

DAIHATSU

L500, L501

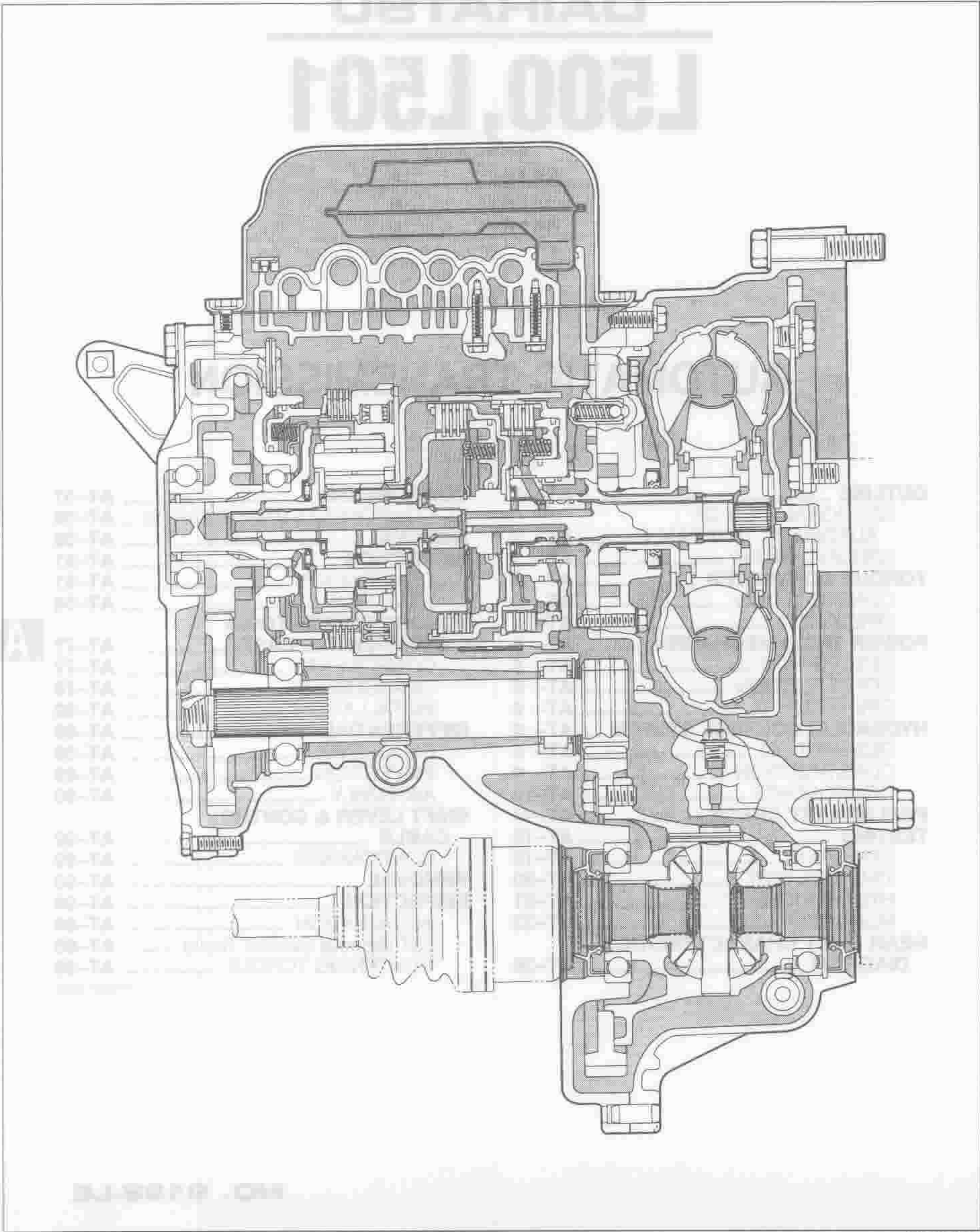
AUTOMATIC TRANSMISSION

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AT

OUTLINE
SECTIONAL VIEW OF AUTOMATIC TRANSAXLE



SPECIFICATIONS

Item		Specifications
Torque converter	Type	Three-element, one-stage, two-phase type
	Stall torque ratio/Stall revolution speed	2.8/3400 rpm
	One-way clutch type	Sprag type
Transmission type	Type	Three forward speeds, one reverse gear, planetary gear type
	Control element	Wet type multiple clutch 2 sets
		Band type brake 1 set
		Wet type multiple brake 1 set
		One-way clutch 1 piece
	Gear ratio	1st gear: 2.800 2nd gear: 1.540 3rd gear: 1.000 reverse gear: 2.333
	Final gear ratio	4.524 (EF) 3.966 (ED)
	Speedometer gear ratio	19/19
	Oil pump	Internal gear type
	Fluid to be used	ATF DEXRON® II
	Fluid capacity	liter 4.0
	Cooling method	Water-cooled (radiator built-in type)
Control system	Gear shift control method	Governor and throttle pressure shift control method
	Automatic gear shift	Three forward speeds, full automatic shift
	Manual control pattern	P—R—N—D—2—L

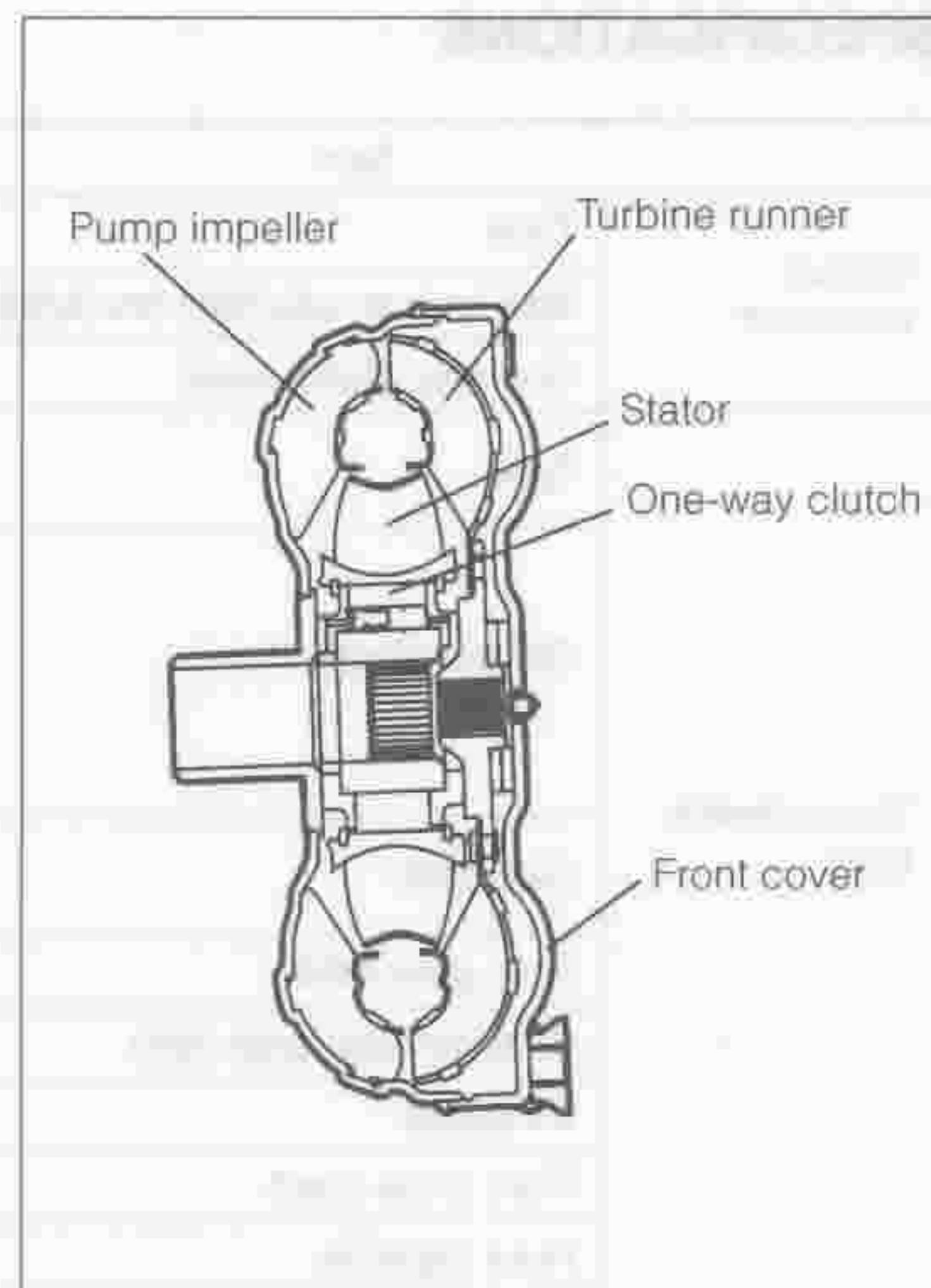
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TORQUE CONVERTER

The torque converter employs a three-element, one-stage, two-phase type converter, as has been hitherto employed.

CONSTRUCTION

The torque converter consists of a front cover to which a drive plate is attached, a pump impeller integral with the torque converter cover, a turbine runner which is spline-fitted with the input shaft at the transmission side, a stator, a one-way clutch which supports the stator and so forth.



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OPERATION

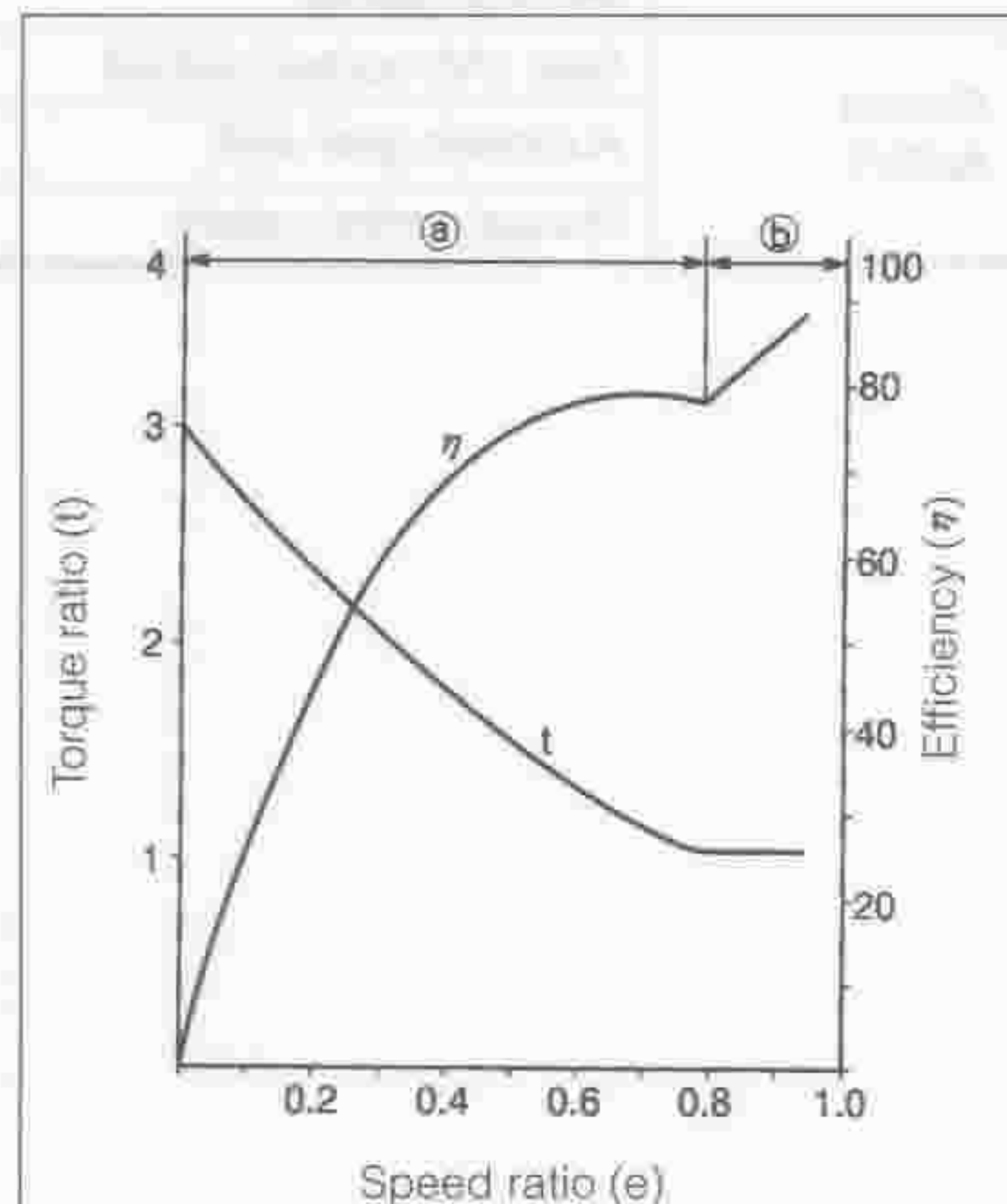
When the ratio of the turbine runner speed to the pump impeller speed is small, the fluid returning from the turbine runner to the pump impeller flows in such a direction that prevents the rotation of the pump impeller. Therefore, the installation of the stator helps converting the fluid flow in such a direction that the pump impeller rotation is assisted.

The torque ratio becomes a maximum of about 3.0 when the speed ratio is zero (at the time when the turbine runner is stopped). The torque ratio at this time is called the stall torque, whereas this stage is called the stall point.

Until the speed ratio reaches about 0.8, fluid transmission takes place, while increasing the torque. As the speed ratio becomes greater, the torque ratio decreases. This stage is called the torque converter range.

When the speed ratio becomes above about 0.8, the torque ratio is maintained at about one, transmitting the same torque without altering it. This stage is called the fluid coupling range. The efficiency rises in proportion to the speed ratio. After passing a certain point, however, the increase rate of the efficiency starts to decline. This is because the fluid from the turbine runner begins to strike the back side of the stator, thus preventing the fluid flow.

Then, the one-way clutch of the stator operates, making the stator rotate. As a result, the increase rate of the efficiency starts to increase again.



(a): Torque converter range

(b): Fluid coupling range

e: Speed ratio = $\frac{\text{Turbine shaft revolution speed}}{\text{Pump shaft revolution speed}}$

t: Torque ratio = $\frac{\text{Turbine shaft torque}}{\text{Pump shaft torque}}$

η: Efficiency = $\frac{\text{Output horse power}}{\text{Input horse power}} \times 100 (\%)$

LAT00005-00003

POWER TRAIN MECHANISM

DESCRIPTION

In the power train mechanism, the power that has been transmitted from the engine to the input shaft of the transmission through the torque converter is transmitted from various clutches to the planetary gear, using reduction ratios optimum for the running condition.

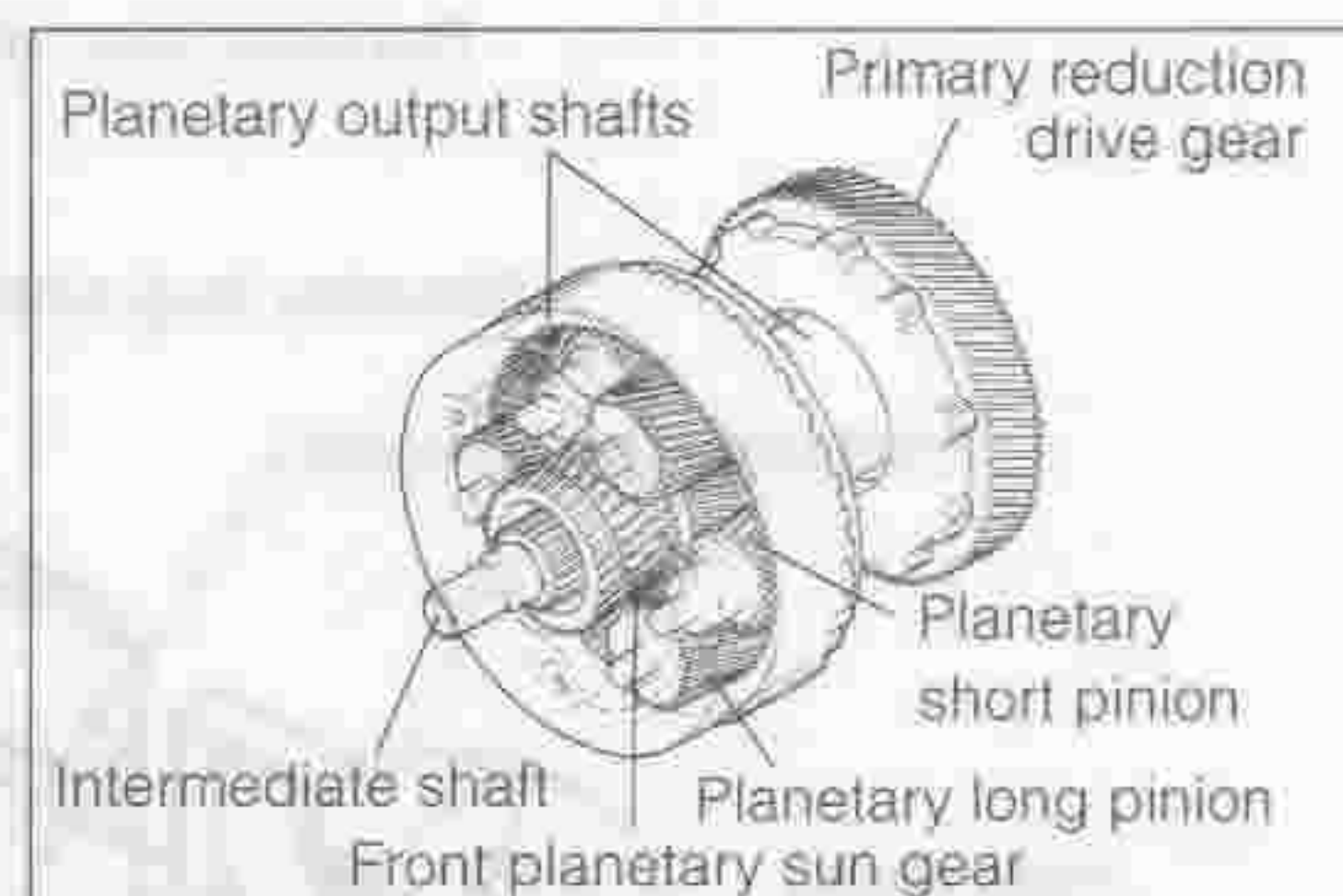
CONSTRUCTION

(1) Planetary gear

A Ravigneau type planetary gear is employed.

The following are the main components: Intermediate shaft, front planetary sun gear, planetary short pinion, planetary long pinion, planetary output shaft and primary reduction drive gear.

The input section of driving force at the planetary gear unit section consists of two systems, i.e. the intermediate shaft and the front planetary sun gear. Depending upon shift conditions, both of input sections serve as the input section simultaneously or one of them does so. The planetary output shaft constitutes the output section.



LAT00006-00004

(2) Shifting control element

The main components are a direct clutch (C1) and a forward clutch (C2) that are two kinds of wet type multi-disc clutches, a 1st & reverse brake (B2) that is a wet type multi-disc brake, and a 2nd brake that is a band type brake. The following table shows the function of each control element.

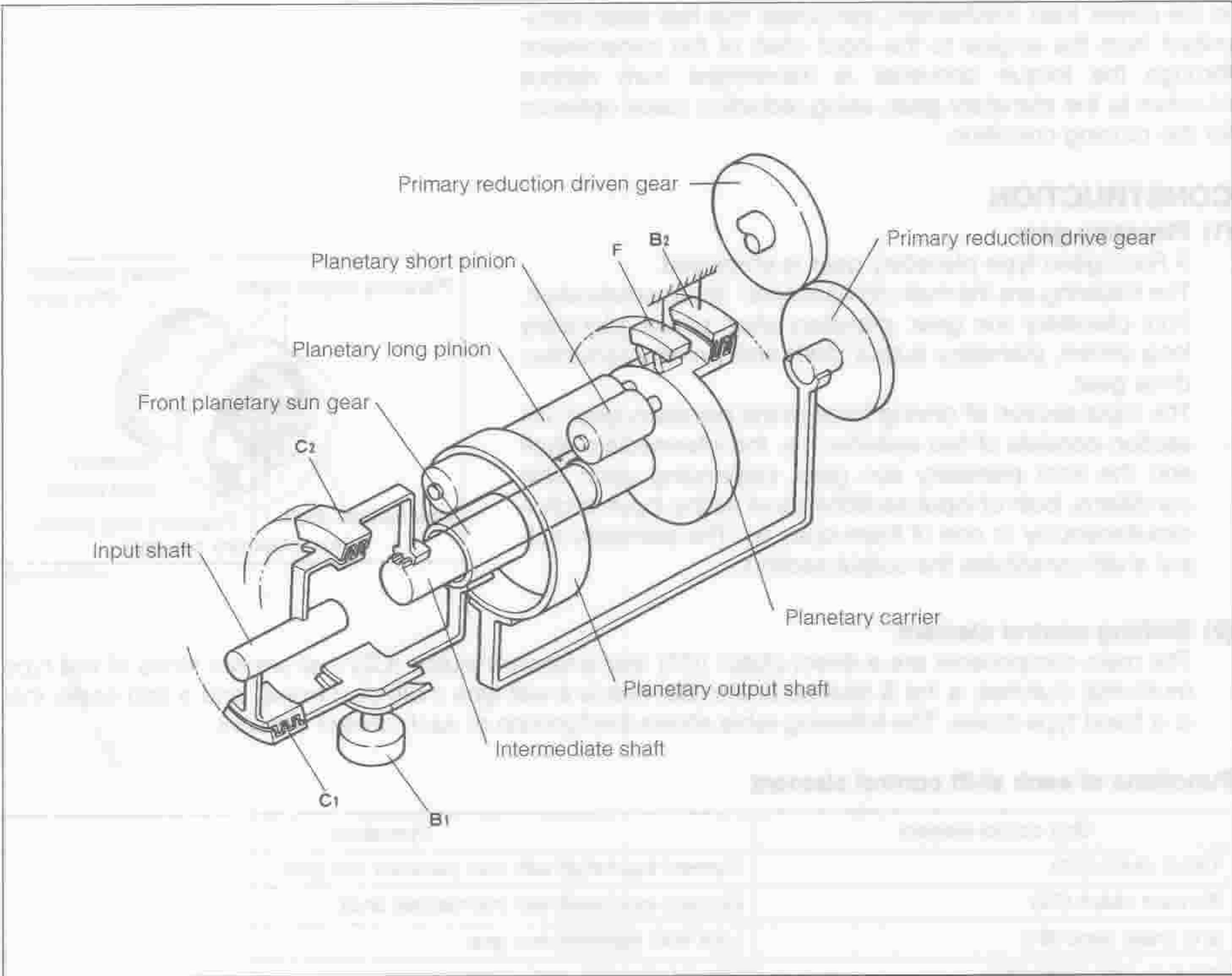
Functions of each shift control element

Shift control element	Operations
Direct clutch (C1)	Connect input shaft with front planetary sun gear.
Forward clutch (C2)	Connect input shaft with intermediate shaft.
2nd brake band (B1)	Lock front planetary sun gear.
1st & reverse brake (B2)	Prevent planetary carrier from rotating.
One-way clutch (F)	Prevent planetary carrier from rotating counterclockwise.

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OPERATION

(1) Power Train Route



There are two routes for the power flow: One is from the input shaft to the front planetary sun gear through the clutch C1, and the other is from the input shaft to the intermediate shaft through the clutch C2. The output route is from the planetary output shaft to the primary reduction drive gear and primary reduction driven gear.

The table below shows functions of each shift control element according to the shifting positions.

Table Showing Functions of Shift Control elements

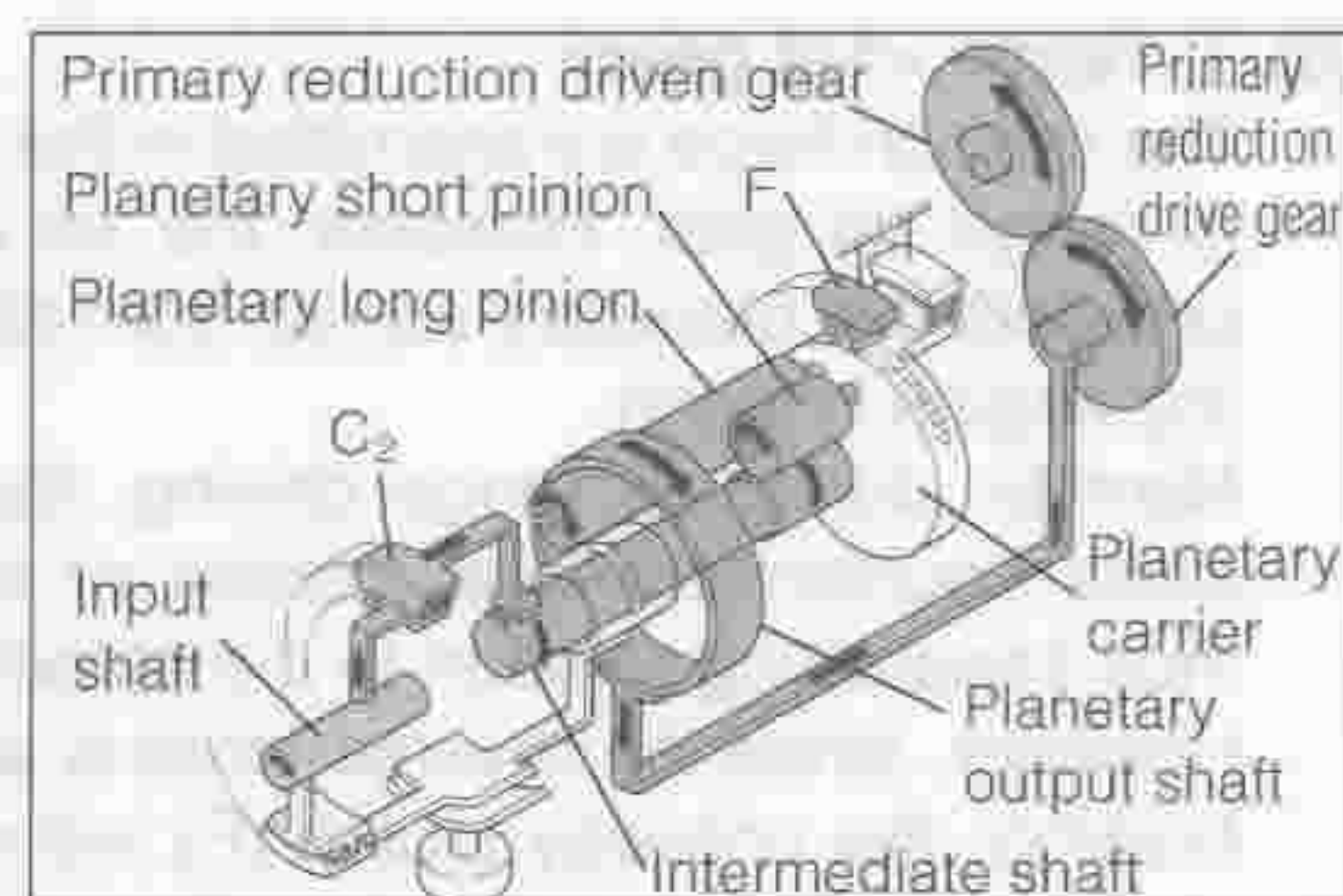
		C1	C2	B1	B'1	B2	F
P	Parking						
R	Reverse	○			○	○	
N	Neutral						
D	1st		○				○
	2nd		○	○			
	3rd	○	○	○	○		
2	1st		○				○
	2nd		○	○			
L	1st		○			○	○

(2) D, 2 range <1st gear> (without engine brake)

When the vehicle speed is relatively low and the throttle valve opening degree is large, namely when a large driving force is needed, the forward clutch (C2) and one-way clutch (F) are engaged. As a result, the primary reduction drive gear is turned clockwise at a gear ratio of 2.800.

Since the forward clutch (C2) is engaged in the 1st gear, as shown in the right figure, the rotating force of the input shaft is directly transmitted to the intermediate shaft. Consequently, a counterclockwise rotation is transmitted to the planetary short pinion.

On the other hand, upon receiving clockwise rotation, the planetary long pinion that meshes with the planetary short pinion tends to make the planetary carrier rotate counterclockwise. However, the one-way clutch (F) prevents this rotation. Therefore, the planetary output shaft receives a clockwise rotation and makes the primary reduction drive gear rotate clockwise.

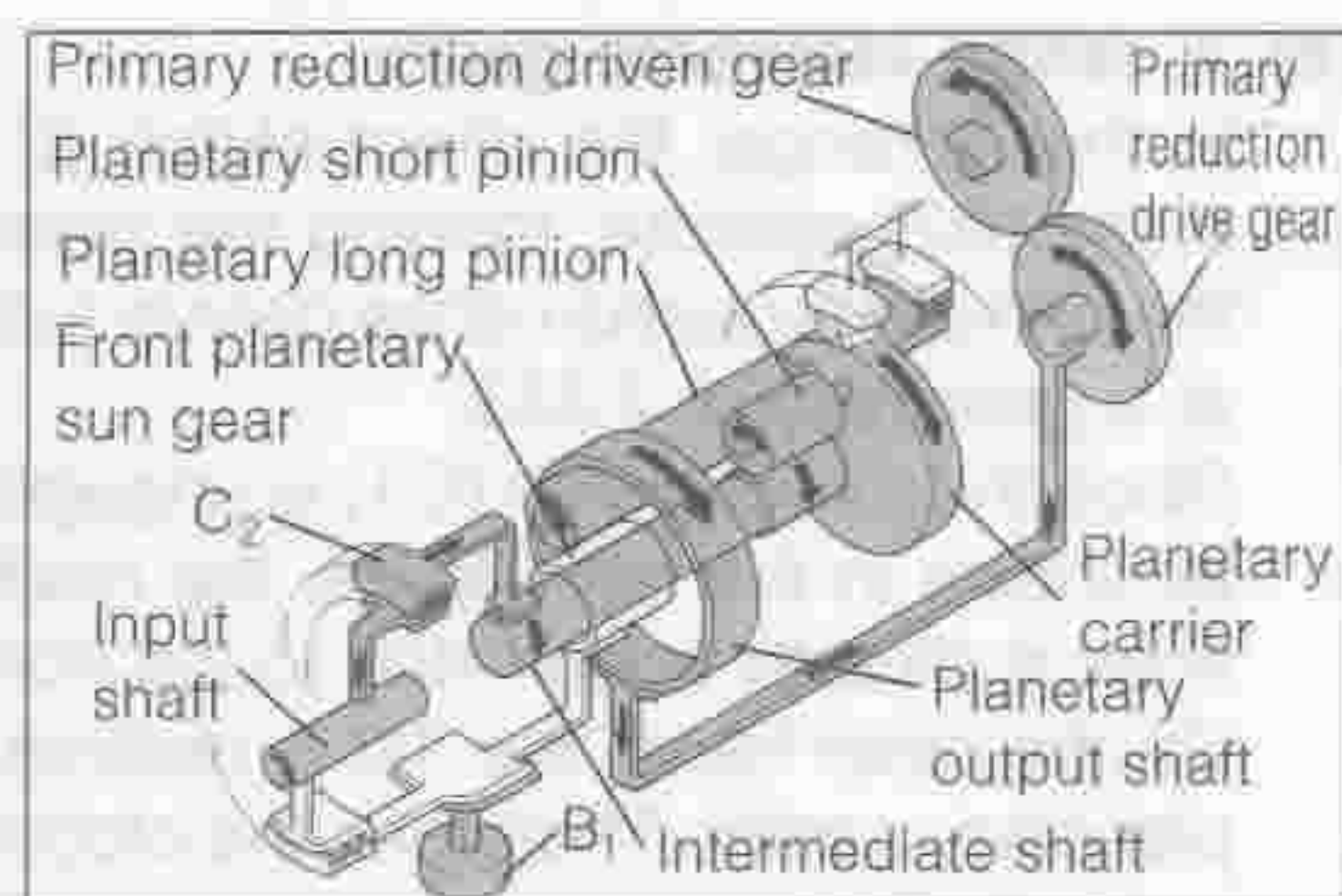


LAT00010-00006

(3) D, 2 range <2nd gear>

When the vehicle speed is increased under the 1st gear condition, the 1-2 relay valve makes the 2nd band (B1) work. Then, the transmission assumes the 2nd gear. As a result, the primary reduction drive gear is turned clockwise at a gear ratio of 1.540. Since the forward clutch (C2) is engaged in the 2nd gear, as shown in the right figure, the rotating force of the input shaft is directly transmitted to the intermediate shaft. Consequently, a counterclockwise rotation is transmitted to the planetary short pinion.

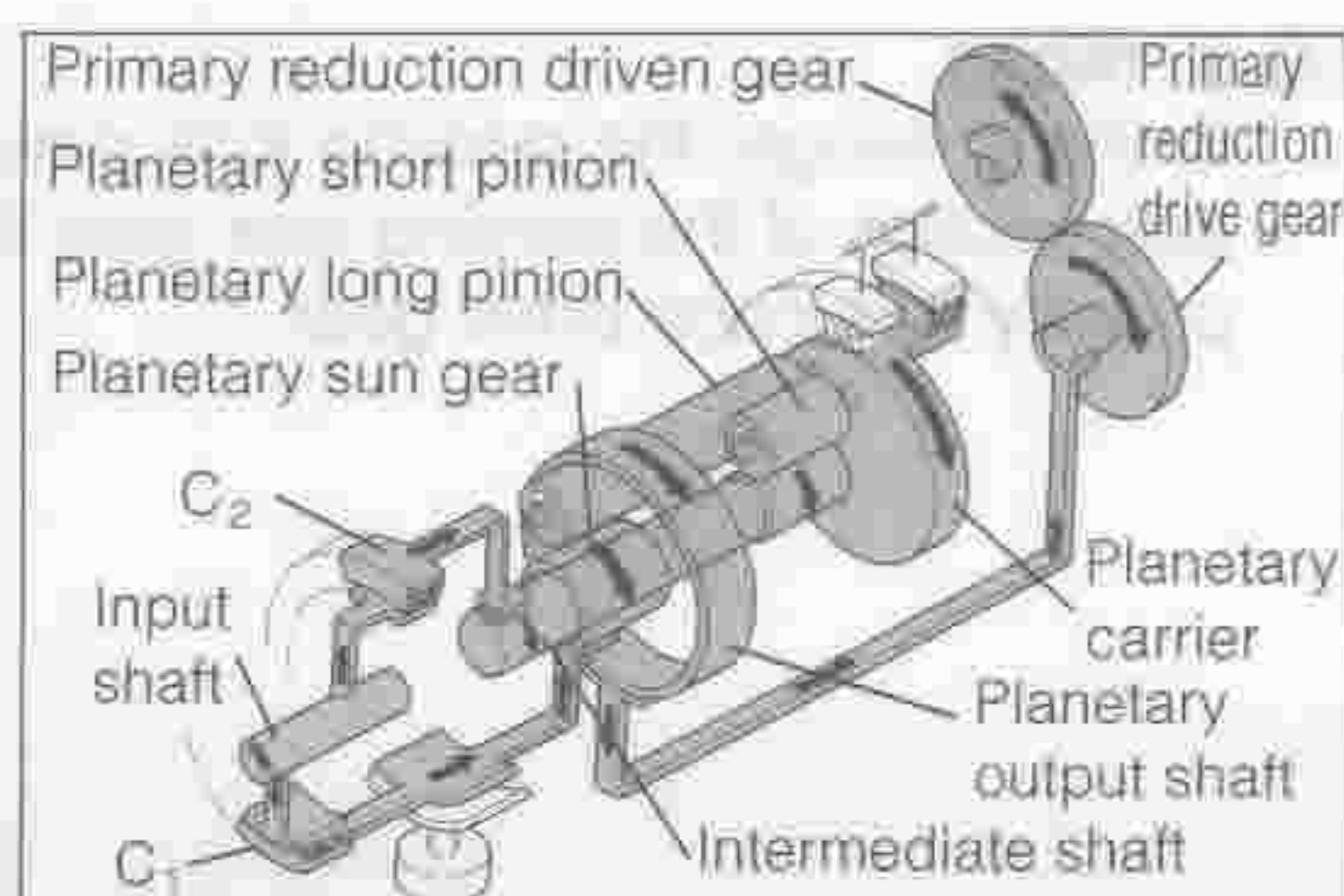
On the other hand, the front planetary sun gear is locked by means of the 2nd band. Therefore, upon receiving clockwise rotation, the planetary long pinion that meshes with the planetary short pinion turns around the front planetary sun gear, while turning on its axis. In this way, the planetary long pinion transmits a clockwise rotation to the planetary output shaft. Then, the rotation of the planetary output shaft transmits a clockwise rotation to the primary reduction drive gear.



LAT00011-00007

(4) D range <3rd gear>

When the vehicle speed is further increased under the 2nd gear condition, the 2-3 relay valve makes the direct clutch be engaged. Then, the transmission assumes the 3rd gear. As a result, the primary reduction drive gear is turned clockwise in a directly connected state at a gear ratio of 1.000. In the 3rd gear, the direct clutch (C1) and forward clutch (C2) are engaged, as shown in the right figure. Then, the input shaft, front planetary sun gear and intermediate shaft turn in the same direction. Therefore, the planetary short pinion and planetary long pinion are in a locked state. As a result, the planetary output shaft receives a clockwise rotation and makes the primary reduction drive gear rotate clockwise.



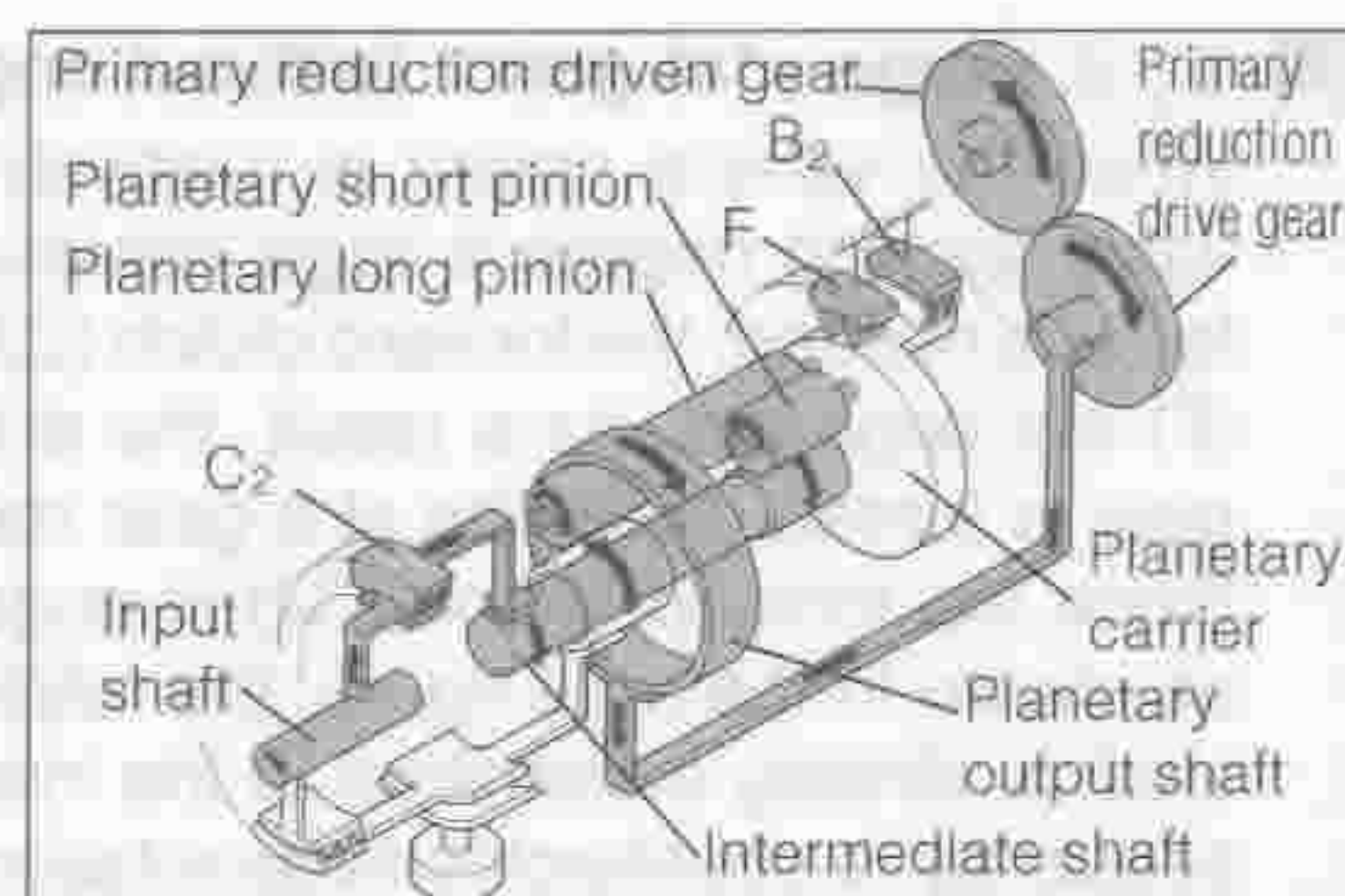
LAT00012-00008

(5) **L** range <1st gear>

The rotation force is transmitted in the same way as with the **D** range 1st gear. However, the 1st & reverse brake (B2) prevents the planetary carrier from rotating clockwise during engine braking.

Namely, during **D** range driving, the one-way clutch (F) locks counterclockwise rotation of the planetary carrier, thus transmitting rotation to the planetary output shaft.

However, since the reverse force is applied during engine braking, the one-way clutch (F) will not work, making the planetary carrier rotating idly. Therefore, the 1st & reverse brake (B2) is actuated to lock the planetary carrier, thus making engine braking work.



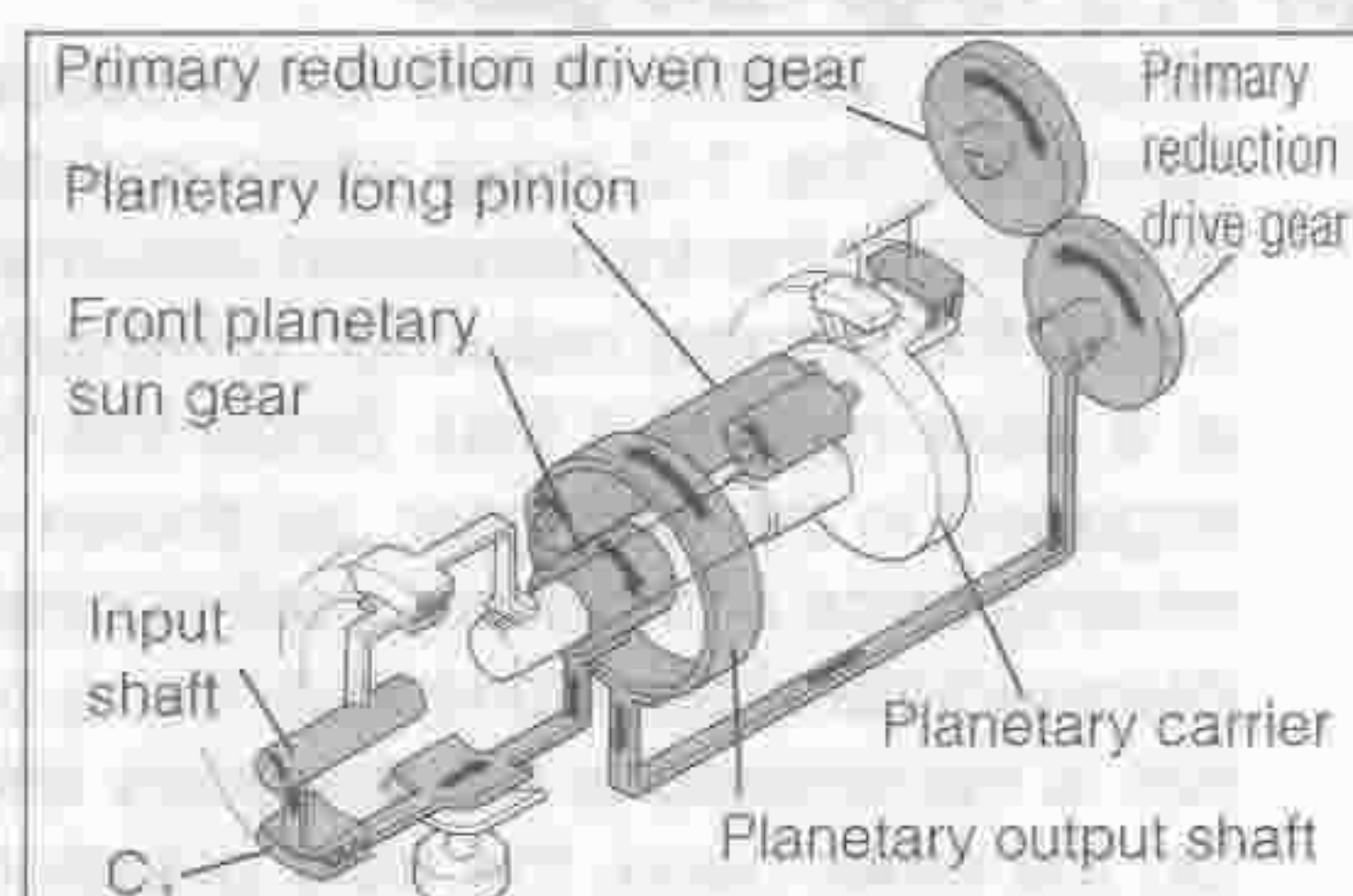
LAT00013-00009

(6) **R** range <Reverse gear>

In the **R** range, the direct clutch (C1) and 1st & reverse brake (B2) operate, forming the reverse gear. As a result, the primary reduction drive gear is turned counterclockwise at a gear ratio of 2.333.

Since the direct clutch (C1) is engaged in the reverse gear, as shown in the right figure, the rotating force of the input shaft is directly transmitted to the front planetary sun gear. On the other hand, the 1st & reverse brake (B2) locks the planetary carrier. Therefore, the clockwise rotation transmitted to the front planetary sun gear makes the planetary long pinion turn on its axis, thus transmitting a counterclockwise rotation to the planetary output shaft.

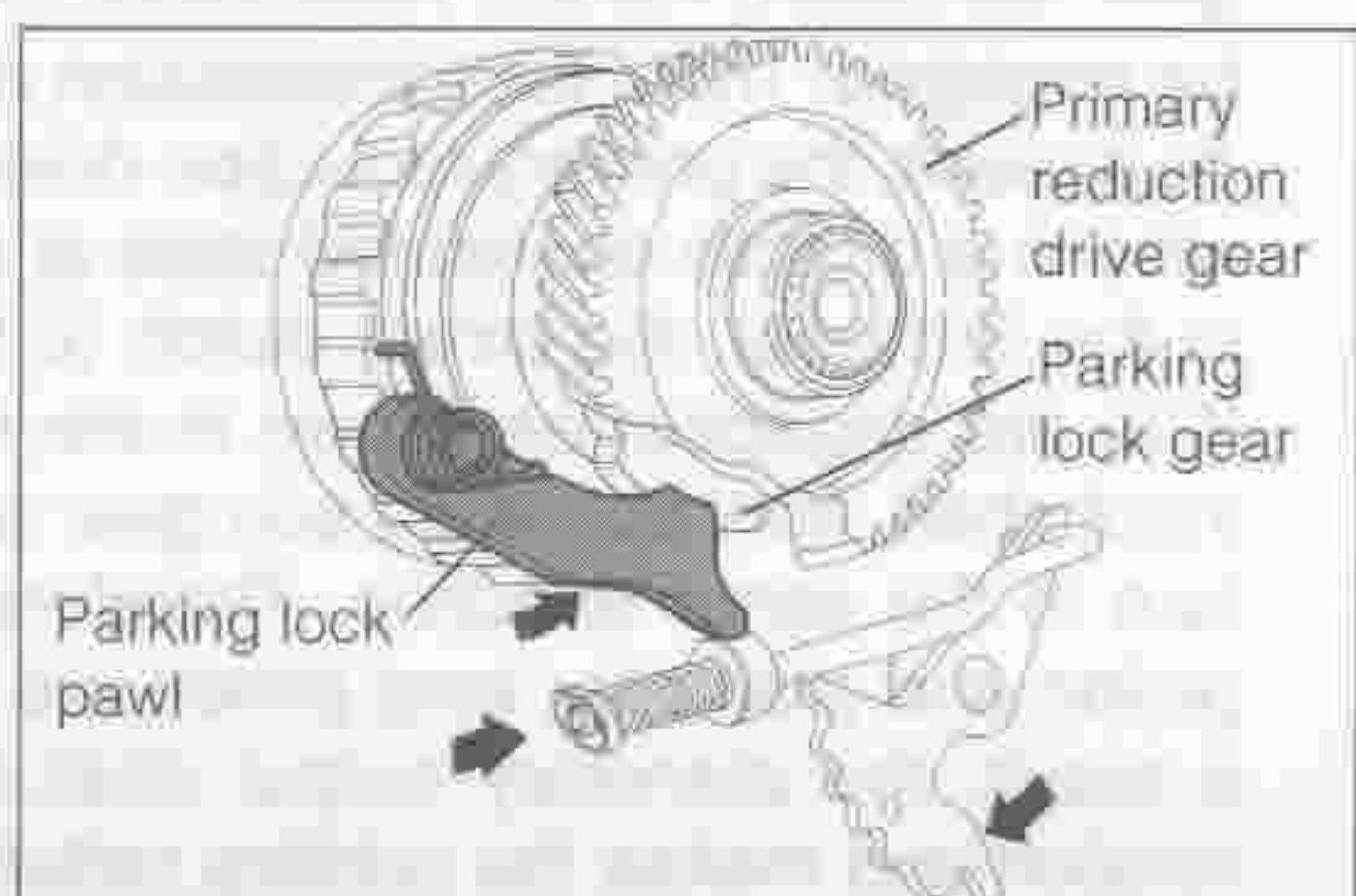
As a result, the primary reduction drive gear that is connected with the planetary output shaft rotates counterclockwise.



LAT00014-00010

(7) **P** range

In the **P** range, the parking lock pawl is engaged with the lock section of the parking lock gear that is integral with the primary reduction drive gear.



LAT00015-00011

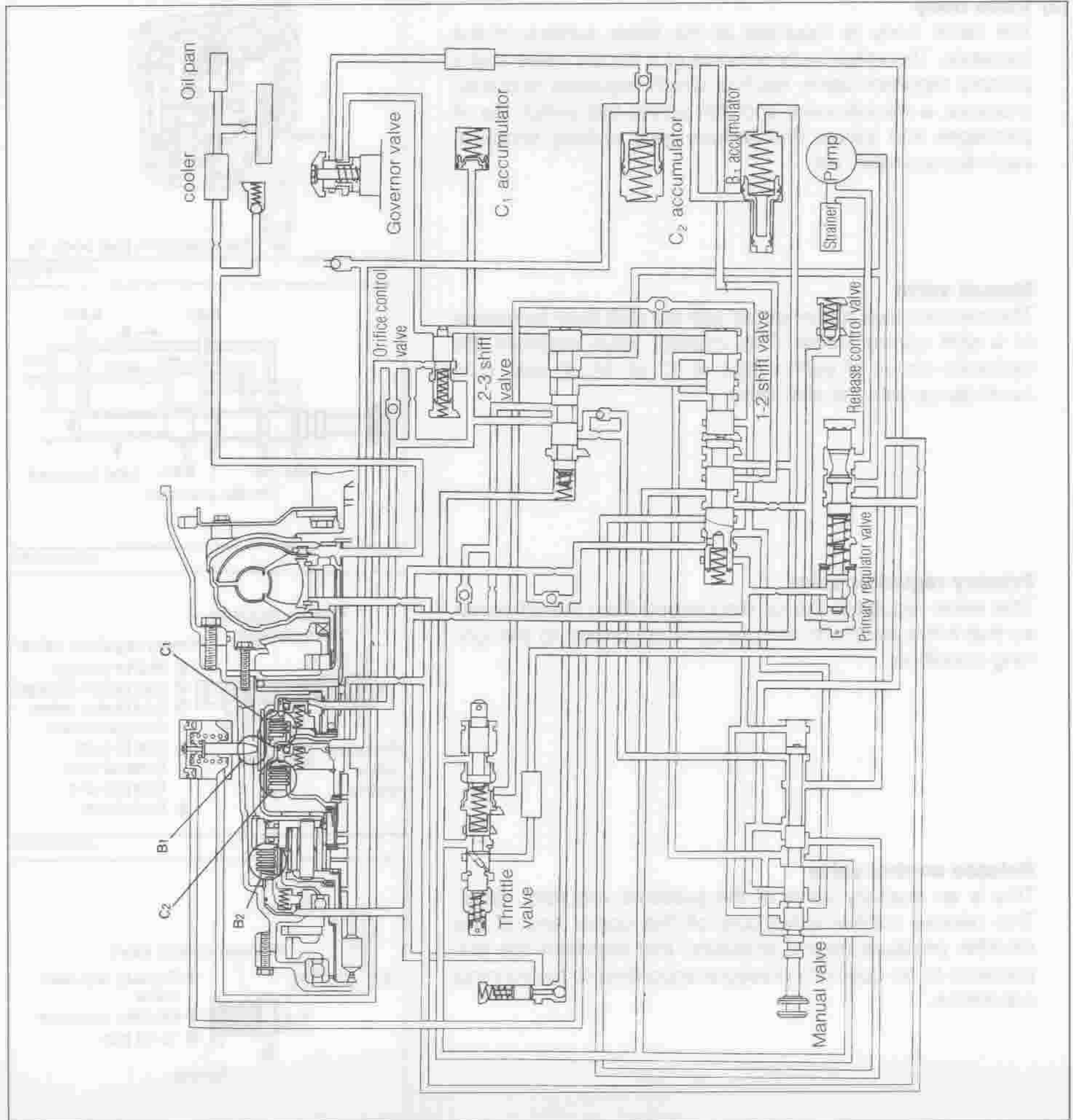
HYDRAULIC CONTROL SYSTEM

DESCRIPTION

The hydraulic control system regulates the hydraulic pressure, such as the line pressure and throttle pressure, and switches the oil passage to each shift control element of the power train mechanism so as to perform gear shifts in the transmission.

CONSTRUCTION

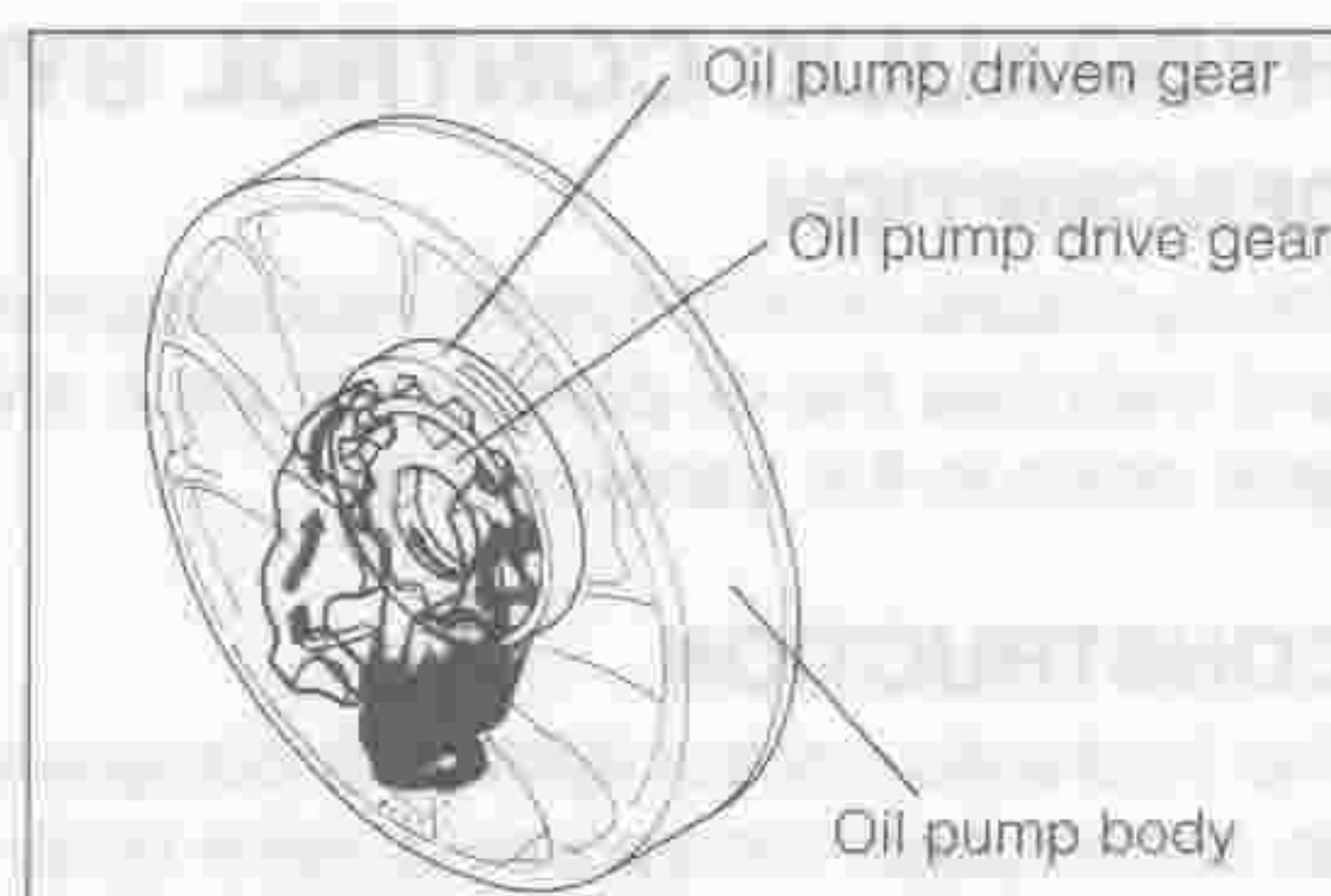
The hydraulic control system is composed of an oil pump, various control valves that switch oil passages, an accumulator-incorporated valve body that regulates hydraulic pressure, a cooling device that cools the transmission fluid and so forth.



COMPONENTS

(1) Oil pump

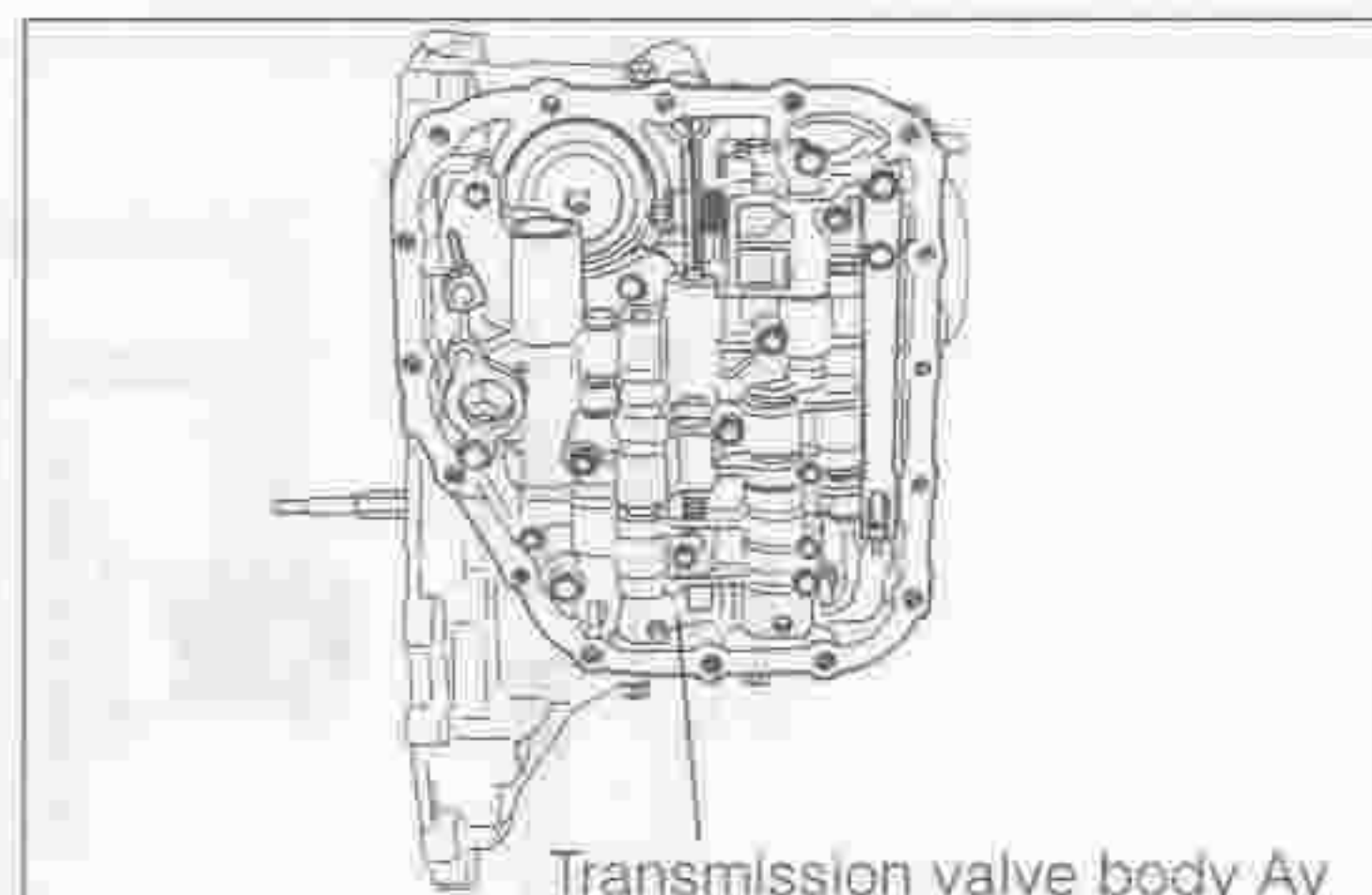
A gear oil pump is employed, as has been hitherto adopted. The oil pump consists of an oil pump body, an oil pump drive gear and an oil pump driven gear. The oil pump drive gear drives the oil pump driven gear that is driven by the torque converter, thereby sending the automatic transmission fluid to the hydraulic control system under a pressurized condition.



LAT00017-00013

(2) Valve body

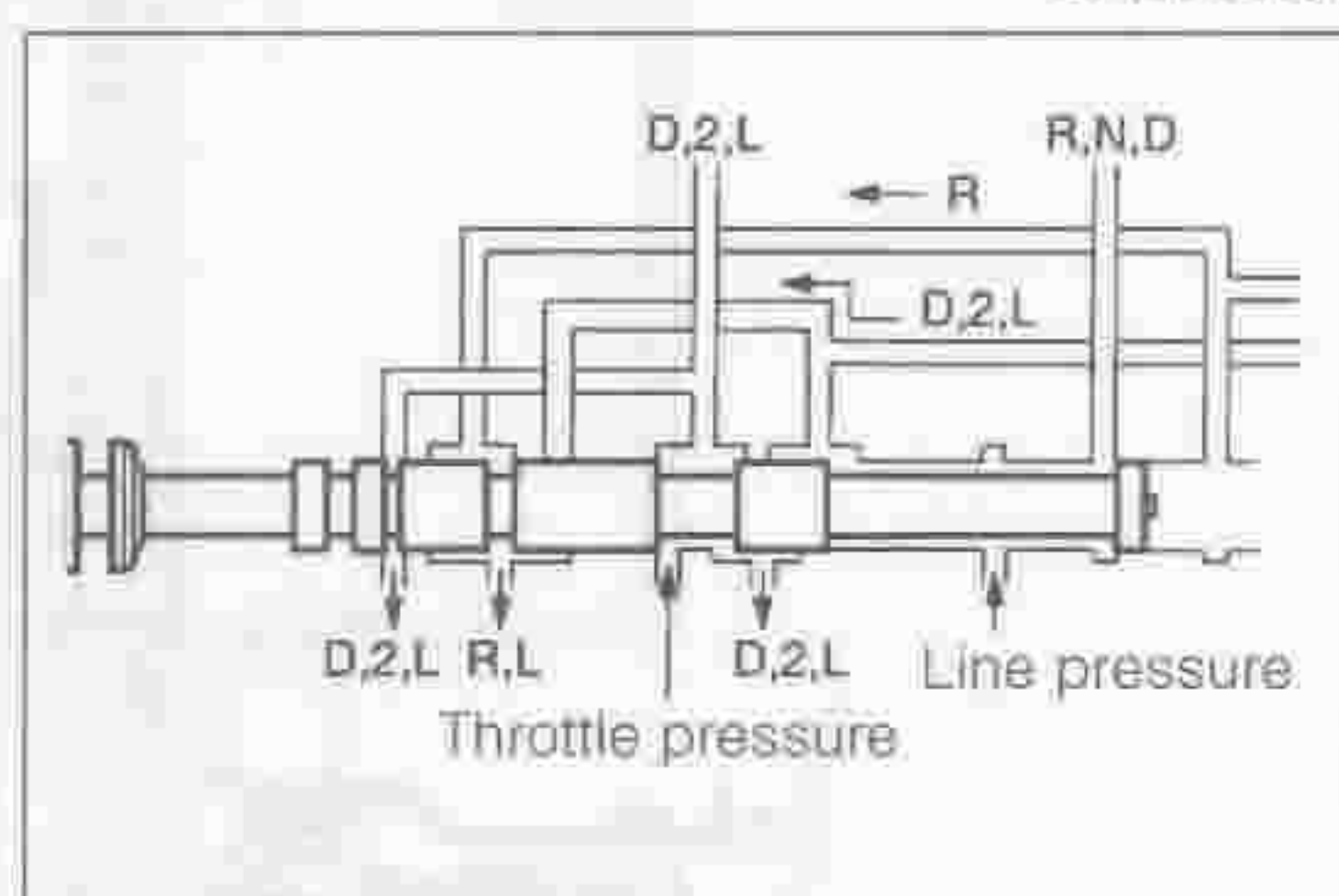
The valve body is mounted at the lower surface of the transaxle. The valve body consists of a throttle valve and a primary regulator valve, each of which regulates hydraulic pressure, a manual valve and shift valves that switch the oil passages and valves that reduce gear shifting shock of each accumulator, etc.



LAT00018-00014

Manual valve

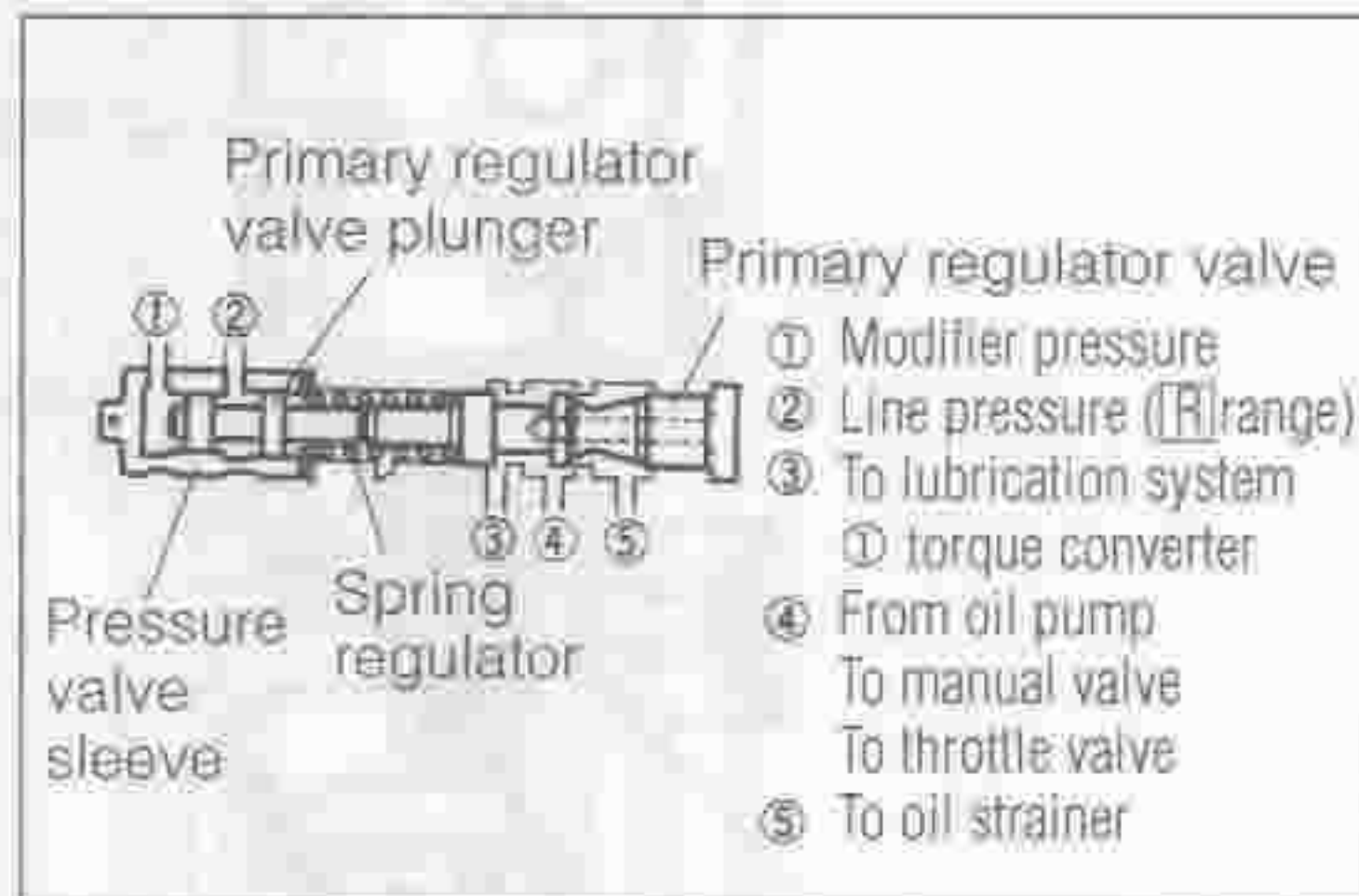
The manual valve is connected with the shift lever by means of a shift control cable. This manual valve switches the hydraulic circuit of each range of **P**, **R**, **N**, **2** and **L** in accordance with the shift lever.



LAT00019-00015

Primary regulator valve

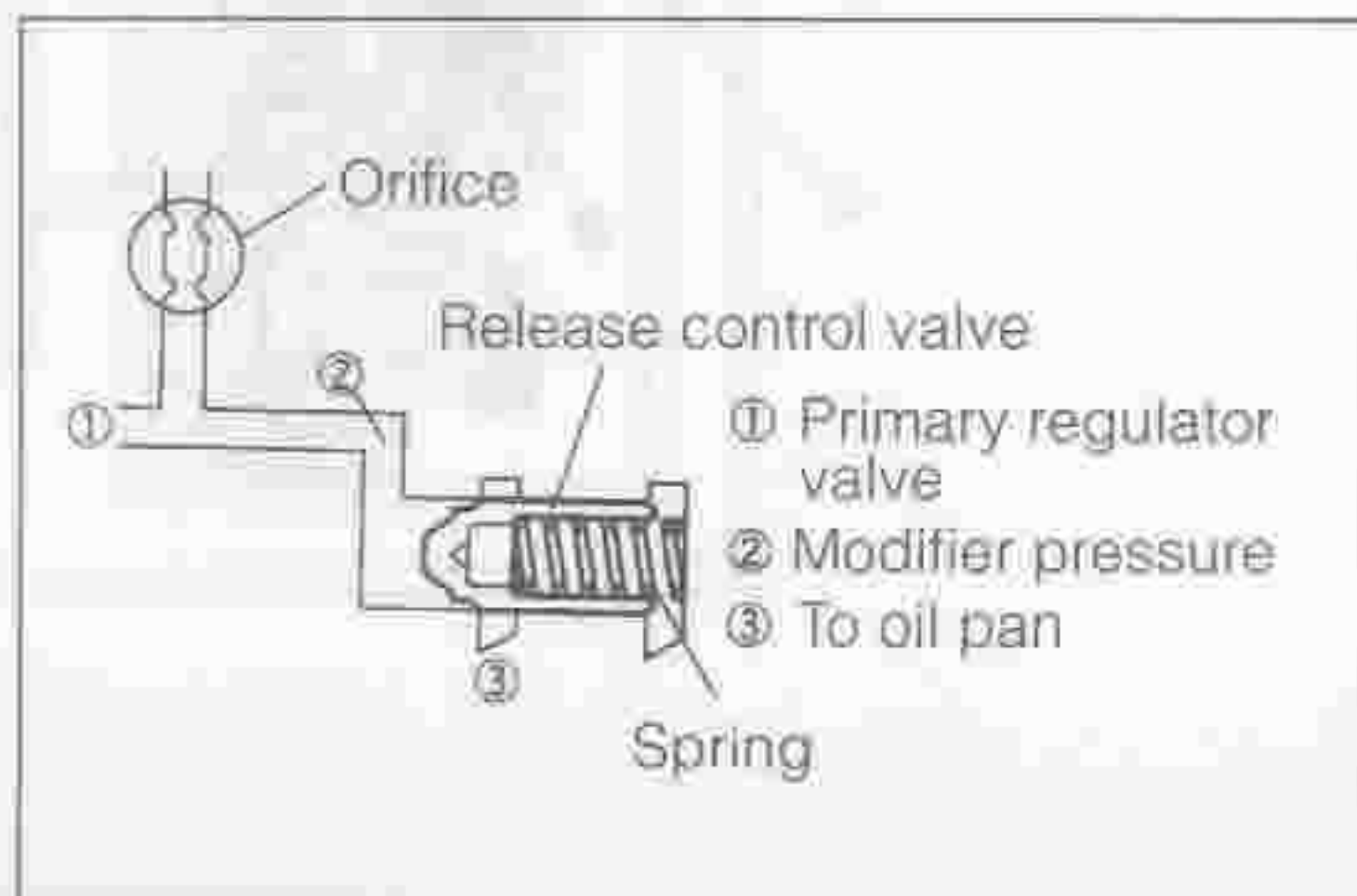
This valve regulates the oil discharged from the oil pump so that it has optimum line pressure according to the running condition.



LAT00020-00016

Release control valve

This is an auxiliary valve of the pressure regulator valve. This release control valve cuts off the upper limit of the modifier pressure (signal pressure) that regulates the line pressure to an optimum pressure according to the running conditions.

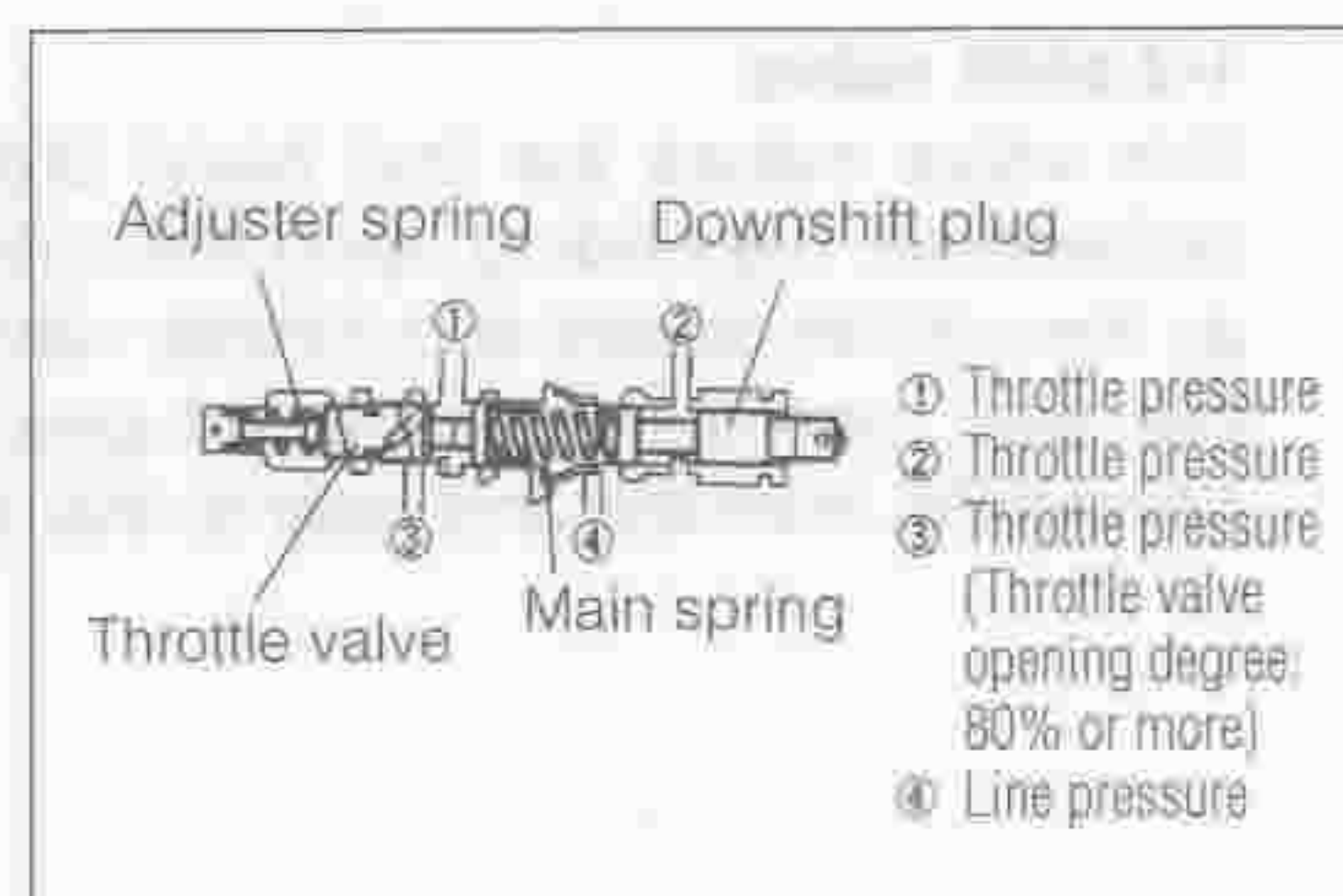


LAT00021-00017

Throttle valve & downshift plug

The throttle valve is provided to obtain the throttle pressure that corresponds to the accelerator pedal depression amount, namely the engine output.

Thus, the throttle pressure becomes a hydraulic pressure corresponding to the throttle valve opening degree. Then, this pressure is applied to the 1-2 shift valve and 2-3 shift valve, thereby counteracting the governor pressure. When the accelerator pedal is depressed nearly to the full-open position, the downshift plug displaces greatly. As a result, the throttle pressure is introduced from the kick-down port to the 1-2 shift valve and 2-3 shift valve.



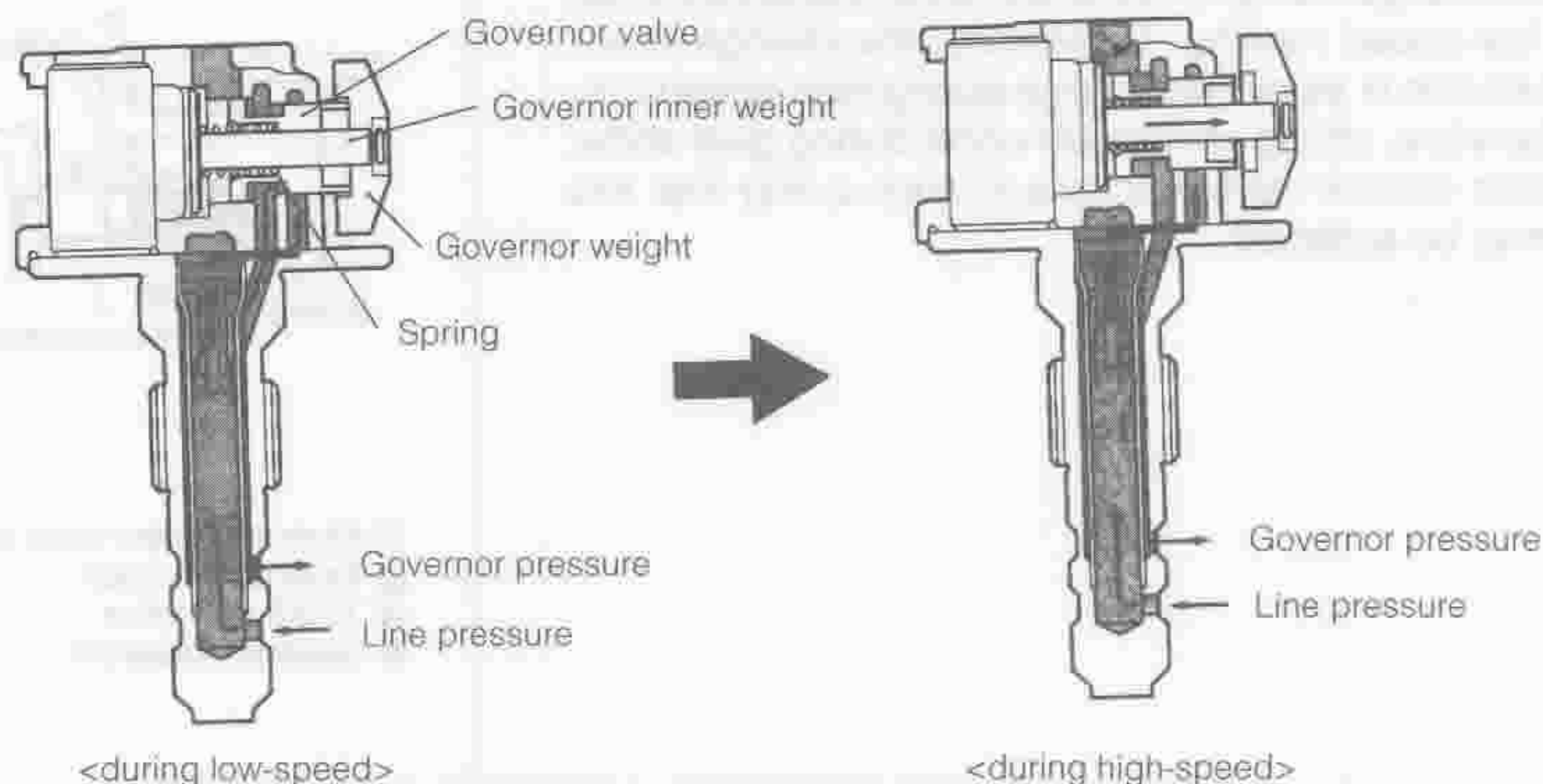
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Governor valve

The governor valve is driven through the governor drive gear mounted on the output shaft. This valve is provided to obtain a hydraulic pressure (governor pressure) that is in proportion to the rotation speed of the output shaft (vehicle speed).

The line pressure from the primary regulator valve is balanced with the centrifugal force exerting on the governor weight. In this way, the hydraulic pressure in proportion to the vehicle speed is obtained.

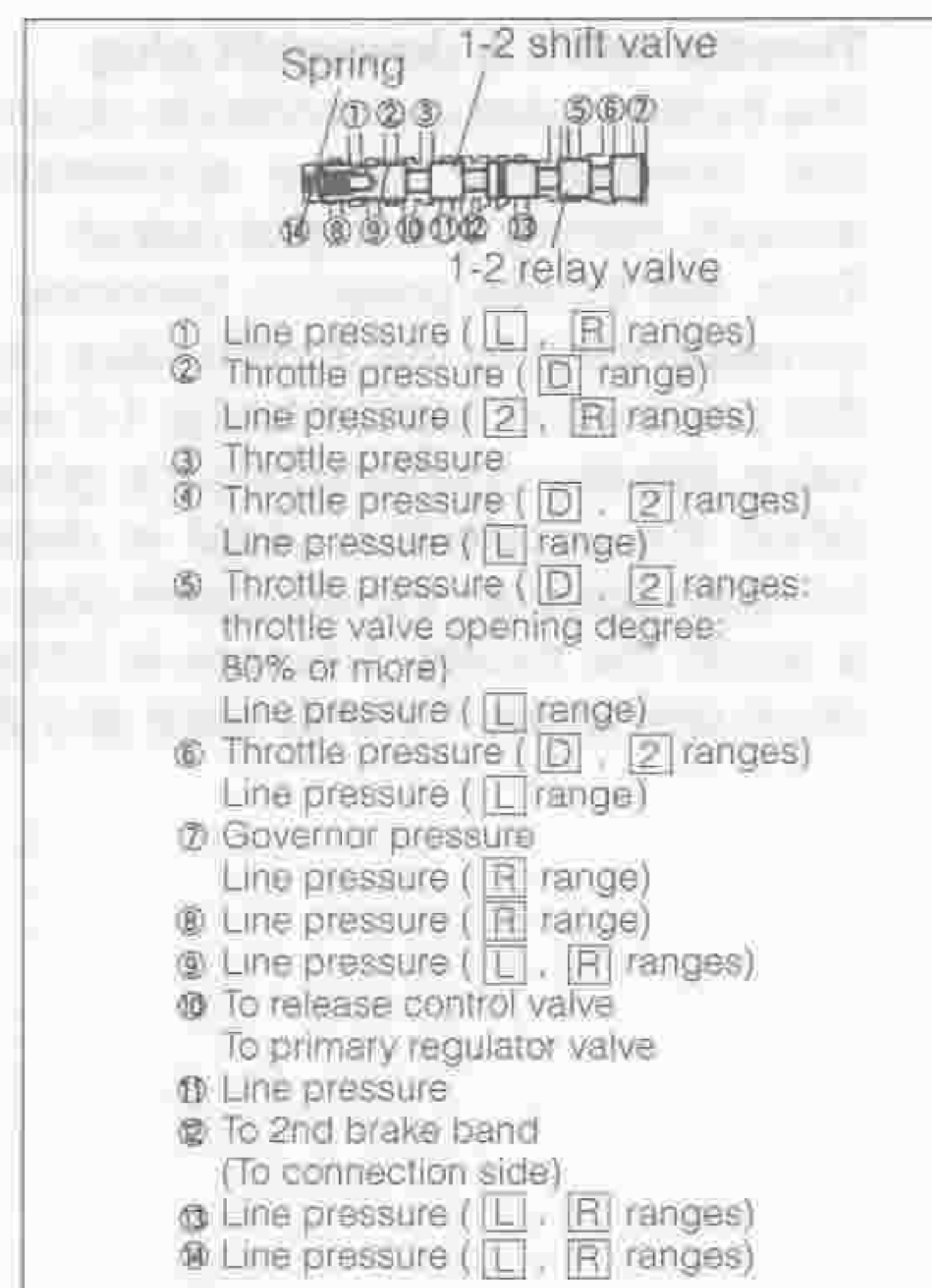
The governor valve works over two stage. First, those components, such as the governor weight, governor valve, governor inner weight and spring, function as an integral body. However, as the speed rises, the governor inner weight is restricted by the governor body. Afterwards, the governor valve and spring function so that the respectively required governor pressure may be obtained.



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1-2 shift valve

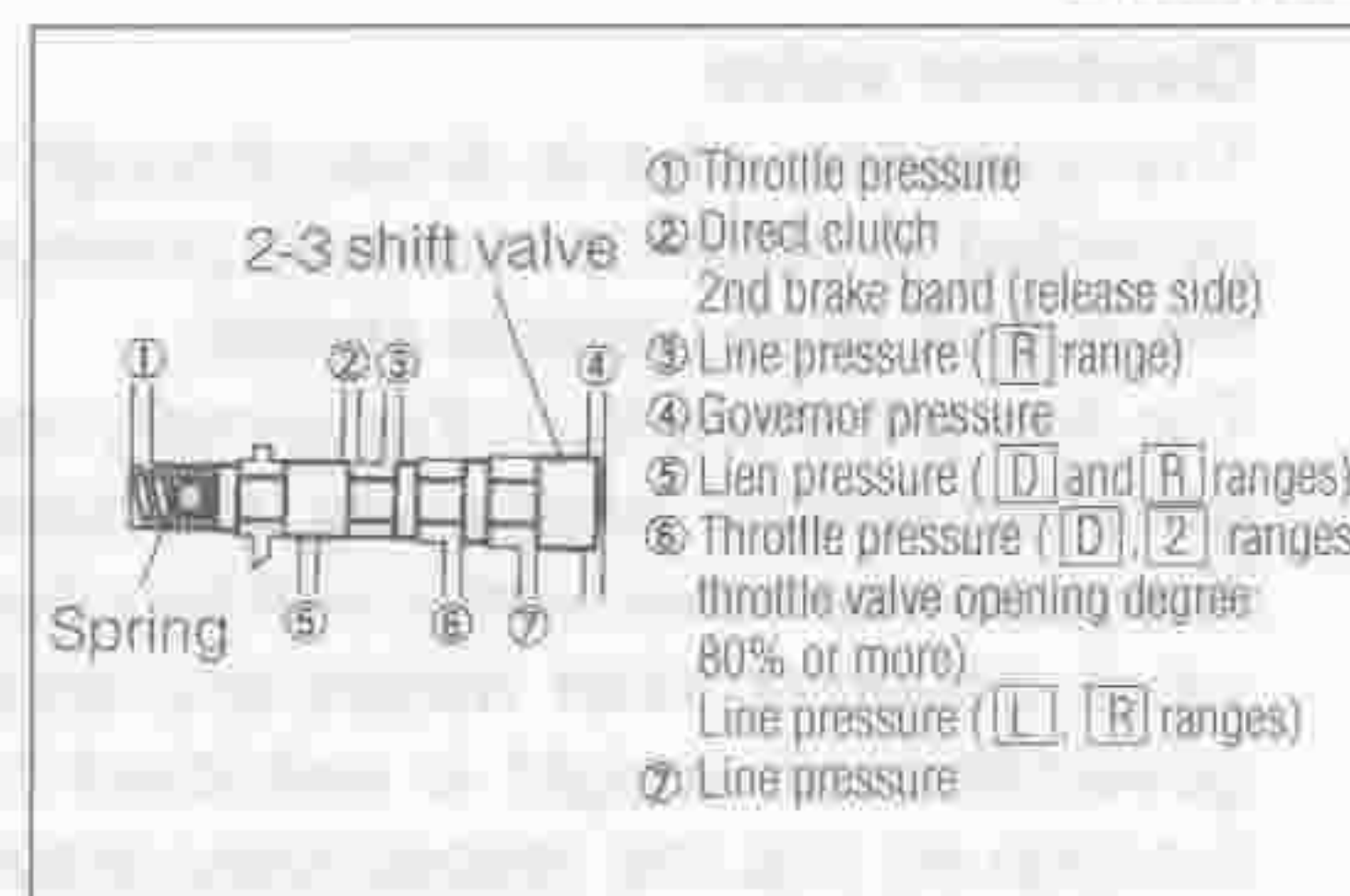
This valve makes the 2nd band brake (B1) operative or inoperative, depending upon the running conditions, such as the vehicle speed and throttle valve opening degree. In this way, upshifts from the 1st gear to the 2nd gear or downshifts from the 2nd gear to the 1st gear take place.



LAT00024-00020

2-3 shift valve

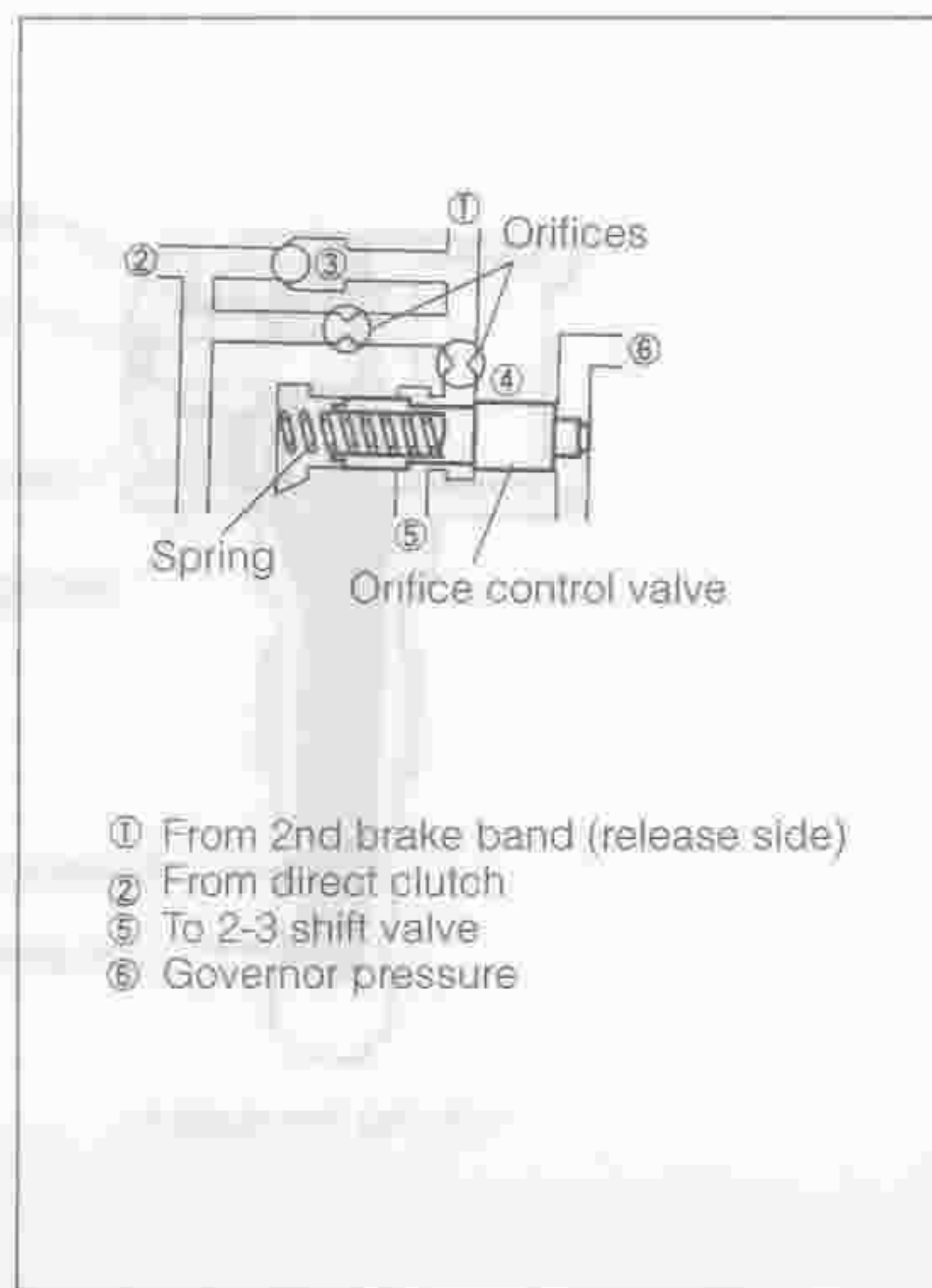
This valve makes the direct clutch (C1) and 2nd band brake (B1) operative or inoperative, depending upon the running conditions, such as the vehicle speed and throttle valve opening degree. In this way, gear upshifts from the 2nd gear to the 3rd gear or downshifts from the 3rd gear to the 2nd gear take place.



LAT00025-00021

Orifice control valve

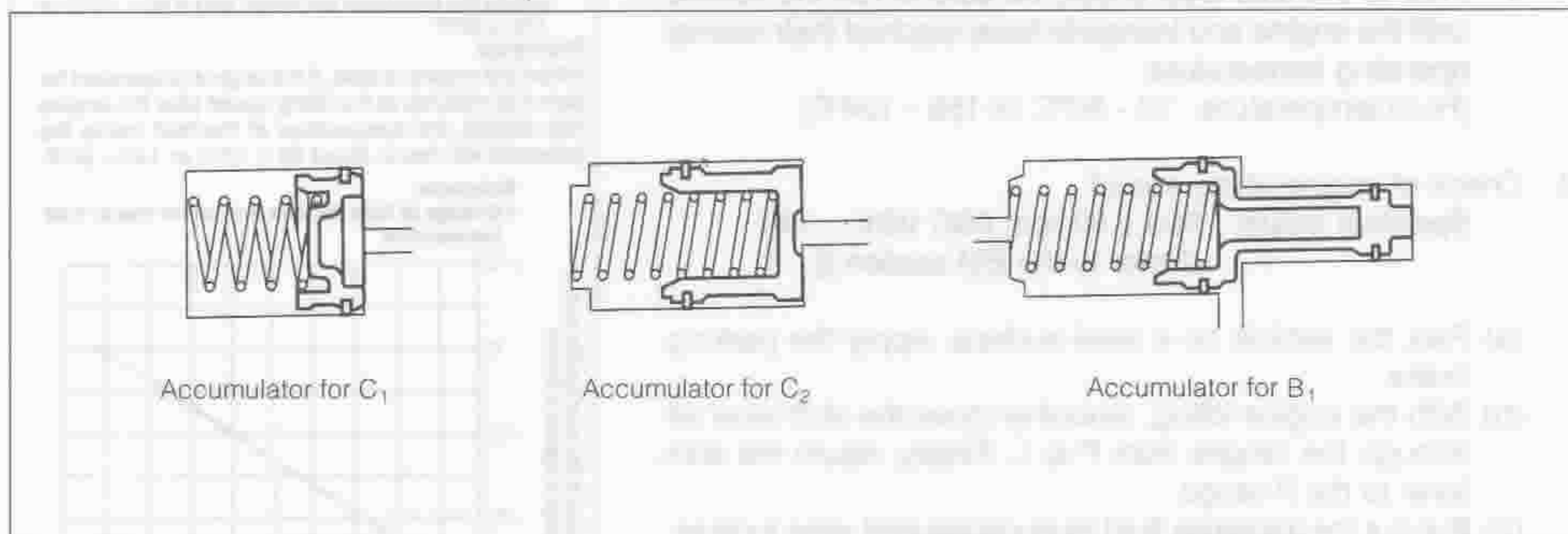
As regards gear downshifts from the 3rd gear to the 2nd gear, the change in engine revolution is comparatively small during low-speed running. Conversely, the change in engine revolution is significantly large during high-speed running. Therefore, strong shocks will occur during gear shifts. This orifice control valve functions in such a way that this shock may be softened.



LAT00026-00022

Accumulator

The accumulator functions in such a way that shocks during gear shifts may be softened. The accumulator comes in three kinds; One is for the direct clutch (C1), another for the 2nd brake band (B1) and the other for the forward clutch (C2). They are provided inside the transaxle case.



LAT00027-00023



PRELIMINARY CHECK

1. Check of transaxle fluid level

NOTE:

- Prior to the fluid level check, be sure to run the vehicle until the engine and transaxle have reached their normal operating temperature.

(Fluid temperature: 70 - 90°C or 158 - 194°F)

2. Check of engine idling speed

Specified Value: 950 ± 50 rpm [ISC VSV ... ON
(Refer to the EM section.)]

- Park the vehicle on a level surface. Apply the parking brake.
- With the engine idling, smoothly move the shift lever all through the ranges from P to L. Finally, return the shift lever to the P range.
- Pull out the transaxle fluid level gauge and wipe it clean.
- Push it back fully into the tube.
- Pull it out and check that the fluid level is in the HOT range.

If the fluid level is too low, add the fluid.

Fluid To Be Used: DEXRON II or A.T.F Ammix multi

Full Capacity: Approx. 4.0 ℓ

Drain and Refill: Approx. 1.5 ℓ

CAUTION:

- Do not overfill the fluid.

NOTE:

- If it is necessary to check the fluid level at a low temperature (20 - 30°C or 68 - 86°F), e.g. at the time of fluid change, first adjust the fluid level so that it may become within the COLD level. Then, recheck the fluid level under the hot conditions.
- If the fluid level fails to reach the cold level on the fluid level gauge, be sure to check the transaxle for fluid leakage. Also, pull out the fluid level gauge and check the fluid for contamination or smell of fluid burning.

3. Check of fluid condition

If the fluid smells burning or it presents a black appearance, change the fluid.

4. Change of transaxle fluid

- Remove the transaxle oil pan subassembly by removing the drain plug with the gasket. Drain the fluid.

NOTE:

- Never reuse the removed gasket.

• Transaxle warming-up method

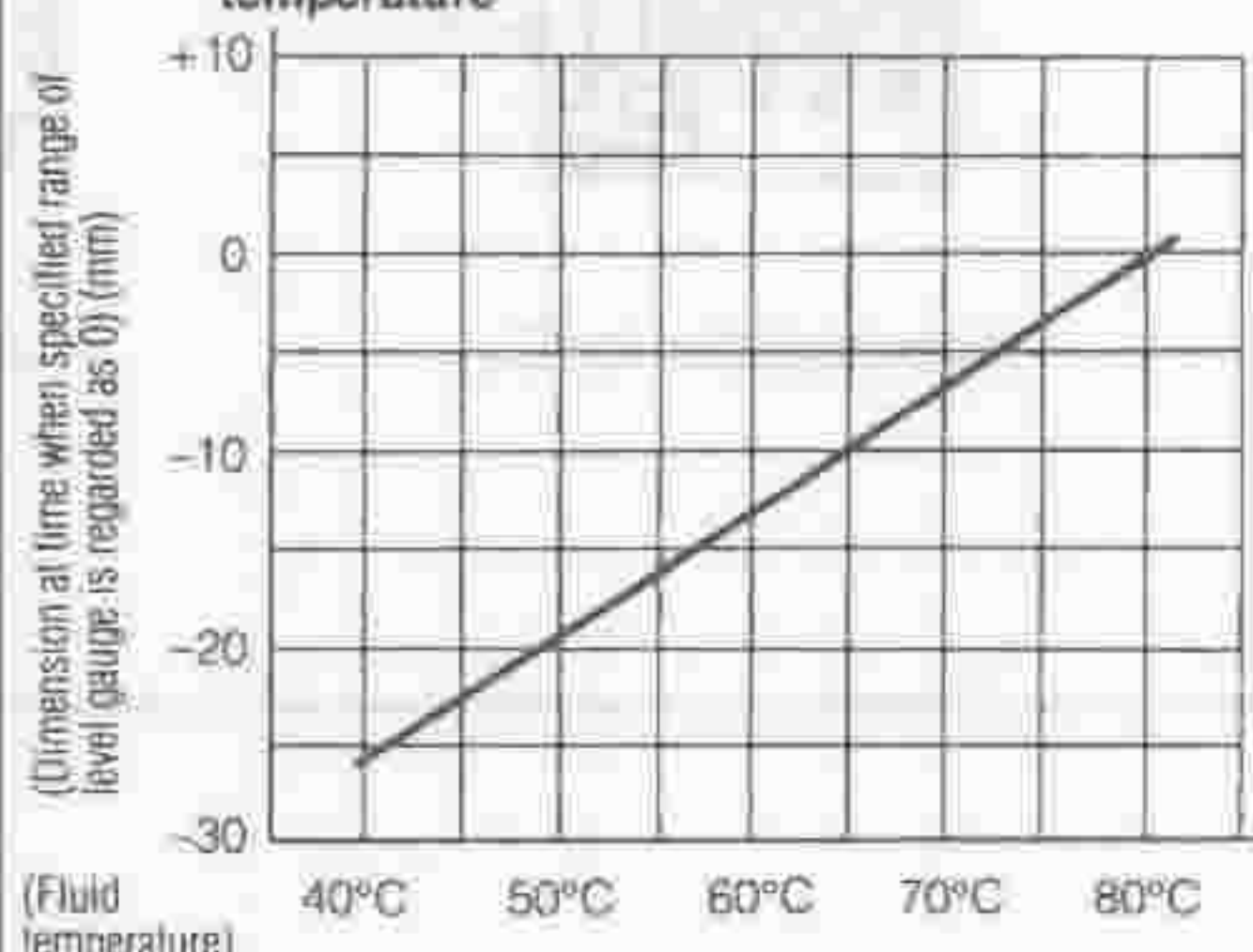
- Warm up the engine.
- If the vehicle runs for about 15 minutes at a speed of 60 km/h or for about 30 minutes at a speed of 40 km/h, the temperature of the fluid inside the transaxle becomes about 80 ± 10°C or 176 ± 50°F.

Reference

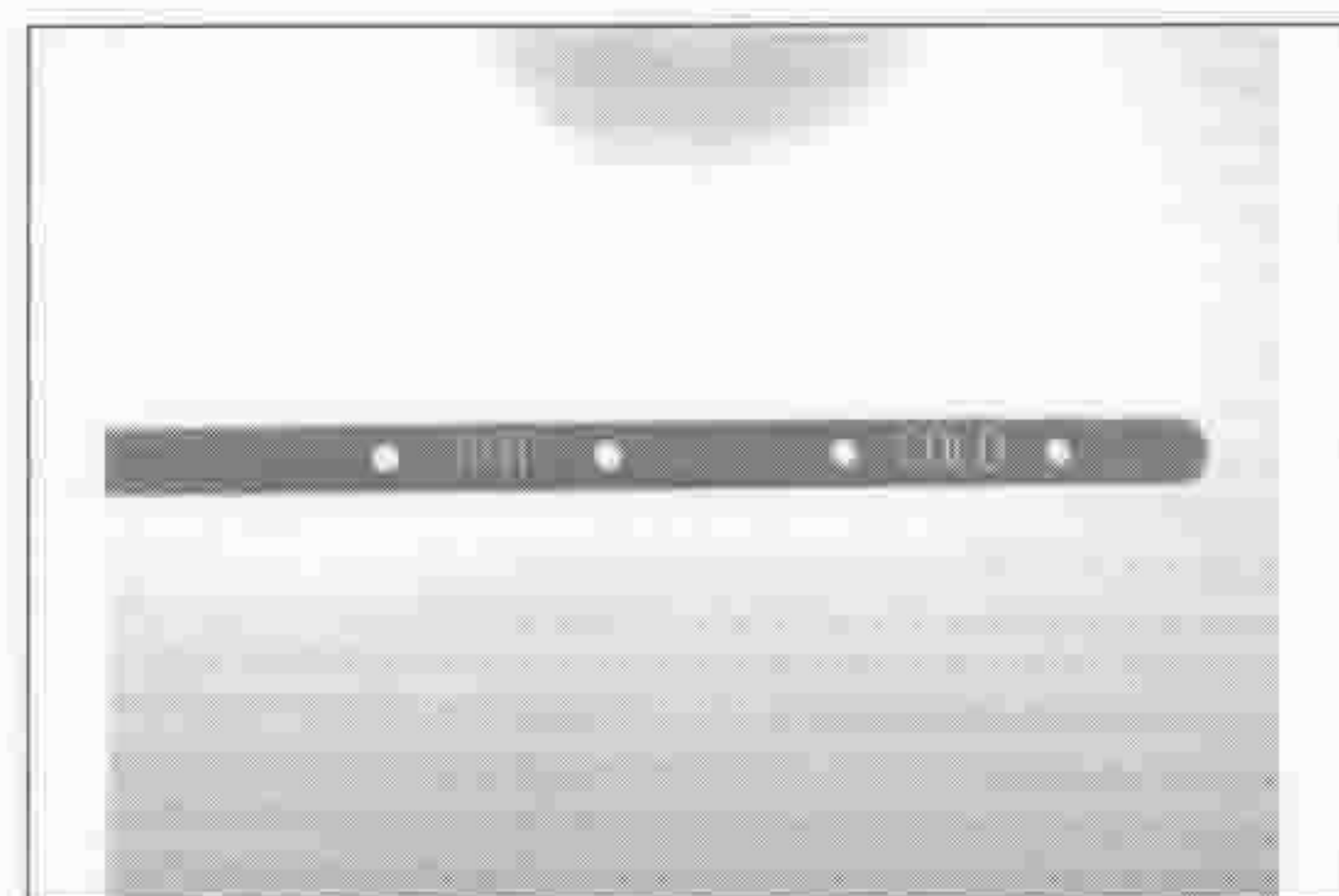
When the engine is cold, if the engine is operated for about 35 minutes at the idling speed after the engine has started, the temperature of the fluid inside the transaxle will rise to about 60 ± 10°C or 140 ± 50°F.

Reference

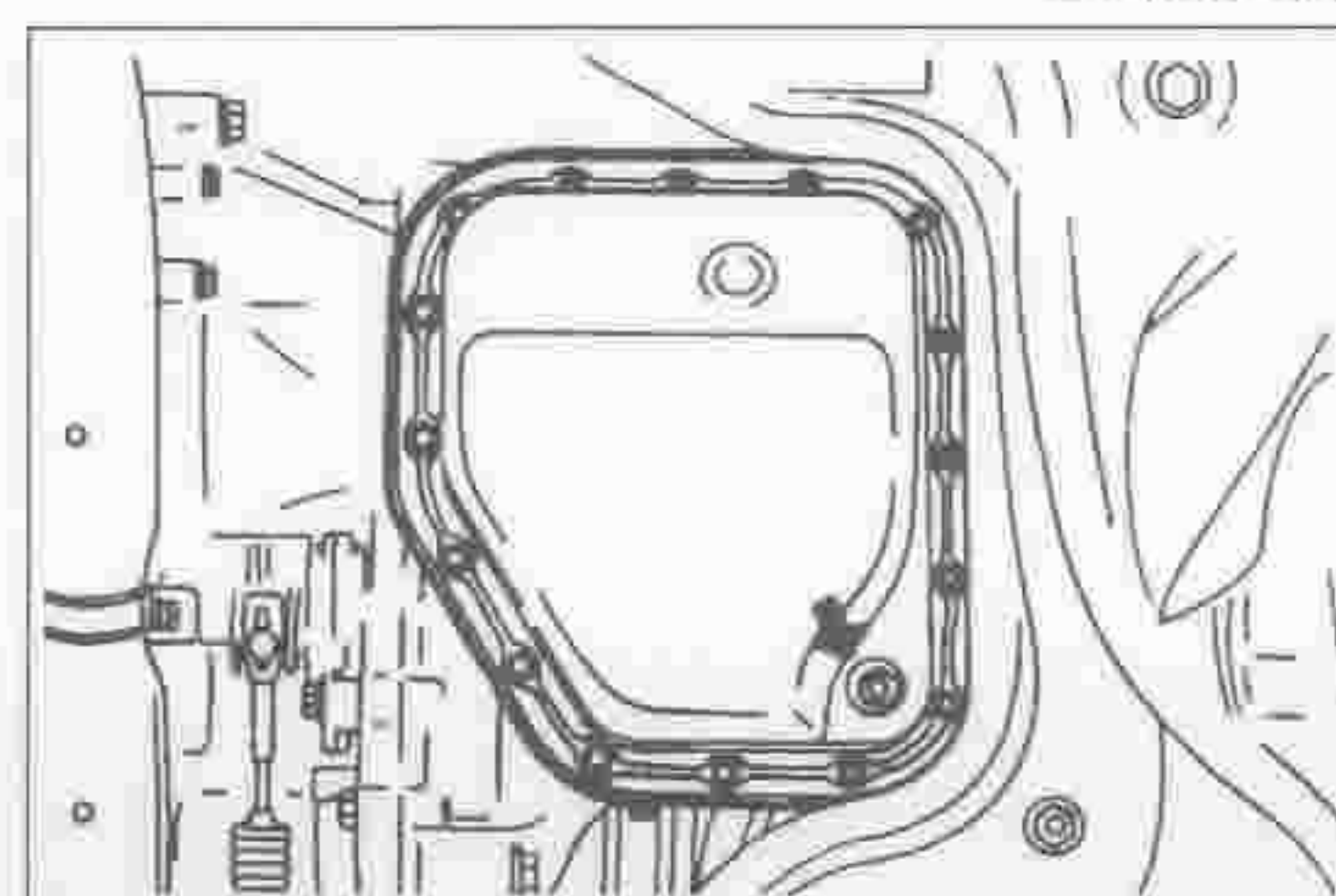
• Change of fluid level as a result of rise in fluid temperature



LAT00028-00024



LAT00029-00025



LAT00030-00026

- (2) With a new gasket interposed, tighten the drain plug securely.

Tightening Torque: 19.6 - 29.4 N·m
(2.0 - 3.0 kgf-m, 14.5 - 21.7 ft-lb)

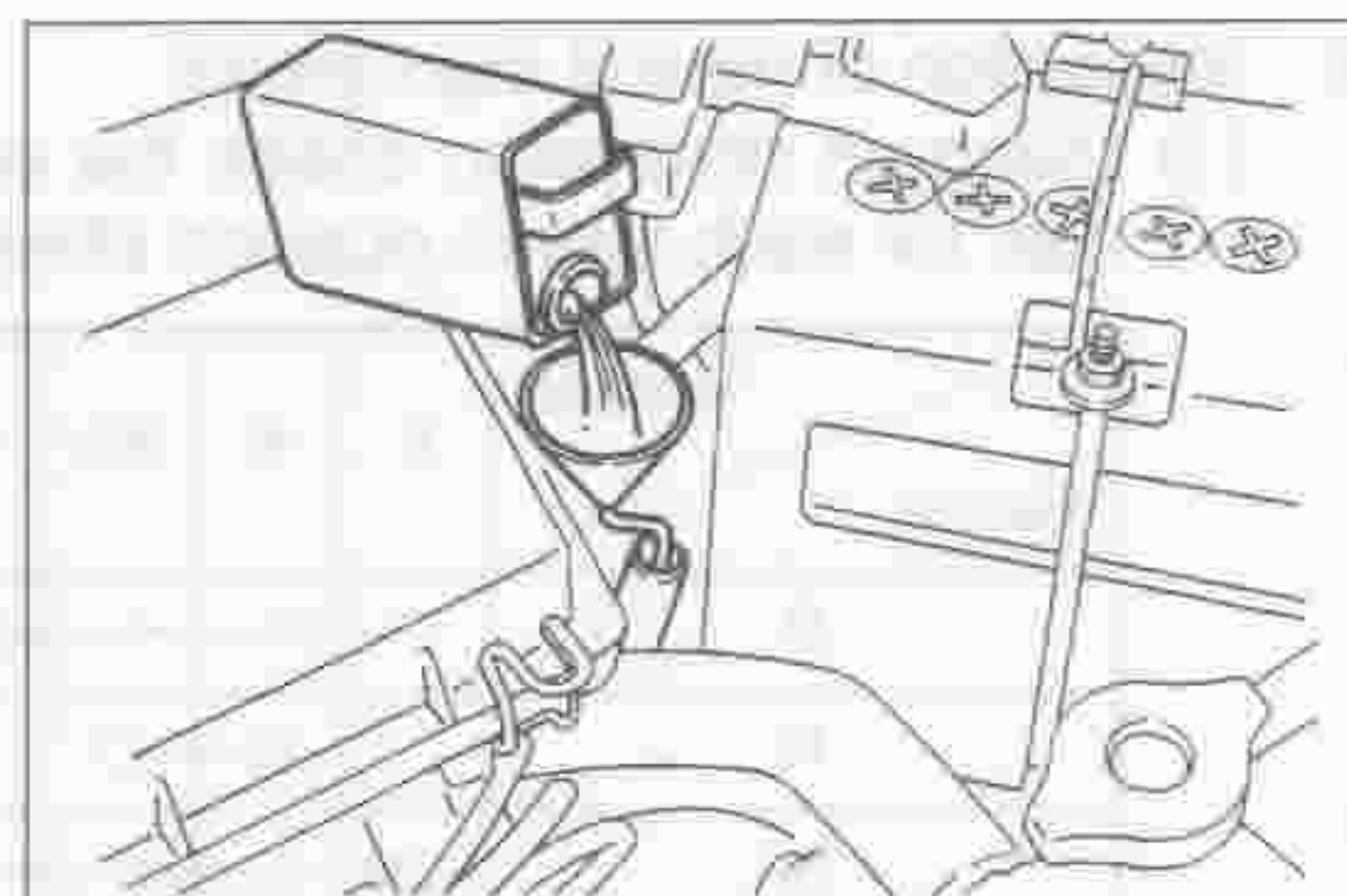
- (3) Add new fluid through the filler tube.

Fluid To Be Used: DEXRON II or A.T.F. Ammix multi

Full Capacity: Approx. 4.0 ℓ

Drain and Refill: Approx. 1.5 ℓ

- (4) Start the engine. Move the shift lever to all positions from P through L. Then, move it to the P position.
- (5) With the engine idling, check the fluid level. Add fluid up to the COLD level on the fluid level gauge.
- (6) Check the fluid level at the normal fluid operating temperature (70 - 90°C or 158 - 194°F). Add the fluid, as required.

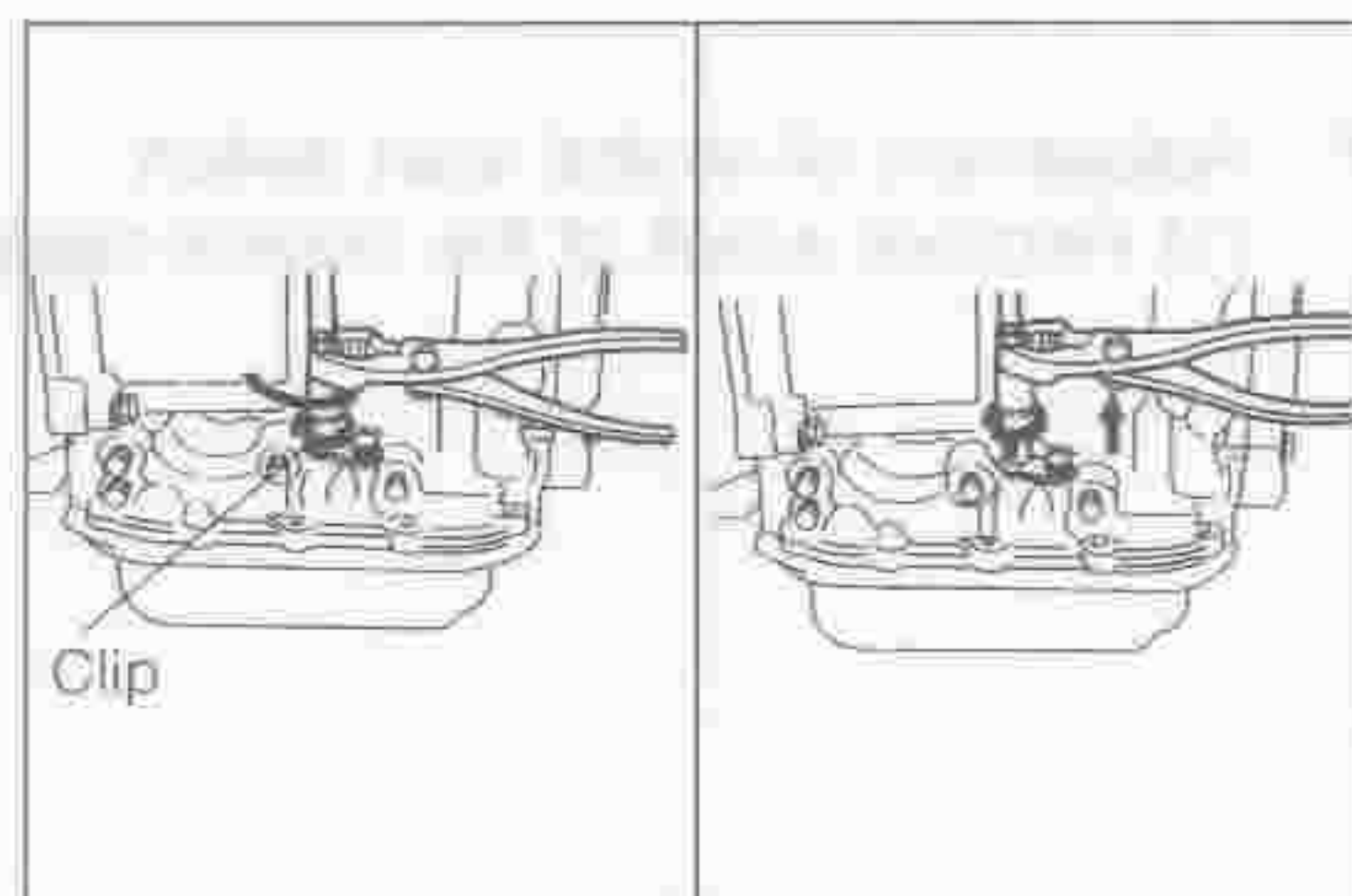


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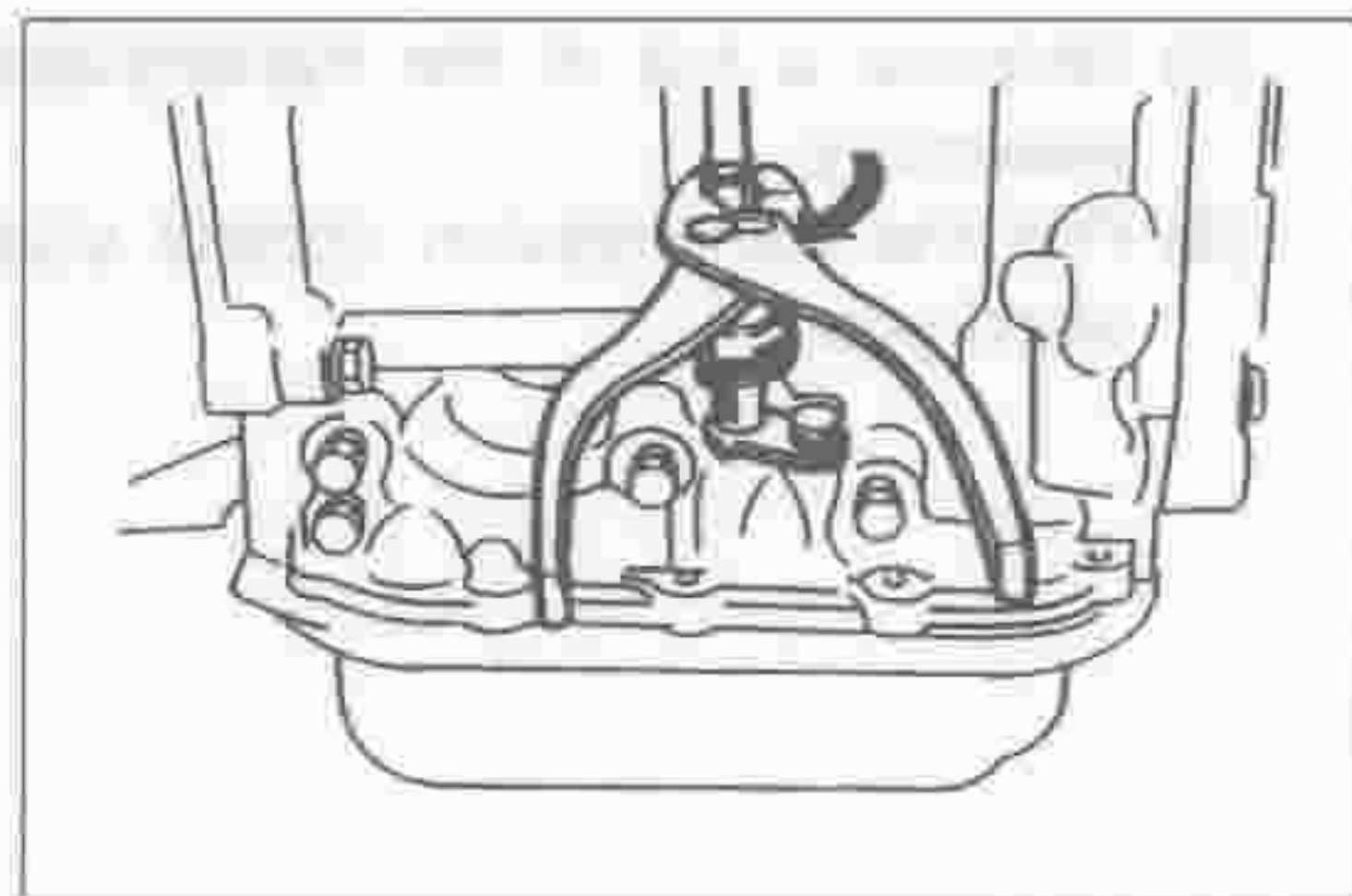
5. Adjustment of throttle cable

The purpose of this adjustment is to align the fully-opened position of the throttle link of the throttle body with the fully-opened position of the throttle valve inside the transaxle.

- (1) Remove the radiator fan motor together with the fan shroud.
- (2) Turn the casing cap approximately 60 to 90 degrees. (The clip expands.)
- (3) Pull up the casing cap until it makes contact with the stopper.
- (4) Turn the casing cap in a direction opposite to (2) above. (The clip retracts, thereby locking the casing cap.)

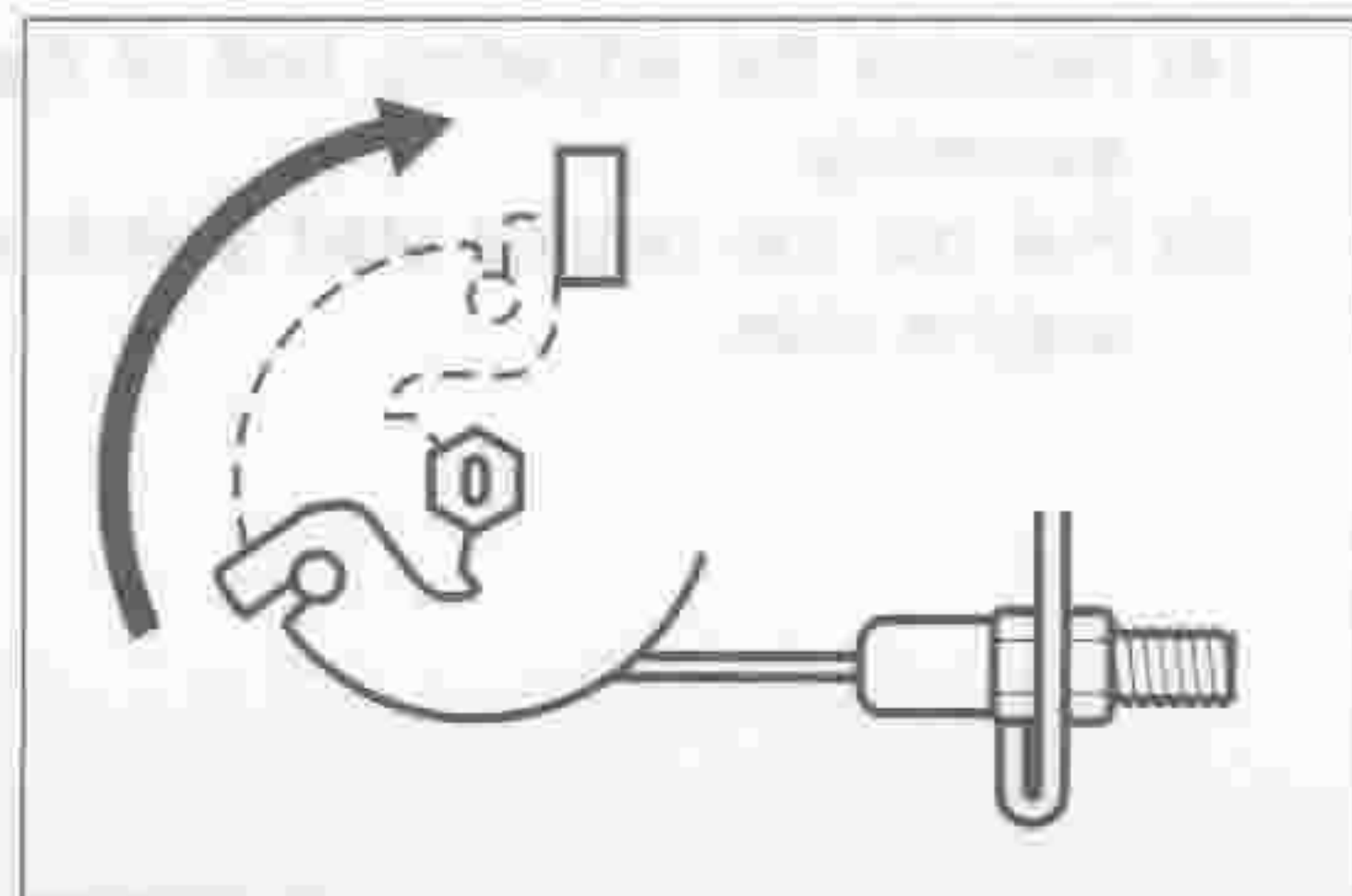


LAT00032-00028



LAT00032-00016

- (5) Make the throttle link at the engine side contact with the stopper (fully open), using a spanner or the like. This time, a "clicking" sound occurs and the automatic adjustment of the throttle cable takes place.
- (6) Install the radiator fan motor together with the fan shroud.

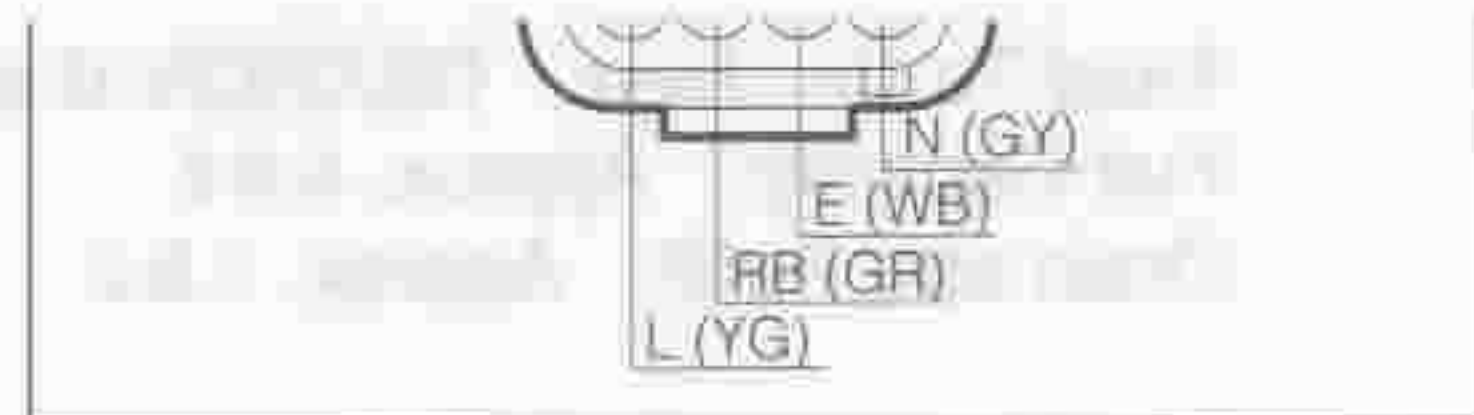


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AT-16

P	
R	
N	
D	
2	
L	

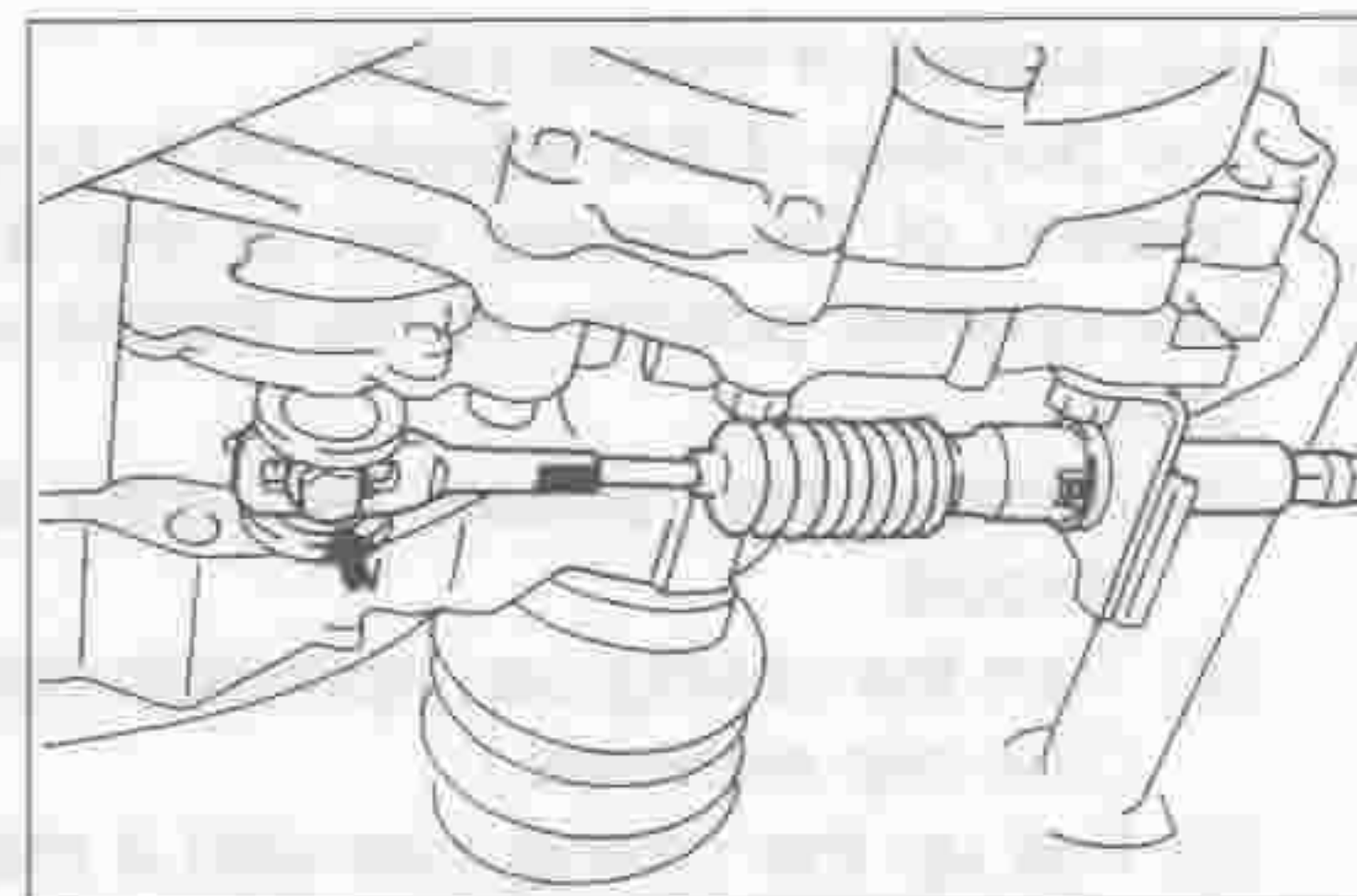
If the continuity does not conform to the specifications, replace the switch.



DATA00034-00030

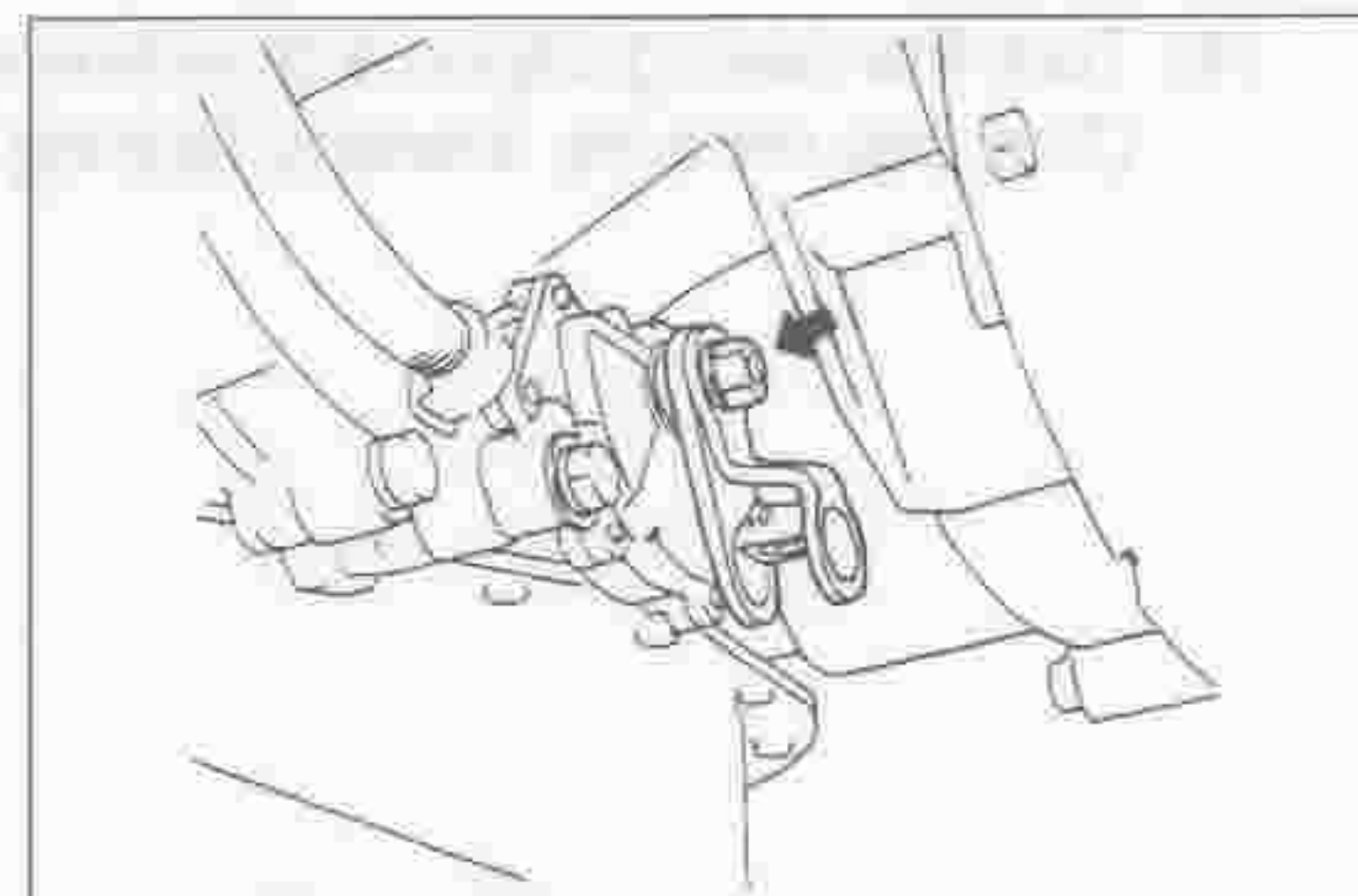
7. Adjustment of neutral start switch

- (1) Remove a bolt of the control cable assembly.



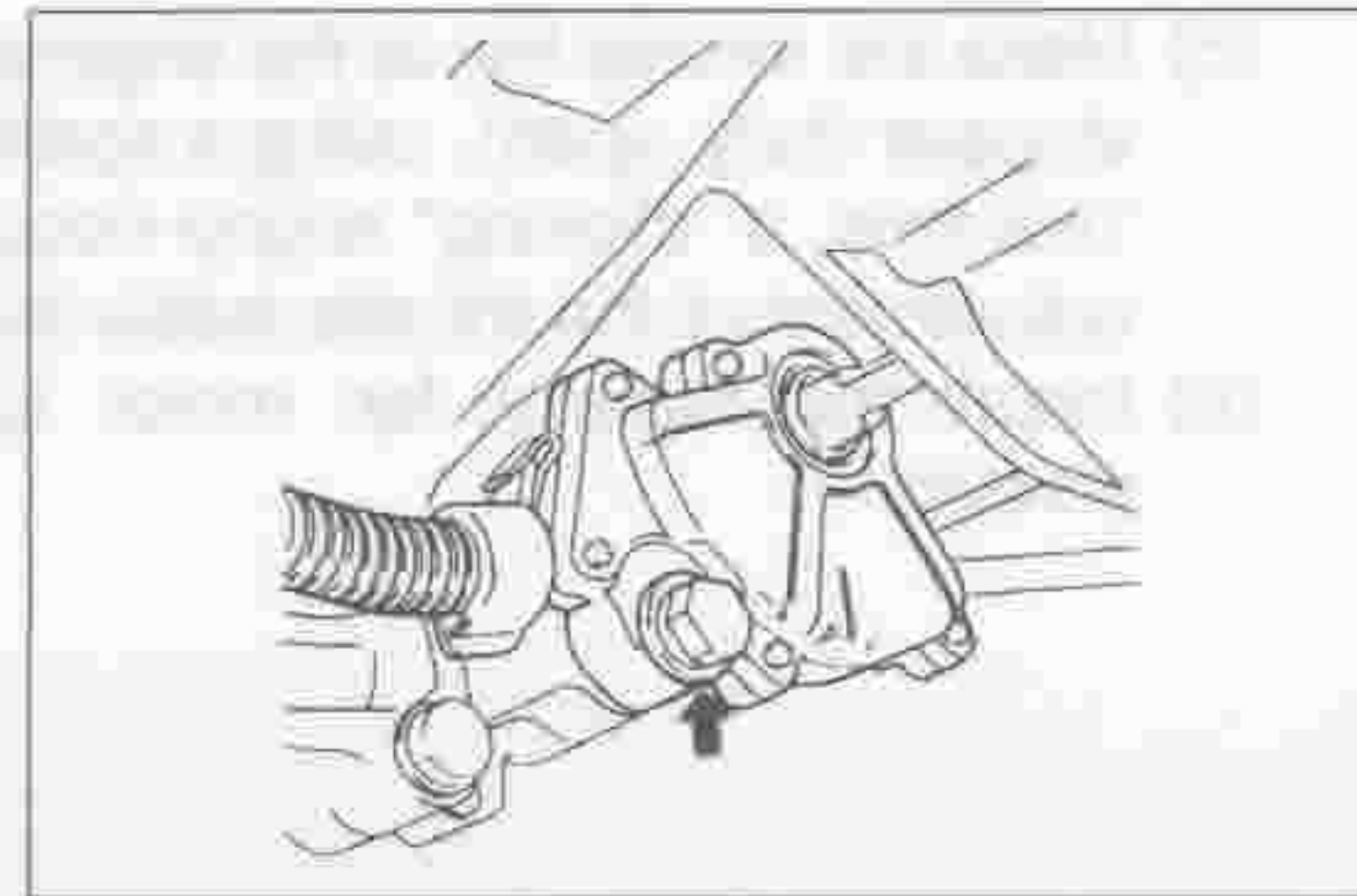
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- (2) Remove a nut of the transmission control shaft lever assembly.
- (3) Pull the transmission control shaft lever assembly toward you.



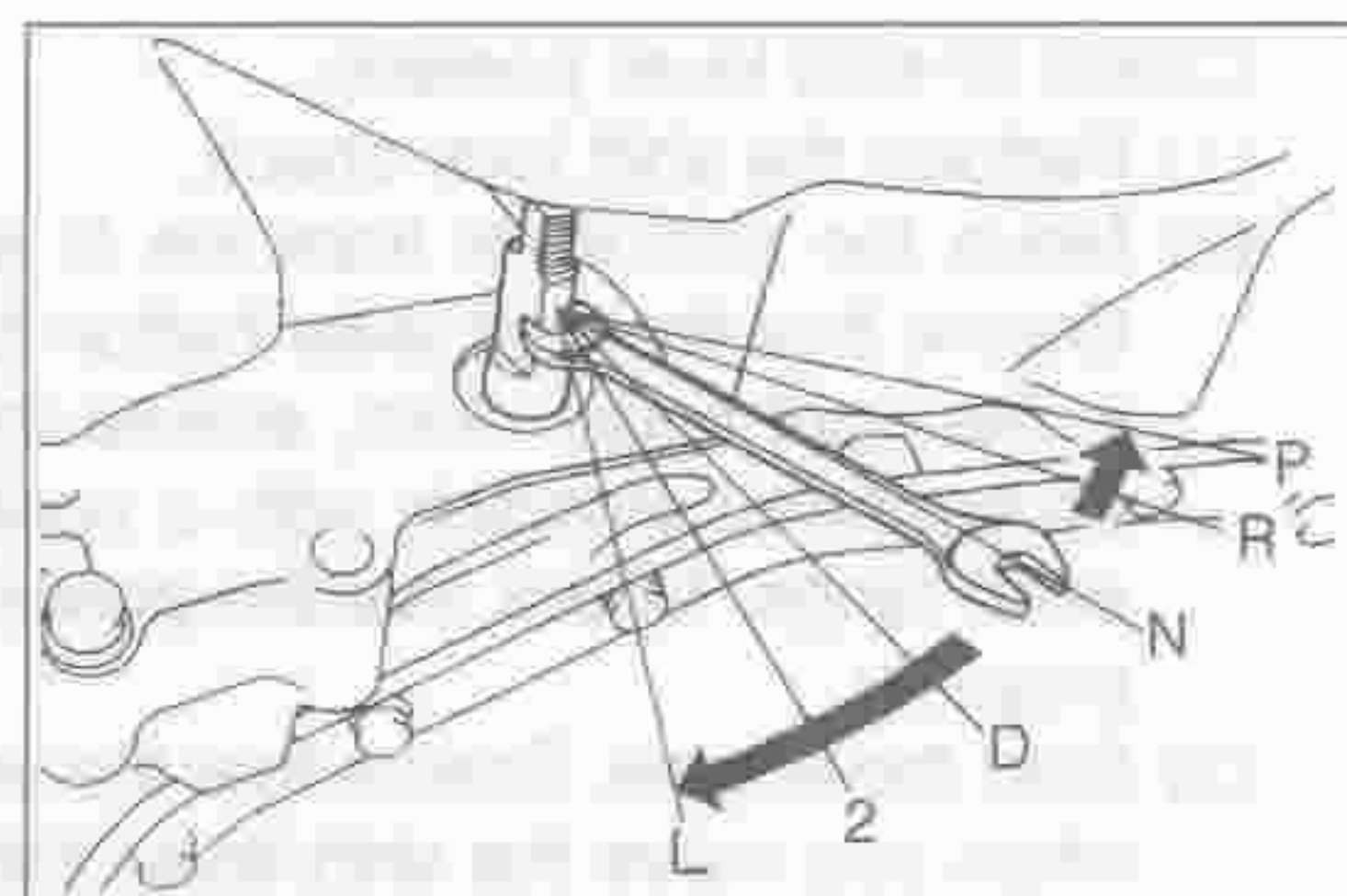
LAFCO036-00032

- (4) Remove the adjusting bolt of the neutral start switch assembly.
- (5) Pull out the neutral start switch assembly toward the engine side.



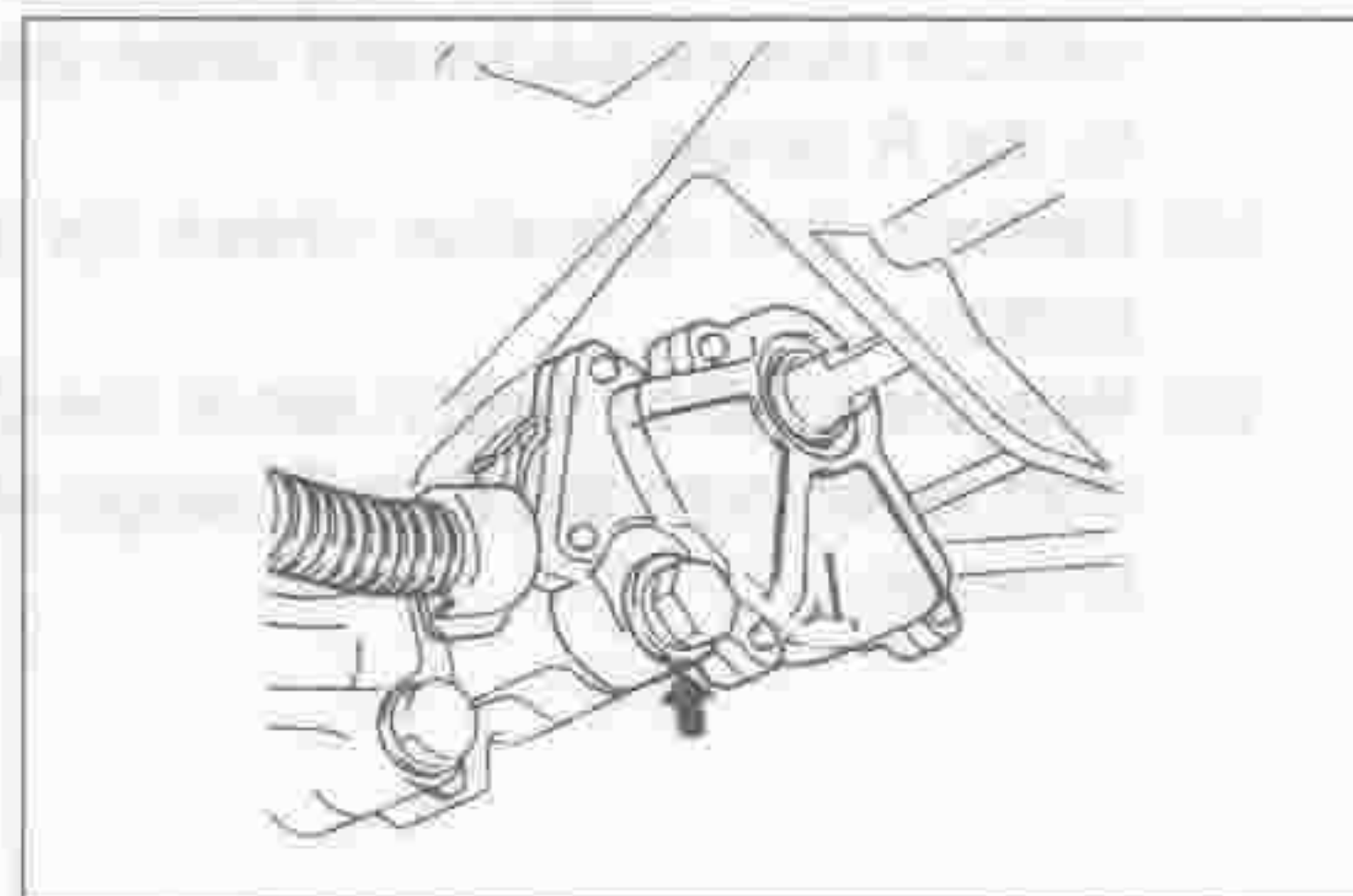
LA 100037-00033

- (6) Back off the manual lever shaft two notches from the parking position, using the standard spanner or the like.



LAT00038-00034

- (7) Place the neutral start switch assembly.
(8) Temporarily tighten the bolt.



LAT00039-00035

- (9) Align the groove with the neutral start switch basic line, using the following SST.
SST: 09302-87201-000



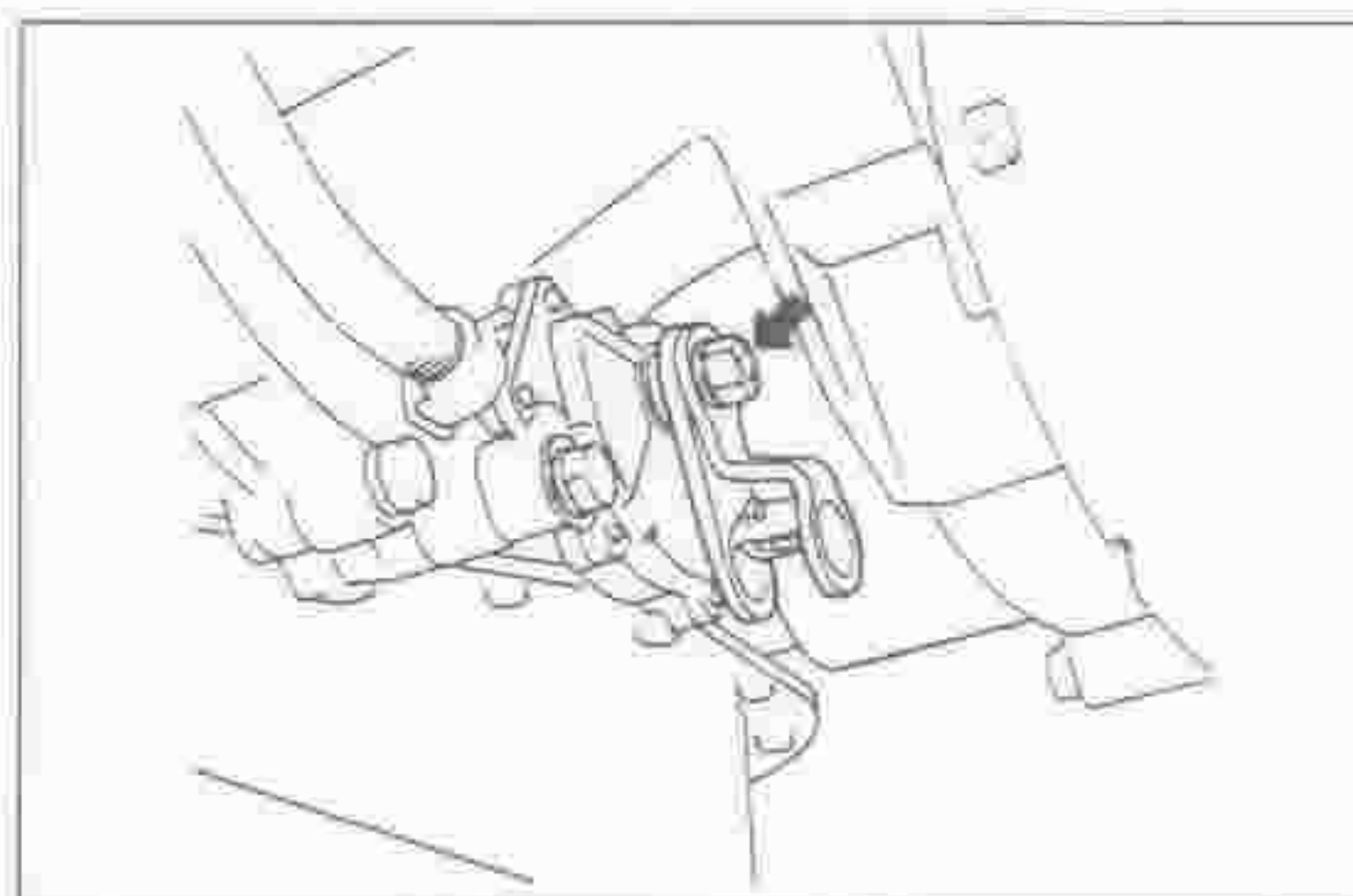
LAT00040-00036

- (10) Tighten the bolt.
Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)

NOTE:

- Make sure that the bolt is tightened to the specified tightening range.

- (11) Install the transmission control shaft lever assembly and tighten it with the nut.
Tightening Torque: 9.8 - 15.7 N·m
(1.0 - 1.6 kgf-m, 7.2 - 11.6 ft-lb)

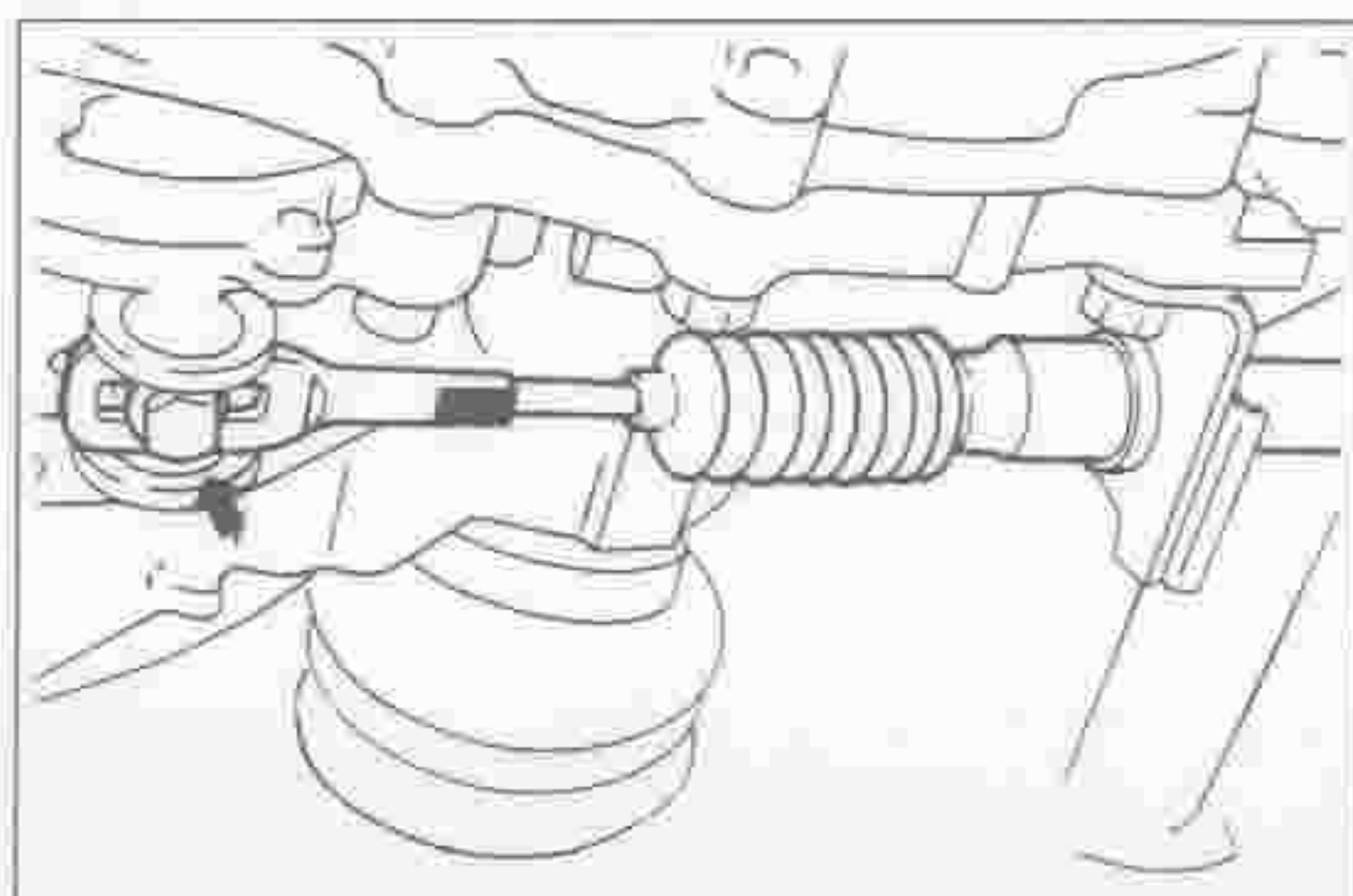


LAT00041-00037

NOTE:

- Make sure that the nut is tightened to the specified tightening torque.

- (12) Tighten the control cable assembly with the bolt.
Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

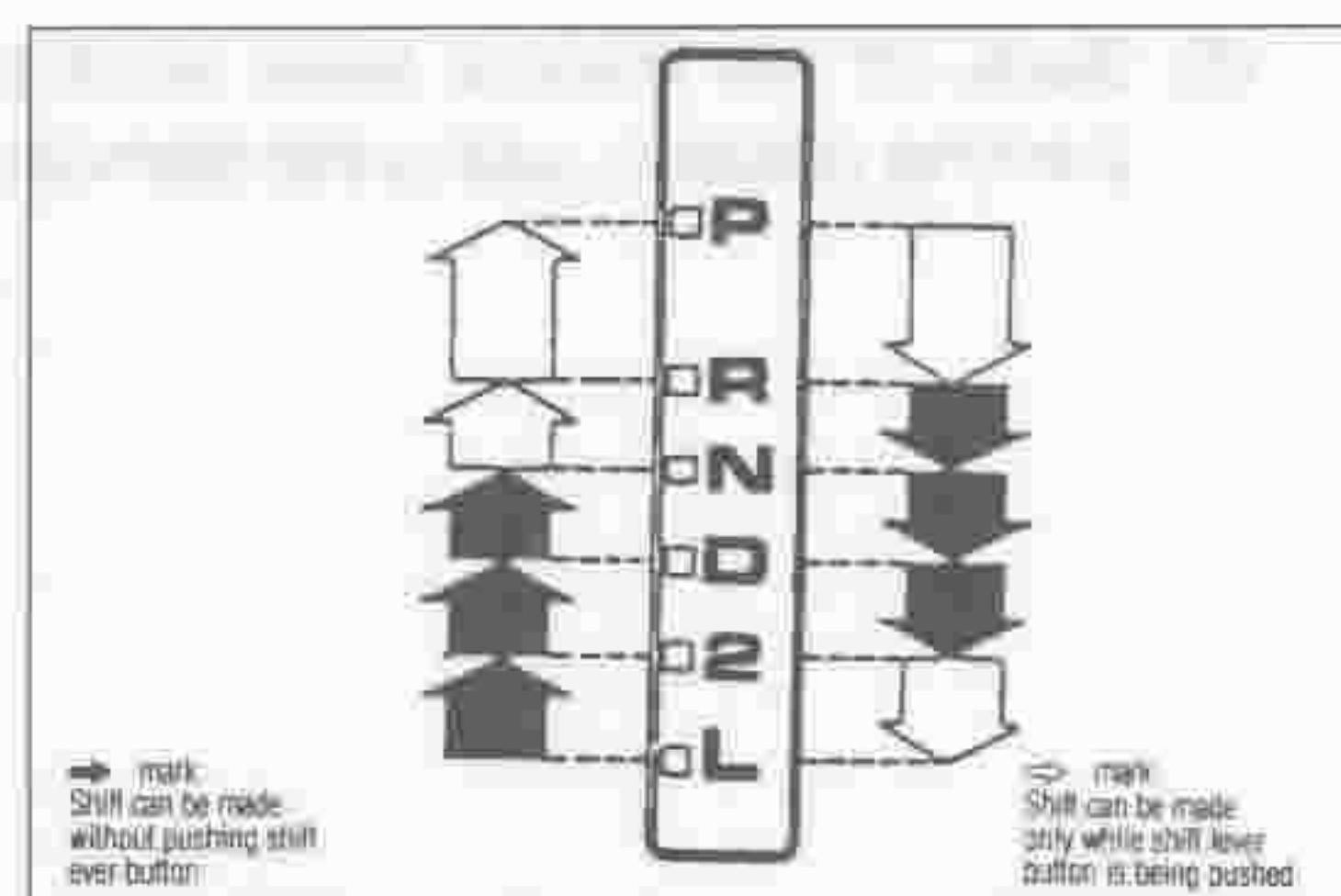


LAT00042-00038

- (13) Check the continuity of the terminals in the neutral start switch connector.
(14) Inspection of shift lever position
(15) Inspection of engine idling speed
(Refer to the EM section.)

Check of shift lever position

- (1) Perform the shift lock check.
- (2) Move the shift lever from the N range to each range. Ensure that the shift lever button functions as indicated in the right figure. Also, ensure that the shift lever can be operated smoothly with a positive detent feeling at each range. Check that the position indicator functions properly.
- (3) Start the engine. Ensure that the vehicle moves forward when you move the shift lever from the N range to the D, 2 and L ranges, respectively. Make sure that the vehicle moves backward when you move the shift lever to the R range.
- (4) Perform the operation check for the shift lock release button.
- (5) With the ignition switch set to the ON position, move the shift lever from the P to R range and also from the N to R range.



LAT00043-00039

TESTING

STALL TEST

The purpose of this test is to check the overall performance of the automatic transmission and engine by measuring the maximum engine speeds in the D and R ranges.

CAUTION:

- Perform the stall test at the normal fluid operating temperature (70 - 90°C or 158 - 194°F).
- Do not conduct this test continuously for more than five seconds.
- Wait at least one minute before the switching is made from the D range to the R range.
- Be sure to turn OFF the air conditioner (if equipped so on).

Measurement of stall speed

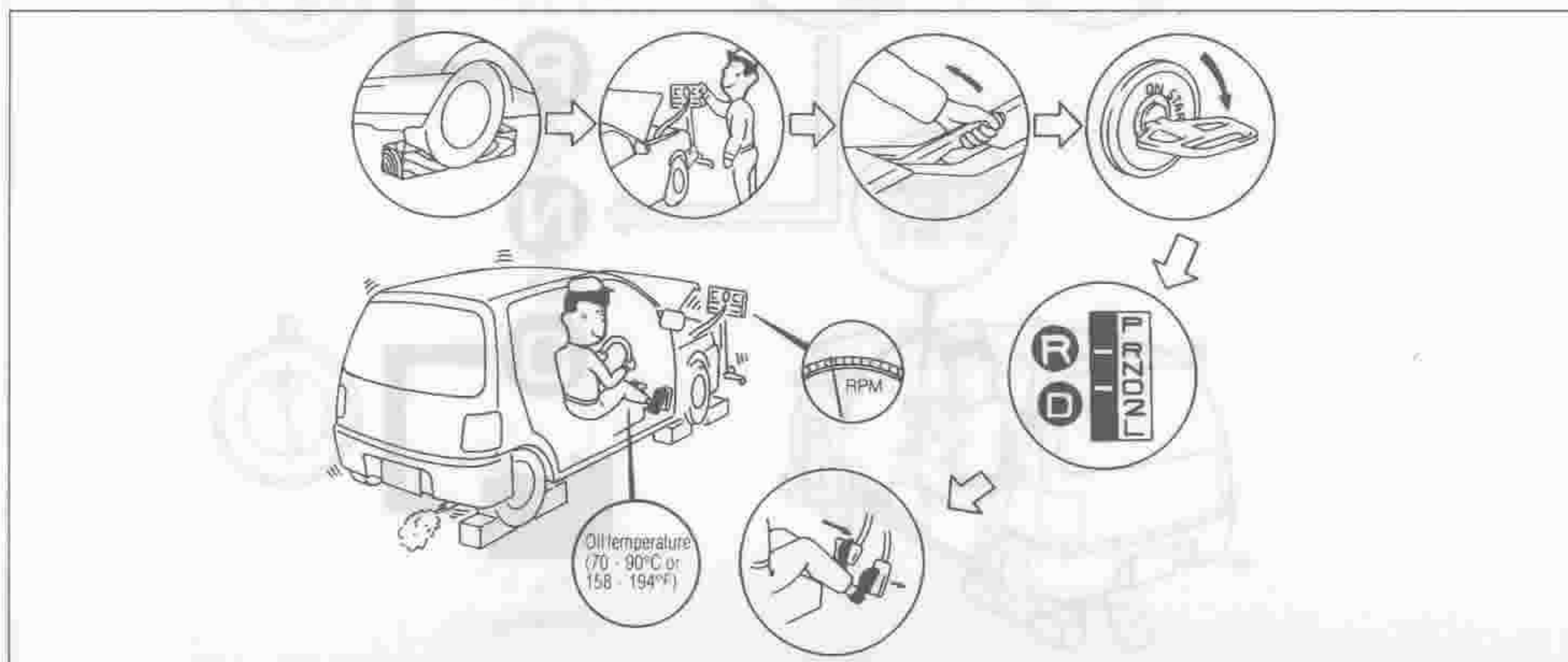
- Place chocks at the four wheels.
- Install an engine tachometer.
- Fully apply the parking brake.
- Keep depressing the brake pedal firmly by your left foot during the test.
- Start the engine.
- Move the shift lever to the D range. Depress the accelerator pedal fully by your right foot. Quickly read the highest engine rpm at this time.

Stall Speed: 3050 - 3650 rpm

- Perform the same test in the R range.

Evaluation

- If the engine speed is the same for both ranges (D, R) but lower than specified value:
 - Engine output probably insufficient (e.g. throttle valve is not opened fully.)
 - Torque converter malfunctioning
- If the stall speed at the D range is higher than specified value:
 - Line pressure too low
 - Forward clutch slipping
 - Torque converter malfunctioning
- If the stall speed in the R range is higher than specified value:
 - Line pressure too low
 - Direct clutch slipping
 - First & reverse brake slipping
- If the stall speed in the R and D ranges is higher than specified value:
 - Line pressure too low
 - Fluid level improper



TIME LAG TEST

(c) Conduct the measurement three times and take the average value.

Measurement of time lag

- Place chocks at the four wheels.
- Fully apply the parking brake.
- Start the engine and check the idle speed.
(Refer to the EM Section.)
- Move the shift lever from the N to the D range. Using a stopwatch, measure the time required from the lever shifting to the time when you feel a shock.

Time Lag: Not to Exceed 1.0 second

(e) In the same manner, measure the time lag when shifting is made from the N to the R range.

Time Lag: Not to Exceed 1.0 seconds

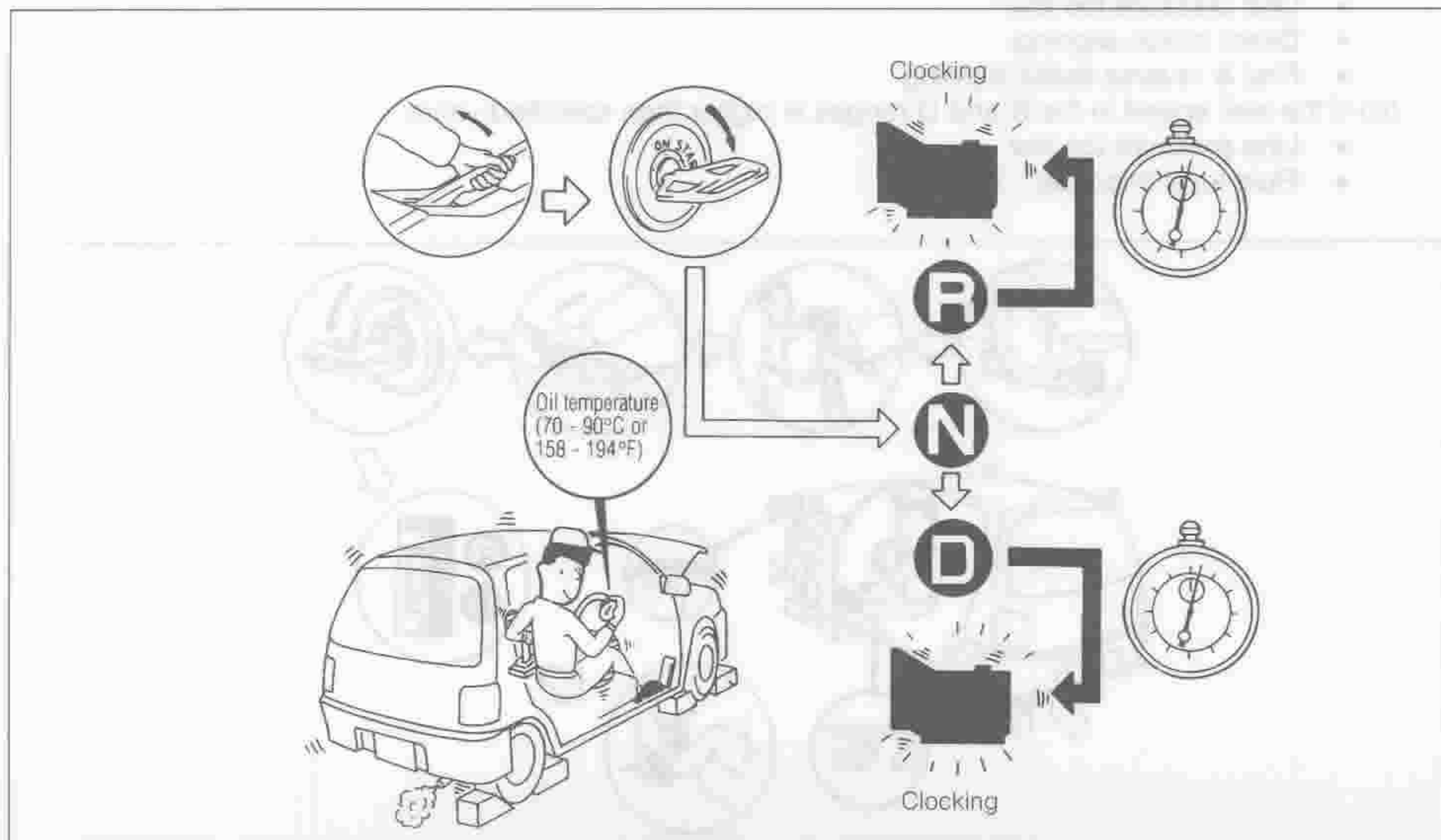
Evaluation

(a) If the N-to-D time lag is longer than the specified value:

- Line pressure too low
- Forward clutch worn

(b) If the N-to-R time lag is longer than the specified value:

- Line pressure too low
- Direct clutch worn
- First & reverse brake worn



HYDRAULIC TEST

1. Measurement of line pressure

- (a) Warm up the transmission fluid.
 - (b) Remove the transmission case test plug and install the oil pressure gauge (SST).
- SST: 09325-87201-000

CAUTION:

- Perform the test at the normal fluid operating temperature (70 - 90°C or 158 - 194°F).

- (c) Fully apply the parking brake and place chocks at the four wheels.
- (d) Start the engine and check the idle speed.
- (e) Move the shift lever to the D range. Depress the brake pedal firmly by your left foot. While manipulating the accelerator pedal by your right foot, measure the line pressure at the engine speeds specified in the table.
- (f) Perform the test in the R range in the same way.
- (g) If the measured pressure does not comply with the specified values, recheck the throttle cable adjustment and perform the test again.

Evaluation

- (a) If the measured values at all ranges are higher than specified value:

- Primary regulator valve malfunctioning
- Throttle pressure incorrect

- (b) If the measured values at all ranges are lower than the specified value:

- Throttle pressure incorrect
- Oil filter clogged
- Oil strainer O-ring
- Looseness of the valve body installation bolts
- Each valve malfunctioning
- Primary regulator valve malfunctioning
- Oil pump malfunctioning

- (c) If the pressure is low in the D range only:

- Fluid leakage at the D range circuit
- Forward clutch defective

- (d) If the pressure is low in the R range only:

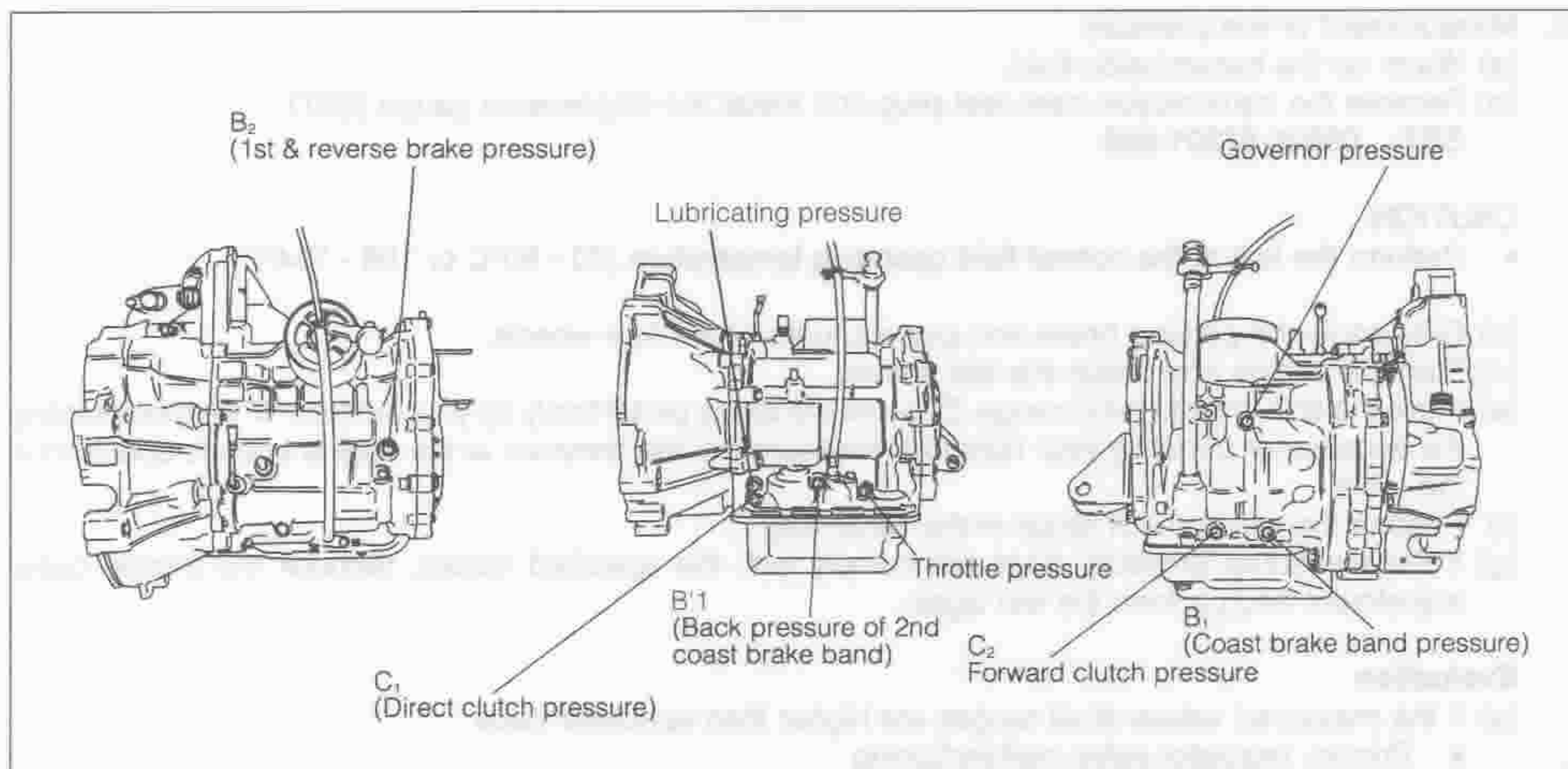
- Clogged the orifice at the reverse oil hole
- First & reverse brake malfunctioning

2. Measurement of throttle pressure

Evaluation

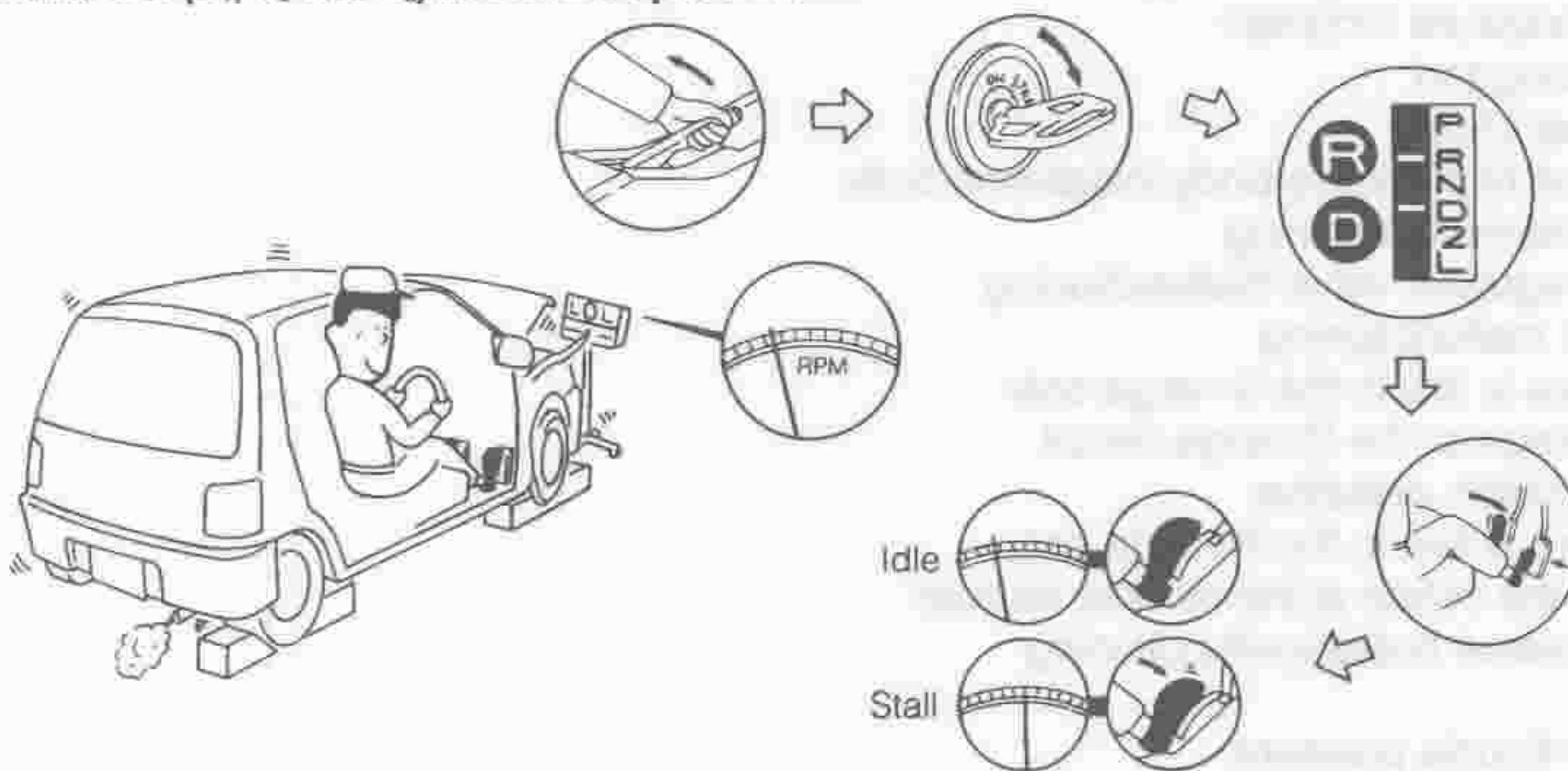
- If the measured values at all ranges are out of specified value
- Throttle cable out of adjustment
- Throttle valve malfunctioning
- Line pressure malfunctioning

3. Location of each inspection plugs

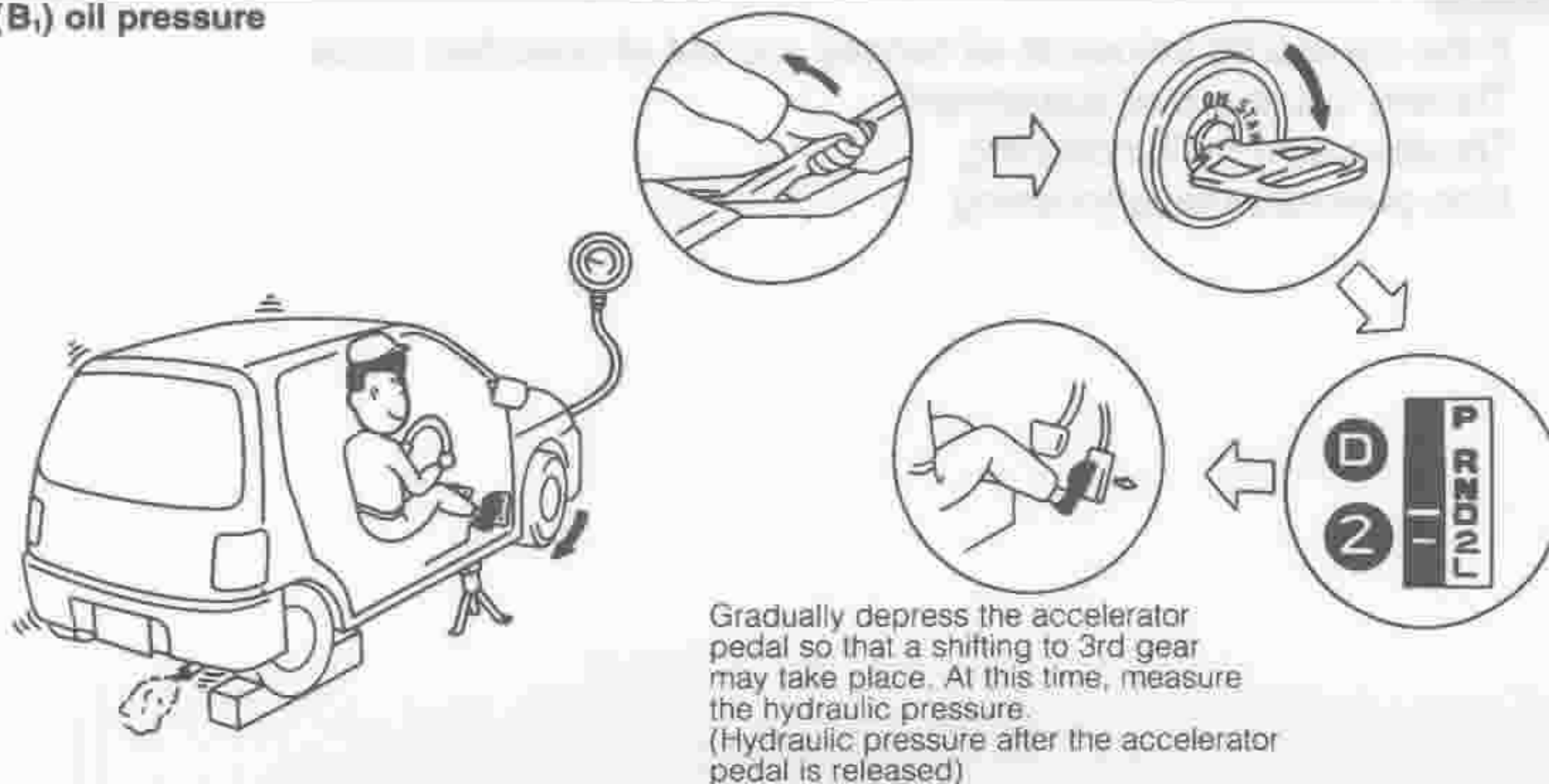


LAT00047-00042

Inspection of line (C₁, C₂ and B₂) and throttle pressure

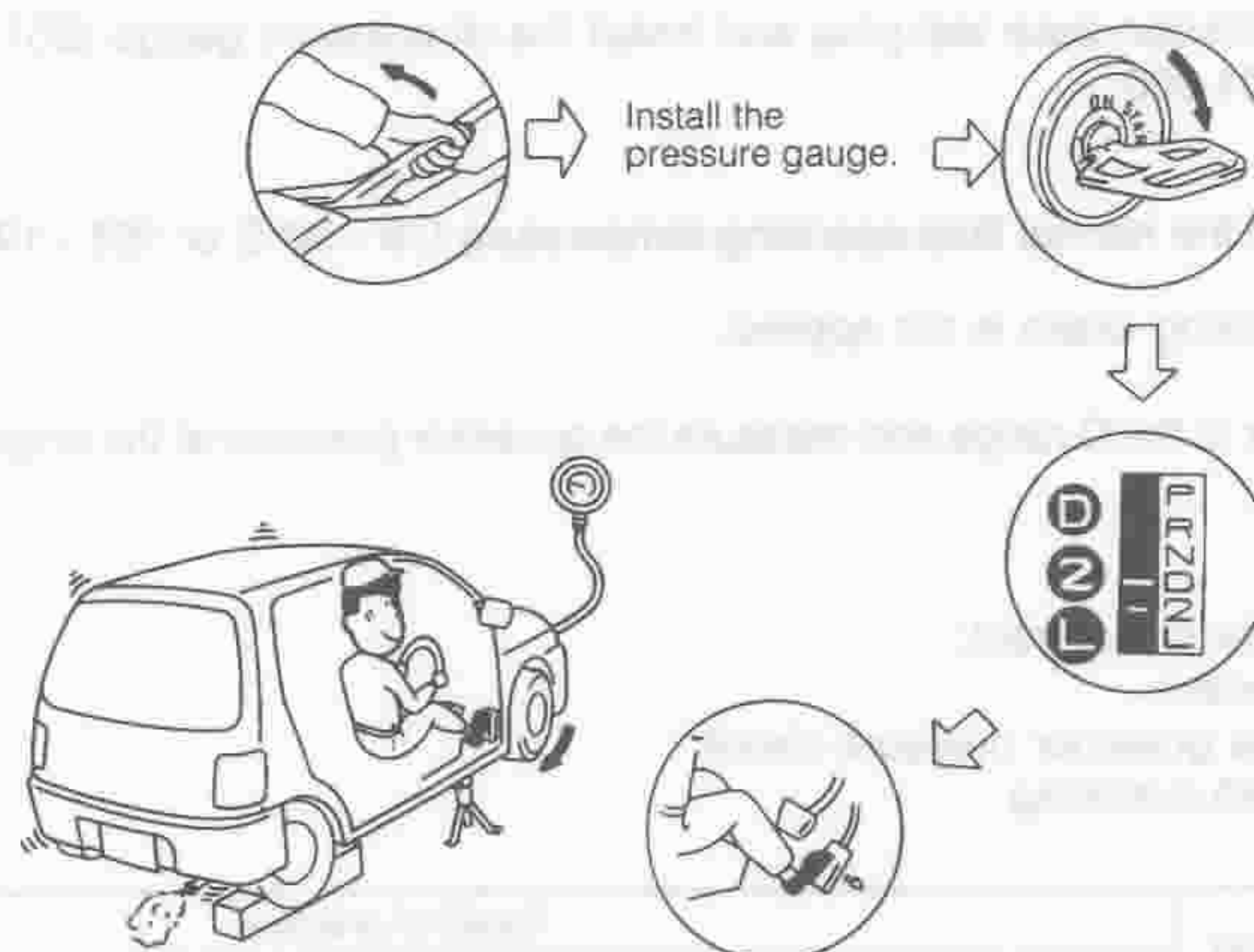


Inspection of line (B₁) oil pressure



LAT00000-00043

Inspection of line (B₁) oil pressure



Install the pressure gauge.

Gradually depress the accelerator pedal so that a shifting to 2nd gear may take place. At this time, measure the hydraulic pressure. (Hydraulic pressure after the accelerator pedal is released)

LAT00000-00044

4. Line pressure and throttle pressure specifications

Line pressure (C₁, C₂ and B₂), Throttle pressure specifications

Unit: kPa

	Engine RPM	Idling			Stall		
		ED-20	EF-EL	EF-CL	ED-20	EF-EL	EF-CL
Throttle pressure		Less than 29			753 - 835	469 - 551	
D range	(C ₂)	499 - 581	370 - 452		855 - 937	645 - 727	
R range	(C ₁ , B ₂)				1964 - 2046	1501 - 1583	

Line pressure (B₁) ... (Hydraulic pressure after shifting to 2nd gear took place)

Unit: kPa

	Engine RPM			
		ED-20	EF-EL	EF-CL
D range	(2nd)	444 - 636	315 - 507	
2 range	(2nd)	1909 - 2101	1446 - 1638	

In the case of D range (2nd gear), first depress the accelerator pedal so that a shifting to 2nd gear may take place. Then, release the accelerator pedal and take the reading at this time.

Reference of lubricating pressure during idling condition at time of D range:

More than 98 kPa (1 kgf/cm², 14 psi)

LAT00048-00000

CAUTION:

- Perform the test at the normal fluid operating temperature (70 - 90°C or 158 - 194°F).

(d) Ensure that the parking brake is not applied.

(e) Start the engine.

(f) Move the shift lever to the D range and measure the governor pressure at the engine speeds specified in the table.

Evaluation

If the governor pressure is incorrect:

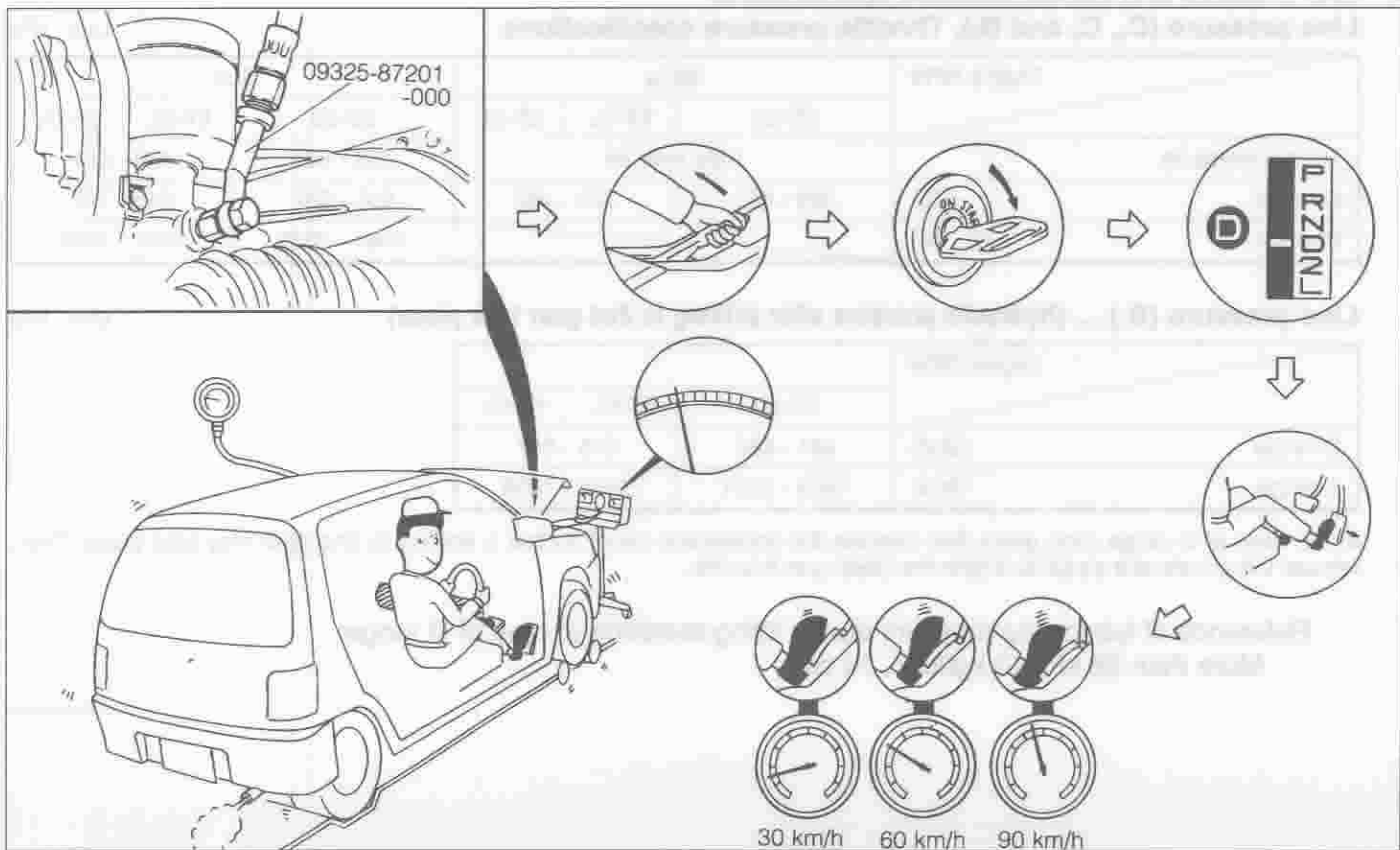
- Line pressure incorrect
- Fluid leakage in the governor pressure circuit
- Governor valve malfunctioning

Unit: kPa

Vehicle speed (Reference)	Governor pressure		
	ED-20	EF-EL	EF-CL
30 km/h	176 - 274	97 - 195	109 - 207
60 km/h	420 - 518	264 - 362	317 - 415
90 km/h	826 - 924	461 - 559	461 - 559

* Check the governor pressure at a vehicle speed of 90 km/h, following the procedure given below.

- (1) Accelerate the vehicle speed to 90 km/h, following the procedure given in the figure below.
- (2) Depress the brake pedal by your left foot so that the vehicle speed may be 90 km/h at a time when the accelerator pedal depressing amount is 40% or more. (This operation must be conducted in a shortest possible time.)
- (3) Under the condition of the step (2), read the governor pressure quickly.



6. Case Where Each Line Pressure and Throttle Pressure Are Deviated from Specified Values:
 (1) Proceed to "Case where all line pressures are deviated from specified value"

Malfunction Symptoms	Possible causes												
	Primary regulator valve malfunctioning	Release control valve malfunctioning	Valve body check ball defective	Throttle pressure improper	Oil filter restricted	Orifice restricted	Oil pump malfunctioning	Oil strainer "O" ring defective	Valve body/oil pump attaching bolts loose	Foreign matter lodged at mate surface of valve body and oil pump	Valve body and oil pump case casting porosity	Valve malfunctioning	C2, B1 accumulator malfunctioning
Line pressure is too high in R range only.	●									●	●		
Line pressure too high	●	●		●		●							
Line pressure is too low high in R range only.	●					●			●	●	●		
Line pressure is too low.	●	●	●	●	●	●	●	●	●	●	●	●	●
No line pressure is generated.	●						●						
Line pressure will not change.	●	●	●	●									
Line pressure pulsates.					●		●	●	●	●	●		
Hysteresis of line pressure is great.	●												

Perform the hydraulic pressure (throttle pressure) test.

OK

Remove the oil pan and oil strainer.

Check the oil strainer for restriction.

OK

Replace valve body. Is malfunction remedied?

NO

Remove the automatic transmission from the vehicle. Disassemble and check the automatic transmission. <Points>
Check the C₂, B₁ accumulators.
Check the oil pump.

NG

"Case where throttle pressure is deviated from specified value"

NG

Replace the oil strainer.

YES

The valve body is malfunctioning.

(2) Case where direct clutch (C₁) pressures is deviated from specified value:

Malfunction Symptoms	Possible causes									
	Line pressure improper	Direct clutch piston malfunctioning	Orifice restricted	C ₁ accumulator malfunctioning	Manual valve improperly adjusted	Valve body/oil pump attaching bolts loose	Valve body and oil pump casing porosity	Foreign matter lodged at mate surface of valve body and oil pump	2nd brake band malfunctioning	
Direct clutch pressure is too high.	●									
Direct clutch pressure too low.	●	●	●	●	●	●	●	●	●	●
Are other line pressures normal? NG Proceed to "Case where all line pressures are deviated from specified value." Remove the oil pan. Is adjustment of the neutral switch of the manual valve OK? NG Adjust the neutral position of the manual valve. Replace valve body. Is malfunction remedied? YES The valve body is malfunctioning Remove the automatic transmission from the vehicle. Disassemble and check the automatic transmission. <Points> Disassemble and check the direct clutch. Disassemble and check the 2nd brake band. Check the C₁ accumulator.										

(3) Case where forward clutch (C₂) pressures is deviated from specified value:

Malfunction Symptoms	Possible causes								
	Line pressure improper	Forward clutch piston malfunctioning	Orifice restricted	C ₂ accumulator malfunctioning	Manual valve improperly adjusted	Valve body/oil pump attaching bolts loose	Valve body and oil pump casting porosity	Foreign matter lodged at mate surface of valve body and oil pump	Oil pump malfunctioning
Forward clutch pressure is too high.	●								
Forward clutch pressure too low.	●	●	●	●	●	●	●	●	●

Are other line pressures normal?
↓ OK
Remove the oil pan.
↓
Is adjustment of the neutral switch of the manual valve OK?
↓ OK
Replace valve body. Is malfunction remedied?
↓ NO
Remove the automatic transmission from the vehicle.
Disassemble and check the automatic transmission.
<Points>
Disassemble and check the forward clutch.
Replace the oil pump.
Check the C₂ accumulator.

NG → Proceed to "Case where all line pressures are deviated from specified value."
NG → Adjust the neutral position of the manual valve.
YES → The valve body is malfunctioning

Malfunction Symptoms	Pos								
	Line pressure improper	2nd brake band piston malfunctioning	Orifice restricted	B ₁ accumulator malfunctioning	1-2 shift valve malfunctioning	Manual valve improperly adjusted	Valve body/oil pump attaching bolts loose	Valve body, piston and pump casting porosity	Foreign matter lodged at mate surface of valve body and
2nd brake band pressure is too high.	●								
2nd brake band pressure too low.	●	●	●	●	●	●	●	●	●
Are other line pressures normal? NG → Proceed to "Case where all line pressures are deviated from specified value." OK → Remove the oil pan. Is adjustment of the neutral switch of the manual value OK? NG → Adjust the neutral position of the manual valve. OK → Replace valve body. Is malfunction remedied? Replace valve body. Is malfunction remedied? YES → The valve body is malfunctioning NO → Remove the automatic transmission from the vehicle. Disassemble and check the automatic transmission. <Points> Disassemble and check the 2nd brake band. Check the B₁ accumulator.									

(5) Case where 2nd brake band (B_1) backpressure is deviated from specified value:

Malfunction Symptoms	Possible causes									
	Line pressure improper	2nd brake band piston malfunctioning	Rear clutch piston malfunctioning	Orifice restricted	Manual valve improperly adjusted	Valve body/oil pump attaching bolts loose	Valve body and oil pump casting porosity	Foreign matter lodged at mate surface of valve body and oil pump	2-3 shift valve and timing valve malfunctioning	
Rear clutch pressure is too high.	●									
Rear clutch pressure too low.	●	●	●	●	●	●	●	●	●	●

Are other line pressures normal?

NG

Proceed to "Case where all line pressures are deviated from specified value."

OK

Remove the oil pan.

Is adjustment of the neutral switch of the manual valve OK?

NG

Adjust the neutral position of the manual valve.

OK

Replace valve body. Is malfunction remedied?

YES

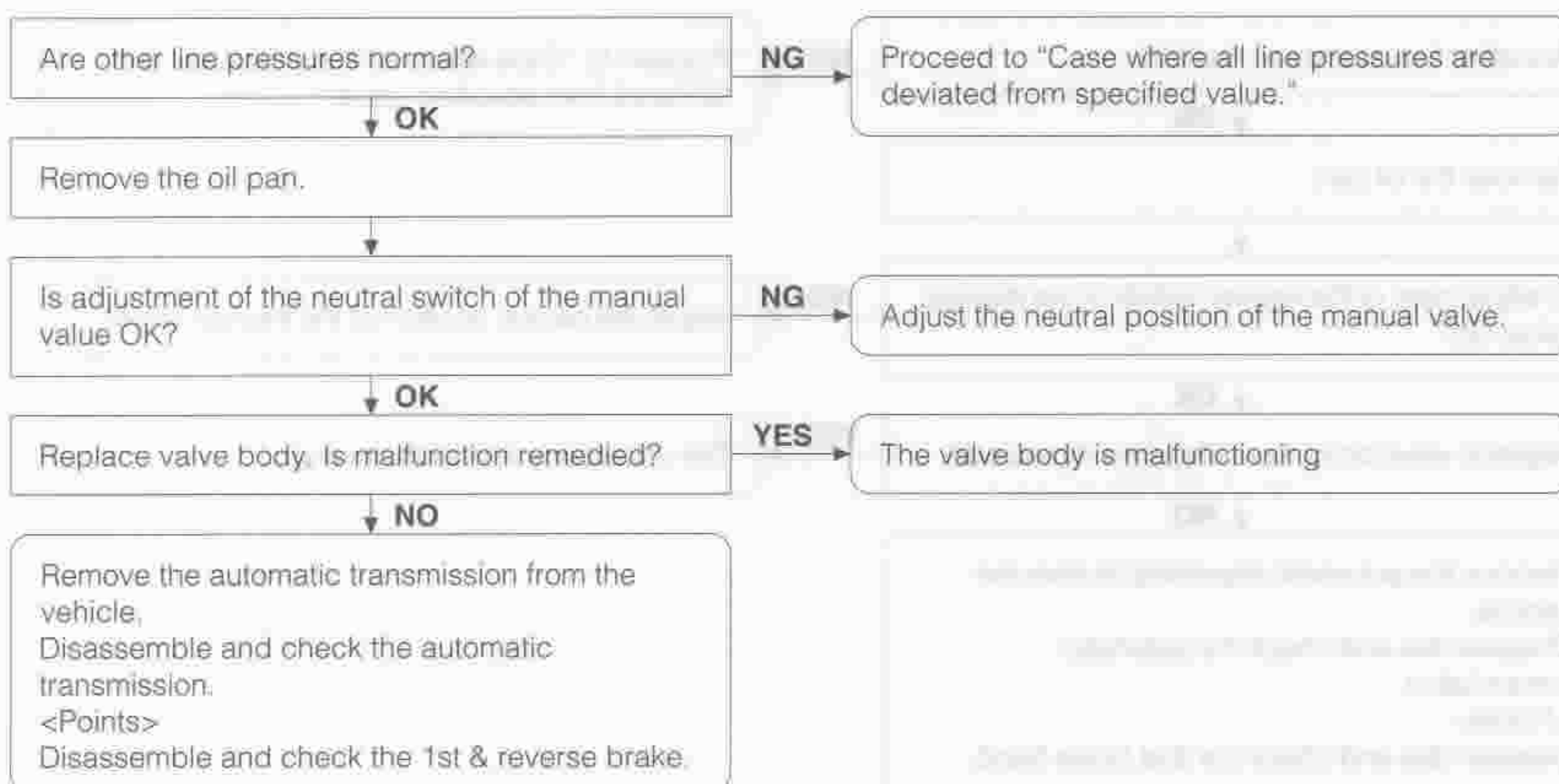
The valve body is malfunctioning

NO

Remove the automatic transmission from the vehicle.
Disassemble and check the automatic transmission.
<Points>
Disassemble and check the 2nd brake band.

(6) Case where 1st & reverse brake (B₂) pressure is deviated from specified value:

Malfunction Symptoms	Possible causes						
	Line pressure improper	1st & reverse brake piston malfunctioning	Orifice restricted	Manual valve improperly adjusted	Valve body attaching bolts loose	Valve body and piston casting porosity	Foreign matter lodged at mate surface of valve body and oil pump
1st & reverse brake pressure is too high.	●						
1st & reverse brake pressure too low.	●	●	●	●	●	●	●



(7) Case where throttle pressures is deviated from specified value:

Malfunction Symptoms	Possible causes												
	Line pressure improper	Throttle valve malfunctioning	Oil filter restricted	Orifice restricted	Valve body attaching bolts loose	Foreign matter lodged at mate surface of valve body	Valve body casting porosity	Throttle cable improperly adjusted	1-2 shift valve, 2-3 shift valve malfunctioning	Throttle cam retaining bolt loose	Throttle cam cable disconnected	Throttle cable broken	Neutral position of manual valve improperly adjusted
Throttle pressure too high	●	●		●		●	●	●	●				
Throttle pressure too low	●	●	●		●	●	●	●	●				●
No throttle pressure is generated.		●	●										
Throttle pressure will not change.		●		●						●	●	●	
Throttle pressure pulsates.	●	●		●									
Hysteresis of throttle pressure is great.		●											

Is adjustment of throttle cable OK?

NG

Adjust throttle cable.

↓ OK

Perform the hydraulic pressure (line pressure) test.

NG

Proceed to "Case where line pressure is deviated from specified value."

↓ OK

Is adjustment of the neutral switch of the manual valve OK?

NG

Adjust the neutral position of the manual valve.

↓ OK

Replace valve body.

(8) Case where governor pressures is deviated from specified value:

Malfunction Symptoms	Possible causes									
	Line pressure improper	Governor valve malfunctioning	Oil filter restricted	Governor washer, ball defective	Governor valve, valve body attaching bolts loose	Foreign matter lodged at mate surface of valve body	Valve body casting porosity	1-2 shift valve, 2-3 shift valve, timing valve malfunctioning	C ₂ , B ₁ accumulator malfunctioning	Manual valve improperly adjusted
Governor pressure too high	●	●		●	●					
Governor pressure too low	●	●	●	●	●	●	●	●	●	
No governor pressure is generated.	●	●	●	●						●
Governor pressure will not change.		●		●	●	●	●			
Governor pressure is generated in [N] , [R] and [P] .					●	●	●			●
Governor pressure pulsates.	●	●								
Hysteresis of governor pressure is great.	●	●			●	●	●			

Check governor valve.

NG

Replace governor valve.

OK

Perform the hydraulic pressure (line pressure) test.

NG

Proceed to "Case where line pressure is deviated from specified value."

OK

Replace oil pan.

Is adjustment of the neutral switch of the manual value OK?

NG

Adjust the neutral position of the manual valve.

OK

Replace valve body. Is malfunction remedied?

YES

The valve body is malfunctioning

NO

Remove the automatic transmission from the vehicle. Disassemble and check the automatic transmission.
<Points>
Check C₂, B₁ accumulators.

ROAD TEST

CAUTION:

- Perform this test at the normal fluid operating temperature (70°C - 80°C or 150°F - 176°F)

1. D range test.

Move the Shift lever to the D range, while driving with the accelerator pedal fully depressed, check the following points:

- (a) Check that the 1-2 and 2-3 up-shifts take place and also that the shift points conform to those in the automatic shift schedule.

- (b) In the same manner, check for shocks and the slippage during 1-2 and 2-3 up-shifts.

- (c) While running in the 3rd gear of D range, check to see if the vehicle emits any abnormal noise or vibration.

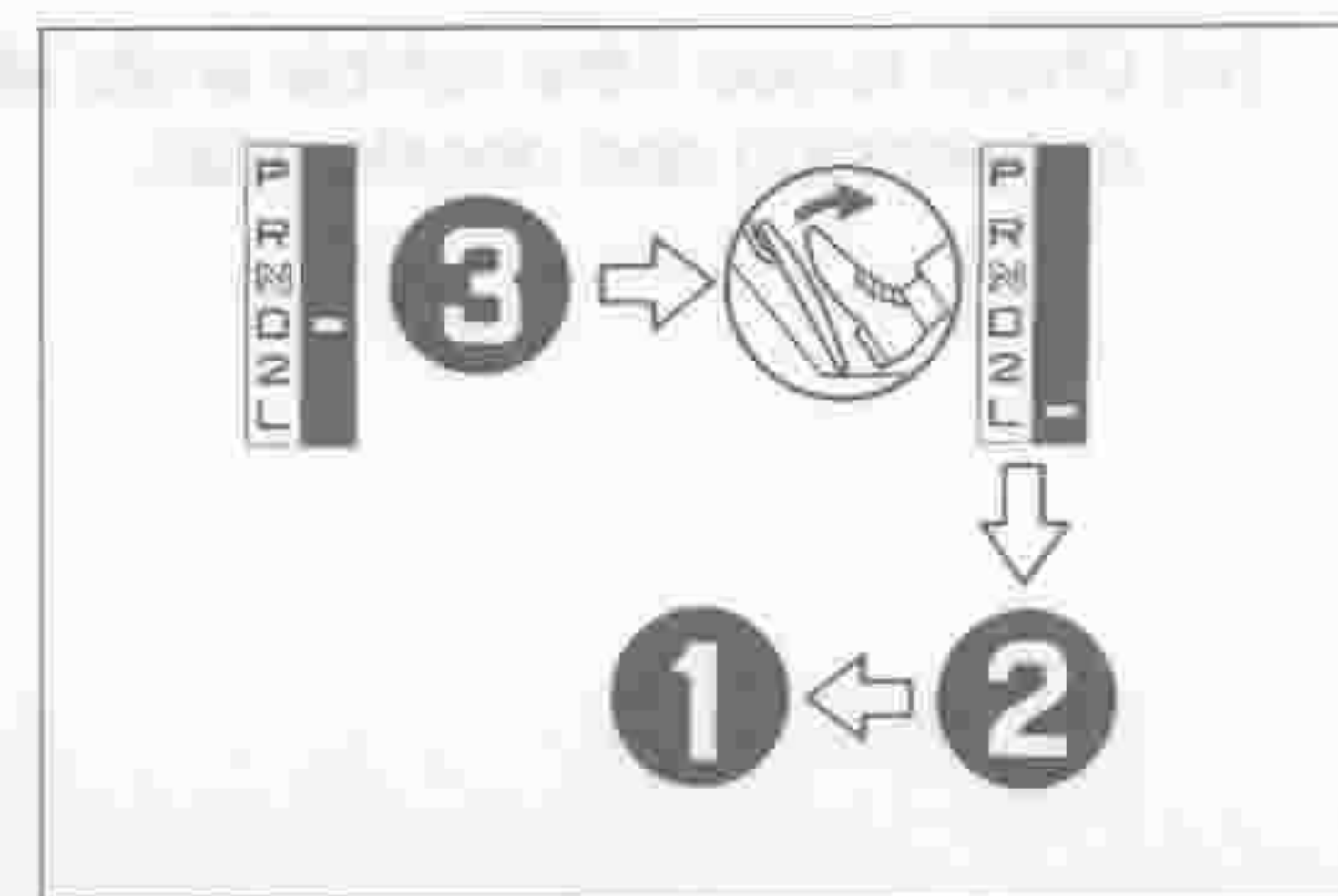
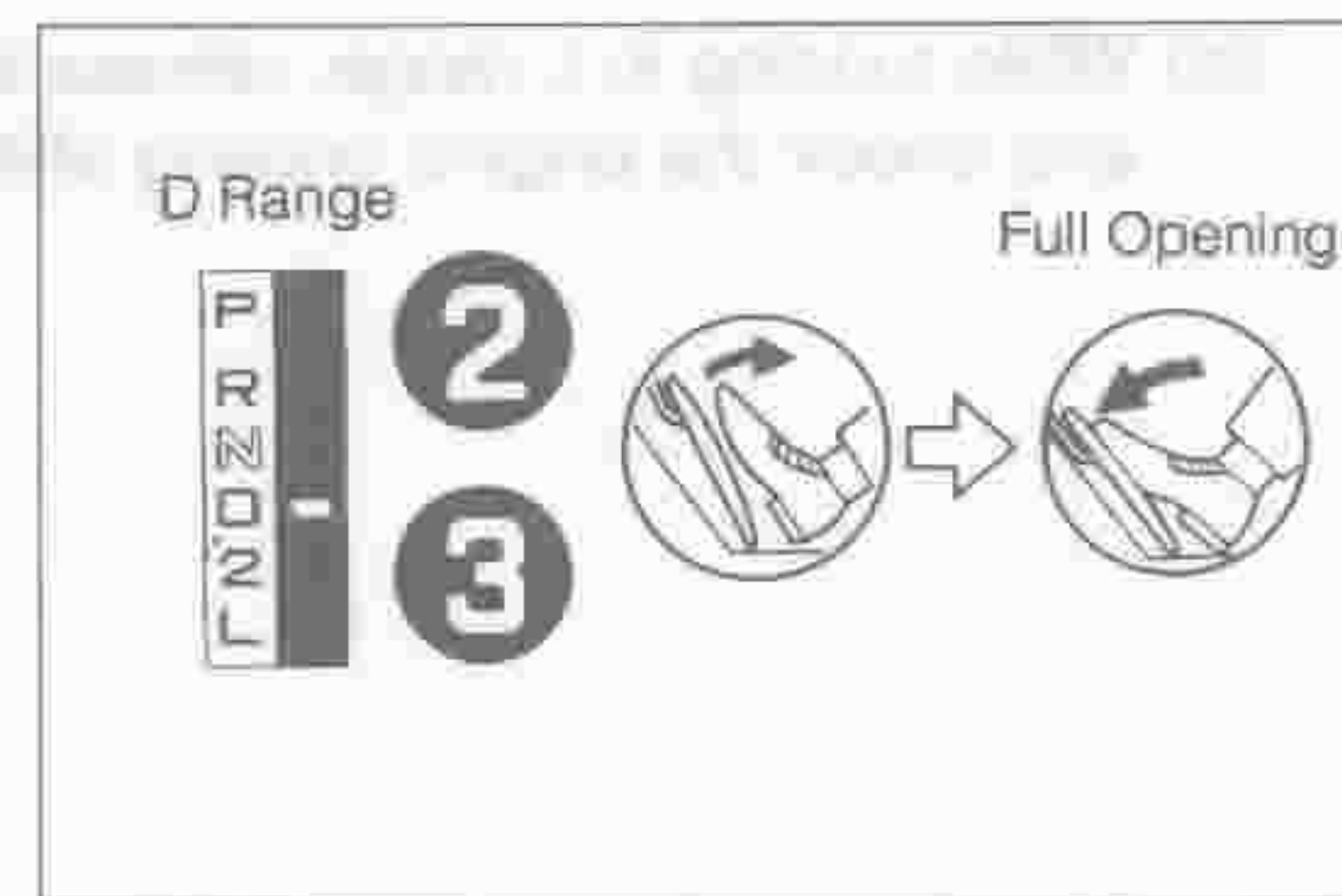
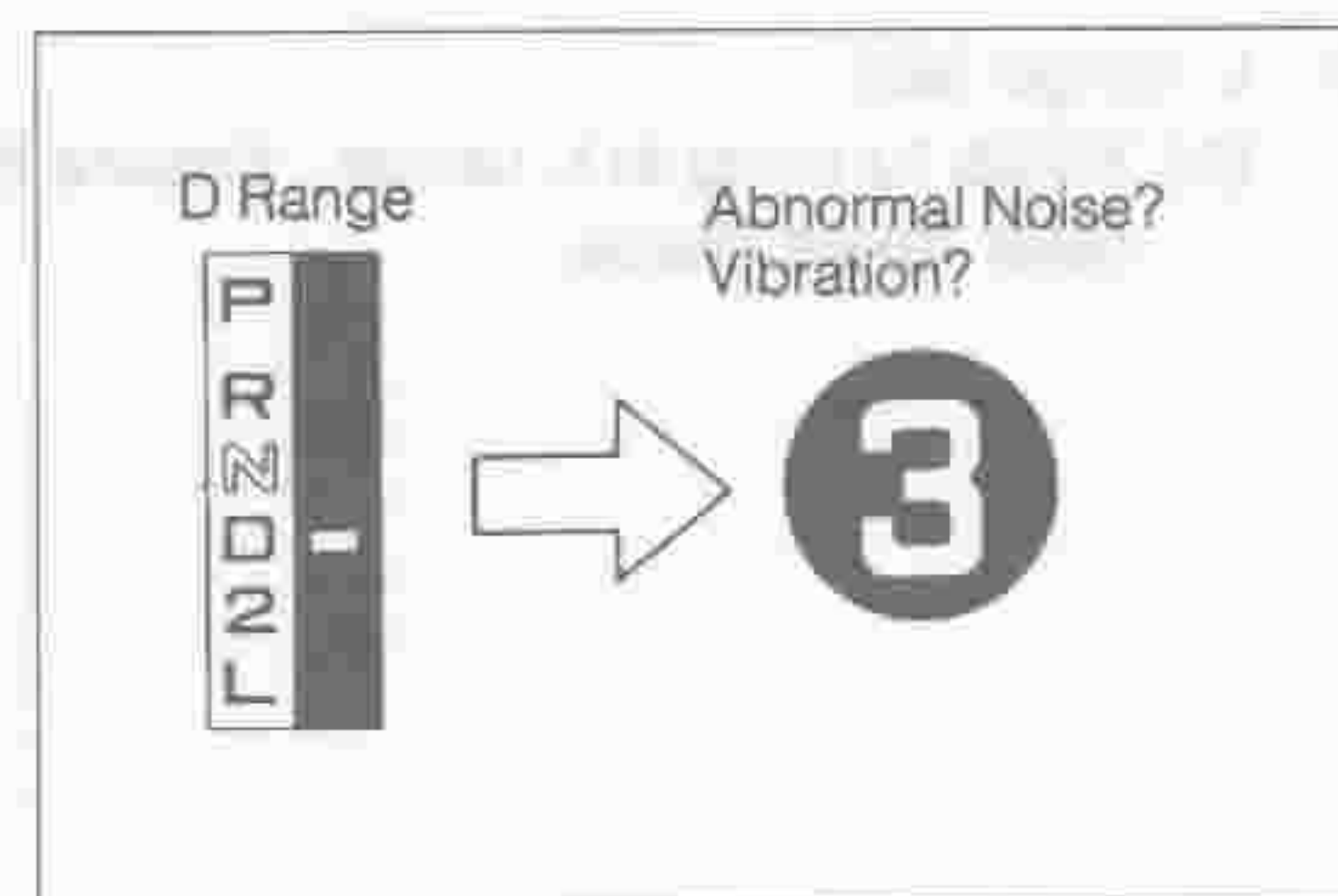
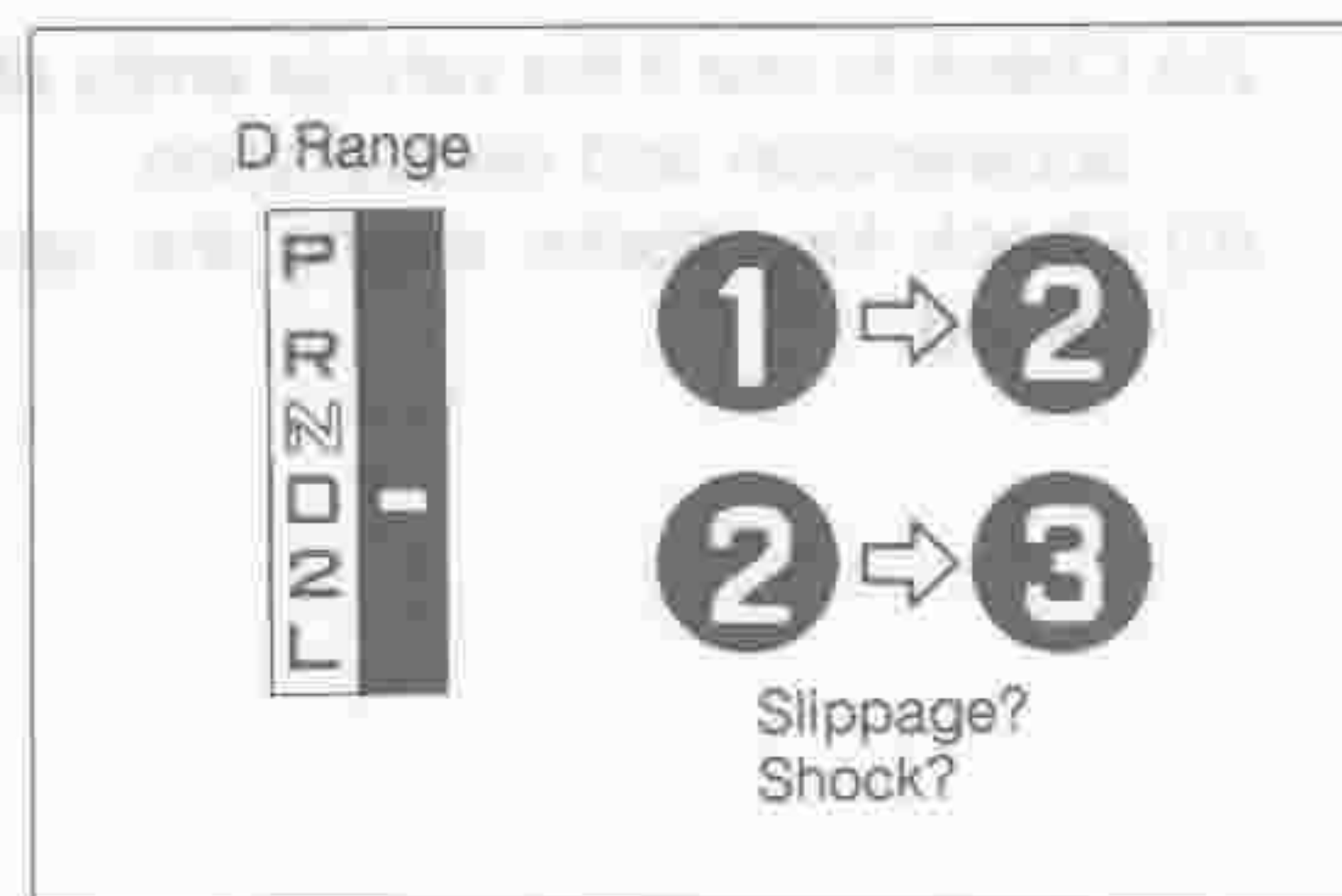
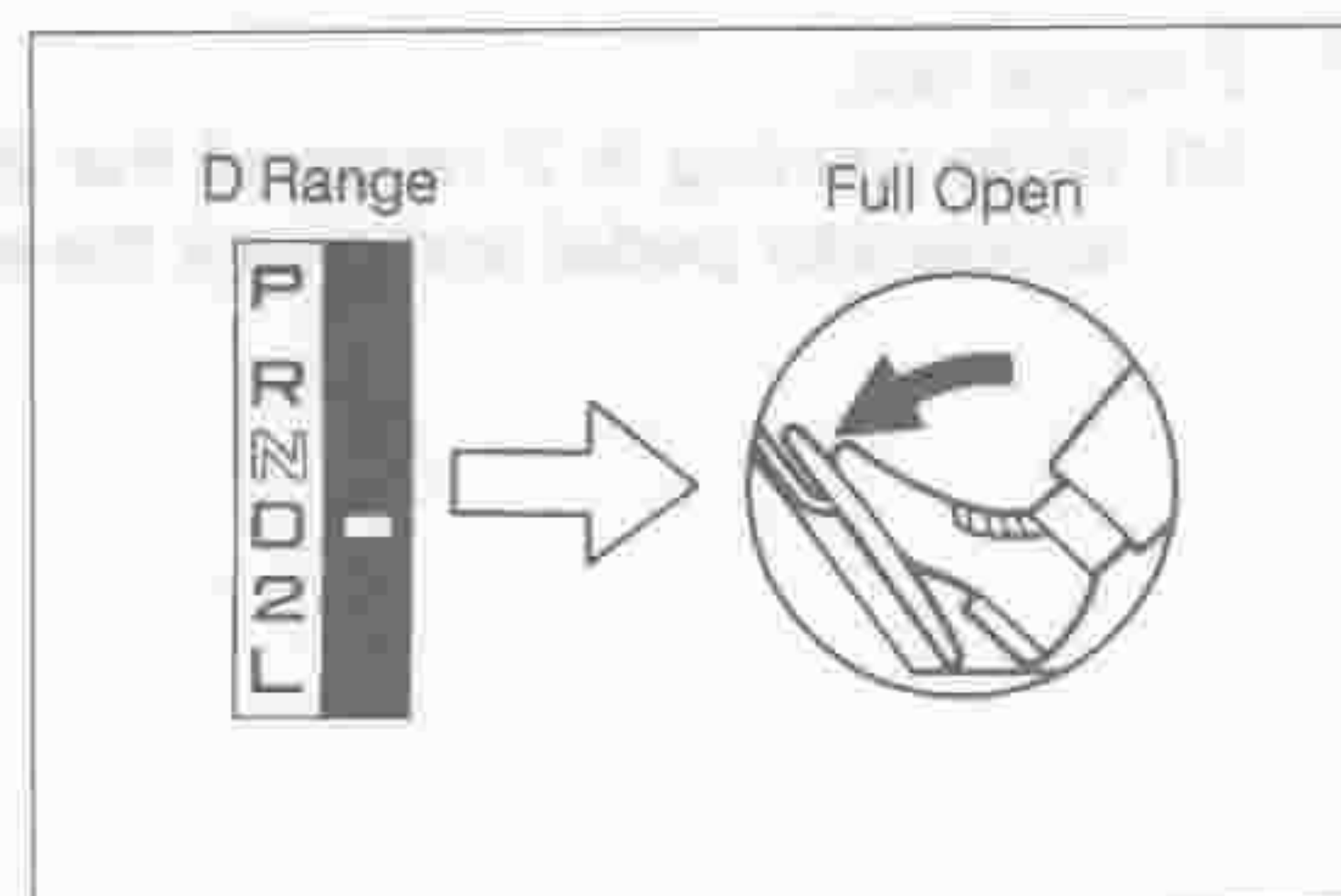
NOTE:

- Extreme care must be exercised during Check for cause of abnormal noise and vibration. These symptoms are caused often by imbalance in the drive shaft, differential, tires, torque converter, etc..

- (d) While running in the 3rd gear of D range, Ensure that the kick-down vehicle speed limits for the 3-1 and 3-2 kick-downs conform to those indicated in the automatic shift schedule.

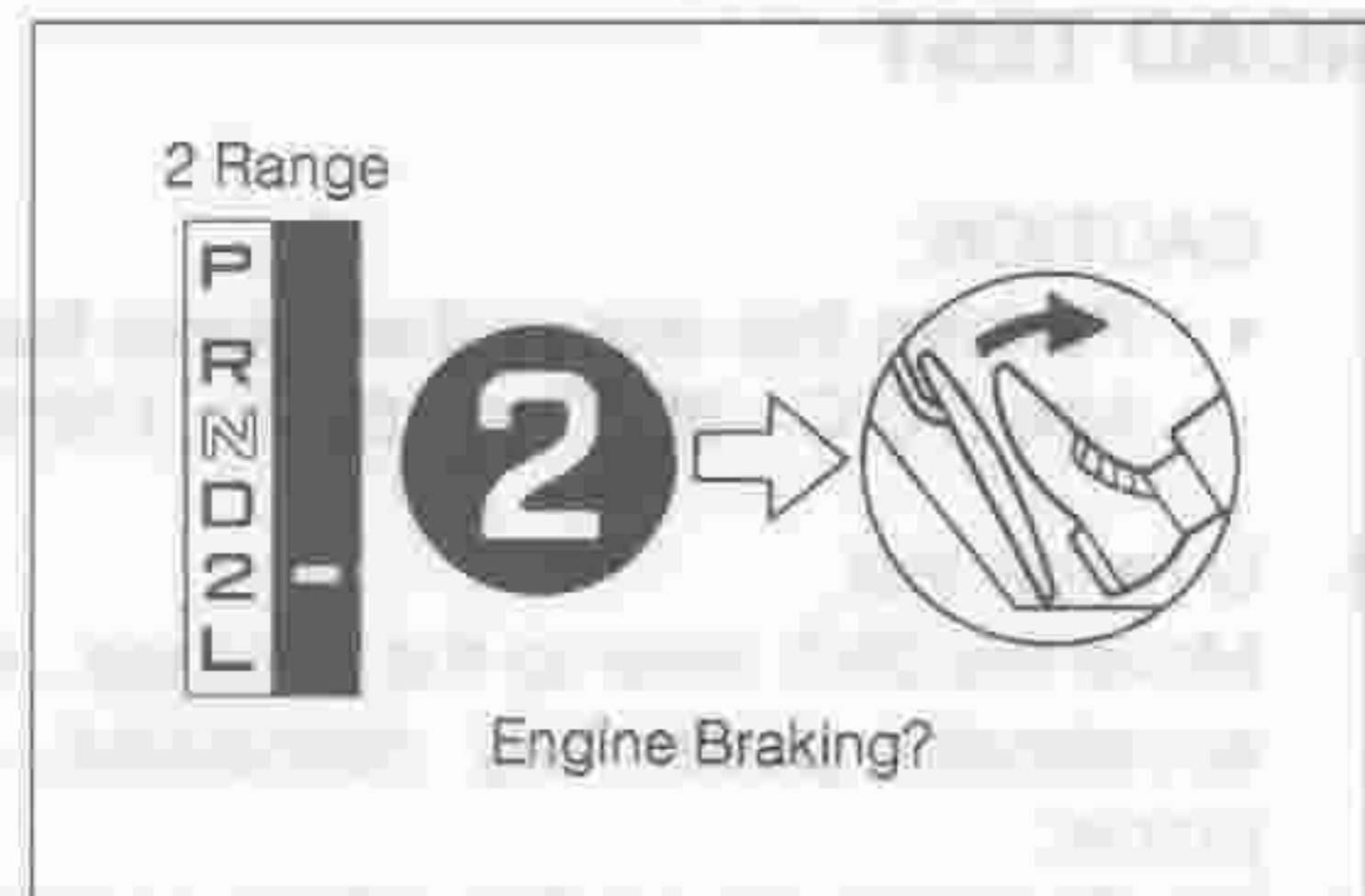
- (e) Check for abnormal shocks and slippage during the kick-down.

- (f) While running at a speed of about 60 km/h (37 mph) in the 3rd gear of the D range, release your foot from the accelerator pedal and move the shift lever to the L range. Then check to see if the 2-1 down-shift point conform to those indicated in the automatic shift schedule.

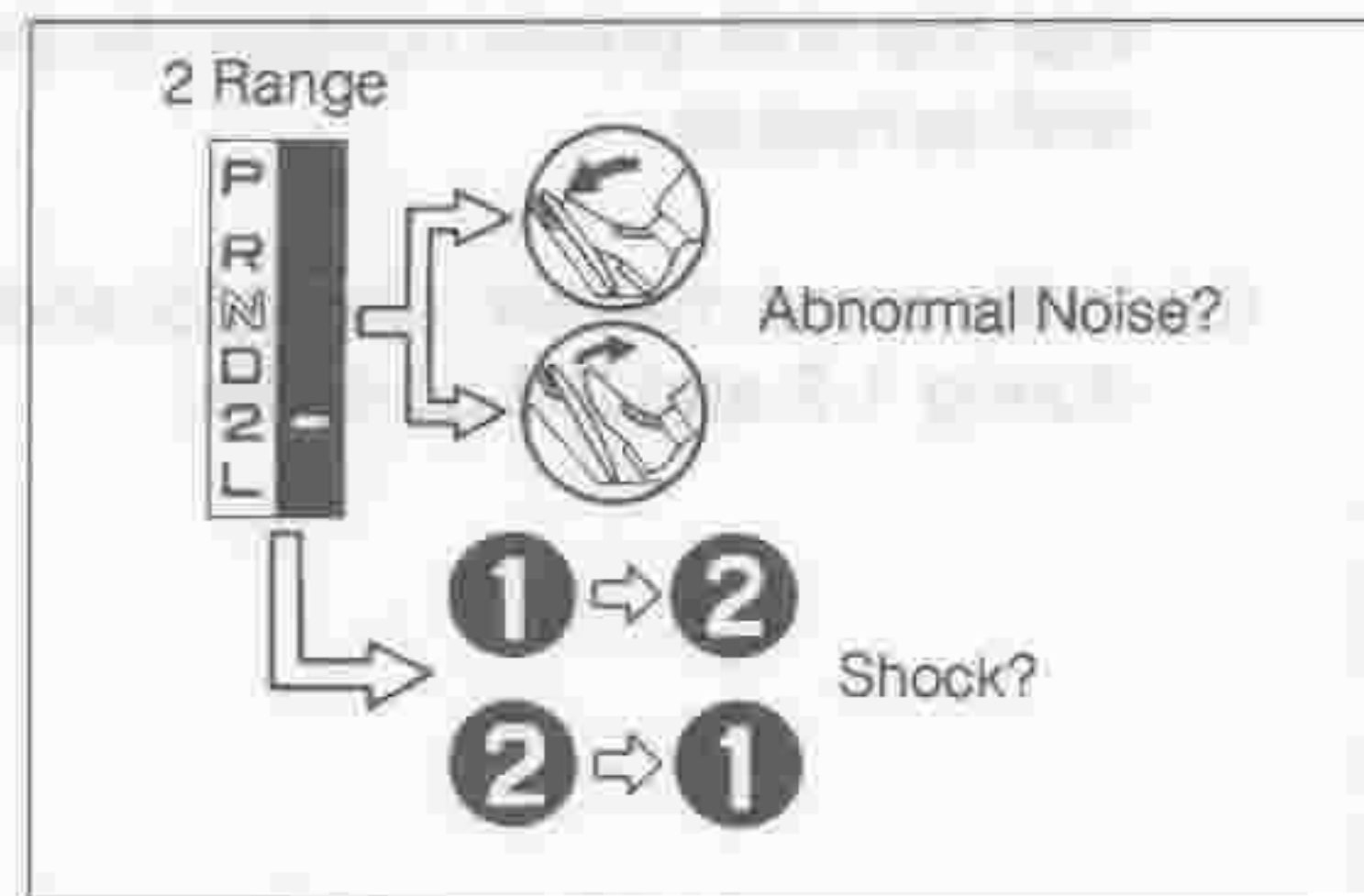
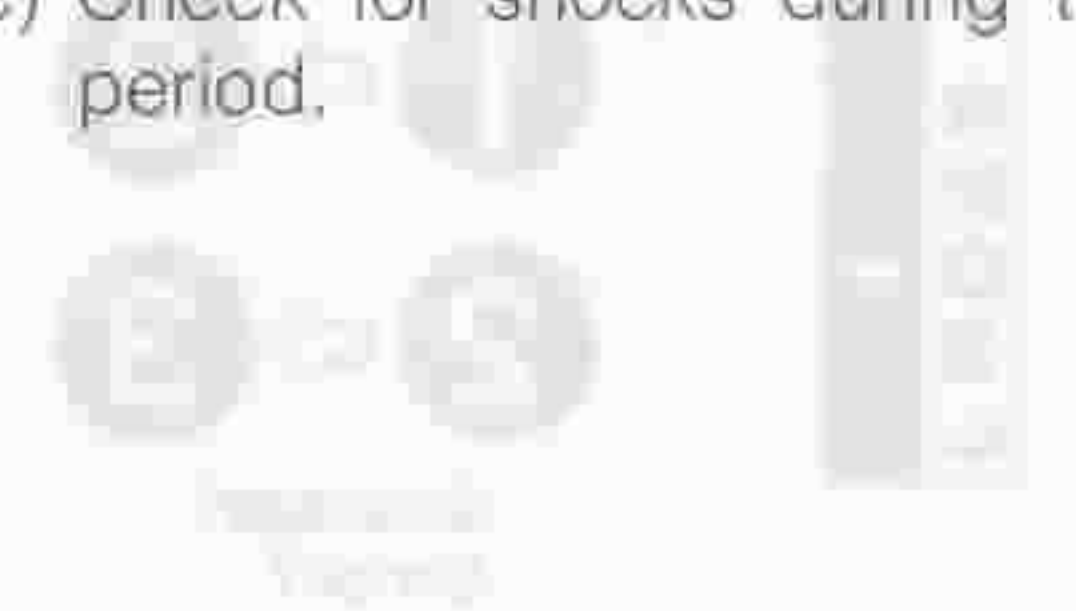


2. 2 range test.

- (a) While running in 2 range of the 2nd gear, release the accelerator pedal and check the engine braking effect.

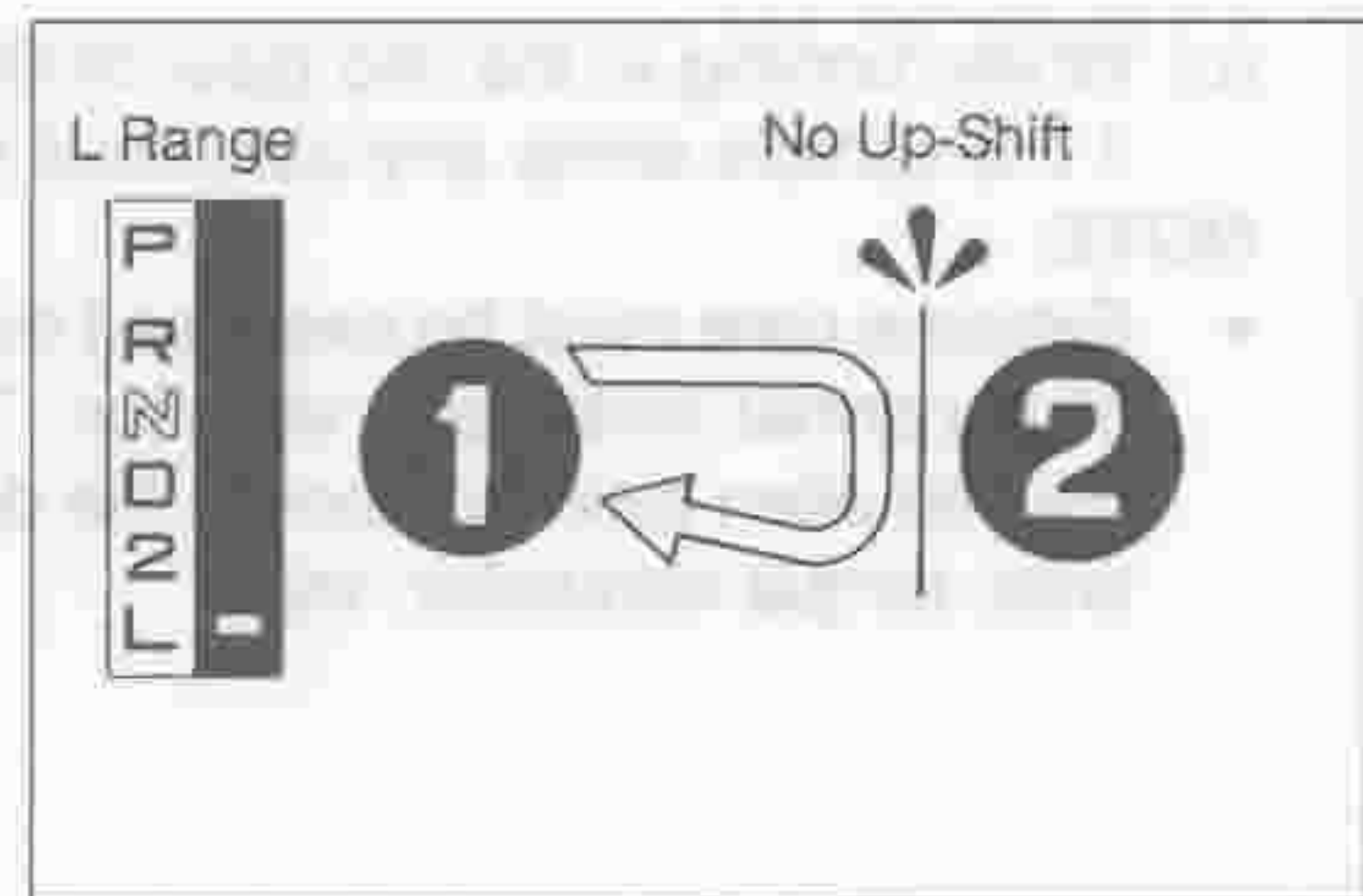


- (b) Check to see if the vehicle emits abnormal noise during acceleration and deceleration.
- (c) Check for shocks during the up-shift and down-shift period.

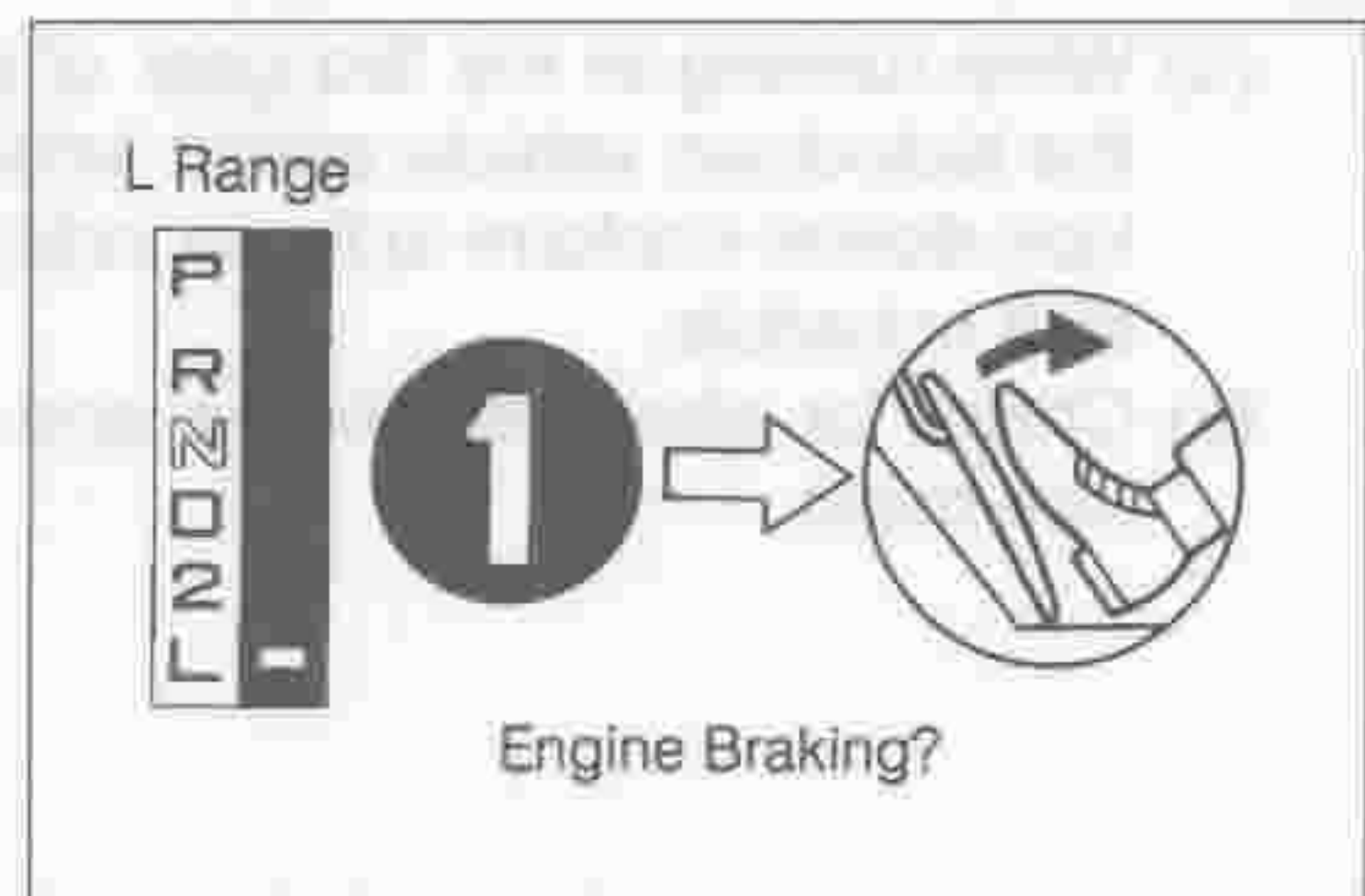


3. L range test.

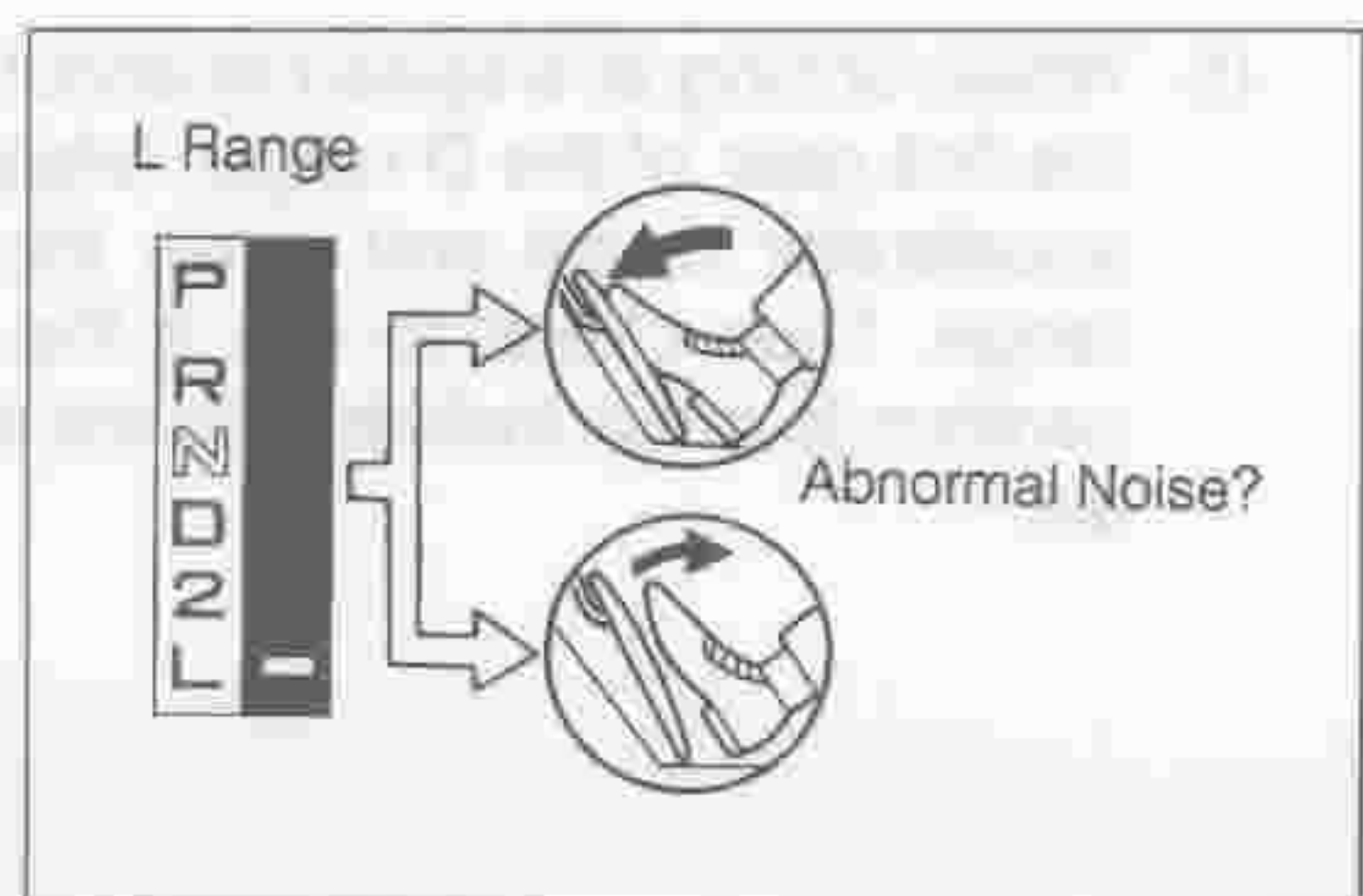
- (a) While running in L range, Ensure that no up-shift to 2nd gear takes place.



- (b) While running in L range, release the accelerator pedal and check the engine braking effect.

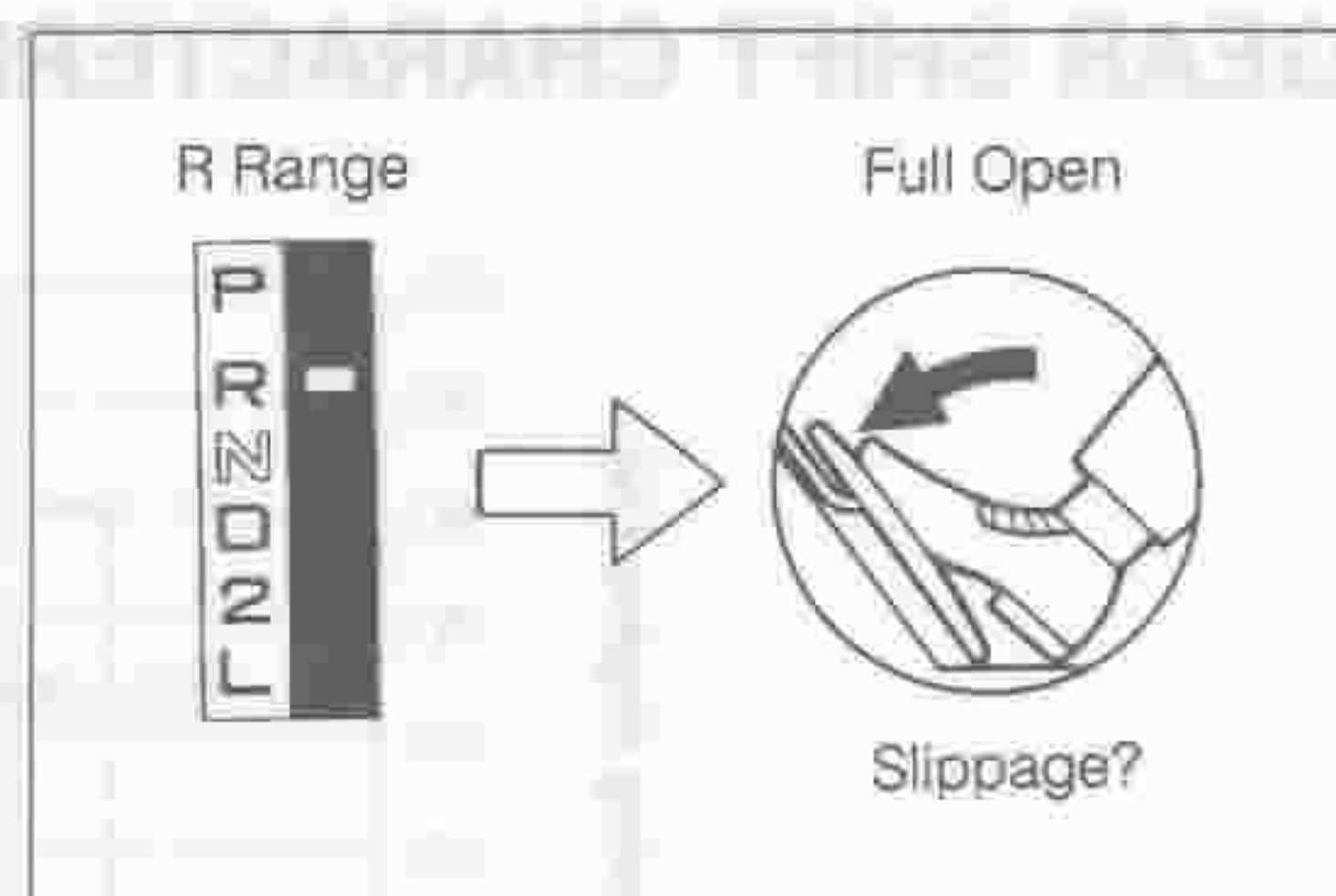


- (c) Check to see if the vehicle emits abnormal noise during acceleration and deceleration.



4. R range test.

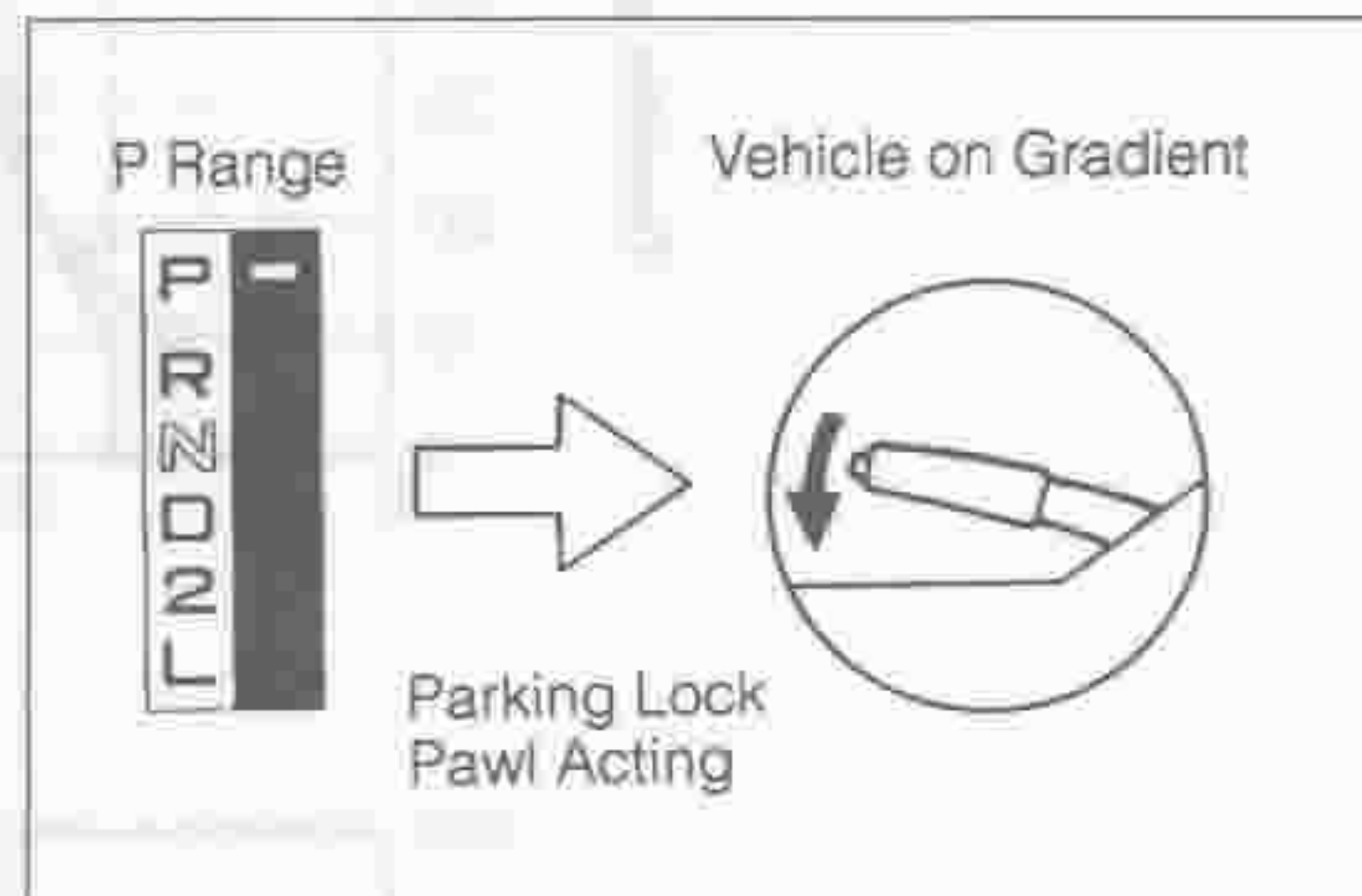
Move the Shift lever to R range and, while running at full throttle, check to see if slippage is taking place.



LAT00248-00303

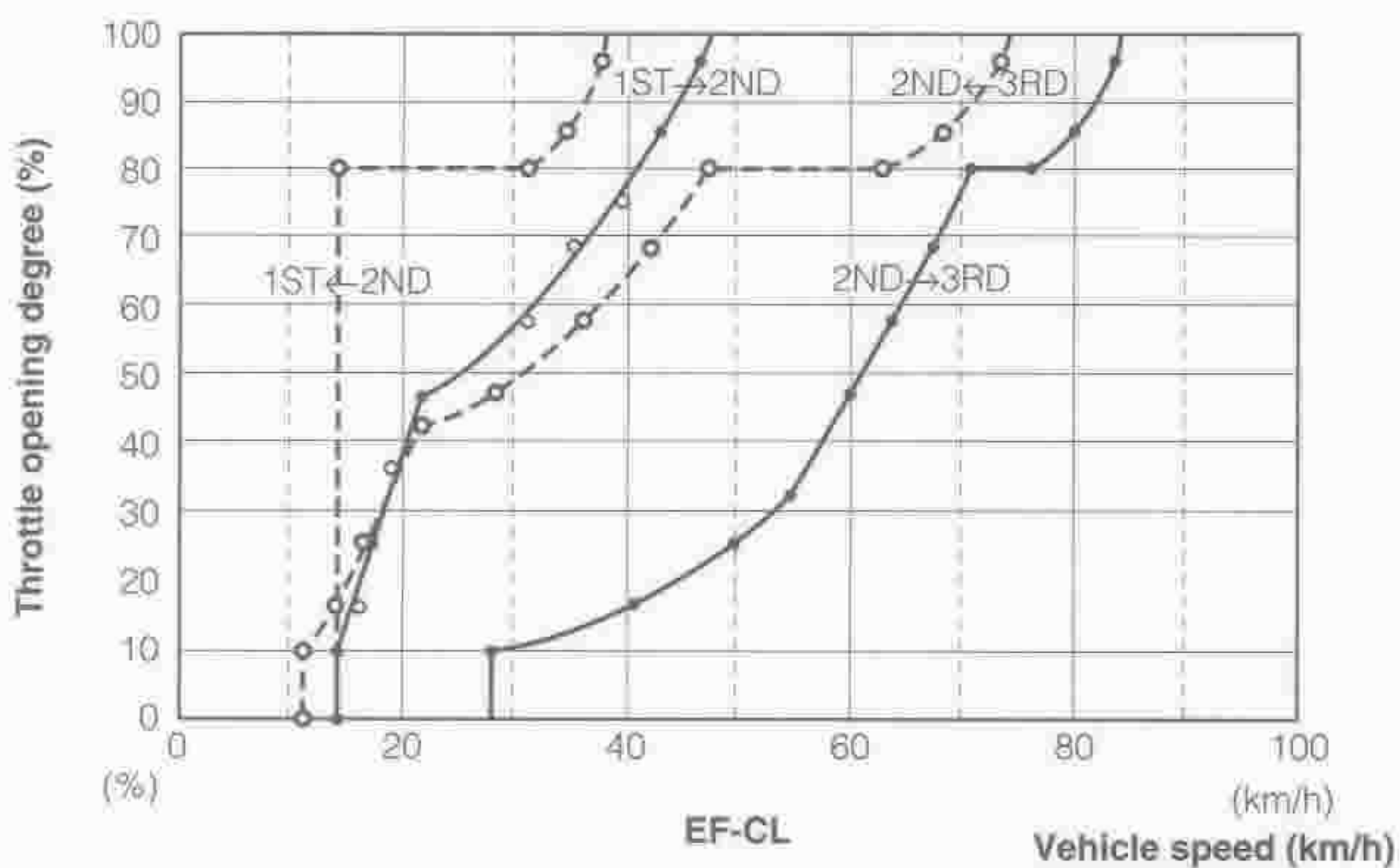
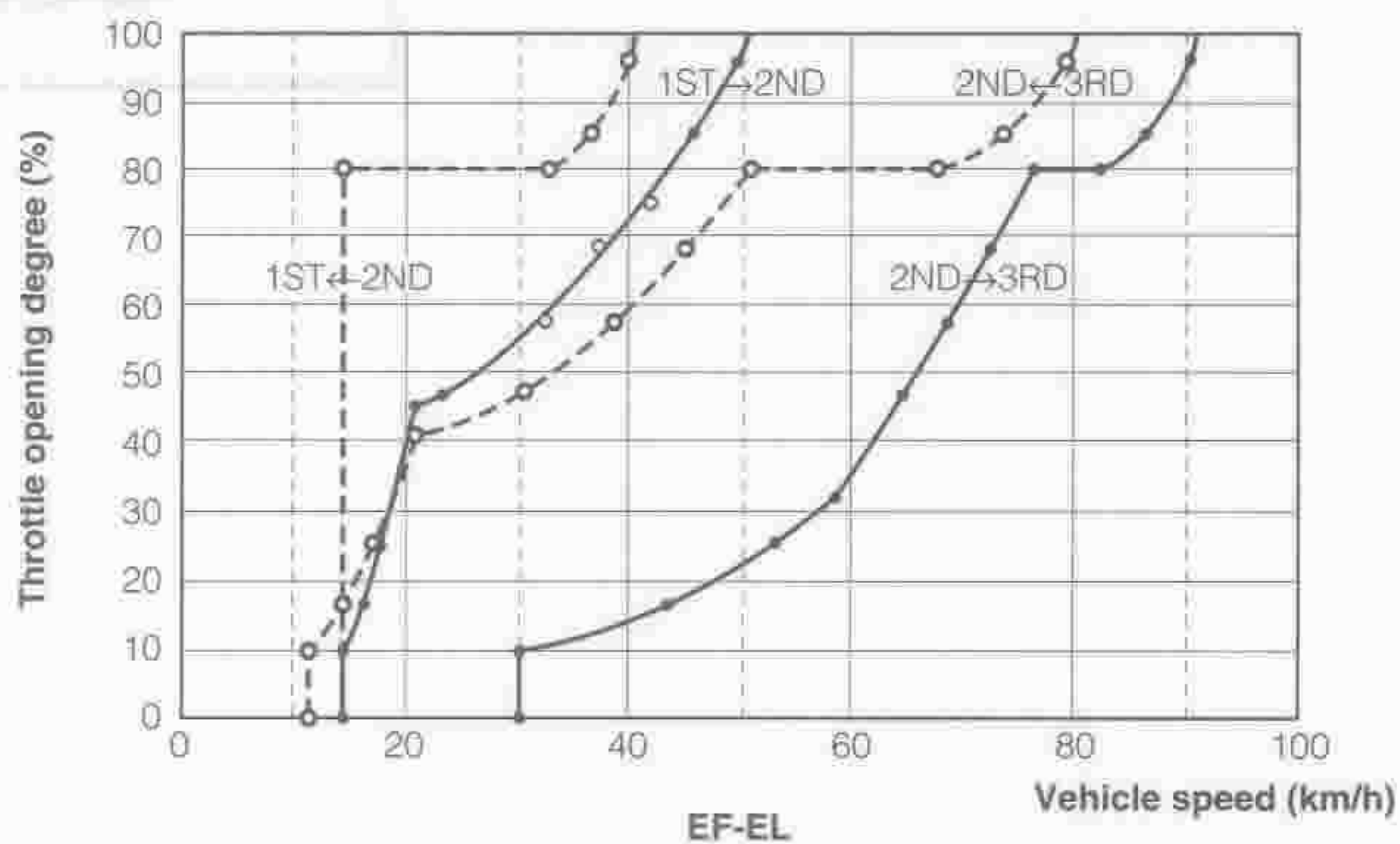
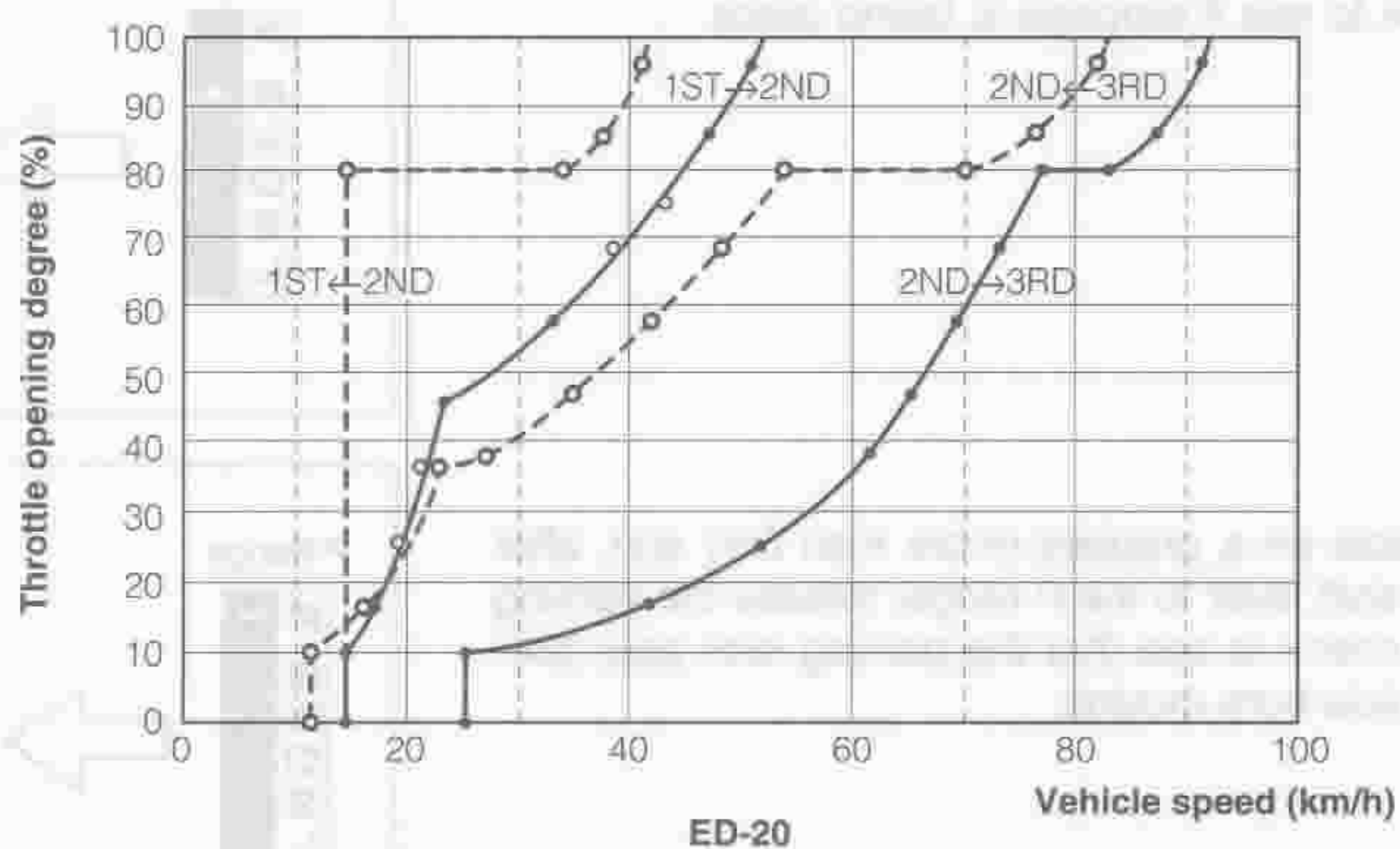
5. P range test.

Stop the vehicle on a gradient (more than 5%) and, after moving the shift lever to the P range, release the parking brake. Then check to see that the parking lock pawl prevents the vehicle from moving.



LAT00249-00304

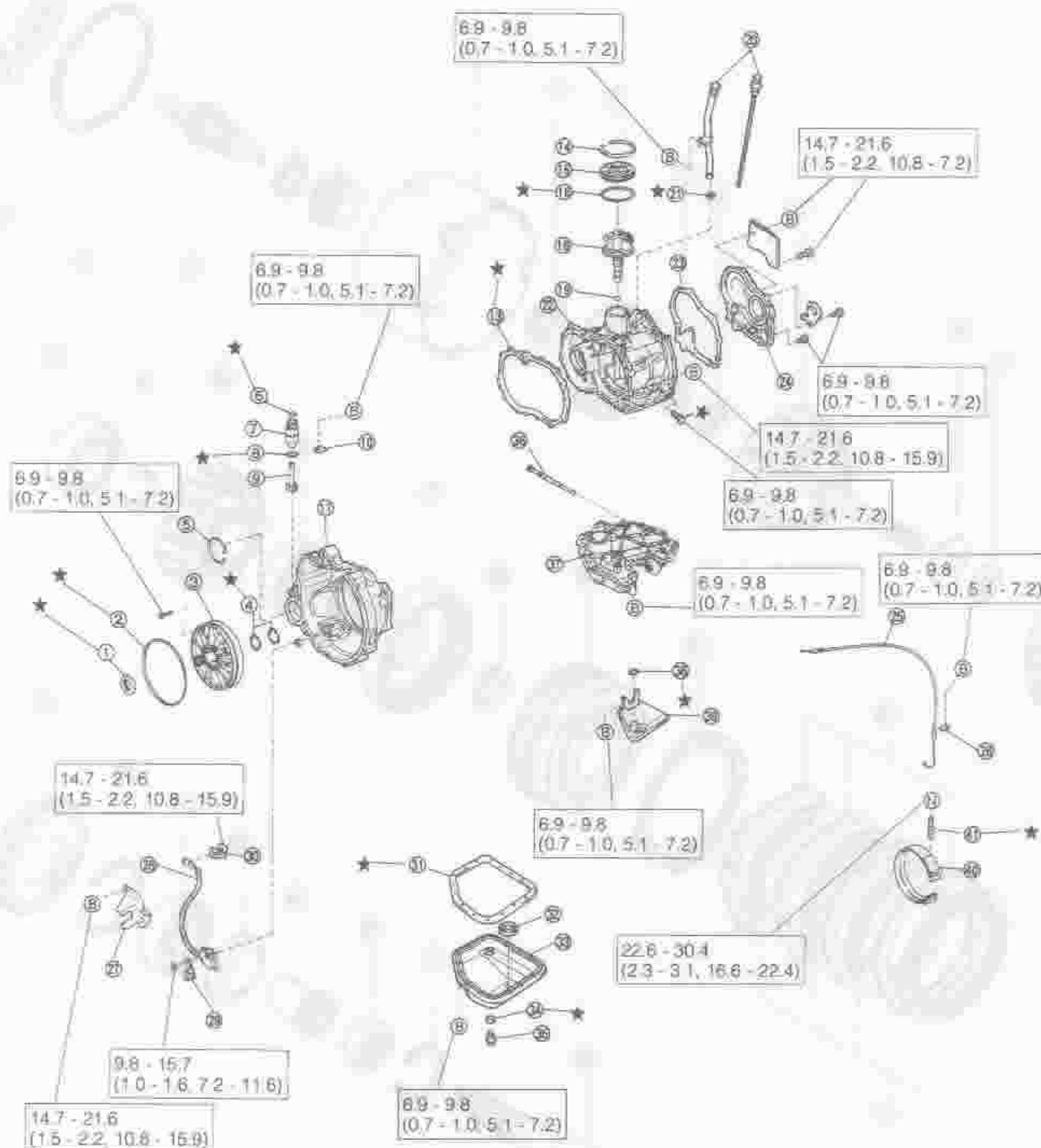
GEAR SHIFT CHARACTERISTICS DIAGRAM



COMPONENTS

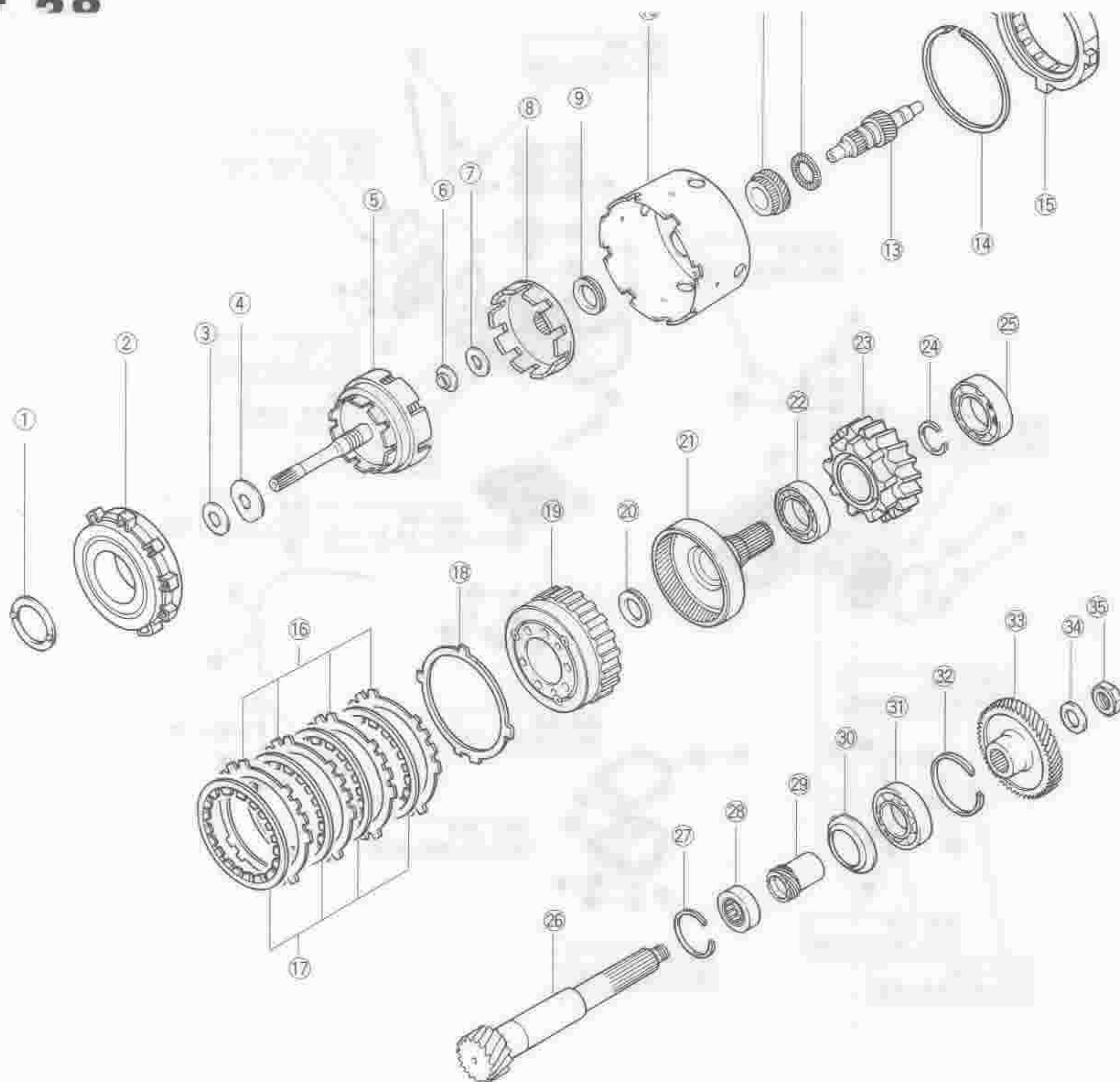
COMPONENTS (POWER PARTS)

□ : Tightening torque
Unit : N·m (kgf-m, ft-lb)
★ : Non-reusable parts



- ① T-type oil seal
- ② O-ring
- ③ Stator shaft & oil pump assembly
- ④ Clutch drum oil seal ring
- ⑤ Hole snap ring
- ⑥ V-type oil seal
- ⑦ Speedometer shaft sleeve subassembly
- ⑧ O-ring
- ⑨ Speedometer driven gear
- ⑩ Speedometer sleeve lock plate
- ⑪ Torque converter & differential case
- ⑫ Differential tube
- ⑬ Transmission case gasket
- ⑭ Hole snap ring
- ⑮ Governor cover
- ⑯ O-ring
- ⑰ Washer
- ⑱ Governor body assembly
- ⑲ Ball
- ⑳ Transmission oil filler tube subassembly
- ㉑ O-ring

- ㉒ Transaxle case
- ㉓ Transaxle case rear cover gasket
- ㉔ Rear transmission case cover subassembly
- ㉕ Throttle cable
- ㉖ Speedometer sleeve lock plate
- ㉗ Control cable bracket
- ㉘ Neutral start switch assembly
- ㉙ Transmission control shaft lever assembly
- ㉚ Clamp
- ㉛ Transaxle oil pan gasket
- ㉜ Oil cleaner magnet
- ㉝ Transaxle oil pan subassembly
- ㉞ Gasket
- ㉟ Drain plug
- ㊱ Manual valve
- ㊲ Valve body assembly
- ㊳ O-ring (for oil strainer)
- ㊴ Oil strainer subassembly
- ㊵ Transmission brake band assembly
- ㊶ Transmission brake band adjusting anchor bolt



- ① Clutch drum thrust washer
- ② Direct clutch subassembly
- ③ Thrust needle roller bearing
- ④ Thrust bearing race
- ⑤ Forward clutch subassembly
- ⑥ Thrust needle roller bearing
- ⑦ Oil reserve plate
- ⑧ Forward clutch hub
- ⑨ Thrust needle roller bearing
- ⑩ 2nd brake drum
- ⑪ Planetary sun gear
- ⑫ Thrust needle bearing
- ⑬ Intermediate shaft
- ⑭ Hole snap ring
- ⑮ One-way clutch
- ⑯ Brake plate
- ⑰ Brake disc
- ⑱ Clutch cushion plate

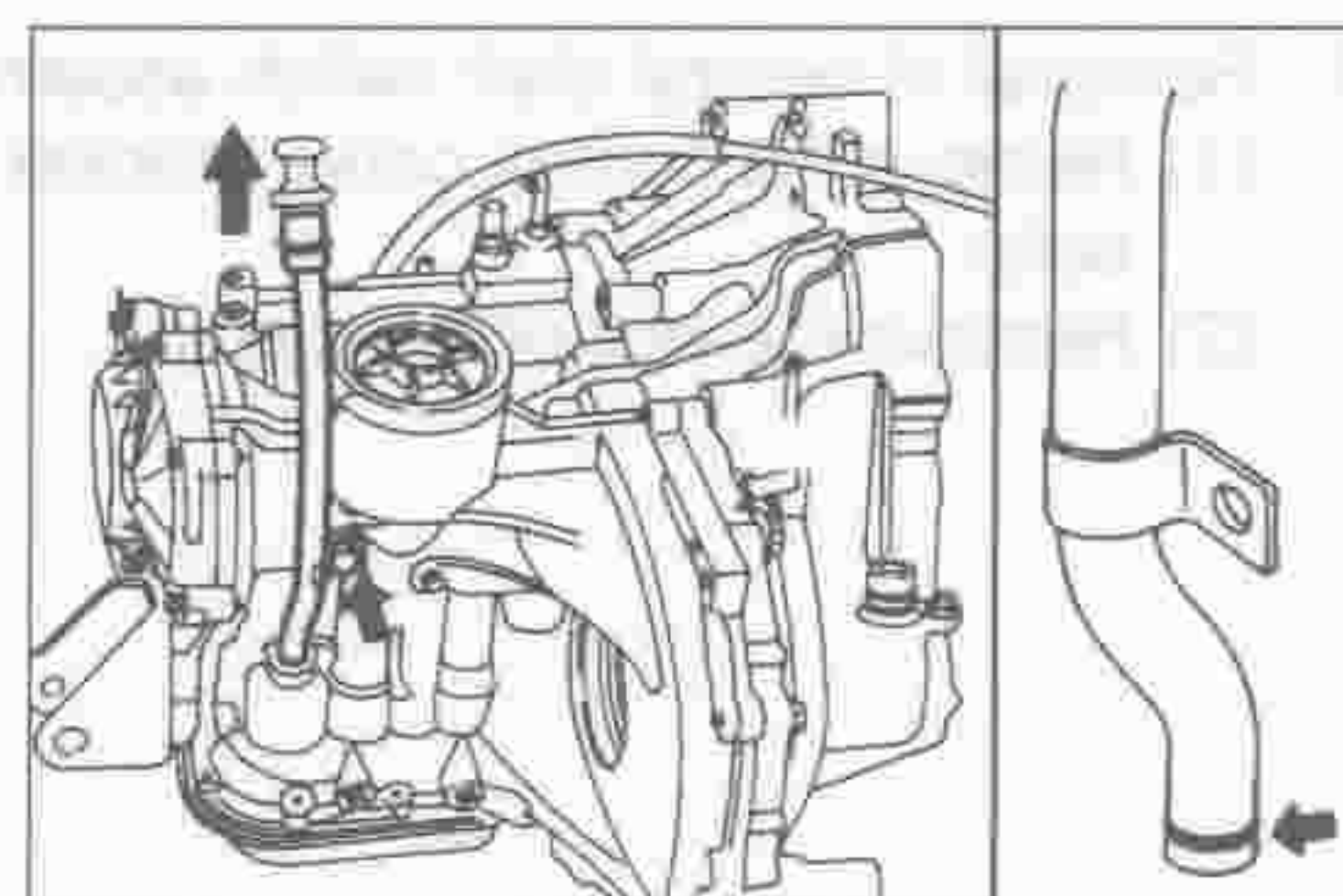
- ⑲ Planetary gear assembly
- ⑳ Thrust needle bearing
- ㉑
- ㉒ Radial ball bearing
- ㉓ Reduction drive gear
- ㉔ Snap ring
- ㉕ Radial ball bearing
- ㉖ Output shaft
- ㉗ Snap ring
- ㉘ Cylindrical roller bearing
- ㉙ Governor drive gear
- ㉚ Oil reserve plate
- ㉛ Radial ball bearing
- ㉜ Snap ring
- ㉝ Primary reduction driven gear
- ㉞ Conical spring washer
- ㉟ Lock nut

REMOVAL

1. Remove the bolt of the transmission oil filler tube subassembly.
2. Pull out the transmission oil filler tube subassembly toward upside.
3. Remove the O-ring from the transmission oil filler tube subassembly.

NOTE:

- Never reuse the removed O-ring.

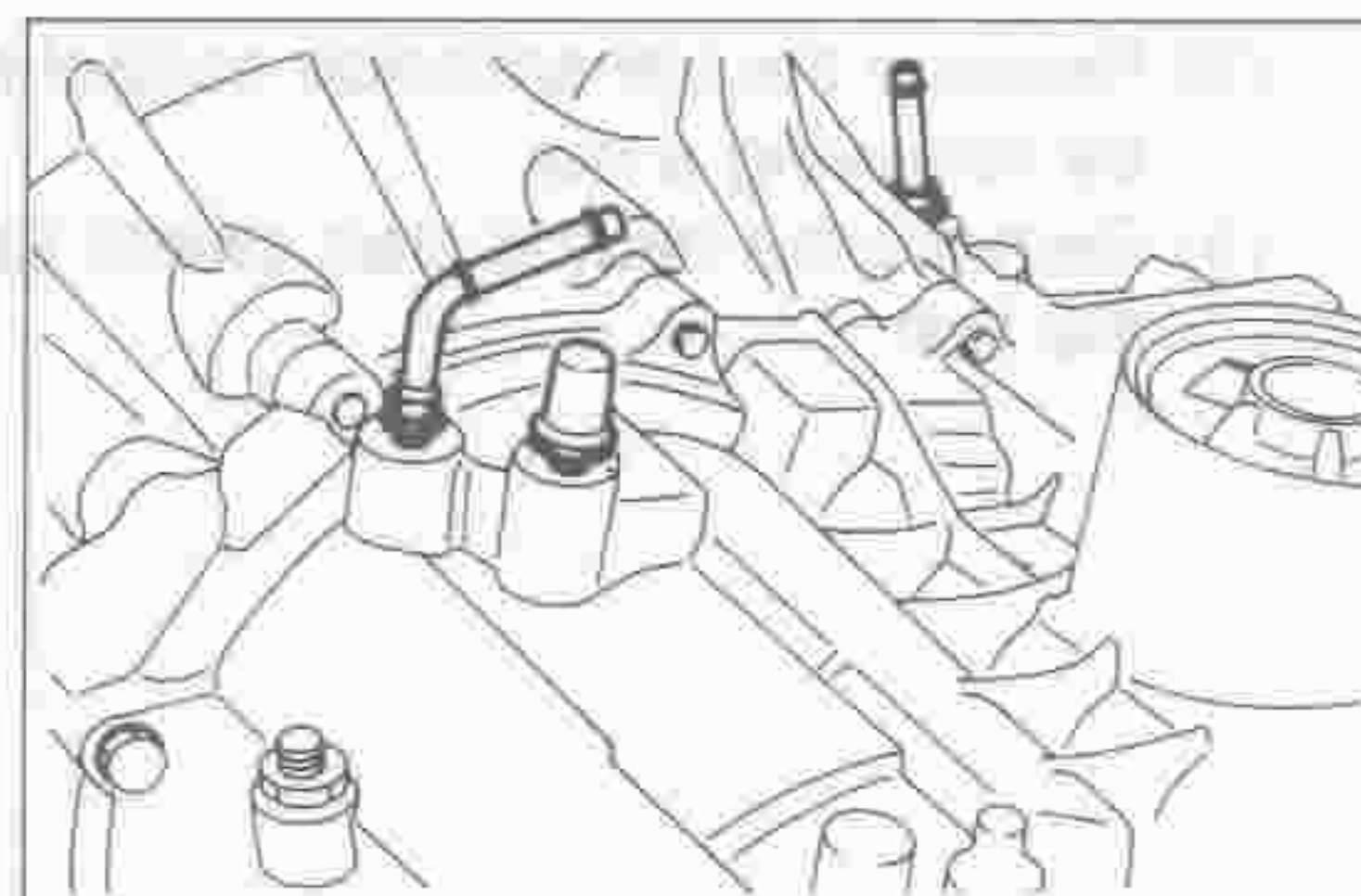


LAT00054-00048

4. Remove the breather plug and unions (for oil cooler).

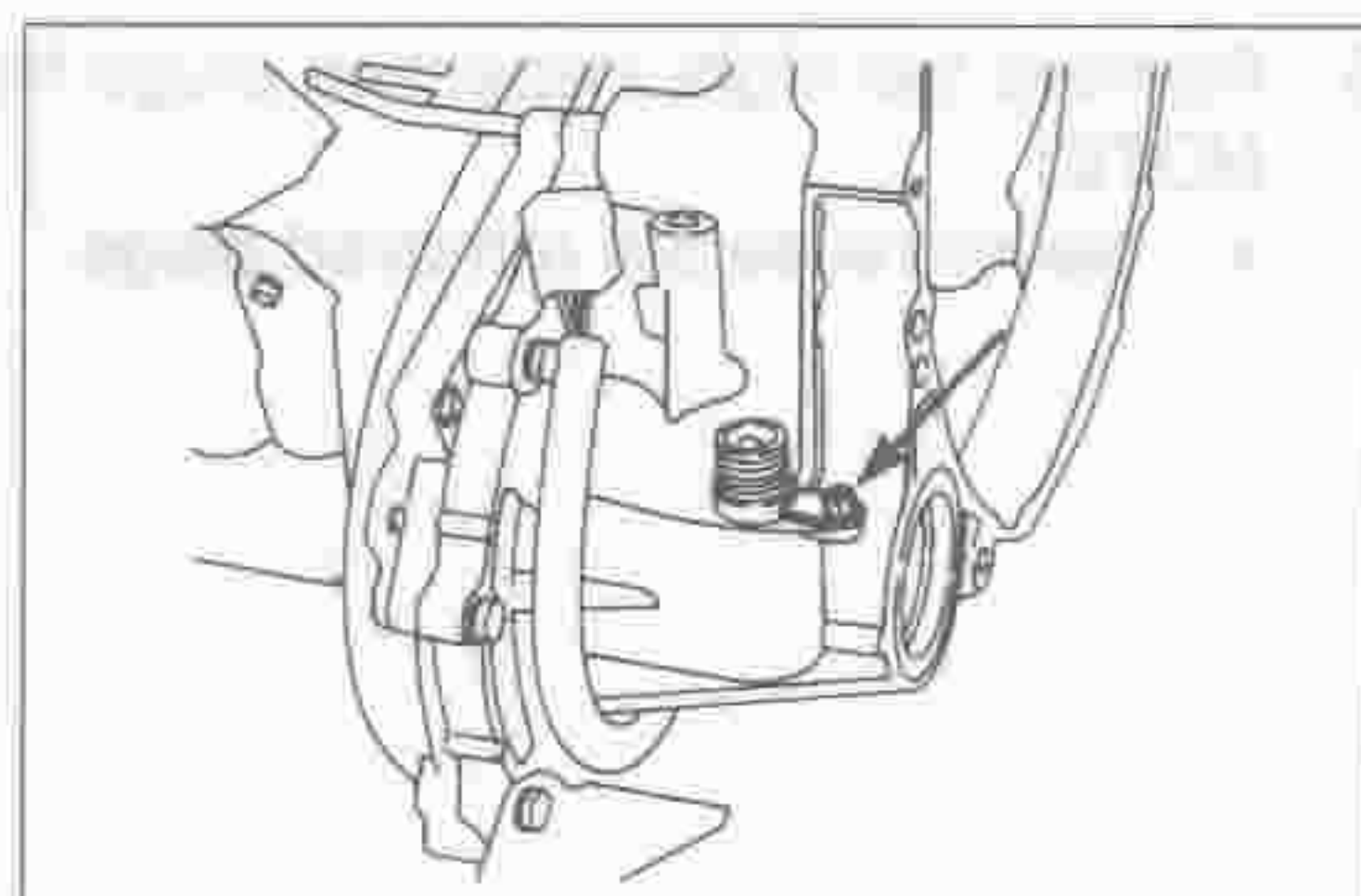
NOTE:

- Never reuse the removed union.



LAT00055-00049

5. Remove the speedometer sleeve lock plate by removing a bolt.
6. Remove the speedometer shaft sleeve subassembly, using the standard flat driver.



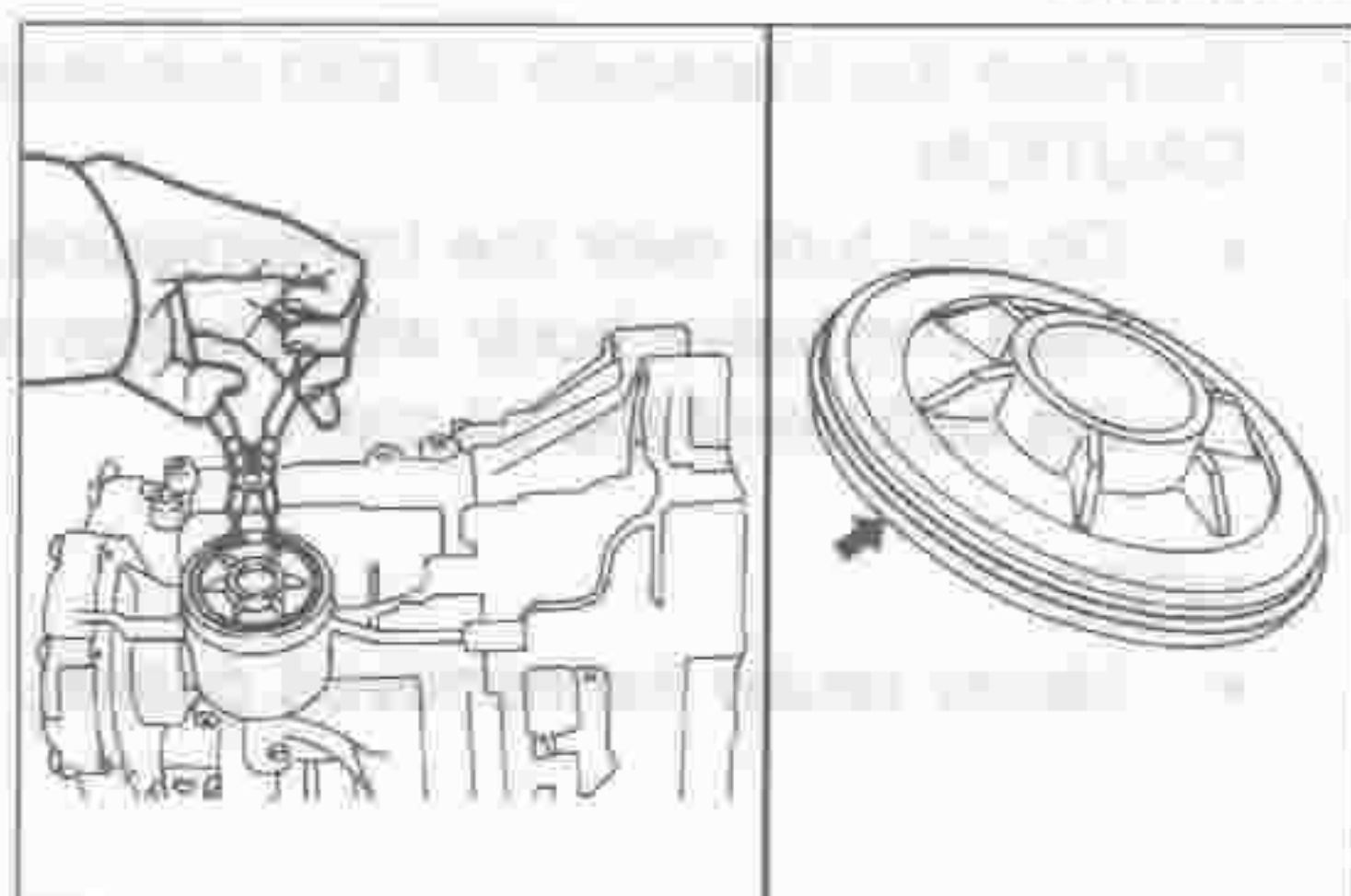
LAT00056-00050

7. Removal of governor valve

- (1) Remove the hole snap ring, using the standard snap ring plier.
- (2) Remove the governor cover with the O-ring installed, using the standard plier.
- (3) Remove the O-ring from the governor cover.

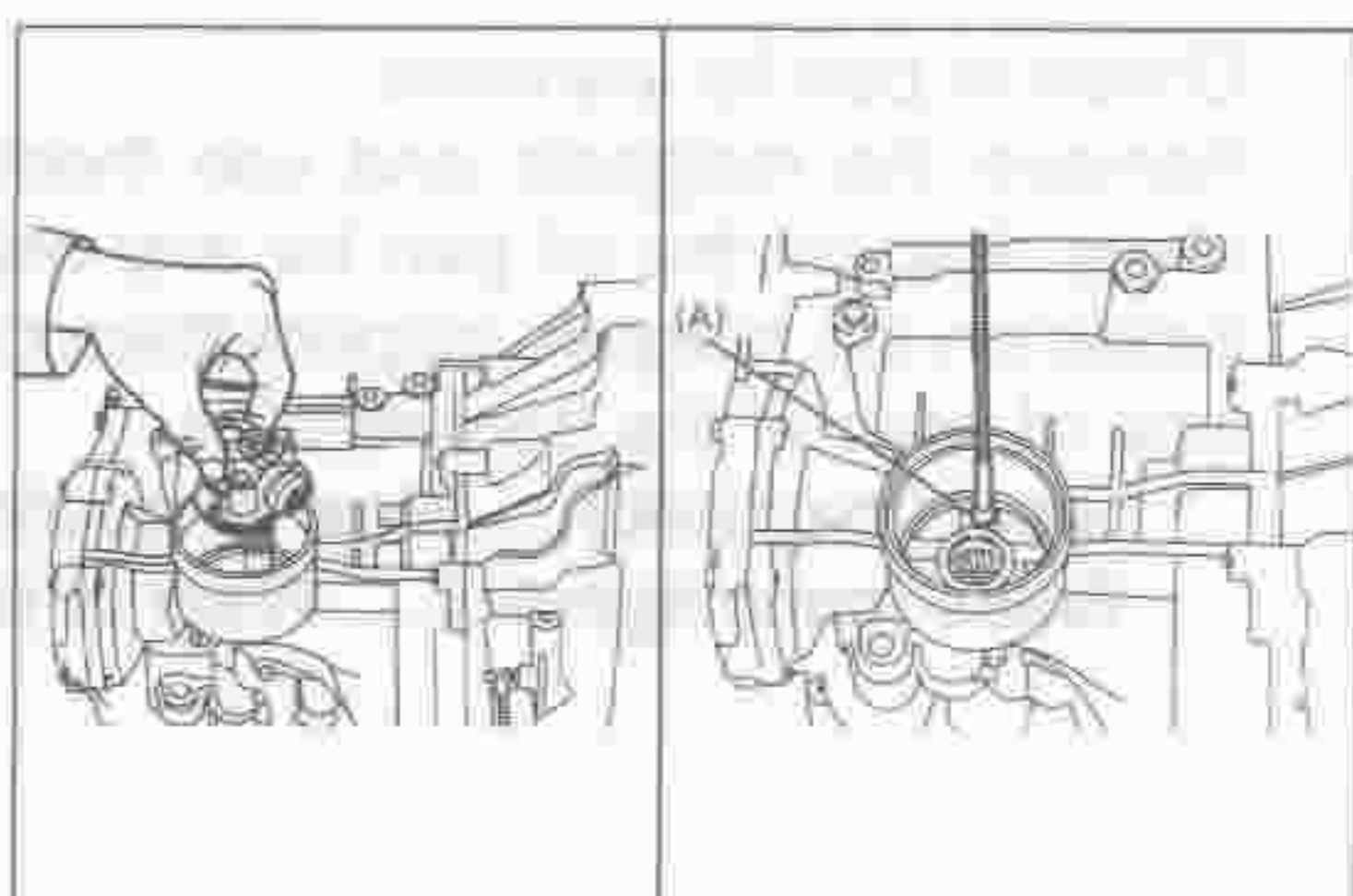
NOTE:

- Never reuse the removed O-ring.



LAT00057-00051

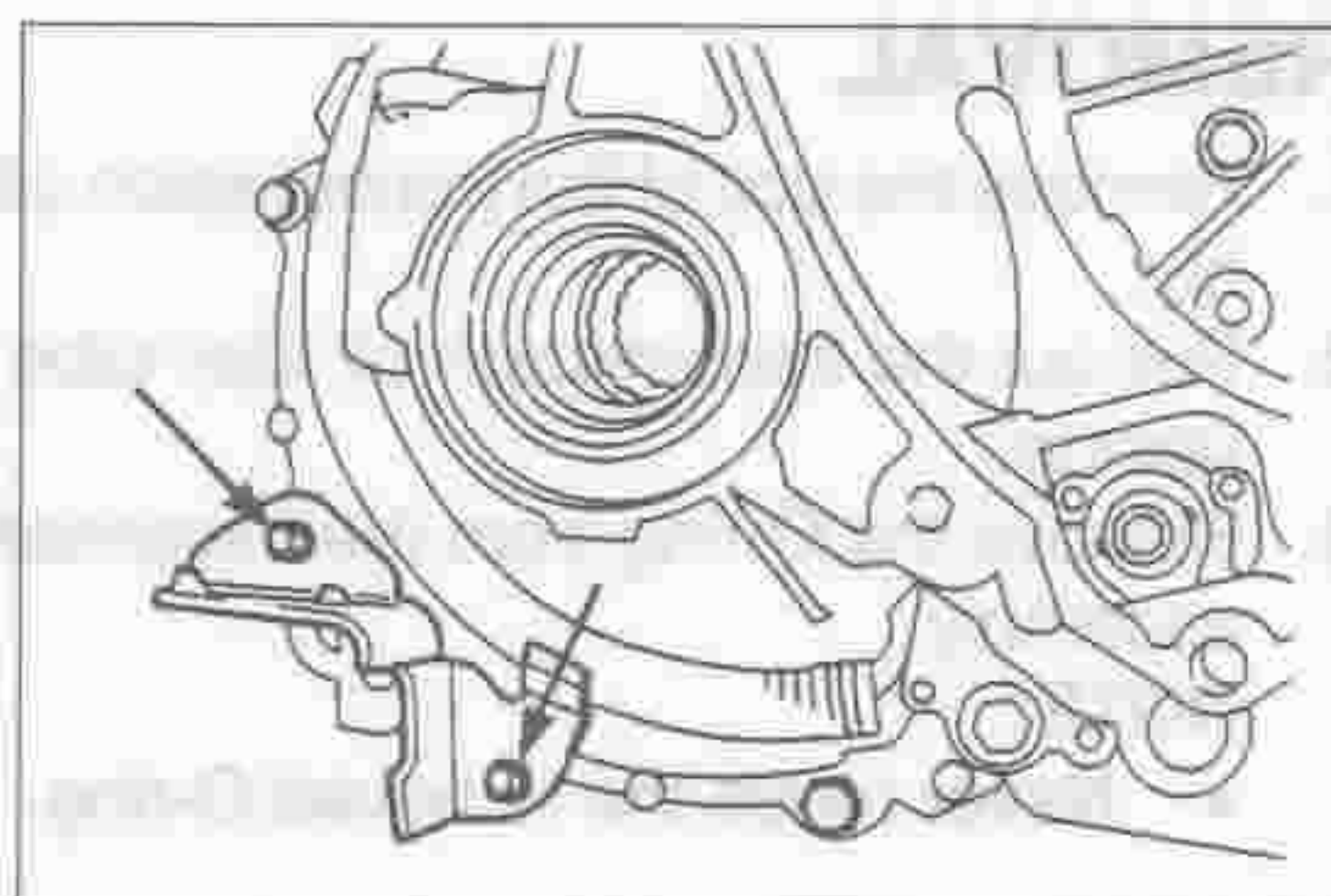
- (4) Remove the governor body assembly from the transaxle case.
- (5) Remove the ball (A), using the standard magnet hand.



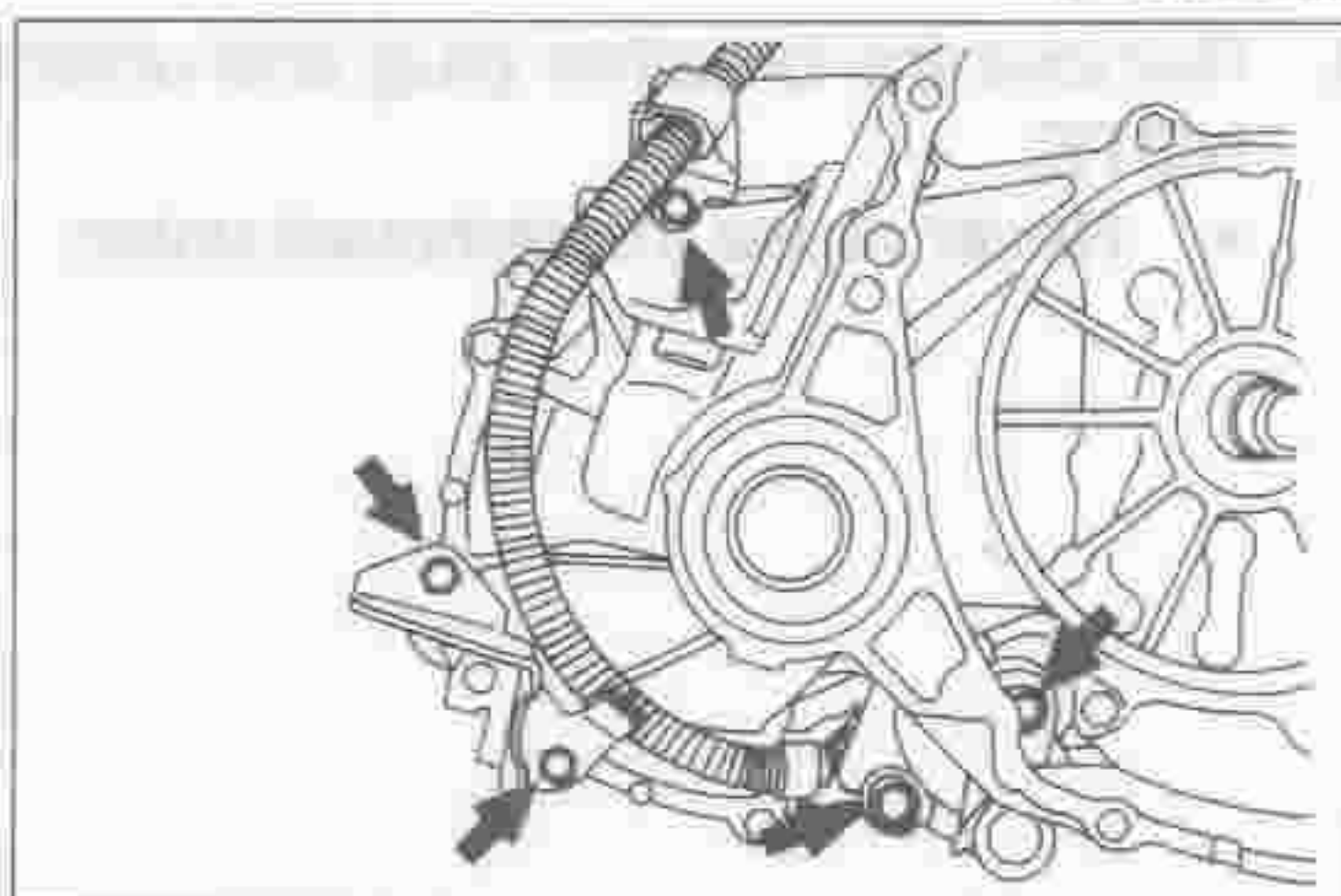
LAT00058-00052

8. Removal of neutral start switch assembly

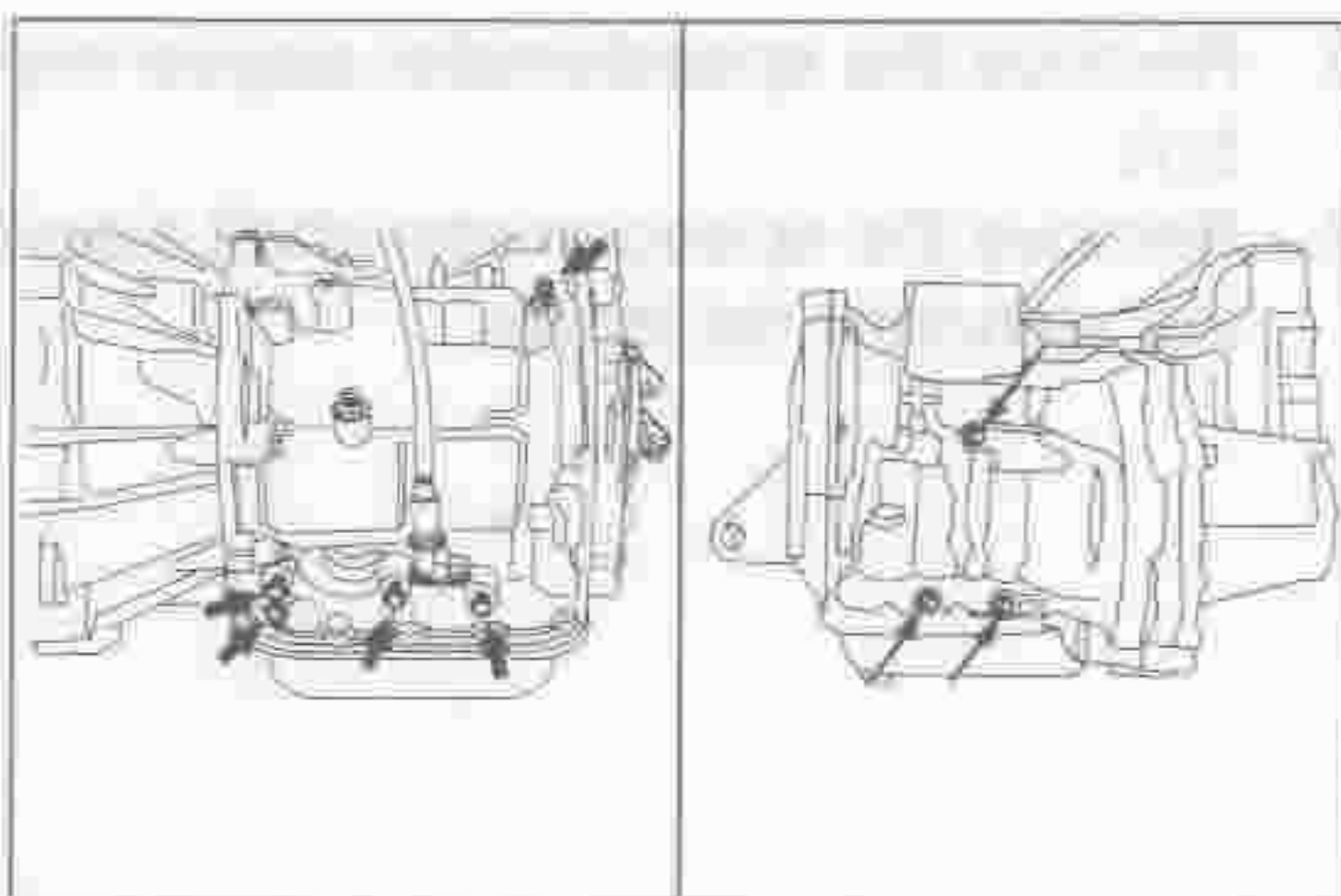
- (1) Remove the control cable bracket by removing the two bolts.
- (2) Remove the bolt of the clamp.



LAT00069-00053



LAT00060-00054



LAT00061-00055

9. Remove the eight inspection plugs from the transaxle.

NOTE:

- Never reuse the removed plugs.

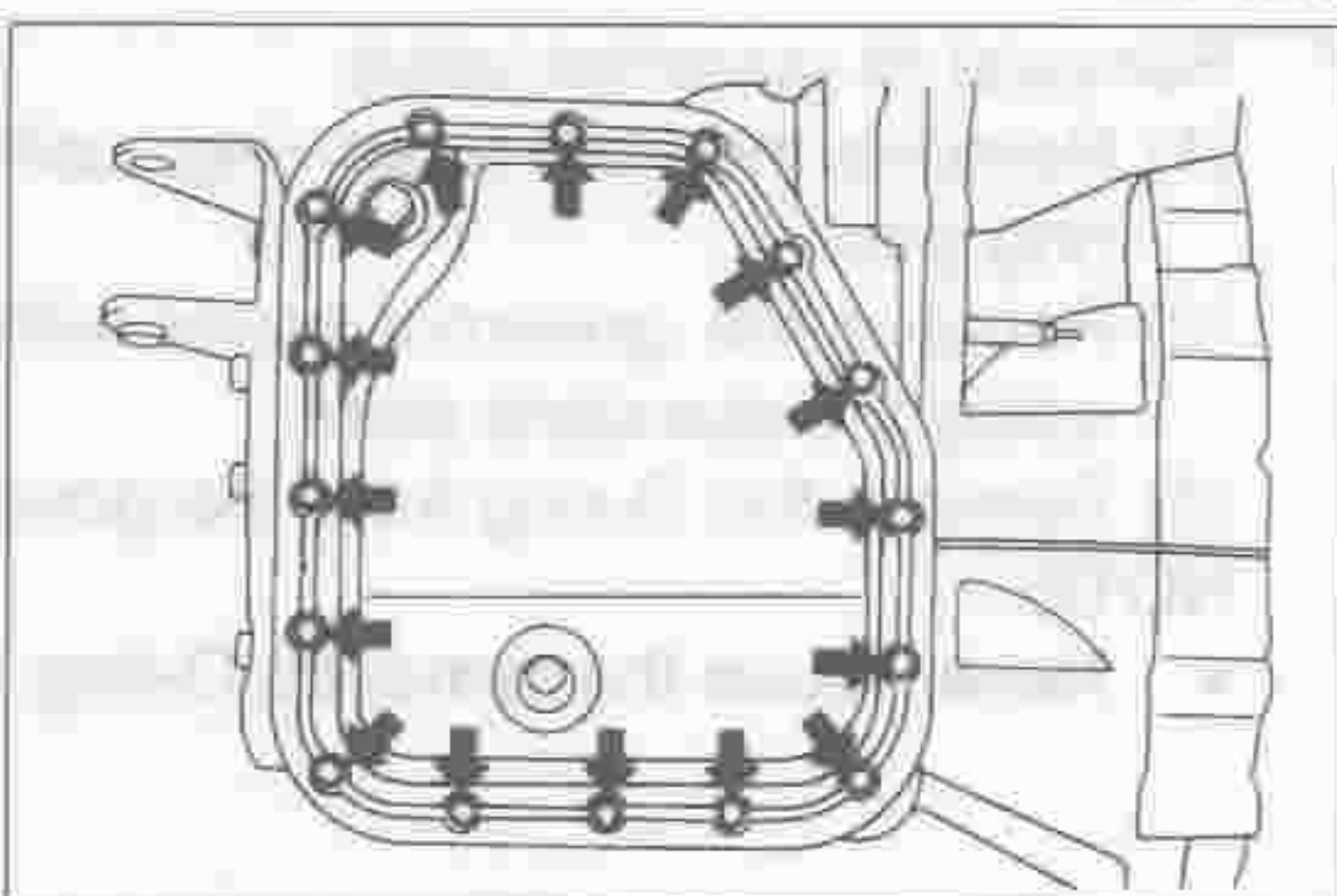
10. Remove the transaxle oil pan subassembly with gasket.

CAUTION:

- Do not turn over the transmission, for this will contaminate the valve body with foreign materials deposited at the bottom of the oil pan.

NOTE:

- Never reuse the removed gasket.



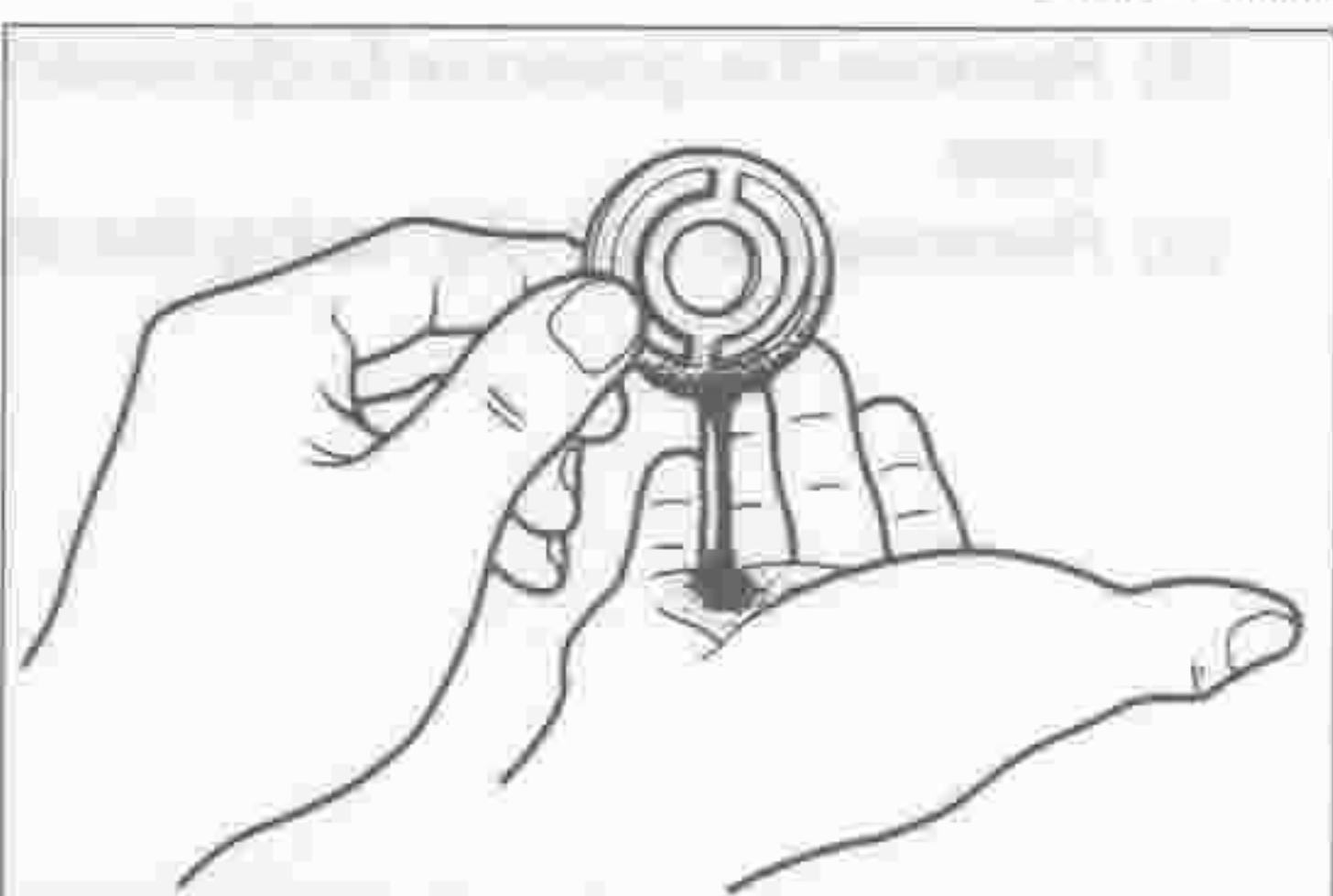
LAT00062-00056

11. Check of pan for particles

Remove the magnets and use them to collect any steel chips. Inspect the oil pan for any chips and particles collected on the magnet. Inspect them carefully to find out the type of wear of the transmission.

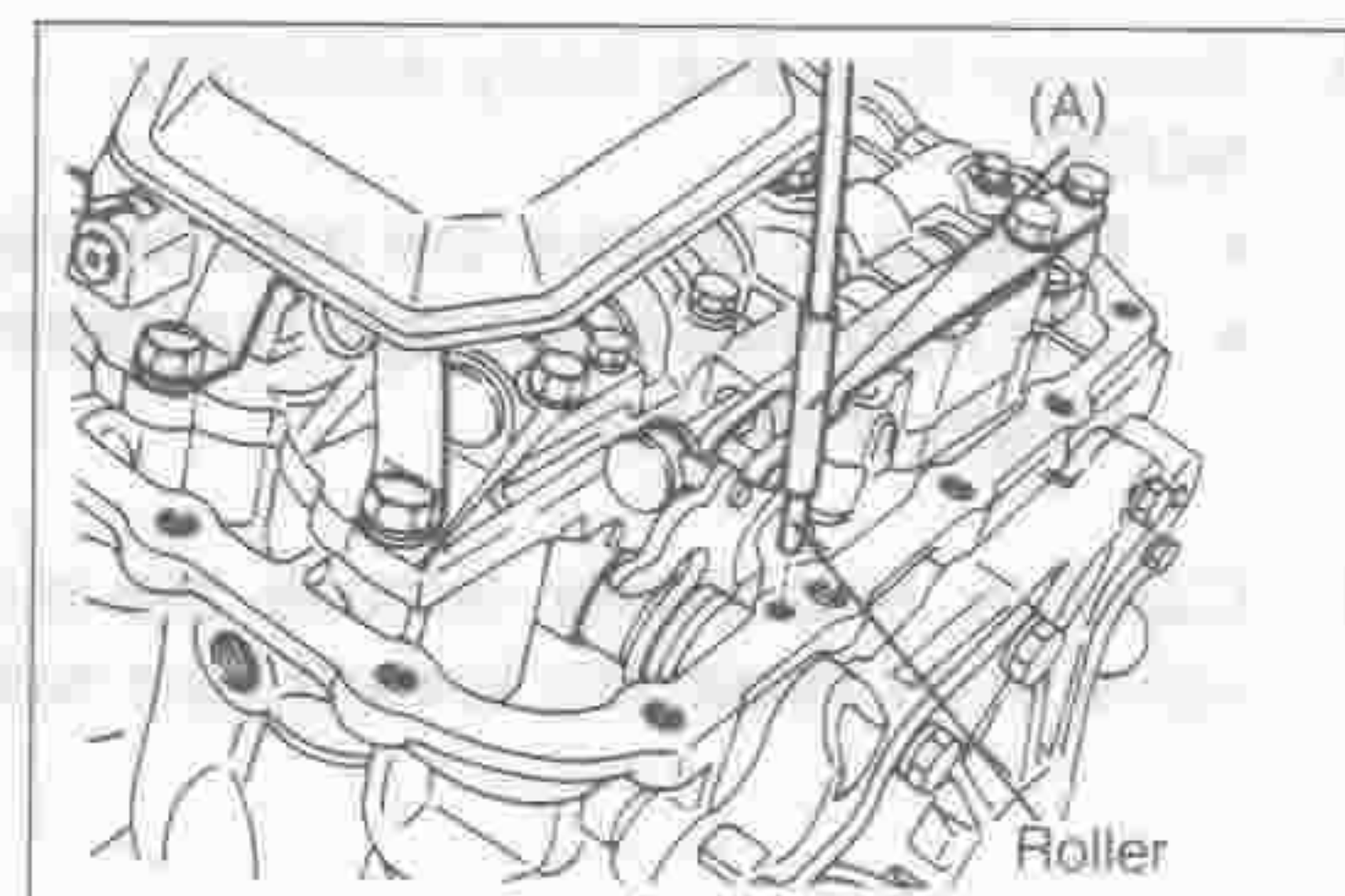
Steel (magnetic) ... Wear of bearing, gear and plate

Brass (nonmagnetic) ... Wear of bush



LAT00063-00057

12. Remove the roller for manual valve lever shaft subassembly, using a standard magnet hand (A).

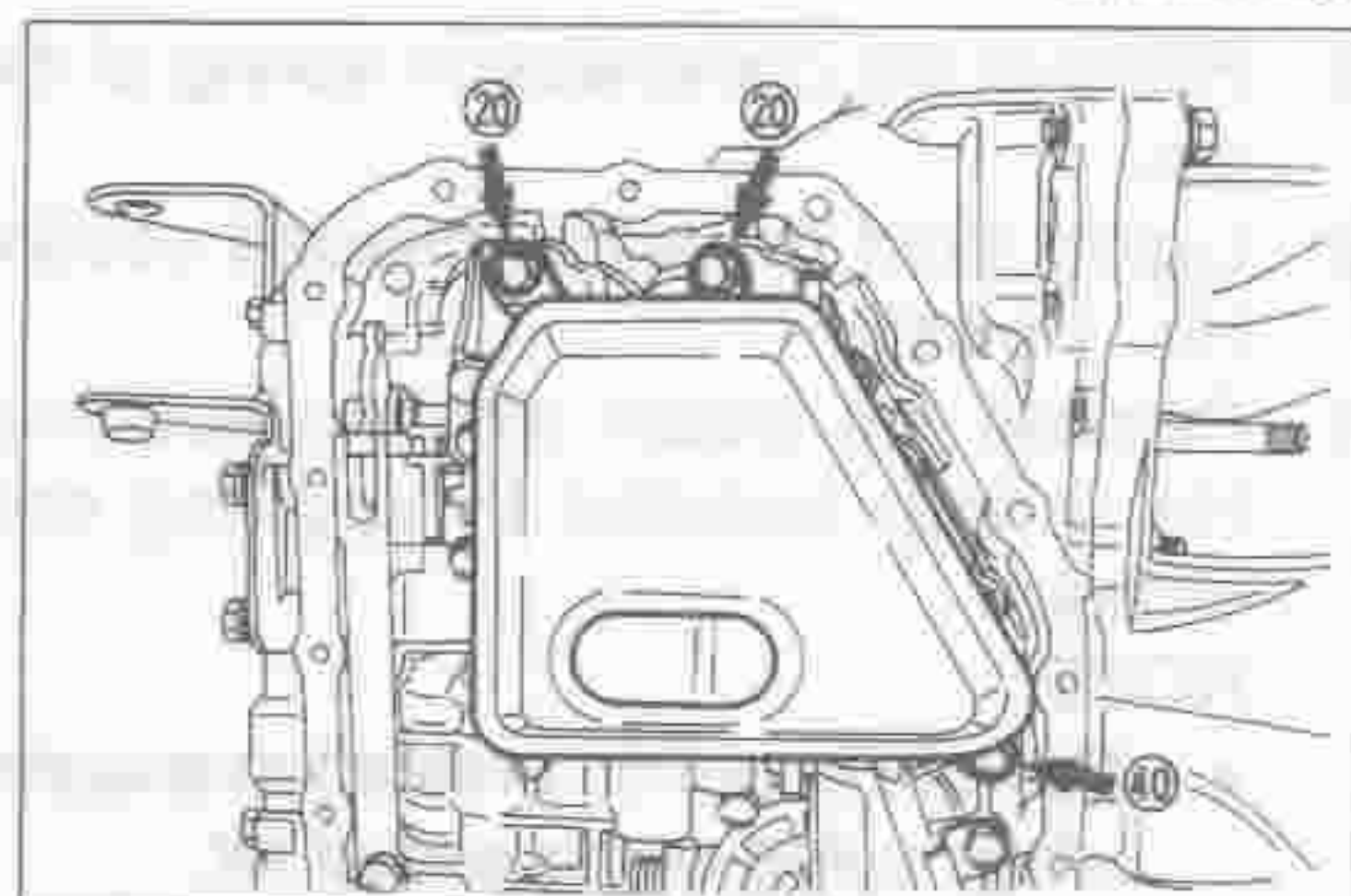


LAT00064-00058

13. Remove the oil strainer subassembly by removing the three bolts.

NOTE:

- Be sure to remove the bolts evenly and uniformly.
- The numerals in the right illustration indicate the nominal length of the bolt.

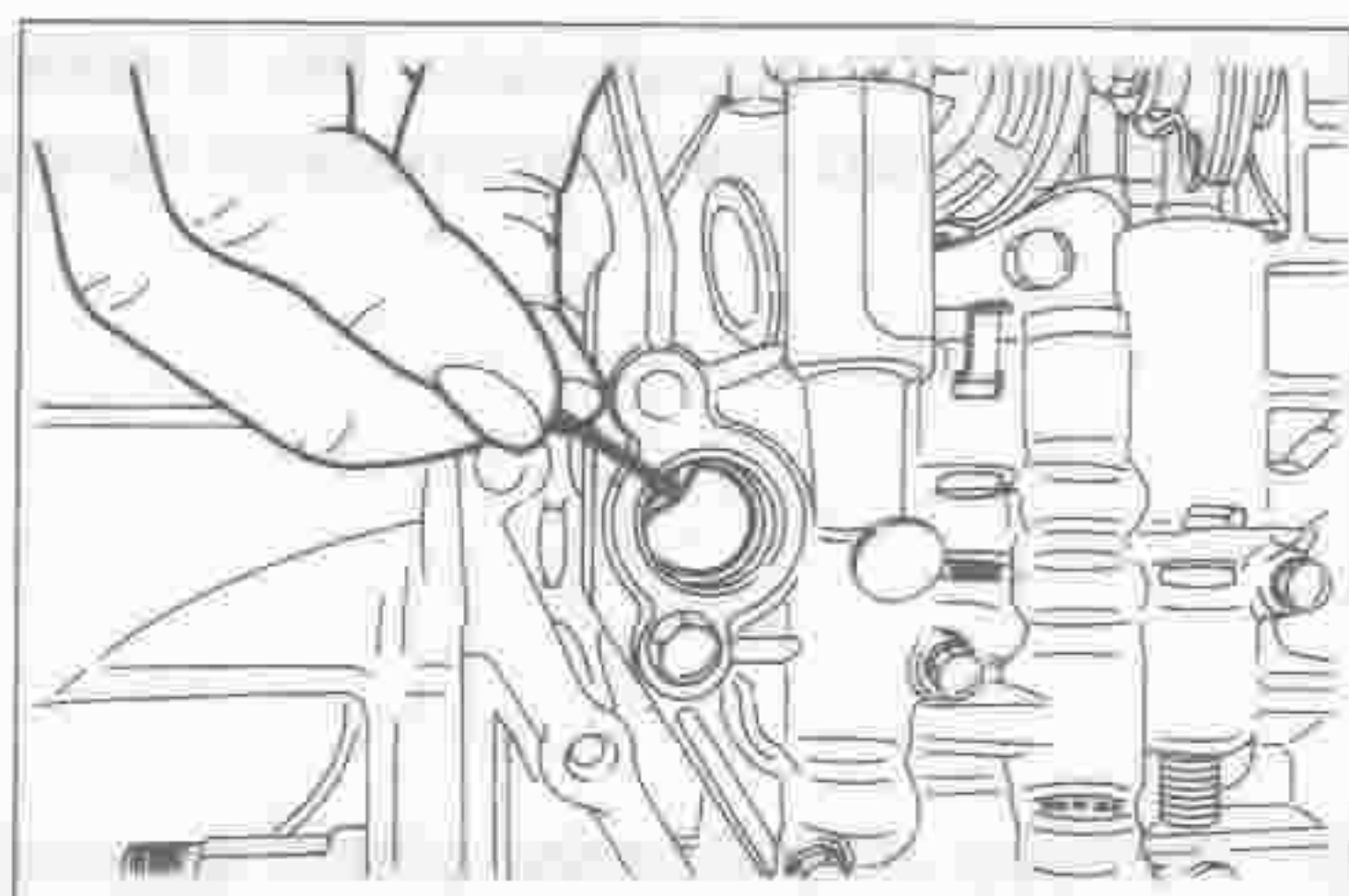


LAT00065-00059

14. Remove the O-ring by sticking a needle into the O-ring for the oil strainer which has been installed at the valve body side.

NOTE:

- Be very careful not to scratch the valve body when sticking the needle into the O-ring.
- Never reuse the removed O-ring.



LAT00066-00060

15. Disconnect the throttle cable from the throttle valve cam.

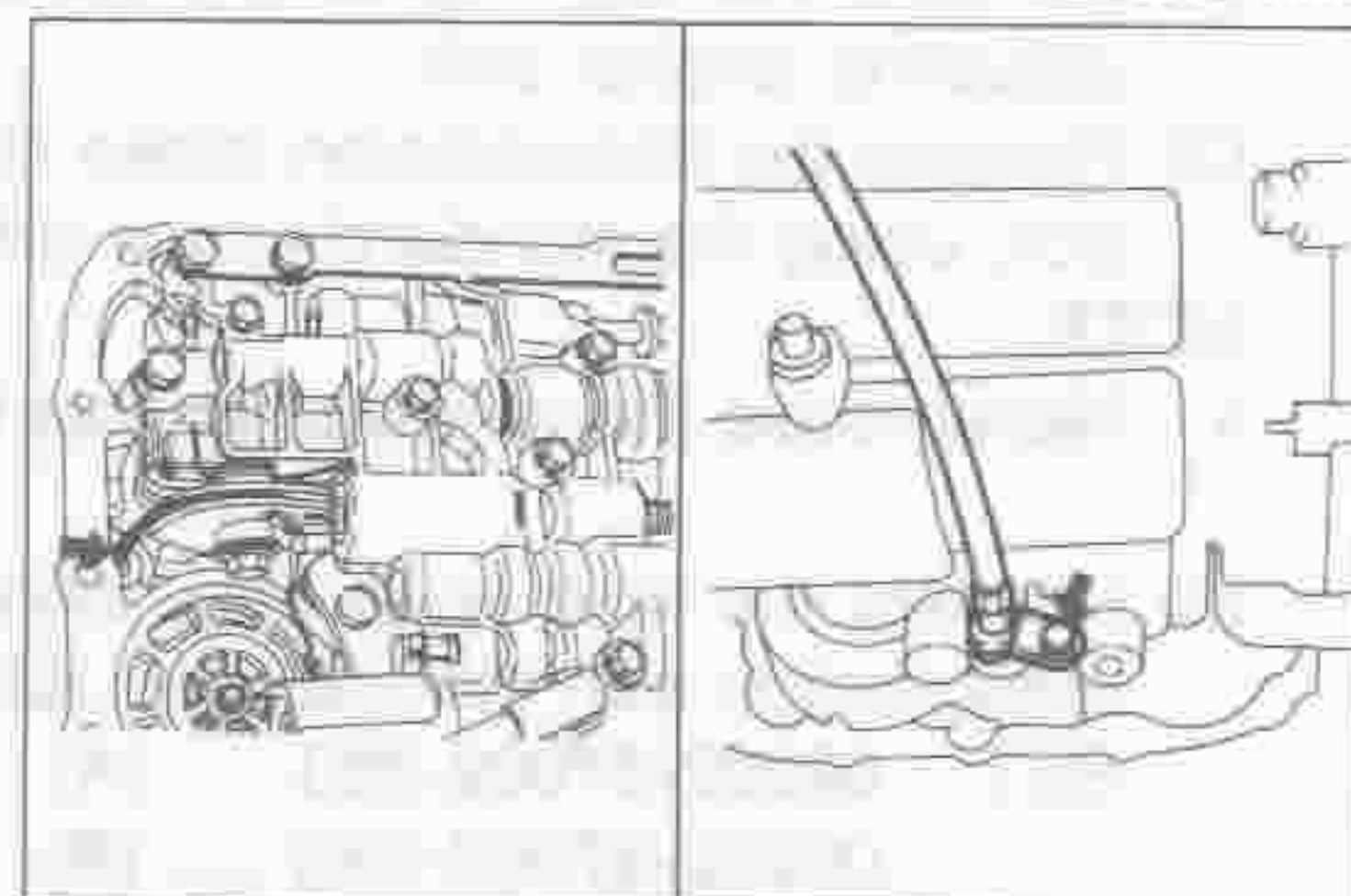
16. Remove the throttle cable attaching bolt.

17. Pull out the throttle cable from the transmission case.

18. Remove the O-ring of the throttle cable.

NOTE:

- Never reuse the removed O-ring.

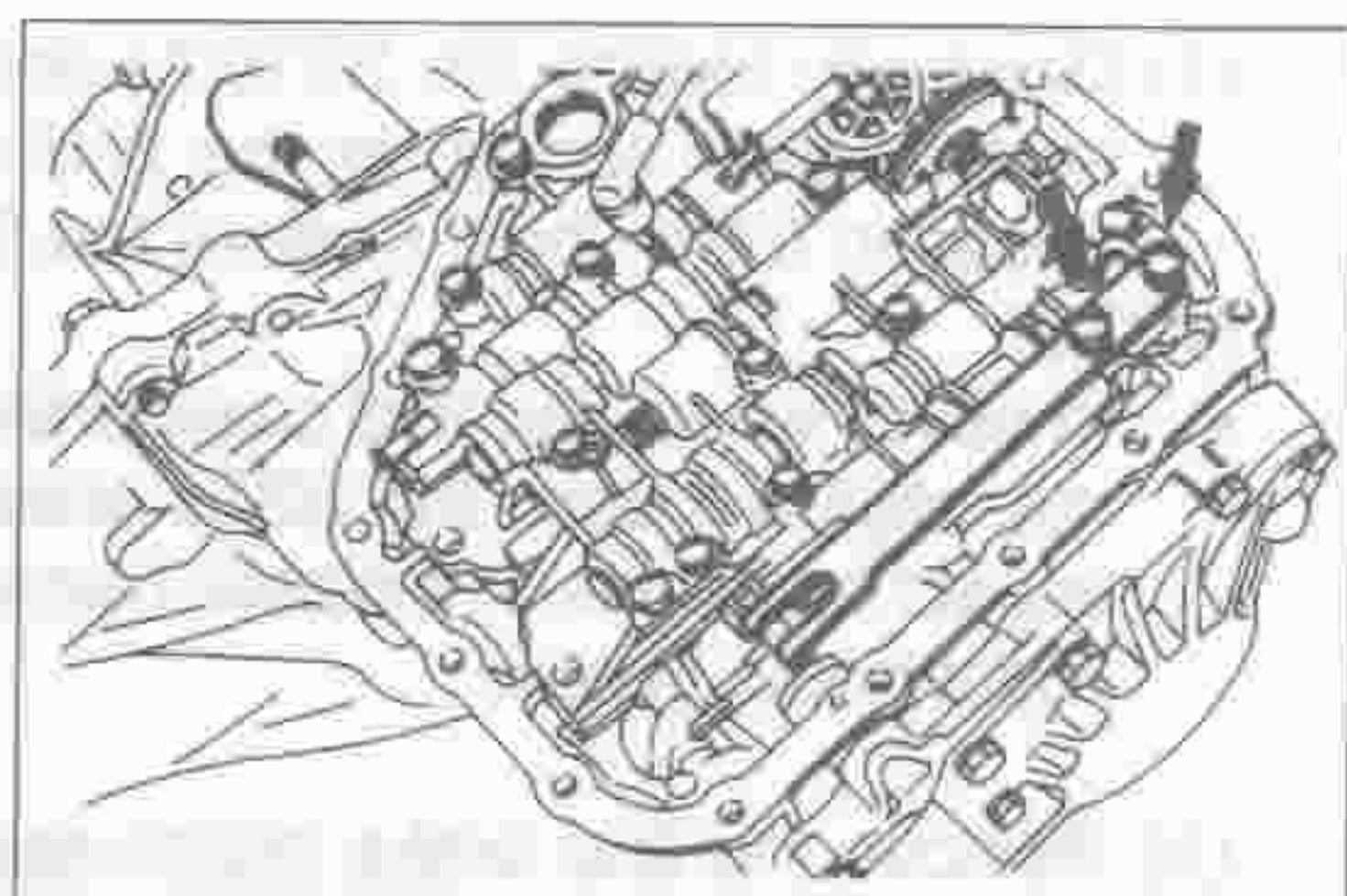


LAT00067-00061

19. Remove the manual detent spring by removing the two bolts.

NOTE:

- Be sure to remove the bolts evenly and uniformly.



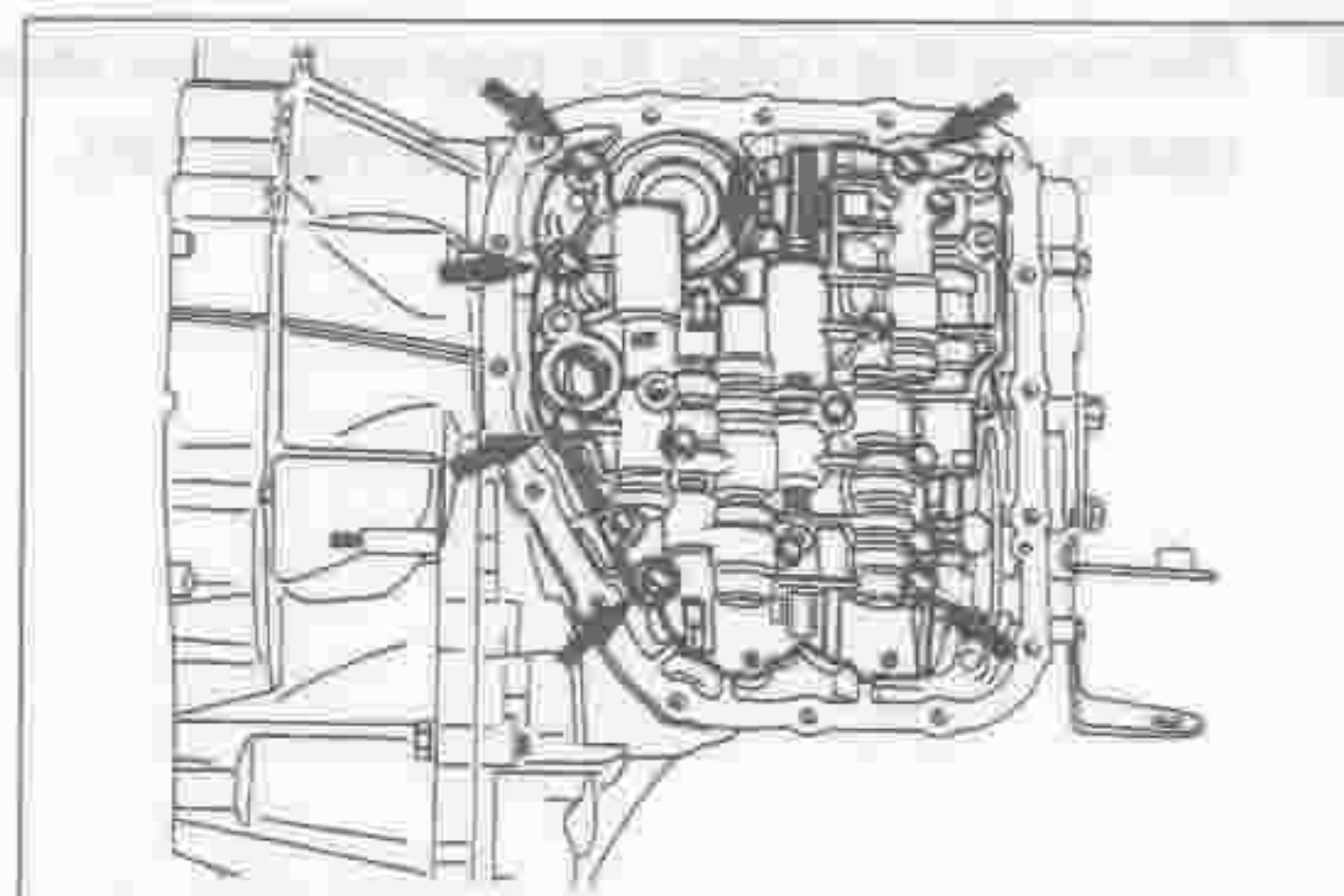
LAT00068-00062

20. Remove the valve body assembly.

NOTE:

- Be sure to remove the bolts evenly and diagonally.
- The numerals in the right illustration indicate the nominal length of the bolt.

21. Carefully and slowly remove the manual valve from the valve body assembly toward your side.



LAT00069-00063

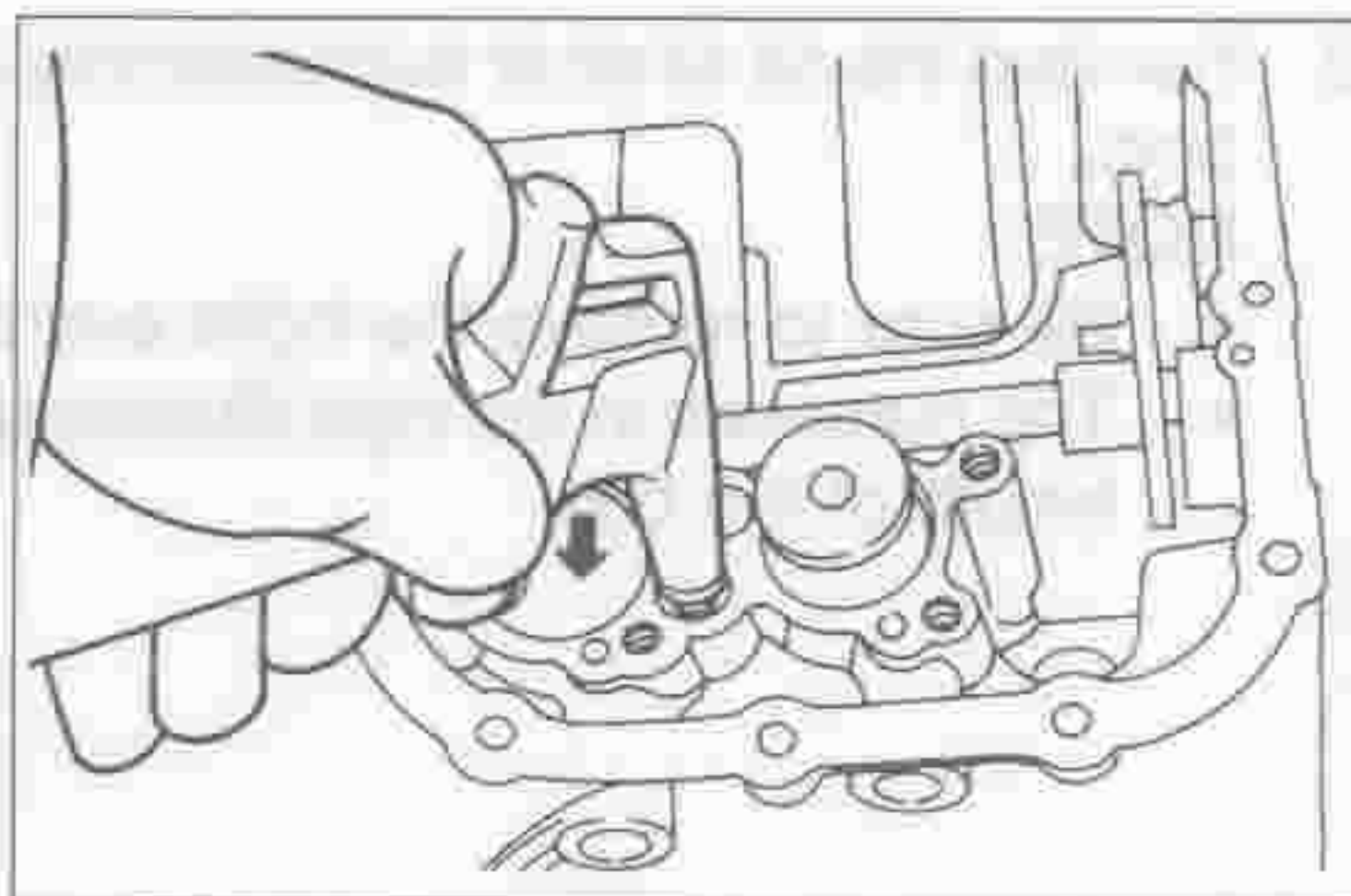
22. Remove the compression spring of the B₁ accumulator piston.

23. Lightly hold the arrow-headed section of the accumulator No. 1 piston.

24. Remove the piston with the accumulator seal No. 1 and No. 2 rings installed by applying compressed air into the oil hole.

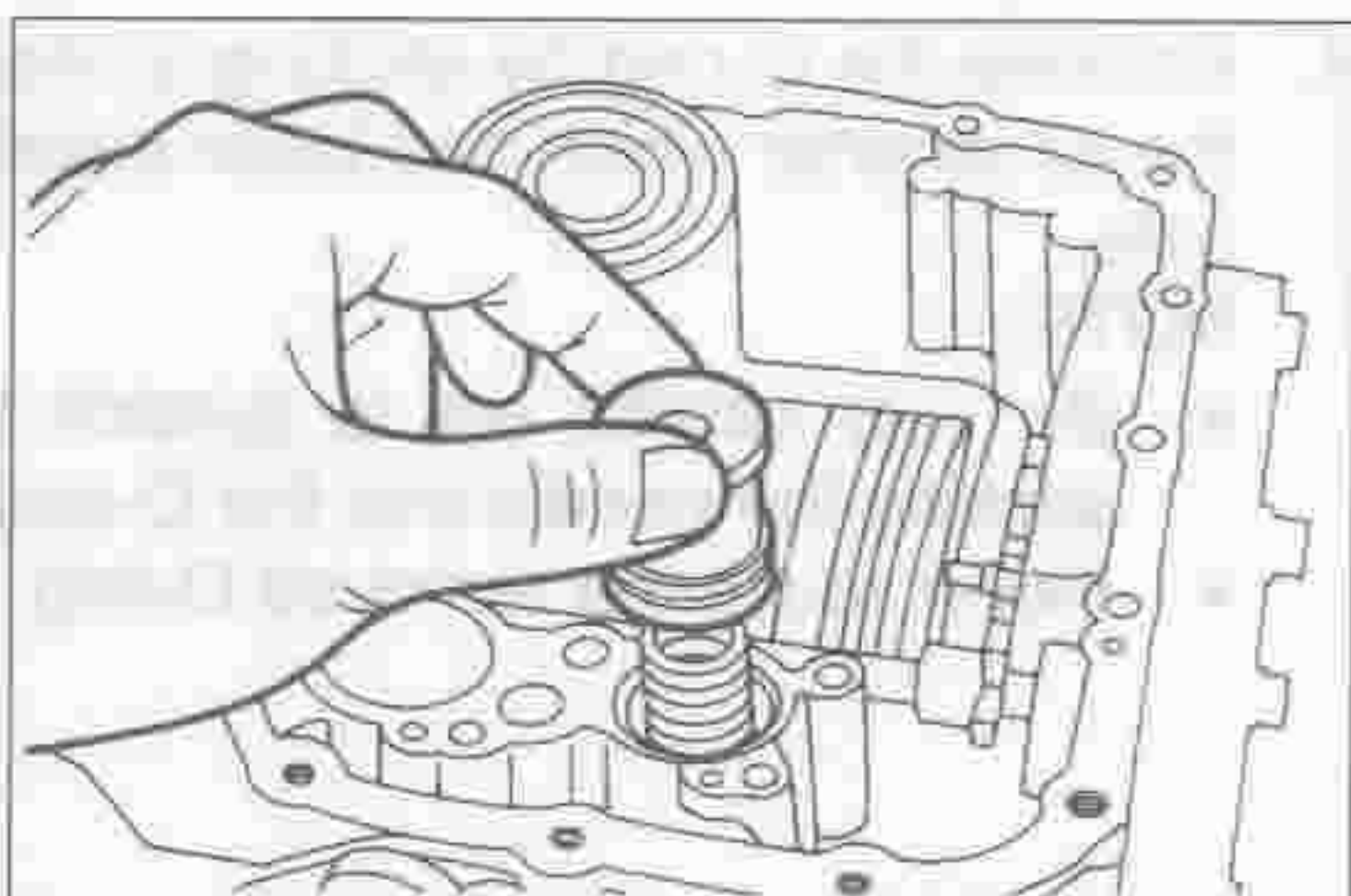
NOTE:

- Be sure to put on protection goggles since oil may splash when using compressed air.



LAT00070-00064

25. Remove the accumulator No. 2 piston with the seal No. 1 ring installed and compression spring.



LAT00071-00065

26. Removal of 2nd brake piston assembly

- (1) Remove the lock nut of the transmission brake band adjusting anchor bolt.

- (2) Remove the transmission brake band adjusting anchor bolt, using the standard screw driver or the like.

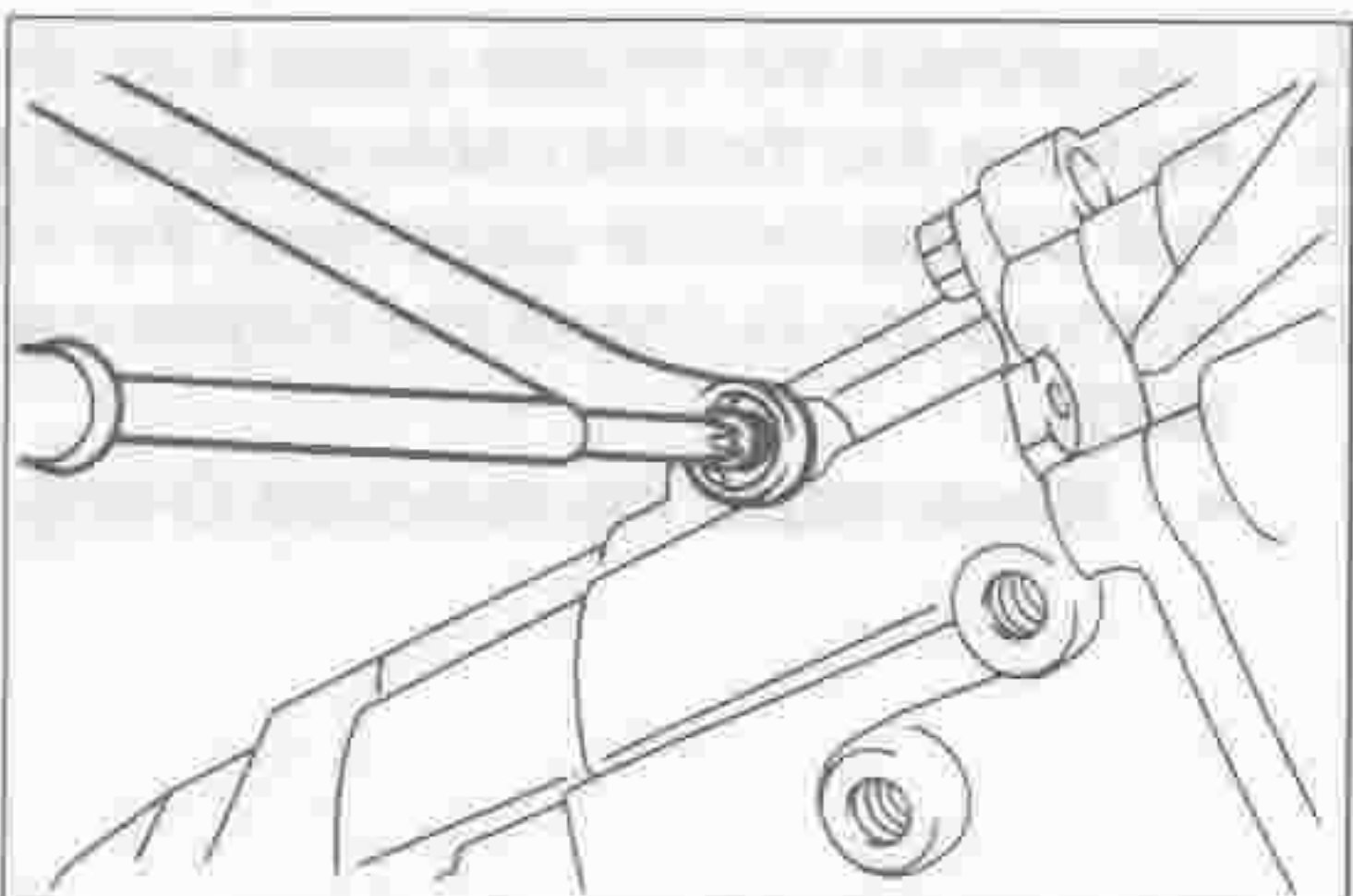
NOTE:

- Never reuse the removed anchor bolt.

- (3) Remove the hole snap ring, using snap ring pliers in combination with the following SSTs.

SST: 09202-87002-000 (A)

09202-87002-0A0 (B)



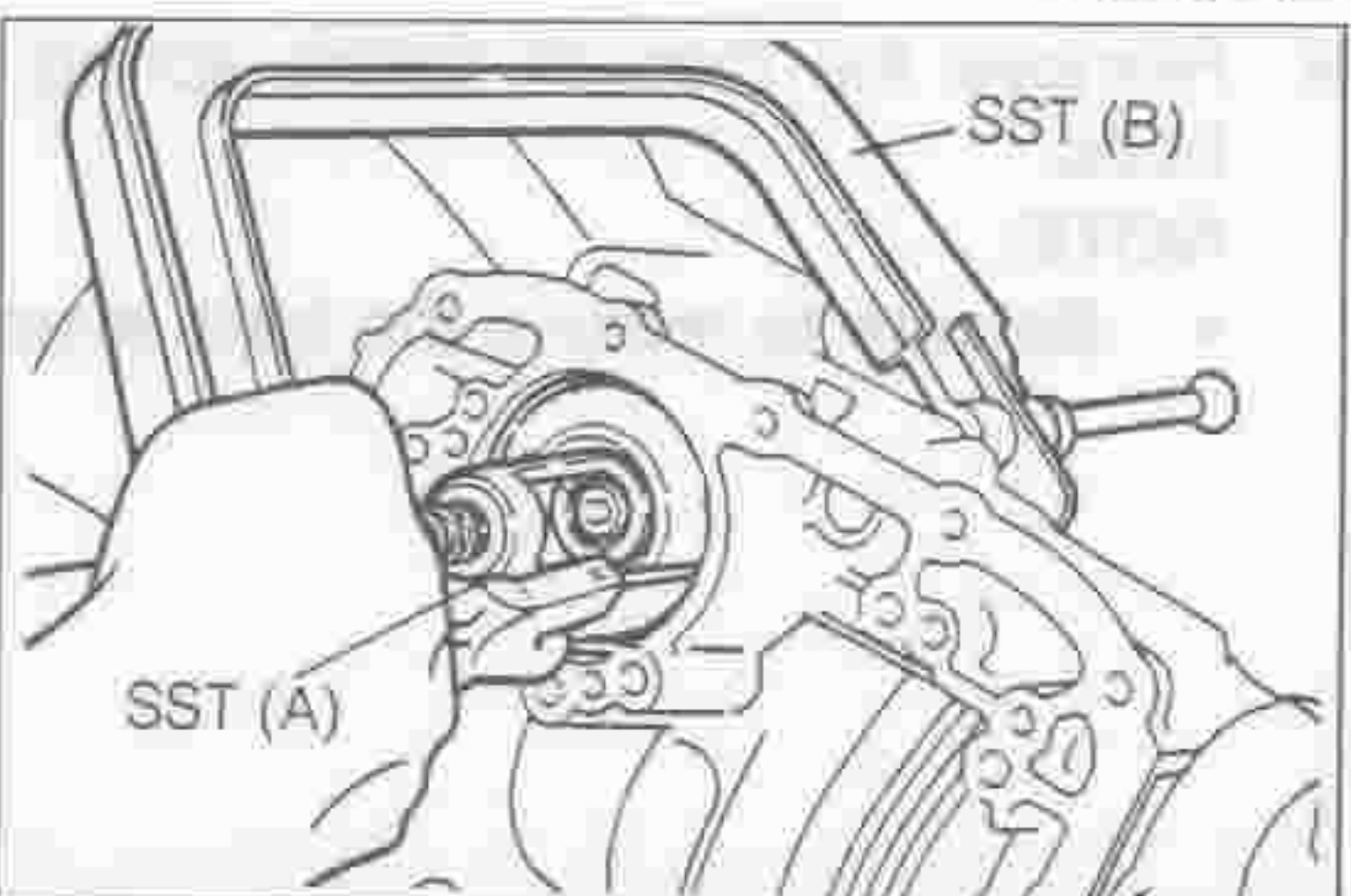
LAT00072-00066

- (4) Gradually loosen the SSTs(A) and (B) above, until the compression spring for the 2nd coast brake piston is released fully. Then, remove the SSTs.

NOTE:

- In cases where the 2nd coast brake piston will not come out, slightly loosen the SSTs above. Then, apply a light impact by means of a plastic hammer to remove the 2nd coast brake piston.

- (5) Remove the 2nd brake piston assembly and compression spring.



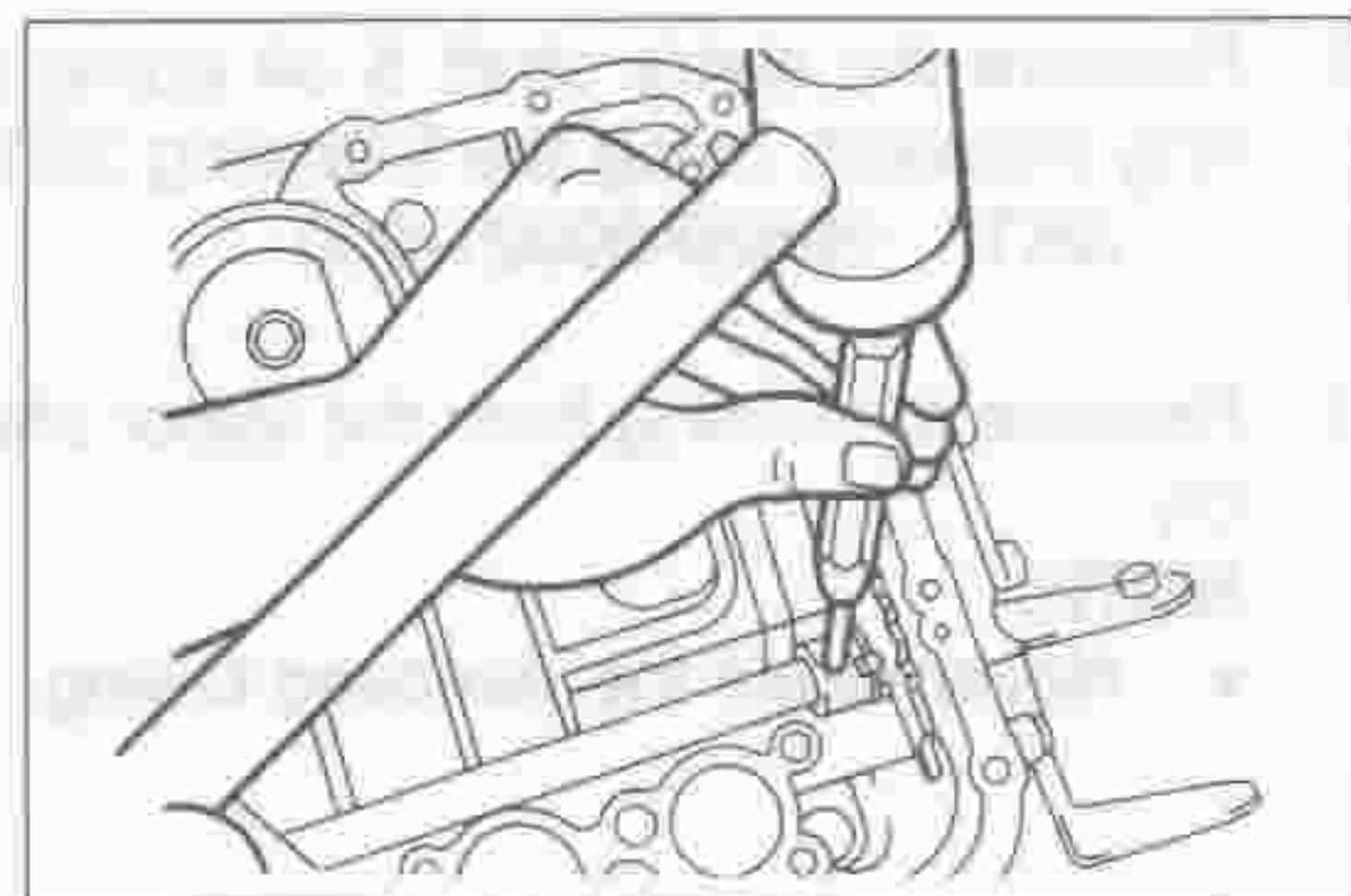
LAT00073-00067

27. Remove the slotted spring pin, using a pin punch and a hammer.

NOTE:

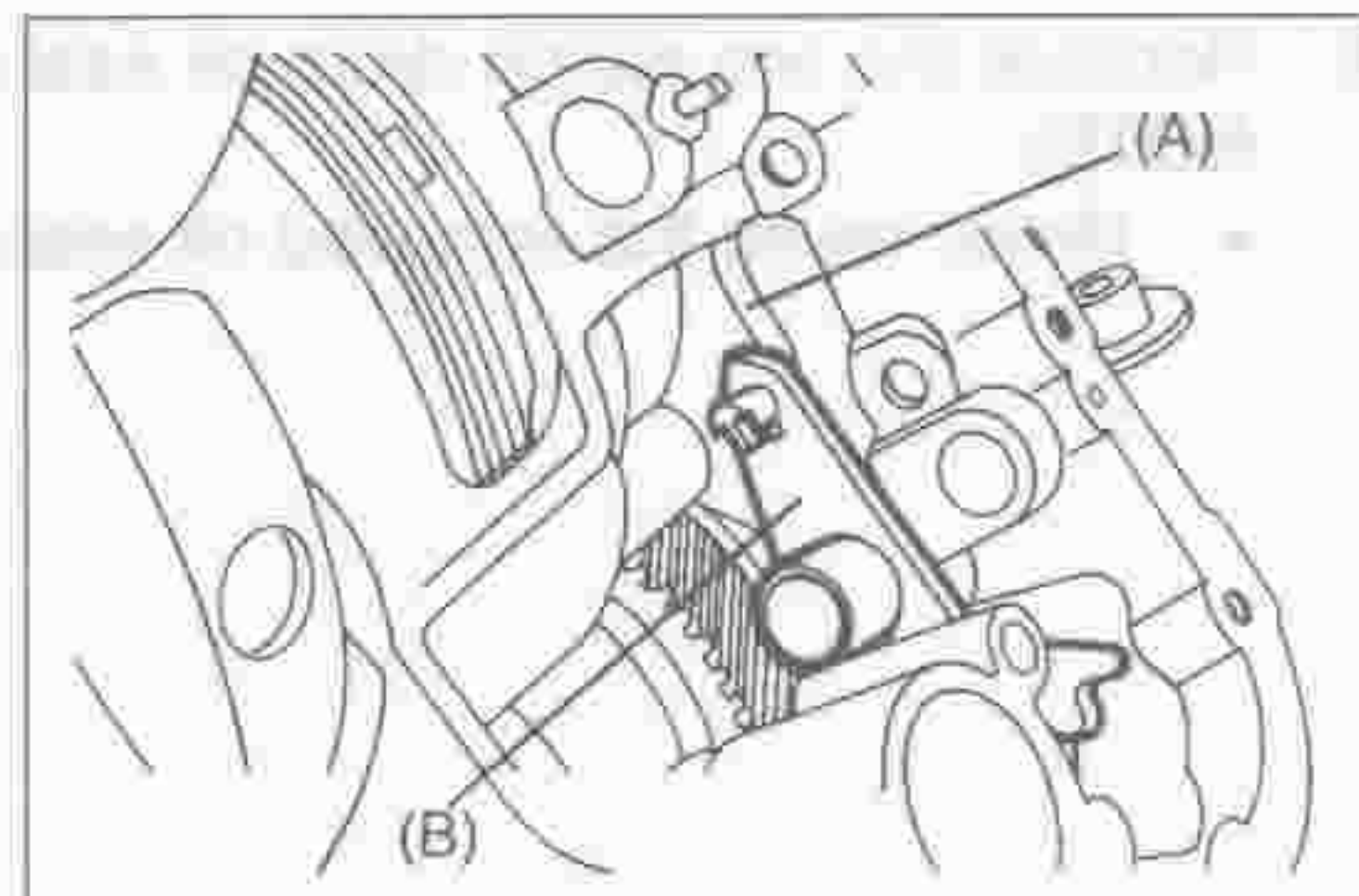
- When removing the slotted spring pin, be very careful not to drop it into the transmission case.
- Never reuse the removed slotted spring pin.

28. Pull out the manual valve lever shaft subassembly toward the engine side.



LAT00074-00069

29. Push the parking lock rod (A) into the transmission case.
30. Remove the manual valve lever by aligning the cut-out groove of the manual valve lever (B) with the protruding section of the parking lock rod.



LAT00075-00069

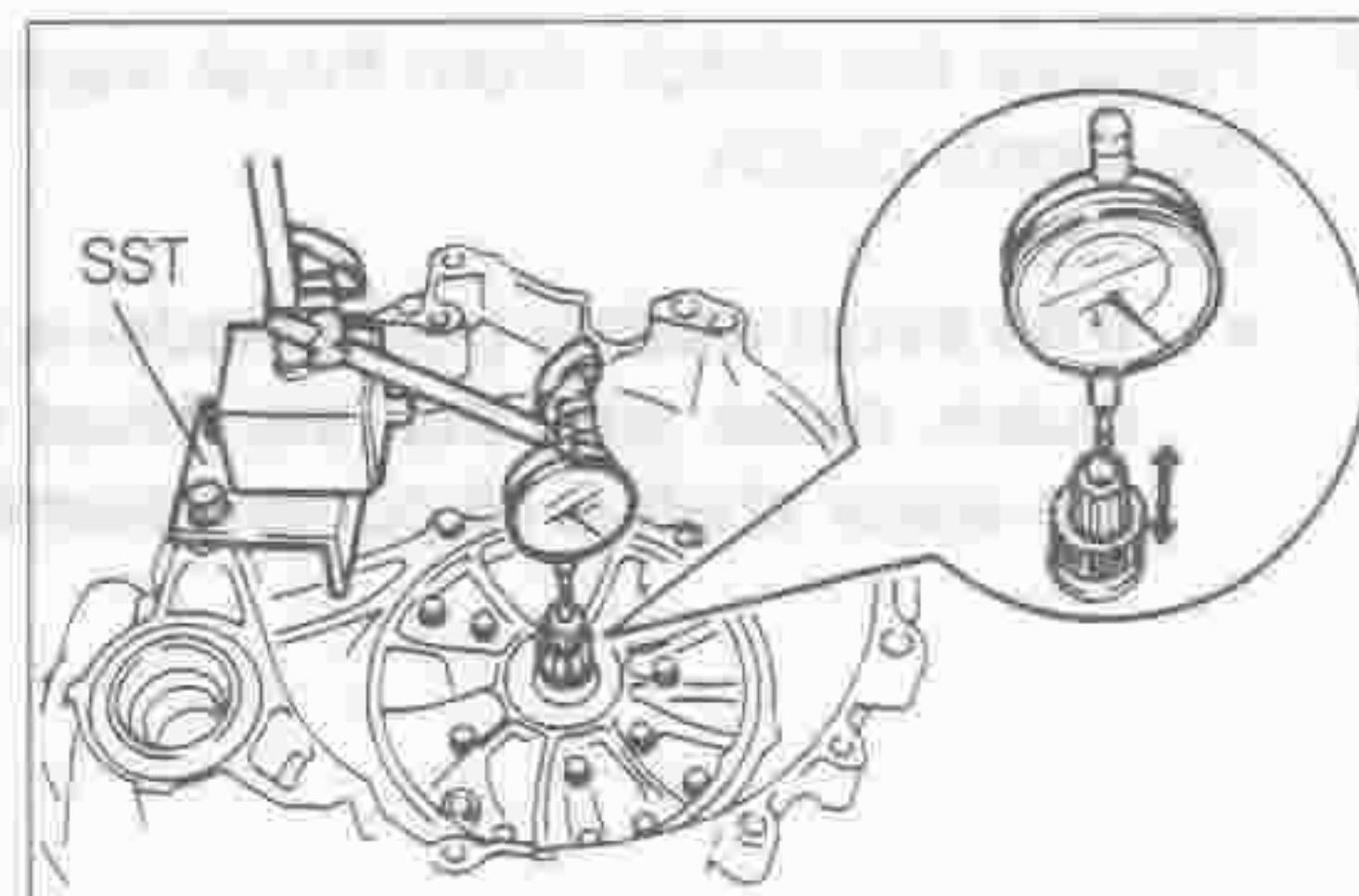
31. Measure the input shaft end play, using a dial gauge in conjunction with the following SST.

SST: 9351-87210-000

Specified Value: 0.28 - 0.92 mm
(0.011 - 0.036 inch)

NOTE:

- Be sure to record the measured value for a guide during the assembly.



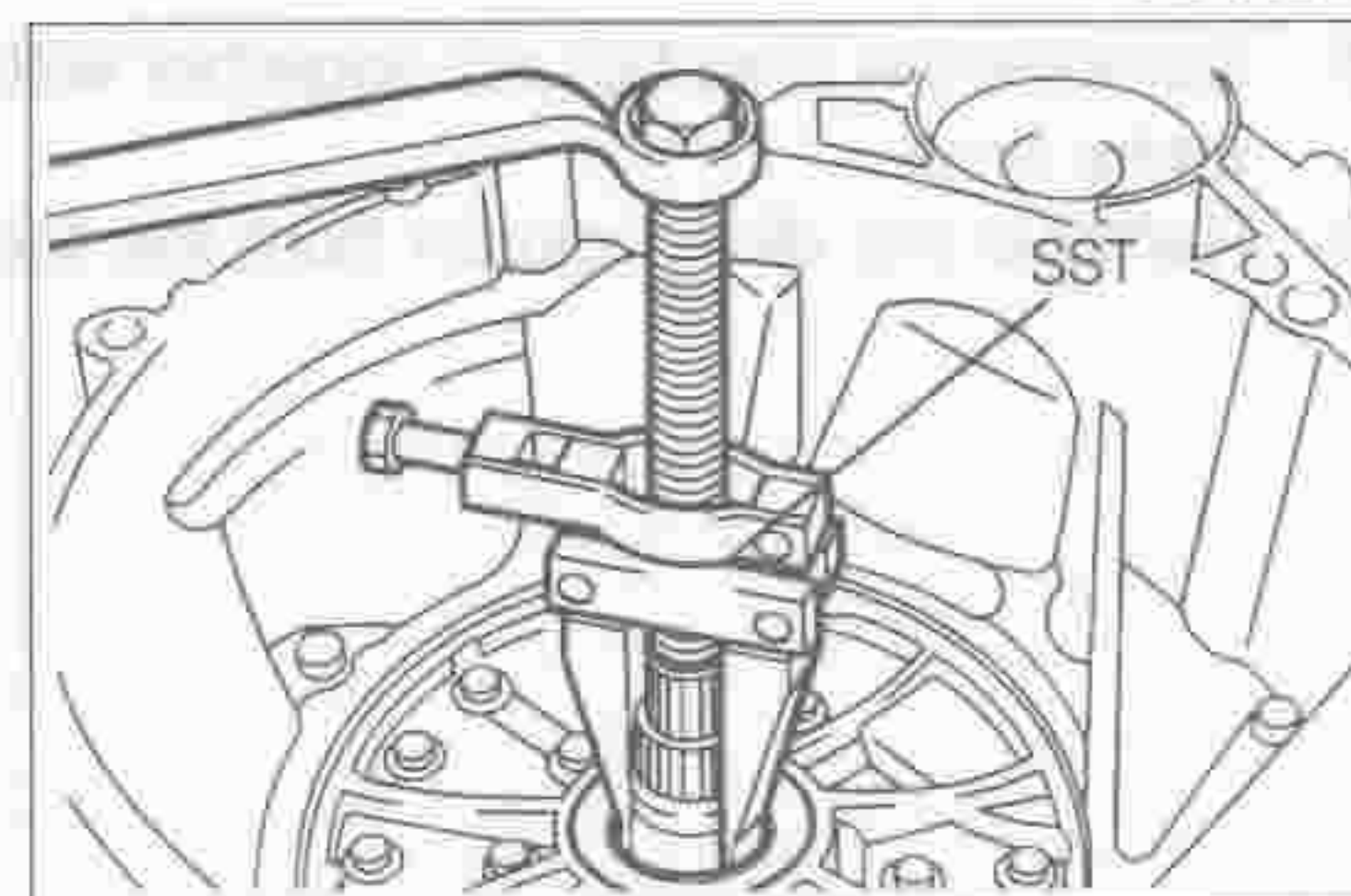
LAT00076-00070

32. Remove the T type oil seal, using the following SST.

SST: 09308-10010-000

NOTE:

- Never reuse the removed oil seal.

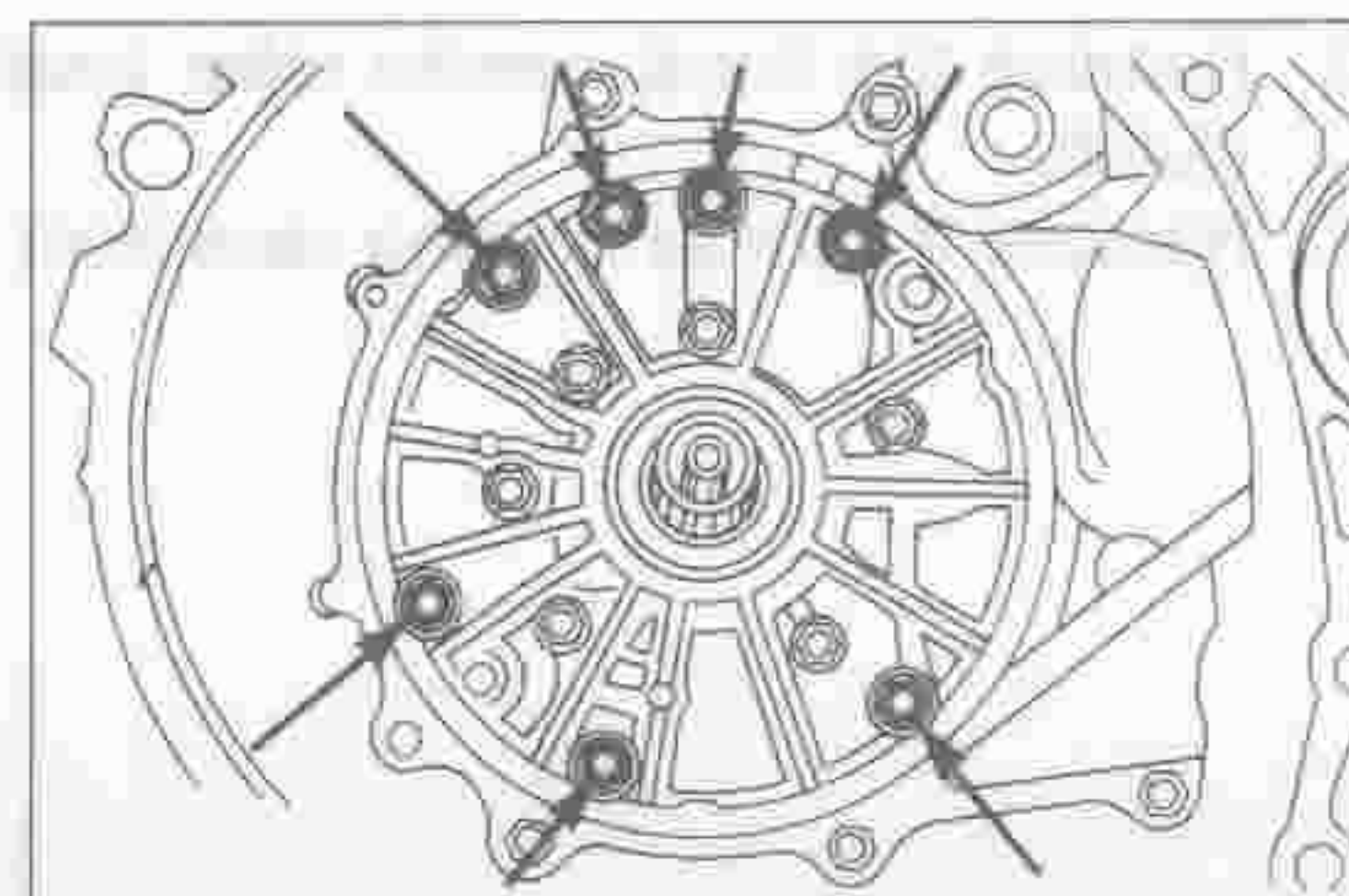


LAT00077-00071

33. Remove the seven bolts of the stator shaft & oil pump assembly.

NOTE:

- Be sure to remove the bolts evenly and diagonally.
- Never loosen any bolt other than the specified ones in the right figure.



LAT00078-00072

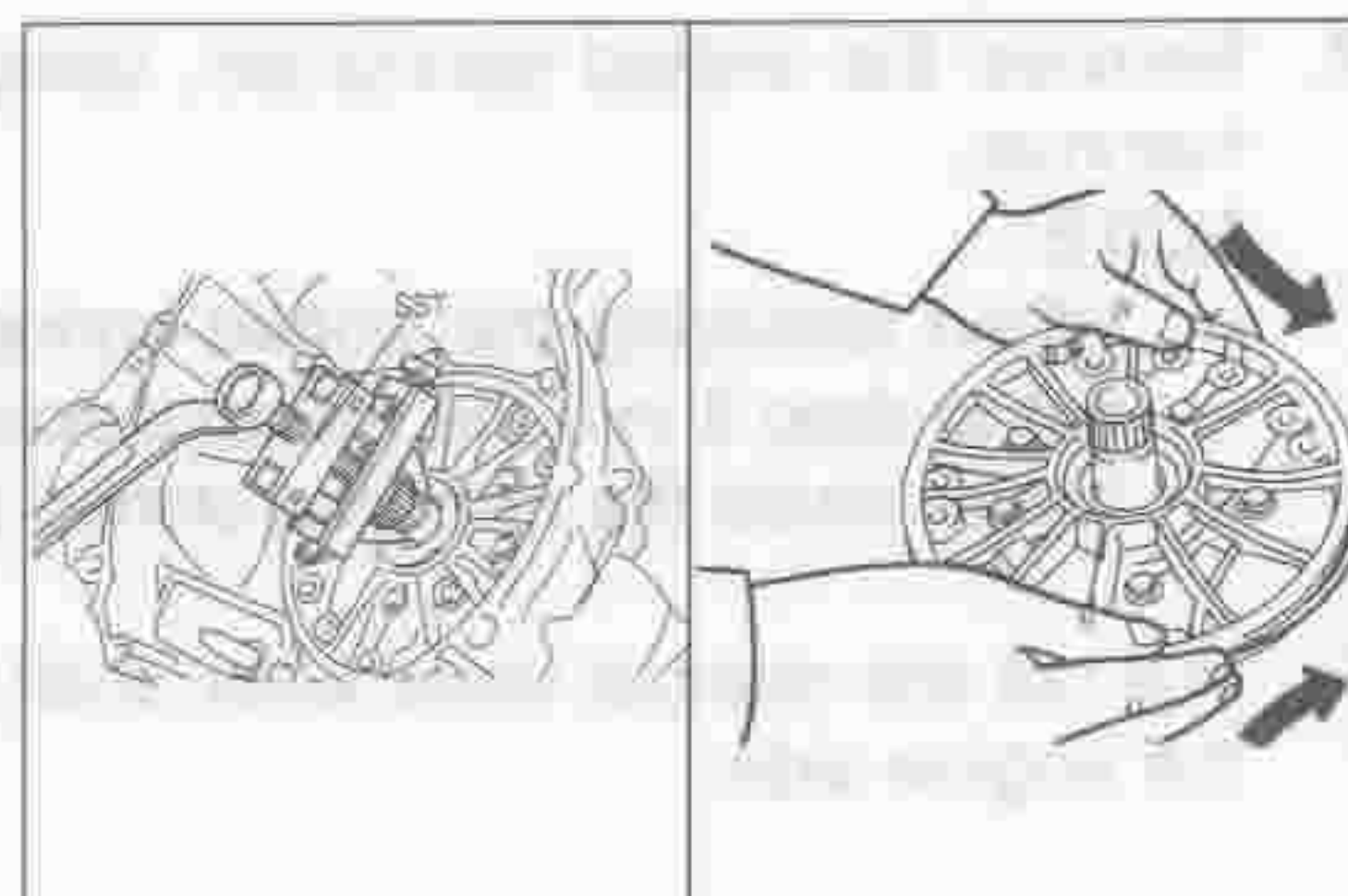
34. Remove the stator shaft & oil pump assembly with the O-ring installed, using the following SST.

SST: 09820-00021-000

35. Remove the O-ring from the stator shaft & oil pump assembly.

NOTE:

- Never reuse the removed O-ring.

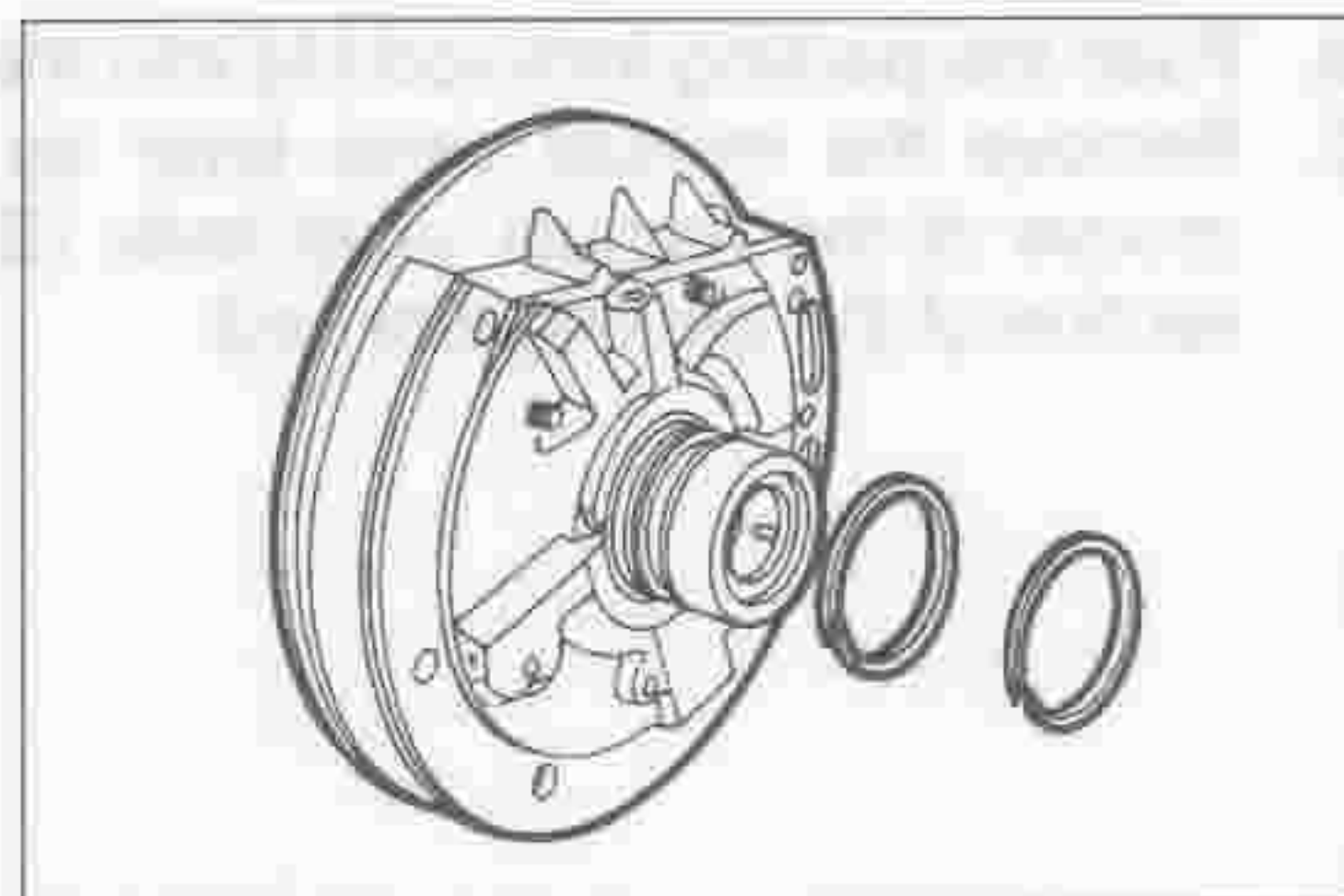


LAT00079-00073

36. Remove the two clutch drum oil seal rings.

NOTE:

- Never reuse the removed oil seal rings.

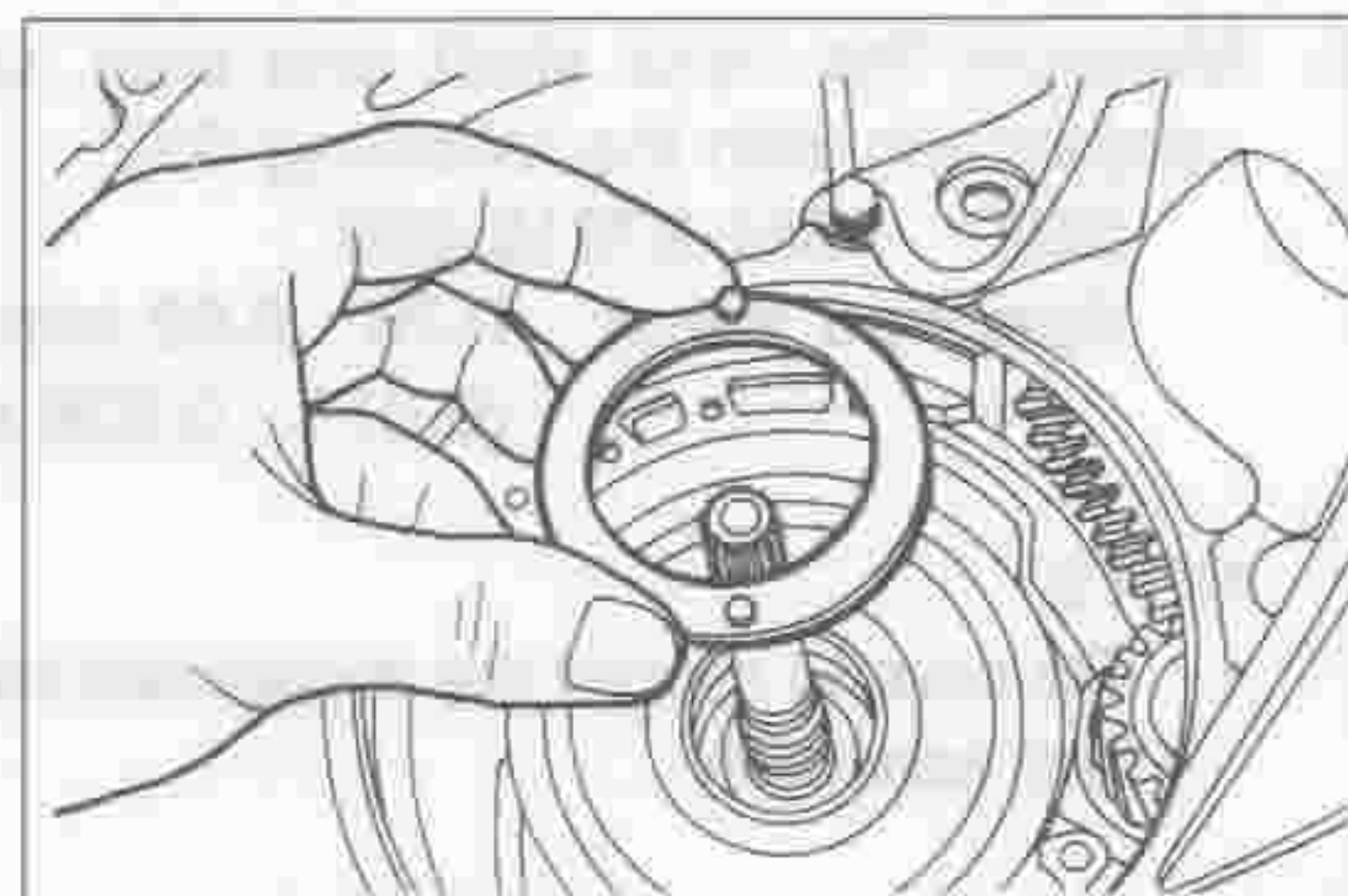


LAT00080-00074

37. Remove the clutch drum thrust washer (resin made) from the direct clutch.

NOTE:

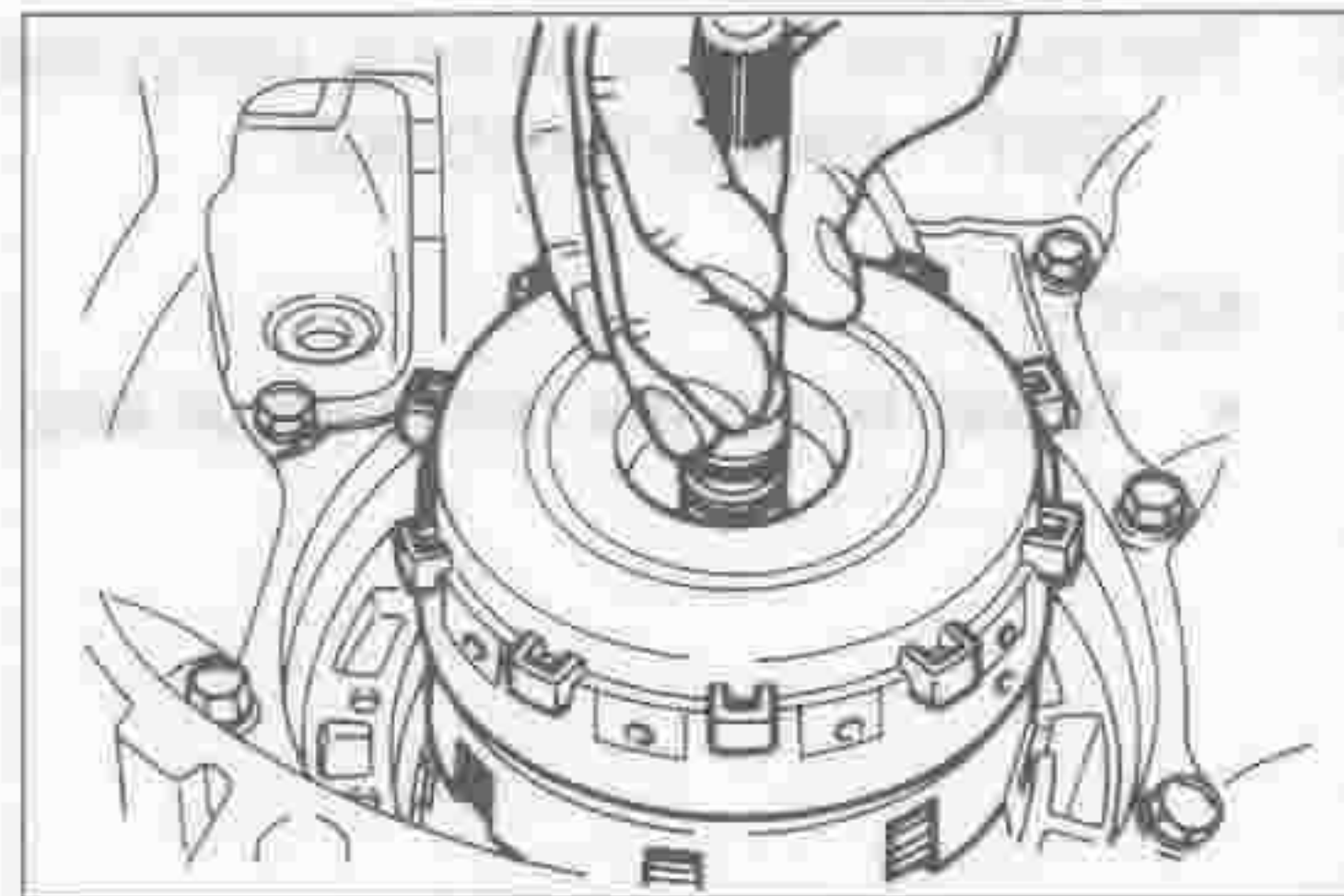
- If no thrust washer (resin made) is provided on the direct clutch, make sure that the thrust washer is installed at the stator shaft & oil pump assembly side.



LAT00081-00075

38. Remove the direct clutch together with forward clutch at the same time.

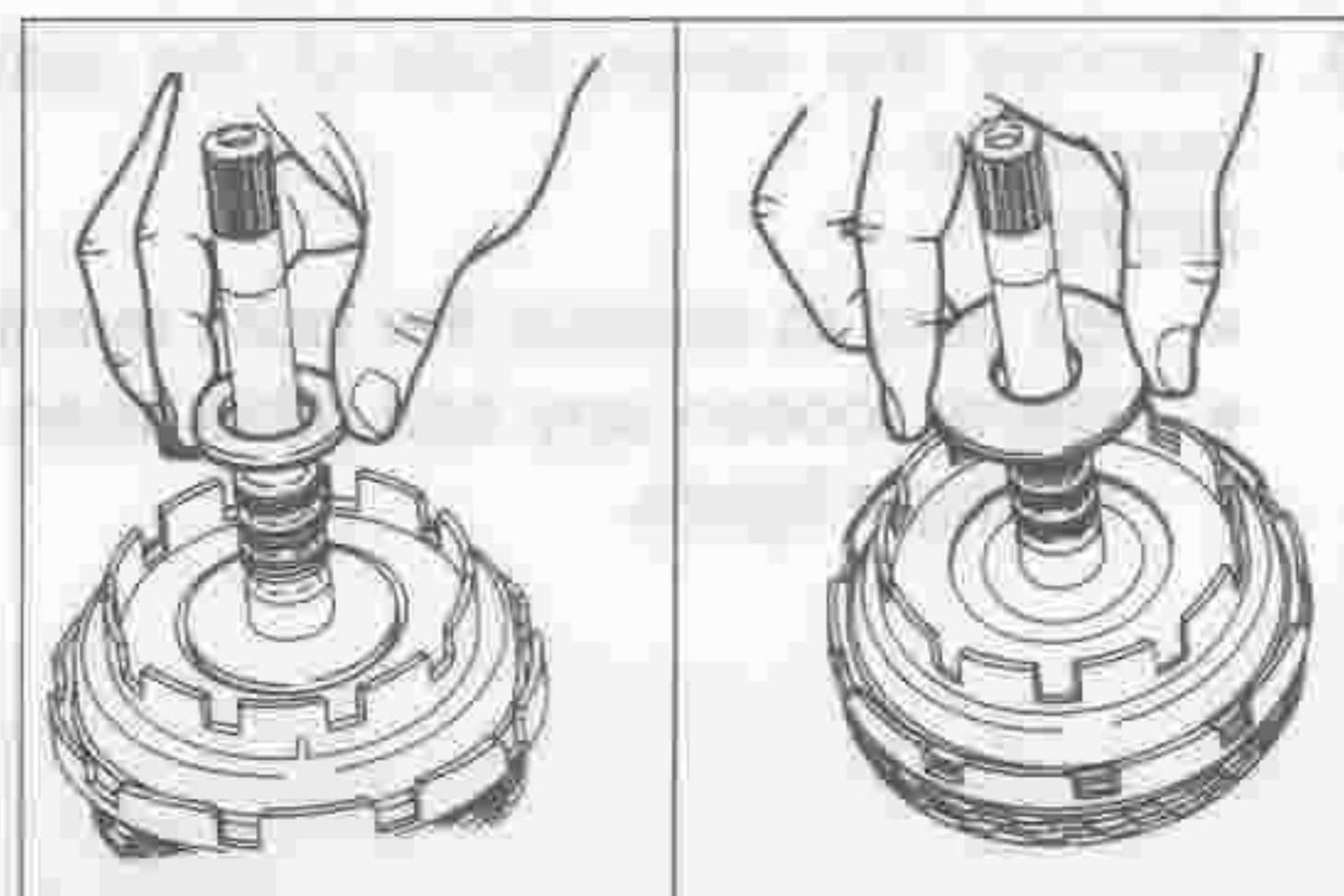
39. Remove the direct clutch from the forward clutch.



LAT00082-00076

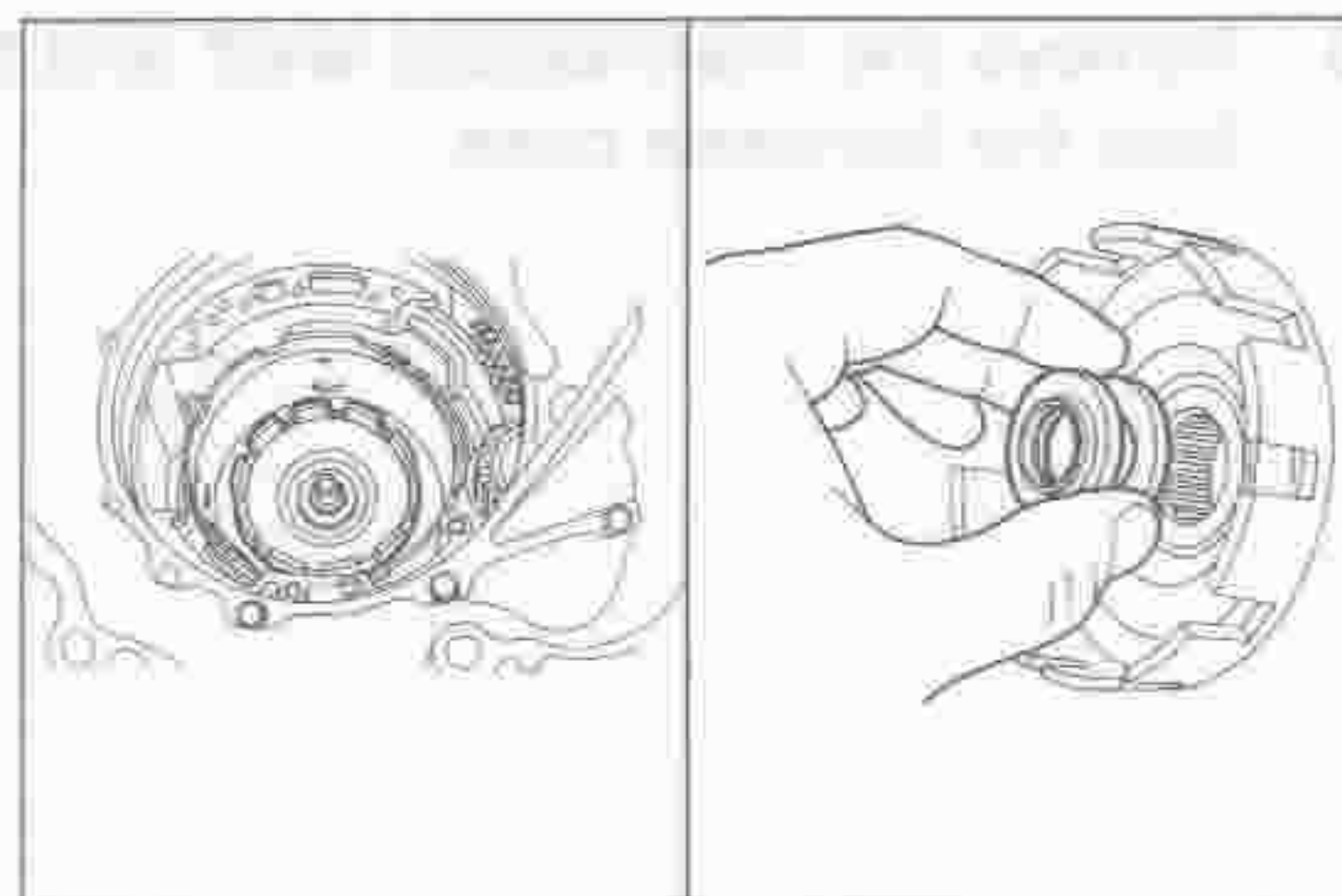
40. Remove the thrust needle roller bearing from the forward clutch.

41. Remove the thrust bearing race from the forward clutch.



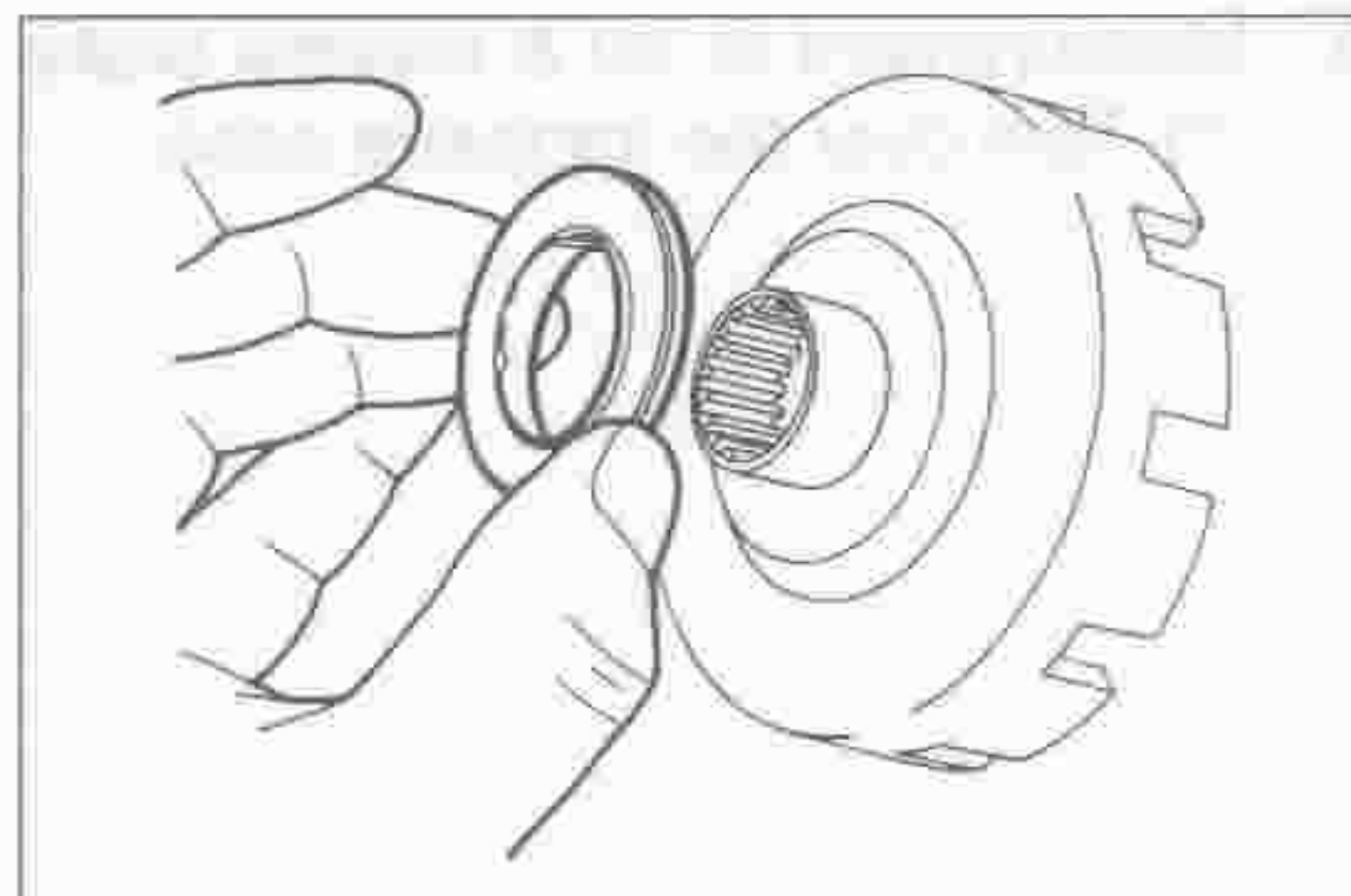
LAT00083-00077

42. Remove the forward clutch hub from the transaxle case.
43. Remove the thrust needle bearing and oil reserve plate from the forward clutch hub.



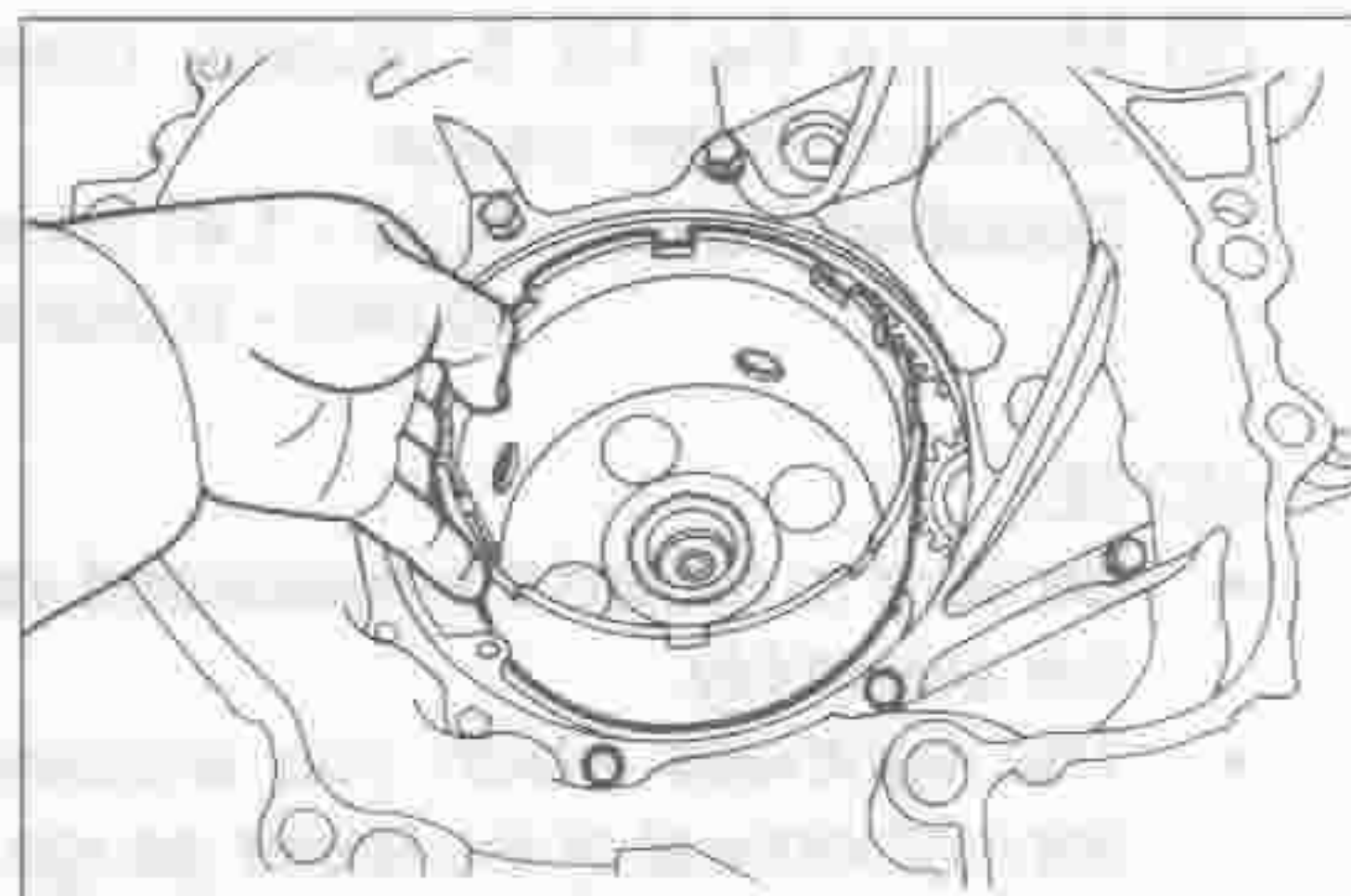
LAT00084-00078

44. Remove the thrust needle bearing from the back side of forward clutch hub.



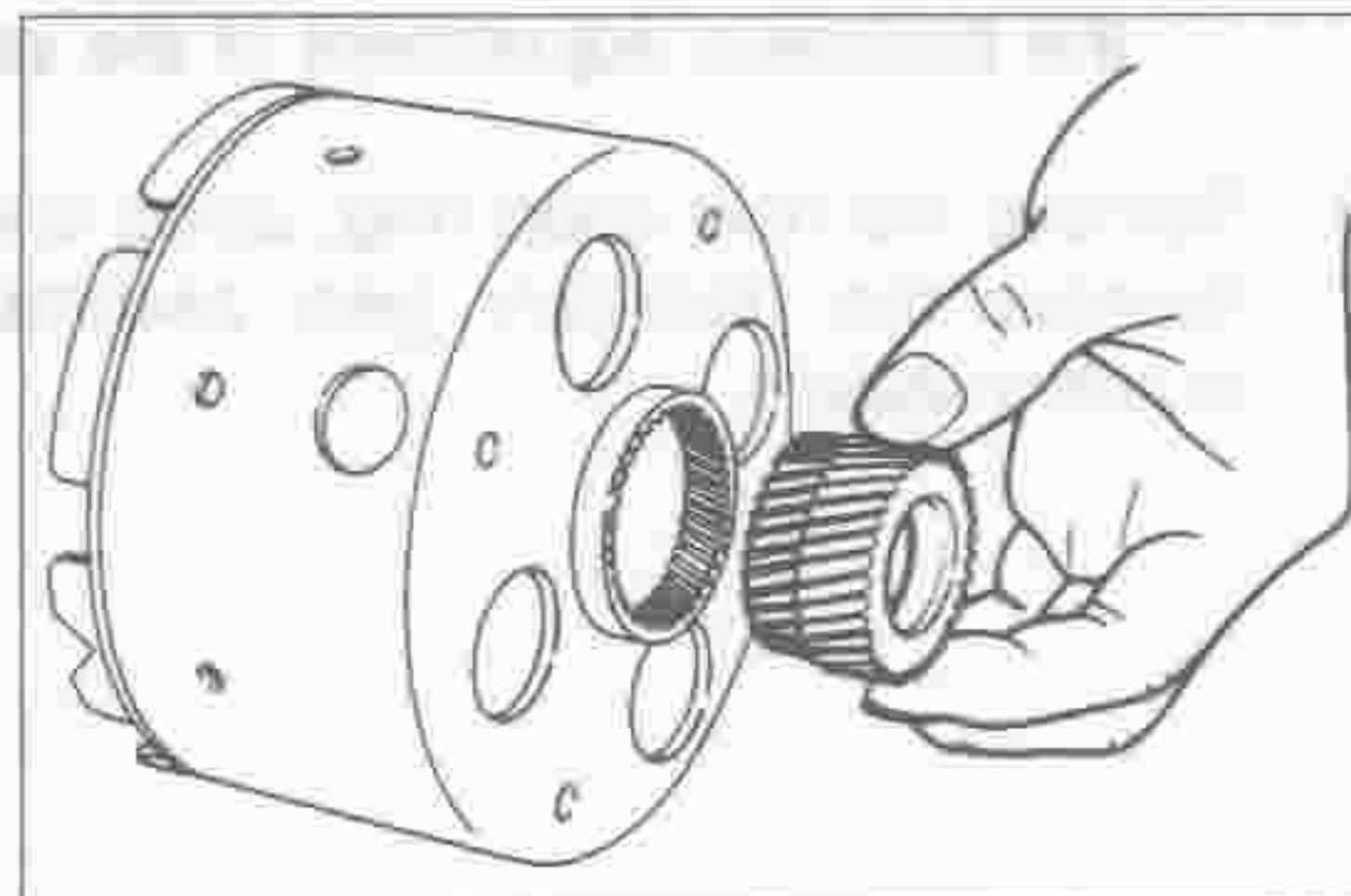
LAT00085-00079

45. Remove the 2nd brake drum from the transaxle case.



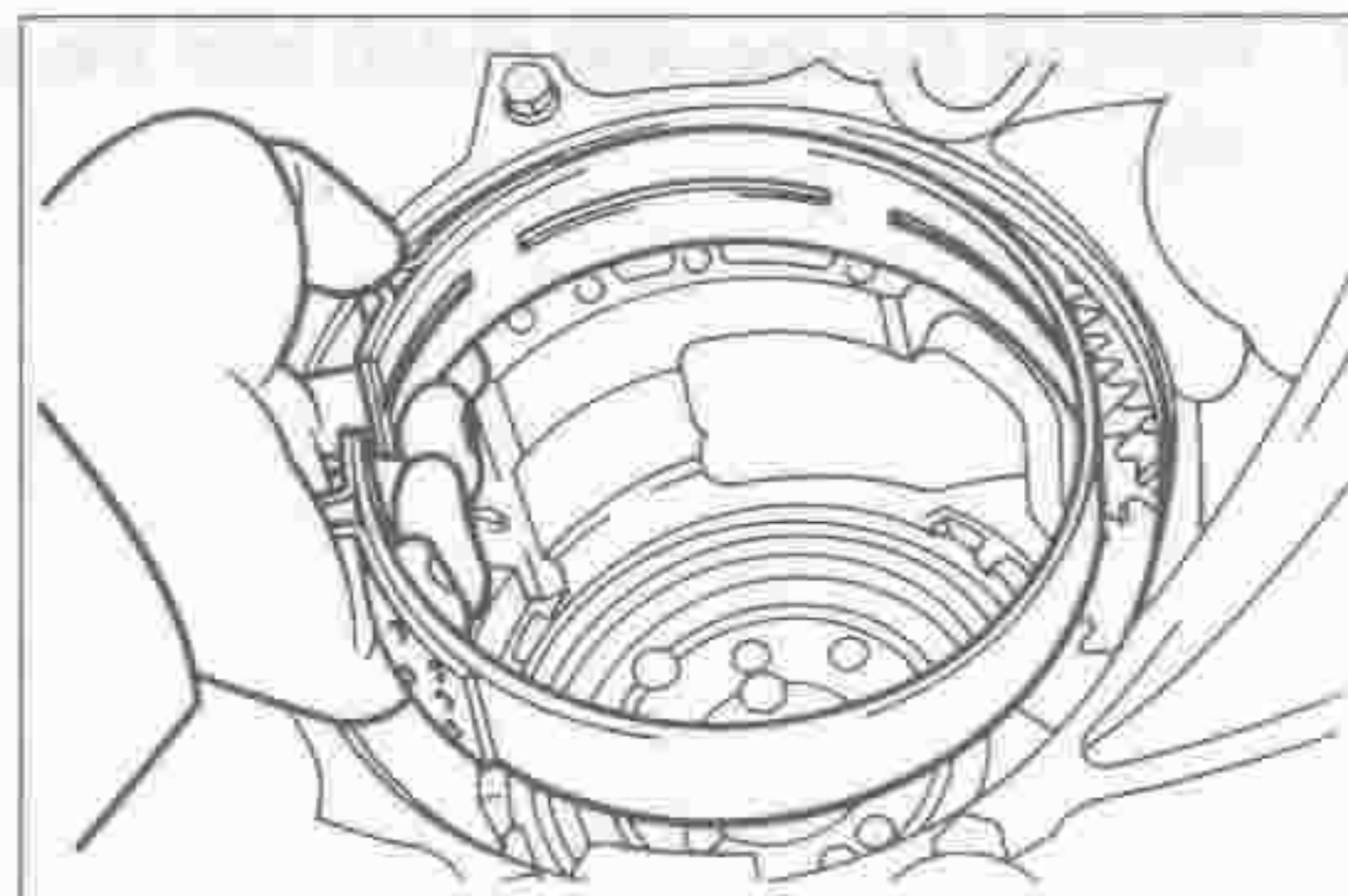
LAT00086-00080

46. Remove the planetary sun gear assembly from the 2nd brake drum.



LAT00087-00081

47. Remove the transmission brake band assembly.



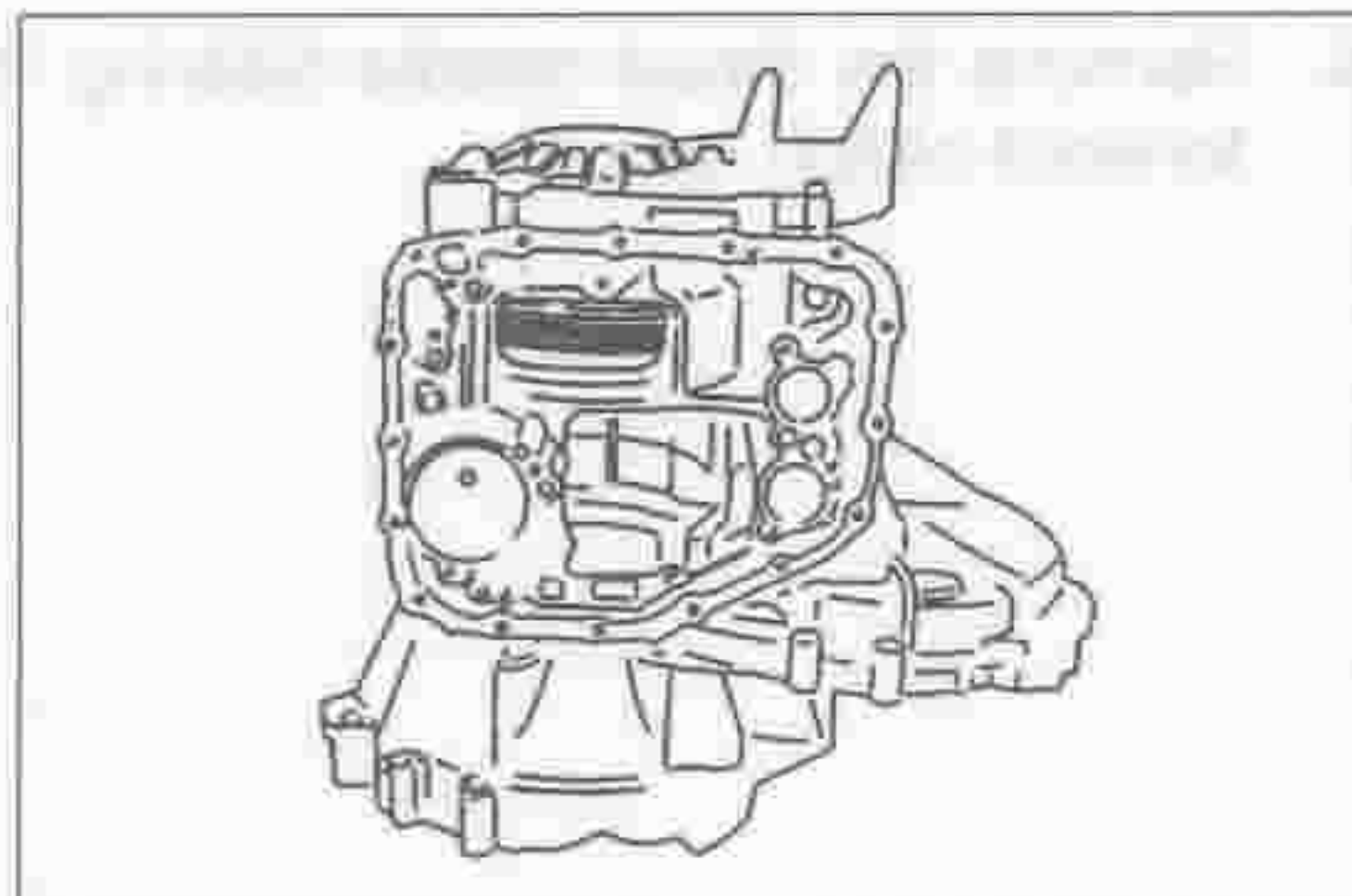
LAT00088-00082

48. Remove the intermediate shaft and thrust needle bearing.



LAT00089-00083

49. Measurement of 1st & reverse brake end play
(1) Turn over the transaxle case.



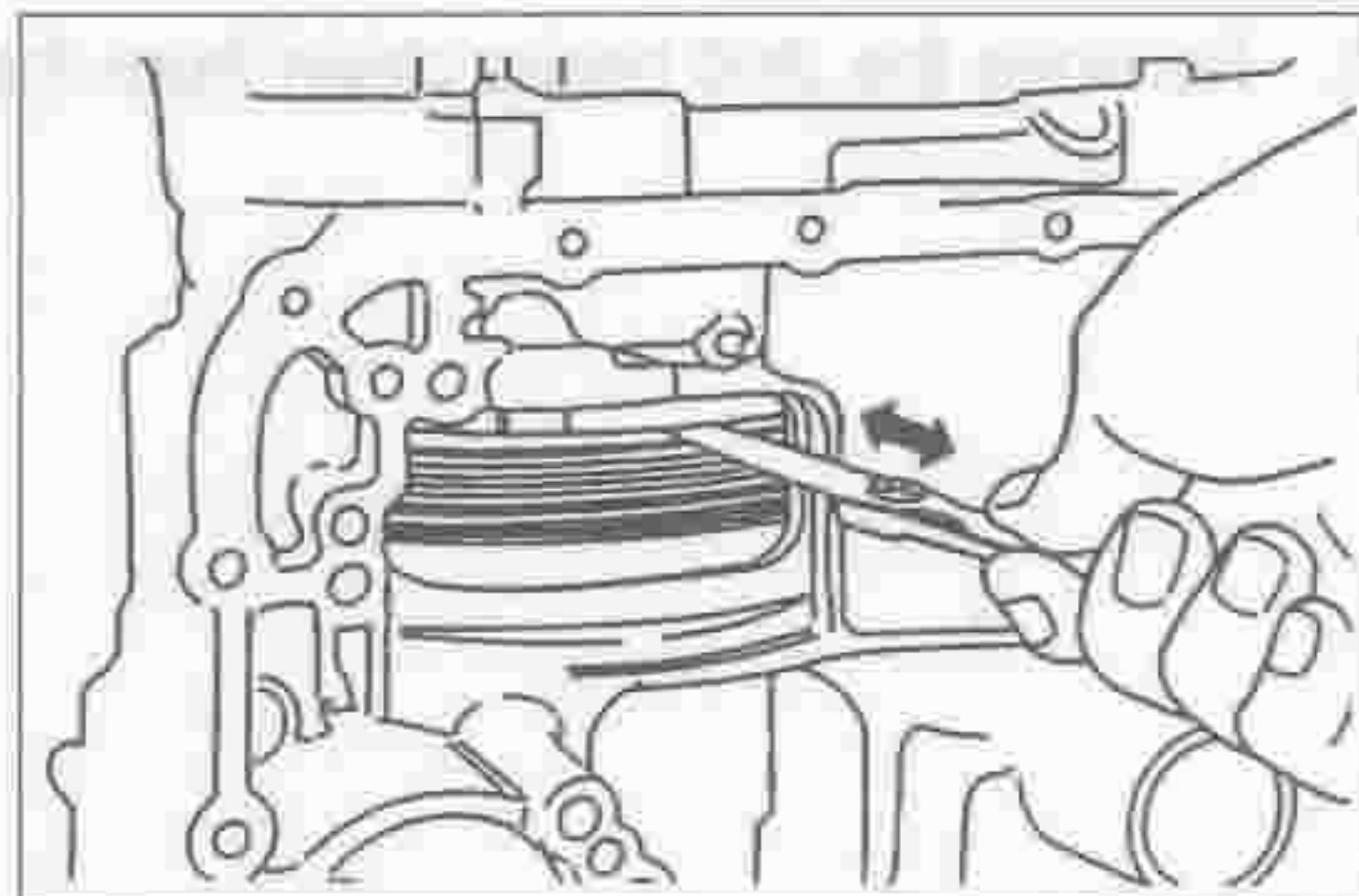
LAT00090-00084

(2) Measure the 1st & reverse brake end play, using a standard feeler gauge.

Specified Value: 1.04 - 1.41 mm
(0.040 - 0.055 inch)

NOTE:

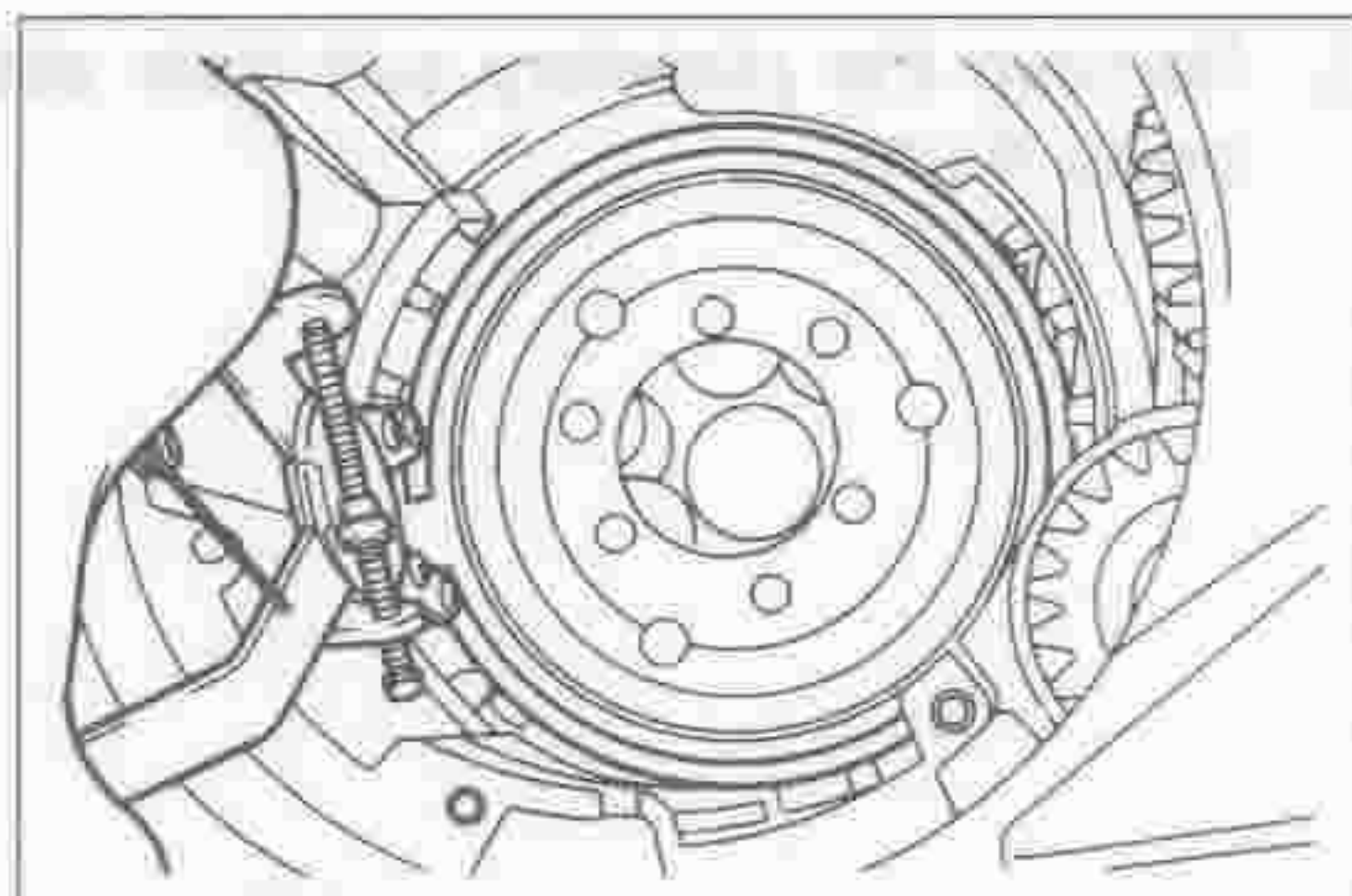
- Be sure to record the measured value for a guide during the assembly.
- The tightness which you encounter during this insertion/withdrawal of the feeler gauge should be virtually the same as the tightness which you would encounter during the thickness adjustment of the valve rocker arm.



LAT00091-00085

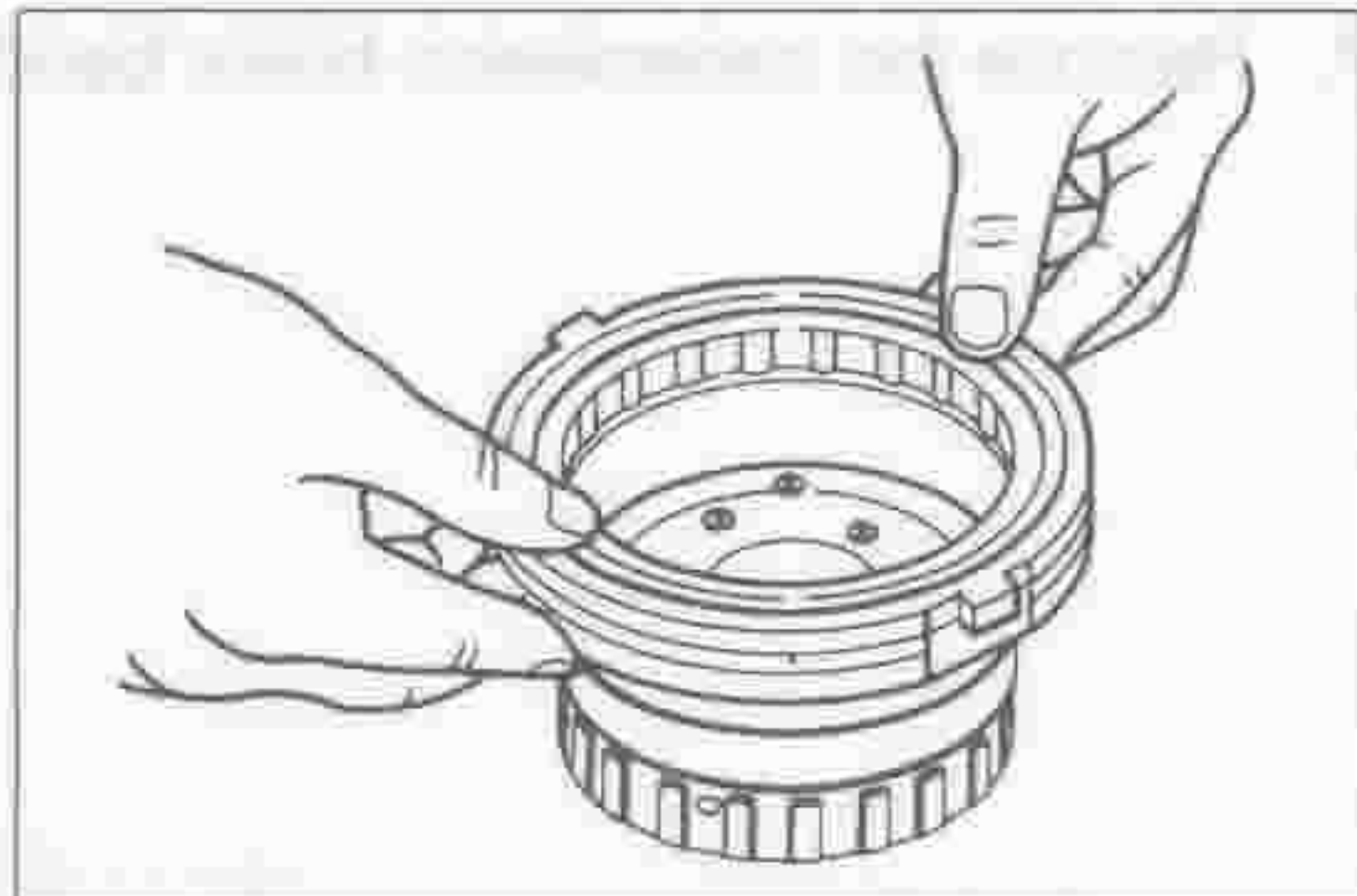
50. Remove the hole snap ring, using snap ring pliers.

51. Remove the planetary gear assembly with the one-way clutch installed.



LAT00092-00086

52. Remove the one-way clutch from the planetary gear assembly.



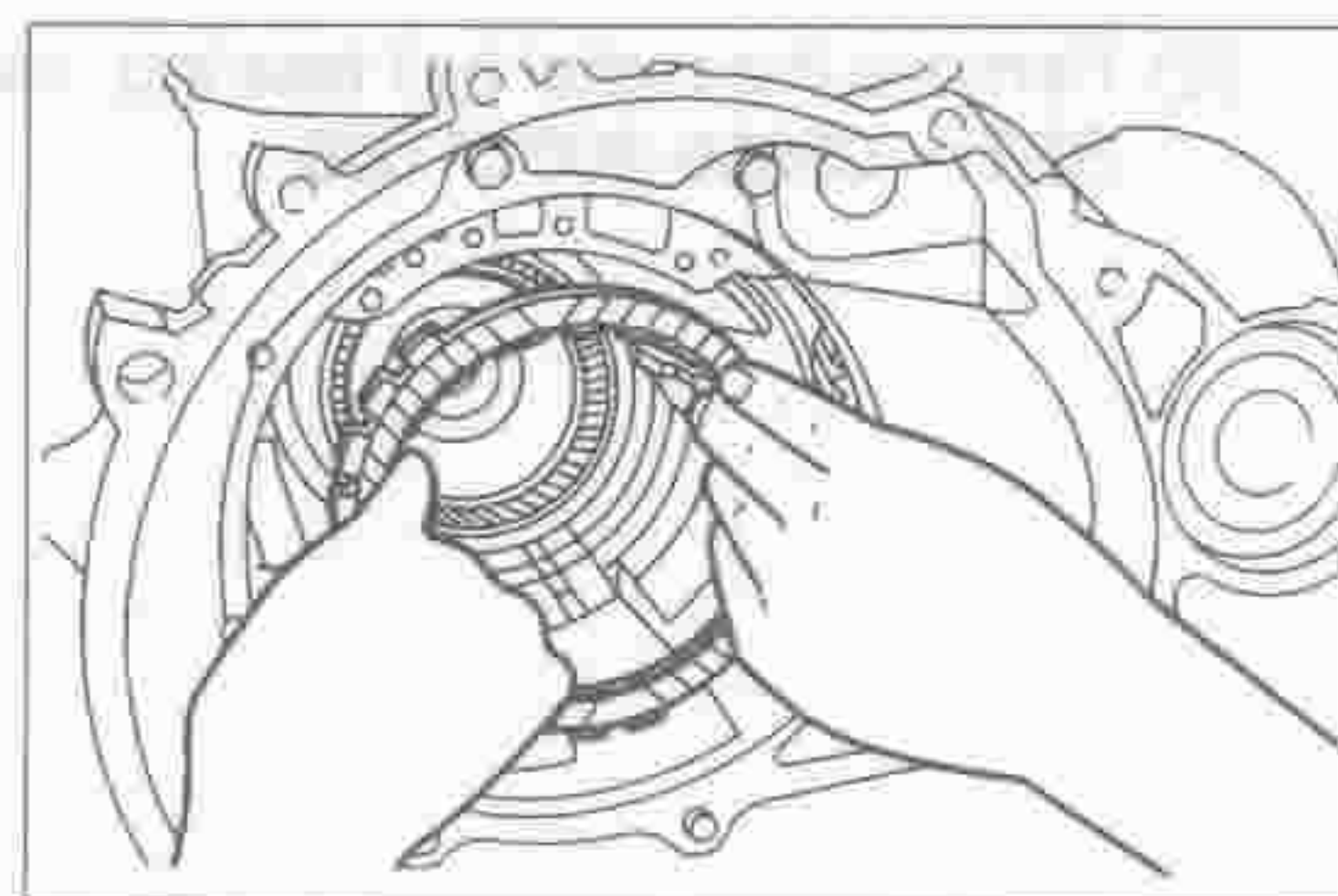
LAT00093-00087

53. Move the brake discs, brake plates and brake cushion plate in a set faces toward the front side (arrow headed mark).
54. Remove the discs, plates and cushion plate in the following order.

D = Brake disc, P = Brake plate

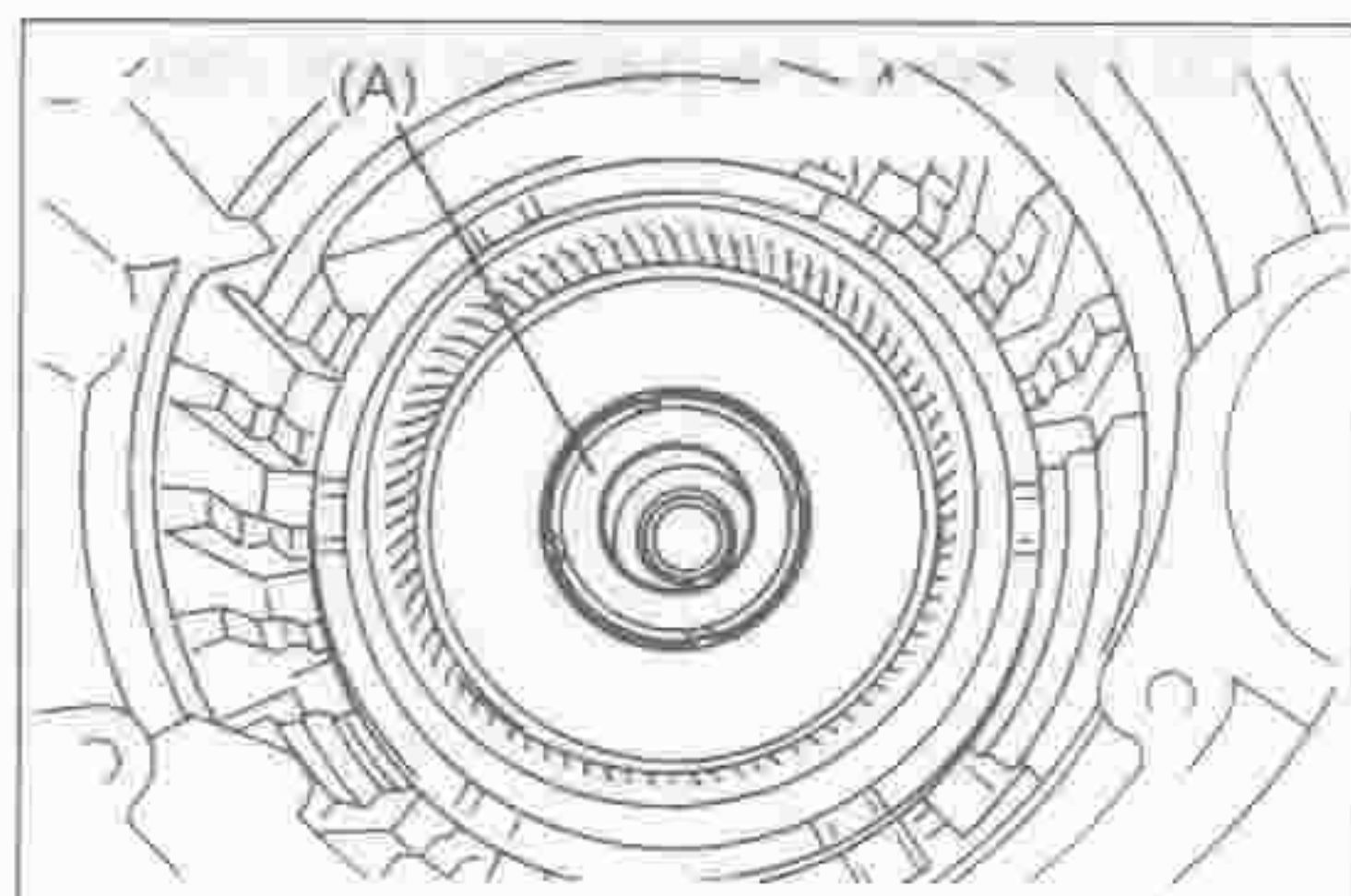
B = Brake cushion plate

D → P → D → P → D → P → D → P → B



LAT00094-00088

55. Remove the thrust needle roller bearing (A) from the planetary output shaft subassembly.

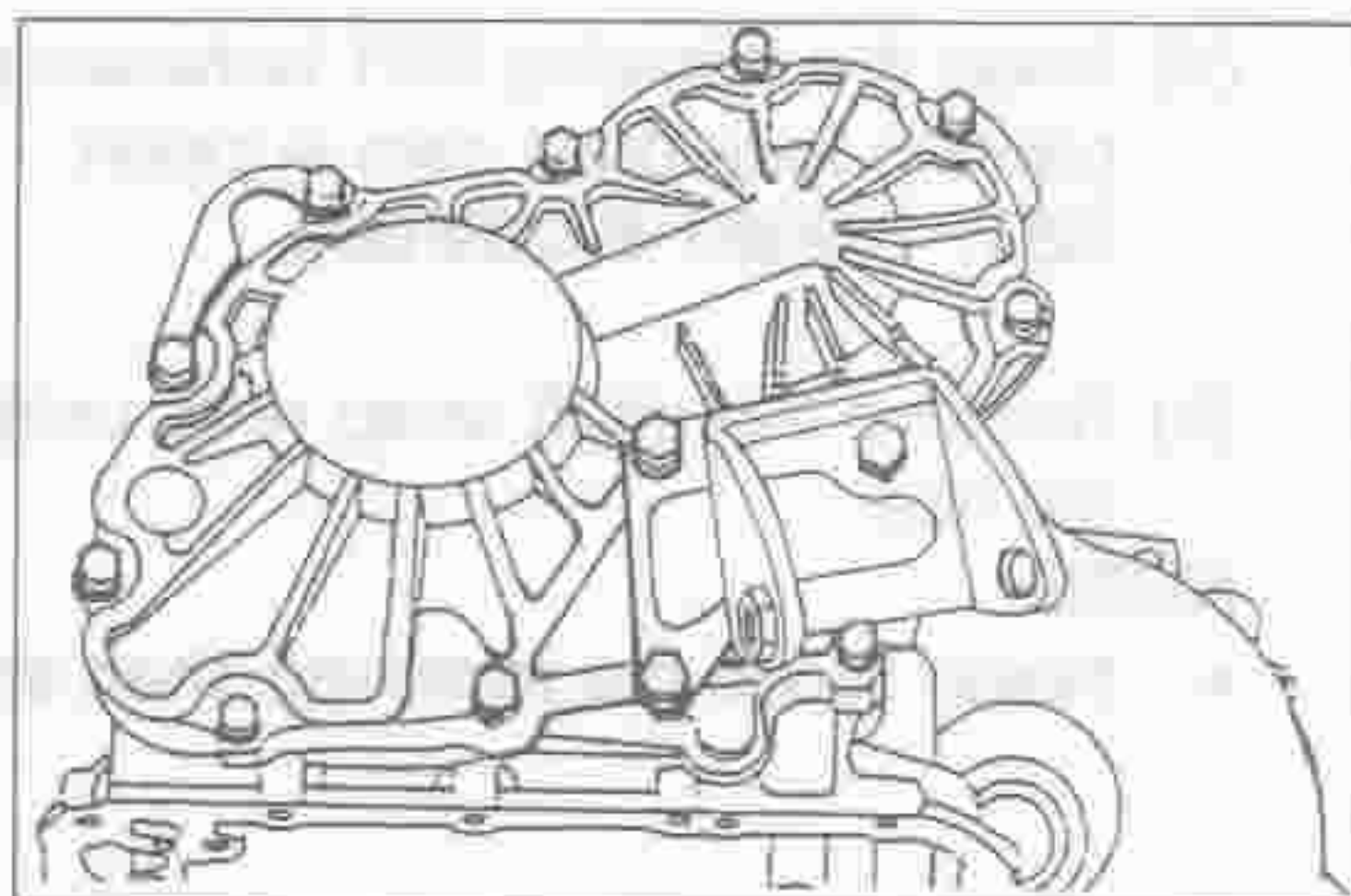


LAT00095-00089

56. Remove the rear transmission case cover subassembly.

NOTE:

- Be sure to loosen the bolts evenly and diagonally.



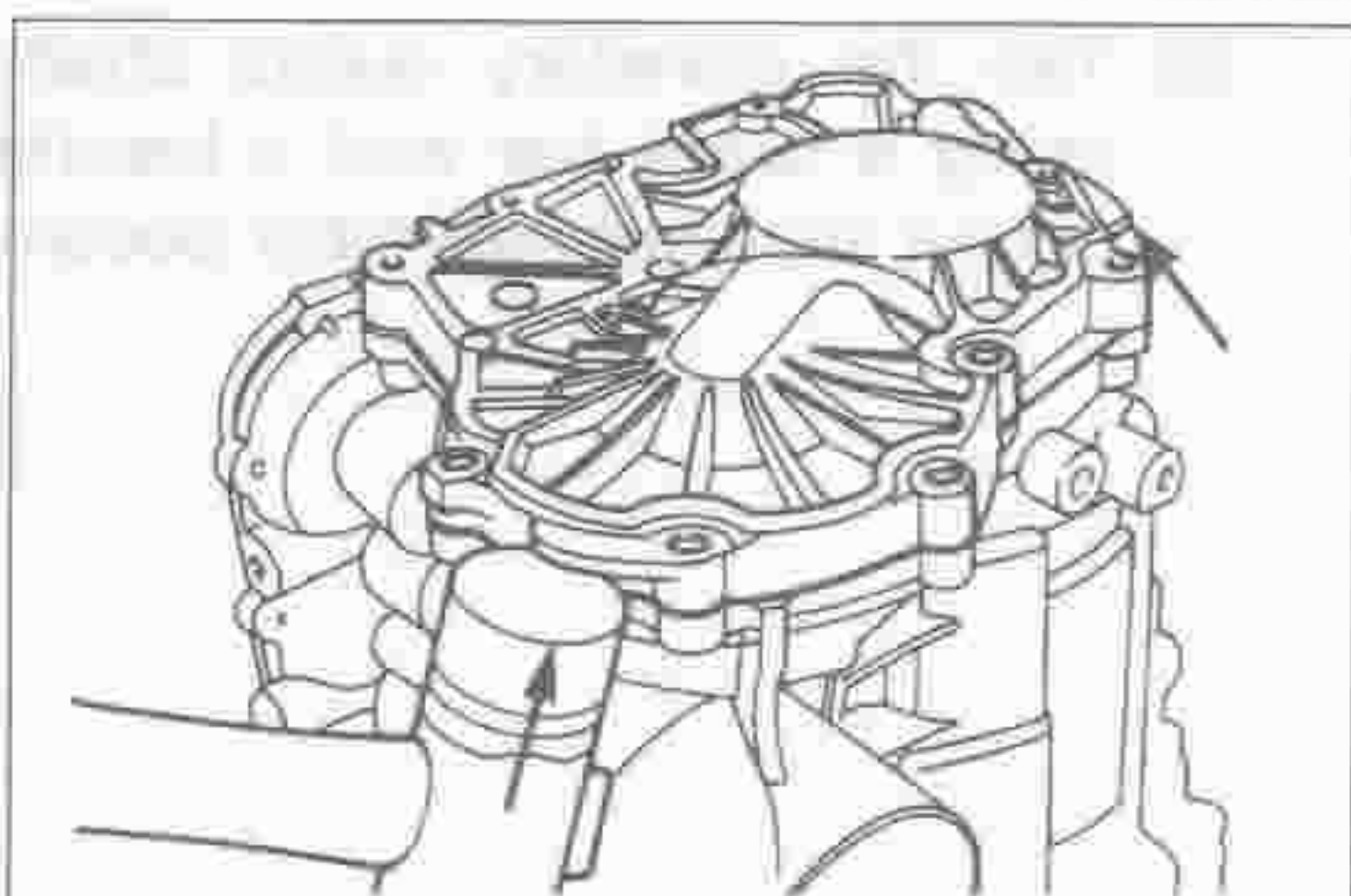
LAT00096-00090

57. Lightly and uniformly tap the 2 rib sections of the rear transmission case cover subassembly, using a standard plastic hammer.

58. Remove the transaxle case rear cover gasket.

NOTE:

- Never reuse the removed gasket.



LAT00097-00091

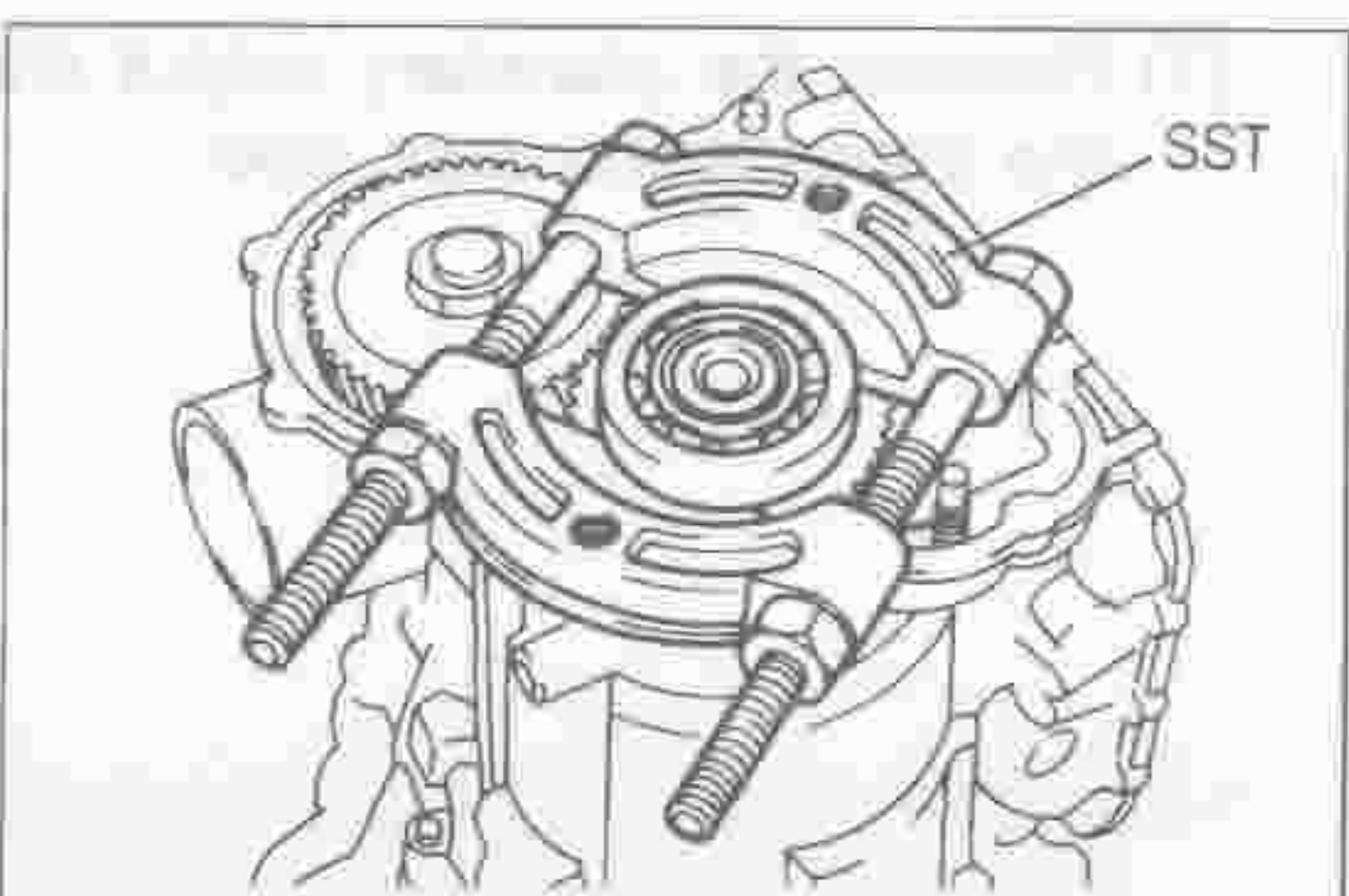
59. Removal of planetary output shaft subassembly.

- (1) Lift the radial ball bearing slightly, using the following SST.

SST: 09950-87701-000

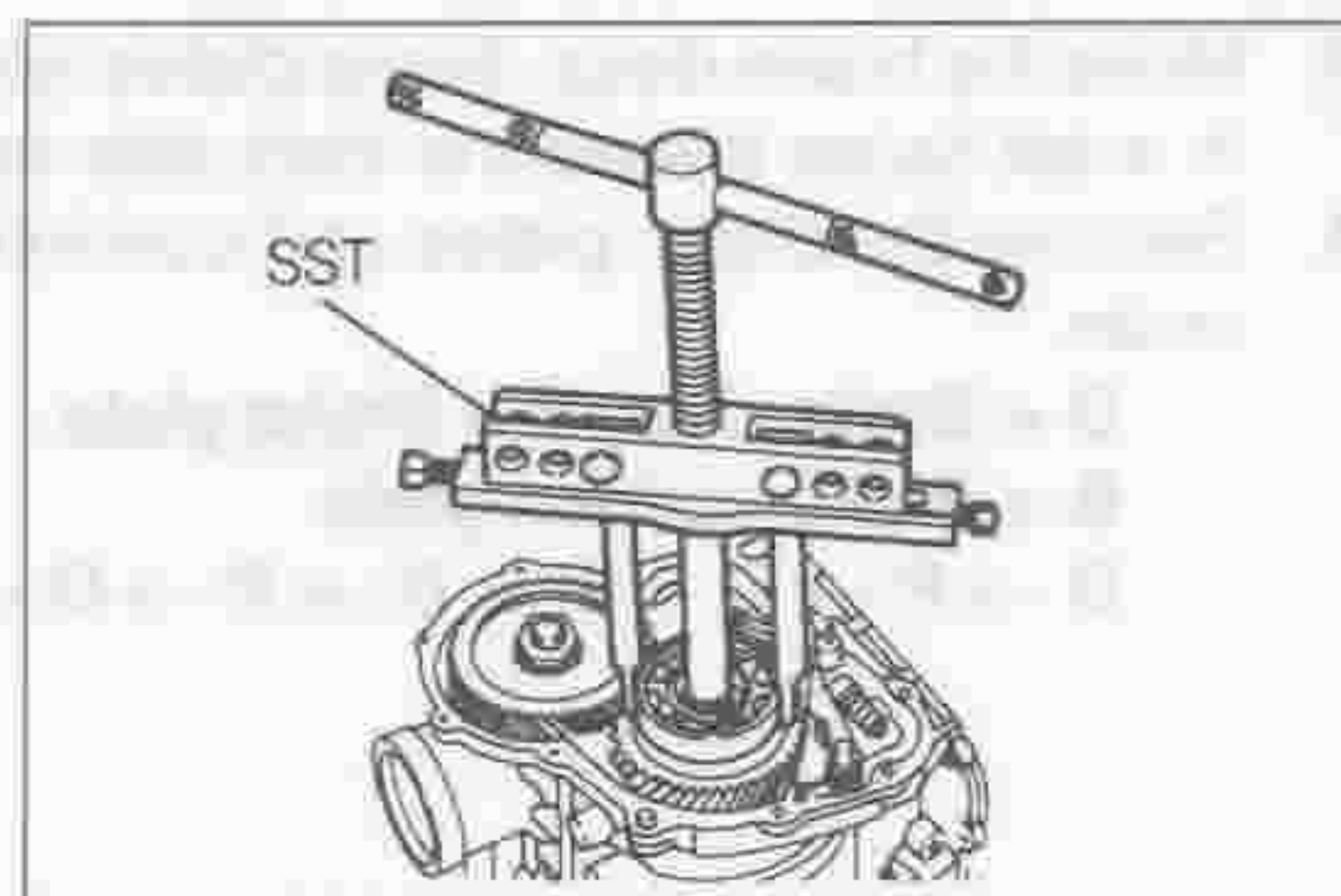
NOTE:

- Be very careful not to damage the shaft section of the reduction drive gear during use the above SST.



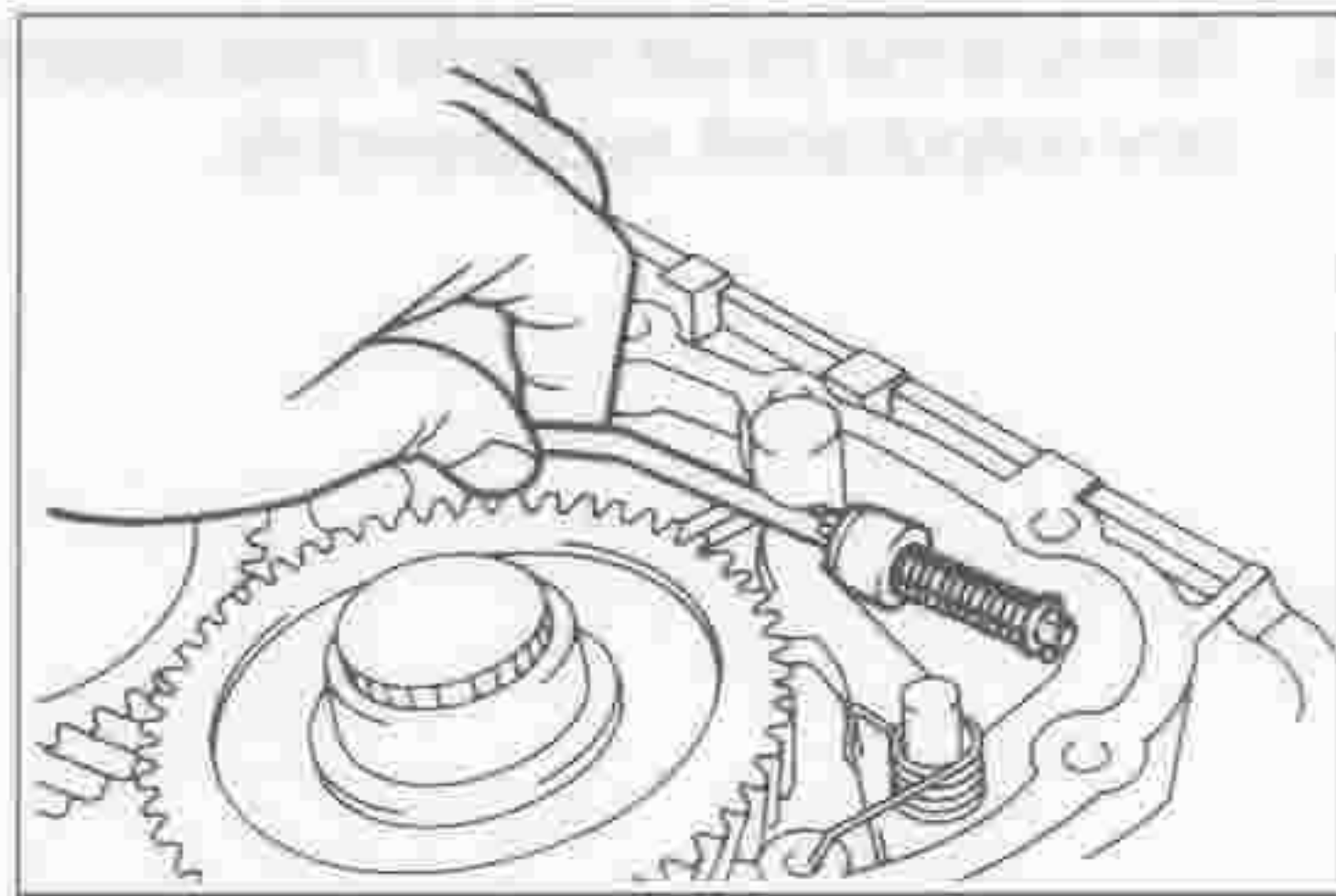
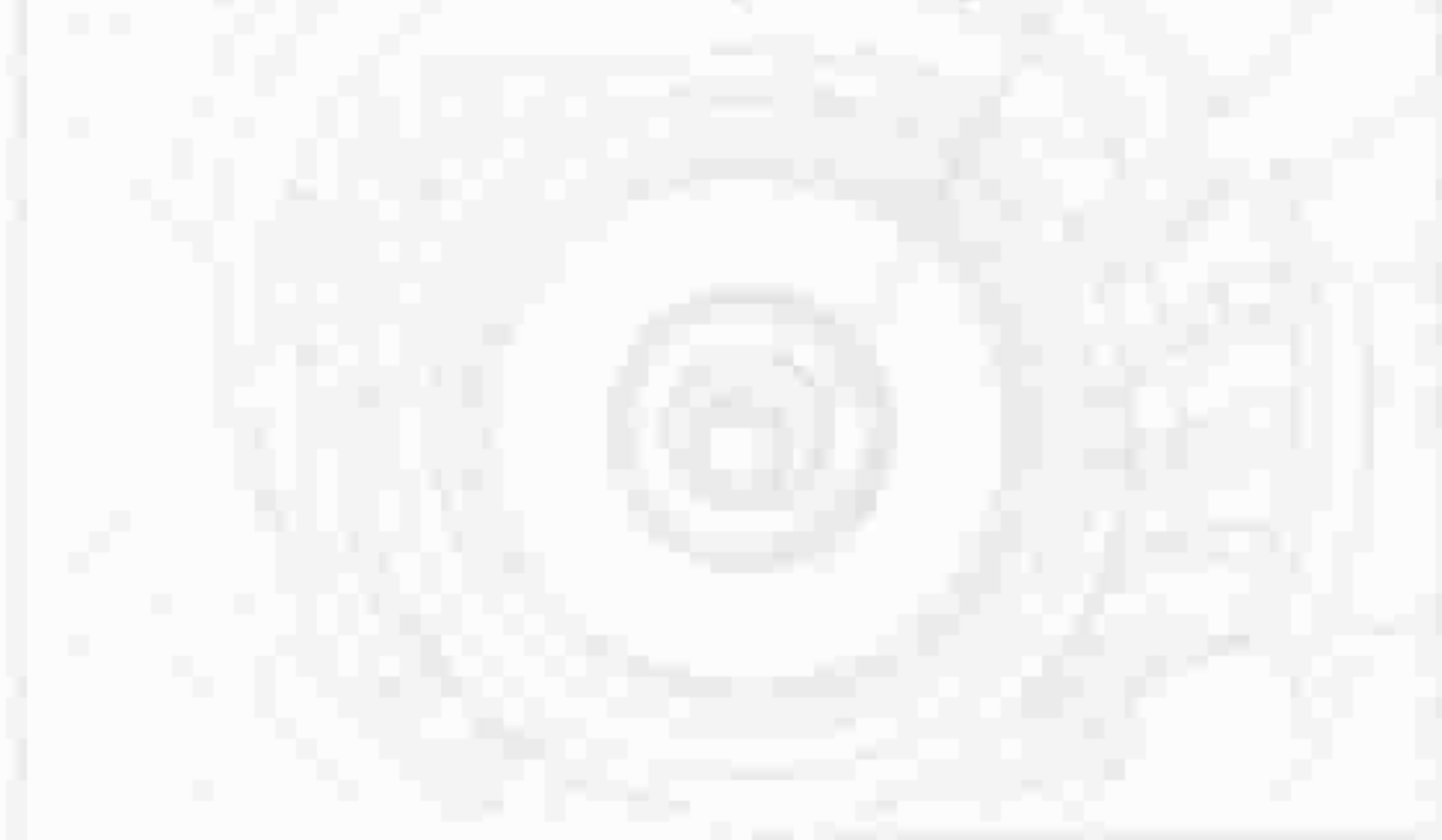
LAT00098-00092

- (2) Remove the radial ball bearing, using the following SST.
SST: 09950-20017-000



LAT00099-00093

- (3) Remove the parking lock rod.



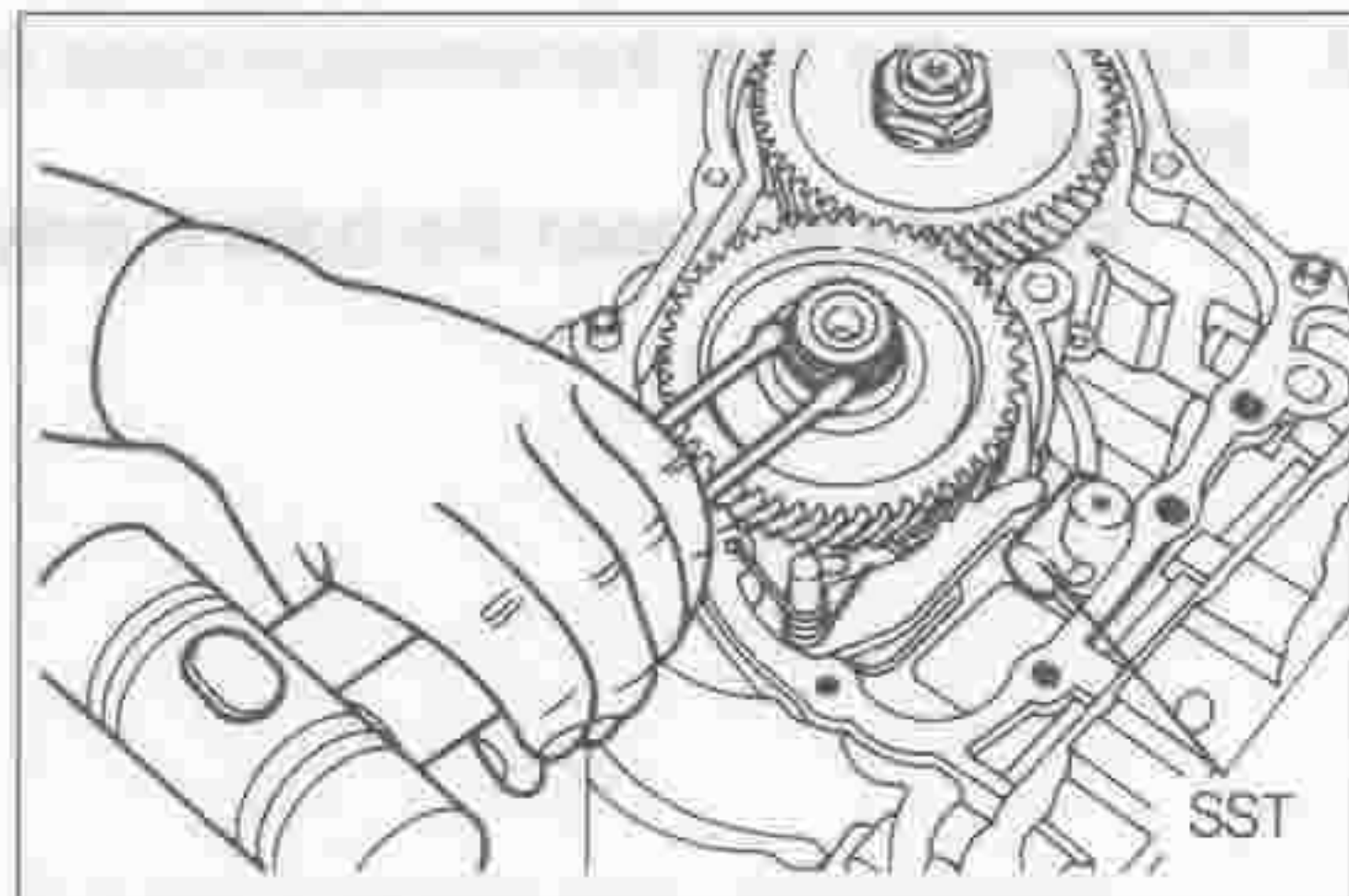
LAT00100-00094

- (4) Insert the following SST between parking lock pawl and parking lock pawl cam support.
SST: 09351-87209-000

- (5) Remove the shaft snap ring, using the 2 flat drivers or the like.

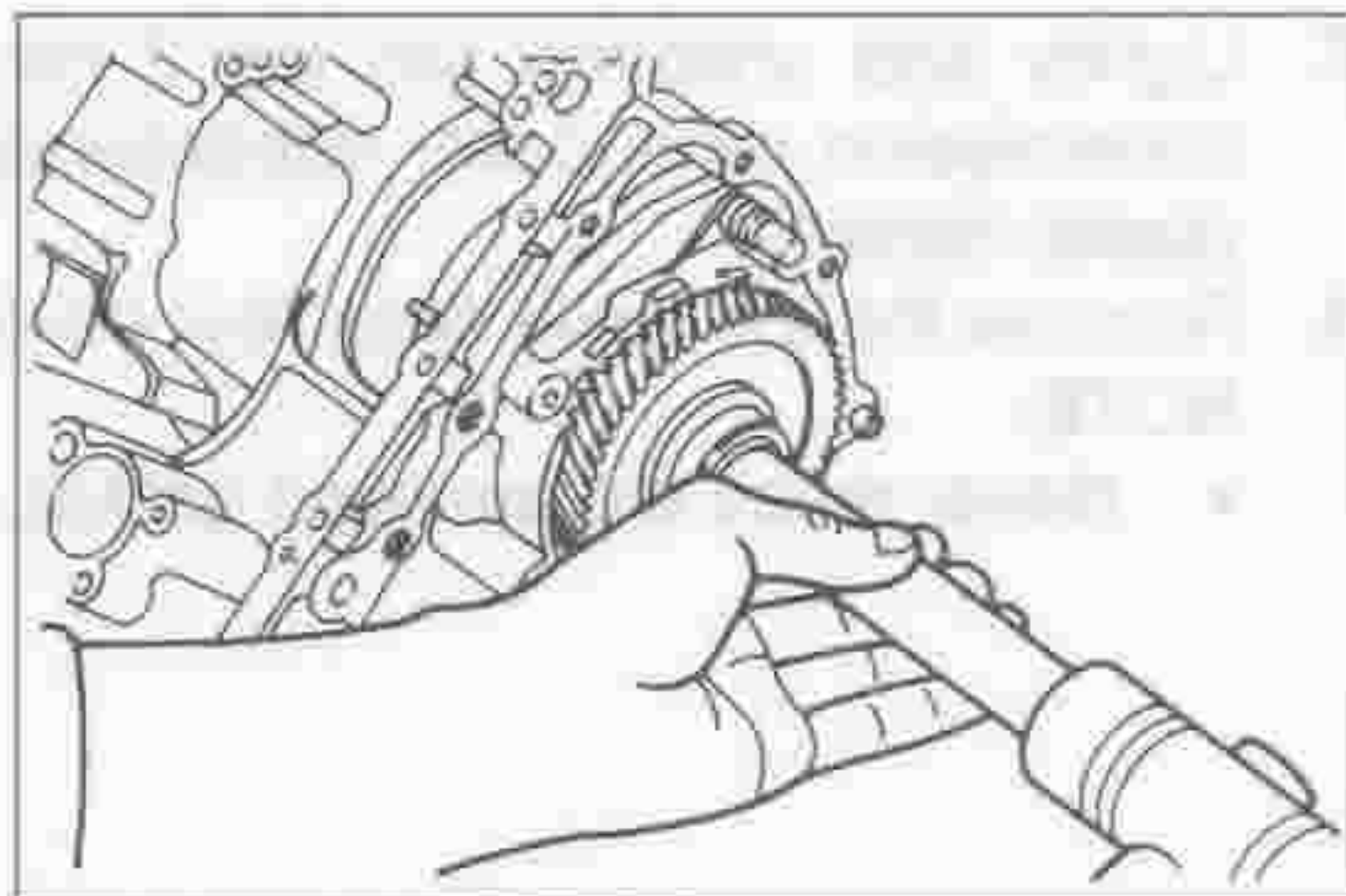
NOTE:

- Never reuse the removed shaft snap ring.



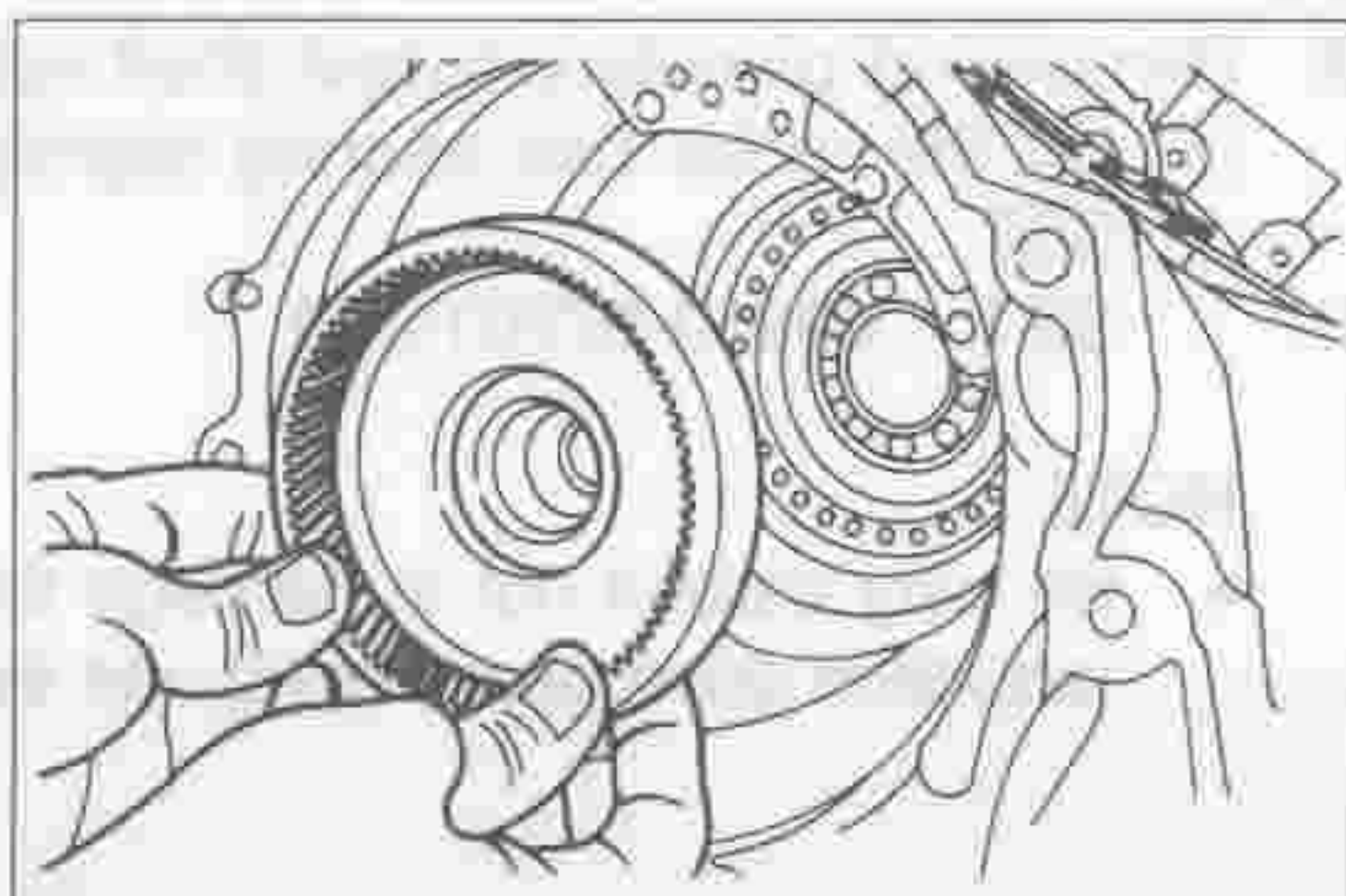
LAT00101-00095

- (6) Tap the planetary output shaft subassembly lightly, using a brass bar and a hammer, until the planetary output shaft subassembly becomes free.



LAT00102-00096

- (7) Remove the planetary output shaft subassembly from the transmission case side.

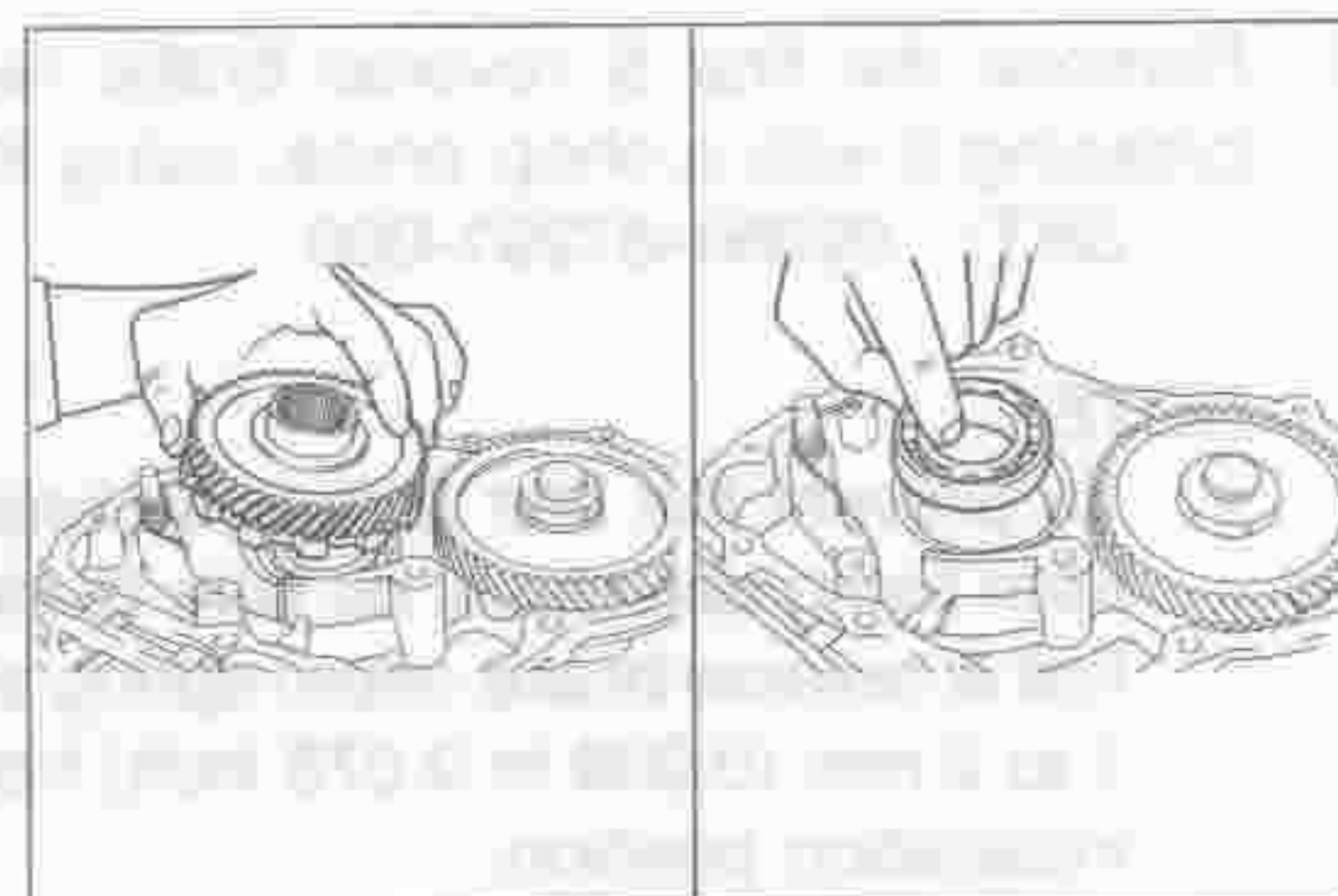


LAT00103-00097

- (8) Remove the reduction drive gear.
- (9) Remove the radial ball bearing.

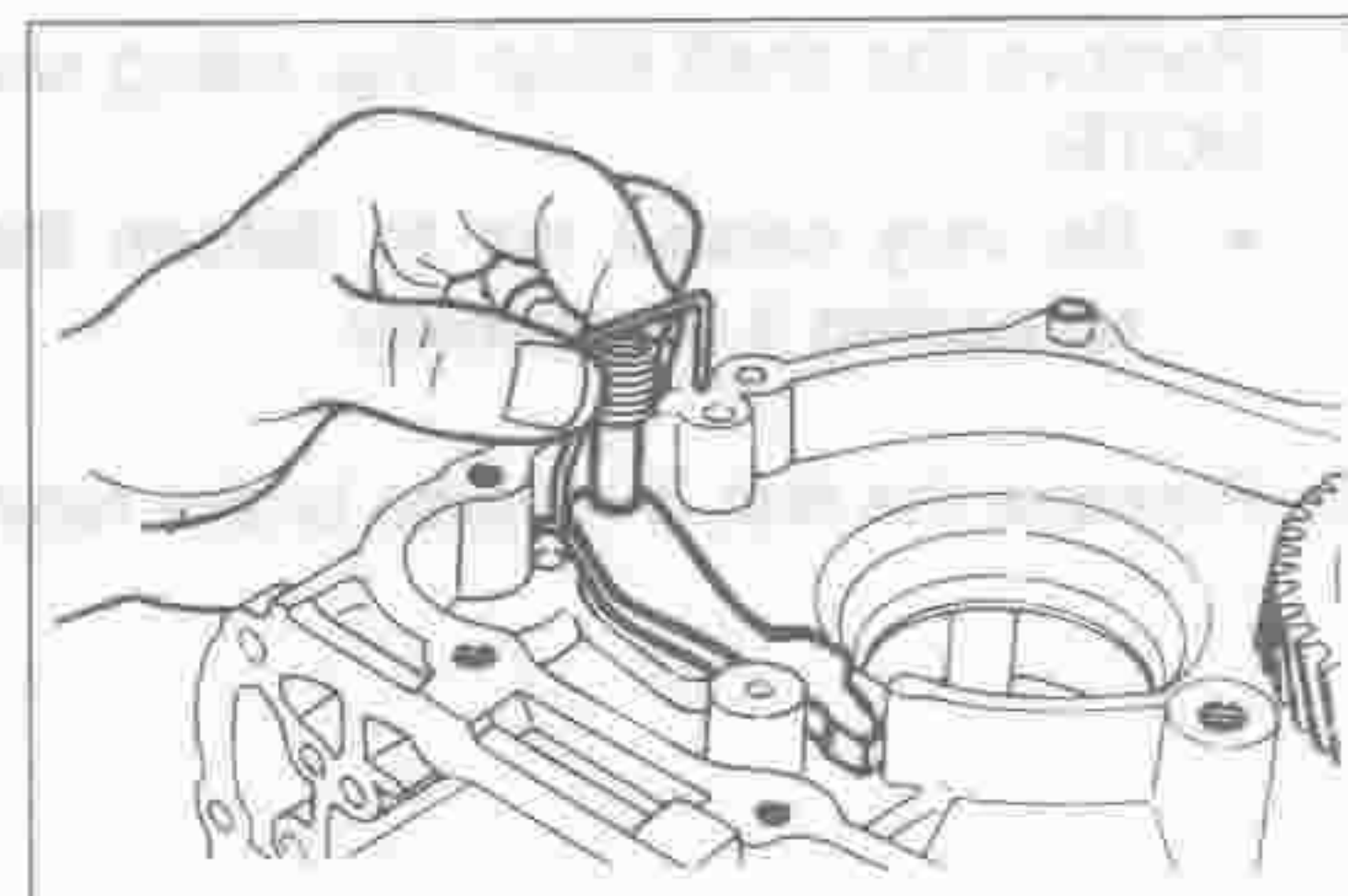
NOTE:

- If any difficulty is encountered in removing the radial ball bearing, remove it by applying a light impact from the inside of the transmission case, using a suitable brass bar in combination with a plastic hammer.



LAT00104-00008

60. Remove the torsion spring.
61. Remove the parking lock pawl.
62. Remove the parking lock pawl shaft.

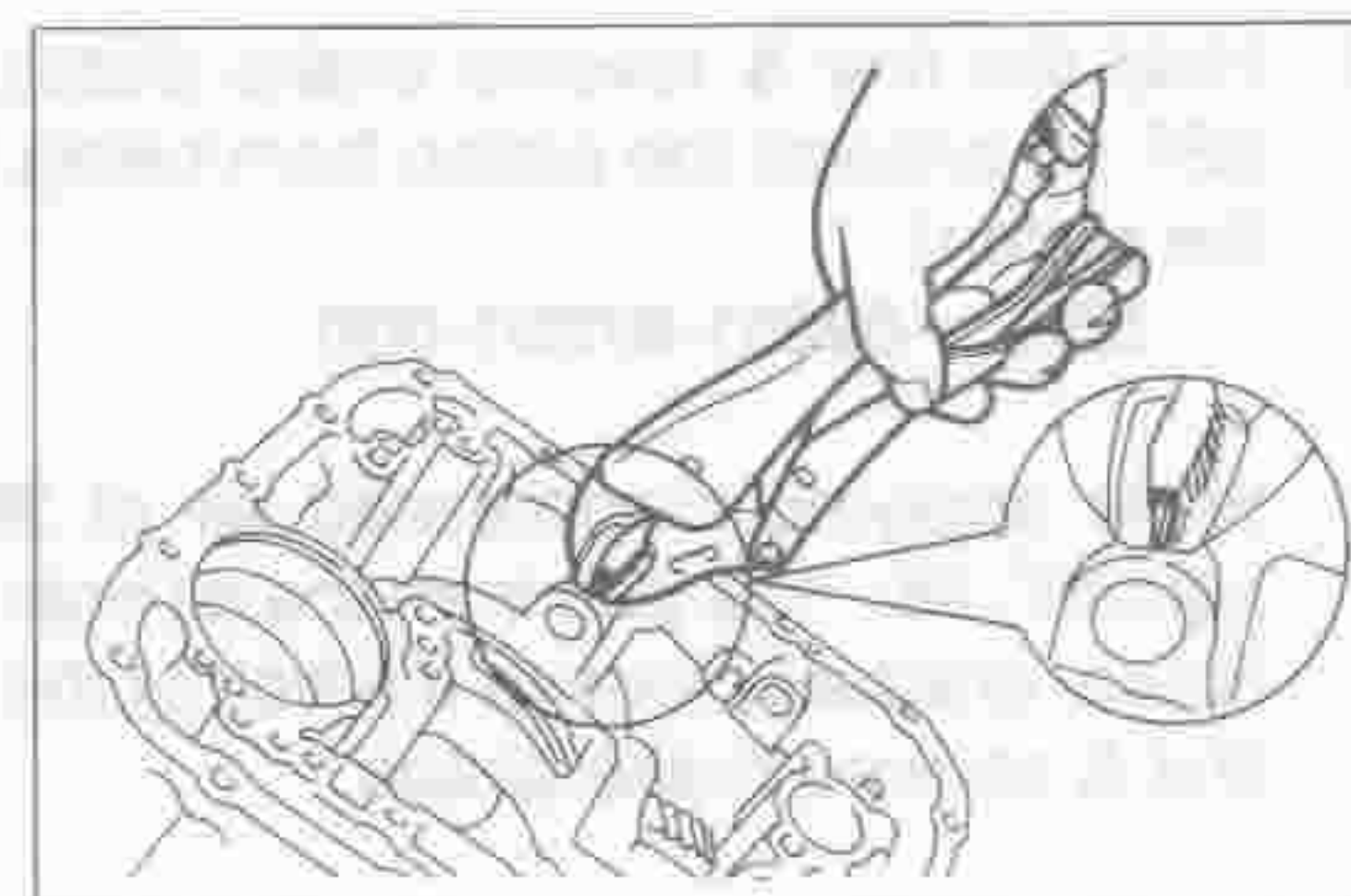


LAT00105-00009

63. Remove the slotted spring pin, using a vice clip.

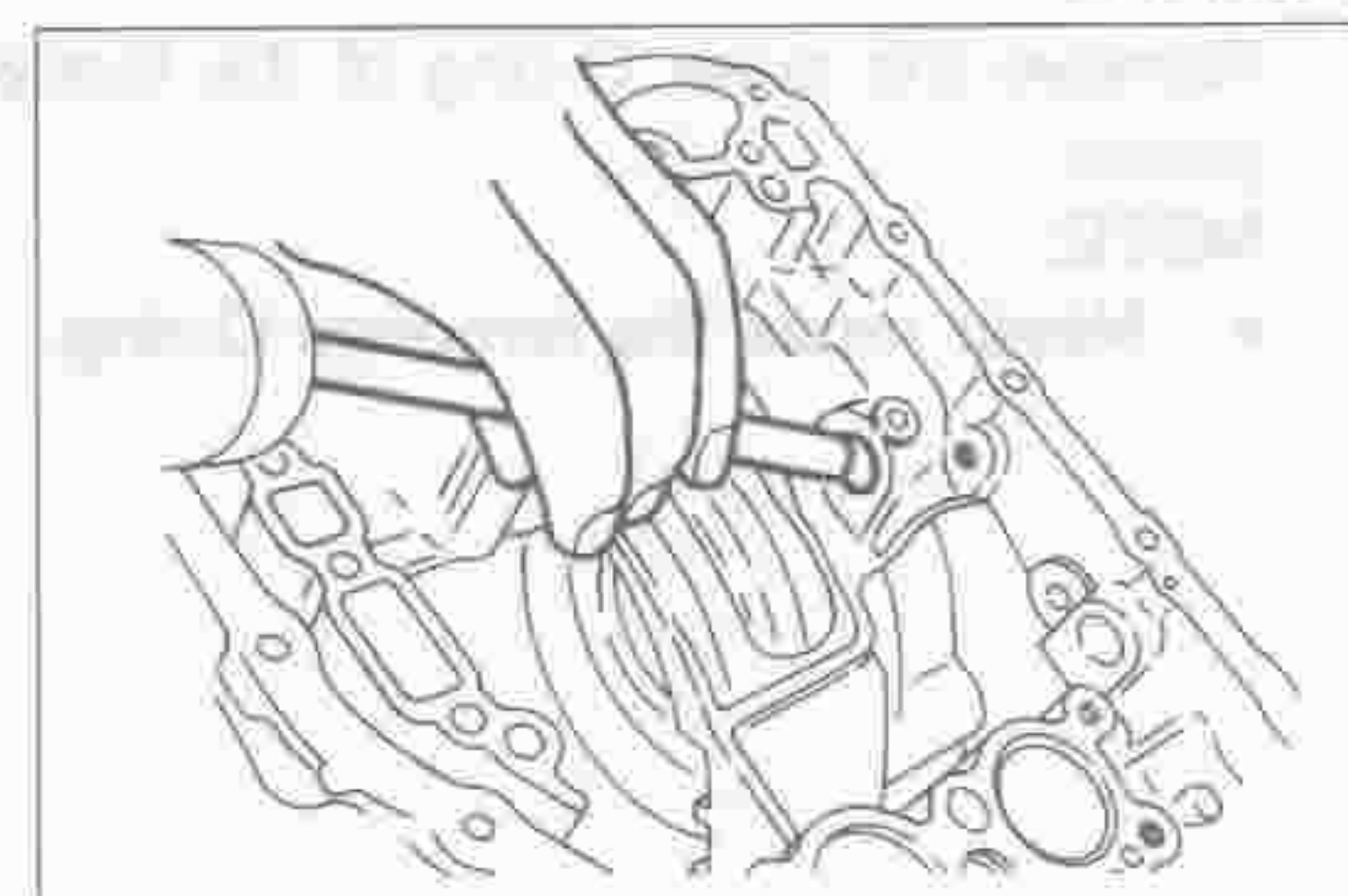
NOTE:

- Securely pinch the slotted spring pin by means of a vice clip. Turn the pin clockwise and counterclockwise and pull the slotted spring pin.
- Never reuse the removed slotted spring pin.



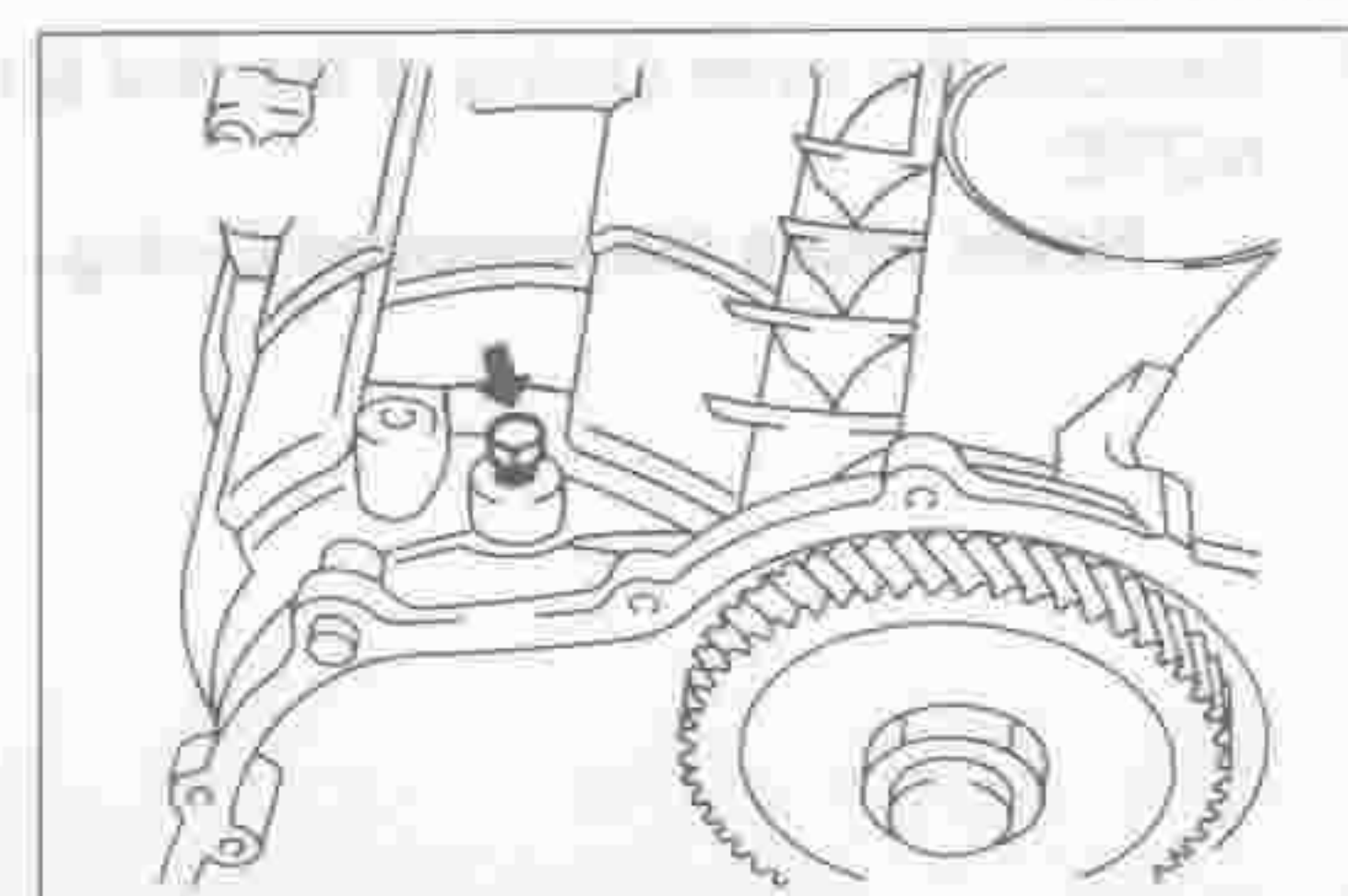
LAT00106-00100

64. Remove the parking lock pawl cam support, using a suitable brass bar and a hammer.



LAT00107-00101

65. Temporarily install the removed B₂ inspection plug to the transaxle.



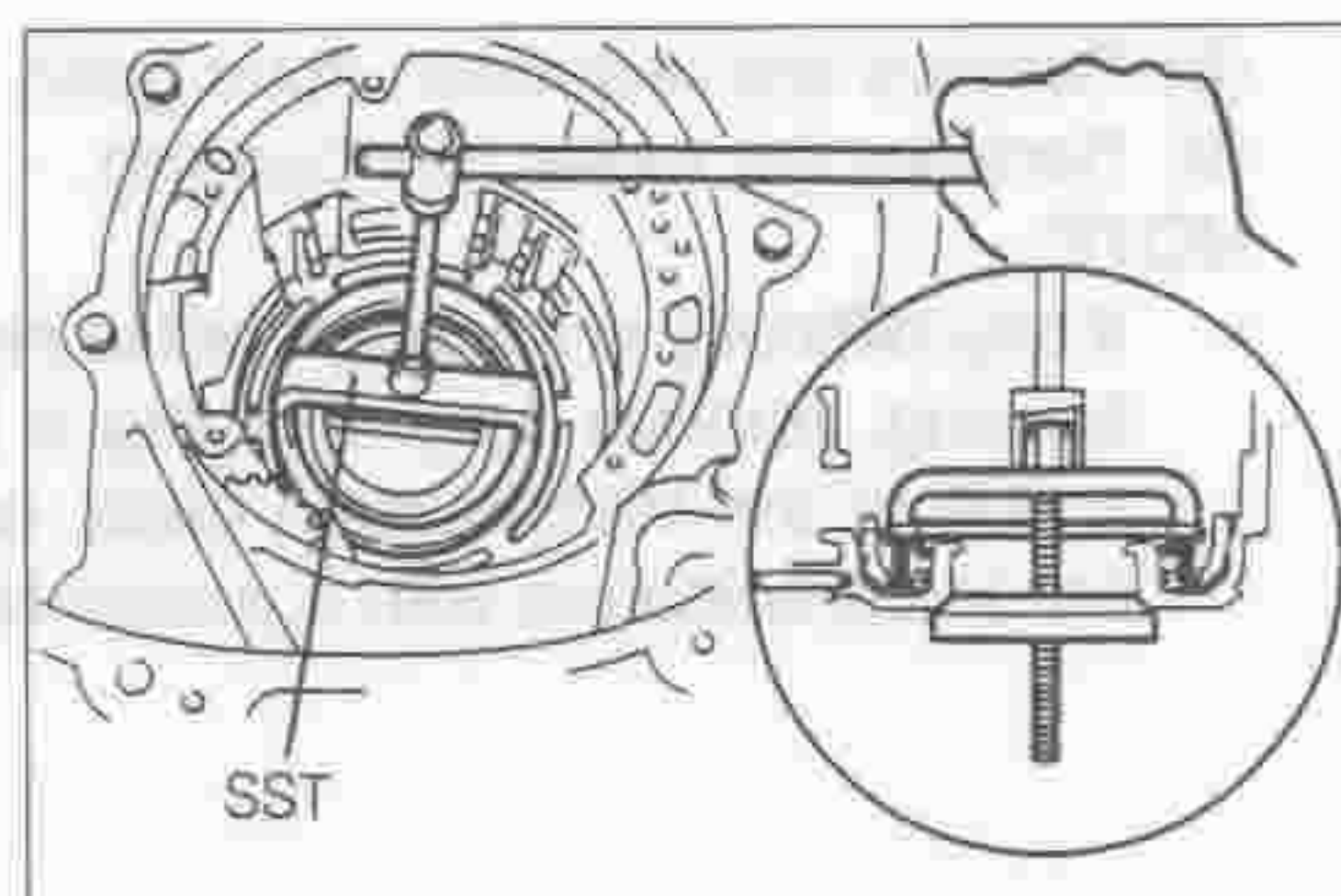
LAT00108-00102

66. Remove the first & reverse brake return spring by compressing it with a shop press, using the following SST.

SST: 09351-87201-000

NOTE:

- To prevent the first & reverse brake return spring seat from being deformed, be sure to stop pressing when the first & reverse brake return spring seat has been lowered 1 to 2 mm (0.039 to 0.078 inch) from the shaft snap ring installation position.



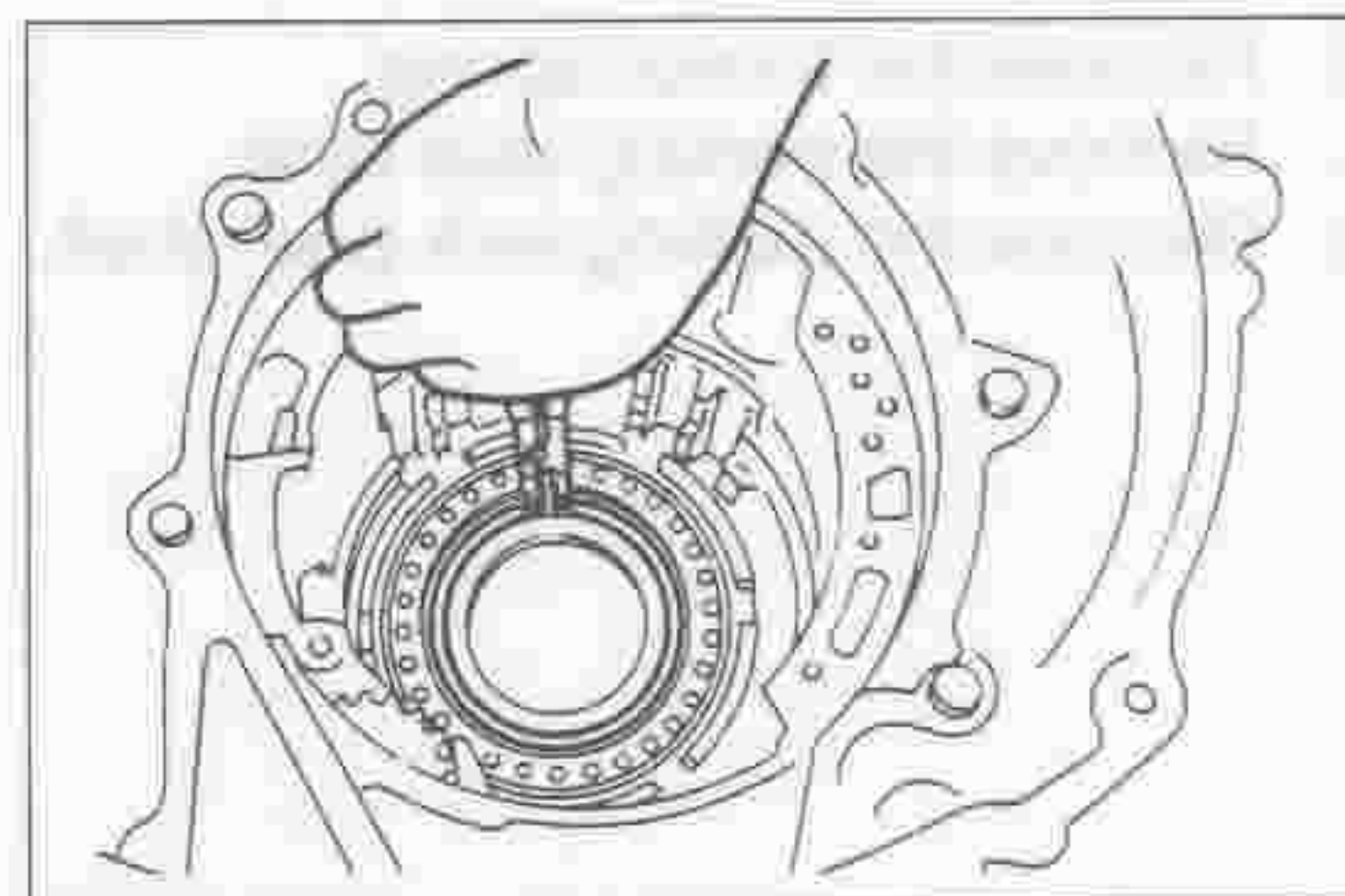
LAT00109-00103

67. Remove the shaft snap ring, using snap ring pliers.

NOTE:

- Be very careful not to deform the shaft snap ring by spreading it excessively.

68. Remove the first & reverse brake return spring.

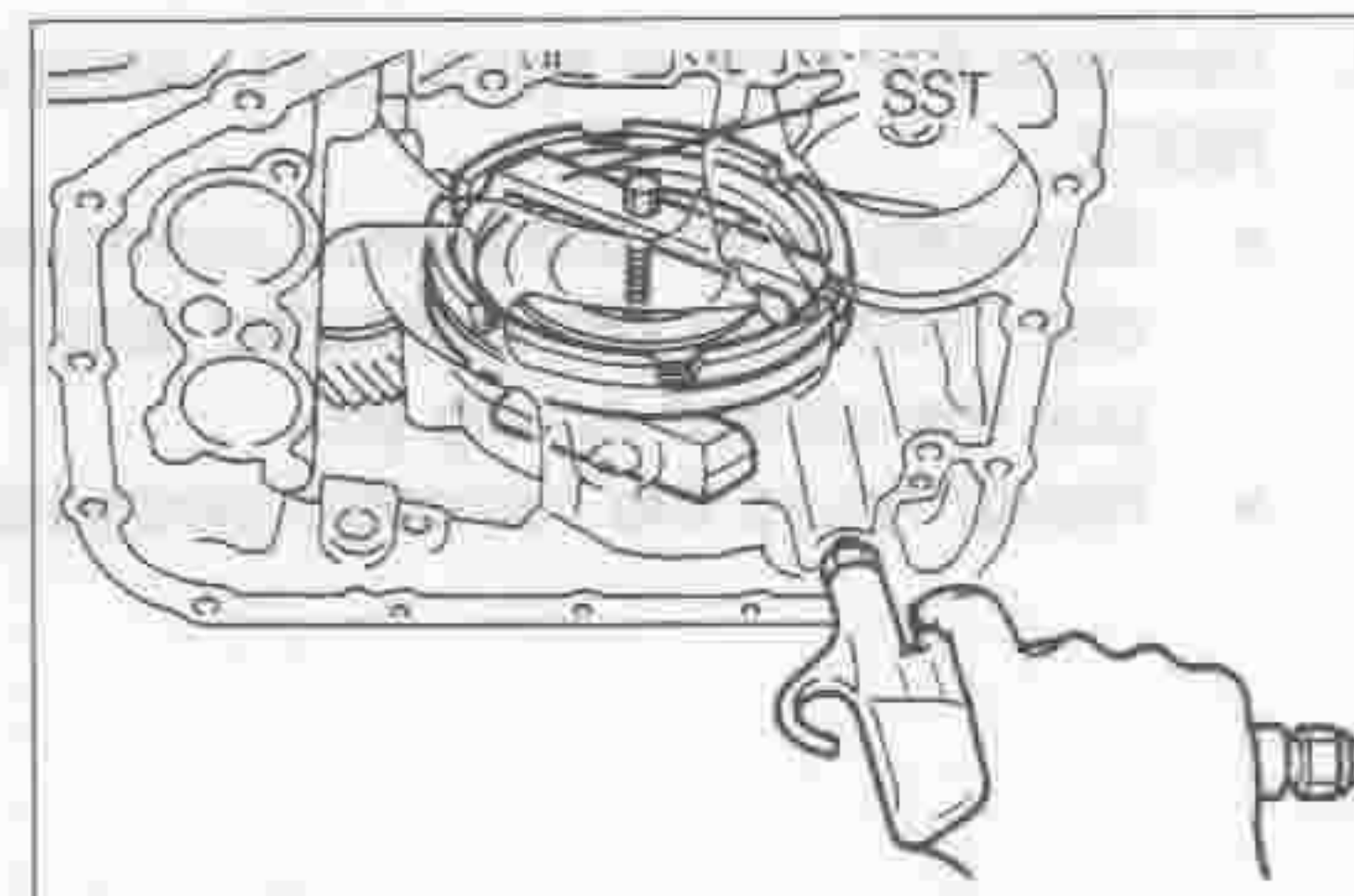


LAT00110-00104

69. Hold the first & reverse brake piston, using the following SST (to prevent the piston from being tilted when removing the piston).

SST: 09351-87201-000

70. While applying compressed air of 392 - 784 kPa (4 - 8 kgf/cm², 48 - 112 psi) from the oil hole indicated in the right figure, gradually loosen the bolt of the SST and remove the first & reverse brake piston.

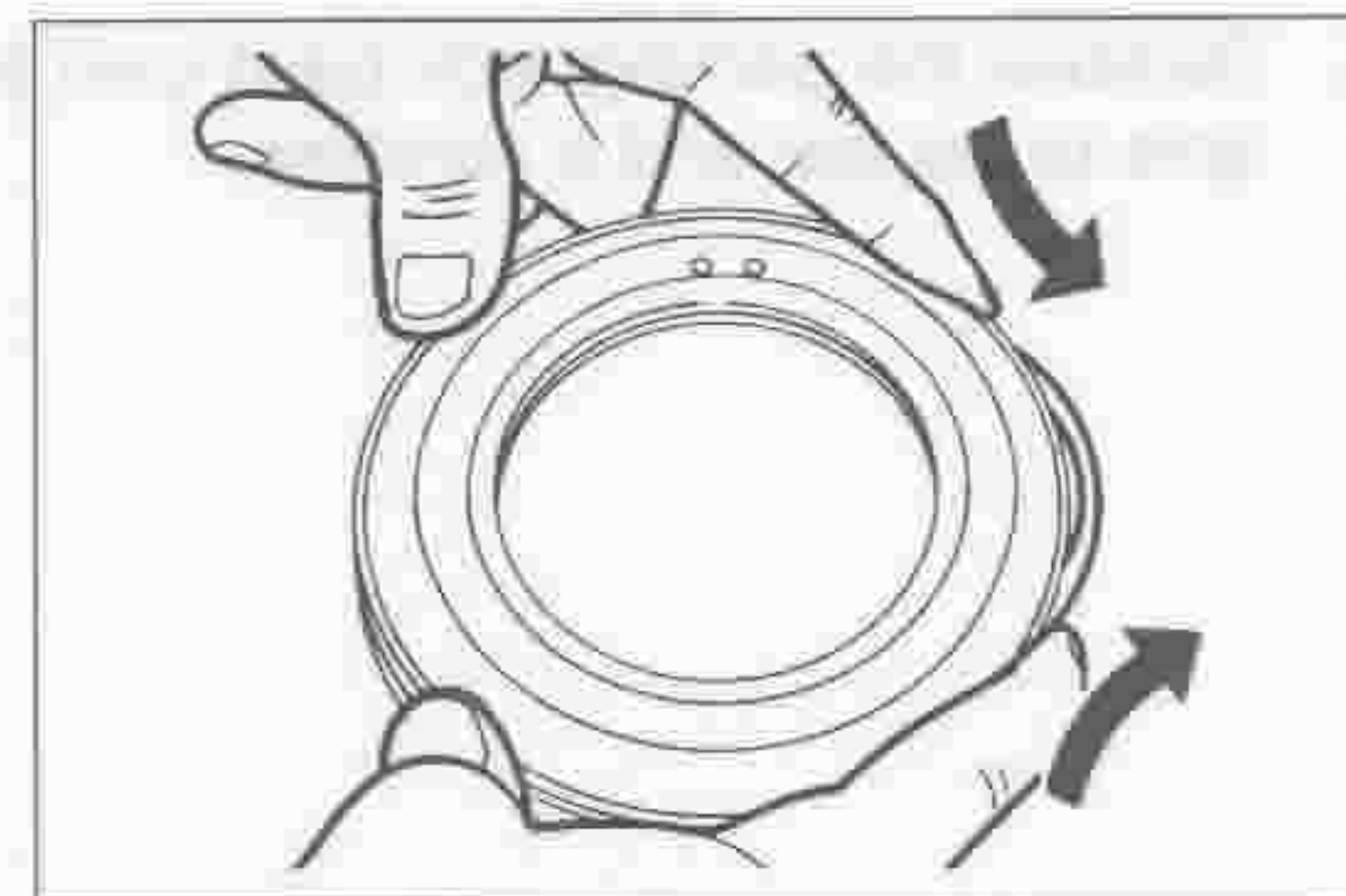


LAT00111-00105

71. Remove the outer O-ring of the first & reverse brake piston.

NOTE:

- Never reuse the removed O-ring.

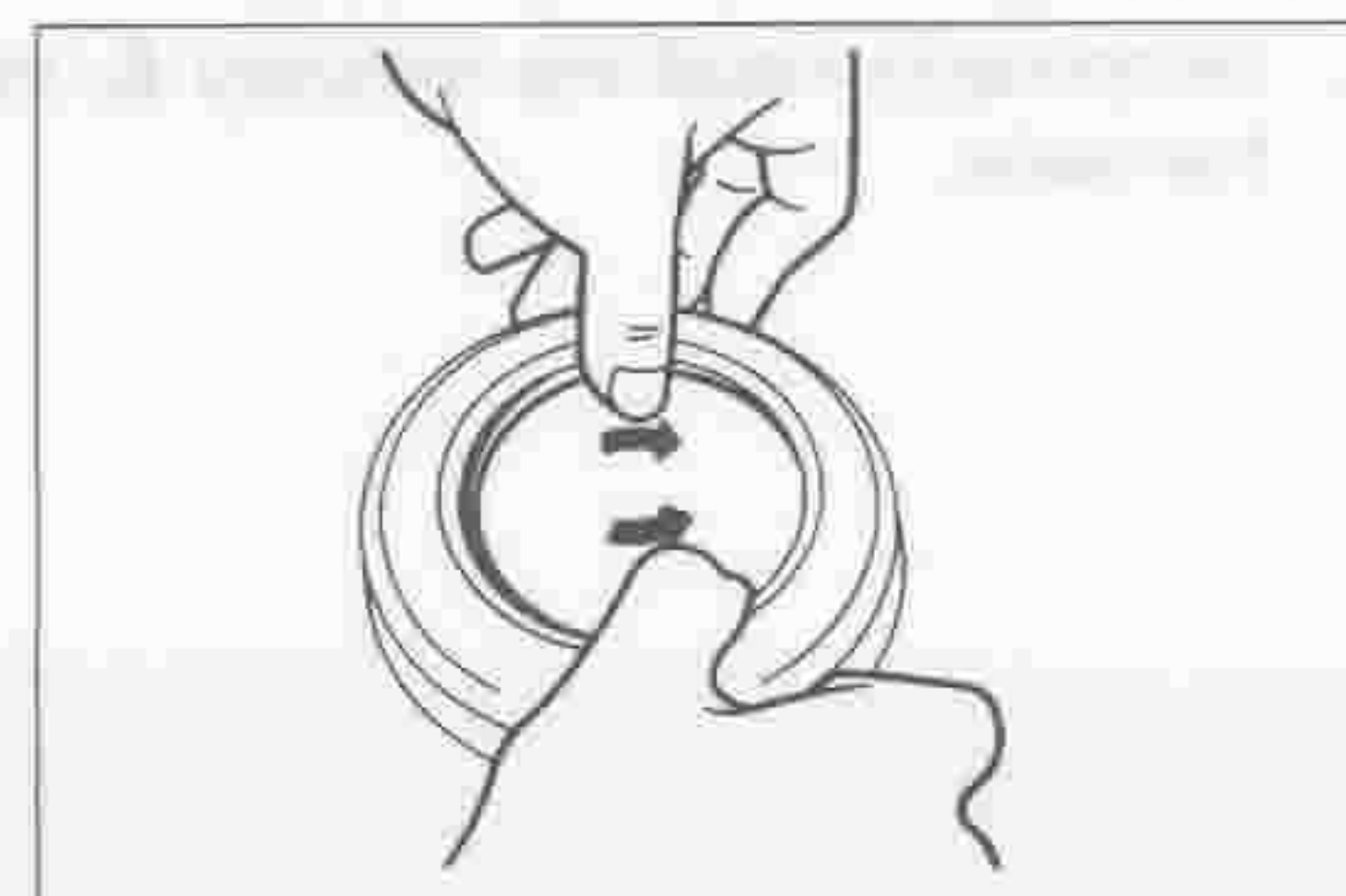


LAT00112-00106

72. Remove the inner O-ring of the first & reverse brake piston.

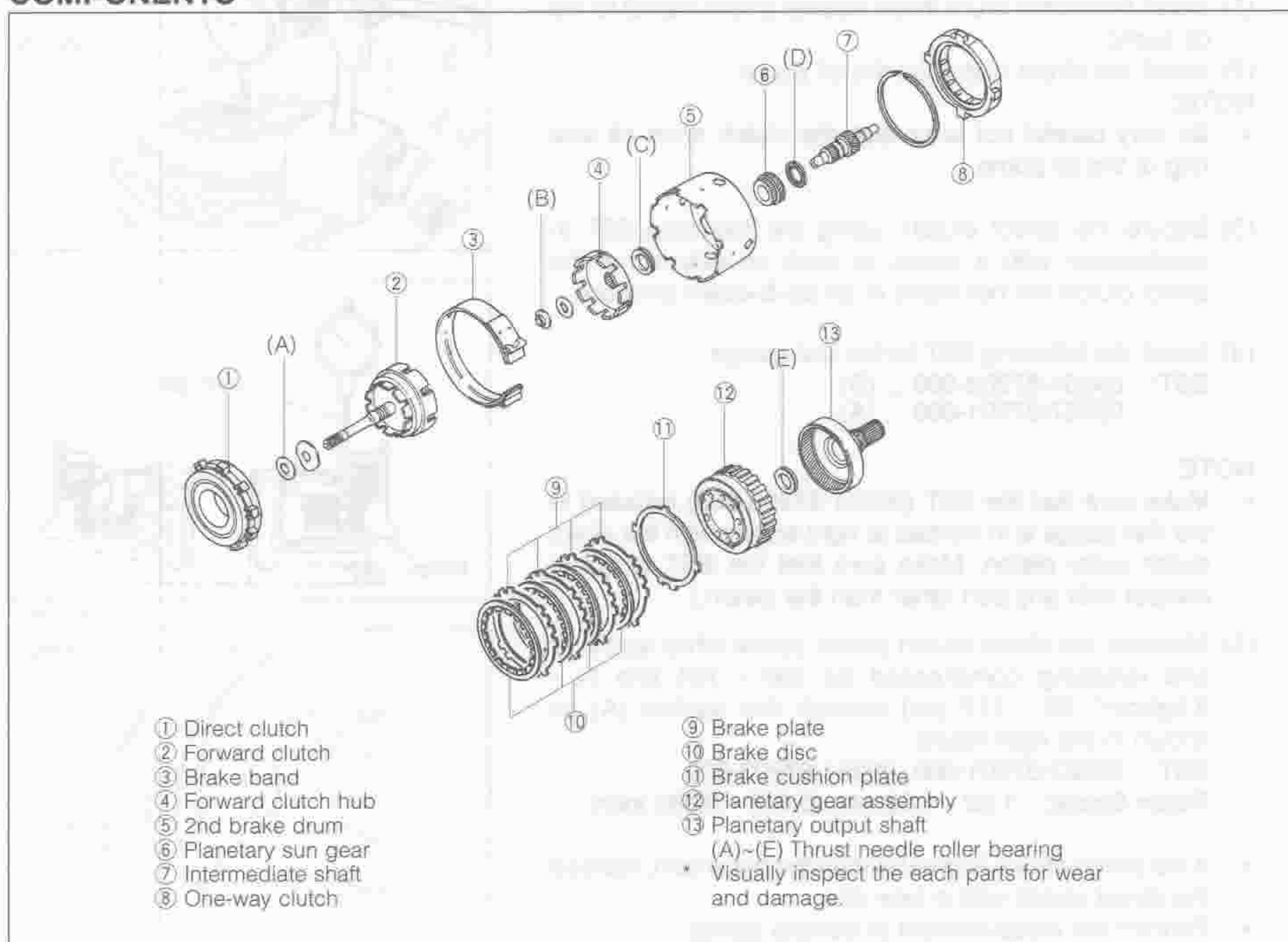
NOTE:

- Never reuse the removed O-ring.



LAT00113-00107

INSPECTION COMPONENTS



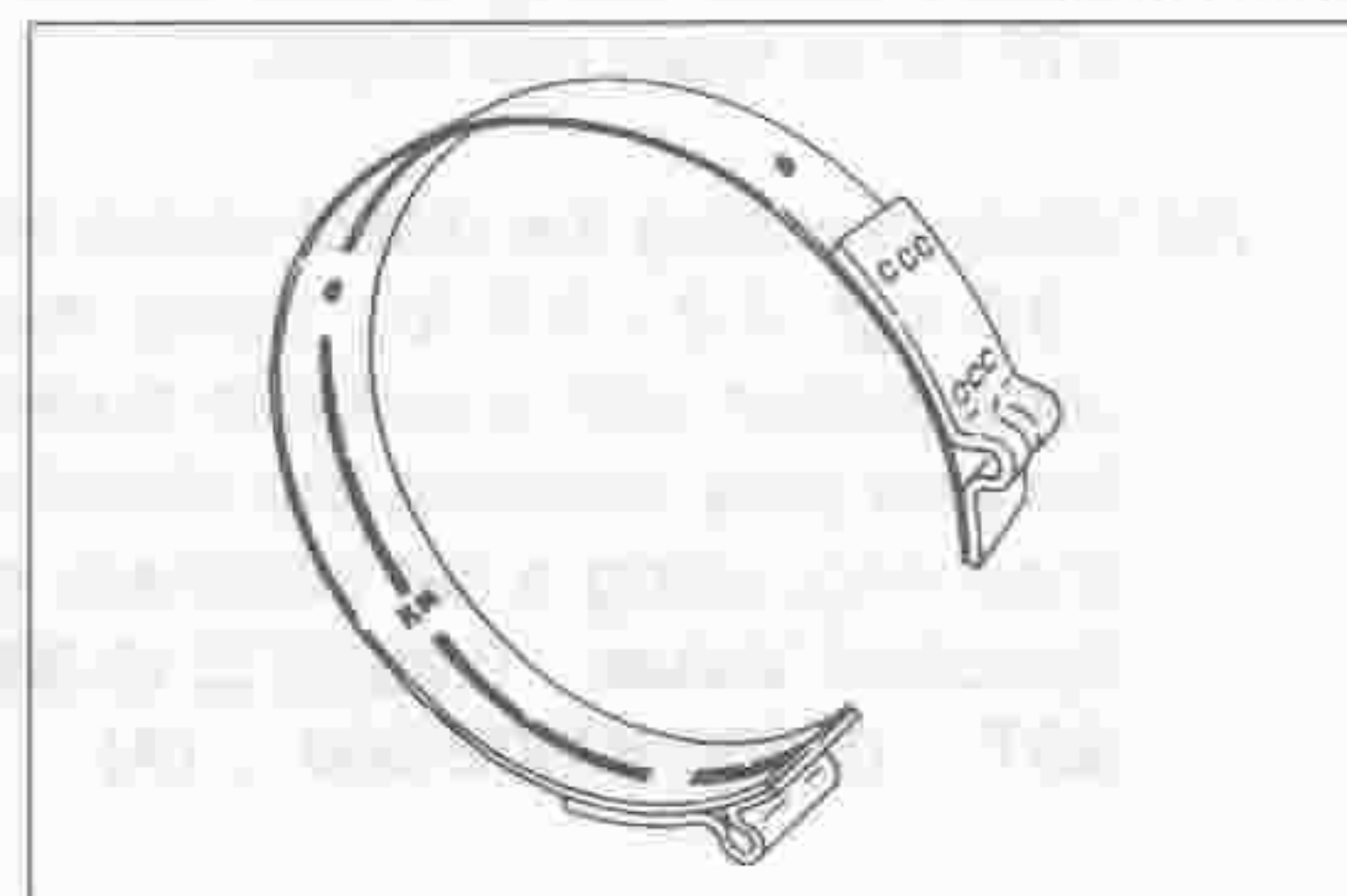
LAT00114-00108

1. Brake band assembly

If the lining of the brake band is exfoliated or discolored, or even a part of the printed number is defaced, replace the brake band.

NOTE:

- When the brake band assembly is replaced, be sure to check the band contacting surface at the 2nd brake drum side.
- If the contacting surface is damaged or discolored, be sure to replace the 2nd brake drum together with the band.
- Before assembling a new brake band, soak it in the ATF for at least two hours.



LAT00115-00108

2. Direct clutch assembly

Check of piston stroke of direct clutch

(1) Install the clutch drum thrust washer (resin made) to the oil pump.

(2) Install the direct clutch on the oil pump.

NOTE:

- Be very careful not to scratch the clutch drum oil seal ring of the oil pump.

(3) Secure the direct clutch, using the following SST in combination with a press, to such an extent that the direct clutch will not move in an up-&-down direction.

(4) Install the following SST to the dial gauge.

SST: 09351-87203-000 ... (B)

09527-87301-000 ... (A)

NOTE:

- Make sure that the SST (09351-87203-000) installed to the dial gauge is in contact at right angles with the direct clutch outer piston. Make sure that the SST is not in contact with any part other than the piston.)

(5) Measure the direct clutch piston stroke while applying and releasing compressed air 392 - 784 kPa (4 - 8 kgf/cm², 56 - 112 psi) through the section (A) as shown in the right figure.

SST: 09527-87301-000, 09351-87203-000

Piston Stroke: 1.22 - 1.53 mm (0.048 - 0.060 inch)

- If the piston stroke is greater than the maximum, replace the direct clutch with a new one.
- Perform the measurement at several points.
- Before assembling a new direct clutch, soak it in the ATF for at least two hours.

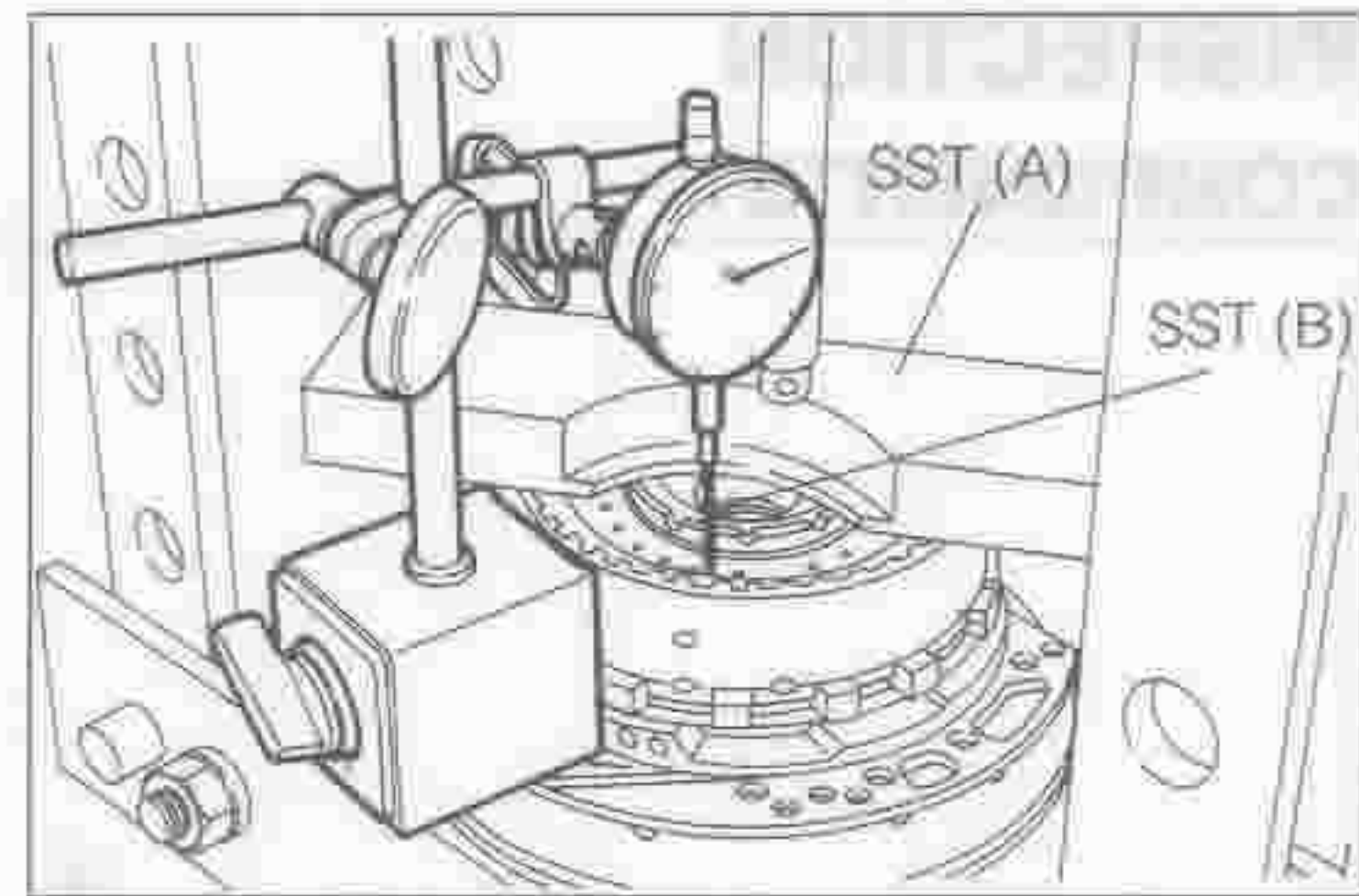
(6) While pressing the direct clutch flange 9.8 - 29.4 N (1.0 - 3.0 kgf, 2.2 - 6.6 lb), using the following SST (A) in combination with a suitable pushable gauge, measure the end play between the direct clutch flange and the snap ring, using a flat thickness gauge (B).

Specified Value: $0.93^{+0.15}_{-0.16}$ mm ($0.036^{+0.0059}_{-0.0062}$ inch)

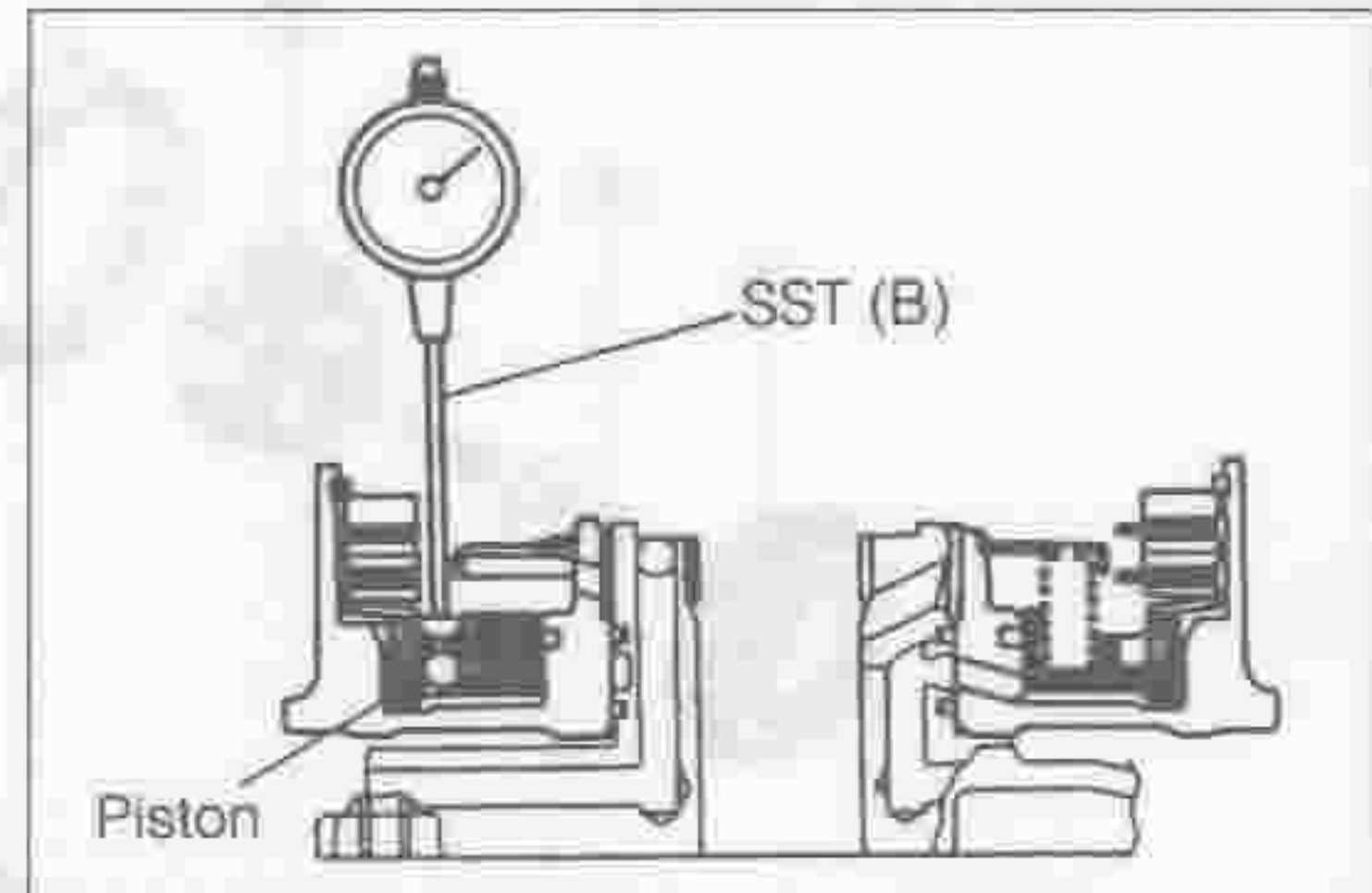
SST: 09306-87302-000 ... (A)

(7) Confirmation of turning effort of clutch disc

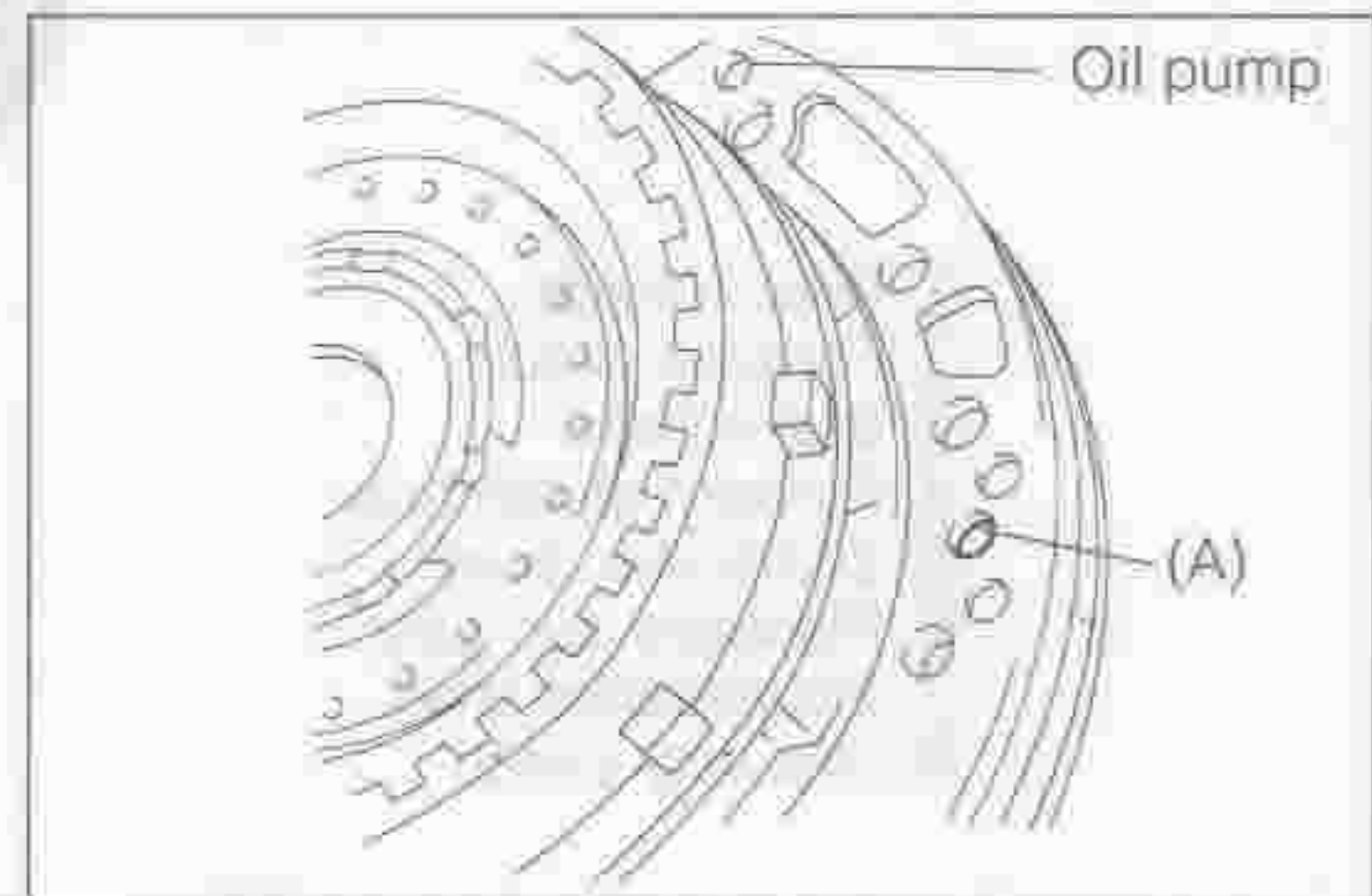
Insert the input shaft (forward clutch) and rotate it. At this time, ensure that the clutch disc rotates lightly.



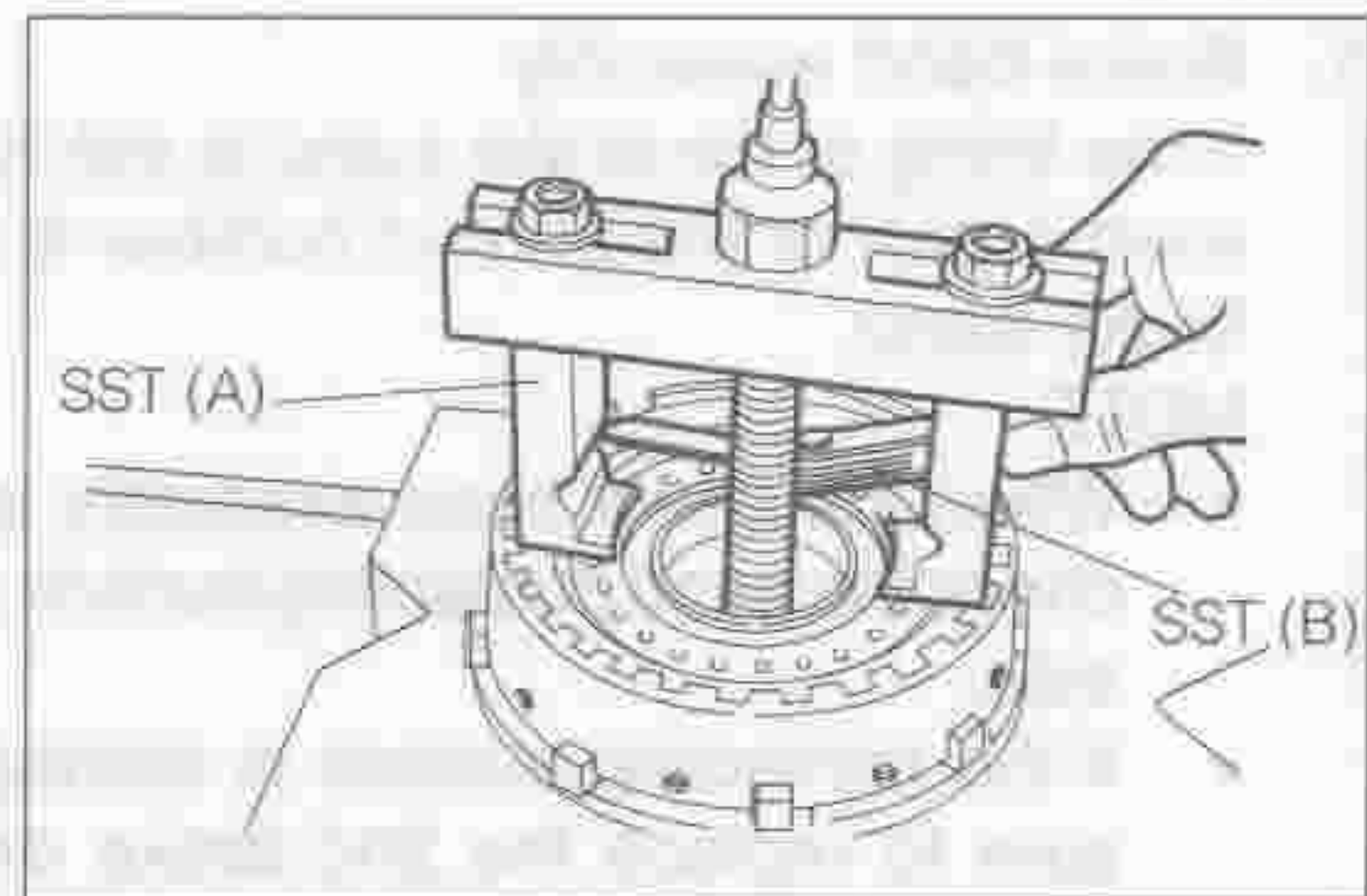
LAT00116-00110



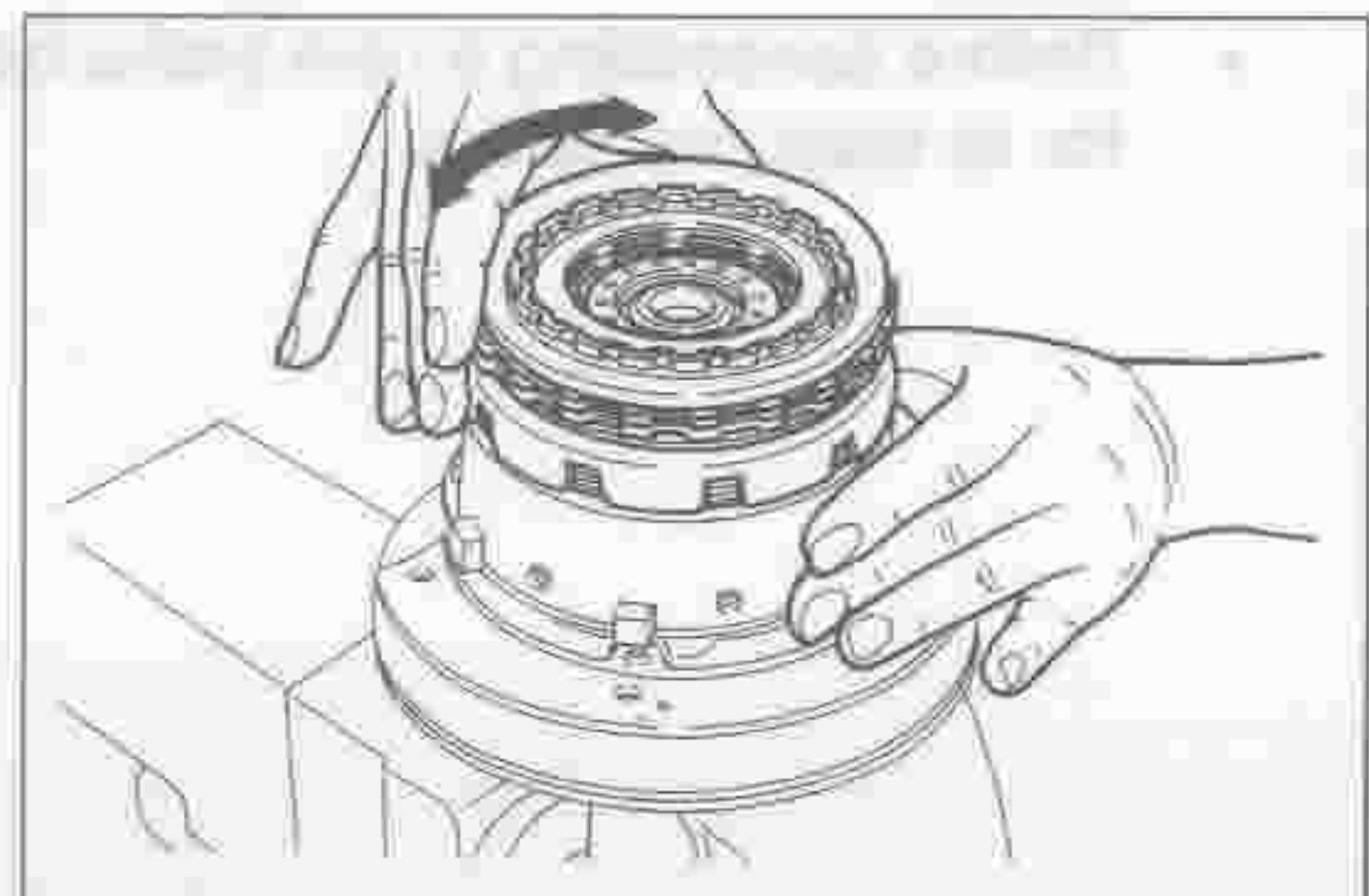
LAT00117-00111



LAT00118-00112



LAT00119-00113



LAT00120-00114

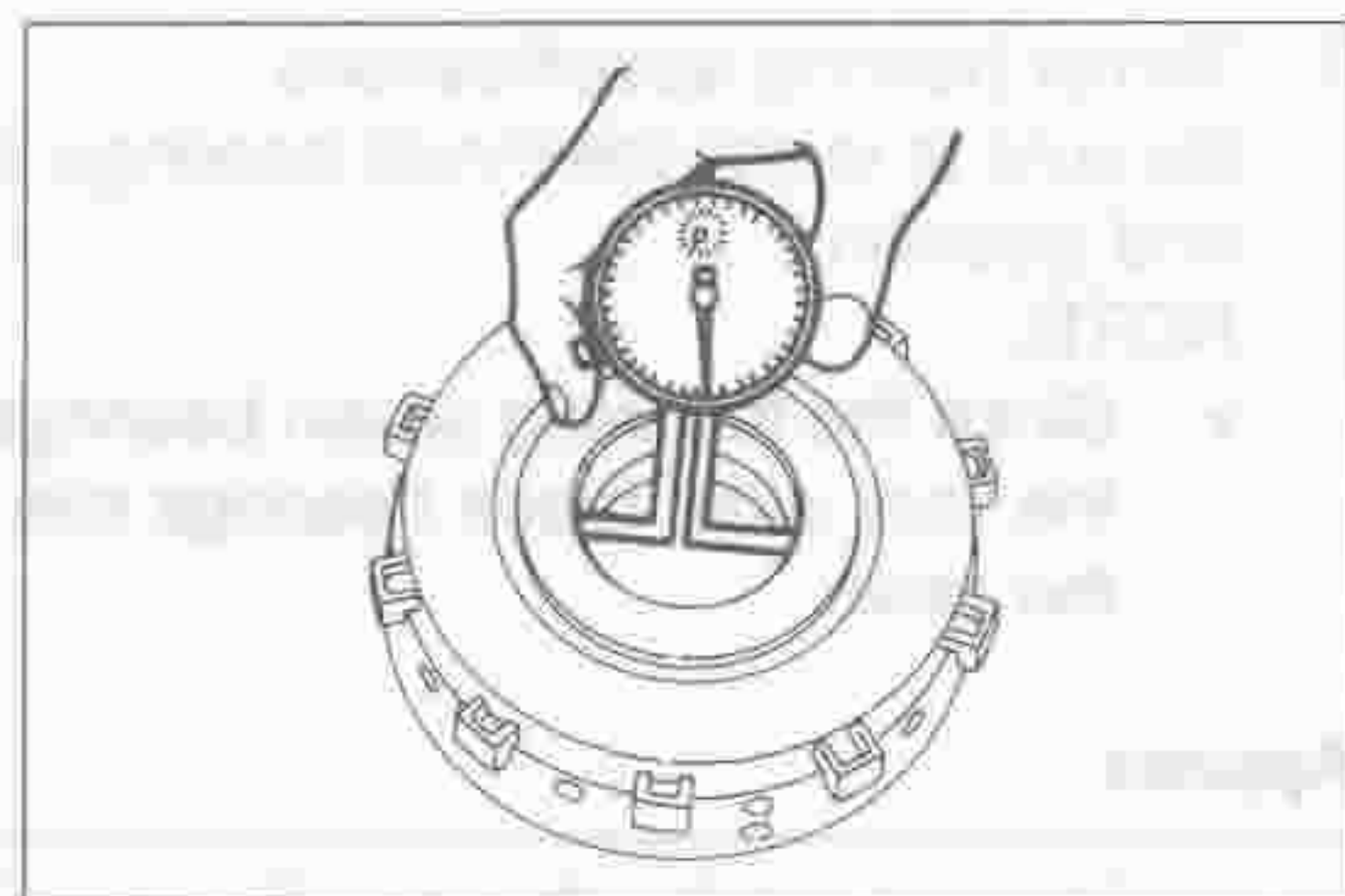
- (8) Measure the bush inner diameter of the direct clutch piston subassembly, using an inner caliper gauge.

Specified Value: 44.000 - 44.025 mm
(1.732 - 1.733 inch)

Allowable Limit: 44.075 mm (1.735 inch)

NOTE:

- Ensure that the measurement should be performed at the several points.
- If the measured value exceeds the allowable limit, replace the direct clutch drum subassembly with a new one.
- If the measured value exceeds the allowable limit of the bush inner diameter, check the bush contacting surface of the stator shaft of the oil pump assembly. If the contacting surface is scratched or discolored, replace the stator shaft & oil pump assembly with a new one, too.



LAT00121-00115

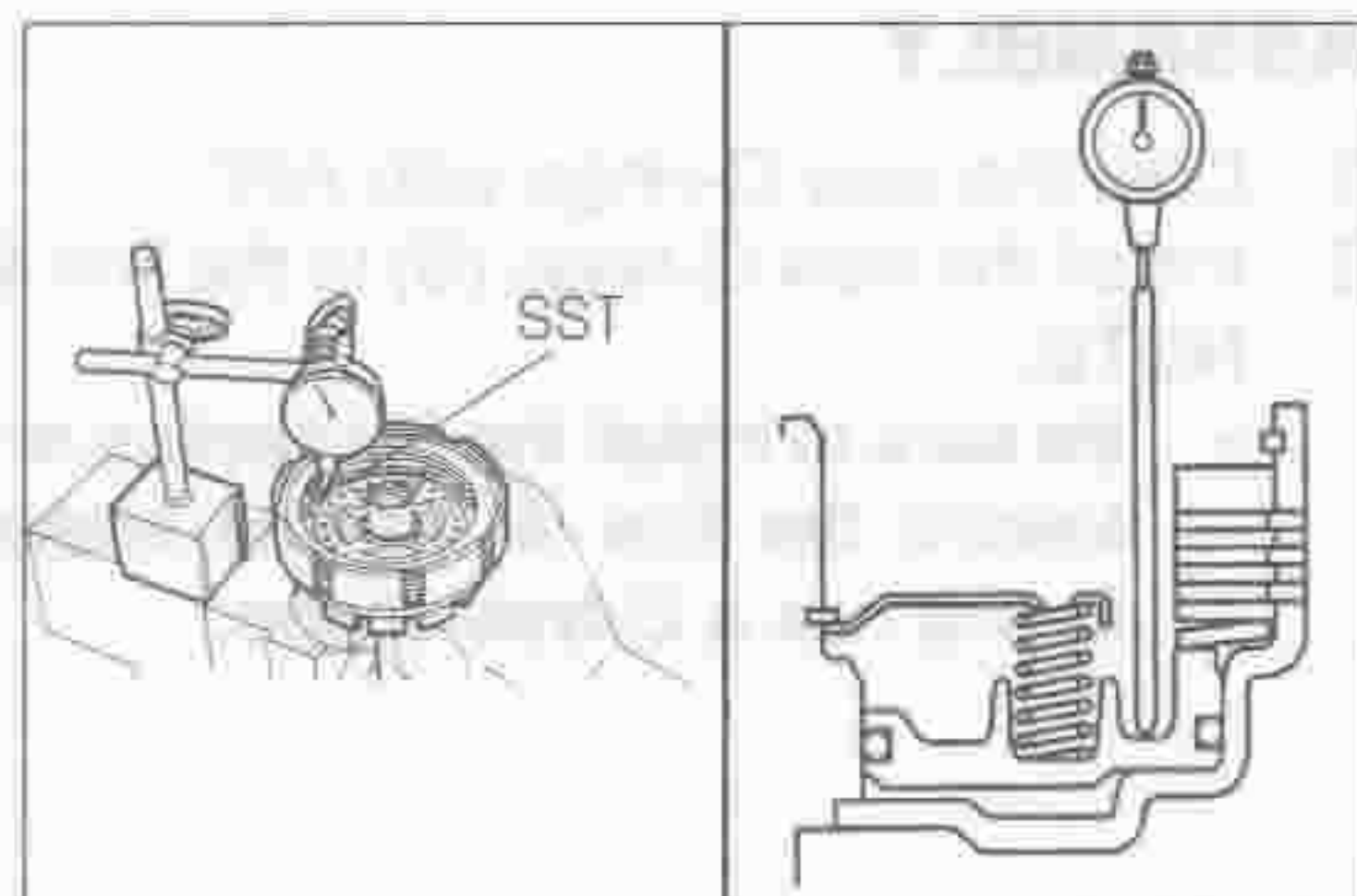
3. Forward clutch piston stroke

- (1) Set the following SST to a dial gauge.

SST: 09351-87203-000

NOTE:

- Make sure that the SST above is in contact at right angles with the forward clutch piston subassembly.



LAT00122-00116

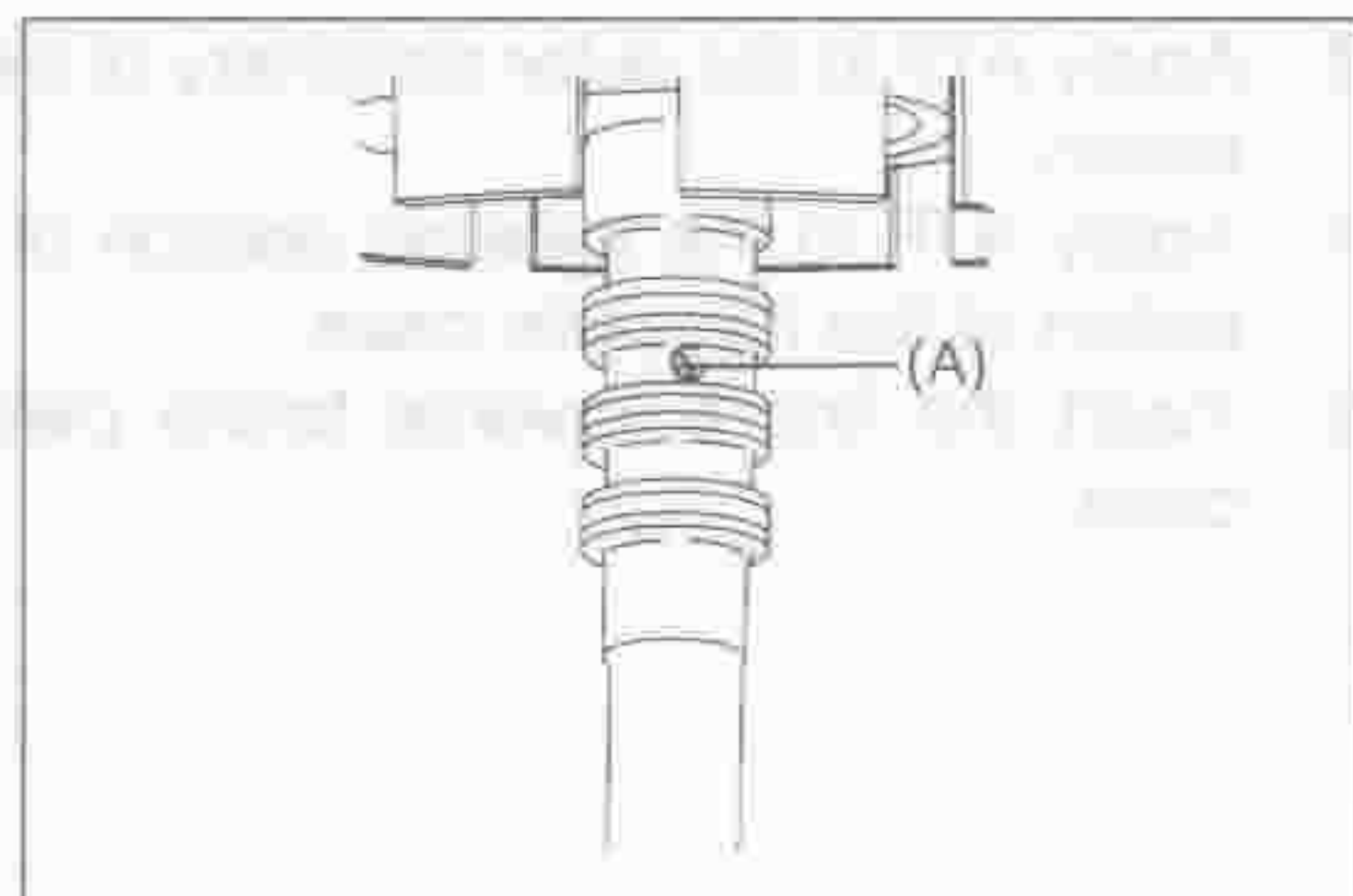
- (2) Measure the forward clutch piston stroke while applying and releasing compressed air 392 - 784 kPa (4 - 8 kgf/cm², 56 - 112 psi) through the section (A) as shown in the right figure.

Piston Stroke: 1.47 - 1.78 mm (0.057 - 0.070 inch)

If the piston stroke is greater than the maximum, replace the forward clutch with a new one.

NOTE:

- Before assembling a new forward clutch, soak it in the ATF for at least two hours.



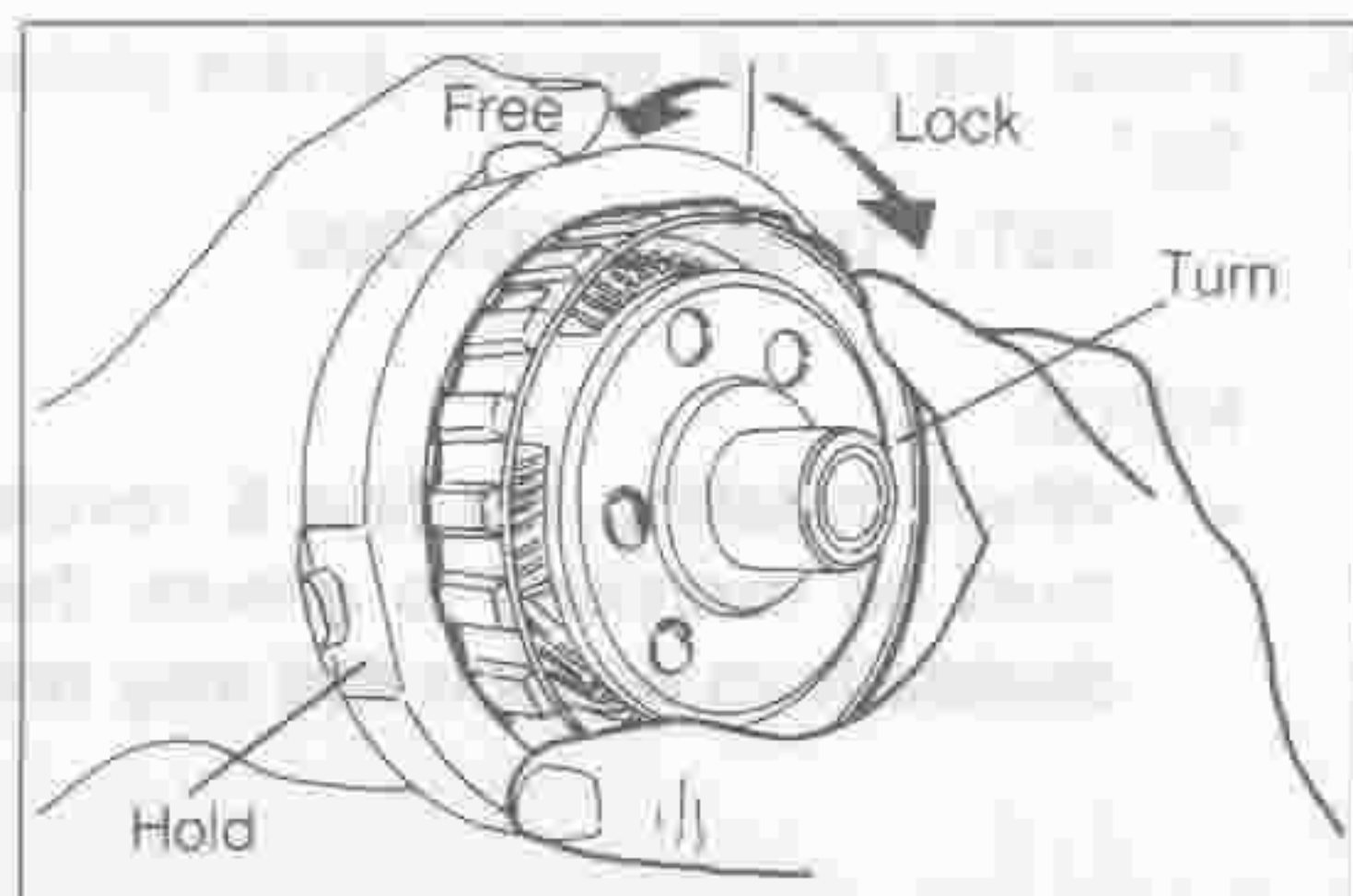
LAT00123-00117

4. One-way clutch

Hold the one-way clutch and turn the planetary gear assembly.

NOTE:

- Ensure that the one-way clutch turns freely when turned counterclockwise and locked when turns clockwise.



LAT00124-00118

5. Thrust bearing specifications

Be sure to install the thrust bearings in the correct direction and position.

NOTE:

- Since the following seven bearings have been staked at the race side, these bearings can not be removed from the race.

Approx

Unit: mm (inch)

	A	B	C	D	E
Outer diameter	35.7 (1.41)	31.0 (1.22)	46.5 (1.83)	35.7 (1.41)	46.5 (1.83)
Inner diameter	22.7 (0.89)	16.5 (0.65)	25.0 (0.98)	22.7 (0.89)	25.0 (0.98)
Thickness	2.8 (0.11)	5.3 (0.21)	5.0 (0.19)	2.8 (0.11)	5.0 (0.19)

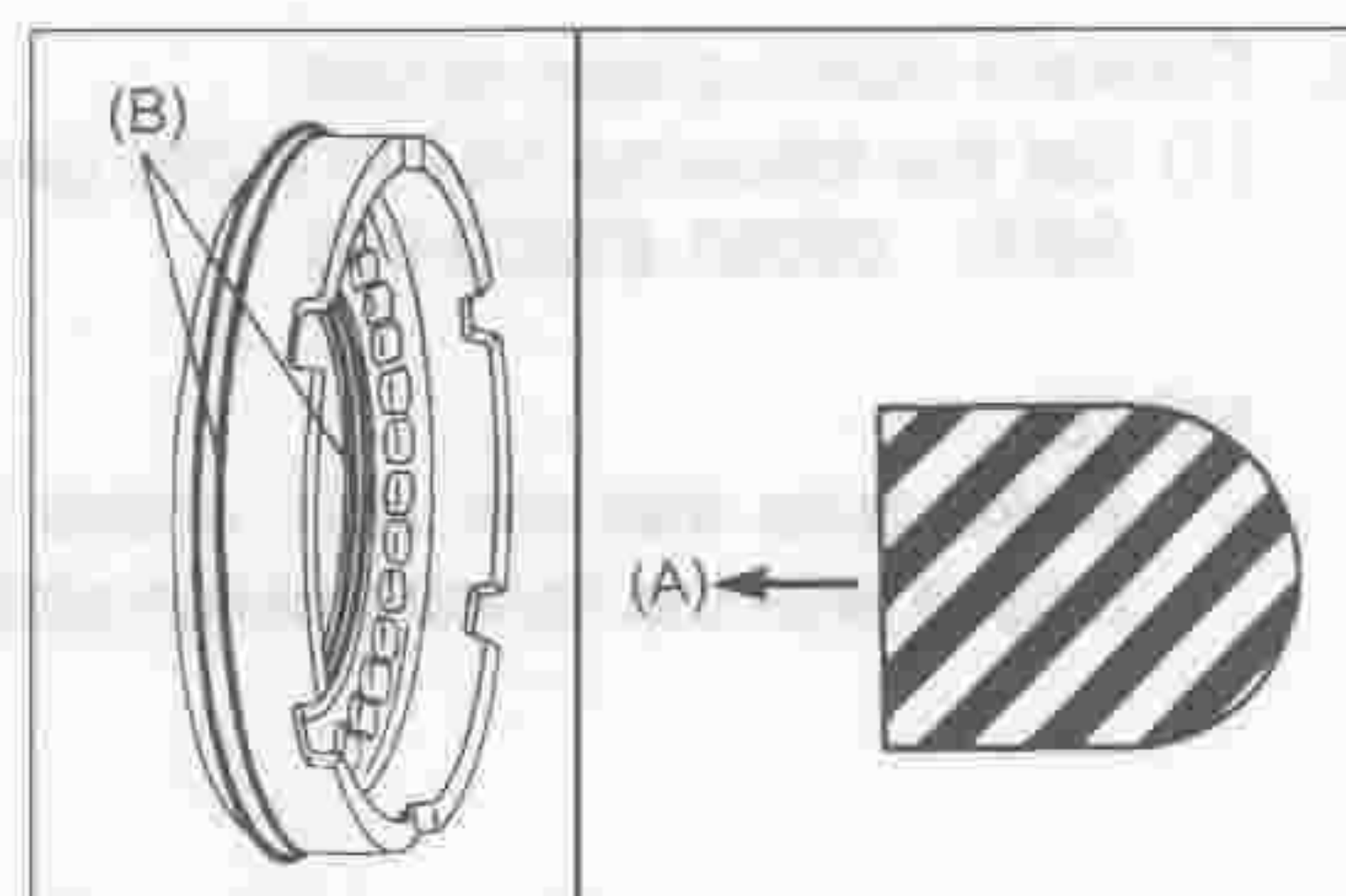
LAT00125-00000

ASSEMBLY

- Coat the new O-rings with ATF.
- Install the new O-rings (B) to the first & reverse brake piston

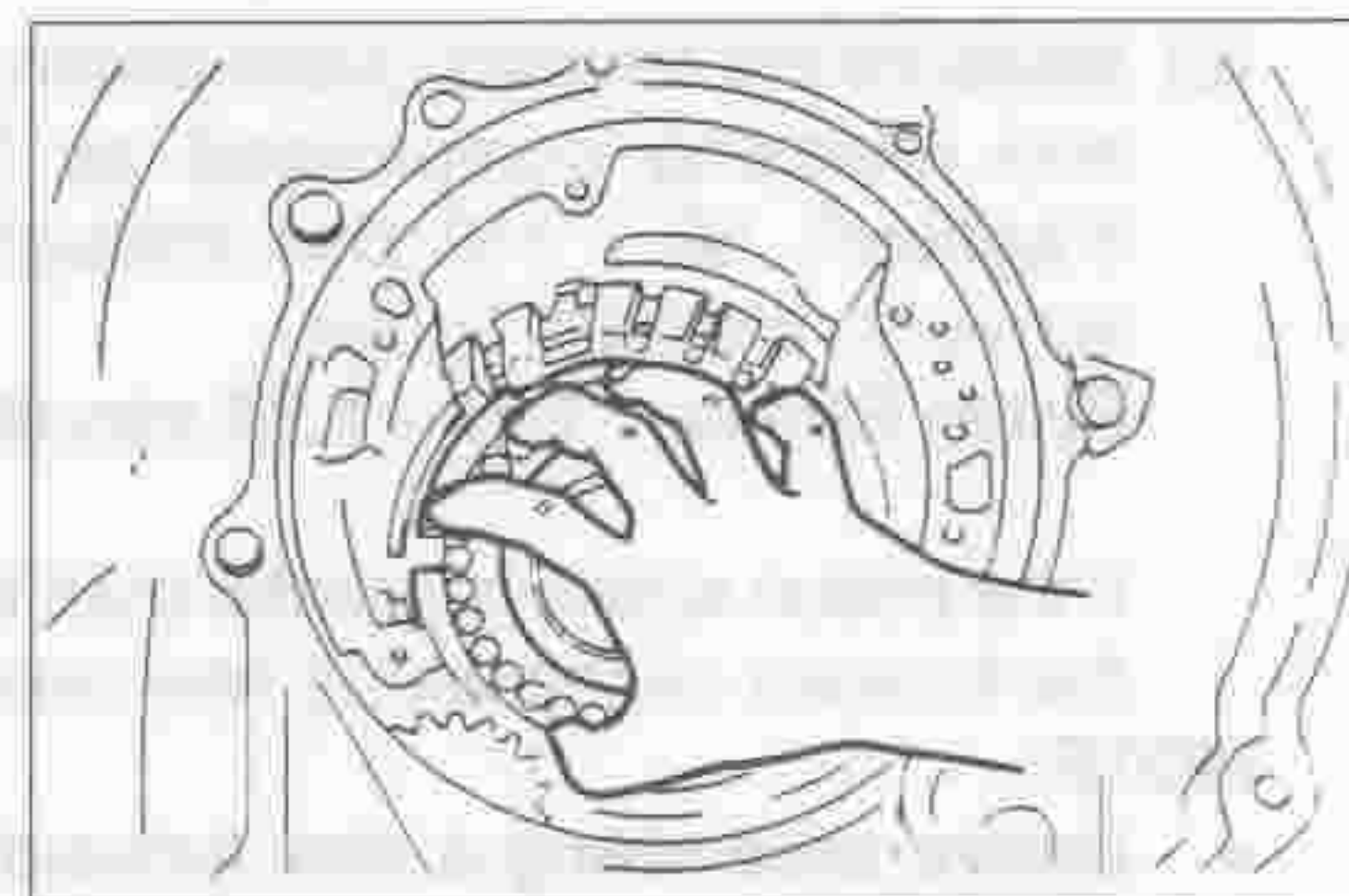
NOTE:

- Be sure to install the (A) section of the new O-rings faces toward the first & reverse brake piston side, for the O-ring has a D-type shape.



LAT00126-00119

- Apply ATF to the outer periphery of the first & reverse brake piston.
- Apply ATF to the inserted section of first & reverse brake piston of the transaxle case.
- Insert the first & reverse brake piston into the transaxle case.



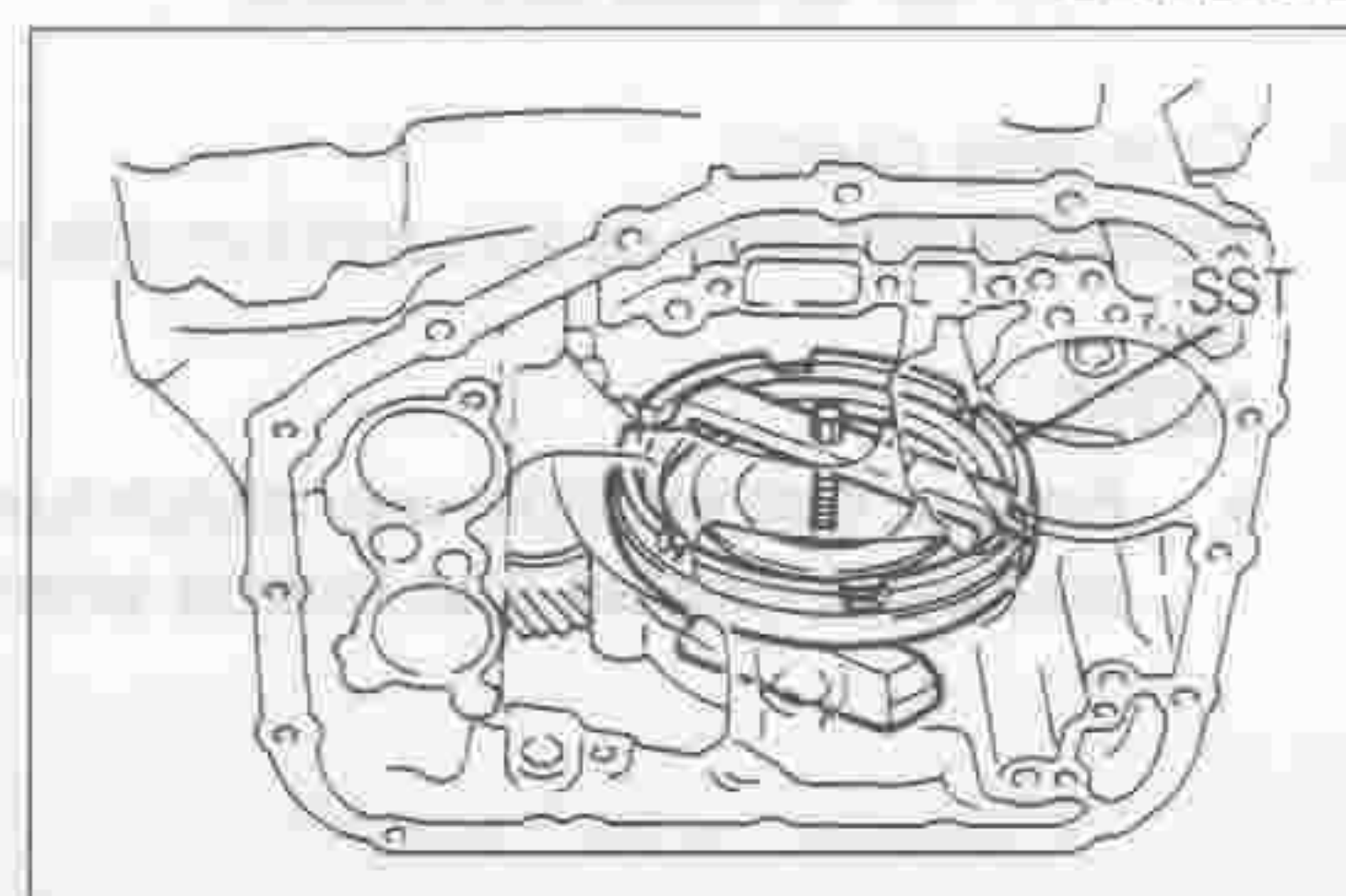
LAT00127-00120

- Install the first & reverse brake piston, using the following SST.

SST: 09351-87201-000

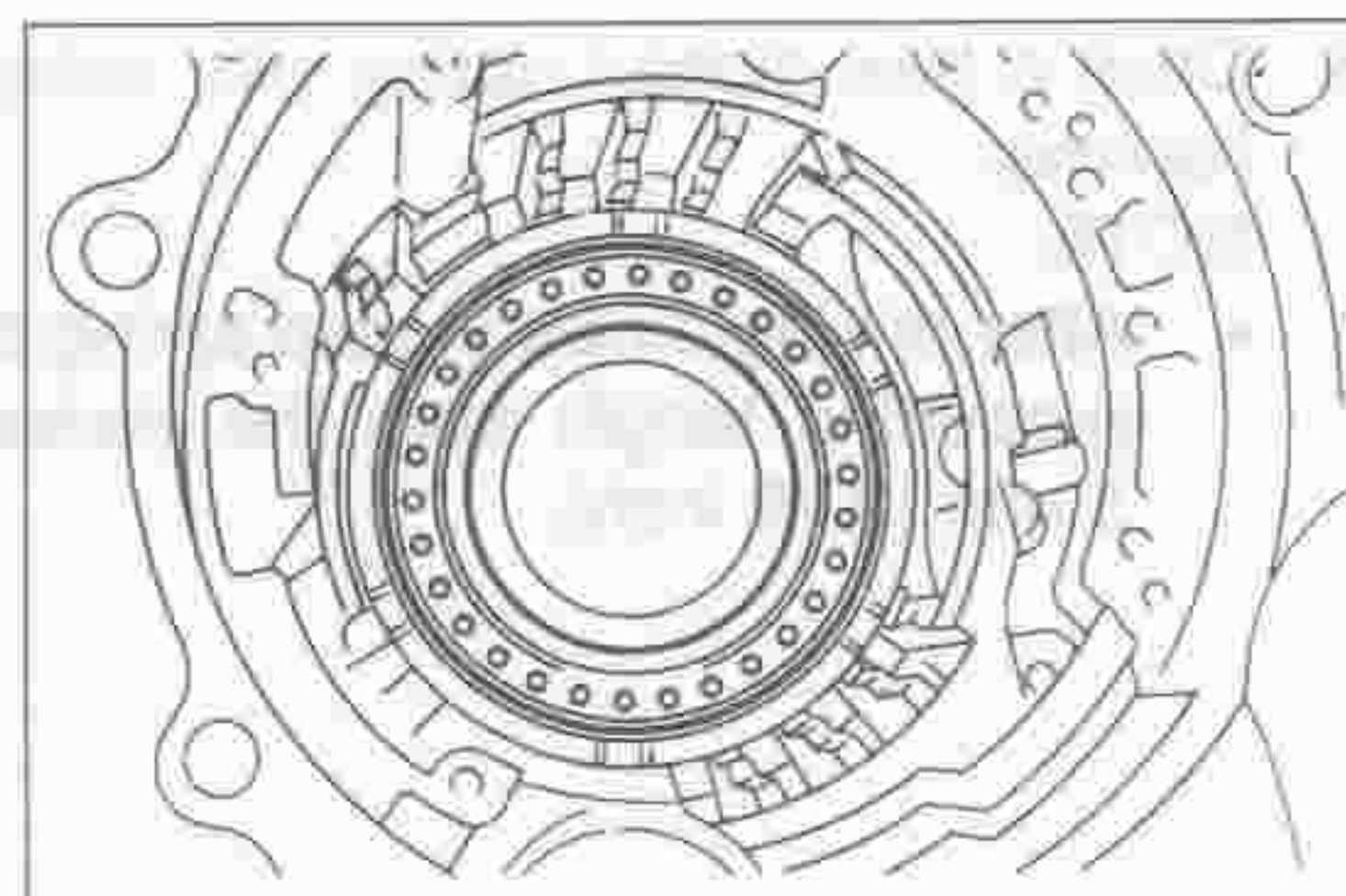
NOTE:

- When installing the first & reverse brake piston, care must be exercised to ensure that the O-ring may not deviate from position and may not be scratched.



LAT00128-00121

7. Remove the aforesaid SST from the transaxle case.
8. Place the first & reverse brake return spring.



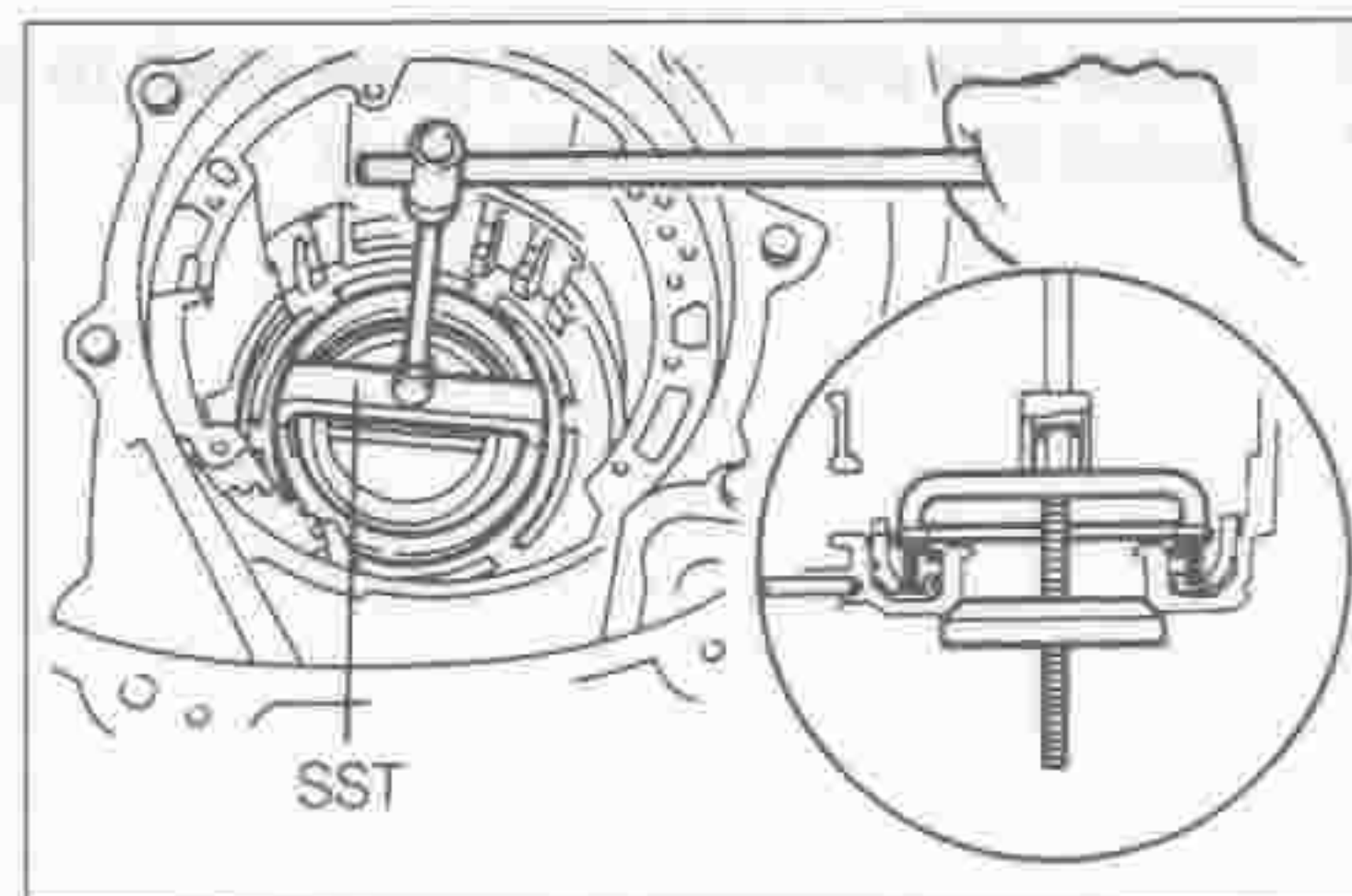
LAT00129-00122

9. Compress the first & reverse brake return spring (seat section), using the following SST.

SST: 09351-87201-000

NOTE:

- To prevent deformation, be sure to stop tightening the SST when the first & reverse brake return spring has been lowered 1 to 2 mm (0.039 to 0.078 inch) from the snap ring installation groove.



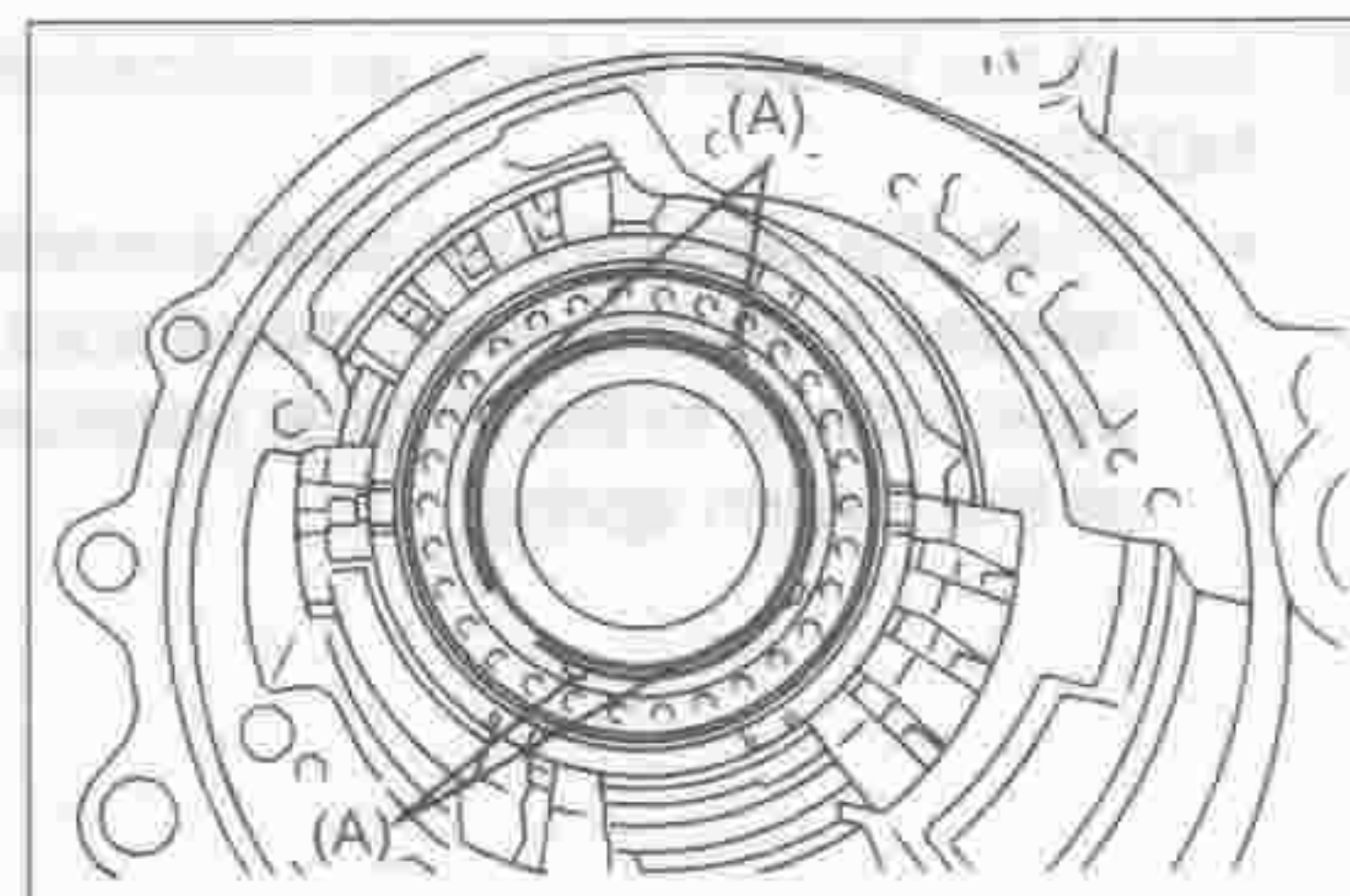
SST

LAT00130-00123

10. Install the shaft snap ring, using snap ring pliers.

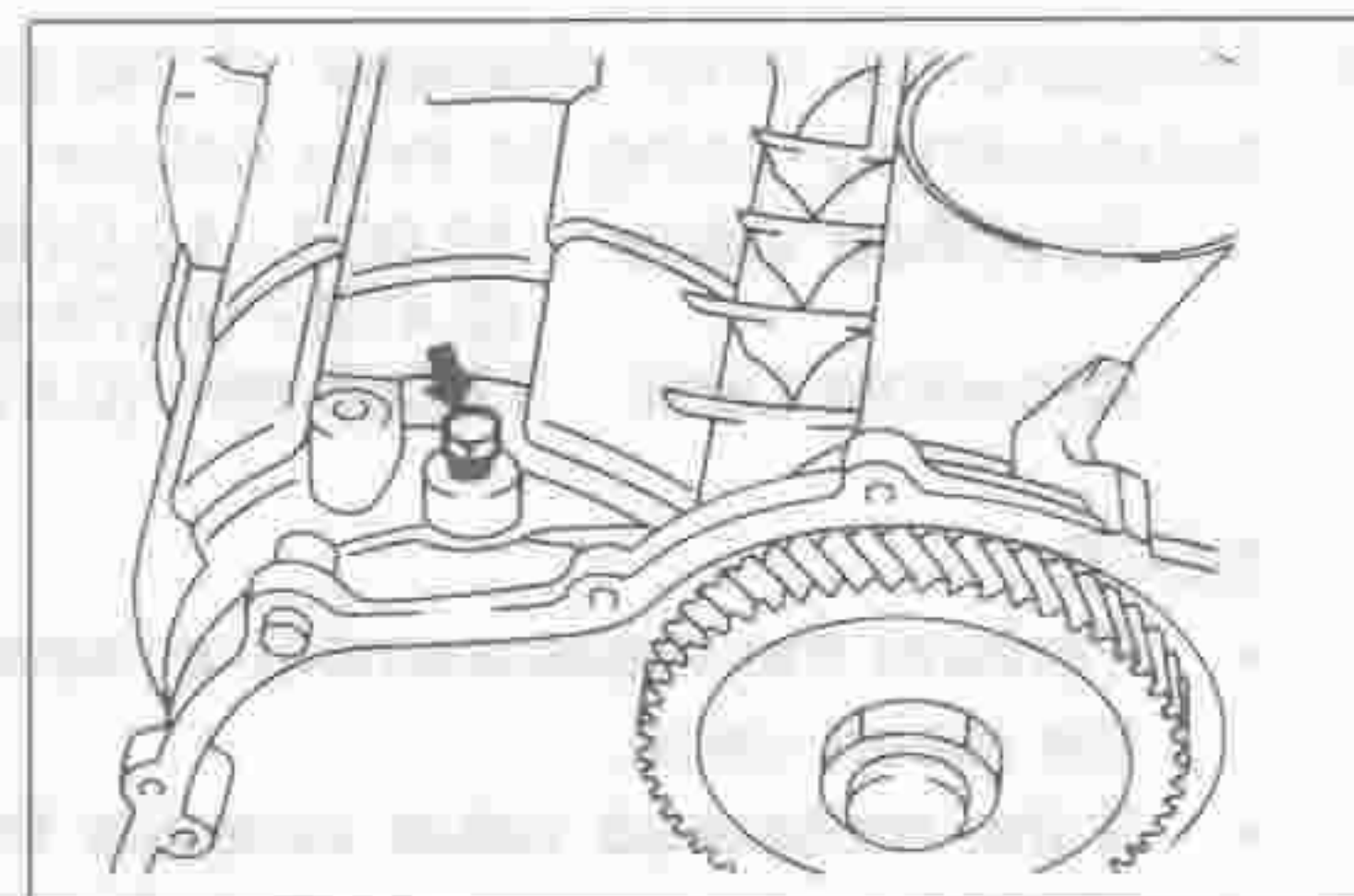
NOTE:

- Do not expand the ring excessively.
- Make sure that the end gap of the shaft snap ring is not aligned with the stopper section (A) of the spring retainer claw.



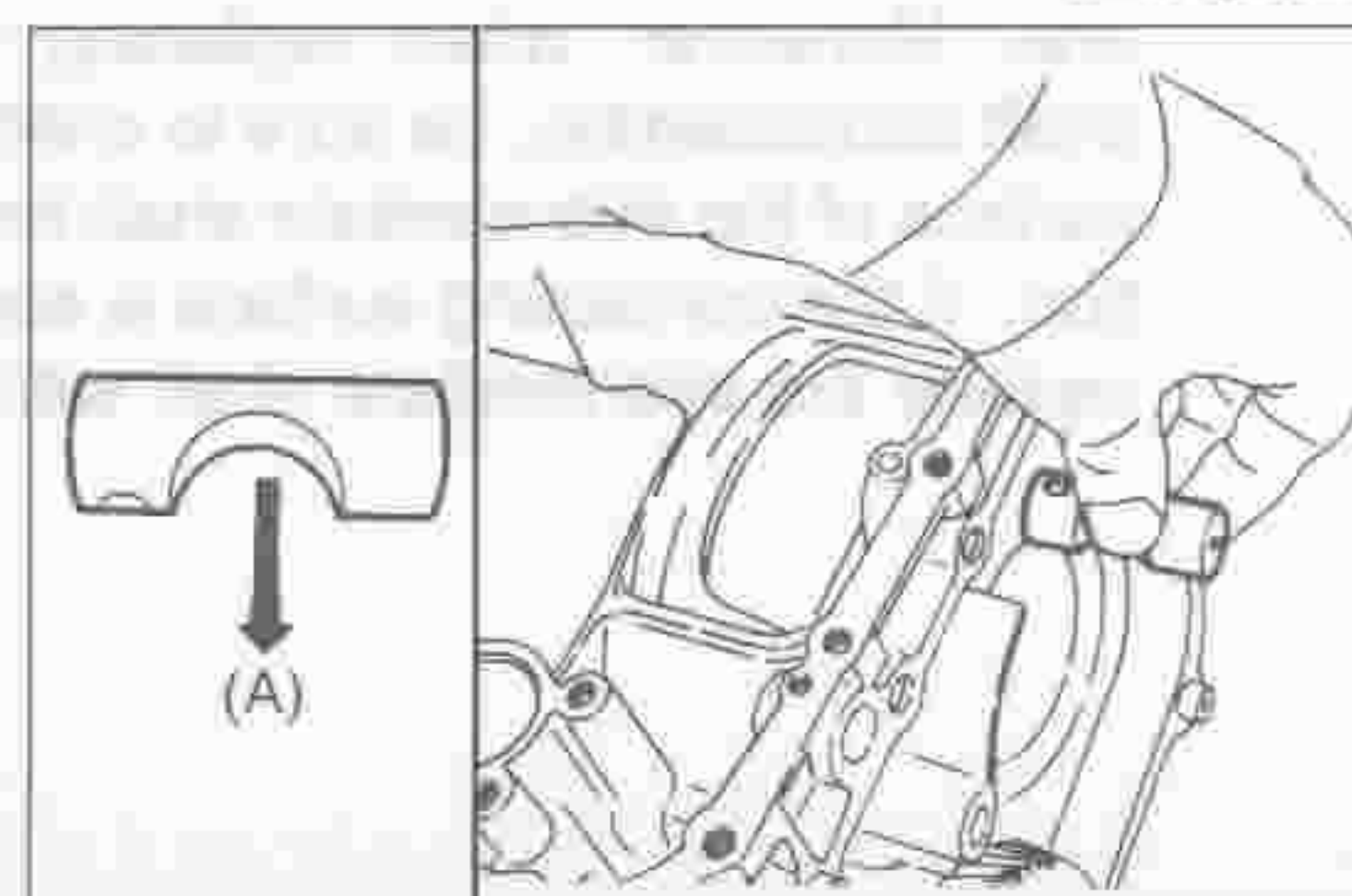
LAT00131-00124

11. Remove the B₂ inspection plug.



LAT00132-00125

12. Face the recessed side of the parking lock pawl cam support toward the section (A) at the drive gear side.
13. Align the parking lock pawl cam support hole with the slotted spring pin installation hole of the transaxle case.
14. Install the parking lock pawl cam support to the transaxle case.



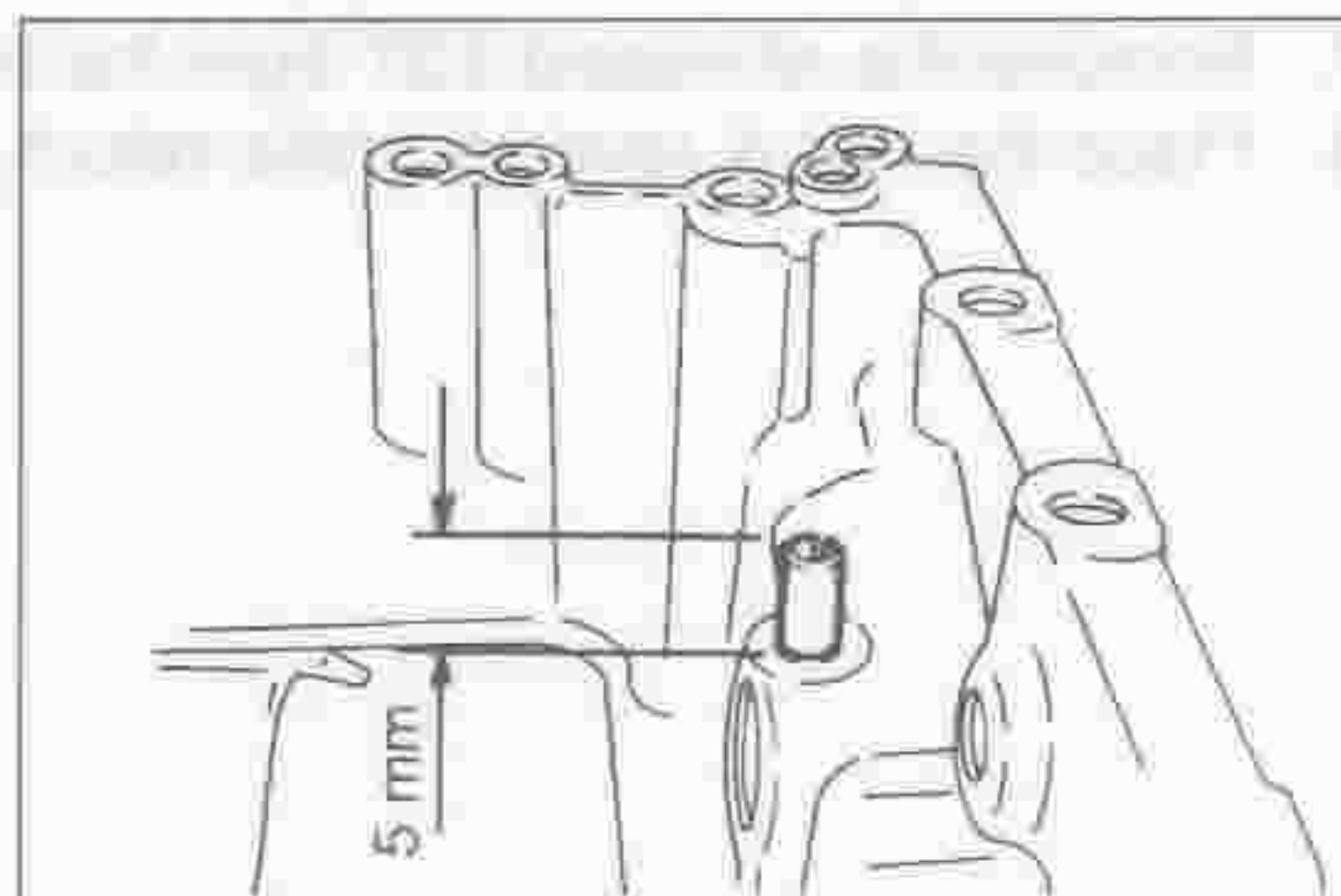
(A)

LAT00133-00126

15. Drive a new slotted spring pin, using a pin punch and a hammer.

NOTE:

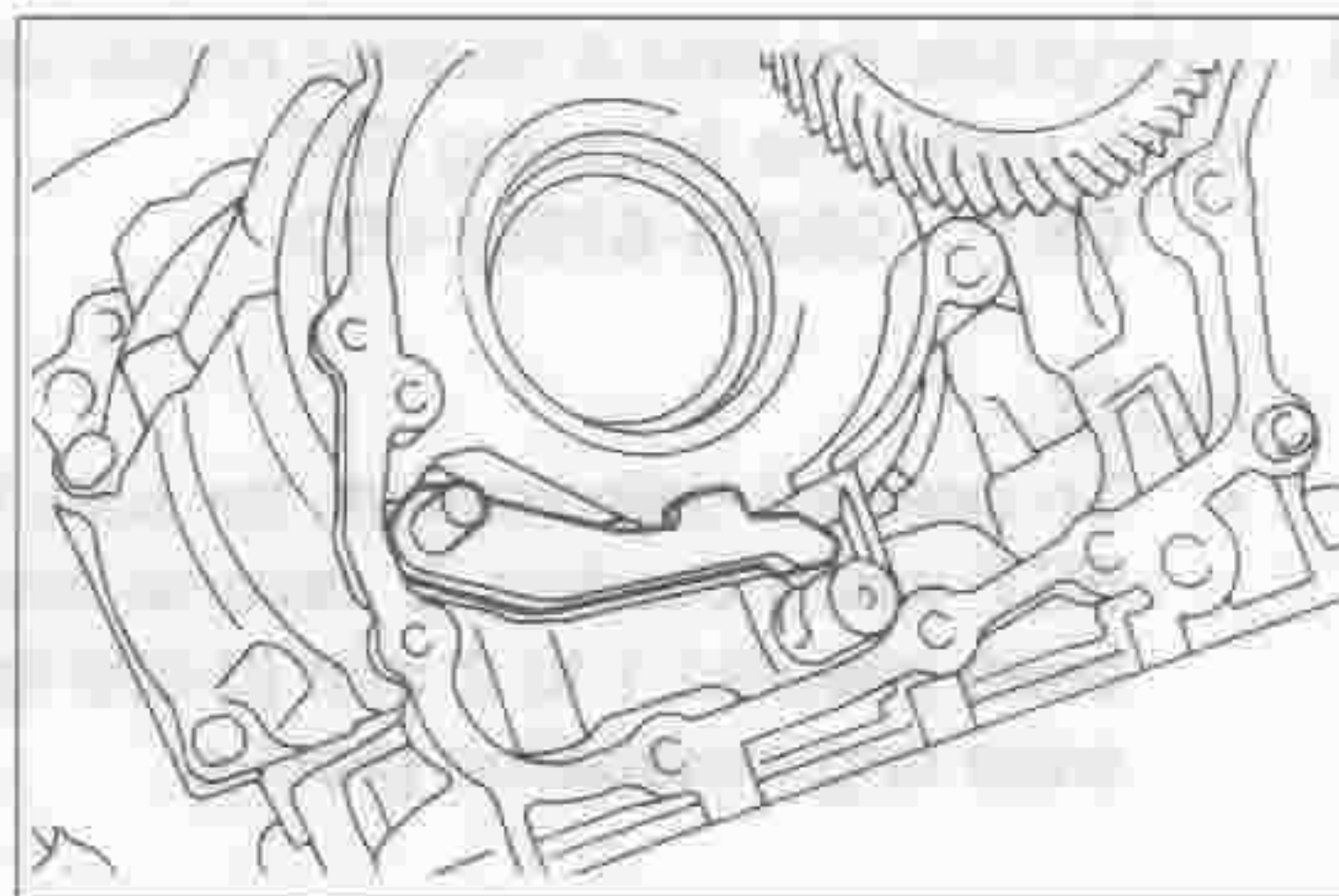
- After driving a new slotted spring pin, make sure that its protruding length from the transaxle case is approx. 5 mm (0.19 inch).



LAT00134-00127

16. Install the parking lock pawl shaft to the transaxle case.

17. Install the parking lock pawl.

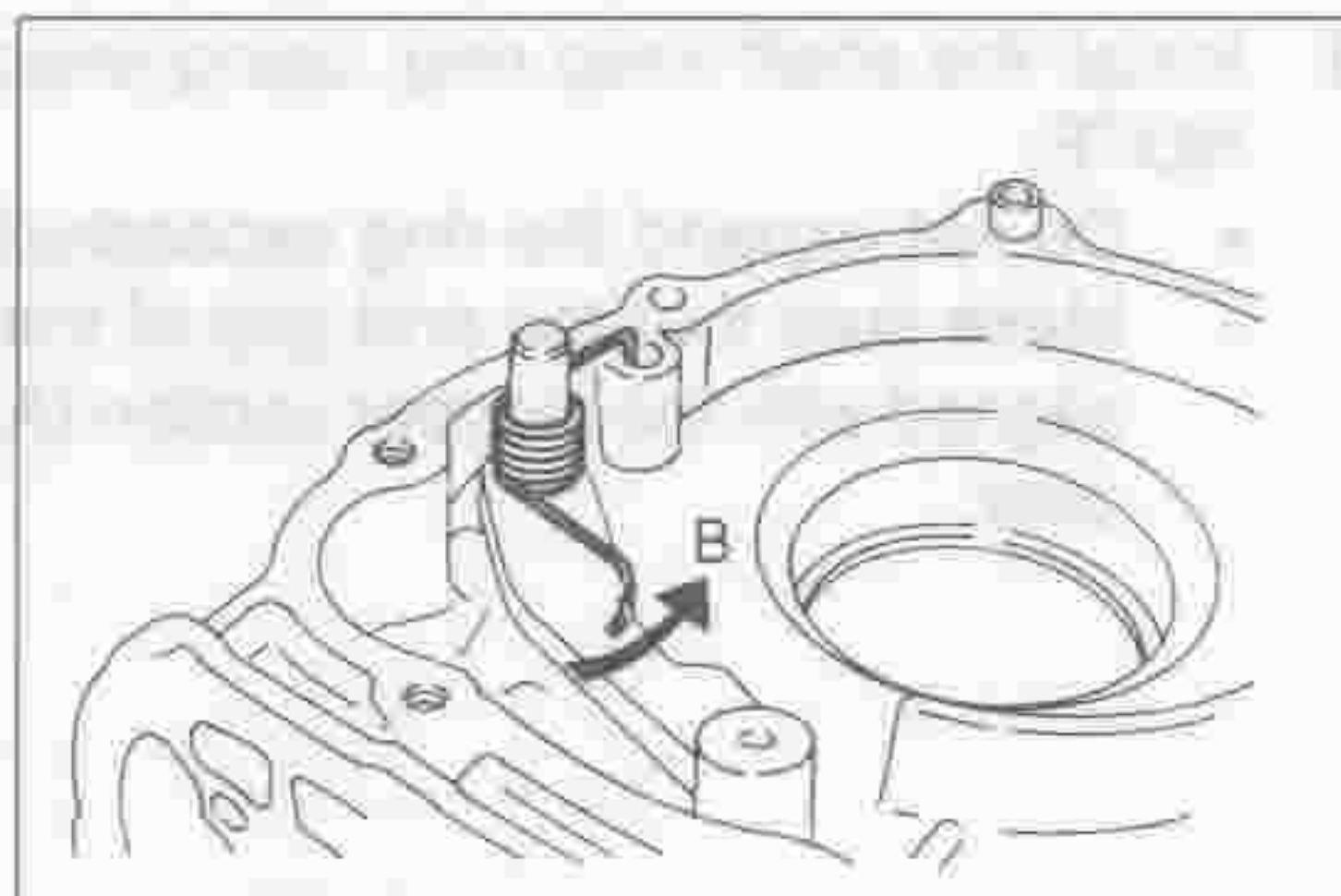


LAT00135-00128

18. Install the torsion spring, as indicated in the right figure.

NOTE:

- Push the parking lock pawl toward the direction (B) and release it. At this time, make sure that the parking lock pawl returns to the original position by the reaction force of the torsion spring.



LAT00136-00129

19. Measure the inner diameter of the planetary output shaft subassembly, using an inner caliper gauge.

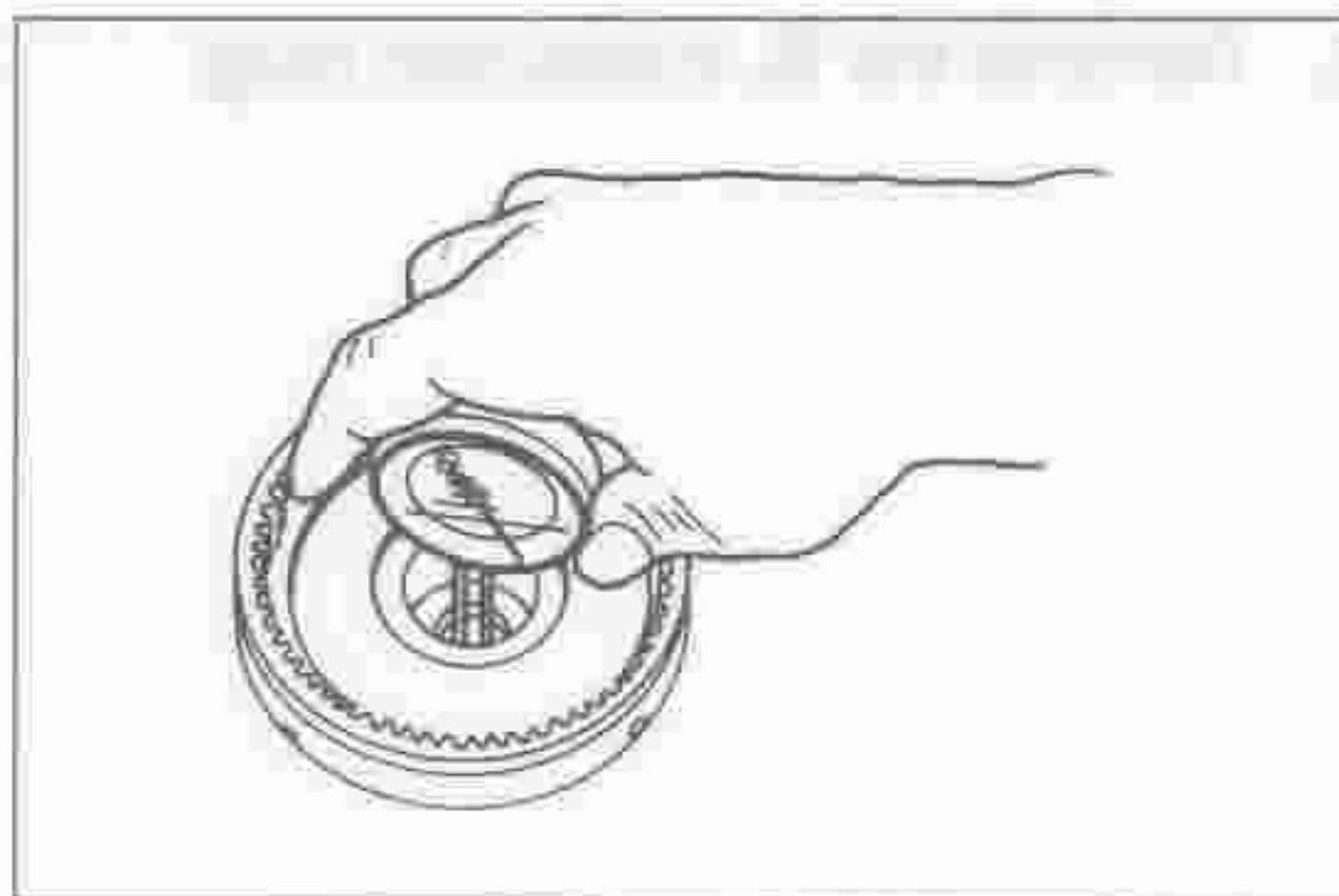
Specified Value: 12.000 - 12.018 mm

(0.472 - 0.473 inch)

Allowable Limit: 12.068 mm (0.475 inch)

NOTE:

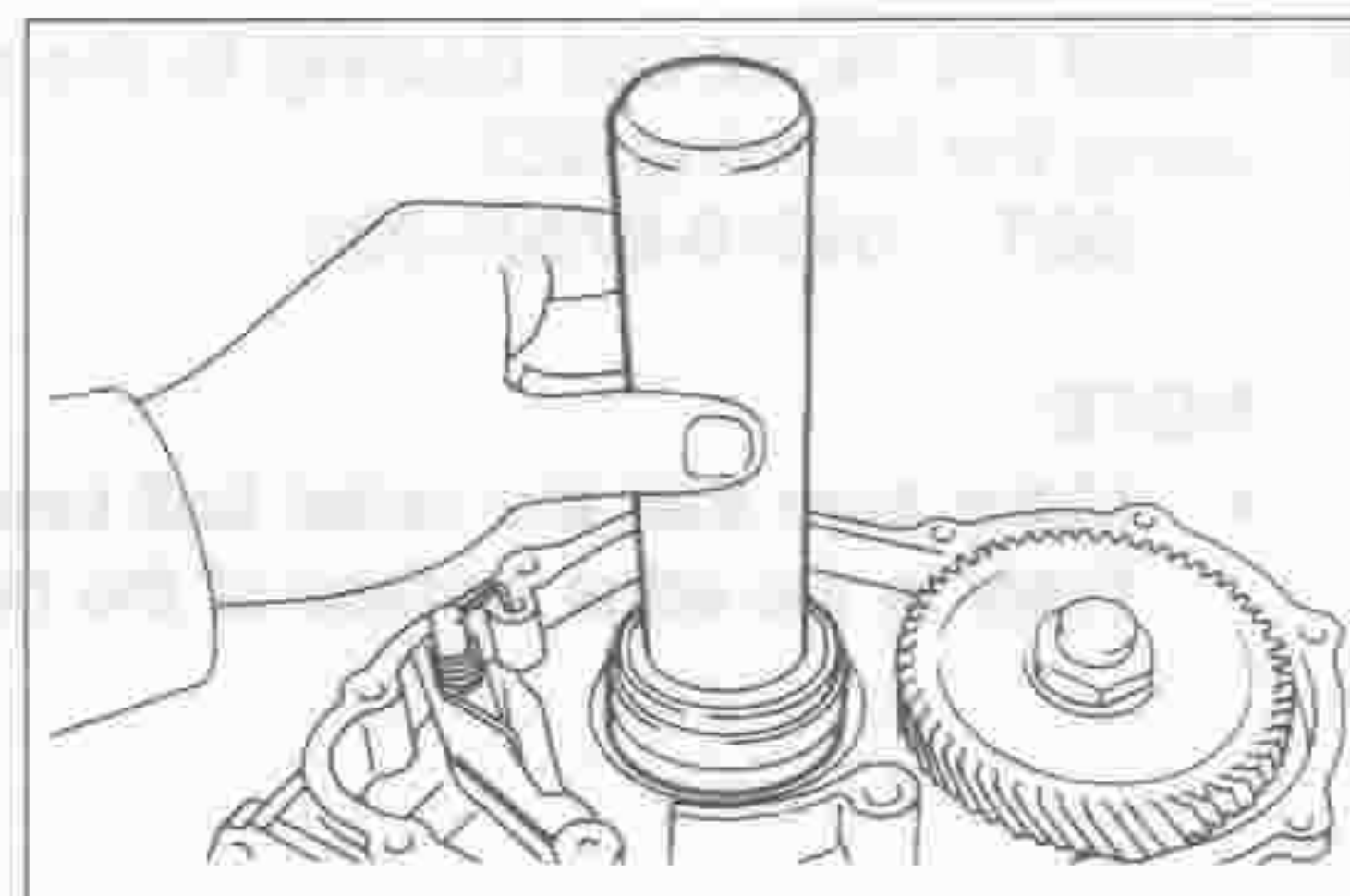
- Perform the measurement at several points. Calculate the mean value.
- If the measured value exceeds the allowable limit, replace the planetary output shaft subassembly with a new one. Moreover, when replacing the planetary output shaft subassembly, be sure to check the bush contacting surface of the intermediate shaft for scratch or discoloration. If the contacting surface is scratched or discolored, replace the intermediate shaft with a new part.



LAT00137-00130

20. Install the radial ball bearing to the transaxle case, using the following SST.

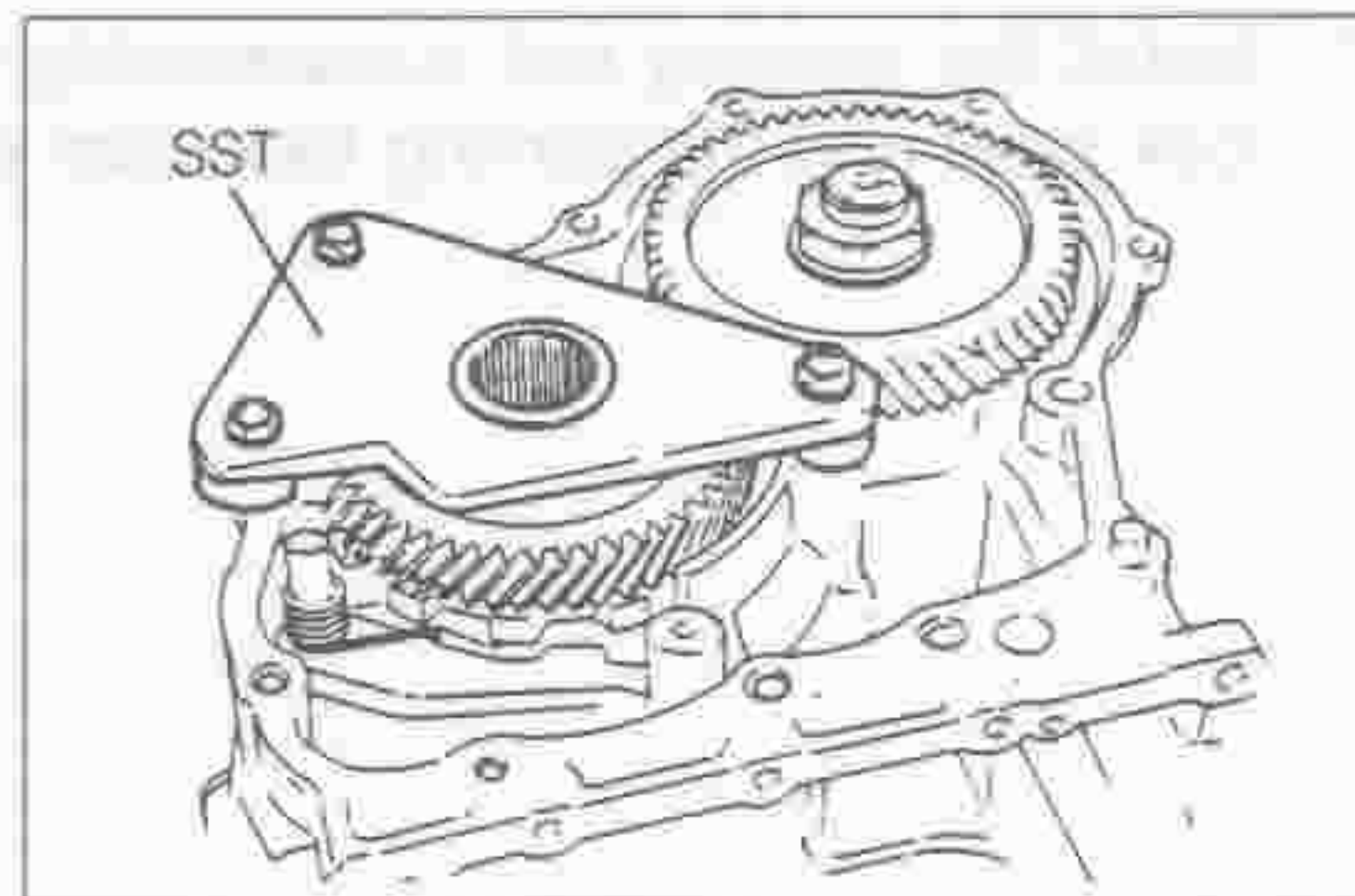
SST: 09310-87301-000



LAT00138-00131

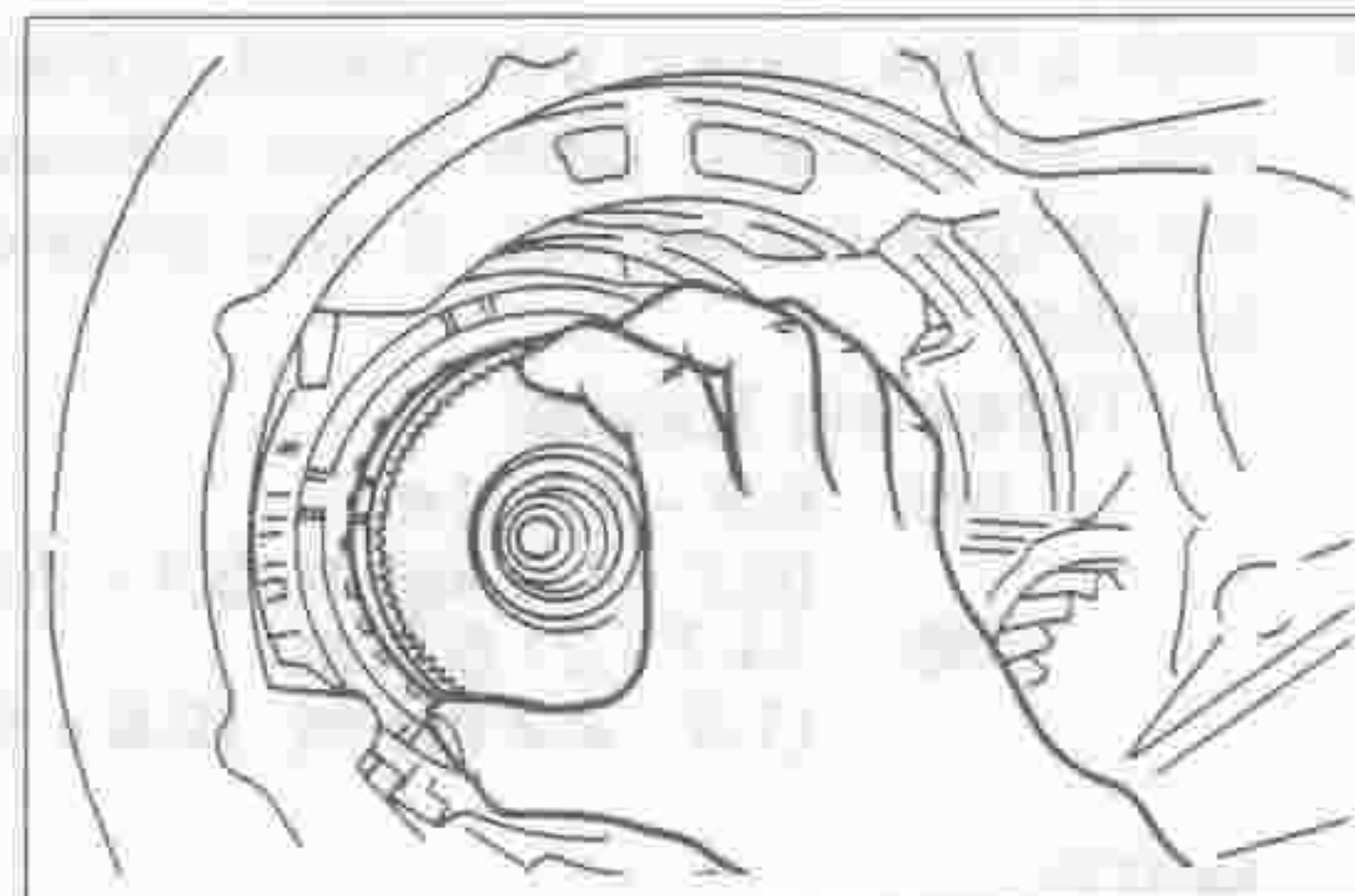
21. To prevent the reduction drive gear from dropping during the installation, install the following SST to the transaxle case.

SST: 09351-87205-000



LAT00139-00132

22. Insert the planetary output shaft subassembly into the reduction drive gear subassembly, until you feel the resistance with your hand.



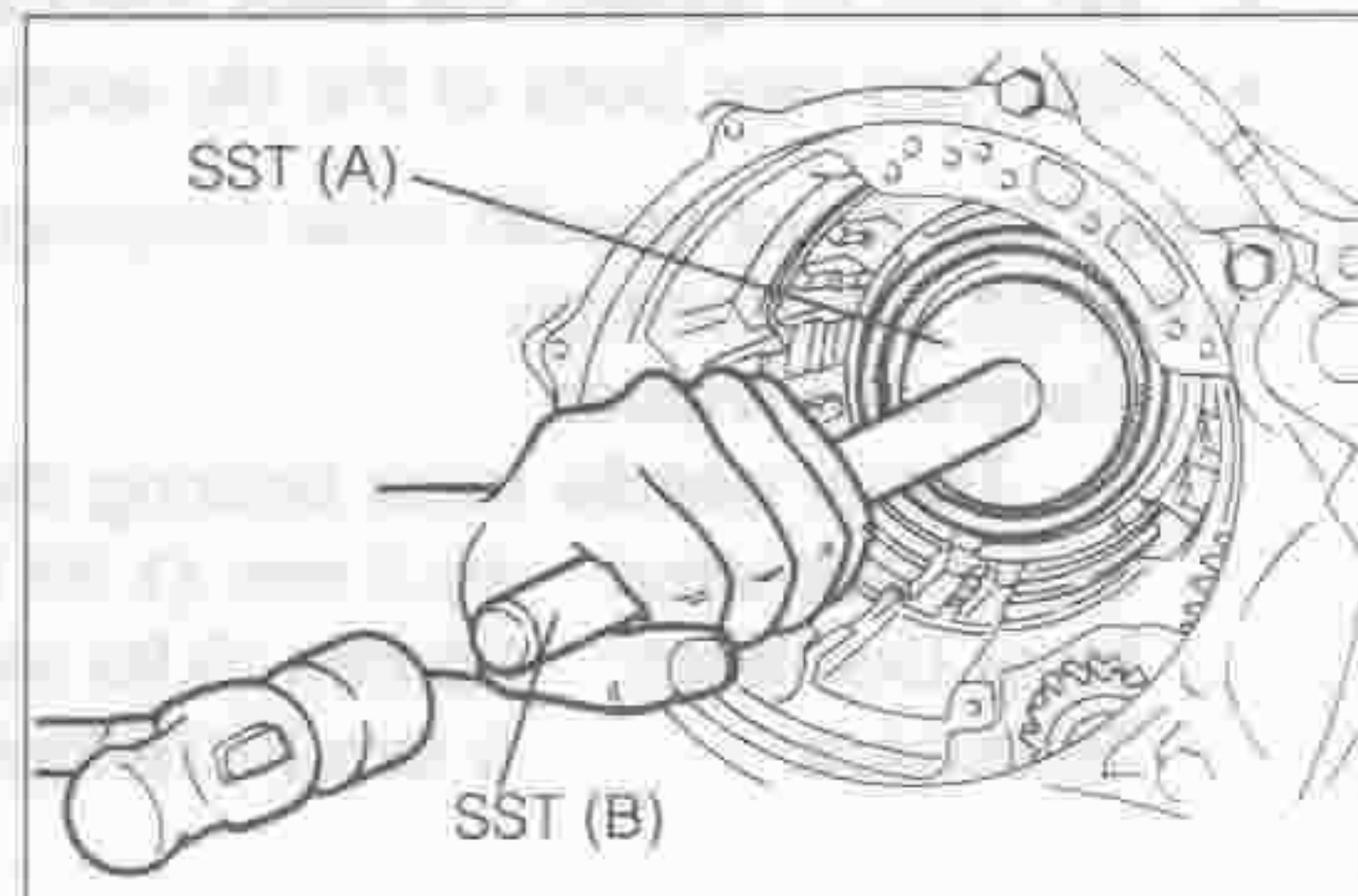
LAT00140-00133

23. Drive the reduction drive shaft subassembly, using the following SSTs.

SST: 09631-12020-000 ... (B)

09608-30011-000

(Use No.2 in the SST set.) ... (A)

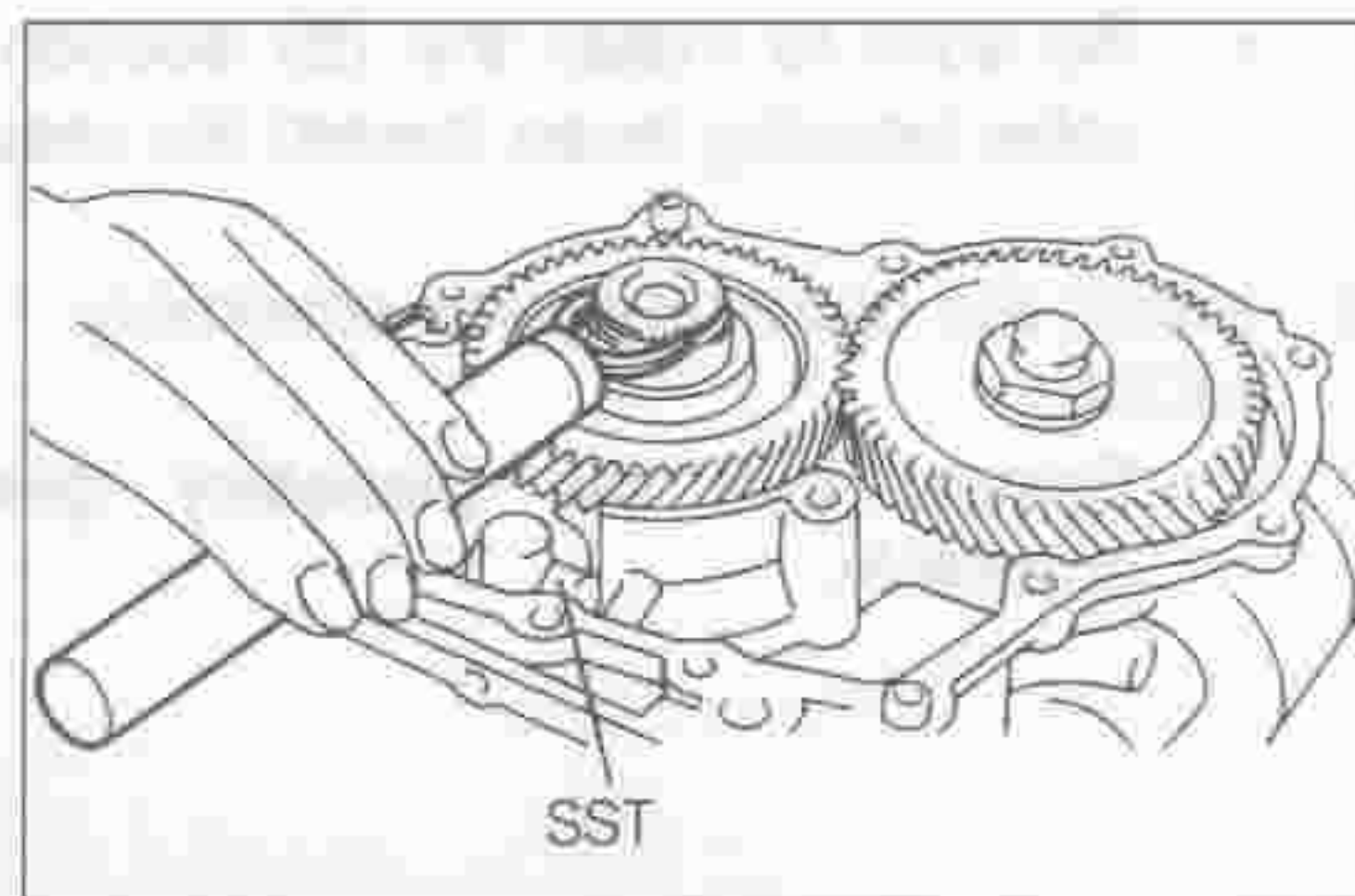


LAT00141-00134

24. Insert the following SST between the parking lock pawl and the parking lock pawl cam support so as to prevent the reduction drive gear from rotating.

SST: 09351-87209-000

25. Install the shaft snap ring to the grooved section of the reduction drive gear subassembly, using a brass bar and a hammer.



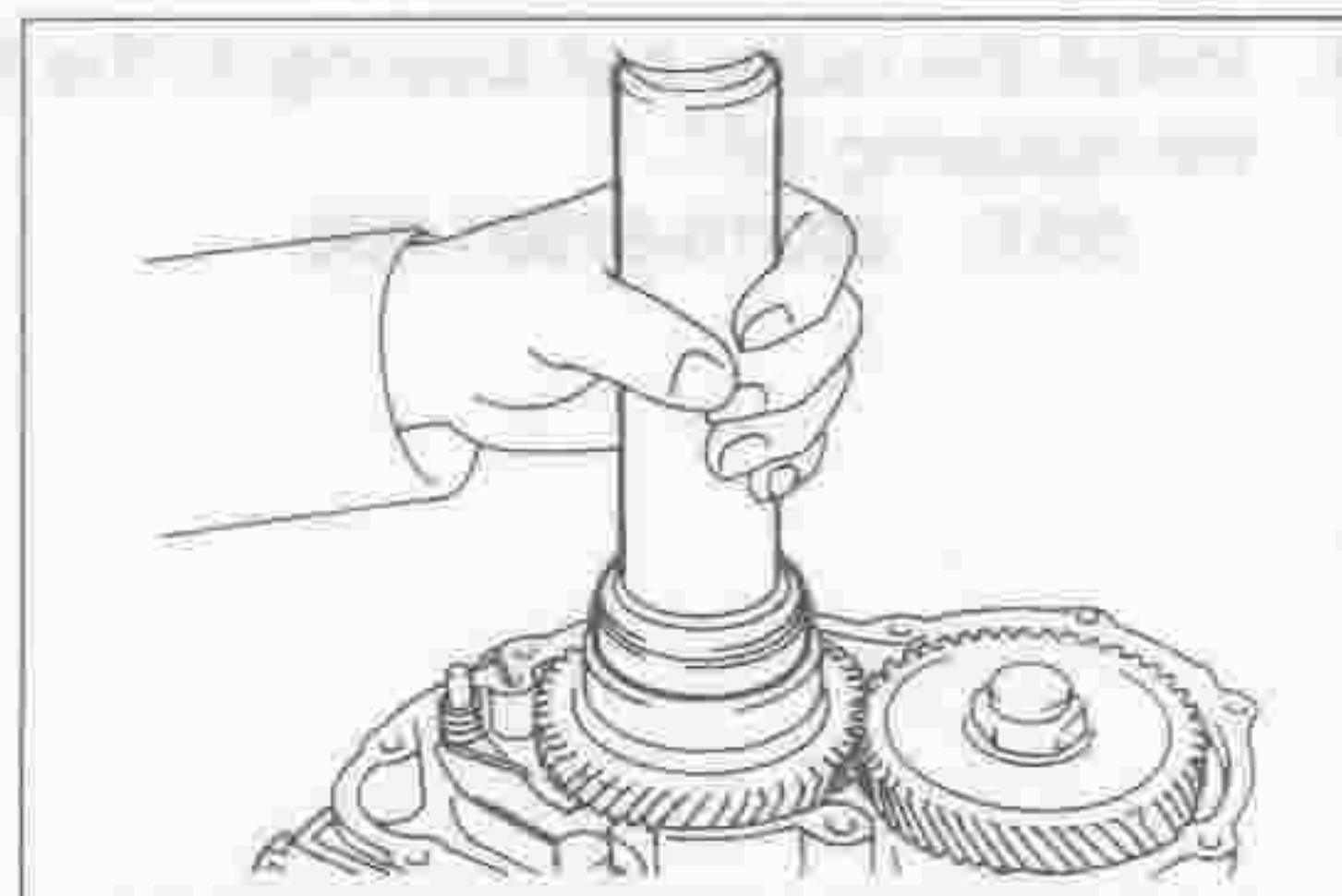
LAT00142-00135

26. Install the radial ball bearing to the reduction drive gear, using the following SST.

SST: 09310-87301-000

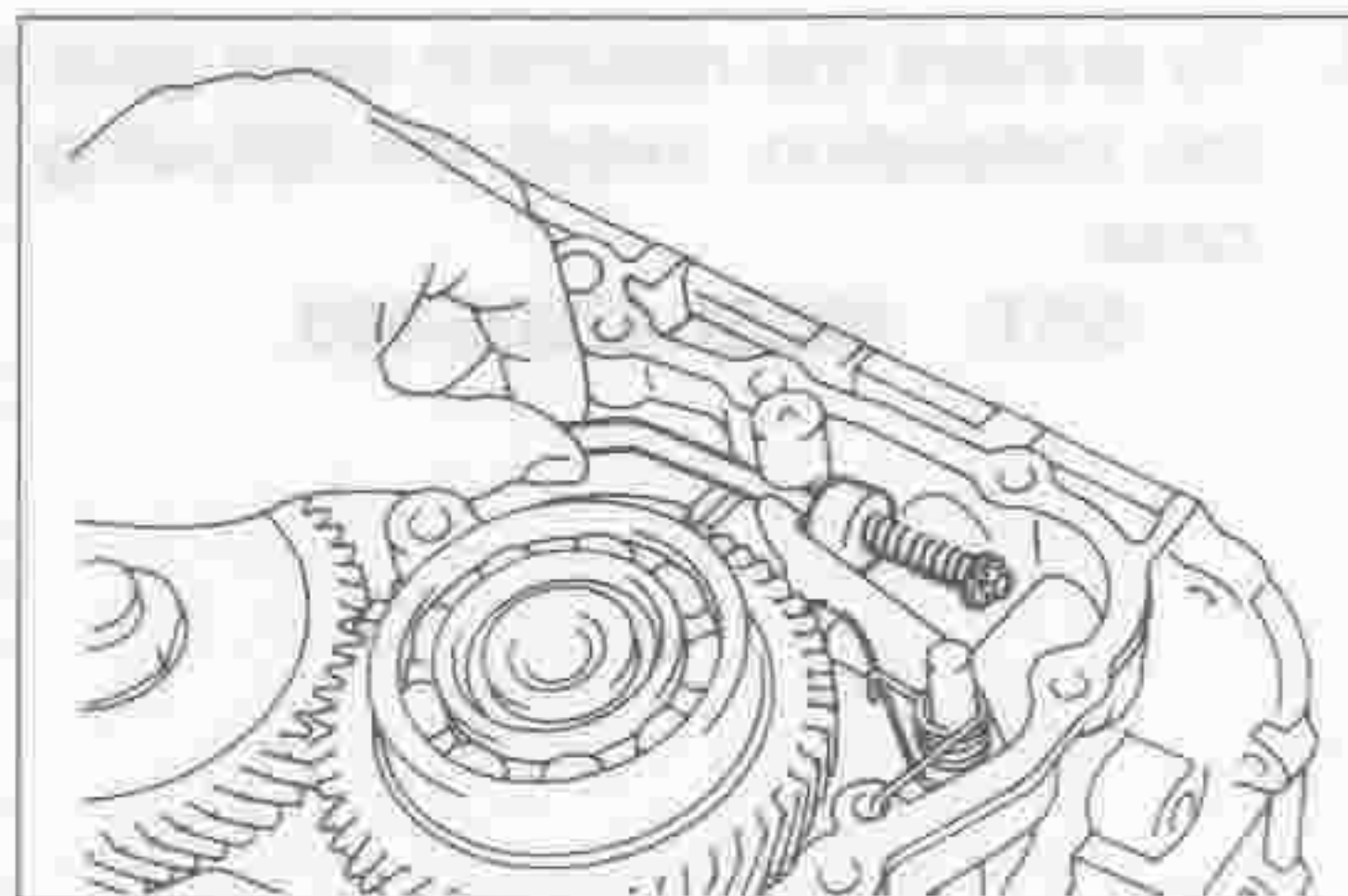
NOTE:

- Make sure that the radial ball bearing is installed positively to the edge surface of the reduction drive gear.



LAT00143-00136

27. Install the parking rod subassembly between the parking lock pawl and the parking lock cam support.

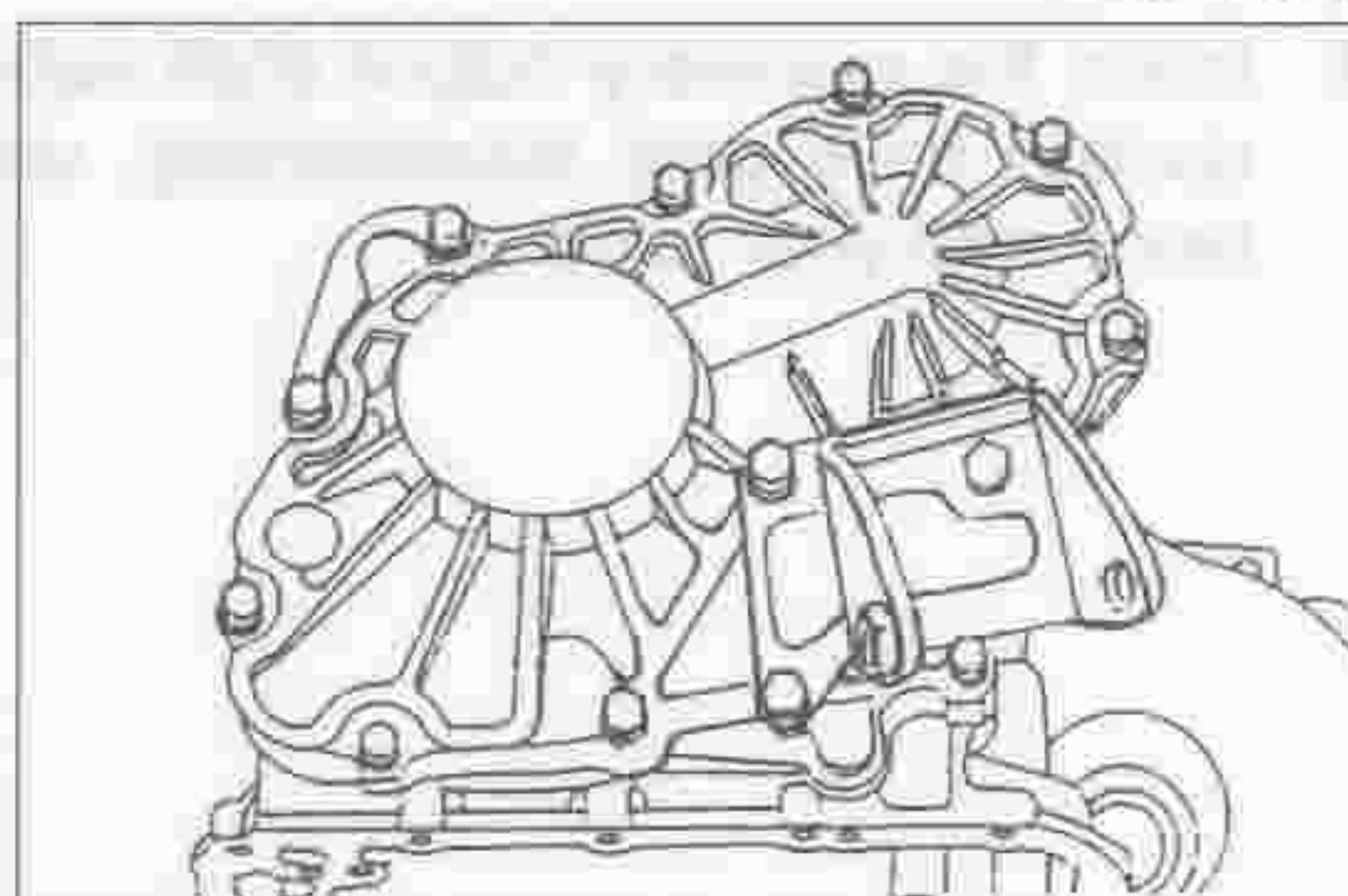


LAT00144-00137

28. With a new gasket interposed, tighten the 13 bolts of the rear transmission case cover subassembly provided with the engine hanger No. 2 and engine mounting lower left bracket.

Tightening Torque:

- M6: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)
M8: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)



LAT00145-00138

NOTE:

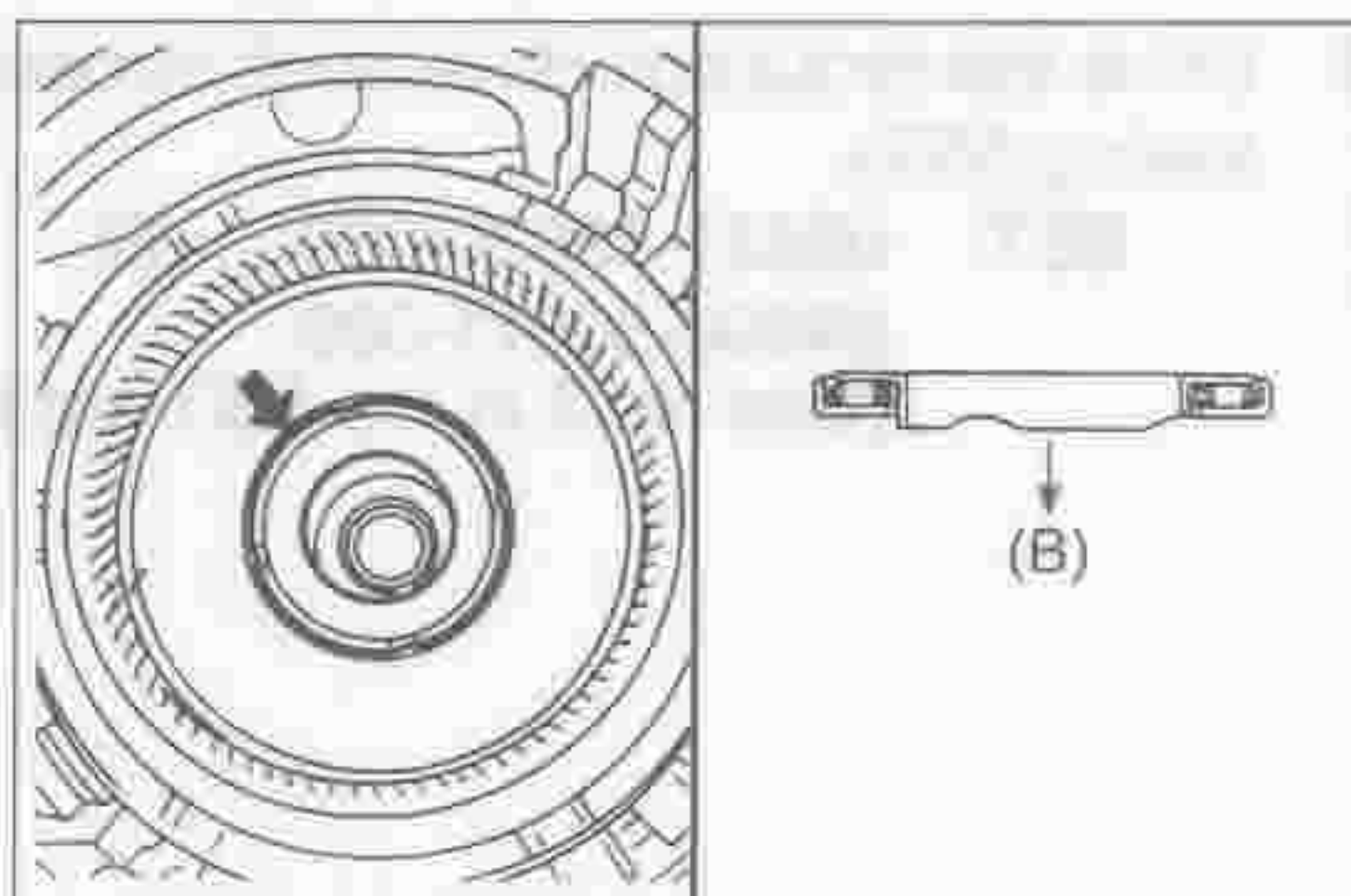
- Be sure to tighten the bolts alternately and diagonally.
- Use two new bolts at the (A) sections.

29. Install the thrust needle roller bearing to the planetary output shaft subassembly.

Reference Value:

Thrust needle roller bearing dimension

- Outer Diameter: 46.5 mm (1.83 inch)
Inner Diameter: 25 mm (0.98 inch)
Thickness: 5 mm (0.19 inch)



LAT00146-00139

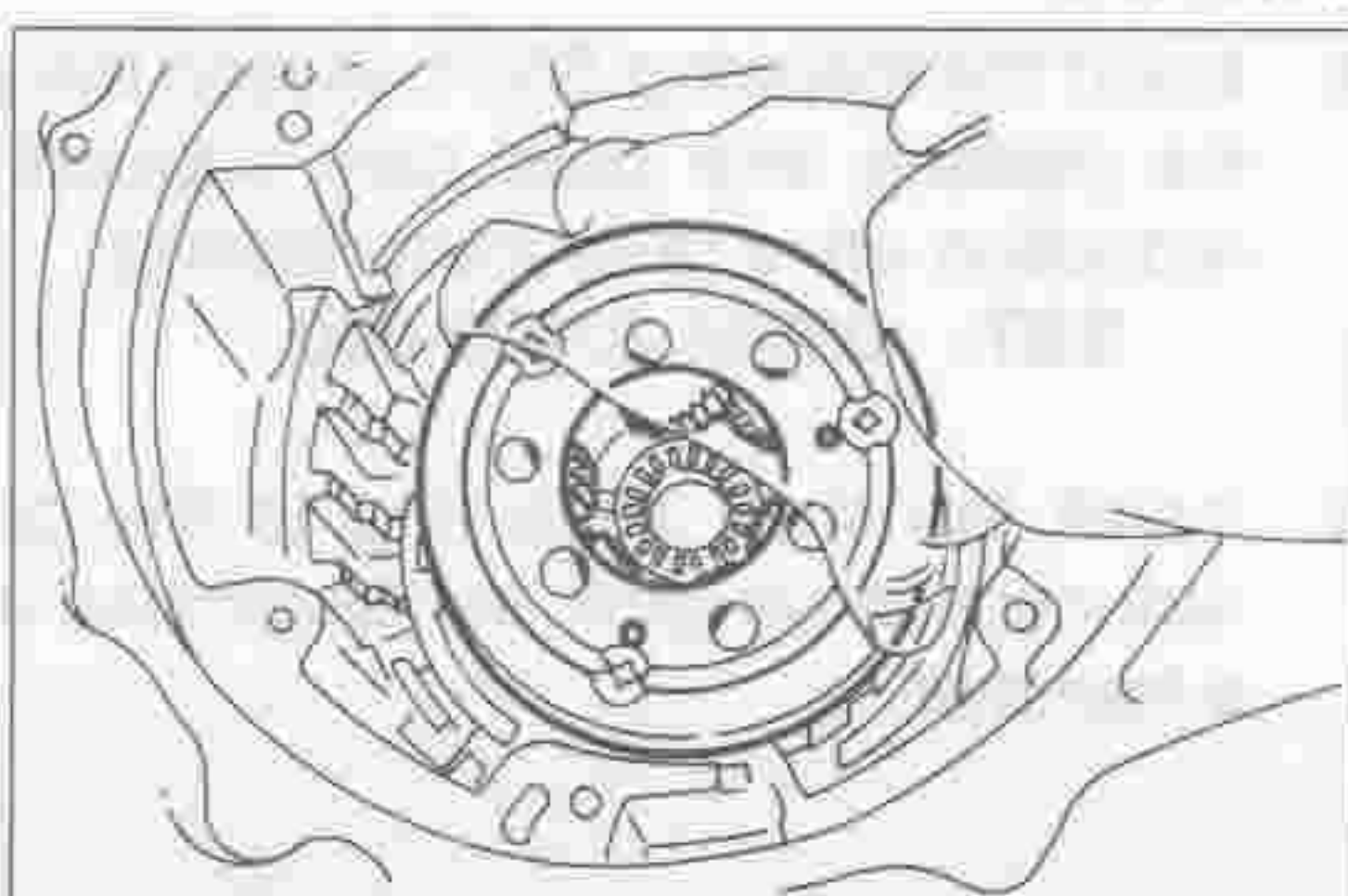
NOTE:

- Be sure to install the (B) section of the thrust needle roller bearing faces toward the reduction drive shaft side.

30. Install the planetary gear assembly.

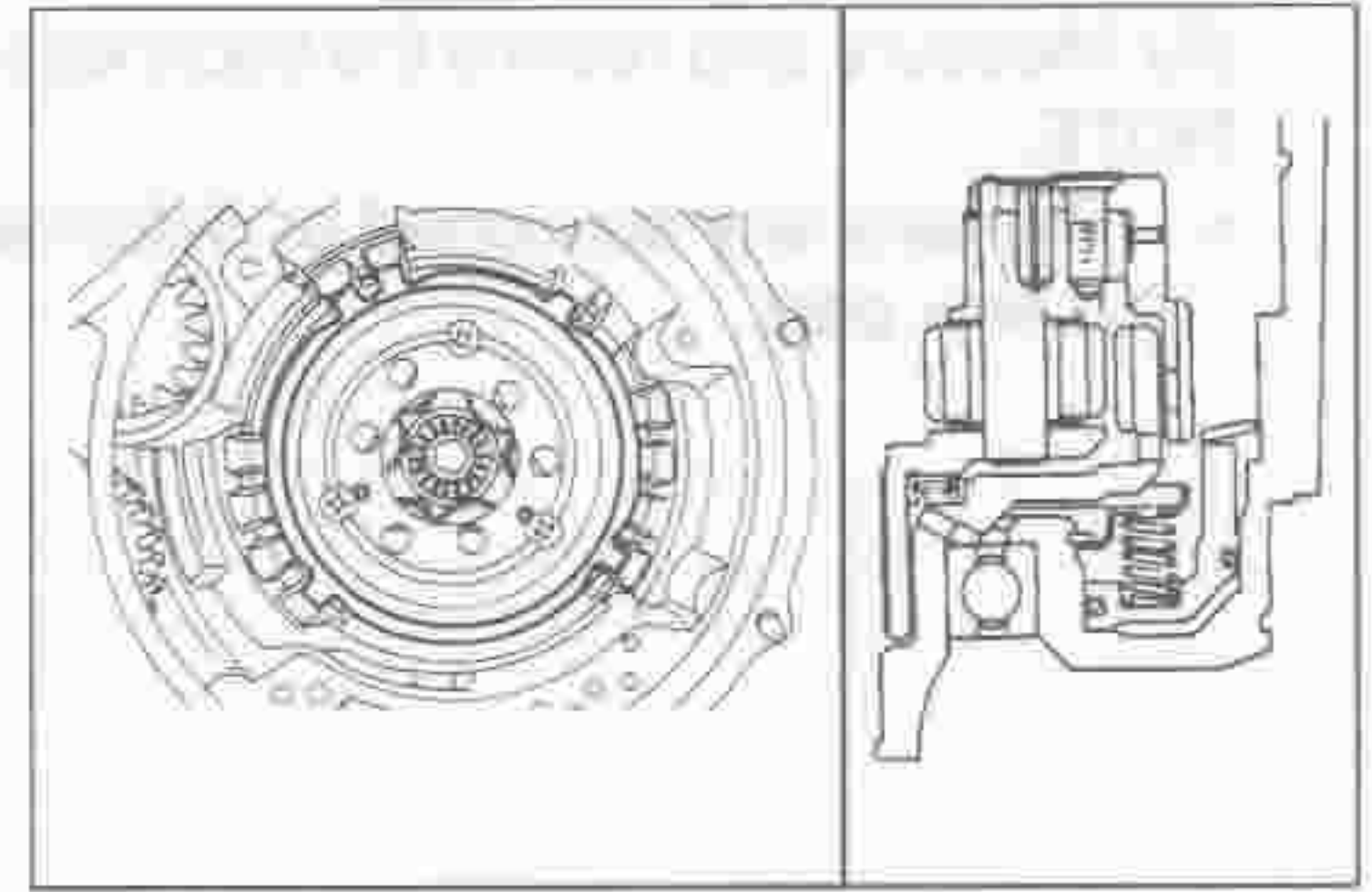
NOTE:

- Ensure that the planetary gear assembly rotates smoothly.



LAT00147-00140

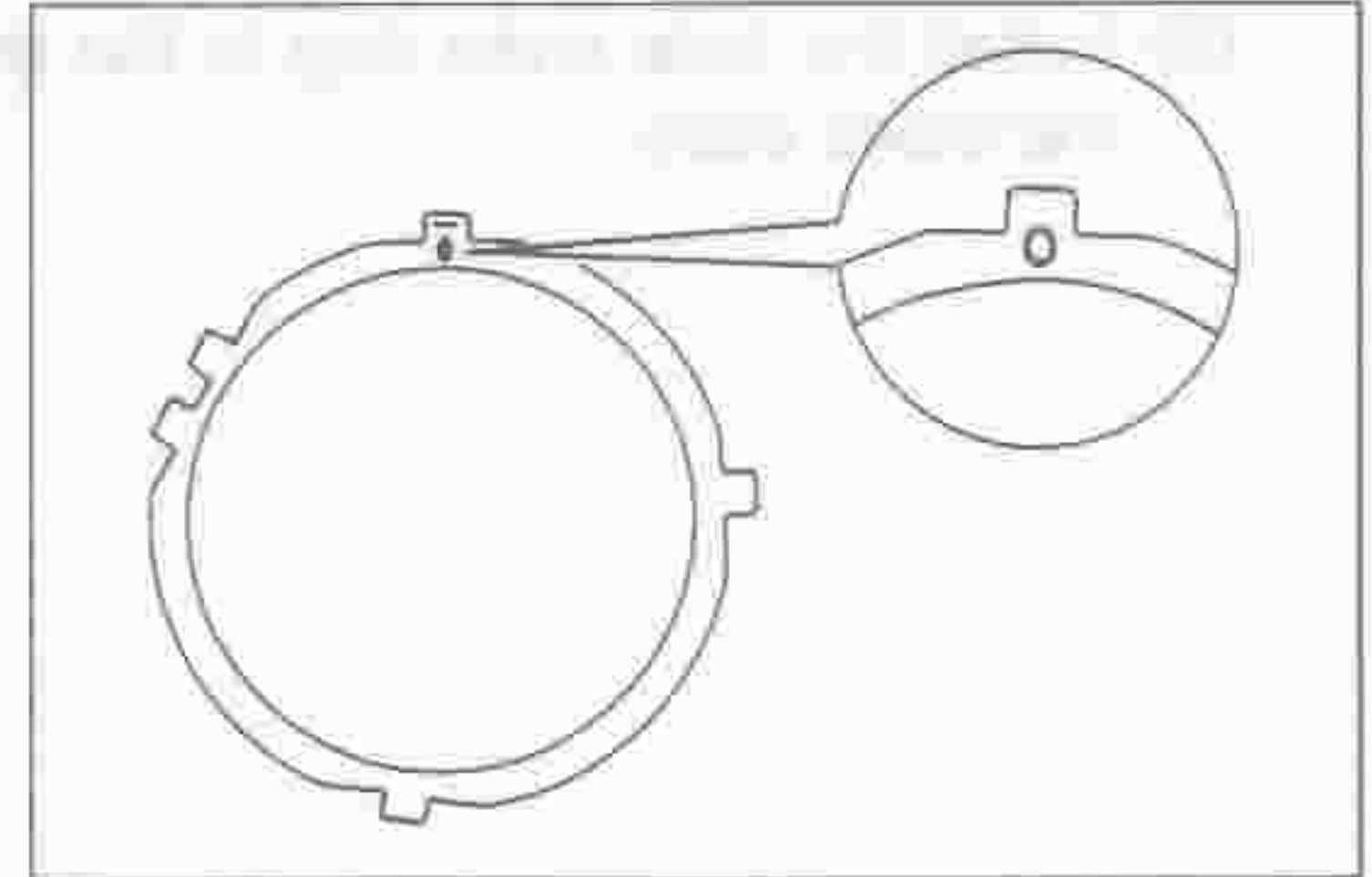
31. Installation of first & reverse brake
(1) Install the brake cushion plate.



LAT00148-00141

NOTE:

- Ensure that the stamped mark "O" of the brake cushion plate faces toward the upper side.



LAT00149-00142

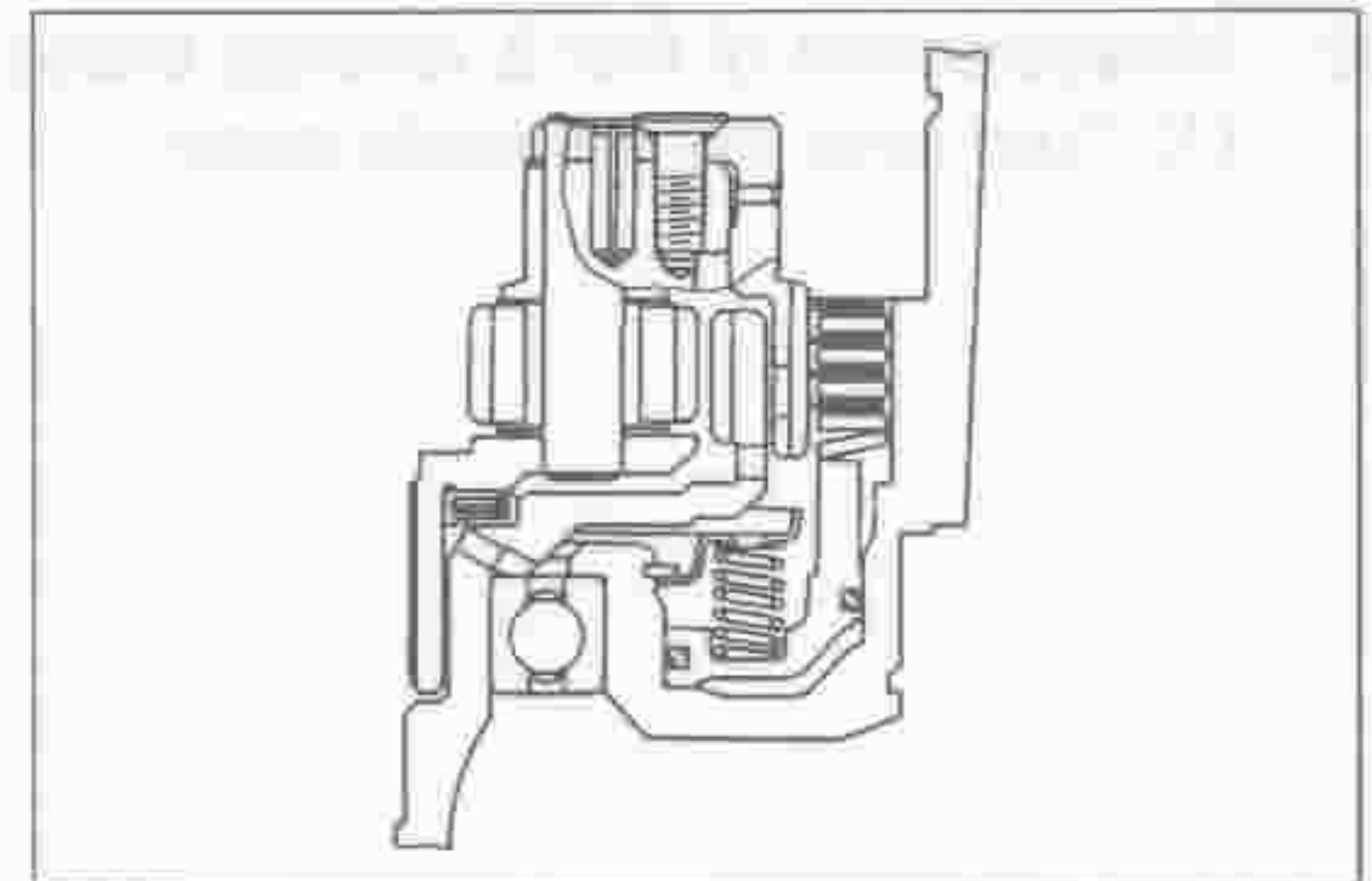
- (2) Install the plates and discs in the following order.

P = Brake plate, D = Brake disc

P → D → P → D → P → D → P → D

NOTE:

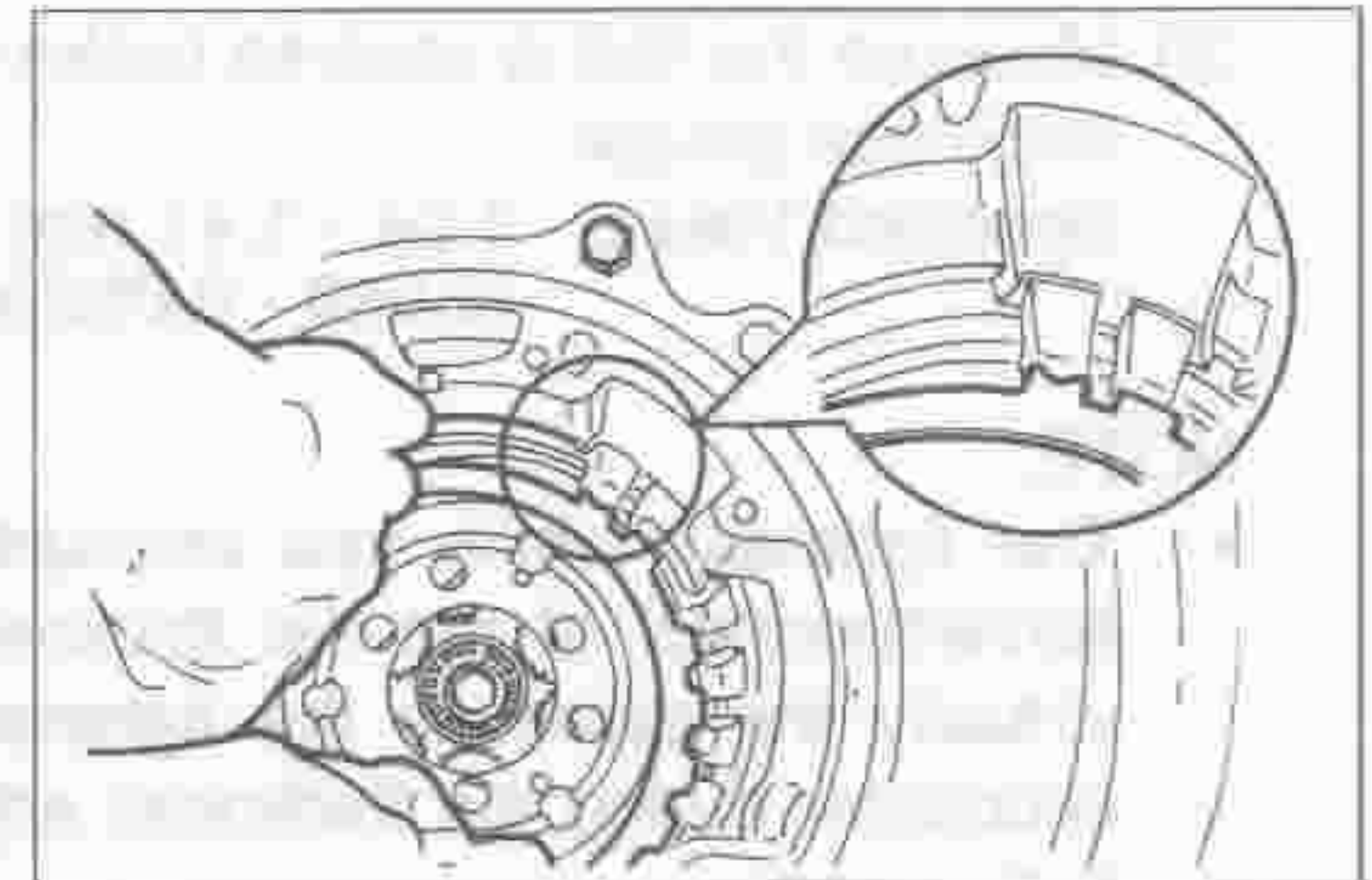
- Before assembling new discs, soak them in the ATF for at least two hours.



LAT00150-00143

NOTE:

- Be sure to align the cut-out section of the brake plate with the protruding section of the transaxle when installing the brake plate.



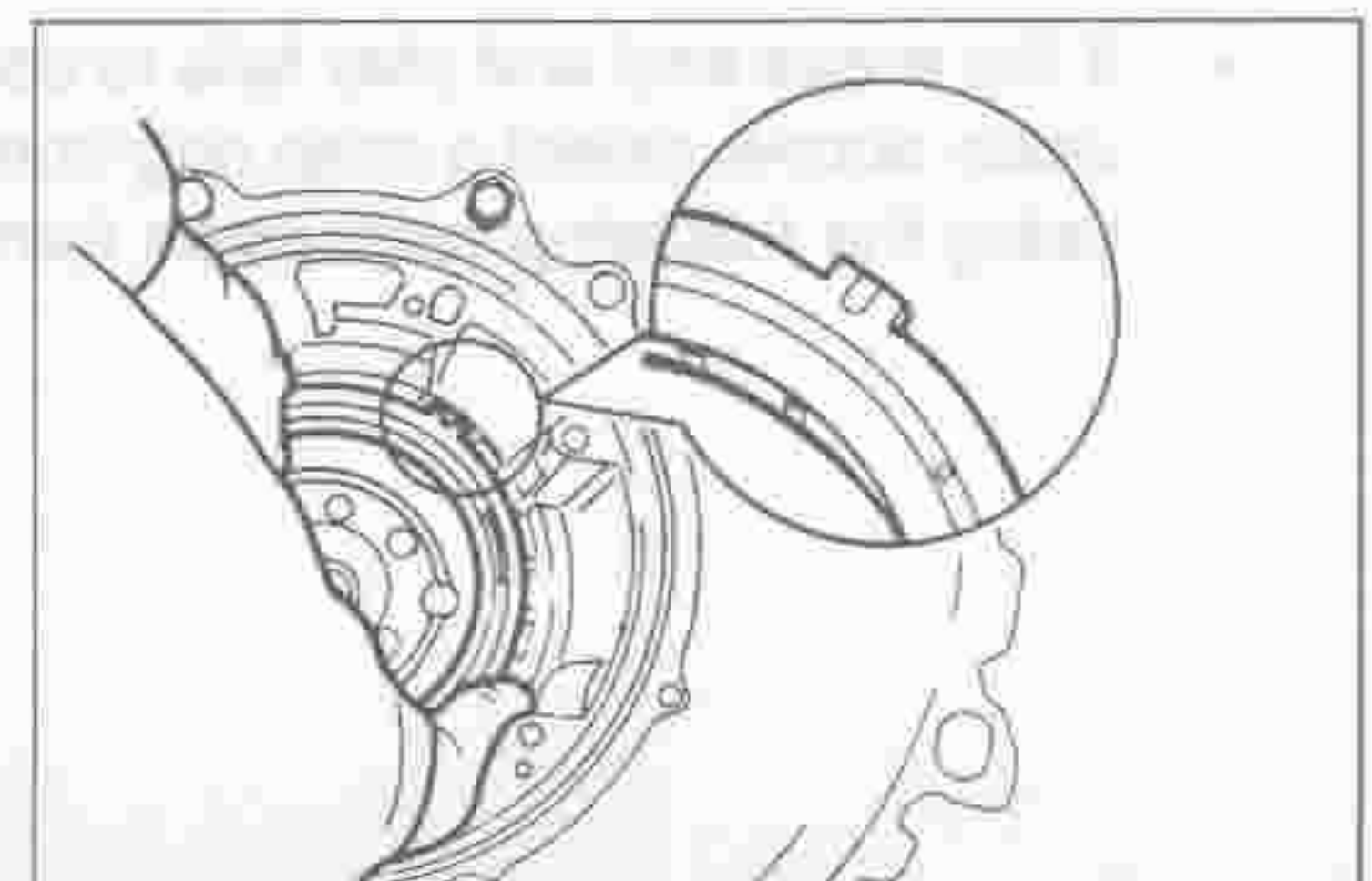
LAT00151-00144

- (3) Coat the sliding section of the one-way clutch and planetary gear assembly with the ATF.

- (4) Install the one-way clutch.

NOTE:

- Ensure that the one-way clutch with the snap ring faces toward the upside.
- Align the cut-out section at the inside of the transaxle case with the protruding section provided with the groove (O mark) of the one-way clutch.

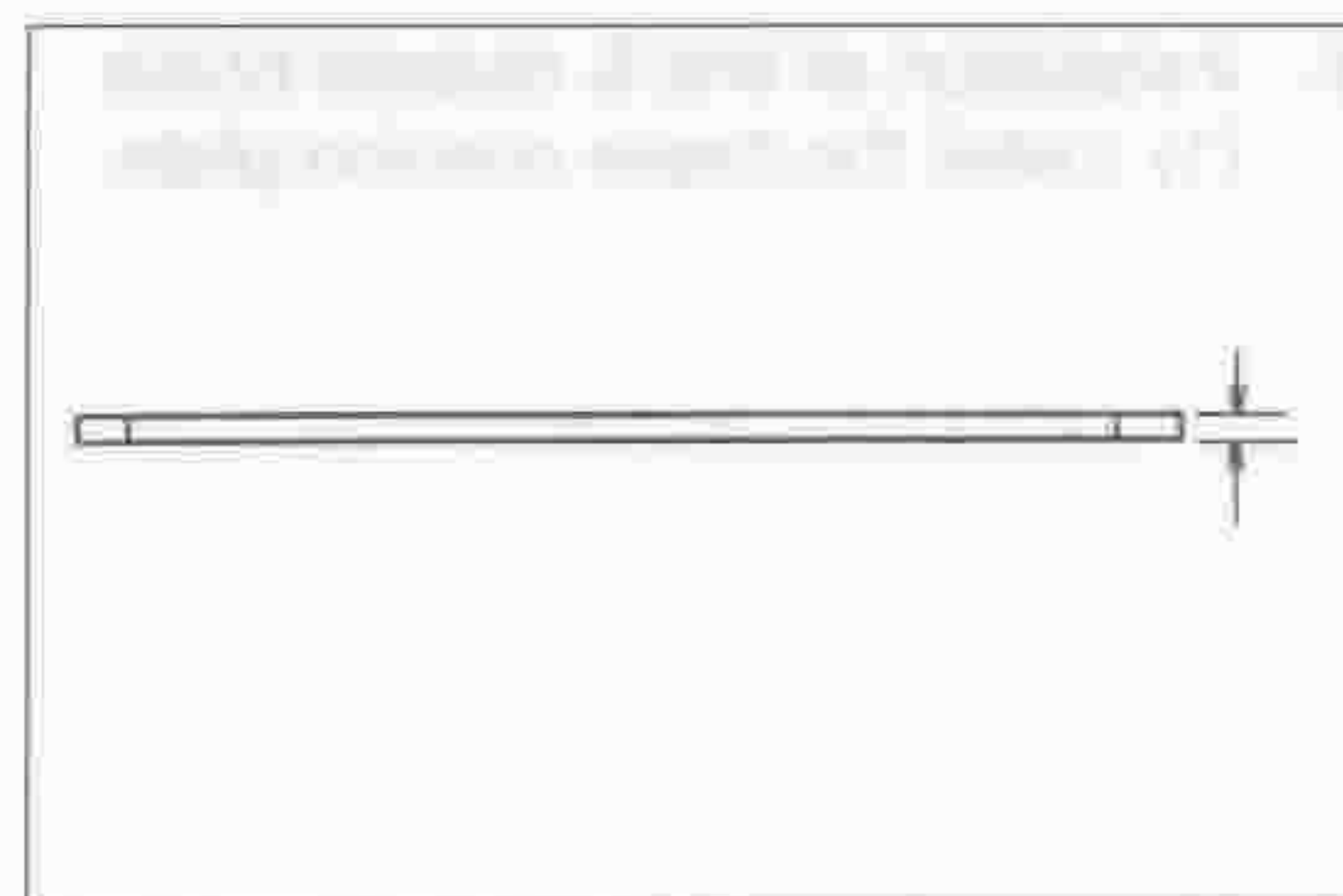


LAT00152-00145

(5) Measure and record the thickness of the hole snap ring.

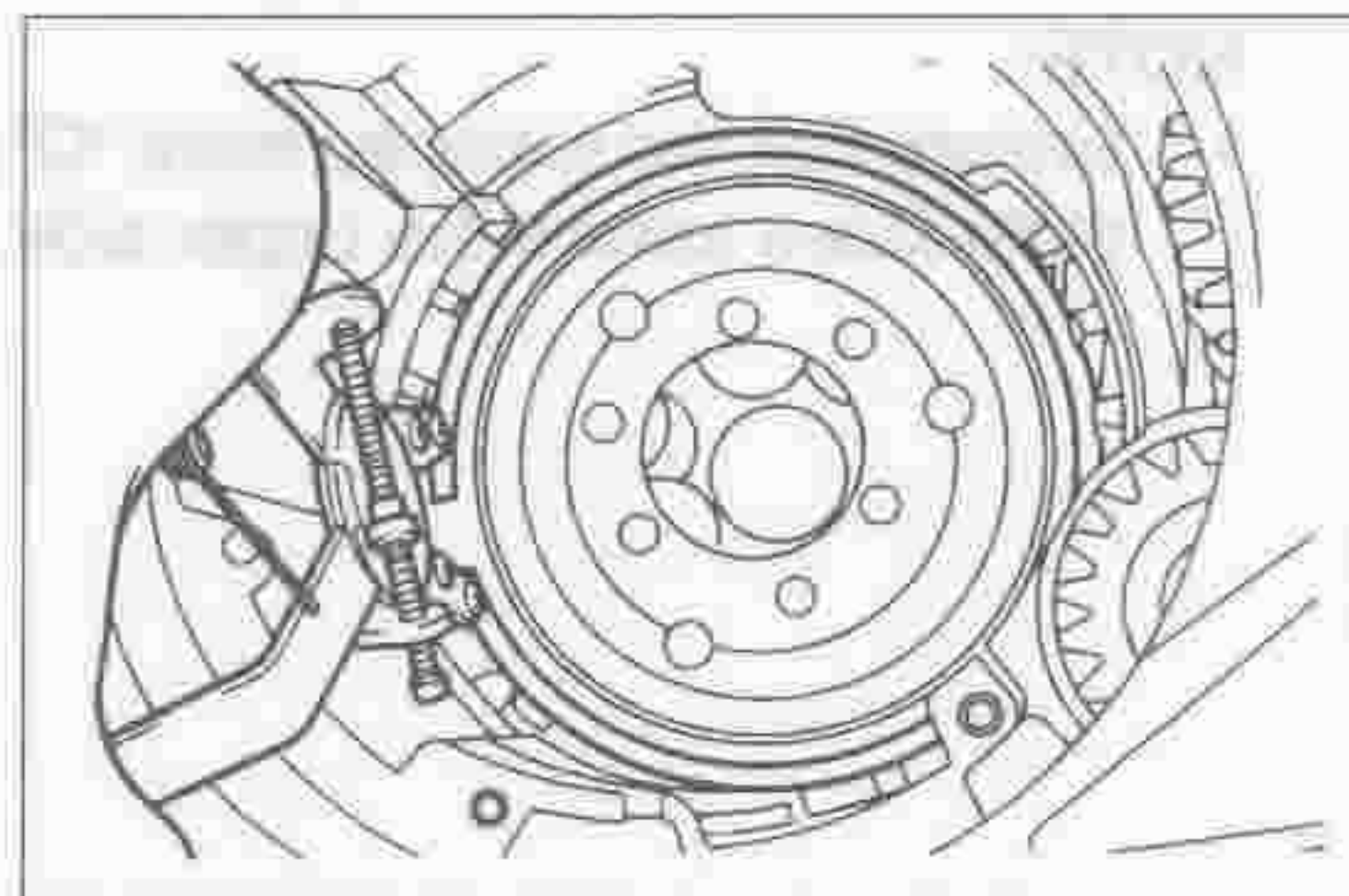
NOTE:

- Replace any scratched or deformed hole snap ring with a new part.



LAT00153-00148

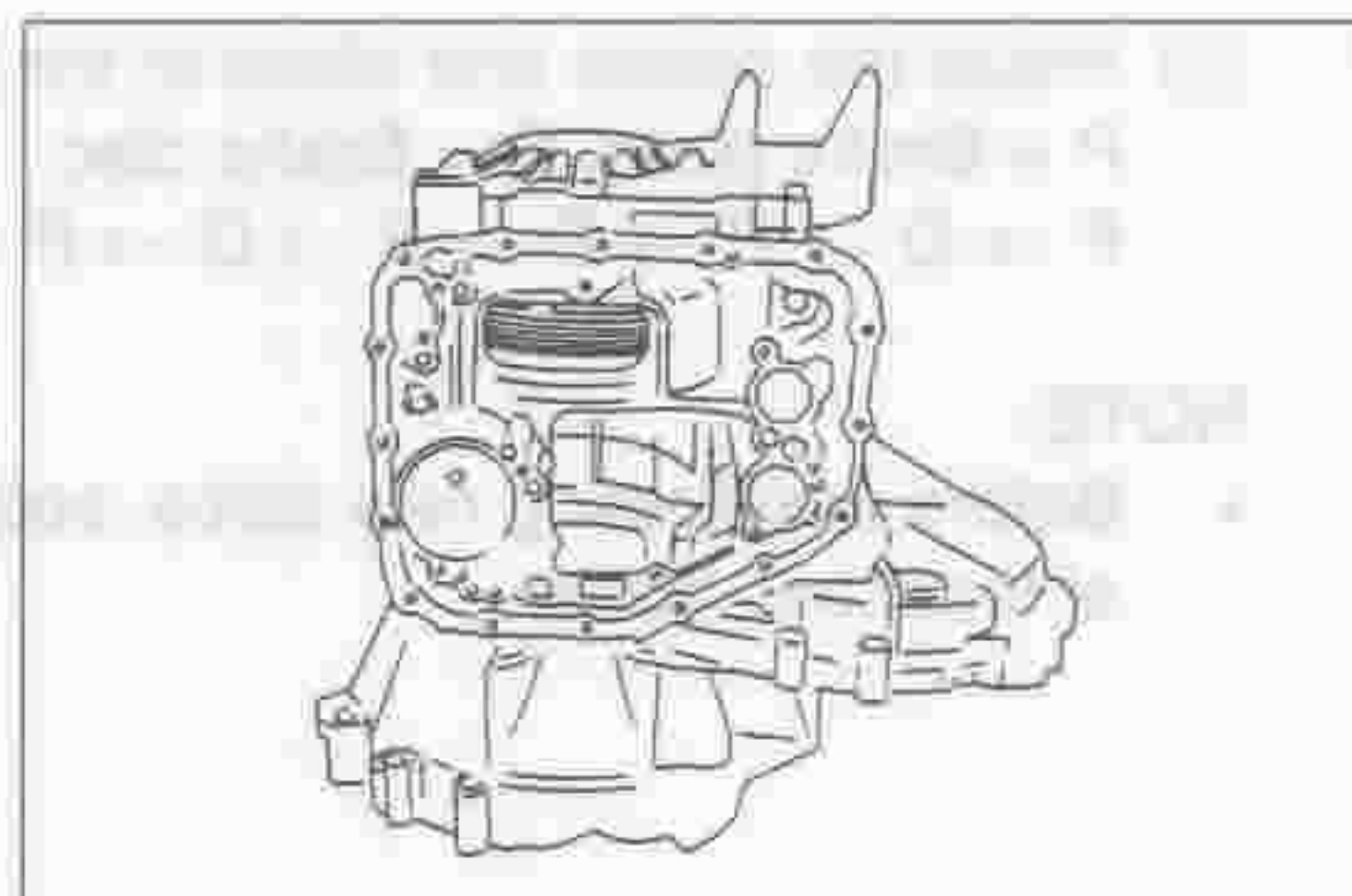
(6) Install the hole snap ring to the grooved section of the transaxle case.



LAT00154-00147

32. Measurement of first & reverse brake end play

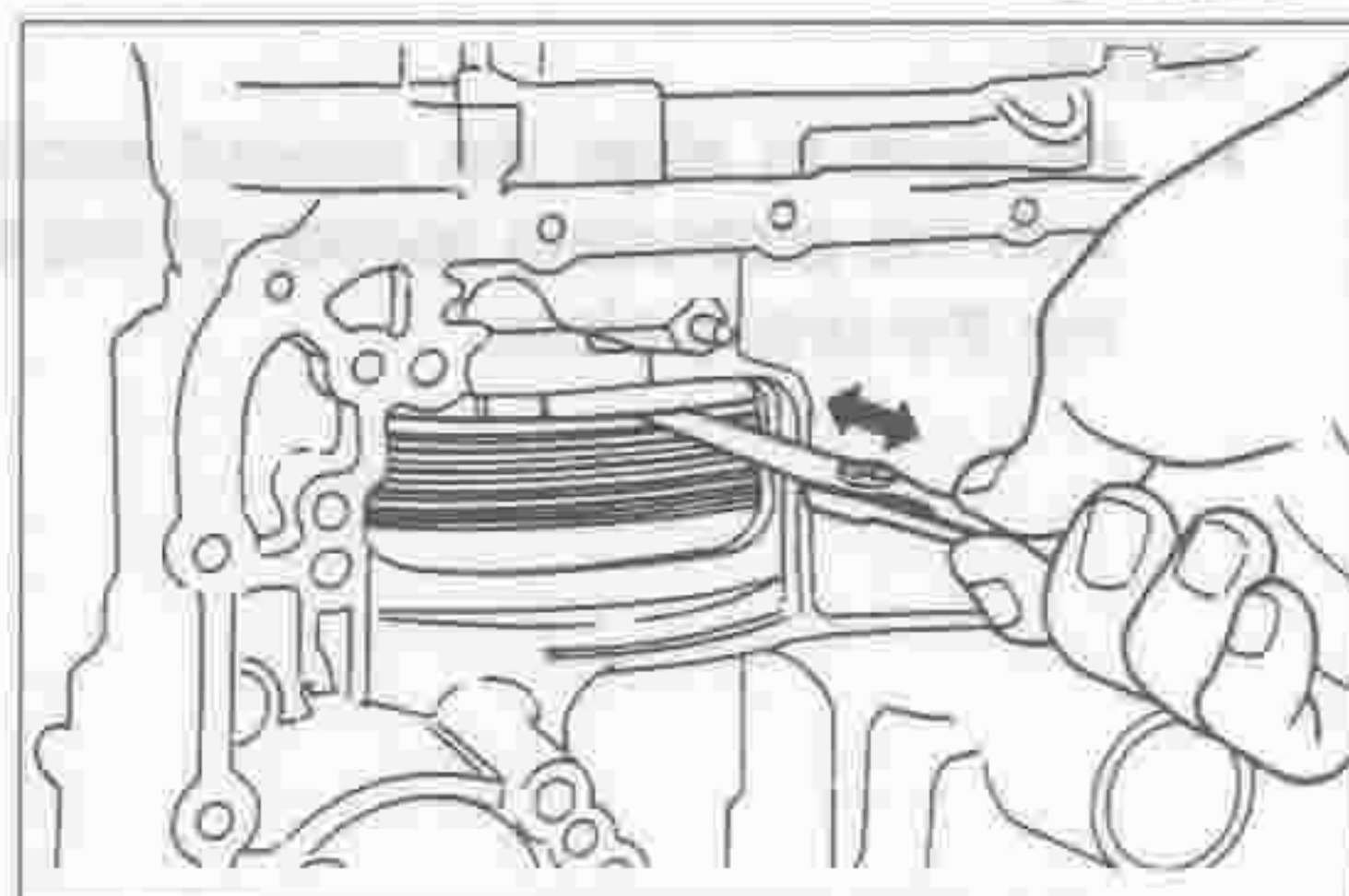
(1) Turn over the transaxle case.



LAT00155-00146

(2) Measure the first & reverse brake end play, using a flat thickness gauge.

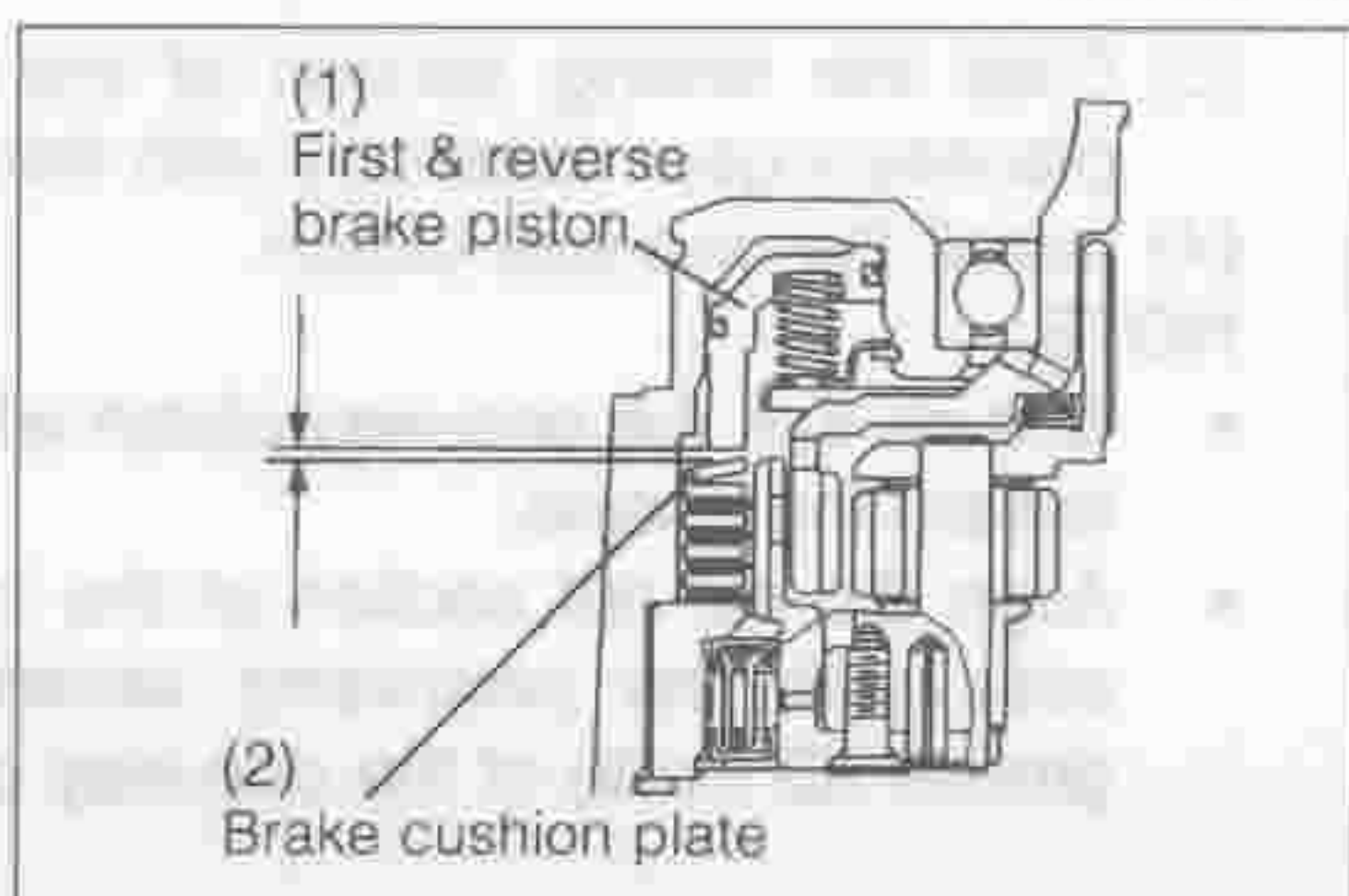
Specified Value: 1.04 - 1.41 mm
(0.040 - 0.055 inch)



LAT00156-00149

NOTE:

- The tightness which you encounter during this insertion/withdrawal of the flat thickness gauge should be virtually the same as the tightness which you would encounter during the thickness adjustment of the valve rocker arm.
- If the measured end play fails to conform to the specified value above, select a snap ring from the right lower table, using the following calculation formula. Then, install it.



LAT00157-00150

Calculation formula

$$A = B - C + D$$

A = Thickness of snap ring to be selected
(Refer to the right table.) Measured value of end play

B = Measured value of end play

C = Specified value of end play

D = Thickness of snap ring that has been already installed

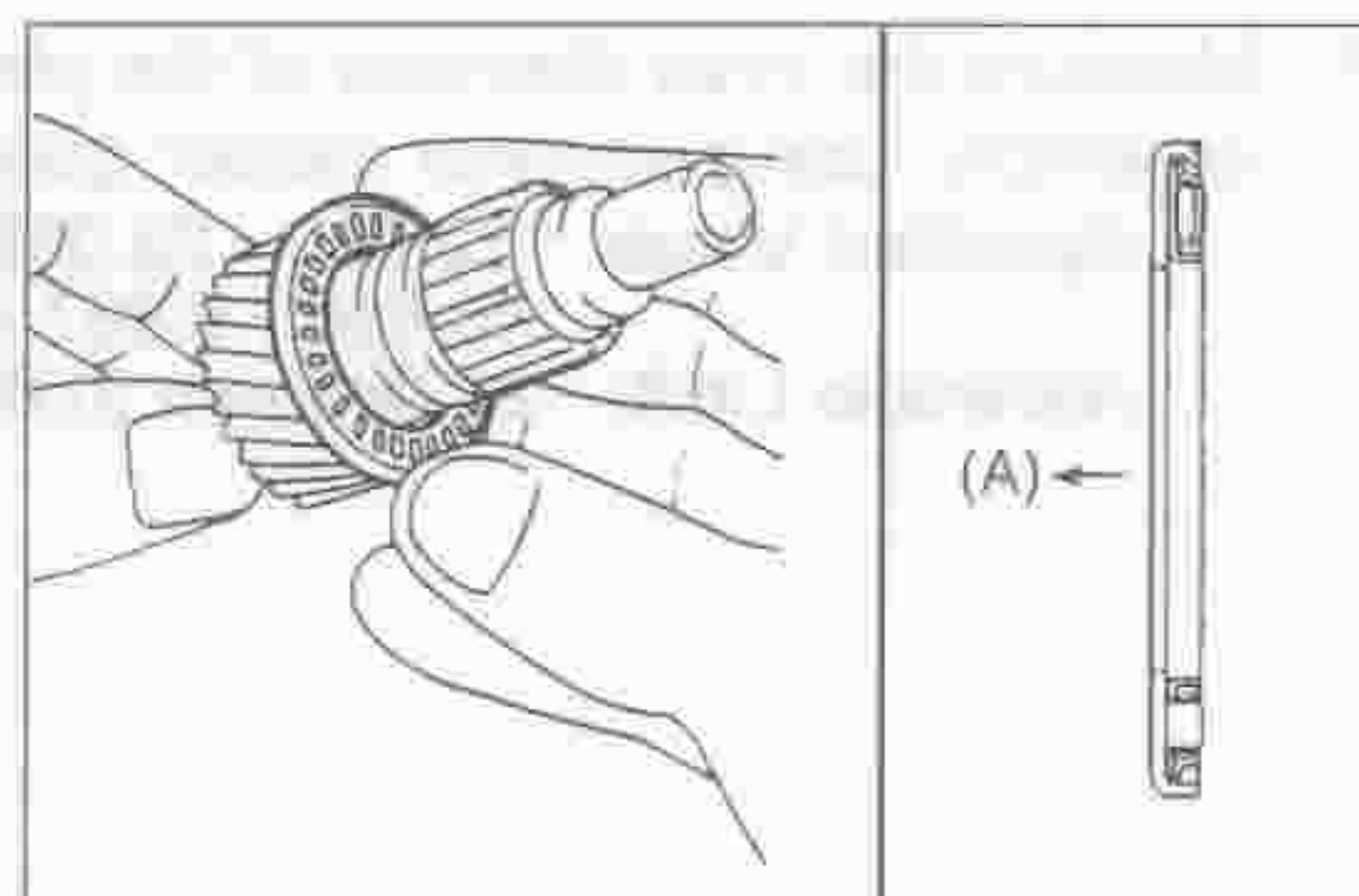
Snap ring thickness Unit: mm (inch)	Part No.
1.97 - 2.03 (0.077 - 0.079)	90045-21119-000
2.22 - 2.28 (0.087 - 0.089)	90045-21120-000
2.48 - 2.53 (0.097 - 0.099)	90045-21121-000
2.72 - 2.78 (0.107 - 0.109)	90045-21123-000

LAT00158-00000

33. Coat the thrust needle bearing with ATF.
34. Install the thrust needle bearing to the 2nd sun gear.

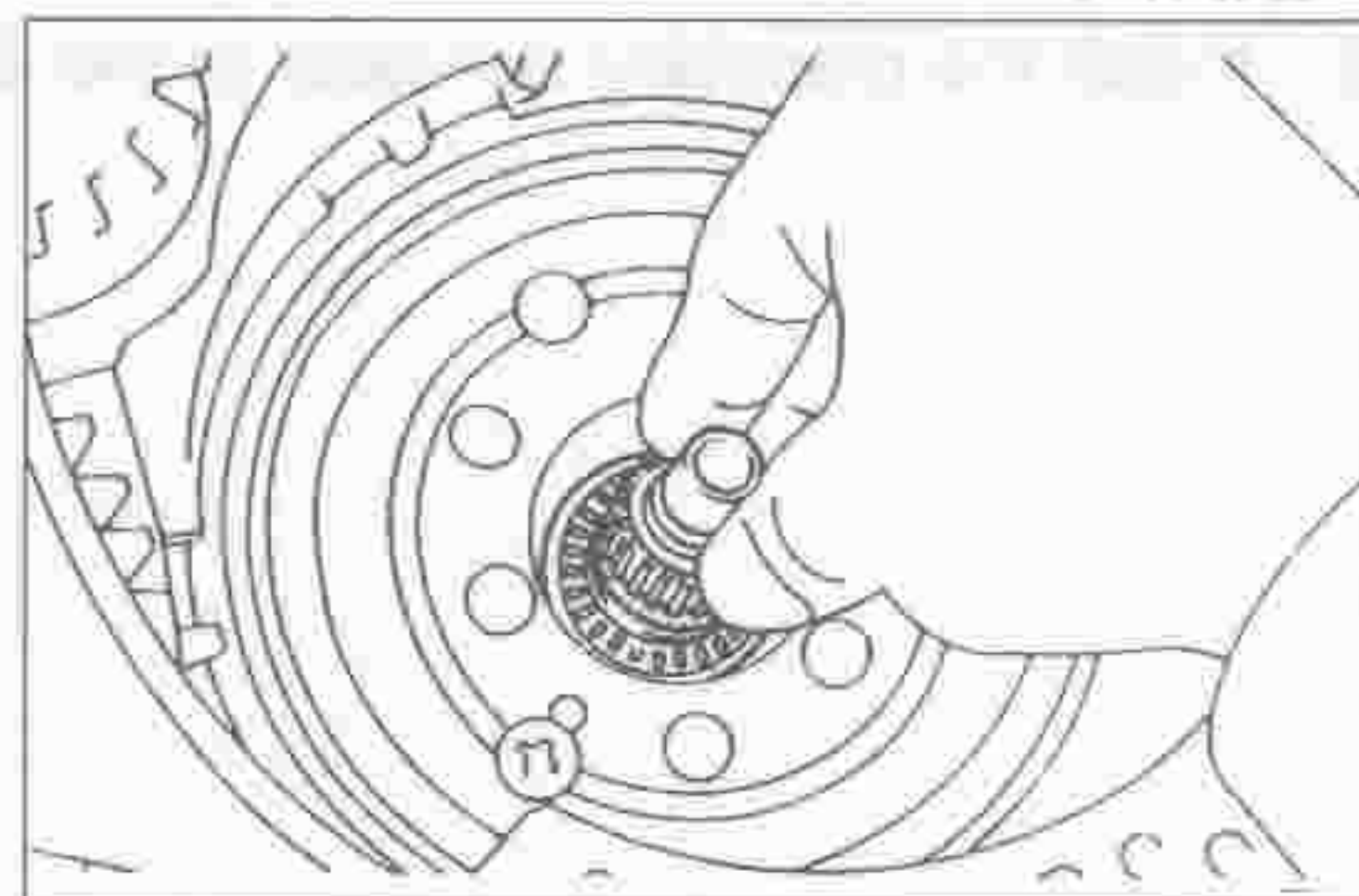
NOTE:

- Ensure that the (A) section of the thrust needle bearing faces toward the gear side.
- Reference Value:
 - Outer Diameter: 35.7 mm (1.40 inch)
 - Inner Diameter: 22.7 mm (0.89 inch)
 - Thickness: 2.8 mm (0.11 inch)



LAT00159-00151

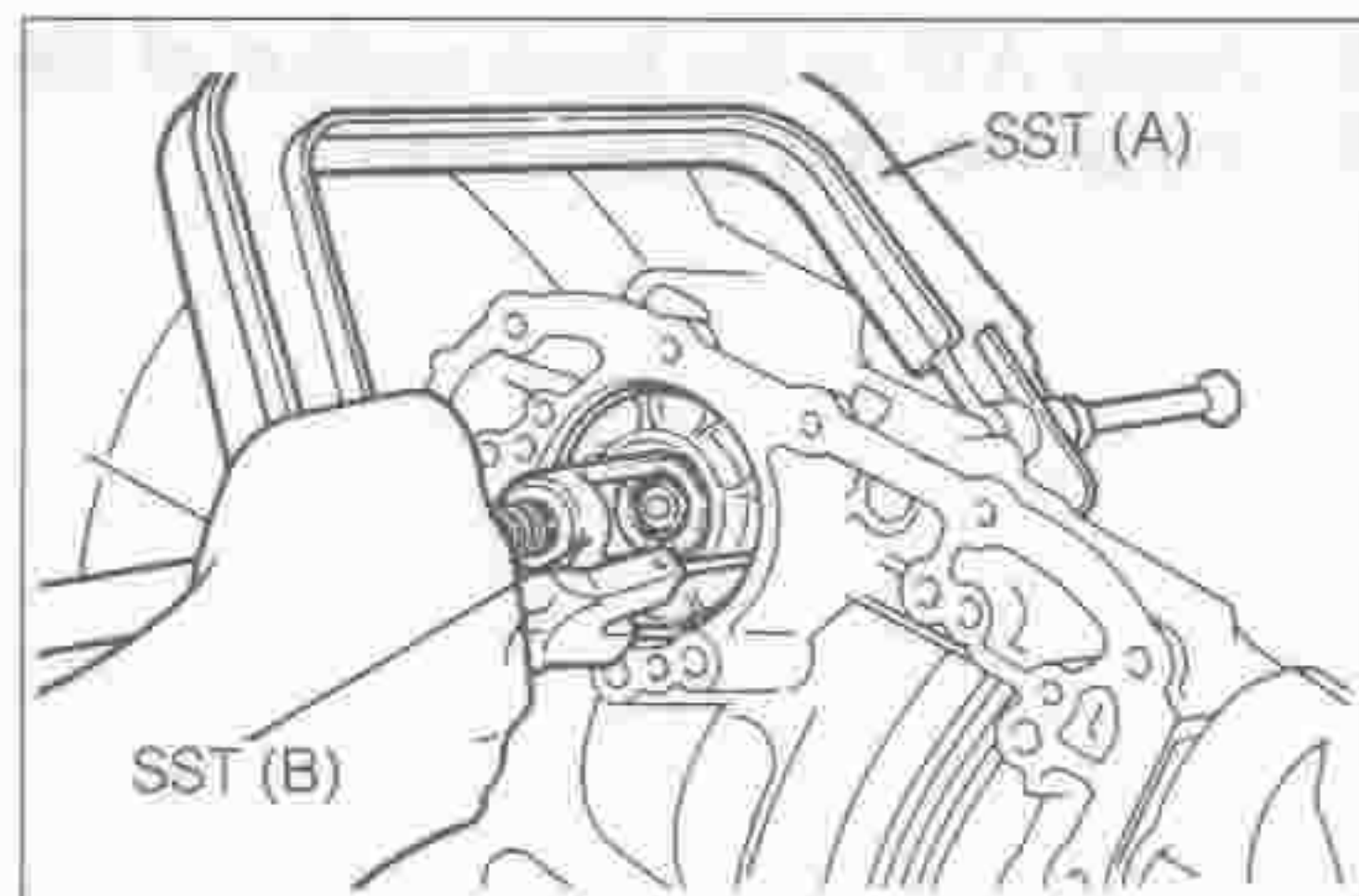
35. Apply ATF to the bush section of the planetary gear.
36. Install the intermediate shaft to the planetary gear assembly.



LAT00160-00152

37. Install the compression spring to the second brake piston assembly.
38. Install the 2nd brake piston assembly to the transaxle case together with the compression spring.
39. While compressing the 2nd brake piston with the following SSTs, install the hole snap ring, using snap ring pliers.

SST: 09202-87002-000 ... (A)
09202-87202-0A0 ... (B)

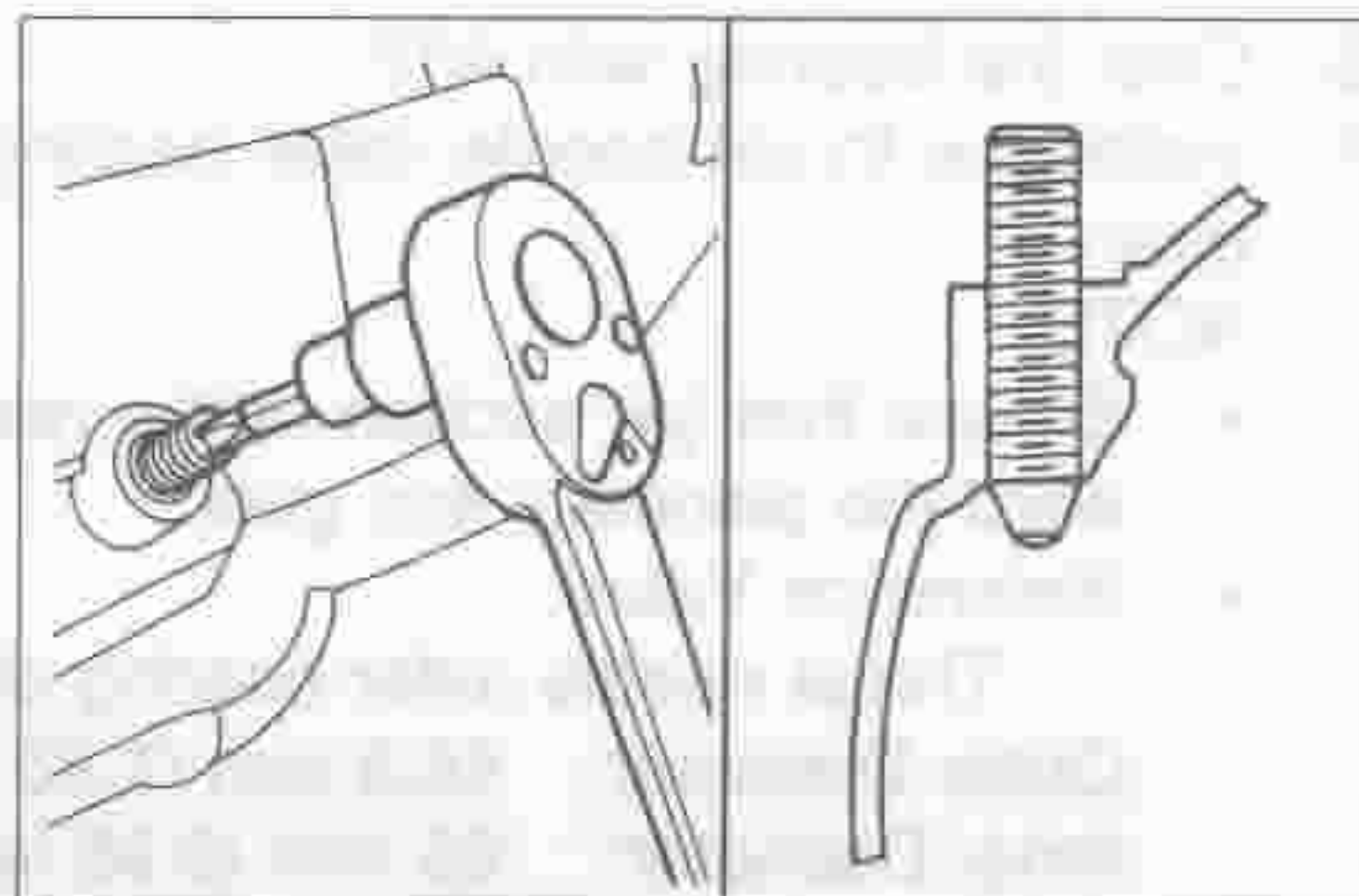


LAT00161-00153

40. Install a new brake band adjusting anchor bolt to the transaxle.

NOTE:

- Be sure to tighten the anchor bolt, until the head section of the anchor bolt appears at the inside of the transaxle case, as indicated in the right figure.



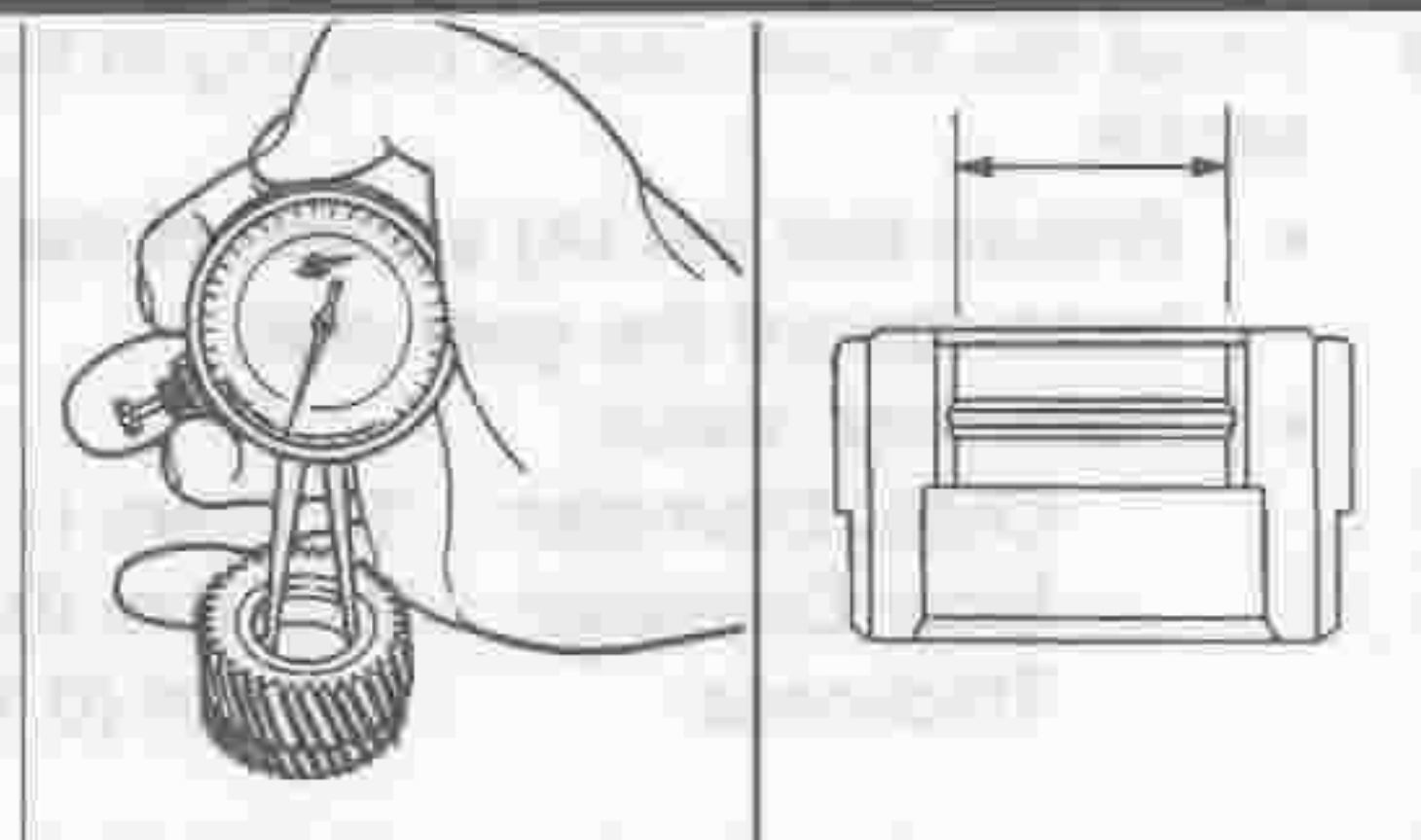
LAT00162-00154

AT-62

assembly, using an inner caliper gauge.

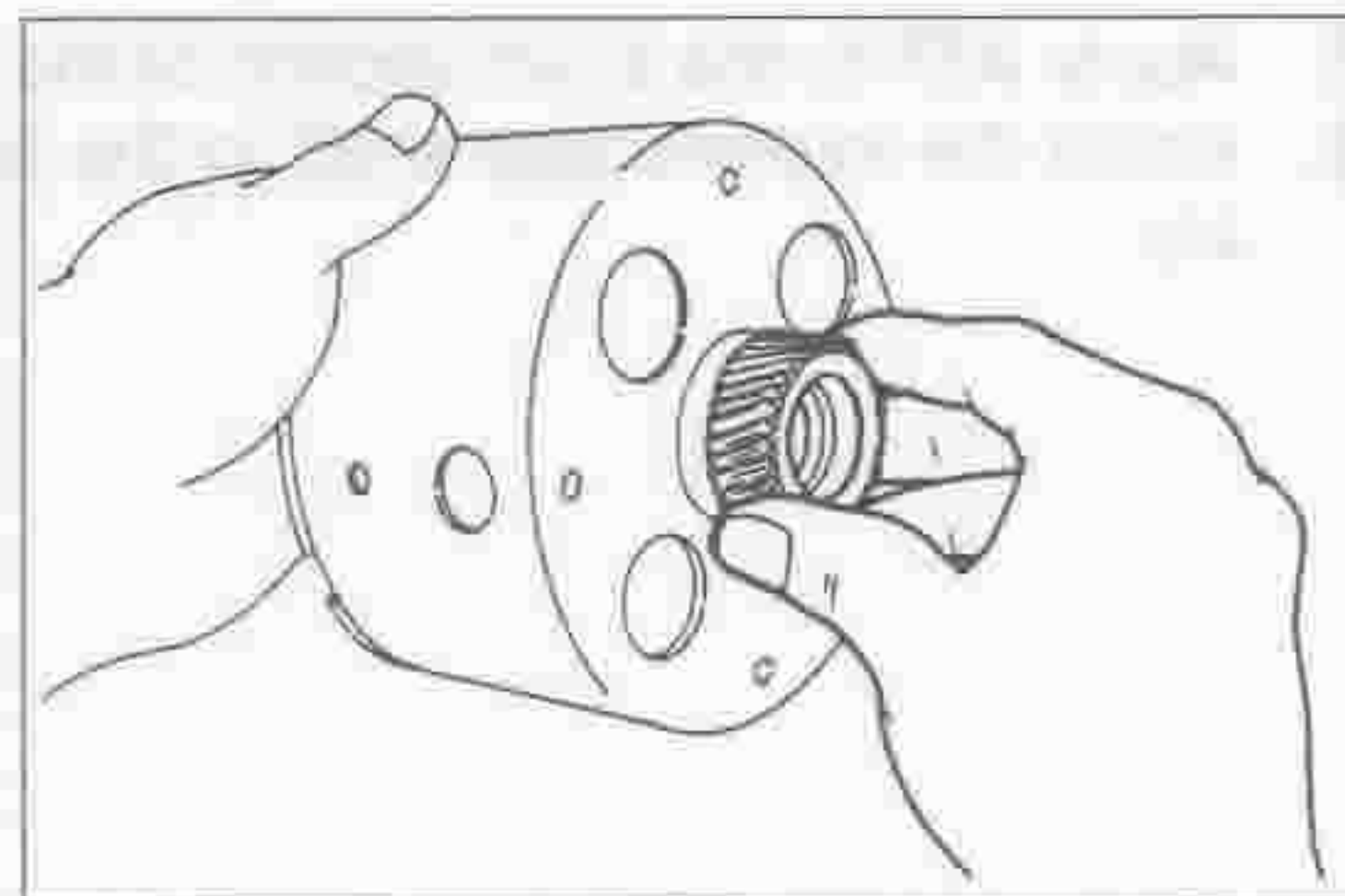
Specified Value: 22.020 - 22.038 mm
(0.866 - 0.867 inch)

Allowable Limit: 22.088 mm (0.869 inch)



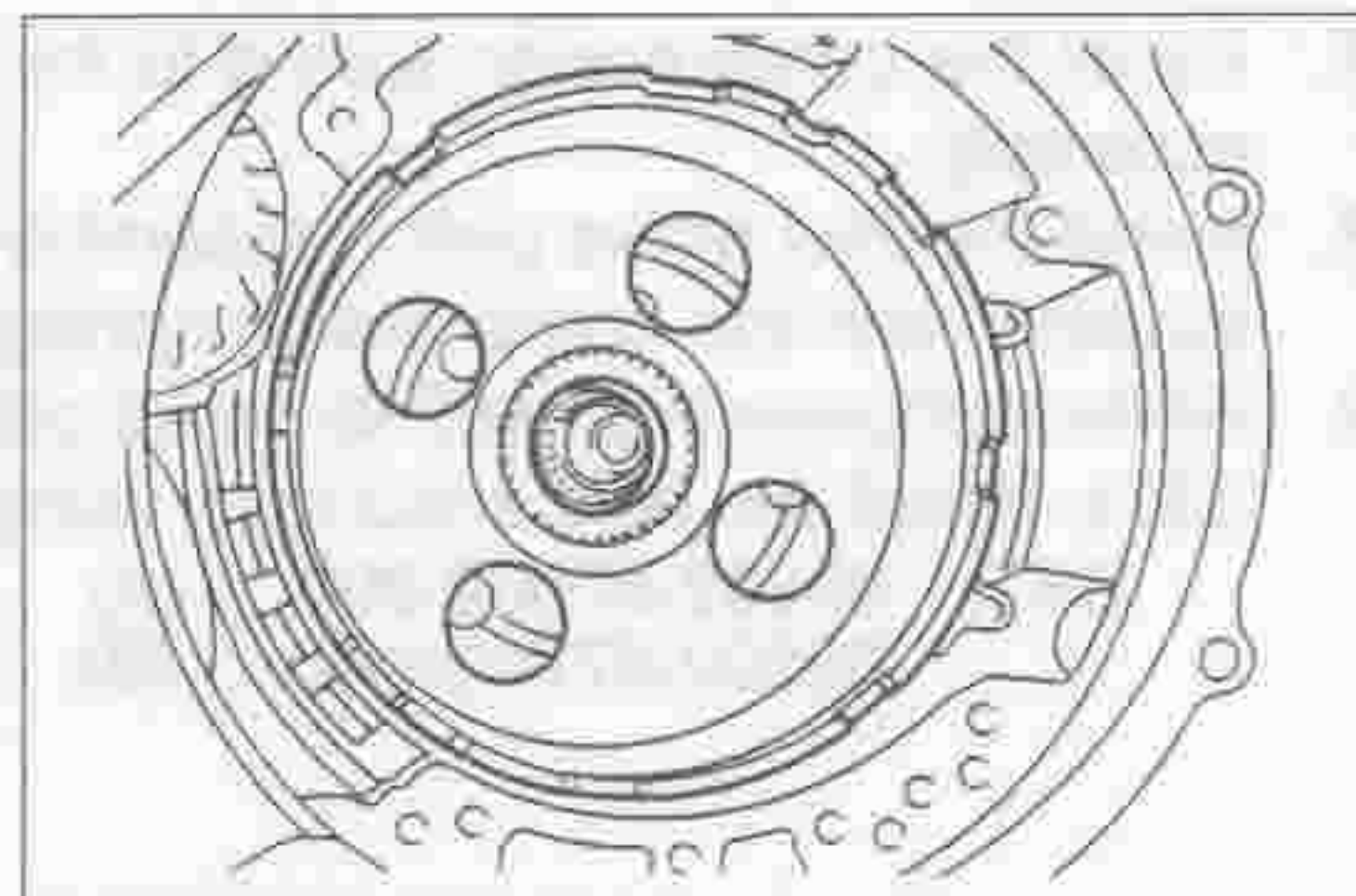
LAT00164-00156

43. Install the planetary sun gear to the 2nd brake drum.



LAT00165-00157

44. Apply ATF to the bush section of the planetary sun gear.
45. Install the 2nd brake drum.



LAT00166-00158

46. Coat the bearing with ATF.
47. Install the thrust needle roller bearing to the planetary sun gear.

NOTE:

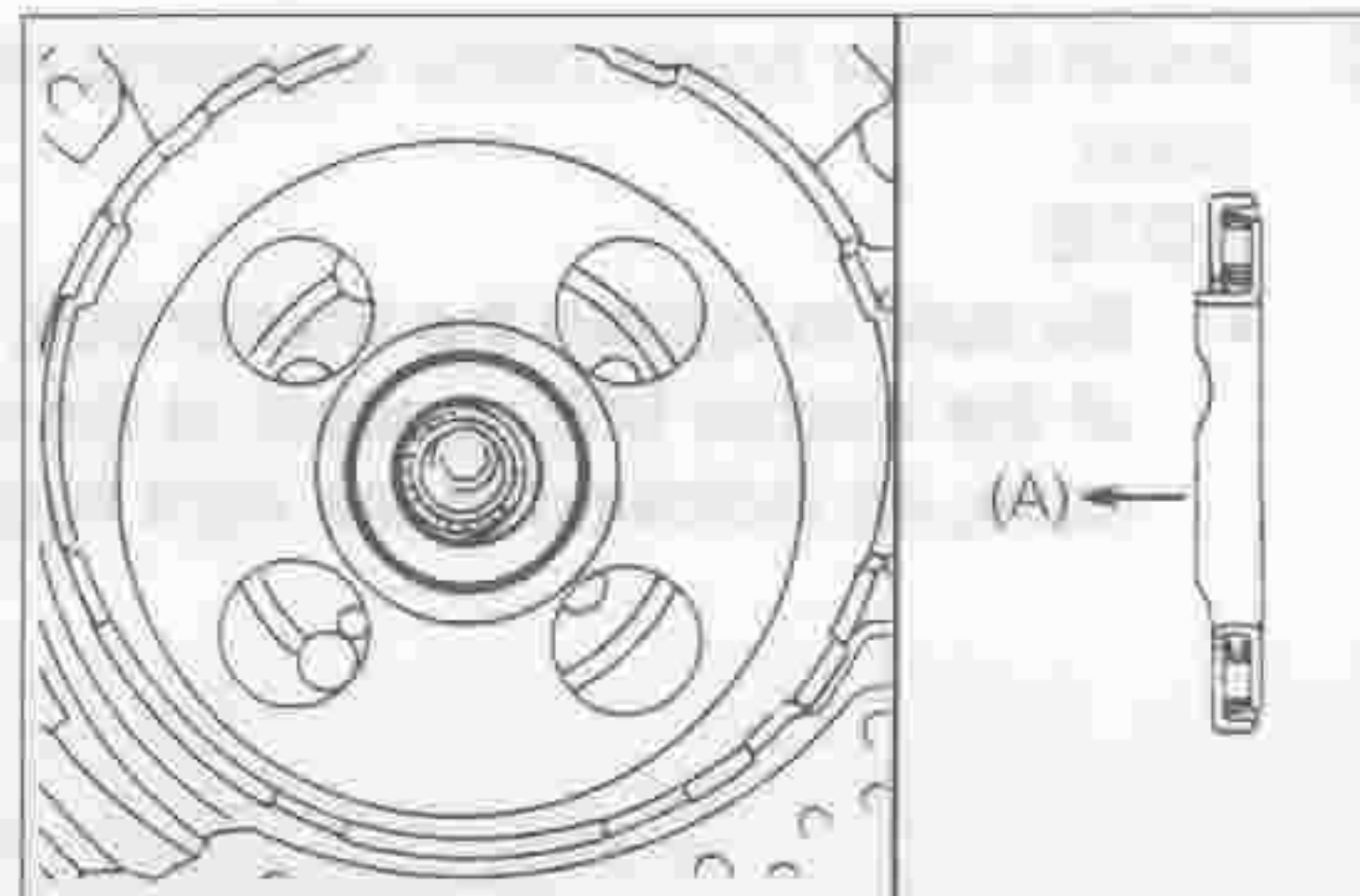
- Ensure that (A) section of the needle roller bearing toward the planetary sun gear.
- Reference Value:

Thrust needle roller bearing dimension

Outer Diameter: 46.5 mm (1.83 inch)

Inner Diameter: 25 mm (0.98 inch)

Thickness: 5 mm (0.20 inch)

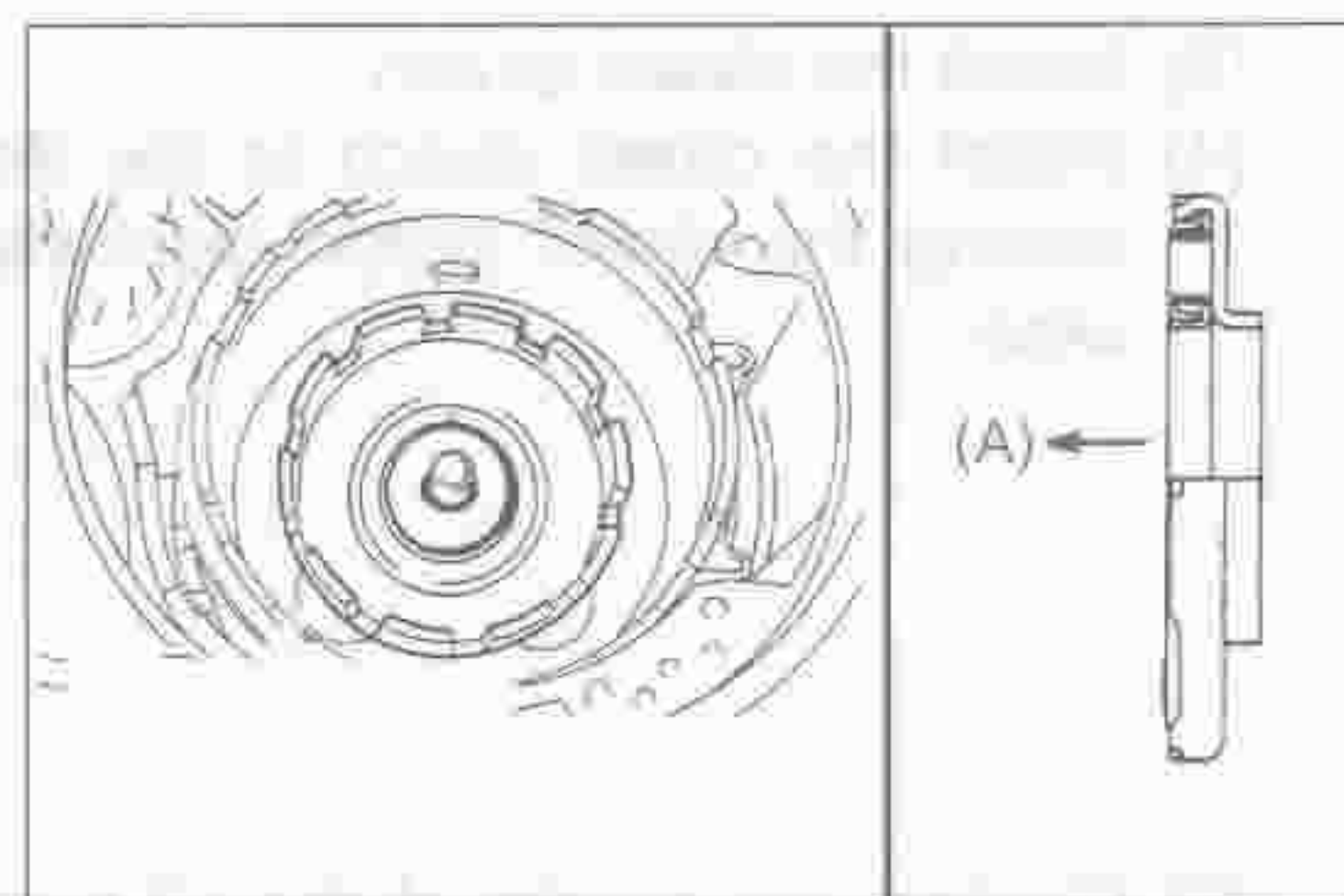


LAT00167-00159

48. Install the forward clutch hub to the intermediate shaft.
49. Install the thrust bearing race and thrust needle roller bearing to the forward clutch hub.

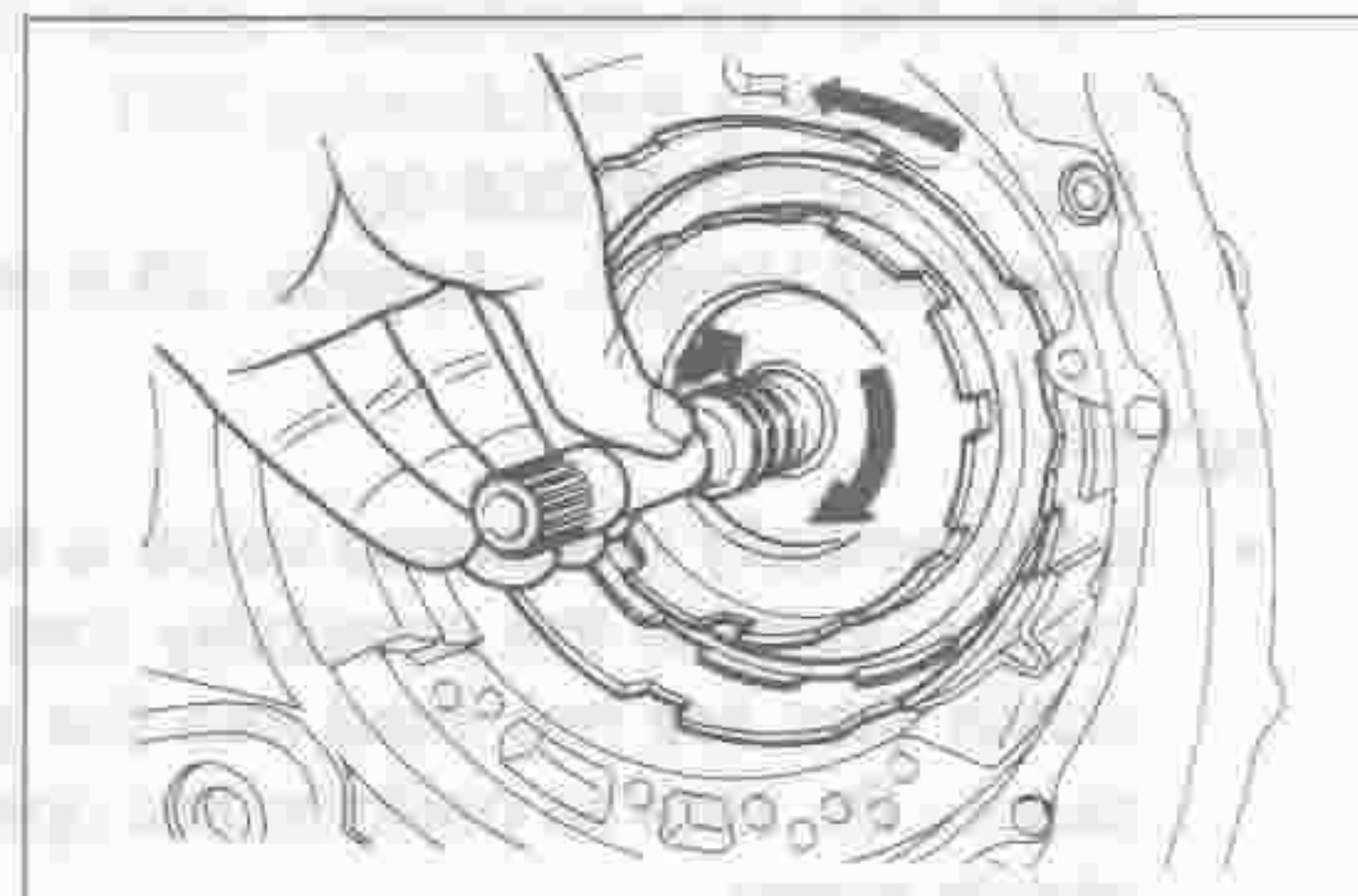
NOTE:

- Ensure that the (A) section of the thrust bearing race faces toward the forward clutch hub side.
- Reference Value:
 Thrust needle roller bearing dimension
 Outer Diameter: 31 mm (1.22 inch)
 Inner Diameter: 16.5 mm (0.65 inch)
 Thickness: 5.3 mm (0.21 inch)



LAT00168-00160

50. Install the forward clutch subassembly.
51. While lightly pushing down the forward clutch, turn it clockwise and counterclockwise. Assemble the forward clutch, making sure that the pawl of the forward clutch disc, the groove of the forward clutch hub are aligned properly with each other.



LAT00169-00161

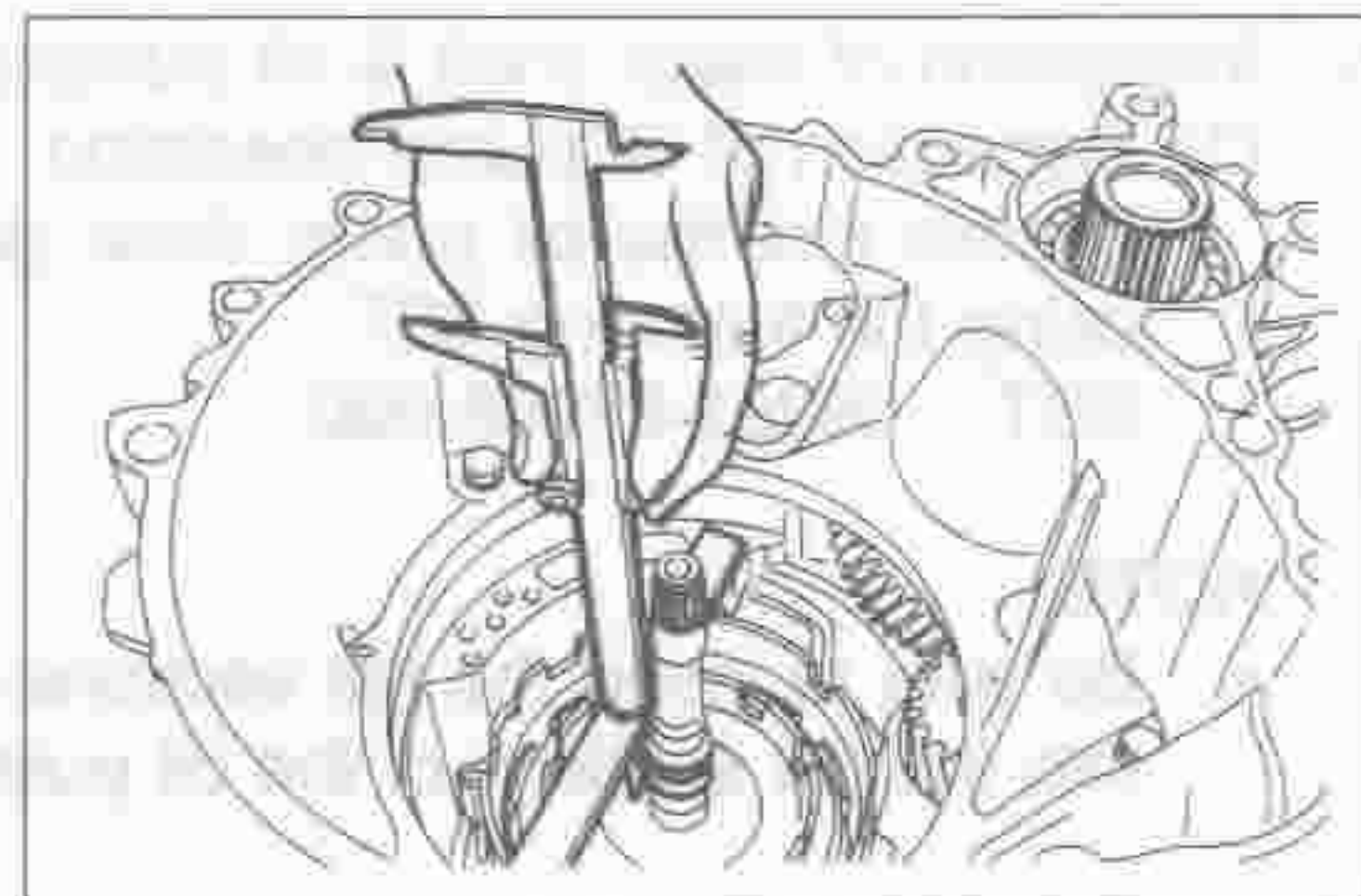
52. Measure the height of the forward clutch between the installation section of the oil pump and the thrust bearing race of the forward clutch, using the following SST.

SST: 09351-87208-000

Specified Value: Approx. 54 mm (2.12 inch)

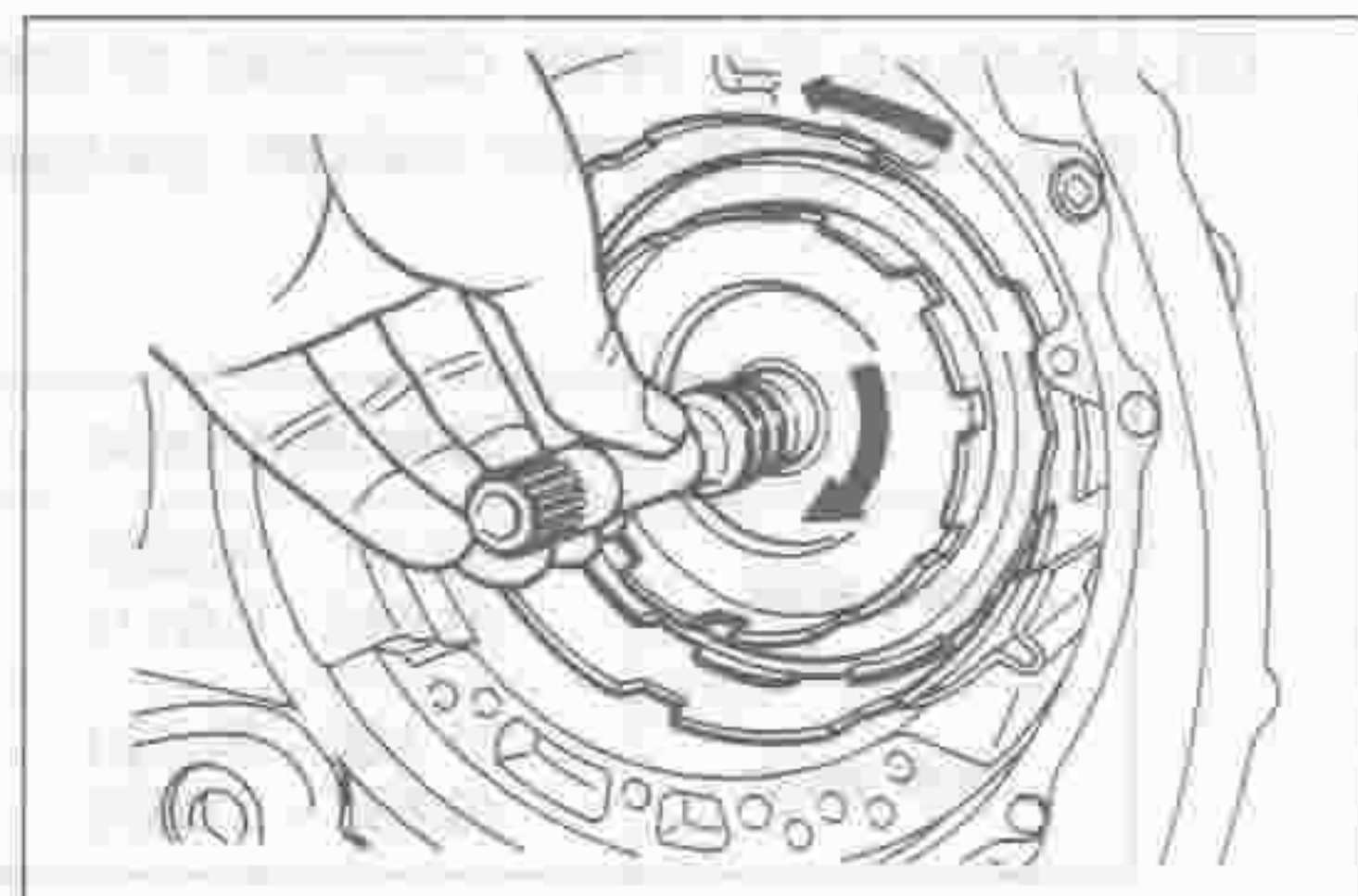
NOTE:

- If the actually measured value is less than the specified value, there is the possibility that the pawl section of the forward clutch disc is not fitted in the groove of the forward clutch hub. Be sure to perform the operation of the step 48 again and recheck the specified dimension.



LAT00170-00162

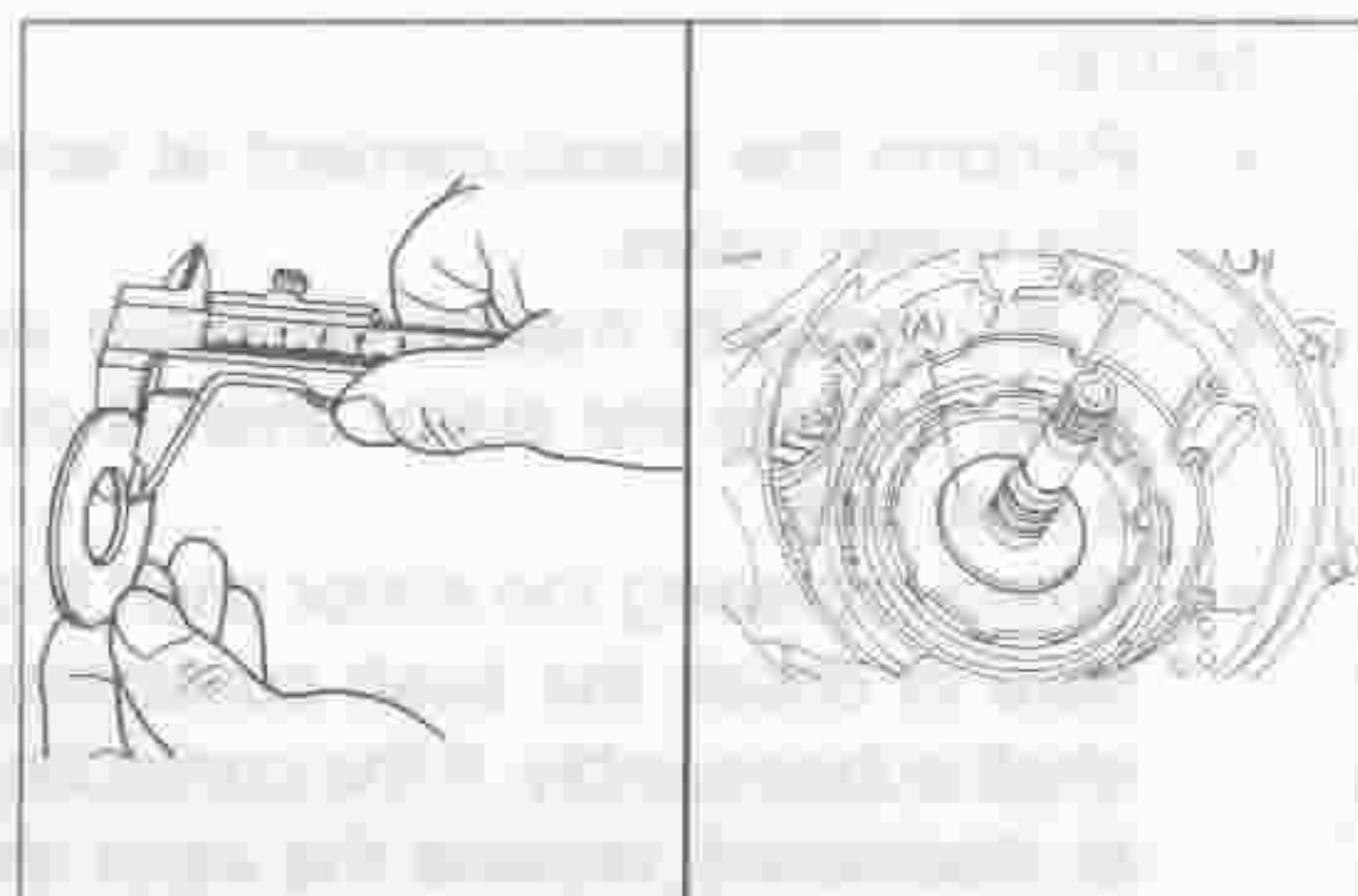
53. Turn the forward clutch clockwise and counterclockwise. At this time, ensure that the forward clutch turns lightly and the 2nd brake drum makes a relative movement with the forward clutch.



LAT00171-00163

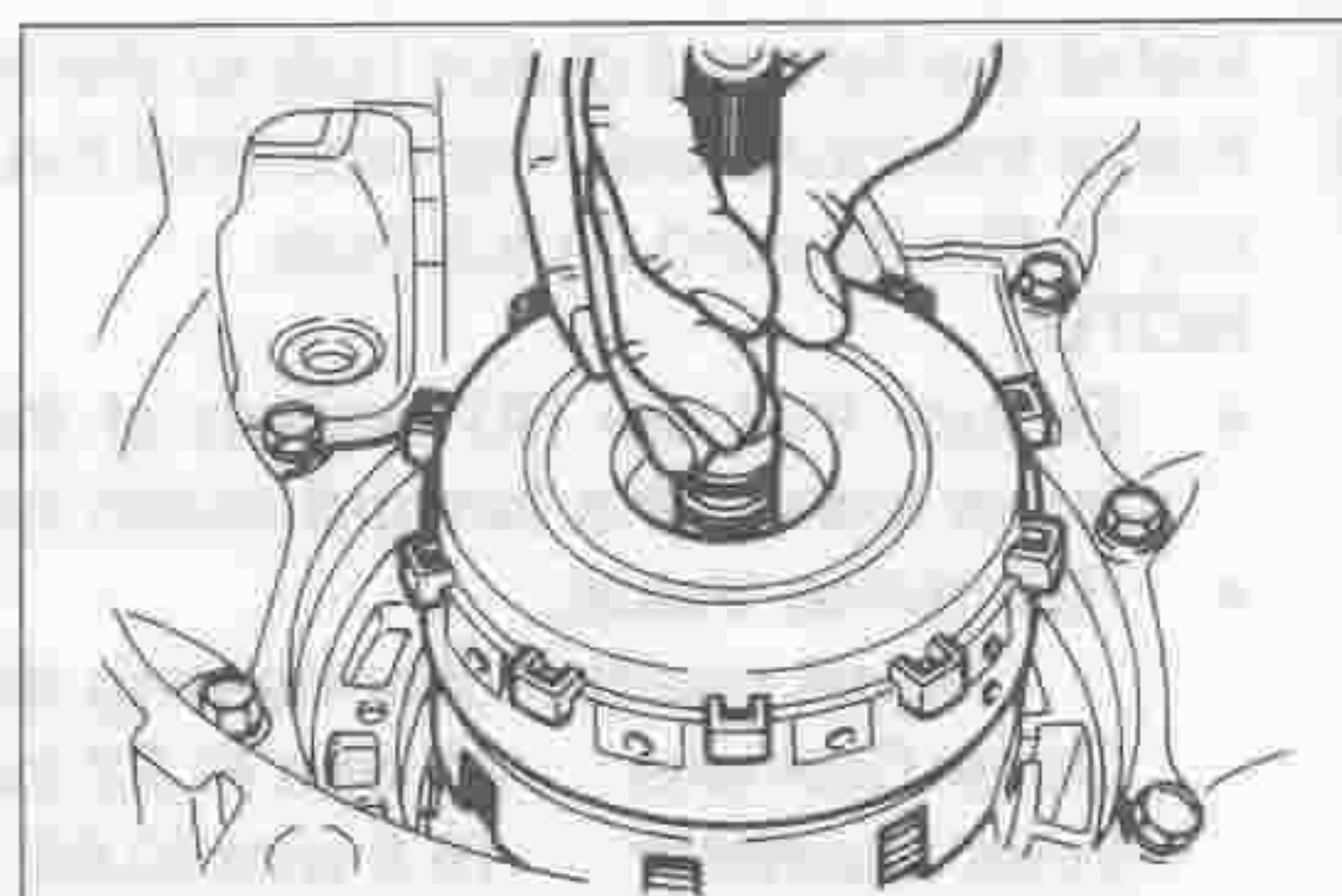
54. Installation of direct clutch

- (1) Measure and record the thickness of the thrust bearing race.
- (2) Install the thrust bearing race (A).



LAT00172-00164

- (3) Install the direct clutch.
- (4) Install the direct clutch to the 2nd brake drum while turning the direct clutch clockwise and counterclockwise.

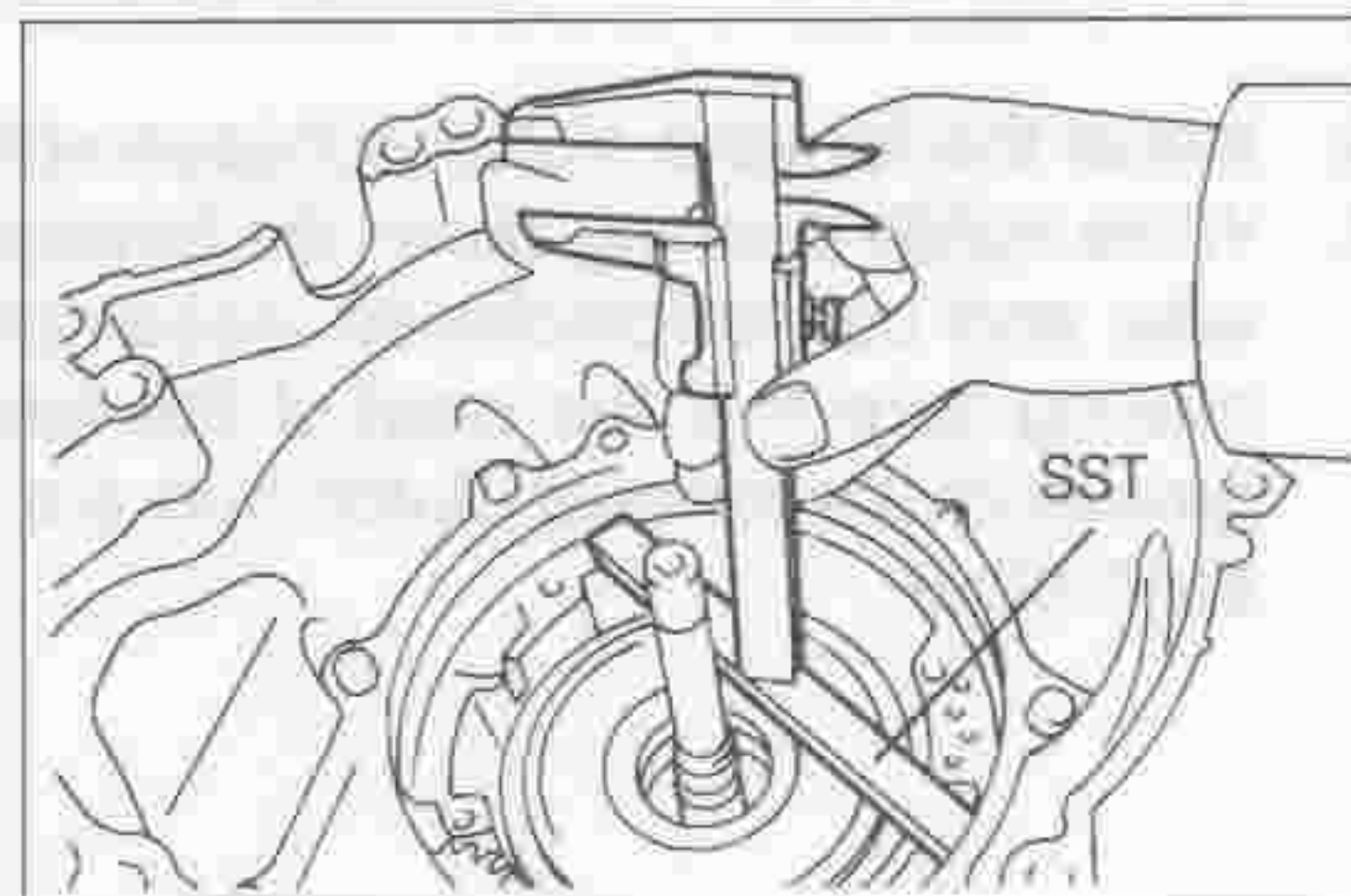


LAT00173-00165

- (5) Confirm the height of the oil pump attaching surface from the non-machined upper surface of the direct clutch, using the following SST.

SST: 09351-87208-000

Specified Height: Approx. 23.5 mm (0.92 inch)



LAT00174-00166

NOTE:

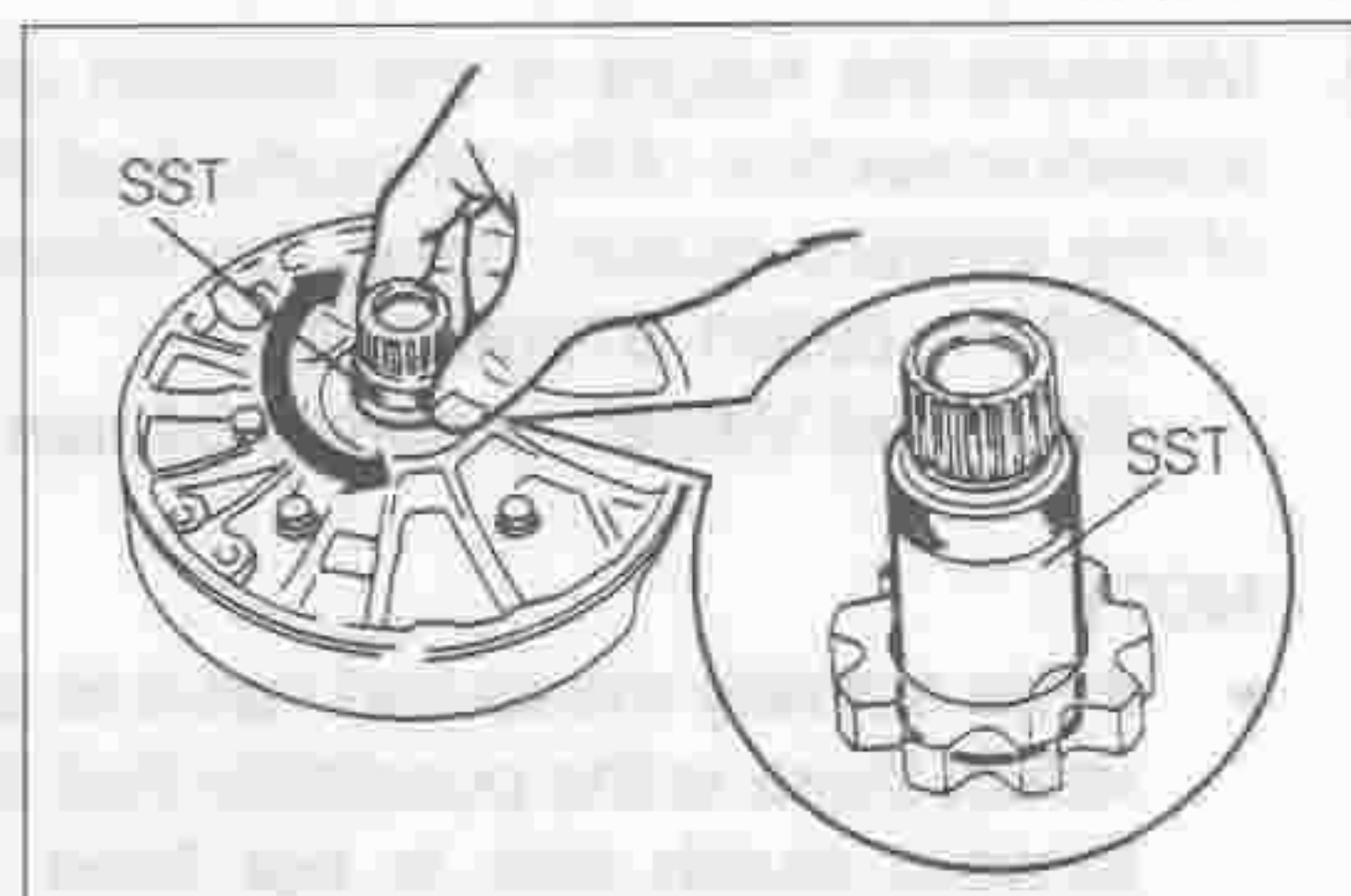
- If the actually measured value is less than the specified height, there is the possibility that the two pawls of the clutch disc are not fitted into the groove of the forward clutch. Be sure to perform the operation of the step (4) above again.

55. Inspection of stator shaft & oil pump assembly

- (1) Inspection of oil pump operation

Ensure that the oil pump drive gear rotates smoothly, using the following SST.

SST: 09351-87206-000



LAT00175-00167

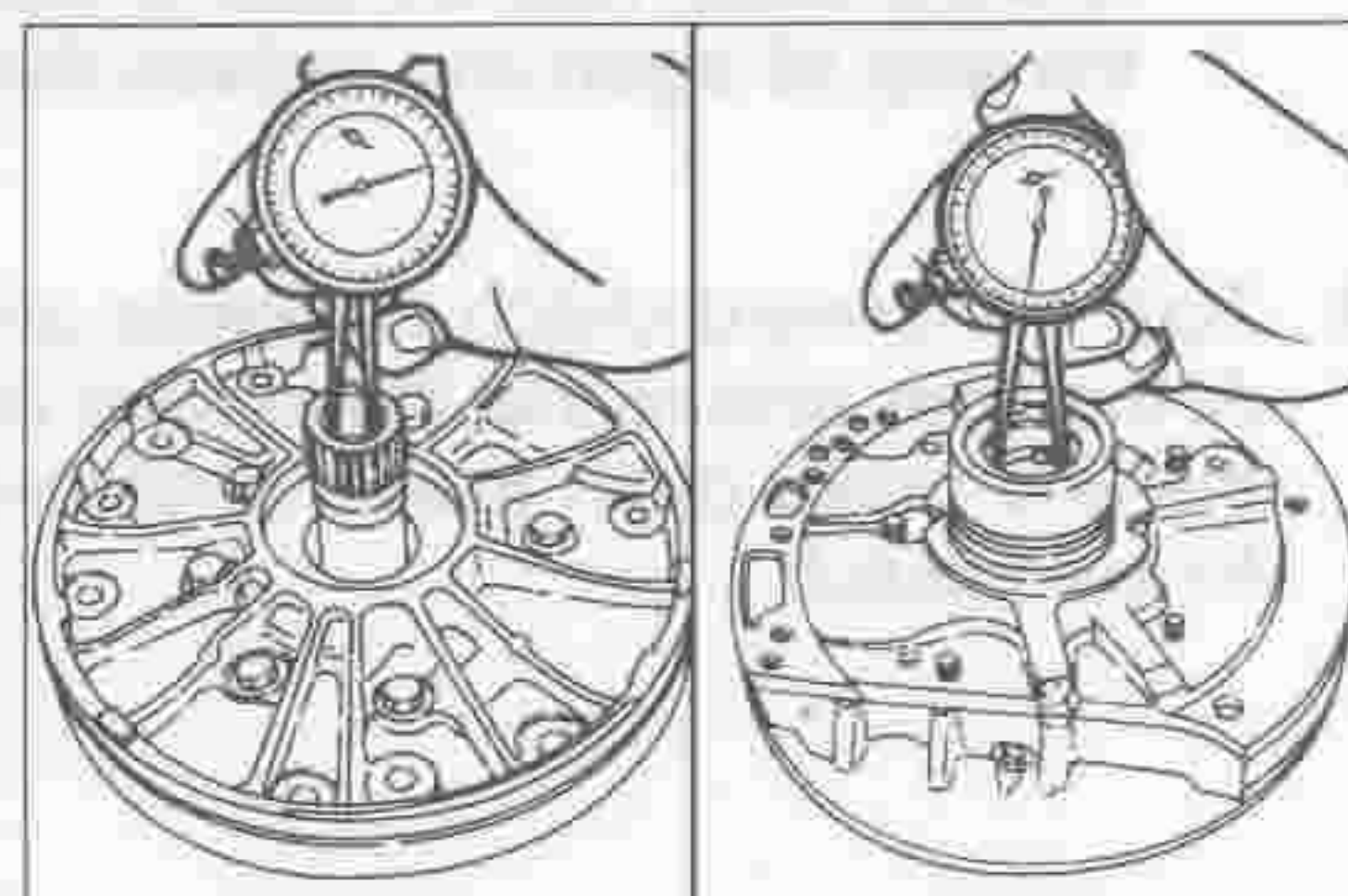
NOTE:

- Be sure to insert the flat sections (2 points) of the SST into the flat sections of the oil pump drive gear.

- (2) Measure the inner diameter of the oil pump bush section, using an inner caliper gauge.

Unit: mm (Inch)

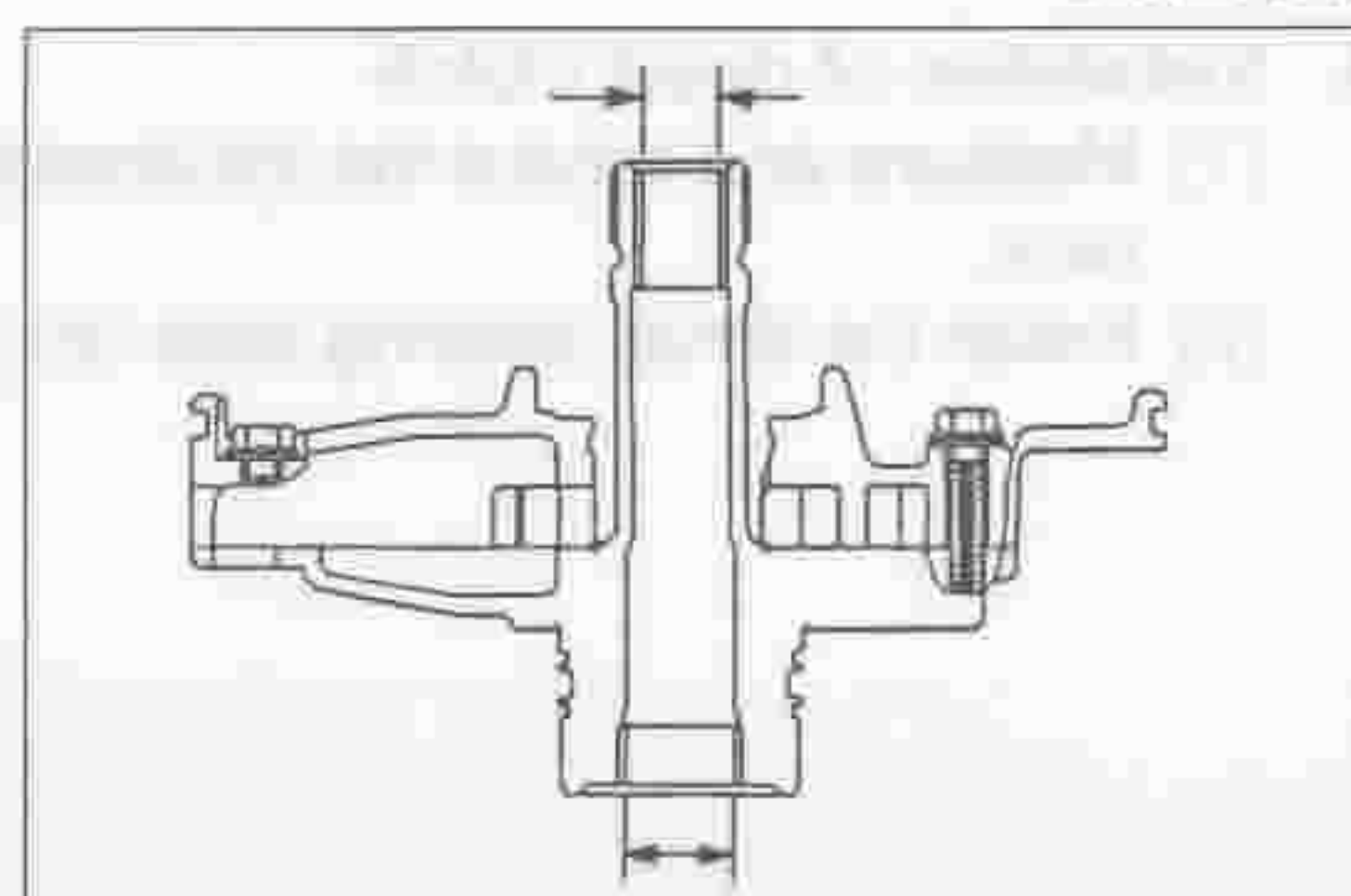
	Specified value	Allowable limit
Front side	15.50 - 15.522 (0.610 - 0.611)	15.572 (0.613)
Rear side	21.100 - 21.121 (0.831 - 0.832)	21.171 (0.834)



LAT00176-00168

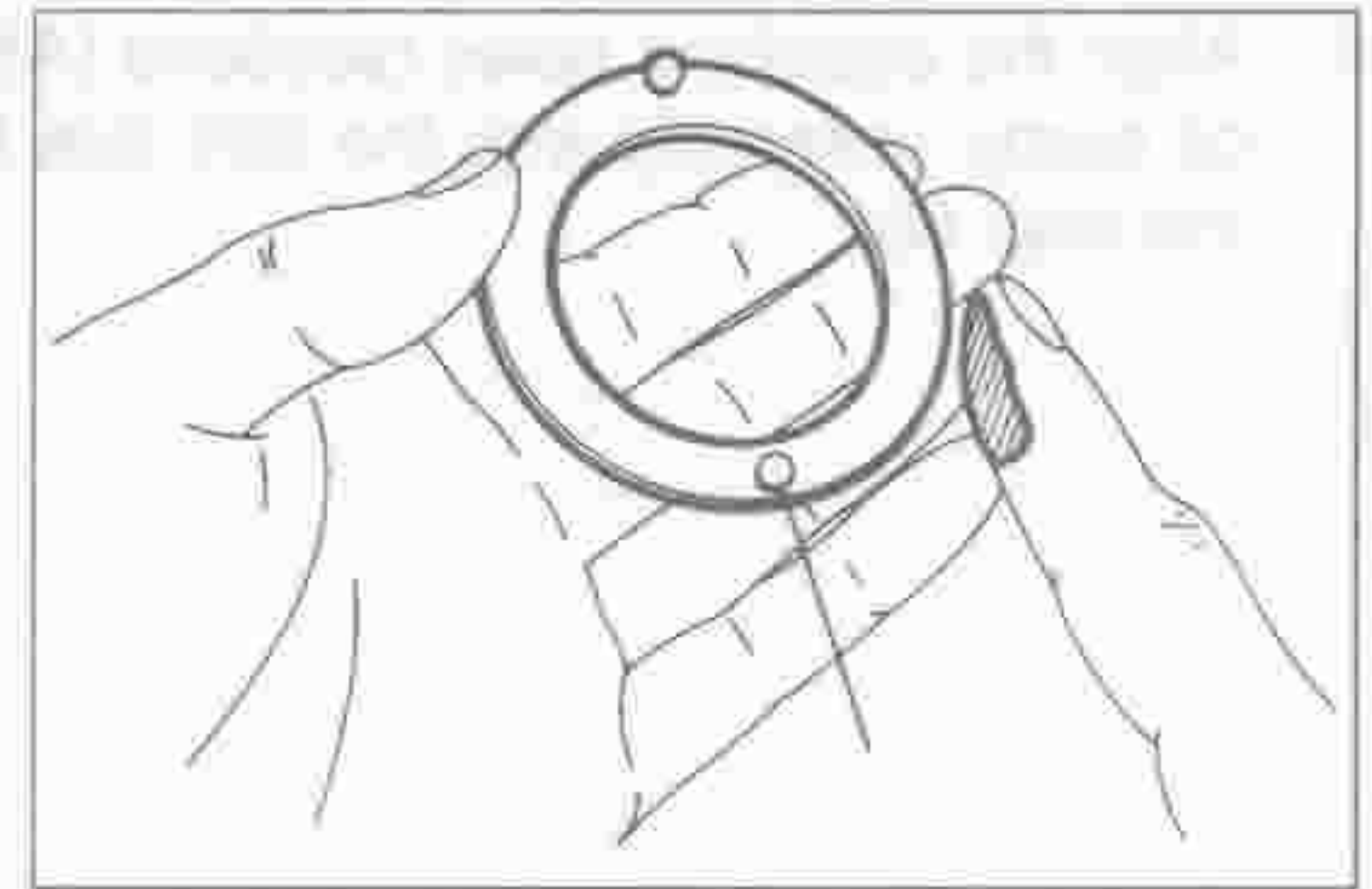
NOTE:

- Perform the measurement at several points. Calculate the mean value.
- If the actually measured value exceeds the allowable limit, replace the stator shaft & oil pump assembly with a new one.
- When replacing the stator shaft & oil pump assembly, be sure to check the bush contacting surface of the input shaft subassembly. If the contacting surface is scratched or discolored, replace the input shaft subassembly with a new one, too, at the same time.



LAT00177-00169

56. Apply a small amount of vaseline to the protruding sections (2 points) of the clutch drum thrust washer.

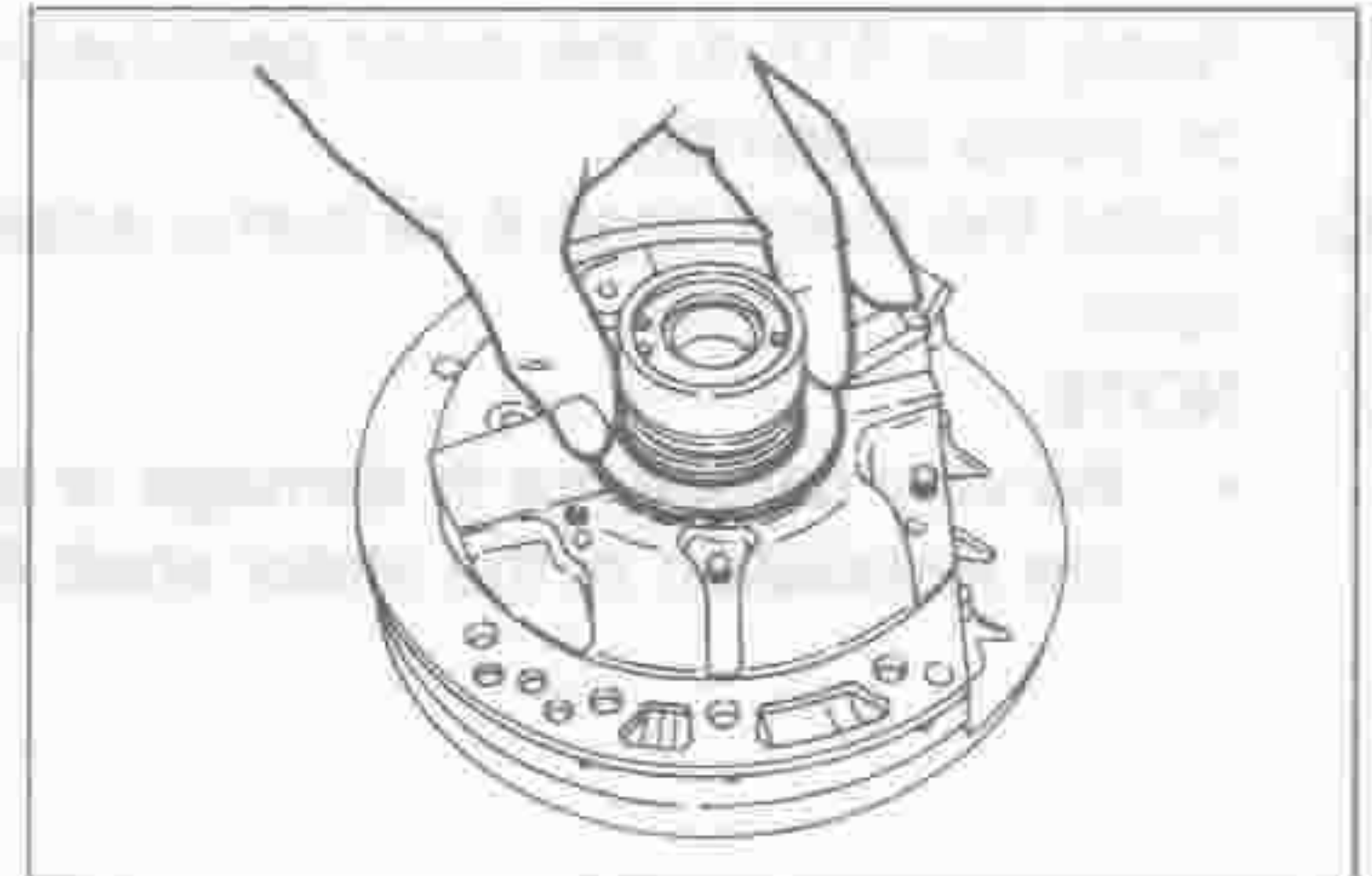


LAT00176-00170

57. Install the clutch drum thrust washer by aligning its protruding section with the recessed section of the oil pump assembly.

NOTE:

- Be sure to apply vaseline in a small amount enough to prevent the clutch drum thrust washer from dropping.

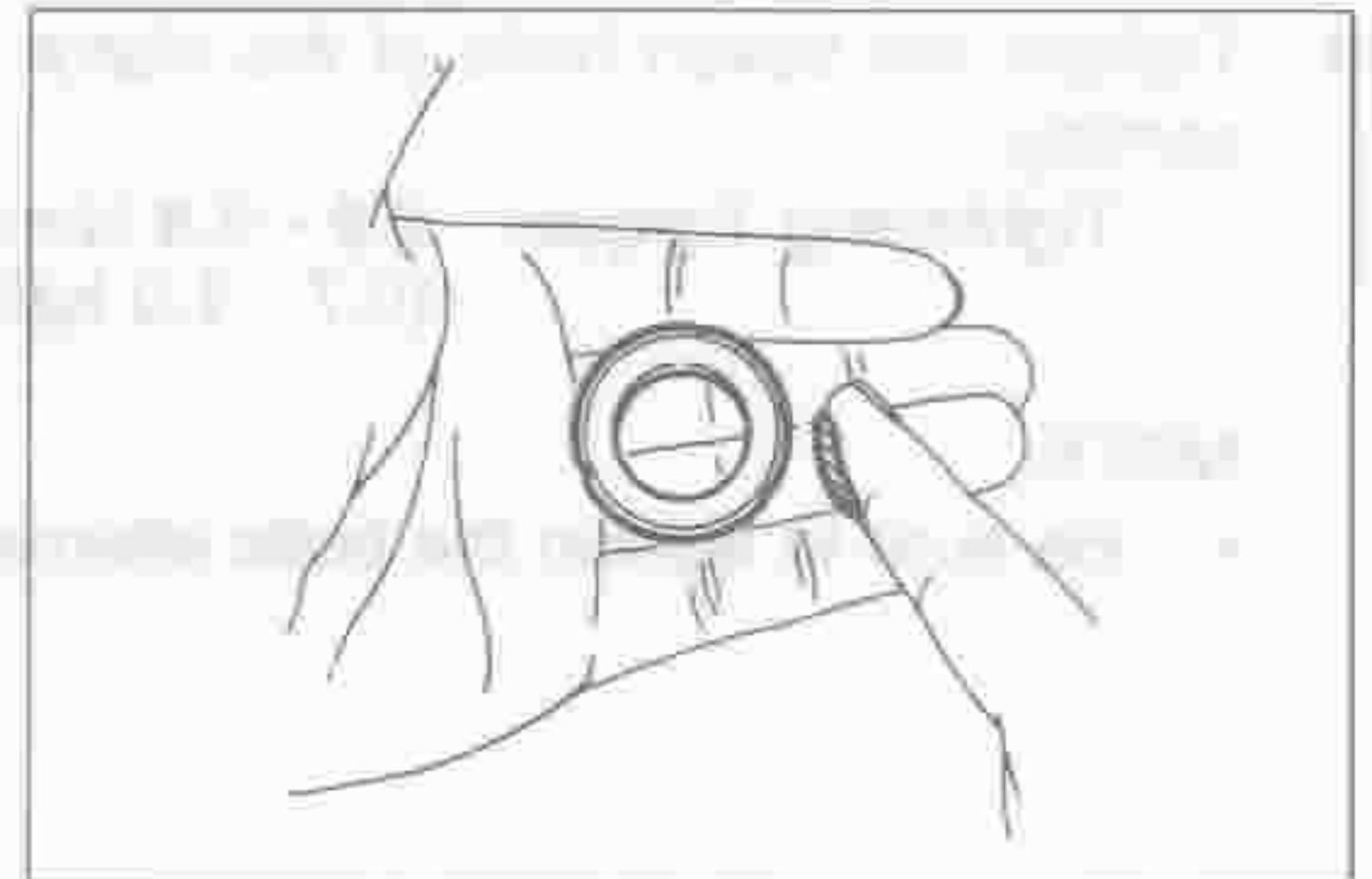


LAT00179-00171

58. Apply a small amount of vaseline to the race side of the thrust needle roller bearing.

NOTE:

- Be sure to apply vaseline in a small amount enough to prevent the thrust needle roller bearing from dropping.



LAT00180-00172

59. Install the thrust needle roller bearing to the oil pump assembly.

NOTE:

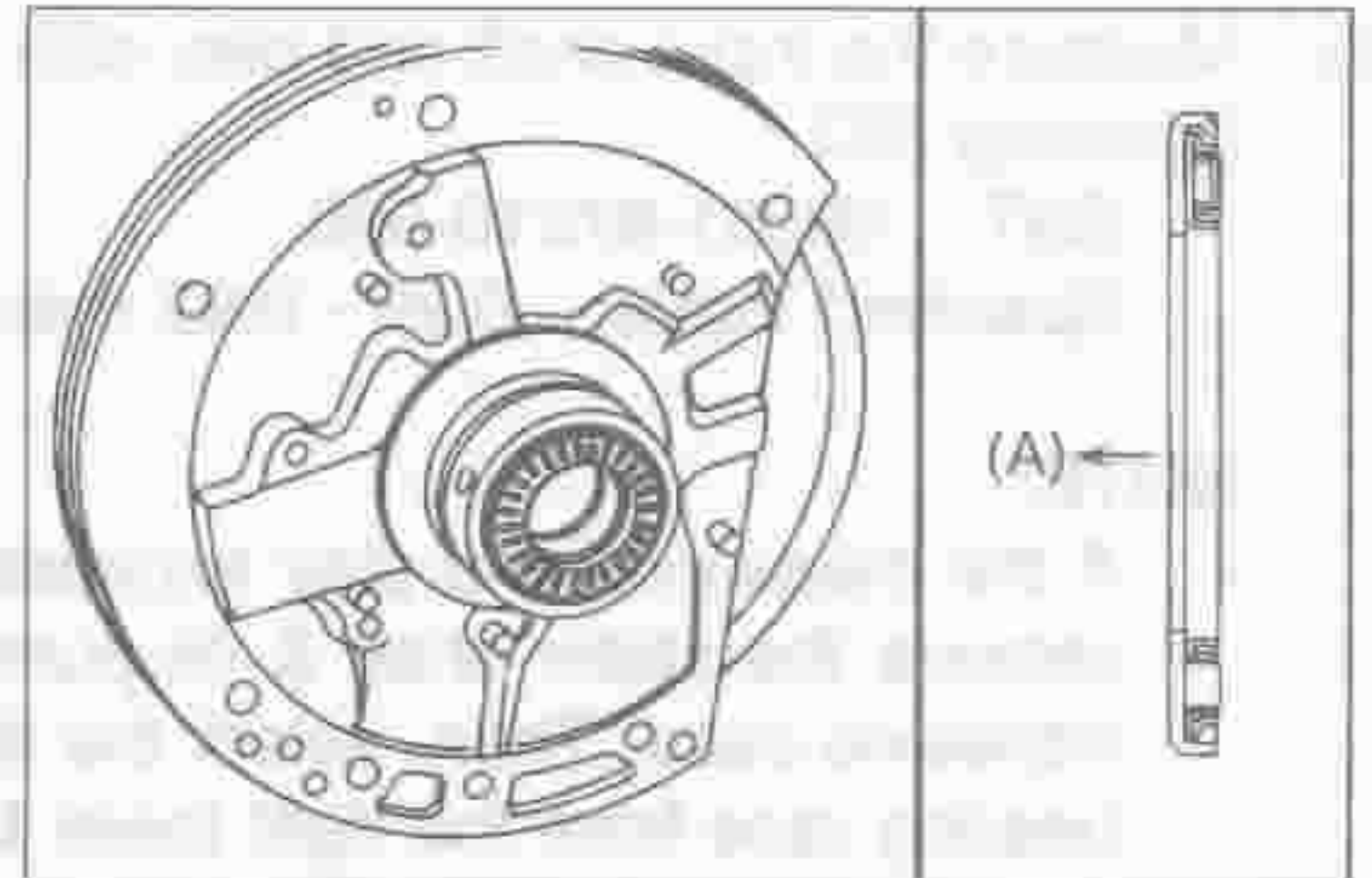
- Ensure that the section (A) of the thrust needle roller bearing race faces toward the oil pump assembly side.
- Reference Value:

Thrust needle roller bearing dimensions

Outer Diameter: 35.7 mm (1.40 inch)

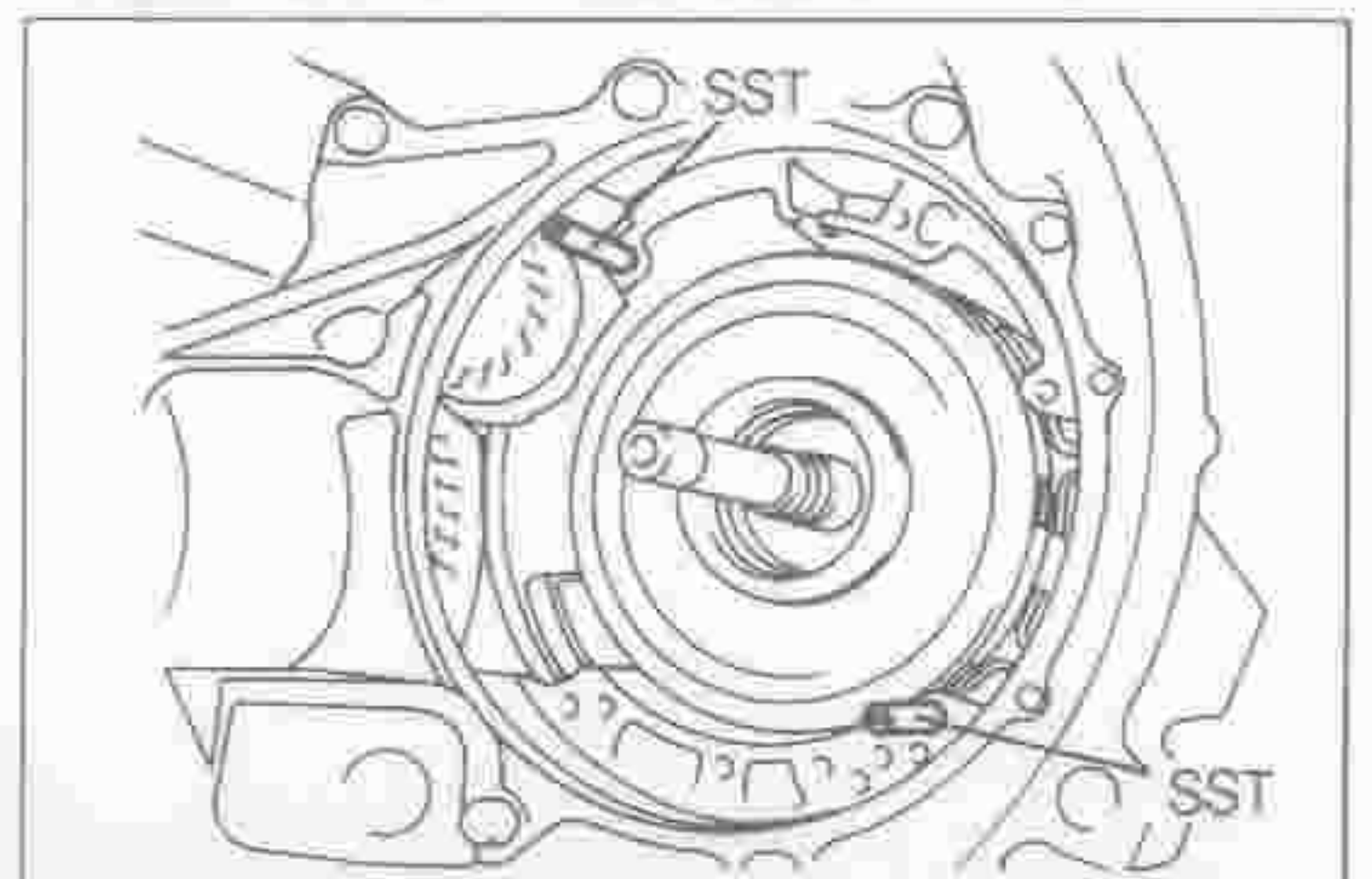
Inner Diameter: 22.0 mm (0.86 inch)

Thickness: 2.8 mm (0.11 inch)



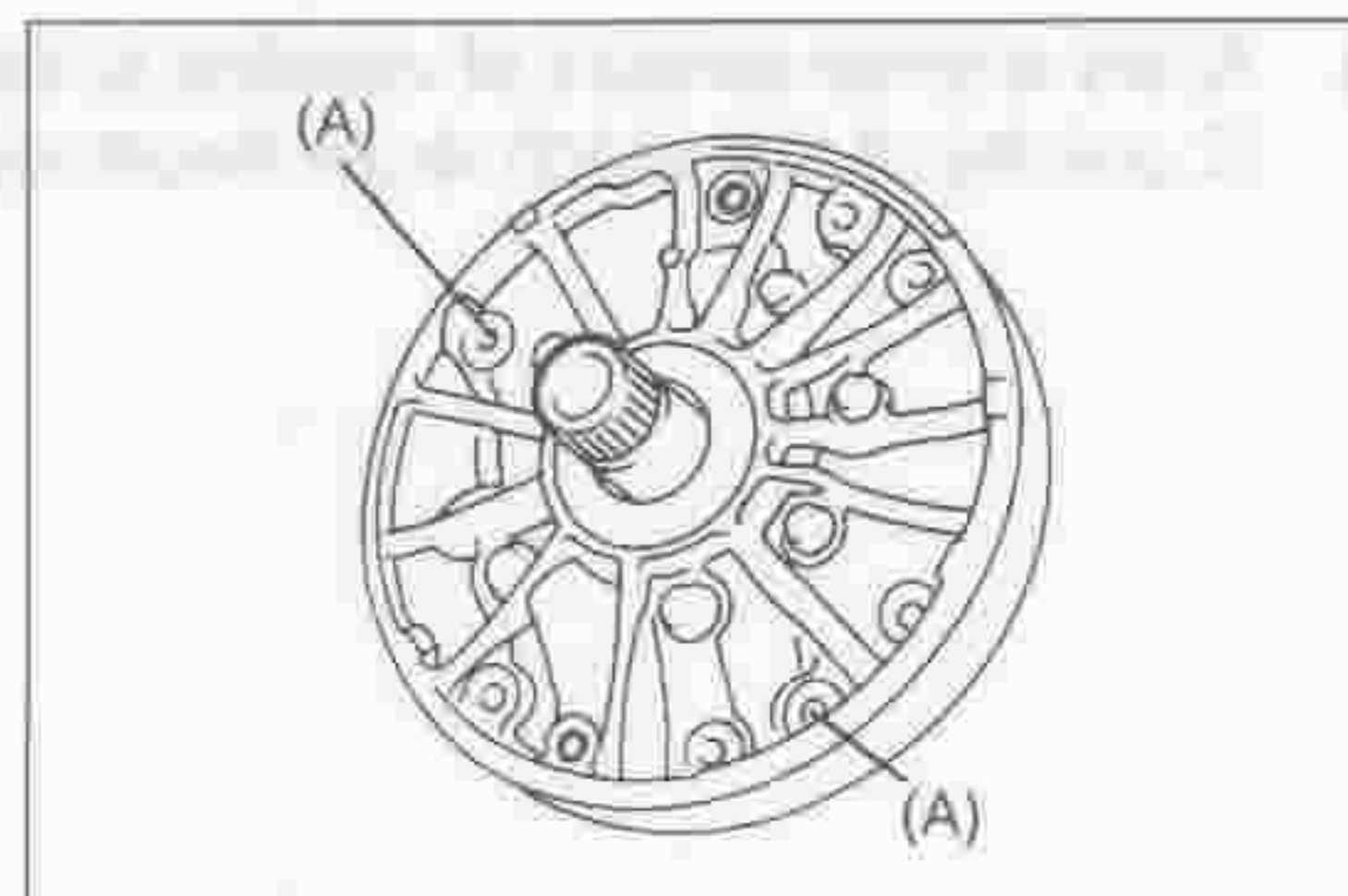
LAT00181-00173

60. Install the following SST to the transaxle case.



LAT00182-00174

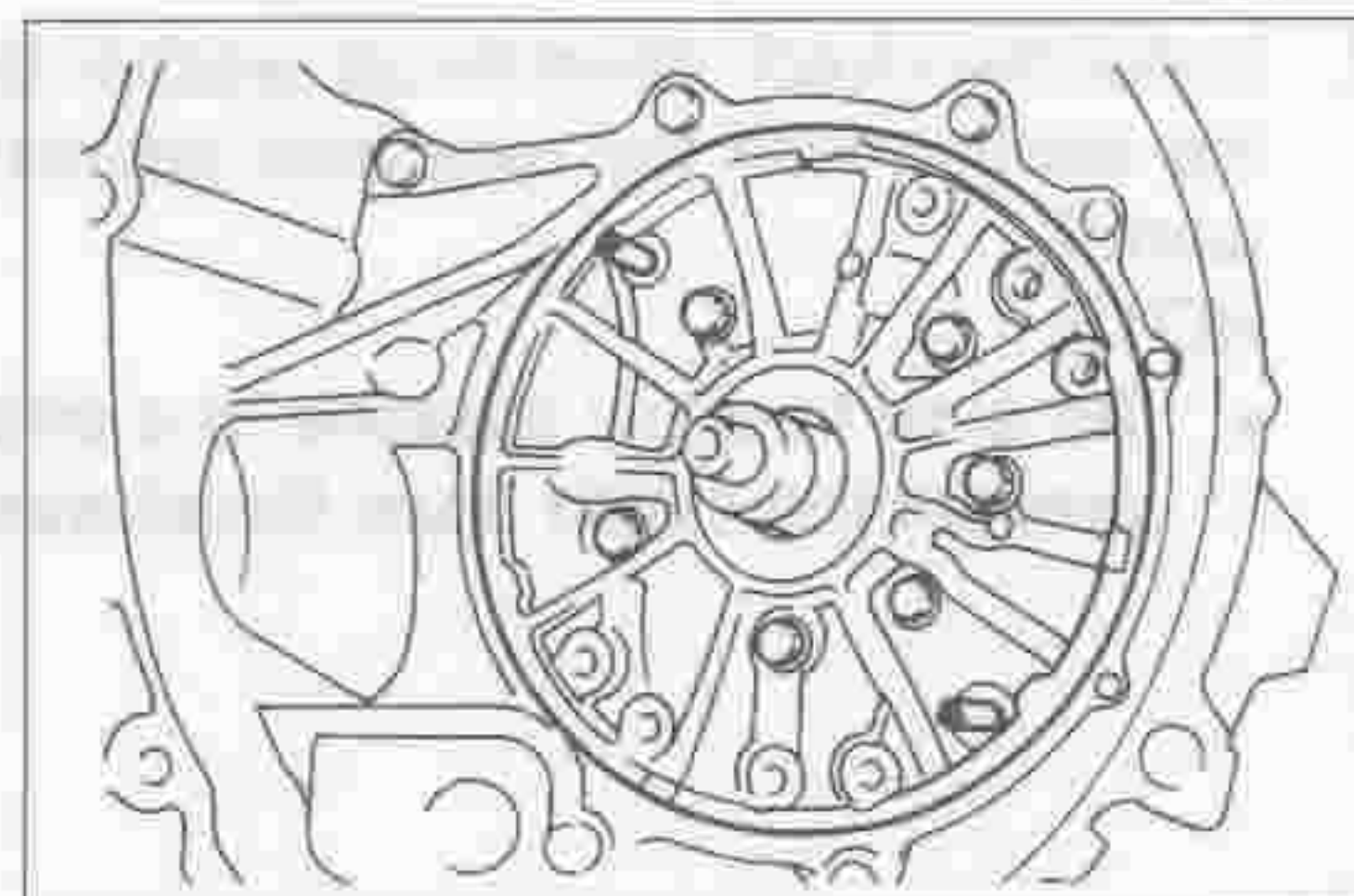
61. Align the attaching holes (sections (A)) of the stator shaft & oil pump assembly with the SST that has been installed at the step 60.



LAT00183-00175

62. Apply the ATF to the outer periphery of the stator shaft & oil pump assembly.

63. Install the stator shaft & oil pump assembly to the transaxle case.



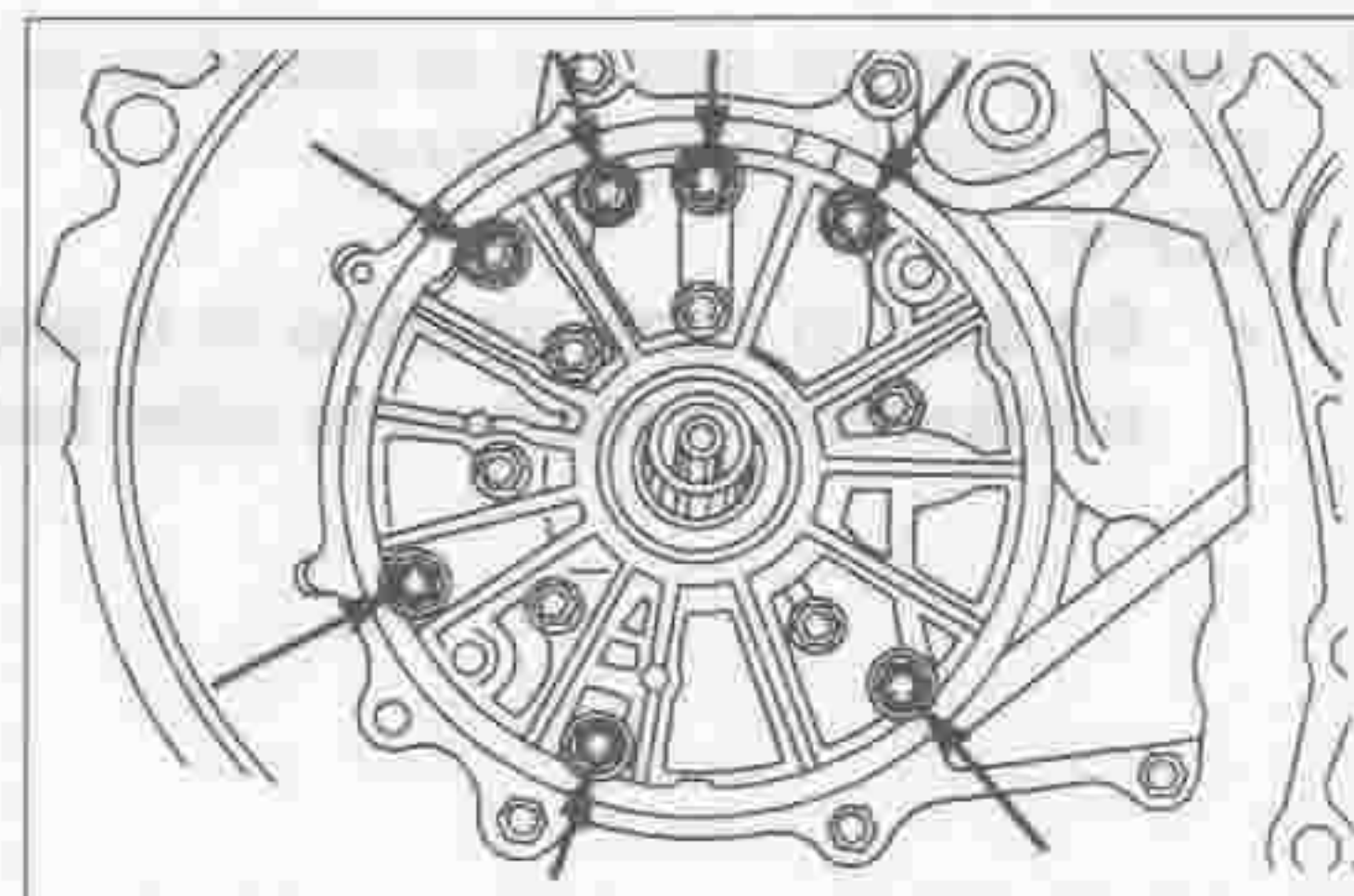
LAT00184-00176

NOTE:

- Be very careful not to damage or twist the O-ring during the installation of the stator shaft & oil pump assembly.

64. Tighten the seven bolts of the stator shaft & oil pump assembly.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00185-00177

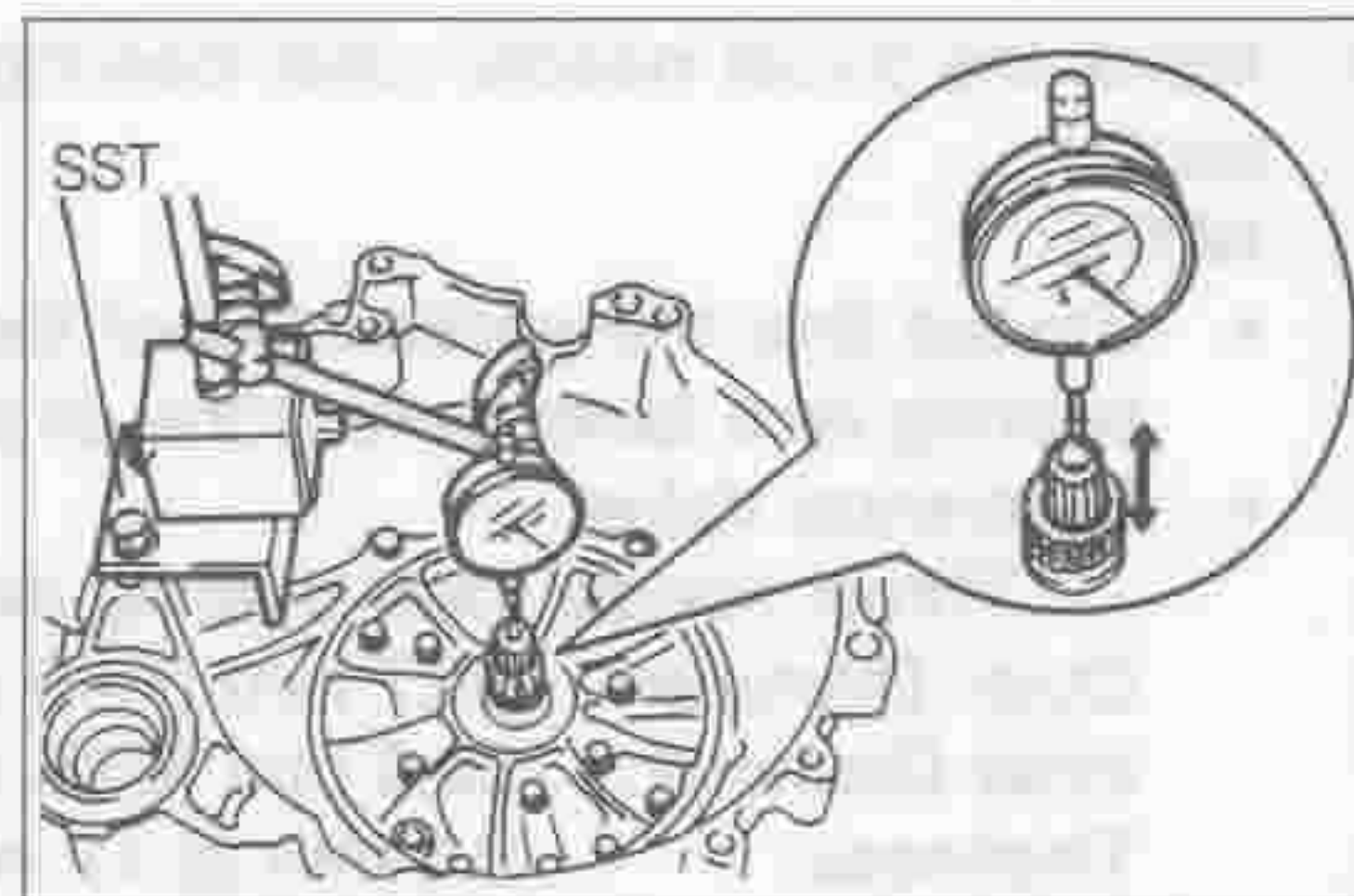
NOTE:

- Be sure to tighten the bolts alternately and diagonally.

65. Measure the input shaft end play with a dial gauge and the following SST.

SST: 09351-87210-000

Specified Value: 0.28 - 0.92 mm (0.011 - 0.36 inch)



LAT00186-00178

NOTE:

- If the measured end play exceeds the specified value, remove the stator shaft & oil pump assembly from the transaxle case. Then, select the thickness of the thrust bearing race from the right lower table. Proceed to perform the operations of the steps from 61 to 65.

Thrust Bearing Race Availability

Thrust bearing race thickness Unit: mm (inch)	Part No.
1.55 - 1.65 (0.061 - 0.064)	35789-87202-000
1.95 - 2.05 (0.076 - 0.080)	35789-87203-000
2.35 - 2.45 (0.092 - 0.096)	35789-87204-000

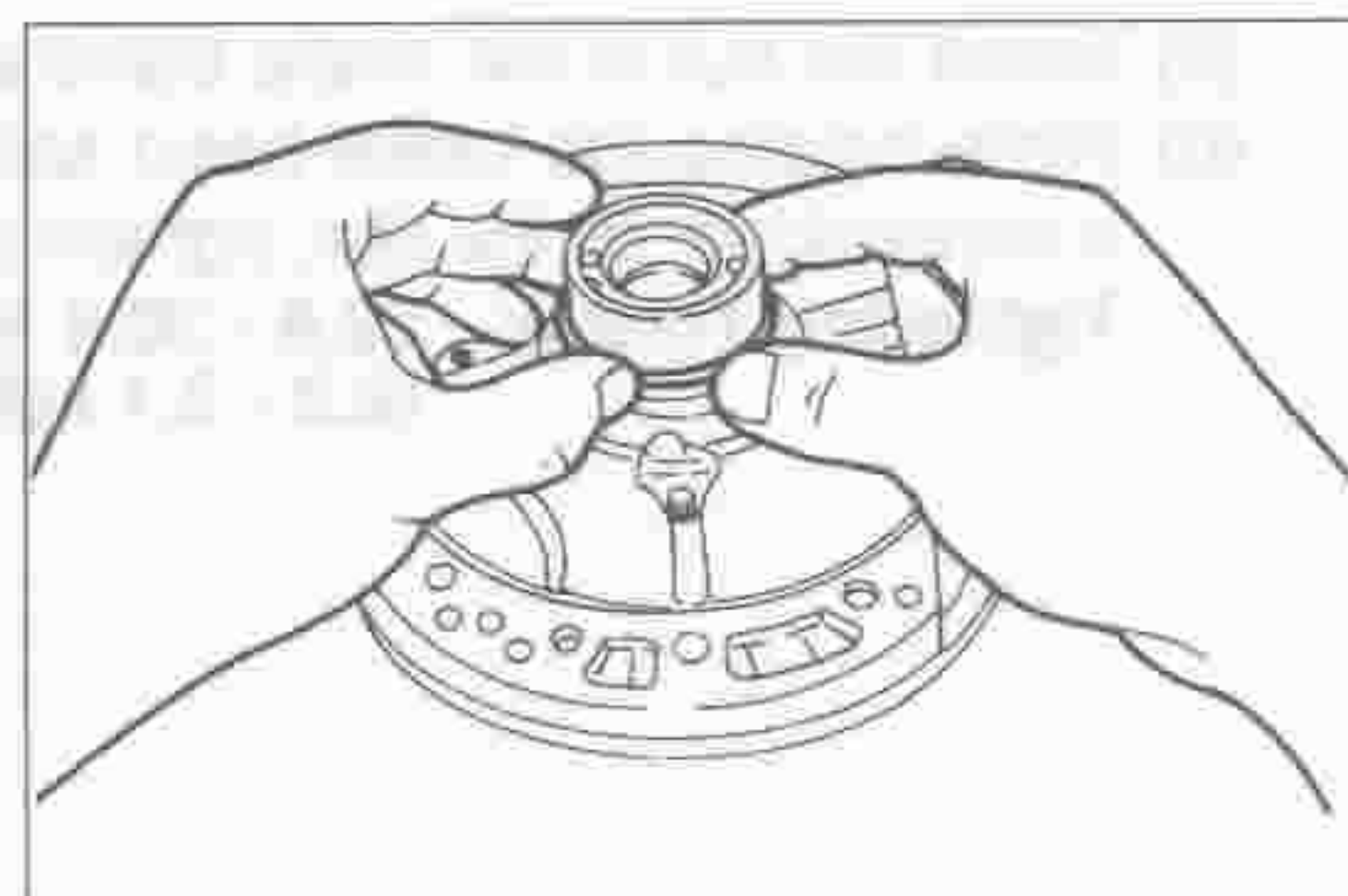
LAT00187-00000

66. Coat two new clutch drum oil seal rings with the ATF.
67. Install the two new clutch drum oil seal rings to the stator shaft & oil pump assembly.

NOTE:

- Do not spread the new oil seal rings excessively.

68. Coat the new O-ring of the stator shaft & oil pump assembly.
69. Install the new O-ring to the stator shaft & oil pump assembly.



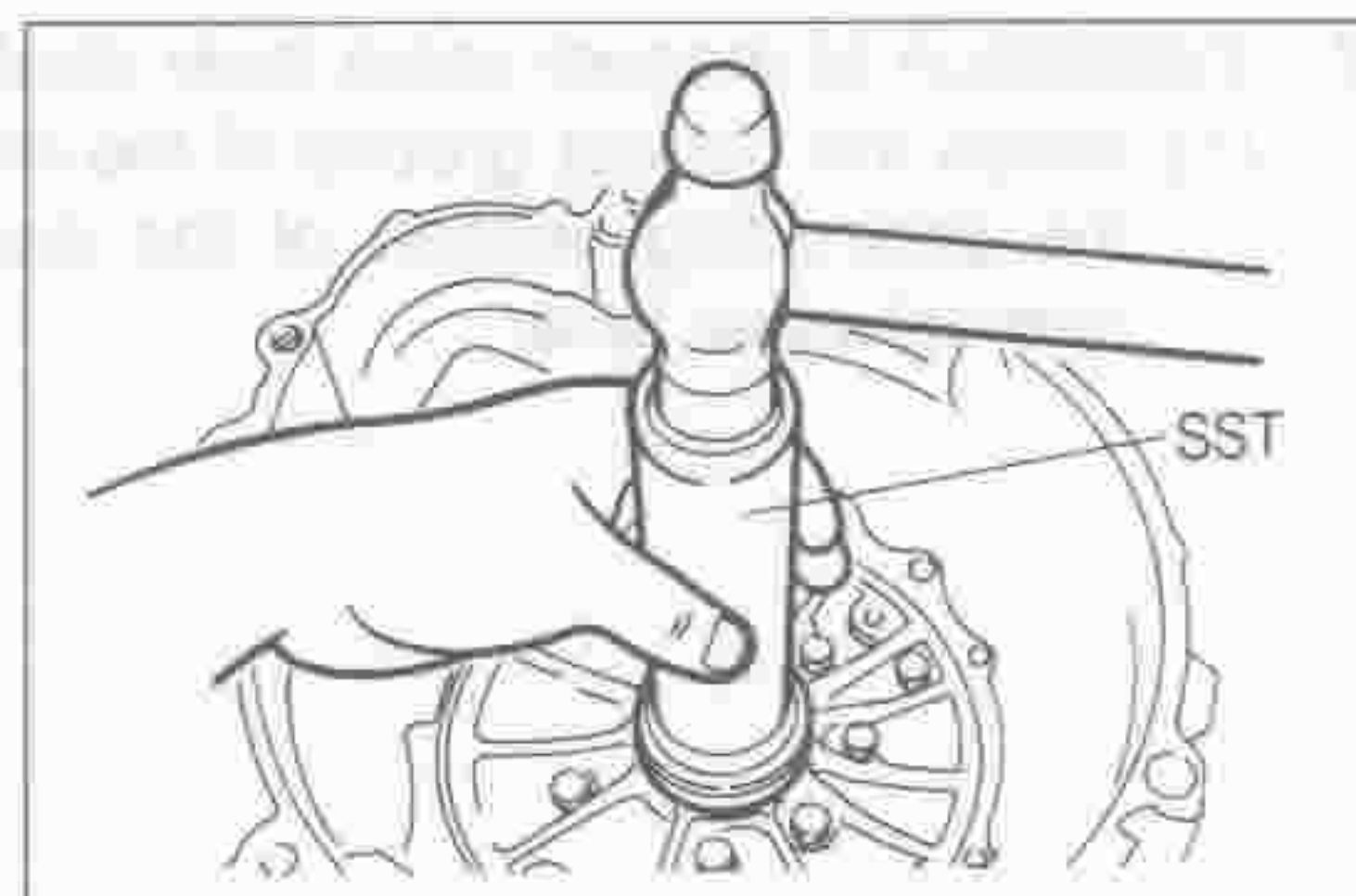
LAT00188-00179

70. Install a new T-type oil seal, using the following SST:

SST: 09310-87301-000

NOTE:

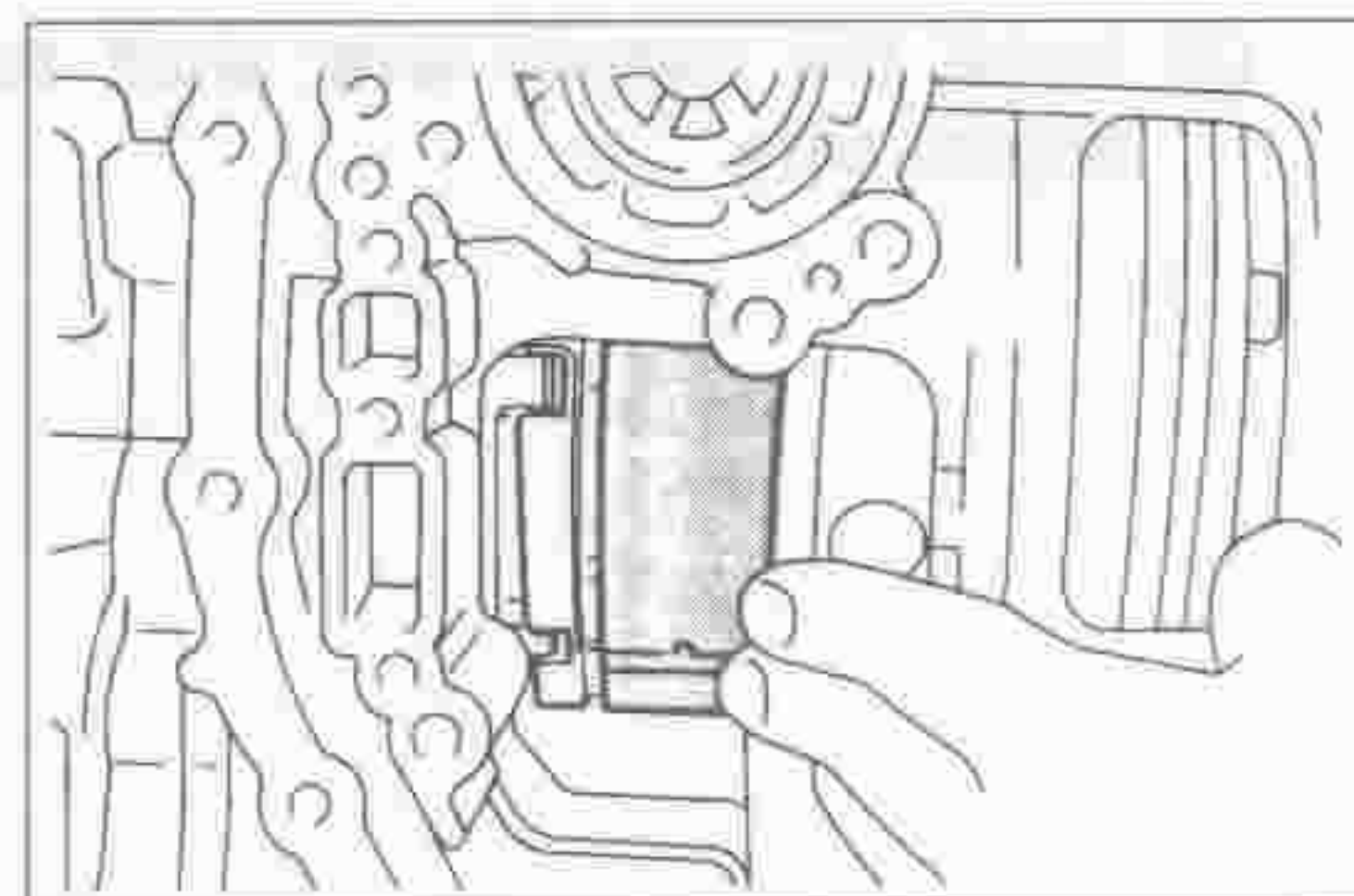
- Make sure that the T-type oil seal is in contact at right angles with the stator shaft & oil pump assembly when installing the oil seal.



LAT00188-00180

71. Adjustment of brake band

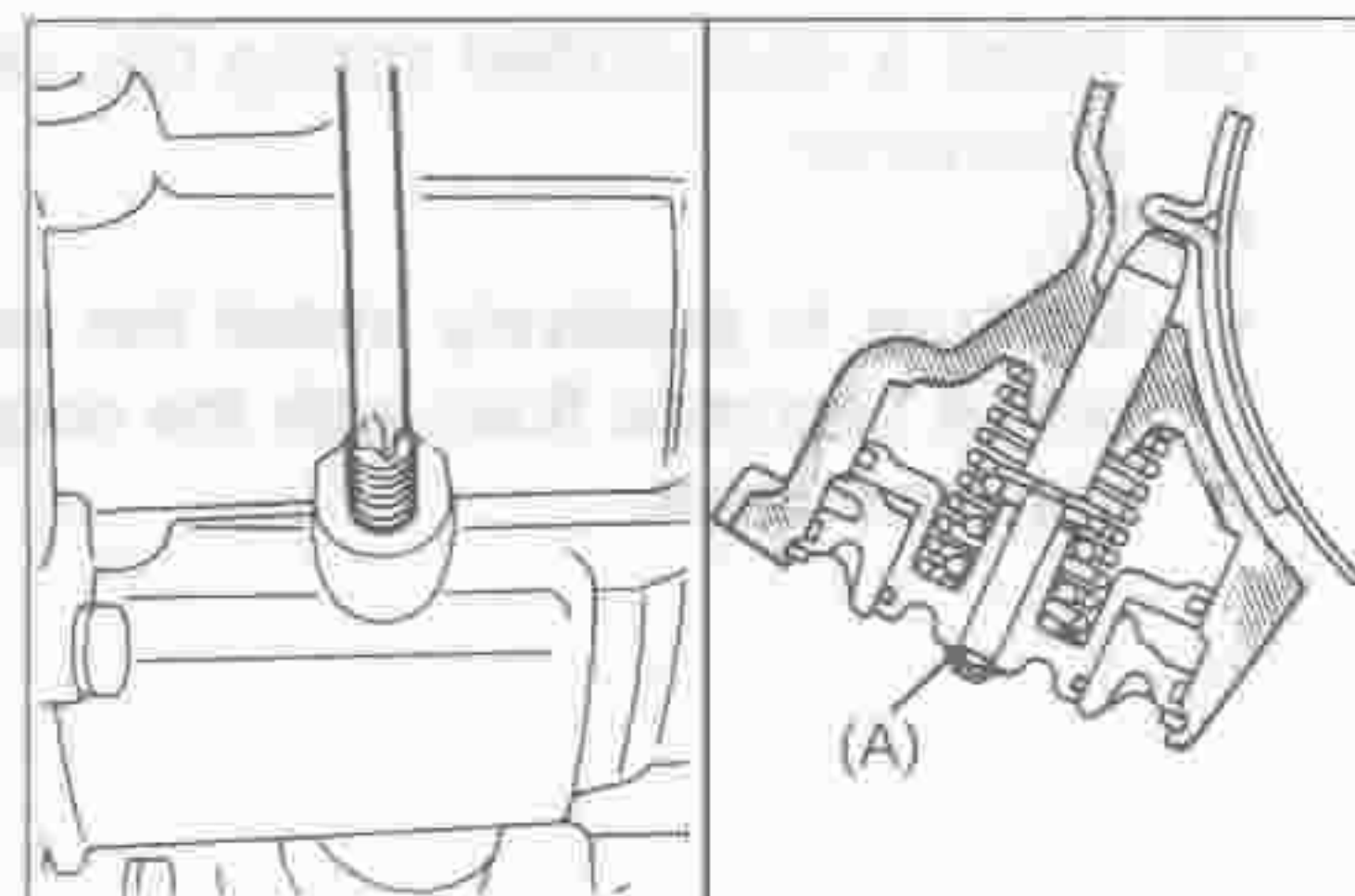
- (1) Set the brake band parallel to the 2nd brake drum.



LAT00190-00181

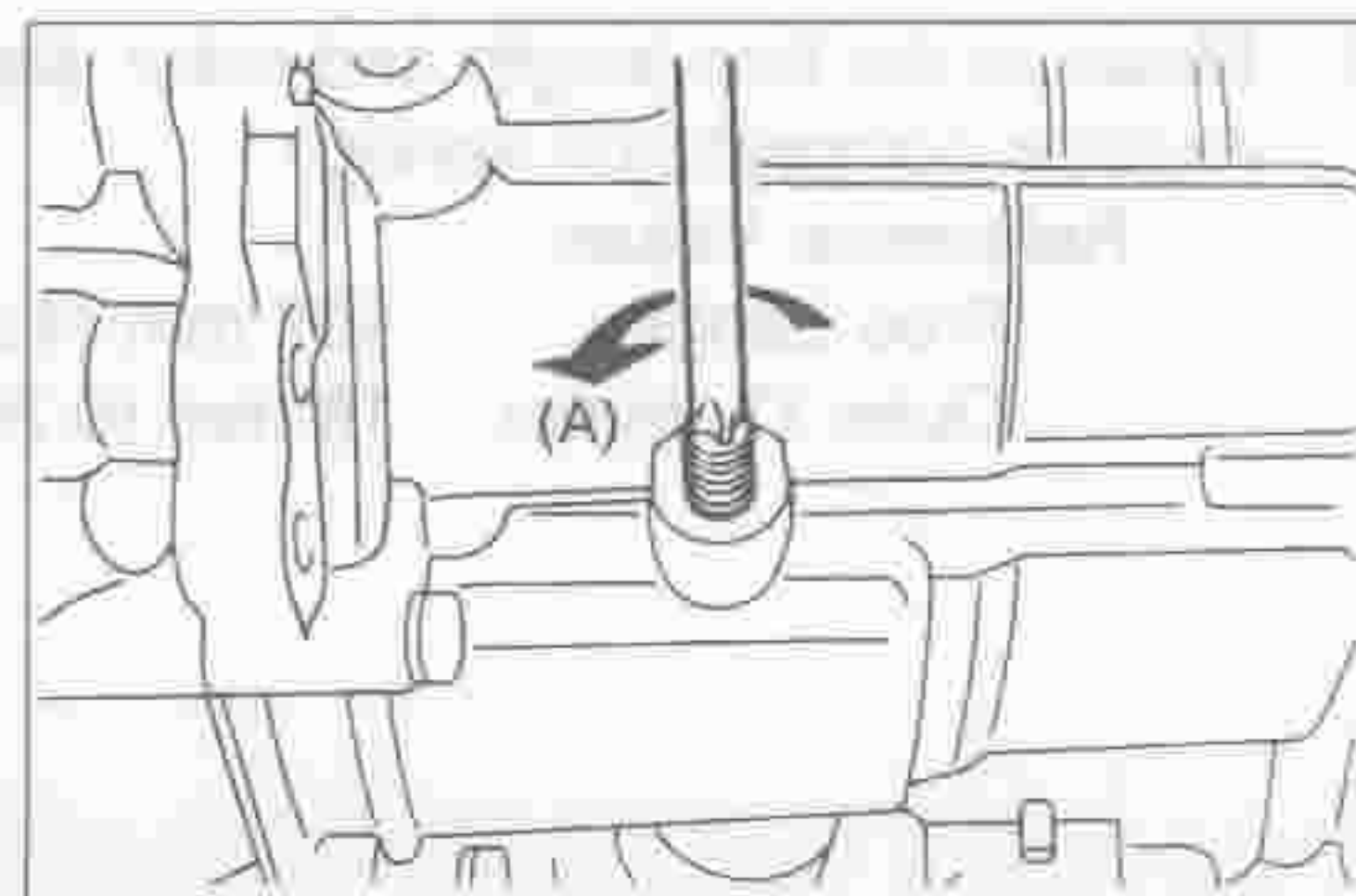
- (2) Tighten the brake band adjusting anchor bolt, until the E-ring (A) of the 2nd coast brake piston slightly floats.

- (3) At the time when the E-ring of the 2nd coast brake piston floats, stop tightening the brake band adjusting anchor bolt.



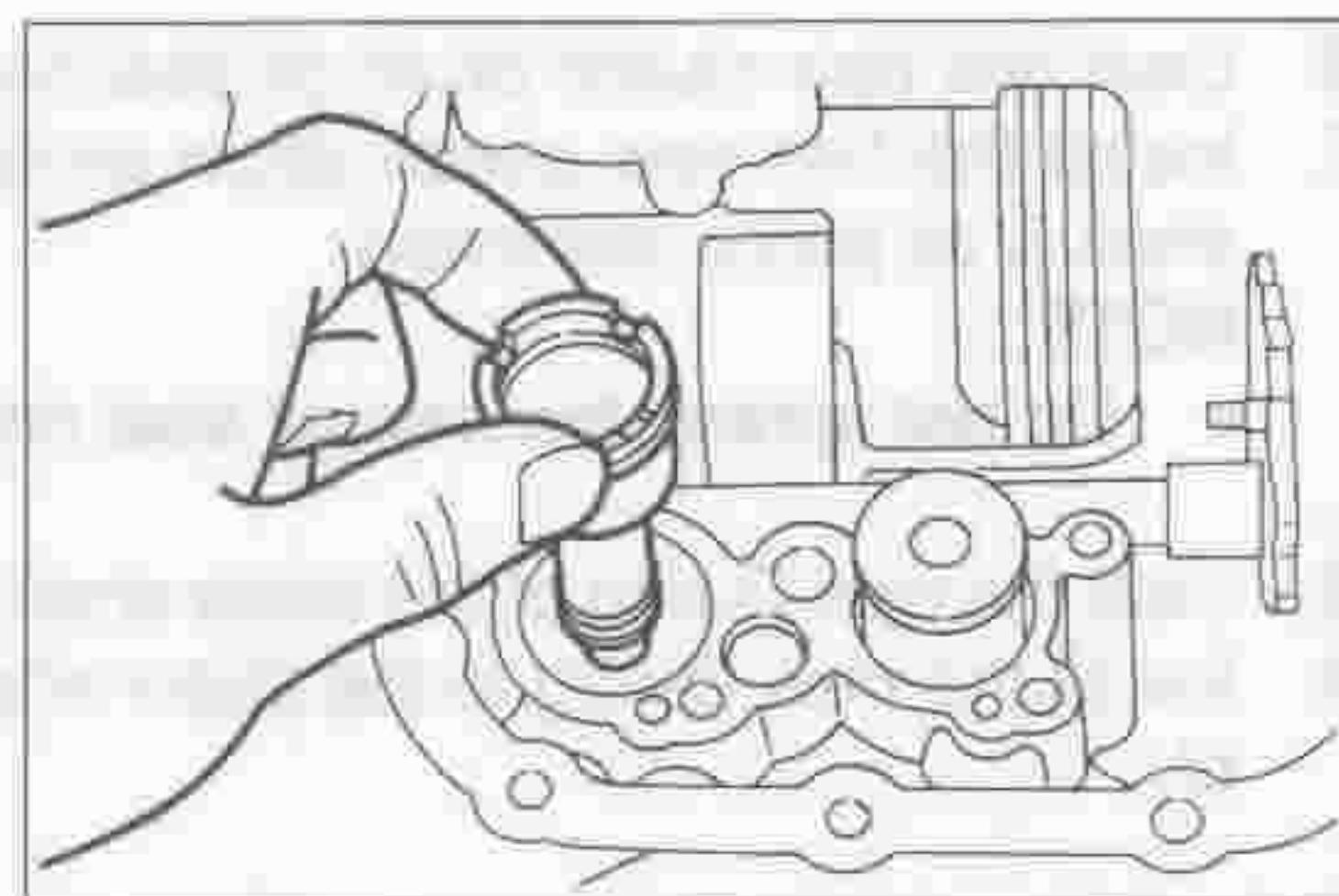
LAT00191-00182

- (4) Under the condition of the step (3) above, loosen the brake band anchor bolt 3.2 turns counterclockwise (direction (A)).



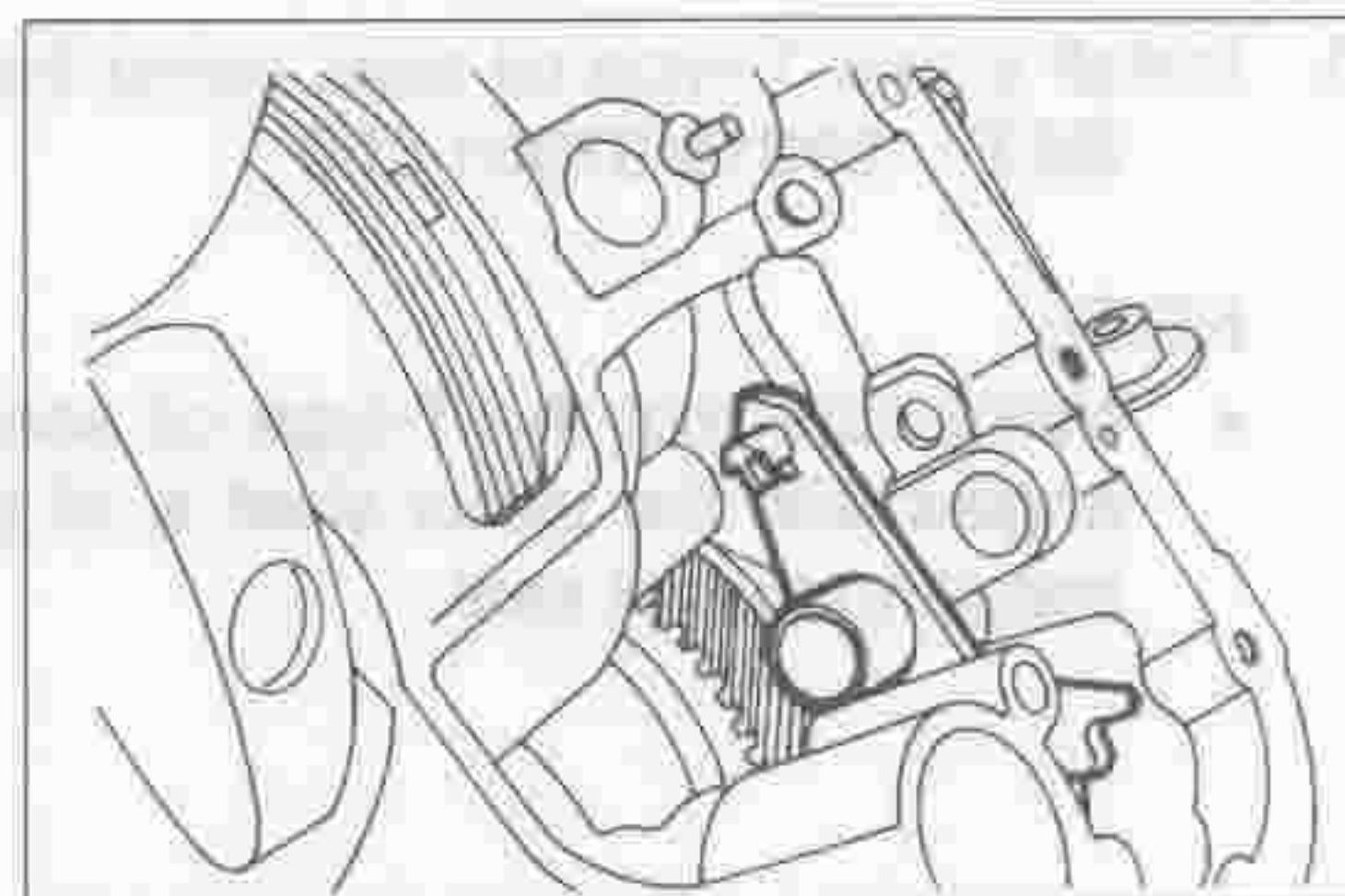
LAT00192-00183

- (5) Install the nut to the brake band anchor bolt.
 - (6) While holding the brake band anchor bolt by means of a screwdriver or the like, tighten the nut.
- Tightening Torque:** 22.6 - 30.4 N·m
(2.3 - 3.1 kgf-m, 16.6 - 22.4 ft-lb)



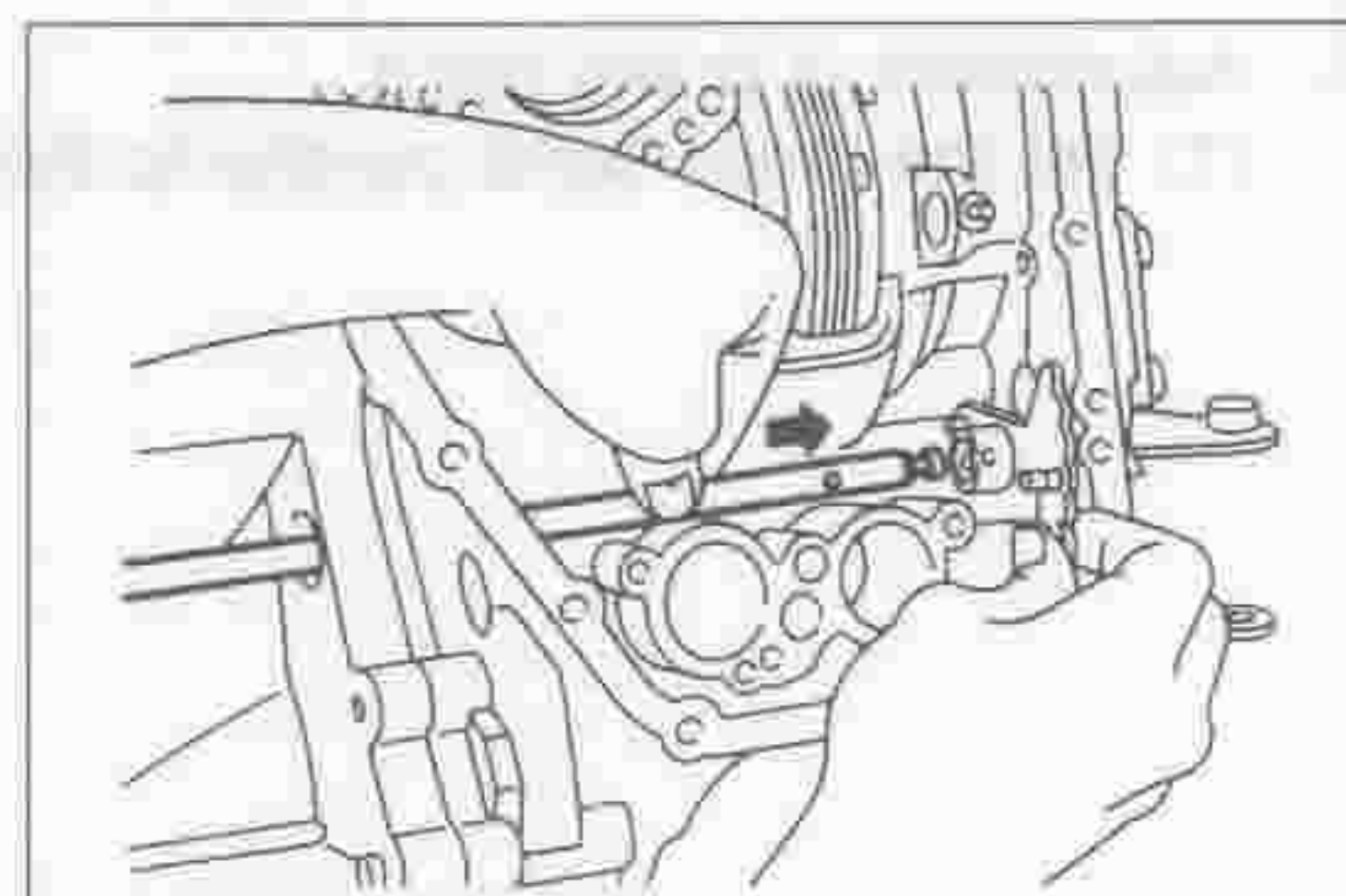
LAT00183-00184

72. Installation of manual valve lever shaft assembly
- (1) Install the cut-out groove of the manual valve lever and the protruding section of the parking lock rod to the manual valve lever.



LAT00184-00185

- (2) Install the manual lever shaft subassembly from the engine side.

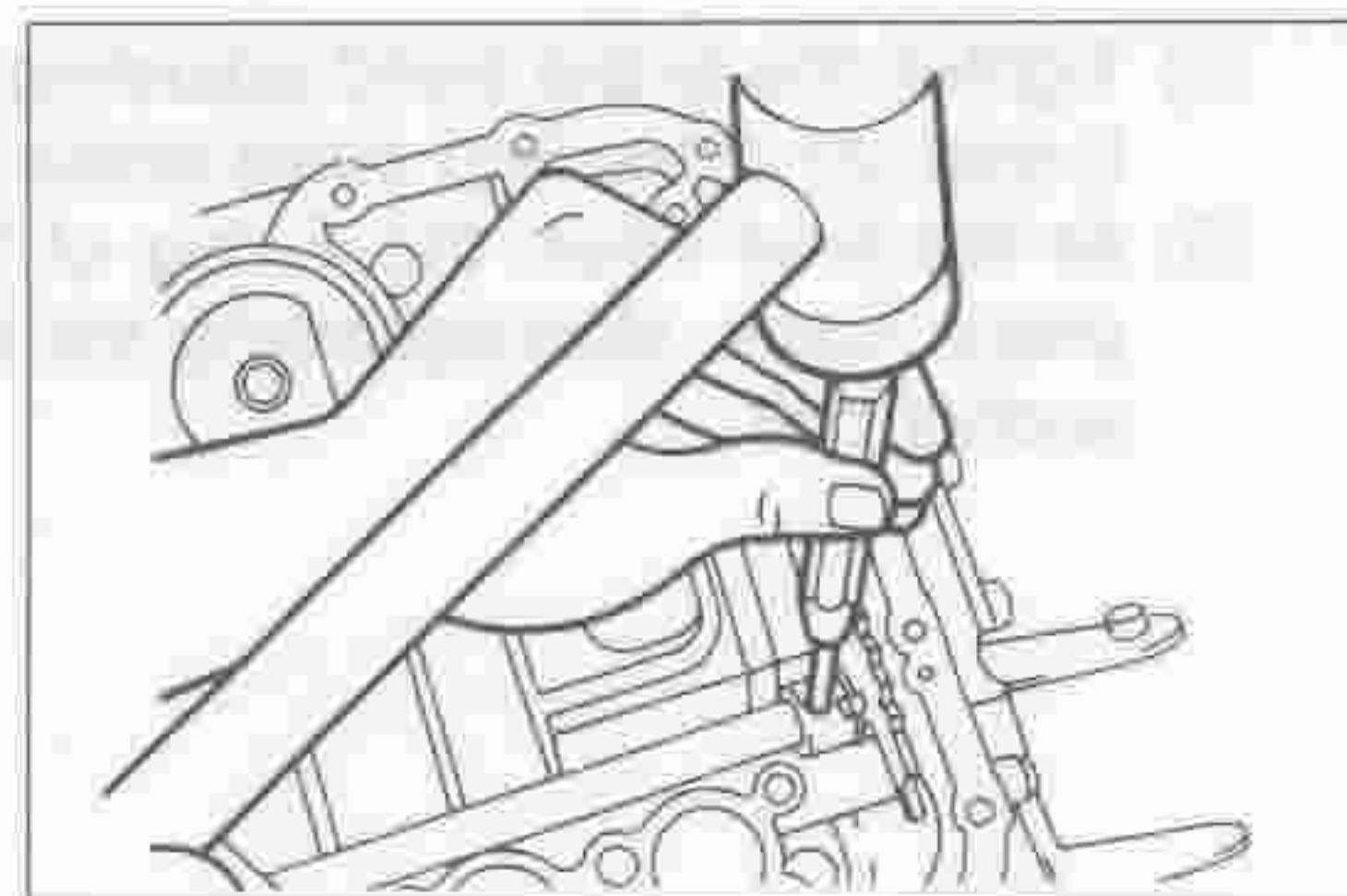


LAT00185-00186

- (3) Install a new slotted spring pin, using a pin punch and a hammer.

NOTE:

- Be sure to positively install the new slotted spring pin, until it becomes flush with the edge surface of the manual valve lever.

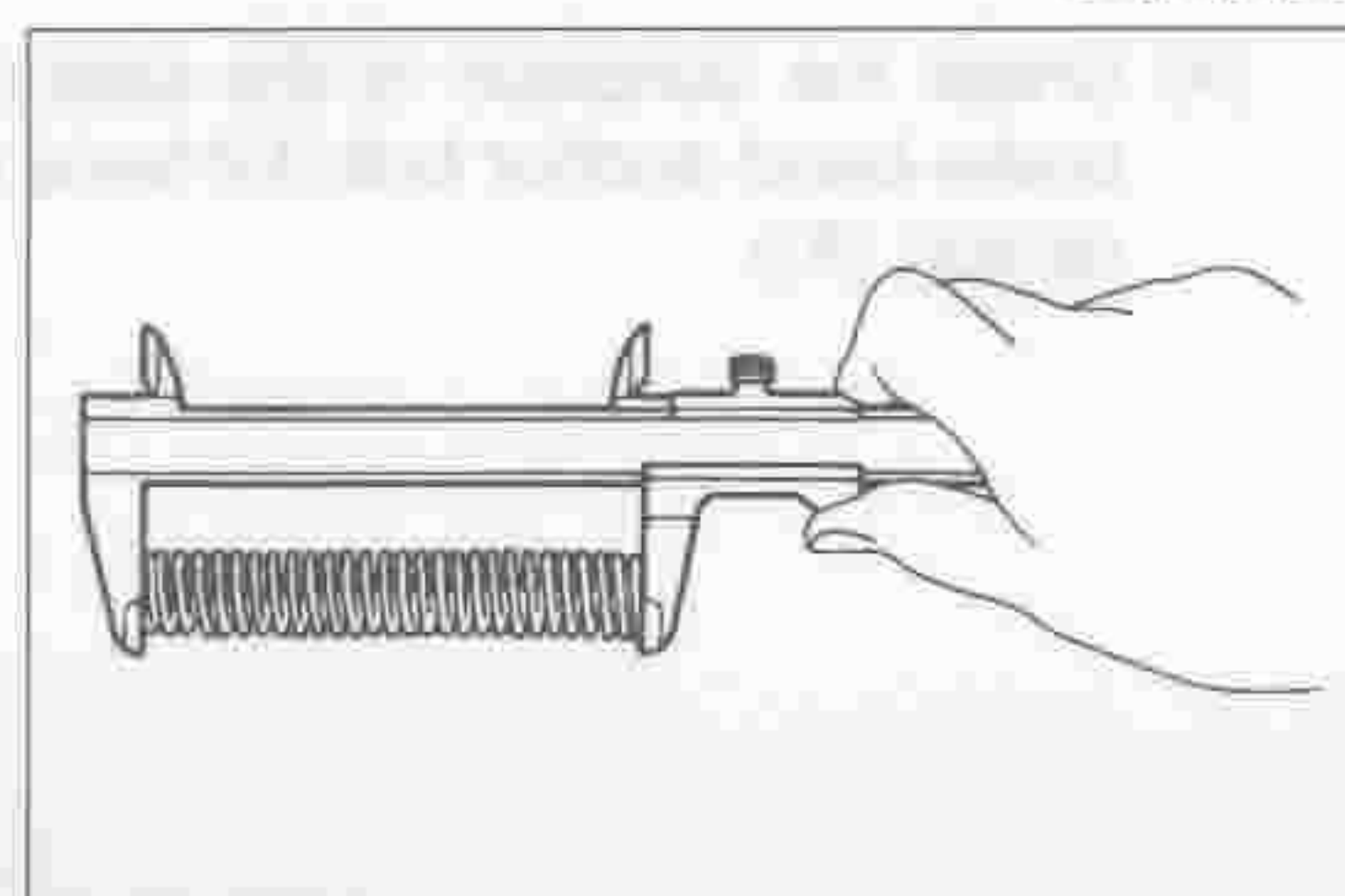


LAT00186-00187

73. Measure the free length and outer diameter of the C₂ accumulator compression spring.

Reference Value:

- Free Length:** 107 mm (4.21 inch)
Outer Diameter: 18 mm (0.70 inch)

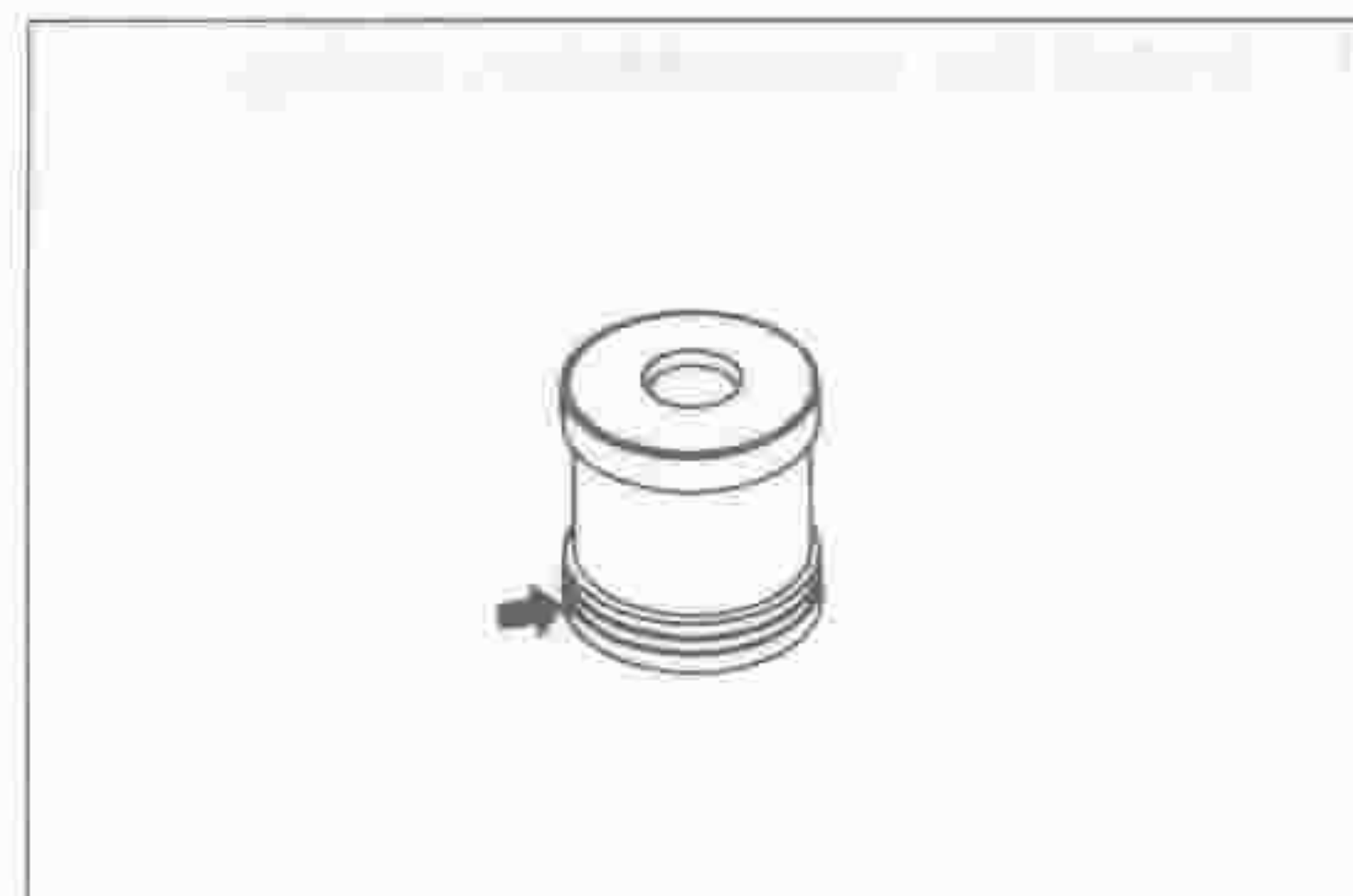


LAT00187-00188

74. Coat a new C₂ accumulator seal No. 1 ring with the ATF.
75. Install the C₂ accumulator seal No. 1 ring to the accumulator No. 2 piston.

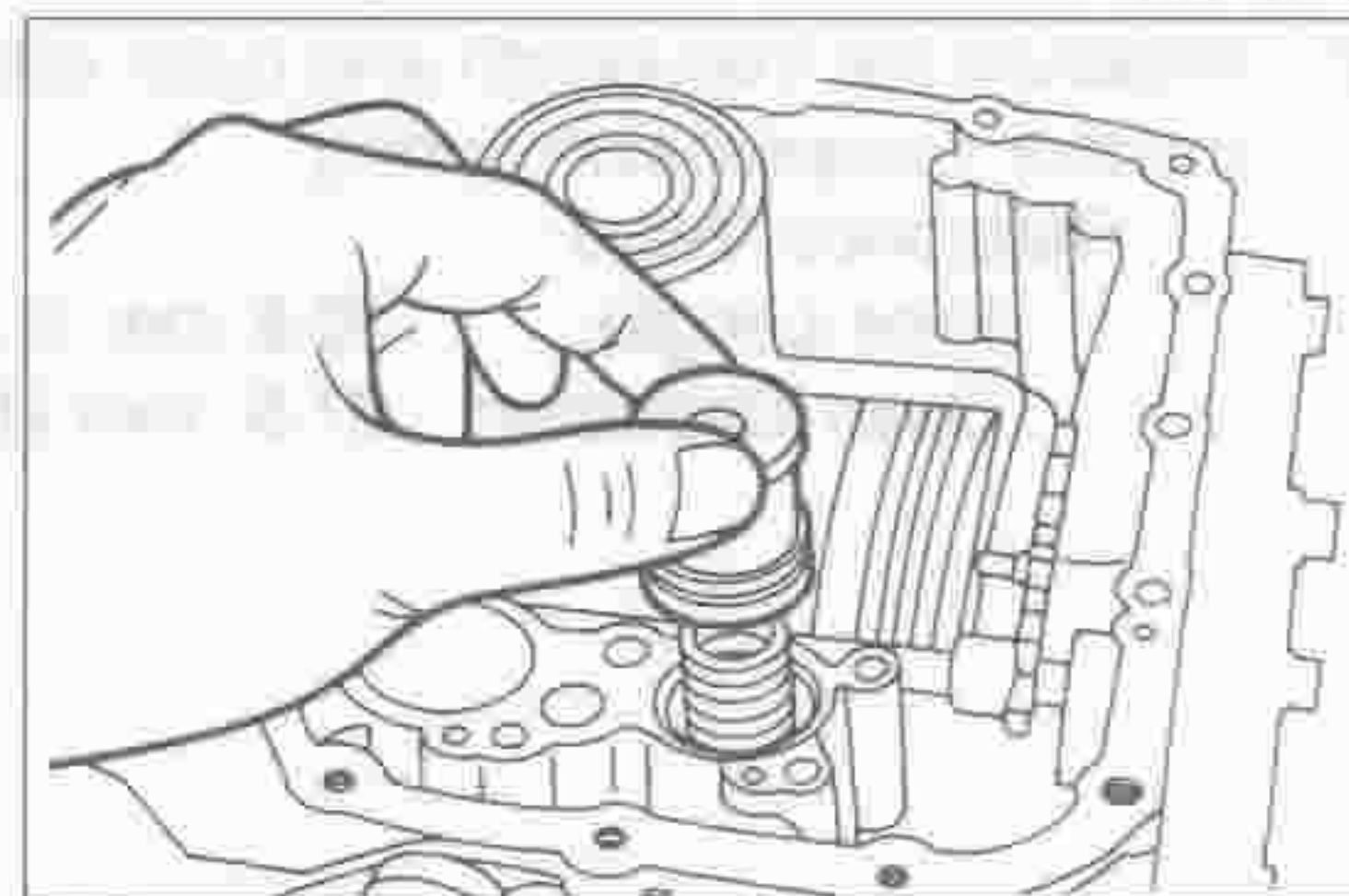
NOTE:

- Do not spread the ring end excessively.



LAT00198-00189

76. Install the compression spring and accumulator No. 2 piston to the transaxle case.

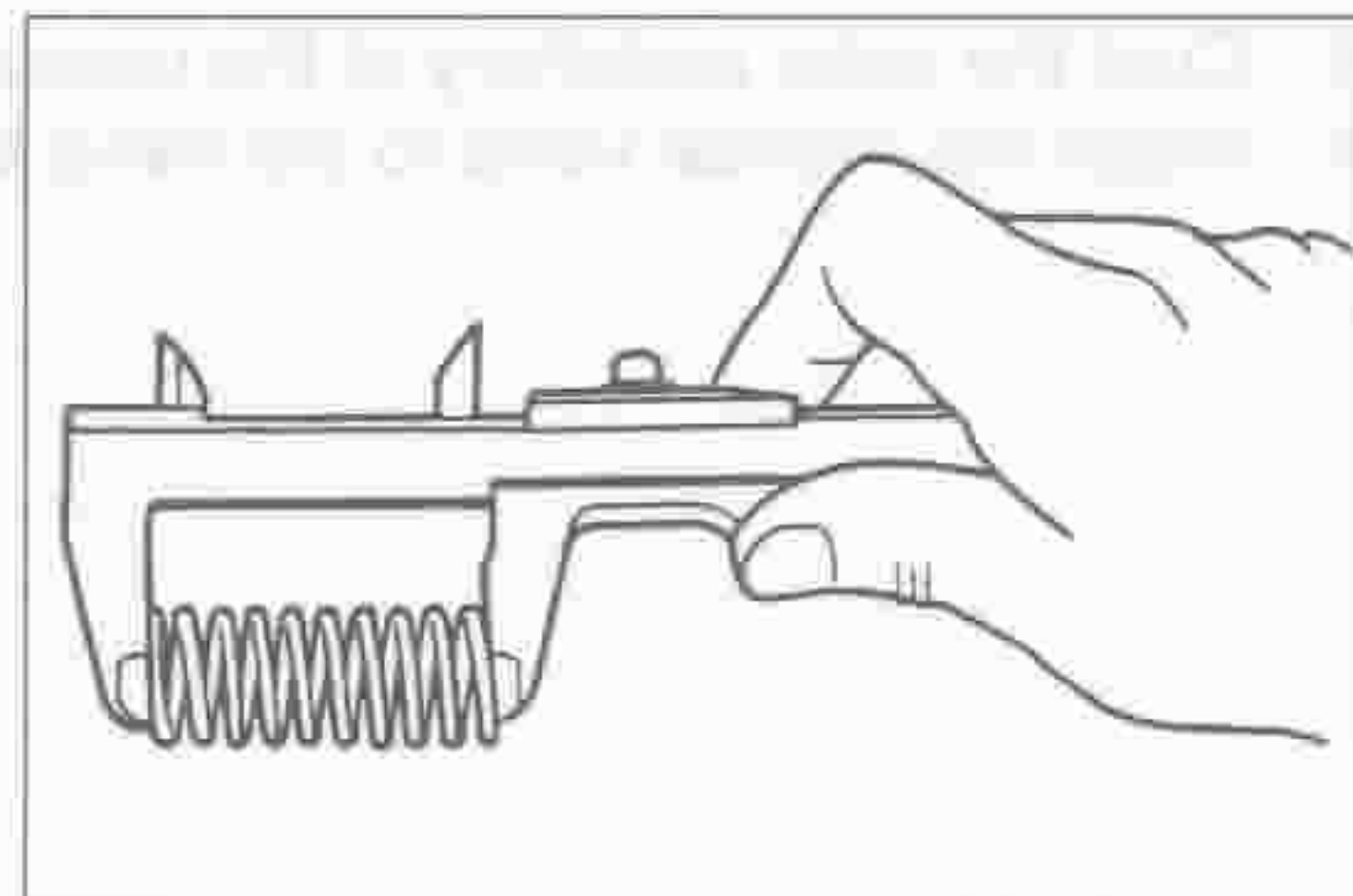


LAT00199-00190

77. Measure the free length and outer diameter of the B₁ accumulator compression spring.

Reference Value:

- | | |
|-----------------|---------------------|
| Free Length: | 53 mm (2.08 inch) |
| Outer Diameter: | 20 mm (0.78 inch) |
| Free Length: | 53 mm (2.08 inch) |
| Outer Diameter: | 14.5 mm (0.57 inch) |

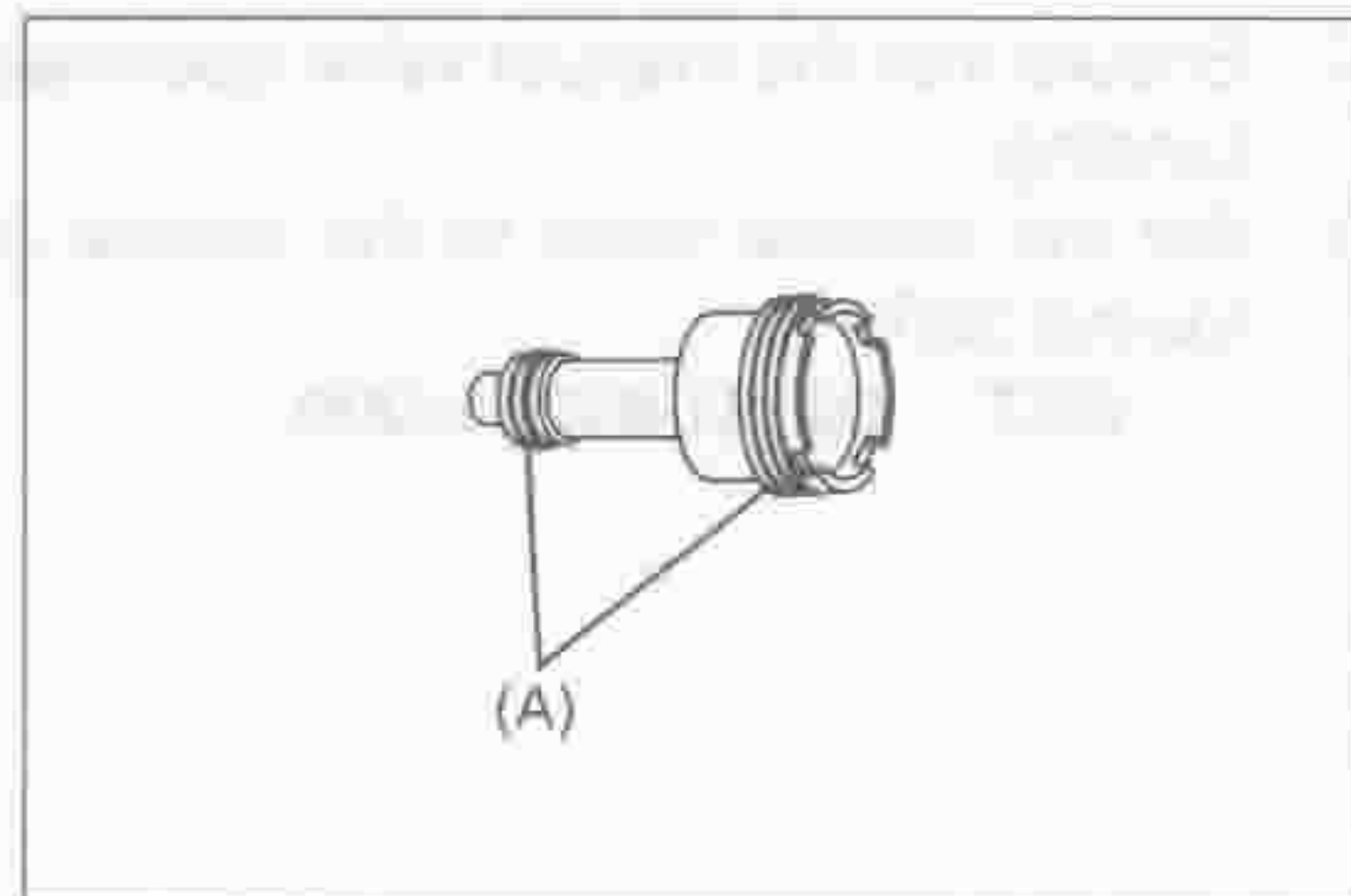


LAT00200-00191

78. Coat the A section of the new accumulator seal No. 1 and No. 2 ring with ATF.
79. Install the accumulator seal No. 1 and No. 2 ring to the accumulator No. 1 piston.

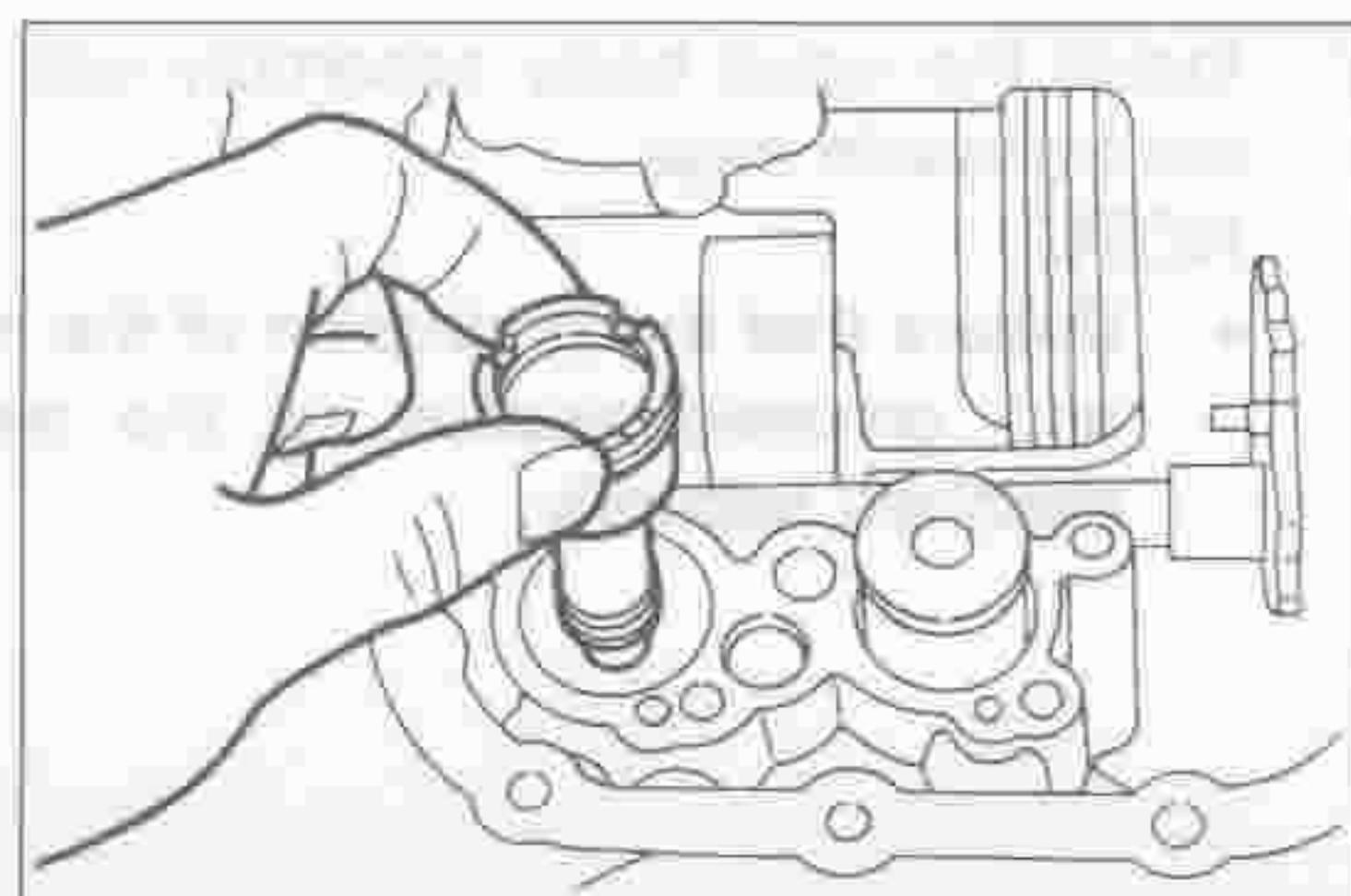
NOTE:

- Do not spread the seal ring end excessively.



LAT00201-00192

80. Install the accumulator No. 1 piston to the transaxle case.



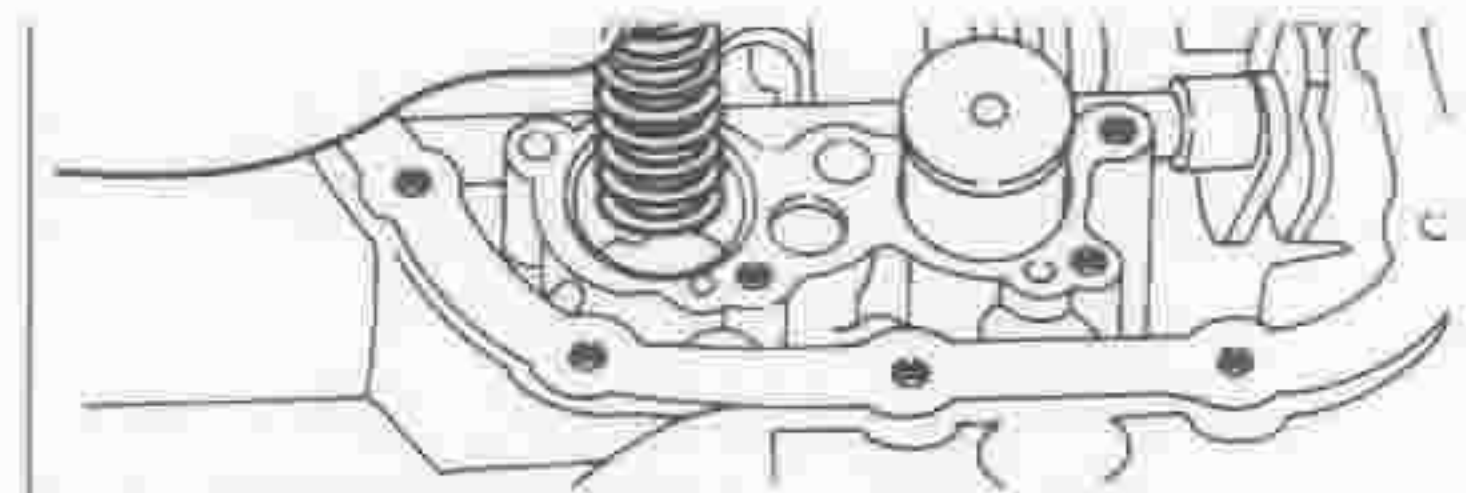
LAT00202-00193

AT-70

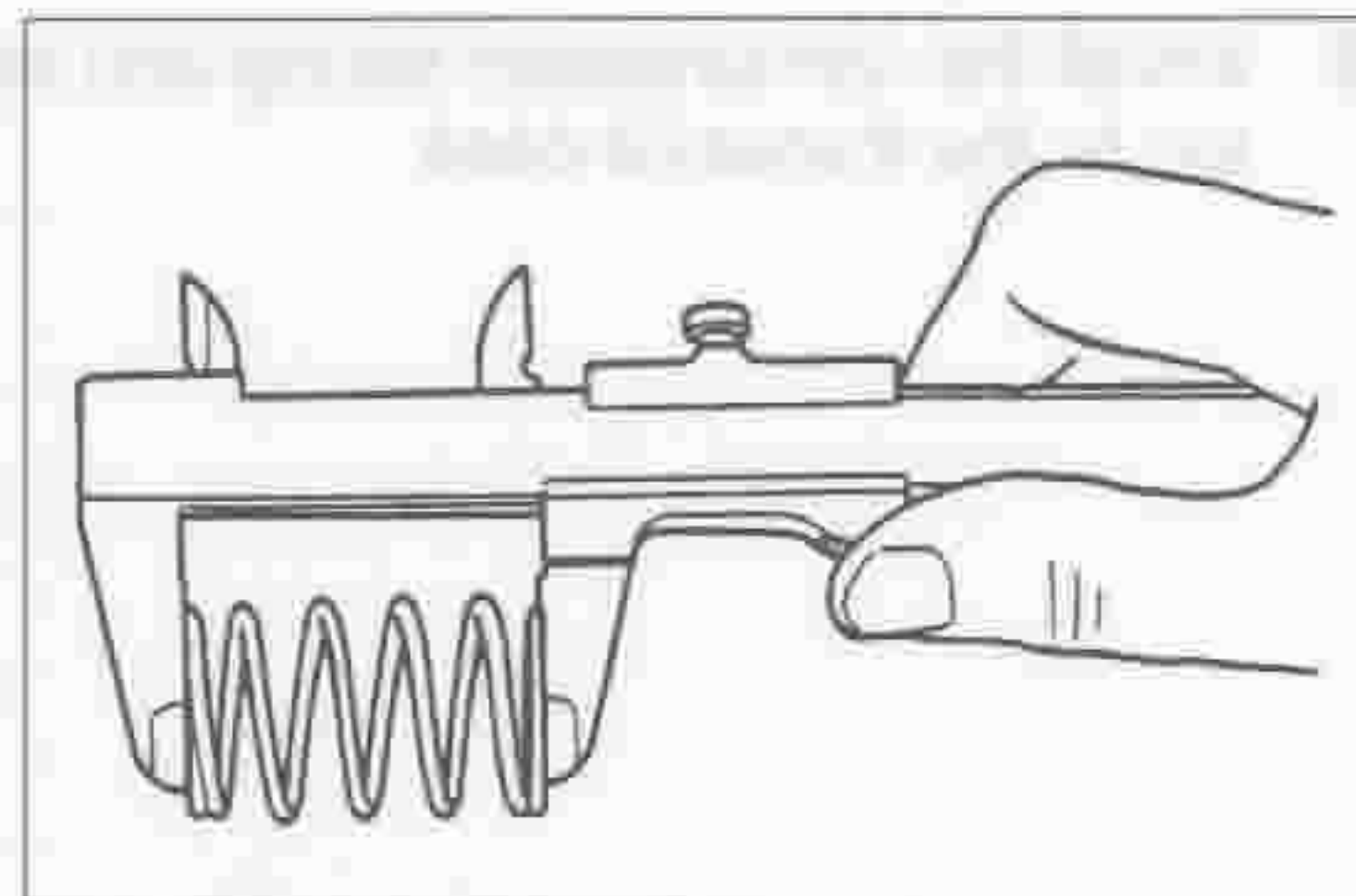
82. Measure the free length and outer diameter of the C₁ accumulator compression spring.

Reference Value:

Free Length: 30.8 mm (1.21 inch)
Outer Diameter: 27.5 mm (1.08 inch)

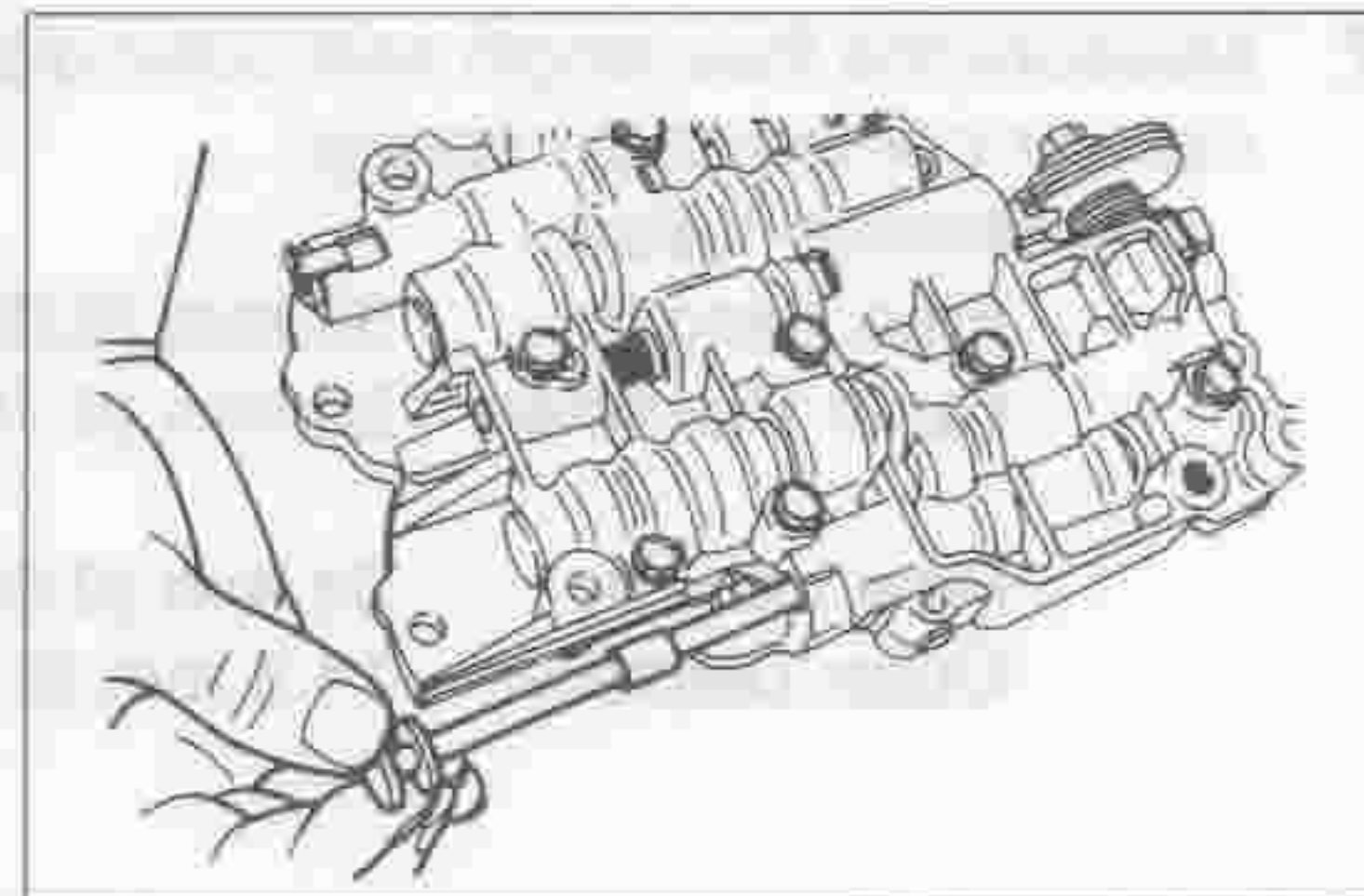


LAT00203-00194



LAT00204-00195

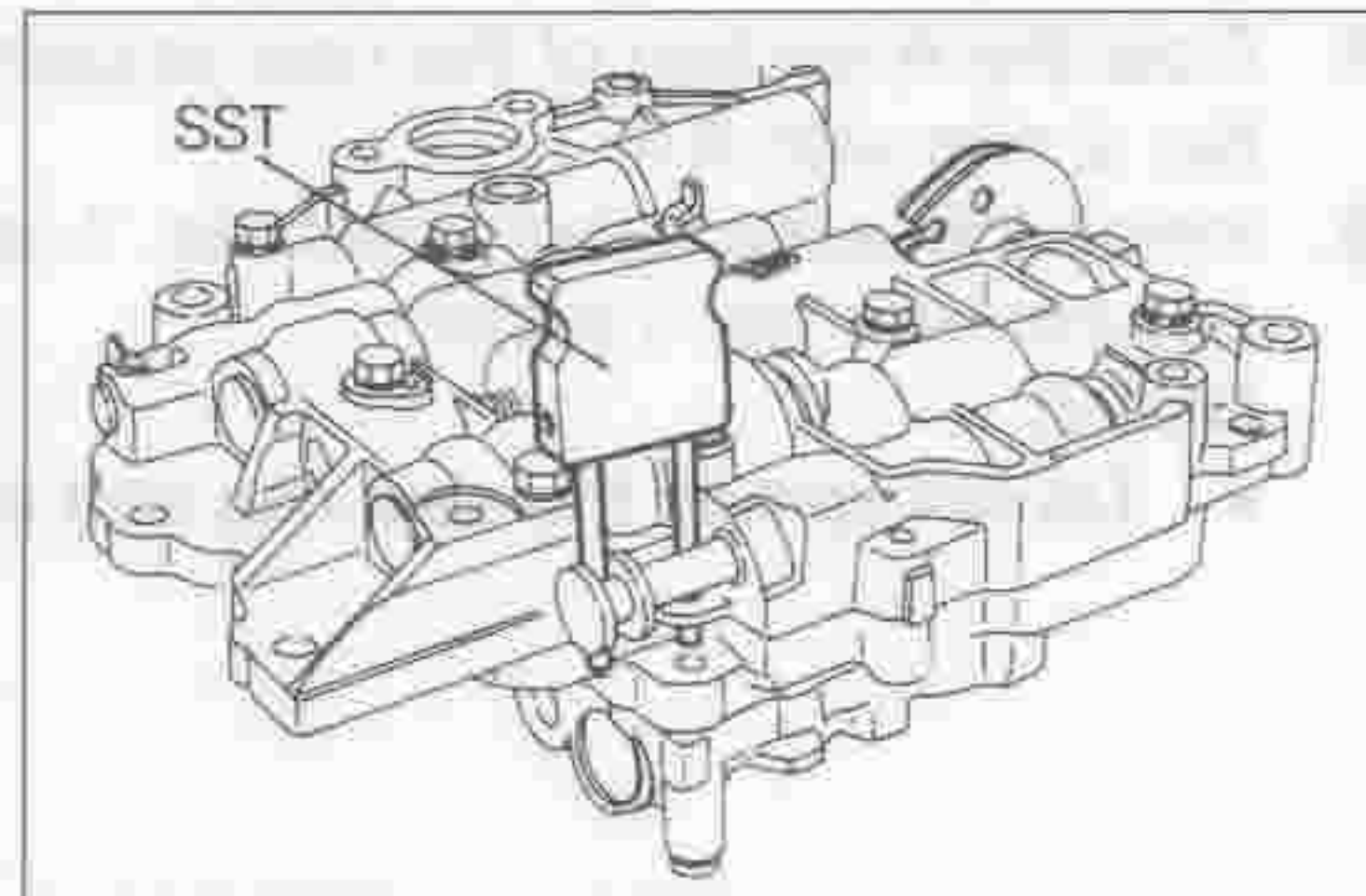
83. Coat the outer periphery of the manual valve with the ATF.
84. Install the manual valve to the valve body assembly.



LAT00205-00196

85. Ensure that the manual valve operates smoothly without any binding.
86. Set the manual valve to the neutral position, using the following SST.

SST: 09351-87211-000

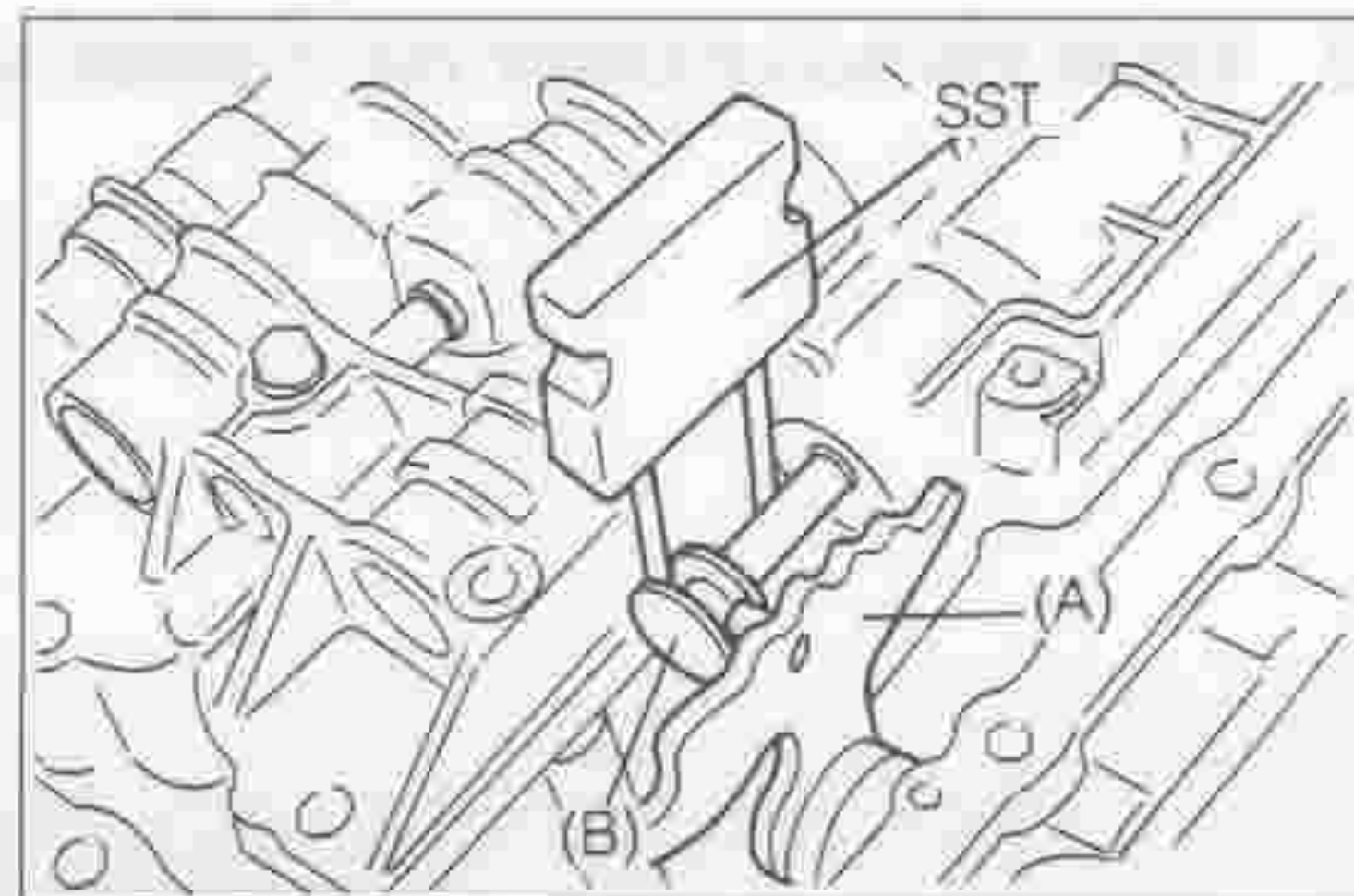


LAT00206-00197

87. Install the valve body assembly with the aforesaid SST to the transaxle case.

NOTE:

- Ensure that the protrusion of the manual valve lever (A) and grooved section of the manual valve (B) are matched securely.



LAT00207-00198

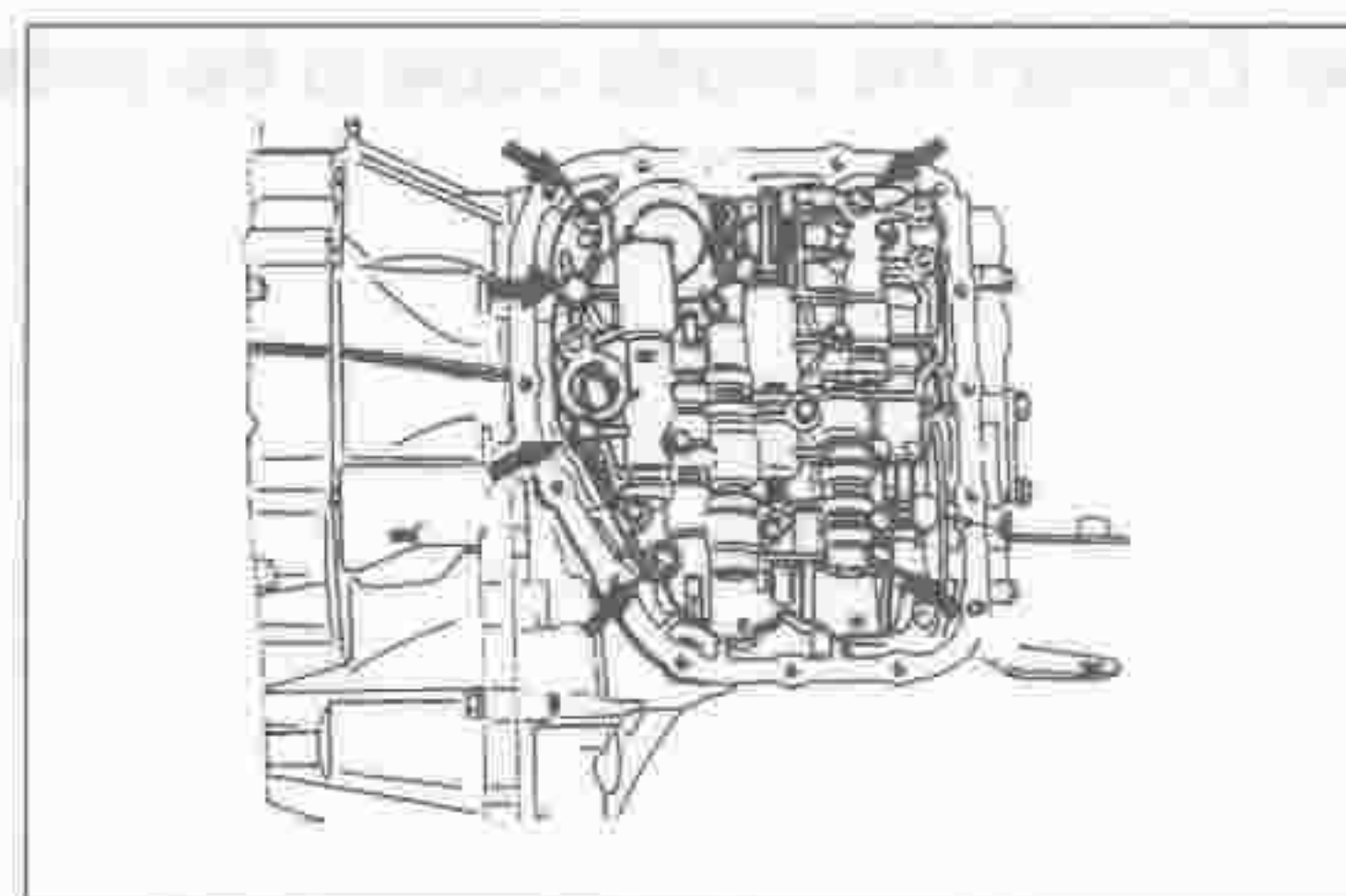
88. Temporarily tighten the six bolts of the valve body assembly.

89. Tighten the bolts of the valve body assembly.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

NOTE:

- The numeral in the right illustration indicates the nominal length of the bolt.
- If the bolt is tightened with any oil getting to the bolt's threaded portion, it may cause the bolt looseness. Therefore, be sure to clean the bolt threaded portion by applying compressed air.



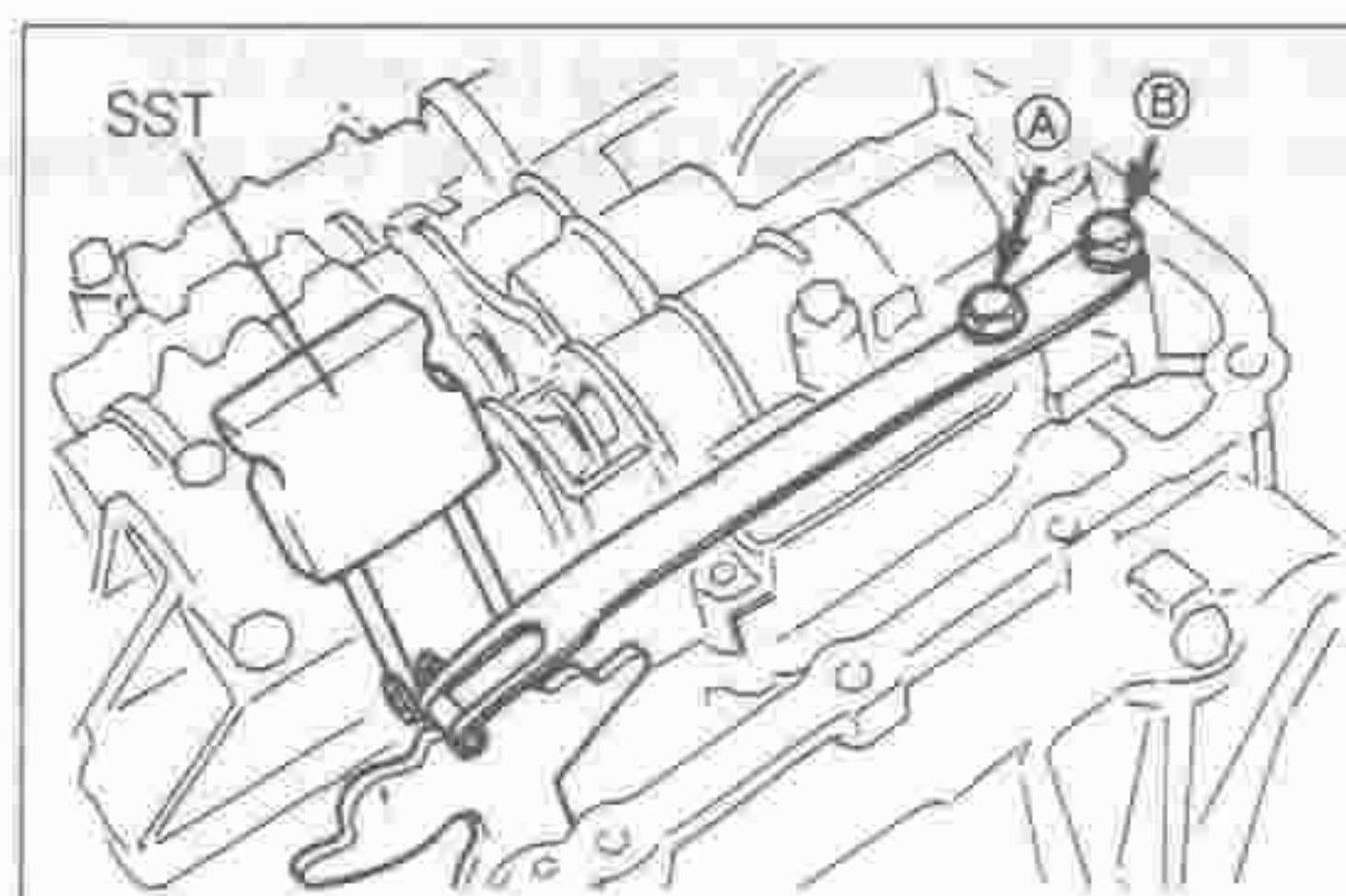
LAT00208-00199

90. Tighten the (A) bolt firstly. Then, proceed to tighten the (B) bolt of the manual detent spring.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

NOTE:

- The numeral in the right figure indicates the nominal length of the bolt.
 (A) = 12 mm (0.47 inch) (B) = 40 mm (1.57 inch)
- Be sure to tighten the bolts alternately.

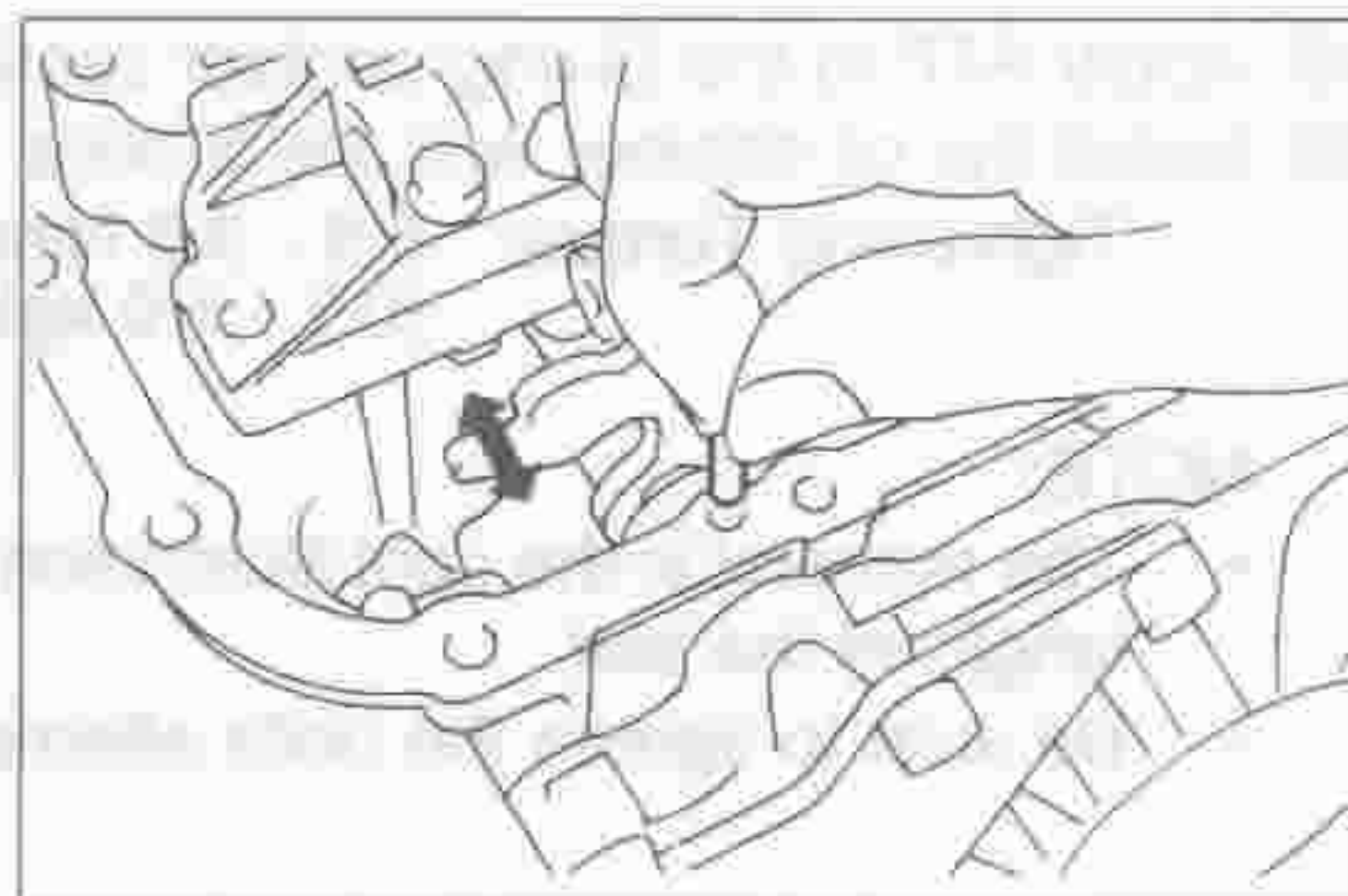


LAT00208-00200

91. Install the roller for the manual valve lever shaft subassembly as illustrated in the right figure.

NOTE:

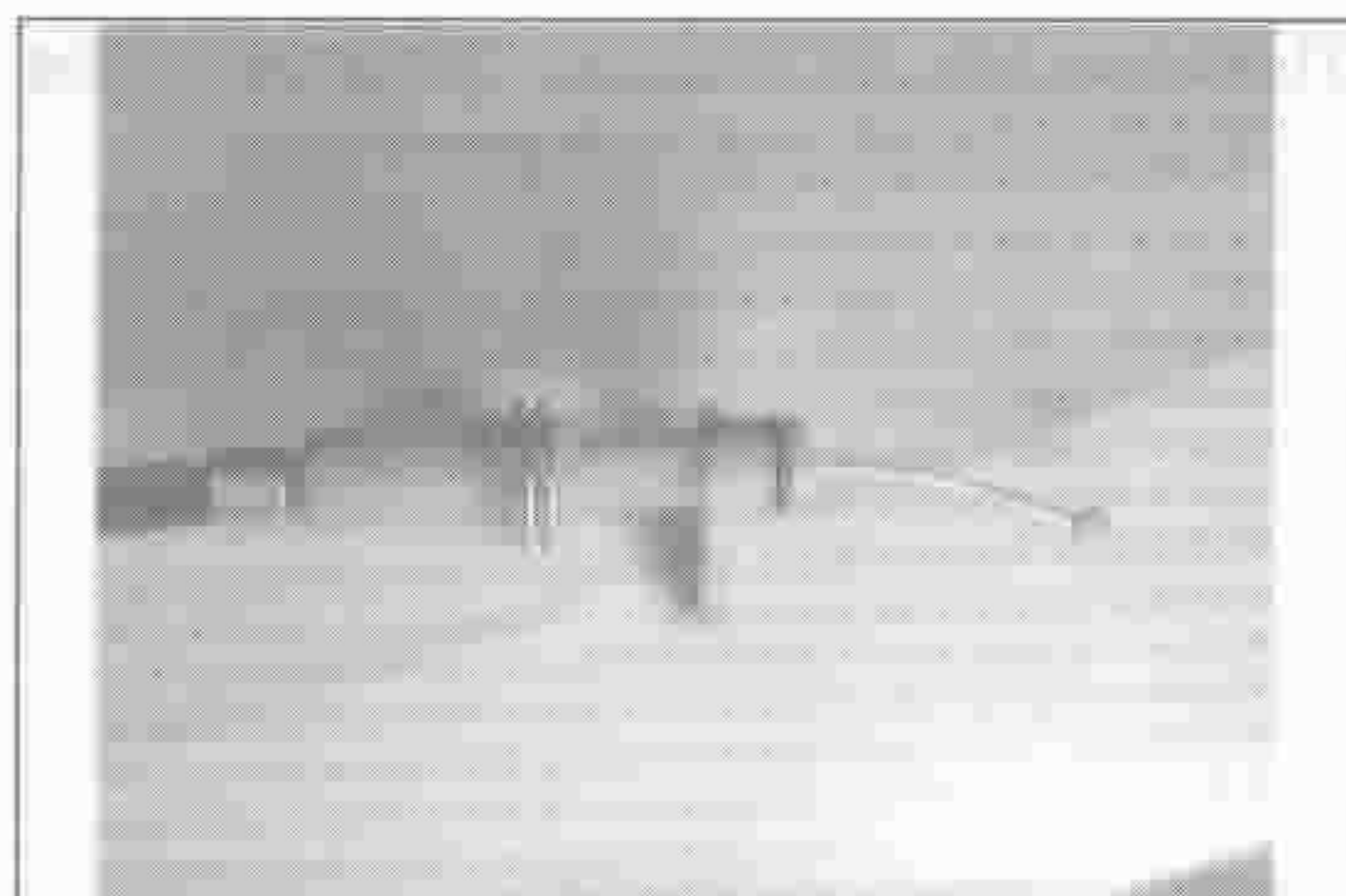
- Make sure that the roller edge surface is lower than the transaxle case edge surface.



LAT00210-00201

92. Coat a new O-ring with the ATF.

93. Install the new O-ring to the throttle cable.



LAT00211-00202

94. Insert the throttle cable to the transaxle case.

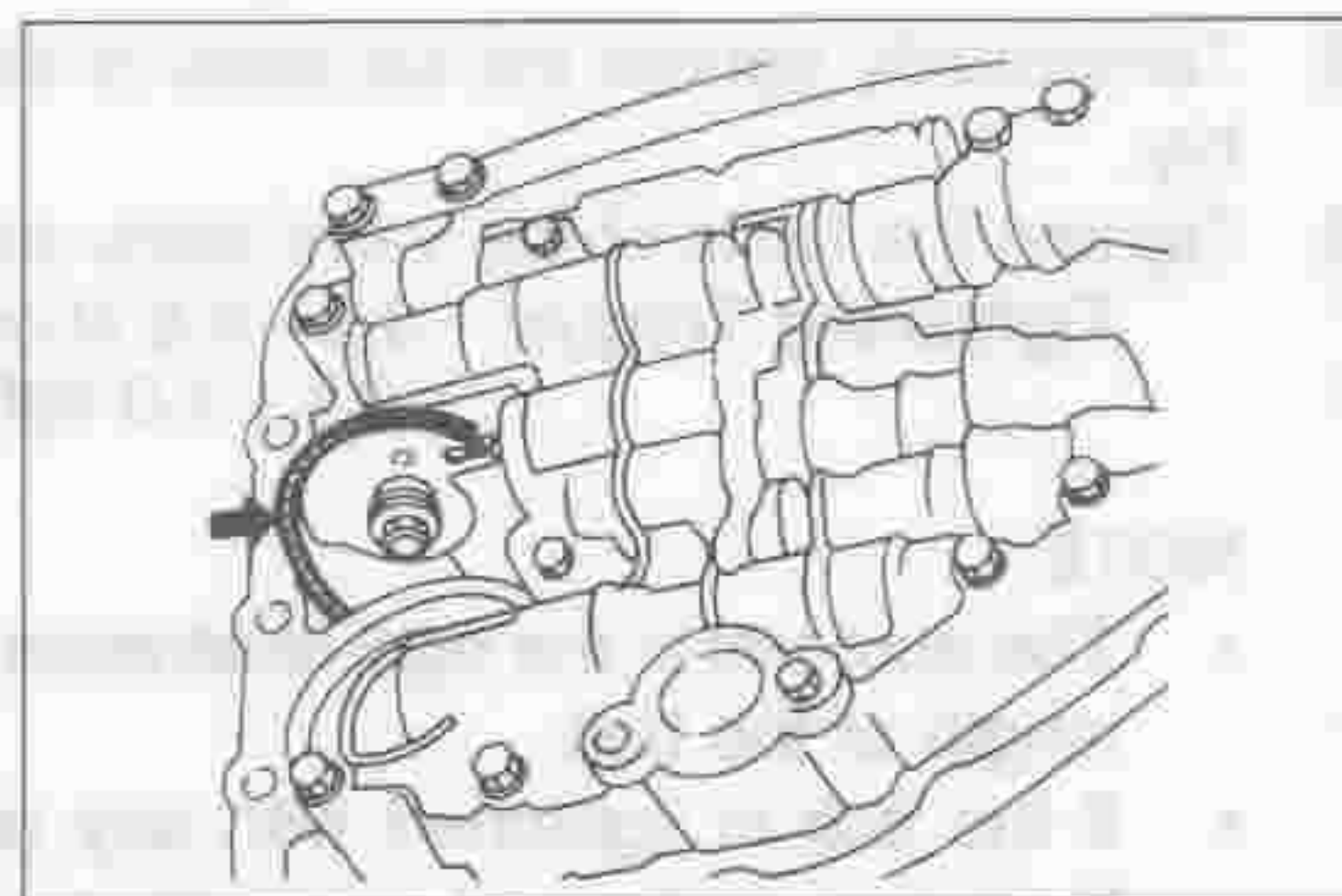
95. Tighten the throttle cable with a bolt.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00212-00203

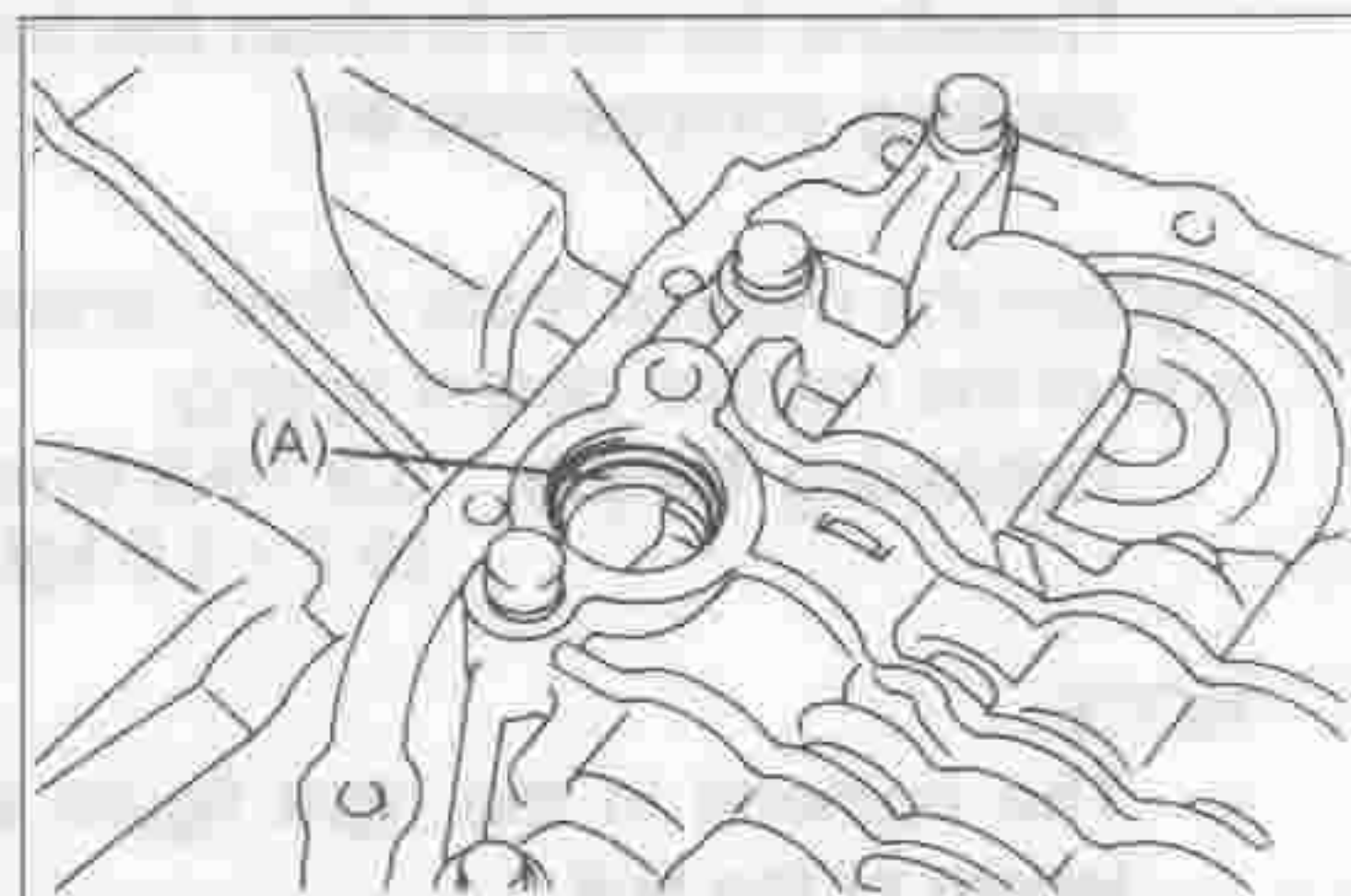
96. Connect the throttle cable to the throttle valve cam.



LAT00213-00204

97. Coat the new O-ring (A) with ATF.

98. Install the new O-ring to the groove section of the valve body.



LAT00214-00205

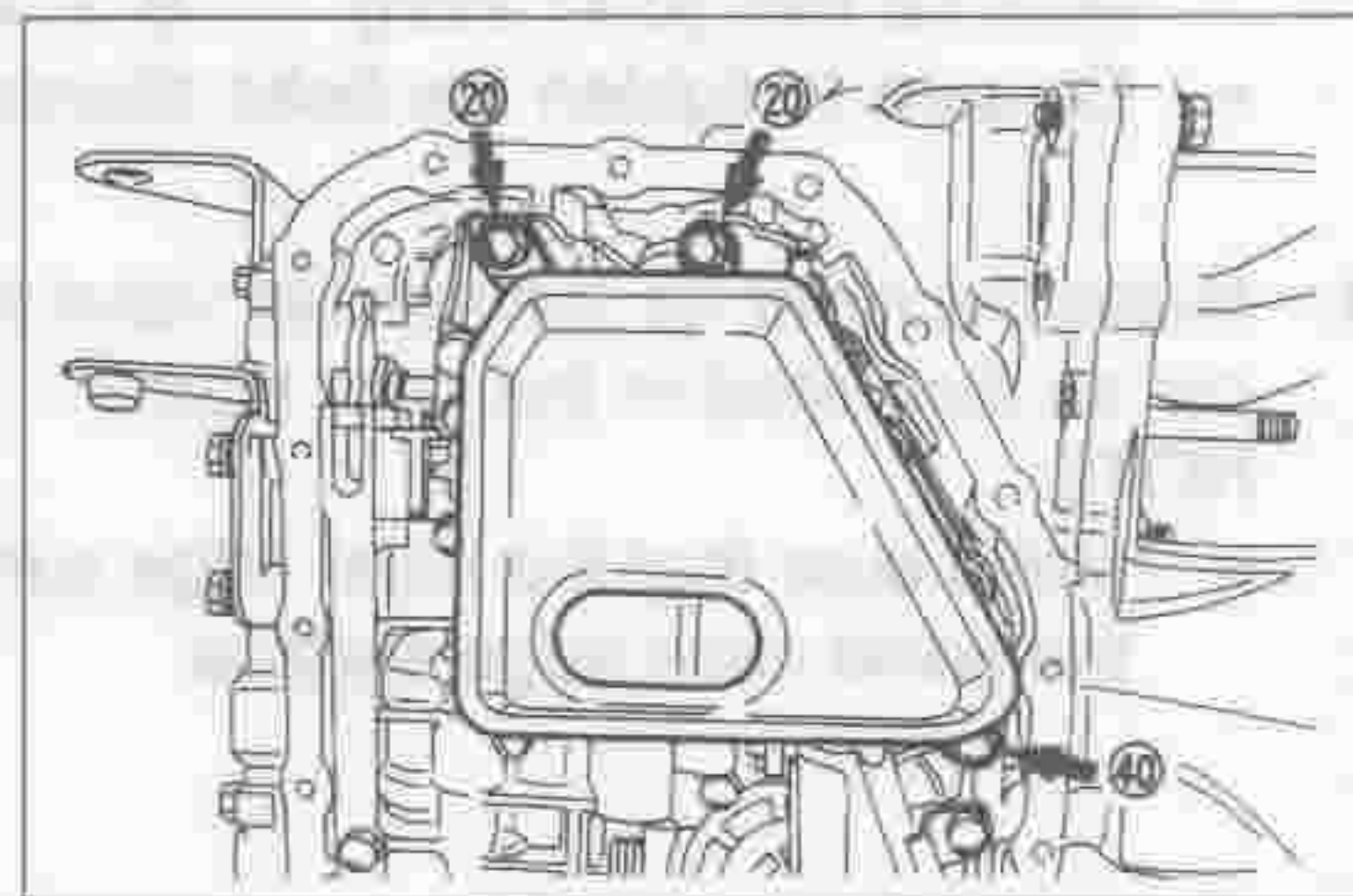
99. Apply ATF to the O-ring contact section of the oil strainer.

100. Install the oil strainer with the 3 bolts.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

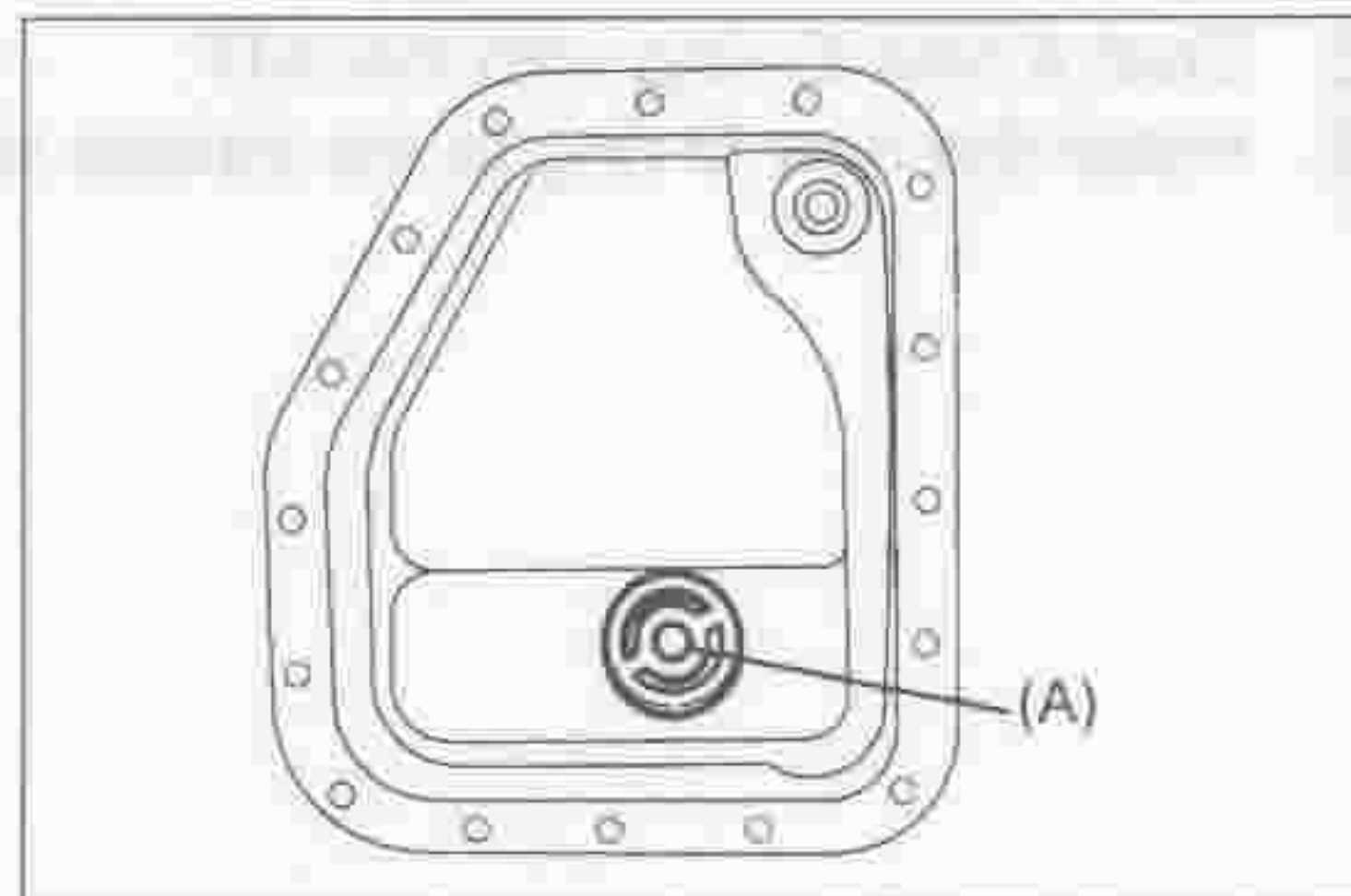
NOTE:

- The numeral in the right illustration indicates the nominal length of the bolt.
- Be sure to tighten the bolts alternately and diagonally.



LAT00215-00206

101. Place the oil cleaner magnet in the protrusion (A) of the transaxle oil pan subassembly.



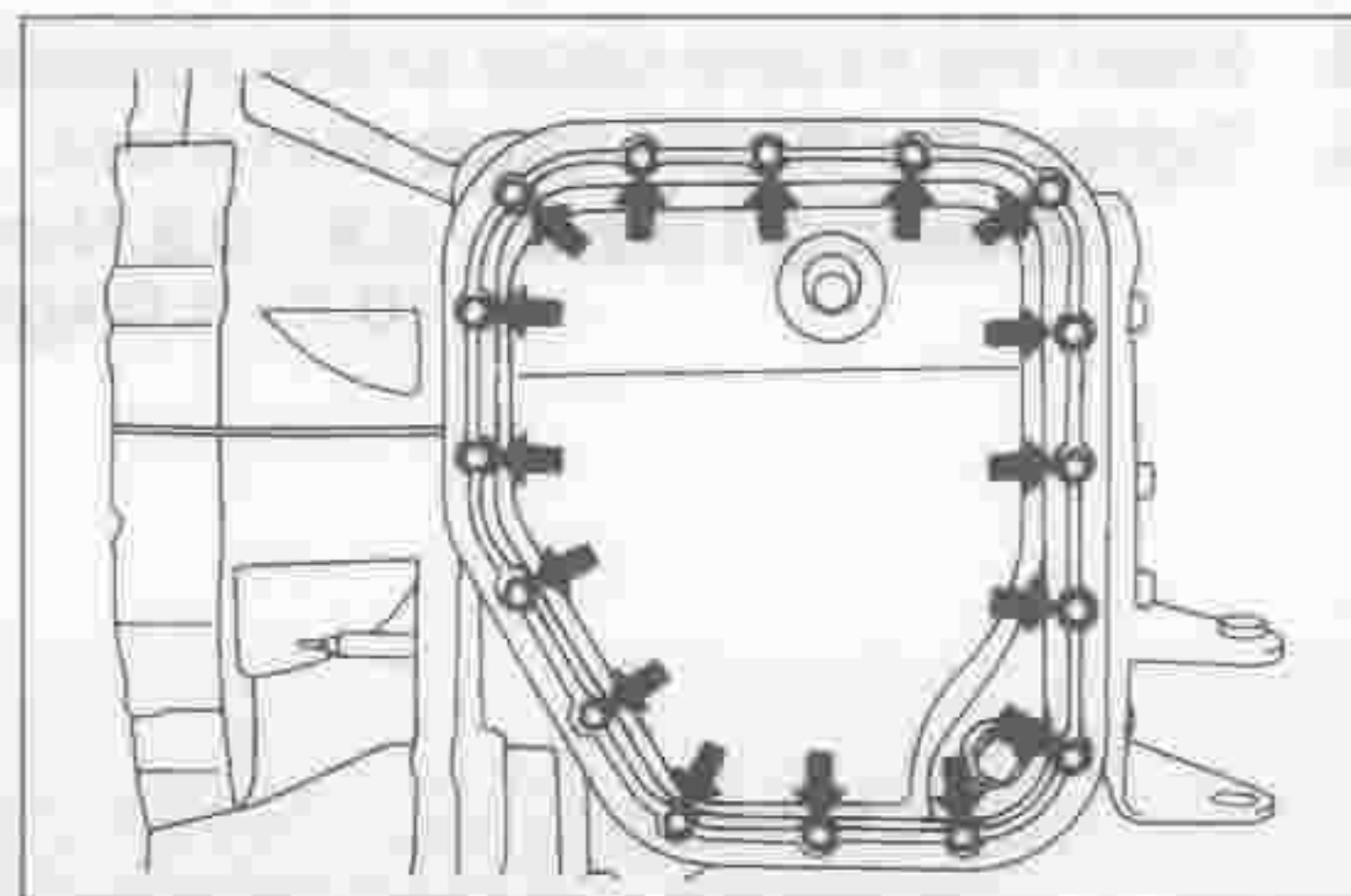
LAT00216-00207

102. With a new gasket interposed, tighten the transaxle oil pan subassembly with the 16 bolts.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

NOTE:

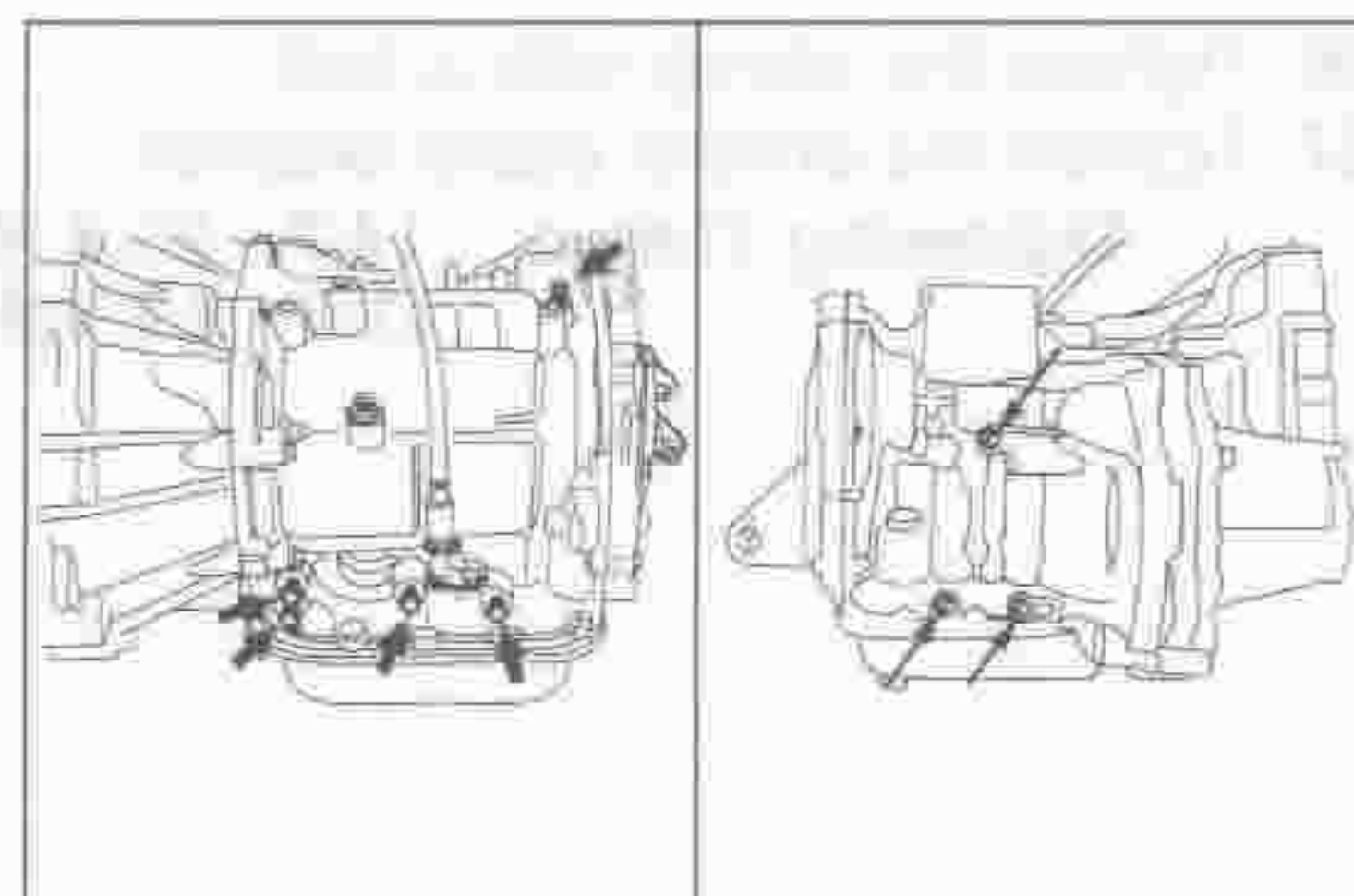
- Be sure to tighten the bolts alternately and diagonally.
- When installing the transaxle oil pan, be very careful not to allow the oil pan to come in contact with any inside part.



LAT00217-00208

103. Tighten eight new inspection plugs to the transaxle case.

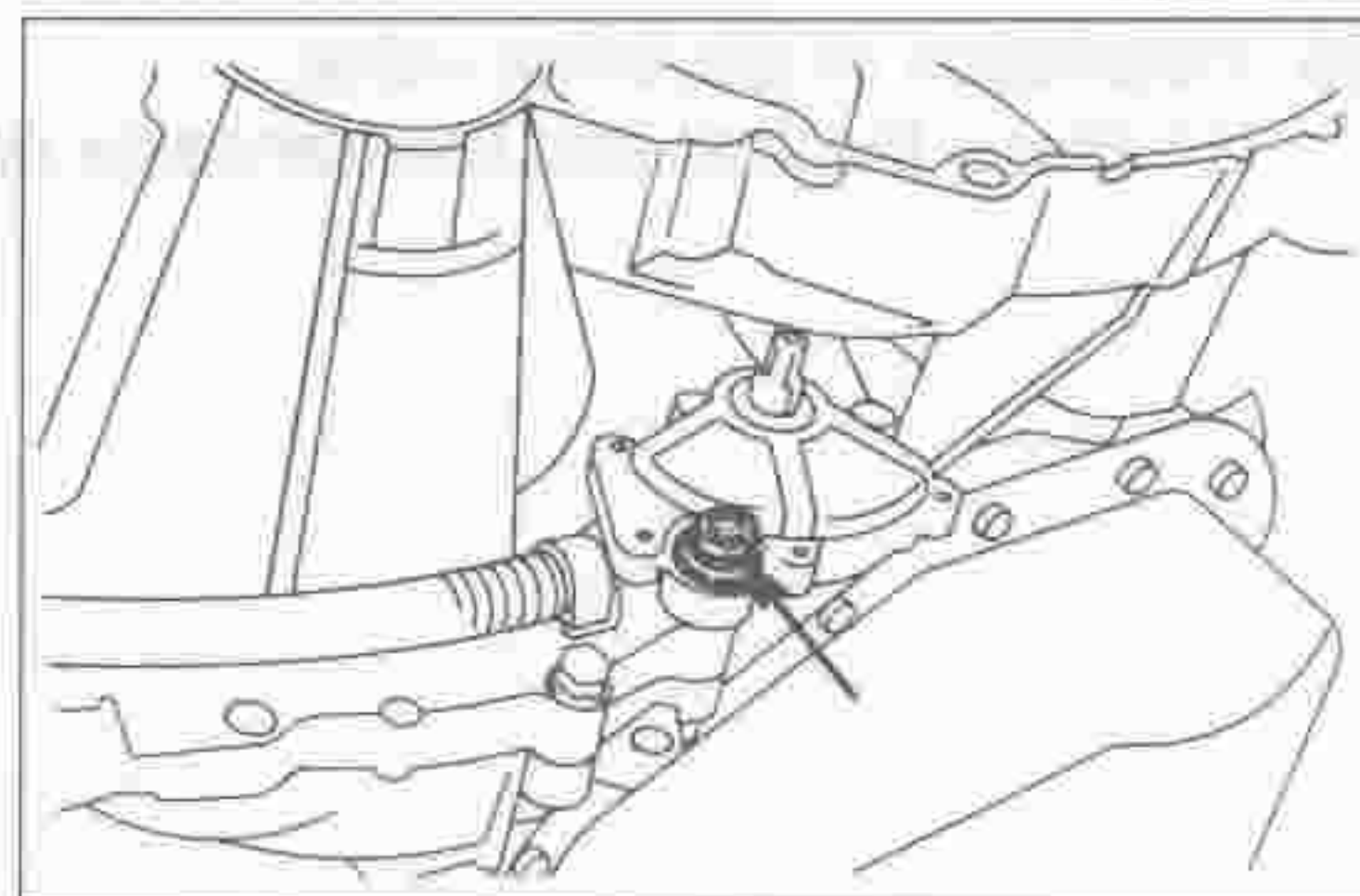
Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00218-00209

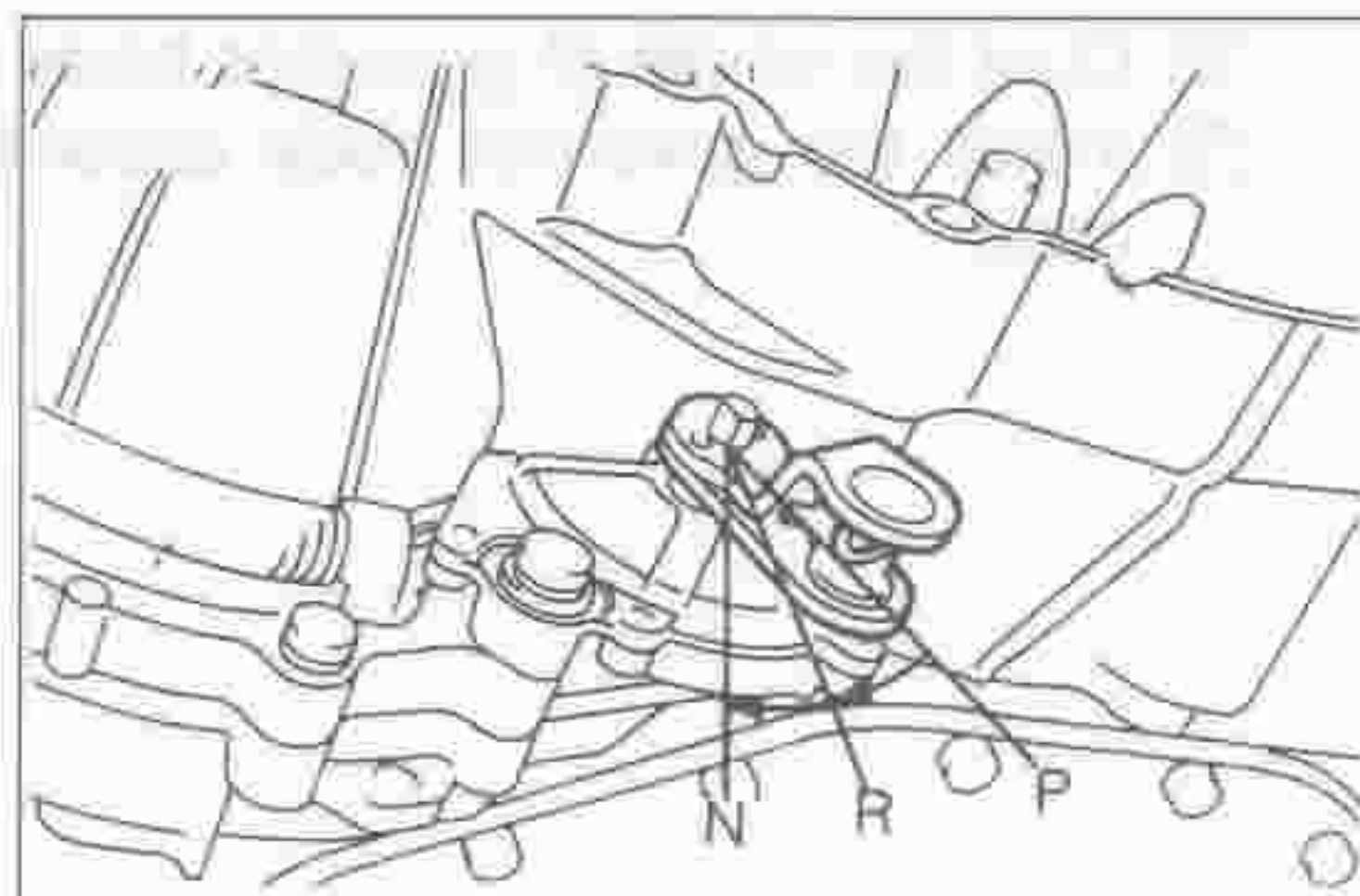
104. Adjustment of neutral start switch

(1) Temporarily tighten the bolt of the neutral start switch assembly.



LAT00219-00210

- (2) Place the transmission control shaft lever subassembly.
- (3) Push the transmission control shaft lever subassembly toward the front side (ie: P range)
- (4) Back off the lever two notches to the NEUTRAL position
- (5) Remove the transmission control shaft lever subassembly.



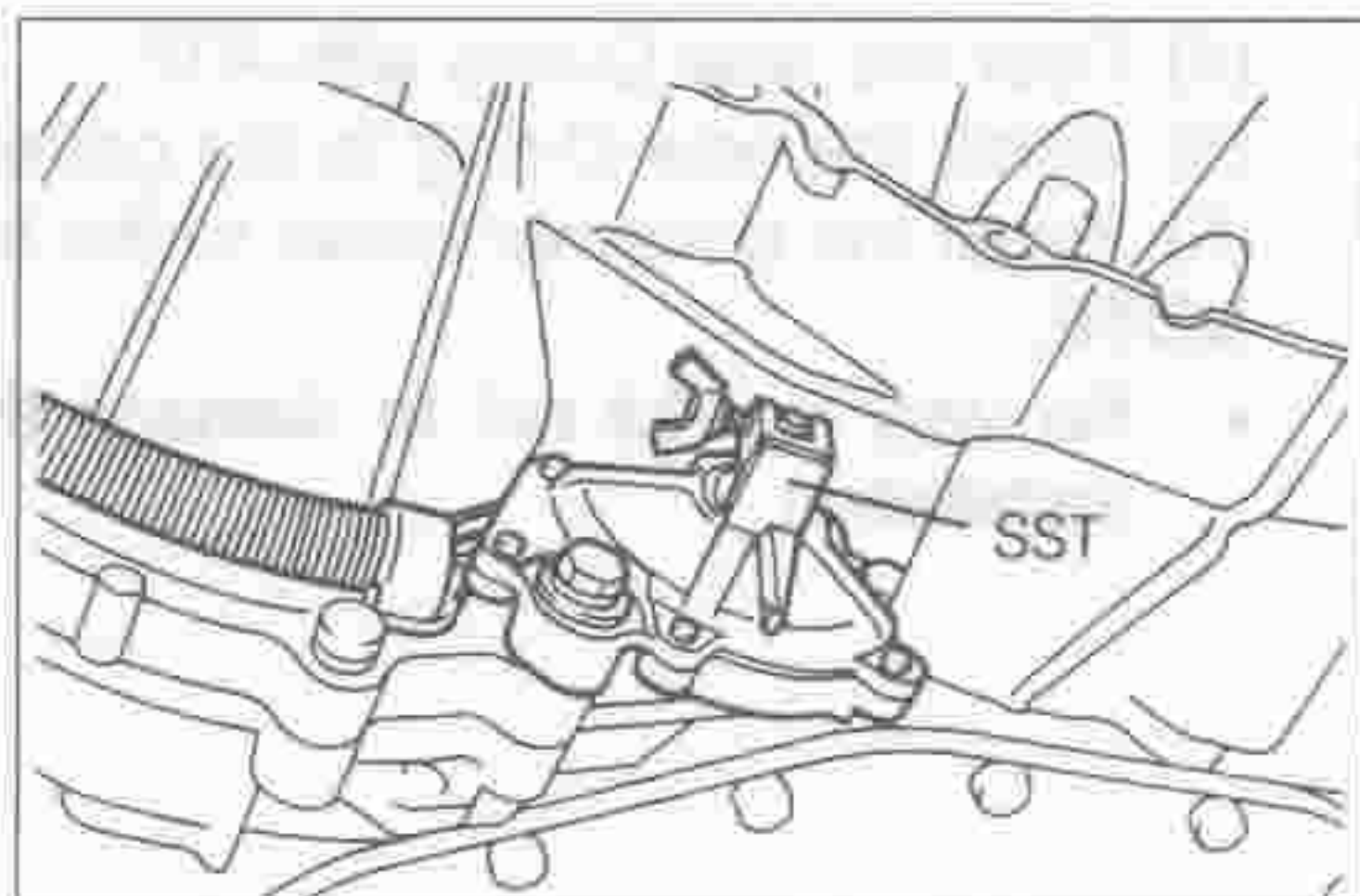
LAT00220-00211

(6) Install the following SST
SST: 09302-87201-000

(7) Adjust the neutral start switch assembly until the neutral basic line should be aligned with SST above.

(8) Tighten the bolt.

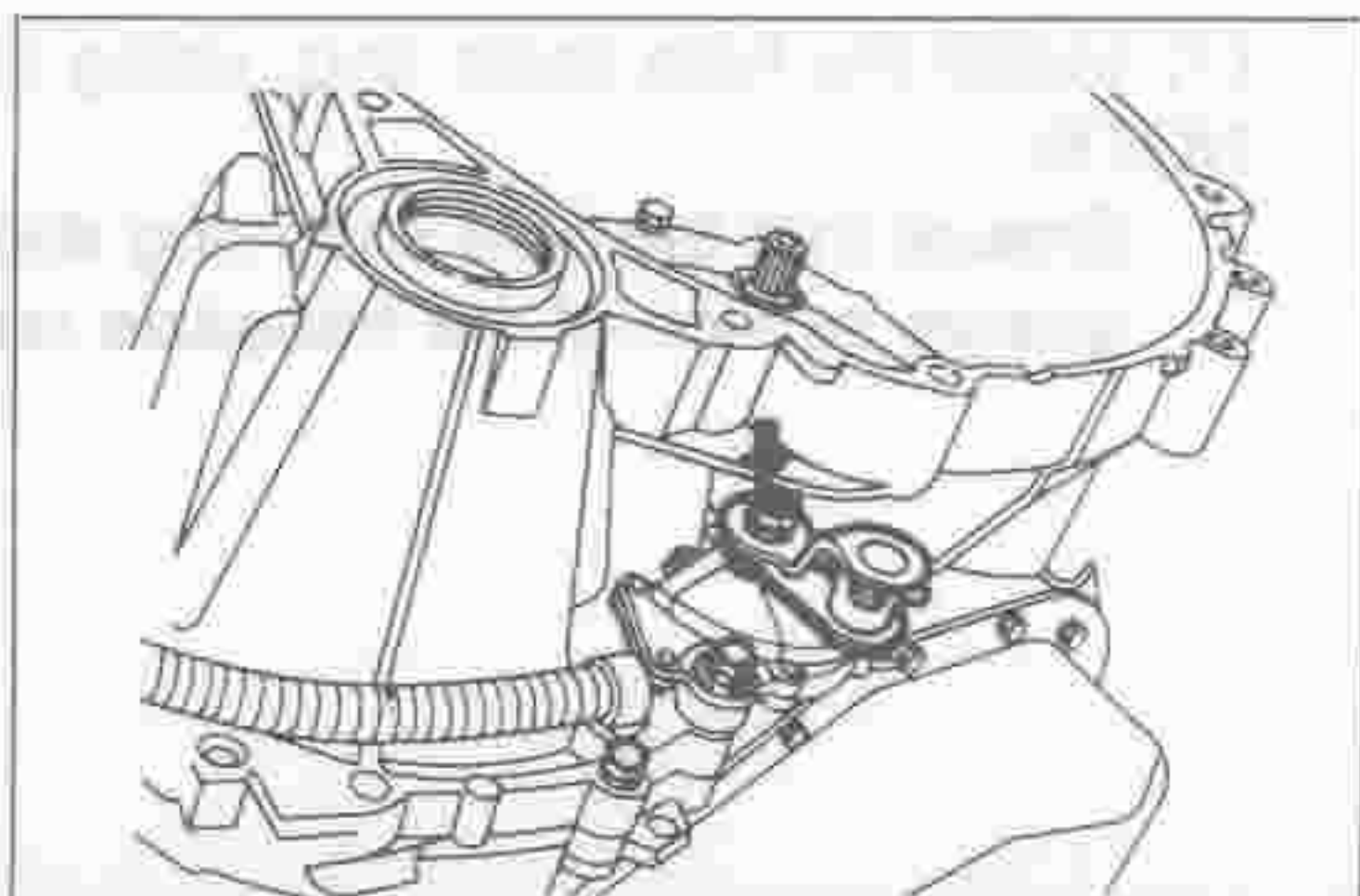
Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)



LAT00221-00212

105. Tighten the transmission control shaft lever subassembly with a nut.

Tightening Torque: 9.8 - 15.7 N·m
(1.0 - 1.6 kgf-m, 7.2 - 11.6 ft-lb)

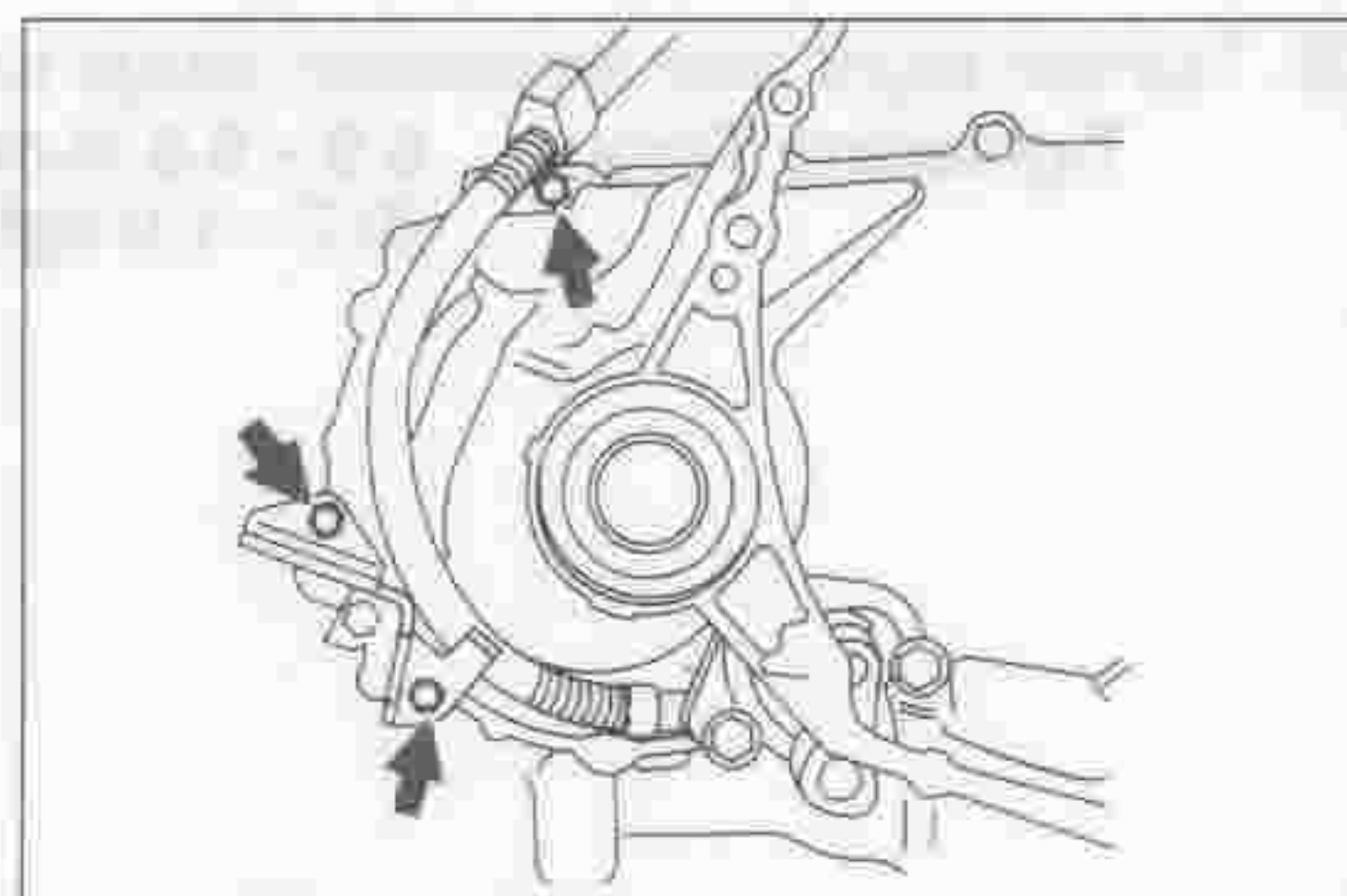


LAT00222-00213

106. Tighten the clamp with a bolt.

107. Tighten the control cable bracket.

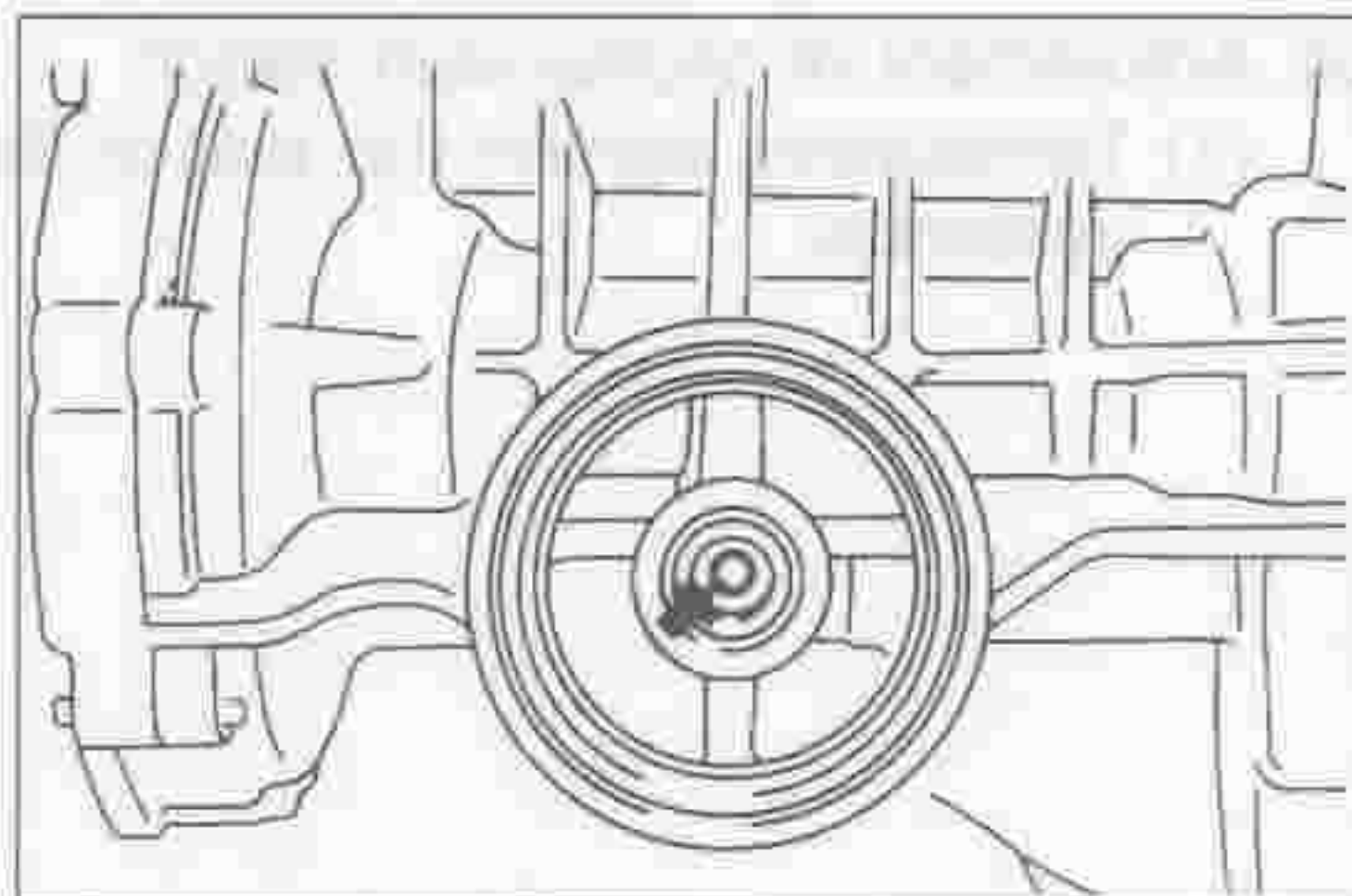
Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)



LAT00223-00214

108. Installation of governor valve.

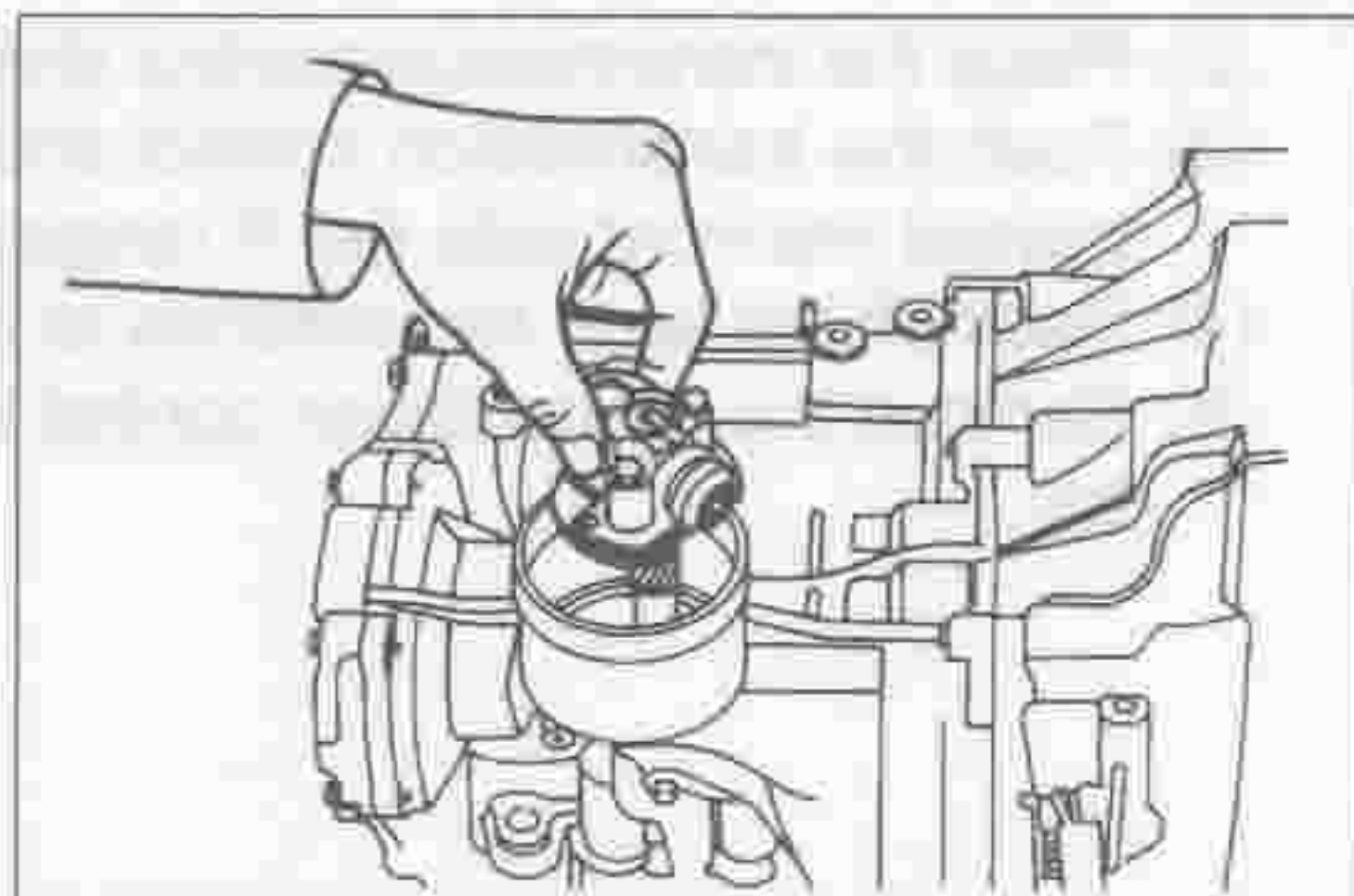
(1) Place the ball into the transaxle case.



LAT00224-00215

(2) Coat the whole of governor body assembly with ATF.

(3) Install the governor body assembly into the transaxle case.



LAT00225-00216

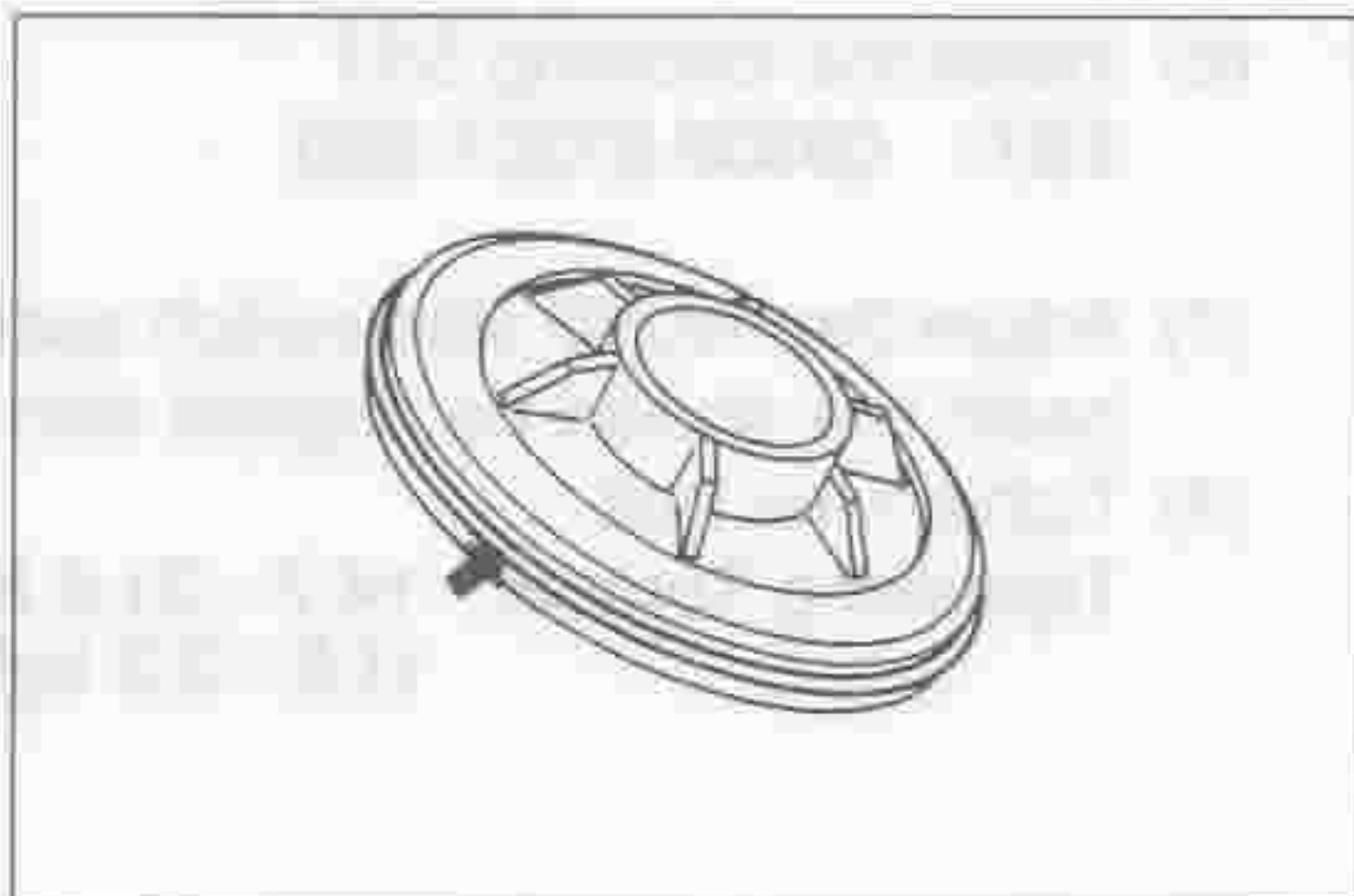
(4) Coat the new O-ring with ATF.

(5) Install the new O-ring to the governor cover.

(6) Install the governor cover to the transaxle case.

NOTE:

- Be very careful not to damage the new O-ring during installation.

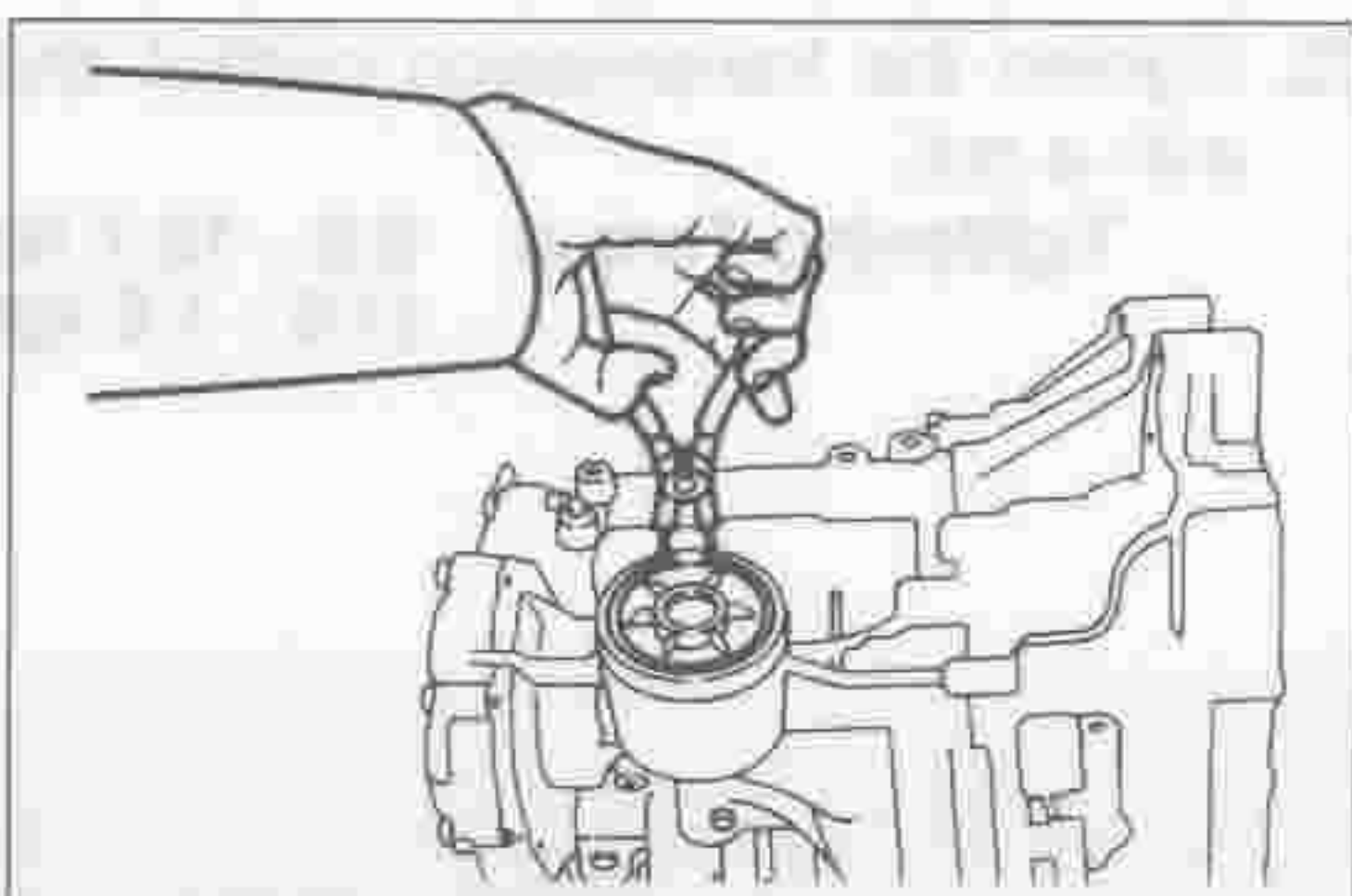


LAT00226-00217

(7) Install the hole snap ring, using the standard plier.

NOTE:

- Ensure that the hole snap ring should be installed to the groove section of the transaxle case.

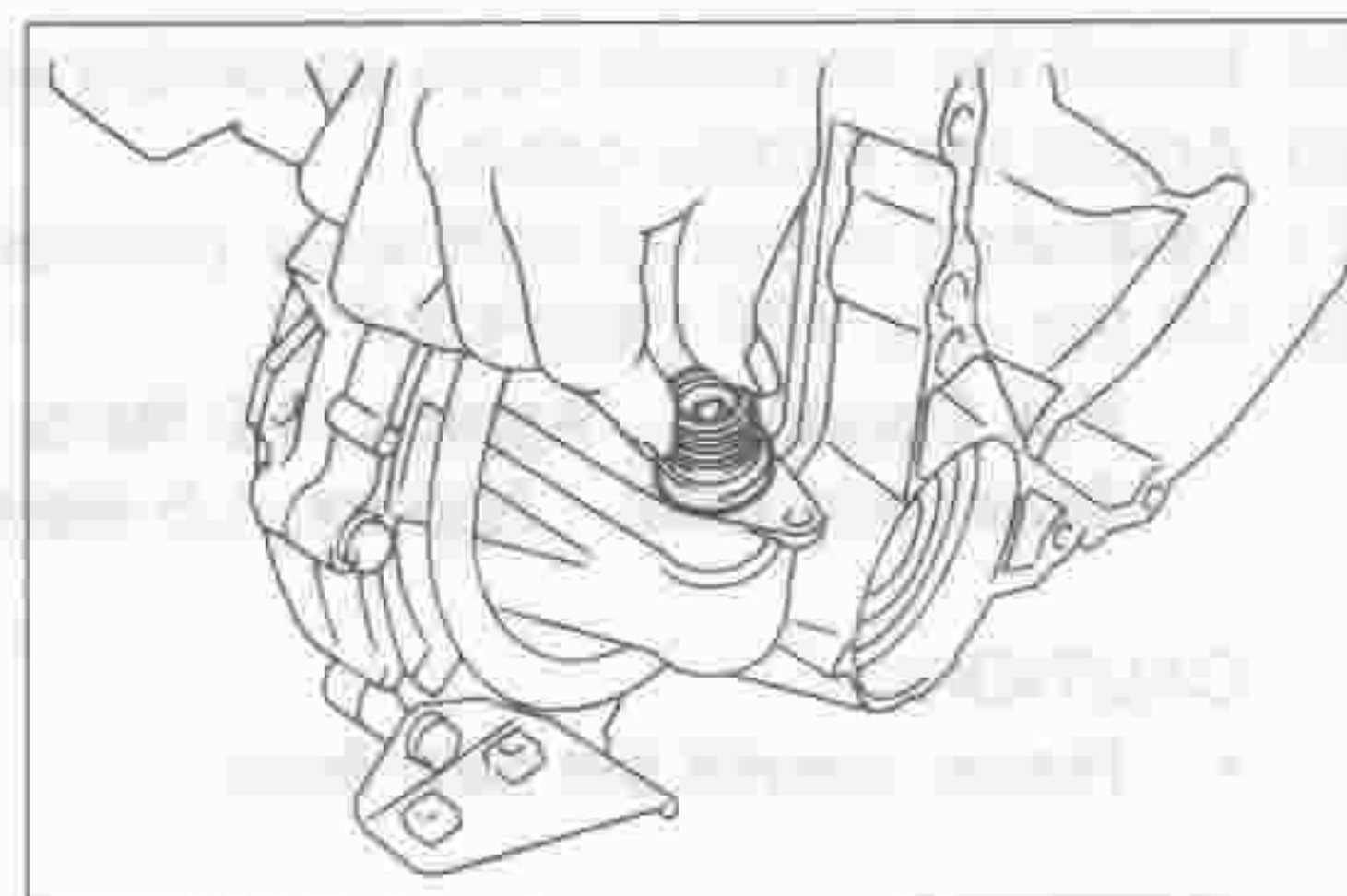


LAT00227-00218

109. Coat the new O-ring section of the speedometer shaft sleeve with the ATF.
110. Insert the speedometer driven gear subassembly into the transaxle case.

NOTE:

- It is recommended to hold the speedometer shaft sleeve during the installation of the speedometer driven gear subassembly.

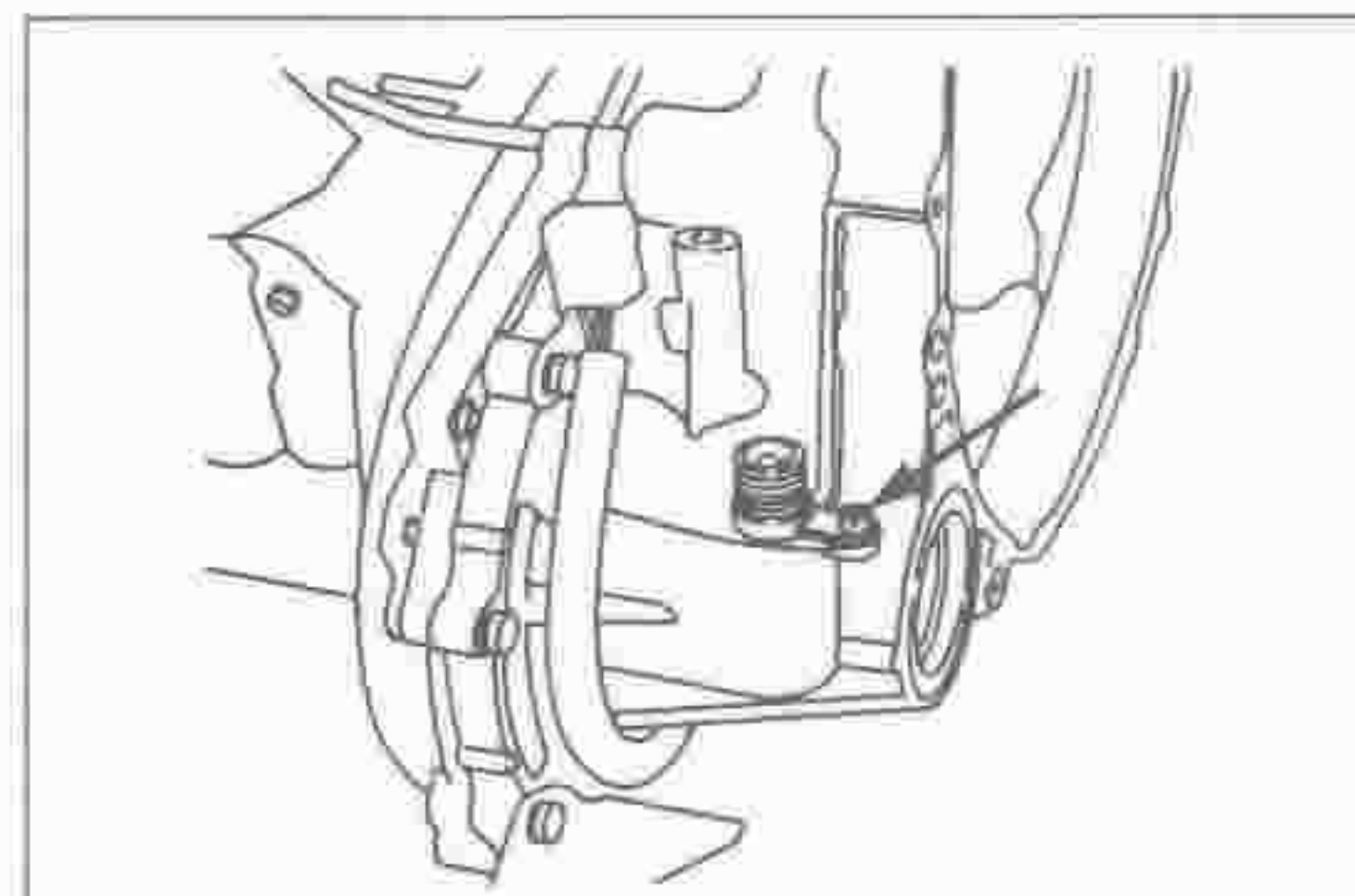


LAT00228-00219

111. Place the speedometer sleeve lock plate.

112. Tighten it with the bolt.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00229-00220

113. Tighten the new unions (for the oil cooler).

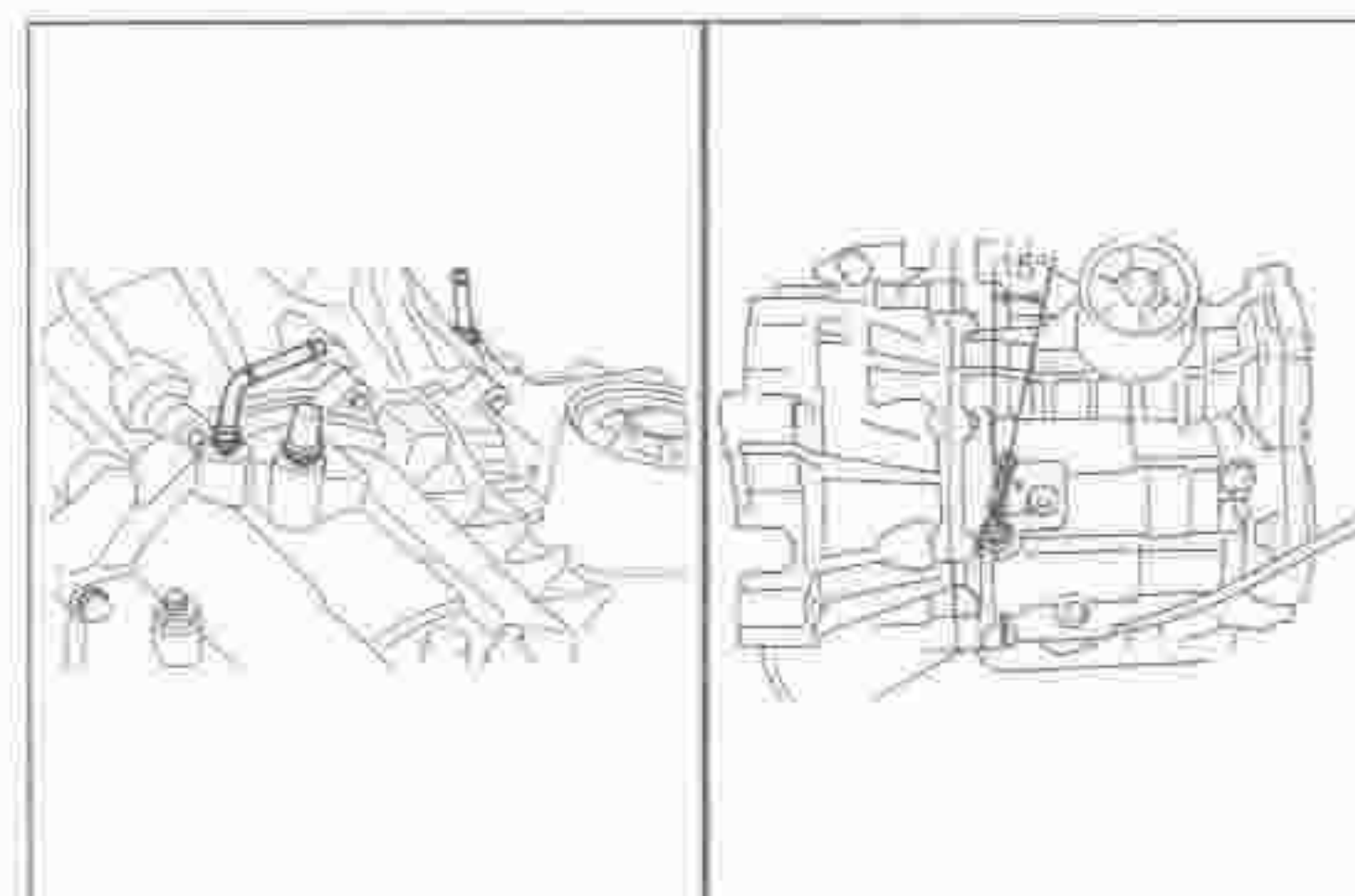
Tightening Torque: 6.9 - 15.7 N·m
(0.7 - 1.6 kgf-m, 5.1 - 11.6 ft-lb)

NOTE:

- Be sure to align the union installation position with the mating mark position (protruding section) provided on the transaxle.

114. Tighten the breather plug.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00230-00221

115. Coat a new O-ring with the ATF.

116. Install the new O-ring to the transmission oil filler tube sub-assembly.

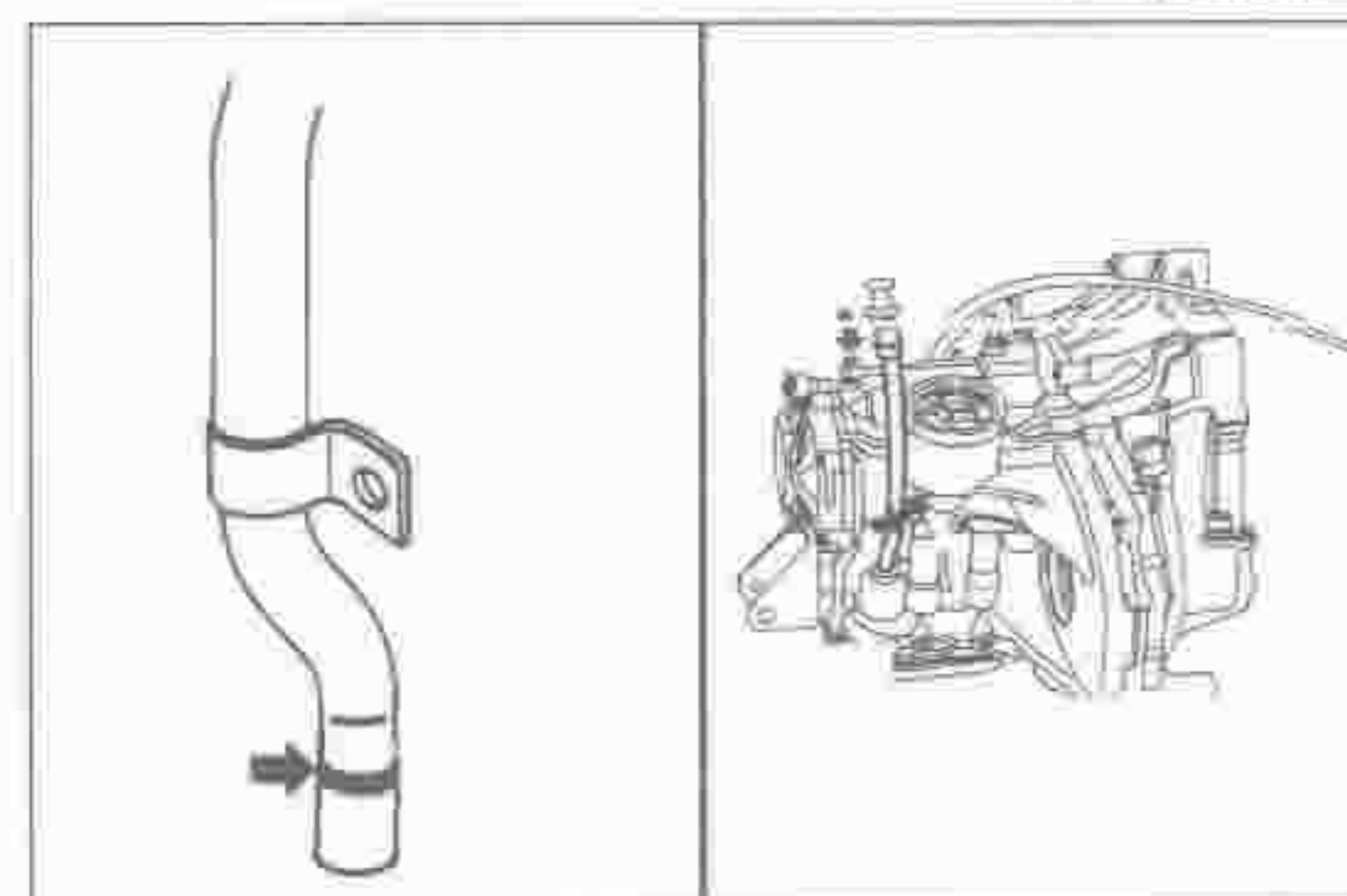
NOTE:

- Be very careful not to twist or damage of the O-ring during installation of the transmission oil filler tube sub-assembly.

117. Insert the transmission oil filler tube subassembly to the transaxle case.

118. Tighten the transmission oil filler tube subassembly with the bolt.

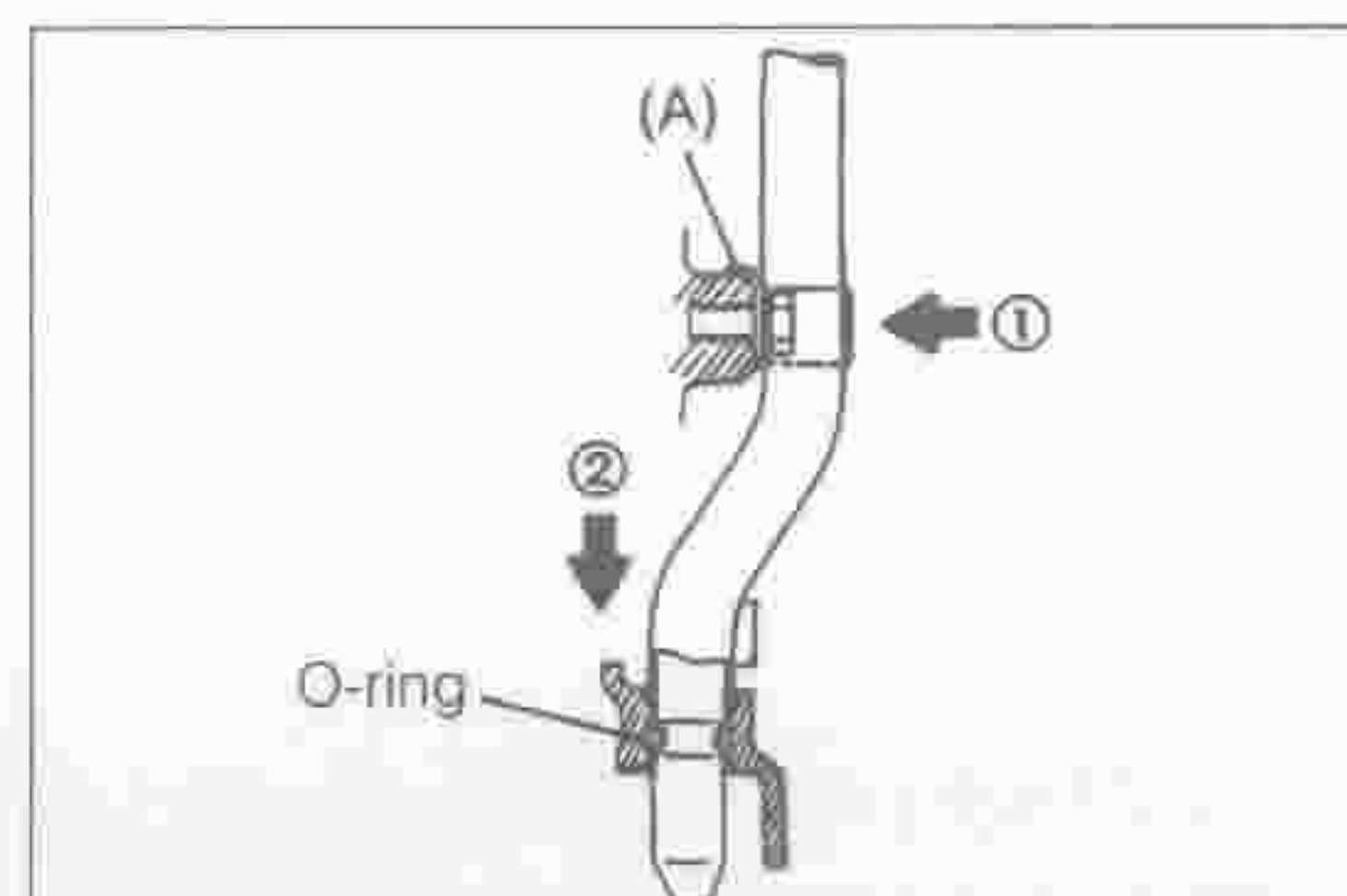
Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)



LAT00231-00222

NOTE:

- If the transmission oil filler tube subassembly is pushed too strongly when it is inserted into the transaxle case, the O-ring may get into the transaxle case, making it difficult to take the O-ring from outside. Hence, utmost care must be paid during the insertion.
- It is recommended to insert the oil filler tube subassembly while applying the stopper section (A) in the right figure to the transaxle case.



LAT00232-00223

AT-76

119. Install the transaxle case assembly to the vehicle.
120. Adjust the throttle cable.
121. Operation check of shift lever position.
122. Fill the new ATF DEXRON® II.

Full Capacity: Approx. 4.0 liters
 Drain and refill: Approx. 1.5 liters

CAUTION:

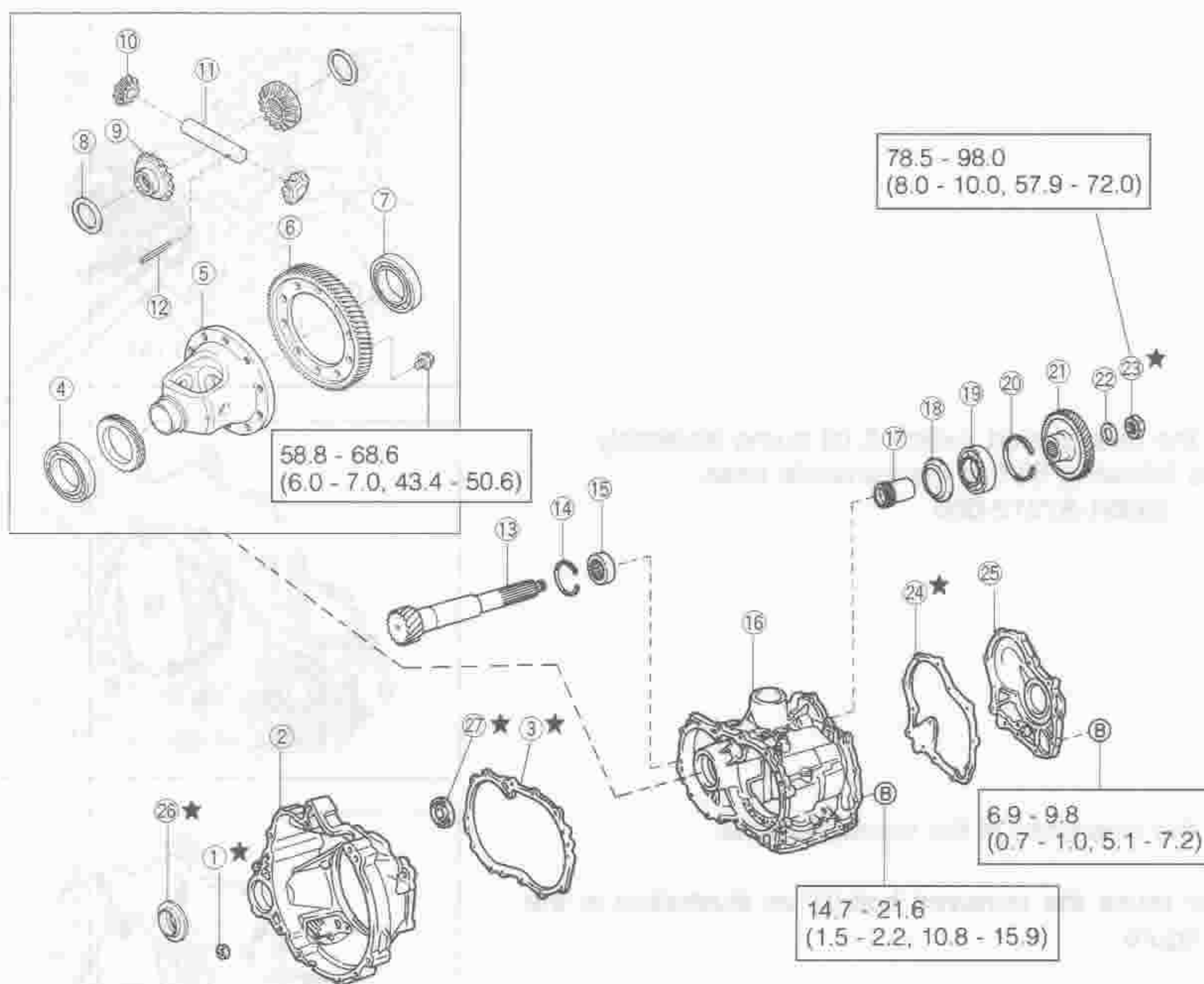
- Never overfill the new fluid.



LAT00233-00000

TORQUE CONVERTOR & DIFFERENTIAL CASE COMPONENTS

□ : Tightening torque
Unit : N·m (kgf-m, ft-lb)
★ : Non-reusable parts



- ① T-type oil seal
- ② Torque converter & differential case
- ③ Transmission case gasket
- ④ Radial ball bearing
- ⑤ Differential case
- ⑥ Differential ring gear
- ⑦ Radial ball bearing
- ⑧ Differential side gear thrust washer
- ⑨ Differential side gear
- ⑩ Differential pinion
- ⑪ Differential pinion shaft
- ⑫ Slotted spring pin
- ⑬ Output shaft
- ⑭ Hole snap ring

- ⑮ Cylindrical roller bearing
- ⑯ Transaxle case
- ⑰ Governor drive gear assembly
- ⑱ Oil reserve plate
- ⑲ Radial ball bearing
- ⑳ Hole snap ring
- ㉑ Primary reduction driven gear
- ㉒ Conical spring washer
- ㉓ Lock nut
- ㉔ Transaxle case rear cover gasket
- ㉕ Rear transmission case cover subassembly
- ㉖ T-type oil seal (for RH drive shaft)
- ㉗ T-type oil seal (for LH drive shaft)

DISASSEMBLY

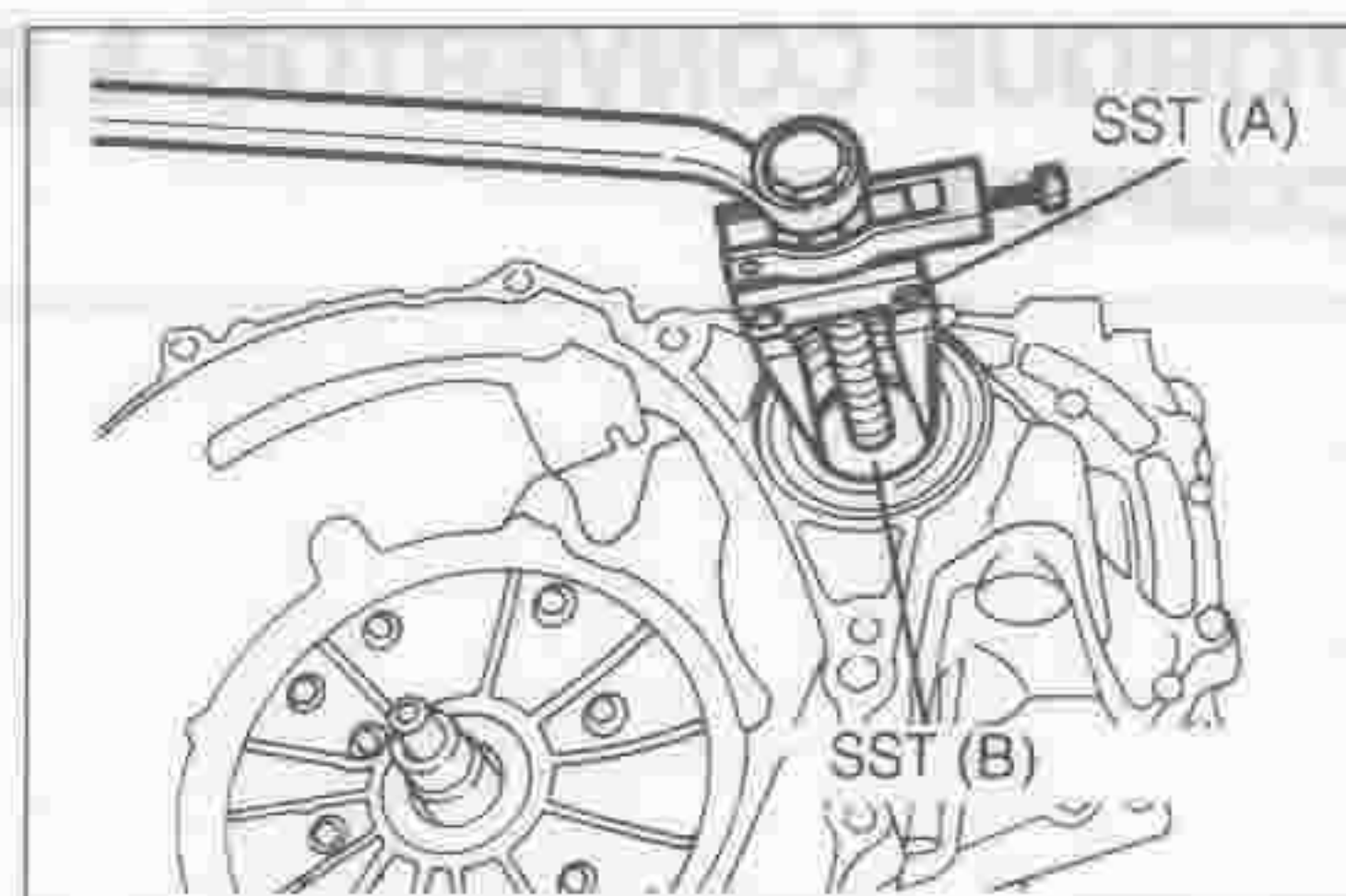
1. Remove the transaxle case assembly from the vehicle
2. Remove the T-type oil seal, using the following SST.

SST: 09308-10010-000 ... (A)

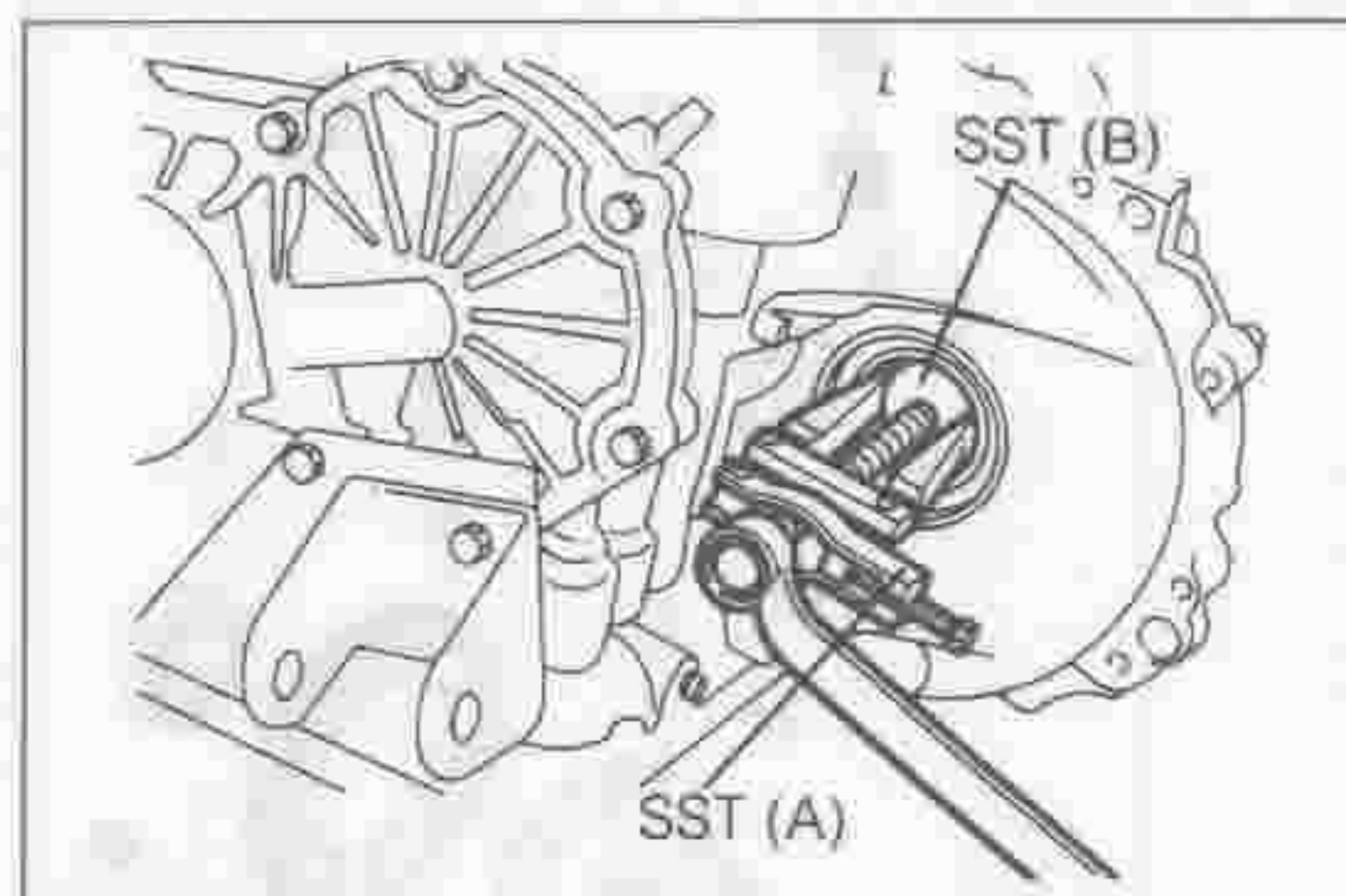
09950-20017-000 (Adapter D) ... (B)

NOTE:

- Never reuse the removed oil seal



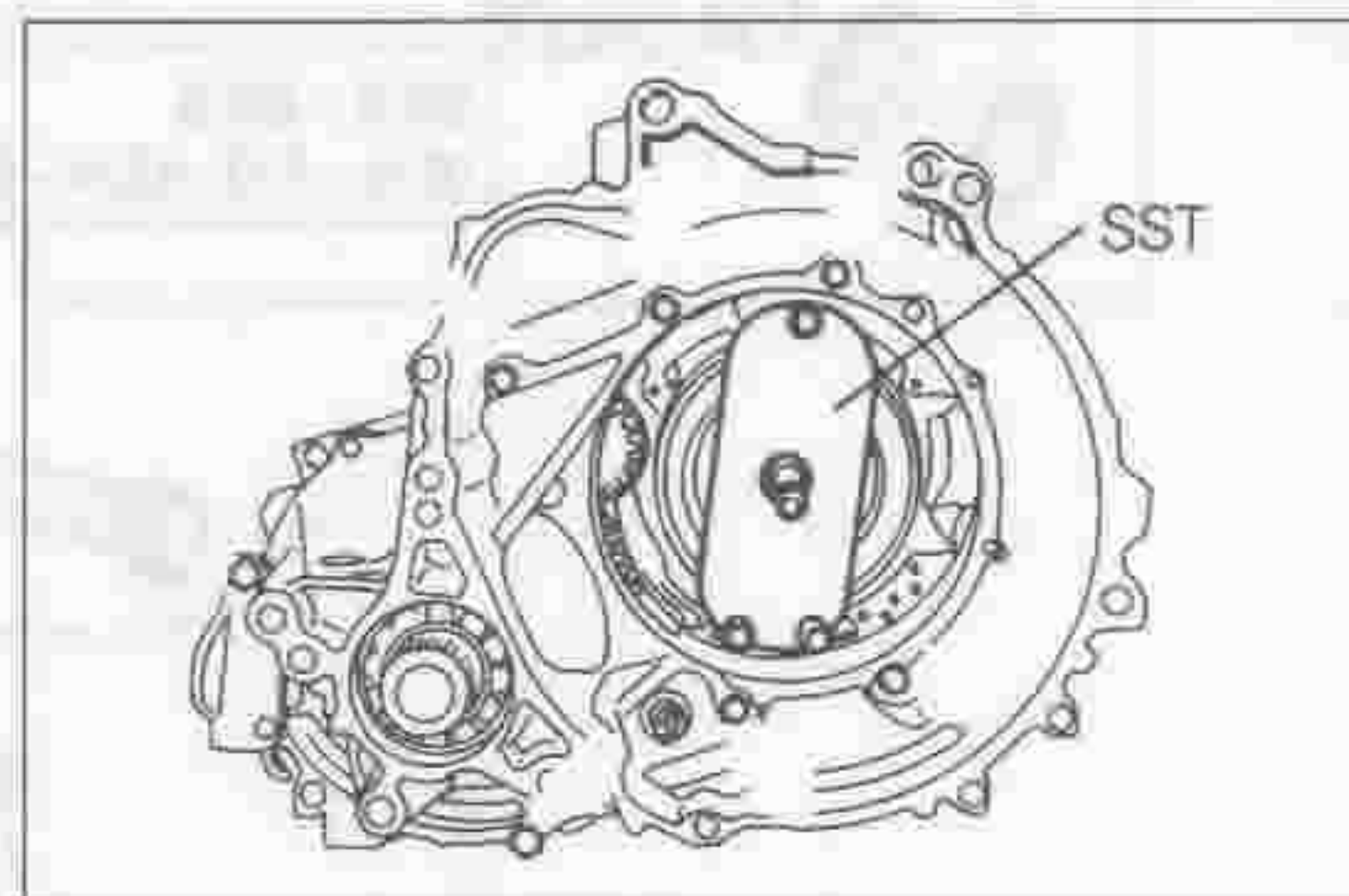
LAT00235-00225



LAT00000-00226

3. Remove the neutral start switch & oil pump assembly
4. Install the following SST to the transaxle case.

SST: 09351-87212-000

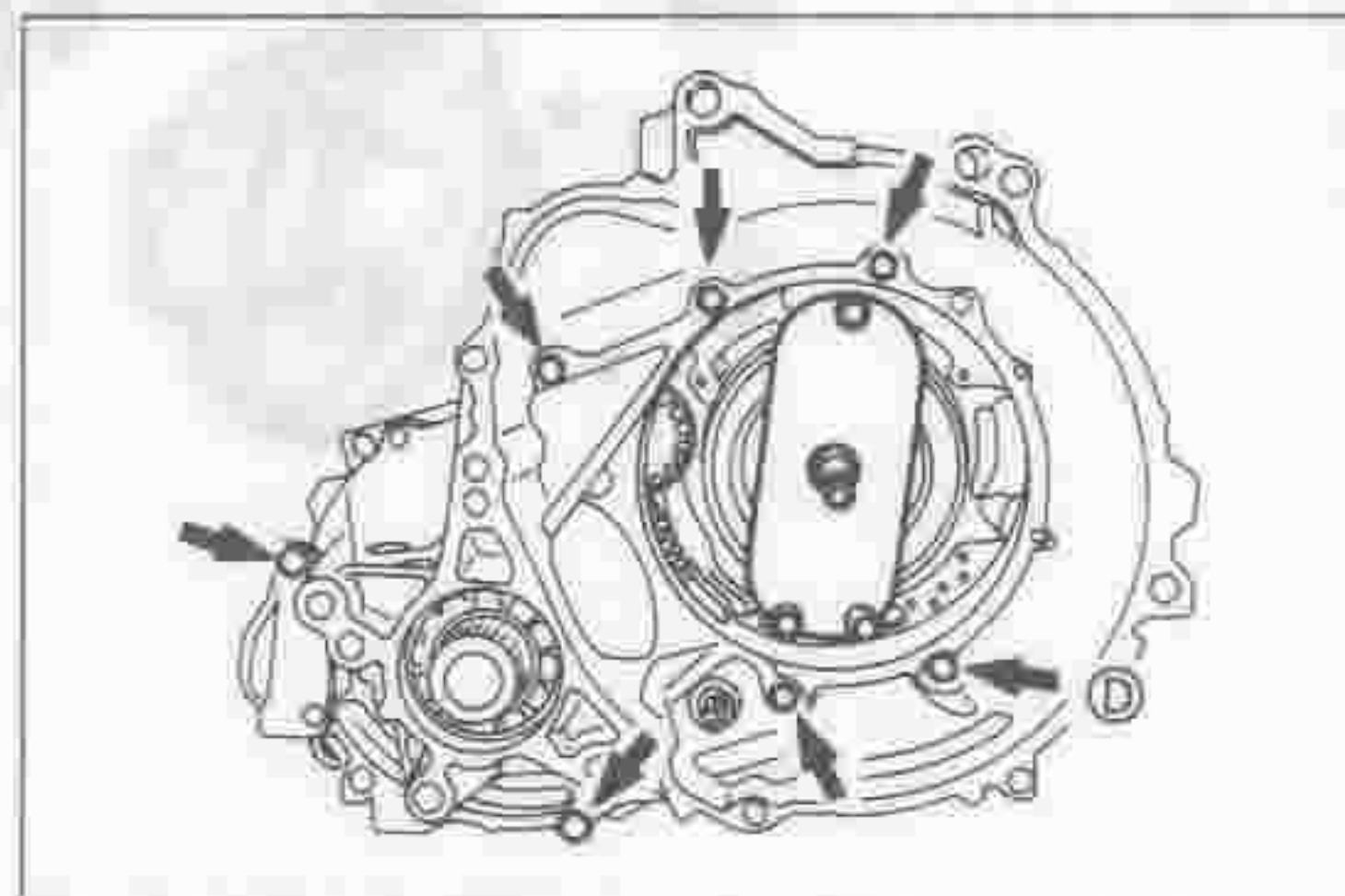


LAT00238-00227

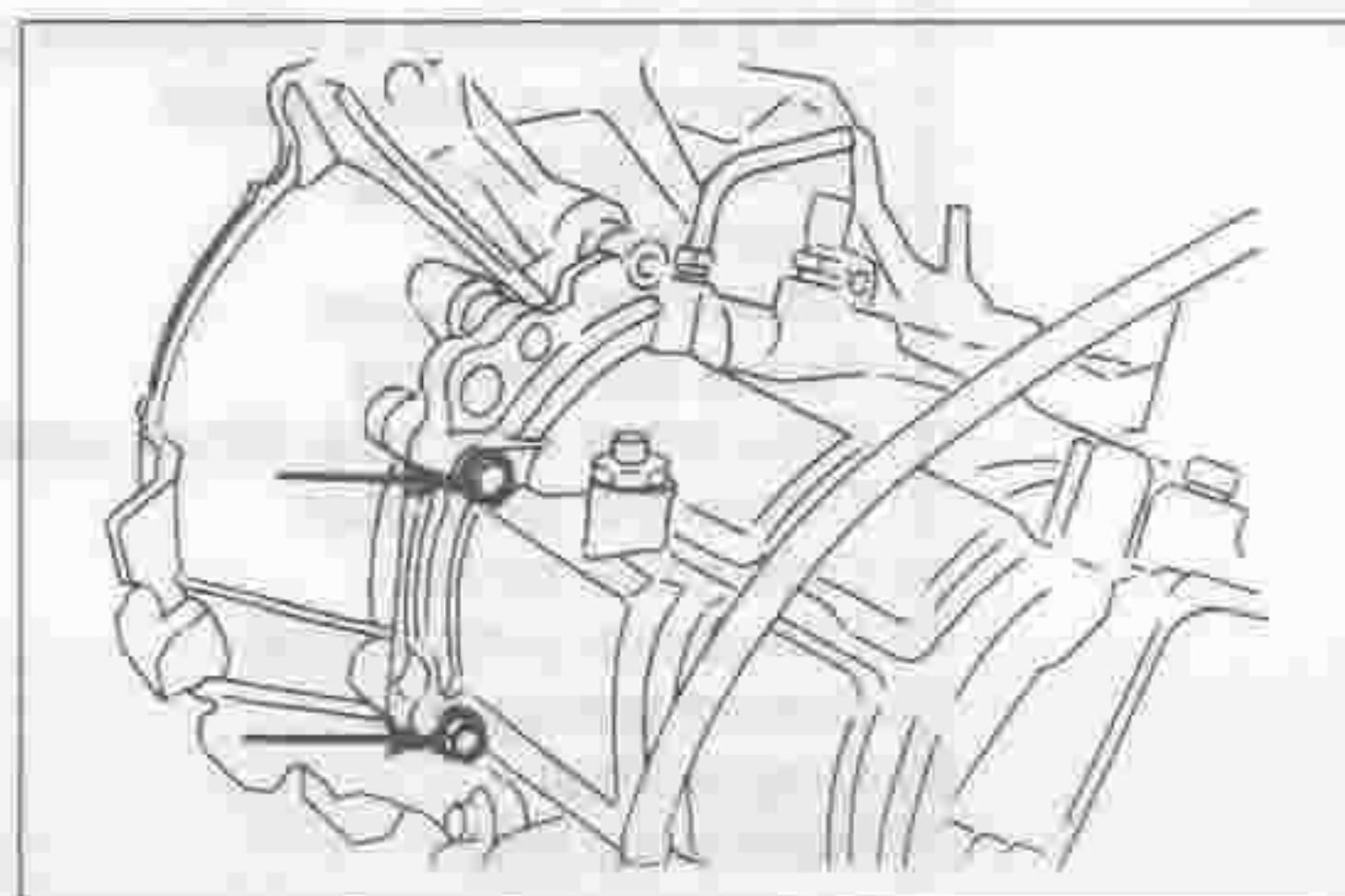
5. Remove the nine bolts of the transaxle case.

NOTE:

- Never reuse the removed bolt ① as illustration in the right figure.



LAT00237-00228



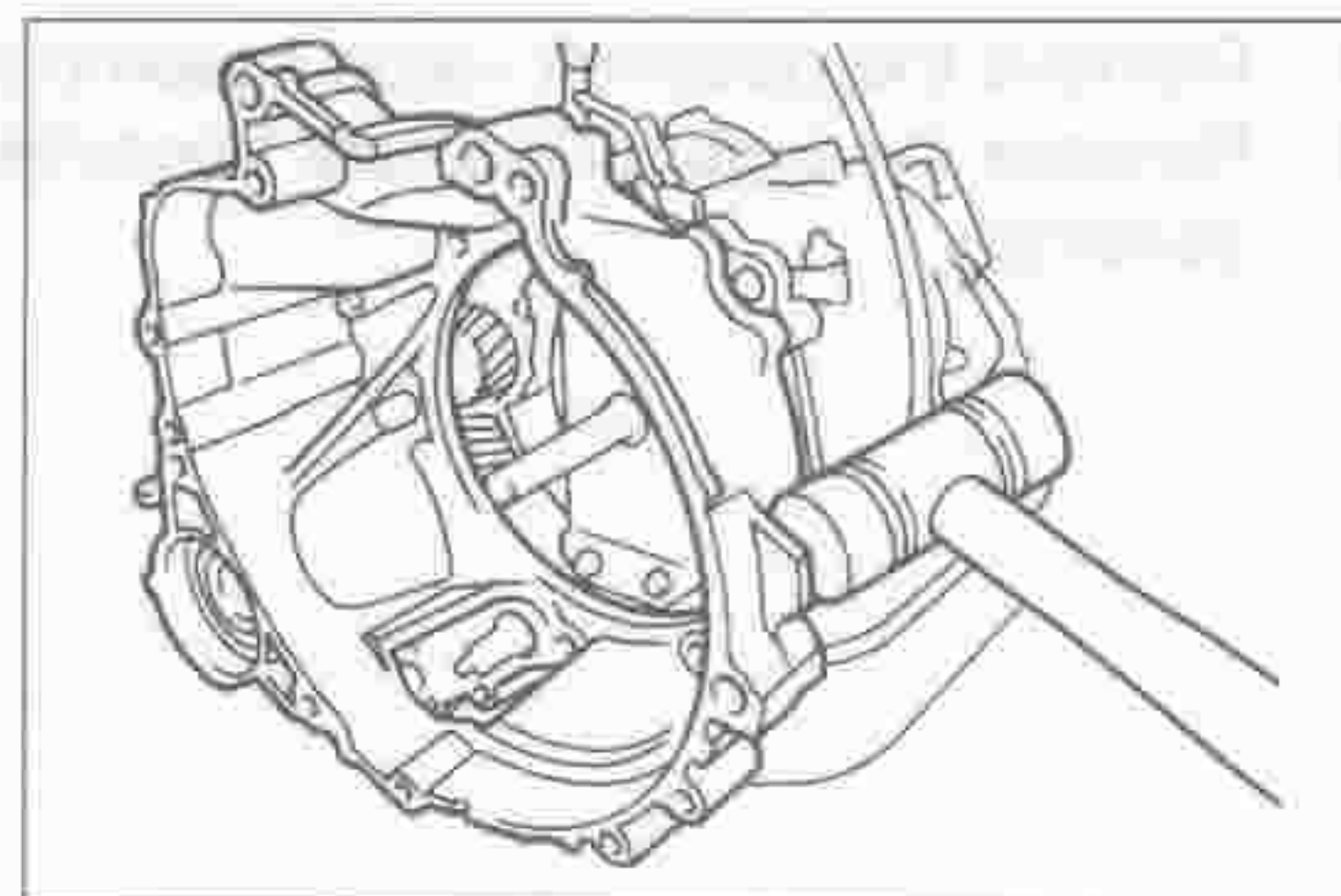
LAT00000-00229

6. Lightly and uniformly tap the two lib sections of the torque converter & differential case, using the standard plastic hammer.

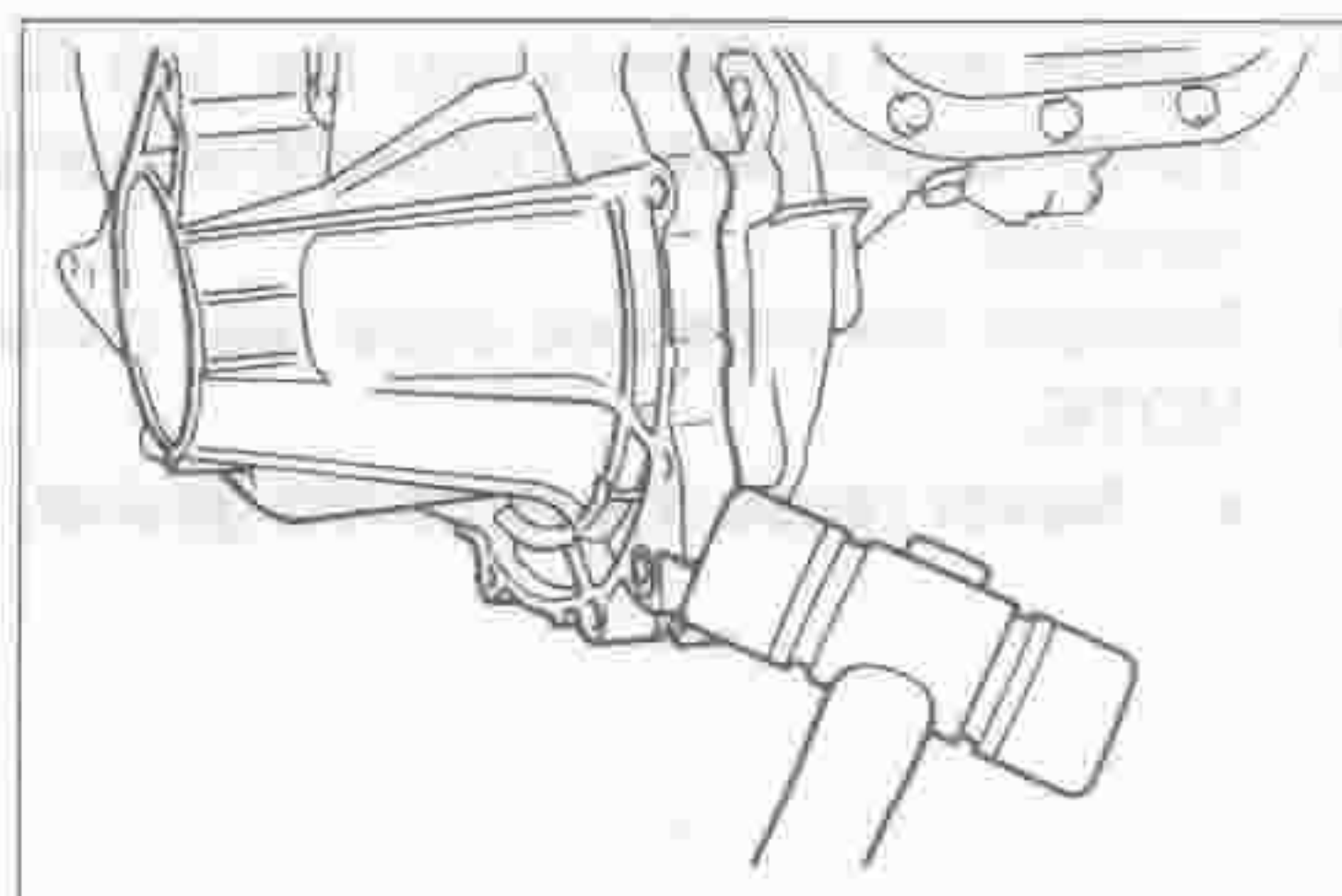
7. Remove the transmission gasket.

NOTE:

- Never reuse the removed gasket.



LAT00238-00230

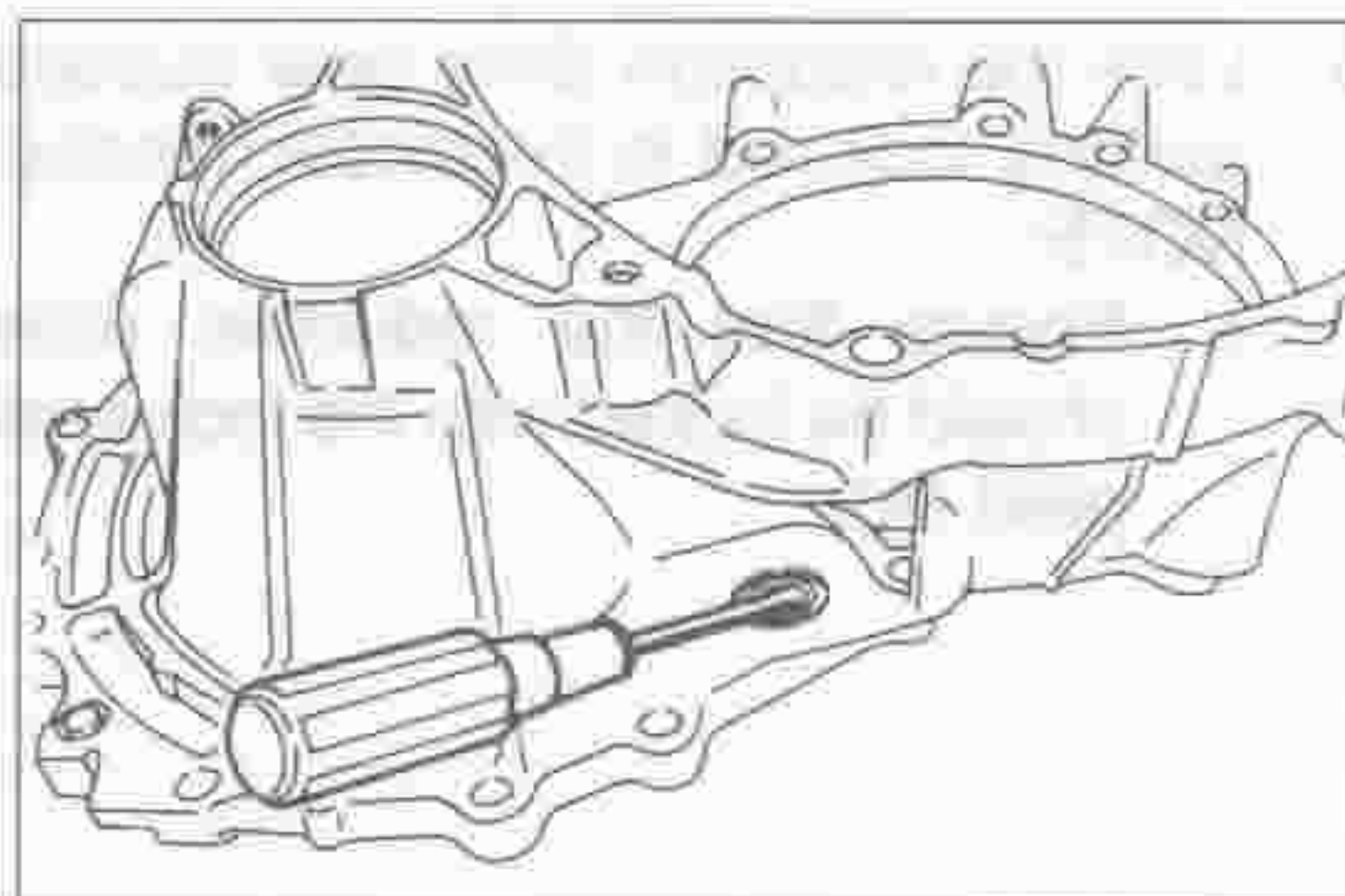


LAT00000-00231

8. Remove the T-type oil seal, using the standard flat driver or the like.

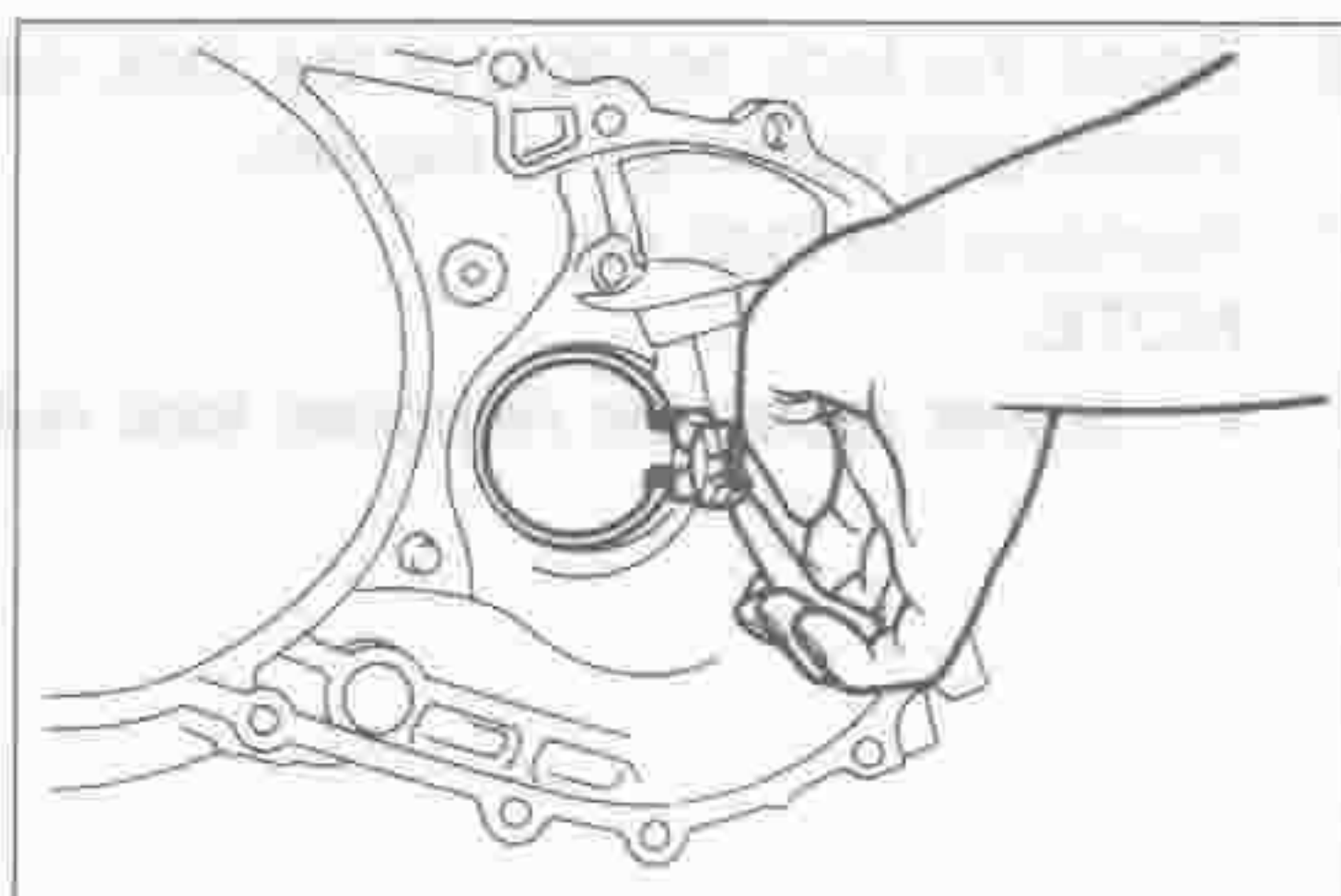
NOTE:

- Never reuse the removed oil seal.



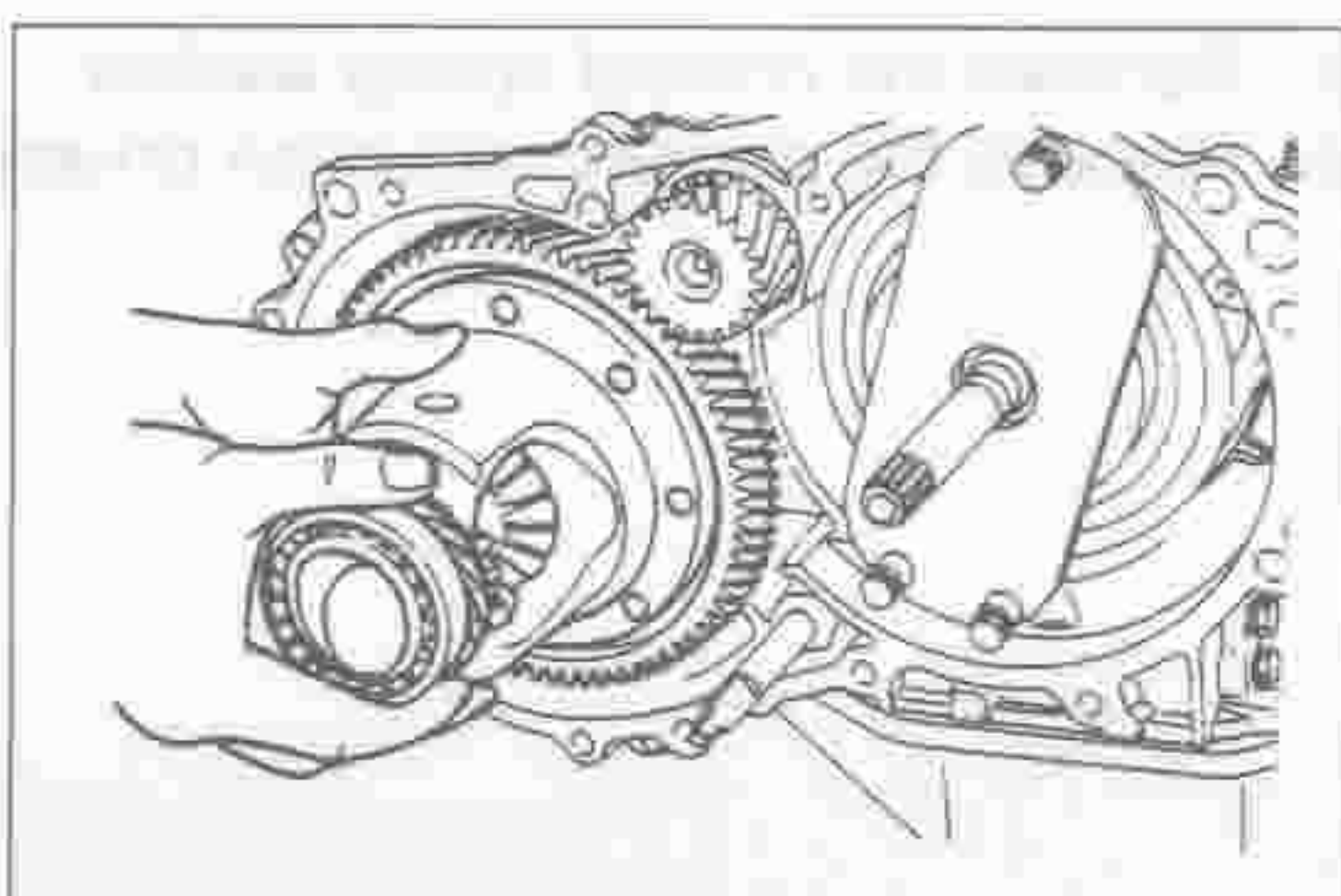
LAT00239-00232

9. Remove the hole snap ring, using the standard snap ring plier.



LAT00240-00233

10. Remove the differential assembly.



LAT00241-00234

13. Lightly and uniformly tap the two lib sections of the rear transmission case subassembly, using the standard plastic hammer.

14. Remove the transaxle case rear cover gasket.

NOTE:

- Never reuse the removed gasket.

15. Lock the reduction drive gear subassembly by moving the parking lock rod in the arrow headed direction.

NOTE:

- Ensure that the reduction drive gear subassembly should be locked with the lock section of the parking lock pawl (A).

16. Raise the lock section of the lock nut, using the standard chisel and hammer or the like.

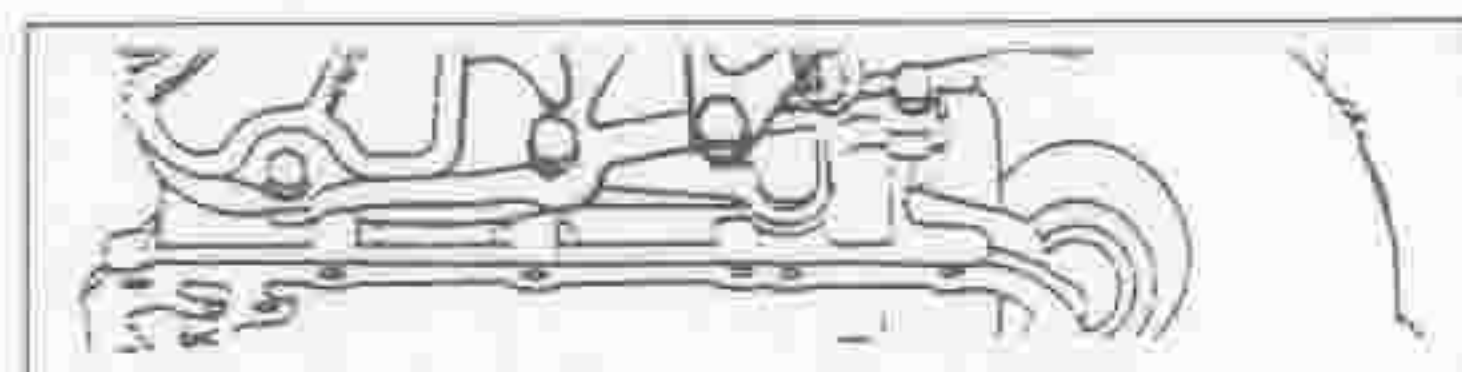
17. Remove the lock nut.

NOTE:

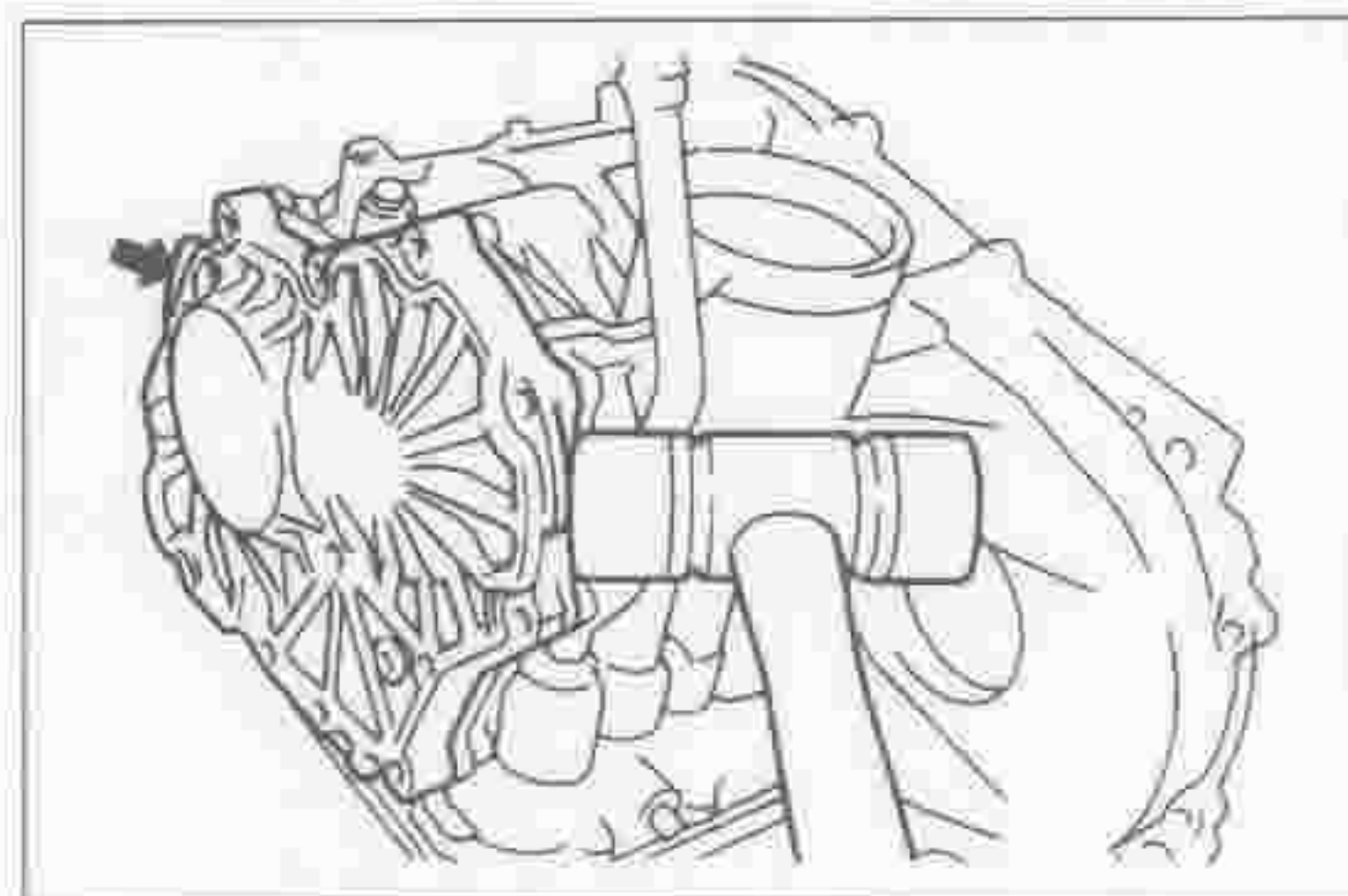
- Never reuse the removed lock nut.

18. Remove the conical spring washer.

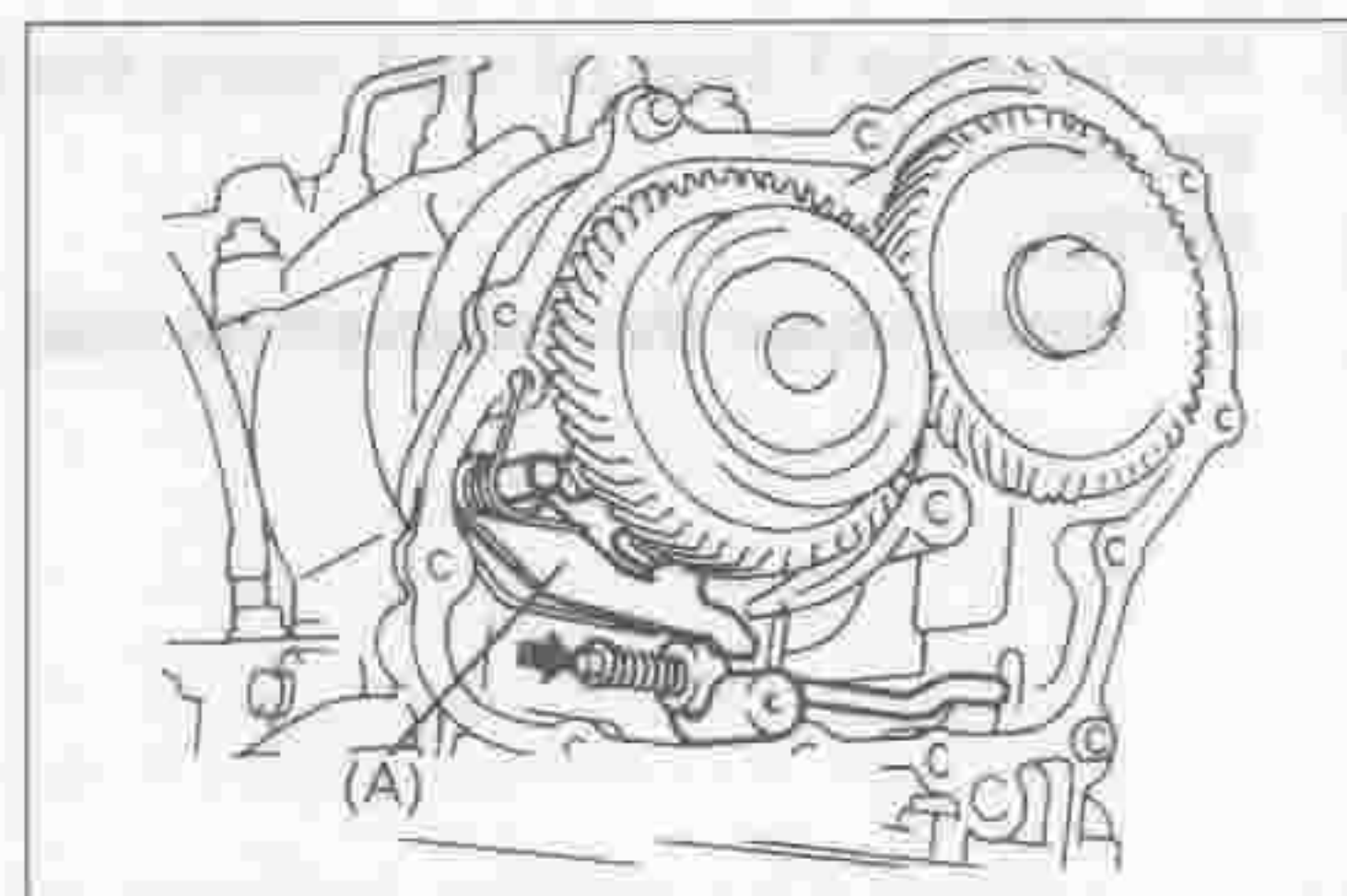
19. Remove the primary reduction driven gear.



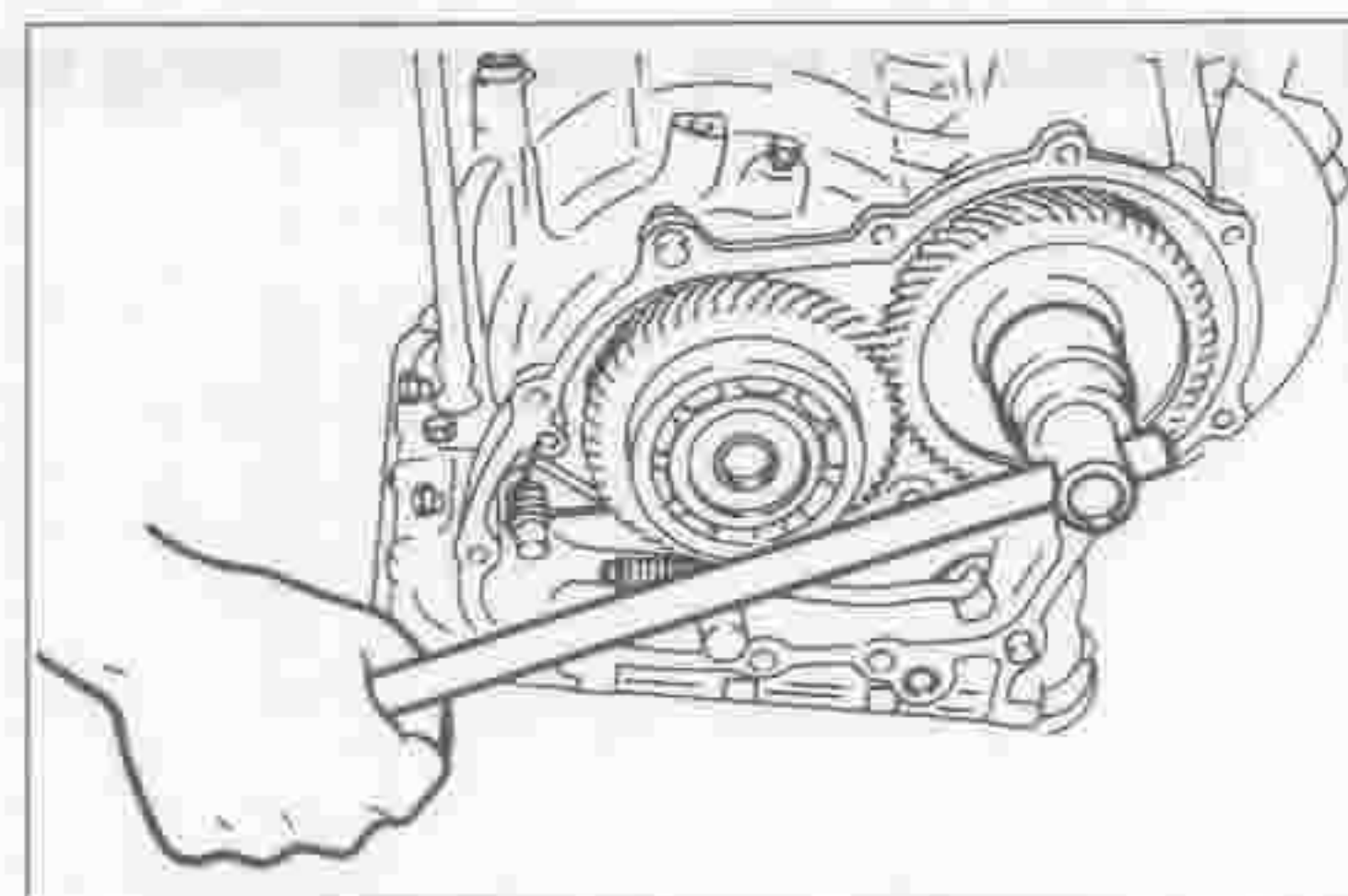
LAT00242-00235



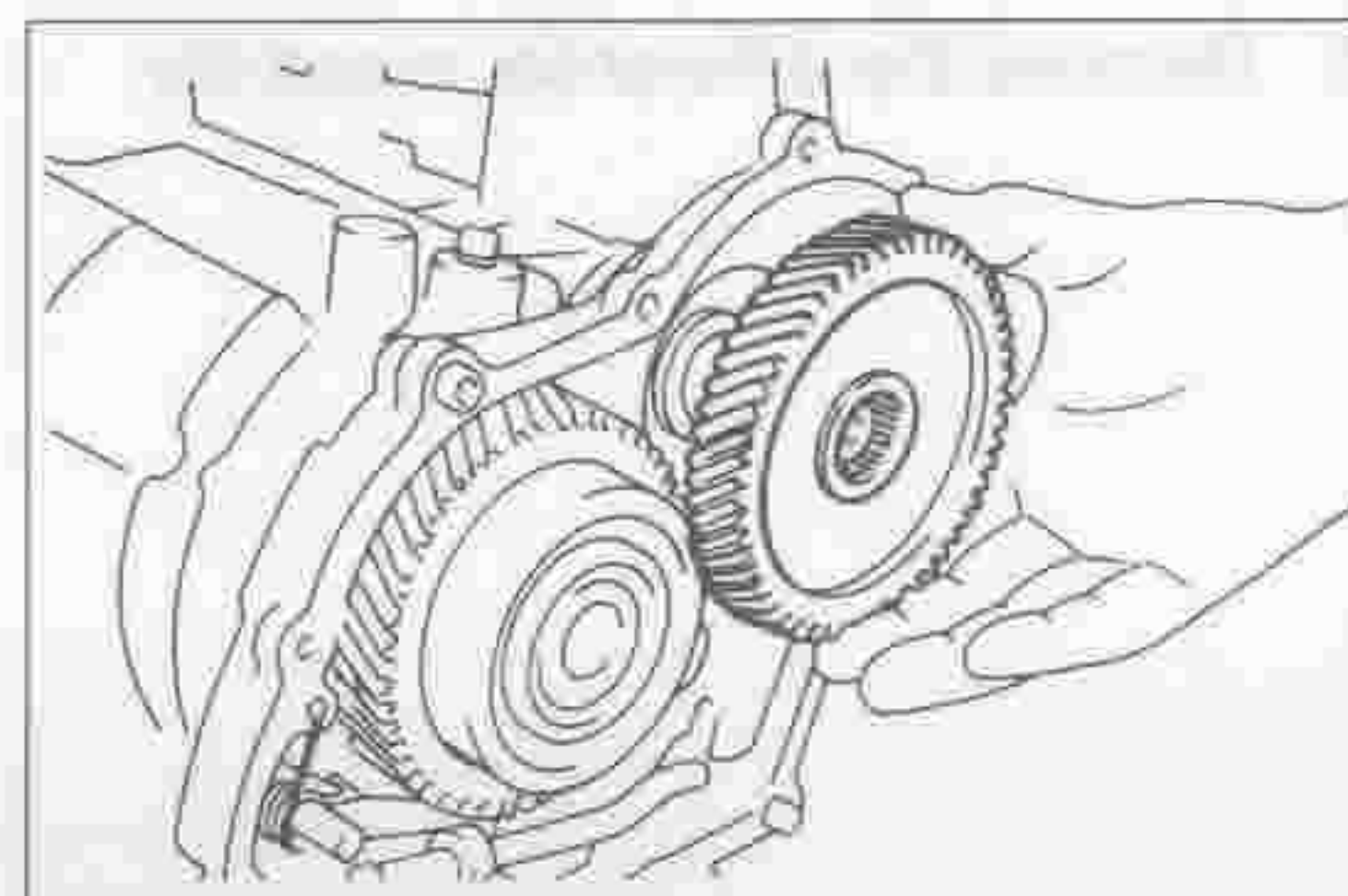
LAT00243-00236



LAT00244-00237

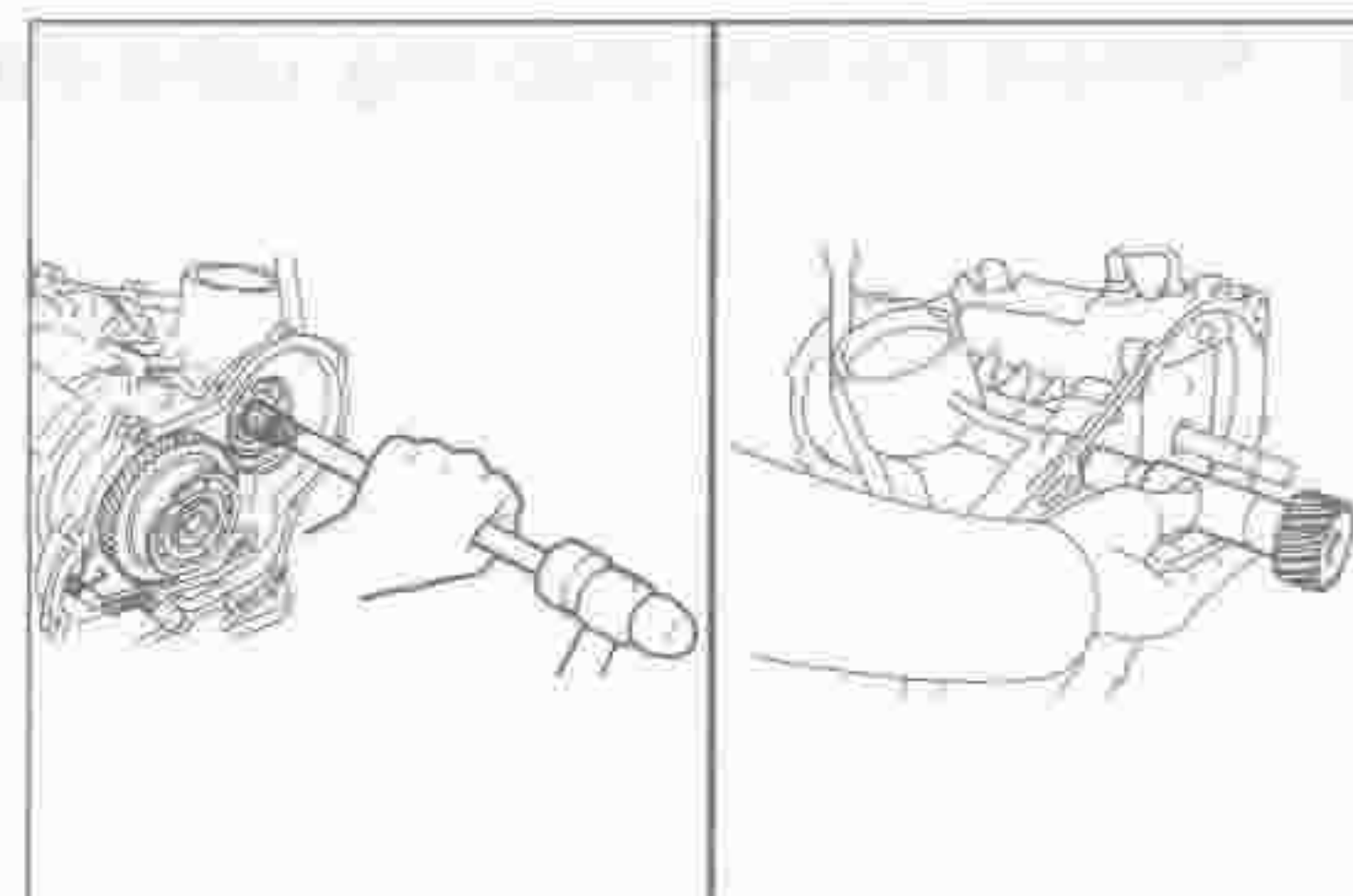


LAT00245-00238



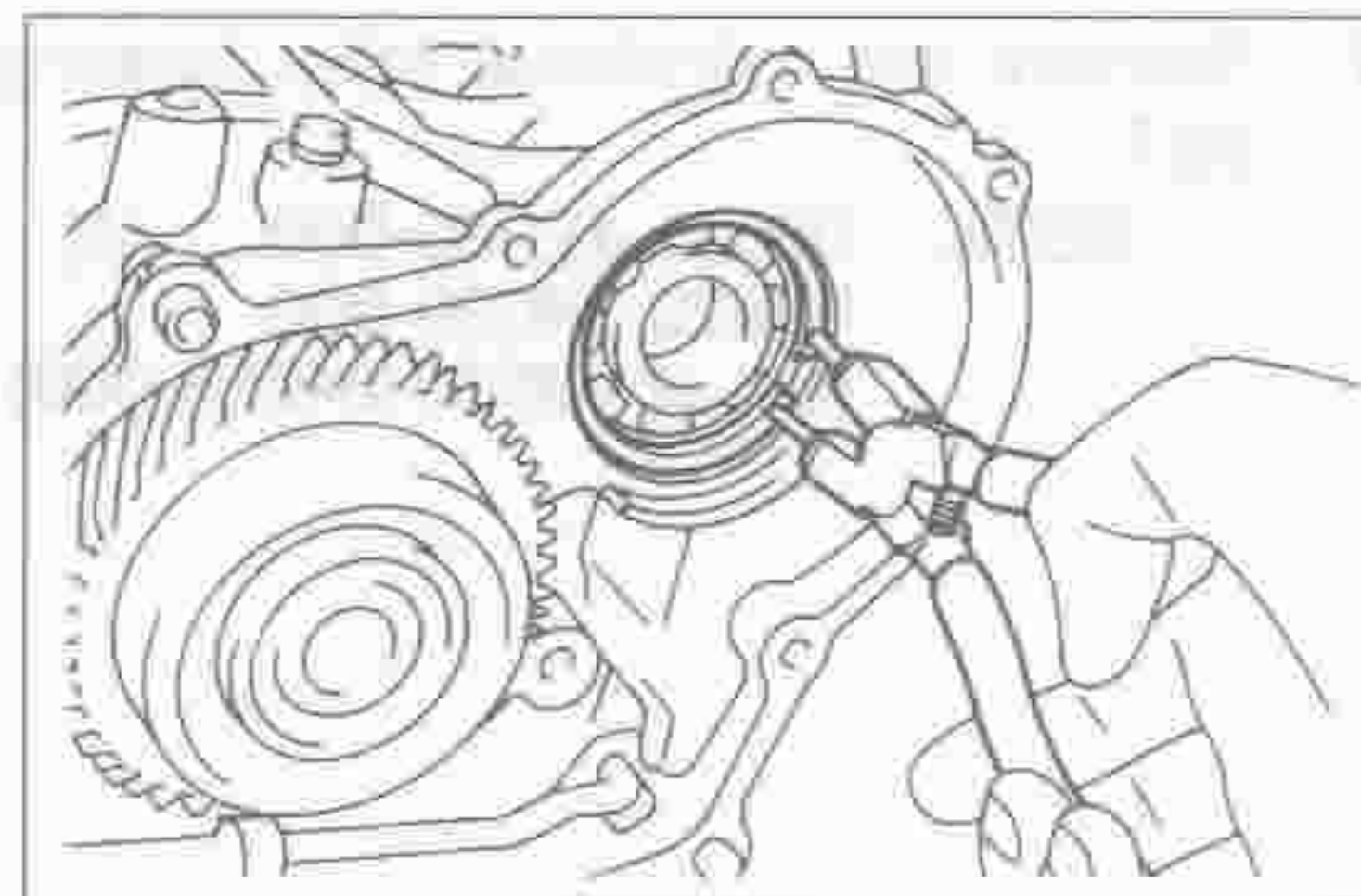
LAT00246-00239

20. Tap the output shaft lightly until the resistance of output shaft is free, using the suitable brass bar and hammer.
21. Remove the output shaft.



LAT00247-00240

22. Remove the hole snap ring, using the standard snap ring plier.

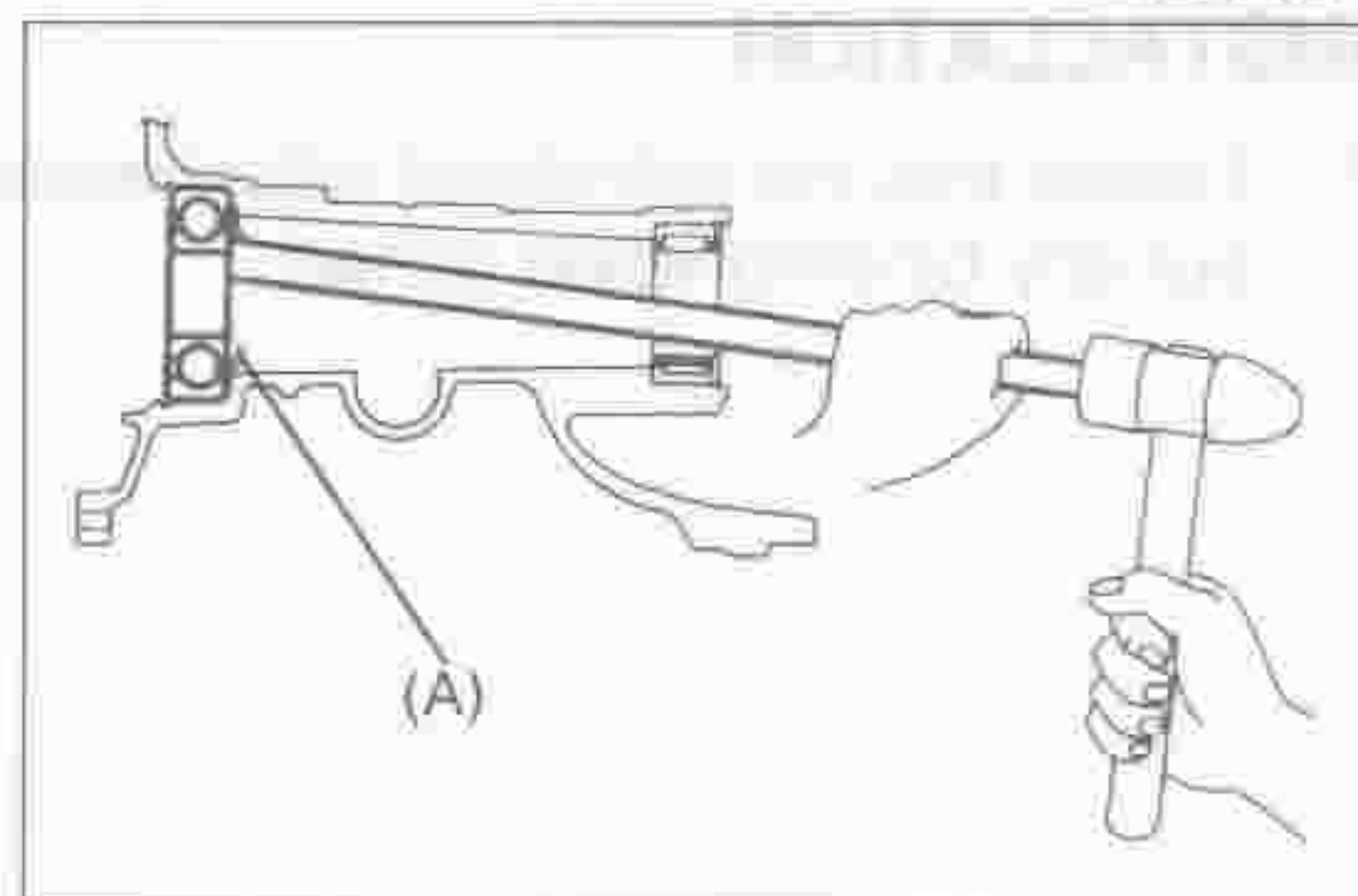


LAT00248-00241

23. Remove the radial ball bearing, using a suitable brass bar and a hammer.

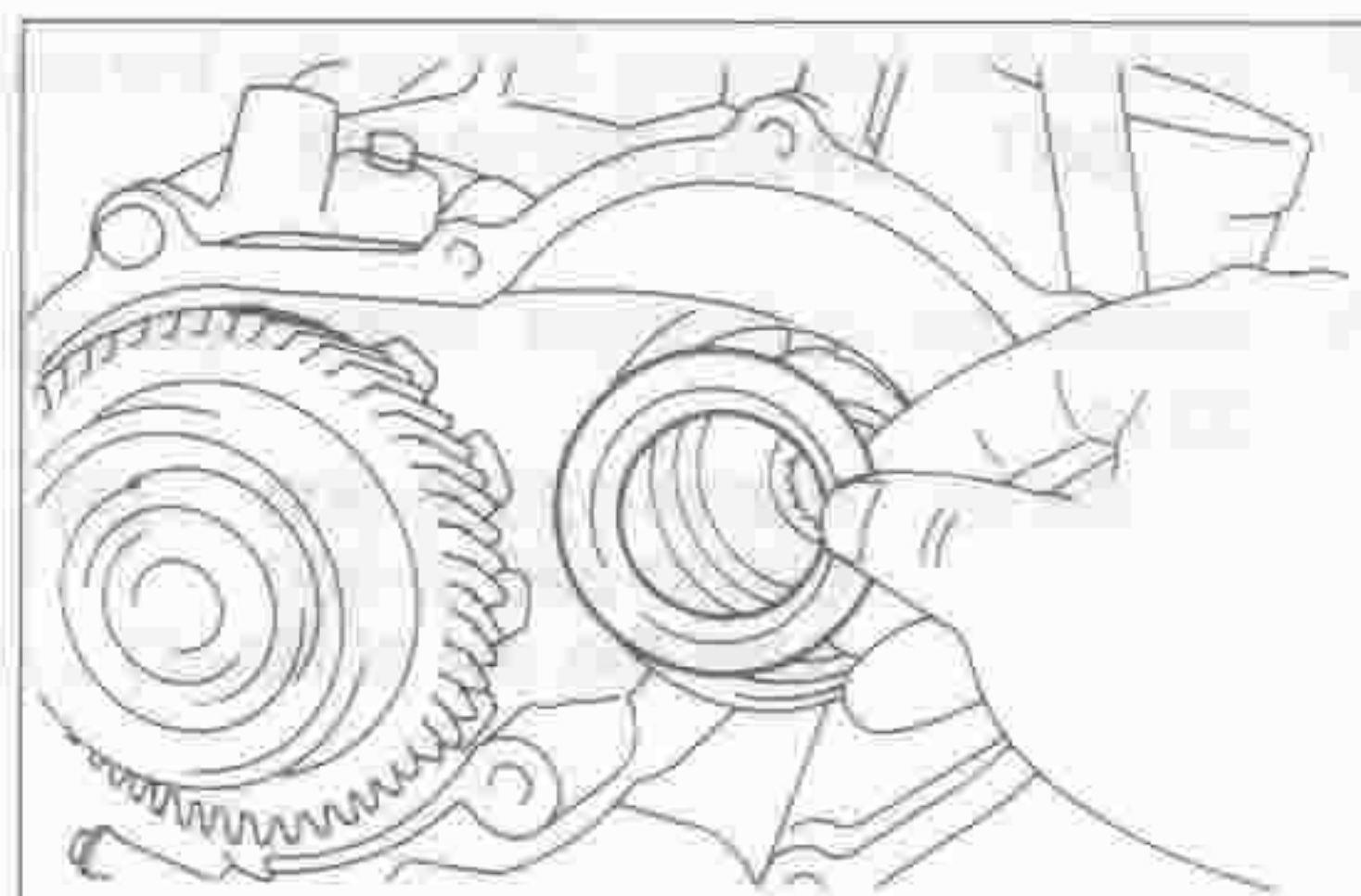
CAUTION:

- Be very careful not to damage the oil reserve plate section (A) during the removal of the radial ball bearing. If the section (A) of the oil reserve plate should be damaged and the damaged oil reserve plate should be installed, it may cause abnormal noise.



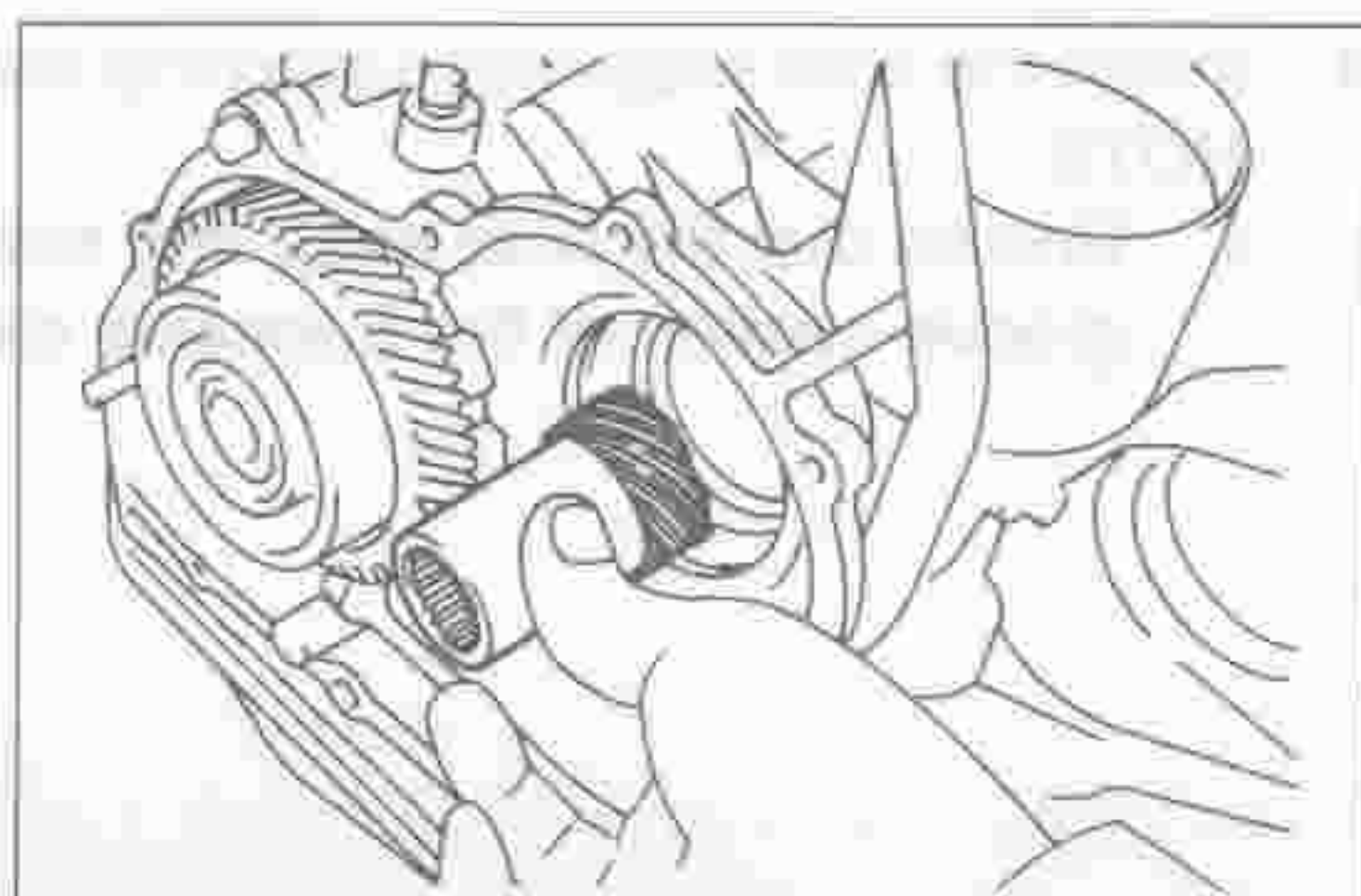
LAT00249-00242

24. Remove the oil reserve plate.



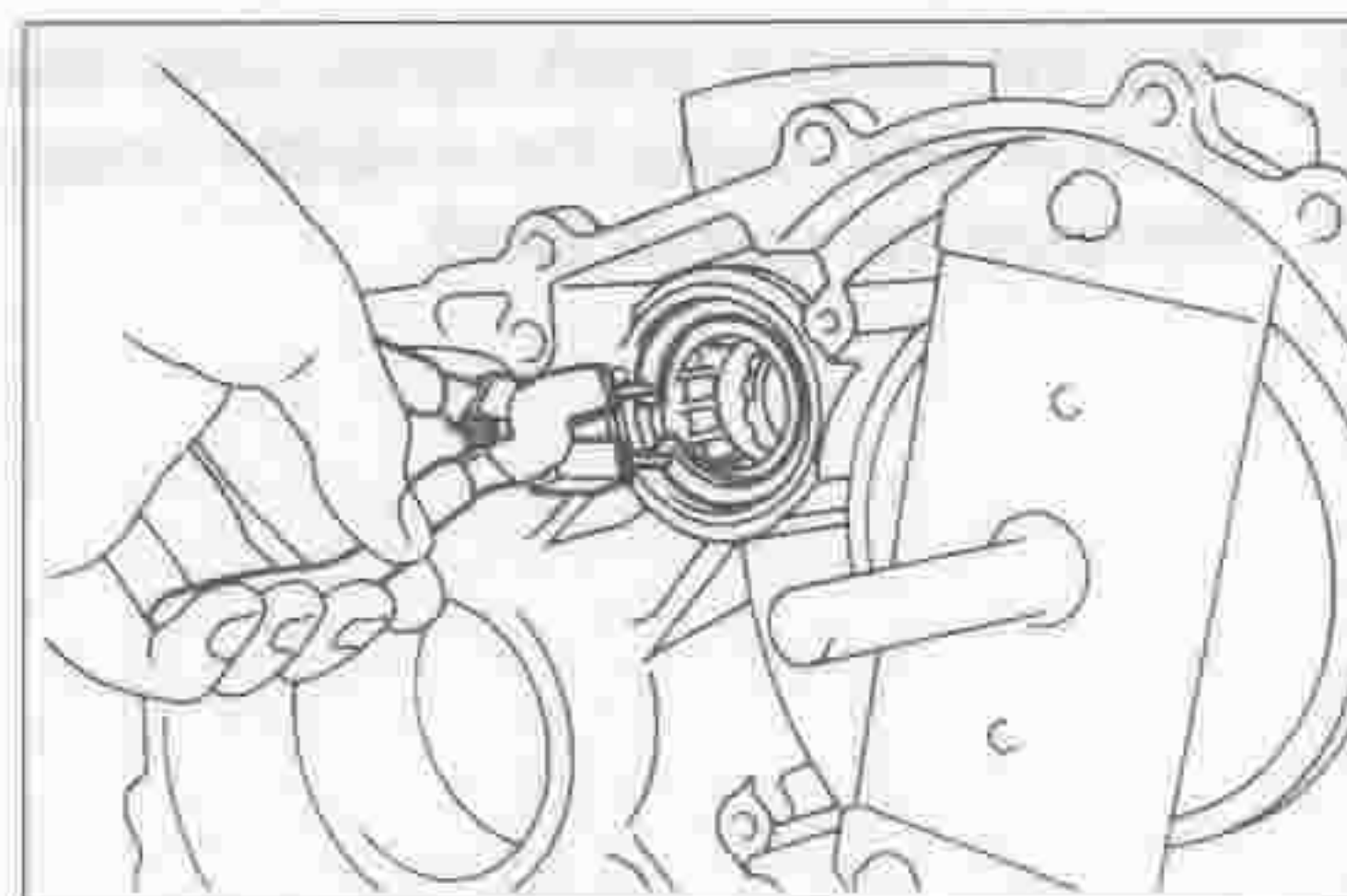
LAT00250-00243

25. Remove the governor drive gear assembly.



LAT00251-00244

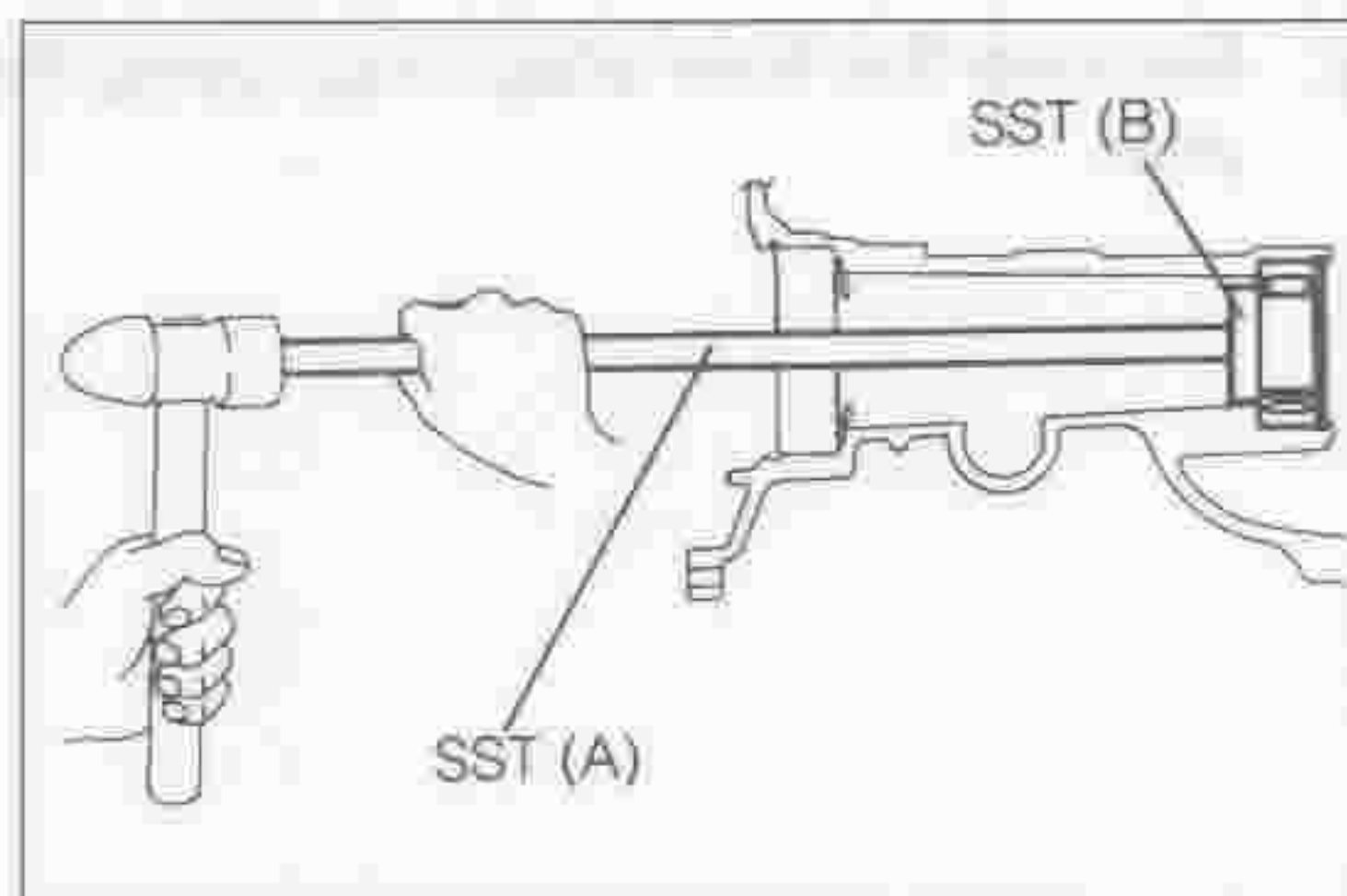
26. Remove the hole snap ring, using snap ring pliers.



LAT00252-00245

27. Remove the cylindrical roller bearing, using the following SST.

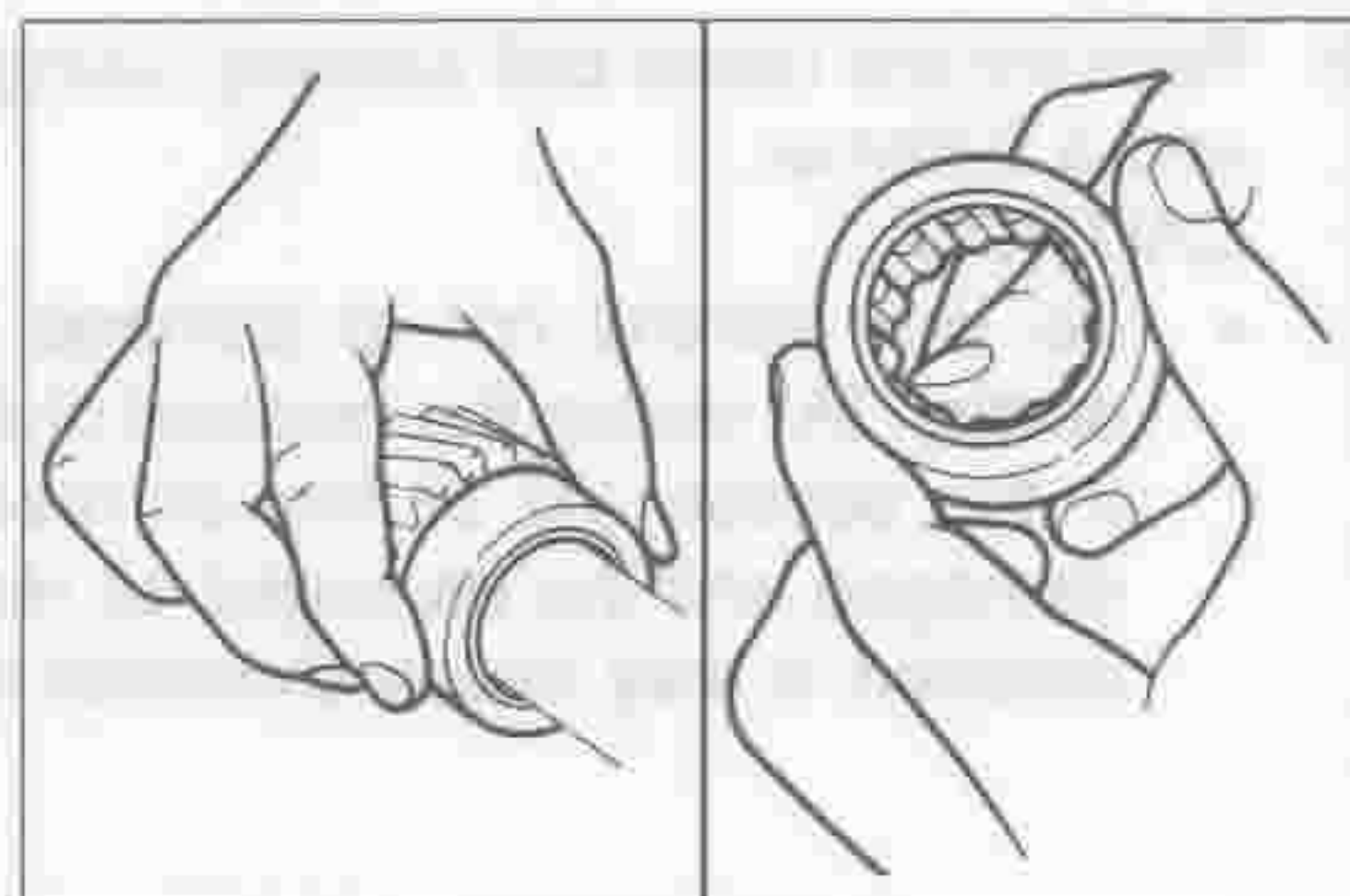
SSTs: 09631-12020-000 ... (A)
09620-24030-000
(set of 09630-24013-000) ... (B)



LAT00253-00246

INSTALLATION

1. Ensure that the cylindrical roller bearing turns smoothly with out any binding when turned.



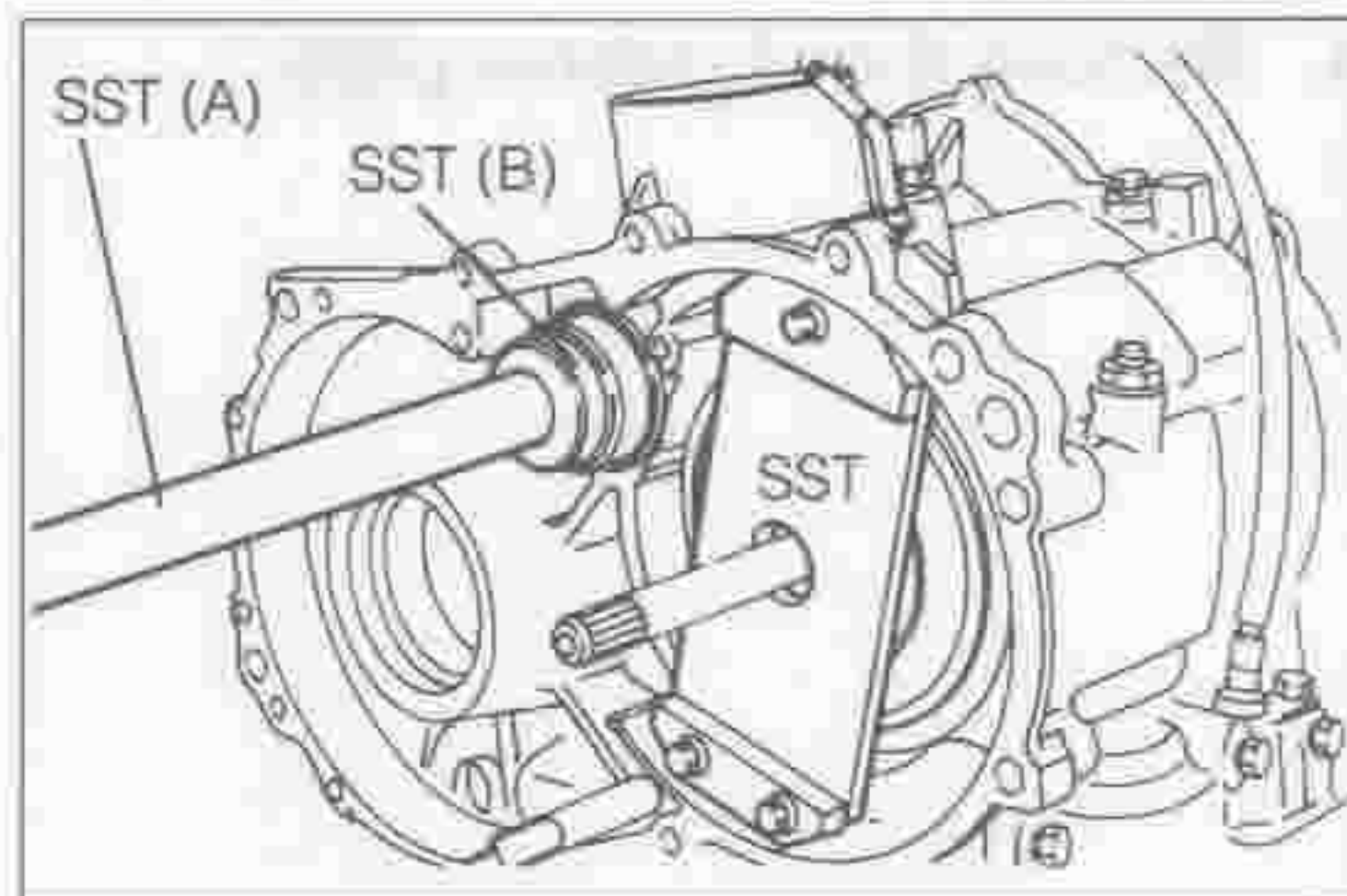
LAT00254-00247

2. Install the following SST to the transaxle case.

SST: 09351-87212-000

3. Install the cylindrical roller bearing, using the following SSTs.

SSTs: 09631-12020-000 ... (A)
09630-24013-000
(Use the set of No. 7) ... (B)

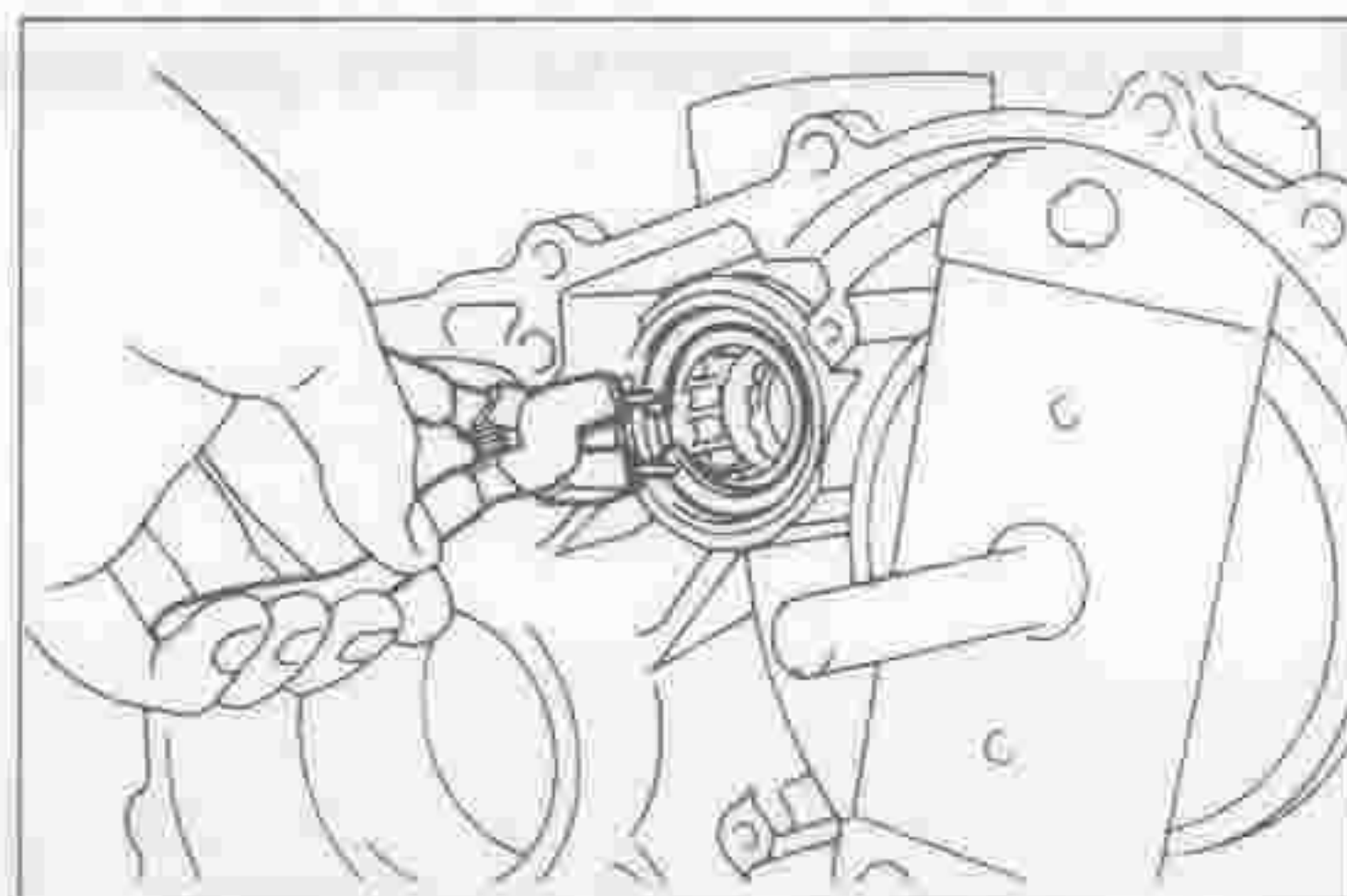


LAT00255-00248

4. Install the hole snap ring, using the standard snap ring plier.

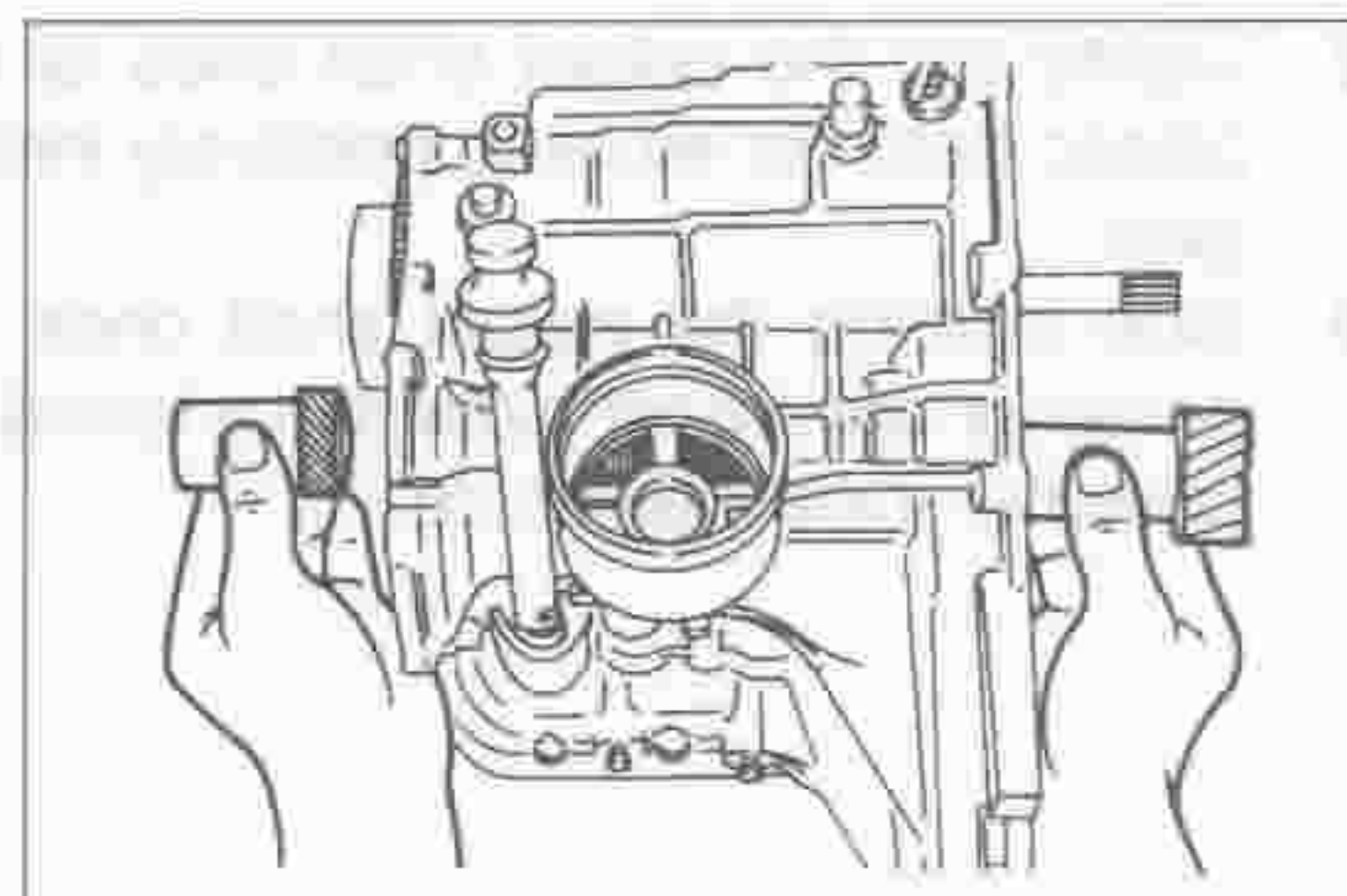
NOTE:

- Ensure that the hole snap ring should be installed to the groove section of the transaxle case.



LAT00256-00249

5. Insert the output shaft and governor drive gear assembly to the transaxle case.

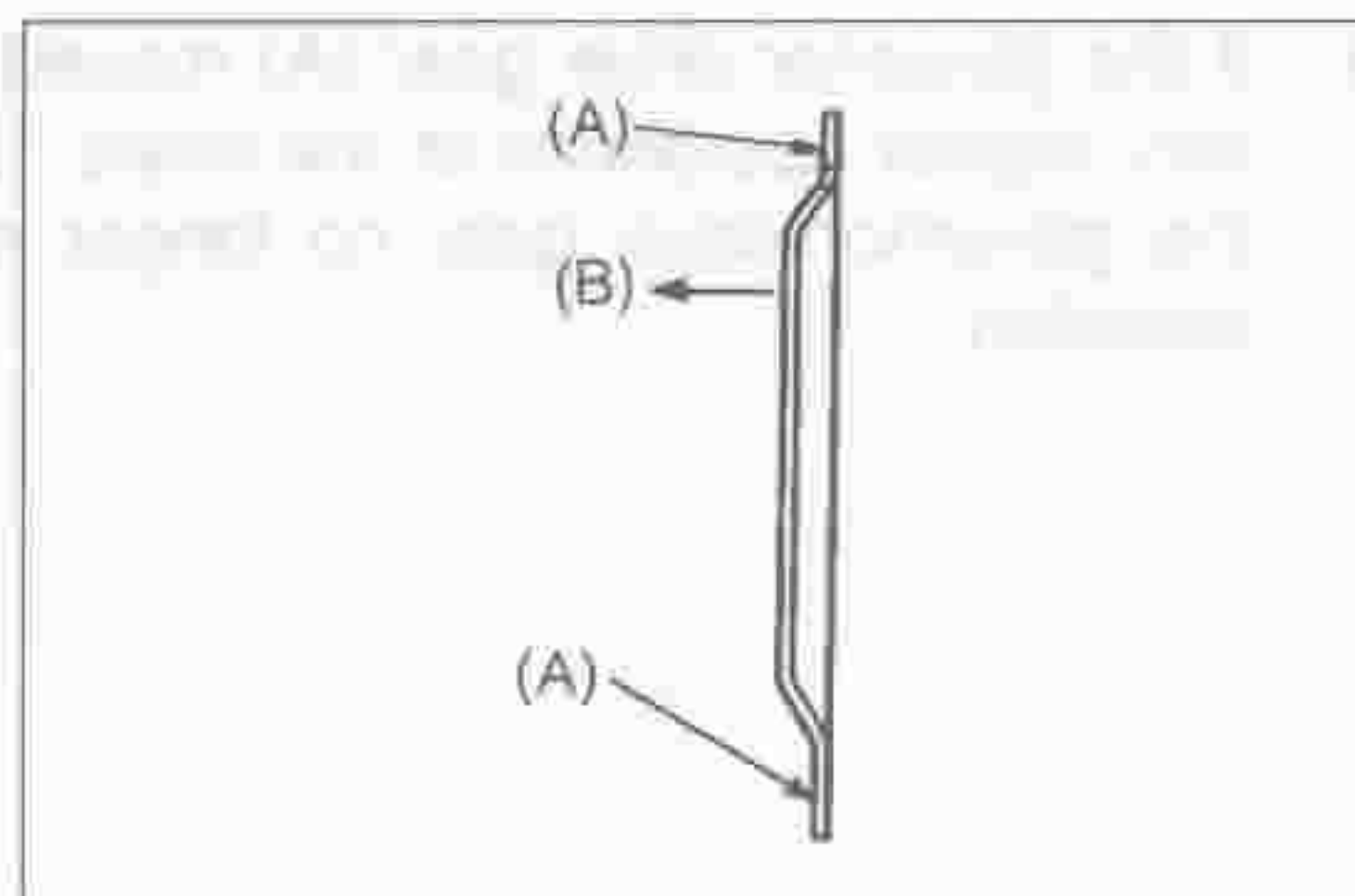


LAT00257-00250

6. Apply vaseline to the (A) section of the oil reserve plate.
7. Install the oil reserve plate.

NOTE:

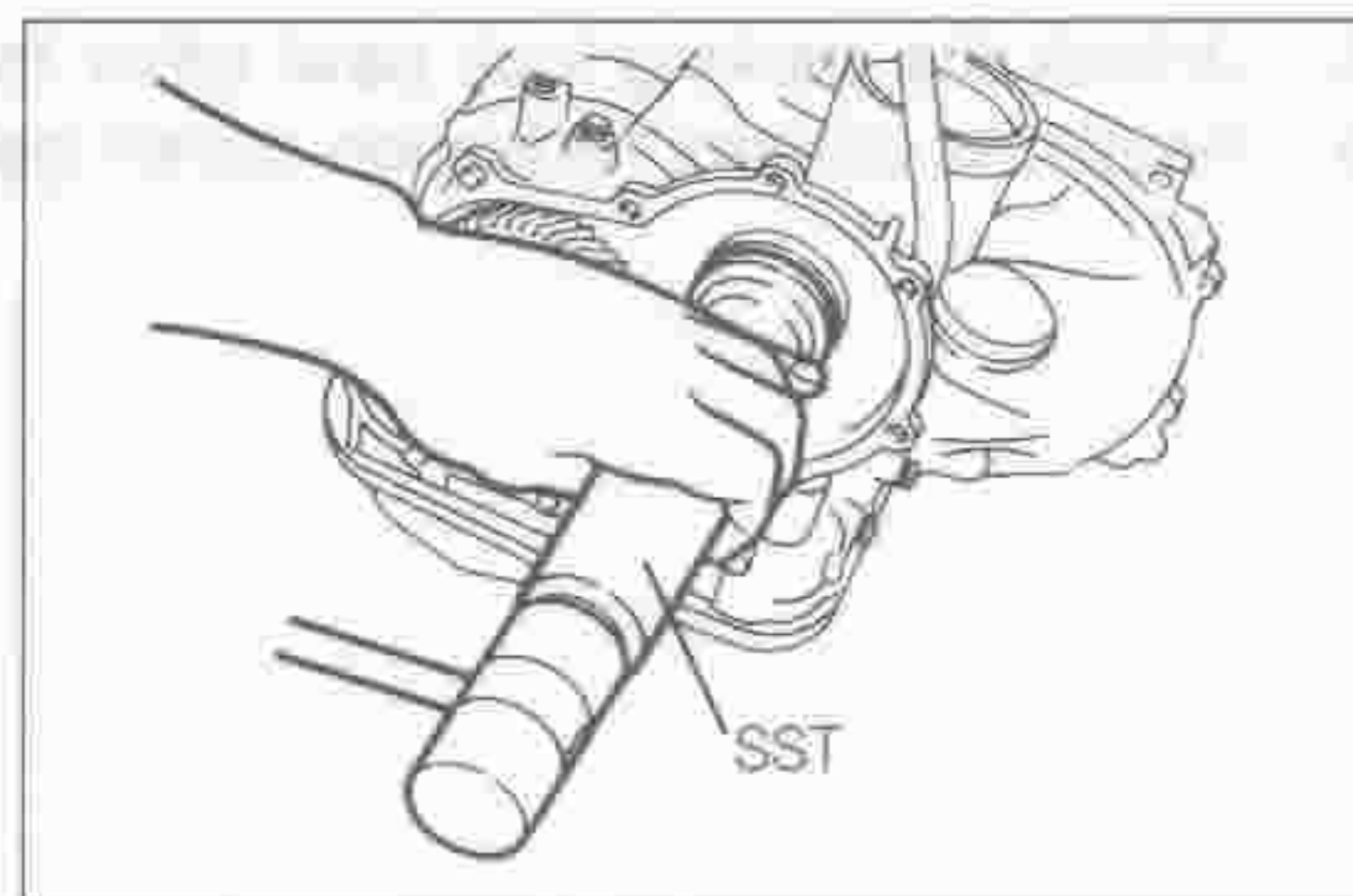
- Ensure that the protrusion (B) section of the oil reserve plate faces toward the inner side of transaxle case.



LAT00258-00251

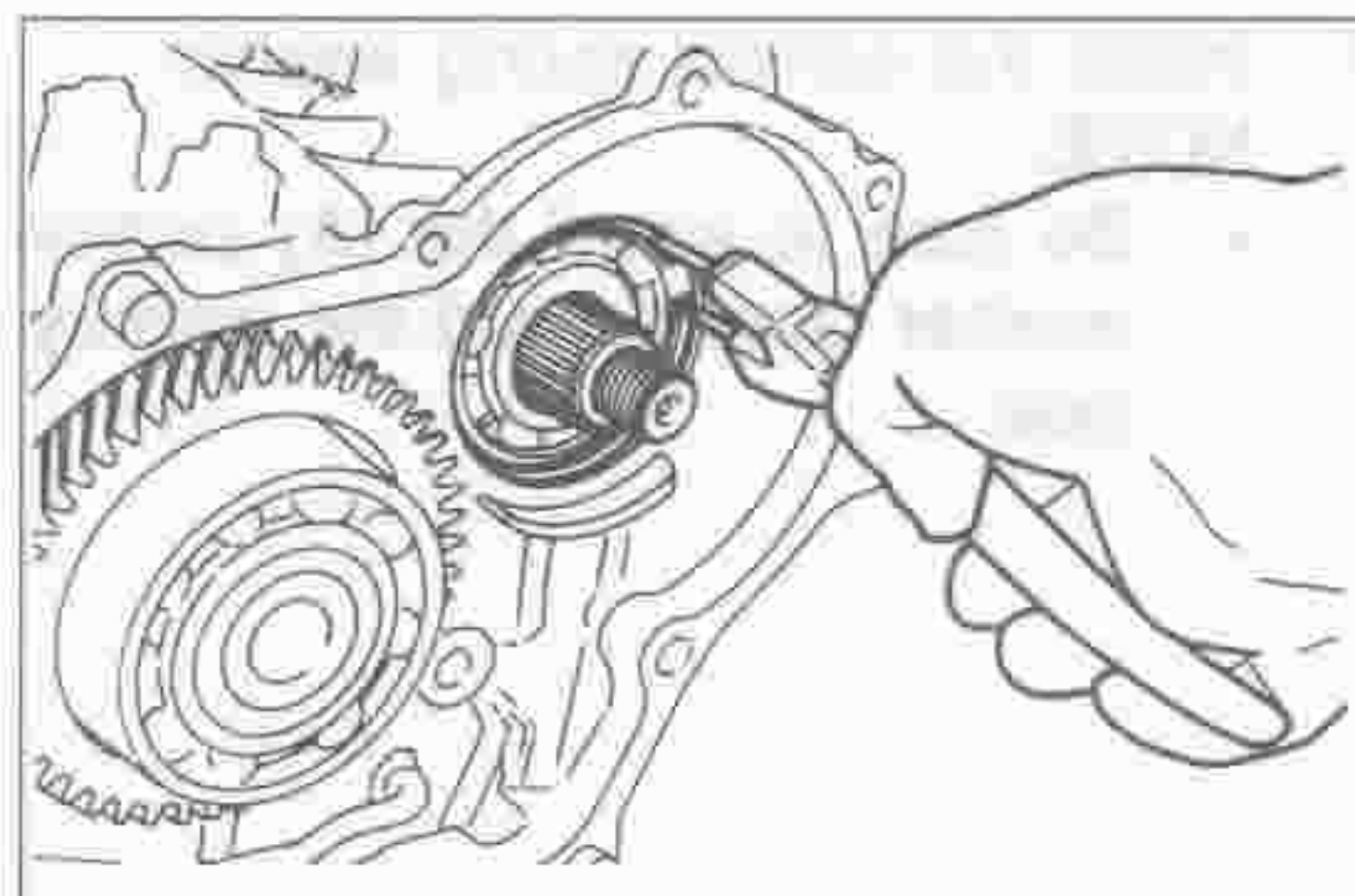
8. Temporarily install the radial ball bearing to the output shaft, until you feel the resistance.
9. Install the radial ball bearing, using the following SST.

SST: 09310-87301-000



LAT00259-00252

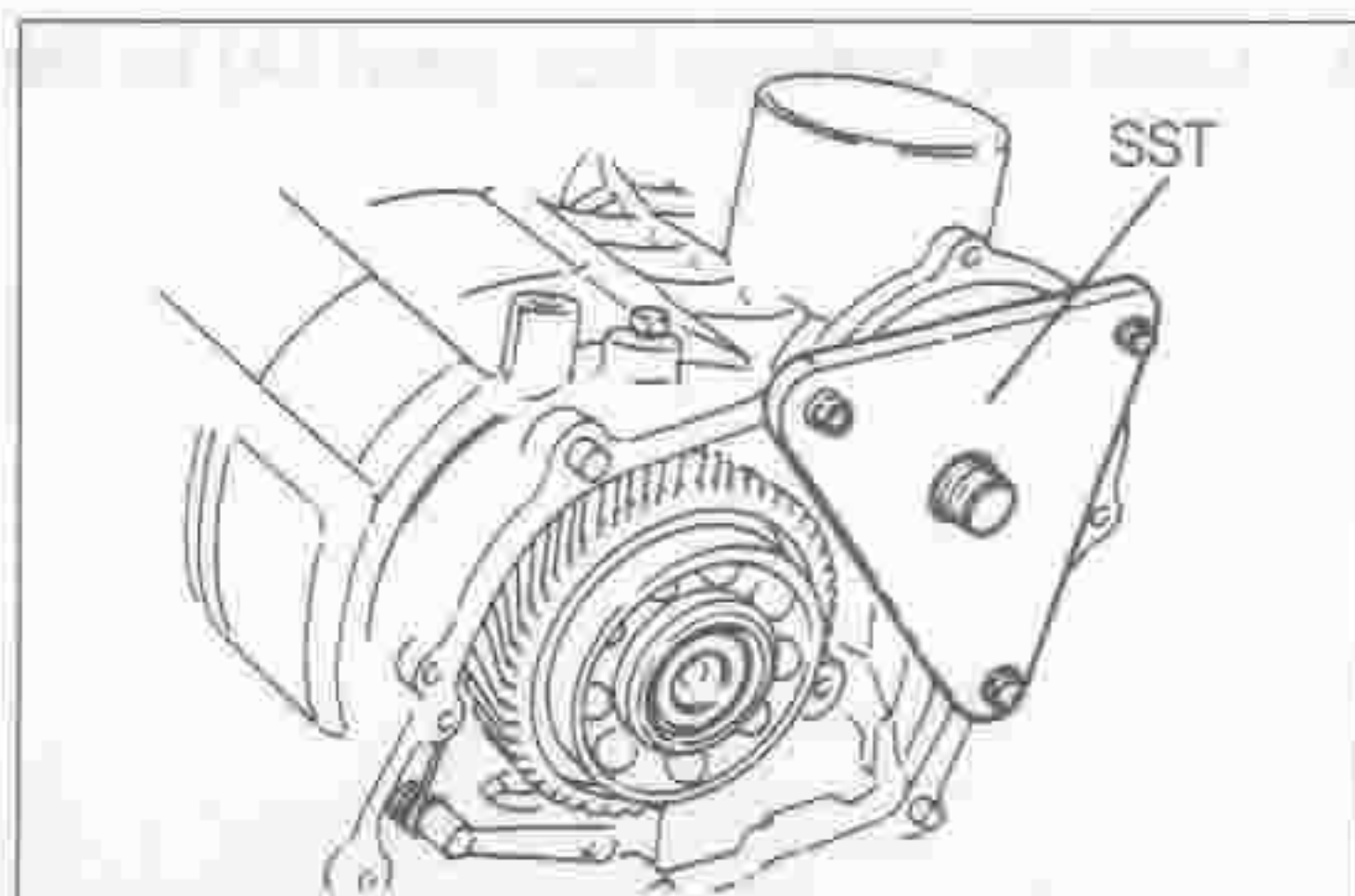
10. Install the hole snap ring, using snap ring pliers.



LAT00260-00253

11. Install the following SST to the transaxle case so that the radial ball bearing may be held during the installation of the output shaft.

SST: 09351-87214-000

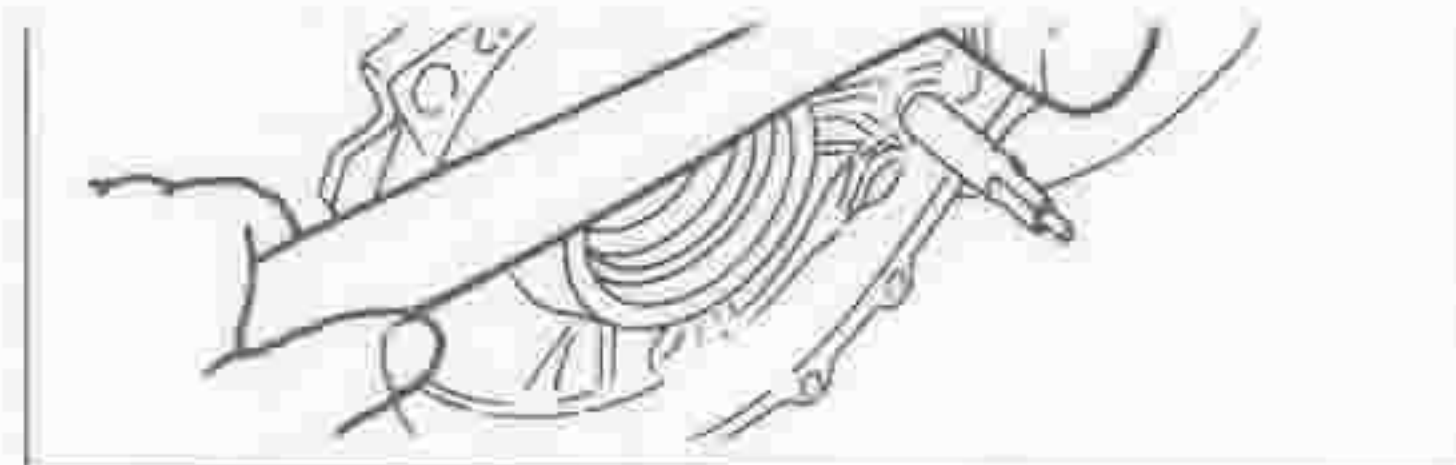


LAT00261-00254

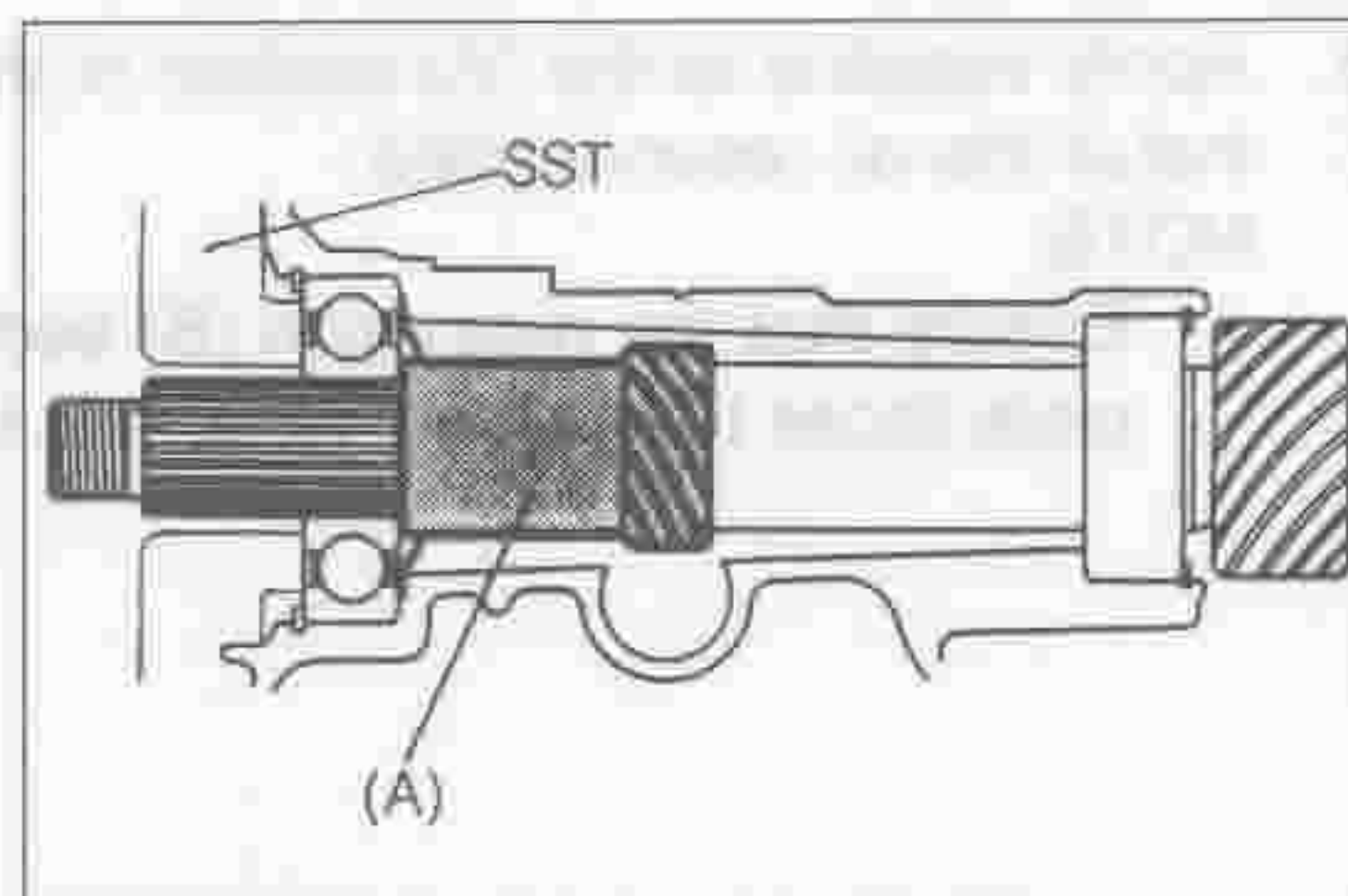
AT-84

governor installation note.

14. If the governor drive gear (A) moved in a fore-&-aft direction, repeat operations of the steps 12 and 13 above, until the governor drive gear no longer moves in a fore-&-aft direction,

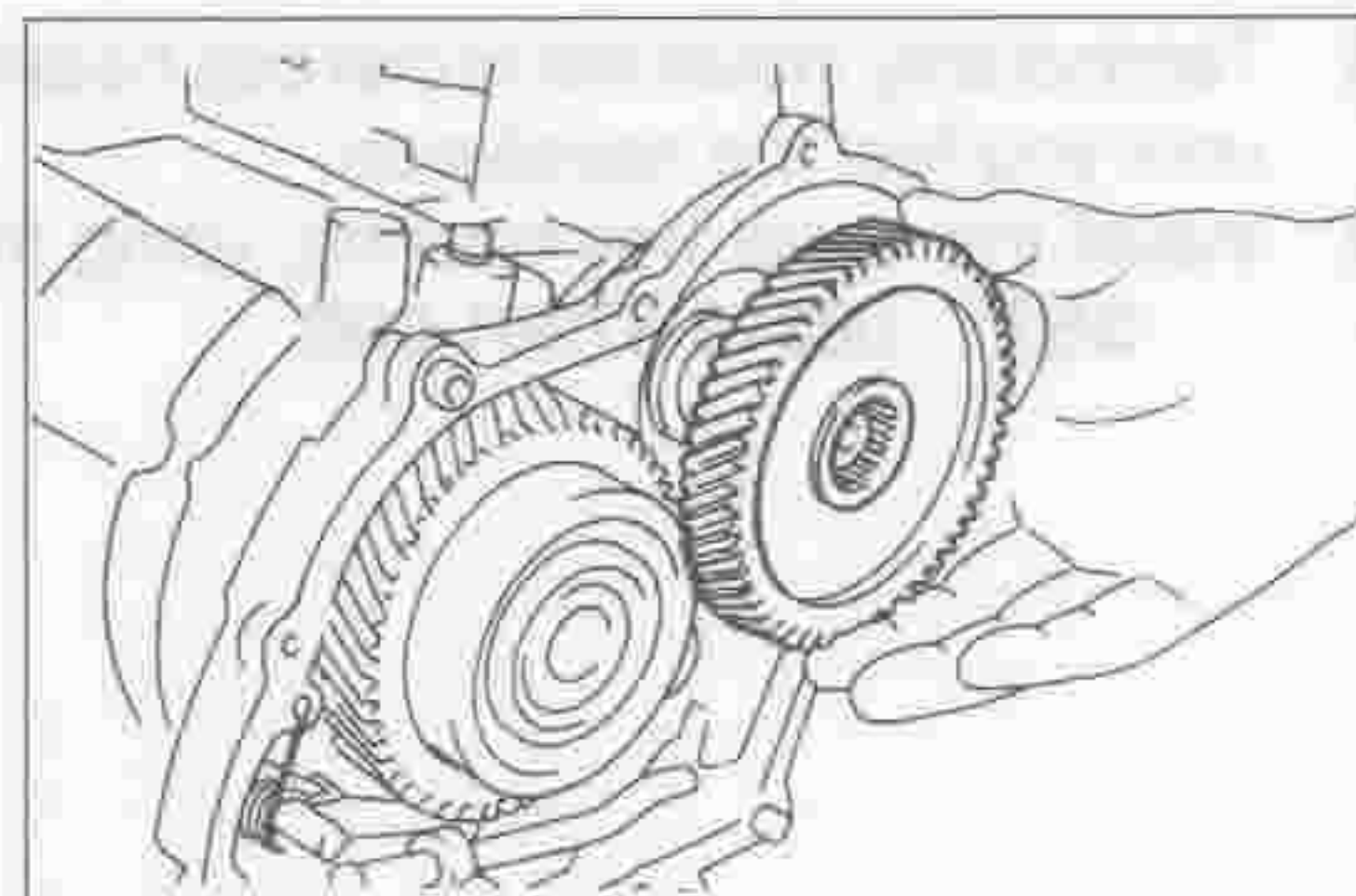


LAT00262-00255



LAT00263-00256

15. Unlock the parking lock pawl other than P range.
16. Install the primary reduction driven gear to the output shaft.

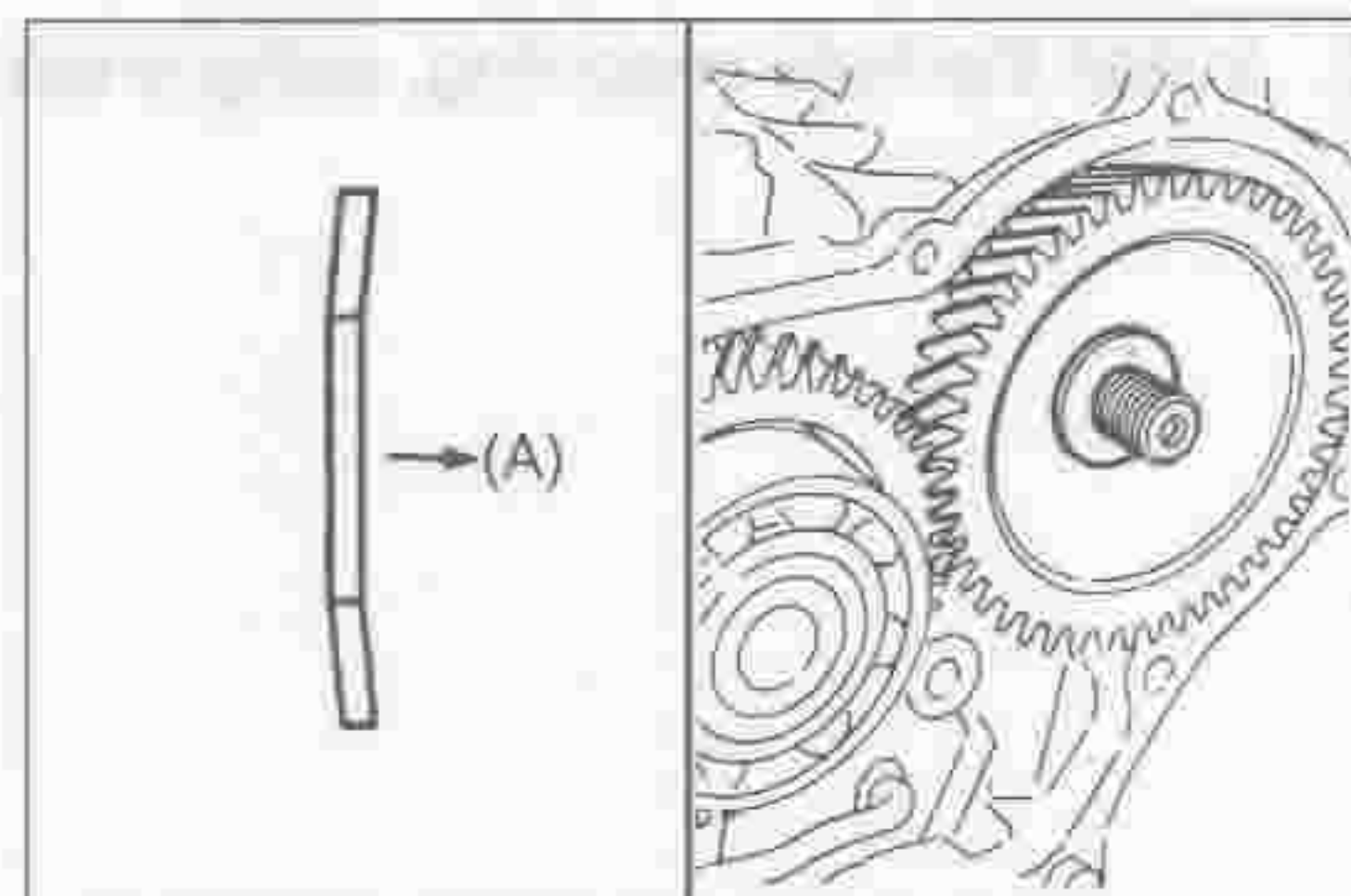


LAT00264-00257

17. Install the conical spring washer

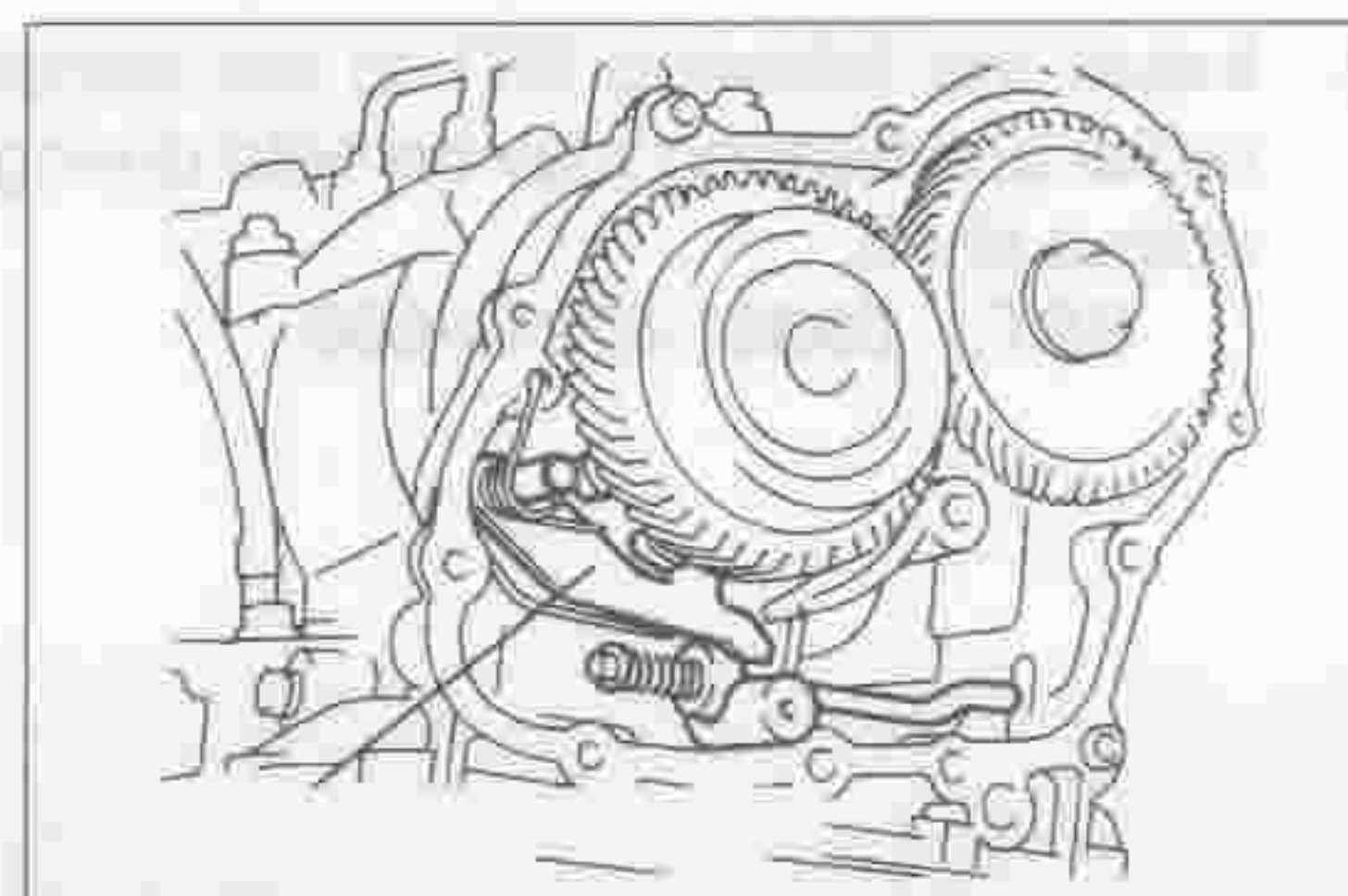
NOTE:

- Be sure to install the (A) section of the conical spring washer faces toward the primary reduction driven gear side.



LAT00265-00258

18. Lock the parking lock pawl (A) to the P range.



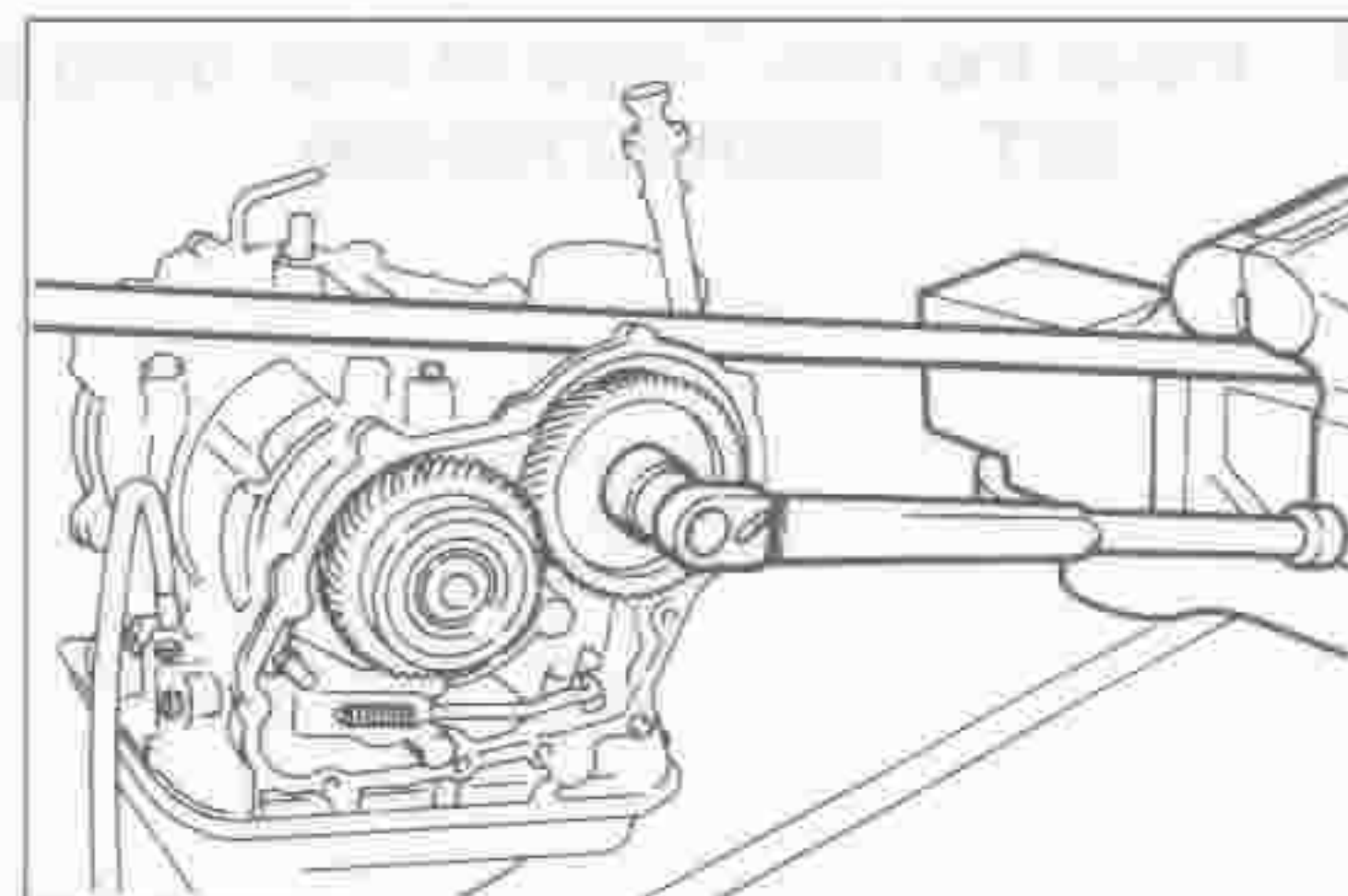
LAT00266-00259

19. With a new lock nut used, tighten the lock nut.

Tightening Torque:

78.5 - 118.0 N·m

(8.0 - 12.0 kgf-m, 57.9 - 87.0 ft-lb)



LAT00267-00260

20. Stake a new lock nut, using a standard punch in combination with a hammer.

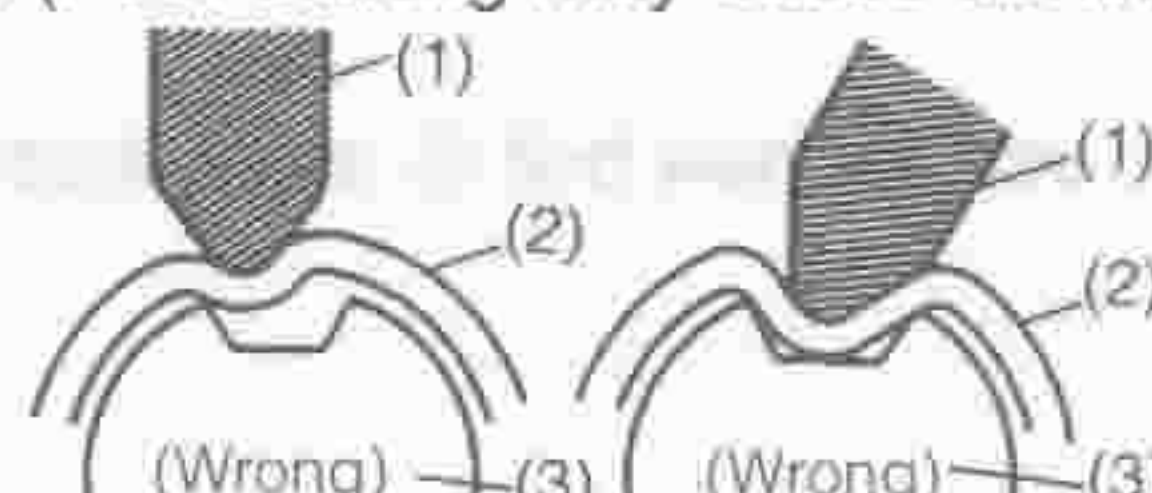
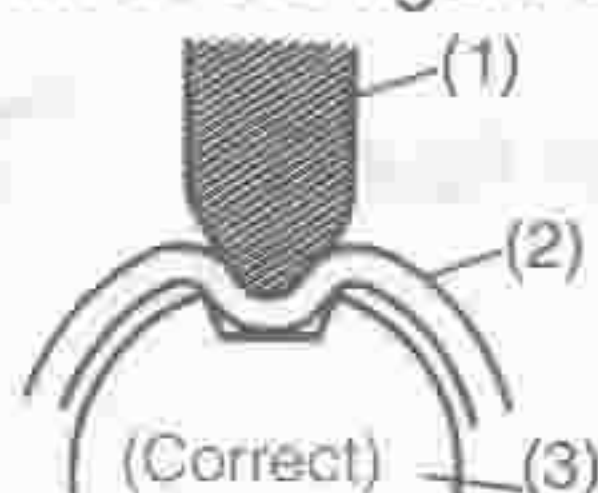
NOTE:

- When staking the lock nut, point a suitable staking tool toward the output shaft axis center and stake the lock nut securely, as shown in the figure below. (Poor staking may cause abnormal noise.)

(1) Suitable staking tool

(2) New nut

(3) Shaft



LAT00268-00261

21. With the new rear transmission case cover gasket interposed, tighten the 13 bolts of the rear transmission case cover.

Tightening Torque:

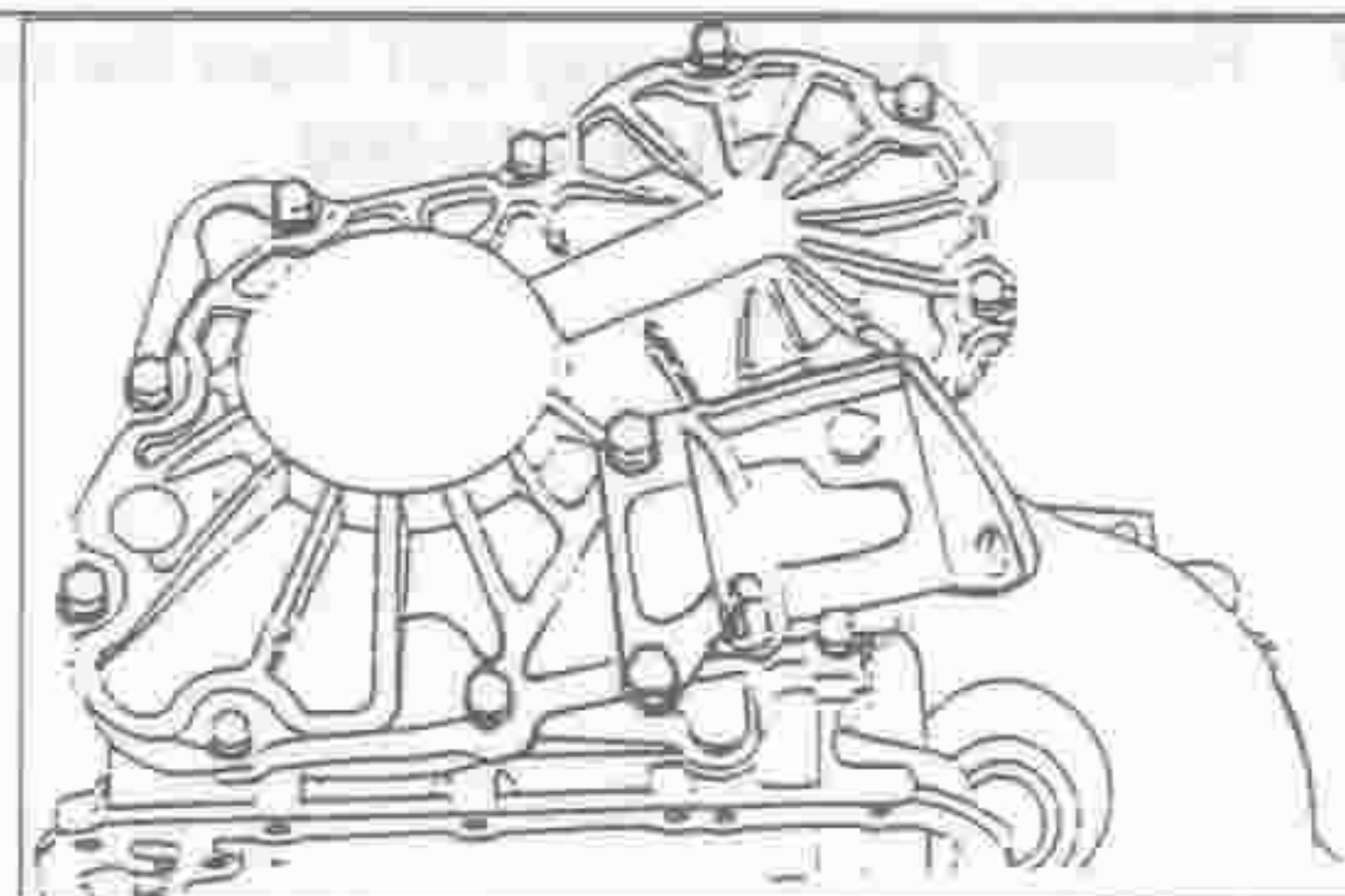
M8: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

M10: 14.7 - 21.6 N·m

(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)

NOTE:

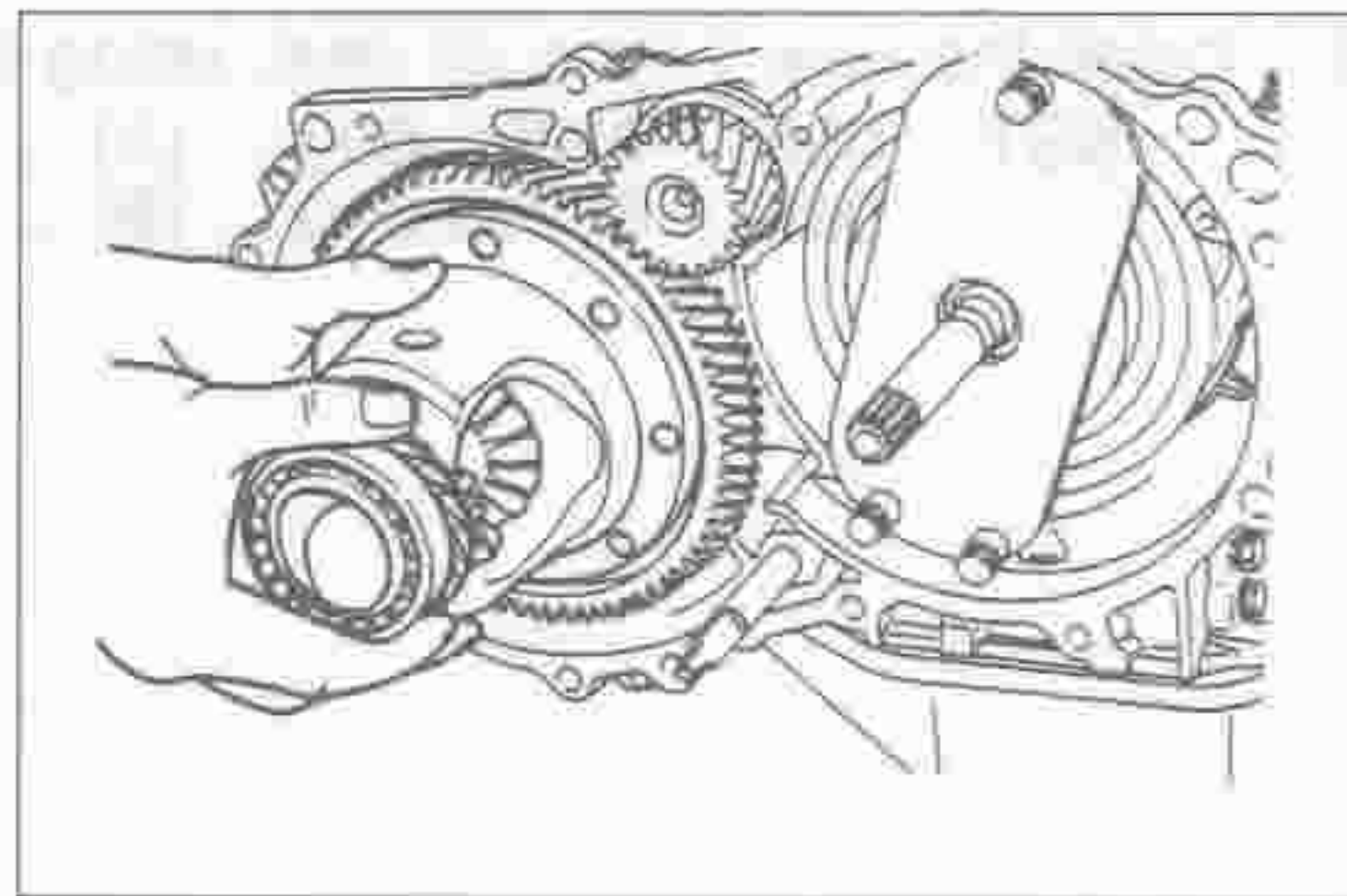
- Be sure to use the new two bolts as illustration in the right figure ①



LAT00269-00262

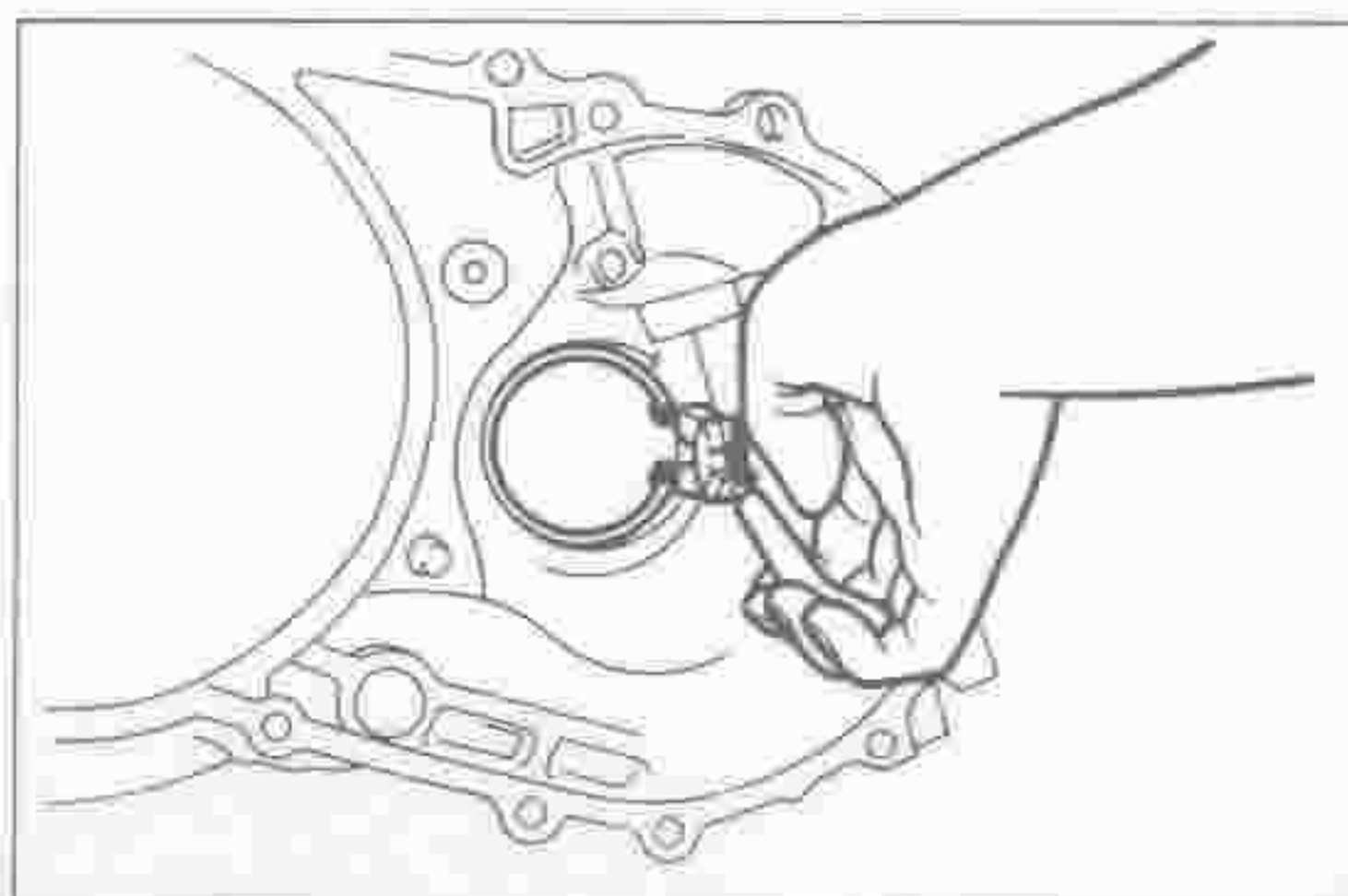
22. Install the governor body assembly (See page AT-130).

23. Install the differential assembly to the transaxle case.



LAT00270-00263

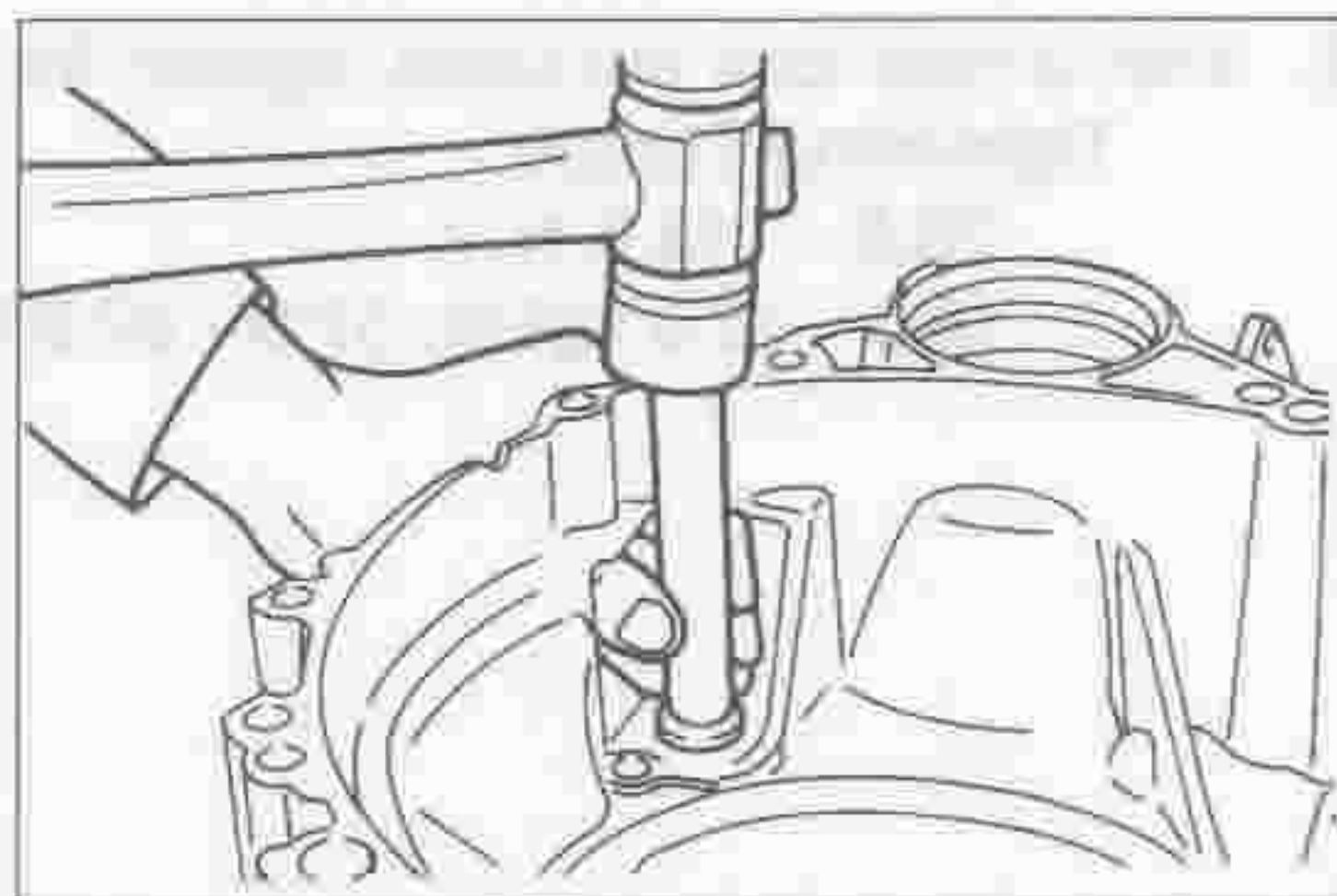
24. Install the hole snap ring, using the standard snap ring plier.



LAT00271-00264

25. Install the new T-type oil seal, using the following SST.

SST: 09301-87702-000



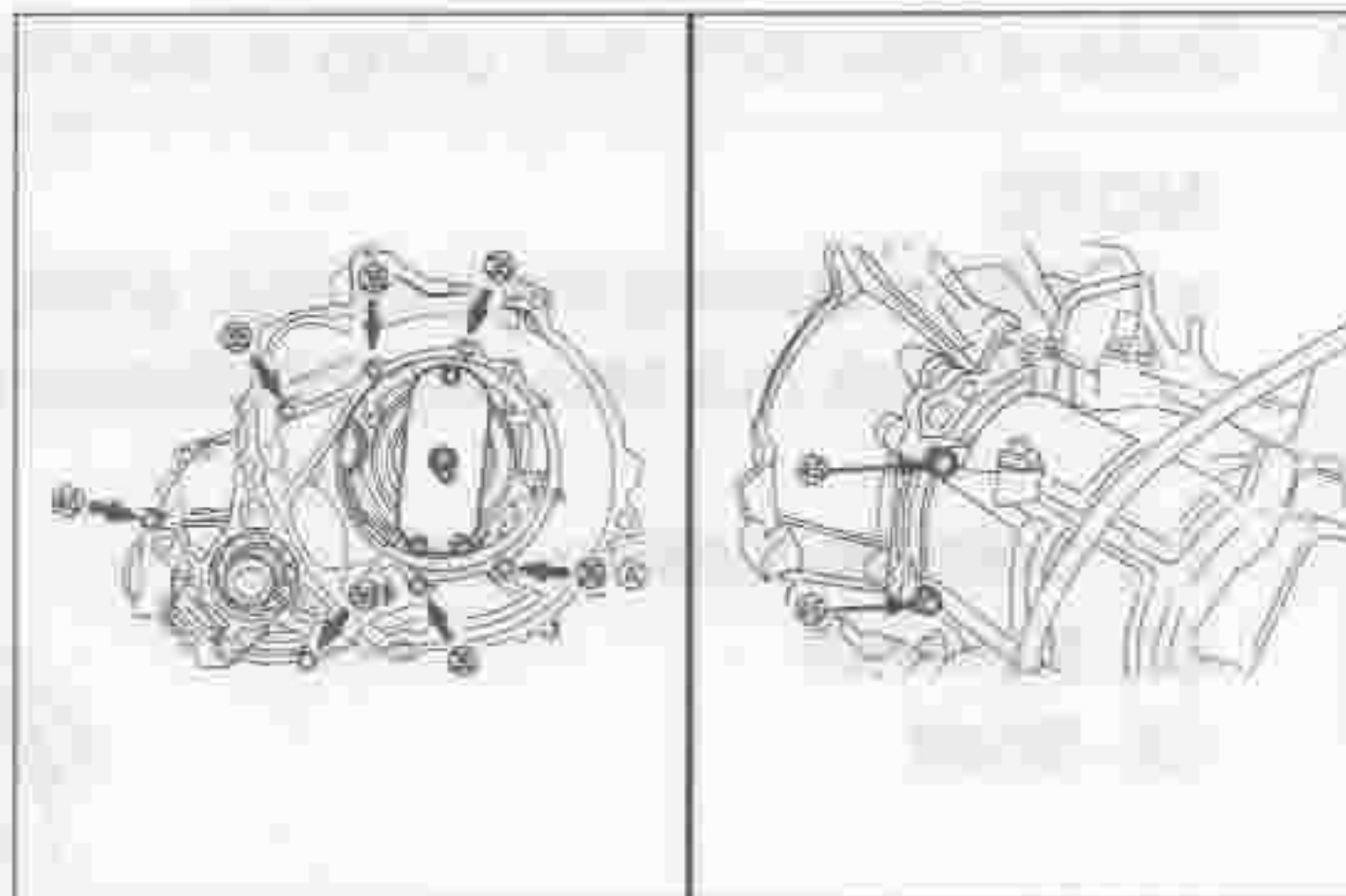
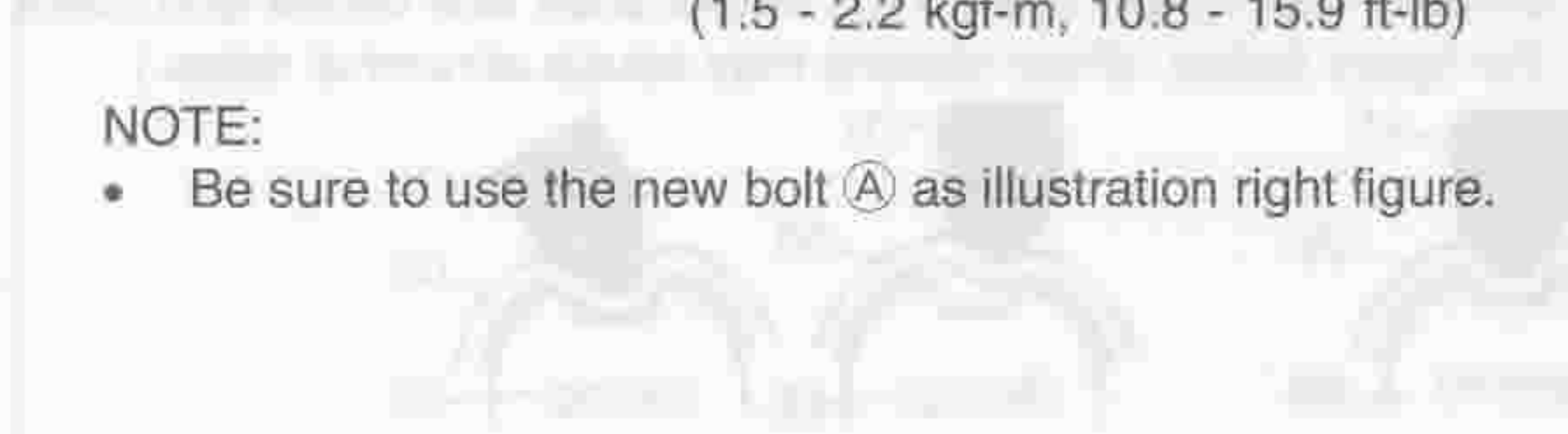
LAT00272-00265

26. With the new transmission case gasket interposed, tighten the nine bolts of the torque converter & differential case.

Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)

NOTE:

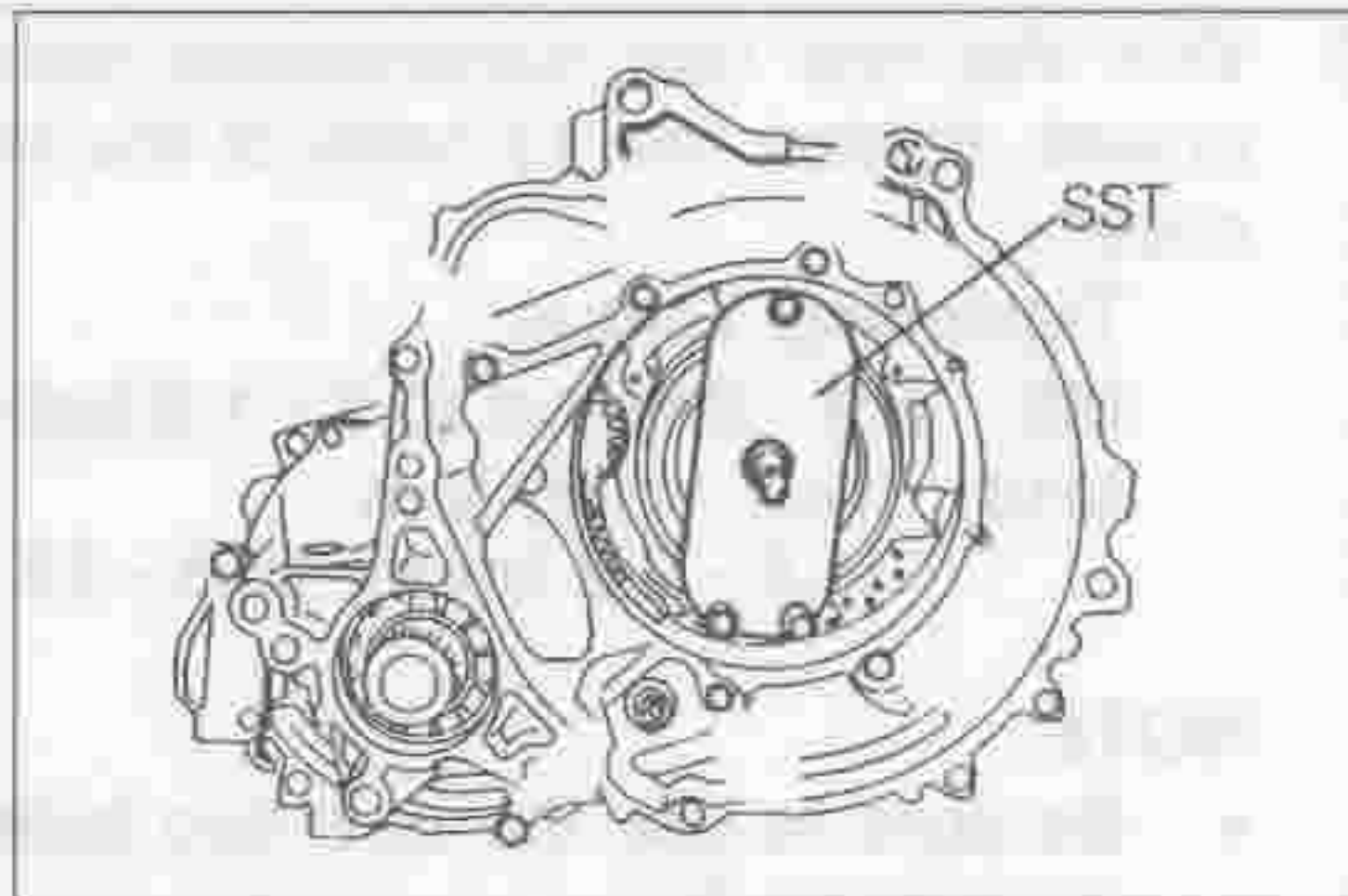
- Be sure to use the new bolt (A) as illustration right figure.



LAT00273-00266

27. Remove the following SST from the transaxle case.

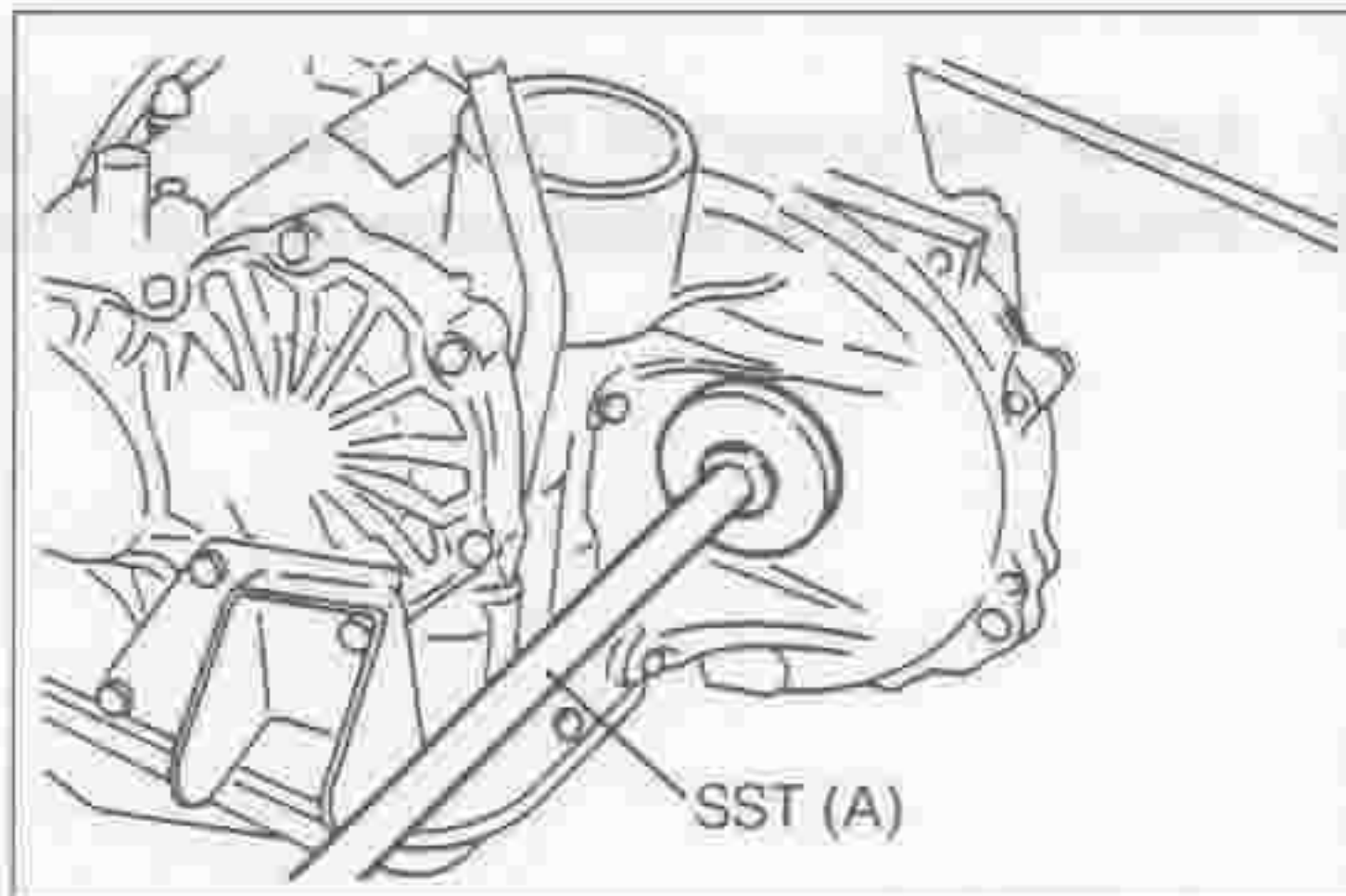
SST: 09351-87212-000



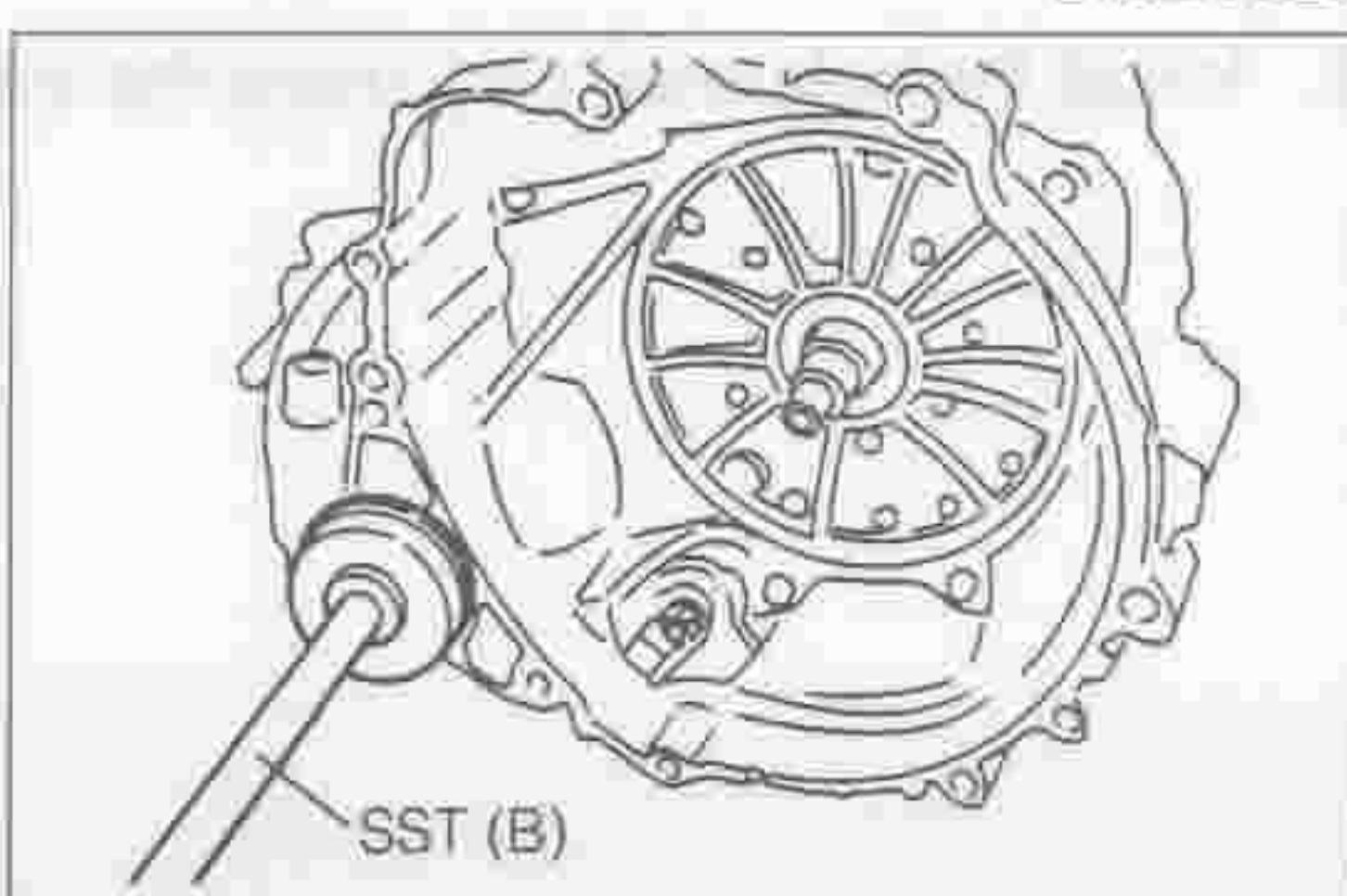
LAT00274-00267

28. Install the new T-type oil seal, using the following SST.

SST: 09517-87205-000 ... (A) ... (for LH)
09517-87203-000 ... (B) ... (for RH)



LAT00275-00268



LAT00000-00269

29. Install the starter shaft & oil pump assembly
30. Install and adjust the neutral start switch assembly
31. Install the speedometer driven gear and shaft sleeve
32. Install the transaxle case assembly to the vehicle
33. Adjust the throttle cable
34. Operation check of shift lever position
35. Fill the new ATF DEXRON® II

Full Capacity: 4.0 ℓ
Drain and Refill: 1.5 ℓ

CAUTION:

- Do not over fill the new fluid.



LAT00276-00000

DIFFERENTIAL DISASSEMBLY

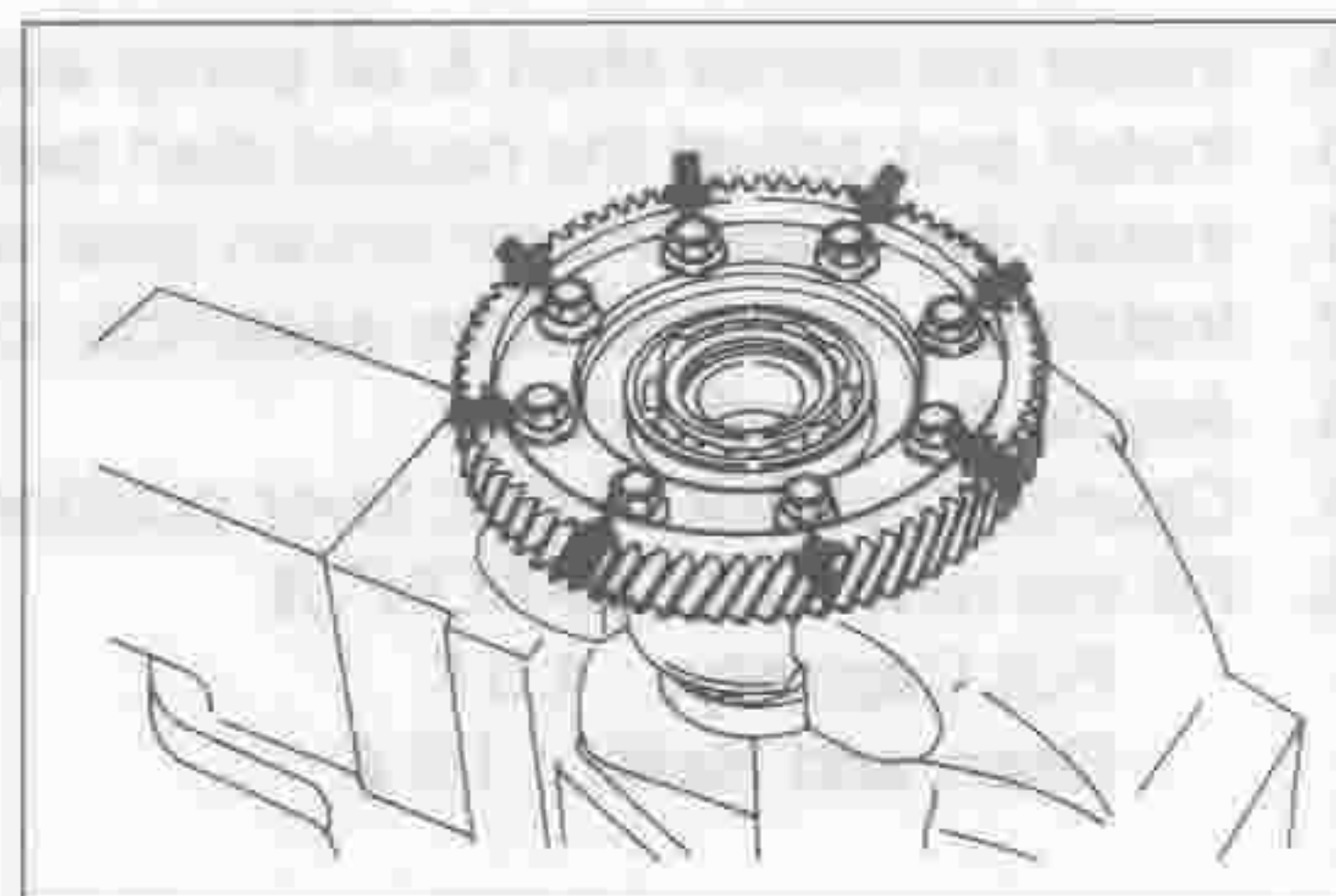
1. Remove the transaxle case assembly from the vehicle.
2. Remove the torque converter & differential case.

3. Remove the differential ring gear by removing the 8 bolts.
4. Clamp the differential case in a vice, using the soft jaws.
5. Remove the radial ball bearing, using the following SSTs
SSTs: 09950-20017-000, 09950-87701-000 ... (A)

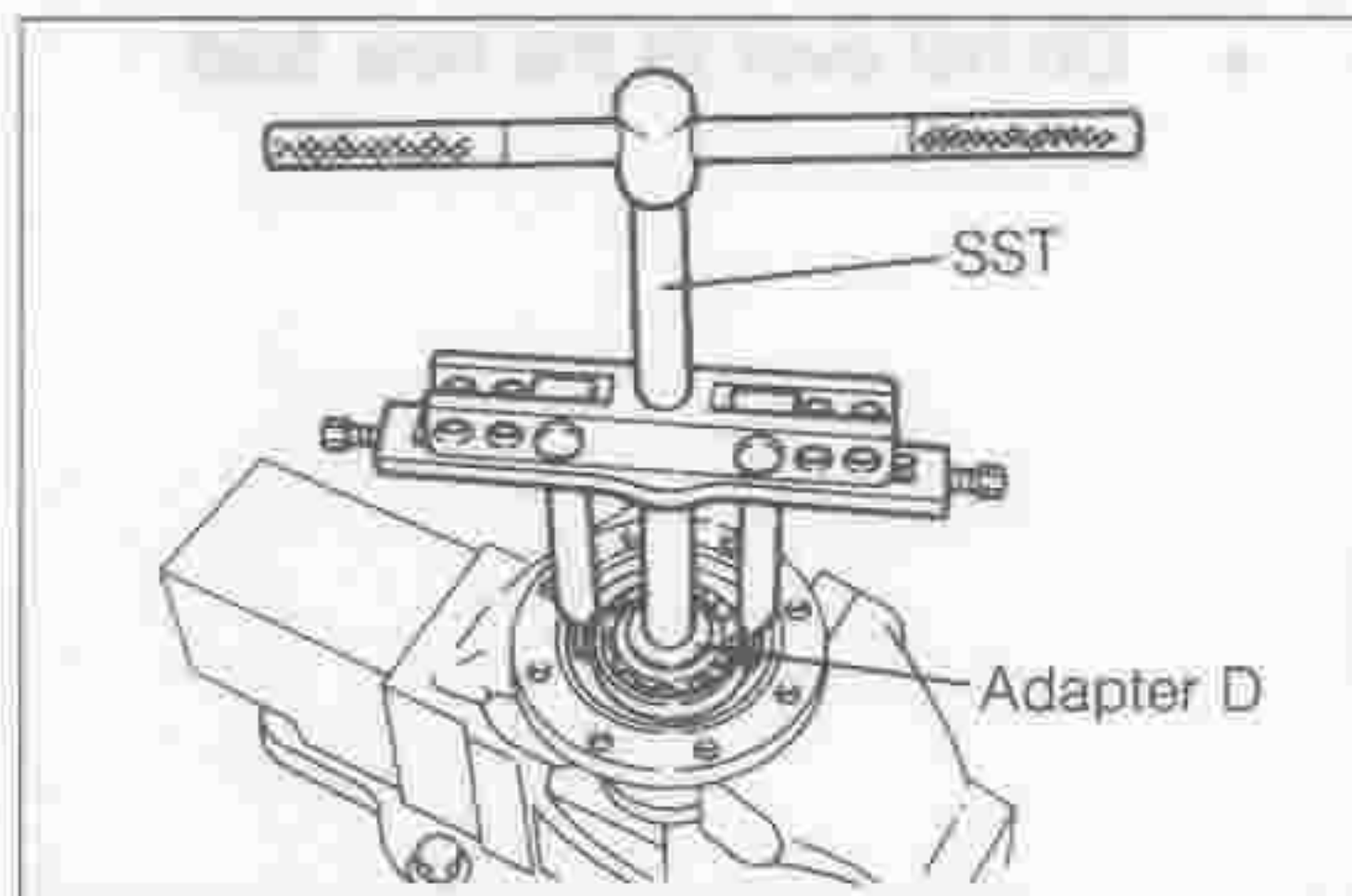
NOTE:

- Never reuse the removed bearing.

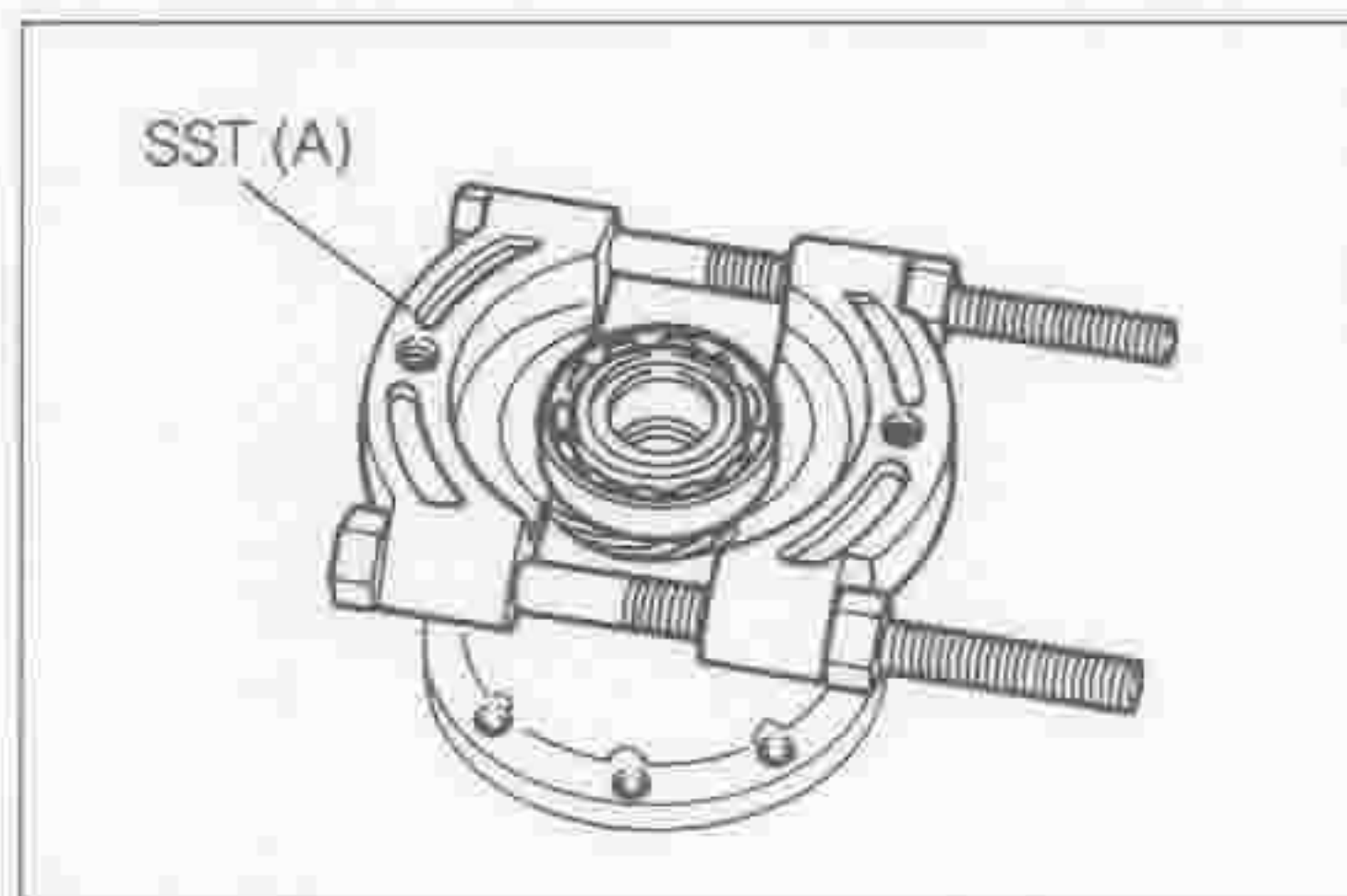
6. Remove the speedometer drive gear.



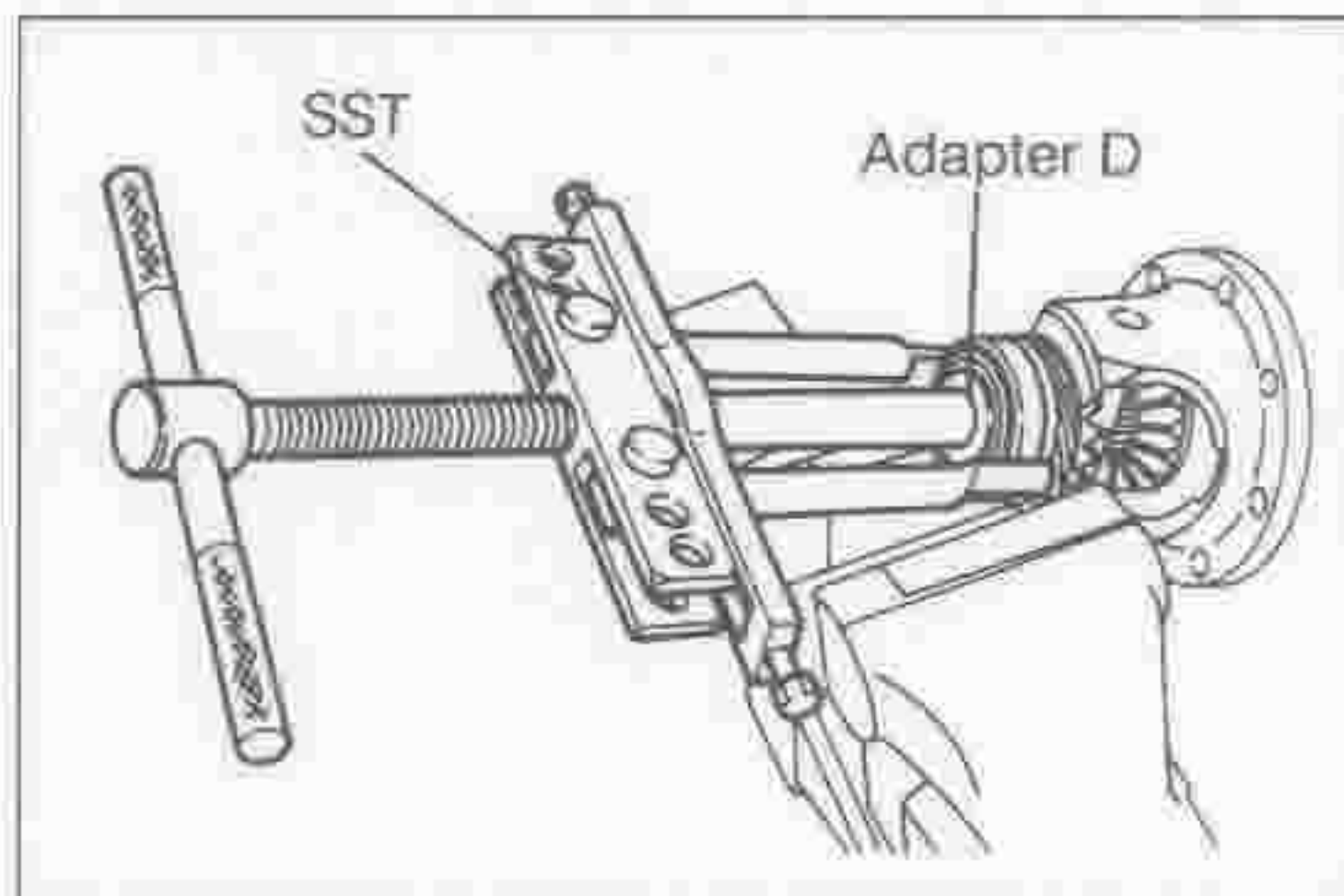
LAT00277-00270



LAT00278-00271



LAT00000-00272

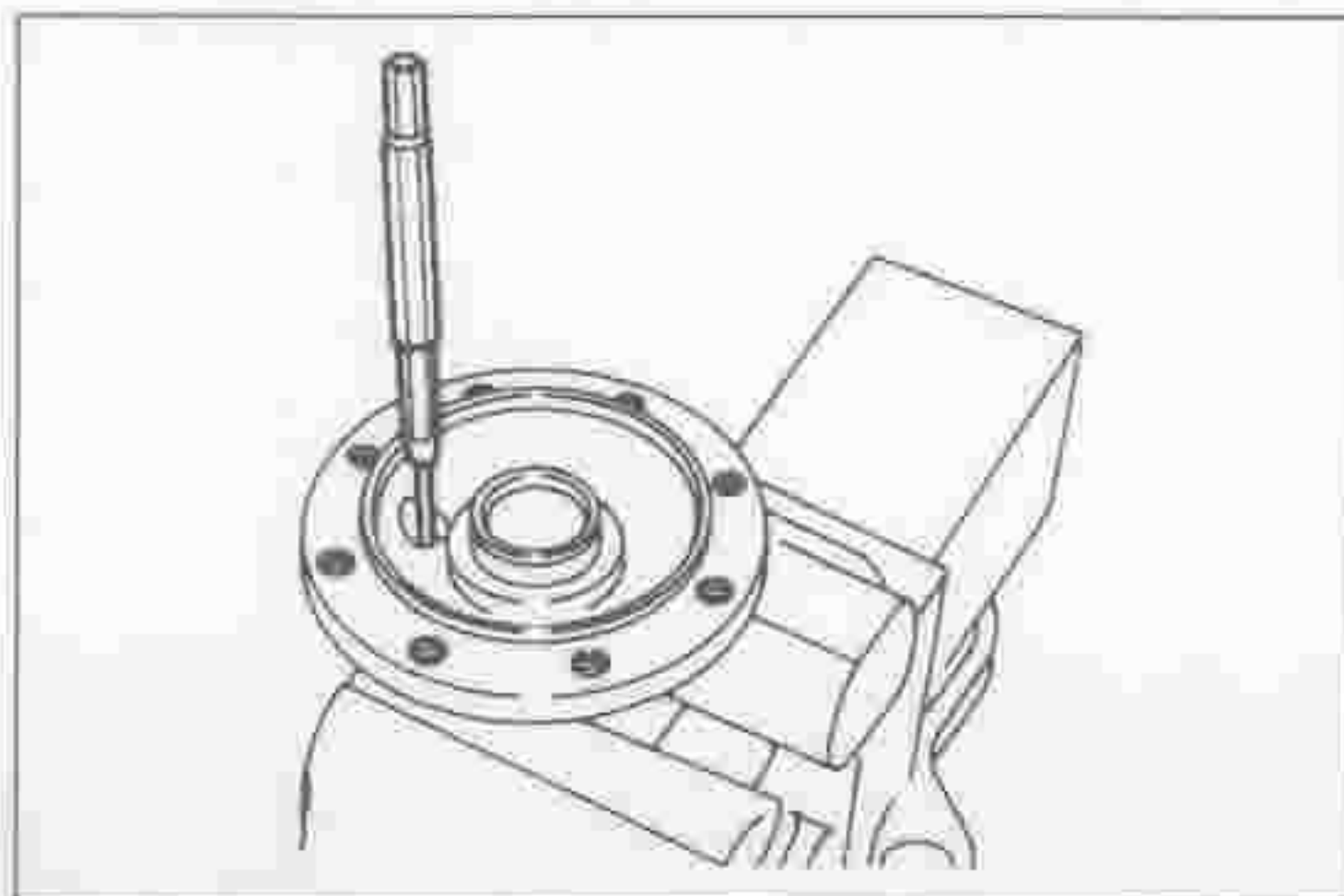


LAT00000-00273

7. Turn over the differential case.
8. Clamp the differential case in a vice, using the soft jaws.
9. Remove the slotted spring pin, using the standard pin punch and hammer.

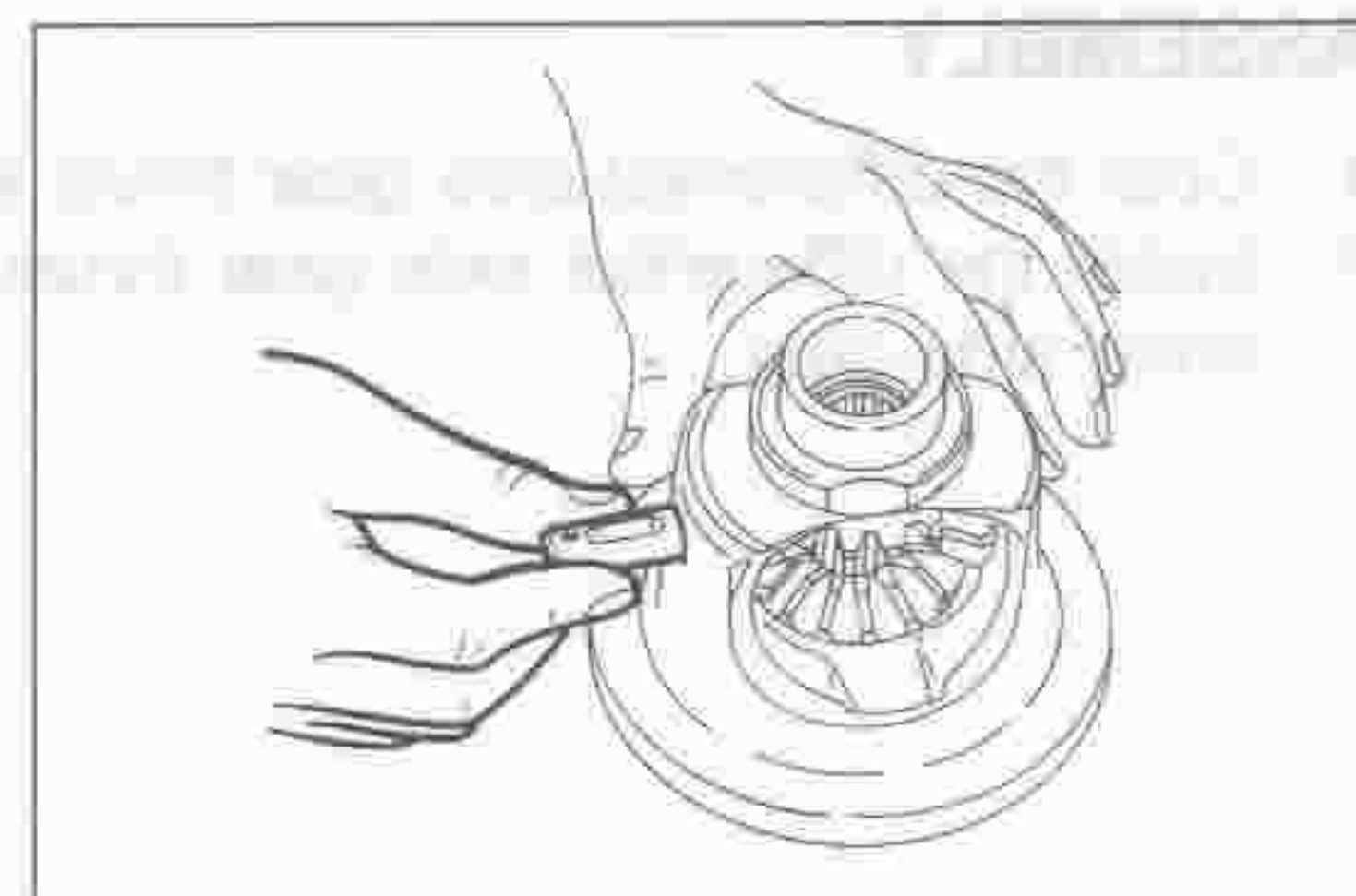
NOTE:

- Never reuse the removed slotted spring pin.



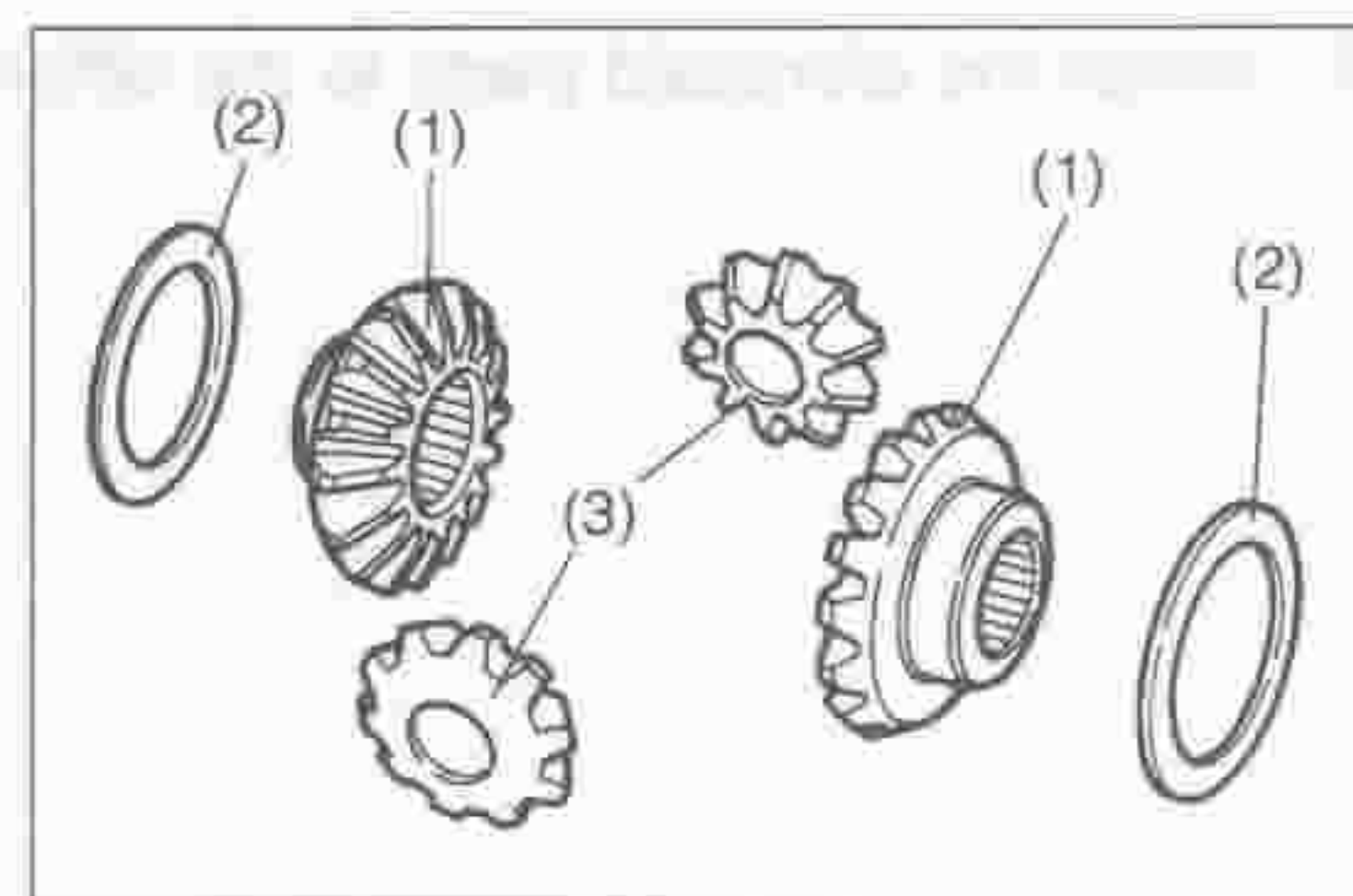
LAT00279-00274

10. Remove the differential pinion shaft from the differential case.



LAT00280-00275

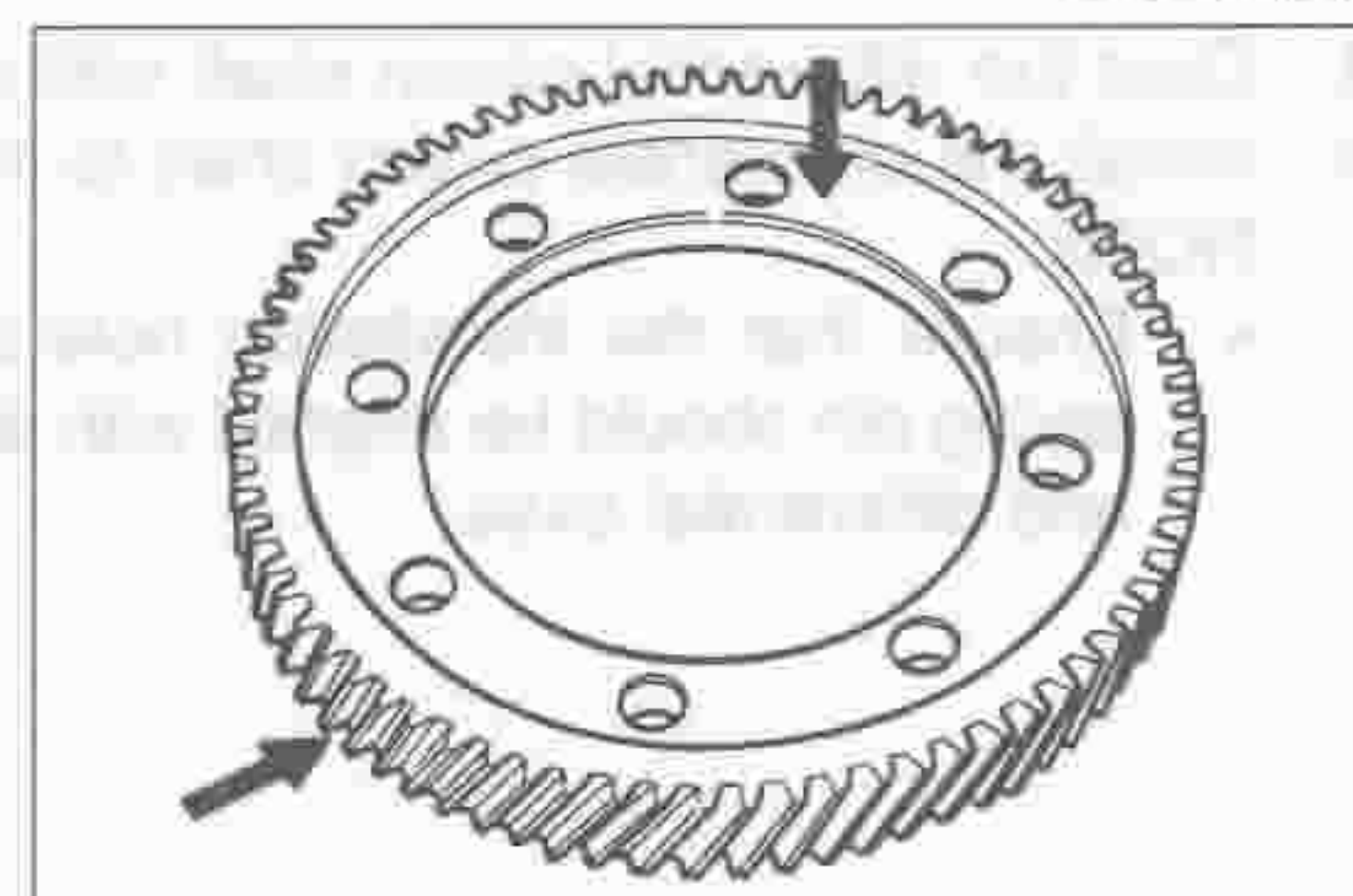
11. Remove the following parts from the differential case.
- (1) Differential side gear 2 pcs
 - (2) Differential side gear thrust washer 2 pcs
 - (3) Differential pinion gear 2 pcs



LAT00281-00276

INSPECTION

1. Visually inspect the damage or wear for installation section of the differential ring gear.

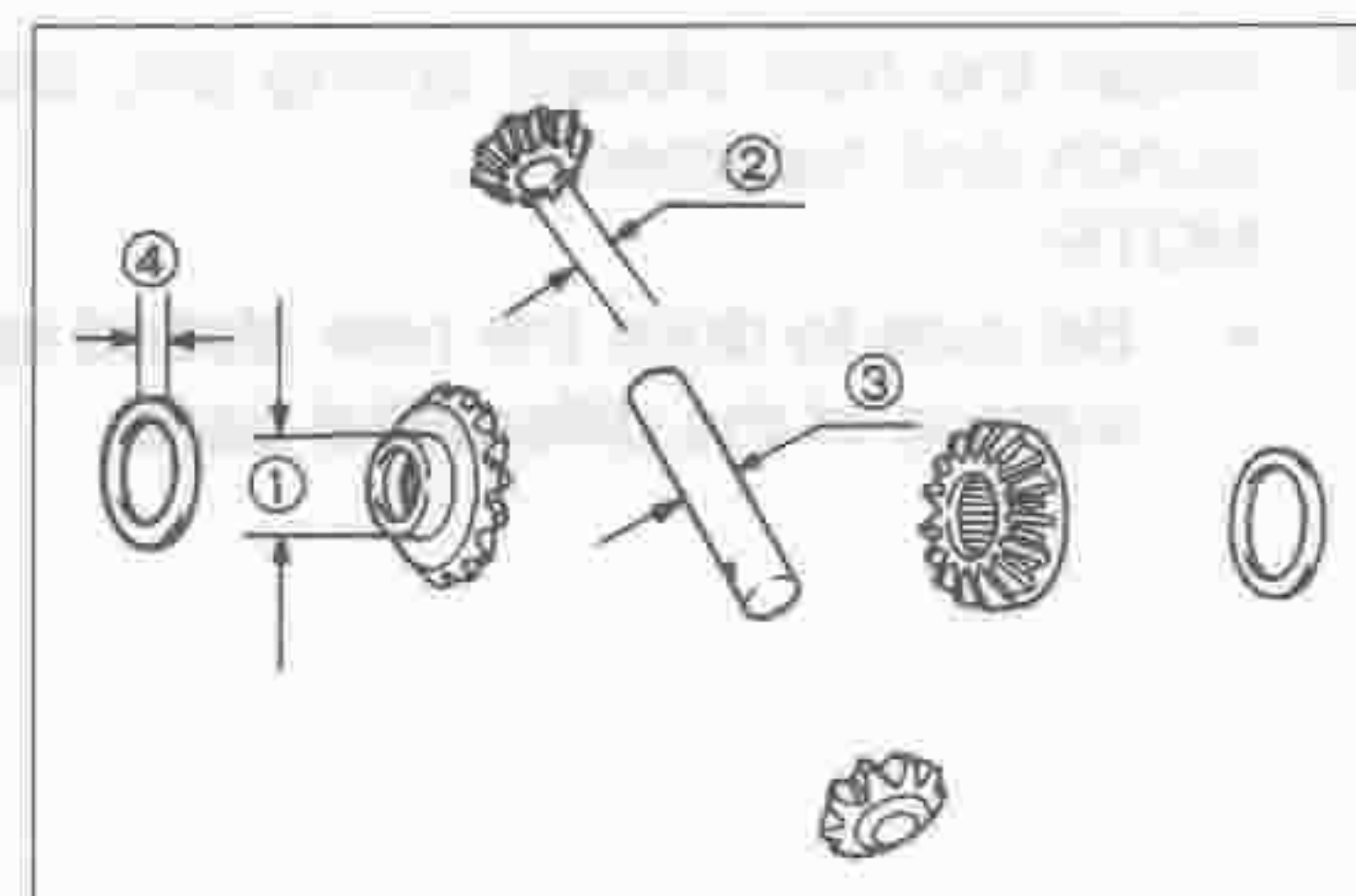


LAT00282-00277

2. Measure and visually inspect the wear or damage for the following parts.

Unit: mm (inch)

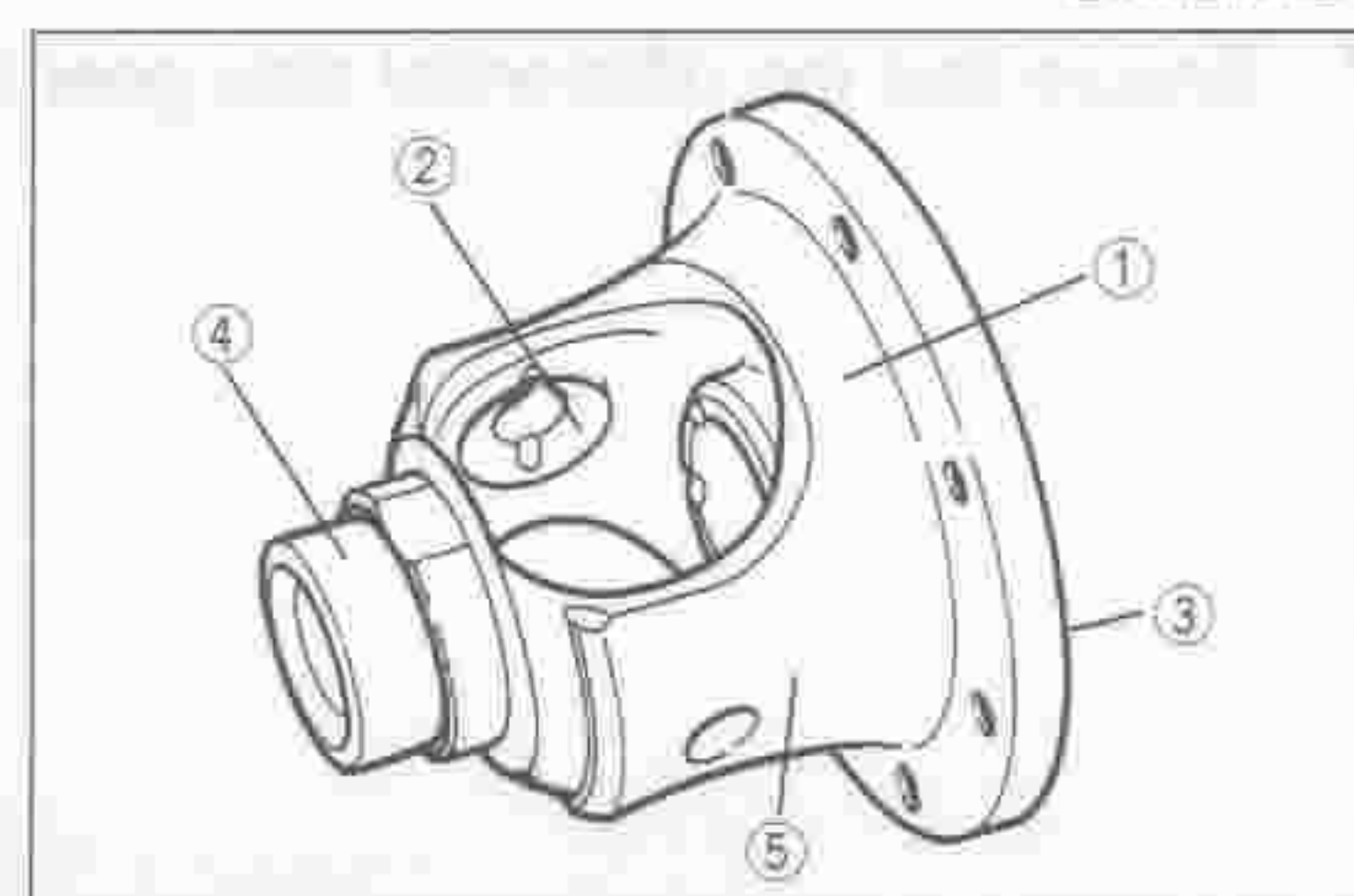
		Specified value	Allowable limit
①	Side gear outer diameter	31.95 - 31.975 (1.257 - 1.258)	31.9 (1.255)
②	Pinion gear inner diameter	15.03 - 15.08 (0.591 - 0.593)	15.13 (0.595)
③	Pinion shaft outer diameter	14.944 - 14.954 (0.588 - 0.589)	14.9 (0.586)
④	Thrust washer thickness	0.75 - 0.85 (0.029 - 0.033)	0.7 (0.027)



LAT00283-00278

3. Visually inspect the differential case of the following section for wear and damage.

- (1) Side gear contacting section
- (2) Pinion gear contacting section
- (3) Ring gear installation section
- (4) Bearing pressing section
- (5) Whole of differential case self.



LAT00284-00279



3. Install the aforesaid parts to the differential case.



4. Coat the differential pinion shaft with ATF.
5. Install the differential pinion shaft to the differential case.

NOTE:

- Ensure that the installation hole section of the slotted spring pin should be aligned with differential pinion shaft and differential case.



6. Install the new slotted spring pin, using the standard pin punch and hammer.

NOTE:

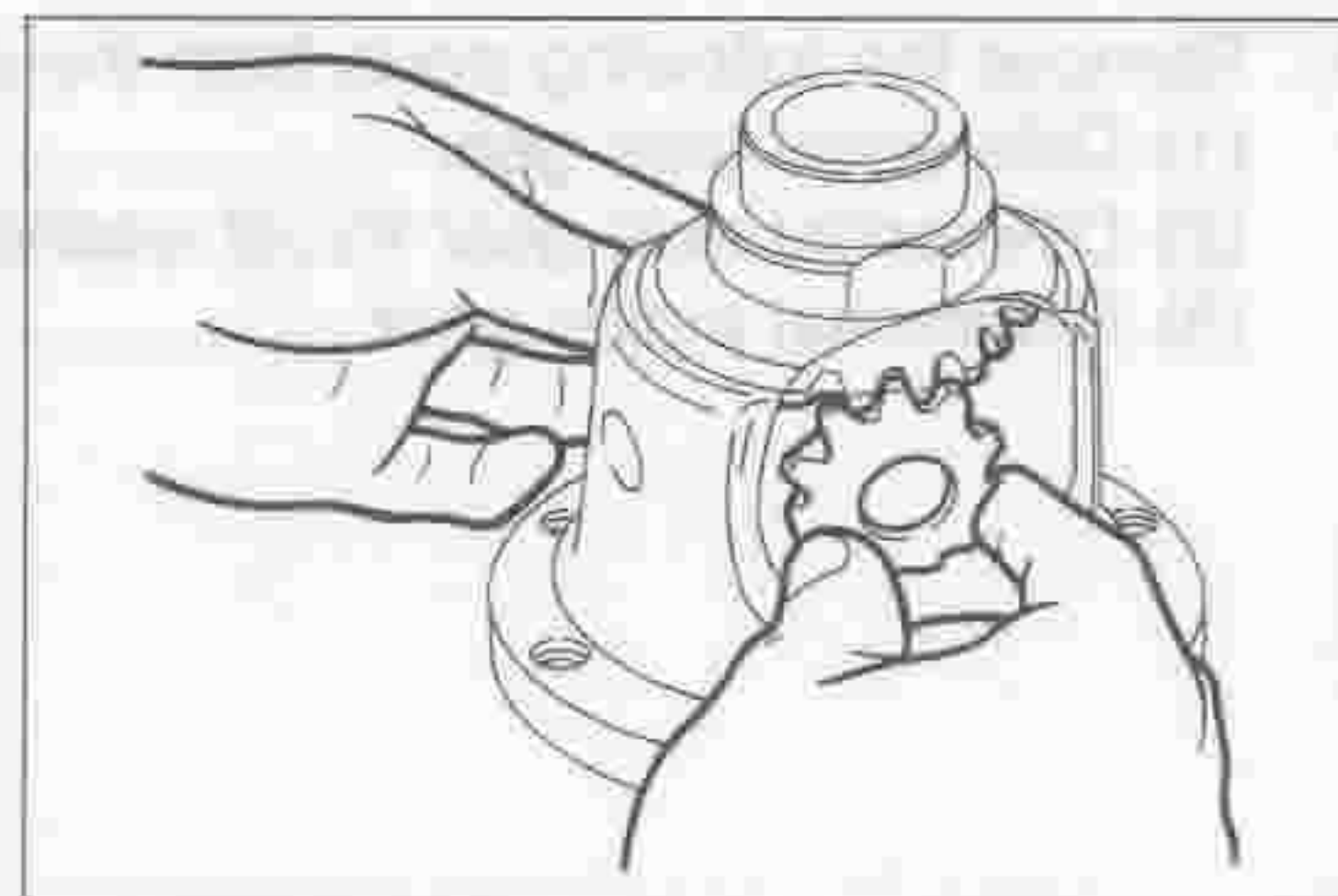
- Be sure to drive the new slotted spring pin until the end surface of the differential case.



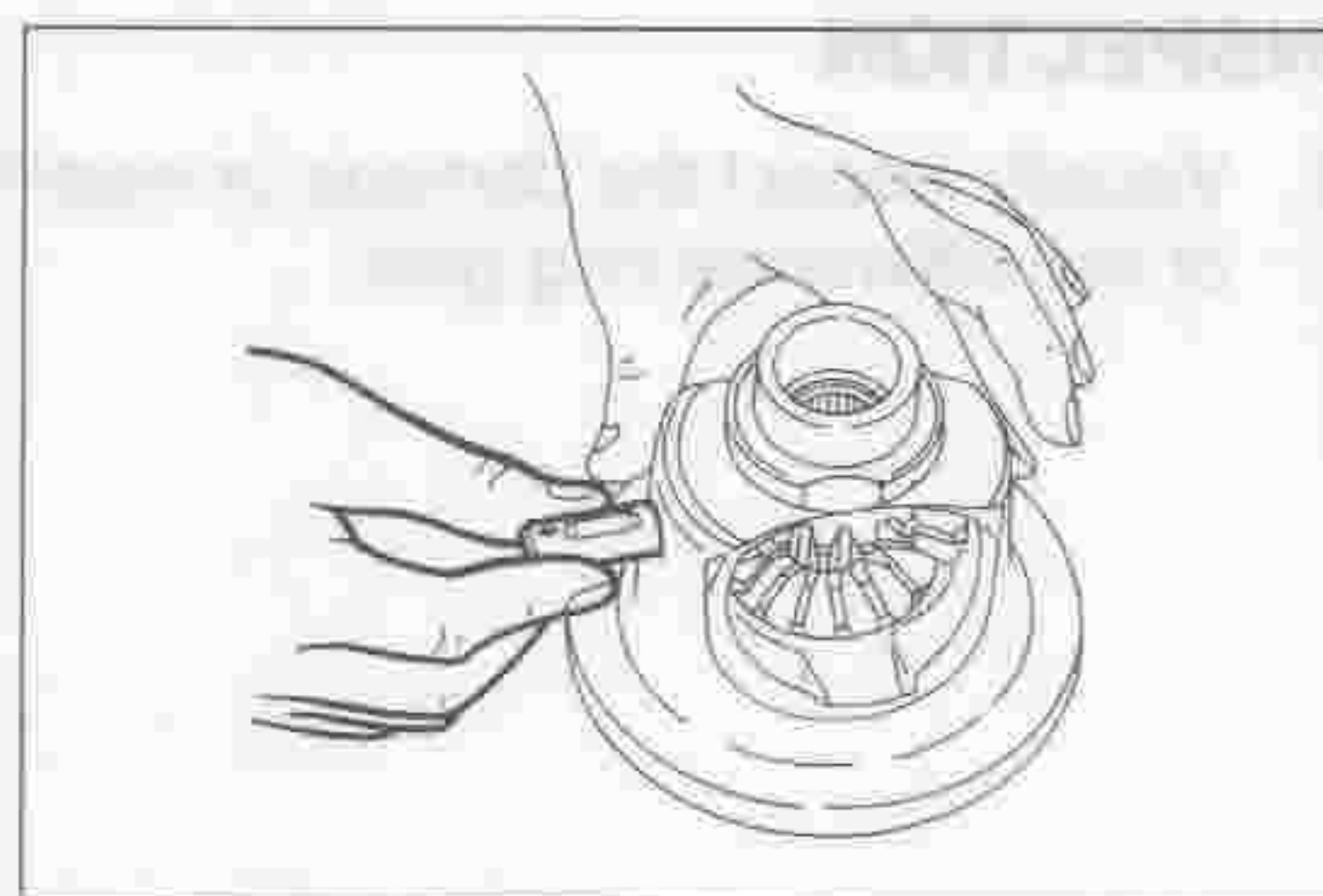
7. Ensure that the differential side gear turns smoothly.



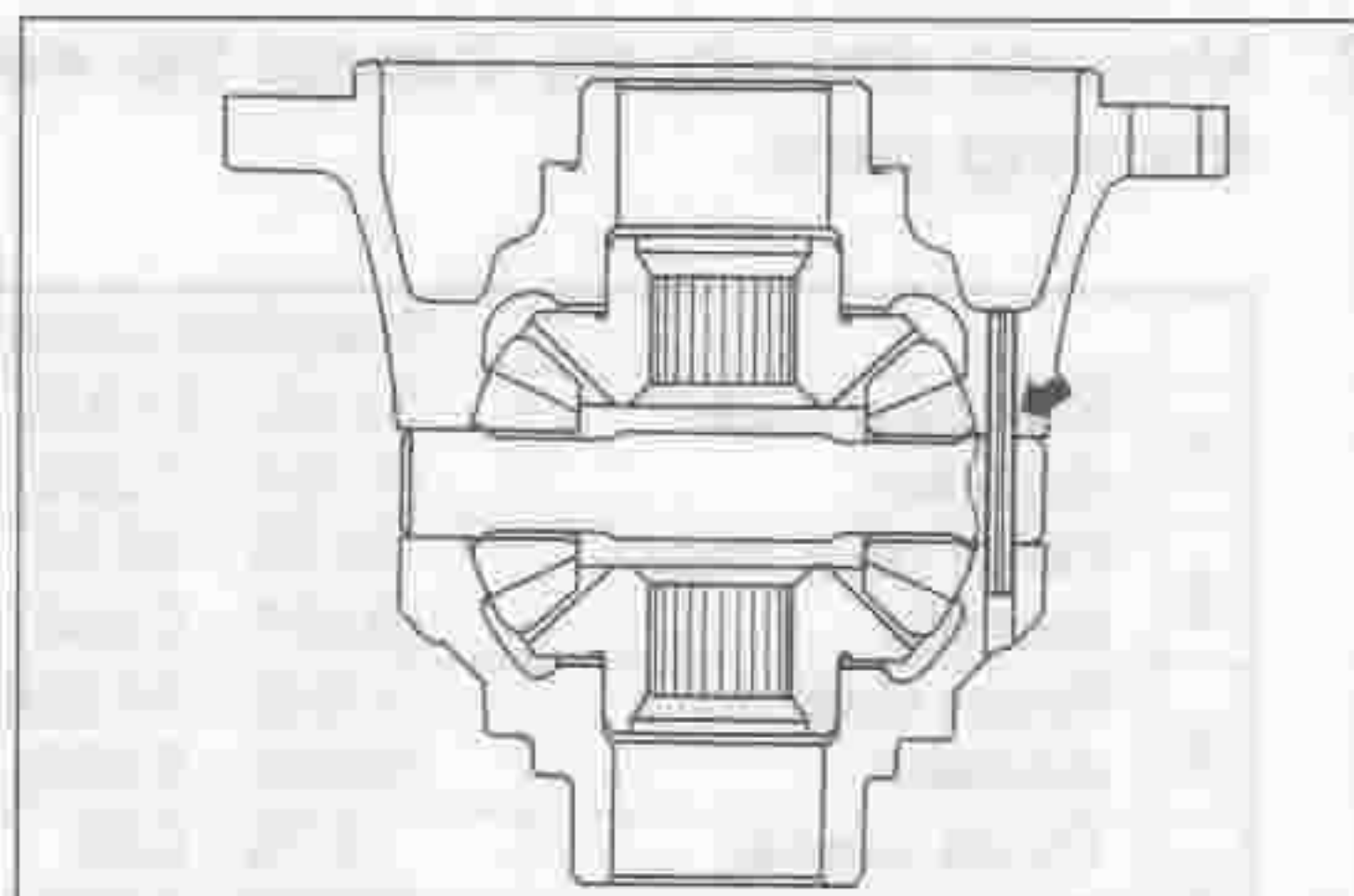
LAT00285-00280



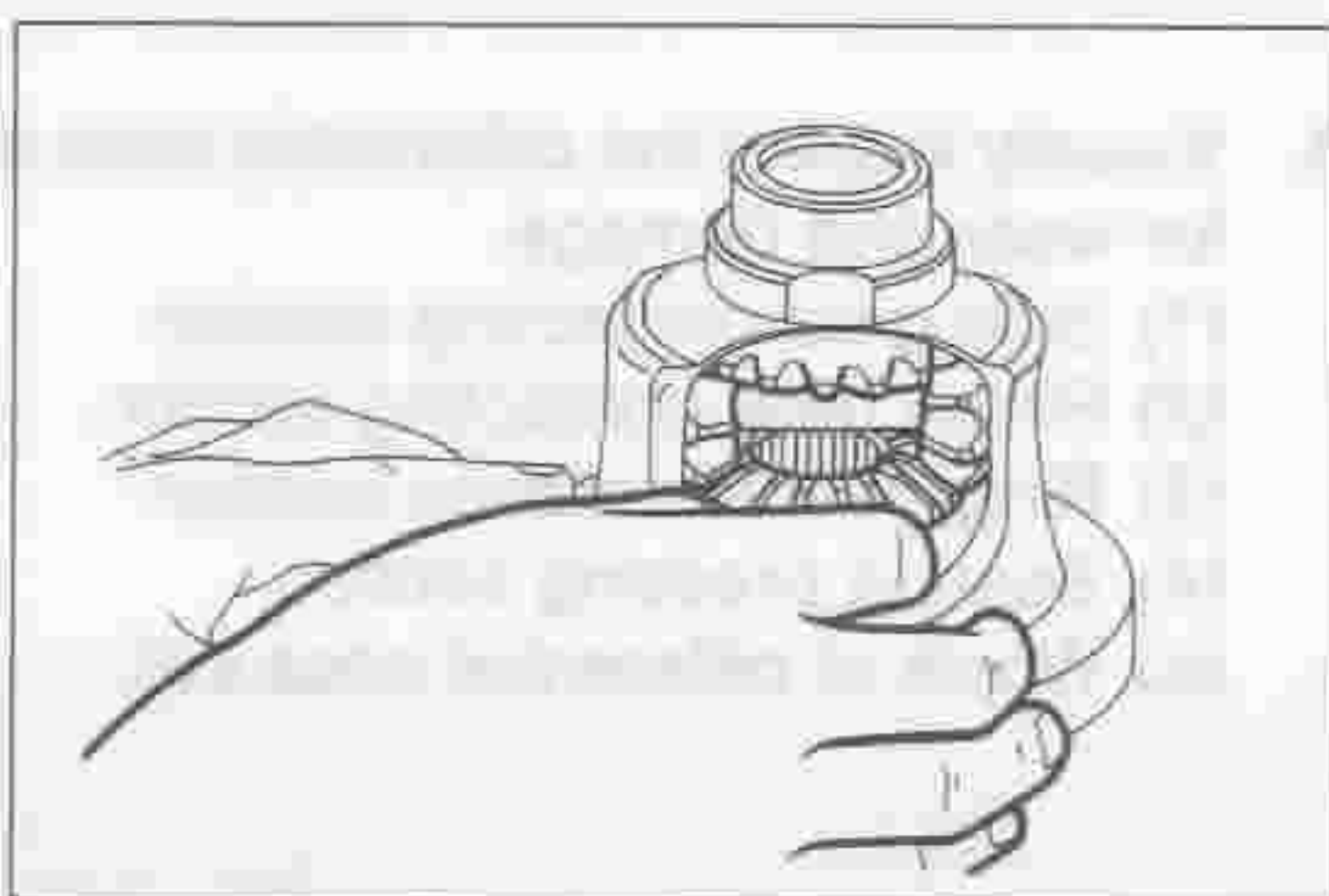
LAT00286-00281



LAT00287-00282



LAT00288-00283



LAT00289-00284

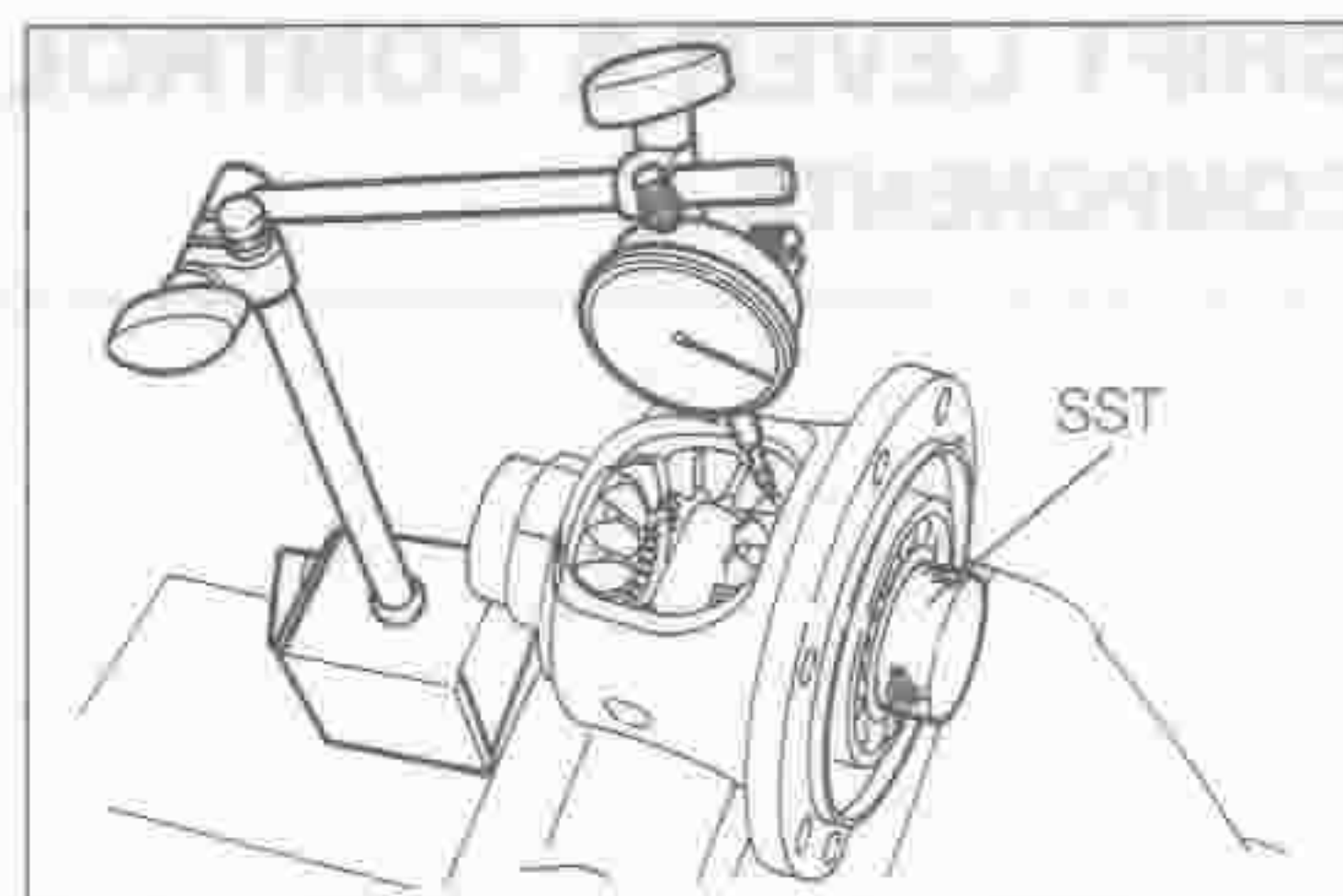
8. Backlash inspection

- (1) Insert the following SST to the differential side gear section.

SST: 09351-87213-000

- (2) Measure the side gear backlash while pushing the pinion gear against the differential case side.

Specified Value: 0.02 - 0.2 mm (0.007 - 0.007 inch)

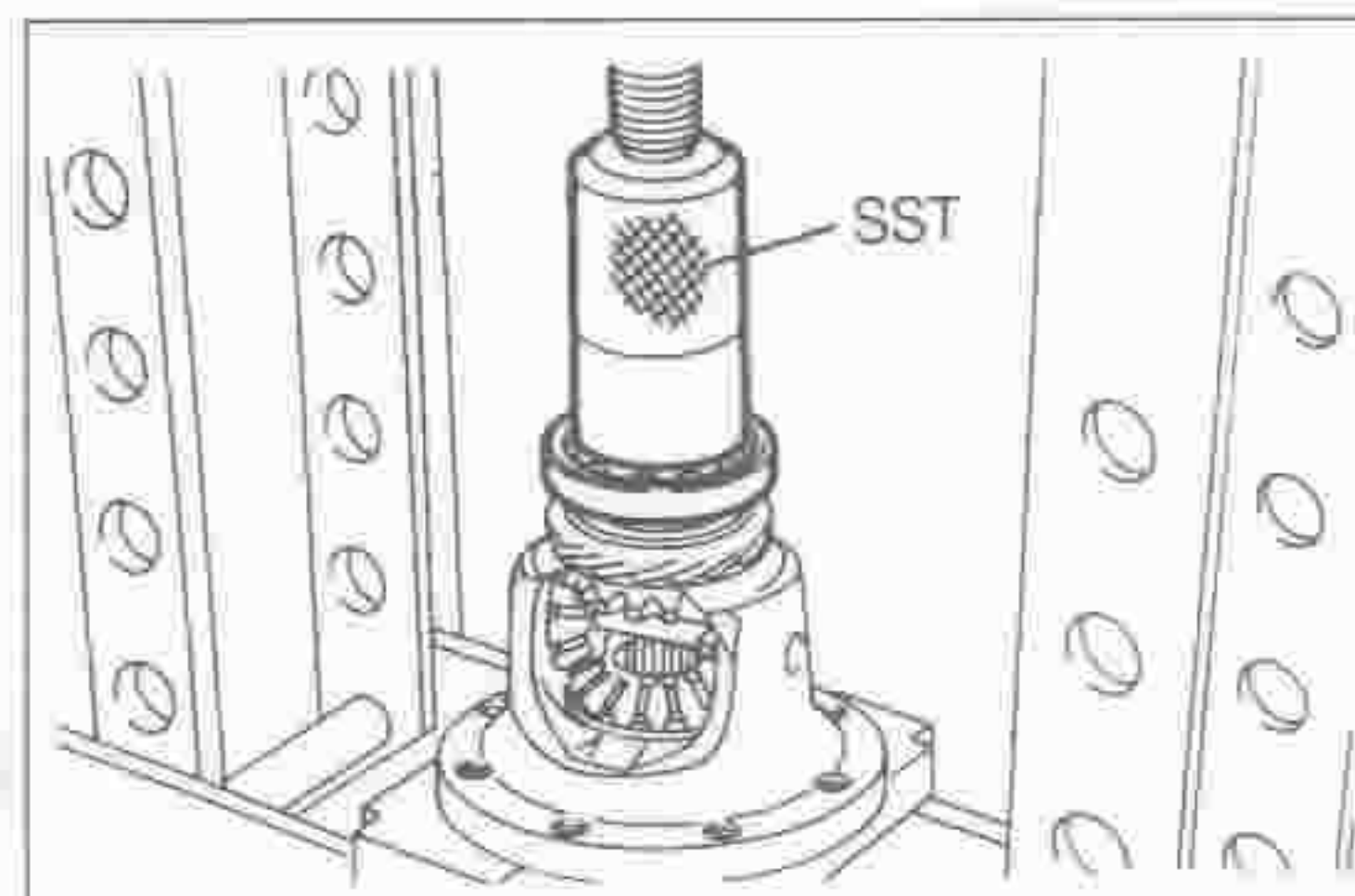


LAT00290-00285

9. Install the speedometer drive gear.

10. Press a new radial ball bearing (width: 15 mm, 0.59 inch), using the following SST.

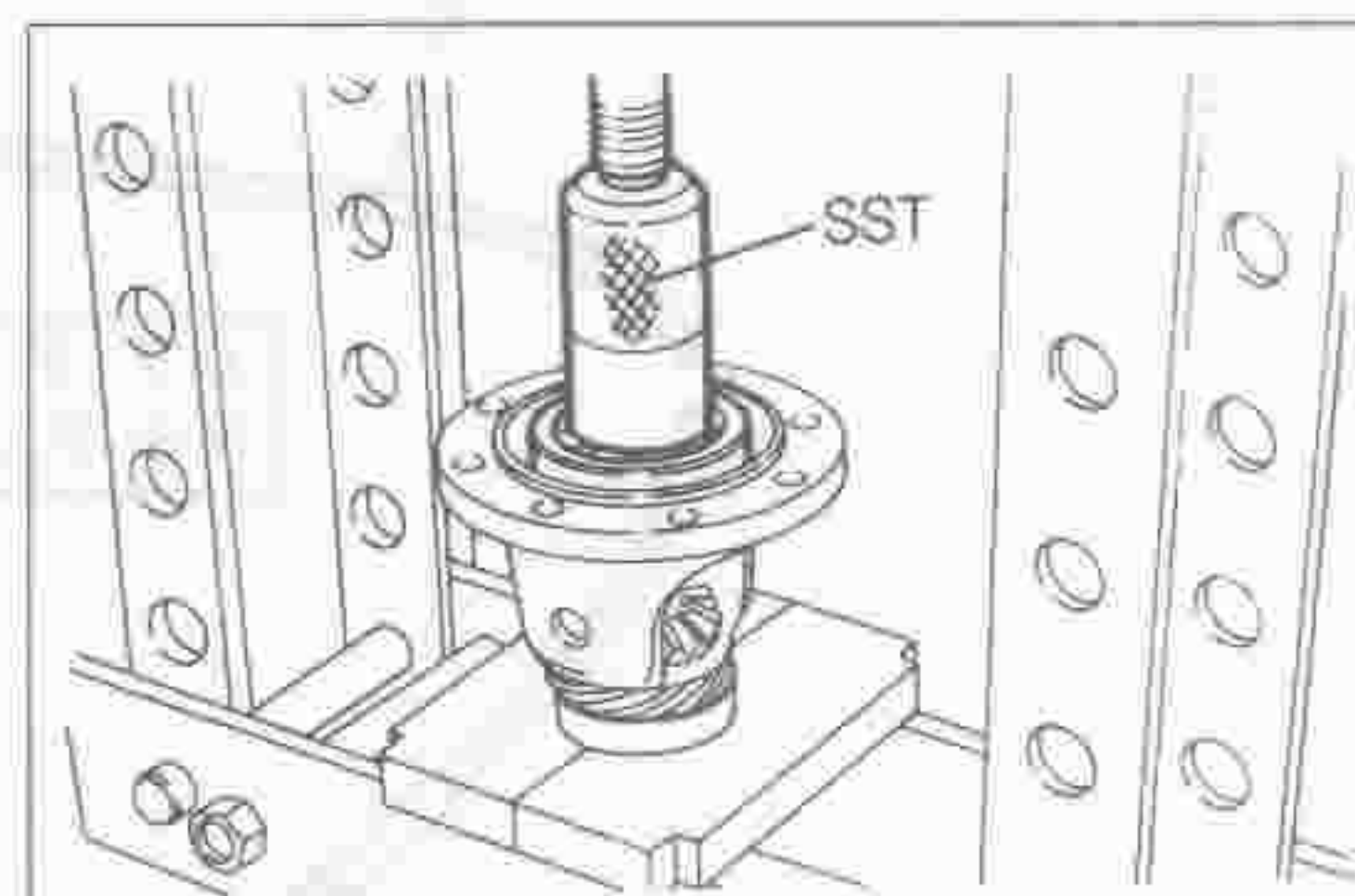
SST: 09636-20010-000



LAT00291-00286

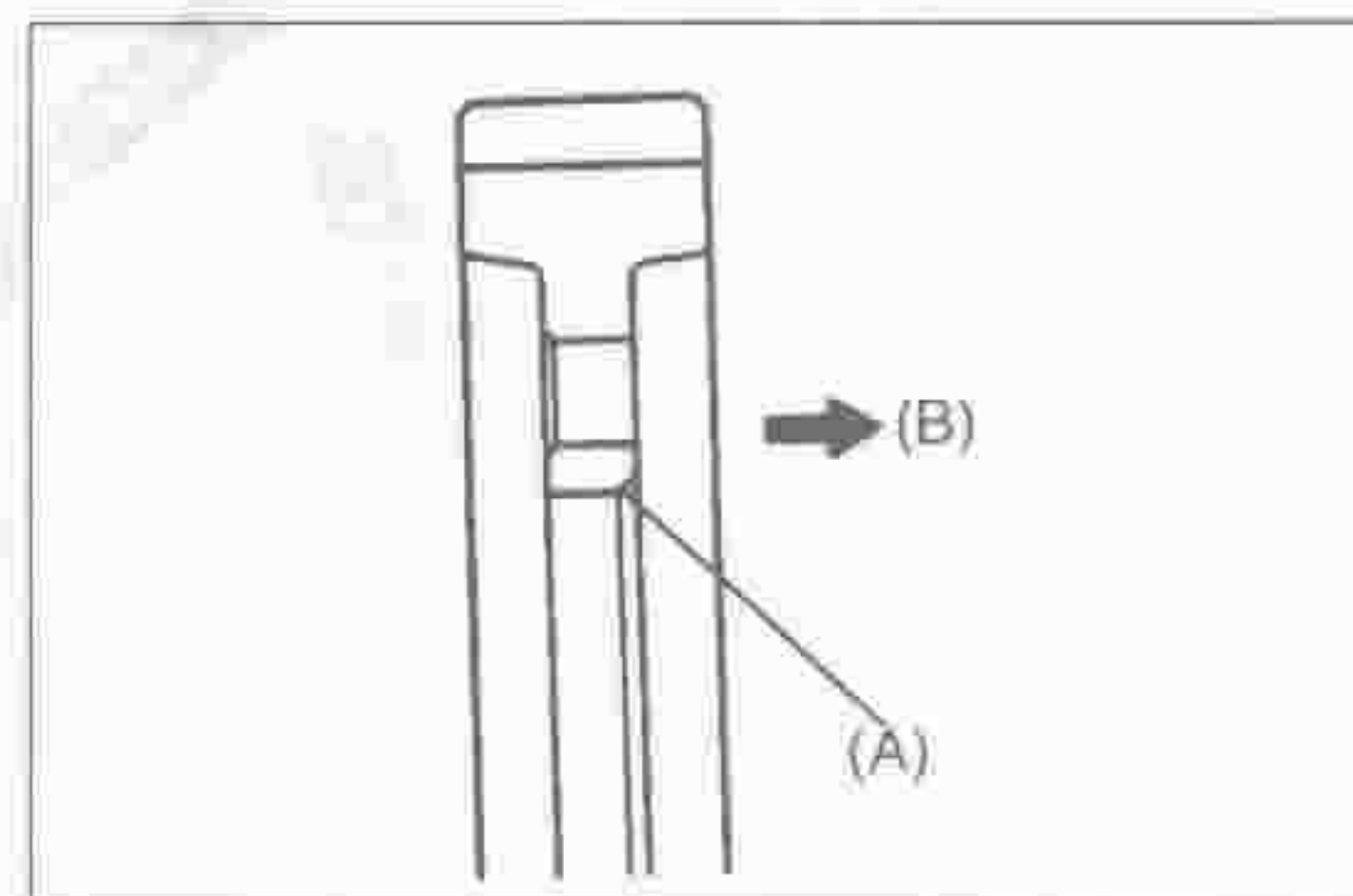
11. Press a new radial ball bearing (width: 14 mm, 0.55 inch), using the following SST.

SST: 09636-20010-000



LAT00292-00287

12. Install the largely-chamfered side (A) of the differential ring gear bore section to the differential case side (B).



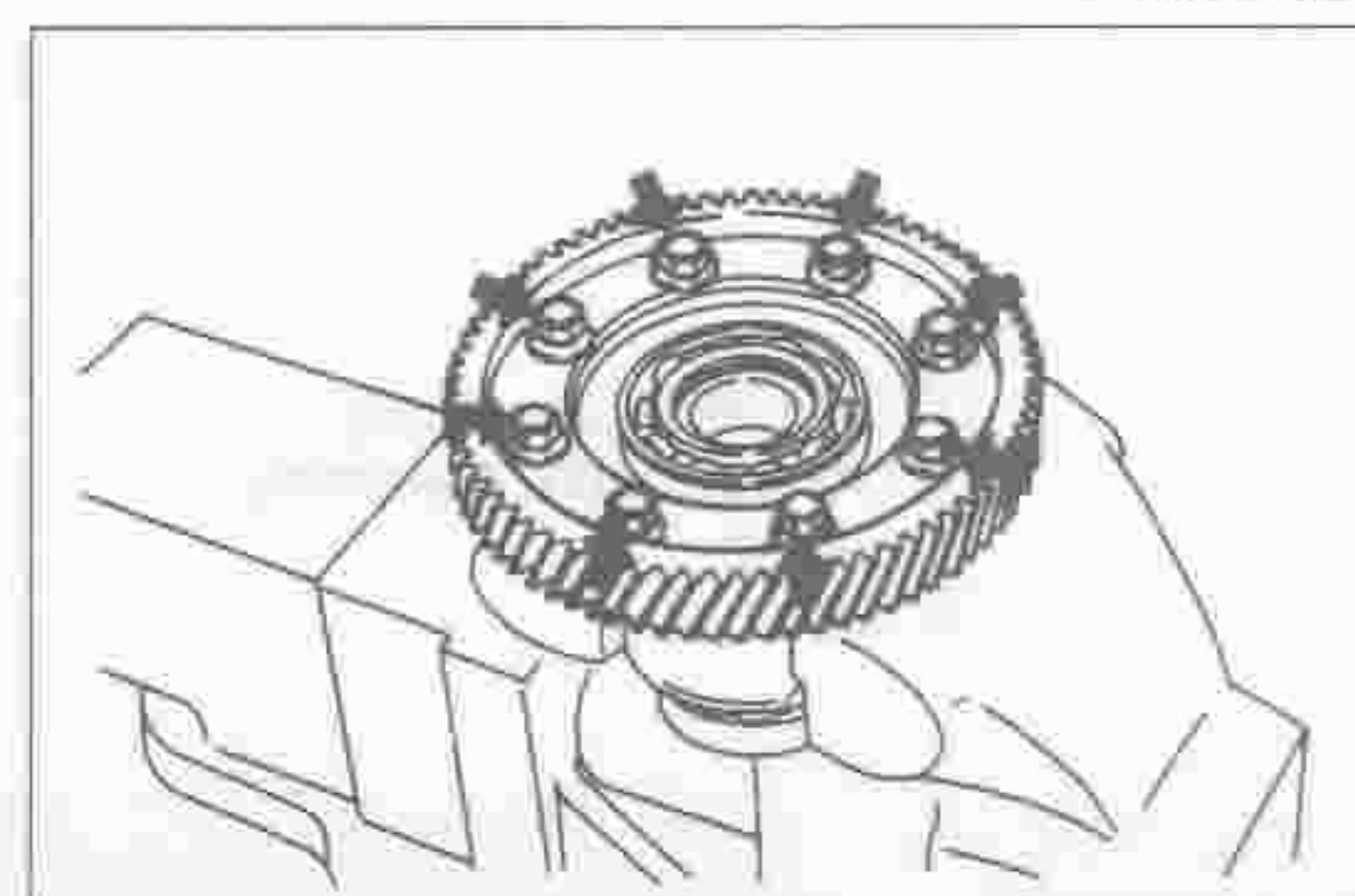
LAT00293-00288

13. Clamp the differential case in a vice, using soft jaws.

14. Tighten the differential ring gear with the eight bolts.

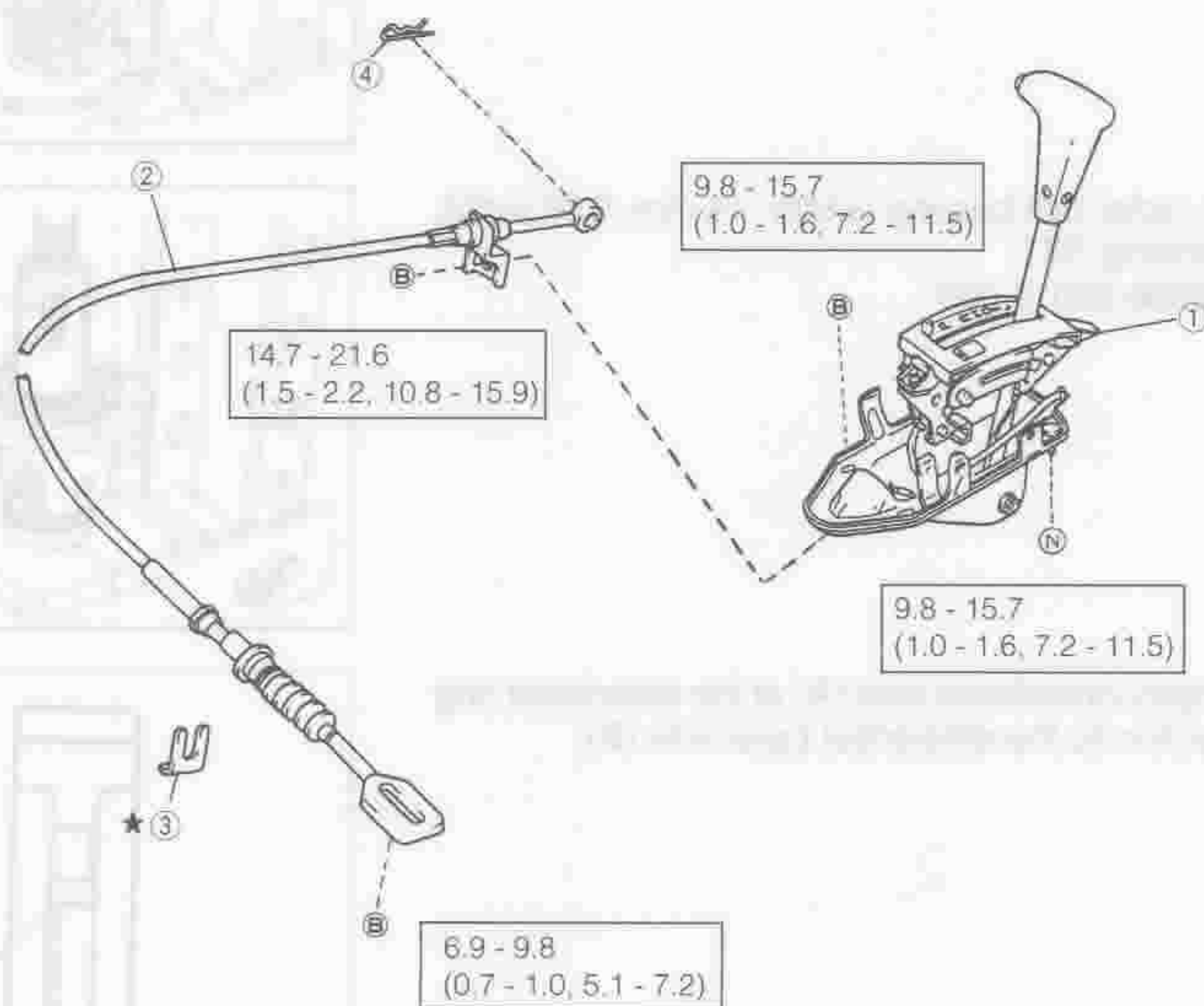
Tightening Torque: 58.8 - 68.6 N·m

(6.0 - 7.0 kgf-m, 43.4 - 50.6 ft-lb)



LAT00294-00289

SHIFT LEVER & CONTROL CABLE COMPONENTS



- ① Shift lever assembly
- ② Control cable assembly
- ③ Clamp
- ④ Clip

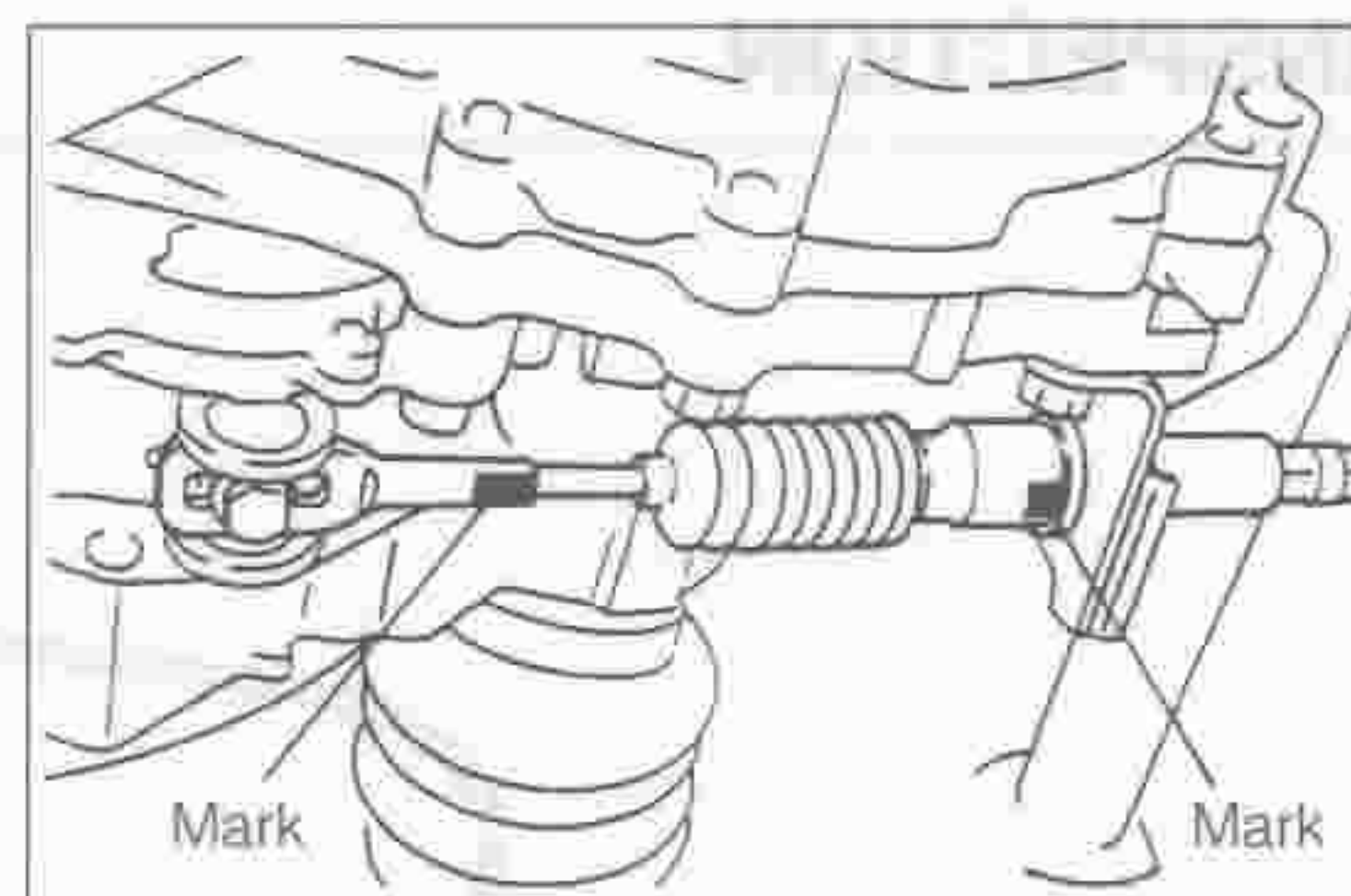
: Tightening torque
 Unit : N·m (kgf-m, ft-lb)
 ★ : Non-reusable parts

REMOVAL

1. Jack up the vehicle. Support the vehicle at the specified positions with safety stands.
2. Move the shift lever to the N range.
Remove the control cable from the neutral start switch.
3. Remove the clamp from the bracket.

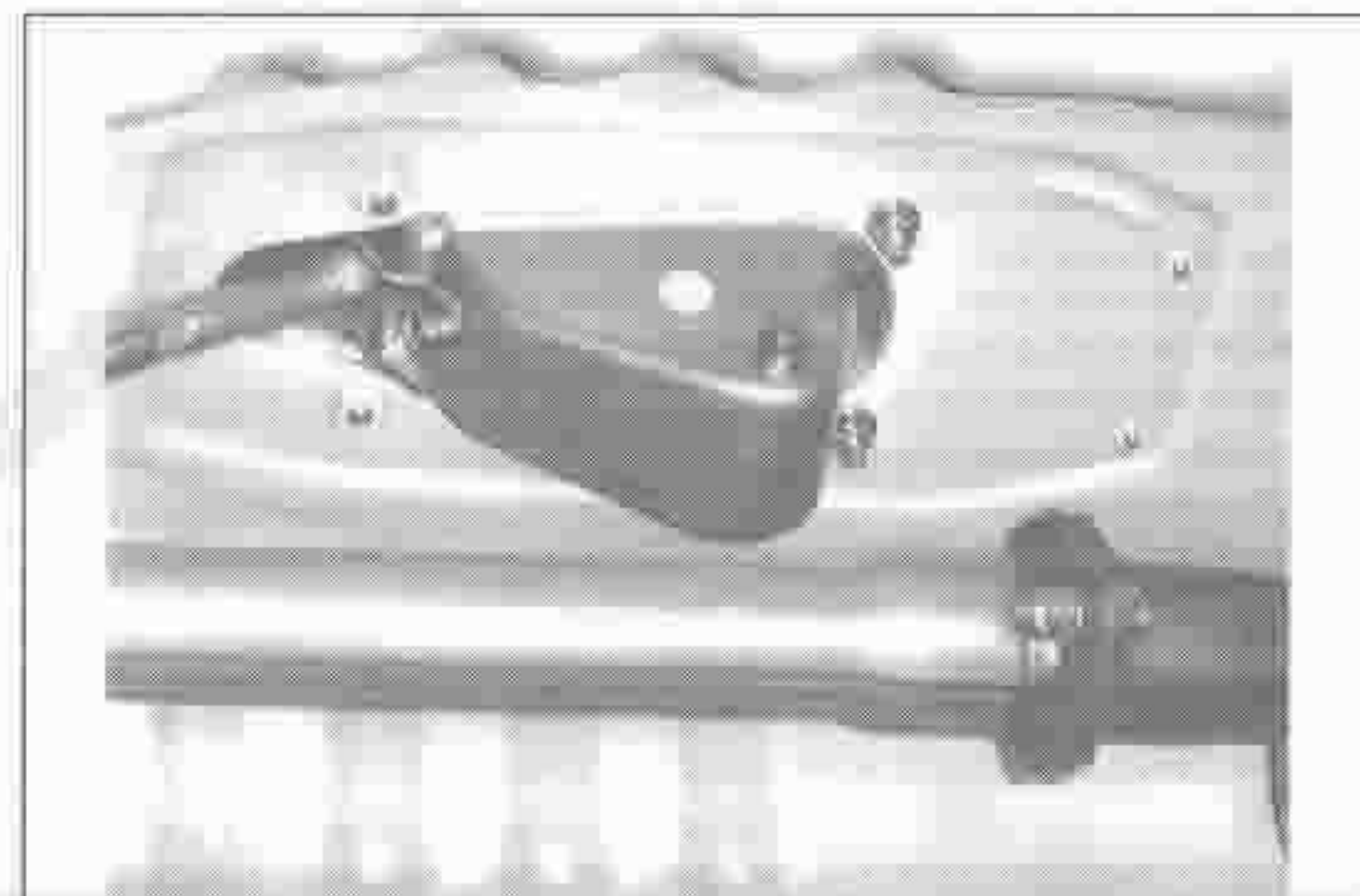
NOTE:

- Prior to the removal, be sure to put a mark on the inner cable as well as on a point underneath the bracket installation section.



LAT00251-00306

4. Remove the attaching bolt from the shift lever assembly.
5. Remove the shift lever attaching nut from the body.



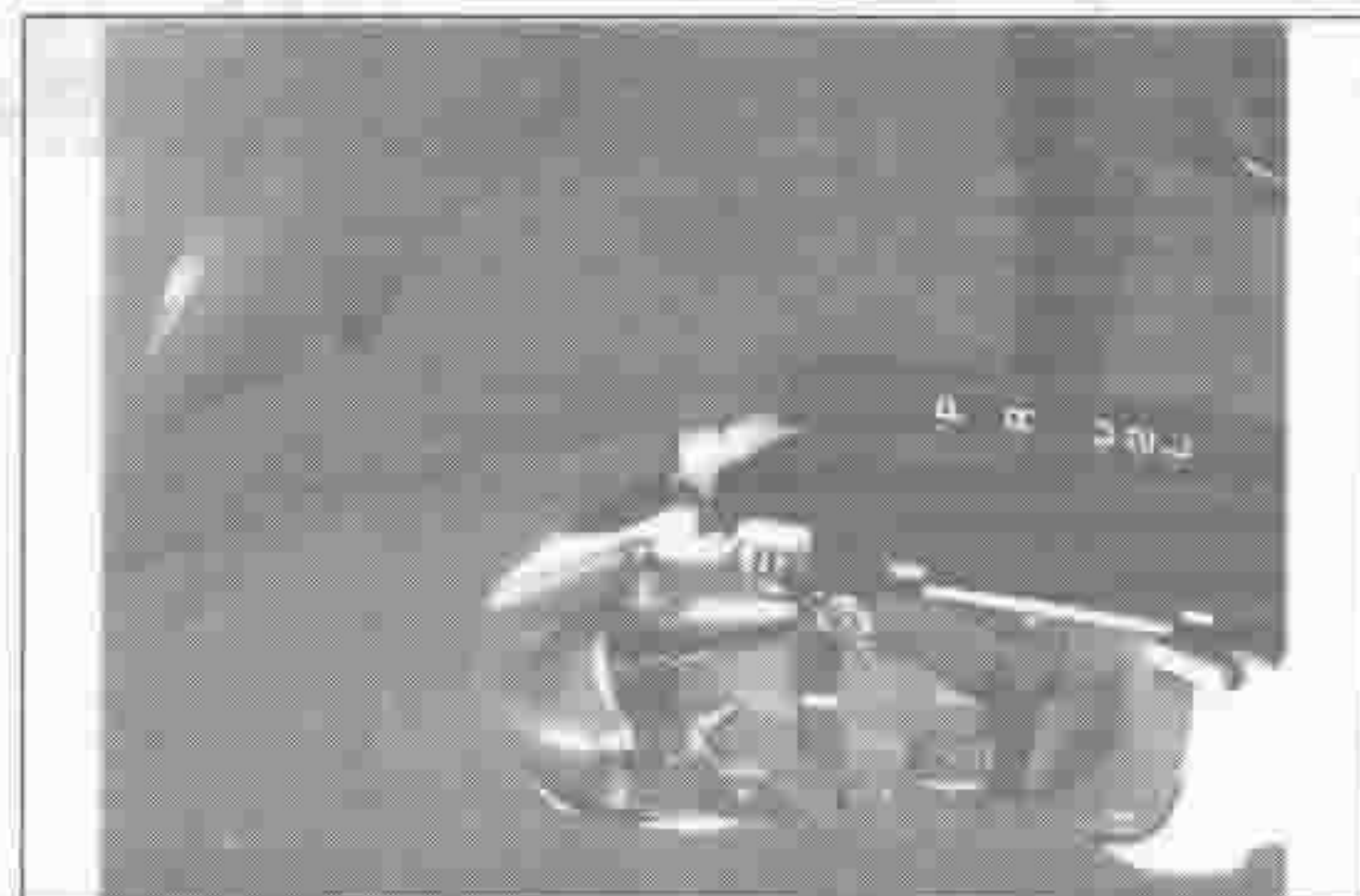
LAT00252-00307

6. Remove the console box.



LAT00253-00308

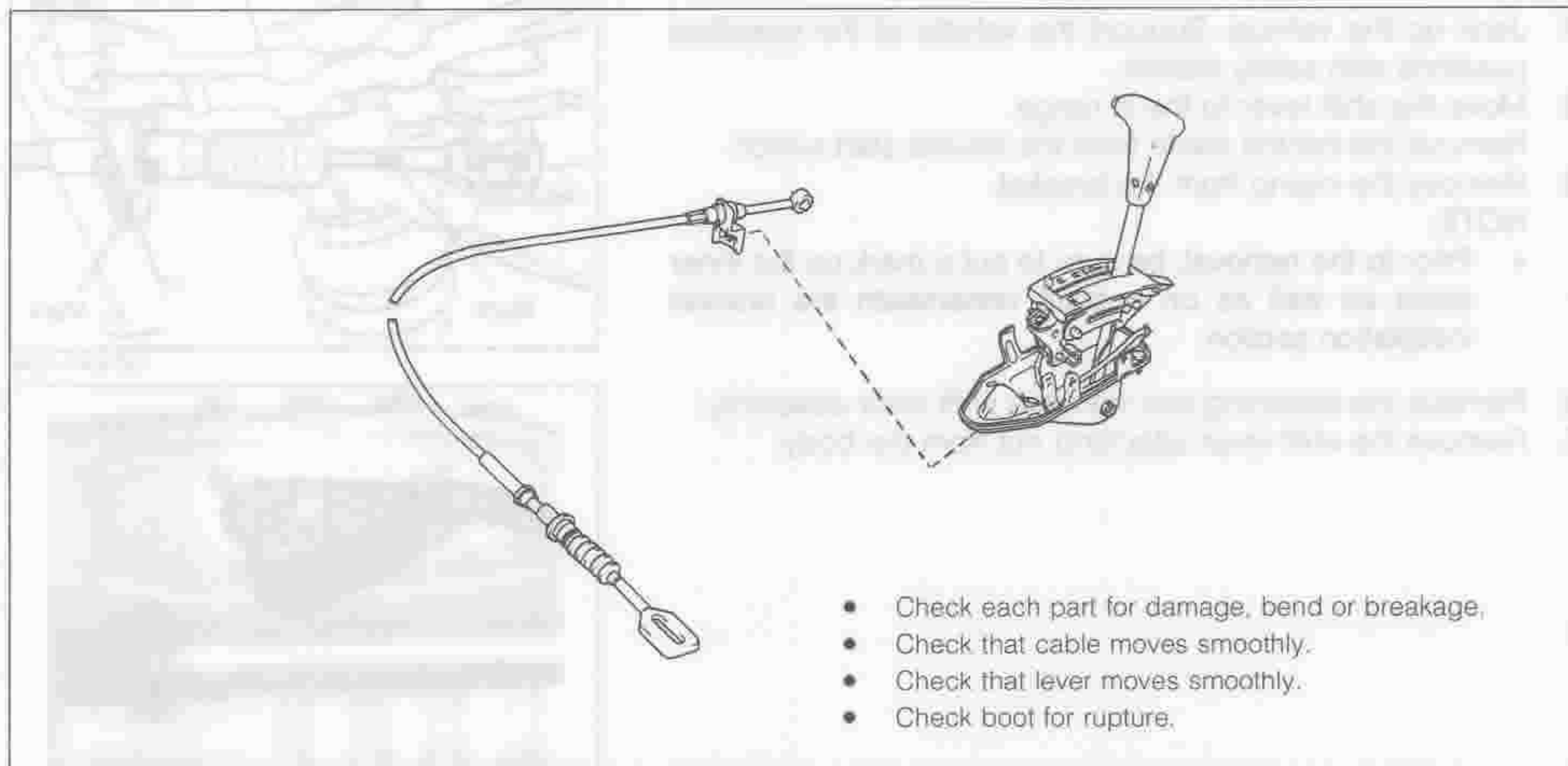
7. Remove the clip.
Disconnect the control cable from the shift lever assembly.
8. Remove the shift lever attaching bolt from the floor. Disconnect the connector of the shift lever indicator lamp.
9. Take out the shift lever assembly from the vehicle.



LAT00254-00309



INSPECTION

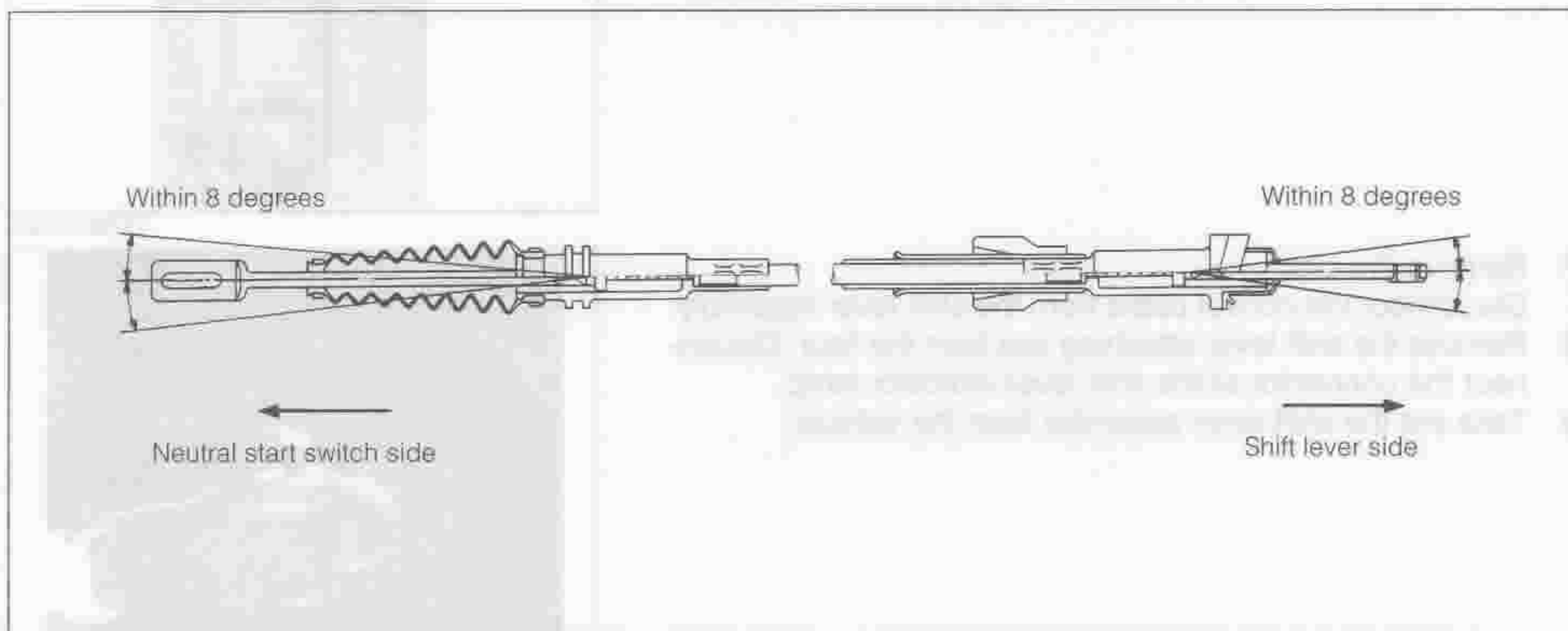


LAT00255-00310

INSTALLATION

NOTE:

- Never rock the control cable end in excess of 8 degrees.
- Never rock the cable end at the shift lever side with the cable end pulled out fully.



LAT00256-00311

1. Install the shift lever assembly to the vehicle.
2. Tighten the shift lever assembly with the bolts and nuts.
Tightening Torque: 9.8 - 15.7 N·m
(1.0 - 1.6 kgf-m, 7.2 - 11.5 ft-lb)
3. Connect the connector of the shift lever indicator lamp.



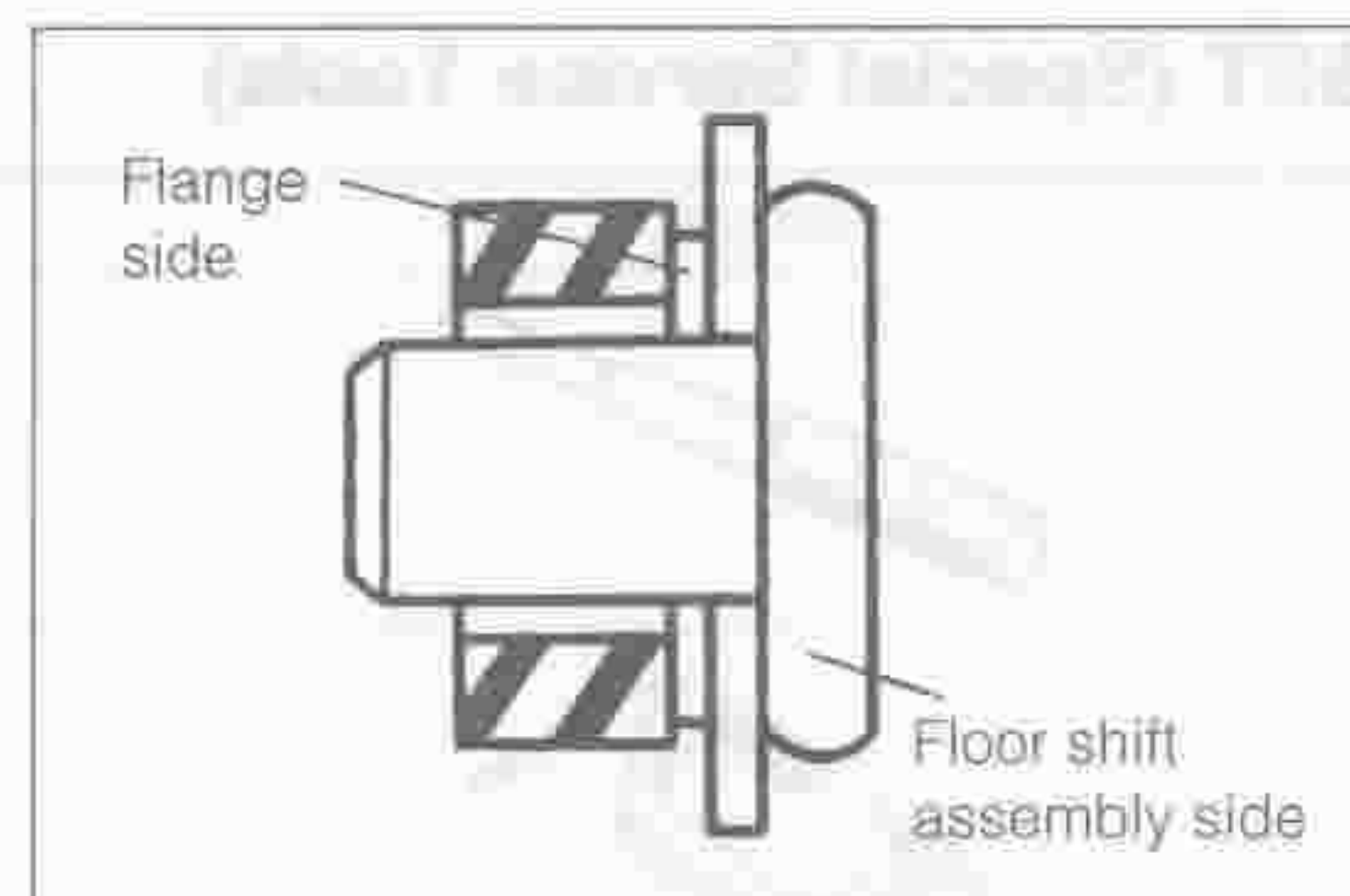
LAT00257-00312

4. Connect the control cable to the shift lever. Install the clip to the shift lever.

NOTE:

- Prior to the installation, be sure to apply MP grease to the joint section of the control cable assembly and the front shift assembly.

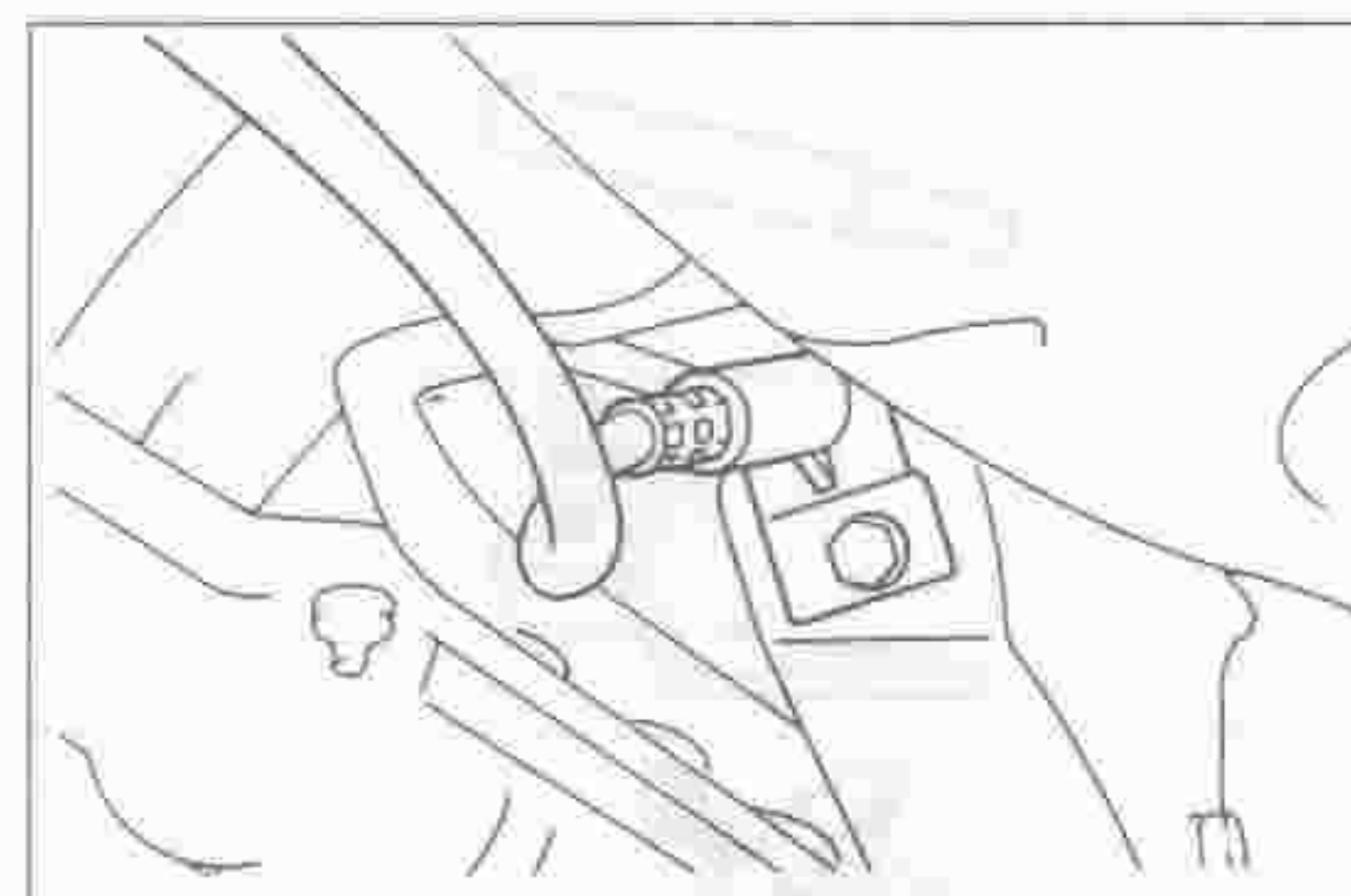
5. Install the console box.



LAT00258-00313

6. Install the control cable to the shift lever assembly.
Shift lever assembly.

Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)



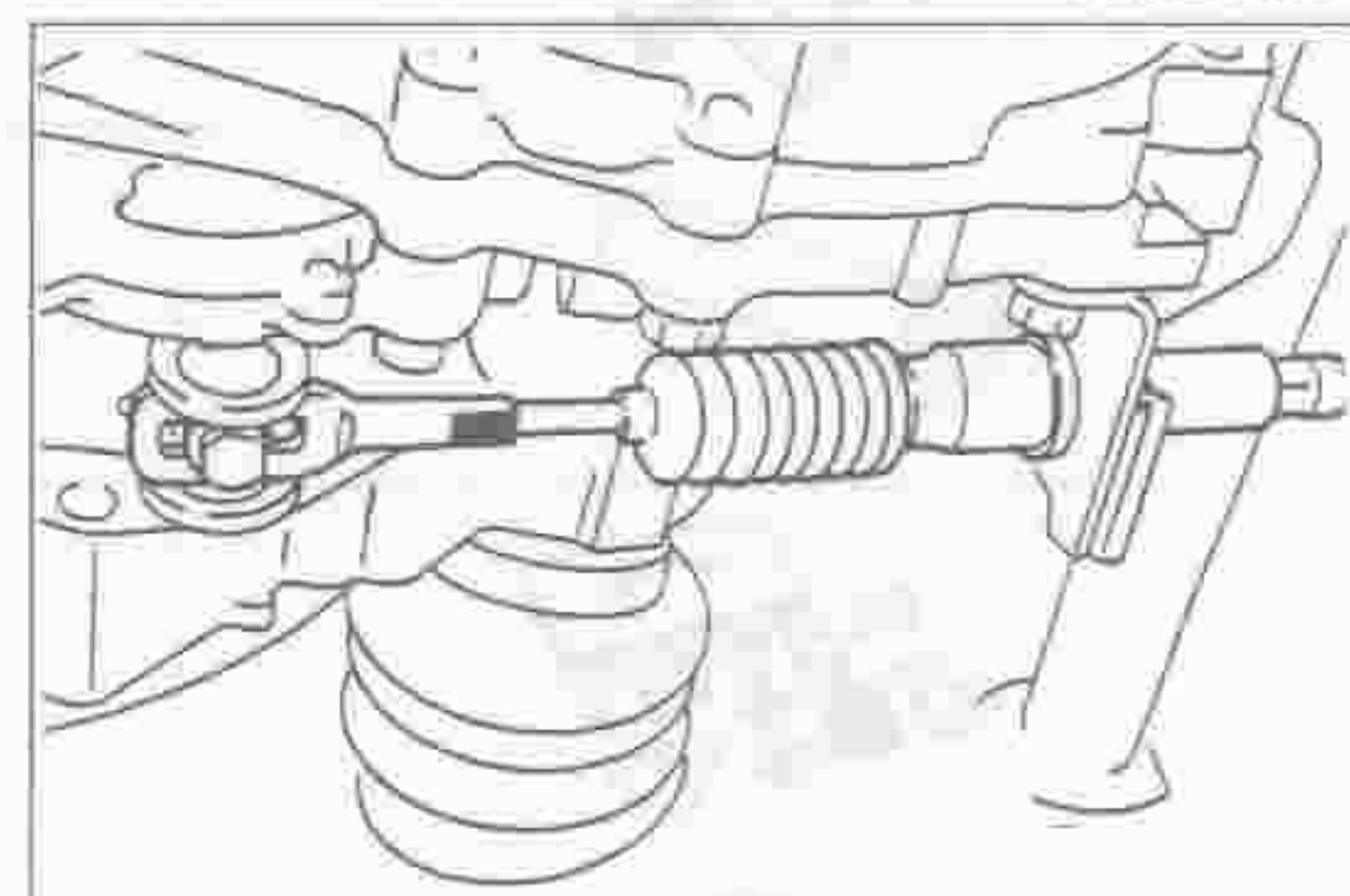
LAT00259-00314

7. Install the control cable to the bracket with the new clamp.
NOTE:

- Do not tap the cable proper during the clamp installation.
- If you inadvertently tap the cable, do not use such tapped cable.
- Use a new clamp.

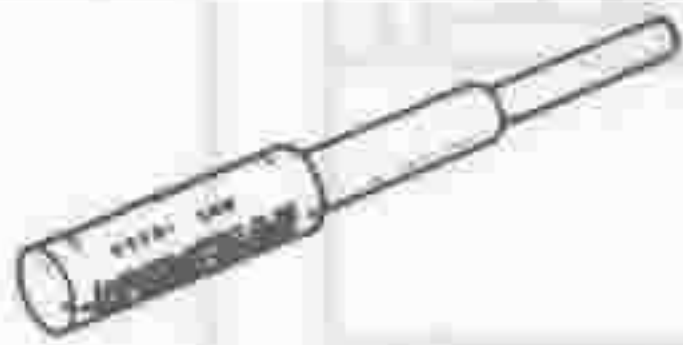
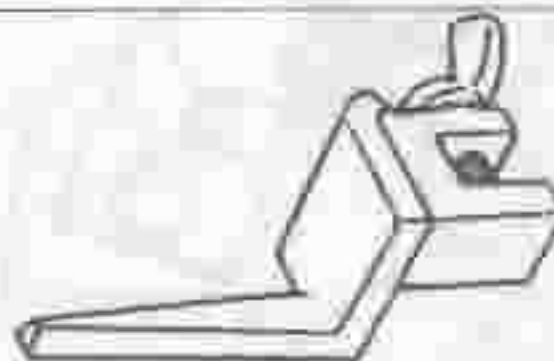
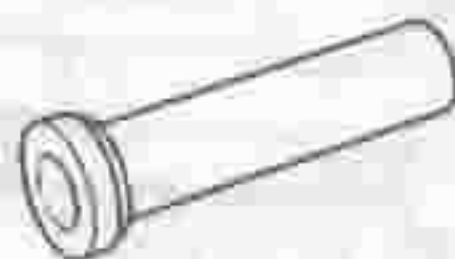
8. Install the control cable to the neutral start switch.

Tightening Torque: 6.9 - 9.8 N·m
(0.7 - 1.0 kgf-m, 5.1 - 7.2 ft-lb)

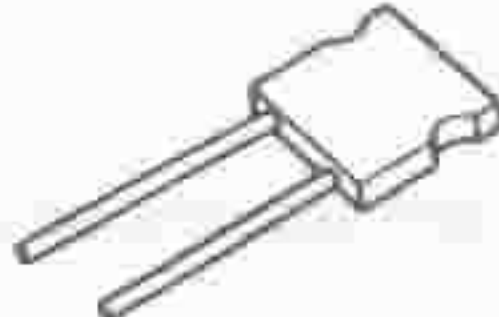
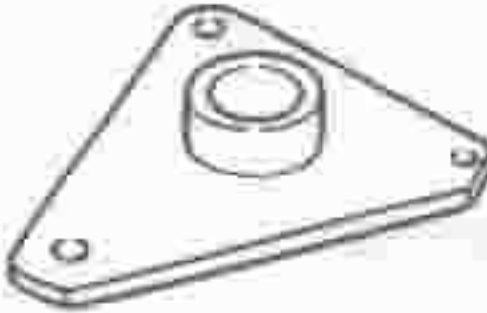


LAT00260-00315

SST (Special Service Tools)

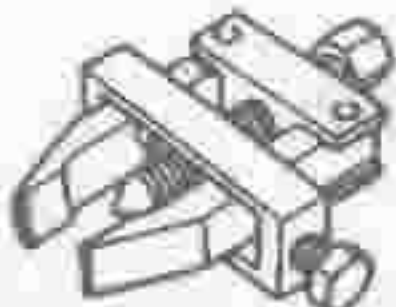
Shape	Part No.	Part name
	09201-60011-000	Remover & replacer value guide bush
	09202-87002-000	Remover & replacer value cutter
	09301-87702-000	Tool clutch guide
	09302-87201-000	Gauge neutral start switch adjust
	09308-10010-000	Puller oil seal
	09310-87301-000	Replacer counter shaft front bearing
	09350-87202-000	Tool set automatic transmission
	09351-87201-000	Compressor piston spring No. 1
	09351-87202-000	Compressor piston spring No. 2
	09351-87203-000	Attachment dial gauge
	09351-87204-000	Compressor spring

*It should be noted that 09350-87202 contains SSTs other than those posted in this section.

Shape	Part No.	Part name
	09351-87205-000	Holder reduction drive gear holding
	09351-87206-000	Driver oil pump
	09351-87207-000	Guide oil pump
	09351-87208-000	Measure direct & forward clutch
	09351-87209-000	Stopper drive gear
	09351-87210-000	Base dial gauge stand
	09351-87211-000	Tool manual value setting
	09351-87212-000	Holder direct clutch
	09351-87213-000	Gauge centering side gear
	09351-87214-000	Holder ball bearing
	09611-87506-000	Handle
	09351-87216-000	Compressor clutch piston spring

*It should be noted that 09350-87202 contains SSTs other than those posted in this section.

AT-98

	09517-87205-000	Replacer oil seal No. 2
	09608-30011-000	Tool set front hub & drive pinion bearing
	09630-24013-000	Tool set steering rack oil seal
	09631-12020-000	Handle
	09636-20010-000	Replacer, upper ball joint dust cover
	09710-28011-000	Tool set, front suspension bush
	09820-00021-000	Puller alternator rear bearing
	09921-00010-000	Tool spring tension
	09950-20017-000	Puller universal
	09950-87701-000	Bearing remover

LAT00297-00292

TIGHTENING TORQUE

Tightening components	Tightening torque		
	N-m	kgf-m	ft-lb
Drive plate × Crank shaft	39.0 - 49.0	4.0 - 5.0	28.9 - 36.2
Transaxle × Engine direct-connecting bolt	49.0 - 69.0	5.0 - 7.0	36.2 - 50.6
Torque convertor × Drive plate	29.0 - 44.0	3.0 - 4.5	21.7 - 32.5
Rear transmission case cover × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Engine mounting lower left bracket × Transmission case	14.7 - 21.6	1.5 - 2.2	10.8 - 15.9
Starter shaft & oil pump × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Nut (for brake band anchor bolt) × Transmission case	22.5 - 30.4	2.3 - 3.1	16.6 - 22.4
Valve body × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Manual detent spring × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Transaxle oil pan × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Inspection plugs × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Neutral start switch × Transmission case	14.7 - 21.6	1.5 - 2.2	10.8 - 15.9
Transmission control shaft lever × Manual shaft lever	9.8 - 16.0	1.0 - 1.6	7.2 - 11.6
Control cable bracket × Transmission case	14.7 - 21.6	1.5 - 2.2	10.8 - 15.9
Unions × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Oil strainer × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Speedometer sleeve lock plate × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Transmission oil filler tube × Transmission case	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2

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