

HOW TO USE THIS AUTOMATIC TRANSMISSION REPAIR MANUAL

010E-01

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual was created in accordance with SAE J2008.
- (b) Generally repair operations can be separated in the following 3 main processes:
 - 1. Diagnosis
 - 2. Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting
 - 3. Final Inspection
- (c) This manual explains "Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting", but "Final inspection" is omitted.
- (d) The following essential operations are not written in this manual, however these operations must be done in the practical situation.
 - (1) Operation with a jack or lift
 - (2) Cleaning of a removed part if necessary
 - (3) Visual check

2. INDEX

- (a) An alphabetical INDEX is provided as a section on the end of the book to guide you to the item to be repaired.

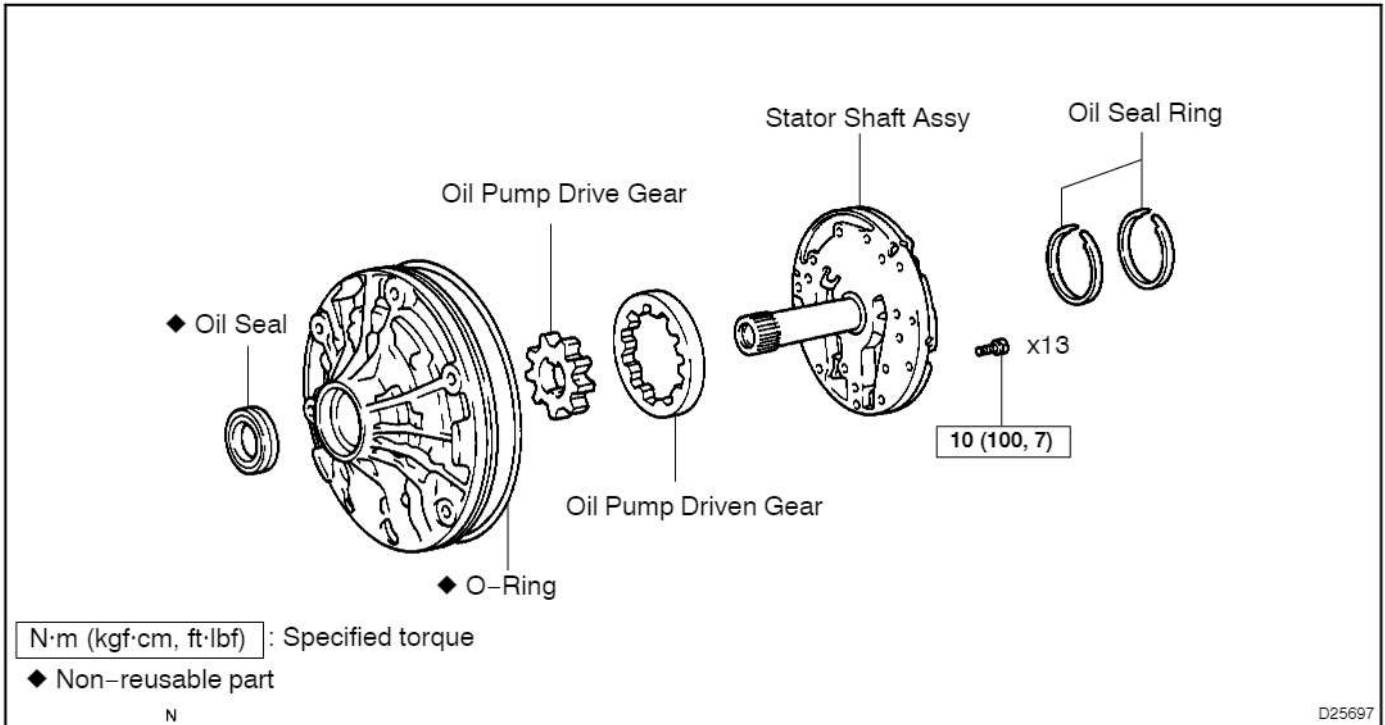
3. PREPARATION

- (a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repairing condition. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section in this manual.

4. REPAIR PROCEDURES

- Component drawing is placed as the section or title if necessary.
- Illustrations of the parts catalog are placed as the "disassembled parts drawing" so that it enables you to understand the fitting condition of the components.
- Non-reusable parts, grease applied parts, precoated parts and torque are specified in the components drawing.

Example:



- Torque, oil applying position, and non-reusable parts are described as important points in the procedure.

NOTICE:

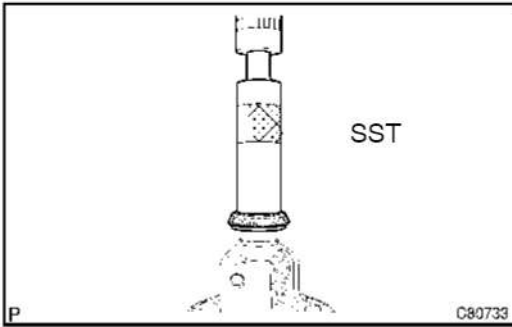
There are cases where such information can only be indicated by an illustration. In those cases, all the information such as torque, oil, etc. is described in the illustration.

- Installing procedure of operation item is performed in the reverse order of the removal, and only the important points are described.
- Only items with points are described in the procedure, and the operational portion and content are placed using an illustration. In the explanations, details of the operational method, standard value and notice are placed.
- There may be cases where the illustrations of similar models are used. In those cases, the details may be different from the actual vehicle.

- (h) The procedures are presented in a step-by-step format:
 - (1) The illustration shows what to do and where to do.
 - (2) The task heading tells what to do.
 - (3) The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:

*Illustration:
what to do and where*



Task heading: what to do

87. INSTALL FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

- (a) Using SST and a press, install the front differential case tapered roller bearing front inner race to the differential case.

SST 09316-60011 (09316-00011)

Set part No.

Component part No.

*Detailed text:
how to do task*

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P HINT:

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

5. SERVICE SPECIFICATIONS

- (a) Specifications are presented in bold type throughout the manual. You never have to leave the procedure to look up your specifications. The specifications are also found in the Service Specifications section for a quick reference.

6. TERMS DEFINITION

CAUTION	Indicate the possibility of injury to you or other people.
NOTICE	Indicate the possibility of damage to the components being repaired.
HINT	Provide additional information to help you perform the repair efficiently.

7. SI UNIT

- (a) The UNITS used in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

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

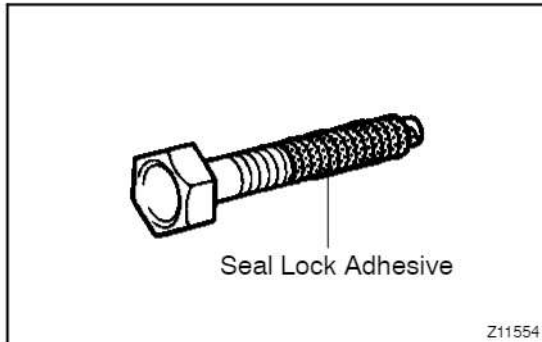


REPAIR INSTRUCTION FOR AUTOMATIC TRANSMISSION REPAIR MANUAL

0101C-01

PRECAUTION

1. BASIC REPAIR HINT



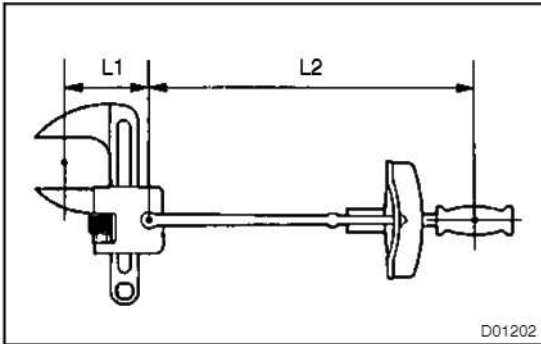
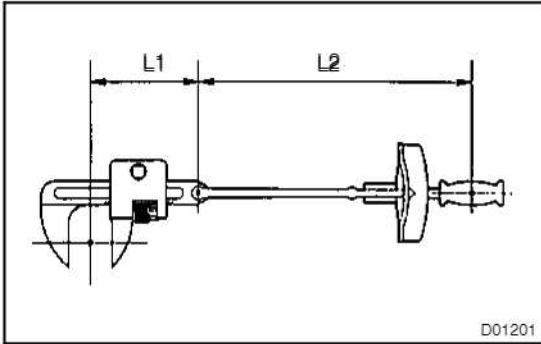
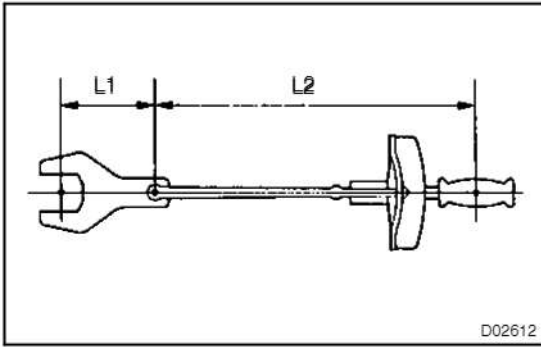
(a) PRECOATED PARTS

- (1) Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
- (3) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

NOTICE:

Do the torque checking with the lower limit value of the torque tolerance.

- (4) Depending on the seal lock agent to apply, there may be a case where it is necessary to leave it for a specified time until it hardens.
- (b) GASKETS
When necessary, use a sealer on gaskets to prevent leaks.
- (c) BOLTS, NUTS AND SCREWS
Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.



(d) TORQUE WHEN USING EXTENSION TOOL WITH TORQUE WRENCH

- (1) In case of tightening by extending the entire length of the torque wrench combined with SST or tool, if you tighten until the reading of the torque wrench reached the specified torque value, the actual torque becomes excessive.
- (2) In this text, only the specified torque is described. In case of using SST or extension tool, find the reading of the torque wrench by the formula.
- (3) Formula $T' = T \times L2 / (L1 + L2)$

T'	Reading of torque wrench {N·m (kgf·cm, ft·lbf)}
T	Torque {N·m (kgf·cm, ft·lbf)}
L1	Length of SST or tool (cm)
L2	Length of torque wrench (cm)

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TERMS FOR AUTOMATIC TRANSMISSION REPAIR MANUAL

ABBREVIATIONS USED IN THIS MANUAL

0101D-01

Abbreviations	Meaning
ASSY	Assembly
AT	Automatic Transmission
ATF	Automatic Transmission Fluid
B ₀	Overdrive Brake
B ₂	3rd Brake
C ₀	Overdrive Clutch
C ₂	Direct Clutch
D	Disc
F	Flange
FIPG	Formed in Place Gasket
MP	Multipurpose
O/D	Overdrive
P	Plate
SSM	Special Service Materials
SST	Special Service Tools
w/	With
w/o	Without

GLOSSARY OF SAE AND TOYOTA TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Toyota equivalents.

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ()--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Inter cooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Potion	-
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	-
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Communication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	-
ECL	Engine Control Level	-
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Control Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only memory	Electrically Erasable Programmable Read Only memory (EEPROM), Erasable Programmable Read Only memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)
IAC	Idol Air Control	Idol Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel-Shutoff	-

ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O ₂ S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O ₂ S)
OBD	On-Board Diagnostic	On-Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CC _O
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	-
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) CC _{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC _R + CC _O
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle

WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	Manifold Converter
3GR	Third Gear	-
4GR	Fourth Gear	-


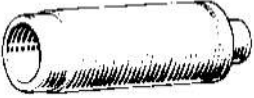



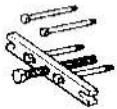

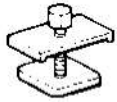



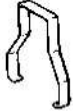


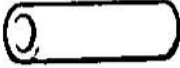

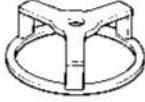
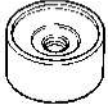
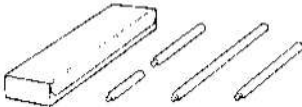

AUTOMATIC TRANSMISSION / TRANSAXLE

PREPARATION


021YU-01

SST

	09223-15020	Oil Seal & Bearing Replacer	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	09226-10010	Crankshaft Front & Rear Bearing Replacer	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	09308-00010	Oil Seal Puller	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	09320-89010	Transfer Clutch Spring Compressor	CLUTCH DRUM & INPUT SHAFT ASSY(A750E/A750F)
	09350-30020	TOYOTA Automatic Transmission Tool Set	AUTOMATIC TRANSMISSION ASSY(A750E/A750F) OIL PUMP ASSY(A750E/A750F) CLUTCH DRUM & INPUT SHAFT ASSY(A750E/A750F)
	(09350-07020)	Oil Pump Puller	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09350-07040)	No.2 Piston Spring Compressor	CLUTCH DRUM & INPUT SHAFT ASSY(A750E/A750F)
	(09350-07050)	No.3 Piston Spring Compressor	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09350-07060)	No.1 Snap Ring Expander	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09350-07070)	No.2 Snap Ring Expander	AUTOMATIC TRANSMISSION ASSY(A750E/A750F) CLUTCH DRUM & INPUT SHAFT ASSY(A750E/A750F)
	(09350-07080)	Brake Reaction Sleeve Puller	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09350-07090)	Brake No.1 Piston Puller	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)

	(09350-07110) Oil Seal Replacer	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09351-32140) Oil Seal Replacer	OIL PUMP ASSY(A750E/A750F)
	09387-00070 First & Reverse Brake Wrench	CLUTCH DRUM & INPUT SHAFT ASSY(A750E/A750F)
	09710-30050 Suspension Arm Bushing Replacer	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	09950-70010 Handle Set	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
	(09951-07100) Handle 100	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)

Recommended Tools

	09031-00030 Pin Punch	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
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Equipment

Feeler gauge	
Cylinder Gauge	
Vernier calipers	
Dial indicator	
Micrometer	
Feeler gauge	
Straight edge	
Torque wrench	
Angle gauge	
V block	

Lubricant

Automatic transmission fluid (LAND CRUISER/ LX470) Dry fill (2UZ-FE w oil cooler) Drain and refill (2UZ-FE w oil cooler)	11.6 liters (12.3 US qts, 10.2 Imp. qts) 3.0 liters (3.2 US qts, 2.6 Imp. qts)	ATF TYPE T-IV or equivalent
Automatic transmission fluid (LAND CRUISER) Dry fill (1HD-FTE w oil cooler) Drain and refill (1HD-FTE w oil cooler)	12.1 liters (12.8 US qts, 10.6 Imp. qts) 3.0 liters (3.2 US qts, 2.6 Imp. qts)	ATF TYPE T-IV or equivalent
Automatic transmission fluid (LAND CRUISER/ LX470) Dry fill (2UZ-FE w/o oil cooler) Drain and refill (2UZ-FE w/o oil cooler)	10.8 liters (11.4 US qts, 9.5 Imp. qts) 3.0 liters (3.2 US qts, 2.6 Imp. qts)	ATF TYPE T-IV or equivalent
Automatic transmission fluid (LAND CRUISER) Dry fill (1HD-FTE w/o oil cooler) Drain and refill (1HD-FTE w/o oil cooler)	11.4 liters (12.0 US qts, 10.0 Imp. qts) 3.0 liters (3.2 US qts, 2.6 Imp. qts)	ATF TYPE T-IV or equivalent
Automatic transmission fluid (4RUNNER, GX470) Dry fill Drain and refill	11.1 liters (11.7 US qts, 9.8 Imp. qts) 3.0 liters (3.2 US qts, 2.6 Imp. qts)	ATF TYPE T-IV or equivalent


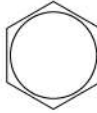

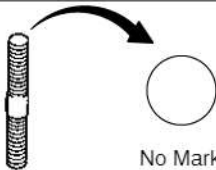
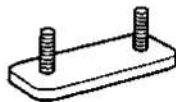

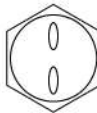





















SSM (Special Service Materials)

08826-00090	"Seal Packing 1281," THREE BOND 1281 or equivalent (FIG)	AUTOMATIC TRANSMISSION ASSY(A750E/A750F)
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STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

03130-01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
  No Mark	 No Mark	 No Mark		4T
 				5T
  w/ Washer	 w/ Washer			6T
 	 			7T
		 		8T
				9T
	 			10T
	 			11T

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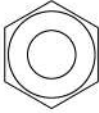
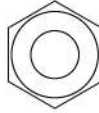
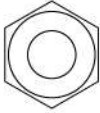


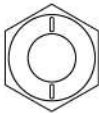
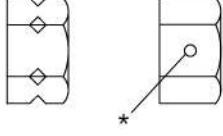


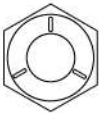



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SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	-	-	-
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	-	-	-
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	-	-	-
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

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HOW TO DETERMINE NUT STRENGTH

Present Standard Hexagon Nut	Nut Type		Class
	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
	 7N	 7N	7N (5T)
 8N			8N
 10N	 10N	 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

AUTOMATIC TRANSMISSION / TRANSAXLE

0305W-03

SERVICE DATA

OIL PUMP		
Body clearance	STD	0.10 – 0.17 mm (0.0039 – 0.0067 in.)
	Maximum	0.17 mm (0.0067 in.)
Tip clearance	STD	0.070 – 0.150 mm (0.0028 – 0.0059 in.)
	Maximum	0.150 mm (0.0059 in.)
Side clearance	STD	0.02 – 0.05 mm (0.0008 – 0.0020 in.)
	Maximum	0.05 mm (0.0020 in.)
Driver and driven gear thickness	0	10.740 – 10.749 mm (0.4228 – 0.4232 in.)
	1	10.750 – 10.759 mm (0.4232 – 0.4236 in.)
	2	10.760 – 10.770 mm (0.4236 – 0.4240 in.)
	3	10.771 – 10.780 mm (0.4241 – 0.4244 in.)
	4	10.781 – 10.790 mm (0.4244 – 0.4248 in.)
Pump body bushing inside diameter	Maximum	38.188 mm (1.504 in.)
Stator shaft bushing inside diameter	(Front side) Maximum	21.577 mm (0.850 in.)
	(Rear side) Maximum	32.08 mm (1.263 in.)
2nd BRAKE		
Piston return spring free length	STD	15.72 mm (0.619 in.)
B3 BRAKE		
Piston stroke		0.42 – 0.72 mm (0.017 – 0.028 in.)
Flange thickness	No. 0	2.0 mm (0.079 in.)
	No. 1	2.2 mm (0.087 in.)
	No. 2	2.4 mm (0.094 in.)
	No. 3	2.6 mm (0.102 in.)
FRONT PLANETARY GEAR		
Planetary gear bushing inside diameter	Maximum	57.48 mm (2.263 in.)
Planetary pinion gear thrust clearance	STD	0.2 – 0.6 mm (0.008 – 0.024 in.)
	Maximum	0.65 mm (0.026 in.)
BRAKE PISTON No.1		
Piston return spring free length	STD	17.05 mm (0.671 in.)
CENTER PLANETARY GEAR		
Planetary pinion gear thrust clearance	STD	0.12 – 0.68 mm (0.005 – 0.027 in.)
	Maximum	0.73 mm (0.029 in.)
B2 BRAKE		
Piston return spring free length	STD	17.45 mm (0.687 in.)
RR PLANETARY RING GEAR FLANGE		
Planetary ring gear flange bushing inside diameter	Maximum	32.175 mm (1.267 in.)
INTERMEDIATE SHAFT		
Intermediate shaft run out	Maximum	0.08 mm (0.003 in.)
Intermediate shaft diameter	STD A:	25.962 – 25.975 mm (1.022 – 1.023 in.)
	B:	25.962 – 25.975 mm (1.022 – 1.023 in.)
	C:	32.062 – 32.075 mm (1.262 – 1.263 in.)
	D:	32.062 – 32.075 mm (1.262 – 1.263 in.)
	Min A:	25.912 mm (1.020 in.)
	B:	25.912 mm (1.020 in.)
	C:	32.012 mm (1.260 in.)
	D:	32.012 mm (1.260 in.)

SERVICE SPECIFICATIONS - AUTOMATIC TRANSMISSION / TRANSAXLE

REAR PLANETARY GEAR		
Planetary pinion gear thrust clearance	STD	0.2 - 0.6 mm (0.008 - 0.024 in.)
	Maximum	0.65 mm (0.026 in.)
Planetary gear bushing inside diameter	Maximum	20.075 mm (0.790 in.)
1ST & REVERSE BRAKE		
Pack clearance		0.8 - 1.1 mm (0.032 - 0.043 in.)
Piston return spring free length	STD	23.74 mm (0.935 in.)
H thickness	No. 0	0 mm (0 in.)
	No. 2	0.2 mm (0.00787 in.)
	No. 4	0.4 mm (0.01575 in.)
	No. 6	0.6 mm (0.02362 in.)
	No. 8	0.8 mm (0.03150 in.)
	No. 10	1.0 mm (0.03937 in.)
	No. 12	1.2 mm (0.04724 in.)
No. 14	1.4 mm (0.05512 in.)	
DIRECT CLUTCH		
Pack clearance		0.50 - 0.80 mm (0.020 - 0.032 in.)
Clutch piston return spring free length	STD	19.51 mm (0.768 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)
REVERSE CLUTCH		
Reverse clutch drum bushing inside diameter	STD	35.812 - 35.837 mm (1.4099 - 1.4109 in.)
	Maximum	35.887 mm (1.4129 in.)
Pack clearance		0.50 - 0.80 mm (0.020 - 0.032 in.)
Clutch piston return spring free length	STD	21.04 mm (0.828 in.)
Flange thickness	No. 0	2.8 mm (0.110 in.)
	No. 1	2.9 mm (0.114 in.)
	No. 2	3.0 mm (0.118 in.)
	No. 3	3.1 mm (0.122 in.)
	No. 4	3.2 mm (0.126 in.)
	No. 5	3.3 mm (0.130 in.)
	No. 6	3.4 mm (0.134 in.)
	No. 7	3.5 mm (0.138 in.)
	No. 8	3.6 mm (0.142 in.)
	No. 9	3.7 mm (0.146 in.)
No. A	3.8 mm (0.150 in.)	
FORWARD CLUTCH		
Forward clutch drum bushing inside diameter	STD	26.037 - 26.062 mm (1.0251 - 1.0261 in.)
	Maximum	26.112 mm (1.028 in.)
Pack clearance		0.60 - 0.90 mm (0.0236 - 0.0354 in.)

Clutch piston return spring free length	STD	26.74 mm (1.053 in.)
Flange thickness	No. 0	3.0 mm (0.118 in.)
	No. 1	3.1 mm (0.122 in.)
	No. 2	3.2 mm (0.126 in.)
	No. 3	3.3 mm (0.130 in.)
	No. 4	3.4 mm (0.134 in.)
	No. 5	3.5 mm (0.138 in.)
	No. 6	3.6 mm (0.142 in.)
	No. 7	3.7 mm (0.146 in.)
	No. 8	3.8 mm (0.150 in.)
	No. 9	3.9 mm (0.154 in.)
No. A	4.0 mm (0.158 in.)	

OUTPUT SHAFT BEARING (A750E)		
Clearance		0.05 - 0.33 mm (0.002 - 0.013 in.)
Flange thickness	No. 1	3.7 mm (0.146 in.)
	No. 2	3.8 mm (0.150 in.)
	No. 3	3.9 mm (0.154 in.)
	No. 4	4.0 mm (0.158 in.)
	No. 5	4.1 mm (0.161 in.)
	No. 6	4.2 mm (0.165 in.)

ACCUMULATOR			
Spring	Free length/Outer diameter mm (in.)	Color	
B ₃	70.5 (2.776) / 19.7 (0.776)	Purple	
C ₂	62.0 (2.441) / 15.9 (0.626)	White	
C ₁	inner	30.4 (1.197) / 11.4 (0.449)	Pink
	outer	48.76 (1.920) / 16.6 (0.654)	Light green
C ₃	inner	44.0 (1.732) / 14.0 (0.551)	Yellow
	outer	73.35 (2.888) / 19.9 (0.784)	Red

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Transmission housing x Transmission case	14 mm	34	345	25
	17 mm	57	581	42
Automatic transaxle breather tube x Transmission case		5.4	55	48 in.·lbf
Park/Neutral position switch assy	Bolt	13	130	9
	Nut	6.9	70	61 in.·lbf
Transmission wire x Transmission case		5.4	55	48 in.·lbf
Oil cooler tube union x Transmission case		29	296	21
Transmission control shaft lever LH		16	163	12
Transmission revolution sensor x Transmission case		5.4	55	48 in.·lbf
Extension housing assy x Transmission case (A750E)		34	345	25
Transmission case adapter adapter x Transmission case (A750F)		34	345	25
Oil pan x Transmission case		4.4	45	39 in.·lbf
Valve body oil strainer assy x Transmission valve body assy		10	100	7
Transmission valve body assy x Transmission case		11	110	8
Parking lock pawl bracket x Transmission case		7.4	75	65 in.·lbf
Drain plug		28	285	21
Oil pump x Transmission case		21	214	15
Oil pump body x Stator shaft assy		12	122	9
Lock plate x Transmission valve body assy		6.4	65	57 in.·lbf
Shift solenoid valve SR x Transmission valve body assy		6.4	65	57 in.·lbf
Shift solenoid valve S1 x Transmission valve body assy		6.4	65	57 in.·lbf
Shift solenoid valve S2 x Transmission valve body assy		10	100	7
ATF Temperature sensor x Transmission valve body assy	36 mm	11	112	8
	12 mm	10	100	7

AUTOMATIC TRANSMISSION ASSY (A750E/A750F)

4007T-04

PRECAUTION

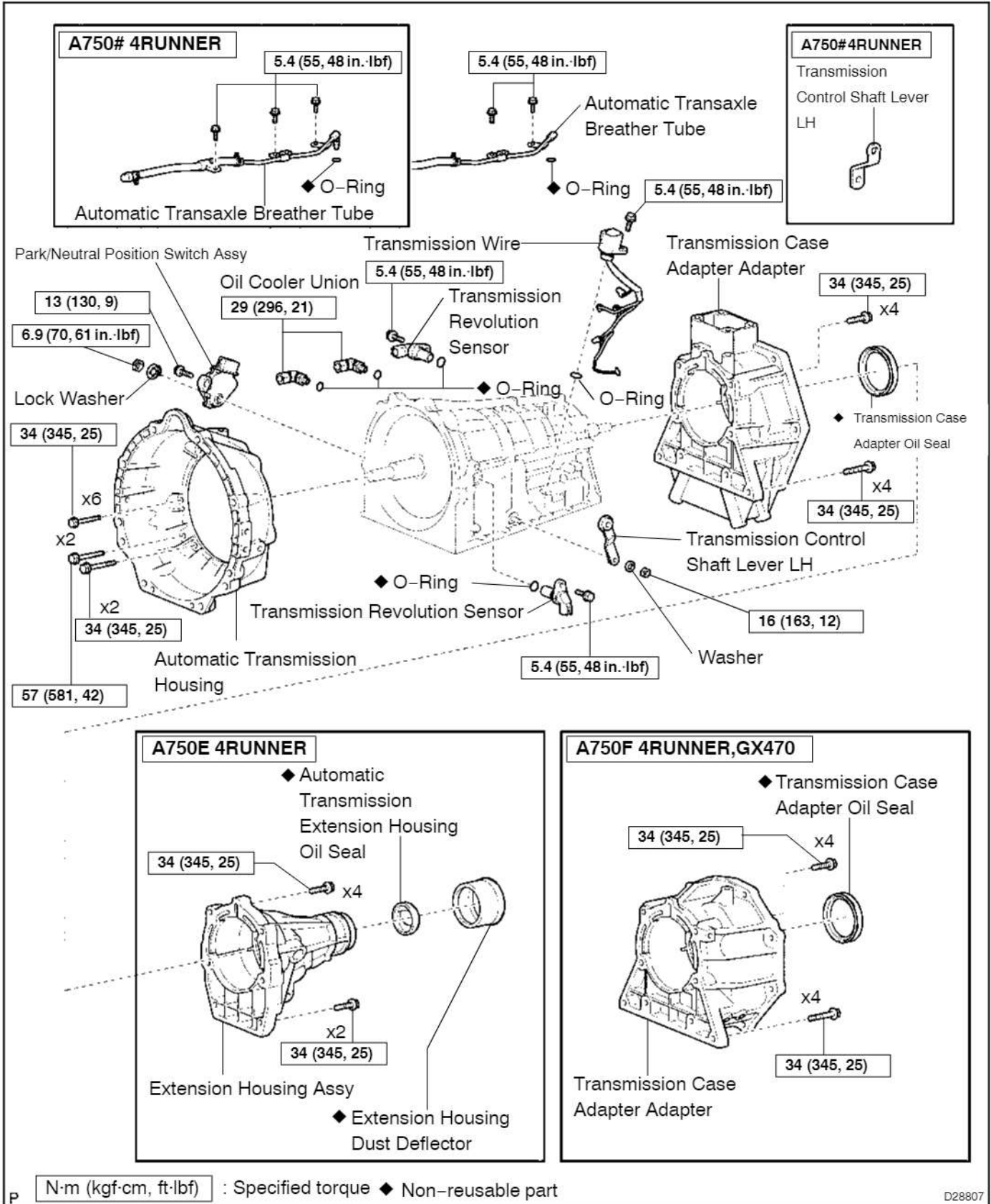
NOTICE:

- The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect the performance. The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion from similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. As much as possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.

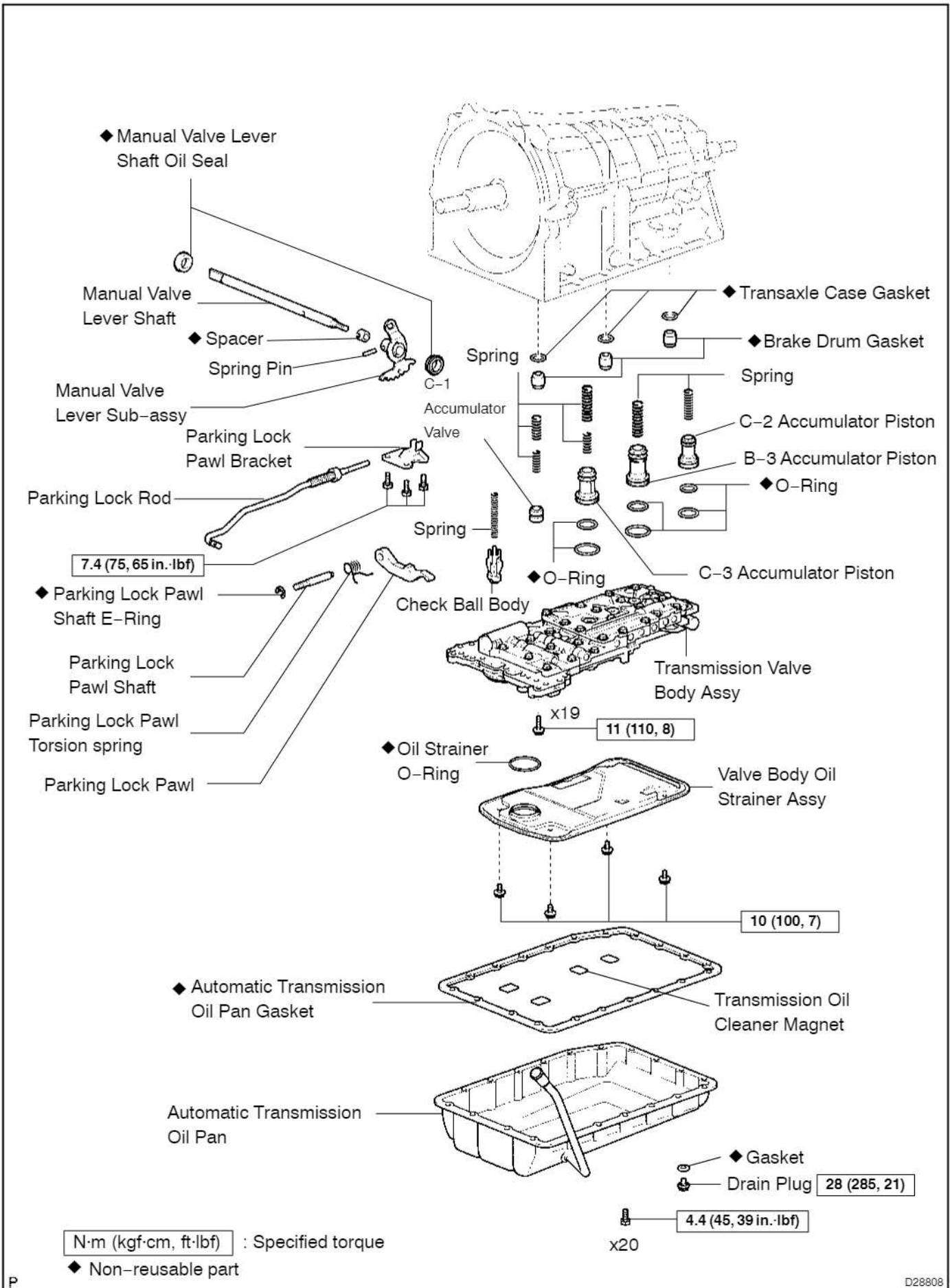
Recommended ATF: T-IV

- All disassembled parts should be washed clean, and any fluid passages and holes should be blown through with compressed air.
- Dry all parts with compressed air-never use shop rags.
- When using compressed air, always aim away from yourself to prevent accidentally spraying ATF or kerosene on your face.
- The recommended automatic transmission fluid or kerosene should be used for cleaning.
- After cleaning, the parts should be arranged in the correct order for efficient inspection, repairs, and reassembly.
- When disassembling a valve body, be sure to match each valve together with the corresponding spring.
- New discs for the brakes and clutches that are to be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
- All gaskets and rubber O-rings should be replaced.
- Do not apply adhesive cements to gaskets and similar parts.
- Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
- If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
- Check thrust bearings and races for wear or damage. Replace if necessary.
- Use petroleum jelly to keep parts in place.
- When working with FIPG material, you must follow the below.
Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surface.
Thoroughly clean all components to remove all the loose material.
Clean both sealing surfaces with a non-residue solvent.
Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

COMPONENTS



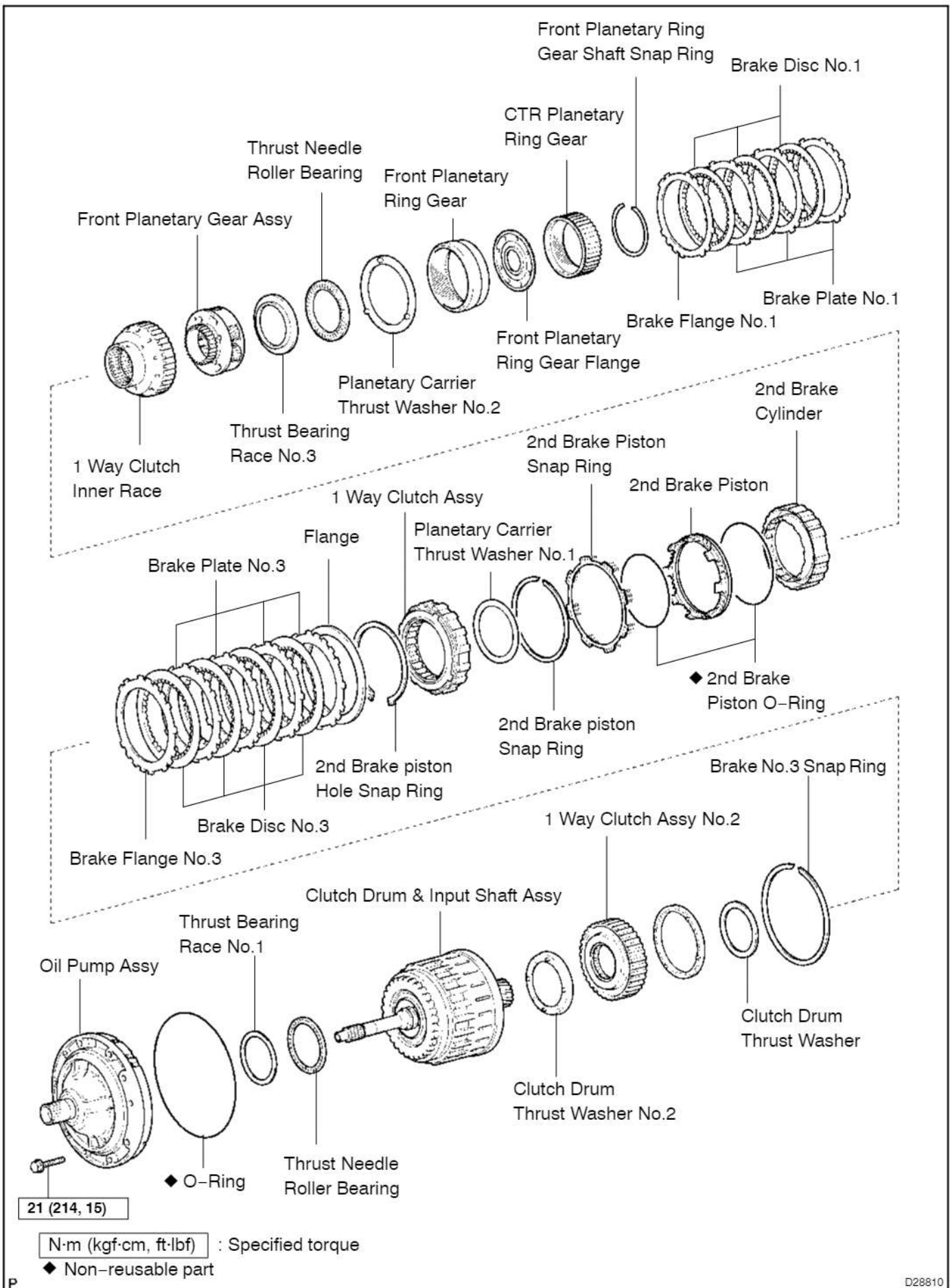
cardiagn.com



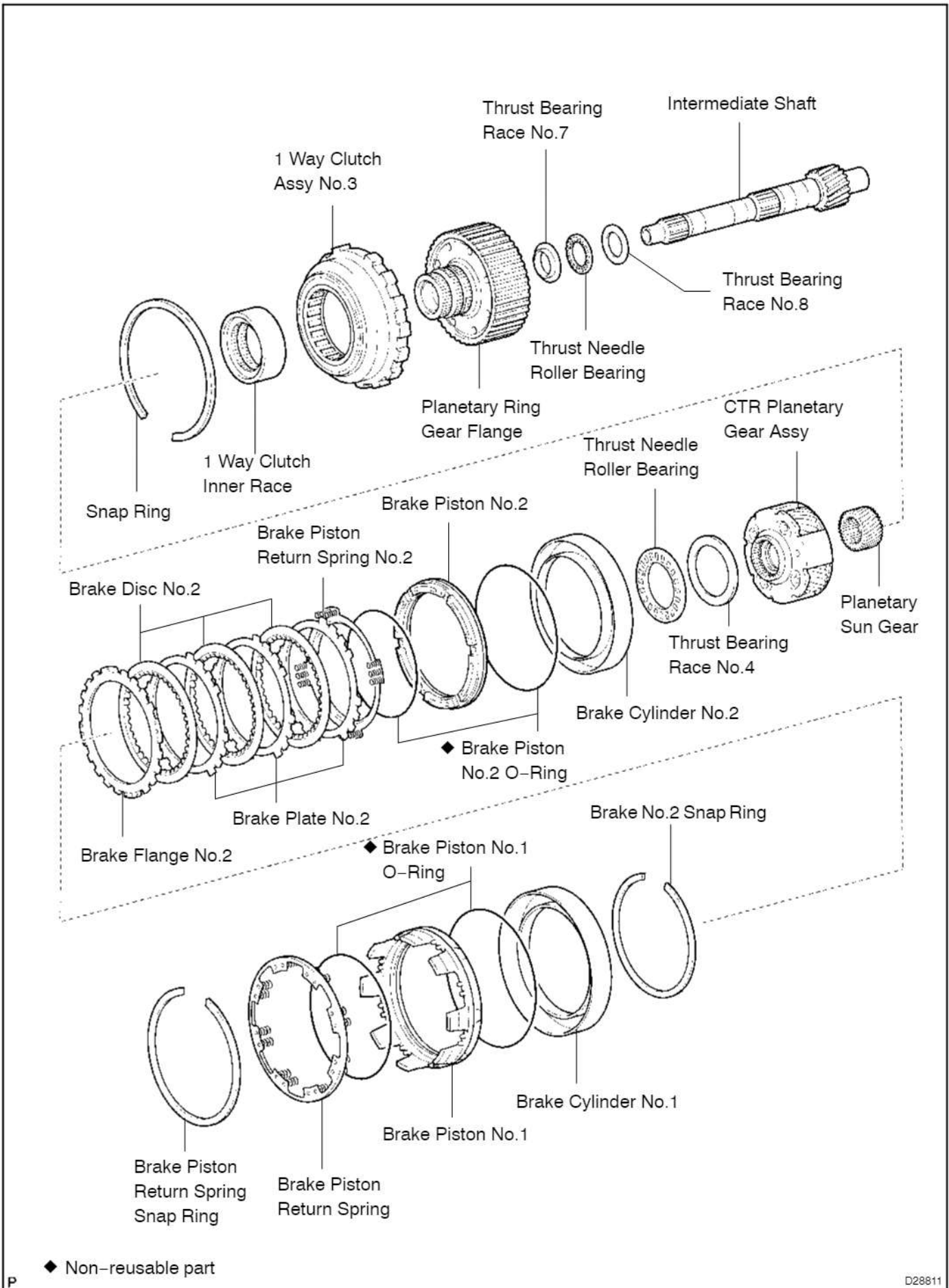
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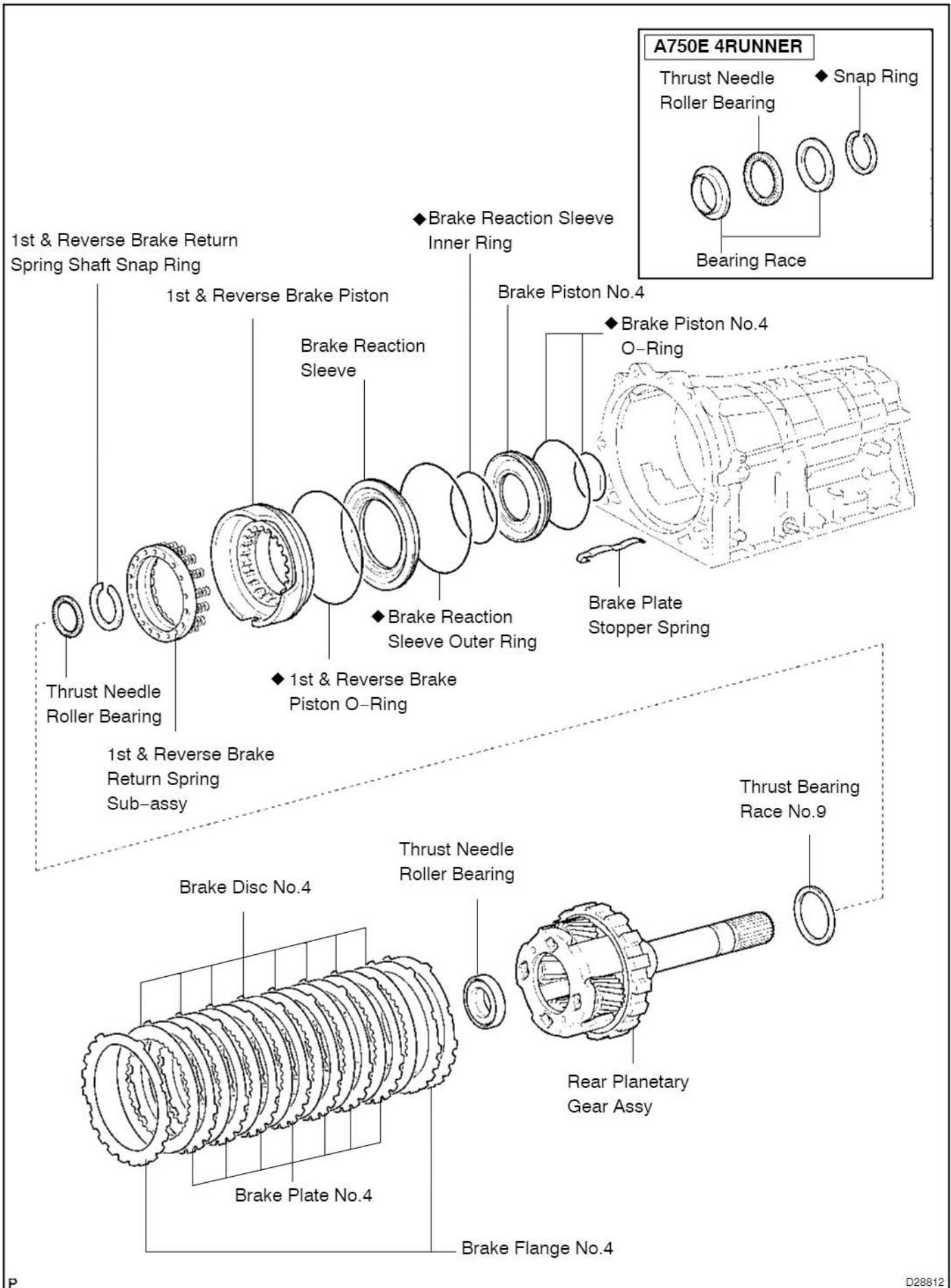
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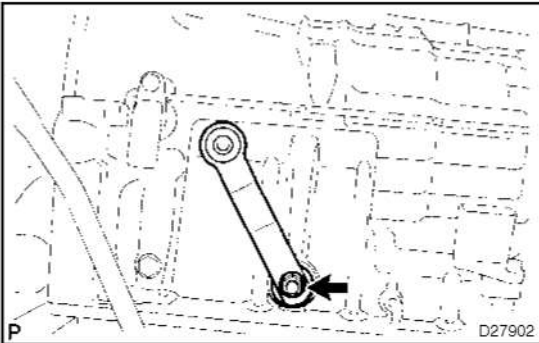


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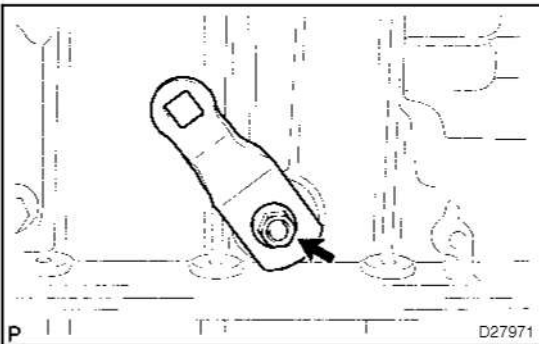
cardiagn.com

OVERHAUL



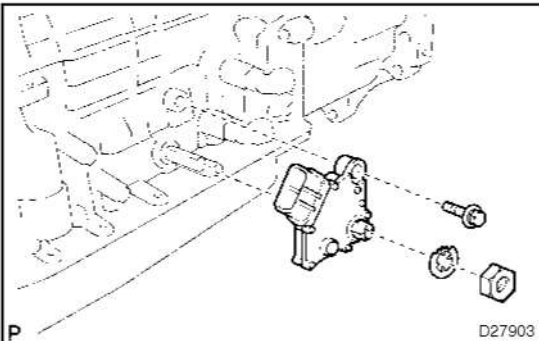
1. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH (A750F EXCEPT 4RUNNER, GX470)

- (a) Remove the nut, the washer and the control shaft lever LH.



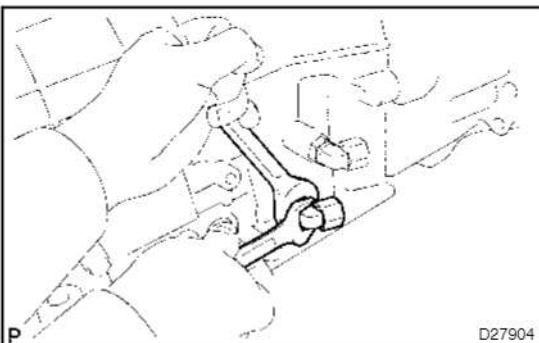
2. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH (A750# 4RUNNER, GX470)

- (a) Remove the nut, the washer and the control shaft lever LH.



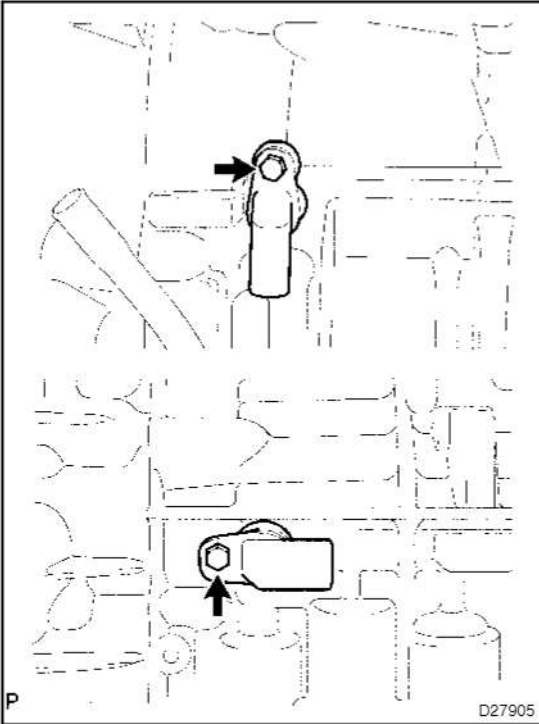
3. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Using a screwdriver, unstake the lock washer.
- (b) Remove the lock washer, the nut and the bolt.
- (c) Remove the park/neutral position switch.

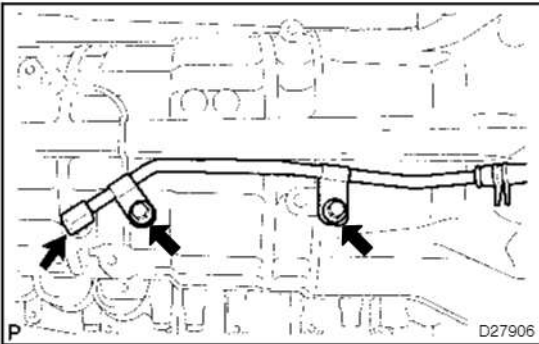


4. REMOVE OIL COOLER TUBE UNION

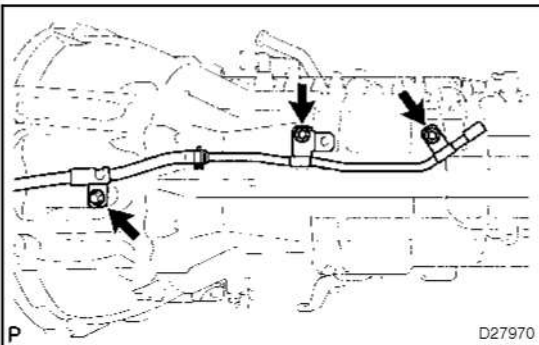
- (a) Remove the 2 oil cooler tube unions.
- (b) Remove the O-ring from the oil cooler tube union.



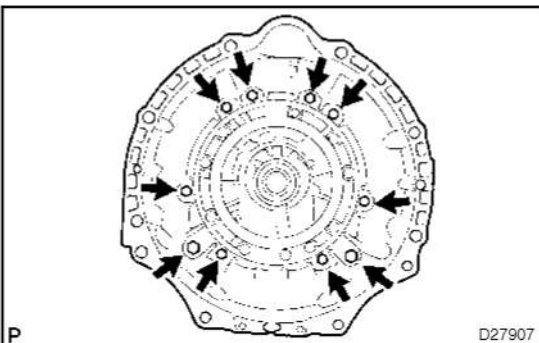
- 5. REMOVE TRANSMISSION REVOLUTION SENSOR**
- Remove the 2 bolts and the 2 transmission revolution sensors.
 - Remove the O-ring from each sensor.



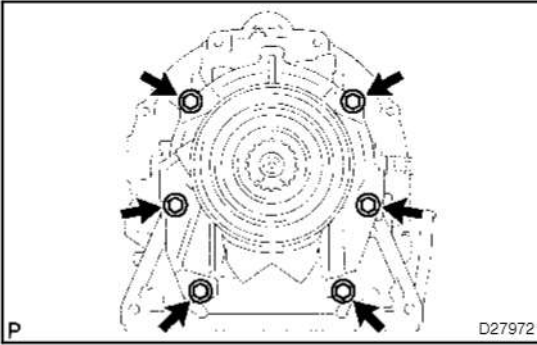
- 6. REMOVE AUTOMATIC TRANSAXLE BREATHER TUBE (A750F EXCEPT 4RUNNER, GX470)**
- Remove the 2 bolts.
 - Remove the breather tube.
 - Remove the O-ring from each tube.



- 7. AUTOMATIC TRANSAXLE BREATHER TUBE (A750# 4RUNNER, GX470)**
- Remove the 3 bolts.
 - Remove the breather tube.
 - Remove the O-ring from each tube.



- 8. REMOVE AUTOMATIC TRANSMISSION HOUSING**
- Remove the 10 bolts.
 - Remove the transmission housing.



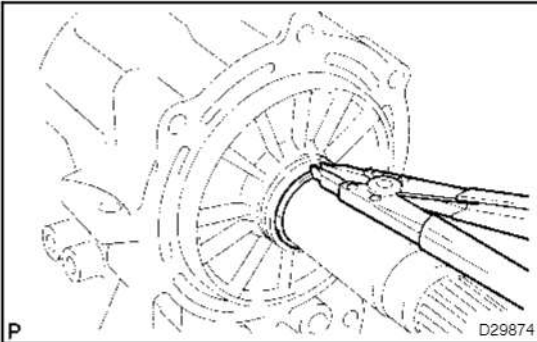
9. REMOVE EXTENSION (ATM) HOUSING SUB-ASSY (A750E 4RUNNER)

- (a) Remove the 6 bolts.
- (b) Remove the extension housing assy.

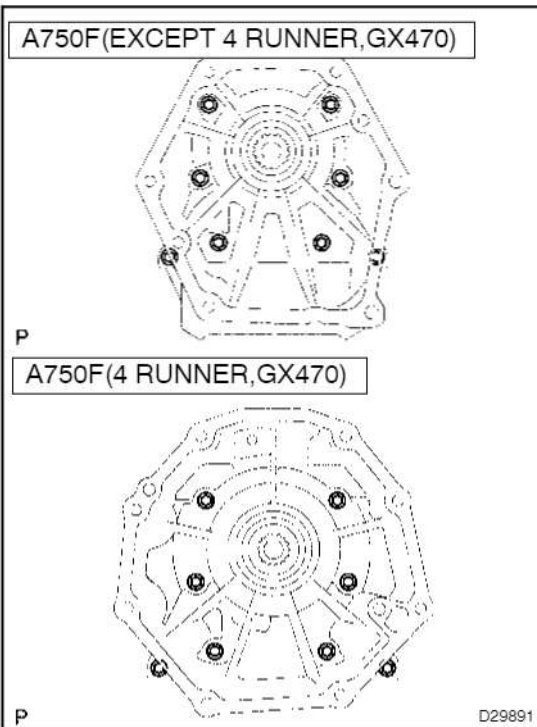
HINT:

Use a brass bar and a hammer to remove the extension housing assy.

- (c) Remove the gasket from the extension housing assy.



- (d) Using a snap ring expander, remove the snap ring.
- (e) Remove the thrust needle roller bearing and the 2 bearing races.



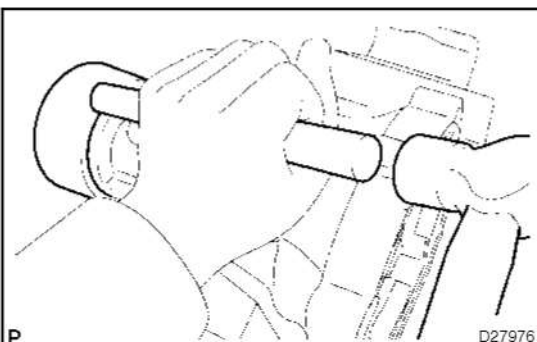
10. REMOVE TRANSMISSION CASE ADAPTER ADAPTER SUB-ASSY (4WD DRIVE TYPE)

- (a) Remove the 8 bolts.
- (b) Remove the transmission case adapter assy.

HINT:

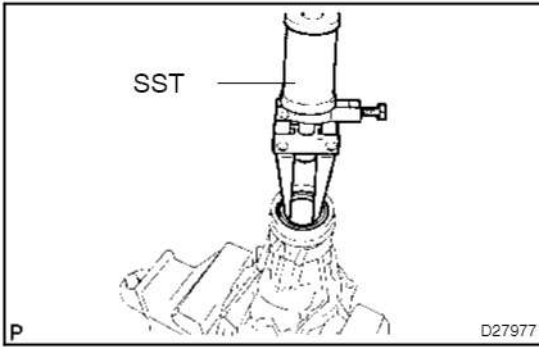
Use a brass bar and a hammer to remove the extension housing assy.

- (c) Remove the gasket from the transmission case adapter adapter assy.



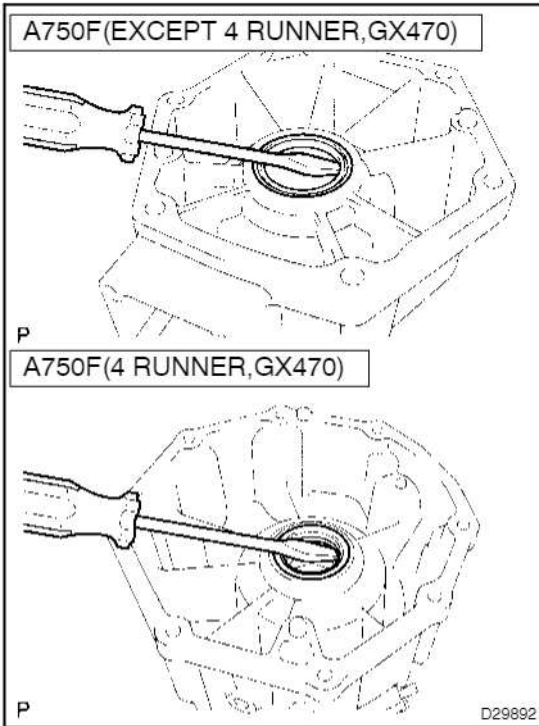
11. REMOVE EXTENSION HOUSING DUST DEFLECTOR (A750E 4RUNNER)

- (a) Using a brass bar and a hammer, remove the extension housing dust deflector.



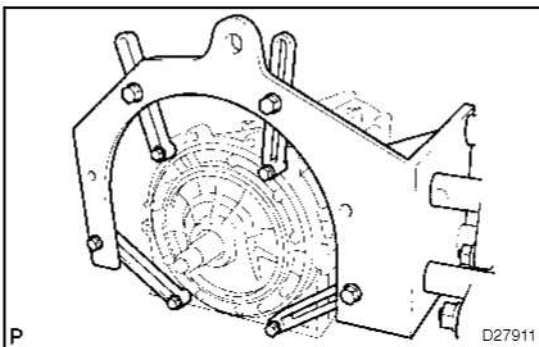
12. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL (A750E 4RUNNER)

- (a) Using SST, remove the oil seal.
SST 09308-00010



13. REMOVE TRANSMISSION CASE ADAPTOR OIL SEAL (4WD DRIVE TYPE)

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



14. FIX AUTOMATIC TRANSMISSION CASE SUB-ASSY

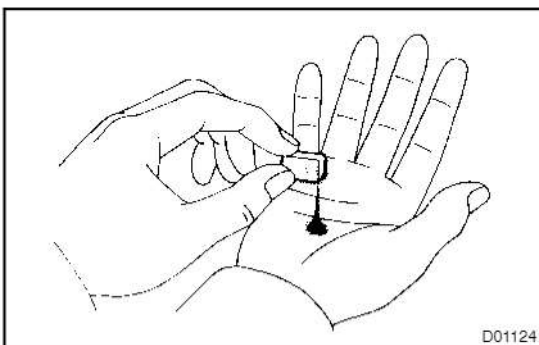
- (a) Install the transmission case on the overhaul attachment.

15. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

NOTICE:

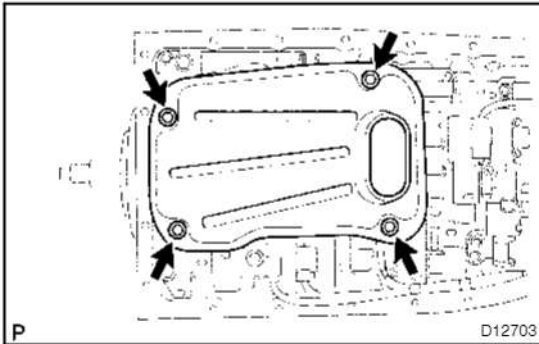
Do not turn the transmission over as this will contaminate the valve body with foreign matter on the bottom of the pan.

- (a) Remove the drain plug and the 20 bolts.

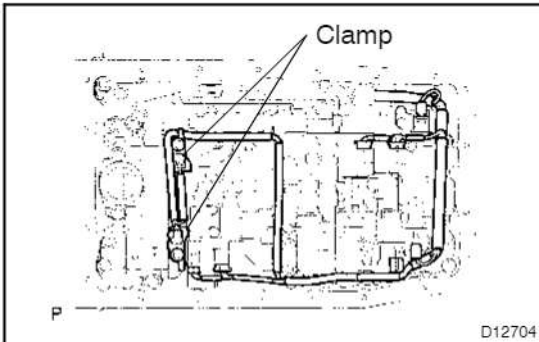


16. INSPECT AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

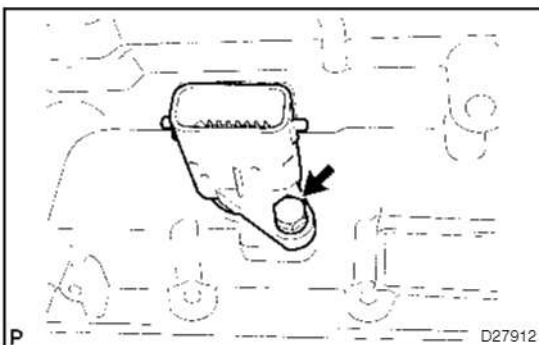
- (a) Remove the magnets, and use them to collect steel particles.
- (b) Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.
- Steel (magnetic): bearing, gear and clutch plate wear
 - Brass (non-magnetic): bushing wear

**17. REMOVE VALVE BODY OIL STRAINER ASSY**

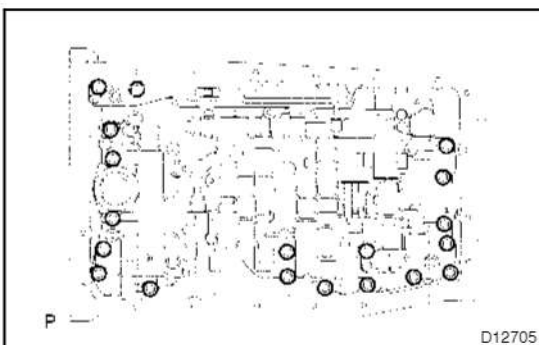
- (a) Turn over the transmission.
- (b) Remove the 4 bolts holding the valve body oil strainer assy to the valve body.
- (c) Remove the O-ring from the valve body oil strainer assy.

**18. REMOVE TRANSMISSION WIRE**

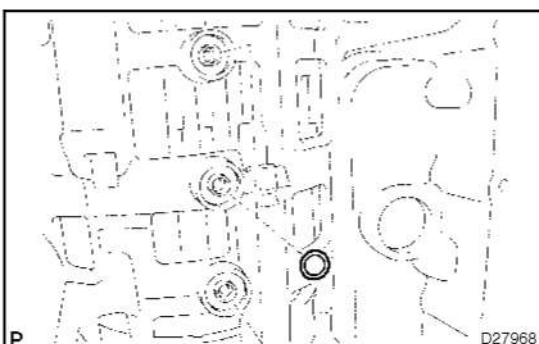
- (a) Remove the ATF temperature sensor.
- (b) Remove the bolt and the clamp.
- (c) Disconnect the 7 connectors from the shift solenoid valves.



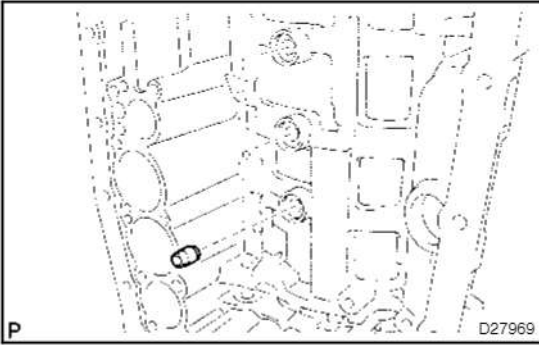
- (d) Remove the bolt from the case.
- (e) Pull the transmission wire out of the transmission case.
- (f) Remove the O-ring from the transmission wire.

**19. REMOVE TRANSMISSION VALVE BODY ASSY**

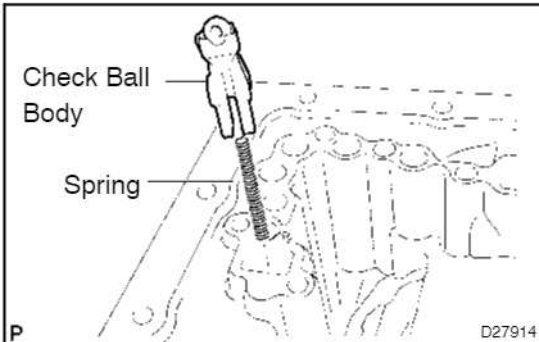
- (a) Remove the 19 bolts.
- (b) Remove the valve body assy.

**20. REMOVE TRANSAXLE CASE GASKET**

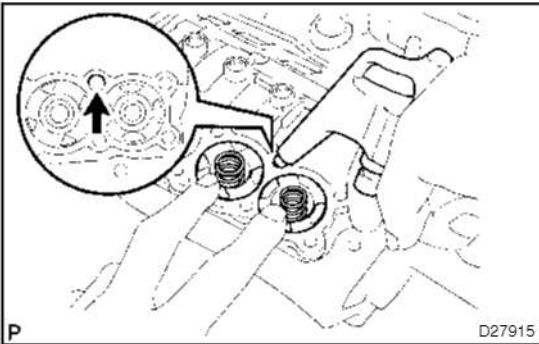
- (a) Remove the 3 transaxle case gaskets.

**21. REMOVE BRAKE DRUM GASKET**

- (a) Remove the 3 brake drum gaskets.

**22. REMOVE CHECK BALL BODY**

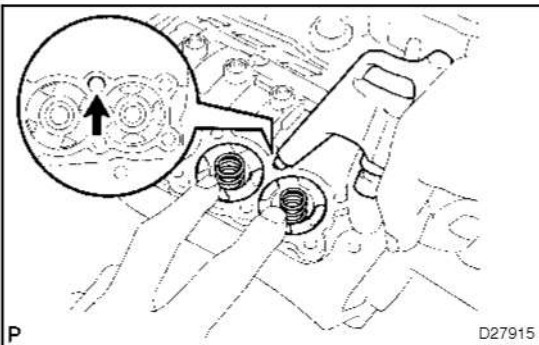
- (a) Remove the check ball body and the spring.

**23. REMOVE C-2 ACCUMULATOR PISTON**

- (a) Applying compressed air to the oil hole, remove the C₂ accumulator piston and the spring.
 (b) Remove the 2 O-rings from the piston.

NOTICE:

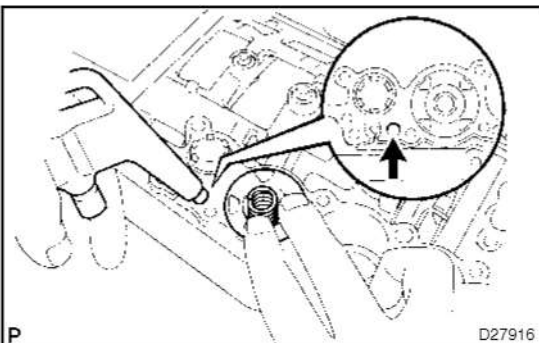
Take care as the C₃ and B₃ accumulator piston may jump out.

**24. REMOVE B-3 ACCUMULATOR PISTON**

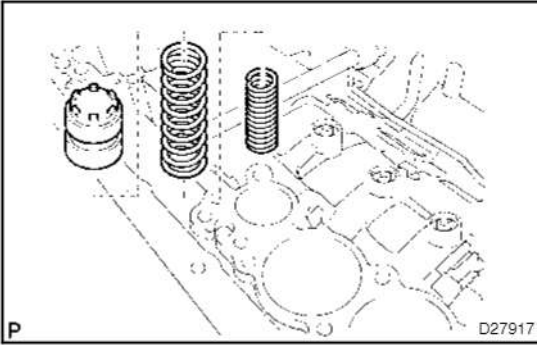
- (a) Applying compressed air to the oil hole, remove the B₃ accumulator piston and the spring.
 (b) Remove the 2 O-rings from the piston.

NOTICE:

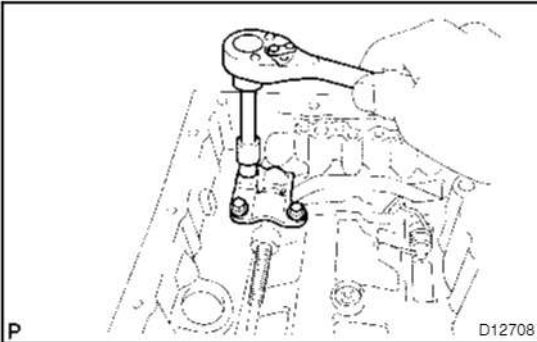
Take care as the C₃ accumulator piston may jump out.

**25. REMOVE C-3 ACCUMULATOR PISTON**

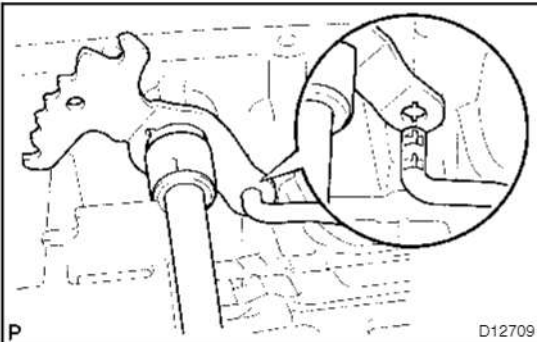
- (a) Applying compressed air to the oil hole, remove the C₃ accumulator piston and the 2 springs.
 (b) Remove the 2 O-rings from the piston.

**26. REMOVE C-1 ACCUMULATOR VALVE**

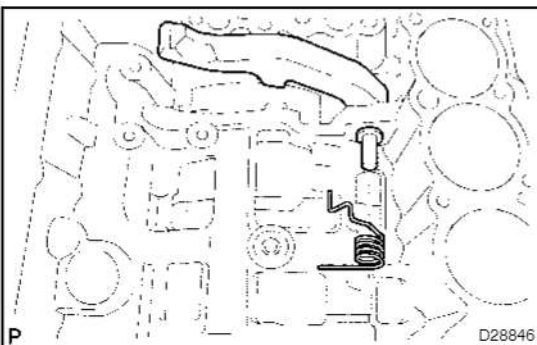
- (a) Remove the C₁ accumulator valve and the 2 springs.

**27. REMOVE PARKING LOCK PAWL BRACKET**

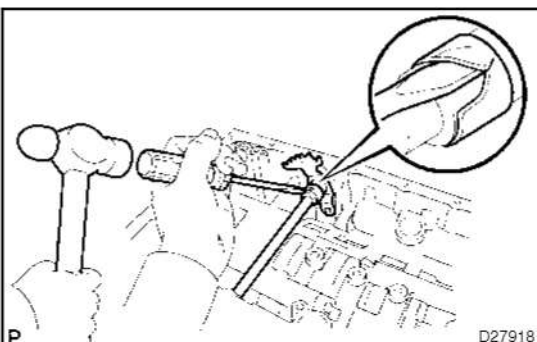
- (a) Remove the 3 bolts and the parking lock pawl bracket.

**28. REMOVE PARKING LOCK ROD SUB-ASSY**

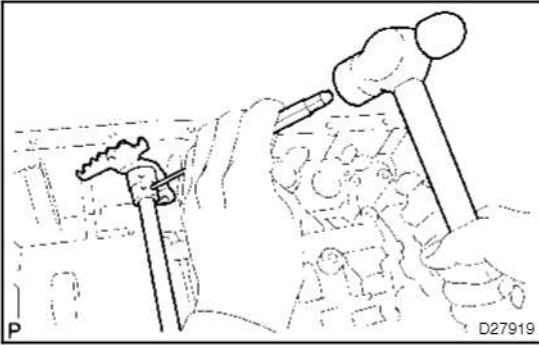
- (a) Disconnect the parking lock rod from the manual valve lever.

**29. REMOVE PARKING LOCK PAWL SHAFT**

- (a) Pull out the parking lock pawl shaft from the front side, then remove the lock pawl and the spring.
 (b) Remove the E-ring from the shaft.

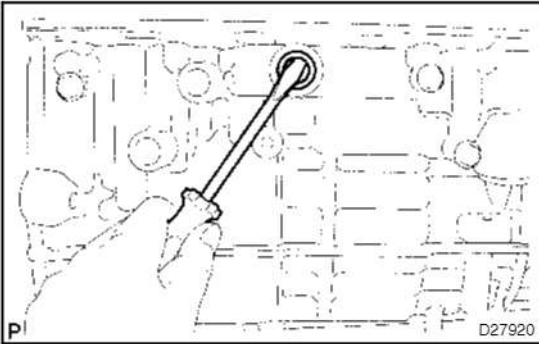
**30. REMOVE MANUAL VALVE LEVER SUB-ASSY**

- (a) Using a hammer and a screwdriver, cut off the spacer and remove it from the shaft.



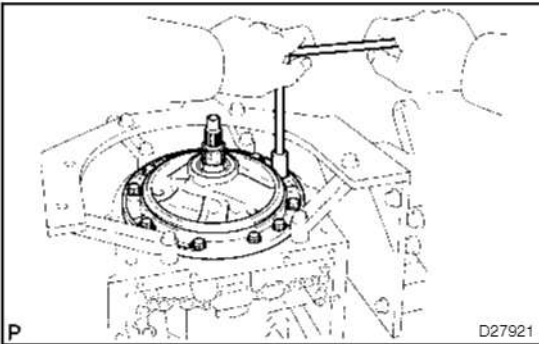
(b) Using a pin punch and a hammer, drive out the spring pin.
HINT:
Slowly drive out the spring pin so that it does not fall into the transmission case.

(c) Pull the manual valve lever shaft out through the case, and remove the manual valve lever.



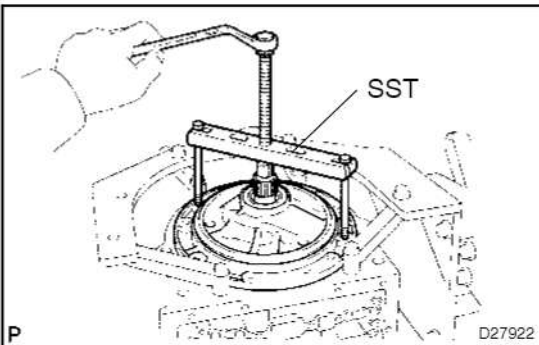
31. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, remove the 2 oil seals.

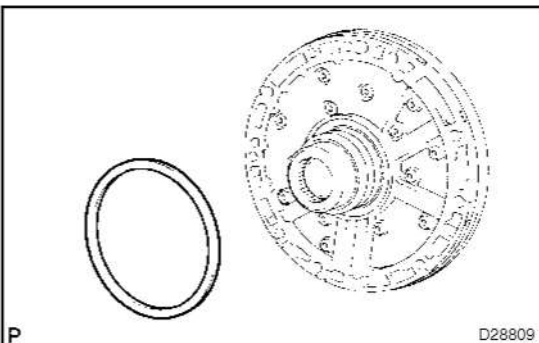


32. REMOVE OIL PUMP ASSY

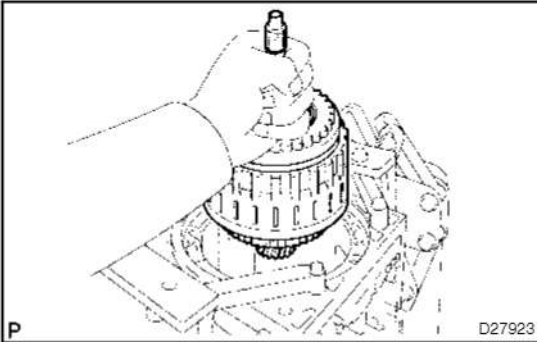
(a) Remove the 10 bolts holding the oil pump from the transmission case.



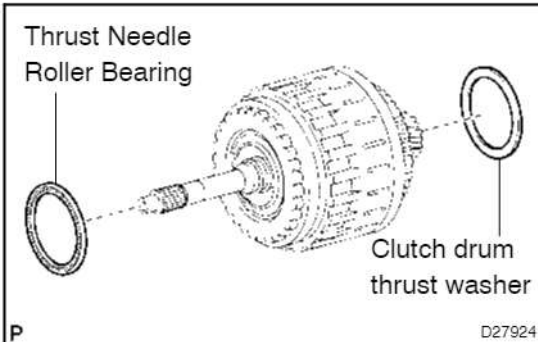
(b) Using SST, remove the oil pump.
SST 09350-30020 (09350-07020)



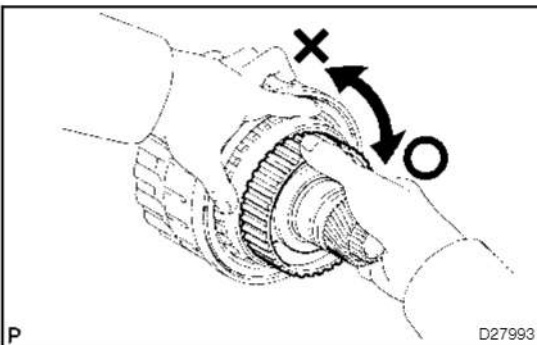
(c) Remove the thrust bearing race No.1 from the front oil pump.

**33. REMOVE CLUTCH DRUM & INPUT SHAFT ASSY**

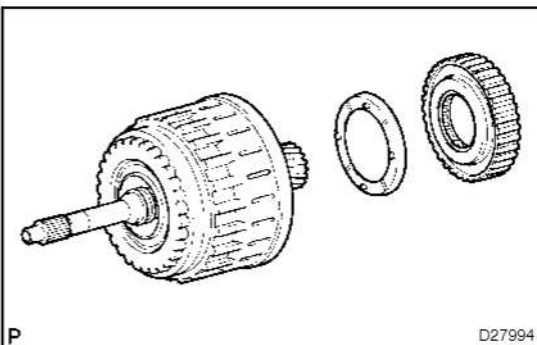
- (a) Remove the clutch drum & input shaft drum assy from the transmission case.



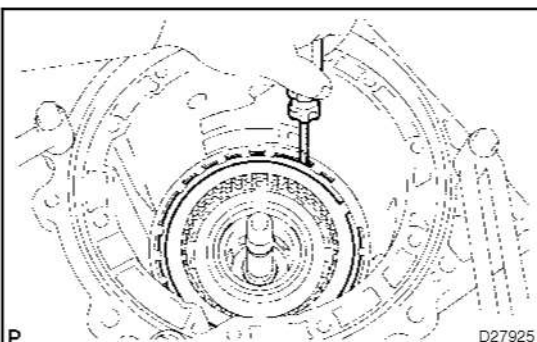
- (b) Remove the clutch drum thrust washer and the thrust needle roller bearing.

**34. INSPECT 1 WAY NO.2 CLUTCH ASSY**

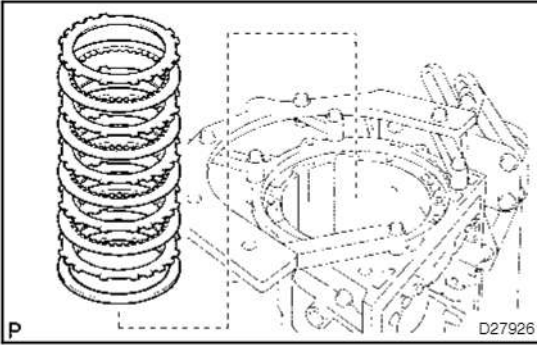
- (a) Hold the Reverse clutch hub and turn the 1 Way clutch assy No.2.
- (b) The 1 Way clutch assy No.2 turns freely clockwise and locks counterclockwise.

**35. REMOVE 1 WAY NO.2 CLUTCH ASSY**

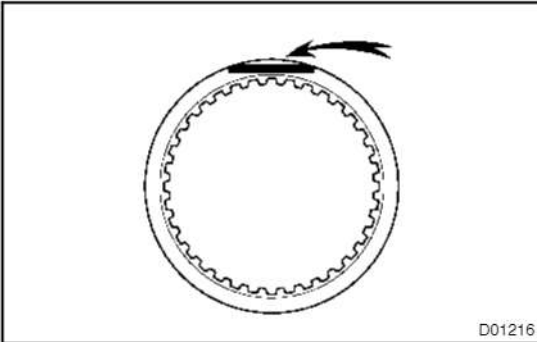
- (a) Remove the 1 Way clutch assy No.2 and clutch drum thrust washer No.2 from the clutch drum and input shaft assy.

**36. REMOVE BRAKE NO.3 SNAP RING**

- (a) Using a screwdriver, remove the brake No.3 snap ring from the case.

**37. REMOVE BRAKE DISC NO.3**

- (a) Remove the flange and cushion plate the 4 discs and the 4 plates from the case.

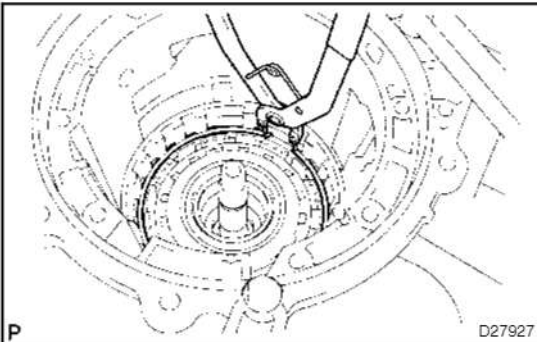
**38. INSPECT BRAKE DISC NO.3**

- (a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt.

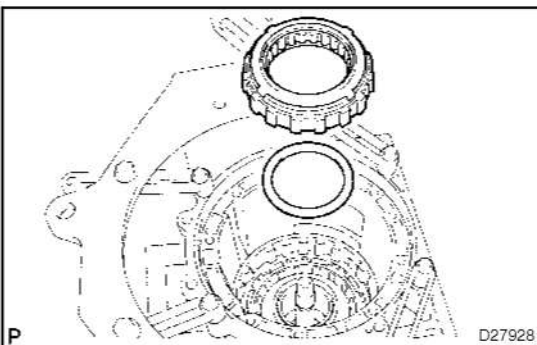
If necessary, replace them.

NOTICE:

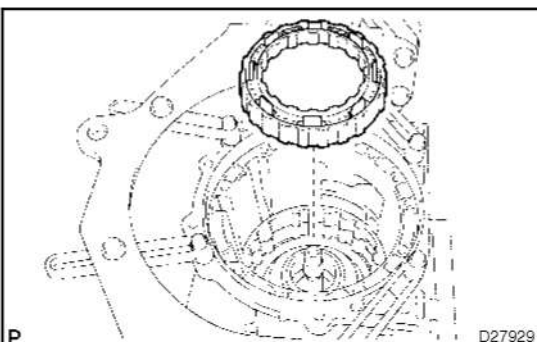
- If the lining of the disc is peeled off or discolored, or even if only a part of the print numbers is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

**39. REMOVE 2ND BRAKE PISTON HOLE SNAP RING**

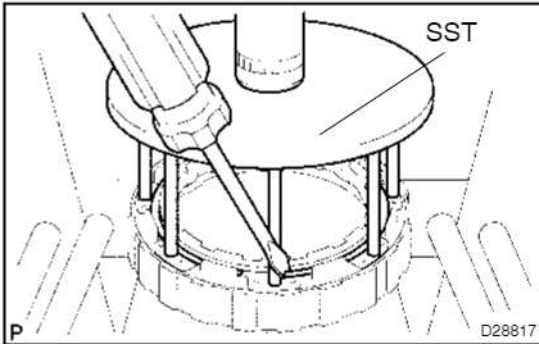
- (a) Using SST, remove the snap ring.
SST 09350-30020 (09350-07060)

**40. REMOVE 1 WAY CLUTCH ASSY**

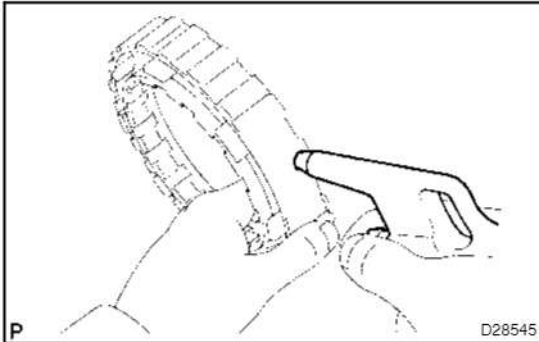
- (a) Remove the 1 way clutch assy and the planetary carrier thrust washer No.1 from the case.

**41. REMOVE 2ND BRAKE CYLINDER**

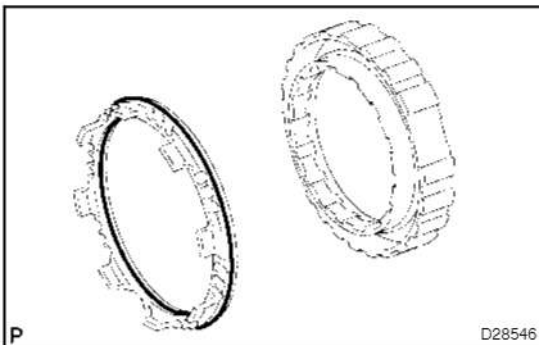
- (a) Remove the 2nd brake cylinder from the case.

**42. REMOVE 2ND BRAKE PISTON**

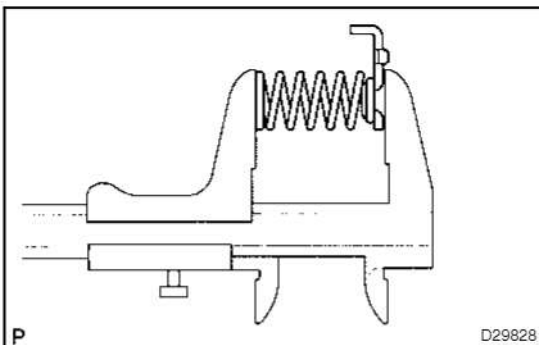
- (a) Using SST and a press, remove the snapring.
SST 09351-40010



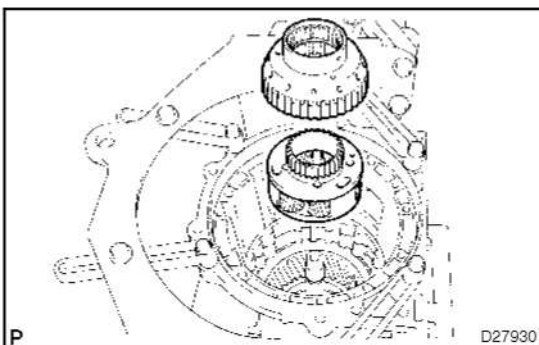
- (b) Hold the 2nd brake piston and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the 2nd brake cylinder to remove the 2nd brake piston.



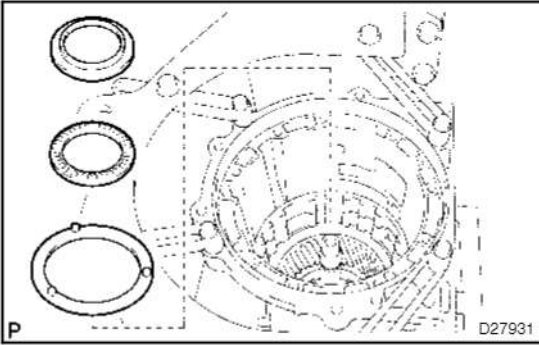
- (c) Remove the 2 O-rings from the 2nd brake piston.

**43. INSPECT BRAKE PISTON RETURN SPRING SUB-ASSYNO.3**

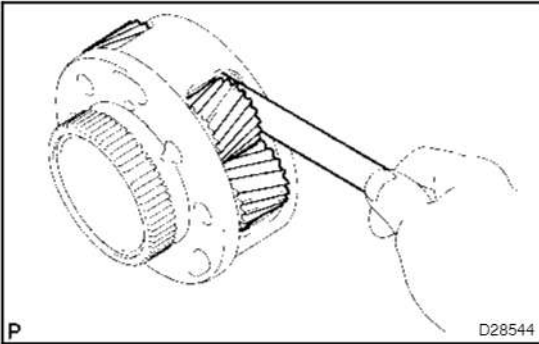
- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 15.72 mm (0.619 in.)

**44. REMOVE FRONT PLANETARY GEAR ASSY**

- (a) Remove the front planetary gear assy and the 1 way clutch inner race from the case.



- (b) Remove the thrust needle roller bearing, the thrust bearing race No.3 and the planetary carrier thrust washer No.2 from the front planetary gear assy.



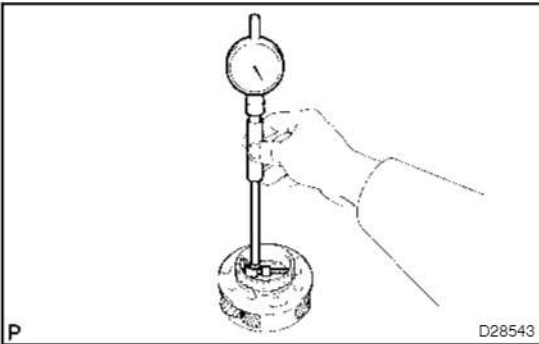
45. INSPECT FRONT PLANETARY GEAR ASSY

- (a) Using a feeler gauge, measure the front planetary pinion gear thrust clearance.

Standard clearance: 0.20 - 0.60 mm (0.008 - 0.024 in.)

Maximum clearance: 0.65 mm (0.026 in.)

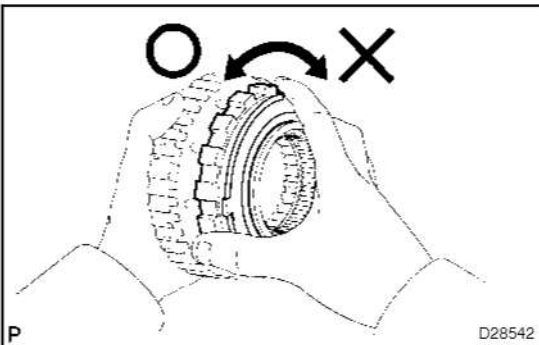
If the clearance is greater than the maximum, replace the front planetary gear assembly.



- (b) Using a dial indicator, measure the inside diameter of the front planetary gear bushing.

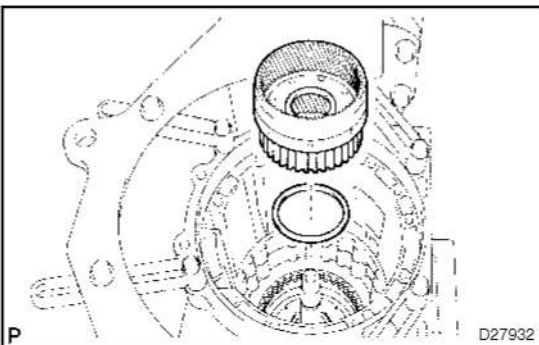
Maximum inside diameter: 57.48 mm (2.263 in.)

If the inside diameter is greater than the maximum, replace the front planetary gear.



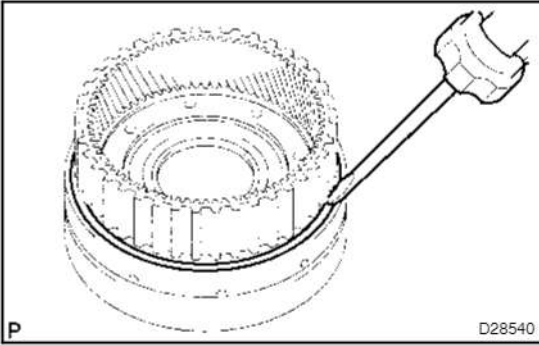
46. INSPECT 1 WAY CLUTCH ASSY

- (a) Install the 1 way clutch assy to 1 way clutch inner race.
 (b) Hold the 1 way clutch inner race and turn the 1 way clutch assy.
 (c) Check that the 1 way clutch assy turns freely counter-clockwise and locks clockwise.
 (d) Remove the 1 way clutch assy from 1 way clutch inner race.

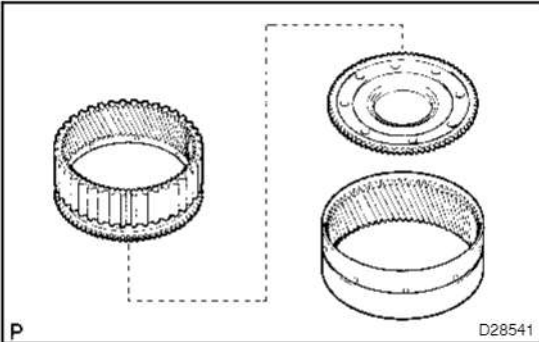


47. REMOVE FRONT PLANETARY RING GEAR

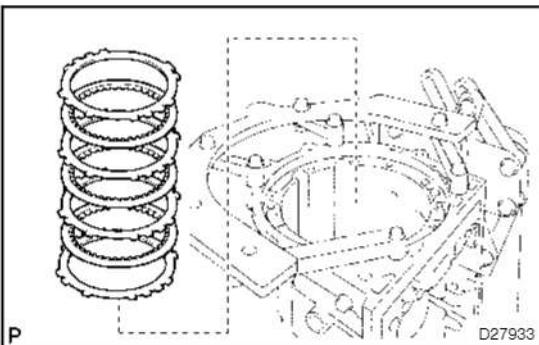
- (a) Remove the front planetary ring gear and the bearing from the transmission case.

**48. REMOVE CTR PLANETARY RING GEAR**

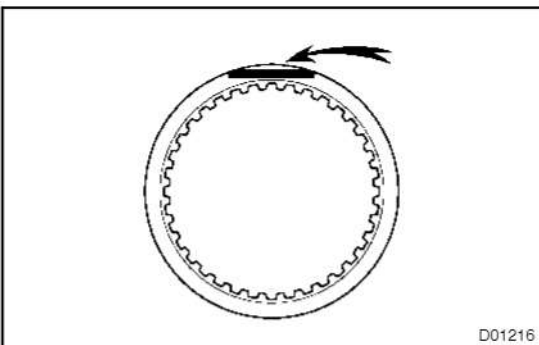
- (a) Using a screwdriver, remove the snap ring.



- (b) Remove the CTR planetary ring gear and the front planetary ring gear flange from the front planetary ring gear.

**49. REMOVE BRAKE DISC NO.1**

- (a) Remove the flange, the 3 discs and the 3 plates from the case.

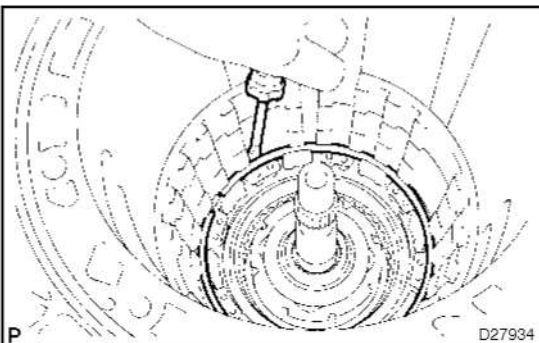
**50. INSPECT BRAKE DISC NO.1**

- (a) Check whether if the sliding surface of the disc, the plate and the flange are worn or burnt.

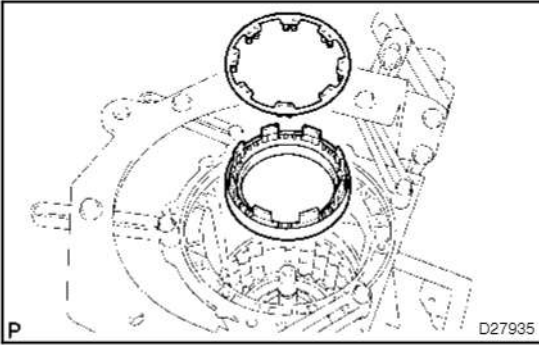
If necessary, replace them.

NOTICE:

- If the lining of the disc is peeled off or discolors, or even if a part of the groove is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

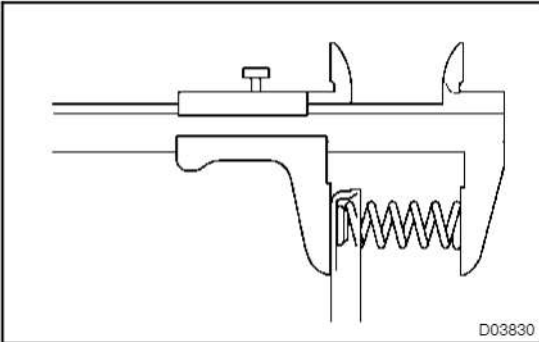
**51. REMOVE BRAKE PISTON RETURN SPRING SNAP RING**

- (a) Using a screwdriver, remove the brake piston return spring snap ring from the case.



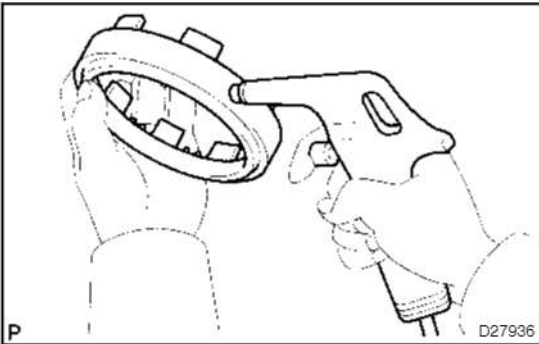
52. REMOVE BRAKE PISTON RETURN SPRING SUB-ASSY

- (a) Remove the brake piston return spring and the brake piston No.1 with the brake cylinder No.1 from the transmission case.



53. INSPECT BRAKE PISTON RETURN SPRING SUB-ASSY

- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 17.05 mm (0.671 in.)



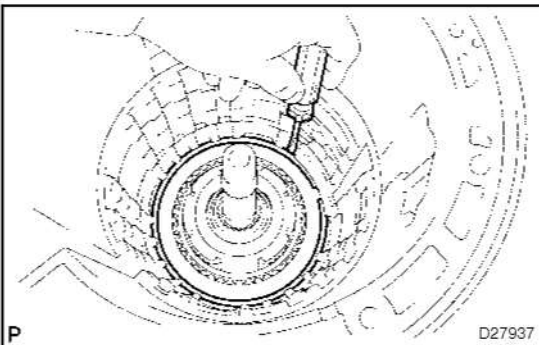
54. REMOVE BRAKE PISTON NO.1

- (a) Hold the brake piston No.1 and apply compressed air (392 kPa, 4 kgf/cm², 57 psi) to the transmission case to remove the brake piston No. 1.

HINT:

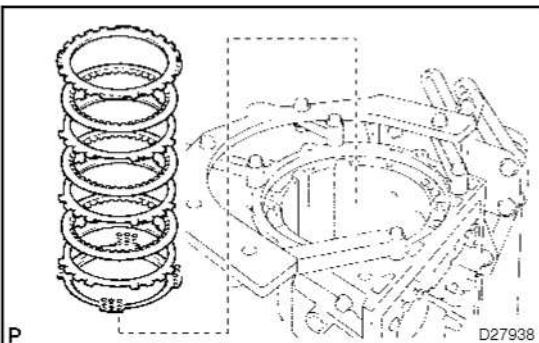
If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

- (b) Remove the 2 O-rings from the brake piston No. 1.

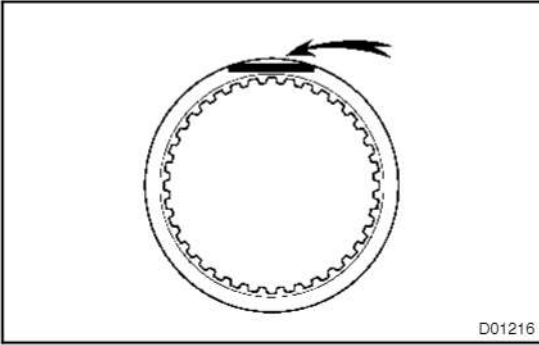


55. REMOVE BRAKE DISC NO.2

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



- (b) Remove the flange, the brake piston return spring, the 3 discs and the 3 plates from the case.

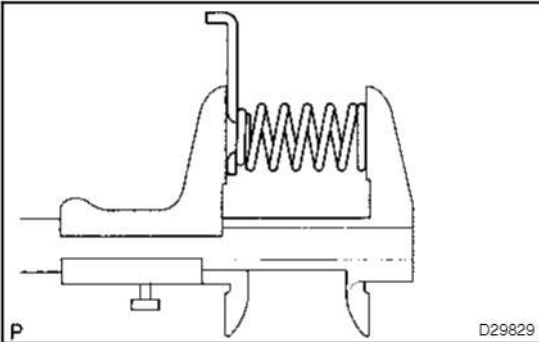
**56. INSPECT BRAKE DISC NO.2**

- (a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt.

If necessary, replace them.

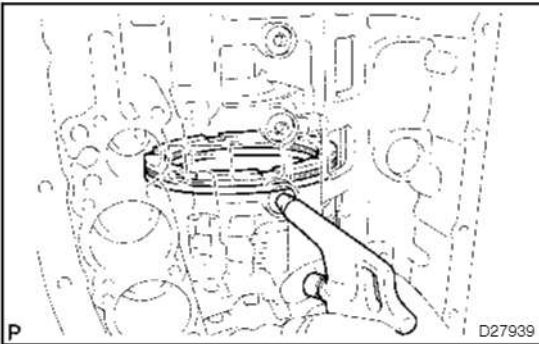
NOTICE:

- If the lining of the disc is peeled off or discolor, or even if only a part of the print numbers is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

**57. INSPECT BRAKE PISTON RETURN SPRING SUB-ASSYNO.2**

- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 17.45 mm (0.687 in.)

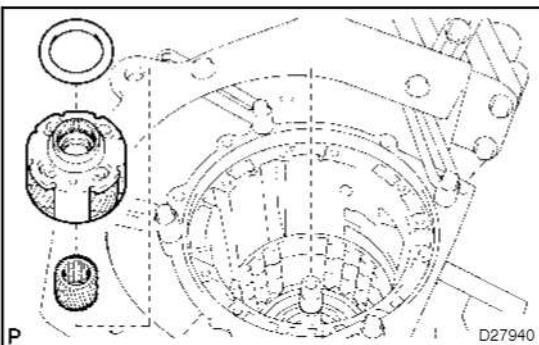
**58. REMOVE BRAKE PISTON NO.2**

- (a) Hold the brake piston No.2 and apply compressed air (392 kPa, 4 kgf/cm², 57 psi) to the transmission case to remove the brake piston No. 2.

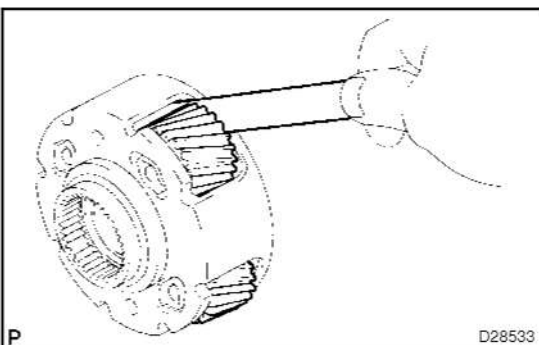
HINT:

If the piston dose not pop out with compressed air, lift the piston out with needle-nose pliers.

- (b) Remove the 2 O-rings from the brake piston No. 2.

**59. REMOVE CTR PLANETARY GEAR ASSY**

- (a) Remove the CTR planetary gear assy, the planetary sun gear and the thrust bearing race No.4 from the case.

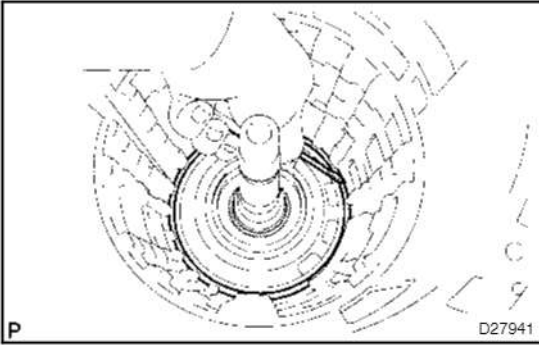
**60. INSPECT CTR PLANETARY GEAR ASSY**

- (a) Using a feeler gauge, measure the CTR planetary gear pinion thrust clearance.

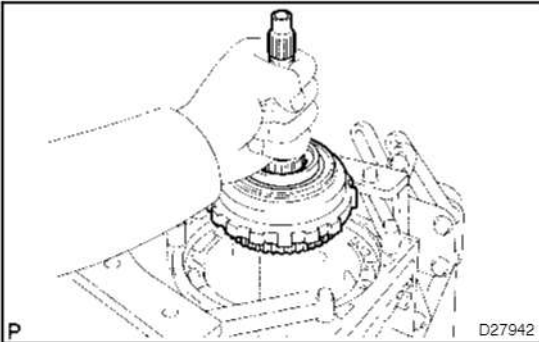
Standard clearance: 0.12 – 0.68 mm (0.005 – 0.027 in.)

Maximum clearance: 0.73 mm (0.029 in.)

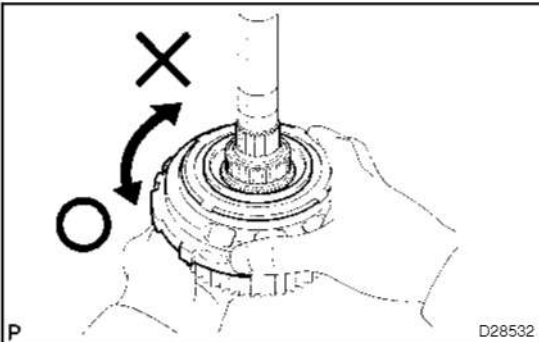
If the clearance is greater than the maximum, replace the CTR planetary gear assy.

**61. REMOVE INTERMEDIATE SHAFT**

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

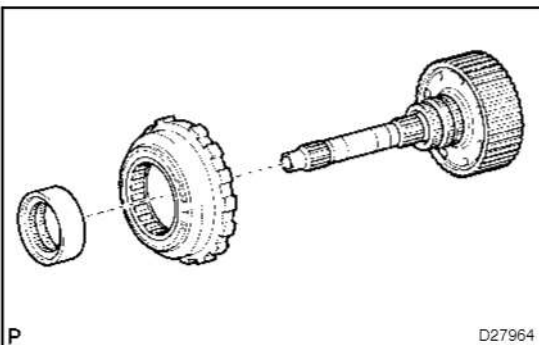


(b) Remove the intermediate shaft with the 1 way clutch assy No.3 from the case.

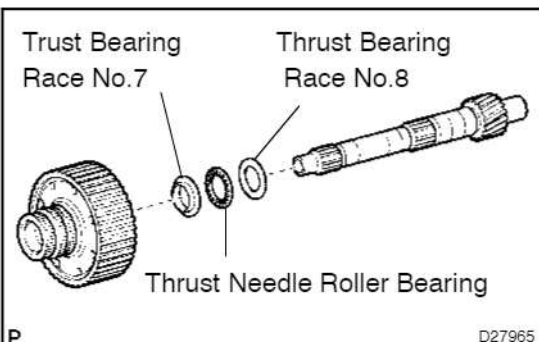
**62. INSPECT 1WAY NO.3 CLUTCH ASSY**

(a) Hold the RR planetary ring gear flange sub assy and turn the 1 way clutch assy.

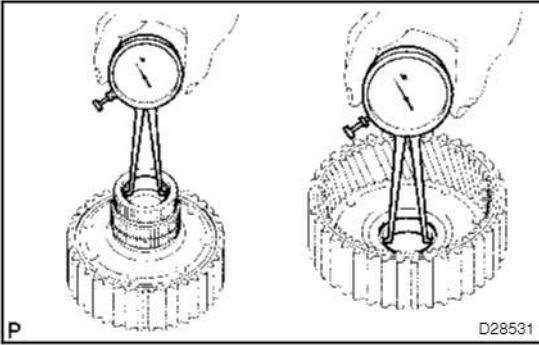
(b) Check that the 1 way clutch assy turns freely counter-clockwise and locks clockwise .

**63. REMOVE 1WAY NO.3 CLUTCH ASSY**

(a) Remove the 1way clutch assy No.3 and the 1way clutch inner race from the intermediate shaft.

**64. REMOVE RR PLANETARY RING GEAR FLANGE SUB-ASSY**

(a) Remove the thrust bearing race No.8, the thrust needle rollerbearing, the thrust bearing race No.7 and the planetary ring gear flange from the intermediate shaft.

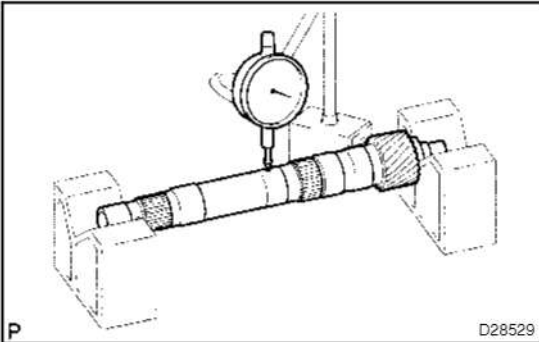


65. INSPECT RR PLANETARY RING GEAR FLANGE SUB-ASSY

- (a) Using a dial indicator, measure the inside diameter of the RR planetary ring gear bushing.

Maximum inside diameter: 32.175 mm (1.267 in.)

If the inside diameter is greater than the maximum, replace the RR planetary ring gear.



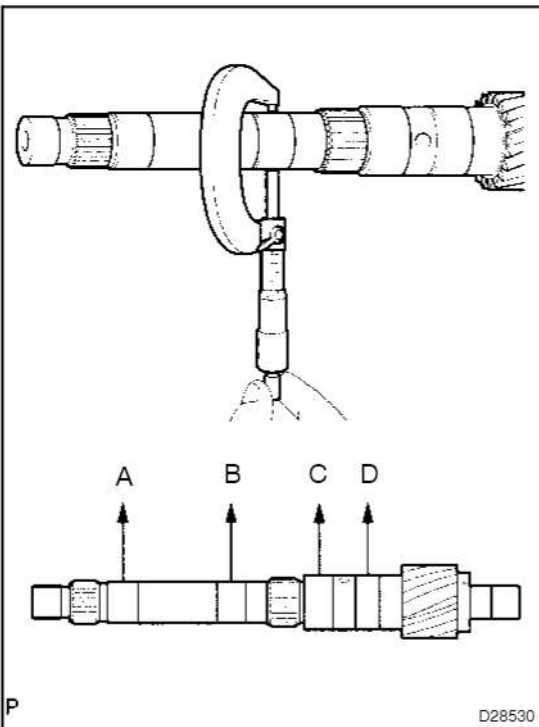
66. INSPECT INTERMEDIATE SHAFT

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

Maximum runout: 0.08 mm (0.003 in.)

NOTICE:

If the bend exceeds the specification, replace the intermediate shaft with a new one.



- (b) Using a micrometer, check the outer diameter of the intermediate shaft positions shown in the diagram.

Standard diameter:

A: 25.962 – 25.975 mm (1.022 – 1.023 in.)

B: 25.962 – 25.975 mm (1.022 – 1.023 in.)

C: 32.062 – 32.075 mm (1.262 – 1.263 in.)

D: 32.062 – 32.075 mm (1.262 – 1.263 in.)

Minimum diameter:

A: 25.912 mm (1.020 in.)

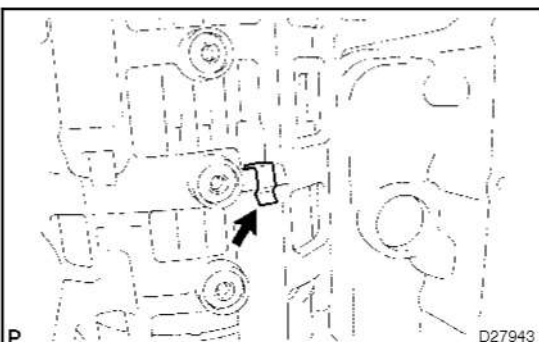
B: 25.912 mm (1.020 in.)

C: 32.012 mm (1.260 in.)

D: 32.012 mm (1.260 in.)

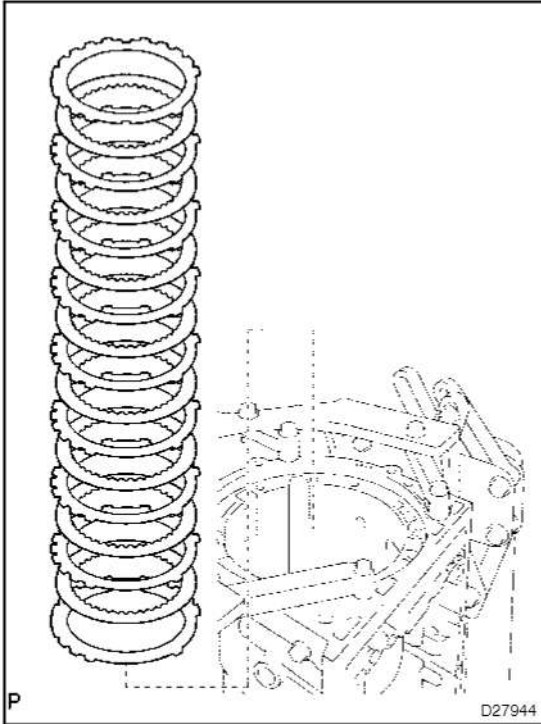
NOTICE:

If the outer diameter is outside the standard, replace the intermediate shaft with the new one.

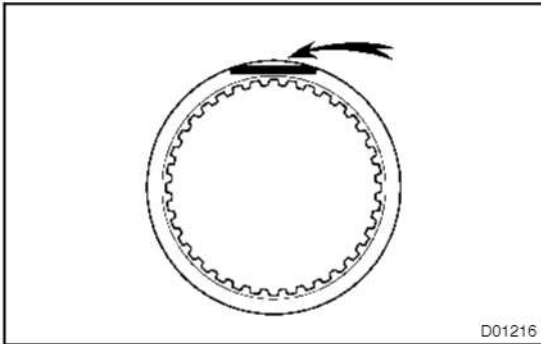


67. REMOVE BRAKE PLATE STOPPER SPRING

- (a) Remove the brake plate stopper spring from the case.

**68. REMOVE BRAKE DISC NO.4**

- (a) Remove the 7 plates, the 8 discs and the 2 flanges from the case.

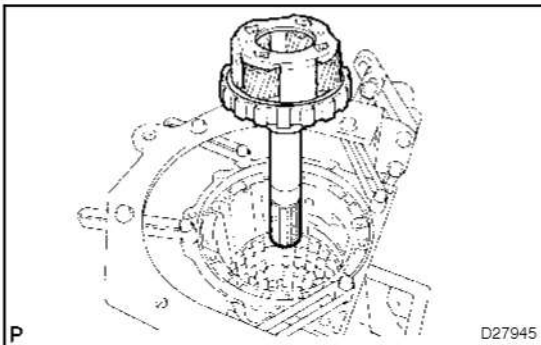
**69. INSPECT BRAKE DISC NO.4**

- (a) Check whether if the sliding surface of the disc, the plate and the flange are worn or burnt.

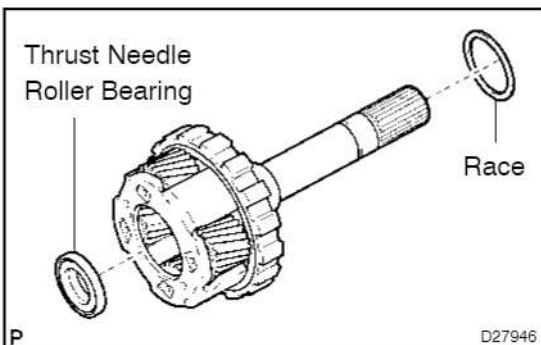
If necessary, replace them.

NOTICE:

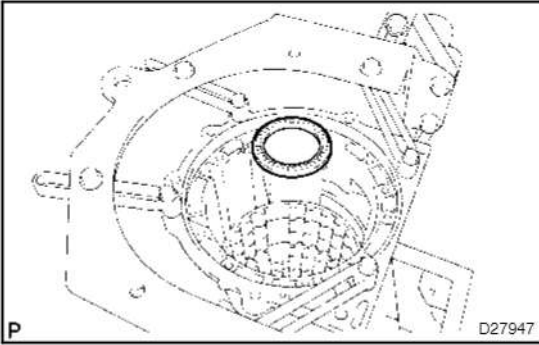
- If the lining of the disc is peeled off or discolor, or even if only a part of the print numbers is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

**70. REMOVE REAR PLANETARY GEAR ASSY**

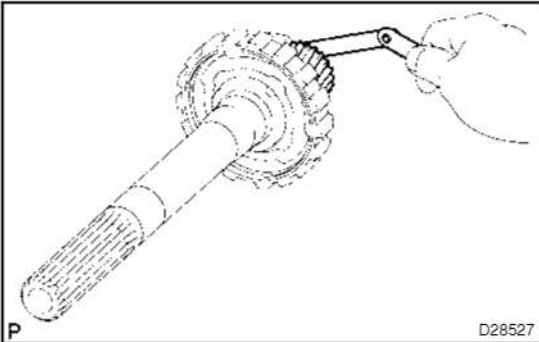
- (a) Remove the rear planetary gear assy from the case.



- (b) Remove the thrust bearing race No.9 and the thrust needle roller bearing from the rear planetary gear assy.



- (c) Remove the thrust needle roller bearing from the case.



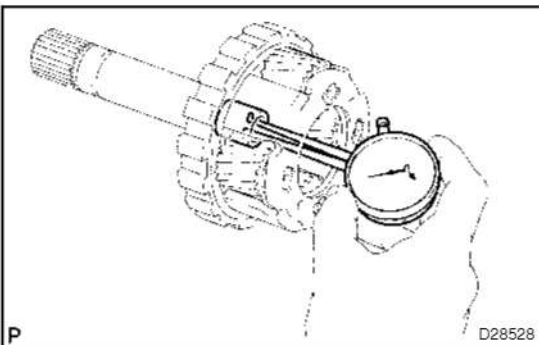
71. INSPECT REAR PLANETARY GEAR ASSY

- (a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance: 0.2 – 0.6 mm (0.008 – 0.024 in.)

Maximum clearance: 0.65 mm (0.026 in.)

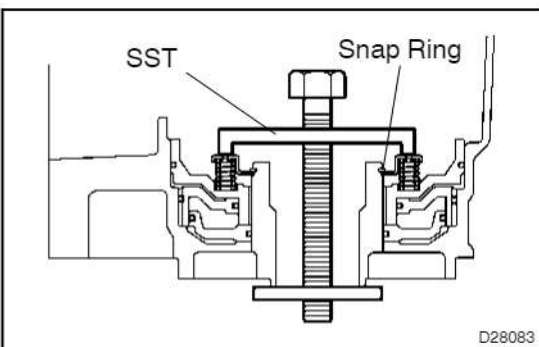
If the clearance is greater than the maximum, replace the planetary gear assy.



- (b) Using a dial indicator, measure the inside diameter of the rear planetary gear bushing.

Maximum inside diameter: 20.075 mm (0.790 in.)

If the inside diameter is greater than the maximum, replace the rear planetary gear assy.



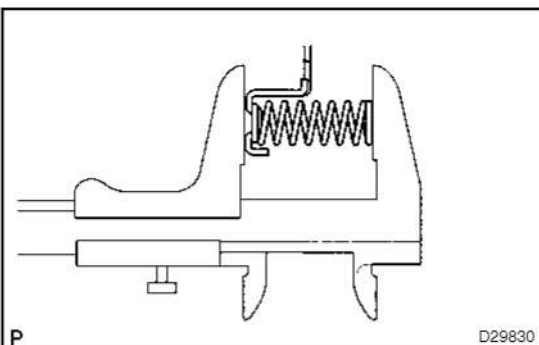
72. REMOVE 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

- (a) Place SST on the spring retainer and compress the brake return spring.

SST 09350-30020 (09350-07050)

- (b) Using SST, remove the snap ring and the brake return spring.

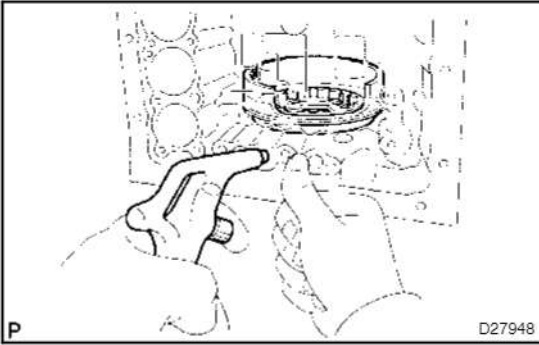
SST 09350-30020 (09350-07070)



73. INSPECT 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 23.74 mm (0.935 in.)

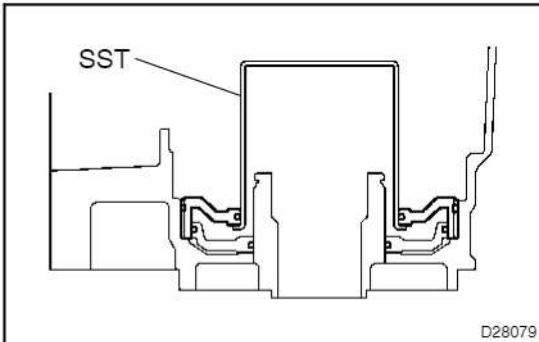
**74. REMOVE 1ST & REVERSE BRAKE PISTON**

- (a) Hold the No.2 brake piston and apply compressed air (392 kPa, 4 kgf/cm², 57 psi) to the transmission case to remove the brake piston No. 2.

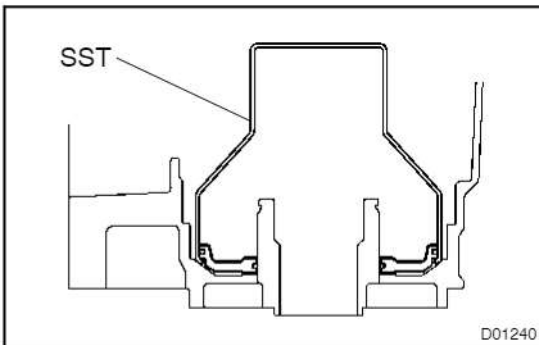
HINT:

If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

- (b) Remove the O-ring from brake piston No. 2.

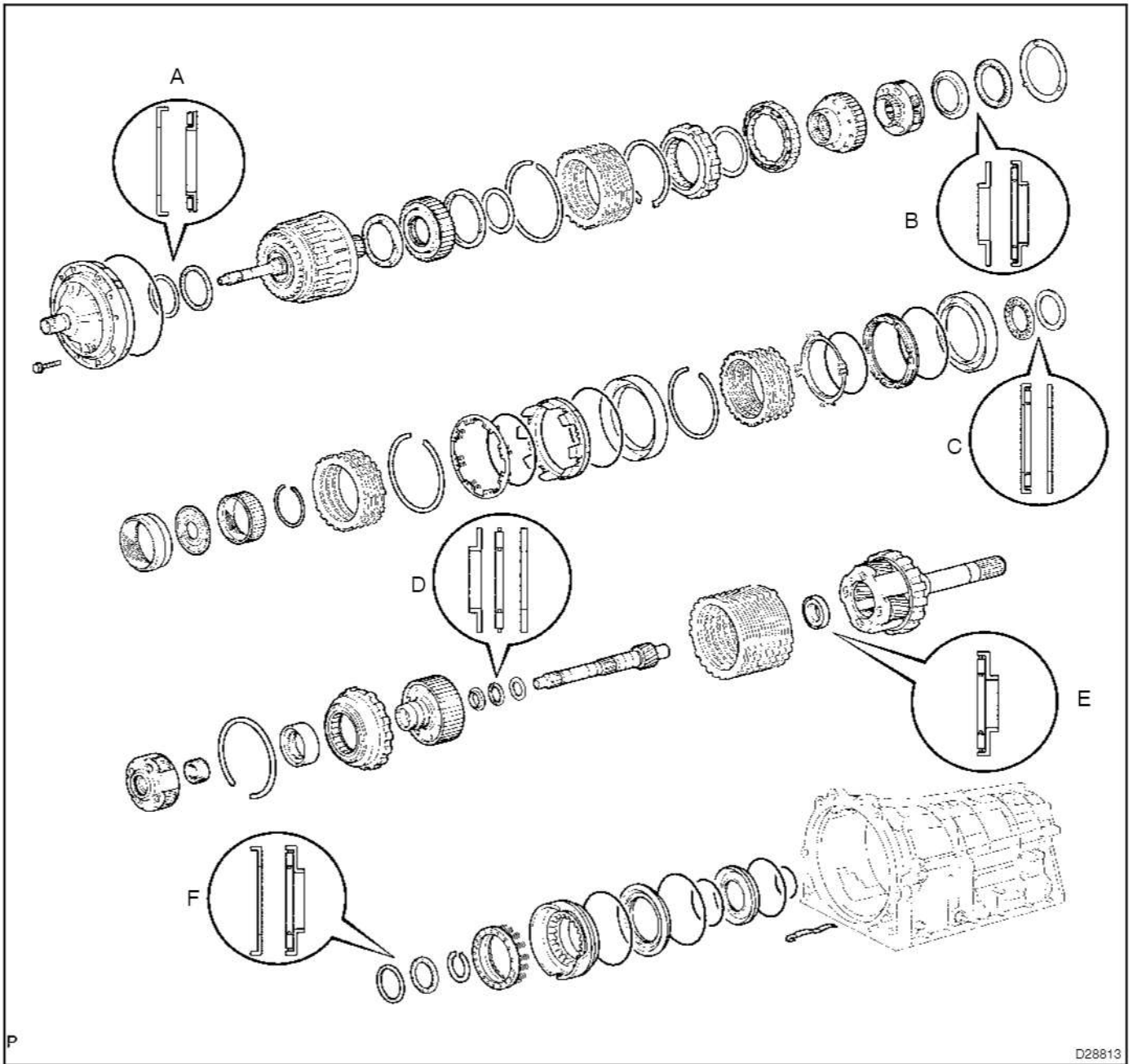
**75. REMOVE BRAKE REACTION SLEEVE**

- (a) Using SST, remove the reaction sleeve.
SST 09350-30020 (09350-07080)
- (b) Remove the O-ring from the reaction sleeve.

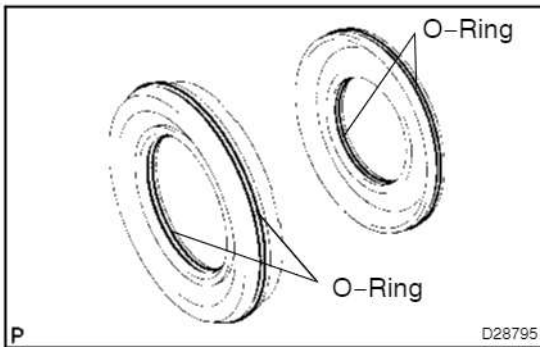
**76. REMOVE BRAKE PISTON NO.4**

- (a) Using SST, remove the brake piston No. 2.
SST 09350-30020 (09350-07090)
- (b) Remove the 2 O-rings from the piston No. 2.

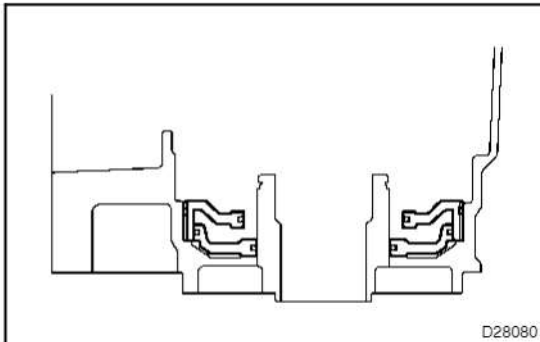
77. BEARING POSITION



Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	73.6 (2.898) / 102.0 (4.016)	71.9 (2.831) / 85.6 (3.370)	-
B	38.0 (1.496) / 57.0 (2.244)	43.4 (1.709) / 58.3 (2.295)	-
C	-	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
D	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
E	-	21.5 (0.847) / 40.8 (1.606)	-
F	48.5 (1.909) / 62.7 (2.469)	45.9 (1.807) / 64.0 (2.520)	-

**78. INSTALL BRAKE PISTON NO.4**

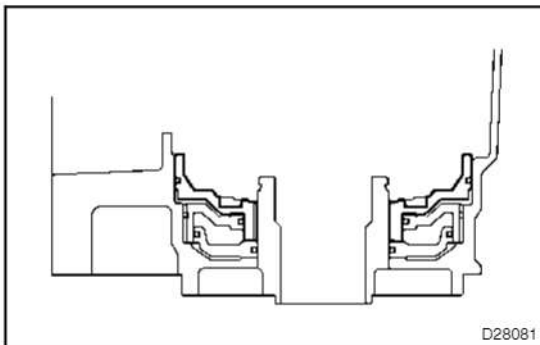
- (a) Coat 2 new O-rings with ATF, and install them to the brake reaction sleeve.
- (b) Coat 2 new O-rings with ATF, and install them to the brake piston No. 4.
- (c) Install the brake piston No. 4 to the reaction sleeve.

**79. INSTALL BRAKE REACTION SLEEVE**

- (a) Coat new O-ring with ATF, and install it to the reaction sleeve.
- (b) With the brake piston No.1 underneath (the rear side), install the brake reaction sleeve and the brake piston No.1 to the transmission case.

NOTICE:

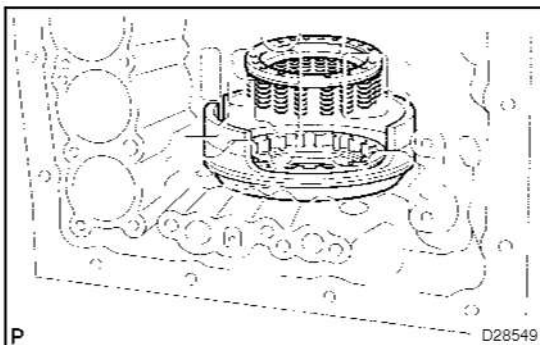
Be careful not to damage the O-rings.

**80. INSTALL 1ST & REVERSE BRAKE PISTON**

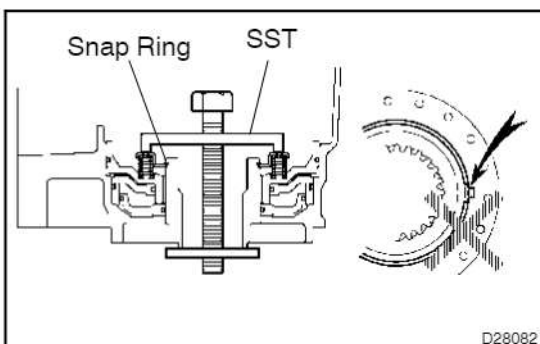
- (a) Coat a new O-ring with ATF.
- (b) Install the O-ring on the 1st & reverse brake piston .
- (c) With the spring seat of the piston facing upwards (the front side), place the piston in the transmission case.

NOTICE:

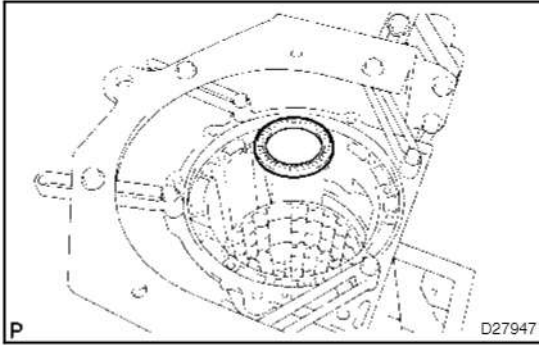
Be careful not to damage the O-ring.



- (d) Place the piston return spring onto the brake piston No.4.

**81. INSTALL 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY**

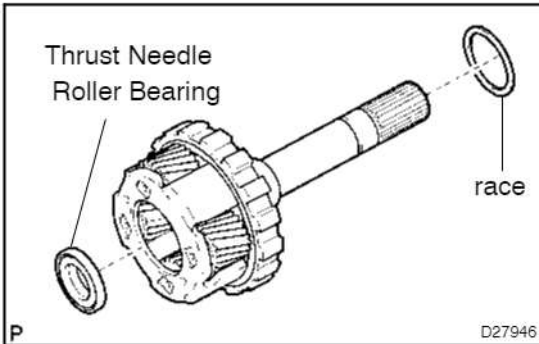
- (a) Place SST on the spring retainer, and compress the return spring.
SST 09350-30020 (09350-07050)
- (b) Using SST, install the snap ring.
SST 09350-30020 (09350-07070)

**82. INSTALL REAR PLANETARY GEAR ASSY**

(a) Install the thrust needle roller bearing.

Thrust needle roller bearing diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	45.9 (1.807)	64.0 (2.520)

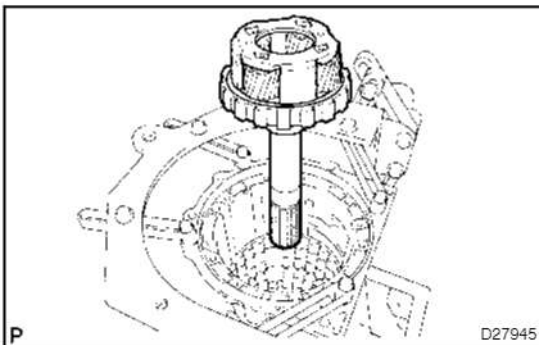


(b) Install the thrust needle roller bearing.

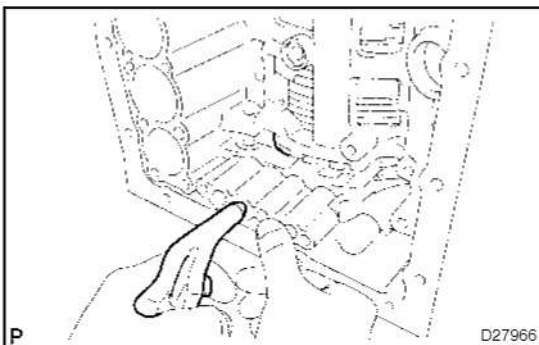
(c) Coat the thrust bearing race No.9 with petroleum jelly, and install it onto the rear planetary ring gear.

Bearing & race diameter: mm (in.)

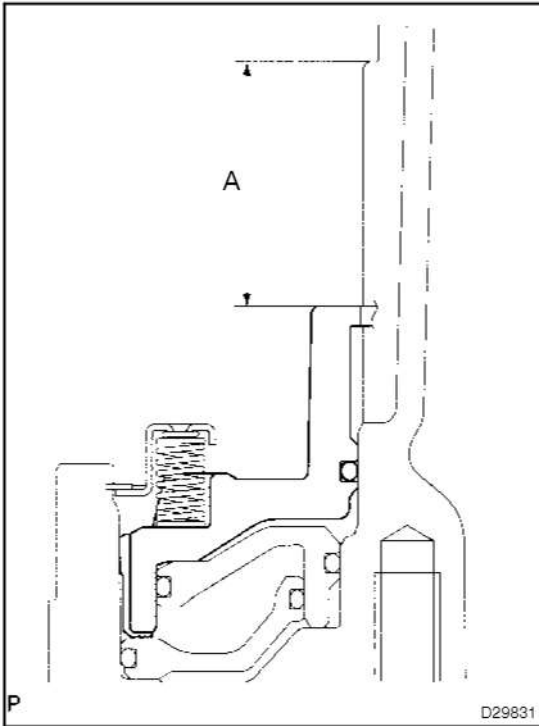
	Inside	Outside
Bearing	21.5 (0.847)	40.8 (1.606)
Race	48.5 (1.909)	62.7 (2.469)



(d) Install the rear planetary gear assy.

**83. INSPECT PACK CLEARANCE OF FIRST & REVERSE BRAKE**

(a) Make sure the 1st & reverse brake pistons move smoothly when applying and releasing the compressed air into the transmission case.



- (b) Using vernier calipers, measure the level difference (length A) between the upper surface of the 1st & reverse brake piston and the hitting surface of the brake flange No.4 at the both end across a diameter, and calculate the average.

NOTICE:

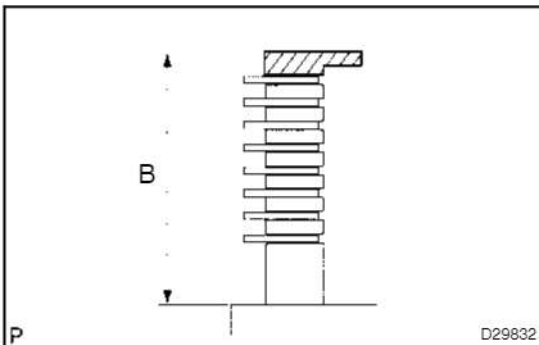
The 1st & reverse brake piston must be installed tightly to the end face of the transmission case.

HINT:

Length A = 36.35 – 37.09 mm

H thickness: mm (in.)

No.	Thickness	No.	Thickness
0	0 (0)	8	0.8 (0.03150)
2	0.2 (0.00787)	10	1.0 (0.03937)
4	0.4 (0.01575)	12	1.2 (0.04724)
6	0.6 (0.02362)	14	1.4 (0.05512)



- (c) Using vernier calipers, measure the thickness (length B) of the 2 brake flanges, the 7 brake plates No.4 and the 8 brake discs No.4 altogether at the both end across a diameter, and calculate the average.

Pack Clearance: 0.8 – 1.1 mm**HINT:**

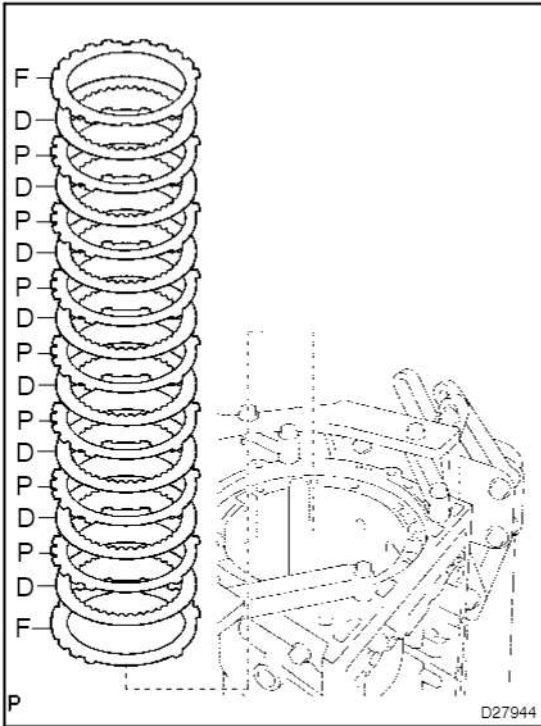
Pack Clearance = Length A – Length B – 0.25 – 1.8 mm

Length B = 36.04 – 37.14 mm

- (d) If the pack clearance is outside the standard, select & install a brake flange that makes the pack clearance to be within the standard.

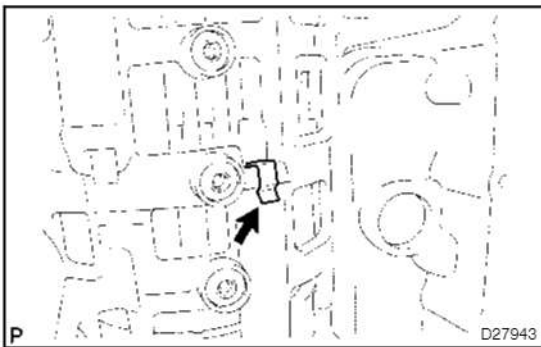
HINT:

Select the flange from 8 kinds (in thickness) of the selective flanges to adjust the pack clearance.



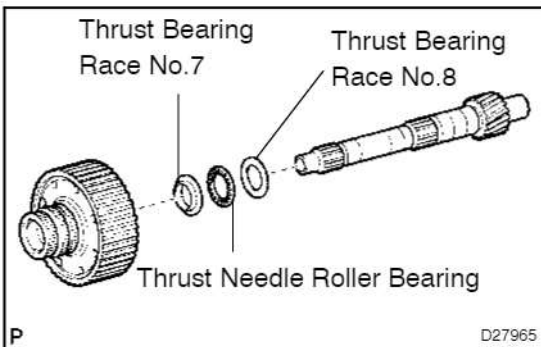
84. INSTALL BRAKE DISC NO.4

- (a) Install the 7 plates, the 8 discs and the 2 flanges.
Install in order: P = Plate, D = Disc, F = Flange
F - D - P - D - P - D - P - D - P - D - P - D - P - D - P - D - F



85. INSTALL BRAKE PLATE STOPPER SPRING

- (a) Install the brake plate stopper spring.

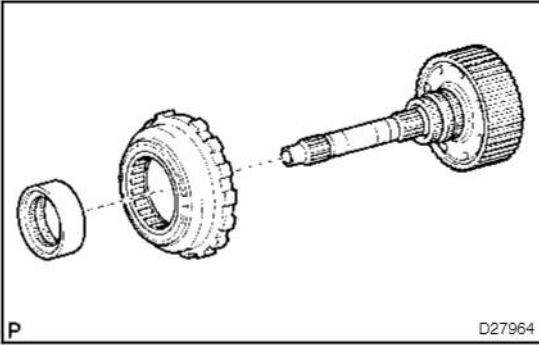


86. INSTALL RR PLANETARY RING GEAR FLANGE SUB-ASSY

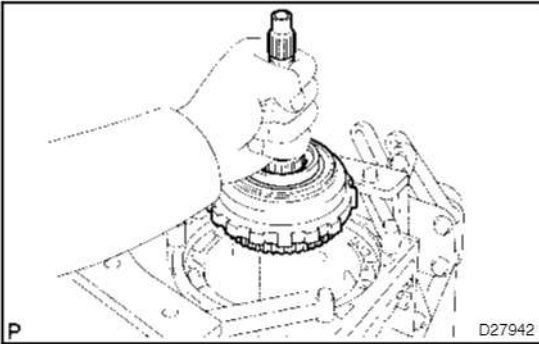
- (a) Install the thrust bearing race No.8, the thrust needle roller bearing, the thrust bearing race No. 7 and the planetary ring gear flange to the intermediate shaft.

Bearing and race diameter mm (in.)

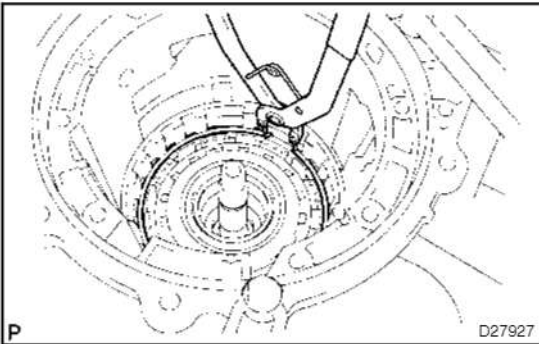
	Inside	Outside
Thrust bearing race No.7	33.4 (1.315)	49.0 (1.929)
Thrust needle roller bearing	32.1 (1.264)	49.35 (1.943)
Thrust bearing race No.8	32.1 (1.264)	49.0 (1.929)

**87. INSTALL 1WAY NO.3 CLUTCH ASSY**

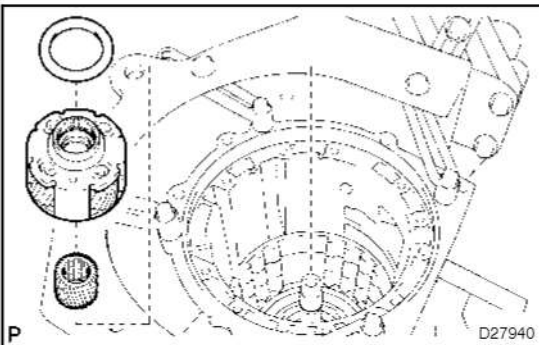
- (a) Install the 1way clutch assy No.3 and the 1 way clutch inner race to the intermediate shaft.

**88. INSTALL INTERMEDIATE SHAFT**

- (a) Install the intermediate shaft with the 1 way clutch assy No.3 to the case.



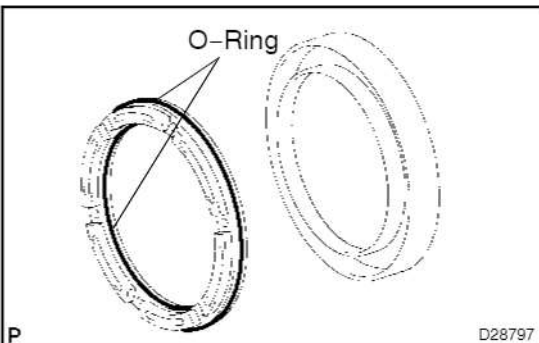
- (b) Using SST, install the snap ring.
SST 09350-30020 (09350-07050, 09350-07060)

**89. INSTALL CTR PLANETARY GEAR ASSY**

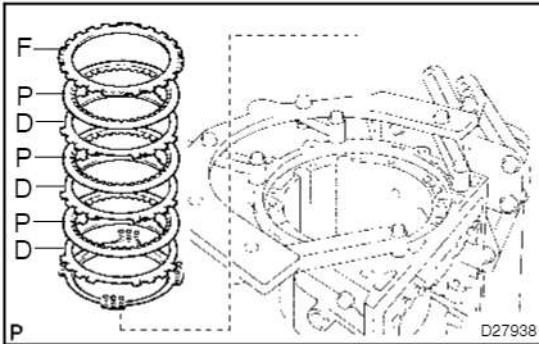
- (a) Install the center planetary gear assy and the planetary sun gear to the case.
(b) Coat the thrust bearing race with petroleum jelly, and install it onto the CTR planetary ring gear.

Race diameter: mm (in.)

	Inside	Outside
Race	53.7 (2.114)	74.0 (2.913)

**90. INSTALL BRAKE PISTON NO.2**

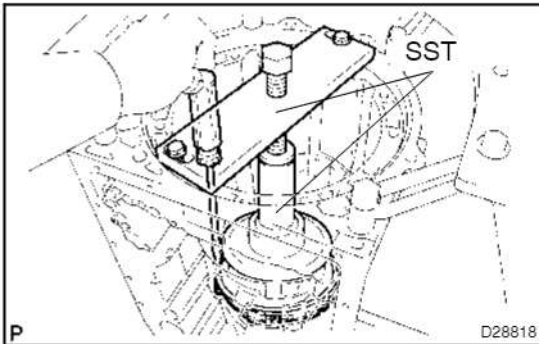
- (a) Coat 2 new O-rings with ATF, and install them to the brake piston No.2.
(b) Be careful not to damage the O-rings. Press the brake piston No.2 into the brake cylinder No.2 with both hands.
(c) Install the brake piston No.2 to the case.

**91. INSTALL BRAKE DISC NO.2**

- (a) Install the flange, the 3 plates, the 3 discs and the brake piston return spring.

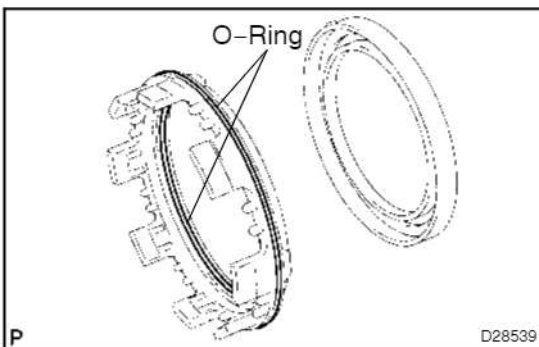
Install in order: P = Plate, D = Disc, F=Flange

F - P - D - P - D - P - D

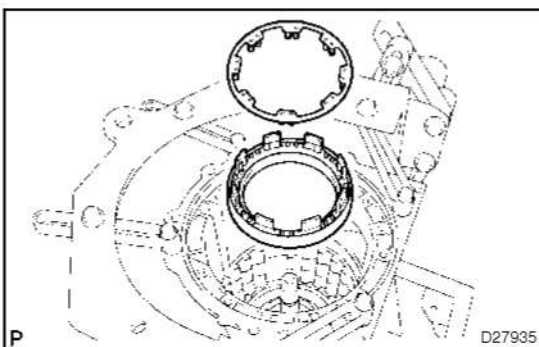


- (b) Using SST and press, install the brake No.2 spring snap ring.

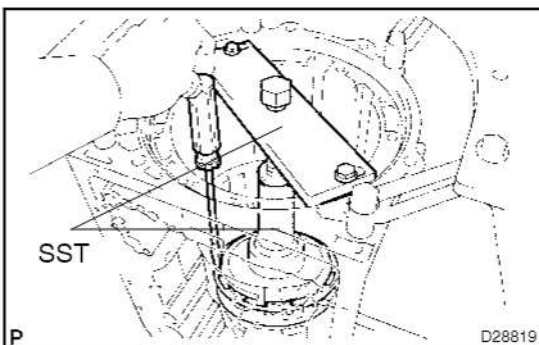
SST 09351-40010

**92. INSTALL BRAKE PISTON NO.1**

- (a) Coat 2 new O-rings with ATF, and install them on the brake piston No.1,
- (b) Be careful not to damage the O-rings. Press the brake piston No.1 into the brake cylinder No.1 with both hands.

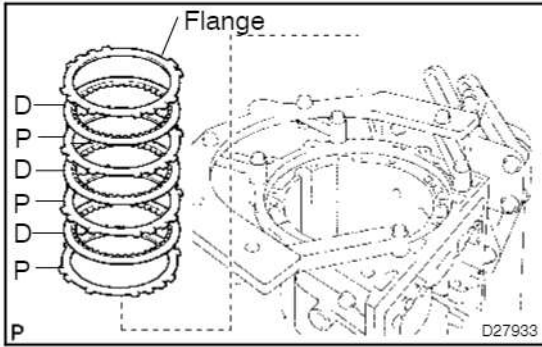
**93. INSTALL BRAKE PISTON RETURN SPRING SUB-ASSY**

- (a) Install the brake piston return spring and the brake piston No.1 with the brake cylinder No.1 on the transmission case.

**94. INSTALL BRAKE PISTON RETURN SPRING SNAP RING**

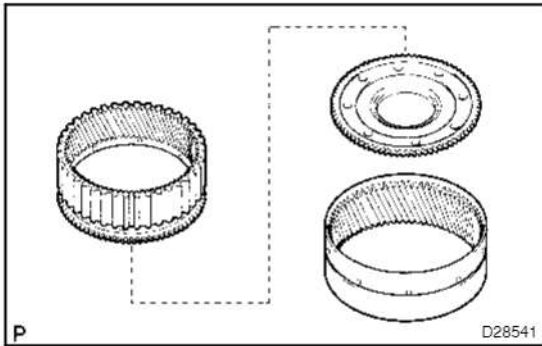
- (a) Using SST and press, install the brake piston return spring snap ring.

SST 09351-40010



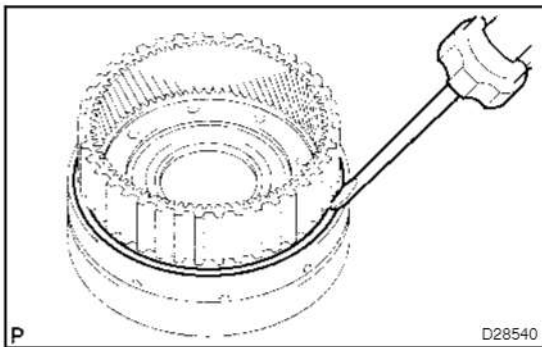
95. INSTALL BRAKE DISC NO.1

- (a) Install the the 3 plates, the 3 discs and the flange.
Install in order: P = Plate, D = Disc, F = Flange
F - D - P - D - P - D - P - D - P - D - P - D

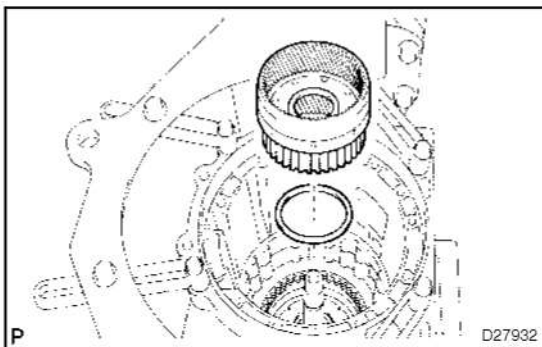


96. INSTALL CTR PLANETARY RING GEAR

- (a) Install the CTR planetary ring gear and the front planetary ring gear flange on the front planetary ring gear.



- (b) Using a screwdriver, Install the snap ring.

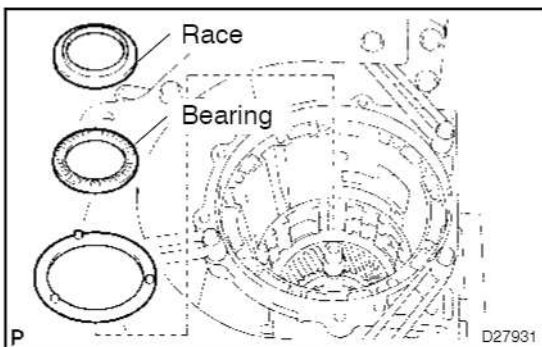


97. INSTALL FRONT PLANETARY RING GEAR

- (a) Install the front planetary ring gear and the thrust needle roller bearing on the case.

Thrust needle roller bearing diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	55.7 (2.193)	76.4 (3.008)

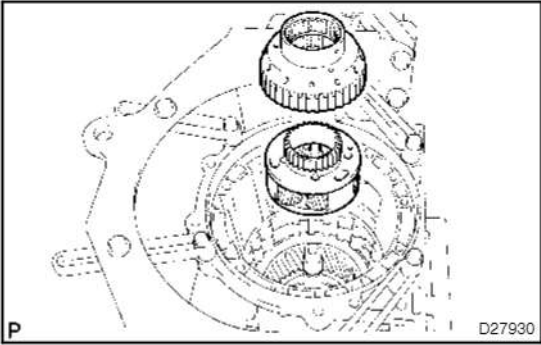


98. INSTALL FRONT PLANETARY GEAR ASSY

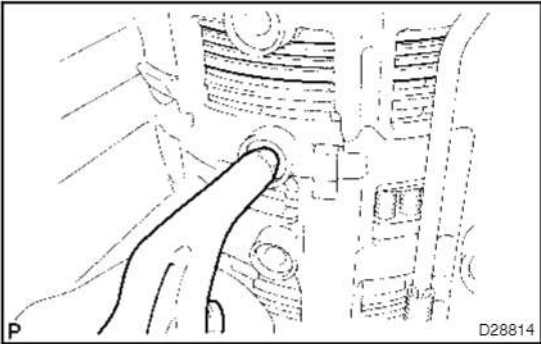
- (a) Install the thrust needle roller bearing and the thrust washer.
 (b) Coat the thrust race with petroleum jelly, and install it onto the front planetary ring gear.

Thrust needle roller bearing and race diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	43.4 (1.709)	58.3 (2.295)
Race	38.0 (1.496)	57.0 (2.244)

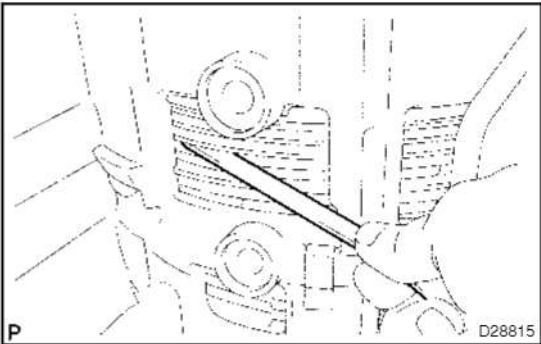


- (c) Install the front planetary gear assy and the 1 way clutch inner race from the case.



99. INSPECT PISTON STROKE OF BRAKE PISTON NO.1

- (a) Make sure the brake piston No.1 moves smoothly when applying and releasing the compressed air into the transmission case.



- (b) Using feeler gauge, measure the B3 brake pack clearance between the snap ring and the flange.

Piston stroke: 0.42 – 0.72 mm (0.017 – 0.028 in.)

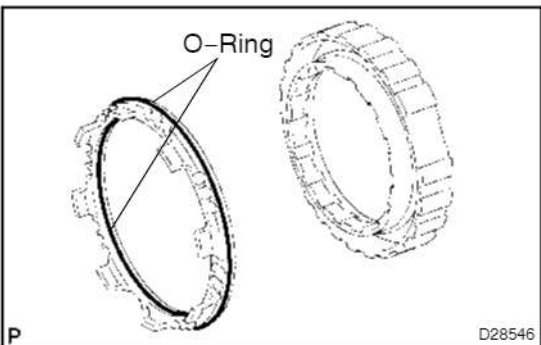
If the piston stroke is outside the specification, parts may have been assembled incorrectly, so check and reassemble again. If the piston stroke is still standard, select another flange.

HINT:

There are 4 different thickness for the flange.

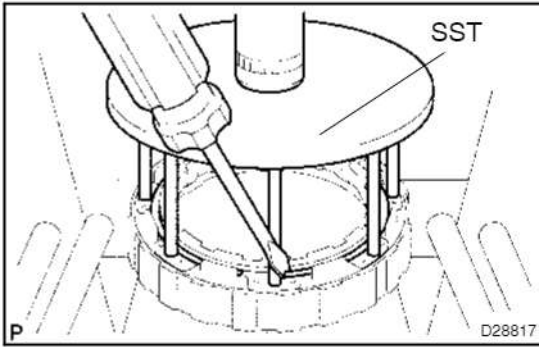
Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
0	2.0 (0.079)	2	2.4 (0.094)
1	2.2 (0.087)	3	2.6 (0.102)



100. INSTALL 2ND BRAKE PISTON

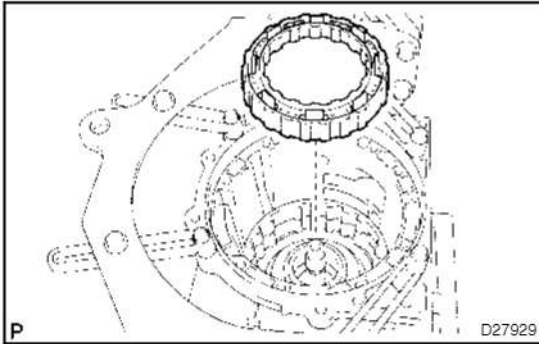
- (a) Coat 2 new O-rings with ATF, and install them to the 2nd brake piston.
- (b) Be careful not to damage the O-rings. Press the 2nd brake cylinder into the 2nd brake piston with both hands.



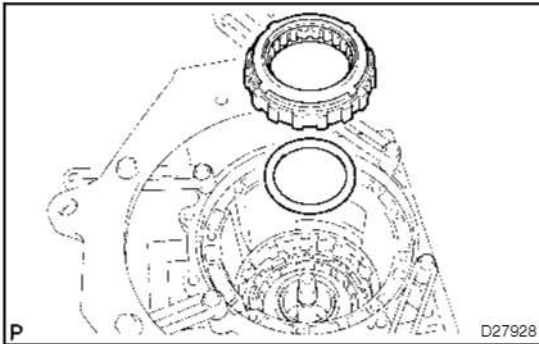
- (c) Using SST and press, Install the snap ring.
SST 09351-40010

NOTICE:

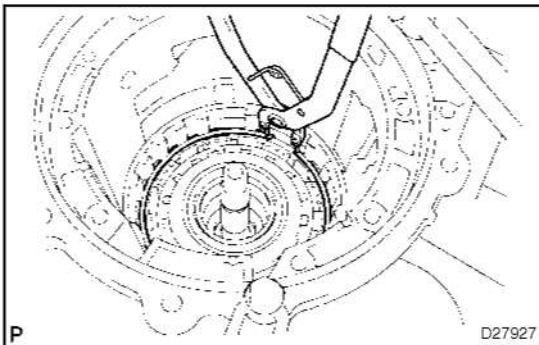
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

**101. INSTALL 2ND BRAKE CYLINDER**

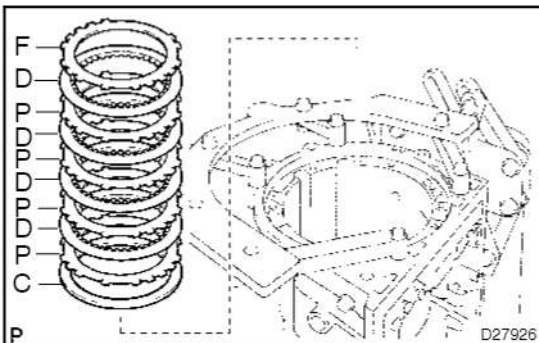
- (a) Install the 2nd brake cylinder from the case.

**102. INSTALL 1 WAY CLUTCH ASSY**

- (a) Install the 1 way clutch assy and the thrust washer from the case.

**103. INSTALL 2ND BRAKE PISTON HOLE SNAP RING**

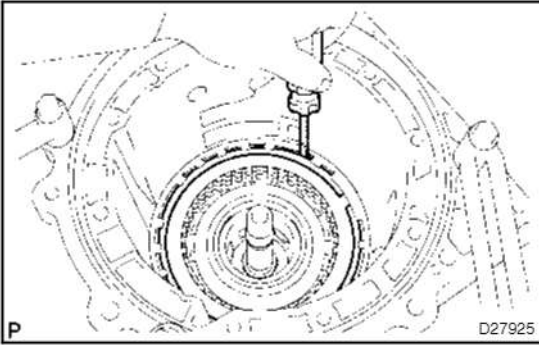
- (a) Using SST, install the snap ring.
SST 09350-30020 (09350-07060)

**104. INSTALL BRAKE DISC NO.3**

- (a) Install the 2 flanges, the 4 discs and the 4 plates on the case.

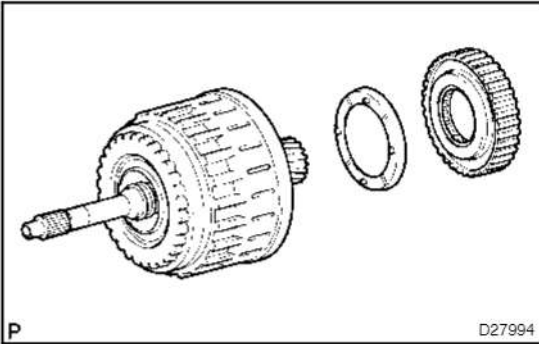
**Install in order: P = Plate, D = Disc, F = Flange
C = Cushion**

F - D - P - D - P - D - P - D - P - C



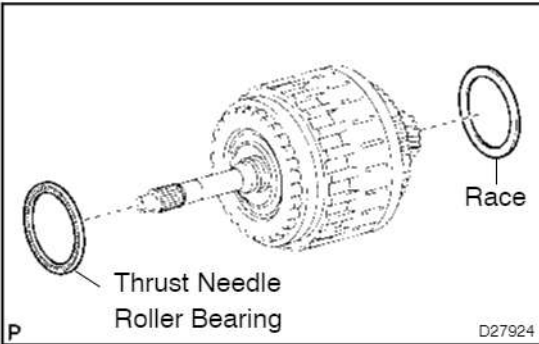
105. INSTALL BRAKE NO.3 SNAP RING

- (a) Using a screwdriver, install the snap ring.
SST 09350-30020 (09350-07060)



106. INSTALL 1 WAY NO.2 CLUTCH ASSY

- (a) Coat the race with petroleum jelly and install it onto the clutch drum thrust washer No.2.
- (b) Install the 1 Way clutch assy No.2 washer No.2.

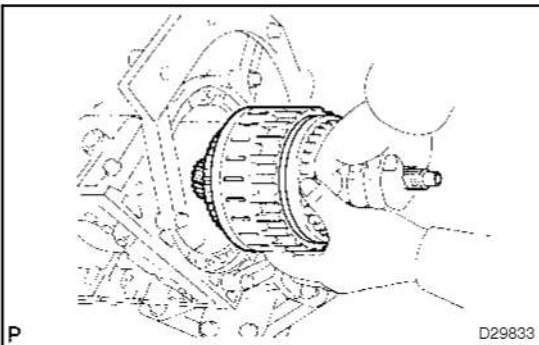


107. INSTALL CLUTCH DRUM & INPUT SHAFT ASSY

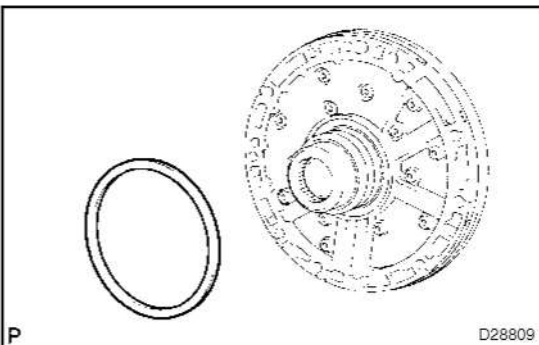
- (a) Install the thrust needle roller bearing.
- (b) Coat the race with petroleum jelly and install it onto the clutch drum & input shaft assy.

Thrust needle roller bearing and diameter: mm (in.)

	Inside	Outside
Thrust needle roller bearing	71.9 (2.831)	85.6 (3.370)
Race	73.6 (2.898)	102.0 (4.016)



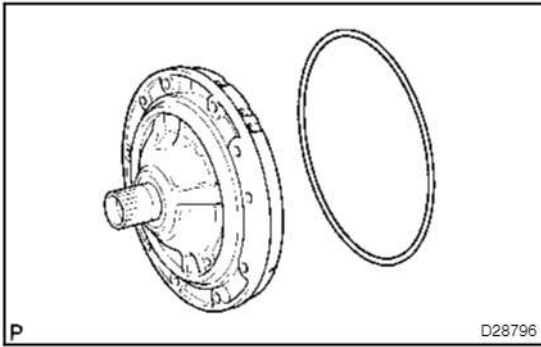
- (c) Install the input shaft sub assy with the direct&reverse multiple disc assy onto the transmission case.



108. INSTALL OIL PUMP ASSY

- (a) Install the thrust bearing race No.1 to the front oil pump

	Inside	Outside
Race	74.2 (2.921)	87.74 (3.454)



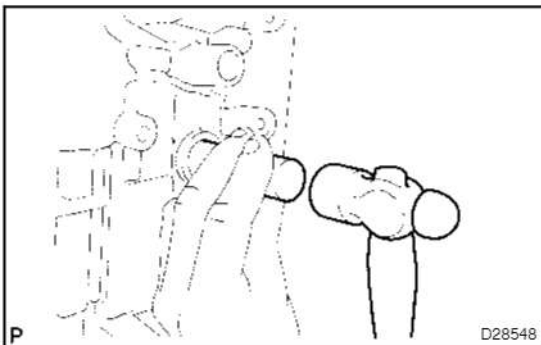
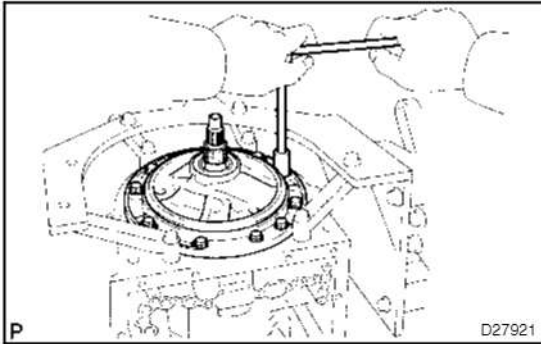
- (b) Coat a new O-ring with ATF, and install it around the oil pump assy.
- (c) Place the oil pump through the input shaft, and align the bolt holes of the oil pump assy with the transmission case.
- (d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings into the overdrive direct clutch drum.

NOTICE:

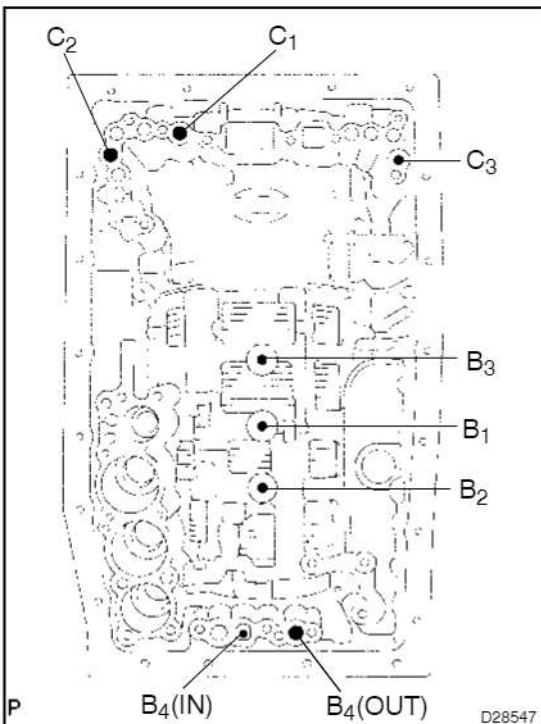
Do not push on the oil pump strongly, or the oil seal ring will stick to the direct clutch drum.

- (e) Install the 10 bolts.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

**109. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL**

- (a) Using SST, drive in 2 new oil seals.
SST 09350-30020 (09350-07110)
- (b) Coat the oil seal lips with MP grease.

**110. INSPECT INDIVIDUAL PISTON OPERATION INSPECTION**

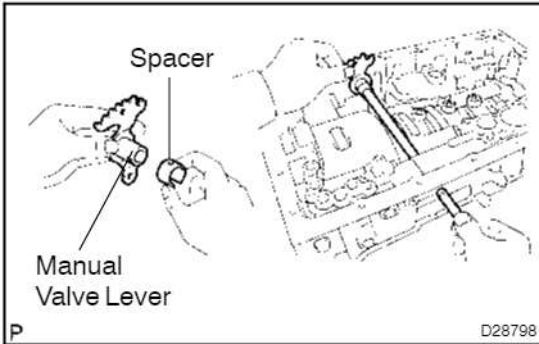
- (a) Check the operating sound while applying compressed air into the oil holes indicated in the illustration.

HINT:

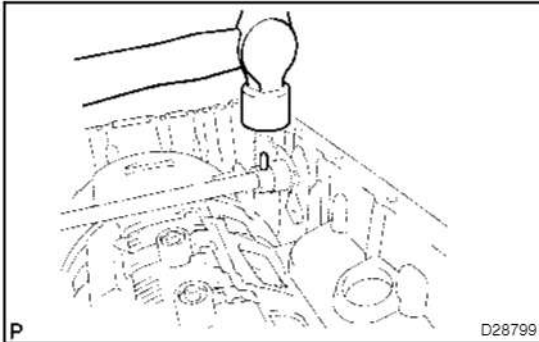
When inspecting the O/D direct clutch, check with the C₃ accumulator piston hole closed.

If there is no sound, disassemble and check the installation condition of the parts.

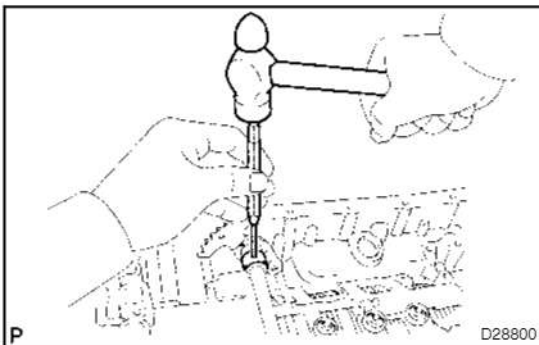
- (1) Clutch No.2 (C₂)
- (2) Clutch No.3 (C₃)
- (3) Clutch No.1 (C₁)
- (4) Brake No.3 (B₃)
- (5) Brake No.1 (B₁)
- (6) Brake No.2 (B₂)
- (7) Brake No.4 (B₄)

**111. INSTALL MANUAL VALVE LEVER SUB-ASSY**

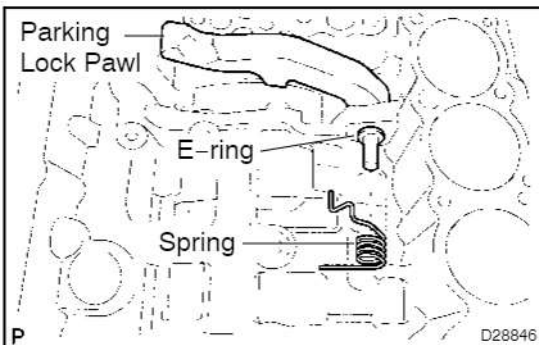
- (a) Install a new spacer to the manual valve lever.
- (b) Install the manual valve lever shaft to the transmission case through the manual valve lever.



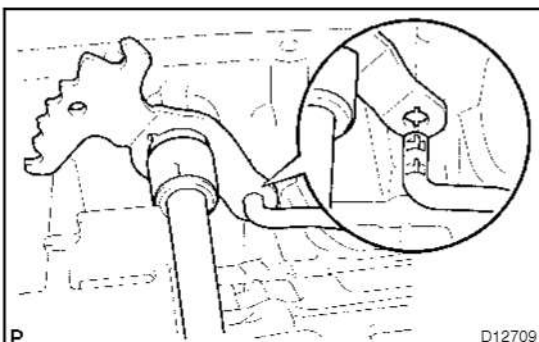
- (c) Using a hammer, drive in a new spring pin.



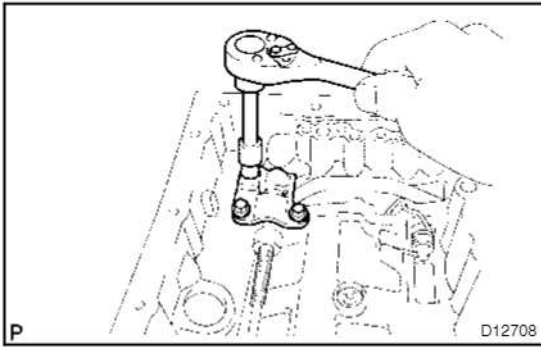
- (d) Align the manual valve lever indentation with the spacer hole, and stake them together with the punch.
- (e) Make sure the shaft rotates smoothly.

**112. INSTALL PARKING LOCK PAWL SHAFT**

- (a) Install the E-ring to the shaft.
- (b) Install the parking lock pawl, the shaft and the spring.

**113. INSTALL PARKING LOCK ROD SUB-ASSY**

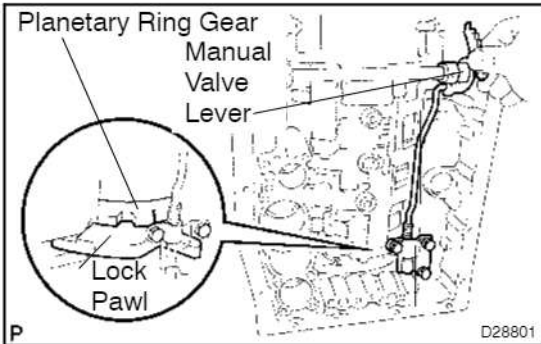
- (a) Connect the parking lock rod to the manual valve lever.



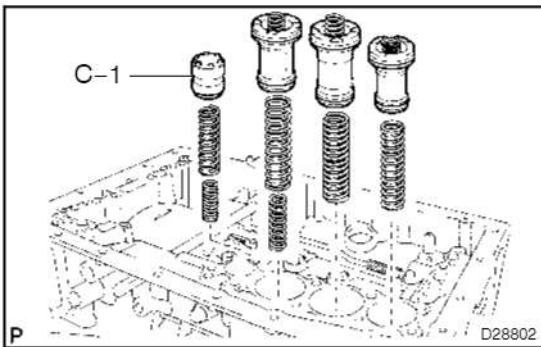
114. INSTALL PARKING LOCK PAWL BRACKET

- (a) Place the parking lock pawl bracket onto the transmission case and torque the 3 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in·lbf)

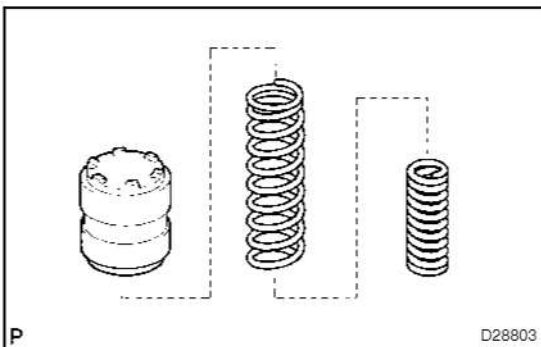


- (b) Shift the manual valve lever to the P position, and confirm the planetary ring gear is correctly locked up by the lock pawl.



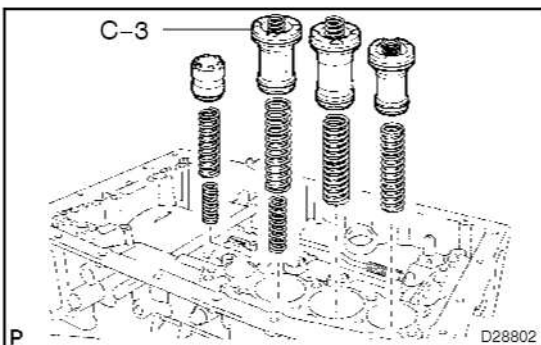
115. INSTALL C-1 ACCUMULATOR VALVE

- (a) Install the spring and the accumulator valve to the hole.



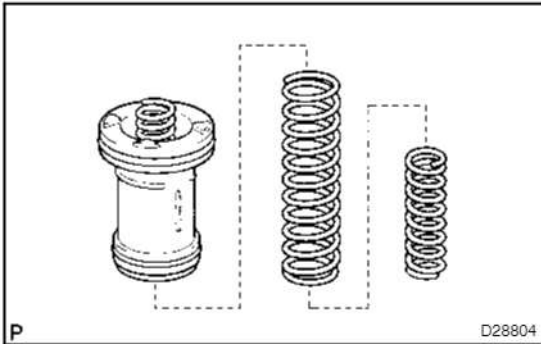
Accumulator spring:

Spring	Free length Outer diameter mm (in.)		Color
	C ₁	Inner	
	Outer	48.76 (1.920) 16.60 (0.654)	Light green



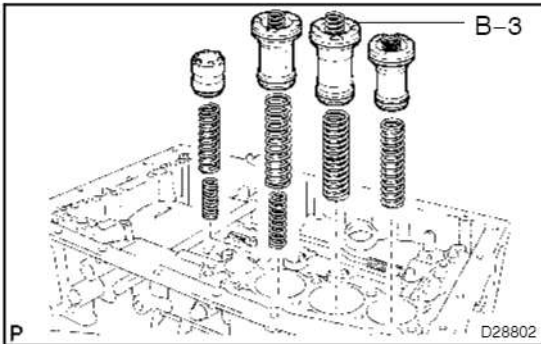
116. INSTALL C-3 ACCUMULATOR PISTON

- (a) Coat new O-ring with ATF, and install it to the piston.
- (b) Install the spring and the accumulator piston to the hole.



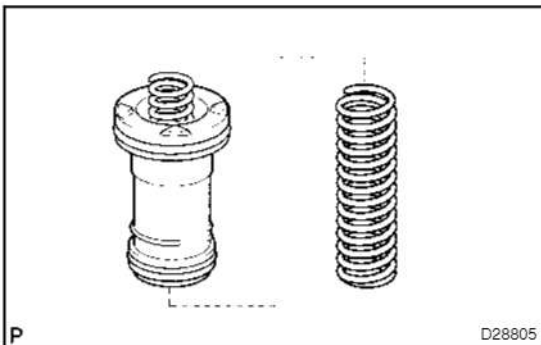
Accumulator spring:

Spring		Free length Outer diameter mm (in.)	Color
C ₃	Inner	44.0 (1.732) 14.0 (0.551)	Yellow
	Outer	73.35(2.888) 19.90 (0.784)	Red



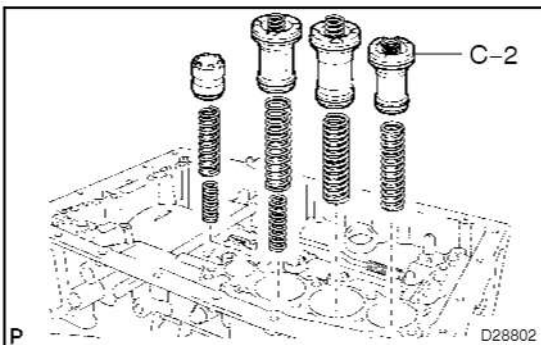
117. INSTALL B-3 ACCUMULATOR PISTON

- (a) Coat 2 new O-rings with ATF, and install them to the piston.
- (b) Install the spring and the accumulator piston to the hole.



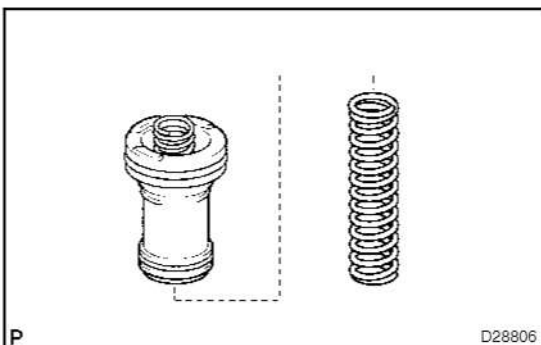
Accumulator spring:

Spring		Free length Outer diameter mm (in.)	Color
B ₃		70.5 (2.776) 19.7 (0.776)	Purple



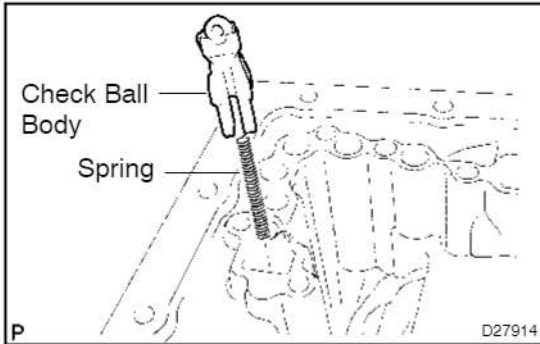
118. INSTALL C-2 ACCUMULATOR PISTON

- (a) Coat 2 new O-rings with ATF, and install them to the piston.
- (b) Install the spring and the accumulator piston to the hole.

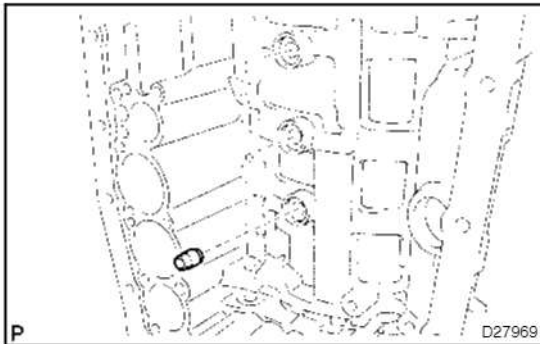


Accumulator spring:

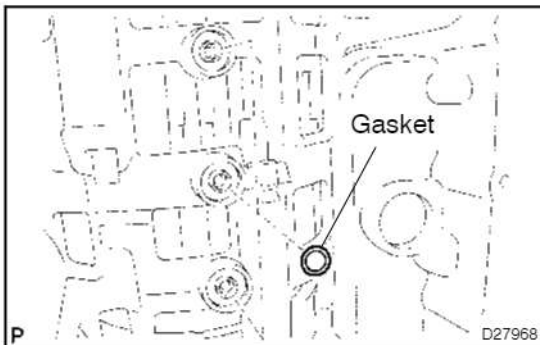
Spring		Free length Outer diameter mm (in.)	Color
C ₂		62.0 (2.441) 15.9 (0.626)	White

**119. INSTALL CHECK BALL BODY**

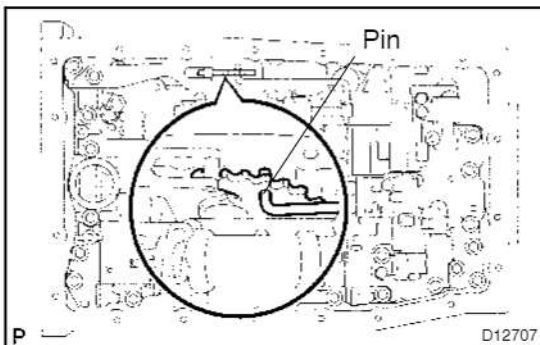
- (a) Install the check ball body and the spring.

**120. INSTALL BRAKE DRUM GASKET**

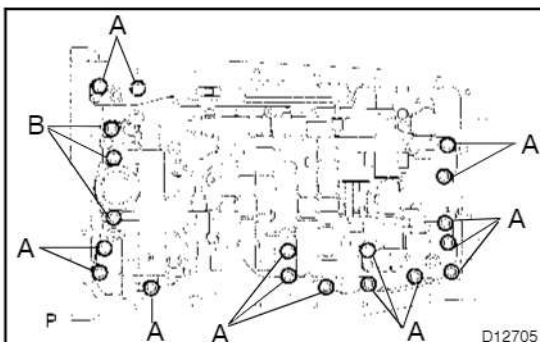
- (a) Install the 3 brake drum gaskets.

**121. INSTALL TRANSAXLE CASE GASKET**

- (a) Install the 3 transaxle case gaskets.

**122. INSTALL TRANSMISSION VALVE BODY ASSY**

- (a) Align the groove of the manual valve with the pin of the lever.



- (b) Install the 19 bolts.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

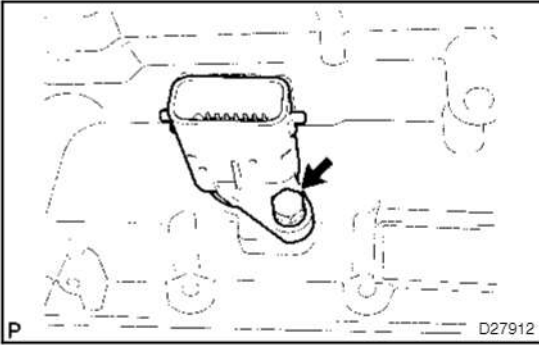
HINT:

Each bolt length is indicated below.

Blot length:

Bolt A: 25 mm (0.98 in.)

Bolt B: 36 mm (1.42 in.)

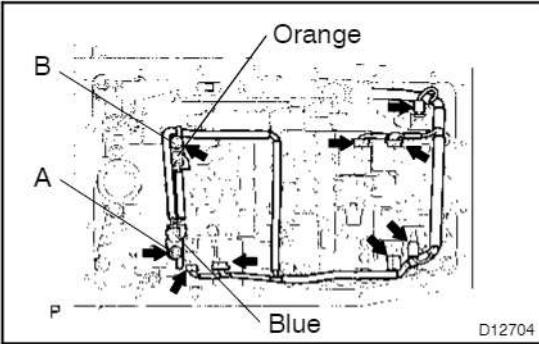


123. INSTALL TRANSMISSION WIRE

- (a) Install a new O-ring to the transmission wire.
- (b) Install the transmission wire harness.
- (c) Install the bolt.

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

- (d) Connect the solenoid connector.



- (e) Connect the 7 solenoid connectors.
- (f) Install the ATF temperature sensor.
- (g) Install the clamp and the 2 bolts.

A: 11 N·m (112 kgf·cm, 8 ft·lbf)

B: 10 N·m (100 kgf·cm, 7 ft·lbf)

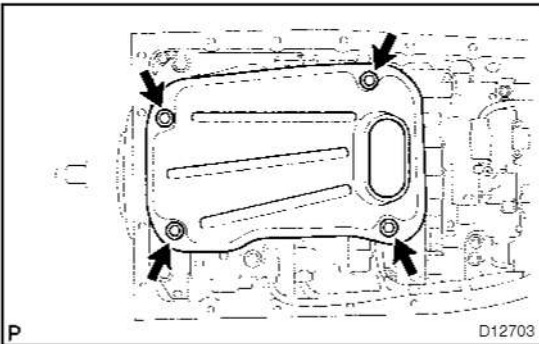
Bolt length:

Bolt A: 36 mm (1.42 in.)

Bolt B: 12 mm (0.47 in.)

Sensor wire harness:

Wire harness	Color
for linear control	Orange
for oil temp warning lamp	Blue

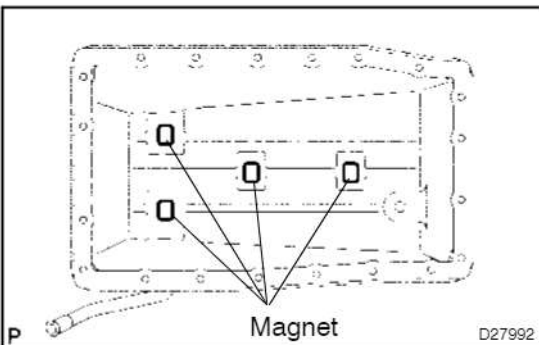


124. INSTALL VALVE BODY OIL STRAINER ASSY

- (a) Coat new O-ring with ATF, and install them to the valve body oil strainer assy.

- (b) Install the oil strainer with the 4 bolts.

10 N·m (100 kgf·cm, 7 ft·lbf)



125. INSTALL TRANSMISSION OIL CLEANER MAGNET

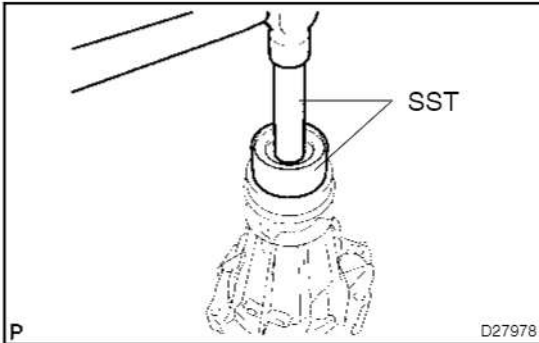
- (a) Install the 4 transmission oil cleaner magnets.

126. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

- (a) Install a new gasket on the oil pan.
- (b) Install and torque the 20 bolts.

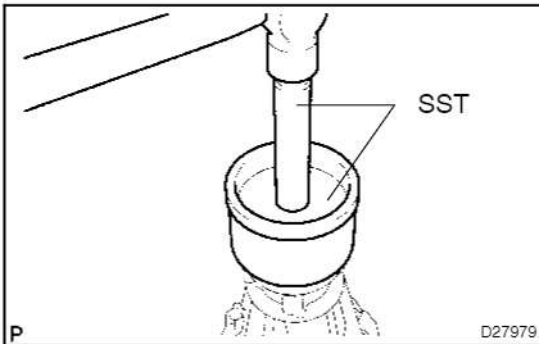
Torque 4.4 N·m (45 kgf·cm, 39 in.·lbf)

- (c) Install the drain plug.
Torque 28 N·m (285 kgf·cm, 21 ft·lbf)



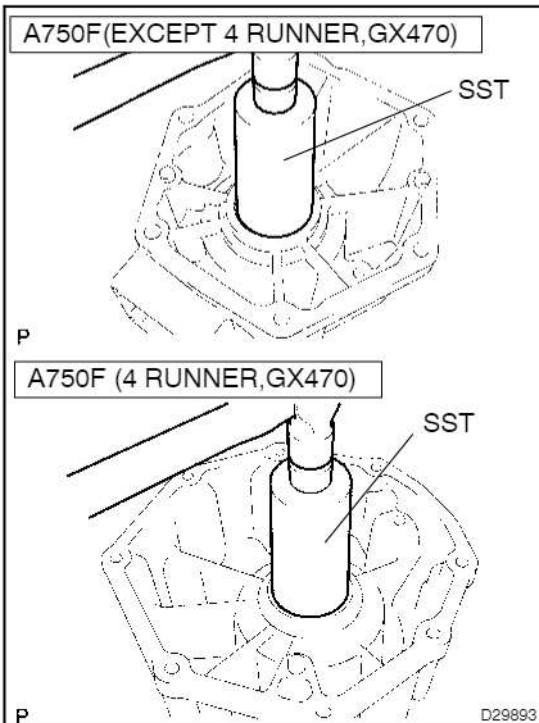
127. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL (A750E 4RUNNER)

- (a) Using SST and a hammer, install a new oil seal.
 SST 09710-30050, 09950-70010 (09951-07100)



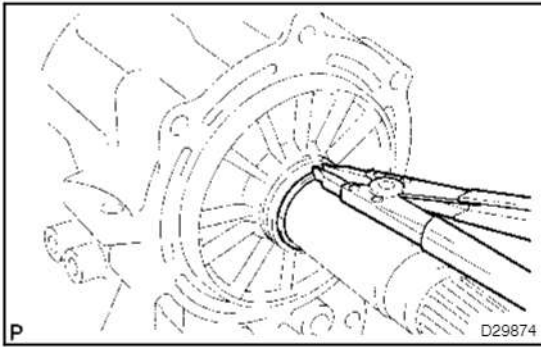
128. INSTALL EXTENSION HOUSING DUST DEFLECTOR (A750E 4RUNNER)

- (a) Using SST and a hammer, install a new extension housing dust deflector.
 SST 09223-15020, 09950-70010 (09951-07100)



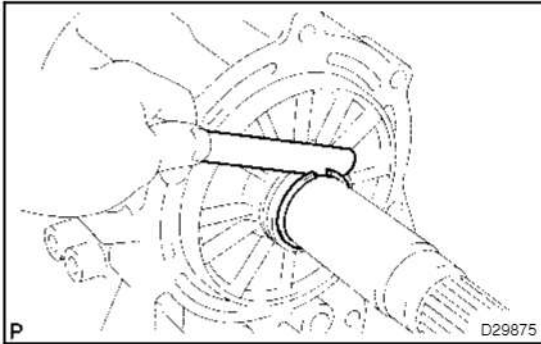
129. INSTALL TRANSMISSION CASE ADAPTOR OIL SEAL (4WD DRIVE TYPE)

- (a) Using SST and a hammer, install a new oil seal.
 SST 09226-10010



130. INSTALL EXTENSION (ATM) HOUSING SUB-ASSY (A750E 4RUNNER)

- (a) Install the thrust needle roller bearing and the 2 bearing races.
- (b) Using a snap ring expander, install the snap ring.



- (c) Using feeler gauge, measure the clearance between the snap ring and the race.

Clearance: 0.05 – 0.33 mm (0.002 – 0.013 in.)

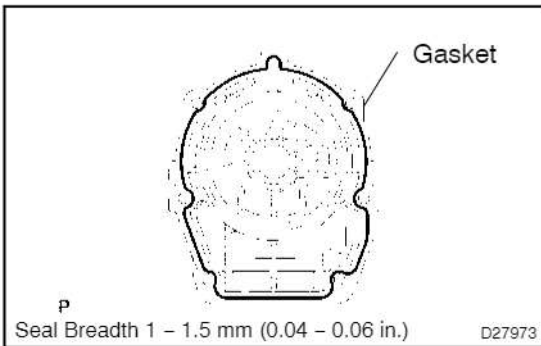
If the Clearance is still standard, select another race.

HINT:

There are 6 different thickness for the race.

Race thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.7 (0.146)	4	4.0 (0.158)
2	3.8 (0.150)	5	4.1 (0.161)
3	3.9 (0.154)	6	4.2 (0.165)



- (d) Install the gasket from the extension housing.

HINT:

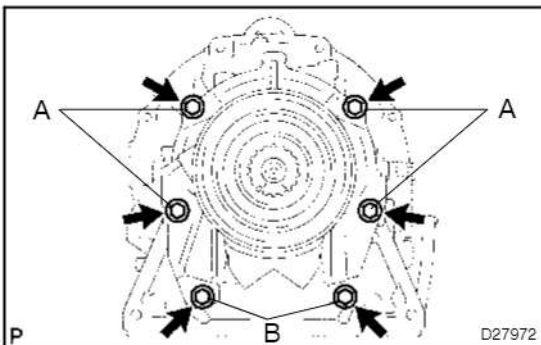
Take care not to drop the gasket.

- (e) Clean the threads of the bolts and the case with white gasoline.

- (f) Apply FIPG to the extension housing.

FIPG:

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



- (g) Install the extension housing with new 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

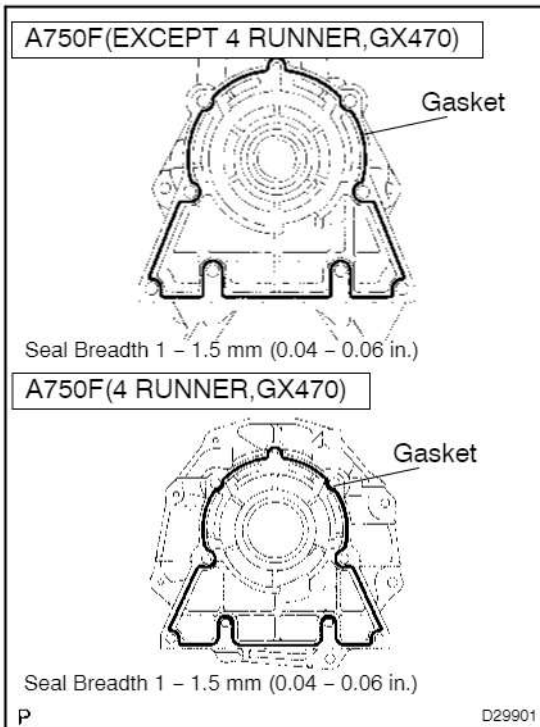
HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A: 45 mm (1.772 in.)

Bolt B: 35 mm (1.378 in.)

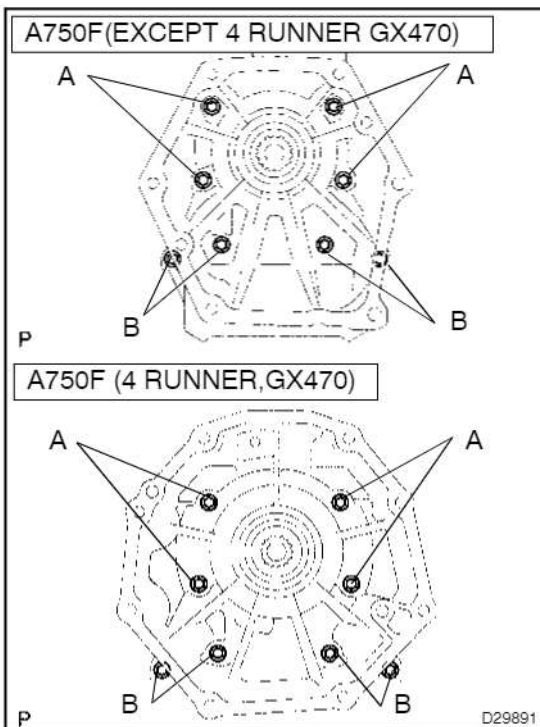


131. INSTALL TRANSMISSION CASE ADAPTER ADAPTER SUB-ASSY (4WD DRIVE TYPE)

- (a) Apply seal packing or equivalent to the 8 bolts.

Seal packing:

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



- (b) Install the transmission case adapter adapter sub assy with the 8 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

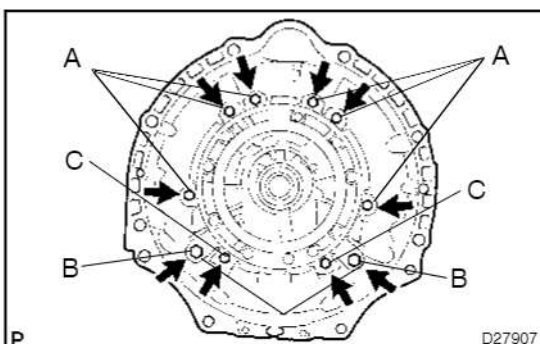
HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A: 50 mm (1.969 in.)

Bolt B: 40 mm (1.575 in.)



132. INSTALL AUTOMATIC TRANSMISSION HOUSING

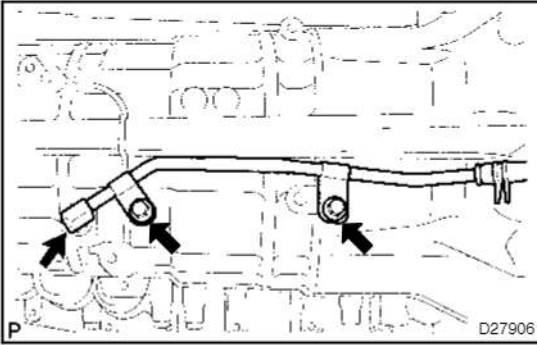
- (a) Clean the threads of the bolts and the case with white gasoline.
- (b) Install the transmission housing with the 10 bolts.

Torque:

A (14 mm bolt): 34 N·m (345 kgf·cm, 25 ft·lbf)

B (17 mm bolt): 57 N·m (581 kgf·cm, 42 ft·lbf)

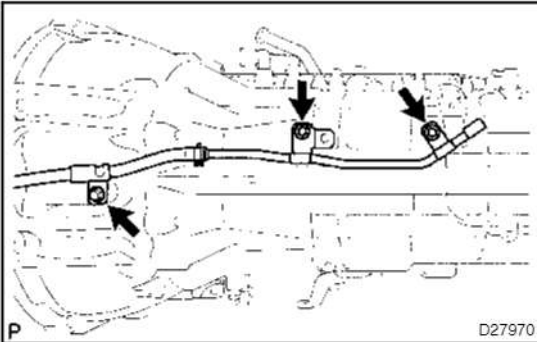
C (14 mm bolt): 34 N·m (345 kgf·cm, 25 ft·lbf)



133. INSTALL AUTOMATIC TRANSAXLE BREATHER TUBE (A750F EXCEPT 4RUNNER, GX470)

- (a) Install a new O-ring to the breather tube.
- (b) Install the breather tube with the 2 bolts.

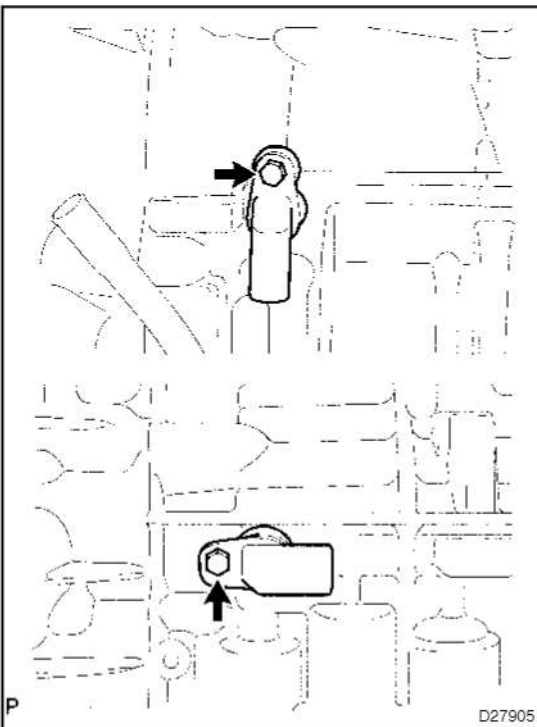
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



134. INSTALL AUTOMATIC TRANSAXLE BREATHER TUBE (A750# 4RUNNER, GX470)

- (a) Install a new O-ring to the breather tube.
- (b) Install the breather tube with the 3 bolts.

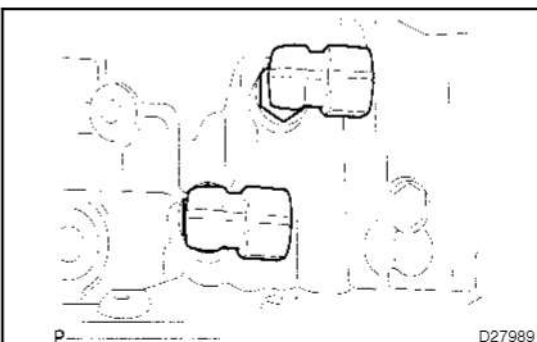
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



135. INSTALL TRANSMISSION REVOLUTION SENSOR

- (a) Coat 2 new O-rings with ATF, and install it to the transmission revolution sensor.
- (b) Install the 2 transmission revolution sensors.
- (c) Install the 2 bolts.

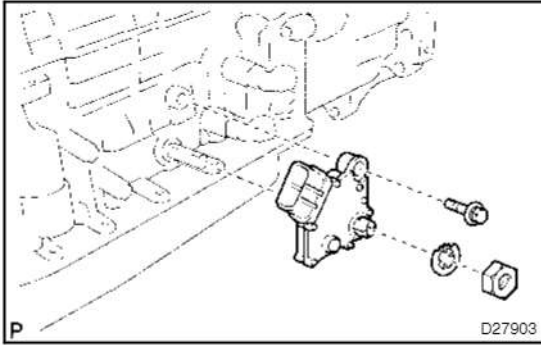
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



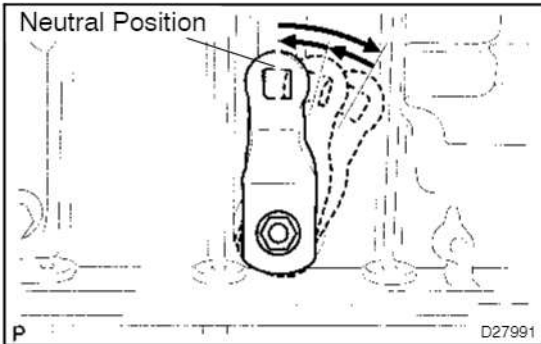
136. INSTALL OIL COOLER TUBE UNION

- (a) Coat new O-ring with ATF, and install it to oil cooler tube union.
- (b) Install the oil cooler tube union.

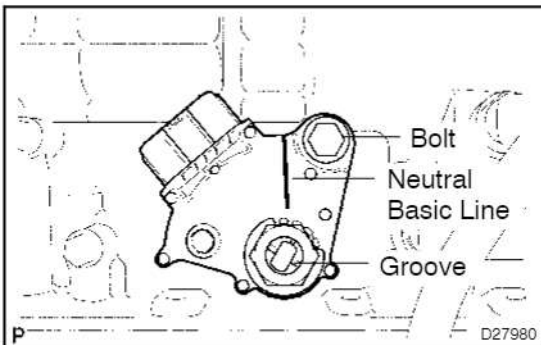
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



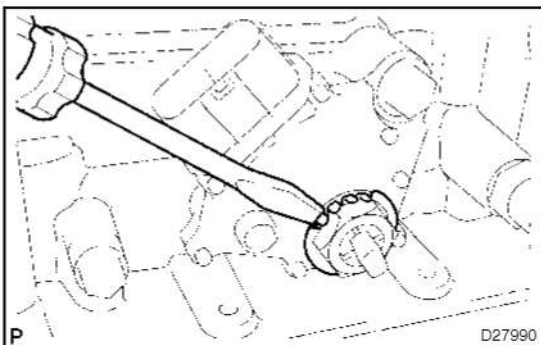
- 137. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY**
- Install the park/neutral position switch onto the manual valve lever shaft, and temporarily install the adjusting bolt.
 - Install the new lock washer. Install and torque the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)



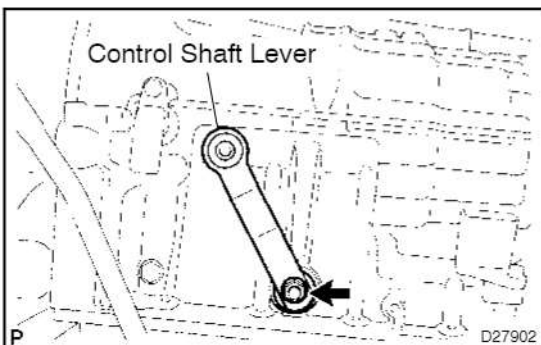
- Using the control shaft lever, fully turn the manual lever shaft back and then return 2 notches. It is now in neutral.



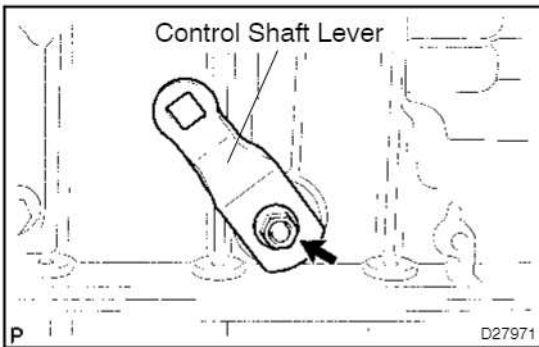
- Align the neutral basic line with the switch groove as shown in the illustration, and tighten the adjusting bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



- Using a screwdriver, bend the tabs of the lock washer.
HINT:
Bend at least 2 of the lock washer tabs.



- 138. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH (A750F EXCEPT 4RUNNER, GX470)**
- Install the washer and the nut to the control shaft lever RH.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

**139. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH (A750# 4RUNNER, GX470)**

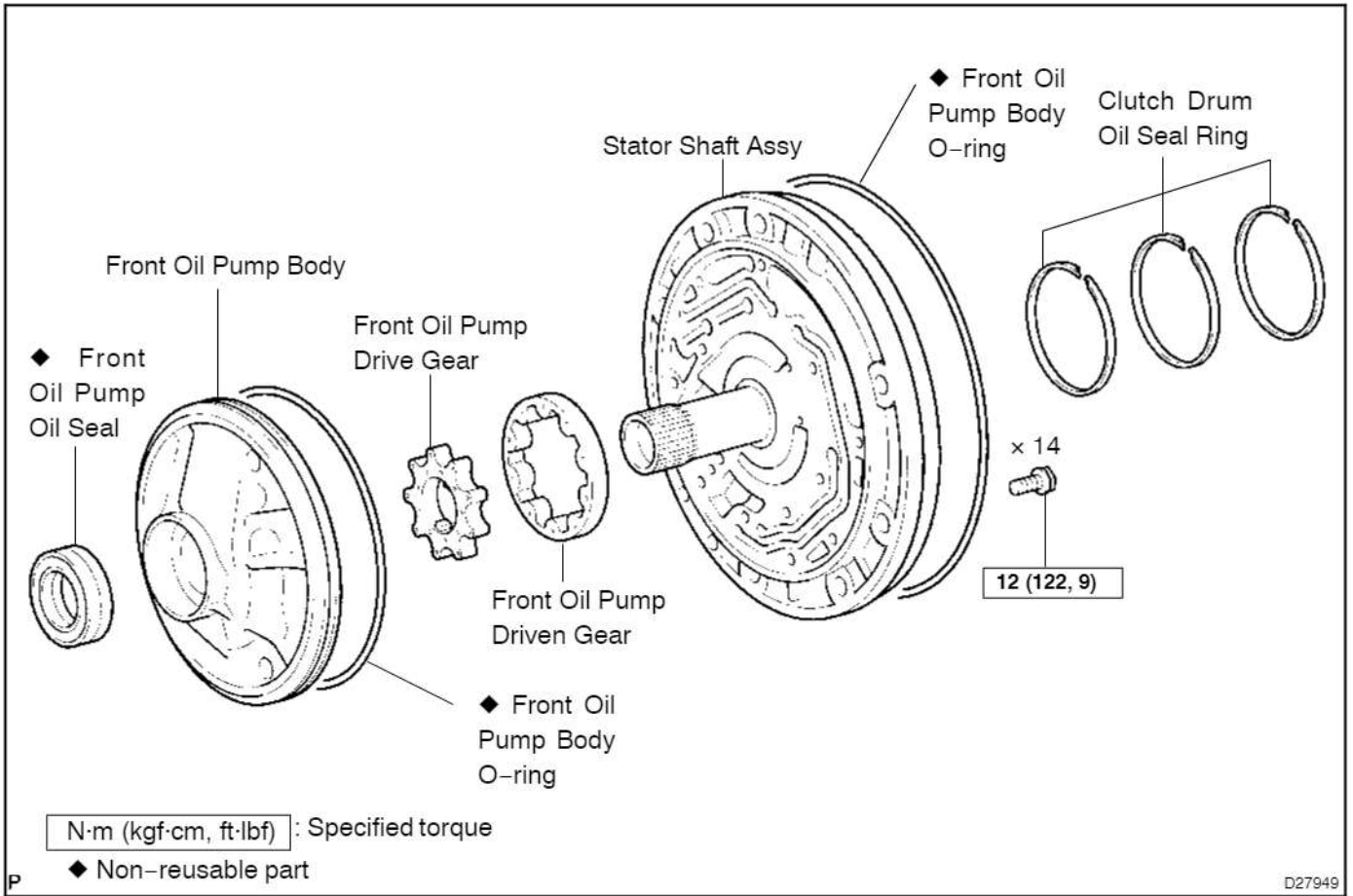
- (a) Install the washer and the nut to the control shaft lever RH.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

OIL PUMP ASSY (A750E/A750F)

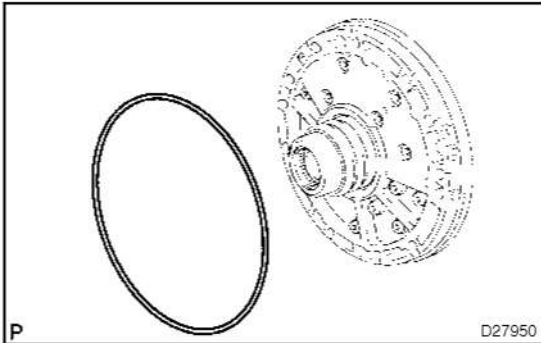
COMPONENTS

40073-02



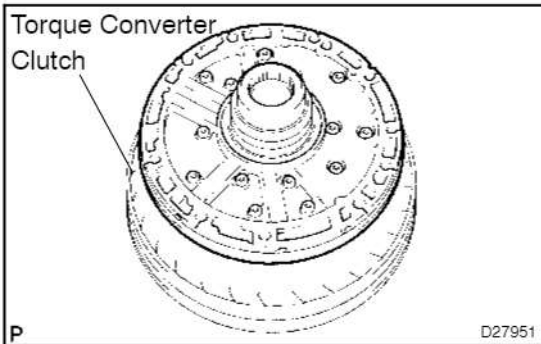
cardiagn.com

OVERHAUL



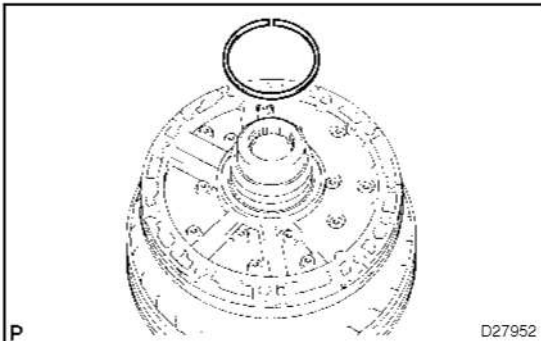
1. REMOVE FRONT OIL PUMP BODY O-RING

- (a) Remove the O-ring from the oil pump assy.



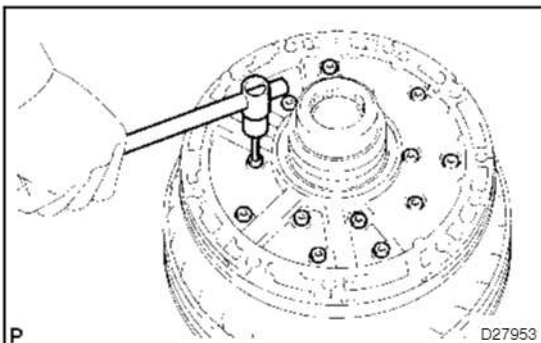
2. FIX OIL PUMP ASSY

- (a) Place the oil pump body on the torque converter clutch.



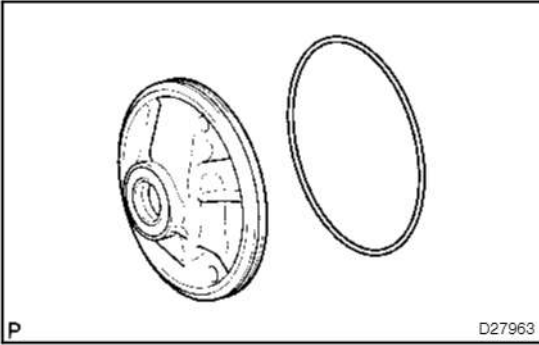
3. REMOVE CLUTCH DRUM OIL SEAL RING

- (a) Remove the 3 oil seal rings.

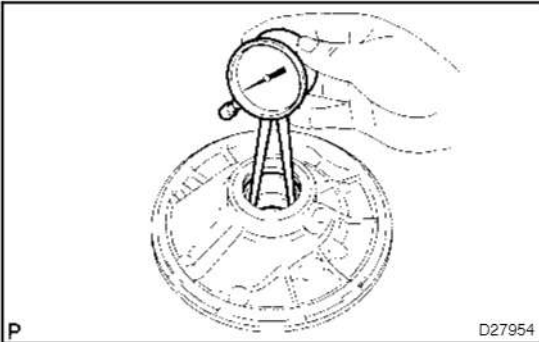


4. REMOVE STATOR SHAFT ASSY

- (a) Remove the 14 bolts, and then remove the stator shaft from the oil pump body.

**5. REMOVE FRONT OIL PUMP BODY O-RING**

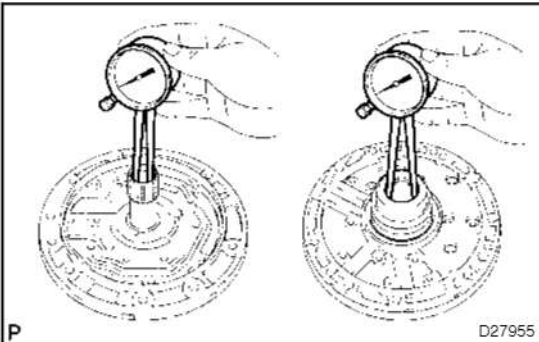
- (a) Remove the O-ring from the oil pump body.
- (b) Remove the oil pump body from the torque converter clutch.

**6. INSPECT FRONT OIL PUMP BODY SUB-ASSY**

- (a) Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Maximum inside diameter: 38.188 mm (1.504 in.)

If the inside diameter is greater than the maximum, replace the oil pump body.

**7. INSPECT STATOR SHAFT ASSY**

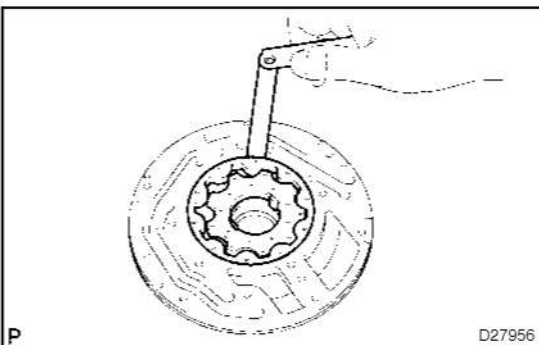
- (a) Using a dial indicator, measure the inside diameter of the stator shaft bushing.

Maximum inside diameter:

Front side: 21.577 mm (0.850 in.)

Rear side: 32.08 mm (1.263 in.)

If the inside diameter is greater than the maximum, replace the stator shaft.

**8. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY**

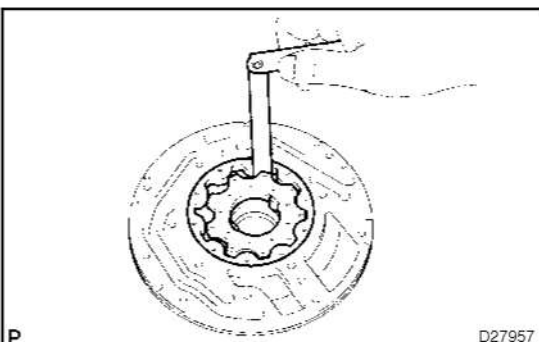
- (a) Push the driven gear to one side of the body.
- (b) Using a feeler gauge, measure the clearance.

Standard body clearance:

0.10 - 0.17 mm (0.0039 - 0.0067 in.)

Maximum body clearance: 0.17 mm (0.0067 in.)

If the body clearance is greater than the maximum, replace the drive gear, the driven gear or the pump body.



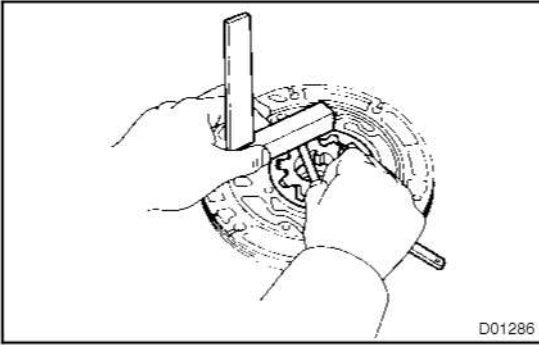
- (c) Using a feeler gauge, measure the clearance between the driven gear teeth and the drive gear teeth.

Standard tip clearance:

0.070 - 0.150 mm (0.0028 - 0.0059 in.)

Maximum tip clearance: 0.150 mm (0.0059 in.)

If the tip clearance is greater than the maximum, replace the drive gear, the driven gear or the pump body.



- (d) Using a steel straight edge and a feeler gauge, measure the side clearance of both gears.

Standard side clearance:

0.02 – 0.05 mm (0.0008 – 0.002 in.)

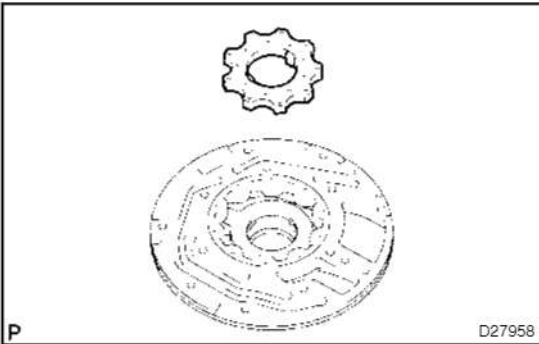
Maximum side clearance: 0.05 mm (0.002 in.)

- (e) There are 5 different thickness for the drive and driven gears.

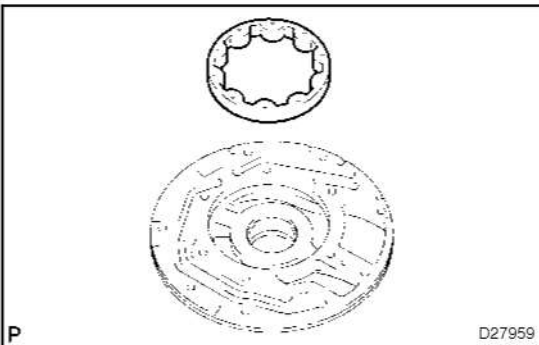
Drive and driven gears thickness: mm (in.)

Mark	Thickness
0	10.74 – 10.749 (0.4228 – 0.4232)
1	10.75 – 10.759 (0.4232 – 0.4236)
2	10.76 – 10.77 (0.4236 – 0.424)
3	10.771 – 10.78 (0.4241 – 0.4244)
4	10.781 – 10.79 (0.4244 – 0.4248)

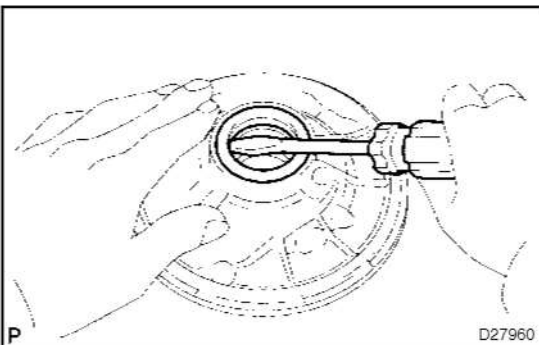
If the side clearance is greater than the maximum, replace the drive gear, the driven gear or the pump body.



9. REMOVE FRONT OIL PUMP DRIVE GEAR



10. REMOVE FRONT OIL PUMP DRIVEN GEAR

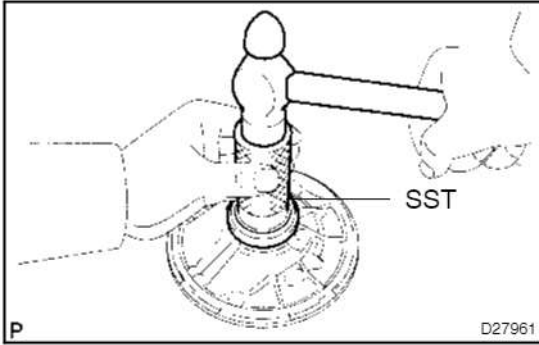


11. REMOVE FRONT OIL PUMP OIL SEAL

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

NOTICE:

Be careful not to damage the bushing and the oil pump body.

**12. INSTALL FRONT OIL PUMP OIL SEAL**

- (a) Using SST and a hammer, install a new oil seal.

HINT:

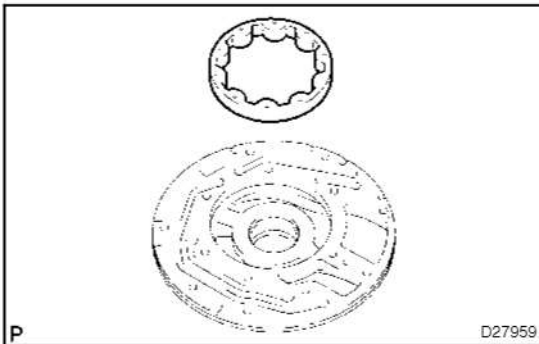
The oil seal end should be flush with the outer edge of the pump body.

SST 09350-30020 (09351-32140)

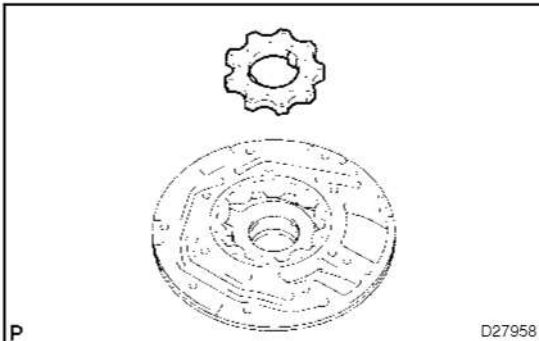
- (b) Coat the oil seal lip with MP grease.

13. FIX FRONT OIL PUMP BODY SUB-ASSY

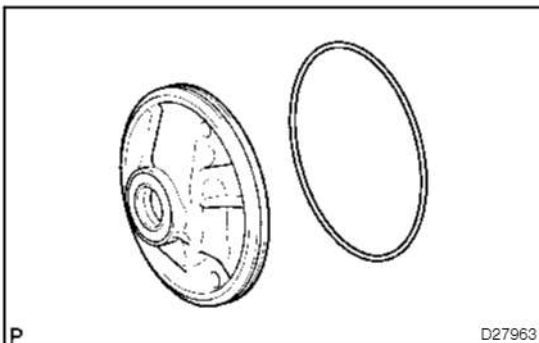
- (a) Place the oil pump body on the torque converter clutch.

**14. INSTALL FRONT OIL PUMP DRIVEN GEAR**

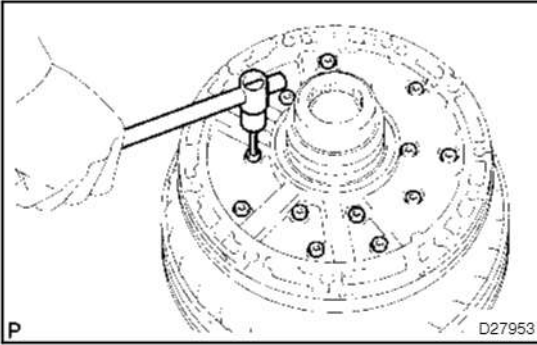
- (a) Coat the driven gear with ATF.
(b) Install the driven gear to the oil pump body.

**15. INSTALL FRONT OIL PUMP DRIVE GEAR**

- (a) Coat the drive gear with ATF.
(b) Install the drive gear to the oil pump body.

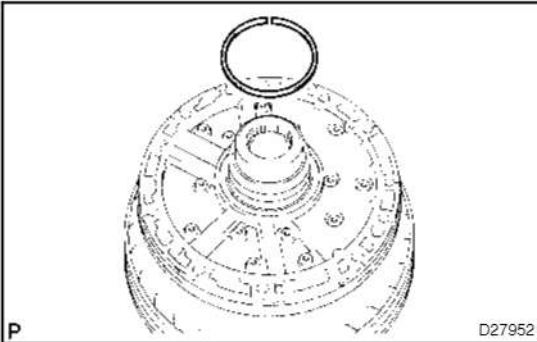
**16. INSTALL FRONT OIL PUMP BODY O-RING**

- (a) Install the O-ring to the oil pump body.

**17. INSTALL STATOR SHAFT ASSY**

- (a) Align the stator shaft with each bolt hole.
- (b) Install the 14 bolts.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

**18. INSTALL CLUTCH DRUM OIL SEAL RING**

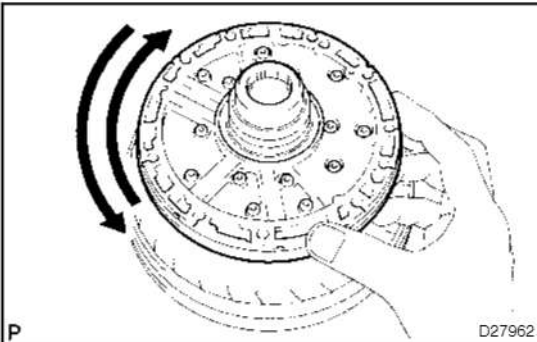
- (a) Coat the 3 oil seal rings with ATF.
- (b) Squeeze the ends of the 3 oil seal rings together with the wrap distance 8 mm or less, and then install them to the starter shaft groove.

NOTICE:

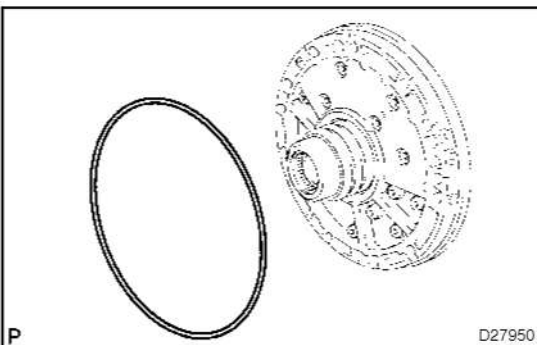
Do not over-spread the ring ends.

HINT:

After installing the oil seal rings, check that they rotate smoothly.

**19. INSPECT OIL PUMP DRIVE GEAR ROTATION**

- (a) Make sure the drive gear rotates smoothly.
- (b) Remove the oil pump assy from the torque converter.

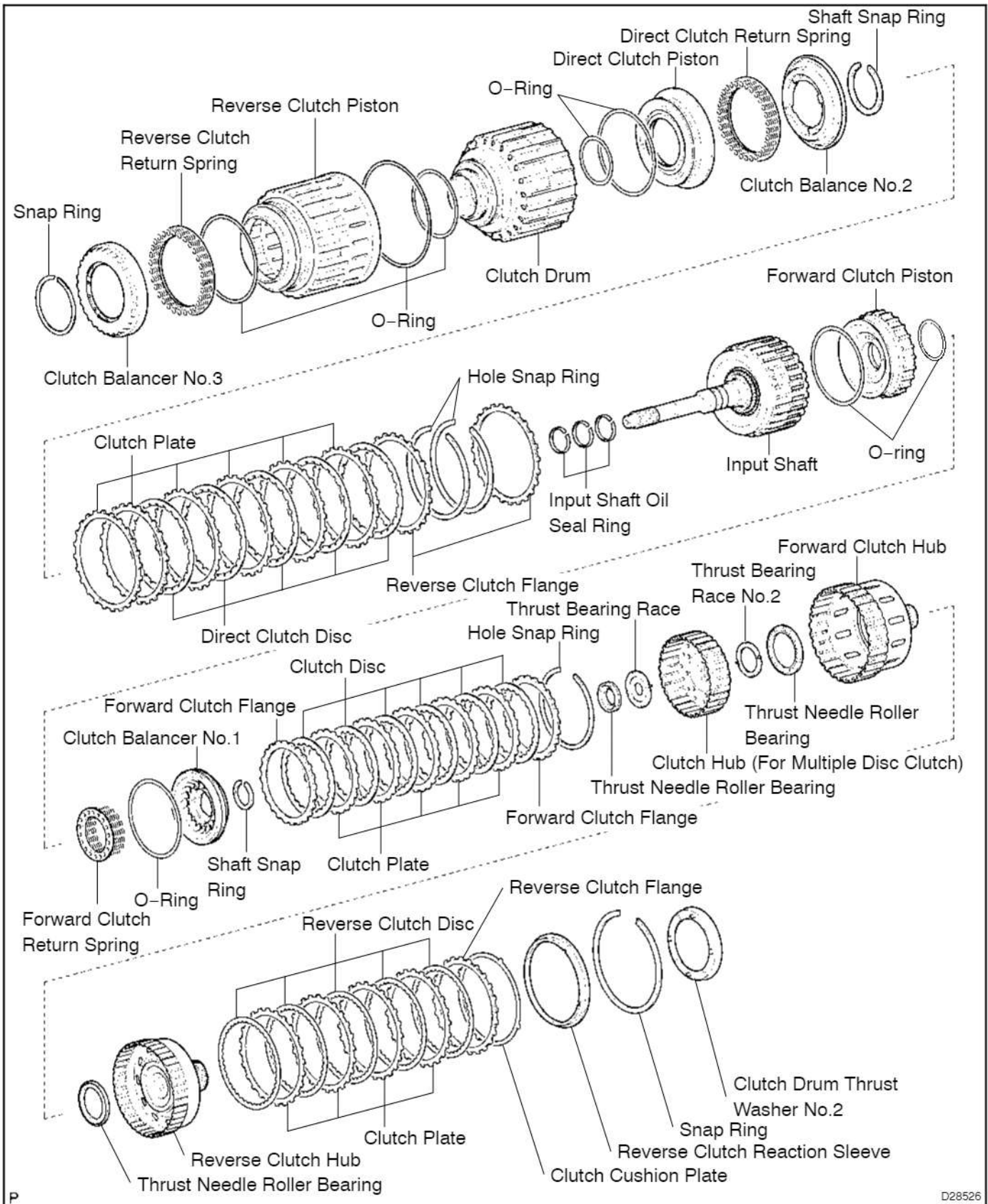
**20. INSTALL FRONT OIL PUMP BODY O-RING**

- (a) Install the O-ring to the oil pump assy.

CLUTCH DRUM & INPUT SHAFT ASSY (A750E/A750F)

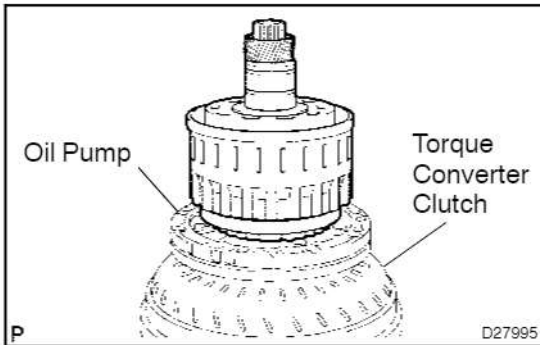
COMPONENTS

40075-02

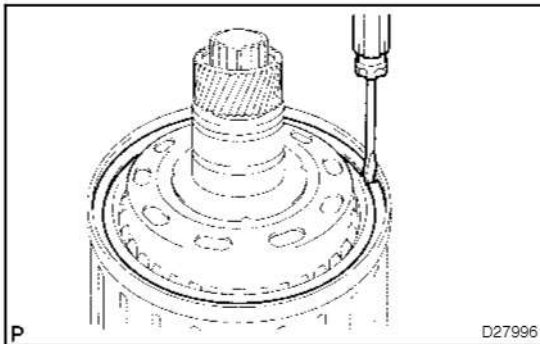


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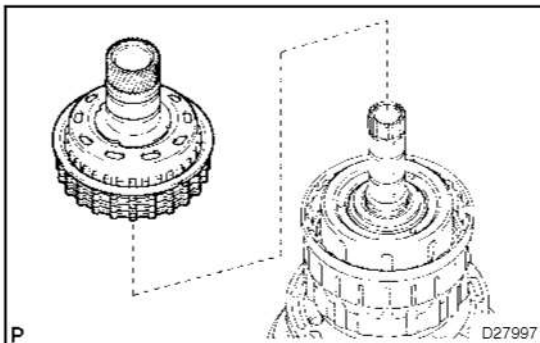
OVERHAUL

**1. FIX CLUTCH DRUM & INPUT SHAFT ASSY**

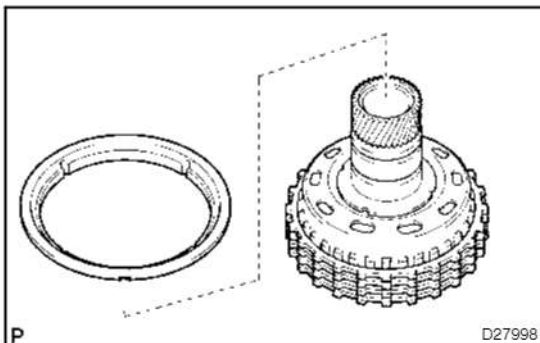
- (a) Place the oil pump onto the torque converter clutch, and then place the clutch drum & input shaft assy onto the oil pump.

**2. REMOVE REVERSE CLUTCH HUB SUB-ASSY**

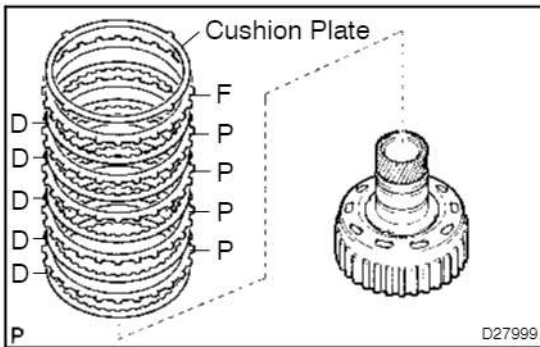
- (a) Using a screwdriver, remove the snap ring from the clutch drum and the input shaft assy.



- (b) Remove the reverse clutch hub sub assy, the reverse clutch reaction sleeve, the clutch cushion, the plate reverse clutch flange, the 5 reverse clutch discs, and the 4 clutch plates from the clutch drum assy.

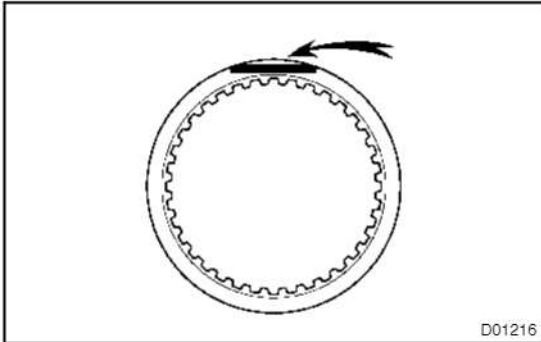
**3. REMOVE REVERSE CLUTCH REACTION SLEEVE**

- (a) Remove the reverse clutch reaction sleeve from the reverse clutch hub assy.



4. REMOVE REAR CLUTCH DISC

- (a) Remove the clutch cushion plate, the reverse clutch flange, the 4 plates and the 5 discs from the reverse clutch hub.

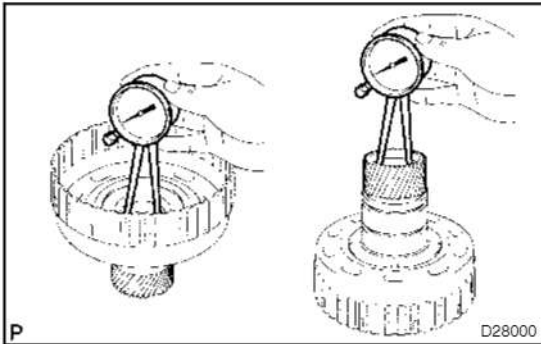


5. INSPECT REAR CLUTCH DISC

- (a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt. If necessary, replace them.

HINT:

- If the lining of the disc is peeled off or discolored, or even if only a part of the printed numbers is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



6. INSPECT REVERSE CLUTCH HUB SUB-ASSY

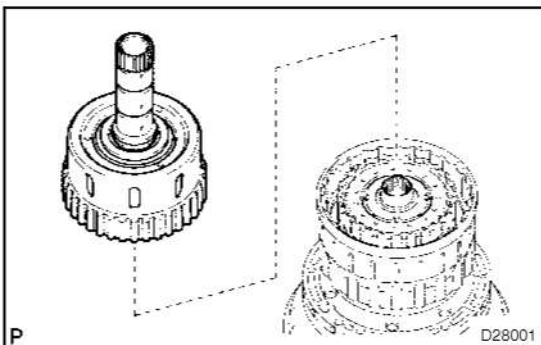
- (a) Using a dial indicator, measure the inside diameter of the reverse clutch hub bushing.

Standard drum bushing:

35.812 – 35.837 mm (1.4099 – 1.4109 in.)

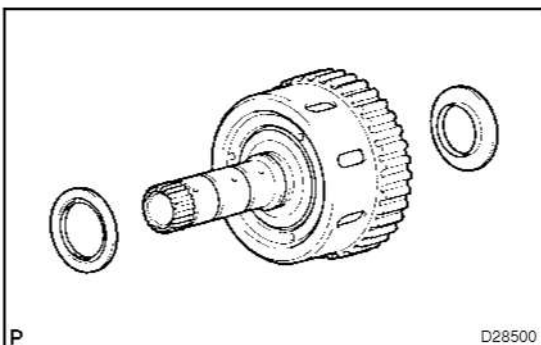
Maximum drum bushing: 35.887 mm (1.4129 in.)

If the inside diameter is greater than the maximum, replace the reverse clutch hub.

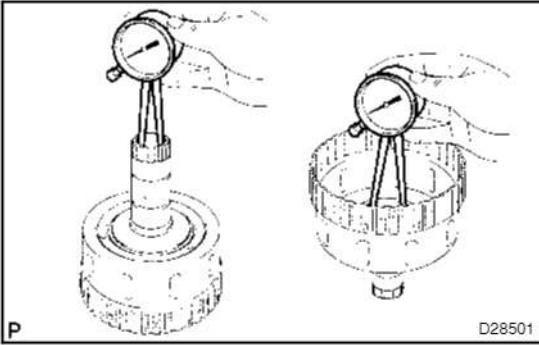


7. REMOVE FORWARD CLUTCH HUB SUB-ASSY

- (a) Remove the forward clutch hub sub assy from the clutch drum assy.



- (b) Remove the 2 thrust needle roller bearings from the forward clutch hub sub assy.

**8. INSPECT FORWARD CLUTCH HUB SUB-ASSY**

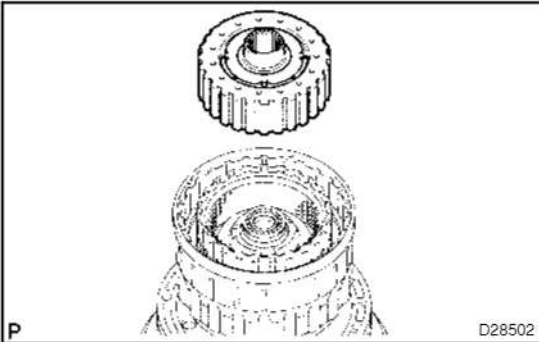
- (a) Using a dial indicator, measure the inside diameter of the forward clutch hub bushing.

Standard drum bushing:

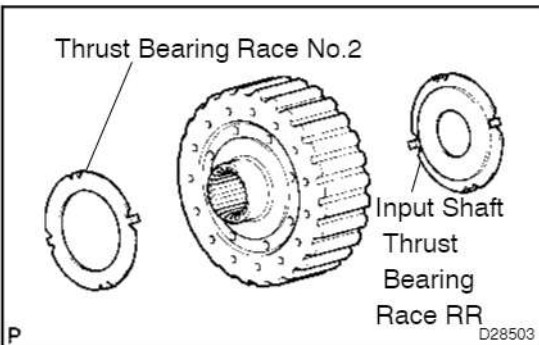
26.037 – 26.062 mm (1.0251 – 1.0261 in.)

Maximum drum bushing: 26.112 mm (1.028 in.)

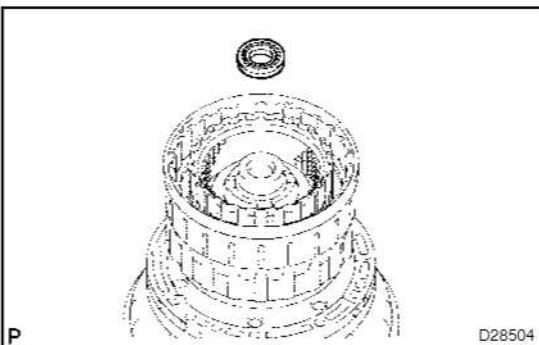
If the inside diameter is greater than the maximum, replace the forward clutch hub.

**9. REMOVE MULTIPLE DISC CLUTCH CLUTCH HUB**

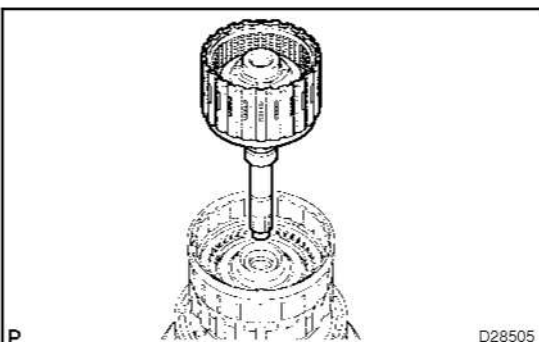
- (a) Remove the multiple disc clutch clutch hub from the clutch drum assy.



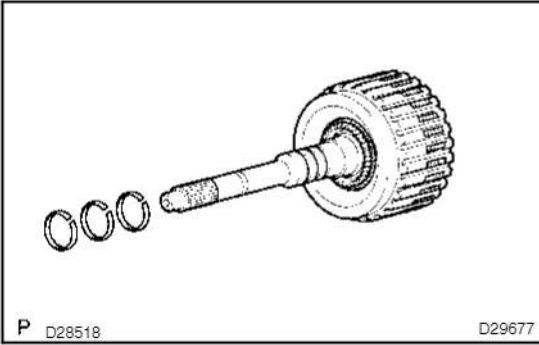
- (b) Remove the thrust bearing race No.2 and the input shaft thrust bearing race RR from the multiple disc clutch clutch hub.

**10. REMOVE INPUT SHAFT ASSY**

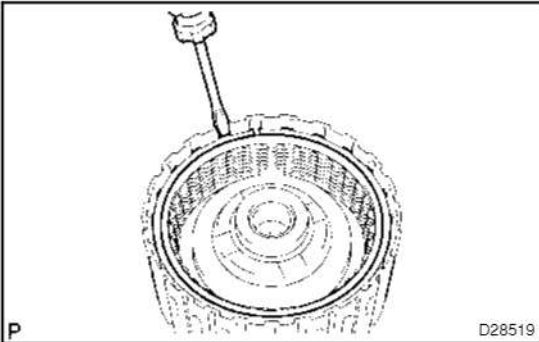
- (a) Remove the thrust needle roller bearing from the clutch drum assy.



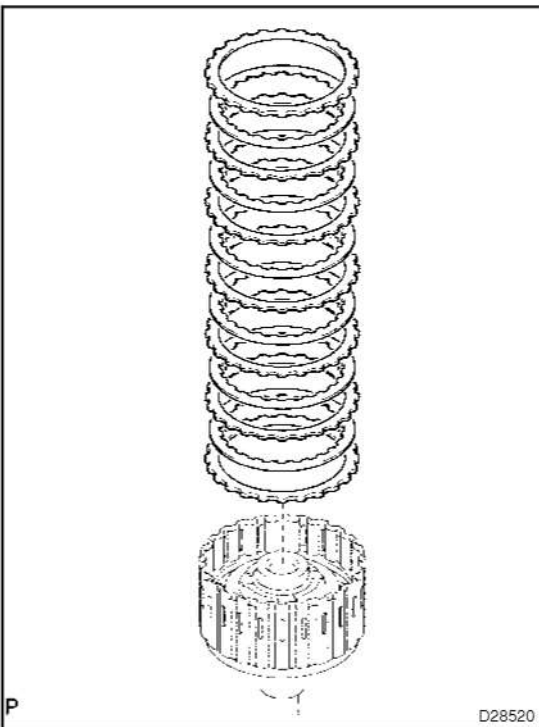
- (b) Remove the input shaft assy from the clutch drum assy.

**11. REMOVE INPUT SHAFT OIL SEAL RING**

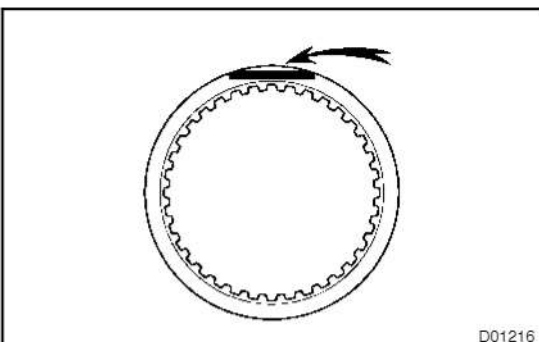
- (a) Remove the 3 oil seal rings from the input shaft assy.

**12. REMOVE FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC**

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



- (b) Remove the 2 flanges, the 6 discs and the 5 plates from the input shaft assy.

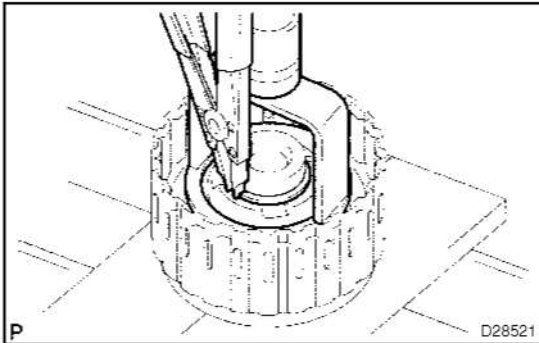
**13. INSPECT FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC**

- (a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt. If necessary, replace them.

HINT:

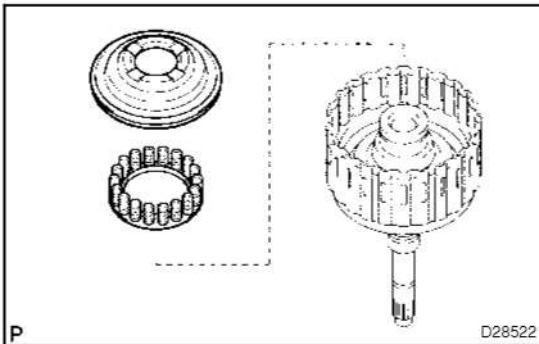
- If the lining of the disc is peeled off or discolored, or even if only a part of the printed numbers is damaged, replace all discs.

- Before assembling new discs, soak them in ATF for at least 15 minutes.

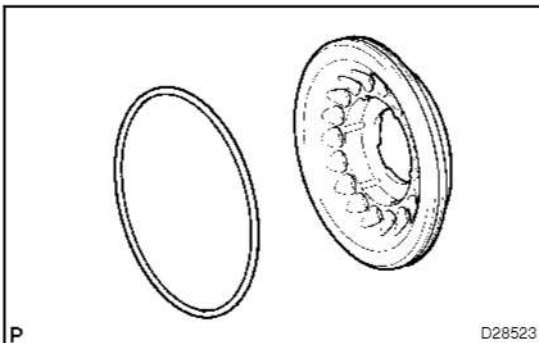


14. REMOVE CLUTCH BALANCER NO.1

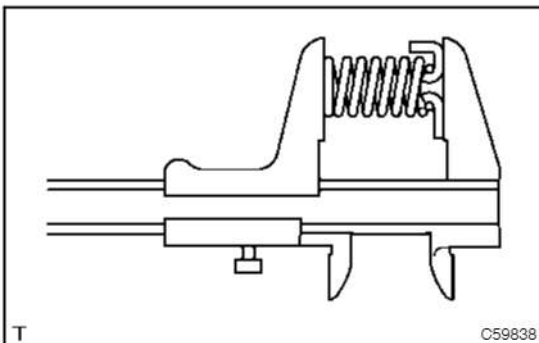
- (a) Place SST on the clutch balancer No.1, and compress the return spring with a press.
SST 09350-30020 (09350-07040, 09350-07070)



- (b) Remove the clutch balancer No.1 and the forward clutch return spring from the inputshaft assy.

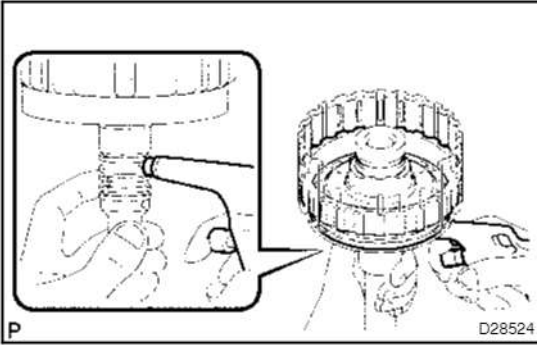


- (c) Remove the O-ring from the clutch balancer No.1.

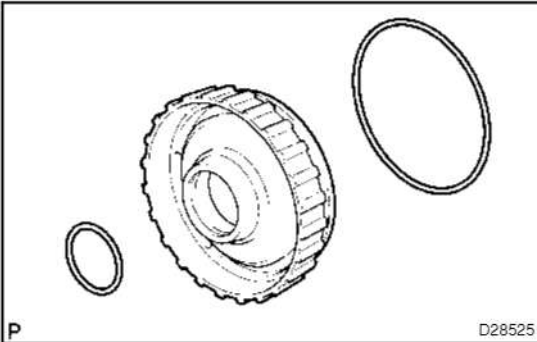


15. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSY

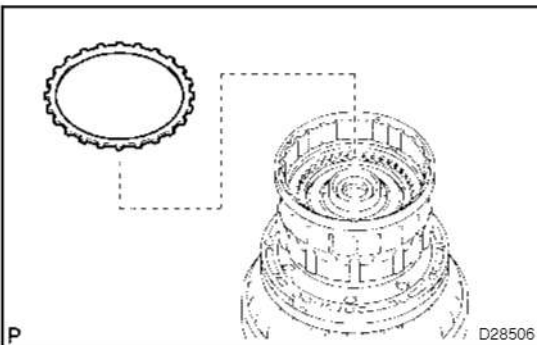
- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 26.74 mm (1.053 in.)

**16. REMOVE FORWARD CLUTCH PISTON**

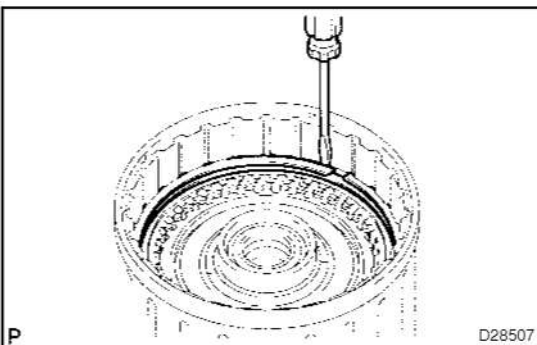
- (a) Holding the forward clutch piston by hand, apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the input shaft to remove the forward clutch piston.



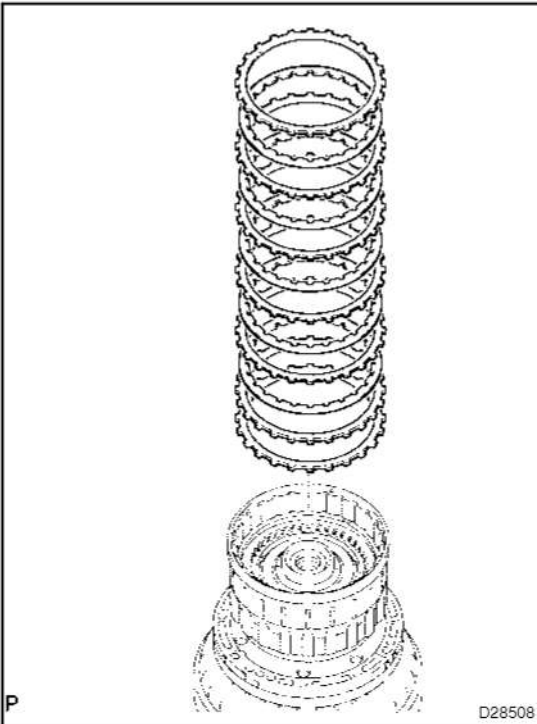
- (b) Remove the 2 O-rings from the forward clutch piston.

**17. REMOVE REVERSE CLUTCH FLANGE**

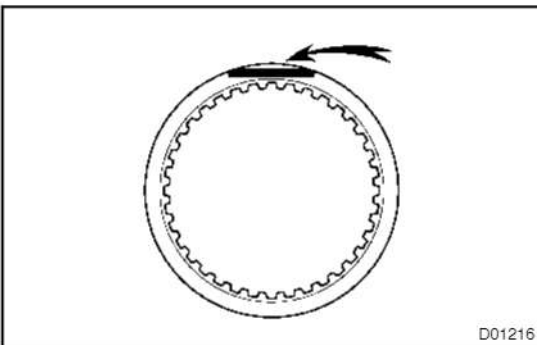
- (a) Remove the reverse clutch flange from the clutch drum assy.

**18. REMOVE DIRECT CLUTCH DISK**

- (a) Using a screwdriver, remove the 2 hole snap rings from the clutch drum assy.



- (b) Remove the reverse clutch flange, the 6 plates and the 5 discs from the clutch drum assy.

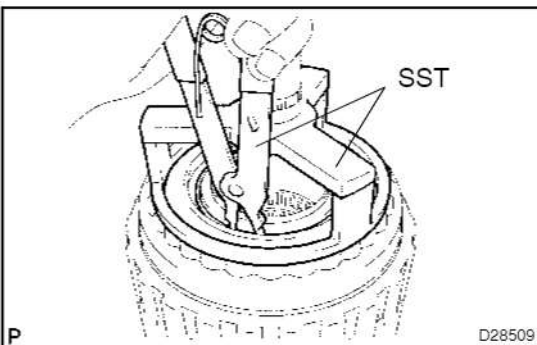


19. INSPECT DIRECT CLUTCH DISK

- (a) Check whether the sliding surface of the disc, the plate and the flange are worn or burnt. If necessary, replace them.

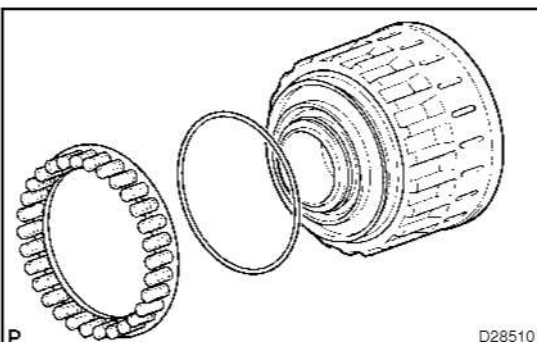
HINT:

- If the lining of the disc is peeled off or discolored, or even if only a part of the printed numbers is damaged, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



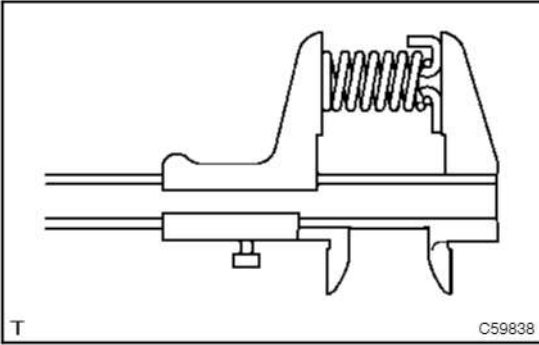
20. REMOVE CLUTCH BALANCER NO.3

- (a) Place SST on the clutch balancer No.3, and compress the return spring with a press.
SST 09387-00070, 09350-30020 (09350-07070)



21. REMOVE REVERSE CLUTCH RETURN SPRING SUB-ASSY

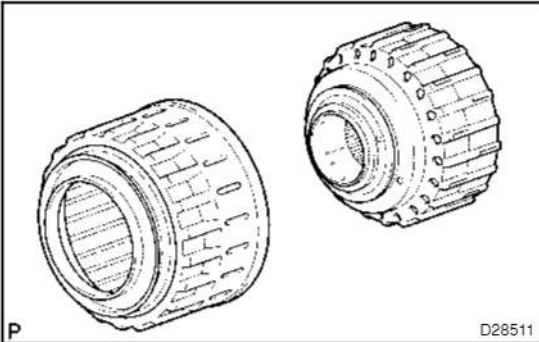
- (a) Remove the reverse clutch return spring and the O-ring from the reverse clutch piston.



22. INSPECT REVERSE CLUTCH RETURN SPRING SUB-ASSY

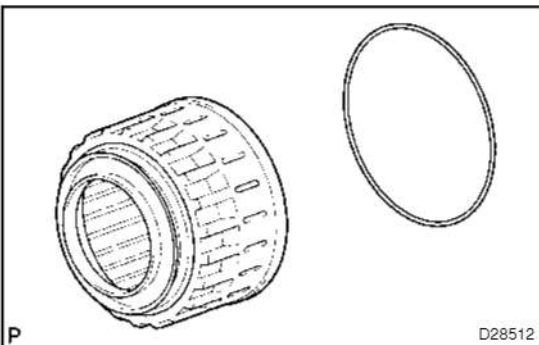
- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 21.04 mm (0.828 in.)

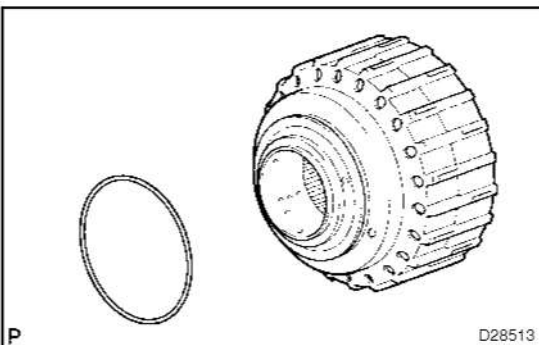


23. REMOVE REVERSE CLUTCH PISTON SUB-ASSY

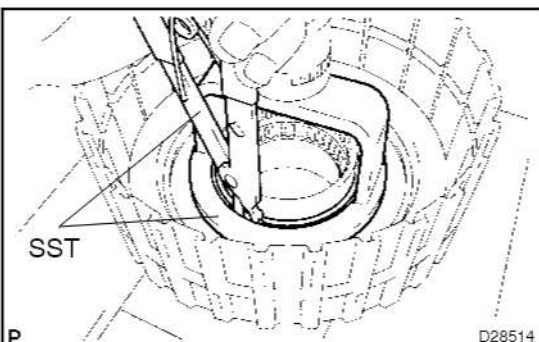
- (a) Remove the reverse clutch piston, sub assy from the clutch drum sub assy.



- (b) Remove the O-ring from the reverse clutch piston sub assy.



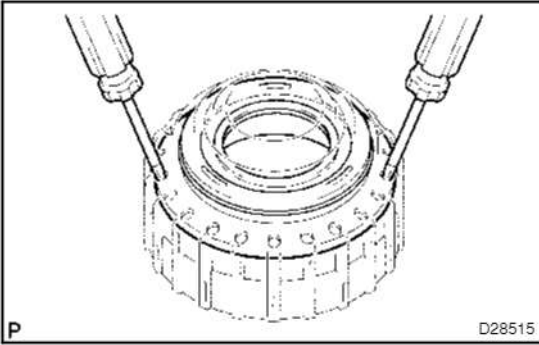
- (c) Remove the O-ring from the clutch drum sub assy.



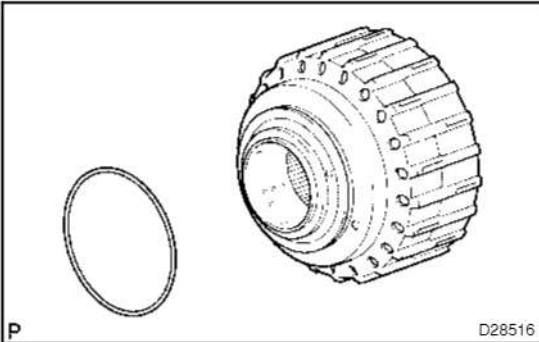
24. REMOVE DIRECT CLUTCH PISTON SUB-ASSY

- (a) Place SST on the direct clutch piston, and compress the return spring with a press.

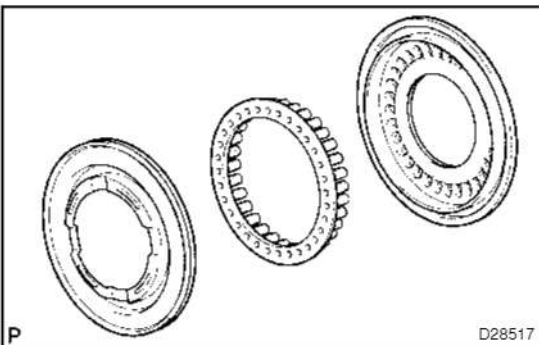
SST 09320-89010, 09350-30020 (09350-07070)



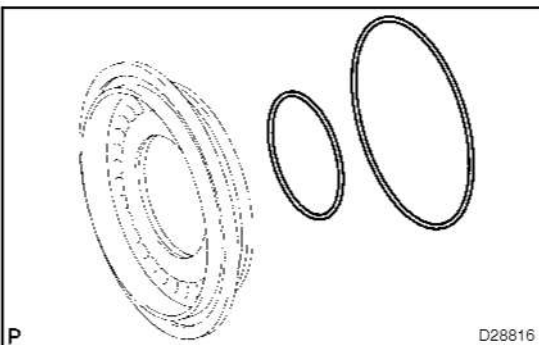
- (b) Using 2 screw drivers, remove the direct clutch piston sub assy from the clutch drum.



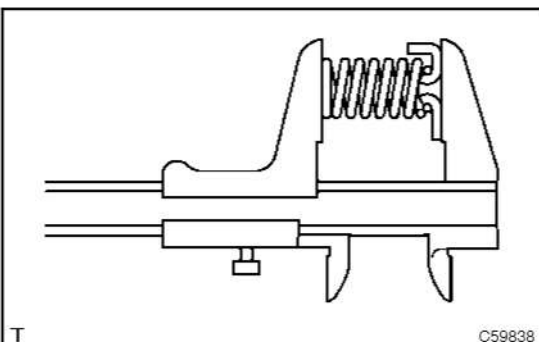
- (c) Remove the O-ring from the clutch drum.



- (d) Remove the clutch balancer No.2 and the direct clutch return spring sub assy from the direct clutch piston sub assy.

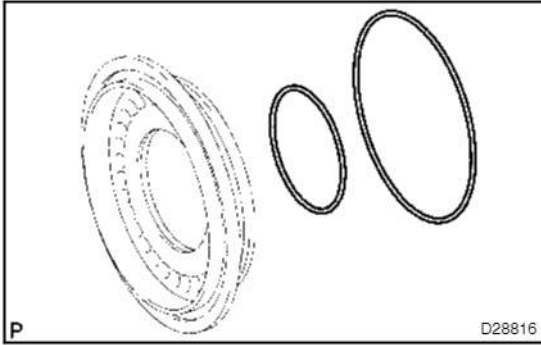


- (e) Remove the 2 O-rings from the direct clutch piston Sub-Assy.

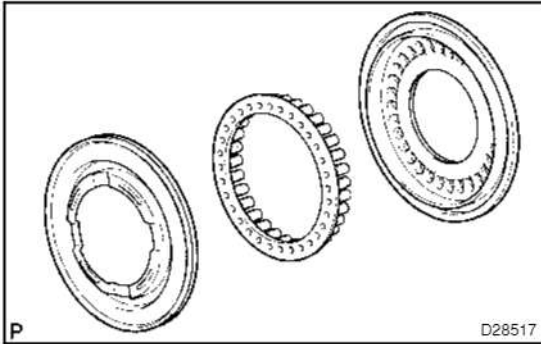


25. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSY

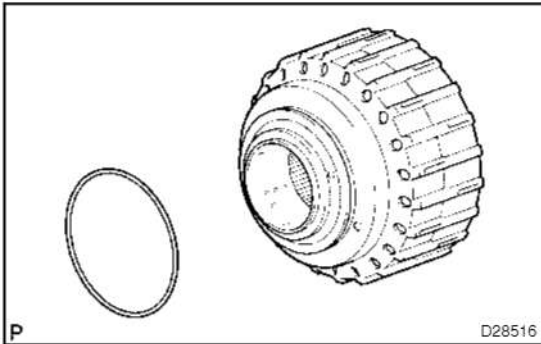
- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 19.51 mm (0.768 in.)

**26. INSTALL DIRECT CLUTCH PISTON SUB-ASSY**

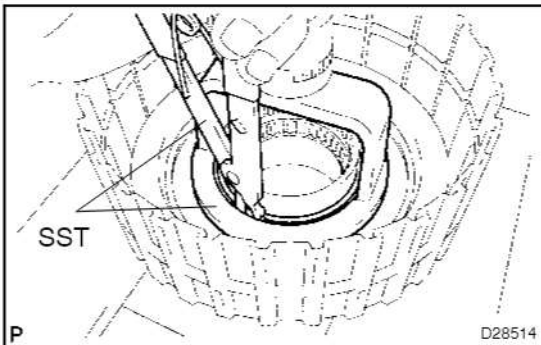
- (a) Coat 2 new O-rings with ATF, and install them in the direct clutch piston.



- (b) Install the clutch balancer No.2 and the direct clutch return spring to the direct clutch piston sub-assy.



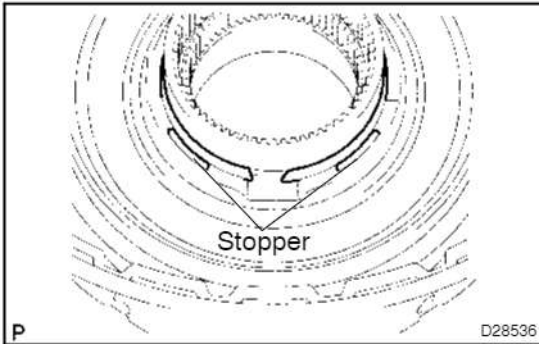
- (c) Coat a new O-ring with ATF, and install them on the clutch drum sub-assy.
- (d) Be careful not to damage the O-rings. Press in the direct clutch piston into the clutch drum with both hands.



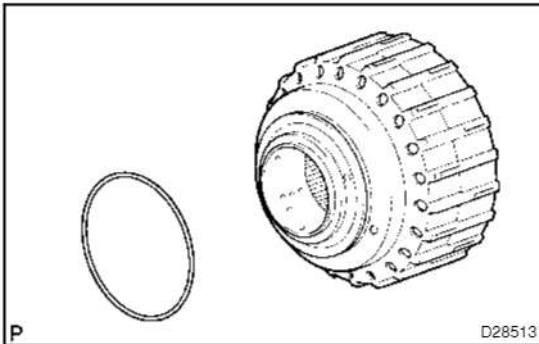
- (e) Place SST on the direct clutch piston, and compress the return spring with a press.
SST 09320-89010, 09350-30020 (09350-07070)
- (f) Install the snap ring with a snap ring expander.

NOTICE:

- Be sure the end gap of the snap ring is not aligned with the spring retainer claw.
- Stop Pressing when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove to prevent the spring sheet from being deformed.
- Do not expand the snap ring excessively.

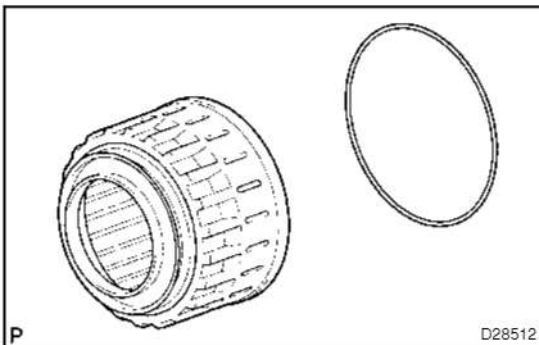


- (g) Set the end gap of the snap ring in the piston as shown in the illustration.

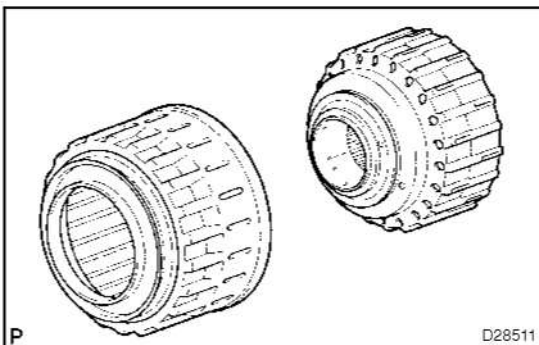


27. INSTALL REVERSE CLUTCH PISTON SUB-ASSY

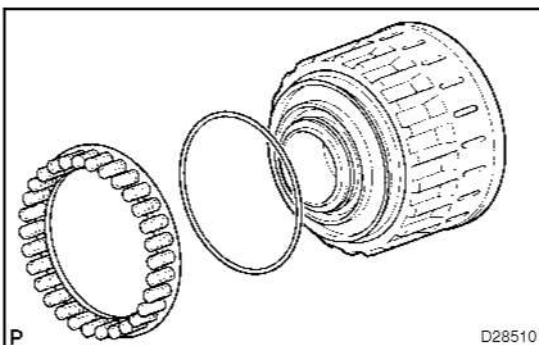
- (a) Coat a new O-ring with ATF, and install it on the clutch drum sub assy.



- (b) Coat a new O-ring with ATF, and install it on the reverse clutch piston sub assy.

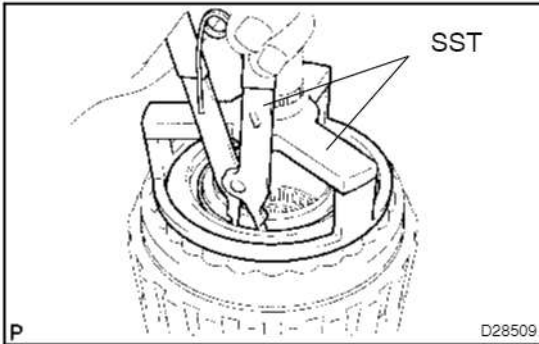


- (c) Be careful not to damage the O-ring. Press in the clutch drum sub assy into the reverse clutch piston with both hands.



28. INSTALL REVERSE CLUTCH RETURN SPRING SUB-ASSY

- (a) Coat a new O-ring with ATF, and install it on the reverse clutch piston sub assy.
- (b) Install the reverse clutch return spring onto the reverse clutch piston sub assy.

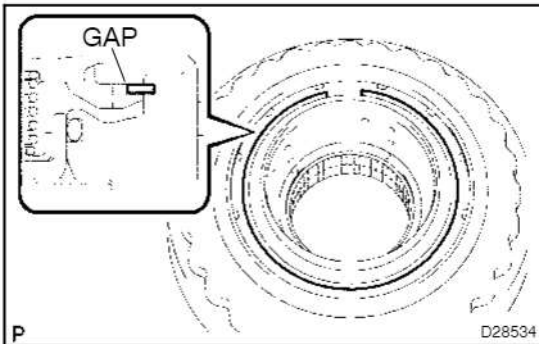


29. INSTALL CLUTCH BALANCER NO.3

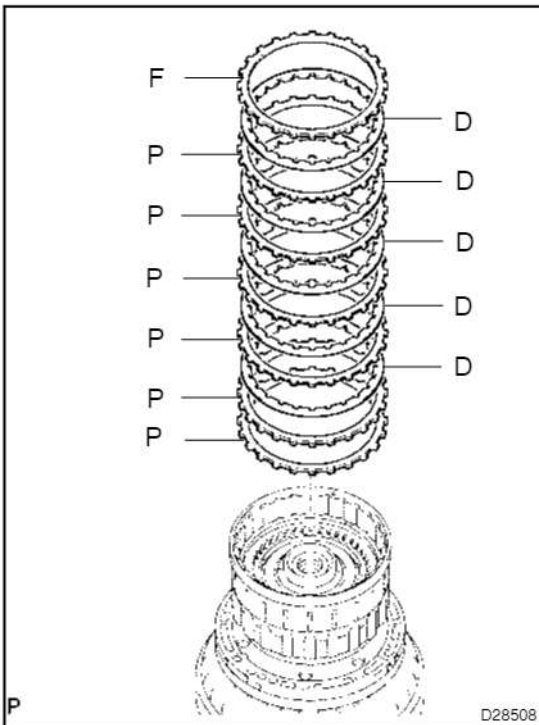
- (a) Place SST on the clutch balancer No.3, and compress the clutch balancer with a press.
SST 09387-00070, 09350-30020 (09350-07070)
- (b) Install the snap ring with a snap ring expander.
- (c) Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

NOTICE:

- **Stop pressing when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove to prevent the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**

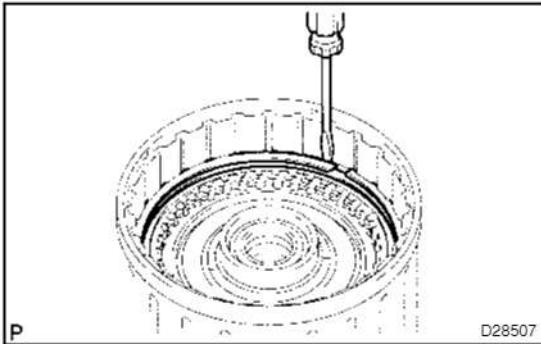


- (d) Set the end gap of the snap ring in the piston as shown in the illustration.

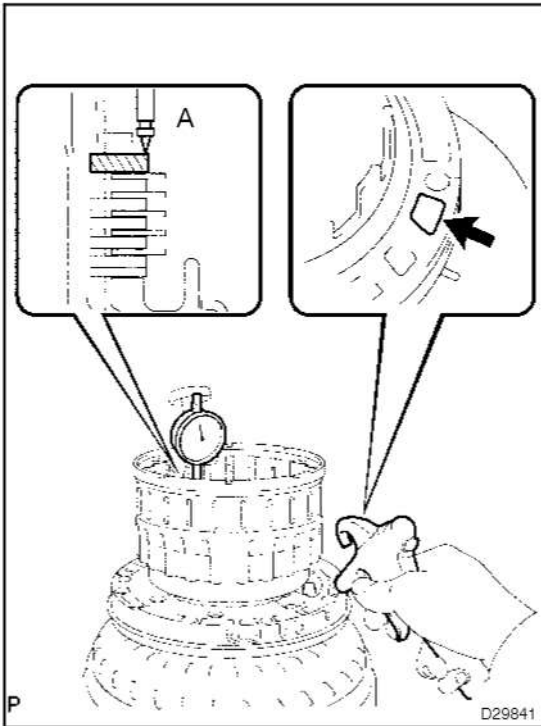


30. INSTALL DIRECT CLUTCH DISK

- (a) Install the reverse clutch flange, the 6 plates and the 5 discs on the clutch drum sub assy.



- (b) Using a screwdriver, install the 2 hole snap rings on the clutch drum sub assy.



31. INSPECT PACK CLEARANCE OF DIRECT CLUTCH

- (a) Using a dial gauge, measure the moving distance (distance A) of the clutch flange at the both end across a diameter while blowing air from the oil hole as shown in the illustration, and calculate the average.

Pack Clearance: 0.5 – 0.8 mm

NOTICE:

Install a selective flange (t 3.4 mm) when measuring the moving distance. (shaded area in the illustration.)

HINT:

Flange moving distance A = 0.26 – 1.14 mm

Pack Clearance = Flange moving distance A – 0.05 mm

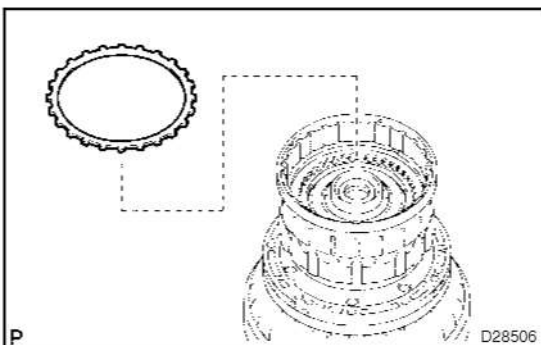
- (b) If the pack clearance is outside the standard, select & install a clutch flange that makes the pack clearance to be within the standard.

HINT:

Select the flange from 9 kinds (in thickness) of the selective flanges to adjust the pack clearance.

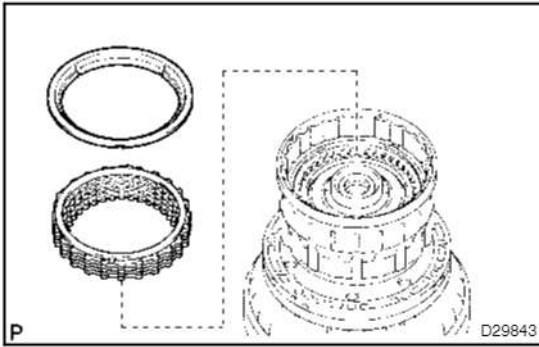
Flange thickness

No.	Thickness	No.	Thickness
0	3.0 (0.118)	5	3.5 (0.138)
1	3.1 (0.122)	6	3.6 (0.142)
2	3.2 (0.126)	7	3.7 (0.146)
3	3.3 (0.130)	8	3.8 (0.150)
4	3.4 (0.134)	-	-



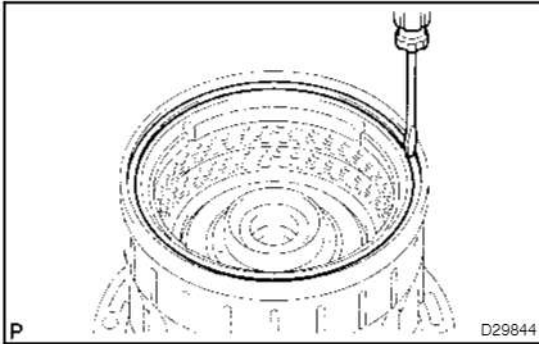
32. INSTALL REVERSE CLUTCH FLANGE

- (a) Install the reverse clutch flange to the clutch drum sub assy.



33. INSTALL REVERSE CLUTCH REACTION SLEEVE

- (a) Install the reverse clutch reaction sleeve, the clutch cushion plate, the reverse clutch flange, the 5 reverse clutch discs, and the 4 clutch plates to the reverse clutch hub.



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

34. INSPECT PACK CLEARANCE OF REVERSE CLUTCH

- (a) Using a dial gauge, measure the reverse clutch piston stroke (distance A) and the moving distance (distance B) of the reverse clutch flange at the both end across a diameter while blowing air (392 kPa, 4 kgf/cm², 57 psi) from the oil hole as shown in the illustration, and calculate the average.

Pack Clearance: 0.5 – 0.8 mm

NOTICE:

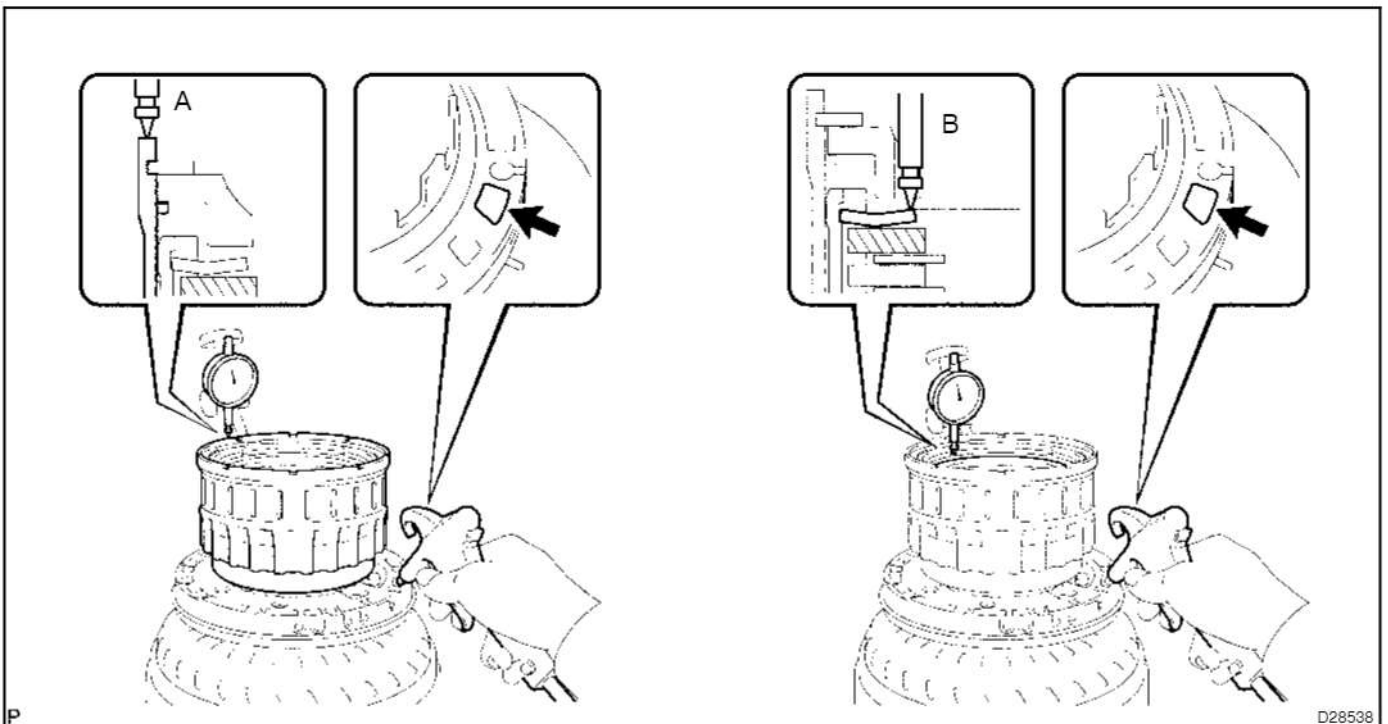
Install a selective flange (t 3.3 mm) when measuring the moving distance. (shaded area in the illustration.)

HINT:

Piston stroke A = 1.05 – 2.15 mm

Flange moving distance B = 0.72 – 1.08 mm

Pack Clearance = Piston stroke A – Flange moving distance B – 0.06



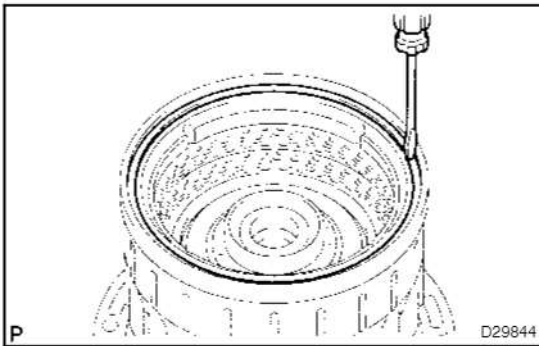
- (b) If the pack clearance is outside the standard, select & install a clutch flange that makes the pack clearance to be within the standard.

HINT:

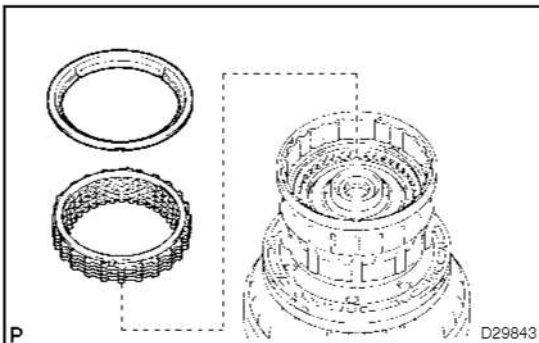
Select the flange from 11 kinds (in thickness) of the selective flanges to adjust the pack clearance.

Flange Thickness: mm (in.)

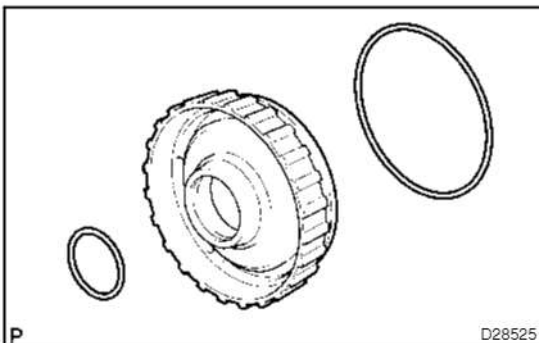
No.	Thickness	No.	Thickness
0	2.8 (0.110)	6	3.4 (0.134)
1	2.9 (0.114)	7	3.5 (0.138)
2	3.0 (0.118)	8	3.6 (0.142)
3	3.1 (0.122)	9	3.7 (0.146)
4	3.2 (0.126)	A	3.8 (0.150)
5	3.3 (0.130)		-

**35. REMOVE REVERSE CLUTCH REACTION SLEEVE**

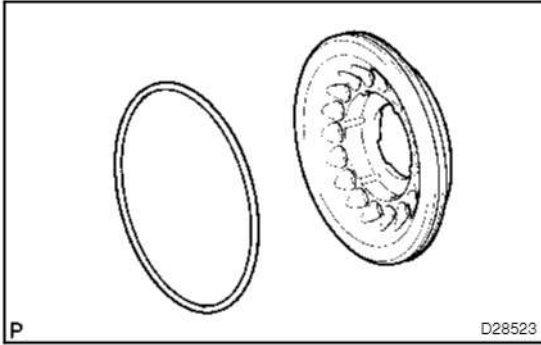
- (a) Using a screwdriver, remove the snap ring from the clutch drum assy.



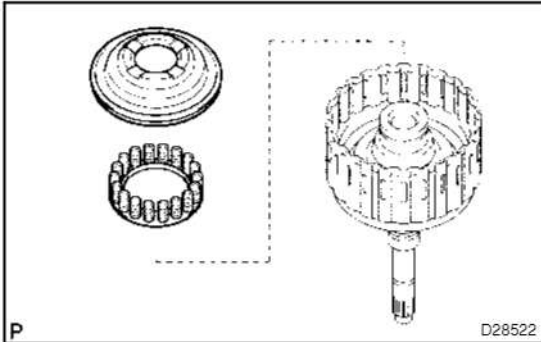
- (b) Remove the reverse clutch reaction sleeve, the clutch cushion plate, the reverse clutch flange, the 5 reverse clutch discs, and the 4 clutch plates from the reverse clutch hub sub assy.

**36. INSTALL FORWARD CLUTCH PISTON**

- (a) Coat 2 new O-rings with ATF, and install them on the forward clutch piston.

**37. INSTALL CLUTCH BALANCER NO. 1**

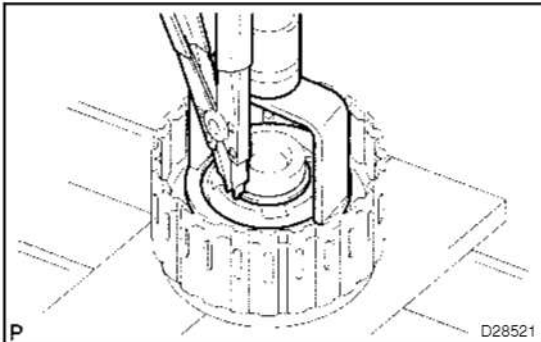
- (a) Coat a new O-ring with ATF and install it on the clutch balancer No. 1.



- (b) Install the clutch balancer No. 1 and the forward clutch return spring sub assembly.

NOTICE:

Be careful not to damage the O-ring.



- (c) Place SST on the clutch balancer No. 1, and compress the return spring with a press.

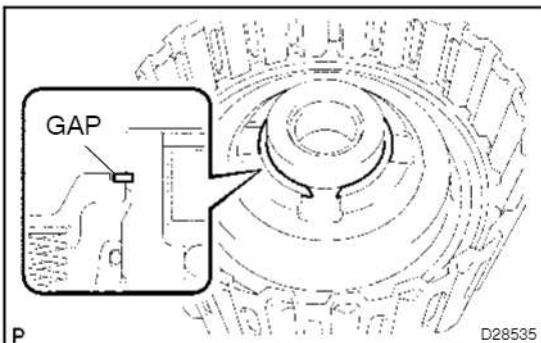
SST 09350-30020 (09350-07040, 09350-07070)

- (d) Install the snap ring with a snap ring expander.

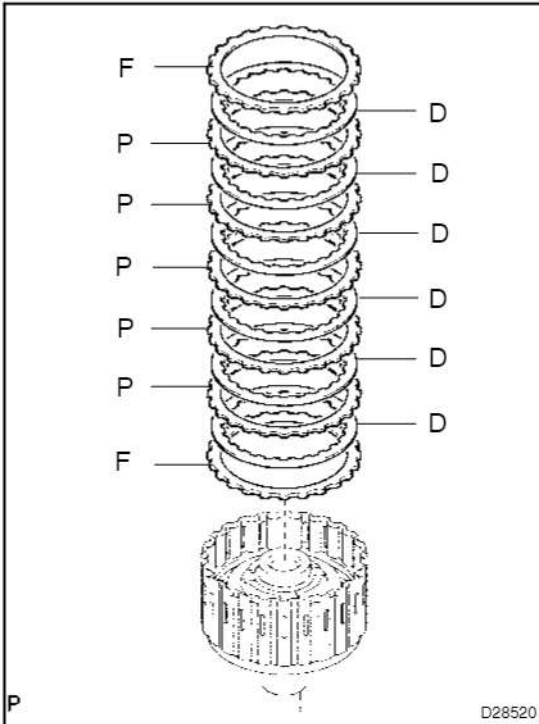
- (e) Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

NOTICE:

- **Stop pressing when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove to prevent the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**

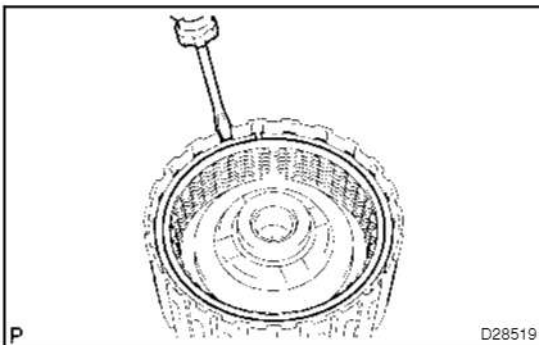


- (f) Set the end gap of the snap ring in the piston as shown in the illustration.

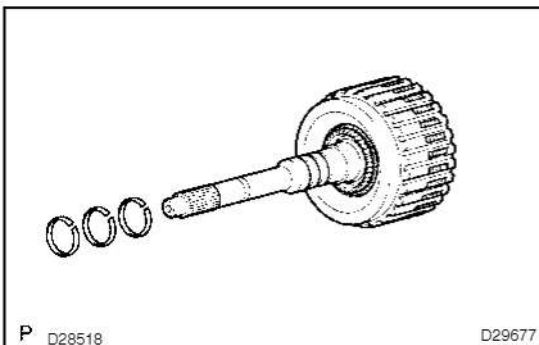


38. INSTALL FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

- (a) Install the 2 flanges, the 6 discs and the 5 plates to the input shaft assy.



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



39. INSTALL INPUT SHAFT OIL SEAL RING

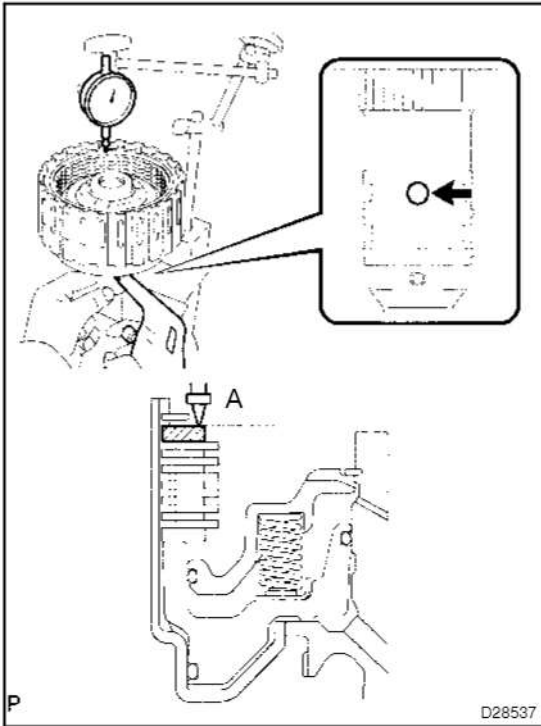
- (a) Coat the 3 oil seal rings with ATF.
- (b) Squeeze the ends of the 3 oil seal rings together, and then install them to the starter shaft groove.

NOTICE:

Do not over-spread the ring ends.

HINT:

After installing the oil seal rings, check that they rotate smoothly.



40. INSPECT PACK CLEARANCE OF FORWARD CLUTCH

- (a) Using a dial gauge, measure the moving distance (distance A) of the clutch flange at the both end across a diameter while blowing air from the oil hole as shown in the illustration, and calculate the average.

Pack Clearance: 0.6 - 0.9 mm

NOTICE:

Install a selective flange (t 3.4 mm) when measuring the moving distance. (shaded area in the illustration.)

HINT:

Flange moving distance A = 0.26 - 1.36 mm

Pack Clearance = Flange moving distance A - 0.01 mm

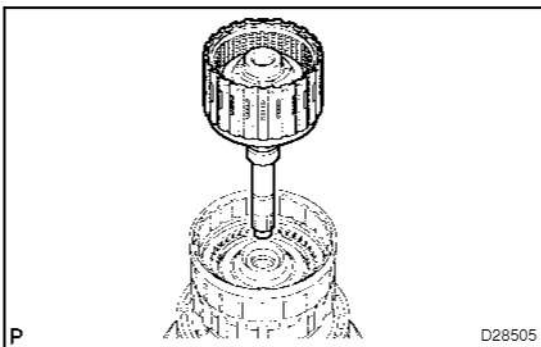
- (b) If the pack clearance is outside the standard, select & install a clutch flange that makes the pack clearance to be within the standard.

HINT:

Select the flange from 11 kinds (in thickness) of the selective flanges to adjust the pack clearance.

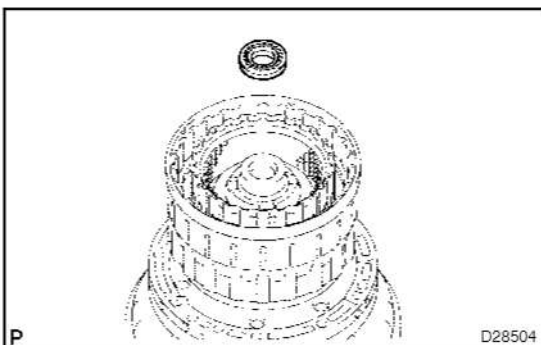
Flange thickness

No.	Thickness	No.	Thickness
0	3.0 (0.118)	6	3.6 (0.142)
1	3.1 (0.122)	7	3.7 (0.146)
2	3.2 (0.126)	8	3.8 (0.150)
3	3.3 (0.130)	9	3.9 (0.154)
4	3.4 (0.134)	A	4.0 (0.158)
5	3.5 (0.138)		-



41. INSTALL INPUT SHAFT ASSY

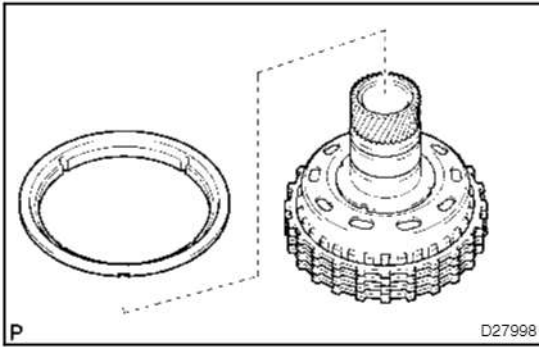
- (a) Install the input shaft assy to the clutch drum.



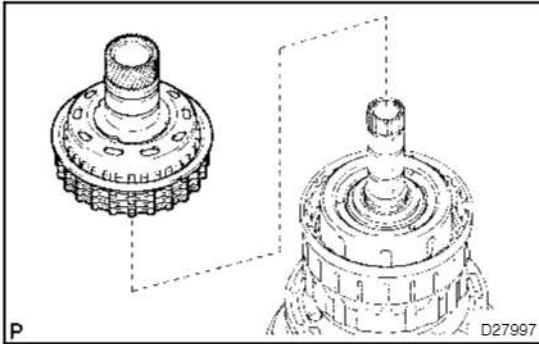
- (b) Install the thrust needle roller bearing to the clutch drum assy.

Thrust needle roller bearing diameter: mm (in.)

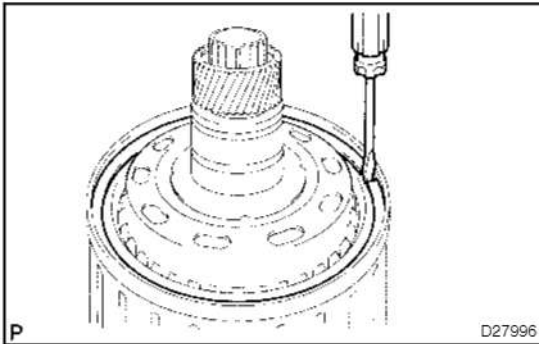
	Inside	Outside
Thrust needle roller bearing	21.3 (0.839)	41.1 (1.618)

**45. INSTALL REVERSE CLUTCH REACTION SLEEVE**

- (a) Install the reverse clutch reaction sleeve to the reverse clutch hub.

**46. INSTALL REVERSE CLUTCH HUB SUB-ASSY**

- (a) Install the reverse clutch hub sub assy, the reverse clutch reaction sleeve, the clutch cushion plate, the reverse clutch flange, the 5 reverse clutch discs, and the 4 clutch plates to the clutch drum assy.

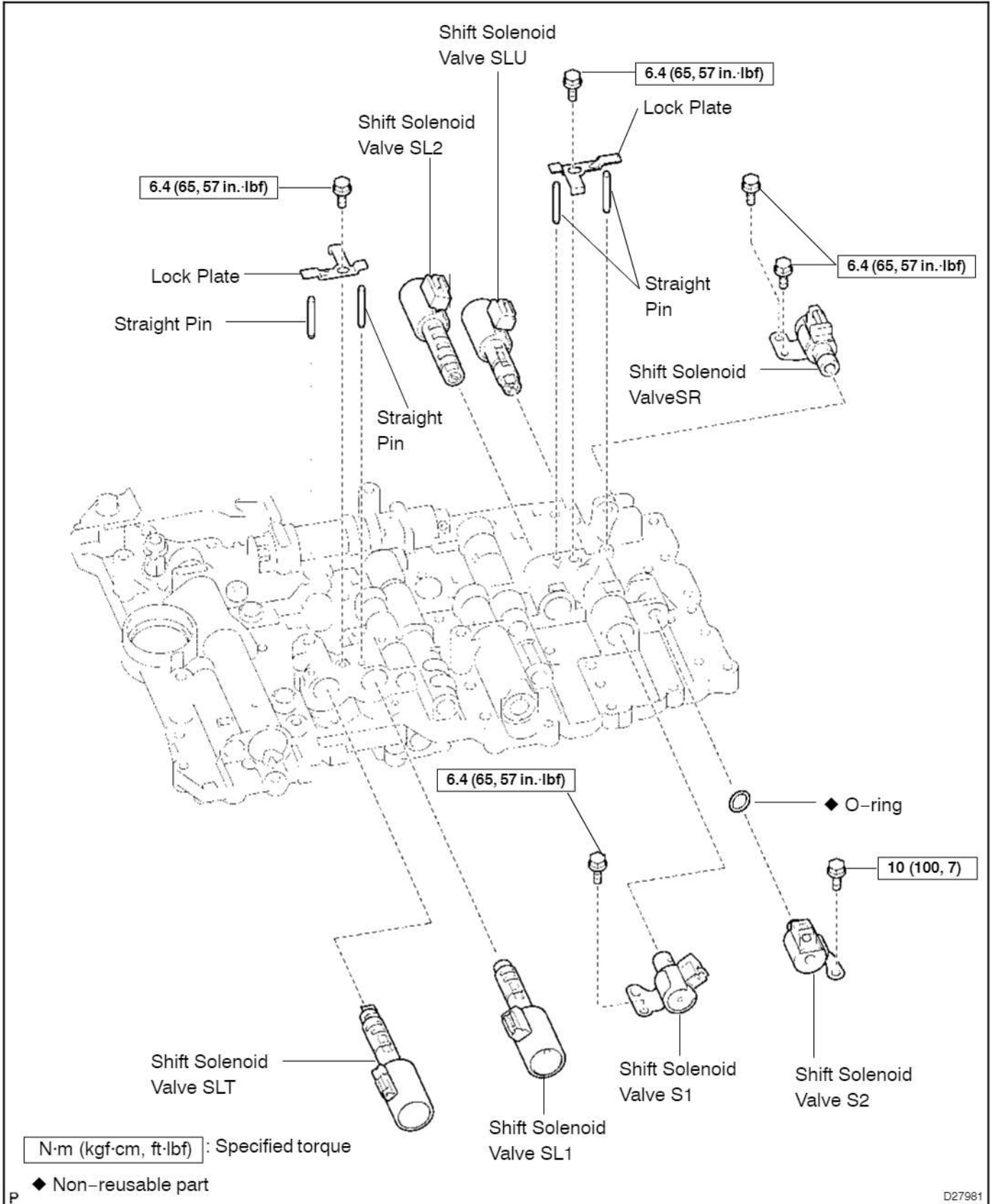


- (b) Using a screwdriver, install the snap ring on the clutch drum and the input shaft assy.

TRANSMISSION VALVE BODY ASSY (A750E/A750F)

COMPONENTS

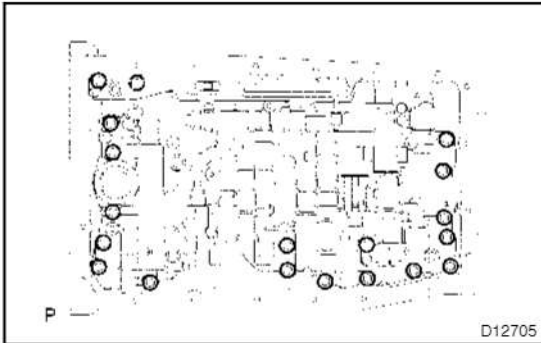
4007L-02



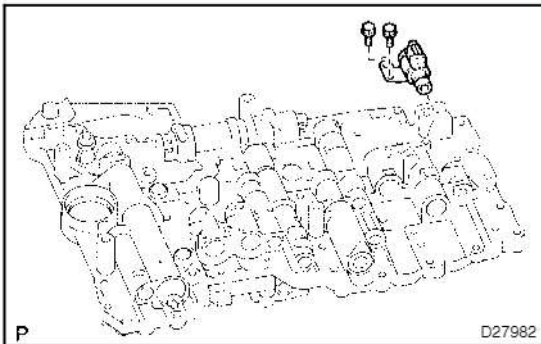
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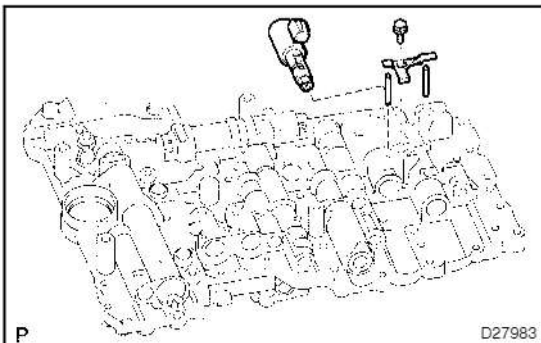
OVERHAUL

**1. REMOVE TRANSMISSION VALVE BODY ASSY**

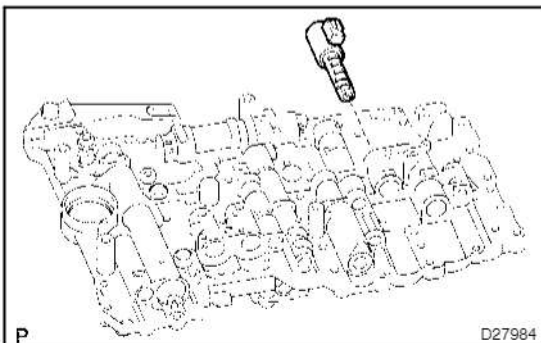
- (a) Remove the 19 bolts.
- (b) Remove the valve body assy.

**2. REMOVE SHIFT SOLENOID VALVE SR**

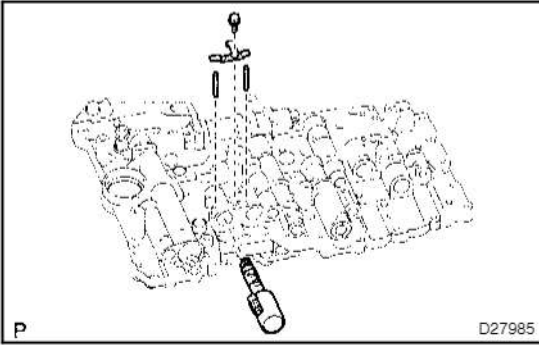
- (a) Remove the 2 bolts and the shift solenoid valve SR.

**3. REMOVE SHIFT SOLENOID VALVE SLU**

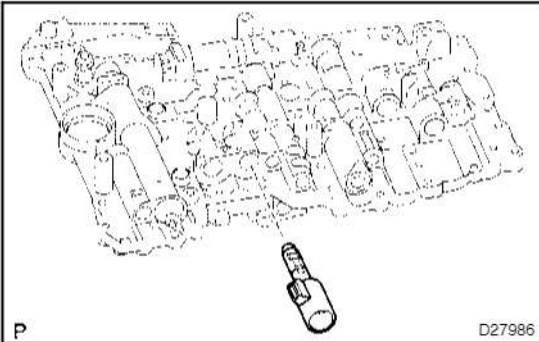
- (a) Remove the bolt, the 2 straight pins and the solenoid lock plate.
- (b) Remove the shift solenoid valve SLU.

**4. REMOVE SHIFT SOLENOID VALVE SL2**

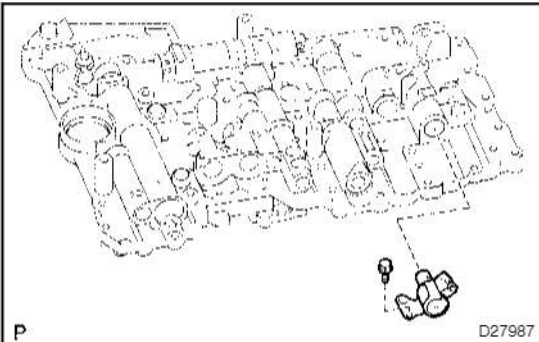
- (a) Remove the shift solenoid valve SL2.

**5. REMOVE SHIFT SOLENOID VALVE SLT**

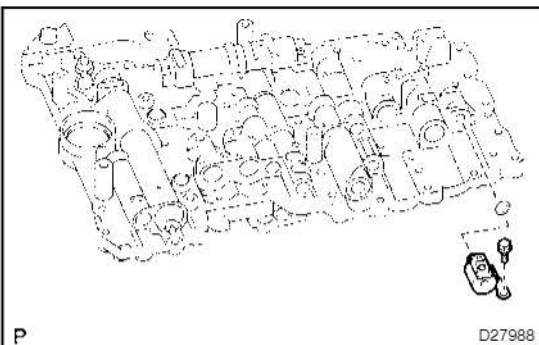
- (a) Remove the bolt, the 2 straight pins and the solenoid lock plate.
- (b) Remove the shift solenoid valve SLT.

**6. REMOVE SHIFT SOLENOID VALVE SL1**

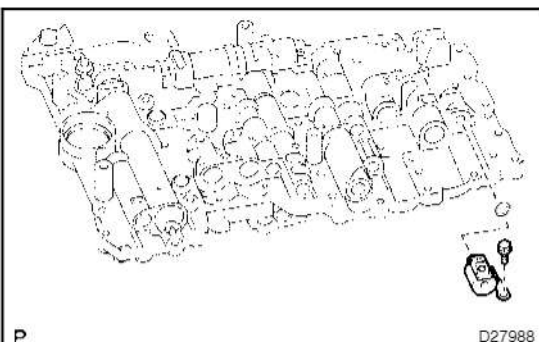
- (a) Remove the shift solenoid valve SL1.

**7. REMOVE SHIFT SOLENOID VALVE S1**

- (a) Remove the bolt and the shift solenoid valve S1.

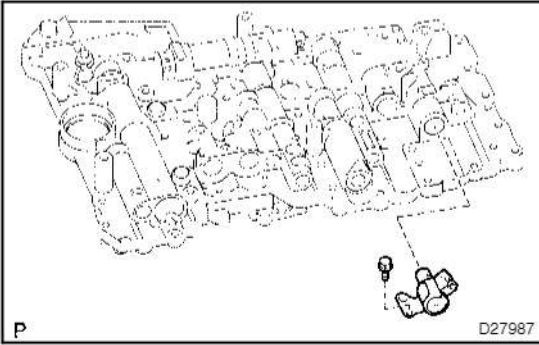
**8. REMOVE SHIFT SOLENOID VALVE S2**

- (a) Remove the bolt and the shift solenoid valve S2.
- (b) Remove the O-ring from the shift solenoid valve S2.

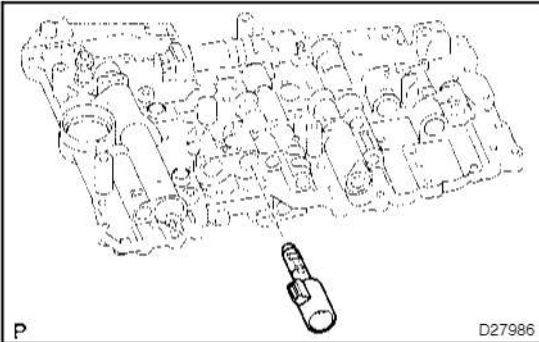
**9. INSTALL SHIFT SOLENOID VALVE S2**

- (a) Install the O-ring to the shift solenoid valve S2.
- (b) Install the bolt and the shift solenoid valve S2.

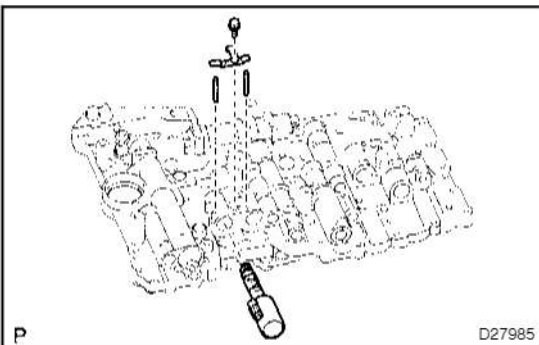
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



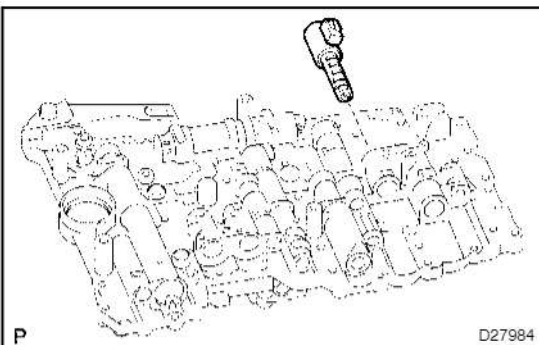
- 10. INSTALL SHIFT SOLENOID VALVE S1**
- Install the O-ring to the shift solenoid valve S1.
 - Install the bolt and the shift solenoid valve S1.
- Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)**



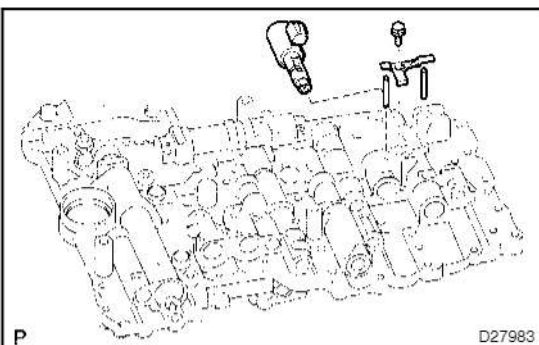
- 11. INSTALL SHIFT SOLENOID VALVE SL1**
- Install the shift solenoid valve SL1.



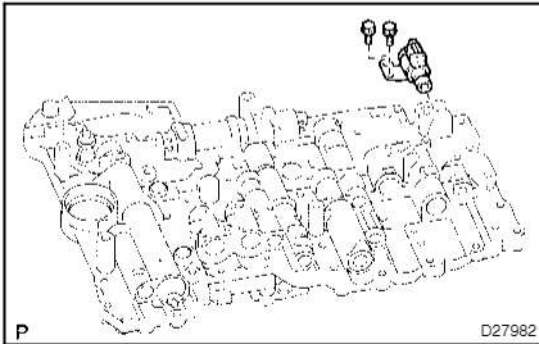
- 12. INSTALL SHIFT SOLENOID VALVE SLT**
- Install the shift solenoid valve SLT.
 - Install the bolt, the 2 straight pins and the solenoid lock plate.
- Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)**



- 13. INSTALL SHIFT SOLENOID VALVE SL2**
- Install the shift solenoid valve SL2.

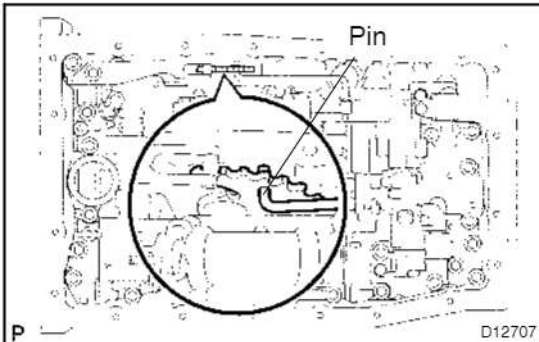


- 14. INSTALL SHIFT SOLENOID VALVE SLU**
- Install the shift solenoid valve SLU.
 - Install the bolt, the 2 straight pins and the solenoid lock plate.
- Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)**

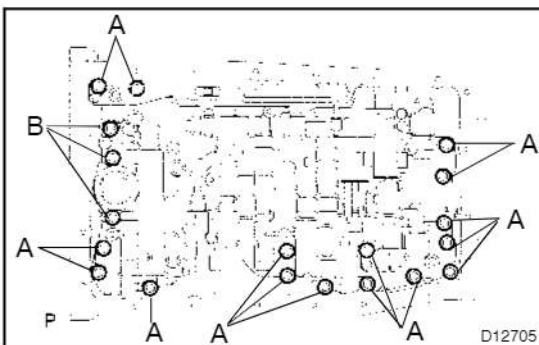
**15. INSTALL SHIFT SOLENOID VALVE SR**

- (a) Instal the 2 bolts and the shift solenoid valve SR.

Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)

**16. INSTALL TRANSMISSION VALVE BODY ASSY**

- (a) Align the groove of the manual valve with the pin of the lever.



- (b) Install the 19 bolts.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

HINT:

Each bolt length is indicated below.

Blot length:

Bolt A: 25 mm (0.98 in.)

Bolt B: 36 mm (1.42 in.)