




Land Cruiser FZJ80, HZJ80

Supplement for changes to A442F automatic transmission

January 1995

This supplement has been produced from A442F automatic transmission repair manual (pub. no. RM314E) with changes indicated by .

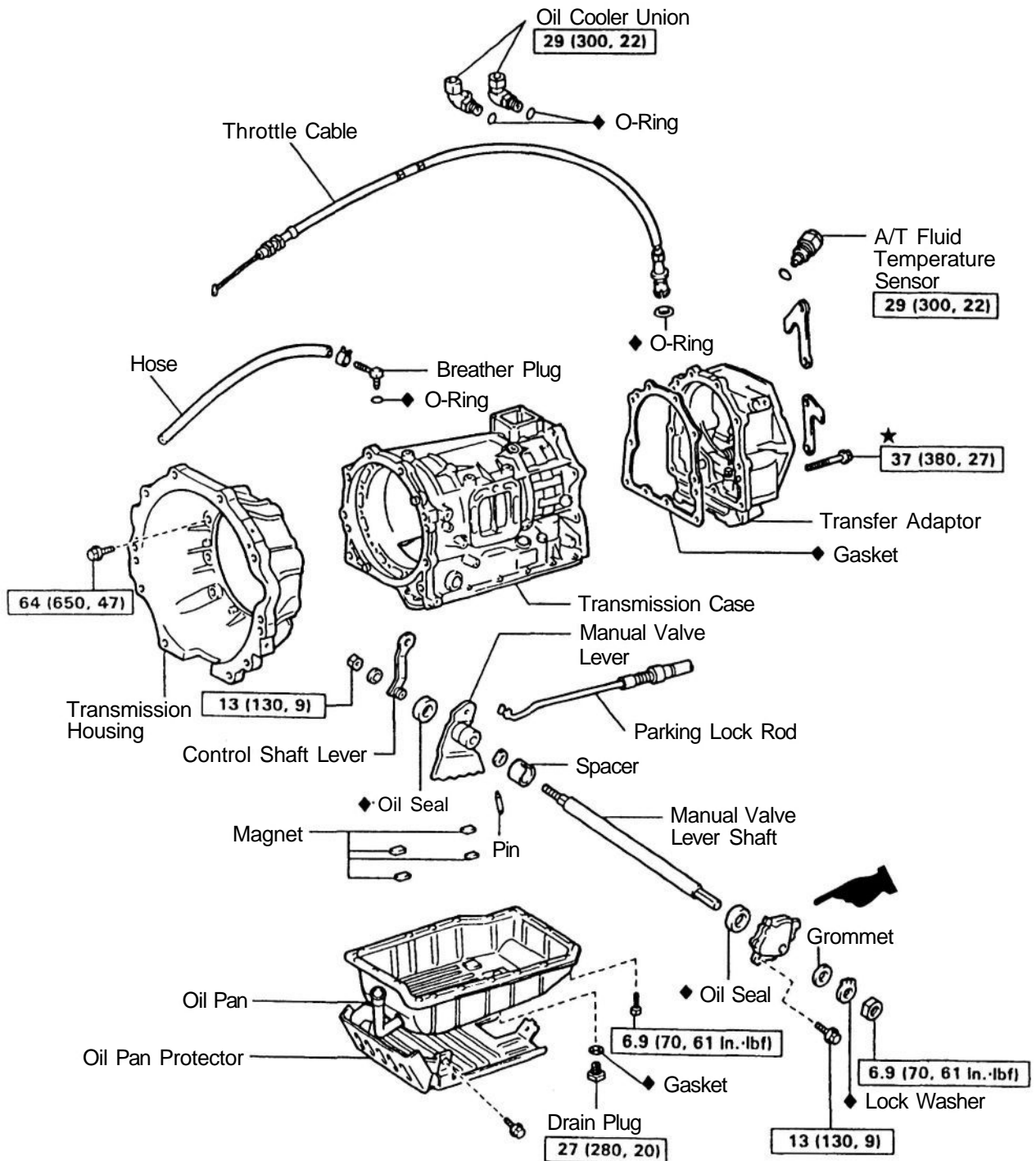
Please use and store this supplement with RM314E.

GENERAL SPECIFICATIONS

Type of Transmission	A442F	←
Type of Engine	1FZ-FE	1HD-T
Torque Converter Stall Torque Ratio	1.8 : 1	2.0 : 1
Lock-up Mechanism	Equipped	←
Gear Ratio		
1st Gear	2.950	←
2nd Gear	1.530	←
3rd Gear	1.000	←
O/D Gear	0.765	←
Reverse Gear	2.678	←
Number of Discs and Plates		
Front Clutch (C ₁)	7 / 7	←
Rear Clutch (C ₂)	5 / 5	←
O/D Direct Clutch (C ₀)	3 / 3	←
2nd Brake (B ₂)	5 / 5	←
1st and Reverse Brake (B ₃)	6 / 6	←
O/D Brake (B ₀)	3 / 3	←
ATF Type	ATF DEXRON® II	←
Capacity (US qts, Imp. qts)		
Total	13.0 (13.7, 11.4)	15.0 (15.9, 13.2)
Drain & Refill	6.0 (6.3, 5.3)	←

COMPONENT PARTS REMOVAL COMPONENTS

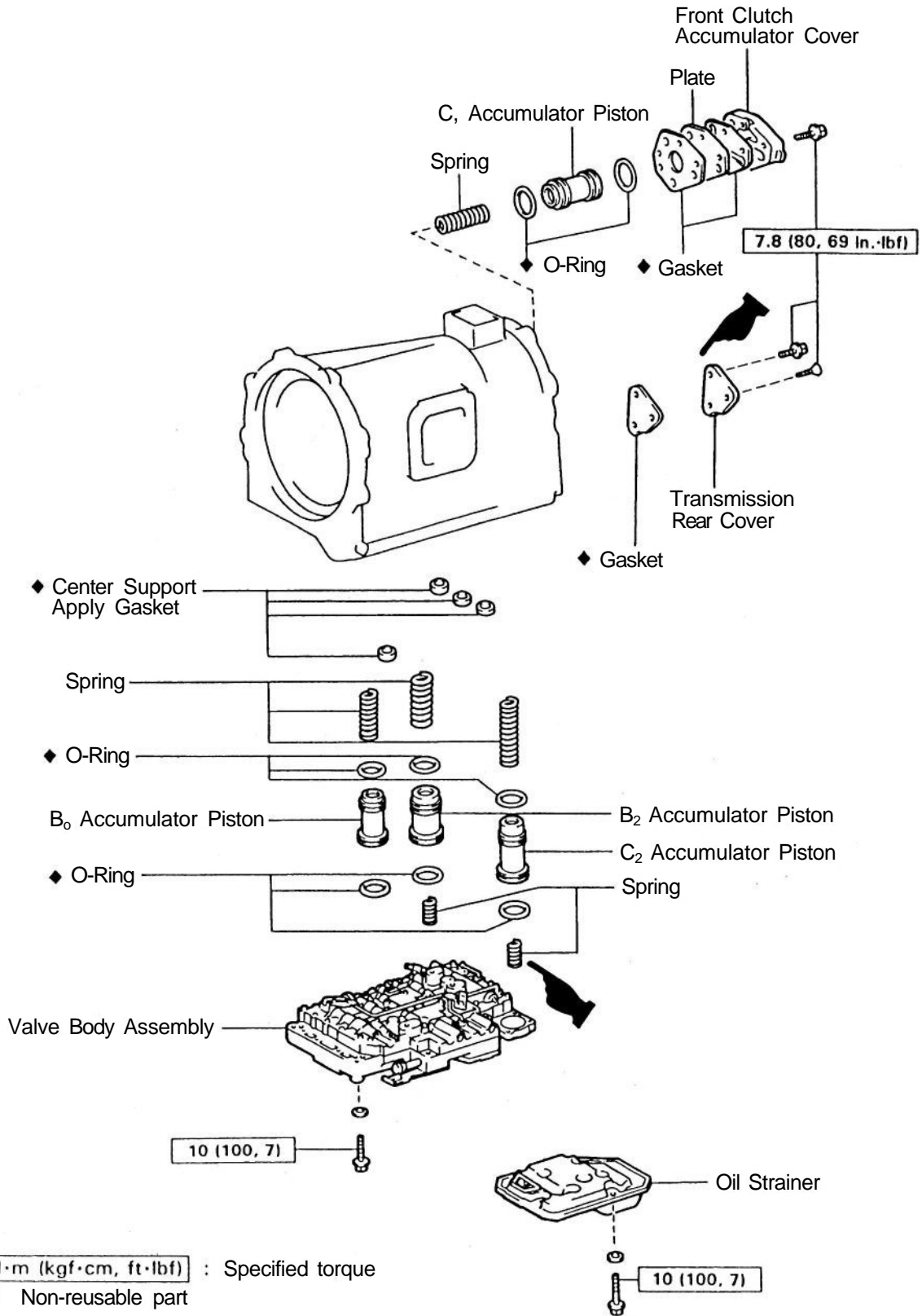
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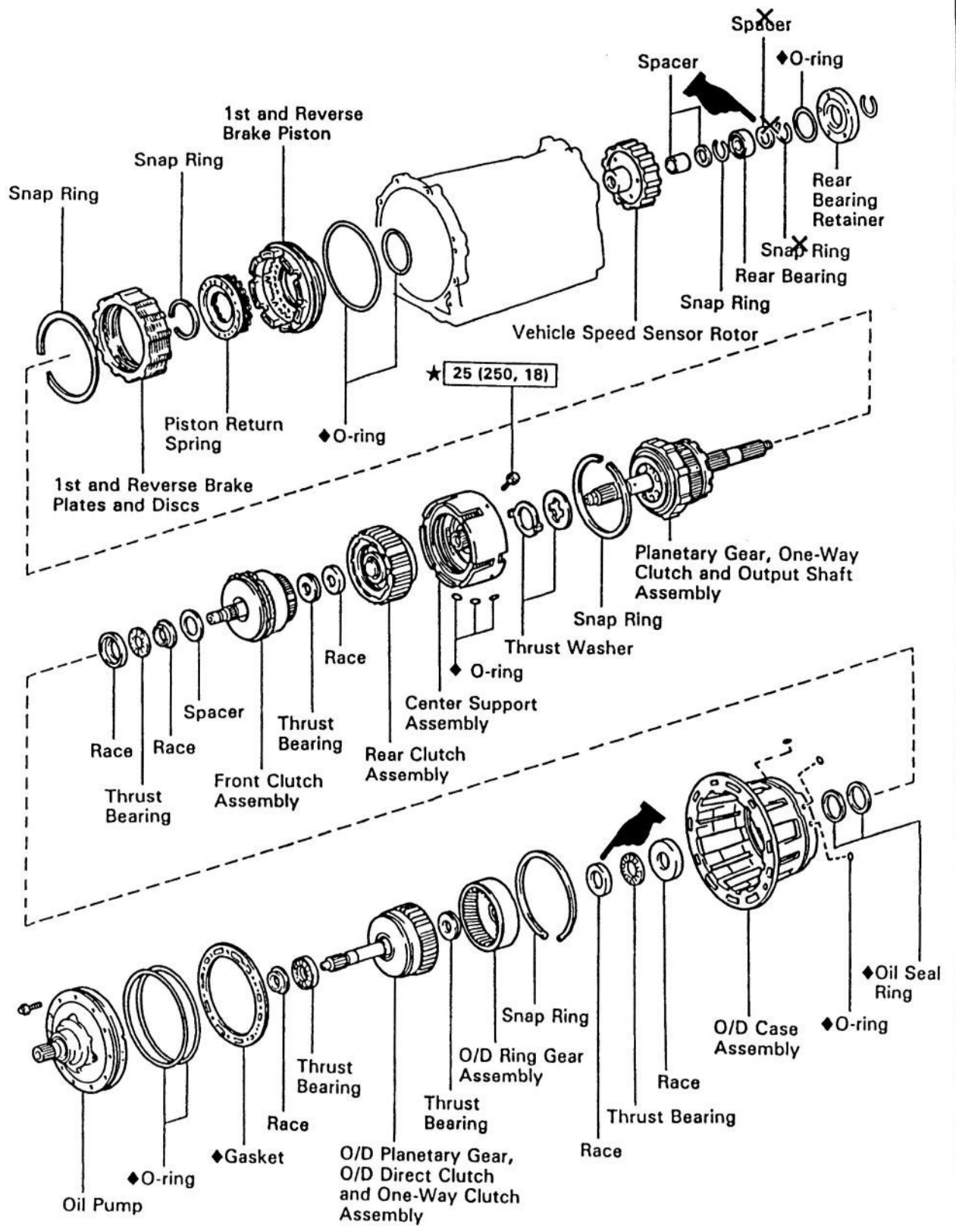


N·m (kgf·cm, ft·lbf) : Specified torque

- ◆ Non-reusable part
- ★ Precoated part

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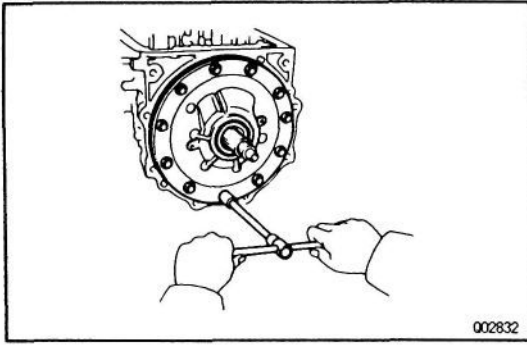




N·m (kgf·cm, ft·lbf) : Specified torque

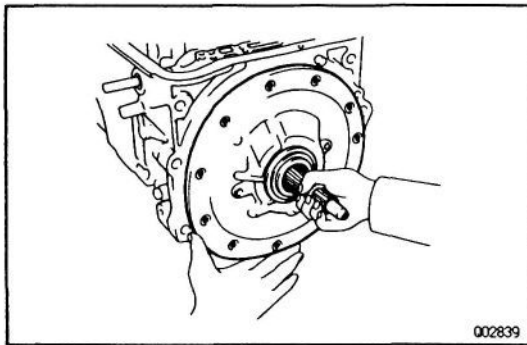
◆ Non-reusable part

★ Precoated part

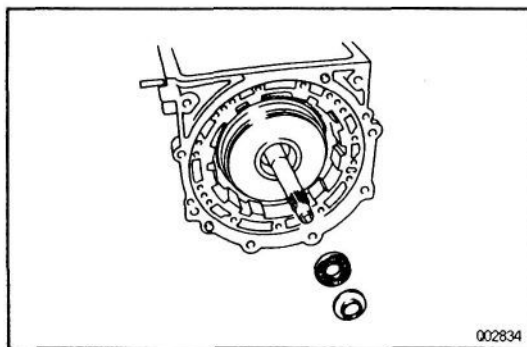


21. REMOVE OIL PUMP

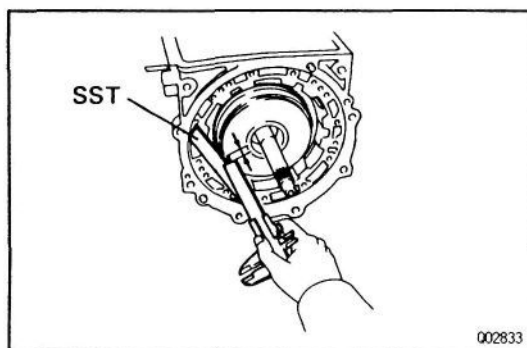
- (a) Remove the eleven bolts holding the oil pump to the transmission case.



- (b) Remove the oil pump and gasket.
- (c) Remove the O—ring from the oil pump.
- (d) Remove the oil pump gasket.

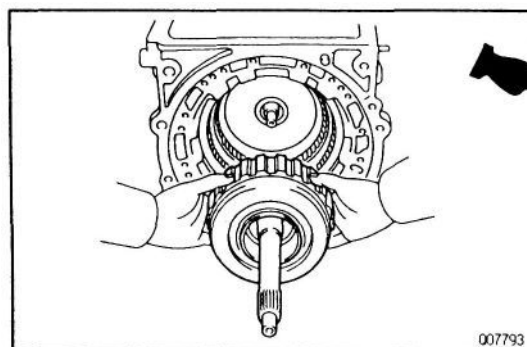


- (d) Remove the race and thrust bearing from the O/D direct clutch drum or oil pump.

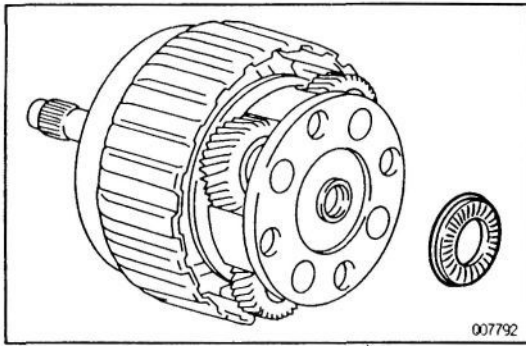


22. REMOVE OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND ONE-WAY CLUTCH ASSEMBLY

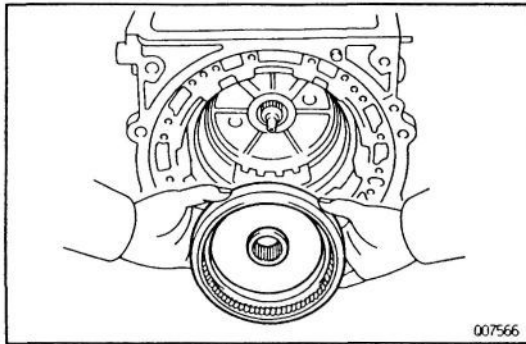
- (a) Place SST on the installation surface of the oil pump. 09350-36010(09350-06090)
- (b) Using calipers, measure the distance between the tops of SST and the clutch drum for assembly.



- (c) Remove the O/D planetary gear, direct clutch and one—way clutch assembly,
- (c') Using a screwdriver, remove the snap ring.

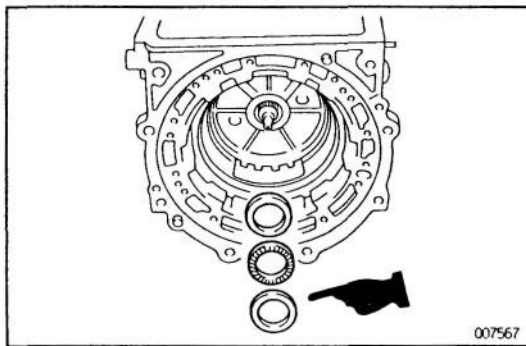


- (d) Remove the bearing from the O/D planetary gear or ring gear flange.

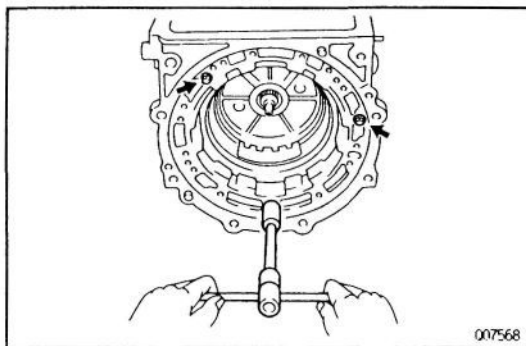


23. REMOVE OVERDRIVE PLANETARY RING GEAR ASSEMBLY

- (a) Remove the ring gear assembly from the O/D case.

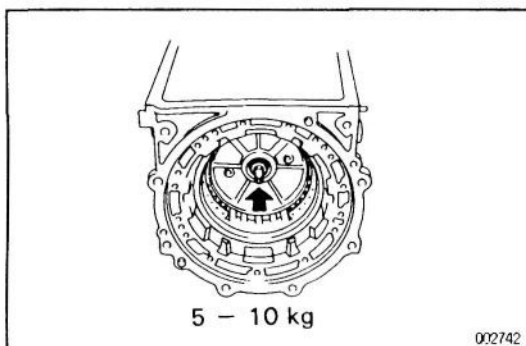


- (b) Remove the thrust bearing and two races from the O/D case or ring gear flange.

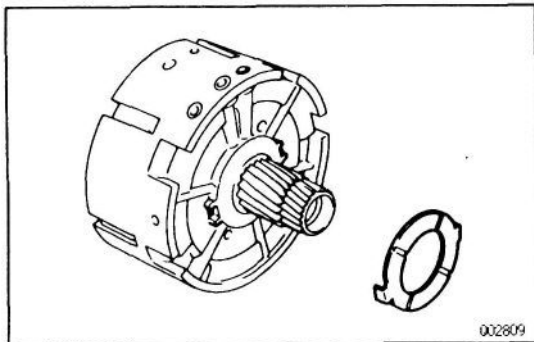


24. CHECK THRUST CLEARANCE OF INPUT SHAFT (FRONT CLUTCH DRUM)

- (a) Temporarily install the three bolts.



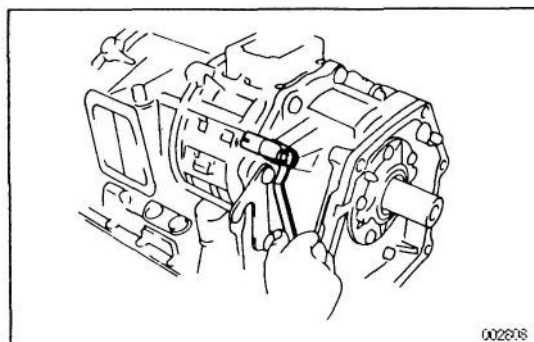
- (b) Push the transmission output shaft toward the front of the transmission by applying a force of 49—98 N (5 - 10 kgf, 11.0-22.0 lbf).



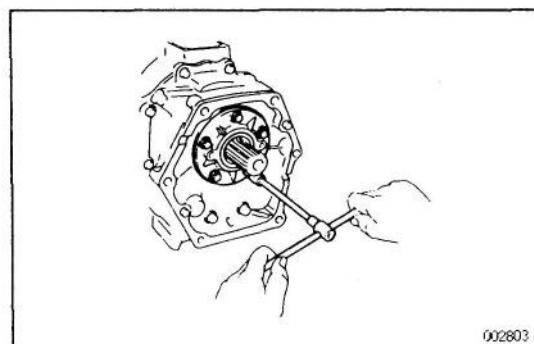
Maximum thrust clearance:

0.90 mm (0.0354 in.)

- (j) Remove the thrust washer from the center support.

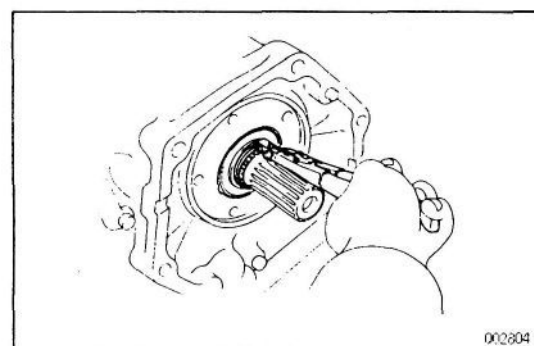


29. REMOVE SPEEDSENSOR

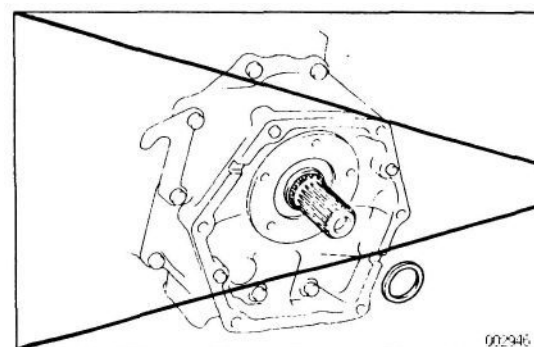


30. REMOVE TRANSFER ADAPTOR AND OUTPUT SHAFT REAR BEARING

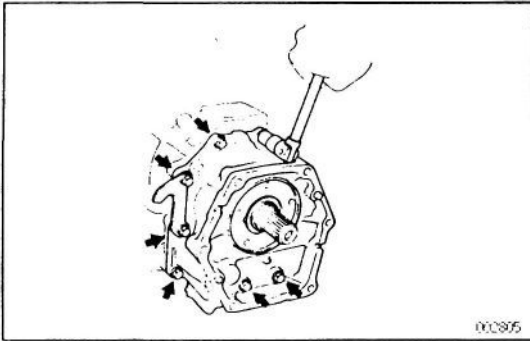
- (a) Remove the five bolts and the tear bearing retainer.



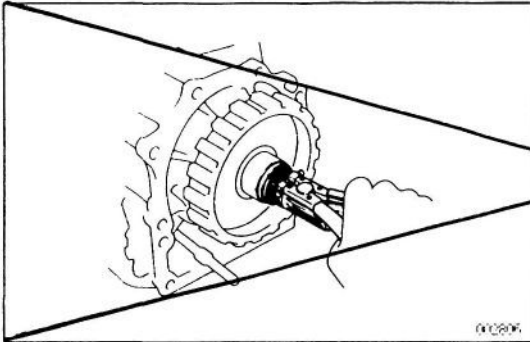
- (b) Using snap ring pliers, remove the snap ring.



- (c) Remove the spacer from the output shaft.

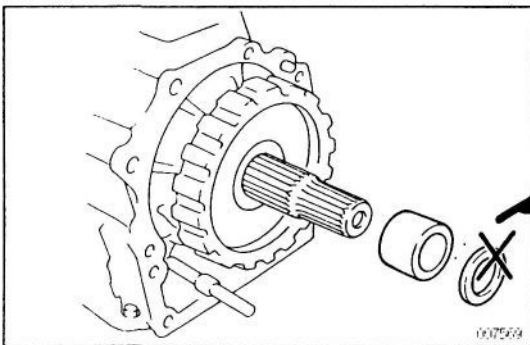


- (d) remove the ten bolts and the adaptor.
- (e) Remove the gasket.

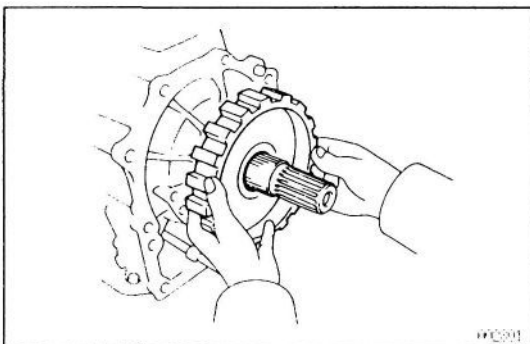


31. REMOVE OUTPUT SHAFT SPACER

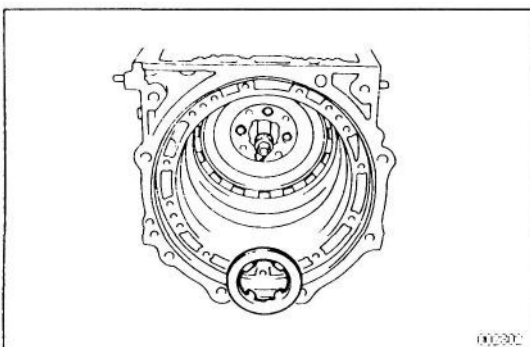
- (a) Using snap ring pliers, remove the snap ring.



- (b) Remove the output shaft spacer.

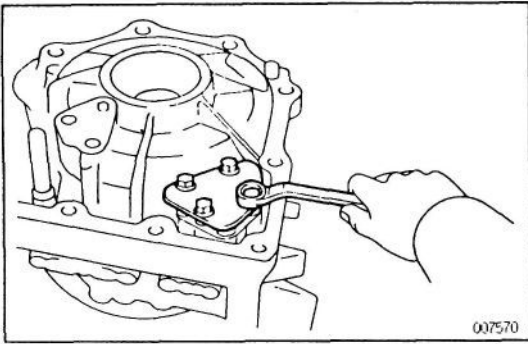


32. REMOVE SPEED SENSOR ROTOR

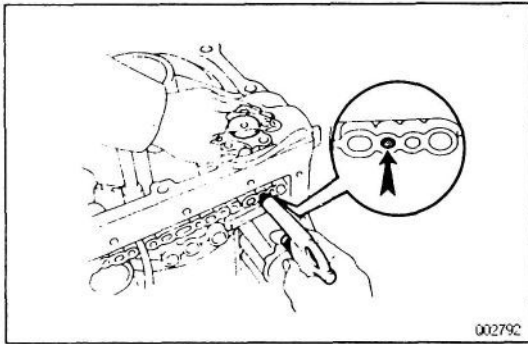


33. REMOVE PLANETARY GEARS, ONE - WAY CLUTCH AND OUTPUT SHAFT ASSEMBLY

- (a) Remove the thrust washer from the planetary gear.

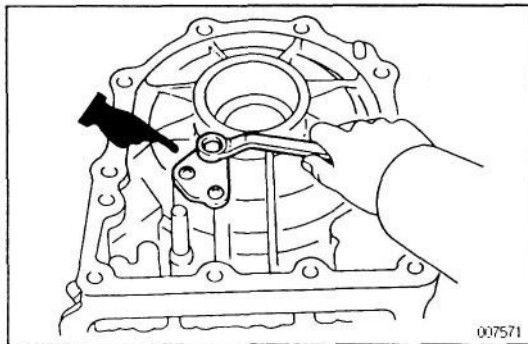
**36. REMOVE C, ACCUMULATOR PISTON AND SPRING**

(a) Remove the four bolts, front clutch accumulator cover, two gaskets and plate.

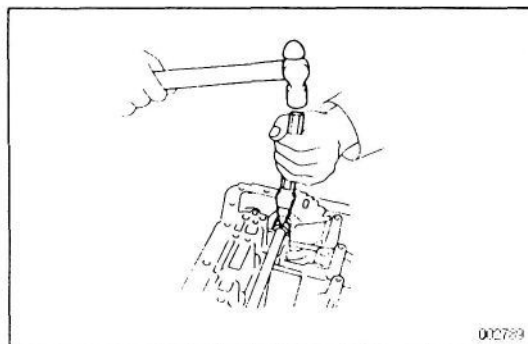


(b) Remove the accumulator piston and spring by applying compressed air to the oil hole.

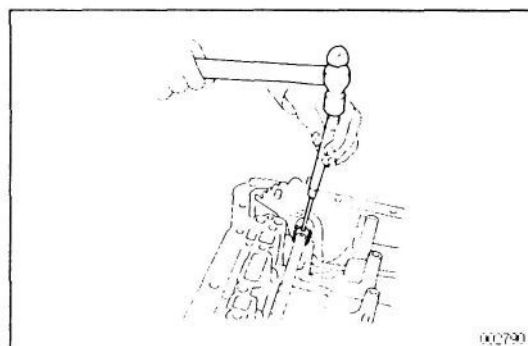
(c) Remove the O—rings from accumulator piston.

**37. REMOVE TRANSMISSION REAR COVER**

Remove the two screws, bolt, rear cover and gasket.

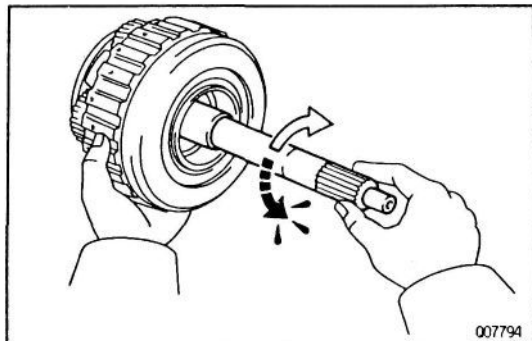
**38. REMOVE MANUAL VALVE LEVER, SHAFT AND OIL SEALS**

(a) Using a chisel, cut off the spacer and remove it from the shaft.



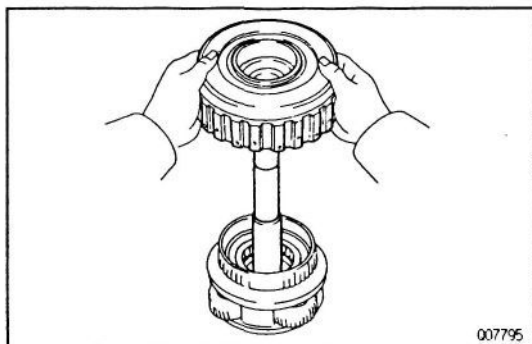
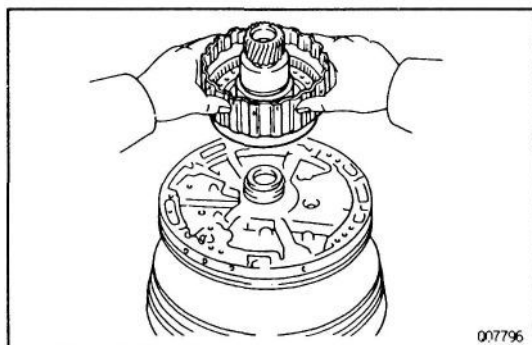
(b) Using a pin punch, tap out the pin.

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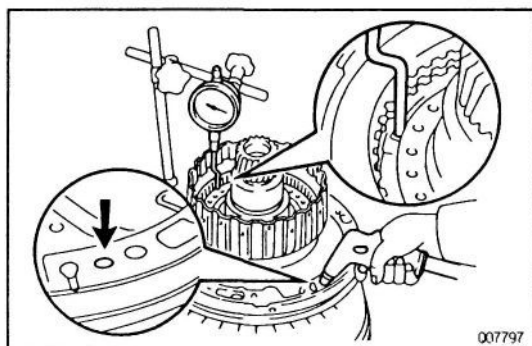
OVERDRIVE GEAR UNIT DISASSEMBLY**1. CHECK OPERATION OF ONE-WAY CLUTCH**

Hold the O/D direct clutch drum and turn the input shaft.

The input shaft should turn freely clockwise and should lock counterclockwise.

**2. REMOVE OVERDRIVE DIRECT CLUTCH ASSEMBLY FROM OVERDRIVE PLANETARY GEAR****3. CHECK PISTON STROKE OF OVERDRIVE DIRECT CLUTCH**

- (a) Place the oil pump onto the torque converter, and then place the O/D direct clutch assembly onto the oil pump.



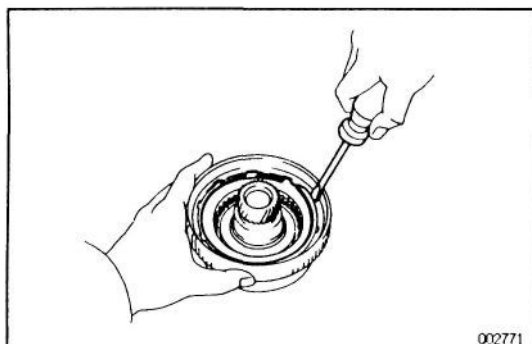
- (b) Using SST and a dial indicator, measure the piston stroke by applying and releasing the compressed air 392-785 kPa (4-8 kgf/cm², 57-114 psi) as shown.

SST 09350-36010(09350-06110)

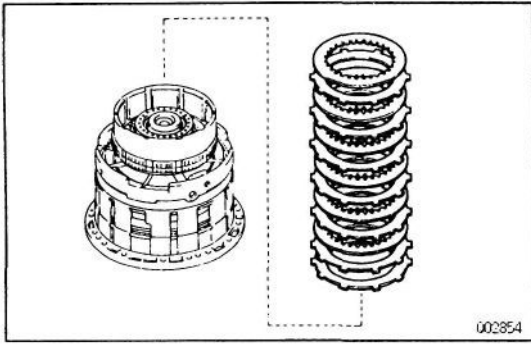
Piston stroke:

1.80-2.07 mm (0.0709-0.0815 in.)

If the piston stroke is not as specified, inspect the discs.

**4. REMOVE FLANGE, PLATES AND DISCS**

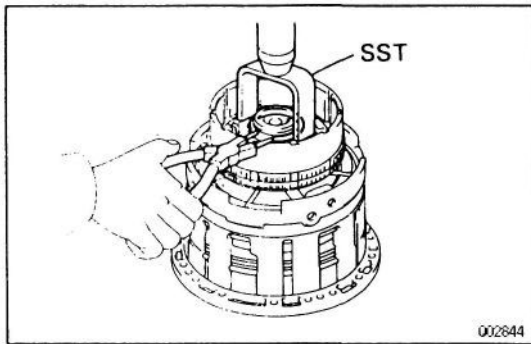
- (a) Using a screwdriver, remove the snap ring.



4. REMOVE DISCS, PLATES AND CUSHION PLATE

(1FZ-FE and 1HD-T Engine)

Remove the seven discs, seven plates and cushion plate.

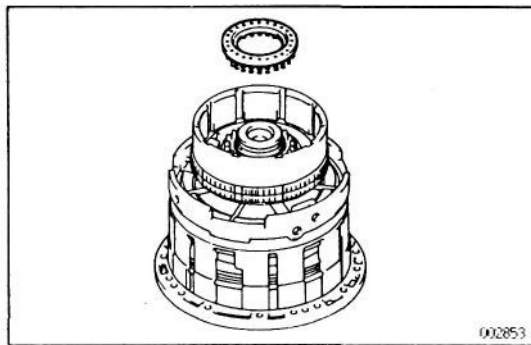


5. REMOVE PISTON RETURN SPRINGS

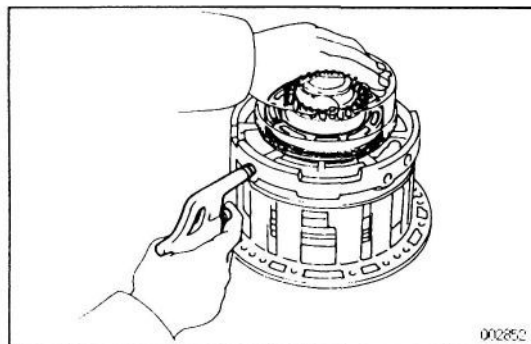
(a) Place SST on the spring seat, and compress the return springs with a shop press.

SST 09350-36010(09350-06010)

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



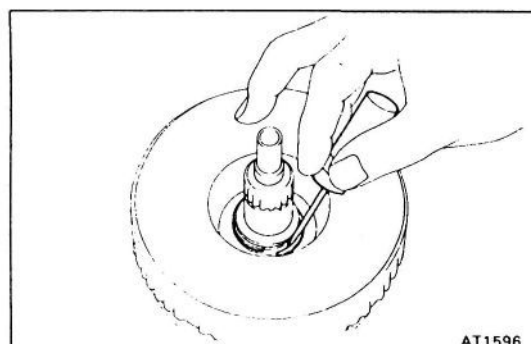
(c) Remove the piston return spring.



6. REMOVE FRONT CLUTCH PISTON

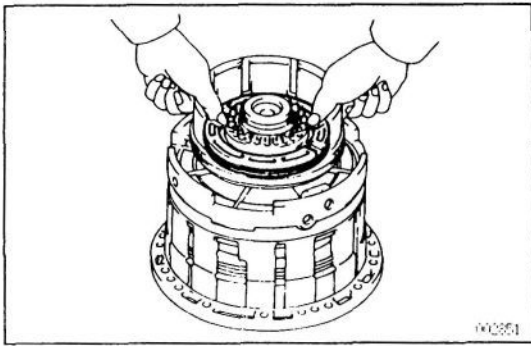
(a) Hold the clutch piston by hand, apply compressed air into the oil hole of the O/D case to remove the clutch piston.

(b) Remove the two O—rings from the clutch piston.



7. REMOVE OIL SEAL RING

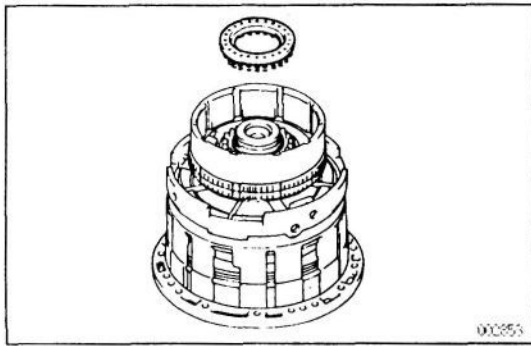
Using a small screwdriver, remove the oil seal ring from the clutch drum.



3. INSTALL FRONT CLUTCH PISTON

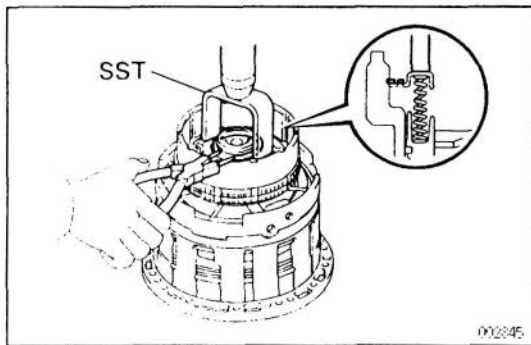
- (a) Coat new two O—rings with ATF, and install them on the clutch piston.
- (b) Push in the clutch piston into the clutch drum by both hands.

NOTICE: Be careful not to damage the O—rings.



4. INSTALL PISTON RETURN SPRINGS

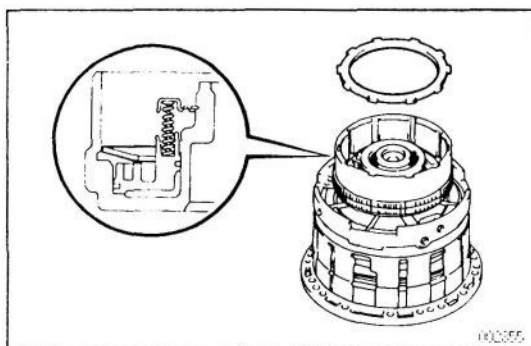
- (a) Install the piston return spring.



- (b) Place SST on the spring seat, and compress the return springs with a shop press.

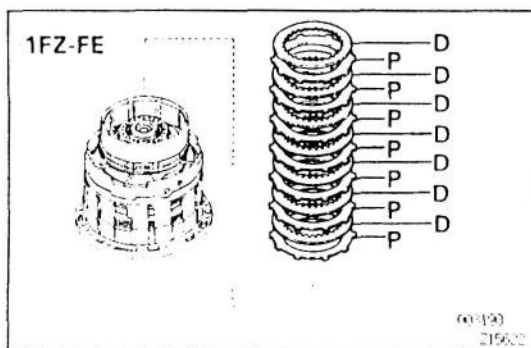
SST 09350-36010(09350-06010)

- (c) Using snap ring pliers, install the snap ring.
- HINT:** Be sure the end gap of the ring is not aligned with the spring seat claw.



5. INSTALL CUSHION PLATE, PLATES AND DISCS

- (a) Install the cushion plate, facing the rounded edge downward.



- (b) (1FZ-FE Engine)

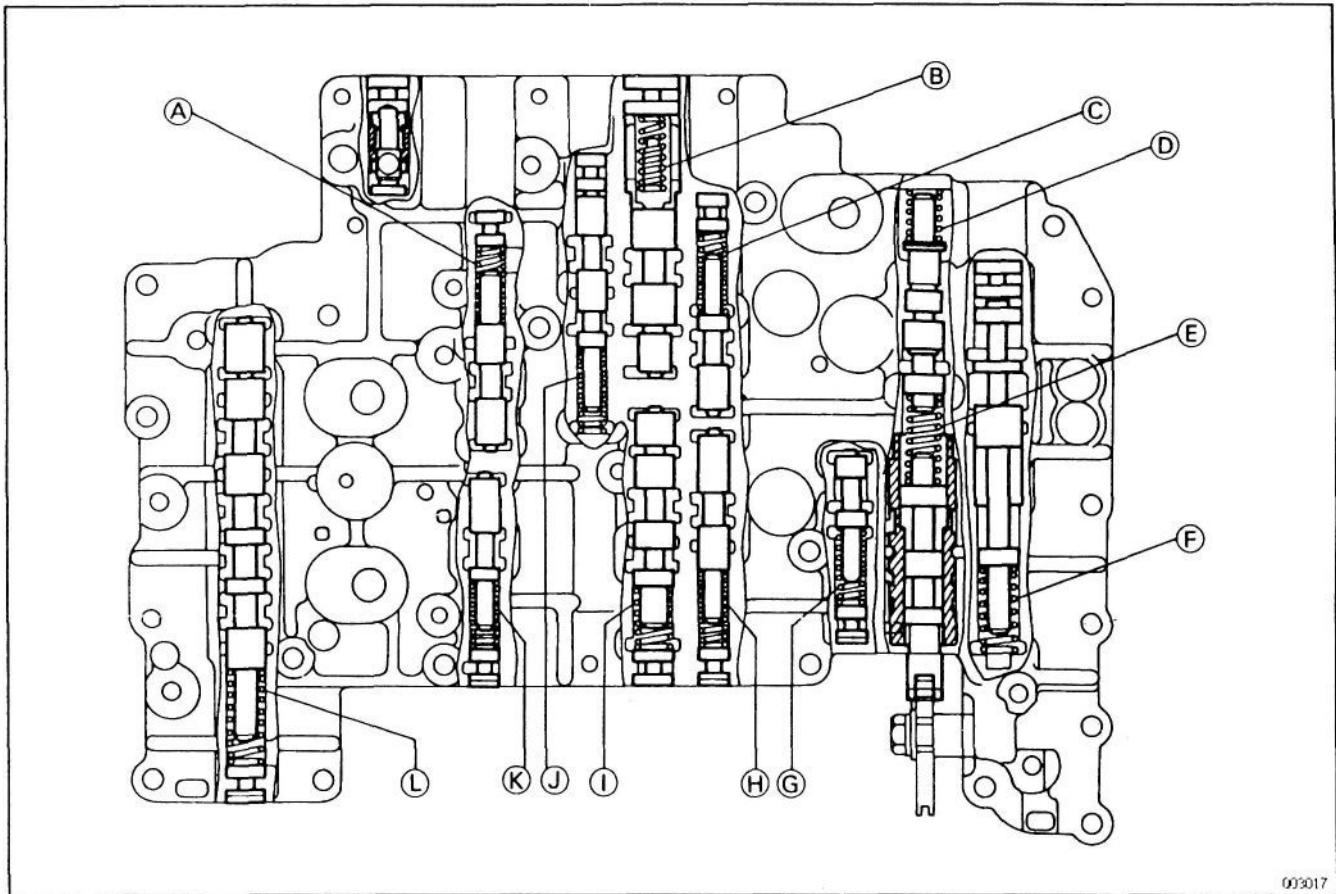
Install the seven plates and disks in order:

P = Plate D = Disk

P-D-P-D-P-D-P-D-P-D-P-D-P-D



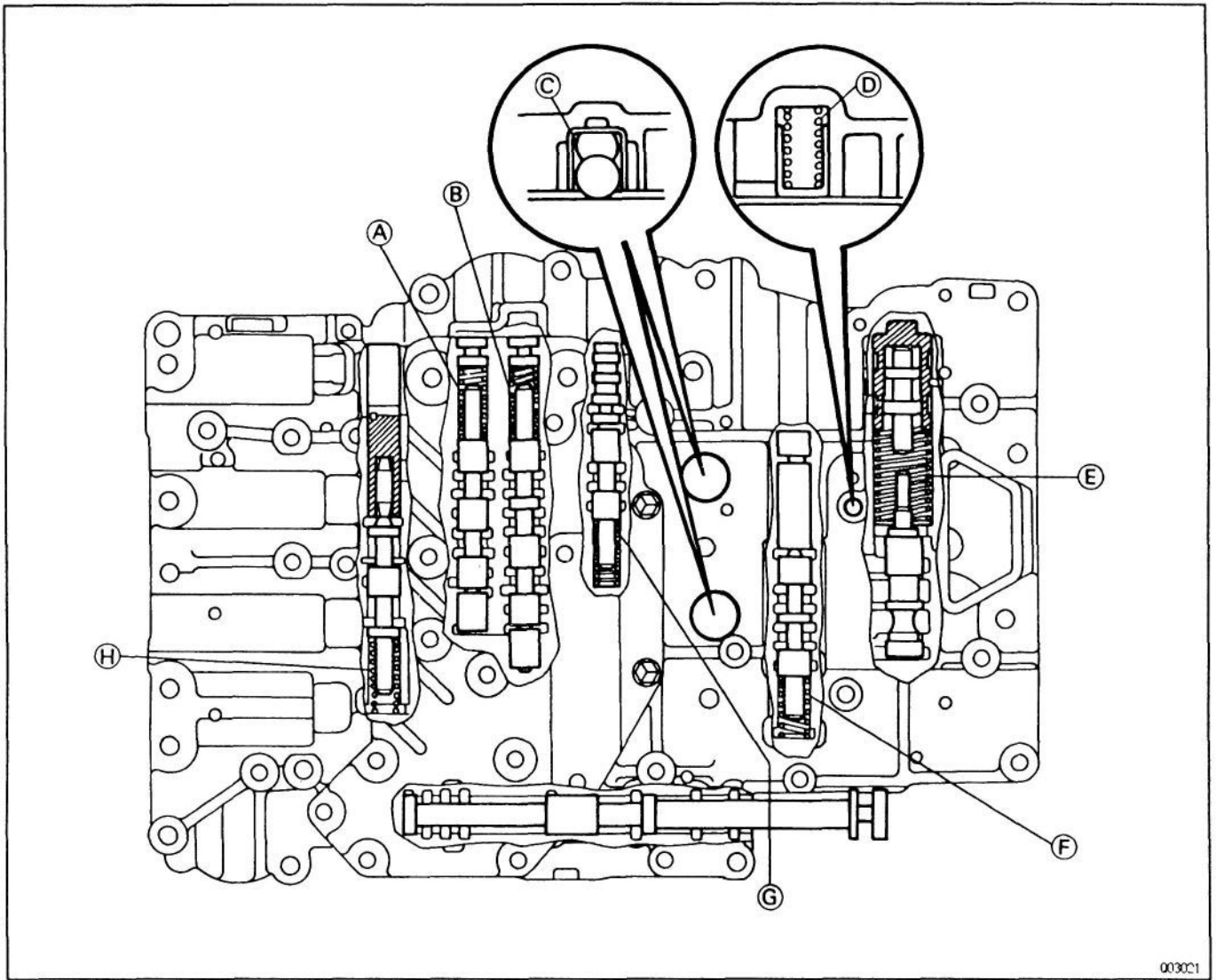
VALVE BODY SPRINGS SPECIFICATIONS



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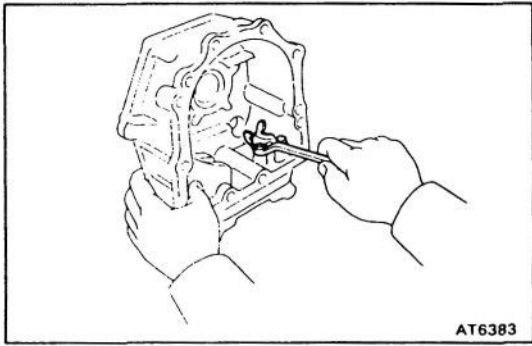
Mark	Name (Color)	Free length x Outer Diameter mm (in.)	Total No. of coils
A	2-3 Shift Valve (Orange)	37.23 x 8.7 (1.466 x 0.343)	18.0
B	Reverse Inhibiter Valve (Light Blue)	29.3 x 7.9 (1.154 x 0.311)	20.0
C	Modulator Valve	1FZ: (Brown)	31.8 x 7.6 (1.252 x 0.299)
		1HD: (Red)	32.0 x 7.6 (1.260 x 0.299)
D	Throttle Valve (White)	25.3 x 9.2 (0.996 x 0.362)	9.5
E	Throttle Valve (Blue)	26.85 x 8.97 (1.057 x 0.353)	10.5
F	Secondary Regulator Valve (None)	46.0 x 16.7 (1.811 x 0.657)	15.0
G	Cut-back Valve (Purple)	30.44 x 7.3 (1.198 x 0.287)	16.0
H	Lock-up Signal Valve (Purple)	30.44 x 7.3 (1.198 x 0.287)	16.0
I	Accumulator Control Valve	1FZ: (Pink)	24.8 x 10.5 (0.976 x 0.413)
		1HD-T: (Green)	27.4 x 10.3 (1.079 x 0.406)
		1HD-FT: (Grey)	21.8 x 9.7 (0.858 x 0.382)
J	Low Coast Modulator Valve (Beige)	30.7 x 7.3 (1.209 x 0.287)	16.0
K	Orifice Control Valve (Yellow Green)	22.5 x 7.5 (0.886 x 0.295)	12.0
L	Low Inhibiter Valve (Purple)	30.44 x 7.3 (1.198x0.287)	16.0

VALVE BODY SPRINGS SPECIFICATIONS



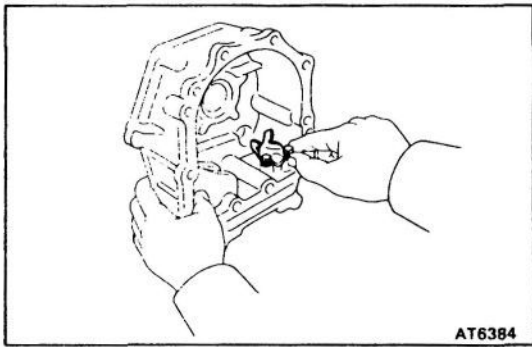
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Mark	Name (Color)	Free length x Outer Diameter mm (in.)	Total No. of coils
Ⓐ	1 - 2 Shift Valve (Orange)	37.23 x 8.7 (1.466 x 0.343)	18.0
Ⓑ	3 - 4 Shift Valve (Orange)	37.23 x 8.7 (1.466 x 0.343)	18.0
Ⓒ	Check Ball (None)	14.0 x 9.8 (0.551 x 0.386)	6.0
Ⓓ	Pressure Relieve Valve(White)	24.0 x 8.2 (0.945 x 0.323)	12.0
Ⓔ	Primary Regulator Valve (Red)	58.2 x 20.9 (2.291 x 0.823)	11.0
Ⓕ	Lock - up Control Valve(White)	26.95 x 9.8 (1.061 x 0.386)	13.0
Ⓖ	C ₀ Exhaust Valve (Yellow)	33.3 x 8.2 (1.311 x 0.323)	14.0
Ⓗ	2 - 3 Timing Valve		
	1FZ and 1HD - T: (Green)	38.97 x 8.6 (1.534 x 0.339)	18.0
	1HD - FT: (Red)	40.1 x 8.6 (1.579 x 0.339)	18.0



3. REMOVE PARKING LOCK PAWL BRACKET

Remove the two bolts and pawl bracket.

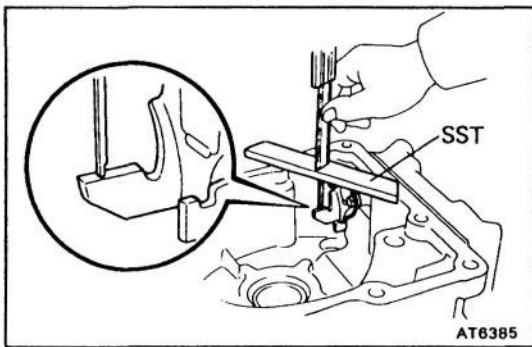


PARKING LOCK PAWL ASSEMBLY

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1. INSTALL PARKING LOCK PAWL BRACKET

(a) Temporarily install the pawl bracket with the two bolts.



(b) Using SST and calipers, set the pawl bracket so that so the distance between the transfer adaptor surface and the top of the bracket tab is specified distance.

Standard distance:

Total distance — SST thickness

Standard distance:

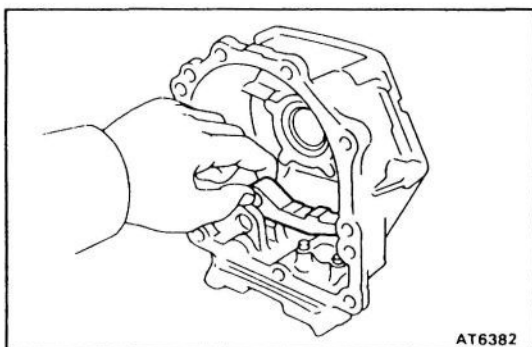
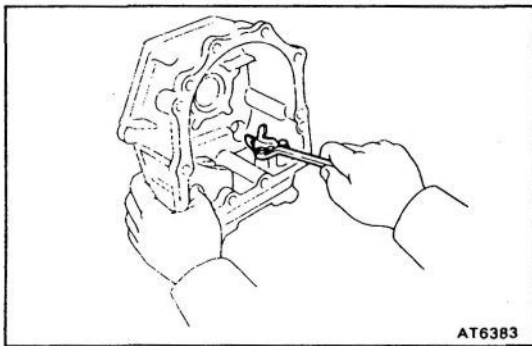
43.9-44.0 mm (1.728-1.732 in.)

SST 09350-36010(09350-06091)



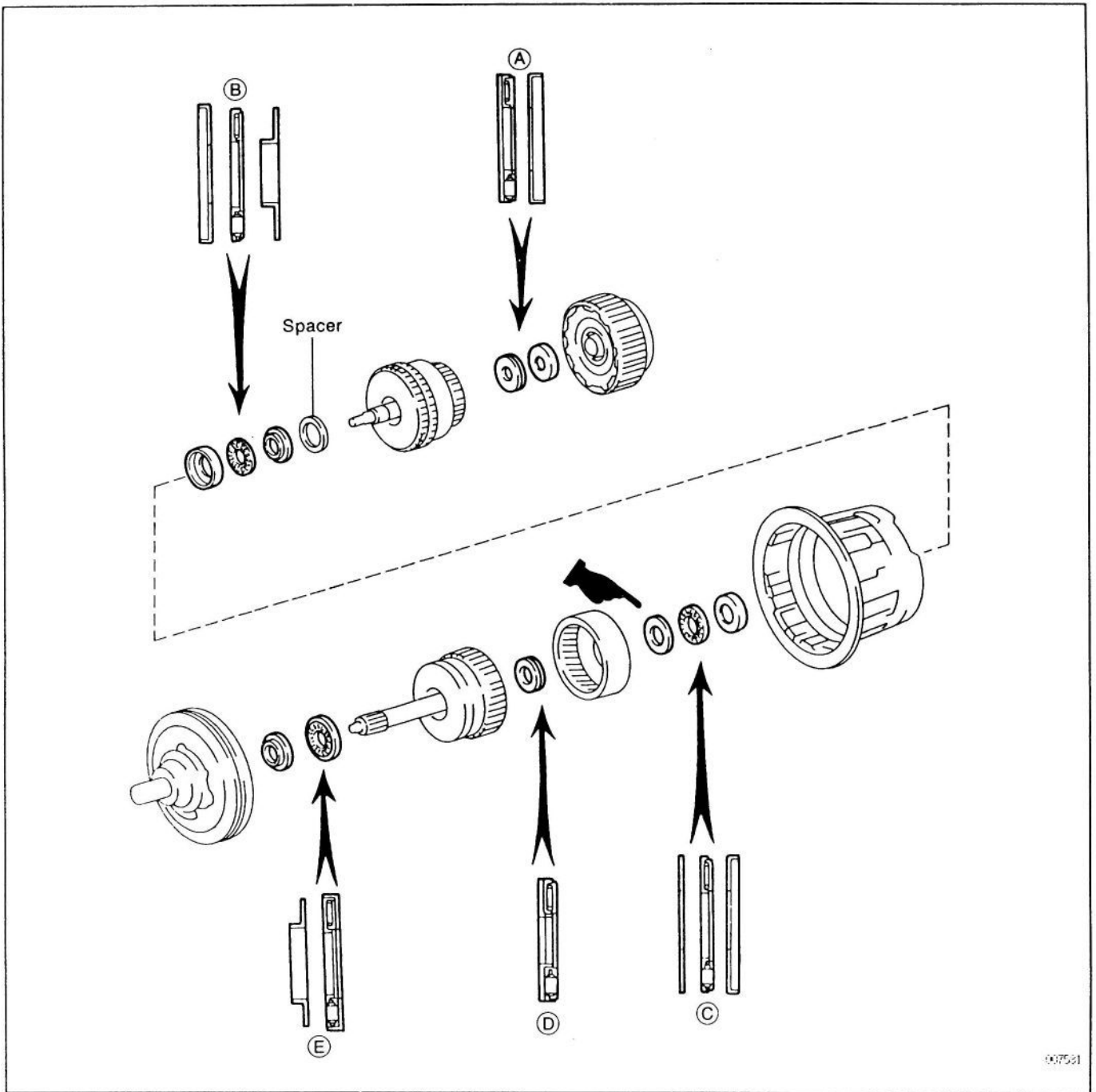
(c) Tighten the bolts.

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



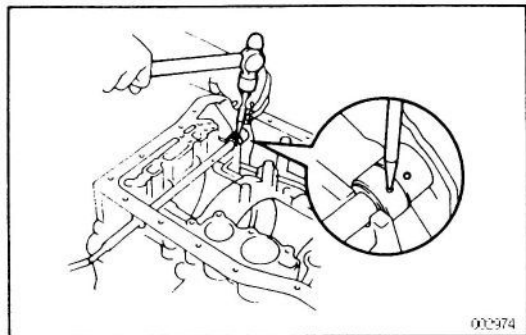
2. INSTALL PARKING LOCK PAWL

BEARINGS AND RACES LOCATION

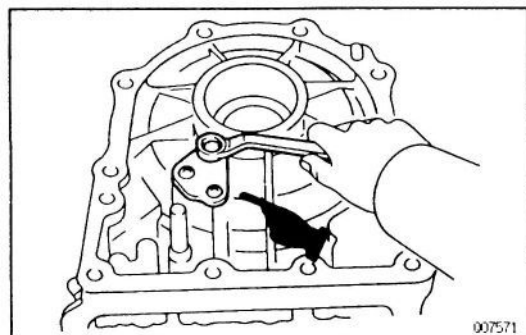


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Mark	Thrust Bearing Diameter	Front Race Diameter	Rear Race Diameter
	Inside/Outside mm (in.)	Inside/Outside mm (in.)	Inside/Outside mm (in.)
Ⓐ	32.8 / 52.0 (1.291 / 2.047)	—	37.0 / 52.0 (1.457 / 2.047)
Ⓑ	32.8 / 52.0 (1.291 / 2.047)	37.0 / 52.0 (1.457 / 2.047)	32.8 / 50.4 (1.291 / 1.984)
Ⓒ	34.7 / 52.0 (1.366 / 2.047)	34.6 / 58.2 (1.362 / 2.291)	37.0 / 60.5 (1.457 / 2.382)
Ⓓ	23.2 / 42.0 (0.913 / 1.654)	—	—
Ⓔ	28.5 / 48.0 (1.122 / 1.819)	27.1 / 43.0 (1.067 / 1.693)	—
		27.9 / 43.0 (1.098 / 1.693)	
		28.3 / 43.0 (1.114 / 1.693)	



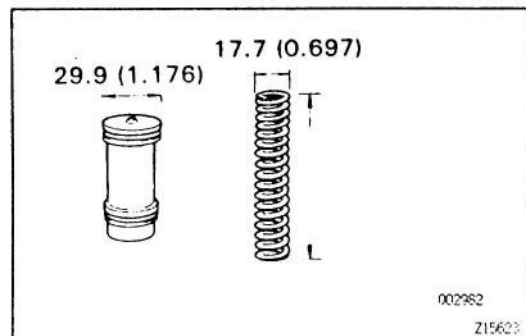
- (g) Match the spacer hole to the lever calking hollow and calk the spacer to the lever,
- (h) Make sure the manual valve lever shaft turns smoothly.



2. INSTALL TRANSMISSION REAR COVER

Install a new gasket and rear cover with the two screws and bolt.

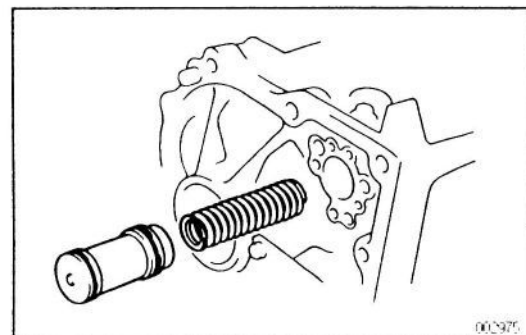
Torque:7.8 N·m **(80 kgf cm, 69 in.lbf)**



3. INSTALL CACCUMULATOR PISTON AND SPRING

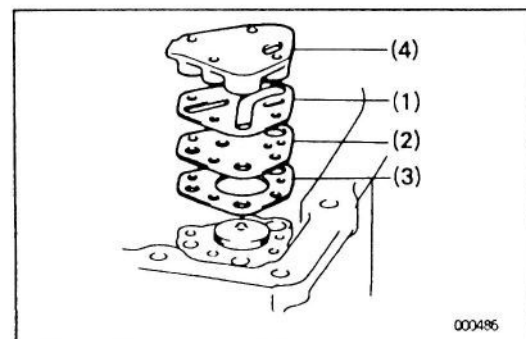
- (a) Coat new two O—rings with ATF, and install them to the piston.

Spring Color	Free Length	Diameter
Green	91.5 mm (3.602 in.)	17.7 mm (0.697 in.)
Red	93.3 mm (3.673 in.)	17.7 mm (0.697 in.)



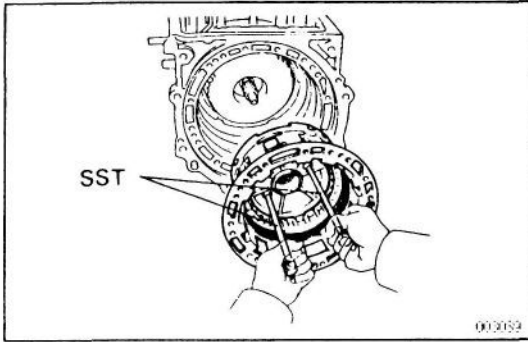
- (b) Install the spring and accumulator piston into the bore of the transmission case.

HINT: Piston, spring diameters and spring free length are shown in the figure.



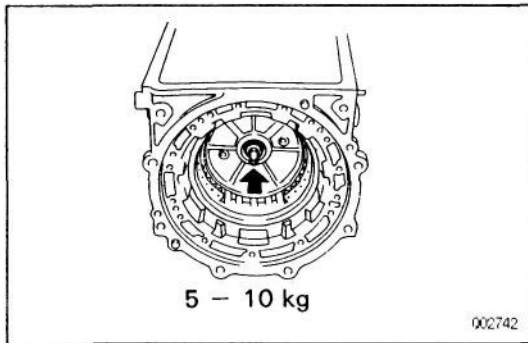
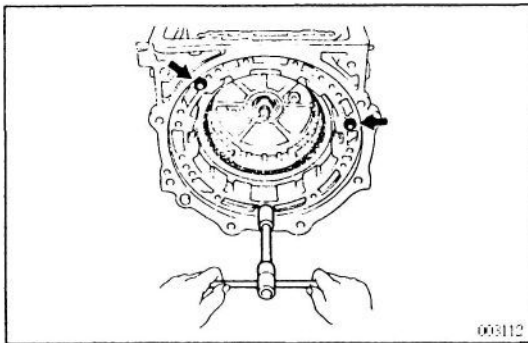
- (c) Place the following parts on the transmission case.

- (1) New gasket
- (2) Plate
- (3) New gasket
- (4) Front clutch accumulator cover



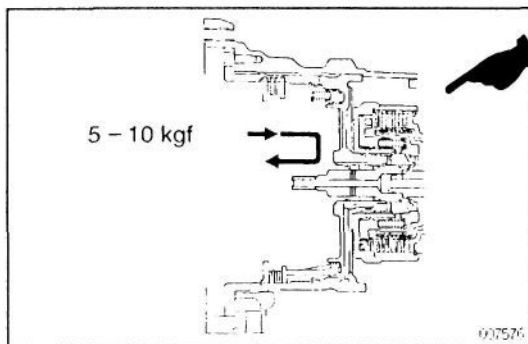
diameter	mm (in.)	Inside	Outside
Bearing		32.8 (1.291)	52.0 (2.047)
Race (Front)		37.0 (1.457)	52.0 (2.047)
Race (Rear)		32.8 (1.291)	50.4 (1.984)

- (c) Install SST (two bolts) to the O/D case.
SST 09350-36010(09350-06140)
- (d) Align the oil holes and bolt holes of the O/D case and transmission case.
- (e) Temporarily install the three bolts
Torque: 25 N.m (250 kgf cm. 18 ft.lbf)

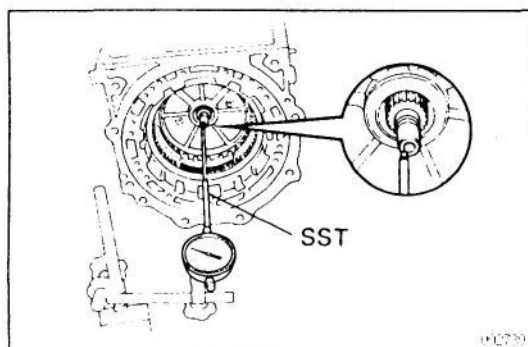


20. ADJUST THRUST CLEARANCE OF INPUT SHAFT (FRONT CLUTCH DRUM)

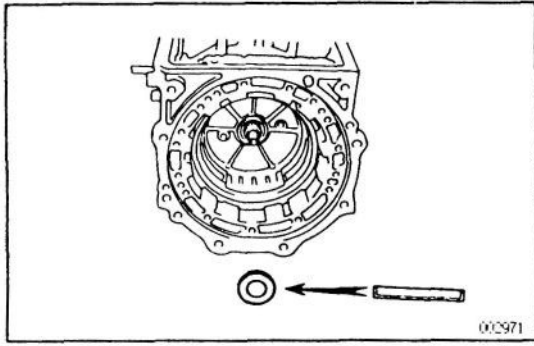
- (a) Push the transmission output shaft toward the front of the transmission by applying a force of 49—98 N (5 - 10 kgf. 11.0-22.0 lbf).



- (b) Push the O/D case toward the rear of the transmission by applying a force of 49—98 N (5—10 kgf, 1 1.0 -22.0 lbf).



- (c) Using SST and a dial indicator, measure the thrust clearance of the input shaft.
SST 09350-36010(093520-06130)
Standard thrust clearance:
0.30-0.70 mm (0.0118-0.0276 in.)
Maximum thrust clearance:
0.70 mm (0.0276 in.)
If the thrust clearance is greater than the maximum, adjust with a spacer.

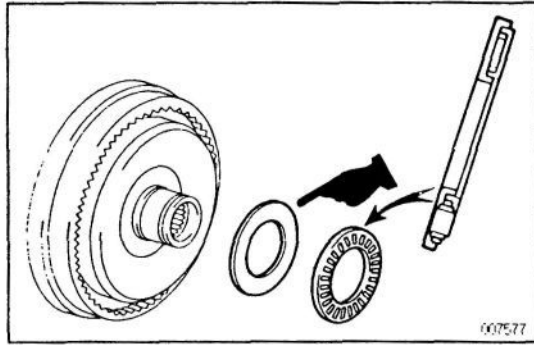


22. INSTALL OVERDRIVE RING GEAR ASSEMBLY

- (a) Coat the race with petroleum jelly, and install it onto the O/D case.

HINT: Race diameter

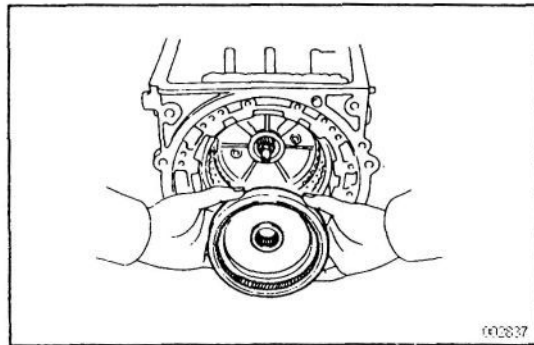
Diameter mm (in.)	Inside	Outside
Race	37.0 (1.457)	60.5 (2.382)



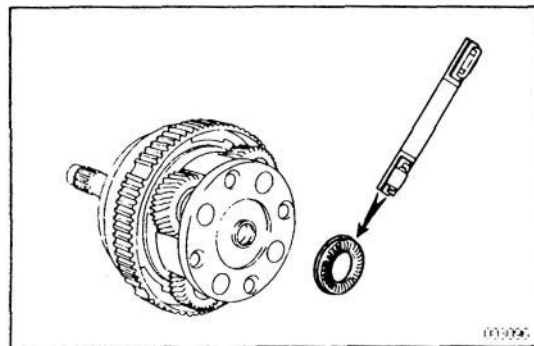
- (b) Coat the bearing with petroleum jelly, and install it onto the ring gear flange.

HINT: Bearing and race diameter

Diameter mm (in.)	Inside	Outside
Bearing race	34.7 (1.366)	52.0 (2.047)
Race	34.6 (1.362)	58.2 (2.291)



- (c) Install the ring gear assembly into the O/D case.

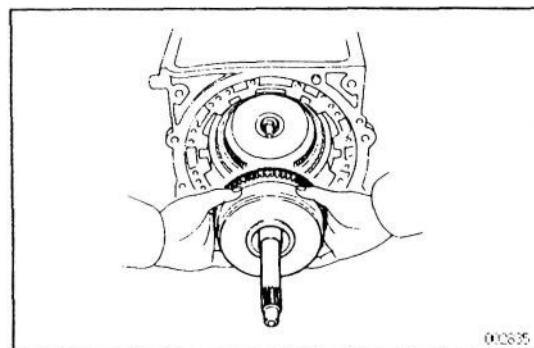


23. INSTALL OVERDRIVE PLANETARY GEAR, OVERDRIVE DIRECT CLUTCH AND ONE-WAY CLUTCH ASSEMBLY

- (a) Coat the bearing with petroleum jelly, and install them onto the planetary gear.

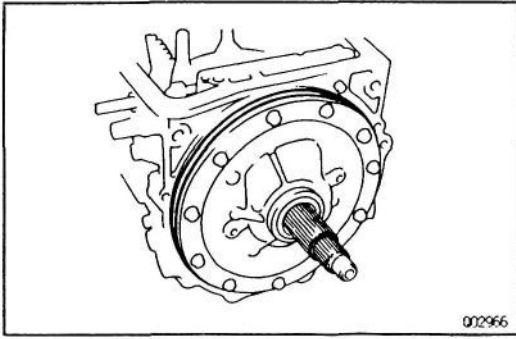
HINT: Bearing and race diameters

Diameter mm (in.)	Inside	Outside
Bearing	23.2 (0.913)	42.0 (1.654)

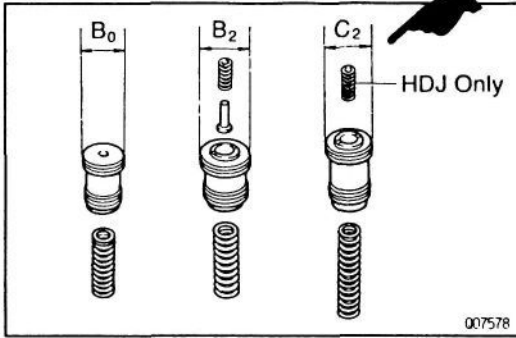


- (b) Install the planetary gear, direct clutch and one—way clutch assembly into transmission case.

HINT: Mesh the spline of the O/D direct clutch drum with the flukes of the discs by rotating and pushing the O/D direct clutch drum clockwise or counter-clockwise.



- (e) Coat two new O—rings with ATF, and install them to the oil pump body.

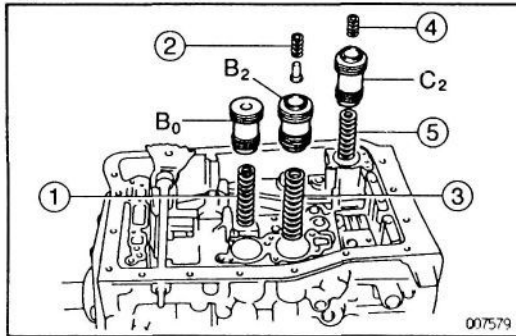


28. INSTALL C₂, B₀, B₂ ACCUMULATOR SPRINGS AND PISTONS

- (a) Coat new O—rings with ATF, and install them to the pistons.
- (b) Install the three springs and accumulator pistons into the bore of the transmission case as shown.

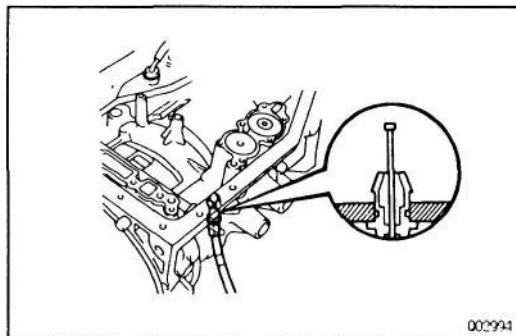
HINT: Piston diameter

	Piston Diameter	mm (in.)
B ₀	35.9	(1.413)
B ₂	43.9	(1.728)
C ₂	39.9	(1.571)



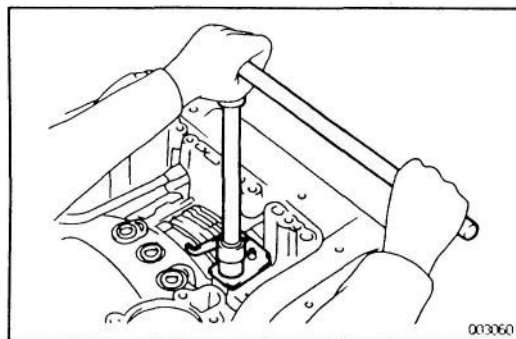
HINT: Spring diameter and free length

No. (Color)	mm (in.)	Free Length	Diameter
① (Light Green)		63.1 (2.484)	20.7 (0.815)
②	(Blue)	26.7 (1.051)	11.0 (0.433)
	(Yellow)	30.4 (1.197)	11.0 (0.433)
③	(Blue or Red)	65.0 (2.559)	25.1 (0.988)
	(White)	67.6 (2.661)	25.1 (0.988)
④	(Purple)	37.7 (1.484)	10.8 (0.425)
	(Green)	83.5 (3.287)	21.7 (0.854)
⑤	(Purple)	80.0 (3.150)	22.4 (0.882)



29. INSTALL THROTTLE CABLE

- (a) Coat a new O—ring with ATF, and install it to the cable.
- (b) Install the cable to the transmission case.



30. INSTALL FIRST AND REVERSE BRAKE GUIDE