

TERMS FOR AUTOMATIC TRANSAXLE REPAIR MANUAL

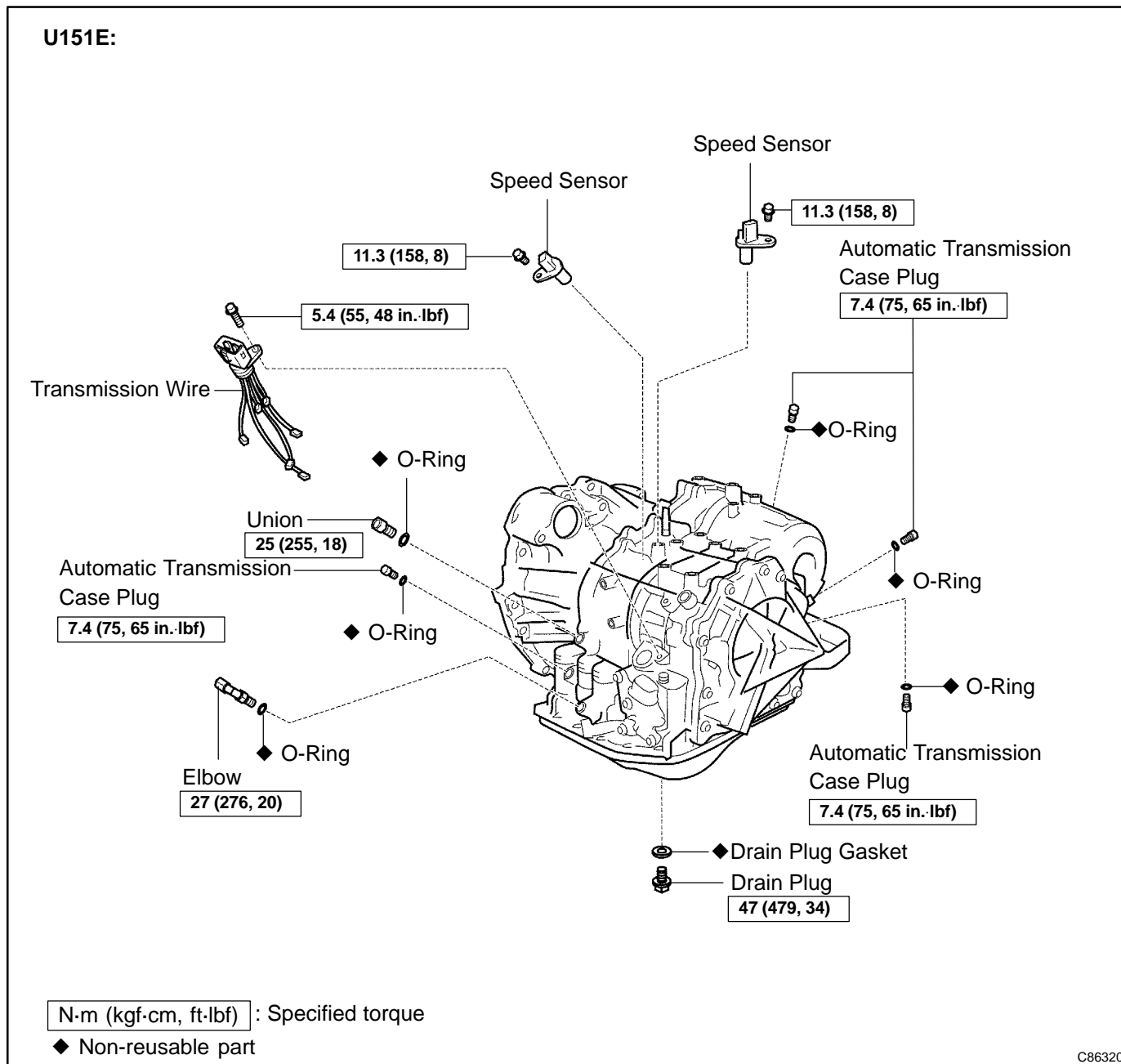
ABBREVIATIONS USED IN THIS MANUAL

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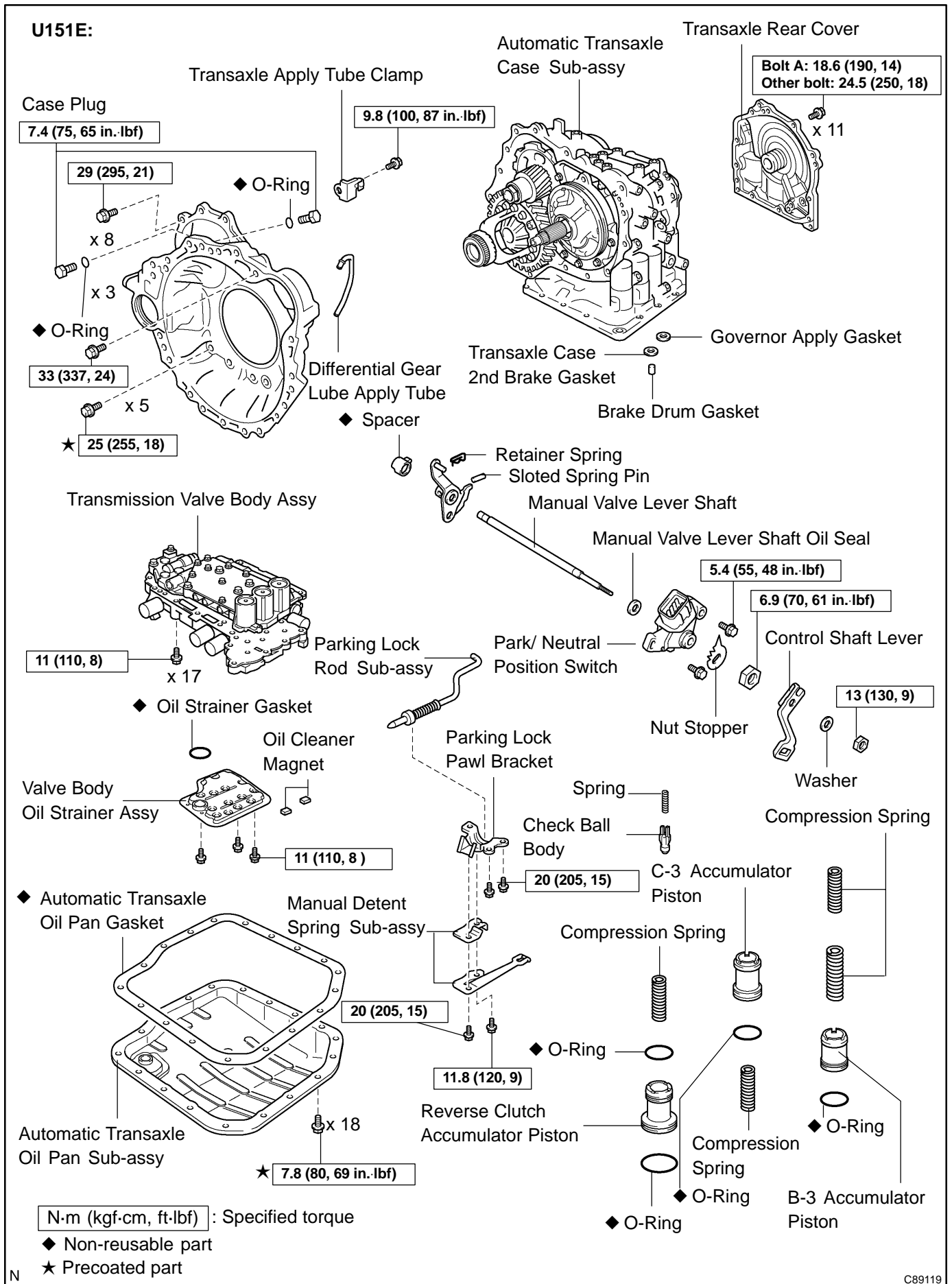
Abbreviations	Meaning
ASSY	Assembly
ATF	Automatic Transaxle Fluid
B ₃	U/D Brake
C ₂	Reverse Clutch
C ₃	U/D Clutch
FIPG	Formed In Place Gasket
O/D	Overdrive
SSM	Special Service Materials
SST	Special Service Tools
U/D	Underdrive
w/	With
w/o	Without
1st	First
2nd	Second

AUTOMATIC TRANSMISSION / TRANSAXLE (U151E/U151F) COMPONENTS

4010I-01

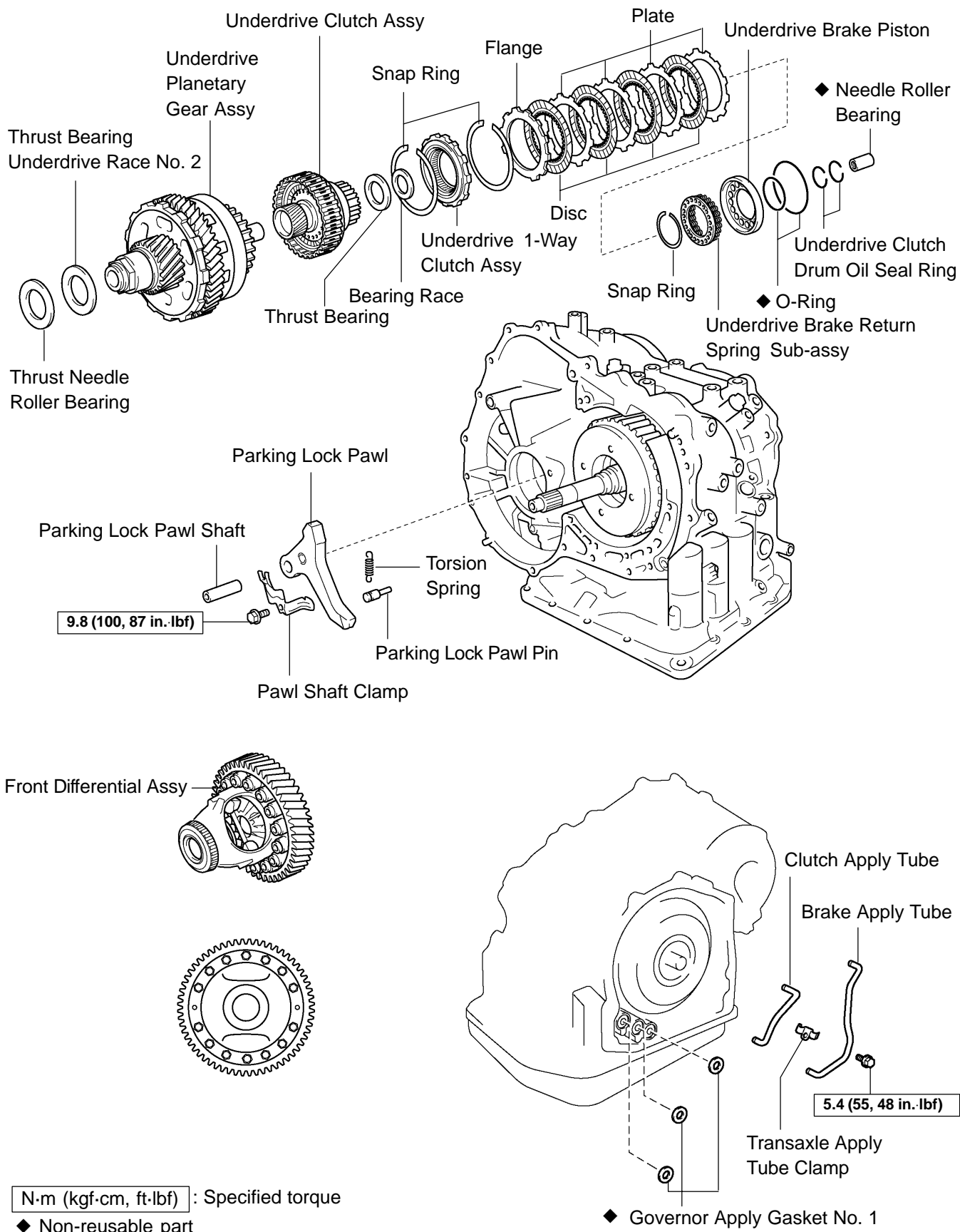


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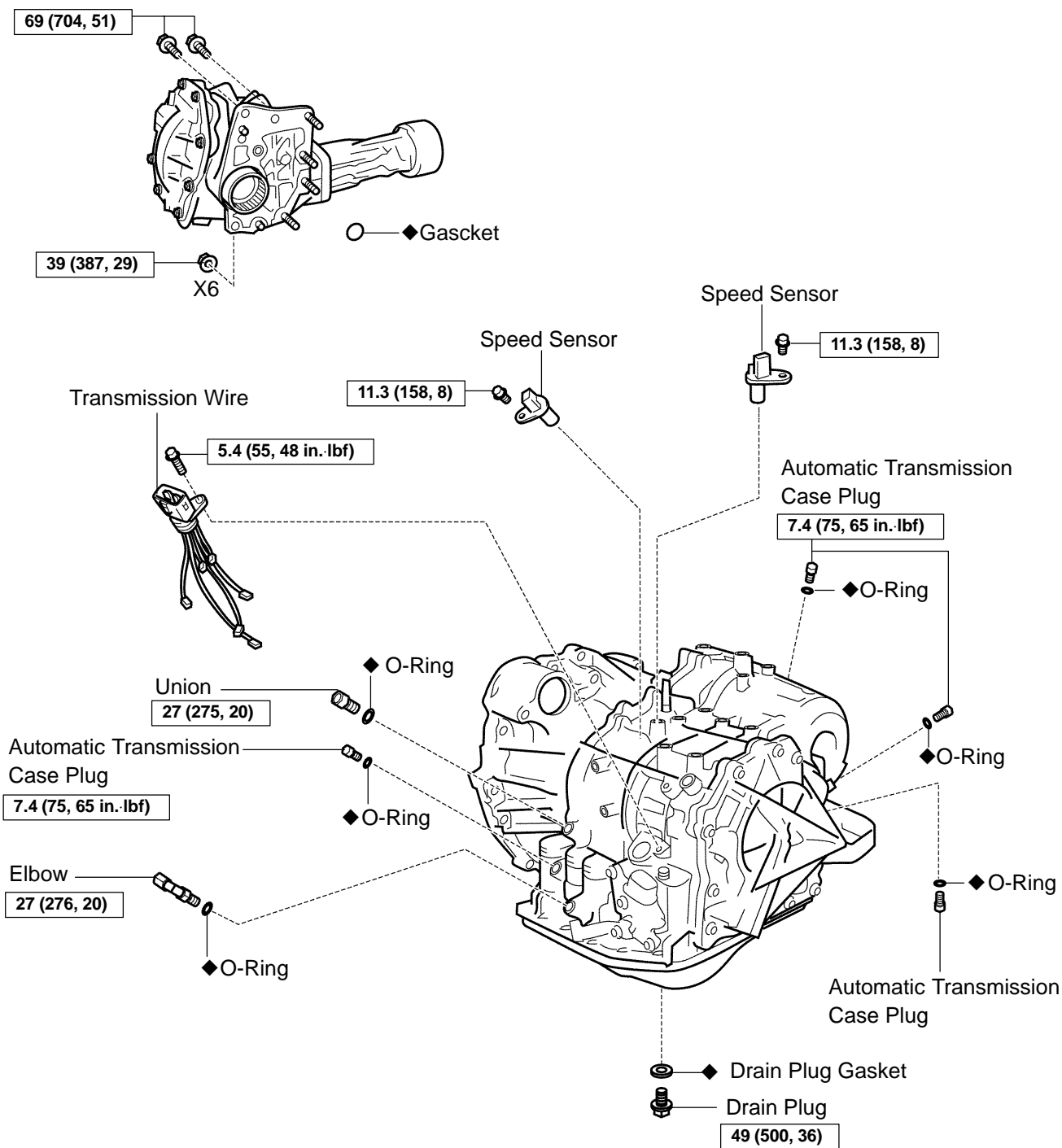
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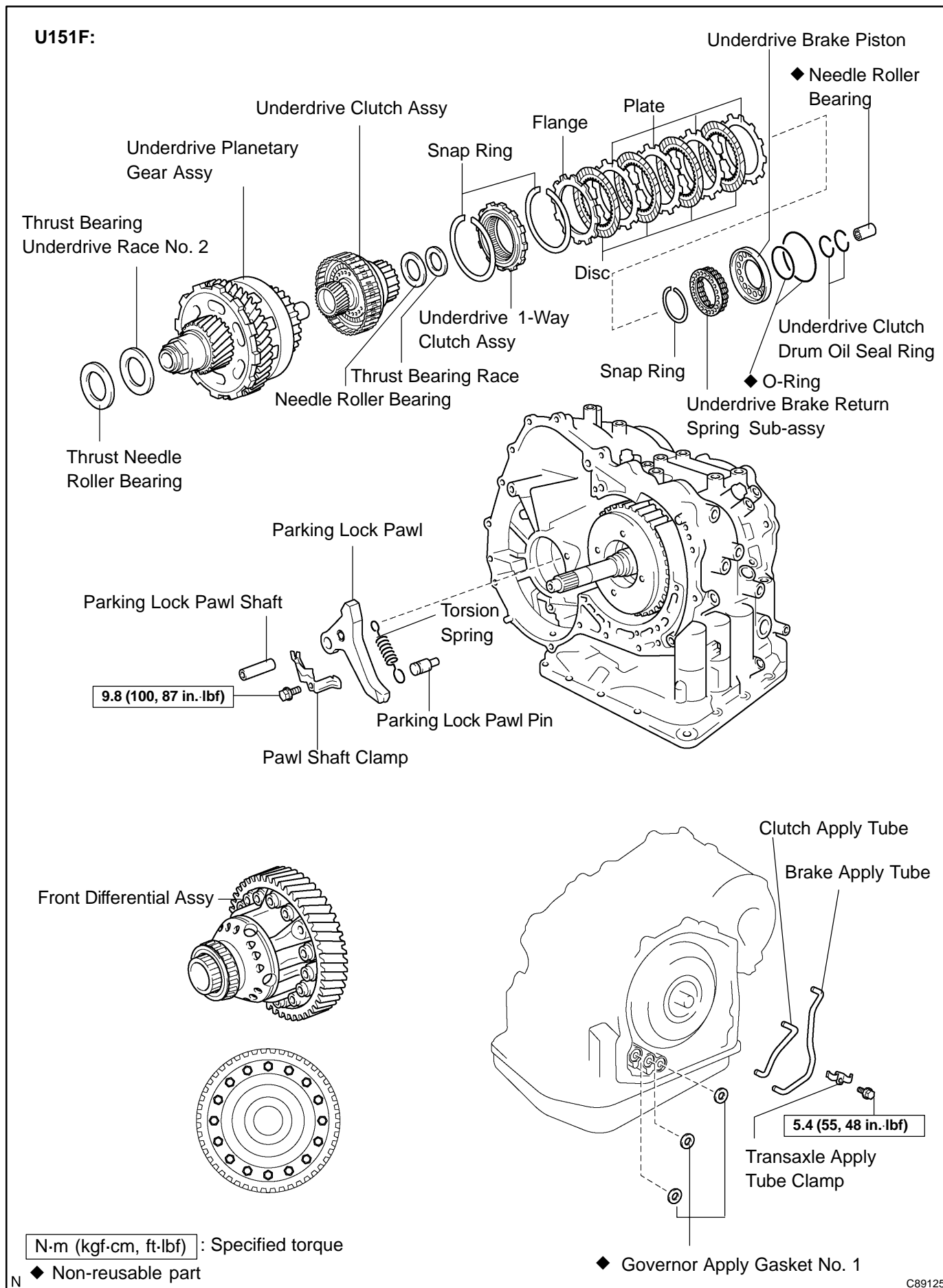
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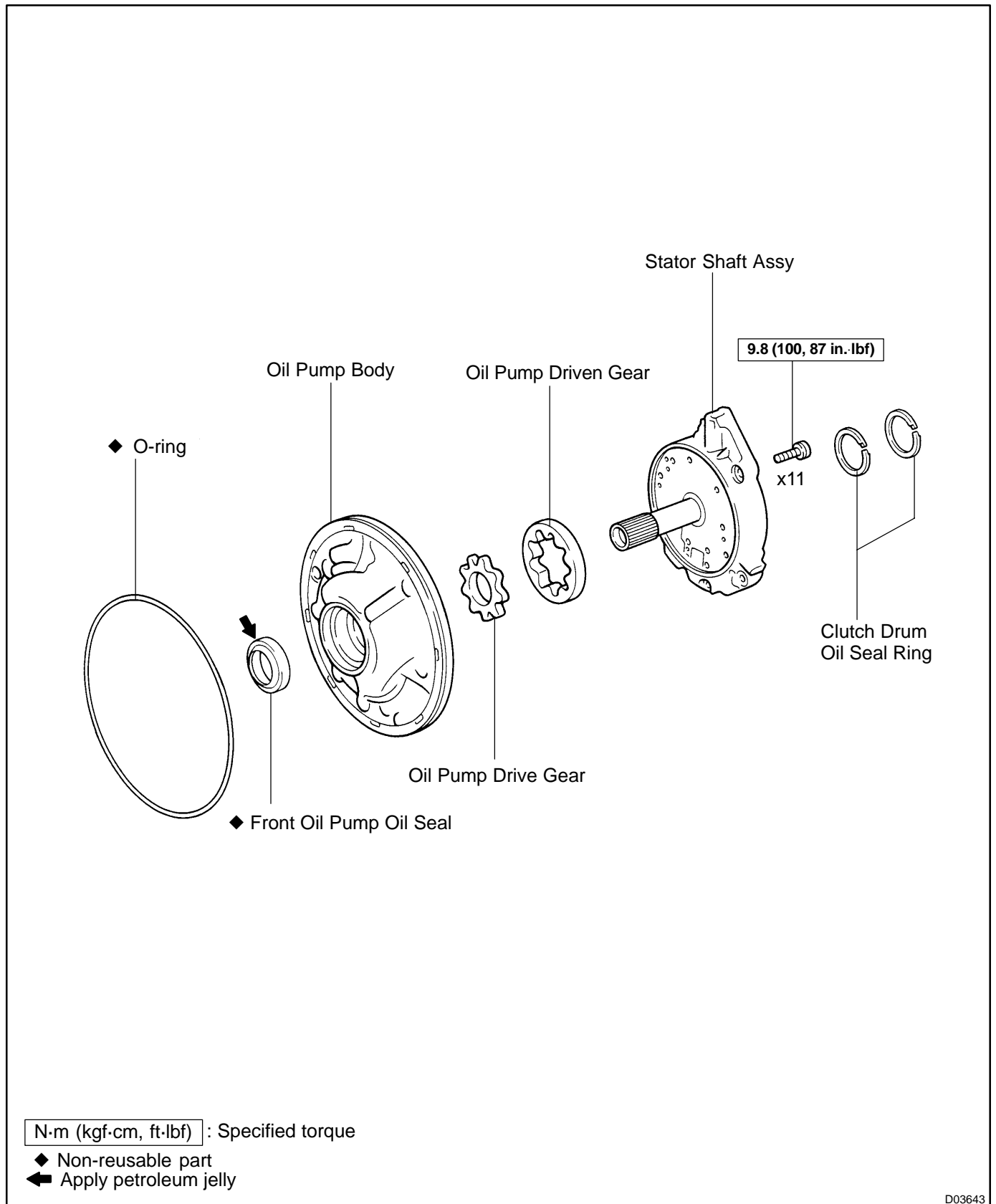


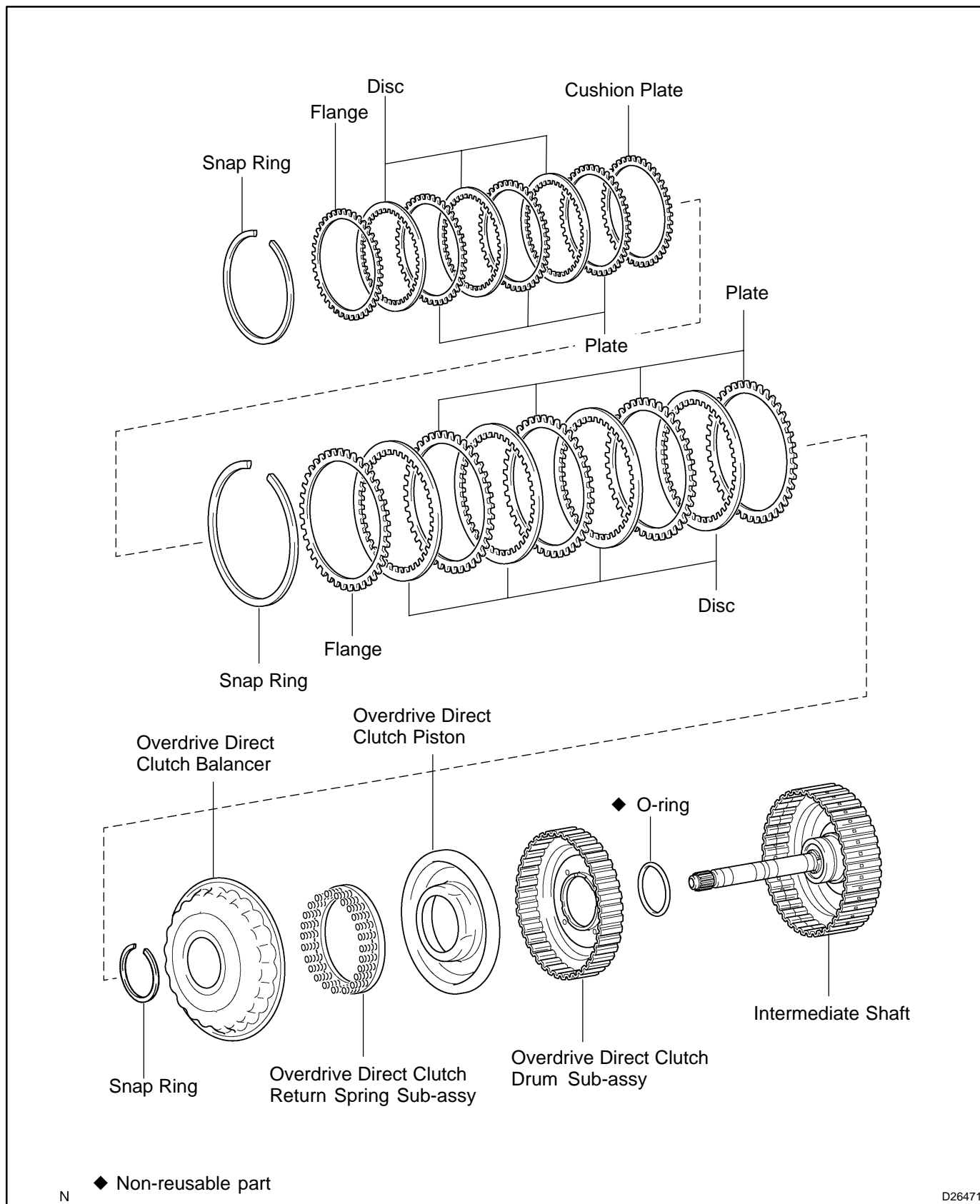
N·m (kgf·cm, ft·lbf) : Specified torque
 ◆ Non-reusable part

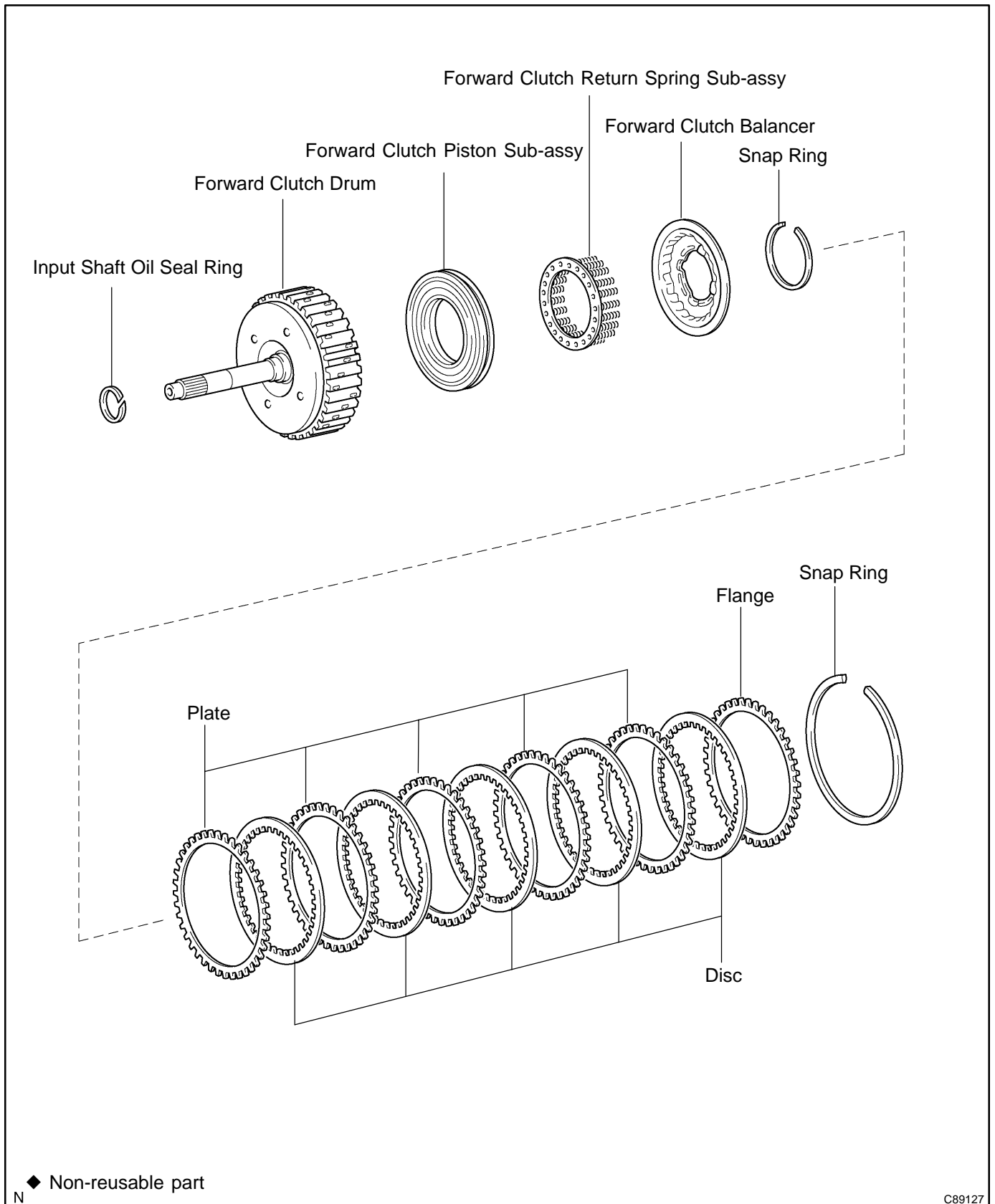
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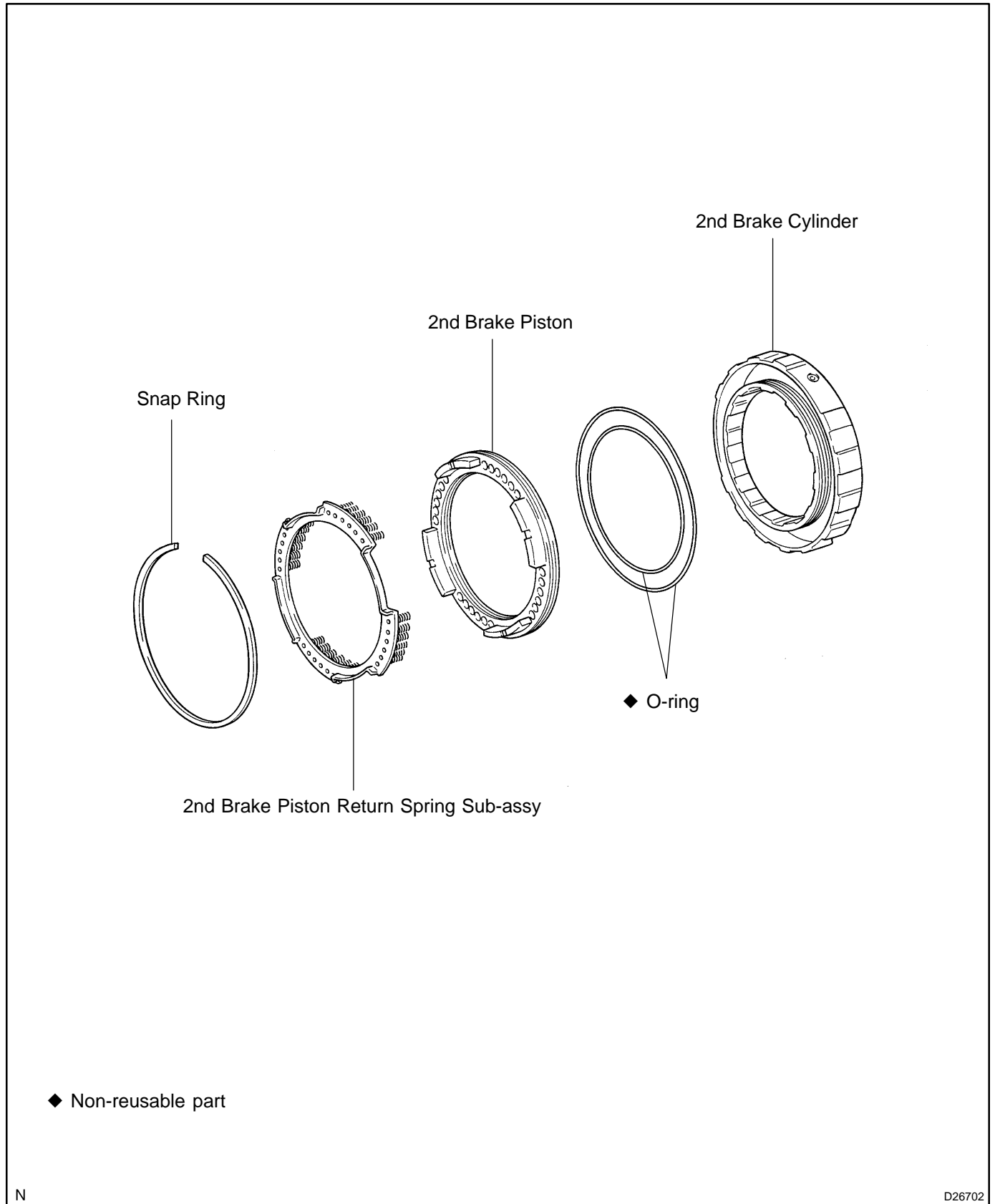


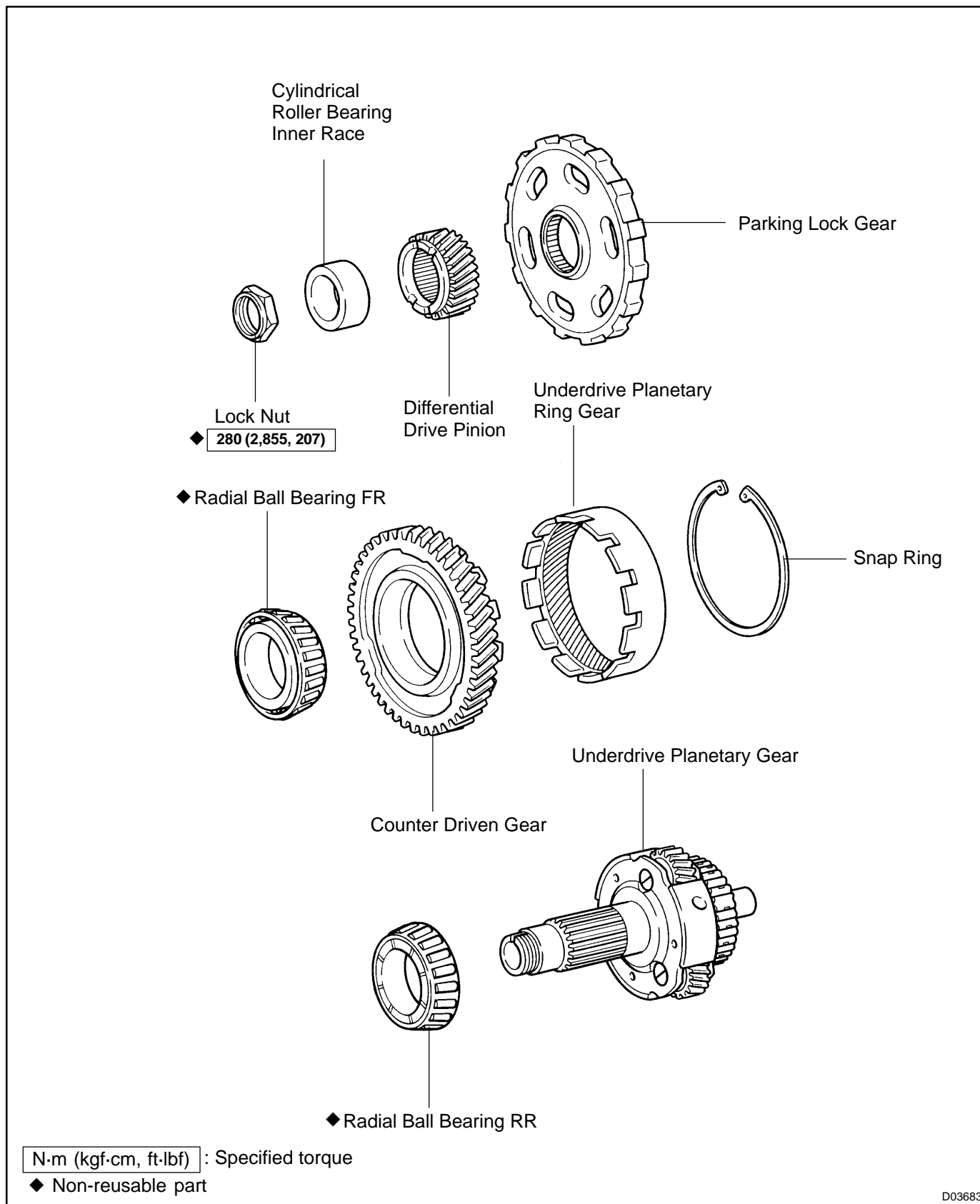
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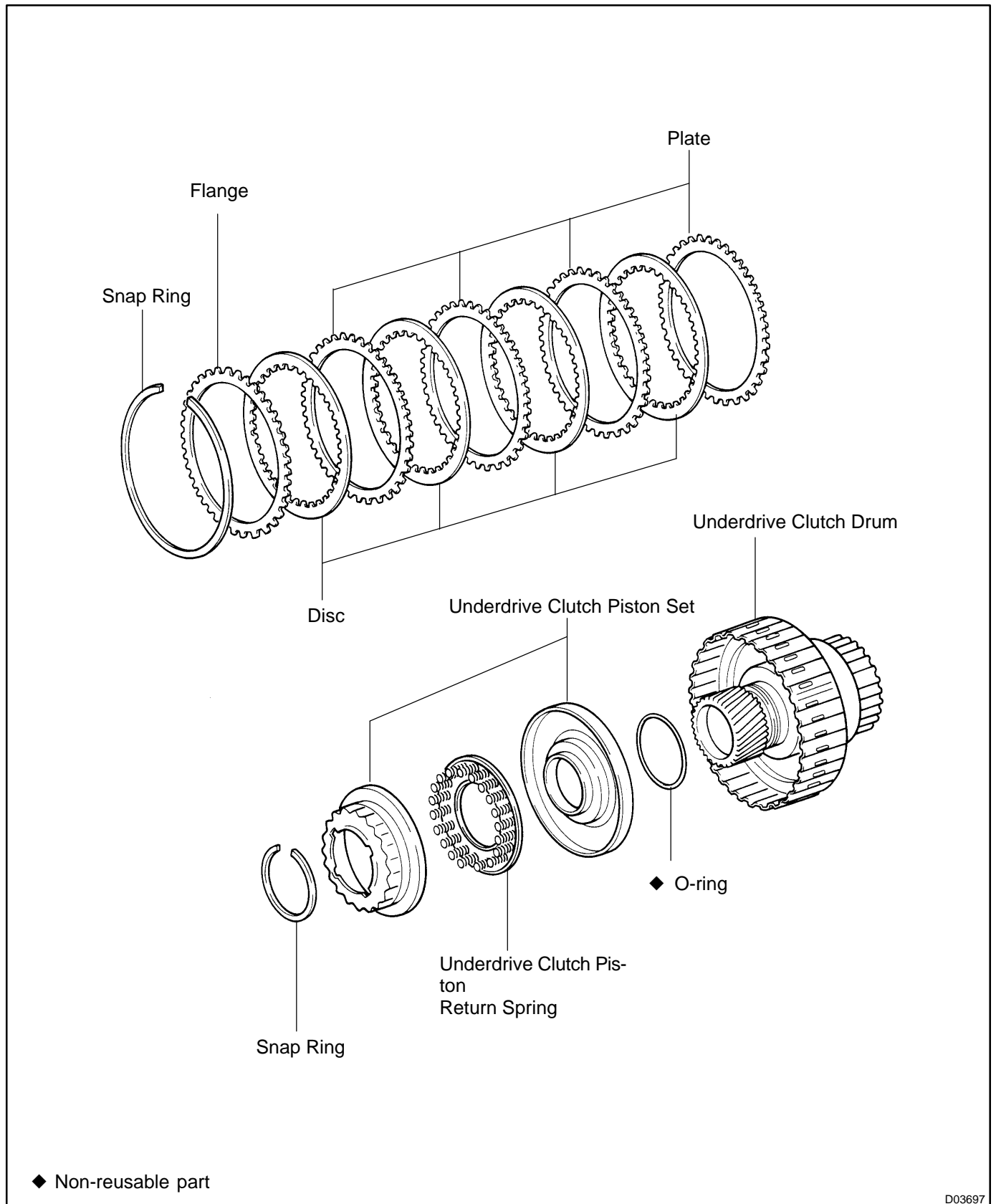




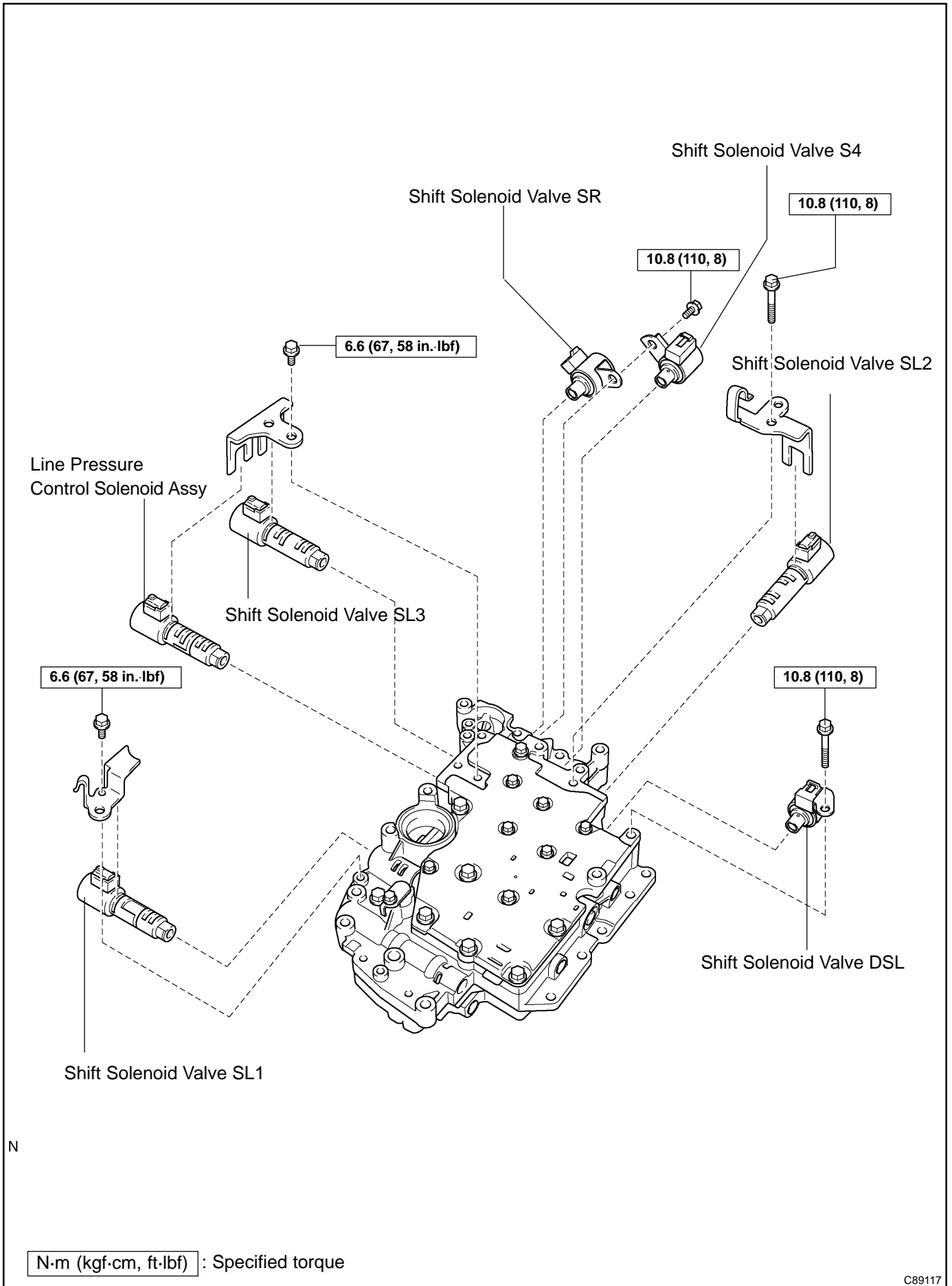


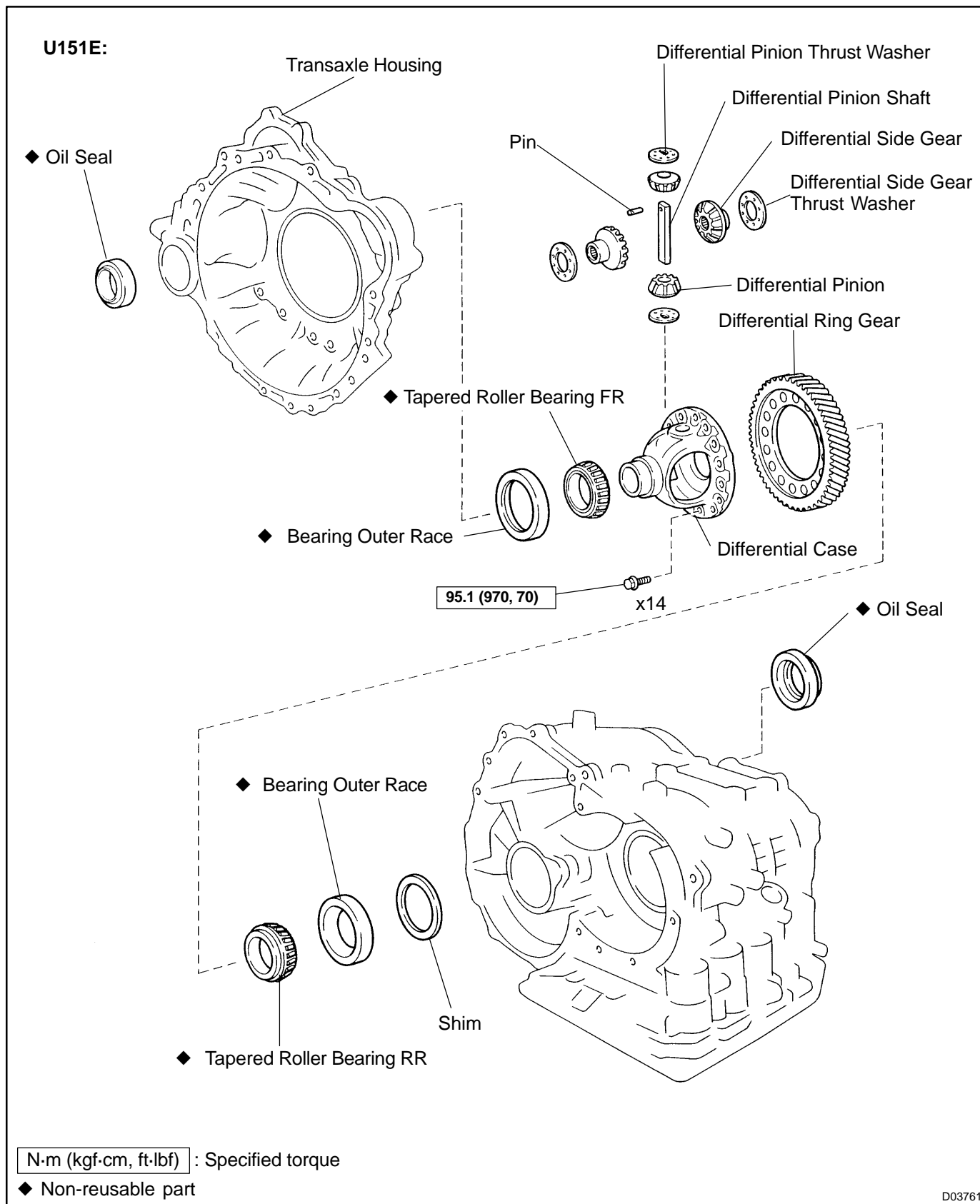


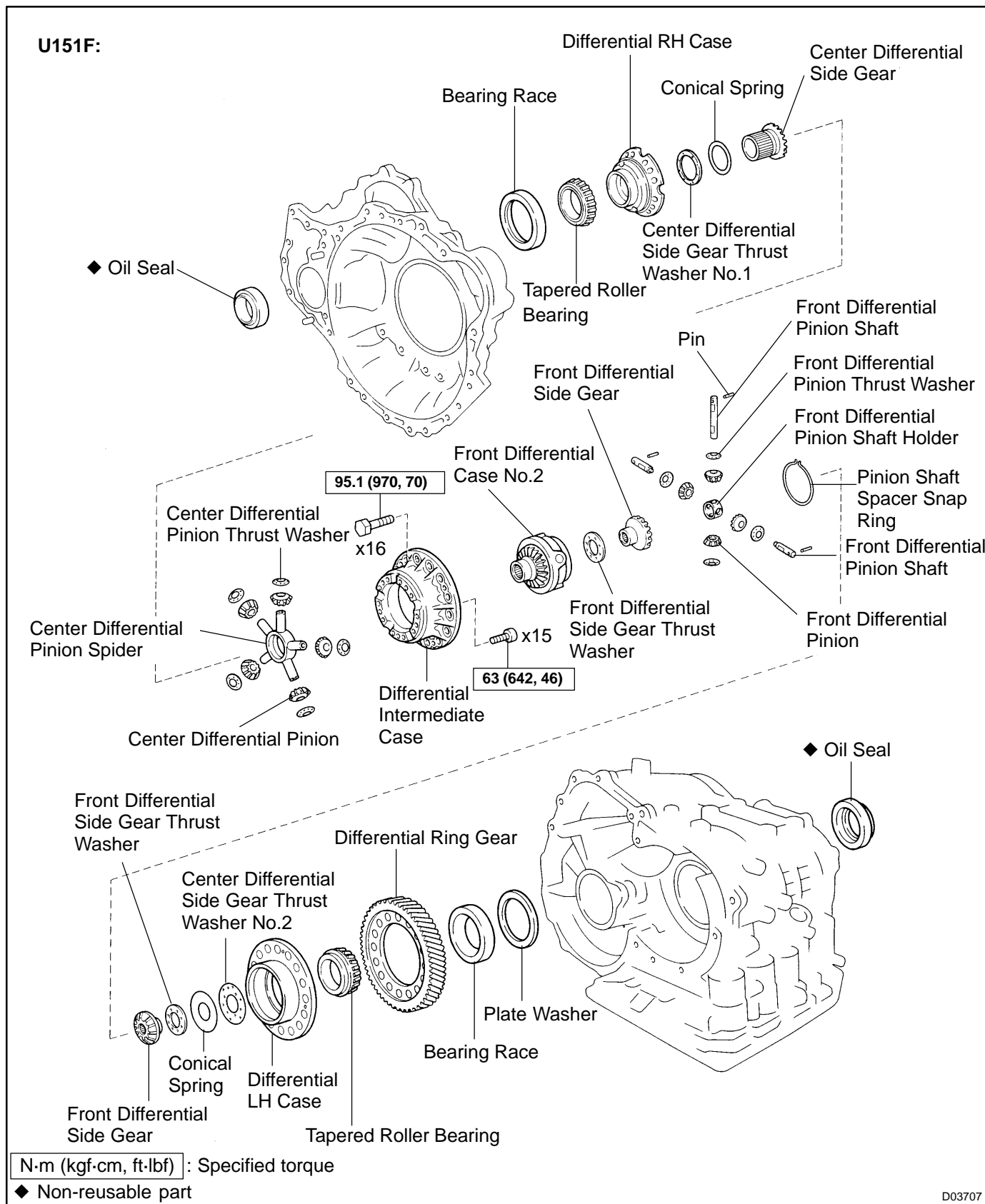




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GLOSSARY OF SAE AND TOYOTA TERMS

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

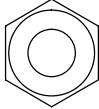
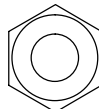
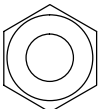


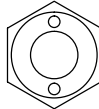
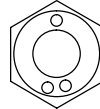
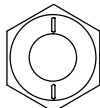
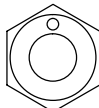
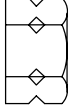
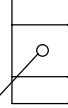
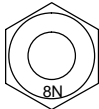
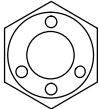
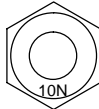
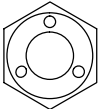
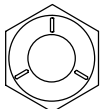
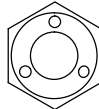

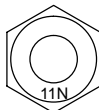
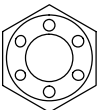

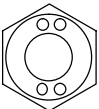
SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ()--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Inter cooler
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	Data Link Connector 1	1: Check Connector
DLC2	Data Link Connector 2	2: Total Diagnosis Communication Link (TDCL)
DLC3	Data Link Connector 3	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	-
O2S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O _{2S})
OBD	On-Board Diagnostic	On-Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CC ₀
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 (Reed 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	-



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
	 	  *	7N (5T)
 			8N
 	 	 No Mark	10N (7T)
 			11N
 			12N

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

B06432

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













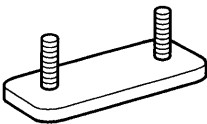
Nut = 4N or more

U151E, U151F A/T REPAIR MANUAL (RM1021U)

STANDARD BOLT FOR AUTOMATIC TRANSAXLE REPAIR MANUAL

030JK-02

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4- 5- 6- 7- 8- 9- 10- 11-	4T	Hexagon flange bolt w/ washer hexagon bolt	 4 Protruding lines	9T
		5T			
		6T	Hexagon flange bolt w/ washer hexagon bolt	 5 Protruding lines	10T
7T					
		8T			
		9T			
		10T			
		11T			
	 No mark	4T	Hexagon flange bolt w/ washer hexagon bolt	 6 Protruding lines	11T
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T	Stud bolt	 No mark	4T
Hexagon head bolt	 2 Protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	 2 Protruding lines	6T	Welded bolt	 Grooved	6T
Hexagon head bolt	 3 Protruding lines	7T			
Hexagon head bolt	 4 Protruding lines	8T		4T	

V06821

HOW TO USE THIS AUTOMATIC TRANSAXLE REPAIR MANUAL

0103A-09

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual is made in accordance with SAE J2008.
- (b) Generally repair operations can be separated in the following 3 main processes:
 1. Diagnosis
 2. Removal and Installation, Replacement, Disassembly, Installation and Check, and Adjustment
 3. Final Inspection
- (c) This manual explains "Removal and Installation, Replacement, Disassembly, Installation and Check, and Adjustment", 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 when necessary
 - (3) Visual check

2. INDEX

- (a) An alphabetical INDEX section is provided at the end of the book as a reference to help find the item to be repaired.

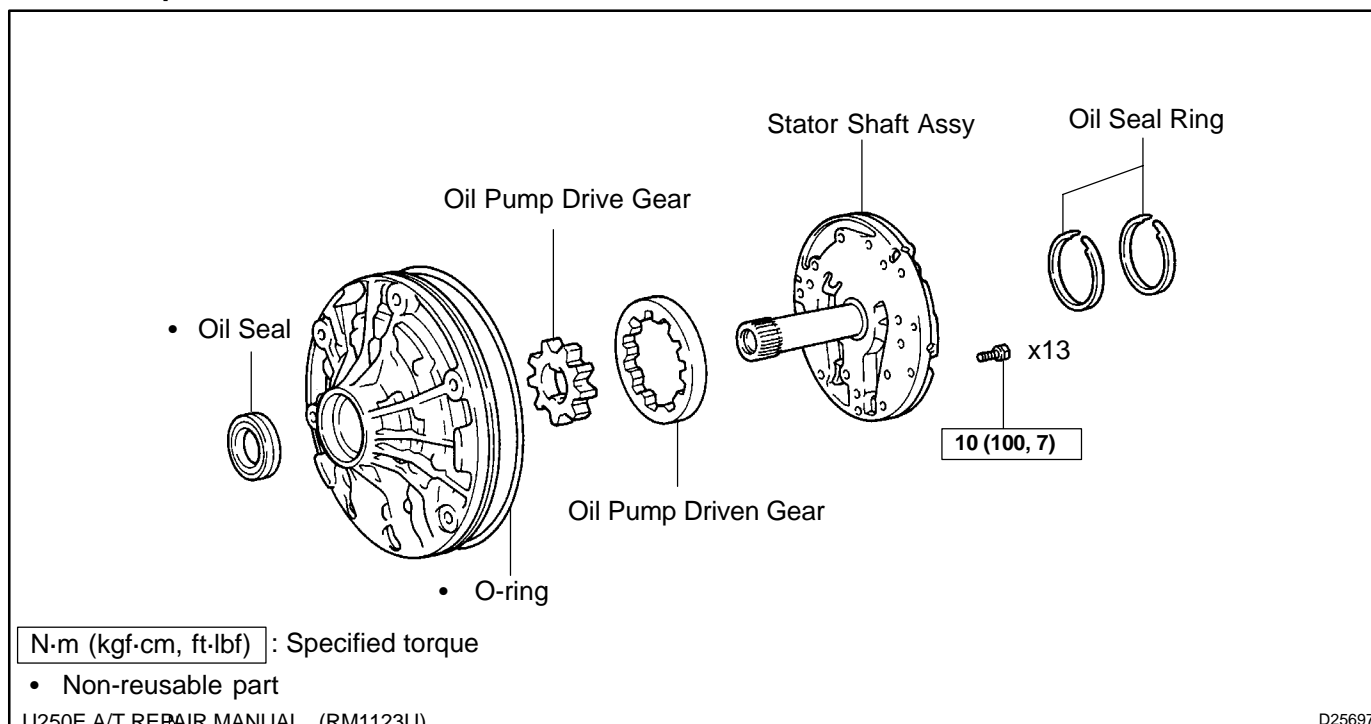
3. PREPARATION

- (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 of this manual.

4. REPAIR PROCEDURES

- (a) A component illustration is placed under the title where necessary.
- (b) 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.
- (c) Non-reusable parts, grease applied parts, precoated parts and tightening torque are specified in the component illustrations.

Example:



(d) Tightening torque, oil applying position, and non-reusable parts are described as important points in the procedure.

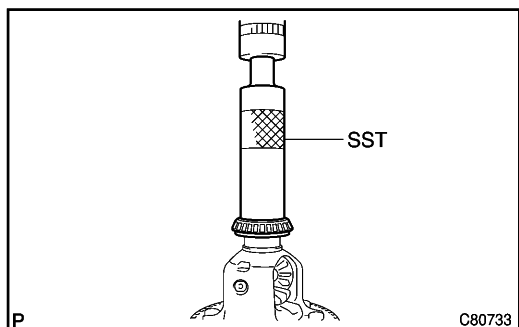
NOTICE:

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

- (e) The installation procedures are the reverse order of the removal procedures. However, only installation procedures requiring additional information are included.
- (f) Only items with key points are described in the text. What to do and other details are placed in illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.
- (g) Illustrations of similar vehicle models are sometimes used. In these cases, specific 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)

*Detailed text:
how to do task*

Set part No.

Component part No.

P

D26831

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. The specifications are also found in the Service Specifications section for quick reference.

6. TERMS DEFINITION

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

7. SI UNIT

- (a) The UNITS given 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)



HOW TO USE THIS AUTOMATIC TRANSAXLE REPAIR MANUAL

0103A-07

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual is made 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 when 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.

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4. REPAIR PROCEDURES

- (a) Component drawing is placed as the section or title when necessary.
- (b) 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.
- (c) Non-reusable parts, grease applied parts, precoated parts and tightening torque are specified in the components drawing.

Example:

Oil Seal

Oil Seal Ring

Oil Pump Drive Gear

Oil Pump Driven Gear

Stator Shaft Assy

x13

10 (100, 7)

O-ring

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

• Non-reusable part

U151E, U151F A/T REPAIR MANUAL (RM1021U)

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(d) Tightening torque, oil applying position, and non-reusable parts are described as important points in the procedure.

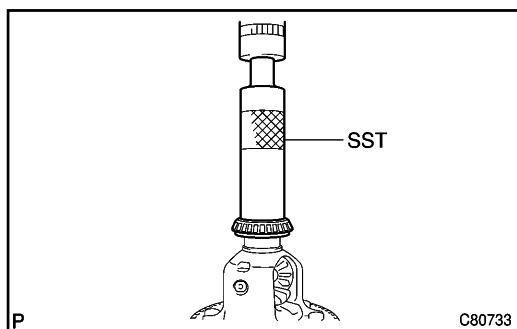
NOTICE:

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

- (e) Installing procedure of operation item is performed in the reverse order of the removing, and only the important points are described.
- (f) 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.
- (g) There may be a case where the illustrations of similar models are used. In that case 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 it.
 - (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**)

*Detailed text:
how to do task*

Set part No.

Component part No.

P

D26831

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.

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Example:

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

AUTOMATIC TRANSMISSION / TRANSAXLE

0305K-11

SERVICE DATA

Oil pump		
Body clearance	STD	0.10 - 0.17 mm (0.0039 - 0.0067 in.)
	Max.	0.17 mm (0.0067 in.)
Tip clearance	STD	0.07 - 0.15 mm (0.0028 - 0.0059 in.)
	Max.	0.15 mm (0.0059 in.)
Side clearance	STD	0.02 - 0.05 mm (0.0008 - 0.0020 in.)
	Max.	0.05 mm (0.0020 in.)
Drive gear thickness	Mark	
	A	11.690 - 11.699 mm (0.4602 - 0.4606 in.)
	B	11.700 - 11.709 mm (0.4606 - 0.4610 in.)
	C	11.710 - 11.720 mm (0.4610 - 0.4614 in.)
	D	11.721 - 11.730 mm (0.4615 - 0.4618 in.)
	E	11.731 - 11.740 mm (0.4619 - 0.4622 in.)
Driven gear thickness	Mark	
	A	11.690 - 11.699 mm (0.4602 - 0.4606 in.)
	B	11.700 - 11.709 mm (0.4606 - 0.4610 in.)
	C	11.710 - 11.720 mm (0.4610 - 0.4614 in.)
	D	11.721 - 11.730 mm (0.4615 - 0.4618 in.)
	E	11.731 - 11.740 mm (0.4619 - 0.4622 in.)
Pump body bushing inside diameter	STD	38.113 - 38.138 mm (1.50050 - 1.50149 in.)
	Max.	38.188 mm (1.50346 in.)
Stator shaft bushing inside diameter	STD	21.500 - 21.526 mm (0.84646 - 0.84748 in.)
	Max.	21.57 mm (0.8492 in.)
Multiple disc clutch		
Inside diameter	STD	23.025 - 23.045 mm (0.9065 - 0.9073 in.)
	Max.	23.09 mm (0.9091 in.)
Forward clutch		
Pack clearance		1.00 - 1.25 mm (0.0394 - 0.4921 in.)
Return spring free length		26.74 mm (1.0528 in.)
Flange thickness	Mark	
	1	3.00 mm (0.1181 in.)
	2	3.15 mm (0.1240 in.)
	3	3.30 mm (0.1299 in.)
	4	3.45 mm (0.1358 in.)
	5	3.60 mm (0.1417 in.)
Reverse clutch		
Pack clearance:		0.60 - 0.82 mm (0.02362 - 0.03228 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)
7	3.6 mm (0.142 in.)	

SERVICE SPECIFICATIONS - AUTOMATIC TRANSMISSION / TRANSAXLE

Direct clutch & O/D clutch		
Pack clearance		0.61 - 0.83 mm (0.02401 - 0.03268 in.)
Return spring free length		25.91 mm (1.0201 in.)
Flange thickness	Mark	
	0	2.5 mm (0.098 in.)
	1	2.6 mm (0.102 in.)
	2	2.7 mm (0.106 in.)
	3	2.8 mm (0.110 in.)
	4	2.9 mm (0.114 in.)
	5	3.0 mm (0.118 in.)
	6	3.1 mm (0.122 in.)
2nd brake		
Pack clearance		0.62 - 0.91 mm (0.0244 - 0.0358 in.)
Return spring free length		16.61 mm (0.6539 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)
	7	3.6 mm (0.142 in.)
U/D clutch		
Pack clearance		1.51 - 1.71 mm (0.0594 - 0.0673 in.)
U/D clutch drum bushing inside diameter	STD	37.06 - 37.08 mm (1.4591 - 1.4598 in.)
	Max.	37.13 mm (1.4618 in.)
Return spring free length		17.14 mm (0.6752 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
U/D brake		
Pack clearance		1.81 - 2.20 mm (0.0713 - 0.0866 in.)
Return spring free length		14.04 mm (0.5528 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.2 mm (0.126 in.)
	3	3.4 mm (0.134 in.)
1st & reverse brake		
Pack clearance		1.16 - 1.35 mm (0.0457 - 0.0531 in.)
Return spring free length		15.53 mm (0.6114 in.)
Flange thickness	Mark	
	1	1.8 mm (0.071 in.)
	2	1.9 mm (0.075 in.)
	3	2.0 mm (0.079 in.)
	4	2.1 mm (0.083 in.)
	5	2.2 mm (0.087 in.)
	6	2.3 mm (0.091 in.)
	7	2.4 mm (0.094 in.)
	8	2.5 mm (0.098 in.)

U/D planetary gear			
Preload (at 60 rpm)		0.50 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in·lbf)	
Front planetary gear			
Turning torque (at 60 rpm)	New Bearing	0.51 - 1.02 N·m (5.1 - 10.0 kgf·cm, 4.4 - 8.7 in·lbf)	
	Used Bearing	0.26 - 0.51 N·m (2.7 - 5.2 kgf·cm, 2.3 - 4.5 in·lbf)	
Input shaft			
End play		0.262 - 1.249 mm (0.0103 - 0.0492 in.)	
Transaxle rear cover			
Bearing press fit depth		20.55 - 21.25 mm (0.8091 - 0.8366 in.)	
Transmission valve body			
Valve body installation bolt length	A	41 mm (1.614 in.)	
	B	57 mm (2.244 in.)	
	C	25 mm (0.984 in.)	
Accumulator			
Spring	Free length/Outer diameter	Color	
B ₃	Inner	62.00 (2.4409) / 15.50 (0.610)	Purple
	Outer	74.23 (2.9224) / 16.50 (0.649)	Purple
C ₂		60.96 (2.3999) / 14.10 (0.555)	Yellow
C ₃		72.20 (2.8425) / 19.0 (0.748)	Colorless
Front differential(U151E)			
Backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)	
Thrust washer thickness	Mark		
	-	1.625 mm (0.0640 in.)	
	-	1.725 mm (0.0679 in.)	
	-	1.825 mm (0.0719 in.)	
Praload (at 60 rpm)	New bearing	0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in·lbf)	
	Used bearing	0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in·lbf)	
Flange thickness	Mark		
	0	2.00 mm (0.0787 in.)	
	1	2.05 mm (0.0807 in.)	
	2	2.10 mm (0.0827 in.)	
	3	2.15 mm (0.0846 in.)	
	4	2.20 mm (0.0866 in.)	
	5	2.25 mm (0.0886 in.)	
	6	2.30 mm (0.0906 in.)	
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	8	2.40 mm (0.0945 in.)	
	9	2.45 mm (0.0965 in.)	
	A	2.50 mm (0.0984 in.)	
	B	2.55 mm (0.1004 in.)	
	C	2.60 mm (0.1024 in.)	
D	2.65 mm (0.1043 in.)		
E	2.70 mm (0.1063 in.)		
F	2.75 mm (0.1083 in.)		
G	2.80 mm (0.1102 in.)		
H	2.85 mm (0.1122 in.)		
Front differential (U151F)			
Side gear backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)	

SERVICE SPECIFICATIONS - AUTOMATIC TRANSMISSION / TRANSAXLE

Thrust washer thickness = Clearance - 0.162 - 0.265 mm (0.0064 - 0.0104 in.)	<table border="1"> <thead> <tr> <th>Mark</th> <th></th> </tr> </thead> <tbody> <tr><td>A</td><td>0.95 mm (0.0373 in.)</td></tr> <tr><td>B</td><td>1.00 mm (0.0393 in.)</td></tr> <tr><td>C</td><td>1.05 mm (0.0413 in.)</td></tr> <tr><td>D</td><td>1.10 mm (0.0433 in.)</td></tr> <tr><td>E</td><td>1.15 mm (0.0453 in.)</td></tr> <tr><td>F</td><td>1.20 mm (0.0472 in.)</td></tr> <tr><td>G</td><td>1.25 mm (0.0492 in.)</td></tr> <tr><td>H</td><td>1.30 mm (0.0512 in.)</td></tr> <tr><td>J</td><td>1.35 mm (0.0532 in.)</td></tr> <tr><td>K</td><td>1.40 mm (0.0552 in.)</td></tr> </tbody> </table>	Mark		A	0.95 mm (0.0373 in.)	B	1.00 mm (0.0393 in.)	C	1.05 mm (0.0413 in.)	D	1.10 mm (0.0433 in.)	E	1.15 mm (0.0453 in.)	F	1.20 mm (0.0472 in.)	G	1.25 mm (0.0492 in.)	H	1.30 mm (0.0512 in.)	J	1.35 mm (0.0532 in.)	K	1.40 mm (0.0552 in.)																
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Oil seal press in depth	5.5 - 6.5 mm (0.217 - 0.256 in.)																																						

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

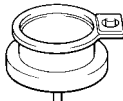
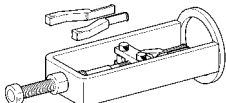
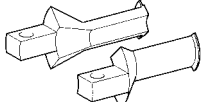
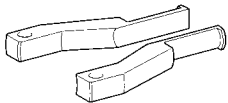
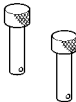
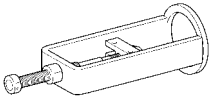
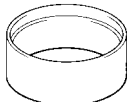
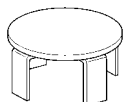
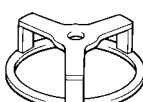
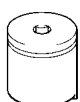


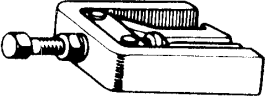
AUTOMATIC TRANSMISSION / TRANS

PREPARATION




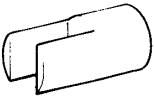
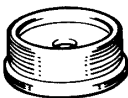
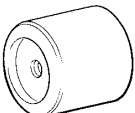


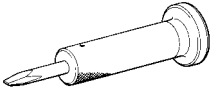
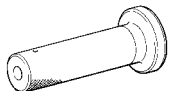

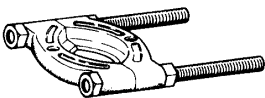
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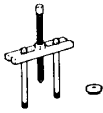


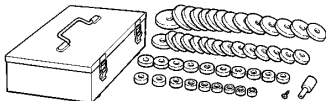







SST

	09214-7601 1	Crankshaft Pulley Replacer	FRONT ASSY(U151F)	DIFFERENTIAL
	09215-00013	Crankshaft Bearing Remover & Replacer Set B	FRONT ASSY(U151E)	DIFFERENTIAL
	(09215-00471)	Camshaft Bearing Remover & Replacer	FRONT ASSY(U151E)	DIFFERENTIAL
	09223-15020	Oil Seal & Bearing Replacer	FRONT ASSY(U151E) FRONT ASSY(U151F)	DIFFERENTIAL DIFFERENTIAL
	09223-15030	Oil Seal & Bearing Replacer	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	09308-00010	Oil Seal Puller	FRONT ASSY(U151E) OIL PUMP ASSY(U151E/U151F) FRONT ASSY(U151F)	DIFFERENTIAL DIFFERENTIAL
	09316-12010	Transfer Bearing Replacer	FRONT ASSY(U151E)	DIFFERENTIAL
	09316-2001 1	Transfer Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT ASSY(U151F)	DIFFERENTIAL
	09350-32014	TOYOTA Automatic Transmission Tool Set	OIL PUMP ASSY(U151E/U151F) UNDERDRIVE ASSY(U151E/U151F)	CLUTCH
	(09351-32070)	No.2 Piston Spring Compressor	UNDERDRIVE ASSY(U151E/U151F)	CLUTCH
	(09351-32140)	Oil Seal Replacer	OIL PUMP ASSY(U151E/U151F)	
	09387-00020	Direct Clutch Wrench	AUTOMATIC ASSY(U151E/U151F) FORWARD ASSY(U151E/U151F) DIRECT ASSY(U151E/U151F)	TRANSAXLE CLUTCH CLUTCH

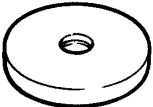

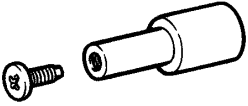
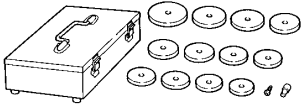
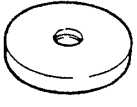
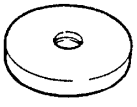
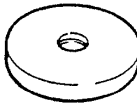
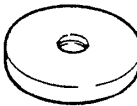


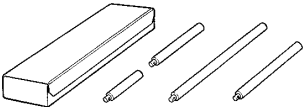
	09387-00030 Counter Drive Gear Holding Tool	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	09387-00041 Bearing Puller Assembly	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	(09387-01010) Claw No.1	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	(09387-01021) Claw No.2	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	(09387-01030) Pin	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	(09387-01040) Bearing Puller Body	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	09387-00050 Under Drive Gear Puller	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	09387-00060 Second Brake Wrench	SECOND BRAKE PISTON ASSY(U151E/U151F)	
	09387-00070 First & Reverse Brake Wrench	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	09387-00080 Counter Drive Gear Nut Wrench	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE
	09502-12010 Differential Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	09506-35010 Differential Drive Pinion Rear Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	09514-3501 1 Rear Wheel Bearing Puller	AUTOMATIC ASSY(U151E/U151F)	TRANSAXLE

PREPARATION - AUTOMATIC TRANSMISSION / TRANS

	09527-1701 1	Rear Axle Shaft Bearing Remover	AUTOMATIC ASSY(U151E/U151F) FRONT ASSY(U151F)	TRANSAXLE DIFFERENTIAL
	09550-60010	Differential Side Bearing Replacer	FRONT ASSY(U151E)	DIFFERENTIAL
	(09951-00490)	Replacer 49	FRONT ASSY(U151E)	DIFFERENTIAL
	09564-3201 1	Differential Preload Adaptor	FRONT ASSY(U151E) FRONT ASSY(U151F)	DIFFERENTIAL DIFFERENTIAL
	09608-10010	Steering Knuckle Oil Seal Replacer	FRONT ASSY(U151E) FRONT ASSY(U151F)	DIFFERENTIAL DIFFERENTIAL
	09649-17010	Steering Knuckle Tool	AUTOMATIC ASSY(U151E/U151F) FRONT ASSY(U151F)	TRANSAXLE DIFFERENTIAL
	09710-30050	Suspension Arm Bushing Replacer	FRONT ASSY(U151E)	DIFFERENTIAL
	09726-40010	Lower Control Shaft Bearing Replacer	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	09930-00010	Drive Shaft Nut Chisel	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	(09931-00010)	Handle	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	(09931-00020)	Nut Chisel	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)	
	09950-00020	Bearing Remover	FRONT ASSY(U151E) AUTOMATIC ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT ASSY(U151F)	DIFFERENTIAL TRANSAXLE DIFFERENTIAL



	<p>09950-00030 Bearing Remover Attachment</p>	<p>FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)</p>
	<p>09950-4001 1 Puller B Set</p>	<p>FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)</p>
	<p>(09957-04010) Attachment</p>	<p>FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)</p>
	<p>09950-60010 Replacer Set</p>	<p>FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)</p>
	<p>(09951-00230) Replacer 23</p>	<p>AUTOMATIC TRANSAXLE ASSY(U151E/U151F)</p>
	<p>(09951-00260) Replacer 26</p>	<p>UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)</p>
	<p>(09951-00320) Replacer 32</p>	<p>AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)</p>
	<p>(09951-00450) Replacer 45</p>	<p>AUTOMATIC TRANSAXLE ASSY(U151E/U151F)</p>
	<p>(09951-00480) Replacer 48</p>	<p>FRONT DIFFERENTIAL ASSY(U151F)</p>
	<p>(09951-00490) Replacer 49</p>	<p>FRONT DIFFERENTIAL ASSY(U151E)</p>
	<p>(09951-00500) Replacer 50</p>	<p>AUTOMATIC TRANSAXLE ASSY(U151E/U151F)</p>

PREPARATION - AUTOMATIC TRANSMISSION / TRANS

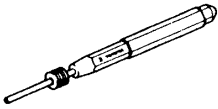

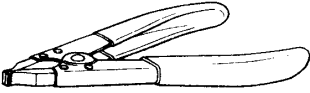
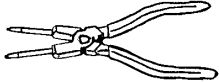
	(09951-00590) Replacer 59	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00600) Replacer 60	FRONT DIFFERENTIAL ASSY(U151F)
	(09952-06010) Adapter	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09950-60020 Replacer Set No.2	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00730) Replacer 73	FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00750) Replacer 75	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00810) Replacer 81	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-00890) Replacer 89	FRONT DIFFERENTIAL ASSY(U151E) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-00910) Replacer 91	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	(09951-01030) Replacer 103	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09950-70010 Handle Set	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)

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PREPARATION - AUTOMATIC TRANSMISSION / TRANS

	(09951-07100) Handle 100	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	(09951-07150) Handle 150	FRONT DIFFERENTIAL ASSY(U151E) AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)

Recommended Tools

	09031-00030 Pin Punch	AUTOMATIC TRANSAXLE ASSY(U151E/U151F)
	09031-00040 Pin Punch .	FRONT DIFFERENTIAL ASSY(U151E) FRONT DIFFERENTIAL ASSY(U151F)
	09905-00012 Snap Ring No.1 Expander	AUTOMATIC TRANSAXLE ASSY(U151E/U151F) FORWARD CLUTCH ASSY(U151E/U151F) DIRECT CLUTCH ASSY(U151E/U151F) FRONT DIFFERENTIAL ASSY(U151F)
	09905-00013 Snap Ring Pliers	UNDERDRIVE PLANETARY GEAR ASSY(U151E/U151F)

02-8

PREPARATION - AUTOMATIC TRANSMISSION / TRANS

Equipment

Dial indicator with magnetic base	
Feeler gauge	
Vernier calipers	
Torque wrench	
Plastic hammer	
Straight edge	
Press	
Seal packing 2403, THREE BOND 2403 or equivalent	
Seal packing 2430, THREE BOND 2430 or equivalent	

Lubricant

item		
U151E / U151F Automatic transaxle fluid Dry fill Drain and refill	6.8 liter (7.2 USqts, 6.0 Imp.qts) 2.9 liter (3.1 USqts, 2.6 Imp.qts)	ATF type T-IV

02-10

PREPARATION - AUTOMATIC TRANSMISSION / TRANS

SSM (Special Service Materials)

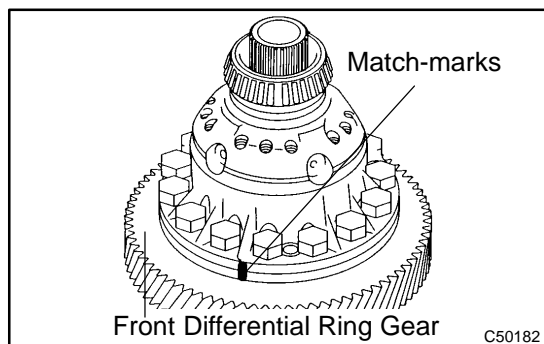
08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	

TORQUE SPECIFICATION

Part Tightened	N-m	kgf-cm	ft-lbf
Differential gear lube apply tube x Transaxle housing	9.8	100	87 in. lbf
Front planetary gear lock nut	210-350	2141-3569	155-258
Brake apply tube clamp x Transaxle case	5.4	55	48 in. lbf
Transaxle case No. 1 plug x Transaxle rear cover	7.4	75	65 in. lbf
Transaxle rear cover x Transaxle case	Bolt A	19	14
	Other bolt	25	18
Pawl shaft clamp x Transaxle case	9.8	100	87 in. lbf
Oil pump assy x Transaxle case	22	226	16
Transaxle housing x Transaxle case	Bolt A	25	18
	Bolt B	33	24
	Bolt C	29	21
	Bolt D	22	16
Automatic transmission case plug x Transaxle housing	7.4	75	65 in. lbf
Automatic transmission case plug x Transaxle case	7.4	75	65 in. lbf
Parking lock pawl bracket x Transaxle case	20	205	15
Manual detent spring x Transaxle case	Bolt A	20	15
	Bolt B	12	9
Transmission wire x Transaxle housing	5.4	55	48 in. lbf
Transmission valve body x Transaxle case	11	110	8
ATF temperature sensor clamp x Transmission valve body	6.6	67	58 in. lbf
Valve body oil strainer assy x Transmission valve body	11	110	8
Automatic transaxle oil pan sub-assy x Transaxle case	7.8	80	69 in. lbf
Drain plug x Automatic transaxle oil pan sub-assy	49	500	36
Speed sensor x Transaxle case	11	115	8
Oil cooler tube union x Transaxle case	Union	27	20
	Elbow	27	20
Park/neutral start switch x nut	6.9	70	61 in. lbf
Park/neutral start switch x Bolt	5.4	55	48 in. lbf
Park/neutral start switch x Control shaft lever	13	130	9
Speedometer driven hole cover sub-assy x Transaxle case	6.9	70	61
Oil pump body x Stator shaft assy	9.8	100	87 in. lbf
Line pressure control solenoid assy x Transmission valve body assy	6.6	67	58 in. lbf
Shift solenoid valve SL1x Transmission valve body assy	6.6	67	58 in. lbf
Shift solenoid valve SL2x Transmission valve body assy	10.8	110	8
Shift solenoid valve SL3x Transmission valve body assy	6.6	67	58 in. lbf
Shift solenoid valve S4x Transmission valve body assy	10.8	110	8
Shift solenoid valve DSL x Transmission valve body assy	10.8	110	8
Front differential case x Front differential ring gear	95.1	970	70

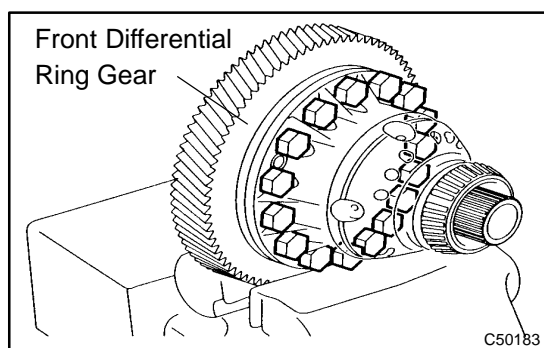
FRONT DIFFERENTIAL ASSY (U151F) OVERHAUL

4006N-02

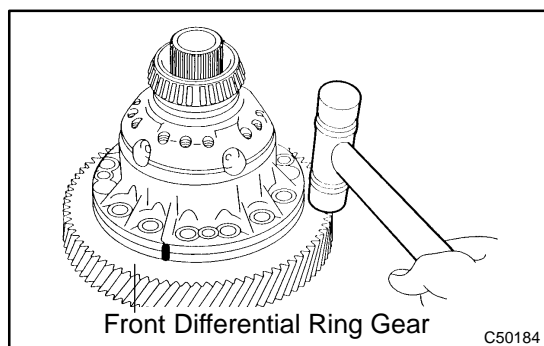


1. REMOVE FRONT DIFFERENTIAL RING GEAR

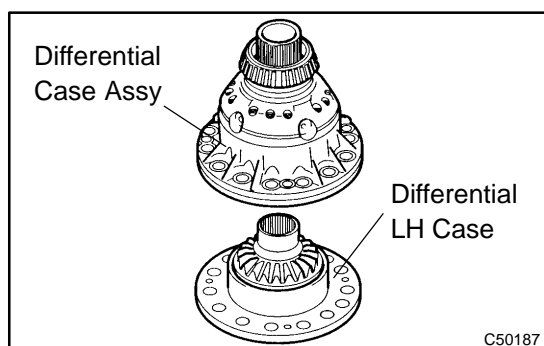
- (a) Place the match-marks on the ring gear and differential case.



- (b) Remove the 16 bolts.

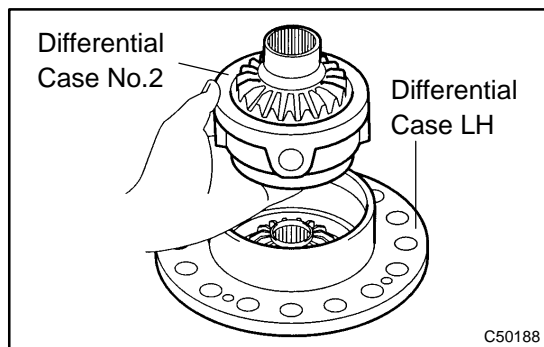


- (c) Using a plastic hammer, tap on the ring gear to remove it from the case.

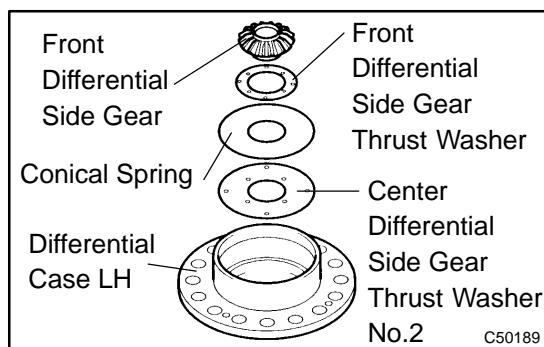


2. REMOVE FRONT DIFFERENTIAL SIDE GEAR

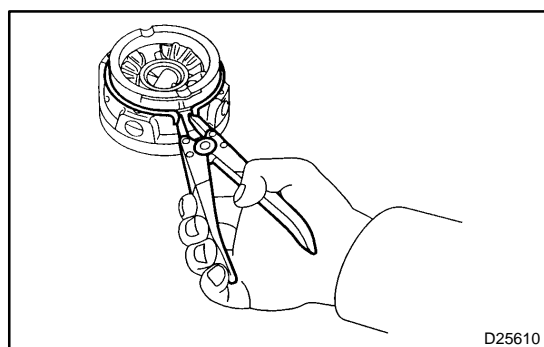
- (a) Remove the differential LH case from the differential case Assy.



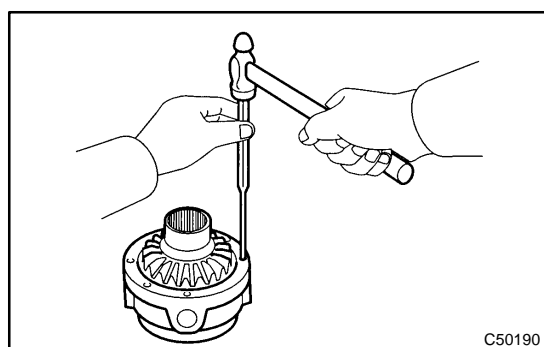
(b) Remove the differential case No.2 from the differential case LH.



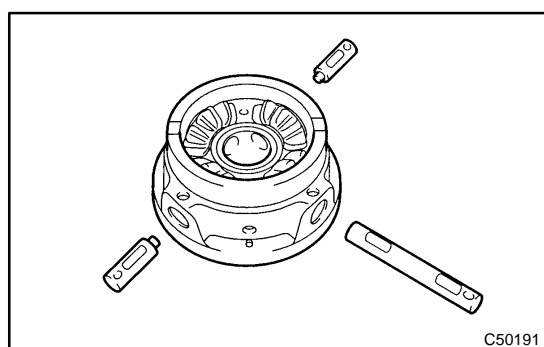
(c) Remove the front differential side gear, front differential side gear thrust washer, conical spring and center differential side gear thrust washer No.2 from the differential case LH.



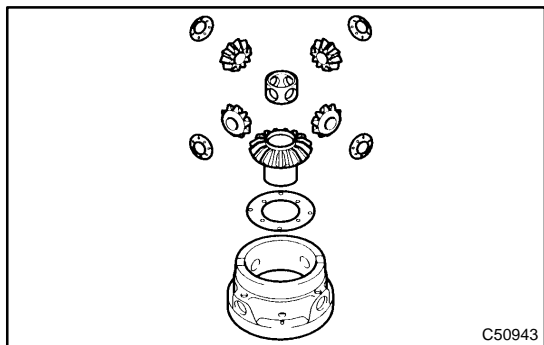
(d) Using a snap ring expander, remove the pinion shaft spacer snap ring.



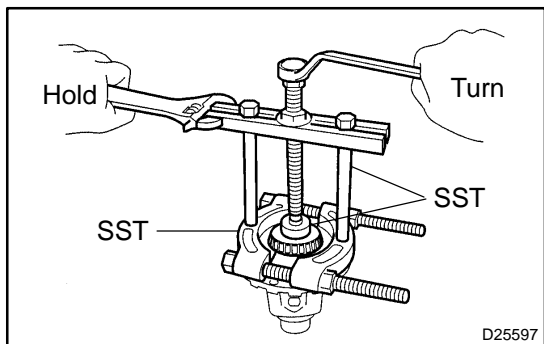
(e) Using a pin punch and a hammer, remove 3 straight pins.



(f) Remove the center differential pinion shaft and 2 differential pinion shafts.

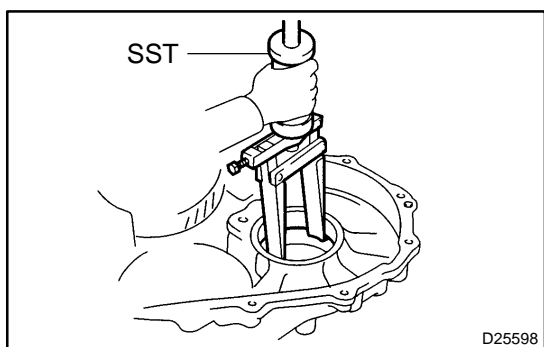


- (g) Remove 4 front differential pinions, 4 front differential pinion thrust washers, front differential pinion shaft holder, front differential planetary ring gear and differential side gear thrust washer No. 1.

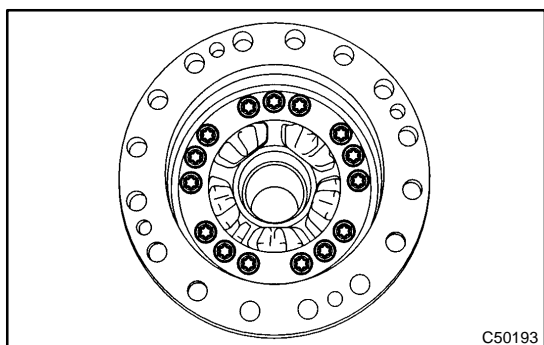


3. REMOVE FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

- (a) Using SST, remove the front differential case rear tapered roller bearing from the differential case.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00480)

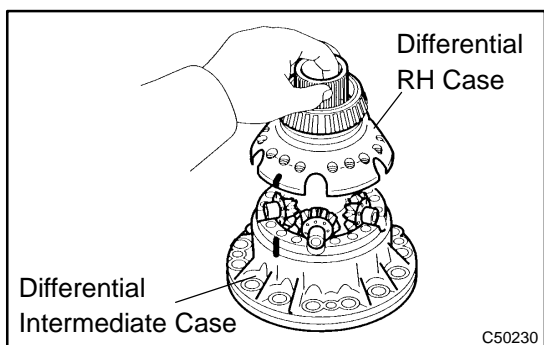


- (b) Using SST, remove the front differential case rear tapered roller bearing outer race and differential case washer.
SST 09308-00010

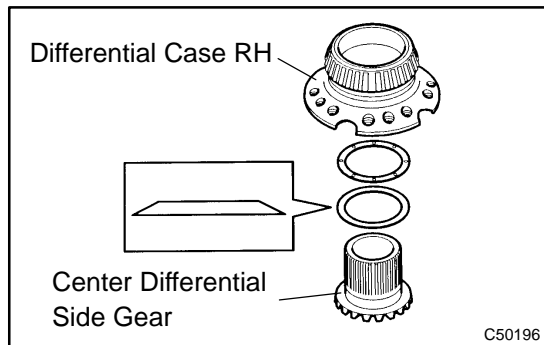


4. REMOVE CENTER DIFFERENTIAL PINION

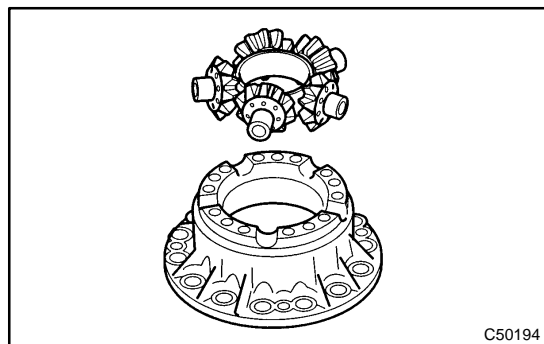
(a) Using torx socket (T50), remove the 15 bolts.



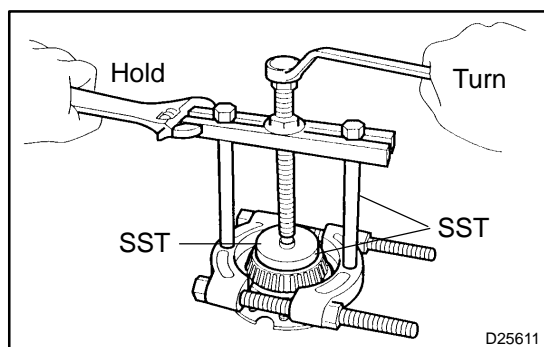
- (b) Place the matchmarks on the differential intermediate case and differential case.
(c) Remove the differential intermediate case from the differential case RH.



- (d) Remove the center differential side gear, conical spring washer and center differential side gear thrust washer No. 1 RH from the differential case RH.

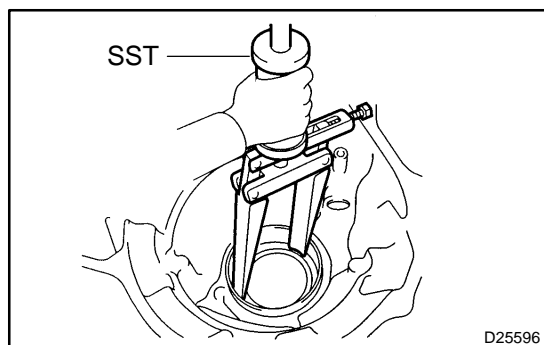


- (e) Remove the differential spider, 5 center differential pinions and 5 center differential pinion thrust washers from the differential intermediate case.

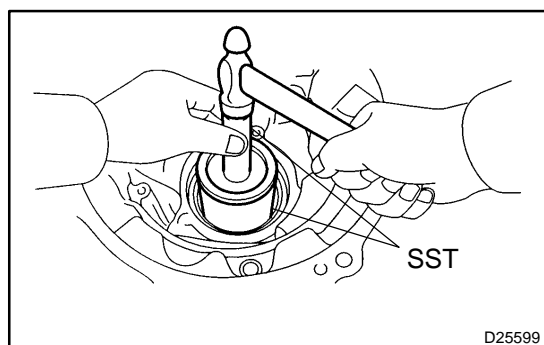


5. REMOVE FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the front differential case front tapered roller bearing from the differential case.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00600)

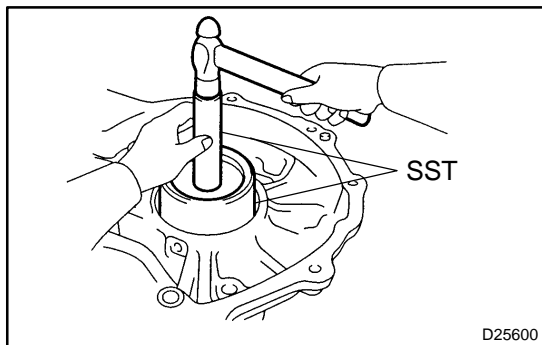


- (b) Using SST, remove the front differential case front tapered roller bearing outer race and differential case washer.
SST 09308-00010



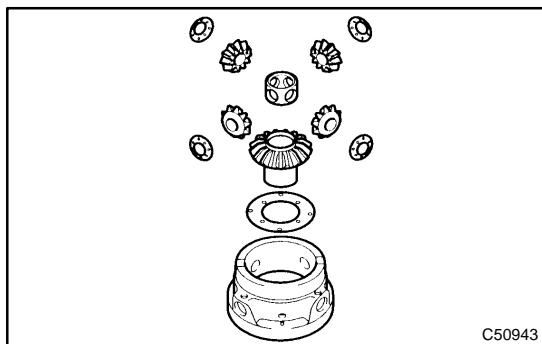
6. REMOVE TRANSAXLE HOUSING OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09649-17010



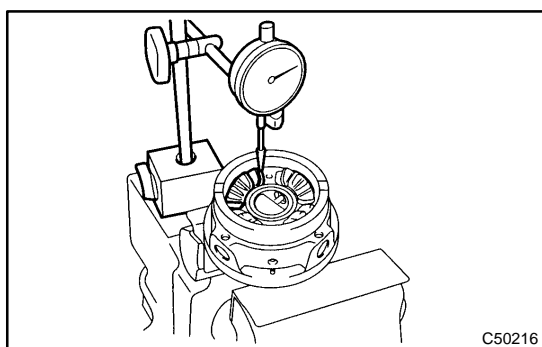
7. REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09608-10010



8. INSTALL DIFFERENTIAL CASE SUB-ASSY NO.2

- (a) Coat the front differential side gear thrust washer No.1, front differential planetary ring gear, front differential pinion No.2, front differential pinion thrust washer No.2, front differential pinion shaft holder, front differential pinion shaft and 2 differential pinion shafts with ATF, install them to the differential case No.2.



- (b) Using a dial indicator, measure the backlash of one pinion gear while holding the front differential side gear toward the case.

Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

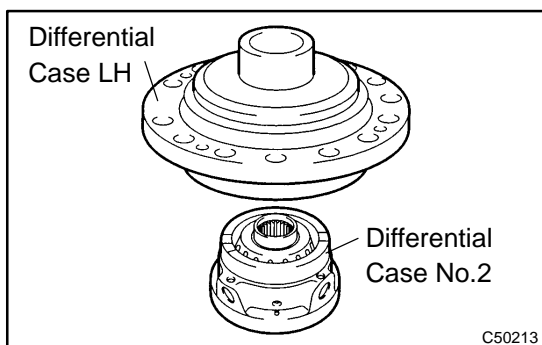
NOTICE:

Do not mount the surface of front differential case which contacts with bushing in a vise.

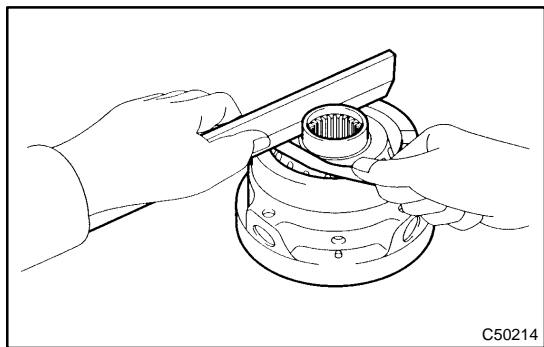
If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

Mark	Thickness	Mark	Thickness
A	0.95 (0.0373)	F	1.20 (0.0472)
B	1.00 (0.0393)	G	1.25 (0.0492)
C	1.05 (0.0413)	H	1.30 (0.0512)
D	1.10 (0.0433)	J	1.35 (0.0532)
E	1.15 (0.0453)	K	1.40 (0.0552)



- (c) Engage the front differential side gear to the above mentioned front differential case.
- (d) Install the differential case LH to the front differential case and measure its center.
- (e) After that, remove the differential case LH.



- (f) Using a straight edge and feeler gauge, measure the clearance between the front differential case and the front differential side gear.

t= Thrust washer thickness

L= Clearance

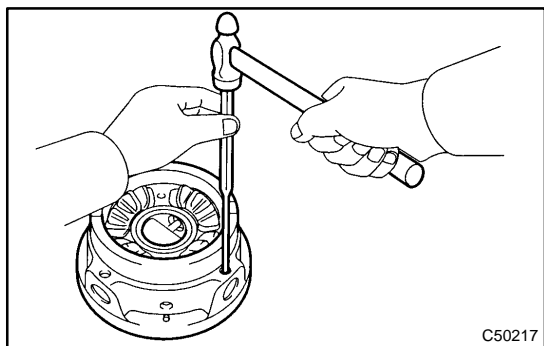
t= L-0.162 - 0.265 mm (0.0064 - 0.0104 in.)

If the clearance is not within the specified value, refer to the table below and select a thrust washer which will ensure that the clearance is within the specified value.

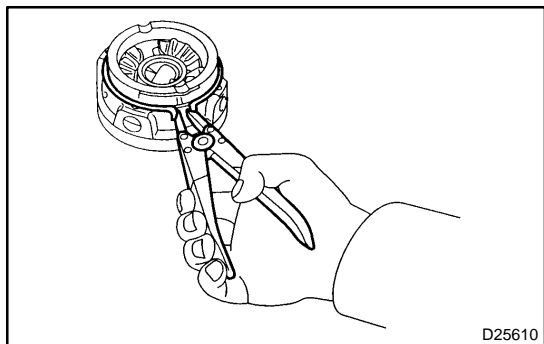
Thrust washer thickness: mm (in.)

Mark	Thickness	Mark	Thickness
A	0.95 (0.0373)	F	1.20 (0.0472)
B	1.00 (0.0393)	G	1.25 (0.0492)
C	1.05 (0.0413)	H	1.30 (0.0512)
D	1.10 (0.0433)	J	1.35 (0.0532)
E	1.15 (0.0453)	K	1.40 (0.0552)

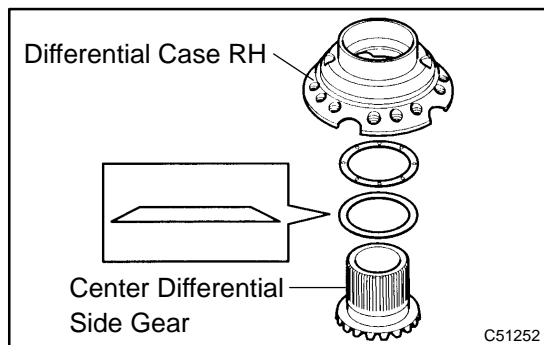
If the clearance is not within the specified value, parts may have been assembled incorrectly, so check and reassemble it.



- (g) Using a pin punch and a hammer, install 3 straight pins.



- (h) Using a snap ring expander, install the pinion shaft spacer snap ring.

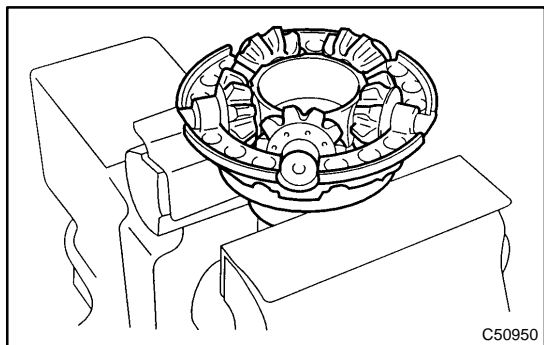


9. INSTALL CTR DIFFERENTIAL PLANETARY GEAR ASSY

- (a) Install the center differential side gear, conical spring washer and center differential side gear thrust washer No.2 RH from the differential case RH.

HINT:

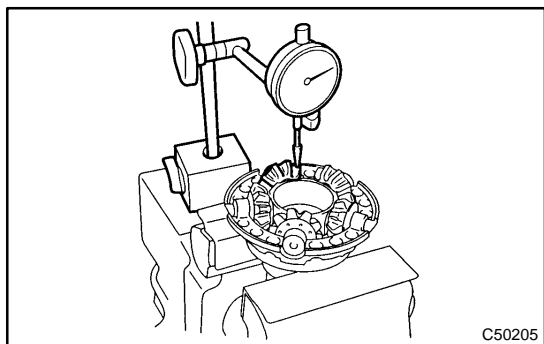
Ensure that the conical washers is installed correctly.



- (b) Hold the differential case RH by vice. Install the center differential pinion and pinion thrust washer to the differential spider and install them to the differential case RH.

NOTICE:

When holding the differential case RH by vise, be sure to place an aluminum sheet between them and use a minimum force.



- (c) Pressing and holding the differential spider toward the differential case RH, measure the pinion's backlash with a dial indicator as illustrated.

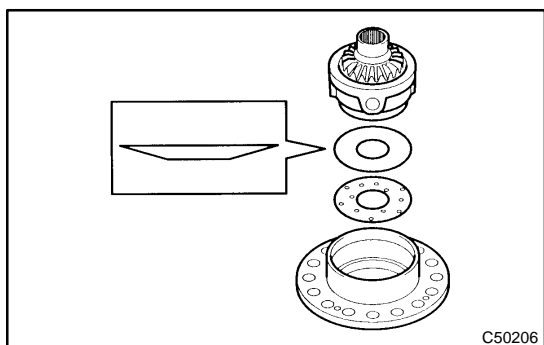
Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

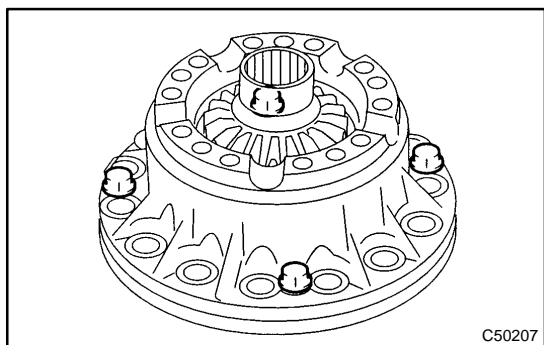
Mark	Thickness	Mark	Thickness
MA	0.80 (0.0313)	MH	1.15 (0.0453)
MB	0.85 (0.0333)	MJ	1.20 (0.0472)
MC	0.90 (0.0353)	MK	1.25 (0.0492)
MD	0.95 (0.0373)	ML	1.30 (0.0512)
ME	1.00 (0.0393)	MM	1.35 (0.0532)
MF	1.05 (0.0413)	MN	1.40 (0.0552)
MG	1.10 (0.0433)	-	-



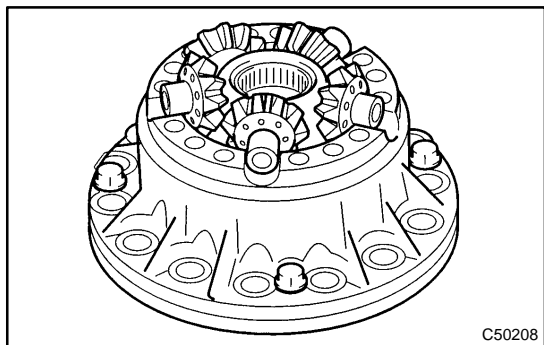
- (d) Temporarily install the differential side gear thrust washer No.2 LH, center differential side gear conical spring washer and differential case No.2 to the differential case LH.

HINT:

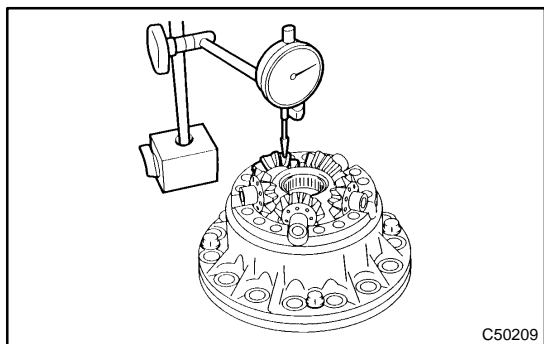
Ensure that the conical washers is installed correctly.



- (e) Install the differential intermediate case to the above and fix them with 4 bolts.



- (f) Remove the differential spider, 5 center differential pinions and 5 center differential pinion thrust washers from the differential case RH. Put them in the differential intermediate case and fix the case.



- (g) Pressing and holding the differential spider toward the differential intermediate case, measure the pinion's backlash with a dial indicator.

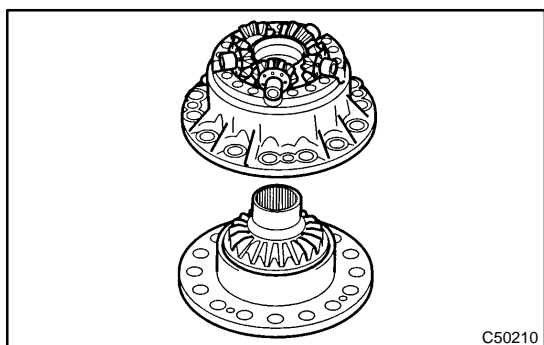
Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

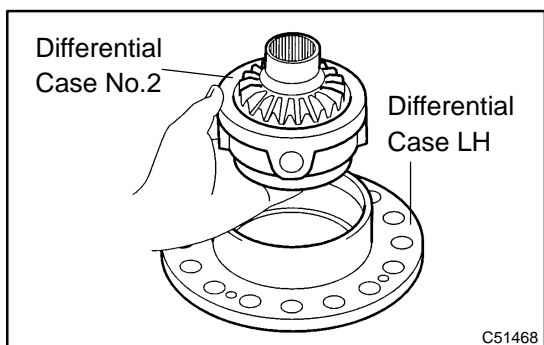
If the backlash is not within the specified value, refer to the table below and select a thrust washer which will ensure that the backlash is within the specified value.

Thrust washer thickness: mm (in.)

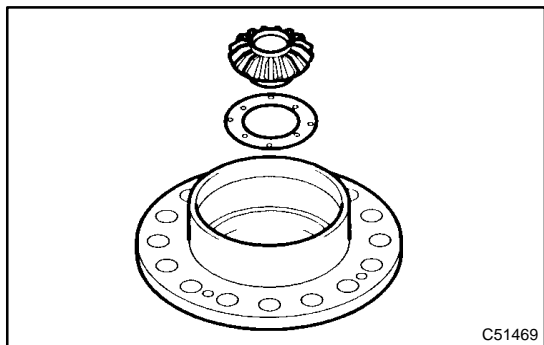
Mark	Thickness	Mark	Thickness
MA	0.80 (0.0313)	MH	1.15 (0.0453)
MB	0.85 (0.0333)	MJ	1.20 (0.0472)
MC	0.90 (0.0353)	MK	1.25 (0.0492)
MD	0.95 (0.0373)	ML	1.30 (0.0512)
ME	1.00 (0.0393)	MM	1.35 (0.0532)
MF	1.05 (0.0413)	MN	1.40 (0.0552)
MG	1.10 (0.0433)	-	-



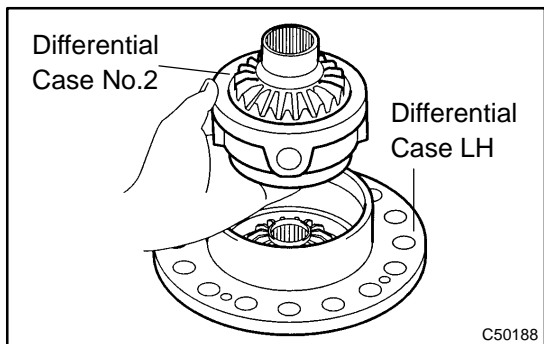
- (h) Remove the 4 bolts and disconnect the differential case LH from the differential intermediate case.



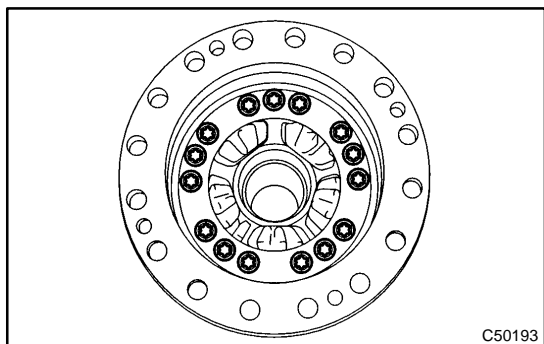
- (i) Remove the differential case No.2 from the differential case LH.



- (j) Install the selected differential side gear thrust washer No. 2 LH and center differential planetary gear to the differential case LH.



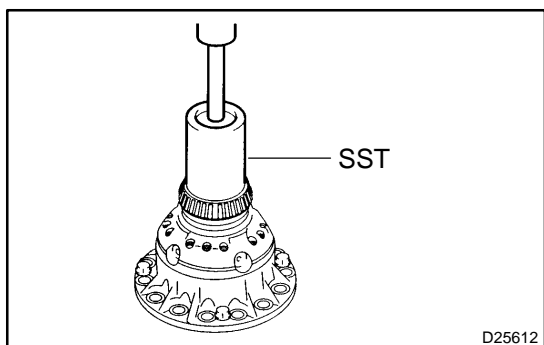
- (k) Install the differential case No. 2 to the differential case LH again.



- (l) Install the adjusted differential case RH to the intermediate case and tighten the 15 bolts using a torx socket wrench (T50).

Torque: 63 N·m (642 kgf·cm, 46 ft·lbf)

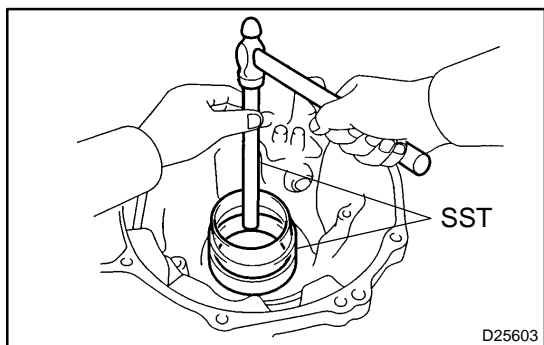
NOTICE:
Align the matchmarks.



10. INSTALL FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

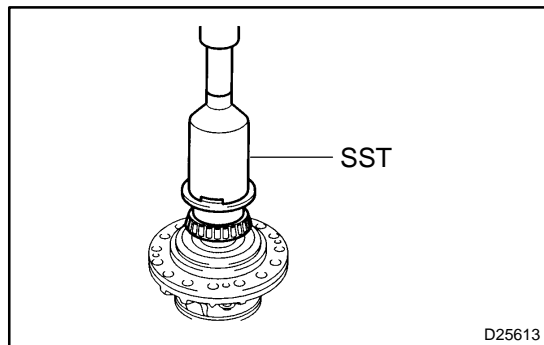
- (a) Using SST and a press, install the front differential case tapered roller bearing FR to the differential case.
SST 09950-70010 (09951-07100), 09649-17010

NOTICE:
Do not make a damage on the bearing cage during the bearing inner race installation.



- (b) Using SST, install the outer race of the tapered roller bearing FR.
SST 09527-1701 1, 09950-60020 (09951-01030)

NOTICE:
Clearance is not allowed between the plate washer and transaxle housing.



11. INSTALL FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

- (a) Using SST and a press, install the front differential case tapered roller bearing RR to the differential case.
SST 09316-2001 1, 09214-76011

NOTICE:

Do not make a damage on the bearing cage during the bearing inner race installation.

- (b) Install the front differential case shim RR to the transaxle case.

If the bearing is new, check to select a front differential case shim RR of proper thickness starting from the thinner ones.

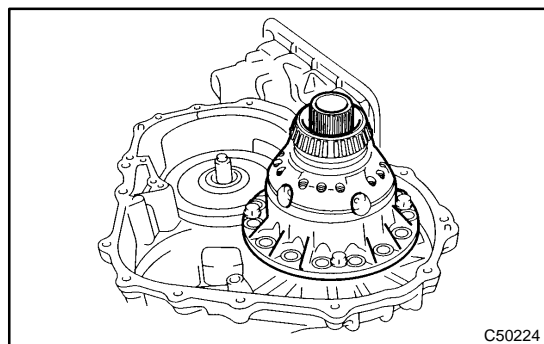
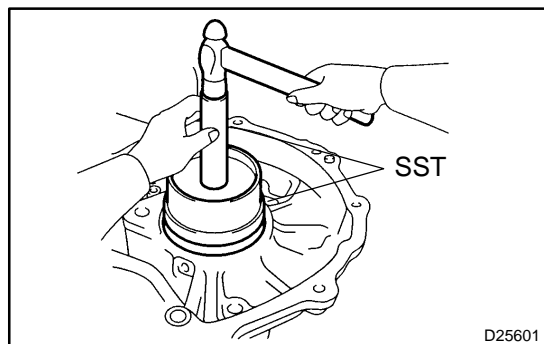
If the bearing is reused, check to select a front differential case shim RR starting from the same thickness as one installed before disassembly.

- (c) Using SST, install the outer race of the front differential case tapered roller bearing RR.

SST 09950-60020 (09951-00890), 09950-70010 (09951-07100)

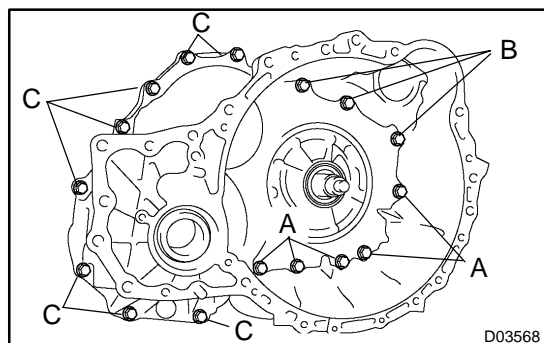
NOTICE:

Clearance is not allowed between the differential case shim and transaxle case.



12. ADJUST TAPERED POLLER BEARING PRELOAD

- (a) Install the intermediate case to the differential case LH and fix them with 4 bolts.
- (b) Install the differential assy to the transaxle case.



- (c) Clean the matching surfaces of the transaxle case and transaxle housing.
- (d) Install the transaxle housing to the transaxle case and tighten them with the 16 bolts.

Torque:

Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)

Bolt B 33 N·m (337 kgf·cm, 24 ft·lbf)

Bolt C 29 N·m (295 kgf·cm, 21 ft·lbf)

Bolt length:

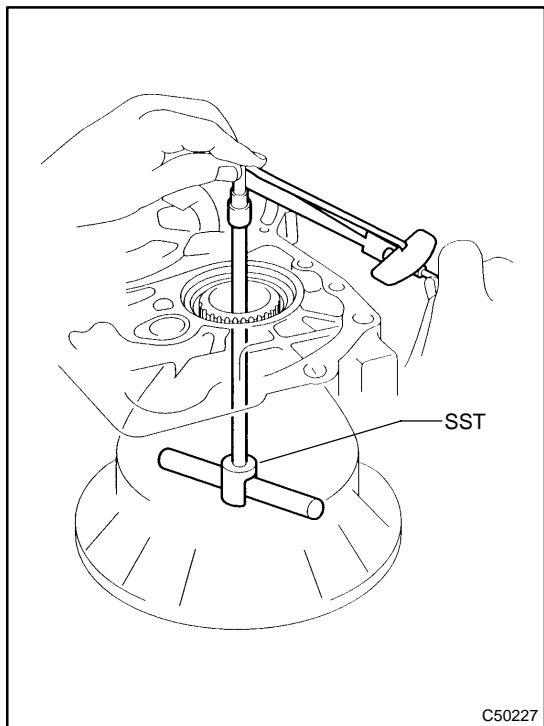
Bolt A: 50 mm (1.969 in.)

Bolt B: 50 mm (1.969 in.)

Bolt C: 42 mm (1.654 in.)

HINT:

Usually, bolt A is a non-reusable bolt. In this case, however, it can be used after cleaning it.



(e) Using SST, turn the differential assy right and left 2or 3 times to allow the bearing settle.

SST 09564-3201 1

(f) Using SST and a torque wrench, measure the turning torque of the differential case assy.

SST 09564-3201 1

Turning torque at 60 rpm:

New bearing

0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in.-lbf)

Used bearing

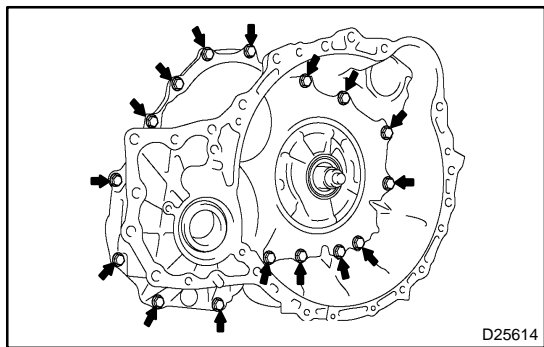
0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in.-lbf)

HINT:

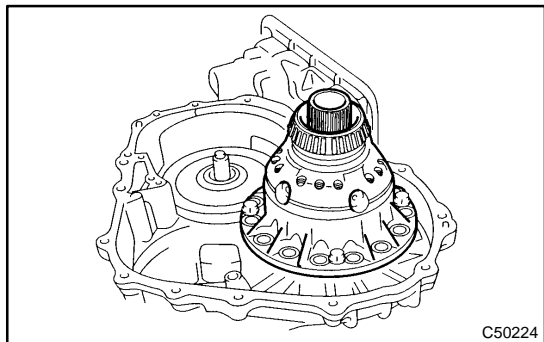
If the turning torque is not within the specified value, refer to the table below and select a thrust washer which turning torque is within the specified value.

Flange thickness: mm (in.)

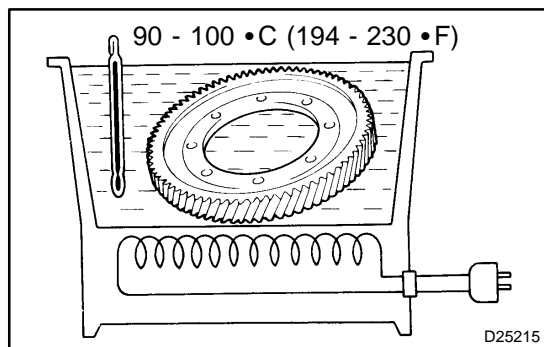
Mark	Thickness	Mark	Thickness
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



(g) Remove the 16 bolts and the transaxle housing.



(h) Remove the differential assy.



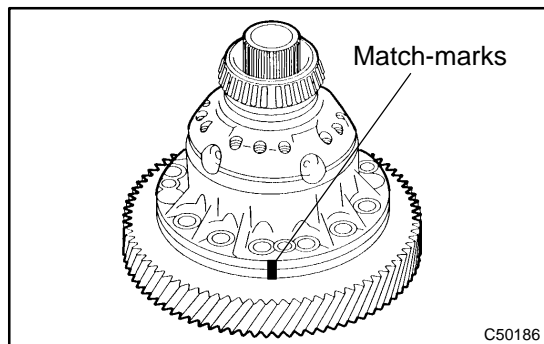
13. INSTALL FRONT DIFFERENTIAL RING GEAR

- (a) Using ATF and heater, heat the front differential ring gear to 90 - 110 •C. (194.0 - 230.0 •F)

NOTICE:

Do not overheat the ring gear to 110 •C (230.0 •F) or more.

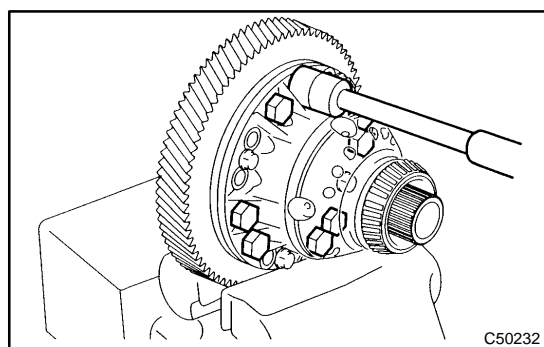
- (b) Clean the contact surface of the front differential case.



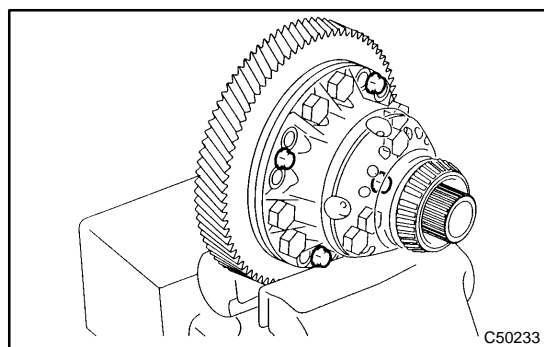
- (c) Set the match-marks, install the front differential ring gear case quickly.

NOTICE:

Do not install the bolts while the ring gear is hot.



- (d) Temporarily install the 8 bolts as shown in the illustration.

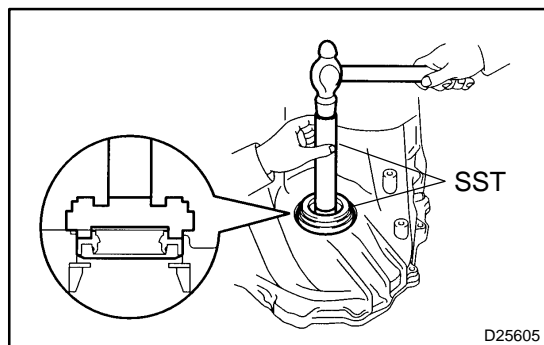


- (e) Remove the 4 bolts shown in the illustration.
- (f) Temporarily install the remaining 8 set bolts.
- (g) Fully tighten the set bolts.

Torque: 95.1 N·m (970 kgf·cm, 70 ft·lbf)

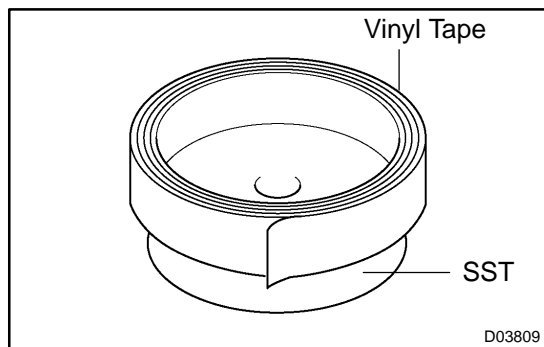
NOTICE:

Tighten the bolts a little at a time in diagonal order.



14. INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.
SST 09223-15020, 09950-70010 (09951-07100)
- (b) Coat the rip of oil seal with a little MP grease.



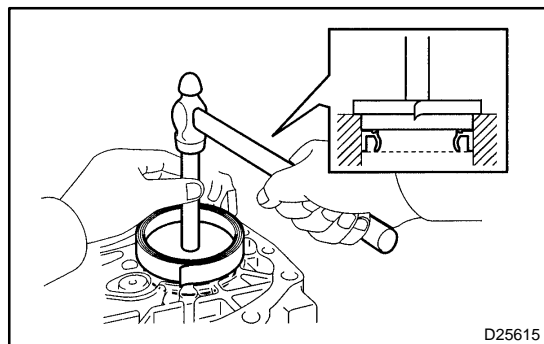
15. INSTALL TRANSAXLE HOUSING OIL SEAL

- (a) Wind a vinyl tape around SST at the place 6.0 mm (0.236 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).
SST 09950-60020 (09951-00730)

NOTICE:

Remove foreign matter such as grease on the SST before winding the tape.

- (b) Coat the rip of oil seal with a little MP grease.



- (c) Using SST, install a new oil seal.
SST 09950-60020 (09951-00730), 09950-70010 (09951-07150)

Standard press in depth:

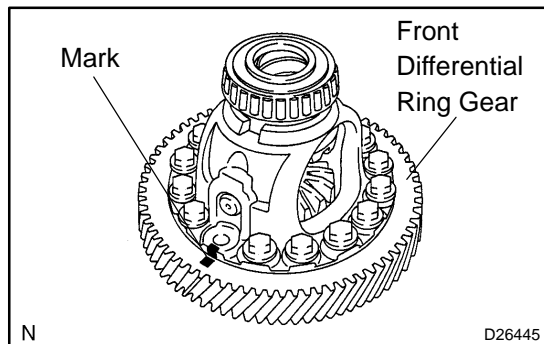
5.5 - 6.5 mm (0.217 - 0.256 in.)

NOTICE:

Stop pressing when the would vinyl tape is contact with the transaxle housing.

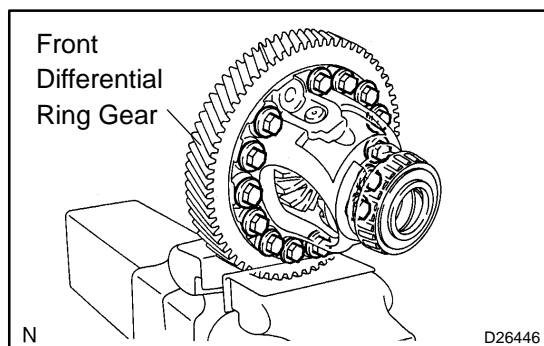
FRONT DIFFERENTIAL ASSY (U151E) OVERHAUL

4006M-03

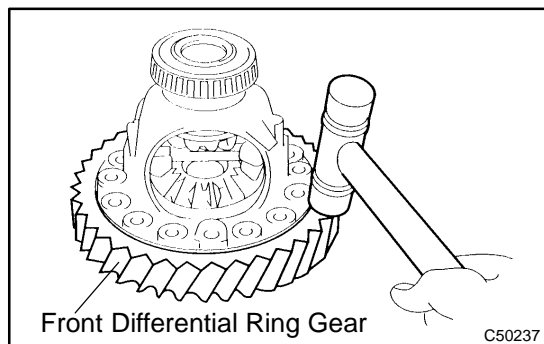


1. REMOVE FRONT DIFFERENTIAL RING GEAR

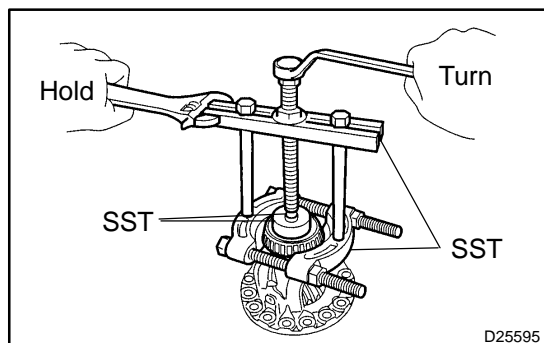
- (a) Place the match-marks on the front differential ring gear and differential case.



- (b) Remove the 14 bolts.



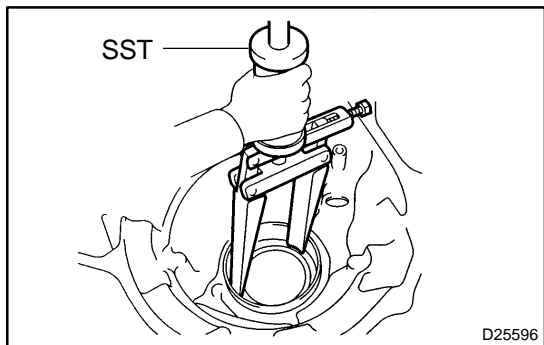
- (c) Using a plastic hammer, tap on the front differential ring gear to remove it from the case.



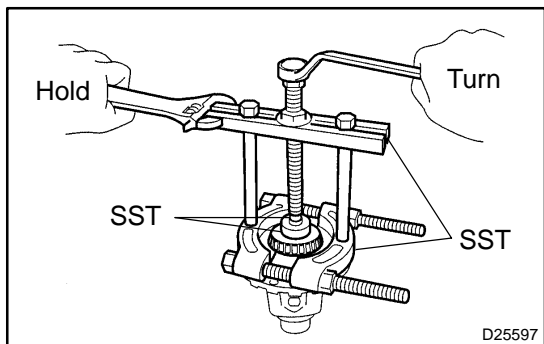
2. REMOVE FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the front differential case front differential tapered roller bearing from the differential case.

SST 09950-00020, 09950-00030, 09950-60010
(09951-00490), 09950-40011 (09957-04010)

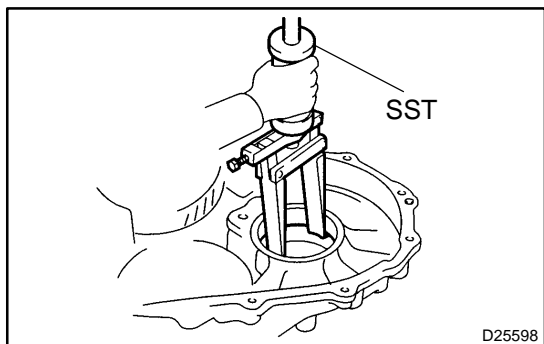


- (b) Using SST, remove the front differential case front tapered roller bearing outer race.
SST 09308-00010

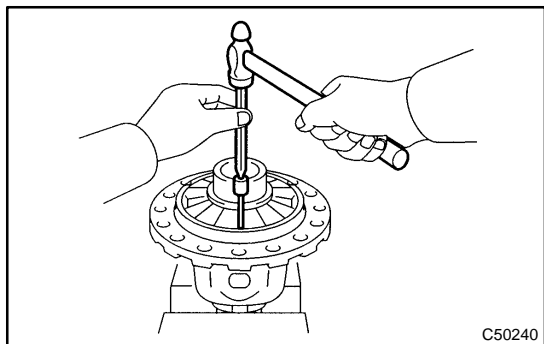


3. REMOVE FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

- (a) Using SST, remove the front differential case rear tapered roller bearing from the differential case.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00490), 09950-40011 (09957-04010)

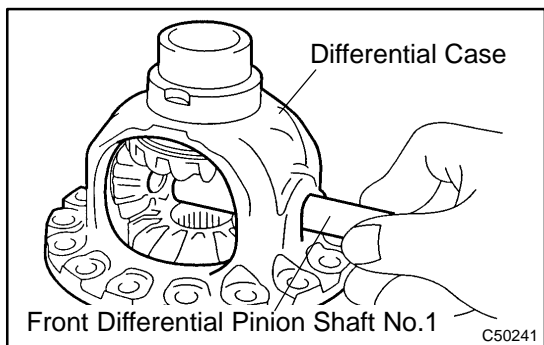


- (b) Using SST, remove the front differential case rear tapered roller bearing outer race.
SST 09308-00010



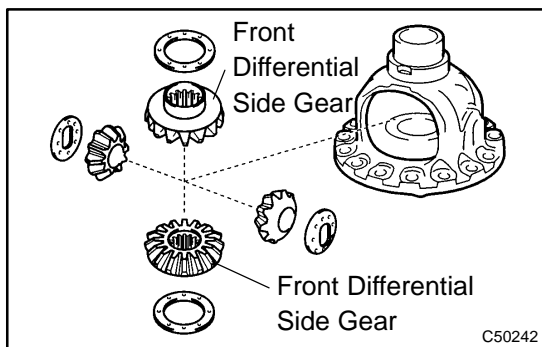
4. REMOVE FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

- (a) Using a pin punch and hammer, install the straight pin.
NOTICE:
Before removing the straight pin, unstake it with a pin punch.



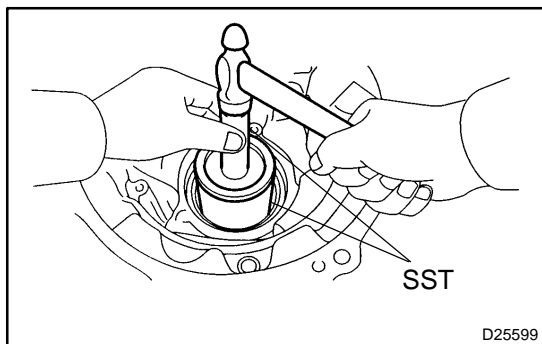
5. REMOVE FRONT DIFFERENTIAL PINION SHAFT NO.1

- (a) Remove the front differential pinion shaft No.1 from the differential case.



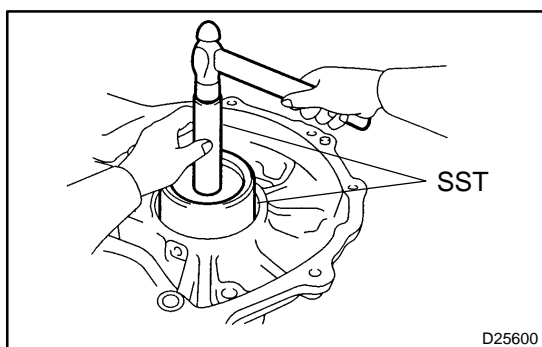
6. REMOVE FRONT DIFFERENTIAL SIDE GEAR

- (a) Remove the 2 front differential pinions, 2 pinion thrust washers, 2 front differential side gears and 2 side gear thrust washers from the differential case.



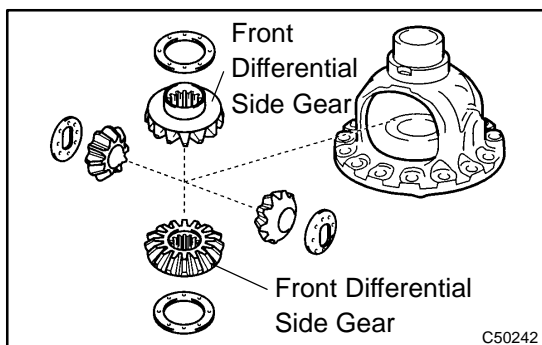
7. REMOVE TRANSAXLE HOUSING OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09215-00013 (09215-00471)



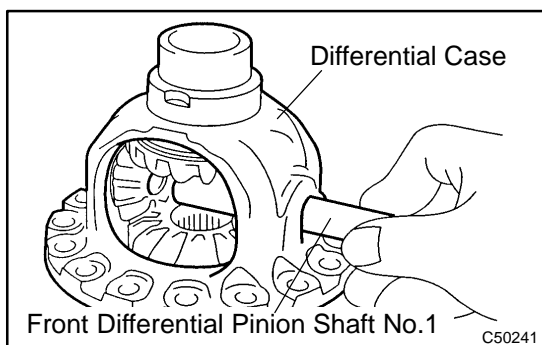
8. REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09950-70010 (09951-07100), 09608-10010



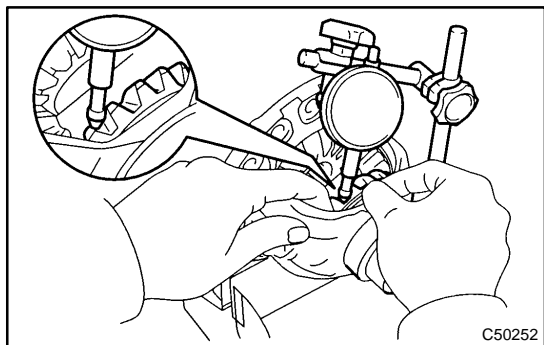
9. INSTALL FRONT DIFFERENTIAL SIDE GEAR

- (a) Apply the 2 front differential side gears, 2 side gear thrust washers, 2 front differential pinions and 2 pinion thrust washers with ATF and install them to the differential case.



10. INSTALL FRONT DIFFERENTIAL PINION SHAFT NO.1

- (a) Apply the front differential pinion shaft No.1 with ATF, install it to the differential case.



11. INSPECT BACKLASH

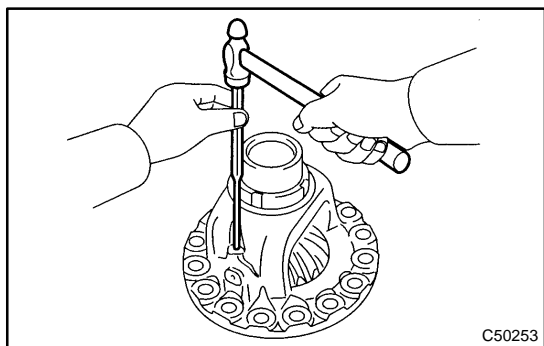
- (a) Using a dial indicator, inspect the backlash of the side gear.

Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)

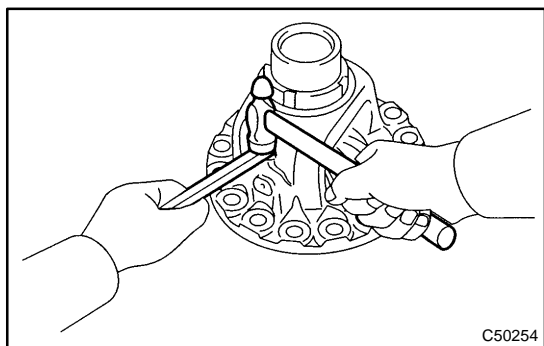
Thrust washer thickness

Mark	Thickness
-	1.625 mm (0.0640 in.)
-	1.725 mm (0.0679 in.)
-	1.825 mm (0.0719 in.)



12. INSTALL FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

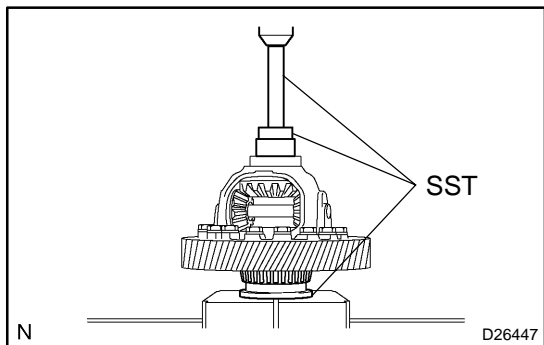
- (a) Using a pin punch and hammer, install the pinion shaft straight pin.



- (b) Using a chisel and hammer, stake the differential case.

NOTICE:

Stake it after adjusting the backlash.



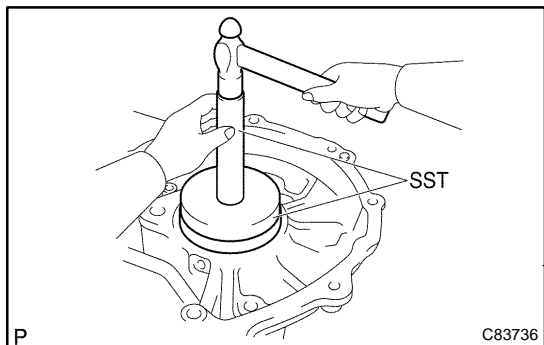
13. INSTALL FR DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

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

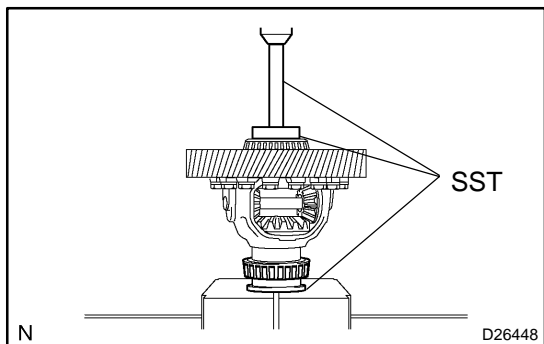
SST 09316- 12010, 09550- 60010 (09951- 00490),
09950-70010 (09951-07100)

NOTICE:

Do not make a damage on the bearing cage during the bearing inner race installation.



- (b) Using SST and a hammer, install the front differential case tapered roller bearing front outer race to the transaxle housing.
 SST 09550-60010 (09951-00490), 09950-60020 (09951-00910)

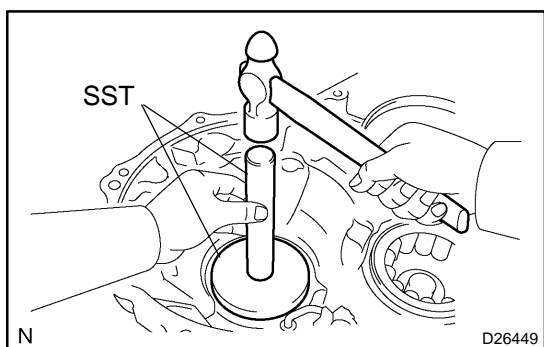


14. INSTALL FR DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

- (a) Using SST and a press, install the front differential case front tapered roller bearing to the differential case.
 SST 09316-12010, 09550-60010 (09951-00490), 09950-70010 (09951-07100)

NOTICE:

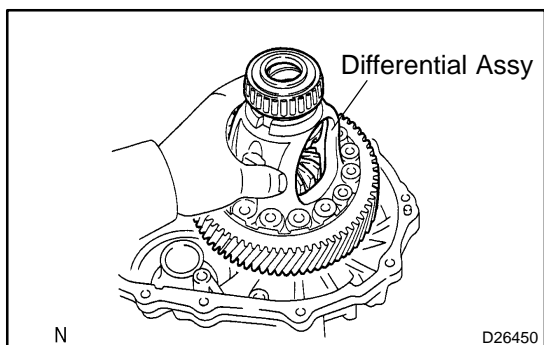
Do not make a damage on the bearing cage during the bearing inner race installation.



- (b) Using SST and a hammer, install the front differential case tapered roller bearing front outer race to the transaxle housing.
 SST 09950-70010 (09951-07150), 09950-60020 (09951-00890)

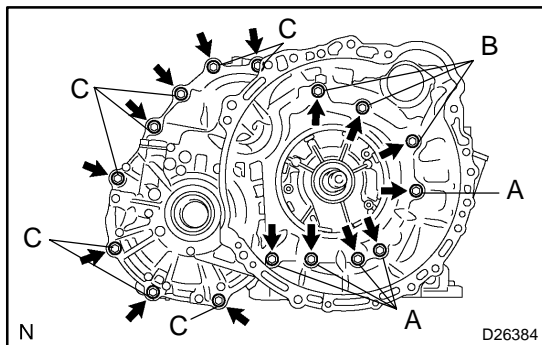
NOTICE:

Clearance is not allowed between the bearing and transaxle housing.



15. ADJUST DIFFERENTIAL SIDE BEARING RRELOAD

- (a) Install the differential assy to the transaxle case.



- (b) Clean the matching surfaces of the transaxle case and transaxle housing.
- (c) Install the transaxle housing to the transaxle case and tighten them with the 16 bolts.

Torque:

- Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)**
- Bolt B: 33 N·m (337 kgf·cm, 24 ft·lbf)**
- Bolt C: 29 N·m (295 kgf·cm, 21 ft·lbf)**
- Bolt D: 22 N·m (226 kgf·cm, 16.0 ft·lbf)**

HINT:

Apply seal packing or equivalent to the A and D.

Seal packing:

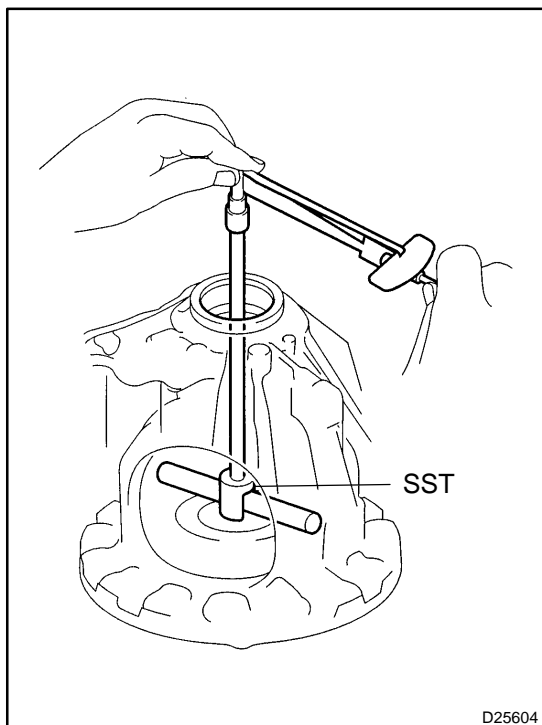
THREE BOND 2403 or equivalent

Bolt length:

- Bolt A: 50 mm (1.969 in.)**
- Bolt B: 50 mm (1.969 in.)**
- Bolt C: 42 mm (1.654 in.)**
- Bolt D: 72 mm (2.835 in.)**

HINT:

Usually, bolt A is a non-reusable bolt. In this case, however, it can be used after cleaning it.



- (d) Using SST, turn the differential assy right and left 2 or 3 times to settle the bearing.

SST 09564-3201 1

- (e) Using SST and a torque wrench, measure the turning torque of the differential.

SST 09564-3201 1

Turning torque at 60 rpm:

New bearing

0.20 - 0.69 N·m (2.0 - 7.0 kgf·cm, 1.8 - 6.1 in·lbf)

Used bearing

0.10 - 0.35 N·m (1.0 - 3.6 kgf·cm, 0.9 - 3.1 in·lbf)

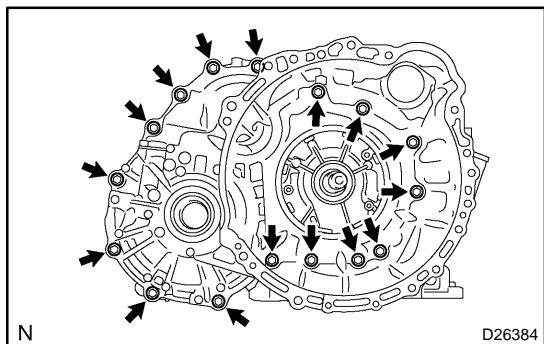
HINT:

If the turning torque is not within the specified value, refer to the table below to select a thrust washer which turning torque is within the specified value.

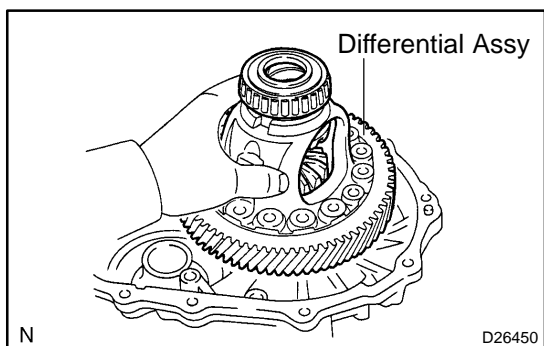
Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)

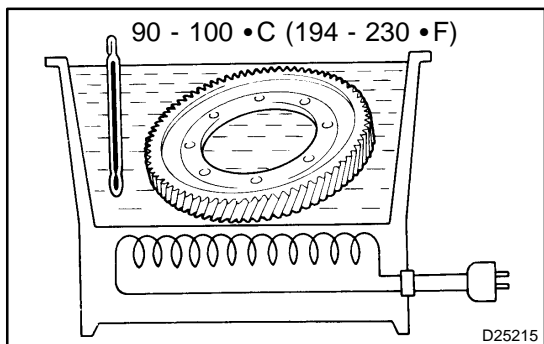
Mark	Thickness	Mark	Thickness
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



(f) Remove the 16 bolts and the transaxle housing.



(g) Remove the differential assy.



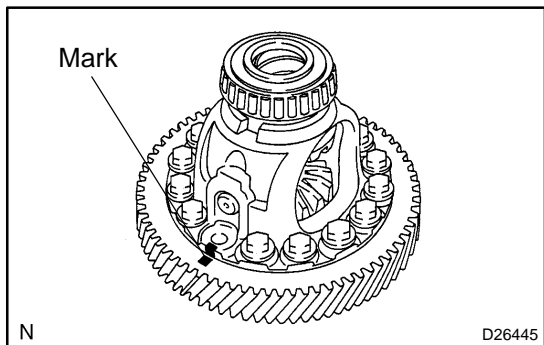
16. INSTALL FRONT DIFFERENTIAL RING GEAR

(a) Using ATF and heater, heat the front differential ring gear to 90 - 110 •C (194.0 - 230.0 •F).

NOTICE:

Do not overheat the ring gear to 110 •C (230.0 •F) or more.

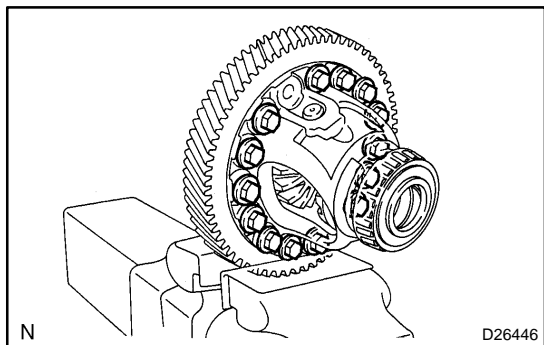
(b) Clean the contact surface of the front differential case.



(c) Align the match-marks, install the front differential ring gear case quickly.

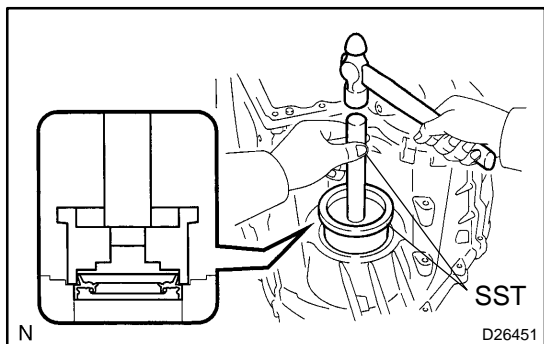
NOTICE:

Do not install the bolts while the ring gear is hot.



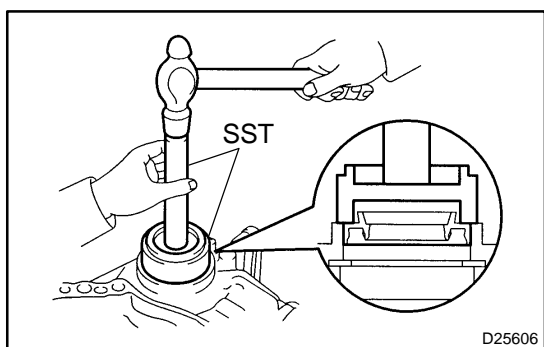
- (d) Tighten the 14 bolts.
Torque: 95.0 N·m (970 kgf·cm, 70 ft·lbf)

NOTICE:
Tighten the bolts a little at a time in diagonal order.



17. INSTALL TRANSAXLE HOUSING OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.
 (b) Apply the lip of oil seal with a little MP grease.
 SST 09223-15020, 09950-70010 (09951-07150)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)

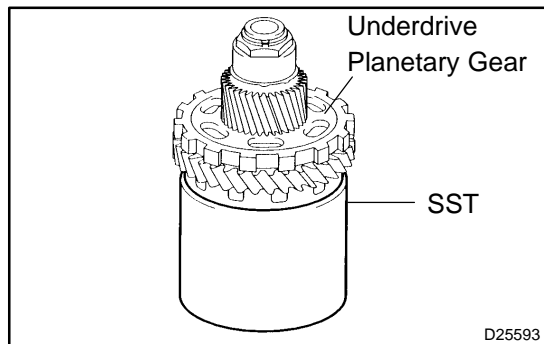


18. INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

- (a) Using SST and a hammer, drive into a new oil seal.
 (b) Apply the lip of the oil seal with a little MP grease.
 SST 09710-30050, 09950-70010 (09951-07150)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)

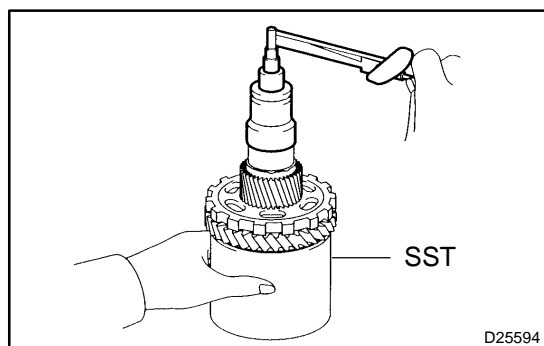
UNDERDRIVE PLANETARY GEAR ASSY (U151E/U151F) OVERHAUL

4006K-03



1. INSPECT UNDERDRIVE PLANETARY GEAR PRELOAD

- (a) Using SST, fix the underdrive planetary gear assy.
SST 09387-00050



- (b) Using SST and a torque wrench, measure the turning torque of underdrive planetary gear assy while rotating the torque wrench at 60 rpm.

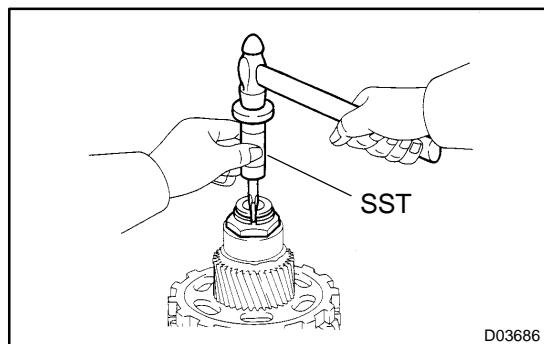
SST 09387-00050

Turning torque at 60 rpm.:

0.50 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in.·lbf)

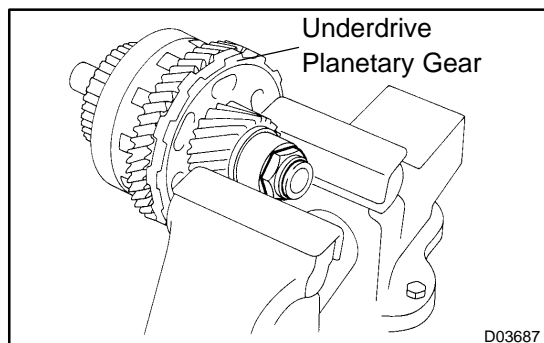
HINT:

Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).



2. REMOVE FRONT PLANETARY GEAR NUT

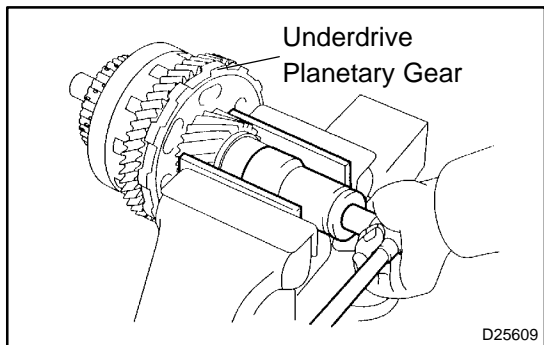
- (a) Using SST, loosen the staked part of the lock nut.
SST 09930-00010 (09931-00010, 09931-00020),
09387-00050



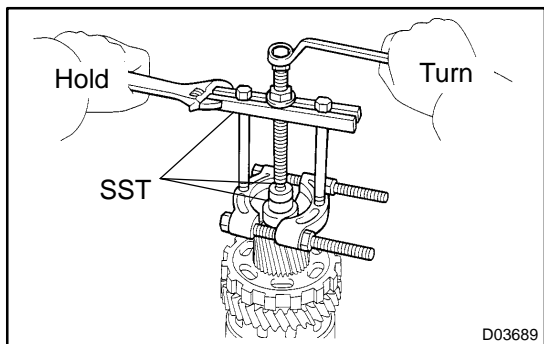
- (b) Clamp the underdrive planetary gear in soft jaw vise.

NOTICE:

Be careful not to damage the differential drive pinion.

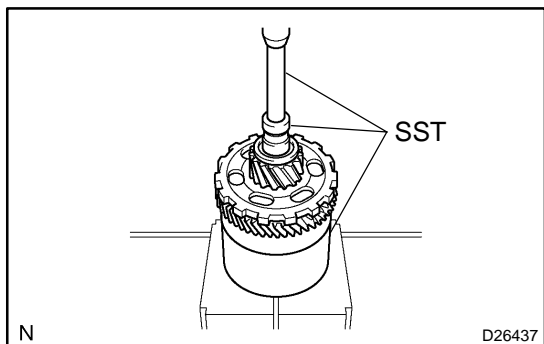


- (c) Using a socket wrench, remove the lock nut.



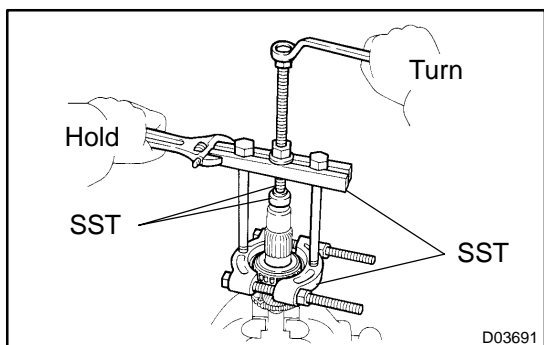
3. REMOVE CYLINDRICAL ROLLER BEARING RACE INNER

- (a) Using SST, remove the cylindrical roller bearing race inner.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00320), 09950-40011 (09957-04010)



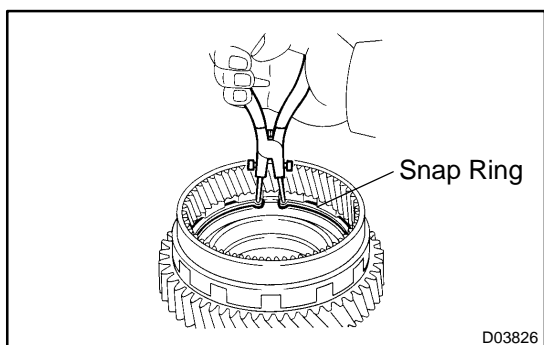
4. REMOVE UNDERDRIVE PLANETARY GEAR ASSY

- (a) Using SST and a press, remove the differential drive pinion, parking lock gear, counter driven gear with underdrive planetary ring gear and front tapered roller bearing.
SST 09950-60010 (09951-00320), 09387-00050



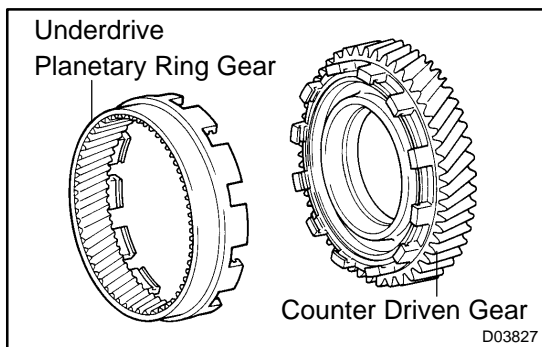
- (b) Clamp the underdrive planetary gear in soft jaw vise.
(c) Using SST, remove the rear tapered roller bearing from the underdrive planetary gear.

SST 09950-00020, 09950-00030, 09950-60010 (09951-00320), 09950-40011 (09957-04010)

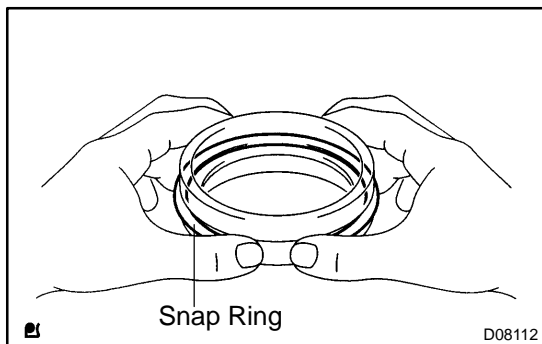


5. REMOVE UNDERDRIVE PLANETARY RING GEAR

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



- (b) Remove the underdrive planetary ring gear from the counter driven gear.

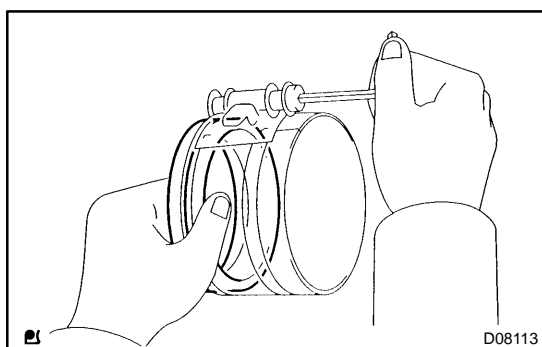


6. INSTALL UNDERDRIVE PLANETARY RING GEAR

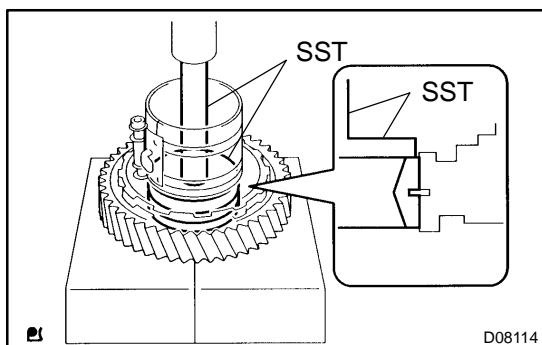
- (a) Install a new snap ring to the outer race of the tapered roller bearing.

HINT:

When replacing the bearing, also replace the counter driven gear with a new one.



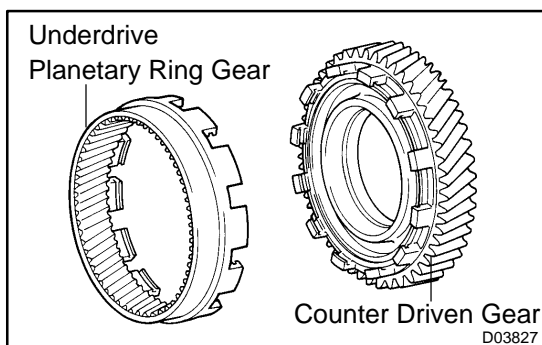
- (b) Using a piston ring compressor, squeeze the snap ring.



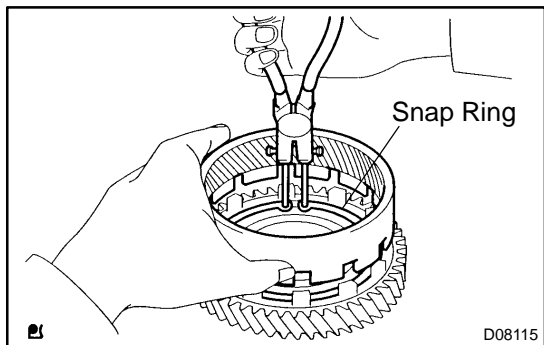
- (c) Using SST and a press, press in the outer race of the tapered roller bearing.
 SST 09950-60020 (09951-00890), 09950-70010 (09951-07100)

NOTICE:

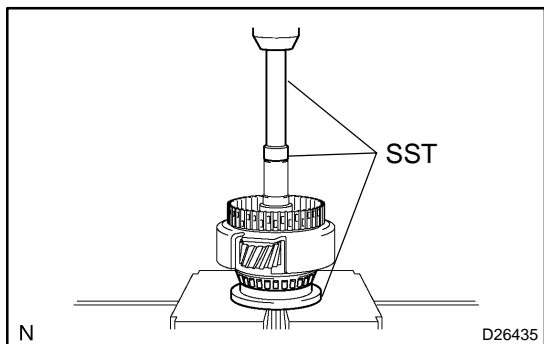
Be sure not to damage on the snap ring during the outer race installation.



- (d) Install the underdrive planetary ring gear to the counter driven gear.



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



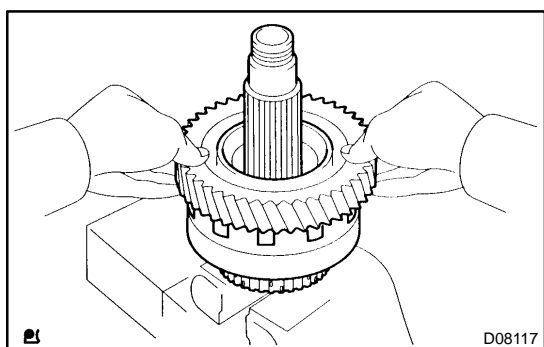
7. INSTALL UNDERDRIVE PLANETARY GEAR ASSY

(a) Using a press, press the rear tapered roller bearing to the underdrive planetary gear.

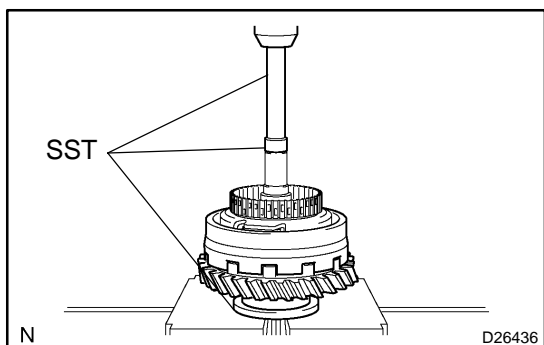
SST 09502-12010, 09950-60010 (09951-00260),
09950-70010 (09951-07100), 09316-20011

NOTICE:

Press the bearing until it becomes flat at the bottom.



(b) Install the counter driven gear with planetary ring gear to the underdrive planetary gear.

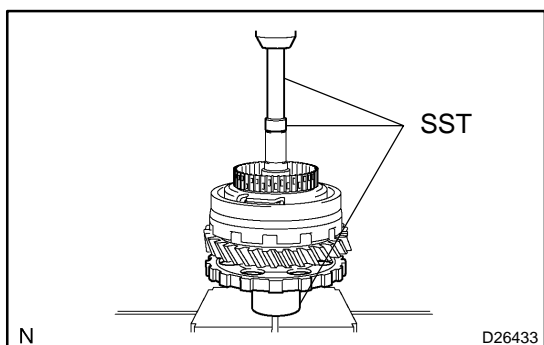


(c) Using SST and a press, press in the front tapered roller bearing.

SST 09502-12010, 09950-60010 (09951-00260),
09950-70010 (09951-07100), 09316-20011

NOTICE:

Press the counter driven gear while rotating it.

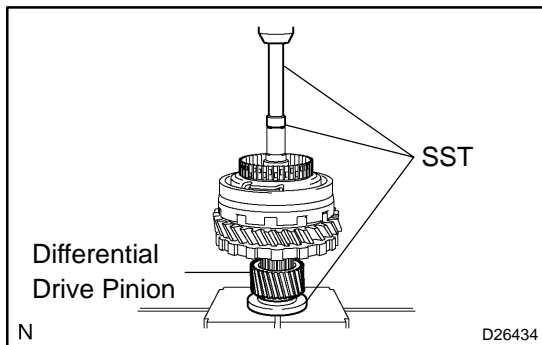


(d) Using a press, press in the parking lock gear.

SST 09502-12010, 09950-60010 (09951-00260),
09950-70010 (09951-07100), 09316-20011

NOTICE:

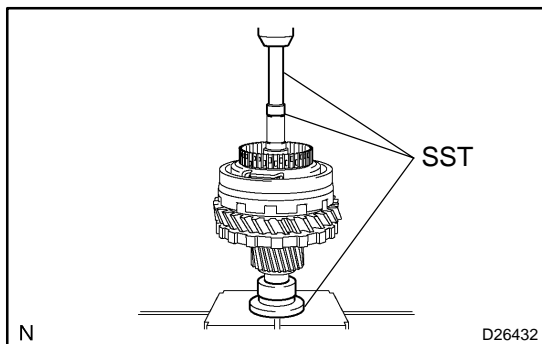
Press the counter driven gear while rotating it.



8. INSTALL DIFFERENTIAL DRIVE PINION

- (a) Using a press, press the differential drive pinion.
SST 09726-40010, 09950-60010 (09951-00260),
09950-70010 (09951-07100)

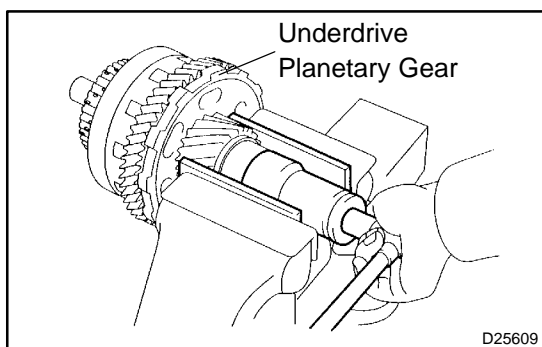
NOTICE:
Press the counter driven gear while rotating it.



9. INSTALL CYLINDRICAL ROLLER BEARING RACE INNER

- (a) Using a press, press the cylindrical roller bearing race inner.
SST 09506-35010, 09950-60010 (09951-00260),
09950-70010 (09951-07100)

NOTICE:
Press the counter driven gear while rotating it.



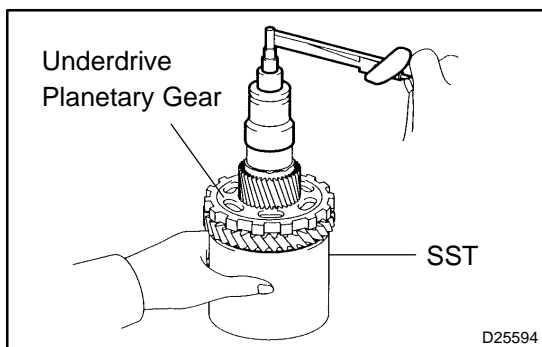
10. INSTALL FRONT PLANETARY GEAR NUT

- (a) Clamp the underdrive planetary gear in soft jaw vise.

NOTICE:
Be careful not to damage the differential drive pinion.

- (b) Using a socket wrench, install a new lock nut.
Torque: 280 N·m (2,855 kgf·cm, 207 in·lbf)

HINT:
Use a torque wrench with a fulcrum length of 750 mm (29.53 in.).



11. INSPECT UNDERDRIVE PLANETARY GEAR PRELOAD

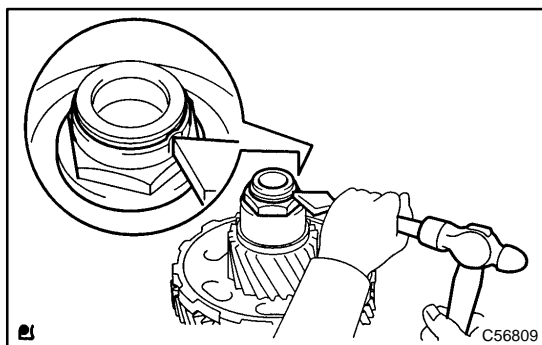
- (a) Using SST and a torque wrench, measure the turning torque of underdrive planetary gear assy while rotating the torque wrench at 60 rpm.

SST 09387-00050
Turning torque at 60 rpm.:
0.5 - 1.42 N·m (5.1 - 14.5 kgf·cm, 0.06 - 0.17 in·lbf)

HINT:
Use a torque wrench with a fulcrum length of 160 mm (6.30 in.).

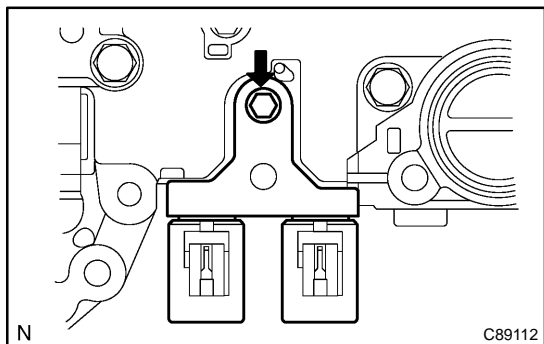
- (b) Using a pin punch and hammer, stake the lock nut.

NOTICE:
Make sure that there are no cracks on the nut.



TRANSMISSION VALVE BODY ASSY (U151E/U151F) OVERHAUL

4010J-01

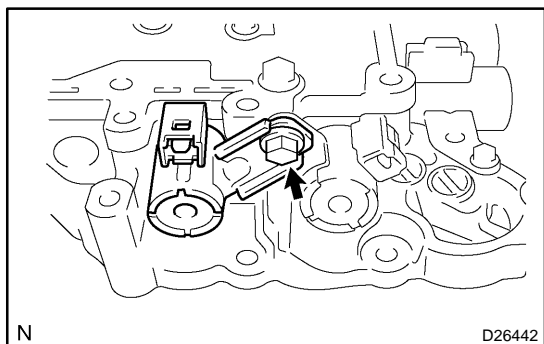


1. REMOVE SHIFT SOLENOID VALVE SL3

- (a) Remove the bolt and shift solenoid valve SL3 from the valve body assy.

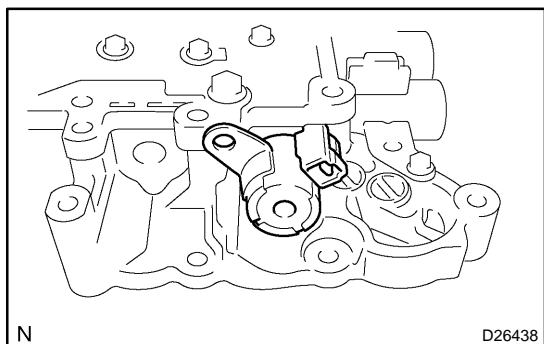
2. REMOVE LINE PRESSURE CONTROL SOLENOID ASSY

- (a) Remove the shift solenoid valve SLT from the valve body assy.



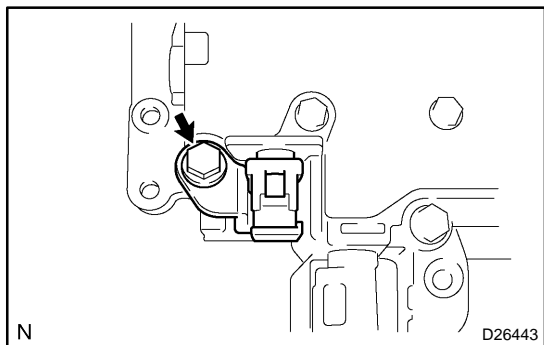
3. REMOVE SHIFT SOLENOID VALVE S4

- (a) Remove the bolt and shift solenoid valve S4 from the valve body assy.



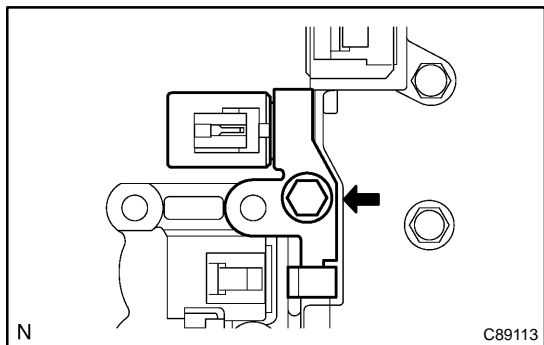
4. REMOVE SHIFT SOLENOID VALVE SR

- (a) Remove the shift solenoid valve SR from the valve body assy.



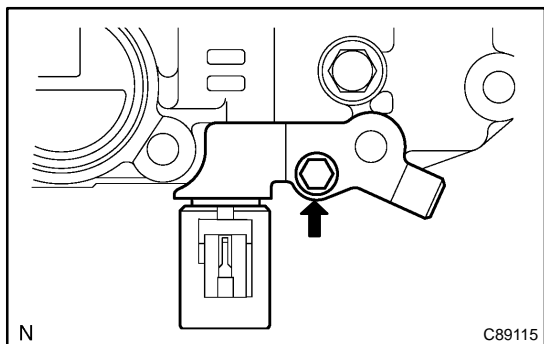
5. REMOVE SHIFT SOLENOID VALVE DSL

- (a) Remove the bolt and shift solenoid valve DSL from the valve body assy.



6. REMOVE SHIFT SOLENOID VALVE SL2

- (a) Remove the bolt and shift solenoid valve SL2 from the valve body assy.



7. REMOVE SHIFT SOLENOID VALVE SL1

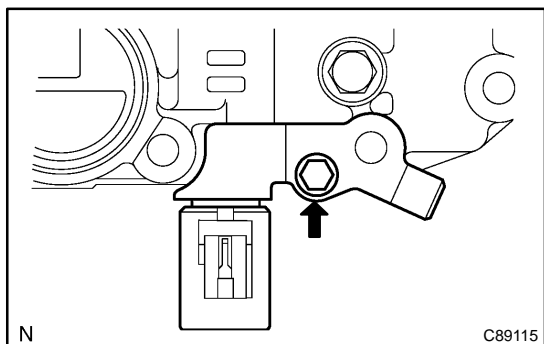
- (a) Remove the bolt and shift solenoid valve SL1 from the valve body assy.

8. REMOVE MANUAL VALVE

- (a) Remove the manual valve from the valve body assy.

9. INSTALL MANUAL VALVE

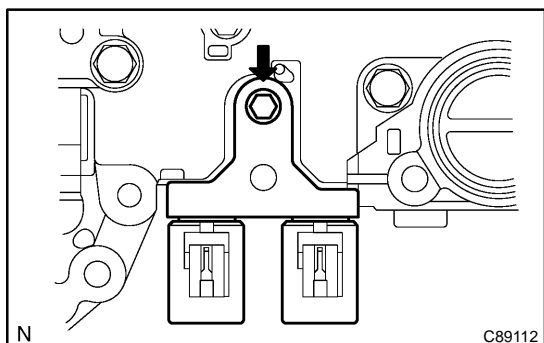
- (a) Install the manual valve to the valve body assy.



10. INSTALL SHIFT SOLENOID VALVE SL1

- (a) Install the shift solenoid valve SL1 to the valve body assy with the bolt.

Torque: 6.6 N·m (67 kgf·cm, 58 in·lbf)



11. INSTALL LINE PRESSURE CONTROL SOLENOID ASSY

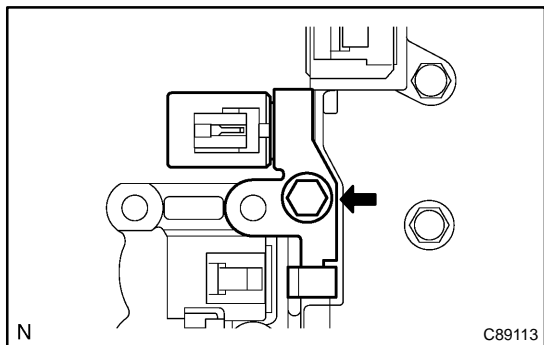
- (a) Install the shift solenoid valve SLT to the valve body assy with the bolt.

Torque: 6.6 N·m (67 kgf·cm, 58 in·lbf)

12. INSTALL SHIFT SOLENOID VALVE SL3

- (a) Install the shift solenoid valve SL3 to the valve body assy with the bolt.

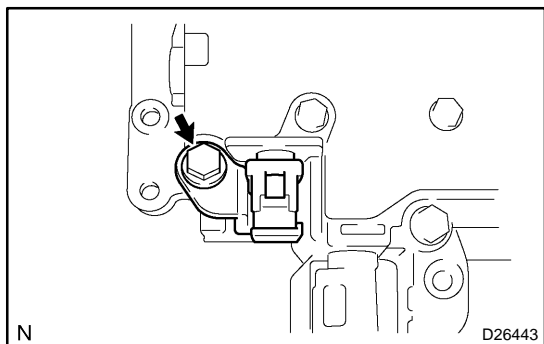
Torque: 6.6 N·m (67 kgf·cm, 58 in·lbf)



13. INSTALL SHIFT SOLENOID VALVE SL2

- (a) Install the shift solenoid valve SL2 to the valve body assy with the bolt.

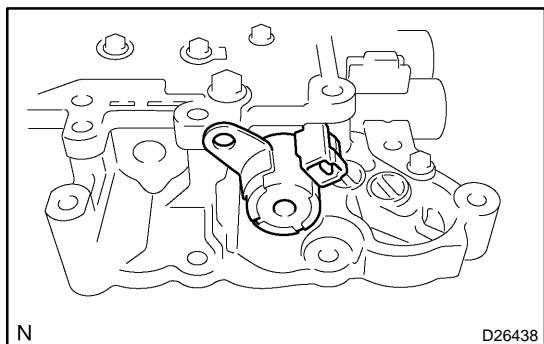
Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)



14. INSTALL SHIFT SOLENOID VALVE DSL

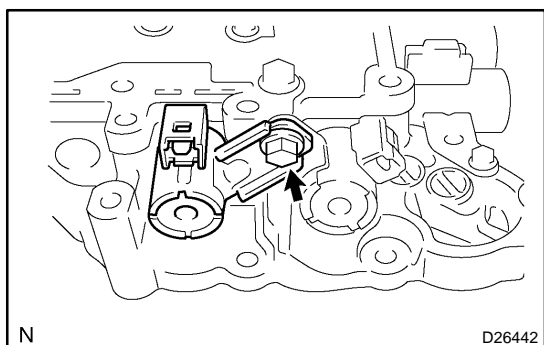
- (a) Install the shift solenoid valve DSL to the valve body assy with the bolt.

Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)



15. INSTALL SHIFT SOLENOID VALVE SR

- (a) Install the shift solenoid valve SR to the valve body assy.



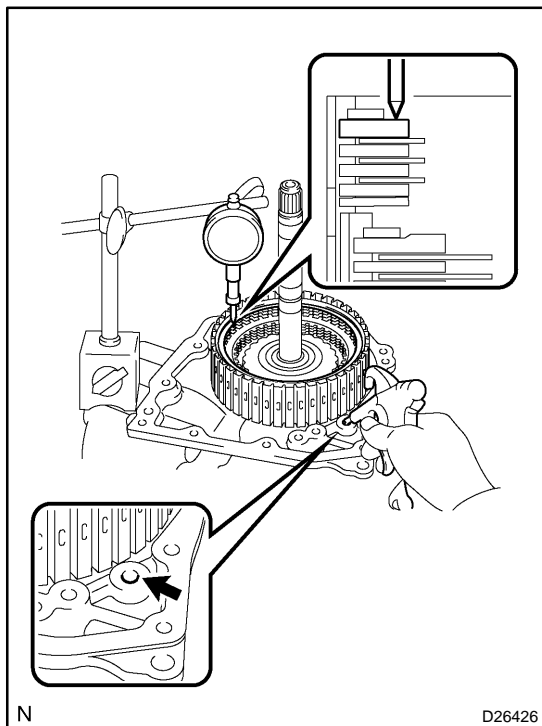
16. INSTALL SHIFT SOLENOID VALVE S4

- (a) Install the shift solenoid valve S4 to the valve body assy with the bolt.

Torque: 10.8 N·m (110 kgf·cm, 8 ft·lbf)

DIRECT CLUTCH ASSY (U151E/U151F) OVERHAUL

400H2-02

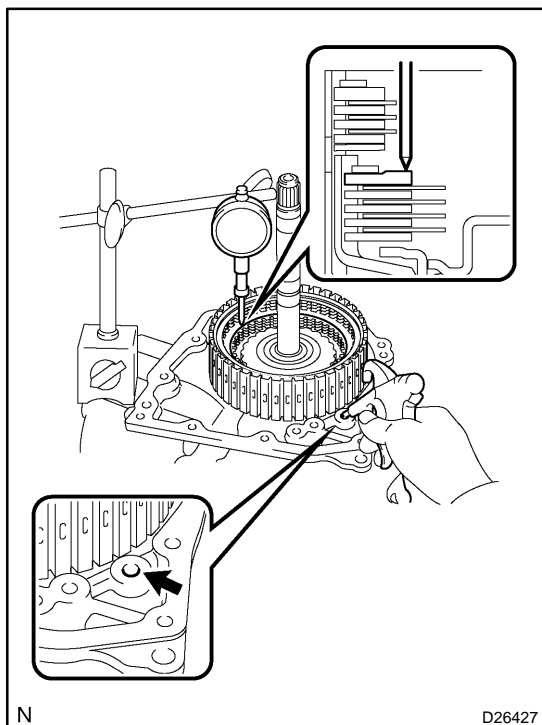


1. INSPECT PACK CLEARANCE OF REVERSE CLUTCH

- (a) Install the intermediate shaft and needle roller bearing on the transaxle rear cover .
- (b) Using a dial indicator, measure the reverse clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

Pack clearance:0.60 - 0.82 mm (0.02362 - 0.03228 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.

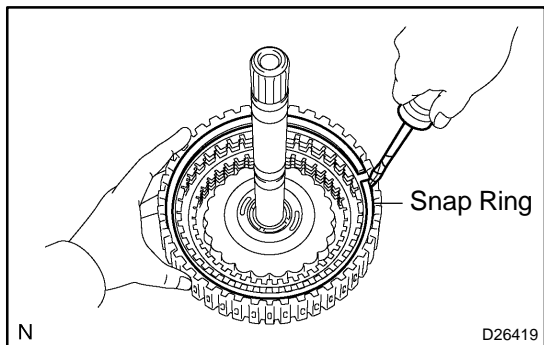


2. INSPECT PACK CLEARANCE OF DIRECT CLUTCH & OVERDRIVE CLUTCH

- (a) Using a dial indicator, measure the direct clutch & overdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

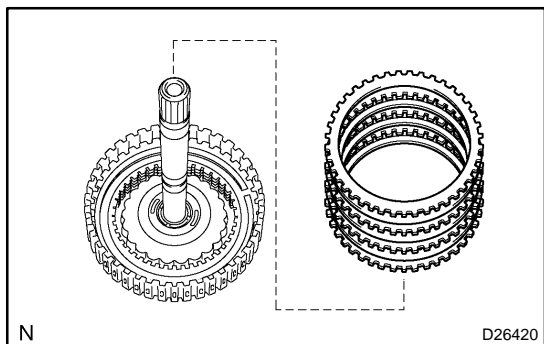
Pack clearance:0.61 - 0.83 mm (0.02401 - 0.03268 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.

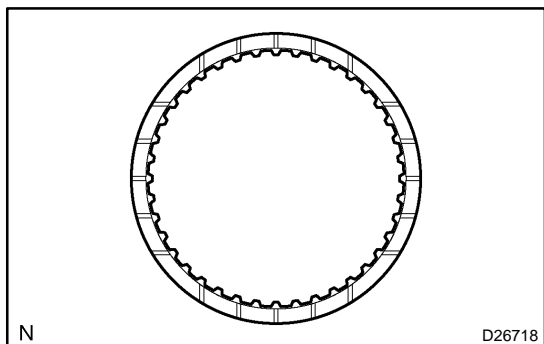


3. REMOVE DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

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



(b) Remove the flange, 3 discs, 3 plates and cushion plate from the intermediate shaft.



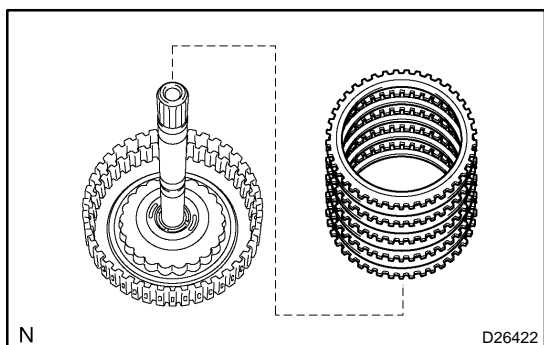
4. INSPECT DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

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

If necessary, replace them.

HINT:

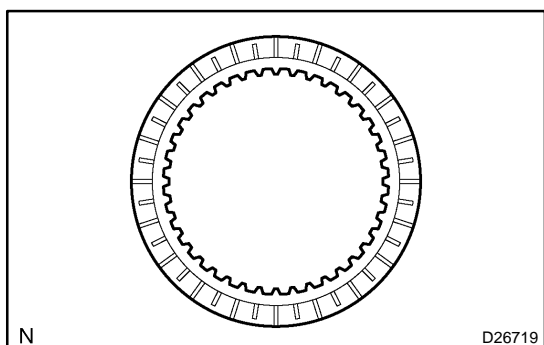
- If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



5. REMOVE OVERDRIVE DIRECT CLUTCH DISC

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

(b) Remove the flange, 4 discs and 4 plates from the intermediate shaft.



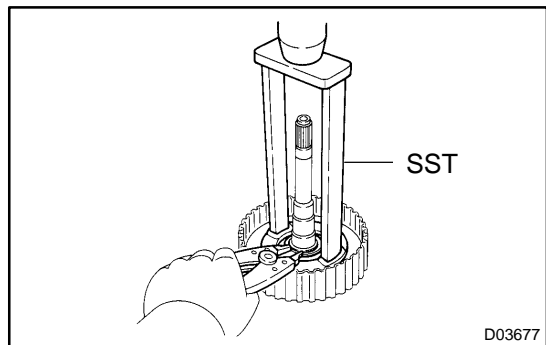
6. INSPECT OVERDRIVE DIRECT CLUTCH DISC

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

If necessary, replace them.

HINT:

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

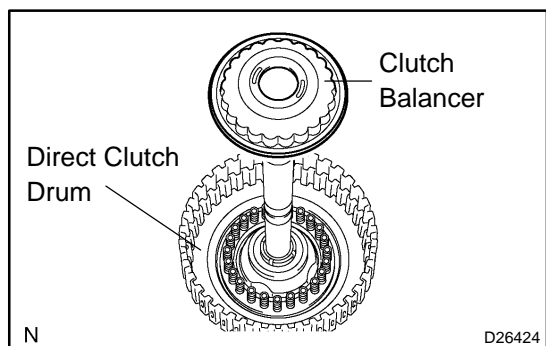


7. REMOVE OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

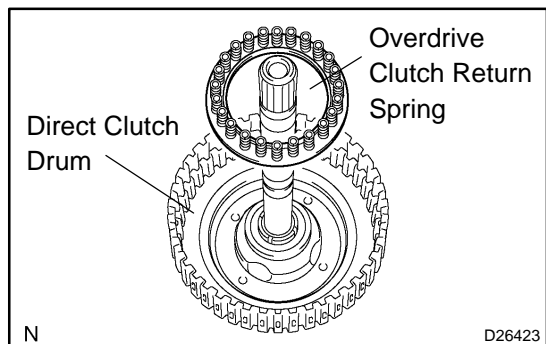
- (a) Place SST on the clutch balancer and compress the spring with a press.
SST 09387-00020
- (b) Using a snap ring expander, remove the snap ring from the direct clutch drum.

NOTICE:

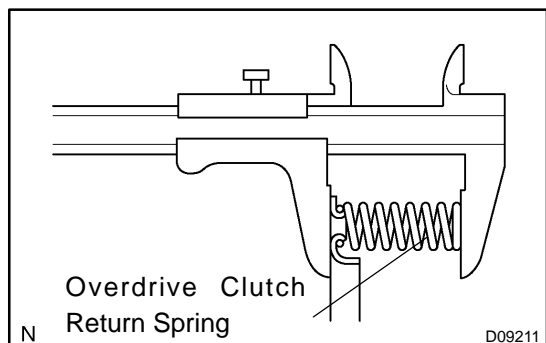
- Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.
- This prevents the spring sheet from being deformed.
- Do not expand the snap ring excessively.



- (c) Remove the clutch balancer from the direct clutch drum.

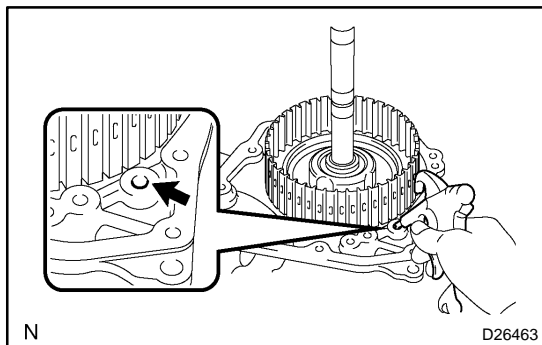


- (d) Remove the overdrive clutch return spring from the direct clutch drum.



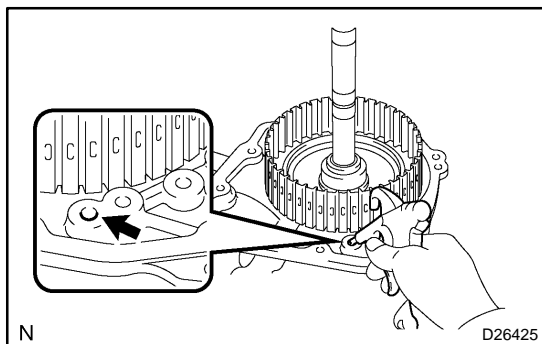
8. INSPECT OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

- (a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 25.91 mm (1.0201 in.)



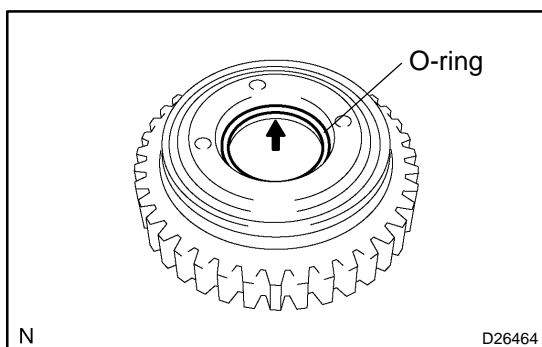
9. REMOVE OVERDRIVE DIRECT CLUTCH PISTON

- (a) Install intermediate shaft on the transaxle rear cover.
- (b) Holding the direct clutch piston with your hand, apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transaxle rear cover to remove the direct clutch piston.



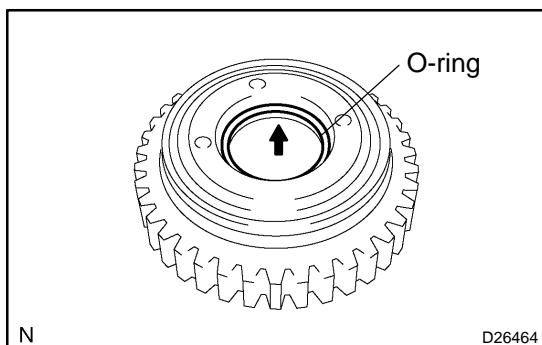
10. REMOVE OVERDRIVE DIRECT CLUTCH DRUM SUB-ASSY

- (a) Holding the direct clutch drum by hand, apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transaxle rear cover to remove the direct clutch drum.



11. REMOVE OVERDRIVE DIRECT CLUTCH O-RING

- (a) Using a screwdriver, remove the O-ring from the direct clutch drum.

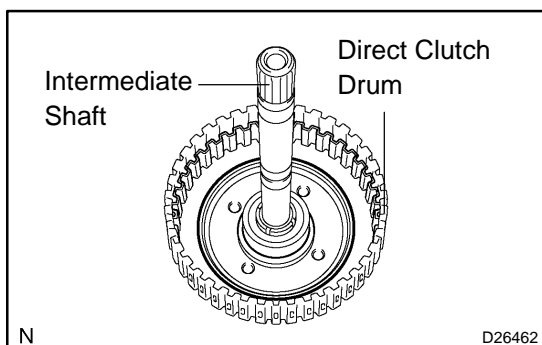


12. INSTALL OVERDRIVE DIRECT CLUTCH O-RING

- (a) Coat a O-ring with ATF, and install it to the direct clutch drum.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

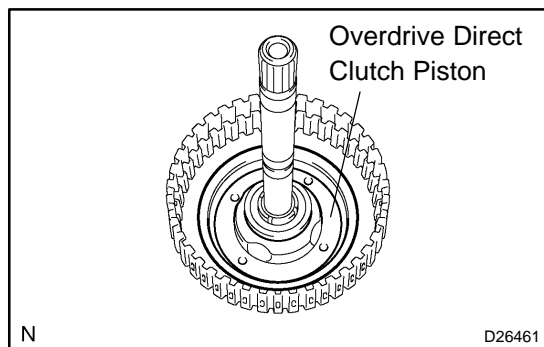


13. INSTALL OVERDRIVE DIRECT CLUTCH DRUM SUB-ASSY

- (a) Coat the direct clutch drum with ATF, and install it to the intermediate shaft.

NOTICE:

- Be careful not to damage the O-ring.
- Be careful not to damage the lip seal of the direct clutch drum.

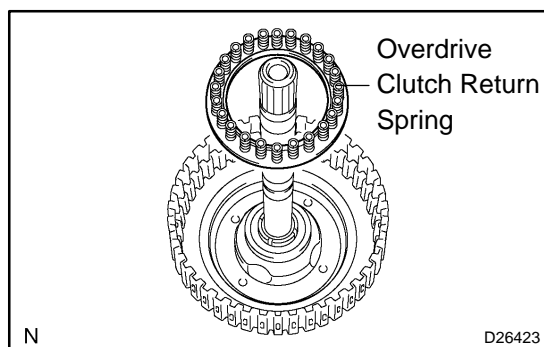


14. INSTALL OVERDRIVE DIRECT CLUTCH PISTON

- (a) Apply the overdrive direct clutch piston with ATF, and install it to the direct clutch drum.

NOTICE:

Be careful not to damage the lip seal of the direct clutch piston.



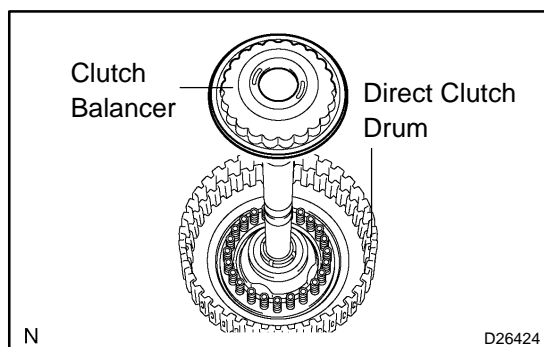
15. INSTALL OVERDRIVE CLUTCH RETURN SPRING SUB-ASSY

- (a) Install the piston return spring to the direct clutch drum.

NOTICE:

Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.

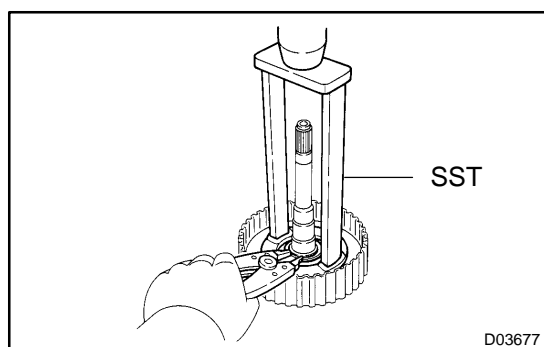
- (b) Coat the clutch balancer with ATF.



- (c) Install the clutch balancer to the direct clutch drum.

NOTICE:

- **Be careful not to damage the lip seal of the direct clutch balancer.**
- **Install the clutch balancer carefully not to have a pinching and any other defects at the sealing lip.**
- **Apply enough ATF to the sealing lip prior to assembling.**



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

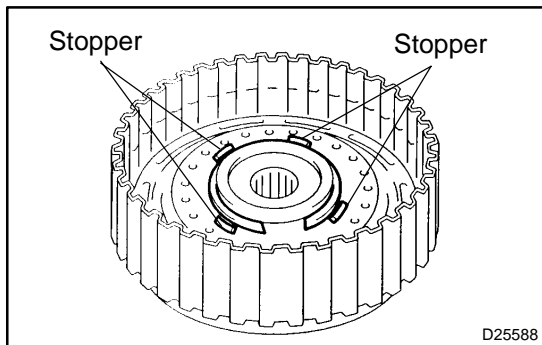
SST 09387-00020

- (e) Using a snap ring expander, install the snap ring to the direct clutch drum.

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

NOTICE:

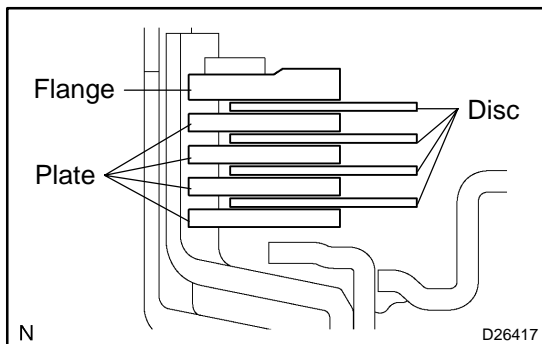
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



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

NOTICE:

The end gap of the snap ring should not coincide with any of the stoppers.

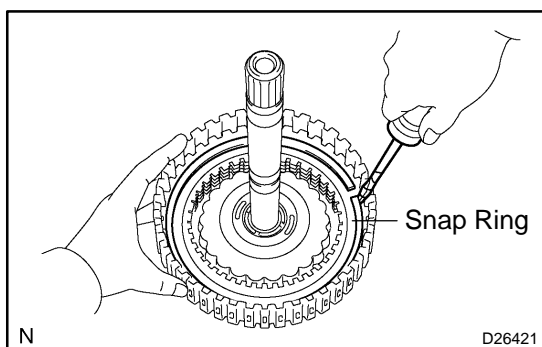


16. INSTALL OVERDRIVE DIRECT CLUTCH DISC

- (a) Coat the 4 discs with ATF.
- (b) Install the 4 plates, 4 discs and flange to the intermediate shaft.

NOTICE:

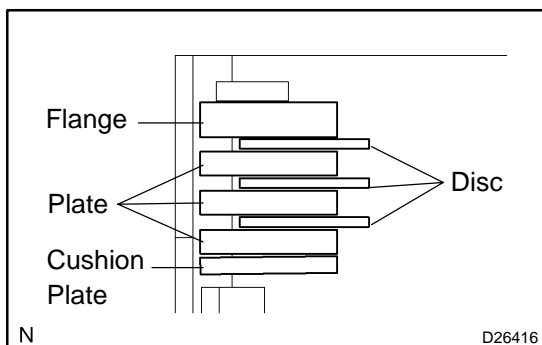
Be careful about the order of discs, plates and flange assembly.



- (c) Using a screwdriver, install the snap ring.
- (d) Check that the end gap of the snap ring is not aligned with one of the cutouts.

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.

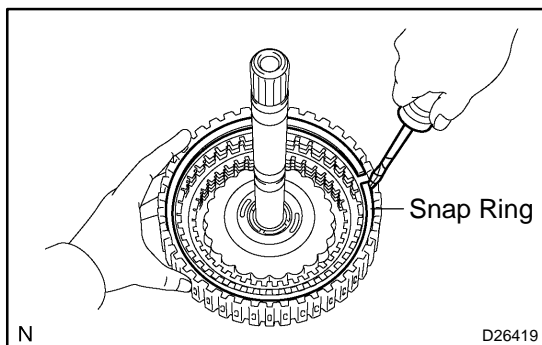


17. INSTALL DIRECT MULTIPLE DISC CLUTCH CLUTCH DISC

- (a) Apply the 3 discs with ATF.
- (b) Install the cushion plate, 3 plates, 3 discs and flange to the intermediate shaft.

NOTICE:

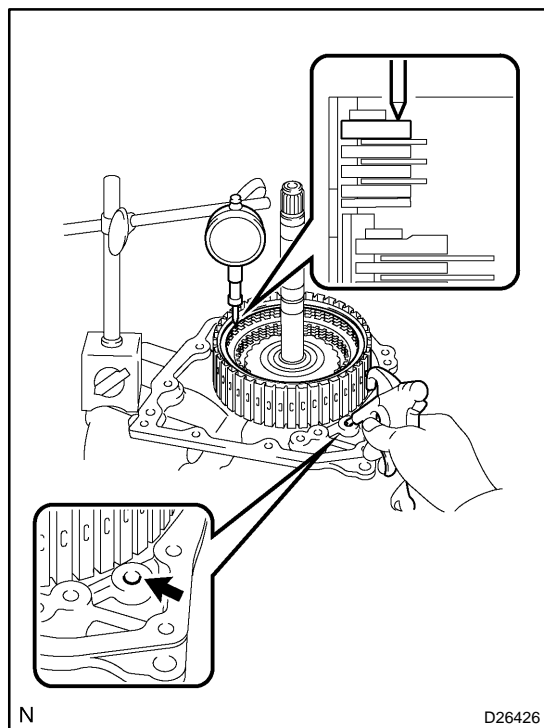
- Install the cushion plate with the mark on the white surface facing to plate.
- Be careful about the order of discs, plates and flange assembly.



- (c) Using a screwdriver, install the snap ring.
- (d) Check that the end gap of the snap ring is not aligned with one of the cutouts.

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



18. INSPECT PACK CLEARANCE OF REVERSE CLUTCH

- (a) Install the intermediate shaft on the transaxle rear cover.
- (b) Using a dial indicator, measure the direct clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

Pack clearance: 0.60 - 0.82 mm (0.02362 - 0.03228 in.)

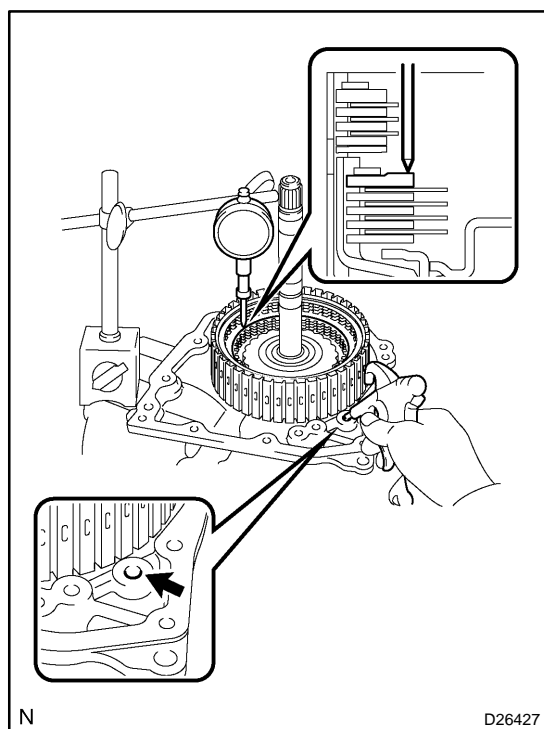
If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again. If the stroke is not within standard, select another flange.

HINT:

There are 6 flanges of different thickness.

Flange thickness: mm (in.)

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



19. INSPECT PACK CLEARANCE OF DIRECT CLUTCH & OVERDRIVE CLUTCH

- (a) Using a dial indicator, measure the direct clutch & overdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

Pack clearance: 0.61 - 0.83 mm (0.02401 - 0.03268 in.)

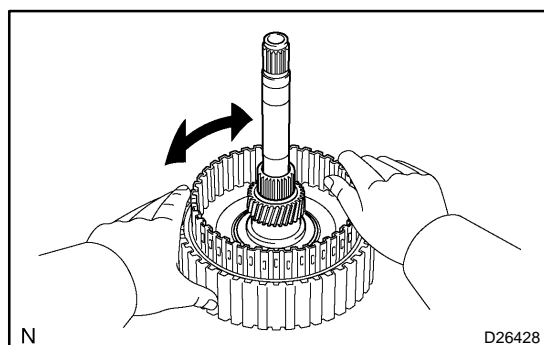
If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again. If the stroke is not within standard, select another flange.

HINT:

There are 7 flanges in different thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
0	2.5 (0.098)	4	2.9 (0.114)
1	2.6 (0.102)	5	3.0 (0.118)
2	2.7 (0.106)	6	3.1 (0.122)
3	2.8 (0.110)	-	-



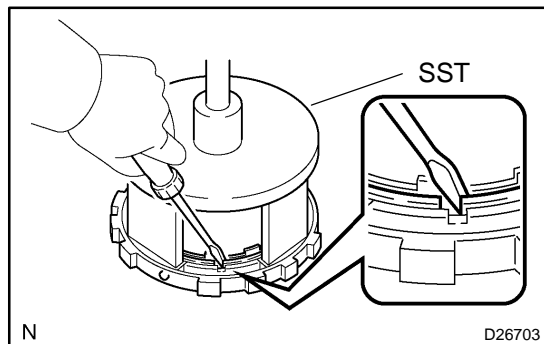
- (b) Check that the disc rotates when rotating the disc after inserting the rear planetary sun gear.

NOTICE:

Do not place the rear planetary sun gear in a vise.

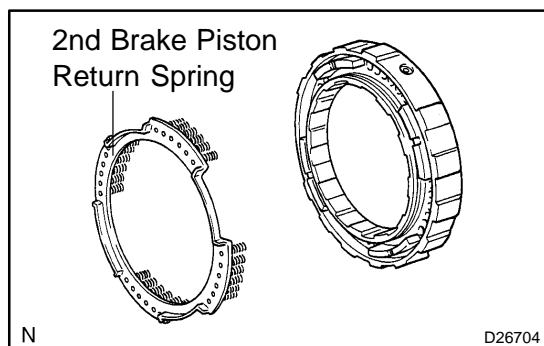
SECOND BRAKE PISTON ASSY (U151E/U151F) OVERHAUL

4006I-03

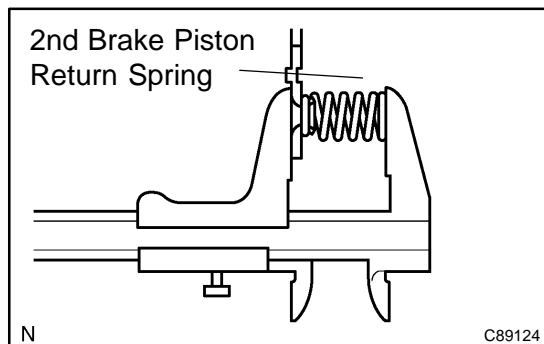


1. REMOVE 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

- (a) Place SST on the return spring and compress.
SST 09387-00060
- (b) Using a screwdriver, remove the snap ring.

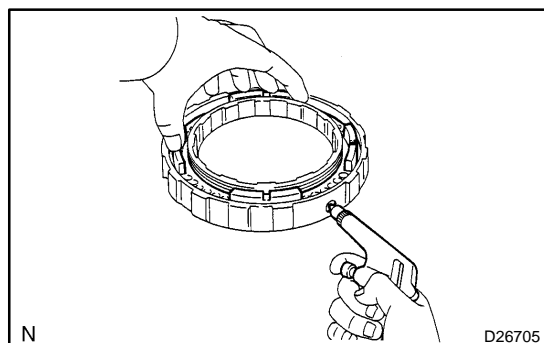


- (c) Remove the 2nd brake piston return spring.



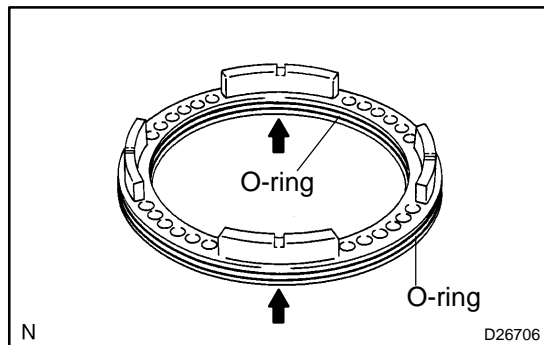
2. INSPECT 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

- (a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 16.61 mm (0.6539 in.)



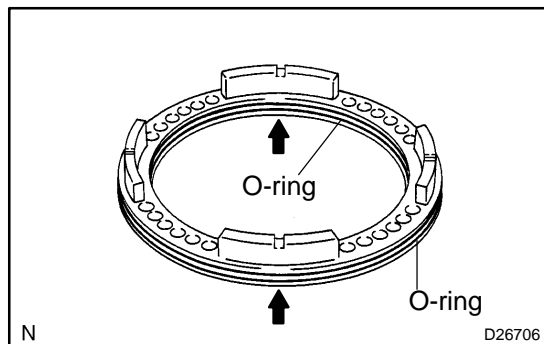
3. REMOVE 2ND BRAKE PISTON

- (a) 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.



4. REMOVE 2ND BRAKE PISTON O-RING

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

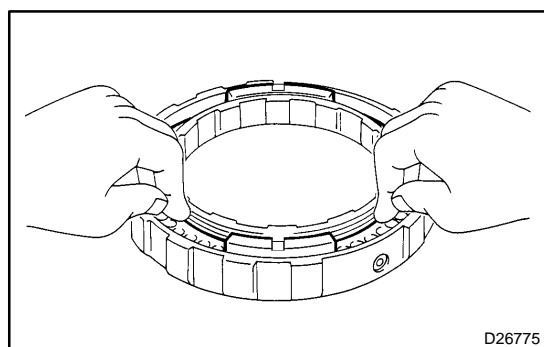


5. INSTALL 2ND BRAKE PISTON O-RING

- (a) Apply the 2 new O-rings with ATF, install them in the 2nd brake piston.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

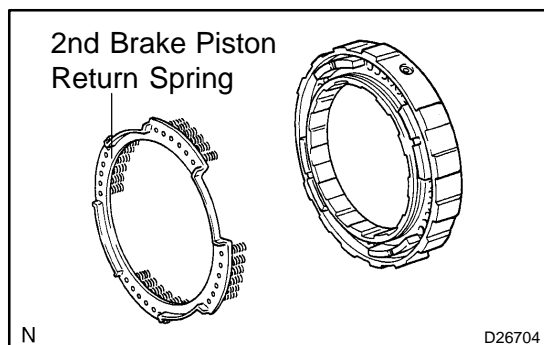


6. INSTALL 2ND BRAKE PISTON

- (a) Apply the 2nd brake piston with ATF, and install it to the 2nd brake cylinder.

NOTICE:

Be careful not to damage the O-ring.

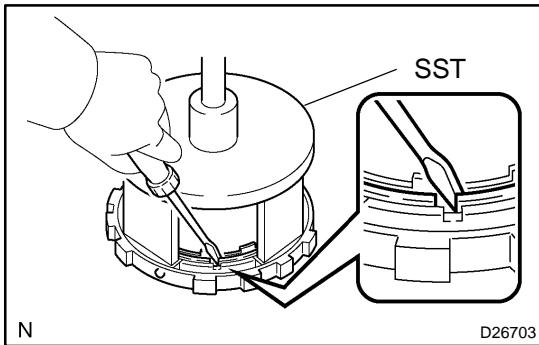


7. INSTALL 2ND BRAKE PISTON RETURN SPRING SUB-ASSY

- (a) Install the 2nd brake piston return spring.

NOTICE:

Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.



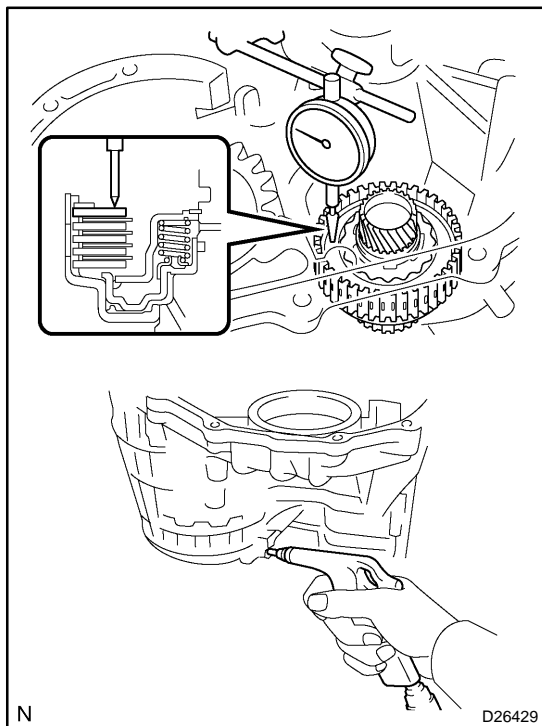
- (b) Place SST on the piston return spring, and compress the piston return spring with a press.
SST 09387-00060
- (c) Using a screwdriver, install the snap ring.
- (d) Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**

UNDERDRIVE CLUTCH ASSY (U151E/U151F) OVERHAUL

400H3-02



1. INSPECT UNDERDRIVE PACK CLEARANCE

- (a) Install the underdrive clutch to the transaxle case.

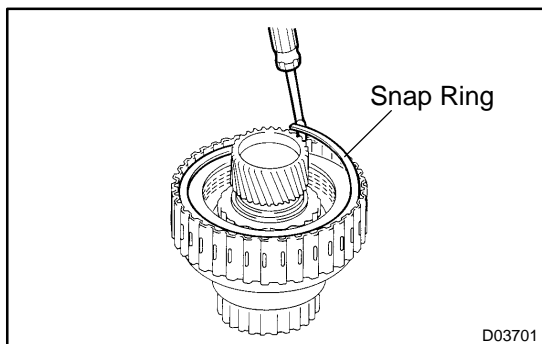
NOTICE:

Be careful not to damage the oil seal rings.

- (b) Install a dial indicator as shown in the illustration.
 (c) Measure the underdrive clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

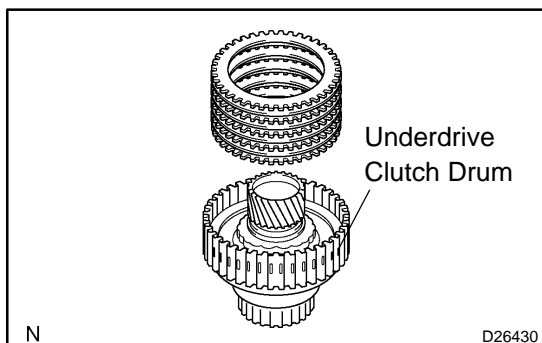
Pack clearance: 1.51 - 1.71 mm (0.0594 - 0.0673 in.)

If the pack clearance is not within standard, inspect the discs, plates and flange.



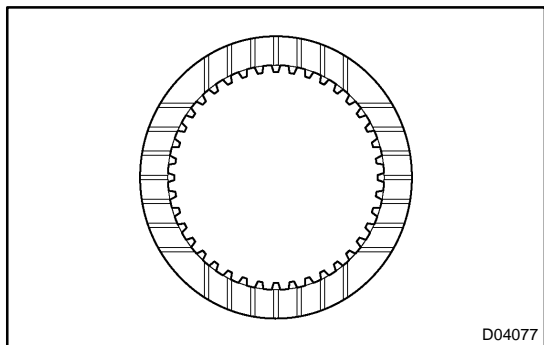
2. REMOVE UNDERDRIVE CLUTCH FLANGE NO.2 HOLE SNAP RING

- (a) Using a screwdriver, remove the underdrive clutch flange No.2 snap ring.



3. REMOVE UNDERDRIVE CLUTCH DISC NO.1

- (a) Remove the flange, 4 discs and 4 plates from the underdrive clutch drum.

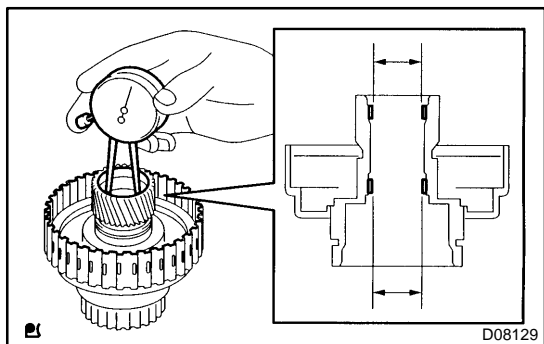


4. INSPECT UNDERDRIVE CLUTCH DISC NO.1

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

HINT:

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



5. INSPECT UNDERDRIVE CLUTCH DRUM SUB-ASSY

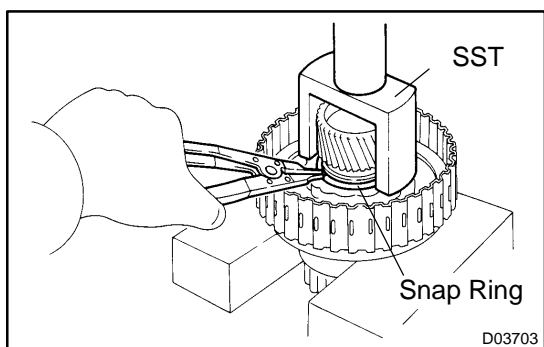
- (a) Using a dial indicator, measure the inside diameter of the underdrive clutch drum bushing.

Standard drum bushing:

37.06 - 37.08 mm (1.4591 - 1.4598 in.)

Maximum drum bushing: 37.13 mm (1.4618 in.)

If the inside diameter is greater than the maximum, replace the underdrive clutch drum.



6. REMOVE UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

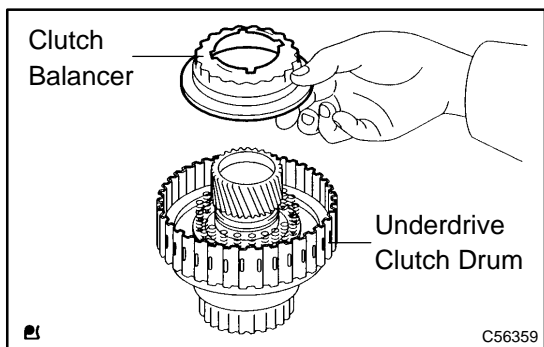
- (a) Place SST on the clutch balancer and compress the spring with a press.

SST 09350-32014 (09351-32070)

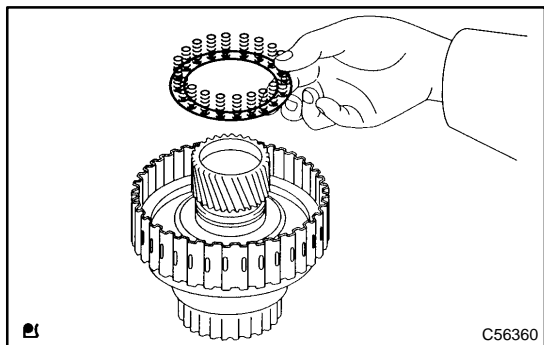
- (b) Using a snap ring expander, remove the snap ring.

NOTICE:

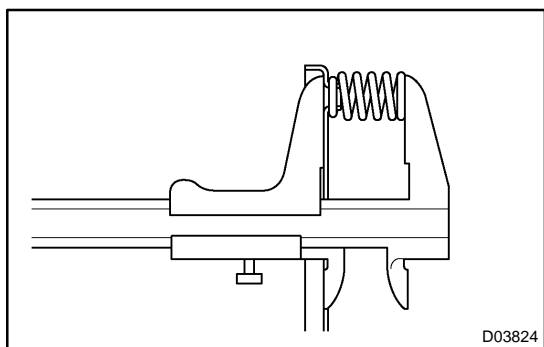
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



- (c) Remove the clutch balancer from the underdrive clutch drum.

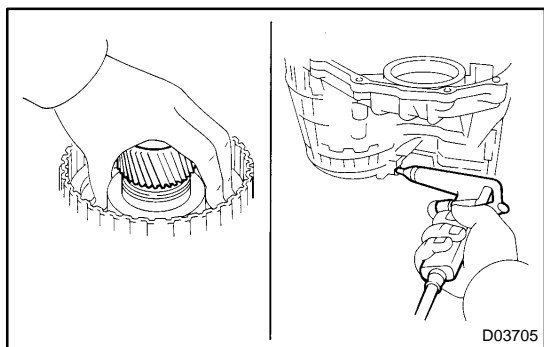


- (d) Remove the return spring from the underdrive clutch drum.



7. INSPECT UNDERDRIVE 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: 17.14 mm (0.6752 in.)



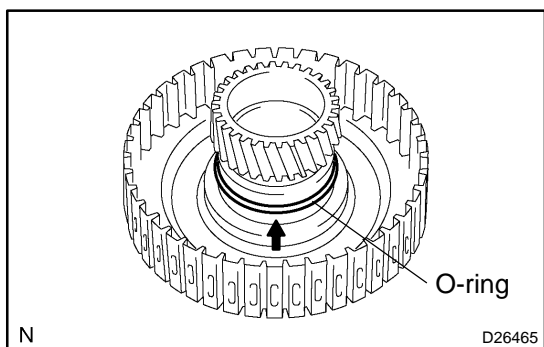
8. REMOVE UNDERDRIVE CLUTCH PISTON SET

- (a) Install the underdrive clutch to the transaxle case.

NOTICE:

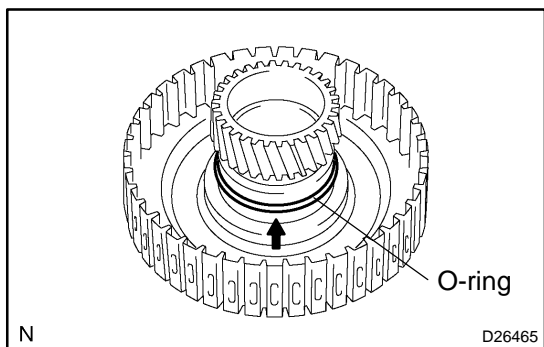
Be careful not to damage the oil seal ring.

- (b) Holding the underdrive clutch piston by hand, apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transaxle case to remove the underdrive clutch piston.



9. REMOVE UNDERDRIVE CLUTCH DRUM O-RING

- (a) Using a screwdriver, remove the O-ring from the underdrive clutch drum.

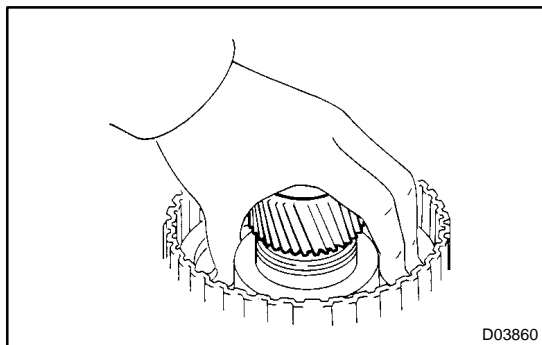


10. INSTALL UNDERDRIVE CLUTCH DRUM O-RING

- (a) Apply the new O-ring with ATF, install it to the underdrive clutch drum.

NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching.

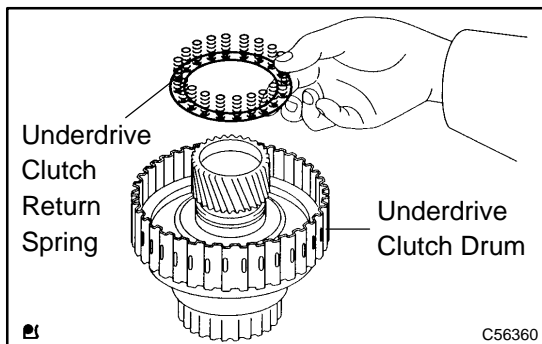


11. INSTALL UNDERDRIVE CLUTCH PISTON SET

- (a) Coat the underdrive clutch piston with ATF, install it to the underdrive clutch piston drum.

NOTICE:

- Be careful not to damage the O-ring.
- Be careful not to damage the lip seal of the piston.



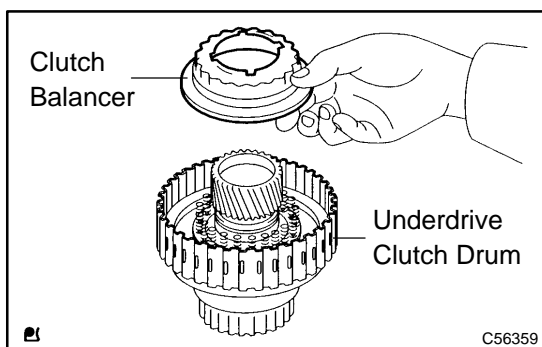
12. INSTALL UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

- (a) Install the return spring to the underdrive clutch drum.

NOTICE:

Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.

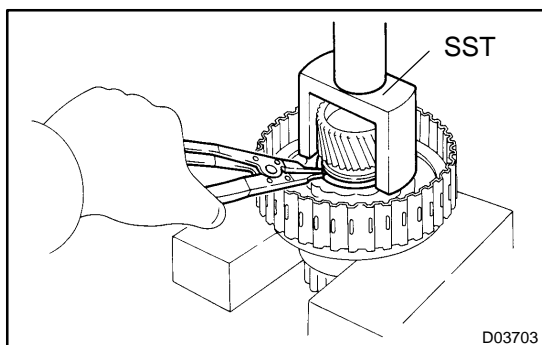
- (b) Coat the clutch balancer with ATF.



- (c) Install the clutch balancer to the underdrive clutch drum.

NOTICE:

Be careful not to damage the lip seal of the clutch balancer.



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

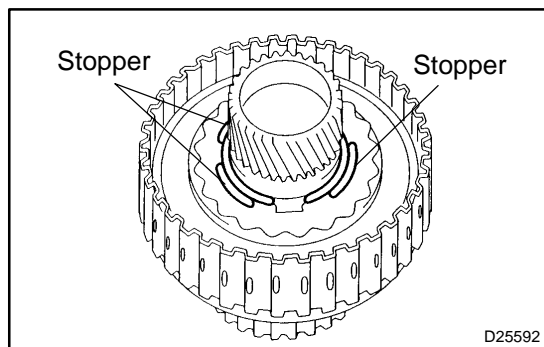
SST 09350-32014 (09351-32070)

- (e) Using a snap ring expander, install the snap ring to the underdrive clutch drum.

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

NOTICE:

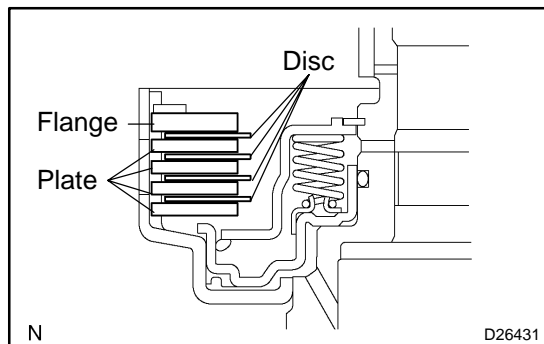
- Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.
- This prevents the spring sheet from being deformed.
- Do not expand the snap ring excessively.



(g) Set the end gap of the snap ring in the underdrive clutch drum shown in the illustration.

NOTICE:

The end gap of the snap ring should not coincide with any of the stopper.

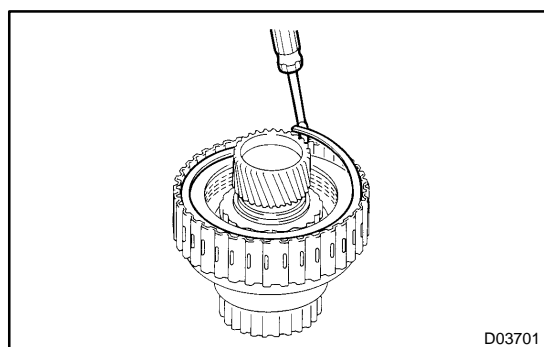


13. INSTALL UNDERDRIVE CLUTCH DISC NO.1

- (a) Apply the 4 discs with ATF.
- (b) Install the 4 plates, 4 discs and flange to the underdrive clutch drum.

NOTICE:

Be careful about the order of discs, plates and flange assembly.

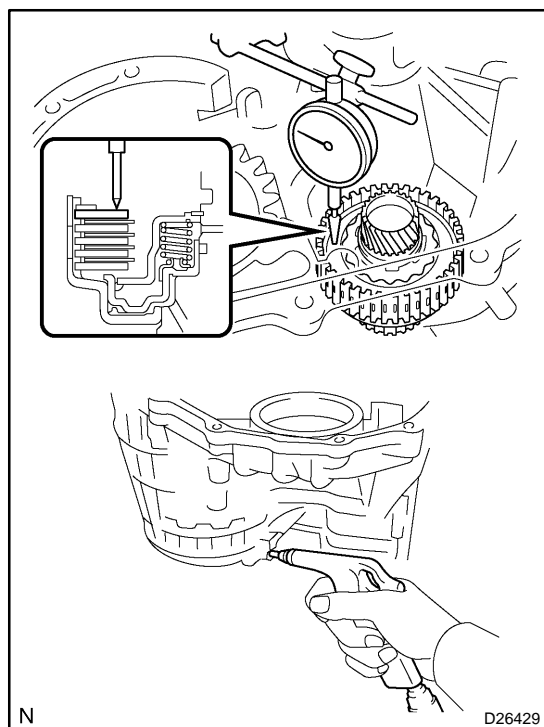


14. INSTALL UNDERDRIVE CLUTCH FLANGE NO.2 HOLE SNAP RING

- (a) Using a screwdriver, install the underdrive clutch flange No.2 hole snap ring.
- (b) Check that the end gap of snap ring is not aligned with one of the cutouts.

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



15. INSPECT UNDERDRIVE PACK CLEARANCE

- (a) Install the underdrive clutch to the transaxle case.

NOTICE:

Be careful not to damage the oil seal ring.

- (b) Set a dial indicator as shown in the illustration.
- (c) Measure the underdrive clutch piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

Park clearance: 1.51 - 1.71 mm (0.0594 - 0.0673 in.)

If the pack clearance is less than the minimum, parts may have been assembled incorrectly, so check and reassemble again. If the pack clearance is not within standard, select another flange.

HINT:

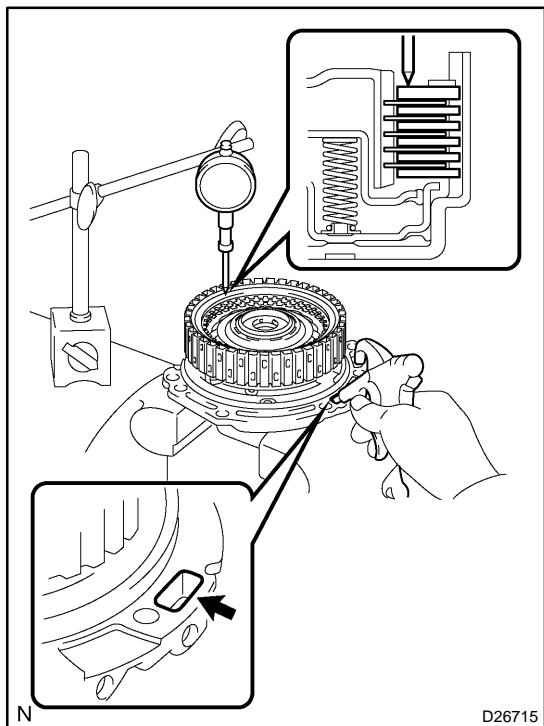
There are 5 flanges in different thickness.

Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	4	3.1 (0.122)
2	3.2 (0.126)	5	3.3 (0.130)
3	3.4 (0.134)	-	-

FORWARD CLUTCH ASSY (U151E/U151F) OVERHAUL

400H1-02



1. INSPECT PACK CLEARANCE OF FORWARD CLUTCH

- (a) Install the forward clutch on the oil pump.

NOTICE:

Be careful not to damage the oil seal ring of oil pump.

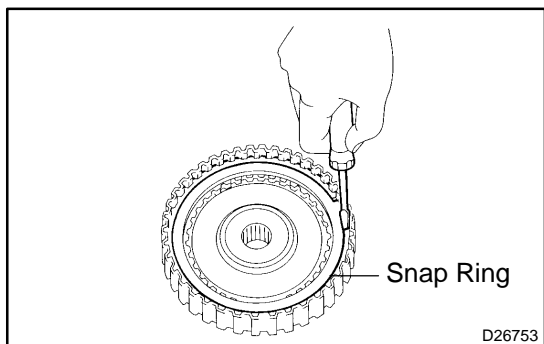
- (b) Using a dial indicator, measure the forward clutch pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).

Pack clearance: 1.00 - 1.25 mm (0.0394 - 0.4921 in.)

If the clearance is not within standard, inspect the discs, plates and flange.

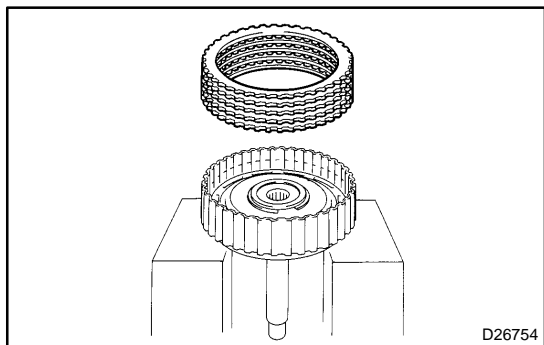
HINT:

As the opening is large, cover it with a shop rug to prevent the compressed air from being released.

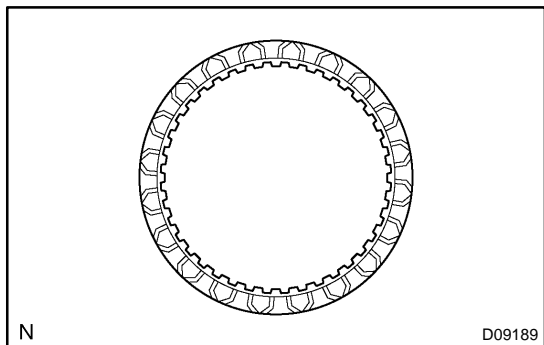


2. REMOVE FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

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



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



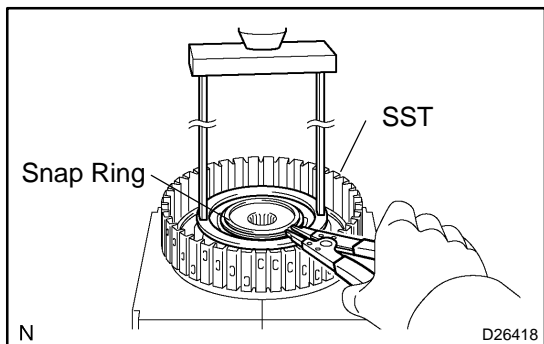
3. INSPECT FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

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

If necessary, replace them.

HINT:

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



4. REMOVE FORWARD CLUTCH RETURN SPRING SUB-ASSY

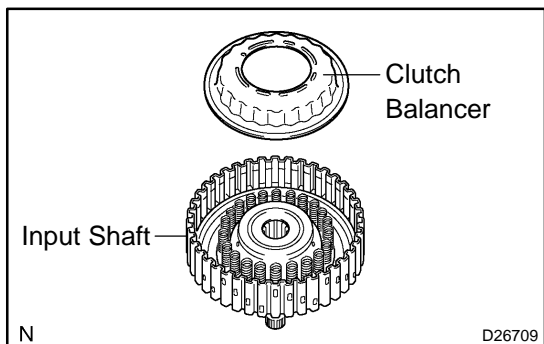
- (a) Place SST on the spring retainer and compress the return spring with a press.

SST 09387-00020

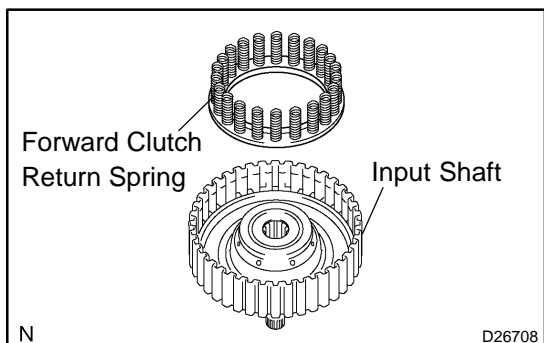
- (b) Using a snap ring expander, remove the snap ring.

NOTICE:

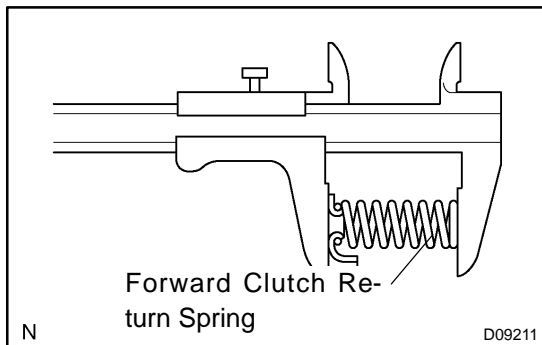
- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



- (c) Remove the clutch balancer from the input shaft.

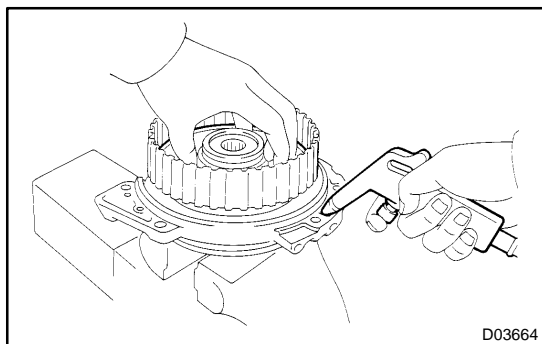


- (d) Remove the forward clutch return spring from the input shaft.



5. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSY

- (a) Using vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 26.74 mm (1.0528 in.)

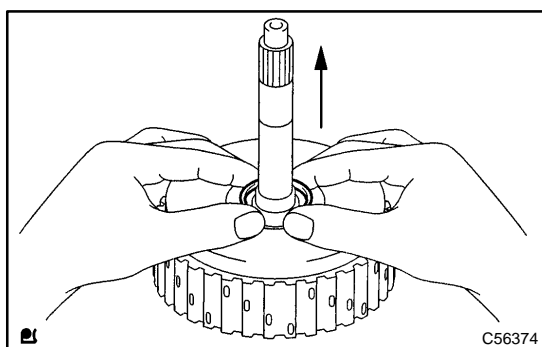


6. REMOVE FORWARD CLUTCH PISTON SUB-ASSY

- (a) Place the forward clutch drum onto the oil pump.
- (b) Holding the forward clutch piston by hand, apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the oil pump to remove the forward clutch piston.

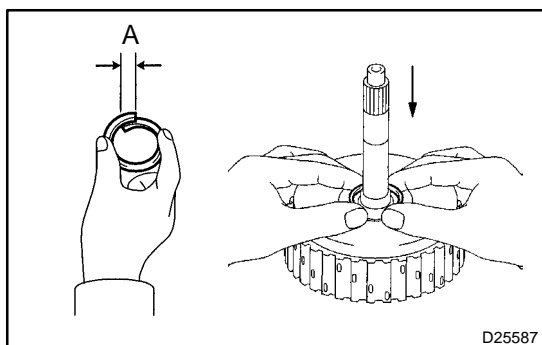
HINT:

When the piston cannot be removed as it is slanted, either blow the air again with the protruding side pushed, or remove the piston using the needle nose plier with vinyl tape on the tip.



7. REMOVE INPUT SHAFT OIL SEAL RING

- (a) Remove the input shaft oil seal ring to the input shaft.

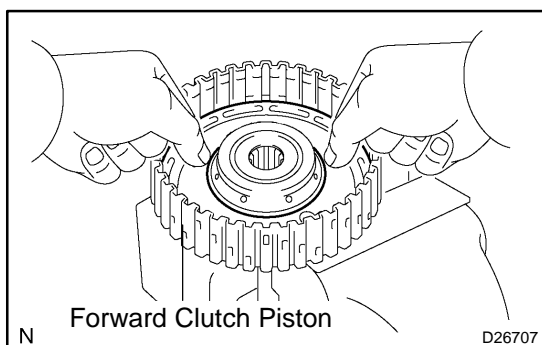


8. INSTALL INPUT SHAFT OIL SEAL RING

- (a) Compress the new input shaft oil seal ring from both sides to reduce dimension A.
Dimension A: 5 mm (0.197 in.)
- (b) Coat the oil seal ring with ATF and install it to the input shaft.

NOTICE:

Do not expand the gap of the oil seal ring too much. Fix the hooks certainly.

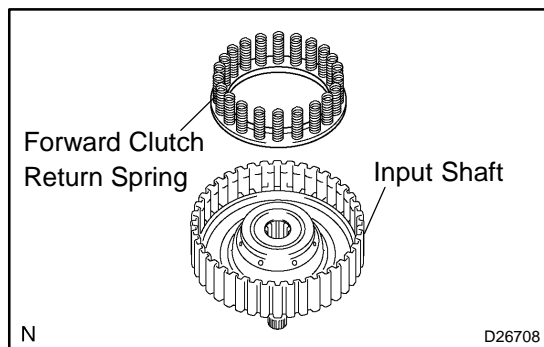


9. INSTALL FORWARD CLUTCH PISTON SUB-ASSY

- (a) Coat the forward clutch piston with ATF, and install it to the input shaft.

NOTICE:

Be careful not to damage the lip seal of the forward clutch piston.



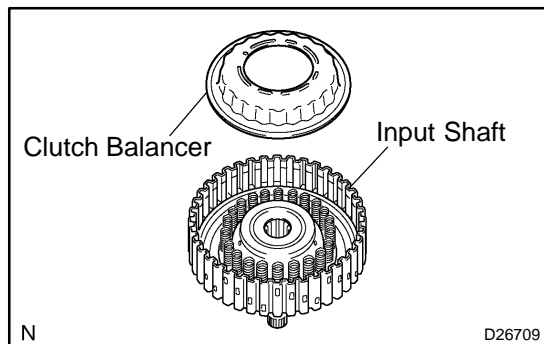
10. INSTALL FORWARD CLUTCH RETURN SPRING SUB-ASSY

(a) Install the return spring to the input shaft.

NOTICE:

Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.

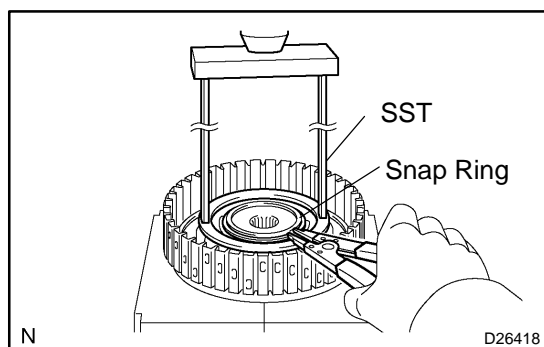
(b) Coat the clutch balancer with ATF.



(c) Install the clutch balancer to the input shaft.

NOTICE:

- **Be careful not to damage the lip seal of the forward clutch balancer.**
- **Install the clutch balancer carefully not to have a pinching and any other defects at the sealing lip.**
- **Apply enough ATF to the sealing lip prior to assembling.**



(d) Place SST on the clutch balancer, and compress the clutch balancer with a press.

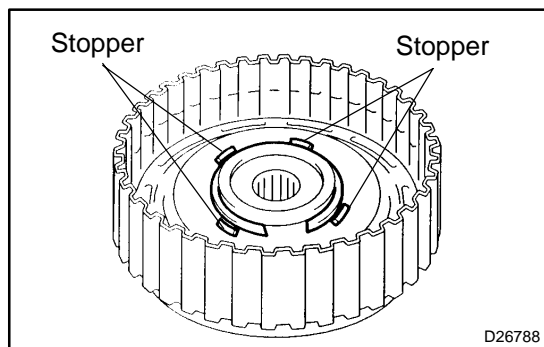
SST 09387-00020

(e) Install the snap ring with a snap ring expander.

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

NOTICE:

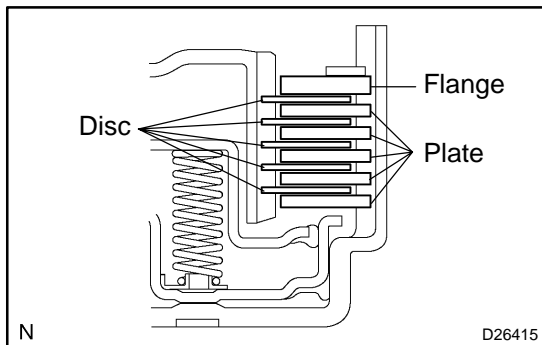
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove.**
- **This prevents the spring sheet from being deformed.**
- **Do not expand the snap ring excessively.**



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

NOTICE:

The end gap of the snap ring should not coincide with any of the stoppers.

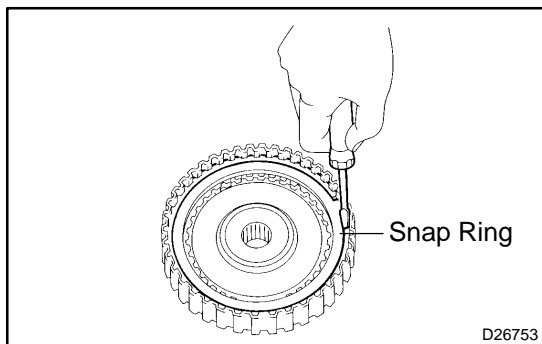


11. INSTALL FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

- (a) Coat the 5 discs with ATF.
- (b) Install the 5 plates, 5 discs and flange input shaft.

NOTICE:

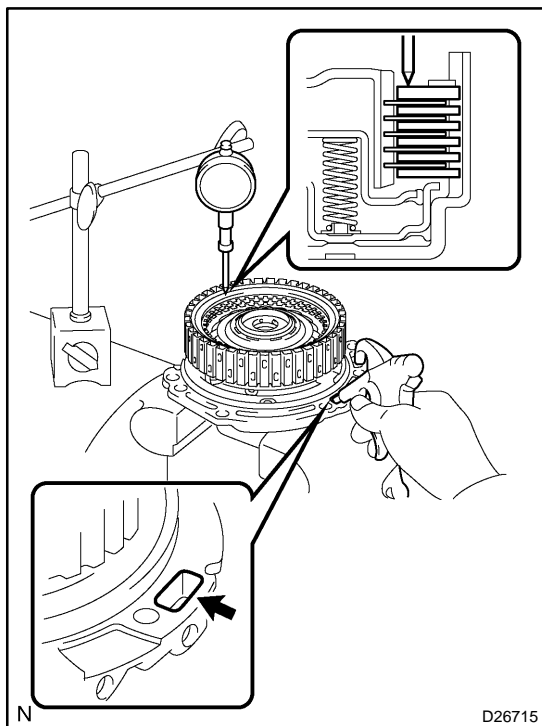
Be careful about the order of discs, plates and flange assembly.



- (c) Using a screwdriver, install the snap ring.
- (d) Check that the end gap of the snap ring is not aligned with one of the cutouts.

NOTICE:

The snap ring should be fixed certainly in the groove of the drum.



12. INSPECT PACK CLEARANCE OF FORWARD CLUTCH

- (a) Using a dial indicator, measure the forward clutch pack clearance while applying and releasing compressed air (392 kgf·cm², 4.0 kPa, 57 psi).

Pack clearance: 1.00 - 1.25 mm (0.0394 - 0.4921 in.)

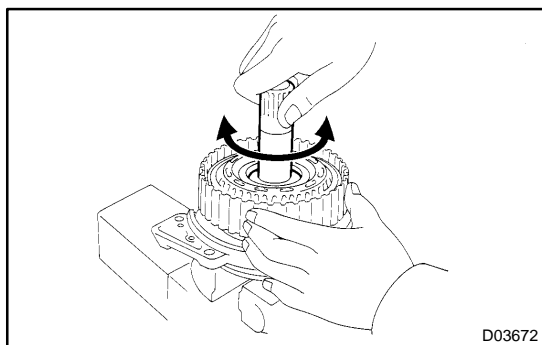
If the piston stroke is less than the minimum, parts may have been assembled incorrectly. Check and reassemble again. If the clearance is not standard, select another flange.

HINT:

There are 5 different flanges in thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.00 (0.1181)	4	3.45 (0.1358)
2	3.15 (0.1240)	5	3.60 (0.1417)
3	3.30 (0.1299)	-	-



13. INSPECT FORWARD MULTIPLE DISC CLUTCH CLUTCH DISC

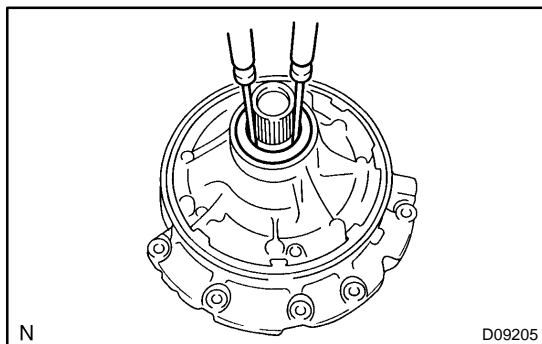
- (a) Check if the disc lightly rotates when rotating the forward clutch assy after inserting the multiple disc clutch into it.

NOTICE:

Do not place the forward clutch assy in a vise.

OIL PUMP ASSY (U151E/U151F) OVERHAUL

4006F-03

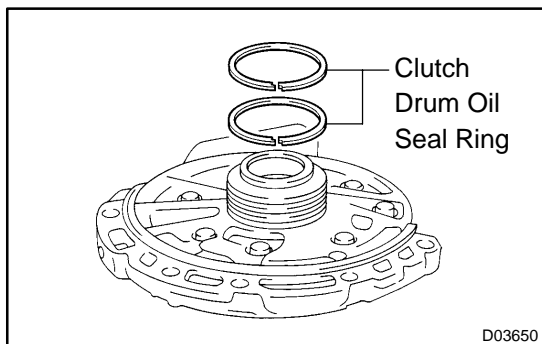


1. INSPECT OIL PUMP ASSY

- (a) Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

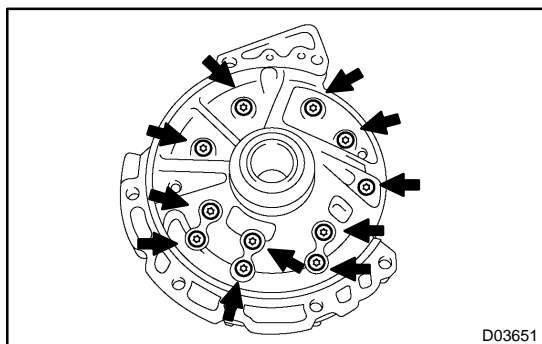
NOTICE:

Be careful not to damage the oil seal lip.



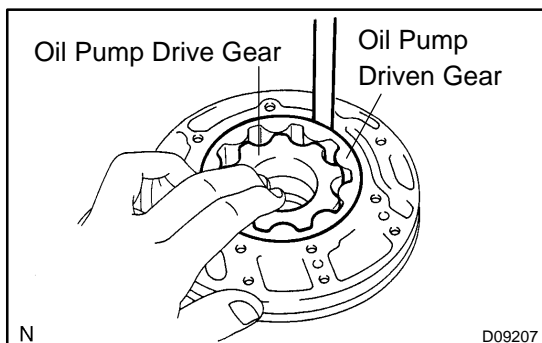
2. REMOVE CLUTCH DRUM OIL SEAL RING

- (a) Remove the 2 clutch drum oil seal rings.



3. REMOVE STATOR SHAFT ASSY

- (a) Using a torx socket (T30), remove the 11 bolts and stator shaft.
- (b) Keep the gears in assembling order.



4. 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.

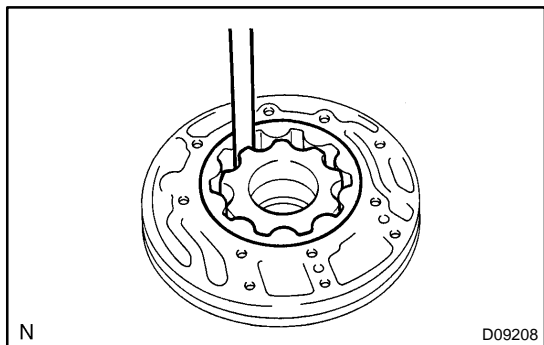
Standard body clearance:

0.10 - 0.17 mm (0.0039 - 0.0067 in.)

Side clearance: 0.02 - 0.05 mm (0.001 - 0.02 in.)

Maximum body clearance: 0.17 mm (0.0067 in.)

If the body clearance is greater than the maximum, replace the oil pump body sub-assy.



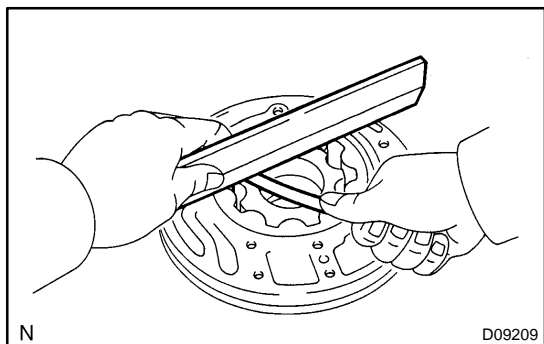
(c) Using a feeler gauge measure the tip clearance between the driven gear teeth and drive gear teeth.

Standard tip clearance:

0.07 - 0.15 mm (0.0028 - 0.0059 in.)

Maximum tip clearance: 0.15 mm (0.0059 in.)

If the tip clearance is greater than the maximum, replace the oil pump body sub-assy.



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

Standard side clearance:

0.02 - 0.05 mm (0.0008 - 0.0020 in.)

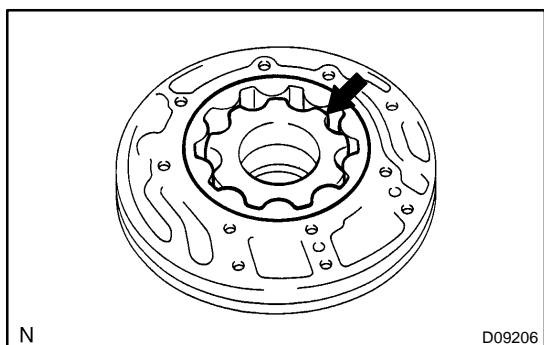
Maximum side clearance: 0.05 mm (0.0020 in.)

Drive gear thickness: mm (in.)

Mark	Thickness
A	11.690 - 11.699 (0.4602 - 0.4606)
B	11.700 - 11.709 (0.4606 - 0.4610)
C	11.710 - 11.720 (0.4610 - 0.4614)
D	11.721 - 11.730 (0.4615 - 0.4618)
E	11.731 - 11.740 (0.4619 - 0.4622)

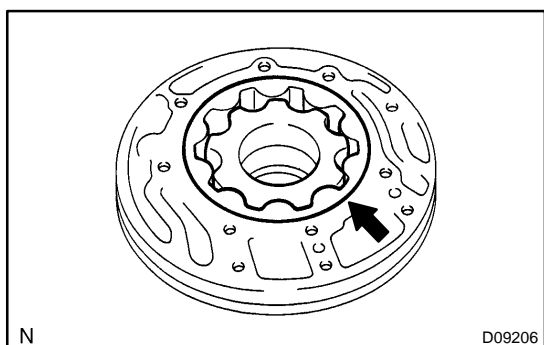
Driven gear thickness: mm (in.)

Mark	Thickness
A	11.690 - 11.699 (0.4602 - 0.4606)
B	11.700 - 11.709 (0.4606 - 0.4610)
C	11.710 - 11.720 (0.4610 - 0.4614)
D	11.721 - 11.730 (0.4615 - 0.4618)
E	11.731 - 11.740 (0.4619 - 0.4622)



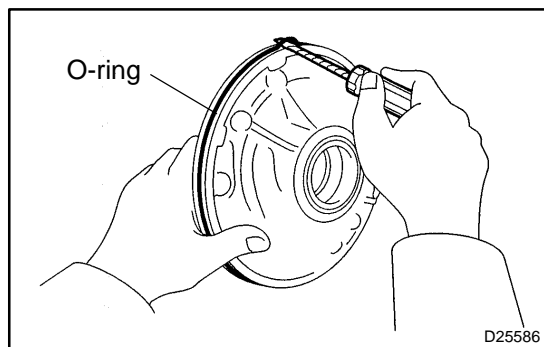
5. REMOVE FRONT OIL PUMP DRIVE GEAR

(a) Remove the front oil pump drive gear.



6. REMOVE FRONT OIL PUMP DRIVEN GEAR

(a) Remove the front oil pump driven gear.

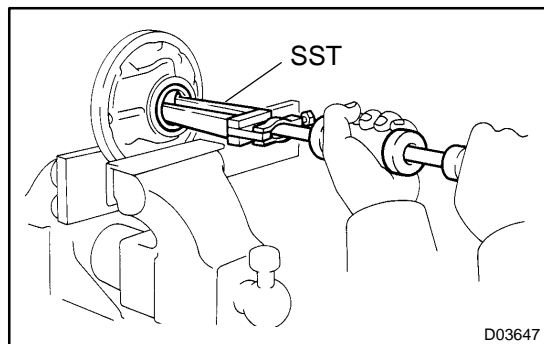


7. REMOVE FRONT OIL PUMP BODY O-RING

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

HINT:

Tape the screwdriver before use.

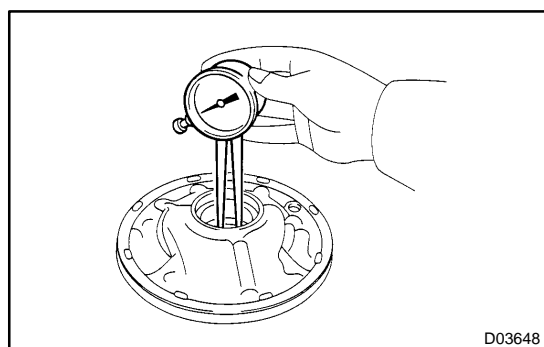


8. REMOVE FRONT OIL PUMP OIL SEAL

(a) Mount oil pump in a soft jaw vise.

(b) Using SST, remove the oil seal from the oil pump body.

SST 09308-00010



9. INSPECT FR OIL PUMP & GEAR BODY SUB-ASSY

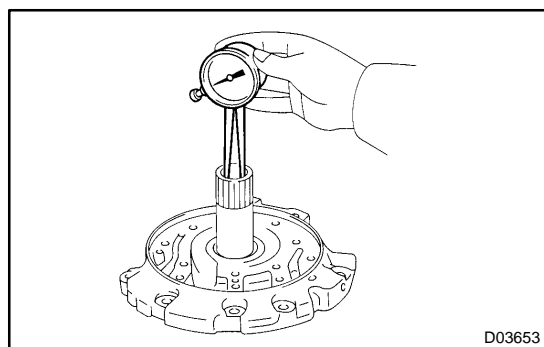
(a) Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Standard inside diameter:

38.113 - 38.138 mm (1.50051 - 1.50149 in.)

Maximum inside diameter: 38.188 mm (1.50346 in.)

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



10. INSPECT STATOR SHAFT ASSY

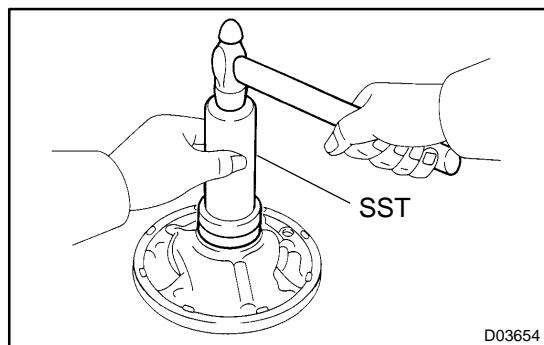
(a) Using a dial indicator, measure the inside diameter of the stator shaft.

Standard inside diameter:

21.500 - 21.526 mm (0.84646 - 0.84748 in.)

Maximum inside diameter: 21.57 mm (0.8492 in.)

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



11. INSTALL FRONT OIL PUMP OIL SEAL

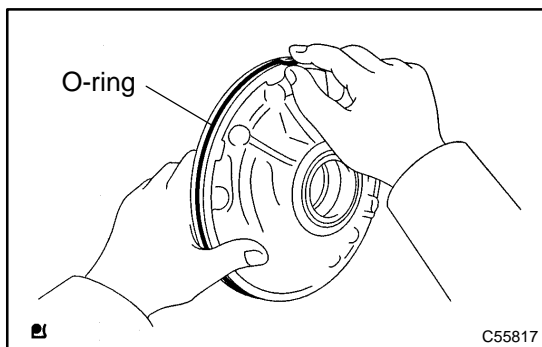
(a) Using SST and a hammer, install a new oil seal to the oil pump body.

SST 09350-32014 (09351-32140)

HINT:

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

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

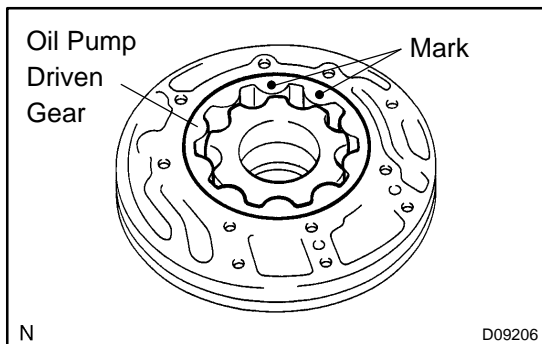


12. INSTALL FRONT OIL PUMP BODY O-RING

- (a) Coat the new O-ring with ATF, install it to the oil pump body.

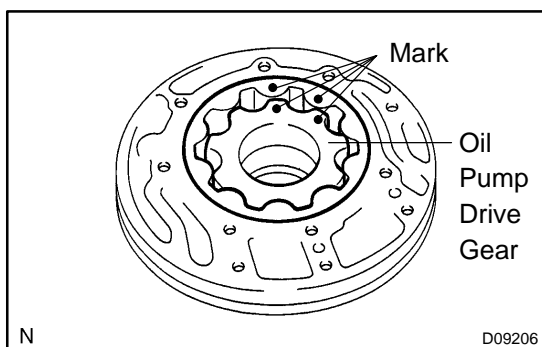
NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching. Moreover, apply enough ATF to the O-ring prior to assembling.



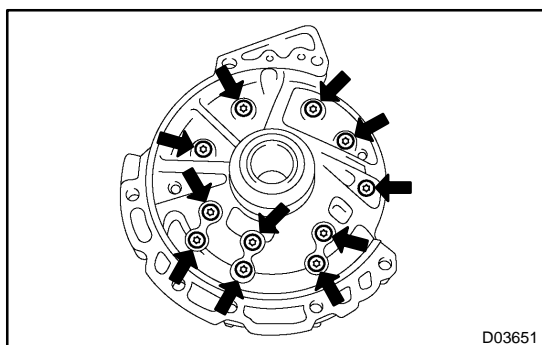
13. INSTALL FRONT OIL PUMP DRIVEN GEAR

- (a) Coat the front oil pump driven gear with ATF, install it to the oil pump body with the marked side up.



14. INSTALL FRONT OIL PUMP DRIVE GEAR

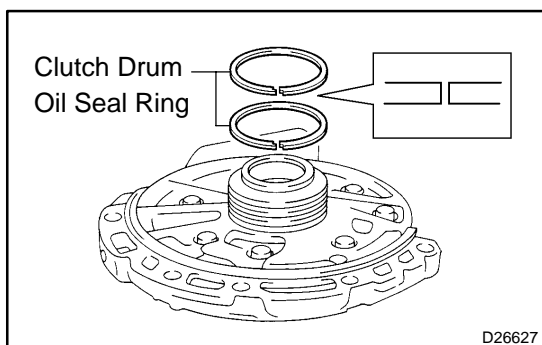
- (a) Coat the front oil pump drive gear with ATF, install it to the oil pump body with the marked side up.



15. INSTALL STATOR SHAFT ASSY

- (a) Set the stator shaft aligned with each bolt hole.
- (b) Using a torx socket (T30), install the 11 bolts.

Torque: 9.8 N·m (100 kgf·cm, 87 in·lbf)



16. INSTALL CLUTCH DRUM OIL SEAL RING

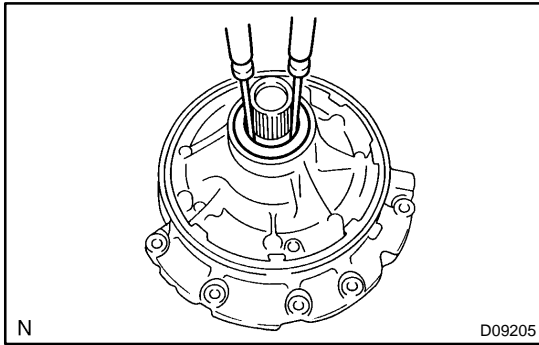
- (a) Coat the 2 new clutch drum oil seal rings with ATF.
- (b) Install the 2 new clutch drum oil seal rings.

NOTICE:

Do not expand the ring ends excessively.

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AUTOMATIC TRANSMISSION / TRANS - OIL PUMP ASSY (U151E/U151F)



17. INSPECT OIL PUMP ASSY

- (a) Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

NOTICE:

Be careful not to damage the oil seal lip.

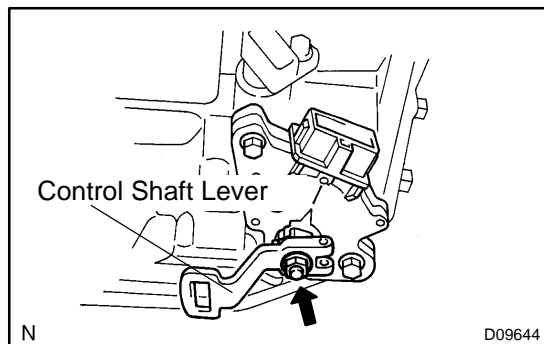
AUTOMATIC TRANSAXLE ASSY (U151E/U151F)

4010K-01

OVERHAUL

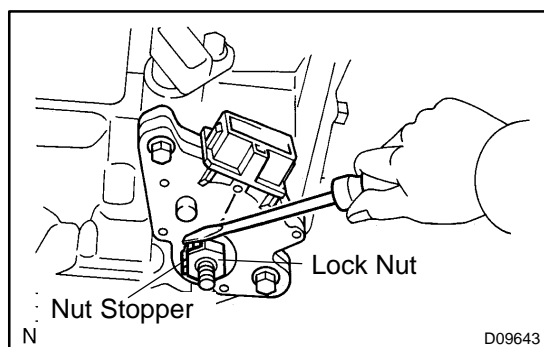
1. REMOVE SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB-ASSY

- (a) Remove the bolt and speedometer driven hole cover sub-assy from the transaxle assy.
- (b) Remove the O-ring from the speedometer driven hole cover.

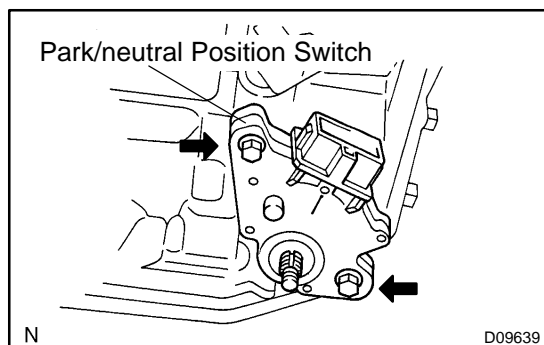


2. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

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



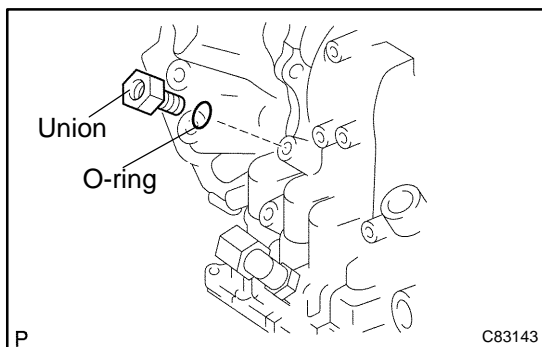
- (b) Using a screwdriver, unstake the nut stopper, and remove the lock nut and nut stopper.



- (c) Remove the 2 bolts and pull out the park/neutral position switch.

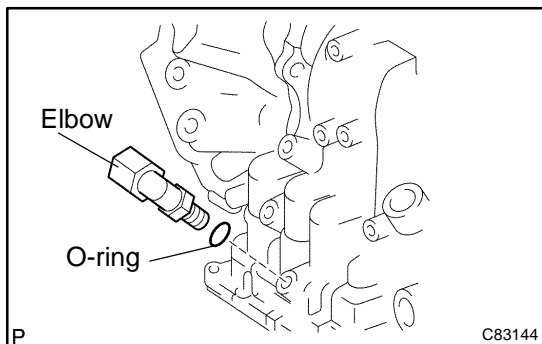
3. REMOVE BREATHER PLUG HOSE

- (a) Remove the breather plug hose from the transaxle case.



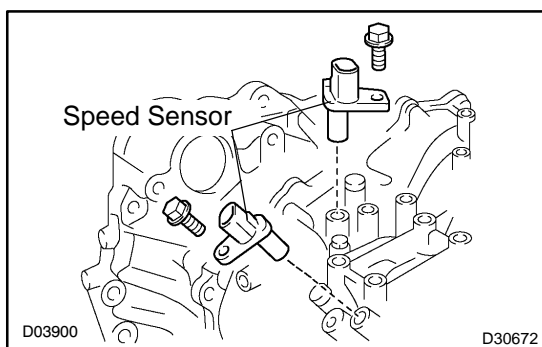
4. REMOVE OIL COOLER TUBE UNION (INLET OIL COOLER UNION)

- (a) Remove the union.
- (b) Remove the O-ring from the union.



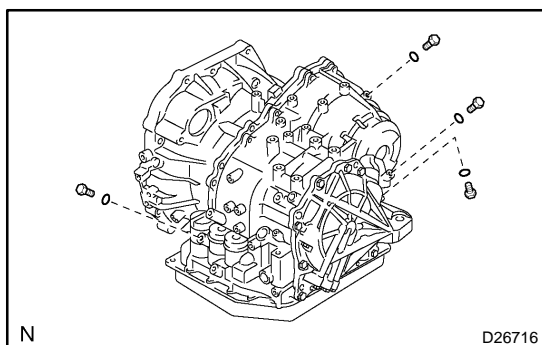
5. REMOVE OIL COOLER TUBE UNION (OUTLET OIL COOLER UNION)

- (a) Remove the elbow.
- (b) Remove the O-ring from the elbow.



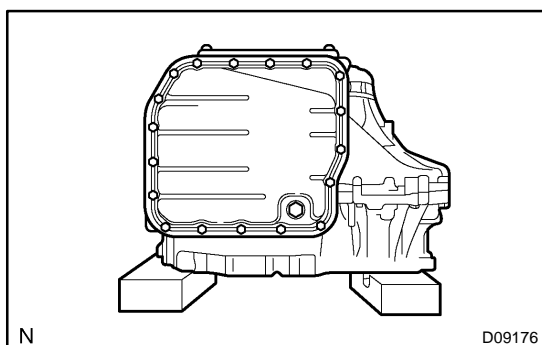
6. REMOVE SPEED SENSOR

- (a) Remove the 2 bolts and the 2 speed sensors from the transaxle assy.



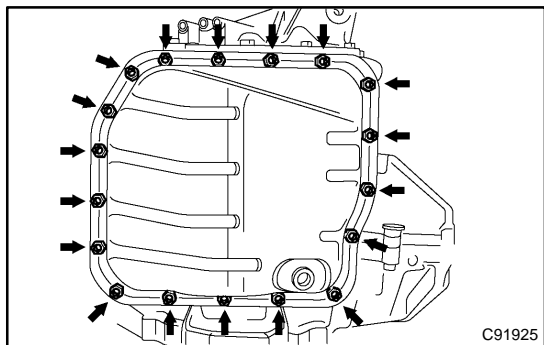
7. REMOVE TRANSAXLE CASE NO.1 PLUG

- (a) Remove the 4 transaxle case No. 1 plugs from the transaxle case.
- (b) Remove the 4 O-rings from the 4 transaxle case No.1 plugs.



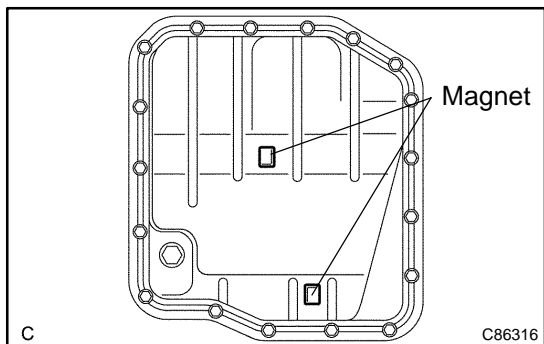
8. FIX AUTOMATIC TRANSAXLE ASSY

- (a) Fix the transaxle assy.

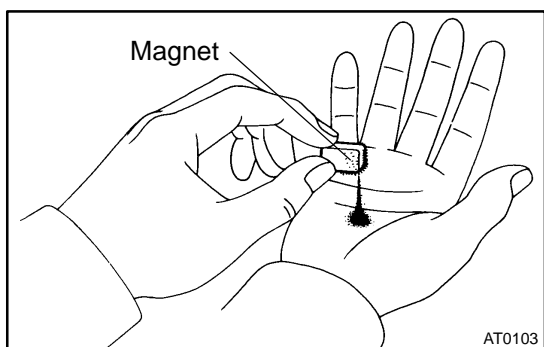


9. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

(a) Remove the 18 bolts, oil pan and gasket.



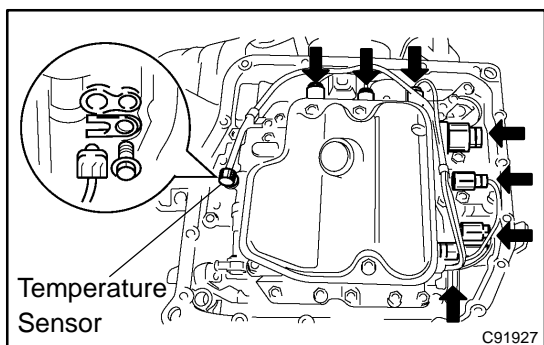
(b) Remove the 2 magnets from the oil pan.



10. INSPECT TRANSMISSION OIL CLEANER MAGNET

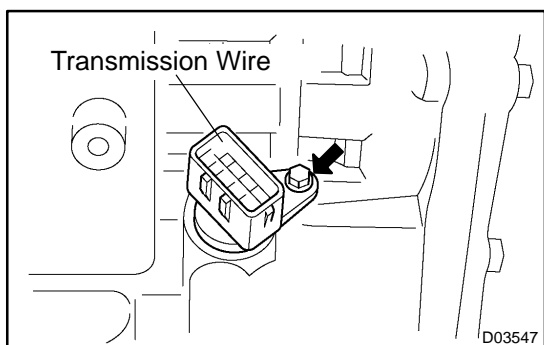
(a) Remove the magnets and use them to collect any steel chips. Examine the chips and particles in the pan and on the magnet to determine what type of wear has occurred in the transaxle:

- Steel (magnetic).... bearing, gear and plate wear
- Brass (non-magnetic).... bushing wear



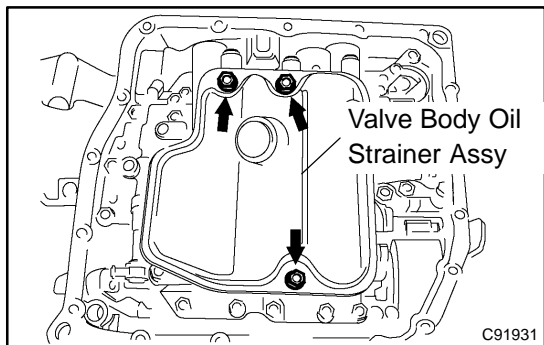
11. DISCONNECT TRANSMISSION WIRE

(a) Remove the 7 connectors from the shift solenoid valves.
 (b) Remove the bolt, lock plate and ATF temperature sensor.



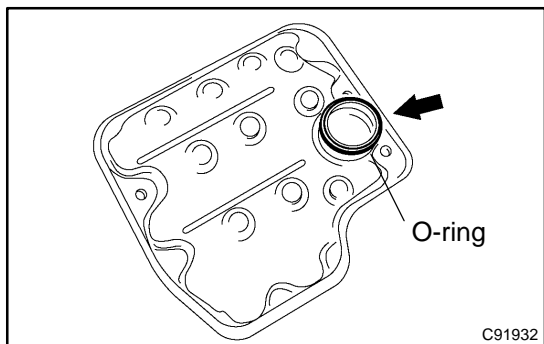
12. REMOVE TRANSMISSION WIRE

(a) Remove the bolt and transmission wire from the transaxle case.

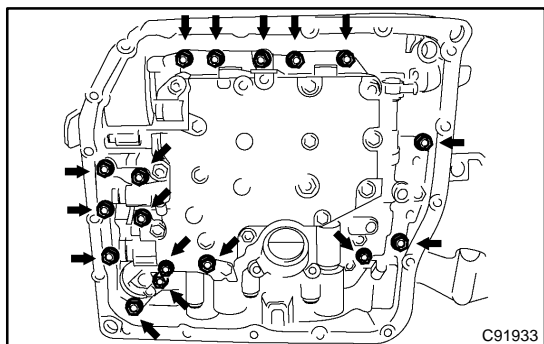


13. REMOVE VALVE BODY OIL STRAINER ASSY

(a) Remove the 3 bolts and oil strainer.

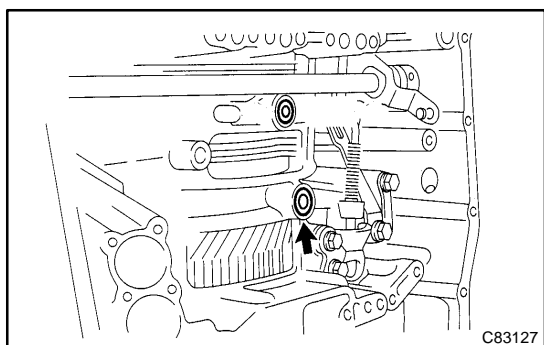


(b) Remove the O-ring from the oil strainer.



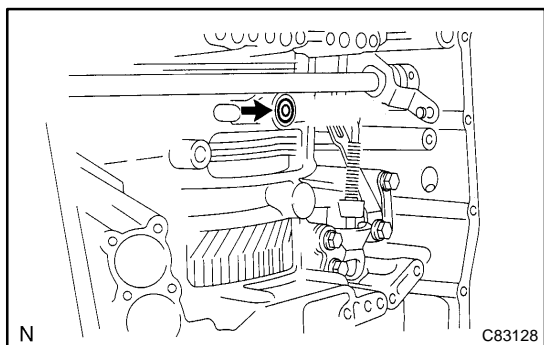
14. REMOVE TRANSMISSION VALVE BODY ASSY

(a) Support the valve body assy and remove the 17 bolts and valve body assy.



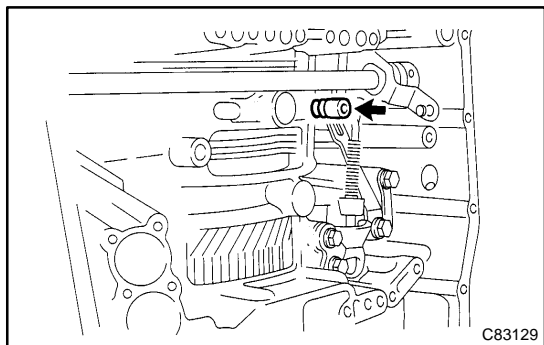
15. REMOVE GOVERNOR APPLY GASKET NO.1

(a) Remove the governor apply gasket No.1 from the transaxle case.



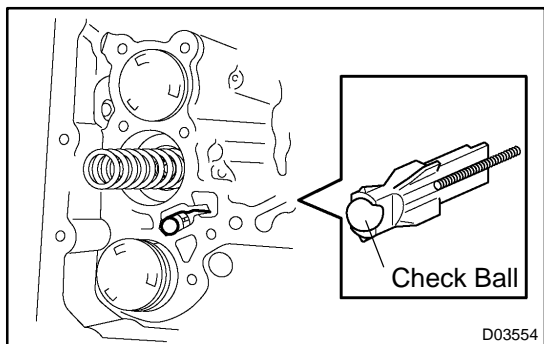
16. REMOVE TRANSAXLE CASE 2ND BRAKE GASKET

(a) Remove the transaxle case 2nd brake gasket from the transaxle case.



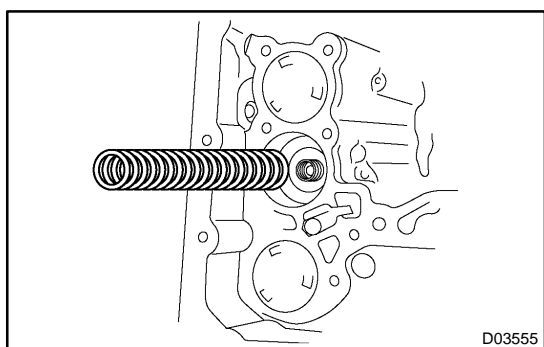
17. REMOVE BRAKE DRUM GASKET

- (a) Remove the brake drum gasket from the transaxle case.



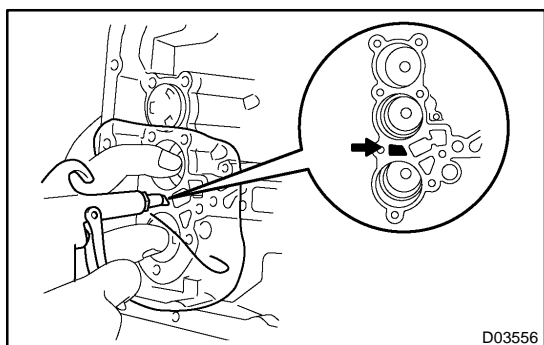
18. REMOVE CHECK BALL BODY

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



19. REMOVE C-3 ACCUMULATOR PISTON

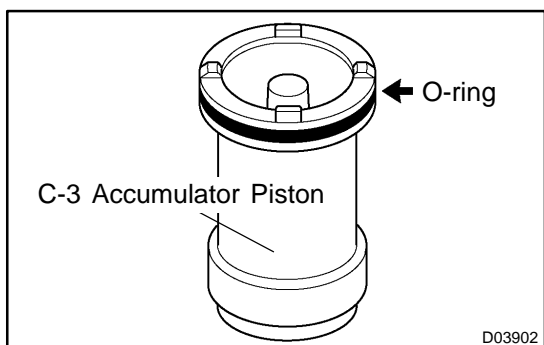
- (a) Remove the spring from the C-3 accumulator piston.



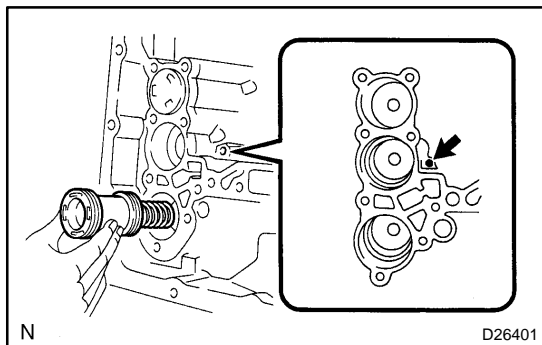
- (b) Apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the oil hole and remove the C-3 accumulator piston.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**



- (c) Remove the O-ring from the C-3 accumulator piston.

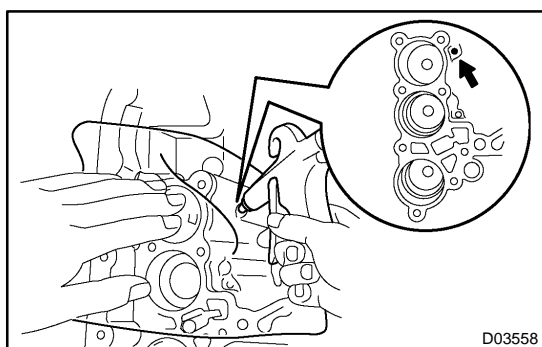
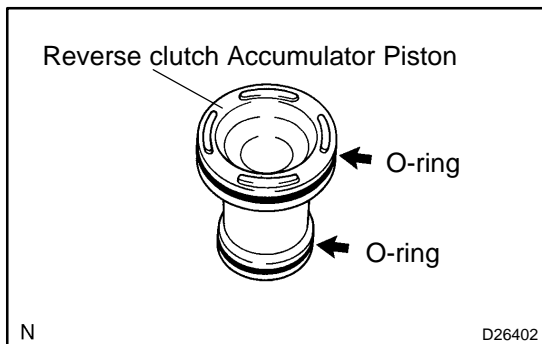


20. REMOVE REVERSE CLUTCH ACCUMULATOR PISTON

- (a) Apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the oil hole and remove the reverse accumulator piston and spring.

NOTICE:

- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
 - **Take care not to splash ATF when air-blowing.**
- (b) Remove the 2 O-rings from the reverse clutch accumulator piston.



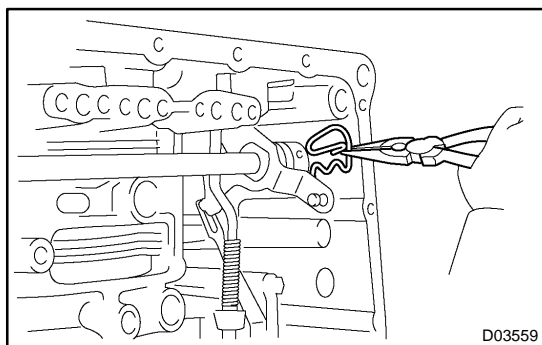
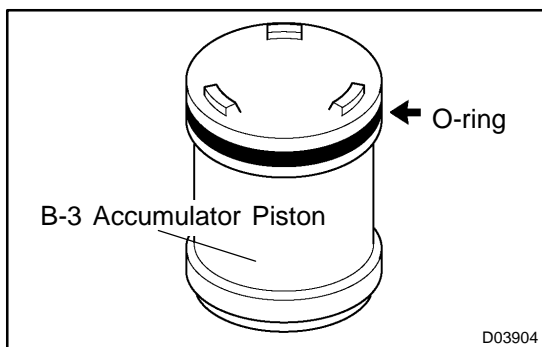
21. REMOVE B-3 ACCUMULATOR PISTON

- (a) Apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the oil hole and remove the B-3 accumulator piston and 2 springs.

NOTICE:

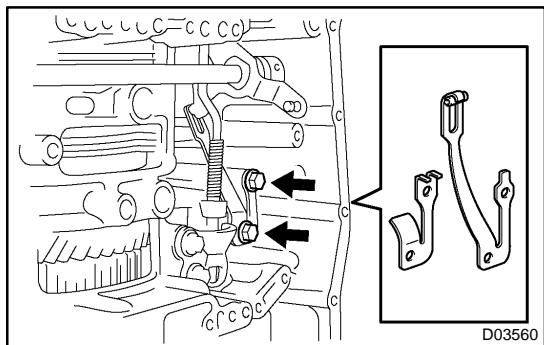
- **Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

- (b) Remove the O-ring from the B-3 accumulator piston.



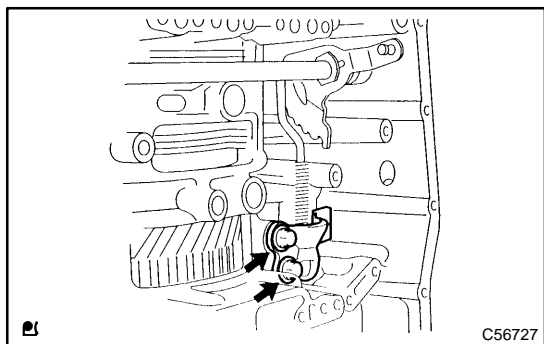
22. REMOVE MANUAL VALVE LEVER SHAFT RETAINER SPRING

- (a) Using a needle-nose pliers, remove the manual valve lever shaft retainer spring.



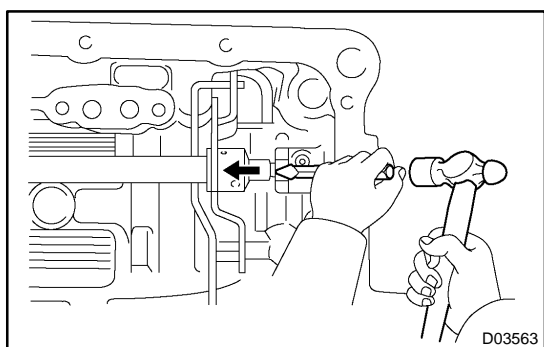
23. REMOVE MANUAL DETENT SPRING SUB-ASSY

- (a) Remove the 2 bolts, the manual detent spring sub-assy and cover.



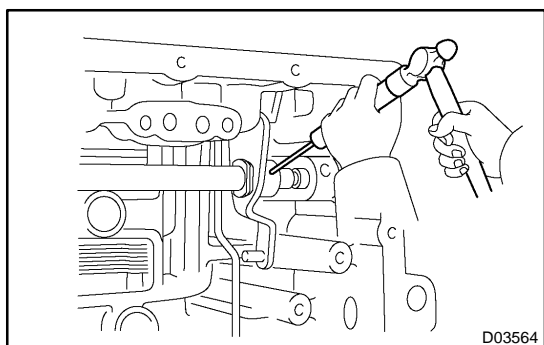
24. REMOVE PARKING LOCK PAWL BRACKET

- (a) Remove the 2 bolts and parking lock pawl bracket.



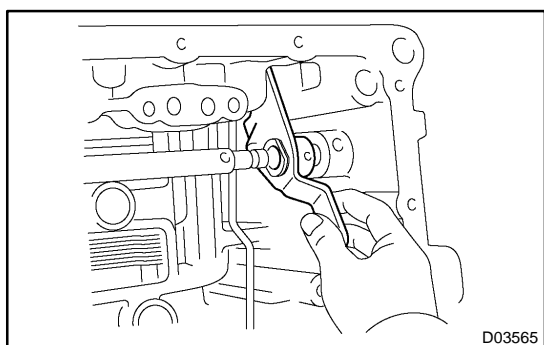
25. REMOVE MANUAL VALVE LEVER SUB-ASSY

- (a) Using a chisel and hammer, cut off and remove the spacer.

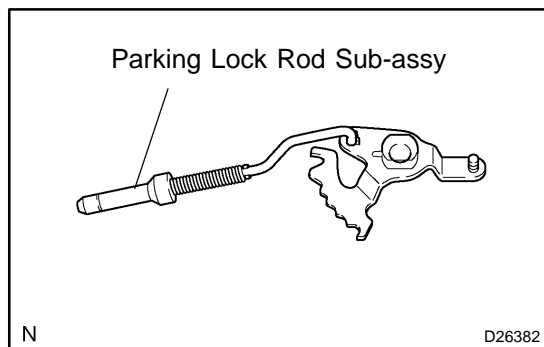


- (b) Using a pin punch ($\phi 35$ mm) and hammer, drive out the pin.

HINT:
Slowly drive out the pin so that it will not fall into the transaxle case.

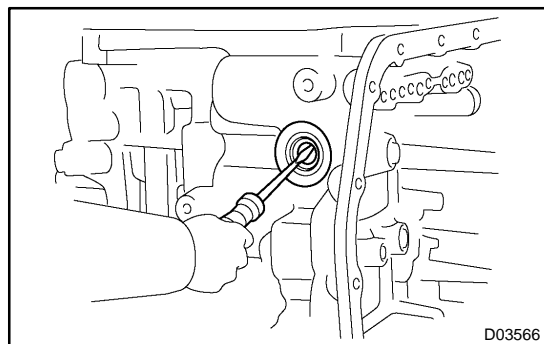


- (c) Remove the manual valve lever shaft and manual valve lever.



26. REMOVE PARKING LOCK ROD SUB-ASSY

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

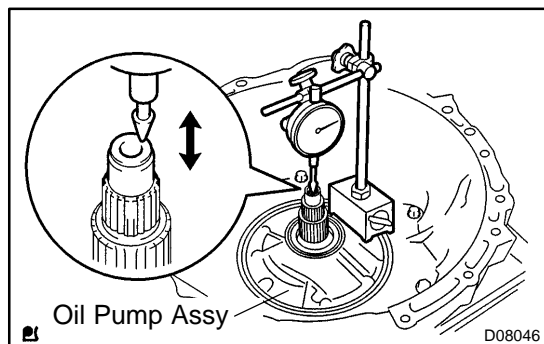


27. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

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

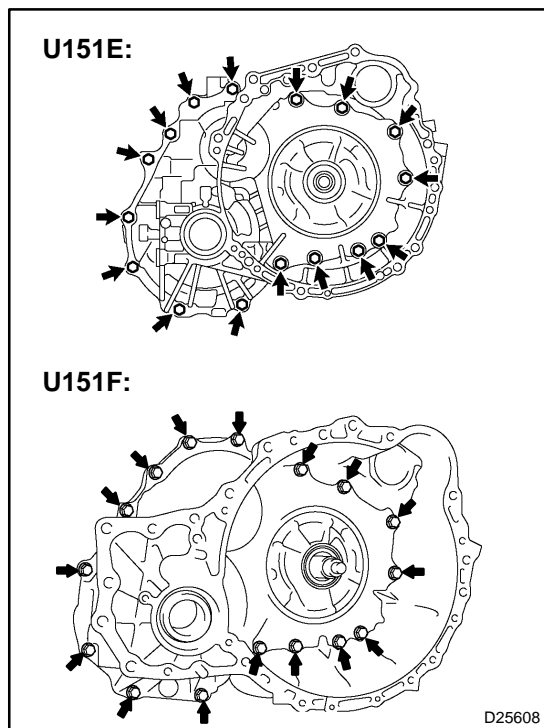
28. FIX AUTOMATIC TRANSAXLE ASSY

- (a) Fix the transaxle case with the oil pump side facing up.



29. INSPECT INPUT SHAFT ENDPLAY

- (a) Using a dial indicator, measure the input shaft endplay.
Endplay: 0.262 - 1.244 mm (0.01 - 0.049 in.)

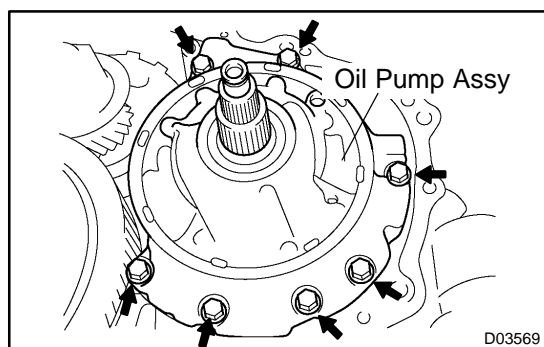


30. REMOVE TRANSAXLE HOUSING

- (a) Remove the 16 bolts.
- (b) Tap on the circumference of the transaxle housing with a plastic hammer to remove the transaxle housing from the transaxle case.

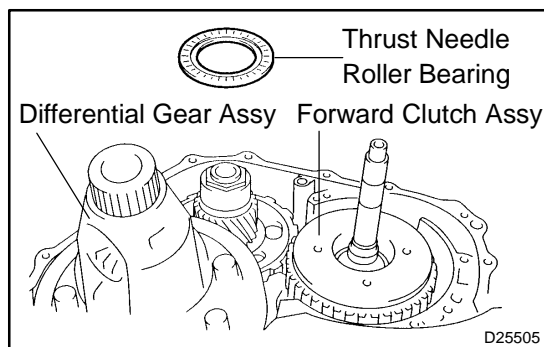
NOTICE:

Differential may be accidentally removed when the transaxle housing is removed.



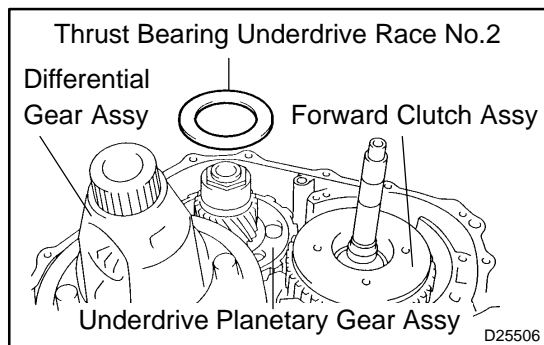
31. REMOVE OIL PUMP ASSY

- (a) Remove the 7 bolts and oil pump from the transaxle case.



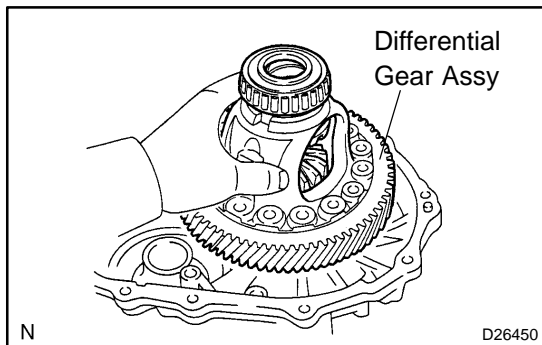
32. REMOVE THRUST NEEDLE ROLLER BEARING

- (a) Remove the thrust needle roller bearing from the underdrive planetary gear assy.



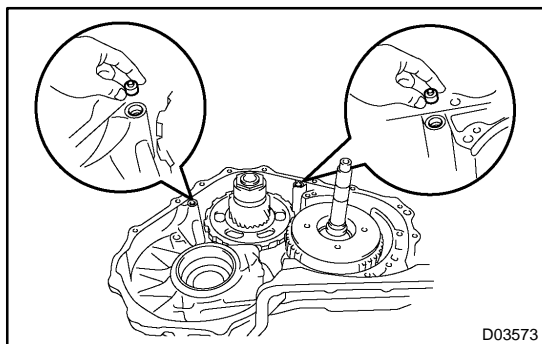
33. REMOVE THRUST BEARING UNDERDRIVE RACE NO.2

- (a) Remove the thrust bearing underdrive race No. 2 from the underdrive planetary gear assy.



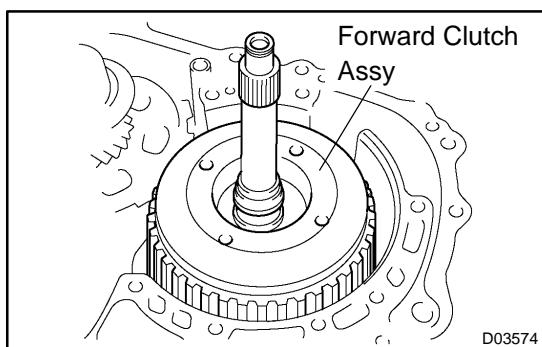
34. REMOVE DIFFERENTIAL GEAR ASSEMBLY

- (a) Remove the differential gear assy from the transaxle case.



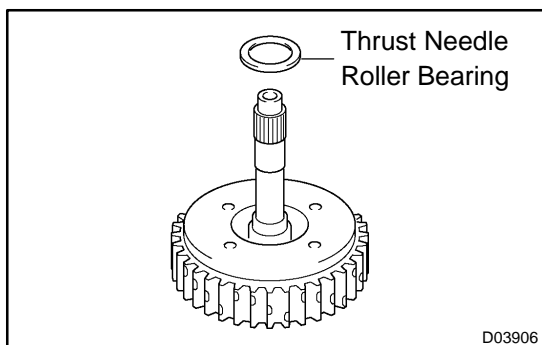
35. REMOVE OVERDRIVE BRAKE GASKET

- (a) Remove the 2 overdrive brake gaskets from the transaxle case.

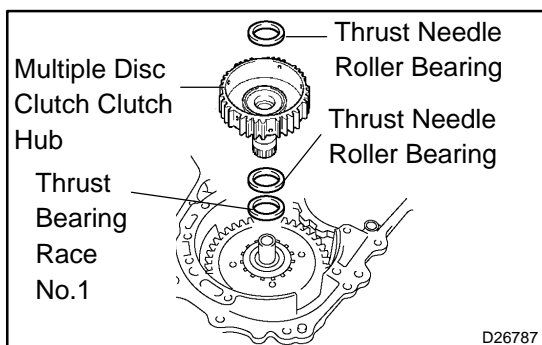


36. REMOVE FORWARD CLUTCH ASSY

- (a) Remove the forward clutch assy from the transaxle case.

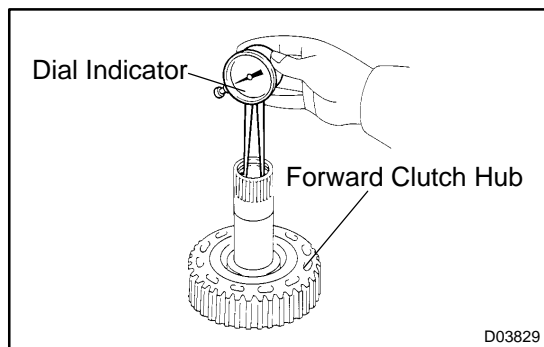


- (b) Remove the thrust needle roller bearing from the forward clutch.



37. REMOVE MULTIPLE DISC CLUTCH CLUTCH HUB

- (a) Remove the thrust needle roller bearing, multiple disc clutch hub, thrust needle roller bearing and thrust bearing race No.1 from the transaxle case.



38. INSPECT MULTIPLE DISC CLUTCH CLUTCH HUB

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

Standard inside diameter:

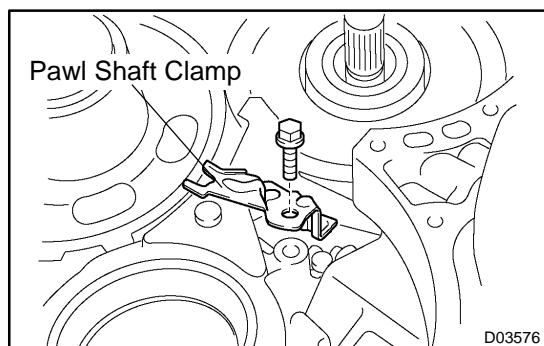
23.025 - 23.046 mm (0.9065 - 0.9073 in.)

Maximum inside diameter: 23.09 mm (0.9091 in.)

NOTICE:

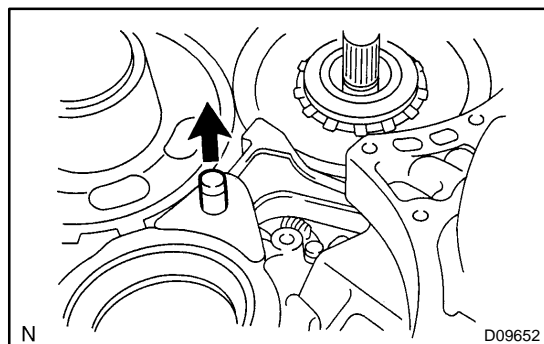
- **When the diameter is over the maximum, replace the multiple disc clutch hub with new one.**
- **Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub-assy with new one.**

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

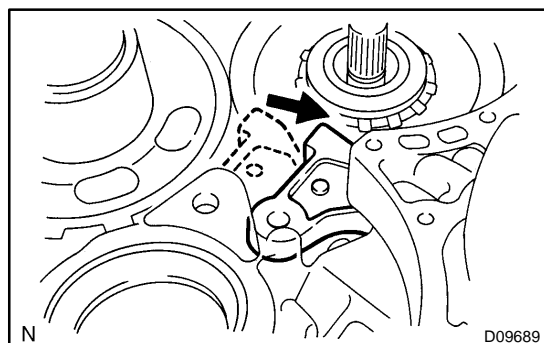


39. REMOVE UNDERDRIVE PLANETARY GEAR ASSY

(a) Remove the bolt and pawl shaft clamp.



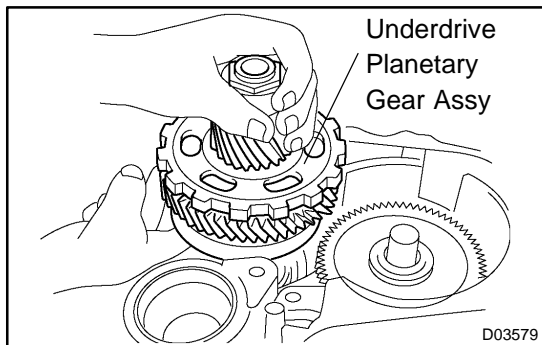
(b) Remove the parking lock pawl shaft.



(c) Push the parking lock pawl.

HINT:

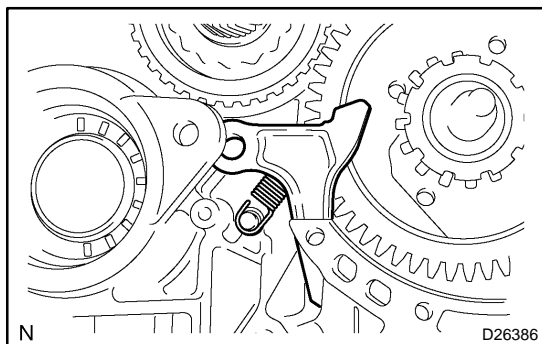
Failure to do so will cause interference when the underdrive planetary gear is removed.



(d) Remove the underdrive planetary gear assy from the transaxle case.

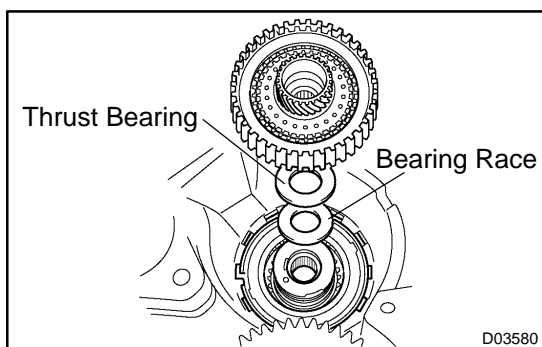
NOTICE:

Be careful so that the underdrive planetary gear assy will not fall out.



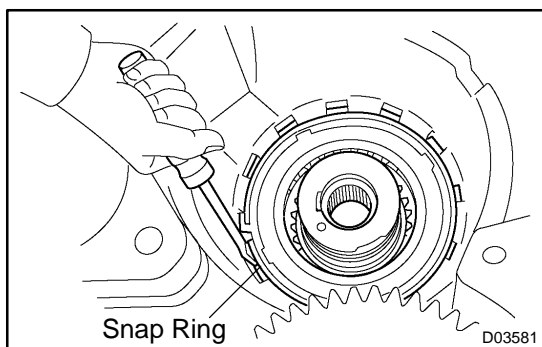
40. REMOVE PARKING LOCK PAWL

(a) Remove the spring, pawl pin and parking lock pawl.



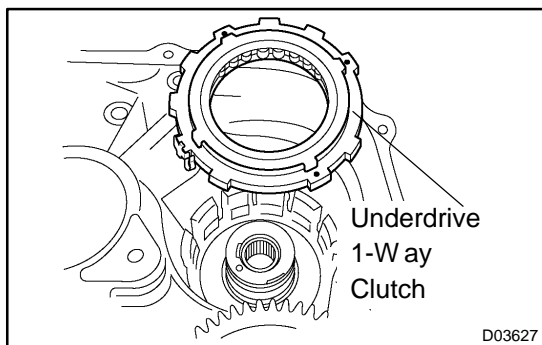
41. REMOVE UNDERDRIVE CLUTCH ASSY

(a) Remove the underdrive clutch assy, thrust bearing and bearing race from the transaxle case.

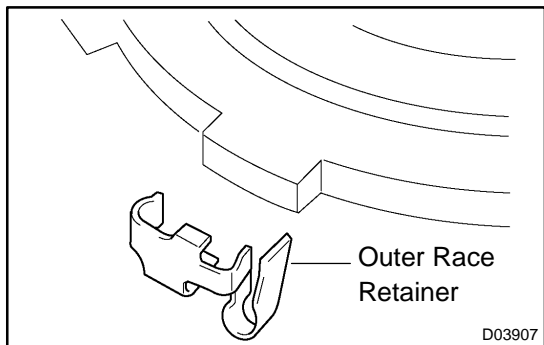


42. REMOVE UNDERDRIVE 1 WAY CLUTCH ASSY

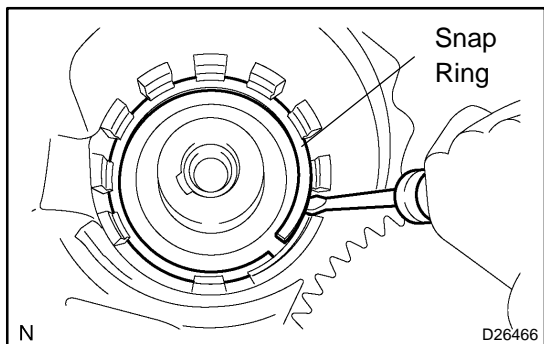
(a) Using a screwdriver, remove the snap ring from the transaxle case.



(b) Remove the underdrive 1-way clutch from the transaxle case.

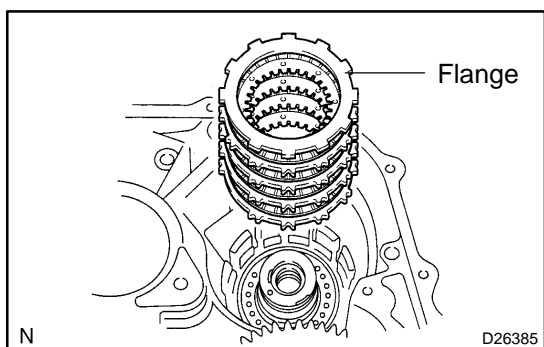


(c) Remove the outer race retainer from the 1-way clutch.

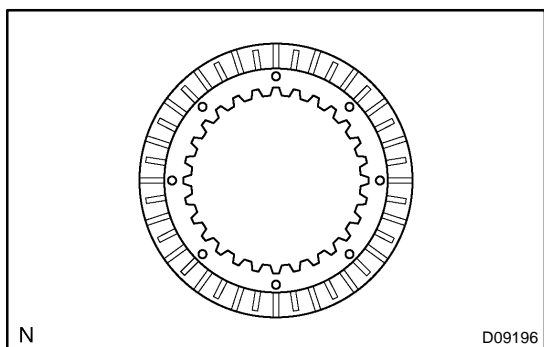


43. REMOVE UNDERDRIVE CLUTCH DISC NO.2

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



(b) Remove the flange, 4 discs and 4 plates from the transaxle case.



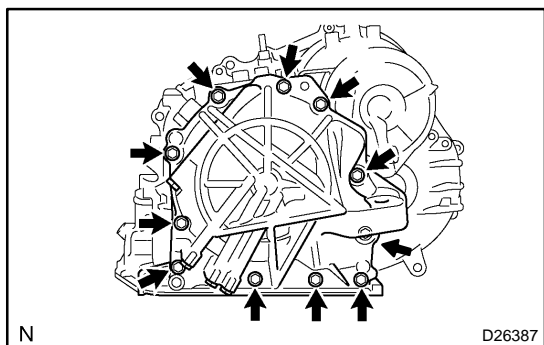
44. INSPECT UNDERDRIVE CLUTCH DISC NO.2

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

If necessary, replace them.

NOTICE:

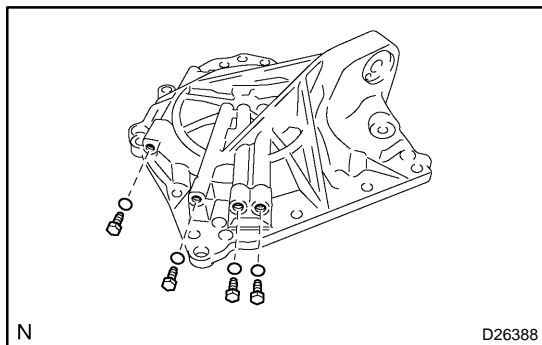
- If the lining of the disc comes off or discolors, or even if a part of the groove is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



45. REMOVE TRANSAXLE REAR COVER SUB-ASSY

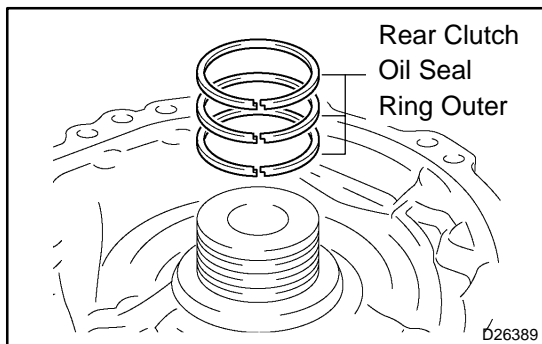
(a) Remove the 11 bolts.

(b) Tap in the circumference of the rear cover with a plastic hammer to remove the transaxle rear cover from the transaxle case.



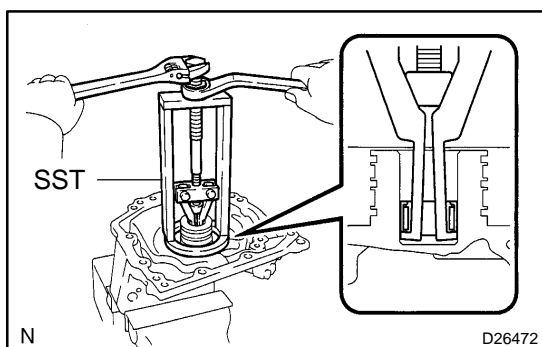
46. REMOVE TRANSAXLE CASE NO.1 PLUG

- (a) Remove the 4 transaxle case No.1 plugs from the transaxle rear cover.
- (b) Remove the 4 O-rings from the 4 transaxle case No.1 plugs.



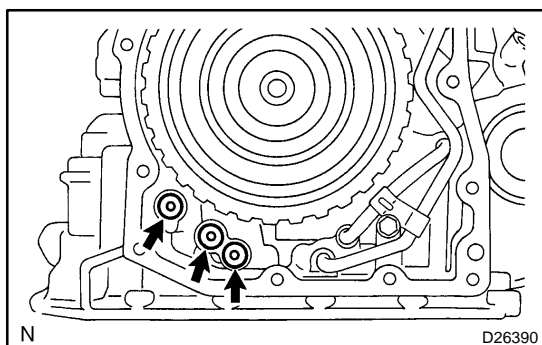
47. REMOVE REAR CLUTCH OIL SEAL RING OUTER

- (a) Remove the 3 rear clutch oil seal rings from the transaxle rear cover.



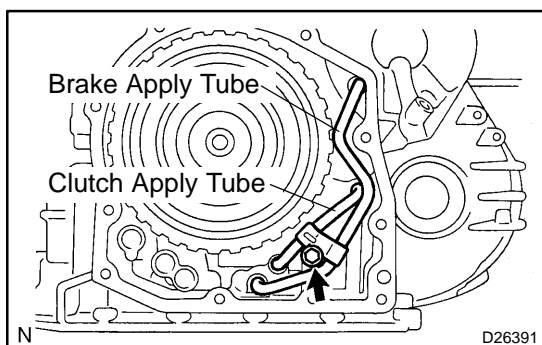
48. REMOVE NEEDLE ROLLER BEARING

- (a) Using SST, remove the needle-roller bearing from the transaxle rear cover.
- SST 09387-00041 (09387-01021, 09387-01030, 09387-01040)



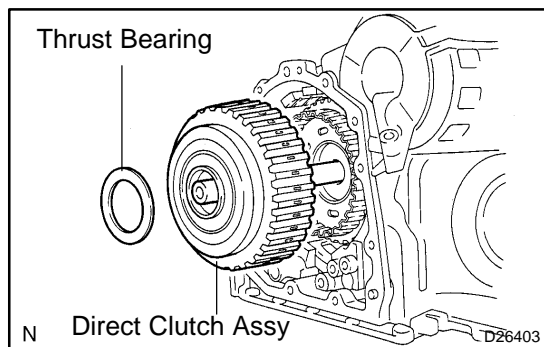
49. REMOVE GOVERNOR APPLY GASKET NO.1

- (a) Using a screwdriver, remove the 3 apply gaskets.



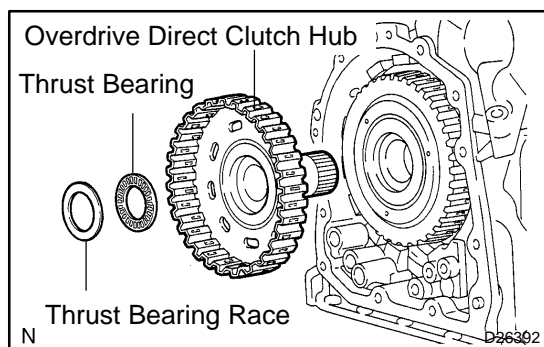
50. REMOVE BRAKE APPLY TUBE

- (a) Remove the bolt, clamp and brake apply tube.
- (b) Remove the clutch apply tube.
- (c) Remove the brake apply tube from the clamp.



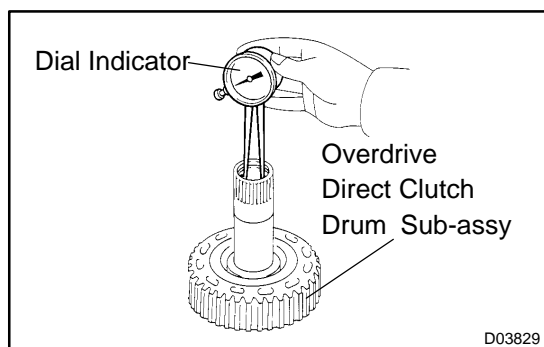
51. REMOVE DIRECT CLUTCH ASSY

- (a) Remove the thrust bearing and the direct clutch assy from the transaxle case.



52. REMOVE OVERDREVE DIRECT CLUTCH HUB SUB-ASSY

- (a) Remove the thrust bearing race, thrust bearing and overdrive direct clutch hub from the planetary gear assy.



53. INSPECT OVERDREVE DIRECT CLUTCH DRUM SUB-ASSY

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

Standard inside diameter:

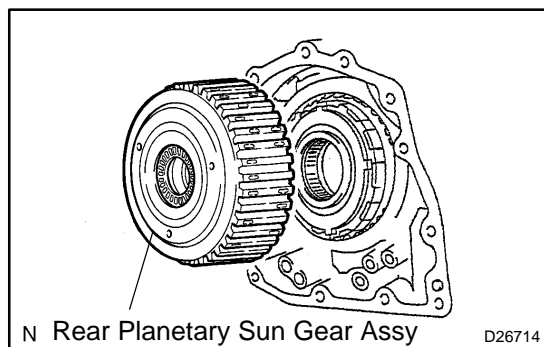
23.025 - 23.046 mm (0.9065 - 0.9073 in.)

Maximum inside diameter: 23.09 mm (0.9091 in.)

NOTICE:

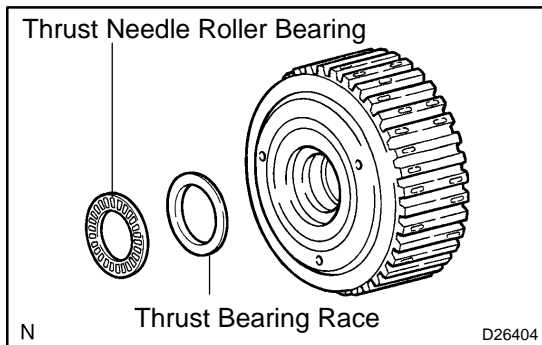
- When the diameter is over the maximum, replace the multiple disc clutch hub with new one.
- Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub-assy with new one.

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

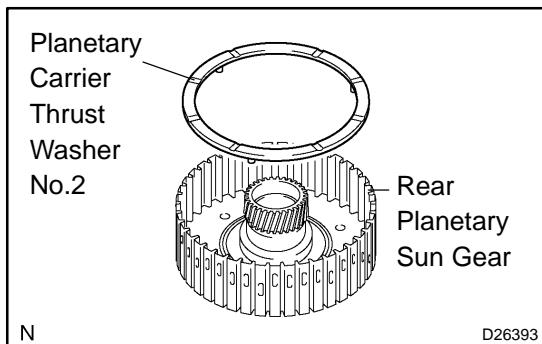


54. REMOVE REAR PLANETARY SUN GEAR ASSY

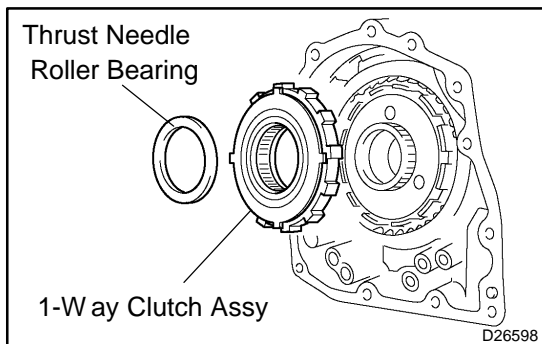
- (a) Remove the rear planetary sun gear assy from the transaxle case.



- (b) Remove the thrust needle roller bearing and thrust bearing race from the rear planetary sun gear assy.

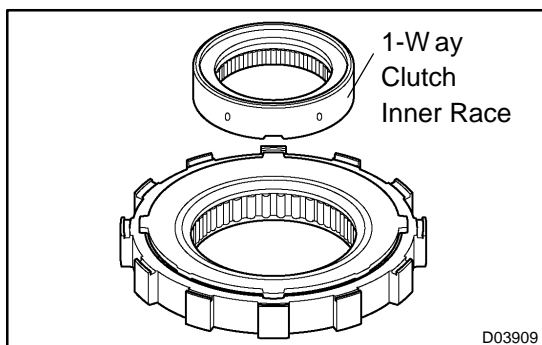


- (c) Remove the planetary carrier thrust washer No.2 from the rear planetary sun gear assy.

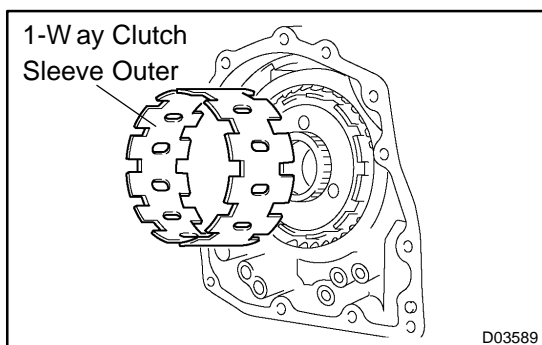


55. REMOVE 1 WAY CLUTCH ASSY

- (a) Remove the 1-way clutch assy and the thrust needle roller bearing from the transaxle case.

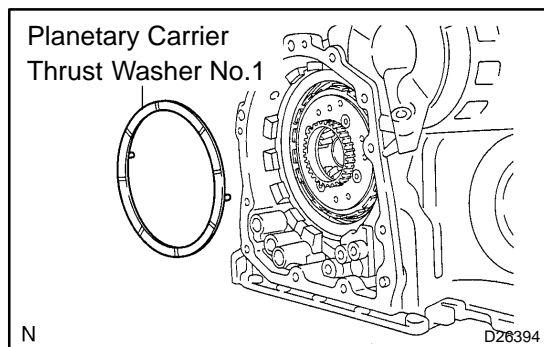


- (b) Remove the 1-way clutch inner race from the 1-way clutch assy.



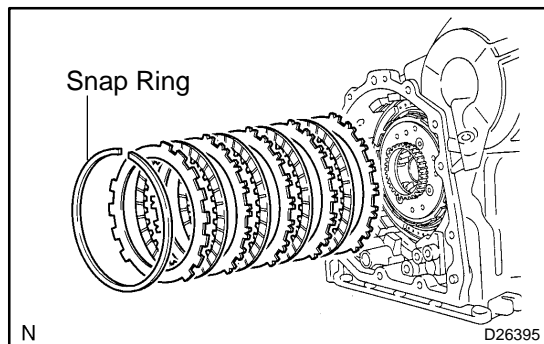
56. REMOVE 1WAY CLUTCH SLEEVE OUTER

- (a) Remove the 1-way clutch sleeve outer from the transaxle case.



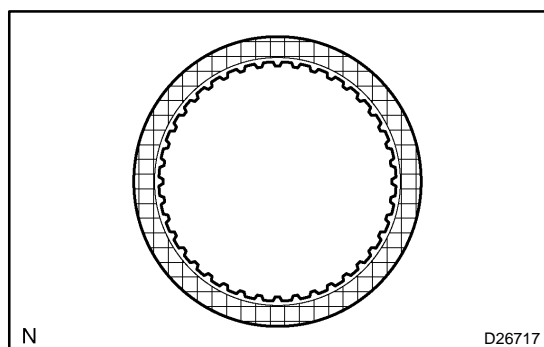
57. REMOVE PLANETARY CARRIER THRUST WASHER NO.1

- (a) Remove the planetary carrier thrust washer No.1 from the planetary gear Assy.



58. REMOVE 2ND BRAKE CLUTCH DISC

- (a) Using a screwdriver, remove the snap ring.
 (b) Remove the flange, 4 discs and 4 plates from the trans-axle case.

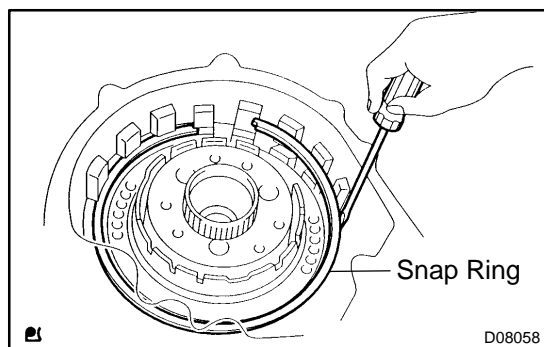


59. INSPECT 2ND BRAKE CLUTCH DISC

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

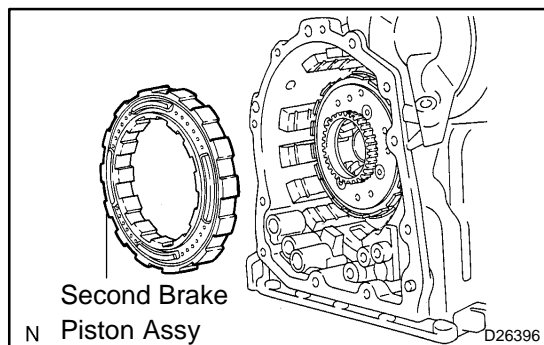
NOTICE:

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

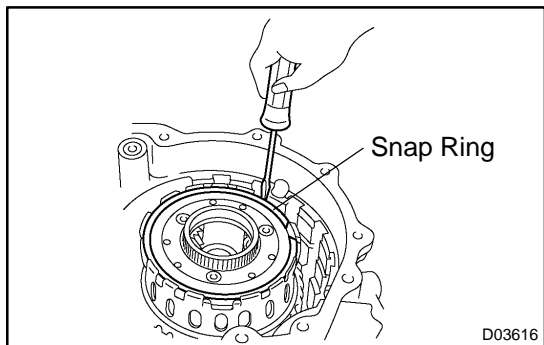


60. REMOVE SECOND BRAKE PISTON ASSY

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

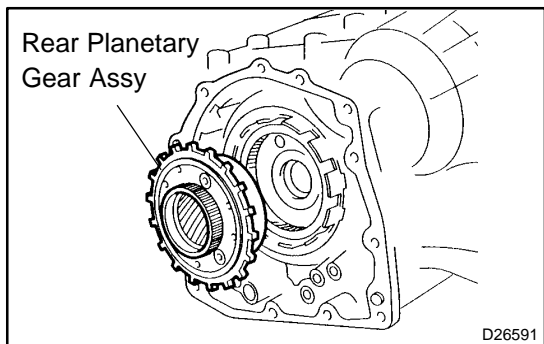


- (b) Remove the second brake piston Assy from the transaxle case.

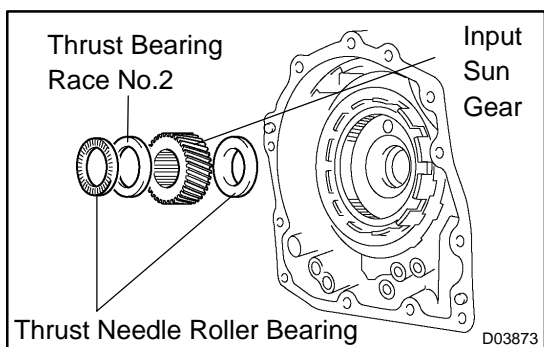


61. REMOVE REAR PLANETARY GEAR ASSY

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

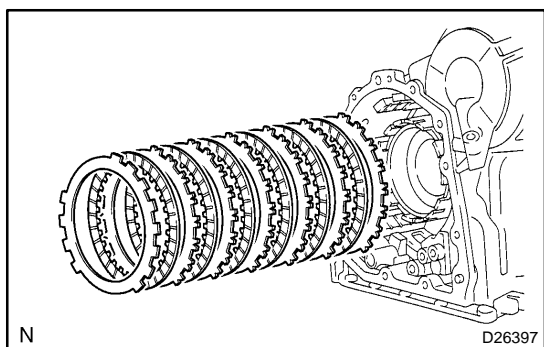


(b) Remove the rear planetary gear assy from the transaxle case.



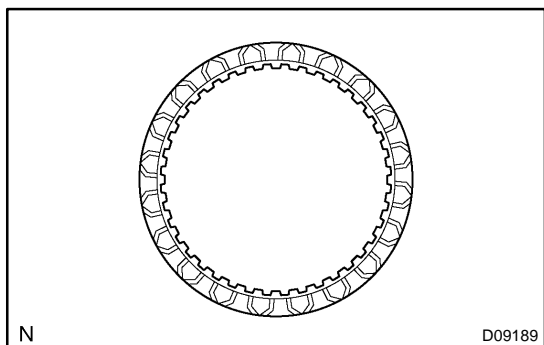
62. REMOVE INPUT SUN GEAR

(a) Remove the 2 thrust needle roller bearings, thrust bearing race No.2 and input sun gear from the transaxle case.



63. REMOVE 1ST & REVERSE BRAKE CLUTCH DISC

(a) Remove the flange, 6 discs and 6 plates from the transaxle case.



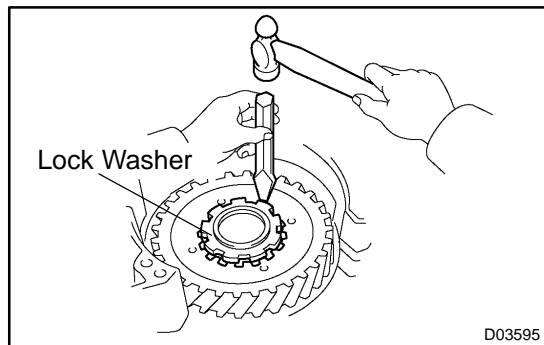
64. INSPECT 1ST & REVERSE BRAKE CLUTCH DISC

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

If necessary, replace them.

NOTICE:

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

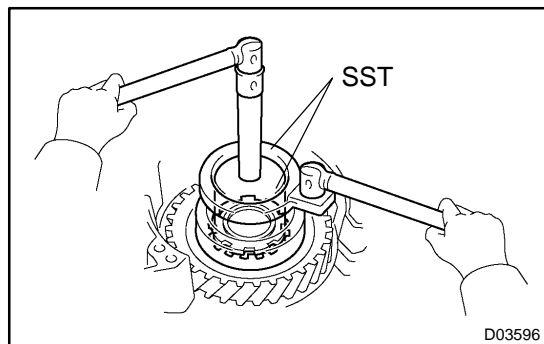


65. REMOVE FRONT PLANETARY GEAR ASSY

(a) Using a chisel and hammer, unstick the lock washer.

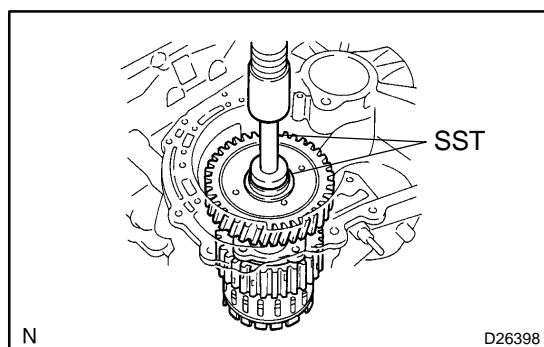
NOTICE:

Push down all claws of the washer. Otherwise SST cannot be fully pressed against the nut, and cannot loosen the nut.



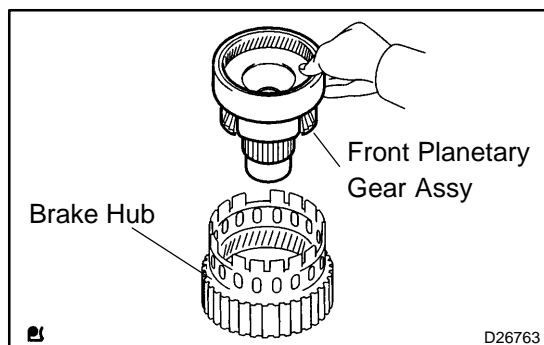
(b) Using SST, remove the nut.

SST 09387-00030, 09387-00080

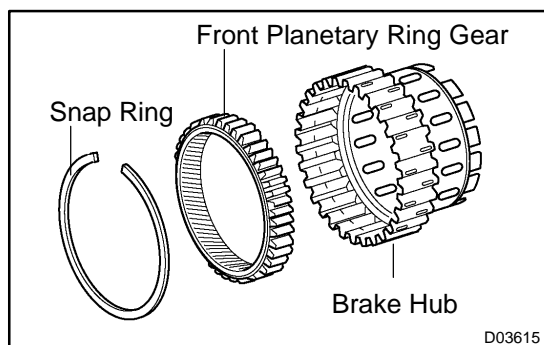


(c) Using SST and a press, remove the front planetary gear assy from the counter drive gear.

SST 09950-60010 (09951-00450), 09950-70010 (09951-07100)

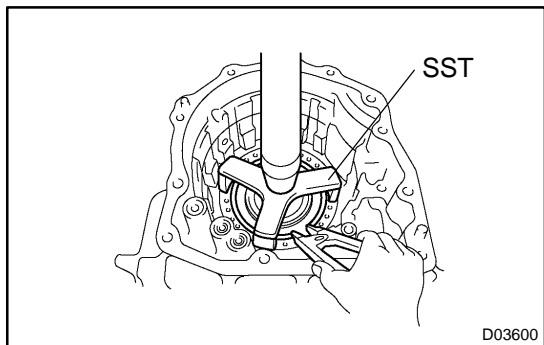


(d) Remove the front planetary gear assy from the brake hub.



66. REMOVE FRONT PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring and front planetary ring gear from the brake hub.

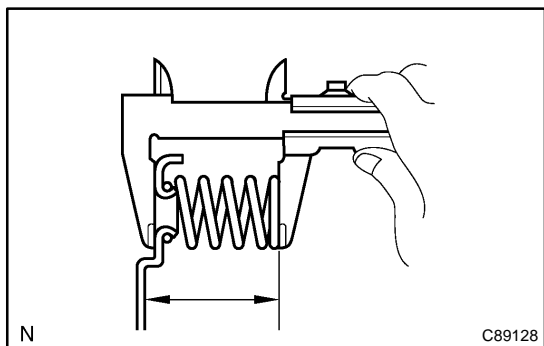


67. REMOVE 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

- (a) Place SST on the return spring, and compress the return spring with a press.
SST 09387-00070
- (b) Using a snap ring expander, remove the snap ring.

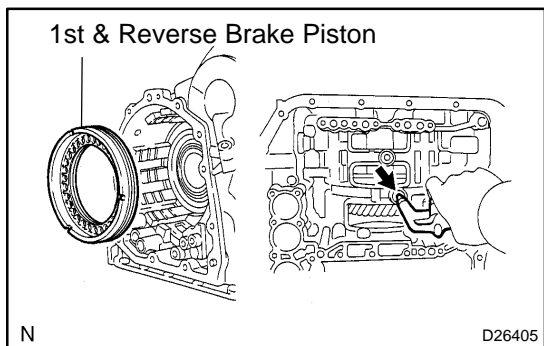
NOTICE:

- Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.
- Do not expand the snap ring excessively.



68. 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: 17.61 mm (0.6933 in.)

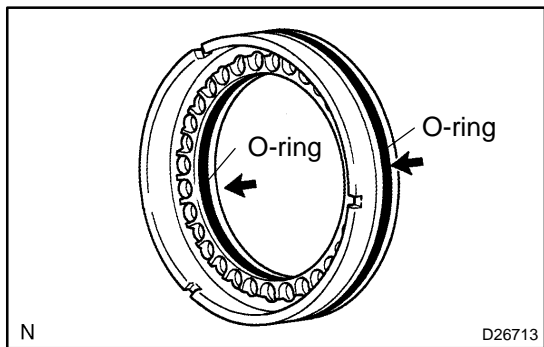


69. REMOVE 1ST & REVERSE BRAKE PISTON

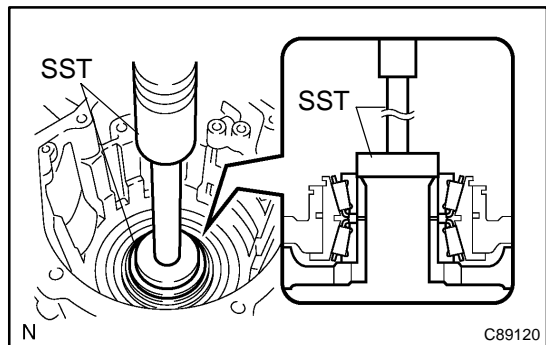
- (a) Apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transaxle case to remove 1st & reverse brake piston.

NOTICE:

- Blowing off the air may cause the piston to jump-out. When removing the piston, hold it by your hand using a waste cloth.
- Take care not to splash ATF when air-blowing.



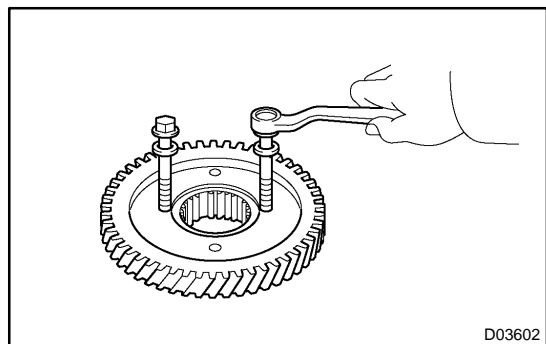
- (b) Remove the 2 O-rings from the 1st & reverse brake piston.



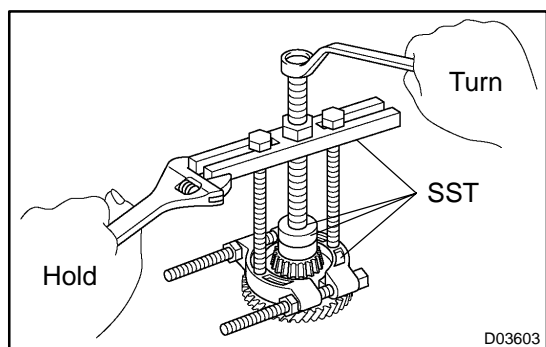
70. REMOVE COUNTER DRIVE GEAR

(a) Using SST and a press, remove the counter drive gear from the transaxle case.

SST 09950-60010 (09951-00590), 09950-70010 (09951-07100)

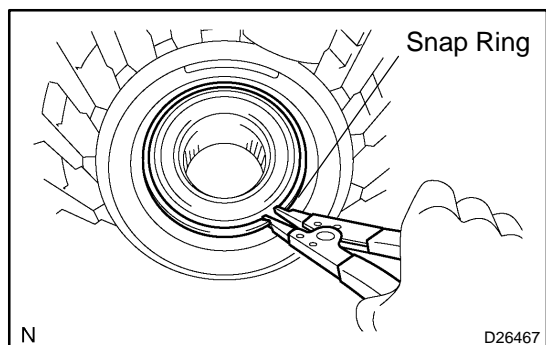


(b) As shown in the illustration, tighten 2 bolts evenly and make clearance of approx. 20.0 mm (0.797 in.) between the counter drive gear and the inner race.



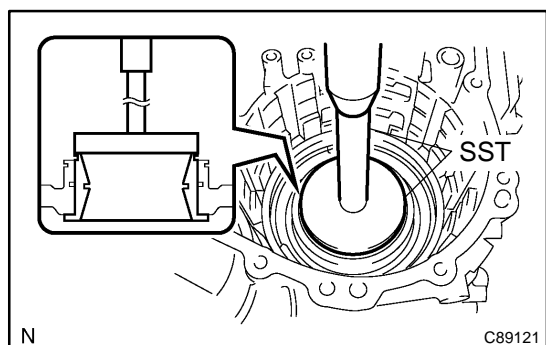
(c) Using SST, remove the tapered roller bearing.

SST 09950-60010 (09951-00590), 09950-70010 (09951-07100), 09950-00020, 09950-00030, 09950-4001 1 (09957-04010)



71. REMOVE COUNTER DRIVE GEAR BEARING

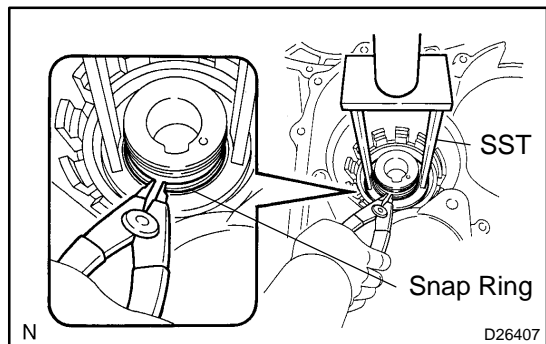
(a) Using a snap ring expander, remove the snap ring.



(b) Using SST and a press, remove the bearing outer race.

SST 09950-60020 (09951-00910), 09950-70010 (09951-07100)

72. REMOVE BREATHER PLUG NO.2 (ATM)

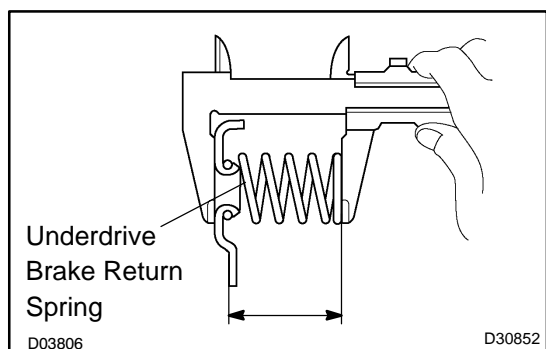


73. REMOVE UNDERDRIVE BRAKE RETURN SPRING SUB-ASSY

- (a) Place SST on the return spring, and compress the return spring with a press.
SST 09387-00020
- (b) Using a snap ring expander, remove the snap ring.

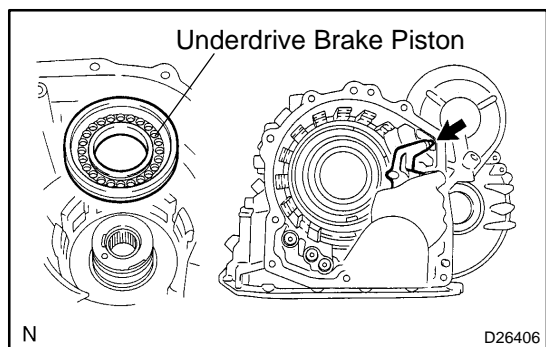
NOTICE:

- Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.
- Do not expand the snap ring excessively.



74. INSPECT UNDERDRIVE BRAKE RETURN SPRING SUB-ASSY

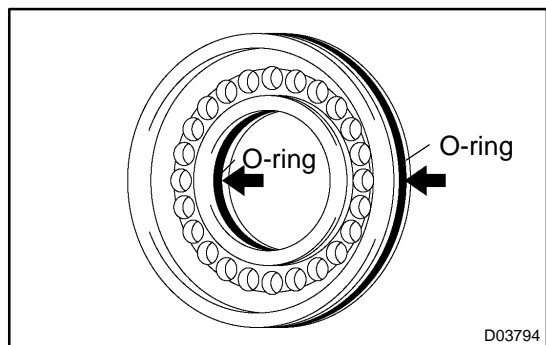
- (a) Using a vernier calipers, measure the free length of the spring together with the spring seat.
Standard free length: 13.24 mm (0.5213 in.)

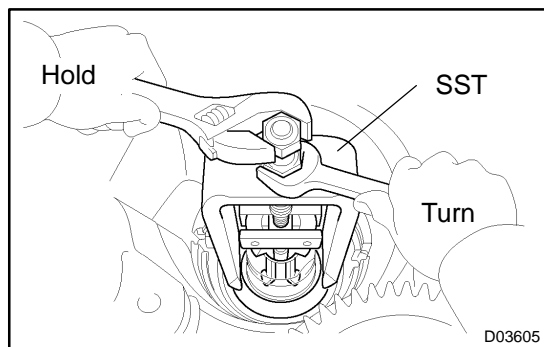


75. REMOVE UNDERDRIVE BRAKE PISTON

- (a) Apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transaxle case to remove the underdrive brake piston.

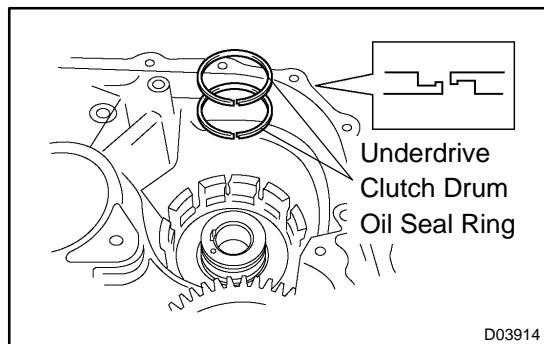
- (b) Remove the 2 O-rings from the underdrive brake piston.





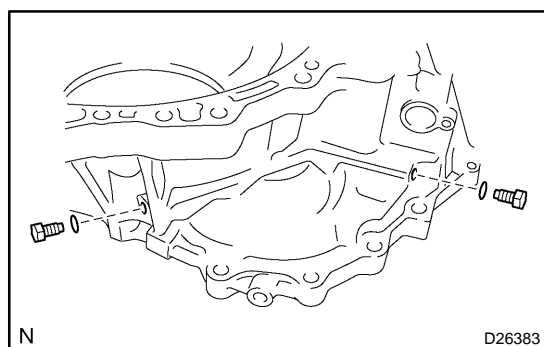
76. REMOVE NEEDLE ROLLER BEARING

- (a) Using SST, remove the needle-roller bearing from the transaxle case.
SST 09387-00041 (09387-01010, 09387-01030, 09387-01040)



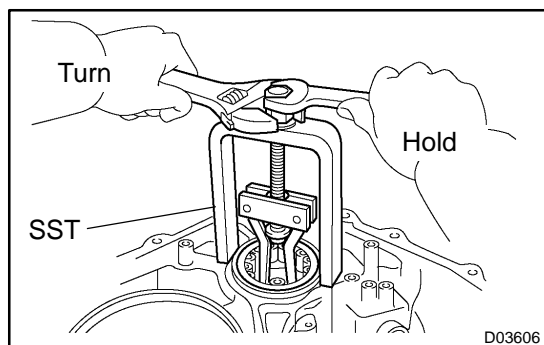
77. REMOVE UNDERDRIVE CLUTCH DRUM OIL SEAL RING

- (a) Remove the 2 oil seal rings from the transaxle case.



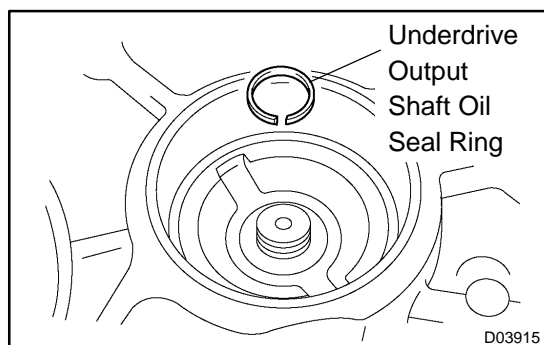
78. REMOVE TRANSAXLE CASE NO.1 PLUG

- (a) Remove the 2 transaxle case No. 1 plugs.
- (b) Remove the 2 O-rings from the 2 transaxle case No. 1 plugs.



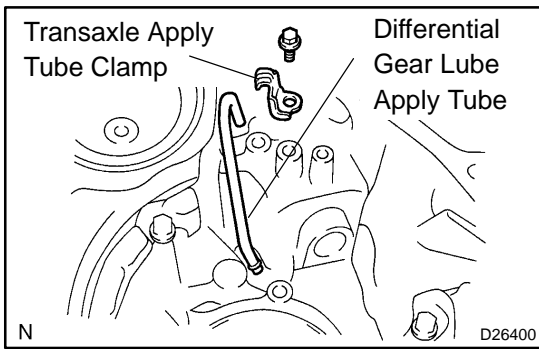
79. REMOVE UNDERDRIVE CYLINDRICAL ROLLER BEARING

- (a) Using SST, remove the underdrive cylindrical roller bearing from the transaxle case.
SST 09514-3501 1



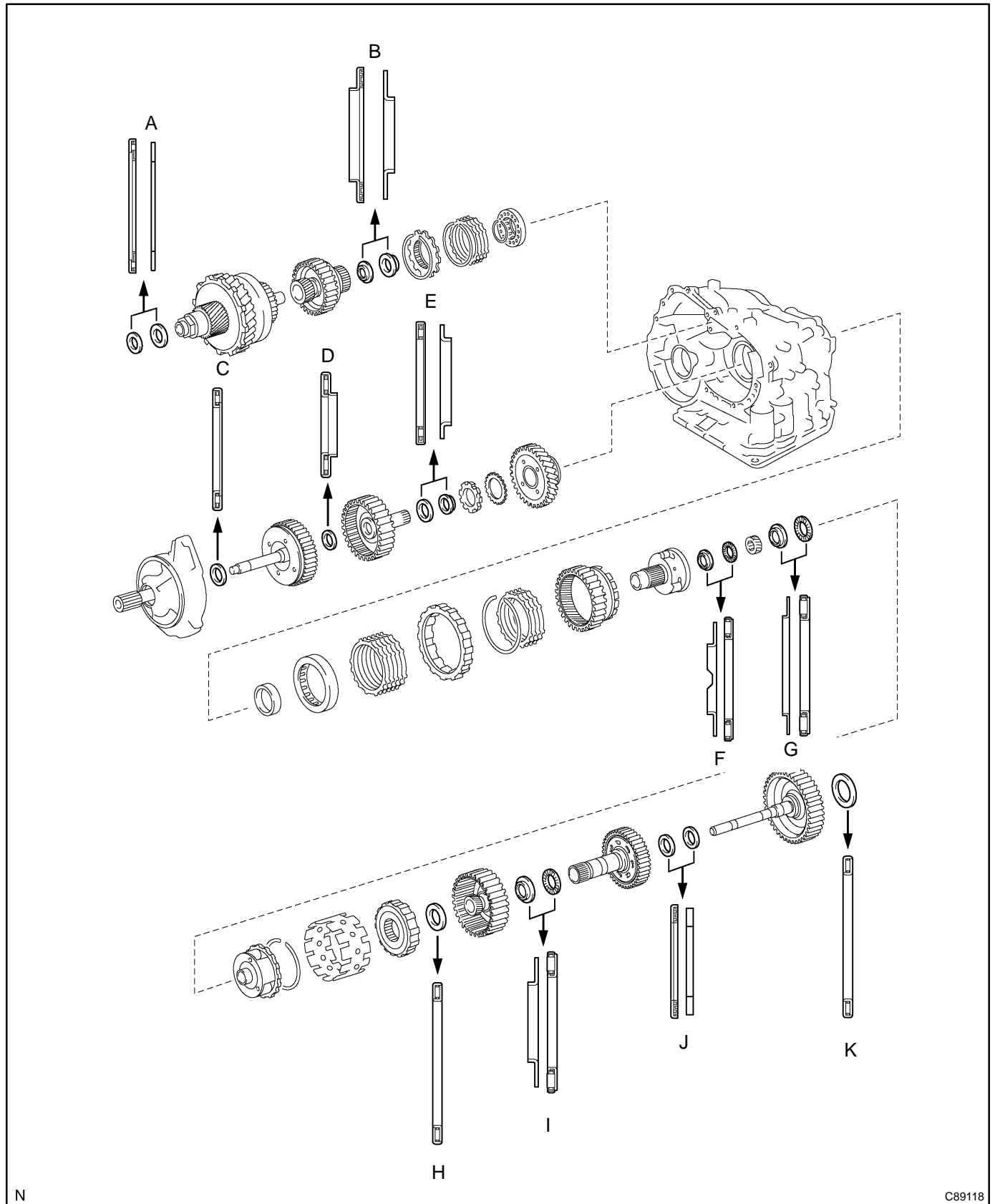
80. REMOVE UNDERDRIVE OUTPUT SHAFT OIL SEAL RING

- (a) Remove the oil seal ring from the transaxle housing.



- 81. REMOVE DIFFERENTIAL GEAR LUBE APPLY TUBE**
- (a) Remove the bolt, transaxle apply tube clamp and differential gear lube apply tube from the transaxle housing.

82. BEARING POSITION

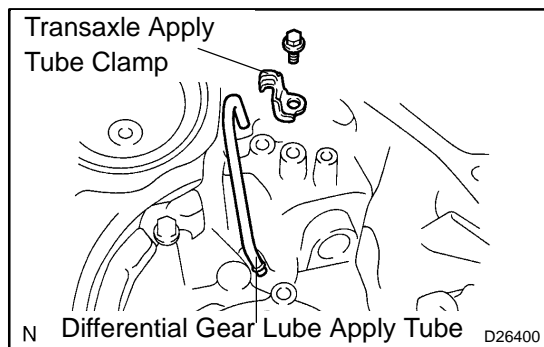


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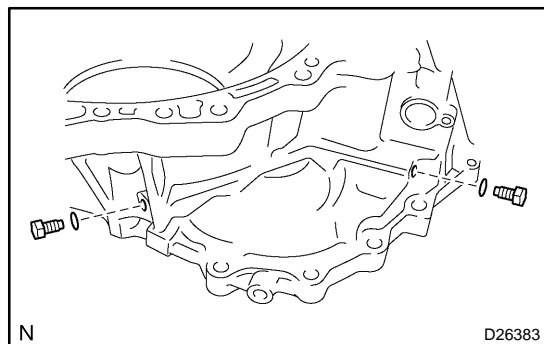
AUTOMATIC TRANSMISSION / TRANS - AUTOMATIC TRANSAXLE ASSY (U151E/U151F)

Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	-	57.2 (2.252) / 84.96 (3.3449)	56.4 (2.220) / 83.0 (3.268)
B	-	37.73 (1.4854) / 58.0 (2.283)	-
C	-	33.85 (1.3327) / 52.2 (2.055)	-
D	24.94 (0.982)	23.5 (0.925) / 44.0(1.732)	-
E	-	36.3 (1.429) / 51.93 (2.044)	34.5 (1.358) / 48.35 (1.904)
F	34.35 (1.352) / 56.57 (2.227)	32.45 (1.278) / 56.48 (2.223)	-
G	40.15 (1.581) / 59.25 (2.333)	38.65 (1.522) / 59.79 (2.354)	38.65 (1.522) / 59.25 (2.332)
H	-	53.6 (2.110) / 69.6 (2.740)	-
I	33.02 (1.3) / 45.8 (1.803)	31.85 (1.254) / 57.3 (2.256)	-
J	-	24.79 (0.976) / 39.5 (1.555)	23.6 (0.929) / 37.95 (1.494)
K	-	56.3 (2.216) / 75.96 (2.991)	-

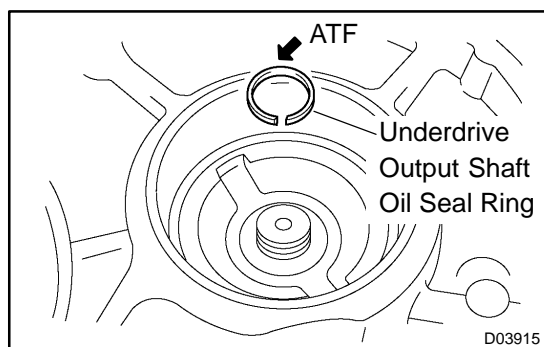


- 83. INSTALL DIFFERENTIAL GEAR LUBE APPLY TUBE**
 (a) Install the differential gear lube apply tube and transaxle apply tube clamp with the bolt to the transaxle housing.
Torque: 9.8 N·m (100 kgf·cm, 87 in.-lbf)

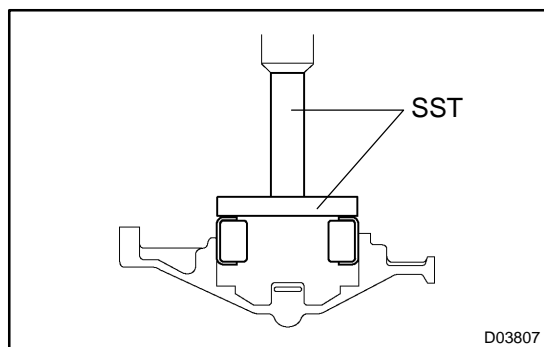
NOTICE:
Make sure to insert the pipe to the stopper.



- 84. INSTALL TRANSAXLE CASE NO.1 PLUG**
 (a) Install the 2 new O-rings to the 2 transaxle case No.1 plugs.
 (b) Install the 2 transaxle case No.1 plugs to the transaxle rear cover.
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

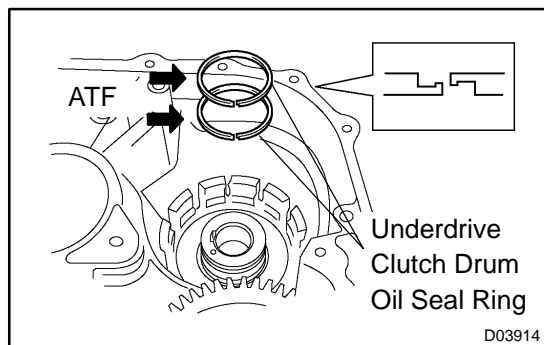


- 85. INSTALL UNDERDRIVE OUTPUT SHAFT OIL SEAL RING**
 (a) Coat the new oil seal ring with ATF and install it to the transaxle housing.

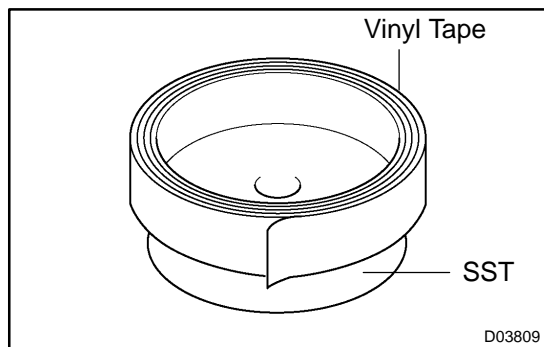


- 86. INSTALL UNDERDRIVE CYLINDRICAL ROLLER BEARING**
 (a) Coat the underdrive cylindrical roller bearing with ATF.
 (b) Using SST and a press, install the underdrive cylindrical roller bearing.
 SST 09950-60020 (09951-00810), 09950-70010 (09951-07100)

NOTICE:
Do not apply excessive pressure to it.



- 87. INSTALL UNDERDRIVE CLUTCH DRUM OIL SEAL RING**
 (a) Coat the 2 new oil seal rings with ATF, install them to the transaxle rear cover.
- NOTICE:**
- Do not expand the gap of the oil seal ring too much.
 - Fix the hooks certainly. Confirm the smooth rotation.



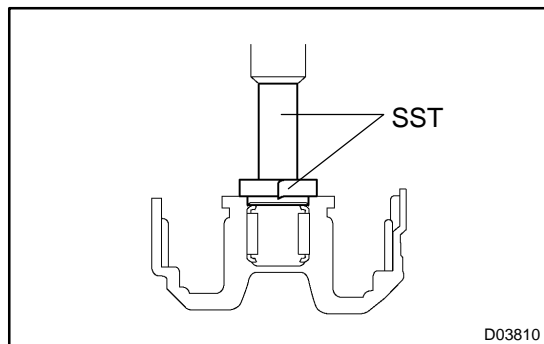
88. INSTALL NEEDLE ROLLER BEARING

- (a) Wind a vinyl tape around SST at the place 4.0 mm (0.157 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).

NOTICE:

Clean SST to remove deposited oil, before winding a vinyl tape.

- (b) Coat the needle roller bearing with ATF.

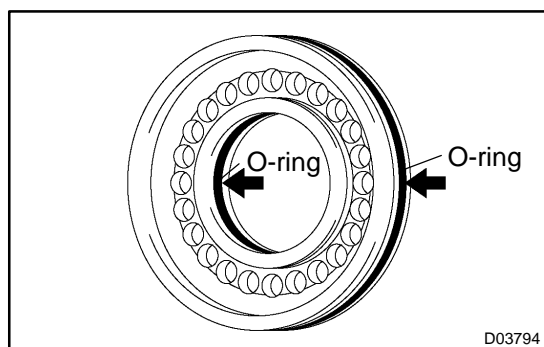


- (c) Using SST and a press, install the needle-roller bearing to the transaxle case.

SST 09950-60010 (09951-00320), 09950-70010 (09951-07100)

NOTICE:

When the wound vinyl tape contacts the transaxle case, stop press-fitting.



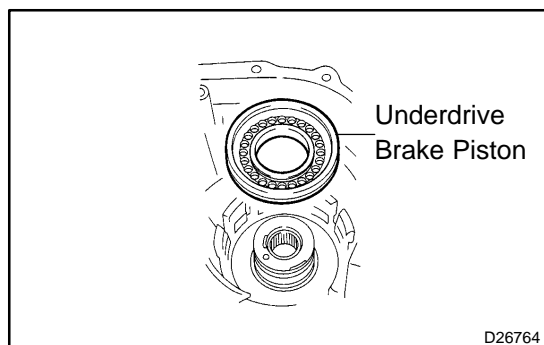
89. INSTALL UNDERDRIVE BRAKE PISTON

- (a) Coat the 2 new O-rings with ATF, install them to the underdrive brake piston.

NOTICE:

- Assemble the O-ring carefully not to have a twist and a pinching.
- Apply enough ATF to the O-ring prior to assembling.

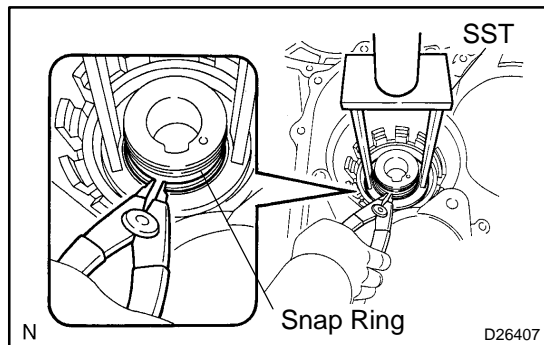
- (b) Coat the underdrive brake piston with ATF.



- (c) Install the underdrive brake piston to the transaxle case.

NOTICE:

Be careful not to damage the O-ring.



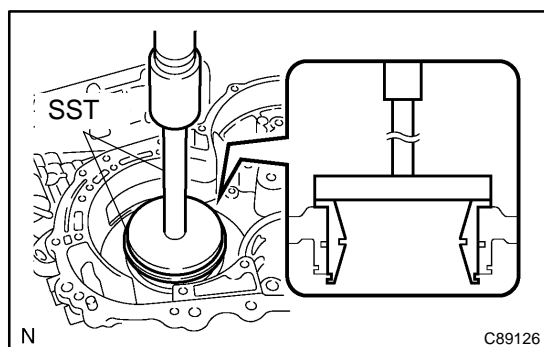
90. INSTALL UNDERDRIVE CLUTCH RETURN SPRING SUB-ASSY

- (a) Place SST on the return spring and compress the return spring with a press.
SST 09387-00020
- (b) Using a snap ring expander, install the snap ring to the transaxle case.

NOTICE:

- Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, to prevent the spring sheet from deforming.
- Do not expand the snap ring excessively.
- Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.
- The snap ring should be fixed surely in the groove of the transaxle case.

91. INSTALL BREATHER PLUG NO.2 (ATM)

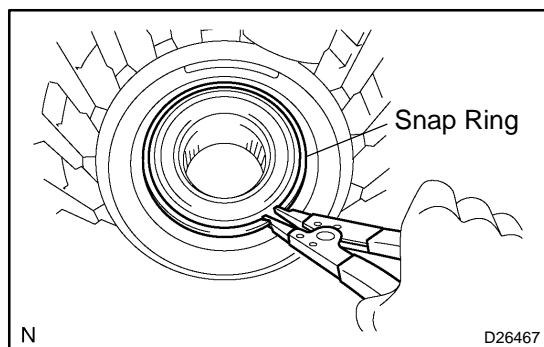


92. INSTALL COUNTER DRIVE GEAR BEARING

- (a) Coat the counterdrive gear bearing with ATF.
- (b) Using SST and a press, install the bearing outer race.
SST 09950-60020 (09951-01030), 09950-70010 (09951-07150), 09649-17010

NOTICE:

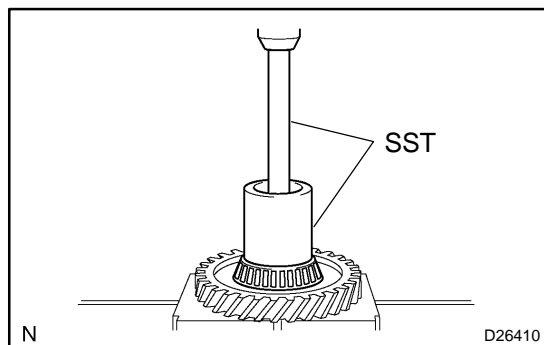
- Do not apply excessive pressure to it.
- Press-fit the bearing outer race until it contacts the transaxle case.



- (c) Using a snap ring expander, install the snap ring.

NOTICE:

Face the white mark side of the snap ring up.

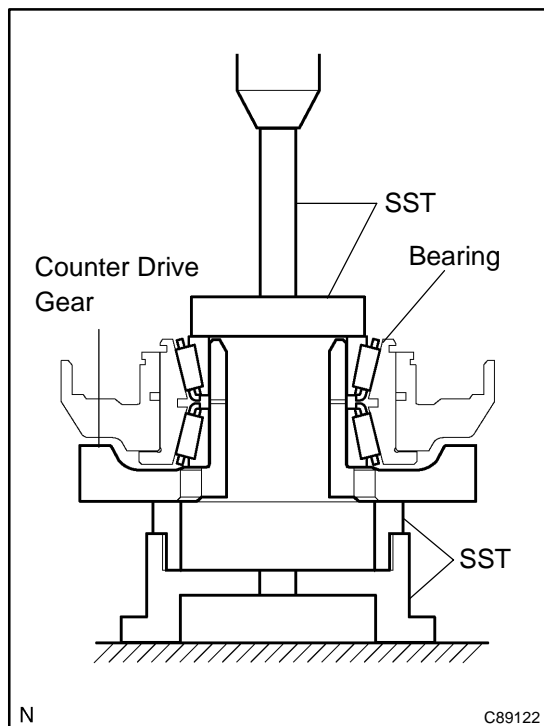


93. INSTALL COUNTER DRIVE GEAR

- (a) Coat the counterdrive gear with ATF.
- (b) Using SST and a press, install the tapered roller bearing to the counter drive gear.
SST 09950-70010 (09951-07150), 09649-17010

NOTICE:

Do not apply excessive pressure to it.

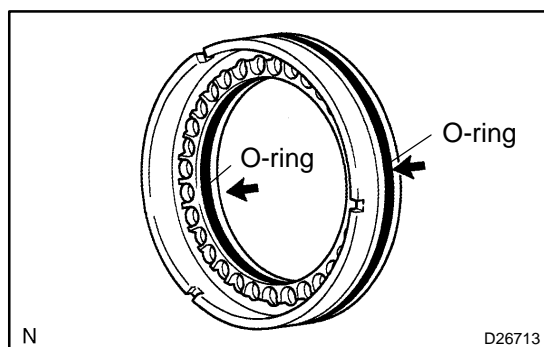


(c) Using SST and a press, install the counter drive gear and bearing to the transaxle case.

SST 09223-15030, 09527-17011, 09950-60020 (09951-00750), 09950-70010 (09951-07150)

NOTICE:

Do not apply excessive pressure to it.



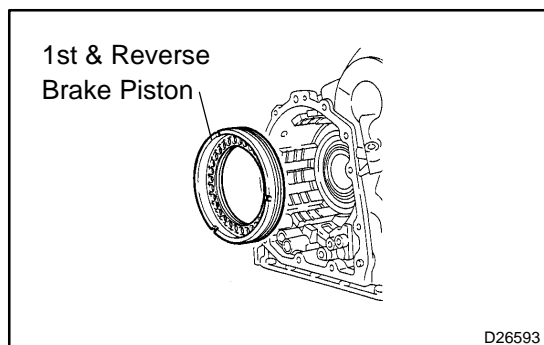
94. INSTALL 1ST & REVERSE BRAKE PISTON

(a) Coat the 2 new O-rings with ATF.

(b) Install the 2 O-rings to the 1st & reverse brake piston.

NOTICE:

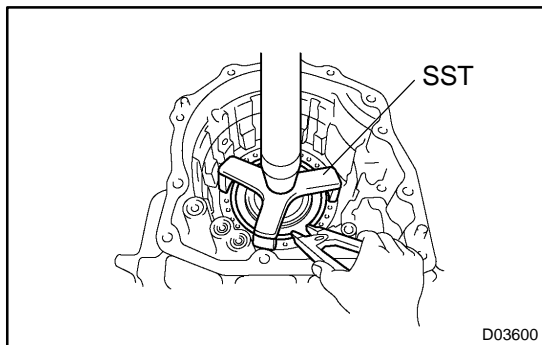
- Assemble the O-ring carefully not to have a twist and a pinching.
- Apply enough ATF to the O-ring prior to assembling.



(c) Coat a 1st & reverse brake piston with ATF, install it to the transaxle case.

NOTICE:

Be careful not to damage the O-ring.

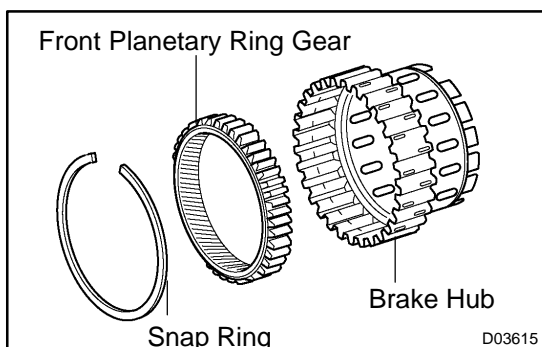


95. INSTALL 1ST & REVERSE BRAKE RETURN SPRING SUB-ASSY

- (a) Place SST on the return spring and compress the return spring with a press.
SST 09387-00070
- (b) Using a snap ring expander, install the snap ring to the transaxle case.

NOTICE:

- Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from being deformed.
- Do not expand the snap ring excessively.
- Installing the spring sub-assembly, check all of the springs are fit in the piston correctly.
- The snap ring should be fixed surely in the groove of the cylinder.
- Fix the snap ring to the inside of the claw of the spring seat surely.

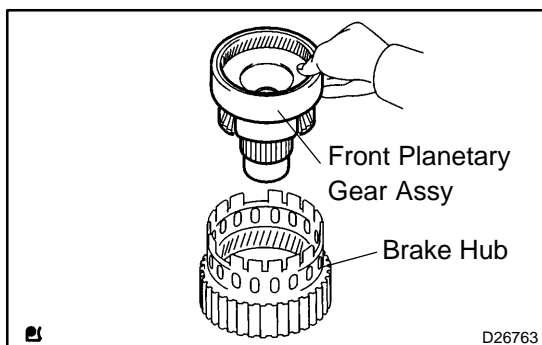


96. INSTALL FRONT PLANETARY RING GEAR

- (a) Using a screwdriver, install the front planetary ring gear and snap ring to the brake hub.

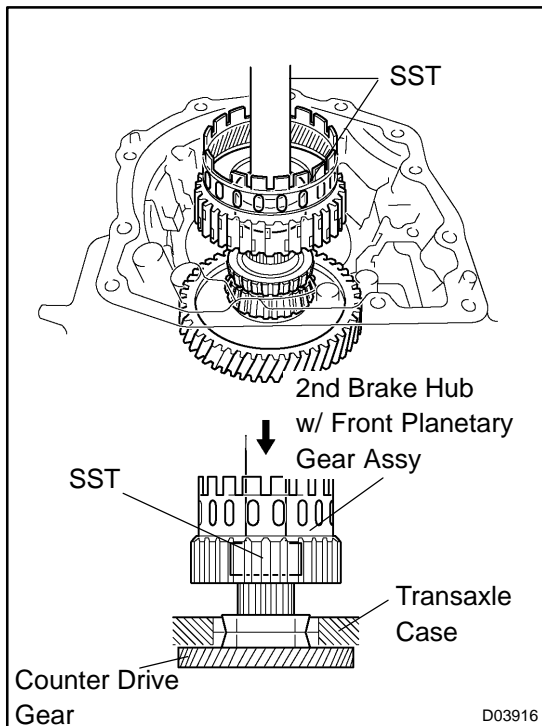
NOTICE:

Confirm the snap ring is fixed in the groove of the brake hub correctly.



97. INSTALL FRONT PLANETARY GEAR ASSY

- (a) Install the front planetary gear assy to the brake hub.

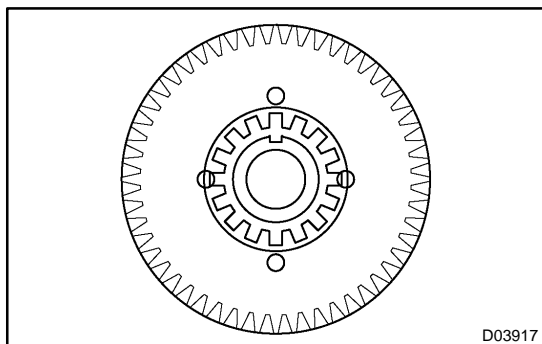


(b) Using SST and a press, press-fit the front planetary gear assembly.

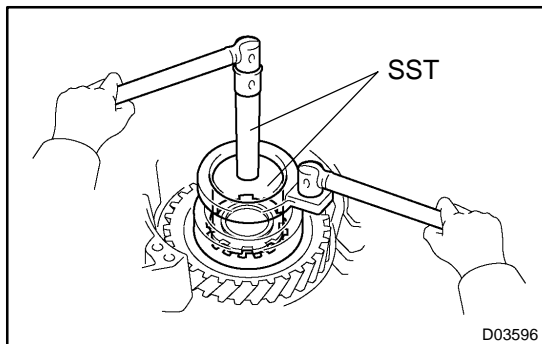
SST 09950-60010 (09951-00500), 09950-70010 (09951-07100)

NOTICE:

- Do not apply excessive pressure to it.
- Press the inner race of LH tapered roller bearing, counter gear and front planetary gear assembly to the position where no pre-load should be applied to one pair of tapered roller bearings (left and right).



(c) Install the new washer, as shown in the illustration.



(d) Using SST, install the nut.

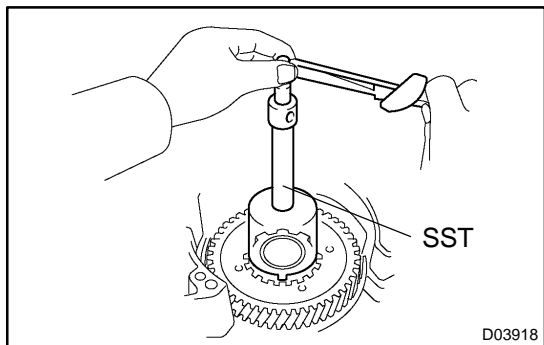
SST 09387-00030, 09387-00080

Torque: 210 - 350 N·m

(2,141 kgf·cm, 155 ft·lbf - 3,569 kgf·cm, 258 ft·lbf)

NOTICE:

Assemble the washer after pressing each part, then tighten the nut to minimum tightening torque.



- (e) Using SST and a torque wrench, measure the turning torque of the bearing while rotating SST at 60 rpm. When the measured value is not within the specified value, gradually tighten the nut until it reaches the specified value.

SST 09387-00080

Turning torque at 60 rpm:

New Bearing

0.51 - 1.02 N·m (5.1 - 10.0 kgf·cm, 4.4 - 8.7 in·lbf)

Used Bearing

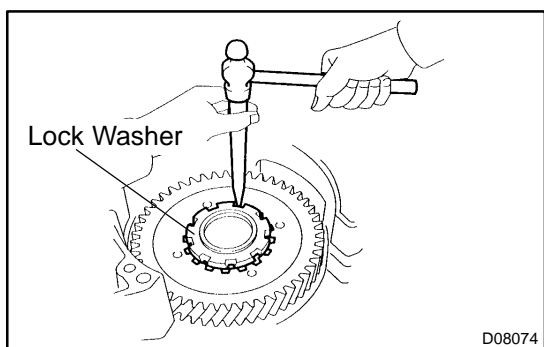
0.26 - 0.51 N·m (2.7 - 5.2 kgf·cm, 2.3 - 4.5 in·lbf)

HINT:

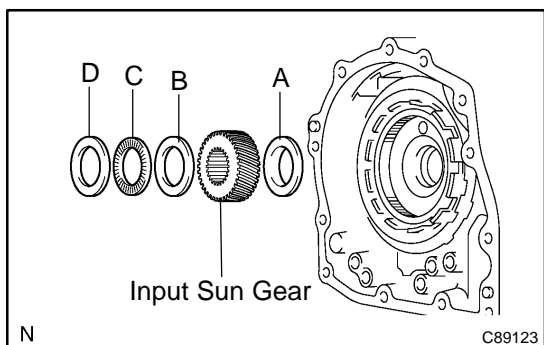
Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).

- (f) Tighten the nut gradually until the specified rotation torque of tapered roller bearing is measured.

Torque: 350 N·m (3,569 kgf·cm, 258 ft·lbf) (a limit)



- (g) Using a chisel and hammer, stake the front lock washer.



98. INSTALL INPUT SUN GEAR

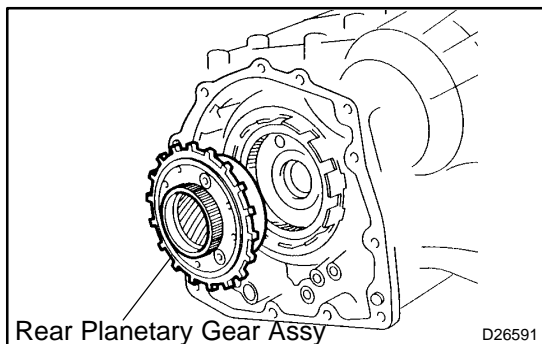
- (a) Coat the 2 thrust bearings with ATF.
 (b) Install the 2 thrust bearings, the bearing race and the front planetary sun gear to the front planetary gear assy.

NOTICE:

- **Install the bearing race on the side of the front planetary carrier. Be careful about the orientation of the race.**
- **Installing thrust bearing and front sun gears, be careful about the orientation of the parts.**
- **Install the bearing race on the side of the front sun gear. Be careful about the orientation of the race.**
- **Install the thrust bearing and the race after holding the parts on the rear planetary carrier by applying grease. Be sure the assembling order.**

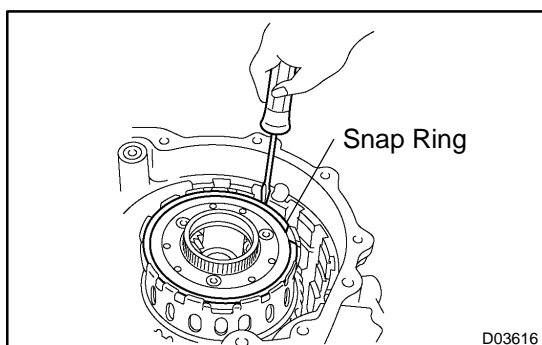
Thrust bearing and bearing race diameter: mm (in.)

	inside	outside
Thrust Bearing, A	32.5 (1.28)	56.5 (2.224)
Bearing Race, B	40.2 (1.583)	59.3 (2.335)
Thrust Bearing, C	38.6 (1.520)	59.7 (2.35)
Bearing Race, D	38.6 (1.520)	59.3 (2.335)



99. INSTALL REAR PLANETARY GEAR ASSY

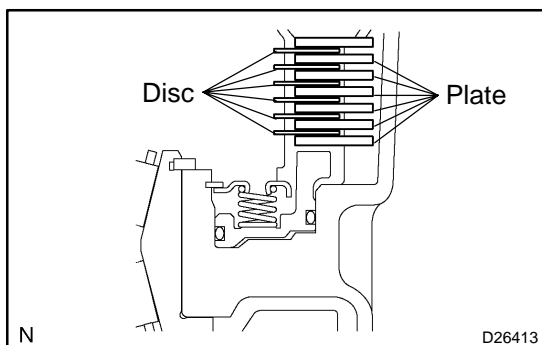
- (a) Install the rear planetary gear assy to the rear planetary ring gear.



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

NOTICE:

Confirm the snap ring is fixed in the groove of the 1st & reverse brake hub correctly.

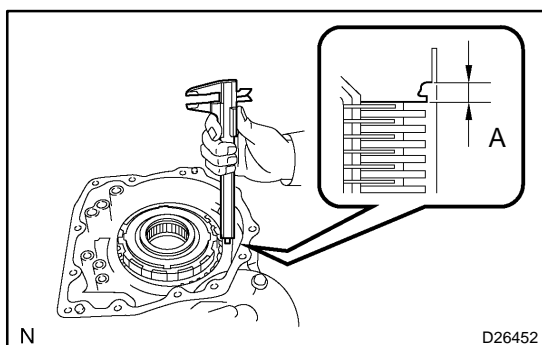


100. INSTALL 1ST & REVERSE BRAKE CLUTCH DISC

- (a) Coat the 6 discs with ATF.
- (b) Install the 6 plates and 6 discs.

NOTICE:

Be careful about the order of discs, plates and flange assembly.



101. INSPECT PACK CLEARANCE OF FIRST & REVERSE BRAKE

- (a) Using vernier calipers, measure the distance between the disc surface and the contact surface of the 2nd brake cylinder and transaxle case (Dimension A).
- (b) Select an appropriate flange so that the pack clearance will meet the specified value.

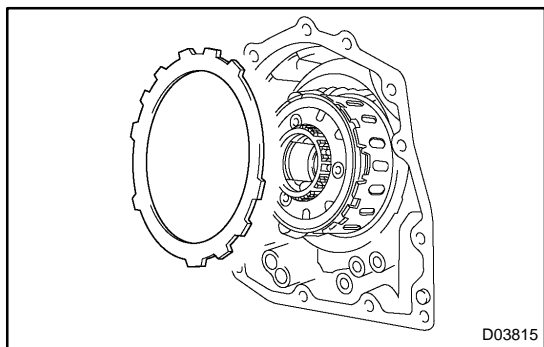
Pack clearance: 1.16 - 1.35 mm (0.0457 - 0.0531 in.)

HINT:

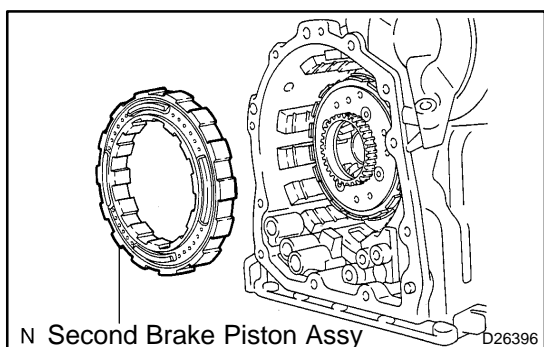
Piston stroke = Dimension A - Flange thickness

Flange thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	1.8 (0.071)	5	2.2 (0.087)
2	1.9 (0.075)	6	2.3 (0.091)
3	2.0 (0.079)	7	2.4 (0.094)
4	2.1 (0.083)	8	2.5 (0.098)

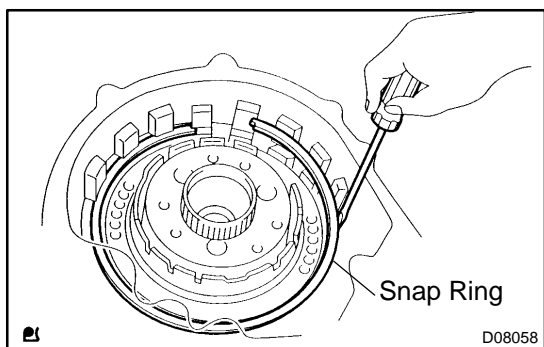


(c) Install the flange.



102. INSTALL SECOND BRAKE PISTON ASSY

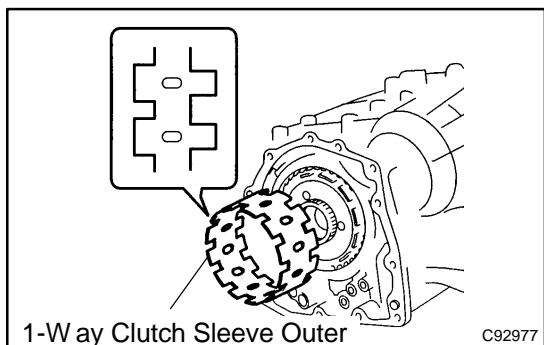
(a) Install the second brake piston assy to the transaxle case.



(b) Install the snap ring and measure the inside diameter.
Inside diameter: More than 167 mm (6.57 in.)

NOTICE:

- Because the taper snap ring has the positioning direction, check it when installing.
- When the diameter does not meet the specified value, replace the snap ring with new one.
- After assembling, confirm that there is no clearance between the second brake cylinder and the fitting surface of the cylinder in the transaxle case.

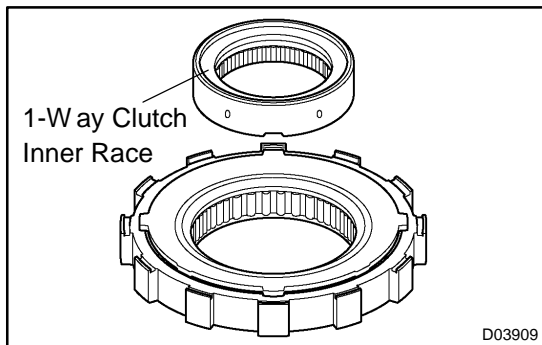


103. INSTALL 1WAY CLUTCH SLEEVE OUTER

(a) Install the 1-way clutch sleeve outer to the 2nd brake cylinder assy.

NOTICE:

Check the positioning direction of the outer sleeve.

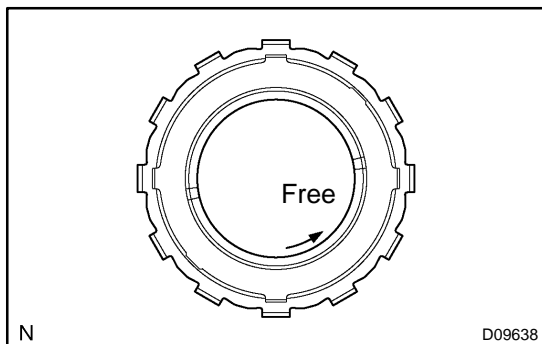


104. INSTALL 1 WAY CLUTCH ASSY

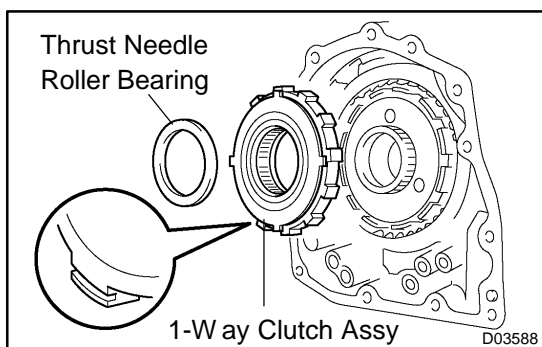
(a) Install the 1-way clutch inner race to the 1-way clutch.

NOTICE:

- Check the direction of the inner race.
- Confirm that the discrimination mark can be seen by the worker.



(b) Check the rotating direction of 1-way clutch for the lock or free operation, as shown in the illustration.



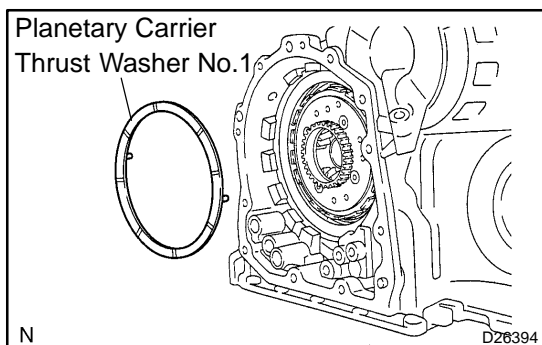
(c) Install the 1-way clutch and thrust needle roller bearing to the 1-way clutch sleeve outer.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	53.6 (2.110)	69.4 (2.732)

NOTICE:

Install the thrust bearing properly so that no-colored race will be visible.

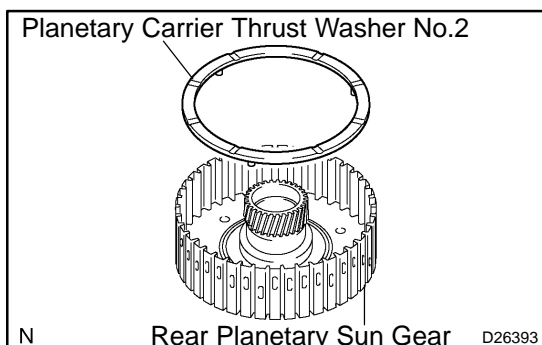


105. INSTALL PLANETARY CARRIER THRUST WASHER NO.1

(a) Coat the planetary carrier thrust washer No. 1 with yellow petrolatum, install it onto the planetary sun gear assy.

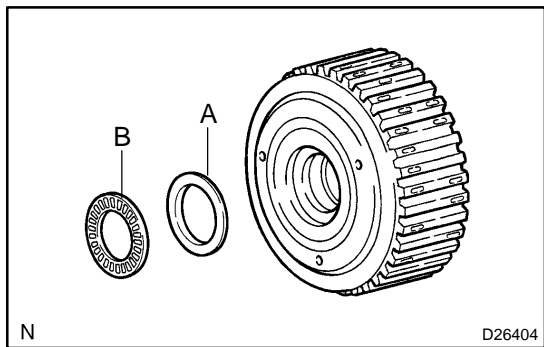
NOTICE:

After assembling, confirm that the projection should be fixed surely in the hole of the planetary sun gear assembly.



106. INSTALL REAR PLANETARY SUN GEAR ASSY

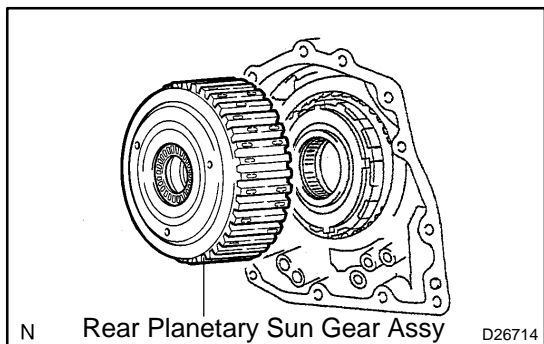
(a) Coat the planetary carrier thrust washer No. 2 with yellow petrolatum, install it onto the rear planetary sun gear.



- (b) Coat the bearing with yellow petrolatum, install it onto the rear planetary sun gear.

Bearing diameter: mm (in.)

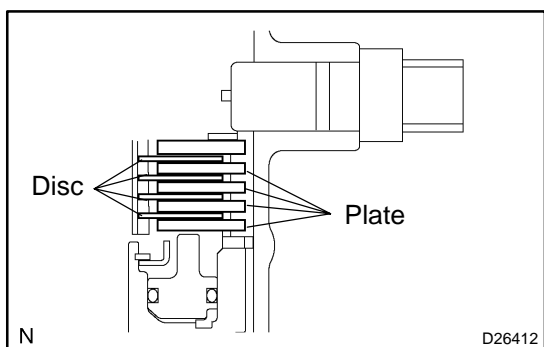
	Inside	Outside
Race, A	33.0 (1.299)	45.4 (1.787)
Bearing, B	31.85 (1.254)	45.2 (1.78)



- (c) Install the rear planetary sun gear assy to the rear planetary gear.

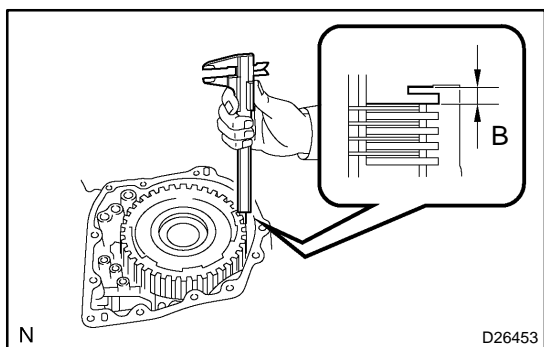
NOTICE:

Installing the rear planetary sun gear assembly, confirm that the B1 discs engage.



107. INSTALL 2ND BRAKE CLUTCH DISC

- (a) Coat the 4 discs with ATF.
 (b) Install the 4 discs and 4 plates to the transaxle case.
 (c) Temporarily install the snap ring.



108. INSPECT PACK CLEARANCE OF SECOND BRAKE

- (a) Using a vernier calipers, measure the distance between the disc surface and snap ring surface (Dimension B).
 (b) Select an appropriate flange so that the pack clearance will meet the specified value.

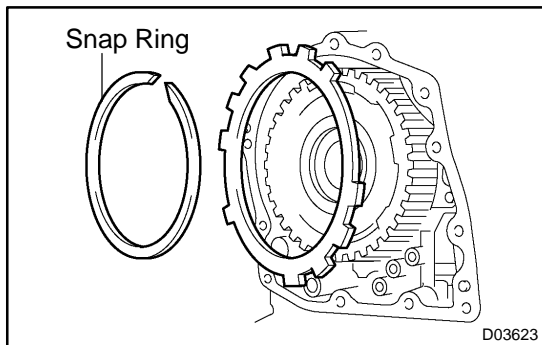
Pack clearance: 0.62 - 0.91 mm (0.0244 - 0.0358 in.)

HINT:

Piston stroke = Dimension B - Flange thickness - Snap ring thickness 1.6 mm (0.063 in.)

Flange thickness: mm (in.)

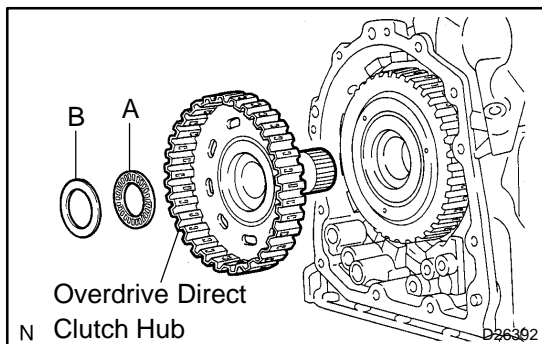
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	5	3.4 (0.134)
2	3.1 (0.122)	6	3.5 (0.138)
3	3.2 (0.126)	7	3.6 (0.142)
4	3.3 (0.130)	8	-



- (c) Temporarily remove the snap ring, attach the selected flange and restore the snap ring.

NOTICE:

Secure the snap ring so that its gap is visible through the groove of the transaxle case.



109. INSTALL OVERDREVE DIRECT CLUTCH HUB SUB-ASSY

- (a) Install the direct clutch hub to the planetary gear assy.

NOTICE:

Be careful not to damage the bush inside of the overdrive clutch hub during instaling.

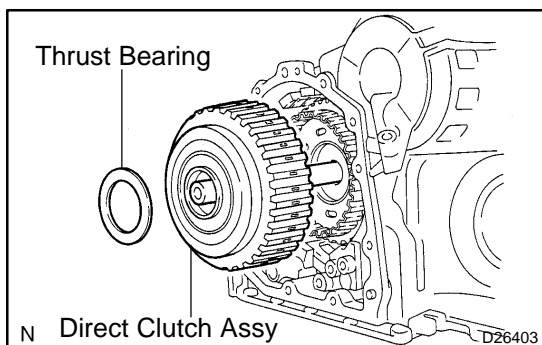
- (b) Coat the thrust bearing with ATF.
 (c) Install the bearing race and the thrust bearing to the direct clutch hub.

NOTICE:

Installing the bearing, hold the part on the side of the overdrive clutch hub.

Bearing and race diameter: mm (in.)

	Inside	Outside
Bearing, A	24.7 (0.972)	39.5 (1.555)
Race, B	23.6 (0.929)	38.0 (1.496)

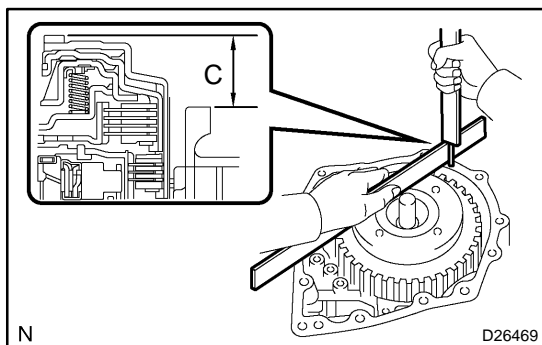


110. INSTALL DIRECT CLUTCH ASSY

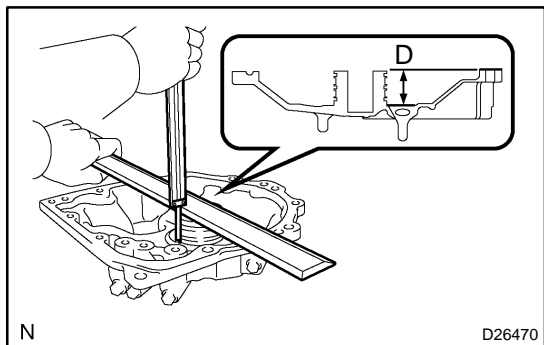
- (a) Coat the thrust bearing with ATF.
 (b) Install the direct clutch assy and thrust bearing to the rear planetary sun gear assy.

NOTICE:

The disc in the direct clutch should completely match with the hub attached outside the rear planetary sun gear. Otherwise, the rear cover can not be installed.



- (c) Clean the connecter part of the transaxle case and the rear cover.
 (d) As shown in the illustration, place a straight edge on the direct clutch drum and measure the distance between transaxle case and the straight edge using vernier calipers (Dimension C).



- (e) Using vernier calipers and a simple straightedge, measure the position shown in the illustration.
- (f) Calculate the end play value using the following formula. Select a thrust bearing which satisfies the end play value and install it.

End play: 0.244 - 0.901 mm (0.0096 - 0.0355 in.)

NOTICE:

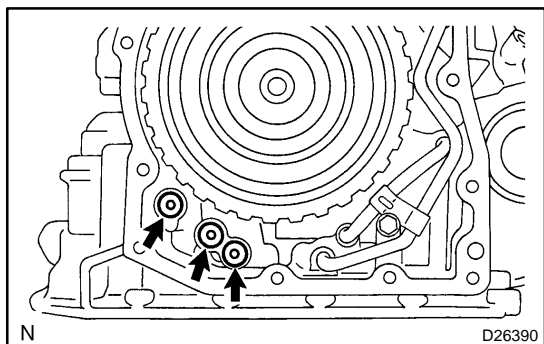
Make sure that the no colored race side is facing the direct clutch assy.

HINT:

End play = Dimension D - Dimension C

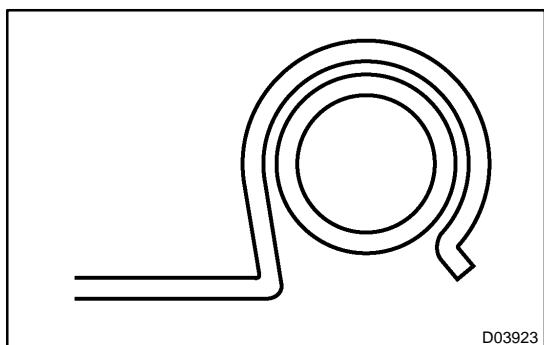
Bearing thickness and diameter : mm (in.)

Thickness	Inside	Outside
3.6 (0.1417)	56.3 (2.217)	75.7 (2.980)
3.8 (0.1496)	56.3 (2.217)	75.7 (2.980)



111. INSTALL GOVERNOR APPLY GASKET NO.1

- (a) Install the 3 new governor apply gaskets No. 1 to the transaxle case.



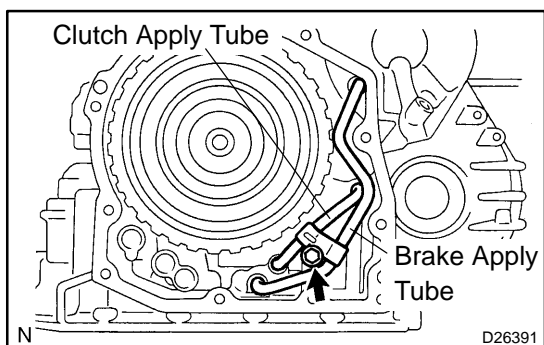
112. INSTALL BRAKE APPLY TUBE

- (a) Install the clamp to the brake apply tube.

NOTICE:

Make sure to install the clamp to the apply tube before installing the apply tube to the transaxle case. This prevents the apply tube from being deformed or damaged.

- (b) Install the clutch apply tube.

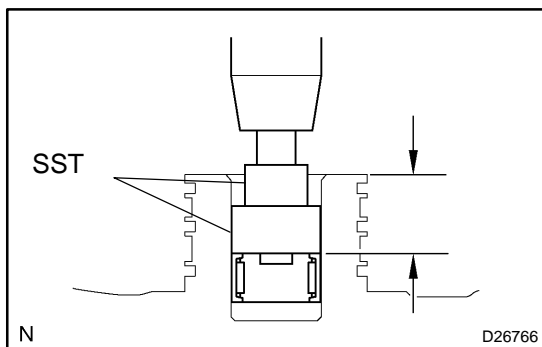


- (c) Install the brake apply tube and a bolt to the transaxle case.

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

NOTICE:

Each pipe should be securely inserted until it reaches the stopper.



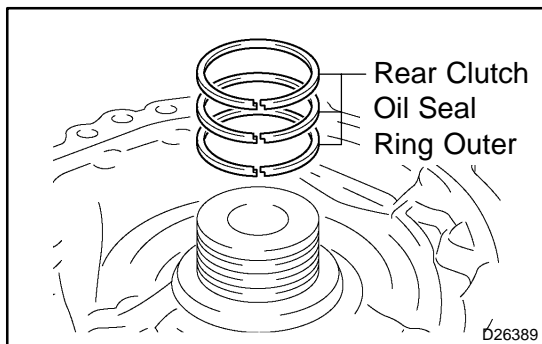
113. INSTALL NEEDLE ROLLER BEARING

- (a) Using SST and a press, install the needle roller bearing to the transaxle rear cover.
SST 09950-60010 (09951-00230, 09952-06010)
Press fit depth: 20.55 - 21.25 mm (0.8091 - 0.8366 in.)

NOTICE:

- Face the inscribed mark side of the bearing race up.
- Repeat the press fit until the specified value is obtained.

- (b) Coat a needle roller bearing with ATF.

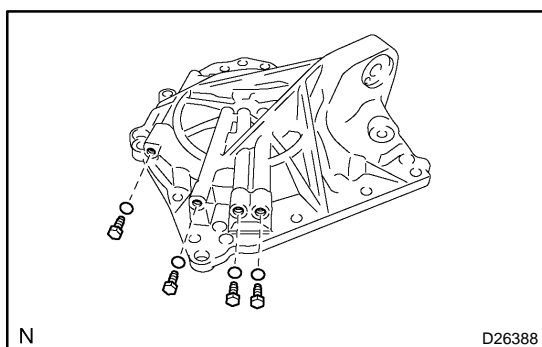


114. INSTALL REAR CLUTCH OIL SEAL RING OUTER

- (a) Coat the 3 new rear clutch oil seal rings with ATF, install them to the transaxle rear cover.

NOTICE:

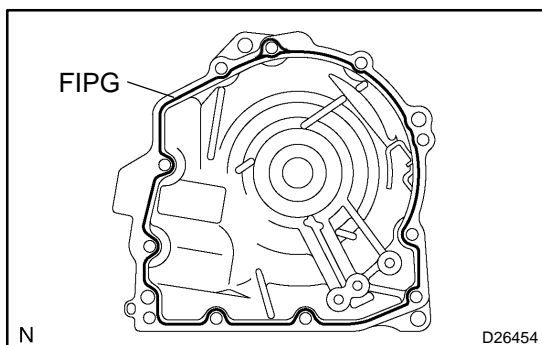
The snap ring should be fixed certainly in the groove of the drum.



115. INSTALL TRANSAXLE CASE NO.1 PLUG

- (a) Install the 4 new O-ring to the 4 transaxle case No. 1 plugs.
- (b) Install the 4 transaxle case No. 1 plugs to the transaxle rear cover.

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



116. INSTALL TRANSAXLE REAR COVER SUB-ASSY

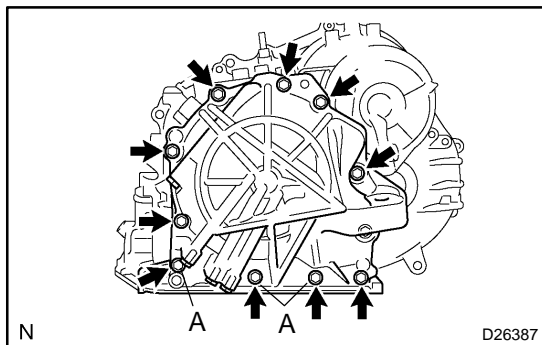
- (a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or the transaxle case.
- (b) Apply FIPG to the cover.

FIPG:

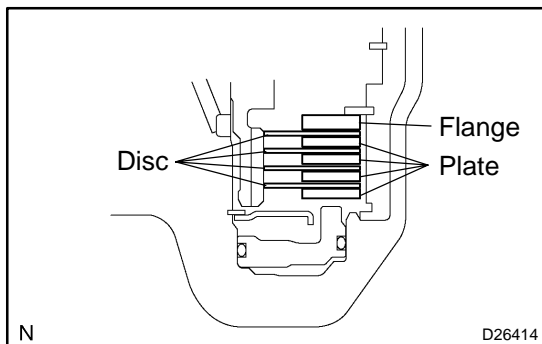
Part No. 08826-00090, THREE BOND 1281 or equivalent.

NOTICE:

Concerning about the amount of the FIPG application, the amount should be controlled to form even sealing film on entire flange surface and have slight protrusion of the FIPG all around of the connecting area. The FIPG shall be applied continuously on the flange. (Reference value of the section diameter: $\phi 1.2$)



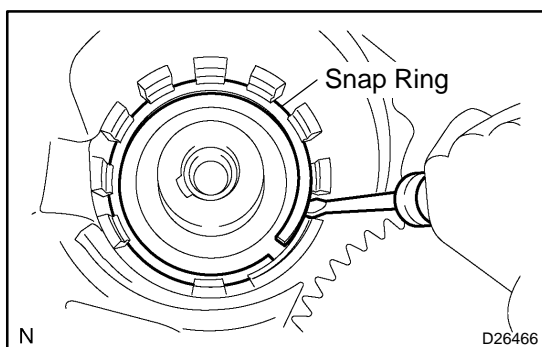
- (c) Apply liquid sealer to the "A" bolt threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent.
- (d) Install the 11 bolts.
Torque:
Bolt A: 19.0 N·m (190 kgf·cm, 14 ft·lbf)
Other bolt: 25.0 N·m (250 kgf·cm, 18 ft·lbf)



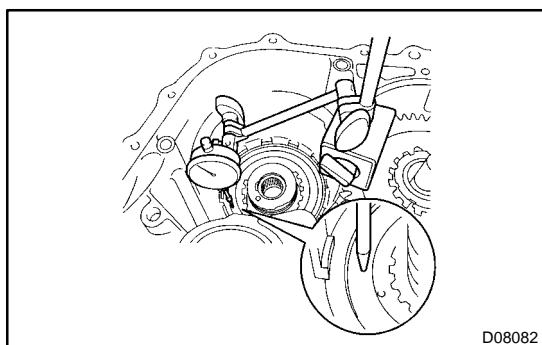
117. INSTALL UNDERDRIVE CLUTCH DISC NO.2

- (a) Coat the 4 discs with ATF.
- (b) Install the 4 discs, 4 plates and flange to the transaxle case.

NOTICE:
Be careful about the order of discs, plate and flange assembly.



- (c) Using a screwdriver, install the snap ring.
NOTICE:
The snap ring should be fixed certainly in the groove of the drum.



118. INSPECT PACK CLEARANCE OF UNDERDRIVE BRAKE

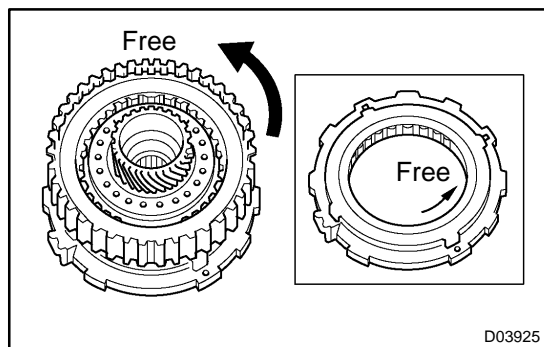
- (a) Using a dial indicator, measure the underdrive brake pack clearance while applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).
Pack clearance: 1.81 - 2.20 mm (0.0713 - 0.0866 in.)

HINT:
 Select an appropriate flange from the table below so that it will meet the specified value.

Flange thickness: mm (in.)

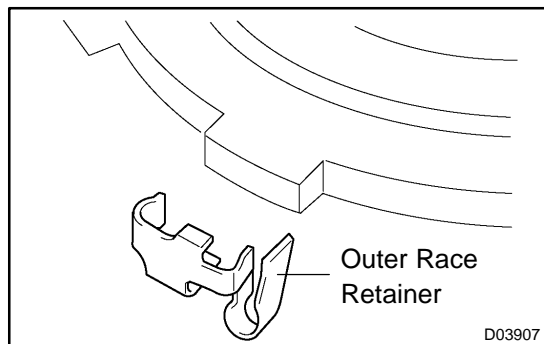
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	4	3.1 (0.122)
2	3.2 (0.126)	5	3.3 (0.130)
3	3.4 (0.134)	-	-

- (b) Temporarily remove the snap ring and attach to the flange.
- (c) Restore the snap ring.



119. INSPECT UNDERDRIVE 1 WAY CLUTCH ASSY

- (a) Install the underdrive clutch assy to the 1-way clutch.
- (b) Rotate the underdrive clutch assy to check the rotating direction for the lock or free operation.

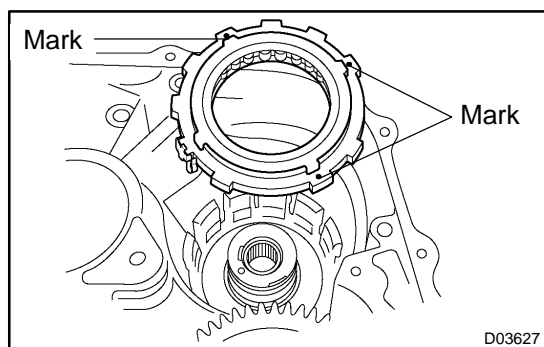


120. INSTALL UNDERDRIVE 1 WAY CLUTCH ASSY

- (a) Install the outer race retainer to the 1-way clutch.

NOTICE:

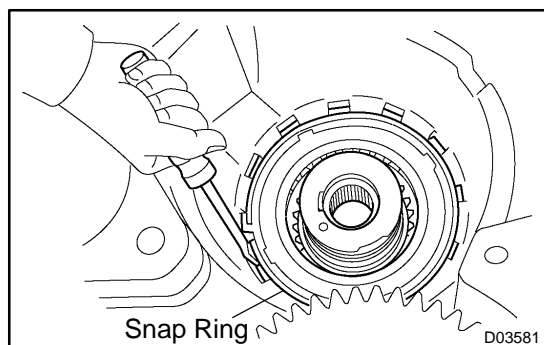
Fix the outer race retainer to the external tooth of the one way clutch surely.



- (b) Install the 1-way clutch to the transaxle case.

NOTICE:

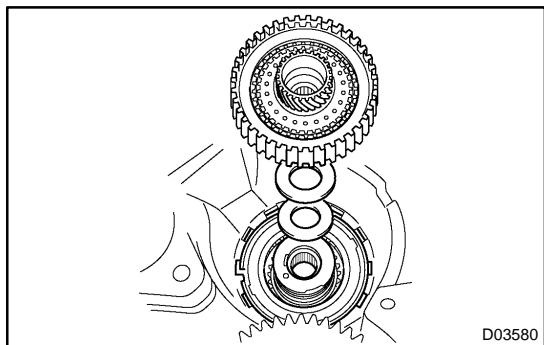
Make sure that the mark on the 1-way clutch outer race is visible.



- (c) Using a screwdriver, install the snap ring to the transaxle case.

NOTICE:

The snap ring should be fixed certainly in the groove of the transaxle case as the gap exists except in the lock of teeth.



121. INSTALL UNDERDRIVE CLUTCH ASSY

- (a) Coat the bearing and bearing race with petroleum jelly, install them onto the underdrive clutch.

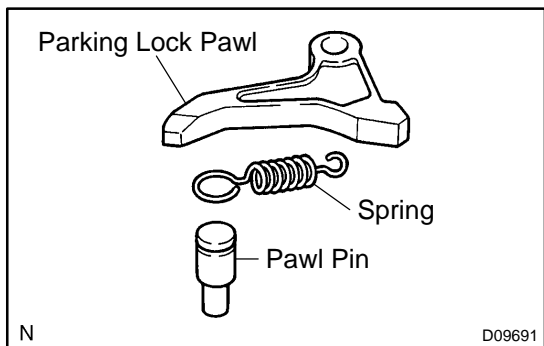
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	37.73 (1.4854)	58.0 (2.2835)
Race	29.9 (1.1772)	55.5 (2.185)

- (b) Install the underdrive clutch assy to the transaxle case.

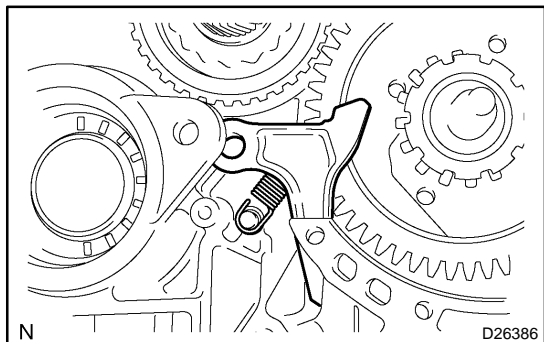
NOTICE:

Installing the underdrive clutch drum sub-assy, be sure not to damage the oil seal ring.

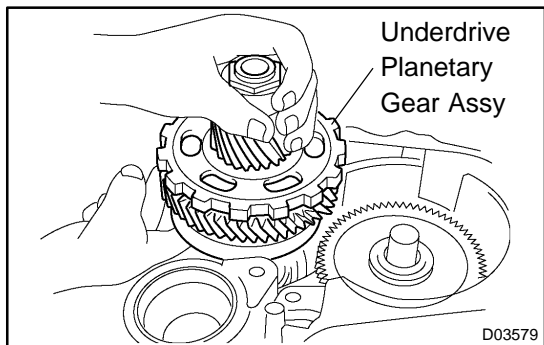


122. INSTALL PARKING LOCK PAWL

- (a) Install the pawl pin and spring to the parking lock pawl.



- (b) Temporarily install the parking lock pawl, shaft and spring to the transaxle case, as shown in the illustration.

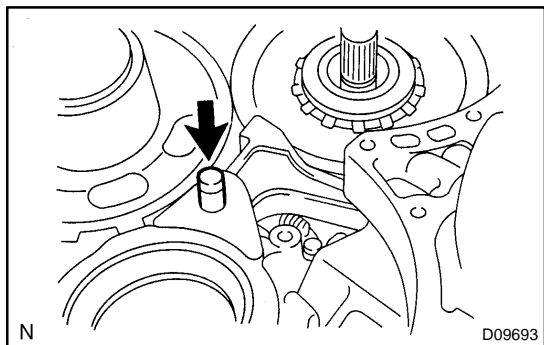


123. INSTALL UNDERDRIVE PLANETARY GEAR ASSY

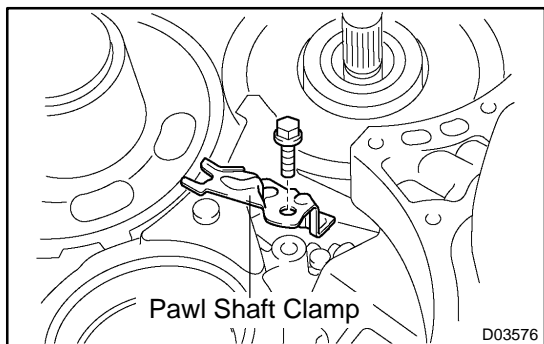
- (a) Install the underdrive planetary gear assy to the transaxle case.

NOTICE:

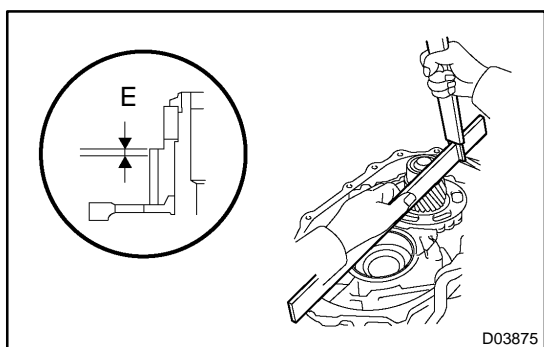
Engage all the discs of underdrive clutch and hub splines of the underdrive planetary gear assy firmly and assemble them securely.



(b) Install the parking lock pawl shaft.



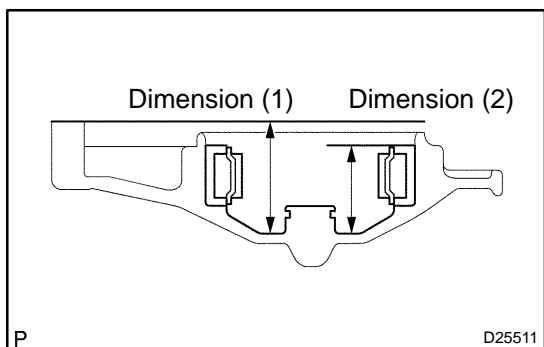
(c) Install the pawl shaft clamp with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in·lbf)



(d) Using a straight edge and vernier calipers as shown in the illustration, measure the gap between the top of the differential drive pinion in the underdrive planetary gear and contact surface of the transaxle case and housing (Dimension E).

NOTICE:

Note down the dimension E as it is necessary for the following process.



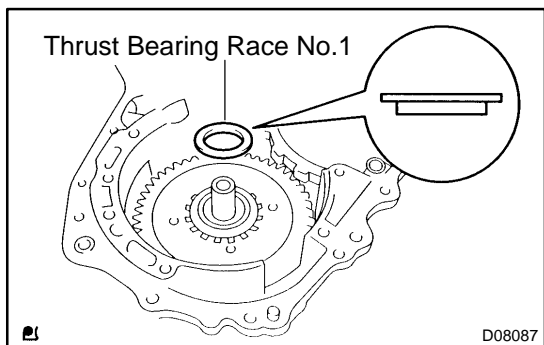
(e) As shown in the illustration, measure the 2 places of the transaxle housing, calculate the dimension F using the formula.

NOTICE:

Note down the dimension F as it is necessary for the following process.

HINT:

Dimension F = Dimension (1) - Dimension (2)

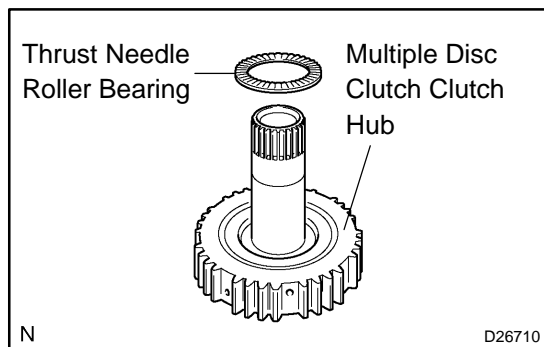


124. INSTALL MULTIPLE DISC CLUTCH CLUTCH HUB

(a) Install the thrust bearing race No.1 to the transaxle case while checking its direction.

Bearing race diameter: mm (in.)

	Inside	Outside
Bearing race	39.5 (1.555)	45.8 (1.803)

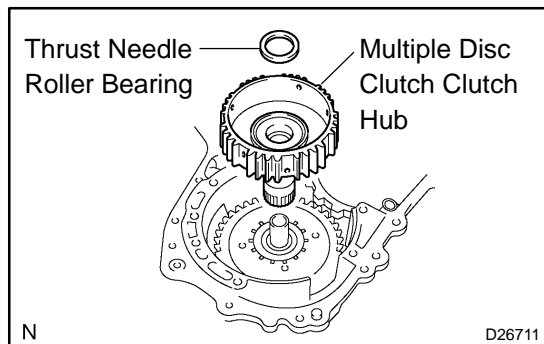


- (b) Coat the thrust needle roller bearing and race with yellow petrolatum, install them onto the multiple disc clutch hub.

Thrust bearing and race diameter: mm (in.)

	Inside	Outside
Thrust Bearing	36.4 (1.433)	52.2 (2.055)

- (c) Coat the needle roller bearing with ATF.

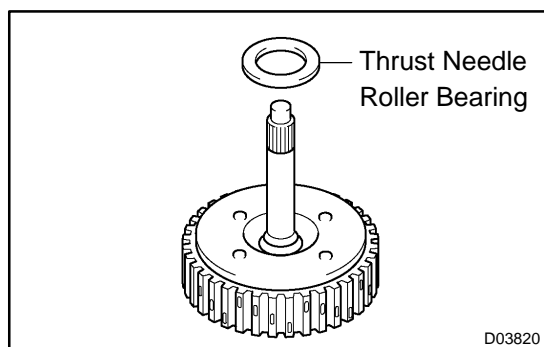


- (d) Install the needle roller bearing to the multiple clutch hub.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	23.6 (0.929)	44 (1.732)

- (e) Install the multiple clutch hub to the transaxle case.



125. INSTALL FORWARD CLUTCH ASSY

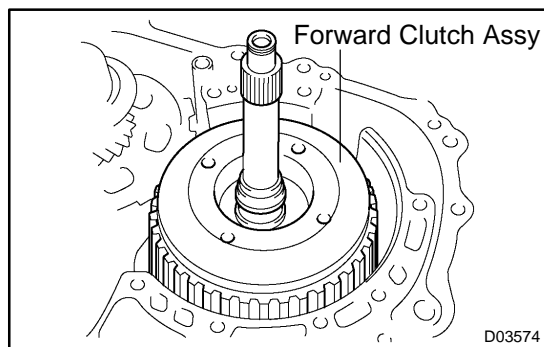
- (a) Coat the thrust needle roller bearing with ATF.
 (b) Install the thrust needle roller bearing to the forward clutch.

Thrust bearing diameter: mm (in.)

	Inside	Outside
Thrust Bearing	33.58 (1.3220)	51.9 (2.043)

NOTICE:

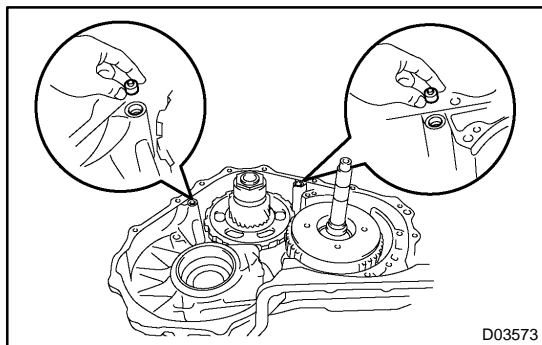
Install the thrust bearing properly so that the no colored race or blue ink jet race will be visible.



- (c) Install the forward clutch to the forward clutch assy.

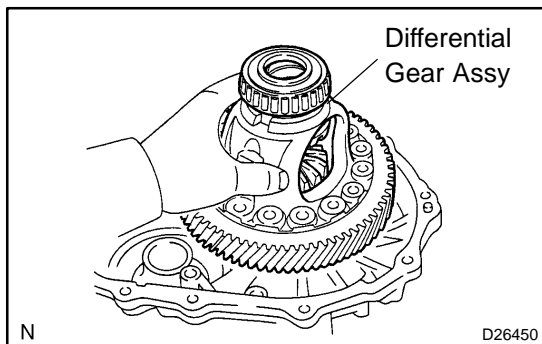
NOTICE:

- Align the splines of all discs in the forward clutch with those of multiple clutch hub to assemble them securely.
- Be careful not to damage the bush inside of the forward clutch hub during installing.



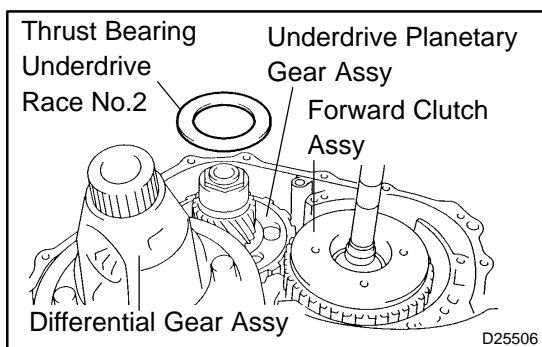
126. INSTALL OVERDRIVE BRAKE GASKET

- (a) Install the 2 new overdrive brake gaskets.



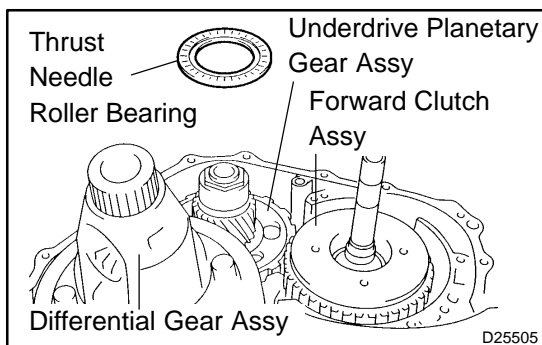
127. INSTALL DIFFERENTIAL GEAR ASSEMBLY

- (a) Install the differential gear assy to the transaxle case.



128. INSTALL THRUST BEARING UNDERDRIVE RACE NO.2

- (a) Install the thrust bearing underdrive race No.2 to the underdrive planetary gear assy.



129. INSTALL THRUST NEEDLE ROLLER BEARING

- (a) Coat the thrust needle roller bearing with ATF.
- (b) Calculate the end play value using the following formula and values of Dimension E and F that were measured when installing cylindrical roller bearing and underdrive planetary gear. Select an appropriate underdrive planetary gear thrust bearing race No. 2 which satisfies the specified end play value, and install it.

End play: 0.498 - 0.993 mm (0.01961 - 0.03909 in.)

HINT:

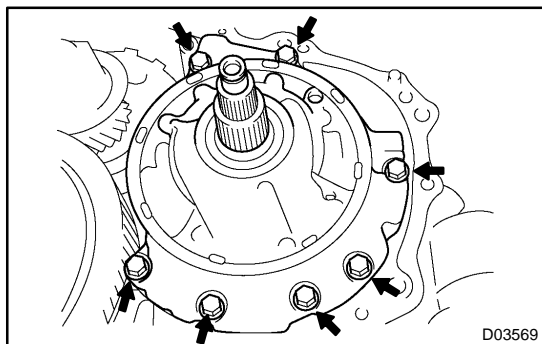
End play = Dimension F - Dimension E - thrust bearing thickness 2.5 mm (0.0984 in.) - underdrive thrust bearing race No. 2 thickness.

Race thickness: mm (in.)

F - E	Thickness
Less than 7.72 (0.3039)	3.5 (0.138)
7.72 (0.3039)	3.8 (0.150)

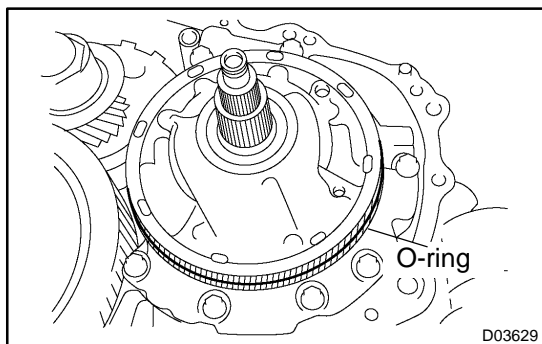
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	57.2 (2.252)	84.96 (3.345)
Bearing race	56.4 (2.22)	83 (3.268)



130. INSTALL OIL PUMP ASSY

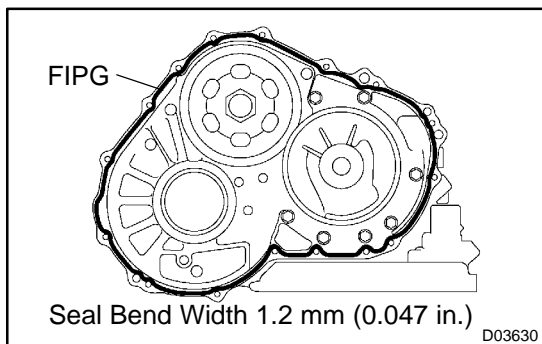
- (a) Install the oil pump to the transaxle case with the 7 bolts.
Torque: 22.0 N·m (226 kgf·cm, 16 ft·lbf)



- (b) Coat the O-ring of oil pump with ATF.

NOTICE:

Confirm the input shaft rotates smoothly with the manual operation after assembling the oil pump.

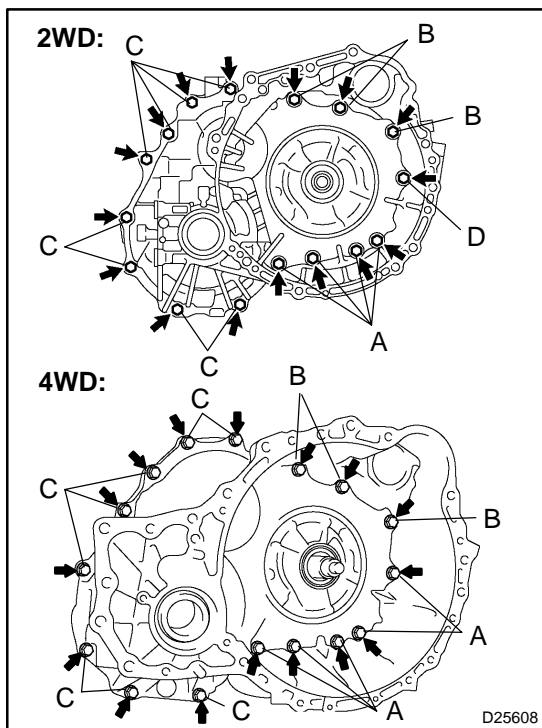


131. INSTALL TRANSAXLE HOUSING

- (a) Remove any parking material and be careful not to get oil on the contacting surface of the transaxle case or transaxle housing.
- (b) Apply FIPG to the transaxle case.

FIPG:

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



(c) Install the transaxle housing and 16 bolts to the transaxle case.

Torque:

- Bolt A: 25 N·m (255 kgf·cm, 18 ft·lbf)**
- Bolt B: 33 N·m (337 kgf·cm, 24 ft·lbf)**
- Bolt C: 29 N·m (295 kgf·cm, 21 ft·lbf)**
- Bolt D: 22 N·m (226 kgf·cm, 16.0 ft·lbf)**

HINT:

Apply seal packing or equivalent to the bolt A and D.

Seal packing:

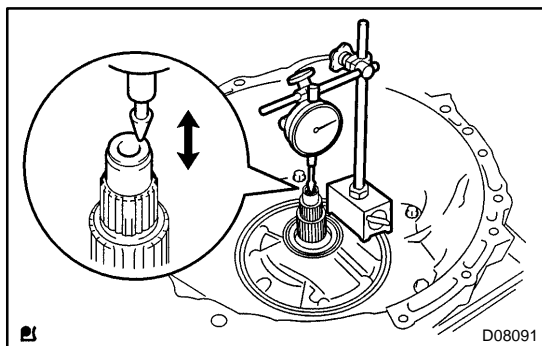
THREE BOND 2403 or equivalent

Bolt length:

- Bolt A: 50 mm (1.969 in.)**
- Bolt B: 50 mm (1.969 in.)**
- Bolt C: 42 mm (1.654 in.)**
- Bolt D: 72 mm (2.835 in.)**

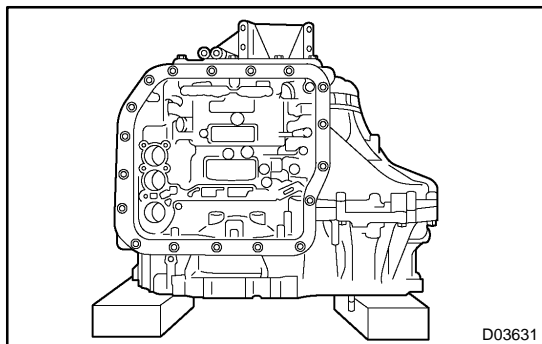
NOTICE:

Because the bolt A is a seal bolt, apply the seal packing to new bolts and tighten them within 10 minutes after application.



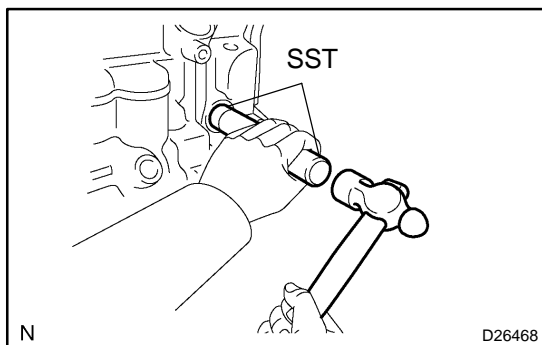
132. INSPECT INPUT SHAFT ENDPLAY

- (a) Using a dial indicator, measure the input shaft end play.
End play: 0.262 - 1.249 mm (0.0100 - 0.0494 in.)



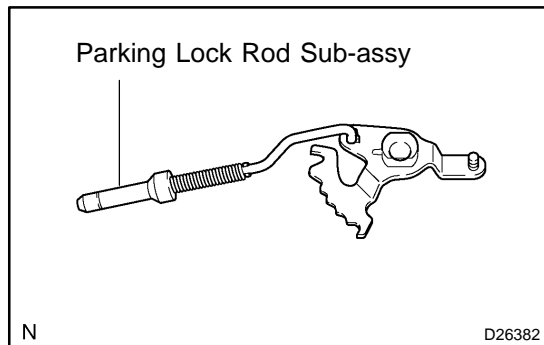
133. FIX AUTOMATIC TRANSAXLE ASSY

- (a) Fix the transaxle assy.



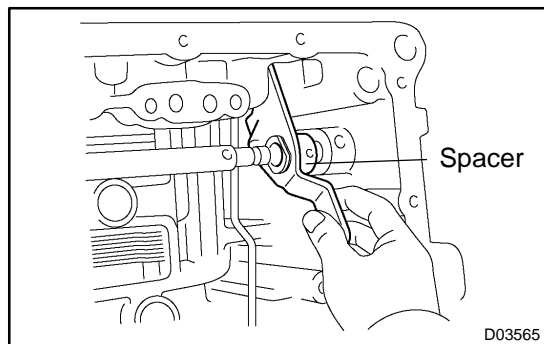
134. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL

- (a) Coat a new oil seal with MP grease.
 (b) Install the oil seal to the transaxle case.
SST 09950-60010 (09951-00230), 09950-70010 (09951-07100)
Oil seal drive in depth: 0 ± 0.5 mm (0 ± 0.0197 in.)



135. INSTALL PARKING LOCK ROD SUB-ASSY

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

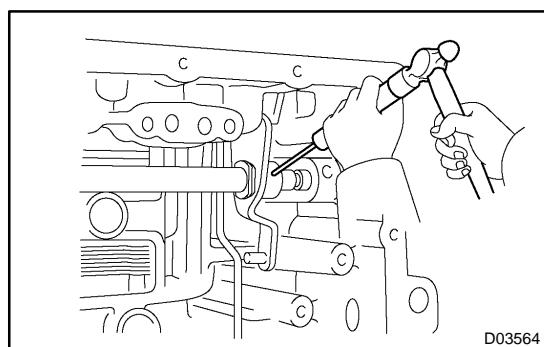


136. INSTALL MANUAL VALVE LEVER SUB-ASSY

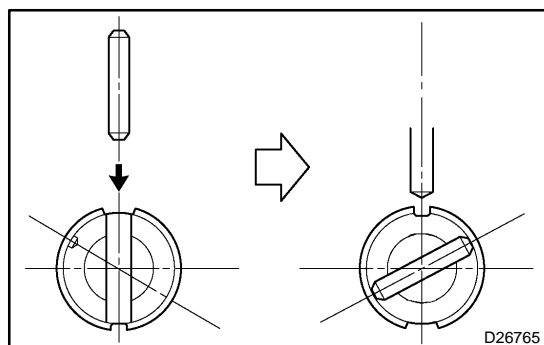
- (a) Install a new spacer and manual valve lever shaft to the transaxle case.

NOTICE:

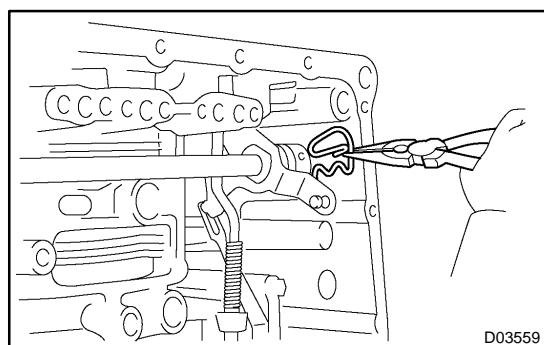
Do not damage on the oil seal during assembling the shaft to the transaxle case.



- (b) Using a pin punch and hammer, drive in a new pin.



- (c) Turn the spacer and the lever shaft to align the small hole for locating the staking position in the spacer with the staking position mark on the lever shaft.
- (d) Using a pin punch, stake the spacer through the small hole.
- (e) Check that the spacer does not turn.

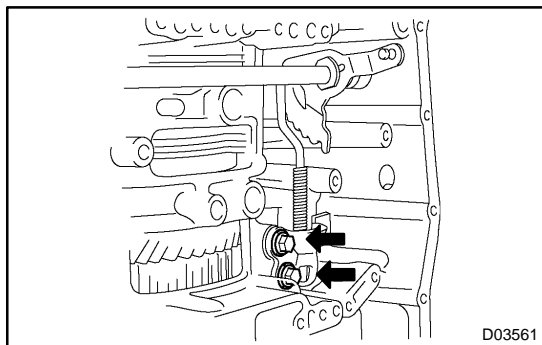


137. INSTALL MANUAL VALVE LEVER SHAFT RETAINER SPRING

- (a) Using needle-nose pliers, install the retainer spring.

NOTICE:

Hang the spring on the shaft certainly.



138. INSTALL PARKING LOCK PAWL BRACKET

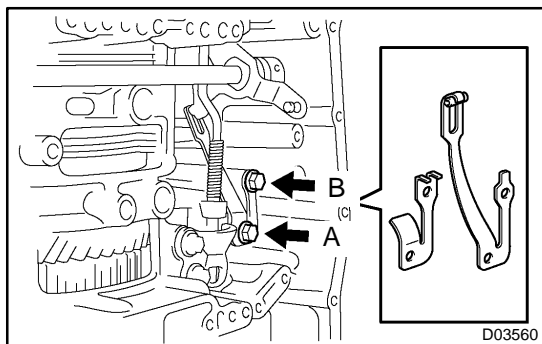
(a) Install the parking lock pawl bracket with the 2 bolts.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

Bolt length: 25 mm (0.984 in.)

NOTICE:

Be sure the parking rod is placed between the parking pawl and the guide of the parking bracket when the parking bracket is assembled.



139. INSTALL MANUAL DETENT SPRING SUB-ASSY

(a) Install the manual detent spring with the 2 bolts.

NOTICE:

Make sure to install the manual detent spring and cover in this order.

HINT:

Tighten them in the order, A and B.

Torque:

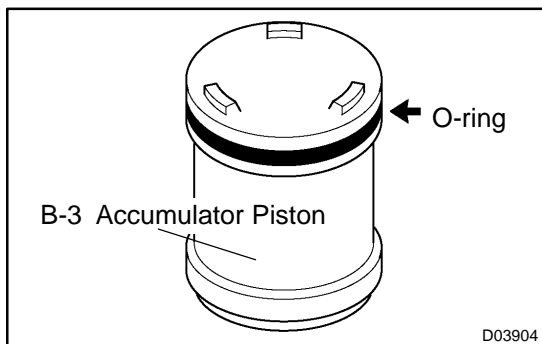
Bolt A: 20 N·m (205 kgf·cm, 15 ft·lbf)

Bolt B: 12 N·m (120 kgf·cm, 9 ft·lbf)

Bolt length:

Bolt A: 27 mm (1.063 in.)

Bolt B: 16 mm (0.630 in.)

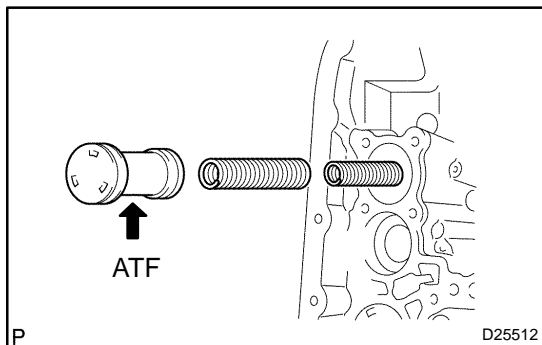


140. INSTALL B-3 ACCUMULATOR PISTON

(a) Coat a new O-ring with ATF, install it to the B-3 accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



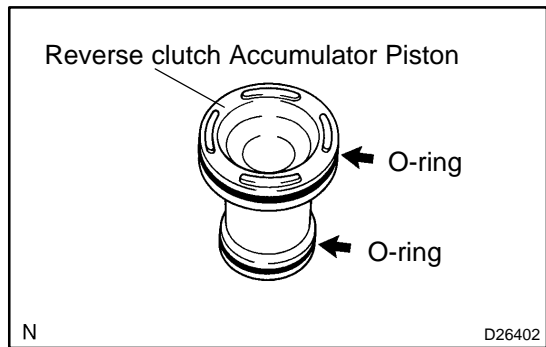
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

Free length Outer diameter mm (in.)	Color
Inner 62.00 (2.4409) / 15.50 (0.610)	Purple
Outer 74.23 (2.9224) / 21.70 (0.854)	Purple

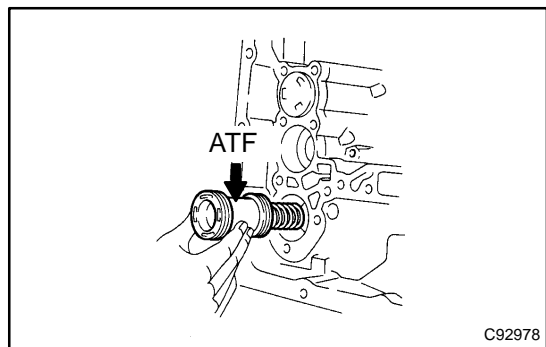


141. INSTALL REVERSE CLUTCH ACCUMULATOR PISTON

(a) Coat the 2 new O-rings with ATF, install them to the reverse accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



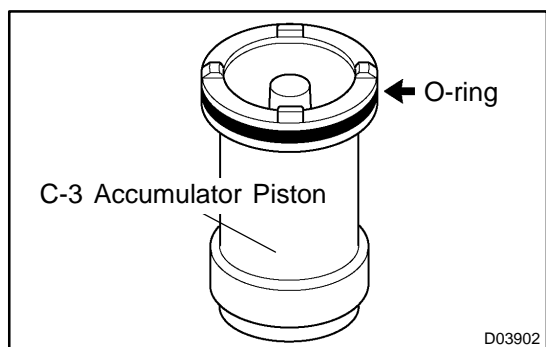
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

Free length Outer diameter mm (in.)	Color
60.96 (2.3999) / 14.10 (0.555)	Yellow

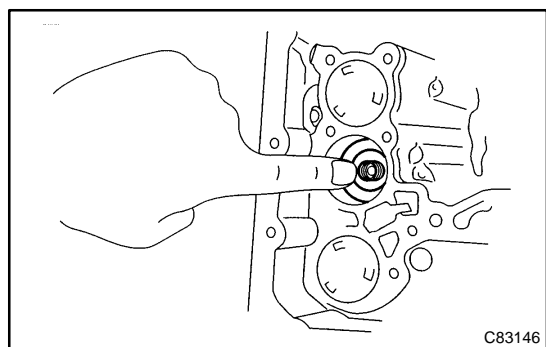


142. INSTALL C-3 ACCUMULATOR PISTON

(a) Coat a new O-ring with ATF, install it to the C-3 accumulator piston.

NOTICE:

Install the O-ring to the accumulator piston and the accumulator sleeve not to have a twist and a protrusion. Moreover, apply enough ATF prior to assembling. Be sure to the installed position.



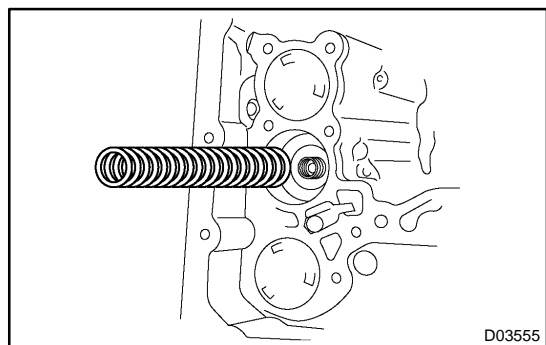
(b) Coat the piston with ATF, install it to the transaxle case.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

Accumulator spring:

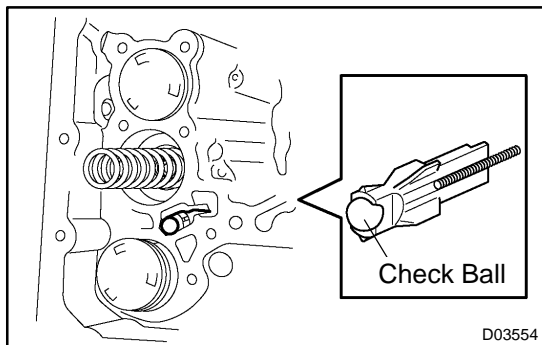
Free length Outer diameter mm (in.)	Color
72.20 (2.8425) / 19.0 (0.748)	Colorless



(c) Install the spring from the C-3 accumulator piston.

NOTICE:

Install the springs to each accumulator piston with checking of the identification color or each spring.

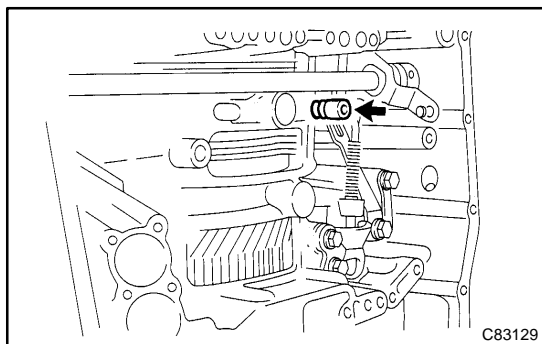


143. INSTALL CHECK BALL BODY

- (a) Coat the check ball body with ATF.
- (b) Install the check ball body and spring.

NOTICE:

Regarding the installation of the spring for the check ball body, be sure to place the spring in the hole in the ball body. Be careful about the parts orientation.

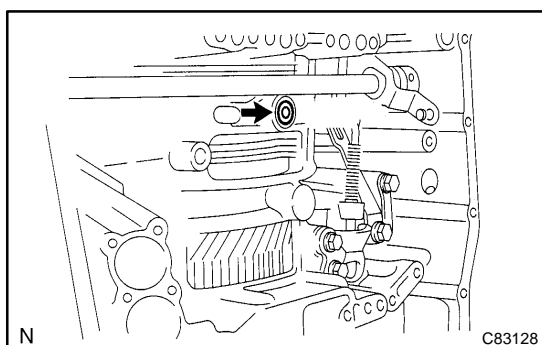


144. INSTALL BRAKE DRUM GASKET

- (a) Coat a new brake drum gasket with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

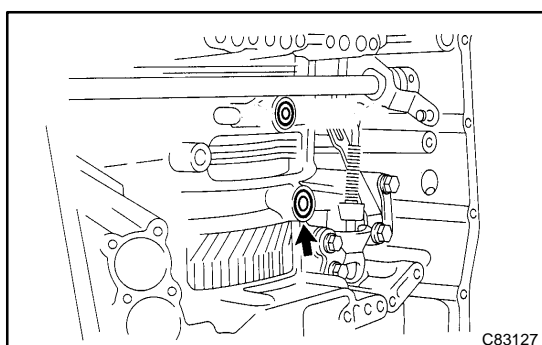


145. INSTALL TRANSAXLE CASE 2ND BRAKE GASKET

- (a) Coat a new transaxle case 2nd brake gasket with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

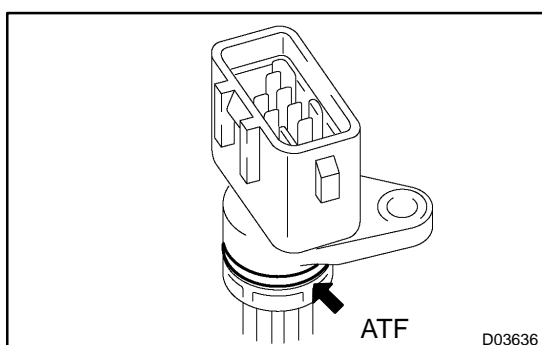


146. INSTALL GOVERNOR APPLY GASKET NO.1

- (a) Coat a new governor apply gasket No. 1 with ATF, install it to the transaxle case.

NOTICE:

Be sure not to damage the lip portion of the transaxle case brake gasket when inserting the gasket to the case. Moreover, apply enough ATF to the gasket prior to assembling. Also, be careful about the parts orientation.

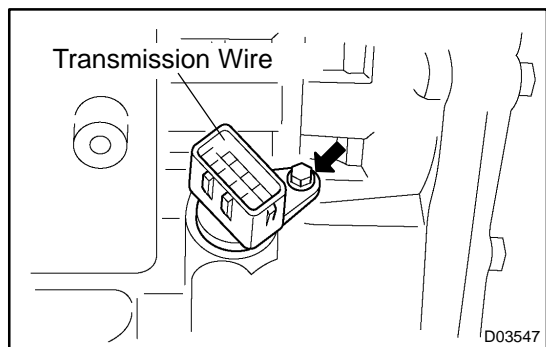


147. INSTALL TRANSMISSION WIRE

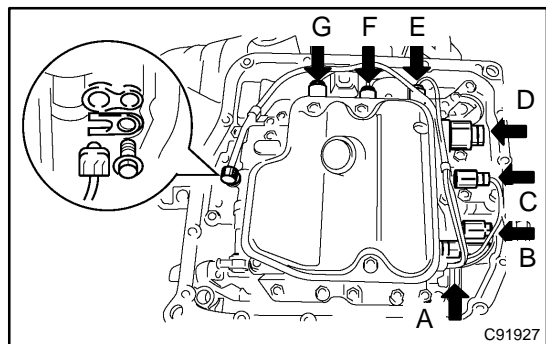
- (a) Coat a new O-ring with ATF, install it to the transmission wire.

NOTICE:

Be careful about the O-ring not to have a twist, a protrusion and a pinching during installing the wire transmission to the transaxle case. Moreover, apply enough ATF to the O-ring prior to assembling.



- (b) Install the transmission wire retaining bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

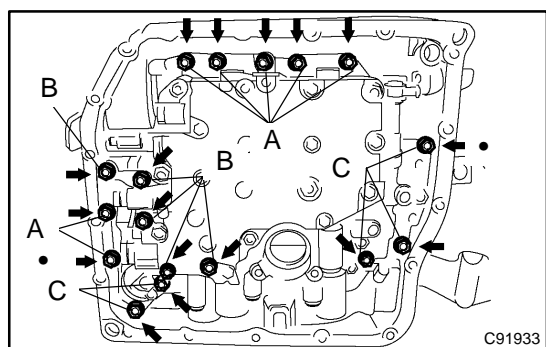


148. CONNECT TRANSMISSION WIRE

- (a) Coat a O-ring of the ATF temperature sensor with ATF.
 (b) Install the ATF temperature sensor, with the lock plate and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in·lbf)
 (c) Connect the 7 solenoid connectors.

NOTICE:

- Connect the connector to A, B, C, D, E, F, G, from shorter one.
- Apply ATF to the bolt.



149. INSTALL TRANSMISSION VALVE BODY ASSY

- (a) Make sure that the manual valve lever position, install the valve body with 17 bolts to the transaxle case.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

Bolt length:

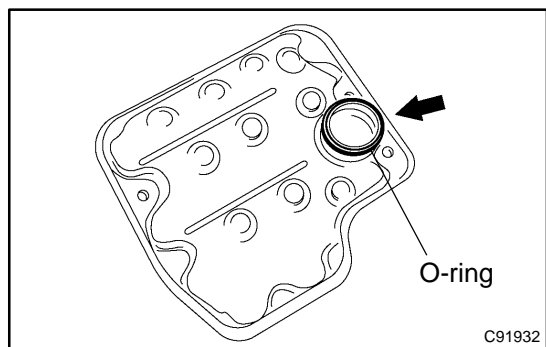
Bolt A: 25 mm (0.984 in.)

Bolt B: 57 mm (2.244 in.)

Bolt C: 41 mm (1.614 in.)

NOTICE:

- Push the valve body against the accumulator piston spring and the check ball body to install it.
- When installing the valve body to the transaxle case, do not hold the solenoids.
- Tighten temporarily those bolts marked by • in the illustration first because they are positioning bolts.

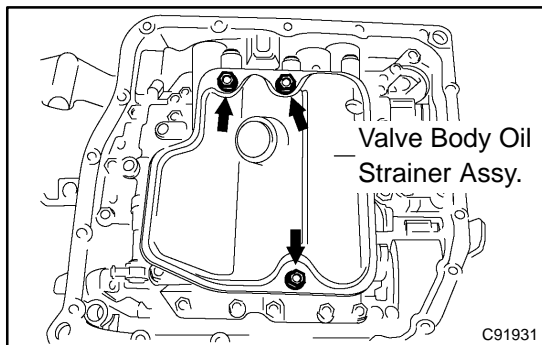


150. INSTALL VALVE BODY OIL STRAINER ASSY

- (a) Coat a new O-ring with ATF, install it to the oil strainer.

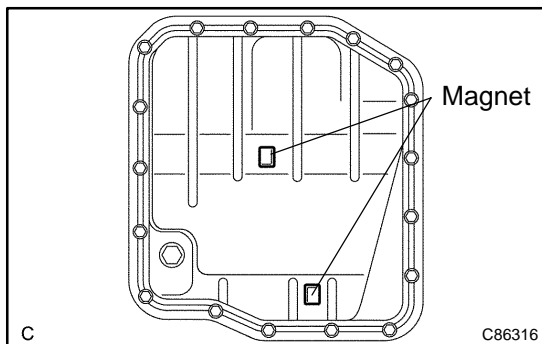
NOTICE:

Assemble the O-ring carefully not to have a twist and a pinching. Moreover, apply enough ATF to the O-ring prior to assembling.



- (b) Install the oil strainer and 3 bolts to the valve body.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

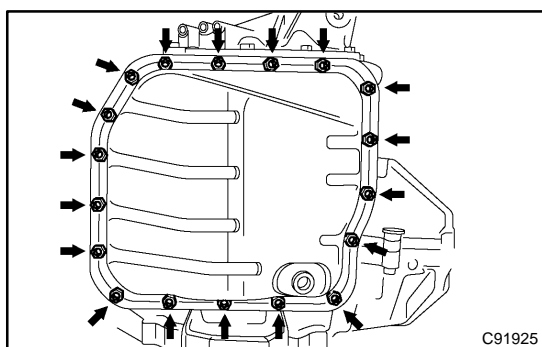
NOTICE:
Apply ATF to the bolts.



151. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSY

- (a) Install the 2 magnets in the oil pan.
 (b) Apply seal packing or equivalent to new 18 bolts.

Seal packing:
THREE BOND 2430 or equivalent

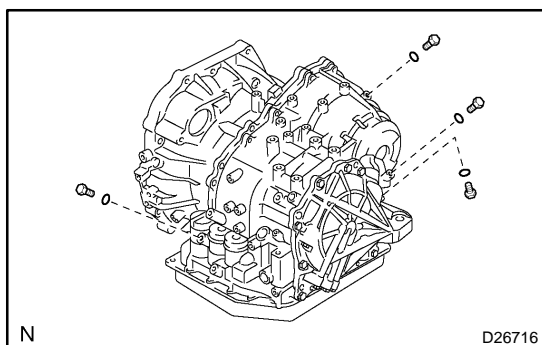


- (c) Install the new oil pan gasket with the 18 bolts to the transaxle case.

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

NOTICE:

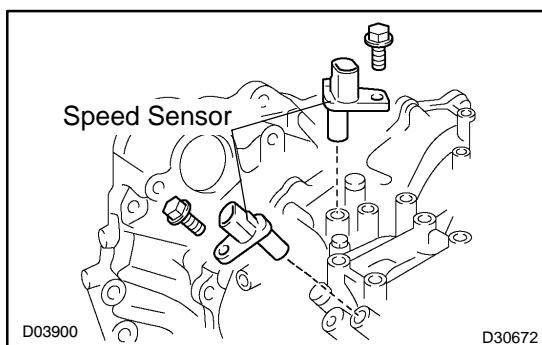
- Because the bolts should be seal bolts, apply seal packing to new bolts and tighten them within 10 minutes after application.
- Remove any oil or grease from the contacting surface of the transaxle case and the oil pan with the gasket completely before the oil pan to the case.



152. INSTALL TRANSAXLE CASE NO.1 PLUG

- (a) Coat the 4 new O-rings with ATF, install them to the 4 transaxle case No. 1 plugs.
 (b) Install the 4 transaxle case No. 1 plugs to the transaxle case.

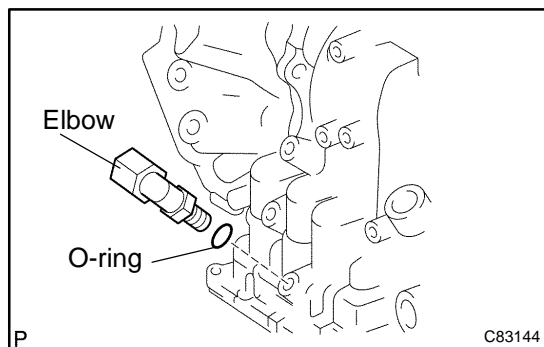
Torque: 7.4 N·m (75 kgf·cm, 65 in·lbf)



153. INSTALL SPEED SENSOR

- (a) Install them to the 2 sensors.
 (b) Install the 2 sensors to the transaxle case with the 2 bolts.

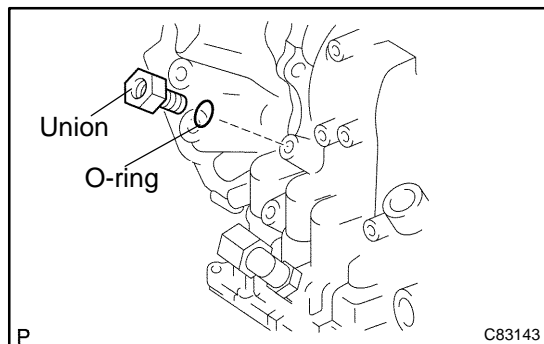
Torque: 11.0 N·m (115 kgf·cm, 8 ft·lbf)



154. INSTALL OIL COOLER TUBE UNION (OUTLET OIL COOLER UNION)

- (a) Coat a new O-ring with ATF, install it to the elbow.
- (b) Install the elbow to the transaxle case.

Torque: 27 N·m (276 kgf·cm, 20 ft·lbf)



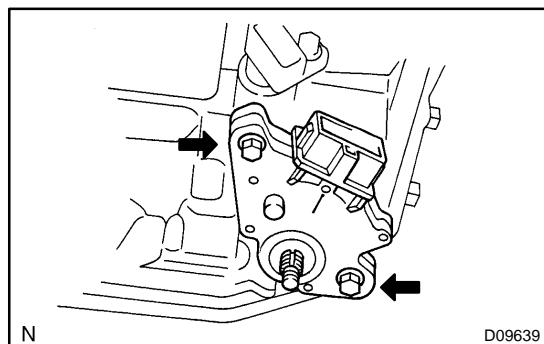
155. INSTALL OIL COOLER TUBE UNION (INLET OIL COOLER UNION)

- (a) Coat a new O-ring with ATF, install it to the union.
- (b) Install the union to the transaxle case.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

156. INSTALL BREATHER PLUG HOSE

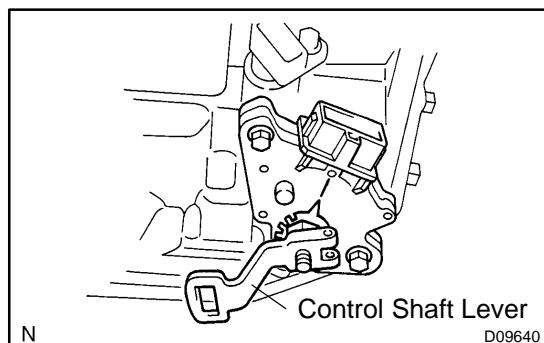
- (a) Install the breather plug hose into the transaxle case certainly.



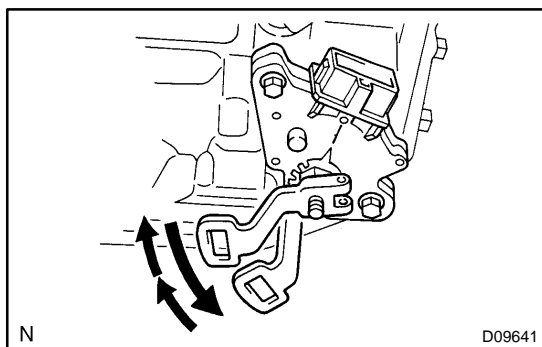
157. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.
- (b) Install a new nut stopper and nut.

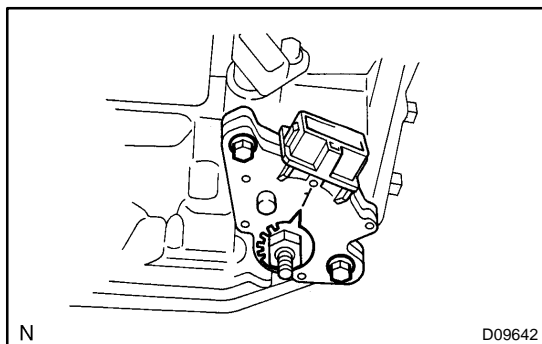
Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)



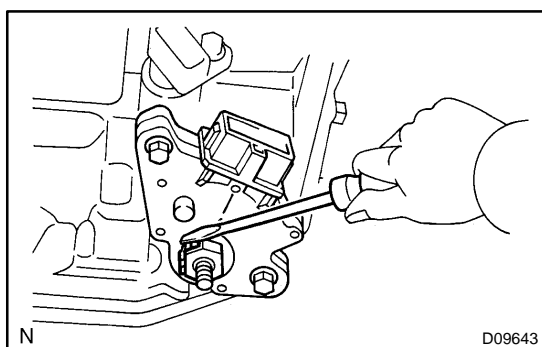
- (c) Temporarily install control shaft lever.



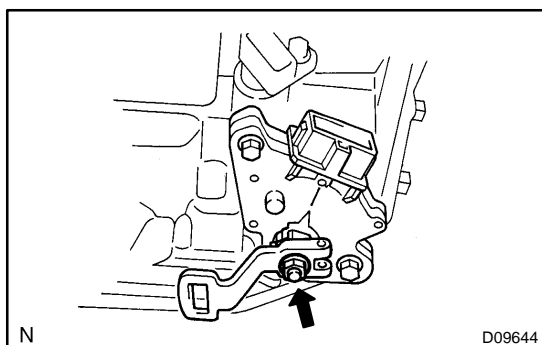
- (d) Turn the lever counterclockwise until it stops, and then turn it clockwise 2 notches.
- (e) Remove the control shaft lever.



- (f) Align the groove with neutral basic line.
- (g) Tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)



- (h) Using a screwdriver, stake the nut with the nut stopper.



- (i) Install the control shaft lever, washer and nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

158. INSTALL SPEEDOMETER DRIVEN HOLE (ATM) COVER SUB-ASSY

- (a) Coat a new O-ring with ATF and install it to the speedometer driven hole cover.
- (b) Install the bolt and speedometer driven hole cover sub-assy to the transaxle assy.
Torque: 6.9 N·m (70 kgf·cm, 61 ft·lbf)