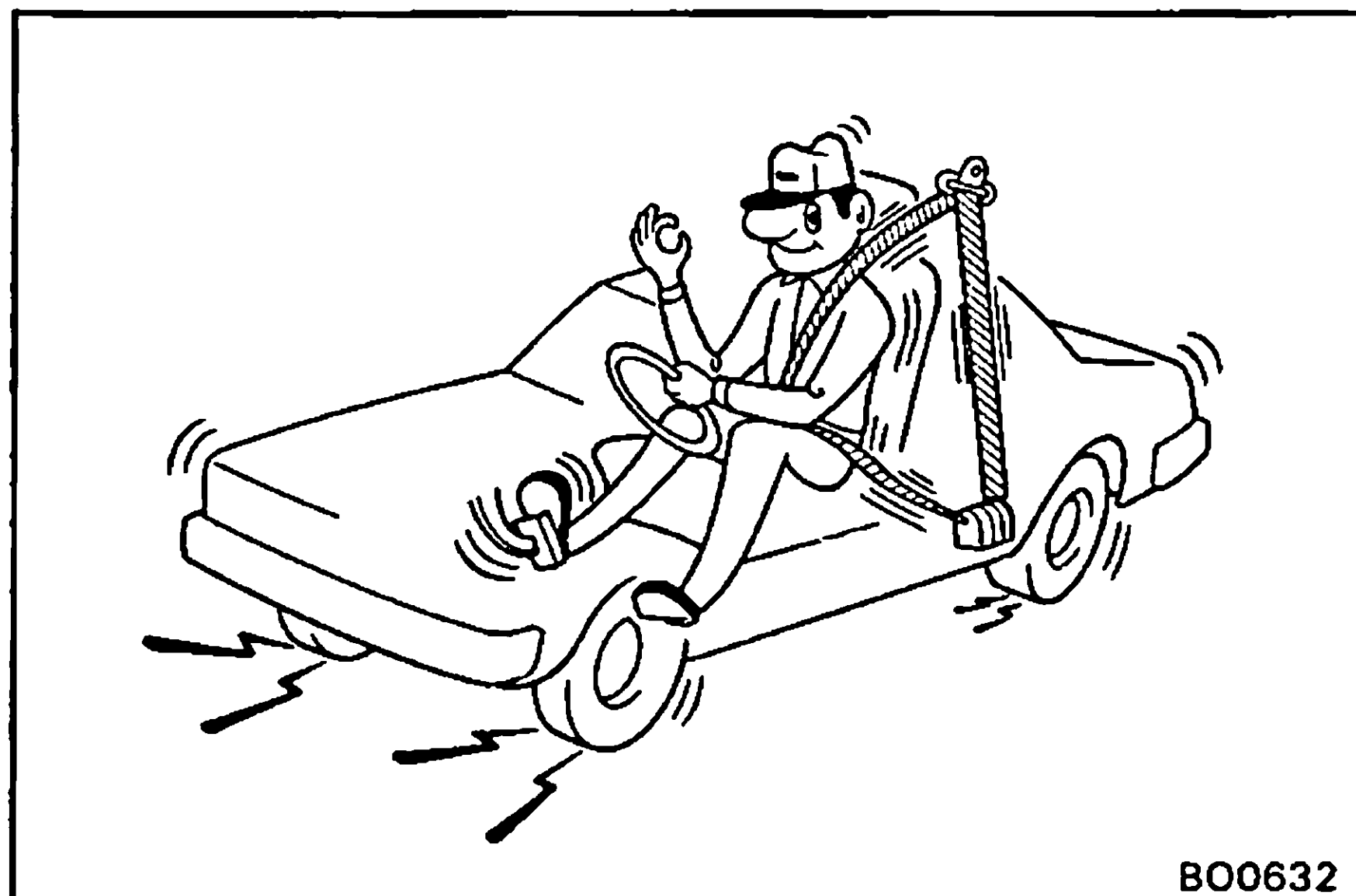


Parallel Seat



N·m (kgf·cm, ft·lbf) : Specified torque

N04165
N04166
N04164



B00632

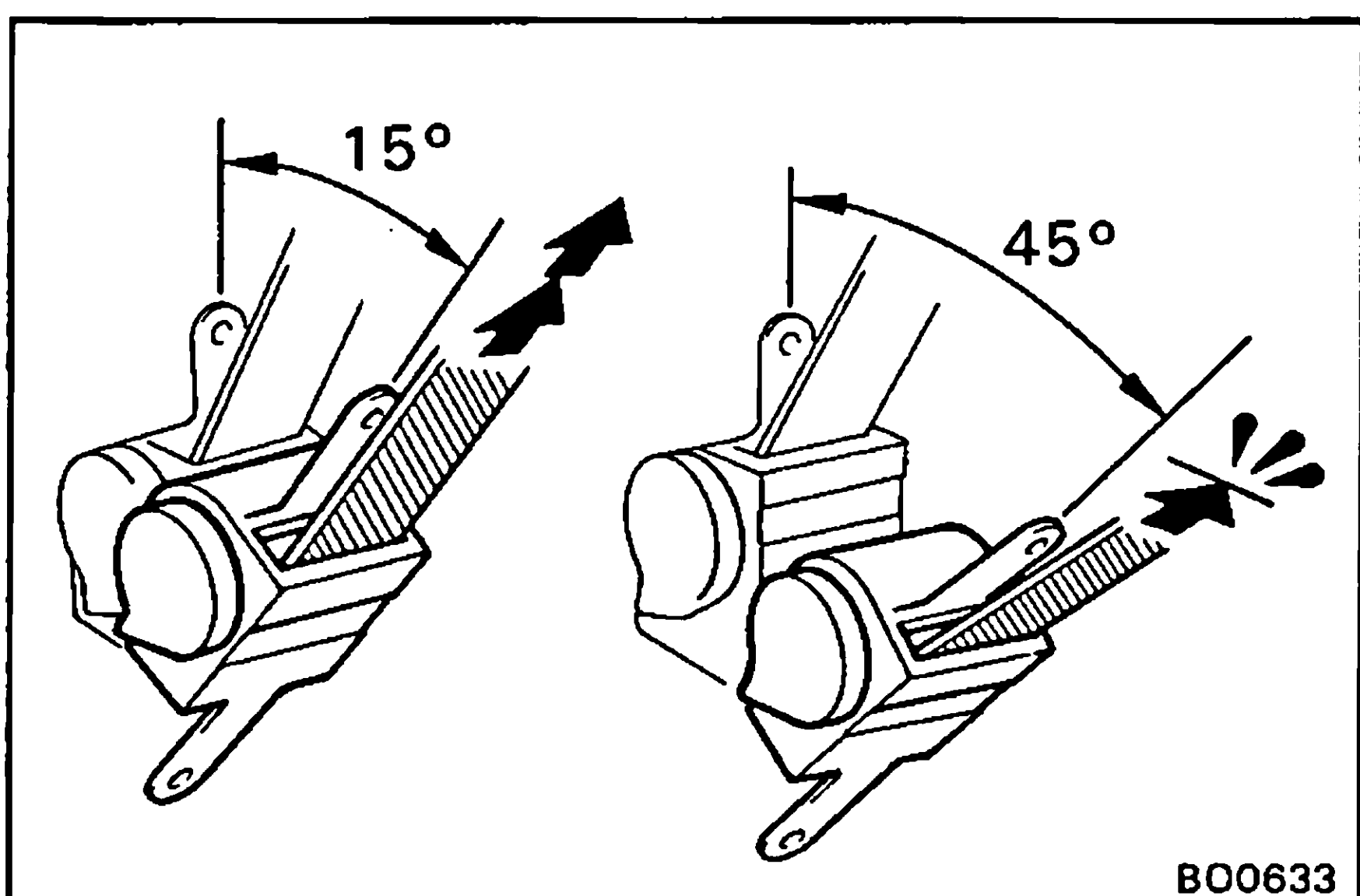
SEAT BELTS

[Emergency Locking Retractor (ELR) Type]

1. RUNNING TEST (IN SAFETY AREA)

- Fasten the seat belt.
- Drive the car at 10 mph (16 km/h) and make a very hard stop.
- Check that the seat belt is locked and cannot be extended at this time.

HINT: Conduct this test in safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.



B00633

2. STATIC TEST

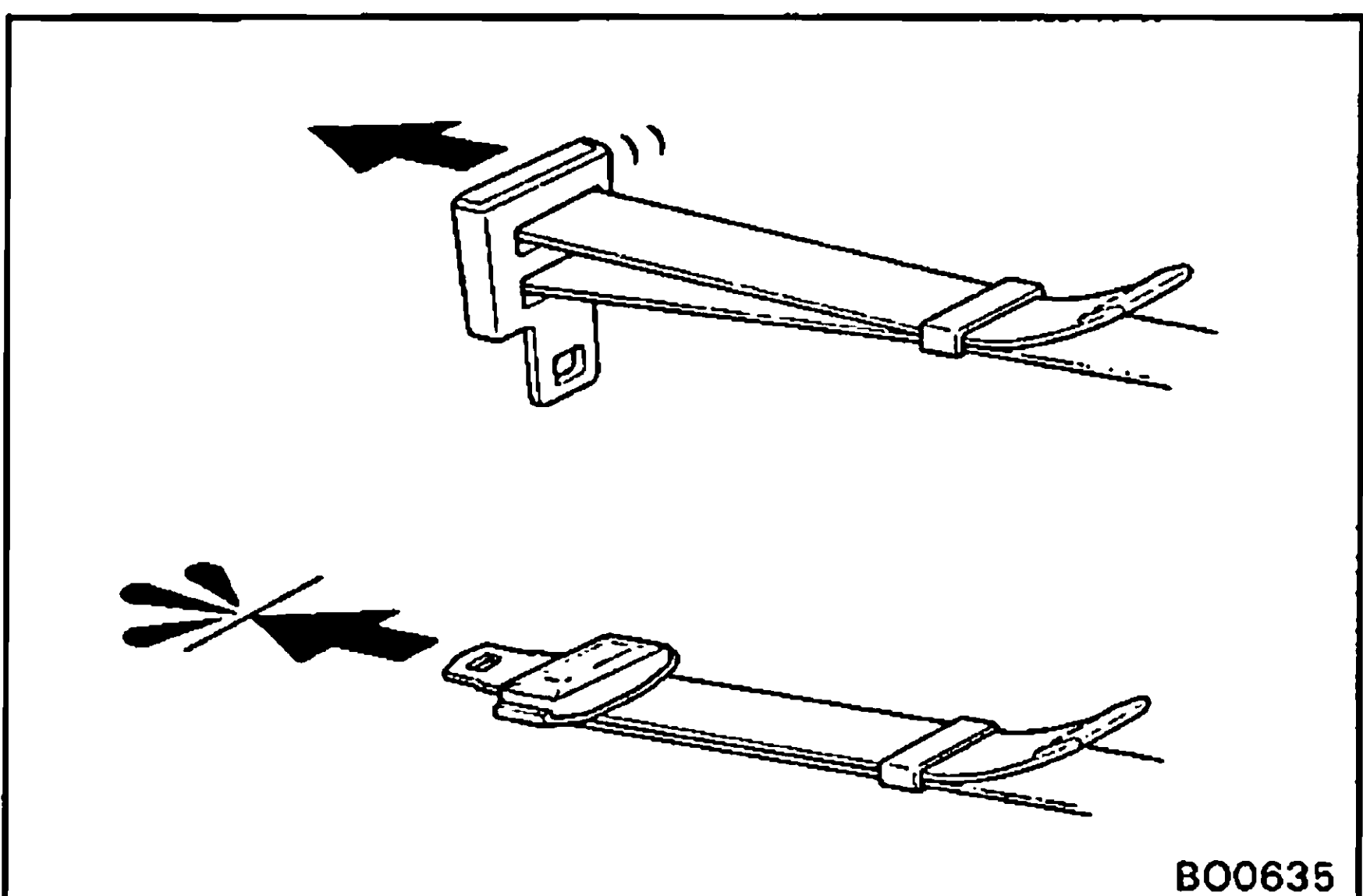
- Remove the locking retractor assembly.
- Tilt the retractor slowly.
- Verify that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.

(Manual Type)

TESTING

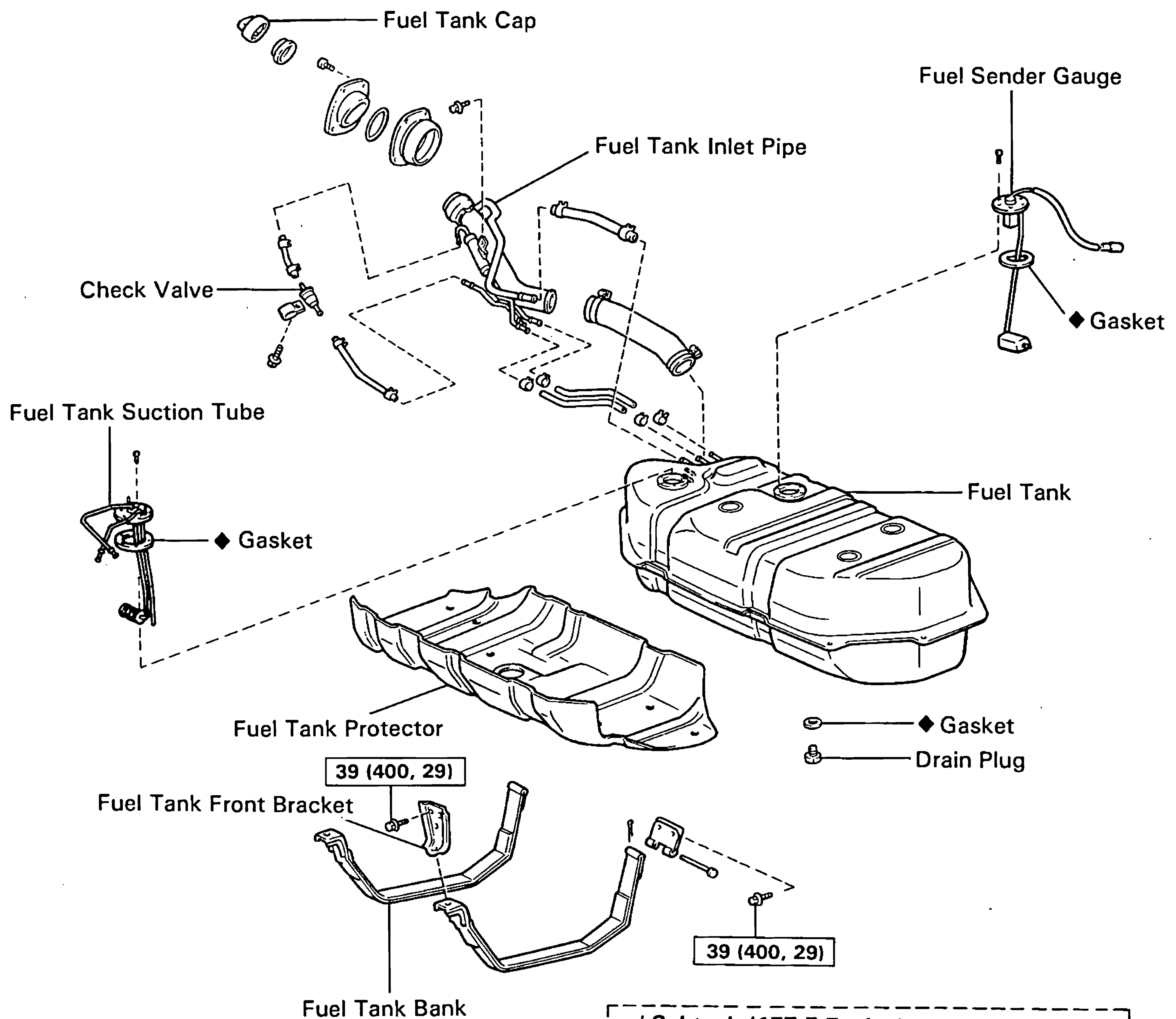
- Adjust the belt to the proper length.
- Apply a firm load to the belt.
- Verify that the belt does not extend.



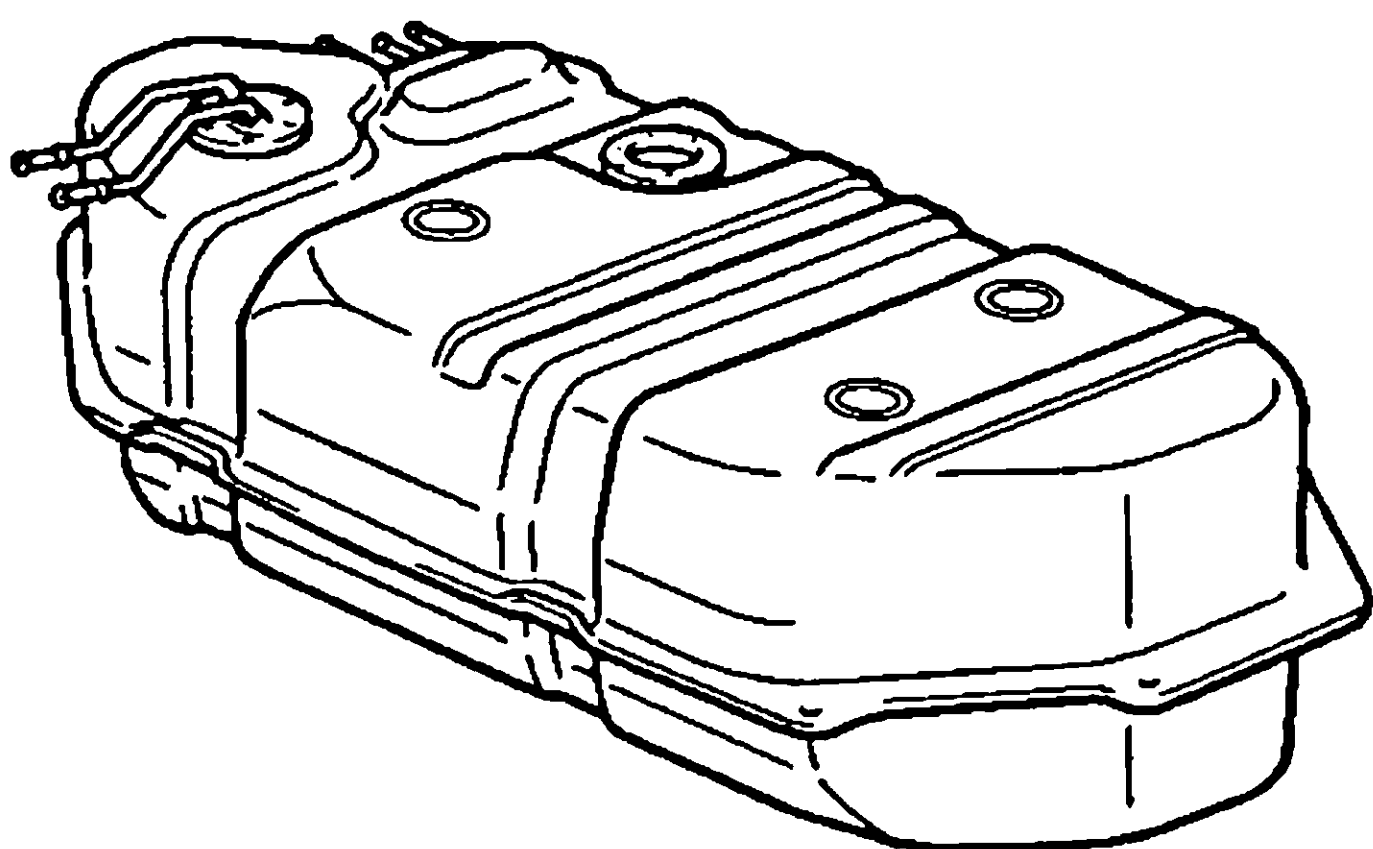
B00635

FUEL TANK AND LINE COMPONENTS

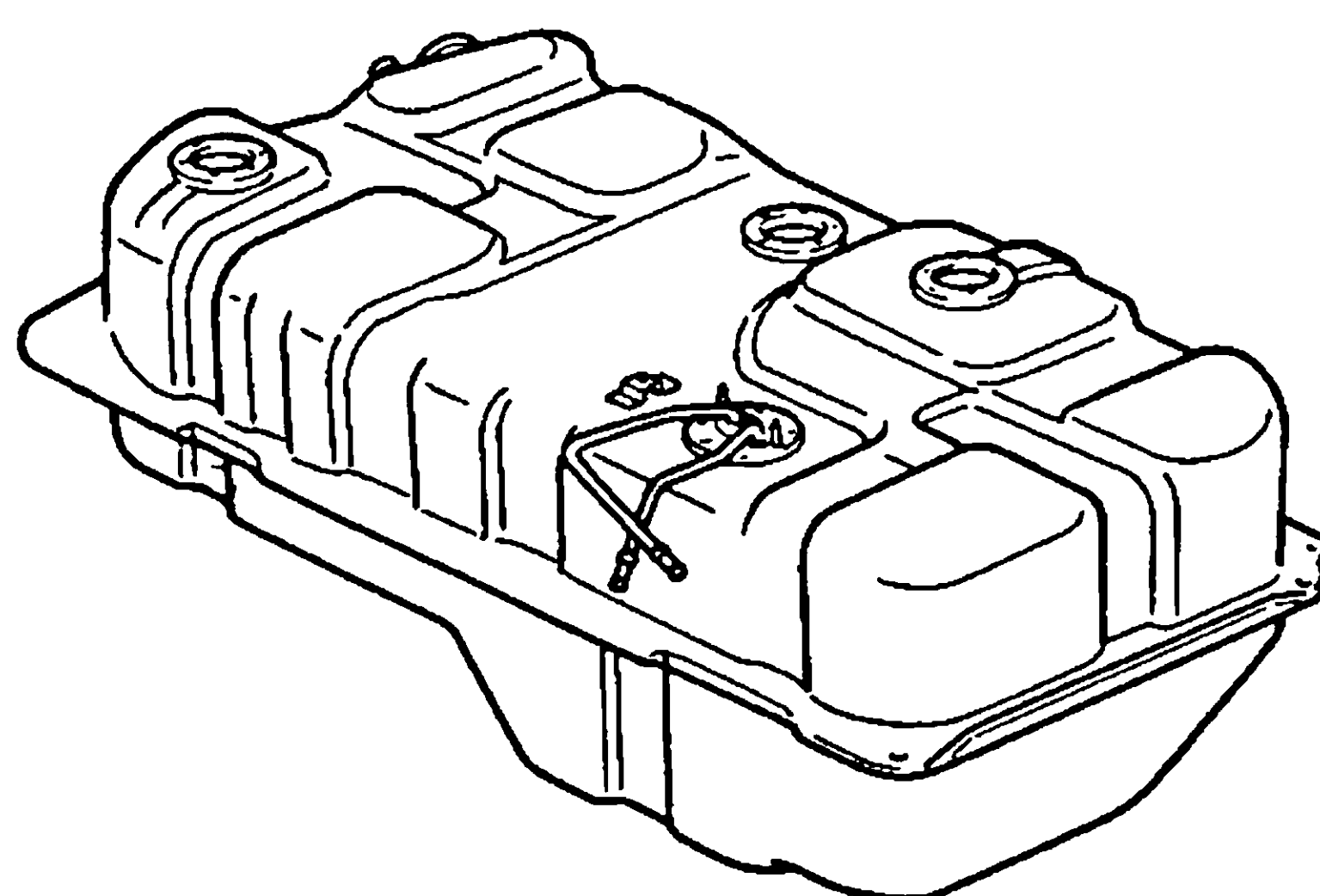
Ex. 75 Series



Europe, South Africa



w/ Subtank (1FZ-F Engine)

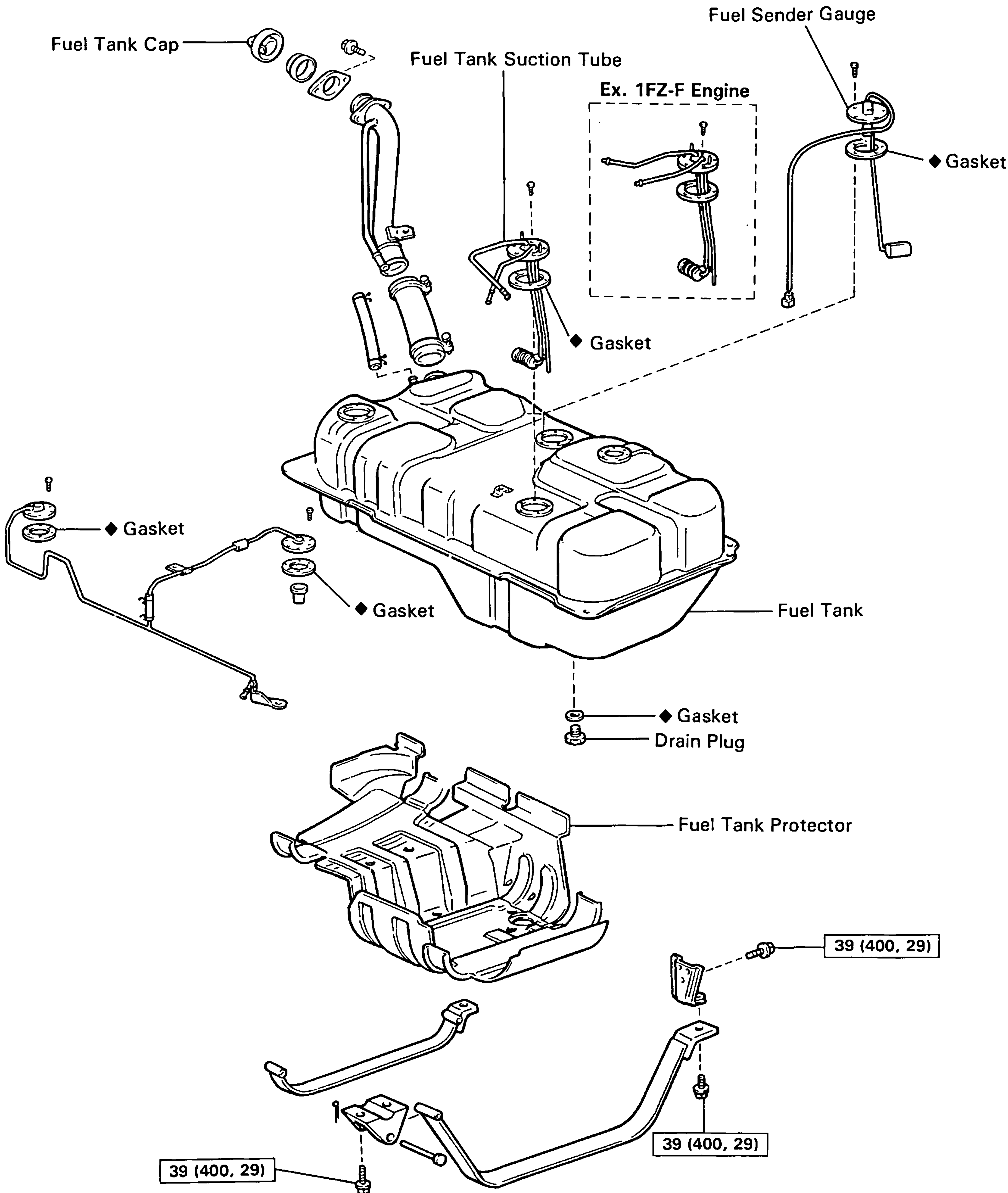


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

COMPONENTS (Cont'd)

75 Series (VAN)
Ex. 3F Engine, Europe, South Africa

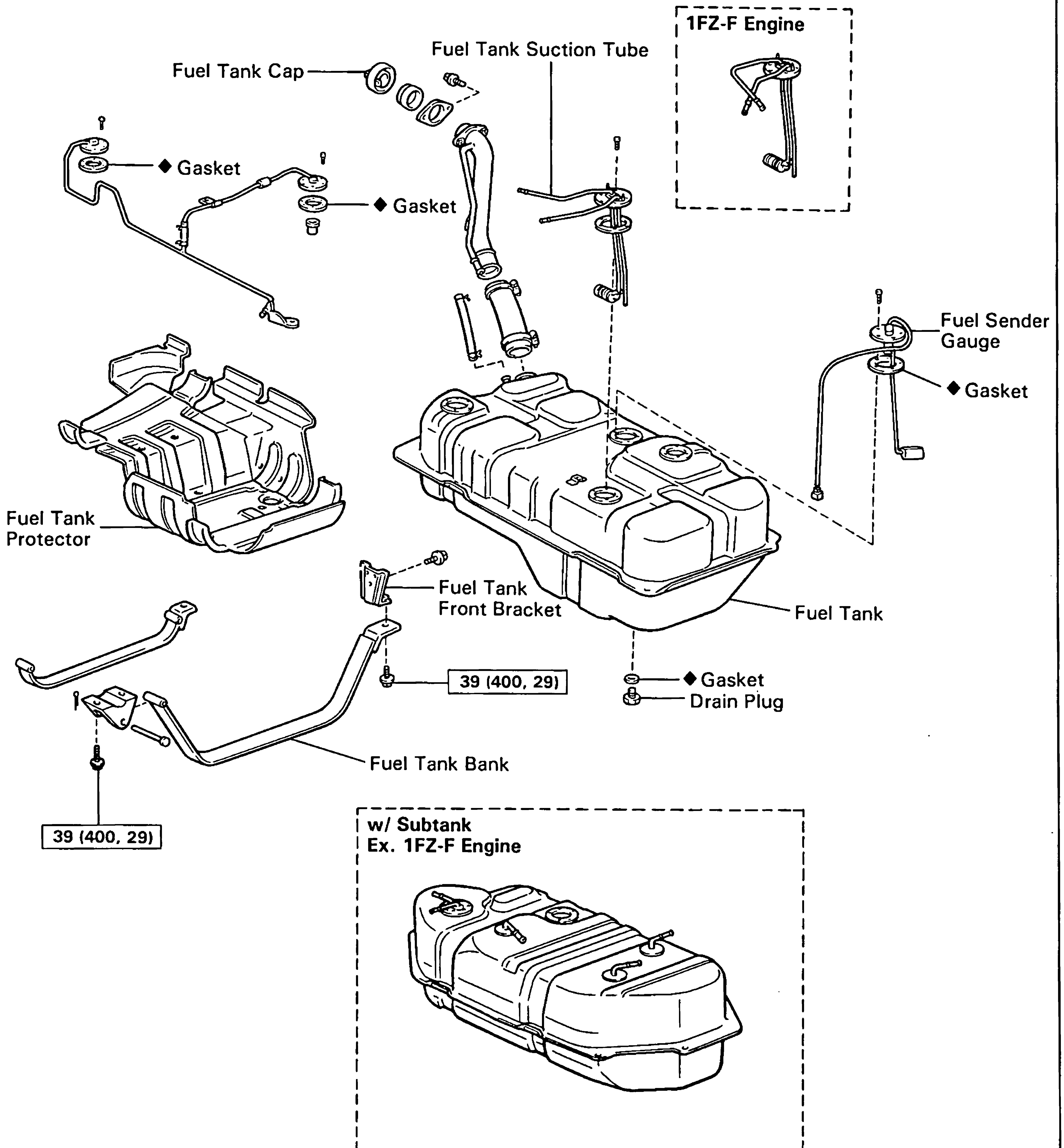


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

COMPONENTS (Cont'd)

75 Series (Pickup) w/ Subtank
Ex. 3F Engine

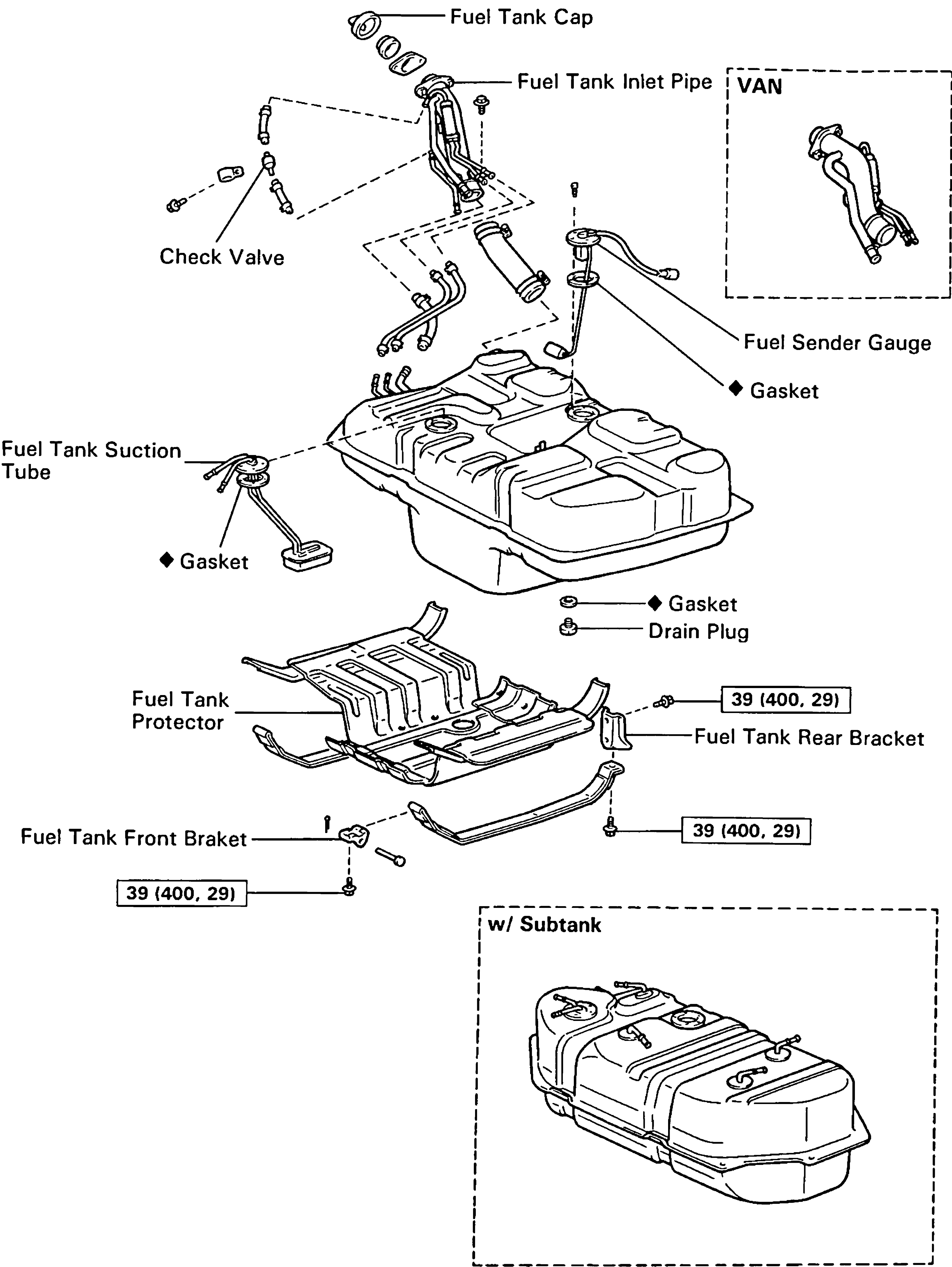


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

COMPONENTS (Cont'd)

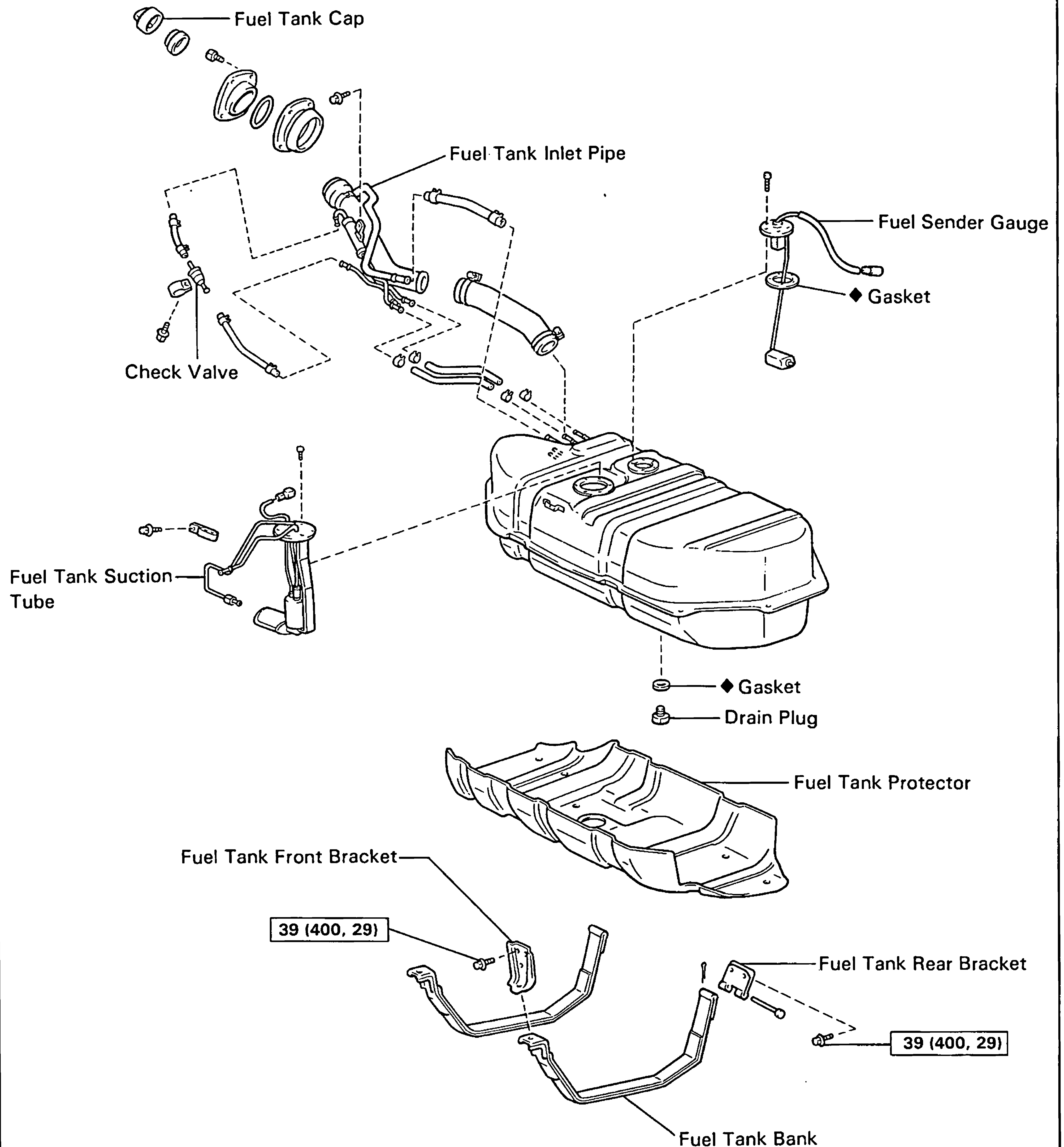
3F Engine (VAN, Pickup) Subtank



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

COMPONENTS (Cont'd)

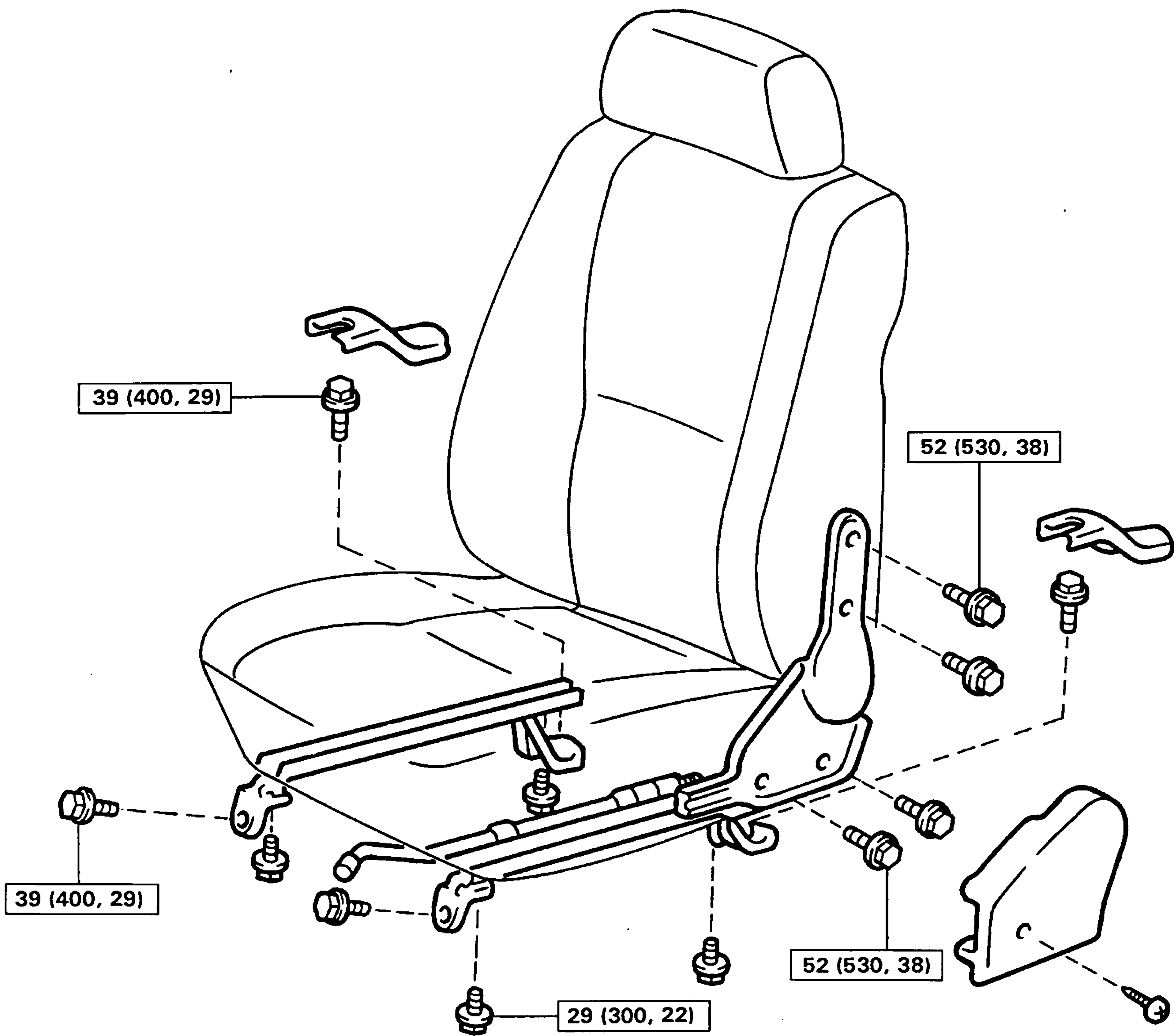
22R-E Engine



N·m (kgf·cm, ft·lbf) : Specified torque

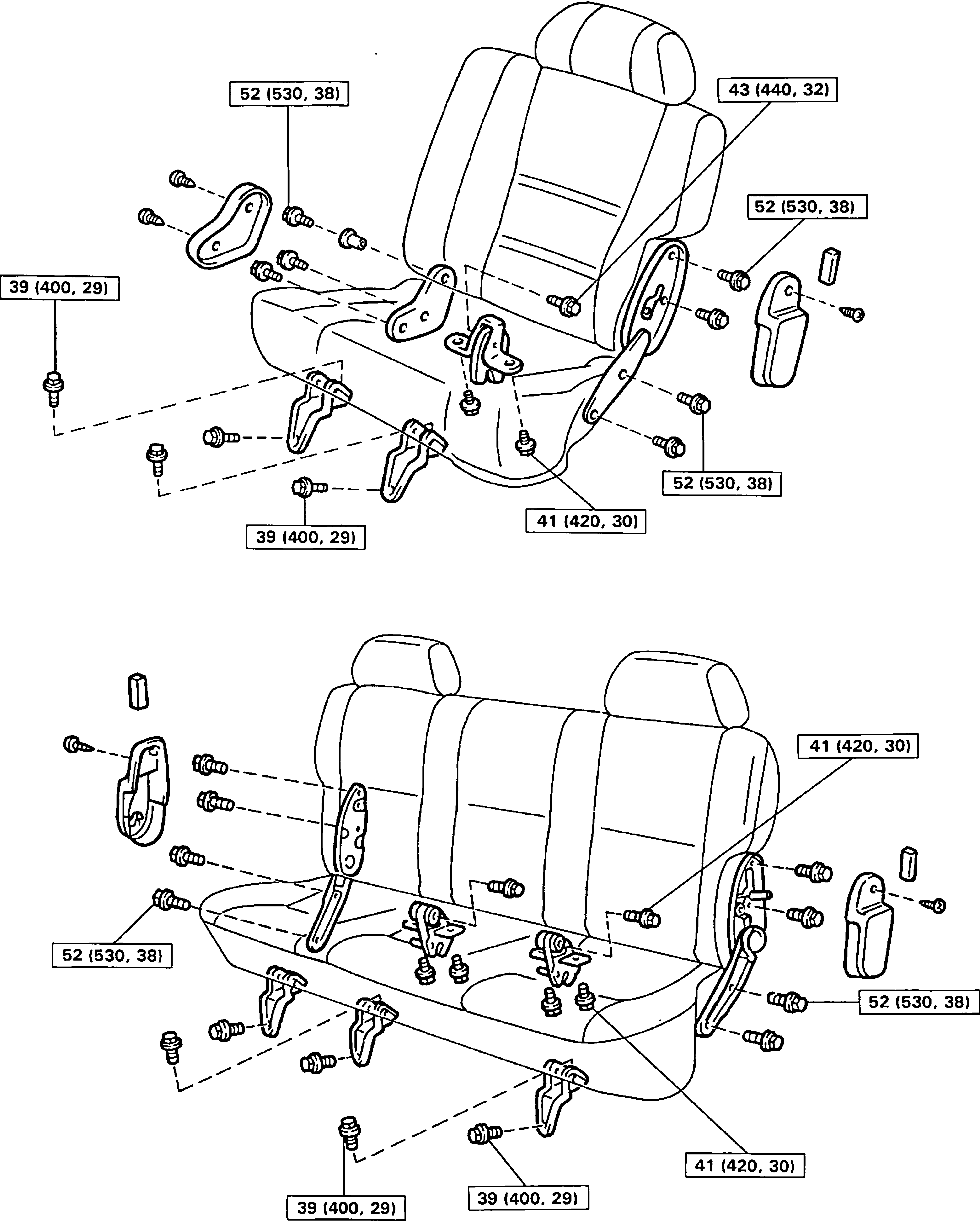
◆ Non-reusable part

SEAT
Front Seat
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

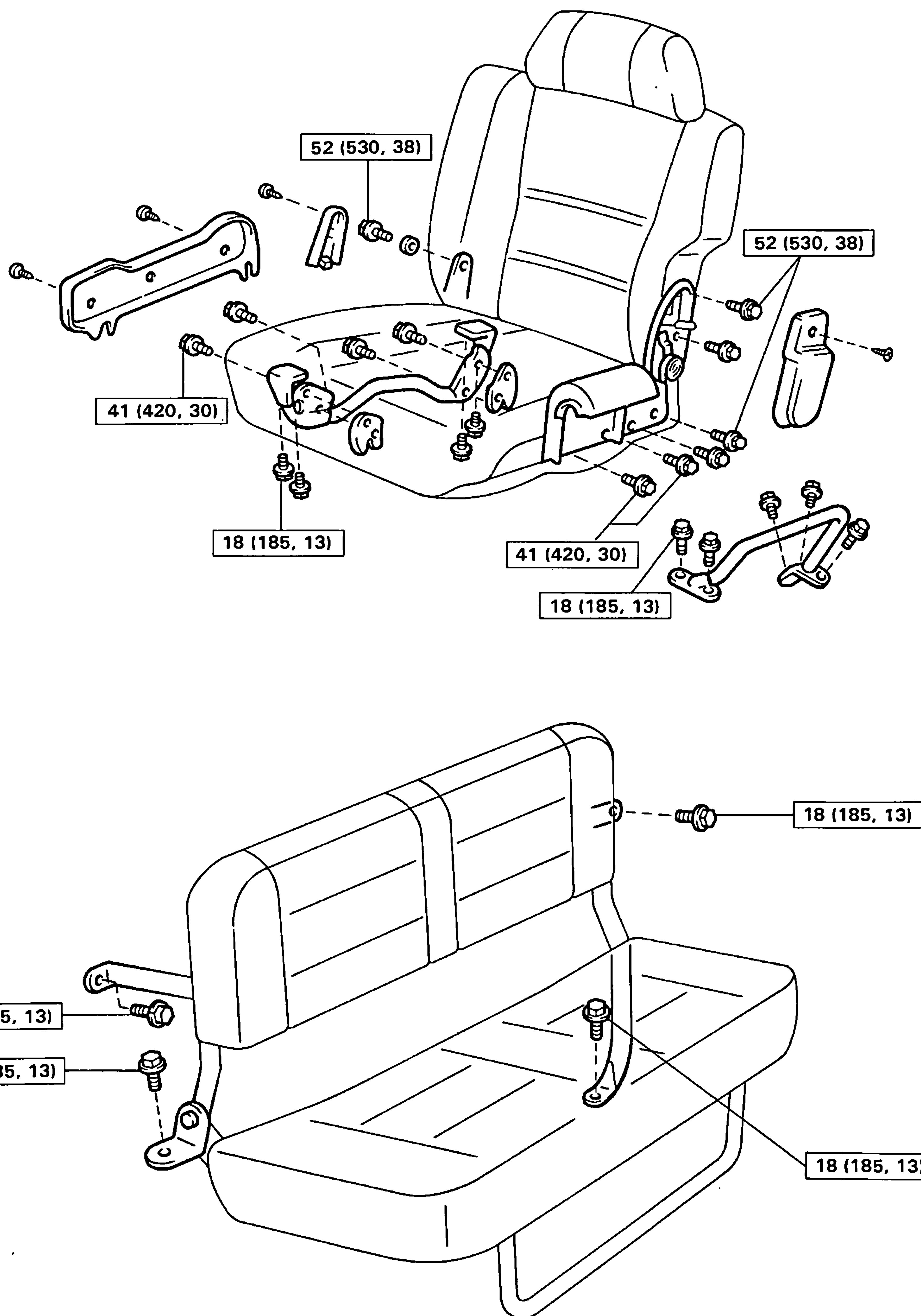
Second Seat COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

N04024
N04025

Third Seat COMPONENTS

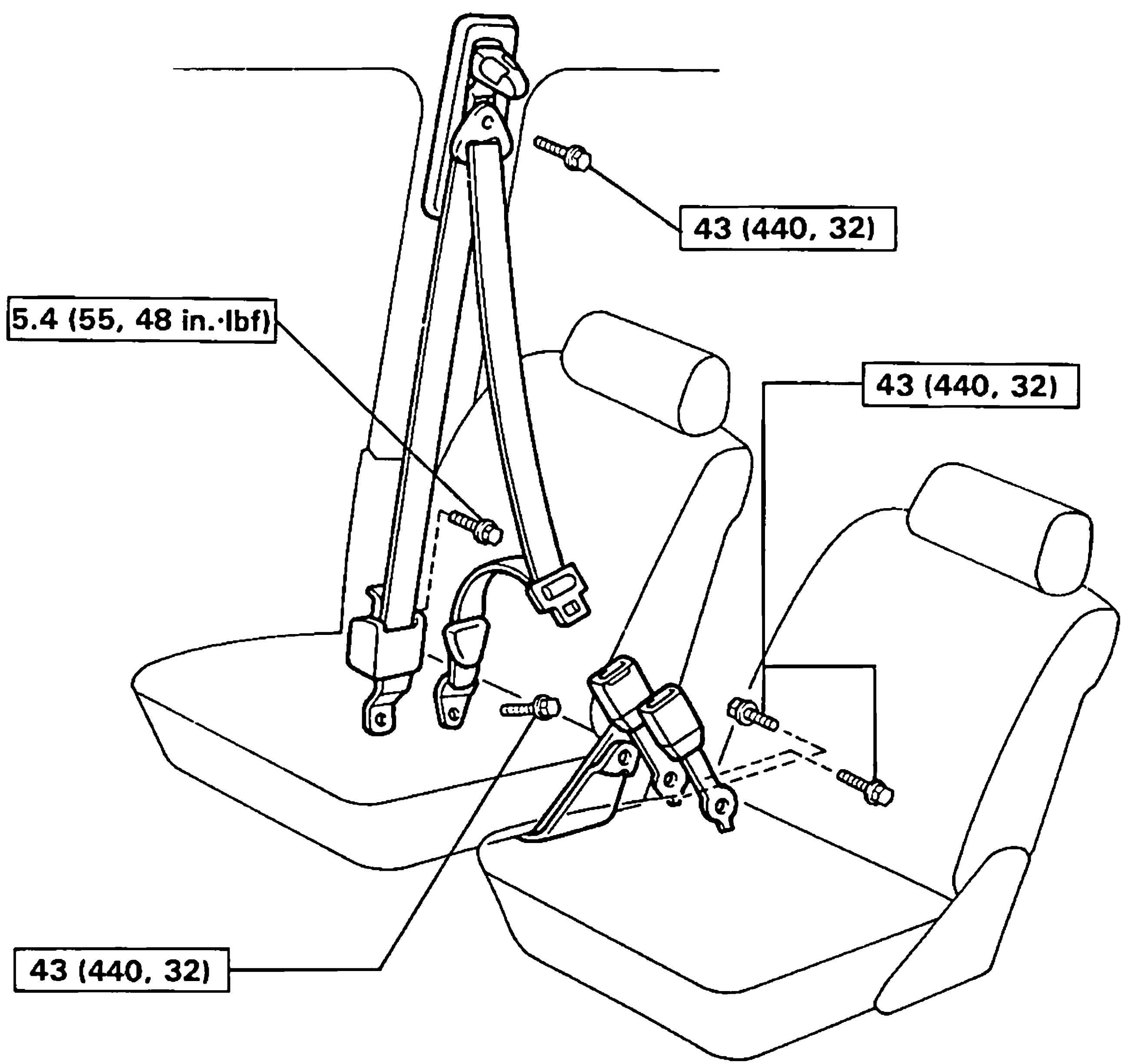


N·m (kgf·cm, ft·lbf) : Specified torque

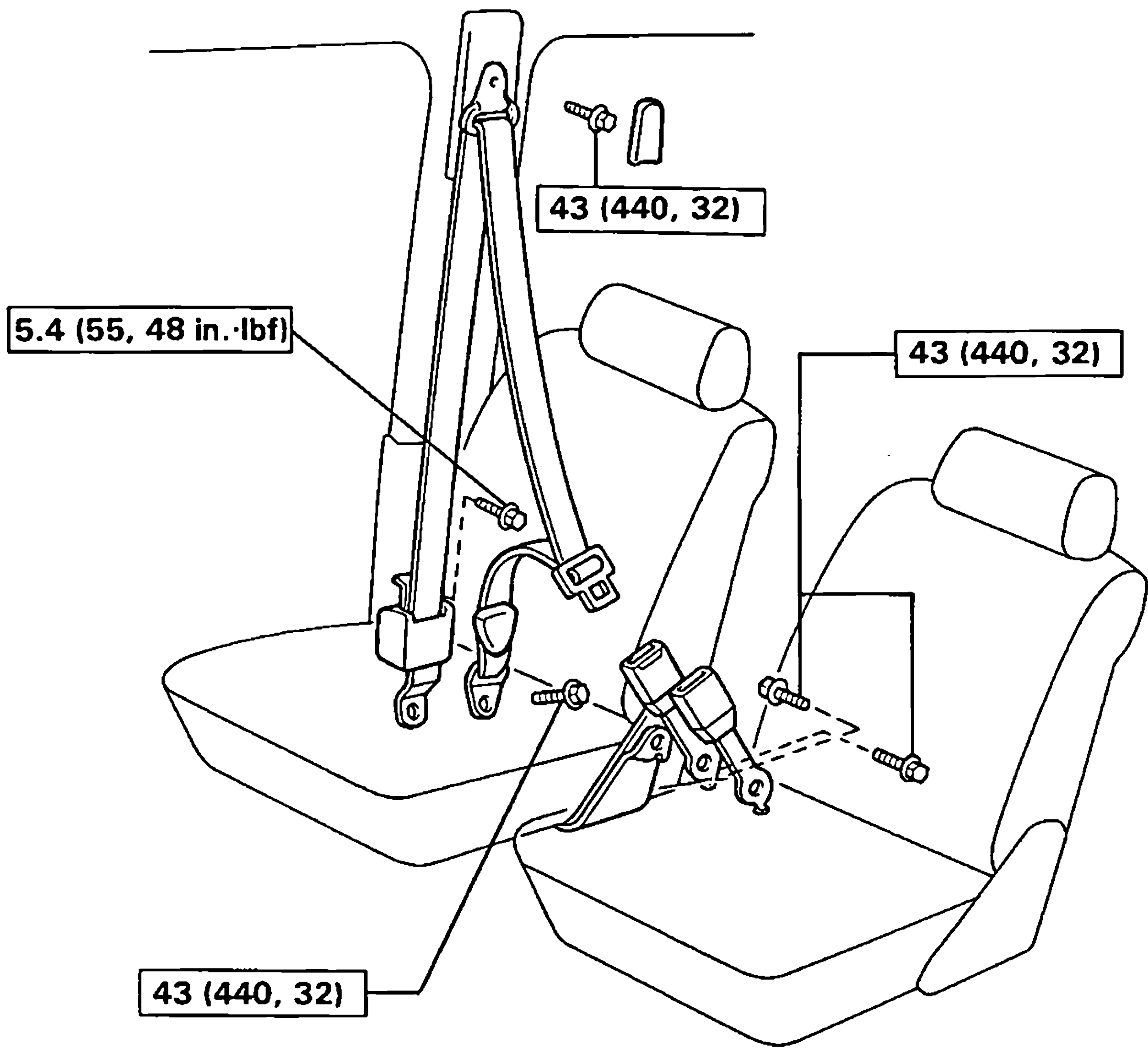
SEAT BELTS

Front Seat Belts

COMPONENTS



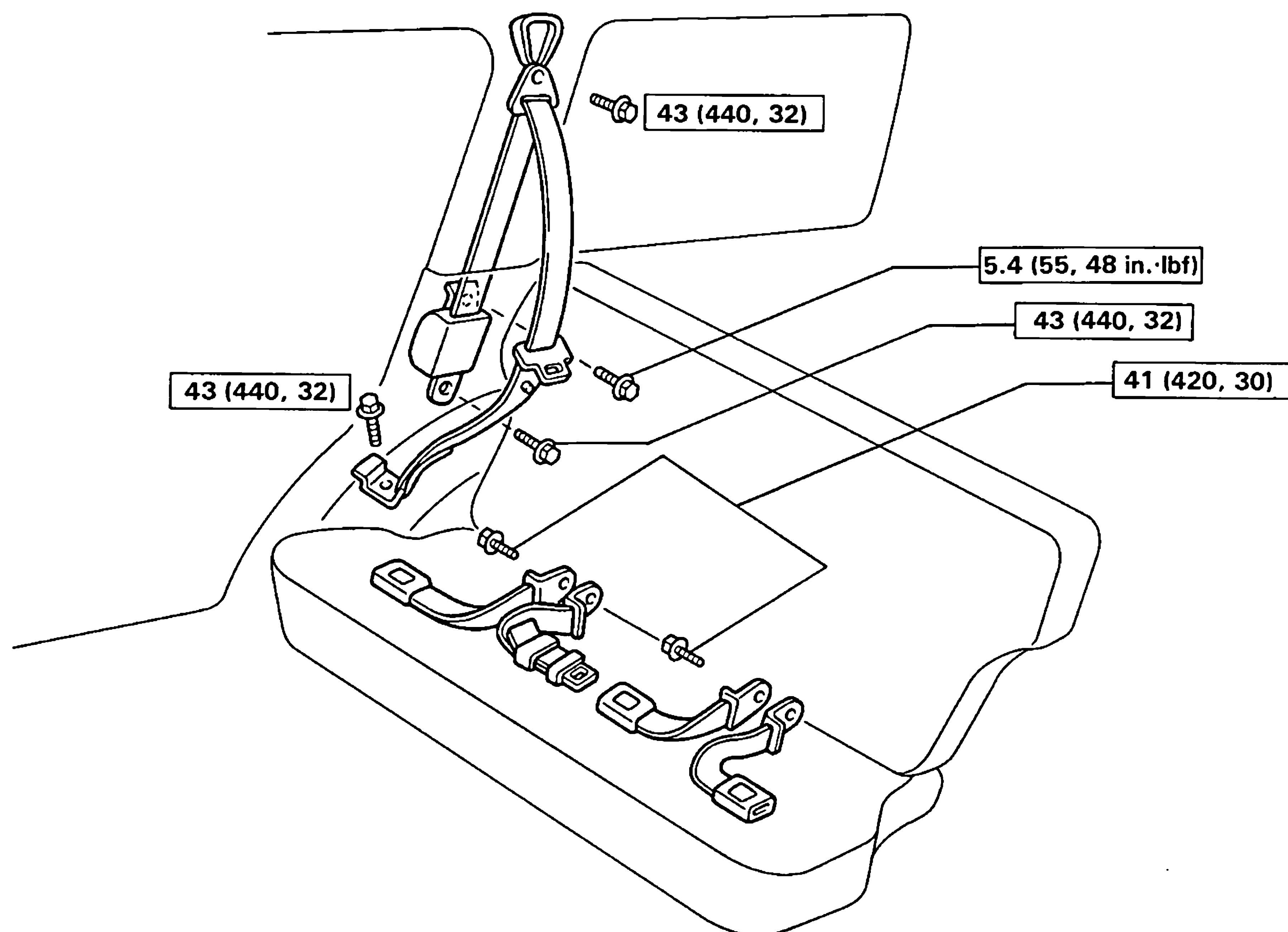
ELR Type
Separate Seat



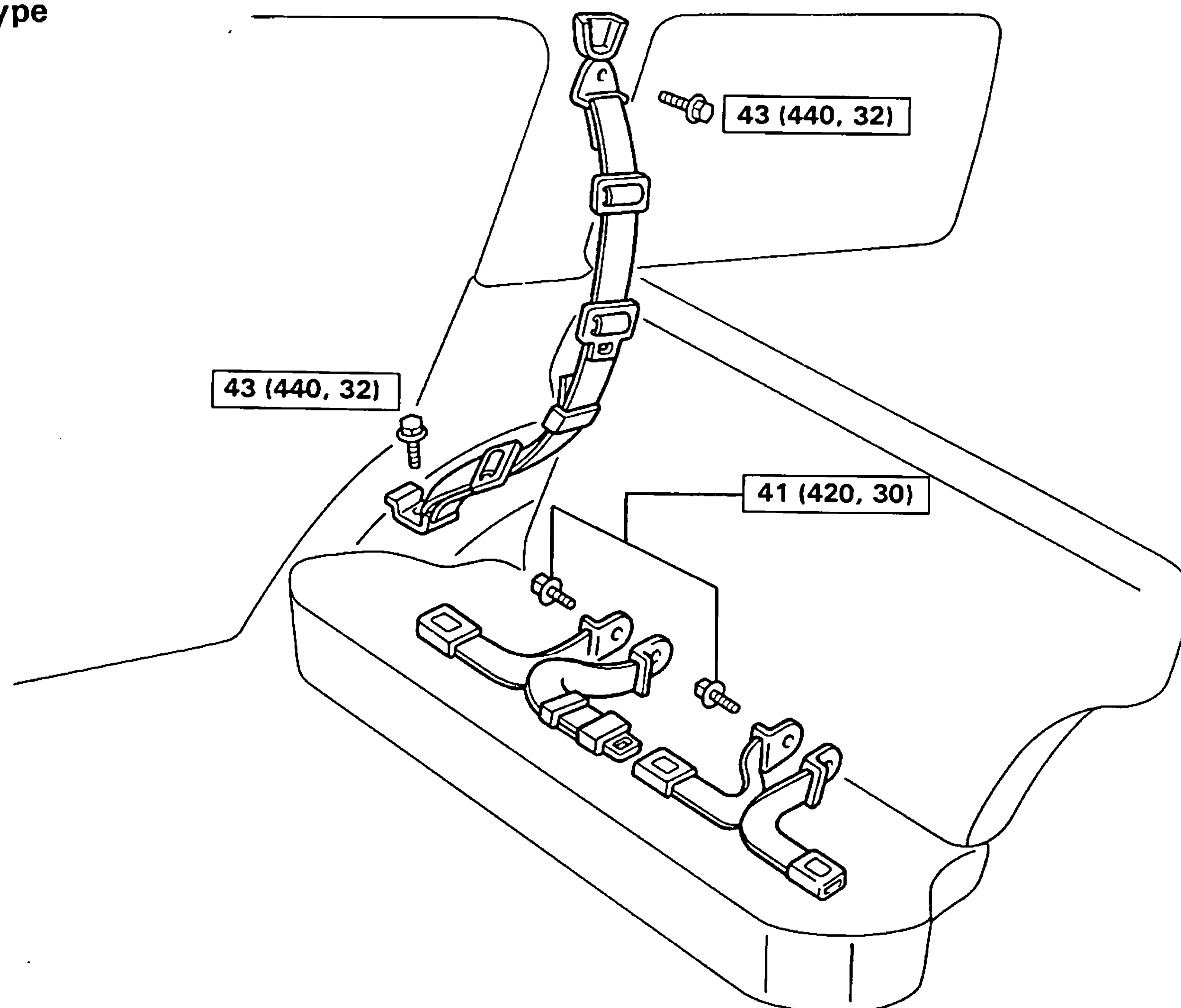
N·m (kgf·cm, ft·lbf) : Specified torque

Second Seat Belts COMPONENTS

ELR and Manual Type



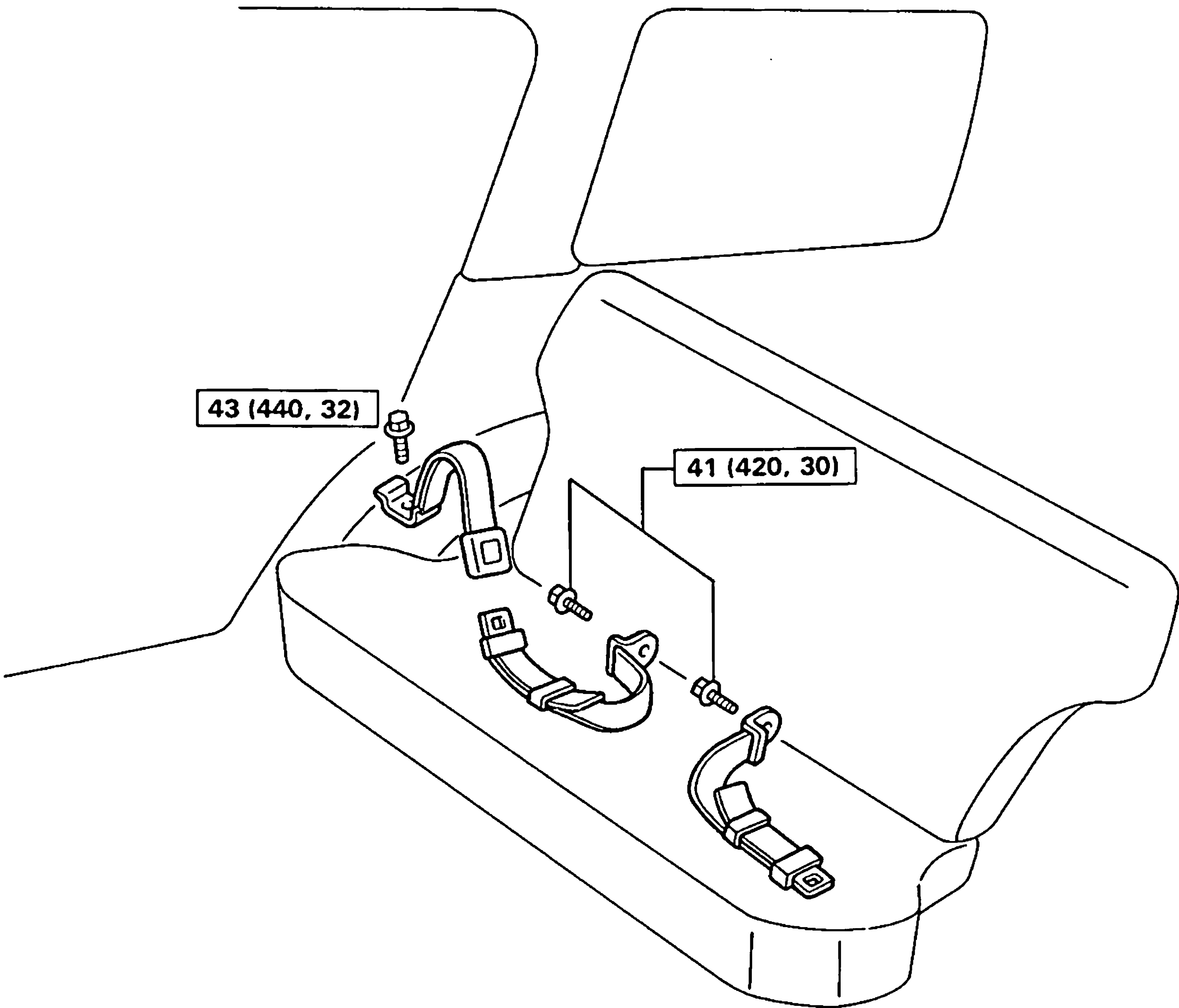
Manual Type



N·m (kgf·cm, ft·lbf) : Specified torque

COMPONENTS (Cont'd)

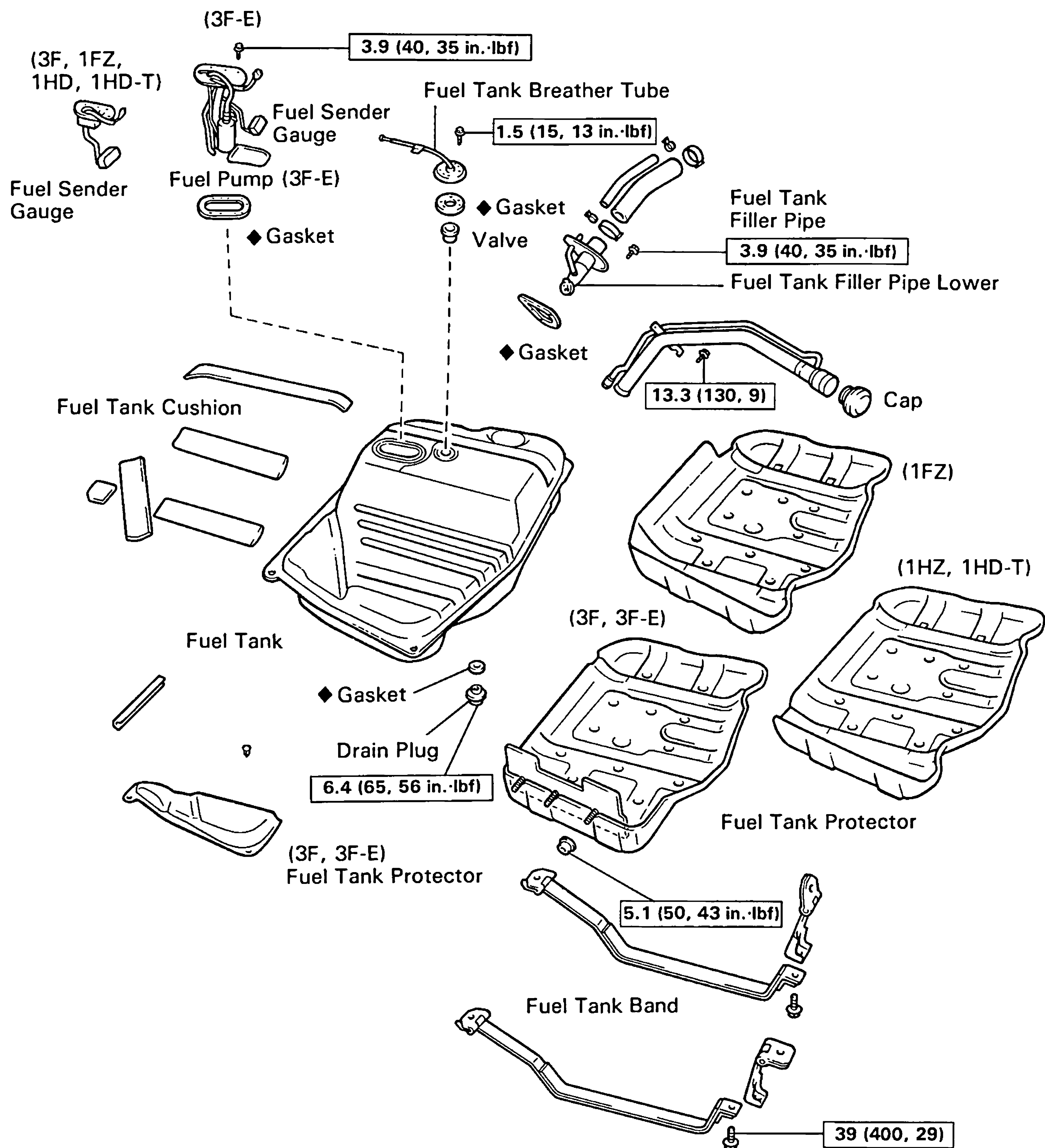
Manual Type



N·m (kgf·cm, ft·lbf) : Specified torque

FUEL TANK AND LINE COMPONENTS

(w/o Sub Fuel Tank)



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

SERVICE SPECIFICATIONS

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (4-Door Hardtop) Chassis and Body Repair Manual Supplement	RM192E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

NOTE: The following pages contain only the points which differ from the above listed manuals.

	Page
(HARDTOP & CANVAS TOP)	
CLUTCH	A-2
TRANSFER (HF1A)	A-3
SUSPENSION AND AXLE	A-5
BODY	A-9
LUBRICANT	A-9
(STATION WAGON)	
CLUTCH	A-10
MANUAL TRANSMISSION (H151F)	A-11
SUSPENSION AND AXLE	A-13
BODY	A-15
LUBRICANT	A-15

(Hardtop & Canvas Top)

CLUTCH

Service Data

Pedal height (from asphalt sheet)			181 mm	7.13 in.
Pedal freeplay	w/o Clutch booster		13 — 23 mm	0.51 — 0.91 in.
	w/ Clutch booster		15 — 30 mm	0.59 — 1.18 in.
Push rod play at pedal top			1 — 5 mm	0.04 — 0.20 in.
Booster air valve stroke at pedal top			5 — 9 mm	0.20 — 0.35 in.
Booster push rod to piston clearance		w/SST	0 mm	0 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	N·m	kgf·cm	ft·lbf
Master cylinder × Body	7.8	80	69 in.·lbf
Clutch line union	15	155	11
Clevis lock nut	25	250	18
Master cylinder × Clutch booster	13	130	9
Clutch booster × Bracket	13	130	9
Bracket × Body	13	130	9
Accumulator bracket × Accumulator housing	5.4	55	48 in.·lbf
Accumulator line union	15	155	11
Accumulator bleeder plug	11	110	8
Accumulator bracket × Transmission	12	120	9
(2L-T Engine Europe RHD Models Only)	69	700	51
Release cylinder set bolt	12	120	9
Release cylinder bleeder plug	11	110	8
Clutch cover × Flywheel	19	195	14
Master cylinder union bolt	25	250	18

TRANSFER (HF1A)

Service Data

Input shaft	Input gear snap ring thickness and power take-off gear snap ring thickness	Mark		
		A	2.0 mm	0.0787 in.
		B	2.1 mm	0.0827 in.
		C	2.2 mm	0.0866 in.
		D	2.3 mm	0.0906 in.
		E	2.4 mm	0.0945 in.
		F	2.5 mm	0.0984 in.
		G	2.6 mm	0.1024 in.
		H	2.7 mm	0.1063 in.
		J	2.8 mm	0.1102 in.
	Input shaft rear ball bearing snap ring thickness	Mark		
		A	2.0 mm	0.0787 in.
		B	2.1 mm	0.0827 in.
		C	2.2 mm	0.0866 in.
		D	2.3 mm	0.0906 in.
		E	2.4 mm	0.0945 in.
Output shaft	High speed gear thrust clearance	STD	0.28 — 0.43 mm	0.0110 — 0.0169 in.
		Limit	0.43 mm	0.0169 in.
	Low speed gear thrust clearance	STD	0.20 — 0.45 mm	0.0079 — 0.0177 in.
		Limit	0.45 mm	0.0177 in.
	High speed gear and low speed gear oil clearance	STD	0.0075 — 0.034 mm	0.0003 — 0.0013 in.
		Limit	0.034 mm	0.0013 in.
	Output shaft journal outer diameter (High speed gear)	Limit	41.984 mm	1.6529 in.
		Limit	42.984 mm	1.6923 in.
	Output shaft synchronizer ring to gear clearance	STD	0.75 — 1.65 mm	0.0295 — 0.0650 in.
		Limit	0.75 mm	0.0295 in.
	Shift fork to hub sleeve clearance	STD	0.1 — 0.4 mm	0.0039 — 0.0157 in.
		Limit	0.4 mm	0.0157 in.
	Output shaft journal length (High speed gear)	Limit	46.55 mm	1.8327 in.
		Limit	62.35 mm	2.4547 in.
	High and low hub sleeve snap ring thickness	Mark		
		A	2.60 mm	0.1024 in.
		B	2.65 mm	0.1043 in.
		C	2.70 mm	0.1063 in.
		D	2.75 mm	0.1083 in.
		E	2.80 mm	0.1102 in.
		F	2.85 mm	0.1122 in.
		G	2.90 mm	0.1142 in.
	Front drive gear piece snap ring thickness	Mark		
		A	2.0 mm	0.0787 in.
		B	2.1 mm	0.0827 in.
		C	2.2 mm	0.0866 in.
		D	2.3 mm	0.0906 in.
		E	2.4 mm	0.0945 in.

Service Data (Cont'd)

Front extension housing assembly	Bearing snap ring	Mark		
		A	1.7 mm	0.0669 in.
		B	1.8 mm	0.0709 in.
	Front output shaft	Mark		
		A	1.8 mm	0.0709 in.
		B	1.9 mm	0.0748 in.
		C	2.0 mm	0.0787 in.
		D	2.1 mm	0.0827 in.
		E	2.2 mm	0.0866 in.
	Preload adjusting shim (Idler gear side)	Mark		
		A	0.15 mm	0.0059 in.
		B	0.30 mm	0.0118 in.
		C	0.45 mm	0.0177 in.
		D	2.40 mm	0.0945 in.
		E	2.60 mm	0.1024 in.
		F	2.80 mm	0.1102 in.
		G	3.00 mm	0.1181 in.
		H	3.20 mm	0.1260 in.
		J	3.40 mm	0.1339 in.
		K	3.60 mm	0.1417 in.
		L	3.80 mm	0.1496 in.
		M	4.00 mm	0.1575 in.
	Preload adjusting shim (Output shaft side)	Mark		
		A	0.15 mm	0.0059 in.
		B	0.30 mm	0.0118 in.
		C	0.45 mm	0.0177 in.
		D	1.00 mm	0.0394 in.
		E	1.20 mm	0.0473 in.
		F	1.40 mm	0.0551 in.
		G	1.60 mm	0.0630 in.
		H	1.80 mm	0.0709 in.
		J	2.00 mm	0.0787 in.
		K	2.20 mm	0.0866 in.
		L	2.40 mm	0.0945 in.
		M	2.60 mm	0.1024 in.

Torque Specifications

Part tightened	N·m	kgf·cm	ft·lbf
Screw plug (Rear extension housing)	19	190	14
Oil pump cover	4.9	50	43 in.·lbf
Oil receiver × Front case	5.4	55	48 in.·lbf
Shift outer lever × Inner lever	12	120	9
Oil strainer × Rear case	4.9	50	43 in.·lbf
Oil receiver × Rear case	13	130	9
Front case × Rear case	37	380	27
Case cover × Rear case	37	380	27
Rear extension housing × Rear case	37	380	27
Lock nut	128	1,300	94
Front extension housing × Front case	37	380	27
4WD indicator switch	37	380	27
Screw plug (Front case)	19	190	14
Motor actuator × Front case	19	195	14

SUSPENSION AND AXLE**Service Data**

Cold tire inflation pressure kPa (kgf/cm ² , psi)	Destination	Model	Tire size	Front	Rear
	Europe	HZJ 70, 73 PZJ 70, 73 PZJ 75 RJ 70, 73 LJ 70, 73 LJ 77	215/80R16 265/75R15 205R16C8 7.50-16-8 7.00-16-6 215/80R16 265/75R15 215/80R16 265/75R15	180 (1.8, 26) 180 (1.8, 26) 220 (2.2, 32) 240 (2.4, 35) 180 (1.8, 26) 160 (1.6, 23) 180 (1.8, 26) 180 (1.8, 26) 180 (1.8, 26) 180 (1.8, 26)	200 (2.0, 29) 200 (2.0, 29) 450 (4.5, 65) 350 (3.5, 51) 240 (2.4, 35) 200 (2.0, 29) 200 (2.0, 29) 260 (2.6, 38) 200 (2.0, 29)
	Australia	FJ 75 HZJ 70, 73 PZJ 70, 73 FJ 70, 73 HZJ 75 LJ 70 RJ 70	7.50R16-8 7.50R16-6 265/75R15 7.50R16-8 205R16C-6 265/75R15	220 (2.2, 32) 200 (2.0, 29) 180 (1.8, 26) 220 (2.2, 32) 170 (1.7, 24) 180 (1.8, 26)	390 (3.9, 57) 350 (3.5, 51) 200 (2.0, 29) 390 (3.9, 57) 220 (2.2, 32) 200 (2.0, 29)
		Middle East	FZJ 70, 73 FZJ 75 FZJ 75 (P/U only) RJ 77 HZJ 75	7.50R16-6 7.50R16-8 31 × 10.50R15 7.50R16-8 (Sahara tire) 7.50R16-8 7.50R16-8 (Sahara tire) 235/95R15C-6 (Sand tire) 205R16C-6 31 × 10.50R15 7.50-16-8 7.50R16-8 7.50R16-8 (Sahara tire) 235/95R15C-6 (Sand tire)	200 (2.0, 29) 225 (2.25, 33) 180 (1.8, 26) 210 (2.1, 30) 225 (2.25, 33) 210 (2.1, 30) 180 (1.8, 26) 200 (2.0, 29) 190 (1.9, 28) 240 (2.4, 35) 225 (2.25, 33) 210 (2.1, 30) 220 (2.2, 32)
	South Africa	FZJ 75 HZJ 75	7.50R16-6 7.50R16-6	225 (2.25, 33) 240 (2.4, 35)	375 (3.75, 54) 350 (3.5, 51)
		Others	FZJ 70, 73 FZJ 75 FJ 70 FJ70, 73 FJ 75	7.00R15-6 7.50R16-6 7.50-16-6 7.50R16-8 31 × 10.50R15 7.50R16-8 (Sahara tire) 7.50-16-8 7.50R16-6 7.50R16-8 7.50R16-8 (Sahara tire) 235/95R15C-6 (Sand tire) 31 × 10.50R15 7.00-15-6 7.50R16-8 7.50R16-8 (Sahara tire) 7.50-16-8 7.50R16-8 7.50R16-8 (Sahara tire)	275 (2.75, 40) 225 (2.25, 33) 200 (2.0, 29) 225 (2.25, 33) 250 (2.5, 36) 270 (2.7, 39) 425 (4.25, 62) — 375 (3.75, 54) 400 (4.0, 58) 220 (2.2, 32) 250 (2.5, 36) 260 (2.6, 38) 225 (2.25, 33) 270 (2.7, 41) 425 (4.25, 62) 375 (3.75, 54) 400 (4.0, 60)

Service Data (Cont'd)

Cold tire inflation pressure kPa (kgf/cm ² , psi)	Destination	Model	Tire size	Front	Rear
	Others (cont'd)	LJ 72	7.00-15-6	180 (1.8, 26)	220 (2.2, 32)
			205R16C-6	170 (1.7, 25)	200 (2.0, 29)
			31 × 10.5R15	180 (1.8, 26)	210 (2.1, 30)
			7.50-16-6	180 (1.8, 26)	180 (1.8, 26)
			7.50R16-6	200 (2.0, 29)	225 (2.25, 33)
			7.00R15-6	200 (2.0, 29)	275 (2.75, 40)
		LJ 77, 79	205R16C-6	200 (2.0, 29)	320 (3.2, 46)
			31 × 10.5R15	190 (1.9, 28)	280 (2.8, 41)
		LJ 79	7.50-16-6	180 (1.8, 26)	260 (2.6, 38)
			7.50R16-6	225 (2.25, 33)	350 (3.5, 51)
		RJ 70	7.00-15-6	180 (1.8, 26)	220 (2.2, 32)
			205R16C-6	170 (1.7, 25)	200 (2.0, 29)
			31 × 10.5R15	180 (1.8, 26)	210 (2.1, 30)
			7.50-16-6	180 (1.8, 26)	180 (1.8, 26)
			7.50R16-6	200 (2.0, 29)	225 (2.25, 33)
			7.00R15-6	200 (2.0, 29)	275 (2.75, 40)
		RJ 77	205R16C-6	200 (2.0, 29)	320 (3.2, 46)
			31 × 10.5R15	190 (1.9, 28)	280 (2.8, 41)
			7.50-16-6	180 (1.8, 26)	260 (2.6, 38)
			7.50R16-6	225 (2.25, 33)	350 (3.5, 51)
		HZJ 75	7.50-16-6	180 (1.8, 26)	—
			7.50-16-8 (Lug type)	240 (2.4, 35)	425 (4.25, 62)
			7.50-16-8 (JEEP SERVICE)	240 (2.4, 35)	425 (4.25, 62)
			7.50-16-8 (Rib & lug type)	—	350 (3.5, 51)
			7.50R16-8	225 (2.25, 32)	375 (3.75, 54)
			7.50R16-8 (Sahara tire)	210 (2.1, 32)	400 (4.0, 60)
		HZJ 75 (P/U only)	235/95R15C-6 (Sand tire)	240 (2.4, 35)	425 (4.25, 62)
		PZJ 70, 73	7.00-15-6	180 (1.8, 26)	260 (2.6, 38)
			7.00R15-6	200 (2.0, 29)	275 (2.75, 40)
			7.50R16-6	200 (2.0, 29)	225 (2.25, 33)
	7.50-16-6		180 (1.8, 26)	200 (2.0, 29)	
7.50R16-8	200 (2.0, 29)		225 (2.25, 33)		
31 × 10.50R15	180 (1.8, 26)		250 (2.5, 36)		
7.50R16-8 (Sahara tire)	210 (2.1, 32)		270 (2.7, 41)		
PZJ 75	7.50R16-6		225 (2.25, 33)	—	
	7.50-16-8	240 (2.4, 35)	425 (4.25, 62)		
	7.50R16-8	225 (2.25, 32)	375 (3.75, 54)		
	7.50R16-8 (Sahara tire)	210 (2.1, 32)	400 (4.0, 60)		
PZJ 75 (P/U only)	7.50-16-6	180 (1.8, 26)	—		
	7.50-16-8	—	400 (4.0, 58)		
	235/95R15C-6 (Sand tire)	180 (1.8, 26)	220 (2.2, 32)		
Chassis ground clearance (Coil spring type) mm (in.)	Tire size		Front		Rear
	7.00-15-6		471 (18.54)		473 (18.62)
	215/80R16		458 (18.03)		460 (18.11)
	205R16C-6		459 (18.07)		461 (18.15)
	265/75R15		476 (18.74)		478 (18.82)
	31 × 10.50R15-6		476 (18.74)		478 (18.82)
	7.00-16-6		483 (19.01)		485 (19.09)
	7.50-16-6		499 (19.66)		501 (19.72)
	7.00R15-6		471 (18.54)		473 (18.62)
7.50R16-6		499 (19.01)		501 (19.72)	
Bound stopper clearance (Leaf spring type)	Front bound stopper clearance			43 mm	1.69 in.
	Rear bound stopper clearance			48 mm	1.89 in.

Service Data (Cont'd)

Front wheel alignment	Suspension type					
	Leaf spring type	Camber		1°00' ± 45'		
		Cross camber		30' or less		
		Steering axis inclination		12°00' ± 45'		
		Caster (Cross caster)	Short, Middle	3°15' ± 45' (30' or less)		
			Long (Van)	2°50' ± 45' (30' or less)		
			Long (Pick up)	2°30' ± 45' (30' or less)		
		Toe-in	Radial tire (31×10.50R15-6) (265/75R15)	-1 ± 2 mm	-0.04 ± 0.08 in.	
			Radial tire (Others)	1 ± 2 mm	0.04 ± 0.08 in.	
			Bias tire	4 ± 2 mm	0.16 ± 0.08 in.	
		Wheel angle (Max.)	Tire size	Inside wheel	Outside wheel	
			7.50-16-6 (JEEP SERVICE) 7.50-16-8 (JEEP SERVICE) 235/95R-15C	30°00' +0° -3°	28°00'	
			Others	32°00' +0° -3°	30°00'	
		Coil spring type	Camber		1°00' ± 45'	
			Cross camber		30' or less	
			Steering axis inclination		12°00' ± 45'	
	Caster		5°23' ± 45'			
	Cross caster		30' or less			
	Toe-in		Tire			
			Bias tire	4 ± 2 mm	0.16 ± 0.08 in.	
			Radial tire (215/80R16) (205R16C-6)	1 ± 2 mm	0.04 ± 0.08 in.	
			Radial tire (265/75R15) (31×10.50R15-6)	-1 ± 2 mm	-0.04 ± 0.08 in.	
	Wheel angle			Inside wheel	Outside wheel	
Max.		32°00' +0° -3°	30°00'			
Front suspension	Wheel bearing preload (rotating load at hub bolt)		27 — 56 N 2.8 — 5.7 kgf 6.2 — 12.6 lbf			
Front differential	Drive pinion bearing preload (at starting)					
	RJ and LJ series					
	New bearing		1.9 — 2.5 N·m 19 — 26 kgf·cm 16.5 — 22.6 in.·lbf			
	Reused bearing		0.9 — 1.3 N·m 9 — 13 kgf·cm 7.8 — 11.3 in.·lbf			
	PZJ, HZJ and FZJ series					
	New bearing		1.0 — 1.6 N·m 10 — 16 kgf·cm 8.7 — 13.9 in.·lbf			
	Reused bearing		0.5 — 0.8 N·m 5 — 8 kgf·cm 4.3 — 6.9 in.·lbf			
	Total preload (at starting)		Add drive pinion bearing preload			
			0.4 — 0.6 N·m 4 — 6 kgf·cm 3.5 — 5.2 in.·lbf			
	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		0.10 mm 0.0039 in.				
Companion flange deviation						
Radial		0.10 mm 0.0039 in.				
Lateral		0.10 mm 0.0039 in.				
Limit						
Limit						

Service Data (Cont'd)

Front differential (cont'd)	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.
		2.33 mm	0.0917 in.
	Rear oil seal drive in depth	1.0 mm	0.039 in.
Rear suspension	Rear axle shaft	Maximum runout	0.8 mm 0.031 in.
	Hub axial play		Less than 0.1 mm (0.004 in.)
	Wheel bearing preload (at starting)		
	Axle housing and lock nut distance	—0.2 — 0.9 mm	—0.008 — 0.035 in.

Torque Specifications

Front axle and suspension	Part tightened	N·m		
		kgf·cm	ft·lbf	
Front axle and suspension	Free wheeling hub body × Axle hub	31	315	23
	Free wheeling hub body × Free wheeling hub cover	10	100	7
	Electrical locking hub body sub-assembly × Axle hub	31	315	23
	Electrical locking hub cover sub-assembly × Electrical locking hub body sub-assembly	31	315	23
	Electrical locking hub slip ring mounting nut	7.4	75	65 in.·lbf
	Axle hub × Flange	31	315	23
	Hub bearing lock nut	64	650	47
	Axle carrier × Disc brake cylinder (w/ Disc brake)	123	1,250	90
	Disc brake cylinder (w/ Disc brake) × Brake tube	15	155	11
	Knuckle arm × Tie rod end	91	925	67
	Axle housing × Backing plate	123	1,250	90
	Bearing lock nut	59	600	43
	Axle hub × Axle shaft	17	175	13
	Disc brake cylinder (w/ Disc brake) × Axle carrier	88	900	65

Torque Specifications (Cont'd)

Differential (8 in. type)	Part tightened	N·m	kgf·cm	ft·lbf
	Propeller shaft × Companion flange	74	750	54
	Drive pinion × Companion flange	196 — 343	2,000 — 3,500	145 — 253
	Ring gear × Differential case	97	985	71
	Side bearing cap × Differential carrier	78	800	58
	Differential carrier × Axle housing	25	250	18
	Differential LH case × RH case	47	480	35
	Differential lock shaft retainer	24	240	17
	Differential lock straight screw plug	22	220	16
	Differential lock indicator switch	40	410	30
	Differential lock actuator	26	270	20
	Drain plug	49	500	36
	Filler plug	49	500	36
	Bearing cap × Nut lock	13	130	9

BODY

Torque Specifications

Part tightened	N·m	kgf·cm	ft·lbf
SEAT BELTS			
ELR × Body	7.8	80	69 in.·lbf
Seat belt anchor × Body	43	440	32
FUEL TANK			
Fuel tank bracket × Body	39	400	29

LUBRICANT

Item	Capacity			Classification
	Liters	US qts	Imp.qts	
Transfer oil	1.3	1.4	1.1	API GL-4 or GL-5, SAE 75W-90

(Station Wagon)

CLUTCH

Service Data

Pedal height (from asphalt sheet)			173 mm	6.81 in.
Pedal freeplay	w/o Clutch booster		13 — 23 mm	0.51 — 0.91 in.
	w/ Clutch booster		15 — 30 mm	0.59 — 1.18 in.
Push rod play at pedal top			1 — 5 mm	0.04 — 0.20 in.
Booster air valve stroke at pedal top			5 — 9 mm	0.20 — 0.35 in.
Booster push rod to piston clearance		w/SST	0 mm	0 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	N·m	kgf·cm	ft·lbf
Master cylinder × Body	7.8	80	69 in.·lbf
Clutch line union	15	155	11
Clevis lock nut	25	250	18
Master cylinder × Clutch booster	13	130	9
Clutch booster × Body	13	130	9
Accumulator bracket × Accumulator housing	5.4	55	48 in.·lbf
Accumulator line union	15	155	11
Accumulator bleeder plug	11	110	8
Release cylinder set bolt	12	120	9
Release cylinder bleeder plug	11	110	8
Clutch cover × Flywheel			
H151F transmission	39	400	29
Others	19	195	14

MANUAL TRANSMISSION (H151F)**Service Data**

Output shaft			
1st gear journal diameter	Limit	49.979 mm	1.9677 in.
2nd gear journal diameter	Limit	57.984 mm	2.2828 in.
3rd gear journal diameter	Limit	37.979 mm	1.4952 in.
5th gear journal diameter	Limit	45.984 mm	1.8104 in.
Frang thickness	Limit	4.725 mm	0.1860 in.
Runout	Limit	0.05 mm	0.0020 in.
Counter gear			
Roller bearing journal diameter	STD	35.957 — 35.970 mm	1.4156 — 1.4161 in.
	Limit	35.957 mm	1.4156 in.
Gear thrust clearance			
1st & 3rd gear	STD	0.1 — 0.45 mm	0.0039 — 0.0177 in.
	Limit	0.45 mm	0.0177 in.
2nd & 5th gear	STD	0.1 — 0.35 mm	0.0039 — 0.0138 in.
	Limit	0.35 mm	0.0138 in.
Reverse gear	STD	0.1 — 0.67 mm	0.0039 — 0.0264 in.
	Limit	0.67 mm	0.0264 in.
Gear oil clearance			
1st & 3rd gear	STD	0.020 — 0.073 mm	0.0008 — 0.0029 in.
	Limit	0.073 mm	0.0029 in.
2nd & 5th gear	STD	0.015 — 0.068 mm	0.0006 — 0.0027 in.
	Limit	0.068 mm	0.0027 in.
Shift fork to hub sleeve clearance	Limit	0.35 mm	0.0138 in.
Synchronizer ring to gear clearance			
1st & 2nd gear	STD	0.85 — 1.4 mm	0.0335 — 0.0551 in.
	Limit	0.85 mm	0.0335 in.
3rd & reverse gear	STD	0.75 — 1.3 mm	0.0295 — 0.0512 in.
	Limit	0.75 mm	0.0295 in.
Oil seal drive in depth			
Front bearing retainer		15.4 — 16.2 mm	0.6063 — 0.6378 in.
Input shaft to synchronizer ring	Limit	0.6 mm	0.0236 in.
Input shaft snap ring thickness			
	Mark		
	A	2.50 — 2.55 mm	0.0984 — 0.1004 in.
	B	2.55 — 2.60 mm	0.1004 — 0.1024 in.
	C	2.60 — 2.65 mm	0.1024 — 0.1043 in.
	D	2.65 — 2.70 mm	0.1043 — 0.1063 in.
	E	2.70 — 2.75 mm	0.1063 — 0.1083 in.
	F	2.75 — 2.80 mm	0.1083 — 0.1102 in.
Counter gear snap ring (Front bearing)			
	Mark		
	A	2.45 — 2.50 mm	0.0970 — 0.0984 in.
	B	2.50 — 2.55 mm	0.0984 — 0.1004 in.
	C	2.55 — 2.60 mm	0.1004 — 0.1024 in.
	D	2.60 — 2.65 mm	0.1024 — 0.1043 in.
	E	2.65 — 2.70 mm	0.1043 — 0.1063 in.
	F	2.70 — 2.75 mm	0.1063 — 0.1083 in.
Output shaft snap ring thickness			
Hub sleeve No.3	Mark		
	A	2.40 — 2.45 mm	0.0945 — 0.0965 in.
	B	2.45 — 2.50 mm	0.0965 — 0.0984 in.
	C	2.50 — 2.55 mm	0.0984 — 0.1004 in.
	D	2.55 — 2.60 mm	0.1004 — 0.1024 in.
	E	2.60 — 2.65 mm	0.1024 — 0.1044 in.
	F	2.65 — 2.70 mm	0.1044 — 0.1063 in.

Specifications (Cont'd)

Output shaft snap ring thickness (cont'd)			
Hub sleeve No.2	Mark		
	4	1.90 — 1.95 mm	0.0748 — 0.0768 in.
	5	1.95 — 2.00 mm	0.0768 — 0.0787 in.
	6	2.00 — 2.05 mm	0.0787 — 0.0807 in.
	7	2.05 — 2.10 mm	0.0807 — 0.0827 in.
	8	2.10 — 2.15 mm	0.0827 — 0.0847 in.
	9	2.15 — 2.20 mm	0.0847 — 0.0866 in.
Hub sleeve No.1	Mark		
	A	2.90 — 2.95 mm	0.1142 — 0.1162 in.
	B	2.95 — 3.00 mm	0.1162 — 0.1181 in.
	C	3.00 — 3.05 mm	0.1181 — 0.1201 in.
	D	3.05 — 3.10 mm	0.1201 — 0.1220 in.
	E	3.10 — 3.15 mm	0.1220 — 0.1240 in.
	F	3.15 — 3.20 mm	0.1240 — 0.1260 in.
Rear bearing	Mark		
	A	2.40 — 2.45 mm	0.0945 — 0.0965 in.
	B	2.45 — 2.50 mm	0.0965 — 0.0984 in.
	C	2.50 — 2.55 mm	0.0984 — 0.1004 in.
	D	2.55 — 2.60 mm	0.1004 — 0.1024 in.
	E	2.60 — 2.65 mm	0.1024 — 0.1044 in.
	F	2.65 — 2.70 mm	0.1044 — 0.1063 in.
	G	2.70 — 2.75 mm	0.1063 — 0.1083 in.
	H	2.75 — 2.80 mm	0.1083 — 0.1102 in.
Oil pump			
Body clearance of driven rotor	STD	0.075 — 0.170 mm	0.0030 — 0.0067 in.
	Limit	0.17 mm	0.0067 in.
Tip clearance of both rotors	STD	0.10 — 0.22 mm	0.0039 — 0.0087 in.
	Limit	0.22 mm	0.0087 in.
Reverse idler gear oil clearance	STD	0.015 — 0.059 mm	0.0006 — 0.0023 in.
	Limit	0.059 mm	0.0023 in.

Torque Specifications

Part tightened	N·m	kgf·cm	ft·lbt
Shift lever control retainer × Transmission case	17	170	12
Restrict pin	37	380	27
Oil receiver × Transmission case	12	120	7
Back-up light switch	44	450	33
Top switch	44	450	33
Drain plug	37	380	27
Front bearing retainer × Transmission case	16	170	12
Clutch housing × Transmission case	37	380	27
Oil strainer × Transfer adaptor	12	120	7
Oil receiver × Intermediate plate	18	185	13
Transmission case × Transfer adaptor	37	380	27
Rear bearing retainer × Intermediate plate	18	185	13
Shift fork No.1 set bolt	36	370	27
Shift fork No.2 set bolt	36	370	27
Shift fork No.3 set bolt	36	370	27
Reverse shift fork set bolt	34	350	25
Screw plug	19	190	14
Oil pump cover × Transfer adaptor	17	170	12
Oil pump screw plug	18	185	13
Oil pump taper plug	12	120	9

SUSPENSION AND AXLE

Service Data

Cold tire inflation pressure	Destination	Grade	Tire size	Pressure kPa (kgf/cm ² , psi)	
				Front	Rear
	Australia	STD	7.50R16-6	240 (2.4, 34)	300 (3.0, 43)
			7.50R16-8	240 (2.4, 34)	300 (3.0, 43)
		GX, VX	7.50R16-6	240 (2.4, 34)	320 (3.2, 46)
			265/75R15 112S	180 (1.8, 26)	180 (1.8, 26)
	Destination	Model	Tire size	Pressure kPa (kgf/cm ² , psi)	
				Front	Rear
	Europe	FJ 80 series	215/80R16 107S	210 (2.1, 30)	240 (2.4, 34)
			265/75R15 112S	180 (1.8, 26)	180 (1.8, 26)
		HZJ 80 series (STD)	215/80R16 107S	210 (2.1, 30)	220 (2.2, 31)
		HZJ 80 series (GX)	215/80R16 107S	220 (2.2, 31)	240 (2.4, 34)
			265/75R15 112S	180 (1.8, 26)	180 (1.8, 26)
		HDJ 80 series	215/80R16 107S	230 (2.3, 33)	240 (2.4, 34)
			265/75R15 112S	180 (1.8, 26)	180 (1.8, 26)
	Middle East	FZJ 80 series	7.50R16-8	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8 (Sahara tire)	270 (2.7, 38)	350 (3.5, 50)
			7.50R16-6	250 (2.5, 36)	325 (3.25, 46)
			235/95R15C-6 (Sand tire)	180 (1.8, 26)	200 (2.0, 28)
			31 × 10.50R15L-6	220 (2.2, 32)	280 (2.8, 41)
		HZJ 80 series	7.50R16-8	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8 (Sahara tire)	270 (2.7, 38)	350 (3.5, 50)
			7.50R16-6	250 (2.5, 36)	325 (3.25, 46)
			235/95R15C-6 (Sand tire)	180 (1.8, 26)	200 (2.0, 28)
			31 × 10.50R15L-6	220 (2.2, 32)	280 (2.8, 41)
	Others	FZJ 80 series	7.50-16-6	200 (2.0, 28)	300 (3.0, 43)
			7.50R16-8	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8 (Sahara tire)	270 (2.7, 38)	350 (3.5, 50)
			7.50R16-6	250 (2.5, 36)	325 (3.25, 46)
			235/95R15C-6 (Sand tire)	180 (1.8, 26)	200 (2.0, 28)
			31 × 10.50R15LT-6	220 (2.2, 31)	280 (2.8, 41)
		HZJ 80 series	7.50-16-6	200 (2.0, 28)	300 (3.0, 43)
			7.50R16-8	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8 (Sahara tire)	270 (2.7, 38)	350 (3.5, 50)
			7.50R16-6	250 (2.5, 36)	325 (3.25, 46)
			235/95R15C-6 (Sand tire)	180 (1.8, 26)	200 (2.0, 28)
			31 × 10.50R15LT-6	220 (2.2, 31)	280 (2.8, 41)
		HDJ 80 series	7.50R16-6	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8	250 (2.5, 36)	325 (3.25, 46)
			7.50R16-8 (Sahara tire)	270 (2.7, 38)	350 (3.5, 50)
			235/95R15C-6 (Sand tire)	180 (1.8, 26)	200 (2.0, 28)
			31 × 10.50R15LT-6	220 (2.2, 31)	300 (3.0, 43)

Service Data (Cont'd)

Follow spring and bumper stopper clearance	A: Follow spring clearance (Front) B: Bumper stopper clearance (Rear)	A	B
		25 mm (0.98 in.)	45 mm (1.77 in.)
Front wheel alignment	Camber Cross camber	1° ± 45' 30' or less	
	Steering axis inclination	13°00' ± 45'	
	Caster (31 × 10.50R15LT-6, 265/75R15) (Others) Cross caster	1°40' ± 45' 3°00' ± 45' 30' or less	
Front axle and suspension	Steering knuckle bearing preload (rotating load at knuckle arm end) Axle shaft lateral runout Hub axial play (w/ Full-floating type) Wheel bearing preload Axle housing and lock nut distance	25 — 44 N 2.5 — 4.5 kgf 5.6 — 12.3 lbf 0.8 mm 0.031 in. Less than 0.1 mm (0.004 in.) 6 — 32 N 0.6 — 1.4 kgf 1.3 — 7.2 lbf — 0.2 — 0.9 mm —0.008 — 0.035 in.	

Torque Specifications

Front axle and suspension	Part tightened	N·m	kgf·cm	ft·lbf
	Knuckle stopper bolt	44	450	33
	Free wheeling hub body × Axle hub	31	315	23
	Free wheeling hub cover × Free wheeling hub body	10	100	7
	Axle carrier × Brake tube	15	155	11
	Axle carrier × Disc brake cylinder	123	1,250	90
	Axle hub × Flange	35	360	26
	Hub bearing adjusting nut	59	600	43
	Steering knuckle × Bearing cap	96	980	71
	Steering knuckle × Knuckle arm	96	980	71
	Steering knuckle × Oil seal retainer	5.4	55	48 in.·lbf
	Knuckle arm × Tie rod end	91	925	67
	Disc rotor × Axle hub	74	750	54
	Disc cover × Dust seal	47	475	34
Rear axle and suspension	Axle shaft × Axle hub	33	340	25
	Axle housing × Backing plate	123	1,250	90
	Bearing lock nut	59	600	43
	Brake cylinder × Axle housing	88	900	65

BODY

Torque Specifications

Part tightened	N·m	kgf·cm	ft·lbf
SEAT			
Front Seat			
Seat adjuster × Body	39	400	29
Seat adjuster × Seat	29	300	22
Reclining seat adjuster × Seat cushion	52	530	38
Second Seat			
Seat hinge × Body	39	400	29
Reclining seat adjuster × Seat cushion	52	530	38
Seat inner support × Seat cushion	41	420	30
Seat inner support × Seat lock	43	440	32
Third Seat			
Inner leg × Seat cushion	18	185	13
Striker bar × Body	18	185	13
Outer lock × Seat cushion	41	420	30
Seat adjuster × Seat back (Parallel type)	52	530	38
Seat frame × Body	18	185	13
SEAT BELT			
ELR × Body	5.4	55	48 in.·lbf
Seat belt anchor × Body	43	440	32
FUEL TANK			
Fuel sender gauge set screw	3.9	40	35 in.·lbf
Fuel tank breather set screw	1.5	15	13 in.·lbf
Fuel tank filler pipe lower set screw	3.9	40	35 in.·lbf
Fuel tank front bracket × Body	39	400	29
Drain plug	6.4	65	56 in.·lbf

LUBRICANT

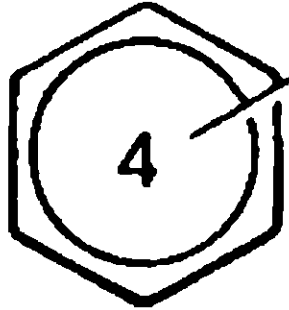
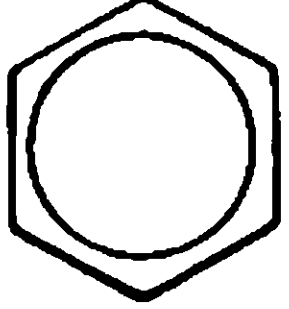
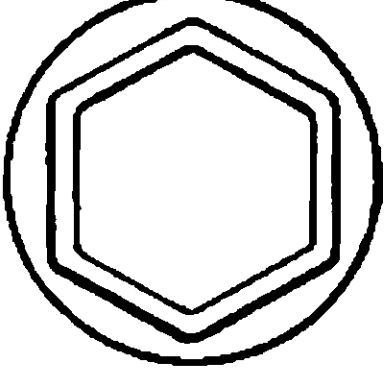
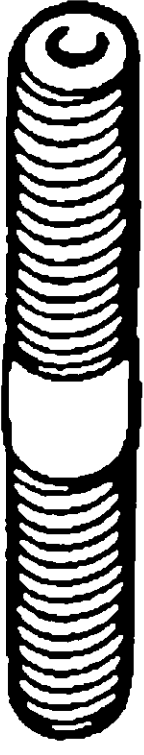
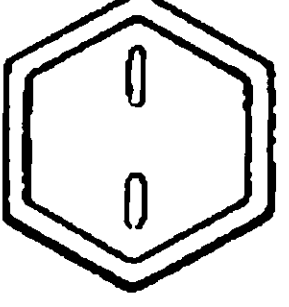
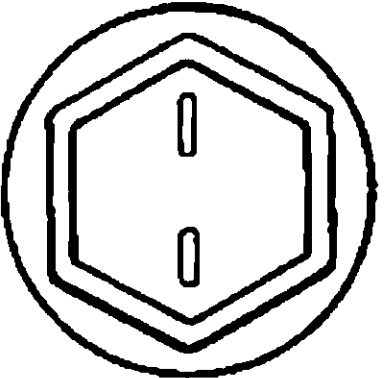
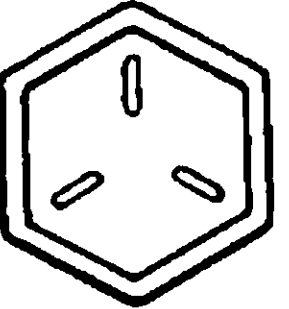
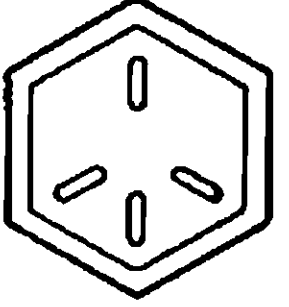
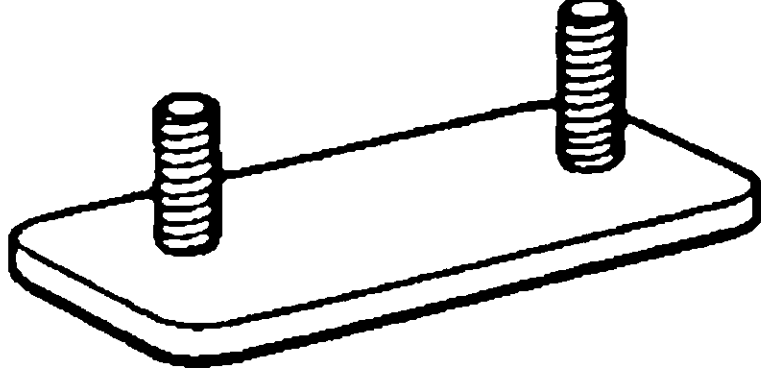
Item	Capacity			Classification
	Liters	US qts	Imp.qts	
Manual transmission oil	2.6	2.7	2.3	API GL-4 or GL-5 SAE 75W-90

STANDARD BOLT TORQUE SPECIFICATIONS

	Page
STANDARD BOLT TORQUE SPECIFICATIONS	B-2

STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	4— 5— 6—  Bolt head No. 7— 8— 9— 10— 11—	4T 5T 6T 7T 8T 9T 10T 11T	Stud bolt	No mark 	4T
	 No mark	4T			
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T	Welded bolt	Grooved 	6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	 Two protruding lines	6T			
Hexagon head bolt	 Three protruding lines	7T			
Hexagon head bolt	 Four protruding lines	8T			
					4T

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	—	—	—
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	—	—	—
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	—	—	—
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	—	—	—
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

SST AND SSM

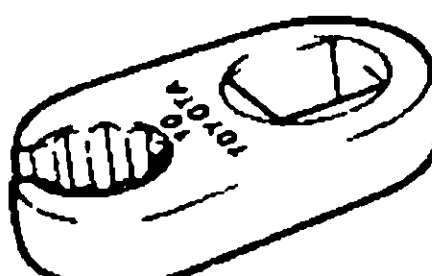
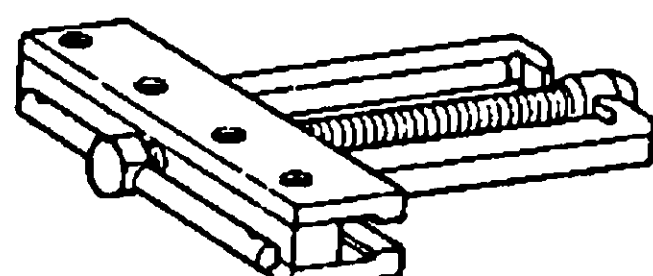
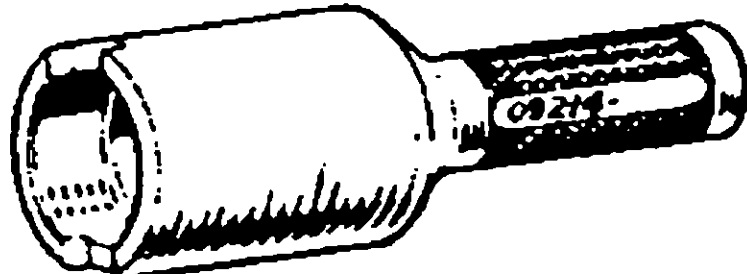
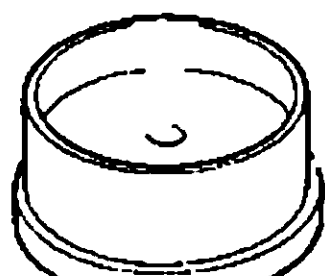
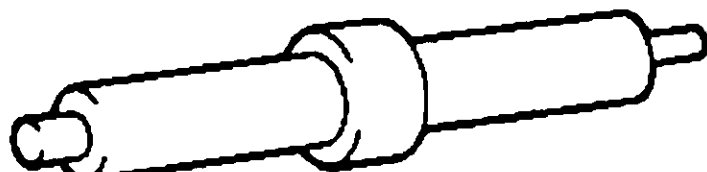
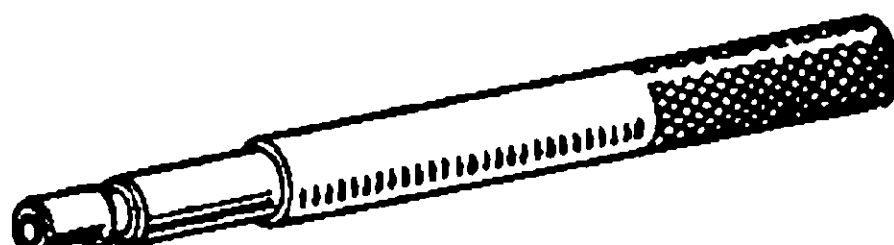
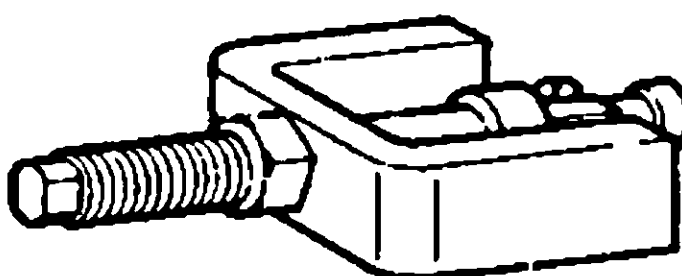
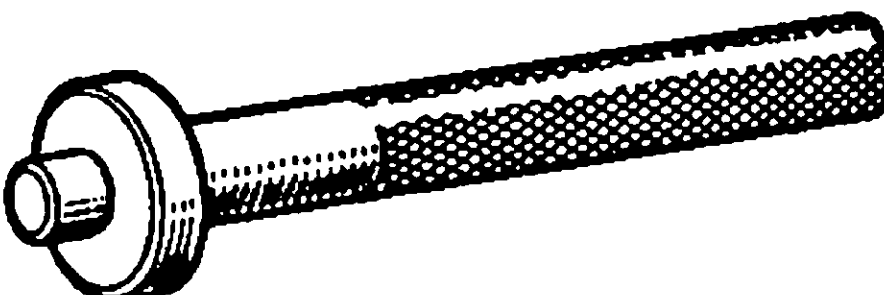
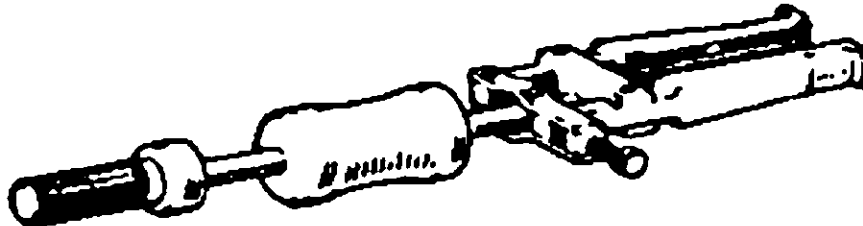
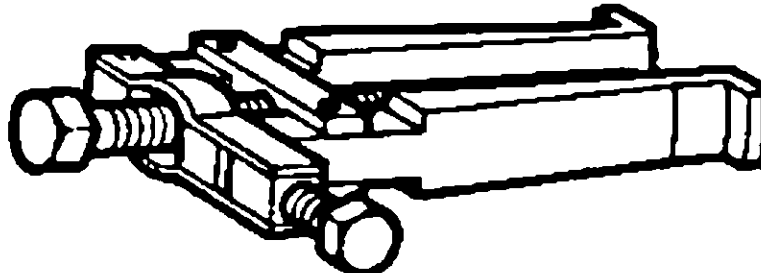
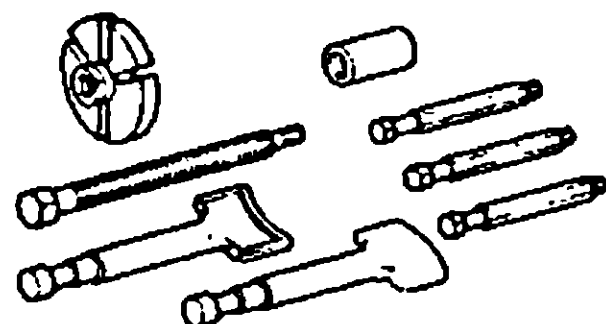
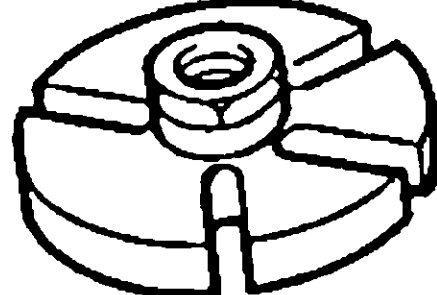
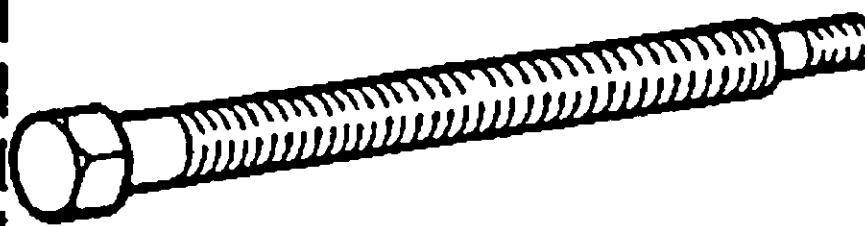
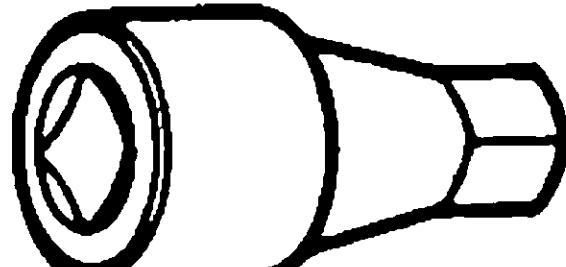
REFER TO FOLLOWING REPAIR MANUAL:

Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (4-Door Hardtop) Chassis and Body Repair Manual Supplement	RM192E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E

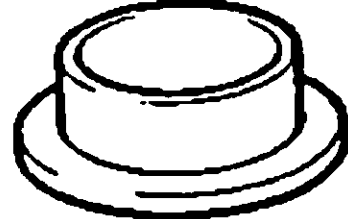
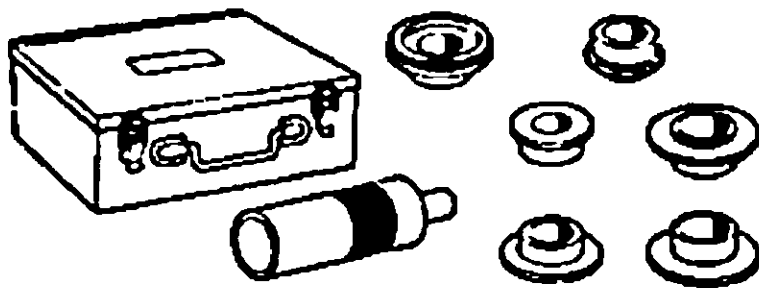
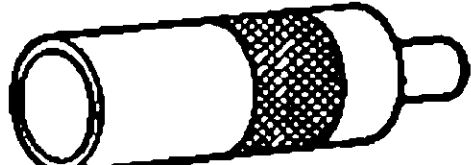
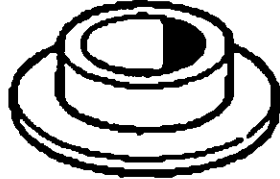
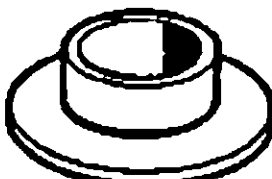
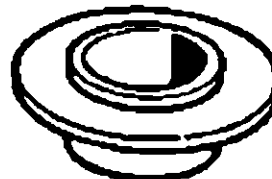
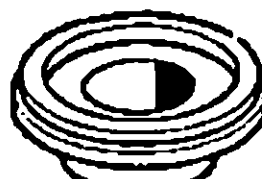
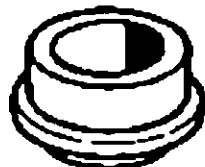
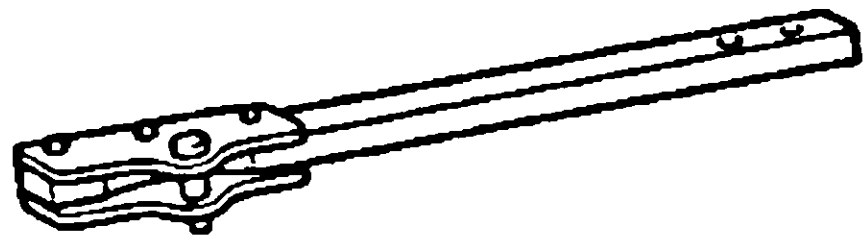
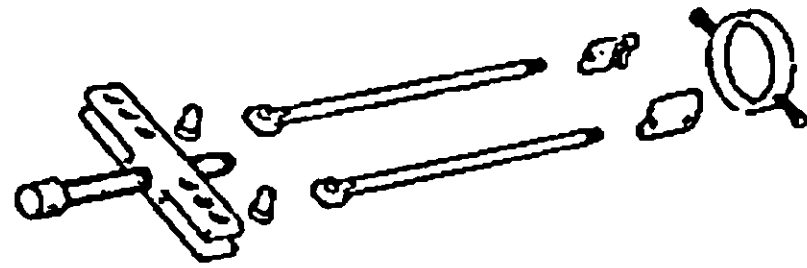
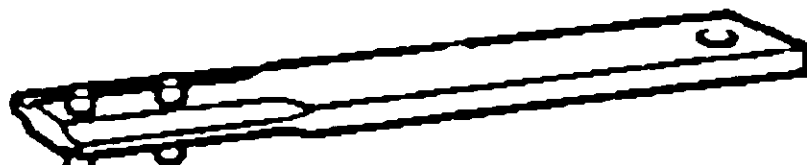
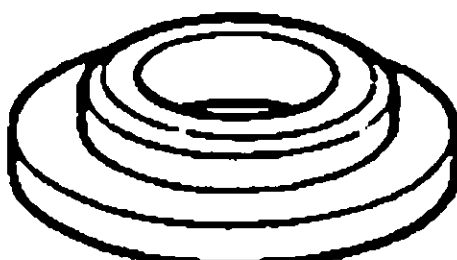
NOTE: The following pages contain only the points which differ from the above listed manual.

	Page
SST (SPECIAL SERVICE TOOLS)	C-2
SSM (SPECIAL SERVICE MATERIALS)	C-7

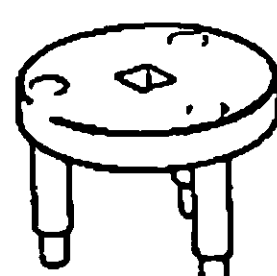
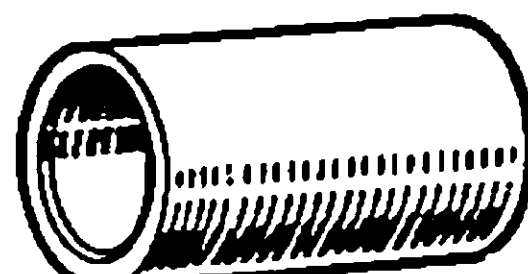
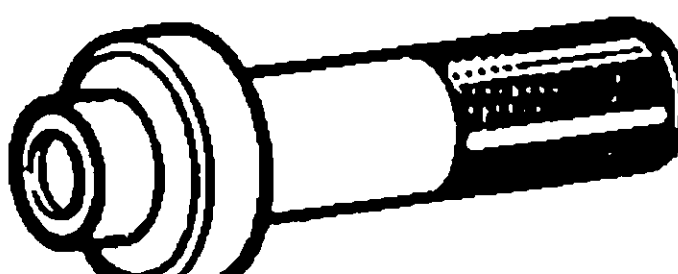
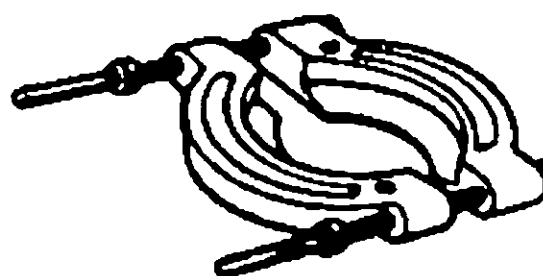
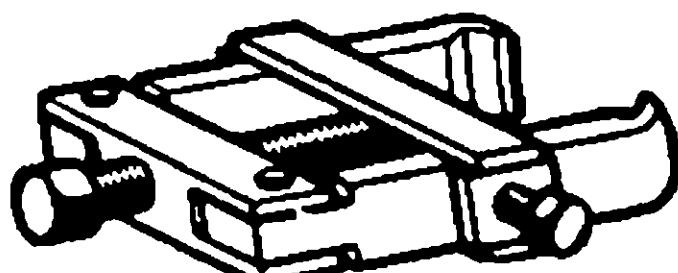
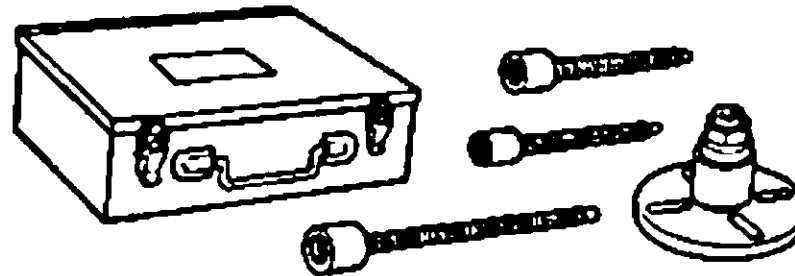
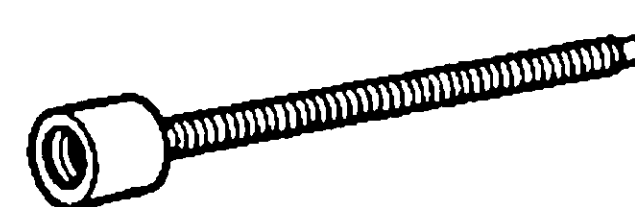
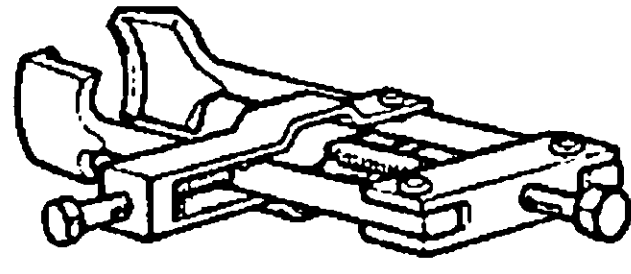
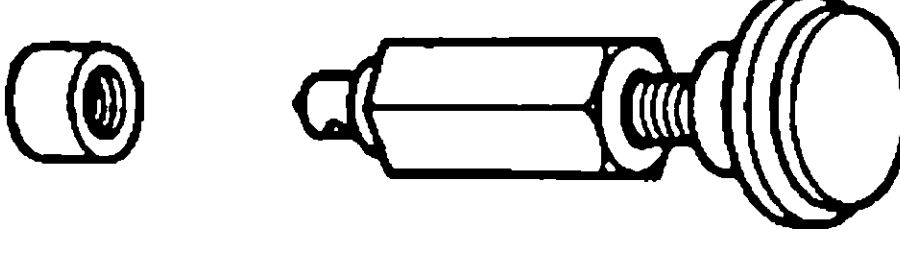
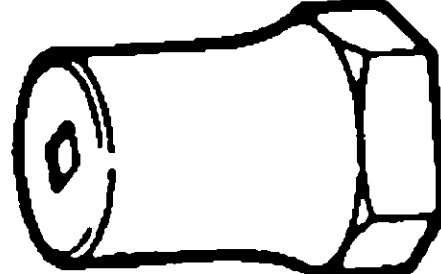
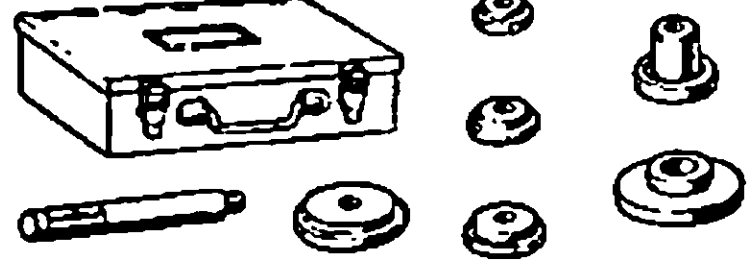
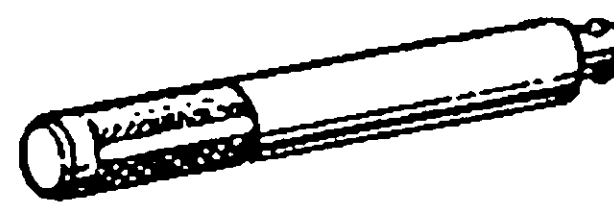
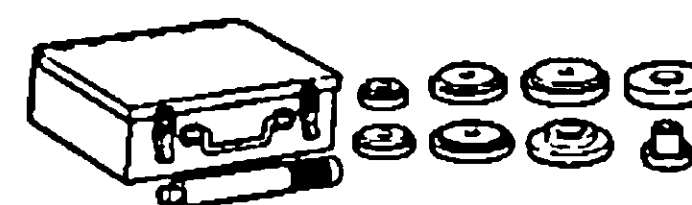
SST (SPECIAL SERVICE TOOLS)

Section			Hardtop and Canvas Top				Station Wagon				Note
Part Name			CL	TF	SA		CL	MT	SA		
Part No.					Front	Rear			Front	Rear	
Illustration											
	09023-00100	Union Nut Wrench 10 mm	●				●				
	09213-27010	Gear Remover		●							
	09214-76011	Crankshaft Pulley Replacer			●						PZJ, HZJ, FZJ series
	09223-15020	Oil Seal & Bearing Replacer			●						2 pinion type
	09301-00120	Clutch Guide Tool					●				
	09301-55022	Clutch Guide Tool	●								
	09303-35011	Input Shaft Front Bearing Puller	●				●				
	09304-30012	Input Shaft Front Bearing Replacer	●				●				
	09308-00010	Oil Seal Puller			●						
	09308-10010	Oil Seal Puller			●						
	09310-17010	Transaxle Gear Remover & Replacer						●			
	(09310-07010)	(Plate)						●			
	(09310-07020)	(Center Bolt)						●			
	09313-30021	Detent Ball Plug Socket			●						w/ Differential lock

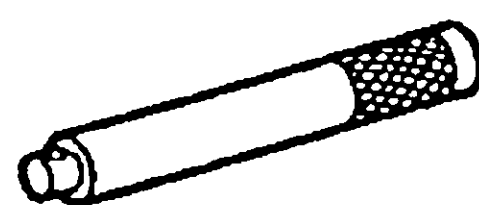
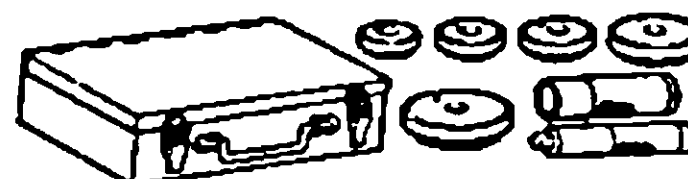
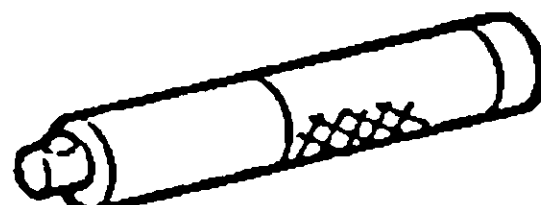
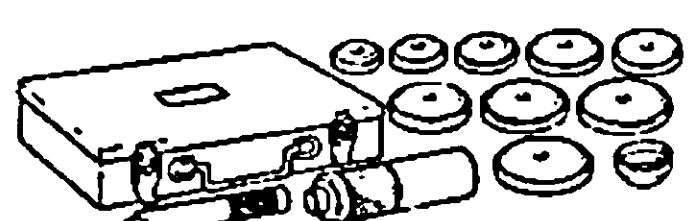
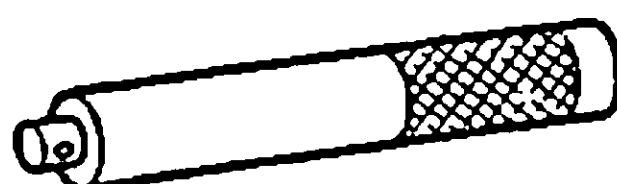
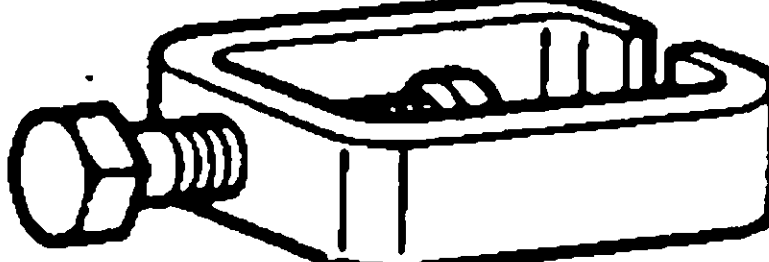
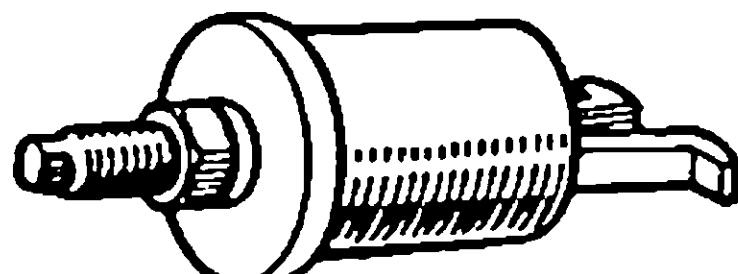
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section			Hardtop and Canvas Top				Station Wagon				Note
Part Name			CL	TF	SA		CL	MT	SA		
Part No.					Front	Rear			Front	Rear	
Illustration											
	09316-20011	Transfer Bearing Replacer		●				●			
	09316-60010	Transmission & Transfer Bearing Replacer		●	●			●			
	(09316-00010)	(Replacer Pipe)		●	*			●			* PZJ, HZJ, FZJ series
	(09316-00020)	(Replacer "A")			*			●			* PZJ, HZJ, FZJ series
	(09316-00030)	(Replacer "B")		●							
	(09316-00040)	(Replacer "C")		●							
	(09316-00050)	(Replacer "D")		●	●						
	(09316-00060)	(Replacer "E")		●							
	(09316-00070)	(Replacer "F")		●							
	09330-00021	Companion Flange Holding Tool		●	●						
	09333-00013	Clutch Diaphragm Spring Aligner	●				●				
	09336-60010	Transmission Gear Remover						●			
	09504-00011	Differential Side Bearing Adjusting Nut Wrench			●						
	09506-30012	Differential Drive Pinion Rear Bearing Cone Replacer			●						

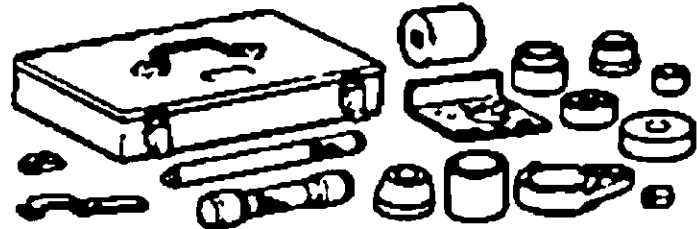
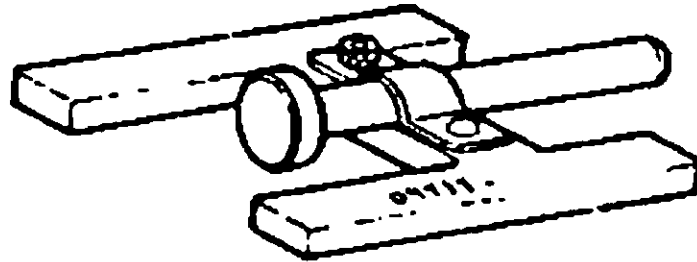
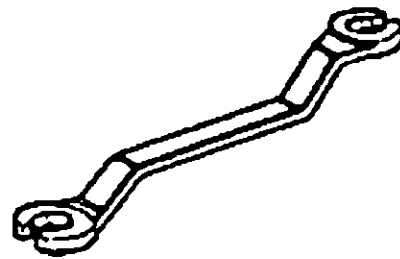
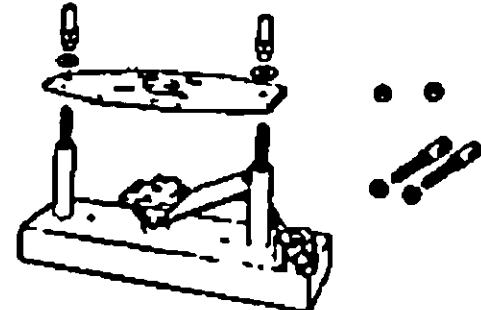
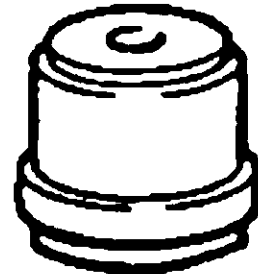
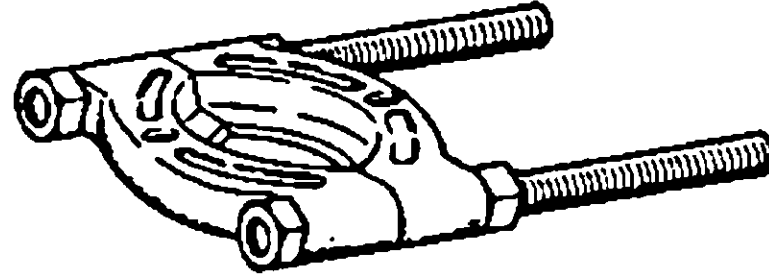
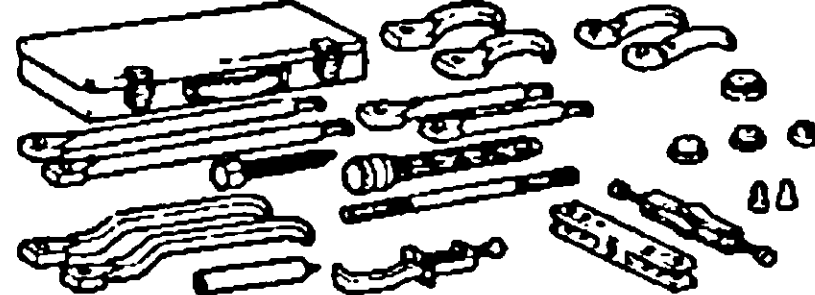
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section			Hardtop and Canvas Top				Station Wagon				Note
Part Name			CL	TF	SA		CL	MT	SA		
Part No.					Front	Rear			Front	Rear	
Illustration											
	09509-25011	Rear Axle Bearing Lock Nut Wrench				●				●	
	09523-36010	Rear Axle Hub Guide Tool						●			Output shaft rear ball bearing
	09554-30011	Differential Oil Seal Replacer			●						RJ, LJ series
	09555-55010	Differential Drive Pinion Bearing Replacer		●				●			
	09556-22010	Drive Pinion Front Bearing Remover			●						
	09557-22022	Companion Flange Remover & Replacer			●						
	(09557-22050)	(No. 3 Bolt)			●						
	09602-35011	Front Axle Inner Bearing Puller						●			Counter gear rear bearing outer race
	09606-60020	Steering Knuckle Bearing Cup Remover							●		
	09607-60020	Front Wheel Adjusting Nut Wrench			●						
	09608-12010	Front Hub & Drive Pinion Bearing Replacer Set						●			
	(09608-00020)	(Remover & Replacer Handle)						●			Oil pump cover oil seal
	(09608-00060)	(Drive Pinion Front Bearing Cup Replacer)						●			Oil pump cover oil seal
	09608-20012	Front Hub & Drive Pinion Bearing Tool Set		●				●			

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section			Hardtop and Canvas Top				Station Wagon				Note
Part Name			CL	TF	SA		CL	MT	SA		
Part No.					Front	Rear			Front	Rear	
Illustration											
	(09608-00040)	(Replacer)		●				●			
	(09608-00080)	(Replacer)		●							
	(09608-03020)	(Handle)		●				●			
	09608-30012	Front Hub & Drive Pinion Bearing Tool Set		●							
	(09608-00060)	(Drive Pinion Front Bearing Cup Replacer)		●							2 pinion type differential
	(09608-04020)	(Handle)		●							RJ, LJ series
	(09608-04060)	(Front Hub Outer Bearing Cup Replacer)		●							
	(09608-04100)	(Drive Pinion Front Bearing Cup Replacer)		●							RJ, LJ series
	(09608-04110)	(Drive Pinion Rear Bearing Cup Replacer)		●							RJ, LJ series
	09608-35014	Axle Hub & Drive Pinion Bearing Tool Set		●							
	(09608-06020)	(Handle)		●							
	(09608-06150)	(Rear Hub Outer Bearing Cup Replacer)		●							
	09611-22012	Tie Rod End Puller			●						RJ, LJ series
	09612-30012	Steering Worm Bearing Puller	●				●				

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section Part Name Part No. Illustration			Hardtop and Canvas Top				Station Wagon				Note
			CL	TF	SA		CL	MT	SA		
					Front	Rear			Front	Rear	
	09616-30020	Steering Worm Bearing Adjusting Screw Wrench			●						
	09630-00012	Power Steering Gear Housing Overhaul Tool Set	●				●				
	(09631-00060)	(Oil Seal Replacer)	●				●				
	09737-00010	Brake Booster Push Rod Gauge	●				●				
	09751-36011	Brake Tube Union Nut 10 x 12 mm Wrench	●		●		●				
	09753-00013	Brake Booster Overhaul Tool Set	●				●				
	09753-30020	Oil Seal Replacer	●				●				
	09950-00020	Bearing Remover		●	●		●				
	09950-20017	Universal Puller		●	●		●				

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Sec.	Use etc.
Seal packing 1281, Three bond 1281 or equivalent	08826-00090	MT	Transmission case × Intermediate plate Transmission case × Front bearing retainer Transfer adaptor × Intermediate plate Transmission case × Shift lever control retainer
		TF	Front case × Rear case Rear case × Case cover Rear case × Rear extension housing Front case × Front extension housing Front case × Motor actuator
Adhesive 1344, Three bond 1344, Loctite 242 or equivalent	08833-00080	MT	Front bearing retainer set bolts Oil pump body set bolts Shift lever control retainer set bolts
		TF	Straight screw plug Rear case set bolts (two bolts) Case cover set bolts

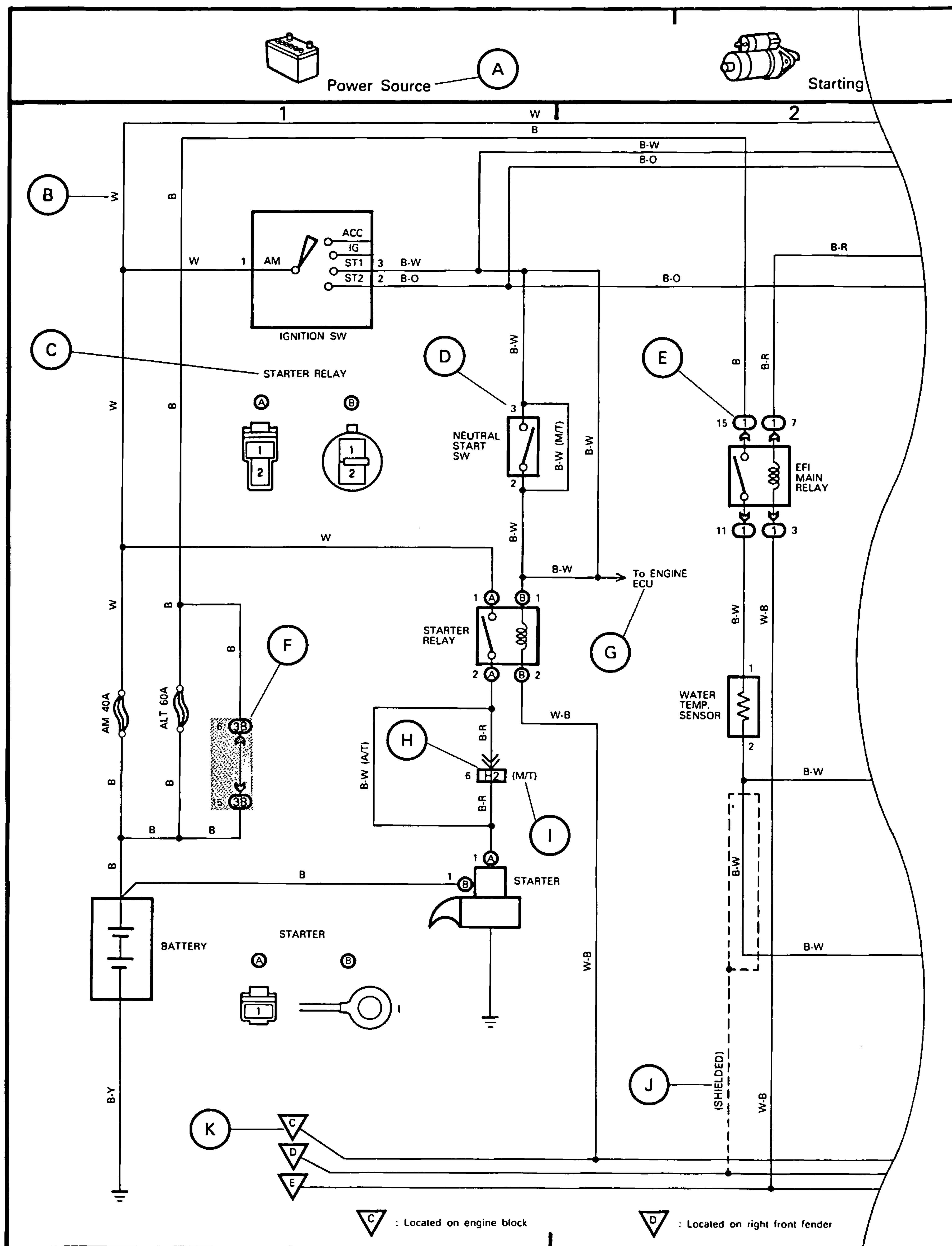
ELECTRICAL WIRING DIAGRAMS

ABBREVIATION

The following abbreviations are used in this wiring diagram.

A/C	=	Air Conditioner
AS	=	Air Suction
A/T	=	Automatic Transmission
CD	=	Compact Disc
COMB.	=	Combination
ECU	=	Electronic Control Unit
EFI	=	Electronic Fuel Injection
EGR	=	Exhaust Gas Recirculation
Ex.	=	Except
FL	=	Fusible Link
J/B	=	Junction Block
LH	=	Left-Hand
M/T	=	Manual Transmission
O/D	=	Overdrive
OVCV	=	Outer Vent Control Valve
PPS	=	Progressive Power Steering
RH	=	Right-Hand
SC	=	Spark Control
SW	=	Switch
TEMP.	=	Temperature
TP	=	Throttle Positioner
VSV	=	Vacuum Switching Valve
w/	=	With
w/o	=	Without
W/G	=	Wagon
2WD	=	Two Wheel Drive Vehicles (4 × 2)
4WD	=	Four Wheel Drive Vehicles (4 × 4)

HOW TO READ THIS SECTION



Ⓐ: System Title

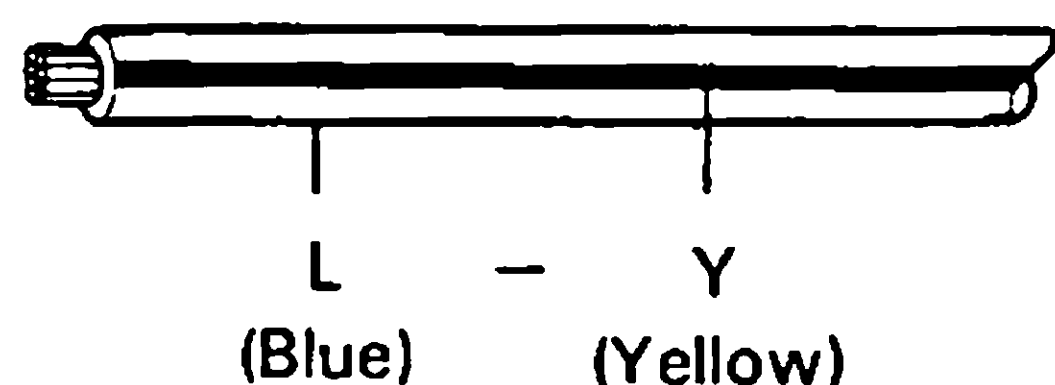
Ⓑ: Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B = Black	L = Blue	R = Red
BR = Brown	LG = Light Green	V = Violet
G = Green	O = Orange	W = White
GR = Gray	P = Pink	Y = Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

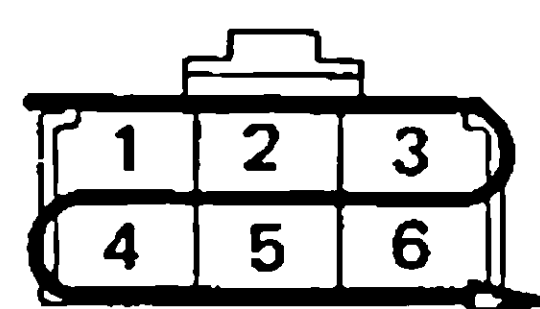
Example: L-Y



Ⓒ: Indicates the connector to be connected to a part (the numeral indicates the pin No.)

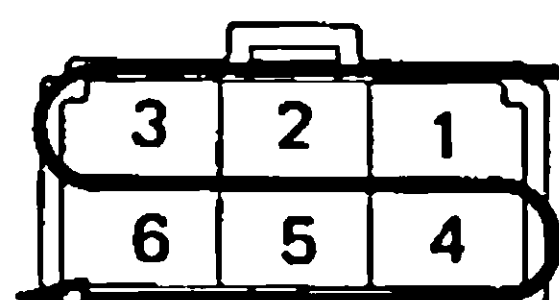
Ⓓ: Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example: Numbered in order from upper left to lower right



Female

Numbered in order from upper right to lower left



Male

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The numbering system for the overall wiring diagram is the same as above.

Ⓔ: Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: ① Indicates Relay Block No.1.

Ⓕ: Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts (different junction blocks are shaded differently for further clarification).

Example:

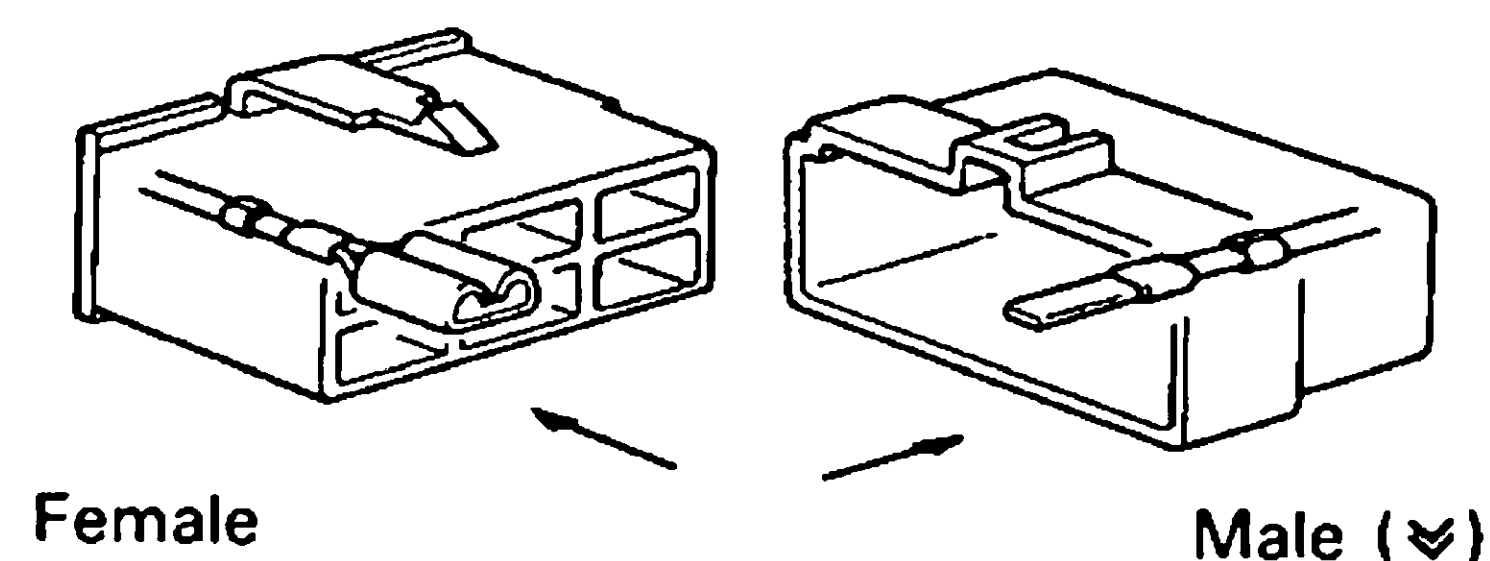


3B indicates that it is inside Junction Block No.3.

Ⓖ: Indicates related system.

Ⓖ: Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (↗). Outside numerals are pin numbers.

- All connectors are shown from the open end, and the lock is on top.



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Ⓖ: () are used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

Ⓖ: Indicates a shielded cable.

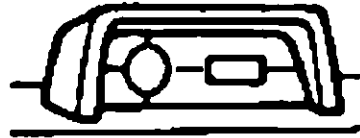
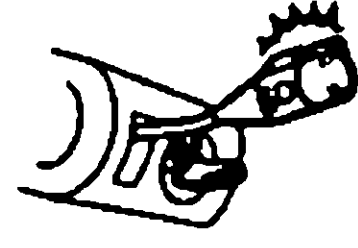
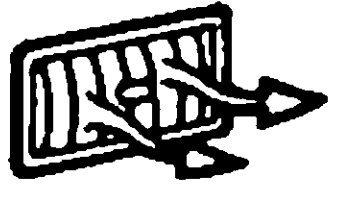
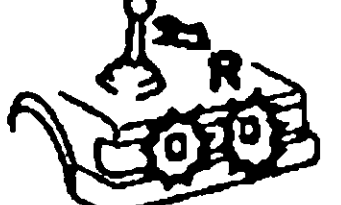
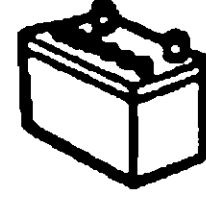
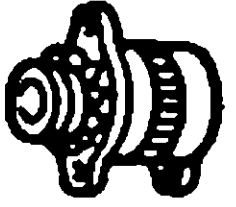
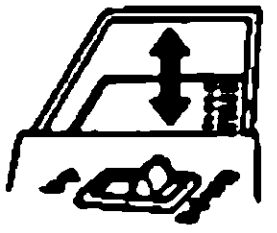
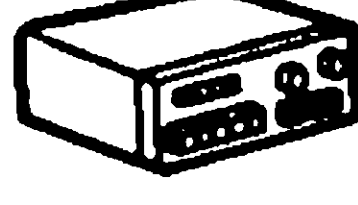
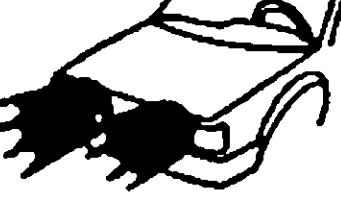
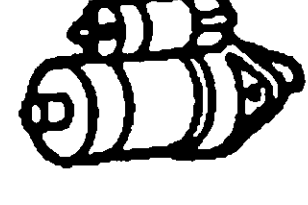
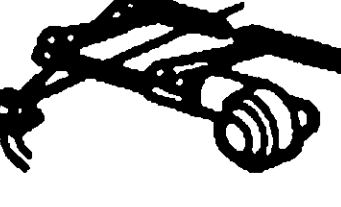
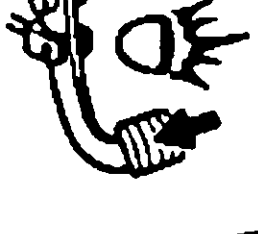
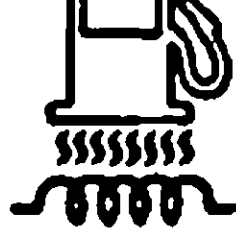
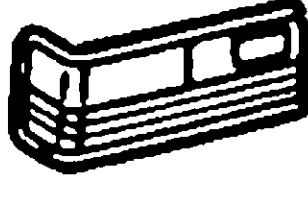
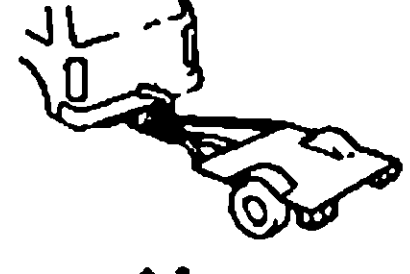
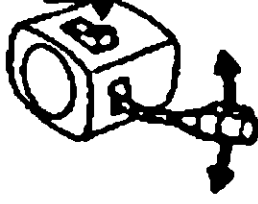
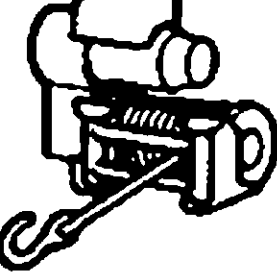
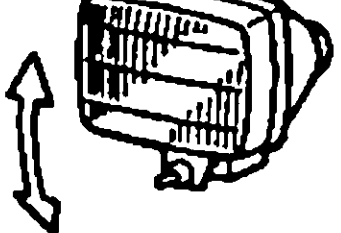
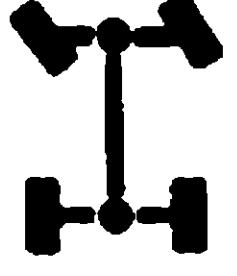
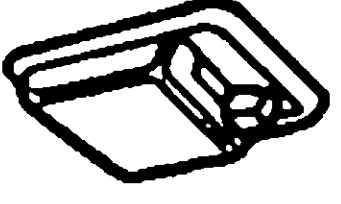


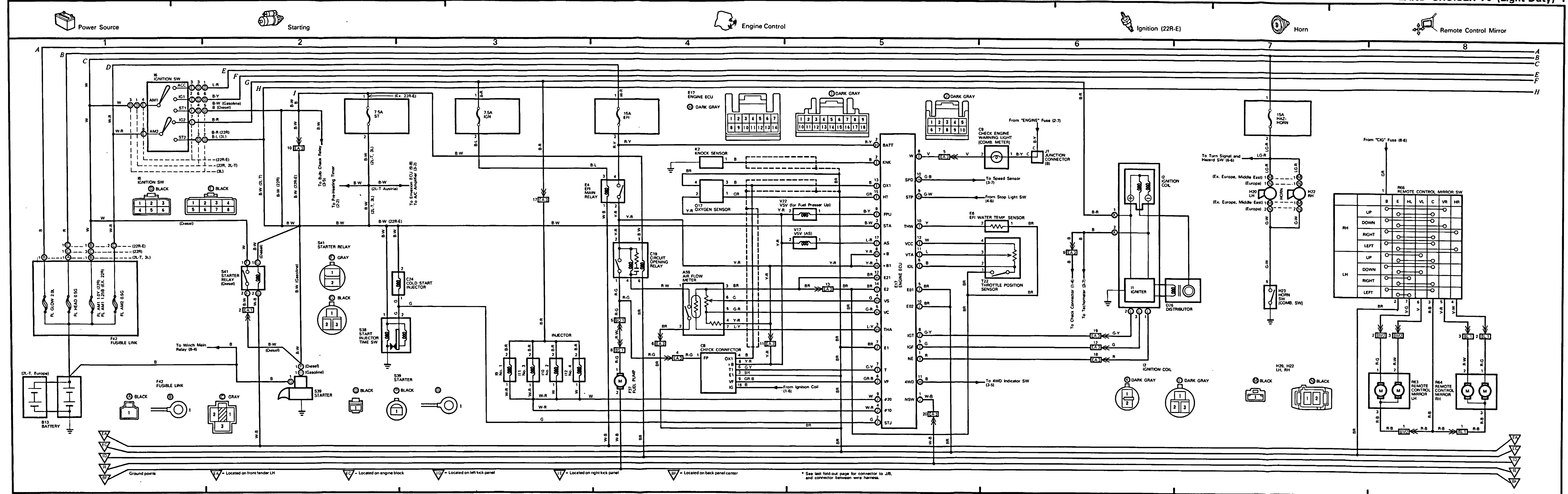
Ⓖ: Indicates a ground point.

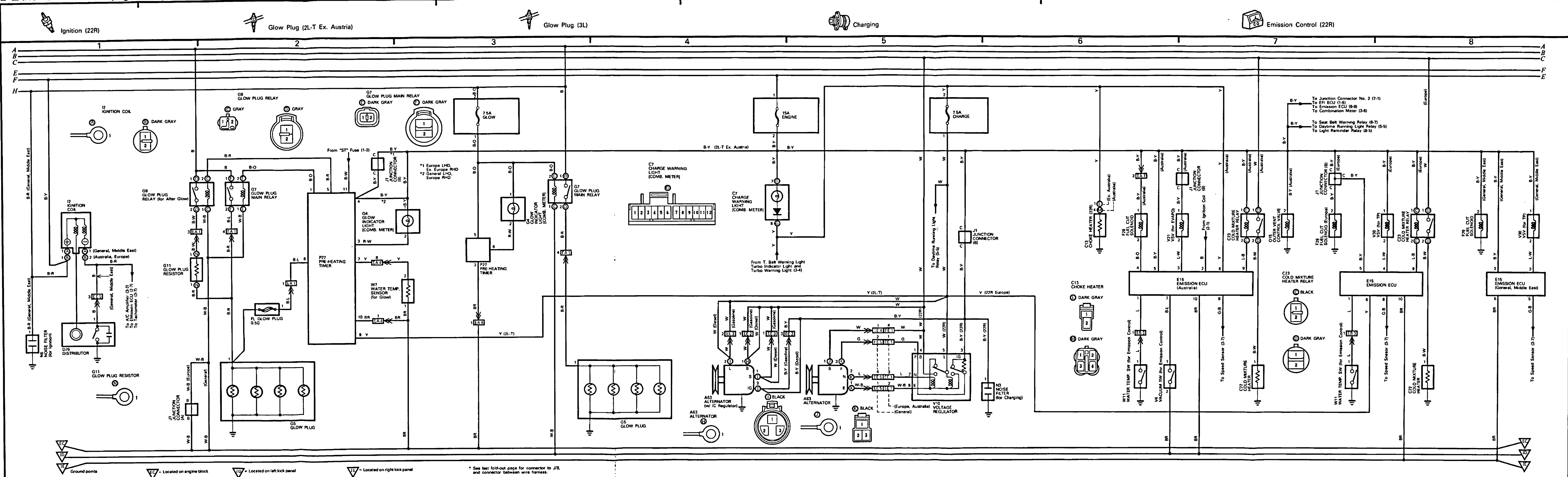
SYSTEM INDEX

LAND CRUISER 70 (Light-Duty)

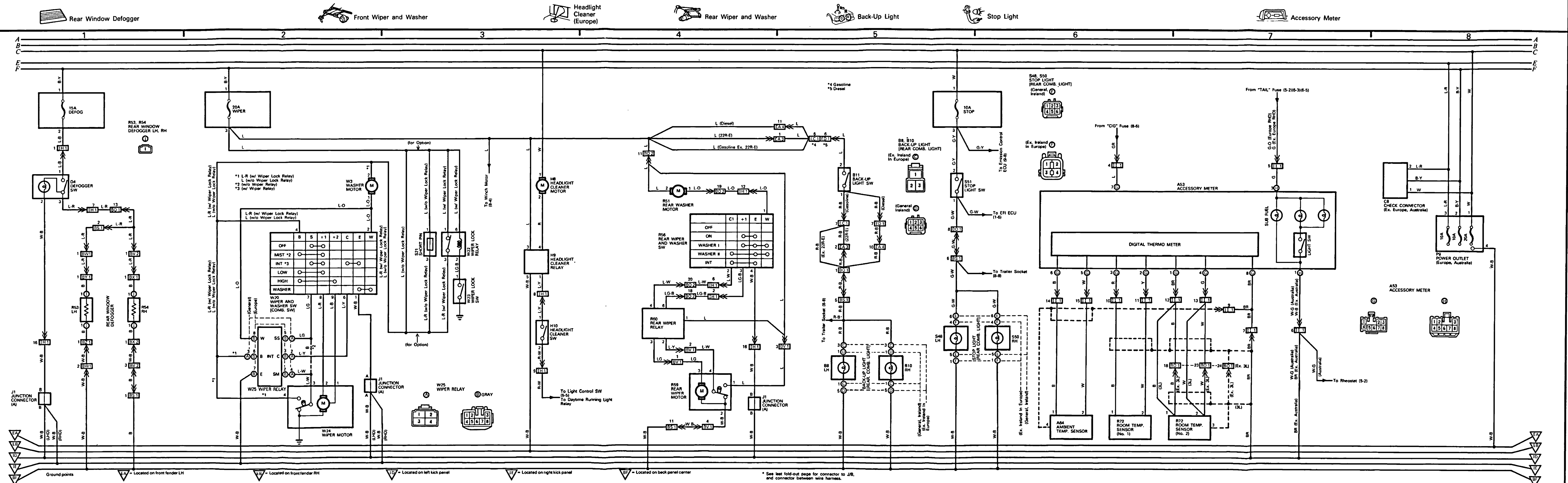
(Location No. 1 to 10)

SYSTEMS		LOCATION	SYSTEMS		LOCATION
Accessory Meter		4-7	Light Reminder		8-5 (Europe)
Air Conditioner, Cooler and Heater		3-2	Moon Roof		9-5
Back-Up Light		4-5	Power Source		1-1
Charging		2-5	Power Window		9-2
Cigarette Lighter		8-6	Radio and Player		8-7
Clock		8-5	Rear Fog Light		3-8
Combination Meter		3-5	Rear Window Defogger		4-1
Door Lock		7-6	Rear Wiper and Washer		4-4
Emission Control		2-7 (22R)	Remote Control Mirror		1-8
Engine Control		1-4 (22R-E)	Seat Belt Warning		8-7
Front Fog Light		5-1 (General Ex. Australia)	Starting		1-2
Front Wiper and Washer		4-2	Stop Light		4-5
Fuel Heater		7-8 (2L-T Europe)	Taillight and Illumination		5-2 (Ex. Europe) 6-2 (Europe)
Glow and Emission Control		9-7 (2L-T Austria)	Trailer Socket		8-8
Glow Plug		2-2 (2L-T Ex. Austria) 2-3 (3L)	Turn Signal and Hazard		6-7
Headlight		5-3 (Ex. Europe) 5-5 (Europe)	Winch		8-4
Headlight Beam Level Control		8-2	4WD		7-3
Headlight Cleaner		4-3			
Horn		1-7	Connector Joining Wire Harness and Wire Harness		10-4
Ignition		1-6 (22R-E) 2-1 (22R)	Junction Connector		10-8
Interior Light		5-8			



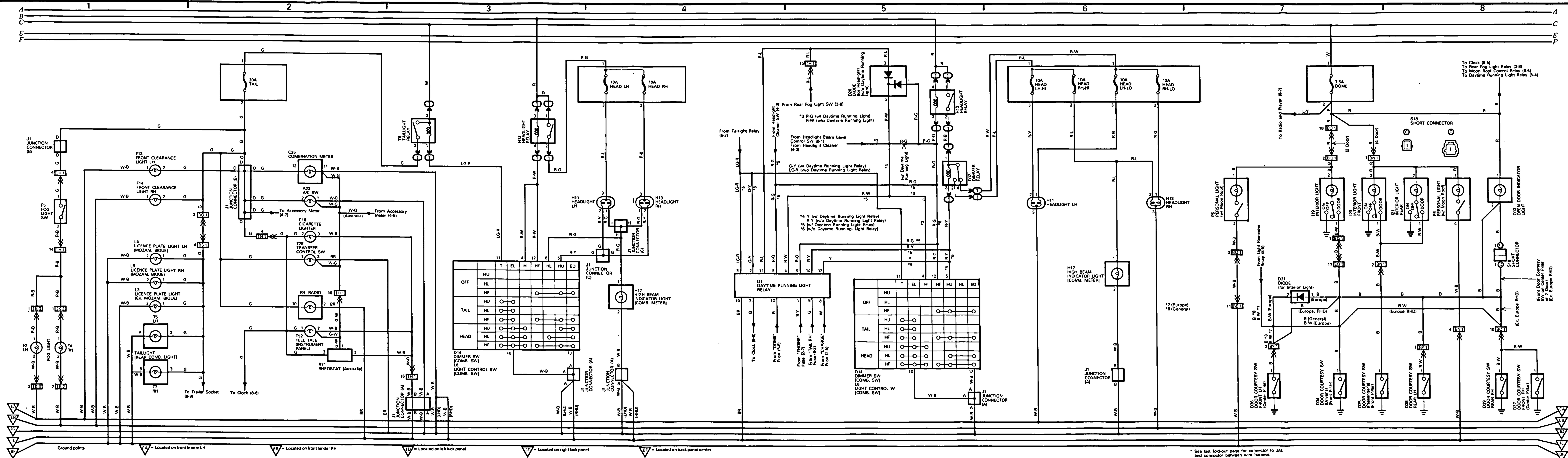




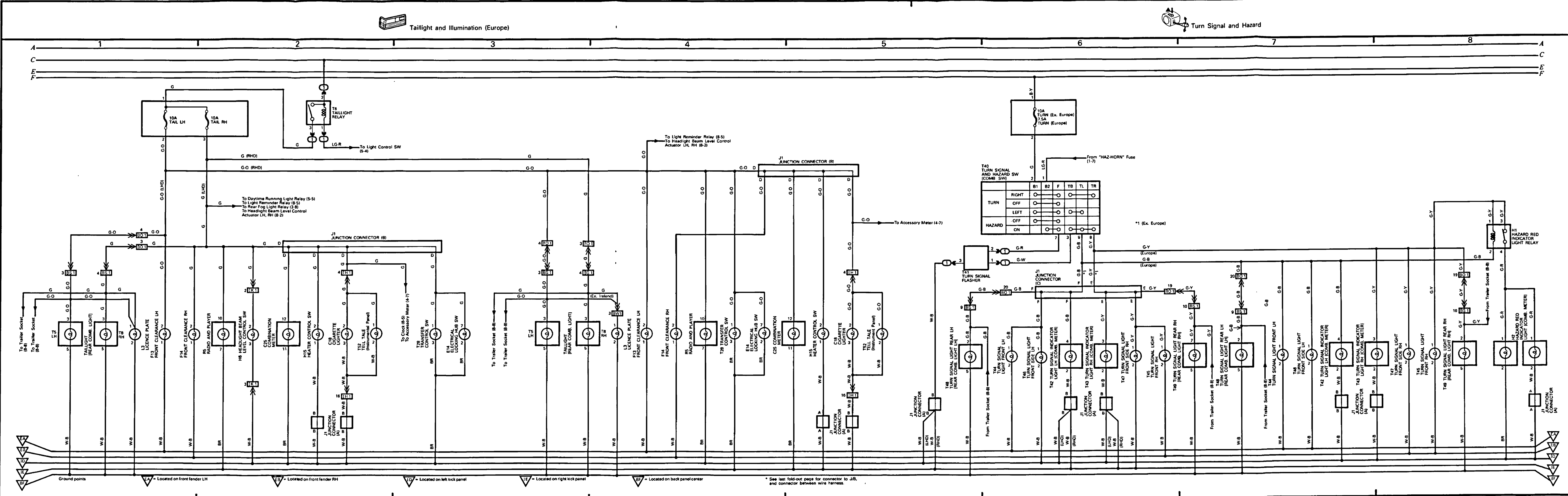


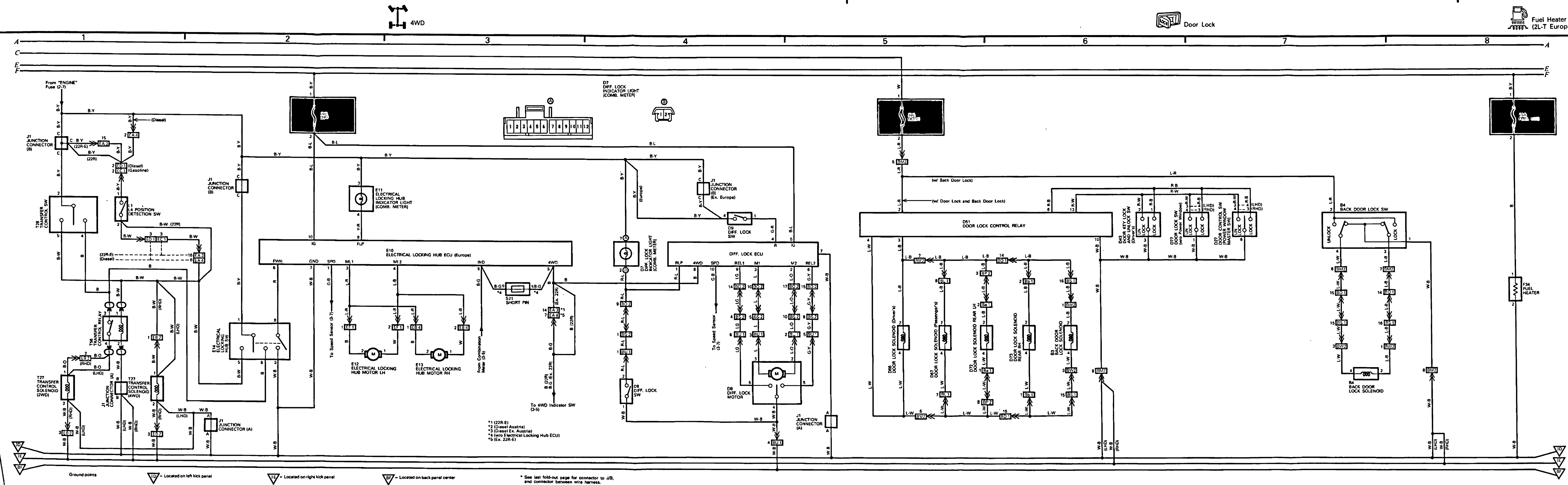


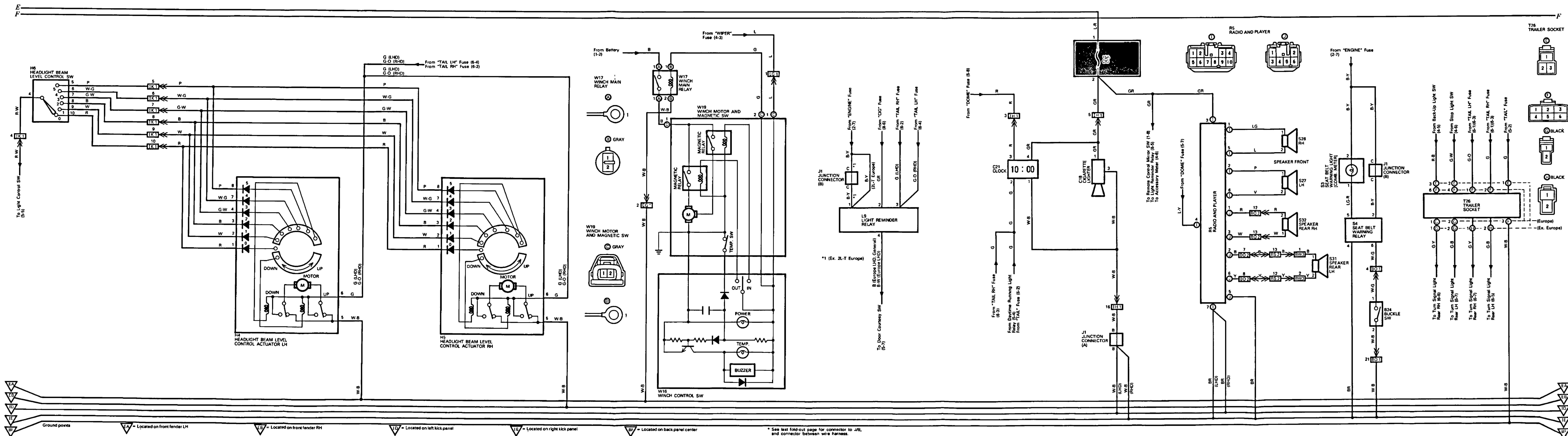
Interior Light

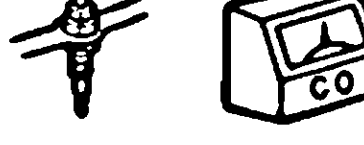


* See last fold-out page for connector to J/B and connector between wire harness.

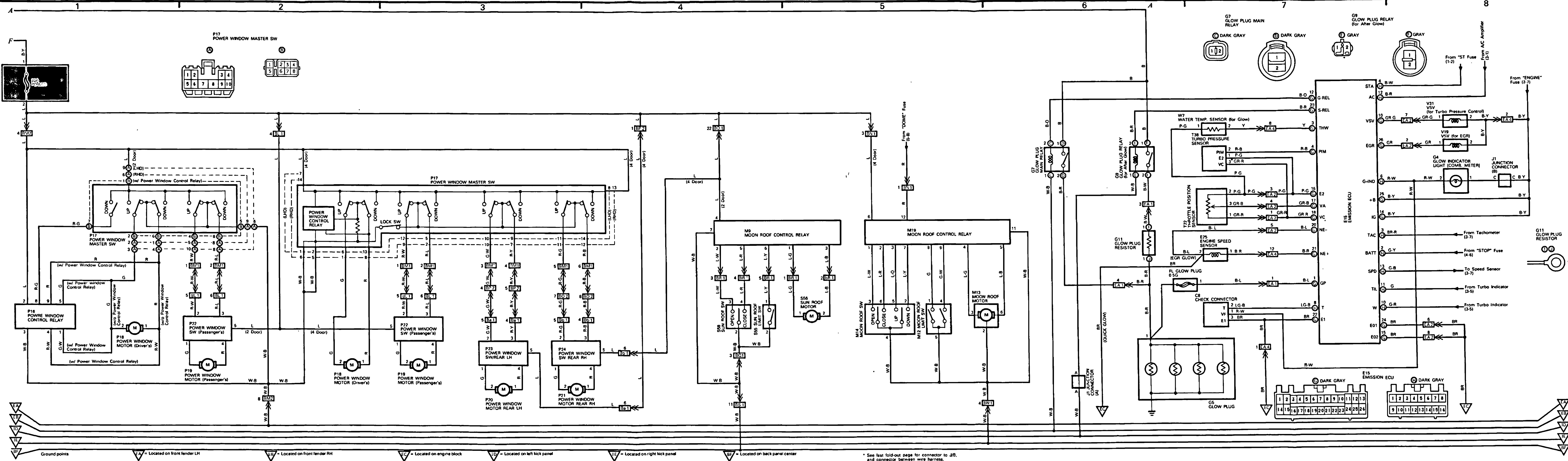




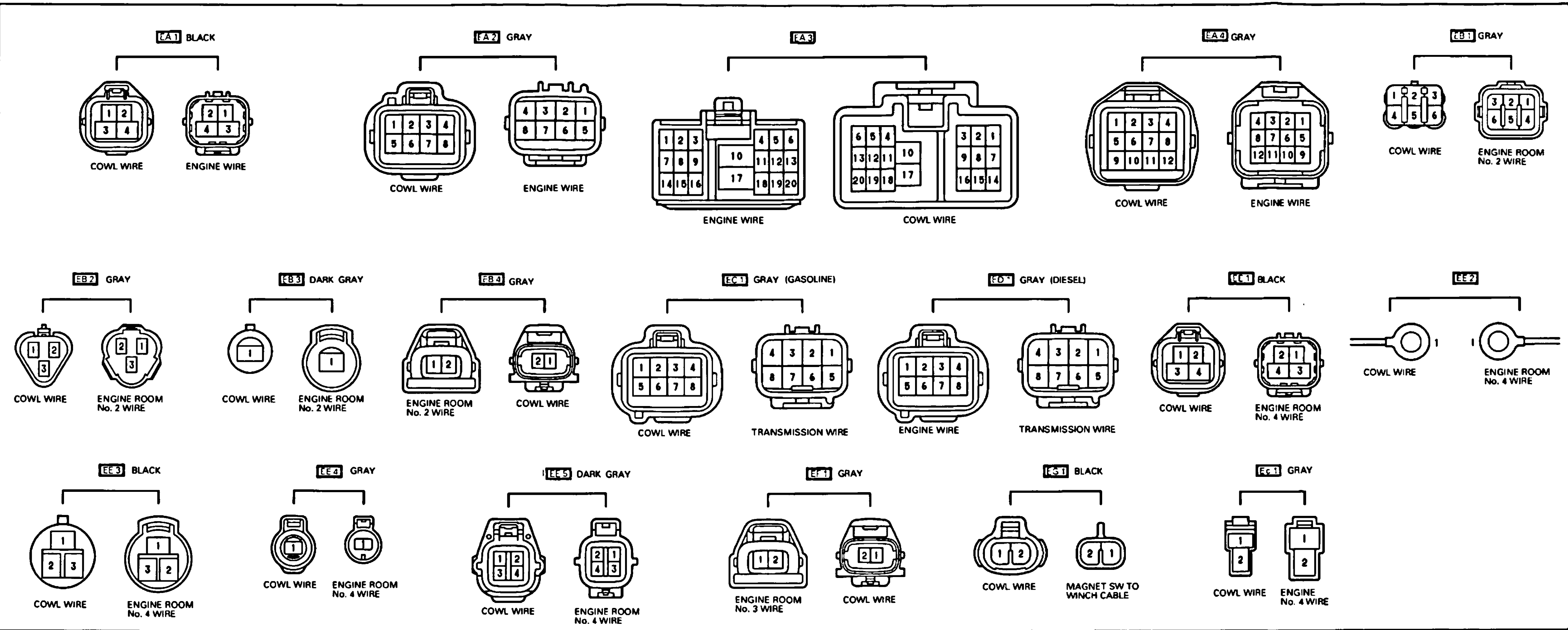




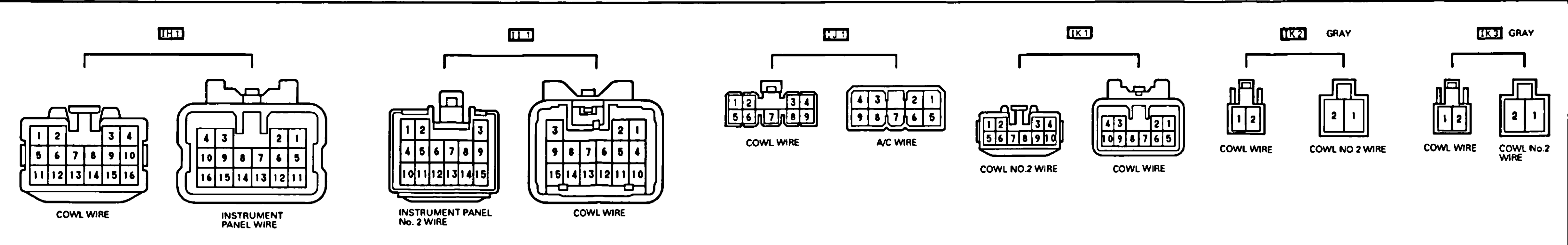
Glow and Emission Control (2L-T Austria)



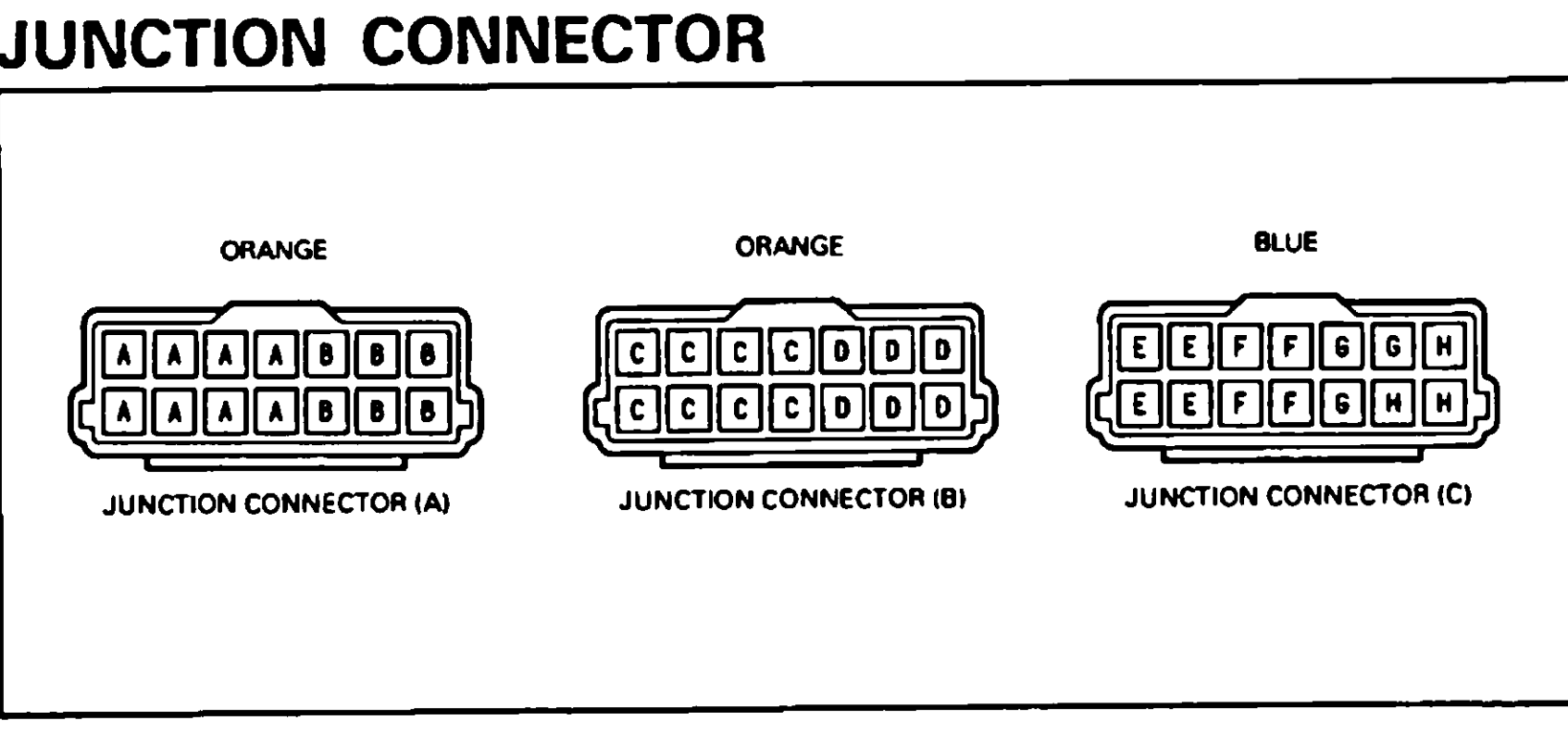
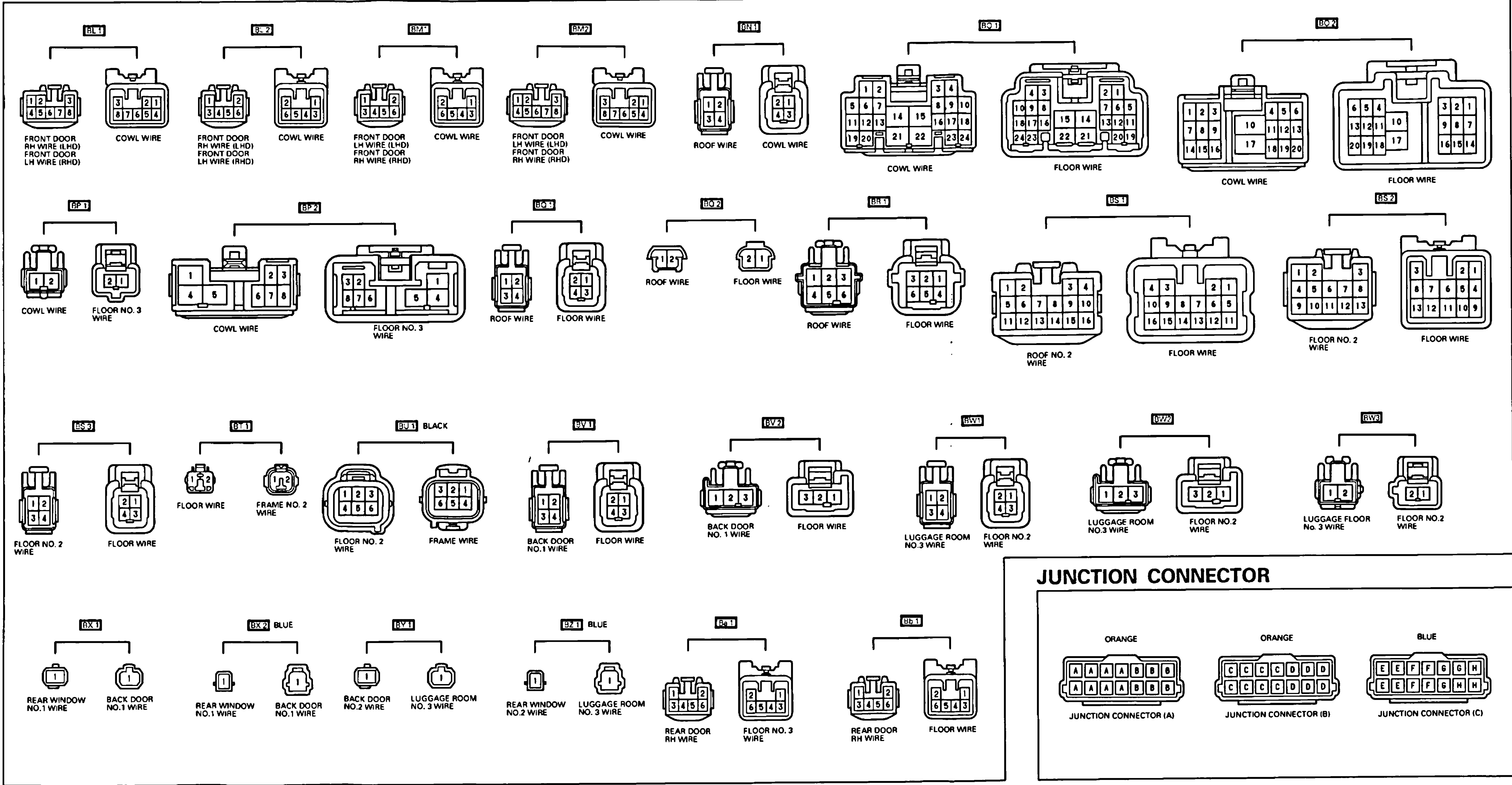
Connector Joining Wire Harness and Wire Harness
(E Group : Engine Compartment area)



(I Group : Instrument Panel and Surrounding area)



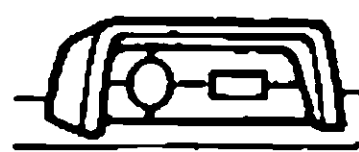
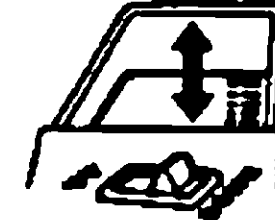
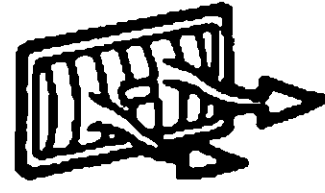
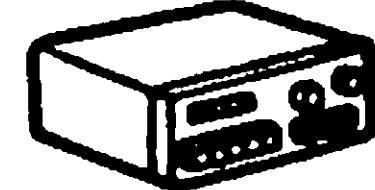
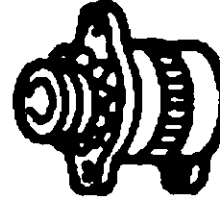
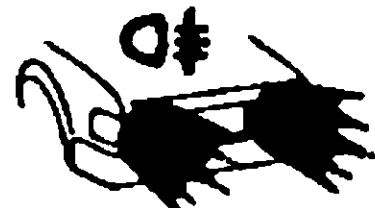
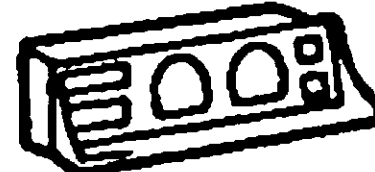
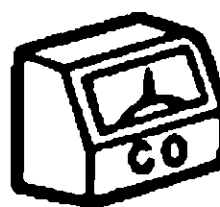
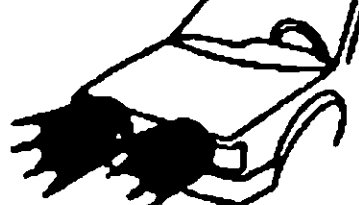
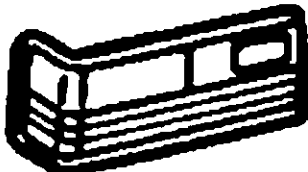
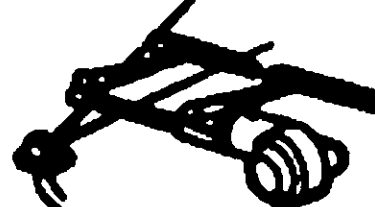
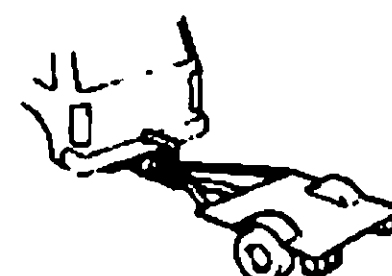
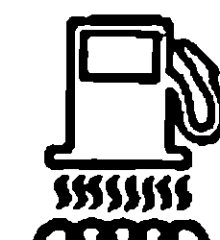
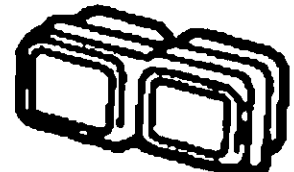
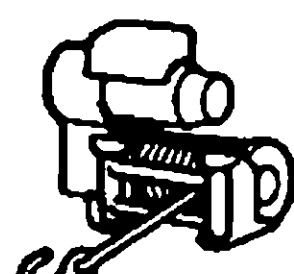
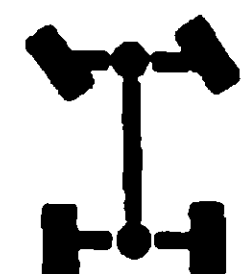
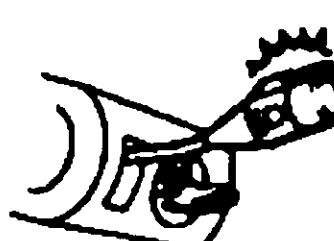
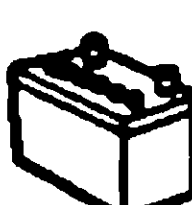
(B Group : Body and Surrounding area)

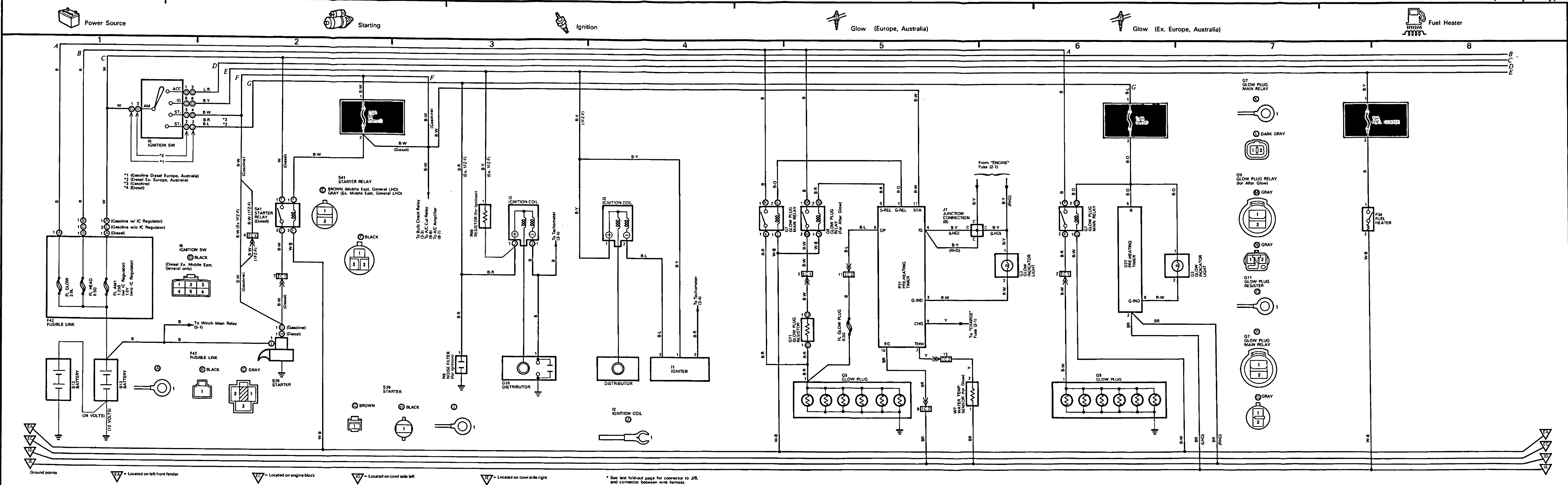


SYSTEM INDEX

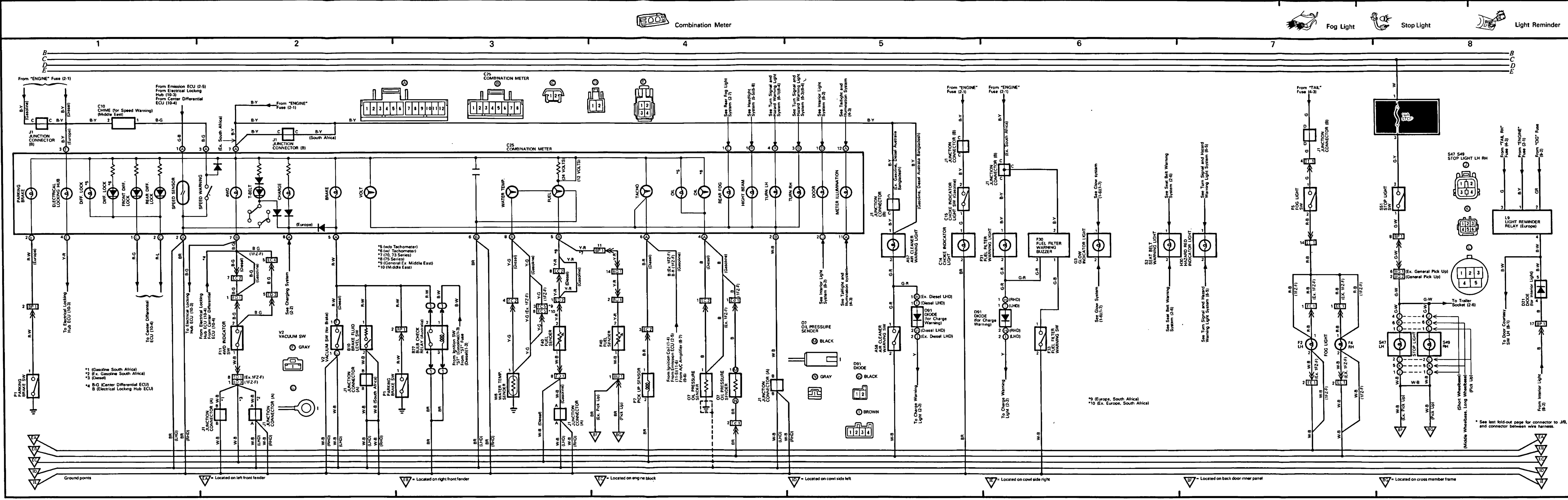
LAND CRUISER 70 (Heavy-Duty)

(Location No. 1 to 12)

SYSTEMS		LOCATION	SYSTEMS		LOCATION
Accessory Meter		11-2	Power Window		7-3
Air Conditioner, Cooler and Heater		8-6 (Single Type) 9-6 (Dual Type)	Radio and Player		9-3
Back-Up Light		5-3	Rear Air Conditioner		10-7
Charging		2-1 (w/ IC Regulator) 2-2 (w/o IC Regulator)	Rear Fog Light		2-8
Cigarette Lighter		9-1	Rear Window Defogger		6-8
Clock		9-1	Rear Wiper and Washer		6-6
Combination Meter		3-4	Remote Control Mirror		9-2
Door Lock		7-7	Seat Belt Warning		2-6
Emission Control		2-4 (Ex. 1FZ-F) 11-5 (1FZ-F)	Starting		1-2
Glow		1-5 (Europe, Australia) 1-6 (Ex. Europe, Australia)	Stop Light		3-8
Fog Light		3-7	Taillight and Illumination		4-3
Front Wiper and Washer		4-7	Trailer Socket		2-6
Fuel Heater		1-7	Turn Signal and Hazard		6-3
Headlight		5-4 (Ex. Europe) 5-6 (Europe)	Winch		5-1
Headlight Cleaner		5-1	4WD		10-3 (Ex. 1FZ-F) 11-7 (1FZ-F)
Ignition		1-3	Connector Joining Wire Harness and Wire Harness		12-4
Horn		8-3	Junction Connector		12-7
Interior Light		8-1			
Light Reminder		3-8			
Moon Roof		7-1			
Power Source		1-1			

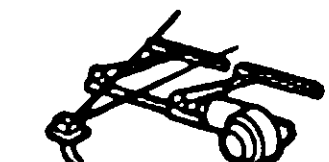




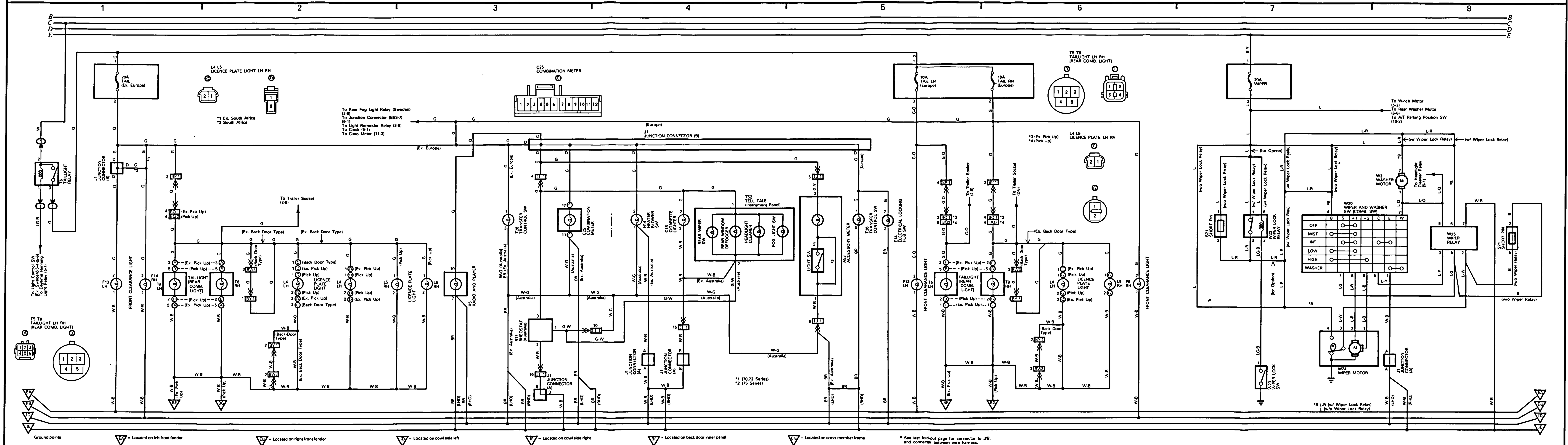




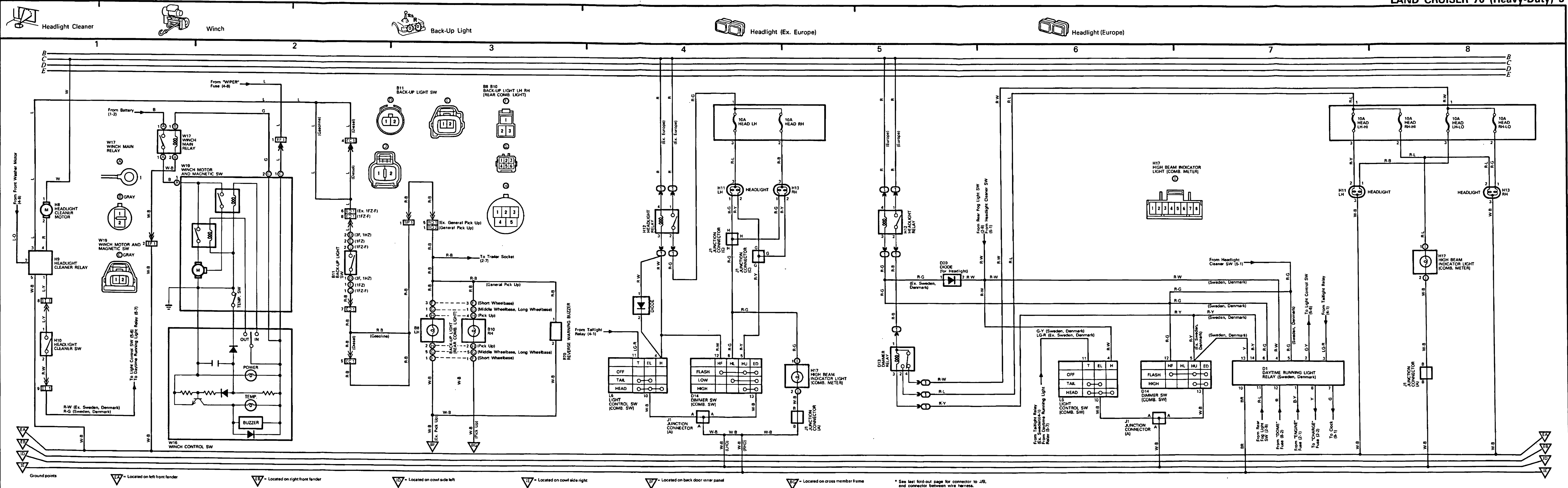
Taillight and Illumination



Front Wiper and Washer

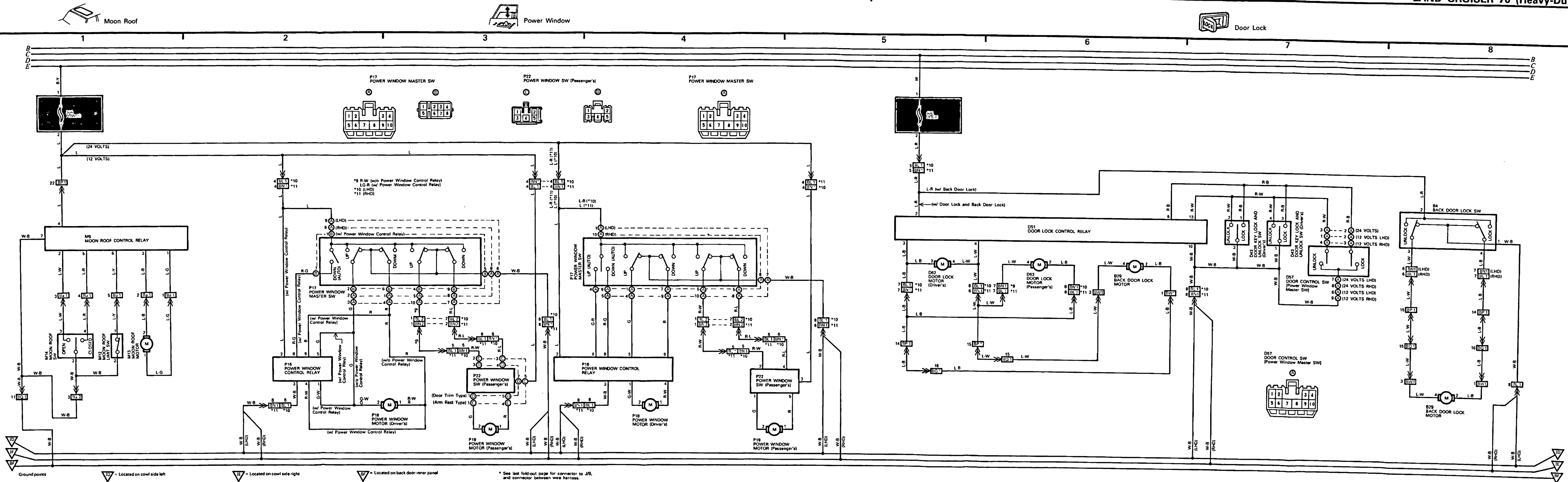


* See last fold-out page for connector to J/B, and connector between wire harness.

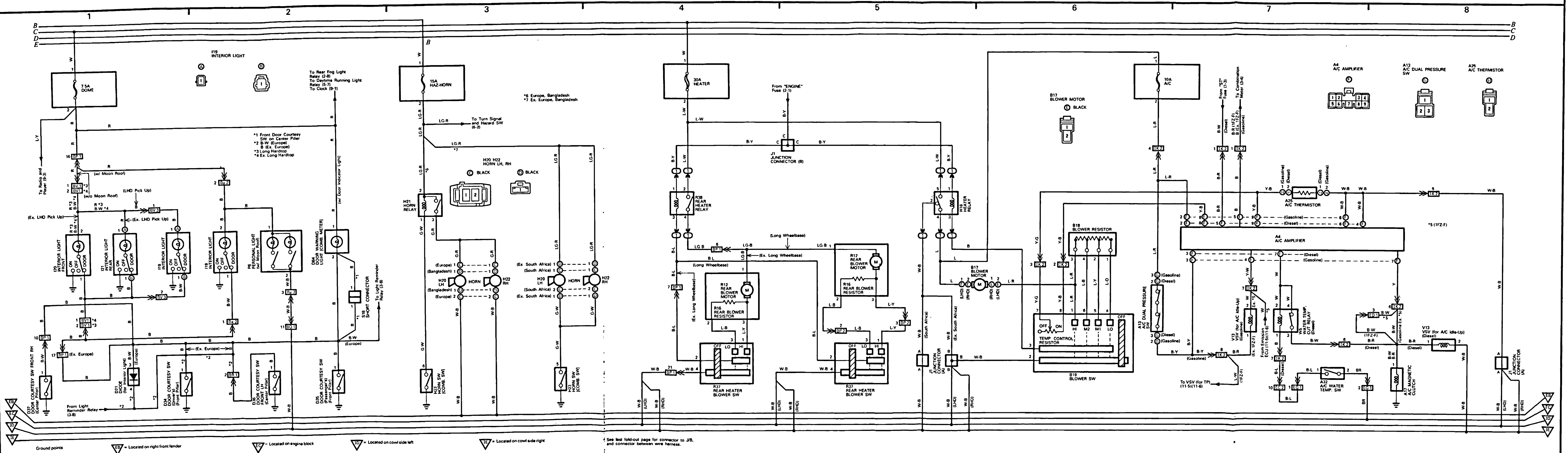


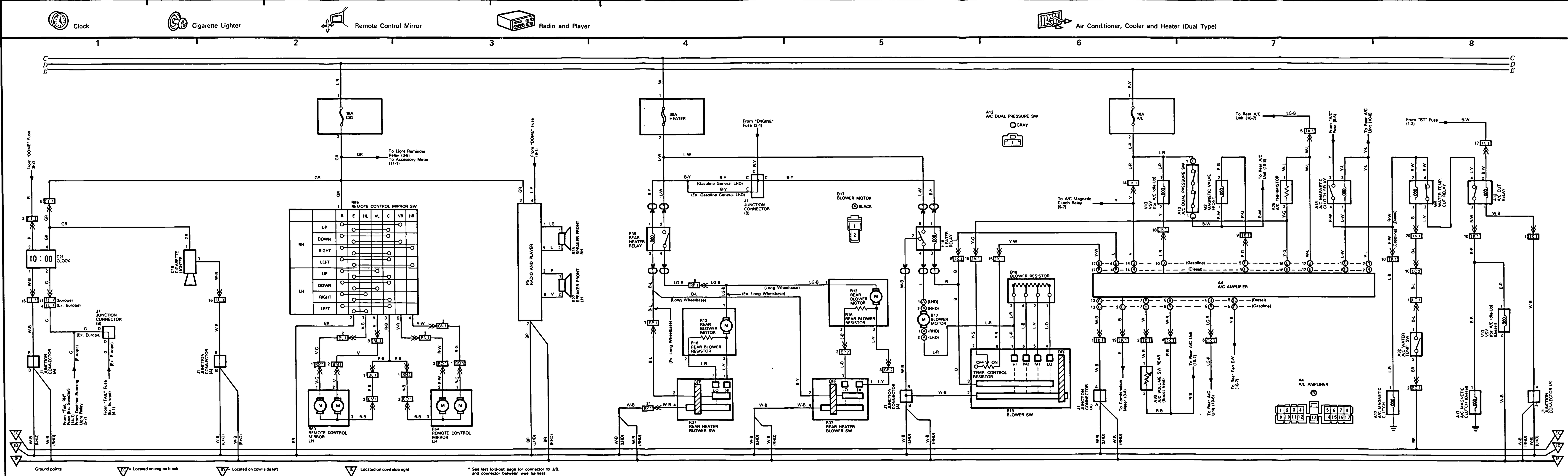
* See last fold-out page for connector to J/B, and connector between wire harness.



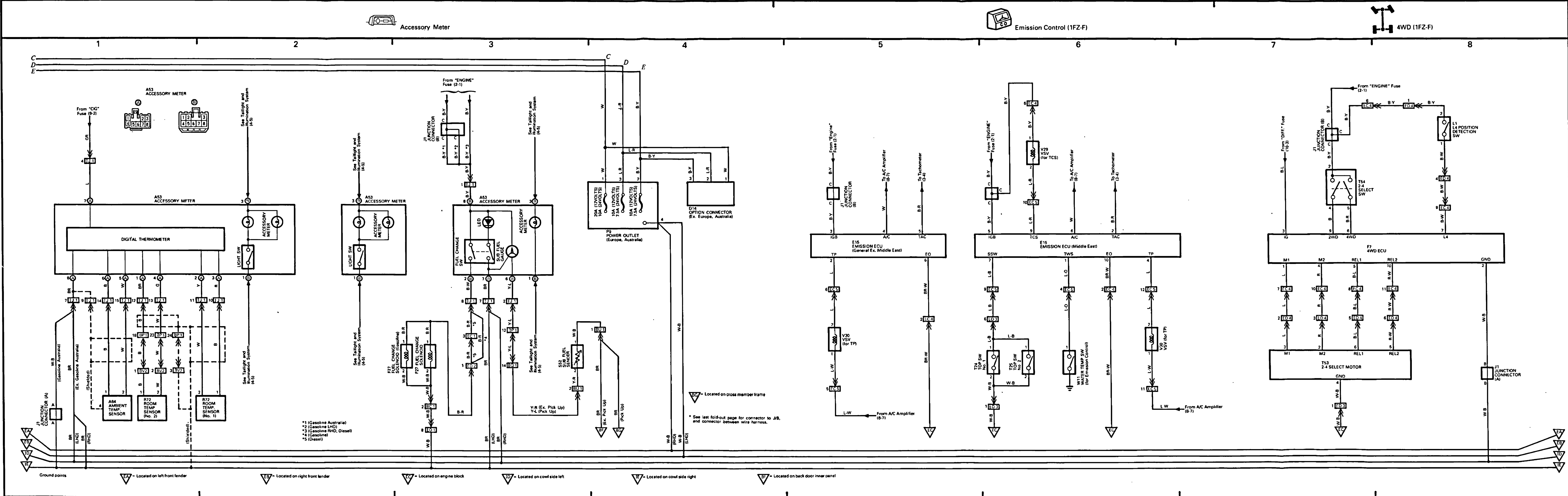


* See last fold-out page for connector to J/B, and connector between wire harness.

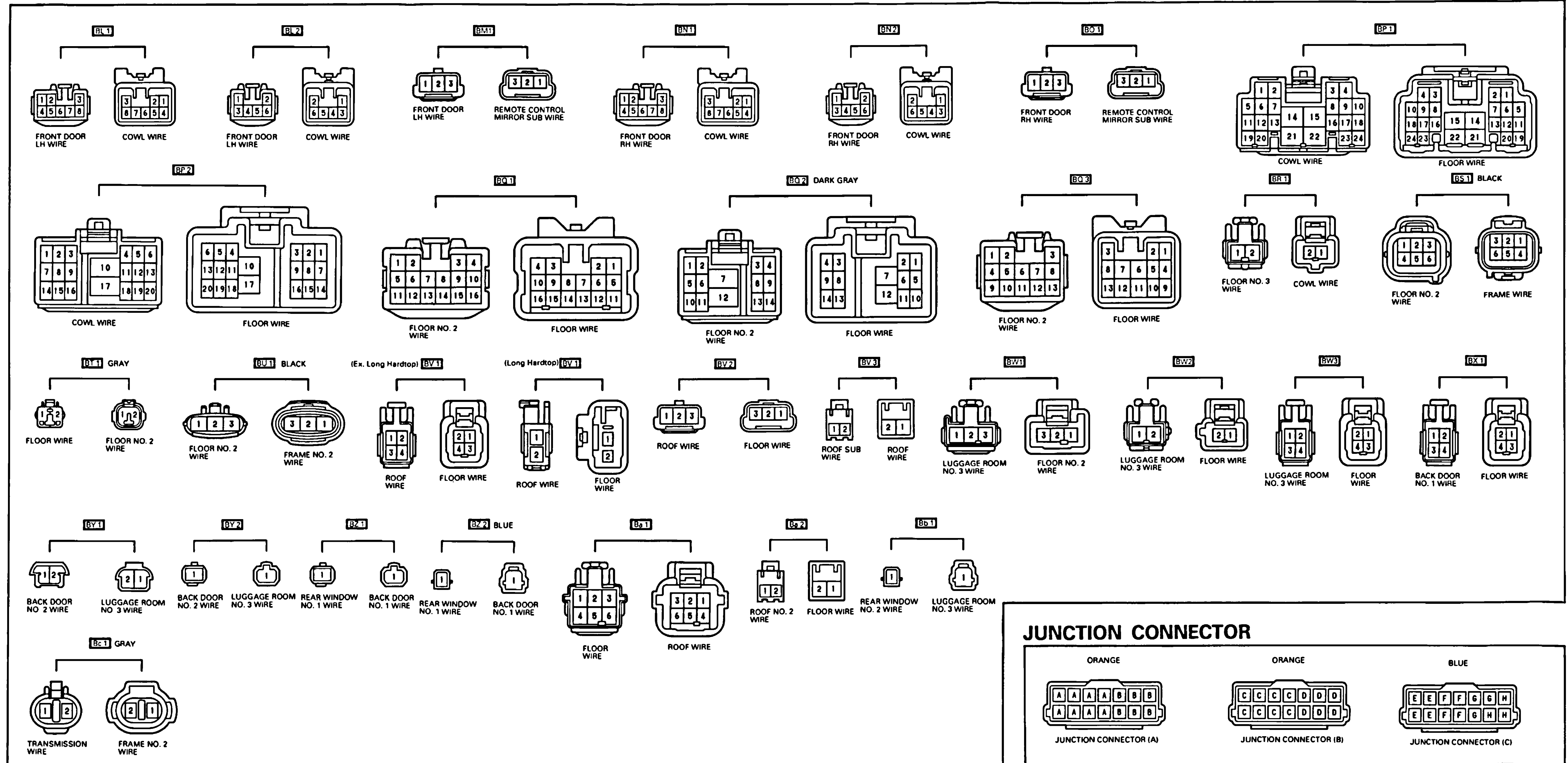








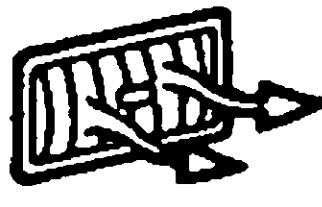
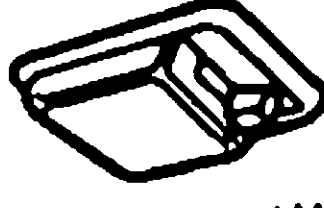
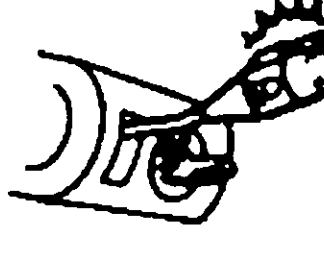
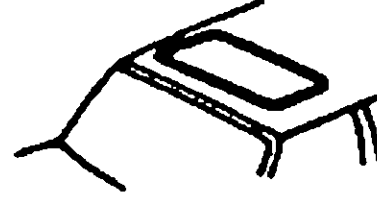
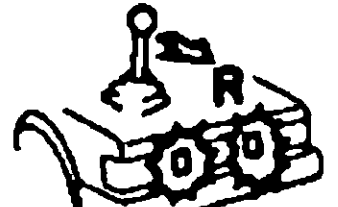
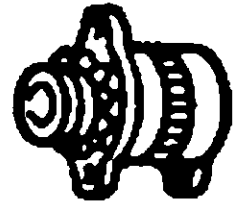
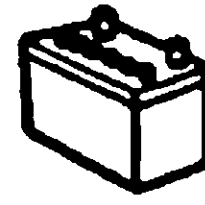
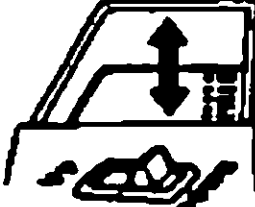
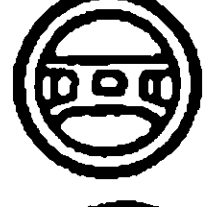
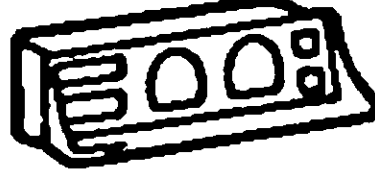
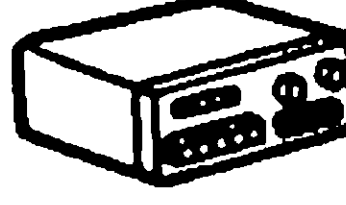
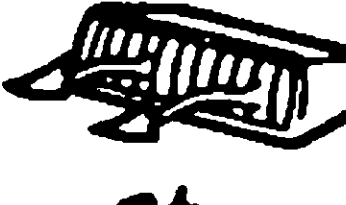
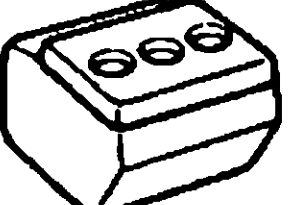
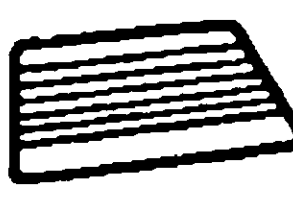
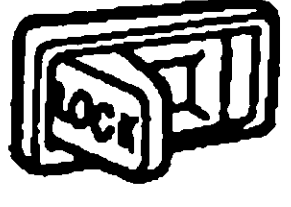
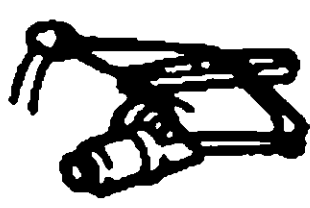
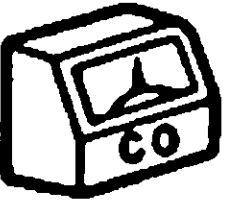
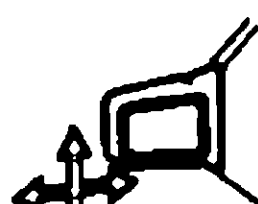
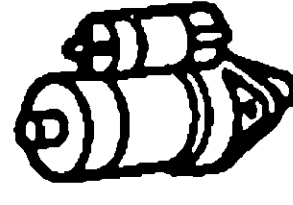
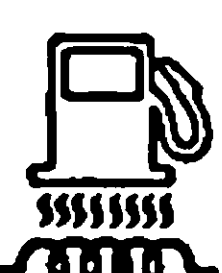
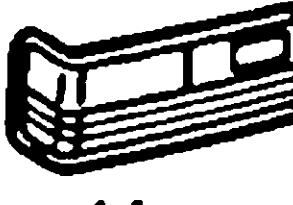
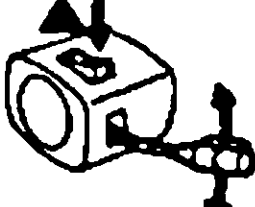
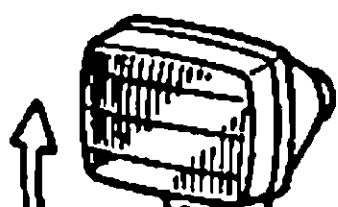
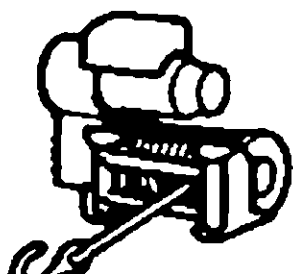
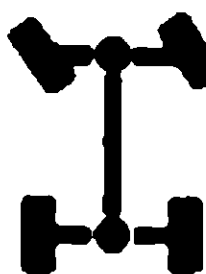
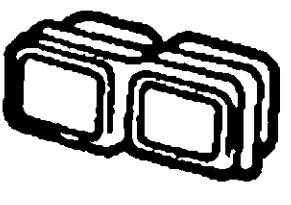
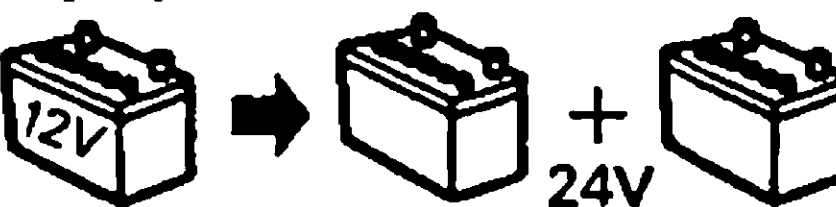
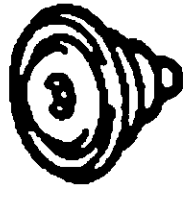
(B Group : Body and Surrounding area)

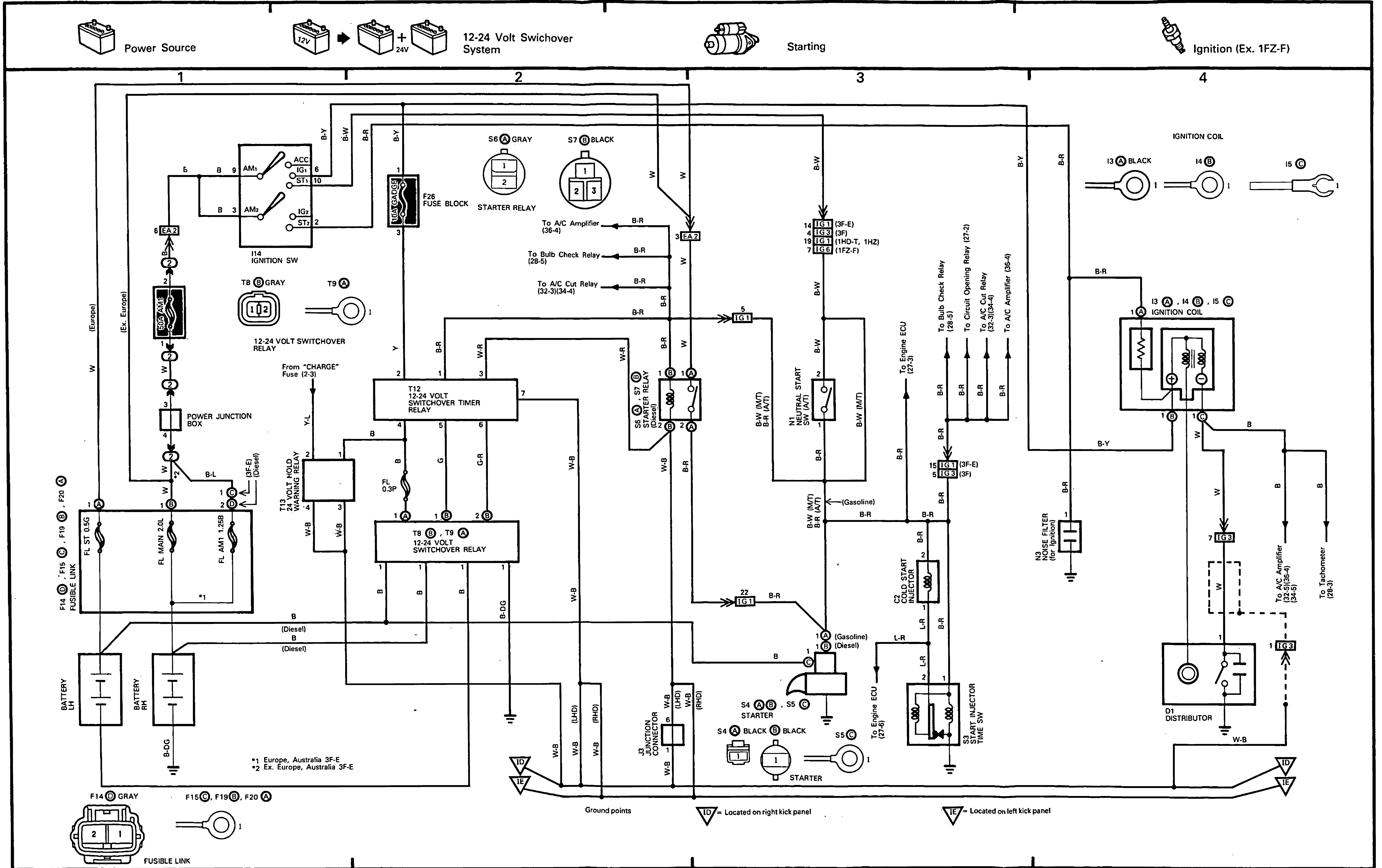


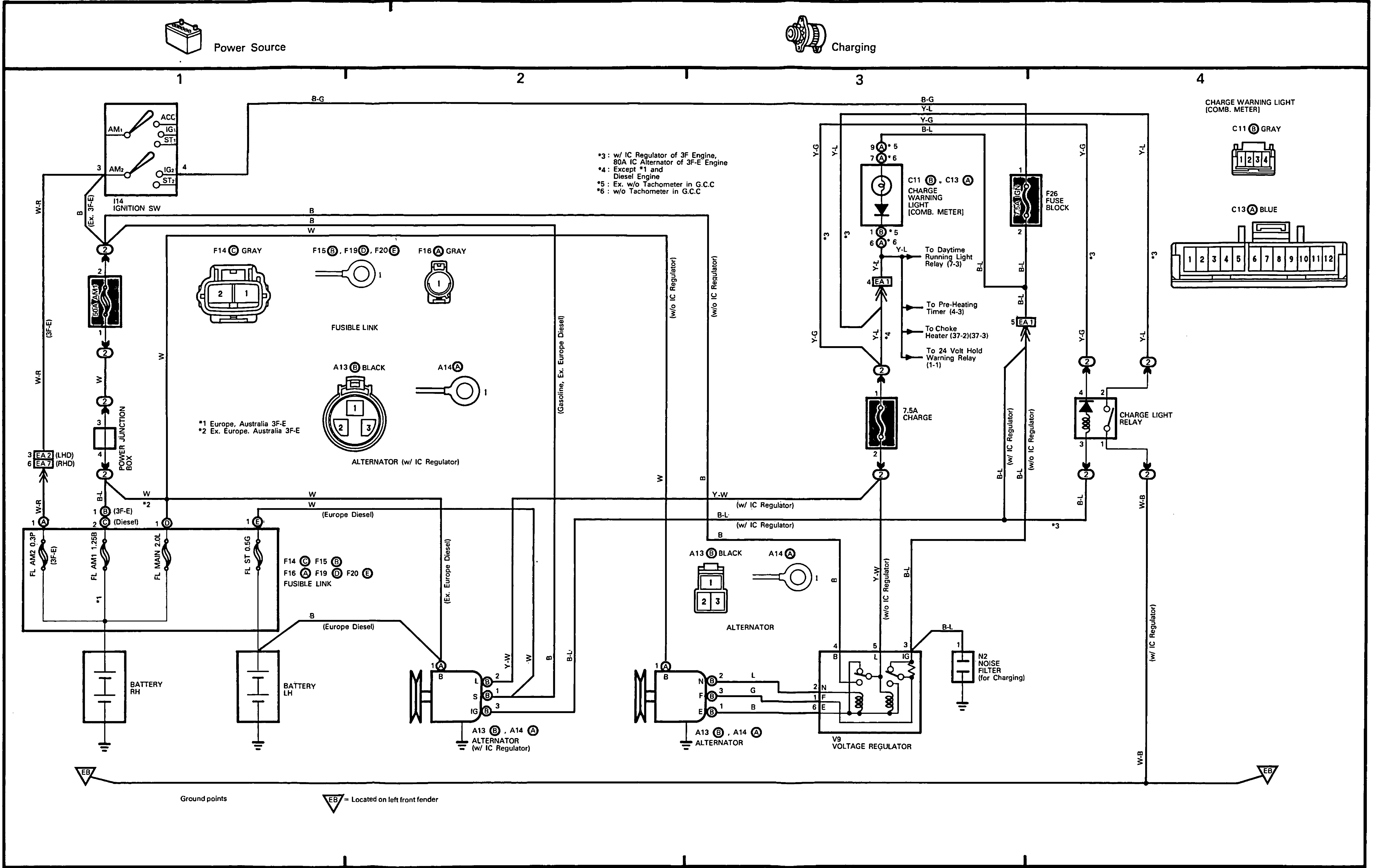
SYSTEM INDEX

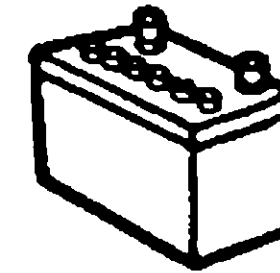
LAND CRUISER (W/G)

(Location No. 1 to 40)

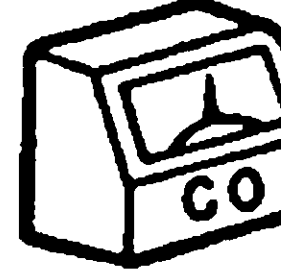
SYSTEMS		LOCATION	SYSTEMS		LOCATION
Accessory Meter		20-3	Ignition		1-4 (Ex. 1FZ-F) 37-4 (1FZ-F)
Air Conditioner, Cooler and Heater		30-4 (Auto) 34-4 (Manual Dual Type) 36-3 (Manual Single Type)	Interior Light		11-3
Auto Antenna		13-2 (Australia) 13-4 (Ex. Australia)	Light Reminder		24-3
Automatic Transmission Indicator		21-2	Moon Roof		19-2
Back-Up Light		21-3	Power Seat		19-3
Charging		2-3	Power Source		1 ~ 30, 34, 36 ~ 38-1
Cigarette Lighter		24-3	Power Window		15-3
Clock		24-2	PPS (Progressive Power Steering)		5-3
Combination Meter		28-4	Radio and Player		26-3 (w/o CD Player) 26-5 (w/ CD Player)
Condenser Fan		34-2	Rear Air Conditioner		33-3 (Auto) 35-4 (Manual)
Cool/Ice Box		33-6	Rear Fog Light		14-3
Cruise Control		23-3	Rear Window Defogger		18-2
Door Lock		16-3	Rear Wiper and Washer		17-3 (Ex. 1FZ-F) 38-4 (1FZ-F)
Emission Control		3-2 (Ex. Middle East) 3-3 (Middle East) 37-2 (1FZ-FLHD) 37-3 (1FZ-FRHD)	Remote Control Mirror		20-2
Engine Compartment Cooling Fan		5-2	Seat Belt Warning		21-4
Engine Control		27-4	Seat Heater		18-4
Front Wiper and Washer		17-2 (Ex. 1FZ-F) 38-2 (1FZ-F)	Starting		1-3
Fuel Heater		19-4	Stop Light		24-4
Fuel Tank Changeover		29-6	Taillight and Illumination		25-4
Glow Plug		4-3	Turn Signal and Hazard Warning Light		12-2
Headlight Beam Level Control		6-3	Winch		5-4
Headlight Cleaner		3-4	4WD		22-3
Headlight		7-2 (w/ Daytime Running Light) 8-2 (LHD in Europe w/o Daytime Running Light) 9-2 (U.K.) 10-2 (Ex. LHD in Europe)	12-24 Volt Switchover System		1-2
Horn		12-4	Connector Joining Wire Harness and Wire Harness		39, 40-3



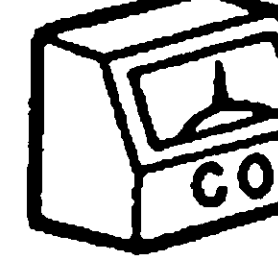




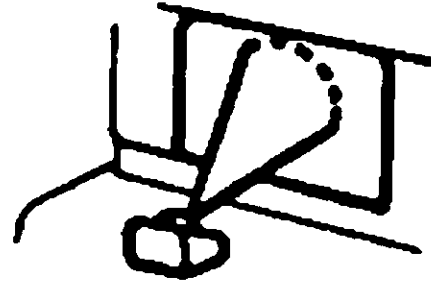
Power Source



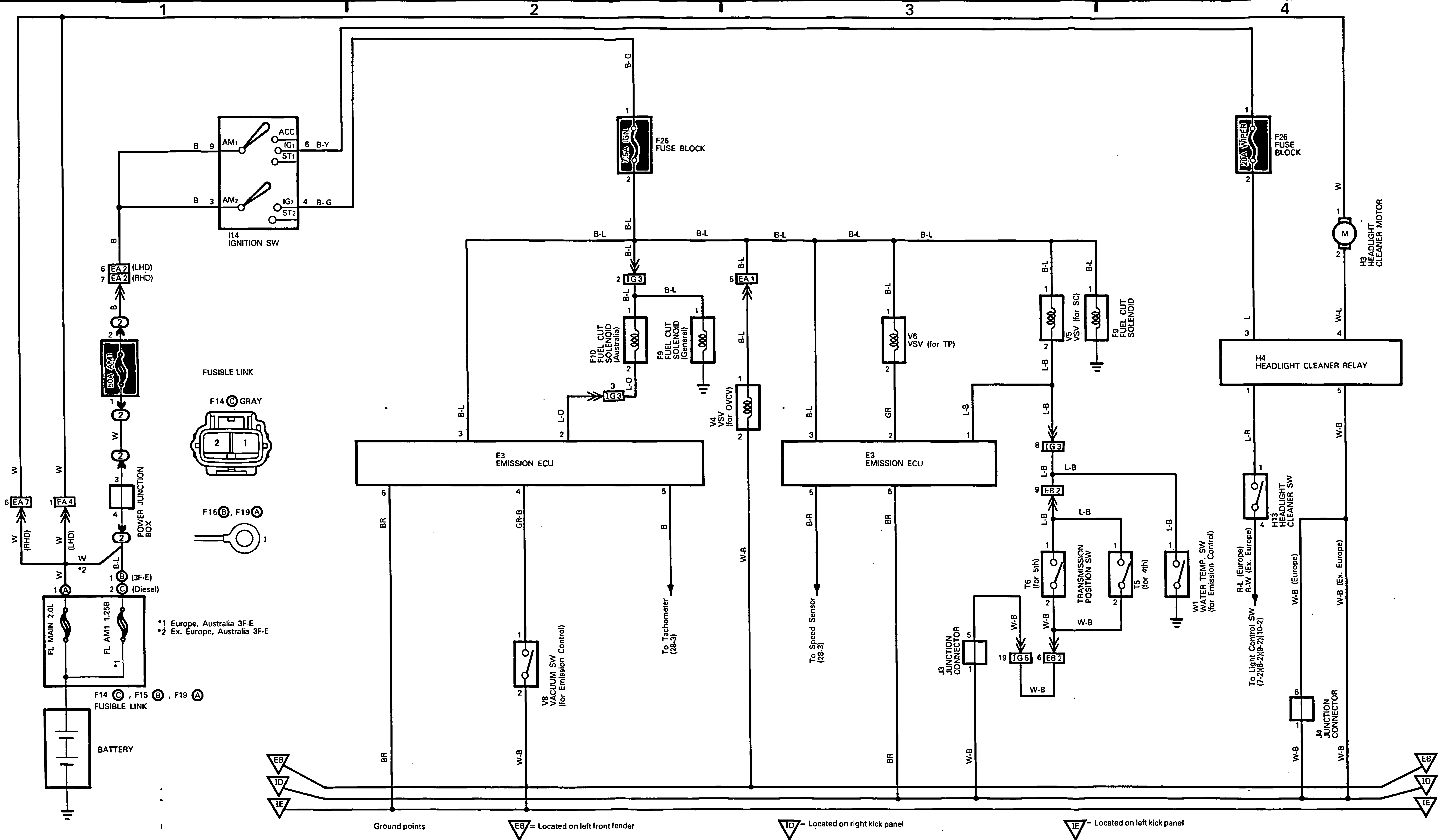
Emission Control (Ex. Middle East)

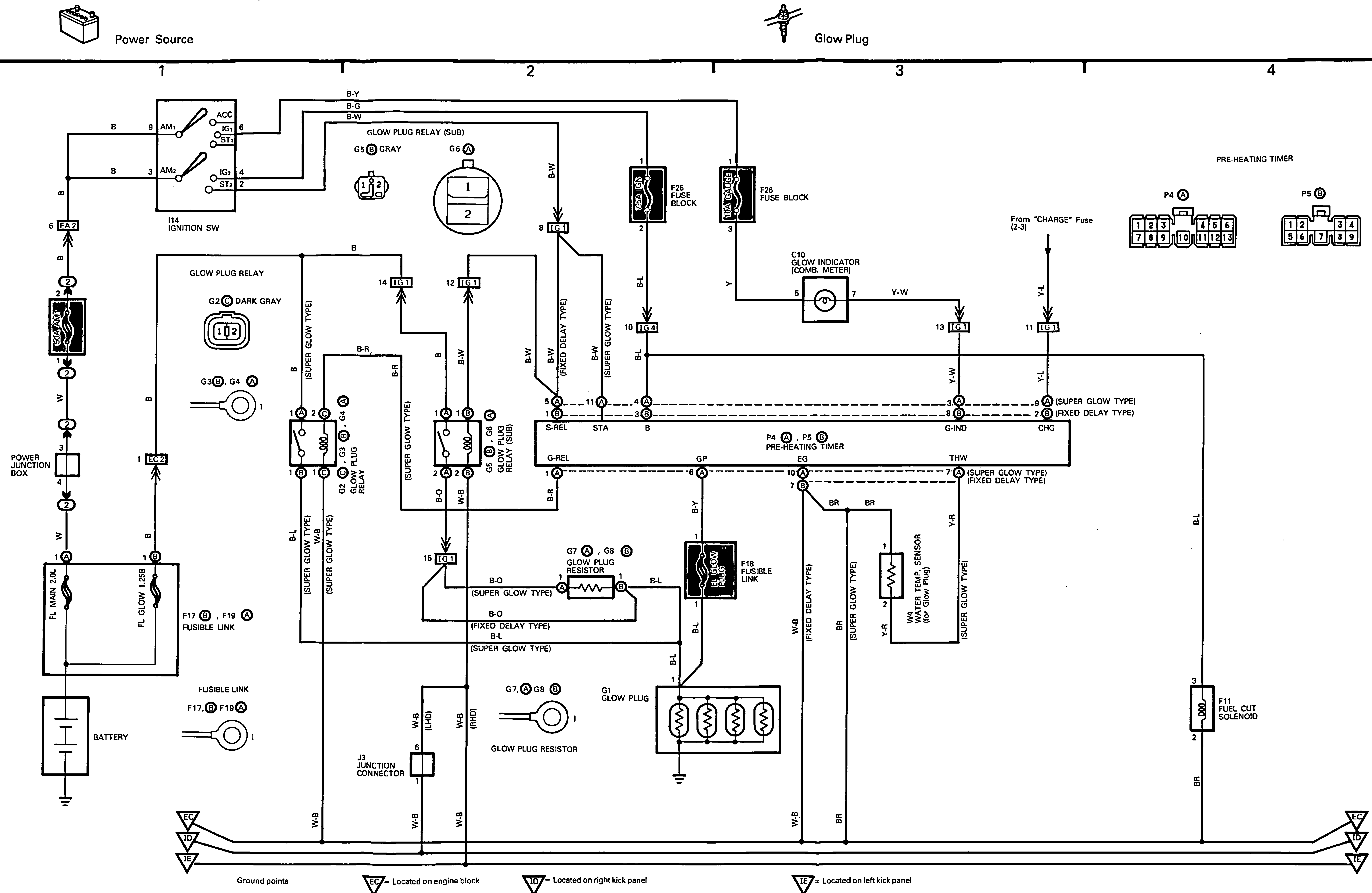


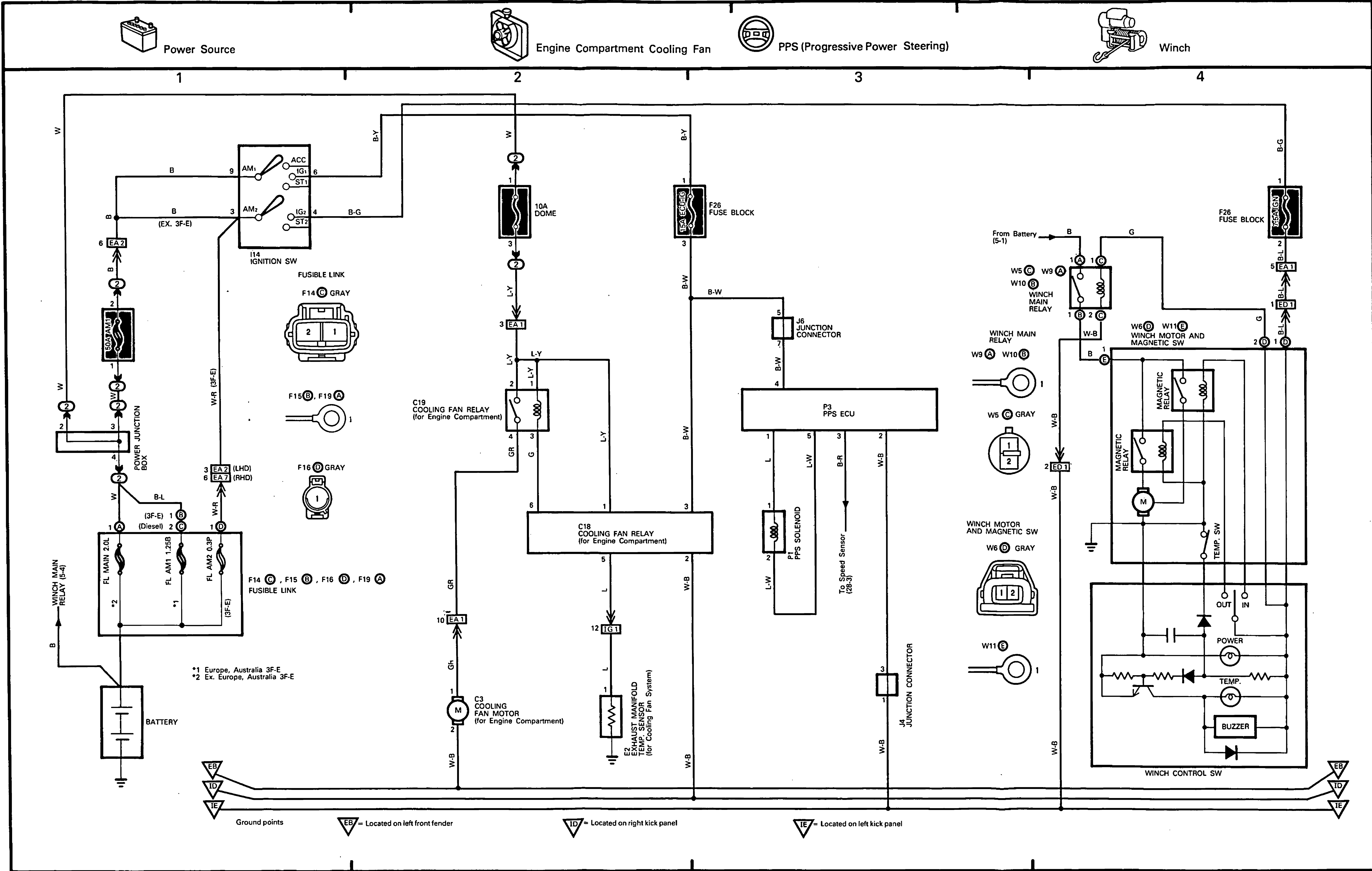
Emission Control (Middle East)

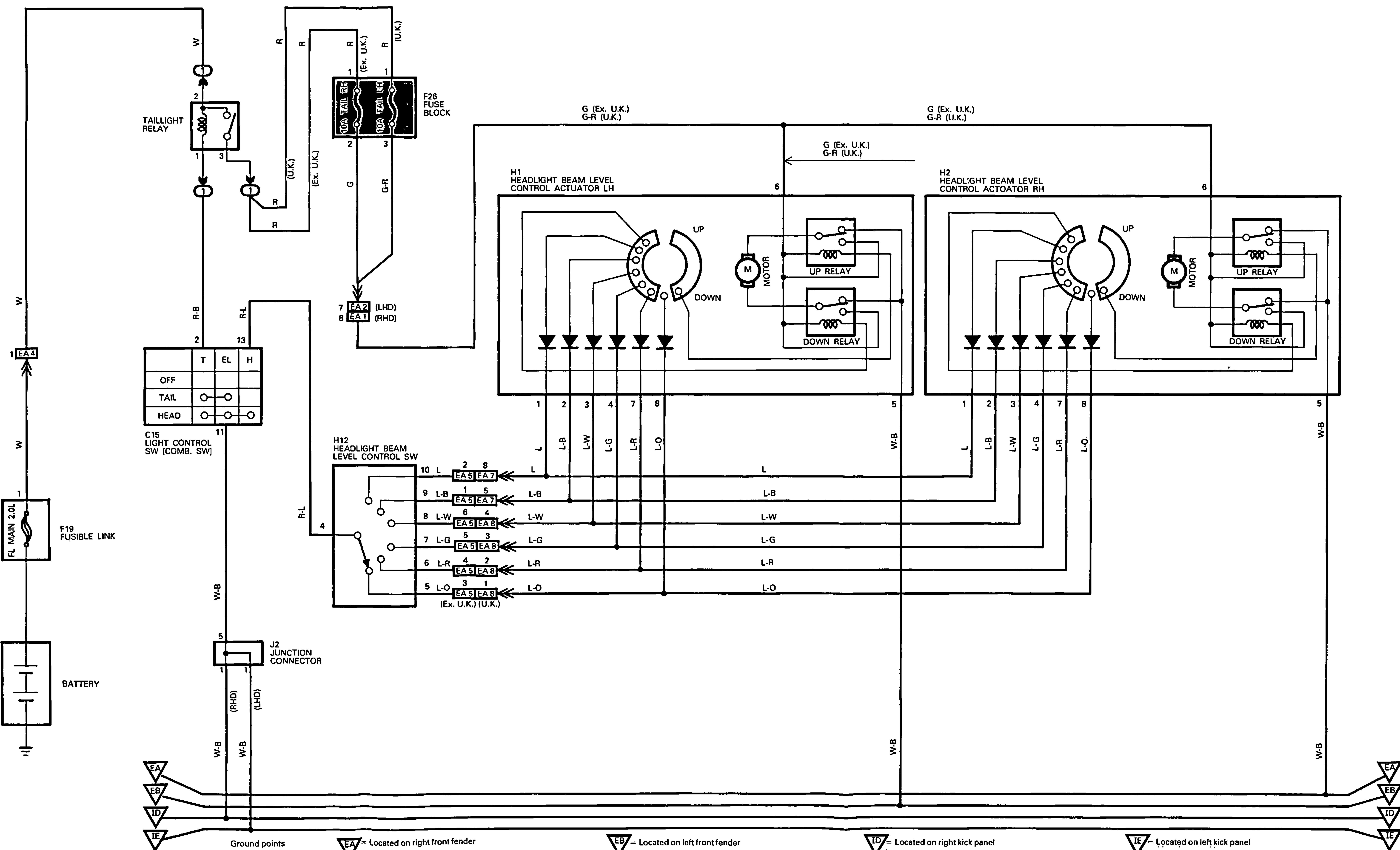


Headlight Cleaner









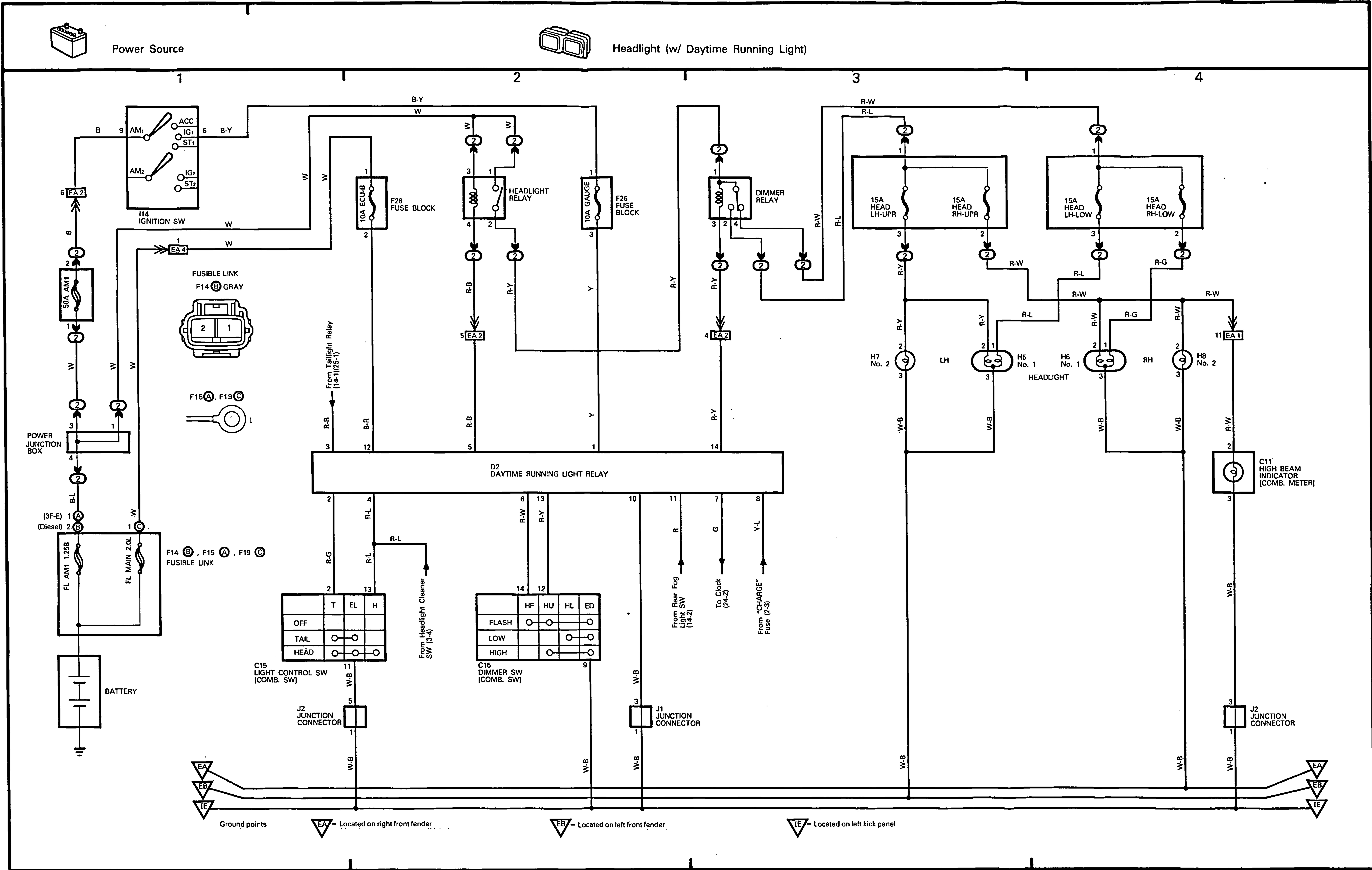
Ground points

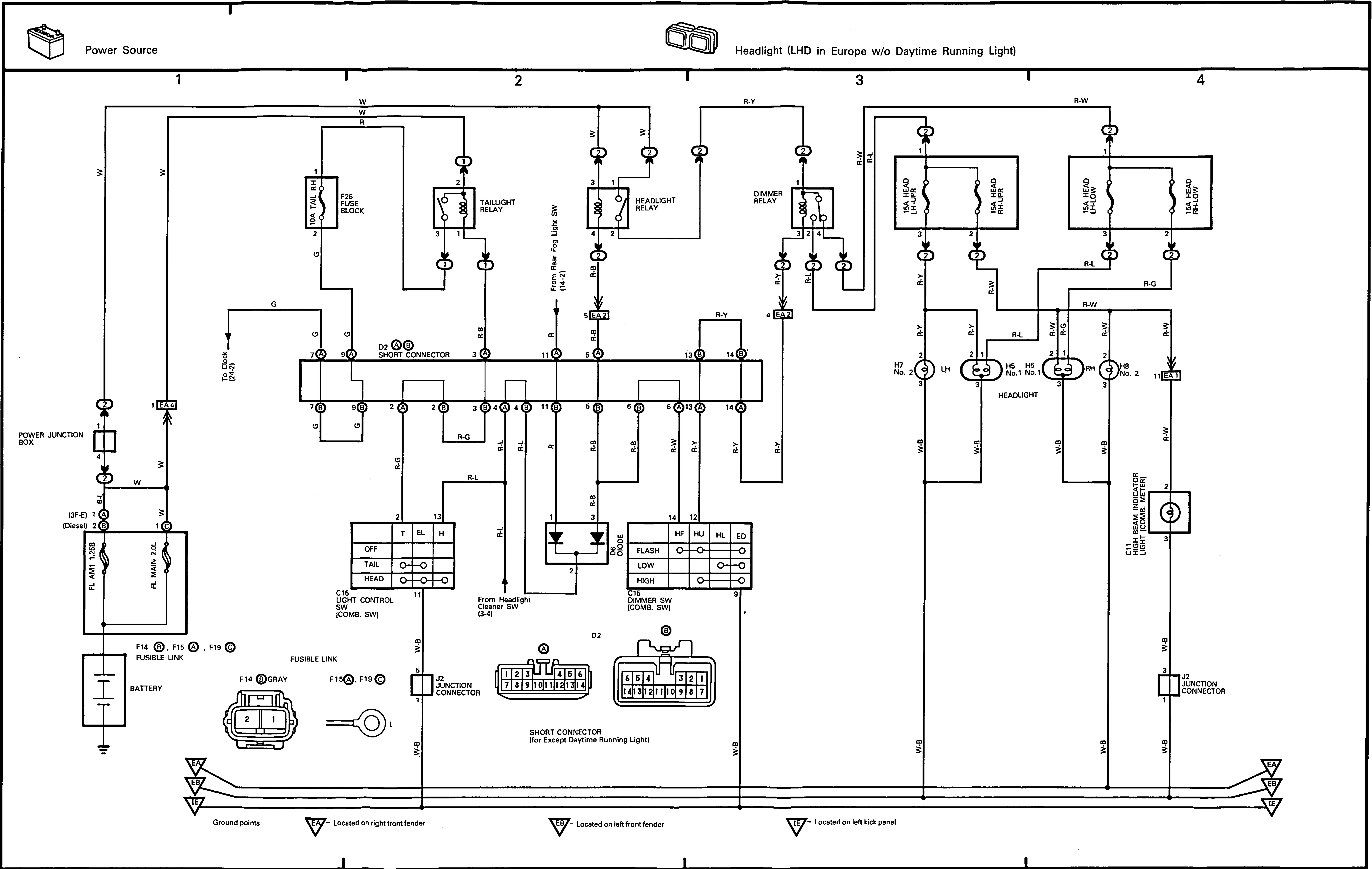
EA = Located on right front fender

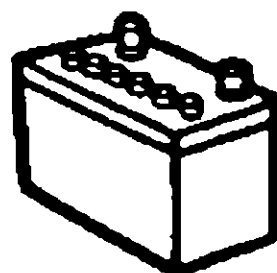
EB = Located on left front fender

ID = Located on right kick panel

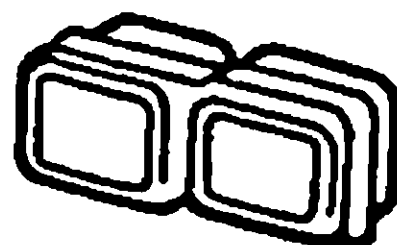
IE = Located on left kick panel



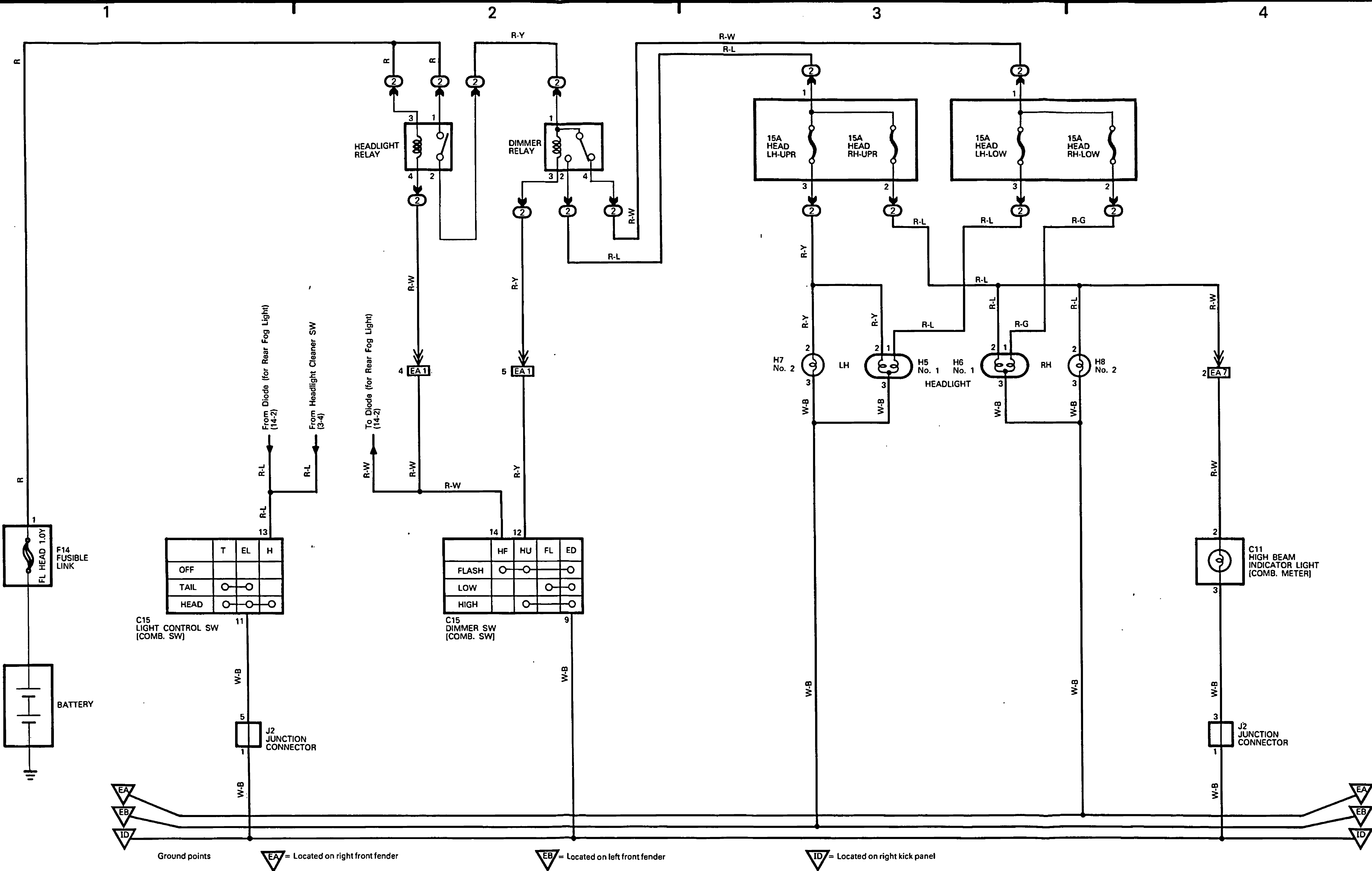


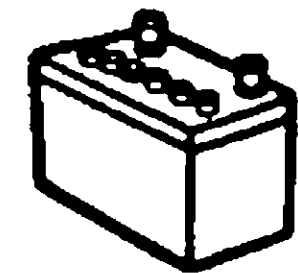


Power Source

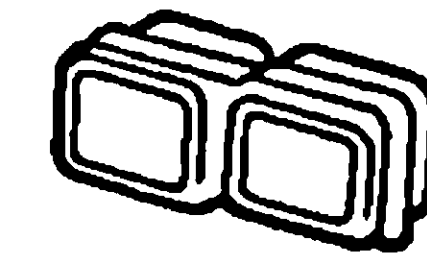


Headlight (U.K.)

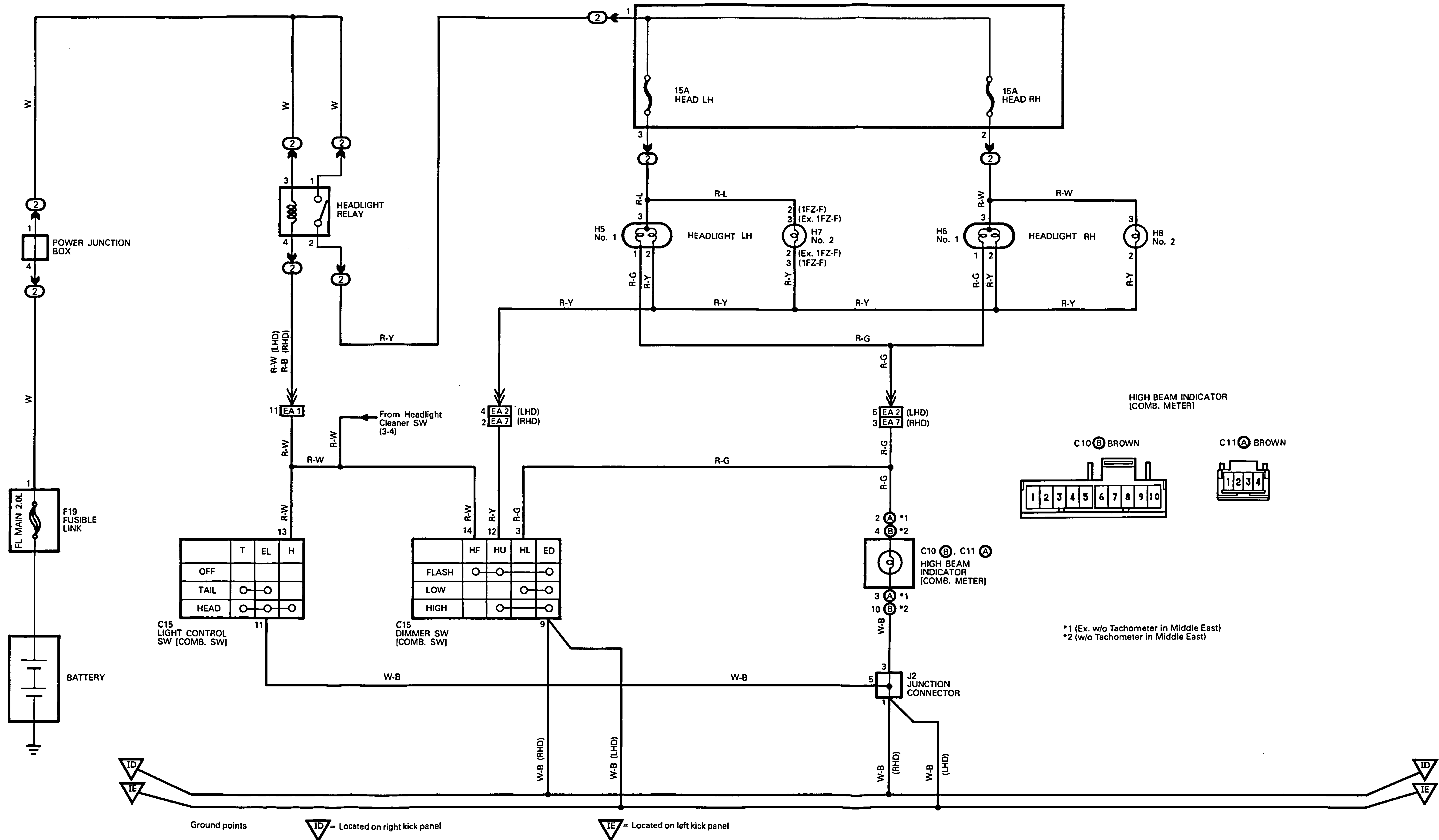


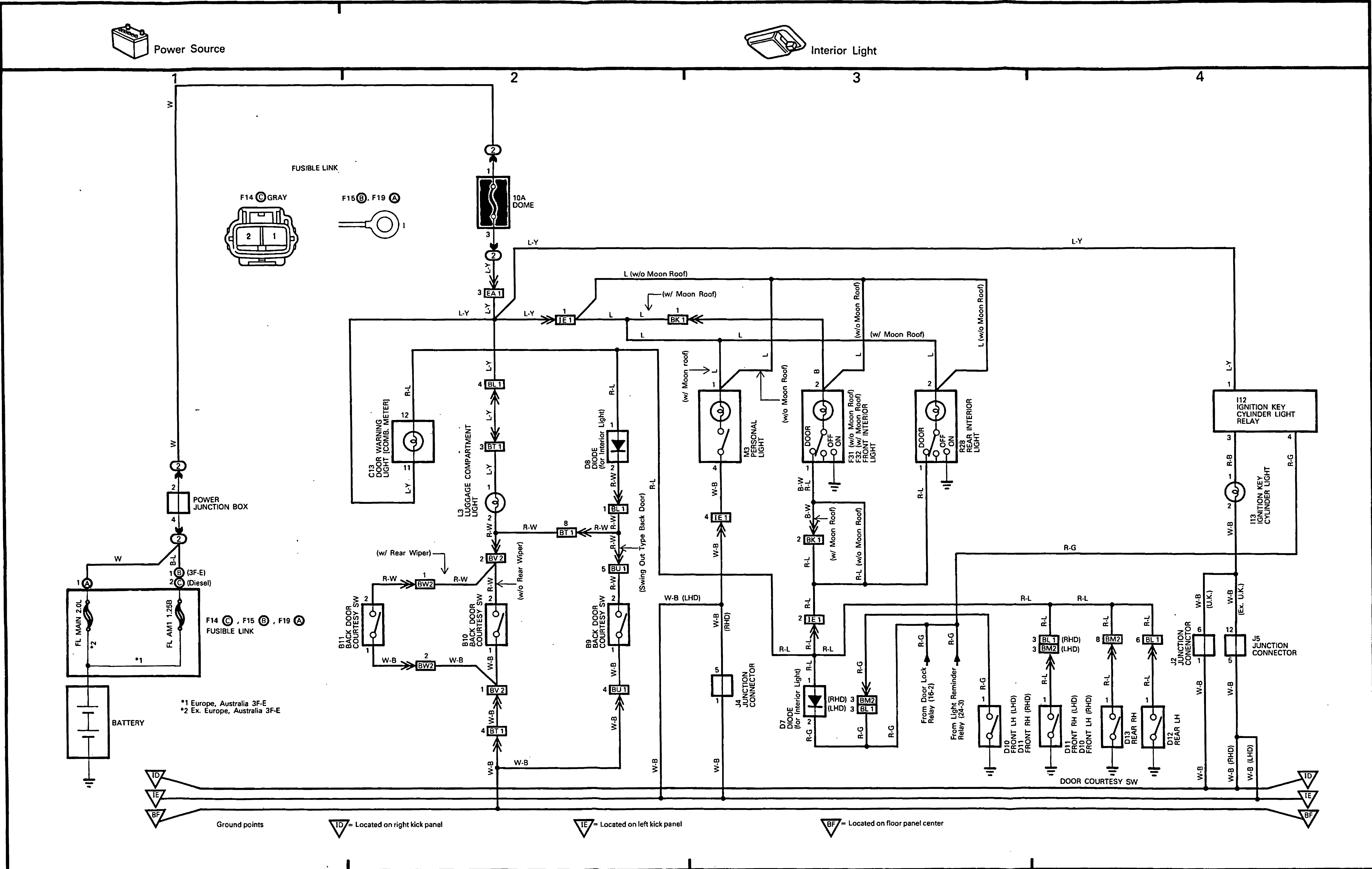


Power Source

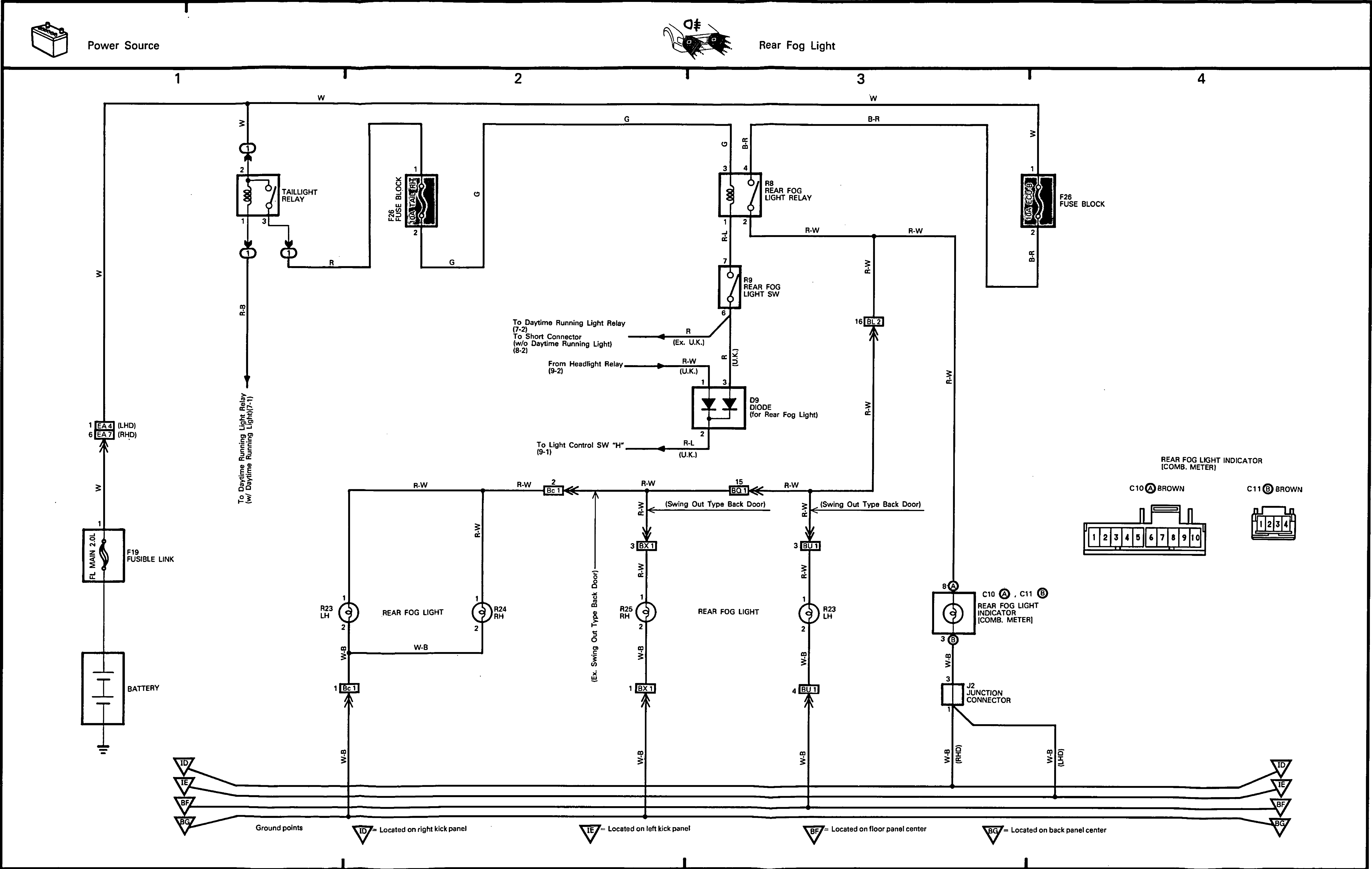


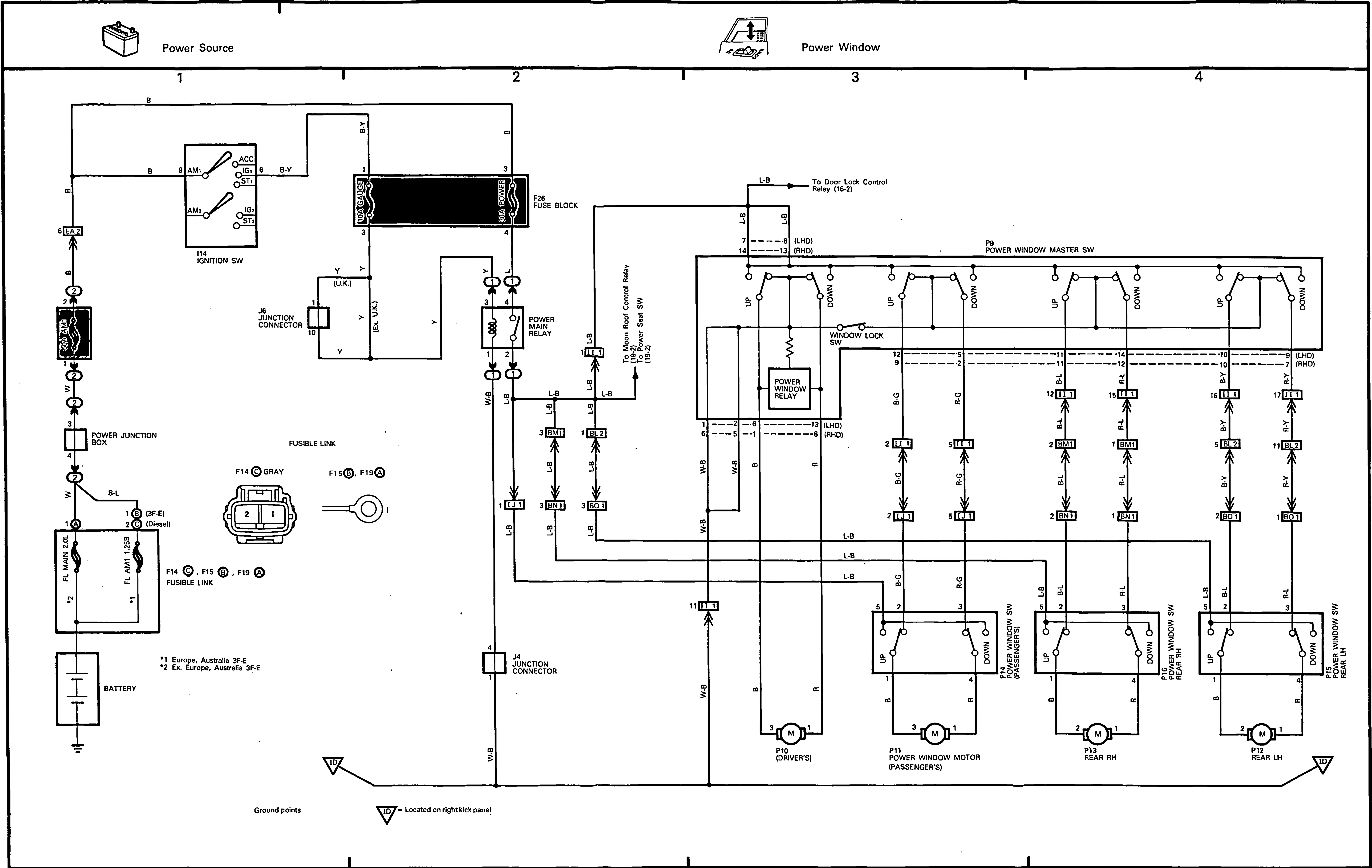
Headlight (Ex. LHD in Europe)

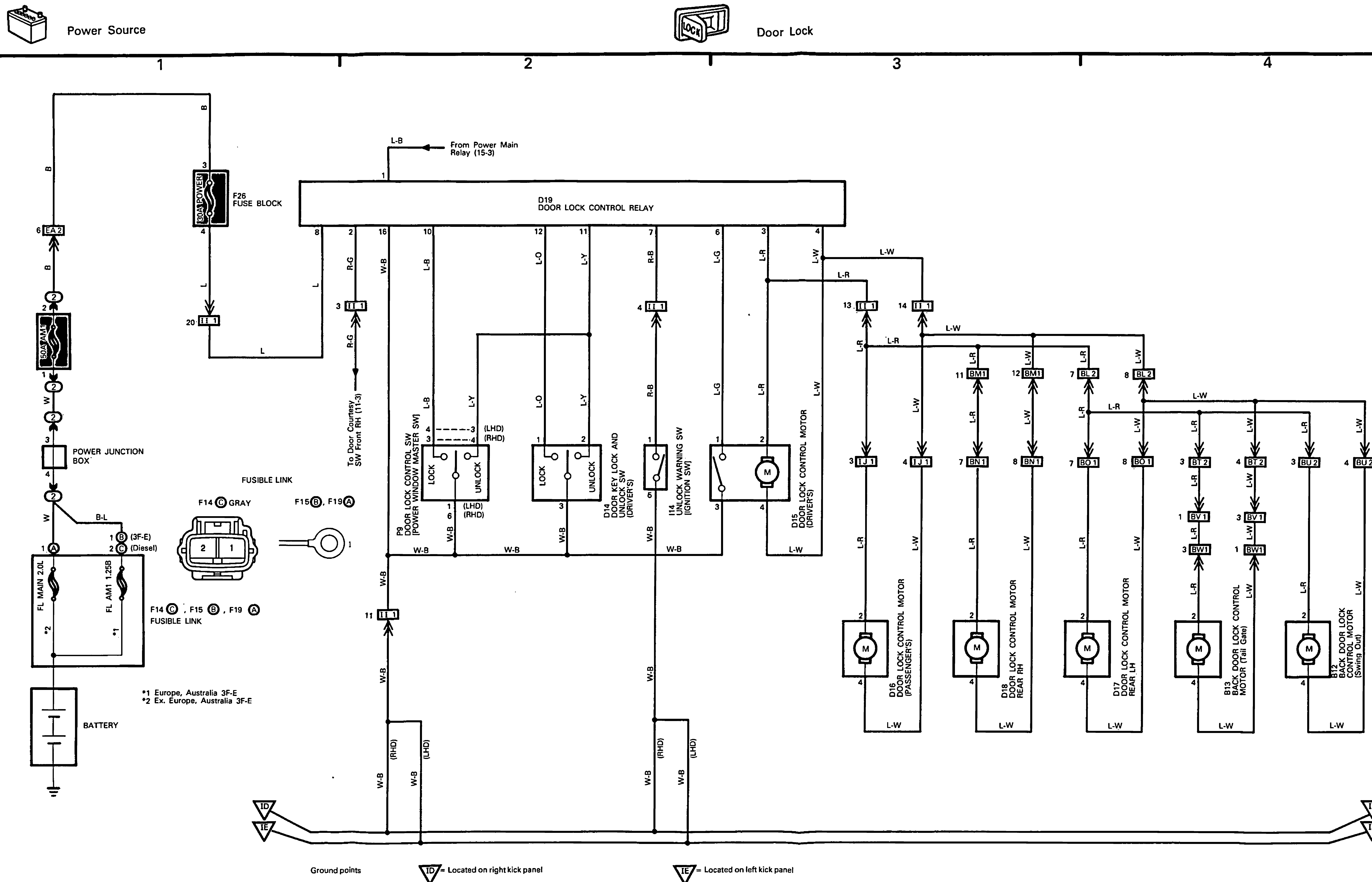


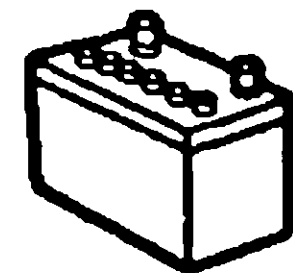


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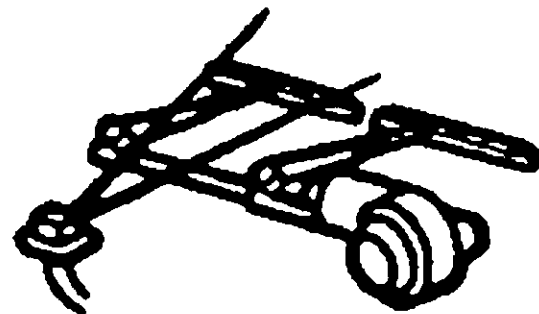




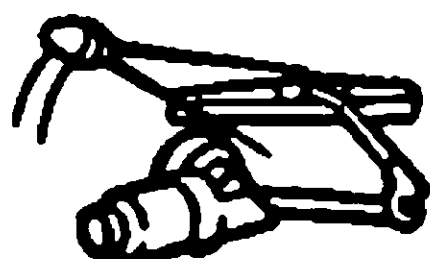




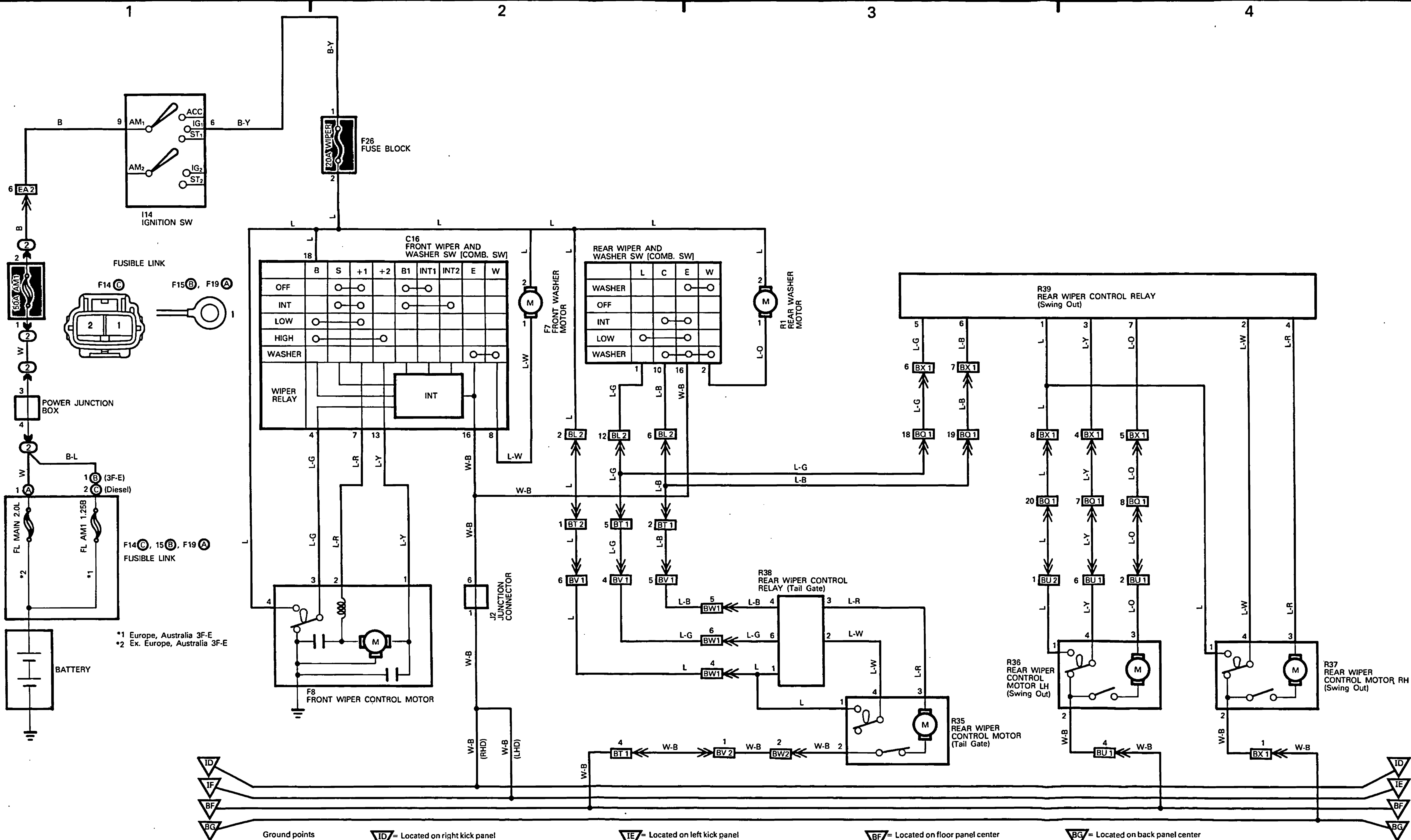
Power Source

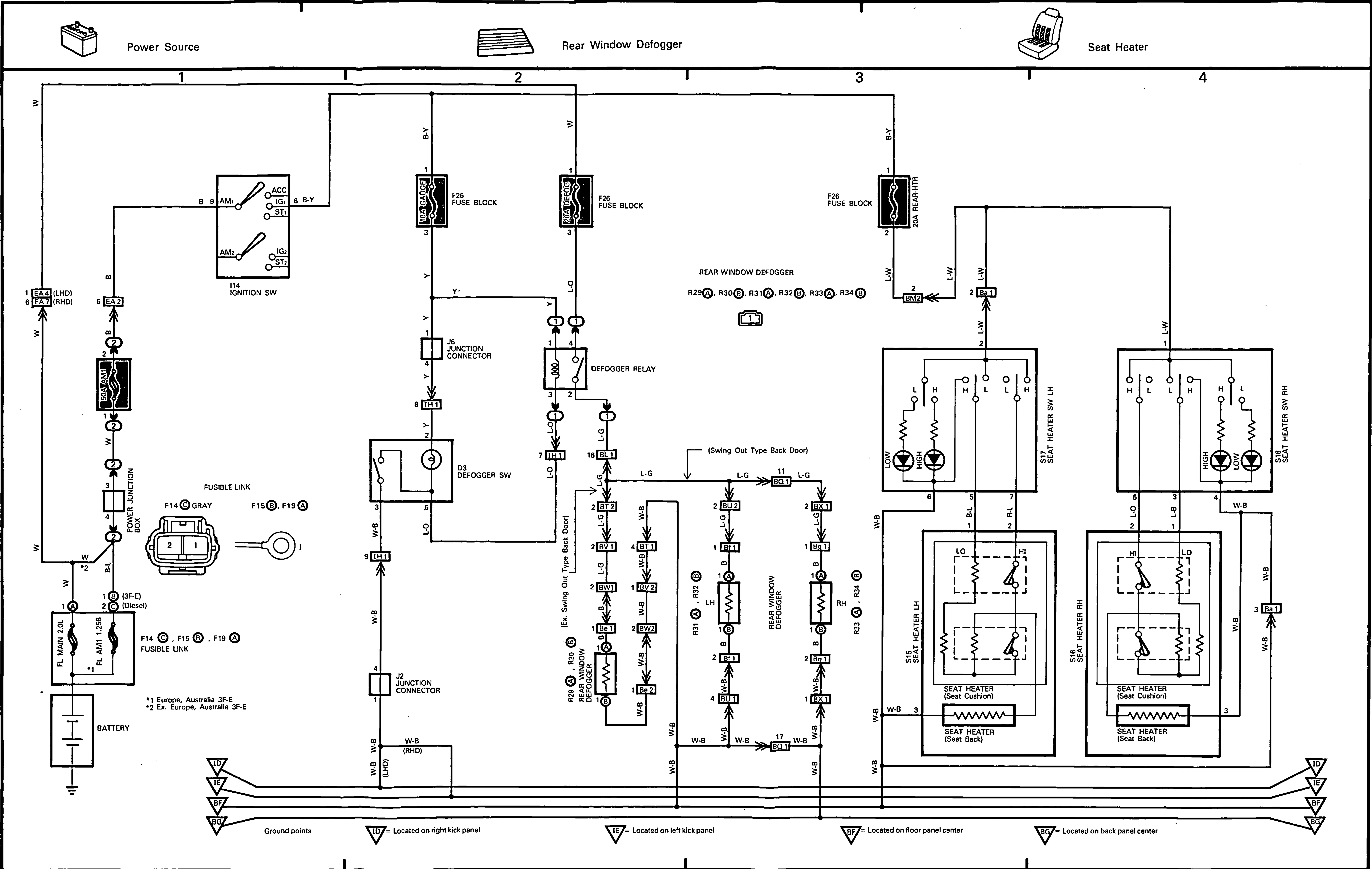


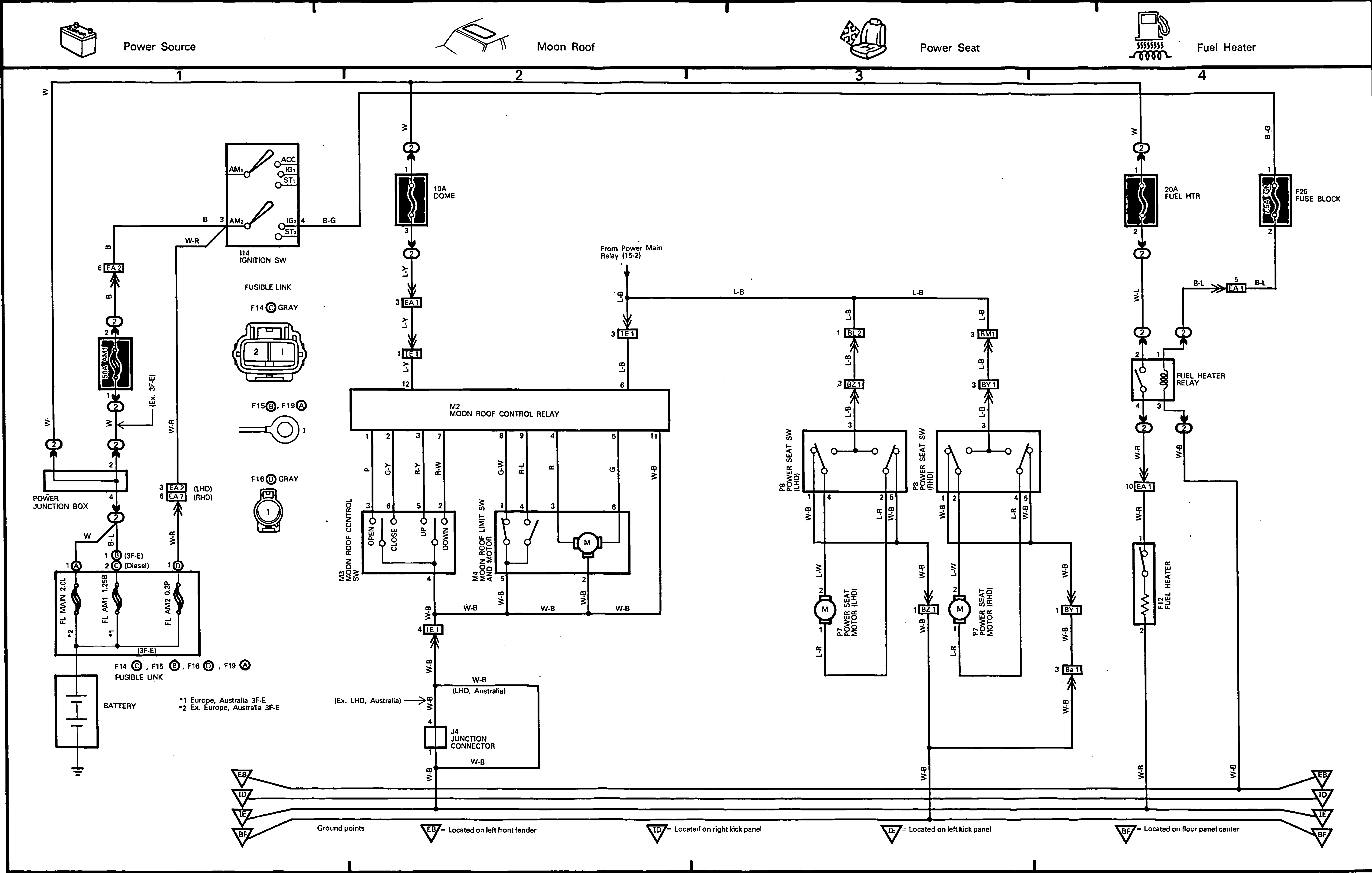
Front Wiper and Washer (Ex. 1FZ-F)



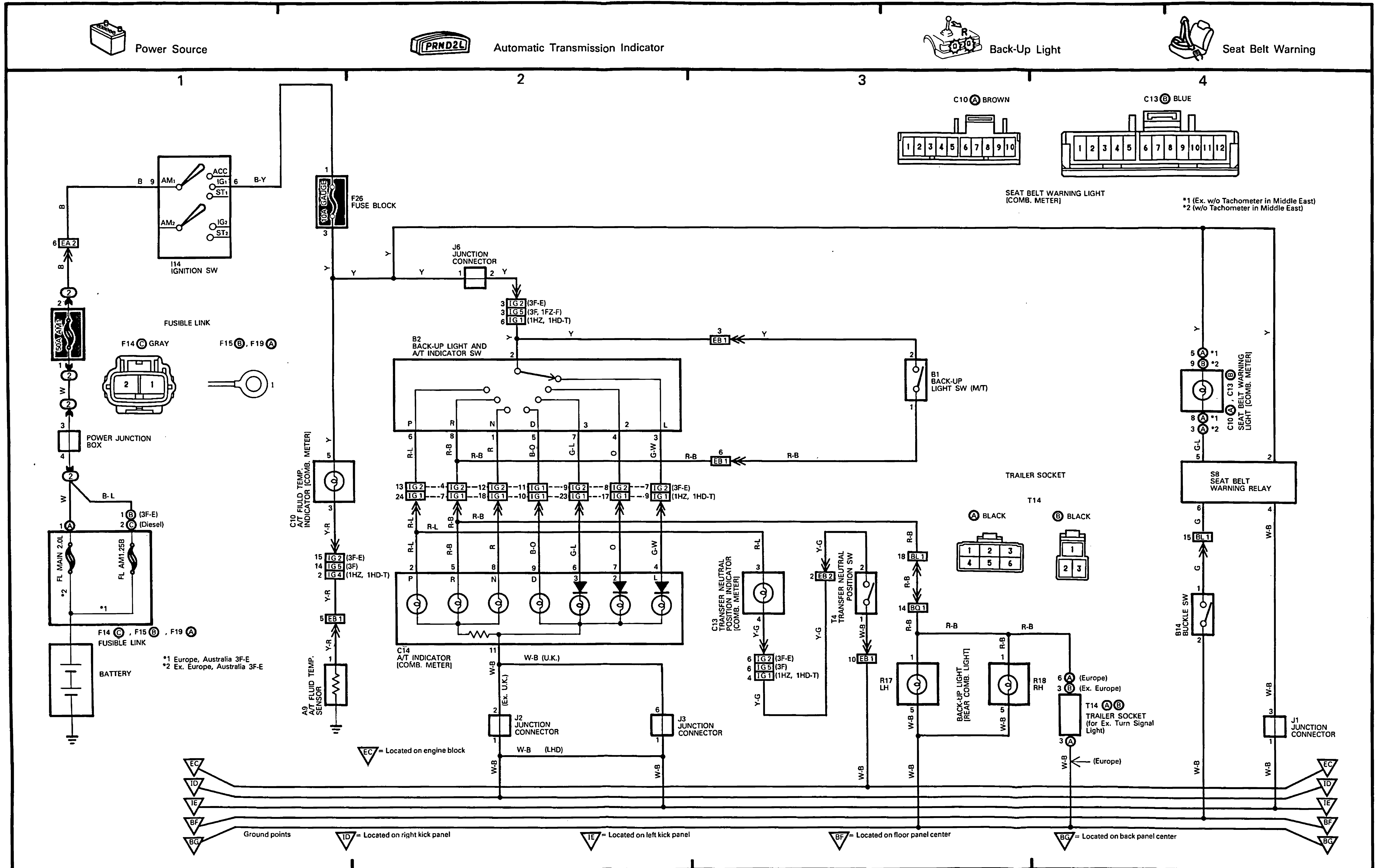
Rear Wiper and Washer (Ex. 1FZ-F)

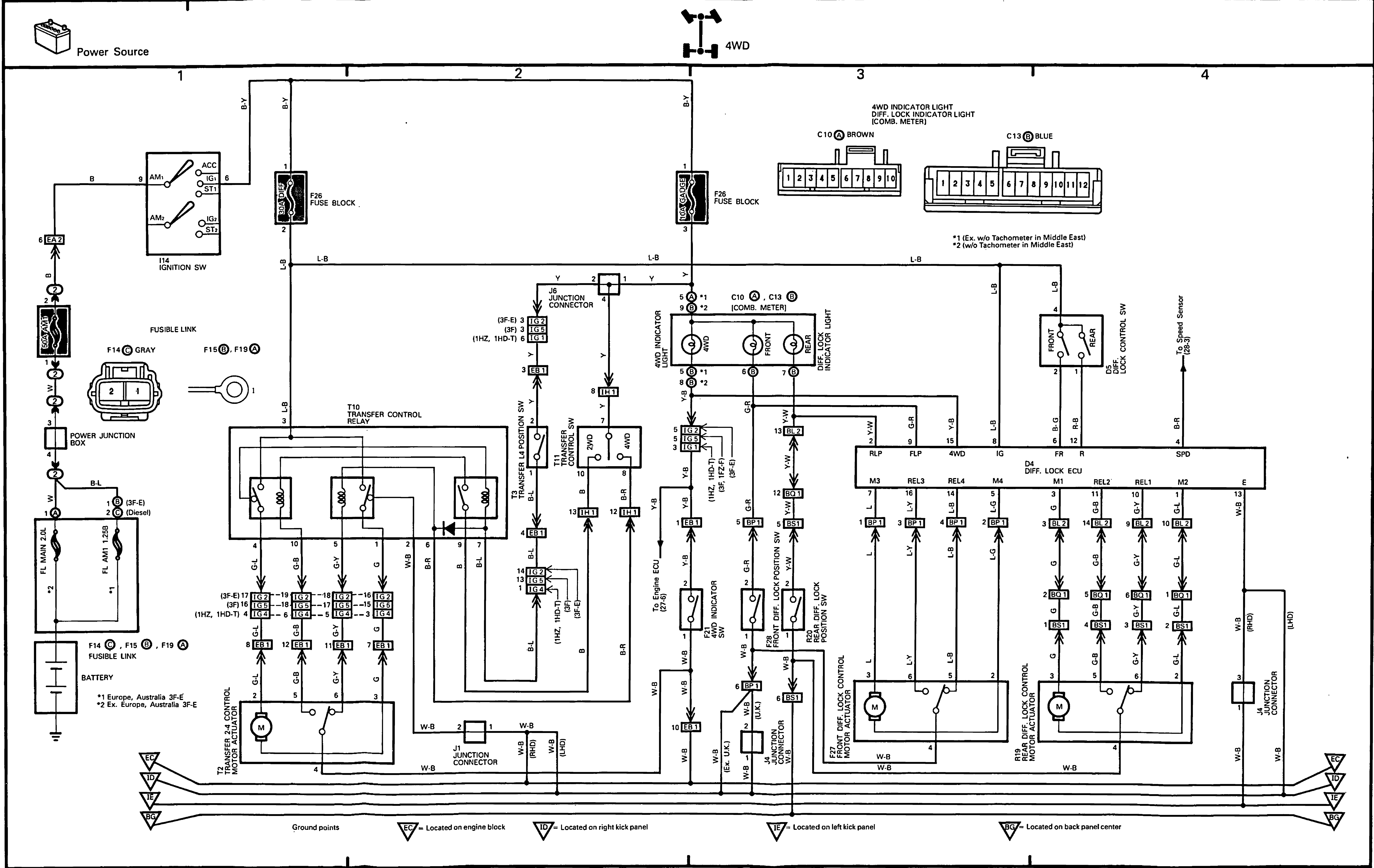


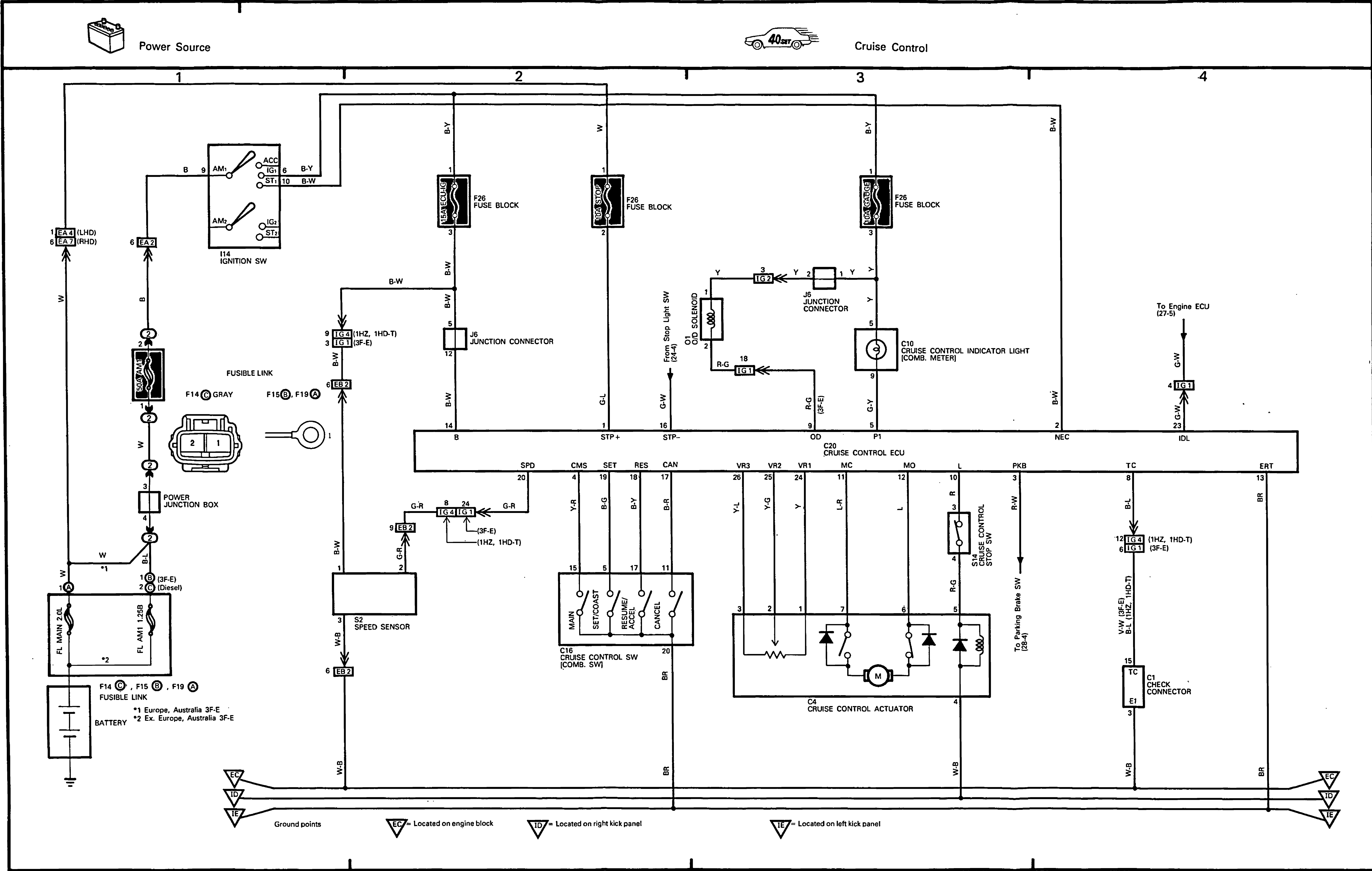




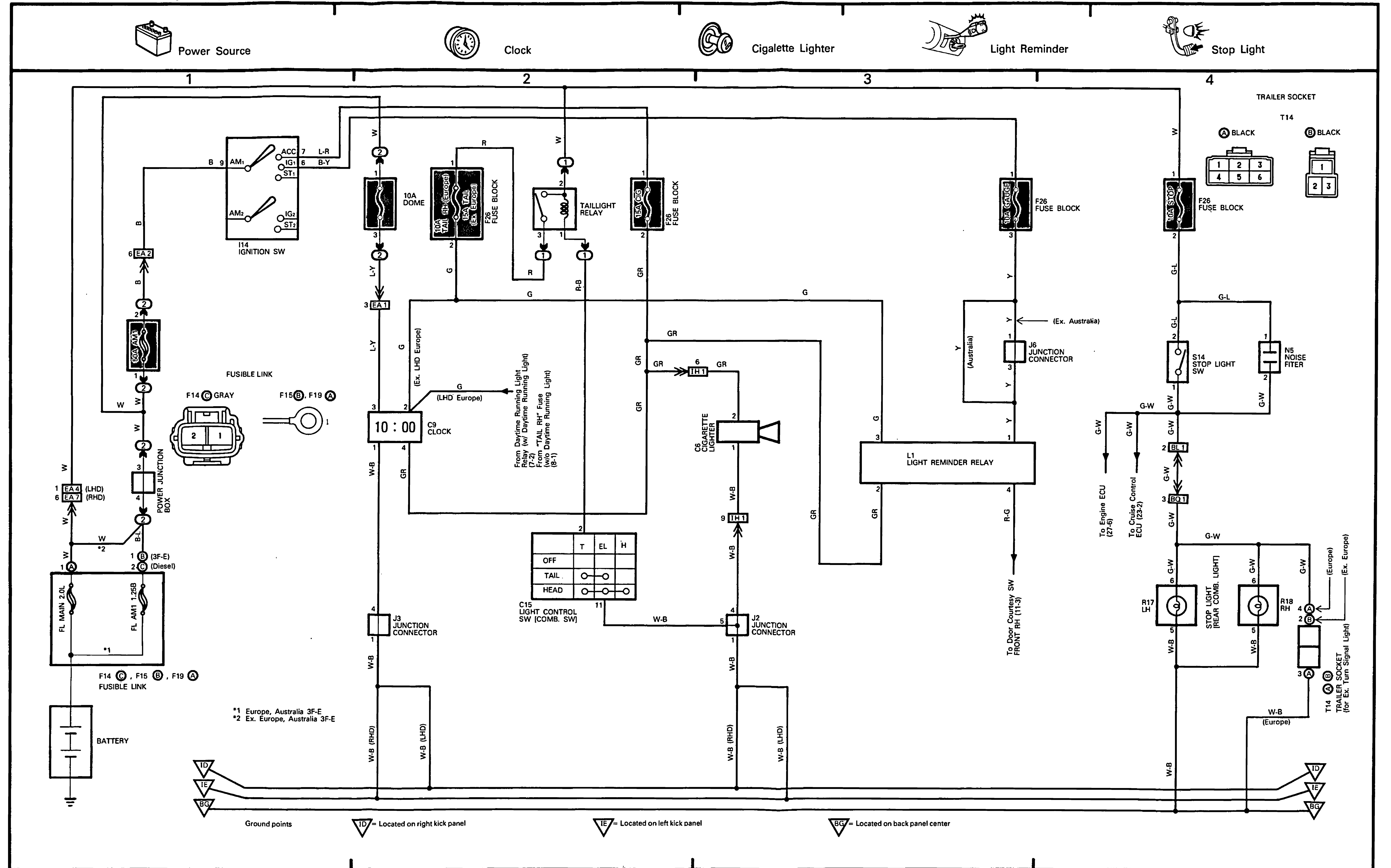


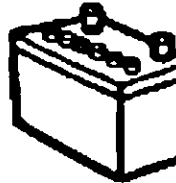




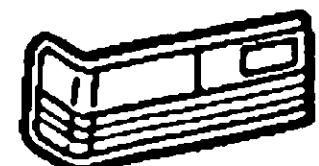


LAND CRUISER (W/G)

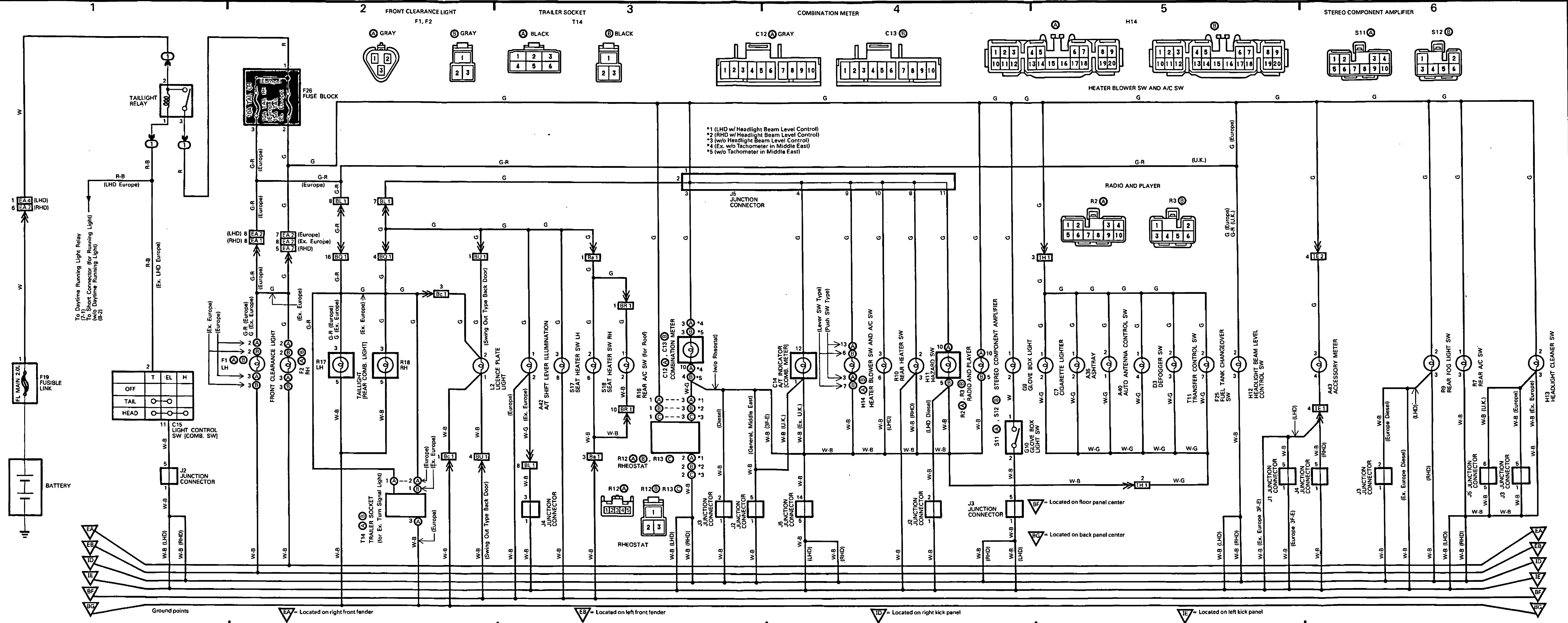


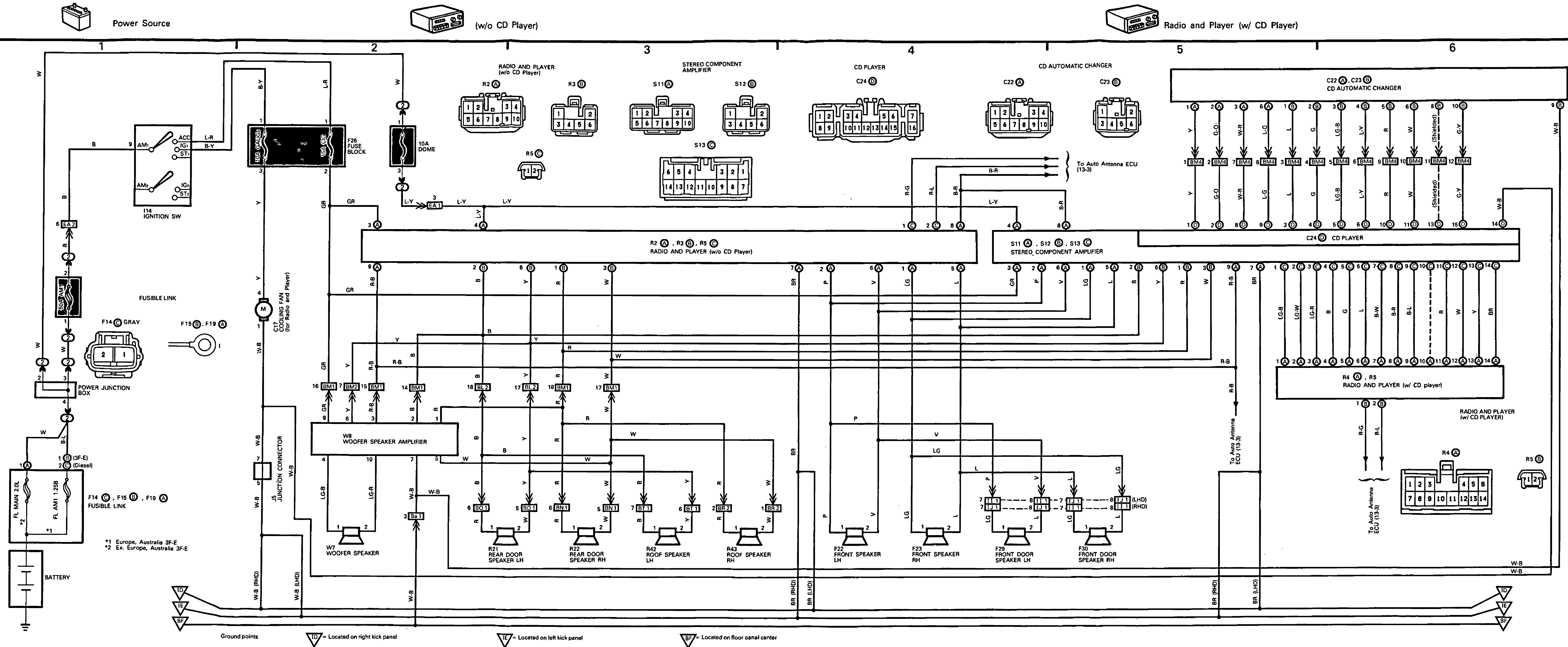


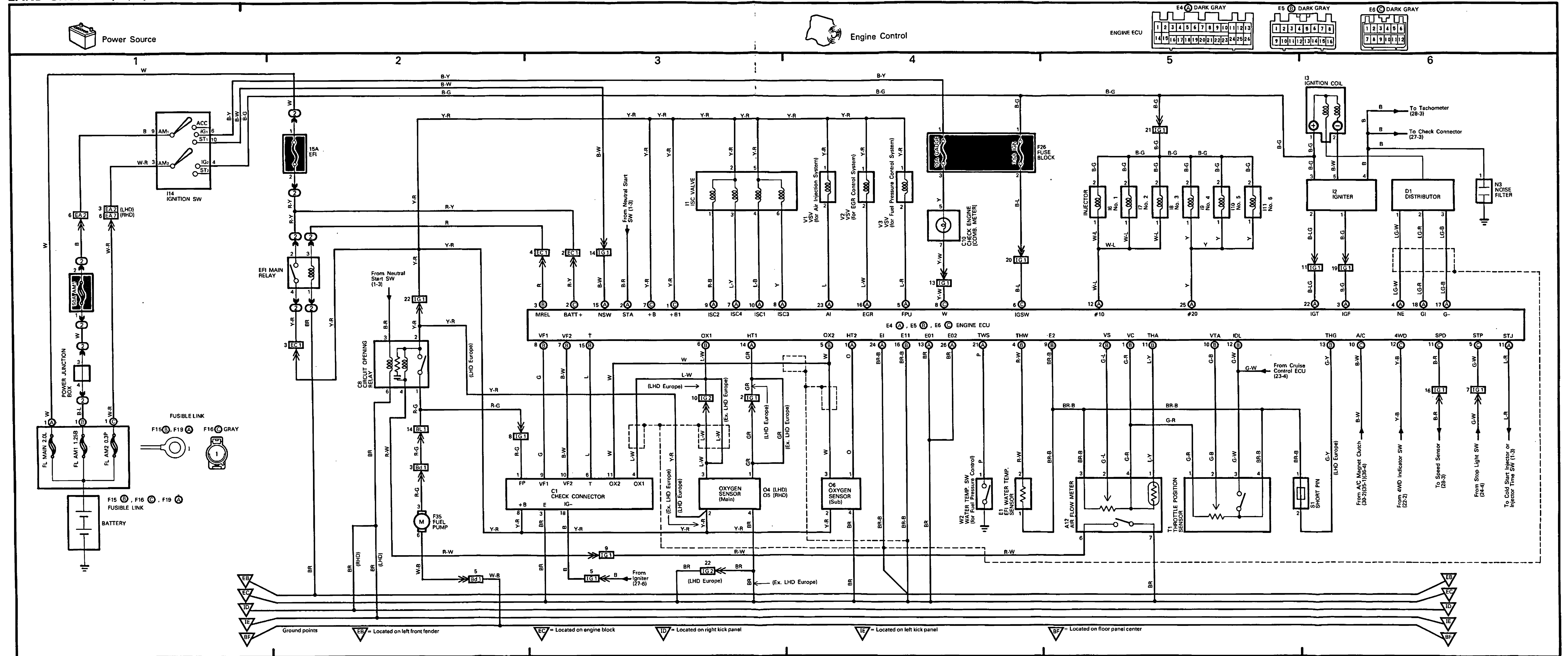
Power Source

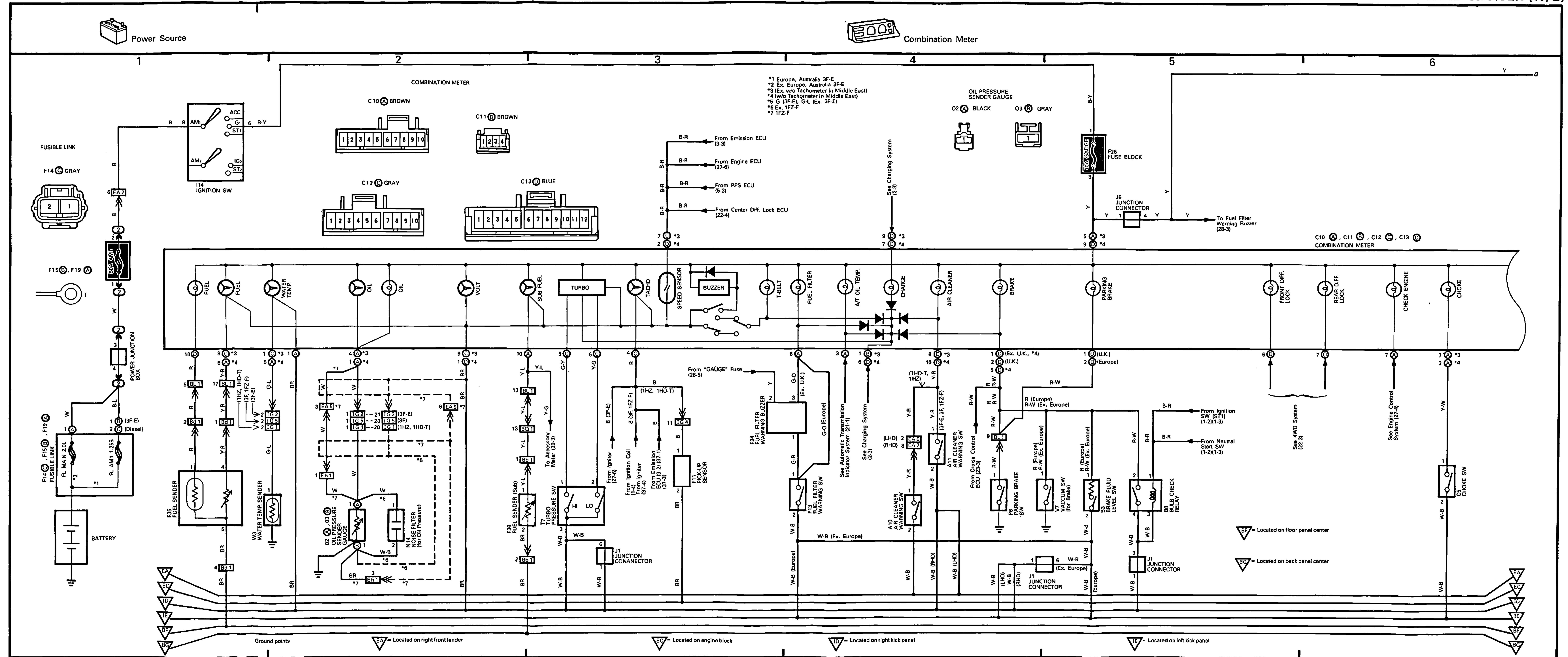


Taillight and Illumination







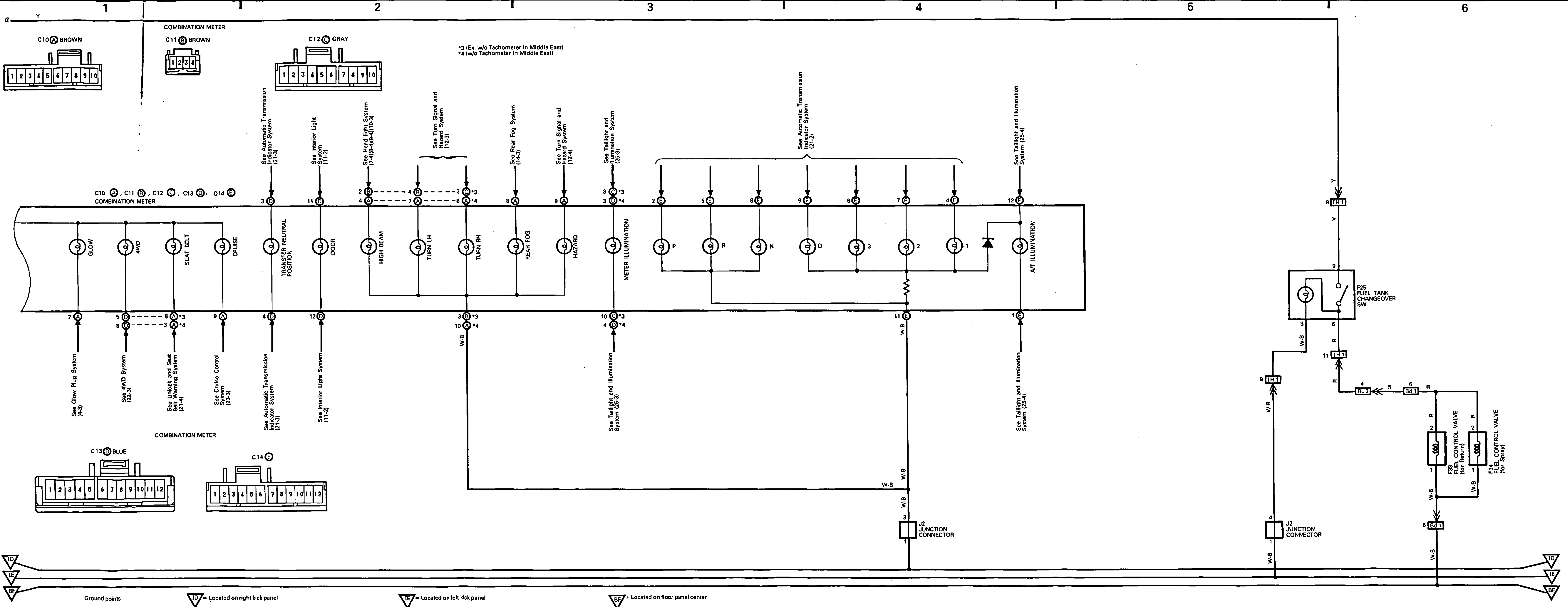




Combination Meter



Fuel Tank Changeover

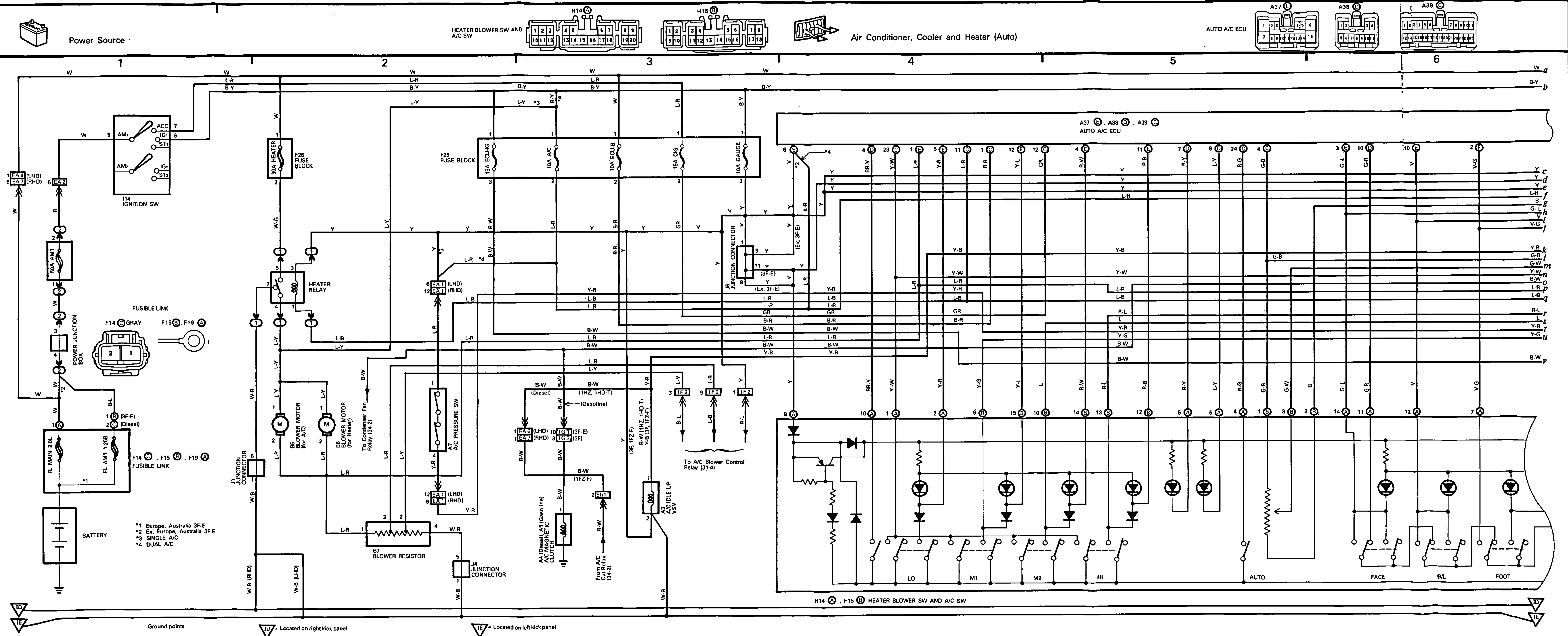


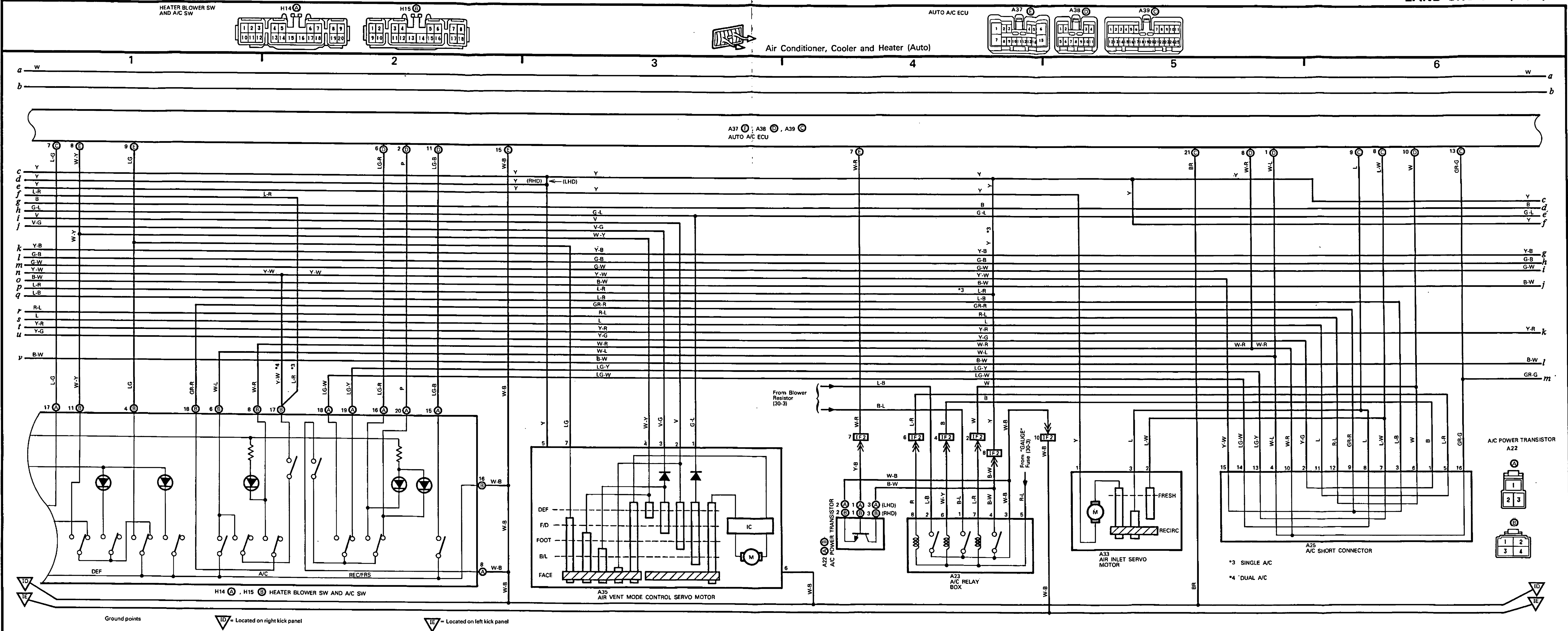
Ground points

ID = Located on right kick panel

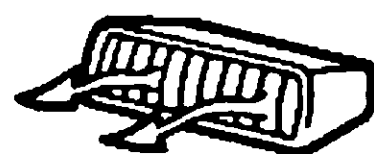
IE = Located on left kick panel

BF = Located on floor panel center

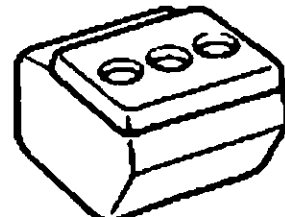




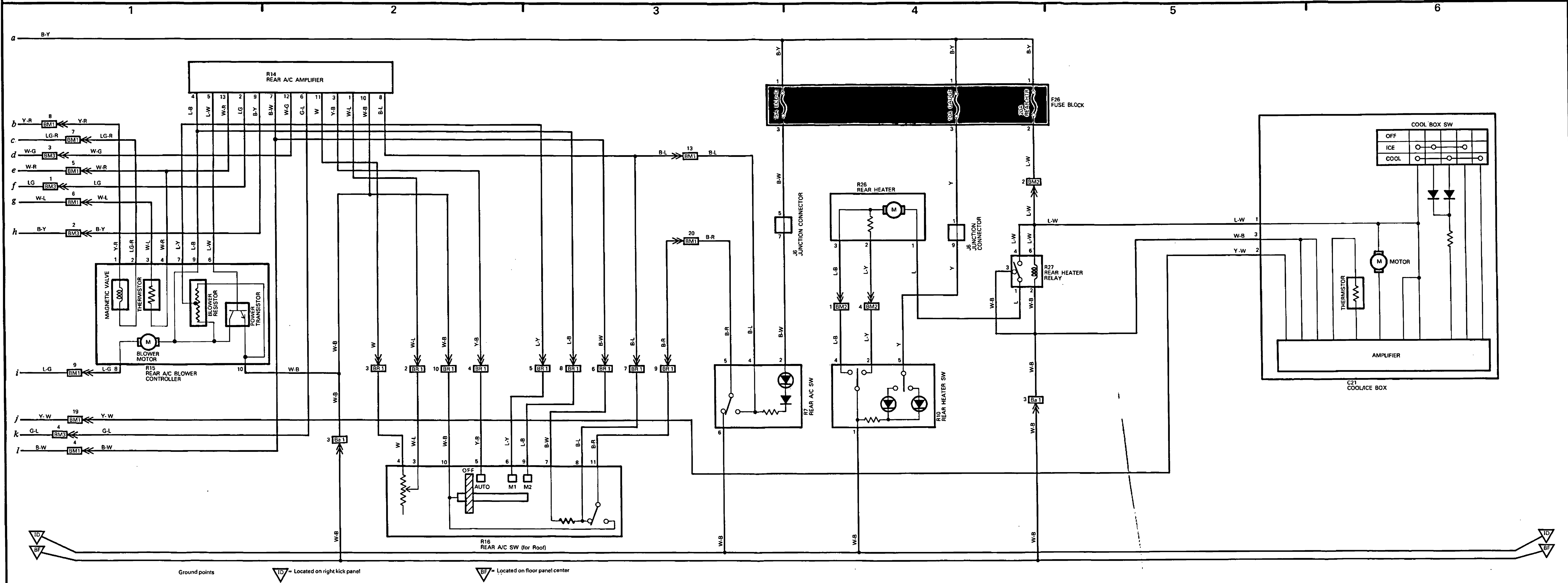


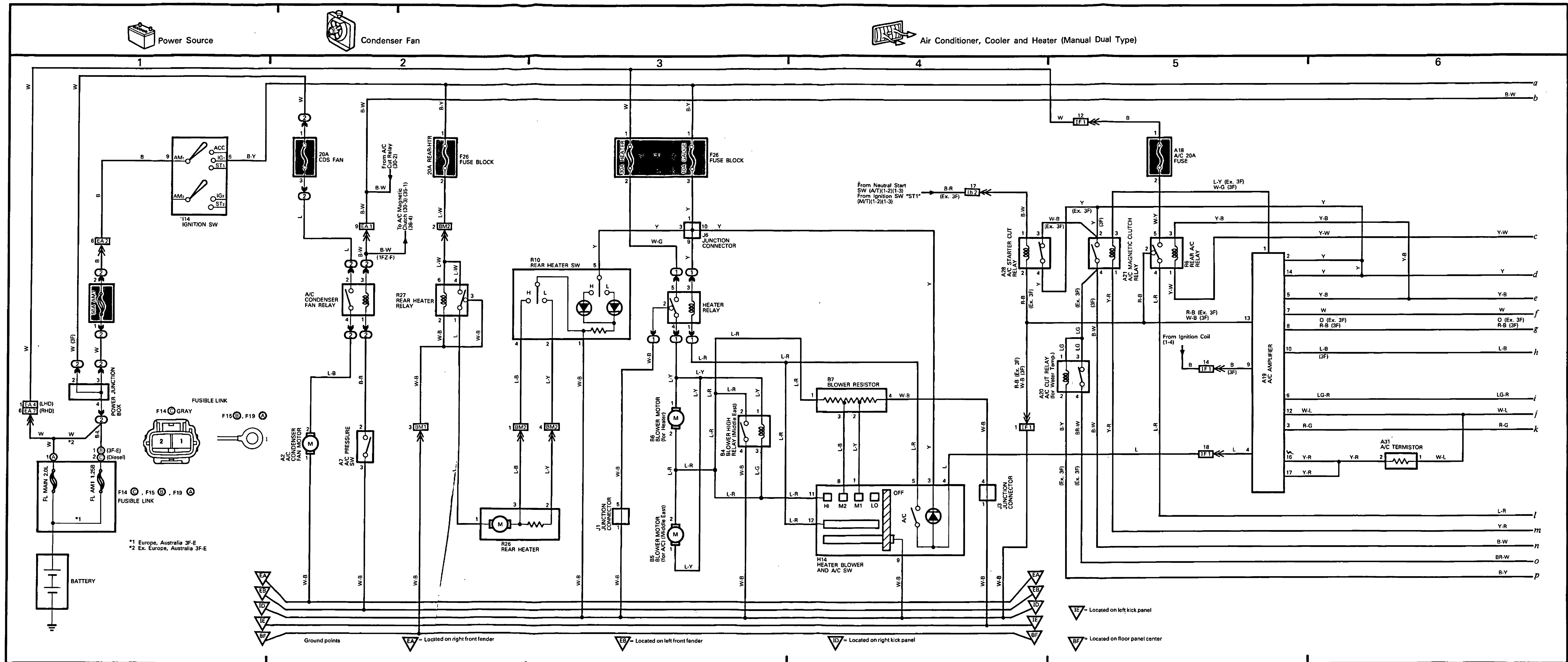


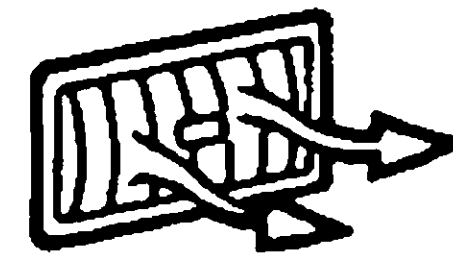
Rear Air Conditioner (Auto)



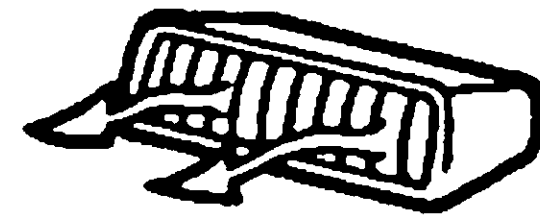
Cool/Ice Box



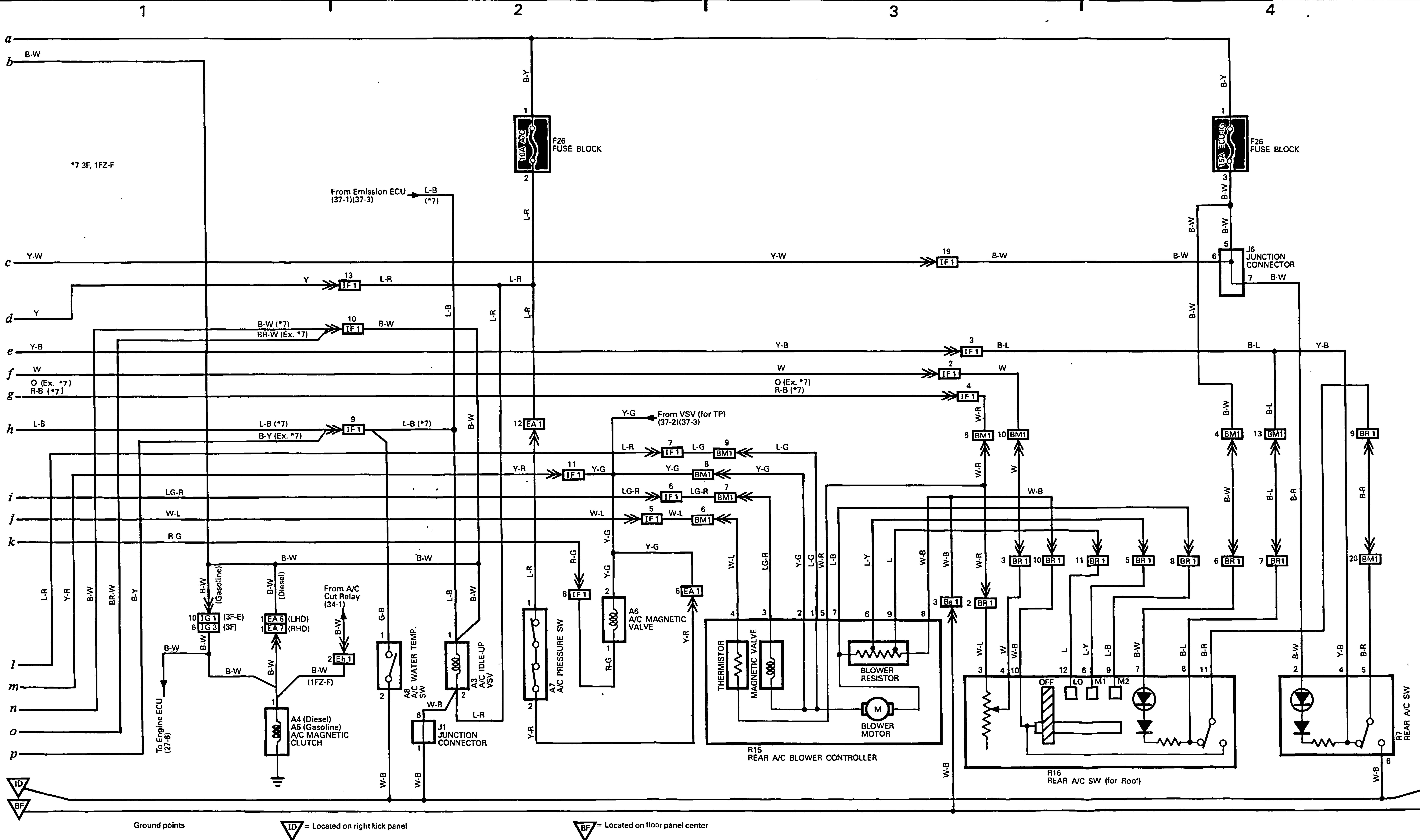


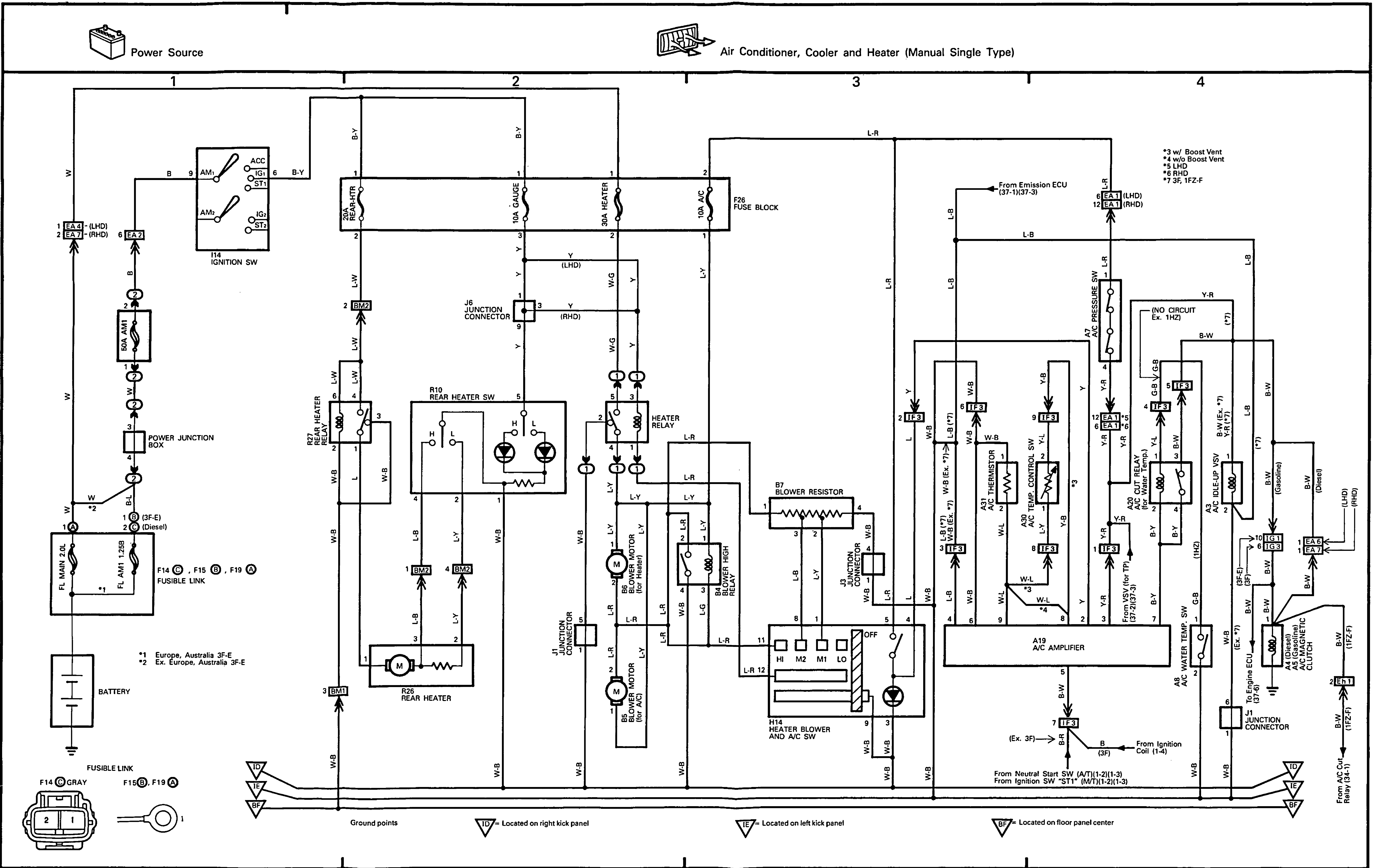


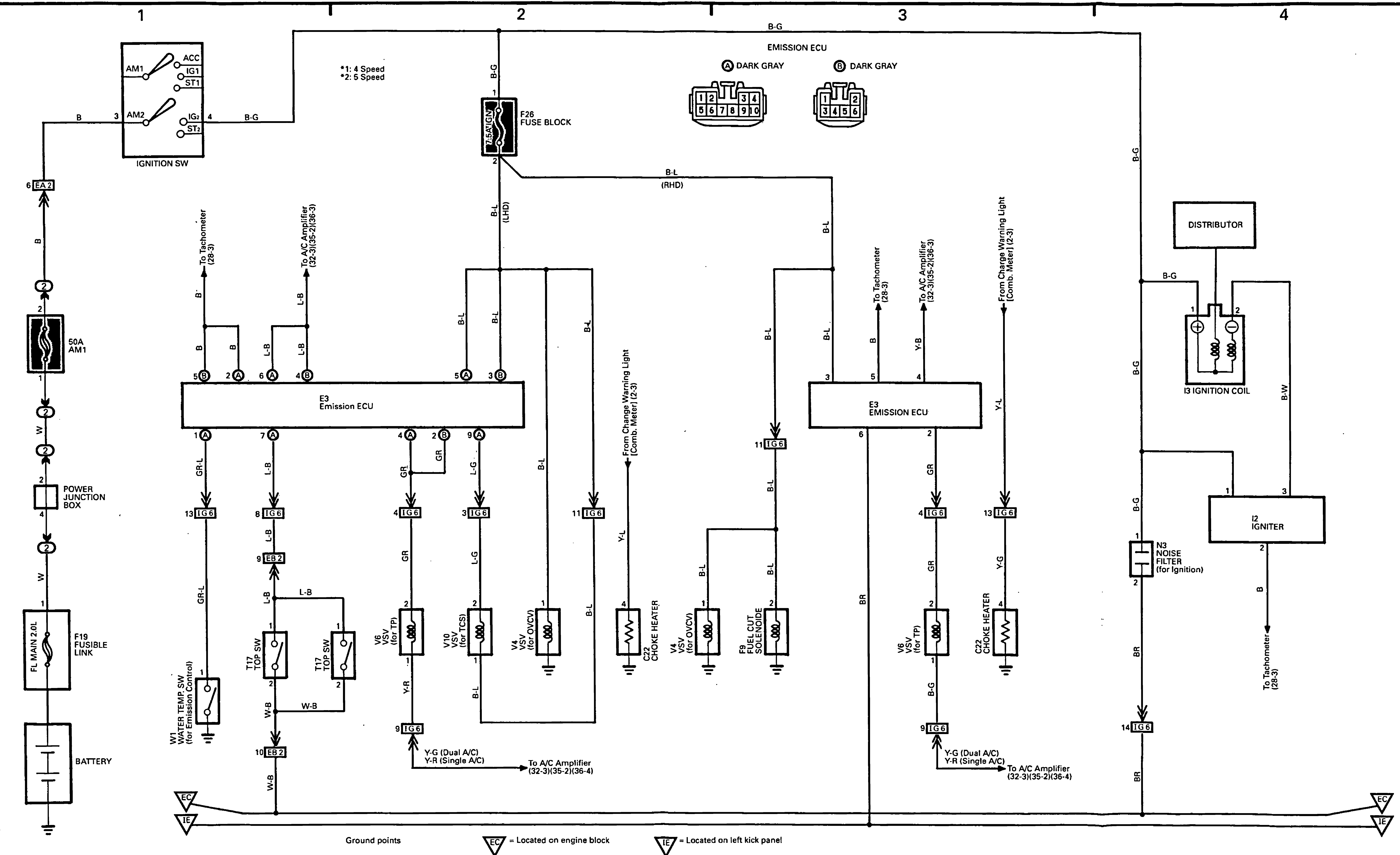
Air Conditioner, Cooler and Heater (Manual Dual Type)

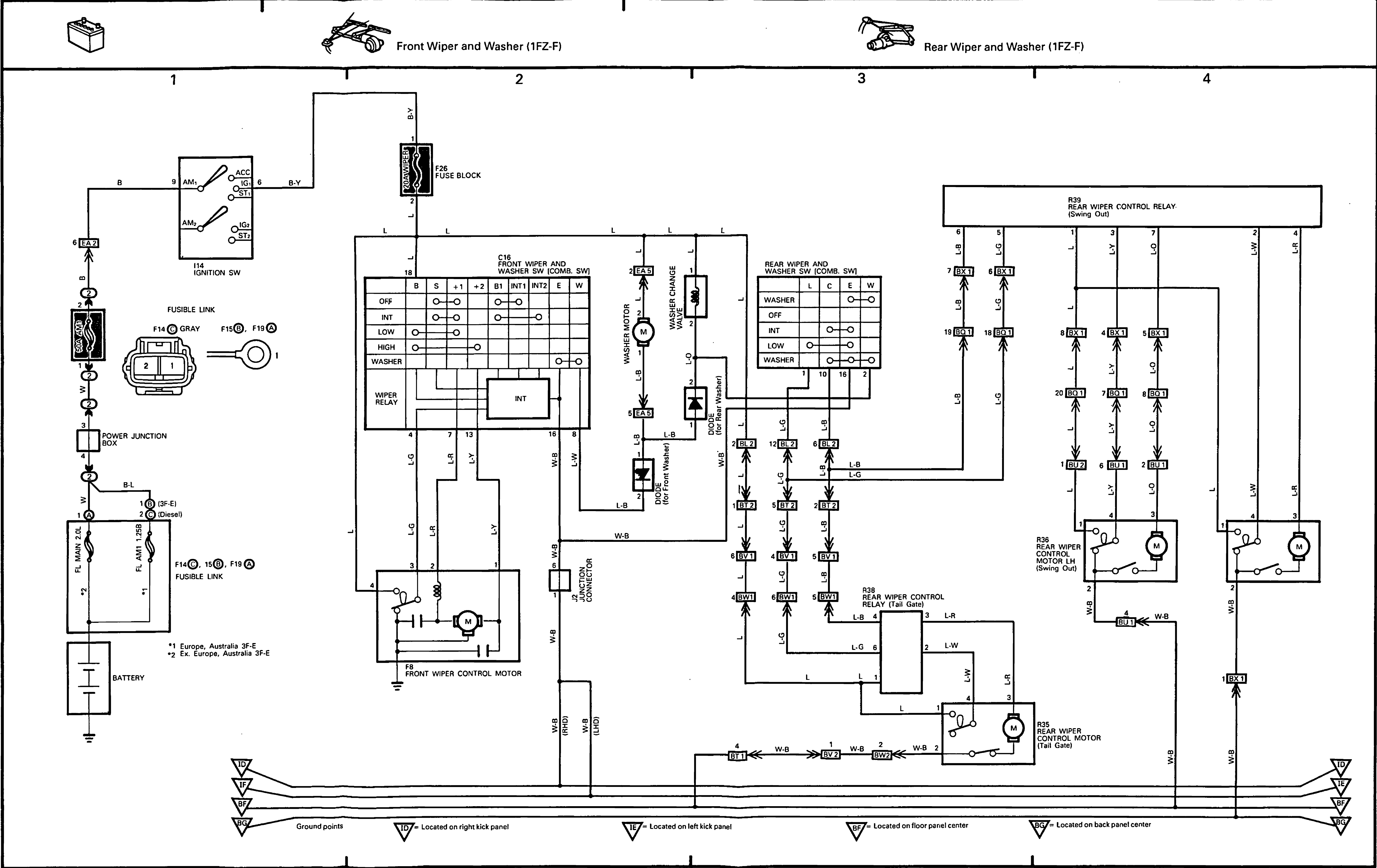


Rear Air Conditioner (Manual)



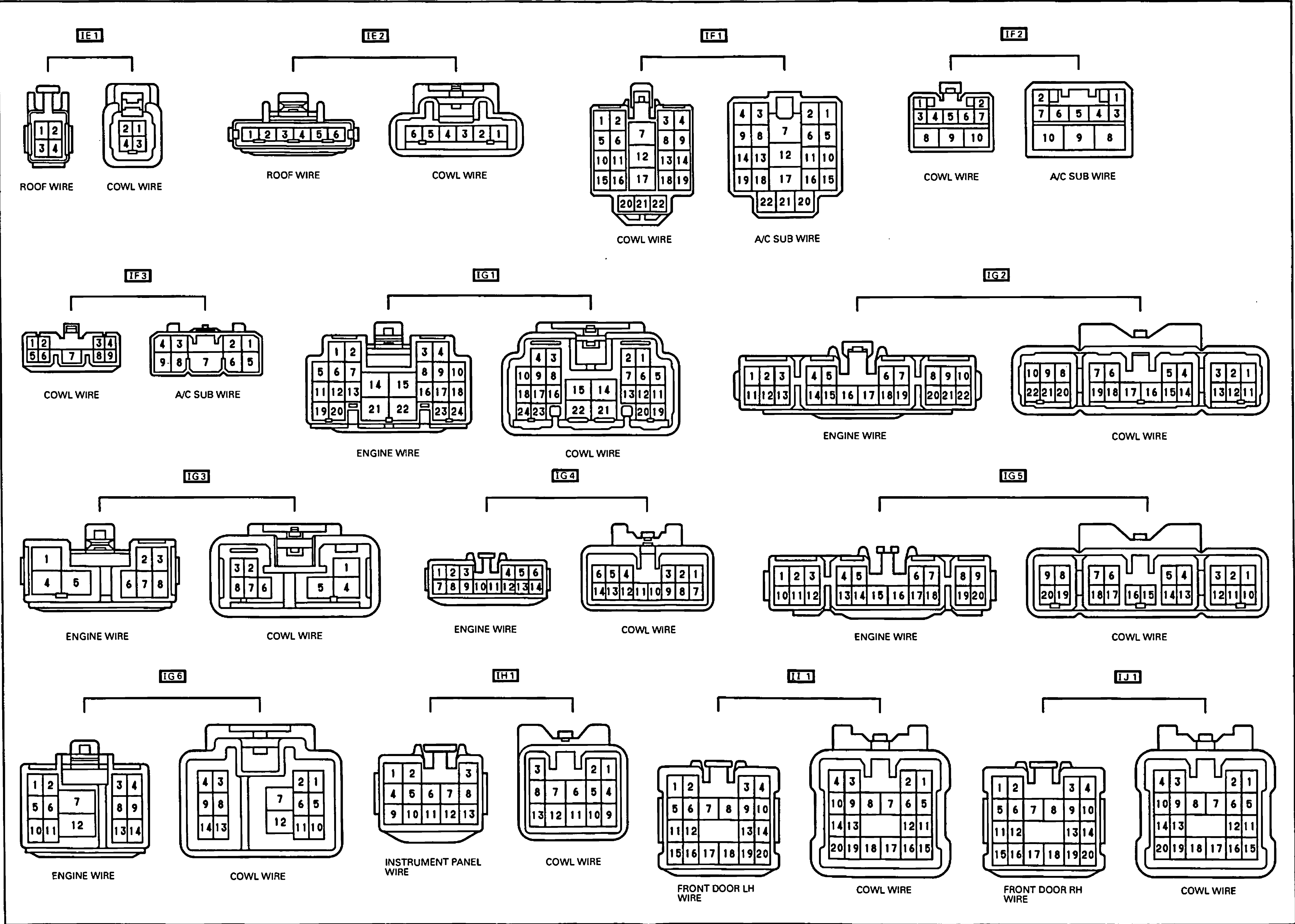
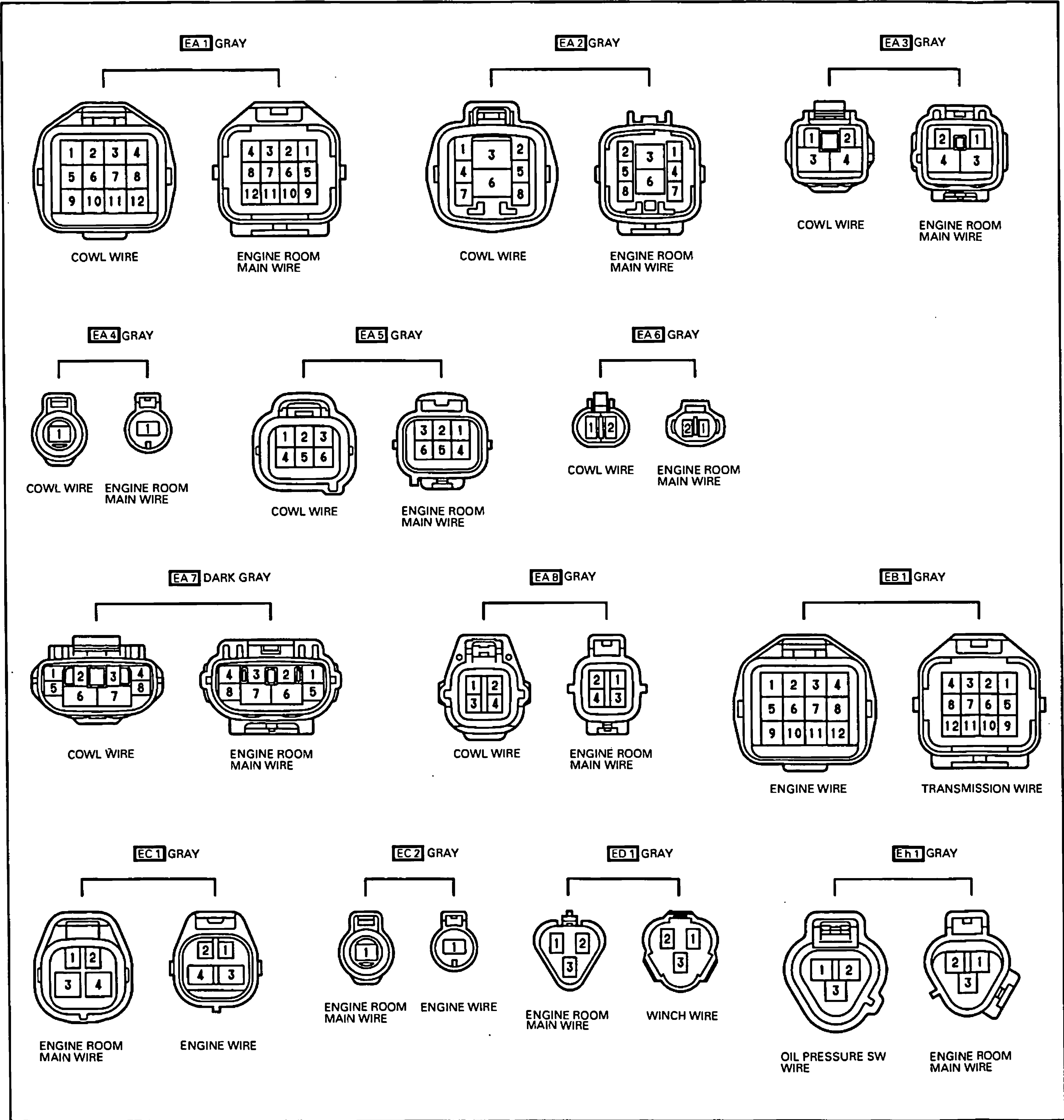




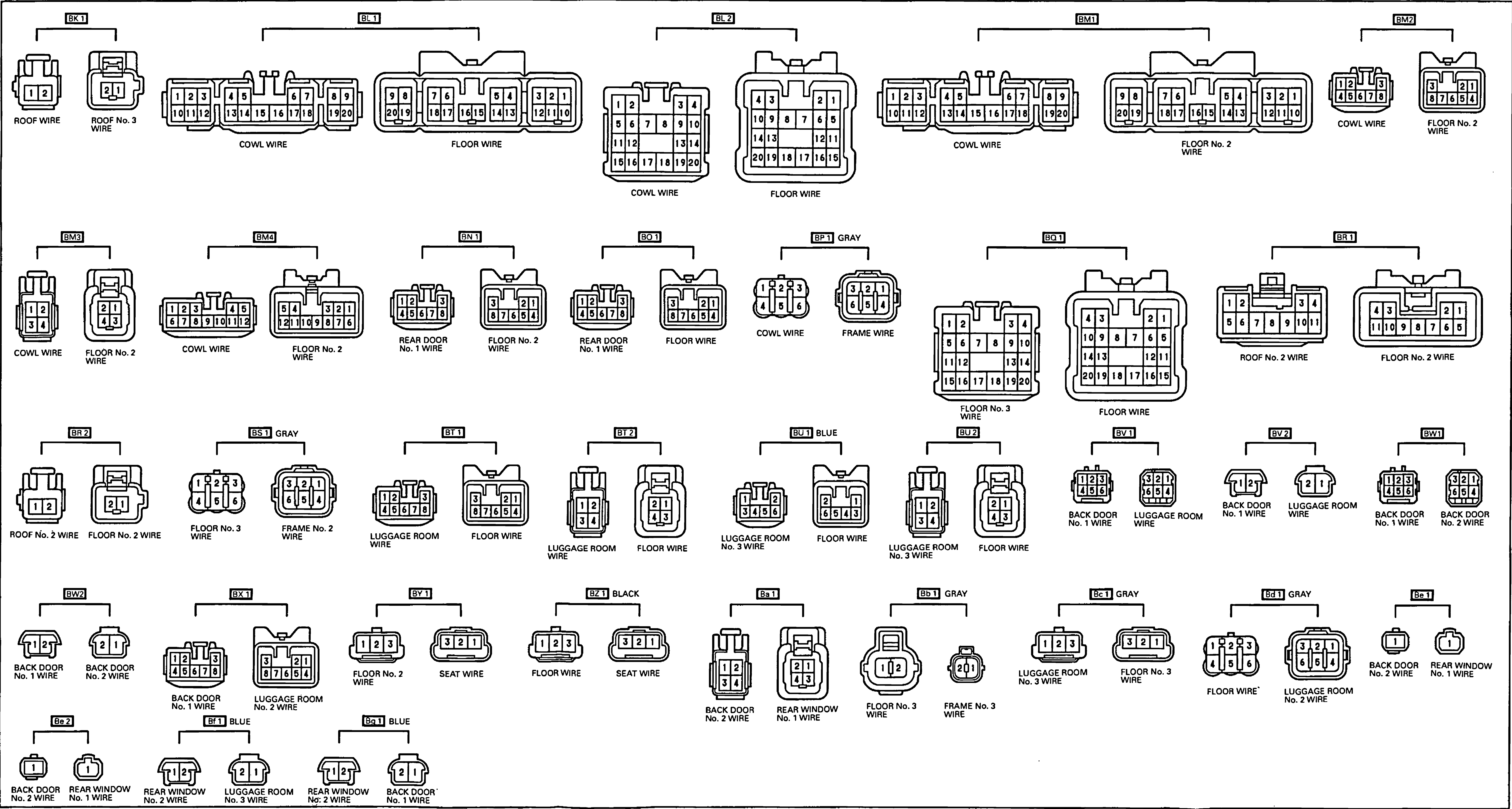


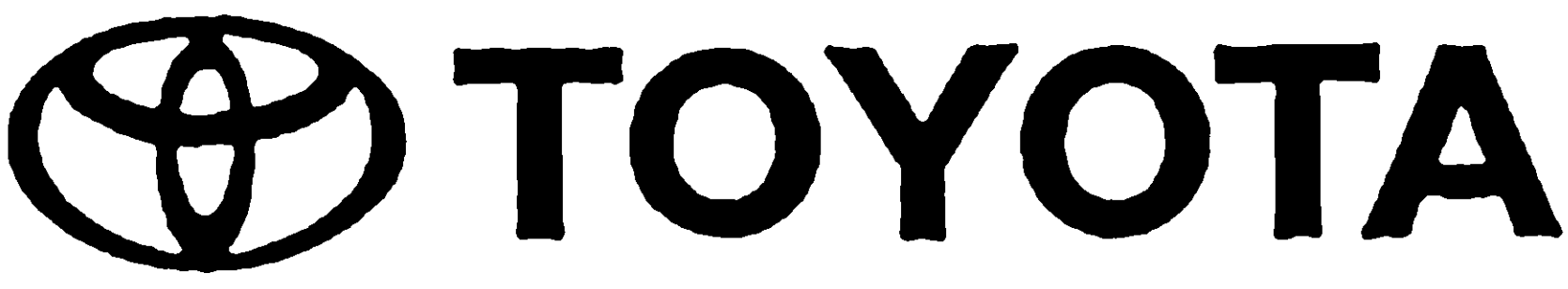
Connector Joining Wire Harness and Wire Harness
(E Group: Engine Compartment Area)

(I Group: Instrument Panel and Surrounding Area)



Connector Joining Wire Harness and Wire Harness
(B Group: Body Surrounding Area)





Land Cruiser FZJ75, 80

Supplement for Chassis and Body repair manual (RM290E)

January 1992

Contents:

Power steering

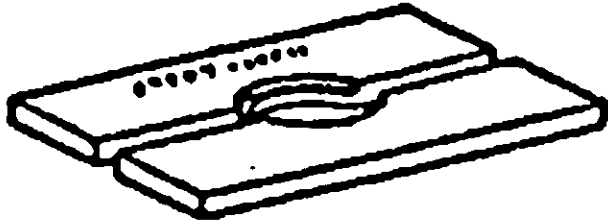
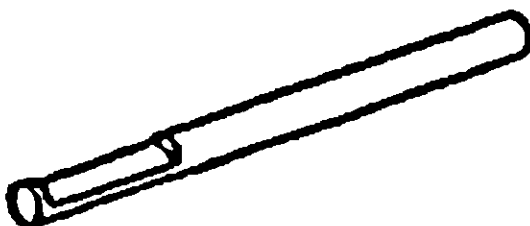
Preparation	SR-2
On-vehicle inspection	SR-3
Power steering pump	SR-8
Service specifications	SR-17

POWER STEERING

PREPARATION

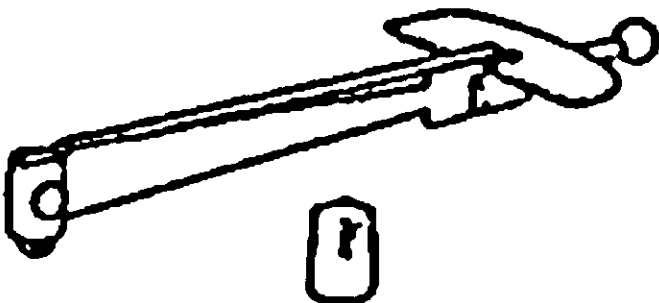
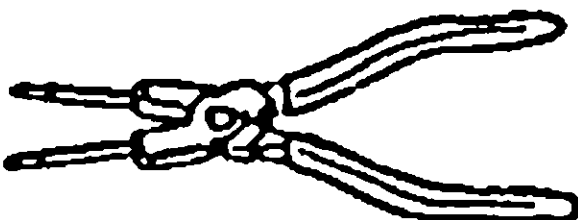
SST (SPECIAL SERVICE TOOLS)

SR009-02

	09527-10011 Rear Axle Shaft Bearing Remover	Vane pump drive gear
	09631-10030 Oil Seal Remover	Side front plate

RECOMMENDED TOOLS

SR009-02

	09025-00010 Torque Wrench (30 kgf-cm) .	Measuring pump rotating torque
	09905-00013 Snap Ring Pliers .	Snap ring

EQUIPMENT

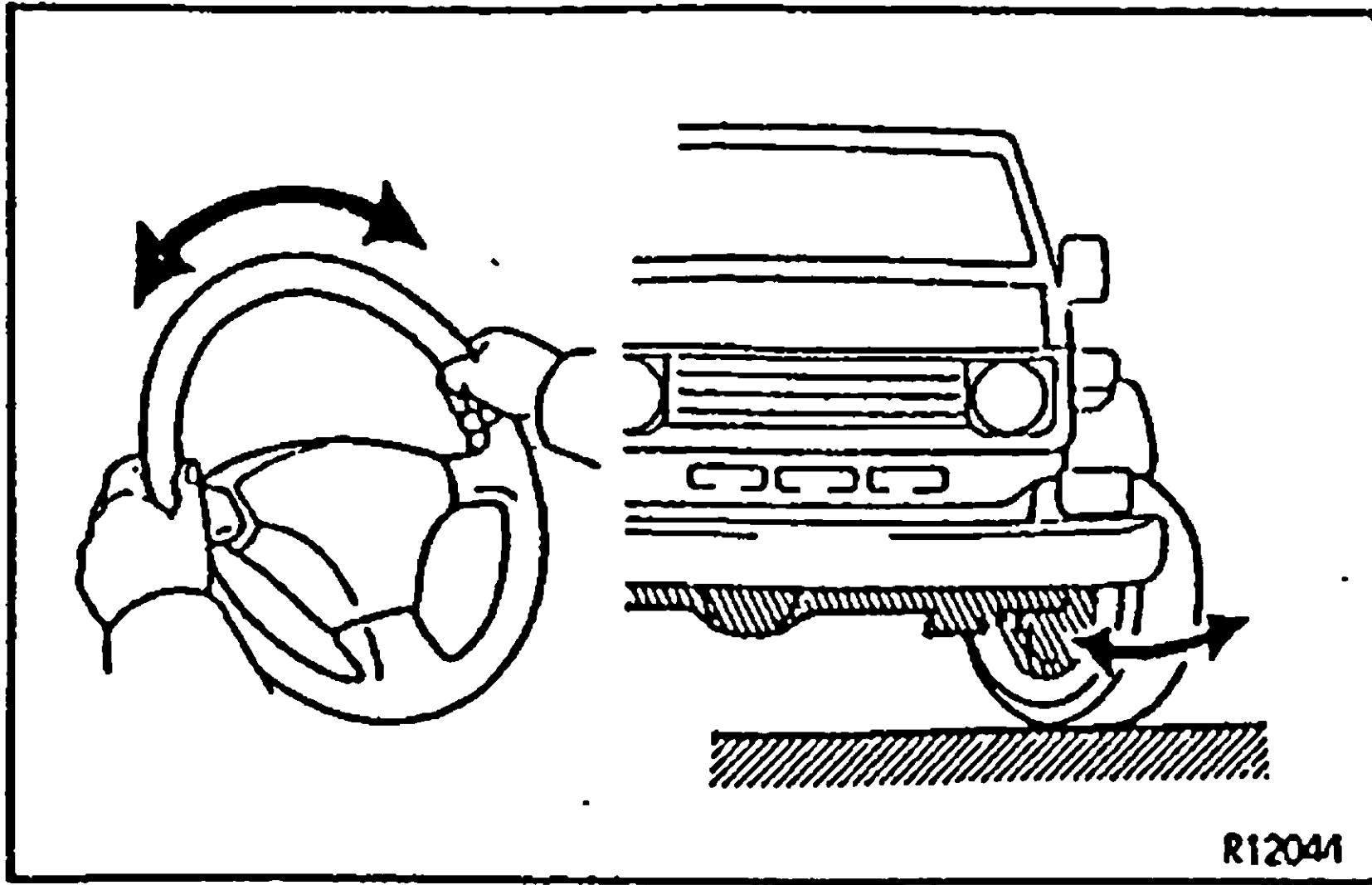
SR009-02

Caliper gauge	Measuring front housing bushing inside diameter
Calipers	Measuring spring free length
Feeler gauge	Measuring pump rotor groove and vane plate clearance
Micrometer	Measuring pumpshaft diameter Measuring vane plate
Oil pressure gauge	Measuring PS fluid pressure
Torque wrench	

LUBRICANT

SR019-00

Item	Capacity	Classification
Power steering fluid Total	0.8 liters (0.8 US qts, 0.7 Imp.qts)	ATF DEXRON® II



ON—VEHICLE INSPECTION FLUID LEVEL CHECK

SR000-00

1. KEEP VEHICLE LEVEL
2. BOOST FLUID TEMPERATURE

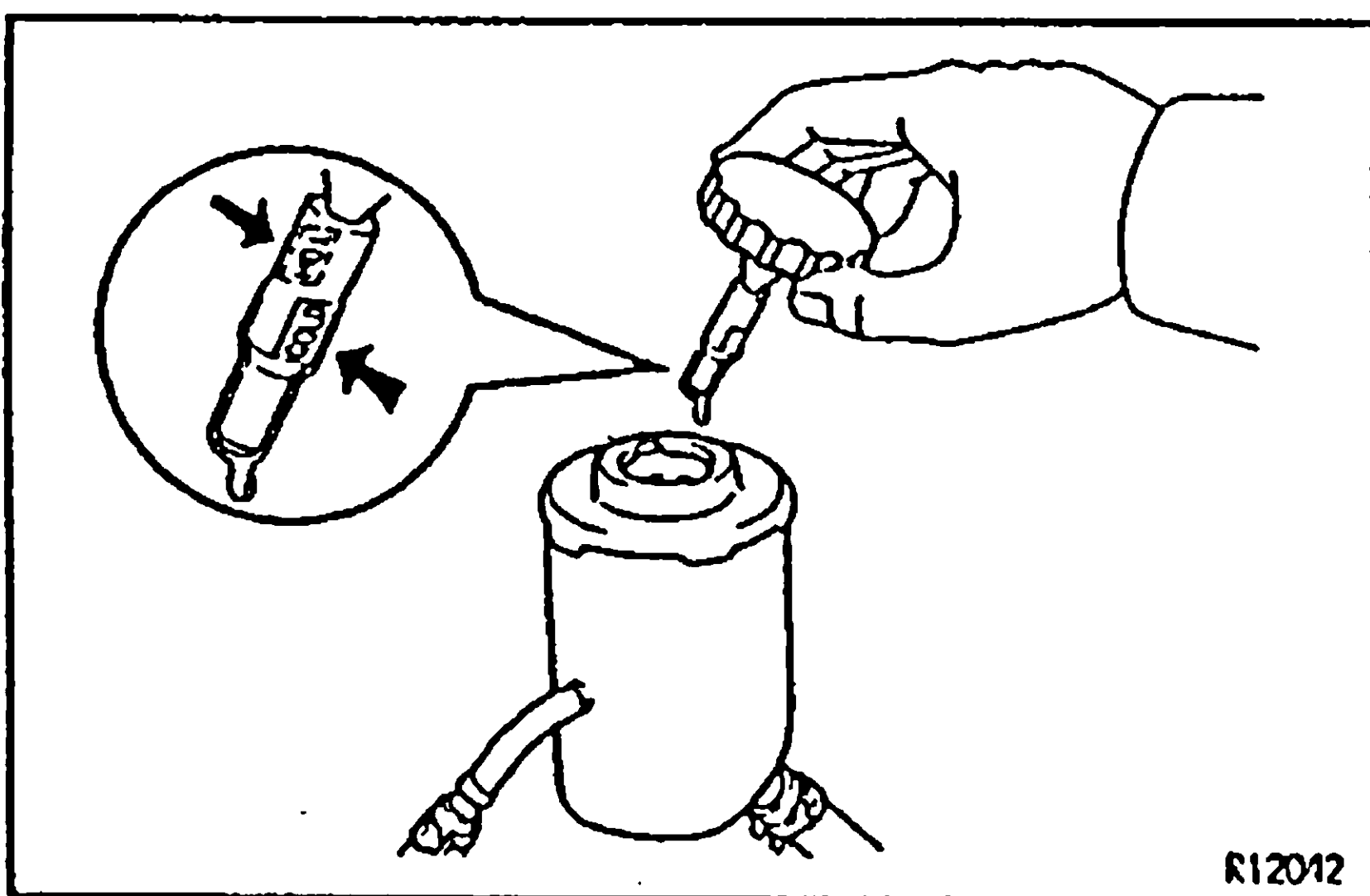
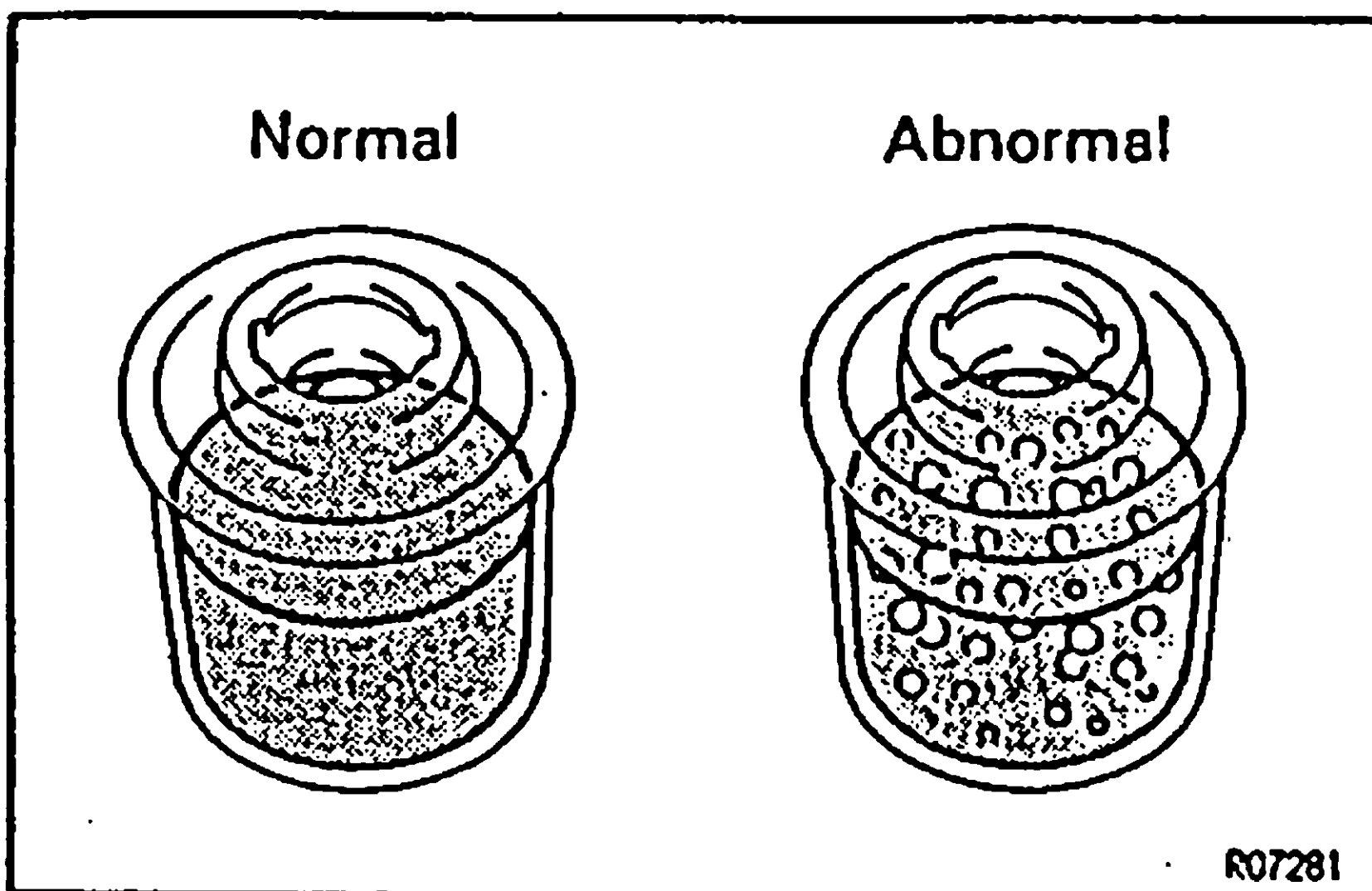
With the engine idling at 1,000 rpm or less, turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature:

80 °C (176 °F)

3. STOP ENGINE
4. CHECK FOR FOAMING OR EMULSIFICATION

HINT: Foaming and emulsification indicate either the existence of air in the system or that the fluid level is too low.



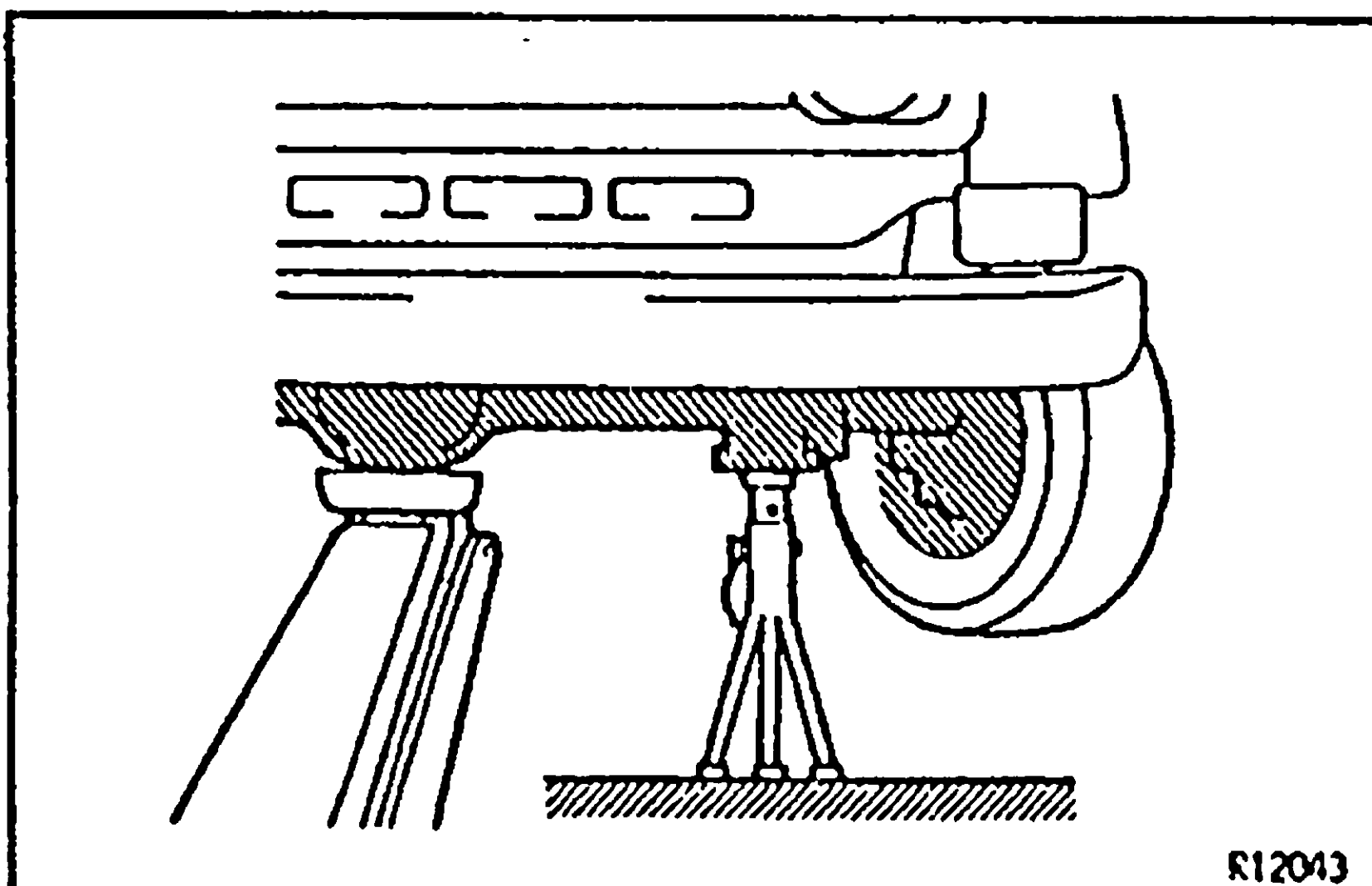
5. CHECK FLUID LEVEL IN OIL RESERVOIR

Check the fluid level and add fluid if necessary.

Fluid:

ATF DEXRON® II

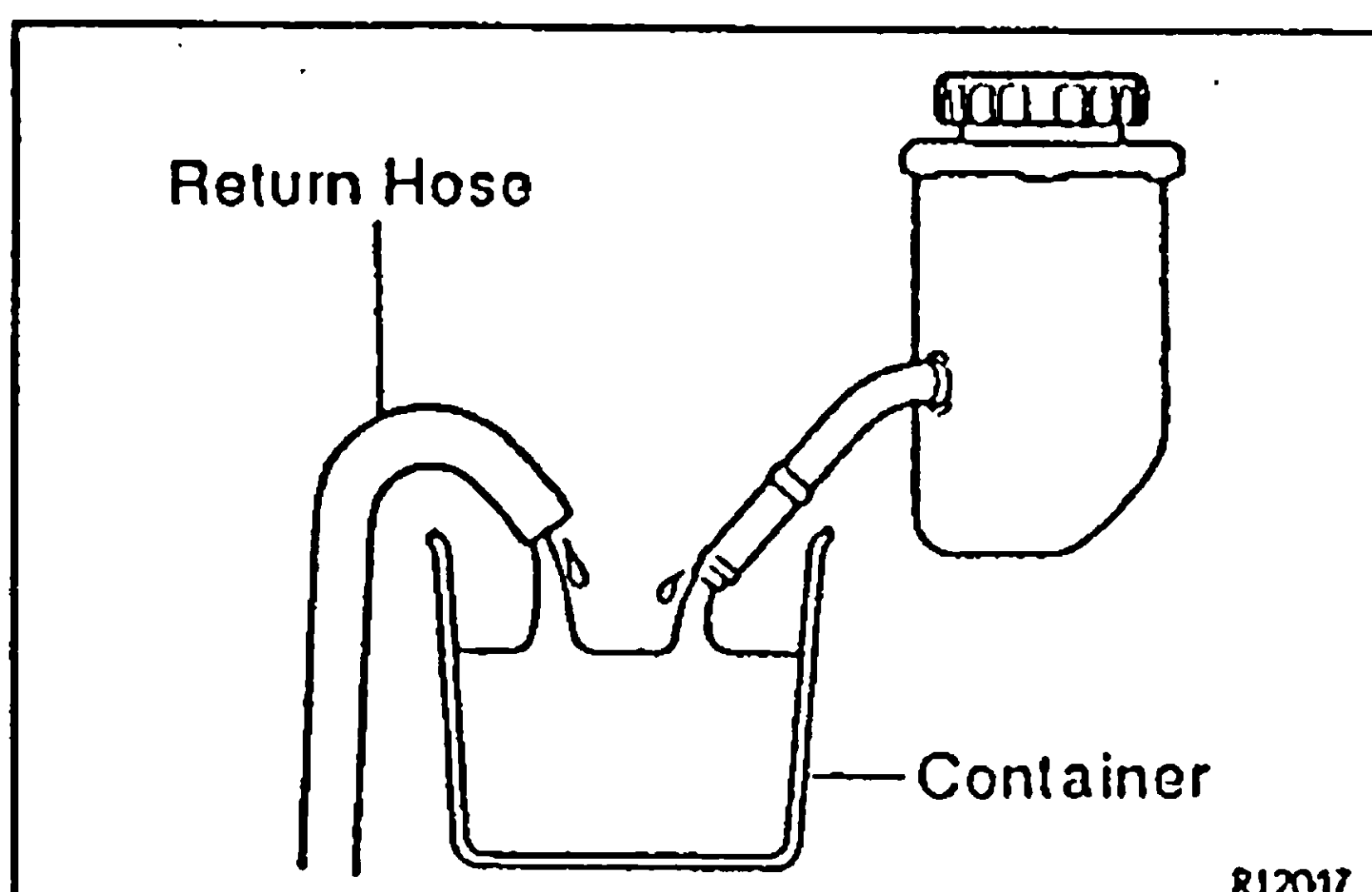
HINT: Check that the fluid level is within the HOT LEVEL range on the reservoir cap dipstick. If the fluid is cold, check that it is within the COLD LEVEL range.



POWER STEERING FLUID REPLACEMENT

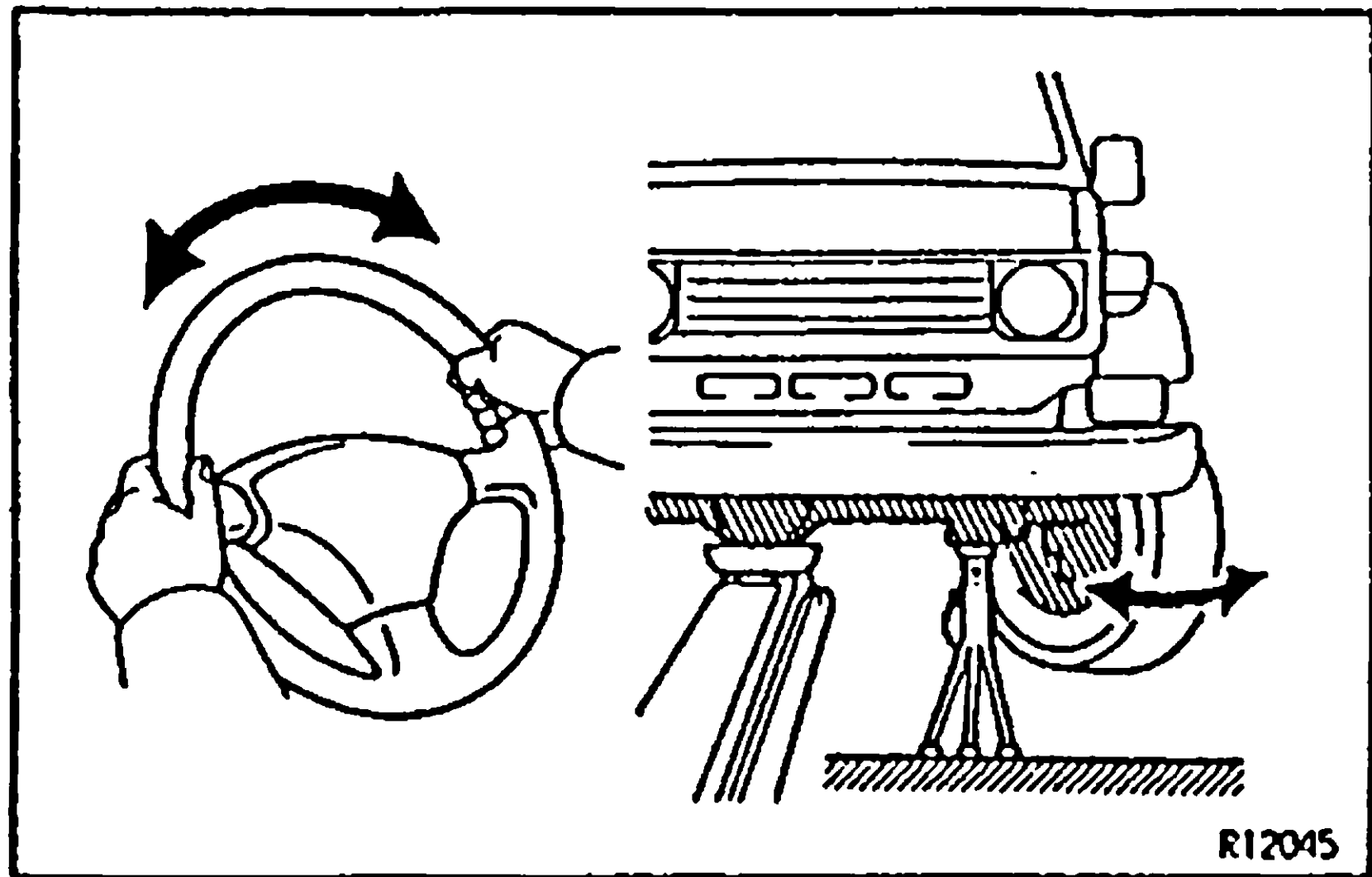
SR001-0A

1. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS

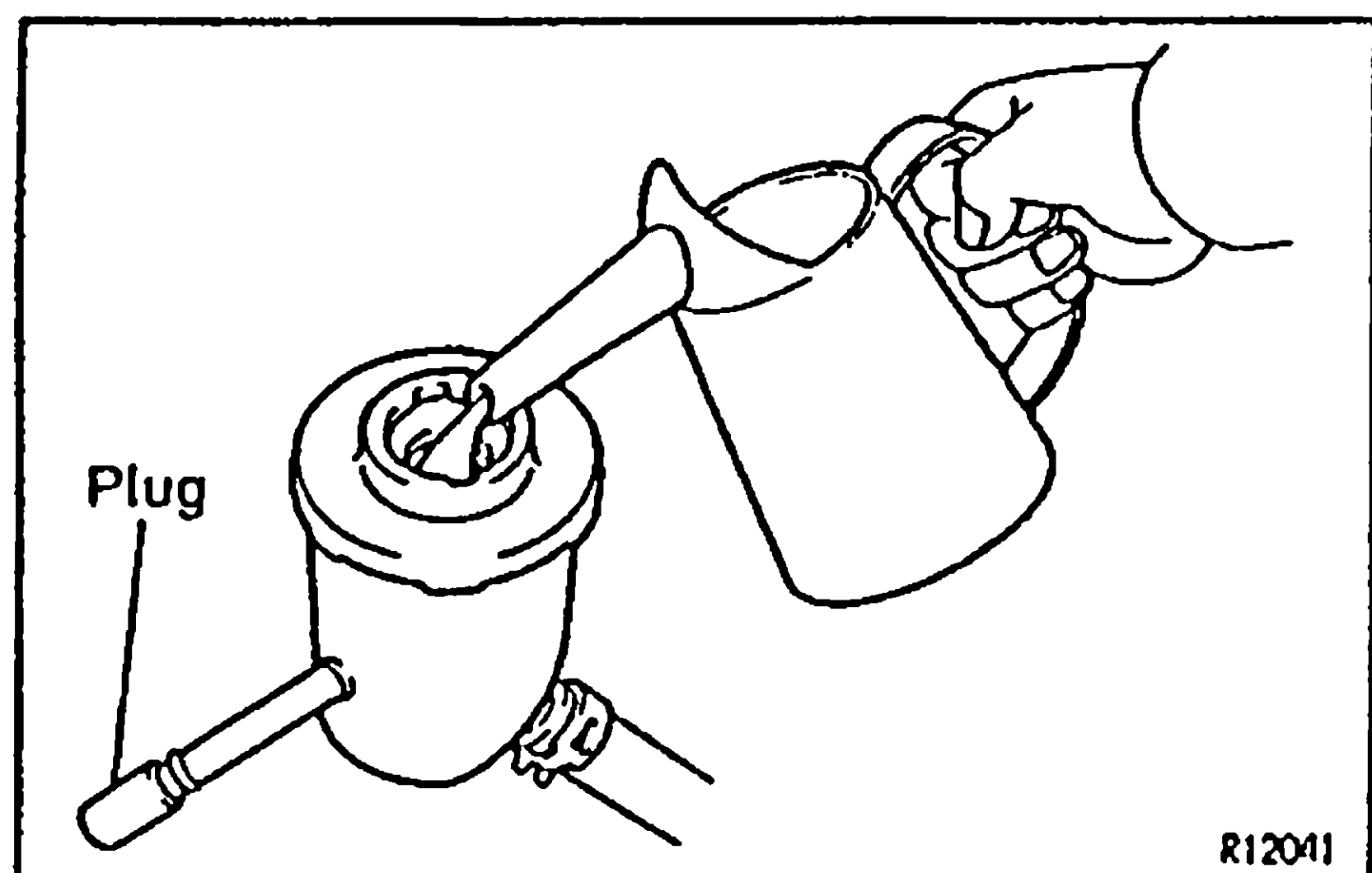


2. DRAIN FLUID

- (a) With the engine stopped, remove the return hose from the oil reservoir.



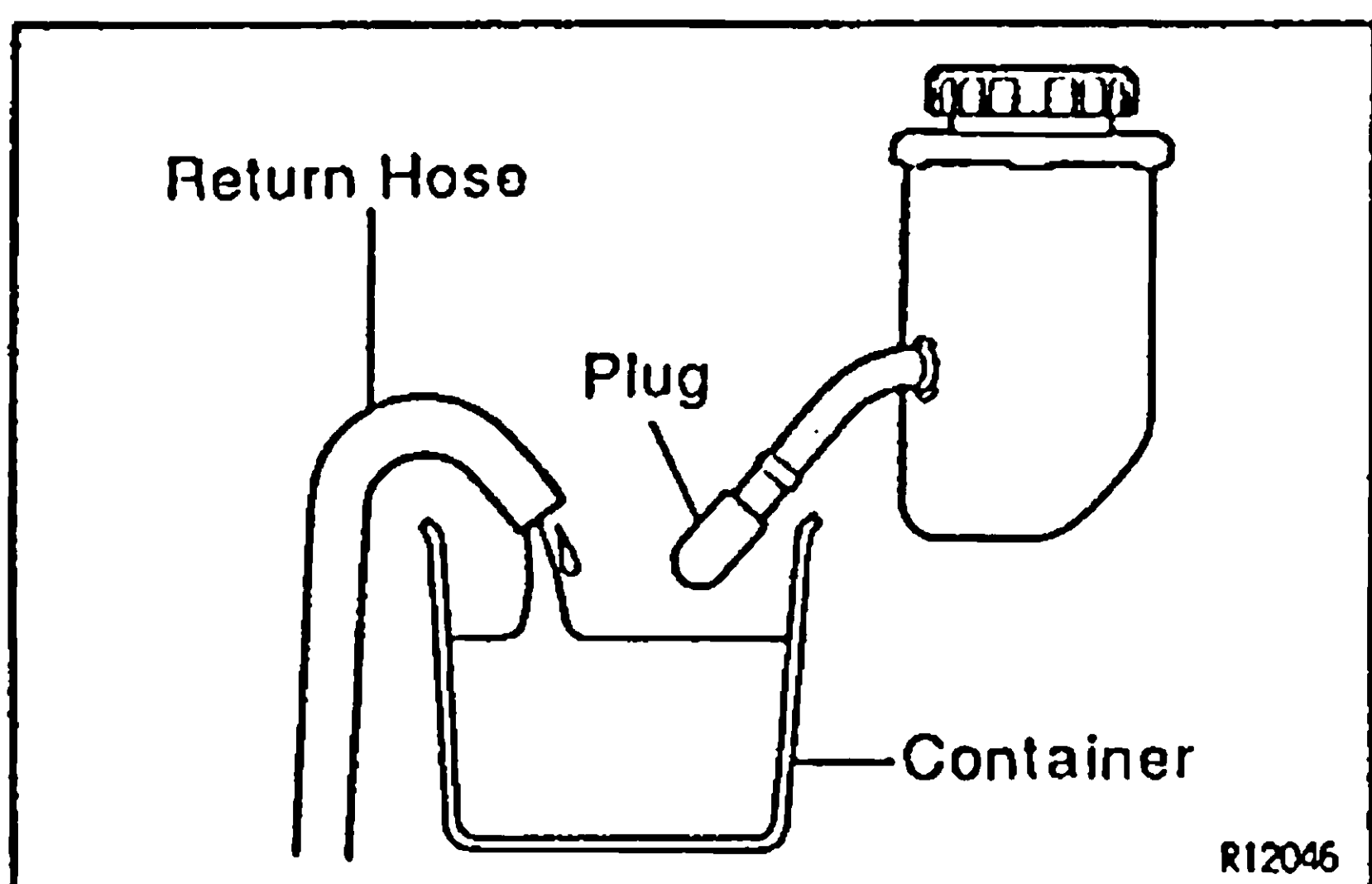
- (b) Turn the steering wheel from lock to lock while draining fluid.



3. FILL OIL RESERVOIR WITH FRESH FLUID

Fluid:

ATF DEXRON® II



4. START ENGINE AND RUN IT AT 1,000 RPM

After 1 or 2 seconds, fluid will begin to discharge from the return hose. Stop the engine immediately at this time.

NOTICE: Take care that some fluid remains left in the oil reservoir.

5. REPEAT STEPS 3 AND 4 FOUR OR FIVE TIMES UNTIL THERE IS NO MORE AIR IN FLUID
6. CONNECT RETURN HOSE TO OIL RESERVOIR
7. BLEED POWER STEERING SYSTEM

POWER STEERING SYSTEM BLEEDING

SP032-0A

1. CHECK FLUID LEVEL IN OIL RESERVOIR

Check the fluid level and add fluid if necessary.

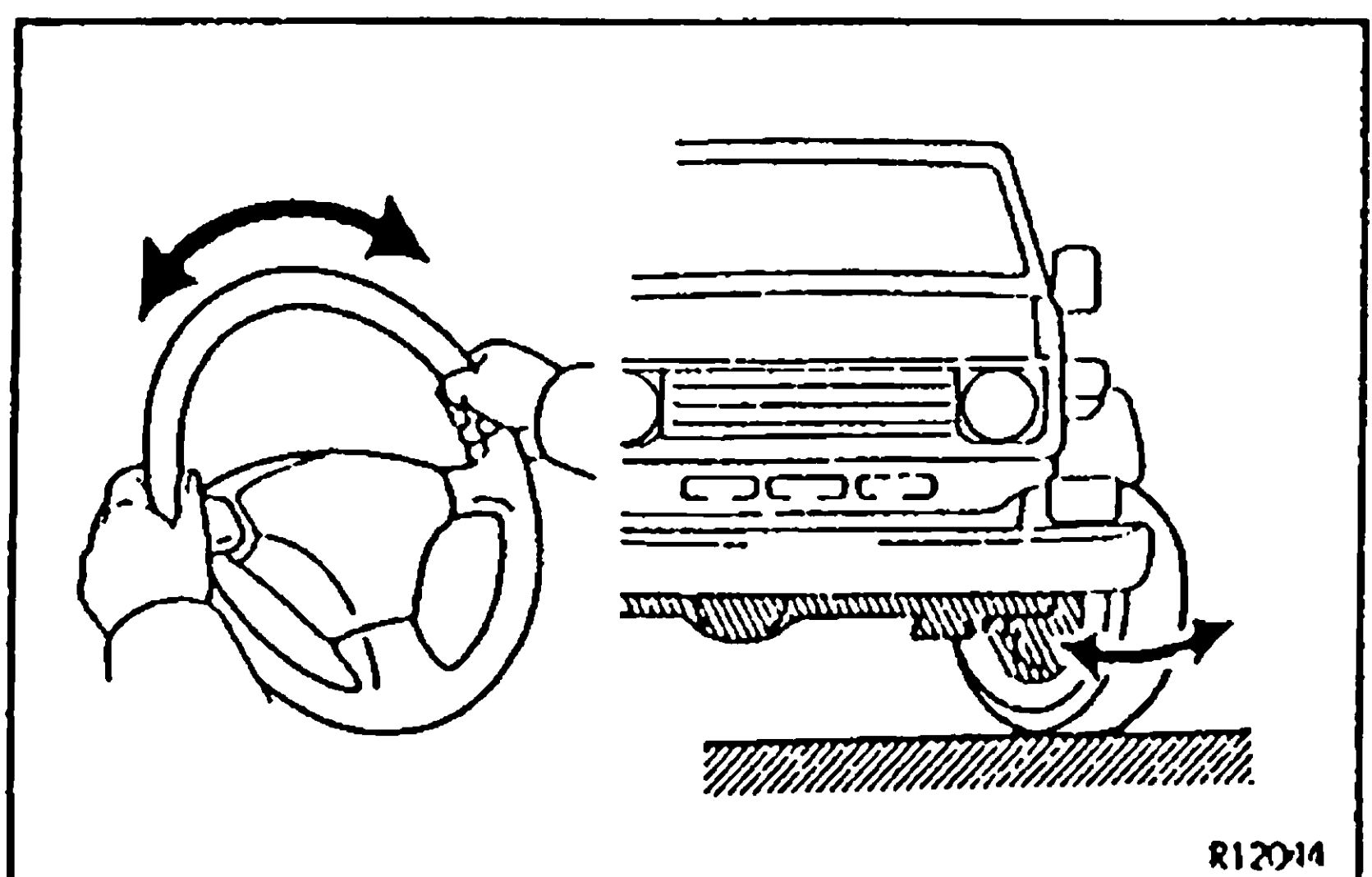
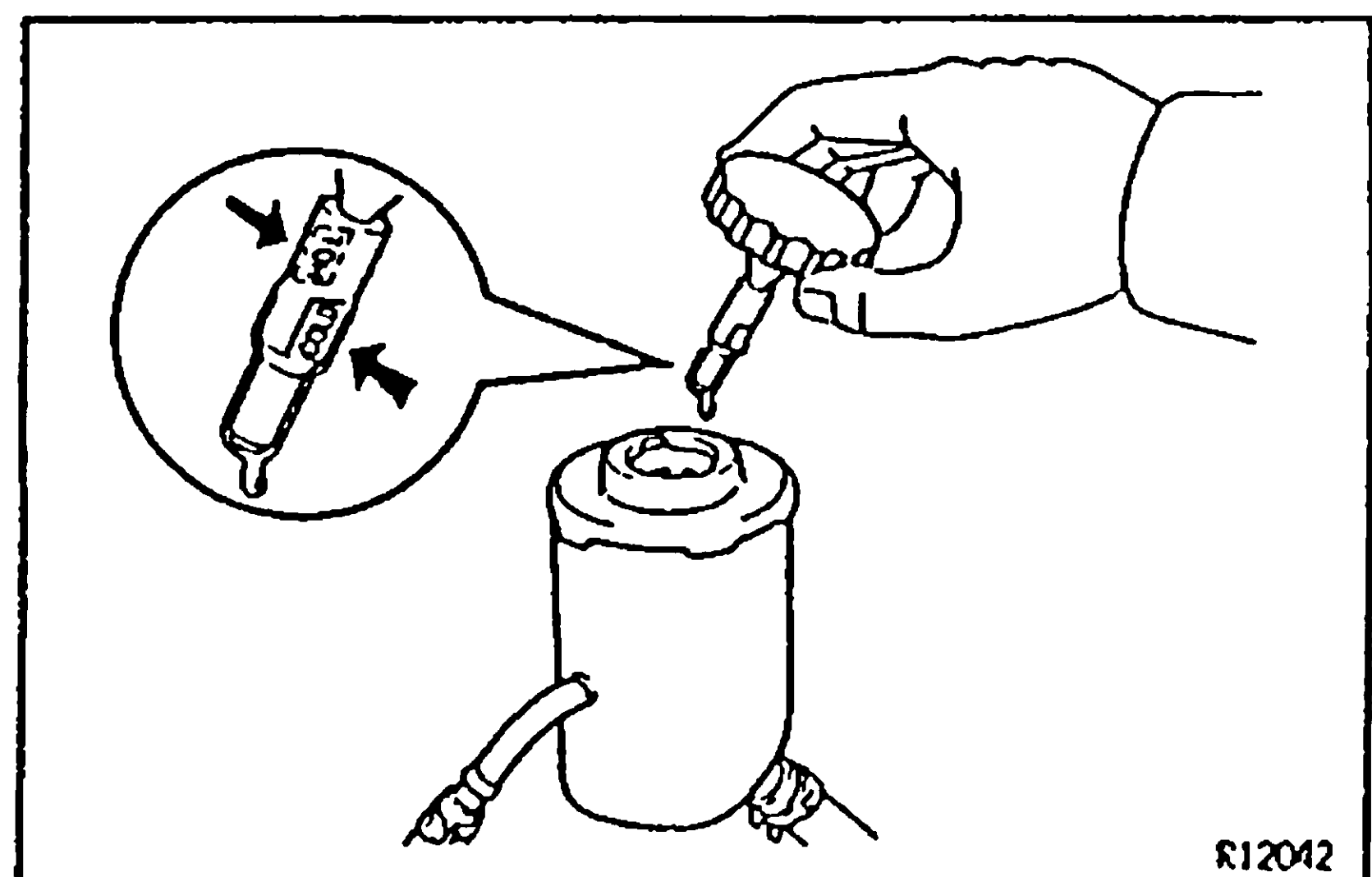
Fluid:

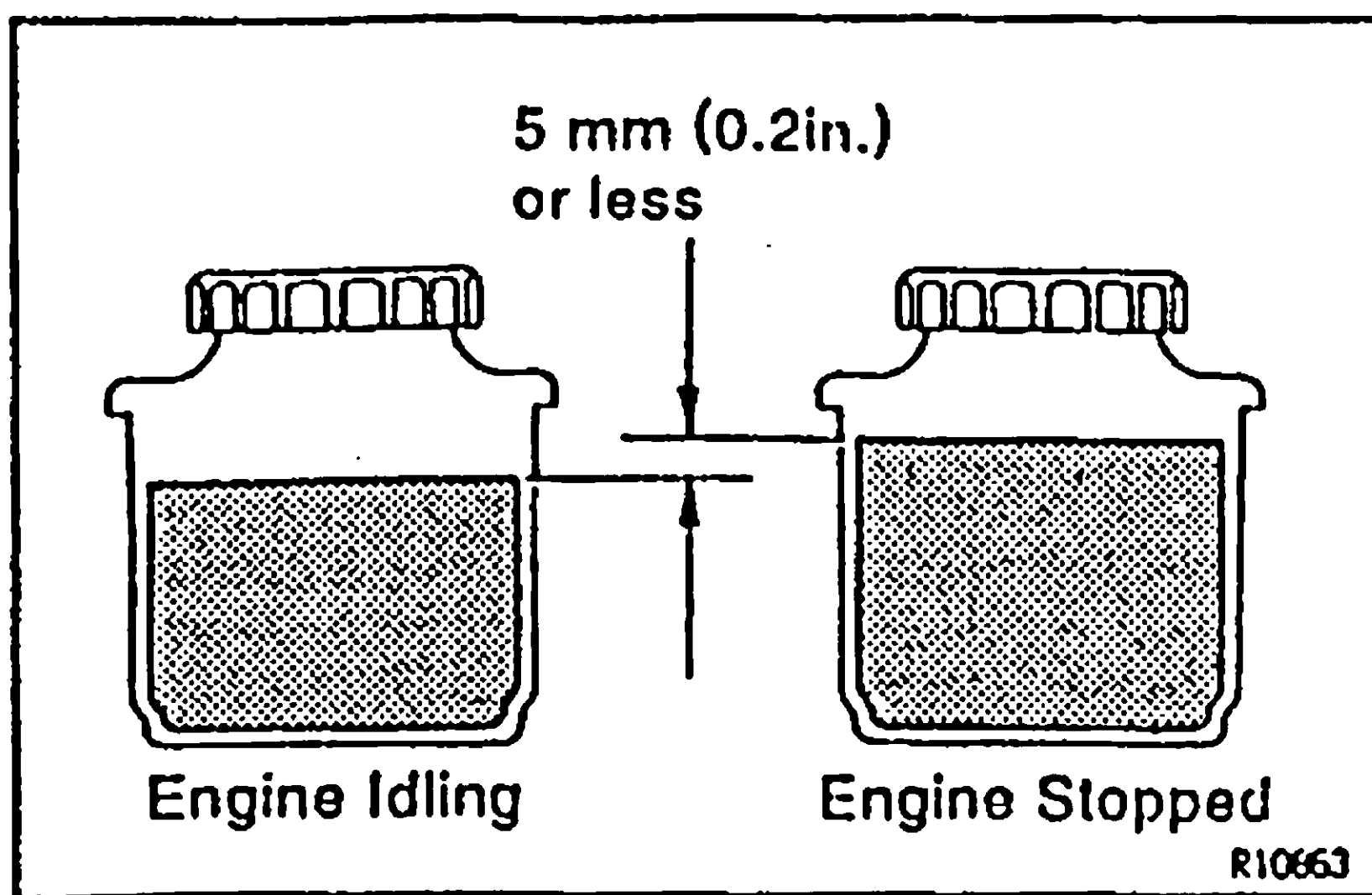
ATF DEXRON® II

HINT: Check that the fluid level is within the HOT LEVEL range on the reservoir cap dipstick. If the fluid is cold, check that it is within the COLD LEVEL range.

2. START ENGINE AND TURN STEERING WHEEL FROM LOCK TO LOCK 3 OR 4 TIMES

With the engine speed below 1,000 rpm, turn the steering wheel to right or left full lock and keep it there for 2 — 3 seconds, then turn the wheel to the opposite full lock and keep it there for 2 — 3 seconds.





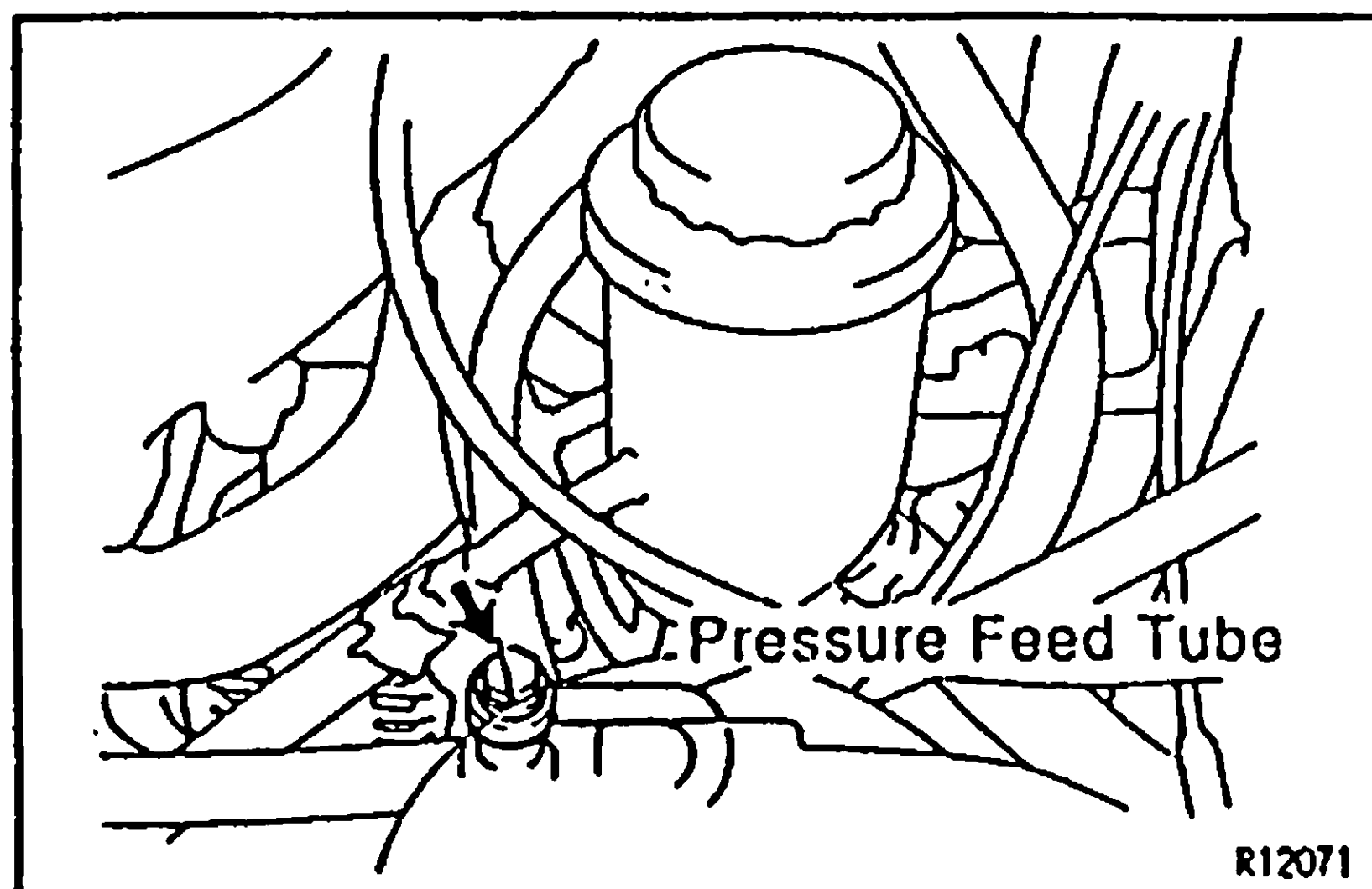
3. CHECK THAT FLUID IN OIL RESERVOIR IS NOT FOAMY OR CLOUDY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED

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 "POWER STEERING FLUID REPLACEMENT" on page SR-3.

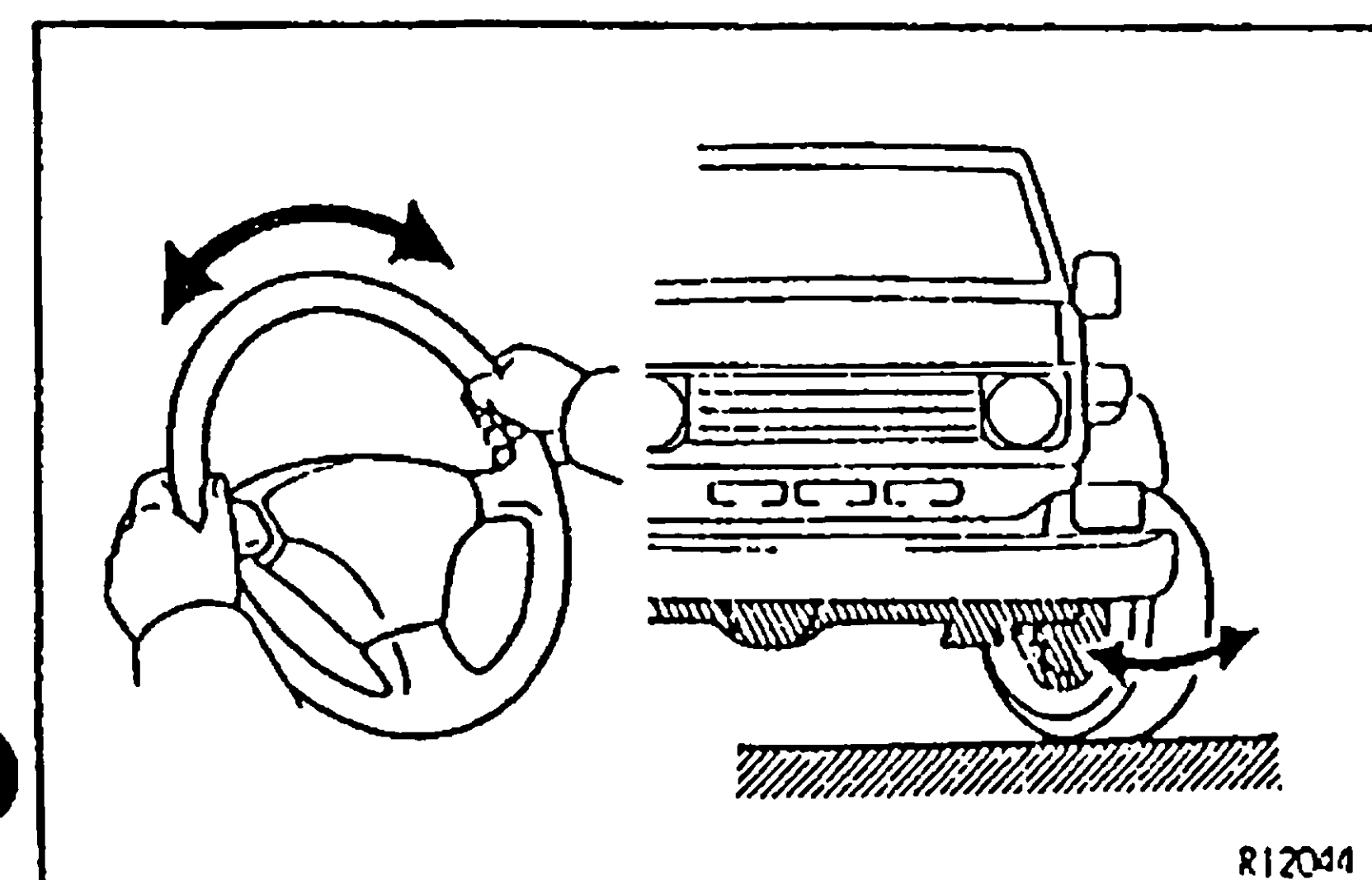
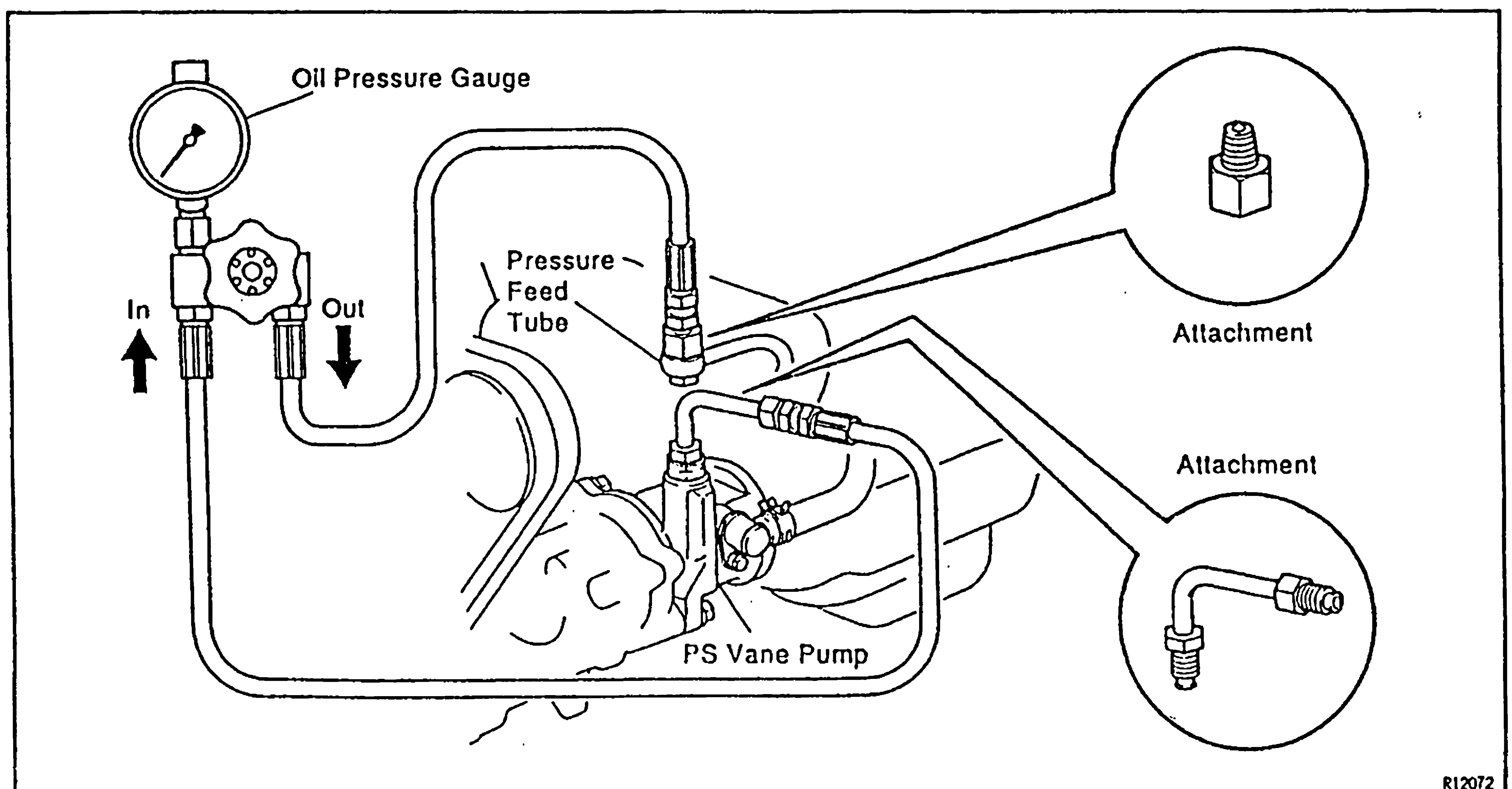


OIL PRESSURE CHECK

1. CONNECT OIL PRESSURE GAUGE

- Disconnect the pressure feed tube from the PS vane pump.
- Connect the gauge with a new gasket on each side of the pressure feed tube.

NOTICE: Check that the valve of the gauge is in the open position.



2. BLEED POWER STEERING SYSTEM

(See page SR-4)

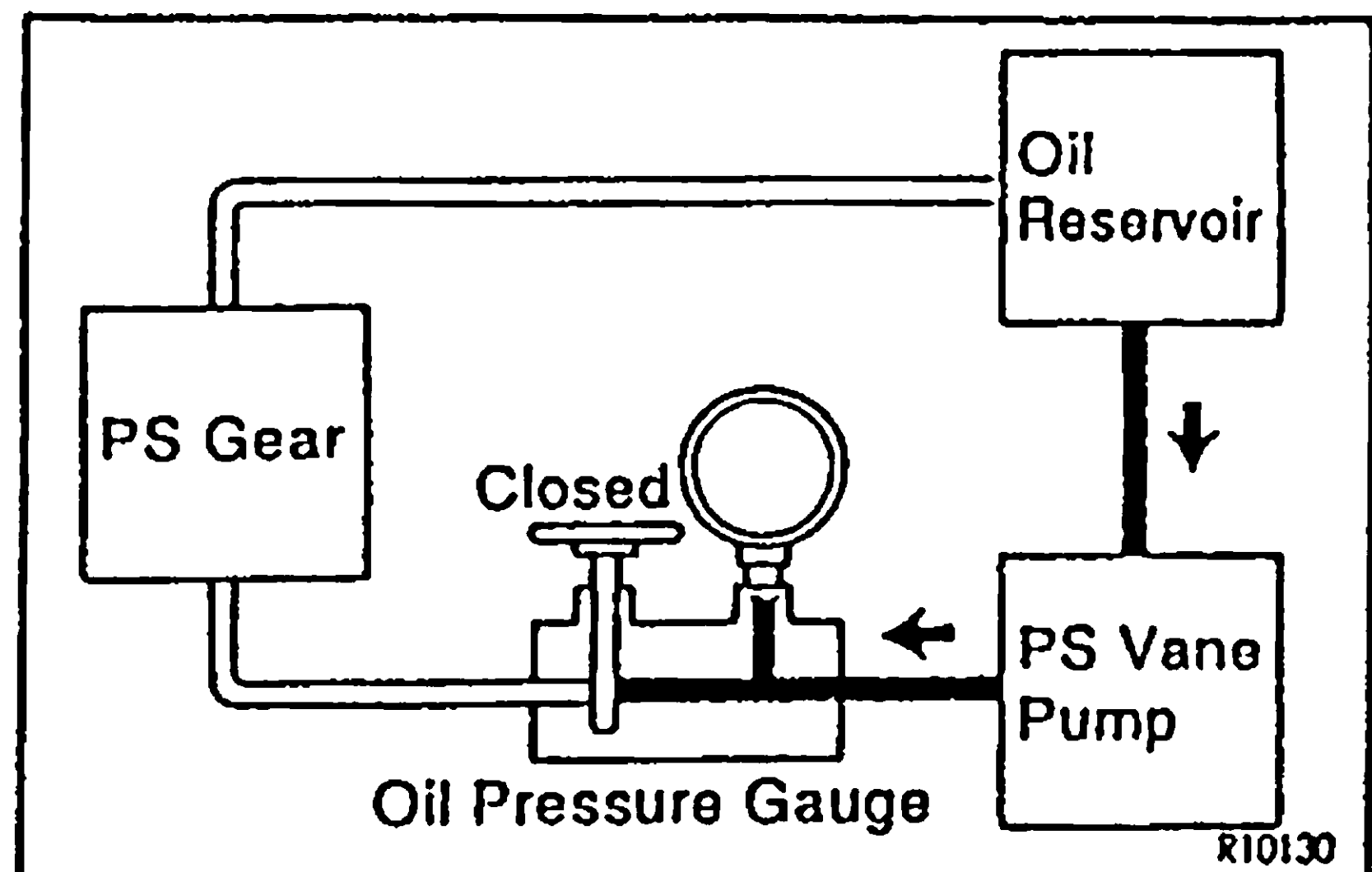
3. START ENGINE AND RUN IT AT IDLE

4. 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)



5. CHECK FLUID PRESSURE READING WITH VALVE CLOSED

Close the valve of the oil pressure gauge and observe the reading on the gauge.

Minimum pressure:

FZJ75 - 8,336 kPa (85 kgf/cm², 1,209 psi)

FZJ80 - 9,316 kPa (95 kgf/cm², 1,351 psi)

NOTICE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high. If pressure is low, repair or replace the PS vane pump.

6. OPEN VALVE FULLY

7. CHECK AND RECORD PRESSURE READING AT 1,000 RPM

8. CHECK AND RECORD PRESSURE READING AT 3,000 RPM

Check that the pressure difference between the 1,000 rpm and 3,000 rpm checks is less than 490 kPa (5 kgf/cm², 71 psi). If the difference is excessive, repair or replace the flow control valve of the PS vane pump.

NOTICE: Do not operate the steering wheel.

9. CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK

Be sure the valve of the oil pressure gauge is fully opened, and the engine idling.

Minimum pressure:

FZJ75 - 8,336 kPa (85 kgf/cm², 1,209 psi)

FZJ80 - 9,316 kPa (95 kgf/cm², 1,351 psi)

NOTICE:

- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high. If pressure is low, the PS gear housing has an internal leak and must be repaired or replaced.

10. DISCONNECT OIL PRESSURE GAUGE

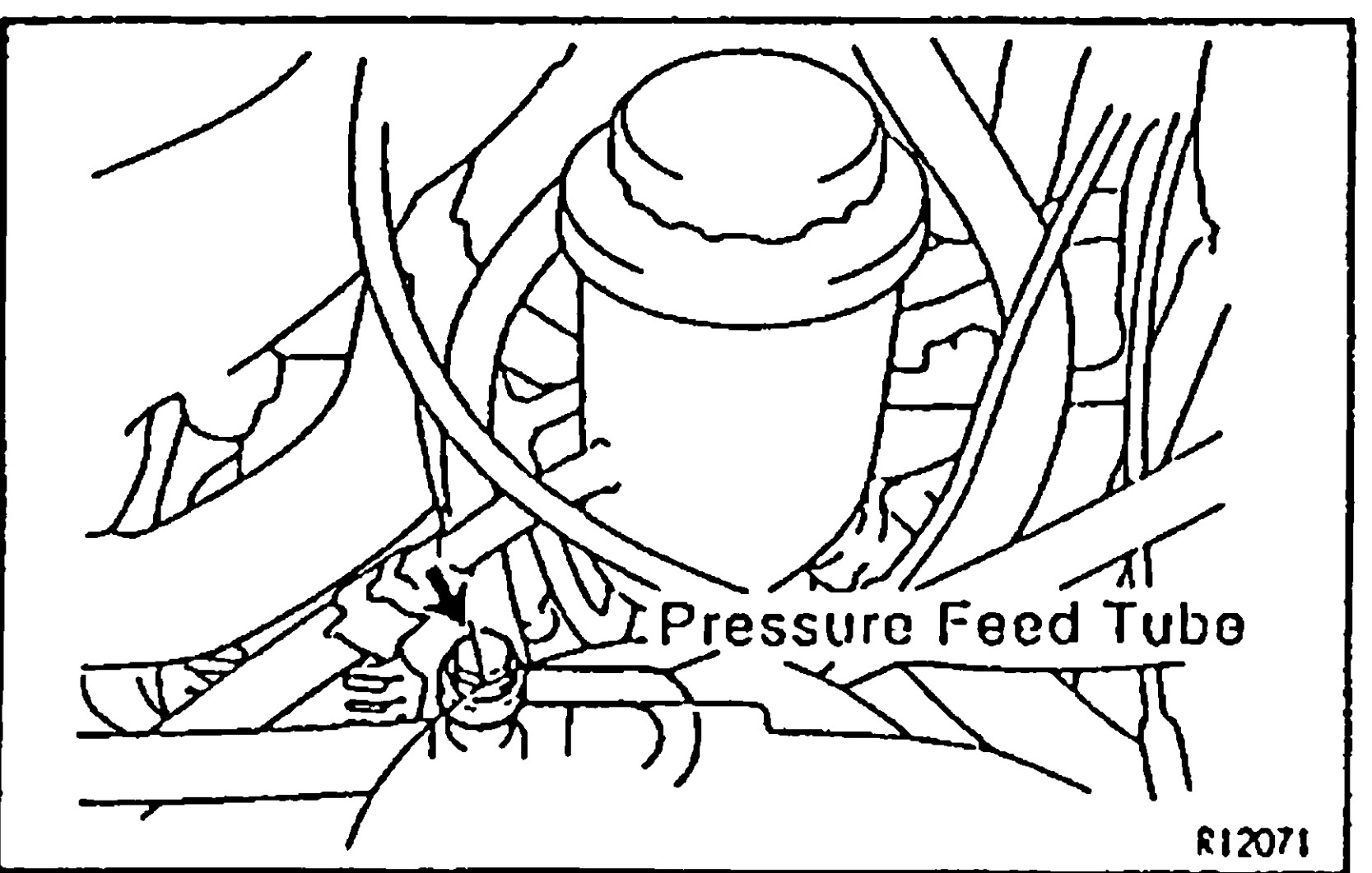
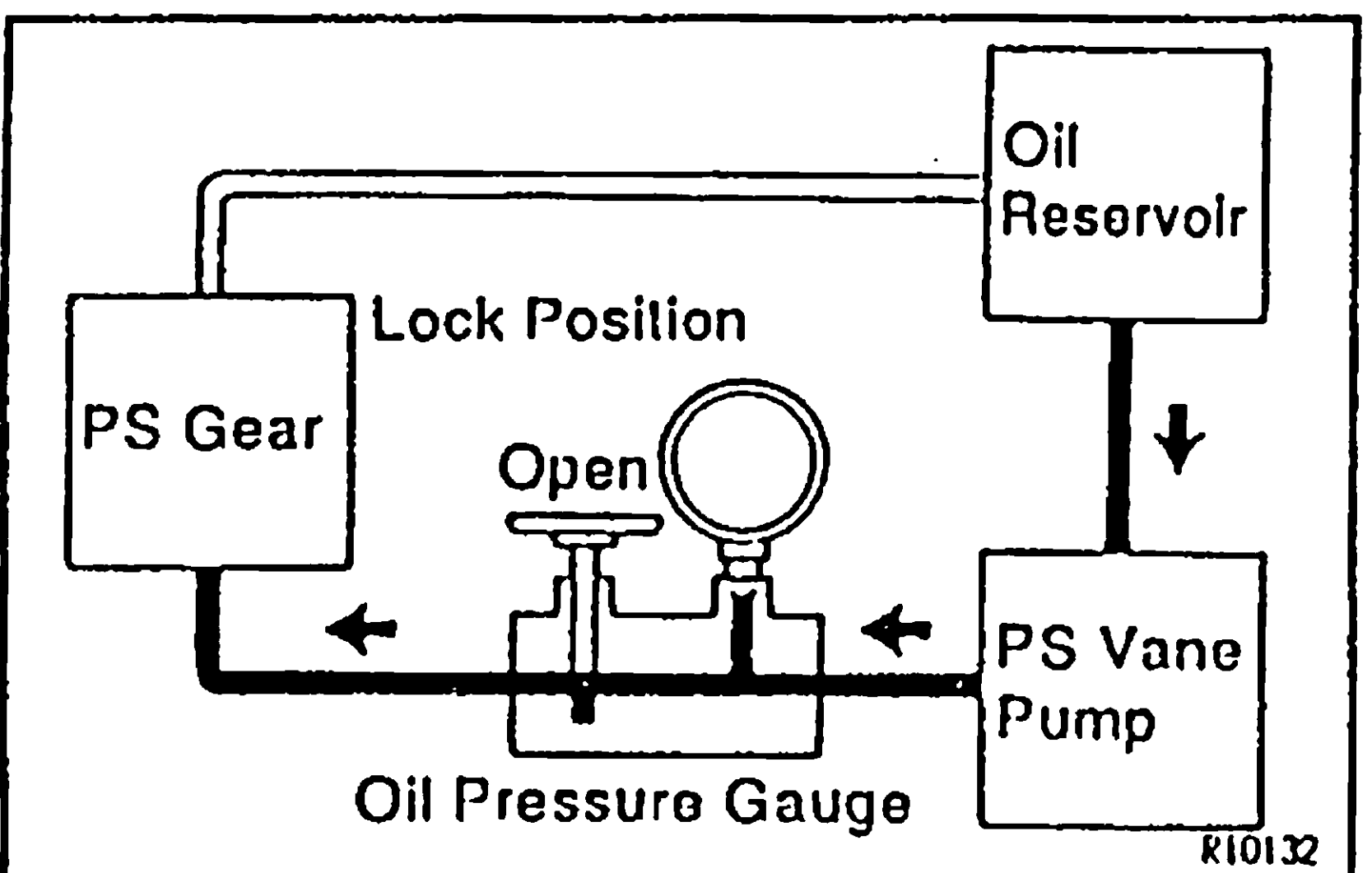
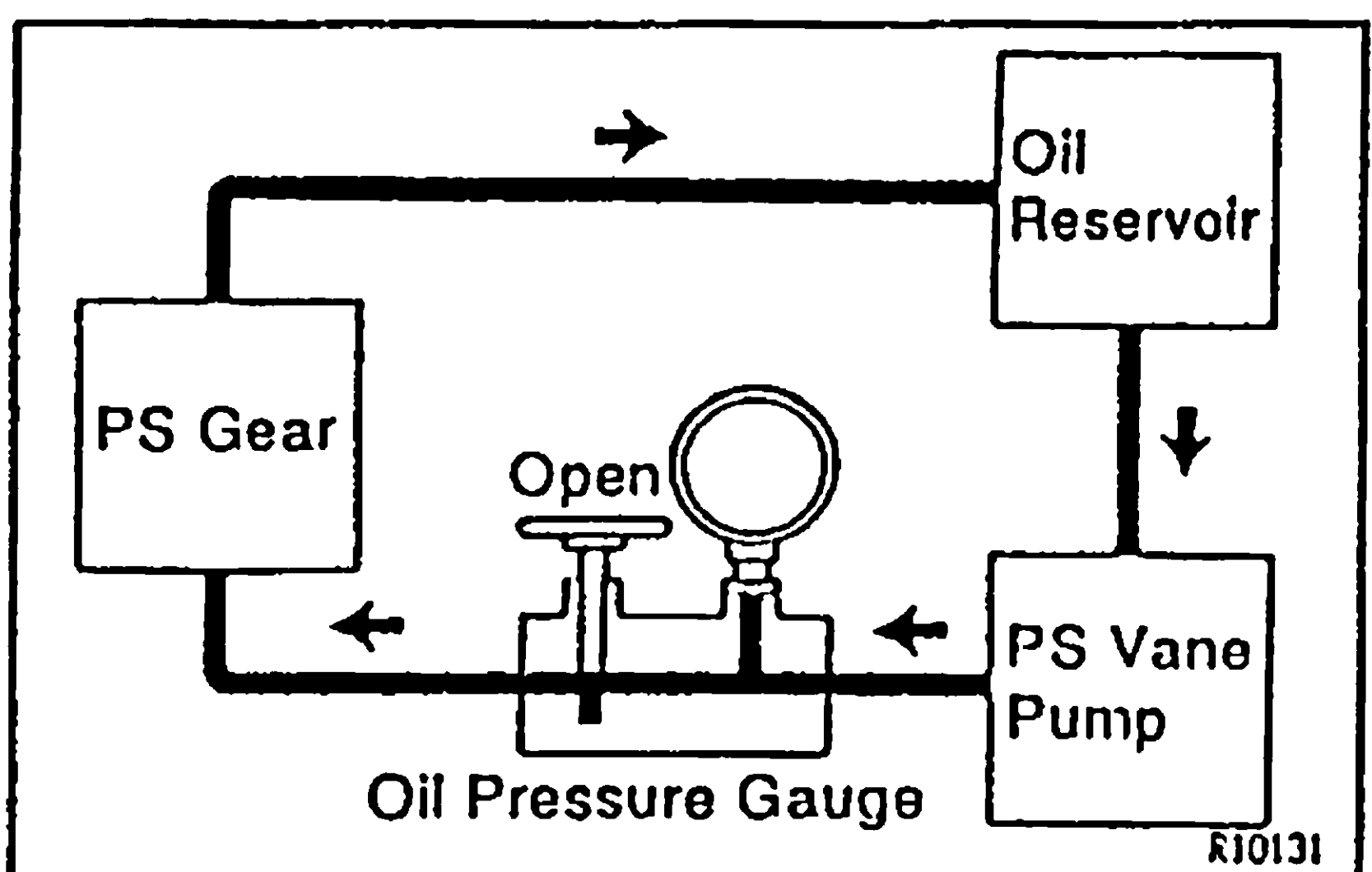
11. CONNECT PRESSURE FEED TUBE

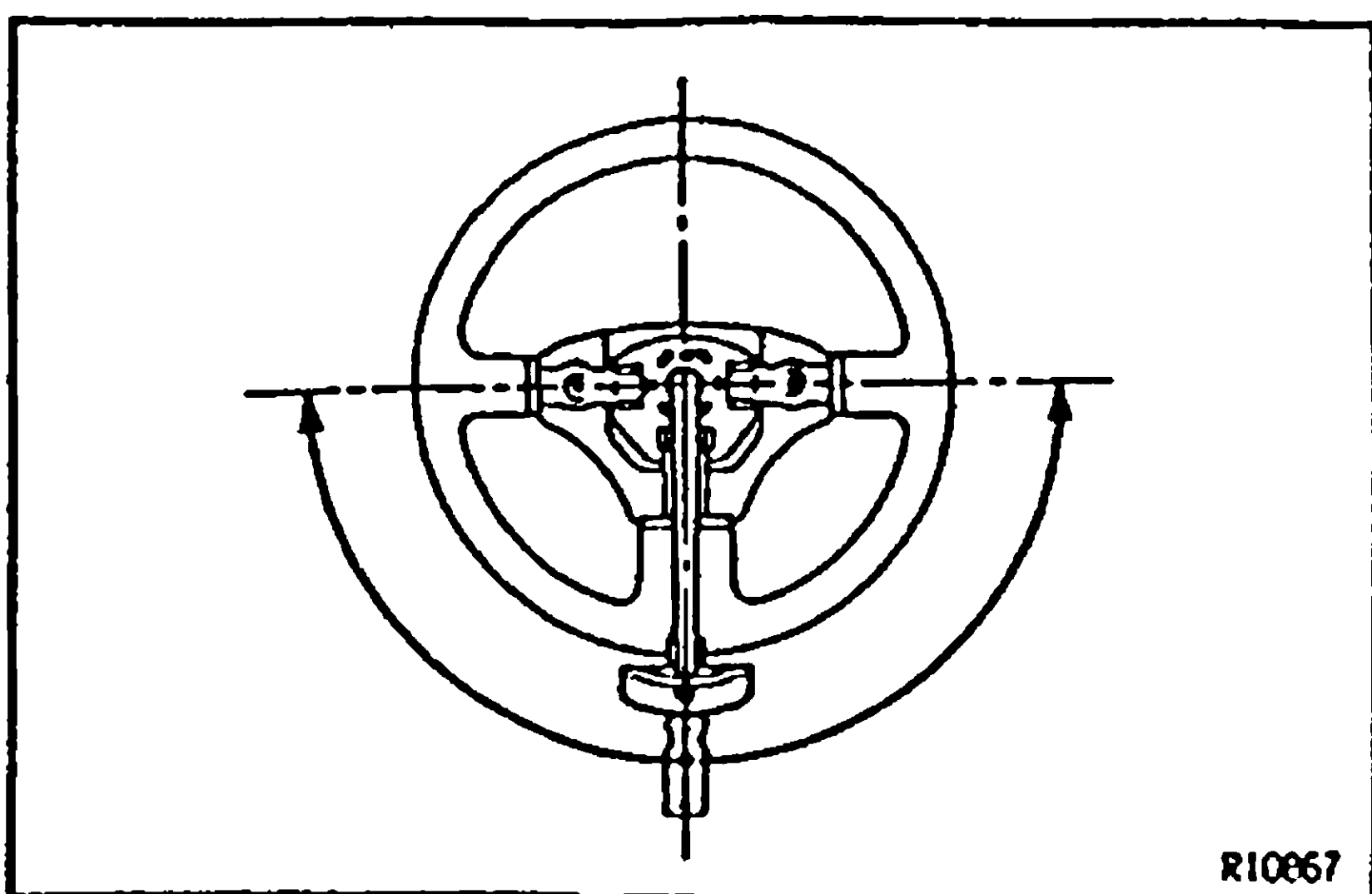
Torque the union bolt with a new gasket on each side of the tube.

Torque: 56 N·m (575 kgf·cm, 42 ft·lbf)

12. BLEED POWER STEERING SYSTEM

(See page SR-4)





MEASURE STEERING EFFORT

1. CENTER STEERING WHEEL
2. MEASURE STEERING EFFORT
 - (a) Remove the steering wheel pad.
 - (b) Start the engine and run it at idle.
 - (c) Measure the steering effort in both directions.

Reference:

FZJ75 - 6.6 N·m (67 kgf·cm, 58 in·lbf)

FZJ80 -

Normal PS - 5.9 N·m (60 kgf·cm, 52 in·lbf)

PPS - 3.7 N·m (38 kgf·cm, 33 in·lbf)

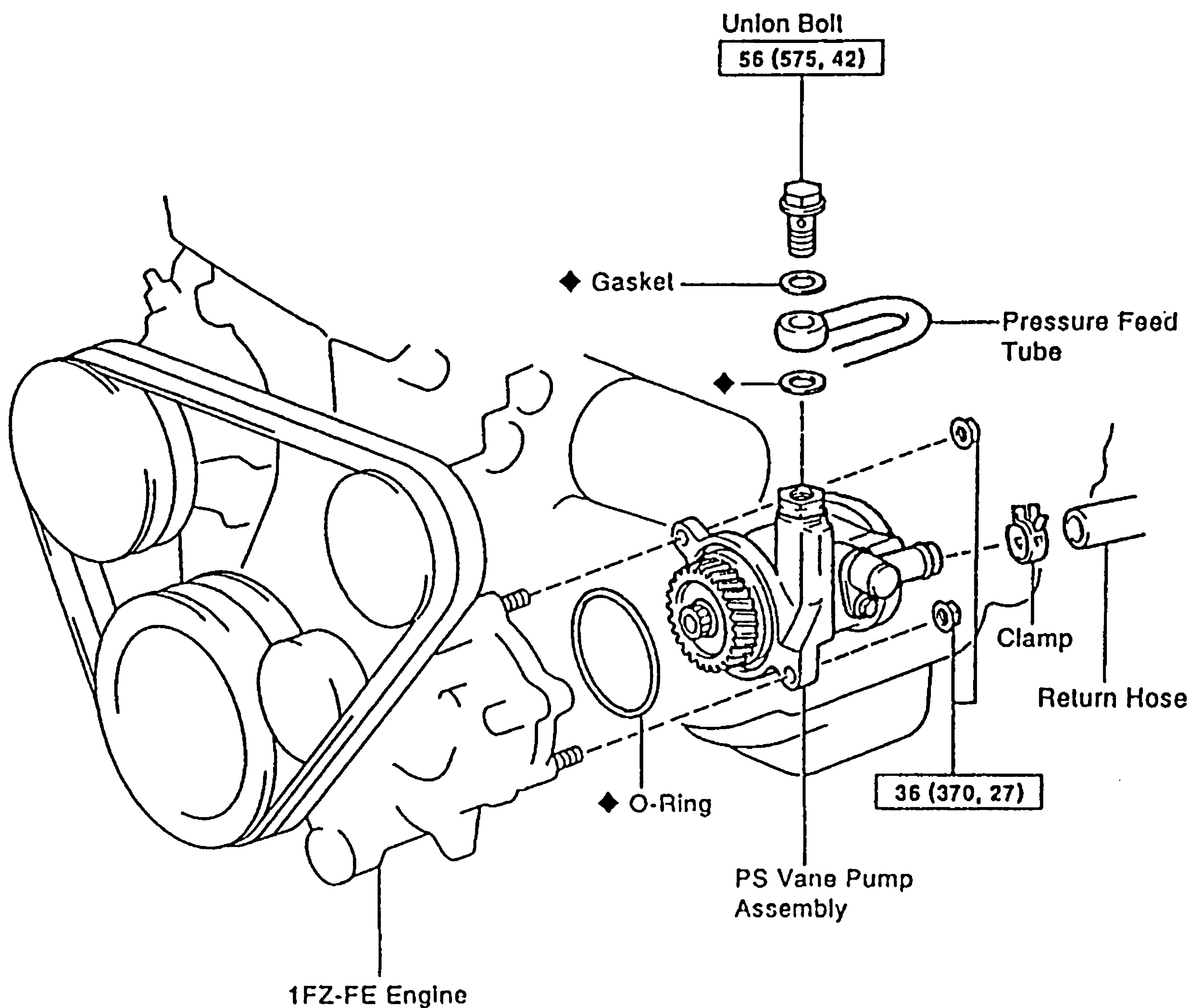
If steering effort is excessive, repair the power steering unit.

HINT: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

- (d) Torque the steering wheel set nut.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
- (e) Install the steering wheel pad.

POWER STEERING PUMP COMPONENTS

BR140-04



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

R12073

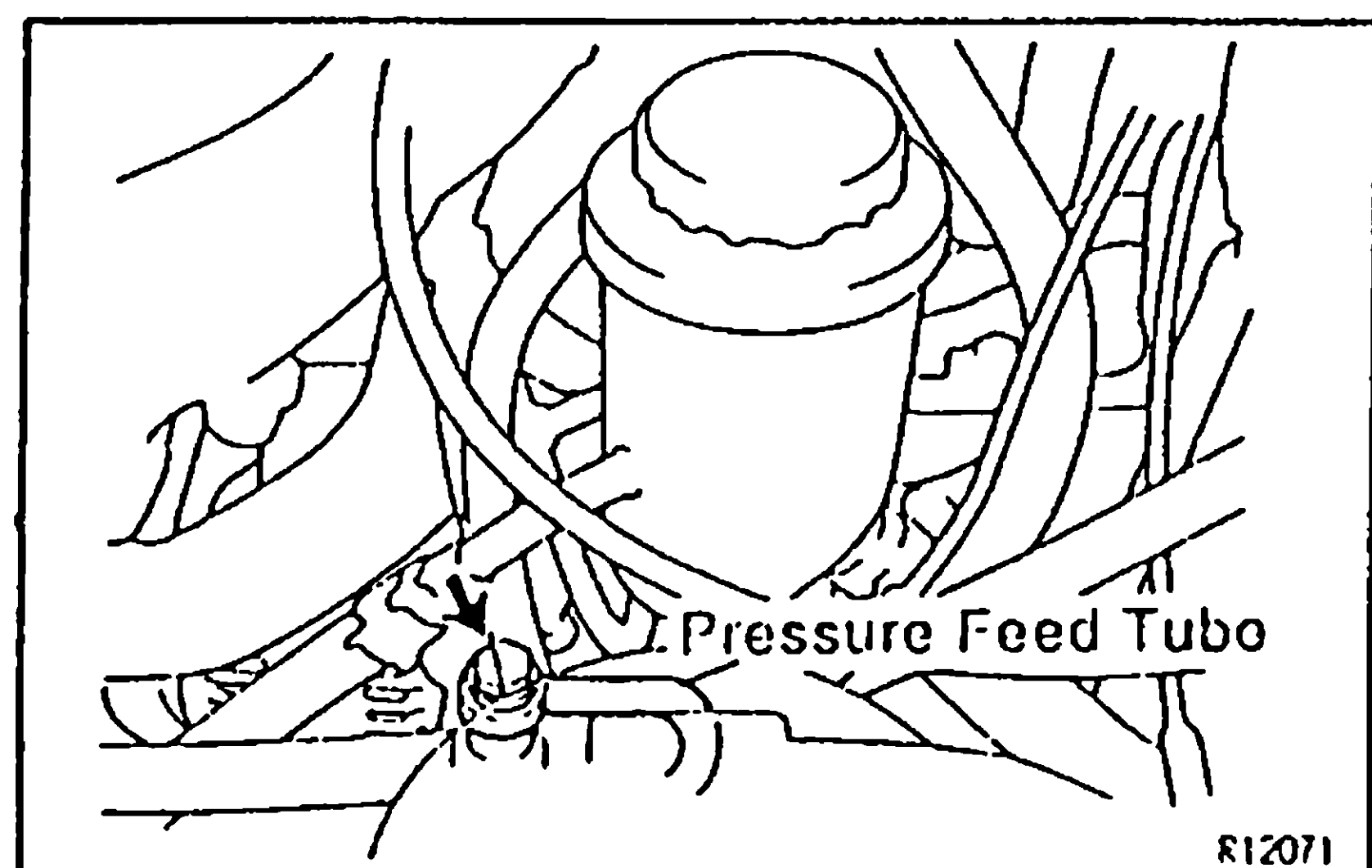
MAIN POINTS OF REMOVAL AND INSTALLATION

BR140-03

DISCONNECT AND CONNECT PRESSURE FEED TUBE

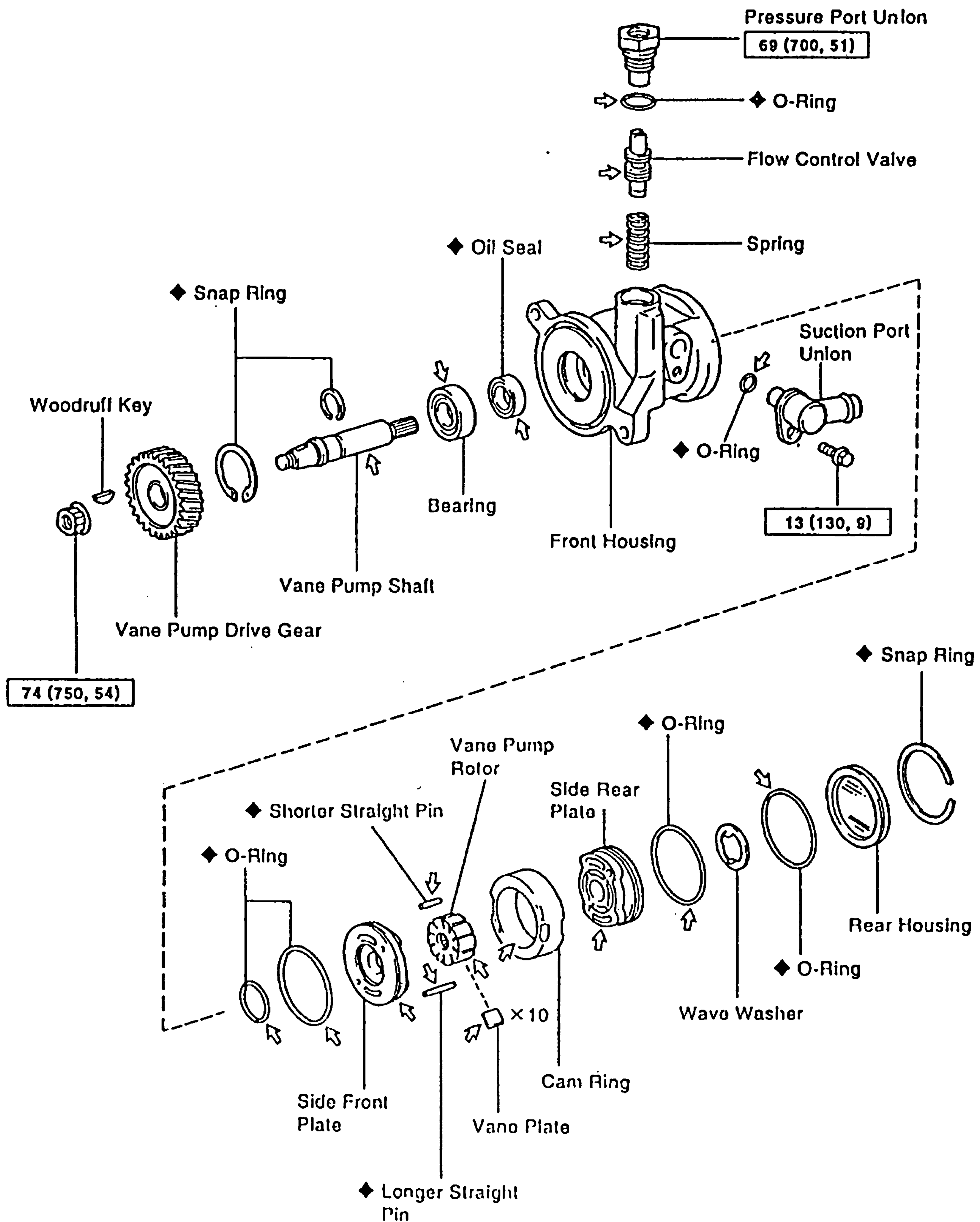
Torque the union bolt with a new gasket on each side of the tube.

Torque: 56 N·m (575 kgf·cm, 42 ft·lbf)



R12071

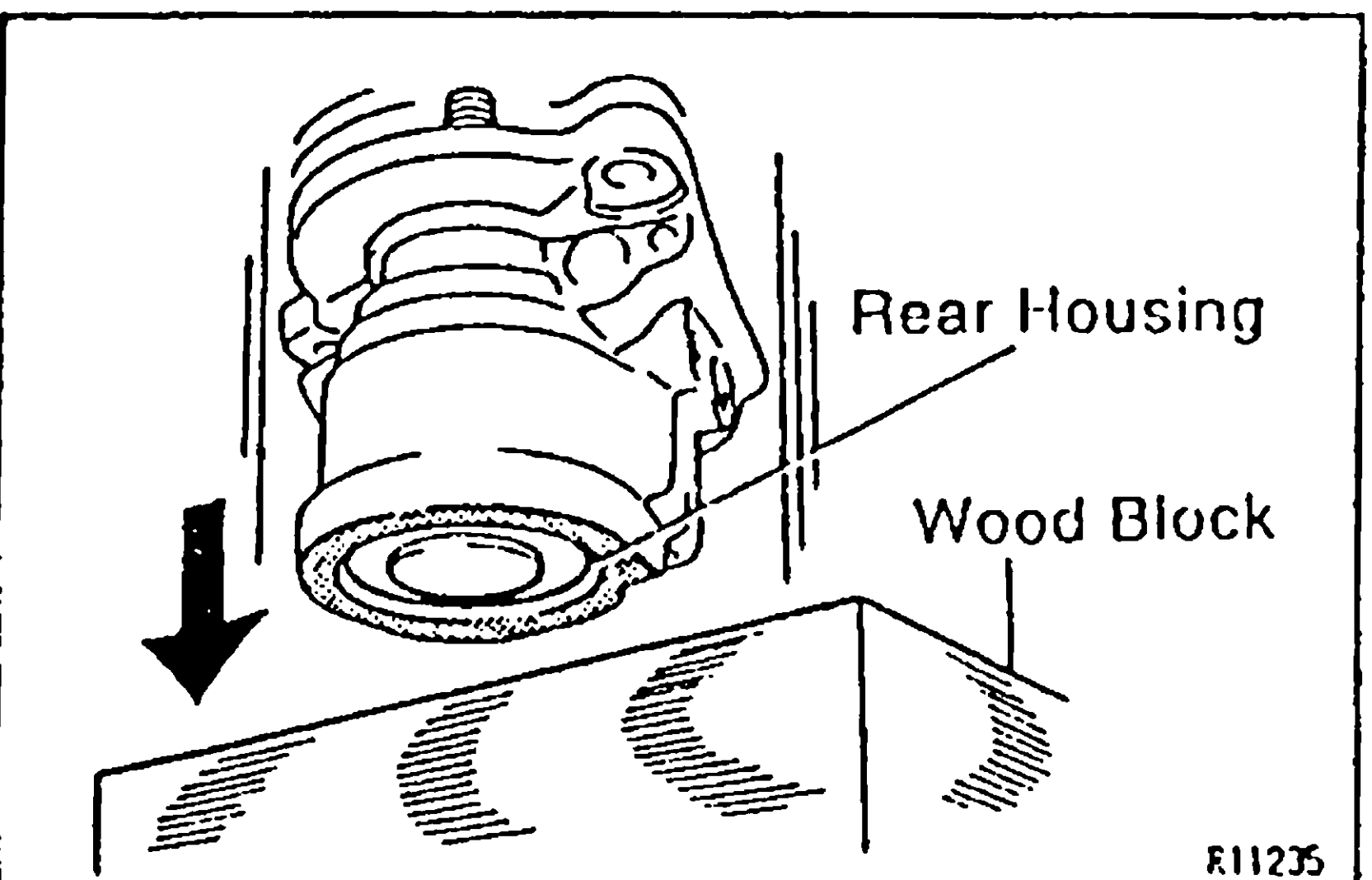
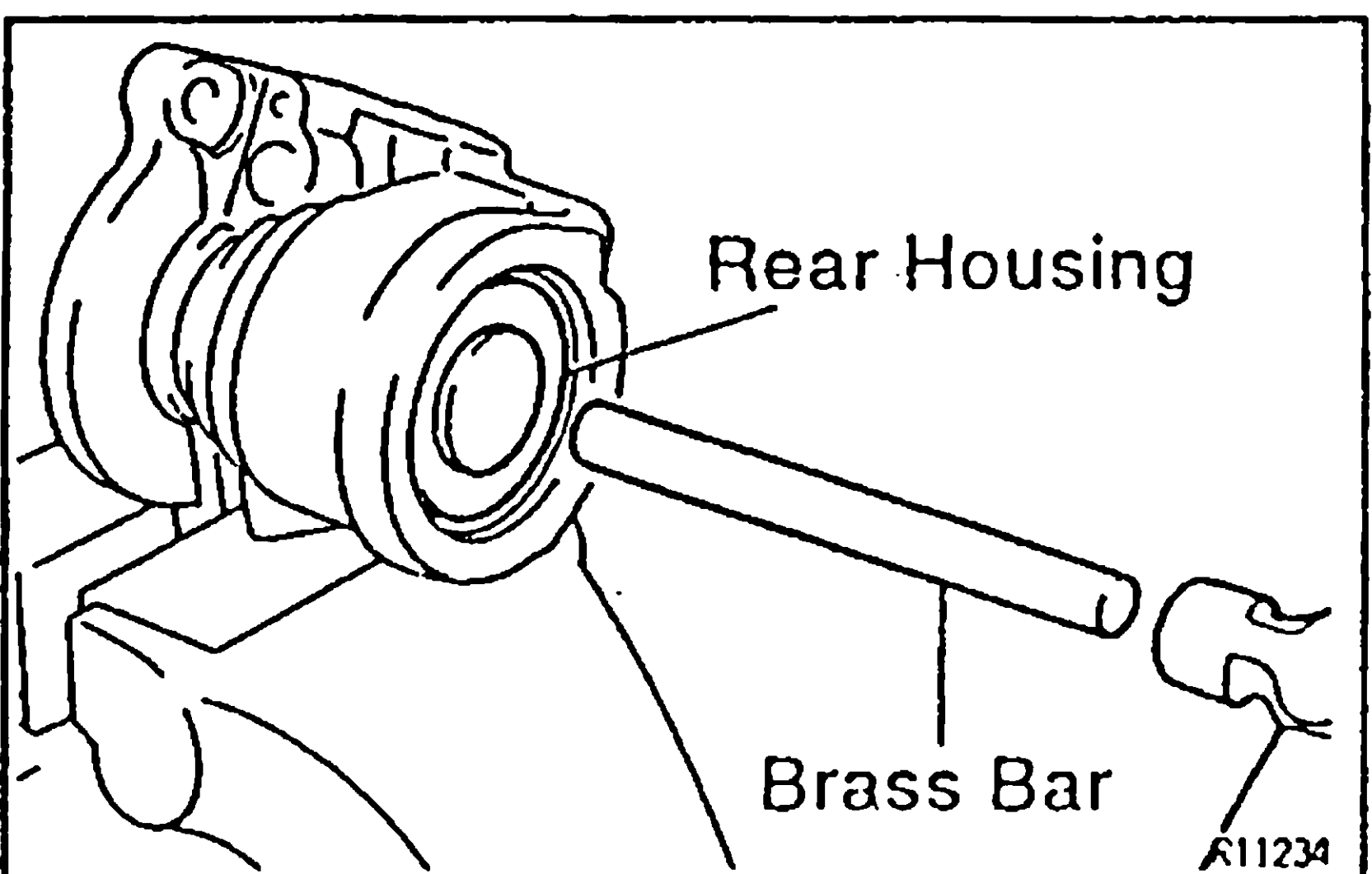
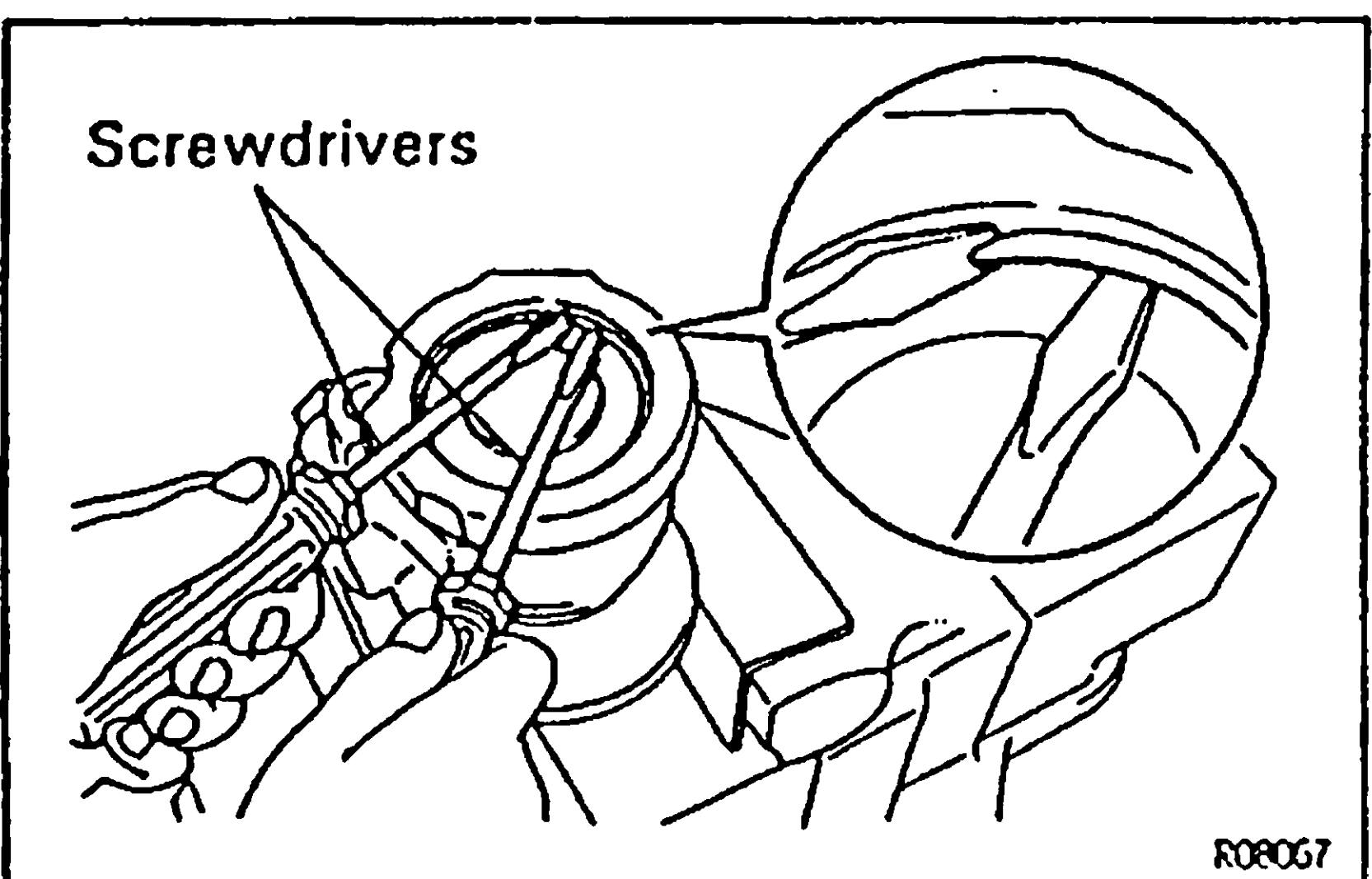
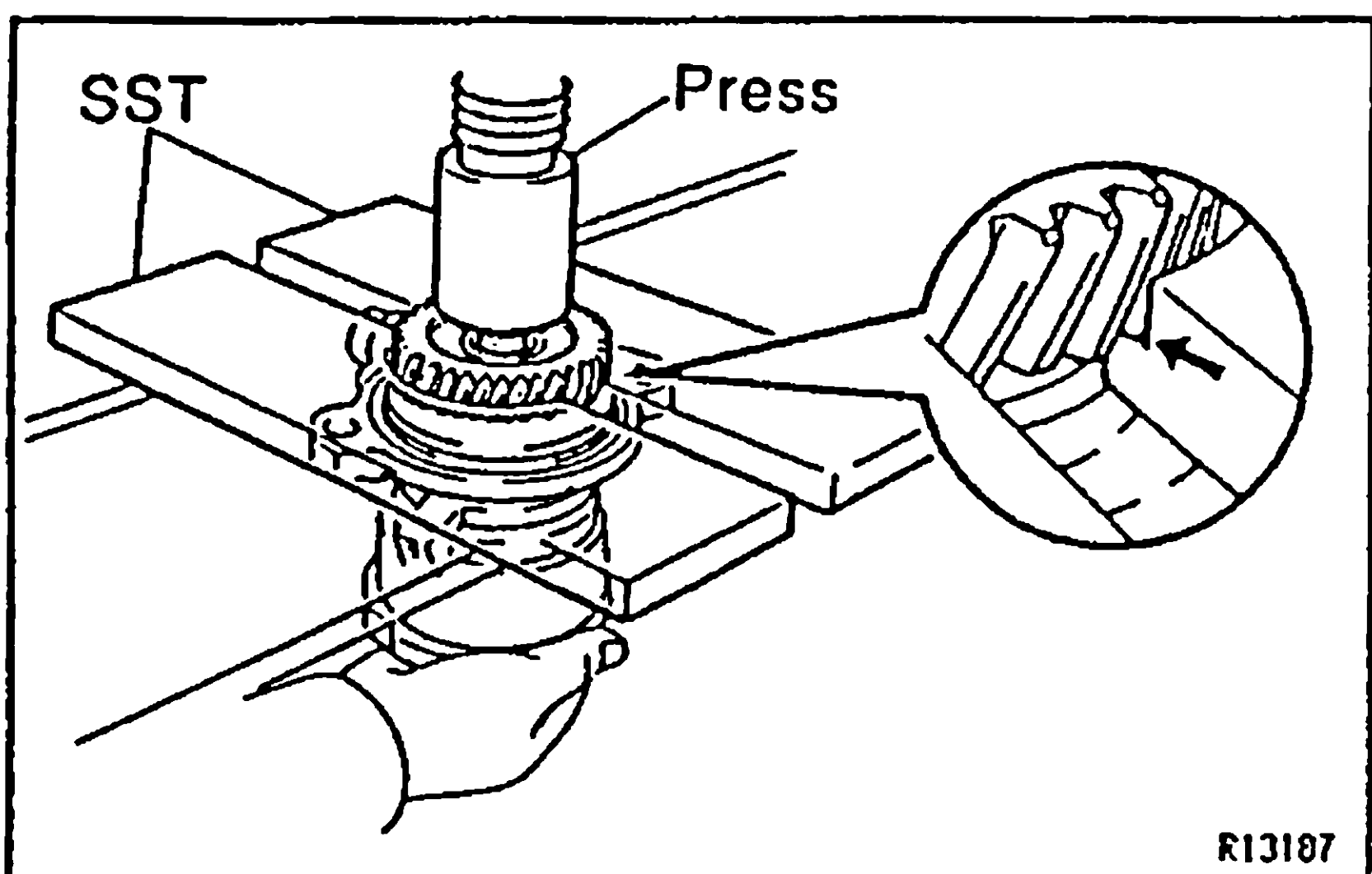
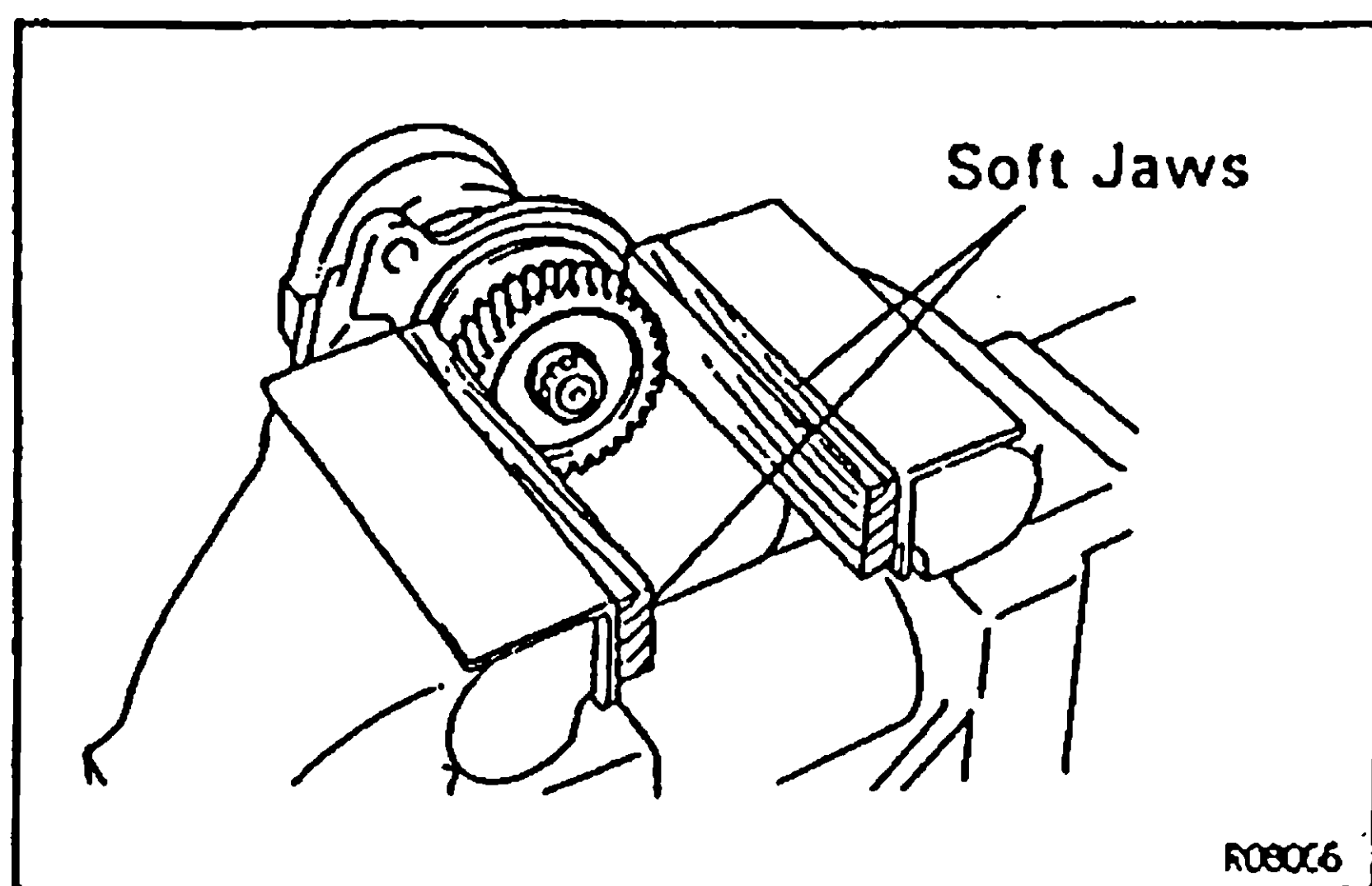
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

⇨ Power steering fluid



POWER STEERING PUMP DISASSEMBLY ^{2M100-01}

NOTICE: When using a vise, do not overtighten it.

1. REMOVE SUCTION PORT UNION

- (a) Remove the bolt.
- (b) Remove the O-ring from the union.

2. REMOVE VANE PUMP DRIVE GEAR

- (a) Using soft jaws on a vise, clamp the gear in the vise.

NOTICE: Be careful not to damage the gear.

- (b) Remove the gear set nut.

- (c) Using SST, press out the gear.

SST 09527-10011

NOTICE:

- Be careful not to damage the gear.
- To avoid dropping the PS pump assembly, support the pump assembly with your hand.

- (d) Remove the woodruff key from the vane pump shaft.

3. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

Remove the O-ring from the union.

4. REMOVE REAR HOUSING AND WAVE WASHER

- (a) Using 2 screwdrivers, remove the snap ring.

NOTICE: Be careful not to damage the housing.

- (b) Using a brass bar and hammer, tap the housing so that the spring force of the wave washer pushes the housing forward.

- (c) Gently tap the PS pump assembly on a wood block and remove the housing and washer.

- (d) Remove the O-ring from the housing.

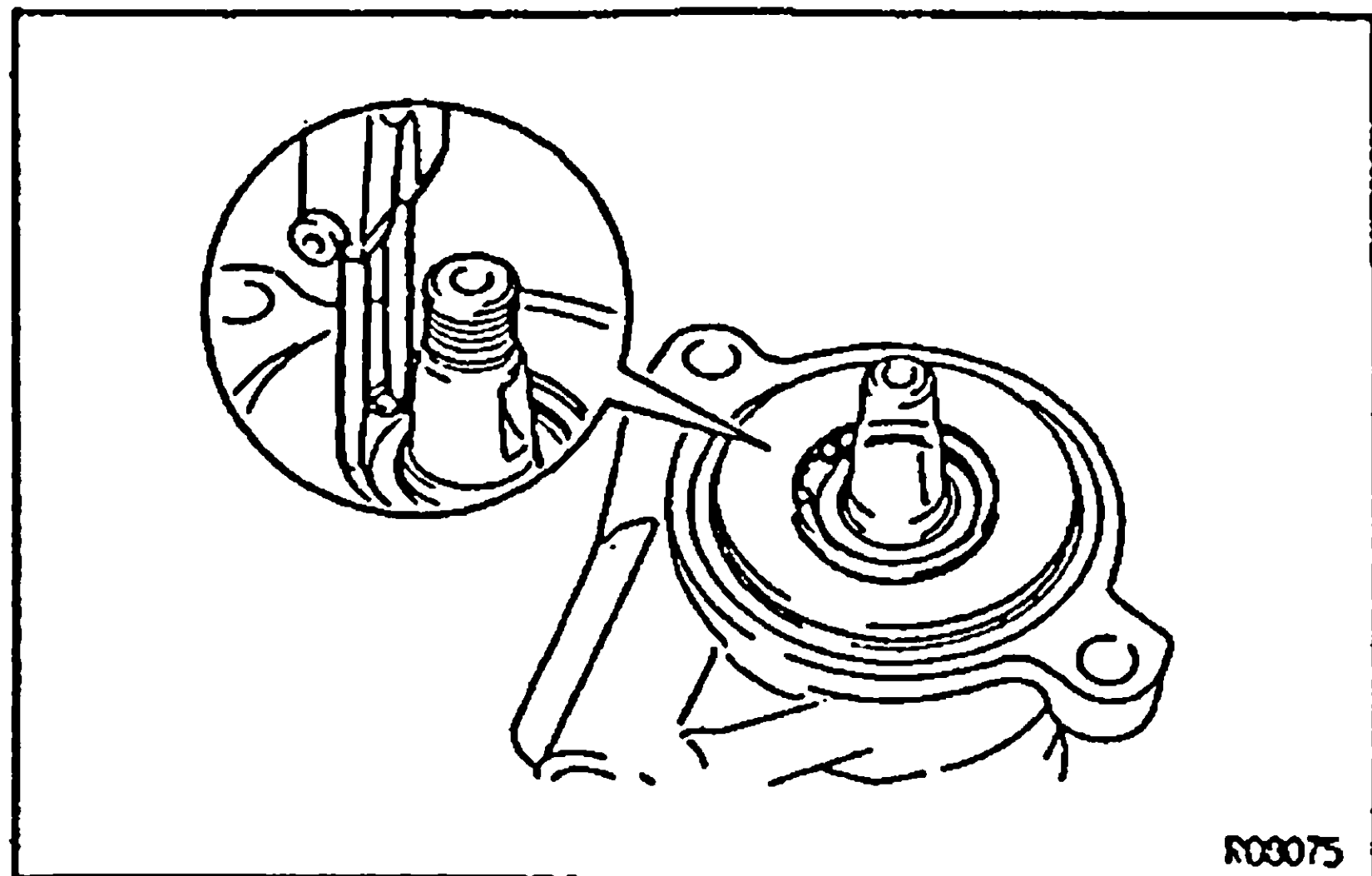
5. REMOVE SIDE REAR PLATE

- (a) Gently tap the PS pump assembly on a wood block and remove the plate.

- (b) Remove the O-ring from the plate.

6. REMOVE CAM RING, VANE PUMP ROTOR AND 10 VANE PLATES

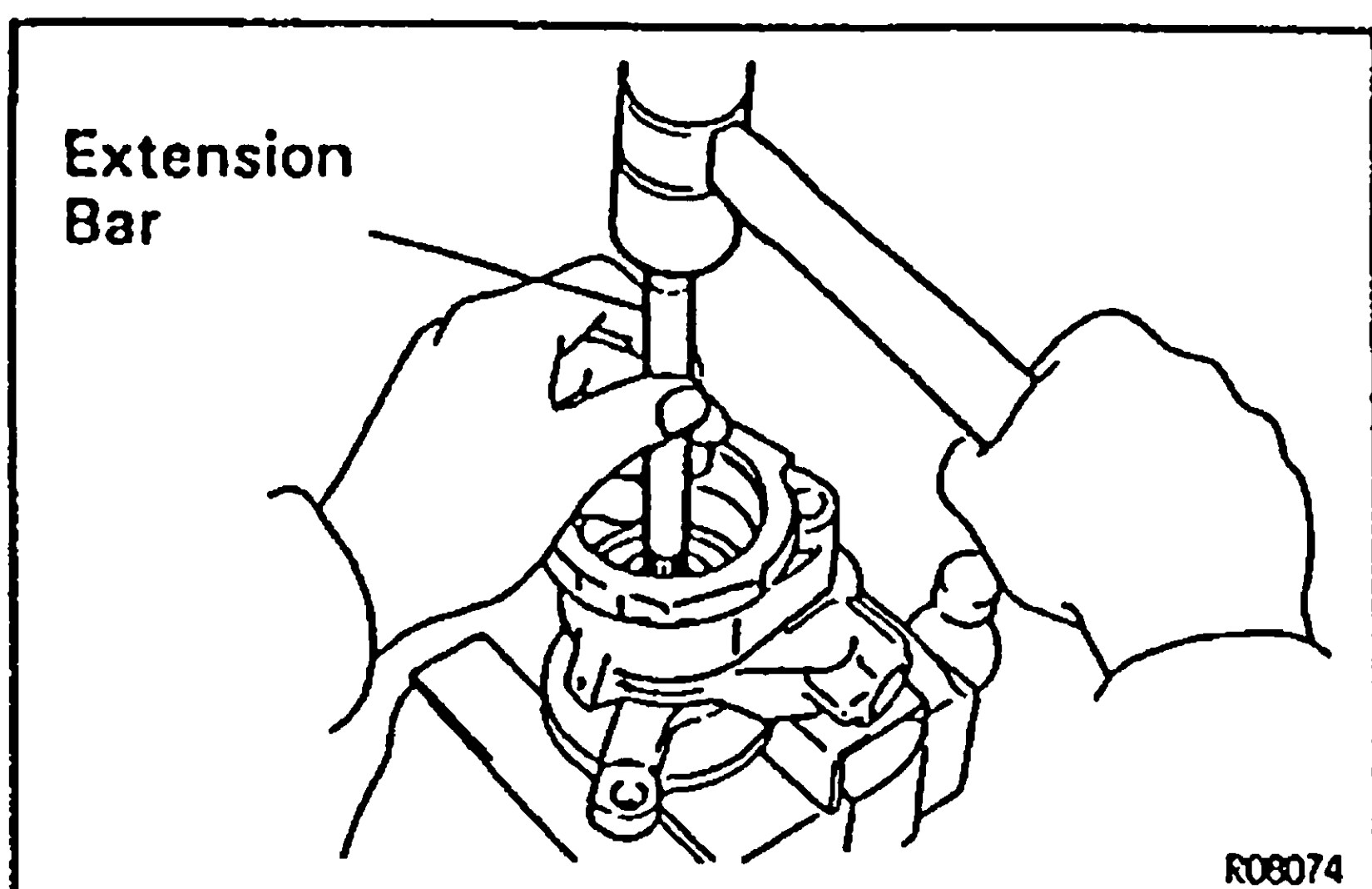
NOTICE: Be careful not to scratch the cam ring, rotor or vane plates.

**7. REMOVE SHORTER STRAIGHT PIN**

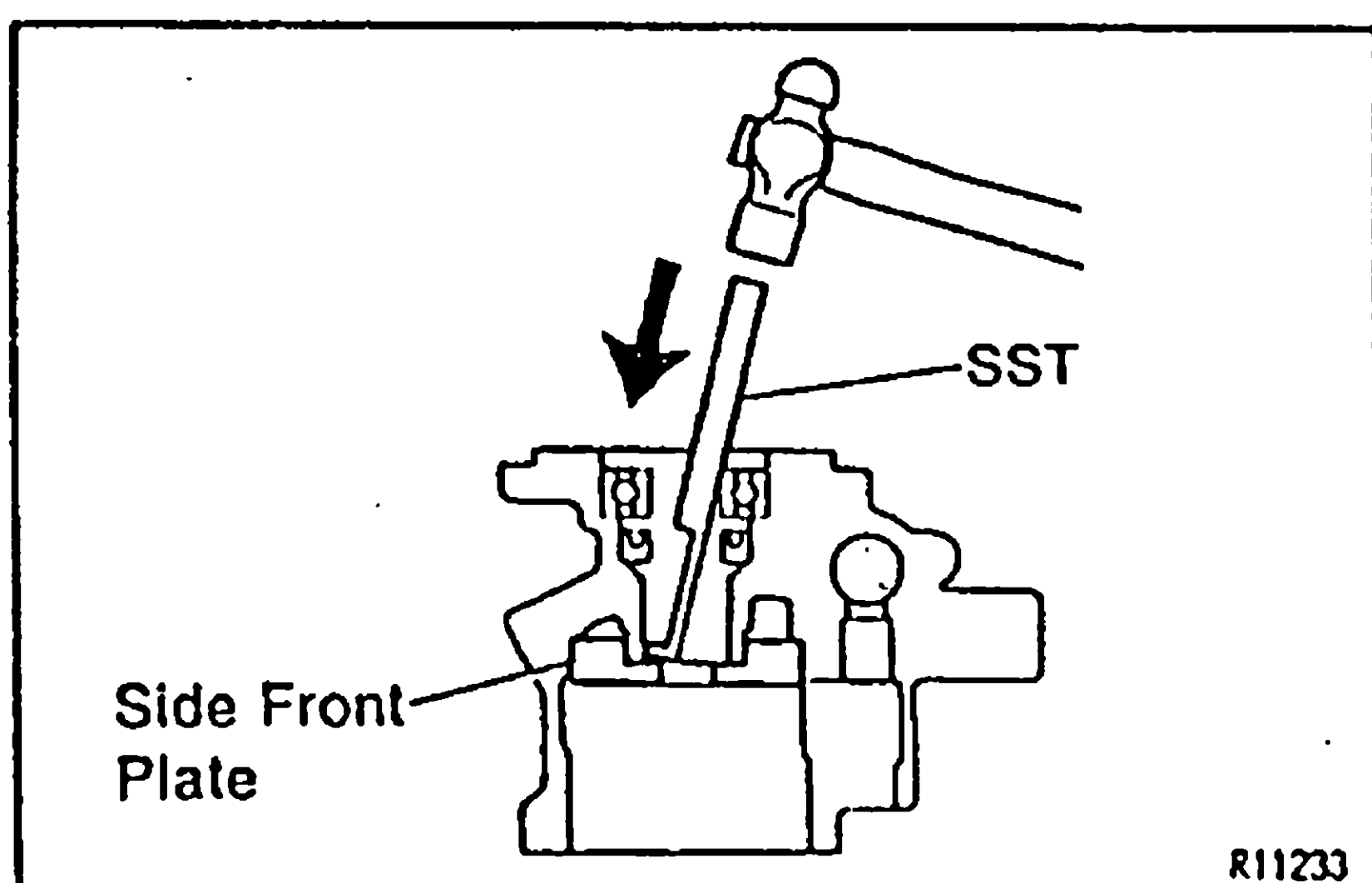
Remove the pin from the side front plate.

8. REMOVE VANE PUMP SHAFT WITH BEARING

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



(b) Using an extension bar and hammer, tap out the shaft with the bearing.

**9. REMOVE SIDE FRONT PLATE**

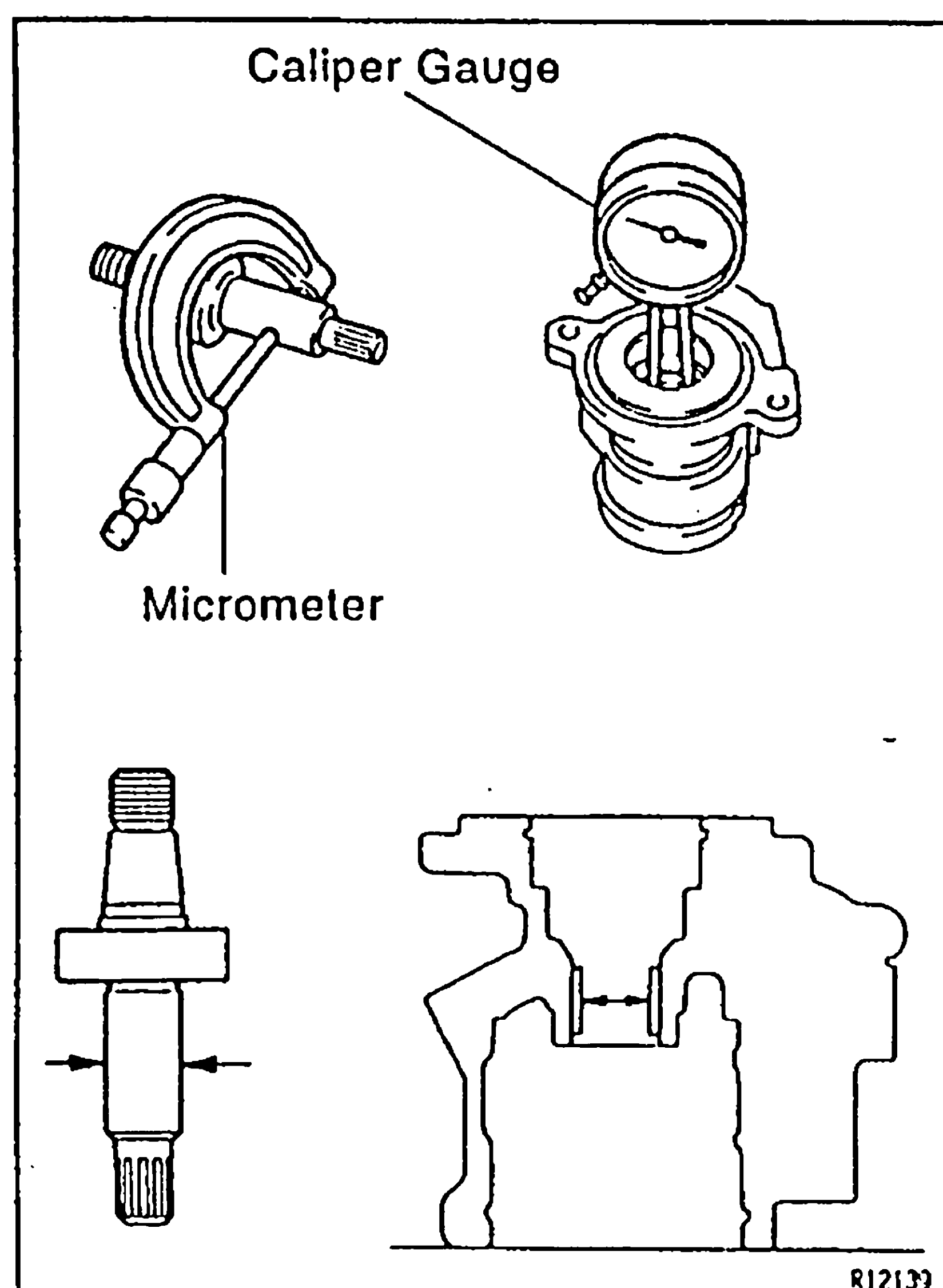
(a) Using SST, tap out the plate.

SST 09631-10030

(b) Remove the 2 O-rings from the plate.

10. REMOVE LONGER STRAIGHT PIN

Using pliers, remove the pin from the front housing.

**POWER STEERING PUMP INSPECTION AND REPLACEMENT****1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING**

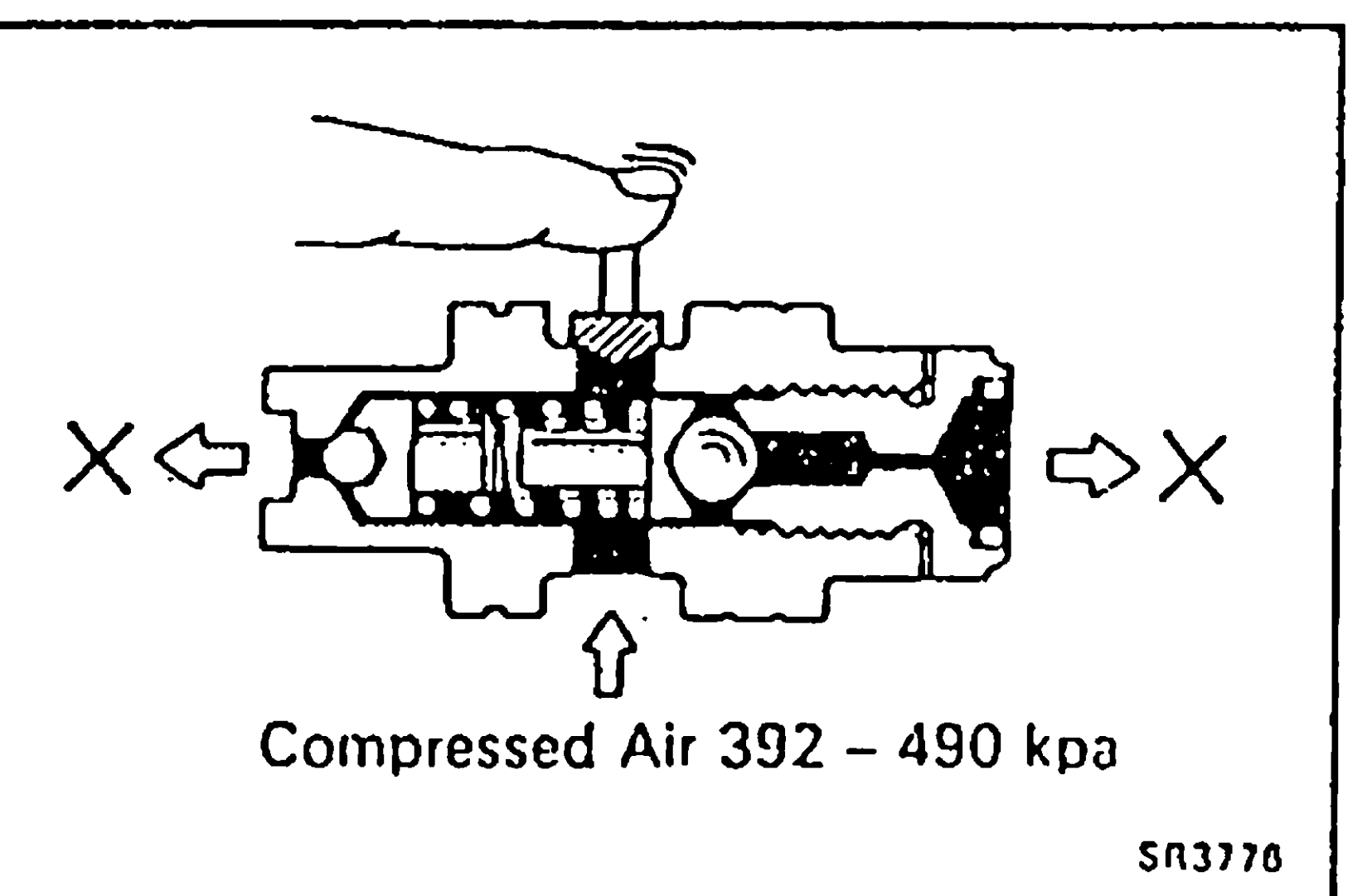
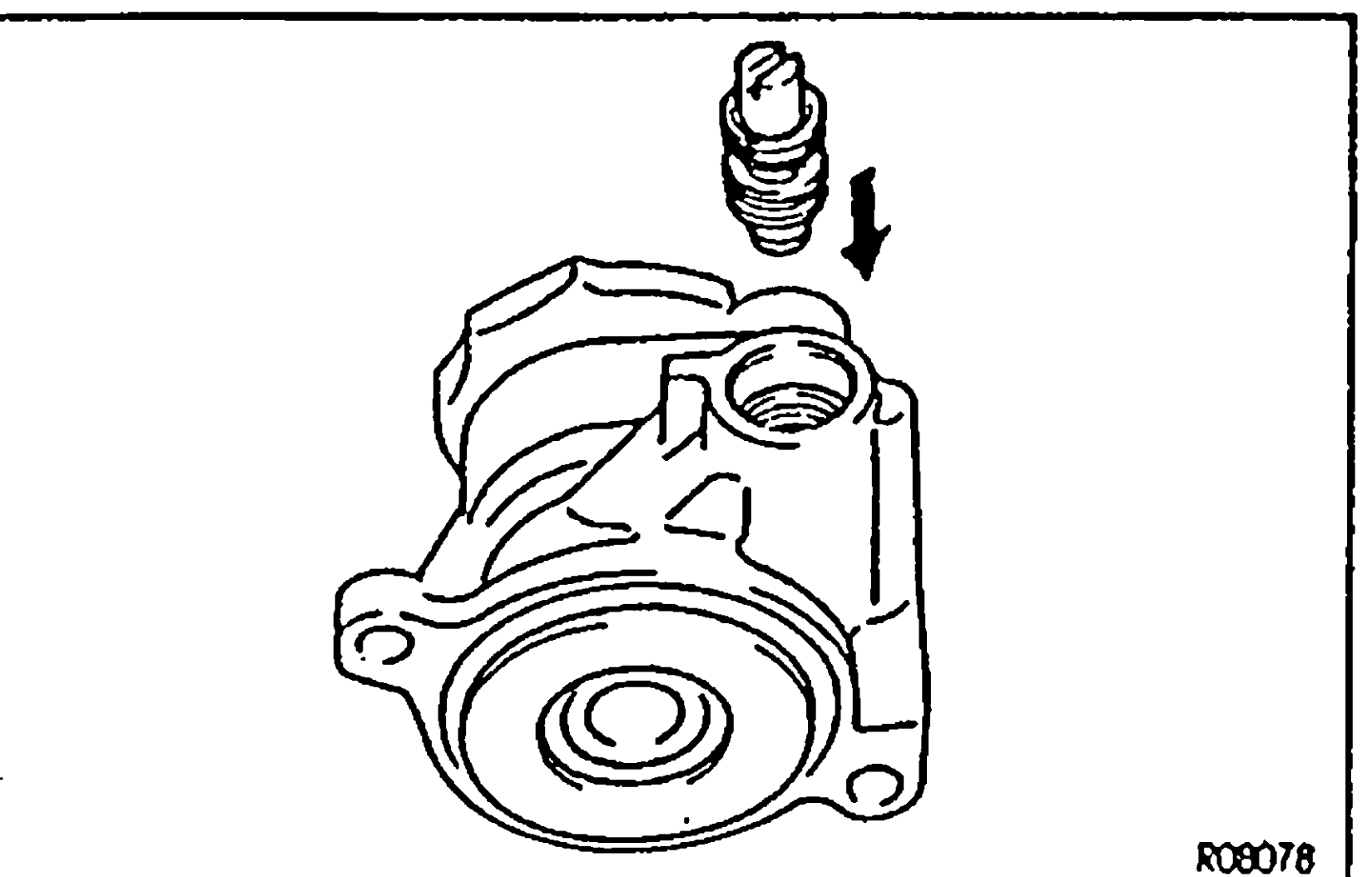
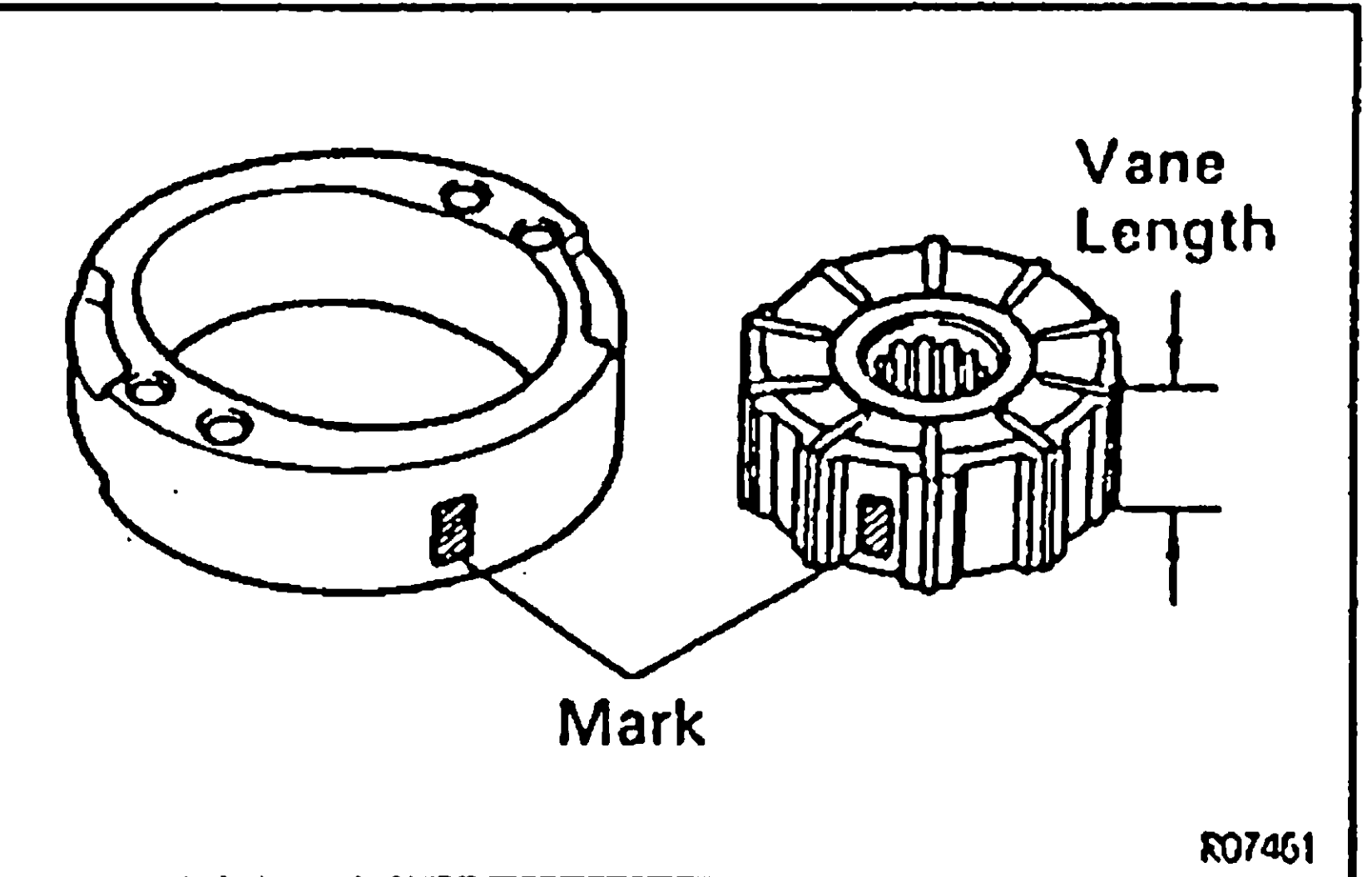
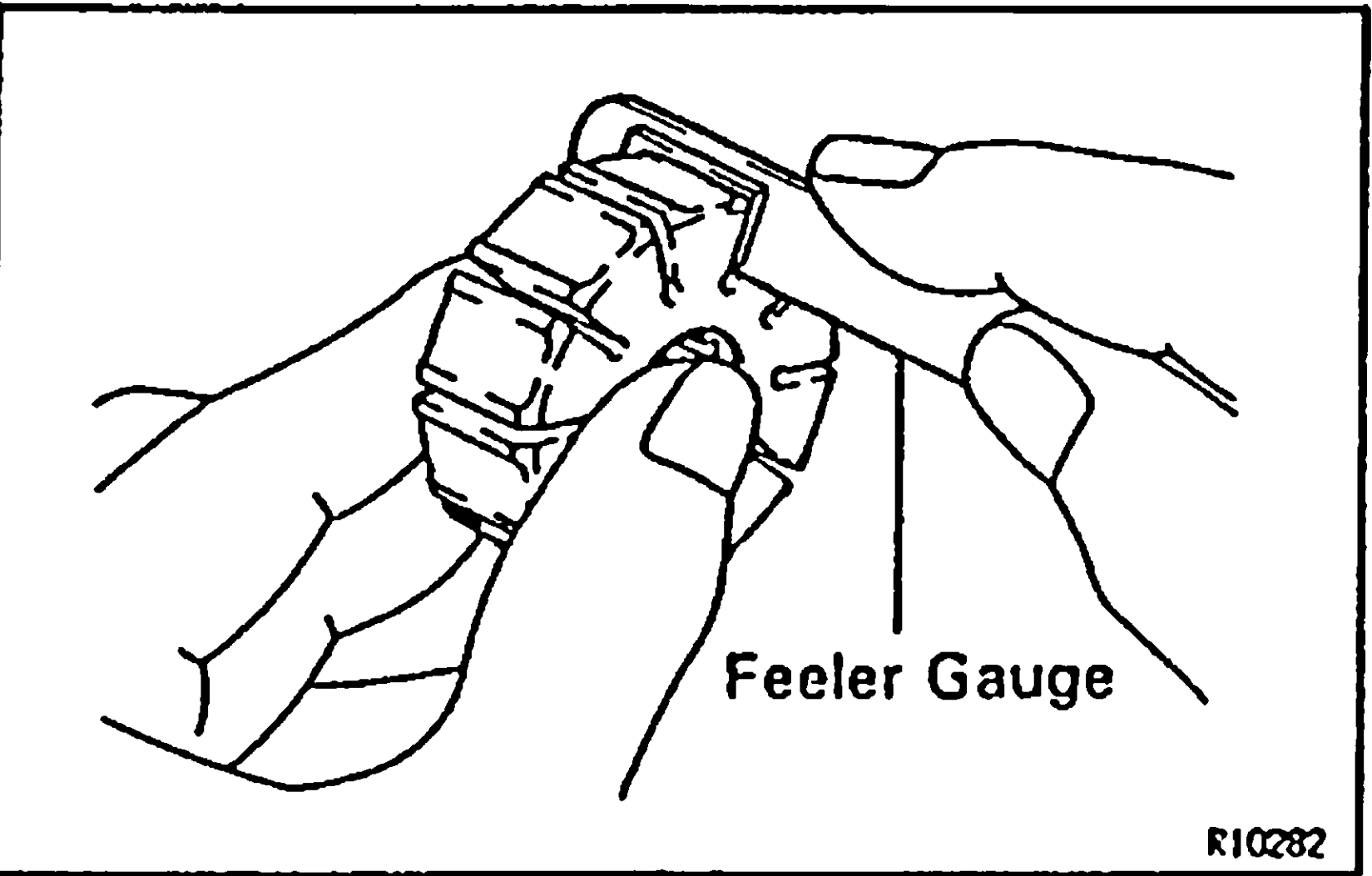
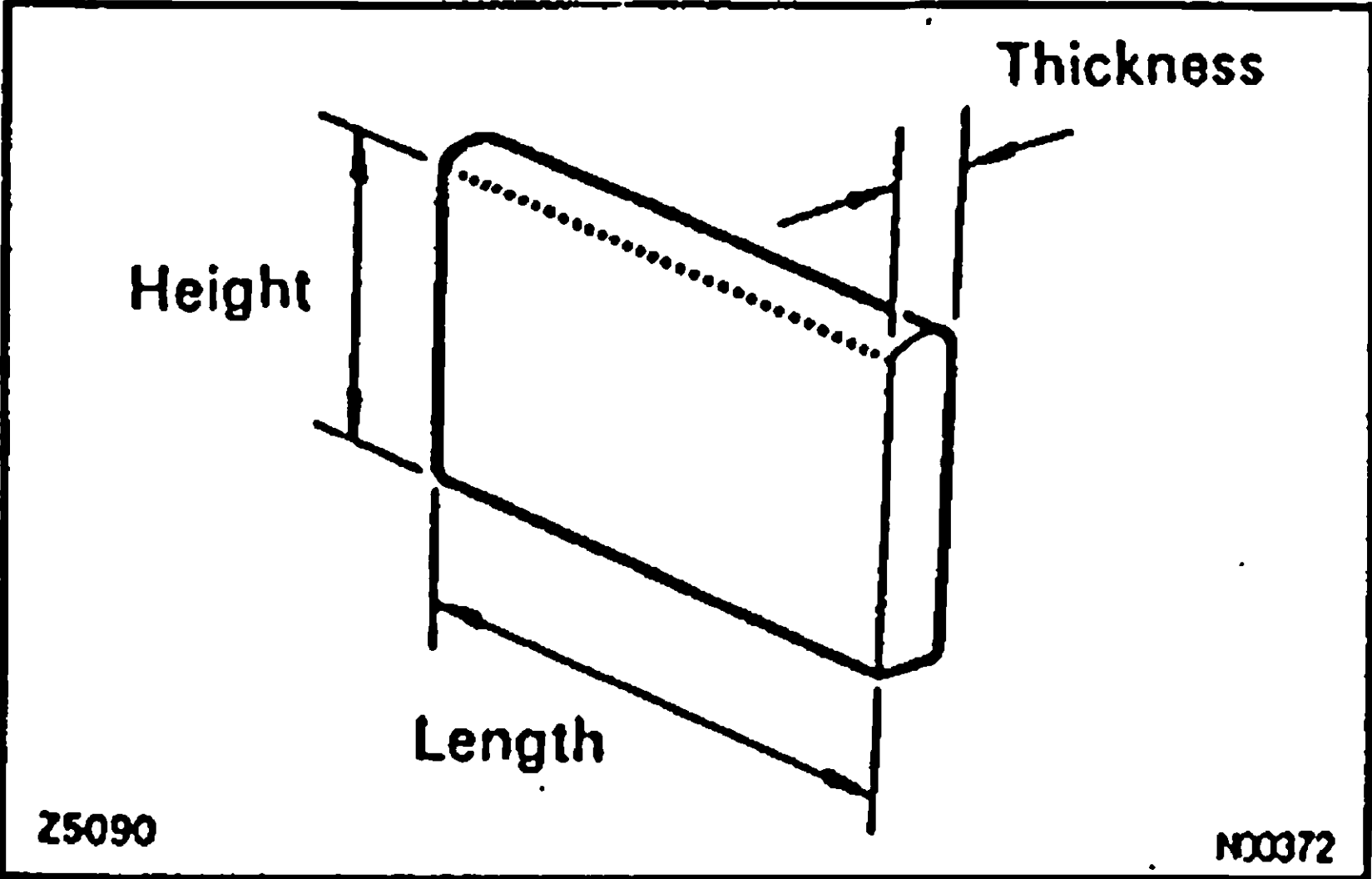
Using a micrometer and caliper gauge, measure the oil clearance.

Standard clearance:

0.03-0.05 mm (0.0012-0.0020 in.)

Maximum clearance:

0.07 mm (0.0028 in.)



2. INSPECT VANE PUMP ROTOR AND 10 VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the plate.

Minimum height:

8.6 mm (0.339 in.)

Minimum thickness:

1.397 mm (0.05500 in.)

Minimum length:

14.891 mm (0.58016 in.)

- (b) Using a feeler gauge, measure the clearance between the rotor groove and plate.

Maximum clearance:

0.033 mm (0.00130 in.)

If more than maximum, replace the plate and/or rotor with one having the mark equivalent to the mark stamped on the cam ring.

Inscribed mark:

Vane pump rotor: 1, 2, 3 or None

Cam ring: 1, 2, 3 or 4

HINT: There are 4 vane lengths for the following rotor and cam ring marks.

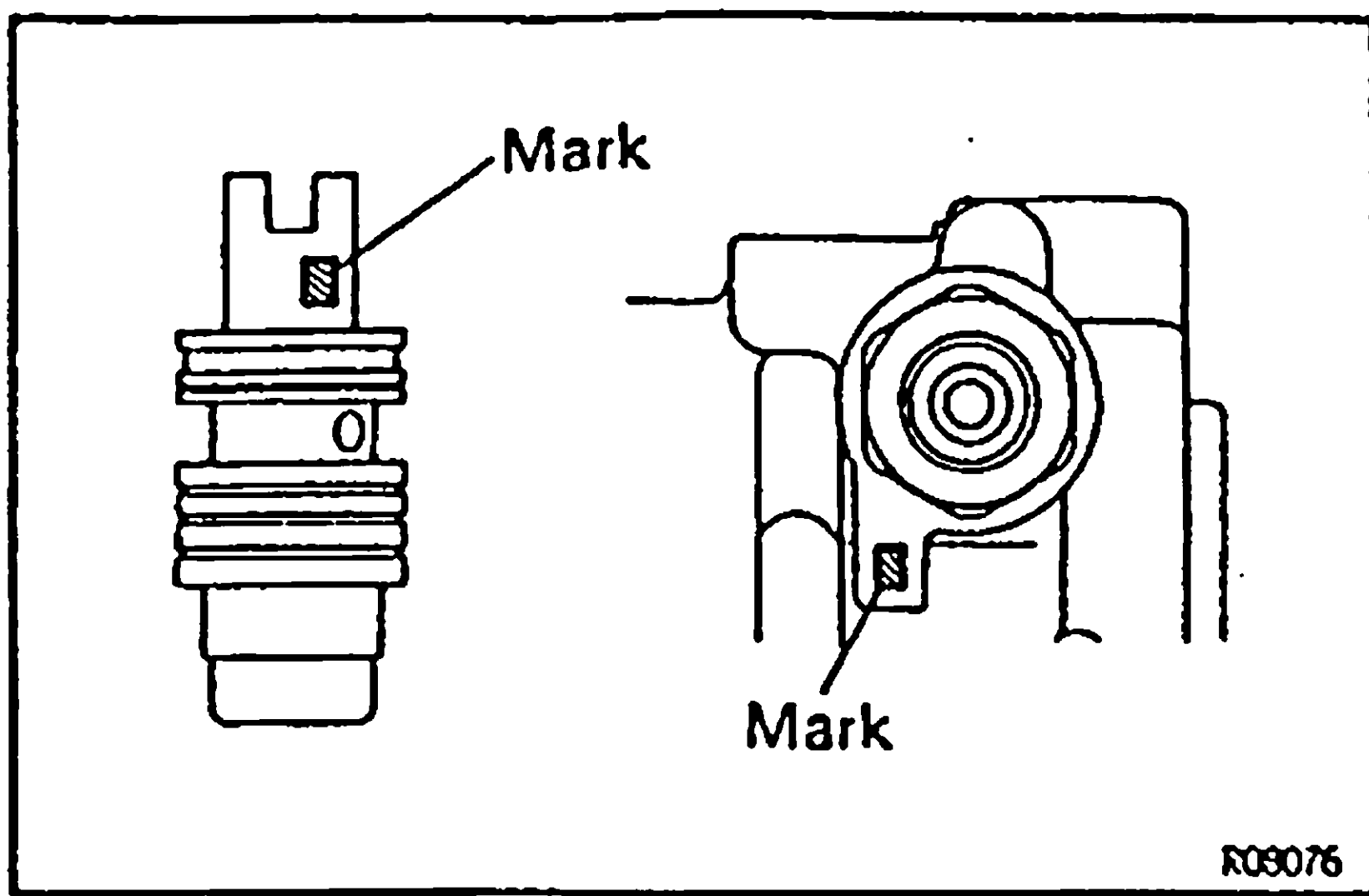
Rotor mark	Cam ring mark	Vane length mm (in.)
None	1	14.997 - 14.999 (0.59043 - 0.59051)
1	2	14.995 - 14.997 (0.59035 - 0.59043)
2	3	14.993 - 14.995 (0.59027 - 0.59035)
3	4	14.991 - 14.993 (0.59020 - 0.59027)

V05471

3. INSPECT FLOW CONTROL VALVE

- (a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.

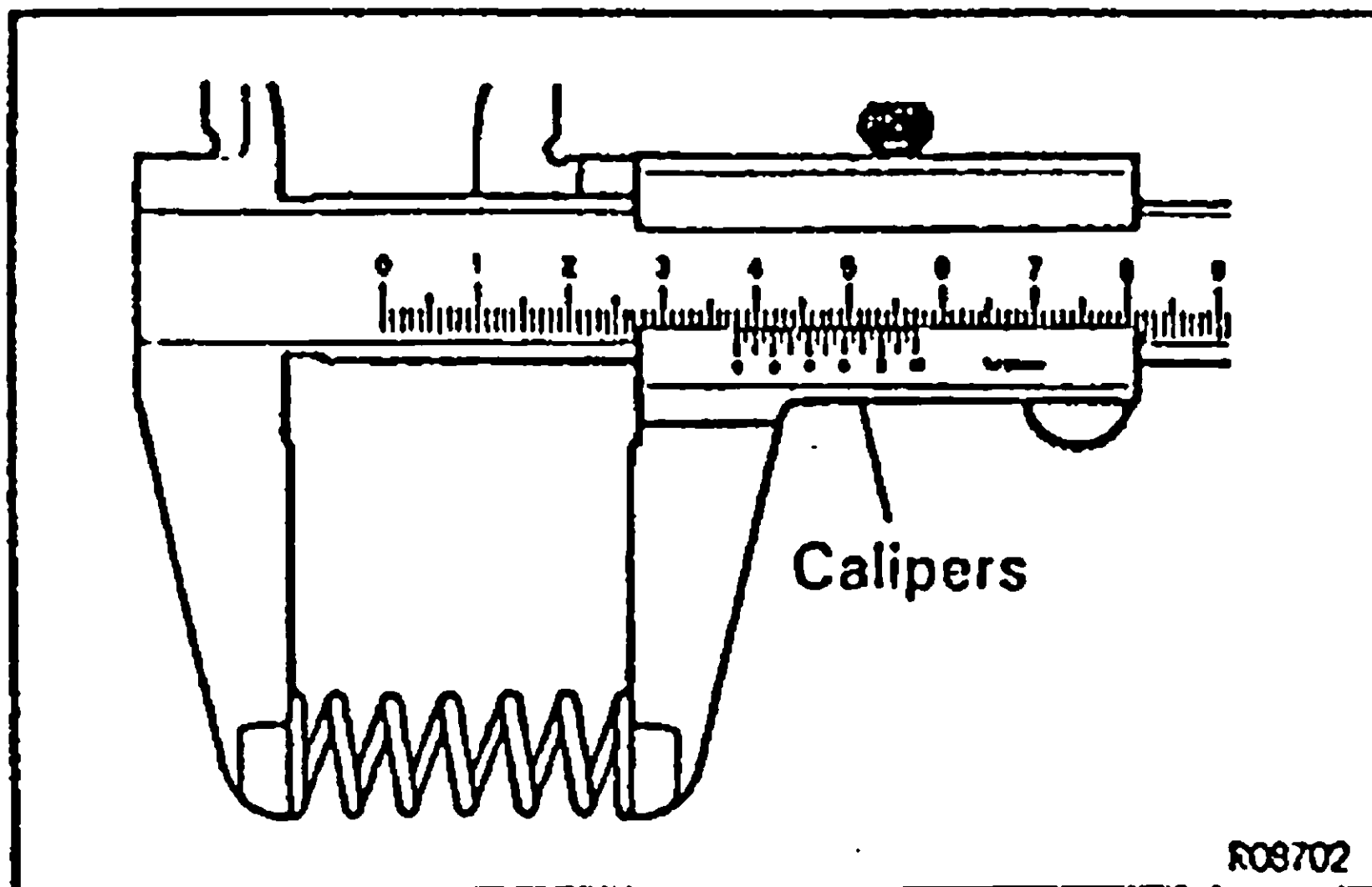
- (b) Check the valve for leakage. Close one of the holes and apply 392-490 kPa (4-5 kgf/cm², 57-71 psi) of compressed air into the opposite side, and confirm that air does not come out from the end holes.



If necessary, replace the valve with one having the same letter as inscribed on the front housing.

Inscribed mark:

A, B, C, D, E or F

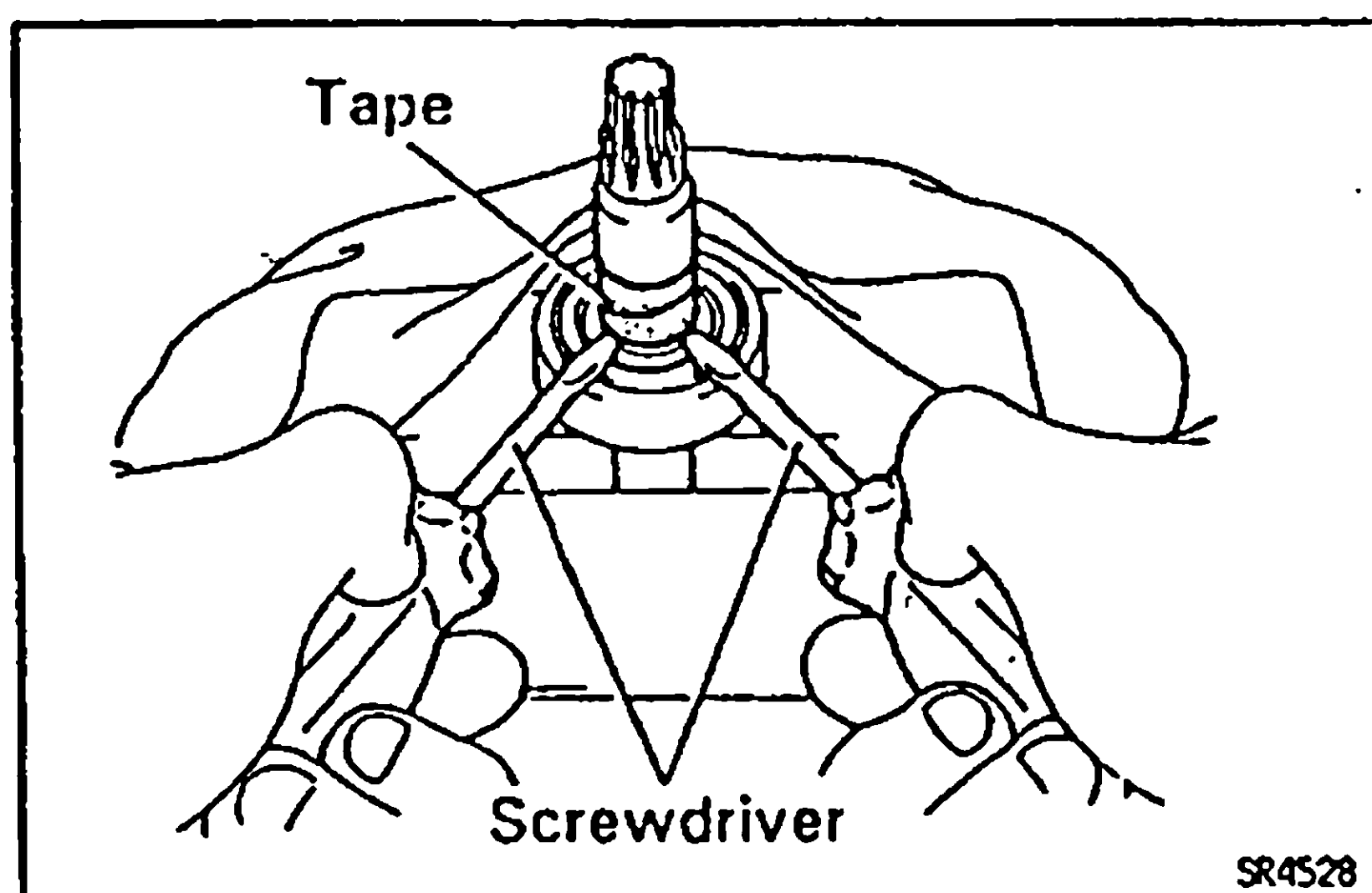


4. INSPECT SPRING

Using calipers, measure the free length of the spring.

Free length:

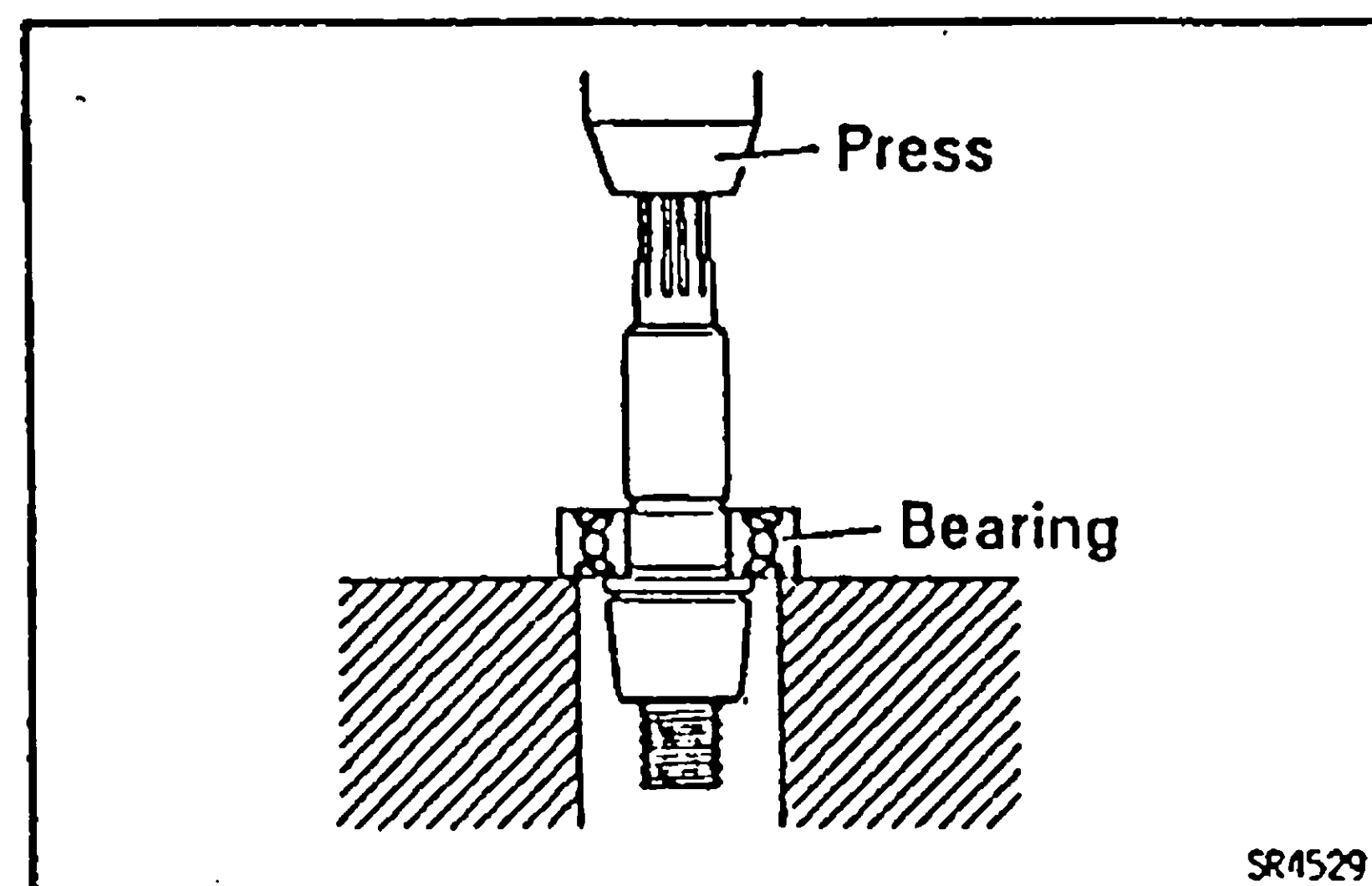
35–37 mm (1.38–1.46 in.)



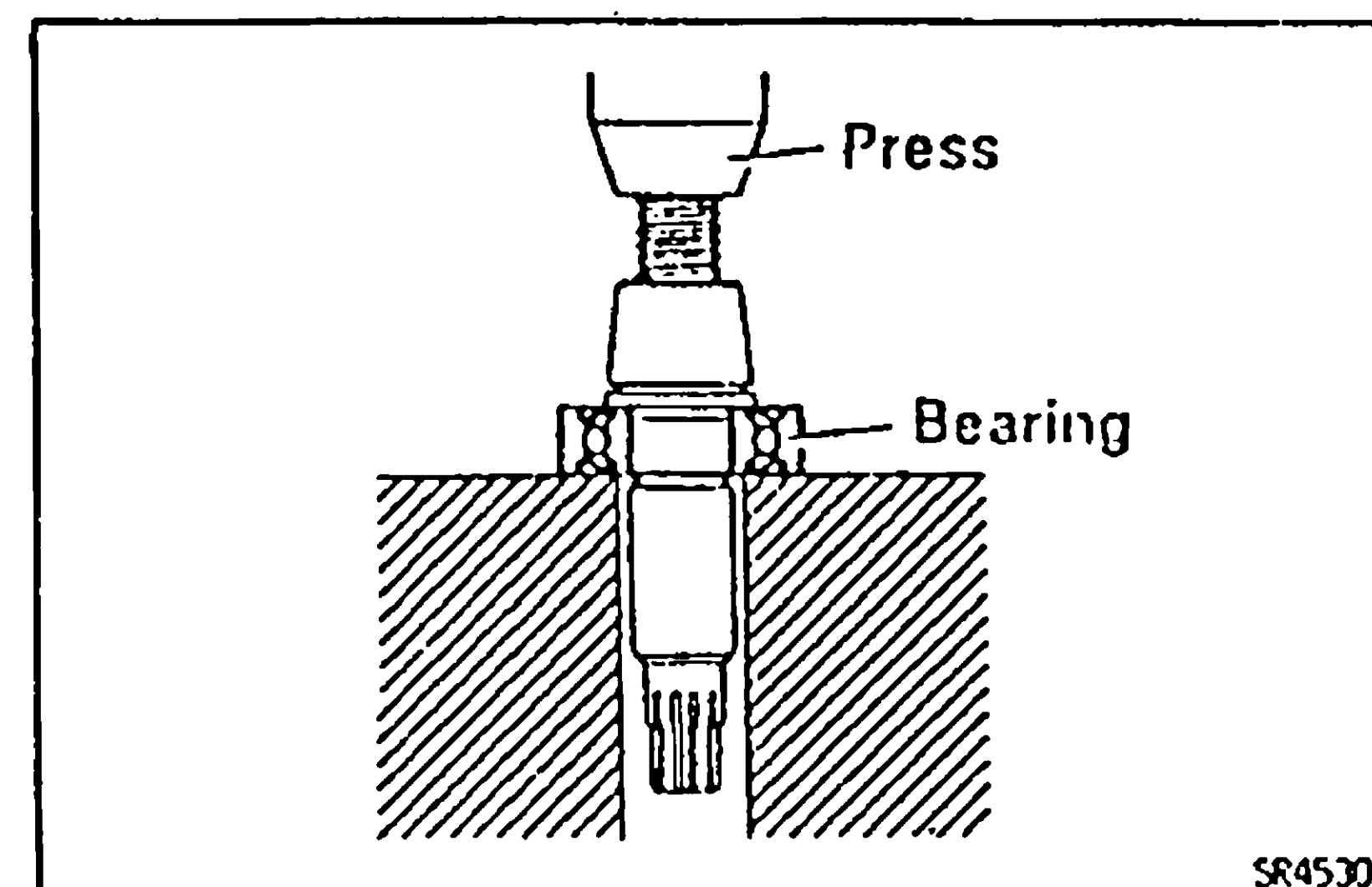
5. IF NECESSARY, REPLACE BEARING

- (a) Using 2 screwdrivers, remove the snap ring from the vane pump shaft.

NOTICE: To prevent vane pump shaft damage, wind tape on the shaft.



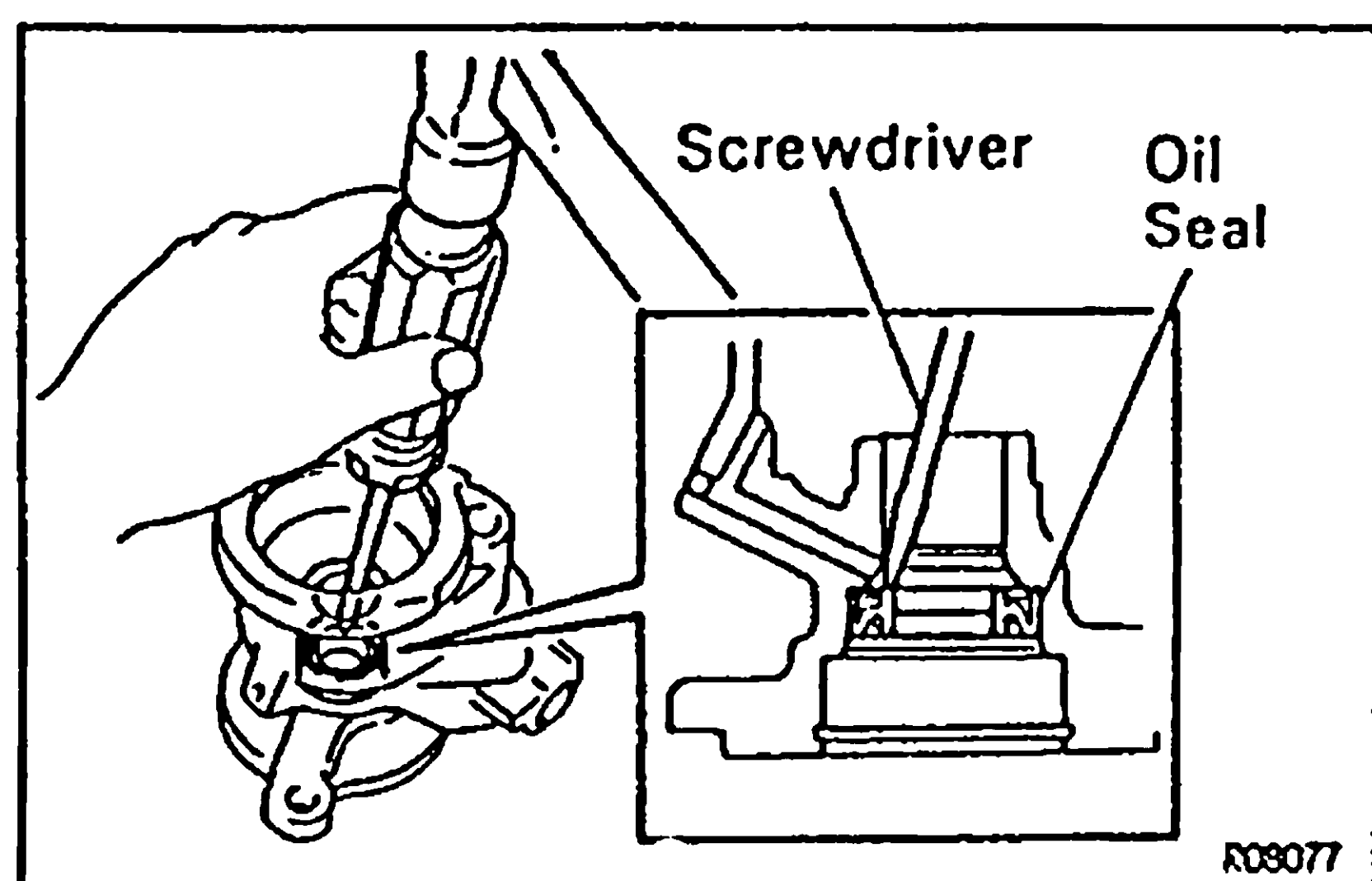
- (b) Using a press, press out the bearing.



- (c) Using a press, press in a new bearing.

NOTICE: Be careful not to damage the shaft.

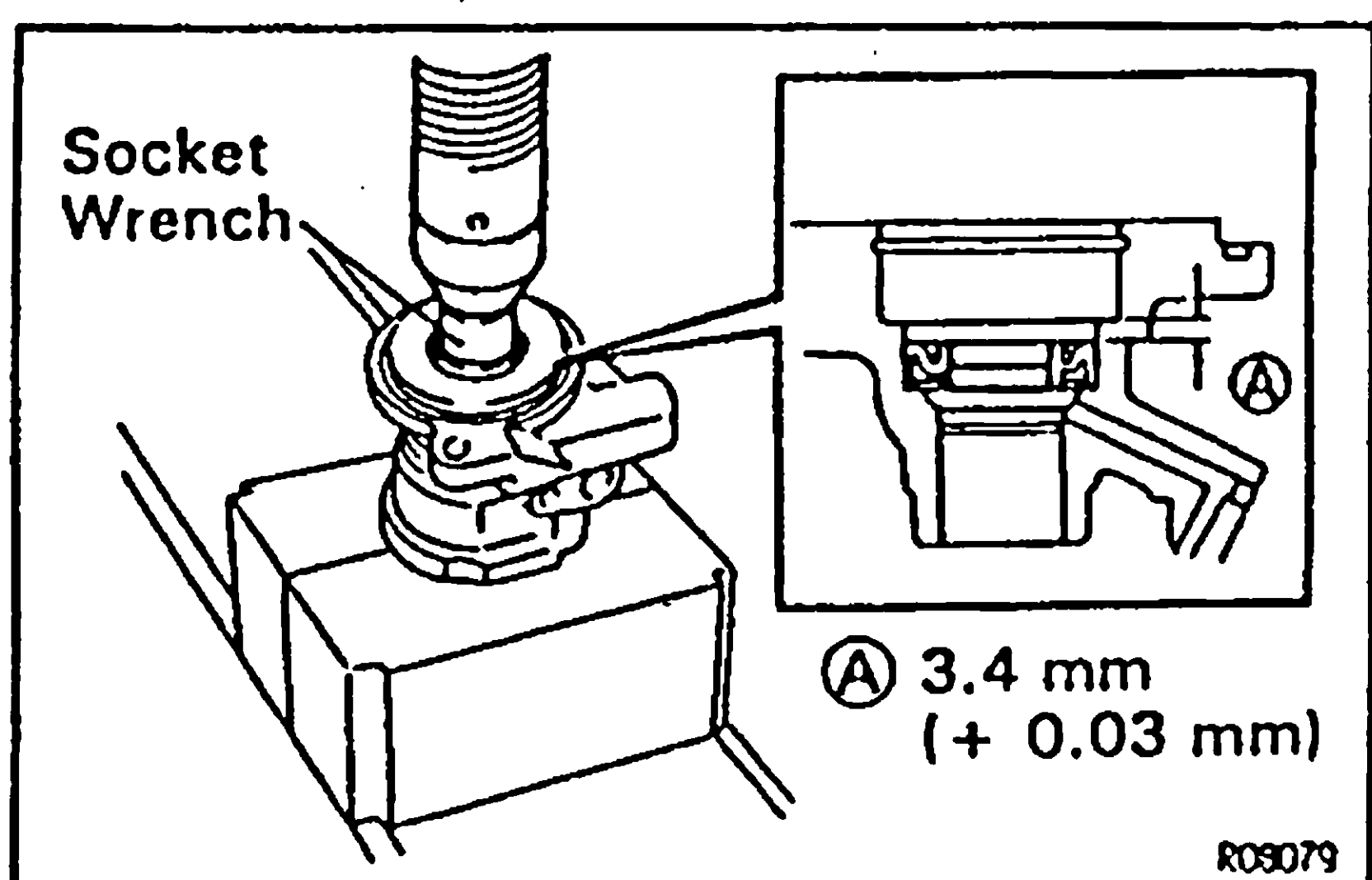
- (d) Install a new snap ring to the shaft.



6. IF NECESSARY, REPLACE OIL SEAL

- (a) Using a screwdriver and hammer, tap out the oil seal from the front housing.

NOTICE: Be careful not to damage the housing.

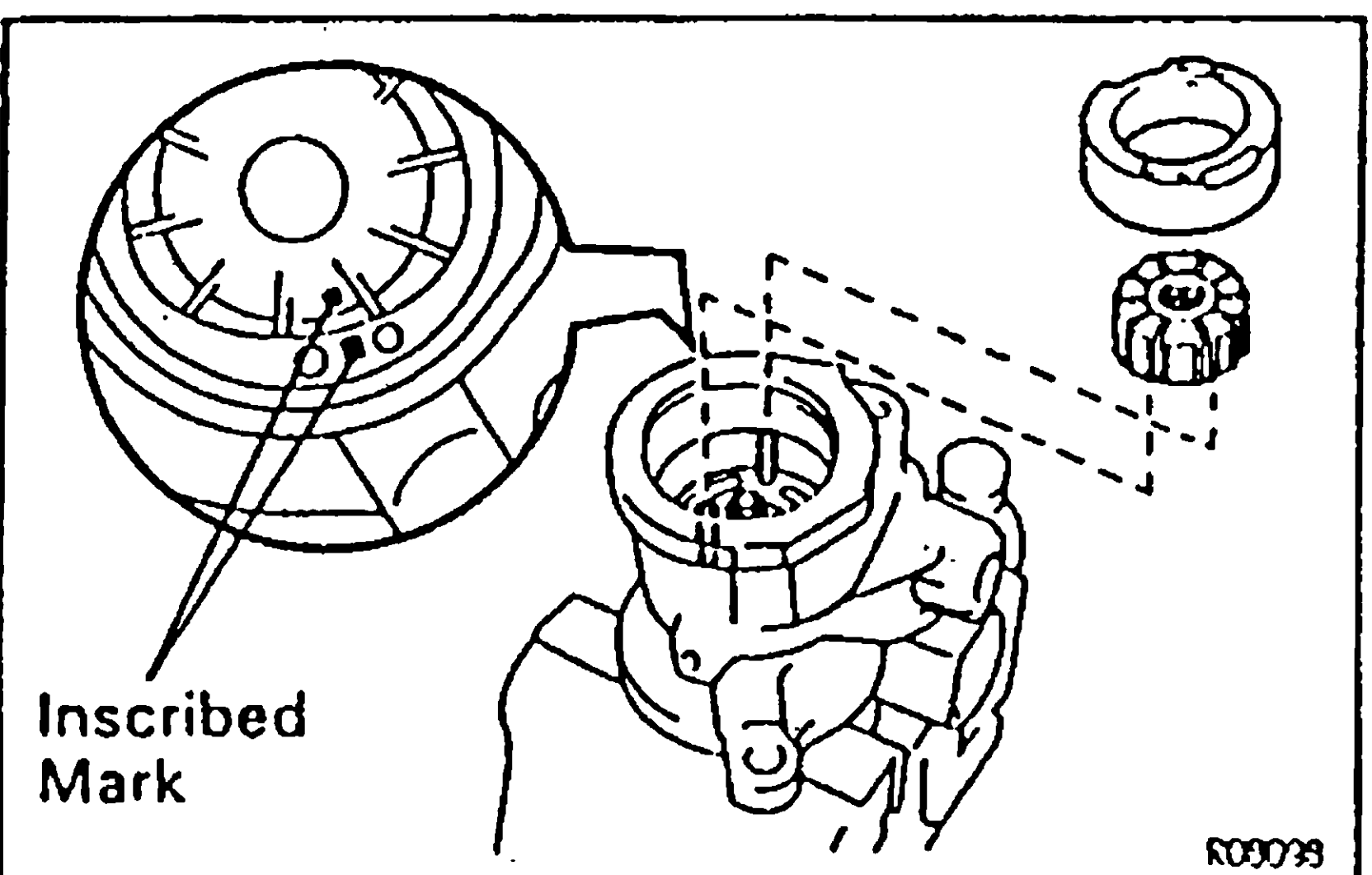
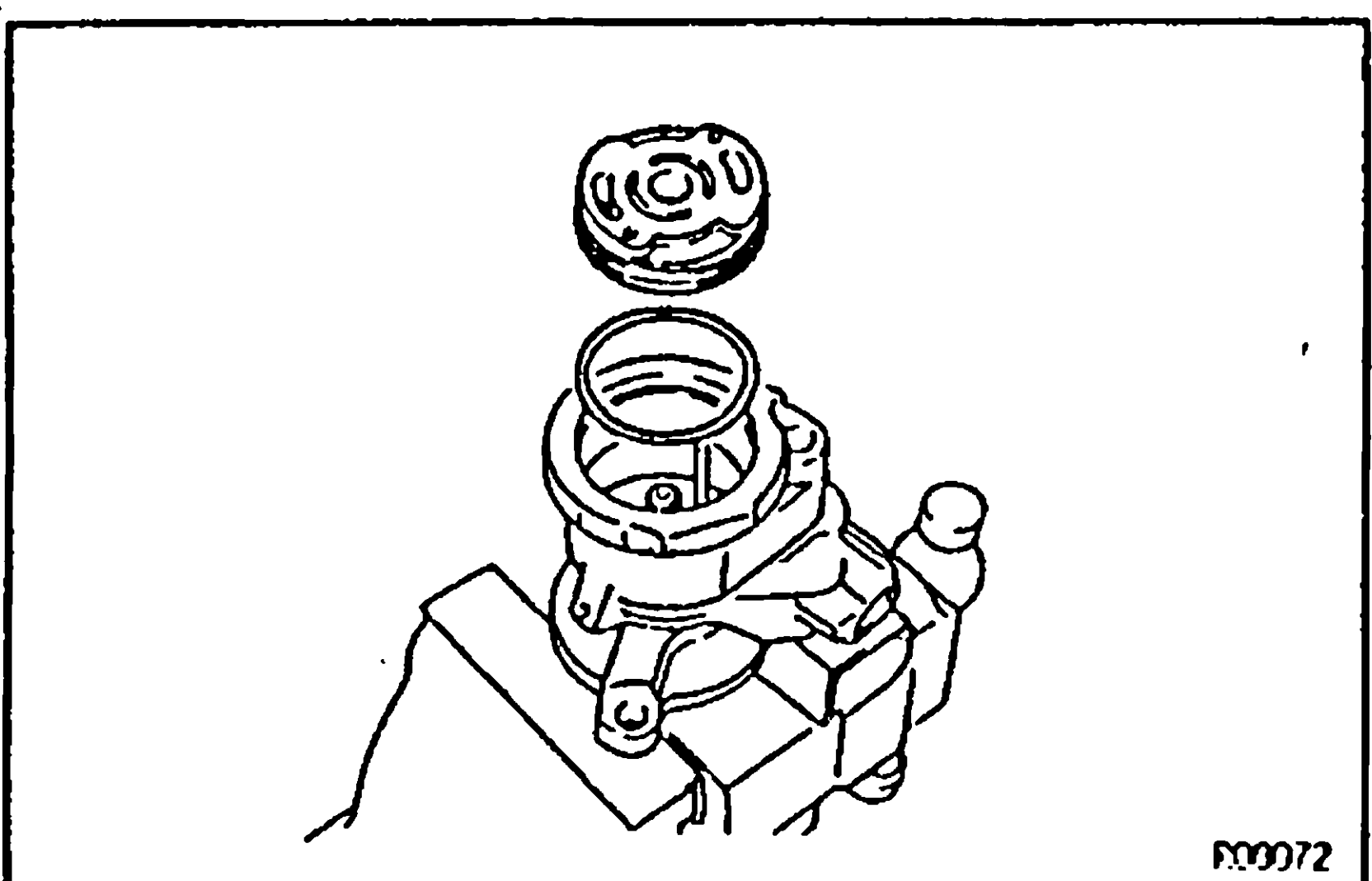
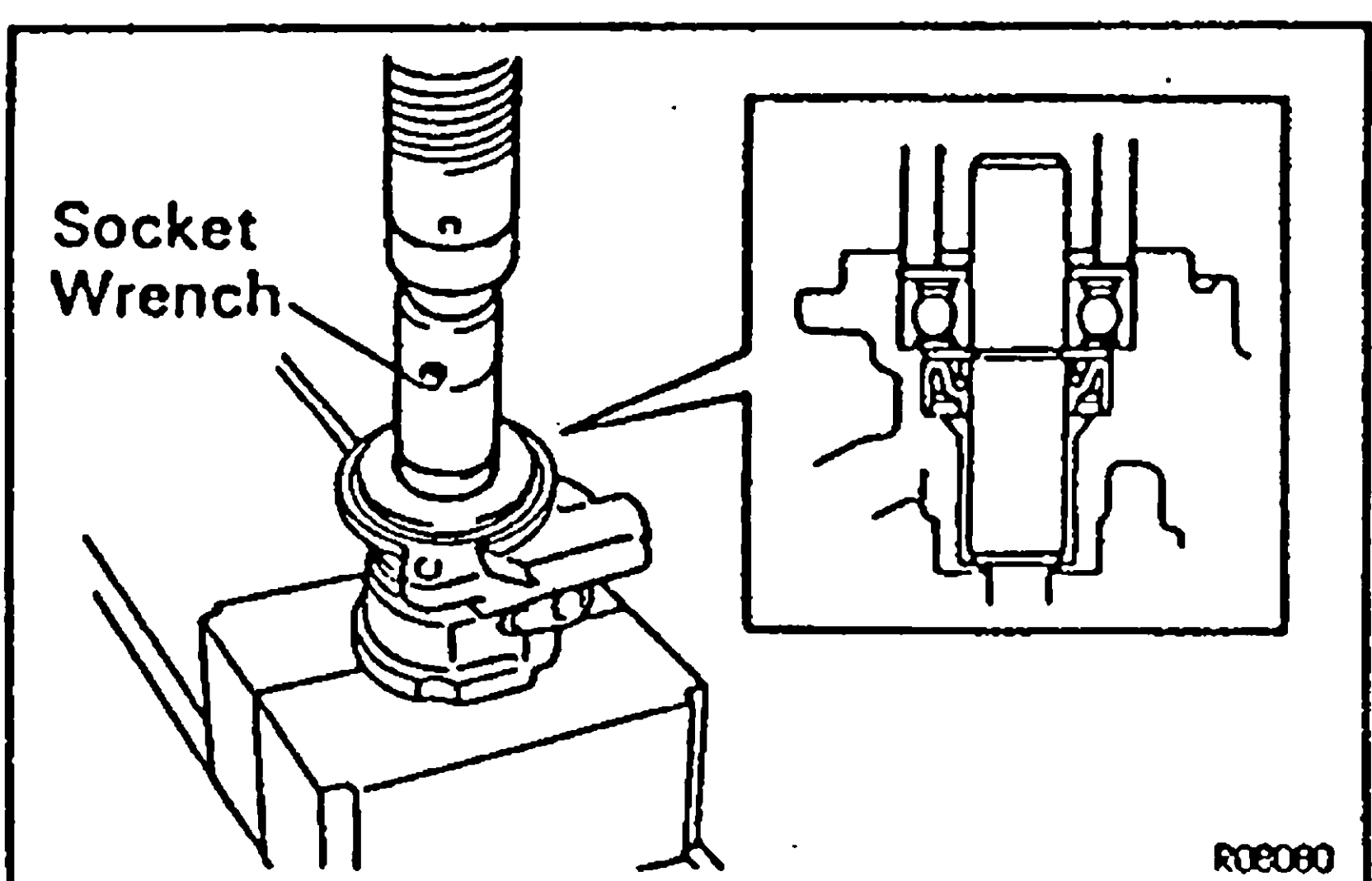


- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using a socket wrench (23 mm), press in the oil seal as shown in the illustration.

NOTICE:

- Make sure you install the oil seal facing the correct direction.
- Be careful not to damage the front housing.



POWER STEERING PUMP ASSEMBLY

09100-02

NOTICE: When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID

(See page SR-9)

2. INSTALL VANE PUMP SHAFT WITH BEARING

- (a) Using a socket wrench (29 mm), press in the shaft with the bearing to the front housing.

NOTICE: Be careful not to damage the oil seal lip.

- (b) Using snap ring pliers, install a new snap ring to the front housing.

3. INSTALL LONGER STRAIGHT PIN

Install a new pin to the front housing.

NOTICE: Be careful not to damage the pin.

4. INSTALL SIDE FRONT PLATE

- (a) Coat a new O-ring with power steering fluid.

- (b) Install the O-ring to the plate.

- (c) Align the hole of the plate and longer straight pin.

NOTICE: Make sure you install the plate facing the correct direction.

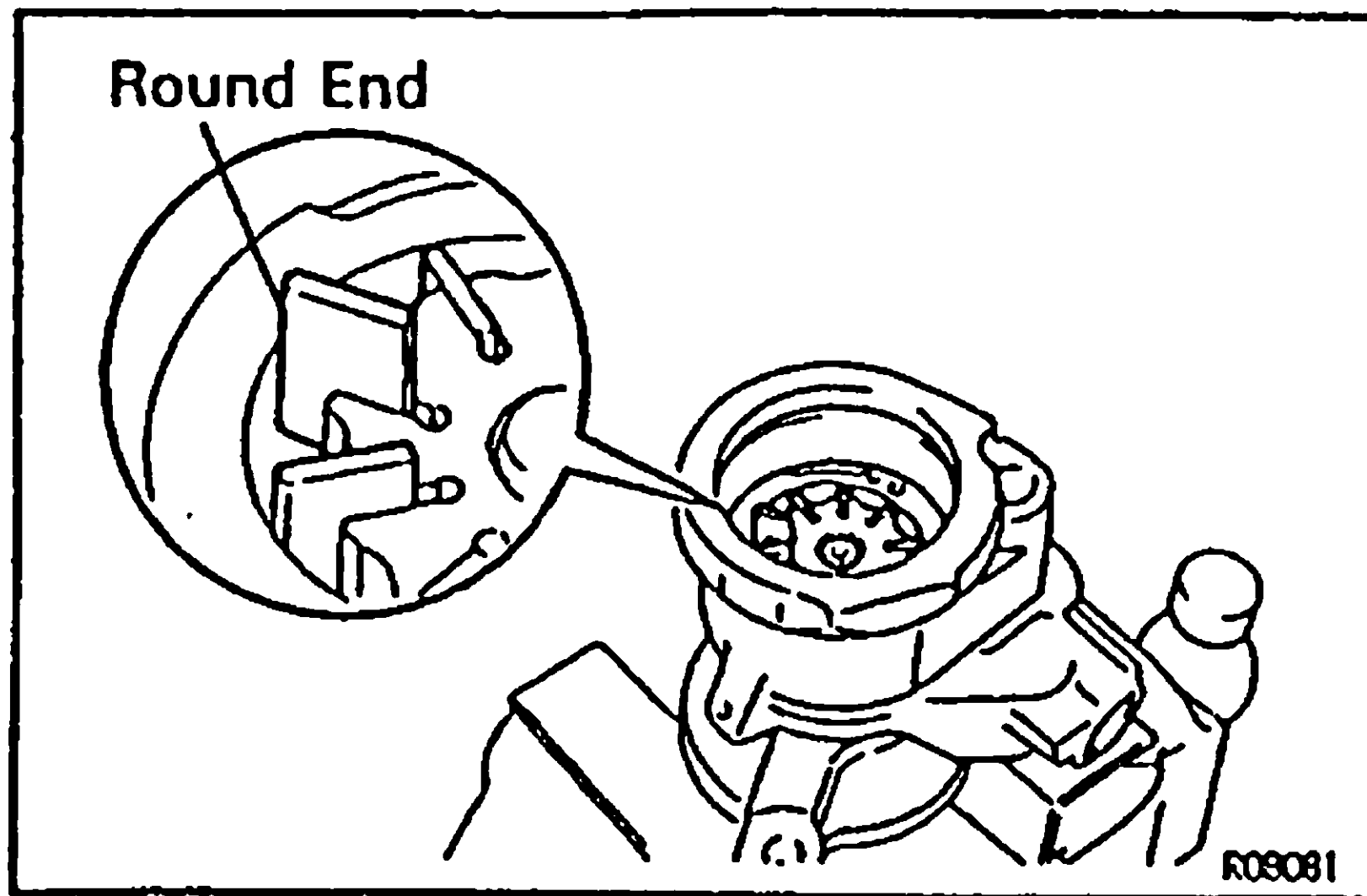
5. INSTALL SHORTER STRAIGHT PIN

Install a new pin to the side front plate.

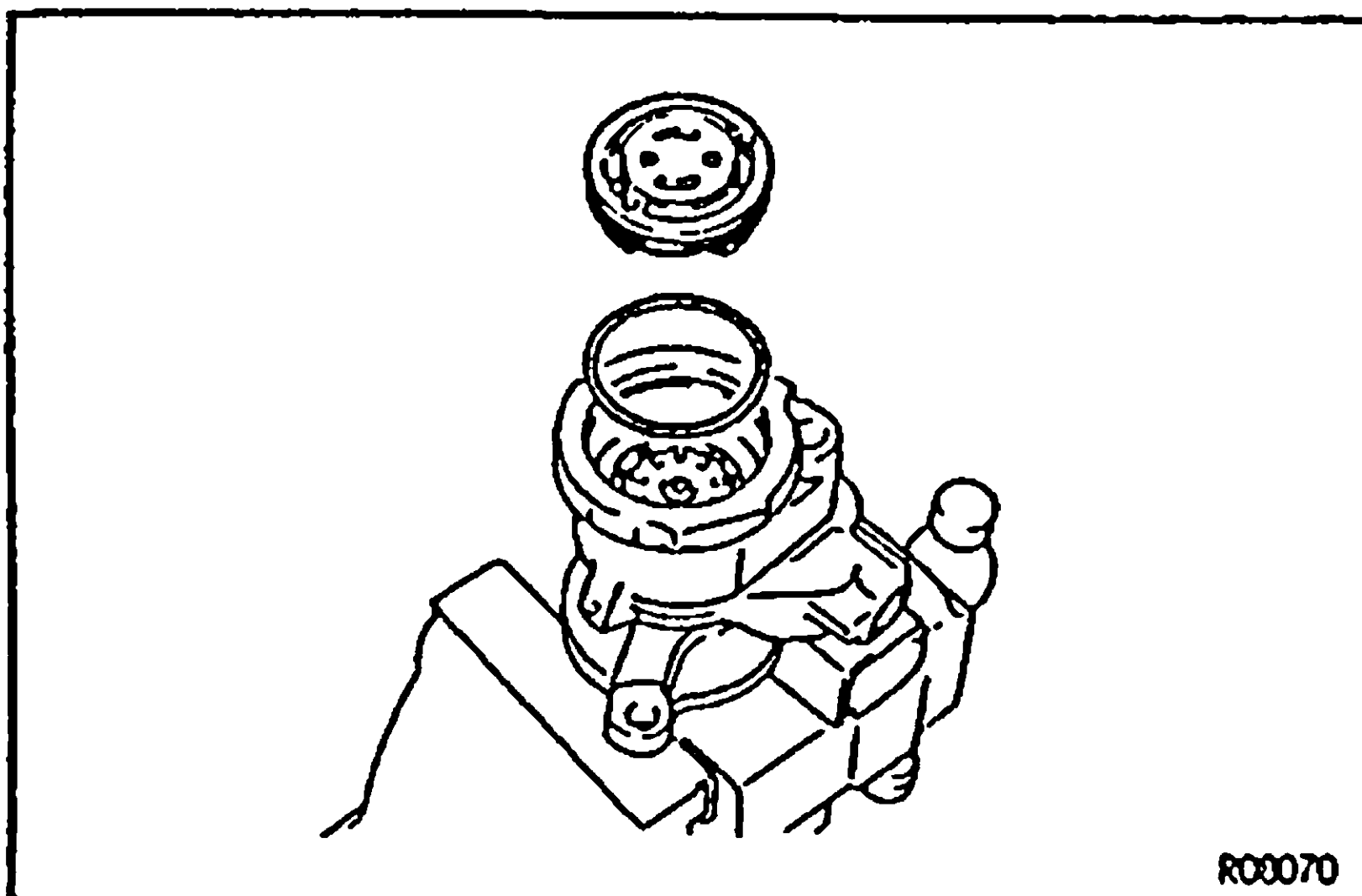
NOTICE: Be careful not to damage the pin.

6. INSTALL CAM RING AND VANE PUMP ROTOR

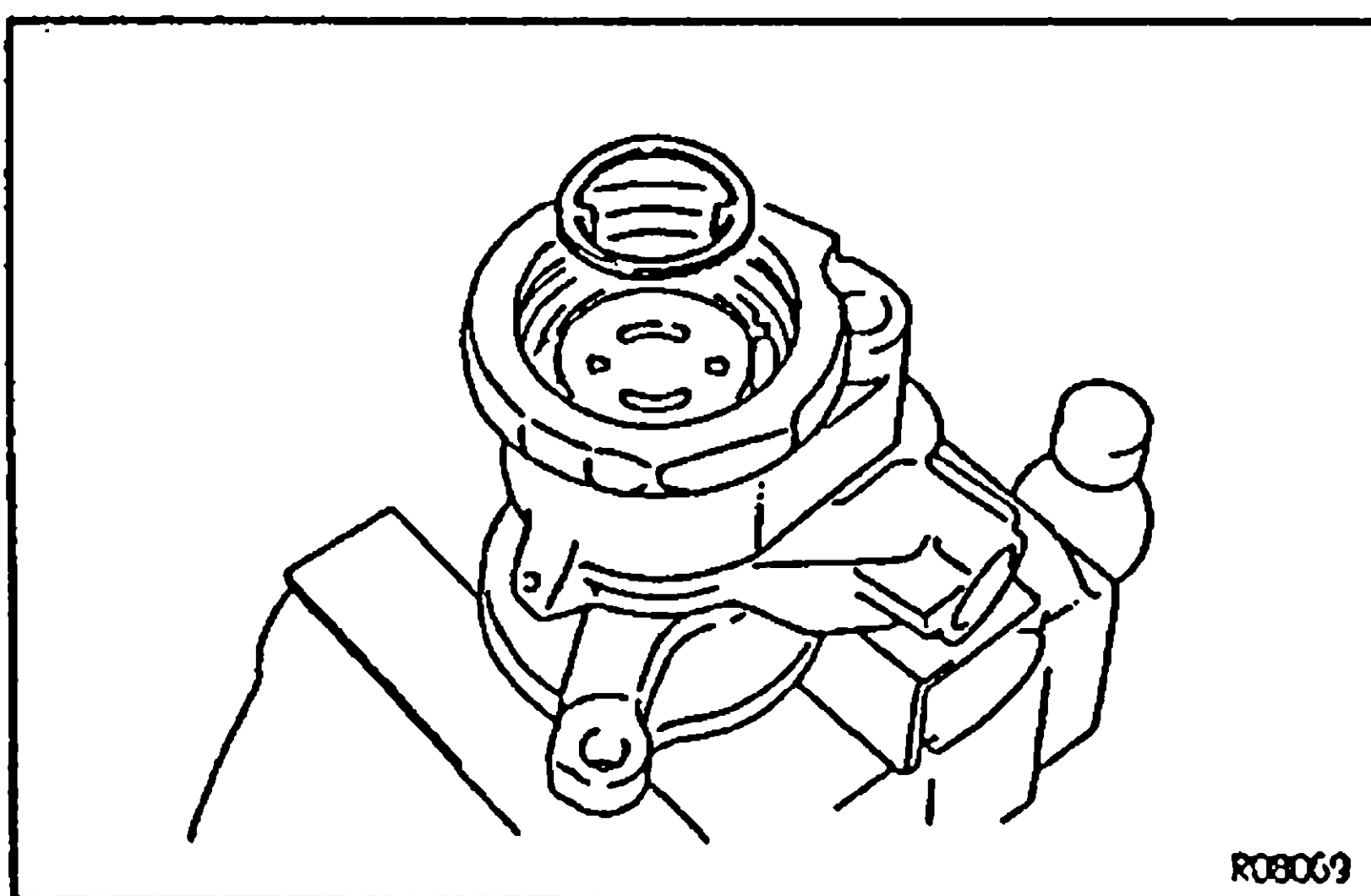
Install the ring and rotor with the inscribed marks facing outward.

**7. INSTALL VANE PLATES**

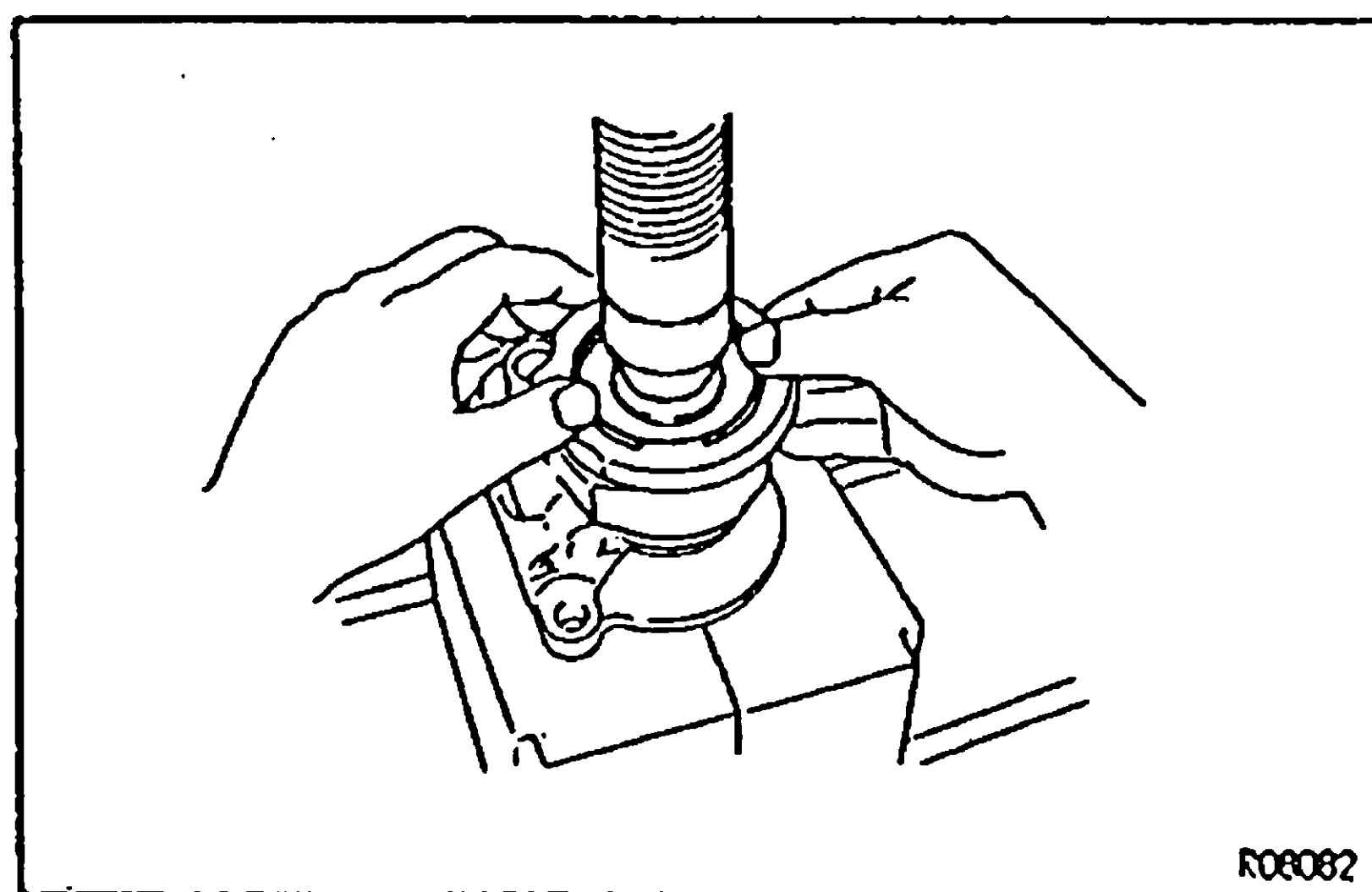
Install the 10 plates with the round end facing outward.

**8. INSTALL SIDE REAR PLATE**

- (a) Coat a new O—ring with power steering fluid.
- (b) Install the O—ring to the plate.
- (c) Align the holes of the plate with the straight pins.

**9. INSTALL WAVE WASHER**

Install the washer so that its protrusions fit into the slots in the side rear plate.

**10. INSTALL REAR HOUSING**

- (a) Coat a new O—ring with power steering fluid.
- (b) Install the O—ring to the housing.
- (c) Using a press, apply just enough pressure to compress the wave washer, and install a new snap ring to the front housing.

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

- (a) Install the valve facing the correct direction.
(See page SR—9)
- (b) Coat a new O—ring with power steering fluid.
- (c) Install the O—ring to the union.
- (d) Torque the union.

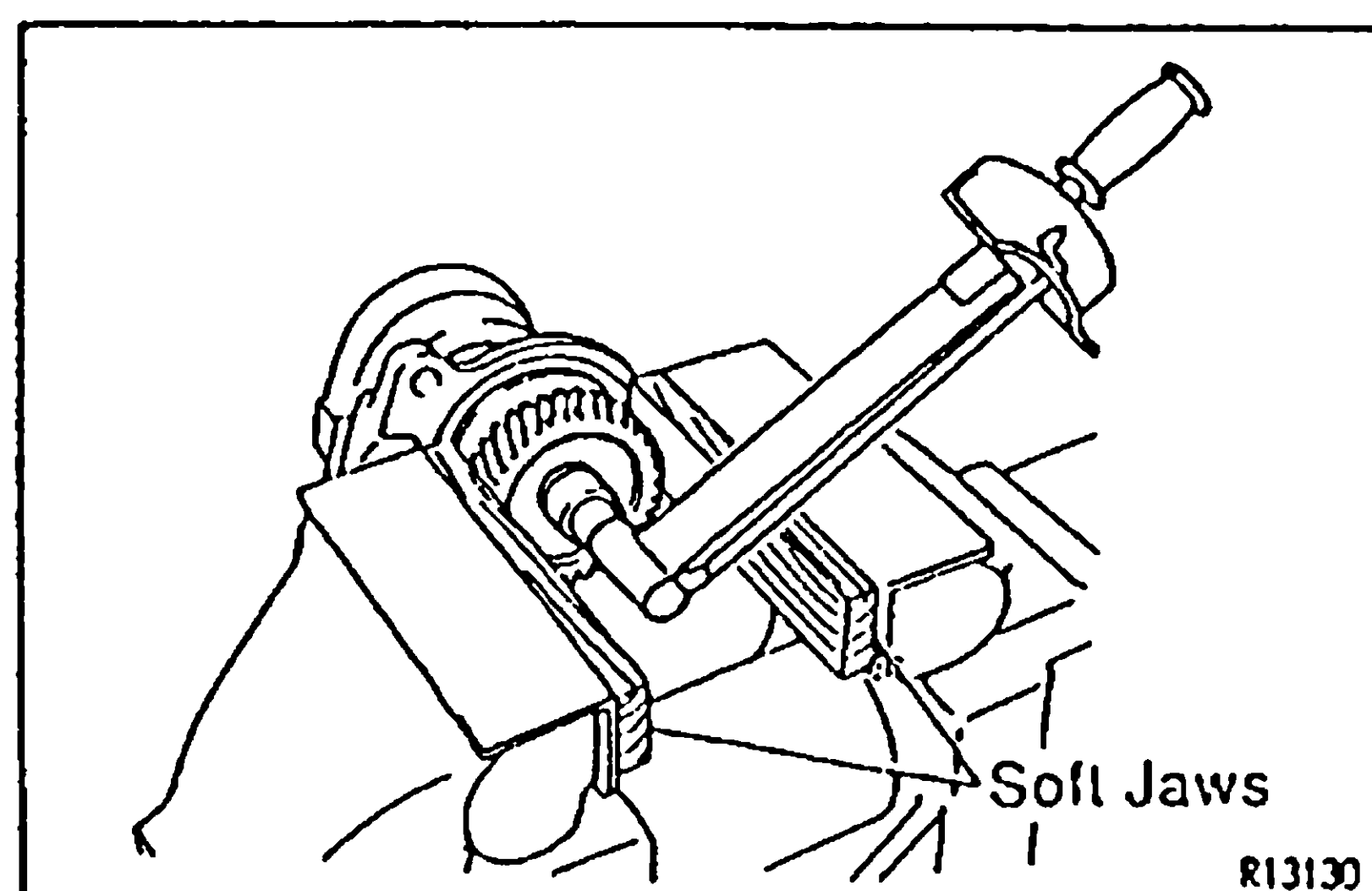
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

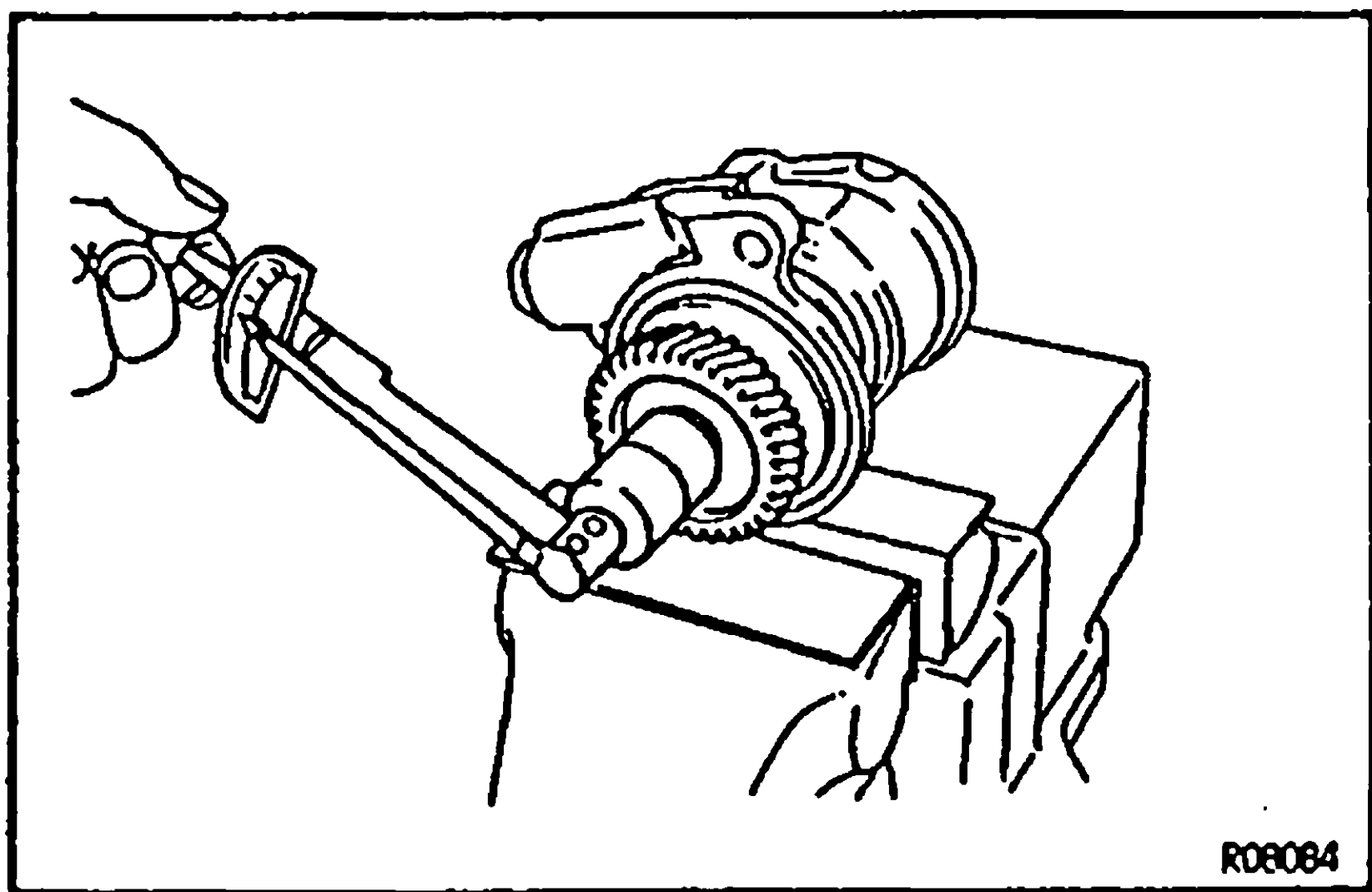
12. INSTALL VANE PUMP DRIVE GEAR

- (a) Using soft jaws on a vise, clamp the gear in the vise.
NOTICE: Be careful not to damage the gear.

- (b) Torque the gear set bolt.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



**13. MEASURE POWER STEERING PUMP ROTATING TORQUE**

- (a) Check that the pump rotates smoothly without abnormal noise.
- (b) Using a torque wrench, check the pump rotating torque.

Rotation torque:

0.3 N·m (2.8 kgf·cm, 2.4 in.-lbf)

14. INSTALL SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid.
- (b) Install the O-ring to the union.
- (c) Torque the bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft-lbf)

SERVICE SPECIFICATIONS
SERVICE DATA

BR026 - 0K

ON-VEHICLE INSPECTION			
Fluid level rise	Maximum	5 mm (0.20 in.)	
Fluid pressure at idle speed with valve closed	Minimum	FZJ75	8336 kPa (85 kgf/cm ² , 1209 psi)
		FZJ80	9316 kPa (95 kgf/cm ² , 1351 psi)
Steering effort at idle speed			
Normal PS	Reference	FZJ75	6.6 N·m (67 kgf·cm, 58 in·lbf)
		FZJ80	5.9 N·m (60 kgf·cm, 52 in·lbf)
PPS	Reference	FZJ80	3.7 N·m (38 kgf·cm, 33 in·lbf)
POWER STEERING PUMP			
Oil clearance between pump shaft and bushing	STD	0.03 - 0.05 mm (0.0012 - 0.0020 in.)	
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)	
Vane plate height	Minimum	8.6 mm (0.339 in.)	
Vane plate thickness	Minimum	1.397 mm (0.055 in.)	
Vane plate length	Minimum	14.991 mm (0.59016 in.)	
Clearance between rotor groove and vane plate		0.033 mm (0.00130 in.)	
Vane length	Pump rotor mark	Cam ring mark	
	None	1	14.997 - 14.999 mm (0.59043 - 0.59051 in.)
	1	2	14.995 - 14.997 mm (0.59035 - 0.59043 in.)
	2	3	14.993 - 14.995 mm (0.59027 - 0.59035 in.)
	3	4	14.991 - 14.993 mm (0.59020 - 0.59027 in.)
Spring free length		35 - 37 mm (1.38 - 1.46 in.)	
Vane pump rotating torque	Maximum	0.3 N·m (2.8 kgf·cm, 2.4 in·lbf)	

BR026 - 0H

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
POWER STEERING PUMP			
Pressure feed tube set union bolt	58	575	42
PS vane pump assembly set nut	38	370	27
Suction port union set bolt	13	130	9
Vane pump drive gear set nut	74	750	54
Pressure port union	89	700	51