HOW TO USE THIS MANUAL

IN002-0W

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

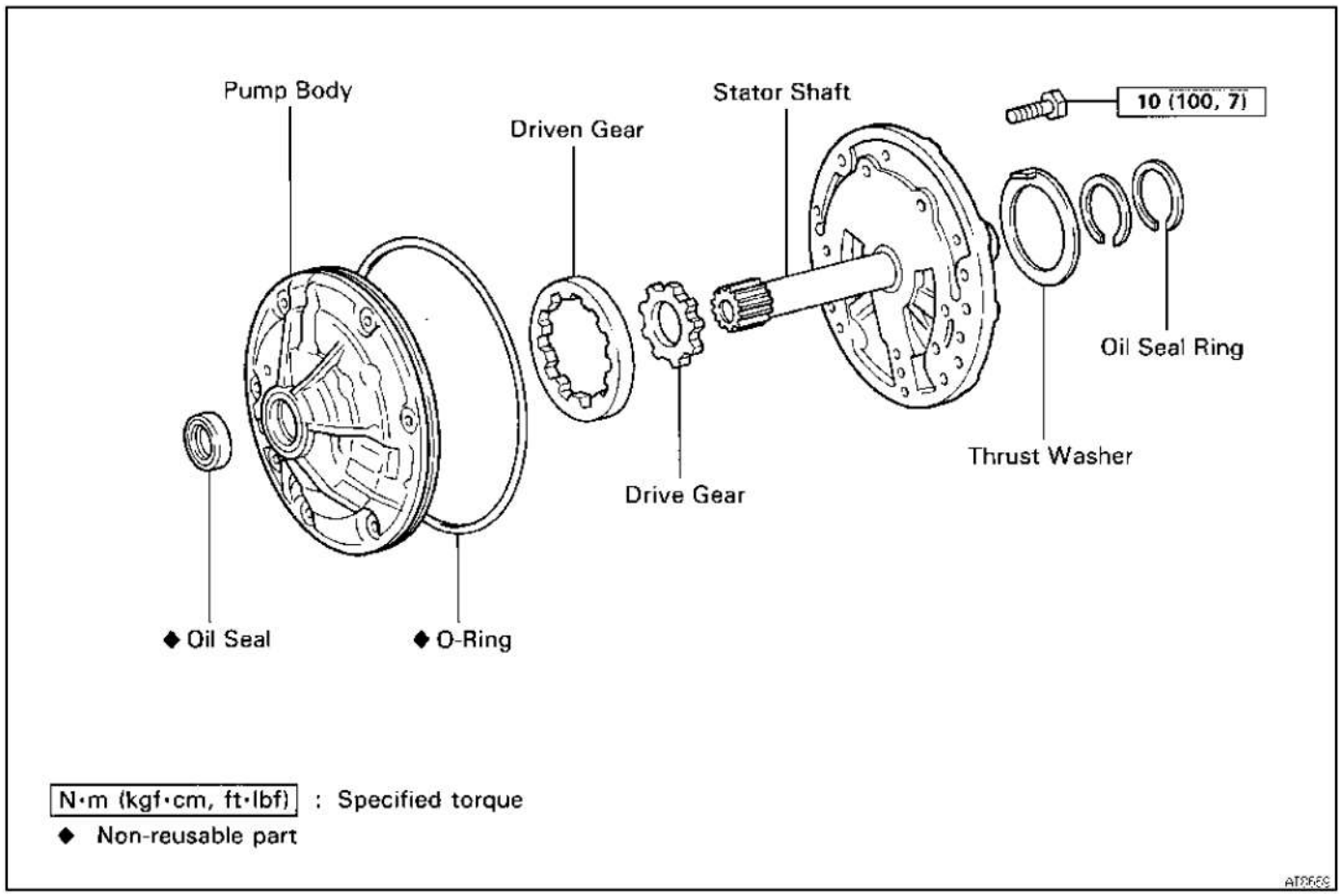
PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

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

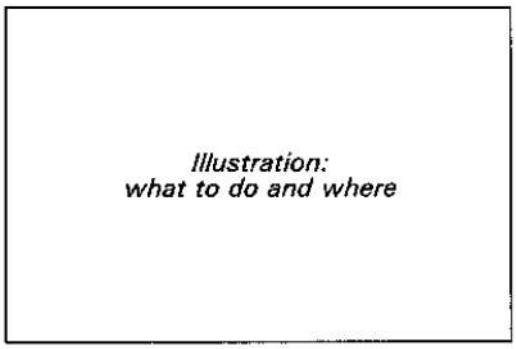
Example:



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

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

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text: how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm² or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

00031

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

REFERENCES

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

SPECIFICATIONS

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

CAUTIONS, NOTICES, HINTS:

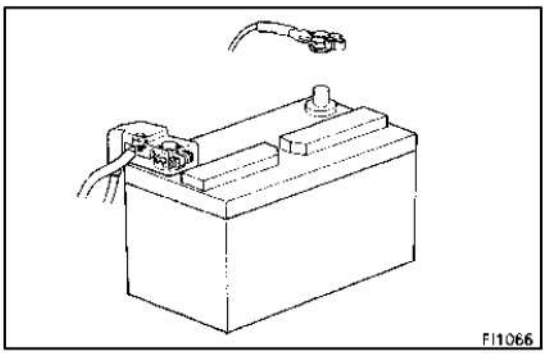
- ★ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ★ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ★ HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

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:

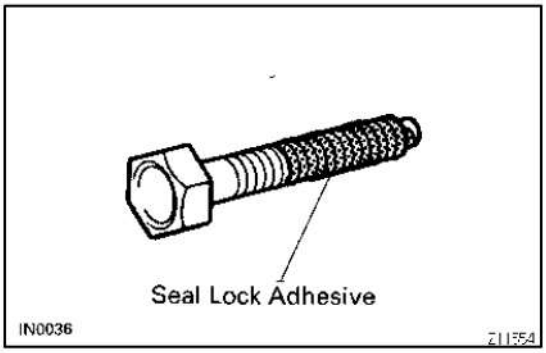
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)


FI1066

GENERAL REPAIR INSTRUCTIONS

IN022-07

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

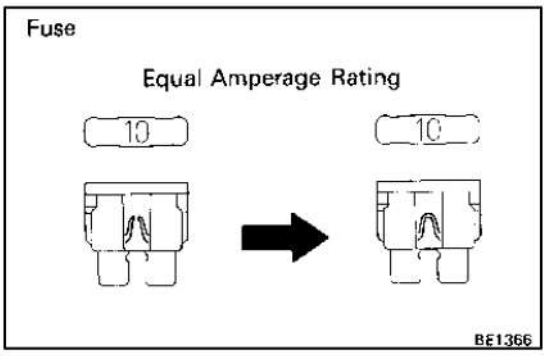


6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) When reusing precoated parts, clean off the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

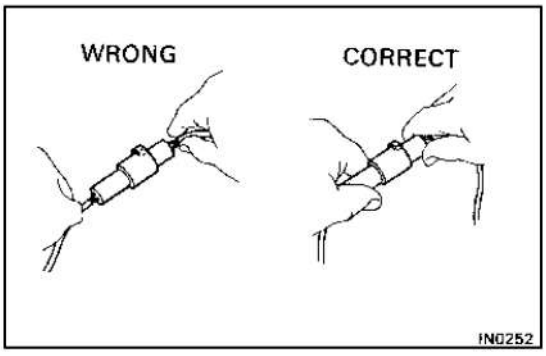
the specified seal lock adhesive to the bolt, nut or threads.

(c) Precoated parts are indicated in the component illustrations by the "★" symbol.

7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the preparation of AX section.



10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.



11. To pull apart electrical connectors, pull on the connector itself, not the wires.
12. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
    (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

GLOSSARY OF SAE AND TOYOTA TERMS

IN016-02

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	Intercooler
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 Position	–
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	–
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Toyota Diagnosis Communication Link (TDCL) 3: OBD@@@@@: [g 2] 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 Coolant 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	Toyota Distributorless Ignition (TDI)
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	Idle Air Control	Idle 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), CCo
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 Catalyst (TWC) CC_{RO}
TWC+OC	Three–Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU–OC	Warm Up Oxidation Catalytic Converter	–
WU–TWC	Warm Up Three–Way Catalytic Converter	Manifold Converter
3GR	Third Gear	–
4GR	Fourth Gear	–

ABBREVIATIONS USED IN THIS MANUAL

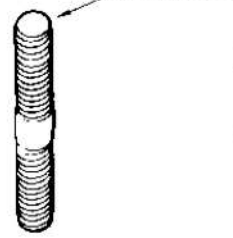
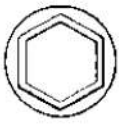
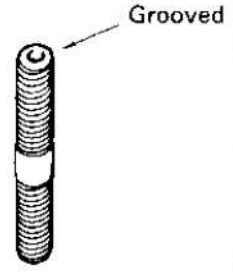
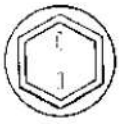
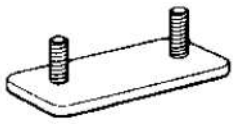
IN01H–0R

ATF	Automatic Transaxle Fluid
B_0	Overdrive Brake
B_1	Second coast Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_0	Overdrive Direct Clutch
C_1	Forward Clutch
C_2	Direct Clutch
D	Disc
F	Flange
F_0	O/D One–way Clutch
F_1	No.1 One–way Clutch
F_2	No.2 One–way Clutch
MP	Multipurpose
O/D	Overdirve
P	Plate
SSM	Special Service Materials
SST	Special Service Tools

STANDARD BOLT TORQUE SPECIFICATIONS

IN008-02

HOW TO DETERMINE BOLT STRENGTH

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

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

SERVICE SPECIFICATIONS

SERVICE DATE

AT06P–0C

Oil Pump

Body clearance	STD	0.07 – 0.15 mm 0.0028 – 0.0059 in.
	Maximum	0.3 mm 0.012 in.
Tip clearance	STD	0.11 – 0.14 mm 0.0043 – 0.0055 in.
	Maximum	0.3 mm 0.012 in.
Side clearance	STD	0.02 – 0.05 mm 0.0008 – 0.0020 in.
	Maximum	0.1 mm 0.004 in.
Pump body bushing inside diameter	Maximum	38.18 mm 1.5031 in.
Stator shaft bushing inside diameter		
	Front side	21.57 mm
Maximum		0.8492 in.
	Rear side	27.07 mm
Maximum		1.0657 in.

Direct Clutch

Clutch drum bushing inside diameter	Maximum	47.07 mm 1.8531 in.
Direct clutch piston stroke		1.11 – 1.44 mm 0.0437 – 0.0567 in.
Flange thickness		2.60 mm 0.1024 in. 3.00 mm 0.1181 in.

Forward Clutch

Piston stroke	1.41 – 1.82 mm 0.0555 – 0.0717 in.
Flange thickness	2.8 mm 0.110 in. 3.0 mm 0.118 in. 3.2 mm 0.126 in. 3.4 mm 0.134 in. 3.6 mm 0.142 in.

Front Planetary Gear

Ring gear bushing inside diameter	Standard	19.025 – 19.050 mm 0.7490 – 0.7500 in.
Planetary pinion gear thrust clearance	Standard	0.20 – 0.50 mm 0.0079 – 0.0197 in.

Rear Planetary Gear

Planetary pinion gear thrust clearance	Standard	0.20 – 0.50 mm 0.0079 – 0.0197 in.

Overdrive Unit

Overdrive direct clutch piston stroke		1.21 – 1.91 mm 0.0476 – 0.0752 in.
Overdrive direct clutch bushing inside diameter	Maximam	22.09 mm 0.8697 in.
Counter drive gear preload		9 – 15 N 920 – 1,530 gf 2.0 – 3.4 lbf
Planetary pinion gear thrust clearance	Standard	0.20 – 0.50 mm 0.0079 – 0.0197 in.

Valve Body Spring

Spring	Free length and Coil outer diameter mm (in.)	Total No. of coils and Color
Upper valve body		
Throttle modulator valve	21.7 (0.854) 9.5 (0.374)	9.5 None
Accumulator control valve	28.1 (0.105) 10.6 (0.417)	13.0 Yellow
Low coast modulator valve	21.6 (0.850) 7.9 (0.311)	11.5 None
Down shift plug	29.8 (1.172) 8.7 (0.344)	13.5 Yellow
Throttle valve	30.7 (1.209) 9.2 (0.362)	9.5 None
Second coast modulator valve	20.9 (0.824) 8.5 (0.336)	10.0 Light Green
Cut–back valve	21.8 (0.858) 6.0 (0.236)	13.5 None
Lock–up relay valve	26.6 (1.046) 10.2 (0.402)	11.5 Green
Lower valve body		
Pressure relief valve	11.2 (0.441) 6.4 (0.252)	7.5 None
1 – 2 shift valve	29.3 (1.152) 9.7 (0.382)	10.5 None
2 – 3 shift valve	29.3 (1.152) 9.7 (0.382)	10.5 None
3 – 4 shift valve	29.3 (1.152) 9.7 (0.382)	10.5 None
Primary regulator valve	66.7 (2.453) 18.6 (0.732)	12.5 None
Secondary regulator valve	43.6 (1.717) 10.9 (0.429)	11.5 None
Lock–up signal valve	30.0 (1.181) 8.2 (0.323)	11.5 None
Cooler By–pass valve	19.9 (0.784) 11.0 (0.433)	8.5 None

Valve Body Retainer

Reteiner	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
Upper valve body			
Throttle Modulator valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Accumulator control valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
Cut–back valve	9.2 (0.591)	5.0 (0.197)	3.2 (0.126)
Lock–up relay valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
Second coast modulator valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
Lower valve body			
Primary regulator valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)

1 – 2 shift valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
2 – 3 shift valve	8.0 (0.315)	5.0 (0.197)	3.2 (0.126)
3 – 4 shift valve	8.0 (0.315)	5.0 (0.197)	3.2 (0.126)
Lock–up signal valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)

Accumulator Spring

Spring	Free length mm (in.)	Color
C_1	57.64 (2.2693)	Red, Purple
B_2	69.39 (2.7323)	Green, White
C_2	70.21 (2.7641)	Purple

Differential

Drive pinion preload (at starting)	New bearing	10 – 16 kgf·cm	1.0 – 1.6 N·m 8.7 – 13.9 in.·lbf
	Reused bearing	5 – 8 kgf·cm	0.5 – 0.8 N·m 4.3 – 6.9 in.·lbf
Total preload (at starting)		Add drive pinion preload	0.3 – 0.4 N·m
	New bearing	2.9 – 4.0 kgf·cm	2.5 – 3.5 in.·lbf
	Reused bearing	1.5 – 2.0 kgf·cm	0.1 – 0.2 N·m 1.3 – 1.7 in.·lbf
Pinion to side gear backlash		0.0020 – 0.0079 in.	0.05 – 0.20 mm
Side gear thrust washer thickness		0.0374 in.	0.95 mm
		0.0394 in.	1.00 mm
		0.0413 in.	1.05 mm
		0.0433 in.	1.10 mm
		0.0427 in.	1.20 mm

Side bearing adjusting shim thickness	1.90 mm 0.0748 in. 1.95 mm 0.0768 in. 2.00 mm 0.0787 in. 2.05 mm 0.0807 in. 2.10 mm 0.0827 in. 2.15 mm 0.0846 in. 2.20 mm 0.0866 in. 2.25 mm 0.0886 in. 2.30 mm 0.0906 in. 2.35 mm 0.0925 in. 2.40 mm 0.0945 in. 2.45 mm 0.0965 in. 2.50 mm 0.0984 in. 2.55 mm 0.1004 in. 2.60 mm 0.1024 in. 2.65 mm 0.1043 in. 2.70 mm 0.1063 in. 2.75 mm 0.1083 in. 2.80 mm 0.1103 in.

TORQUE SPECIFICATION

AT06Q-0C

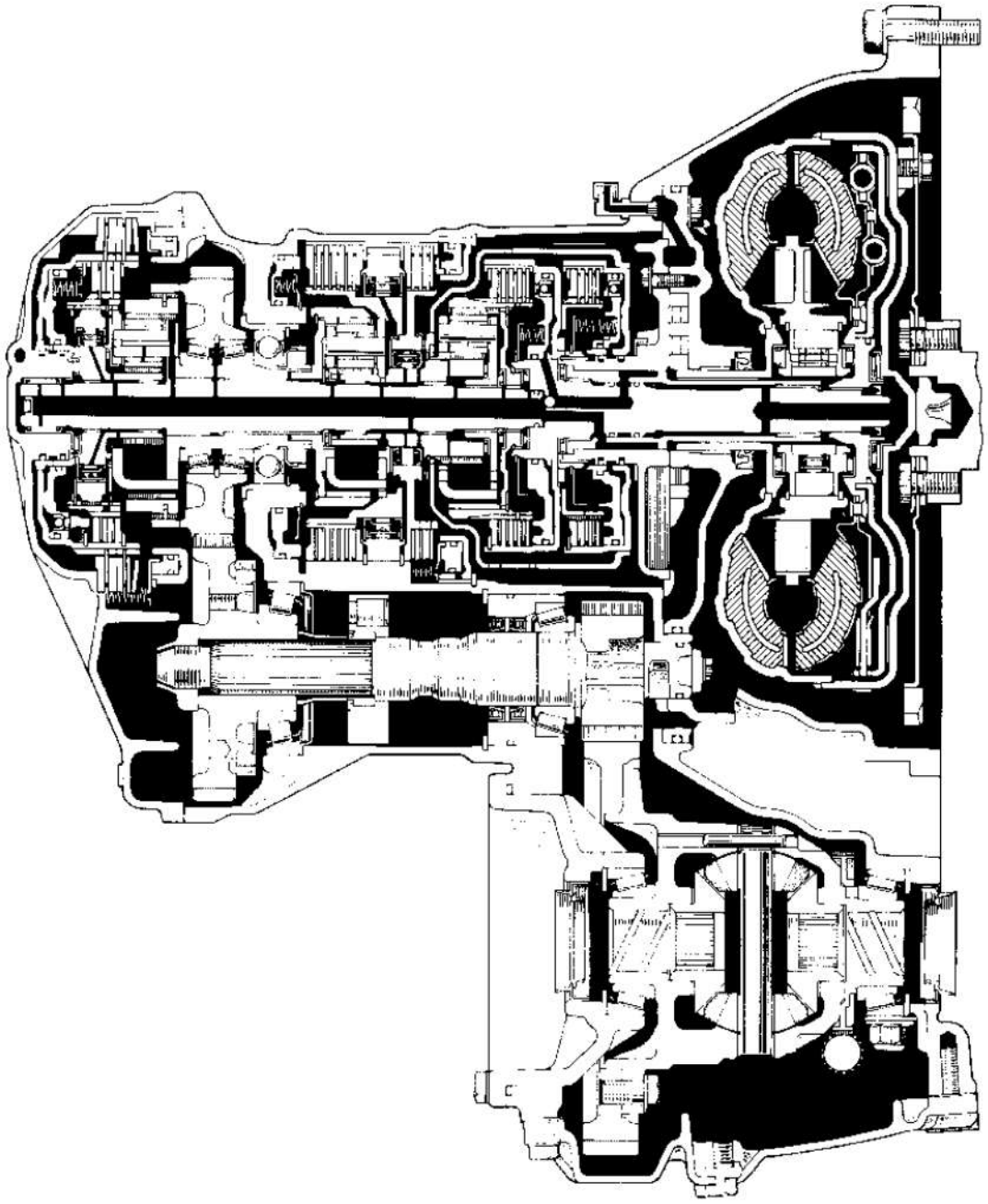
Part tightened	N·m	kgf·cm	ft·lbf
Stator shaft x Oil pump body	10	100	7
Upper valve body x Lower valve body	5.4	55	48 <in.lbf>
Ring gear x Differential case	97	985	71
Side bearing cap x Transaxle case	72	730	53
Bearing retainer x Transaxle case	19	195	14
Counter drive gear x Drive pinion	172	1,750	127
Carrier cover x Transaxle case	25	250	18
Parking lock pawl bracket	7.4	75	65 in.·lbf
Overdrive case x Transaxle case	25	260	19
Oil pump x Transaxle case	22	220	16
Valve body x Transaxle case	10	100	7
Manual valve body x Transaxle case	10	100	7
Detent spring x Valve body	10	100	7
Oil tube bracket x Transaxle case	10	100	7
Oil strainer x Valve body	10	100	7
Oil pan x Transaxle case	4.9	50	43 in.·lbf
Park/Neutral position switch	6.9	70	61 in.·lbf
Park/Neutral position switch adjusting bolt	5.4	55	48 in.·lbf
Union	27	275	20

GENERAL DESCRIPTION

AX0EP–02

The A140E automatic transaxle described in this AX section is a 4–speed lock–up automatic transaxle developed exclusively for use with a transversely–mounted engine.

Sectional View



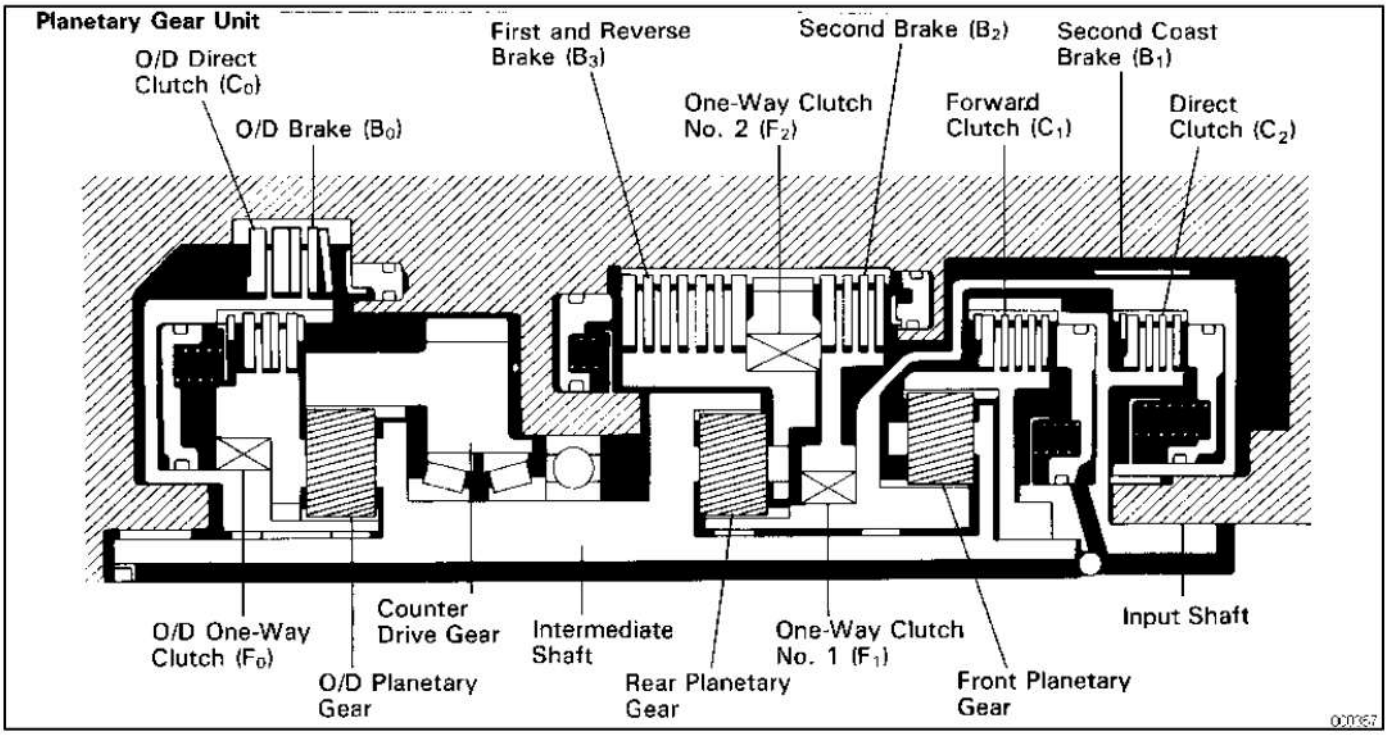
N00509

General Specifications

Type of Transaxle		A140E
Type of Engine		5S–FE
Torque Converter Clutch Stall Torque Ratio		2.0 : 1
Lock–up Mechanism		Equipped
Gear Ratio	1st Gear	2.810
	2nd Gear	1.549
	3rd Gear	1.000
	O/D Gear	0.706
	Reverse Gear	2.296
Number of Discs and Plates	O/D Direct Clutch (C_0)	2/1
	Forward Clutch (C_1)	4/4
	Direct Clutch (C_2)	3/3
	Second Brake (B_2)	3/3
	First and Reverse Brake (B_3)	6/5
	O/D Brake (B_0)	2/3
B_1 Band Width	mm (in.)	25 mm (0.98 in.)
ATF Type		ATF DEXRON ® @@@@@: [g 2]
Capacity	liter (US qts, Imp. qts)	
	Transaxle	5.6 (5.9, 4.9)
	Differential	1.6 (1.7, 1.4)

OPERATION
OPERATION

AX0SW-01

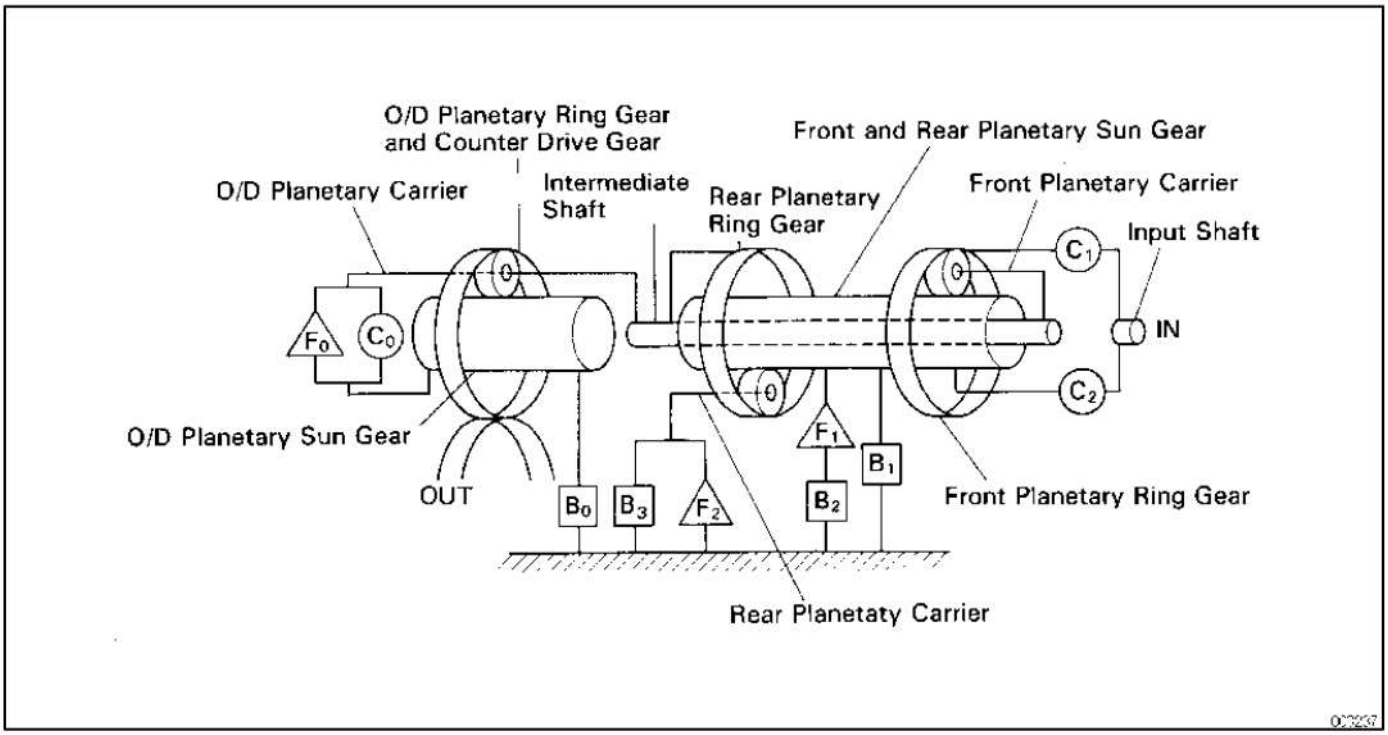


Shift lever position	Gear Position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○			
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*3rd	○	○	○			○		○		
L	1st	○	○					○	○		○
	*2nd	○	○			○	○		○	○	

W2496

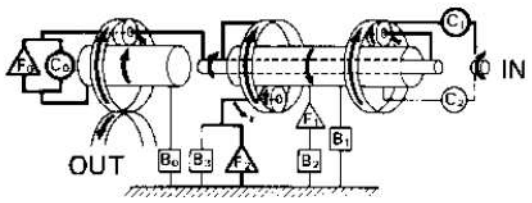
1. FUNCTION OF COMPONENTS

FUNCTION	OPERATION
O/D Direct Clutch (C_0)	Connects overdrive sun gear and overdrive carrier
O/D Brake (B_0)	Prevents overdrive sun gear from turning either clockwise or counterclockwise
O/D One–way Clutch (F_0)	When transmission is being driven by engine, connects overdrive sun gear and overdrive carrier.
Front Clutch (C_1)	Connects input shaft and intermediate shaft
Rear Clutch (C_2)	Connects input shaft and front and rear planetary sun gears
No.1 Brake (B_1)	Prevents front and rear planetary sun gears from turning either clockwise or counterclockwise
No.2 Brake (B_2)	Prevents outer race of F_1 from turning either clockwise or counterclockwise, thus previnting front and rear planetary sun gears from turning counterclockwise
No.3 Brake (B_3)	Prevents front planetary carrier from turning either clockwise or counterclockwise
No.1 One–way Clutch (F_1)	When B_2 is operating prevents front and rear planetary sun gears from turning counterclockwise
No.2 One–way Clutch (F_2)	Prevents front planetary carrier from turning counterclockwise



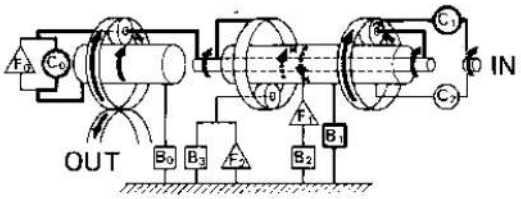
Power from the engine transmitted to the input shaft via the torque converter is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one–way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution of the planetary gear unit.
Shift change is carried out by altering the combination of clutch and brake operation.
Each clutch and brake operates by hydraulic pressure; gear position is decided according to the throttle opening angle and vehicle speed, and shift change automatically occurs.
The conditions of operation for each gear position are shown on the following illustrations:

D or 2 Position 1st Gear



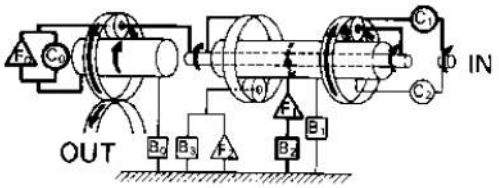
AT1097

2 Position 2nd Gear



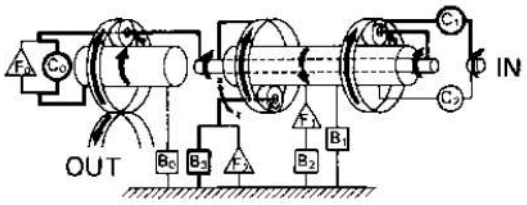
AT1102

D Position 2nd Gear



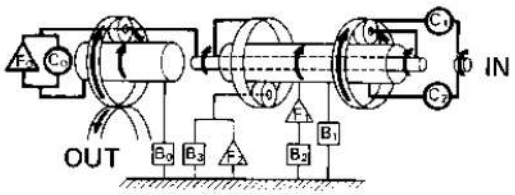
AT1098

L Position 1st Gear



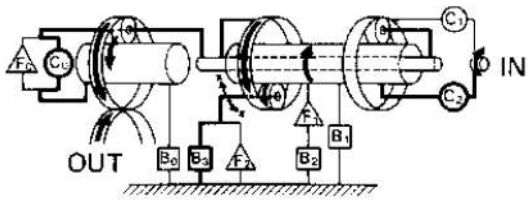
AT1103

D Position 3rd Gear



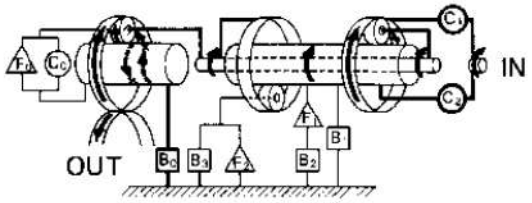
AT1099

R Position Reverse Gear



AT1101

Position O/D Gear



AT1100

2. HYDRAULIC CONTROL SYSTEM

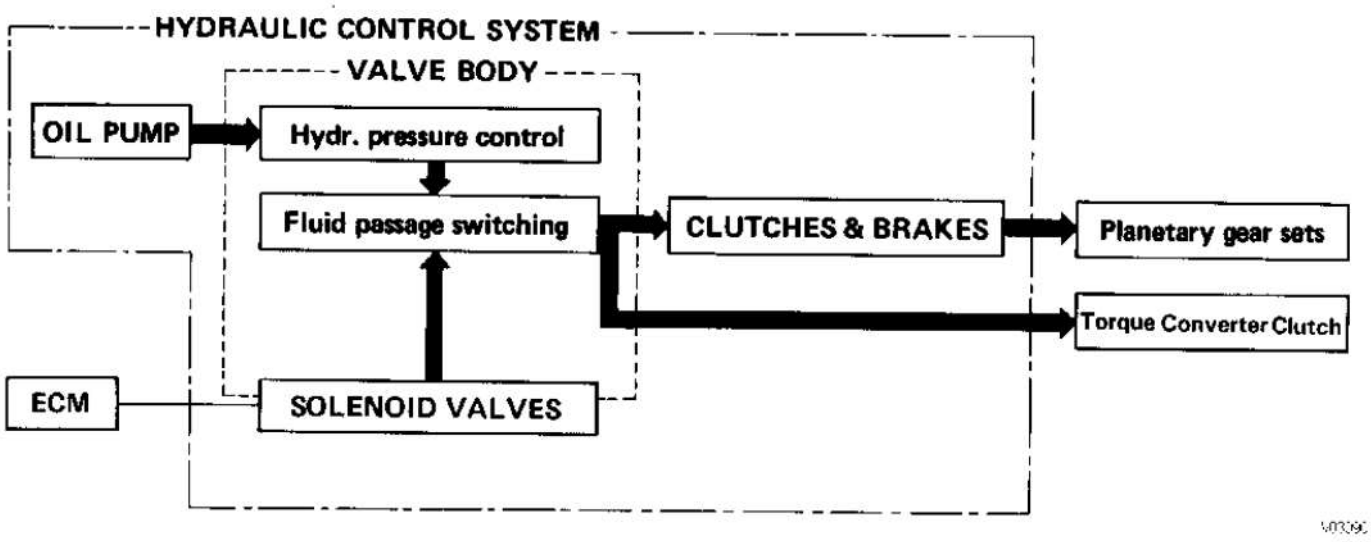
The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes, and the governor valve as well as the fluid passages which connect all of these components.

Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

There are three solenoid valves on the valve body.

The No.1 and No.2 solenoid valves are turned on and off by signals from the ECM to operate the shift valves and change the gear shift position.

The No.3 solenoid valve is operated by signals from the ECM to engage or disengage the lock–up clutch of the torque converter.



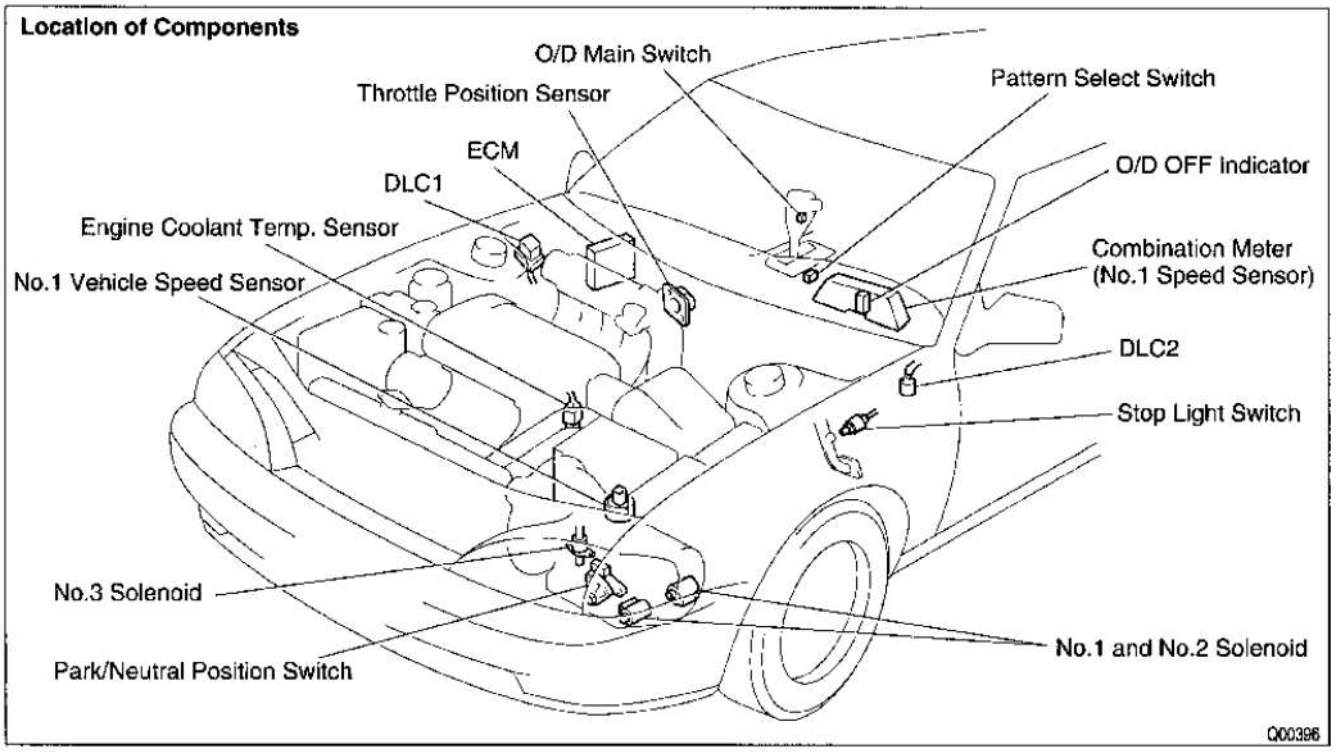
2. ELECTRONIC CONTROL SYSTEM

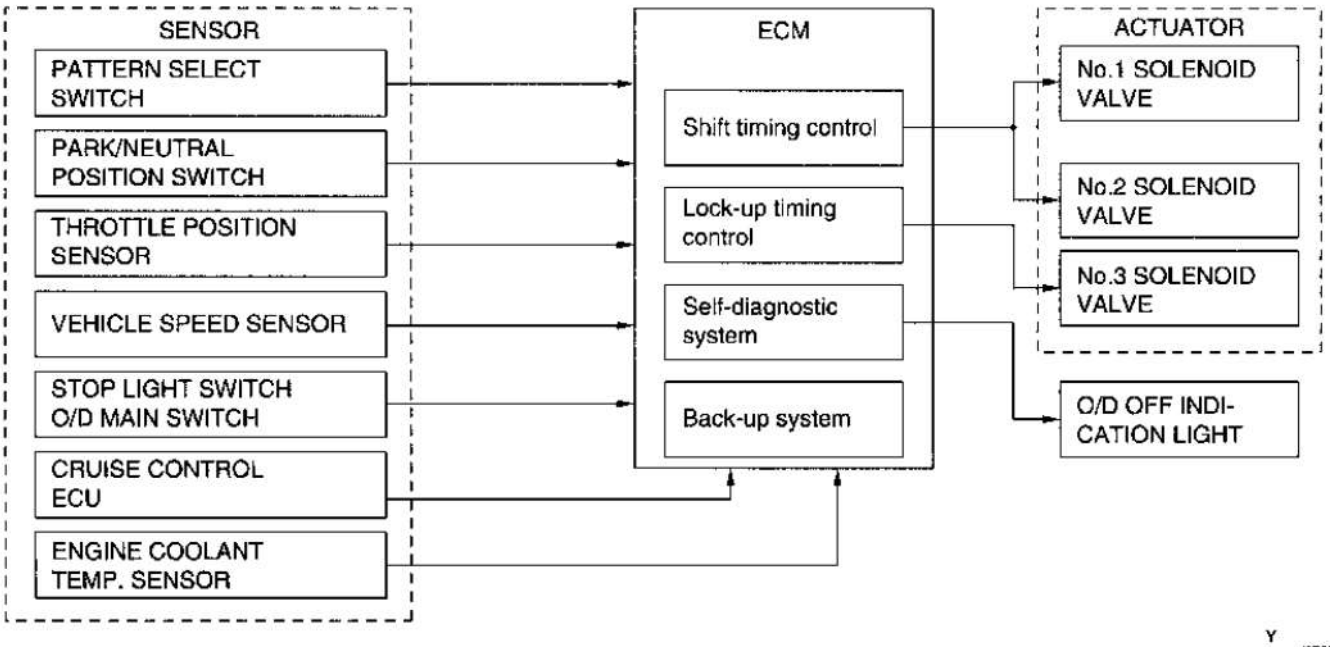
The electronic control system for controlling the shift timing and the operation of the lock–up clutch is composed of the following 3 parts:

(a) Sensors: These sense the vehicle speed and throttle position and send this data to the ECM in the form of electronic signals.

(b) ECM: This determines the shift and lock–up timing based upon the signals from the sensors.

(c) Actuators: Solenoid valves divert hydraulic pressure from one circuit of the hydraulic control unit to another, thus controlling shifting and lock–up timing.



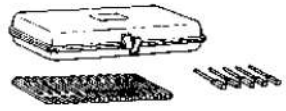
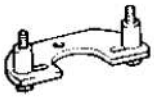
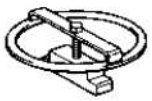
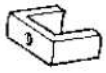
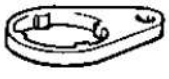
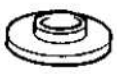


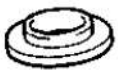
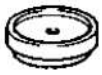
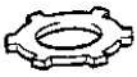
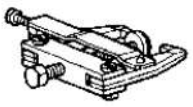
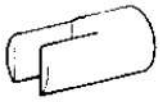
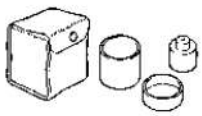
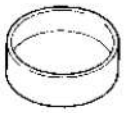
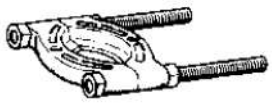
Y v05055

PREPARATION

SST (SPECIAL SERVICE TOOLS)

AX0EQ-02

	09240–00020	Wire Gauge Set	
	09330–00021	Companion Flange Holding Tool	
	09350–32014	TOYOTA Automatic Transmission Tool Set	
	09308–10010	Oil Seal Puller	
	(09351–32020)	Stator Stopper	
	(09351–32032)	Counter Driven Gear Holding Tool	
	(09351–32040)	No.1 Piston Spring Compressor	
	(09351–32050)	Snap Ring Expander	
	(09351–32061)	Oil Pump Puller	
	(09351–32070)	No.2 Piston Spring Compressor	
	(09351–32080)	Lock Nut Wrench	
	(09351–32090)	Oil Seal Remover & Replacer	
	(09351–32100)	Drive Pinion Bearing Replacer	

	(09351–32111) Side Bearing Race Replacer	
	(09351–32120) Overdrive Bearing Replacer	
	(09351–32130) Handle	
	(09351–32140) Oil Seal Replacer	
	(09351–32150) Oil Seal Replacer	
	(09351–32190) Measure Terminal	
	(09351–32200) No.3 Piston Spring Compressor	
	09502–10012 Differential Side Bearing Puller ★	
	09564–32011 Differential Preload Adaptor	
	09710–28020 Front Suspension Bushing Tool Set★	
	(09710–08040) Bushing Replacer★	
	09950–00020 Bearing Remover	

AX0ER-02

RECOMMENDED TOOL

	09031–00030 Pin Punch .	

EQUIPMENT

AX0ES-02

Feeler gauge	
Vernier calipers	
Dial indicator or dial indicator with magnetic base	
Straight edge	
Torque wrench	

LUBRICANT

AX0ET-02

Item		US qts	Liters Imp qts	Clacification
Automatic Transaxle Fluid			5.6	
(w/o Differential Fluid)	Dry Fill	5.9	4.9	ATF DEXRON ® @@@@@: [g 2]
	Drain and Refill		2.5	
		2.6	2.2	
Differential Fluid			1.6	ATF DEXRON ® @@@@@: [g 2]
		1.7	1.4	

SSM (SPECIAL SERVICE MATERIALS)

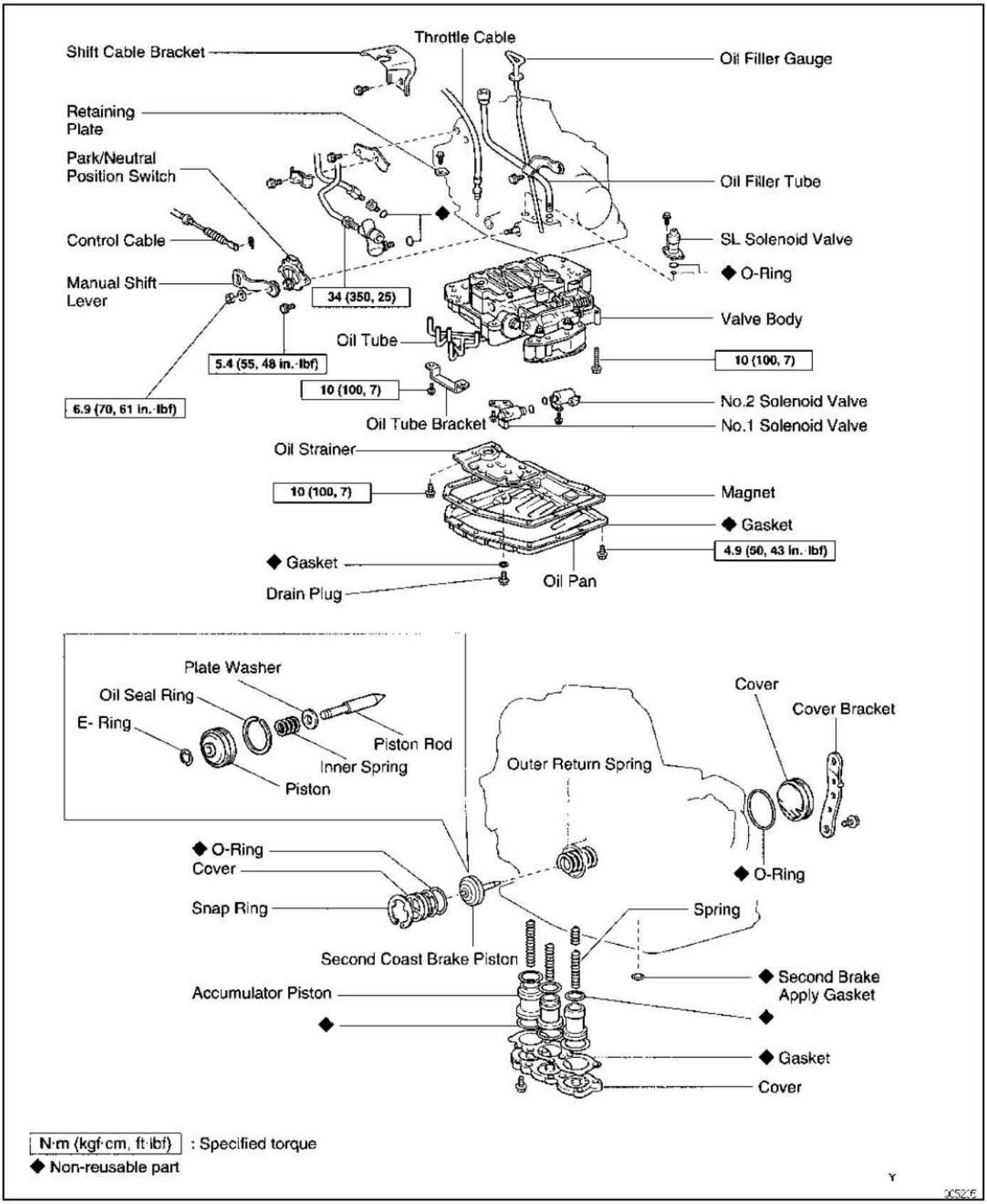
AX0EU-02

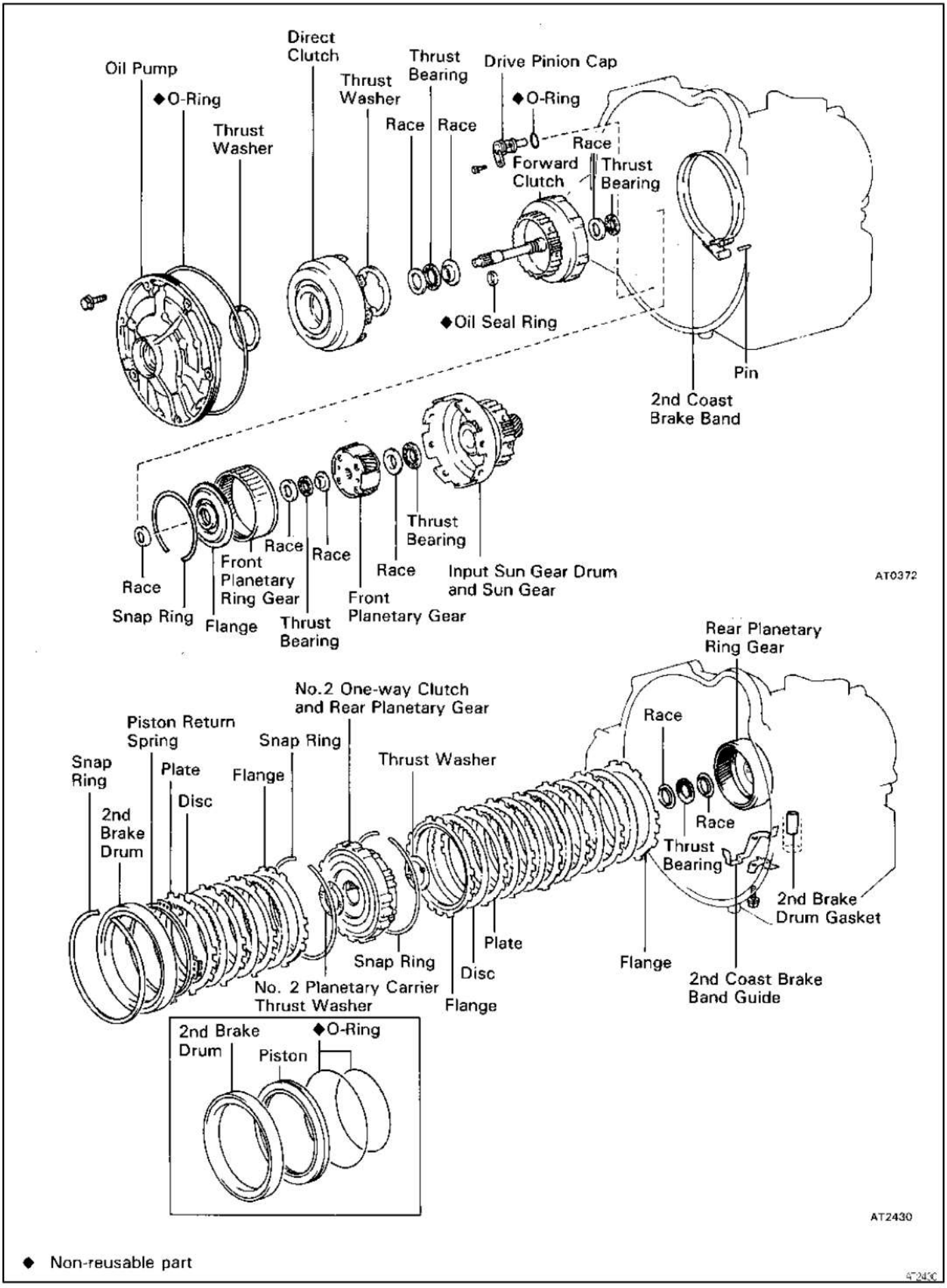
08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	

COMPONENT PARTS REMOVAL

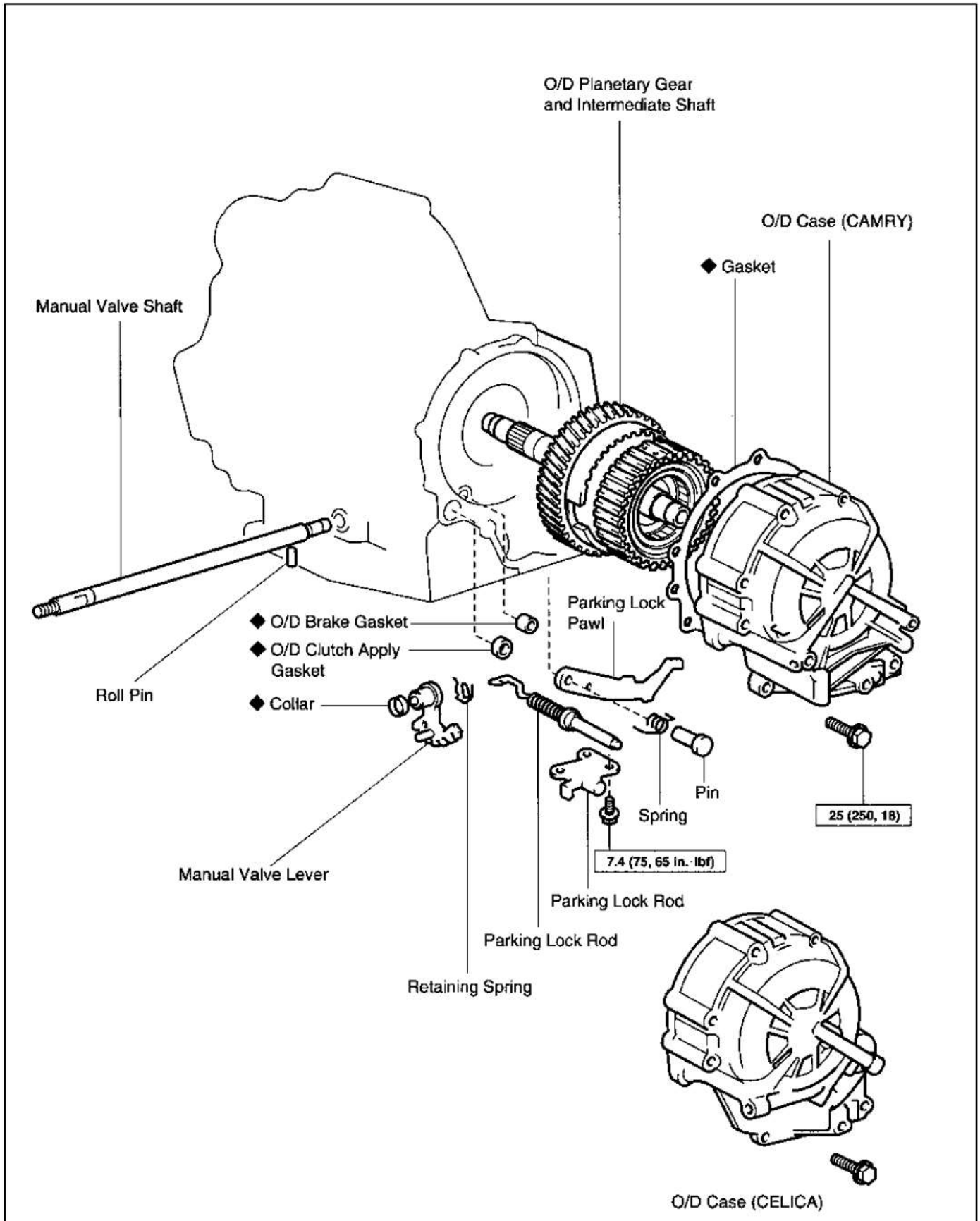
AX0GS-02

COMPONENTS



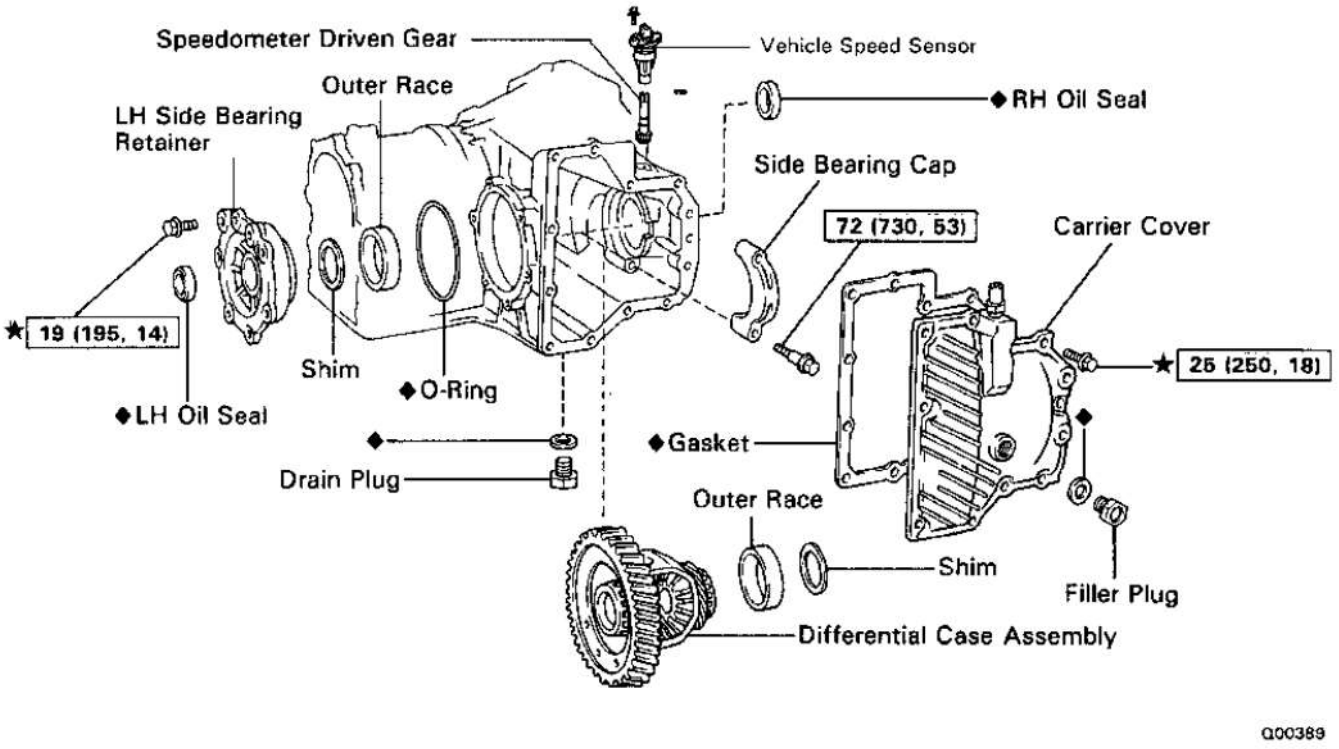


◆ Non-reusable part

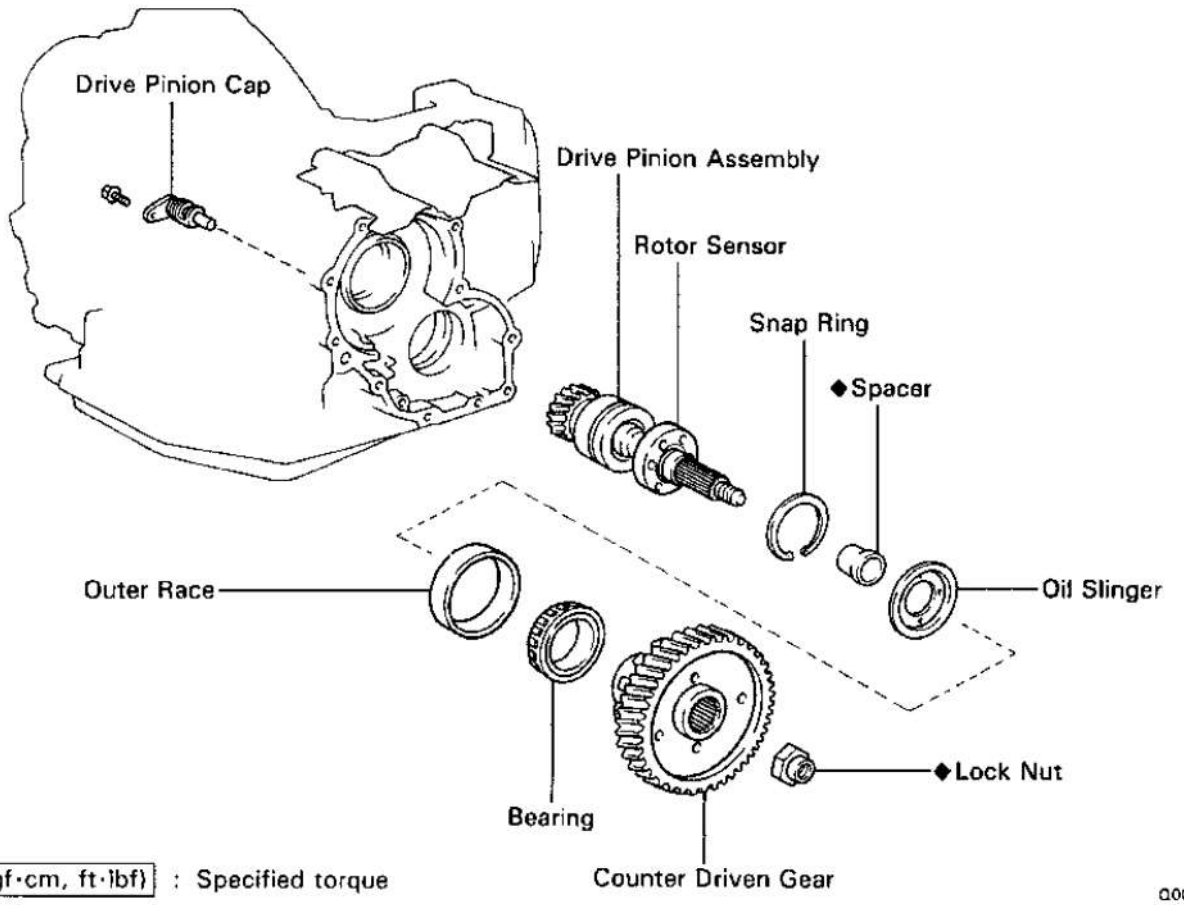


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Y



Q00389

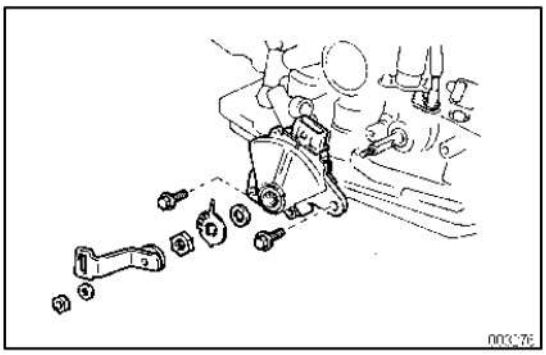


Q00047

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

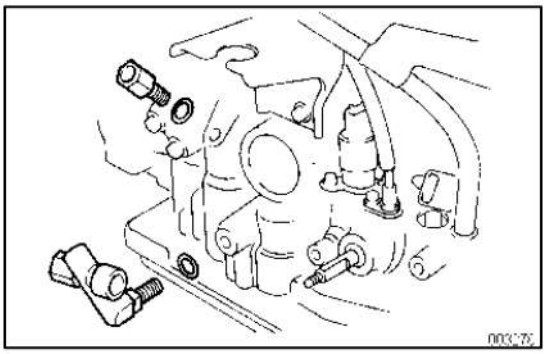
AX0EW-02

SEPARATE BASIC SUBASSEMBLY



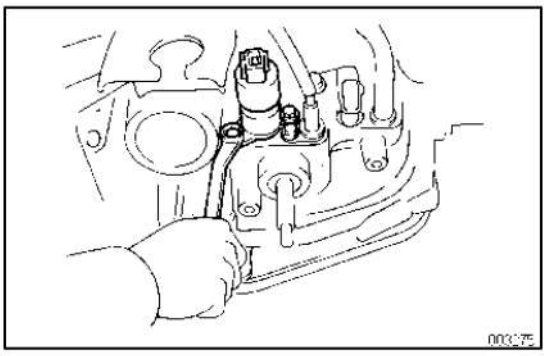
1. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Remove the manual shift lever.
(b) Pry off the lock washer and remove the manual valve shaft nut.
(c) Remove the 2 bolts and pull out the park/neutral position switch.



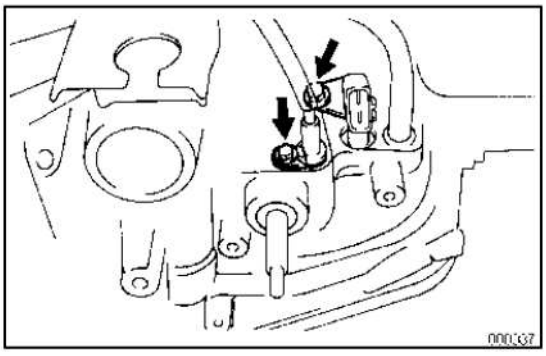
2. REMOVE UNION AND ELBOW

(a) Using the open end wrench, remove the union and elbow.
(b) Remove the O–rings from the union and elbow.



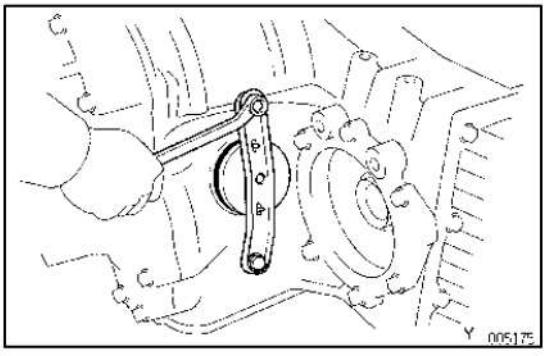
3. REMOVE SL SOLENOID

(a) Disconnect the connector.
(b) Remove the 2 bolts and SL solenoid.



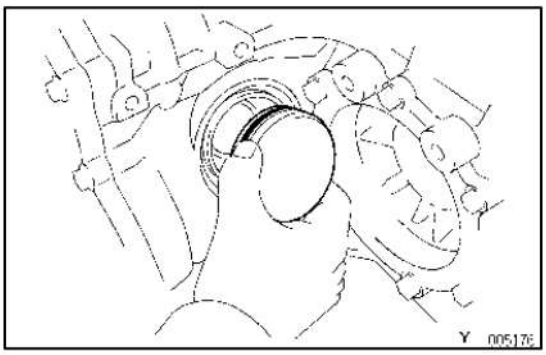
4. REMOVE THROTTLE CABLE RETAINING PLATE

5. REMOVE SOLENOID WIRE RETAINING BOLT

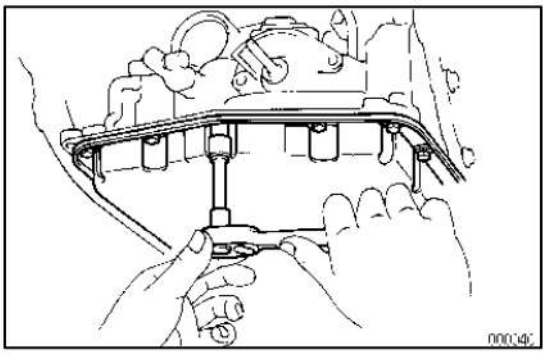


6. REMOVE COVER

(a) Remove the 2 bolts and cover bracket.



(b) Remove the cover.



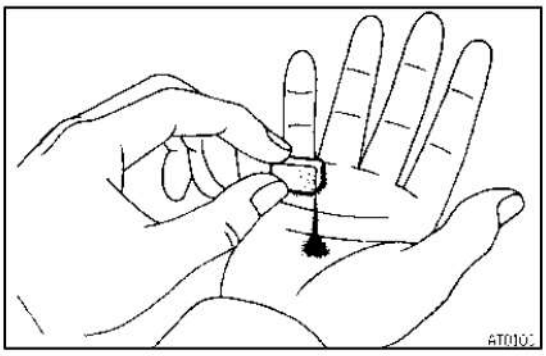
7. REMOVE OIL PAN AND GASKET

(a) Remove the 15 bolts.

(b) Remove the oil pan by lifting transaxle case.

NOTICE: Do not turn the transaxle over as this will contaminate the valve body with the foreign materials in the bottom of the oil pan.

(c) Place the transaxle on wooden blocks to prevent damage to the tube bracket.

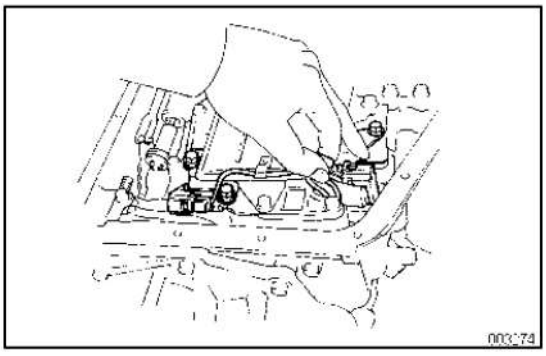


8. EXAMINE PARTICLES IN PAN

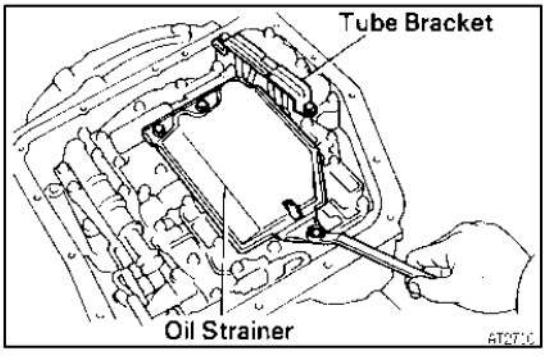
Remove the magnets and use them to collect any steel chips. Look carefully at the chips and particles in the oil pan and on the magnets to anticipate what type of wear you will find in the transmission:

Steel (magnetic): bearing, gear and plate wear

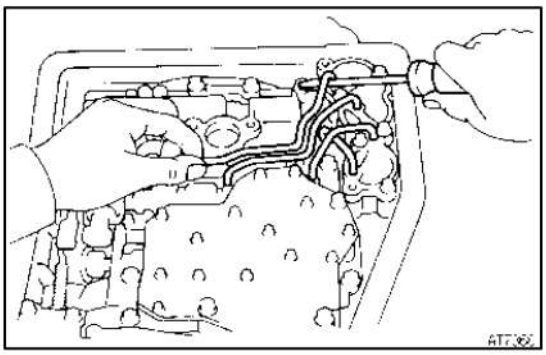
Brass (non–magnetic): bushing wear



9. DISCONNECT NO.1 AND NO.2 SOLENOID CONNECTORS

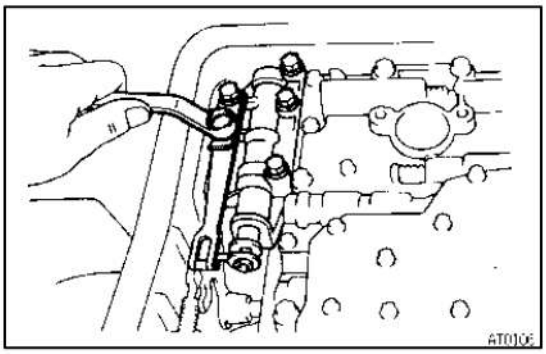


10. REMOVE TUBE BRACKET AND OIL STRAINER



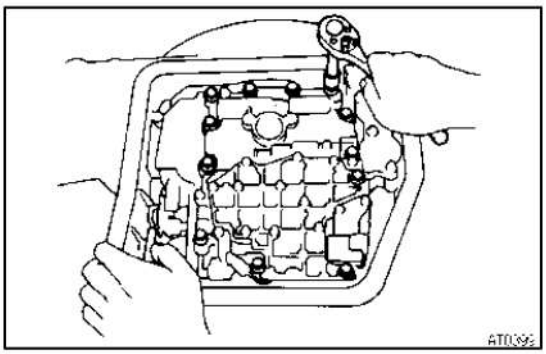
11. REMOVE OIL TUBES

Pry up both tube ends with a large screwdriver and remove the 4 tubes.



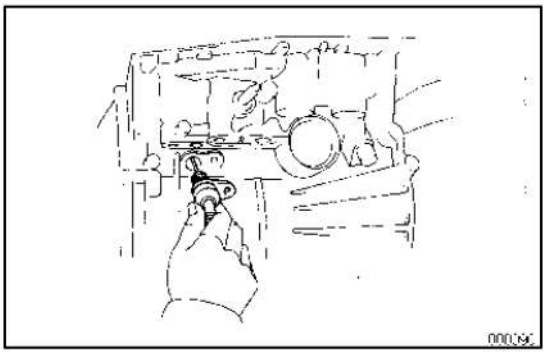
12. REMOVE MANUAL DETENT SPRING

13. REMOVE MANUAL VALVE AND MANUAL VALVE BODY

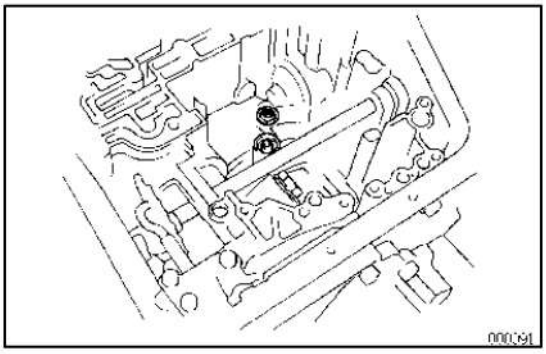


14. REMOVE VALVE BODY

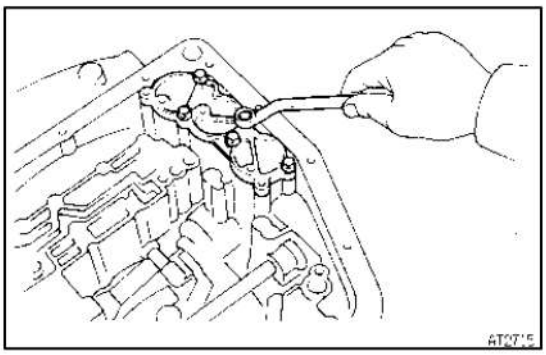
(a) Remove the 12 bolts.



15. REMOVE THROTTLE CABLE AND SOLENOID WIRING FROM CASE



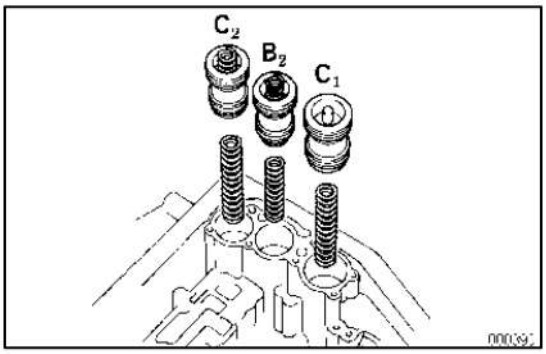
16. REMOVE SECOND BRAKE APPLY GASKET



17. REMOVE ACCUMULATOR PISTON AND SPRINGS

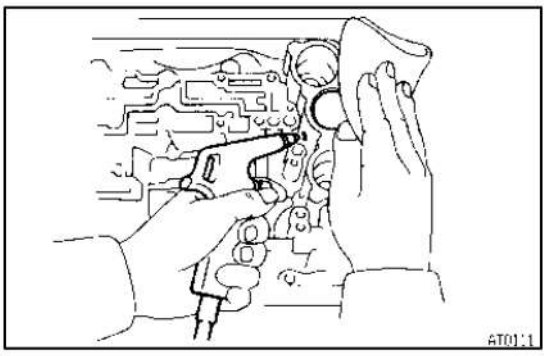
(a) Loosen the 5 bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



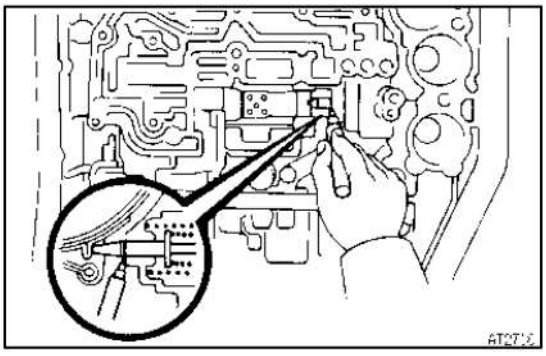
(c) Remove the piston and spring for C_1 and C_2.

(d) Remove the O–rings.



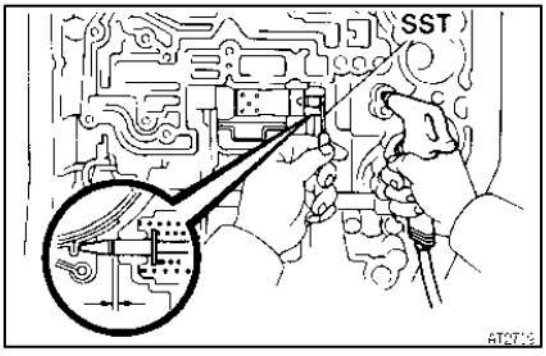
(e) Pop out piston C_1 into a rag, using low–pressure compressed air 98 kPa (1 kgf/cm^2, 14 psi).

(f) Remove the 2 O–rings from the B_2 piston.



18. MEASURE PISTON STROKE OF SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.



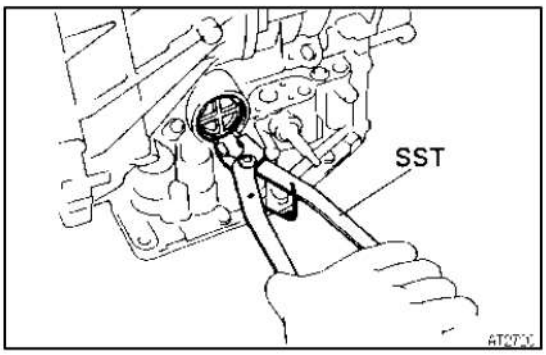
(b) Using SST, measure the piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57 – 114 psi).

SST 09240–00020

Piston stroke:

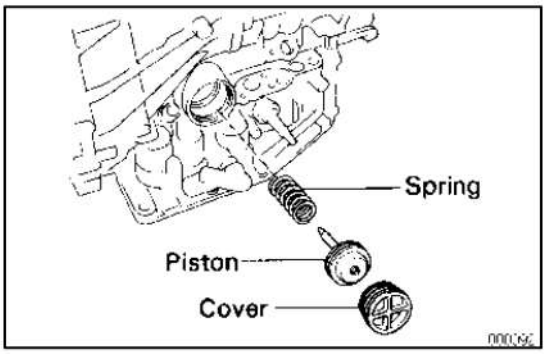
1.5 – 3.0 mm (0.059 – 0.118 in.)

If the piston stroke exceeds the limit, replace the piston rod or brake band.

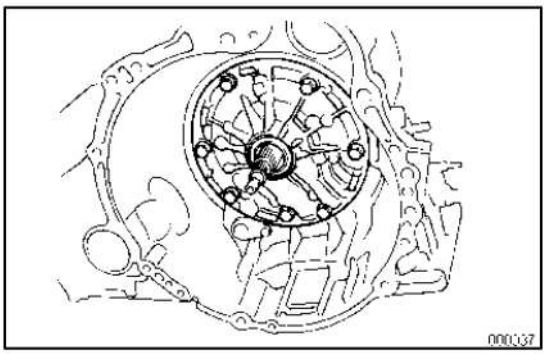


19. REMOVE SECOND COAST BRAKE PISTON

(a) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)



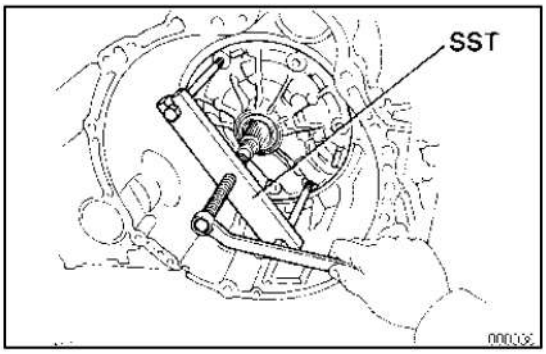
(b) Remove the cover.
(c) Remove the piston and outer return spring.
(d) Remove the O–ring from the cover.



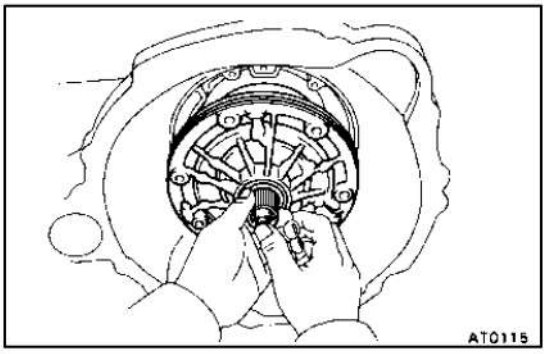
20. REMOVE OIL PUMP AND DIRECT CLUTCH

NOTICE: Before removing the oil pump, remove the second coast brake piston.

(a) Remove the 7 bolts.



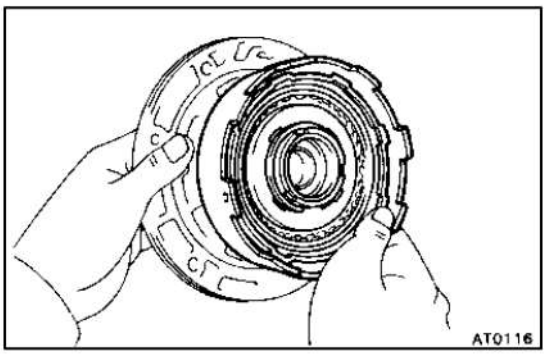
(b) Using SST, pull out the oil pump from the transaxle case.
SST 09350–32014 (09351–32061)



21. REMOVE OIL PUMP AND DIRECT CLUTCH

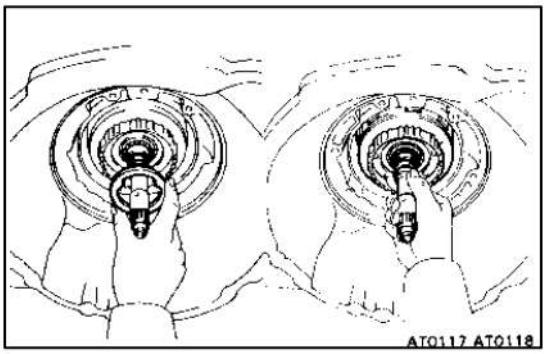
While holding the input shaft, grasp the pump stator shaft and pull the oil pump and direct clutch together out of the transaxle case.

NOTICE: Push the second coast brake band into the case, being careful not to catch it on the direct clutch drum.



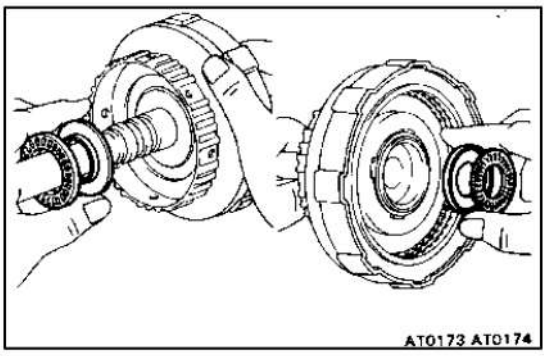
22. REMOVE DIRECT CLUTCH FROM OIL PUMP

23. BE CAREFUL WHEN REMOVING RACE BEHIND OIL PUMP

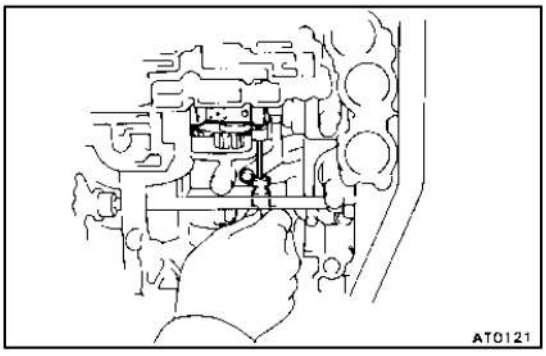


24. REMOVE CLUTCH DRUM THRUST WASHER

25. REMOVE FORWARD CLUTCH



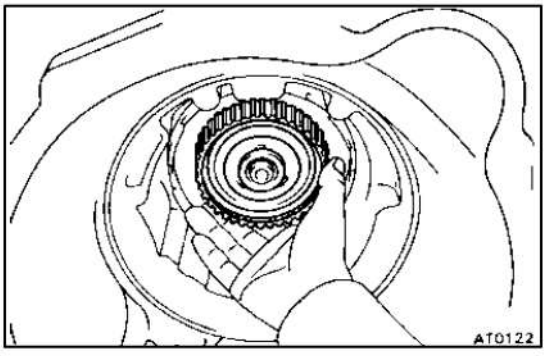
26. REMOVE BEARINGS AND RACES FROM FORWARD CLUTCH



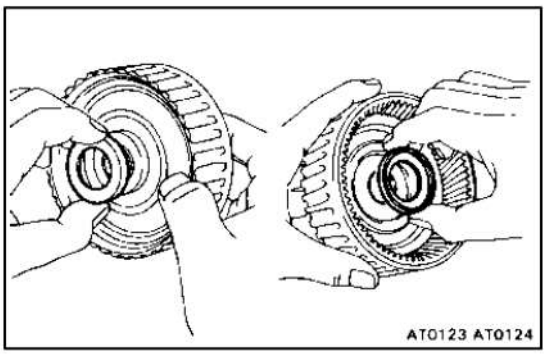
27. REMOVE SECOND COAST BRAKE BAND

(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

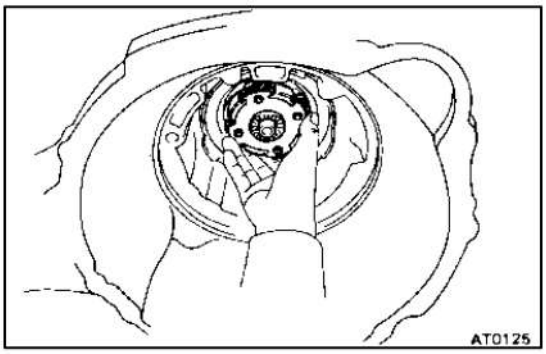
(b) Remove the brake band.



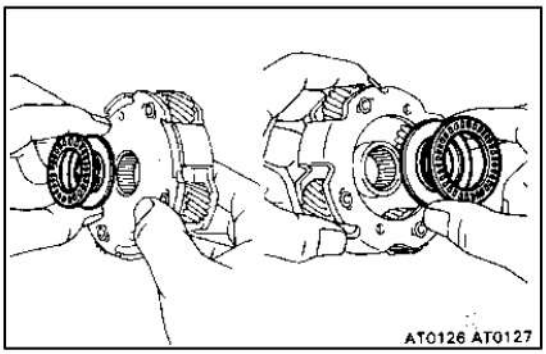
28. REMOVE FRONT PLANETARY RING GEAR



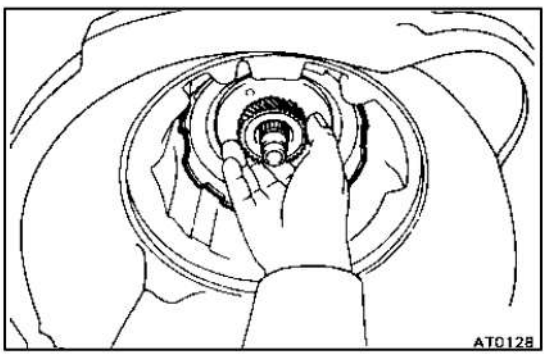
29. REMOVE BEARING RACES FROM FRONT PLANETARY RING GEAR



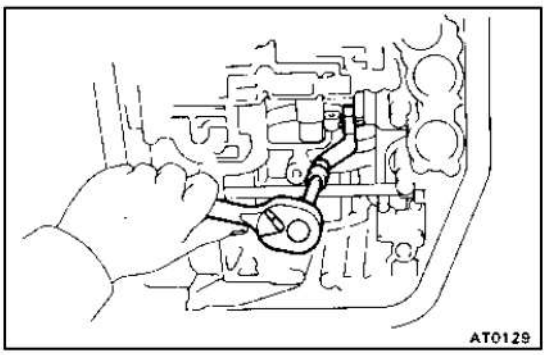
30. REMOVE PLANETARY GEAR



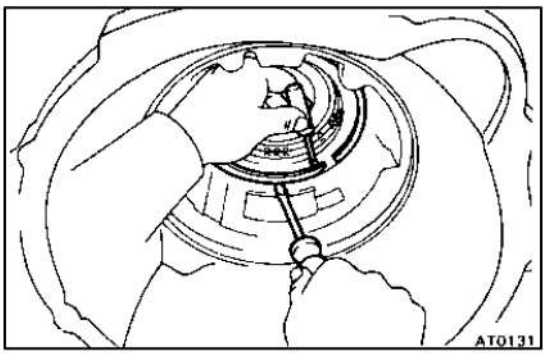
31. REMOVE RACES AND BEARINGS FROM PLANETARY GEAR



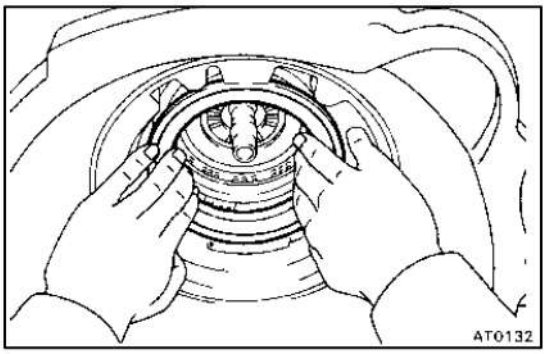
32. REMOVE SUN GEAR, SUN GEAR INPUT DRUM, SECOND BRAKE HUB AND NO.1 ONE–WAY CLUTCH



33. STAND TRANSMISSION CASE UP AND REMOVE SECOND COAST BRAKE BAND GUIDE

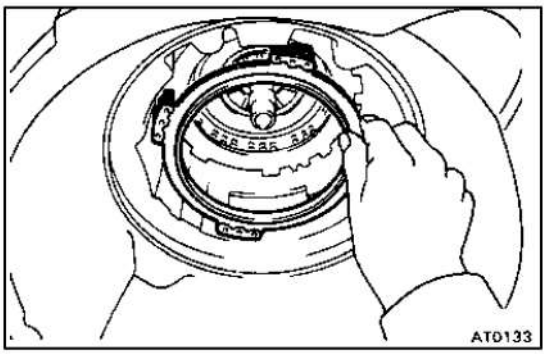


34. REMOVE SNAP RING HOLDING SECOND BRAKE DRUM TO CASE

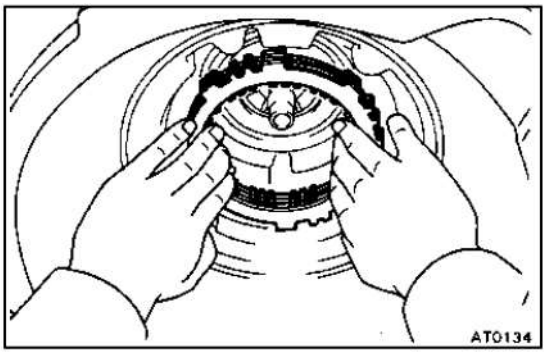


35. REMOVE SECOND BRAKE DRUM

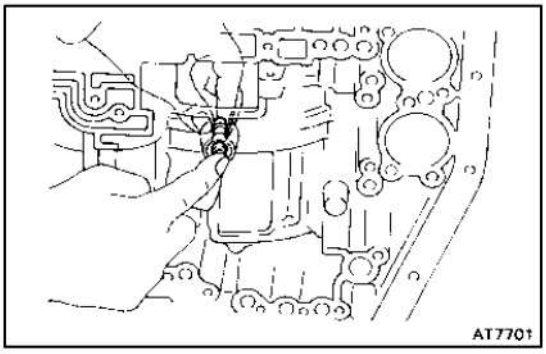
If the brake drum is difficult to remove, lightly tap it with a wooden block.



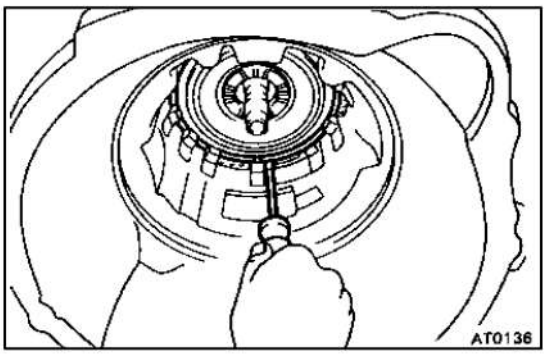
36. REMOVE SECOND BRAKE PISTON RETURN SPRING



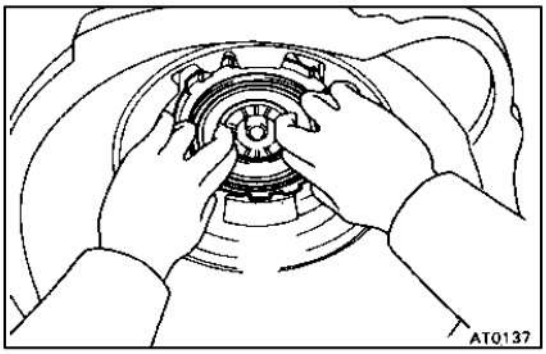
37. REMOVE PLATES, DISCS AND FLANGE



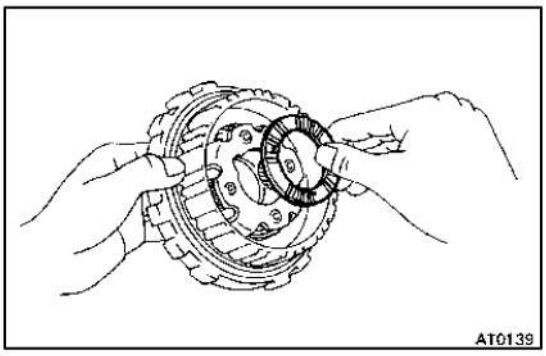
38. REMOVE SECOND BRAKE DRUM GASKET



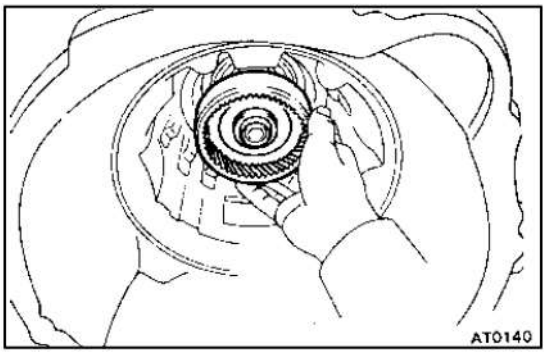
39. REMOVE SNAP RING HOLDING NO.2 ONE–WAY CLUTCH OUTER RACE TO CASE



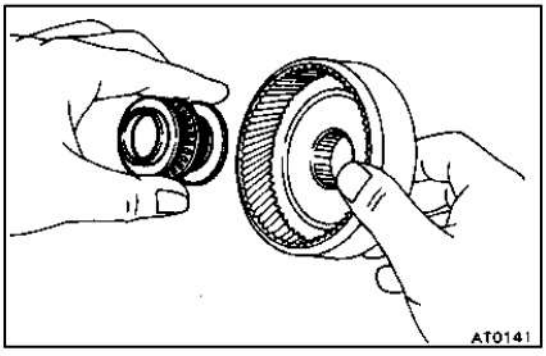
40. REMOVE NO.2 ONE–WAY CLUTCH AND REAR PLANETARY GEAR



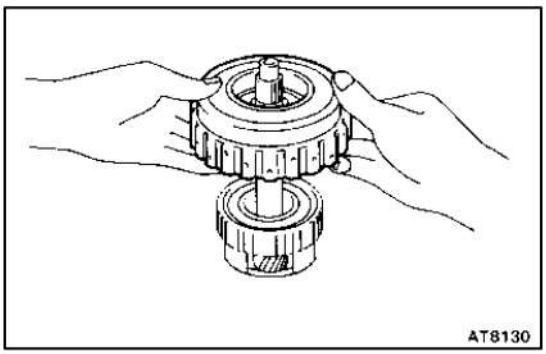
41. BE CAREFUL WHEN REMOVING THRUST WASHERS FROM BOTH SIDES OF PLANETARY CARRIER



42. REMOVE REAR PLANETARY RING GEAR



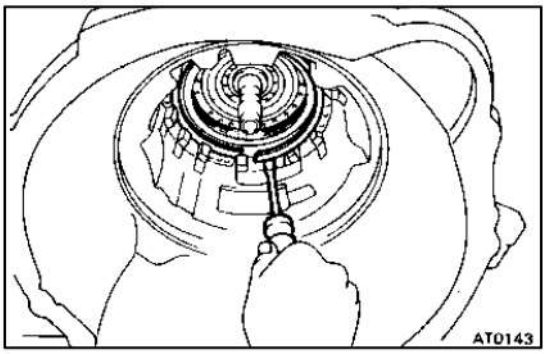
43. REMOVE BEARINGS AND RACES



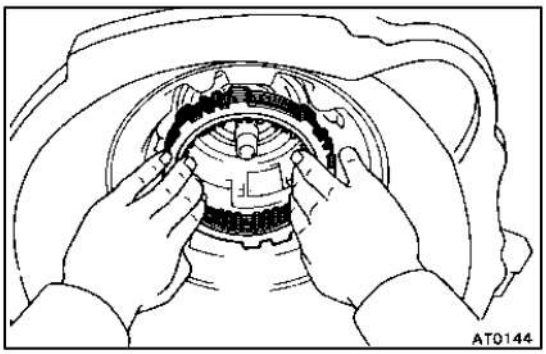
44. CHECK OPERATION OF FIRST AND REVERSE BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.

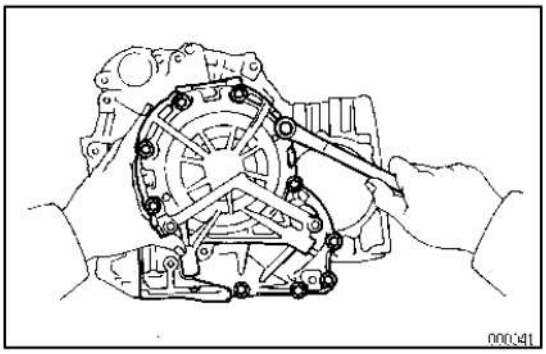
If the piston does not move, disassemble and inspect.



45. REMOVE SNAP RING HOLDING FLANGE TO CASE

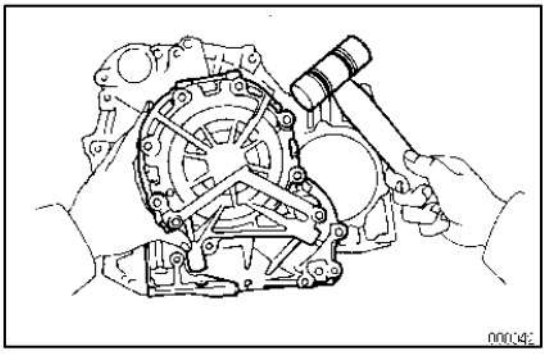


46. REMOVE FLANGES, PLATES AND DISCS



47. TURN TRANSAXLE CASE AROUND

48. REMOVE 11 BOLTS HOLDING OVERDRIVE UNIT TO TRANSAXLE CASE

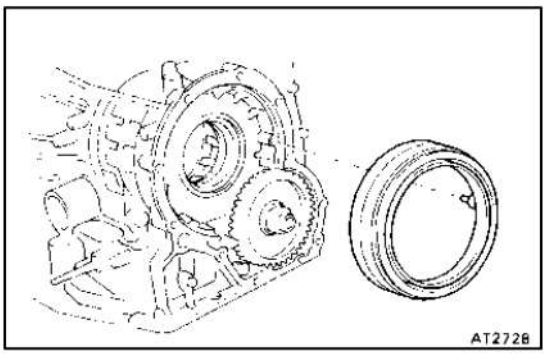


49. REMOVE OVERDRIVE UNIT WITH ALL PARTS

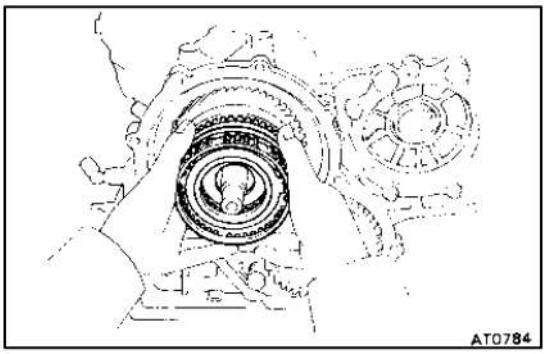
(a) Tap on the overdrive case circumference with a plastic hammer to remove the unit from the transaxle case.

(b) Remove the overdrive planetary gear and counter gear if they remained in the transaxle.

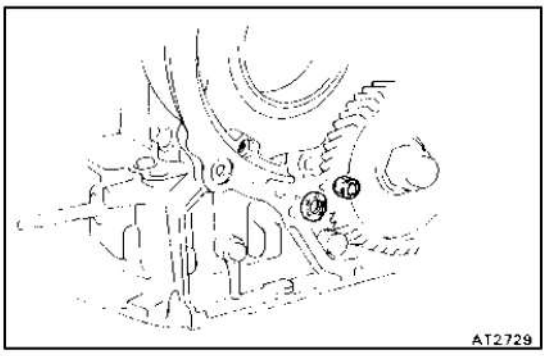
HINT: The overdrive unit is heavy, so be careful not to drop it.



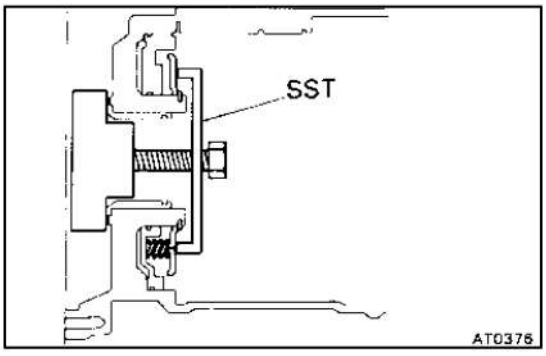
(c) Remove the overdrive brake drum from the transaxle case.



(d) Remove the overdrive planetary gear and counter gear if they remain in the transaxle.

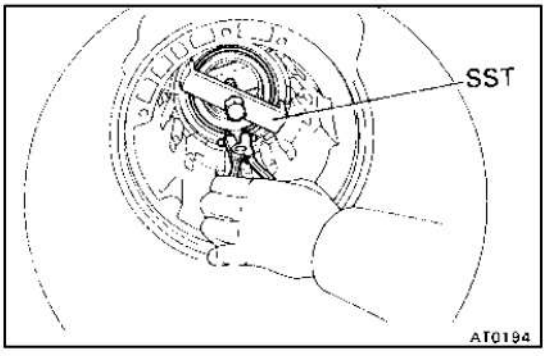


50. REMOVE OVERDRIVE CLUTCH APPLY GASKET AND OVERDRIVE BRAKEAPPLY GASKET

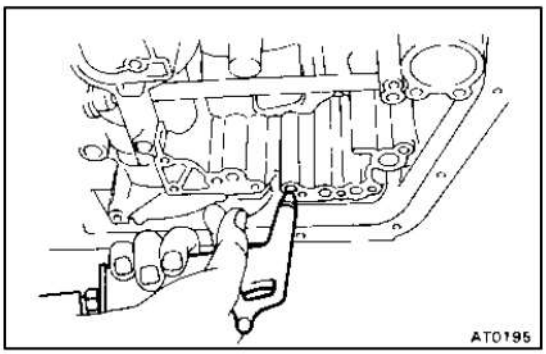


51. REMOVE PISTON RETURN SPRING

(a) Place SST, and compress the return springs evenly by tightening the bolt gradually.
SST 09350–32014 (09351–32040)

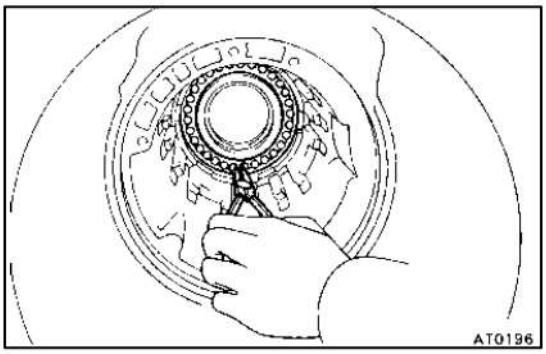


(b) Using snap ring pliers, remove the snap ring.
(c) Remove SST.
(d) Remove the return spring from the case.

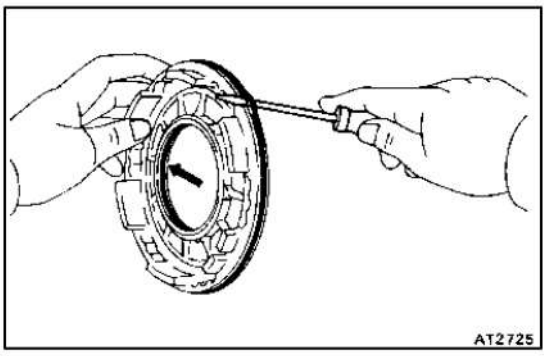


52. REMOVE FIRST AND REVERSE BRAKE PISTON

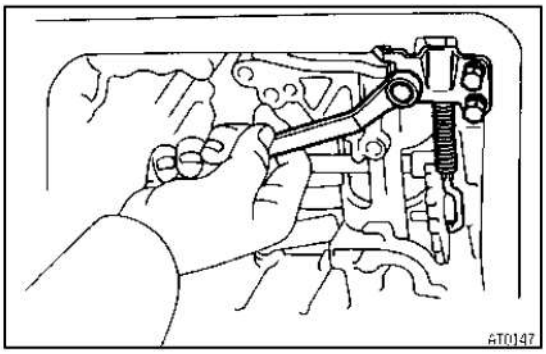
(a) Apply compressed air into the passage of the case to remove the piston.
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



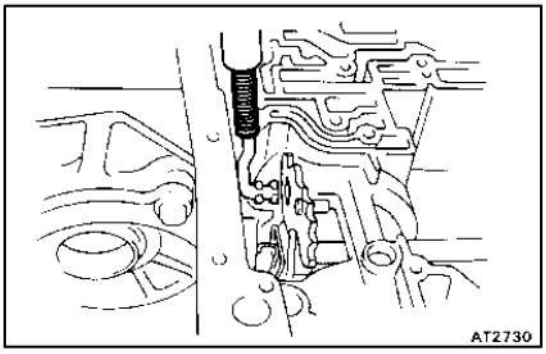
(b) If the piston does not pop out with compressed air, use needle–nose pliers to remove it.



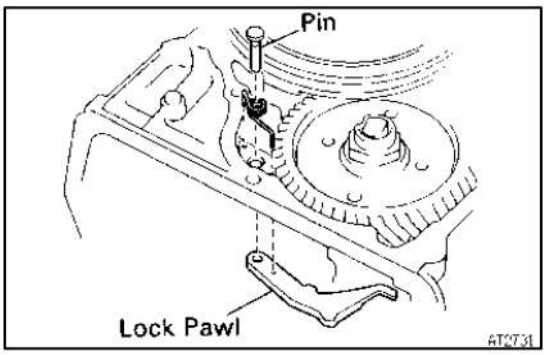
(c) Remove the 2 O–rings from the piston.



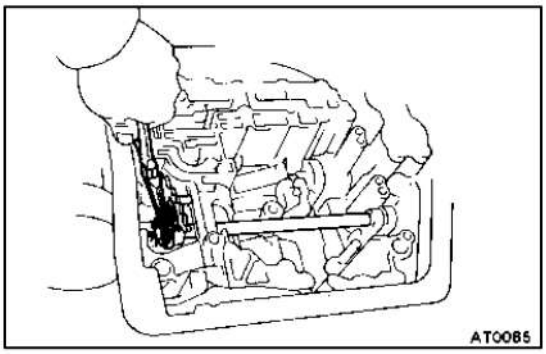
53. REMOVE PARKING LOCK PAWL BRACKET



54. REMOVE PARKING LOCK ROD

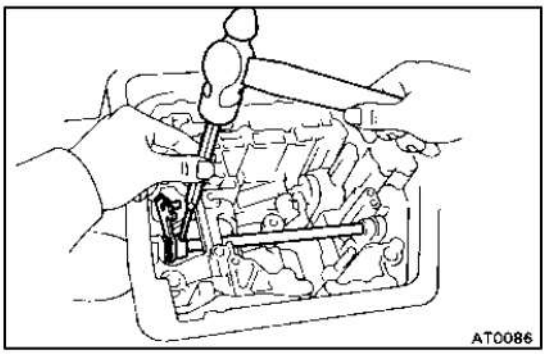


55. REMOVE PIN, SPRING AND PARKING LOCK PAWL



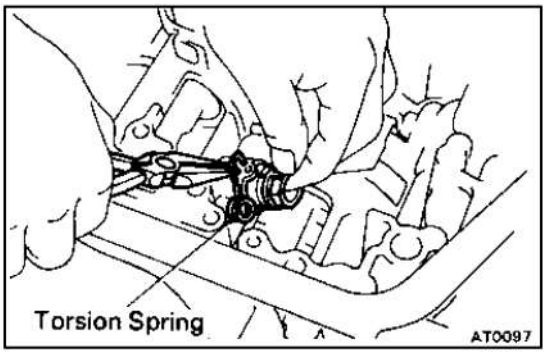
56. REMOVE MANUAL VALVE SHAFT

(a) Remove the retaining spring.

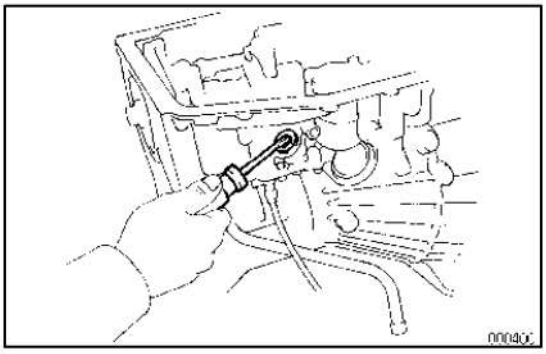


(b) Using a hammer and chisel, pry and turn the collar.

(c) Using a hammer and punch, drive out the pin.



(d) Slide out the shaft and remove the manual valve lever from the case.

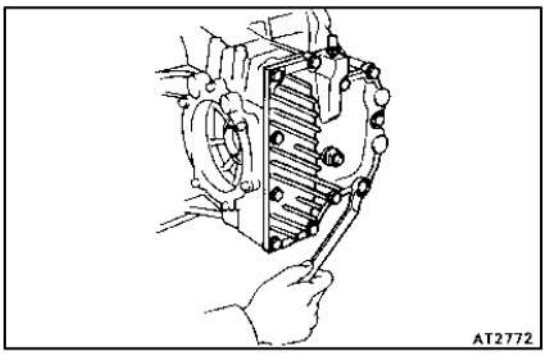


57. REMOVE MANUAL SHAFT OIL SEAL

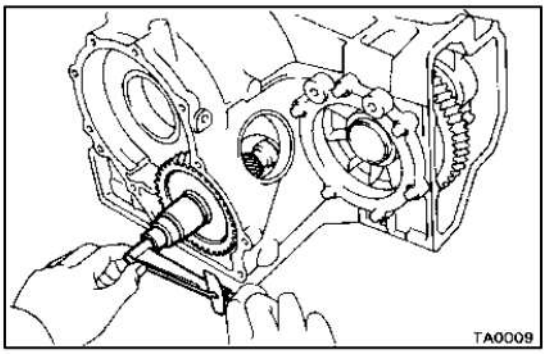
Remove the oil seal with a screwdriver.

AX0EX-02

DISASSEMBLY OF DIFFERENTIAL

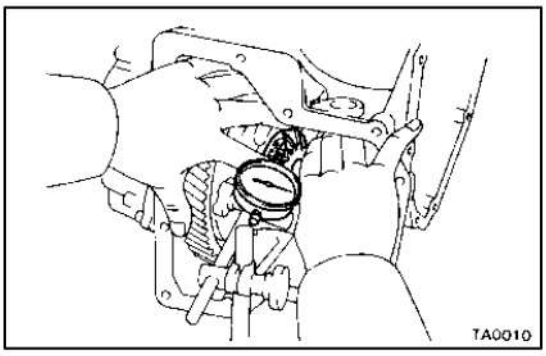


1. REMOVE CARRIER COVER



2. MEASURE TOTAL PRELOAD

Using a torque meter, measure the total preload, and note the measurement value.

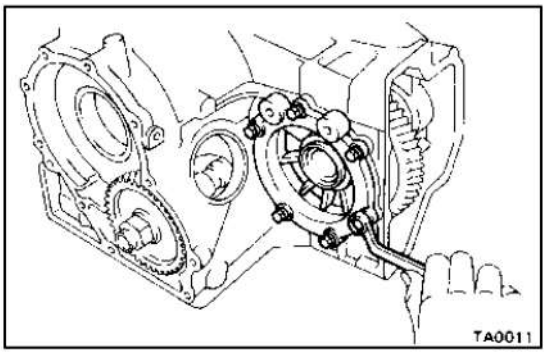


3. MEASURE BACKLASH OF SIDE GEAR

Measure each side gear backlash while holding one pinion toward the case.

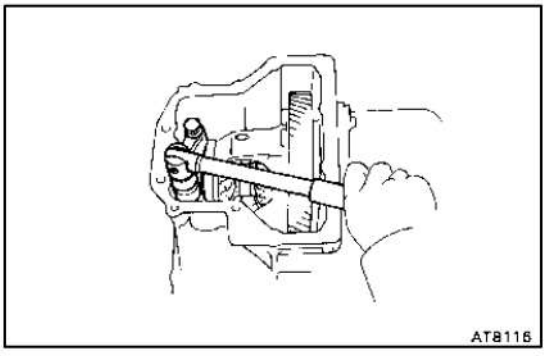
Standard backlash:

0.05 – 0.20 mm (0.0020 – 0.0079 in.)



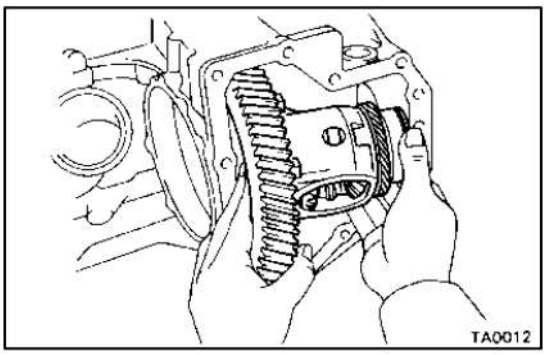
4. REMOVE LH BEARING RETAINER

(a) Remove the 6 bolts.
(b) Tap the retainer with a plastic hammer to remove it.
(c) Remove the O–ring from the retainer.



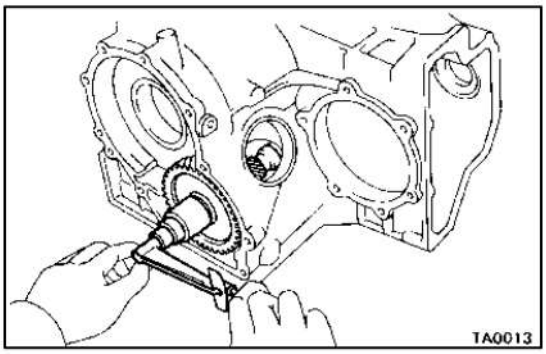
5. REMOVE RH SIDE BEARING CAP

Remove the 2 bolts and the side bearing cap.



6. REMOVE DIFFERENTIAL CASE, OUTER RACE AND ADJUSTING SHIM

Remove the differential case, the outer race and the adjusting shim from the case.



7. MEASURE DRIVE PINION PRELOAD

Using a torque meter, measure the drive pinion preload.

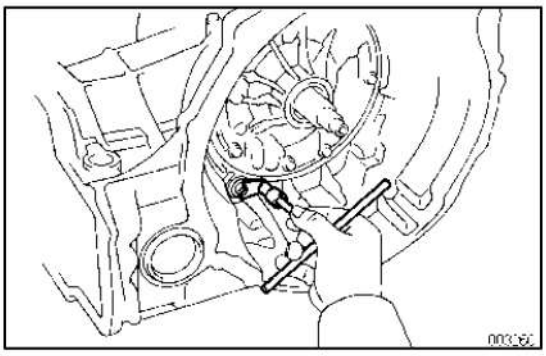
Preload (at starting):

Reused bearing

0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

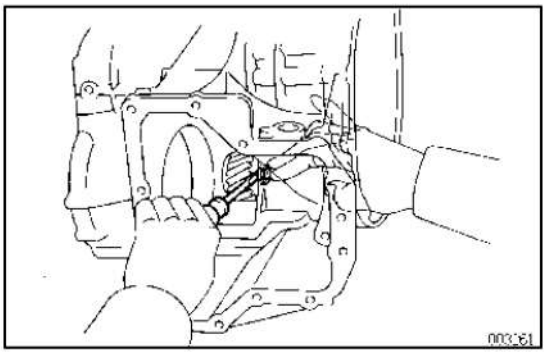
The total preload measured in step 2 minus the drive pinion preload equals 0.1 – 0.2 N·m (1.5 – 2.0 kgf·cm, 1.3 – 1.7in.·lbf).

If the result is not within this specification, the side bearing preload is bad.

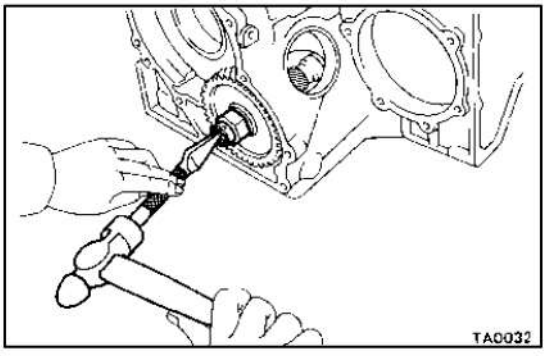


8. REMOVE DRIVE PINION CAP

(a) Remove the drive pinion cap installation bolt.

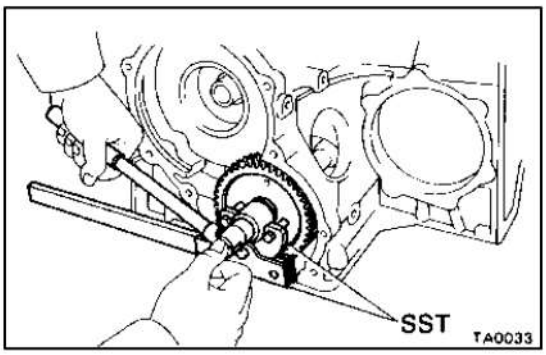


(b) Using a screwdriver, push out the drive pinion cap.

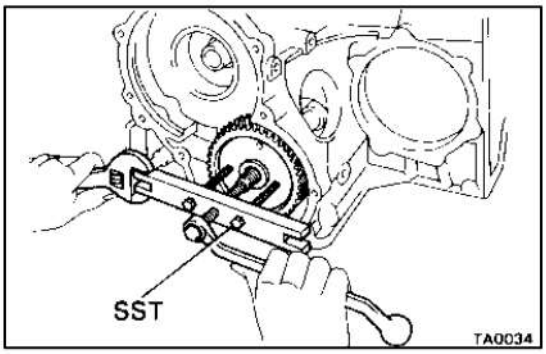


9. REMOVE COUNTER DRIVEN GEAR

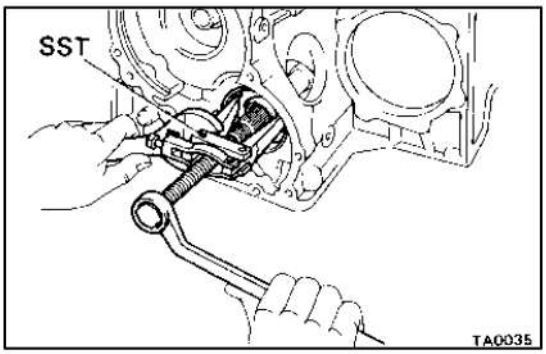
(a) Using a chisel, loosen the staked part of the nut.



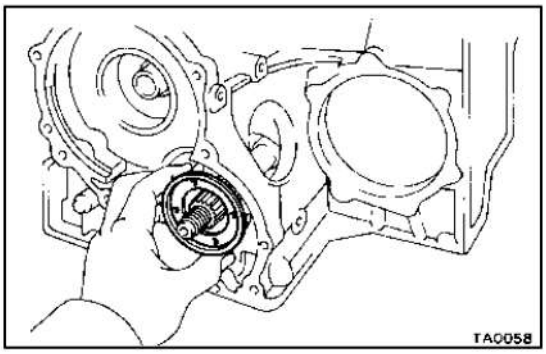
(b) Install SST onto the gear.
SST 09350–32014 (09351–32032)
(c) Using SST to hold the gear, remove the nut.
SST 09330–00021



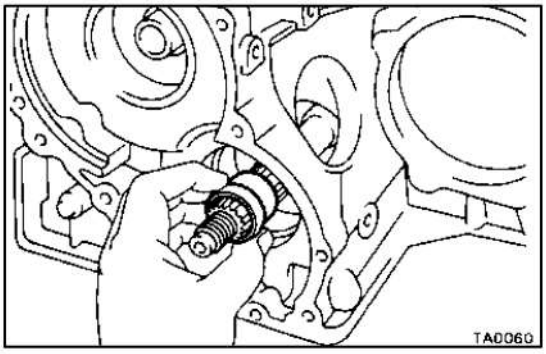
(d) Using SST, remove the gear and bearing.
SST 09350–32014 (09351–32061)



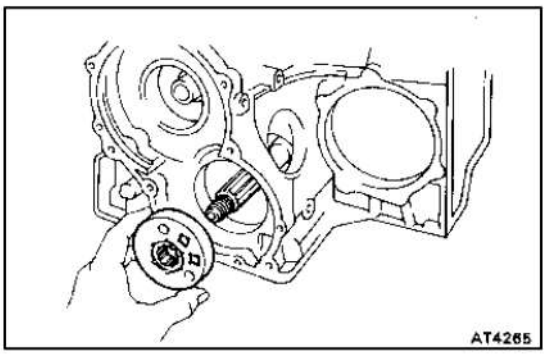
10. REMOVE OUTER RACE FROM CASE
Using SST, remove the outer race.
SST 09350–32014 (09308–10010)



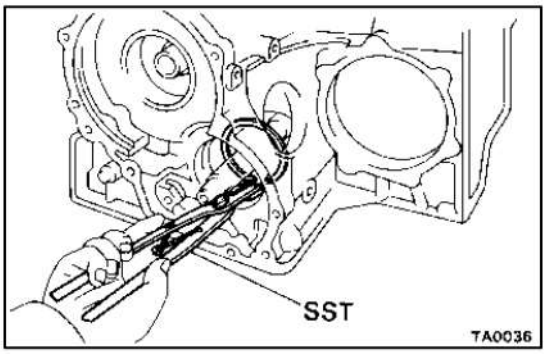
11. REMOVE OIL SLINGER



12. REMOVE SPACER

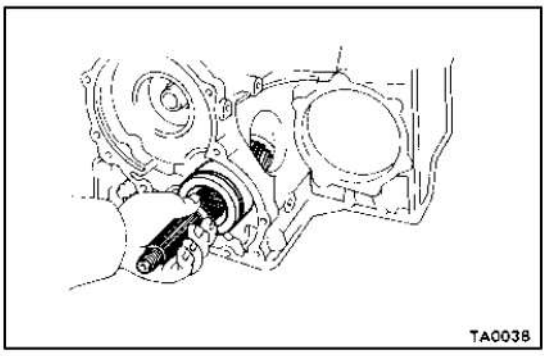


13. REMOVE ROTOR SENSOR



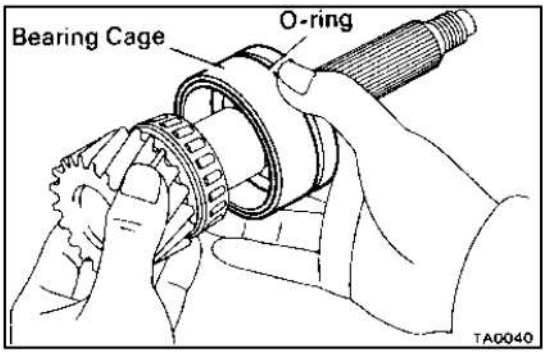
14. REMOVE DRIVE PINION

(a) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)



(b) Install a brass bar into case hole to tap out the drive pinion.

(c) Tap the drive pinion and remove the bearing cage from the bore.



15. REMOVE BEARING CAGE FROM DRIVE PINION

16. REMOVE O–RING FROM BEARING CAGE

COMPONENT PARTS

GENERAL NOTES

AX0EY-02

The instructions here are organized so that you work on only one component group at a time.
This will help avoid confusion from similar–looking parts of different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the converter housing side.
As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.

Recommended fluid for the automatic transaxle:

DEXRON ® @@@@@: [g 2]

GENERAL CLEANING NOTES:

1. All disassembled parts should be washed clean and any fluid passages and holes blown through with compressed air.
2. When using compressed air to dry parts, always aim away from yourself to prevent accidentally spraying automatic transmission fluid or kerosene in your face.
3. The recommended automatic transaxle fluid or kerosene should be used for cleaning.

PARTS ARRANGEMENT:

1. After cleaning, the parts should be arranged in the correct order to allow efficient inspection, repairs, and reassembly.
2. When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
3. New brakes and clutches that are to be used for replacement must be soaked in transaxle fluid for at least 15 minutes before assembly.

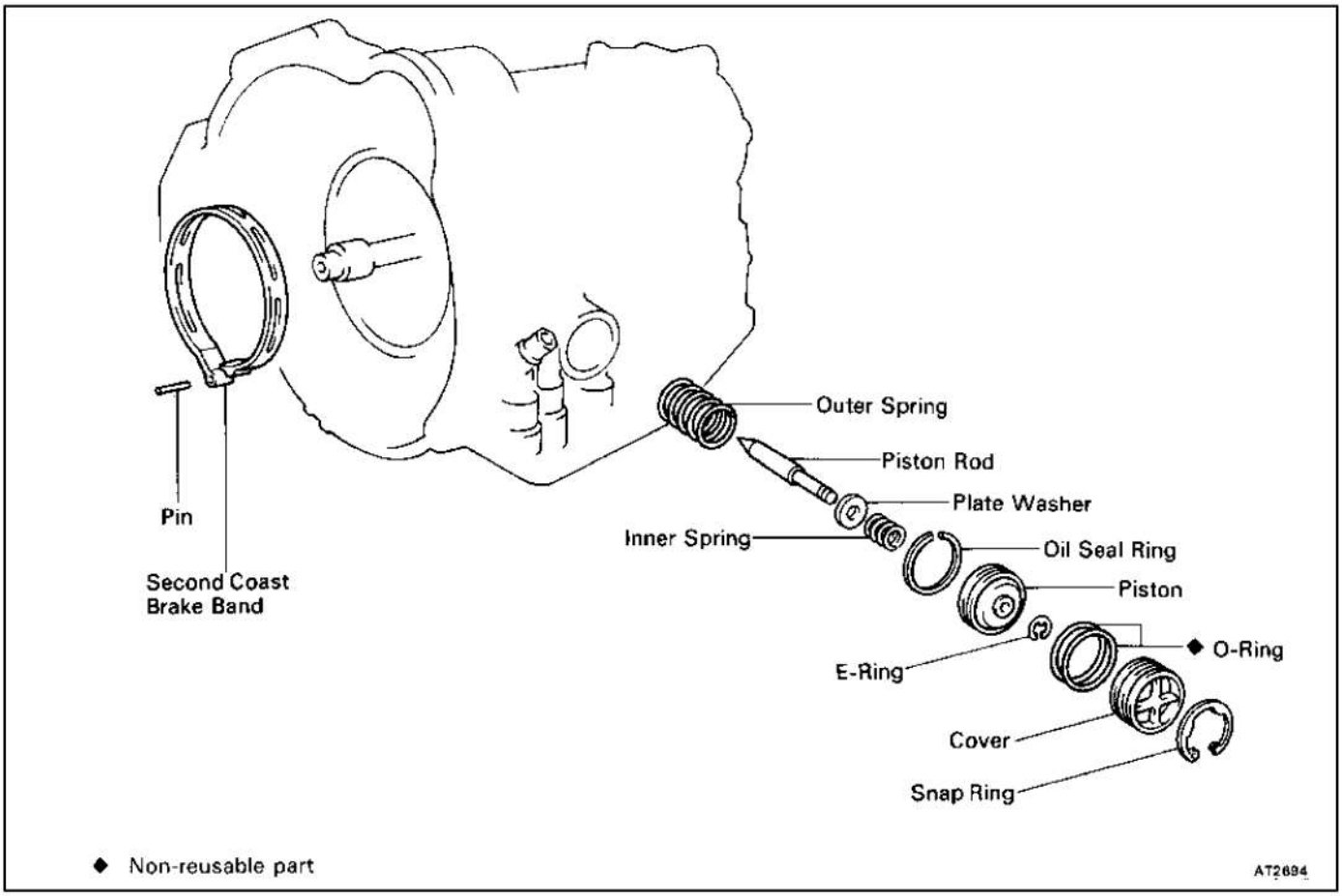
GENERAL ASSEMBLY:

1. All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
2. All gaskets and rubber O–rings should be replaced.
3. Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
4. If a worn bushing is to be replaced, the subassembly containing that bushing must be replaced.
5. Check thrust bearings and races for wear or damage. Replace if necessary.
6. Use petroleum jelly to keep parts in place.

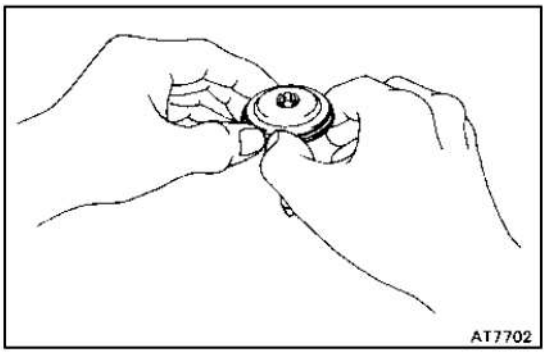
SECOND COAST BRAKE

COMPONENTS

AX0EZ-02



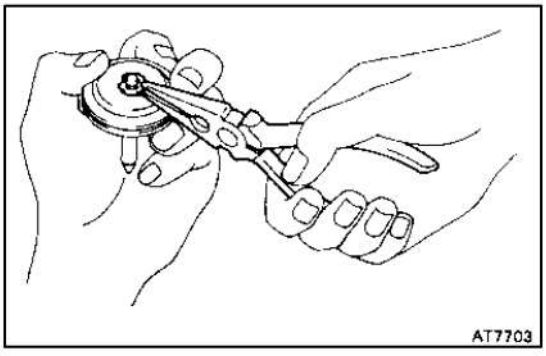
AX0F0-02



SECOND COAST BRAKE PISTON DISASSEMBLY

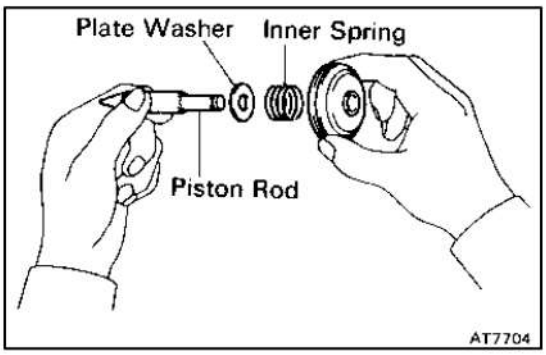
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

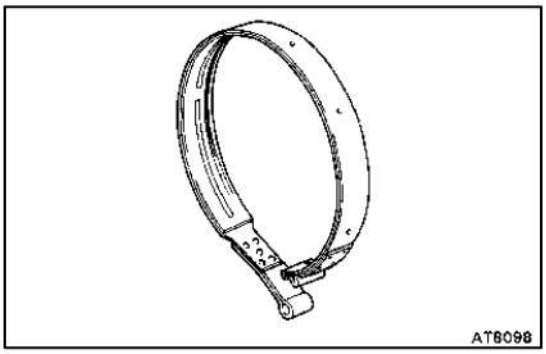


2. REMOVE PISTON ROD

(a) Remove the E–ring while pushing the piston with needle–nose pliers.



(b) Remove the spring, washer and piston rod.

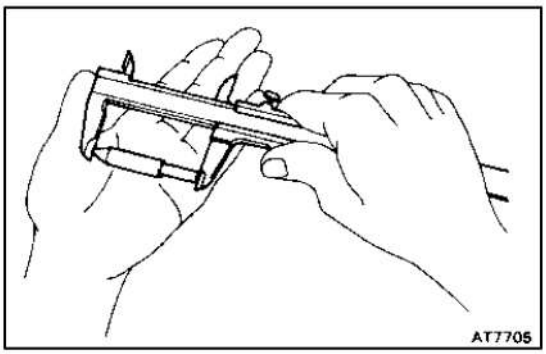


SECOND COAST BRAKE INSPECTION

AX0F1-02

INSPECT BRAKE BAND

If the lining of the brake band is peeling off or discolored, or even if a part of the printed numbers are defaced, replace the brake band.



SECOND COAST BRAKE PISTON ASSEMBLY

AX0F2-02

1. SELECT PISTON ROD

If the band is OK, but the piston stroke is not within the standard value, select a new piston rod.

Piston stroke:

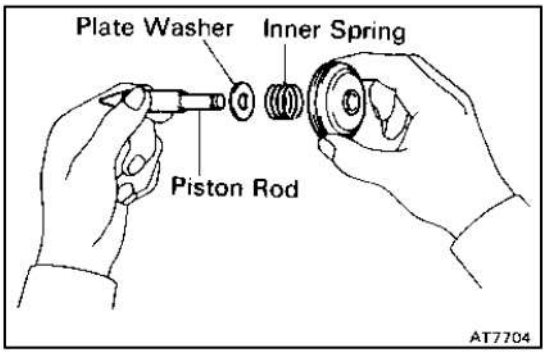
1.5 – 3.0 mm (0.059 – 0.118 in.)

There are 2 lengths of piston rod.

Piston rod length:

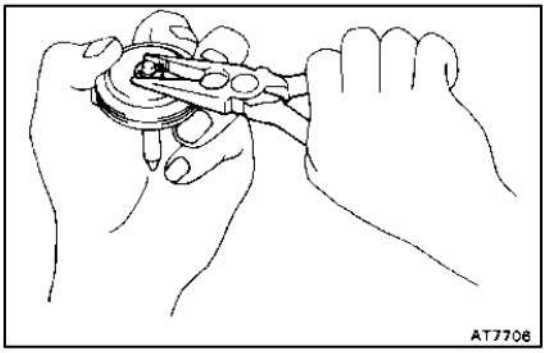
72.9 mm (2.870 in.)

71.4 mm (2.811 in.)

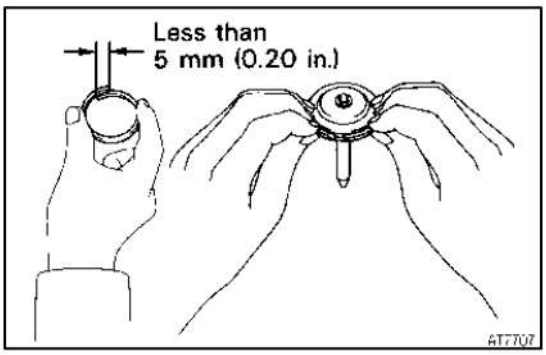


2. INSTALL PISTON ROD

(a) Install the washer and spring to the piston rod.



(b) Install an E–ring while pushing the piston.



3. INSTALL OIL SEAL RING

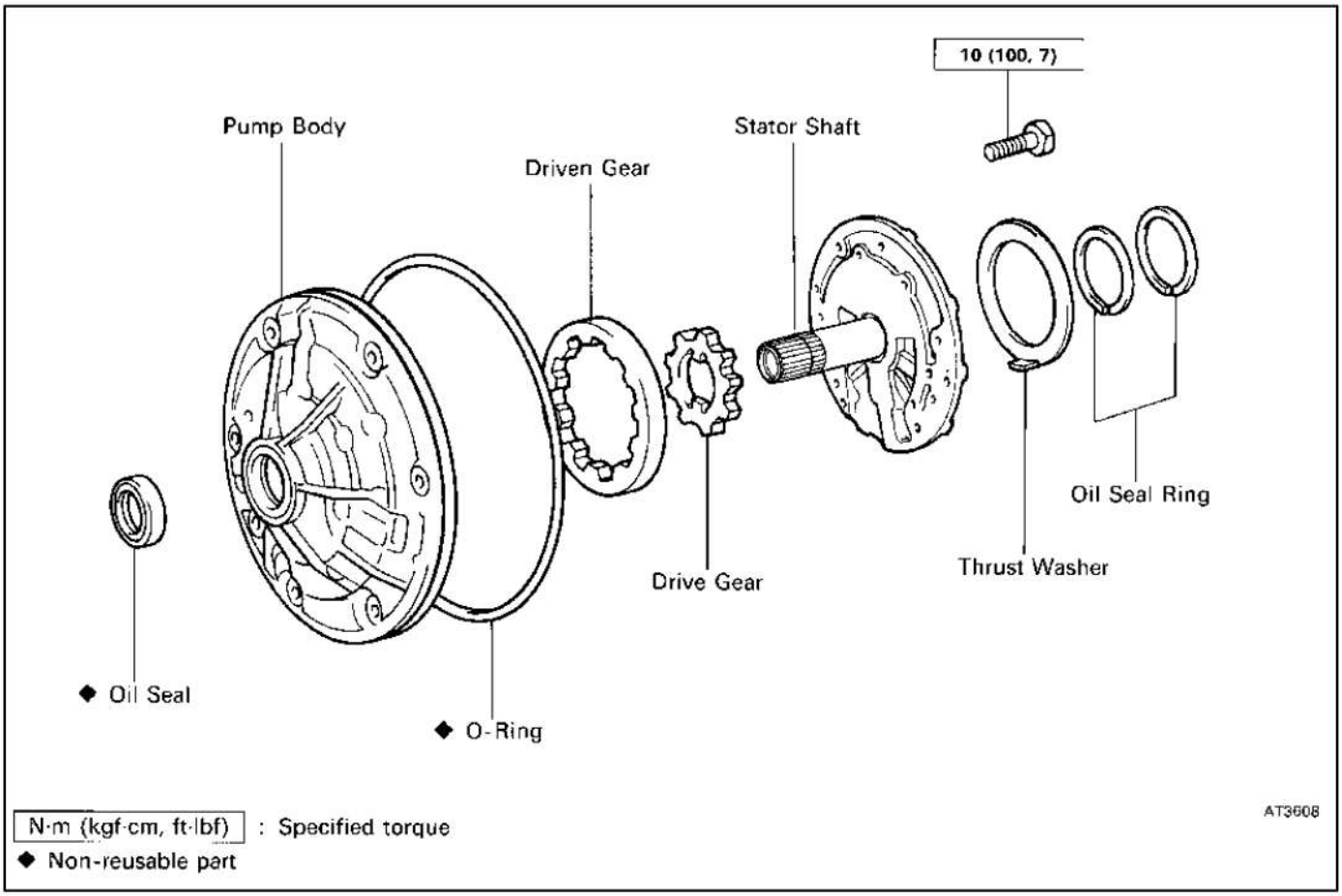
(a) Apply ATF to the oil seal ring.

(b) Install the oil seal ring to the piston.

NOTICE: Do not spread the ring ends more than necessary.

OIL PUMP
COMPONENTS

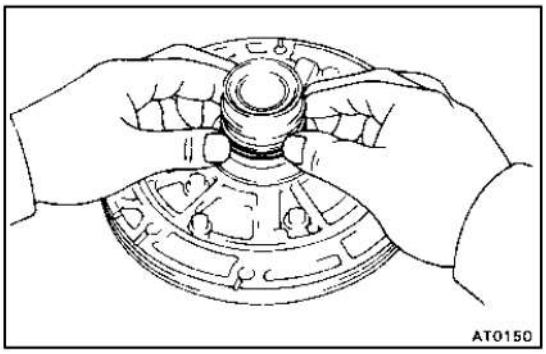
AX0F3-02



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

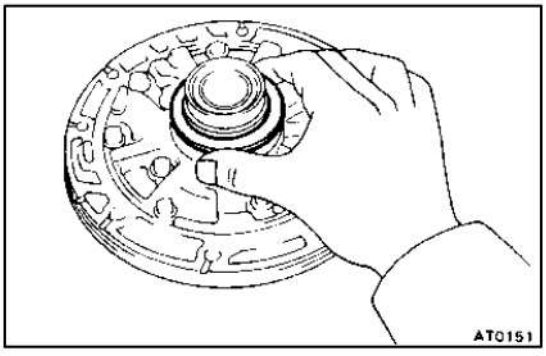
AX0F4-02

OIL PUMP DISASSEMBLY

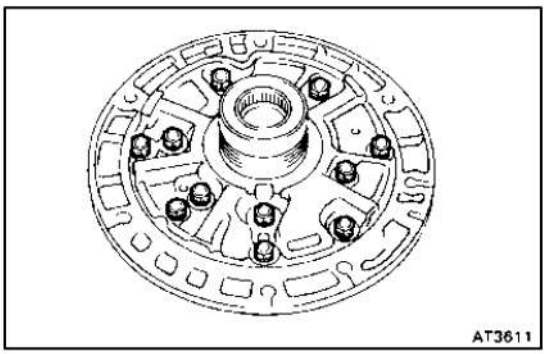


1. REMOVE OIL SEAL RINGS

Remove the 2 oil seal rings from the stator shaft back side.

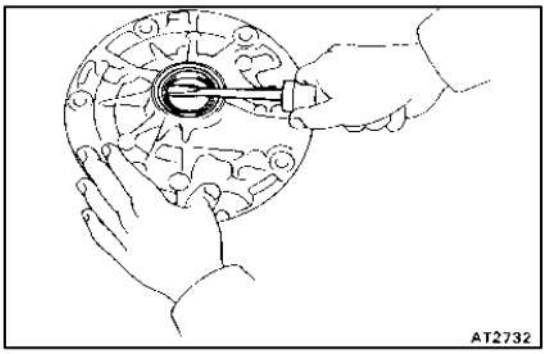


2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



3. REMOVE STATOR SHAFT

Remove the 11 bolts and stator shaft.
Keep the gears in assembly order.

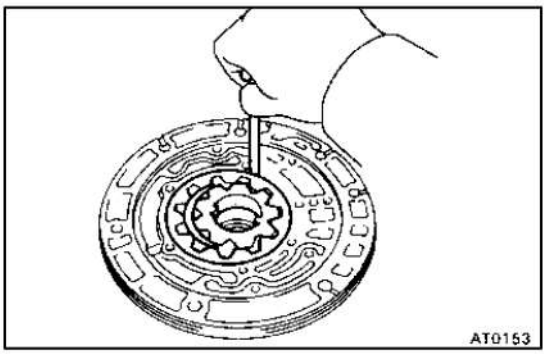


4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.

AX0F5-02

OIL PUMP BUSHING INSPECTION



1. CHECK BODY CLEARANCE OF DRIVEN GEAR

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

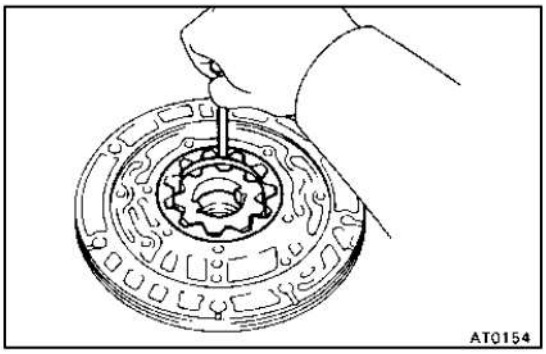
Standard body clearance:

0.07 – 0.15 mm (0.0028 – 0.0059 in.)

Maximum body clearance:

0.3 mm (0.012 in.)

If the body clearance is greater than the maximum, replace the oil pump body subassembly.



2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescent–shaped part of the pump body.

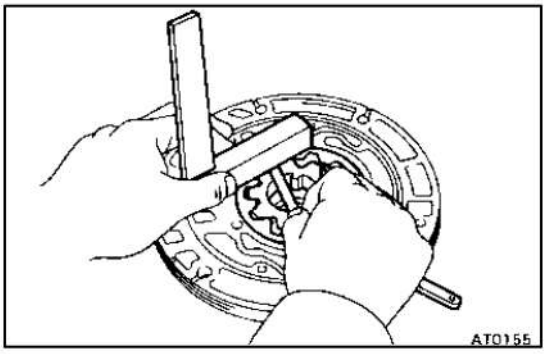
Standard tip clearance:

0.11 – 0.14 mm (0.0043 – 0.0055 in.)

Maximum tip clearance:

0.3 mm (0.012 in.)

If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and a 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:

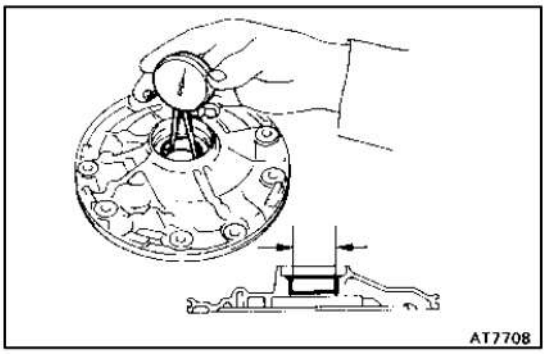
0.1 mm (0.004 in.)

There are 3 different thicknesses for drive and driven gears.

Drive and driven gear thickness

Mark	Thickness mm (in.)
A	9.440 – 9.456 (0.3717 – 0.3723)
B	9.456 – 9.474 (0.3723 – 0.3730)
C	9.474 – 9.490 (0.3730 – 0.3736)

If the thickest gear cannot make the side clearance within standard specification, replace the oil pump body subassembly.



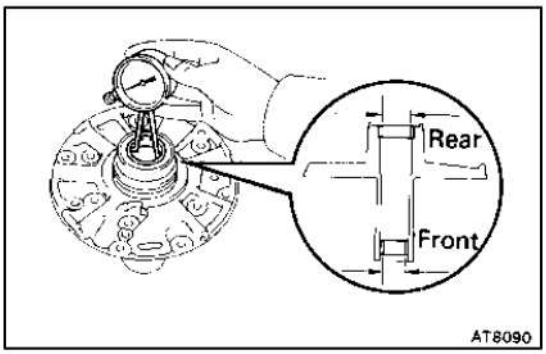
4. CHECK OIL PUMP BODY BUSHING

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

Maximum inside diameter:

38.18 mm (1.5031 in.)

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



5. CHECK STATOR SHAFT BUSHINGS

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

Maximum inside diameter:

Front side

21.57 mm (0.8492 in.)

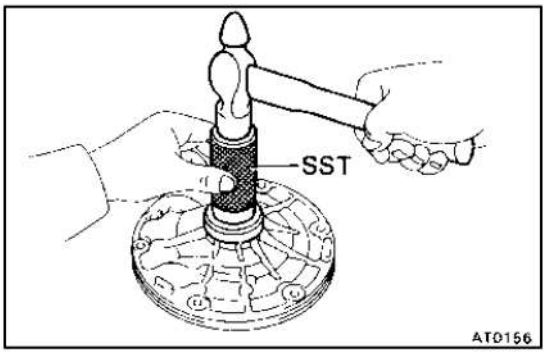
Rear side

27.07 mm (1.0657 in.)

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

AX0F6-02

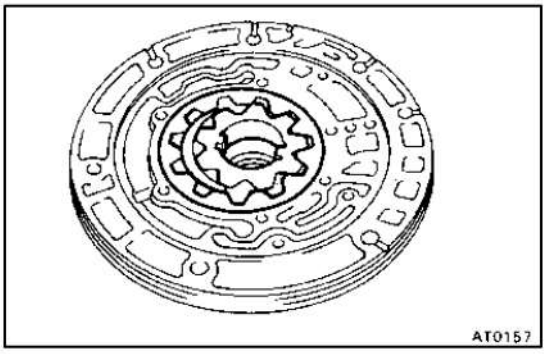
OIL PUMP ASSEMBLY



1. INSTALL FRONT OIL SEAL

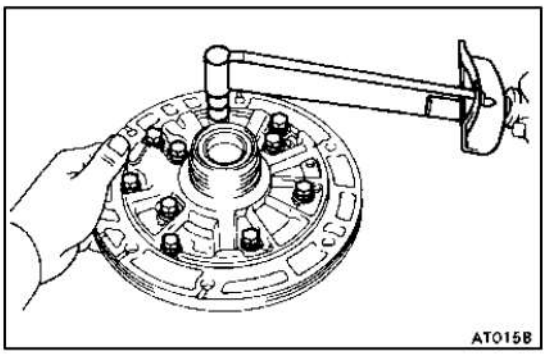
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350–32014 (09351–32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

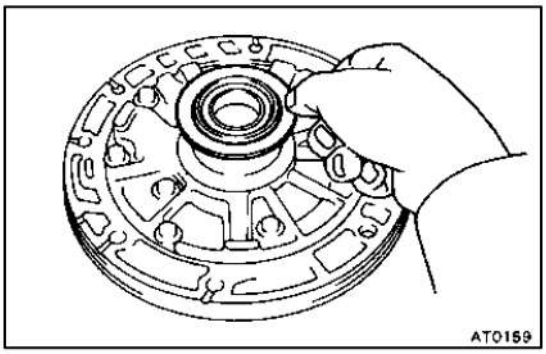


3. INSTALL STATOR SHAFT ONTO PUMP BODY

Align the stator shaft with each bolt hole.

4. TIGHTEN 11 STATOR SHAFT BOLTS

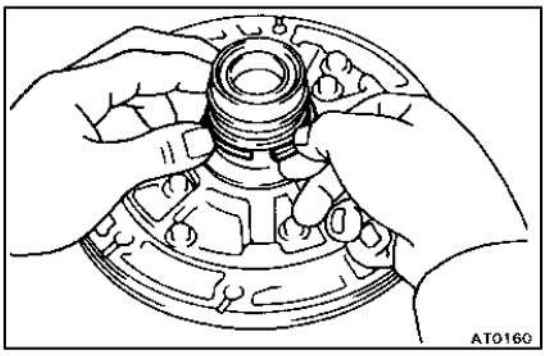
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



5. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollow of the pump body.

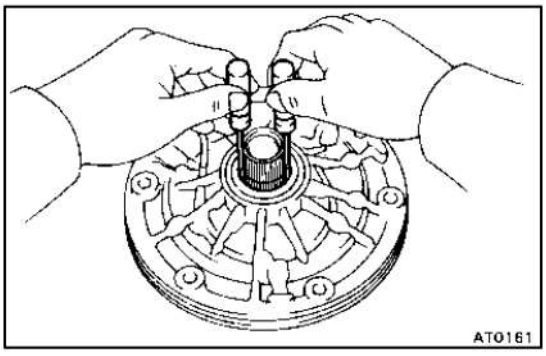


6. INSTALL 2 OIL SEAL RINGS ON OIL PUMP

Install 2 oil seal rings to the stator shaft groove, then snug them down by squeezing their ends together.

NOTICE: Do not spread the ring ends too much.

HINT: After installing the oil seal rings, check that they move smoothly.



7. CHECK PUMP DRIVE GEAR ROTATION

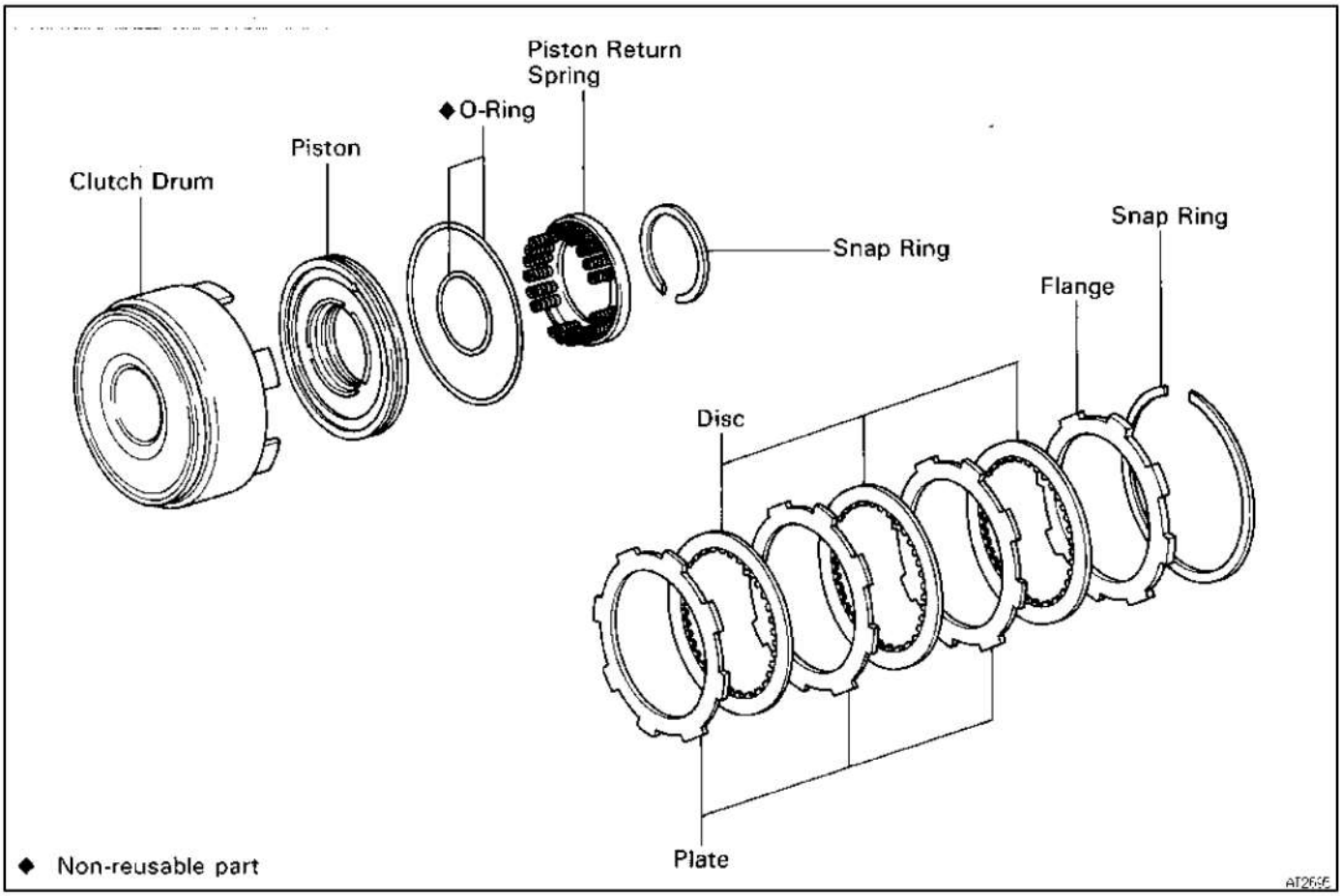
Turn the drive gear with screwdrivers and make sure that it rotates smoothly.

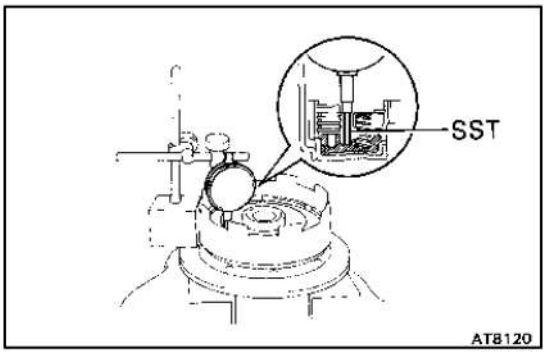
NOTICE: Be careful not to damage the oil seal lip.

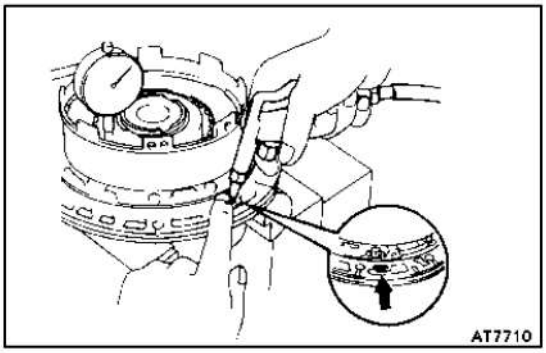
DIRECT CLUTCH

COMPONENTS

AX0GT-02







AX0F7-02

DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

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

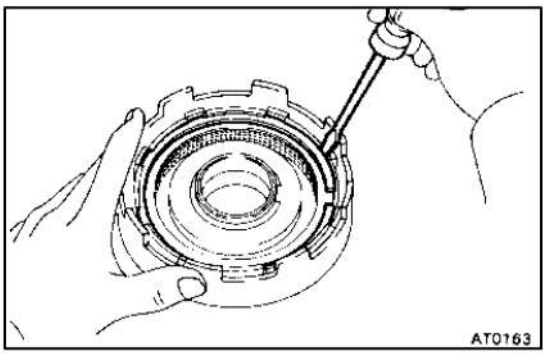
(b) Set a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57 – 114 psi).

SST 09350–32014 (09351–32190)

Piston stroke:

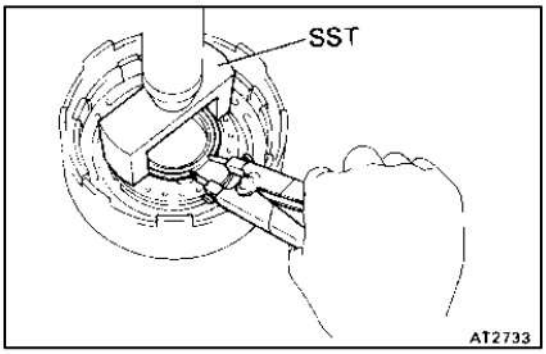
1.11 – 1.44 mm (0.0437 – 0.0567 in.)

If the piston stroke is greater than the maximum inspect each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM

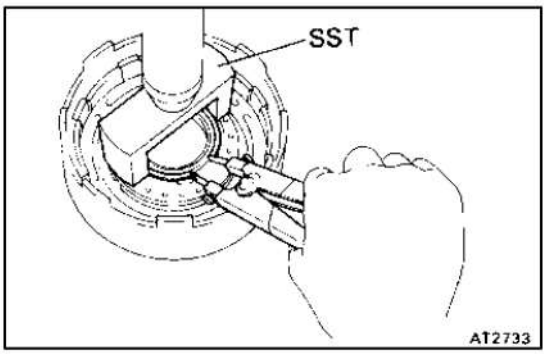
3. REMOVE FLANGE, DISCS AND PLATES



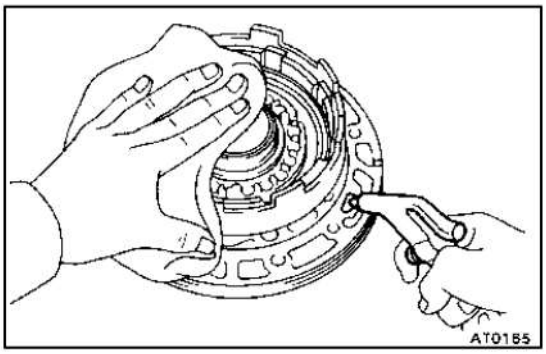
4. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a shop press.
SST 09350–32014 (09351–32070)

(b) Remove the snap ring with the snap ring pliers.



(c) Remove the piston return spring.

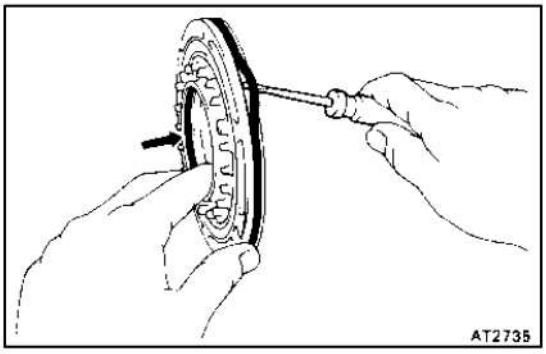


5. REMOVE CLUTCH PISTON

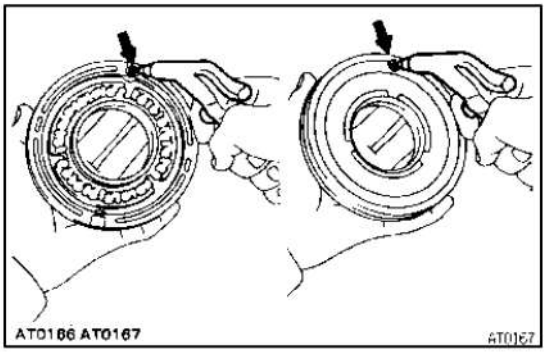
(a) Install the direct clutch onto the oil pump.

(b) Apply compressed air to the oil pump to remove the piston. (if the piston does not come out completely, use needle–nose pliers to remove it).

(c) Remove the direct clutch from the oil pump.



(d) Remove the 2 O–rings from the piston.

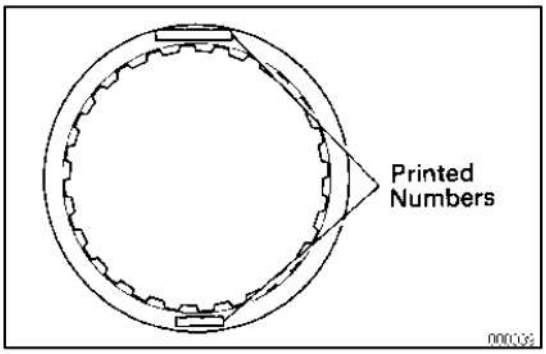


AX0F8-02

DIRECT CLUTCH INSPECTION

1. INSPECT CLUTCH PISTON

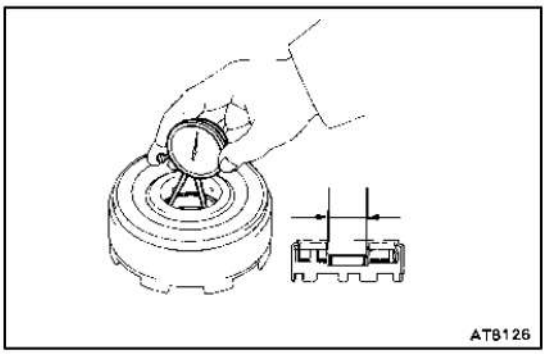
(a) Check that the check ball is free by shaking the piston.
(b) Check that the valve does not leak by applying lowpressure compressed air.



2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.
HINT:

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



3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the direct clutch bushing.

Maximum inside diameter:

47.07 mm (1.8531 in.)

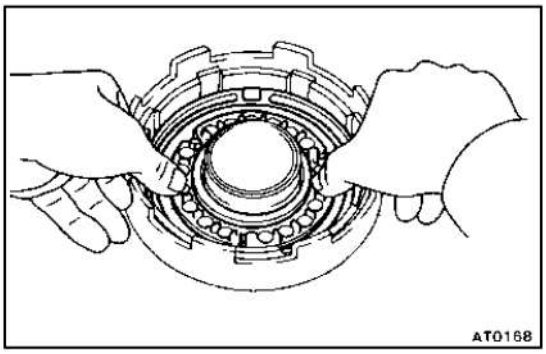
If the inside diameter is greater than the maximum, replace the direct clutch.

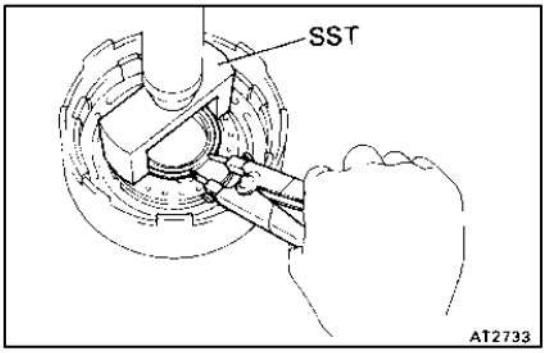
AX0F9-02

DIRECT CLUTCH ASSEMBLY

1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

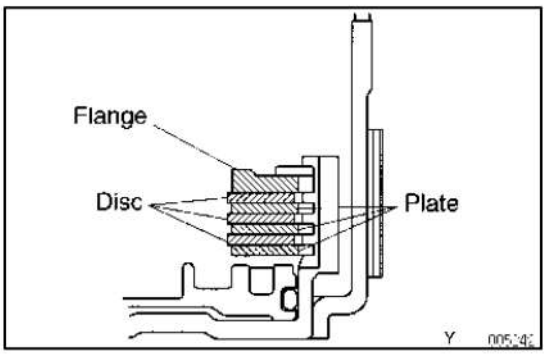
(a) Install new O–rings to the piston. Coat the O–rings with ATF.
(b) Being careful not to damage the O–rings, press the piston into the drum with the cup side up.





2. INSTALL PISTON RETURN SPRING

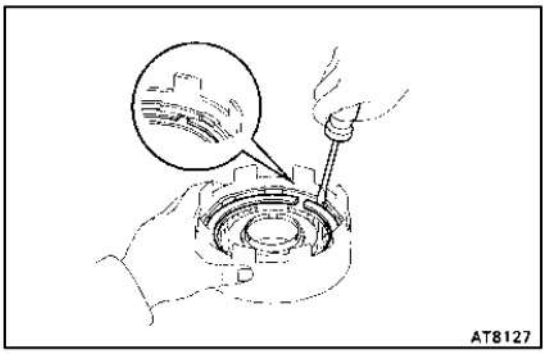
(a) Place the return spring and snap ring onto the piston.
(b) Place SST on the spring retainer, and compress the return spring with a shop press.
SST 09350–32014 (09351–32070)
(c) Install the snap ring with the snap ring pliers. Be sure the end gap of snap ring is not aligned with the spring retainer claw.



3. INSTALL PLATES, DISCS AND FLANGE

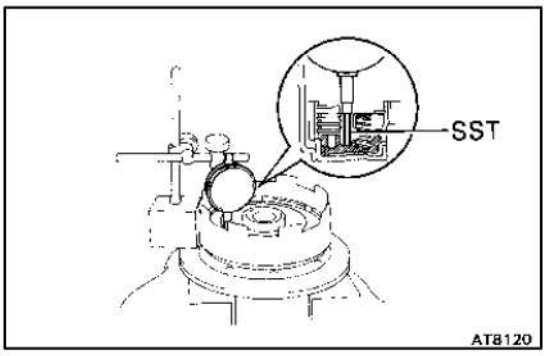
(a) Install plates and discs.
Install in order: P=Plate D=Disc
P – D – P – D – P – D

(b) Install the flange with the flat end facing downward.



4. INSTALL SNAP RING

Check that the end gap of the snap ring is not aligned with one of the cutouts.



5. RECHECK PISTON STROKE OF DIRECT CLUTCH

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

(b) Set a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57 – 114 psi).
SST 09350–32014 (09351–32190)

Piston stroke:

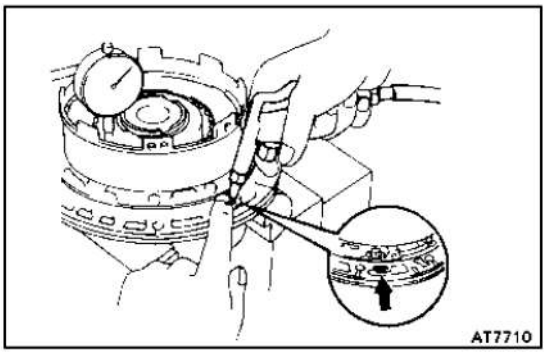
1.11 – 1.44 mm (0.0437 – 0.0567 in.)

If the piston stroke is non–standard, select another flange.

HINT: There are 2 different flange thickness.

Flange thickness:

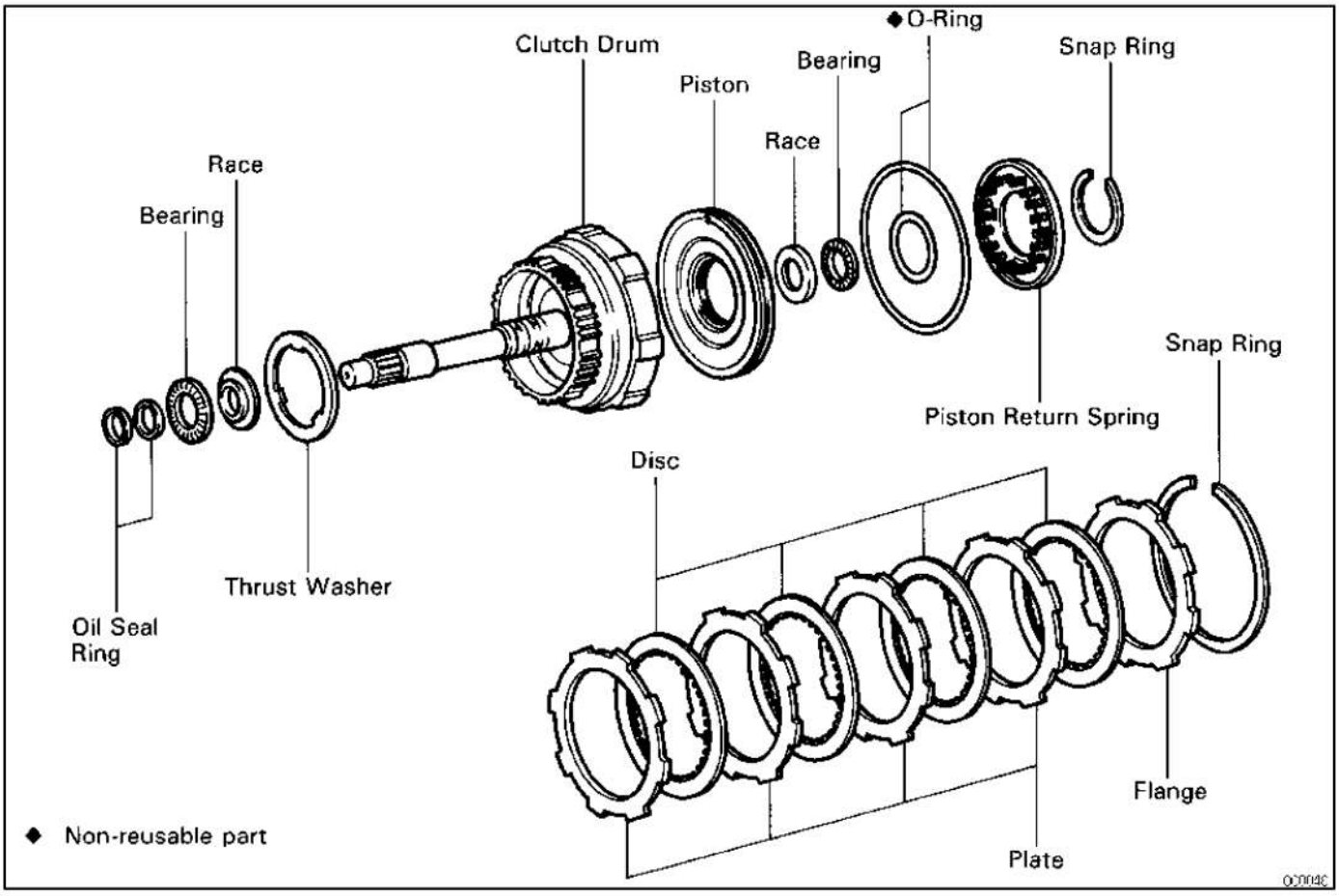
2.60 mm (0.1024 in.)
3.00 mm (0.1181 in.)

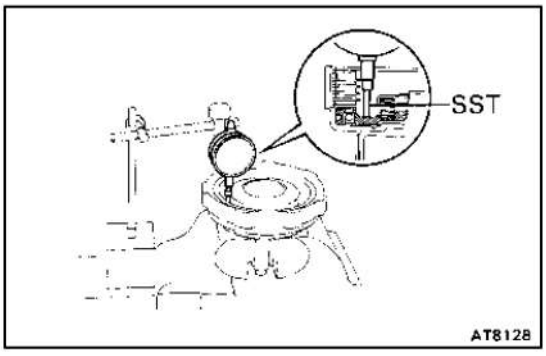


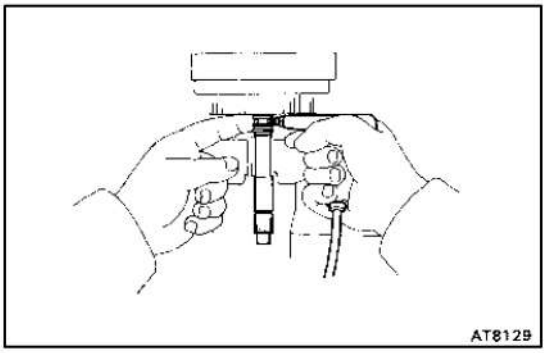
FORWARD CLUTCH

COMPONENTS

AX0FA-02







AX0FB-02

FORWARD CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF FORWARD CLUTCH

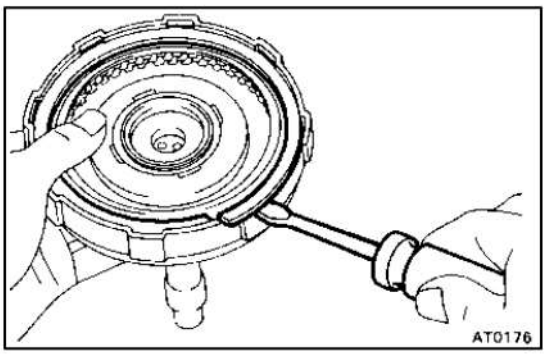
Set a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57 – 114 psi).

SST 09350–32014 (09351–32190)

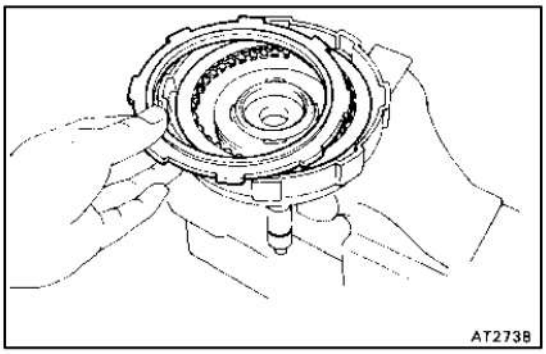
Piston stroke:

1.41 – 1.82 mm (0.0555 – 0.0717 in.)

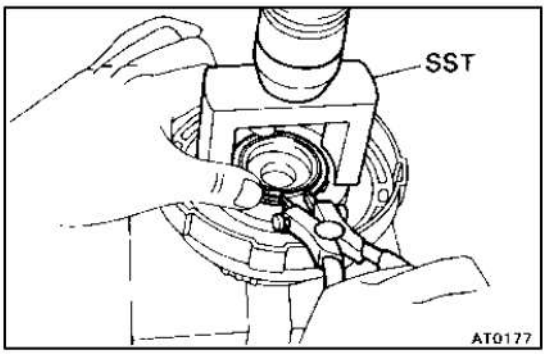
If the piston stroke is greater than the maximum inspect the each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM



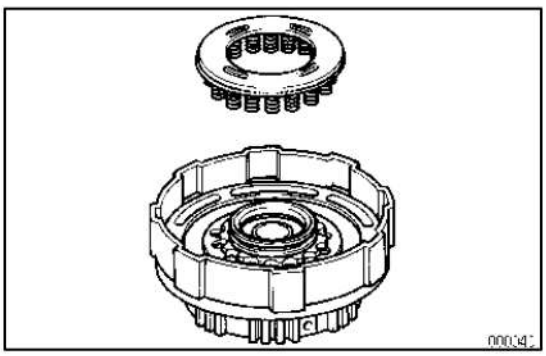
3. REMOVE FLANGE, DISCS AND PLATES



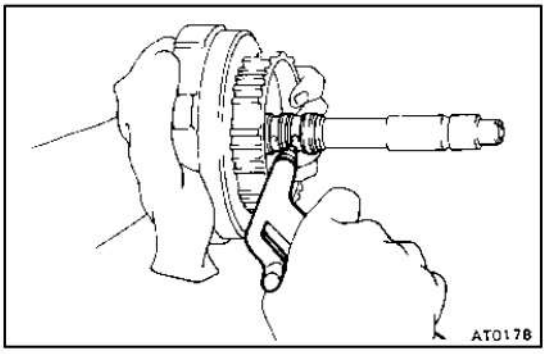
4. REMOVE RETURN SPRINGS

(a) Place SST on the spring retainer and compress the springs with a shop press.
SST 09350–32014 (09351–32070)

(b) Remove the snap ring with the snap ring pliers.

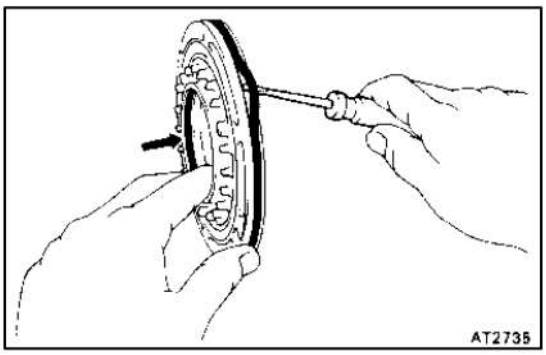


(c) Remove the piston return spring.

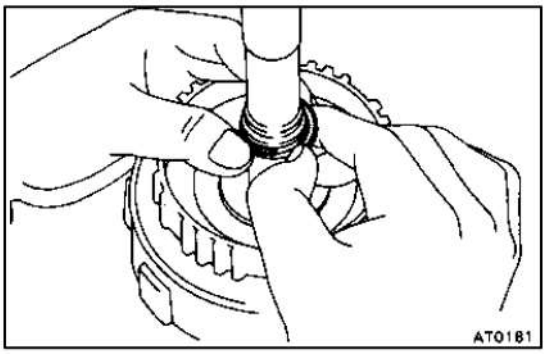


5. REMOVE CLUTCH PISTON

(a) Apply compressed air into the oil passage to remove the piston.
If the piston does not come out, use needle–nose pliers to remove it.



(b) Remove the 2 O–rings from the piston.



6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the 2 oil seal rings from the shaft.

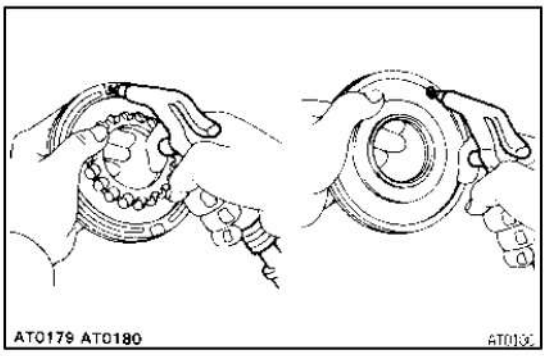
AX0FC–02

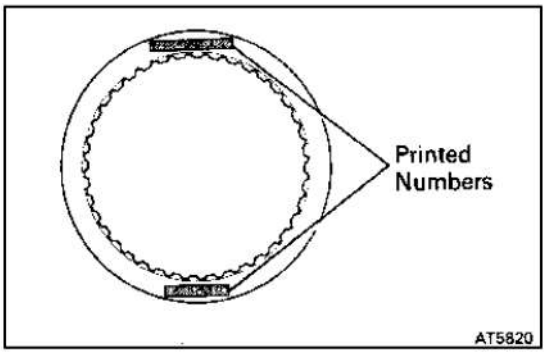
FORWARD CLUTCH INSPECTION

1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying lowpressure compressed air.





2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

AX0FD–02

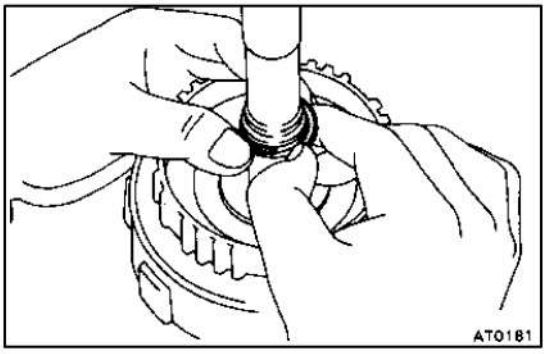
FORWARD CLUTCH ASSEMBLY

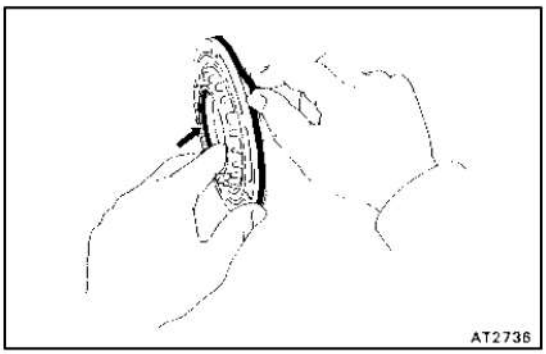
1. INSTALL OIL SEAL RINGS

Install the 2 oil seal rings to the shaft.

NOTICE: Do not spread the ring ends more than necessary.

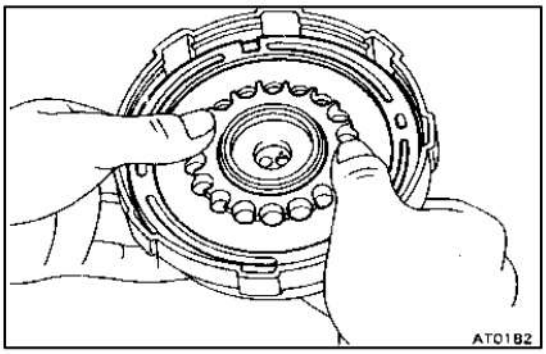
HINT: After installing the oil seal rings, check that they move smoothly.





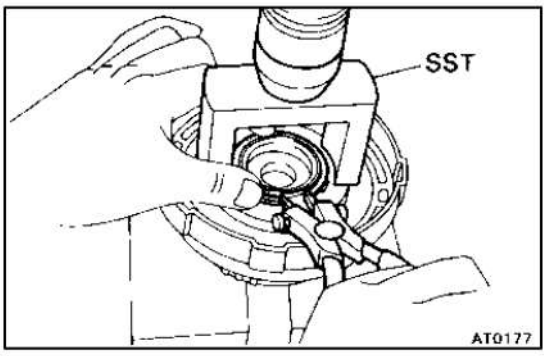
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

(a) Install the 2 new O–rings to the piston.



(b) Coat the O–rings with ATF.

(c) Press the piston into the drum with the cup side up, being careful not to damage the O–rings.

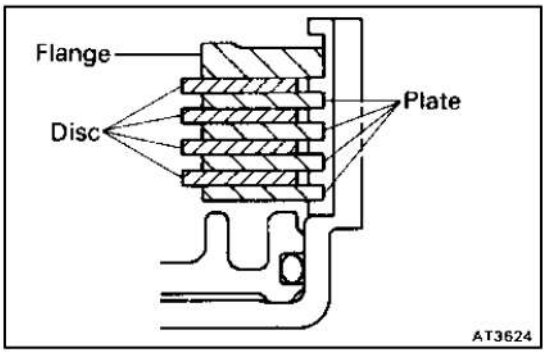


3. INSTALL PISTON RETURN SPRINGS

(a) Place the piston return spring and snap ring onto the piston.

(b) Place SST on the piston return spring, and compress the springs with a shop press.
SST 09350–32014 (09351–32070)

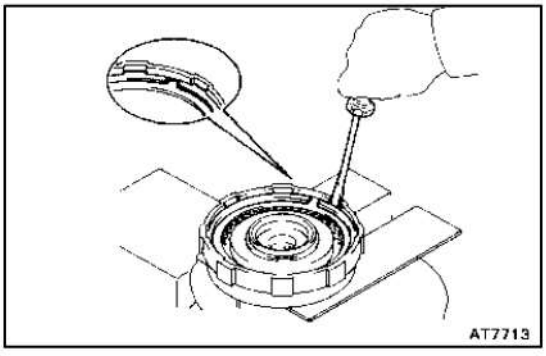
(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

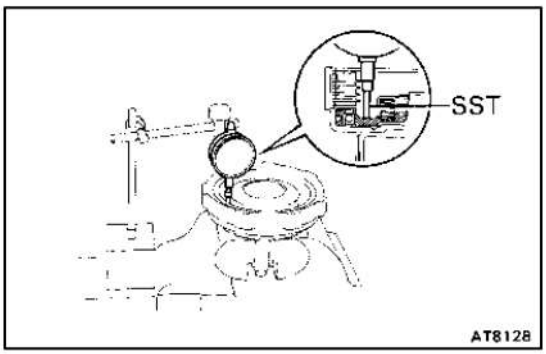
(a) Install the plates and discs.
Install in order: P=Plate D=Disc
P – D – P – D – P – D – P – D

(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.



6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Set a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57 – 114 psi).

SST 09350–32014 (09351–32190)

Piston stroke:

1.41 – 1.82 mm (0.0555 – 0.0717 in.)

If the piston stroke is less than the limit, parts may be misassembled and reinstall them.

If the piston stroke is non–standard, select another flange.

HINT: There are 5 different flange thickness.

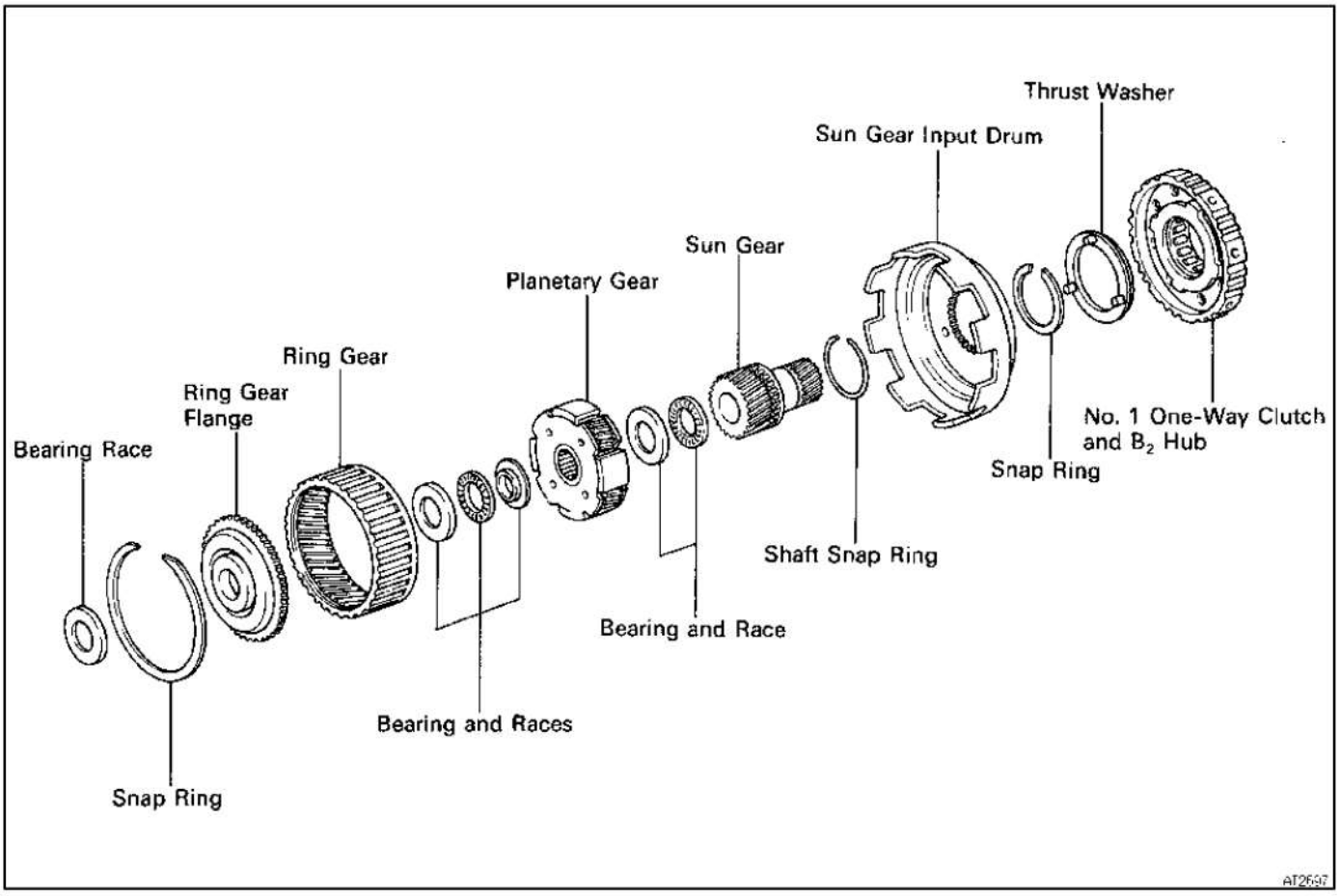
Flange thickness:

2.8 mm (0.110 in.)
3.0 mm (0.118 in.)
3.2 mm (0.126 in.)
3.4 mm (0.134 in.)
3.6 mm (0.142 in.)

FRONT PLANETARY GEAR

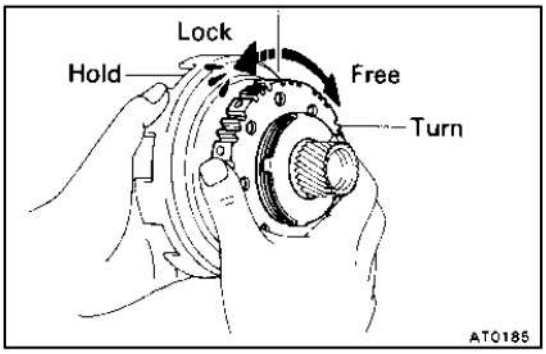
AX0FE-02

COMPONENTS



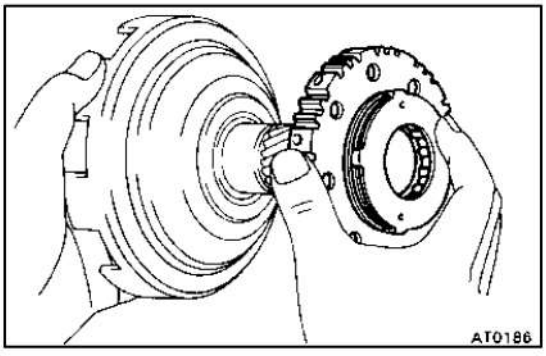
AX0FF-02

ONE–WAY CLUTCH AND SUN GEAR DISASSEMBLY



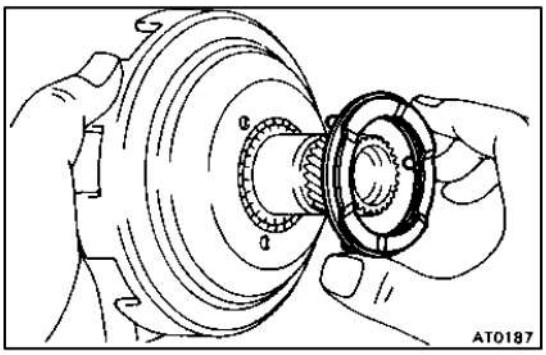
1. CHECK OPERATION OF ONE–WAY CLUTCH

Hold the sun gear and turn the hub. The hub should turn freely clockwise and should lock counterclockwise.

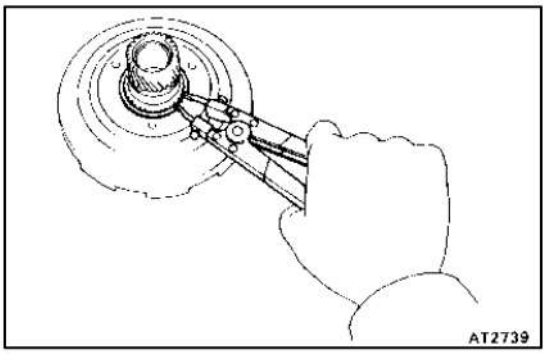


2. REMOVE SECOND BRAKE HUB AND ONE–WAY CLUTCH FRONT SUN GEAR

While turning the hub clockwise, remove the one–way clutch from the sun gear.



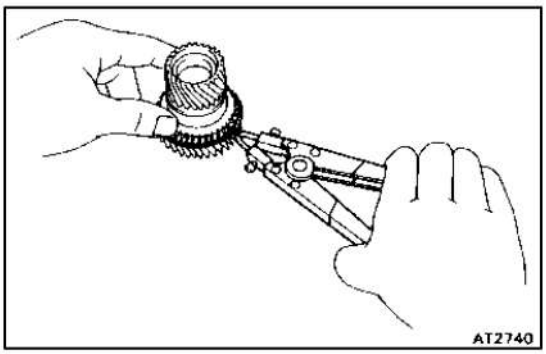
3. REMOVE THRUST WASHER FROM SUN GEAR INPUT DRUM



4. REMOVE SUN GEAR FROM DRUM

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

(b) Remove the sun gear from the drum.

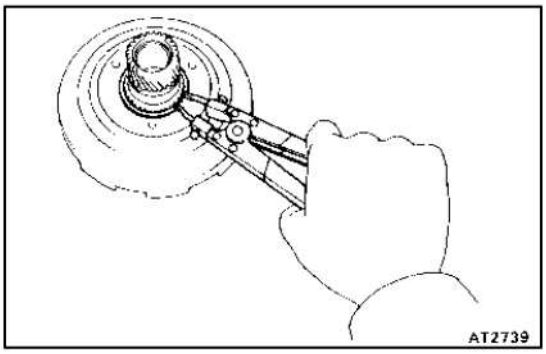


5. REMOVE SHAFT SNAP RING

Using snap ring pliers, remove the shaft snap ring from the sun gear.

AX0FG–02

ONE–WAY CLUTCH AND SUN GEAR ASSEMBLY

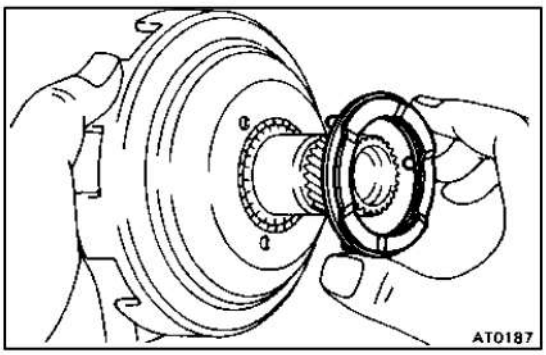


1. INSTALL SHAFT SNAP RING TO SUN GEAR

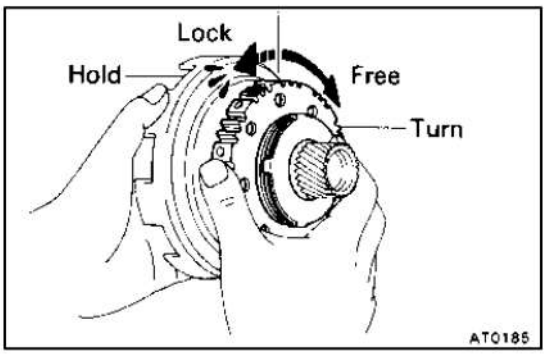
2. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

(b) Using snap ring pliers, install the snap ring to the drum.



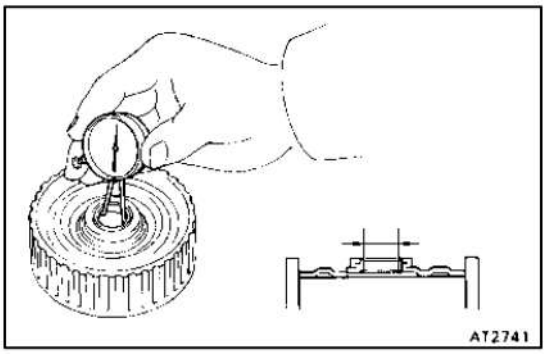
3. INSTALL THRUST WASHER TO SUN GEAR INPUT DRUM



4. INSTALL ONE–WAY CLUTCH AND SECOND BRAKE HUB ON SUN GEAR

While turning the hub clockwise, slide the one–way clutch onto the sun gear.

5. RECHECK OPERATION OF ONE–WAY CLUTCH



PLANETARY RING GEAR INSPECTION

AX0FH–02

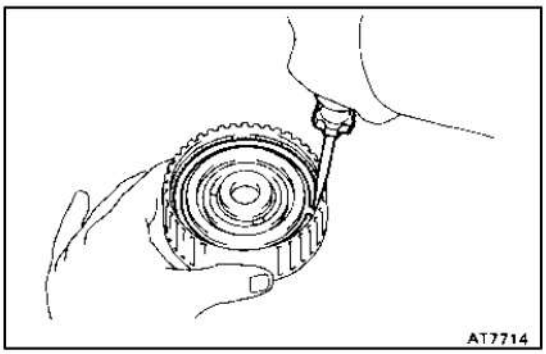
1. INSPECT RING GEAR FLANGE BUSHING

Using a dial indicator, measure the inside diameter of the flange bushing.

Standard inside diameter:

19.025 – 19.050 mm (0.7490 – 0.7500 in.)

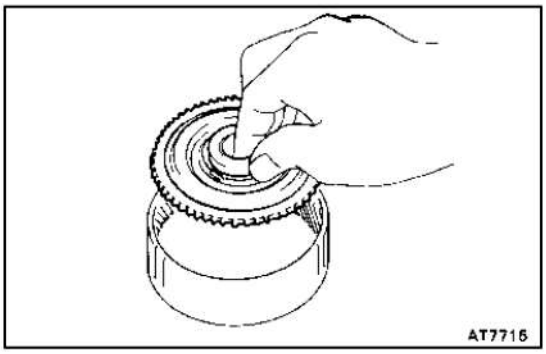
If the inside diameter is greater than the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

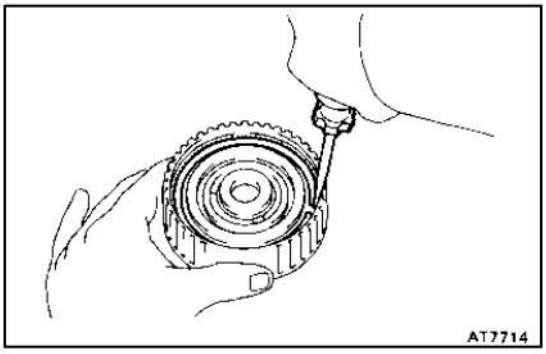
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

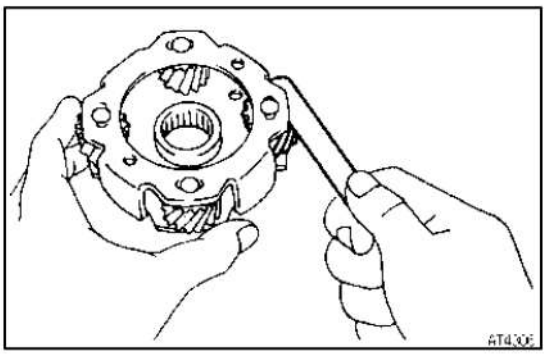


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



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



FRONT PLANETARY GEAR INSPECTION

AX0FJ-02

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

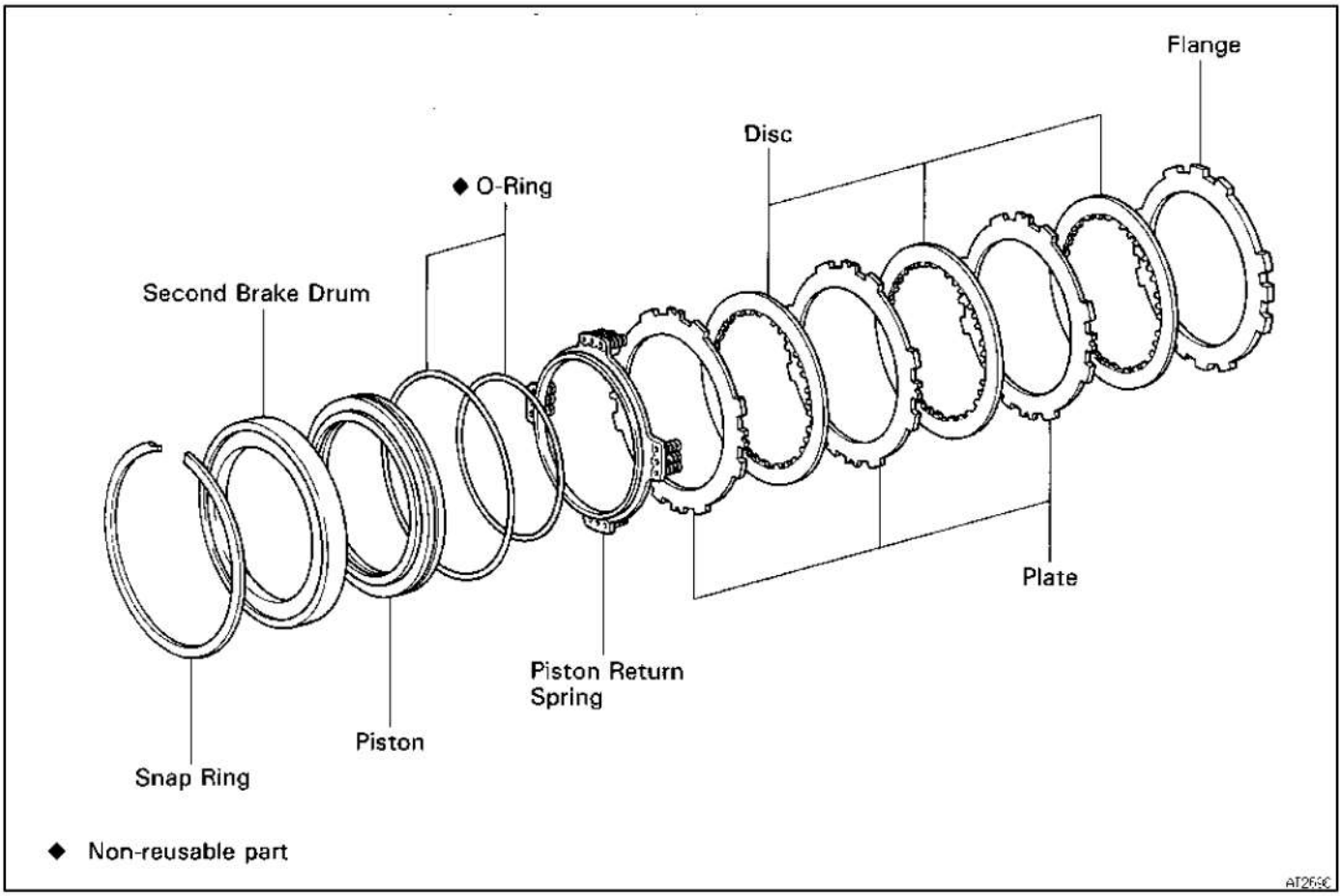
Using a feeler gauge, measure the planetary pinion gear thrust clearance.

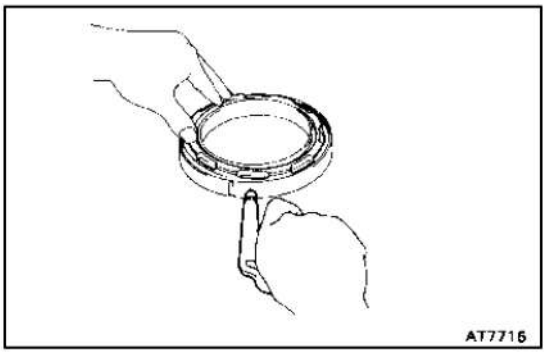
Standard clearance:

0.20 – 0.50 mm (0.0079 – 0.0197 in.)

SECOND BRAKE
COMPONENTS

AX0FK-02



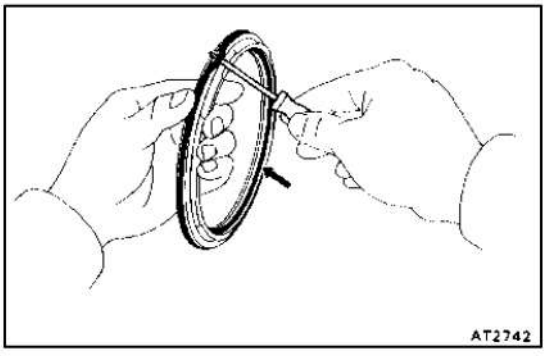


SECOND BRAKE PISTON DISASSEMBLY

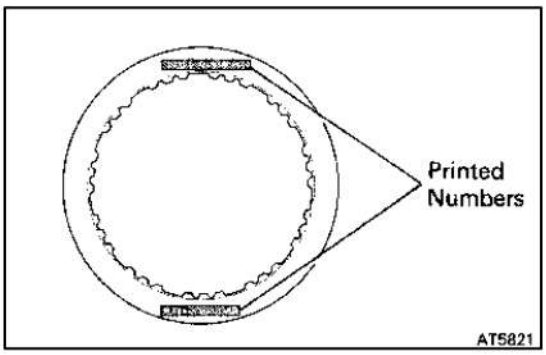
AX0FL-02

REMOVE SECOND BRAKE PISTON

(a) Apply compressed air to the oil hole to remove the piston.



(b) Remove the 2 O–rings from the piston.



AX0FM–02

SECOND BRAKE INSPECTION

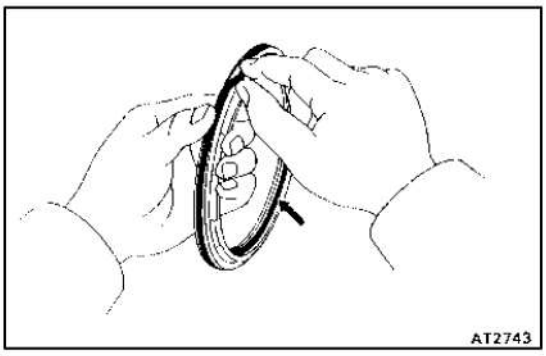
INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surface of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



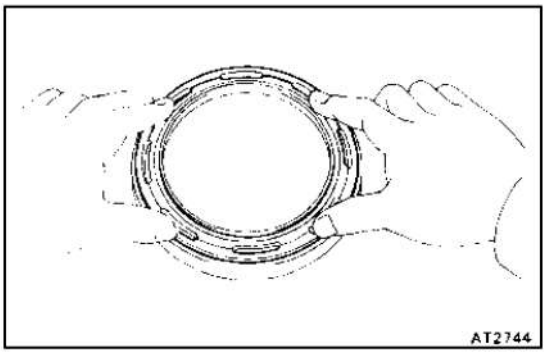
AX0FN–02

SECOND BRAKE PISTON ASSEMBLY

INSTALL PISTON

(a) Coat a new O–ring with ATF.

(b) Install the 2 O–rings on the piston.

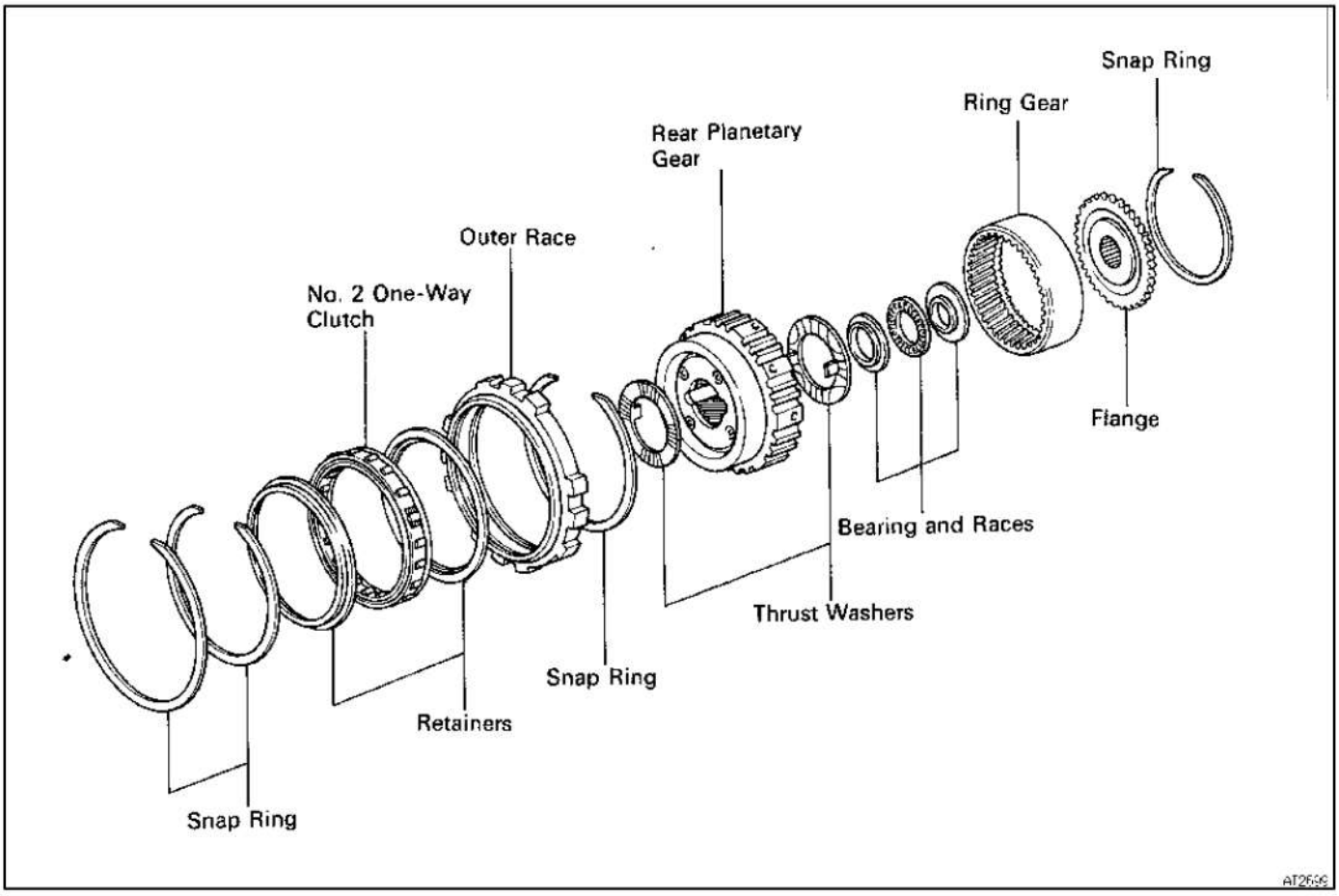


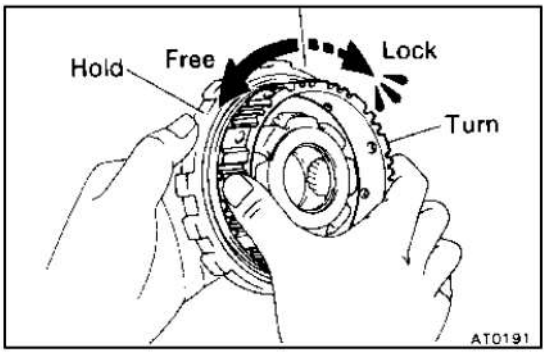
(c) Press the piston into the drum, being careful not to damage the O–rings.

REAR PLANETARY GEAR

COMPONENTS

AX0FP-02

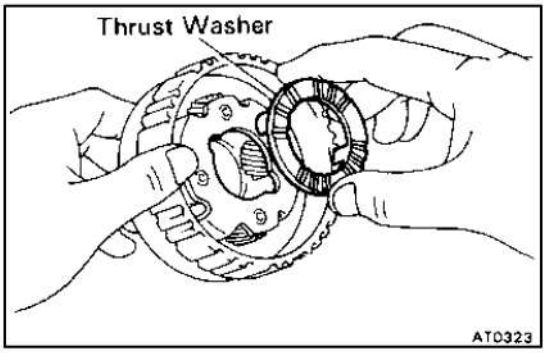




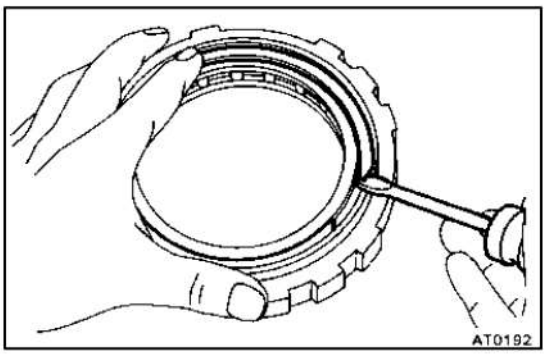
AX0FQ-02

ONE–WAY CLUTCH DISASSEMBLY

1. **CHECK OPERATION OF ONE–WAY CLUTCH**
   Hold the outer race and turn the hub. The hub should turn freely counterclockwise and should lock clockwise.

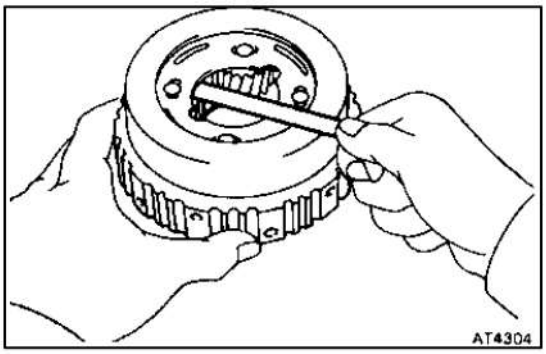


2. **SEPARATE ONE–WAY CLUTCH AND PLANETARY GEAR**
3. **REMOVE THRUST WASHERS**
   Remove the 2 thrust washers from both sides of the planetary gear.



4. REMOVE ONE–WAY CLUTCH FROM OUTER RACE

(a) Remove the 2 snap rings and retainers from both sides.
(b) Remove the one–way clutch from the outer race.



REAR PLANETARY GEAR INSPECTION

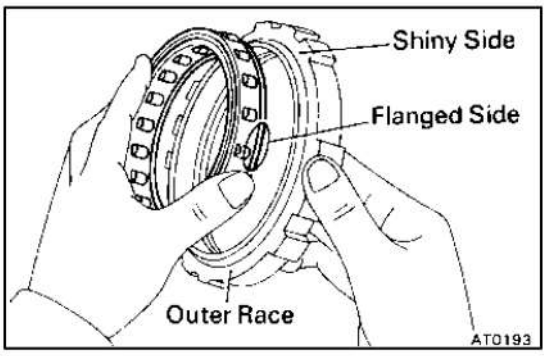
AX0FR–02

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.20 – 0.50 mm (0.0079 – 0.0197 in.)

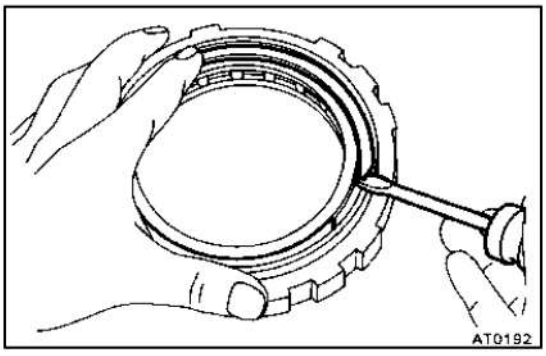


ONE–WAY CLUTCH ASSEMBLY

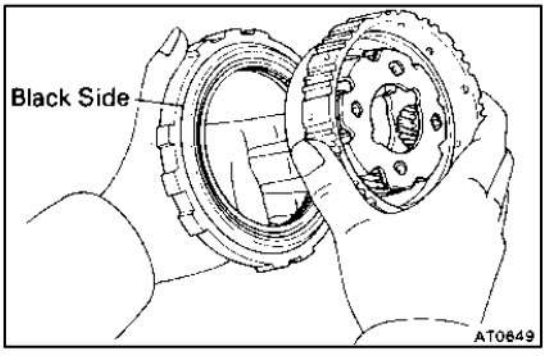
AX0FS–02

1. INSTALL ONE–WAY CLUTCH

(a) Install the one–way clutch into the outer race, facing the flanged side of the one–way clutch toward the shiny side of the outer race.

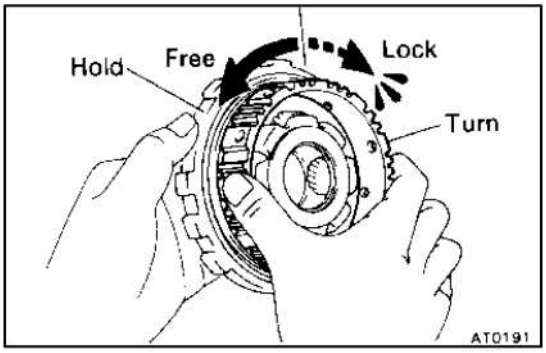


(b) Install the 2 retainers and snap rings to both sides.

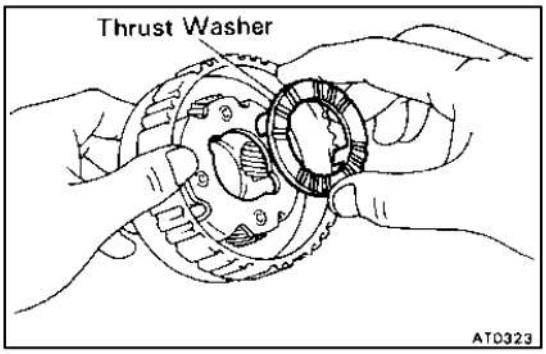


2. INSTALL PLANETARY GEAR INTO ONE–WAY CLUTCH

Install the planetary gear into the one–way clutch, facing the inner race of the planetary gear toward the black side of the one–way clutch outer race.



3. CHECK OPERATION OF ONE–WAY CLUTCH

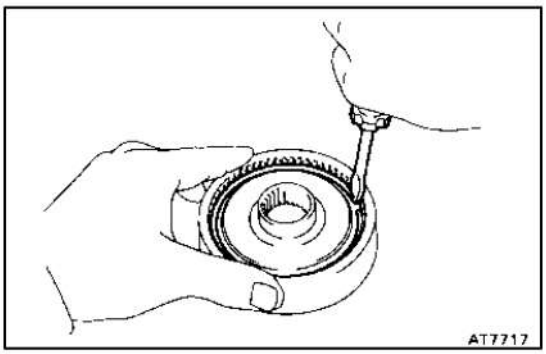


4. INSTALL THRUST WASHERS

(a) Coat the 2 thrust washers with petroleum jelly.
(b) Align the tab of the washers with the hollow of the carrier.

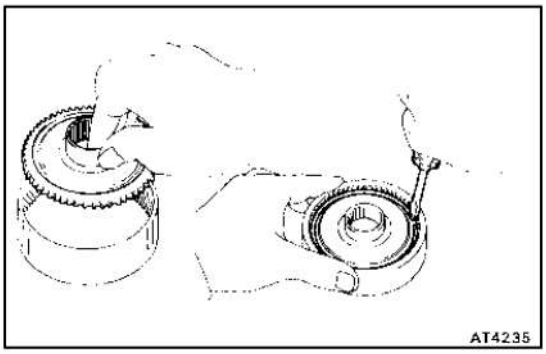
AX0FT–02

RING GEAR FLANGE REPLACEMENT



1. REMOVE RING GEAR FLANGE

(a) Using a screwdriver, remove the snap ring.
(b) Remove the flange from the ring gear.



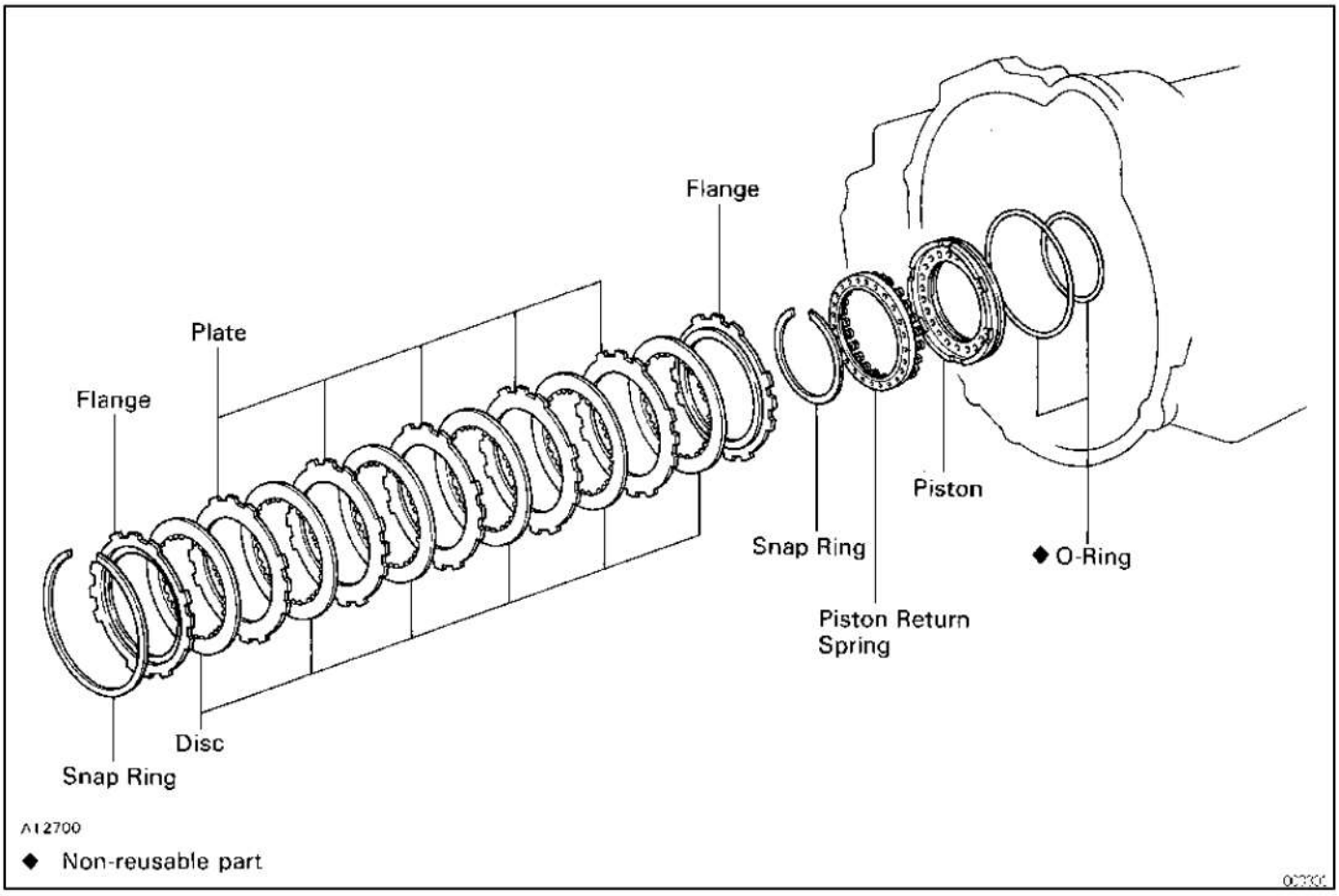
2. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.
(b) Using a screwdriver, install the snap ring.

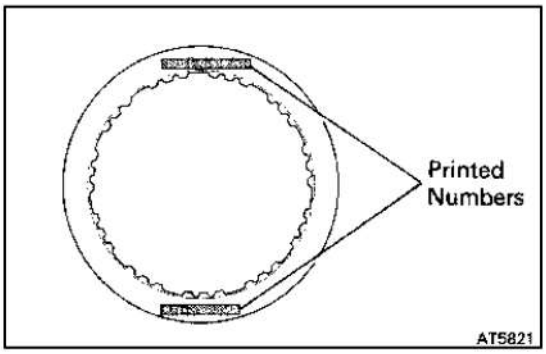
FIRST AND REVERSE BRAKE

AX0FU-02

COMPONENTS



◆ Non-reusable part



AX0FV-02

FIRST AND REVERSE BRAKE INSPECTION

INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

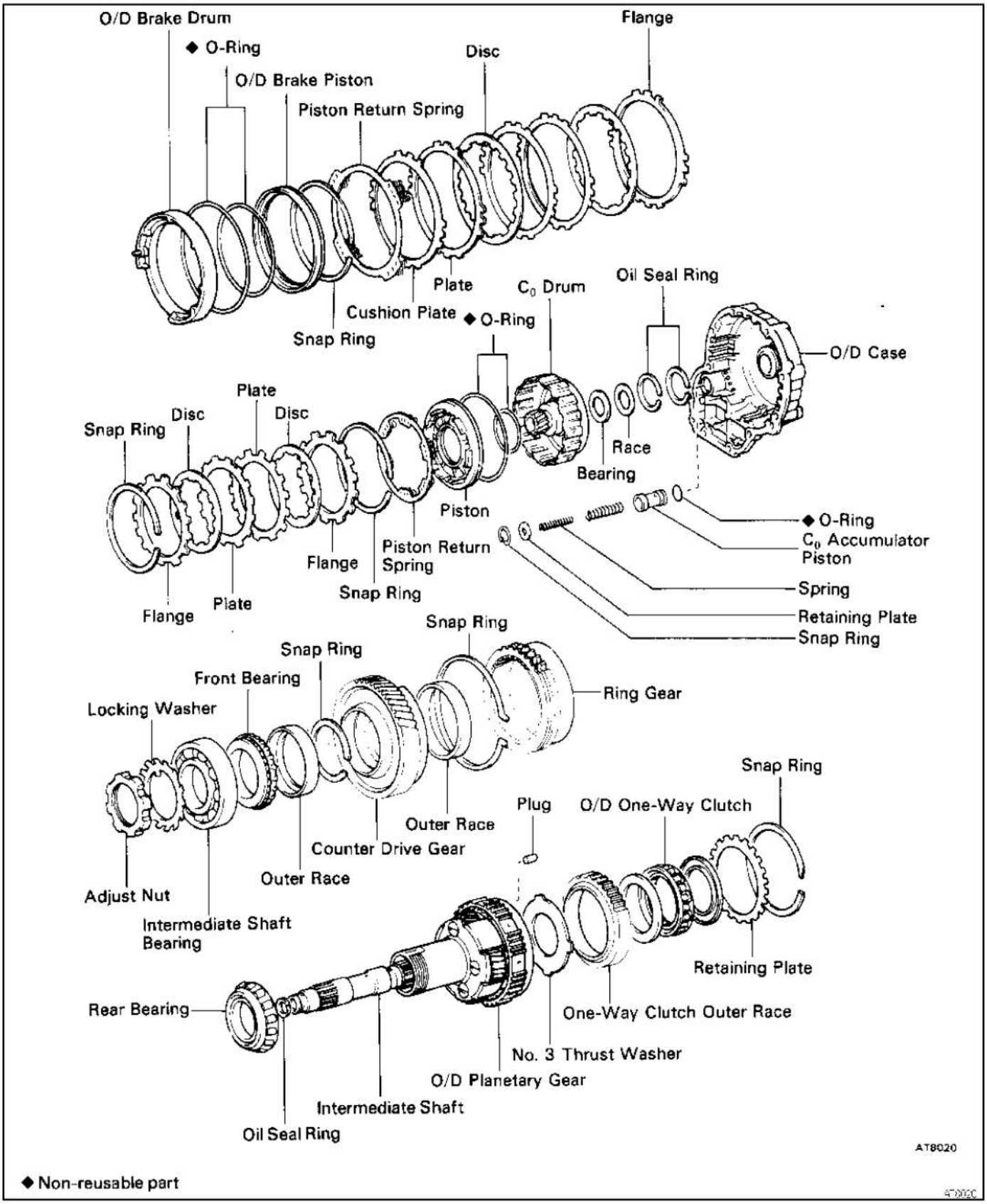
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembly new discs, soak them in ATF for at least 15 minutes.

OVERDRIVE UNIT
COMPONENTS

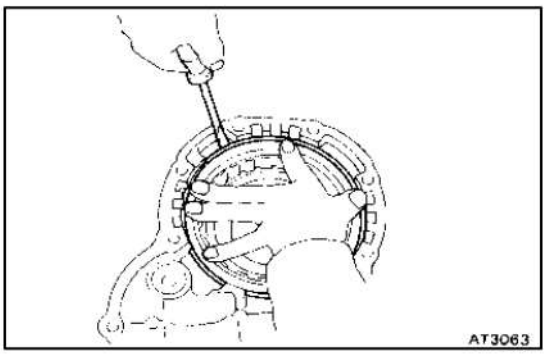
AX0FW-02



◆ Non-reusable part

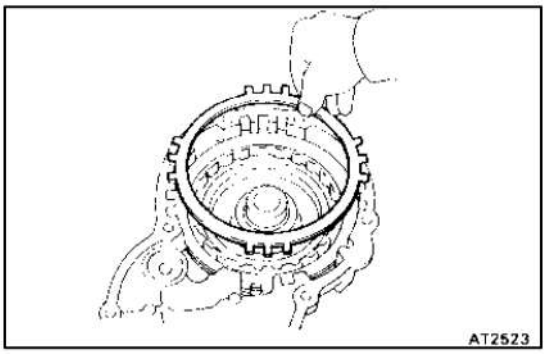
AX0FX-02

OVERDRIVE BRAKE DISASSEMBLY

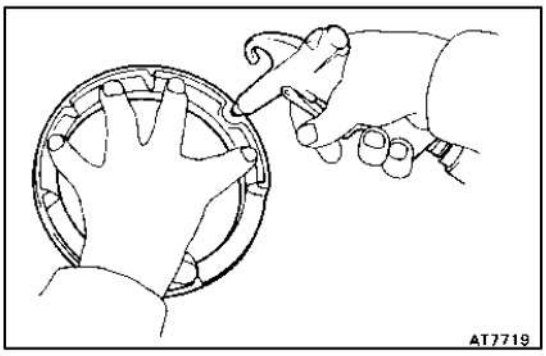


1. REMOVE PISTON RETURN SPRING

(a) While pushing the return spring, remove the snap ring with a screwdriver.
(b) Remove the piston return spring.

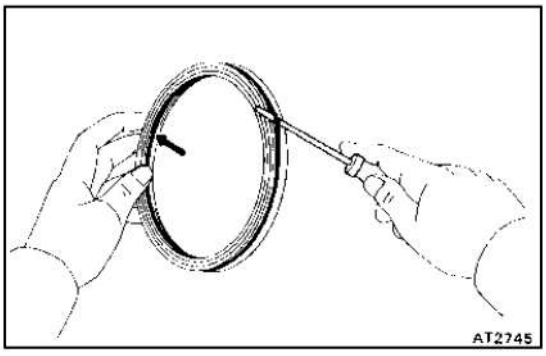


2. REMOVE CUSHION PLATE, PLATES, DISCS AND FLANGE



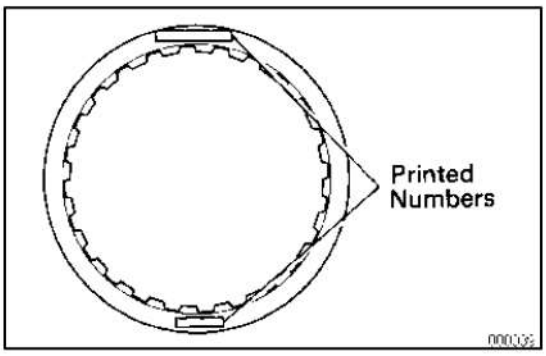
3. REMOVE PISTON FROM DRUM

Apply compressed air to oil hole to remove the piston.
HINT: Blow with the gun slightly away from the oil hole, and be careful that the piston does not tilt.



4. REMOVE O–RINGS

Remove the inner and outer O–rings from the piston.



AX0FY-02

OVERDRIVE BRAKE INSPECTION

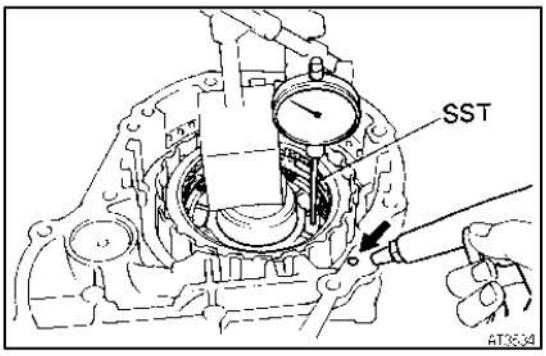
INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



AX0FZ-02

OVERDRIVE DIRECT CLUTCH DISASSEMBLY

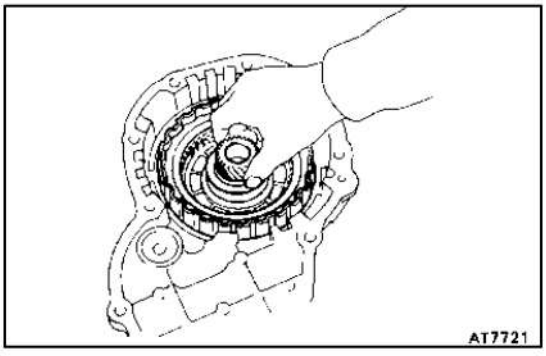
1. CHECK PISTON STROKE OF DIRECT CLUTCH

Using a dial indicator, measure the piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57– 114 psi).

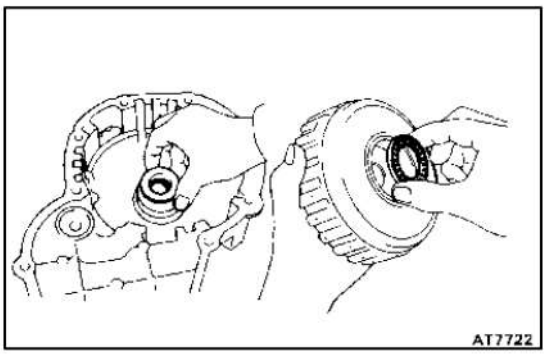
Piston stroke:

1.21 – 1.91 mm (0.0476 – 0.0752 in.)

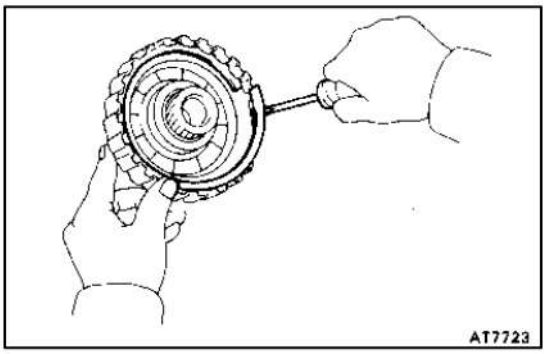
If the piston stroke is greater than the maximum, inspect the each component.



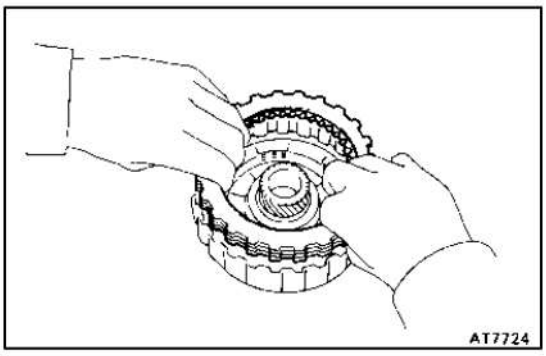
2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE



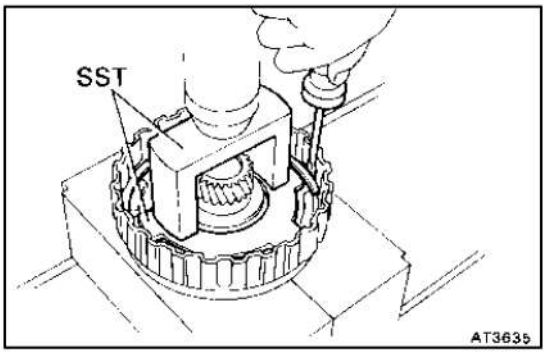
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



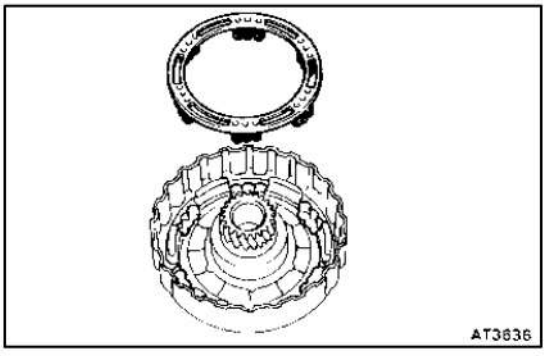
5. REMOVE FLANGES, DISCS AND PLATES



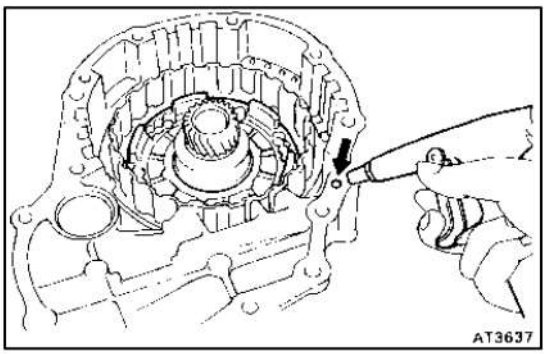
6. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the spring with a shop press.
SST 09350–32014 (09351–32070, 09351–32200)

(b) Remove the snap ring.

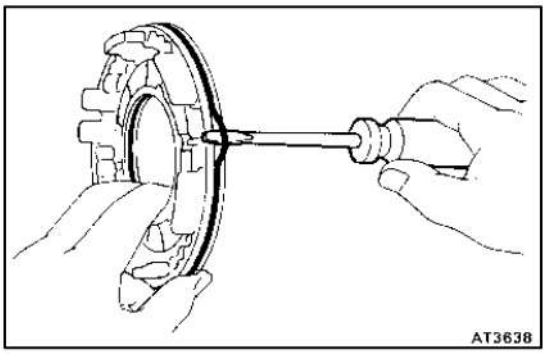


(c) Remove the piston return spring.



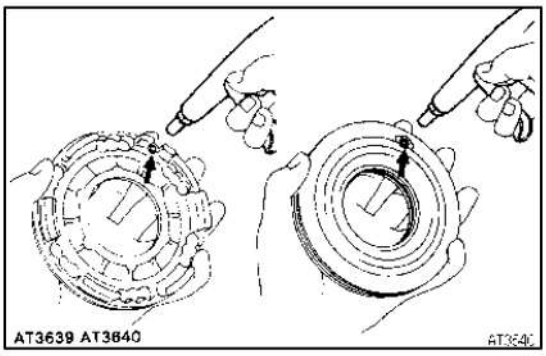
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum of the case.
(b) Apply compressed air to the pressure apply hole of the case.
(c) Remove the piston from the clutch drum.
If the piston does not come out completely, use needle–nose pliers to remove it.
(d) Remove the clutch drum from the case.



8. REMOVE O–RINGS

Remove the 2 O–rings from the piston.

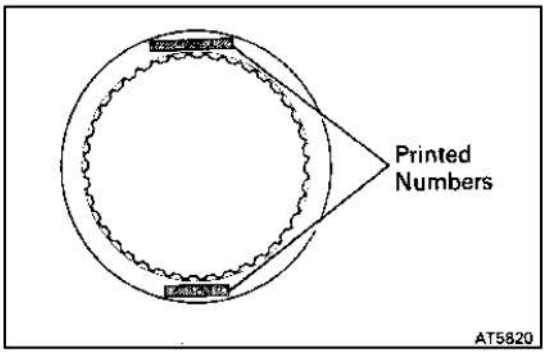


OVERDRIVE DIRECT CLUTCH INSPECTION

AX0G0–02

1. INSPECT OVERDRIVE DIRECT CLUTCH

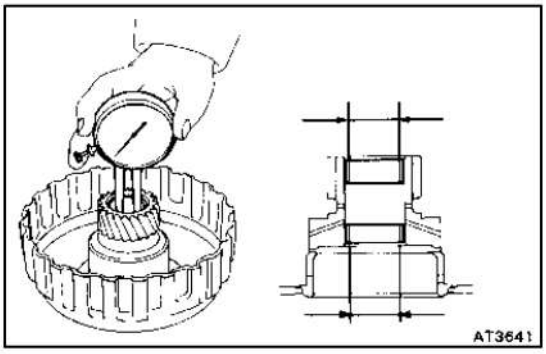
(a) Check that the check ball is free by shaking the piston.
(b) Check that the valve does not leak by applying lowpressure compressed air.



2. INSPECT DISCS, PLATES AND FLANGES

Check that the sliding surfaces of discs, plates and flanges are worn or burnt. If necessary, replace them.
HINT:

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



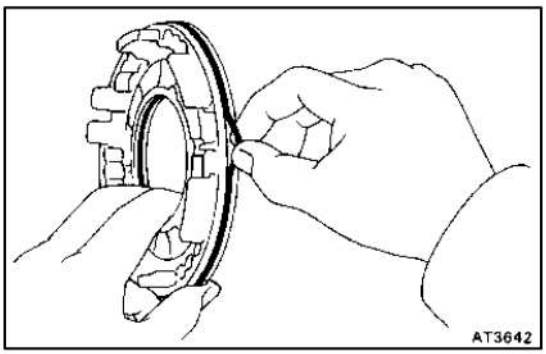
3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the two direct clutch bushings.

Maximum inside diameter:

22.09 mm (0.8697 in.)

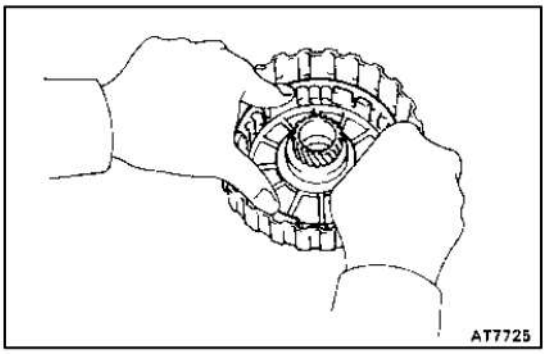
If the inside diameter is greater than the maximum, replace the direct clutch drum.



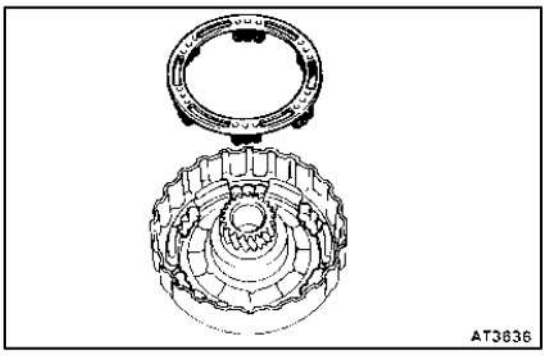
OVERDRIVE DIRECT CLUTCH ASSEMBLY AX0G1–02

1. INSTALL CLUTCH PISTON

(a) Install new O–rings to the piston. Coat the O–rings with ATF.

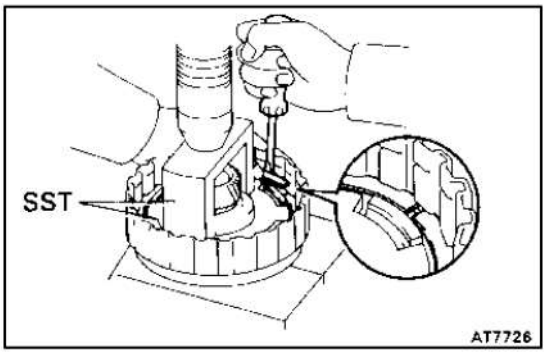


(b) Press the piston into the drum with the cup side up, being careful not to damage the O–ring.



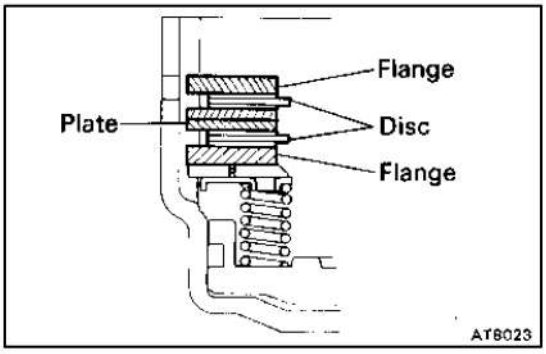
2. INSTALL PISTON RETURN SPRING

(a) Install the return spring and set snap ring in place.



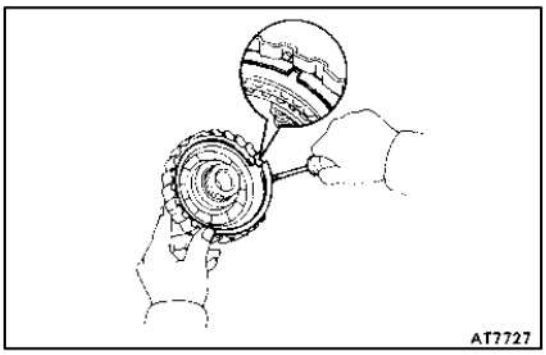
(b) Place SST on the spring retainer, and compress the spring with a shop press.
SST 09350–32014 (09351–32070, 09351–32200)

(c) Install the snap ring with a screwdriver. Be sure end gap of snap ring is aligned with the groove of the clutch drum.



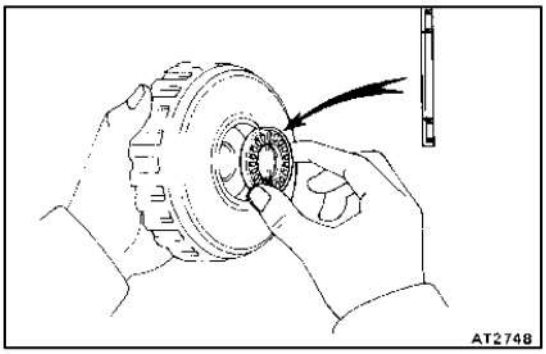
3. INSTALL PLATES, DISCS AND FLANGE

Install in order: P=Plate D=Disc
Flange – D – P – D – Flange



4. INSTALL SNAP RING

Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.

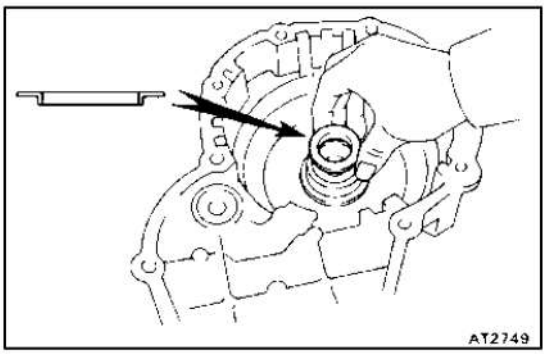


5. INSTALL BEARING AND RACE

(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.

Bearing:

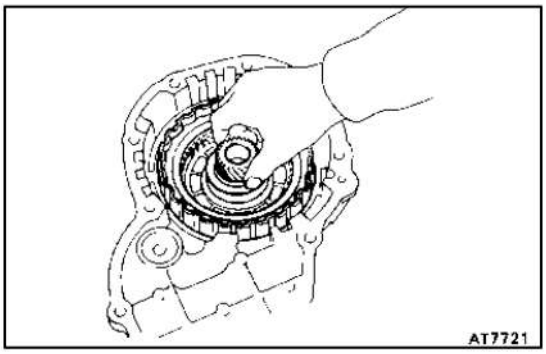
Outer diameter
46.3 mm (1.823 in.)
Inner diameter
26.2 mm (1.031 in.)



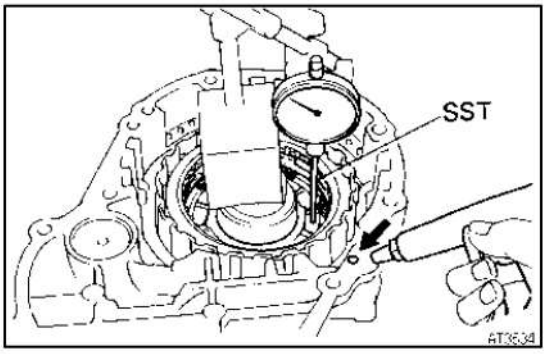
(b) Coat the race with petroleum jelly and install it to thecase.

Race:

Outer diameter
43.0 mm (1.693 in.)
Inner diameter
24.5 mm (0.965 in.)



6. INSTALL DIRECT CLUTCH ON CASE

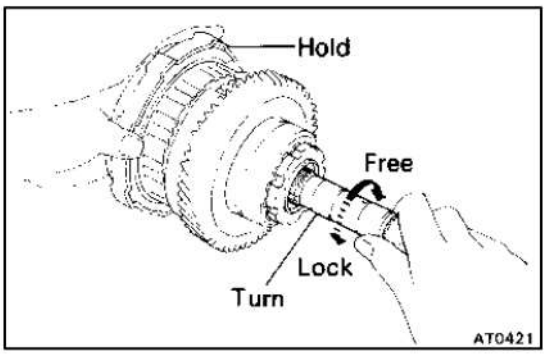


7. RECHECK PISTON STROKE OF DIRECT CLUTCH

Using a dial indicator, measure the piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf/cm^2, 57– 114 psi).

Piston stroke:

1.21 – 1.91 mm (0.0476 – 0.0752 in.)



COUNTER DRIVE GEAR DISASSEMBLY

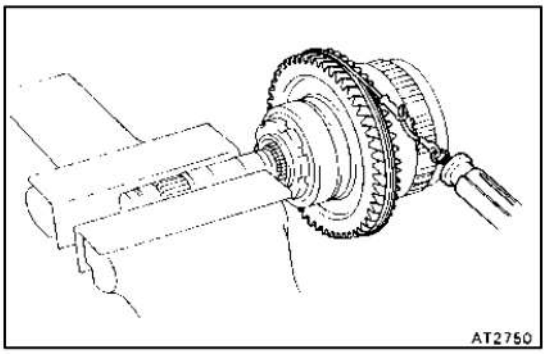
AX0G2-02

1. CHECK OPERATION OF ONE–WAY CLUTCH

(a) While turning the overdrive gear clockwise, install the overdrive direct clutch into the one–way clutch.

(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.

(c) Remove the overdrive direct clutch.



2. CHECK COUNTER DRIVE GEAR PRELOAD

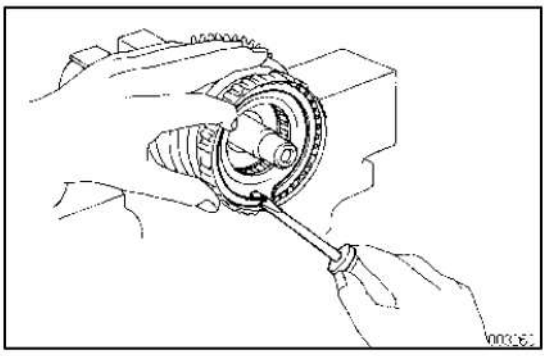
(a) Hold the intermediate shaft in a vise with soft jaws.

(b) Using a tension gauge, measure the preload.

Preload (at starting):

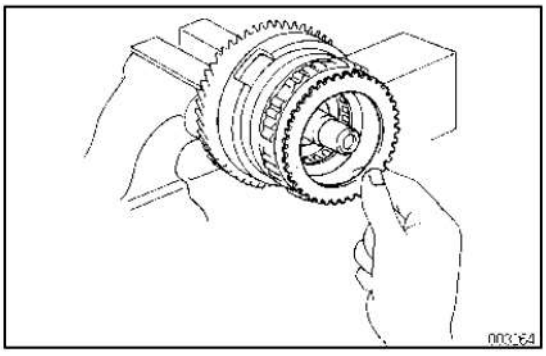
9 – 15 N (920 – 1,530 gf, 2.0 – 3.4 lbf)

HINT: Turn the counter drive gear right and left several times before measuring the preload.

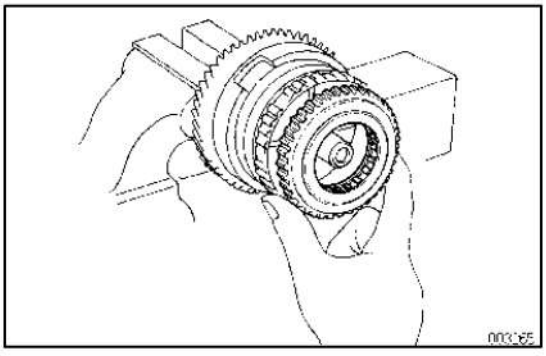


3. REMOVE RETAINING PLATE

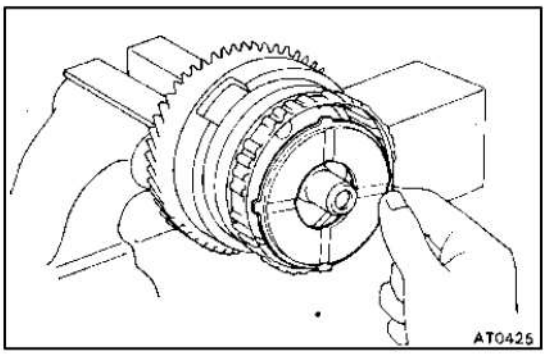
(a) Remove the snap ring with a screwdriver.



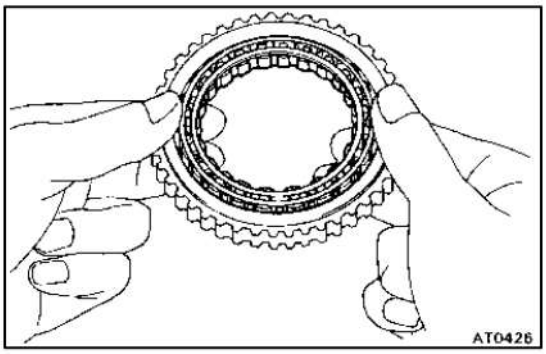
(b) Remove the retaining plate.



4. REMOVE ONE–WAY CLUTCH AND OUTER RACE

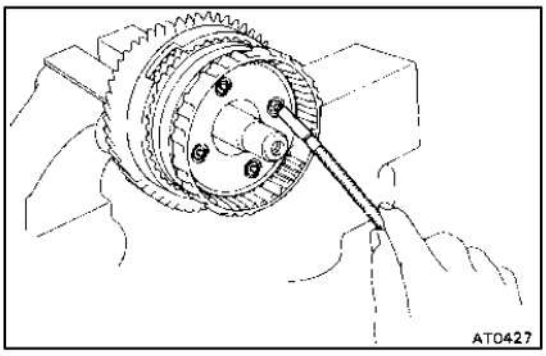


5. REMOVE NO.3 OVERDRIVE PLANETARY THRUST WASHER



6. REMOVE ONE–WAY CLUTCH FROM OUTER RACE

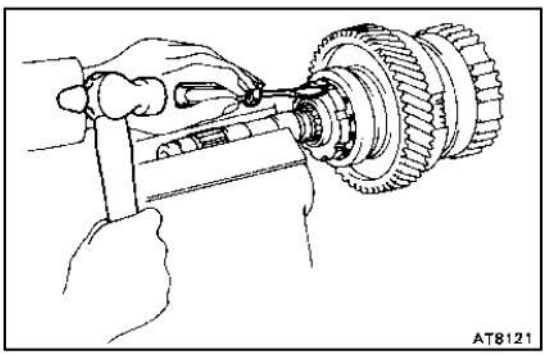
Note the direction of the one–way clutch.



7. REMOVE PLUGS FROM PLANETARY GEAR

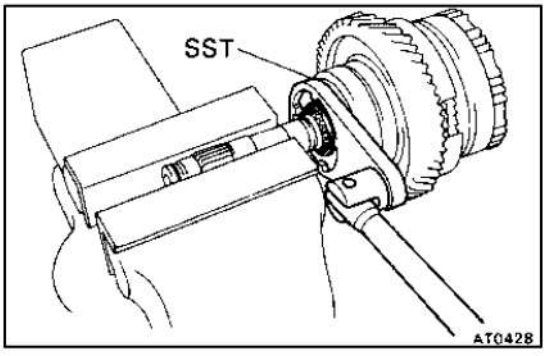
Remove the 4 plugs with a magnetic finger.

HINT: Be careful not to lose them.



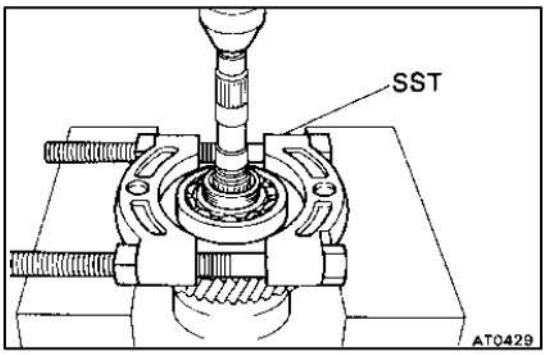
8. REMOVE ADJUSTING NUT AND WASHER

(a) Pry off the locking washer with chisel.



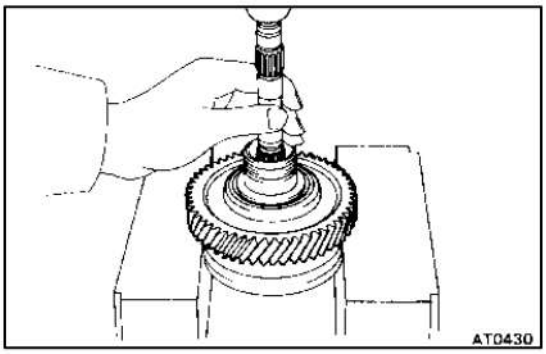
(b) Using SST, loosen the adjusting nut.
SST 09350–32014 (09351–32080)

(c) Remove the adjusting nut and washer.



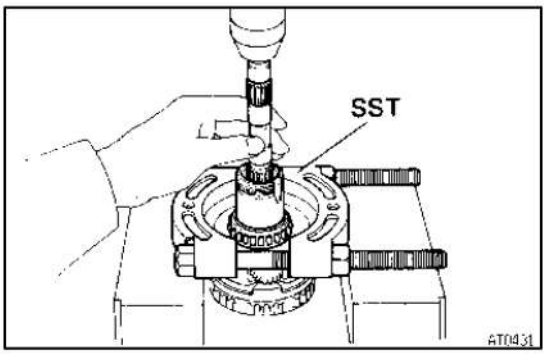
9. REMOVE INTERMEDIATE SHAFT BEARING

Using SST, press out the bearing from the shaft.
SST 09950–00020



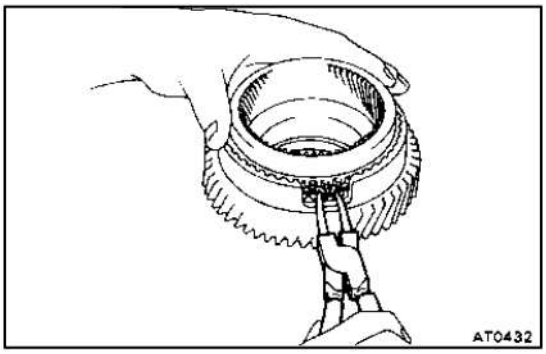
10. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

Press out the gear and bearing together.



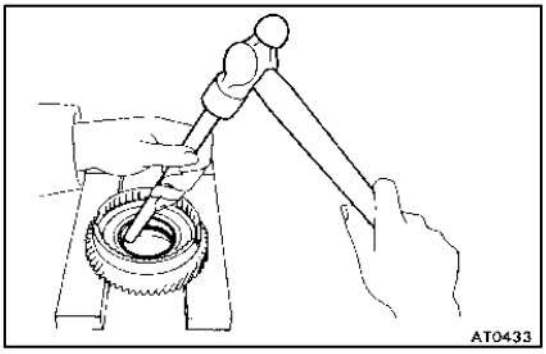
11. REMOVE REAR BEARING

Using SST, press out the bearing.
SST 09950–00020



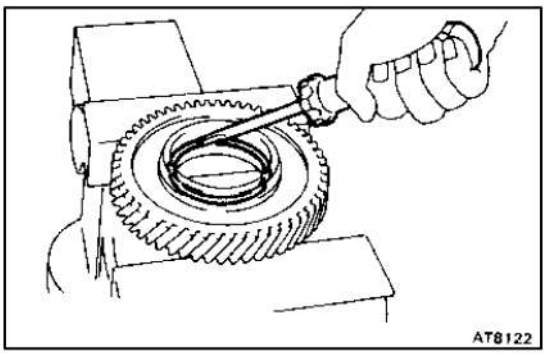
12. REMOVE OVERDRIVE PLANETARY RING GEAR FROM COUNTER DRIVEGEAR

(a) While pulling up the ring gear, compress the snap ring with needle–nose pliers and remove it from the groove.
(b) Remove the ring gear from the counter drive gear.



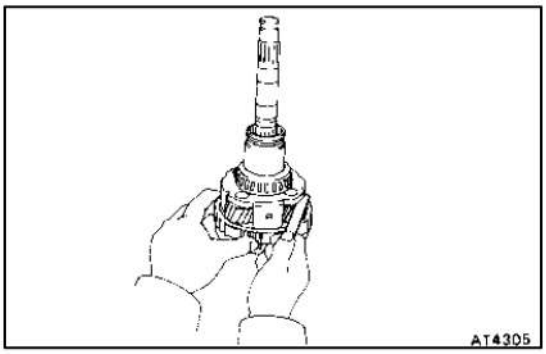
13. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

Drive out the 2 races with a brass bar and hammer.



14. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



AX0G3–02

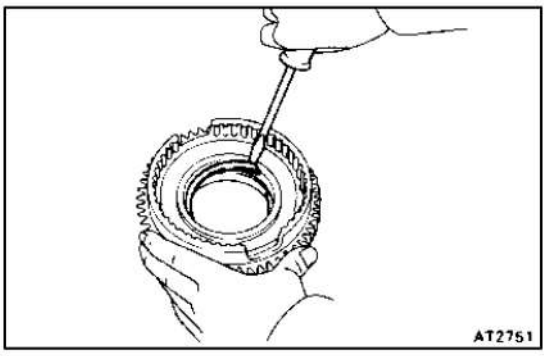
OVERDRIVE PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.20 – 0.50 mm (0.0079 – 0.0197 in.)

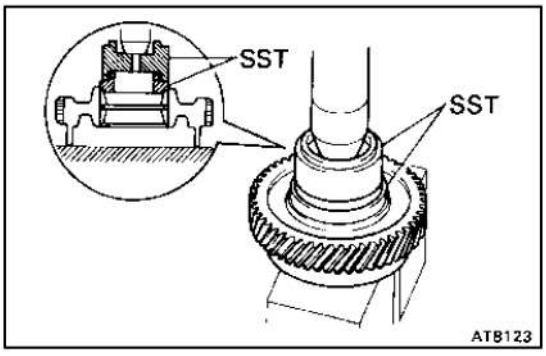


AX0GU–02

COUNTER DRIVE GEAR ASSEMBLY

1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.

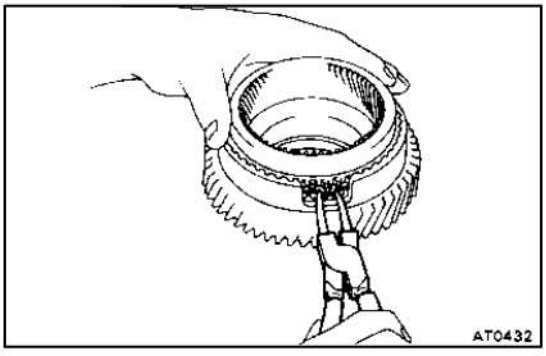


2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the 2 outer races to the gear both side.

SST 09350–32014 (09351–32120, 09351–32150)

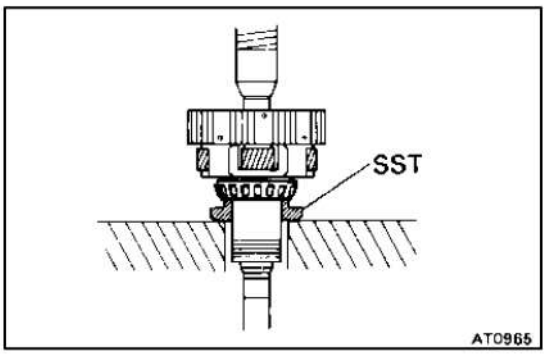
HINT: Press in the 2 outer races until they touch the snap ring. Tap the races in straight, so that they do not tilt.



3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVEGEAR

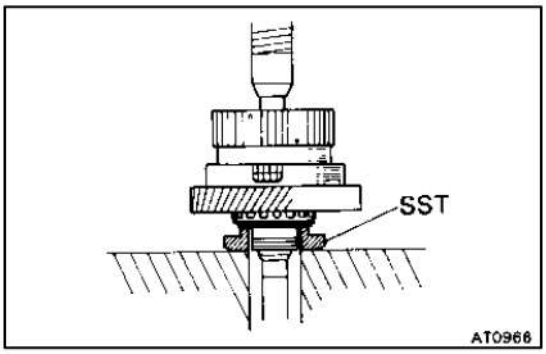
While pushing down the ring gear, squeeze the snap ring end with a needle–nose pliers, and install it into the groove.

HINT: When the snap ring is fully seated, the end will be free.



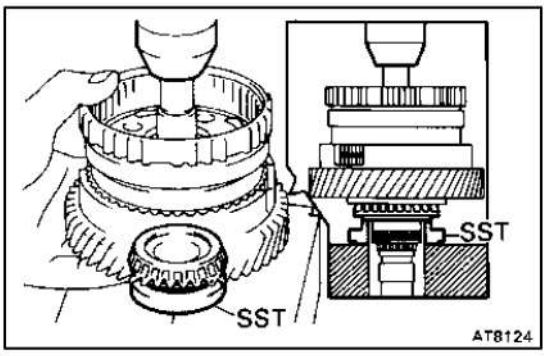
4. INSTALL REAR BEARING

Using SST, press in the bearing onto the shaft.
SST 09350–32014 (09351–32120)
HINT: Press in the bearing until the side surface of the inner race touches the shaft.

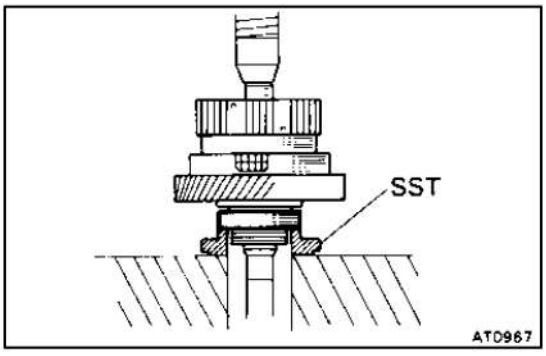


5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

(a) Install the gear onto the shaft, and mesh the ring gear with the planetary pinions.
(b) Place the front bearing onto the shaft.
HINT: Hold the ring gear to prevent it from falling.

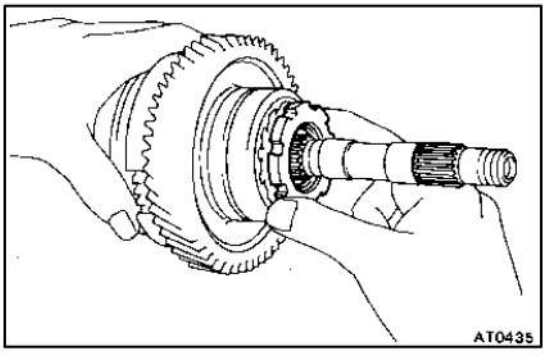


(c) Using SST, press in the bearing until there is slight play between the bearings.
SST 09350–32014 (09351–32120)

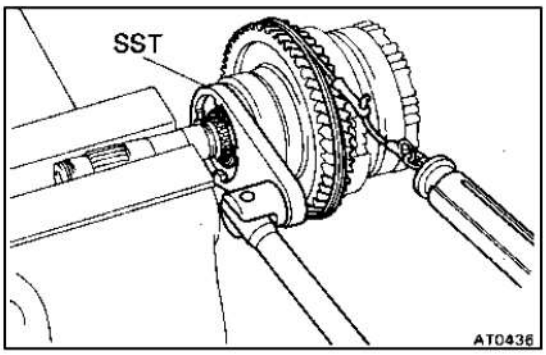


6. INSTALL INTERMEDIATE SHAFT BEARING

Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.
SST 09350–32014 (09351–32120)
HINT: The counter drive gear can be turned lightly.



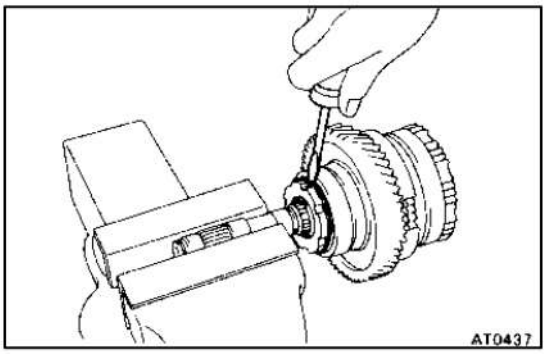
7. PLACE NEW LOCKING WASHER AND ADJUSTING NUT ONTO INTERMEDIATE SHAFT



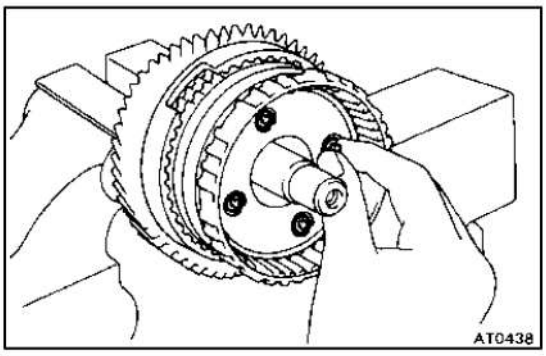
8. ADJUST PRELOAD OF COUNTER DRIVE GEAR

(a) Place SST onto the adjusting nut and hold the shaft in a vise with soft jaws.
SST 09350–32014 (09351–32080)

(b) Tighten the adjusting nut until the following gear starting load occurs with a tension gauge.
Preload (at starting):
9 – 15 N (920 – 1,530 gf, 2.0 – 3.4 lbf)
HINT: Turn the counter drive gear right and left several times before measuring the preload.

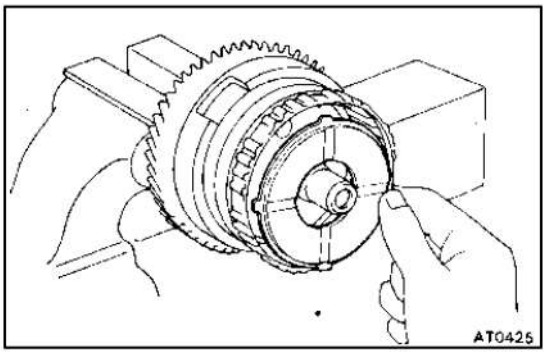


(c) Lock the adjusting nut with one tab on locking washer. Bend the locking washer tab until it is even with the adjusting nut groove.



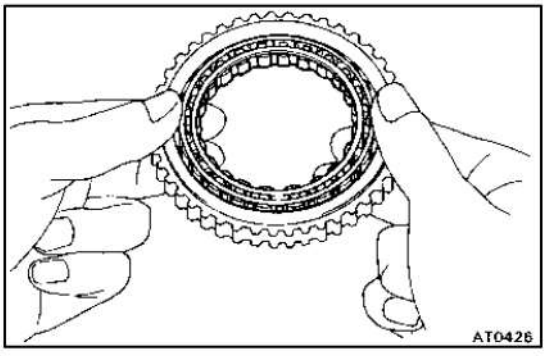
9. INSTALL PINION SHAFT PLUGS

Install the 4 plugs into the pinion shaft.



10. INSTALL NO.3 OVERDRIVE PLANETARY THRUST WASHER

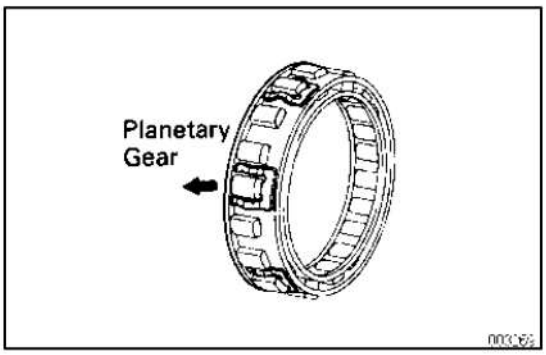
Install the thrust washer, facing the groove toward the overdrive case.



11. ASSEMBLE OVERDRIVE ONE–WAY CLUTCH

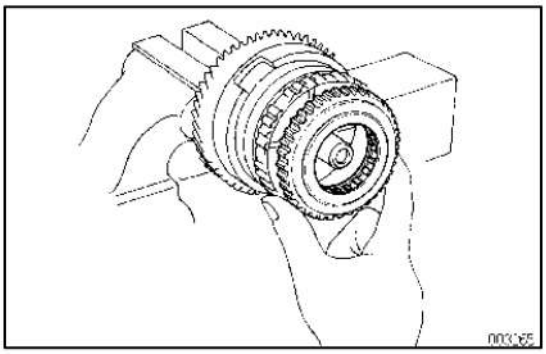
(a) Install the one–way clutch into the outer race.

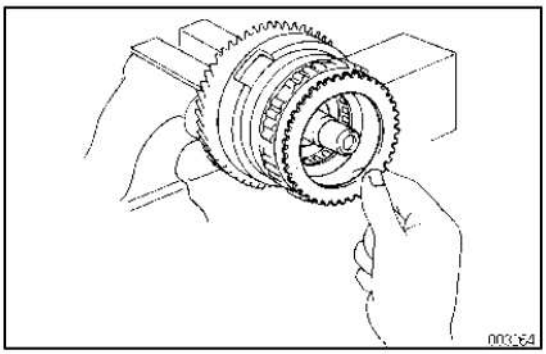
(b) Install a retainer on both sides of the one–way clutch.



12. INSTALL OVERDRIVE ONE–WAY CLUTCH INTO HUB

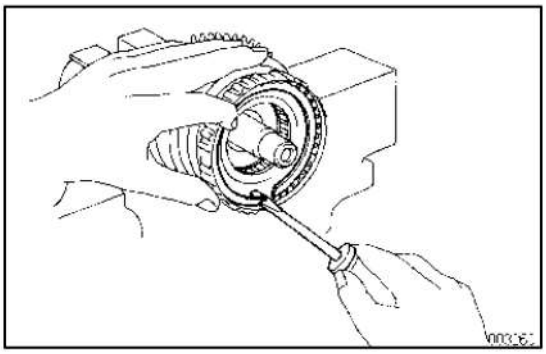
Be sure that the one–way clutch is installed in the correct direction.



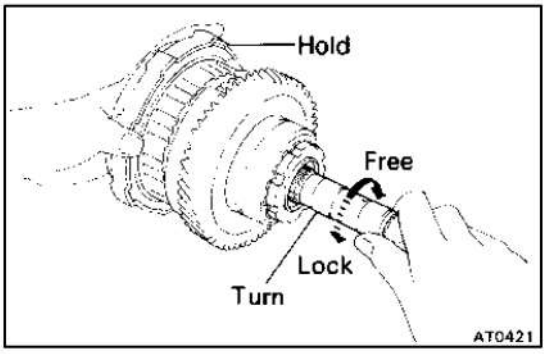


13. INSTALL RETAINING PLATE

(a) Place the retaining plate into the hub.



(b) Install the snap ring with a screwdriver.



14. CHECK OPERATION OF ONE–WAY CLUTCH

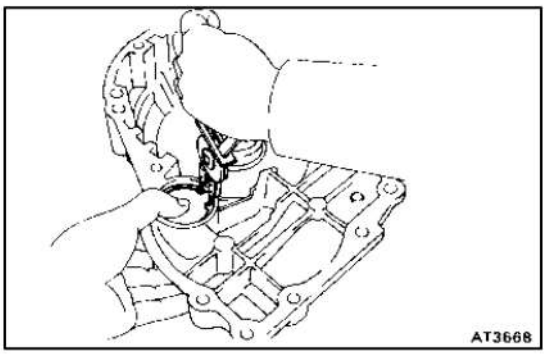
(a) While turning the overdrive gear clockwise, install the overdrive direct clutch into the one–way clutch.

(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shafts should turn freely clockwise and should lock counterclockwise.

(c) Remove the overdrive direct clutch.

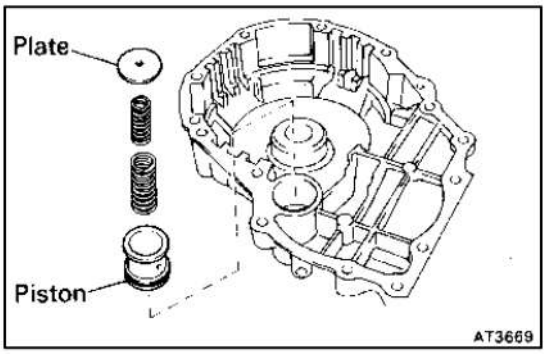
AX0G4-02

OVERDRIVE CASE DISASSEMBLY

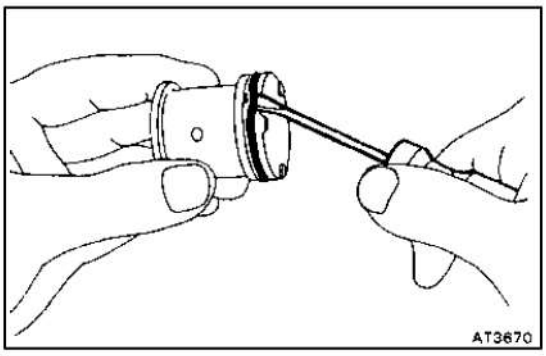


1. REMOVE C_0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

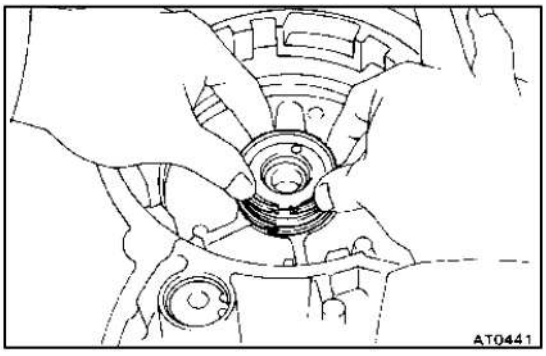
(a) Using snap ring pliers, remove the snap ring.



(b) Remove the retaining plate and two springs.
(c) Remove the accumulator piston.



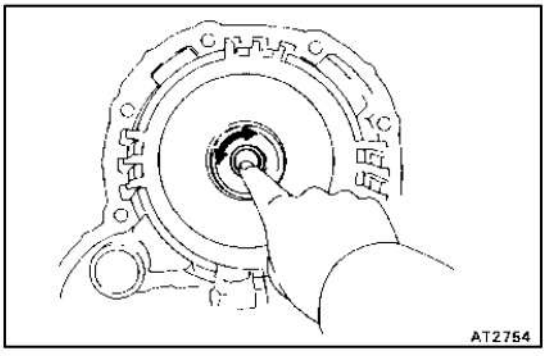
(d) Remove the O–ring from the piston.



2. REMOVE OIL SEAL RINGS

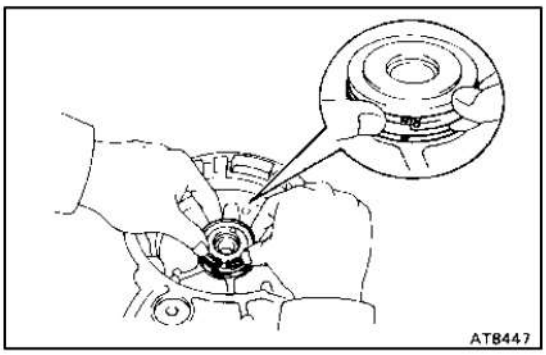
Spread the 2 rings apart and remove them.

OVERDRIVE CASE INSPECTION



INSPECT OVERDRIVE CASE BEARING

Check that the bearing turns smoothly with your finger.



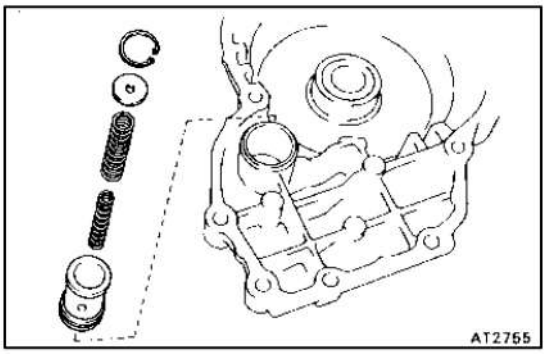
AX0G5–02

OVERDRIVE CASE ASSEMBLY

1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Install the oil seal rings to the O/D case groove, then snug them down by squeezing their ends together.

HINT: After installing the oil seal rings, check that they move smoothly.

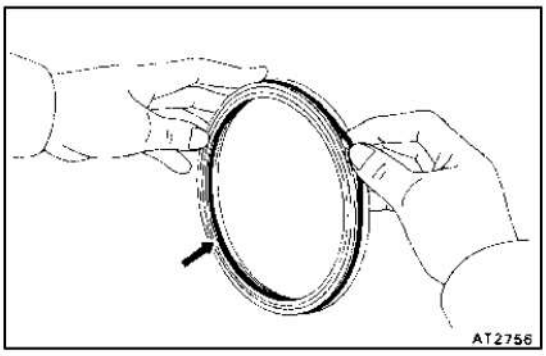


2. INSTALL C_0 ACCUMULATOR PISTON OF OVERDRIVE CLUTCH

(a) Install a new O–ring to the accumulator piston. Coat the O–ring with ATF.

(b) Install the accumulator piston, 2 springs and plate.

(c) Install the snap ring with snap ring pliers.

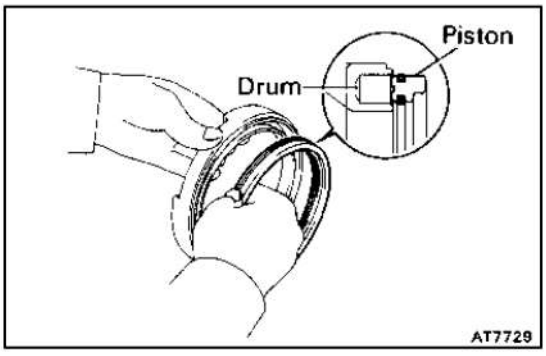


AX0G6–02

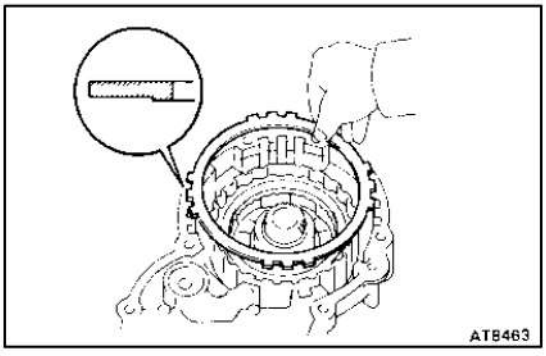
OVERDRIVE BRAKE ASSEMBLY

1. INSTALL PISTON INTO DRUM

(a) Install the new O–rings to the piston. Coat the O–rings with ATF.

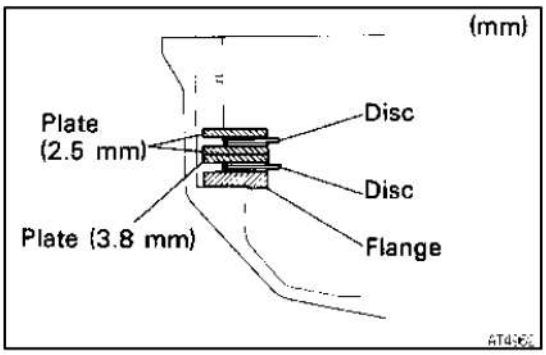


(b) Press the piston into the drum, being careful not to damage the O–rings.

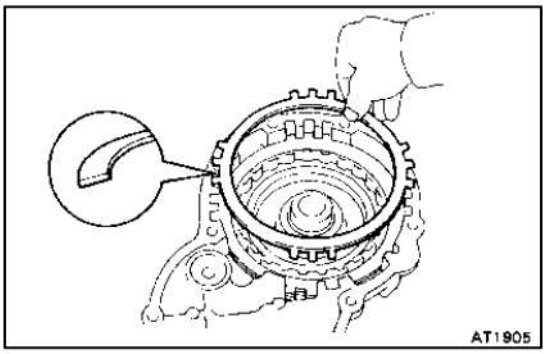


2. INSTALL FLANGE, DISCS AND PLATES

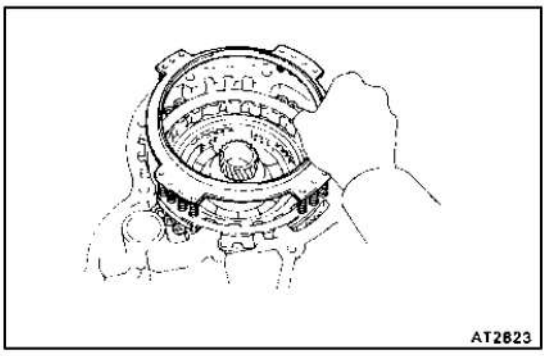
(a) Install the flange, facing the flat end upward.



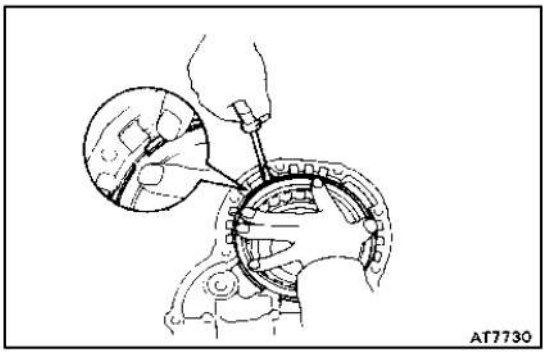
(b) Install the discs and plates.
Install in order: P=Plate D=Disc
Flange – D – P – P – D – P
HINT: There are 2 different thickness plates, as shown in the illustration.



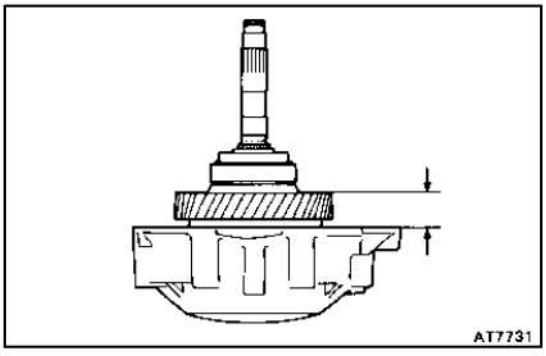
(c) Install the cushion plate facing the rounded end upward.



3. INSTALL PISTON RETURN SPRING



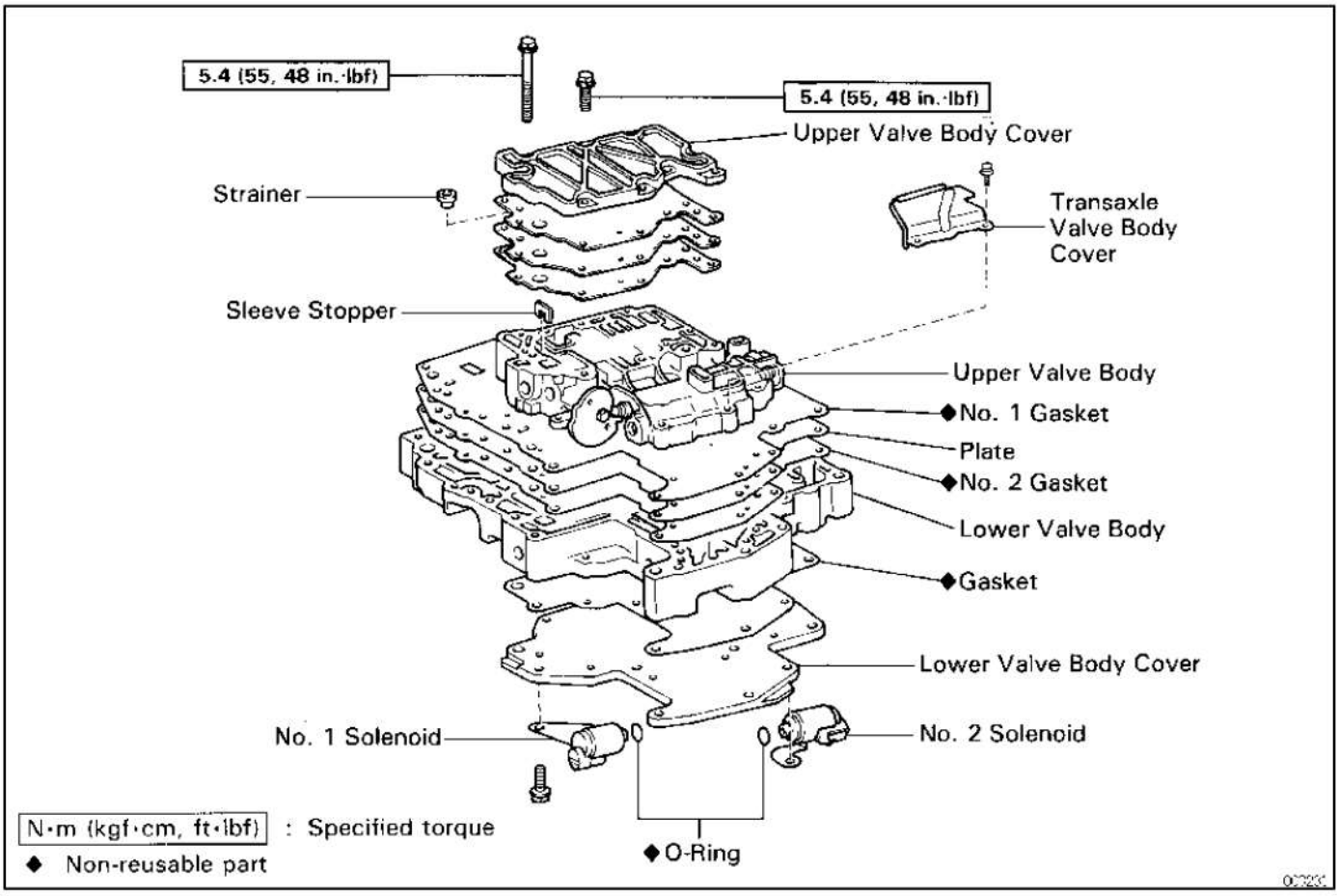
4. INSTALL SNAP RING INTO CASE
Be sure the end gap of the snap ring is not aligned with one of the cutouts.

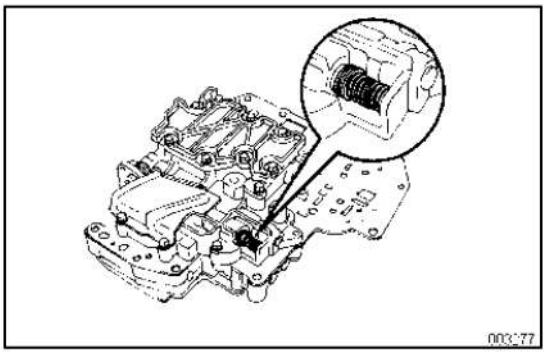


5. INSTALL OVERDRIVE GEAR ASSEMBLY ONTO CASE
While turning the overdrive gear clockwise, install the overdrive gear assembly to the case.
If the overdrive gear assembly is properly installed to the overdrive case, the clearance between them will be about 24 mm (0.94 in.).

VALVE BODY
COMPONENTS

AX0G7-02



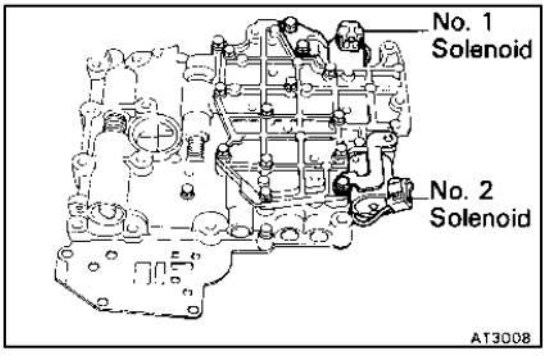


AX0G8-02

VALVE BODY DISASSEMBLY

1. NOTE THE NUMBERS OF ADJUSTING RINGS

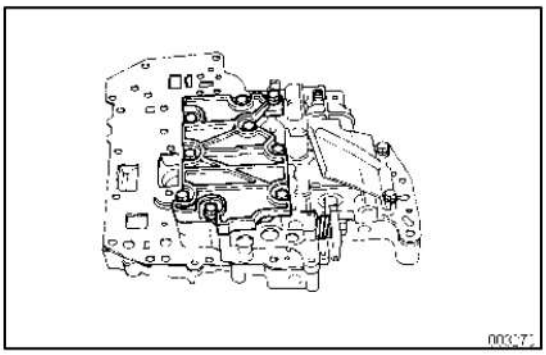
HINT: Count the number of adjusting rings before disassembly of the valve body because the throttle pressure is changed according to the number. (Some of the valve bodies do not have any adjusting rings).



2. REMOVE SOLENOIDS

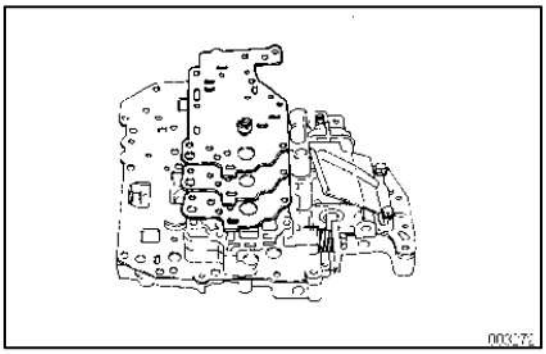
(a) Remove the No.1 and No.2 solenoids.

(b) Remove the O–rings from the solenoids.



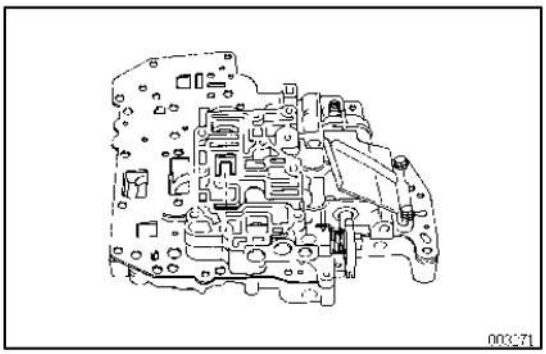
3. REMOVE UPPER VALVE BODY COVER

Remove the 9 bolts and upper valve body cover.

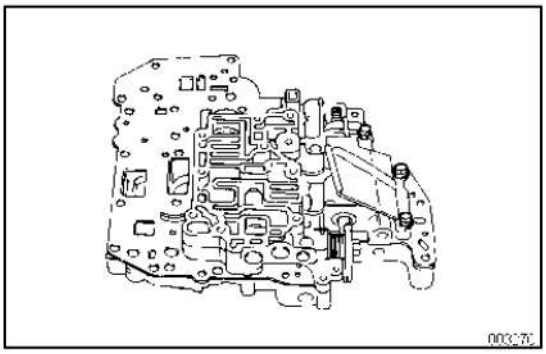


4. REMOVE STRAINER GASKETS, PLATE AND SLEEVE STOPPER FROM UPPER VALVE BODY

(a) Remove the strainer, 2 gaskets and plate.

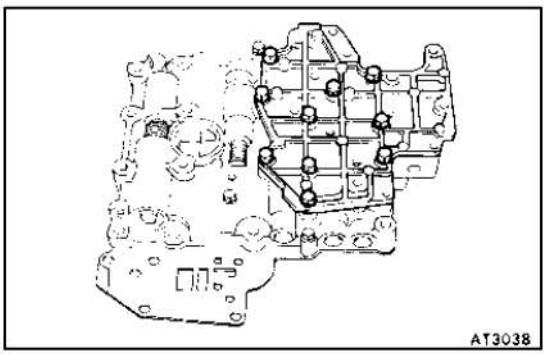


(b) Remove the sleeve stopper.



5. REMOVE BOLTS FROM UPPER VALVE BODY

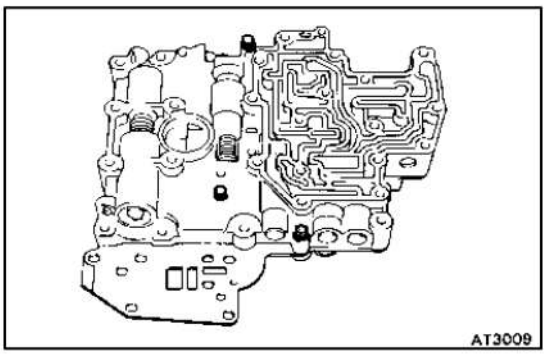
Remove the 3 bolts from the upper valve body.



6. REMOVE LOWER VALVE BODY COVER

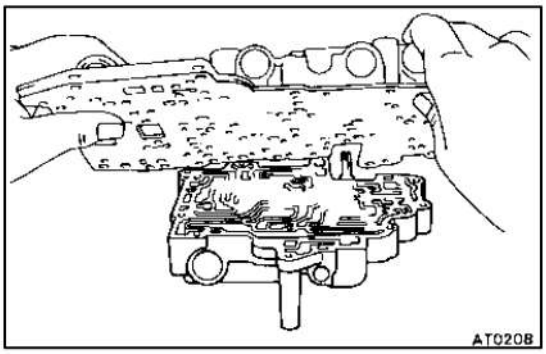
(a) Remove the 10 bolts.

(b) Remove the lower valve body cover and gasket.



7. REMOVE BOLTS FROM LOWER VALVE BODY

Remove the 3 bolts from lower valve body.

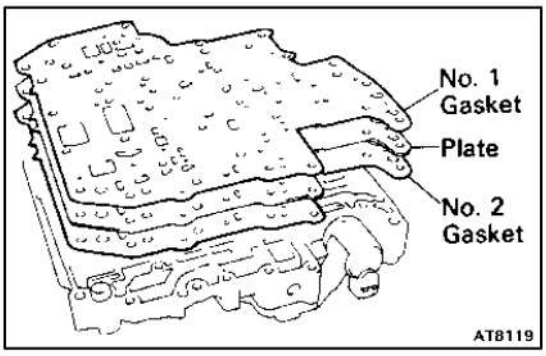


8. LIFT OFF LOWER VALVE BODY AND PLATE AS SINGLE UNIT

Hold the plate to the lower valve body and lift off the lower valve body.

HINT: Be careful that the check balls do not fall out.

9. REMOVE PLATE AND GASKETS



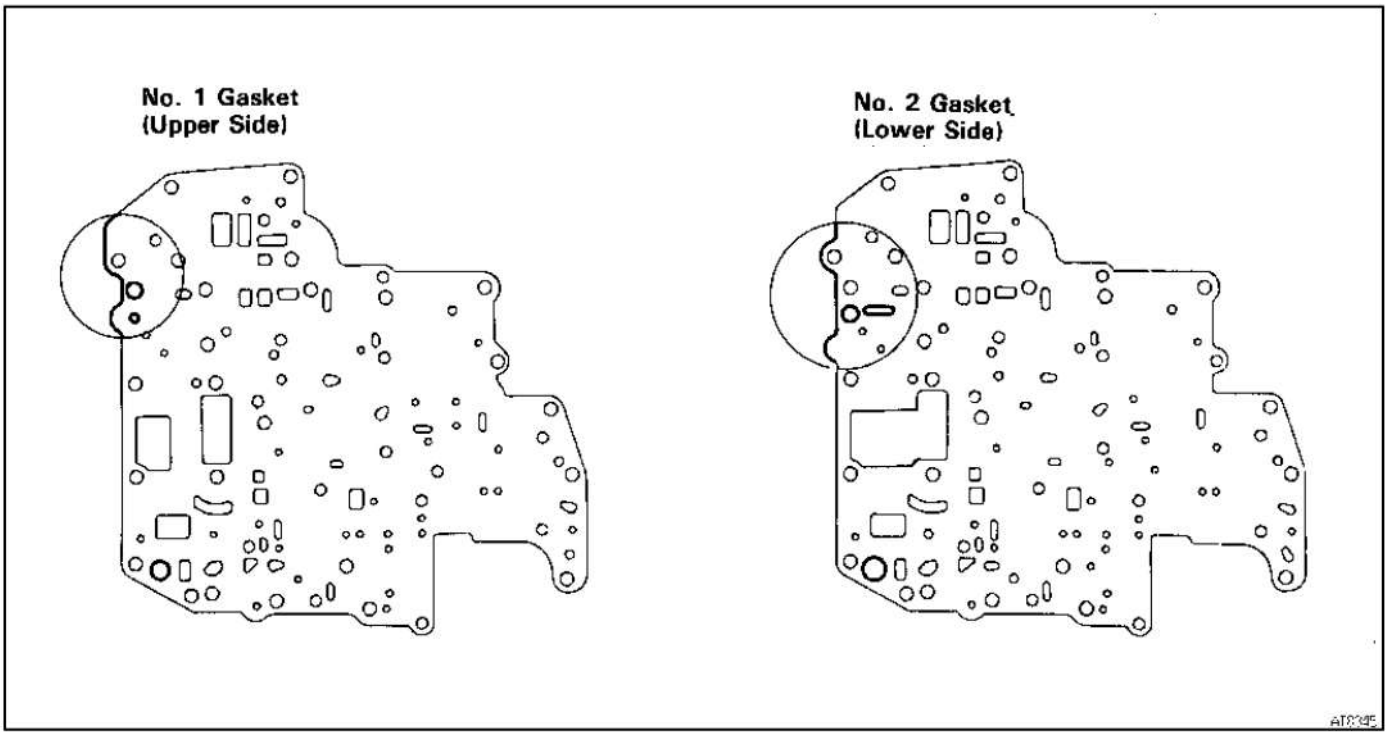
AX0G9–02

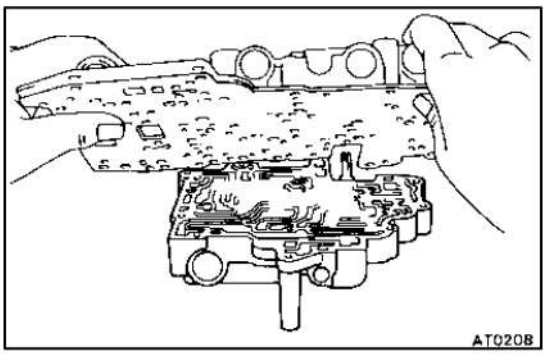
VALVE BODY ASSEMBLY

1. POSITION PLATE AND NEW GASKETS ON LOWER VALVE BODY

Position the new No.2 gasket, the plate and then the new No.1 gasket on the lower valve body.

HINT: Since No.1 gasket and No.2 gasket are similar use the illustration below to discriminate between them.

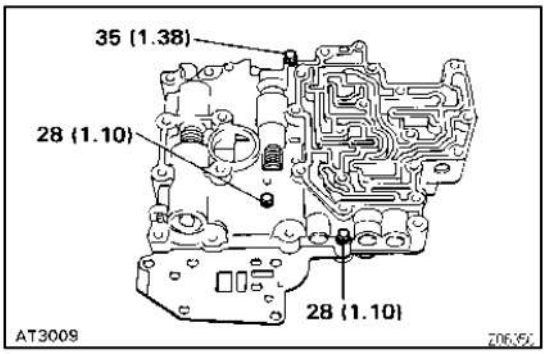




2. PLACE LOWER VALVE BODY WITH PLATE AND GASKETS ON UPPER VALVE BODY

HINT: Hold the lower valve body, gaskets and plate securely so they do not separate.

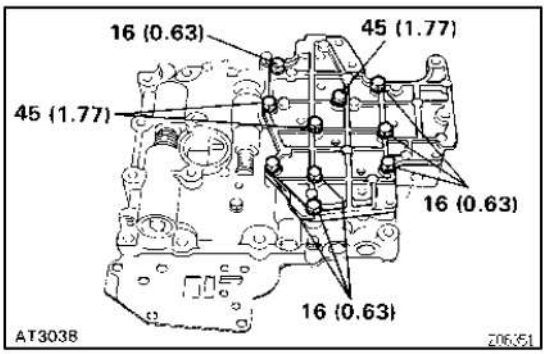
Align each bolt hole in the valve bodies with the gaskets and plate.



3. INSTALL AND FINGER TIGHTEN BOLTS IN LOWER VALVE BODY TO SECURE UPPER VALVE BODY

Install and finger tighten the 3 bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.

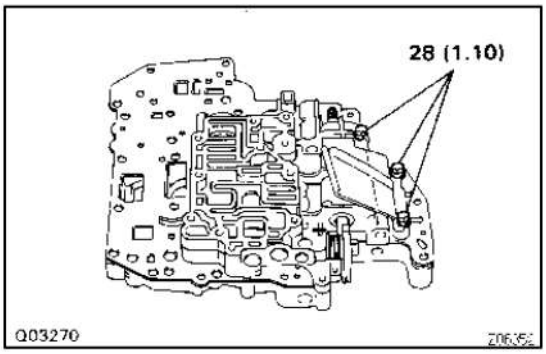


4. INSTALL LOWER VALVE BODY COVER

(a) Install the lower valve body cover over the new gasket.

(b) Install and finger tighten the 10 bolts.

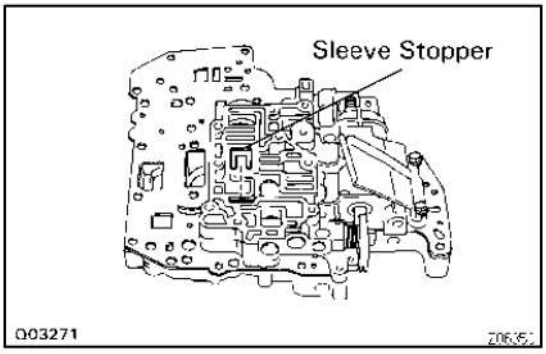
HINT: Each bolt length (mm, in.) is indicated in the illustration.



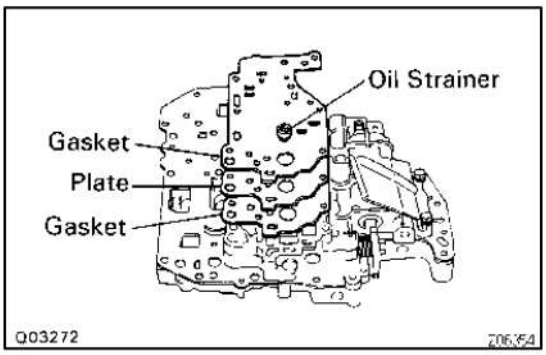
5. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY

Install and finger tighten the 3 bolts.

HINT: Each bolt length (mm, in.) is indicated in the illustration.



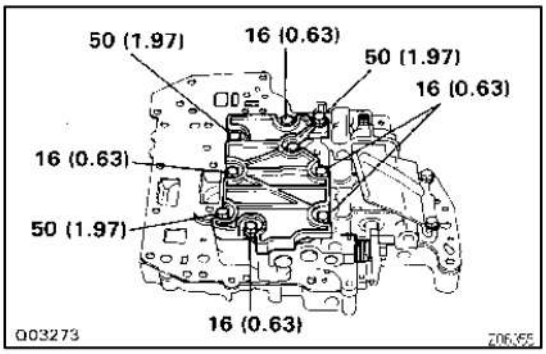
6. INSTALL SLEEVE STOPPER



7. INSTALL UPPER VALVE BODY COVER GASKETS, PLATE AND THROTTLE MODULATOR OIL STRAINER

(a) Position a new gasket and plate and then another new gasket.
HINT: The gaskets are not identical, but can be installed in any order.

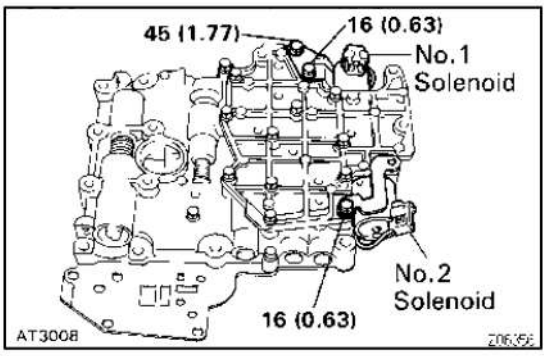
(b) Install the oil strainer onto the gasket.



8. INSTALL UPPER VALVE BODY COVER

(a) Position the upper valve body cover.

(b) Install and finger tighten the 9 bolts.
HINT: Each bolt length (mm, in.) is indicated in the illustration.

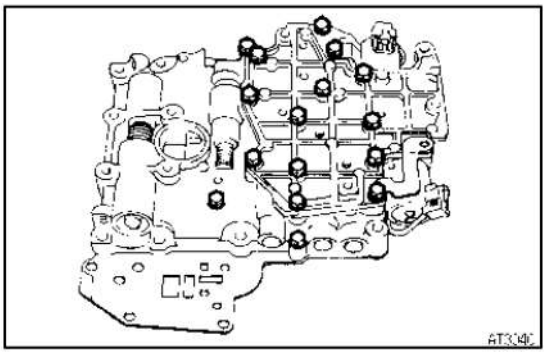


9. INSTALL SOLENOIDS

(a) Install the new O–rings on the solenoids.

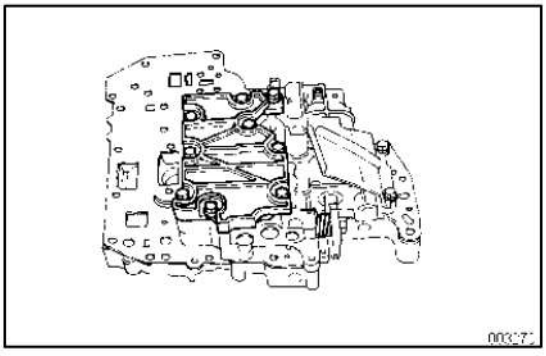
(b) Install the No.1 and No.2 solenoids.

(c) Install and finger tighten the 3 bolts.
HINT: Each bolt length (mm, in.) is indicated in the illustration.



10. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

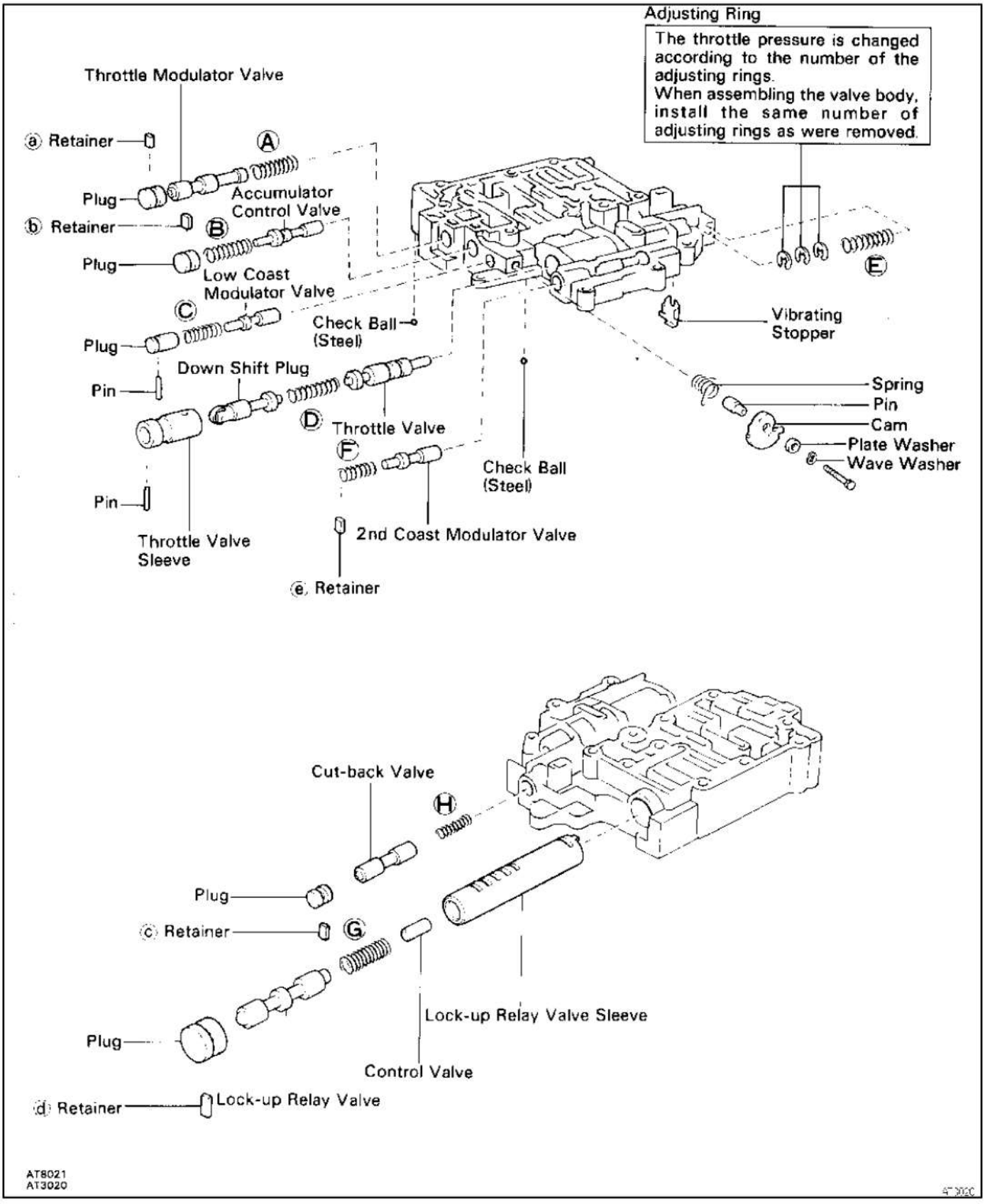
(a) Tighten the 16 bolts in the lower valve body.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



(b) Tighten the 12 bolts in the upper valve body.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

UPPER VALVE BODY
COMPONENTS

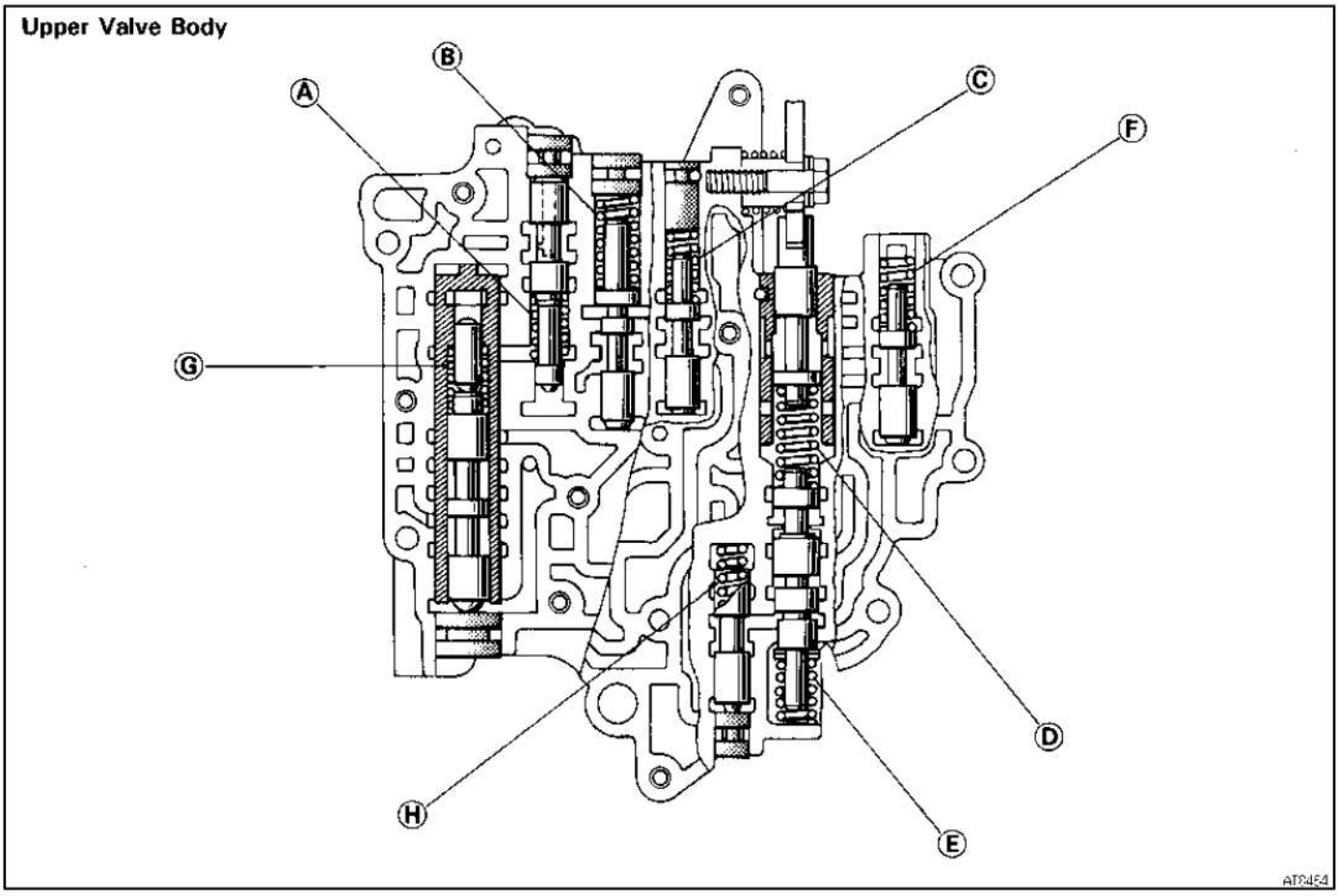
AX0GA–02



AX0GB–02

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During re–assembly please refer to the spring specifications below to help you to discriminate between the different springs.

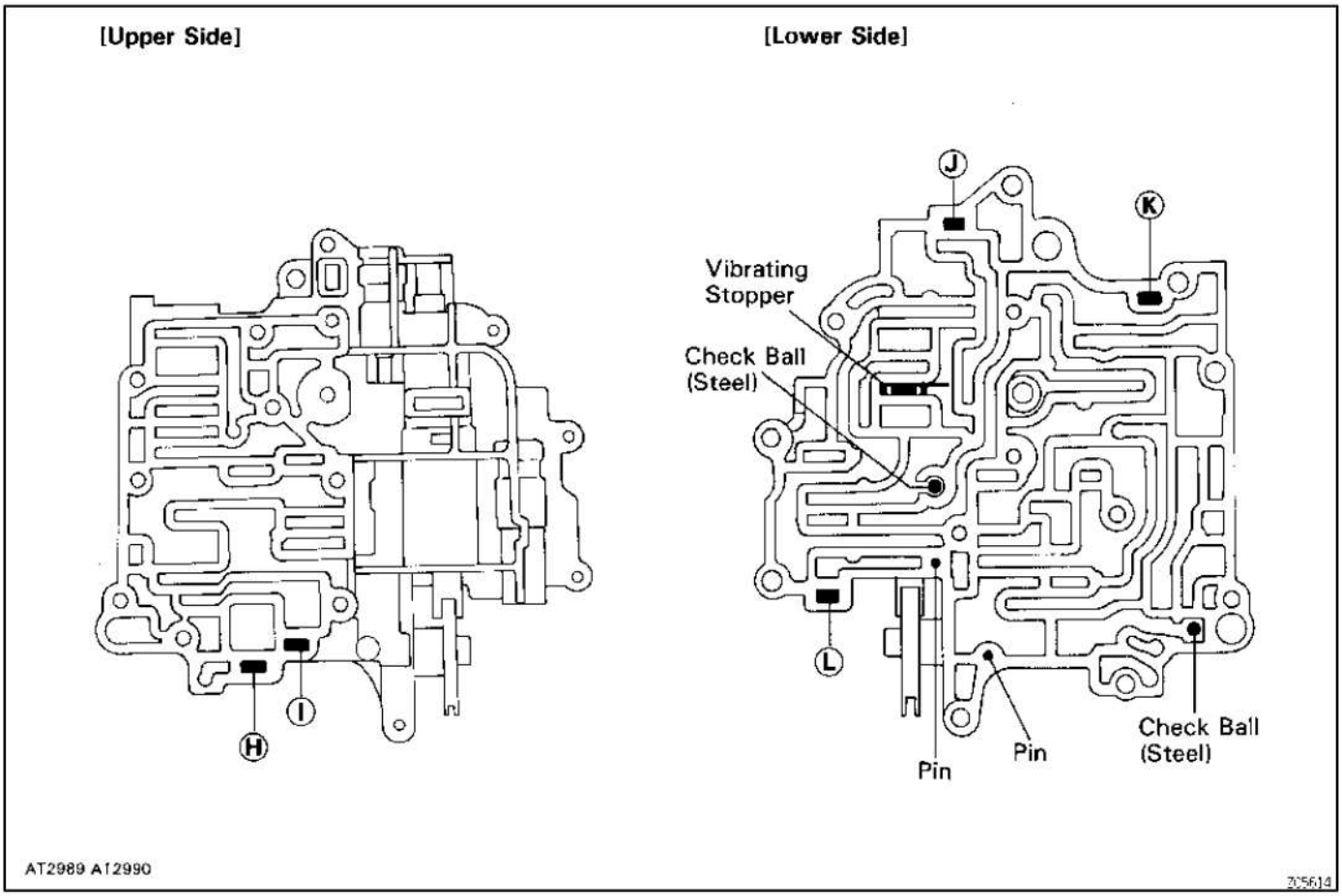


	Spring (Color)	Free Length / Coil Outer Diameter mm (in.)	Number of Coils
@@ @@ @: [c A]	Throttle Modulator Spring (None)	21.70 / 9.50 (0.8543 / 0.3740)	9.5
@@ @@ @: [c B]	Accumulator Control Spring (Yellow)	28.06 / 10.60 (1.1047 / 0.4173)	13.0
@@ @@ @: [c C]	Low Coast Modulator Spring (None)	21.60 / 7.90 (0.8504 / 0.3110)	11.5
@@ @@ @: [c D]	Down Shift Valve Spring (Yellow)	29.76 / 8.73 (1.1717 / 0.3437)	13.5

@@@@@: [c E]	Throttle Valve Spring (None)	30.70 / 9.20 (1.2087 / 0.3622)	9.5
@@@@@: [c F]	Second Coast Modulator Valve Spring (Light Green)	20.93 / 8.50 (0.8240 / 0.3364)	10.0
@@@@@: [c G]	Lock–up Relay Valve spring (Green)	26.56 / 10.20 (1.0457 / 0.4016)	11.5
@@@@@: [c H]	Cut–back Valve Spring (None)	21.80 / 6.00 (0.8583 / 0.2362)	13.5

RETAINERS, PINS, VIBRATING STOPPER AND CHECK BALLS LOCATION

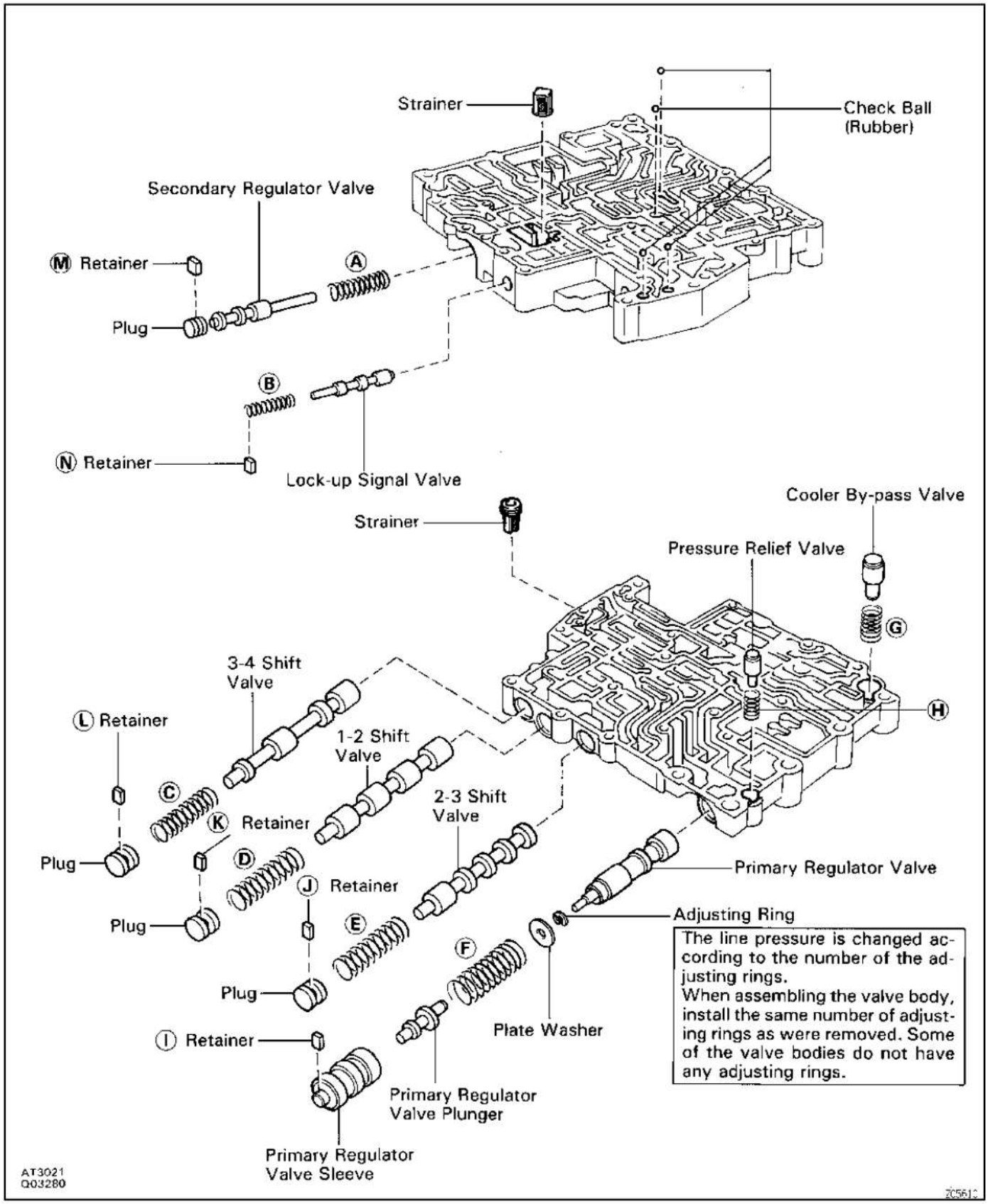
AX0GC-02



	Retainer	Height / Width / Thickness mm (in.)
@@@@@: [c H]	Throttle Modulator Valve	9.2 / 5.0 / 3.2 (0.362 / 0.197 / 0.126)
@@@@@: [c I]	Accumulator Control Valve	11.5 / 5.0 / 3.2 (0.453 / 0.197 / 0.126)
@@@@@: [c J]	Cut–back Valve	9.2 / 5.0 / 3.2 (0.362 / 0.197 / 0.126)
@@@@@: [c K]	Lock–up Relay Valve	15.0 / 5.0 / 3.2 (0.591 / 0.197 / 0.126)
@@@@@: [c L]	2nd Coast Modulator Valve	15.0 / 5.0 / 3.2 (0.591 / 0.197 / 0.126)

LOWER VALVE BODY
COMPONENTS

AX0GV–02

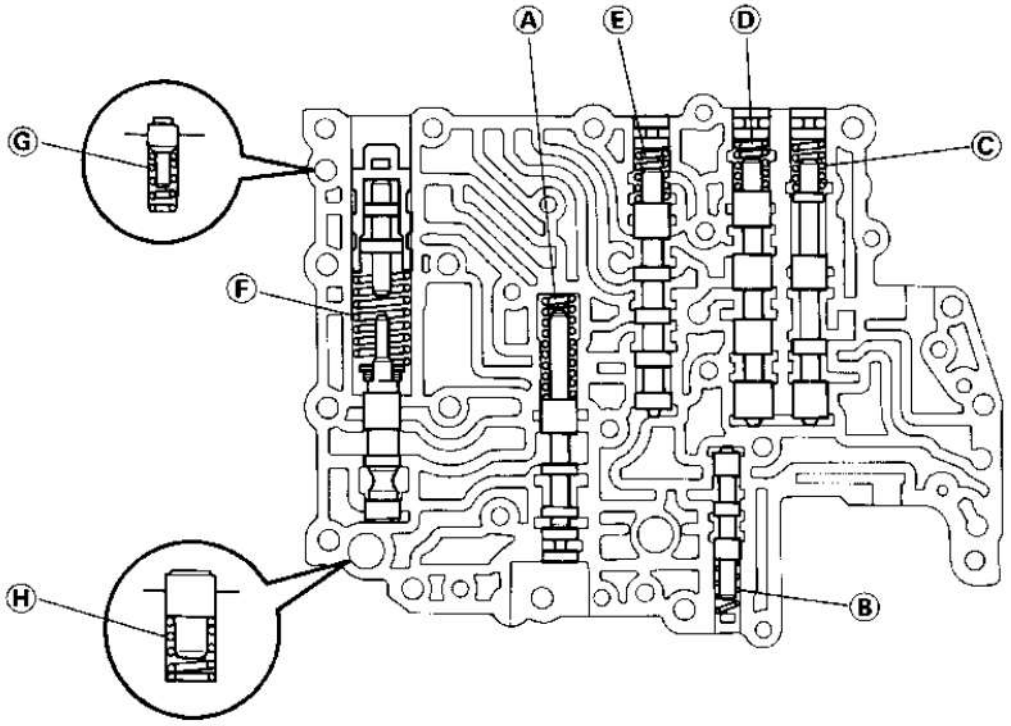


AX0GD-02

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During re–assembly please refer to the spring specifications below to help you to discriminate between the different springs.

Lower Valve Body

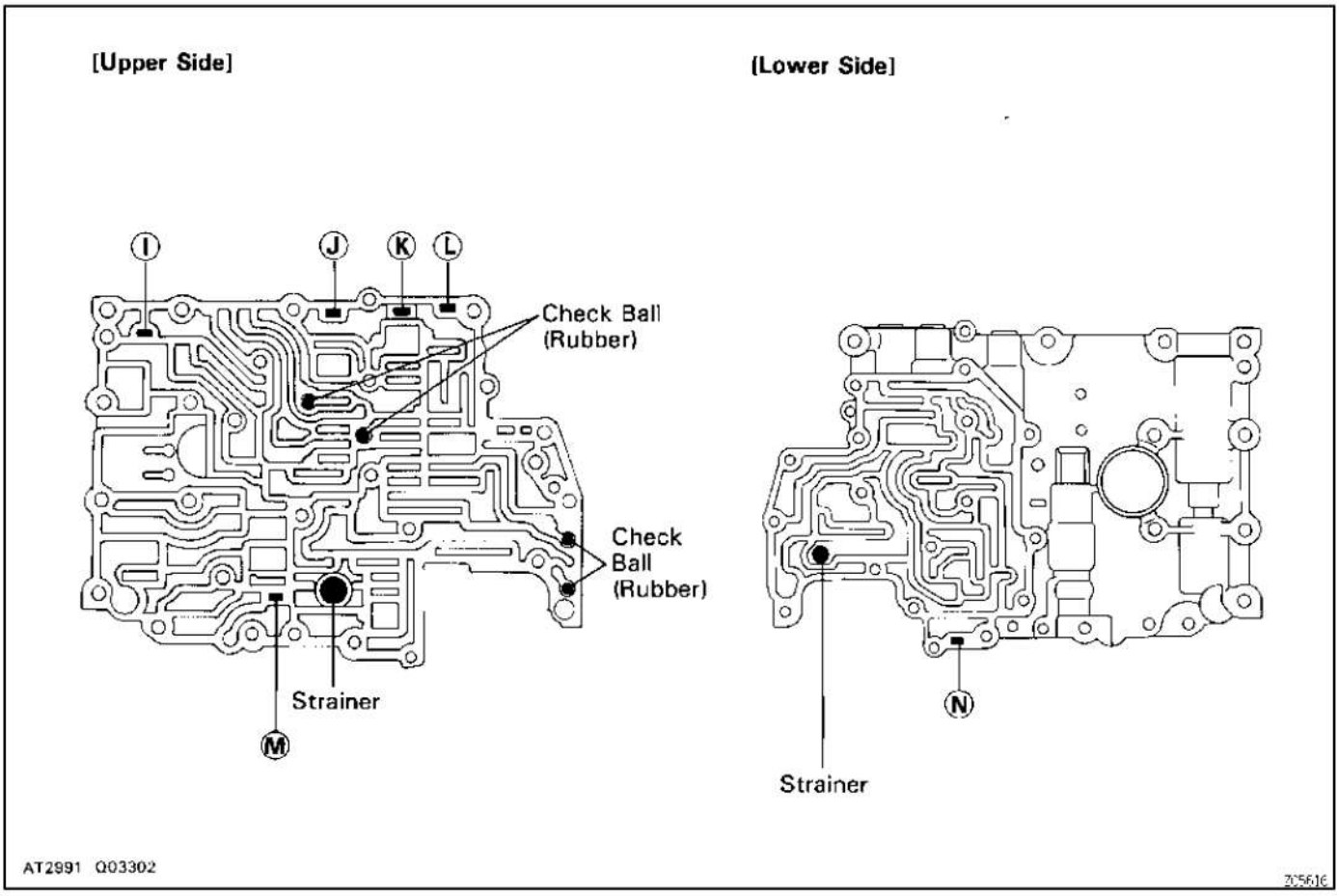


	Spring (Color)	Free length / Outer diameter mm (in.)	Number of Coils
@@@@@: [c A]	Secondary Regulator Valve Spring (None)	43.60 / 10.90 (1.7165 / 0.4291)	11.5
@@@@@: [c B]	Lock–up Signal Valve Spring (None)	30.00 / 8.20 (1.1811 / 0.3228)	11.5
@@@@@: [c C]	3–4 Shift Valve Spring (None)	29.27 / 9.70 (1.1524 / 0.3819)	10.5

@@@@@: [c D]	1–2 Shift Valve Spring (None)	29.27 / 9.70 (1.1524 / 0.3819)	10.5
@@@@@: [c E]	2–3 Shift Valve Spring (None)	29.27 / 9.70 (1.1524 / 0.3819)	10.5
@@@@@: [c F]	Primary Regulator Valve Spring (None)	66.65 / 18.60 (2.6240 / 0.7323)	12.5
@@@@@: [c G]	Cooler By–pass Valve Spring (None)	19.90 / 11.00 (0.7835 / 0.4331)	8.5
@@@@@: [c H]	Pressure Relief Valve Spring (None)	11.20 / 6.40 (0.4409 / 0.2520)	7.5

RETAINER, STRAINER AND CHECK BALLS LOCATION

AX0GE-02

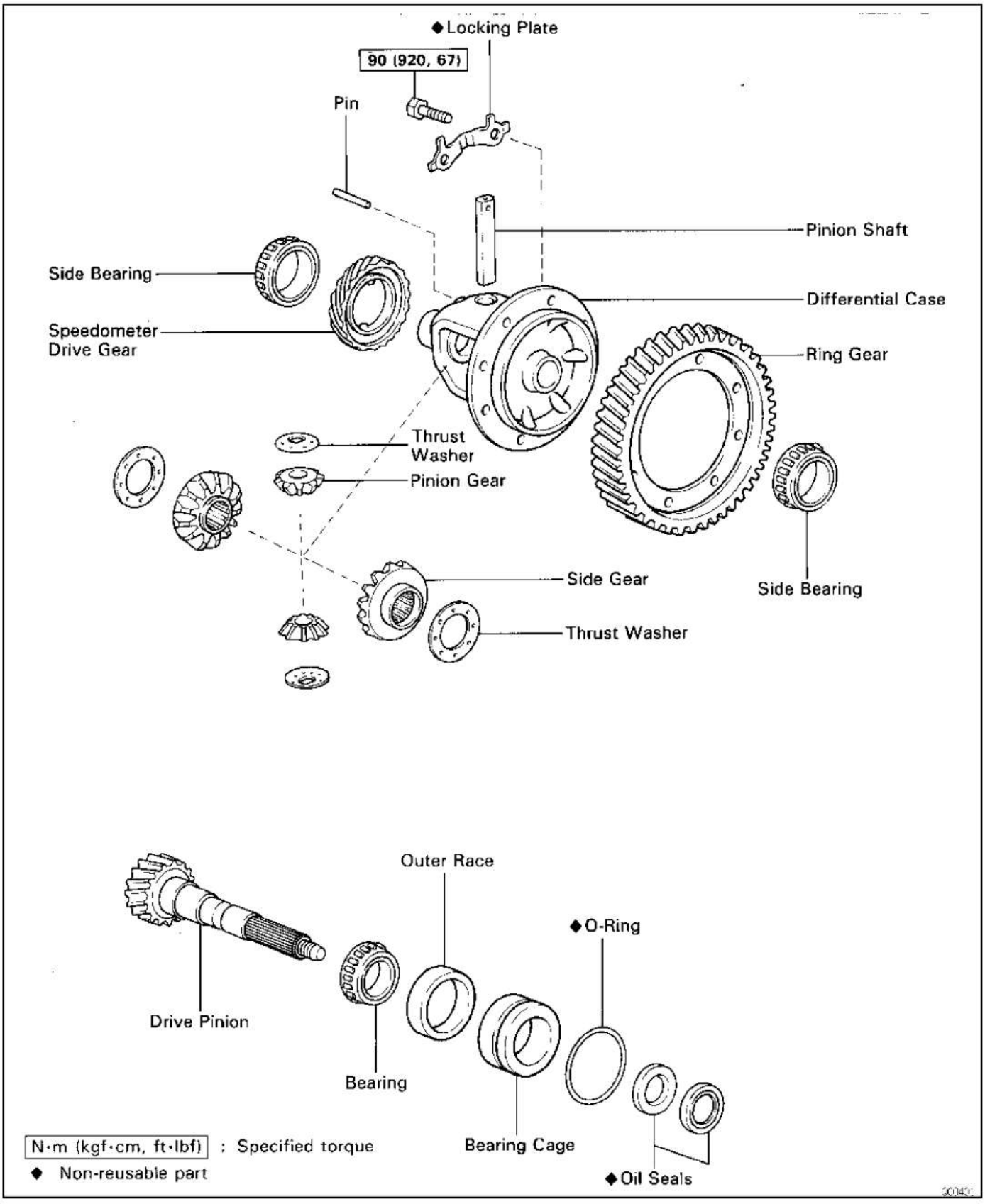


	Retainer	Height / Width / Thickness mm (in.)
@@@@@: [c I]	Primary Regulator Valve	9.2 / 5.0 / 3.2 (0.362 / 0.197 / 0.128)
@@@@@: [c J]	2–3 Shift Valve	8.0 / 6.0 / 3.2 (0.315 / 0.236 / 0.126)
@@@@@: [c K]	1–2 Shift Valve	9.2 / 5.0 / 3.2 (0.362 / 0.197 / 0.126)
@@@@@: [c L]	3–4 Shift Valve	8.0 / 6.0 / 3.2 (0.315 / 0.236 / 0.126)
@@@@@: [c M]	Secondary Regulator Valve	13.0 / 6.0 / 3.2 (0.512 / 0.236 / 0.126)
@@@@@: [c N]	Lock–up Signal Vave	15.0 / 5.0 / 3.2 (0.591 / 0.197 / 0.126)

DIFFERENTIAL ASSEMBLY

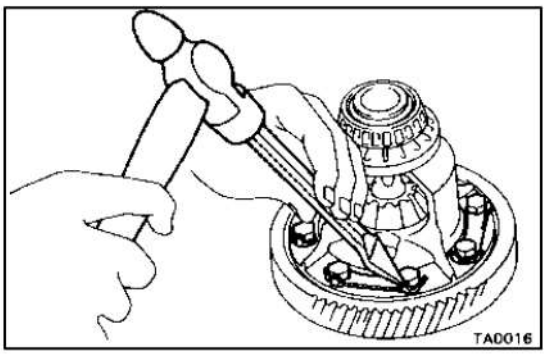
COMPONENTS

AX0GF-02



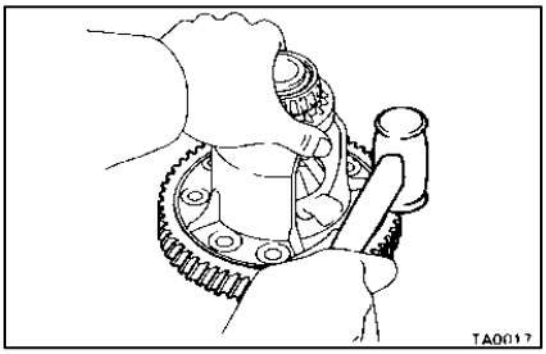
AX0GG-02

DIFFERENTIAL CASE DISASSEMBLY

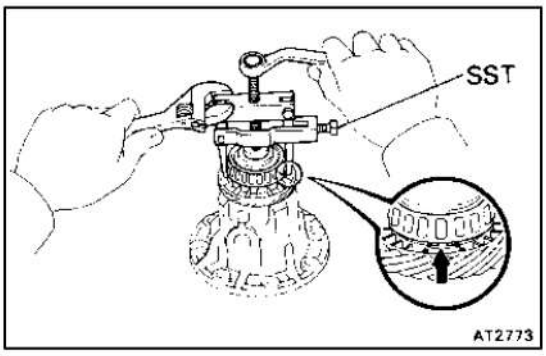


1. REMOVE RING GEAR

(a) Loosen the staked part of the lock plate.

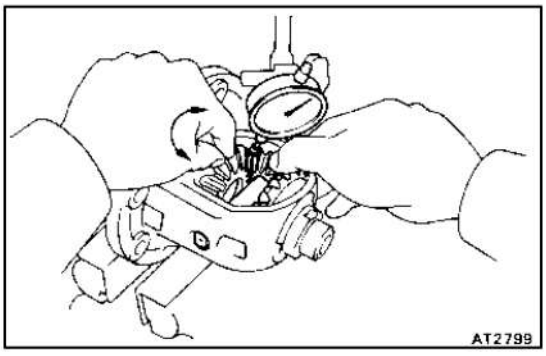


(b) Remove the 8 bolts and locking plates.
(c) Using a copper hammer, tap on the ring gear to remove it from the case.



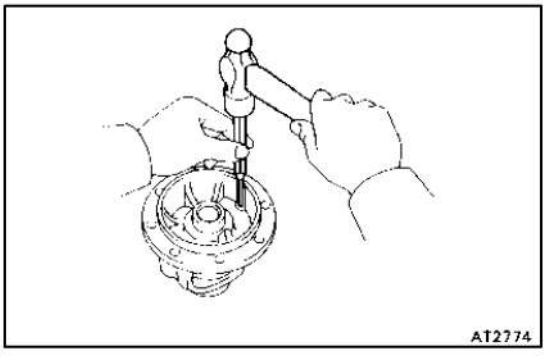
2. REMOVE SIDE BEARINGS

Fasten SST under the bearing above the cutouts on the speedometer drive gear. Remove the bearing from the case.
SST 09502–10012



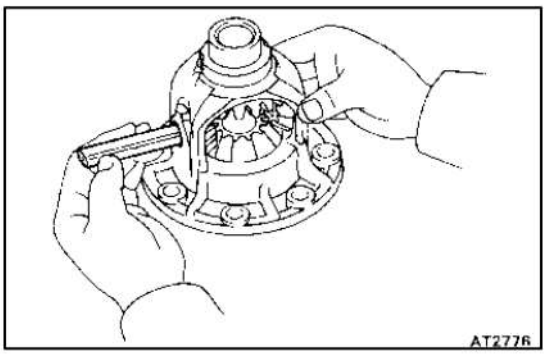
3. CHECK SIDE GEAR BACKLASH

Using a dial gauge, measure the backlash of each side gear while holding one pinion toward the case.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)

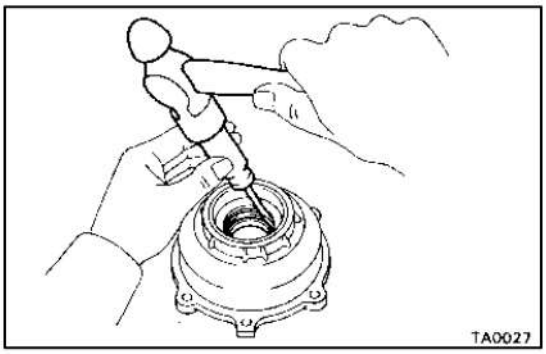


4. DISASSEMBLE DIFFERENTIAL CASE

(a) Drive out the pinion shaft lock pin from the side on which the ring gear is installed.

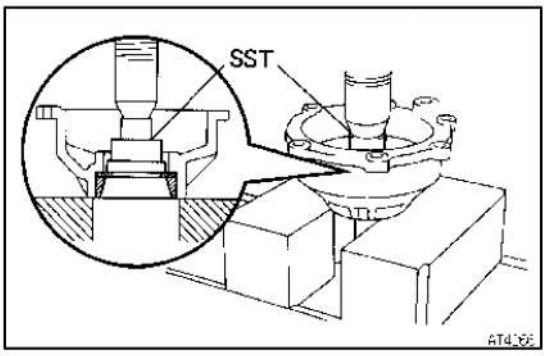


(b) Remove the pinion shaft from the case.
(c) Remove the 2 pinions and 2 side gears with the 4 thrust washers.



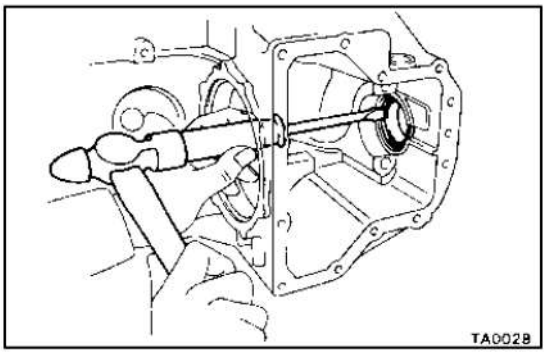
5. REMOVE LH OIL SEAL

Using a hammer and screwdriver, remove the oil seal.



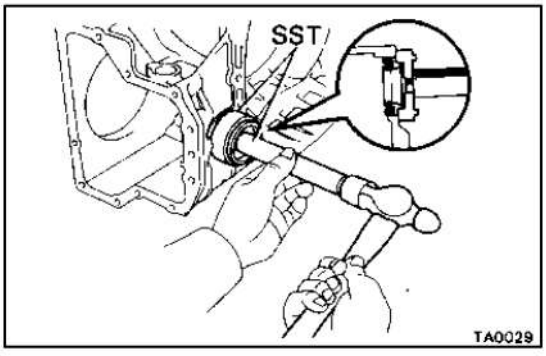
6. REMOVE BEARING OUTER RACE FROM LH SIDE BEARING RETAINER

Using SST, press out the outer race and shim.
SST 09350–32014 (09351–32090)



7. REMOVE RH OIL SEAL

Using a hammer and screwdriver, remove the oil seal.

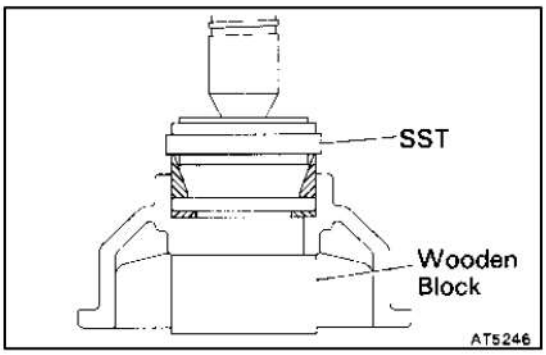


AX0GH-02

DIFFERENTIAL CASE ASSEMBLY

1. INSTALL RH OIL SEAL

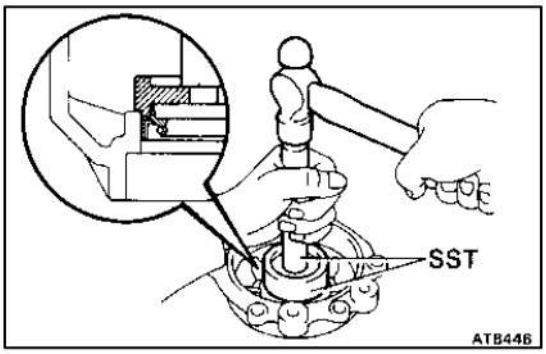
(a) Using SST, drive in a new oil seal until its surface is flush with the surface of the case.
SST 09350–32014 (09351–32130, 09351–32150)
(b) Coat the oil seal lip with MP grease.



2. INSTALL BEARING OUTER RACE TO LH SIDE BEARING RETAINER

(a) Place the shim onto the retainer.

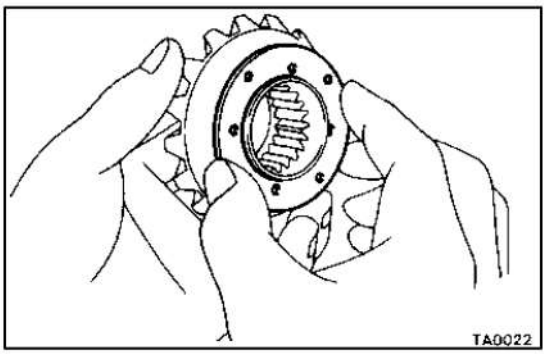
(b) Using SST, press a new outer race into the retainer.
SST 09350–32014 (09351–32111, 09351–32130)
HINT: Use the 2.60 mm (0.1024 in.) thick thim.



3. INSTALL LH OIL SEAL

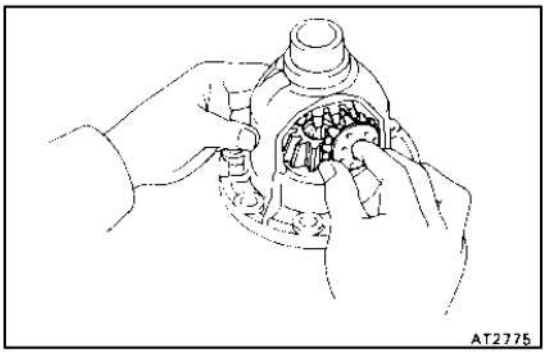
(a) Using SST, drive in a new oil seal.
SST 09350–32014 (09351–32130, 09351–32150)
Oil seal drive in depth:
2.7 mm (0.106 in.)

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

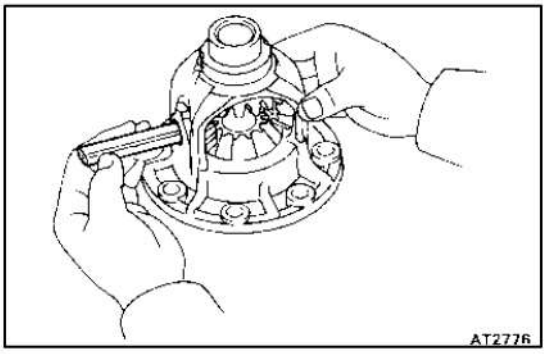


4. ASSEMBLE DIFFERENTIAL CASE

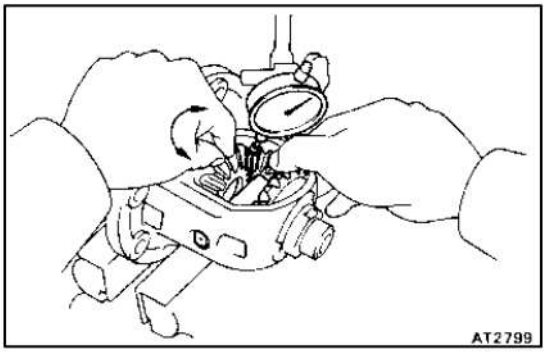
(a) Install the removed thrust washers to the side gears.



(b) Install the side gears with thrust washers, pinion thrust washers and pinion gears.



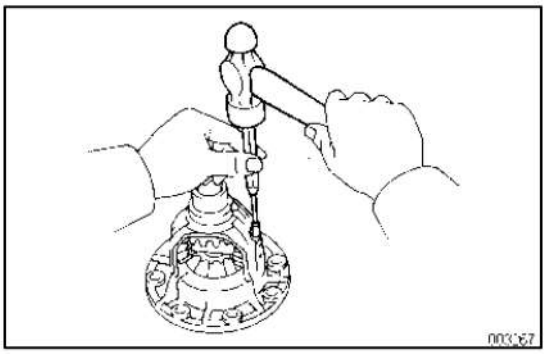
(c) Install the pinion shaft.



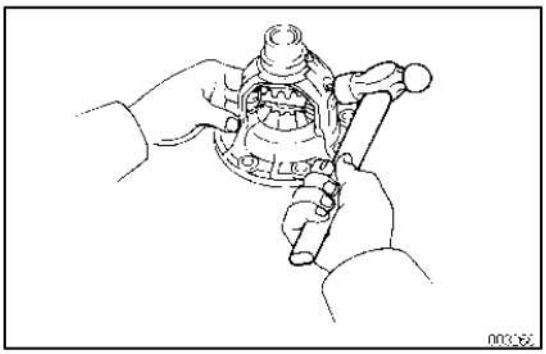
(d) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.
Standard backlash:
0.05 – 0.20 mm (0.0020 – 0.0079 in.)
Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.
Thrust washer thickness
mm (in.)

Thickness	Thickness
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

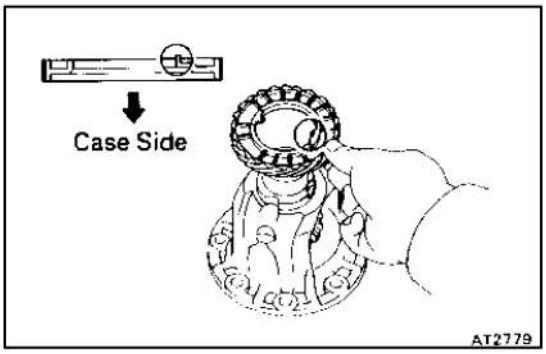
If the backlash is not within specification, install a thrust washer of a different thickness.



(e) Using a hammer and punch, drive the lock pin through the case and hole in the pinion shaft.

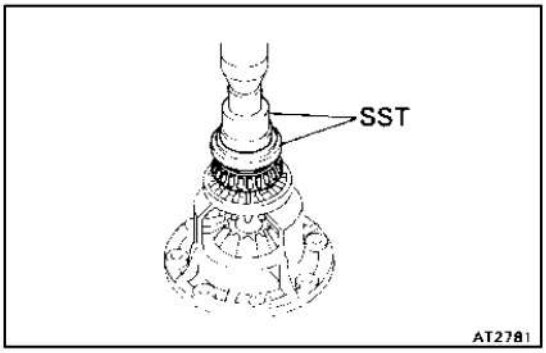


(f) Stake the differential case.

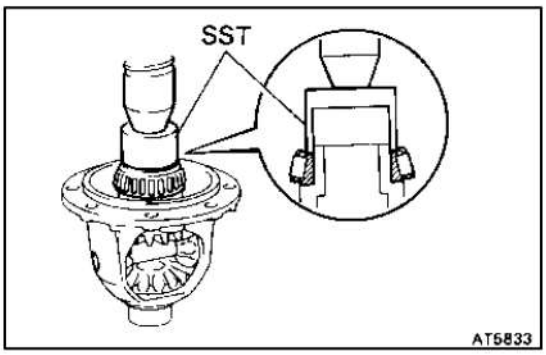


5. INSTALL SIDE BEARINGS

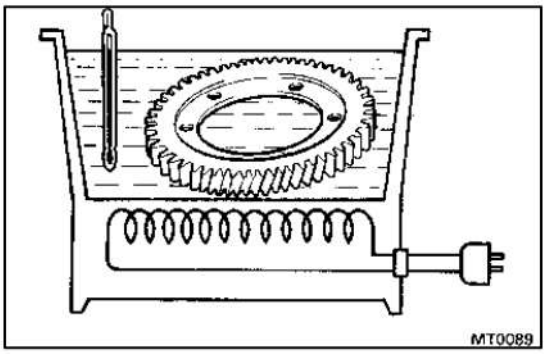
(a) Install the speedometer drive gear onto the differential case.



(b) Using SST and a press, press in the RH side bearing onto the differential case.
SST 09350–32014 (09351–32090, 09351–32120)

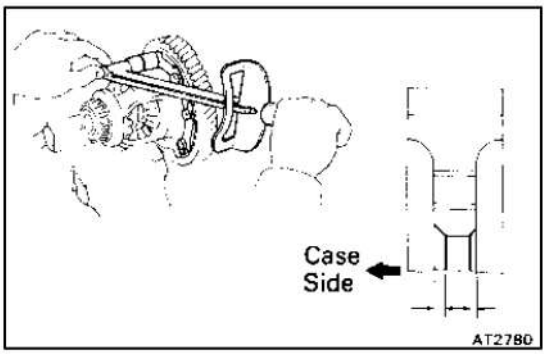


(c) Using SST and a press, press in the LH side bearing onto the differential case.
SST 09710–28020 (09710–08040)

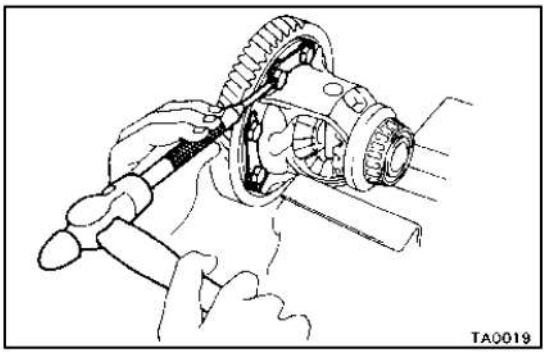


6. INSTALL RING GEAR

(a) Clean the contact surface of the differential case.
(b) Heat the ring gear to about 100 °C (212 °F) in an oil bath.
(c) Carefully remove the ring gear from the water.
NOTICE: Do not heat the ring gear above 110 °C (230 °F).
(d) Clean the contact surface of the ring gear with cleaning solvent.



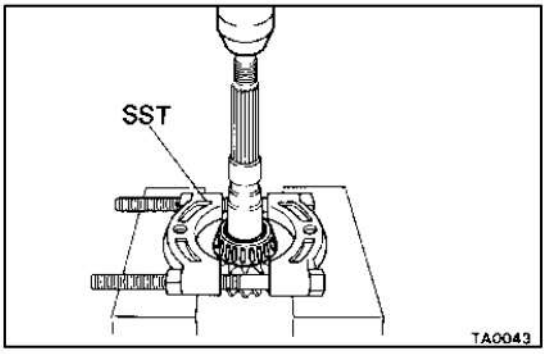
(e) Quickly install the ring gear on the differential case.
(f) Install new locking plates and set bolts. When the ring gear has cooled sufficiently, tighten the set bolts uniformly a little at a time. Torque the bolts.
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



(g) Using a hammer and drift punch, stake the locking plates.
HINT: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.

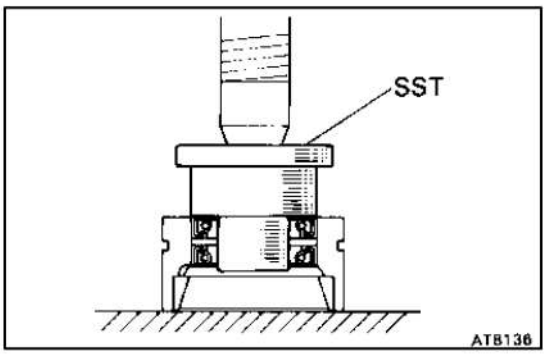
AX0GJ–02

DRIVE PINION DISASSEMBLY



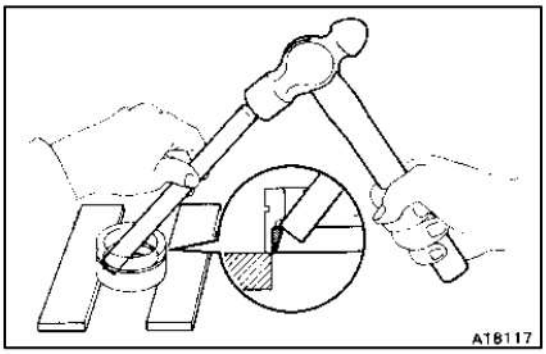
1. REMOVE DRIVE PINION SHAFT BEARING

Using SST, press out the bearing.
SST 09950–00020



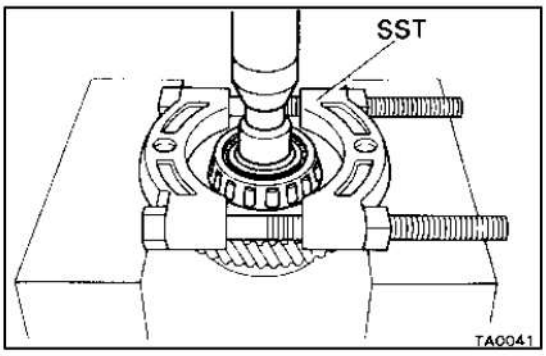
2. REMOVE OIL SEALS FROM CAGE

Using SST, press out the two oil seals together.
SST 09350–32014 (09351–32090)



3. REMOVE SHAFT BEARING OUTER RACE FROM CAGE

Using a hammer and brass bar, drive out the outer race from the cage.

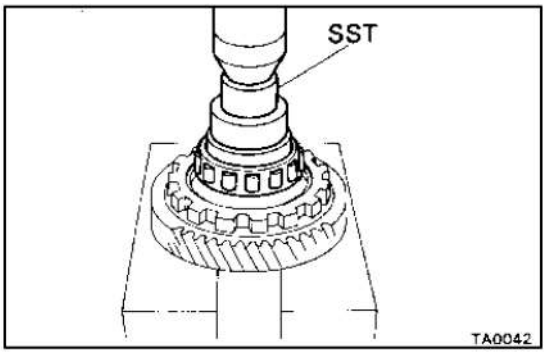


4. REMOVE COUNTER DRIVEN GEAR BEARING

Using SST, press out the bearing.
SST 09950–00020

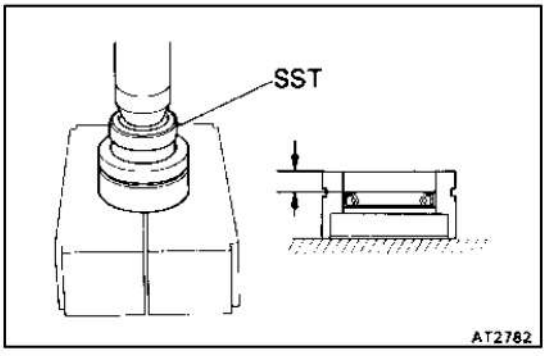
AX0GK–02

DRIVE PINION SHAFT ASSEMBLY



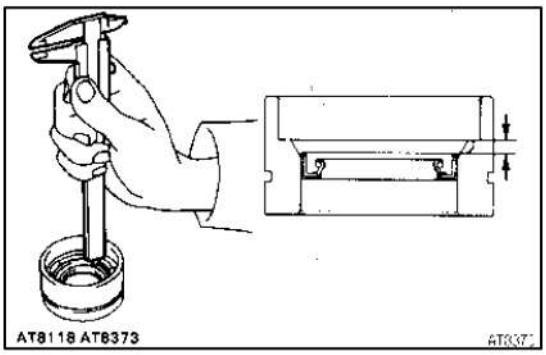
1. INSTALL COUNTER DRIVEN GEAR BEARING

Using SST, press in a new bearing.
SST 09350–32014 (09351–32090)

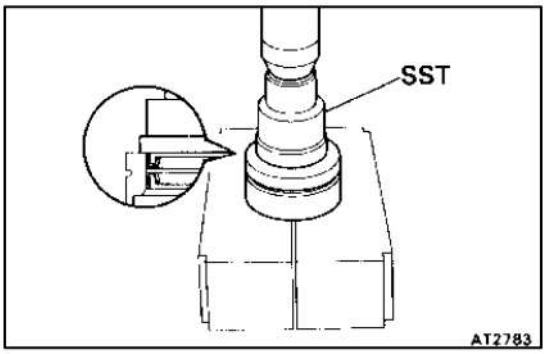


2. INSTALL OIL SEALS TO CAGE

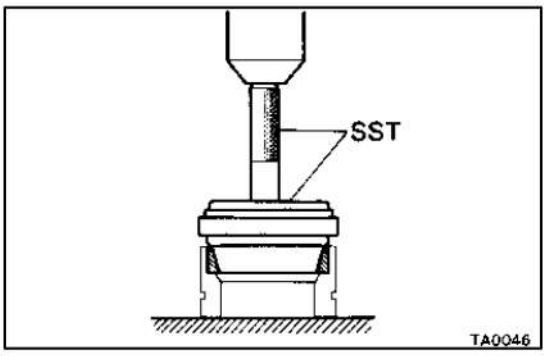
(a) Using SST, press in a new oil seal with the lip facing downward.
SST 09350–32014 (09351–32090)
Oil seal press in depth (from flat end):
9.5 mm (0.374 in.)



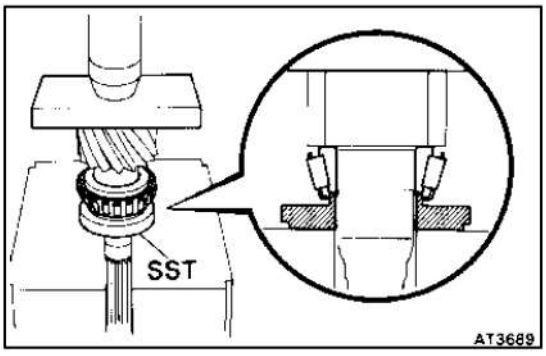
(b) Measure the oil seal press in depth.
Oil seal press in depth:
4 mm (0.16 in.)



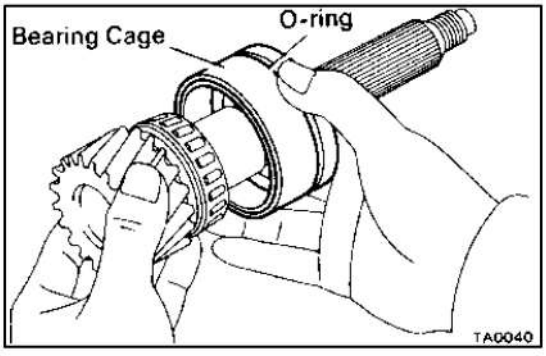
(c) With the oil seal lip facing upward, use SST to press in a new oil seal until its end is flush with the surface of the cage.
SST 09350–32014 (09351–32090)
(d) Coat the oil seal lip with MP grease.



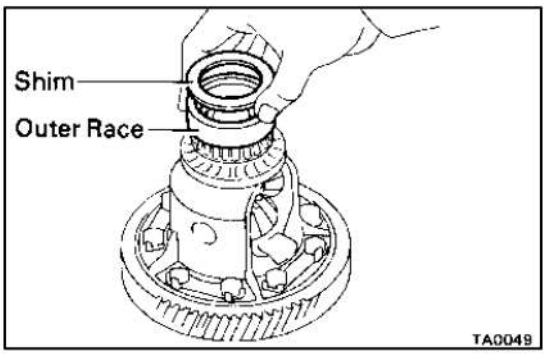
3. INSTALL SHAFT BEARING OUTER RACE TO CAGE
Using SST, press a new outer race into the cage.
SST 09350–32014 (09351–32111, 09351–32130)



4. INSTALL DRIVE PINION SHAFT BEARING
Using SST, press in the bearing.
SST 09350–32014 (09351–32100)



5. PLACE BEARING CAGE ONTO DRIVE PINION SHAFT
Be careful not to damage the oil seal with the splines.

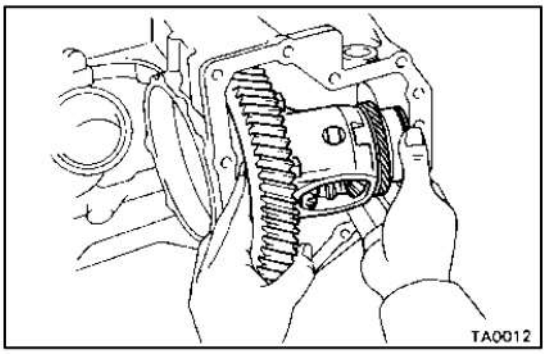


DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTMENT

AX0GL-02

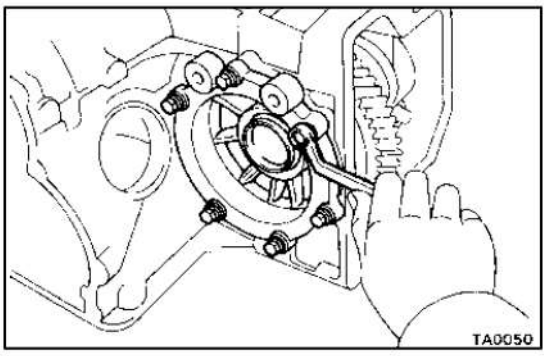
1. PLACE OUTER RACE AND ADJUSTING SHIM ONTO RH SIDE BEARING

Use the adjusting shim which was removed or one 2.40 mm (0.0945 in.) thick.



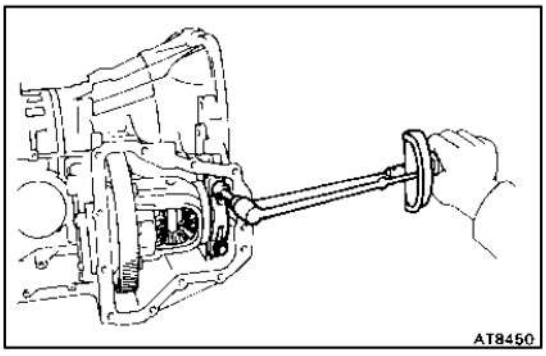
2. PLACE DIFFERENTIAL CASE INTO TRANSAXLE CASE

Be sure to install the adjusting shim.



3. INSTALL LH BEARING RETAINER

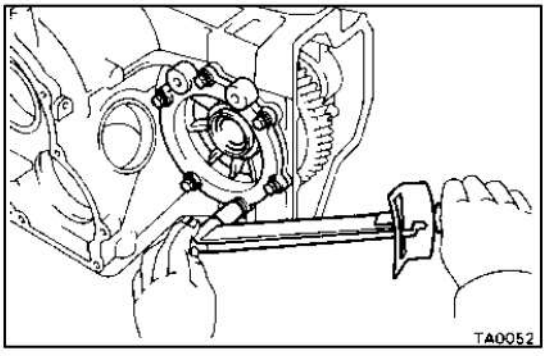
(a) Do not install the O–ring yet.
(b) Do not coat the bolt threads with sealant yet.
(c) Temporarily tighten the bolts evenly and gradually while turning the ring gear.



4. INSTALL RH SIDE BEARING CAP

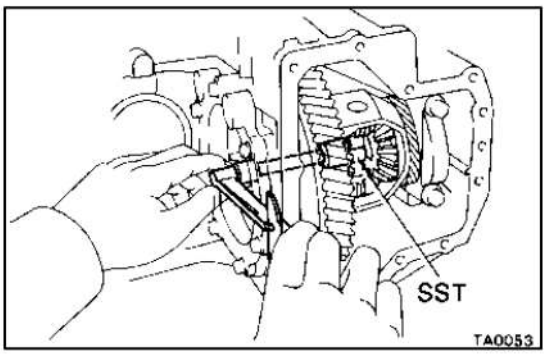
Tighten the bolts evenly and gradually while turning the ring gear.

Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)



5. TIGHTEN LH BEARING RETAINER

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



6. ADJUST SIDE BEARING PRELOAD

Using SST and a torque meter, measure the preload of the ring gear.

SST 09564–32011

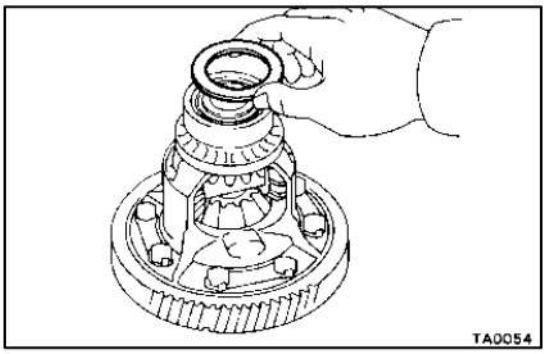
Preload (at starting):

New bearing

1.0 – 1.6 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)

Reused bearing

0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)



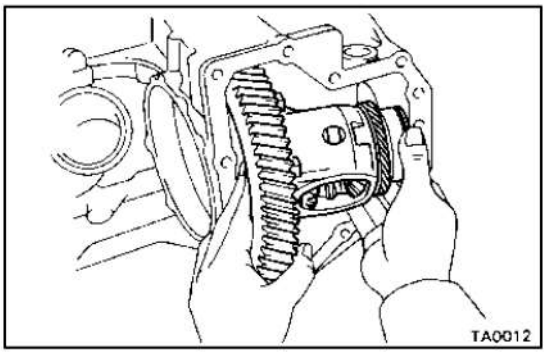
If the preload is not within specification, remove the differential case assembly.

Reselect the RH adjusting shim.

mm (in.)

Thickness	Thickness
1.90 (0.0748)	2.40 (0.0945)
1.95 (0.0786)	2.45 (0.0965)
2.00 (0.0787)	2.50 (0.0984)
2.05 (0.0807)	2.55 (0.1004)
2.10 (0.0827)	2.60 (0.1024)
2.15 (0.0846)	2.65 (0.1043)
2.20 (0.0866)	2.70 (0.1063)
2.25 (0.0886)	2.75 (0.1083)
2.30 (0.0906)	2.80 (0.1103)

HINT: The preload will change by about 0.3 – 0.4 N·m (3 – 4kgf·cm, 2.6 – 3.5 in.·lbf) with a change in shim thickness of 0.05 mm (0.0020 in.).



7. REMOVE DIFFERENTIAL CASE AND COMPONENT PARTS

If the preload is adjusted within specification, remove the bearing retainer, differential case, RH side bearing and shim.

Be careful not to lose the adjusting shim.

COMPONENT PARTS INSTALLATION

COMPONENT PARTS INSTALLATION

AX0GW–02

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure, again, that all component groups are assembled correctly.
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.

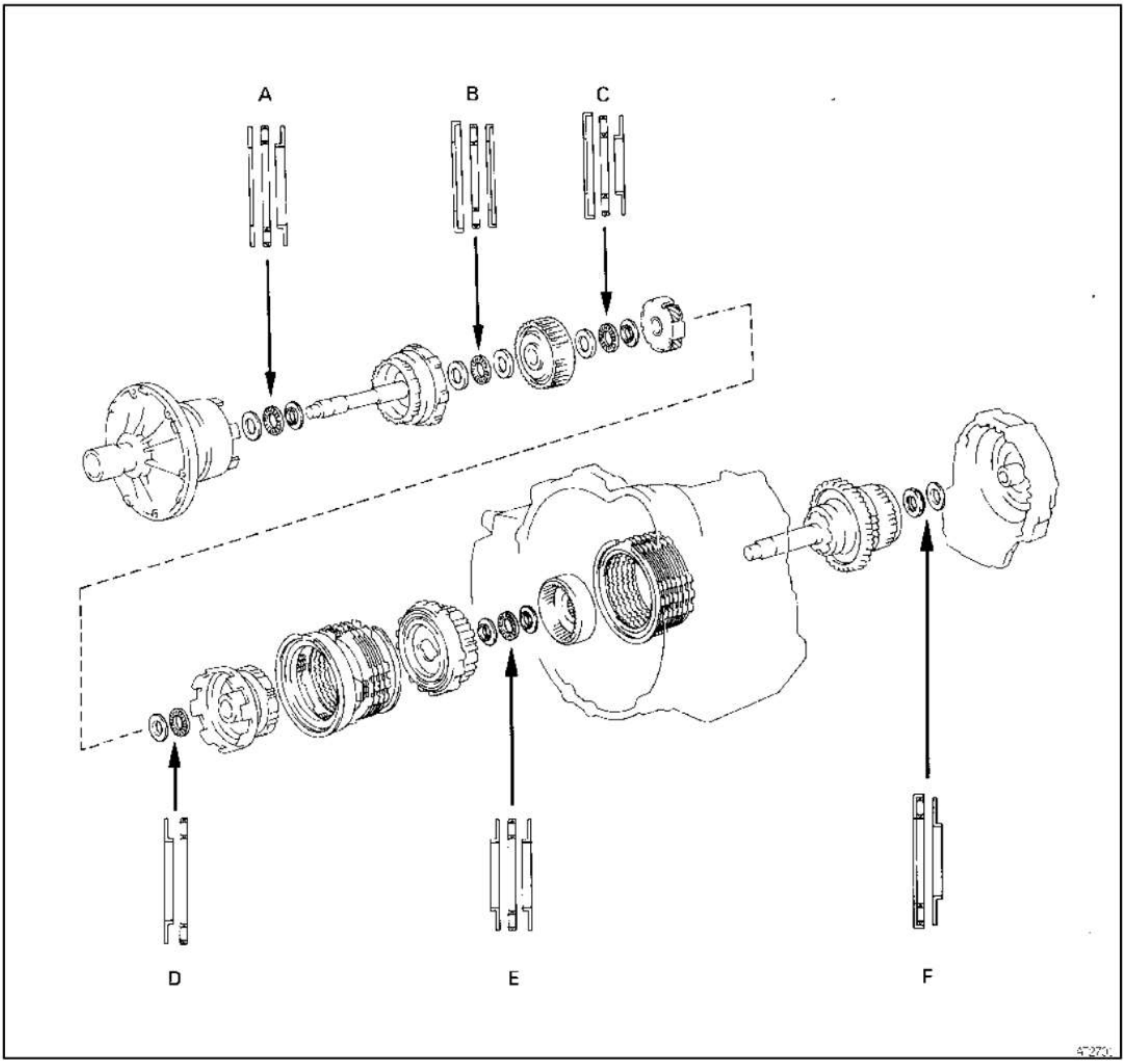
Recommended ATF:

DEXRON ® @@@@@: [g 2]

GENERAL INSTALLATION NOTES:

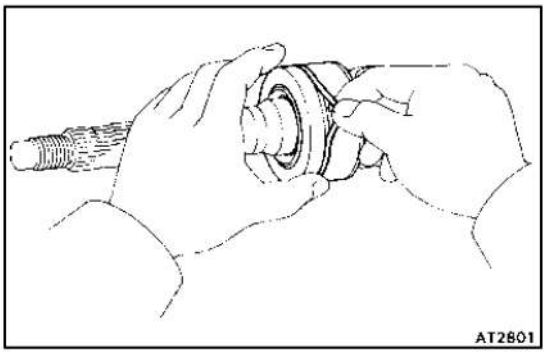
1. The automatic transaxle is composed of highly precision–finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage and affect performance.
2. Before assembling new clutch discs, soak them in automatic transaxle fluid for at least 15 minutes.
3. Apply automatic transaxle fluid on the sliding or rotating surfaces of parts before assembly.
4. Use petroleum jelly to keep small parts in their places.
5. Do not use adhesive cements on gaskets and similar parts.
6. When assembling the transaxle, be sure to use new gaskets and O–rings.
7. Dry all parts with compressed air–never use shop rags.
8. Be sure to install the thrust bearings and races in the correct direction and position.

BEARING AND RACE DIAMETERS



mm (in.)	Front Bearing Race Outer / Inner Diameter	Thrust Bearing Race Outer / Inner Diameter	Rear Bearing Race Outer / Inner Diameter
@@ @@ @: [c A]	43.0 / 30.5 (1.693 / 1.201)	42.0 / 28.9 (1.654 / 1.138)	42.0 / 27.1 (1.654 / 1.067)

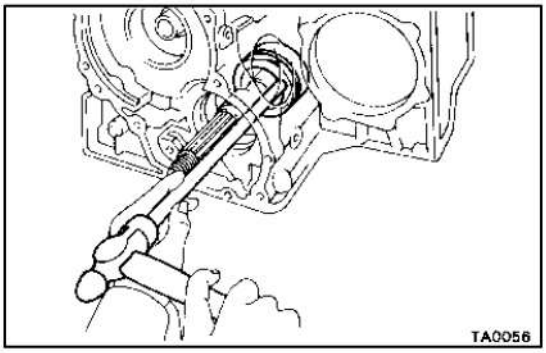
@@@@@: [c B]	37.9 / 22.0 (1.492 / 0.866)	36.1 / 22.2 (1.421 / 0.874)	35.7 / 23.0 (1.406 / 0.906)
@@@@@: [c C]	37.9 / 22.0 (1.492 / 0.866)	36.1 / 22.2 (1.421 / 0.874)	35.0 / 19.0 (1.378 / 0.748)
@@@@@: [c D]	45.0 / 28.0 (1.772 / 1.102)	45.0 / 30.0 (1.772 / 1.181)	–
@@@@@: [c E]	37.3 / 24.1 (1.469 / 0.949)	37.6 / 24.0 (1.480 / 0.945)	37.6 / 22.2 (1.480 / 0.874)
@@@@@: [c F]	–	46.3 / 26.2 (1.823 / 1.031)	43.0 / 24.5 (1.693 / 0.965)



DRIVE PINION ASSEMBLY INSTALLATION

AX0GM–02

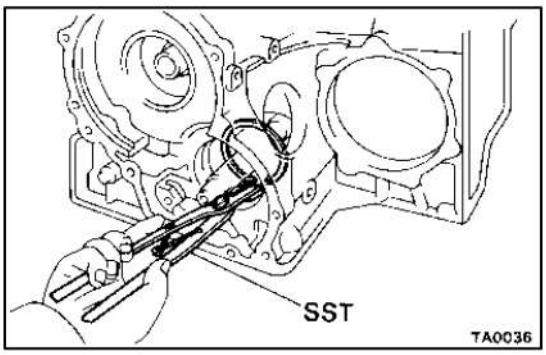
1. INSTALL NEW O–RING ONTO BEARING CAGE



2. INSTALL DRIVE PINION SHAFT INTO CASE

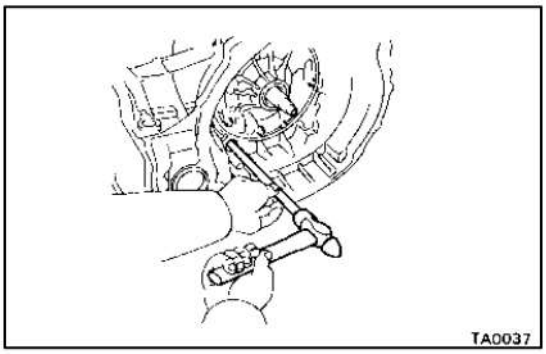
Slightly tap the cage into the case until the groove with the bore can be see.

HINT: Drive in the bearing cage until the surface of the bearing cage passes through the groove with the bore.

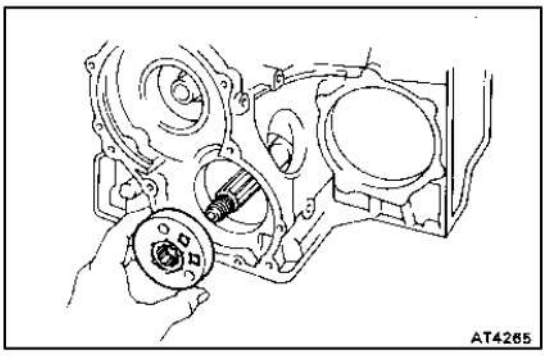


3. INSTALL SNAP RING INTO CASE

(a) Using SST, install the snap ring into the groove.
SST 09350–32014 (09351–32050)

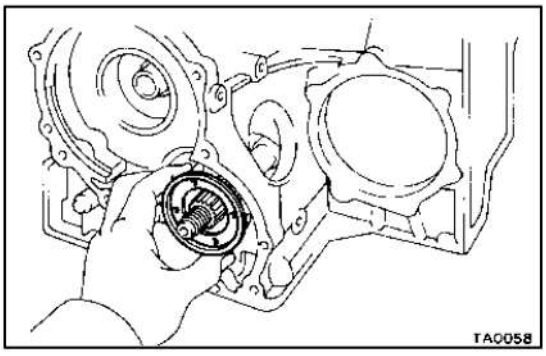


(b) Slightly tap the drive pinion to fit the snap ring into the groove.



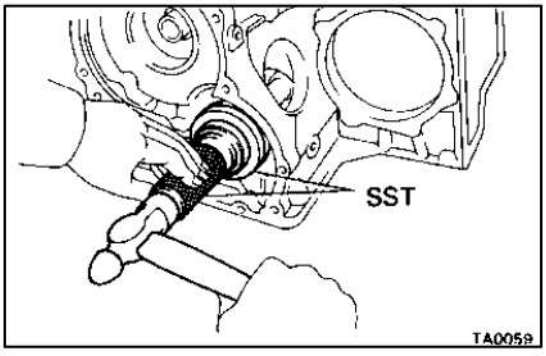
4. INSTALL ROTOR SENSOR

Install the rotor sensor, facing the magnet outward.



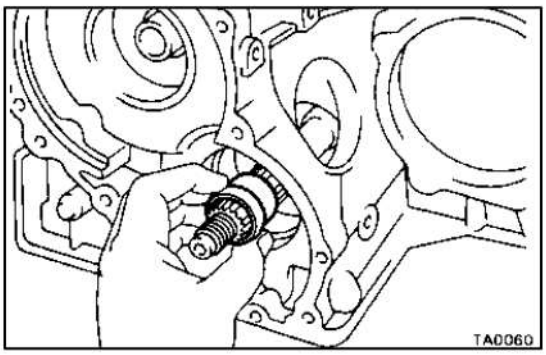
5. INSTALL OIL SLINGER

Install the oil slinger, facing the lip outward.



6. INSTALL OUTER RACE

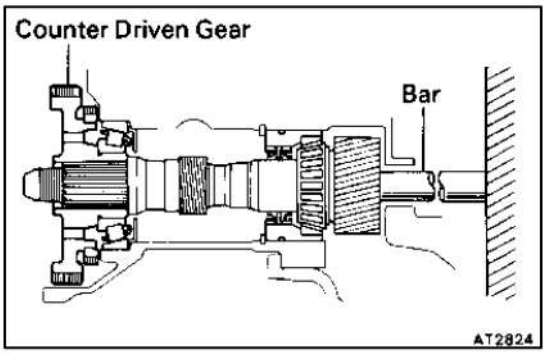
Using SST, drive the outer race into the case.
SST 09350–32014 (09351–32100, 09351–32140)



7. INSTALL NEW SPACER

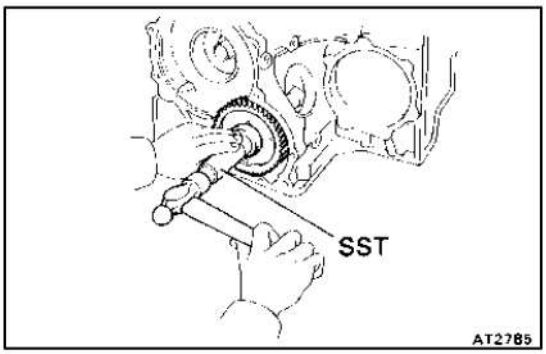
Always use new spacer.

Install the spacer with the small end first.



8. INSTALL COUNTER DRIVEN GEAR ONTO SHAFT

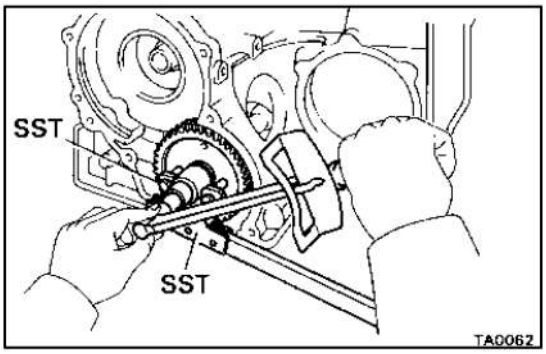
(a) Place a bar at the drive pinion side and position the outer end of the bar against a vise or similar.



(b) Using SST, driven in gear onto the shaft until the nut can be installed on the threads of the shaft.

NOTICE: Be careful not to cause an impact to the transaxle case.

SST 09350–32014 (09351–32140)



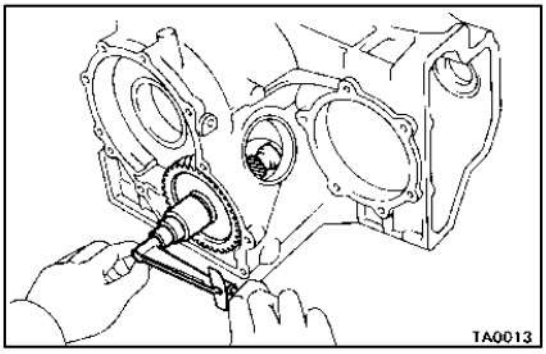
9. ADJUST DRIVE PINION PRELOAD

(a) Coat the threads and surface of the nut with MP grease.

(b) Using SST to hold the gear, tighten the nut.

Torque: 172 N·m (1,750 kgf·cm, 127 ft·lbf)

SST 09330–00021, 09350–32014 (09351–32032)



(c) Turn the gear counterclockwise and clockwise several times.

(d) Using a torque meter, measure the preload of the drive pinion.

Preload (at starting):

New bearing

1.0 – 1.6 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)

Reused bearing

0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

★ If the preload is greater than specified, replace the bearing spacer.

★ If the preload is less than specified, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

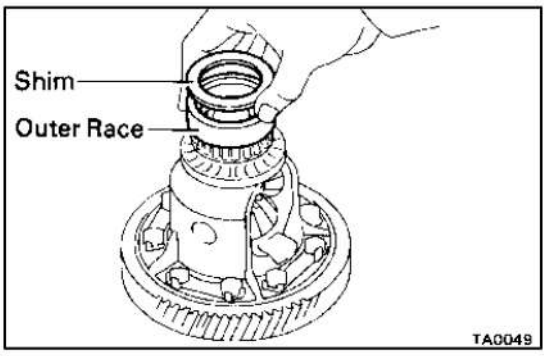
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

Do not back off the nut to reduce the preload.

Maximum torque:

289 N·m (2,950 kgf·cm, 213 ft·lbf)

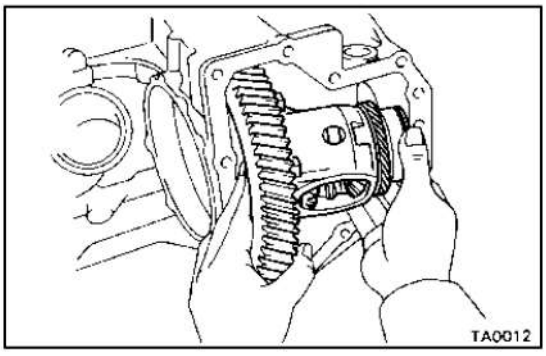
(e) If the preload is adjusted within specification, make a note of it.



AX0SX–01

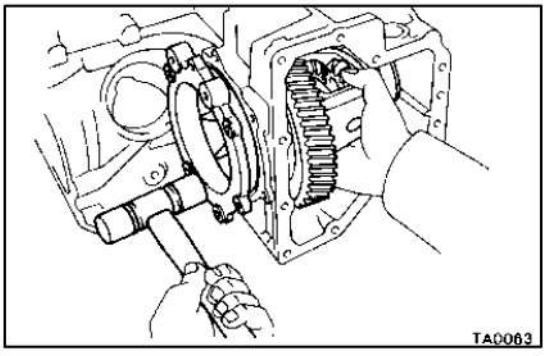
DIFFERENTIAL INSTALLATION

1. PLACE OUTER RACE AND SELECTED ADJUSTING SHIM ONTO RH SIDE BEARING



2. PLACE DIFFERENTIAL CASE INTO CASE

Be sure to install the adjusting shim into place.

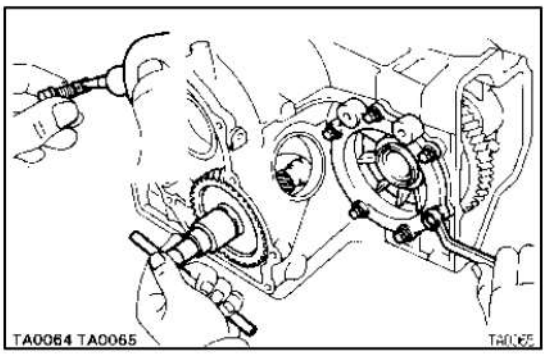


3. INSTALL LH BEARING RETAINER

(a) Install a new O–ring.

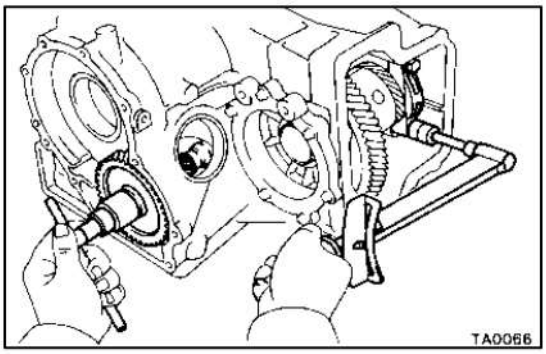
(b) Position the retainer by tapping it while holding the differential case center with the retainer.

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

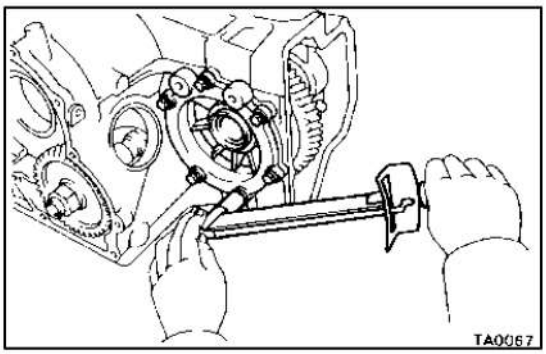


(d) Coat the threads of the bolts with sealer.
Sealer:
Part No.08833–00070, THREE BOND 1324 or equivalent

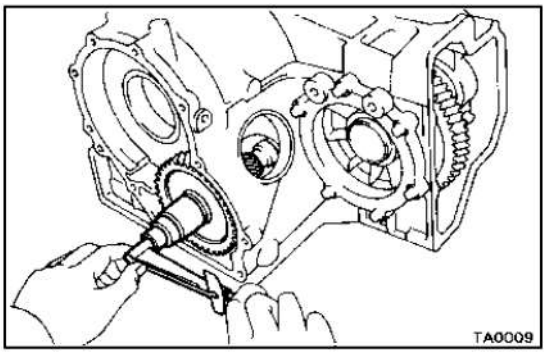
(e) Temporarily tighten the bolts evenly and gradually while turning the ring gear.



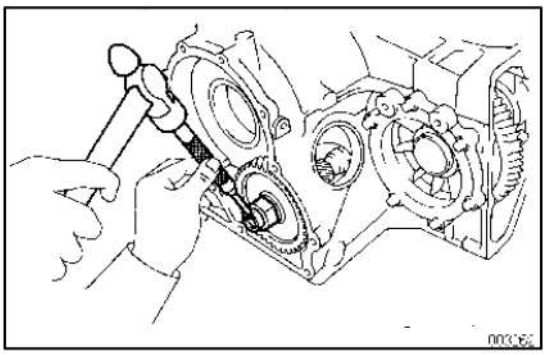
4. INSTALL RH SIDE BEARING CAP
Tighten the bolts evenly and gradually while turning the ring gear.
Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)



5. TIGHTEN LH BEARING RETAINER
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

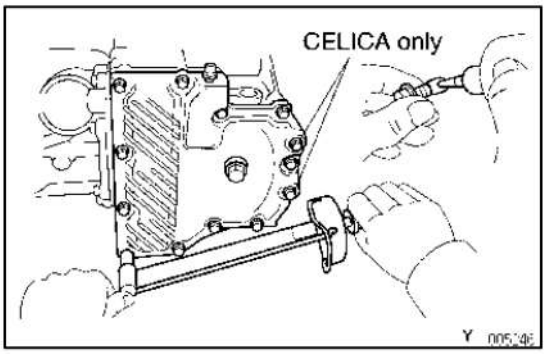


6. MEASURE TOTAL PRELOAD
Using a torque meter, measure the total preload of the drive pinion shaft.
Total preload (at starting):
Add drive pinion preload (See page AX–xx)
New Bearing
0.3 – 0.4 N·m (2.9 – 4.0 kgf·cm, 2.5 – 3.5 in.·lbf)
Reused bearing
0.1 – 0.2 N·m (1.5 – 2.0 kgf·cm, 1.3 – 1.7 in.·lbf)
If the preload is not within specification, redisassemble and readjust.



7. STAKE COUNTER DRIVEN GEAR NUT

8. INSTALL DRIVE PINION CAP



9. INSTALL CARRIER COVER

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

(b) Coat the threads of the bolts with sealer.

Sealer:

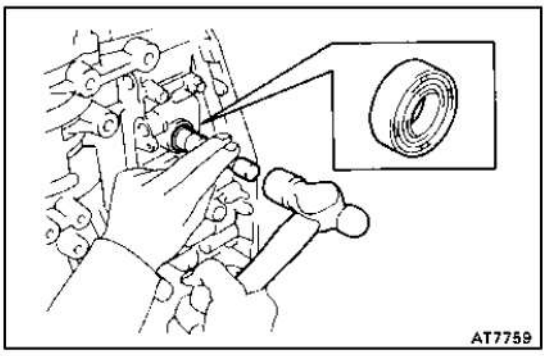
Part No.08833–00070, THREE BOND 1324 or equivalent

(c) Install the carrier cover over the gasket.

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

AX0SY–01

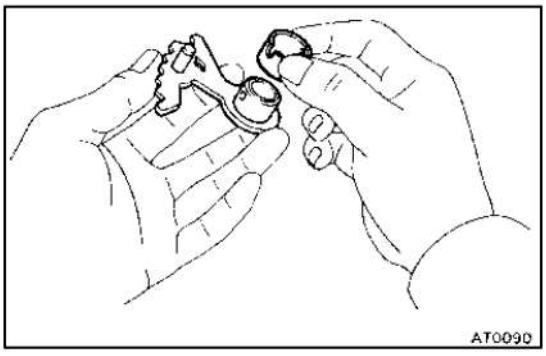
4–SPEED GEAR UNIT INSTALLATION



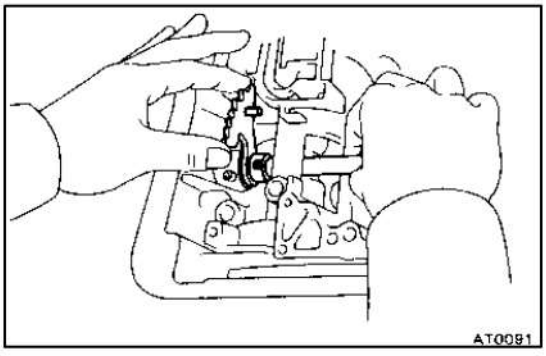
1. INSTALL MANUAL VALVE SHAFT

(a) Coat the oil seal lip with MP grease.

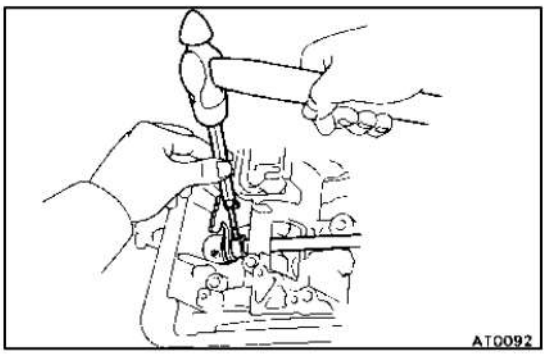
(b) Using a socket wrench and hammer, drive in a new manual valve shaft oil seal to the case.



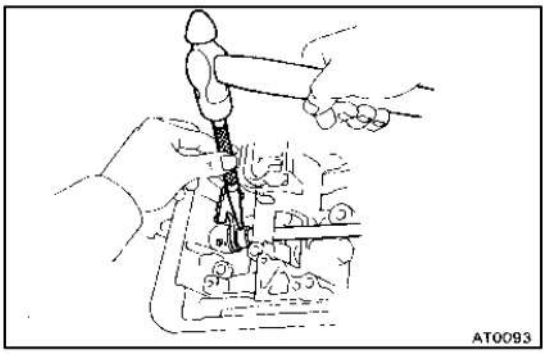
(c) Assemble a new collar to the manual valve lever.



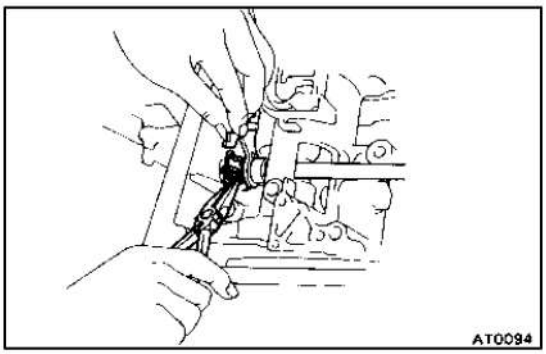
(d) Install the manual valve lever shaft to the transaxle case through the manual valve lever.



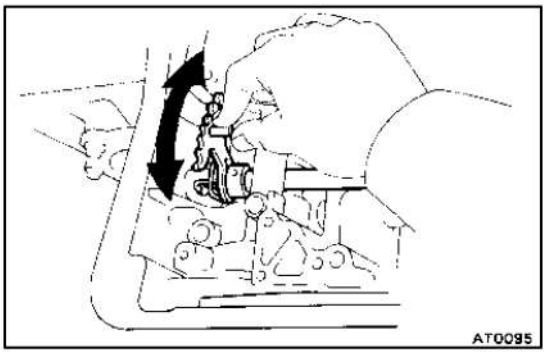
(e) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



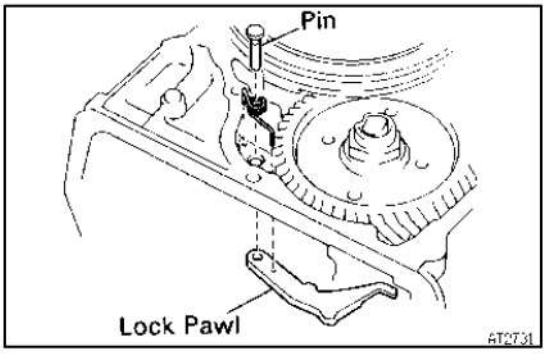
(f) Match the collar hole to the lever calking hollow and calk the collar to the lever.



(g) Install the retaining spring.



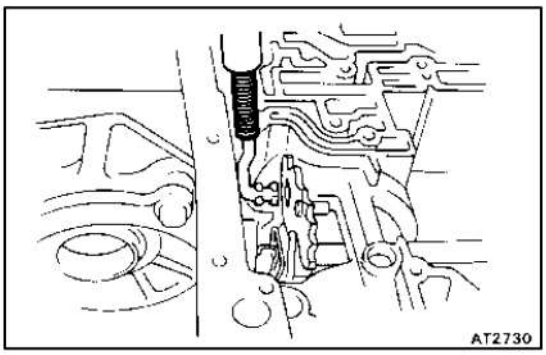
(h) Make sure that the lever moves smoothly.



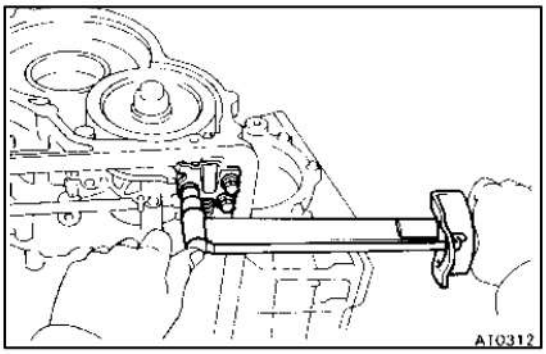
2. INSTALL PARKING LOCK PAWL

(a) Place the parking lock pawl onto the case. Hook the spring ends to the case and pawl.

(b) Install the pin into the hole of the case through the spring and pawl.

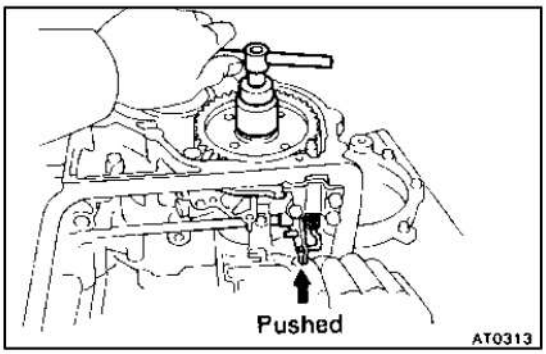


3. INSTALL PARKING LOCK ROD



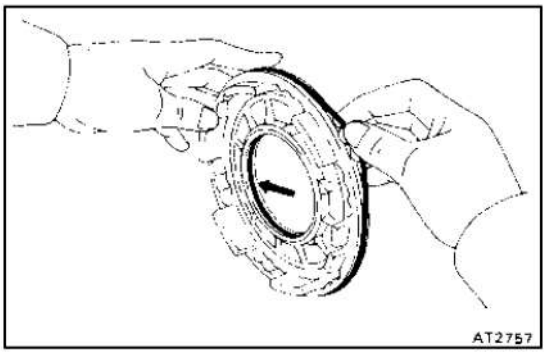
4. INSTALL PARKING LOCK PAWL BRACKET

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



5. CHECK OPERATION OF PARKING LOCK PAWL

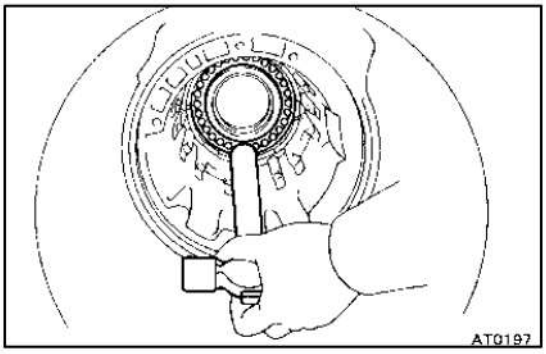
Make sure the counter driven gear is locked when the manual valve lever is in the P position.



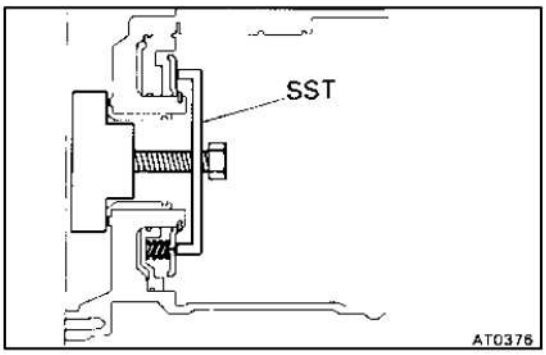
6. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

(a) Coat a new O–rings with ATF.

(b) Install the 2 O–rings on the piston.



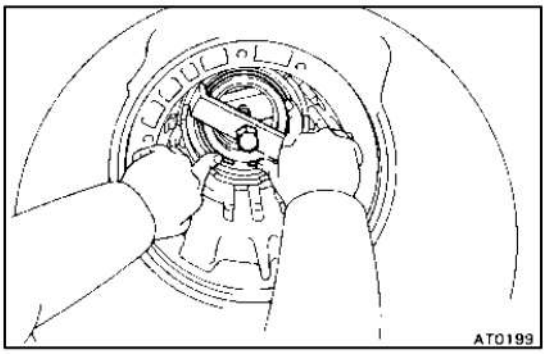
(c) Push the piston into the bore of the case, facing the spring seat upward.



7. INSTALL PISTON RETURN SPRING

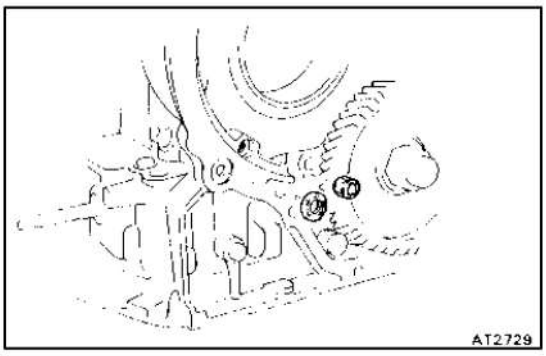
(a) Place the return spring and snap ring on the piston.

(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.
SST 09350–32014 (09351–32040)



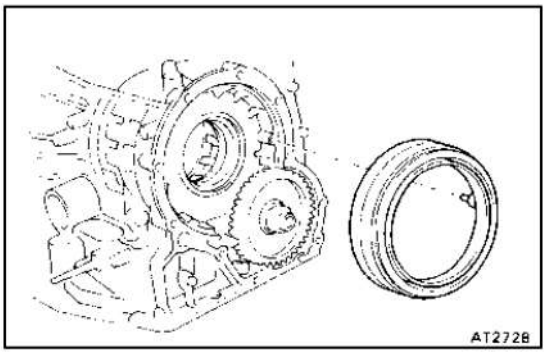
(c) Install snap ring. Visually check to make sure it is fully seated and centered by the 3 lugs on the spring retainer. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove SST.



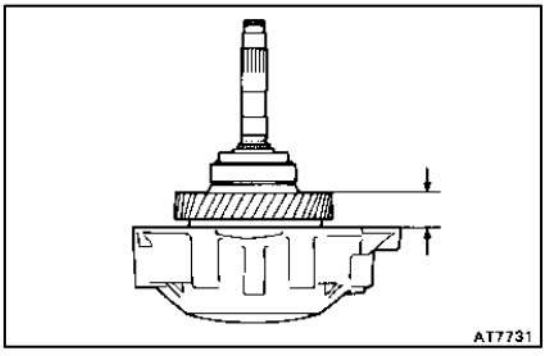
8. INSTALL OVERDRIVE UNIT

(a) Install the overdrive brake apply gasket and overdrive clutch apply gasket.

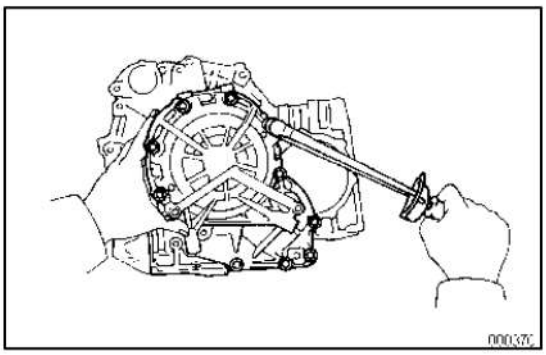


(b) Install the overdrive brake drum to the case.

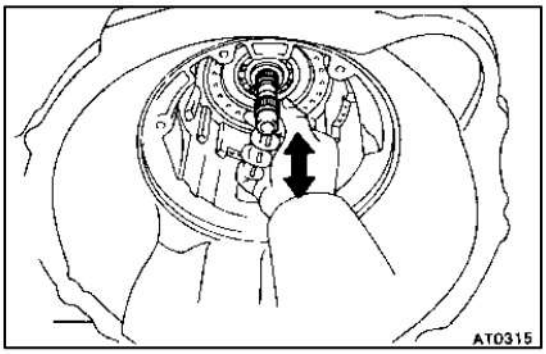
(c) Install a new case gasket to the case.



(d) Make sure that the length from the top surface of the case to the counter driven gear top surface should be about 24 mm (0.94 in.).

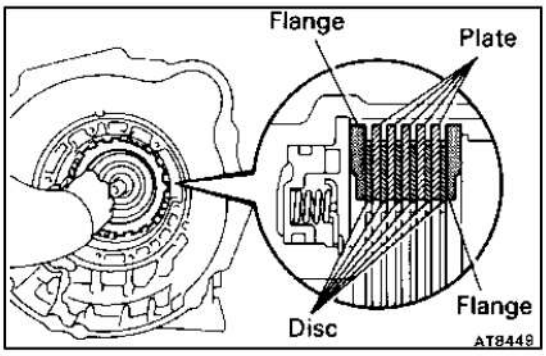


(e) Install the overdrive unit with overdrive case to the transaxle case.
(f) Install and tighten the bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



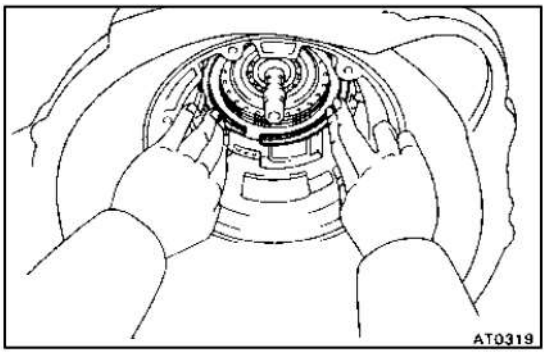
9. CHECK INTERMEDIATE SHAFT END PLAY

(a) Make sure that the intermediate shaft has thrust play.
Thrust play:
0.49 – 1.51 mm (0.0193 – 0.0594 in.)
If the thrust play is not within specification, check the installation of intermediate shaft.
(b) Make sure that the intermediate shaft turns smoothly.



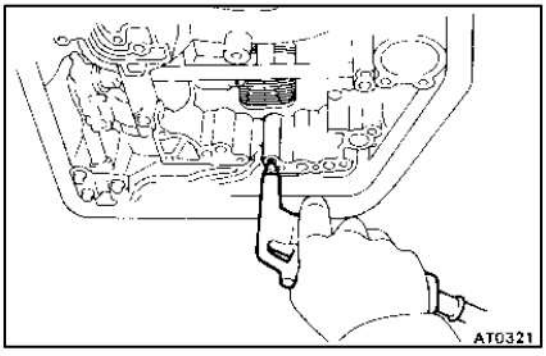
10. INSTALL FIRST AND REVERSE BRAKE IN CASE

(a) Install the inner flange facing the flat end toward the oil pump side.
(b) Install the discs and plates.
Install in order: P=Plate D=Disc
D – P – D – P – D – P – D – P – D – P – D
(c) Install the outer flange, facing the flat end toward the piston side.



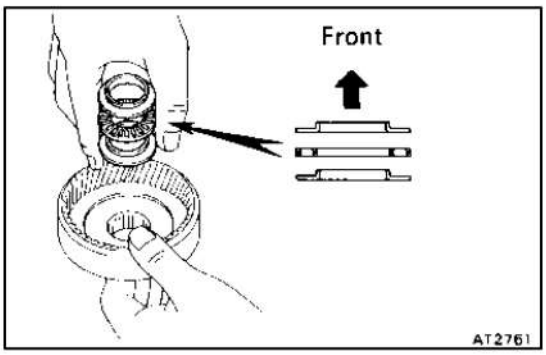
11. INSTALL SNAP RING

Be sure the end gap of the snap ring is not aligned with one of the cutouts.



12. CHECK OPERATION OF FIRST AND REVERSE BRAKE

Apply compressed air into the oil passage with the case and be sure that the piston moves.



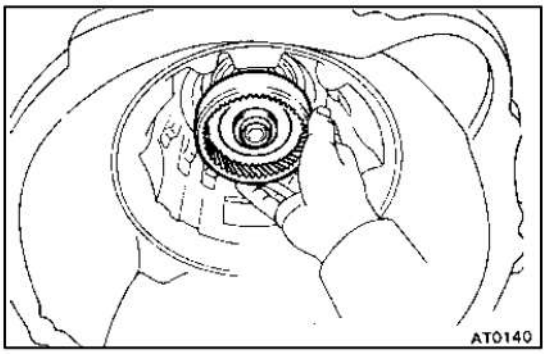
13. INSTALL RING GEAR INTO CASE

(a) Coat the races and bearing with petroleum jelly and install them onto the ring gear.

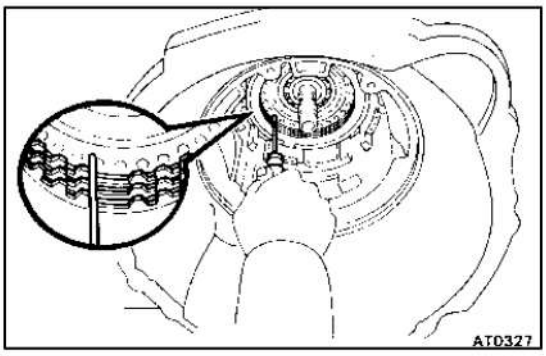
Bearing and races

mm (in.)

	Outer Diameter	Inner Diameter
Front Race	37.3 (1.469)	24.1 (0.949)
Bearing	37.6 (1.480)	24.0 (0.945)
Rear Race	37.6 (1.480)	22.2 (0.874)

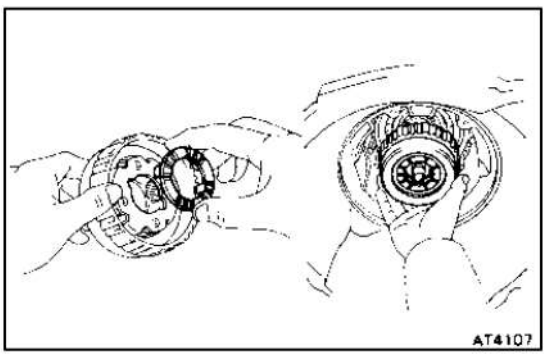


(b) Install the ring gear into the case.



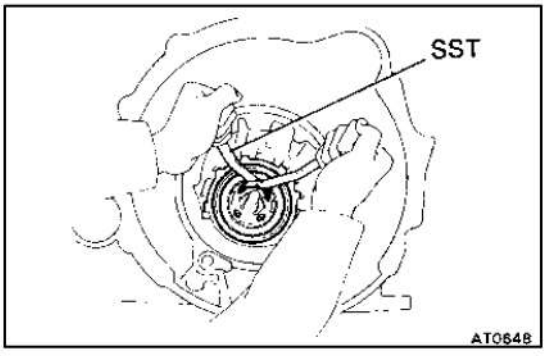
14. INSTALL REAR PLANETARY GEAR INTO CASE

(a) Align the flukes of the discs in the first and reverse brake.



(b) Coat the thrust washer with petroleum jelly.
Align the tab of the washer with the hollow of the carrier.

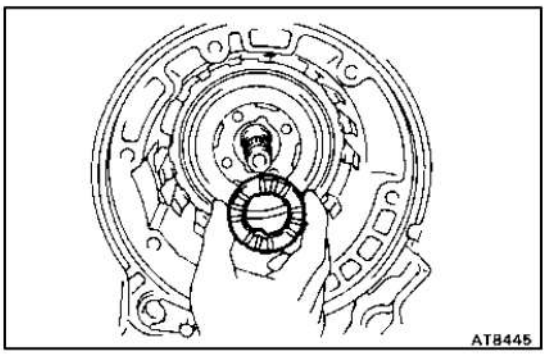
(c) Align the spline of the planetary carrier with either of the flukes of the discs, and install the planetary gear into the first and reverse brake discs.



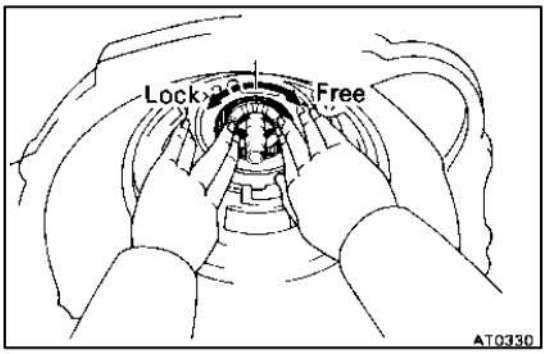
15. INSTALL NO.2 ONE–WAY CLUTCH INTO CASE WITH SHINY SIDE UPWARD

(a) Place the one–way clutch with the shiny side upward.

(b) Install the one–way clutch onto the inner race while turning the planetary gear clockwise with SST.
SST 09350–32014 (09351–32050)

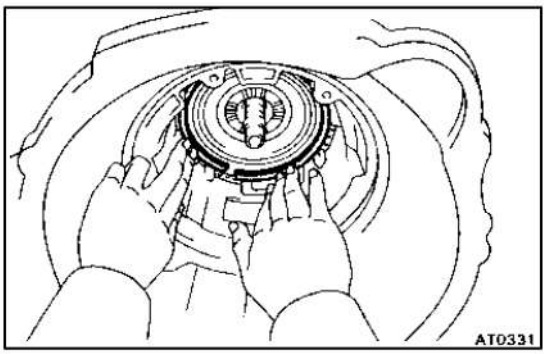


(c) Coat the thrust washer with petroleum jelly and install it onto the planetary gear.



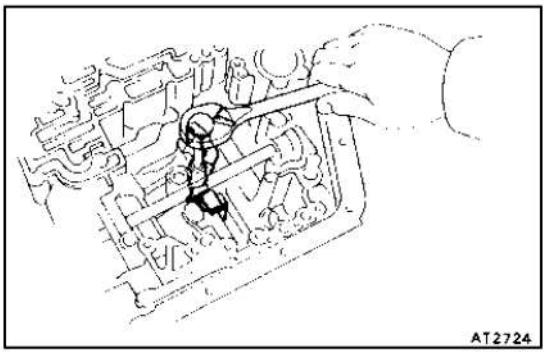
16. CHECK OPERATION OF NO.2 ONE–WAY CLUTCH

Turn the planetary carrier. The carrier should turn freely clockwise and lock counterclockwise.



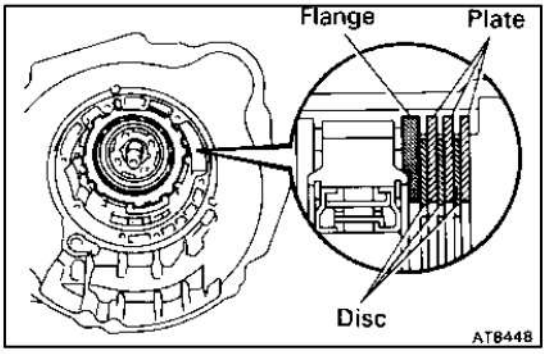
17. INSTALL SNAP RING

Be sure the end gap of the snap ring is not aligned with one of cutouts.



18. INSTALL SECOND COAST BRAKE BAND GUIDE

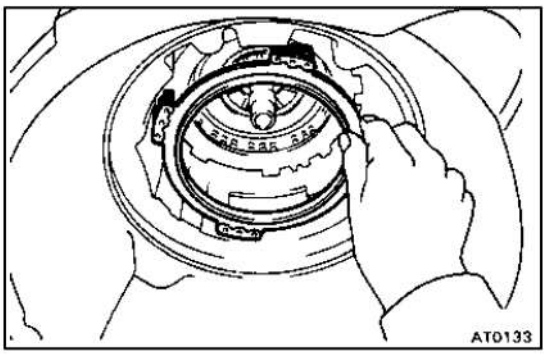
Install the 2 band guides so that its tip touches the case.



19. INSTALL SECOND BRAKE INTO CASE

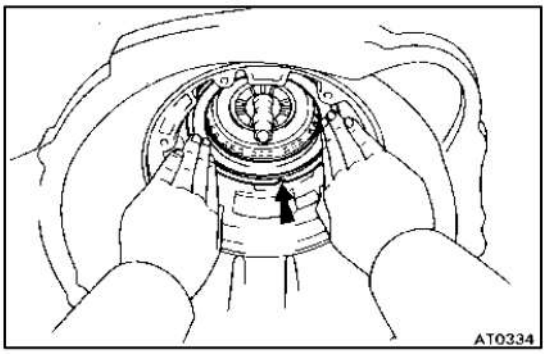
(a) Install the flange, facing the flat end toward the oil pump side.

(b) Install the discs and plates.
Install in order: P=Plate D=Disc
Flange – D – P – D – P – D – P



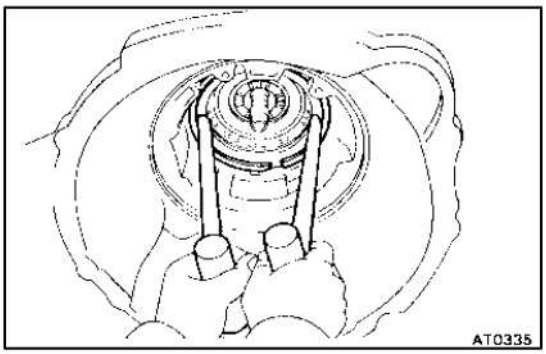
20. INSTALL PISTON RETURN SPRING

Each spring end is installed onto the protrusion with the case.



21. INSTALL SECOND BRAKE DRUM INTO CASE

Align the groove of the drum with the bolt and place it into the case.

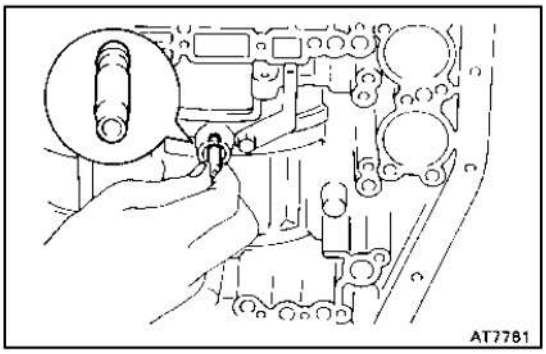


22. INSTALL SNAP RING

(a) Place the snap ring into the case so that the end gap is installed into the groove.

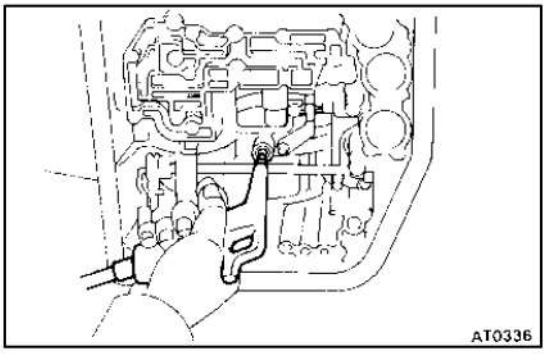
(b) While compressing the piston return springs over the drum with hammer handles, install the snap ring into the groove.

(c) Be sure the end gap of the snap ring is not aligned with one of the cutouts.



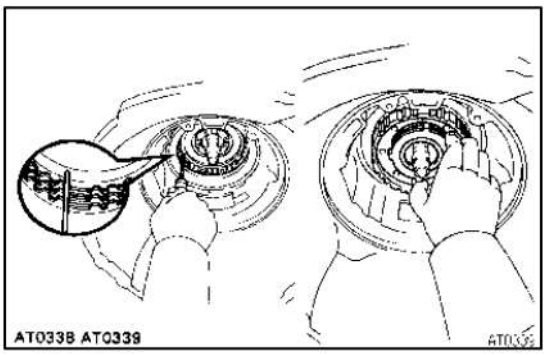
23. INSTALL SECOND BRAKE DRUM GASKET

Install a new gasket until it makes contact with the second brake drum.



24. CHECK OPERATION OF SECOND BRAKE

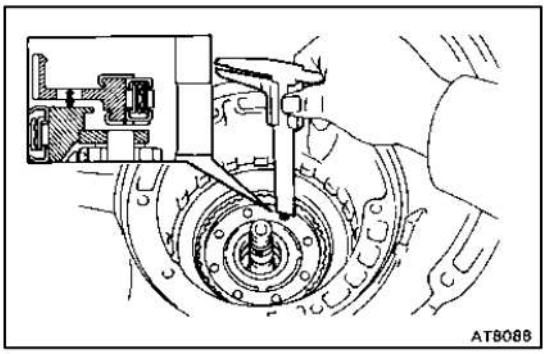
Blow compressed air into the oil passage with the case, and be sure that the piston moves.



25. INSTALL NO.1 ONE–WAY CLUTCH AND SECOND BRAKE HUB

(a) Align the flukes of the discs in the second brake.

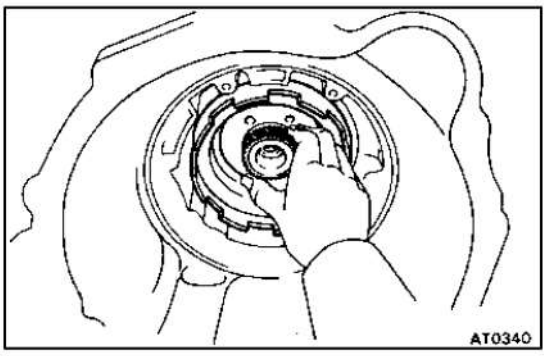
(b) Align the spline of the hub with the flukes of the discs and install the hub to the second brake discs.



(c) Check the distance between the surfaces of the second brake hub and rear planetary gear.

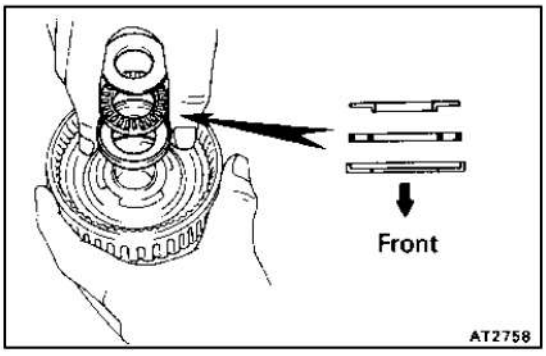
Distance:

Approx. 5 mm (0.20 in.)



26. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

While turning the sun gear clockwise, install it into the one–way clutch.



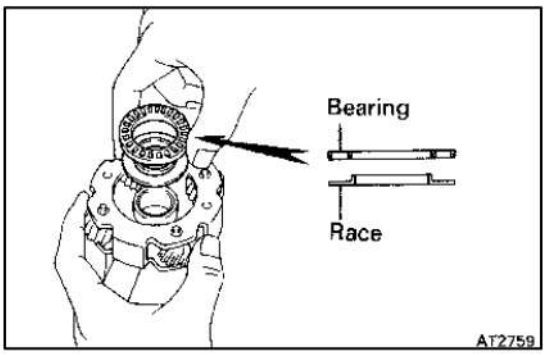
27. INSTALL FRONT PLANETARY GEAR ONTO RING GEAR

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

Bearing and race

mm (in.)

	Outer Diameter	Inner Diameter
Front Race	37.9 (1.492)	22.0 (0.866)
Bearing	36.1 (1.421)	22.2 (0.874)
Rear Bearing	35.0 (1.378)	19.0 (1.102)

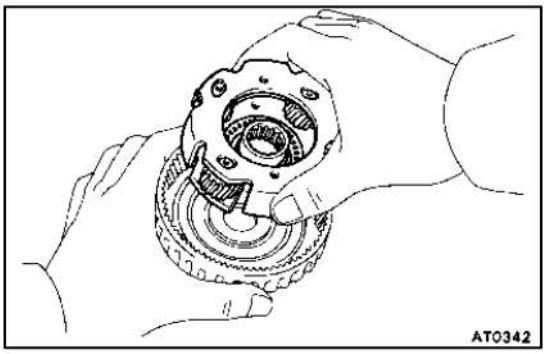


(b) Coat the race and bearing with petroleum jelly, and install them onto the planetary gear.

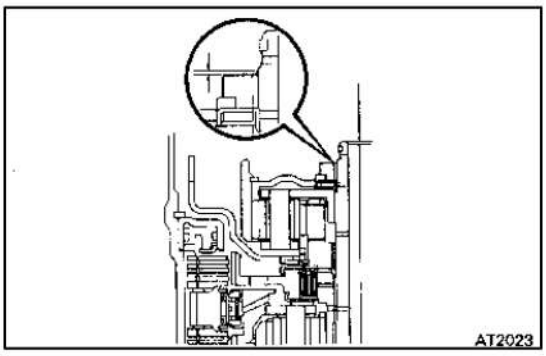
Bearing and race

mm (in.)

	Outer Diameter	Inner Diameter
Bearing	45.0 (1.772)	30.0 (1.181)
Race	45.0 (1.772)	28.0 (1.102)

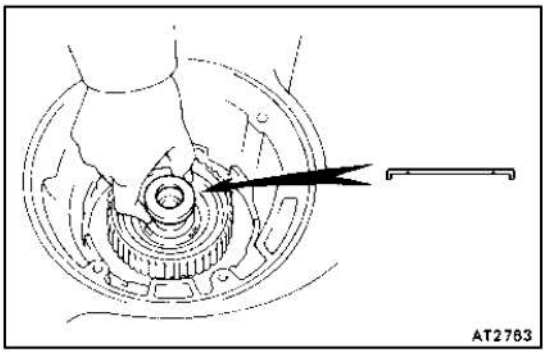


(c) Install the planetary gear onto the ring gear.



28. INSTALL FRONT PLANETARY GEAR ASSEMBLY ONTO SUN GEAR

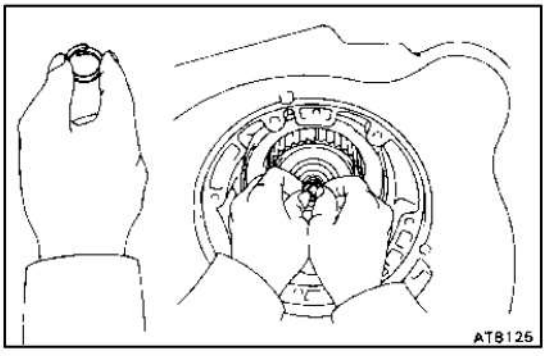
(a) If the planetary gear and other parts are installed correctly into the case, the end of the bushing with the ring gear flange will be flush with a shoulder of the intermediate shaft or under.



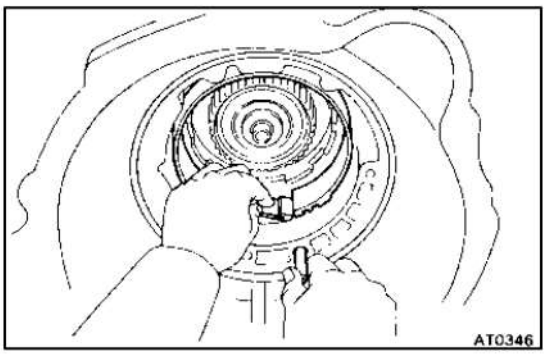
(b) Coat the race with petroleum jelly and install it onto the tip of ring gear flange.

Race:

Outer diameter
35.7 mm (1.406 in.)
Inner diameter
23.0 mm (0.906 in.)



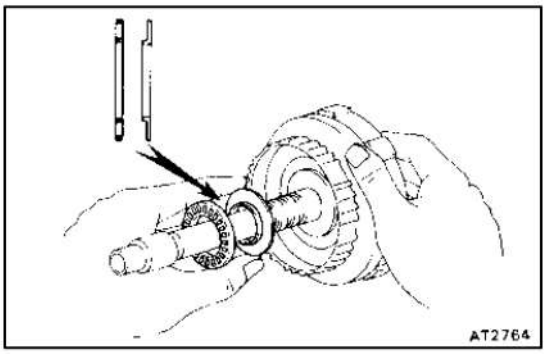
29. INSTALL INTERMEDIATE SHAFT OIL SEAL RING



30. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

(b) Install the pin through the oil pump mounting bolt hole.



31. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the races and bearing with petroleum jelly, and install them onto both sides of the clutch drum.

Bearing and race (Front side)

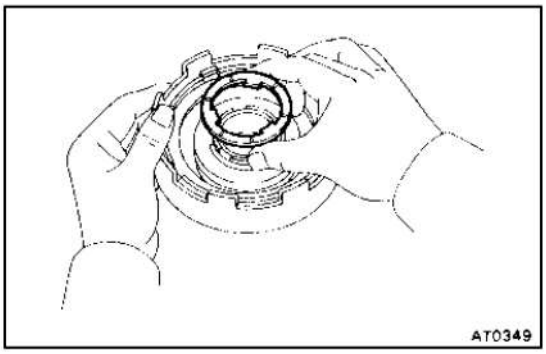
mm (in.)

	Outer Diameter	Inner Diameter
Bearing	42.0 (1.645)	28.9 (1.138)
Race	42.0 (1.654)	27.1 (1.067)

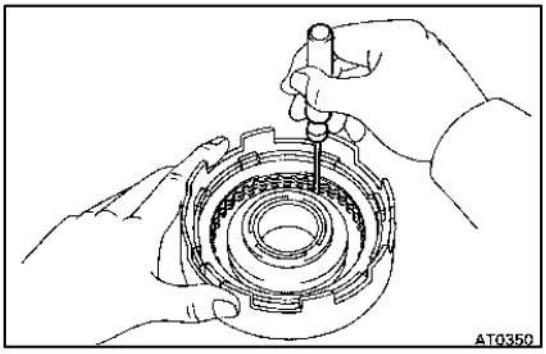
AT2765:Bearing and race (Rear side)

mm (in.)

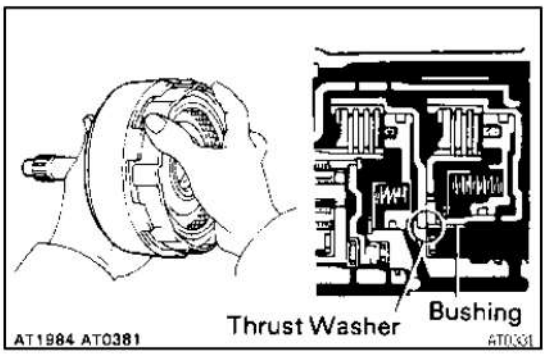
	Outer Diameter	Inner Diameter
Bearing	36.1 (1.421)	22.2 (0.874)
Race	37.9 (1.492)	22.0 (0.866)



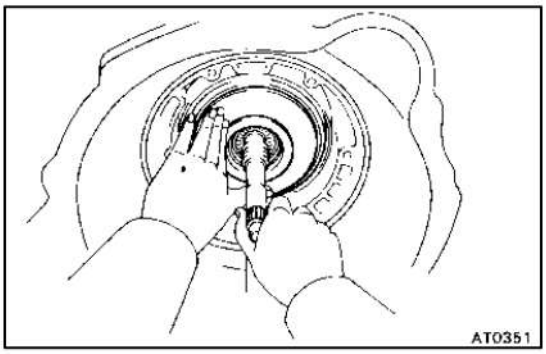
(b) Coat the clutch drum thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.



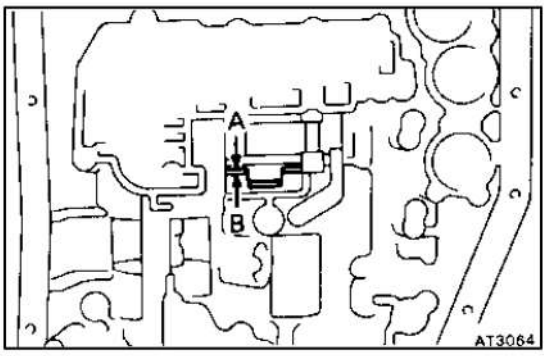
(c) Align the flukes of discs in the direct clutch.



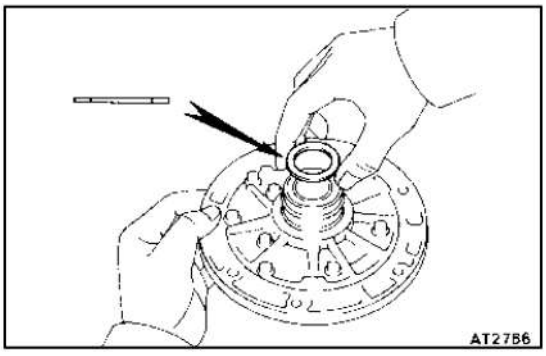
(d) Mesh the hub with the flukes of the direct clutch while turning the clutch drum or forward clutch.
(e) If the flukes of the discs are meshed with the hub correctly, the end of the bushing with the direct clutch drum will be flush with the surface of the forward clutch.



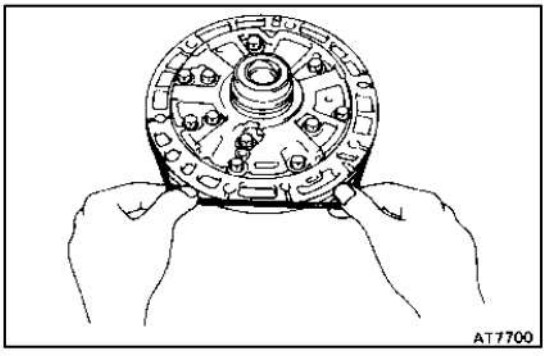
(f) Place the direct clutch and forward clutch into the case.
(g) Rotate the forward clutch to mesh the front planetary ring gear and discs.



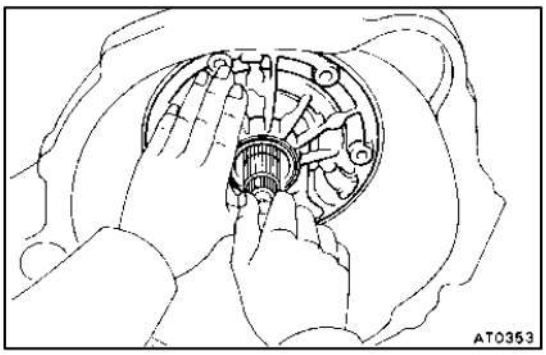
(h) Check the distance between the A and B.
Distance:
Approx. 3 mm (0.118 in.)



32. INSTALL OIL PUMP INTO CASE
(a) Coat the race with petroleum jelly and install it onto stator shaft.



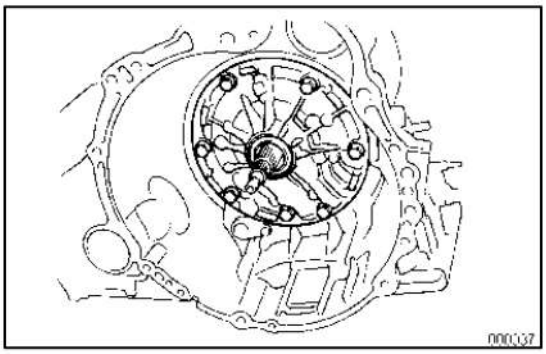
(b) Coat a new O–ring with ATF and install it to oil pump.



(c) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transaxle case.

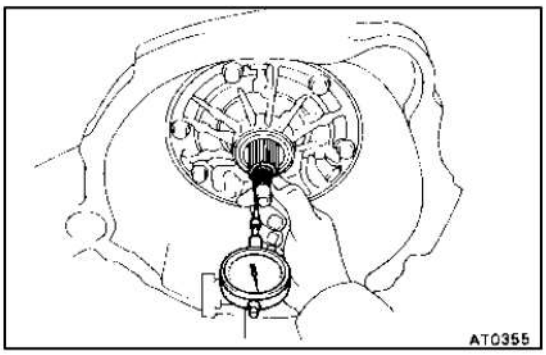
(d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings on the stator shaft through the direct clutch drum.

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



(e) Install tighten the 7 bolts.

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)



33. MEASURE THRUST PLAY OF INPUT SHAFT

Measure the thrust play with a dial gauge.

Thrust play:

0.3 – 0.9 mm (0.012 – 0.035 in.)

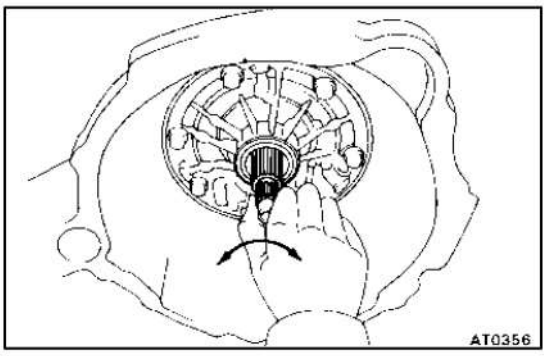
HINT: There are 2 thickness of races for the end of stator shaft.

If the thrust play is in excess of standard, select one of them.

Race thicknesses:

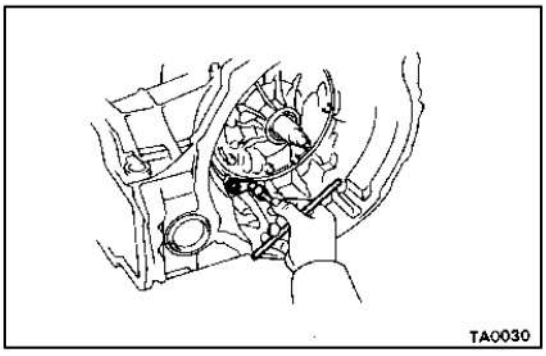
0.8 mm (0.031 in.)

1.4 mm (0.055 in.)

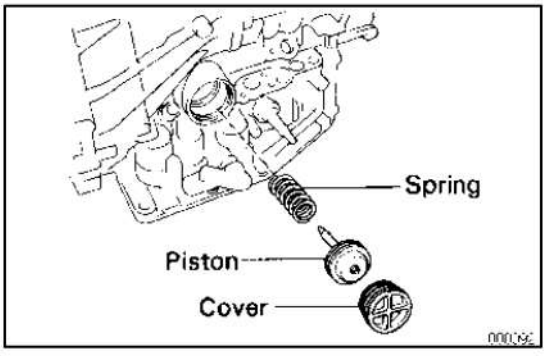


34. CHECK INPUT SHAFT ROTATION

Make sure that the input shaft rotates smoothly.



35. INSTALL DRIVE PINION CAP

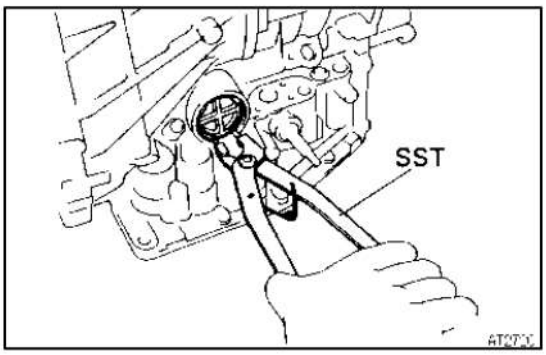


36. INSTALL SECOND COAST BRAKE PISTON

(a) Coat a new O–rings with ATF and install them on the cover.

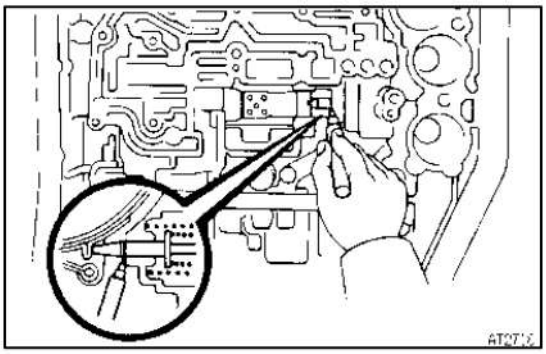
(b) Install the outer spring with the piston.

(c) Place the cover into the bore.



(d) Using SST, install the snap ring while pressing the cover.
SST 09350–32014 (09351–32050)

(e) Check that the front end of the piston rod contacts the center of the second brake band depression.



37. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.

(b) Using SST, measure the piston stroke while applying and releasing compressed air (392 – 785 kPa, 4 – 8 kgf·cm, 57 – 114 psi).
SST 09240–00020

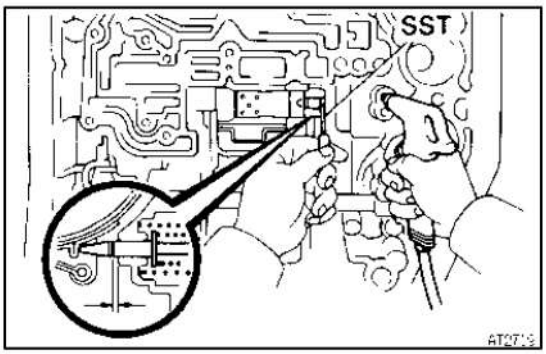
Piston stroke:

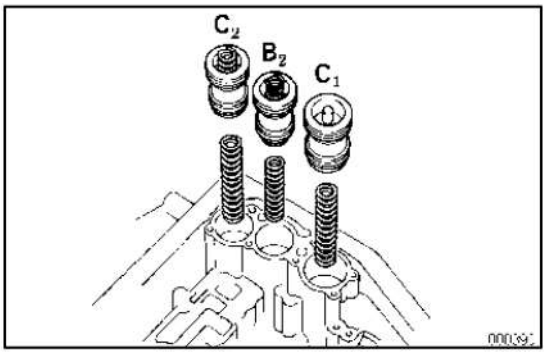
1.5 – 3.0 mm (0.059 – 0.118 in)

If the stroke is more than standard value, replace the piston rod with a longer one.

Piston rod length:

72.9 mm (2.870 in)
71.4 mm (2.811 in)

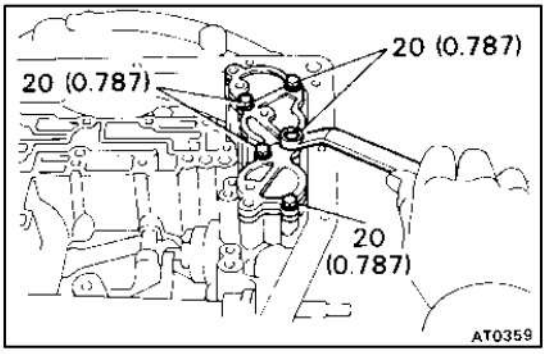




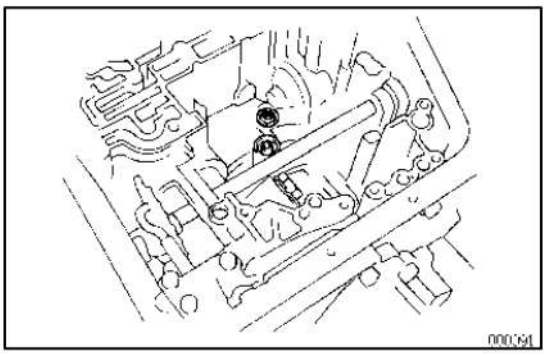
38. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the springs and pistons into the bore.

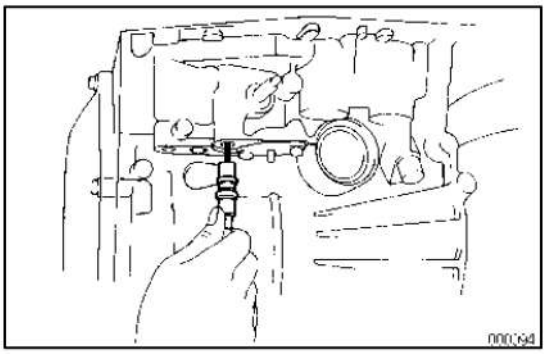
Sprnig	Free length mm (in.)	Color
C_1	57.64 (2.2693)	Red, Purple
B_2	69.39 (2.7323)	Green, White
C_2	70.21 (2.7641)	Purple



(b) Place the cover with the gasket and tighten the bolts gradually in sequence.
HINT: Each bolt length (mm, in.) is indicated in the illustration.



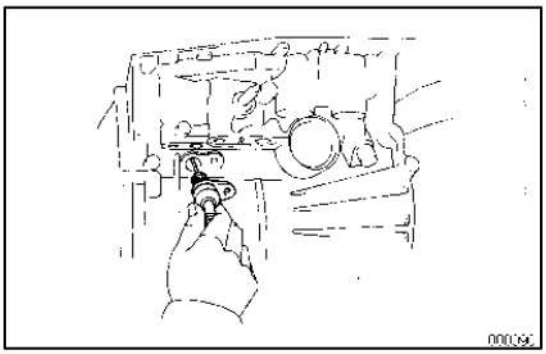
39. INSTALL NEW SECOND BRAKE APPLY GASKET



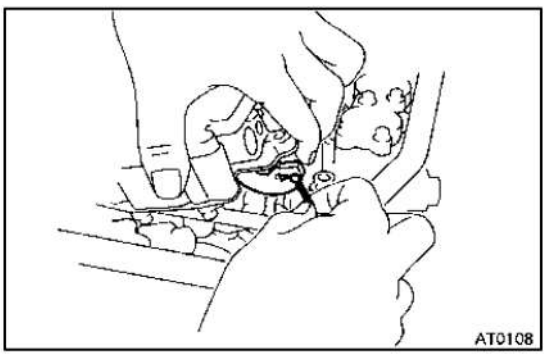
40. INSTALL THROTTLE CABLE IN CASE

Push the cable through the case, being careful not to damage the O–ring. Check for full seating.

NOTICE: In subsequent work, to avoid breaking the cable fitting do not roll the case over the cable.



41. INSTALL SOLENOID WIRING

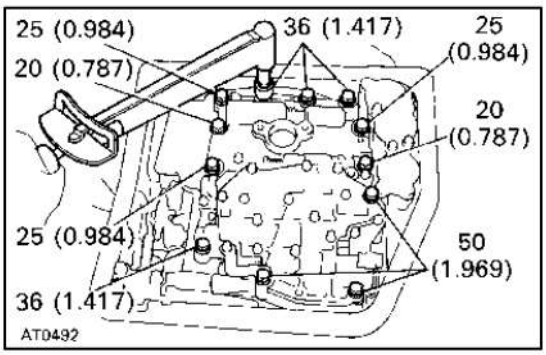


42. PLACE VALVE BODY ON TRANSAXLE

(a) While holding the cam down by your hand, slip the cable end into the slot.

(b) Lower the valve body into place.

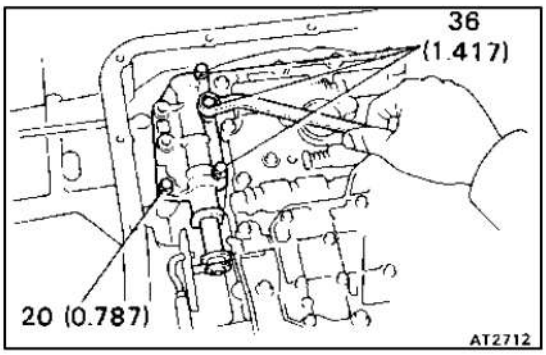
NOTICE: Do not entangle the kick–down switch wire or solenoid wire.

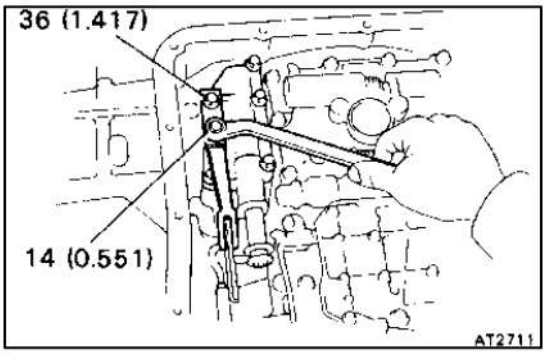


43. INSTALL BOLTS IN VALVE BODY

HINT: Each bolt length (mm, in.) is indicated in the illustration. Hand tighten the 12 bolts first, then torque with a torque wrench.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)





44. INSTALL MANUAL VALVE BODY AND DETENT SPRING

HINT: Each bolt length (mm, in.) is indicated in the illustration.

(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the manual valve body into place.

(c) Hand tighten the 4 bolts first. Then, tighten them with a torque wrench.

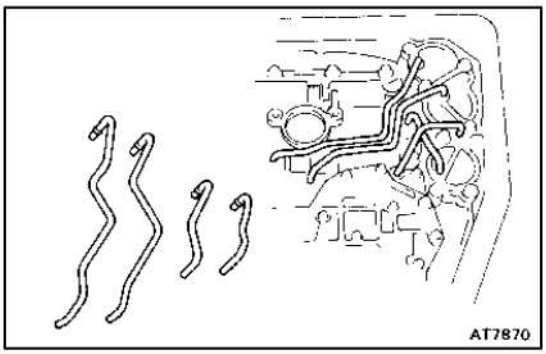
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

(d) Place the detent spring on the manual valve body and hand tighten the 2 bolts first.

Then, tighten them with a torque wrench.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

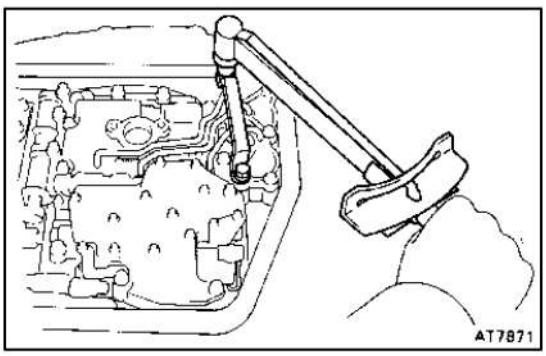
(e) Check that the manual valve lever is touching the center of the detent spring tip roller.



45. INSTALL OIL TUBES

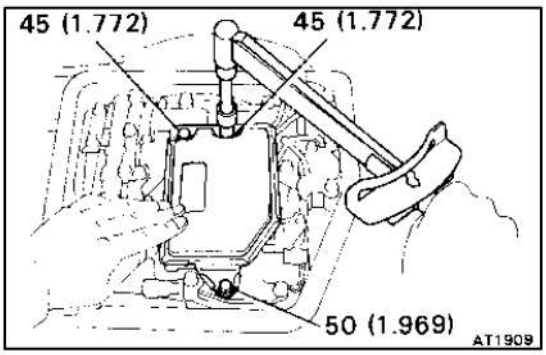
Using a plastic hammer, install the 4 tubes into the positions indicated in the illustration.

NOTICE: Be careful not to bend or damage the tubes.



46. INSTALL TUBE BRACKET

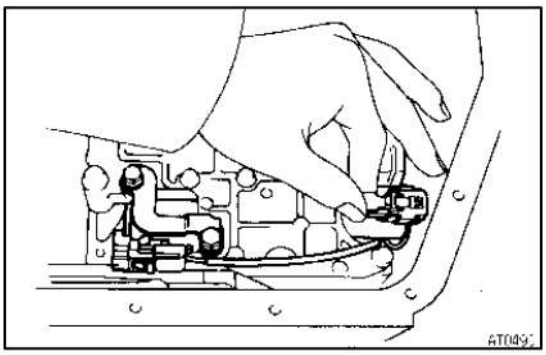
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



47. INSTALL OIL STRAINER

Each bolt length (mm, in.) is indicated in the figure.

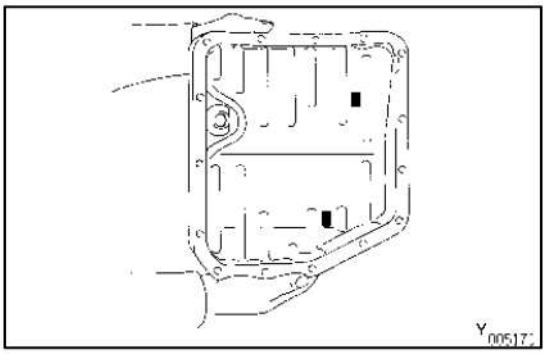
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



48. CONNECT SOLENOID WIRING

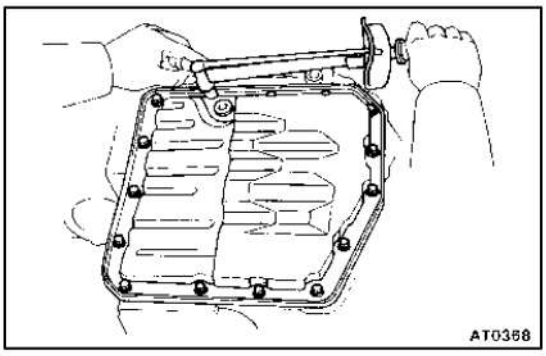
(a) Connect the No.1 solenoid connector. (white and shorter wire)

(b) Connect the No.2 solenoid connector. (black and longer wire)



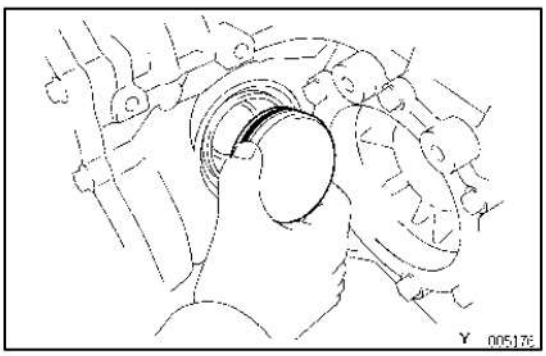
49. INSTALL 3 MAGNETS IN PLACE

NOTICE: Make sure that the magnets do not interfere with the oil tubes.

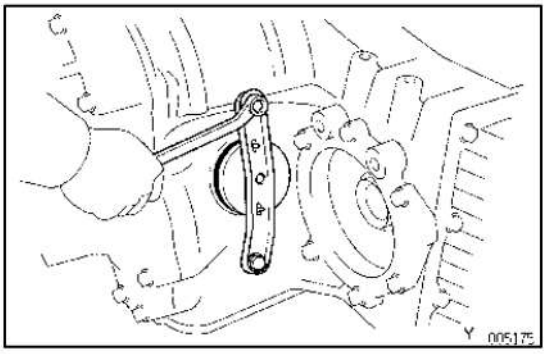


50. INSTALL OIL PAN WITH NEW GASKET

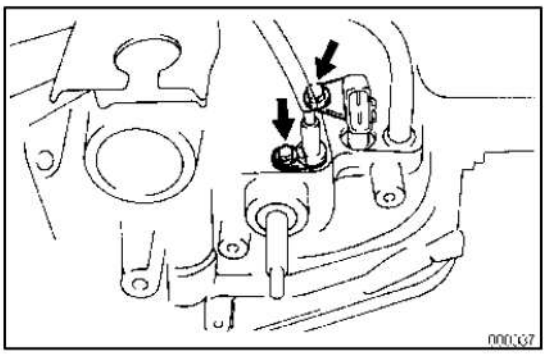
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



51. INSTALL COVER



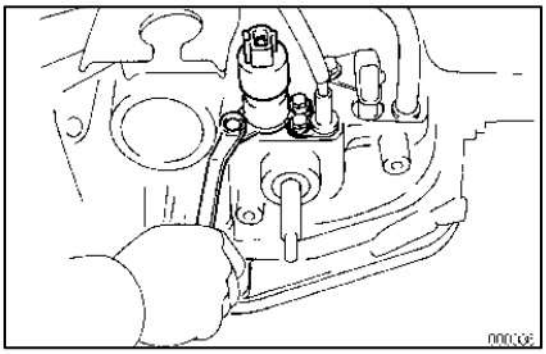
52. INSTALL COVER BRACKET



53. INSTALL SOLENOID WIRING RETAINING PLATE

54. INSTALL THROTTLE CABLE RETAINING PLATE

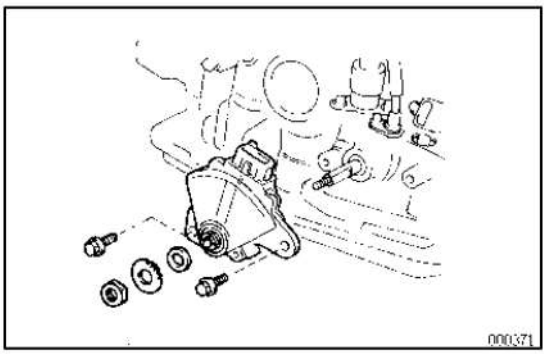
55. INSTALL FILLER TUBE AND BRACKET



56. INSTALL SL SOLENOID

(a) Coat the O–ring with ATF and push the tip of SL solenoid into the hole.

(b) Tighten the 2 bolts evenly and gradually.



57. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch to the manual valve shaft.

(b) Install the seal gasket and locking plate.

(c) Tighten the nut and stake it with the locking plate.

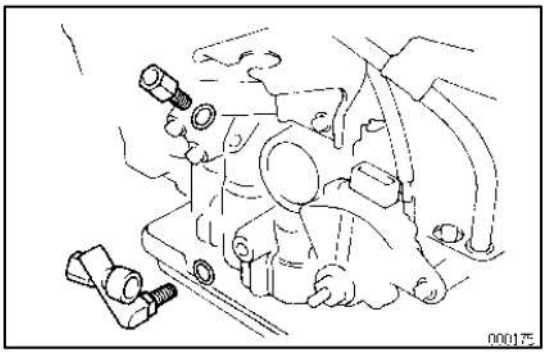
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

58. ADJUST PARK/NEUTRAL POSITION SWITCH

(a) Align the groove and return neutral basic line.

(b) Lock the switch with 2 bolts.

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



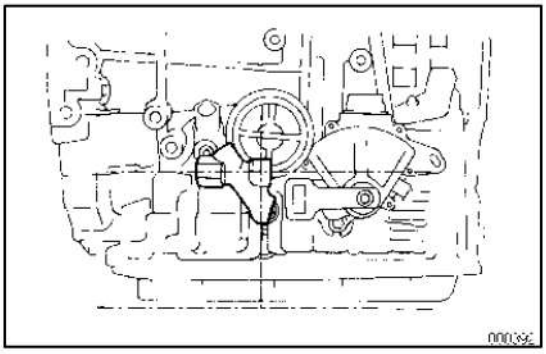
59. INSTALL UNION AND ELBOW

(a) Coat a new O–rings with ATF.

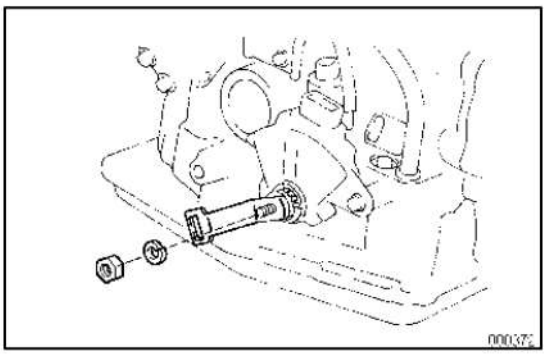
(b) Install the O–rings to the union and elbow.

(c) Install the union and elbow to the transaxle case.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



HINT: Install the elbow as shown in the illustration.



60. INSTALL MANUAL SHIFT LEVER

HOW TO USE THIS MANUAL

IN002-0W

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

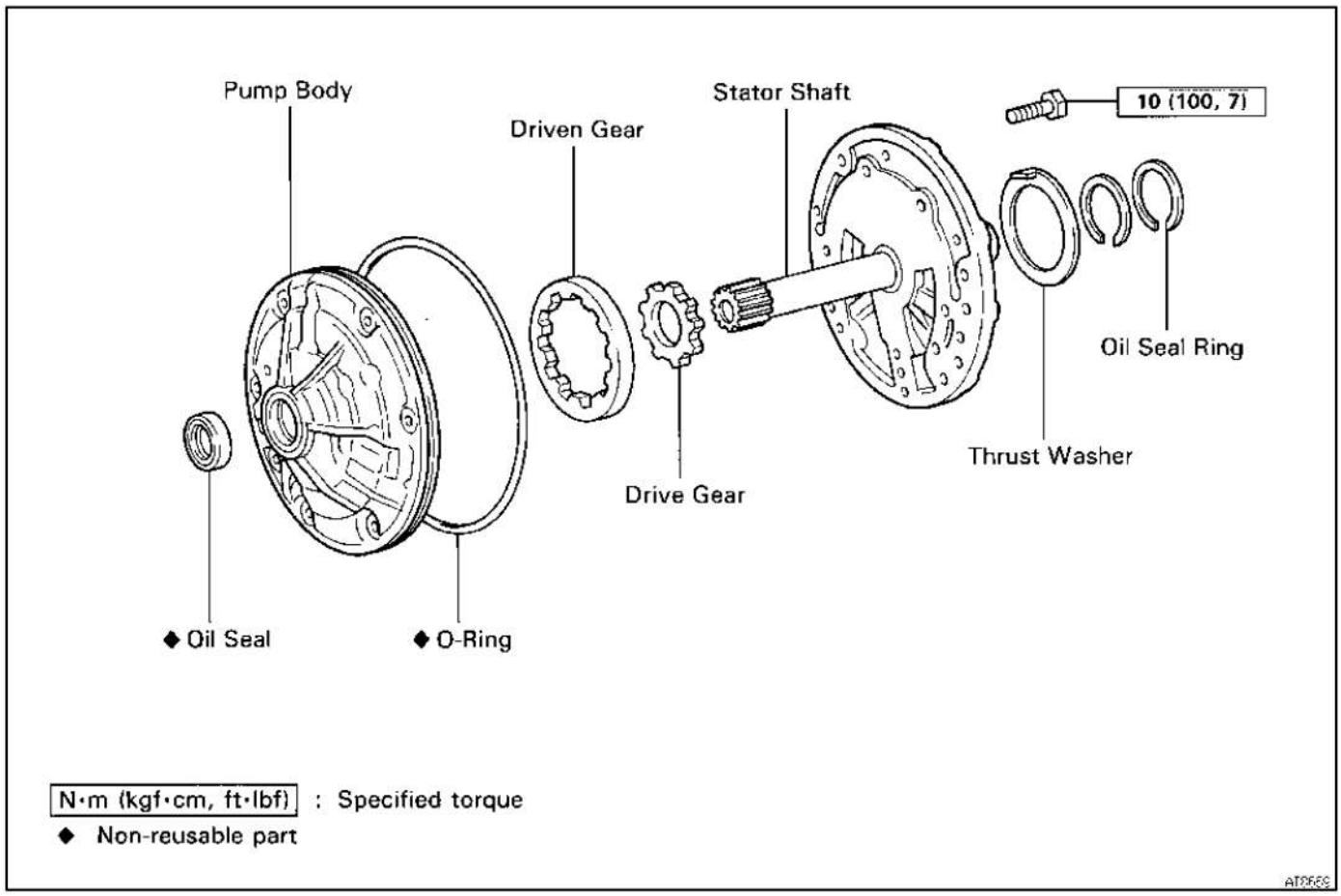
PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

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

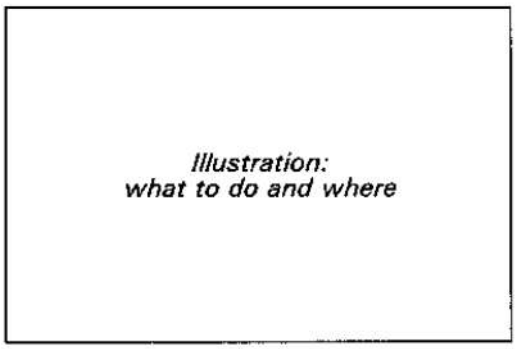
Example:



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

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

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text: how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm² or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

00031

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

REFERENCES

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

SPECIFICATIONS

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

CAUTIONS, NOTICES, HINTS:

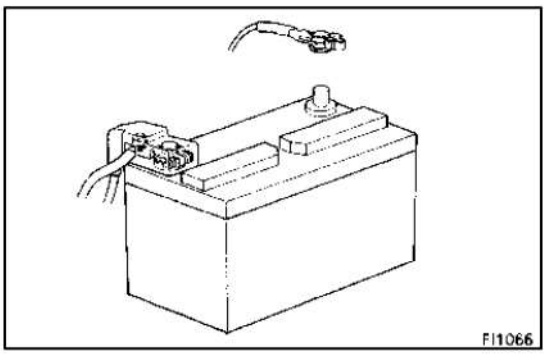
- ★ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ★ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ★ HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

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:

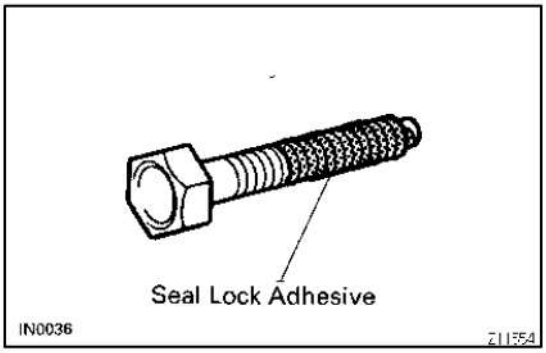
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)


FI1066

GENERAL REPAIR INSTRUCTIONS

IN022-07

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

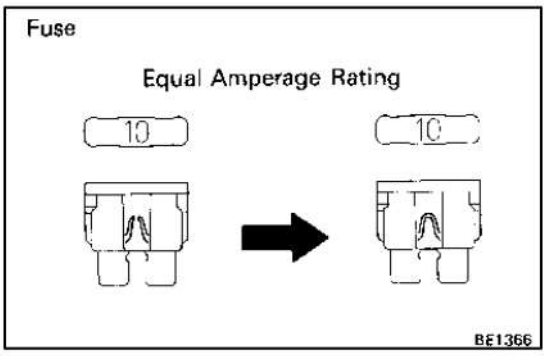


6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) When reusing precoated parts, clean off the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

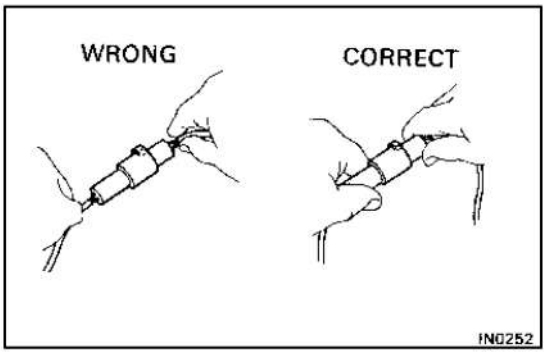
the specified seal lock adhesive to the bolt, nut or threads.

(c) Precoated parts are indicated in the component illustrations by the "★" symbol.

7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the preparation of AX section.



10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.



11. To pull apart electrical connectors, pull on the connector itself, not the wires.
12. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
    (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

GLOSSARY OF SAE AND TOYOTA TERMS

IN016-02

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	Intercooler
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 Position	–
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	–
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Toyota Diagnosis Communication Link (TDCL) 3: OBD@@@@@: [g 2] 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 Coolant 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	Toyota Distributorless Ignition (TDI)
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	Idle Air Control	Idle 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), CCo
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 Catalyst (TWC) CC_{RO}
TWC+OC	Three–Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU–OC	Warm Up Oxidation Catalytic Converter	–
WU–TWC	Warm Up Three–Way Catalytic Converter	Manifold Converter
3GR	Third Gear	–
4GR	Fourth Gear	–

ABBREVIATIONS USED IN THIS MANUAL

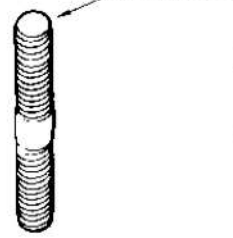
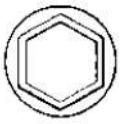
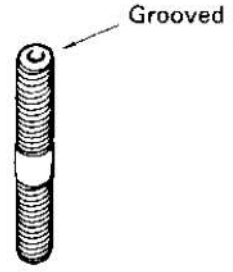
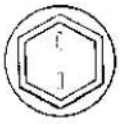
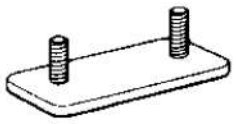
IN01H–0R

ATF	Automatic Transaxle Fluid
B_0	Overdrive Brake
B_1	Second coast Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_0	Overdrive Direct Clutch
C_1	Forward Clutch
C_2	Direct Clutch
D	Disc
F	Flange
F_0	O/D One–way Clutch
F_1	No.1 One–way Clutch
F_2	No.2 One–way Clutch
MP	Multipurpose
O/D	Overdirve
P	Plate
SSM	Special Service Materials
SST	Special Service Tools

STANDARD BOLT TORQUE SPECIFICATIONS

IN008-02

HOW TO DETERMINE BOLT STRENGTH

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

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

DESCRIPTION

GENERAL SPECIFICATIONS

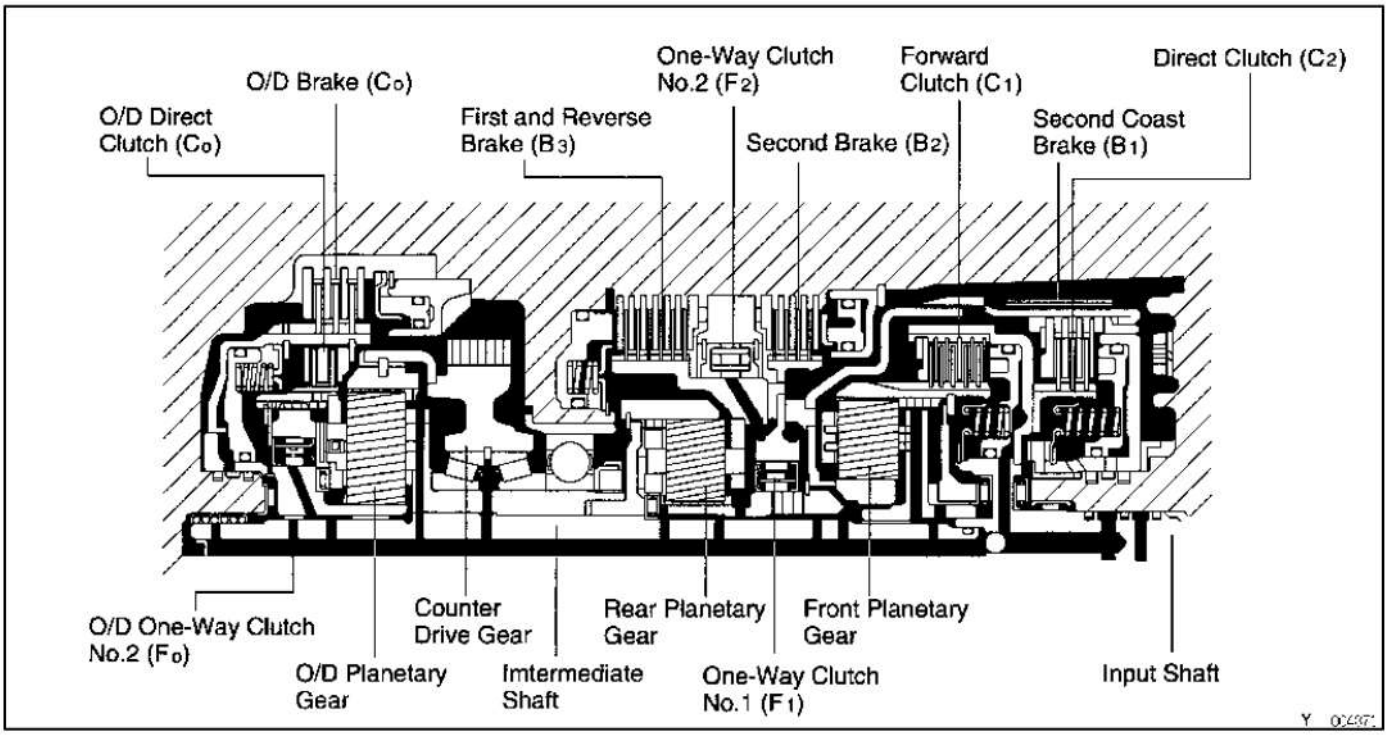
AX0CH–05

Type of Transaxle		A541E
Type of Engine		1MZ–FE
Torque Converter Clutch Stall Torque Ratio		1.8 : 1
Torque Converter Clutch Lock–up Mechanism		Equipped
Gear Ratio	1st Gear	2.810
	2nd Gear	1.549
	3rd Gear	1.000
	O/D Gear	0.735
	Reverse Gear	2.296
Transaxle	Number of Discs and Plates	
	O/D Direct Clutch (C_0)	2 / 2
	Forward Clutch (C_1)	5 / 5
	Direct Clutch (C_2)	3 / 3
	2nd Brake (B_2)	3 / 3
	First and Reverse Brake (B_3)	6 / 6
	O/D Brake (B_0)	3 / 3
B_1 Band Width	mm (in.)	25 (0.98)
ATF Type		ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])
Capacity liter (US qts, Imp.qts)	A/T	6.75(7.1, 5.9)
	D/F	0.85 (0.9, 0.7)

OPERATION

1. MECHANICAL OPERATION

AX0RF-01



○ ..... Operating

Shift lever position	Gear Position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○			
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*3rd	○	○	○			○		○		
L	1st	○	○					○	○		○
	*2nd	○	○			○	○		○	○	

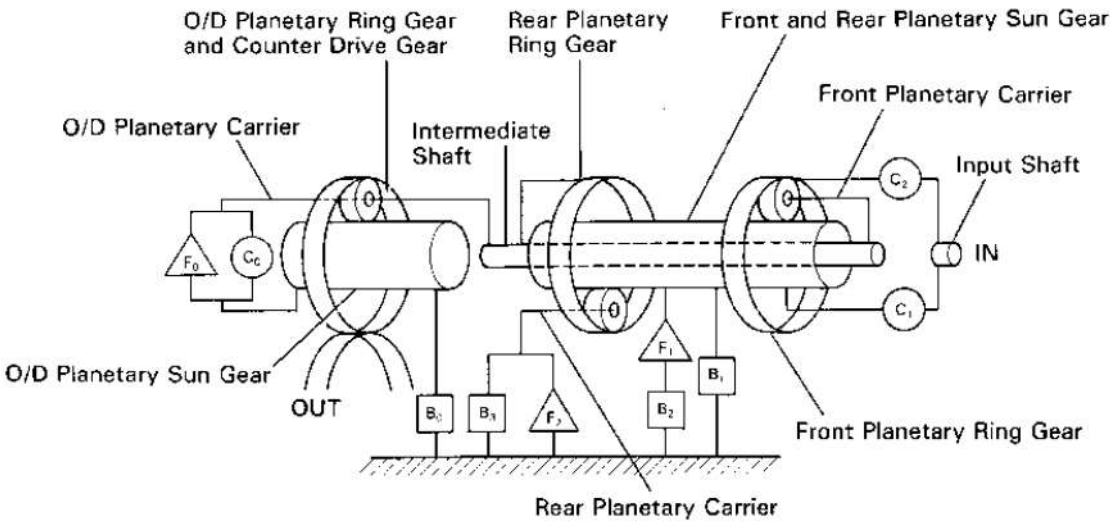
*Down-shift only – no up-shift

W0475C

AX019-03

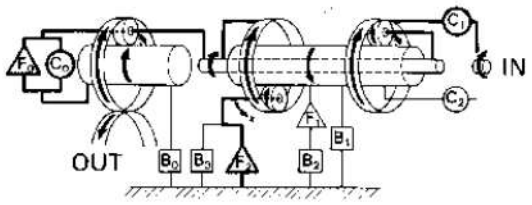
2. FUNCTION OF COMPONENTS

COMPONENT		FUNCTION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents outer race of F_1 from turning either clockwise or counterclockwise, thus preventing front & rear planetary sun gear from turning counterclockwise
1st & Reverse Brake	B_3	Prevents rear planetary carrier from turning either clockwise or counterclockwise
No.1 One-Way Clutch	F_1	When B_2 is operating, prevents front & rear planetary sun gear from turning counterclockwise
No.2 One-Way Clutch	F_2	Prevents rear planetary carrier from turning counterclockwise
O/D Direct Clutch	C_0	Connects overdrive sun gear and overdrive planetary carrier
O/D Brake	B_0	Prevents overdrive sun gear from turning either clockwise or counterclockwise
O/D One-Way Clutch	F_0	When transaxle is being driven by engine, connects overdrive sun gear and overdrive carrier
Planetary Gears		These gears change the route through which driving force is transmitted in accordance with the operation of each clutch and brake in order to increase or reduce the input and output speed



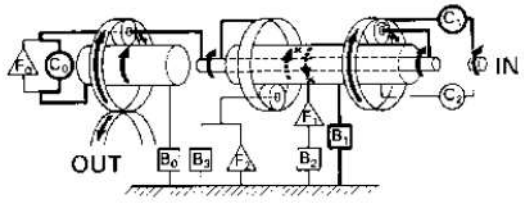
Power from the engine transmitted to the input shaft via the torque converter clutch is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one–way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution of the planetary gear unit.
Shift change is carried out by altering the combination of clutch and brake operation.
Each clutch and brake operates by hydraulic pressure; gear position is decided according to the throttle opening angle and vehicle speed, and shift change automatically occurs.
The conditions of operation for each gear position are shown on the following illustrations:

D or 2 Position 1st Gear



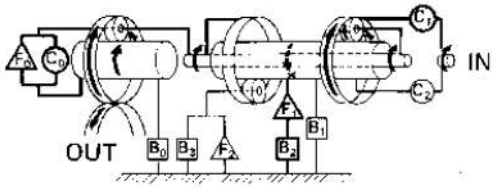
AT1097

2 Position 2nd Gear



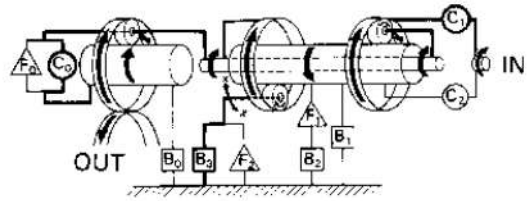
AT1102

D Position 2nd Gear



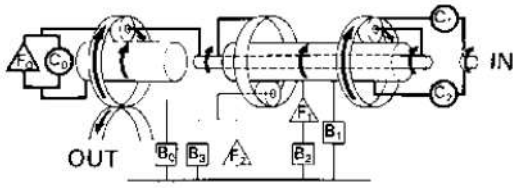
AT1098

L Position 1st Gear



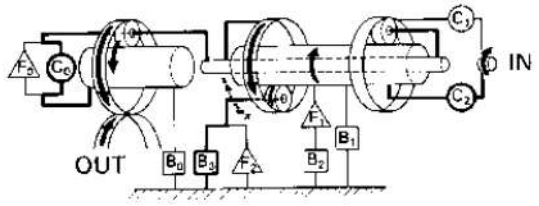
AT1103

D Position 3rd Gear



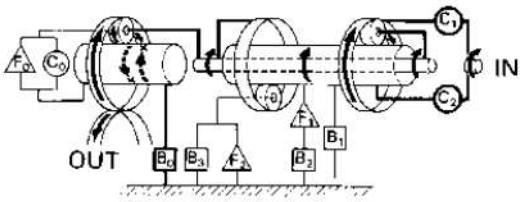
AT1099

R Position Reverse Gear



AT1101

D Position O/D Gear



AT1100

AX01A-0B

3. HYDRAULIC CONTROL SYSTEM

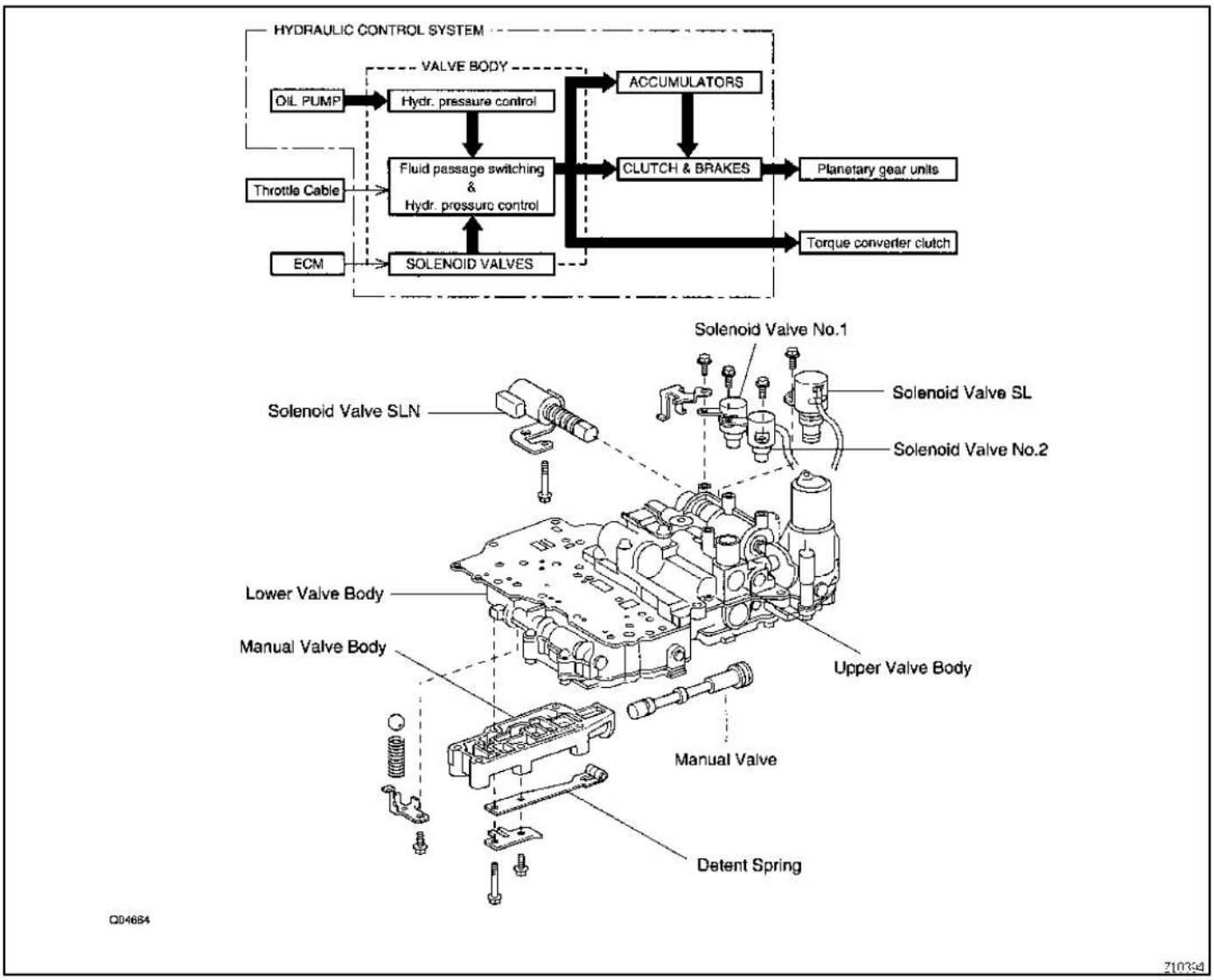
The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connect all of these components. Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

There are three solenoid valves on the valve body.

The No.1 and No.2 solenoid vales are turned on and off by signals from the ECM to operate the shift valves and change the gear shift position.

The SL solenoid valve is operated by signals from the ECM to engage or disengage the lock–up clutch of the torque converter clutch.

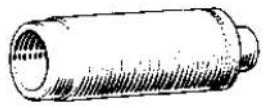
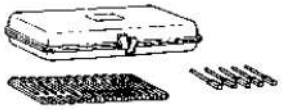
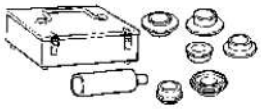
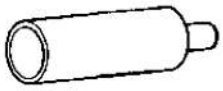
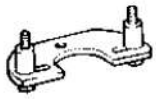
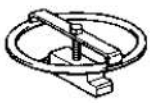
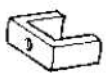
The SLN solenoid valve is operated by signals from the ECM to control the engagement speed and reduce gear shift shock.

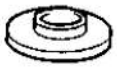
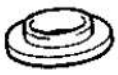
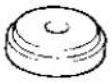


PREPARATION

SST (SPECIAL SERVICE TOOLS)

AX02L–06

	09226–10010	Crankshaft Front & Rear Bearing Replacer	Install RH retainer oil seal
	09240–00020	Wire Gauge Set	
	09316–20011	Transfer Bearing Replacer	
	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	
	09350–32014	TOYOTA Automatic Transmission Tool Set	
	09308–10010	Oil Seal Puller	
	(09351–32032)	Counter Driven Gear Holding Tool	
	(09351–32040)	No.1 Piston Spring Compressor	
	(09351–32050)	Snap Ring Expander	
	(09351–32061)	Oil Pump Puller	
	(09351–32070)	No.2 Piston Spring Compressor	
	(09351–32080)	Lock Nut Wrench	

	(09351–32100)	Drive Pinion Bearing Replacer	
	(09351–32120)	Overdrive Bearing Replacer	
	(09351–32140)	Oil Seal Replacer	
	(09351–32150)	Oil Seal Replacer	
	(09351–32190)	Measure Terminal	
	(09351–32200)	No.3 Piston Spring Compressor	
	09608–16011	Rear Hub Bearing Tool–	Remove differential side bearing
	09612–65014	Steering Worm Bearing Puller	Remove pinion shaft bearing outer race
	09950–40010	Puller B Set	

AX02M–02

RECOMMENDED COOL

	09031–00030	Pin Punch .	

EQUIPMENT

AX02N-02

Feeler gauge	Check major clearance.
Vernier calipers	Check length of second coast brake piston rod.
Dial indicator with magnetic base	Check piston stroke and end play of the output shaft.
Dial indicator	Check inside diameter of major bushing.
Straight edge	Check side clearance of oil pump.
Torque wrench	

AX01V-08

LUBRICANT

Item	Capacity	Classification
Automatic transaxle fluid: Dry fill Drain and refill	 6.75 liters (7.10 US qts, 5.94 Imp.qts) 2.5 liters (2.6 US qts, 2.2 Imp.qts)	ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])
Differential oil	0.85 liters (0.89 US qts, 0.75 Imp.qts)	ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

AX02P-02

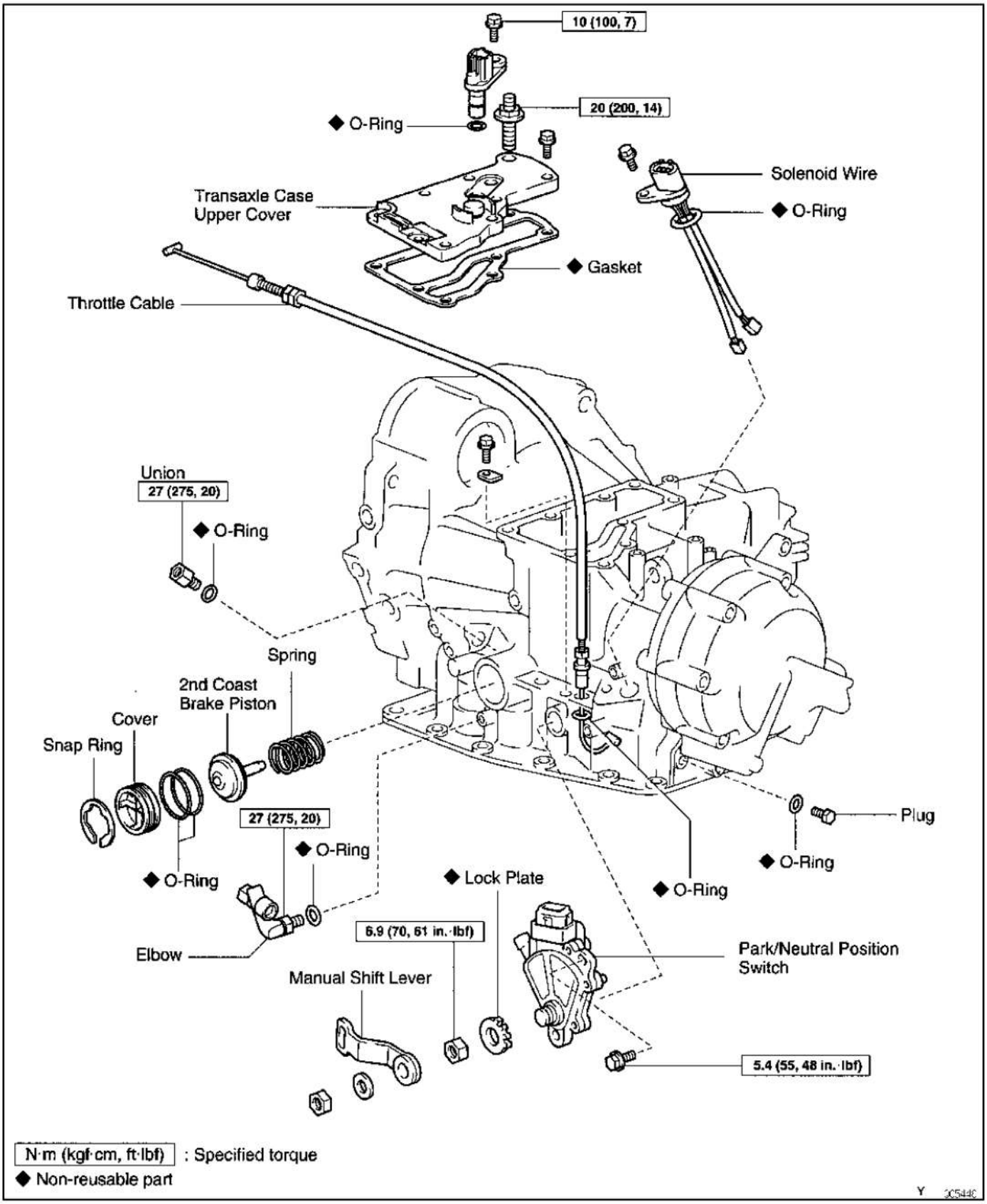
SSM (SPECIAL SERVICE MATERIALS)

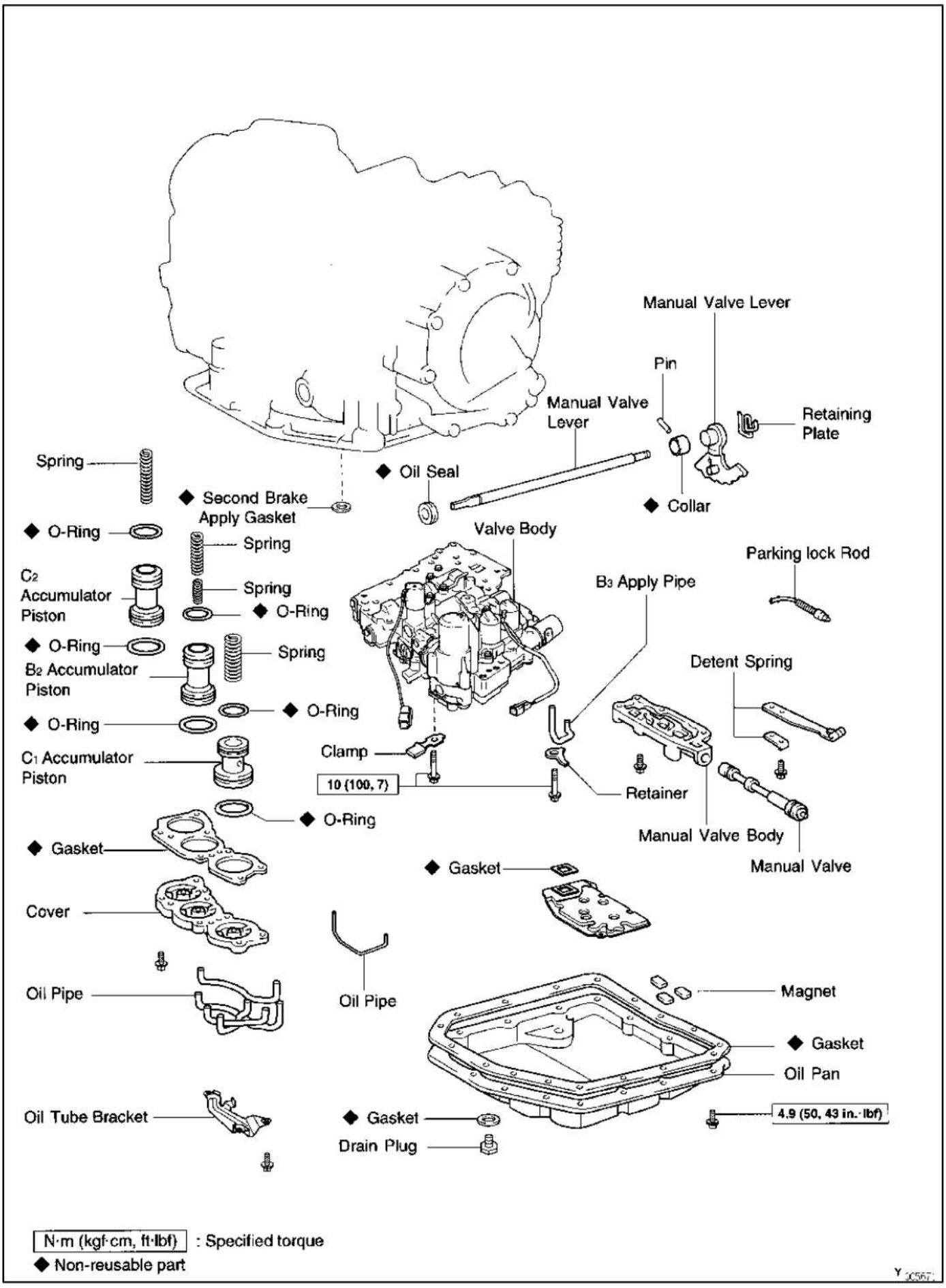
08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Differential LH bearing retainer Differential RH retainer
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Differential RH retainer set bolt

COMPONENT PARTS REMOVAL

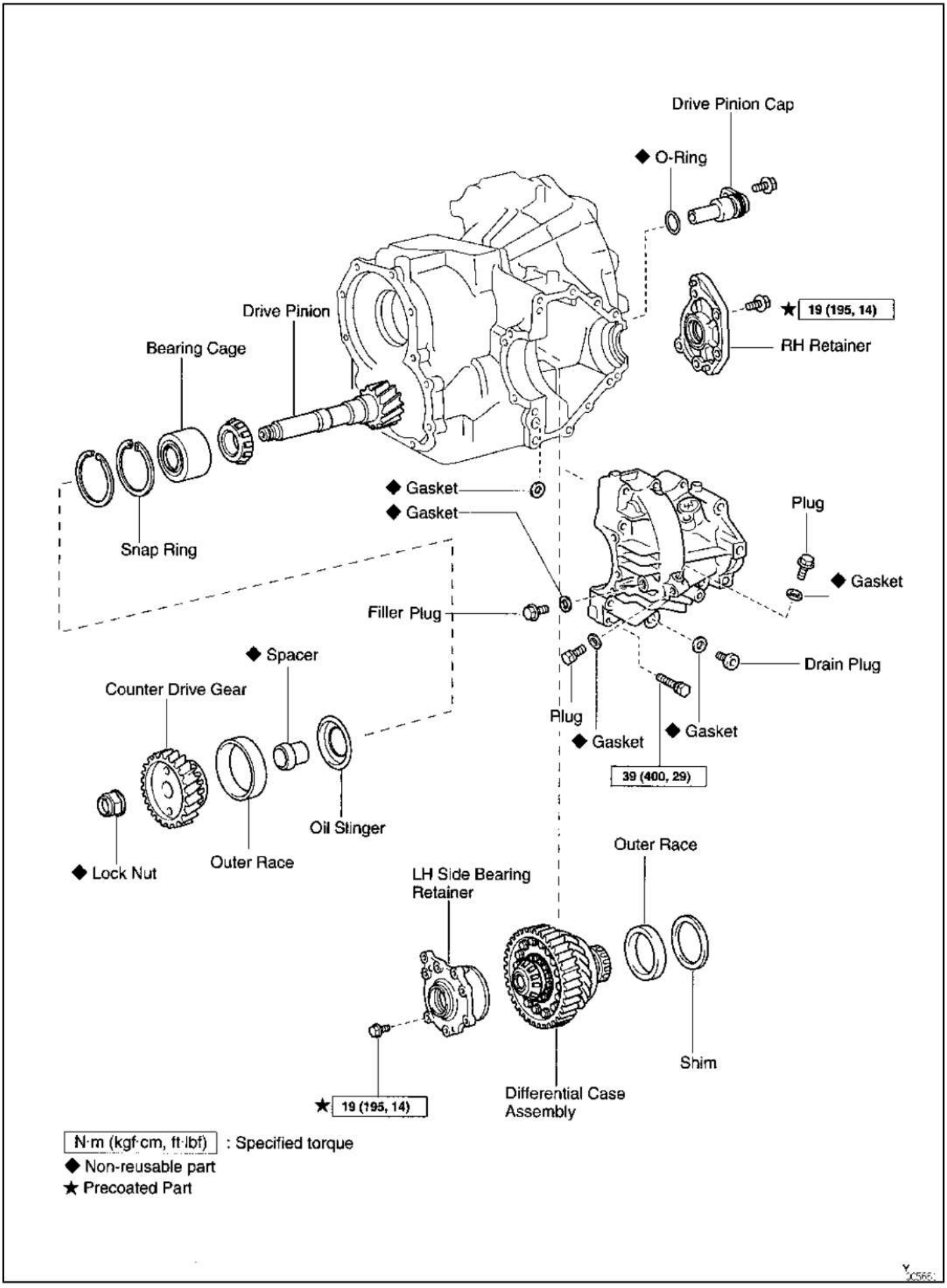
COMPONENTS

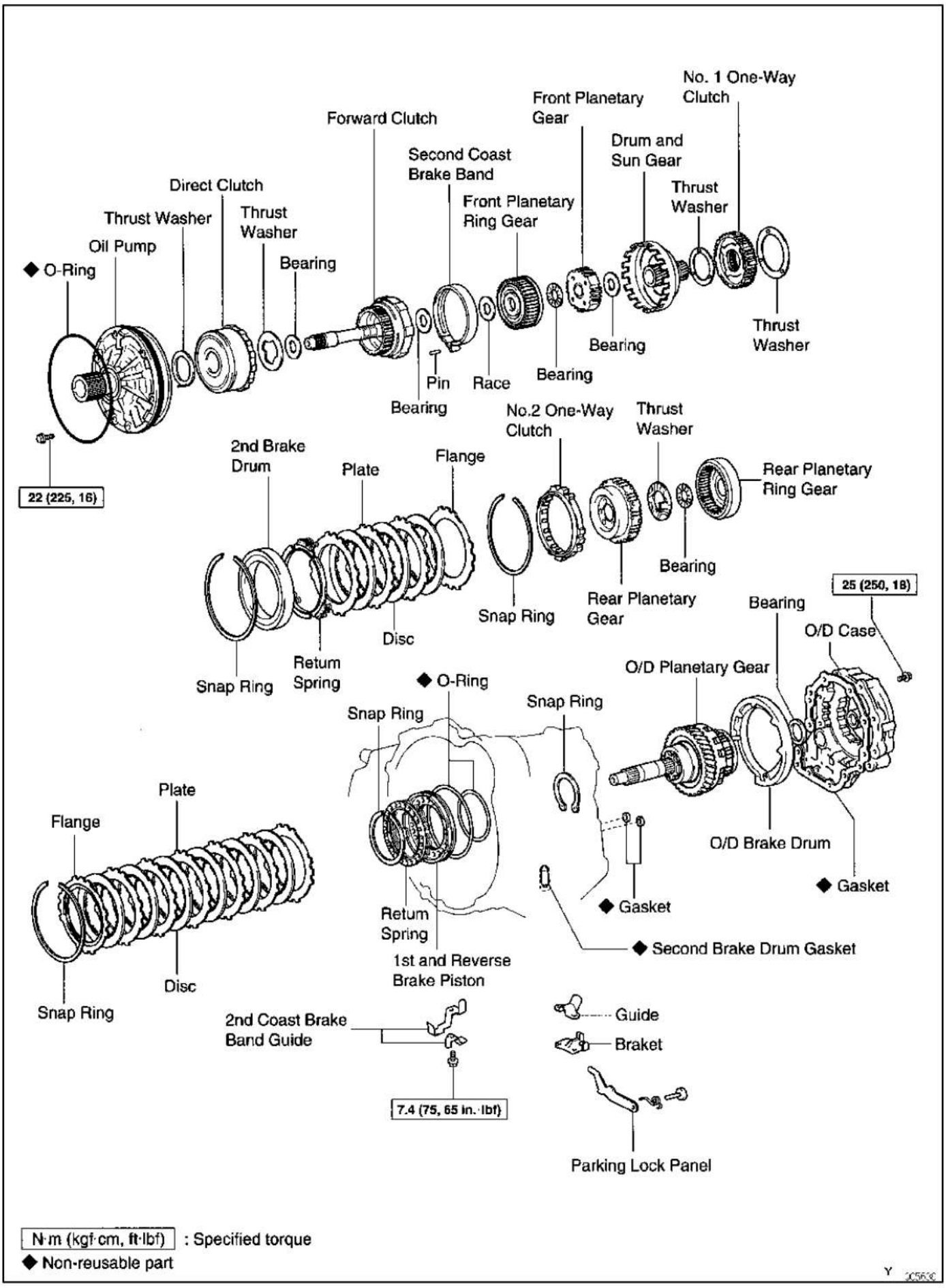
AX02Q-02





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


Drive Pinion Cap
◆ O-Ring
★ 19 (195, 14)
RH Retainer
Drive Pinion
Bearing Cage
Snap Ring
◆ Gasket
◆ Gasket
Plug
◆ Gasket
Filler Plug
Drain Plug
◆ Spacer
Counter Drive Gear
Plug
◆ Gasket
◆ Gasket
39 (400, 29)
Oil Stinger
Outer Race
◆ Lock Nut
Outer Race
LH Side Bearing Retainer
Shim
★ 19 (195, 14)
Differential Case Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated Part



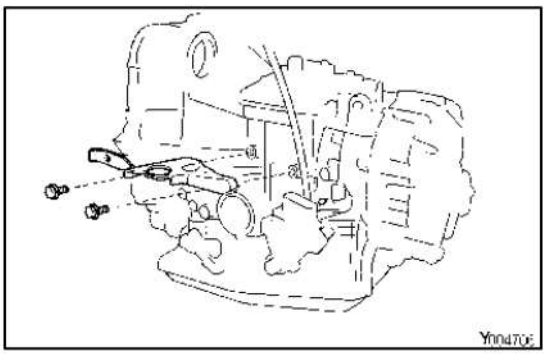
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

AX0TT–02

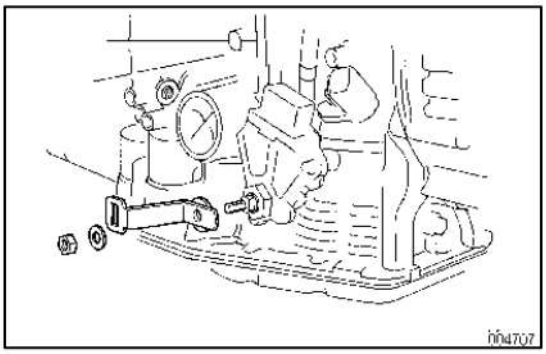
SEPARATE BASIC SUBASSEMBLY

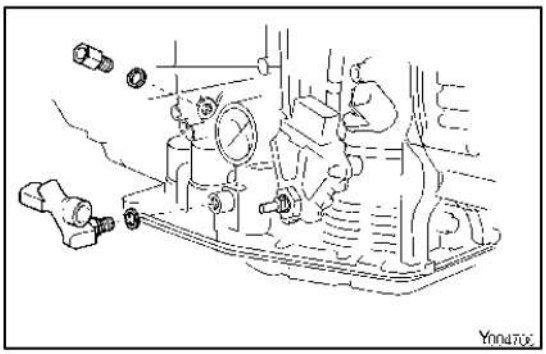
1. REMOVE SHIFT CONTROL CABLE BRACKET



2. REMOVE UNION AND ELBOW

(a) Remove the manual shift lever.

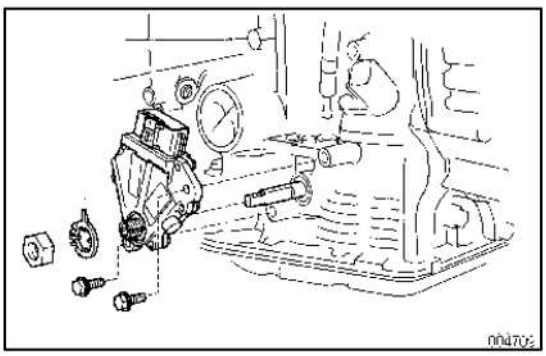




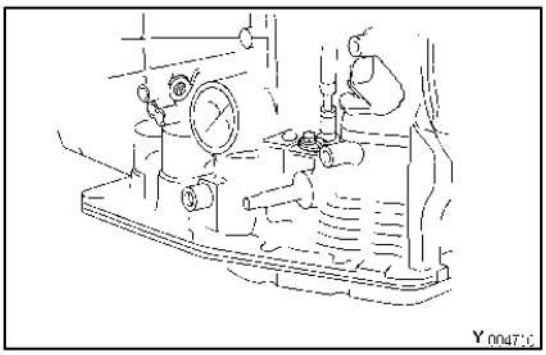
(b) Using a open end wrench, remove the union and elbow.
(c) Remove the O–rings from the union and elbow.

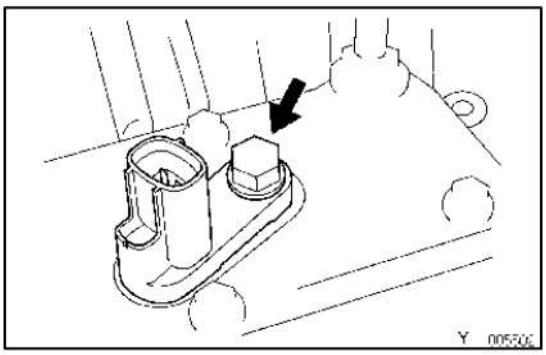
3. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Pry off the lock washer and remove the manual valve shaft nut.
(b) Remove the 2 bolts and pull out the park/neutral position switch.



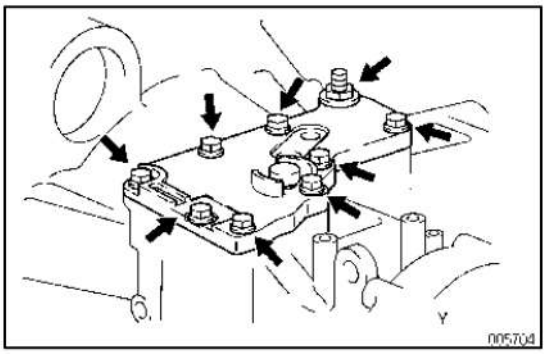
4. REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE



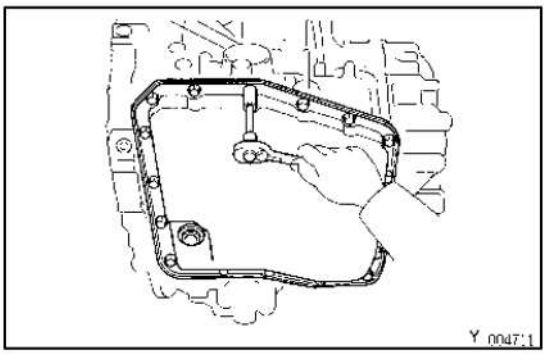


5. REMOVE T/M REVOLUTION SENSOR

(a) Remove the bolt and T/M revolution sensor.
(b) Remove the O–ring from the T/M revolution sensor.

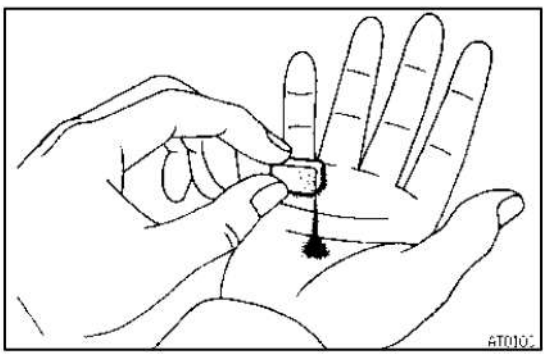


6. REMOVE TRANSAXLE CASE UPPER COVER



7. REMOVE OIL PAN AND GASKET

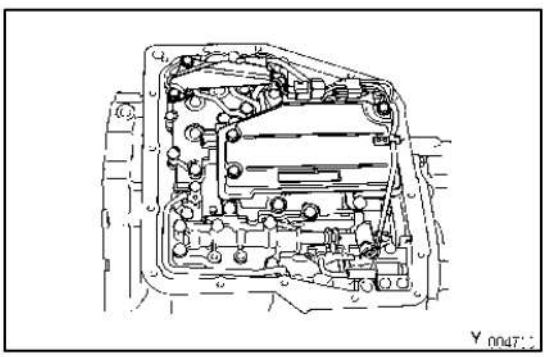
(a) Remove the 17 bolts.
(b) Remove the oil pan by lifting transaxle case.
NOTICE: Do not turn the transaxle over as this will contaminate the valve body with the foreign materials in the bottom of the oil pan.
(c) Place the transaxle on wooden blocks to prevent damage to the oil pipe bracket.



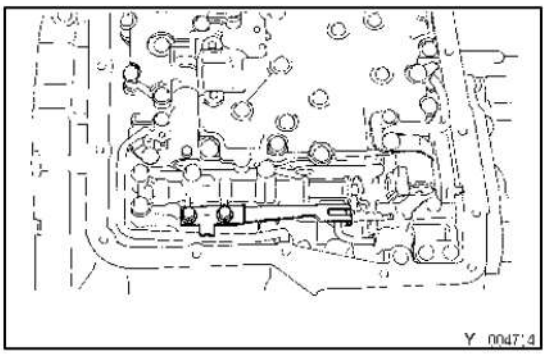
8. EXHAUST PARTICLES IN PAN

Remove the magnet and use it to collect any steel chips. Lock carefully at the chips and particles in the oil pan and on magnet to anticipate what type of wear you will find in the transaxle.

★ Steel (magnetic): bearing, gear and plate wear
★ Brass (non–magnetic): bushing wear

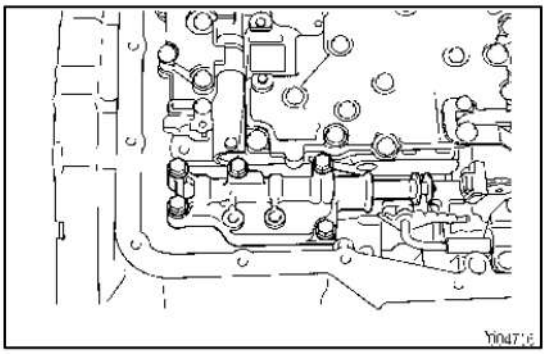


9. REMOVE OIL PIPE BRACKET AND STRAINER



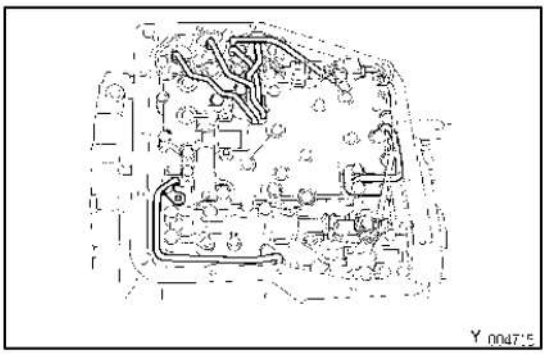
10. REMOVE MANUAL VALVE BODY

(a) Remove the 2 bolts and detent spring.



(b) Remove the 5 bolts and manual valve body with the manual valve.

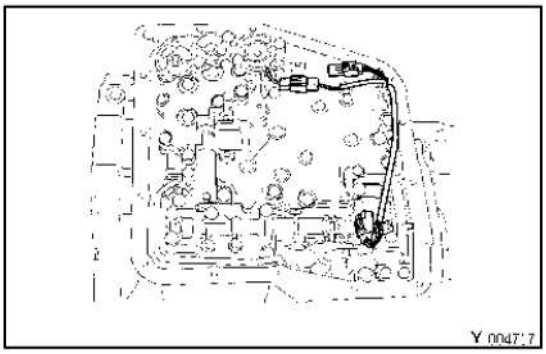
(c) Remove the manual valve from the manual valve body.



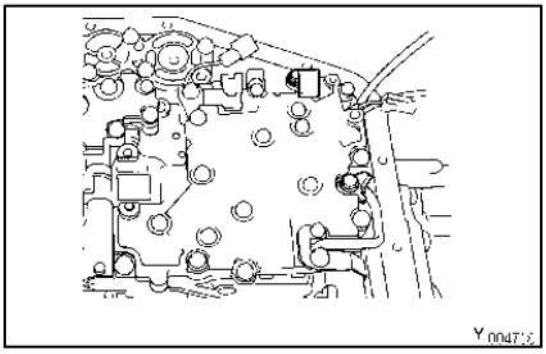
11. REMOVE OIL PIPES

(a) Remove the bolt.

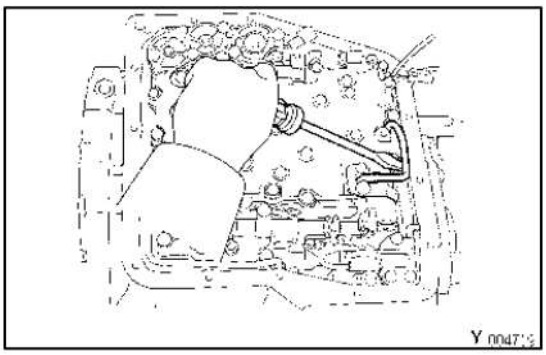
(b) Pry up both pipe ends with a large screwdriver and remove the 6 pipes.



12. DISCONNECT SOLENOID CONNECTORS

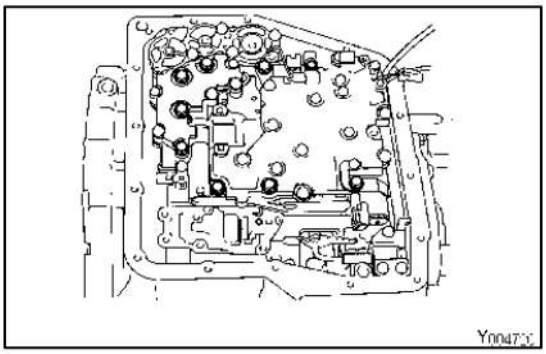


13. REMOVE CONNECTOR CLAMP AND PIPE RETAINER



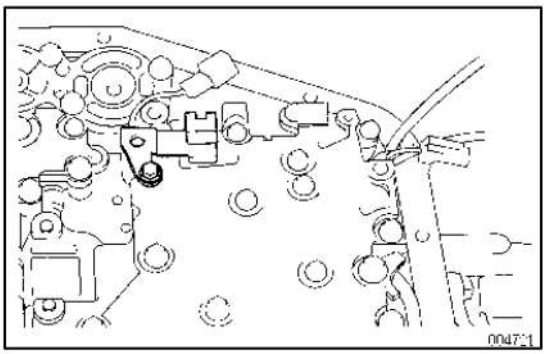
14. REMOVE B_3 APPLY PIPE

Pry up the pipe with a screwdriver and remove the pipe.

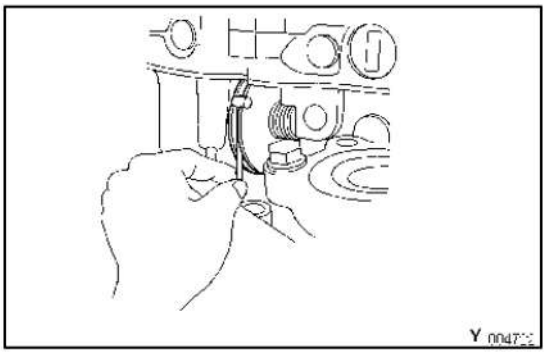


15. REMOVE VALVE BODY

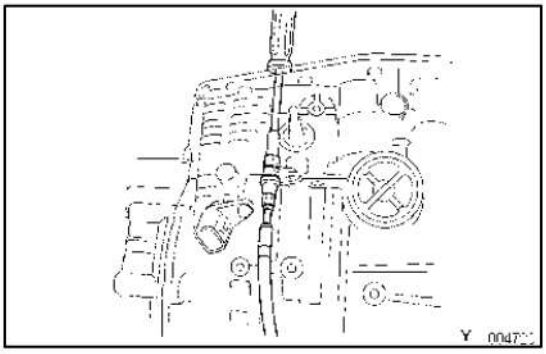
(a) Remove the 9 bolts.



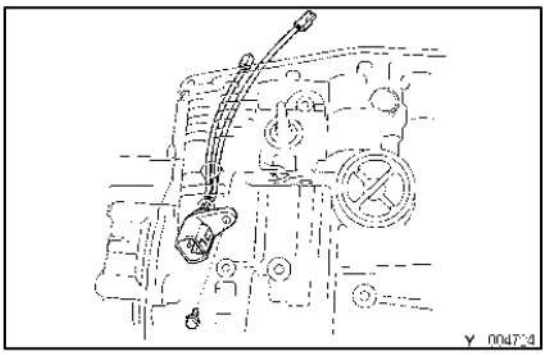
(b) Remove the wire harness clamp.



(c) Disconnect the throttle cable from the cam, and remove the valve body.

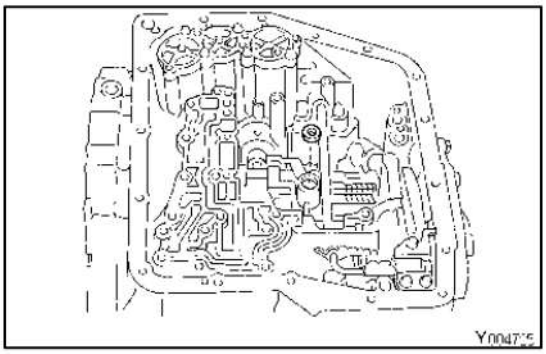


16. REMOVE THROTTLE CABLE

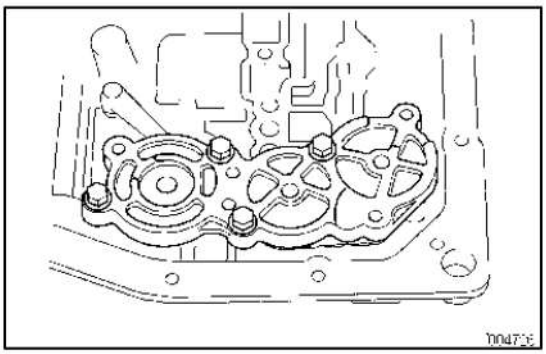


17. REMOVE SOLENOID WIRING

Remove the bolt and the solenoid wiring.



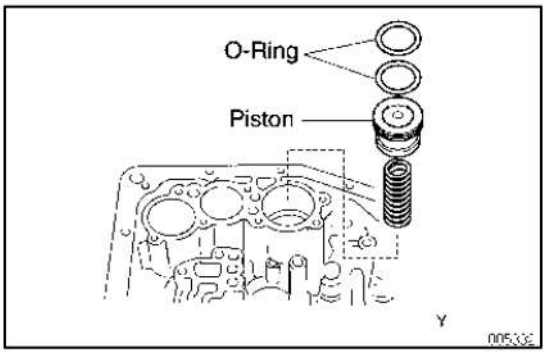
18. REMOVE SECOND BRAKE APPLY GASKET



19. REMOVE ACCUMULATOR PISTONS AND SPRINGS

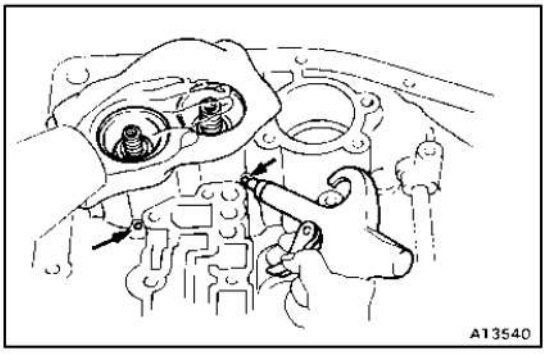
(a) Loosen the 4 bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



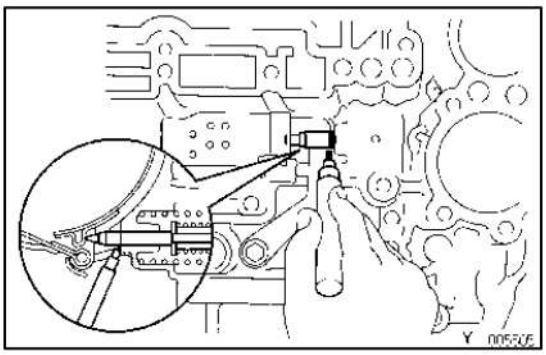
(c) Remove the C_1 accumulator piston and spring.

(d) Remove the 2 O–rings from the piston.



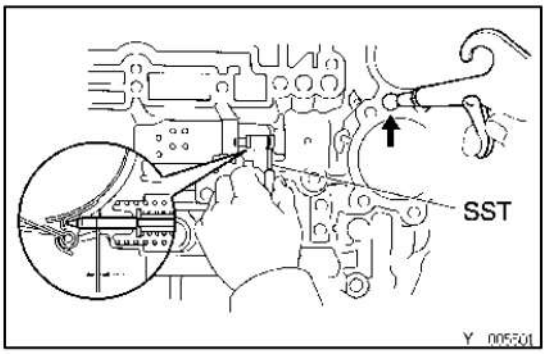
(e) Pop out pistons for C_2 and B_2 into a rag, using low–pressure compressed air (98 kPa, 1 kgf/cm^2, 14 psi).

(f) Remove the O–rings from the pistons.

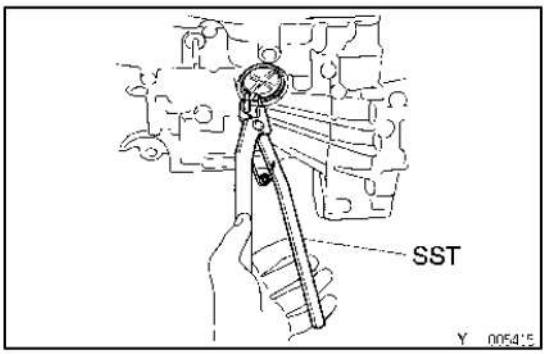


20. MEASURE PISTON STROKE SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.

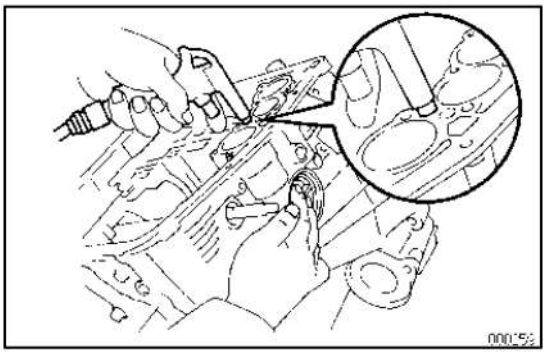


(b) Using SST, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09240–00020
Maximum thrust clearance:
2.0–3.5 mm (0.079–0.138 in.)
If the piston stroke exceeds the limit, inspect the second coast brake band.



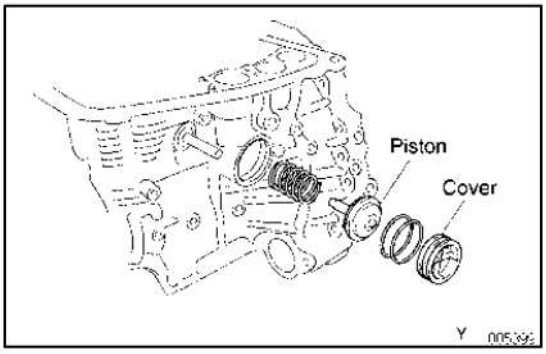
21. REMOVE SECOND COAST BRAKE PISTON

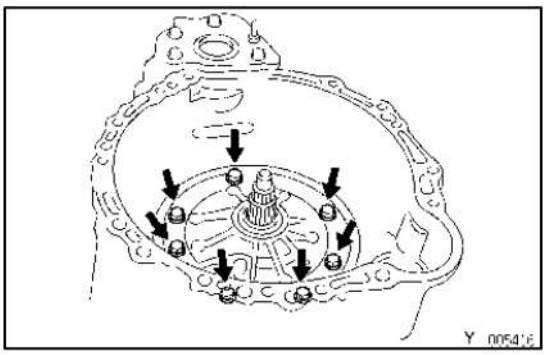
(a) Using SST, remove the snap ring.
SST 09350–32014



(b) Applying compressed air to the oil hole, remove the second coast brake cover, piston assembly and spring.

(c) Remove the 2 O–rings from the cover.



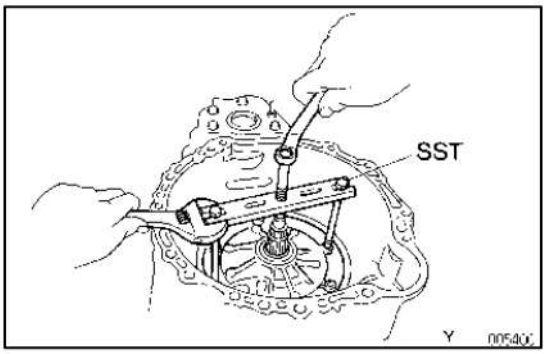


22. STAND TRANSAXLE ENGINE SIDE UPWARD

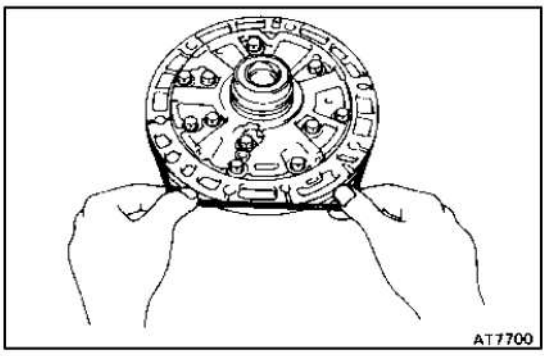
23. REMOVE OIL PUMP

NOTICE: Before removing the oil pump, remove the second coast brake piston.

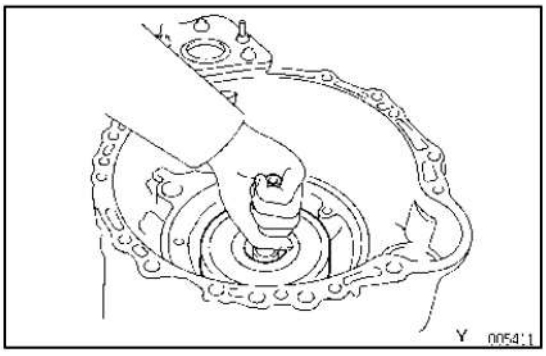
(a) Remove the 7 bolts.



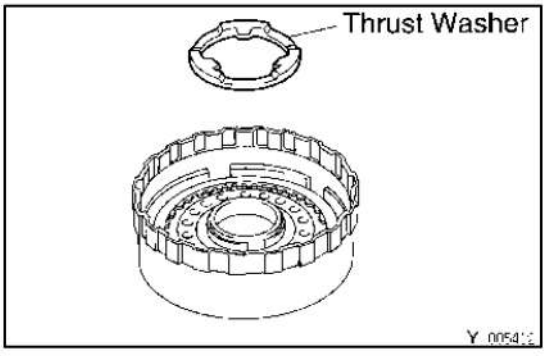
(b) Using SST, pull out the oil pump from the transaxle case.
SST 09350–32014



24. REMOVE O–RING FROM OIL PUMP



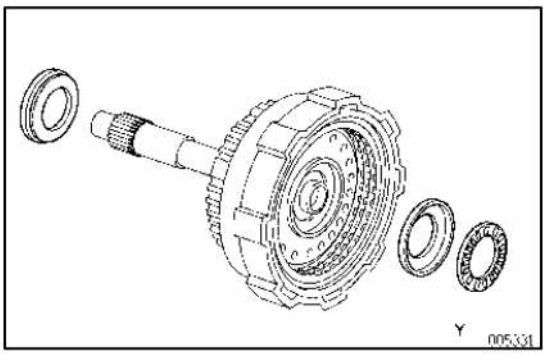
25. REMOVE DIRECT CLUTCH AND FORWARD CLUTCH



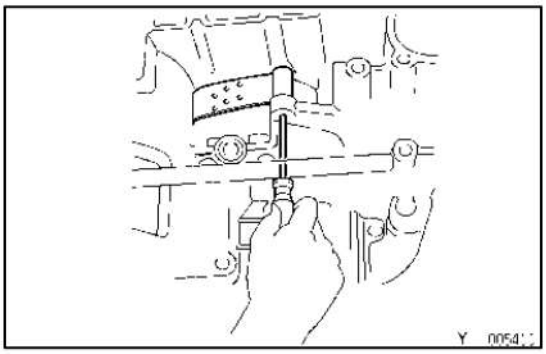
26. SEPARATE DIRECT CLUTCH AND FORWARD CLUTCH

(a) Separate the direct clutch and forward clutch.

(b) Remove the thrust washer from direct clutch.



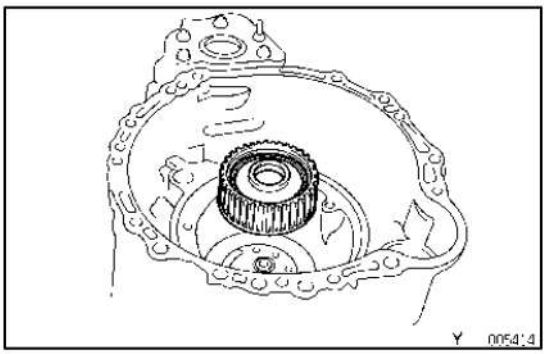
27. REMOVE BEARING FROM FORWARD CLUTCH



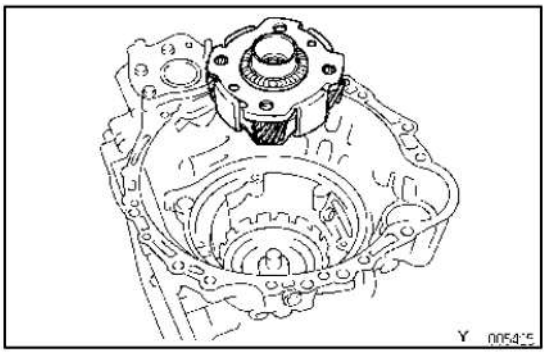
28. REMOVE SECOND COAST BRAKE BAND

(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

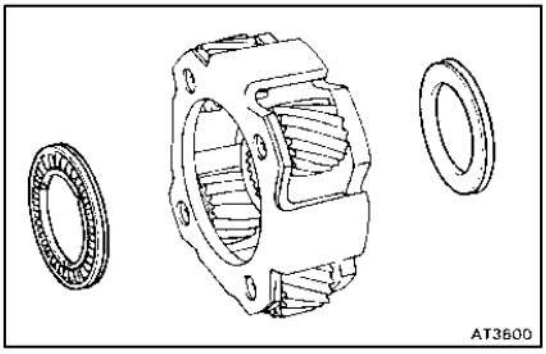


29. REMOVE FRONT PLANETARY RING GEAR

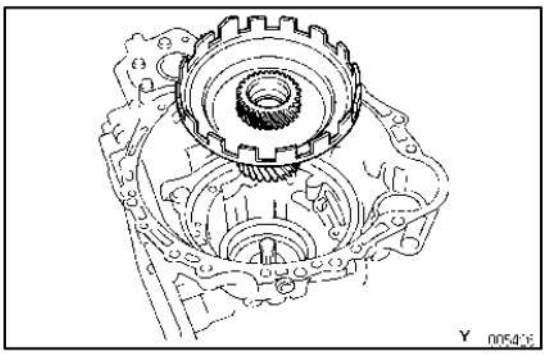


30. REMOVE FRONT PLANETARY GEAR

(a) Remove the front planetary gear.

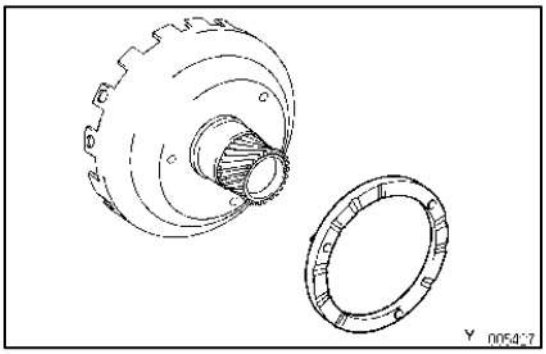


(b) Remove the 2 bearings from the planetary gear.

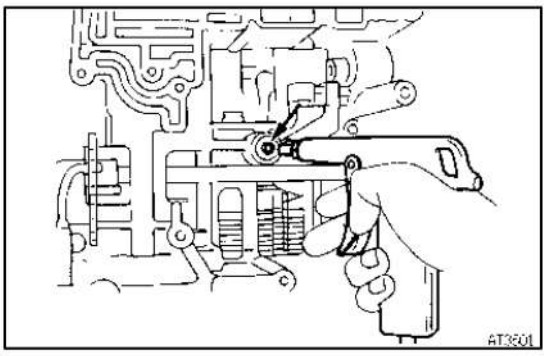


31. REMOVE SUN GEAR AND SUN GEAR INPUT DRUM

(a) Remove the sun gear and the sun gear input drum.



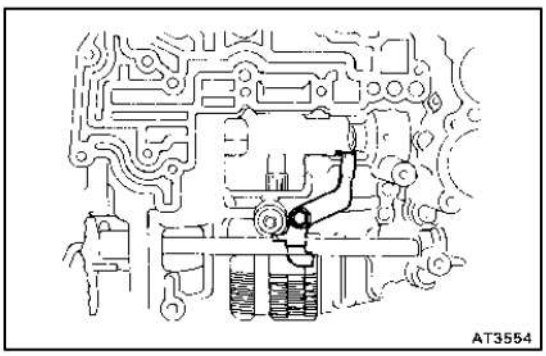
(b) Remove the thrust washer from sun gear input drum.



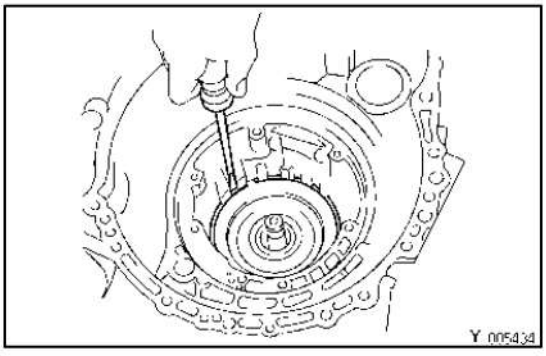
32. CHECK OPERATION OF SECOND BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.

If the piston does not move, disassembe and inspect.

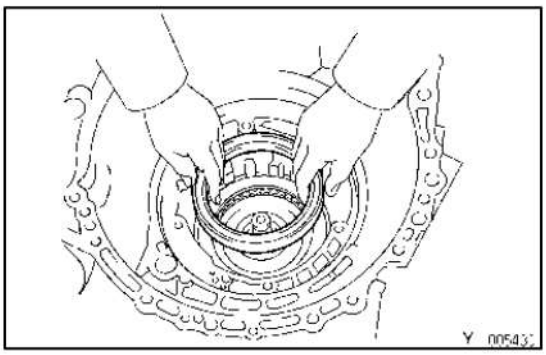


33. REMOVE SECOND COAST BRAKE BAND GUIDE

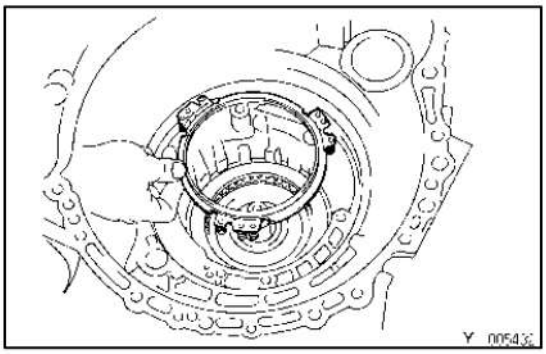


34. REMOVE SECOND BRAKE DRUM

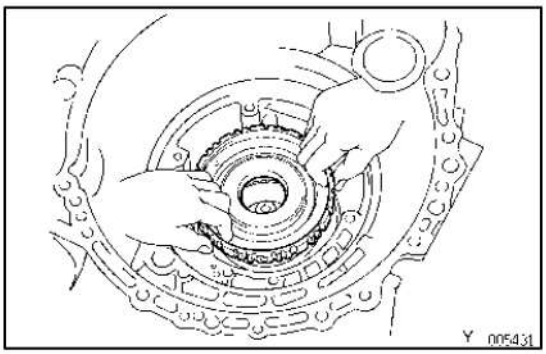
(a) Remove the snap ring.



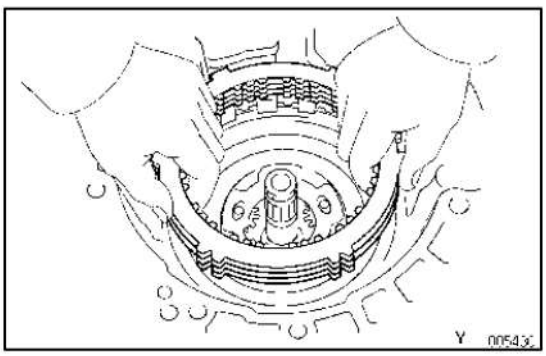
(b) Remove the second brake drum.



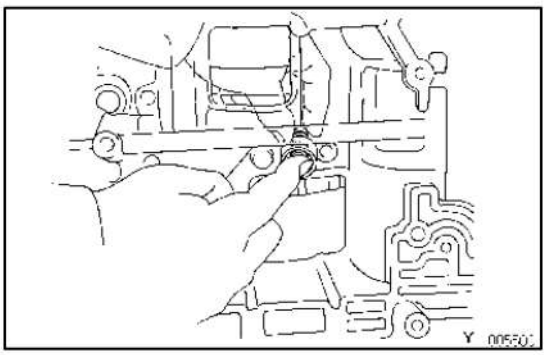
35. REMOVE SECOND BRAKE PISTON RETURN SPRING



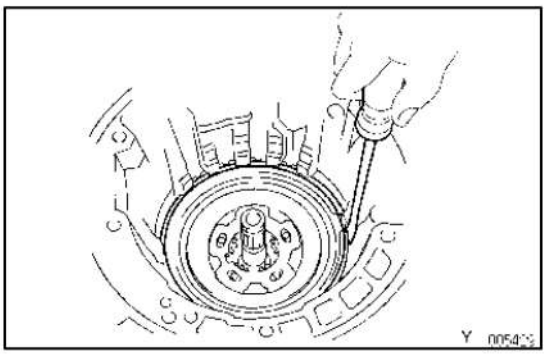
36. REMOVE NO.1 ONE–WAY CLUTCH



37. REMOVE PLATES, DISCS AND FLANGE

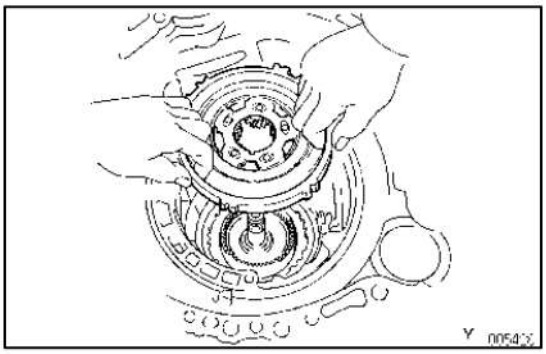


38. REMOVE SECOND BRAKE DRUM GASKET
Remove the gasket.

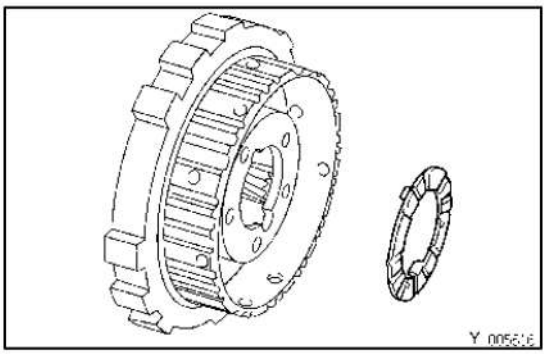


39. REMOVE NO.2 ONE–WAY CLUTCH AND REAR PLANETARY GEAR

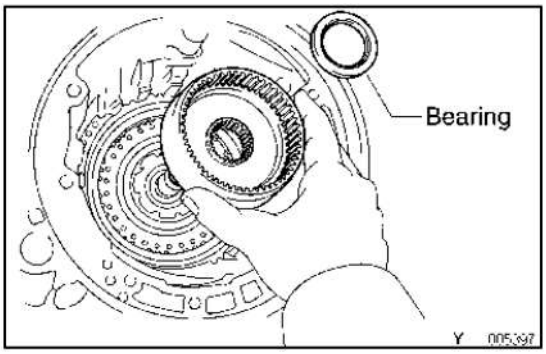
(a) Remove the snap ring.



(b) Remove the No.2 one–way clutch and rear planetary gear.



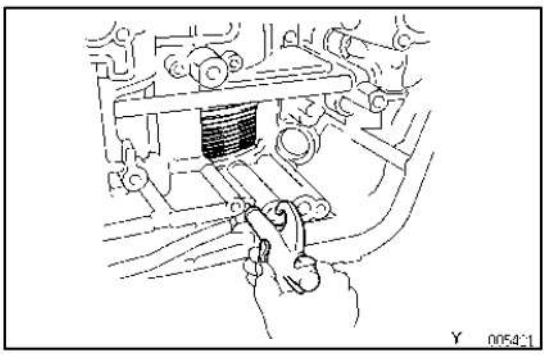
(c) Remove the thrust washer from the rear planetary gear.



40. REMOVE REAR PLANETARY RING GEAR

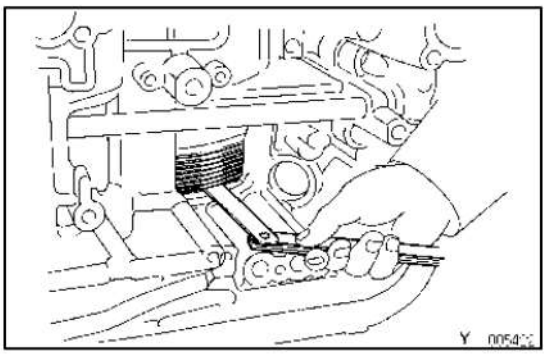
(a) Remove the rear planetary ring gear.

(b) Remove the bearing from the ring gear.

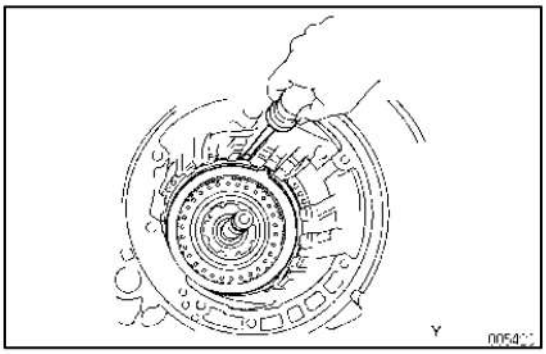


41. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassemble and inspect.

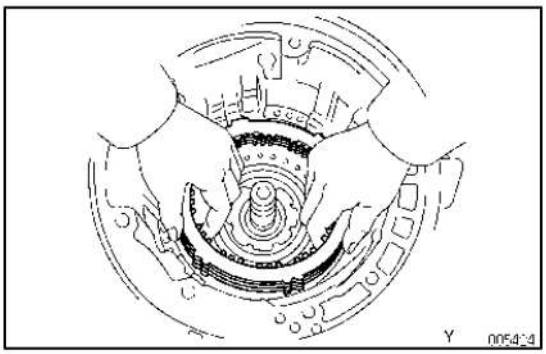


(b) Using a filler gauge, check the pack clearance of the first and reverse brake.
Clearance: 1.92–2.68 mm (0.0756–0.1055 in.)

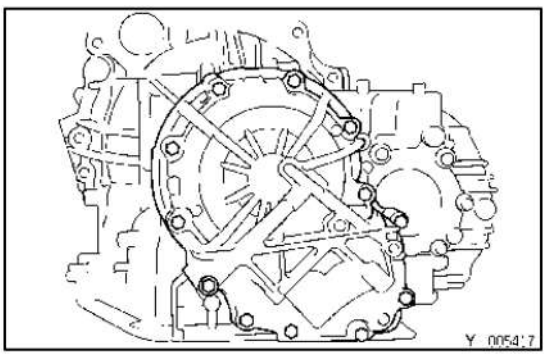


42. REMOVE FLANGE, DISCS AND PLATES OF FIRST AND REVERSE BRAKE

(a) Remove the snap ring.



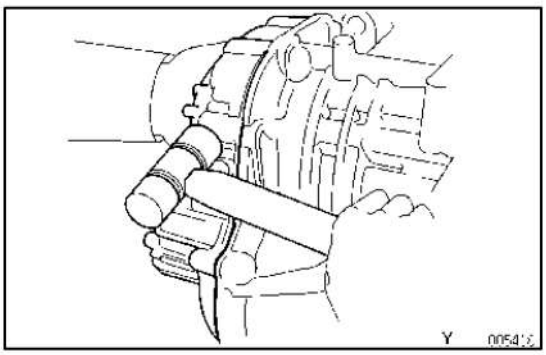
(b) Remove the flange, 6 discs and plates.



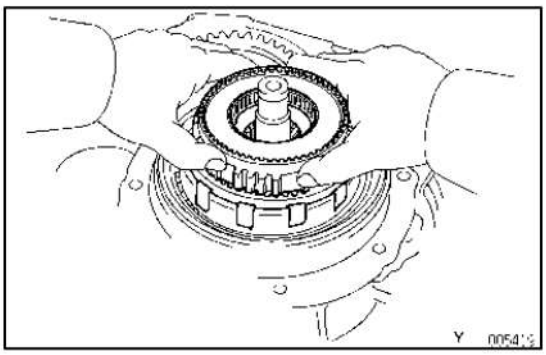
43. TURN TRANSAXLE CASE AROUND

44. REMOVE OVERDRIVE UNIT

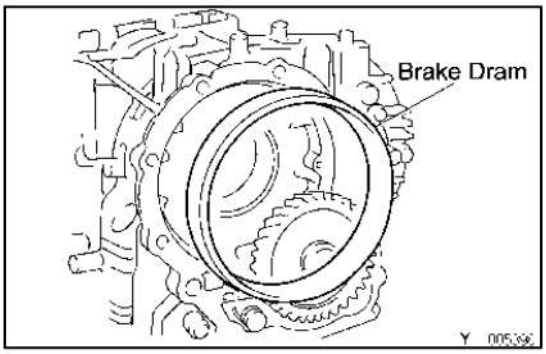
(a) Remove the 13 bolts.



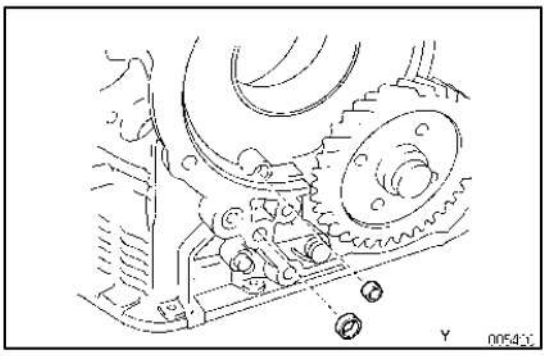
(b) Tap on the circumference of the overdrive case with a plastic hammer to remove the overdrive case and gasket.



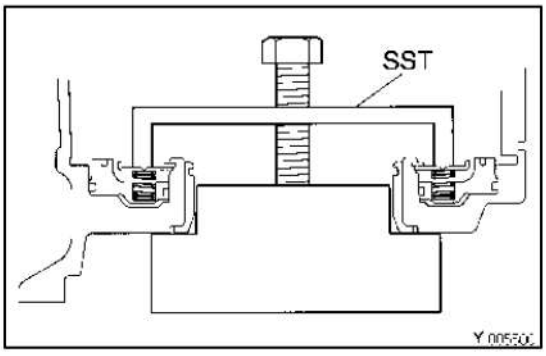
(c) Remove the overdrive planetary gear from transaxle case.



(d) Remove the overdrive brake drum from the transaxle case.



(e) Remove the overdrive clutch apply gasket and overdrive brake apply gasket.

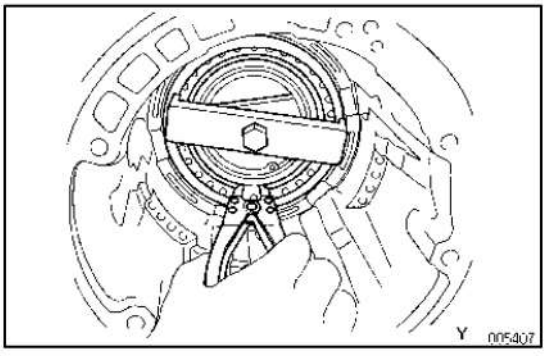


45. REMOVE FIRST AND REVERSE BRAKE PISTON

(a) Remove the piston return spring.

★ Place SST, compress the return spring evenly by tightening the bolt gradually.

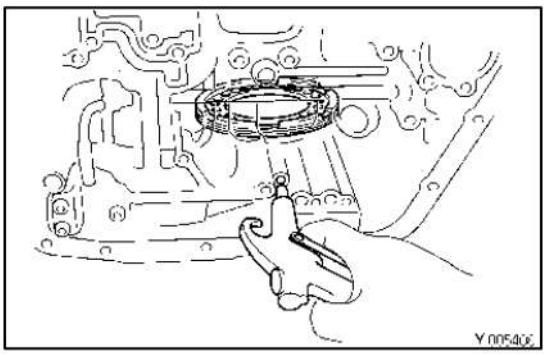
SST 09350–32014 (09351–32040)



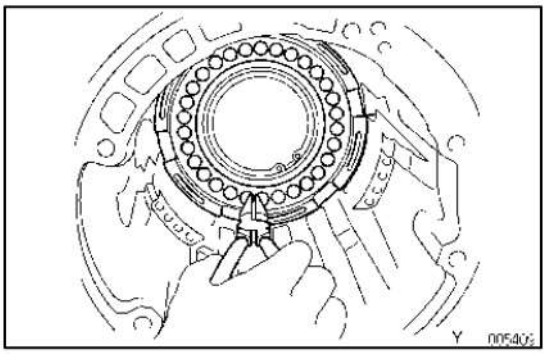
★ Using snap ring pliers, remove the snap ring.

★ Remove the SST.

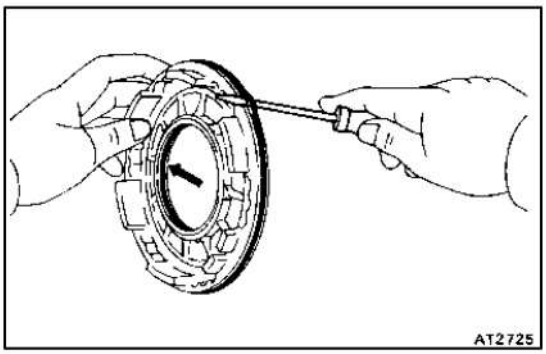
★ Remove the return spring from the case.



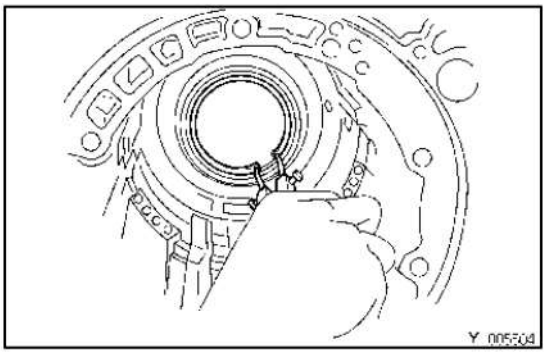
(b) Apply compressed air into the passage of the case to remove the piston.
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



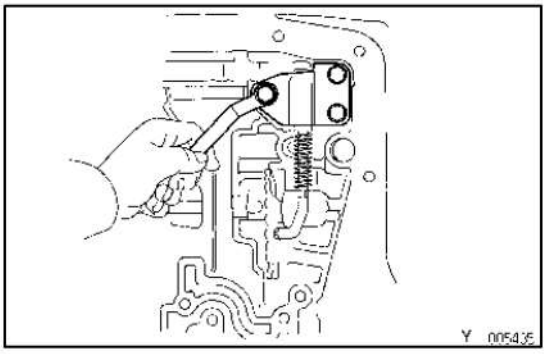
(c) If the piston does not pop out with compressed air, use needle–nose pliers to remove it.



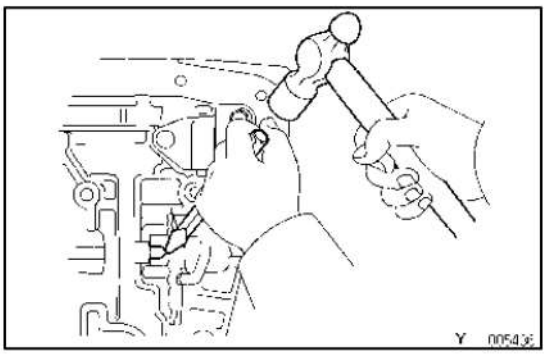
(d) Remove the 2 O–rings from the piston.



(e) Remove the snap ring.

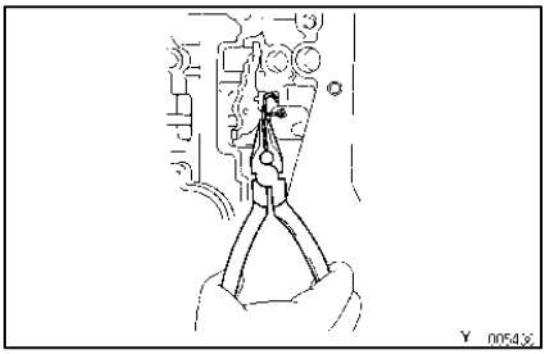


46. REMOVE PARKING LOCK PAWL BRACKET AND GUIDE

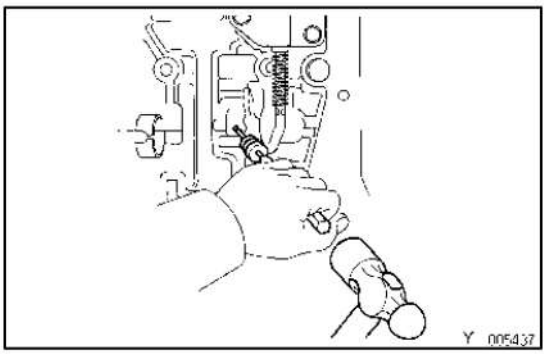


47. REMOVE MANUAL VALVE SHAFT

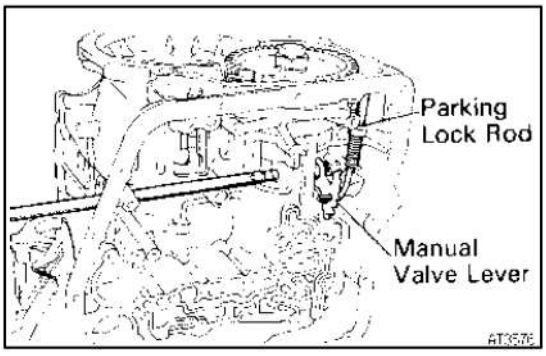
(a) Using a chisel and hammer, cut the collar.



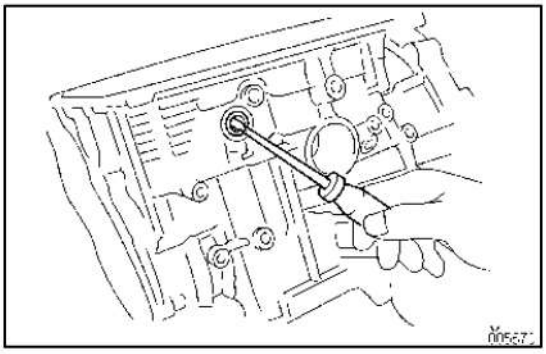
(b) Remove the retaining spring.



(c) Using a pin punch and hammer, drive out the pin.

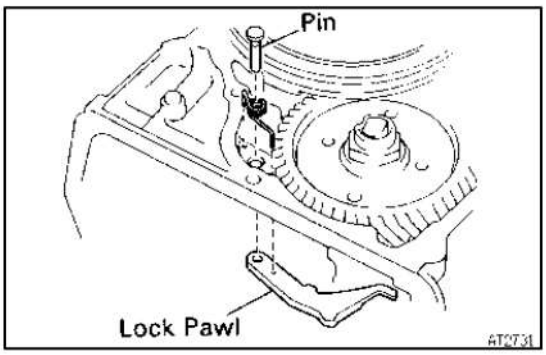


(d) Slide out the shaft from the transaxle case and remove the manual valve lever and parking lock rod.

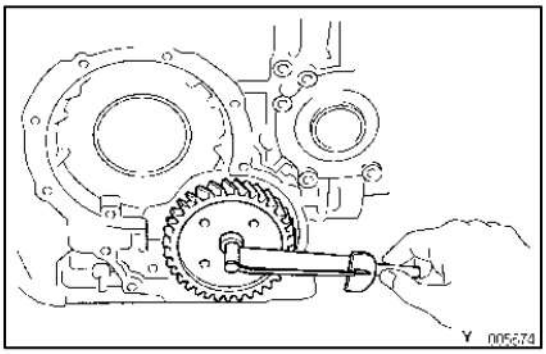


48. REMOVE MANUAL VALVE SHAFT OIL SEAL

Using a screwdriver, remove the oil seal.



49. REMOVE PIN, SPRING AND PARKING LOCK PAWL

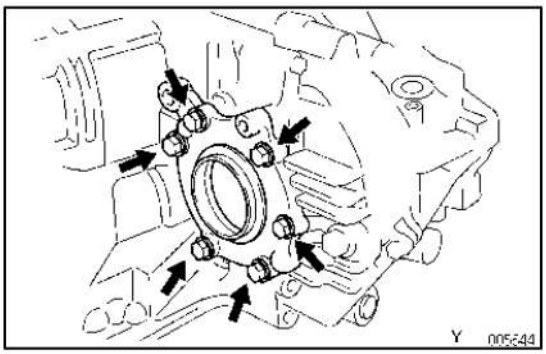


AX02S–04

DIFFERENTIAL COMPONENT PARTS REMOVAL

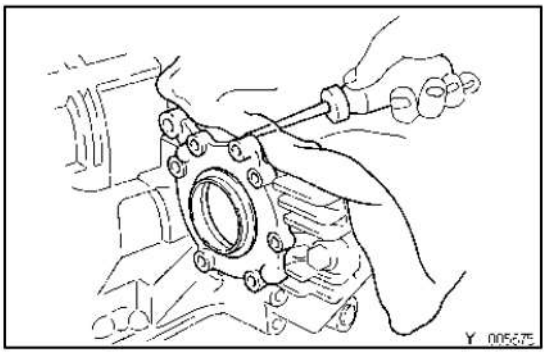
1. MEASURE DIFFERENTIAL TOTAL PRELOAD

Using a small torque wrench, measure the total preload and make a note of it.



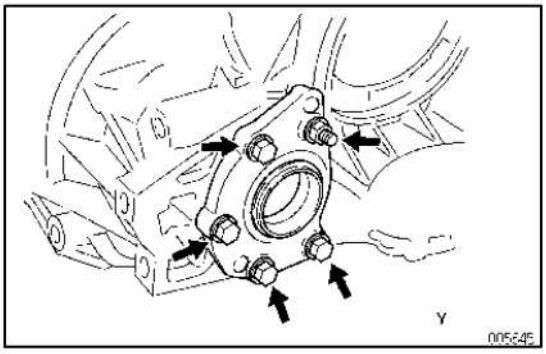
2. REMOVE LH BEARING RETAINER

(a) Remove the 6 bolts.



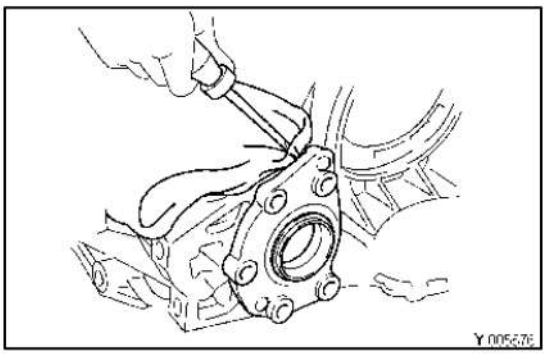
(b) Using a large screwdriver, remove the LH bearing retainer.

NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

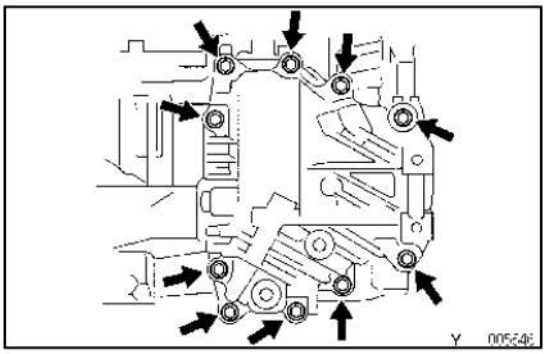


3. REMOVE RH RETAINER

(a) Remove the 5 bolts.

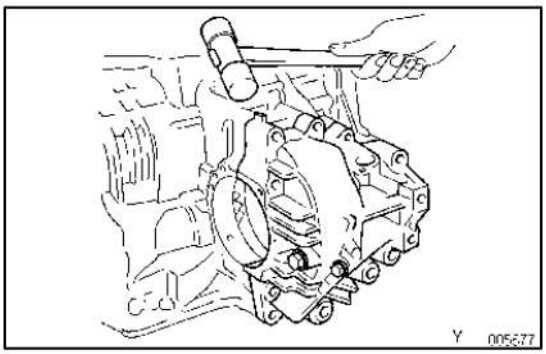


(b) Using a large screwdriver, remove the RH retainer.
NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

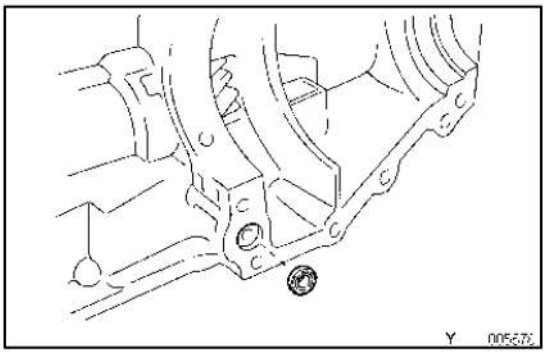


4. REMOVE CARRIER COVER

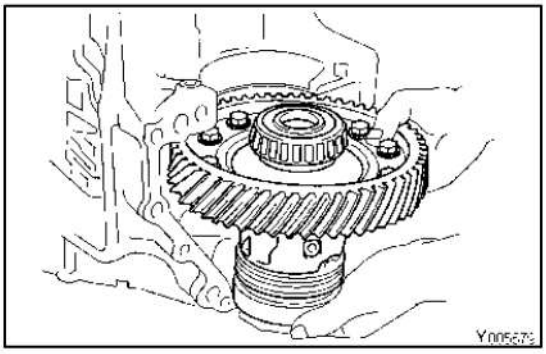
(a) Remove the 10 bolts.



(b) Tap the carrier cover with a plastic hammer to remove it.

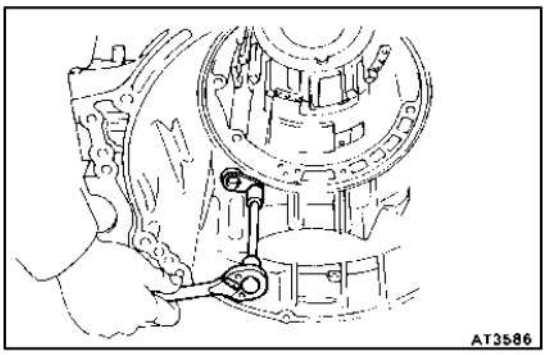


(c) Remove the apply gasket.



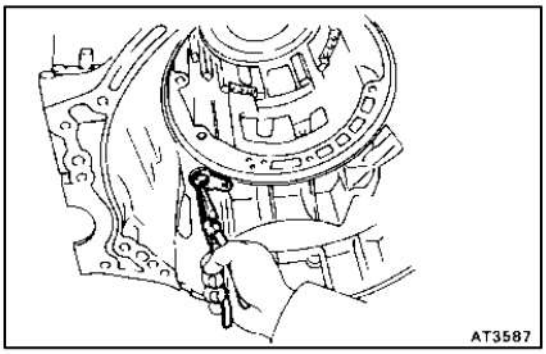
5. REMOVE DIFFERENTIAL CASE

Remove the differential case, outer case and shim from the transaxle case.

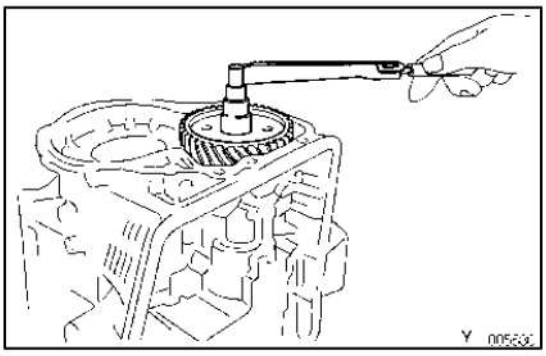


6. REMOVE TRANSAXLE CAP

(a) Remove the bolt.



(b) Using pliers, pull out the drive pinion cap.
(c) Remove the O–rings from the cap.



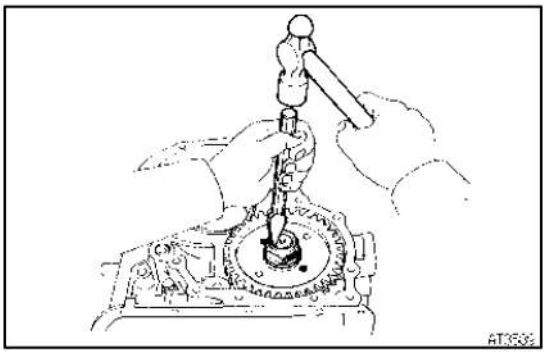
7. MEASURE DRIVE PINION PRELOAD

Using a small torque wrench, measure the drive pinion preload.

Preload (Reused bearing at starting):

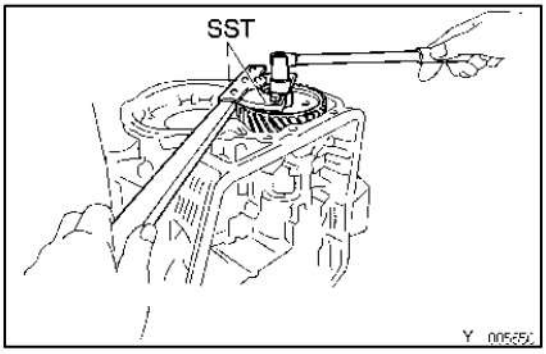
0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 in.·lbf)

The total preload measured in step 1 minus the drive pinion preload equals 0.1–0.2 N·m (1.3–2.0 kgf·cm, 1.1–1.7 in.·lbf). If the result is not within this specification, the side bearing preload is suspect.

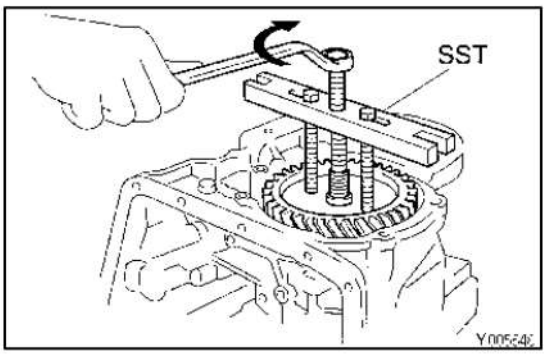


8. REMOVE COUNTER DRIVEN GEAR

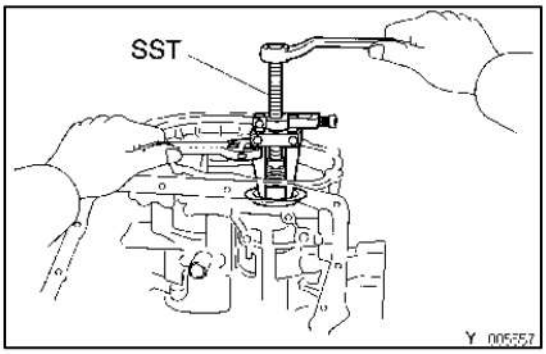
(a) Using a chisel and hammer, loosen the staked part of the nut.



(b) Using SST to hold the gear, remove the nut.
SST 09330–00021, 09350–32014 (09351–32032)

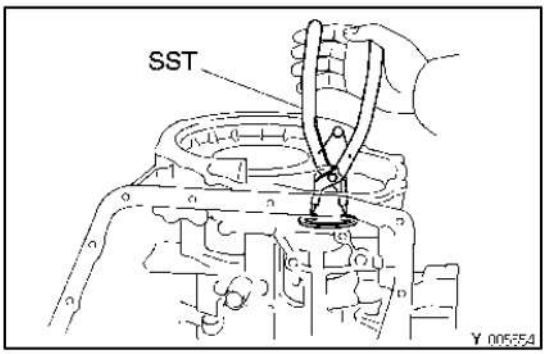


(c) Using SST, remove the gear and bearing.
SST 09350–32014 (09351–32061)

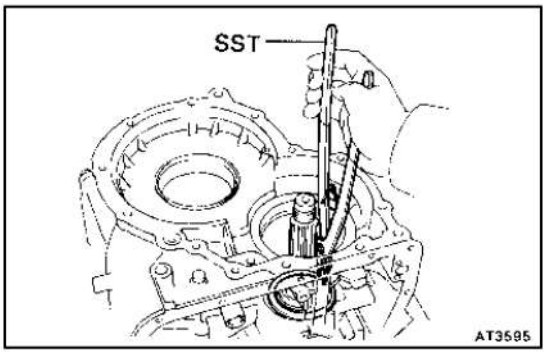


9. REMOVE OUTER RACE, SPACER AND OIL SLINGER

(a) Using SST, remove the outer race with oil slinger and spacer.
SST 09350–32014 (09308–10010)

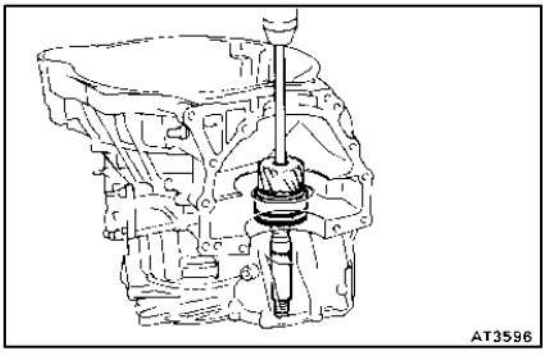


(b) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)



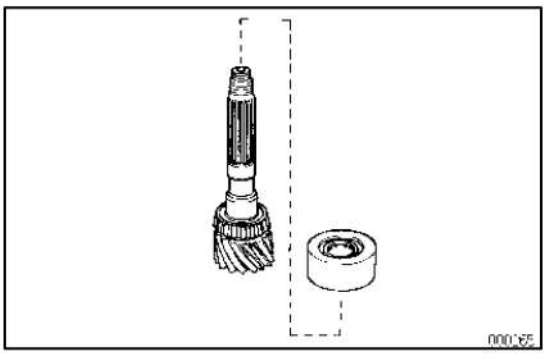
10. REMOVE DRIVE PINION

(a) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)

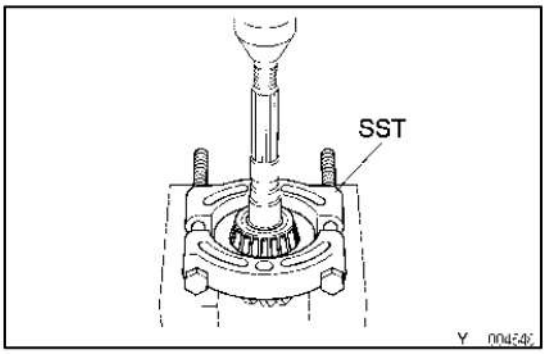


(b) Install the bar into the case hole to drive out the drive pinion.

(c) Using a press, drive out the drive pinion from transaxle case.



(d) Remove the bearing cage from drive pinion.



(e) Using SST, press out the bearing.
SST 09950–00020

AX02T-07

GENERAL NOTES

The instructions here are organized so that you work on only one component group at a time.
This will help avoid confusion from similar–looking parts of different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the converter housing side.
As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.
Recommended fluid for the automatic transaxle: ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

1. GENERAL CLEANING NOTES:

(a) All disassembled parts should be washed clean and any fluid passages and holes blown through with compressed air.
(b) When using compressed air to dry parts, always aim away from yourself to prevent accidentally spraying automatic transaxle fluid or kerosene in your face.
(c) The recommended automatic transaxle fluid or kerosene should be used for cleaning.

2. PARTS ARRANGEMENT:

(a) After cleaning, the parts should be arranged in the correct order to allow efficient inspection, repairs, and reassembly.
(b) When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
(c) New brakes and clutches that are to be used for replacement must be soaked in transaxle fluid for at least fifteen minutes before assembly.

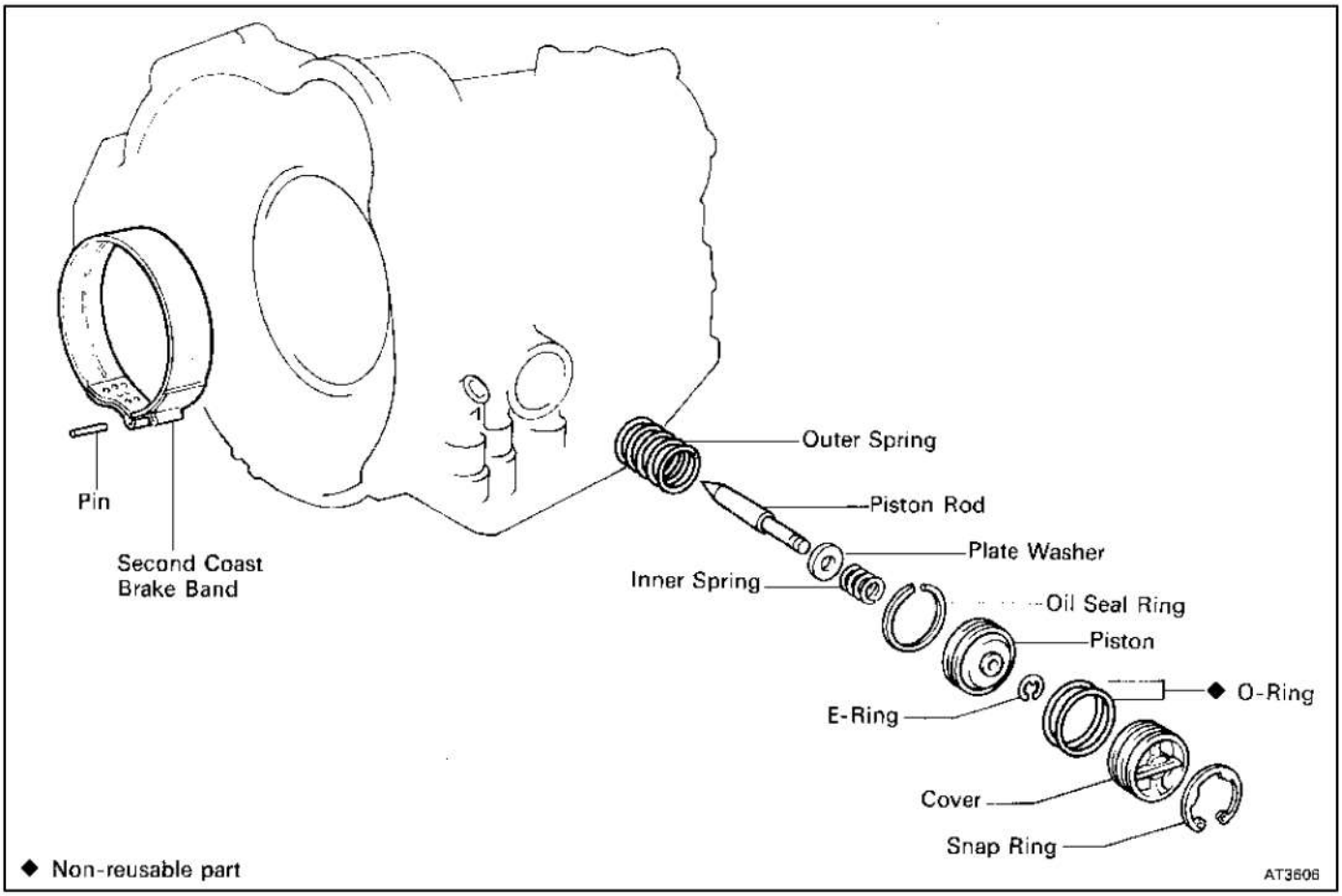
3. GENERAL ASSEMBLY:

(a) All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
(b) All gaskets and rubber O–rings should be replaced.
(c) Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
(d) If a worn bushing is to be replaced, the subassembly containing that bushing must be replaced.
(e) Check thrust bearings and races for wear or damage. Replace if necessary.
(f) Use petroleum jelly to keep parts in place.

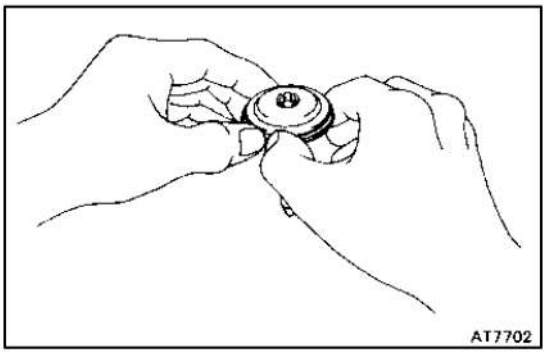
SECOND COAST BRAKE

COMPONENTS

AX02U–02



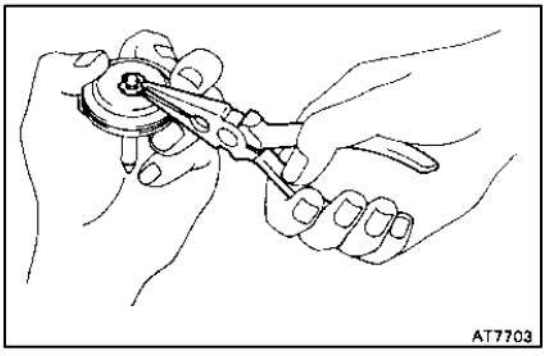
AX02V–02



SECOND COAST BRAKE PISTON DISASSEMBLY

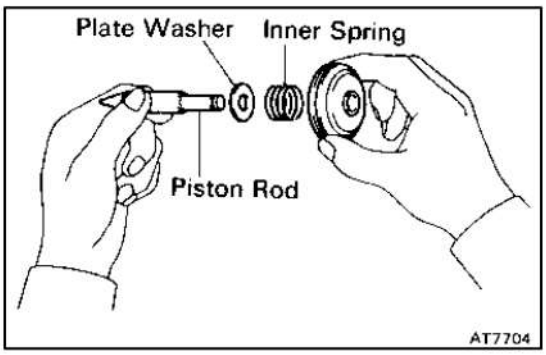
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

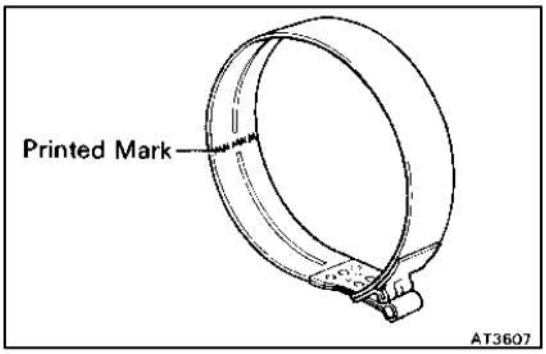


2. REMOVE PISTON ROD

(a) Remove the E–ring while pushing the piston with needle–nose pliers.



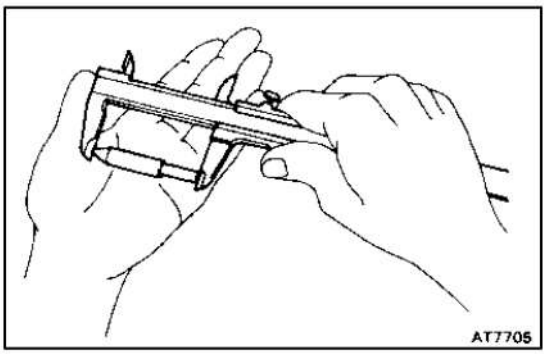
(b) Remove the inner spring, plate washer and piston rod.



SECOND COAST BRAKE COMPONENT INSPECTION

AX02W–03

If the lining of the brake band is peeling off or discolored, or even part of the printed mark is defaced, replace the brake band.



SECOND COAST BRAKE PISTON ASSEMBLY

AX02X–03

1. SELECT PISTON ROD

If the band is OK but piston stroke not within the standard value, select a new piston rod.

Piston stroke:

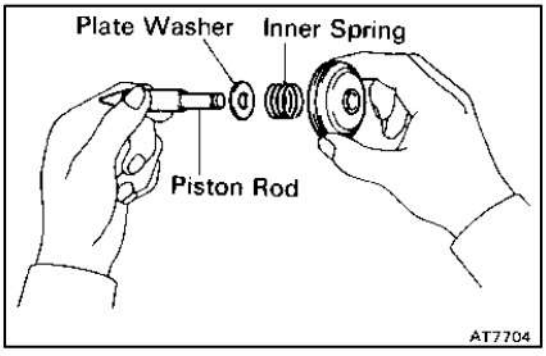
2.0–3.5 mm (0.079–0.138 in.)

There are 2 lengths of piston rod.

Piston rod length:

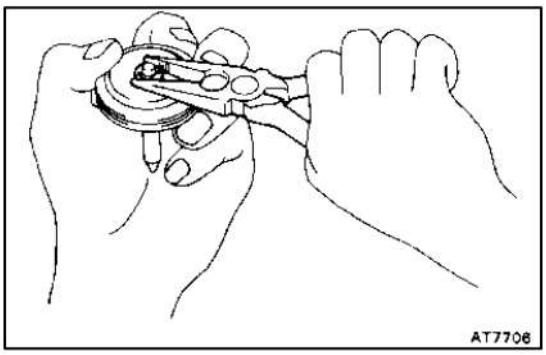
95.2 mm (3.748 in.)

96.3 mm (3.791 in.)

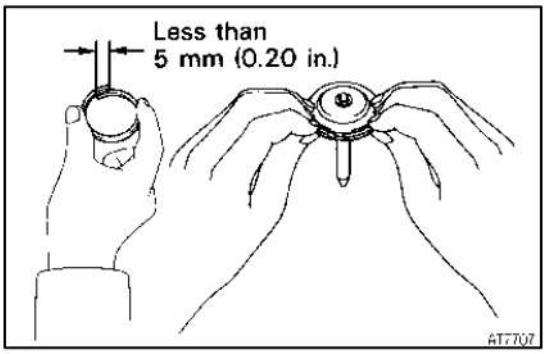


2. INSTALL PISTON ROD

(a) Install the plate washer and inner spring to the piston rod.



(b) Install the E–ring while pushing the piston.



3. INSTALL OIL SEAL RING

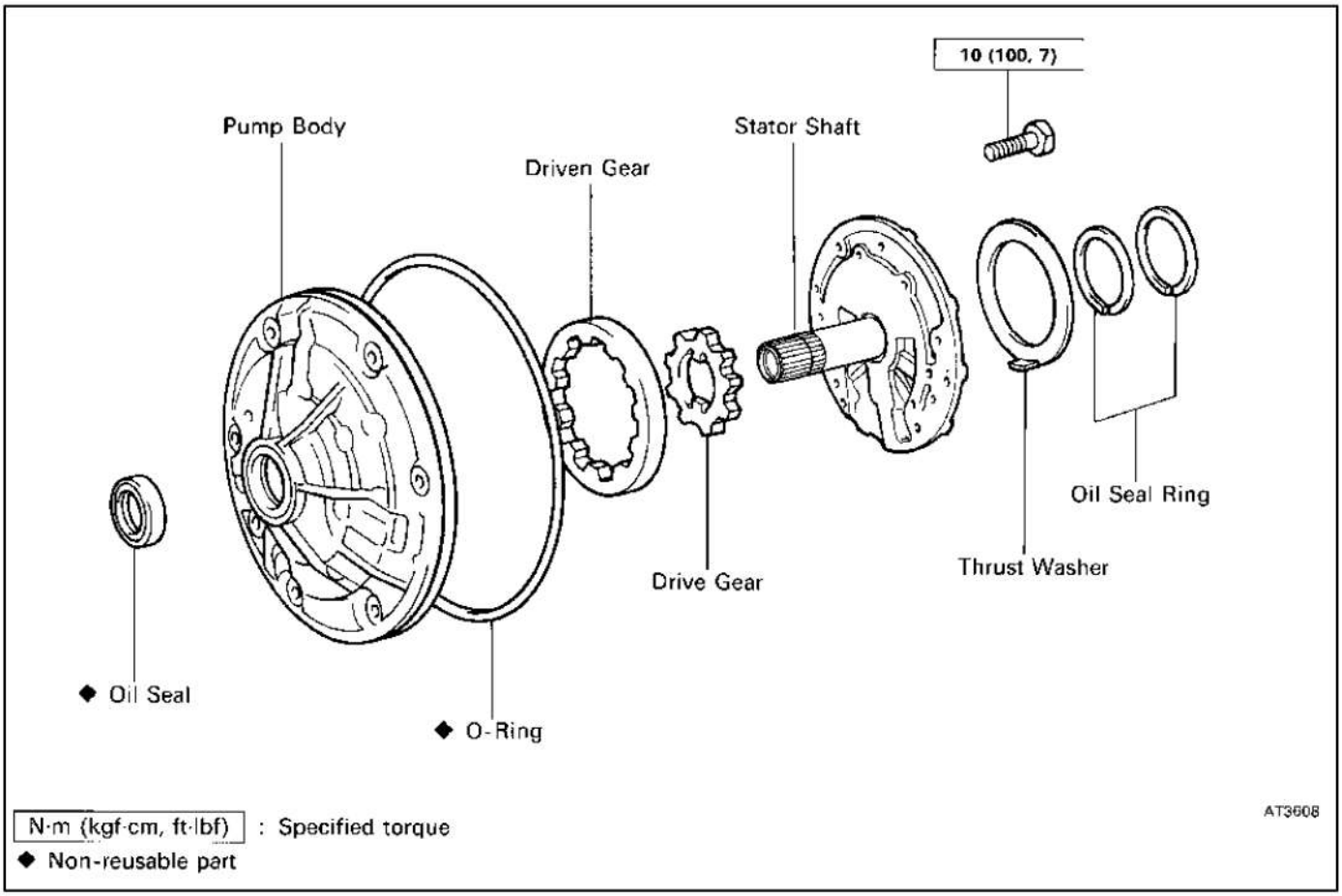
(a) Apply ATF to the oil seal ring.

(b) Install the oil seal ring to the piston.

NOTICE: Do not spread the ring ends more than necessary.

OIL PUMP
COMPONENTS

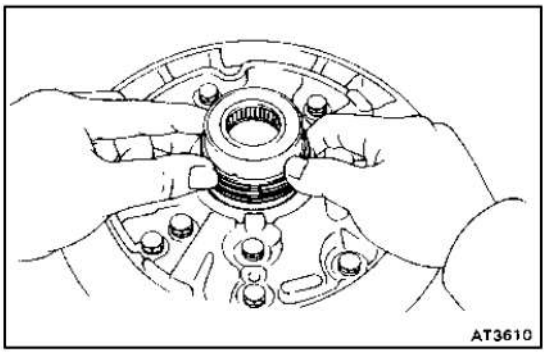
AX02Y-02



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

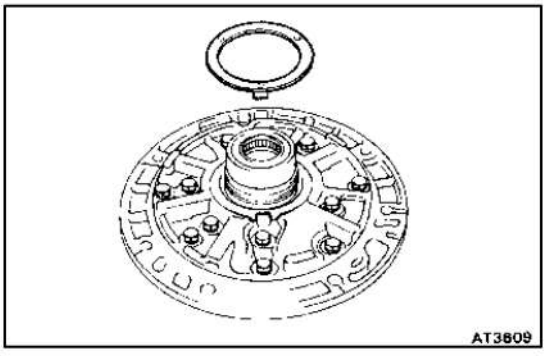
AX02Z-02

OIL PUMP DISASSEMBLY

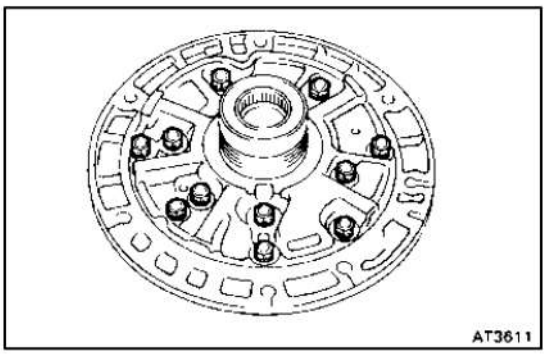


1. REMOVE OIL SEAL RINGS

Remove the 2 oil seal rings from the stator shaft back side.



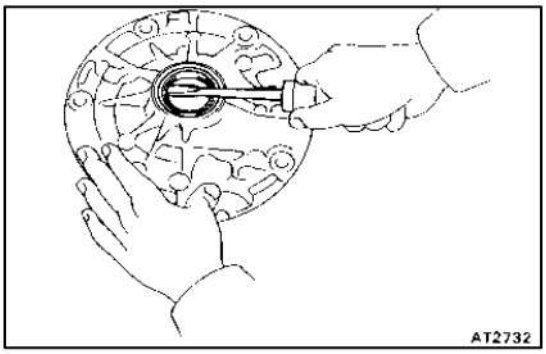
2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



3. REMOVE STATOR SHAFT

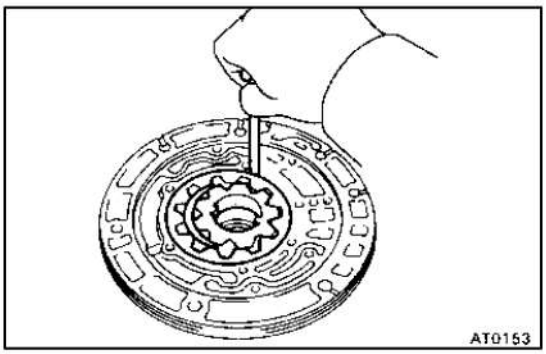
Remove the 11 bolts and stator shaft.

HINT: Keep the gears in assembly order.



4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.



AX030-06

OIL PUMP BUSHING INSPECTION

1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.

Using a feeler gauge, measure the clearance.

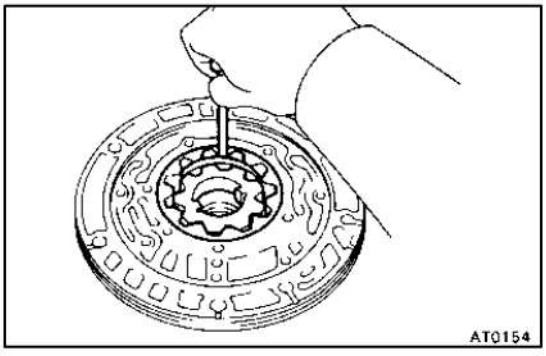
Standard body clearance:

0.07–0.15 mm (0.0028–0.0059 in.)

Maximum body clearance:

0.30 mm (0.0118 in.)

If the body clearance is greater than the maximum, replace the oil pump body subassembly.



2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescent–shaped part of the pump body.

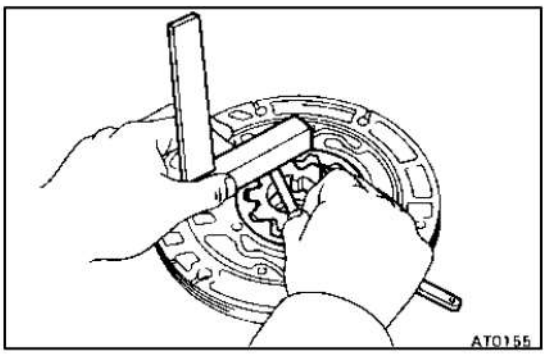
Standard tip clearance:

0.11–0.14 mm (0.0043–0.0055 in.)

Maximum tip clearance:

0.30 mm (0.0118 in.)

If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and feeler gauge, measure the side clearance of both gears.

Standard side clearance:

0.002–0.005 mm (0.0008–0.0020 in.)

Maximum side clearance:

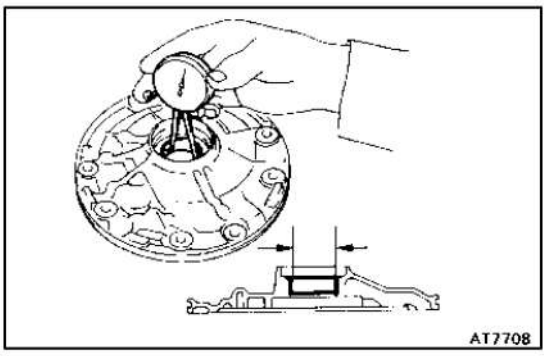
0.100 mm (0.0039 in.)

There are 3 different thicknesses for drive and driven gears.

Drive and driven gear thickness

Mark	Thickness mm (in.)
A	9.440–9.456 (0.3717–0.3723)
B	9.456–9.474 (0.3723–0.3730)
C	9.474–9.490 (0.3730–0.3736)

If the thickest gear can not make the side clearance within standard specification, replace the oil pump body subassembly.



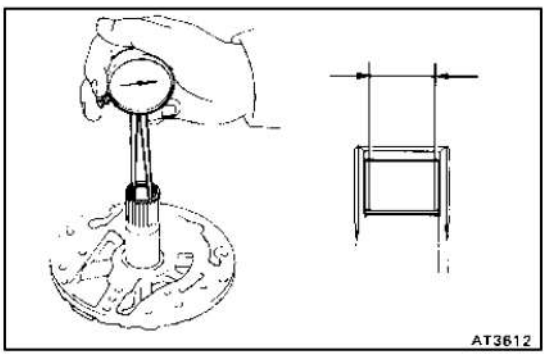
4. CHECK OIL PUMP BODY BUSHING

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

Maximum inside diameter:

38.18 mm (1.5031 in.)

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



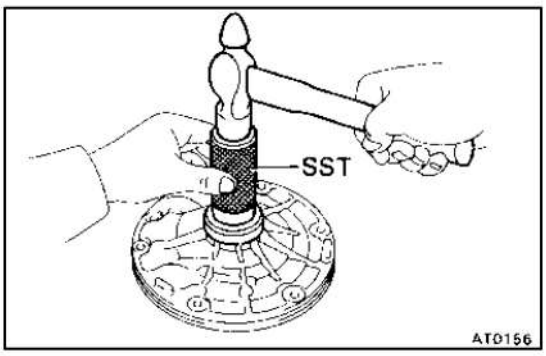
5. CHECK STATOR SHAFT BUSHING

Using a dial indicator, measure the inside diameter stator shaft bushing.

Maximum inside diameter:

21.57 mm (0.8492 in.)

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



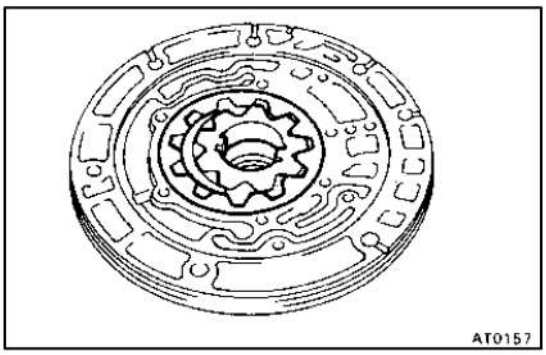
AX031–02

OIL PUMP ASSEMBLY

1. INSTALL FRONT OIL SEAL

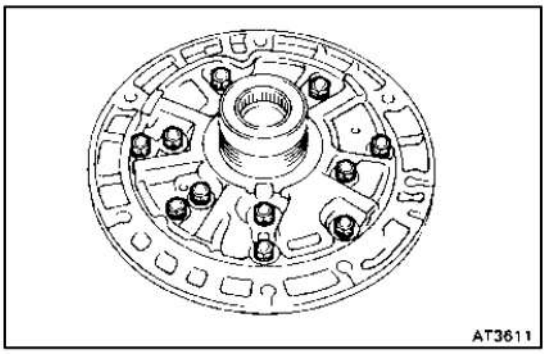
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350–32014 (09351–32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

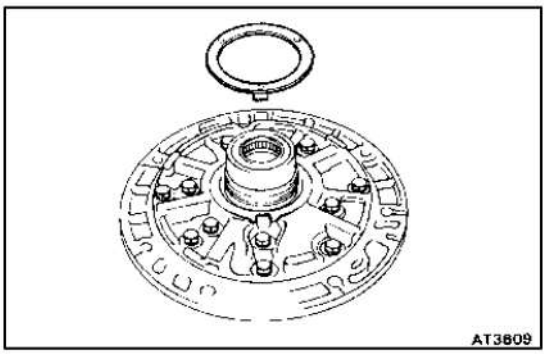


3. INSTALL STATOR SHAFT TO PUMP BODY

(a) Align the stator shaft with each bolt hole.

(b) Torque the 11 bolts.

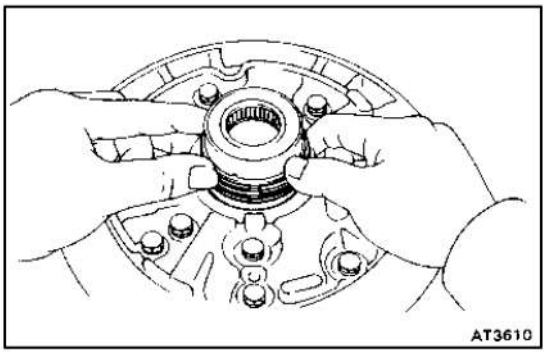
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollow of the pump body.

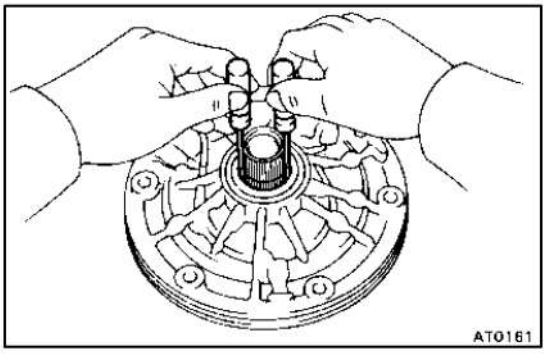


5. INSTALL OIL SEAL RINGS

Install the 2 oil seal rings to the stator shaft back side.

NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.



6. CHECK PUMP DRIVE GEAR ROTATION

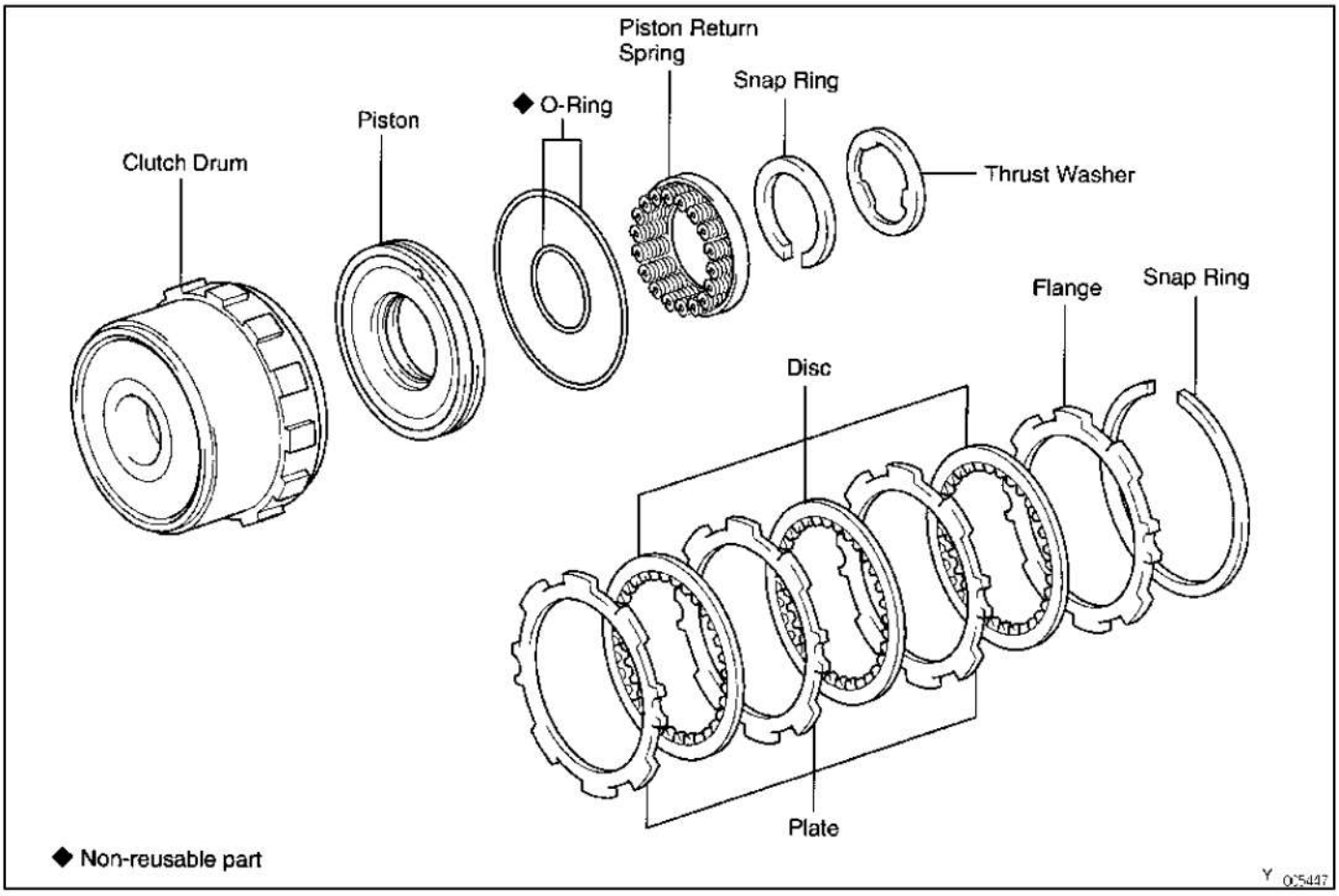
Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

NOTICE: Be careful not to damage the oil seal lip.

DIRECT CLUTCH

COMPONENTS

AX032-02



AX033-05

DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

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

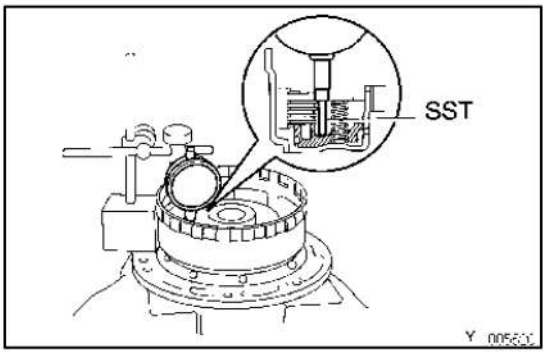
(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kg/cm^2, 57–114 psi).

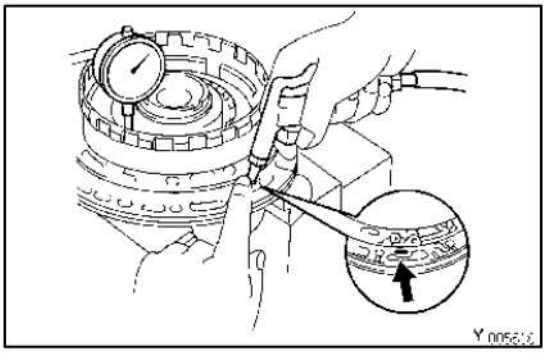
SST 09350–32014 (09351–32190)

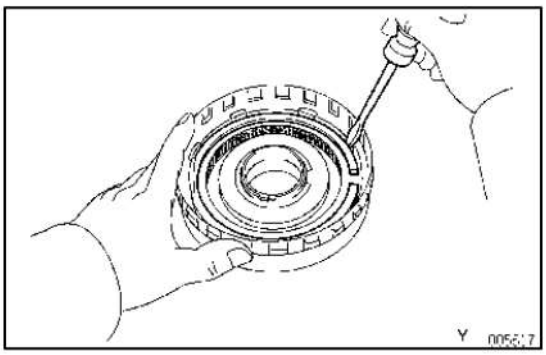
Piston stroke:

0.91–1.35 mm (0.0358–0.0531 in.)

If the piston stroke is greater than the maximum, inspect each component.

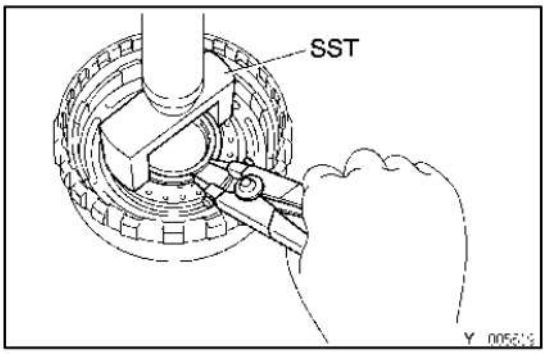






2. REMOVE SNAP RING FROM CLUTCH DRUM

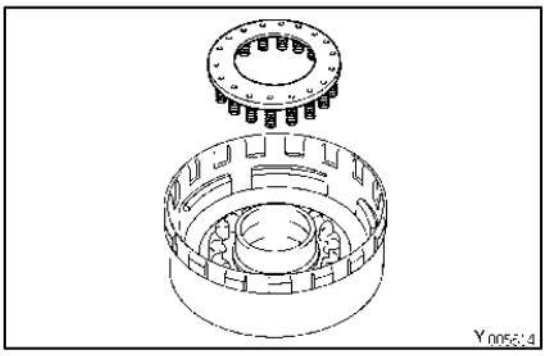
3. REMOVE FLANGE, DISCS AND PLATES



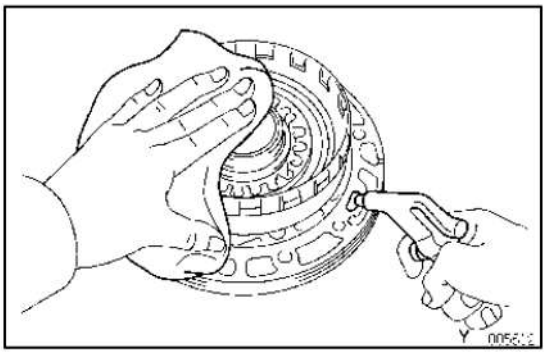
4. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350–32014 (09351–32070)

(b) Remove the snap ring with snap ring pliers.



(c) Remove the piston return spring.

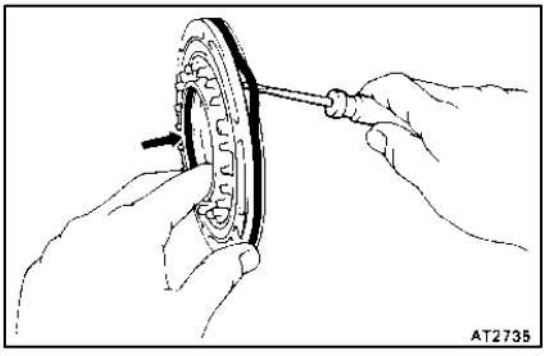


5. REMOVE CLUTCH PISTON

(a) Install the direct clutch onto the oil pump.

(b) Apply compressed air to the oil pump to remove the piston (if the piston does not come out completely, use needle–nose pliers to remove it).

(c) Remove the direct clutch from the oil pump.

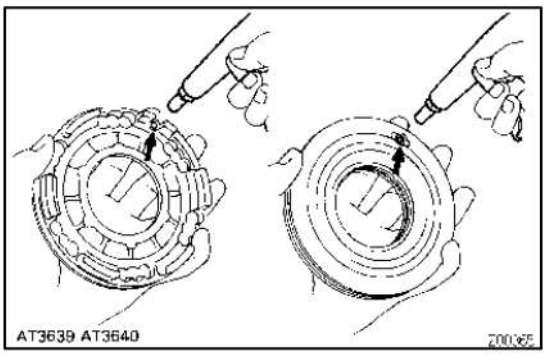


(d) Remove the 2 O–rings from the piston.

AX034-03

DIRECT CLUTCH INSPECTION

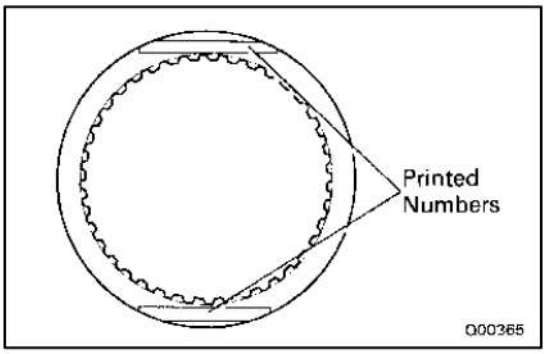
1. INSPECT CLUTCH PISTON



(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.

2. INSPECT DISCS, PLATES AND FLANGE



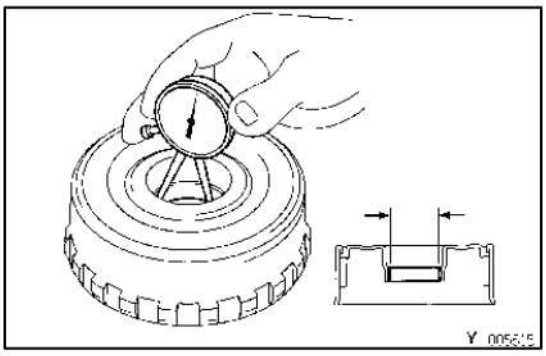
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

3. CHECK DIRECT CLUTCH BUSHING



Using a dial indicator, measure the inside diameter of the direct clutch bushing.

Maximum inside diameter:

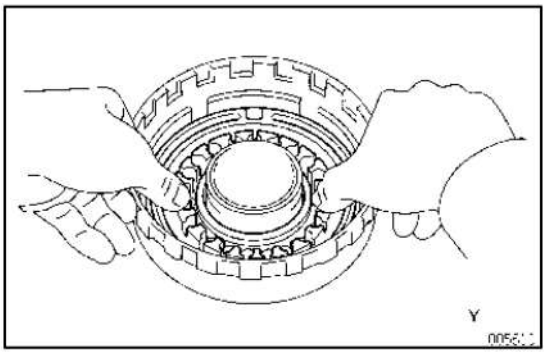
48.27 mm (1.9004 in.)

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

AX035-06

DIRECT CLUTCH ASSEMBLY

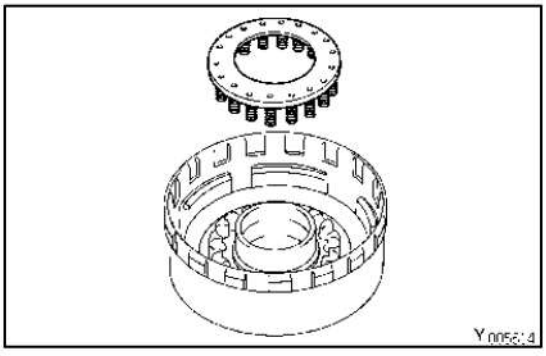
1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM



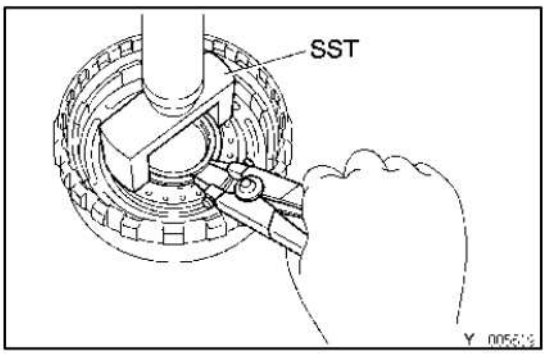
(a) Install new O–rings to the piston. Coat the O–rings with ATF.

(b) Being careful not to damage the O–rings, press the piston into the drum with the cup side up.

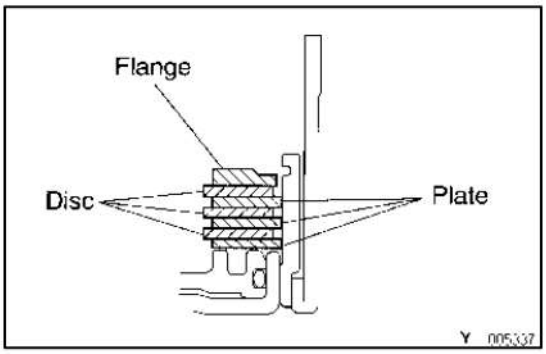
2. INSTALL PISTON RETURN SPRING



(a) Place the return spring and snap ring onto the piston.

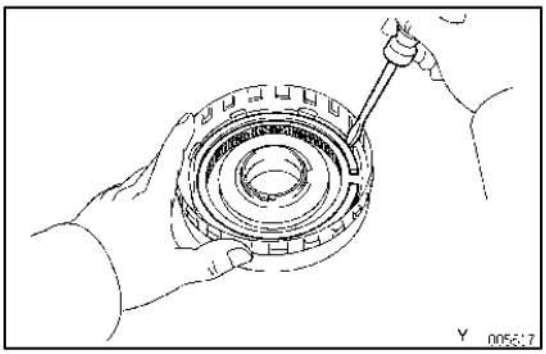


(b) Place SST on the spring retainer, and compress the return spring with a press.
SST 09350–32014 (09351–32070)
(c) Install the snap ring using snap ring pliers. Be sure the end gap of snap ring is aligned with the spring retainer claw.



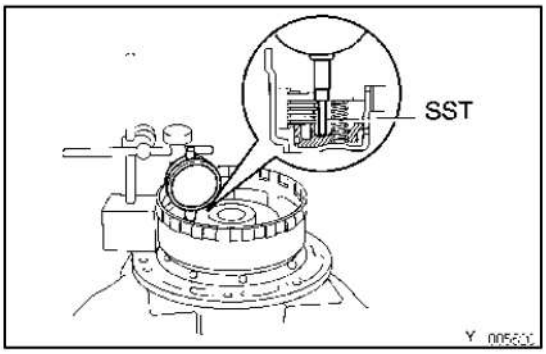
3. INSTALL PLATES, DISCS AND FLANGE

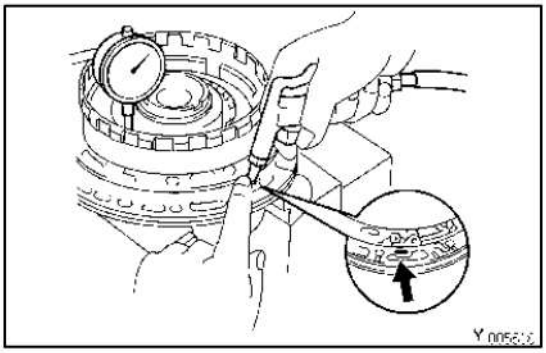
(a) Install plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D
(b) Install the flange with the flat end facing downward.



4. INSTALL SNAP RING

Check that the end gap of the snap ring is not aligned with one of the cutouts.





5. RECHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch on the oil pump.
(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09350–32014 (09351–32190)

Piston stroke:

0.91–1.35 mm (0.0358–0.0531 in.)

If the piston stroke is non–standard, select another flange.
HINT: There are 2 different thickness for the flange.

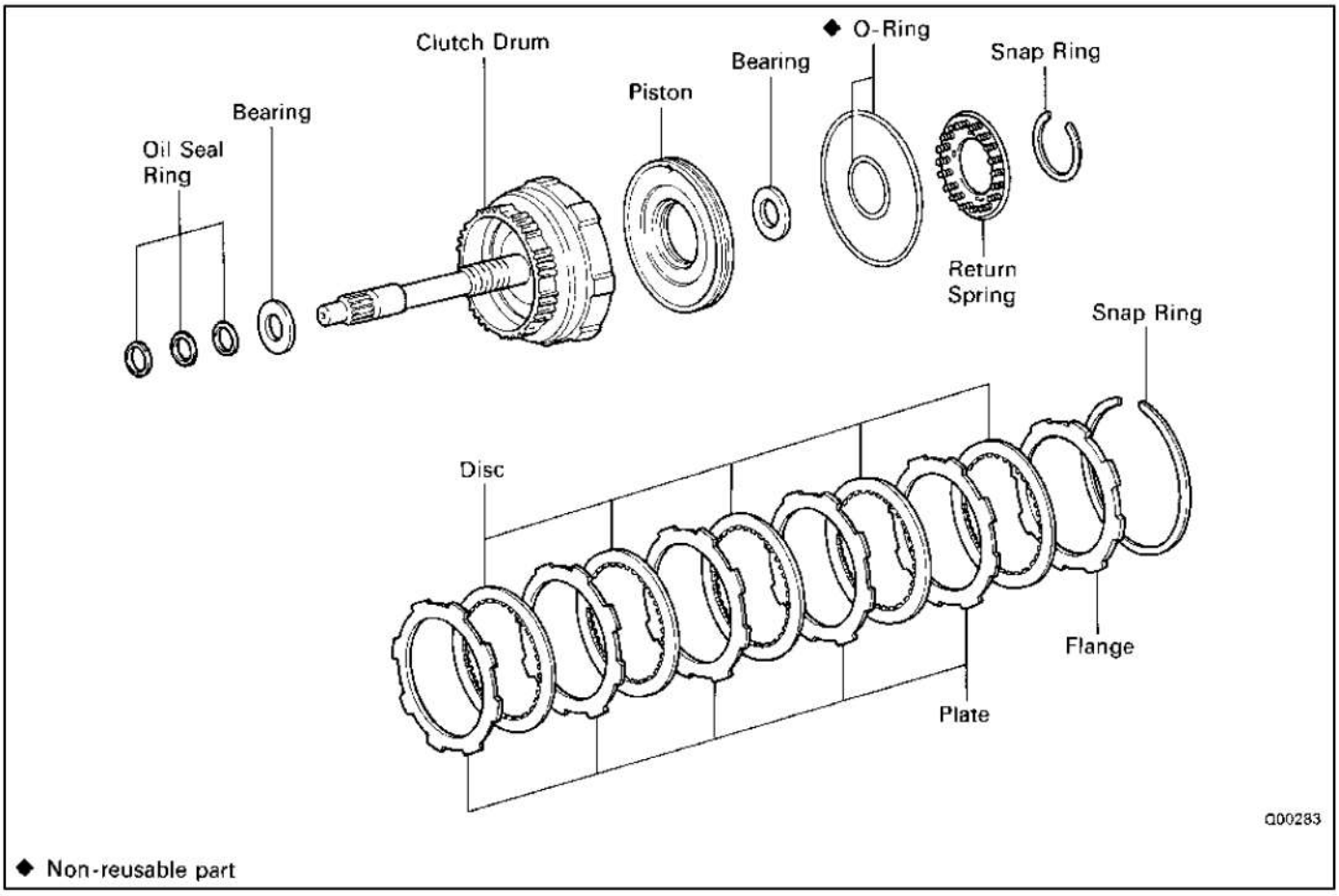
Flange thickness:

2.70 mm (0.1063 in.)
3.00 mm (0.1181 in.)

FORWARD CLUTCH

AX036-02

COMPONENTS



◆ Non-reusable part

AX037-04

FORWARD CLUTCH DISASSEMBLY

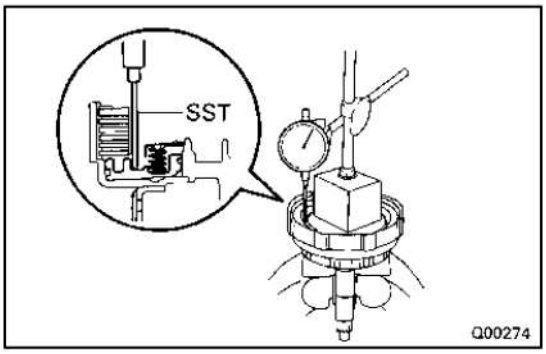
1. CHECK PISTON STROKE OF FORWARD CLUTCH

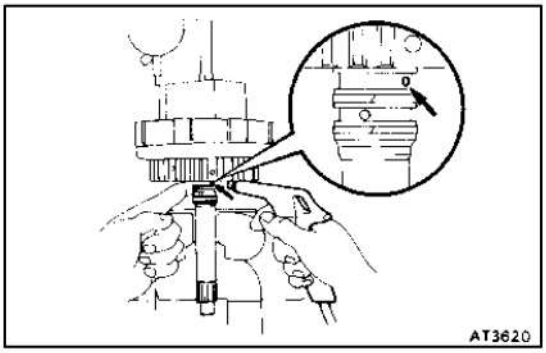
Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).

SST 09350–32014 (09351–32190)

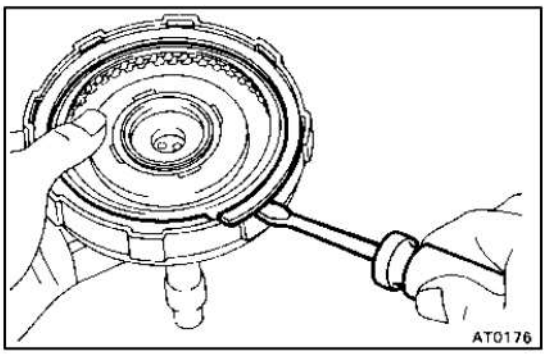
Piston stroke:

1.79–2.21 mm (0.0704–0.0870 in.)

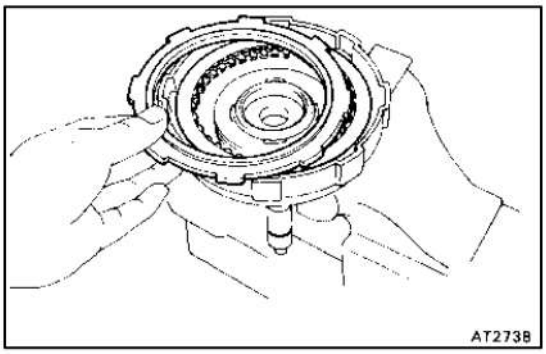




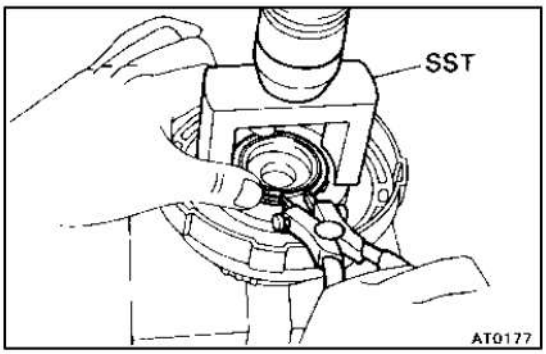
each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM



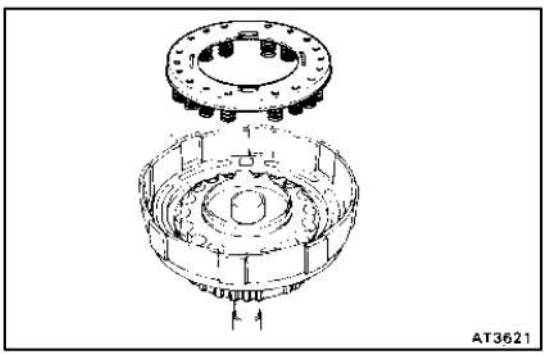
3. REMOVE FLANGE, DISCS AND PLATES



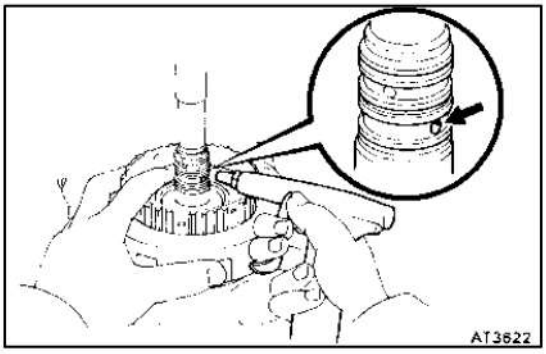
4. REMOVE RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350–32014 (09351–32070)

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

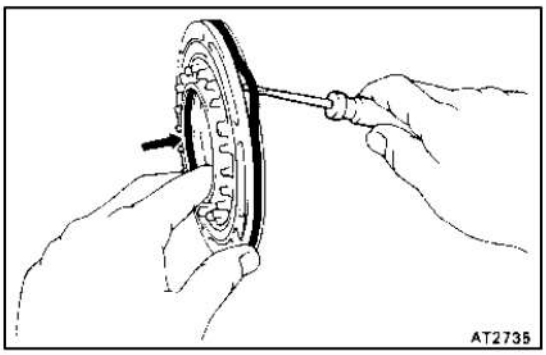


(c) Remove the return spring.

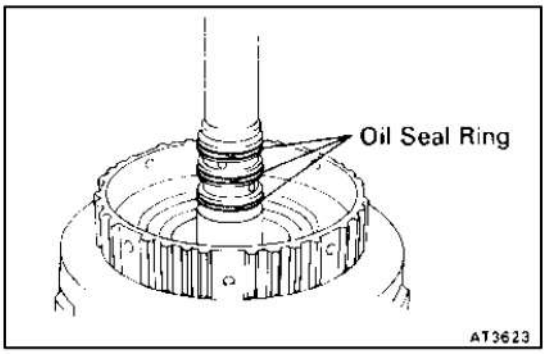


5. REMOVE CLUTCH PISTON

(a) Apply compressed air into the oil passage to remove the piston.
If the piston does not come out, use needle–nose pliers to remove it.



(b) Remove the 2 O–rings from the piston.



6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the 3 oil seal rings from the shaft.

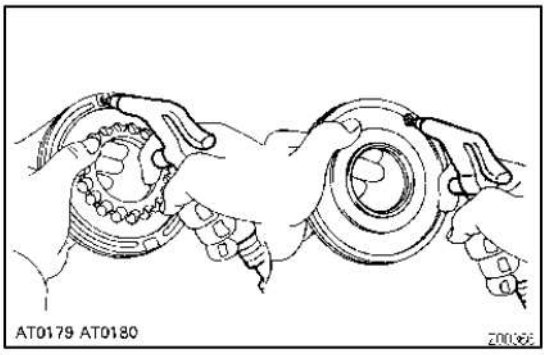
AX038-03

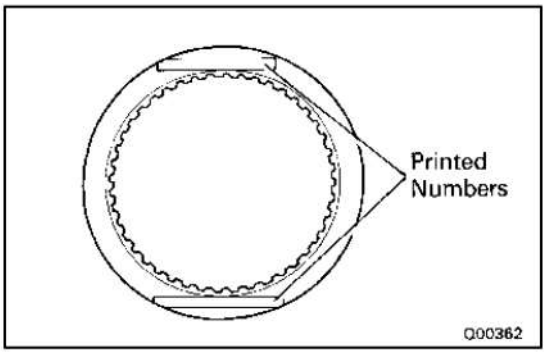
FORWARD CLUTCH INSPECTION

1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.





2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

AX039-04

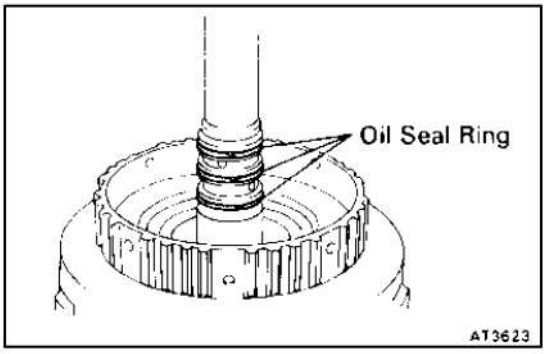
FORWARD CLUTCH ASSEMBLY

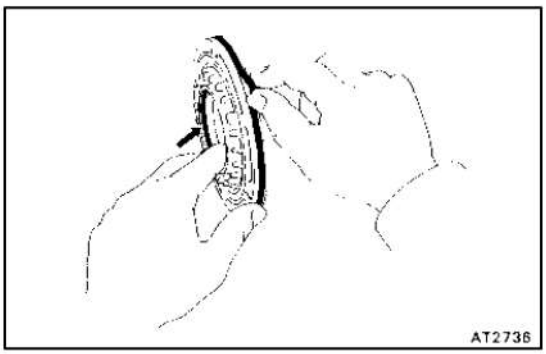
1. INSTALL OIL SEAL RINGS

Install the 3 oil seal rings to the shaft.

NOTICE: Do not spread the ring ends more than necessary.

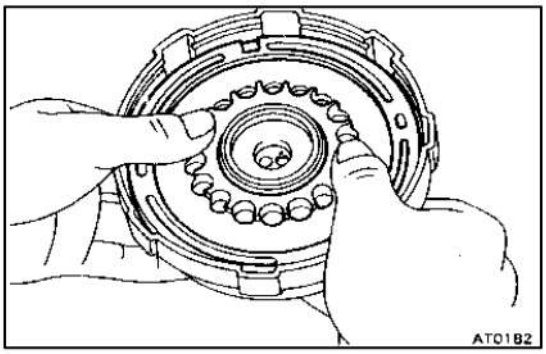
HINT: After installing the oil seal rings, check that they move smoothly.





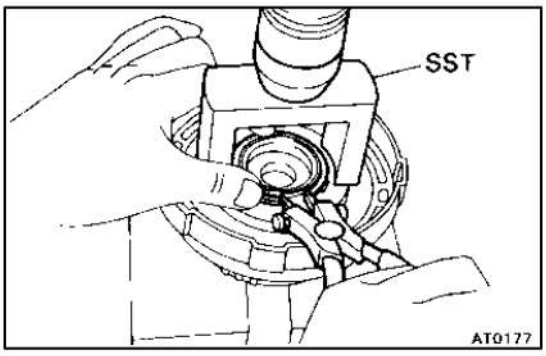
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

(a) Install the 2 new O–rings to the piston.



(b) Coat the O–ring with ATF.

(c) Press the piston into the drum with the cup side up, being careful not to damage the O–rings.

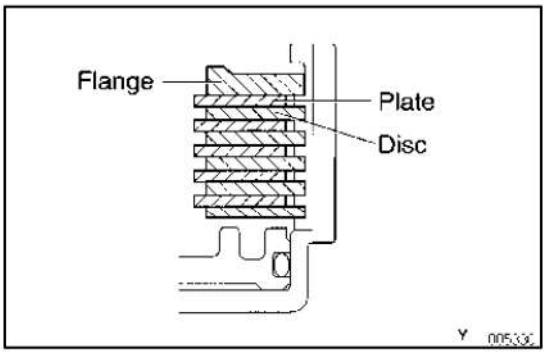


3. INSTALL PISTON RETURN SPRINGS

(a) Place the return spring and snap ring onto the piston.

(b) Place SST on the spring retainer, and compress the springs with a press.
SST 09350–32014 (09351–32070)

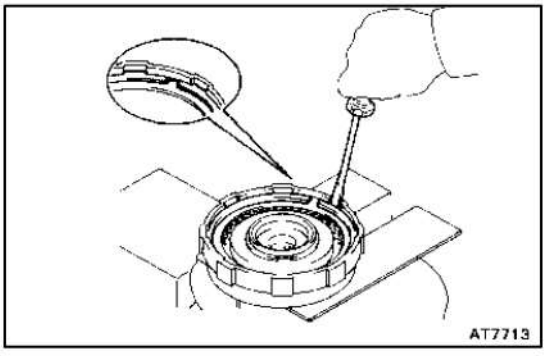
(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

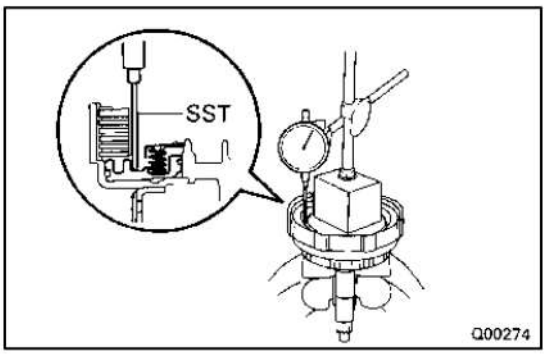
(a) Install the plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D–P–D–P–D

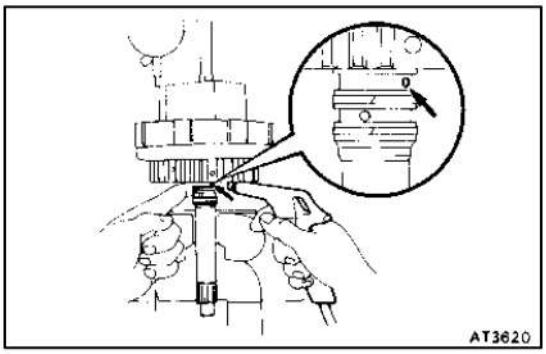
(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.





6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).

SST 09350–32014 (09351–32190)

Piston stroke:

1.79–2.21 mm (0.0704–0.0870 in.)

If the piston stroke is non–standard, select another flange.

HINT: There are 2 different thicknesses for the flange.

Flange thickness:

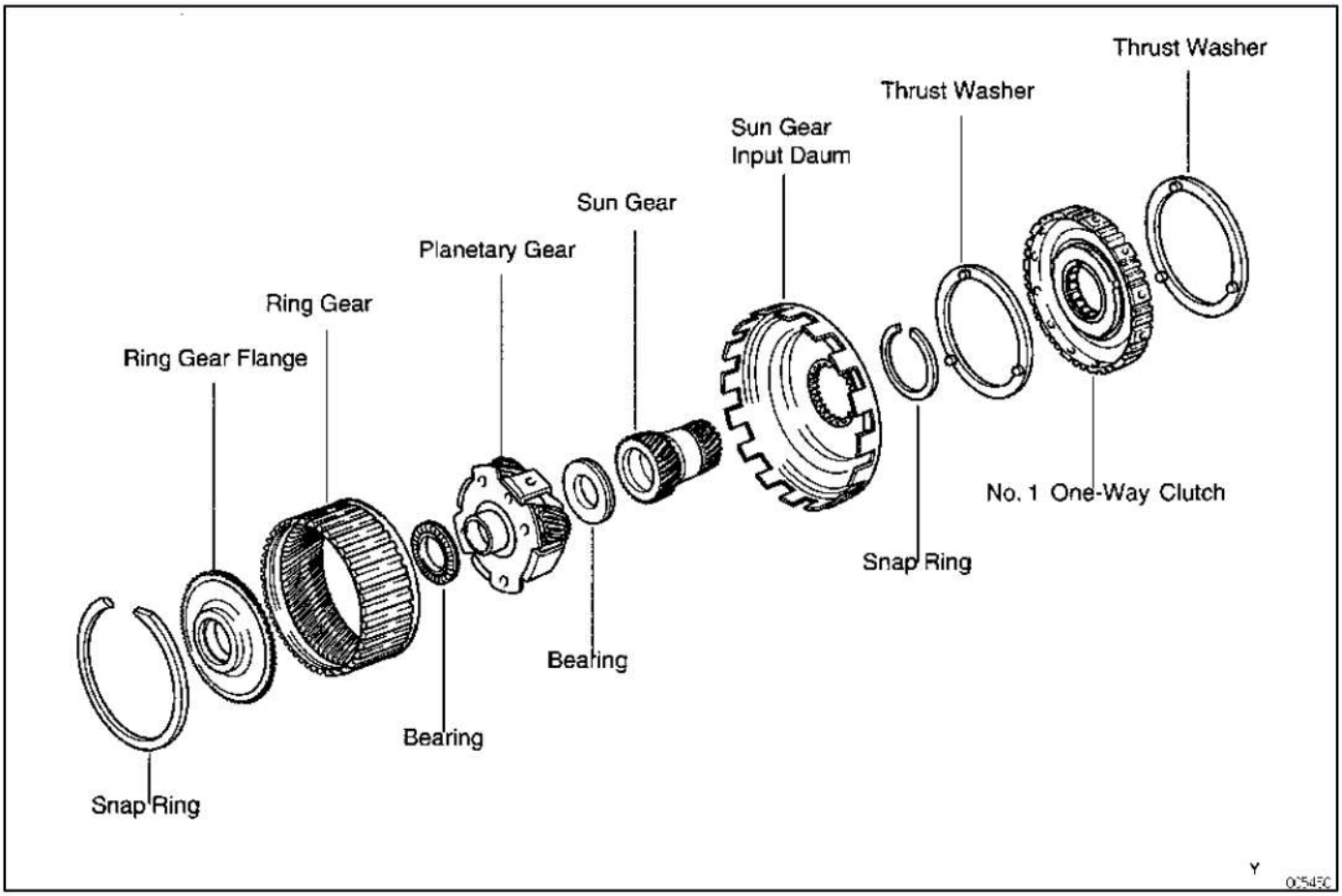
2.30 mm (0.0906 in.)

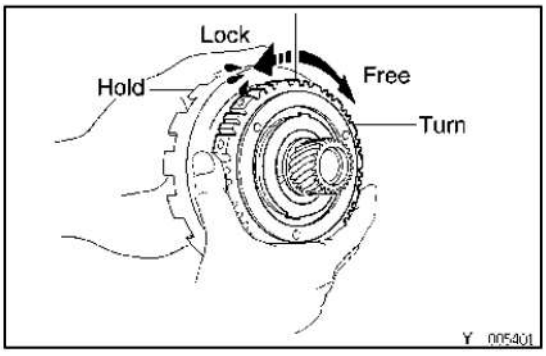
2.70 mm (1.0630 in.)

FRONT PLANETARY GEAR

COMPONENTS

AX03A-02

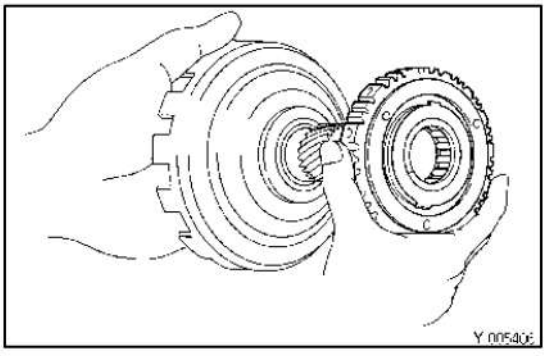




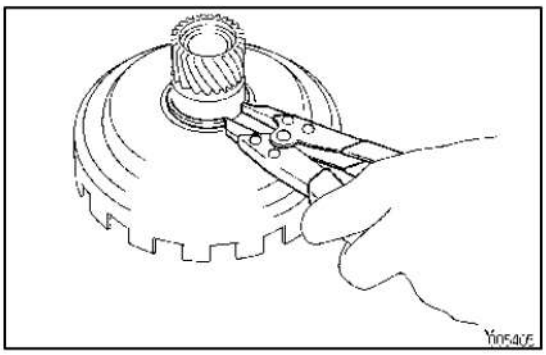
AX0TU-03

NO.1 ONE–WAY CLUTCH AND SUN GEAR DISASSEMBLY

1. **CHECK OPERATION OF NO.1 ONE–WAY CLUTCH**
   Hold the sun gear and turn the hub. The hub should turn freely clockwise and should lock counterclockwise.



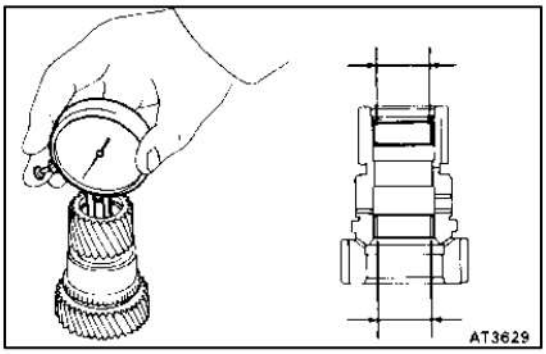
2. **REMOVE NO.1 ONE–WAY CLUTCH FROM SUN GEAR**
   While turning the hub clockwise, remove the No.1 one–way clutch from the sun gear.



3. REMOVE SUN GEAR FROM DRUM

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

(b) Remove the sun gear from the drum.



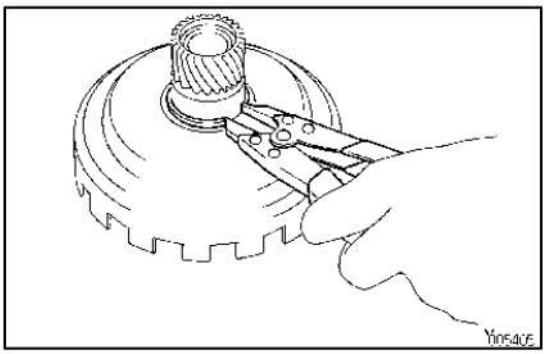
4. CHECK SUN GEAR BUSHINGS

Using a dial indicator, measure the inside diameter of the sun gear bushings.

Maximum inside diameter:

22.59 mm (0.8894 in.)

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



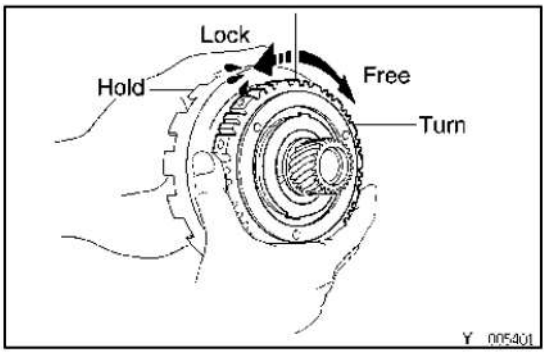
NO.1 ONE–WAY CLUTCH AND SUN GEAR ASSEMBLY

AX0TV–01

1. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

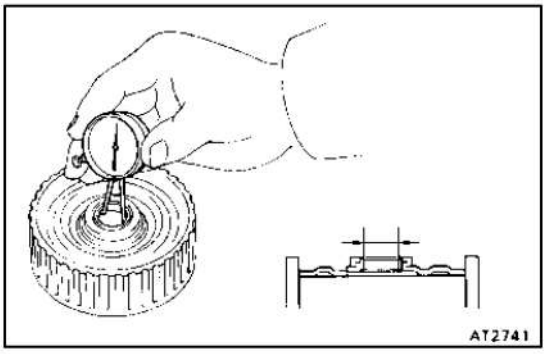
(b) Using snap ring pliers, install the snap ring to drum.



2. INSTALL NO.1 ONE–WAY CLUTCH ON SUN GEAR

While turning the hub clockwise, slide the No.1 one–way clutch onto the sun gear.

3. RECHECK OPERATION OF NO.1 ONE–WAY CLUTCH



PLANETARY RING GEAR INSPECTION

AX03D–02

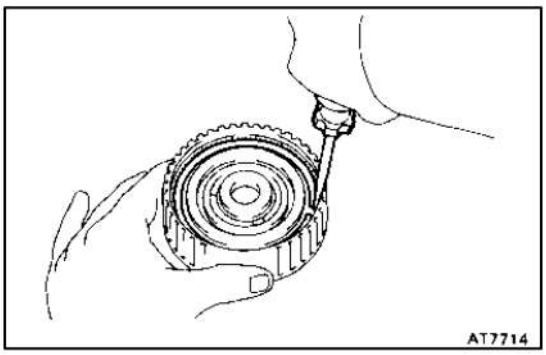
1. INSPECT RING GEAR FLANGE BUSHING

Using a dial indicator, measure the inside diameter of the flange bushing.

Maximum inside diameter:

30.08 mm (1.1842 in.)

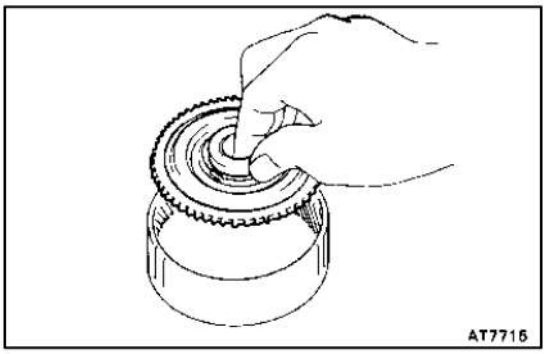
If the inside diameter is greater than the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

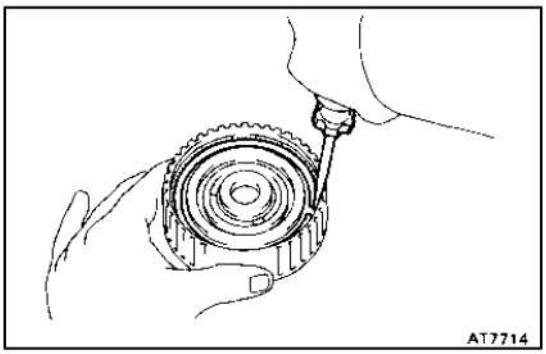
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

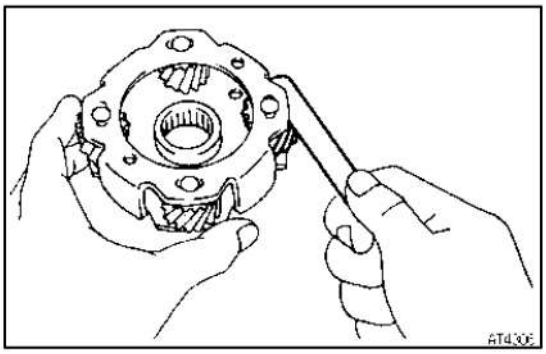


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



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



FRONT PLANETARY GEAR INSPECTION AX03E–03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

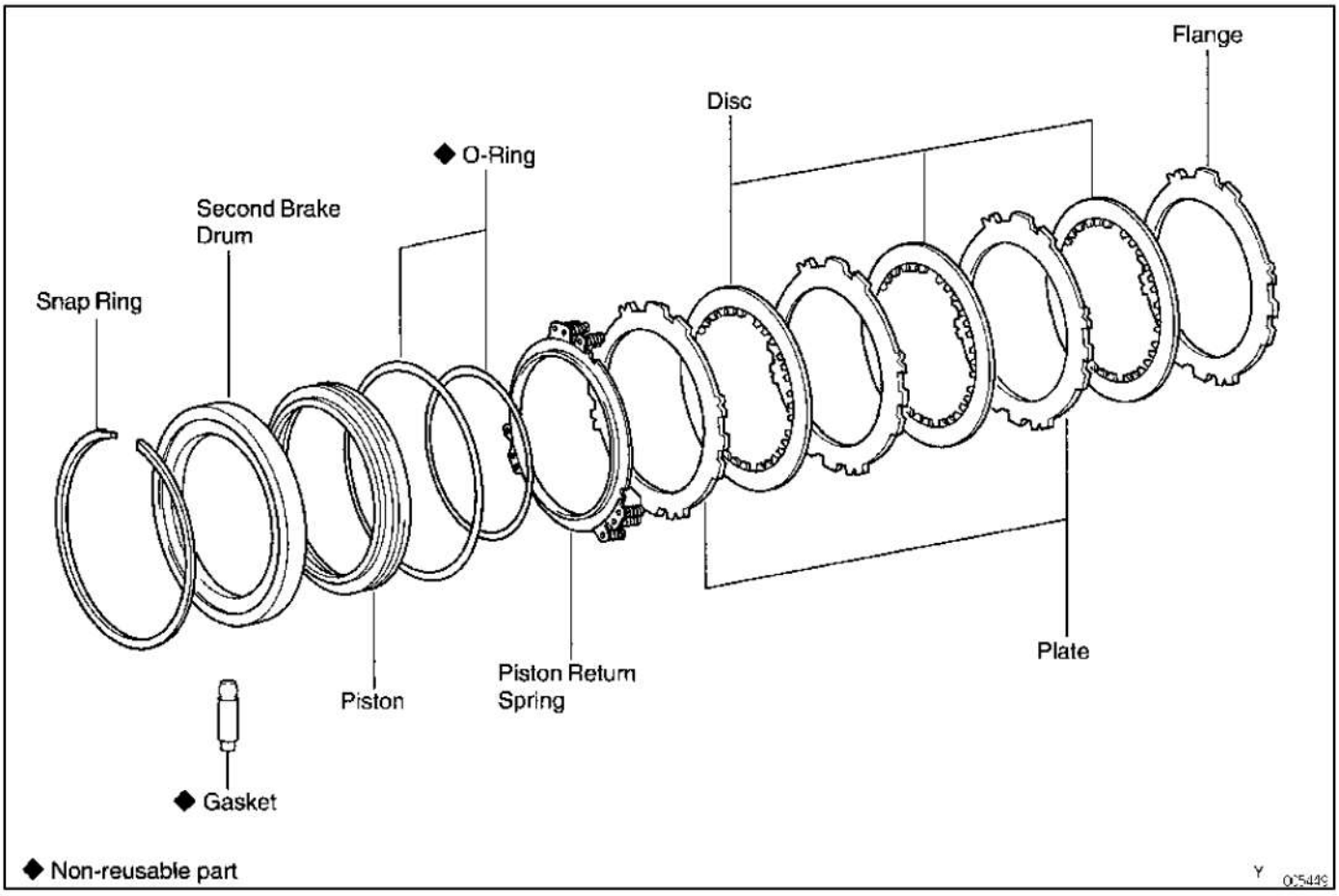
Maximum clearance:

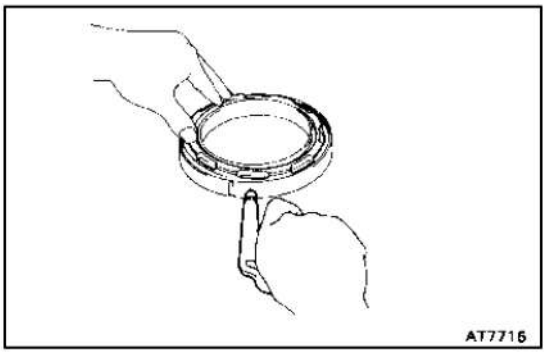
0.61 mm (0.0240 in.)

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

SECOND BRAKE
COMPONENTS

AX03F-02



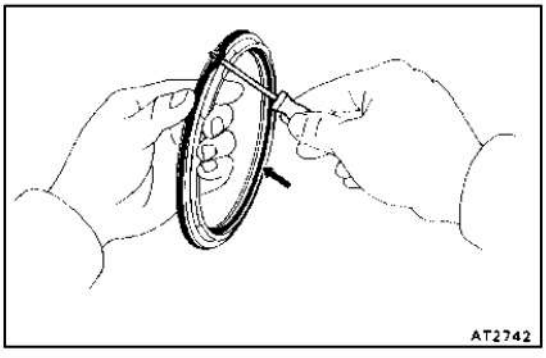


SECOND BRAKE PISTON DISASSEMBLY

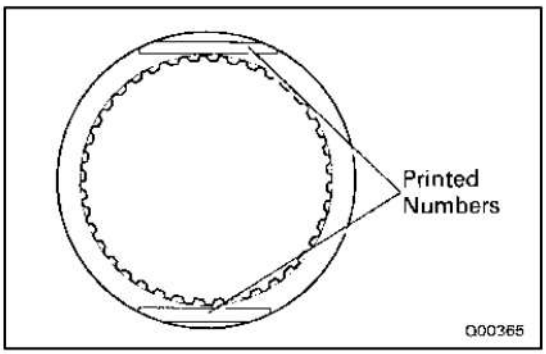
AX03G-03

REMOVE SECOND BRAKE PISTON

(a) Apply compressed air to the oil hole to remove the piston.



(b) Remove the 2 O–rings from the piston.



SECOND BRAKE COMPONENT INSPECTION

AX03H–03

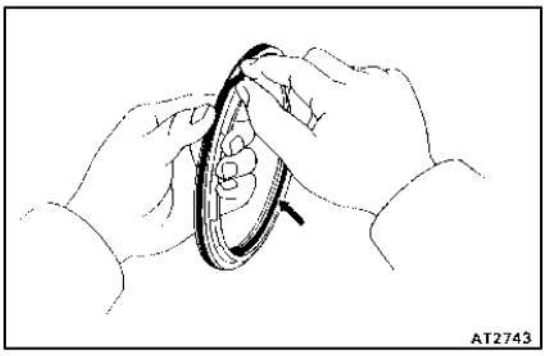
INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



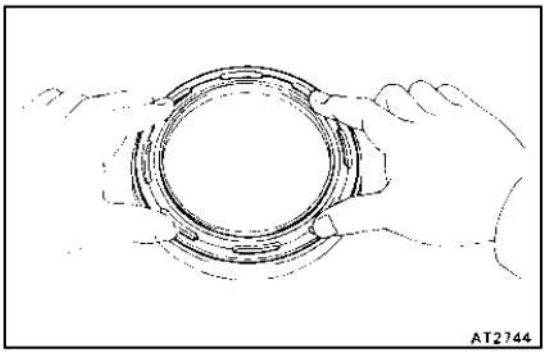
SECOND BRAKE PISTON ASSEMBLY

AX03J–06

INSTALL PISTON

(a) Coat a new O–ring with ATF.

(b) Install the 2 new O–rings on the piston.

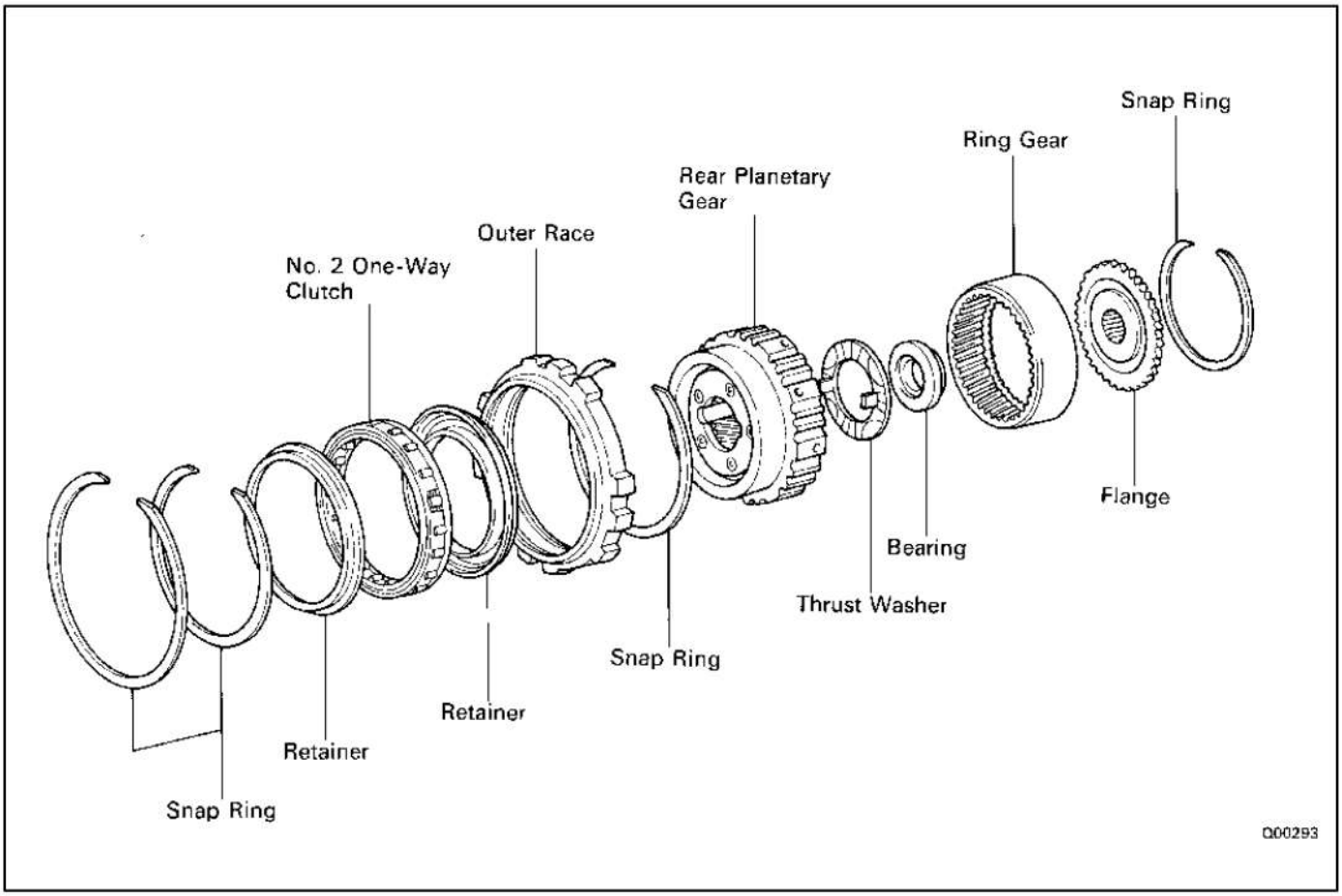


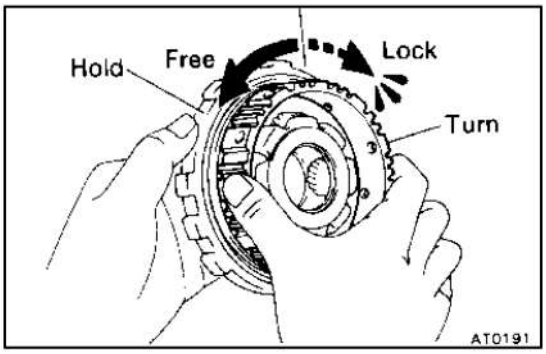
(c) Press the piston into the drum, being careful not to damage the O–rings.

REAR PLANETARY GEAR

COMPONENTS

AX03K-02

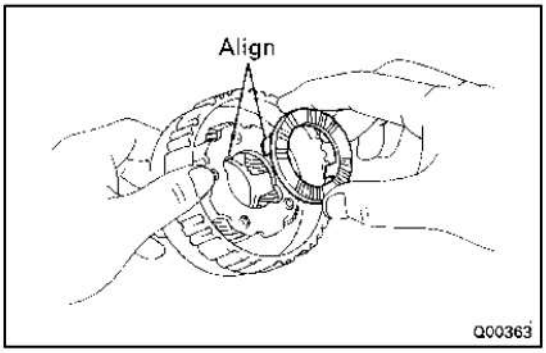




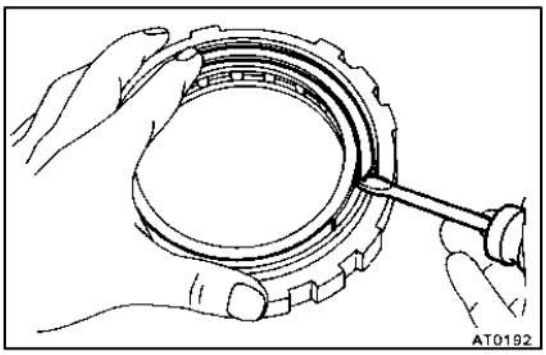
NO.2 ONE–WAY CLUTCH DISASSEMBLY

AX03L-02

1. **CHECK OPERATION OF NO.2 ONE–WAY CLUTCH**
   Hold the outer race and turn the rear planetary gear. The rear planetary gear should turn freely counterclockwise and should lock clockwise.

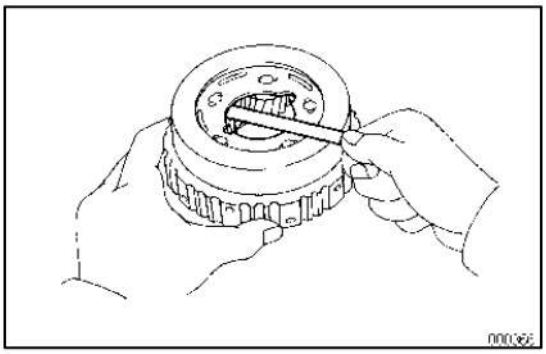


2. **SEPARATE NO.2 ONE–WAY CLUTCH AND REAR PLANETARY GEAR**
3. **REMOVE THRUST WASHER**
   Remove the thrust washer from the rear side of planetary gear.



4. REMOVE NO.2 ONE–WAY CLUTCH FROM OUTER RACE

(a) Remove the 2 snap rings and retainers from both sides.
(b) Remove the No.2 one–way clutch from the outer race.



REAR PLANETARY GEAR INSPECTION

AX03M–03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

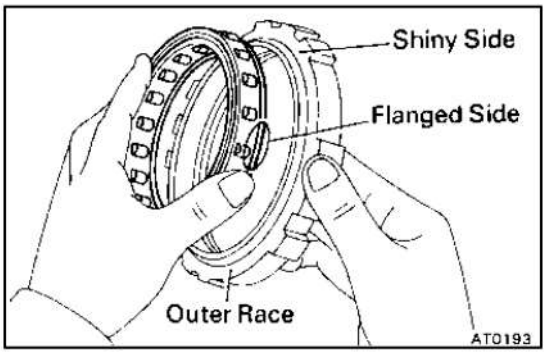
Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

Maximum clearance:

0.61 mm (0.0240 in.)

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

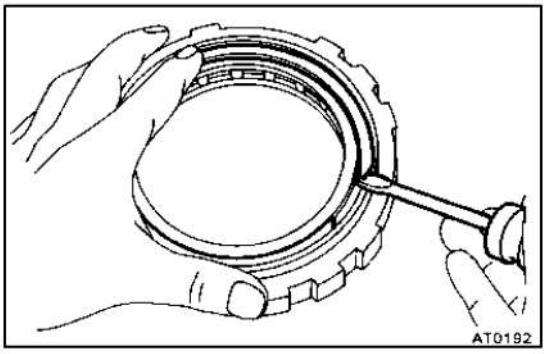


NO.2 ONE–WAY CLUTCH ASSEMBLY

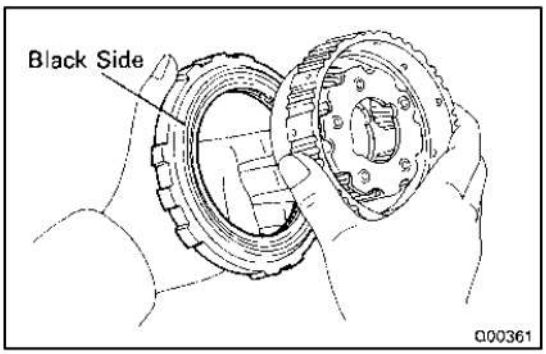
AX03N–02

1. INSTALL ONE–WAY CLUTCH

(a) Install the No.2 one–way clutch into the outer race, facing the flange side of the No.2 one–way clutch toward the shiny side of the outer race.

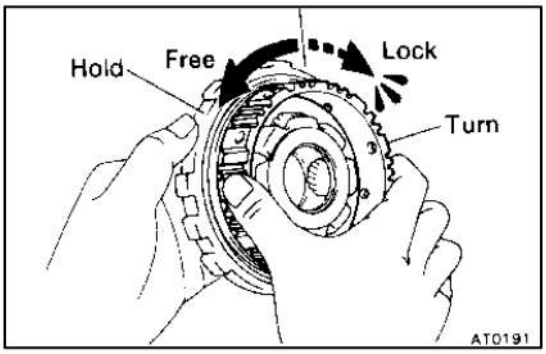


(b) Install the 2 retainers and snap rings to both sides.

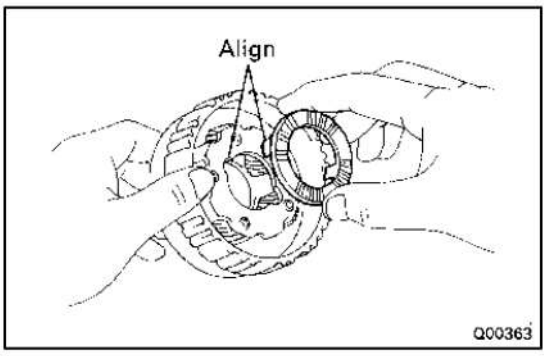


2. INSTALL PLANETARY GEAR INTO NO.2 ONE–WAY CLUTCH

Install the planetary gear into the No.2 one–way clutch, facing the inner race of the rear planetary gear toward the black side of the No.2 one–way clutch outer race.



3. CHECK OPERATION OF NO.2 ONE–WAY CLUTCH

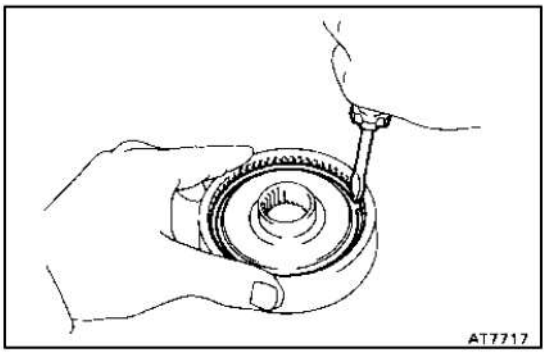


4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.
(b) Align the tab of the washer with the hollows of the carrier.

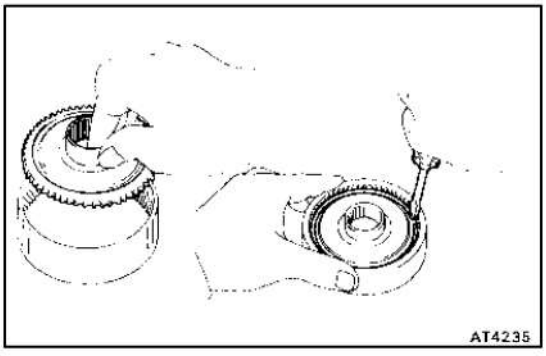
AX03P–02

RING GEAR FLANGE REPLACEMENT



1. REMOVE RING GEAR FLANGE

(a) Using a screwdriver, remove the snap ring.
(b) Remove the flange from the ring gear.

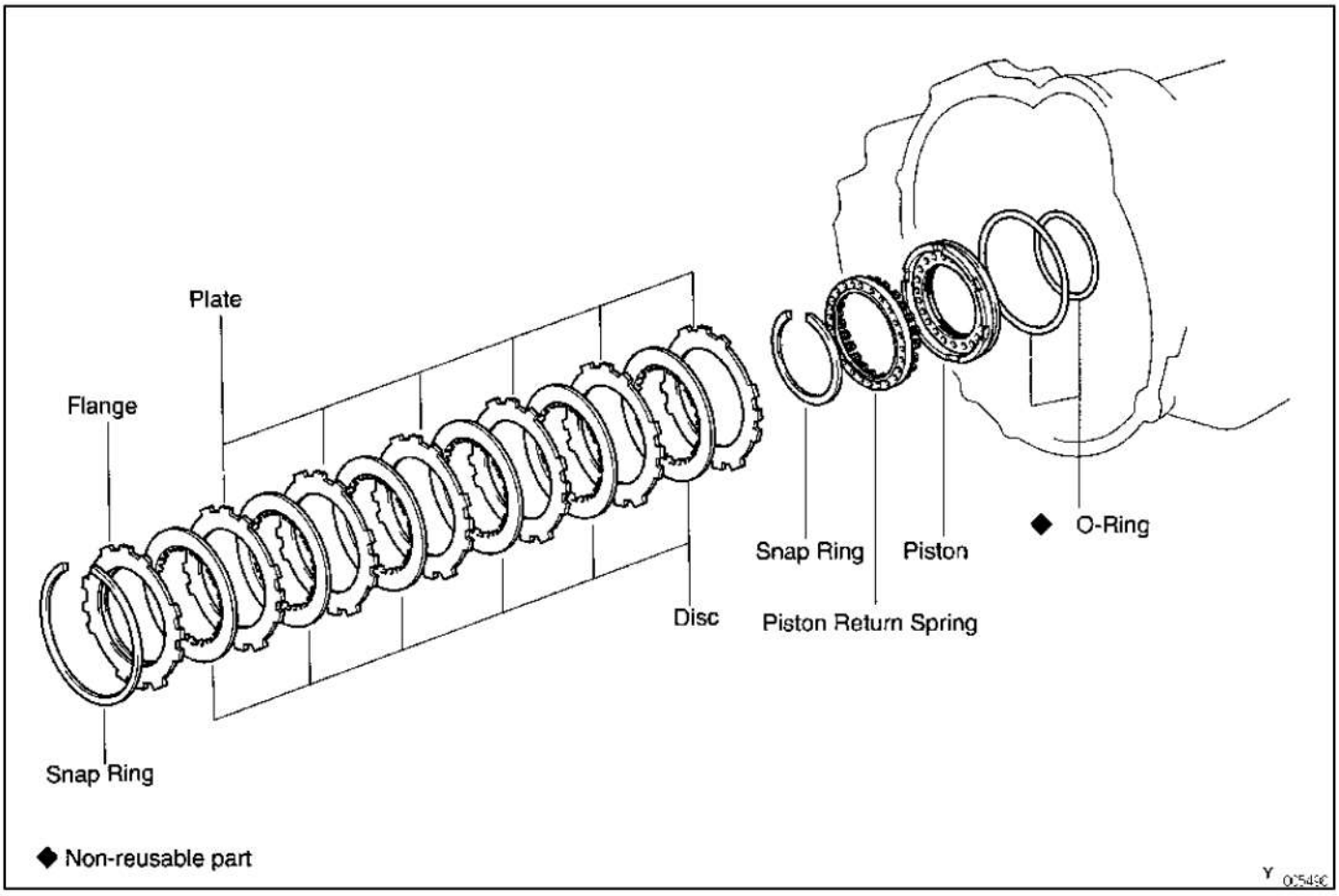


2. INSTALL RING GEAR FLANGE

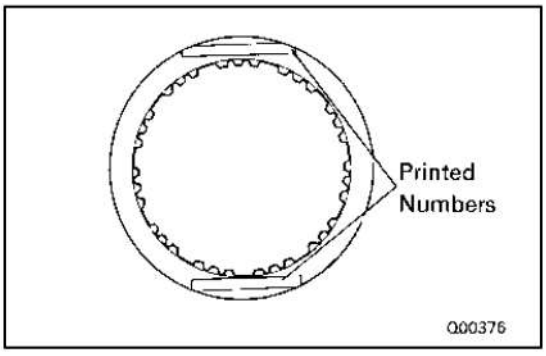
(a) Position the flange into the ring gear.
(b) Using a screwdriver, install the snap ring.

FIRST AND REVERSE BRAKE
COMPONENTS

AX03Q-02



AX03R-03



FIRST AND REVERSE BRAKE COMPONENTS INSPECTION

INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

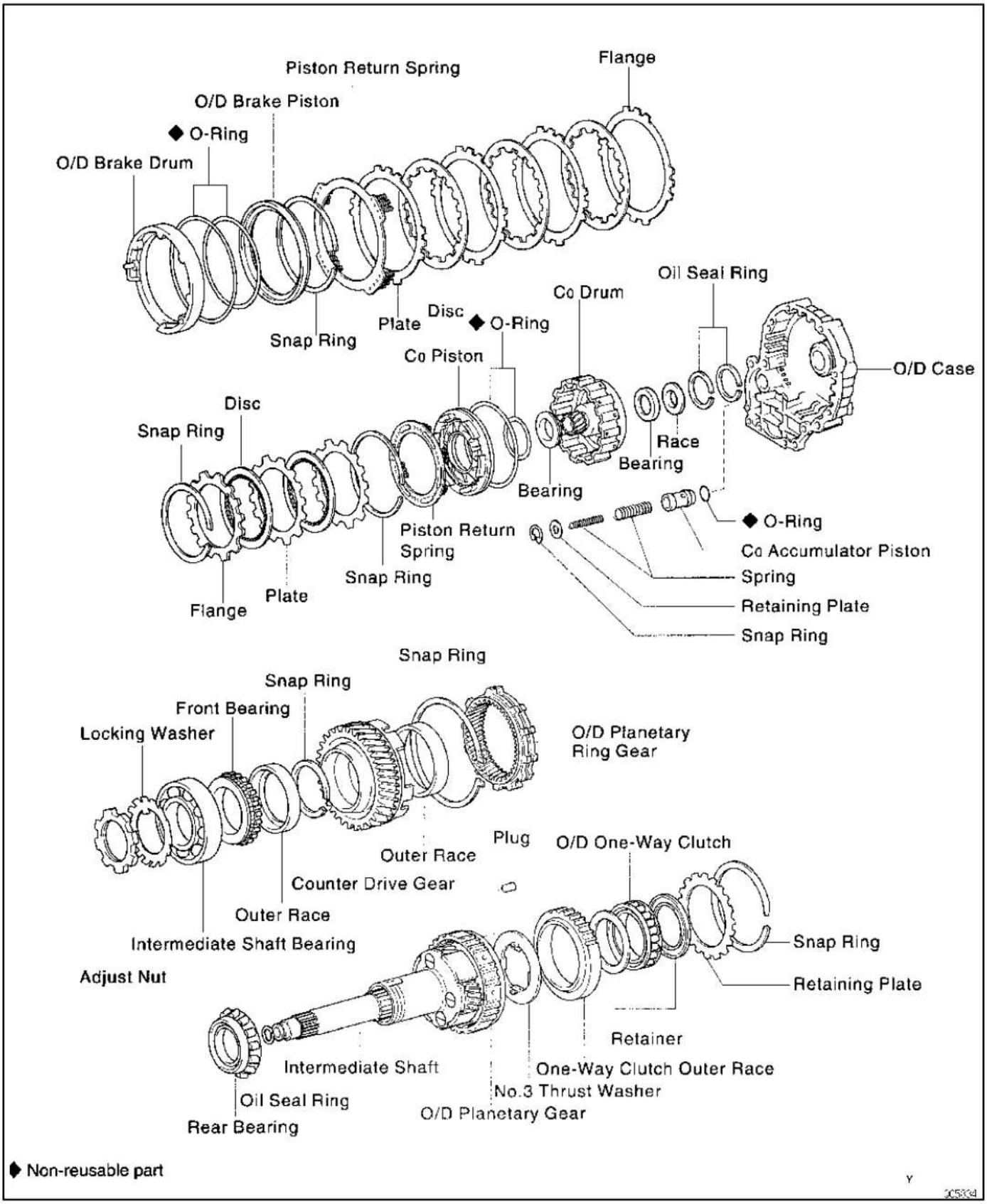
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

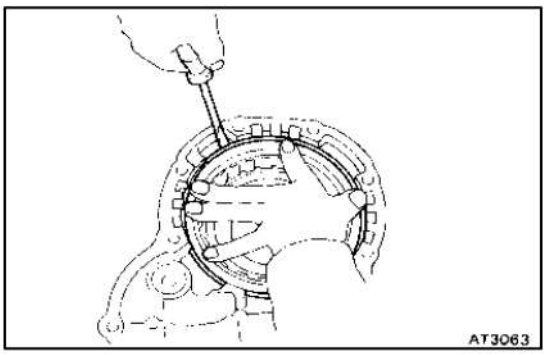
OVERDRIVE UNIT
COMPONENTS

AX03S-02



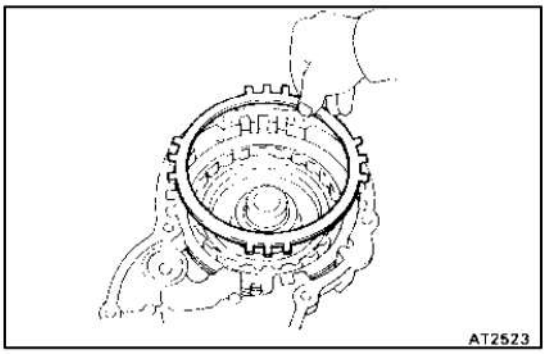
AX03T-03

OVERDRIVE BRAKE DISASSEMBLY

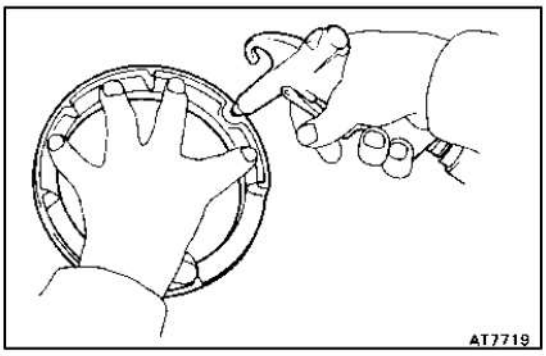


1. REMOVE PISTON RETURN SPRING

(a) While pushing the return spring, remove the snap ring with a screwdriver.
(b) Remove the piston return spring.

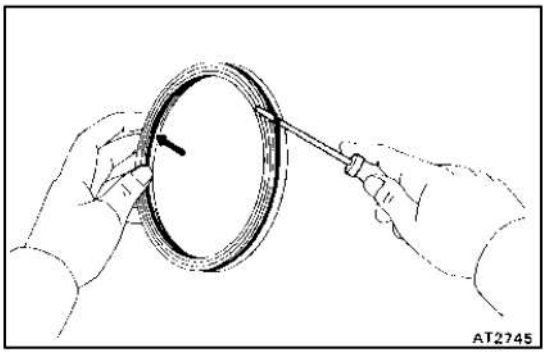


2. REMOVE PLATES, DISCS AND FLANGE



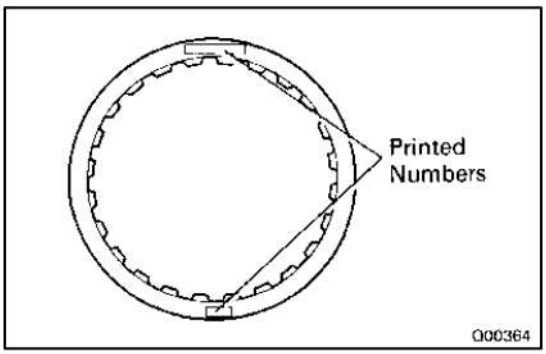
3. REMOVE PISTON FROM DRUM

Apply compressed air to oil hole to remove the piston.
HINT: Blow with the gun slightly away from the oil hole, and be careful that the piston does not tilt.



4. REMOVE O–RINGS

Remove the inner and outer O–rings from the piston.



AX03U-03

OVERDRIVE BRAKE INSPECTION

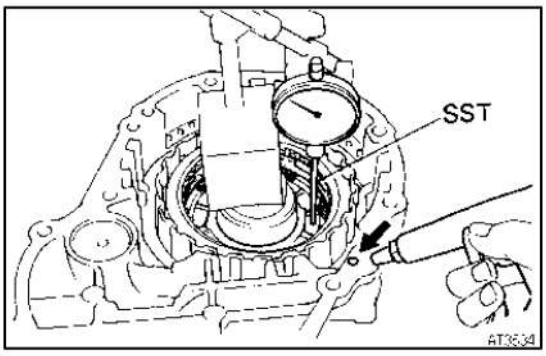
INSPECT DISCS, PLATES AND FLANGE

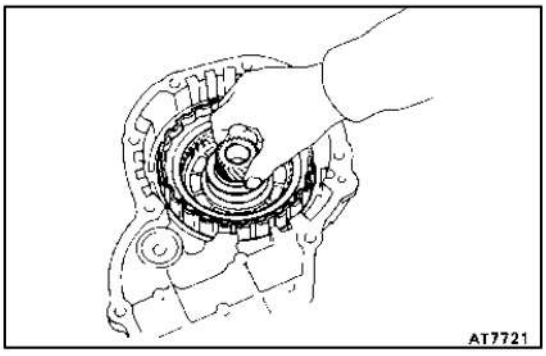
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

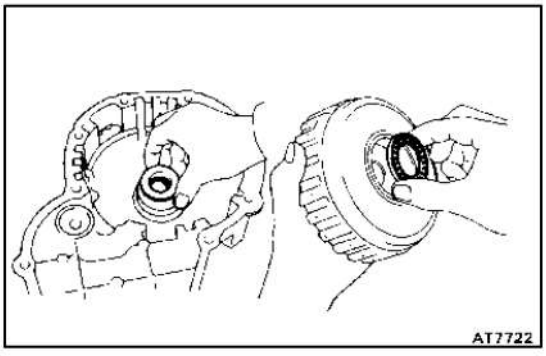
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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







AX03V-05

OVERDRIVE DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 5–8 kgf/cm^2, 57–114 psi).

Piston stroke:

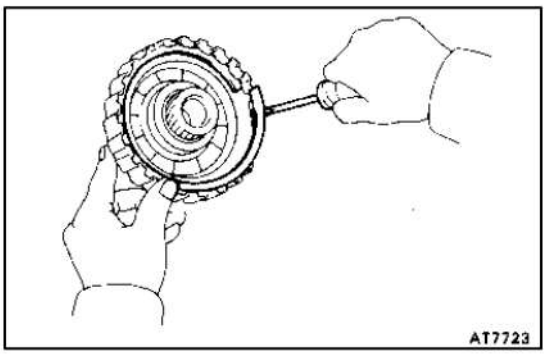
1.75–2.49 mm (0.0689–0.0980 in.)

SST 09350–32014 (09351–32190)

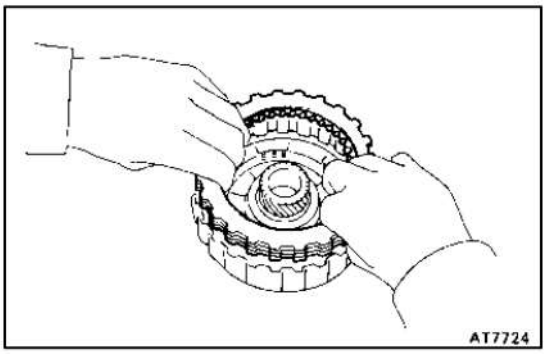
If the piston stroke is greater than the maximum, inspect each component.

2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE

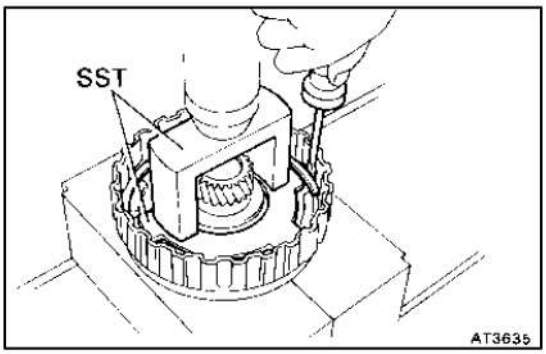
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



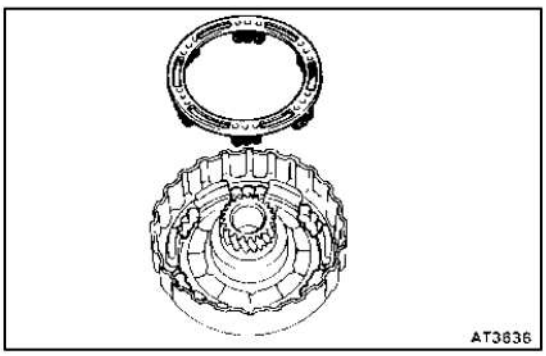
5. REMOVE FLANGES, DISCS AND PLATES



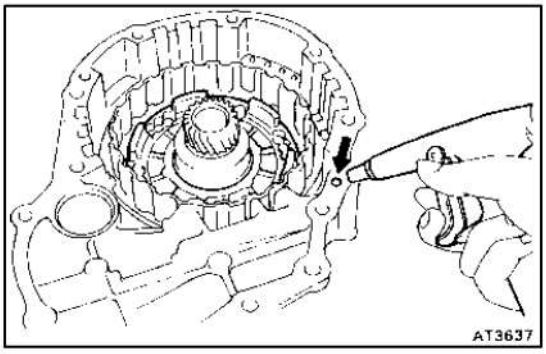
6. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the spring with a press.
SST 09350–32014 (09351–32070, 09351–32200)

(b) Remove the snap ring.



(c) Remove the piston return spring.



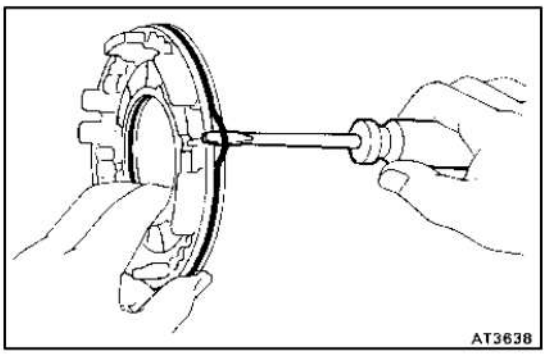
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum on the case.

(b) Apply compressed air to the pressure apply hole of the case.

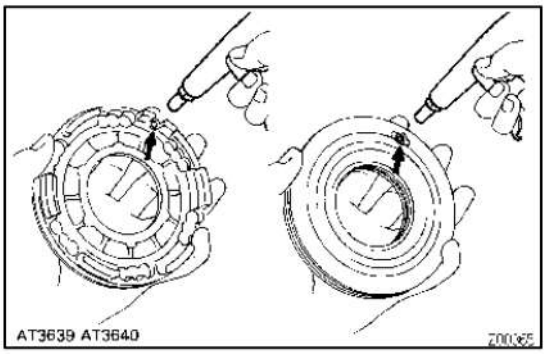
(c) Remove the piston from the clutch drum.
If the piston does not come out completely, use needle–nose pliers to remove it.

(d) Remove the clutch drum from the case.



8. REMOVE O–RINGS

Remove the 2 O–rings from the piston.



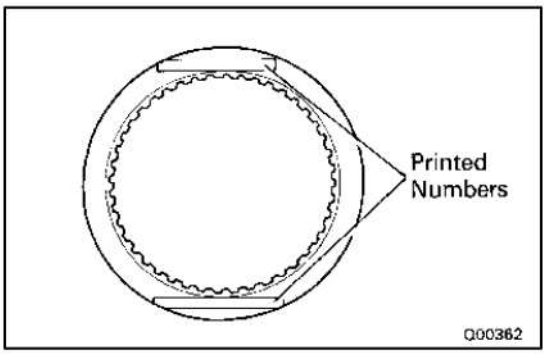
OVERDRIVE DIRECT CLUTCH INSPECTION

AX03W–03

1. INSPECT OVERDRIVE DIRECT CLUTCH

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.



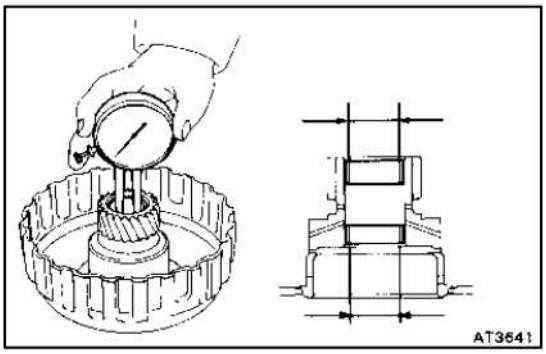
2. INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



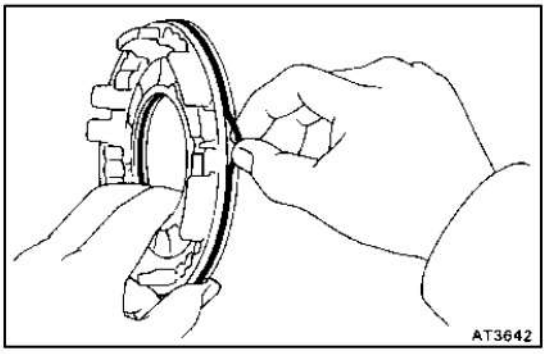
3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the 2 direct clutch bushings.

Maximum inside diameter:

22.13 mm (0.8713 in.)

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

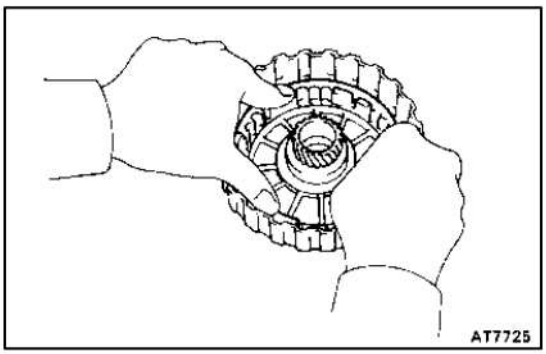


OVERDRIVE DIRECT CLUTCH ASSEMBLY

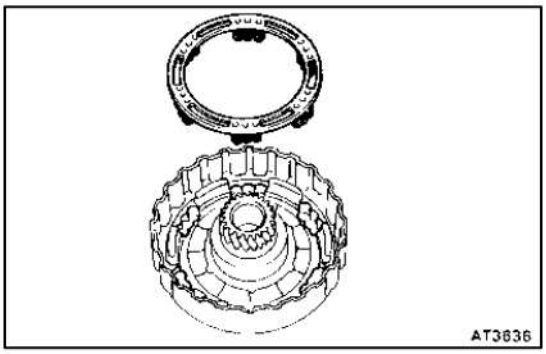
AX03X–06

1. INSTALL CLUTCH PISTON

(a) Install new O–rings to the piston. Coat the O–rings with ATF.

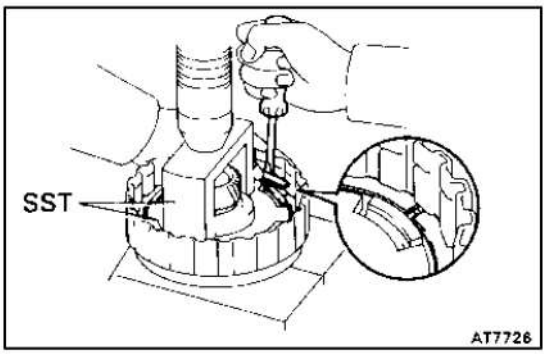


(b) Press the piston into the drum with the cup side up, being careful not to damage the O–ring.



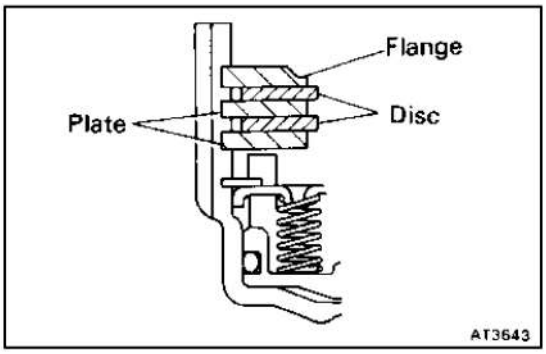
2. INSTALL PISTON RETURN SPRING

(a) Install the return spring and seat snap ring in place.



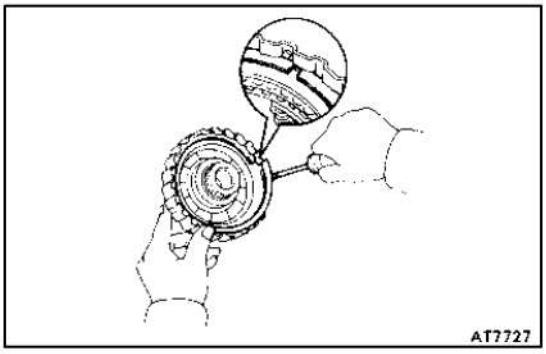
(b) Place SST on the spring retainer, and compress the spring with a press.
SST 09350–32014 (09351–32070, 09351–32200)

(c) Install the snap ring with a screwdriver. Be sure end gap of snap ring is aligned with the groove of the clutch drum.



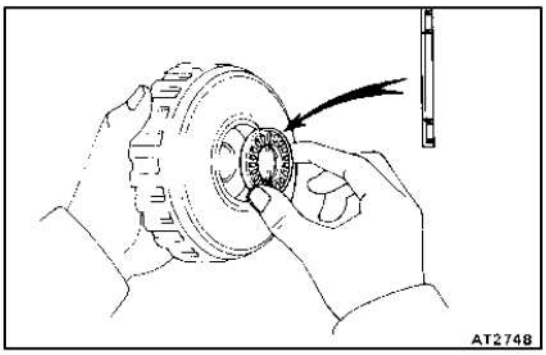
3. INSTALL PLATES, DISCS AND FLANGE

Install in order:
P=Plate D=Disc
P–D–P–D–Flange



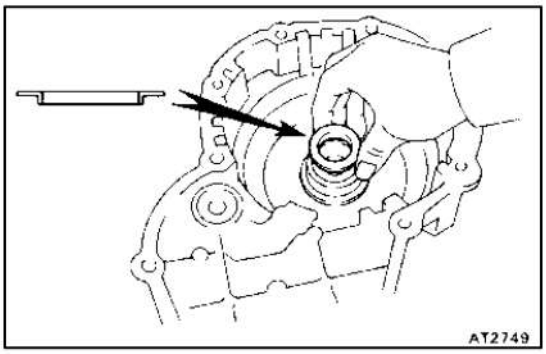
4. INSTALL SNAP RING

Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.

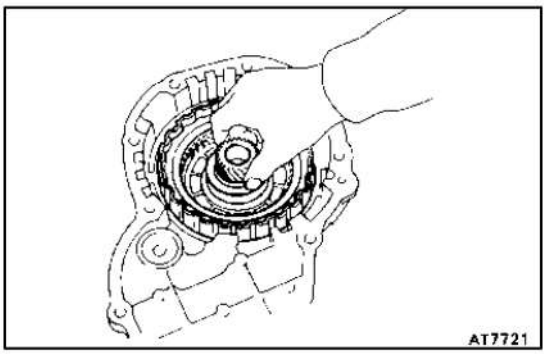


5. INSTALL BEARING AND RACE

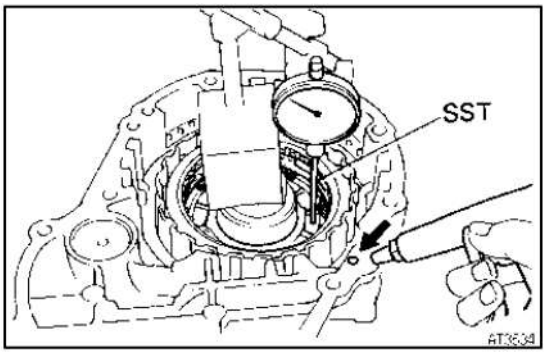
(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.
Bearing outer diameter: 46.3 mm (1.823 in.)
Bearing inner diameter: 26.2 mm (1.031 in.)



(b) Coat the race with petroleum jelly and install it to the case.
Race outer diameter: 43.0 mm (1.693 in.)
Race inner diameter: 24.5 mm (0.965 in.)

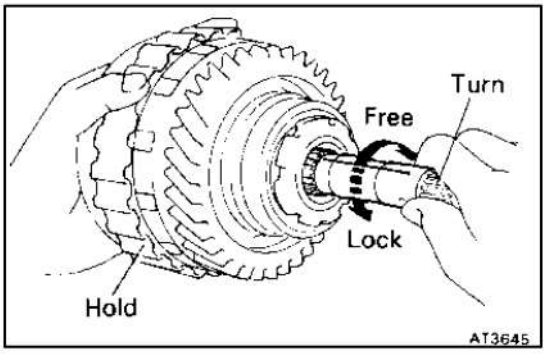


6. INSTALL DIRECT CLUTCH ON CASE



7. RECHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
Piston stroke:
1.75–2.49 mm (0.0689–0.0980 in.)
SST 09350–32014 (09351–32190)

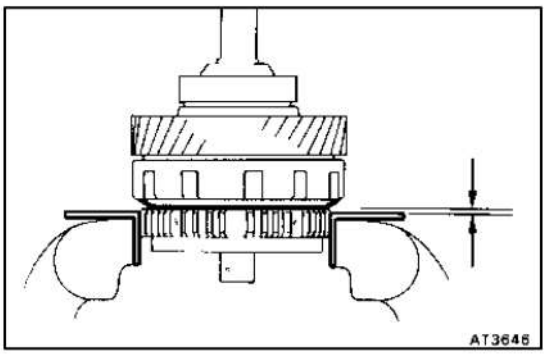


COUNTER DRIVE GEAR DISASSEMBLY

AX03Y–03

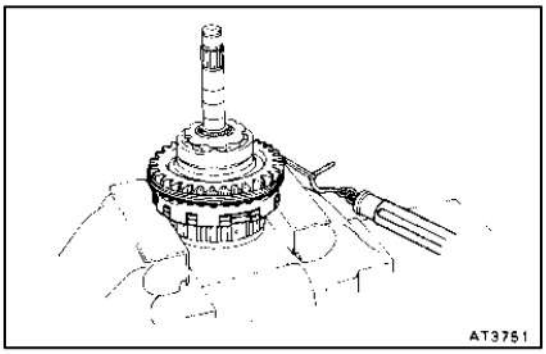
1. CHECK OPERATION OF ONE–WAY CLUTCH

(a) Install the O/D direct clutch into the one–way clutch.
(b) Hold the O/D direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the O/D direct clutch.

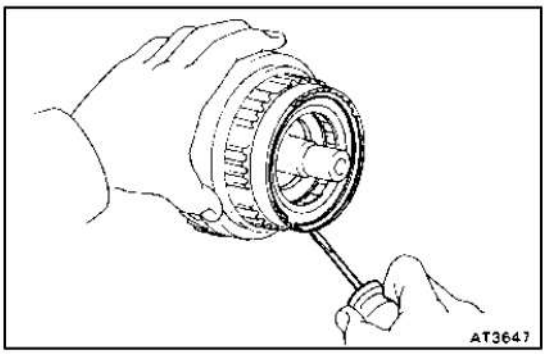


2. CHECK COUNTER DRIVE GEAR PRELOAD

(a) Hold the O/D planetary gear in a vise with soft jaws.
HINT: Do not let the counter drive gear touch the vise.

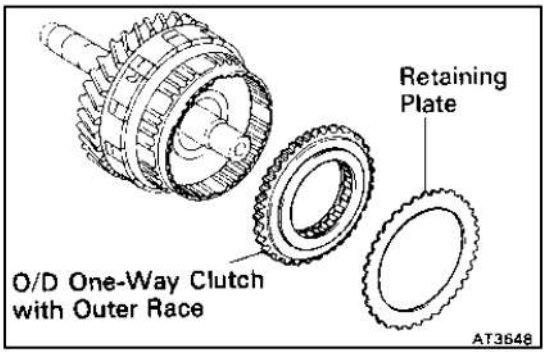


(b) Using a tension gauge, measure the preload.
Preload (at starting):
9.2–15.3 N (940–1,560 g, 2.1–3.4 lb)
HINT: Turn the counter drive gear right and left several times before measuring the preload.

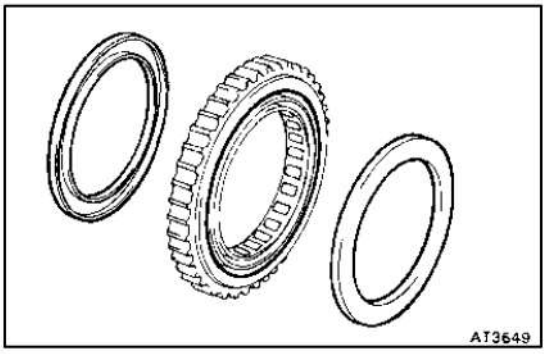


3. REMOVE O/D ONE–WAY CLUTCH AND OUTER RACE

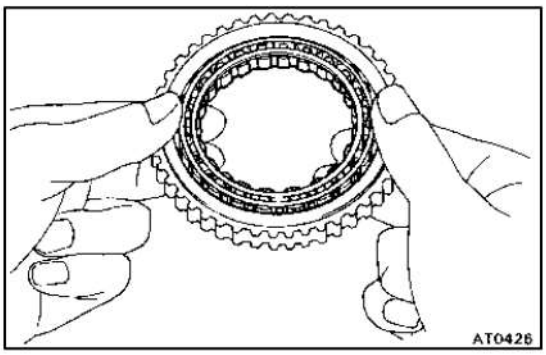
(a) Remove the snap ring.



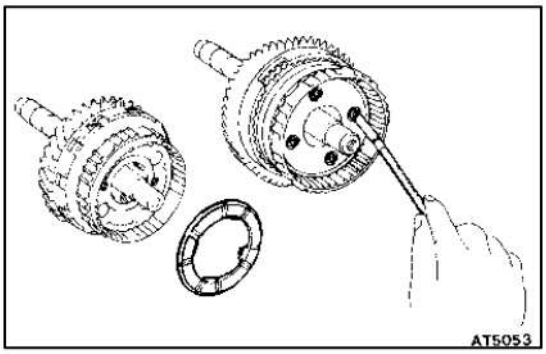
(b) Remove the retaining plate.
(c) Remove the O/D one–way clutch with outer race.



(d) Remove the 2 retainers from both sides of the O/D one–way clutch.



(e) Remove the O/D one–way clutch from the outer race.
HINT: Note the direction of the one–way clutch.

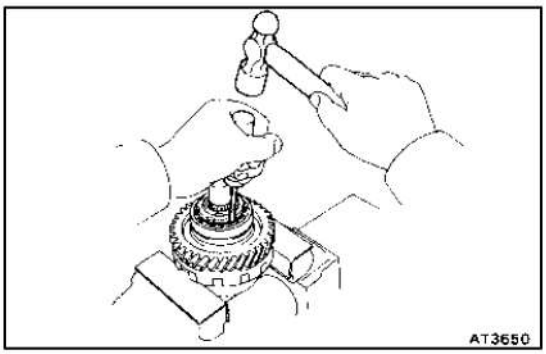


4. REMOVE NO.3 PLANETARY THRUST WASHER

5. REMOVE PLUGS FROM PLANETARY GEAR

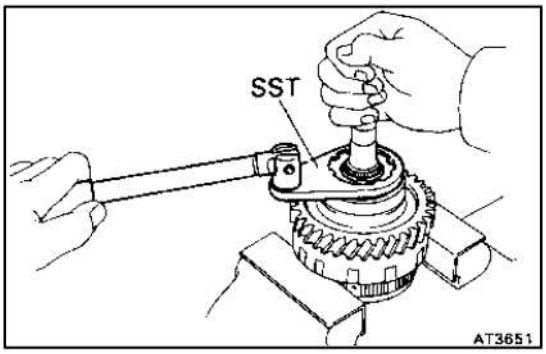
Remove the 4 plugs with a magnetic finger.

NOTICE: Be careful not to lose them.



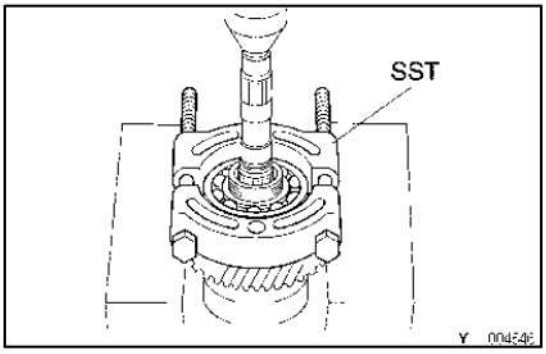
6. REMOVE ADJUSTING NUT AND LOCKING WASHER

(a) Pry off the locking washer.



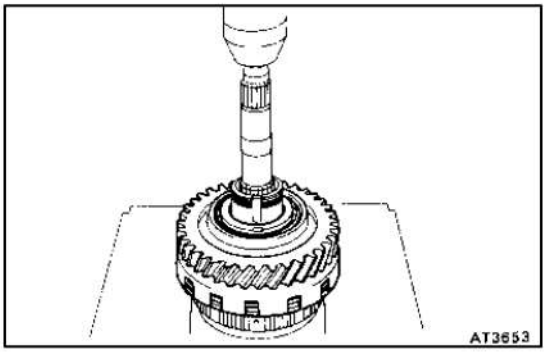
(b) Using SST, loosen the adjusting nut.
SST 09350–32014 (09351–32080)

(c) Remove the adjusting nut and locking washer.



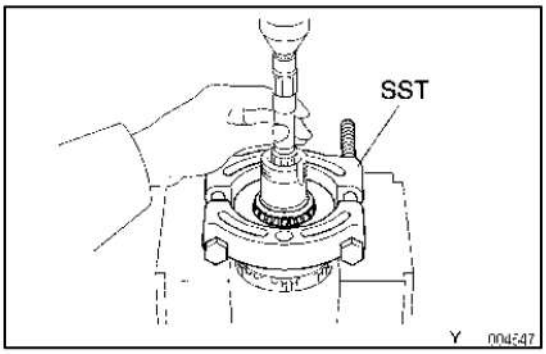
7. REMOVE INTERMEDIATE SHAFT BEARING

Using SST, press out the bearing from the shaft.
SST 09950–00020



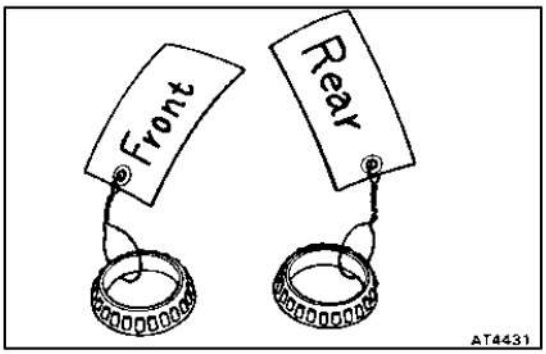
8. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

Press out the gear and bearing together.

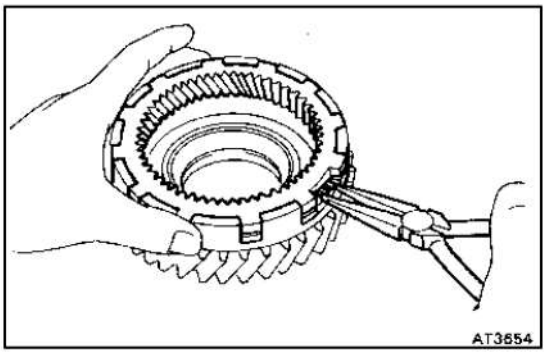


9. REMOVE REAR BEARING

(a) Using SST, press out the bearing.
SST 09950–00020

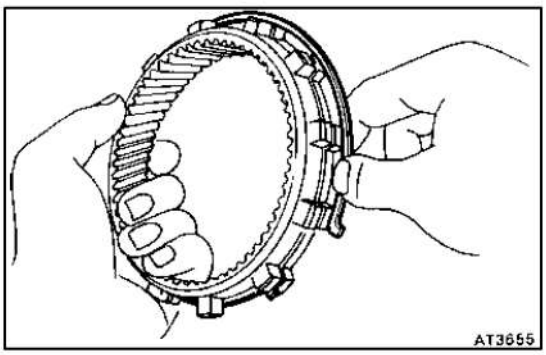


(b) Tag the bearings to show the location for reassembly.

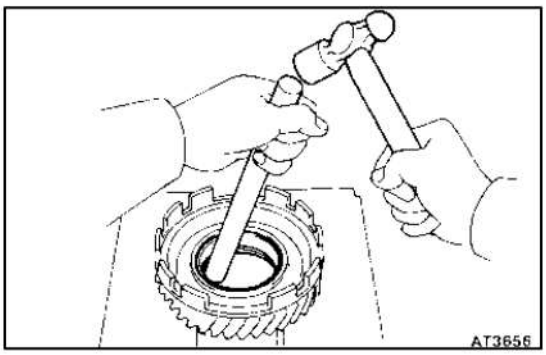


10. REMOVE O/D PLANETARY RING GEAR FROM COUNTER DRIVE GEAR

(a) While pulling up the ring gear, compress the snap ring with needle–nose pliers and remove it from the groove.
(b) Remove the ring gear from the counter drive gear.

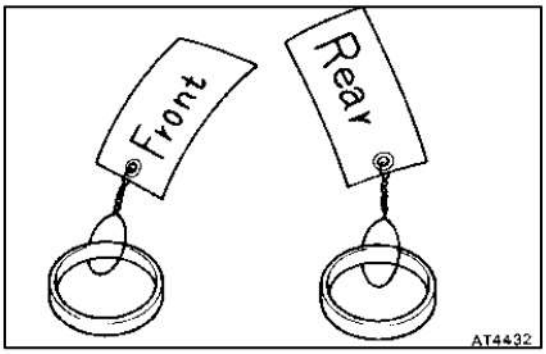


(c) Remove the snap ring from the ring gear.

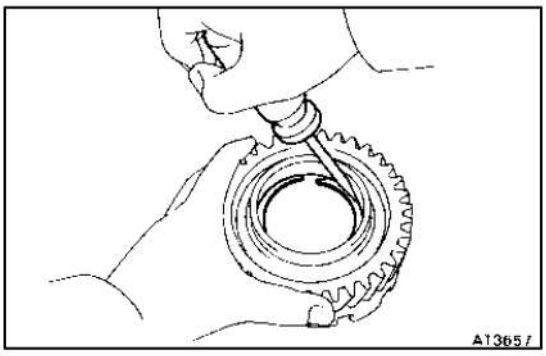


11. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

(a) Drive out the 2 races with a brass bar and hammer.

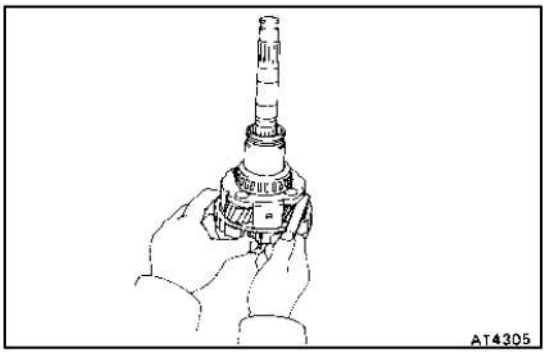


(b) Tag the races to show the location for reassembly.



12. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



AX03Z-03

OVERDRIVE PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

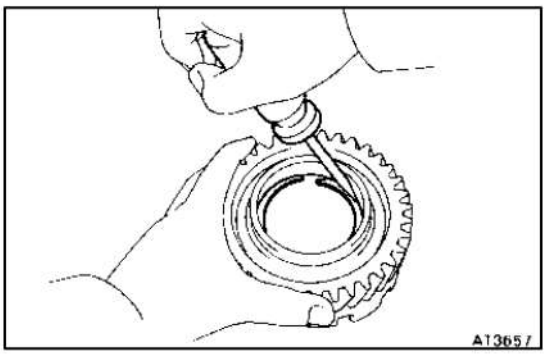
Maximum clearance:

0.61 mm (0.0240 in.)

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

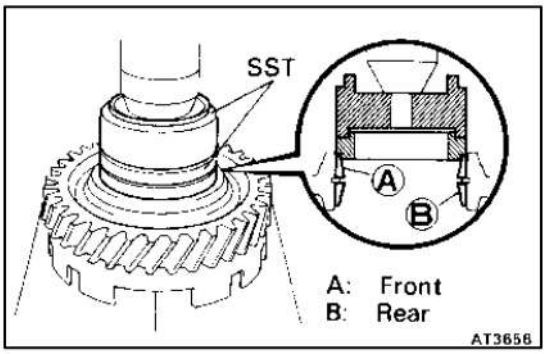
AX040-03

COUNTER DRIVE GEAR ASSEMBLY



1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.

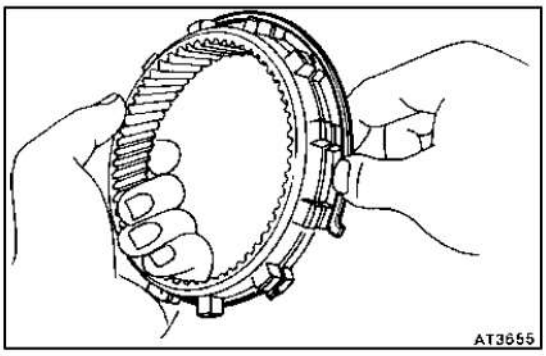


2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the 2 outer races to both sides of the gear.

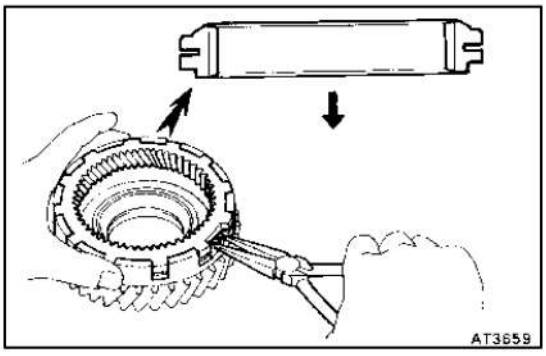
SST 09350–32014 (09351–32120, 09351–32150)

HINT: Press in the 2 outer races until they touch the snap ring. Tap the races in straight, so that they do not tilt.

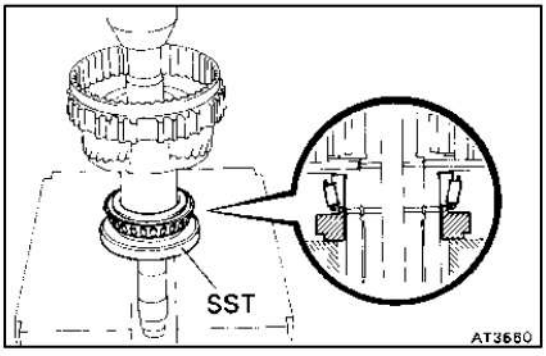


3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVE GEAR

(a) Install the snap ring to the ring gear.



(b) While pushing down the ring gear, squeeze the snap ring end with needle–nose pliers, and install it into the groove.

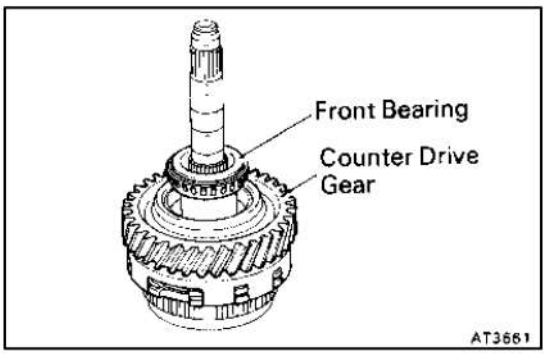


4. INSTALL REAR BEARING

Using SST, press in the bearing onto the shaft.

SST 09350–32014 (09351–32120)

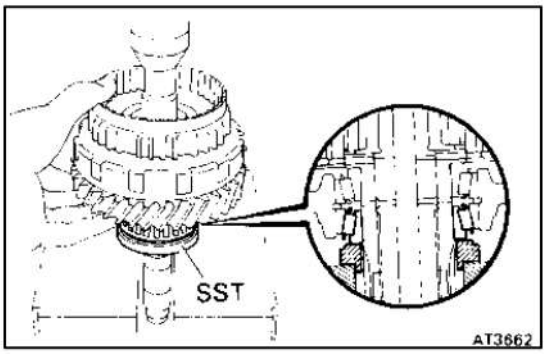
HINT: Press in the bearing until the side surface of the inner race touches the planetary carrier.



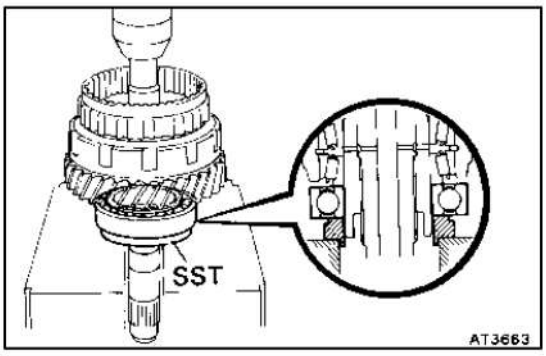
5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

(a) Install the gear onto the shaft, and mesh the ring gear with the planetary pinions.

(b) Place the front bearing on to the shaft.

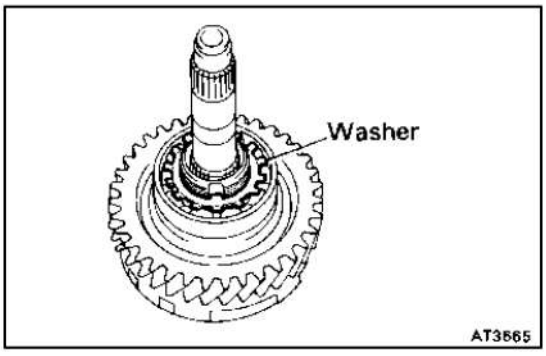


(c) Using SST, press in the bearing until there is slight play between the bearings.
SST 09350–32014 (09351–32120)
HINT: Hold the ring gear to prevent it from falling.

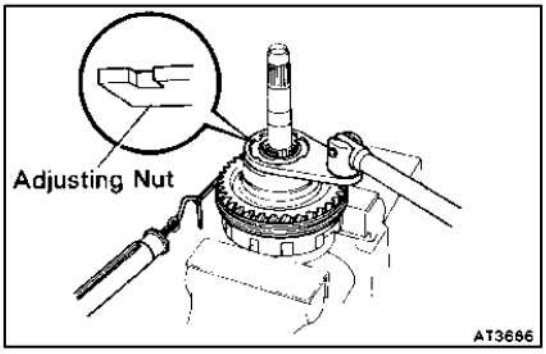


6. INSTALL INTERMEDIATE SHAFT BEARING

Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.
SST 09350–32014 (09351–32120)
HINT: The counter drive gear can be turned lightly.



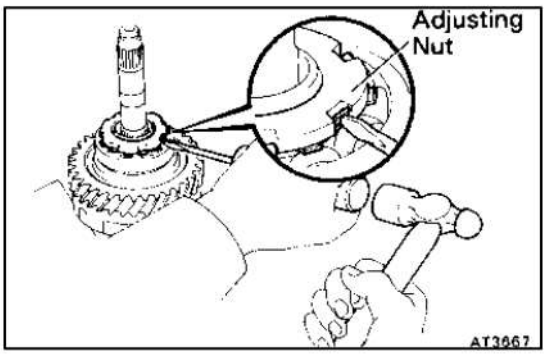
7. PLACE NEW LOCKING WASHER



8. INSTALL ADJUSTING NUT AND ADJUST PRELOAD OF COUNTER DRIVE GEAR

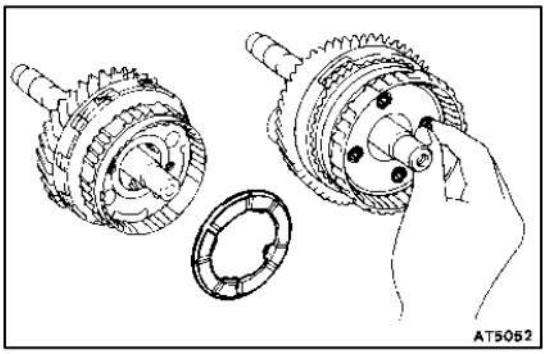
(a) Hold the overdrive planetary gear in a vise with soft jaws.

(b) Using SST, tighten the adjusting nut until the following gear starting load is reached on the tension gauge.
SST 09350–32014 (09351–32080)
Preload (at starting):
9.2–15.3 N (940–1,560 g, 2.1–3.4 lb)



HINT: Turn the counter drive gear right and left several times before measuring the preload.

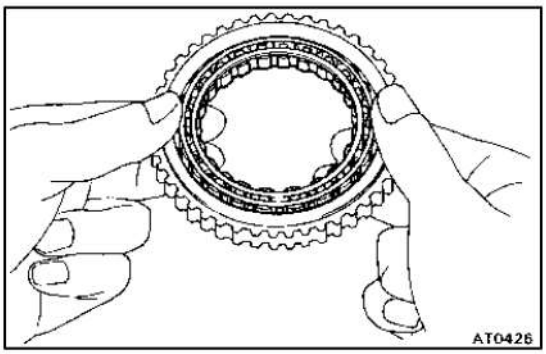
(c) Lock the adjusting nut with one locking washer tab. Bend the locking washer tab until it is flat with the adjusting nut groove.



9. INSTALL NO.3 OVERDRIVE PLANETARY THRUST WASHER

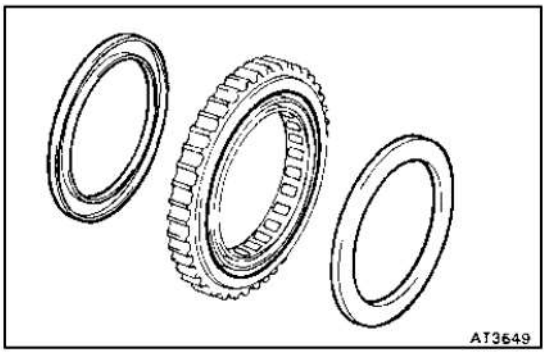
10. INSTALL PINION SHAFT PLUGS

Install the 4 plugs into the pinion shaft.

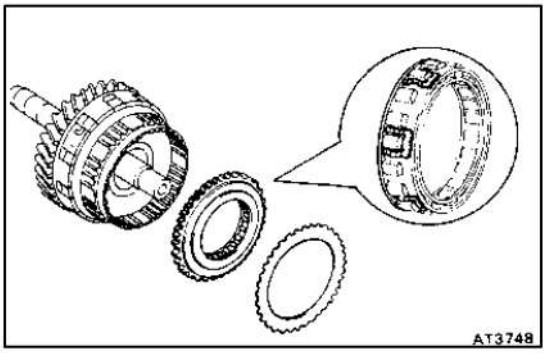


11. INSTALL OVERDRIVE ONE–WAY CLUTCH AND RETAINING PLATE

(a) Install the one–way clutch into the outer race.



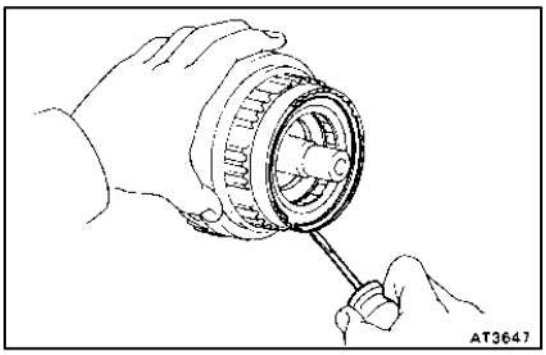
(b) Install the 2 retainers on both sides of the one–way clutch.



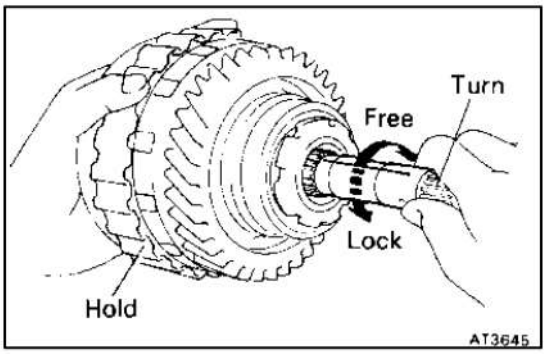
(c) Install the one–way clutch into the overdrive planetary gear.

HINT: Be sure that the one–way clutch is installed in the correct direction.

(d) Install the retaining plate.



(e) Install the snap ring.

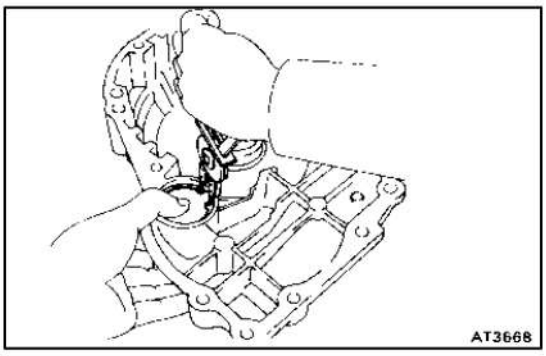


12. CHECK OPERATION OF O/D ONE–WAY CLUTCH

(a) Install the overdrive direct clutch into the one–way clutch.
(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the overdrive direct clutch.

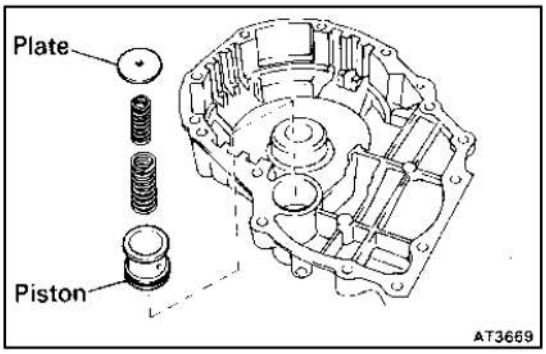
AX041–02

OVERDRIVE CASE DISASSEMBLY

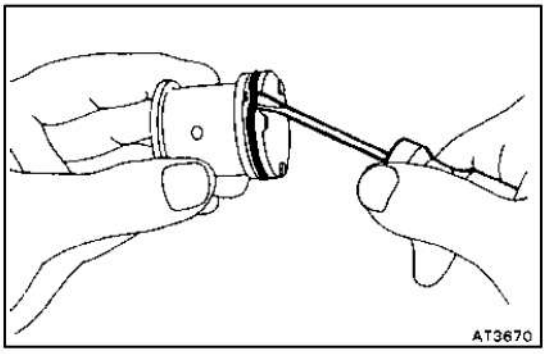


1. REMOVE C_0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

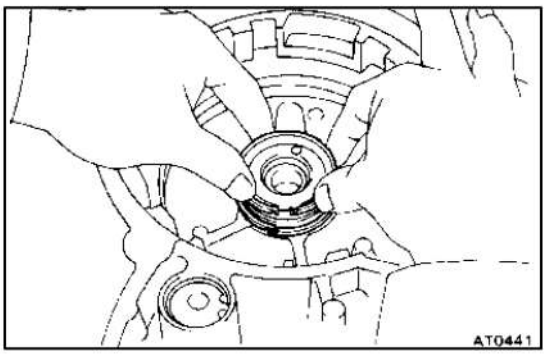
(a) Using snap ring pliers, remove the snap ring.



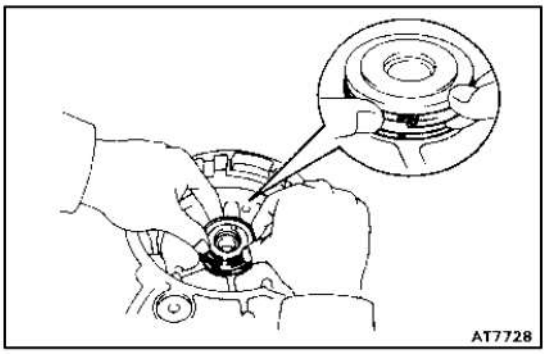
(b) Remove the retaining plate and 2 springs.
(c) Remove the accumulator piston.



(d) Remove the O–ring from the piston.



2. REMOVE OIL SEAL RINGS

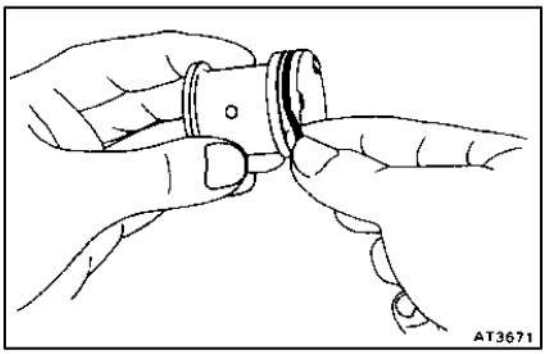


AX042-02

OVERDRIVE CASE ASSEMBLY

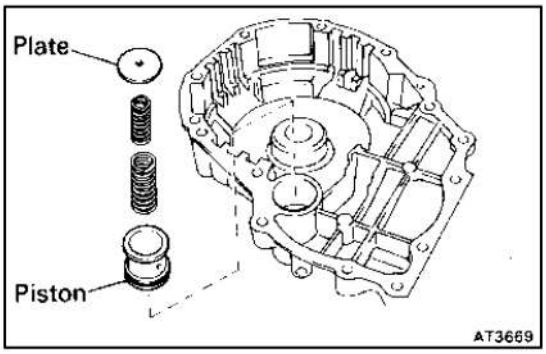
1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Install the 2 oil seal rings to the overdrive case groove, then snug them down by squeezing their ends together.
HINT: After installing the oil seal rings, check that they move smoothly.

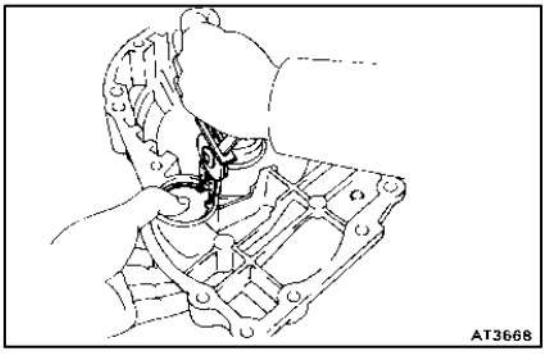


2. INSTALL C0 ACCUMULATOR PISTON TO OVERDRIVE CASE

(a) Install a new O–ring to the accumulator piston.
(b) Coat the O–ring with ATF.



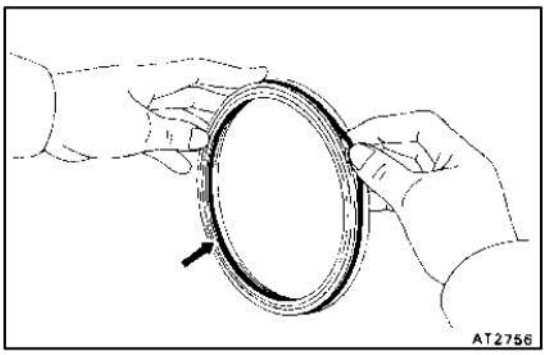
(c) Install the accumulator piston, 2 springs and retaining plate.



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

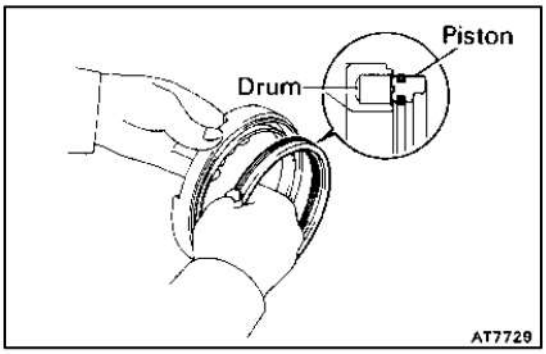
AX043-05

OVERDRIVE BRAKE ASSEMBLY

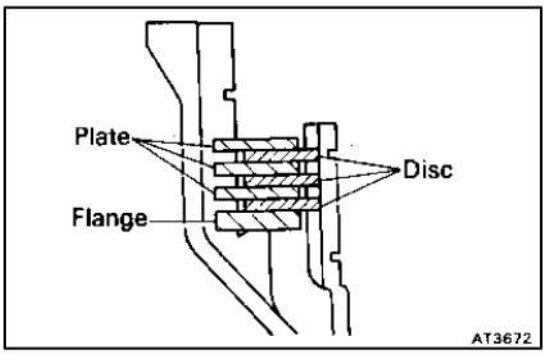


1. INSTALL PISTON INTO DRUM

(a) Install new O–rings to the piston.
Coat the new O–rings with ATF.

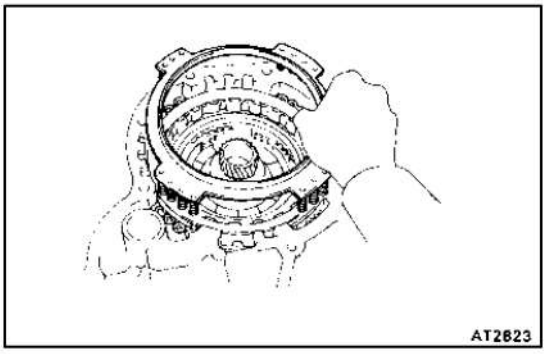


(b) Press the piston into the drum, being careful not to damage the O–rings.

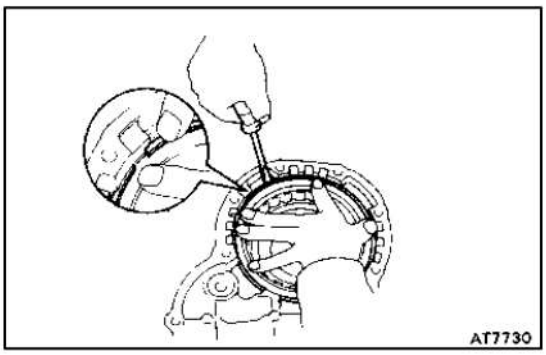


2. INSTALL FLANGE, DISCS AND PLATES

Install the flange, discs and plates.
Install in order:
P=Plate D=Disc
Flange–D–P–D–P–D–P

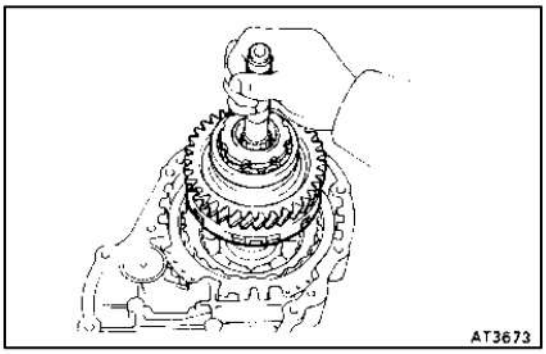


3. POSITION PISTON RETURN SPRING



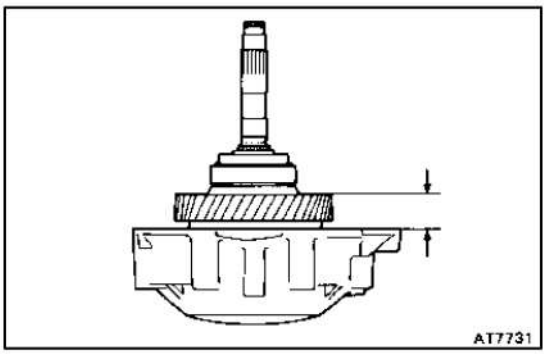
4. INSTALL SNAP RING INTO CASE

Be sure the end gap of the snap ring is not aligned with one of cutouts.



5. INSTALL OVERDRIVE PLANETARY GEAR ONTO OVERDRIVE DIRECT CLUTCH

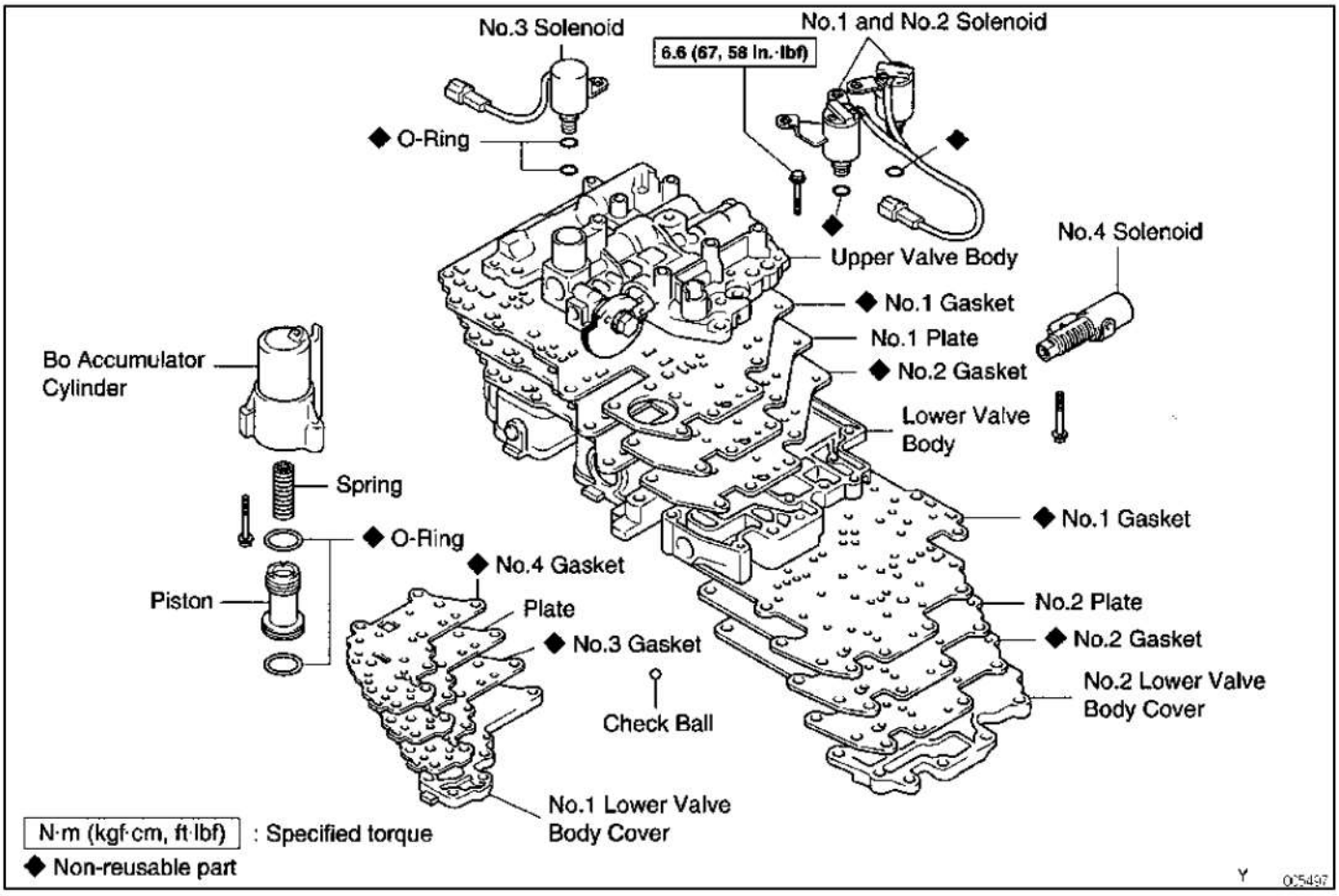
While turning the overdrive planetary gear clockwise, install it onto the overdrive direct clutch.

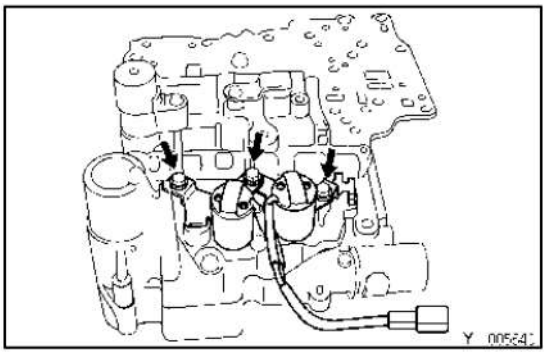


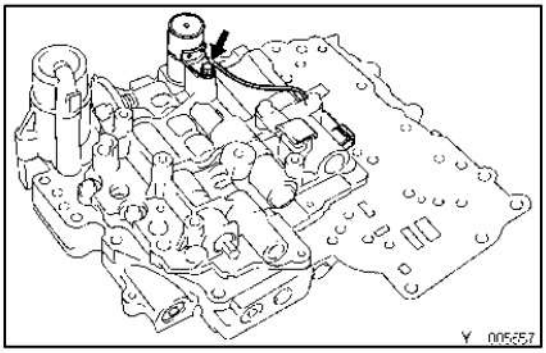
HINT: If the overdrive planetary gear is properly installed onto the direct clutch, the counter drive gear height from the overdrive case will be about 24 mm (0.94 in.).

VALVE BODY
COMPONENTS

AX044-02







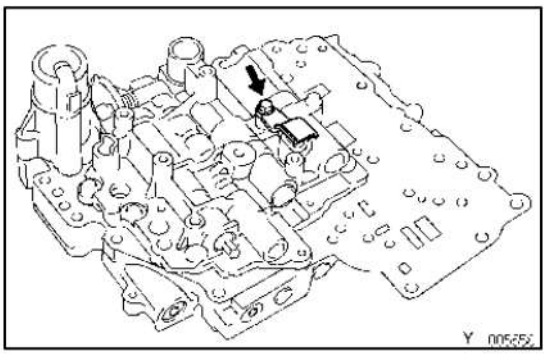
AX0TW-01

VALVE BODY DISASSEMBLY

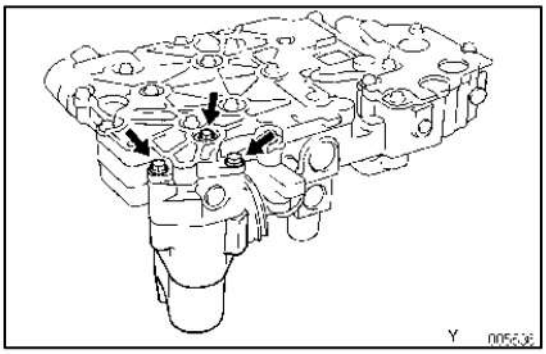
NOTICE: When disassembling the valve body, be careful not to damage or deform the plate which overhangs the valve body.

1. REMOVE SOLENOIDS

(a) Remove No.1 and No.2 solenoids with the retainer.
NOTICE: When removing the solenoid, do not use a screwdriver, etc. to pry up the solenoid.
(b) Remove the O–ring from each solenoid.
(c) Remove the No.3 solenoid.
(d) Remove the O–ring from the solenoid.

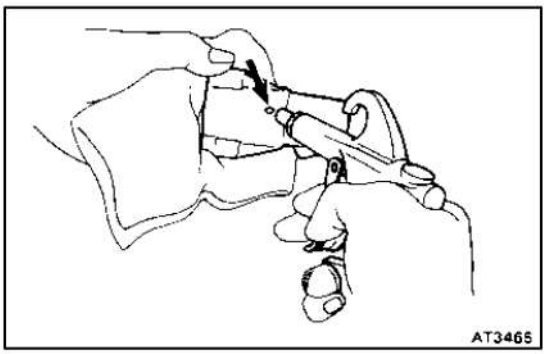


2. REMOVE LOCK PLATE



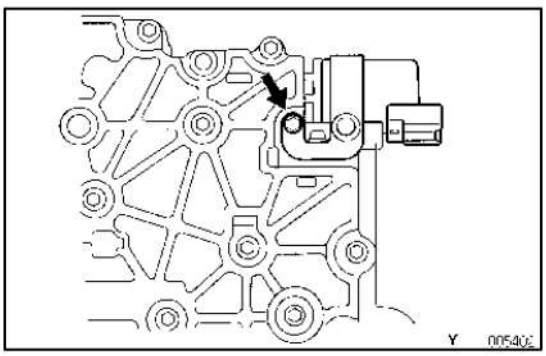
3. REMOVE B_0 ACCUMULATOR ASSEMBLY

(a) Remove the 3 bolts.
(b) Remove the B_0 accumulator assembly.



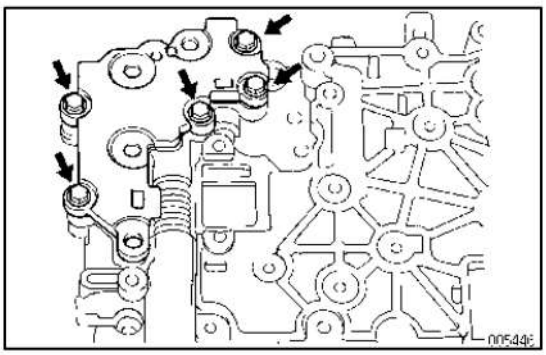
4. DISASSEMBLE B_0 ACCUMULATOR ASSEMBLY

(a) Applying compressed air to the cylinder hole, remove the piston and spring.
(b) Remove the 2 O–rings from the piston.



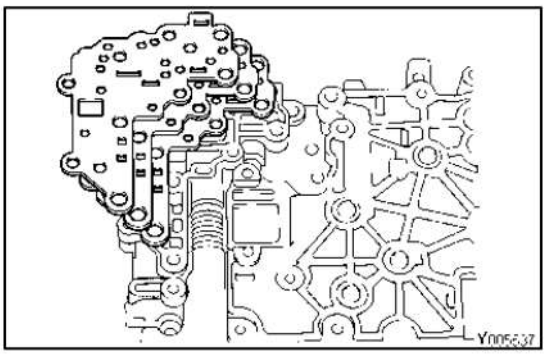
5. REMOVE NO.4 SOLENOID

(a) Remove the No.4 solenoid.
(b) Remove the O–ring from the solenoid.



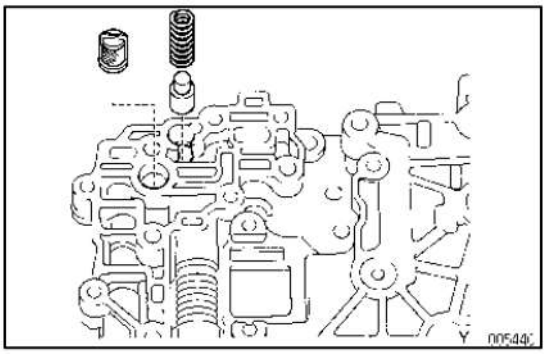
6. REMOVE NO.1 LOWER VALVE BODY COVER

Remove the 5 bolts and No.1 lower valve body cover.

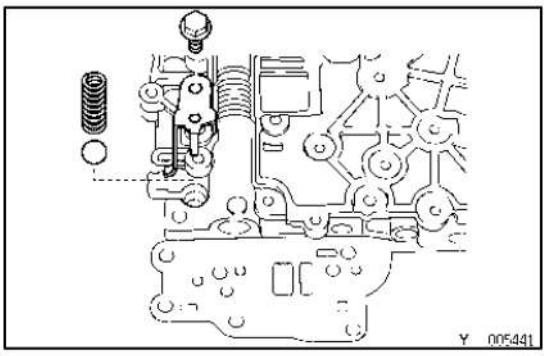


7. REMOVE OIL STRAINER, NO.1 LOWER VALVE BODY COVER GASKETS AND CHECK VALVE

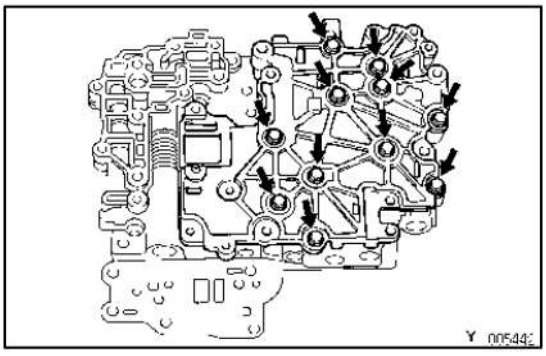
(a) Remove the 2 gaskets and plate from the lower valve body.



(b) Remove the oil strainer, check valve and spring.

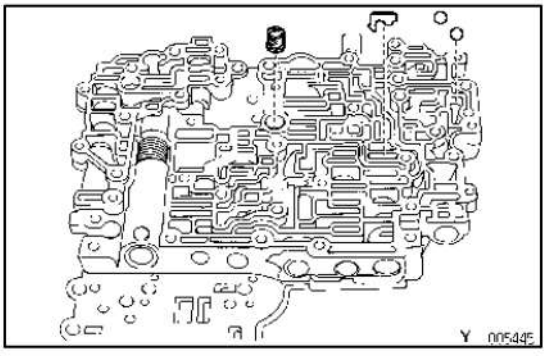


8. REMOVE PRESSURE RELIEF VALVE

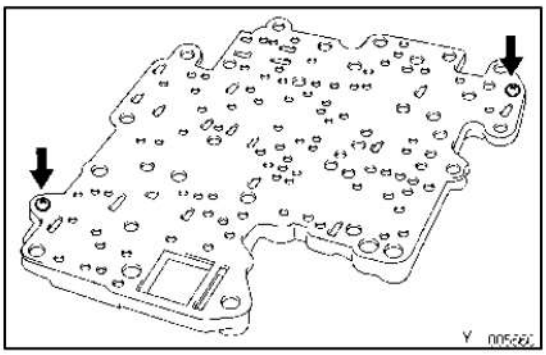


9. REMOVE NO.2 LOWER VALVE BODY COVER, OIL STRAINER, CHECK BALLS AND VIBRATING STOPPER

Remove the 11 bolts and lower valve body cover.

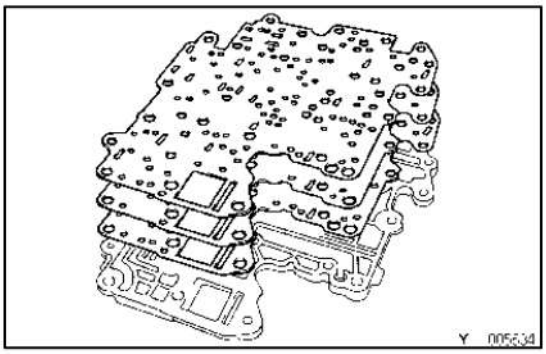


(b) Remove the 2 check balls, oil strainer and vibrating stopper.

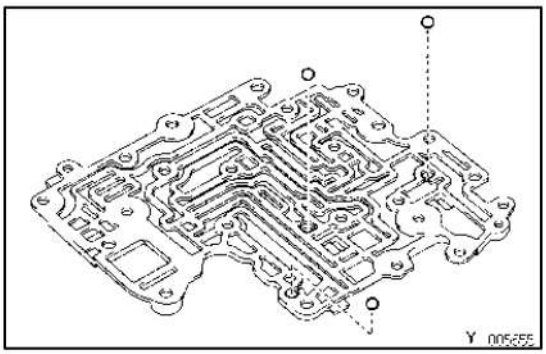


10. REMOVE NO.2 LOWER VALVE BODY COVER GASKETS AND CHECK BALLS

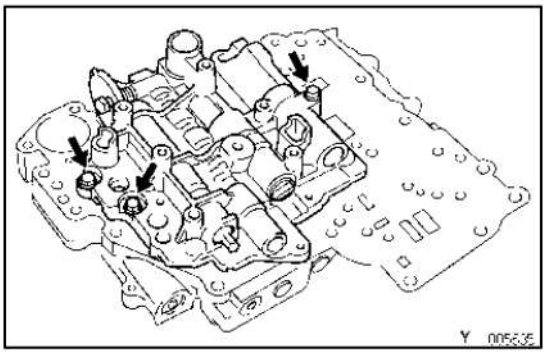
(a) Remove the 2 screws from the lower valve body cover.



(b) Remove the 2 gaskets and plate.

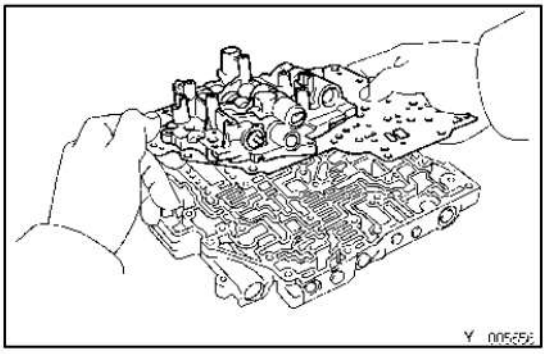


(c) Remove the 3 check balls from the cover.



11. REMOVE BOLTS FROM UPPER VALVE BODY

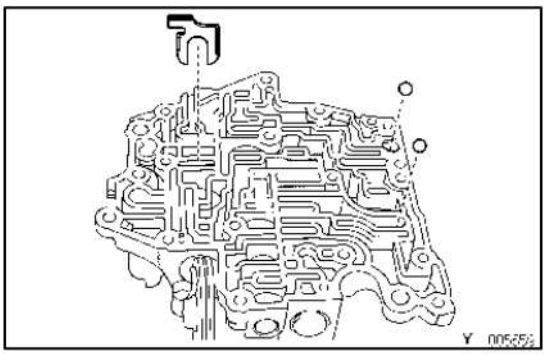
Remove the 3 bolts.



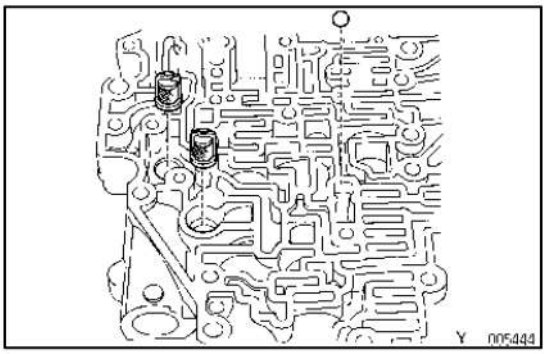
12. LIFT OFF UPPER VALVE BODY AND NO.1 PLATE AS A SINGLE UNIT

Hold No.1 plate to the upper valve body and lift off the upper valve body.

HINT: Be careful that the check balls and oil strainer do not fall out.



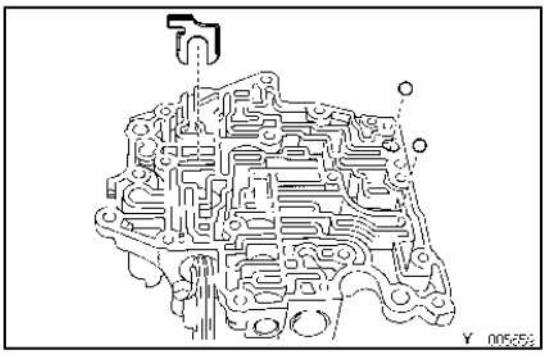
13. REMOVE 2 CHECK BALLS AND VIBRATING STOPPER FROM UPPER VALVE BODY



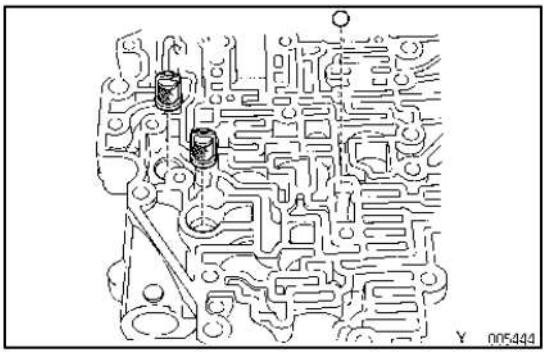
14. REMOVE 2 OIL STRAINERS AND CHECK BALL FROM LOWER VALVE BODY

VALVE BODY ASSEMBLY

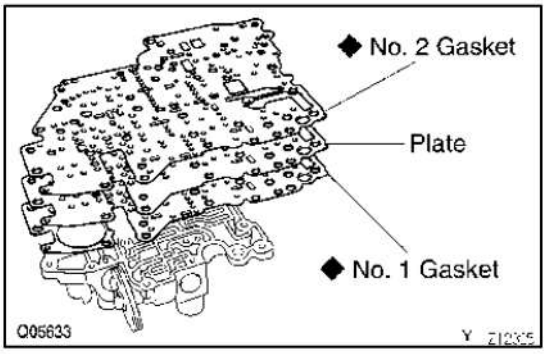
AX0TX–01



1. INSTALL 2 CHECK BALLS AND VIBRATING STOPPER TO UPPER VALVE BODY



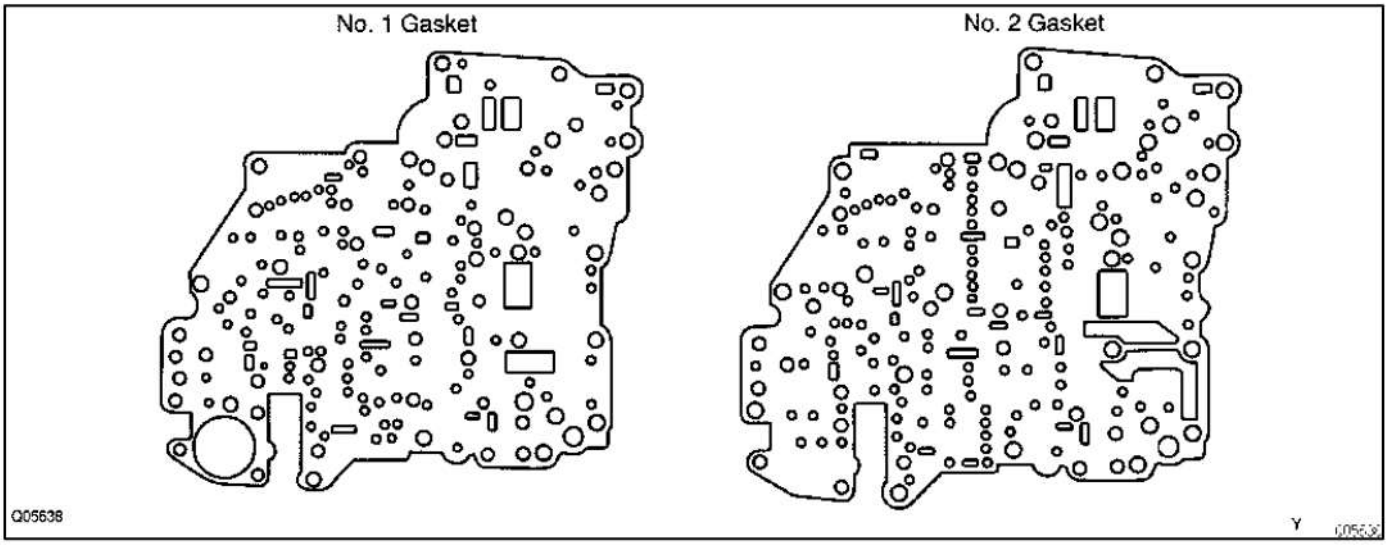
2. INSTALL 2 OIL STRAINERS AND CHECK BALL TO LOWER VALVE BODY

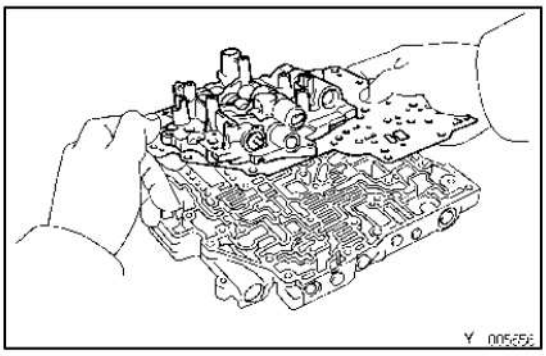


3. POSITION PLATE AND NEW GASKETS ON UPPER VALVE BODY

Position new No.1 gasket, plate and the new No.2 gasket on the upper valve body.

HINT: Since No.1 gasket and No.2 gasket are similar, use the illustration below to discriminate between them.

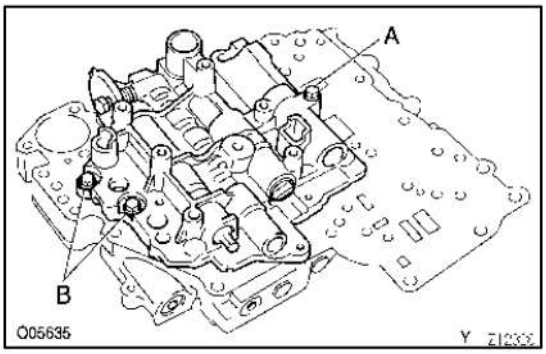




4. PLACE UPPER VALVE BODY WITH PLATE AND GASKETS ON LOWER VALVE BODY

Hold the upper valve body, plate and gaskets securely so they do not separate.

Align each bolt hole in the valve bodies with the gaskets and plate.



5. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY TO SECURE LOWER VALVE BODY

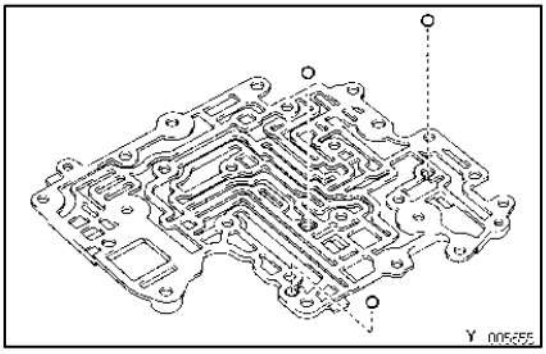
Install and finger tighten the 3 bolts.

HINT: Each bolt length is indicated below.

Bolt length:

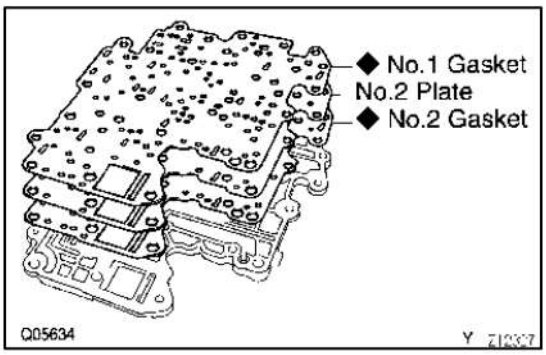
Bolt A: 44 mm (1.732 in.)

Bolt B: 16 mm (0.630 in.)

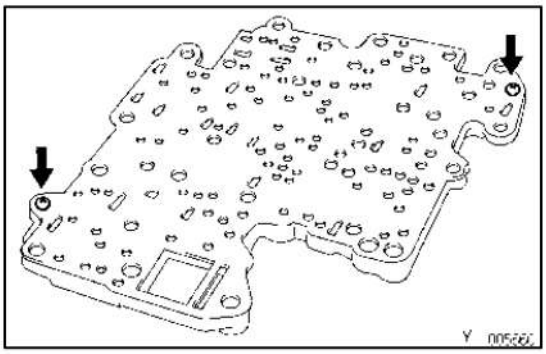


6. INSTALL NO.2 LOWER VALVE BODY COVER GASKETS, PLATE AND 3 CHECK BALLS

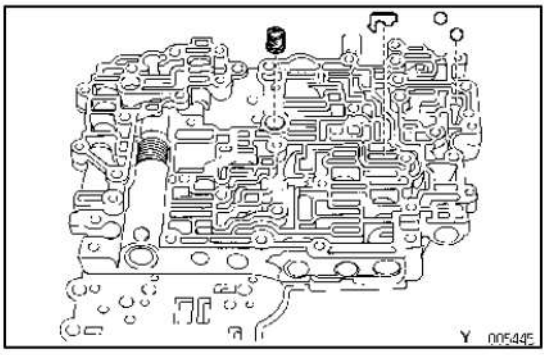
(a) Install the 3 check balls into the No.2 lower valve body cover.

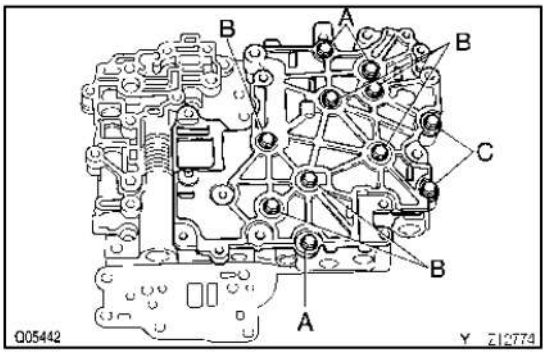


(b) Position a new gasket and plate and then another new gasket.
HINT: Both gaskets are identical.



(c) Install the 2 screws.

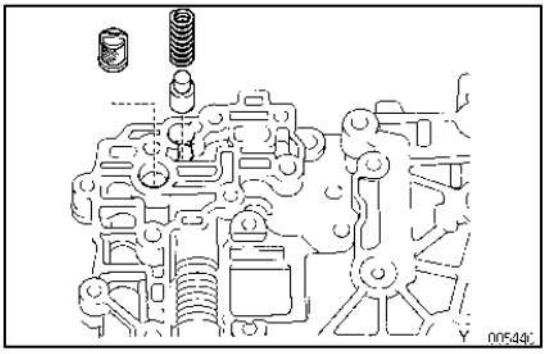




8. INSTALL NO.2 LOWER VALVE BODY COVER

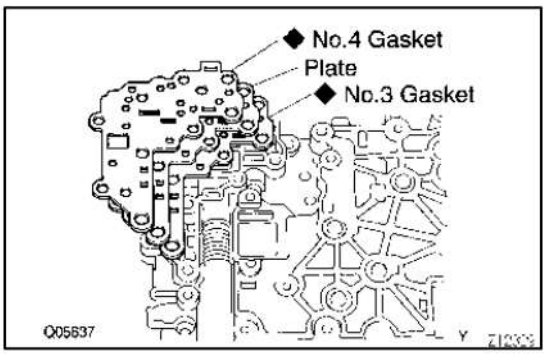
(a) Position the No.2 lower valve body cover.

(b) Install and finger tighten the 11 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 40 mm (1.575 in.)
Bolt B: 44 mm (1.732 in.)
Bolt C: 14 mm (0.551in.)



9. INSTALL OIL STRAINER AND CHECK VALVE

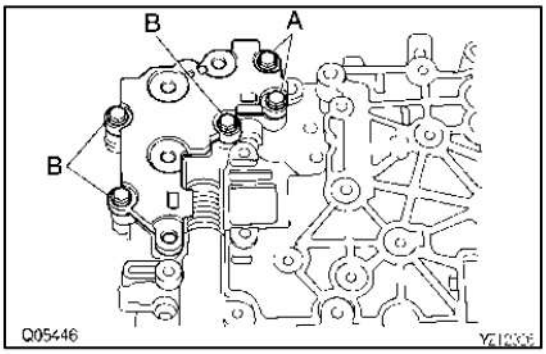
Install the oil strainer and check valve into the lower valve body.



10. INSTALL LOWER VALVE BODY COVER GASKETS AND NO.2 PLATE

Position a new gasket and plate and then another new gasket.

HINT: Both gaskets are identical.



11. INSTALL LOWER VALVE BODY COVER

(a) Position the lower valve body cover.

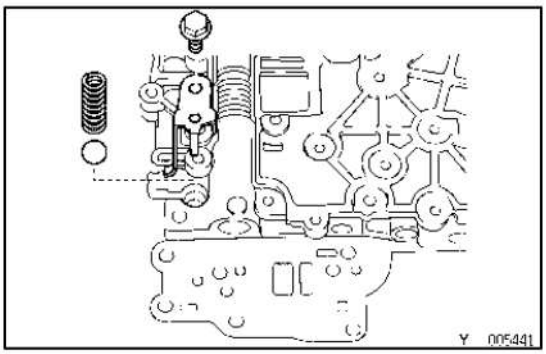
(b) Install and finger tighten the 5 bolts.

HINT: Each bolt length is indicated below.

Bolt length

Bolt A: 47 mm (1.850 in.)

Bolt B: 14 mm (0.551 in.)

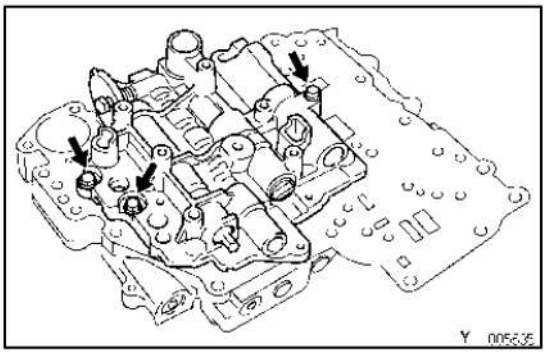


12. INSTALL PRESSURE RELIEF VALVE

13. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

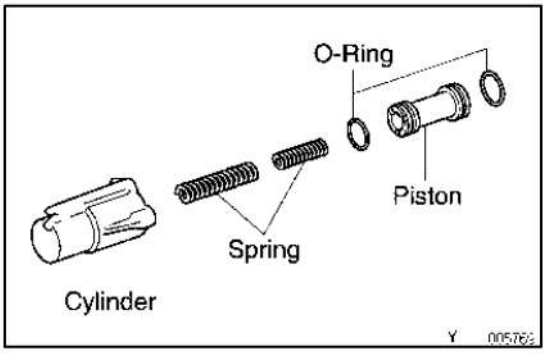
(a) Tighten the 16 bolts in the lower valve body.

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



(b) Tighten the 3 bolts in the upper valve body.

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



14. INSTALL B_0 ACCUMULATOR ASSEMBLY

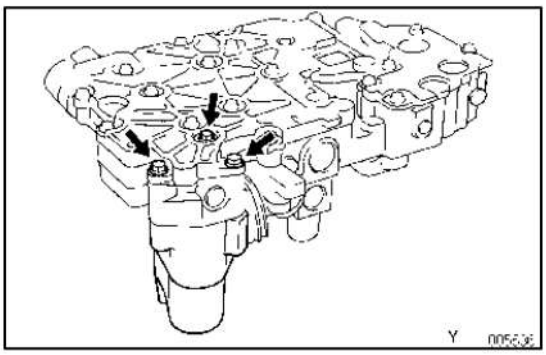
(a) Coat new O–rings with ATF and install them to the piston.

(b) Install the spring and piston into the cylinder.

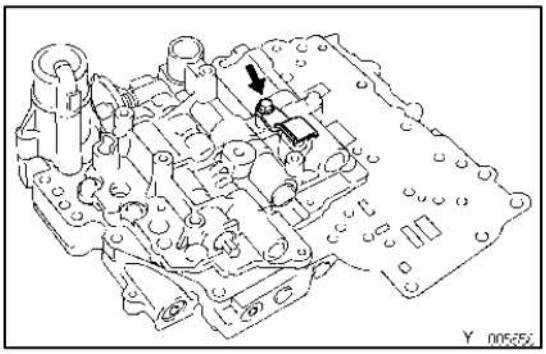
Spring dimensions

mm (in.)

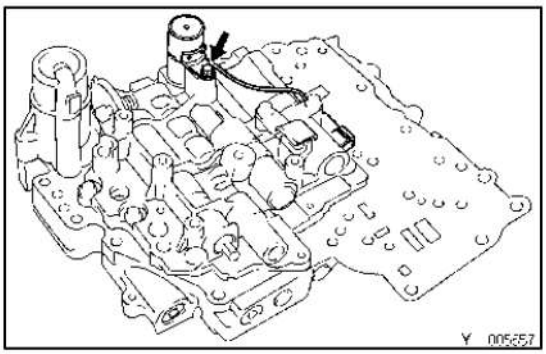
	Color	Free length	Coil outer diameter
Inner	White	47.5 (1.870)	18.9 (0.744)
Outer	None	16.3 (0.642)	20.7 (0.815)



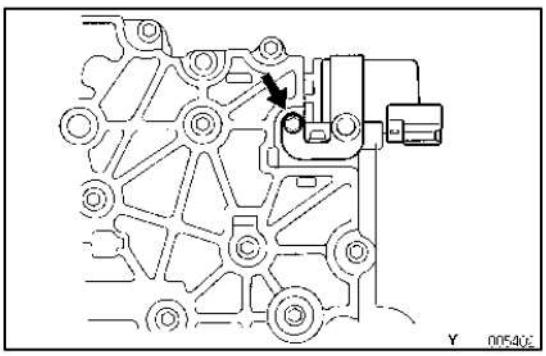
(d) Install the B_0 accumulator assembly.
(e) Install the torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



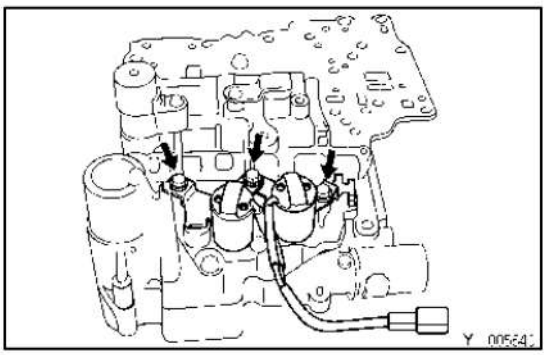
15. INSTALL LOCK PLATE



16. INSTALL SOLENOIDS
(a) Coat new O–rings with ATF and install them to the solenoids.
(b) Install the lock–up solenoid.
(c) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



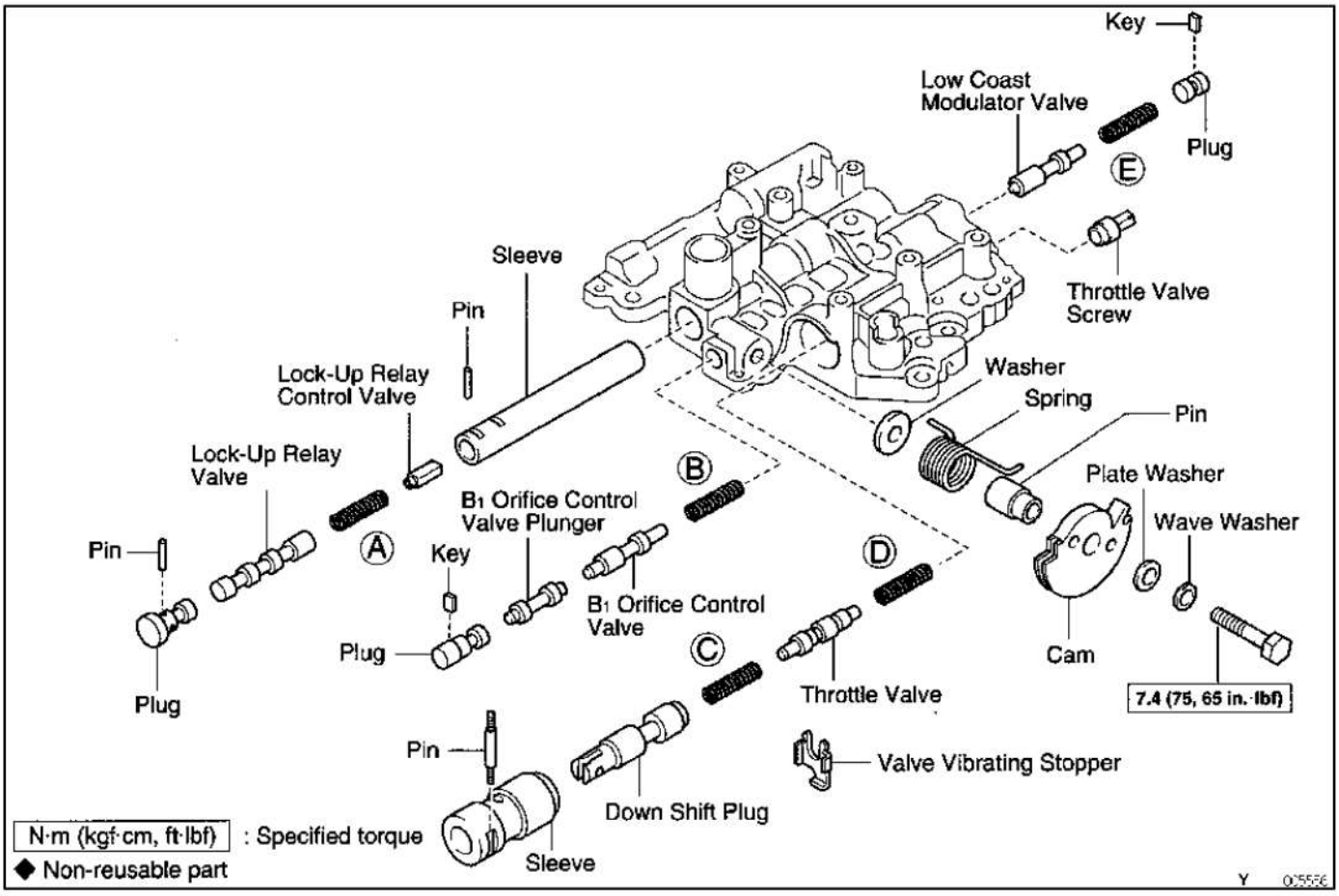
(d) Install the No.4 solenoid.
(e) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



(d) Install No.1 and No.2 solenoids.
(e) Install and torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

UPPER VALVE BODY
COMPONENTS

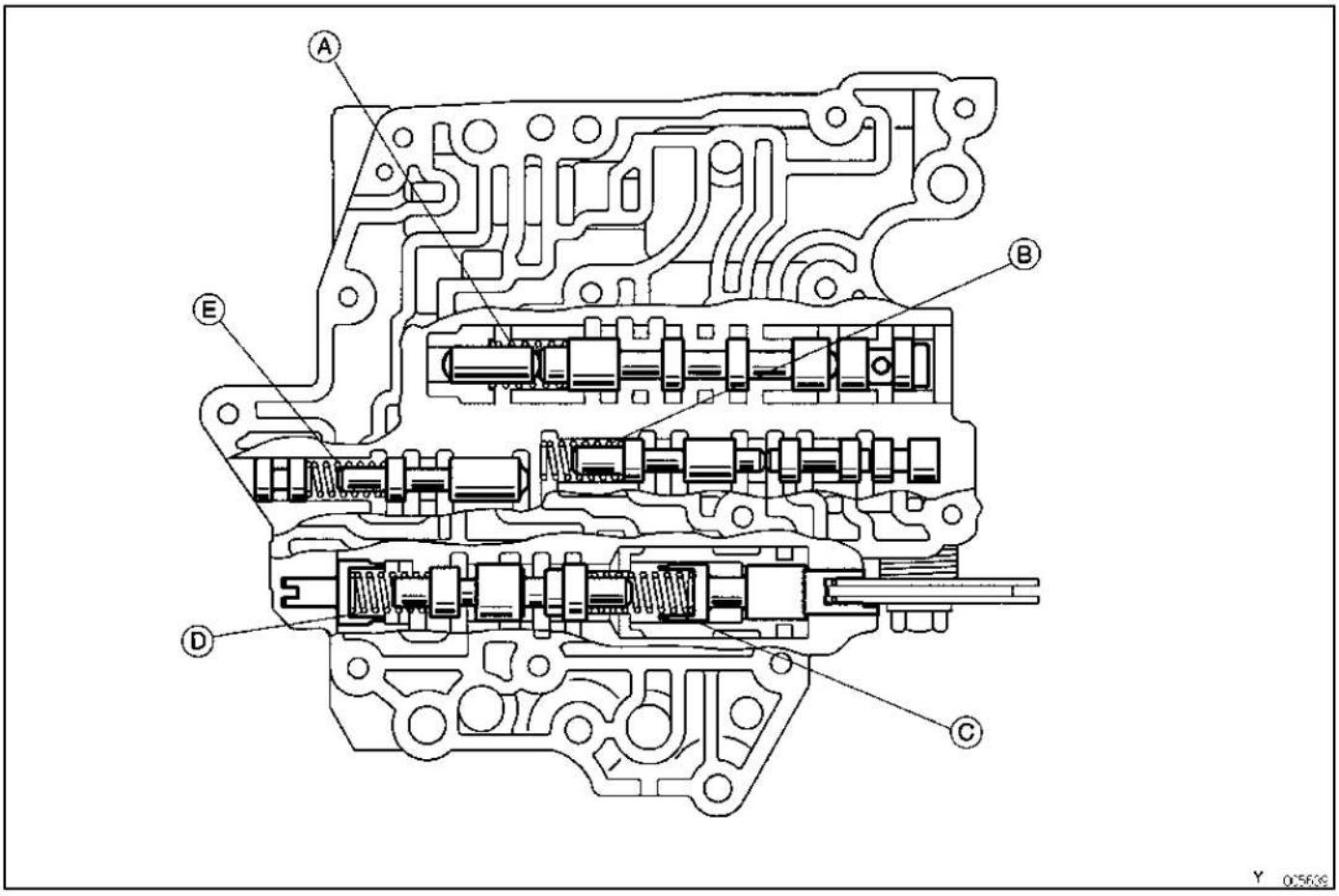
AX047-03



AX048-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.



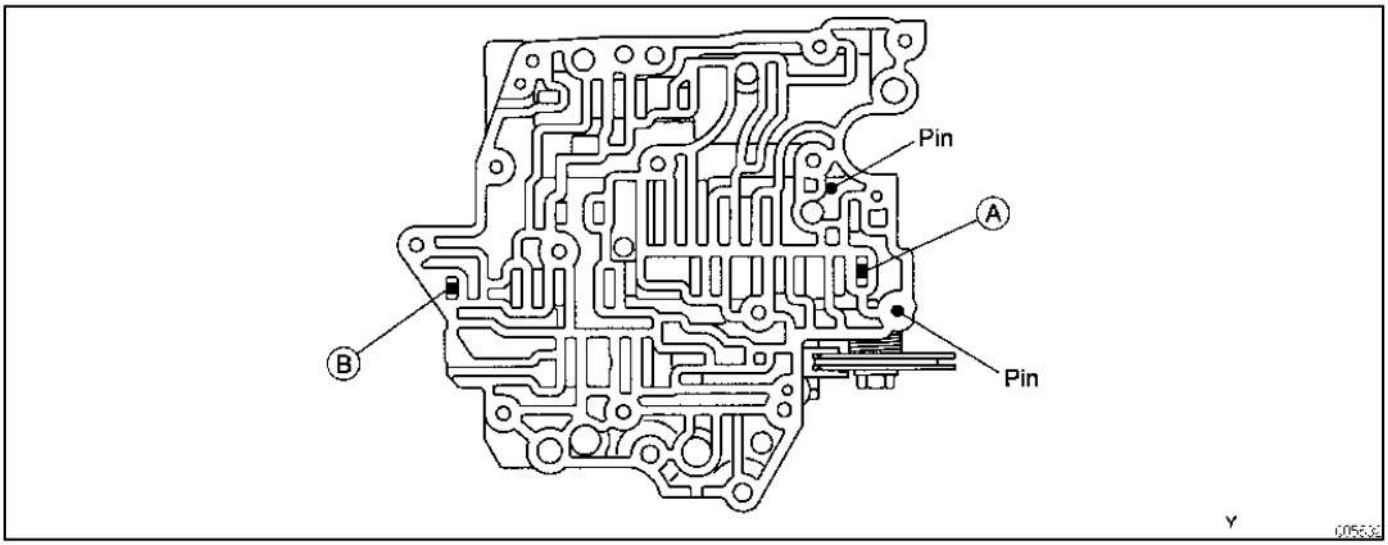
Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
@@@@@: [c A]	Lock–Up Relay Valve (Yellow)	26.8 (1.055) / 10.2 (0.402)	10.8
@@@@@: [c B]	B_1 Orifice Control Valve (White)	24.8 (0.976) / 6.4 (0.252)	12.0
@@@@@: [c C]	Throttle Valve (Green)	31.5 (1.240) / 7.0 (0.276)	11.4
@@@@@: [c D]	Down–Shift Plug (None)	15.0 (0.591) / 11.0 (0.433)	7.0

@@ @@ @: [c E]	Low Coast Modulator Valve (Purple)	20.2 (0.795) / 7.9 (0.311)	11.9

AX0GZ-02

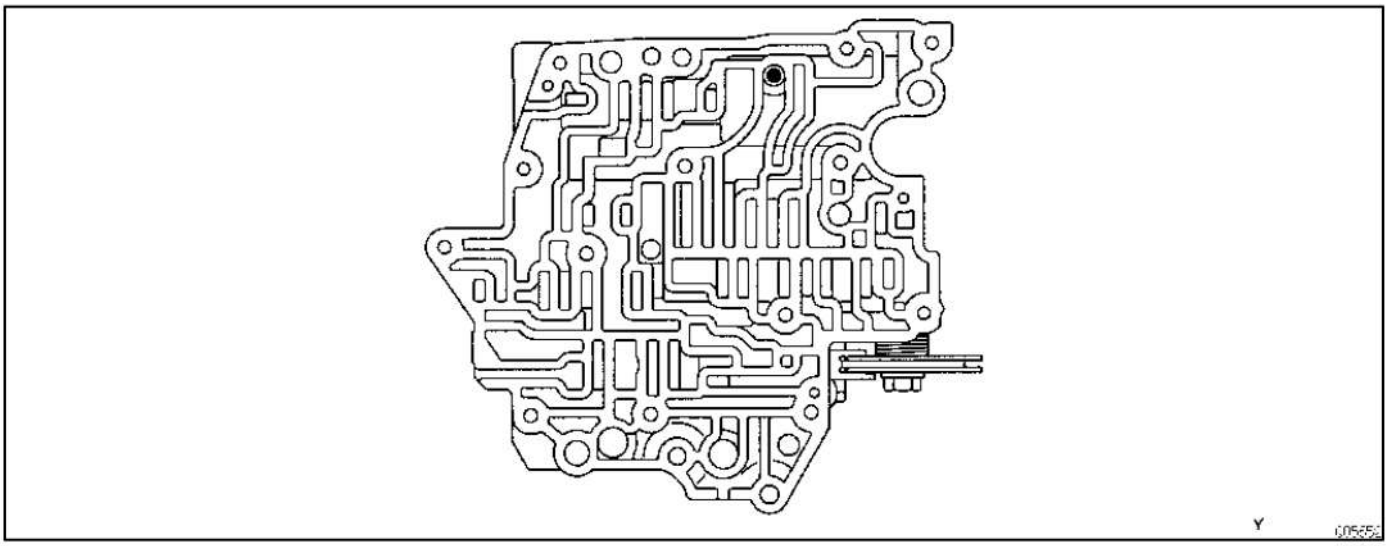
RETAINERS, PIN, AND CHECK BALLS LOCATION

1. PIN, RETAINERS



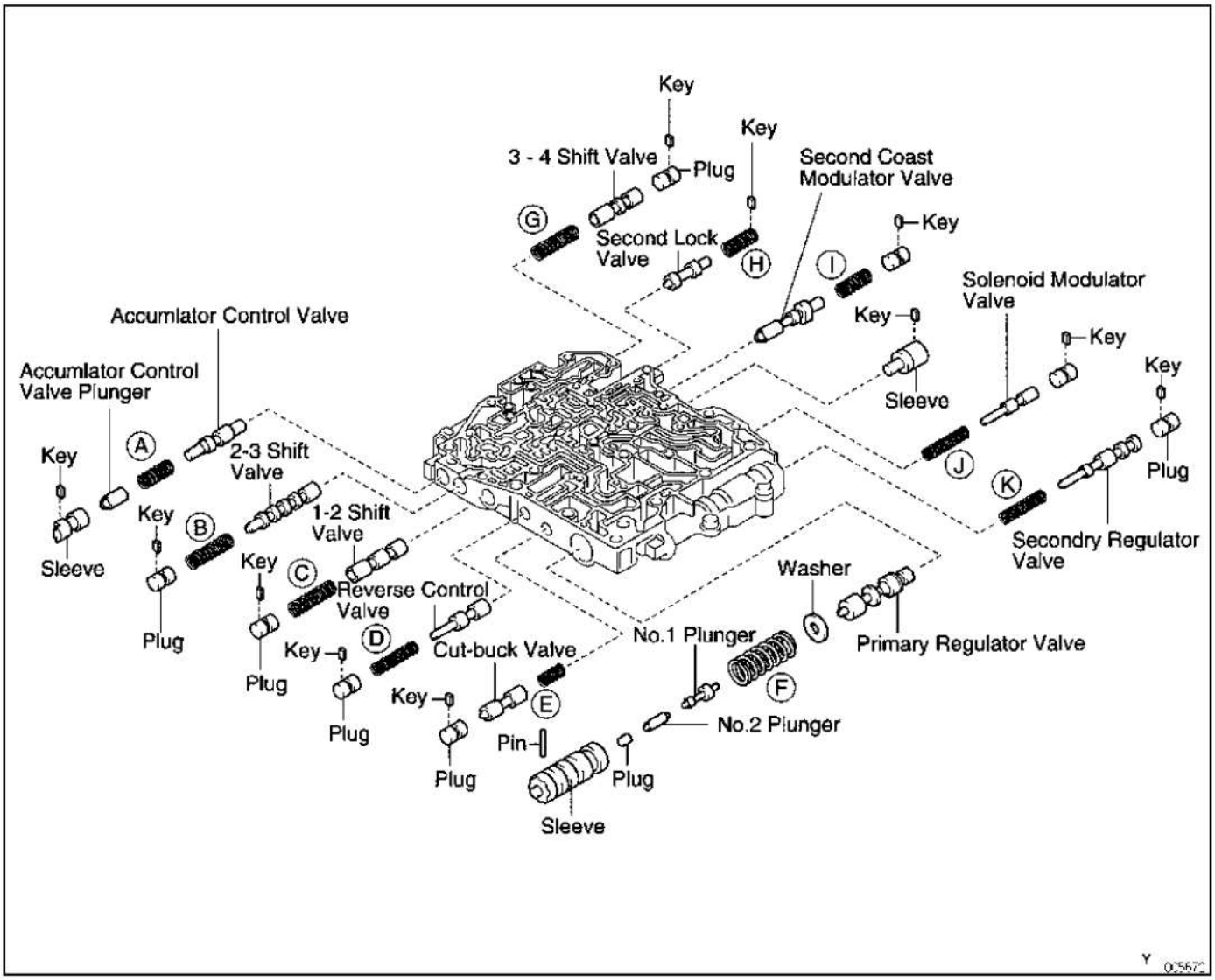
Mark	Name	Height / Width / Thickness mm (in.)
@@@@@: [c A]	B_1 Orifice Control Valve	8.9 (0.350) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c B]	Low Coast Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALLS



LOWER VALVE BODY
COMPONENTS

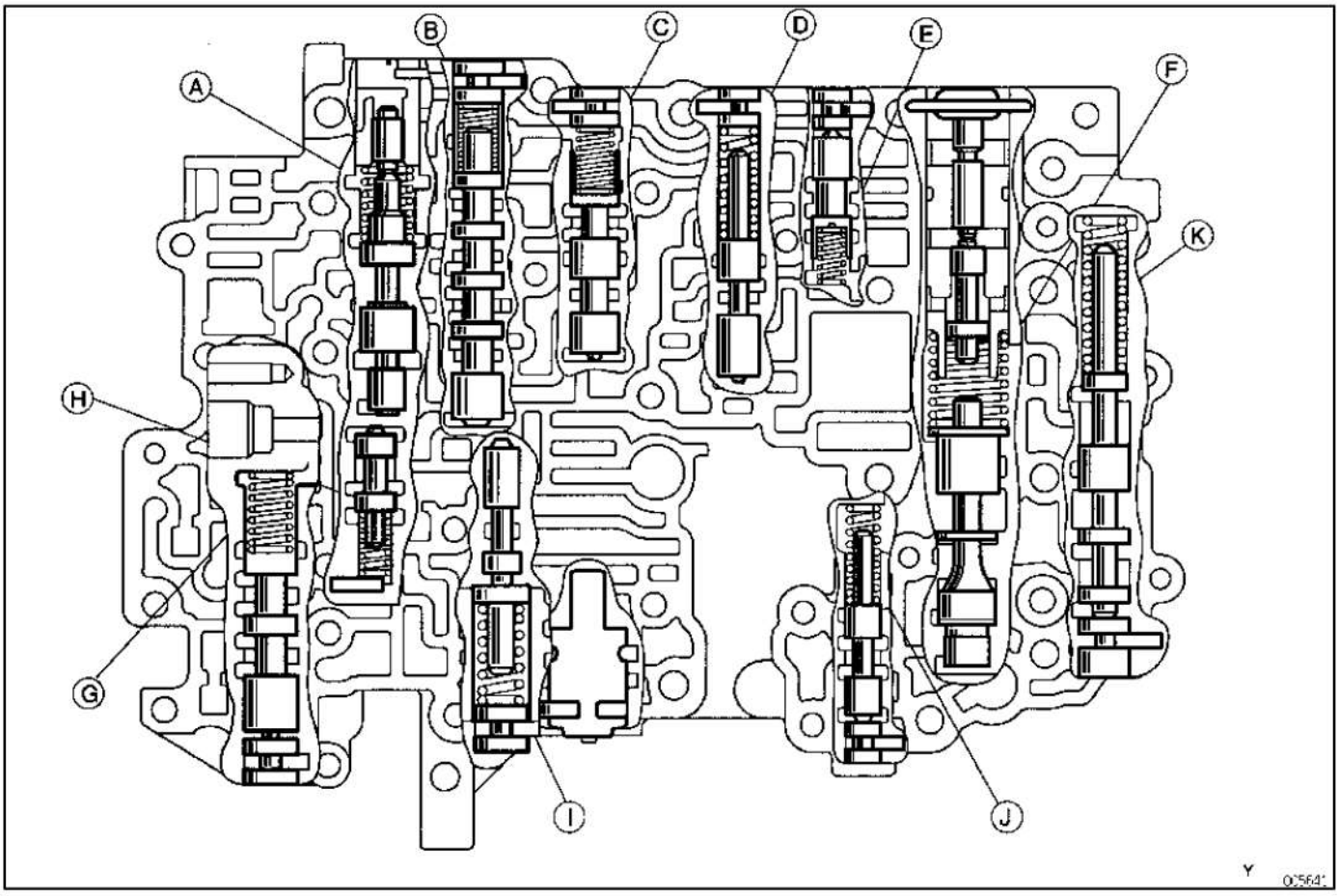
AX04A-03



AX04B-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.



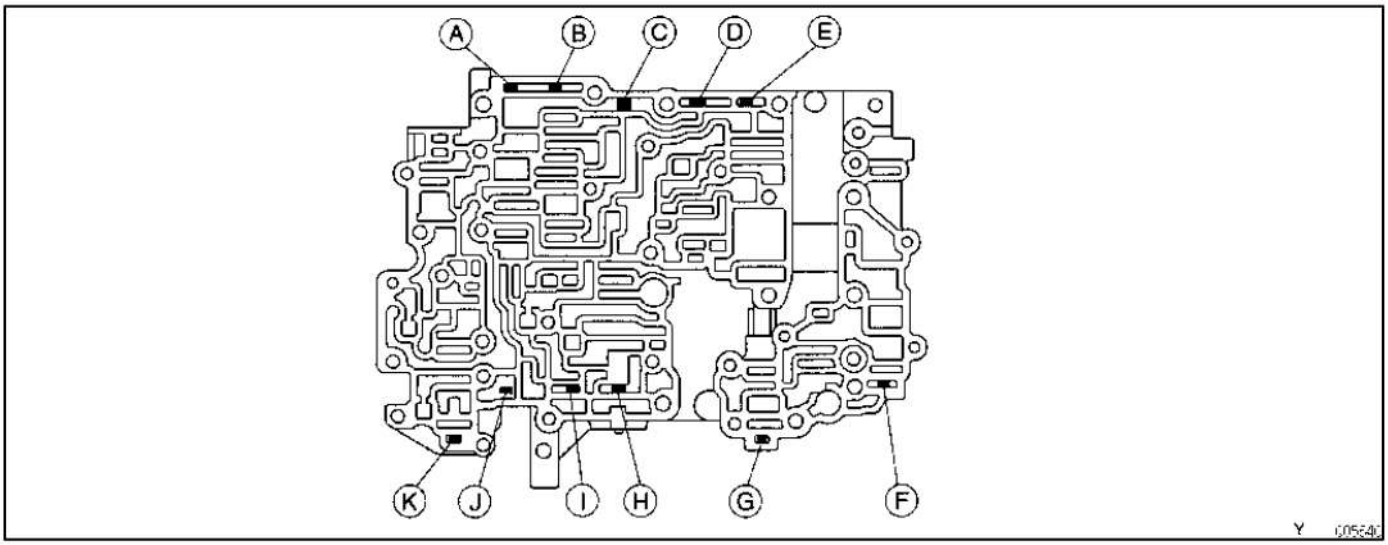
Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
@@@@@: [c A]	Accumulator Control Valve (Red)	25.1 (0.988) / 8.6 (0.339)	8.0
@@@@@: [c B]	2–3 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
@@@@@: [c C]	1–2 Shift Valve (Light Green)	29.2 (1.150) / 8.9 (0.350)	12.0
@@@@@: [c D]	Reverse Control Valve (White/Purple)	38.1 (1.500) / 6.5 (0.256)	19.0

@@@@@: [c E]	Cut–Back Valve (None)	21.8 (0.858) / 6.0 (0.236)	13.5
@@@@@: [c F]	Primary Regulator Valve (None)	36.6 (1.441) / 16.1 (0.634)	6.3
@@@@@: [c G]	3–4 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
@@@@@: [c H]	Second Lock Valve (None)	20.7 (0.815) / 7.4 (0.291)	9.5
@@@@@: [c I]	Second Coast Modulator Valve (White)	32.2 (1.268) / 9.0 (0.354)	11.4
@@@@@: [c J]	Solenoid Modulator Valve (Purple/Pink)	30.2 (1.189) / 5.6 (0.220)	15.3
@@@@@: [c K]	Secondary Regulator Valve (None)	46.9 (1.846) / 5.9 (0.232)	21.8

AX0TY-01

RETAINERS AND CHECK BALLS LOCATION

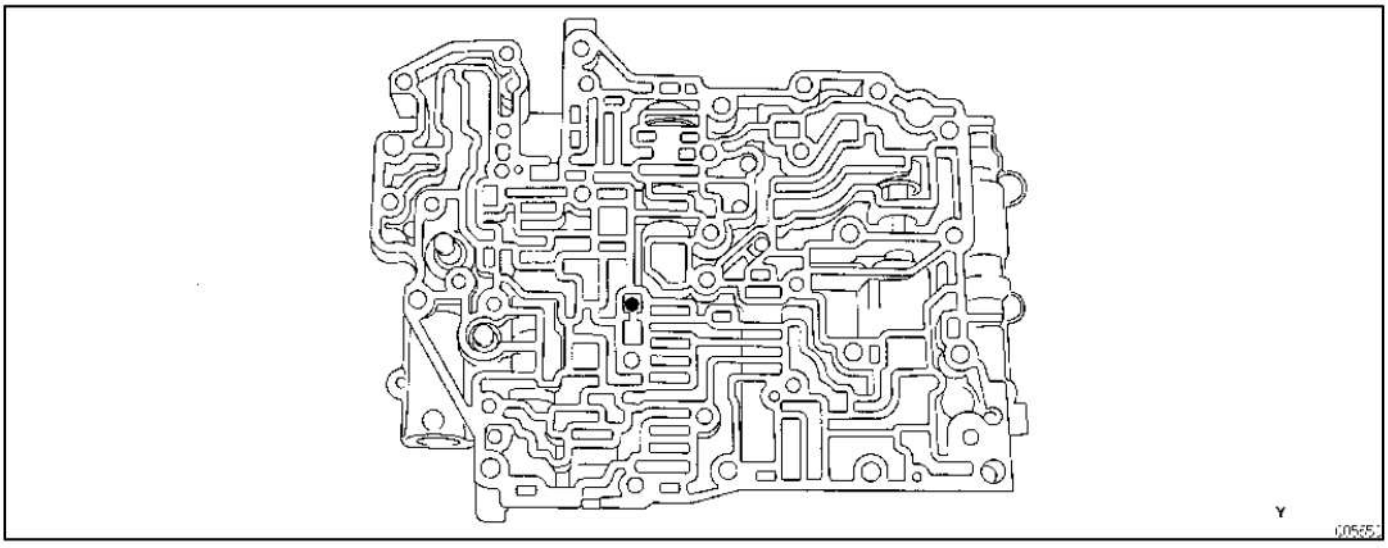
1. RETAINERS



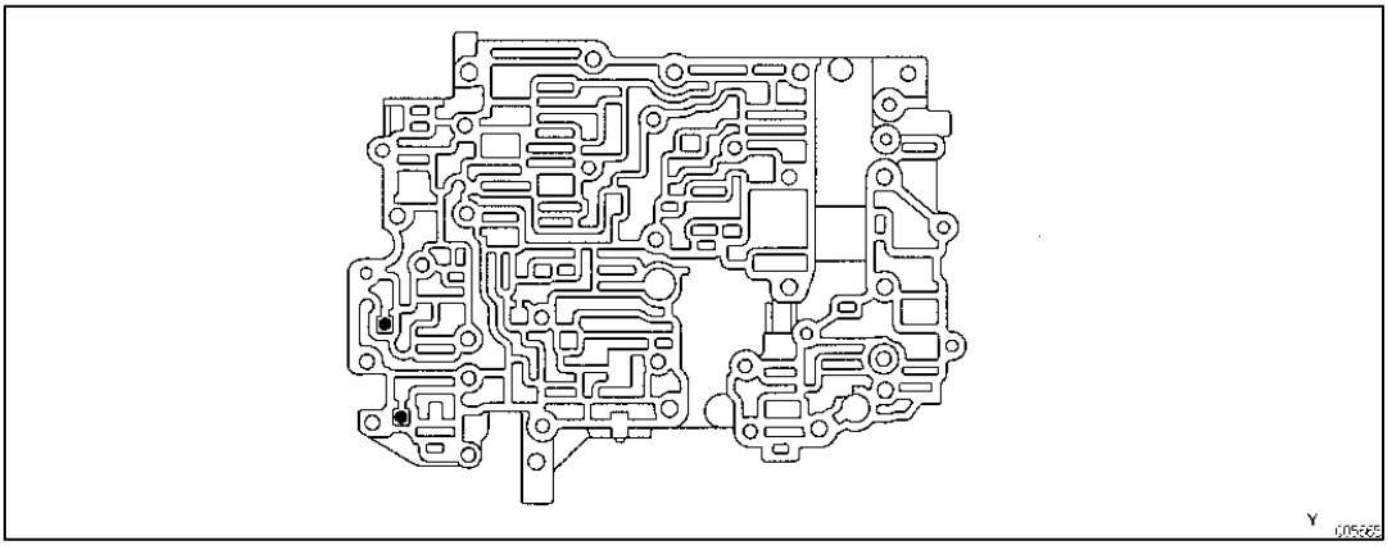
Mark	Name	Height / Width / Thickness mm (in.)
@@@@@: [c A]	Accumulator Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c B]	2–3 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c C]	1–2 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c D]	Reverse Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c E]	Cut–Back Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c F]	Secondary Regulator Valve	11.0 (0.433) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c G]	Solenoid Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c H]	Lock–Up Control Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c I]	Second Coast Modulator Valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c J]	Second Lock Valve	9.2 (0.362) / 11.5 (0.453) / 3.2 (0.126)
@@@@@: [c K]	3–4 Shift Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALLS

Upper Side



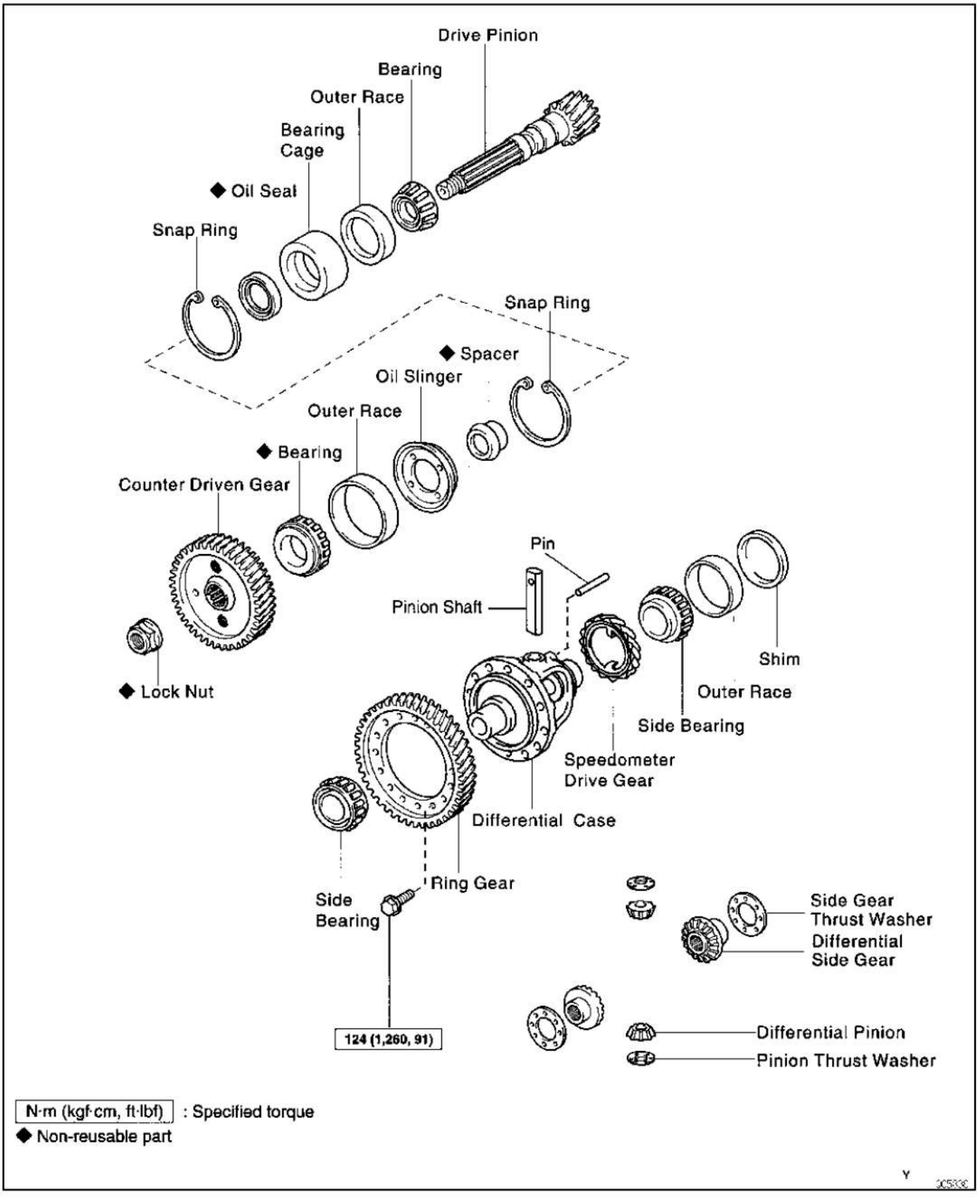
Lower Side



DIFFERENTIAL ASSEMBLY

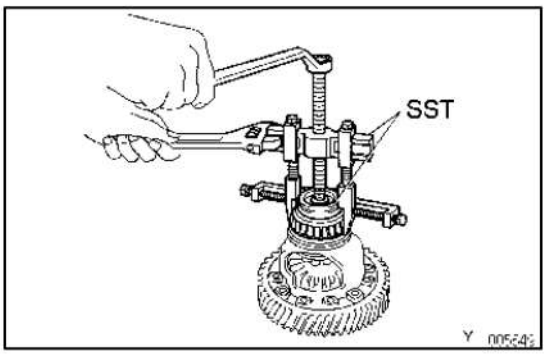
COMPONENTS

AX04D-02



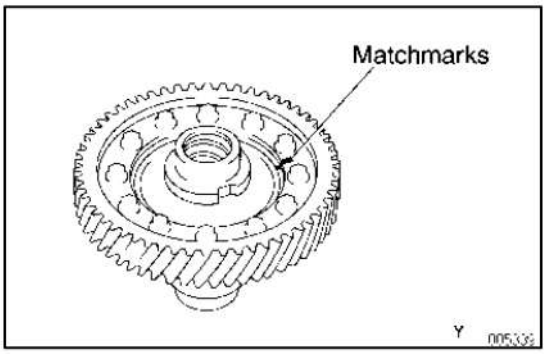
AX0TZ-02

DIFFERENTIAL CASE DISASSEMBLY



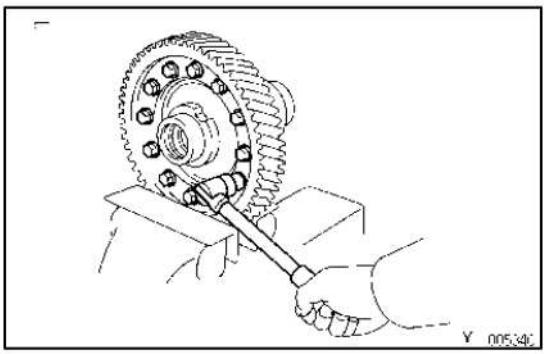
1. REMOVE SIDE BEARING

Using SST, remove the 2 side bearings.
SST 09608–16011, 09550–40010

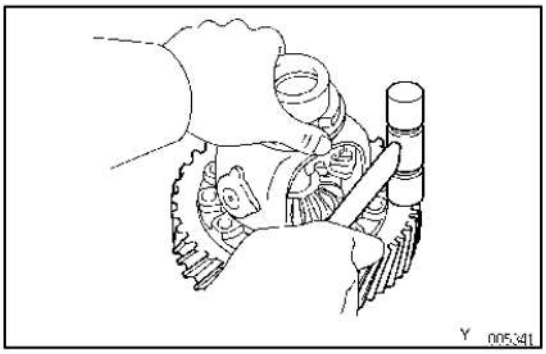


2. REMOVE RING GEAR

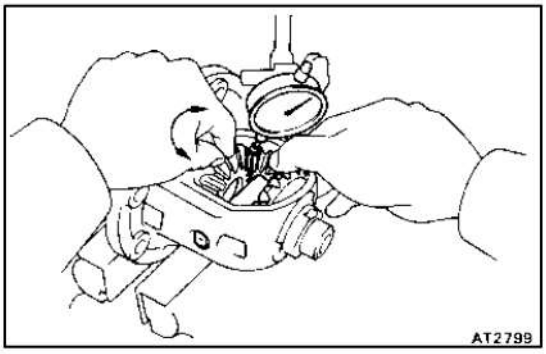
(a) Place matchmarks on both the differential case and ring gear.



(b) Remove the 12 bolts.



(c) Using a plastic hammer, tap out the ring gear.

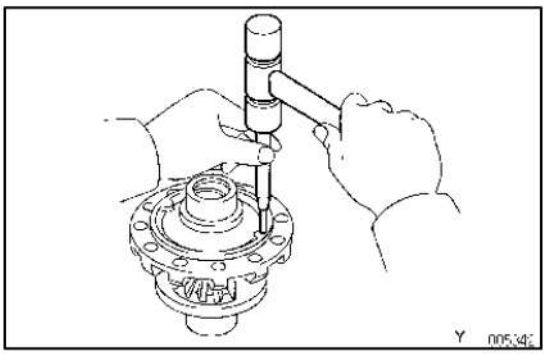


3. CHECK SIDE GEAR BACKLASH

Using a dial gauge, measure the backlash of each side gear while holding one pinion toward the case.

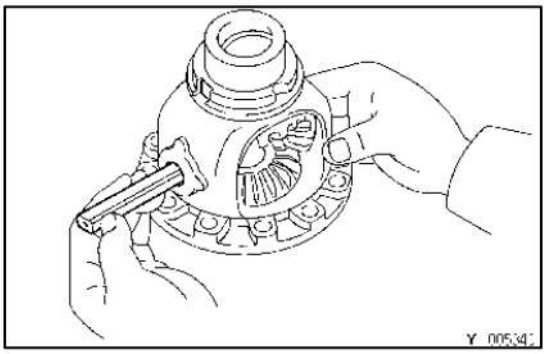
Standard backlash:

0.05 – 0.20 mm (0.0020 – 0.0079 in.)



4. DISASSEMBLE DIFFERENTIAL CASE

(a) Drive out the pinion shaft lock pin from the side on which the ring gear is installed.



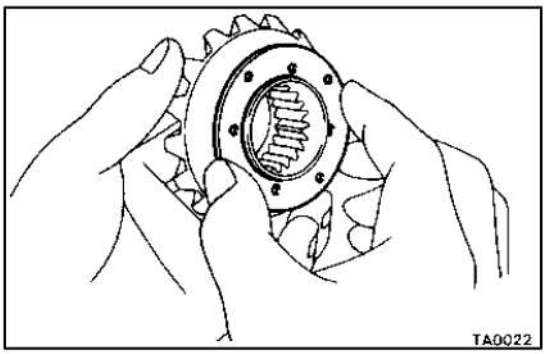
(b) Remove the pinion shaft from the case.
(c) Remove the 2 pinions and side gears with the 4 thrust washers.

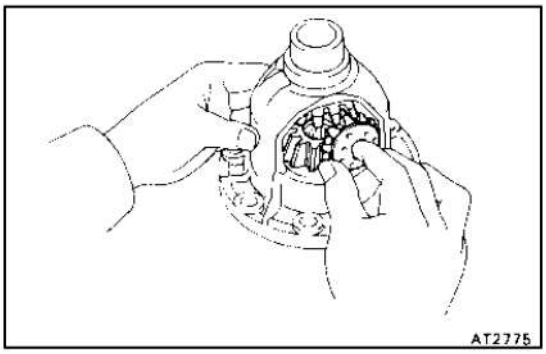
AX0U0-02

DIFFERENTIAL CASE ASSEMBLY

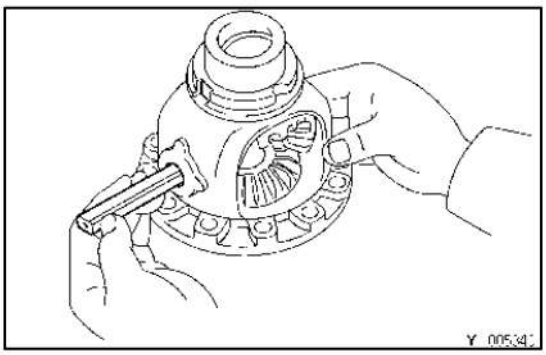
1. ASSEMBLE DIFFERENTIAL CASE

(a) Install the removed thrust washers to the side gears.

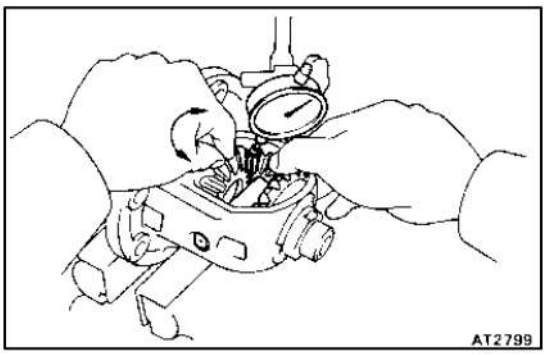




(b) Install the side gears with thrust washers, pinion thrust washers and pinion gears.



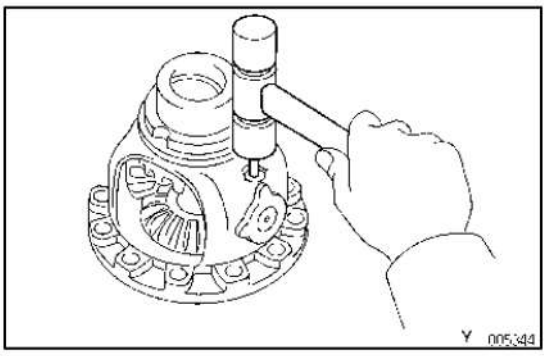
(c) Install the pinion shaft.



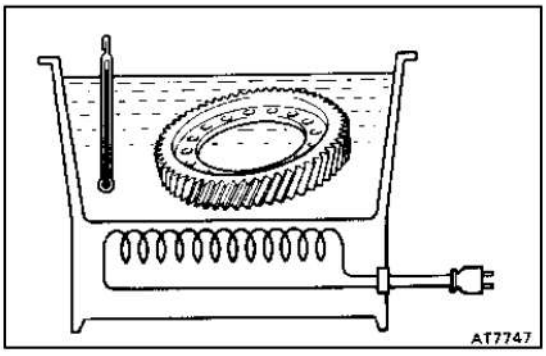
(d) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.
Standard backlash:
0.05–0.20 mm (0.0020–0.0079 in.)
Refering to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.
Thrust washer thickness
mm (in.)

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.0630)	1.70 (0.0670)
1.80 (0.0709)	

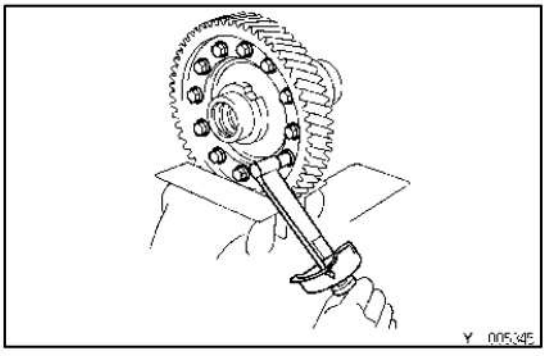
If the backlash is not within specification, install a thrust washer of a different thickness.



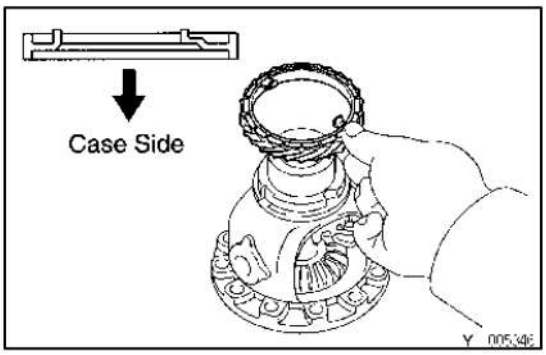
(e) Using a pin punch and hammer, drive the lock pin through the case and hole in the pinion shaft.
(f) Stake the differential case.



2. INSTALL RING GEAR
(a) Clean the contact surface of the differential case.
(b) Heat the ring gear to about 100°C (212°F) in an oil bath.
NOTICE: Do not heat the ring gear above 110°C (230°F).
(c) Carefully remove the ring gear from the oil bath.
(d) Clean the contact surface of the ring gear with cleaning solvent.

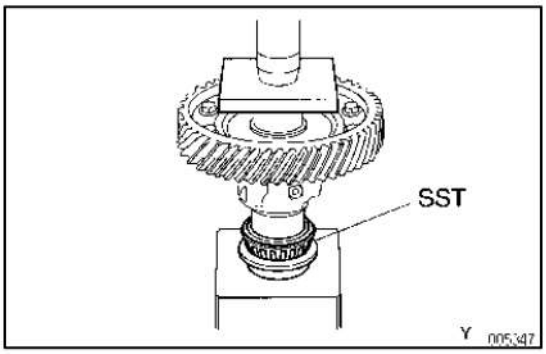


(e) Quickly install the ring gear on the differential case.
Install the 12 bolts.
HINT: Align the matchmarks on the differential left case and contact the ring gear.
(f) Tighten the set bolts uniformly a little at a time.
Torque the bolts.
Torque: 124 N·m (1,260 kgf·cm, 91 ft·lbf)

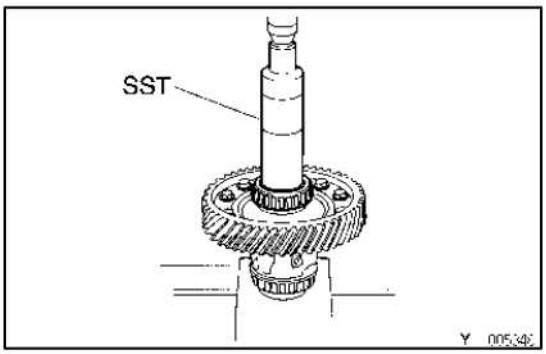


3. INSTALL SIDE BEARING

(a) Install the speedometer drive gear onto the differential case.



(b) Using SST and a press, press in the RH side bearing onto the differential case.
SST 09316–20011



(c) Using SST and a press, press in the LH side bearing onto the differential case.
SST 09316–60010 (09316–00010)

COMPONENT PARTS INSTALLATION

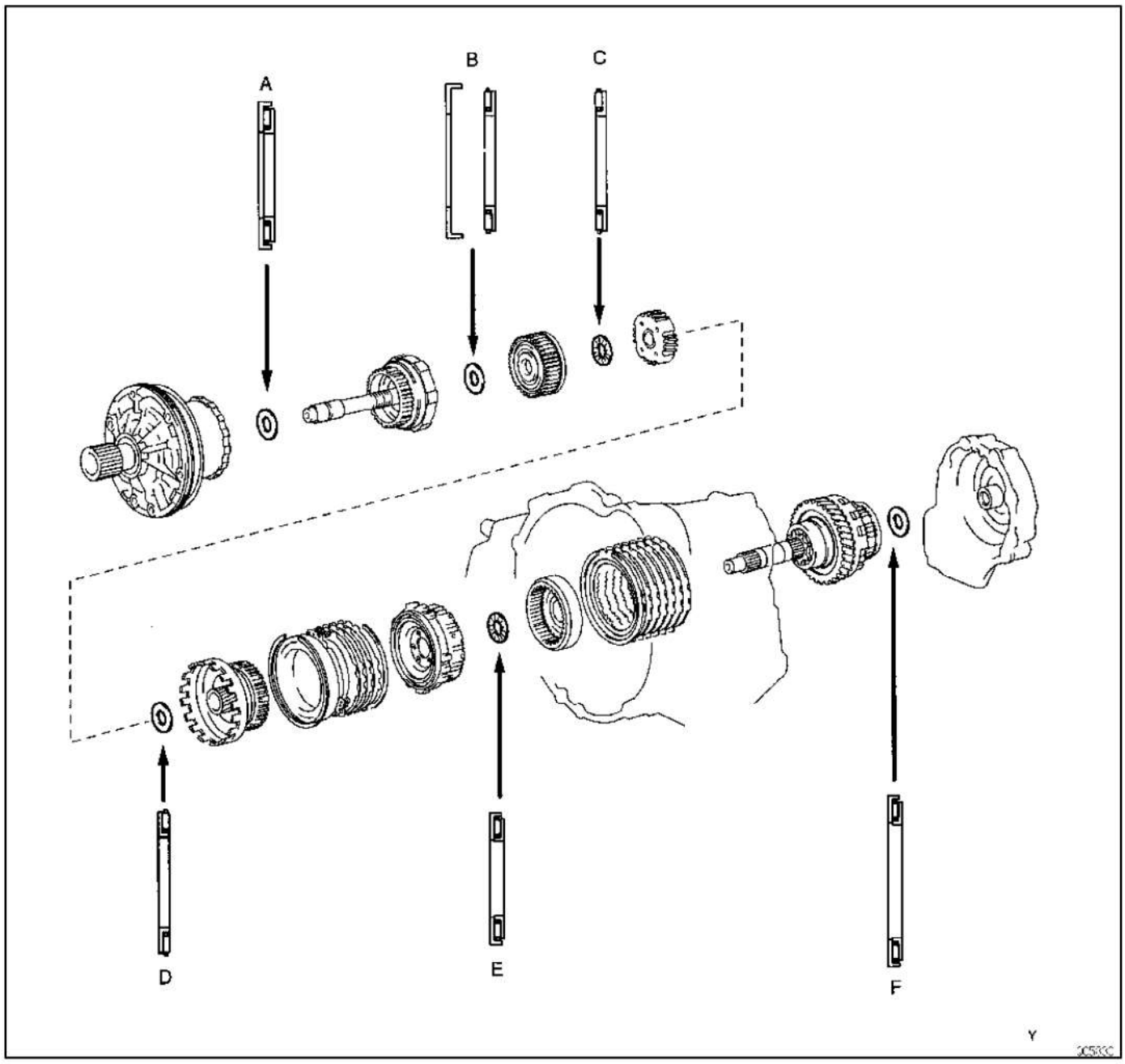
AX04G–06

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure, again, that all component groups are assembled correctly.
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.
Recommended ATF: D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

AX04H–03

GENERAL INSTALLATION NOTES:

(a) The automatic transaxle is composed of highly precision–finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
(b) Before assembling new clutch discs, soak them in automatic transaxle fluid for at least 15 minutes.
(c) Apply automatic transaxle fluid on the sliding or rotating surfaces of parts before assembly.
(d) Use petroleum jelly to keep small parts in their places.
(e) Do not use adhesive cements on gaskets and similar parts.
(f) When assembling the transaxle, be sure to use new gaskets and O–rings.
(g) Dry all parts with compressed air–never use shop rags.
(h) Be sure to install the thrust bearings and races in the correct direction and position.

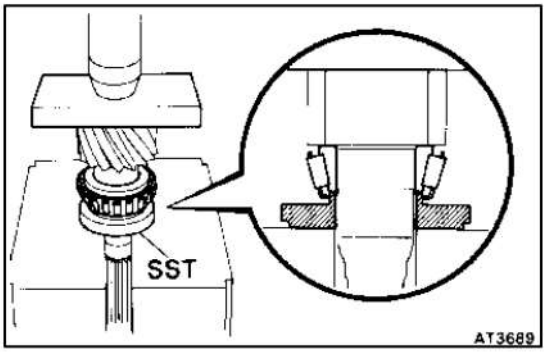


Mark	Thrust Bearing Outside Diameter mm (in.)	Thrust Bearing Inside Diameter mm (in.)
A	See page AX–118	27.7 (1.091)
B	47.6 (1.874)	31.4 (1.236)
C	45.5 (1.791)	30.1 (1.185)
D	45.5 (1.791)	30.1 (1.185)
E	38.7 (1.524)	22.6 (0.890)
F	46.3 (1.823)	28.6 (1.126)

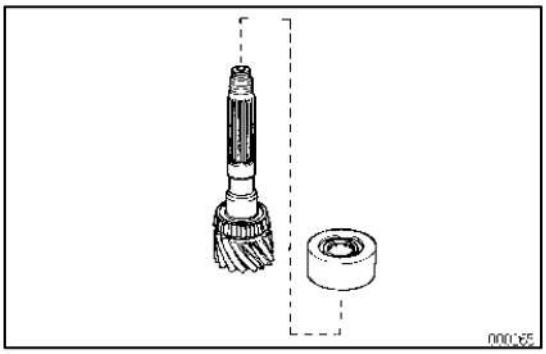
AX0U1-02

DIFFERENTIAL AND DRIVE PINION INSTALLATION

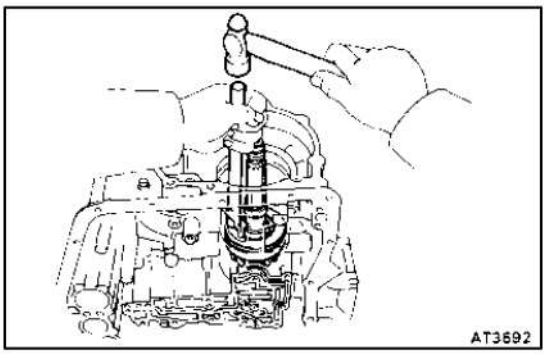
1. INSTALL DRIVE PINION INTO TRANSAXLE CASE



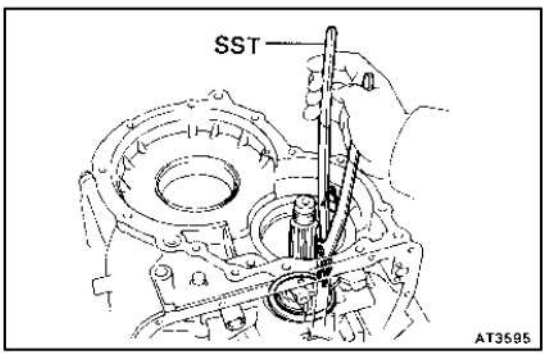
(a) Using SST, install the bearing to the drive pinion shaft.
SST 09350–32014 (09351–32120)



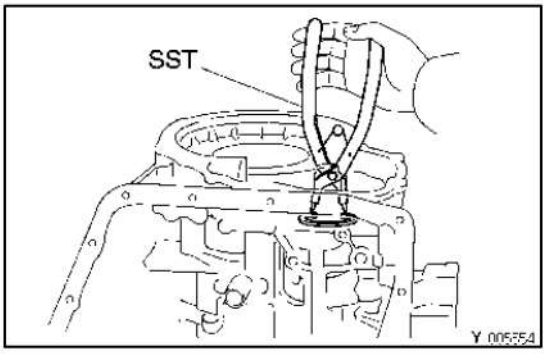
(b) Place the bearing cage onto the drive pinion shaft.
NOTICE: Be careful not to damage the oil seals with the pinion shaft.



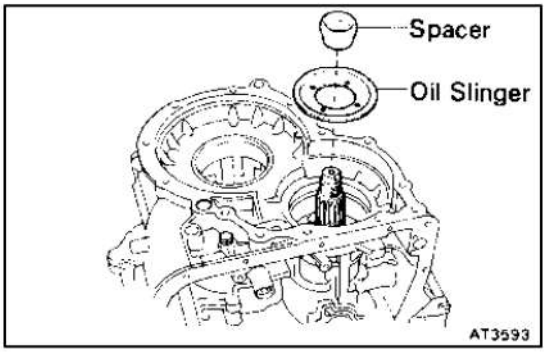
(c) Using a brass bar and hammer, slightly tap the bearing cage into the transaxle case until the snap ring groove in the bore can be seen.



(d) Using SST, install snap ring into the bore.
SST 09350–32014 (09351–32050)

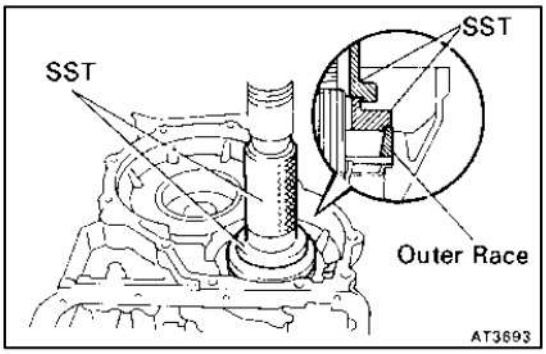


(e) Using SST, install the snap ring.
SST 09350–32014 (09351–32050)



2. PLACE OIL SLINGER AND NEW SPACER

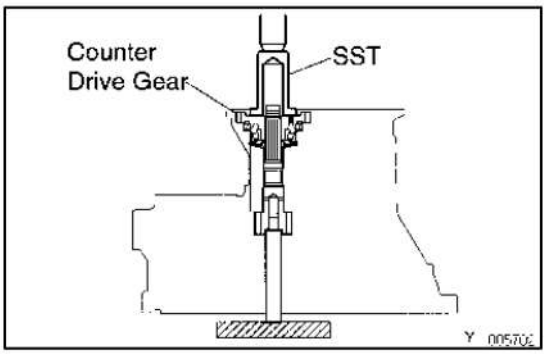
HINT: Install the spacer with the small end downward.



3. INSTALL OUTER RACE TO TRANSAXLE CASE

Using SST, press in the outer race.

SST 09350–32014 (09351–32100, 09351–32140)

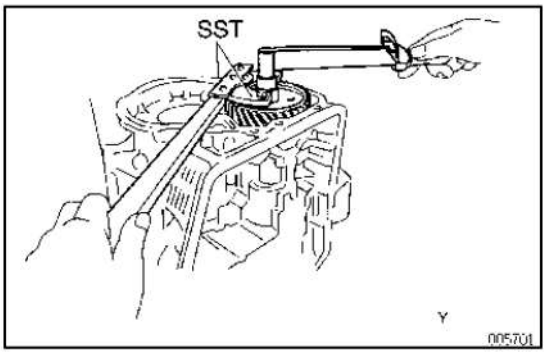


4. INSTALL COUNTER DRIVE GEAR

(a) Place a brass bar into the transaxle hole to hold the drive pinion shaft.

(b) Using SST, press in the counter driven gear until the counter driven gaer bearing almost touches the counter gear.

SST 09350–32014 (09351–32140)



5. INSTALL NEW LOCK NUT AND ADJUST DRIVE PINION PRELOAD

(a) Install the new lock nut.

(b) Using SST to hold the gear, tighten the nut.

Torque: 280 N·m (2,855 kgf·cm, 206 ft·lbf)

SST 09330–00021, 09350–32014 (09351–32032)

(c) Turn the gear counterclockwise and clockwise several times.

(d) Using a small torque wrench, measure the preload of the drive pinion.

Drive pinion preload (at starting):

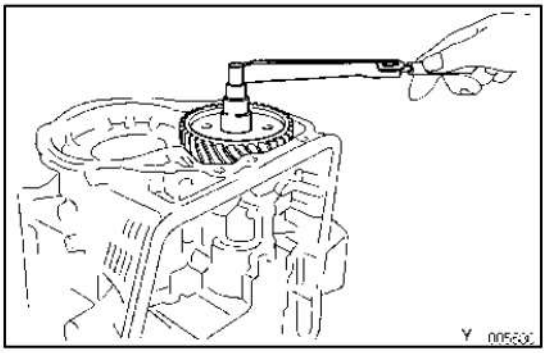
New bearing

1.0–1.6 N·m (10–16 kgf·cm, 8.7–13.9 in.·lbf)

Reused bearing

0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 in.·lbf)

★ If the preload is greater than specified, replace the bearing spacer.

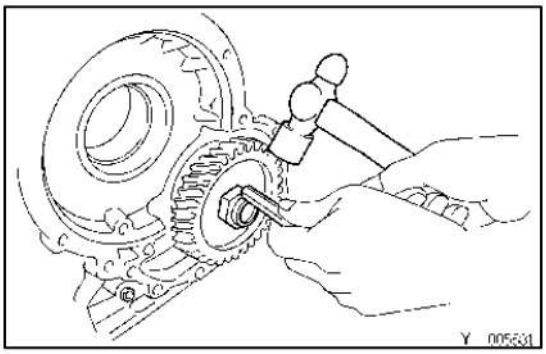


★ If the preload is less then specified, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

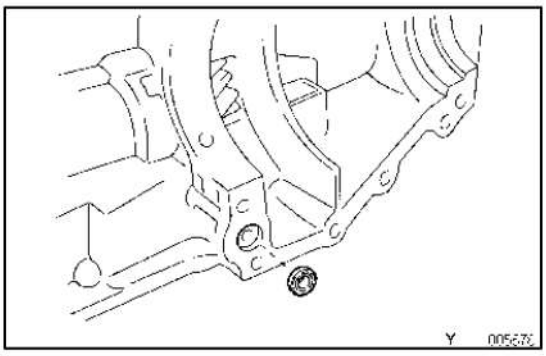
Do not back off the nut to reduce the preload.

Maximum torque: 353 N·m (3,600 kgf·cm, 260 ft·lbf)

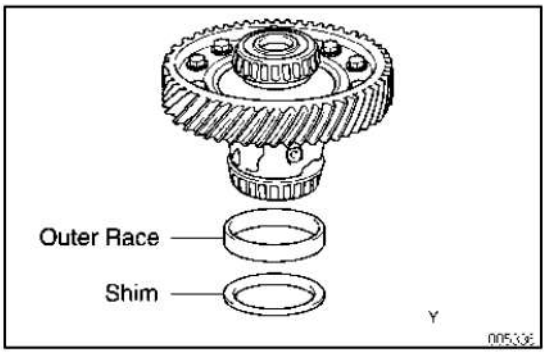


(e) If the preload is adjusted within specification, make a note of it.

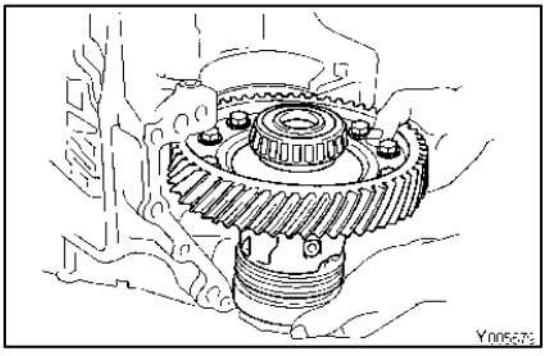
(f) Stroke the lock nut.



6. INSTALL APPLY GASKET

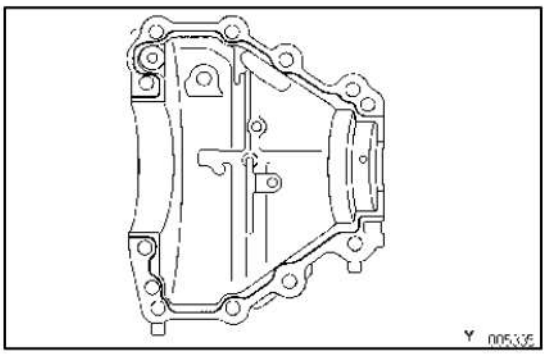


7. PLACE OUTER RACE AND SHIM ONTO RH SIDE BEARING



8. PLACE DIFFERENTIAL CASE INTO TRANSAXLE CASE

Be sure to install the shim and outer race into place.



9. INSTALL CARRIER COVER

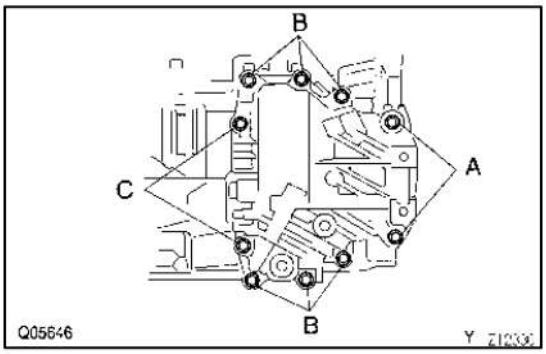
(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the carrier cover and transaxle case.

(b) Apply seal packing to the carrier cover.

Seal packing:

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

HINT: Install the carrier cover within 10 minutes after applying seal packing.



(c) Install and torque the 11 bolts.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

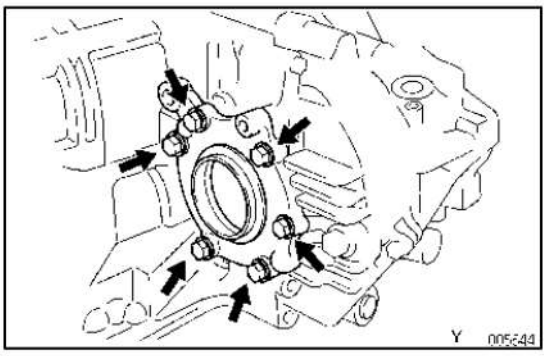
HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 100 mm (3.937 in.)

Bolt B: 65 mm (2.559 in.)

Bolt C: 75 mm (2.953 in.)



10. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material on the contacting surfaces of the LH bearing retainer and transaxle case.

HINT: Do not apply seal packing yet.

(b) Install the LH bearing retainer and torque the 6 bolts.

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

(c) Snap down the bearings by turning the differential case several times.

(d) Using a small torque wrench, measure the differential total preload.

Total preload (at starting):

New bearing

Drive pinion preload plus 0.2–0.4 N·m

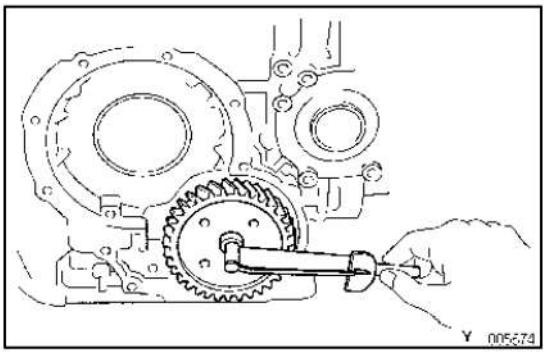
(2.5–5.1 kgf·cm, 2.2–3.6 in.·lbf)

Reused bearing

Drive pinion preload plus 0.1–0.2 N·m

(1.3–2.0 kgf·cm, 1.1–1.7 in.·lbf)

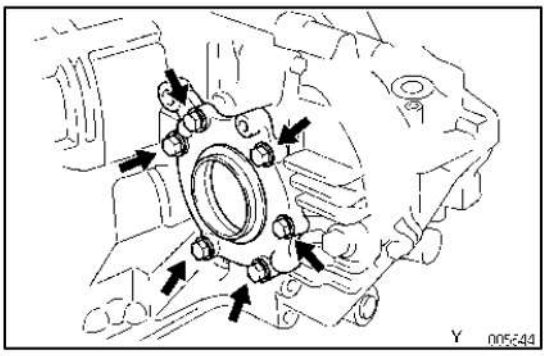
If the preload is not within specification, replace the adjusting shim in the LH bearing retainer with one of a different thickness.



AT3700:Adjusting shim thickness

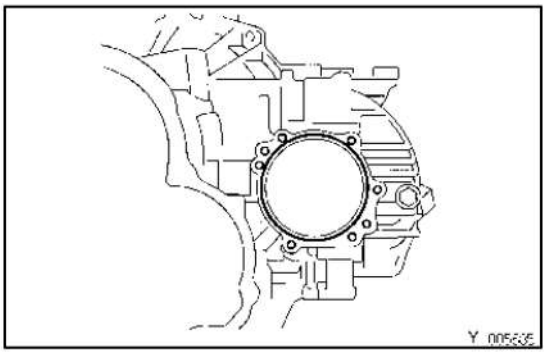
mm (in.)

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)



11. INSTALL LH BEARING RETAINER

(a) Remove the 6 bolts and LH bearing retainer.



(b) Remove any FIPG material on the contacting surfaces of LH bearing retainer, transaxle case and carrier cover.

(c) Apply FIPG to the transaxle case and carrier cover.

FIPG: Part No.08826–00090, THREE BOND 1281 or equivalent

HINT: Install the LH bearing retainer within 10 minutes after applying FIPG.

(d) Install the LH bearing retainer.

(e) Coat the threads of bolts with sealer.

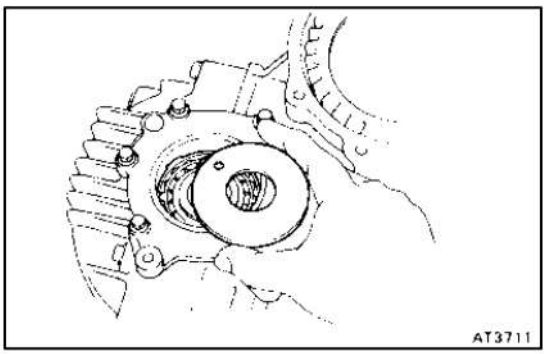
Sealer: Part No.08833–00070, THREE BOND 1324 or equivalent

(f) Tighten the bolts.

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

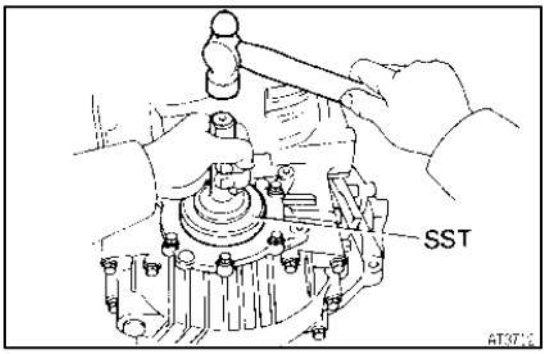
(g) Snap down the bearings.

(h) Recheck the differential total preload.

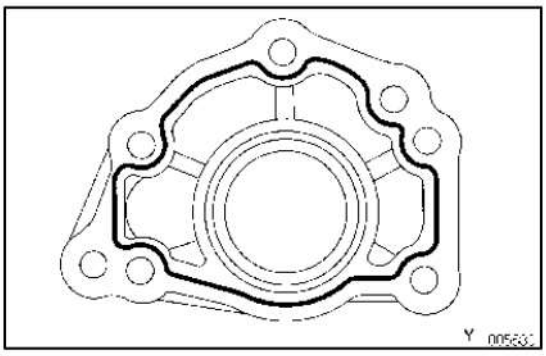


12. INSTALL NEW OIL SEAL

(a) Place the oil baffle onto the LH bearing retainer.



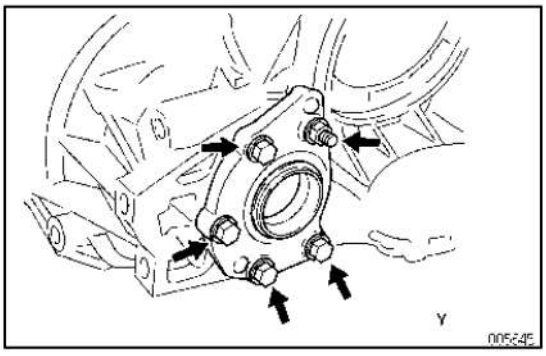
(b) Using SST, drive in a new oil seal unit its end is flush with surface of the LH bearing retainer.
SST 09223–15010



13. INSTALL RH RETAINER

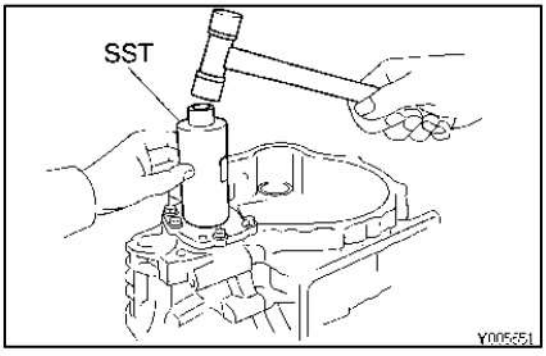
(a) Remove any FIPG material on the contacting surfaces of RH retainer and transaxle case.

(b) Apply FIPG to the RH retainer.
FIPG: Part No.08826–00090, THREE BOND 1281 or equivalent
HINT: Install the RH retainer within 10 minutes after applying FIPG.

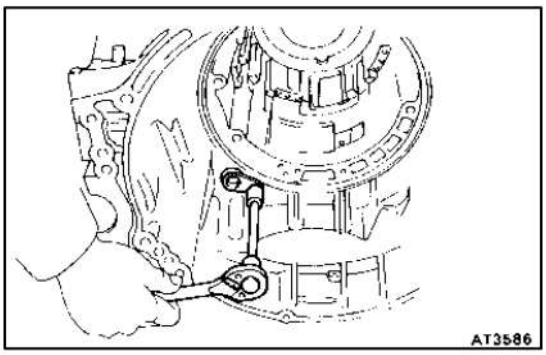


(c) Coat the bolts' threads with sealer.
Sealer: Part No.08833–00070, THREE BOND 1324 or equivalent

(d) Tighten the bolts.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

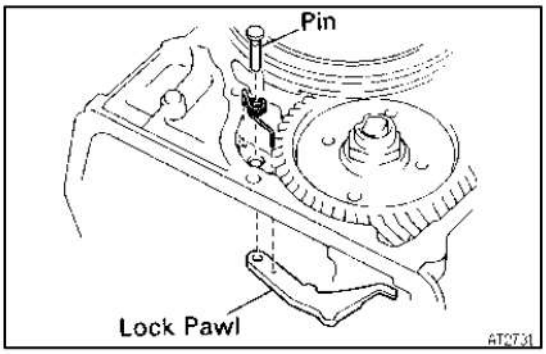


(e) Using SST, press in the oil seal.
SST 09226–10010



14. INSTALL DRIVE PINION CAP

(a) Install a new O–ring to the cap.
(b) Install the drive pinion cap to the transaxle case.

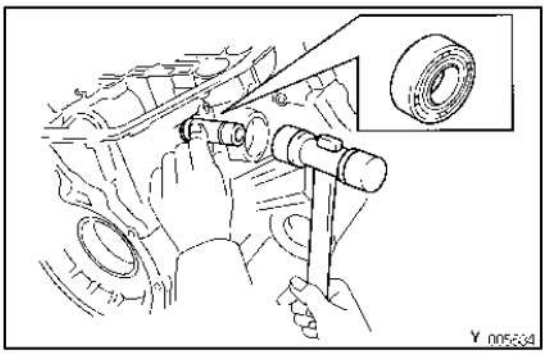


AX0U2-03

4–SPEED GEAR UNIT INSTALLATION

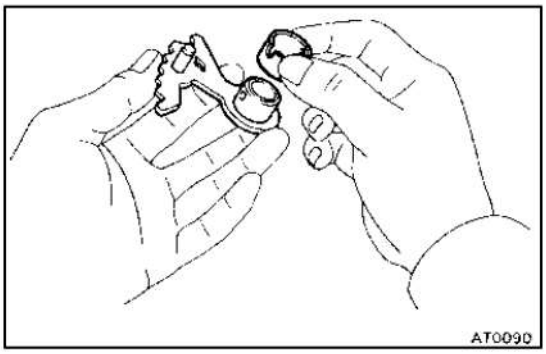
1. INSTALL PARKING LOCK PAWL

(a) Place the parking lock pawl onto the case.
Hook the spring ends to the case and pawl.
(b) Instal the pin into the hole of the case through the spring and pawl.

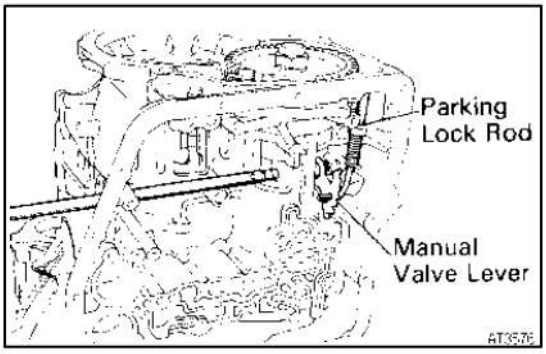


2. INSTALL MANUAL VALVE SHAFT

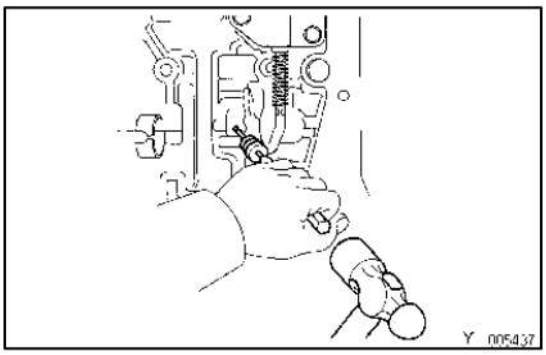
(a) Coat the oil seal lip with MP grease.
(b) Install the manual valve shaft oil seal to the case.



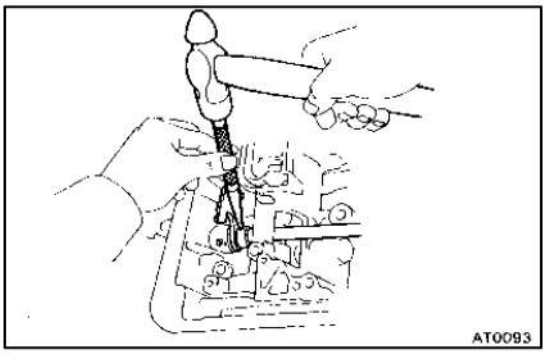
(c) Assembly a new collar to the manual valve lever.



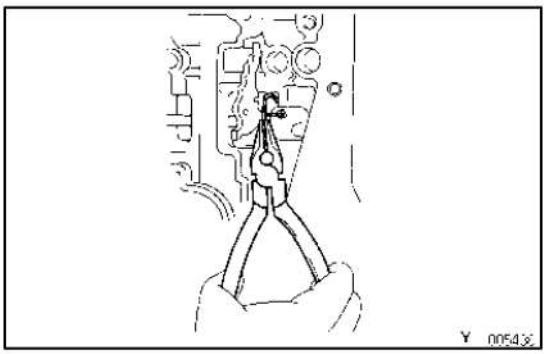
(d) Install the manual valve shaft to the transmission case through the manual lever.
(e) Install the parking lock rod.



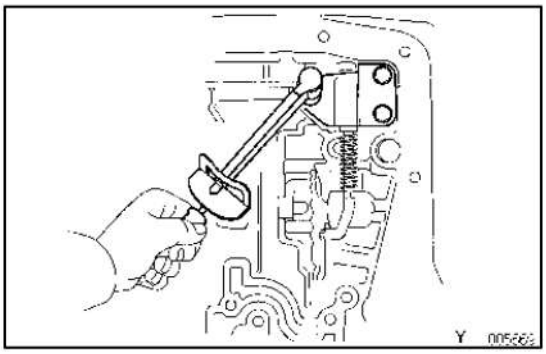
(f) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



(g) Match the collar hole to the lever caulking hollow and caulk the collar to the lever.

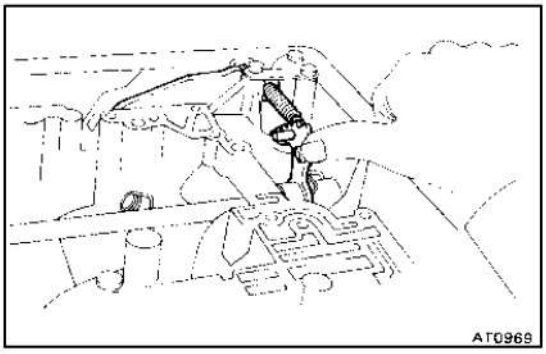


(h) Install the retaining spring.



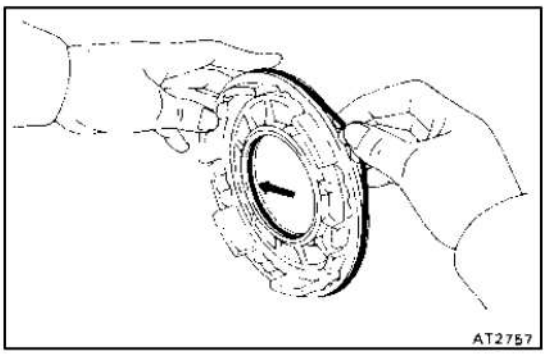
3. INSTALL PARKING LOCK PAWL BRACKET AND GUIDE

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



4. CHECK OPERATION OF PARKING LOCK PAWL

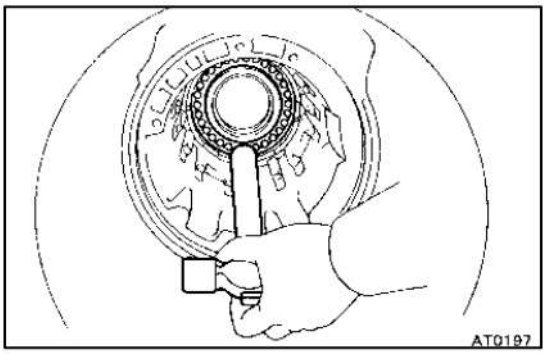
Make sure the counter driven gear is locked when the manual valve lever is in the P position.



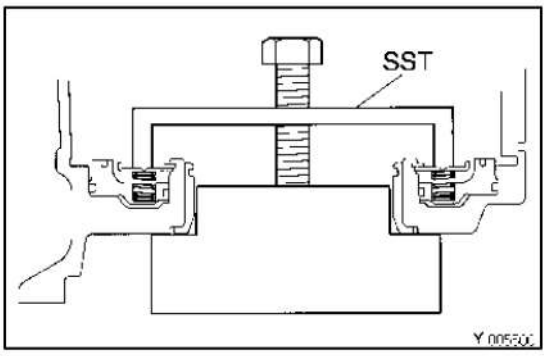
5. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

(a) Coat the new O–rings with ATF.

(b) Install the 2 O–rings on the piston.



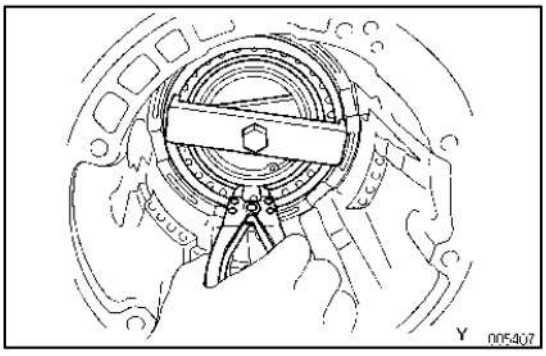
(c) Push the piston into the bore of the case, facing the spring seat upward.



6. INSTALL PISTON RETURN SPRING

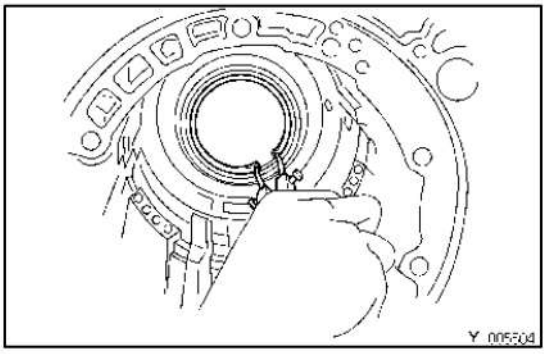
(a) Place the return spring and snap ring on the piston.

(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.
SST 09350–32014 (09351–32040)

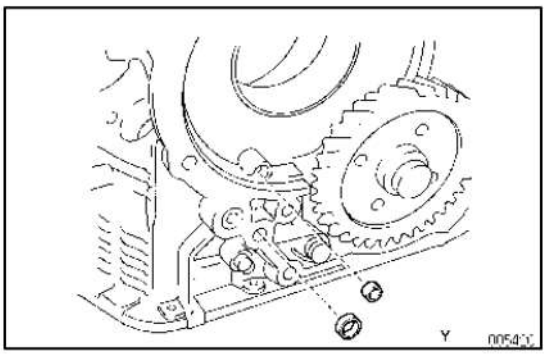


(c) Install snap ring. Visually check to make sure it is fully seated and centered by the 3 lugs on the spring retainer. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove the SST.

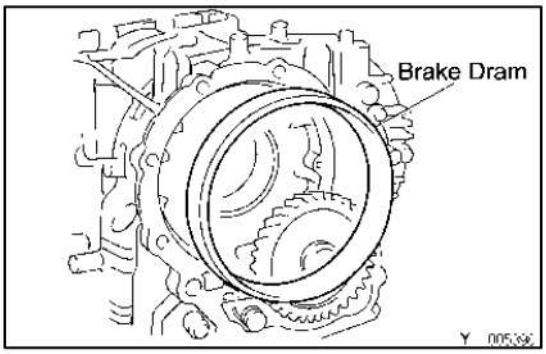


7. INSTALL SNAP RING TO TRANSAXLE CASE

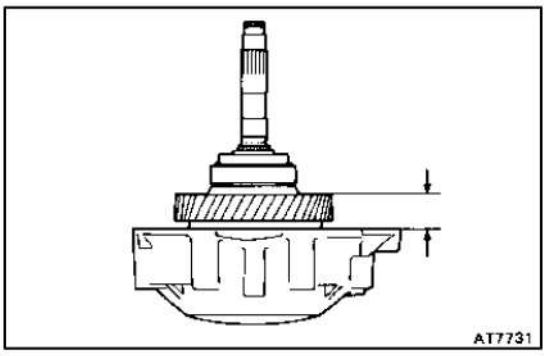


8. INSTALL OVERDRIVE UNIT

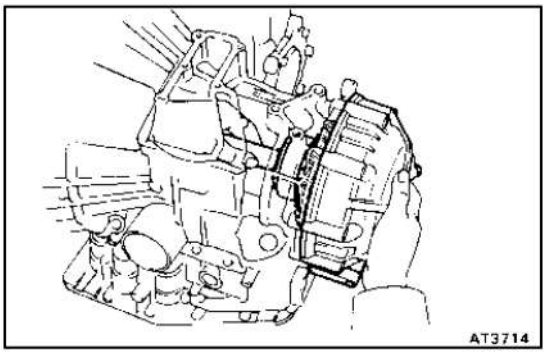
(a) Install the overdrive brake apply gasket and overdrive clutch apply gasket.



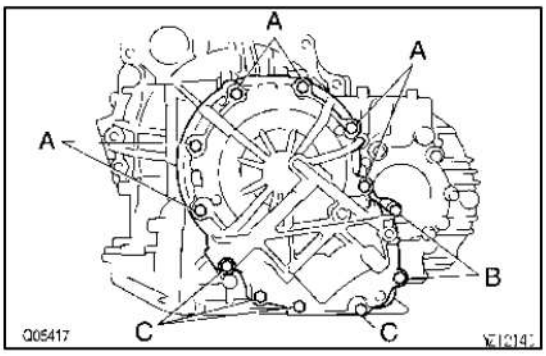
(b) Install the overdrive brake drum to the case.
(c) Install the new case gasket to the case.



(d) Make sure that the length from the top surface of the case to the counter driven gear surface should be about 24 mm (0.94 in.).

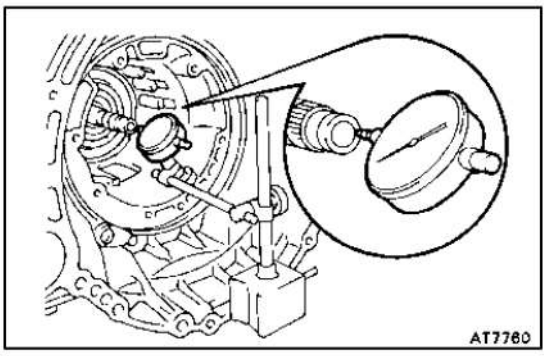


(e) Place the new gasket onto the transaxle case.
(f) Install the overdrive assembly with overdrive case to the transaxle case.



(g) Coat the threads of 23 mm (0.91 in.) bolts with sealer.
Sealer:
Part No.08833–00070, THREE BOND 1324 or equivalent

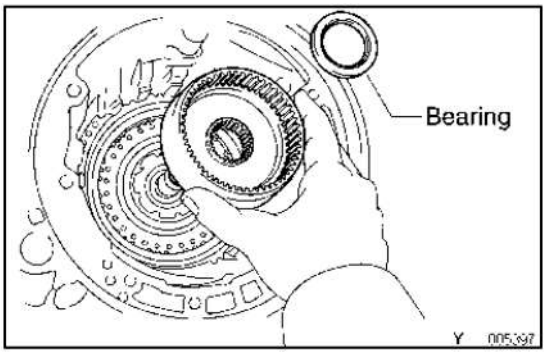
(h) Install and tighten the 13 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 61 mm (2.402 in.)
Bolt B 38 mm (1.496 in.)
Bolt C: 23 mm (0.906 in.)
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



9. CHECK INTERMEDIATE SHAFT END PLAY

(a) Make sure that the intermediate shaft as end play in axial direction.
End play: 0.47–1.50 mm (0.0185–0.0591 in.)
If the end play is not within specification, check the installation of intermediate shaft.

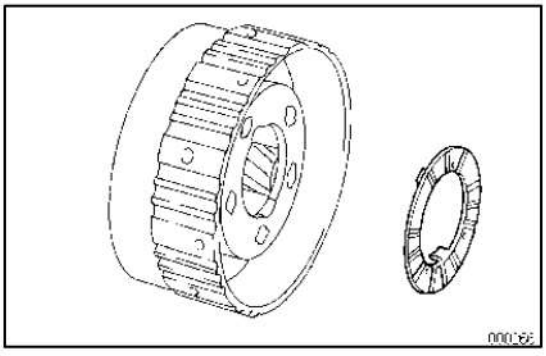
(b) Make sure that the intermediate shaft turns smoothly.



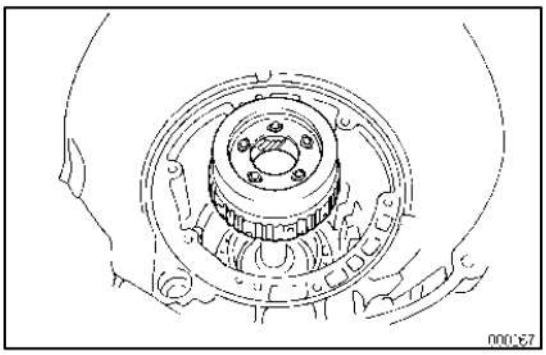
10. INSTALL REAR PLANETARY GEAR

(a) Install the rear planetary ring gear.

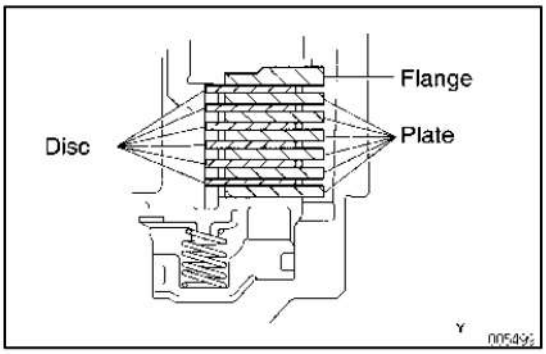
(b) Place the bearing onto the ring gear.
Bearing outer diameter: 38.7 mm (1.524 in.)
Bearing inner diameter: 22.6 mm (0.890 in.)



(c) Coat the thrust washer with petroleum jelly and place it onto the rear planetary gear.



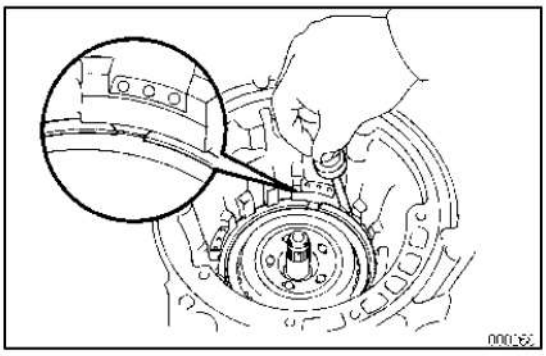
(d) Install the rear planetary gear.



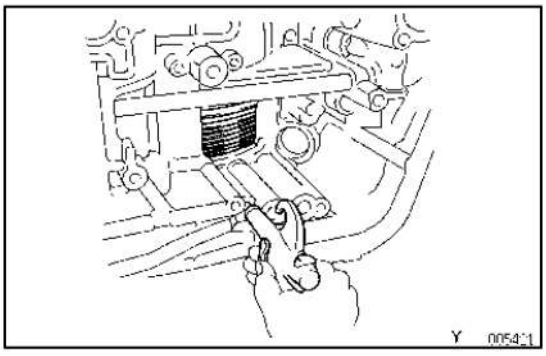
11. INSTALL DISCS, PLATES AND FLANGE OF FIRST AND REVERSE BRAKE

(a) Install the 6 plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D–P–D–P–D–P–D

(b) Install the flange, facing the flat end downward.

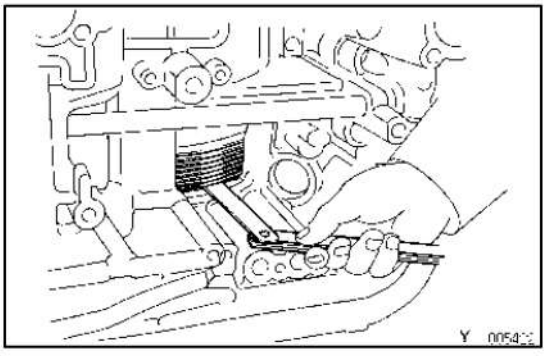


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of the cutouts.

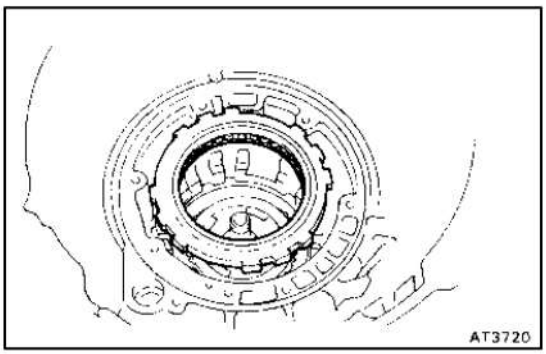


12. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.

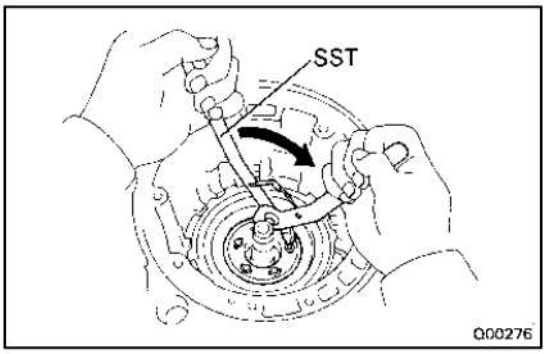


(b) Using a filler gauge, check that pack clearance of the first and reverse brake.
Clearance:
1.92–2.68 mm (0.0756–0.1055 in.)

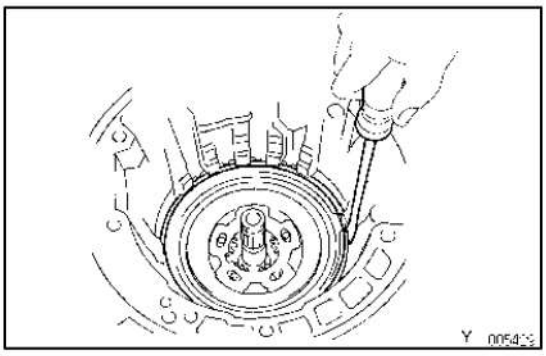


13. INSTALL NO.2 ONE–WAY CLUTCH INTO CASE

(a) Place the No.2 one–way clutch with the shiny side of flange upward.

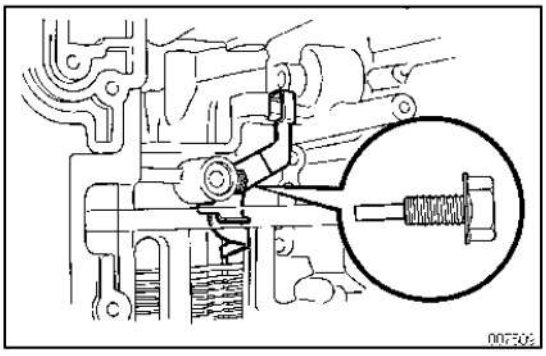


(b) Install the one–way clutch while turning the planetary gear clockwise with SST.
SST 09350–32014 (09351–32050)
If the planetary gear cannot turn clockwise, check the installation of the one–way clutch.

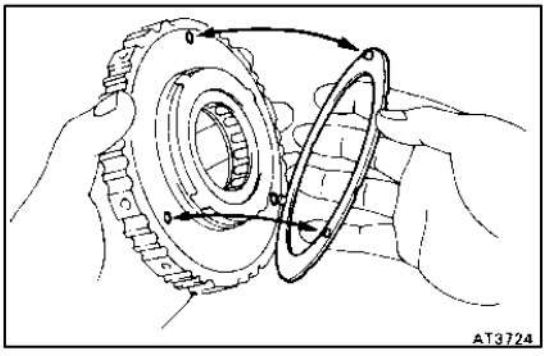


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of cutouts.

(d) Coat the thrust washer with petroleum jelly and install it onto the rear planetary gear.

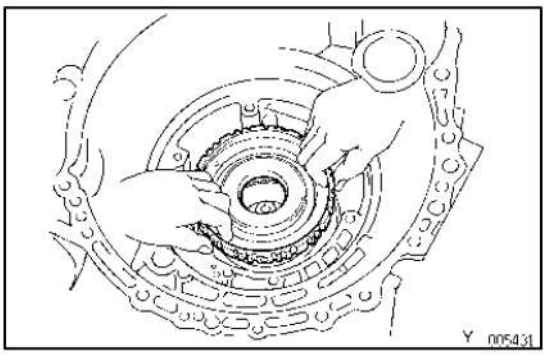


14. INSTALL SECOND COAST BRAKE BAND GUIDE

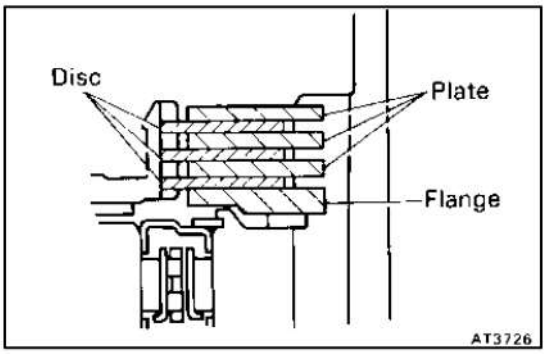


15. PLACE NO.1 ONE–WAY CLUTCH

(a) Coat the thrust washer with petroleum jelly and install it on the No.1 one–way clutch.



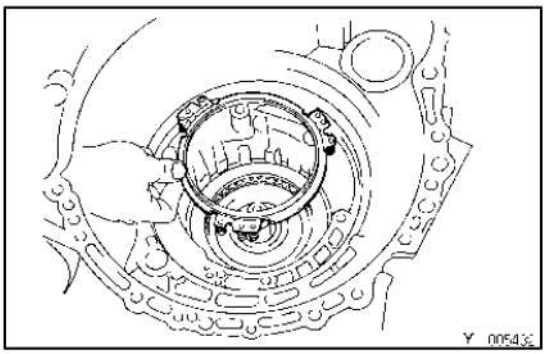
(b) Place the No.1 one–way clutch onto the rear planetary gear.



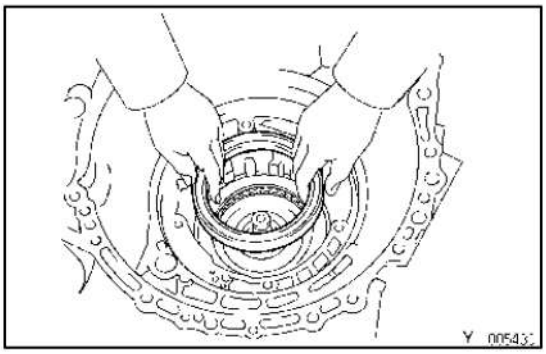
16. INSTALL SECOND BRAKE

(a) Install the flange, facing the flat end upward.

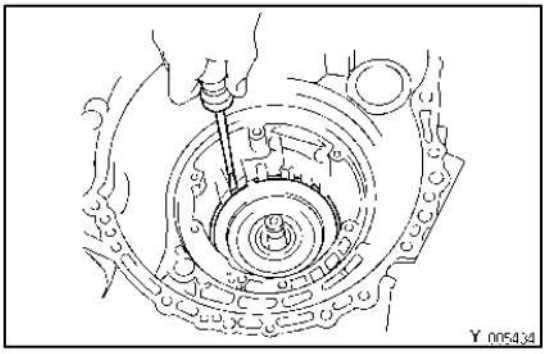
(b) Install the 3 discs and plates.
Install in order:
P=Plate D=Disc
D–P–D–P–D–P



(c) Place the piston return spring into the case.



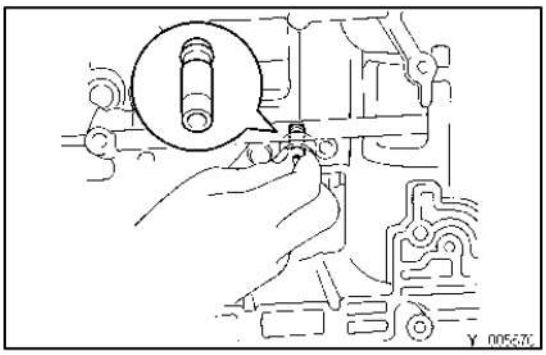
(d) Place the second brake drum into the case.
HINT: Align the groove of the drum with the bolt.



(e) Place the snap ring into the case so that end gap is installed into the groove.

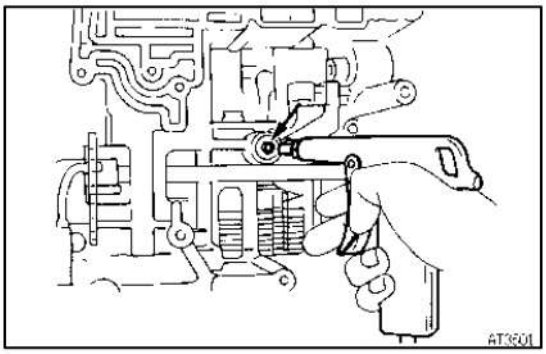
(f) While compressing the piston return spring over the drum with screwdriver, install the snap ring into the groove.

(g) Be sure that the end gap of the snap ring is not aligned with one of cutouts.



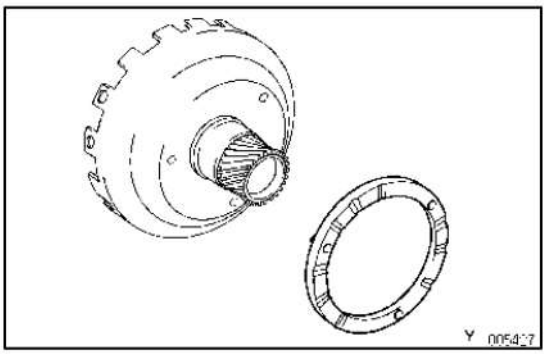
17. INSTALL NEW SECOND BRAKE GASKET

Install a new gasket until it makes contact with the second brake drum.



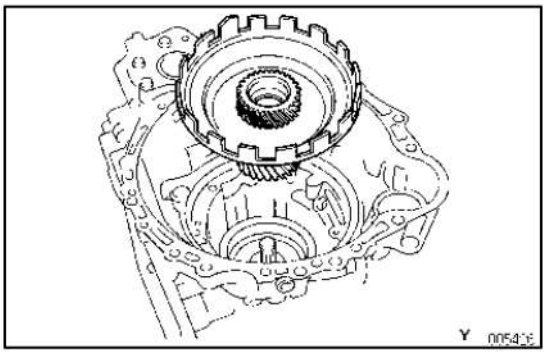
18. CHECK OPERATION OF SECOND BRAKE

Apply compressed air into the second brake gasket and confirm that the piston moves.

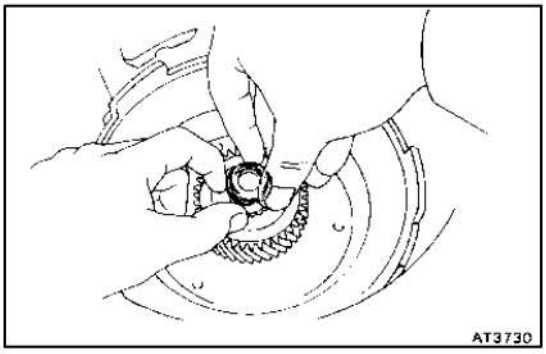


19. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.

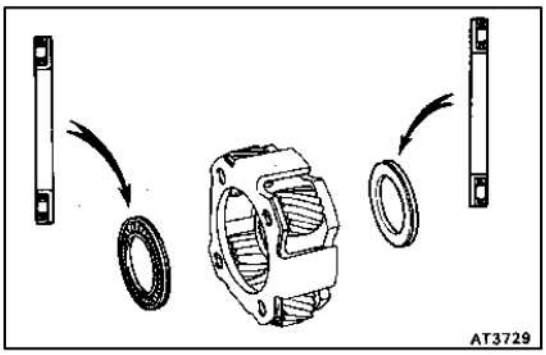


(b) While turning the sun gear clockwise, install it into the No.1 one–way clutch.



20. INSTALL OIL SEAL RING TO INTERMEDIATE SHAFT

HINT: After installing the oil seal ring, check that it moves smoothly.

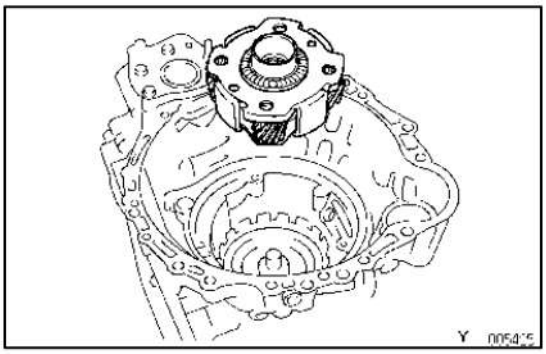


21. INSTALL FRONT PLANETARY GEAR

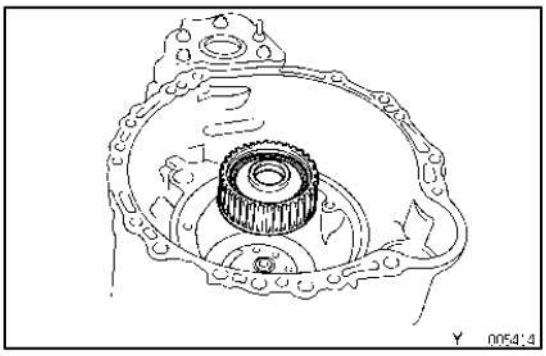
(a) Coat the bearings with petroleum jelly, and install them onto the both sides of planetary gear.

Bearing outer diameter: 45.5 mm (1.791 in.)

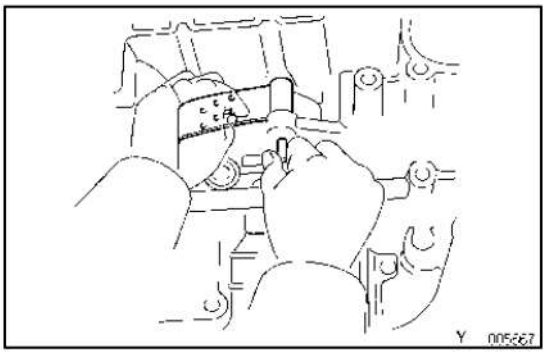
Bearing inner diameter: 30.1 mm (1.185 in.)



(b) Install the planetary gear onto the sun gear.



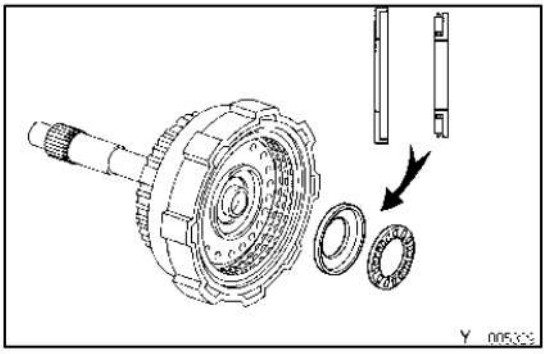
22. INSTALL FRONT PLANETARY RING GEAR



23. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

(b) Install the pin through the oil pump mounting bolt hole.

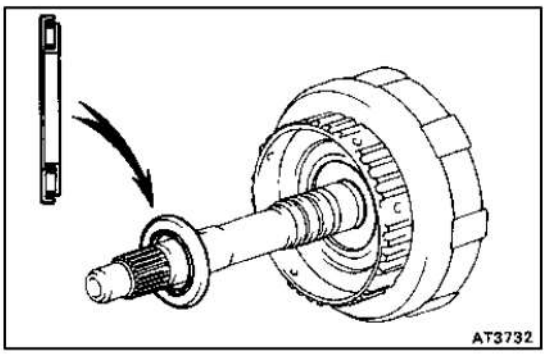


24. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the bearing with petroleum jelly and install it onto rear side of the forward clutch.

Bearing outer diameter: 47.6 mm (1.874 in.)

Bearing inner diameter: 31.4 mm (1.236 in.)

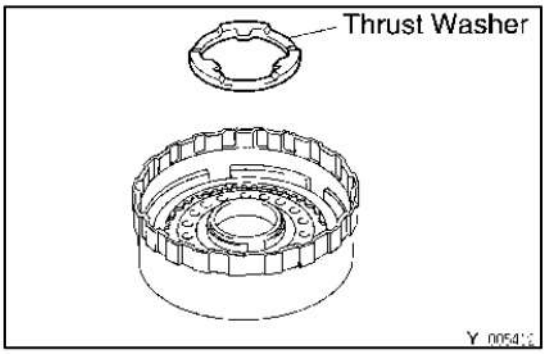


(b) Coat the bearing with petroleum jelly and install it onto the front side of the forward clutch.
HINT: There are 2 different thickness bearings for adjustment of the input shaft thrust play.

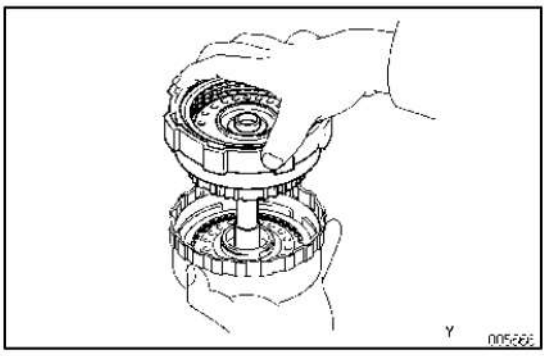
Bearing thickness

mm (in.)

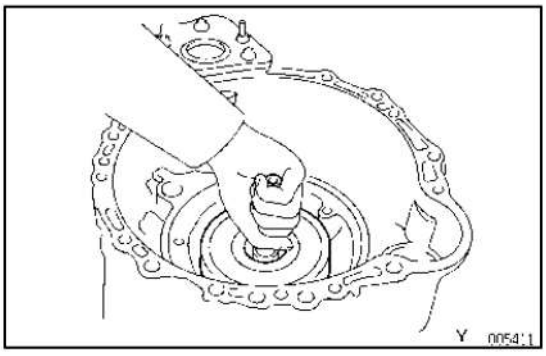
Thickness	Outer diameter	Inner diameter
3.60 (0.1417)	45.9 (1.807)	27.7 (1.091)
4.19 (0.1650)	47.1 (1.854)	27.7 (1.091)



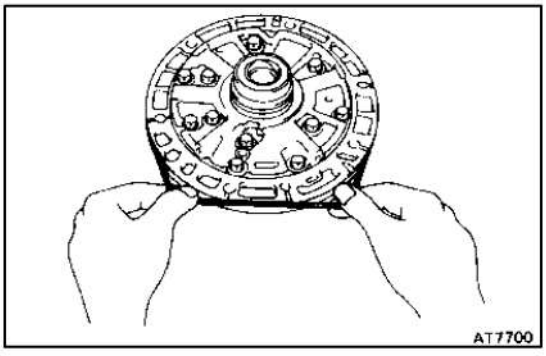
(c) Coat the thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.



(d) Mesh the hub of the forward clutch flukes with the direct clutch discs.
HINT: Be careful that the bearing and thrust washer do not get out of place.

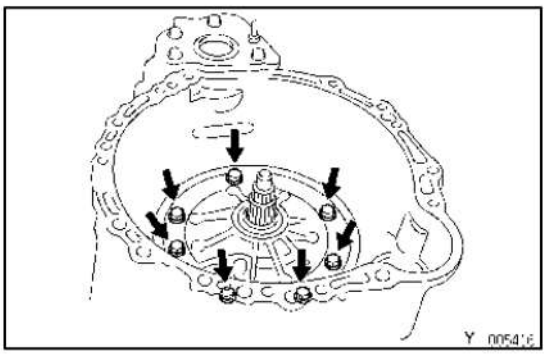


(e) Install the direct clutch and forward clutch into the case.
HINT: Hold the direct clutch toward the forward clutch to prevent the thrust washer from getting out of place.



25. INSTALL OIL PUMP INTO CASE

(a) Coat a new O–ring with ATF and install it to the oil pump.



(b) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

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

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

26. MEASURE END PLAY OF INPUT SHAFT

Measure the end play with a dial gauge.

End play:

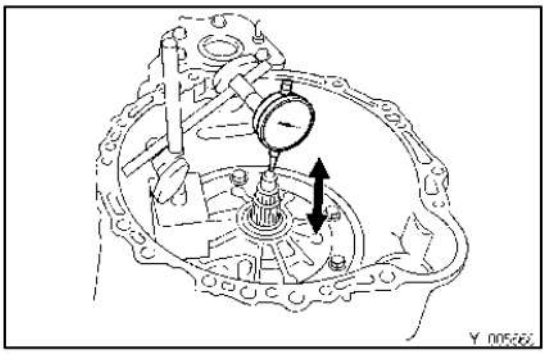
0.25–0.90 mm (0.0098–0.0354 in.)

HINT: There are 2 different thickness bearings for end of stator shaft. If the end play is in excess of standard, select one of them.

Bearing thickness:

3.60 mm (0.1417 in.)

4.19 mm (0.1650 in.)



27. CHECK INPUT SHAFT ROTATION

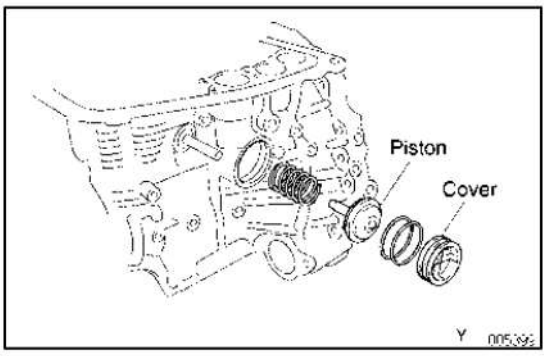
Make sure that the input shaft rotates smoothly.

28. INSTALL SECOND COAST BRAKE PISTON

(a) Coat the new O–rings with ATF and install it to the cover.

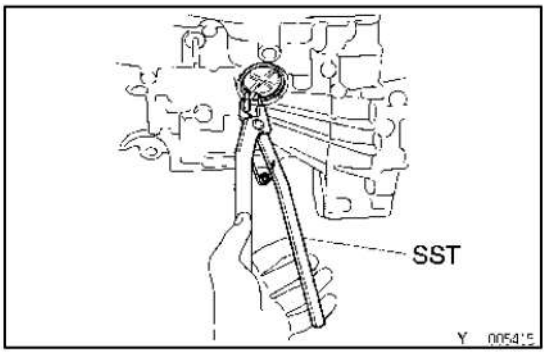
(b) Install the outer spring with the piston.

(c) Place the cover into the bore.



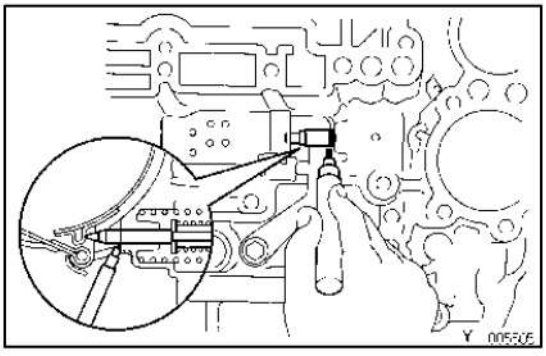
(d) Using SST, install the snap ring while pressing the cover.
SST 09350–32014 (09351–32050)

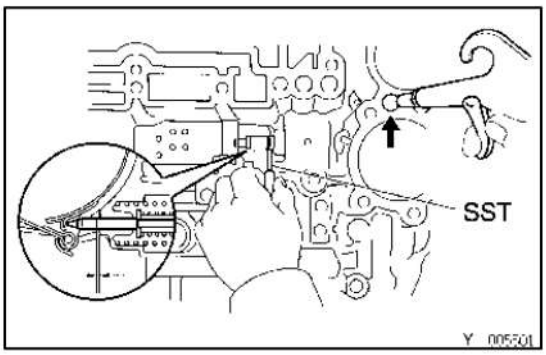
(e) Check that the front end of the piston rod contacts the center of the second brake band depression.



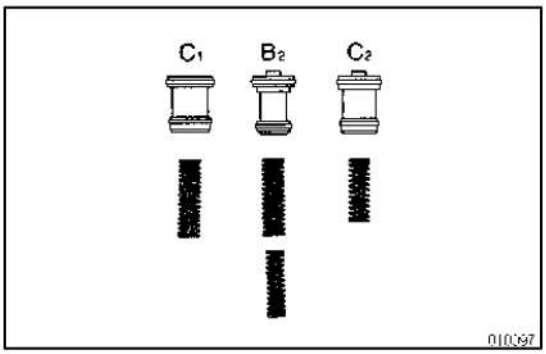
29. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.





(b) Using SST, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09240–00020
Piston stroke:
2.0–3.5 mm (0.079–0.138 in.)
If the stroke is more than specified, replace the piston rod with a longer one.
Piston rod length:
95.2 mm (3.748 in.)
96.3 mm (3.791 in.)
If the still more than standard value, replace the brake band with a new one.

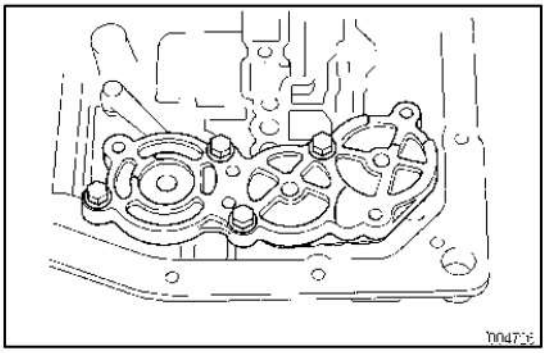


HYDRAULIC CONTROL UNIT INSTALLATION
AX0U3-02

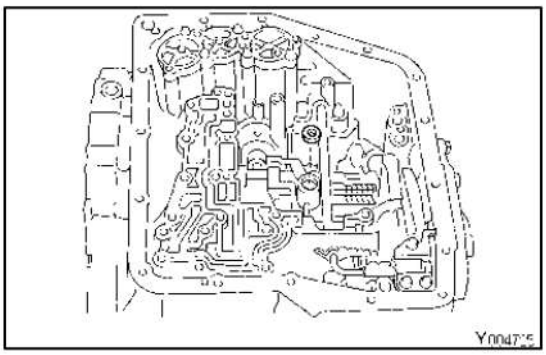
1. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the new O–rings to the pistons.
(b) Install the springs and pistons into the bores.
Spring dimensions
mm (in.)

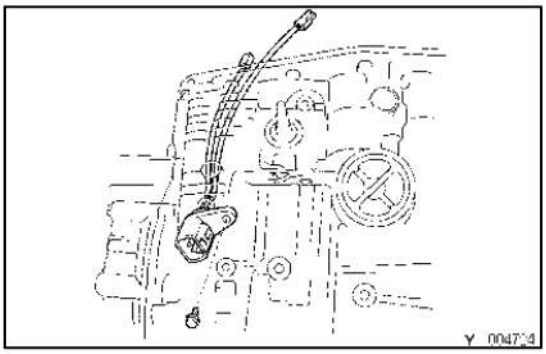
Spring	Color	Free length
C_2	Yellow/Purple	51.8 (2.039)
B_2	None	88.2 (3.473)
B_2	None	70.3 (2.767)
C_1	None	73.6 (2.898)



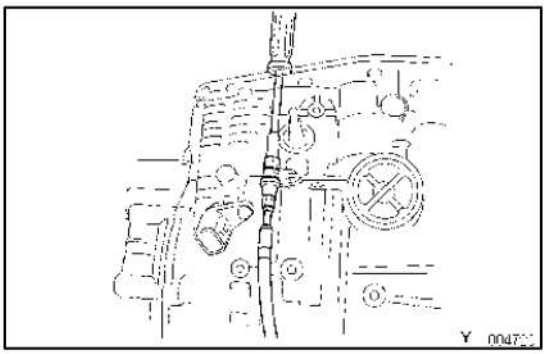
(c) Place the cover with a new gasket and gradually tighten the bolts a little at a time in sequence.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



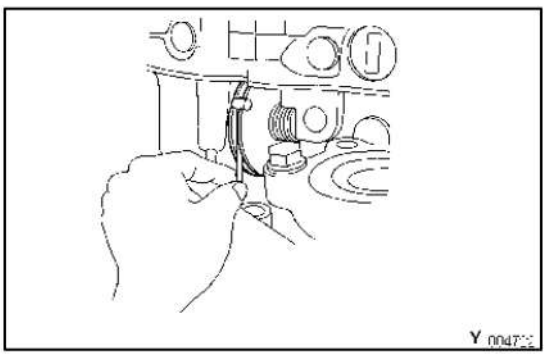
2. PLACE NEW SECOND BRAKE APPLY GASKET



3. INSTALL SOLENOID WIRE



4. INSTALL THROTTLE CABLE

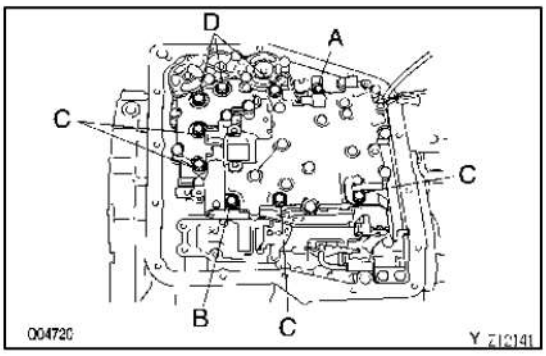


5. INSTALL VALVE BODY TO TRANSAXLE CASE

(a) While holding the cam down with your hand, slip the cable end into the slot.

(b) Lower the valve body into place.

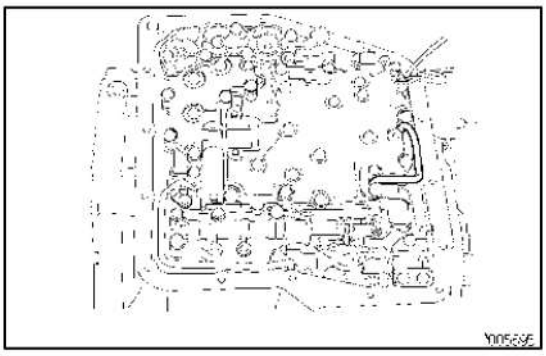
NOTICE: Do not entangle the solenoid wire.



(c) Install and tighten the 9 bolts.
HINT:
★ Each bolt length is indicated below.
★ Hand tighten the 9 bolts first, then torque with a torque wrench.

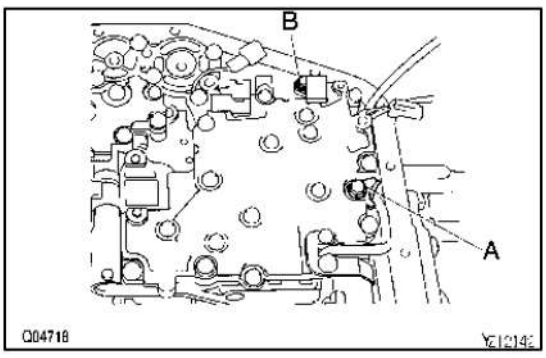
Bolt length:
Bolt A: 30 mm (1.181 in.)
Bolt B: 43 mm (1.693 in.)
Bolt C: 48 mm (1.890 in.)
Bolt D: 52 mm (2.047 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



6. INSTALL B_3 APPLY PIPE

NOTICE: Be careful not to bend or damage the pipe.

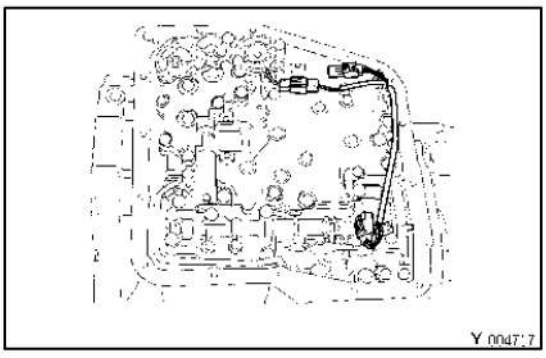


7. INSTALL CONNECTOR CLAMP AND PIPE RETAINER

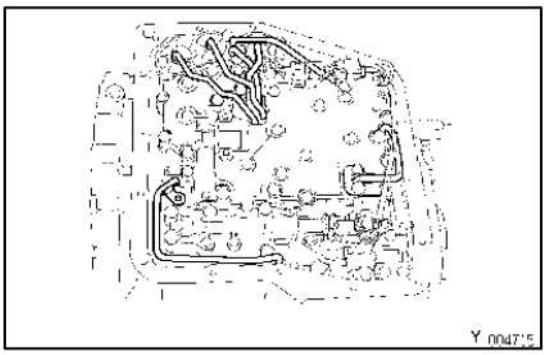
HINT: Each bolt length is indicated below.

Bolt length:
Bolt A: 48 mm (1.890 in.)
Bolt B: 39 mm (1.535 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



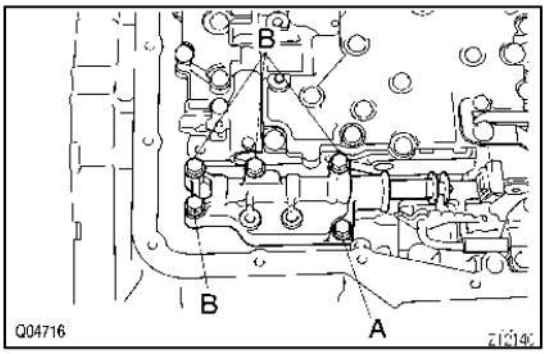
8. CONNECT SOLENOID CONNECTORS

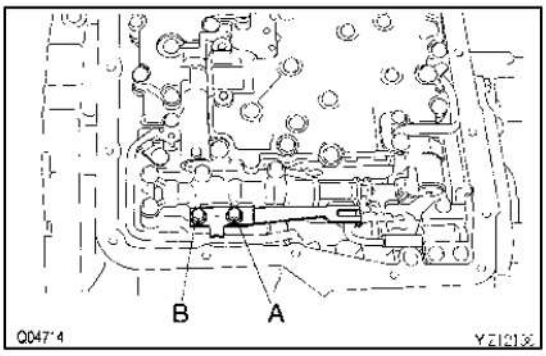


9. INSTALL OIL PIPES

Using a plastic hammer, install the pipes into the positions.

NOTICE: Be careful not to bend or damage the pipes.





10. INSTALL MANUAL VALVE BODY AND DETENT SPRING

HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 22 mm (0.866 in.)

Bolt B: 37 mm (1.457 in.)

(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the manual valve body into place.

(c) Hand tighten the 5 bolts first. Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

(d) Place the detent springs on the manual valve body and hand tighten the 2 bolts first.

Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

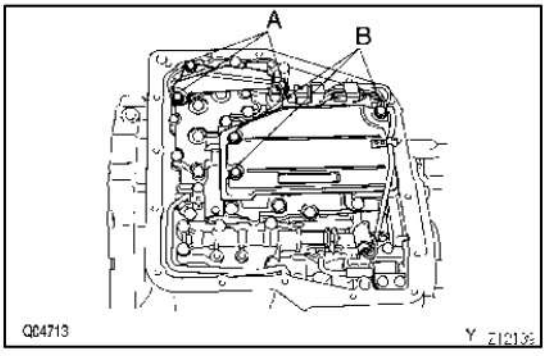
HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 14 mm (0.551 in.)

Bolt B: 37 mm (1.457 in.)

(e) Check that the manual valve lever is touching the center of the detent spring tip roller.



11. INSTALL PIPE BRACKET AND OIL STRAINER

Each bolt length is indicated below.

Bolt length:

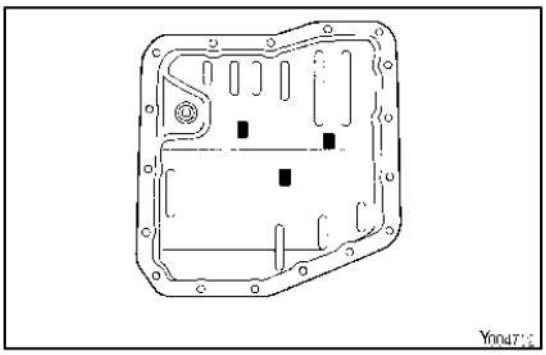
Bolt A: 22 mm (0.866 in.)

Bolt B: 53 mm (2.087 in.)

Torque:

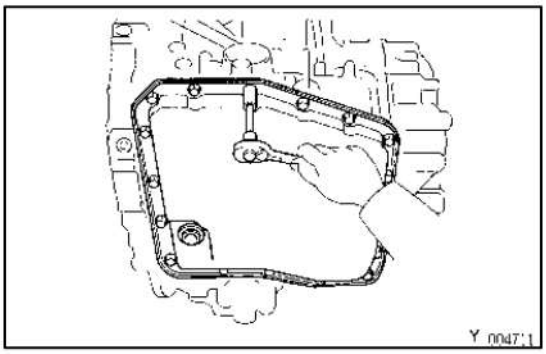
Pipe bracket: 10 N·m (100 kgf·cm, 7 ft·lbf)

Oil strainer: 11 N·m (110 kgf·cm, 8 ft·lbf)



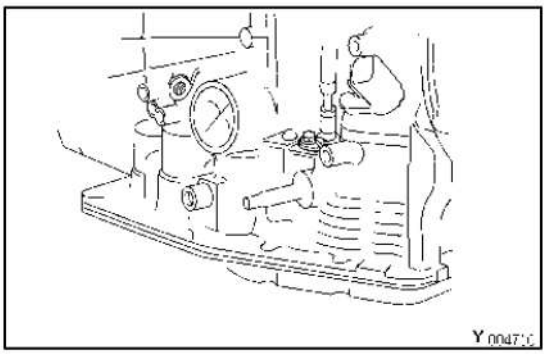
12. INSTALL MAGNETS IN PLACE

NOTICE: Make sure that the magnets do not interfere with the oil pipes.

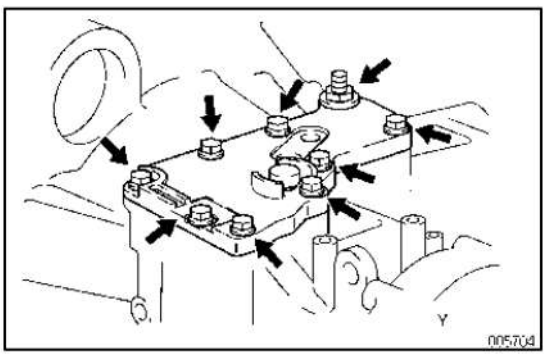


13. INSTALL OIL PAN WITH NEW GASKET

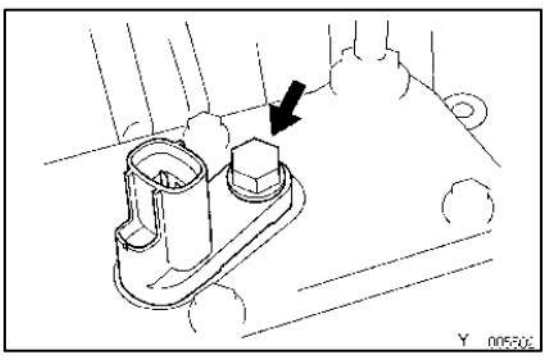
(a) Install a new gasket and oil pan.
(b) Install and torque the 17 bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



14. INSTALL THROTTLE CABLE RETAINING PLATE

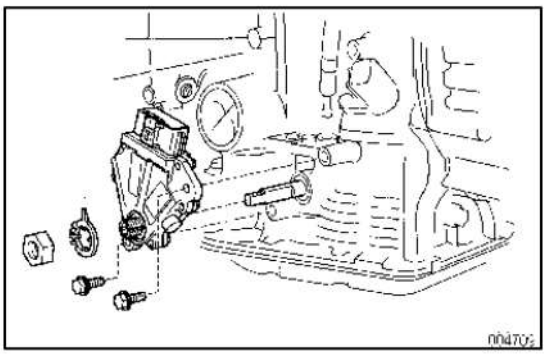


15. INSTALL TRANSAXLE UPPER COVER



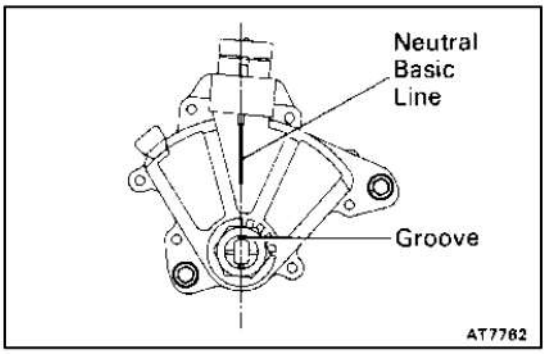
16. INSTALL T/M REVOLUTION SENSOR

(a) Install a new O–ring to the T/M revolution sensor.
(b) Install the T/M revolution sensor with the bolt.

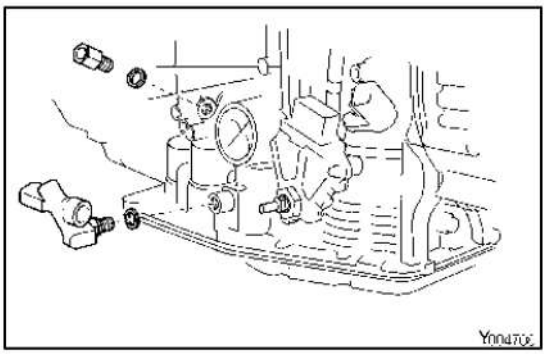


17. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch to the manual valve shaft.
(b) Place the new locking plate and tighten the nut.
(c) Stake the nut with locking plate.
(d) Install the 2 bolts.

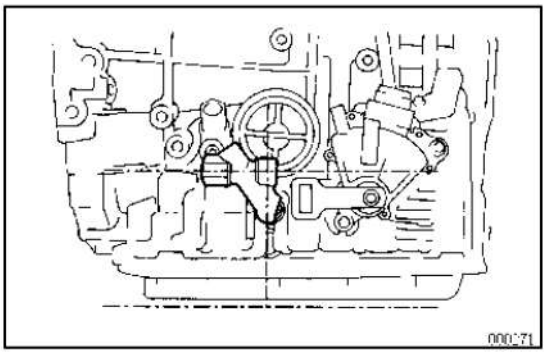


(e) Adjust the park/neutral position switch.
HINT: Align the groove and neutral basic line.
(f) Tighten the 2 bolts.

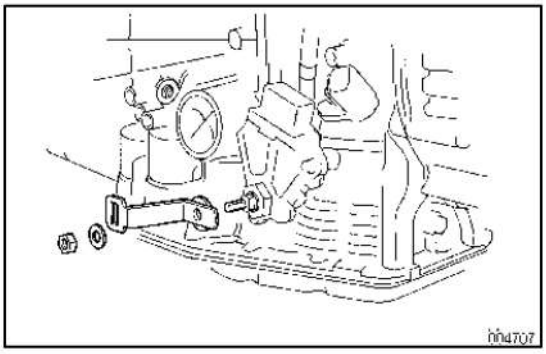


18. INSTALL UNION AND ELBOW

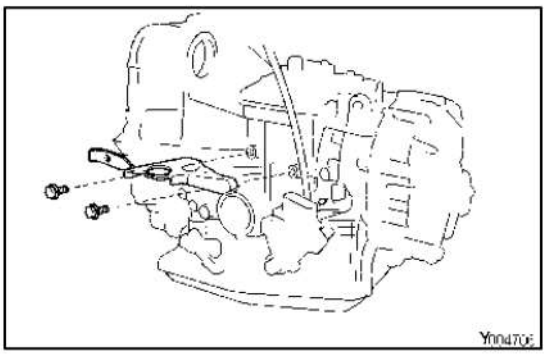
(a) Install the new O–rings to the union and elbow.
(b) Install the union elbow to the transaxle case.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



HINT: Install the elbow, as shown in the illustration.



19. INSTALL MANUAL SHAFT LEVER



20. INSTALL SHIFT CONTROL CABLE BRACKET

SERVICE SPECIFICATIONS

SERVICE DATE

AX0H1-06

Second Coast Brake

Piston stroke	2.0 – 3.5 mm 0.079 – 0.138 in.
Piston rod length	95.2 mm 3.748 in.
	96.3 mm 3.791 in.

Oil Pump

Body clearance	STD	0.07 – 0.15 mm 0.0028 – 0.0059 in.
	Maximum	0.30 mm 0.0118 in.
Tip clearance	STD	0.11 – 0.14 mm 0.0043 – 0.0055 in.
	Maximum	0.30 mm 0.0118 in.
Side clearance	STD	0.02 – 0.05 mm 0.0008 – 0.0020 in.
	Maximum	0.10 mm 0.0039 in.
Pump body bushing inside diameter	Maximum	38.18 mm 1.5031 in.
Stator shaft bushing inside diameter		
Front side	Maximum	21.57 mm 0.8492 in.
Rear side	Maximum	27.07 mm 1.0657 in.

Direct Clutch

Piston stroke	0.91 – 1.35 mm 0.0358 – 0.0531 in.
Drum bushing inside diameter	48.27 mm 1.9004 in.
Flange thickness	2.70 mm 0.1063 in. 3.00 mm 0.1181 in.

Forward Clutch

Piston stroke	1.79 – 2.21 mm 0.0704 – 0.0870 in.
Flange thickness	2.30 mm 0.0906 in. 2.70 mm 0.1063 in.

Front Planetary Gear

Sun gear bushing inside diameter	Maximum	22.59 mm 0.8894 in.
Ring gear flange bushing inside diameter	Maximum	30.08 mm 1.1842 in.
Planetary pinion gear thrust clearance	Maximum	0.61 mm 0.024 in.

Rear Planetary Gear

Planetary pinion gear thrust clearance	Maximum	0.61 mm 0.024 in.

First and Reverse Brake

Pack clearance		1.92 – 2.68 mm 0.0756 – 0.1055 in.

Overdrive Unit

Piston stroke		1.75 – 2.49 mm 0.0689 – 0.0980 in.
Direct clutch bushing inside diameter	Maximum	22.13 mm 0.8713 in.
Planetary pinion gear thrust clearance	STD	0.16 – 0.56 mm 0.0063 – 0.0220 in.
	Maximum	0.61 mm 0.024 in.

Valve Body Spring

Spring	Free length / Coil outer diameter mm (in.)	Total No. of coils / Color
Upper valve body		
Low coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
B_1 orifice control valve	24.8 (0.976) / 6.4 (0.252)	12.0 / White
Down–shift plug	15.0 (0.591) / 11.0 (0.433)	7.0 / None
Throttle valve	31.5 (1.240) / 7.0 (0.276)	11.4 / Green
Lock–up relay valve	26.8 (1.055) / 10.2 (0.402)	10.8 / Yellow
Lower valve body		
2–3 shift valve	28.0 (1.102) / 9.4 (0.370)	10.3 / None
Second coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
Accumulator control vavle	25.1 (0.988) / 8.6 (0.339)	8.0 / Red
Secondary regulator valve	46.9 (1.846) / 5.9 (0.232)	21.8 / None
Second lock valve	20.7 (0.815) / 7.4 (0.291)	9.5 / None
Reverse control valve	38.1 (1.500) / 6.5 (0.256)	19.0 / White/Purple
1–2 shift valve	29.2 (1.150) / 8.9 (0.350)	12.0 / Light Green
3–4 shift valve	28.0 (1.102) / 7.6 (0.299)	10.3 / None
Primary regulator valve	36.6 (1.441) / 16.1 (0.634)	6.3 / None
Cut–back valve	21.8 (0.858) / 6.0 (0.236)	13.5 / None
Solenoid modulator valve	30.2 (1.189) / 5.6 (0.220)	15.3 / Purple/Pink

Valve Body Key

Key	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
Upper valve body			
B_1 orifice control valve	8.9 (0.350)	5.0 (0.197)	3.2 (0.126)
Low coast modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lower valve body			
Accumulator control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Secondary regulator valve	11.0 (0.433)	5.0 (0.197)	3.2 (0.126)
1–2 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
2–3 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
3–4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
Second lock valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Second coast modulator valve	8.0 (0.315)	5.0 (0.197)	3.2 (0.126)
Reverse control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Cut–back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Solenoid modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lock–up control valve	9.2 (0.315)	5.0 (0.197)	3.2 (0.126)

Accumulator Spring

Spring		Free length mm (in.)	Color
C_0	Inner	47.5 (1.870)	White
	Outer	16.3 (0.642)	None
C_1		73.6 (2.898)	None
C_2		51.8 (2.039)	Yellow / Purple
B_0		66.8 (2.630)	Red / Yellow
B_2	Inner	70.3 (2.767)	None
	Outer	88.2 (3.473)	None

Differential Assembly

Drive pinion preload (at Starting)	
New bearing	1.0 – 1.6 N·m 10 – 16 kgf·cm 8.7 – 13.9 in.·lbf
Reused bearing	0.5 – 0.8 N·m 5 – 8 kgf·cm 4.3 – 6.9 in.·lbf
Total preload (at starting)	
New bearing	Drive pinion preload plus 0.3 – 0.4 N·m 2.8 – 4.4 kgf·cm 2.4 – 3.8 in.·lbf
Reused bearing	Drive pinion preload plus 0.1 – 0.2 N·m 1.4 – 2.2 kgf·cm 1.2 – 1.9 in.·lbf
Pinion to side gear backlash	0.05 – 0.20 mm 0.0020 – 0.0079 in.
Side gear thrust washer thickness	1.60 mm 0.0630 in. 1.70 mm 0.0670 in. 1.80 mm 0.0709 in.

Side bearing adjusting shim 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.
	7	2.35 mm 0.0925 in.
	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.

TORQUE SPECIFICATIONS

AX04N-03

Part tightened	N·m	kgf·cm	ft·lbf
Oil cooler pipe union	27	275	20
Oil pan	4.9	50	43 in.·lbf
Valve body x Transaxle case	11	110	8
Accumulator x Cover	10	100	7
Oil pump x Transaxle case	22	225	16
O/D case x Transaxle case	25	250	18
Differential LH side bearing retainer	19	195	14
Differential RH retainer	19	195	14
Differential carrier cover	39	400	29
Oil pump body x Stator shaft	10	100	7
Ring gear x Differential case	124	1,260	91
Upper valve body x Lower valve body	6.6	67	58 in.·lbf
Accumulator cylinder x Valve body	6.6	67	58 in.·lbf
Solenoid x Valve body	6.6	67	58 in.·lbf
Counter drive gear lock nut	280	2,855	206
Carrire cover x Transaxle case	39	400	29
Parking lock pawl bracket	7.4	75	65 in.·lbf
Oil strainer x Transaxle case	11	110	8

HOW TO USE THIS MANUAL

IN002-0W

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

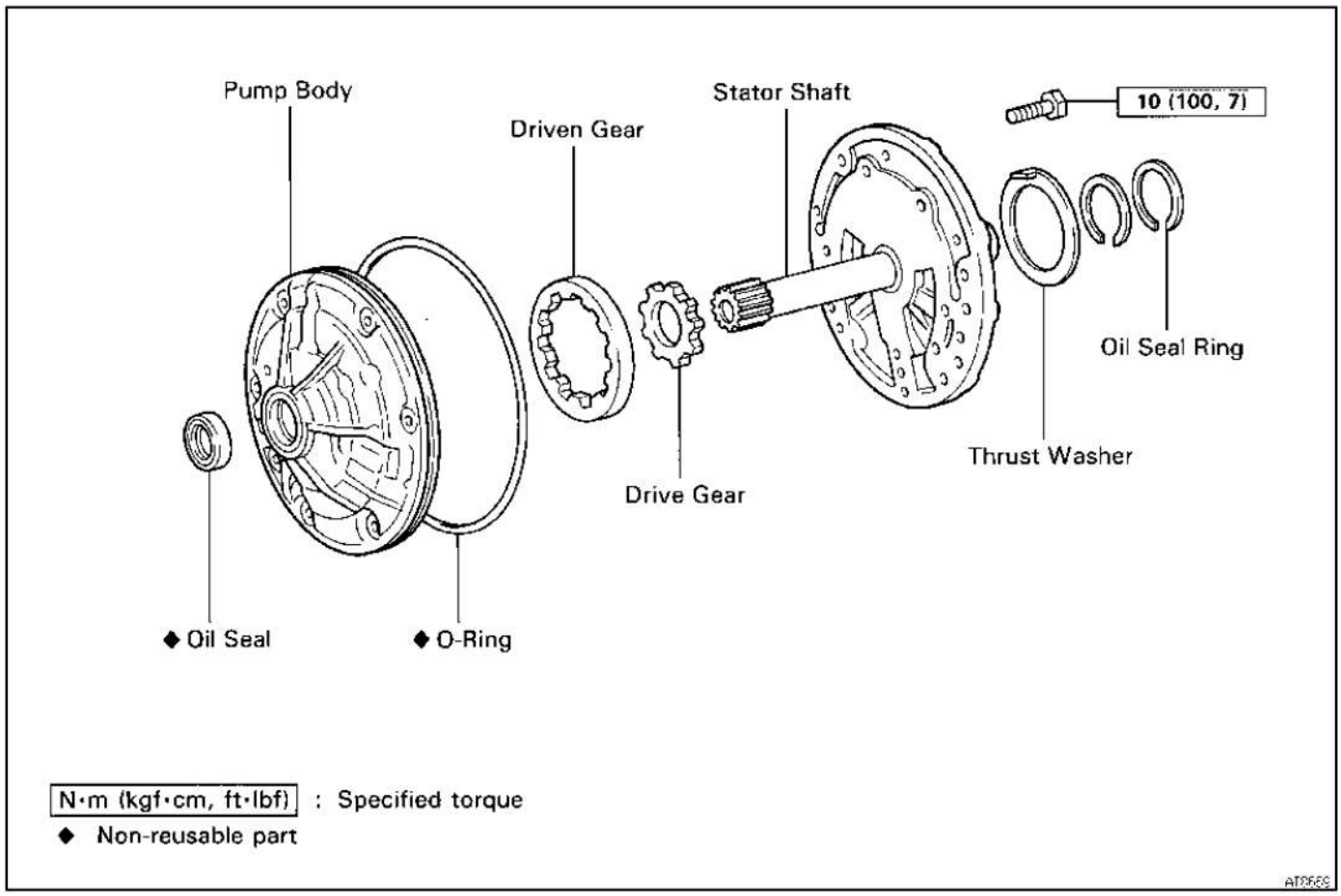
PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

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

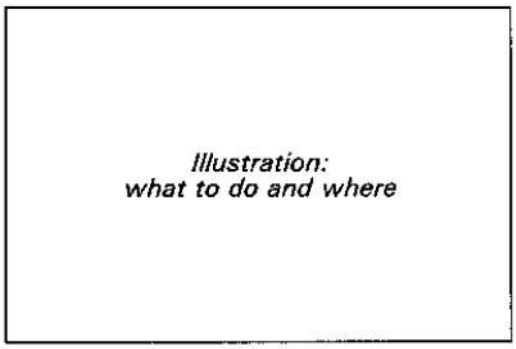
Example:



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

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

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text: how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm² or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

00031

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

REFERENCES

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

SPECIFICATIONS

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

CAUTIONS, NOTICES, HINTS:

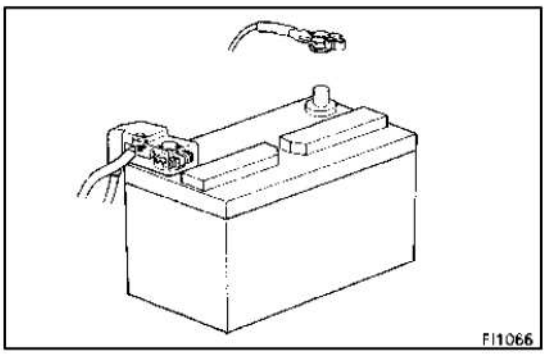
- ★ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ★ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ★ HINTS are separated from the text but do not appear in bold. They provide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

SI UNIT

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:

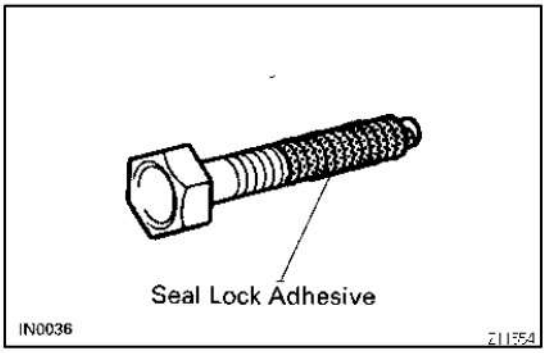
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)


FI1066

GENERAL REPAIR INSTRUCTIONS

IN022-07

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

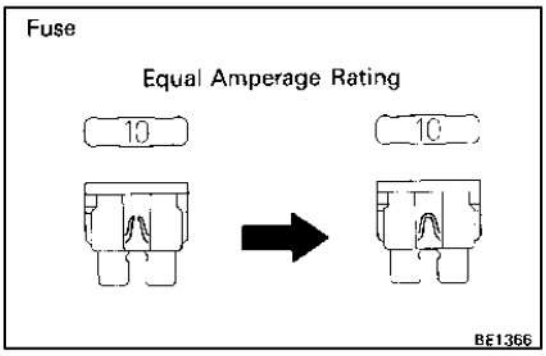


6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) When reusing precoated parts, clean off the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

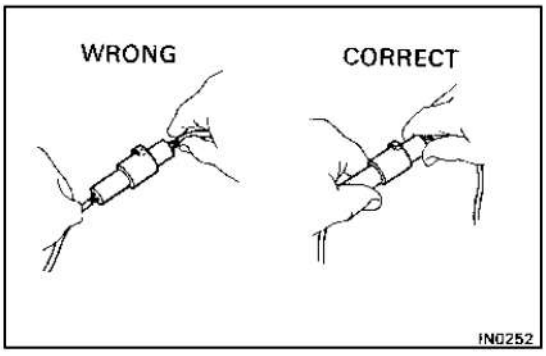
the specified seal lock adhesive to the bolt, nut or threads.

(c) Precoated parts are indicated in the component illustrations by the "★" symbol.

7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the preparation of AX section.



10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.



11. To pull apart electrical connectors, pull on the connector itself, not the wires.
12. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
    (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

GLOSSARY OF SAE AND TOYOTA TERMS

IN016-02

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	Intercooler
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 Position	–
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	–
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Toyota Diagnosis Communication Link (TDCL) 3: OBD@@@@@: [g 2] 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 Coolant 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	Toyota Distributorless Ignition (TDI)
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	Idle Air Control	Idle 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), CCo
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 Catalyst (TWC) CC_{RO}
TWC+OC	Three–Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU–OC	Warm Up Oxidation Catalytic Converter	–
WU–TWC	Warm Up Three–Way Catalytic Converter	Manifold Converter
3GR	Third Gear	–
4GR	Fourth Gear	–

ABBREVIATIONS USED IN THIS MANUAL

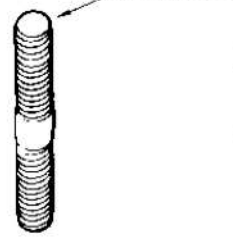
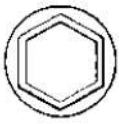
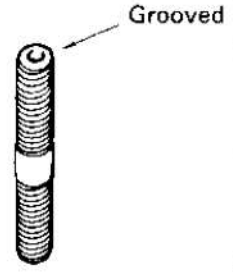
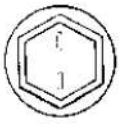
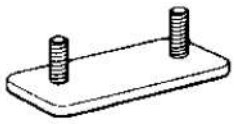
IN01H–0R

ATF	Automatic Transaxle Fluid
B_0	Overdrive Brake
B_1	Second coast Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_0	Overdrive Direct Clutch
C_1	Forward Clutch
C_2	Direct Clutch
D	Disc
F	Flange
F_0	O/D One–way Clutch
F_1	No.1 One–way Clutch
F_2	No.2 One–way Clutch
MP	Multipurpose
O/D	Overdirve
P	Plate
SSM	Special Service Materials
SST	Special Service Tools

STANDARD BOLT TORQUE SPECIFICATIONS

IN008-02

HOW TO DETERMINE BOLT STRENGTH

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

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

DESCRIPTION

GENERAL SPECIFICATIONS

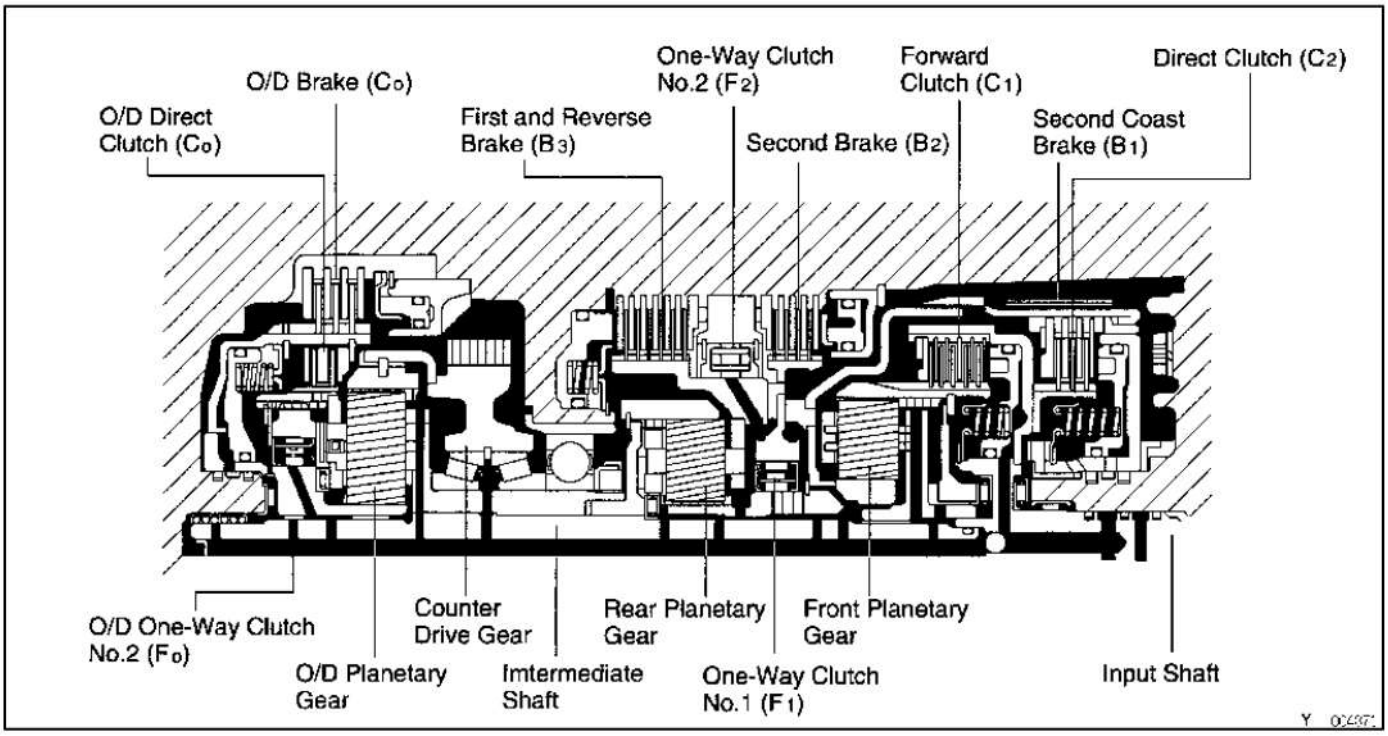
AX0CH–05

Type of Transaxle		A541E
Type of Engine		1MZ–FE
Torque Converter Clutch Stall Torque Ratio		1.8 : 1
Torque Converter Clutch Lock–up Mechanism		Equipped
Gear Ratio	1st Gear	2.810
	2nd Gear	1.549
	3rd Gear	1.000
	O/D Gear	0.735
	Reverse Gear	2.296
Transaxle	Number of Discs and Plates	
	O/D Direct Clutch (C_0)	2 / 2
	Forward Clutch (C_1)	5 / 5
	Direct Clutch (C_2)	3 / 3
	2nd Brake (B_2)	3 / 3
	First and Reverse Brake (B_3)	6 / 6
	O/D Brake (B_0)	3 / 3
B_1 Band Width	mm (in.)	25 (0.98)
ATF Type		ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])
Capacity liter (US qts, Imp.qts)	A/T	6.75(7.1, 5.9)
	D/F	0.85 (0.9, 0.7)

OPERATION

1. MECHANICAL OPERATION

AX0RF-01



○ ..... Operating

Shift lever position	Gear Position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○			
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*3rd	○	○	○			○		○		
L	1st	○	○					○	○		○
	*2nd	○	○			○	○		○	○	

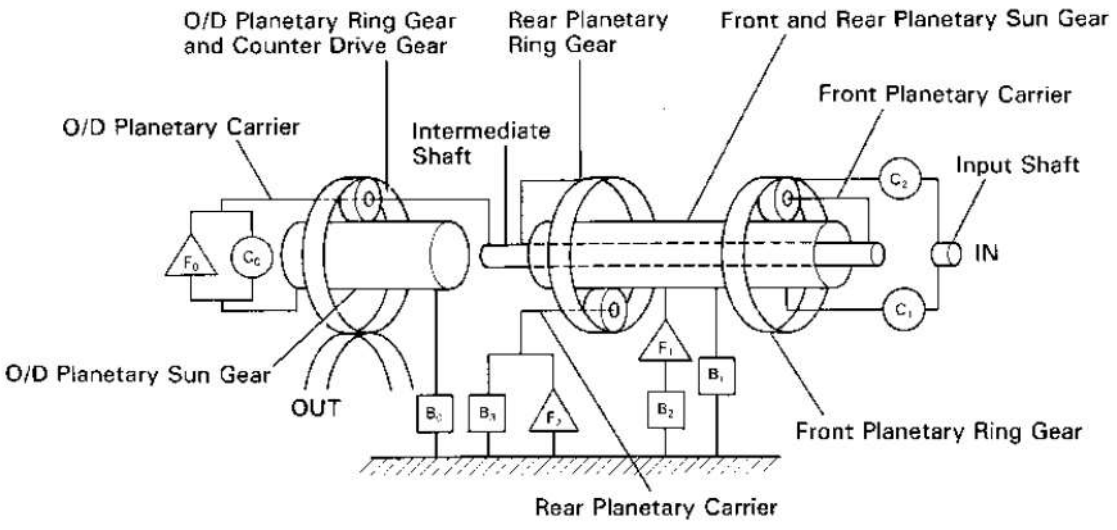
*Down-shift only – no up-shift

W0475C

AX019-03

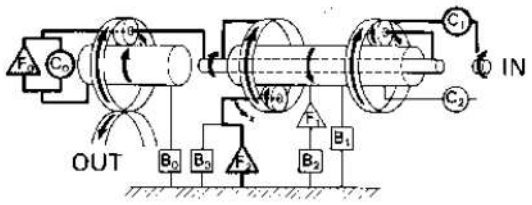
2. FUNCTION OF COMPONENTS

COMPONENT		FUNCTION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents outer race of F_1 from turning either clockwise or counterclockwise, thus preventing front & rear planetary sun gear from turning counterclockwise
1st & Reverse Brake	B_3	Prevents rear planetary carrier from turning either clockwise or counterclockwise
No.1 One-Way Clutch	F_1	When B_2 is operating, prevents front & rear planetary sun gear from turning counterclockwise
No.2 One-Way Clutch	F_2	Prevents rear planetary carrier from turning counterclockwise
O/D Direct Clutch	C_0	Connects overdrive sun gear and overdrive planetary carrier
O/D Brake	B_0	Prevents overdrive sun gear from turning either clockwise or counterclockwise
O/D One-Way Clutch	F_0	When transaxle is being driven by engine, connects overdrive sun gear and overdrive carrier
Planetary Gears		These gears change the route through which driving force is transmitted in accordance with the operation of each clutch and brake in order to increase or reduce the input and output speed



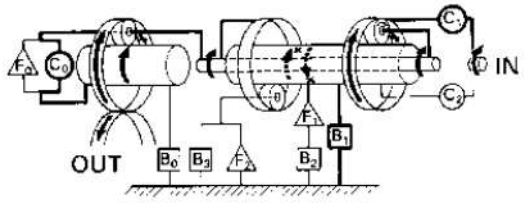
Power from the engine transmitted to the input shaft via the torque converter clutch is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one–way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution of the planetary gear unit.
Shift change is carried out by altering the combination of clutch and brake operation.
Each clutch and brake operates by hydraulic pressure; gear position is decided according to the throttle opening angle and vehicle speed, and shift change automatically occurs.
The conditions of operation for each gear position are shown on the following illustrations:

D or 2 Position 1st Gear



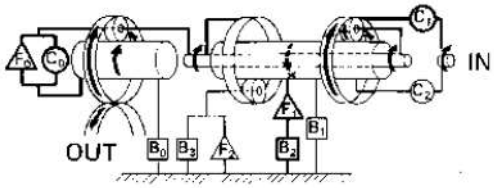
AT1097

2 Position 2nd Gear



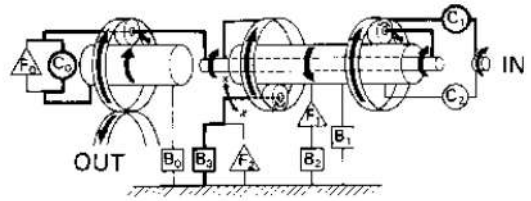
AT1102

D Position 2nd Gear



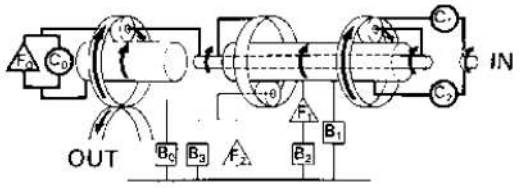
AT1098

L Position 1st Gear



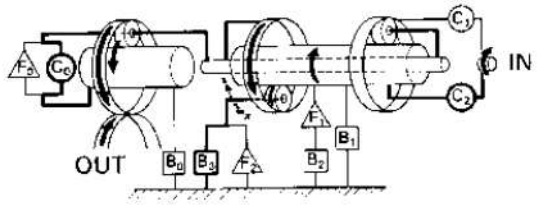
AT1103

D Position 3rd Gear



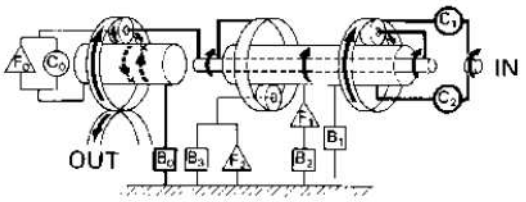
AT1099

R Position Reverse Gear



AT1101

D Position O/D Gear



AT1100

AX01A-0B

3. HYDRAULIC CONTROL SYSTEM

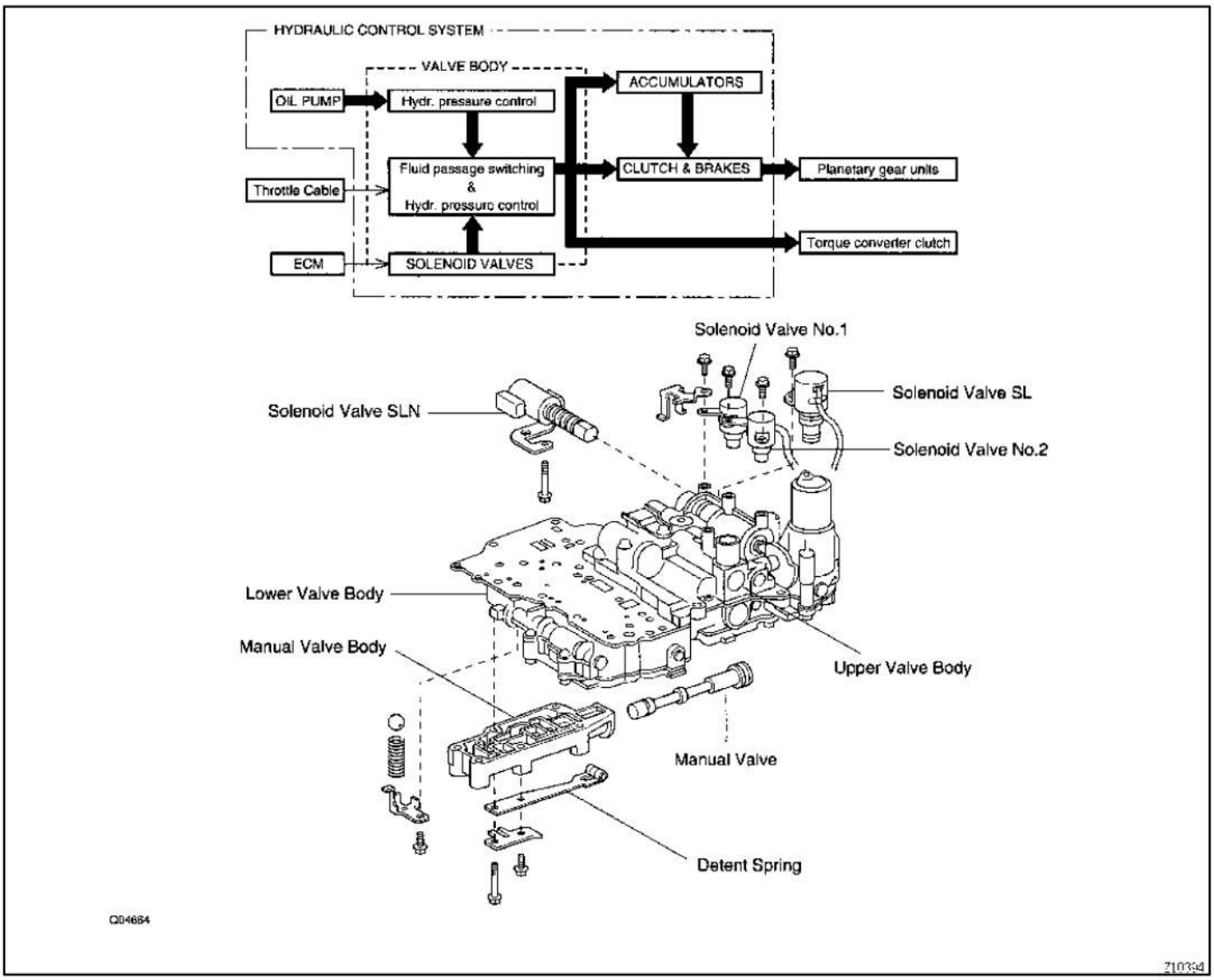
The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connect all of these components. Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

There are three solenoid valves on the valve body.

The No.1 and No.2 solenoid vales are turned on and off by signals from the ECM to operate the shift valves and change the gear shift position.

The SL solenoid valve is operated by signals from the ECM to engage or disengage the lock–up clutch of the torque converter clutch.

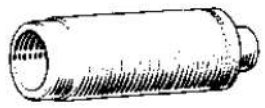
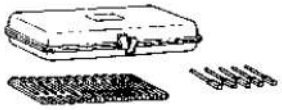
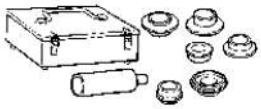
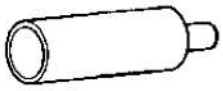
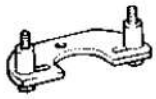
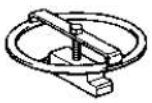
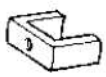
The SLN solenoid valve is operated by signals from the ECM to control the engagement speed and reduce gear shift shock.

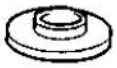
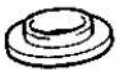
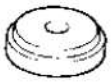


PREPARATION

SST (SPECIAL SERVICE TOOLS)

AX02L–06

	09226–10010	Crankshaft Front & Rear Bearing Replacer	Install RH retainer oil seal
	09240–00020	Wire Gauge Set	
	09316–20011	Transfer Bearing Replacer	
	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	
	09350–32014	TOYOTA Automatic Transmission Tool Set	
	09308–10010	Oil Seal Puller	
	(09351–32032)	Counter Driven Gear Holding Tool	
	(09351–32040)	No.1 Piston Spring Compressor	
	(09351–32050)	Snap Ring Expander	
	(09351–32061)	Oil Pump Puller	
	(09351–32070)	No.2 Piston Spring Compressor	
	(09351–32080)	Lock Nut Wrench	

	(09351–32100)	Drive Pinion Bearing Replacer	
	(09351–32120)	Overdrive Bearing Replacer	
	(09351–32140)	Oil Seal Replacer	
	(09351–32150)	Oil Seal Replacer	
	(09351–32190)	Measure Terminal	
	(09351–32200)	No.3 Piston Spring Compressor	
	09608–16011	Rear Hub Bearing Tool–	Remove differential side bearing
	09612–65014	Steering Worm Bearing Puller	Remove pinion shaft bearing outer race
	09950–40010	Puller B Set	

AX02M–02

RECOMMENDED COOL

	09031–00030	Pin Punch .	

EQUIPMENT

AX02N-02

Feeler gauge	Check major clearance.
Vernier calipers	Check length of second coast brake piston rod.
Dial indicator with magnetic base	Check piston stroke and end play of the output shaft.
Dial indicator	Check inside diameter of major bushing.
Straight edge	Check side clearance of oil pump.
Torque wrench	

AX01V-08

LUBRICANT

Item	Capacity	Classification
Automatic transaxle fluid: Dry fill Drain and refill	 6.75 liters (7.10 US qts, 5.94 Imp.qts) 2.5 liters (2.6 US qts, 2.2 Imp.qts)	ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])
Differential oil	0.85 liters (0.89 US qts, 0.75 Imp.qts)	ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

AX02P-02

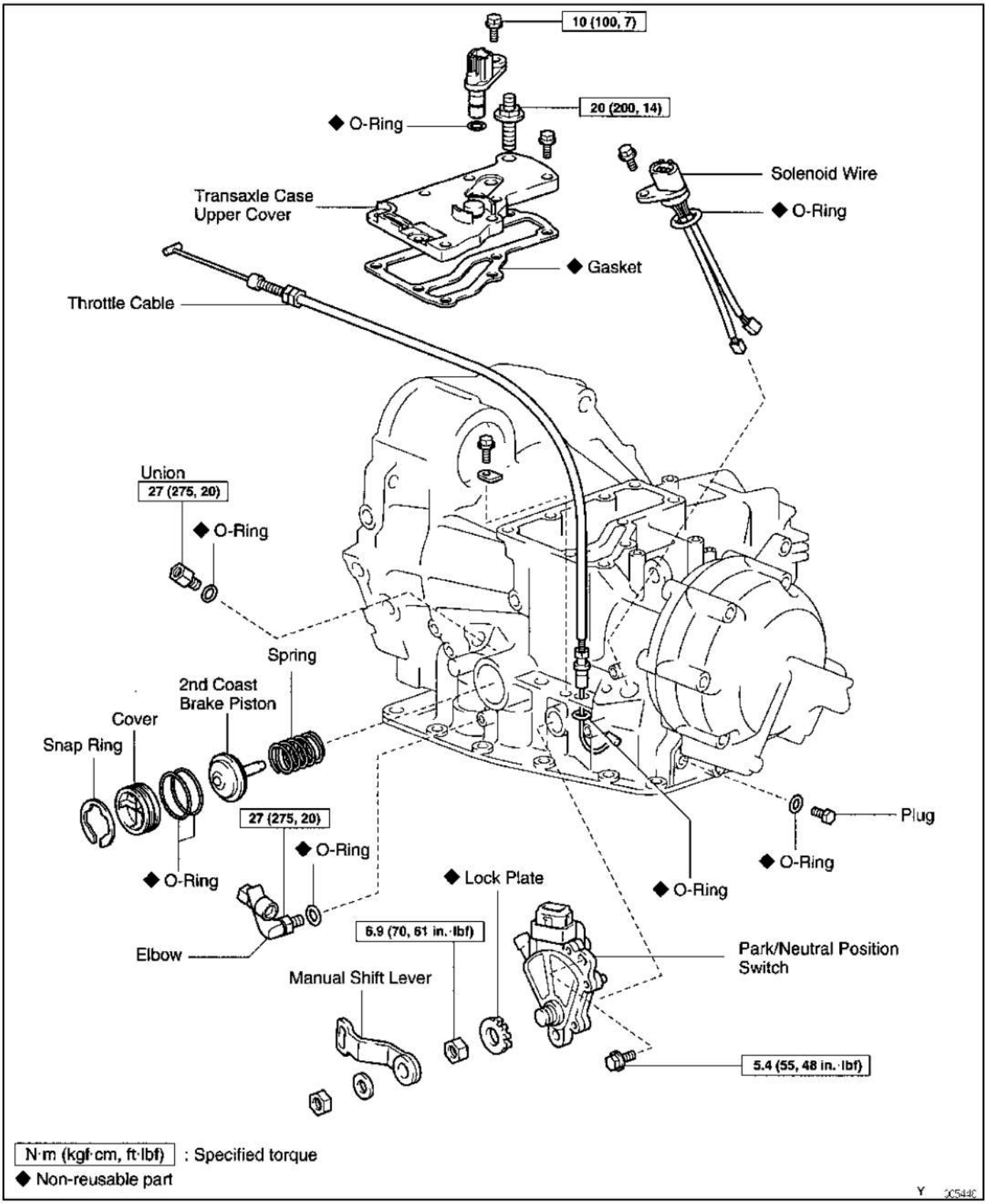
SSM (SPECIAL SERVICE MATERIALS)

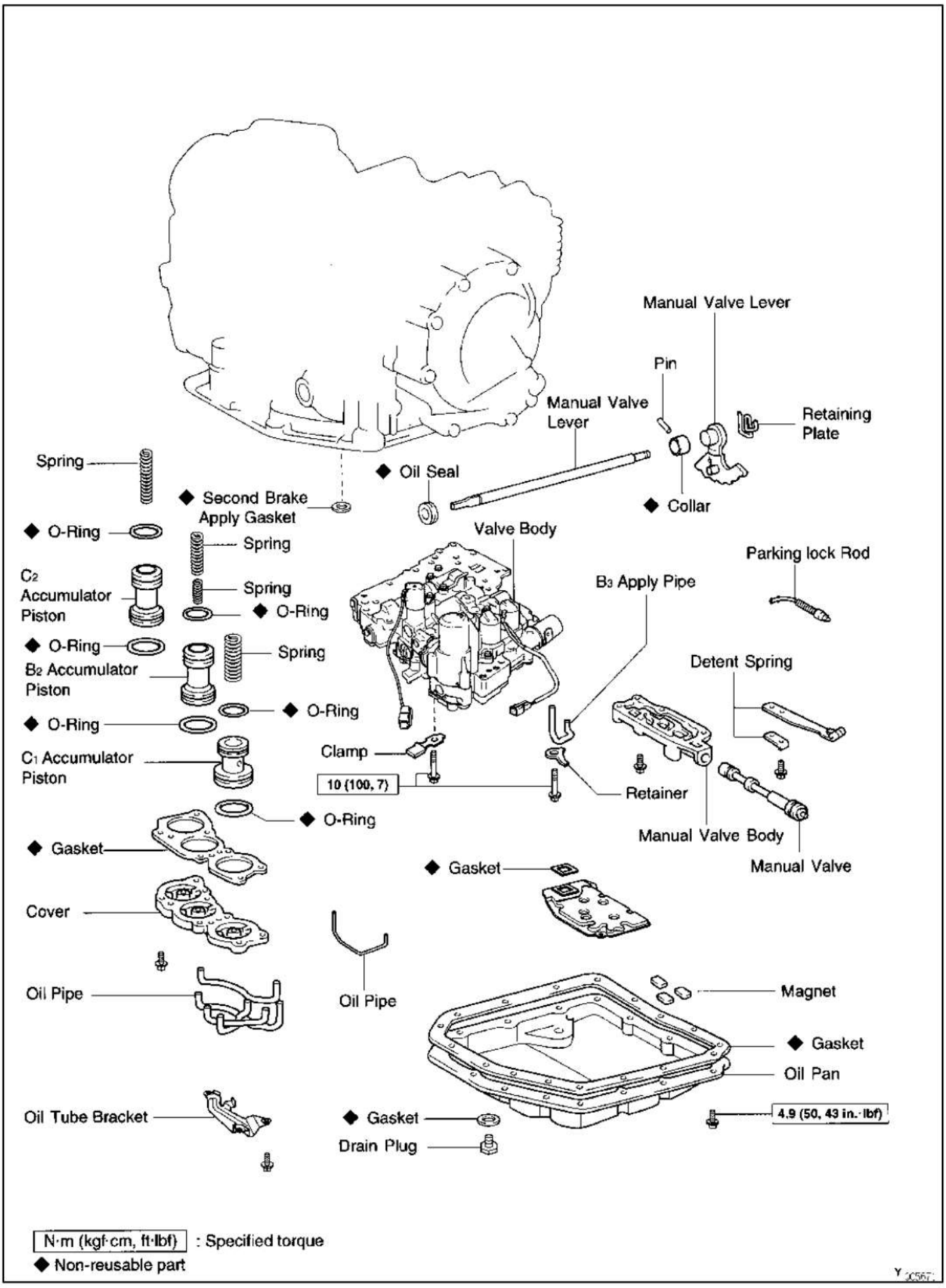
08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Differential LH bearing retainer Differential RH retainer
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Differential RH retainer set bolt

COMPONENT PARTS REMOVAL

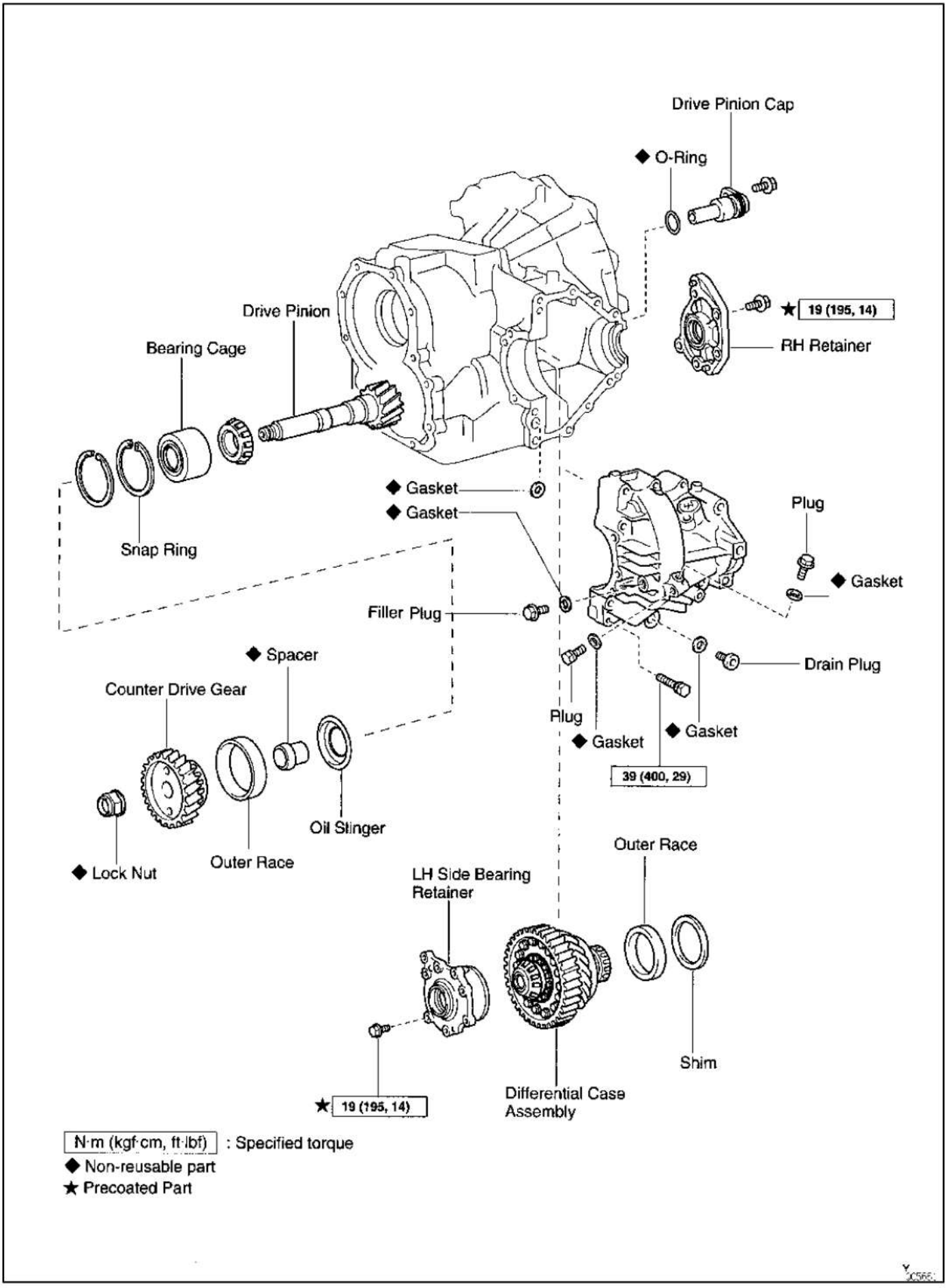
COMPONENTS

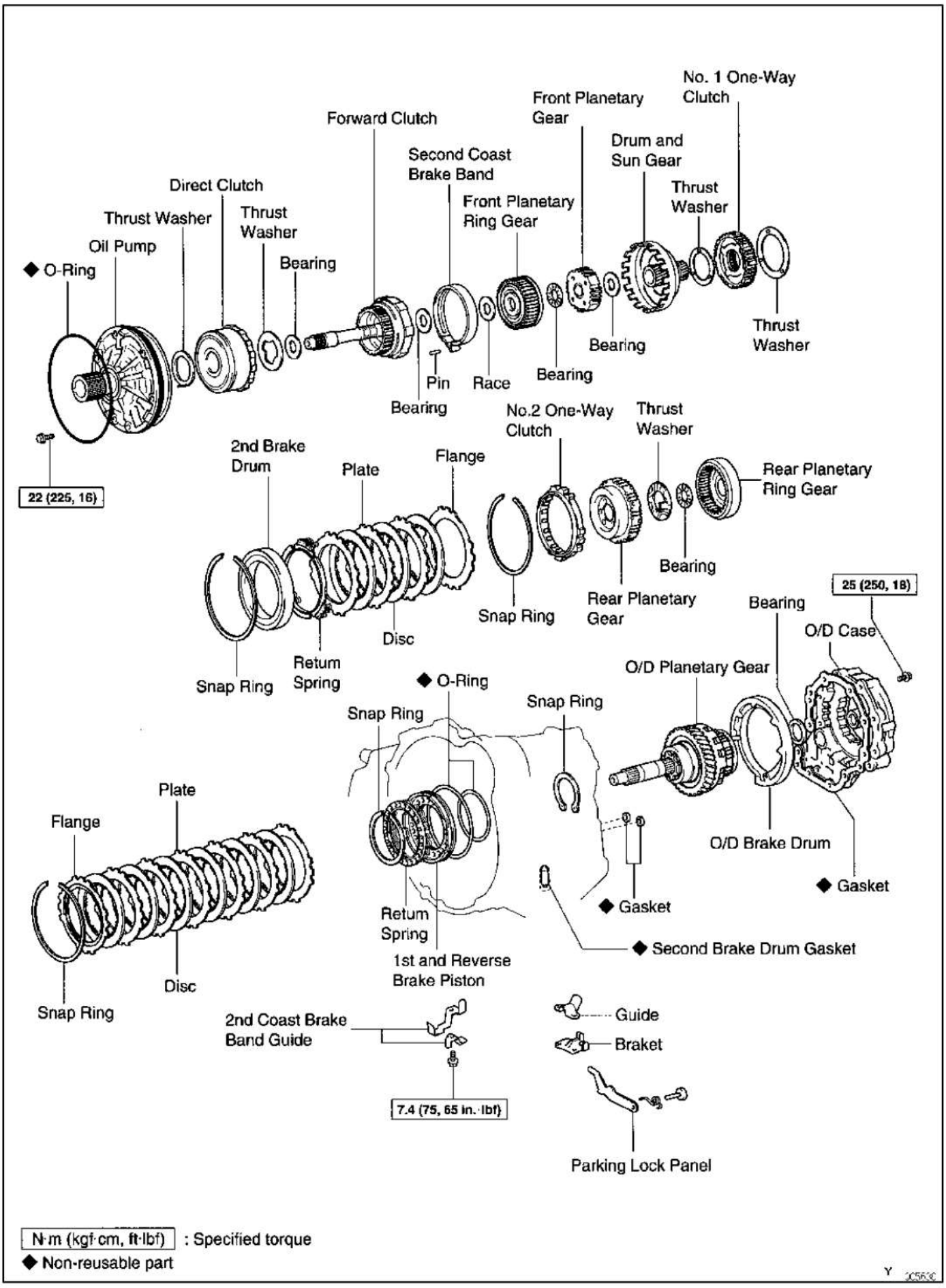
AX02Q-02





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


Drive Pinion Cap
◆ O-Ring
★ 19 (195, 14)
RH Retainer
Drive Pinion
Bearing Cage
Snap Ring
◆ Gasket
◆ Gasket
Plug
◆ Gasket
Filler Plug
Drain Plug
◆ Spacer
Counter Drive Gear
Plug
◆ Gasket
◆ Gasket
39 (400, 29)
Oil Stinger
Outer Race
◆ Lock Nut
Outer Race
LH Side Bearing Retainer
Shim
★ 19 (195, 14)
Differential Case Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated Part



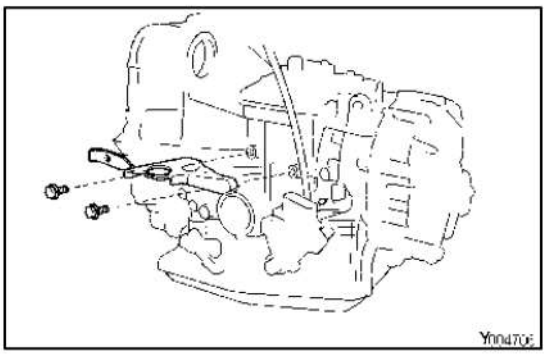
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

AX0TT–02

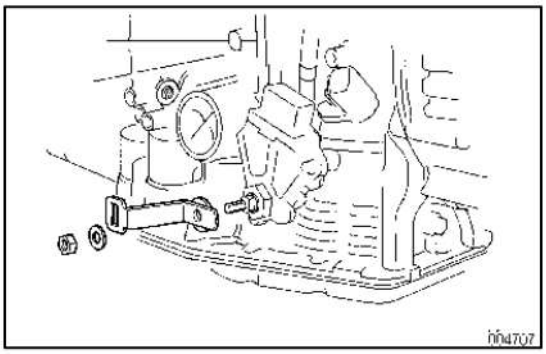
SEPARATE BASIC SUBASSEMBLY

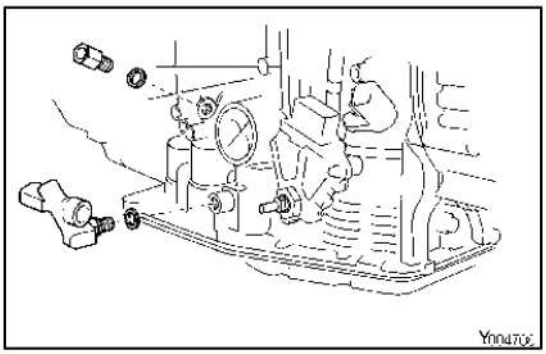
1. REMOVE SHIFT CONTROL CABLE BRACKET



2. REMOVE UNION AND ELBOW

(a) Remove the manual shift lever.

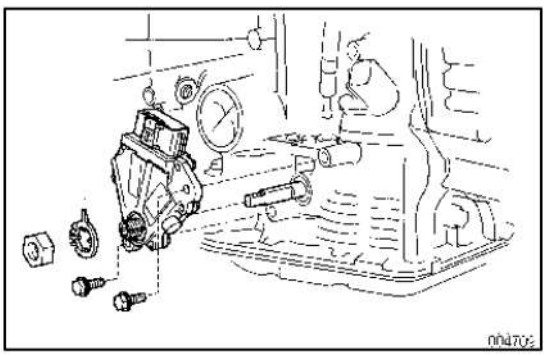




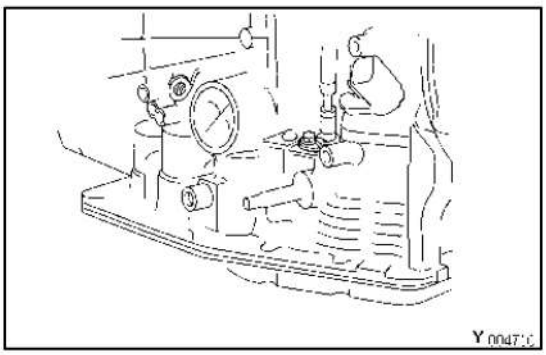
(b) Using a open end wrench, remove the union and elbow.
(c) Remove the O–rings from the union and elbow.

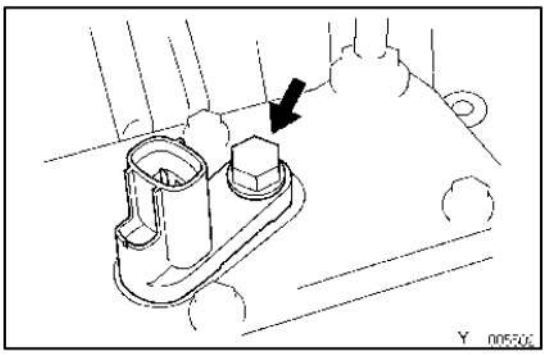
3. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Pry off the lock washer and remove the manual valve shaft nut.
(b) Remove the 2 bolts and pull out the park/neutral position switch.



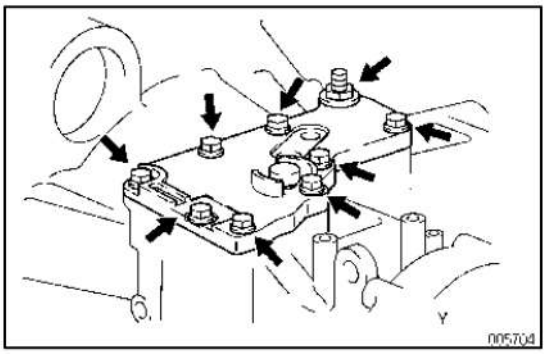
4. REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE



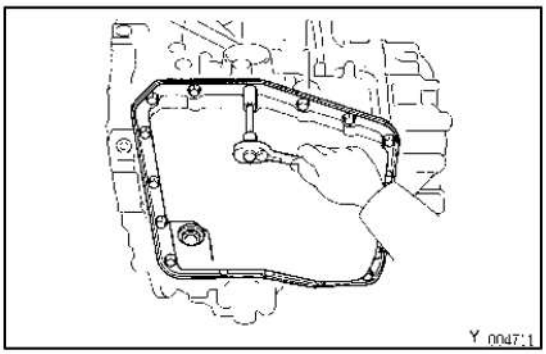


5. REMOVE T/M REVOLUTION SENSOR

(a) Remove the bolt and T/M revolution sensor.
(b) Remove the O–ring from the T/M revolution sensor.

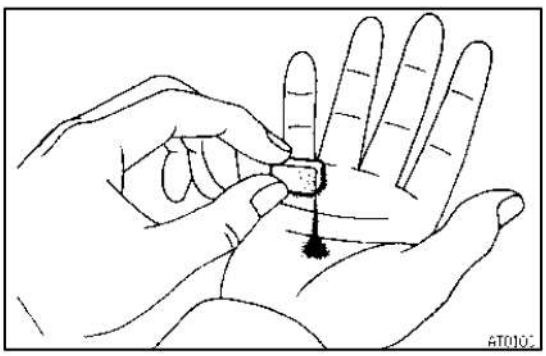


6. REMOVE TRANSAXLE CASE UPPER COVER



7. REMOVE OIL PAN AND GASKET

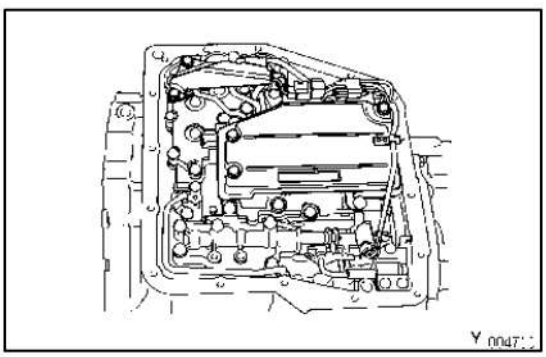
(a) Remove the 17 bolts.
(b) Remove the oil pan by lifting transaxle case.
NOTICE: Do not turn the transaxle over as this will contaminate the valve body with the foreign materials in the bottom of the oil pan.
(c) Place the transaxle on wooden blocks to prevent damage to the oil pipe bracket.



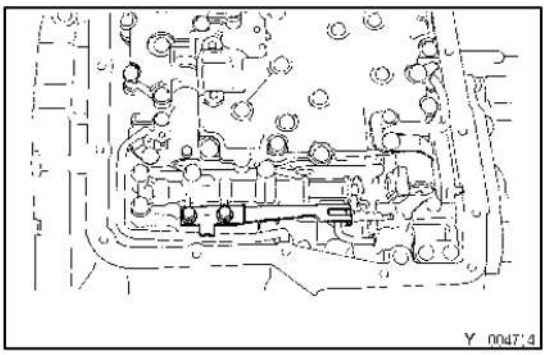
8. EXHAUST PARTICLES IN PAN

Remove the magnet and use it to collect any steel chips. Lock carefully at the chips and particles in the oil pan and on magnet to anticipate what type of wear you will find in the transaxle.

★ Steel (magnetic): bearing, gear and plate wear
★ Brass (non–magnetic): bushing wear

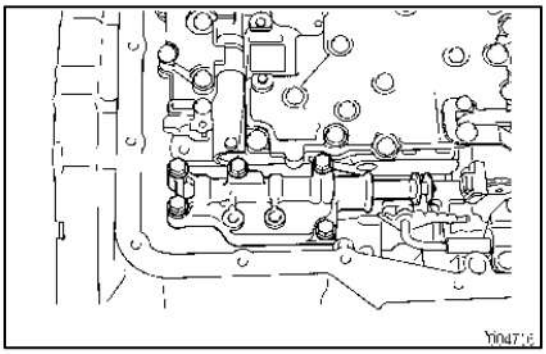


9. REMOVE OIL PIPE BRACKET AND STRAINER



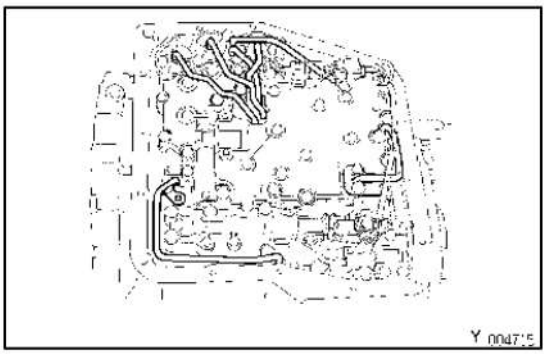
10. REMOVE MANUAL VALVE BODY

(a) Remove the 2 bolts and detent spring.



(b) Remove the 5 bolts and manual valve body with the manual valve.

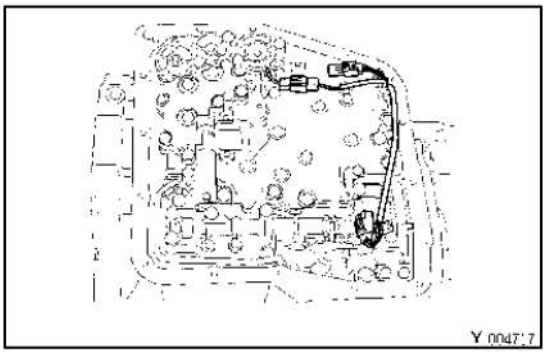
(c) Remove the manual valve from the manual valve body.



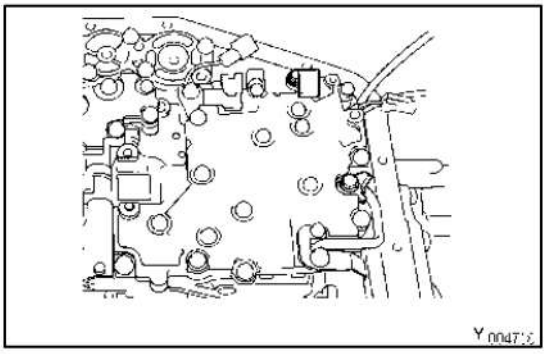
11. REMOVE OIL PIPES

(a) Remove the bolt.

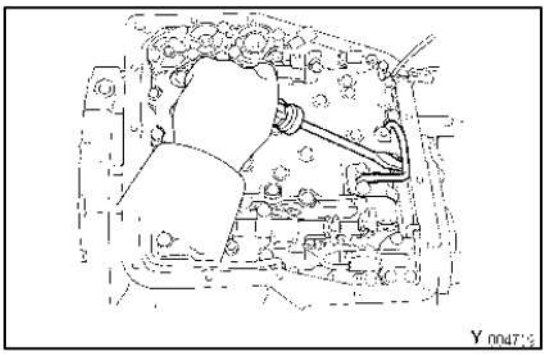
(b) Pry up both pipe ends with a large screwdriver and remove the 6 pipes.



12. DISCONNECT SOLENOID CONNECTORS

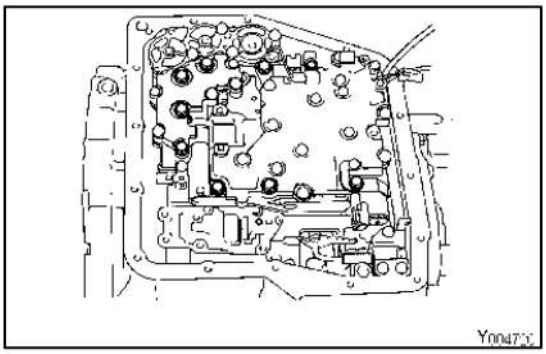


13. REMOVE CONNECTOR CLAMP AND PIPE RETAINER



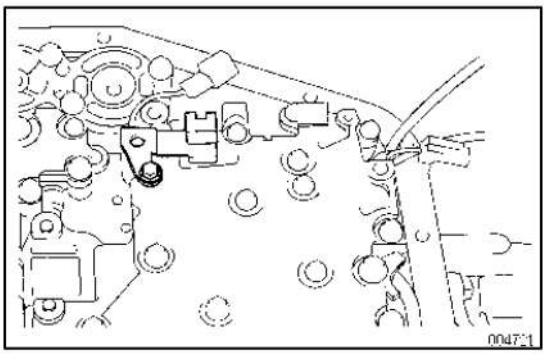
14. REMOVE B_3 APPLY PIPE

Pry up the pipe with a screwdriver and remove the pipe.

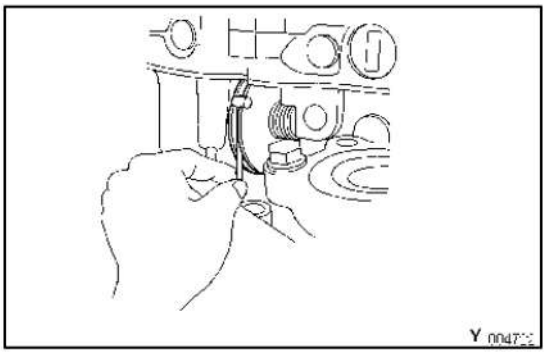


15. REMOVE VALVE BODY

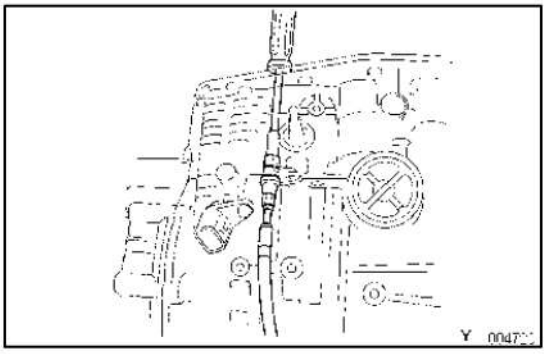
(a) Remove the 9 bolts.



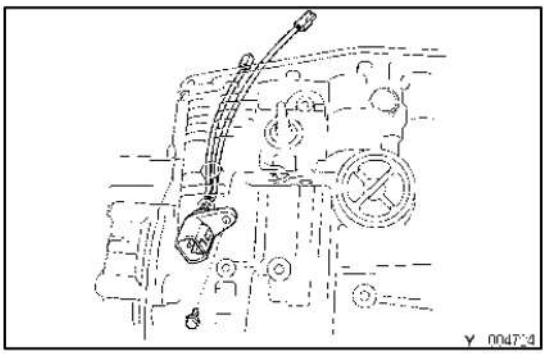
(b) Remove the wire harness clamp.



(c) Disconnect the throttle cable from the cam, and remove the valve body.

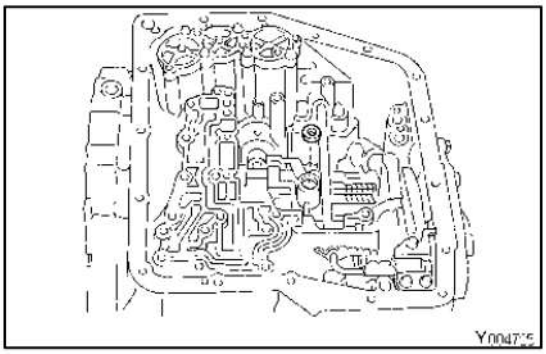


16. REMOVE THROTTLE CABLE

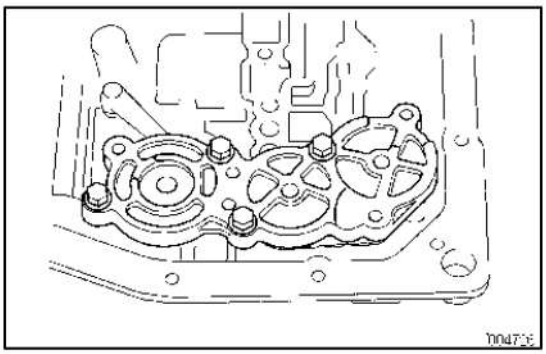


17. REMOVE SOLENOID WIRING

Remove the bolt and the solenoid wiring.



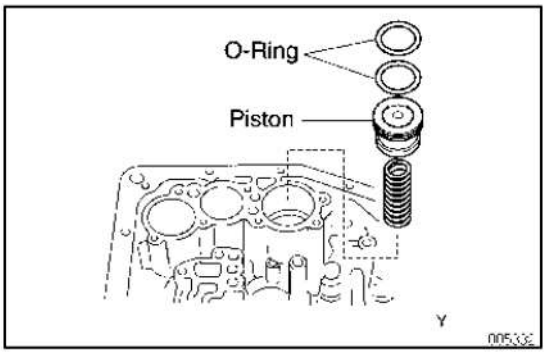
18. REMOVE SECOND BRAKE APPLY GASKET



19. REMOVE ACCUMULATOR PISTONS AND SPRINGS

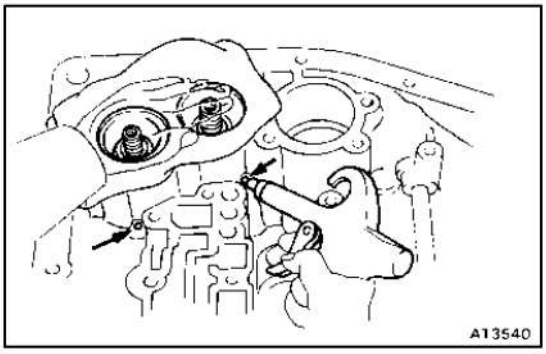
(a) Loosen the 4 bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



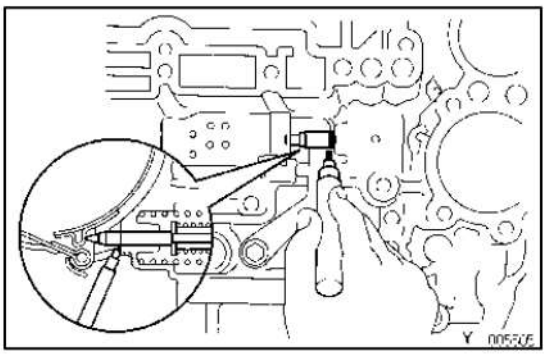
(c) Remove the C_1 accumulator piston and spring.

(d) Remove the 2 O–rings from the piston.



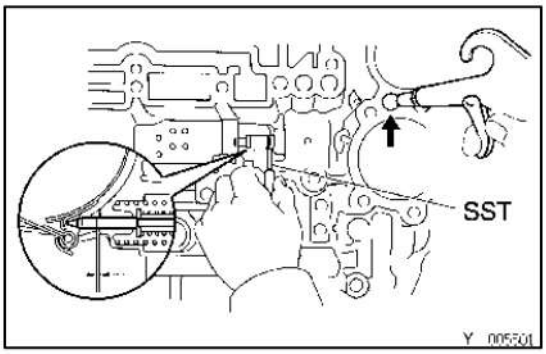
(e) Pop out pistons for C_2 and B_2 into a rag, using low–pressure compressed air (98 kPa, 1 kgf/cm^2, 14 psi).

(f) Remove the O–rings from the pistons.

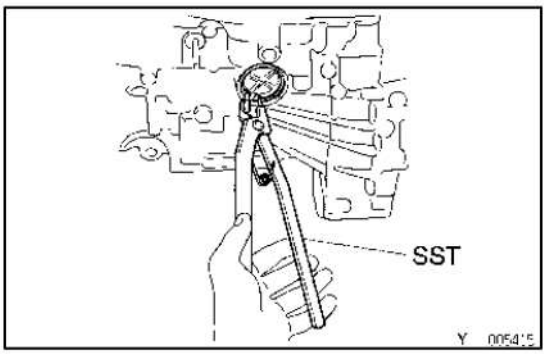


20. MEASURE PISTON STROKE SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.

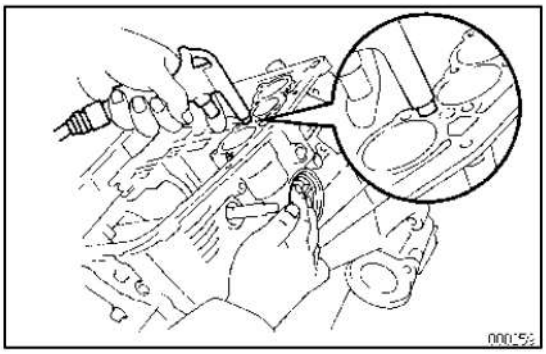


(b) Using SST, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09240–00020
Maximum thrust clearance:
2.0–3.5 mm (0.079–0.138 in.)
If the piston stroke exceeds the limit, inspect the second coast brake band.



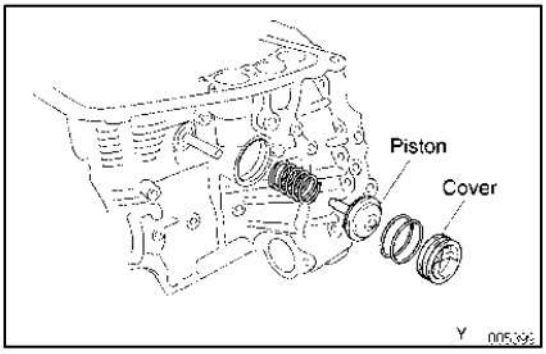
21. REMOVE SECOND COAST BRAKE PISTON

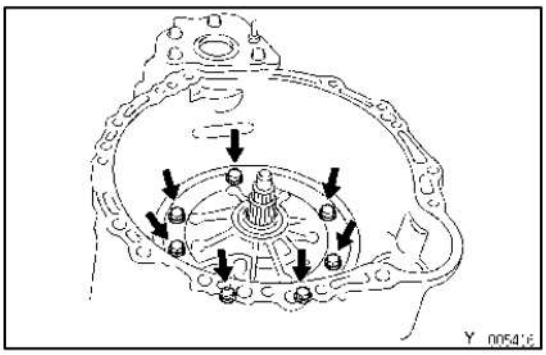
(a) Using SST, remove the snap ring.
SST 09350–32014



(b) Applying compressed air to the oil hole, remove the second coast brake cover, piston assembly and spring.

(c) Remove the 2 O–rings from the cover.



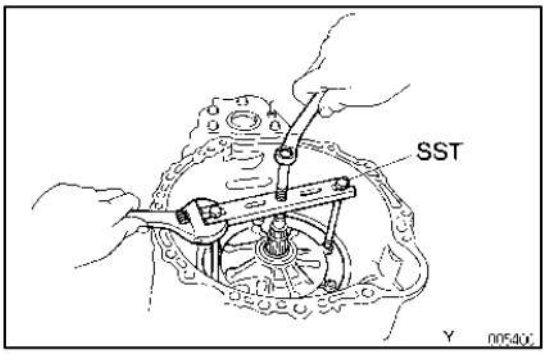


22. STAND TRANSAXLE ENGINE SIDE UPWARD

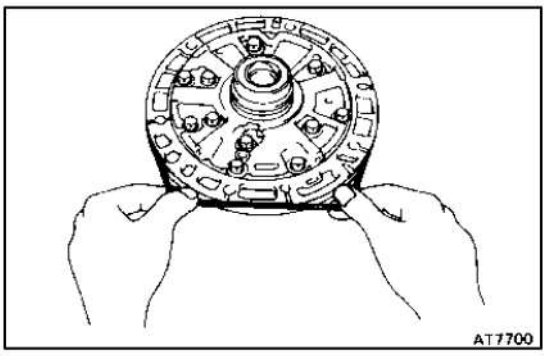
23. REMOVE OIL PUMP

NOTICE: Before removing the oil pump, remove the second coast brake piston.

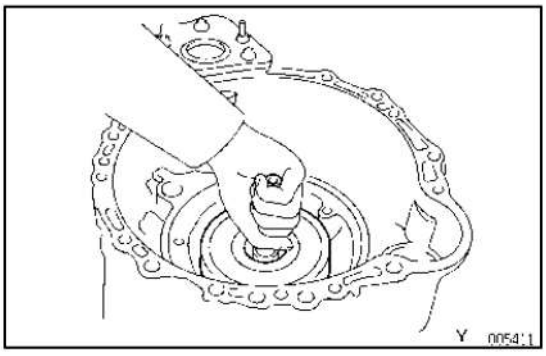
(a) Remove the 7 bolts.



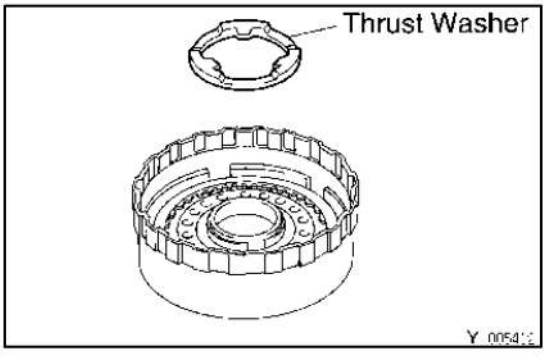
(b) Using SST, pull out the oil pump from the transaxle case.
SST 09350–32014



24. REMOVE O–RING FROM OIL PUMP



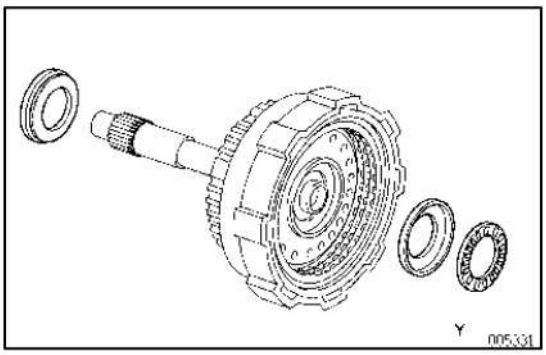
25. REMOVE DIRECT CLUTCH AND FORWARD CLUTCH



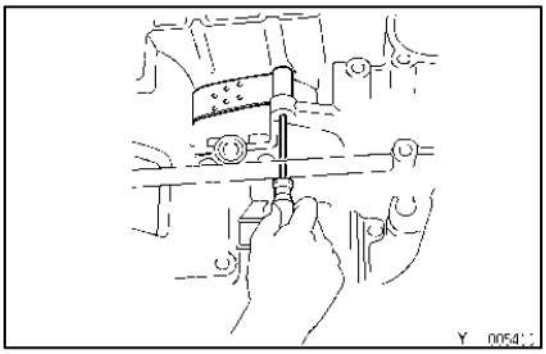
26. SEPARATE DIRECT CLUTCH AND FORWARD CLUTCH

(a) Separate the direct clutch and forward clutch.

(b) Remove the thrust washer from direct clutch.



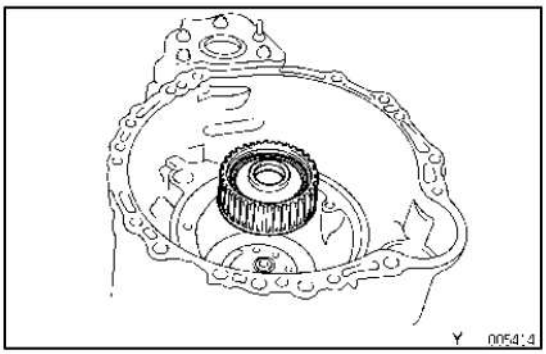
27. REMOVE BEARING FROM FORWARD CLUTCH



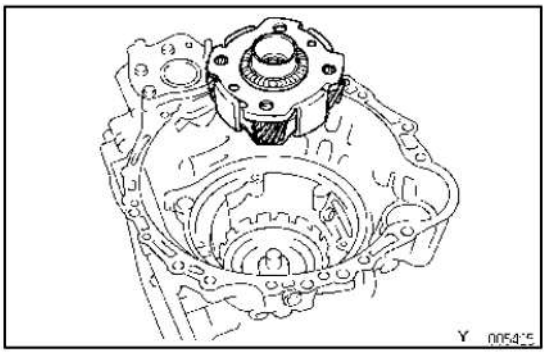
28. REMOVE SECOND COAST BRAKE BAND

(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

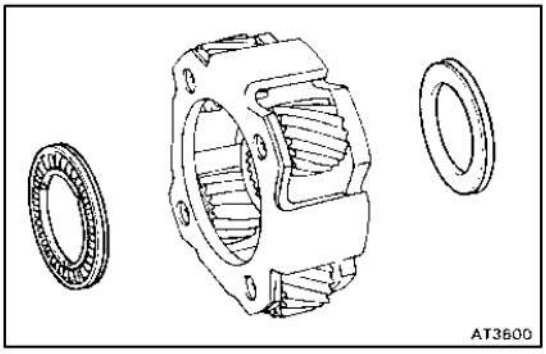


29. REMOVE FRONT PLANETARY RING GEAR

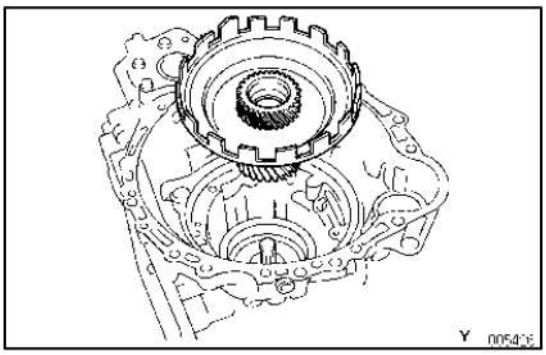


30. REMOVE FRONT PLANETARY GEAR

(a) Remove the front planetary gear.

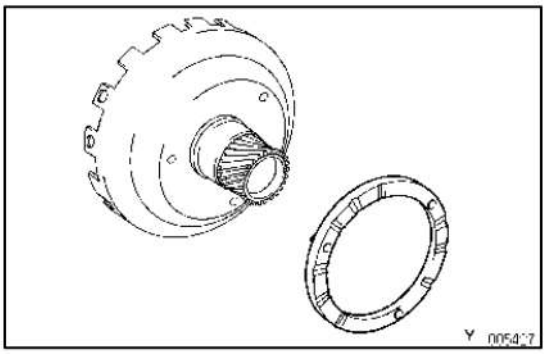


(b) Remove the 2 bearings from the planetary gear.

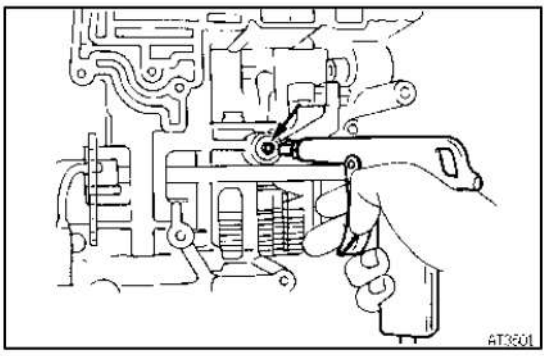


31. REMOVE SUN GEAR AND SUN GEAR INPUT DRUM

(a) Remove the sun gear and the sun gear input drum.



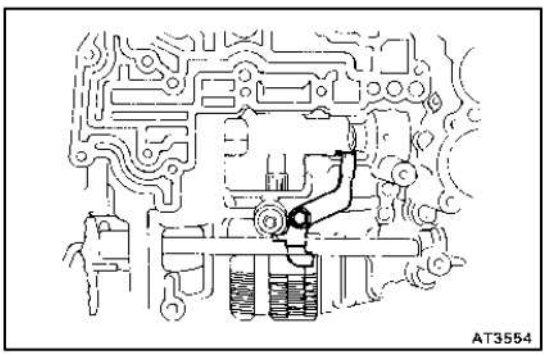
(b) Remove the thrust washer from sun gear input drum.



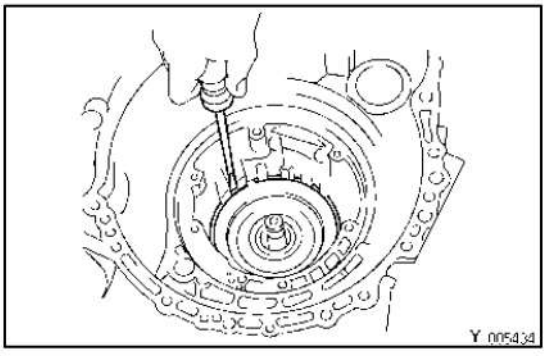
32. CHECK OPERATION OF SECOND BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.

If the piston does not move, disassembe and inspect.

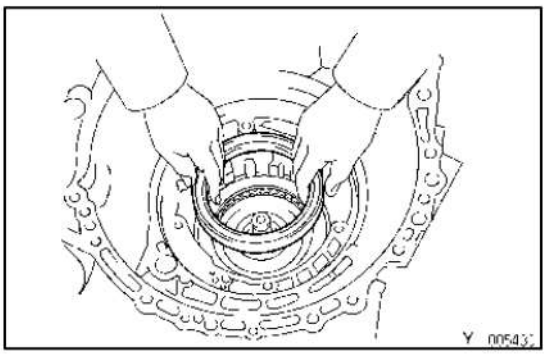


33. REMOVE SECOND COAST BRAKE BAND GUIDE

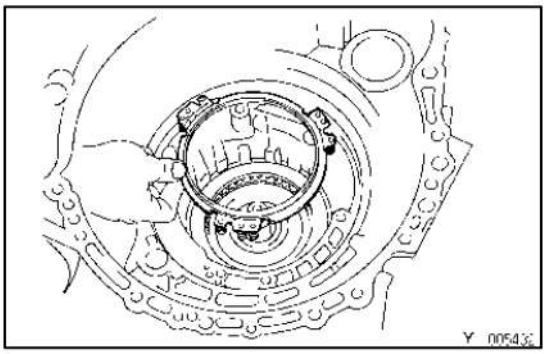


34. REMOVE SECOND BRAKE DRUM

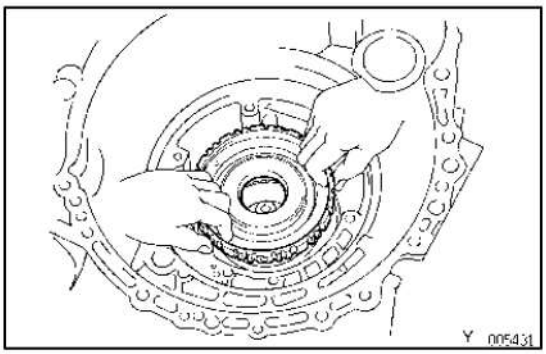
(a) Remove the snap ring.



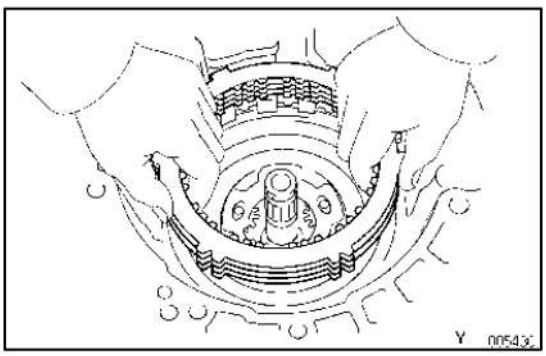
(b) Remove the second brake drum.



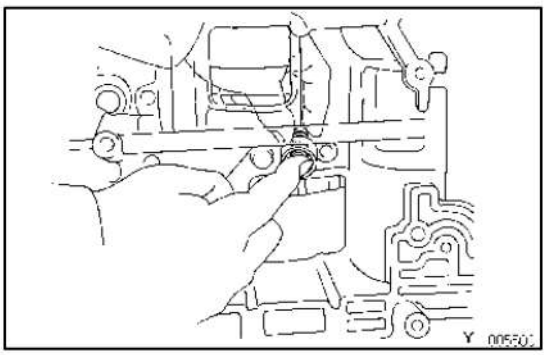
35. REMOVE SECOND BRAKE PISTON RETURN SPRING



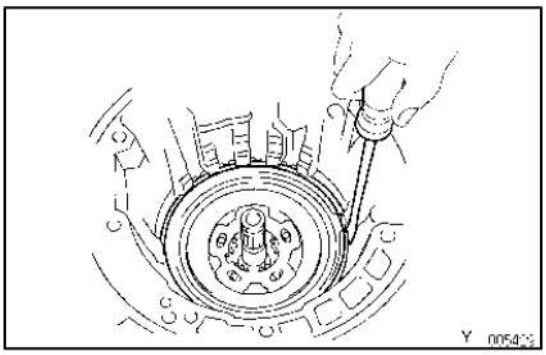
36. REMOVE NO.1 ONE–WAY CLUTCH



37. REMOVE PLATES, DISCS AND FLANGE

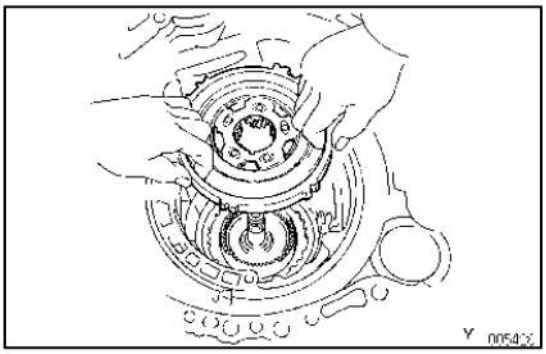


38. REMOVE SECOND BRAKE DRUM GASKET
Remove the gasket.

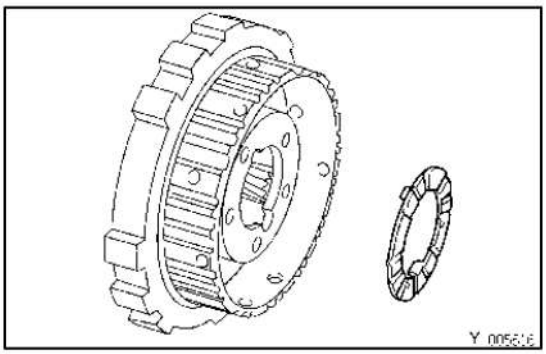


39. REMOVE NO.2 ONE–WAY CLUTCH AND REAR PLANETARY GEAR

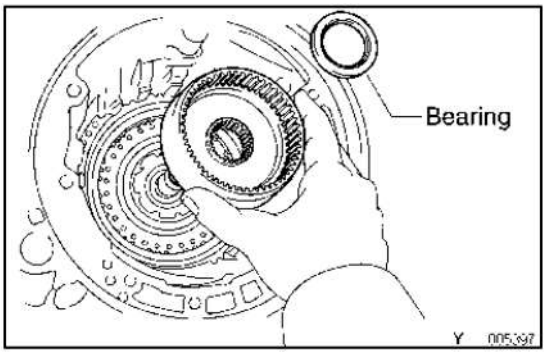
(a) Remove the snap ring.



(b) Remove the No.2 one–way clutch and rear planetary gear.



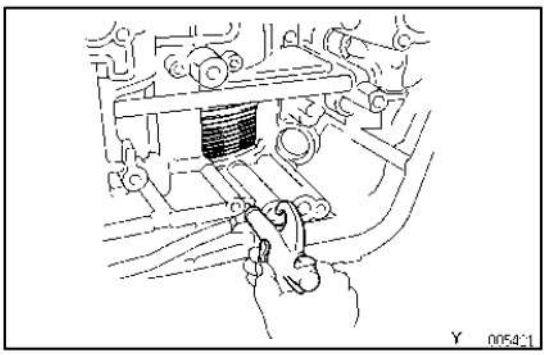
(c) Remove the thrust washer from the rear planetary gear.



40. REMOVE REAR PLANETARY RING GEAR

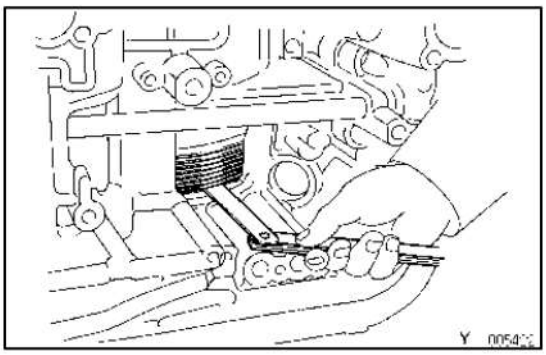
(a) Remove the rear planetary ring gear.

(b) Remove the bearing from the ring gear.

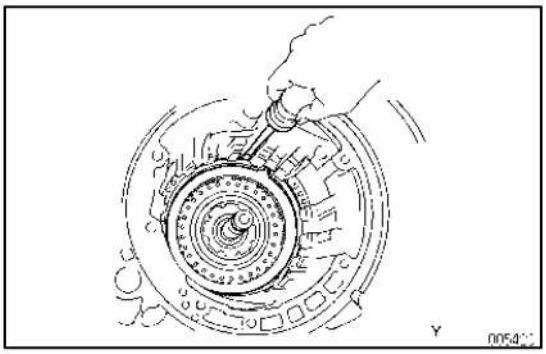


41. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassemble and inspect.

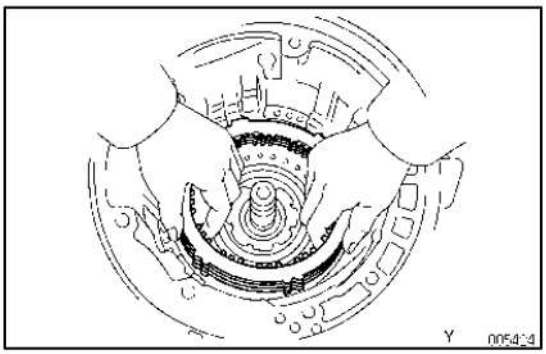


(b) Using a filler gauge, check the pack clearance of the first and reverse brake.
Clearance: 1.92–2.68 mm (0.0756–0.1055 in.)

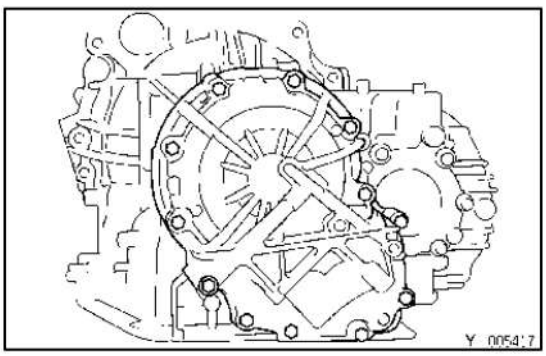


42. REMOVE FLANGE, DISCS AND PLATES OF FIRST AND REVERSE BRAKE

(a) Remove the snap ring.



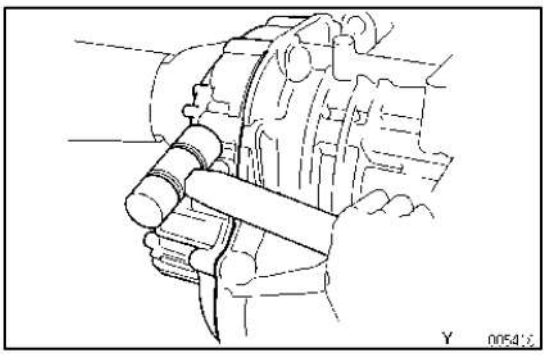
(b) Remove the flange, 6 discs and plates.



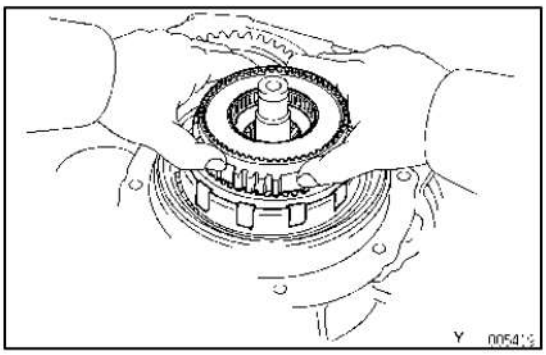
43. TURN TRANSAXLE CASE AROUND

44. REMOVE OVERDRIVE UNIT

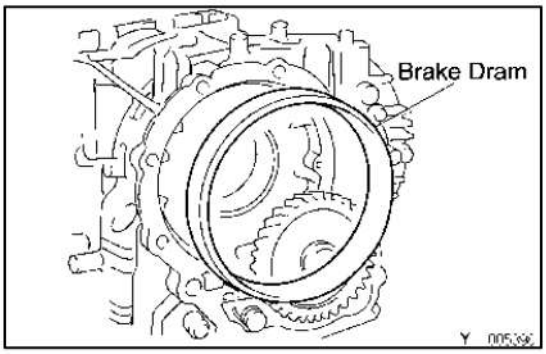
(a) Remove the 13 bolts.



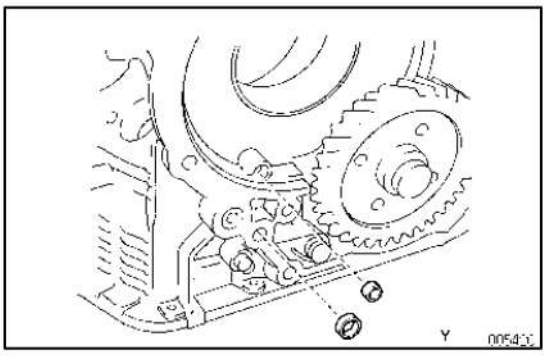
(b) Tap on the circumference of the overdrive case with a plastic hammer to remove the overdrive case and gasket.



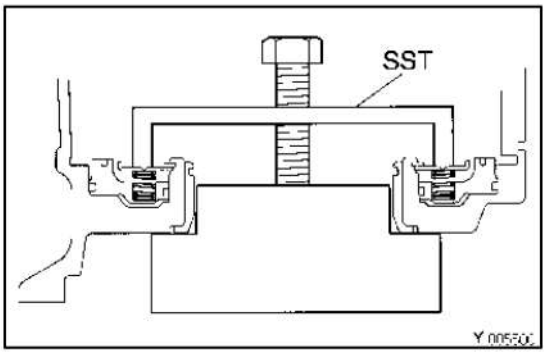
(c) Remove the overdrive planetary gear from transaxle case.



(d) Remove the overdrive brake drum from the transaxle case.



(e) Remove the overdrive clutch apply gasket and overdrive brake apply gasket.

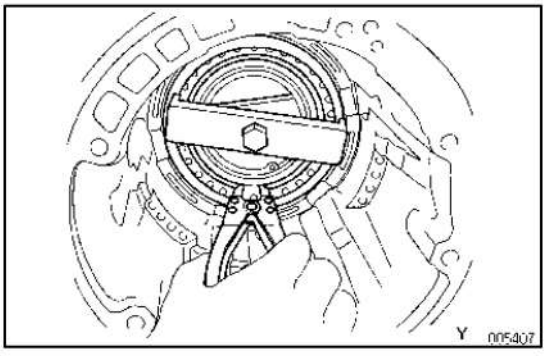


45. REMOVE FIRST AND REVERSE BRAKE PISTON

(a) Remove the piston return spring.

★ Place SST, compress the return spring evenly by tightening the bolt gradually.

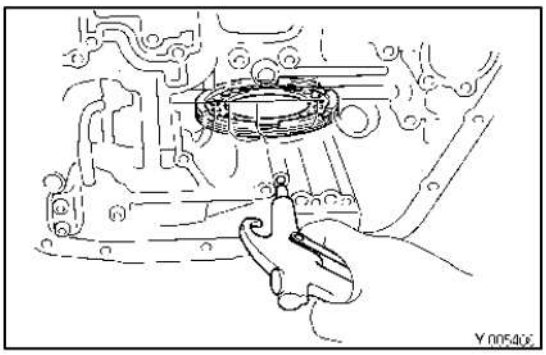
SST 09350–32014 (09351–32040)



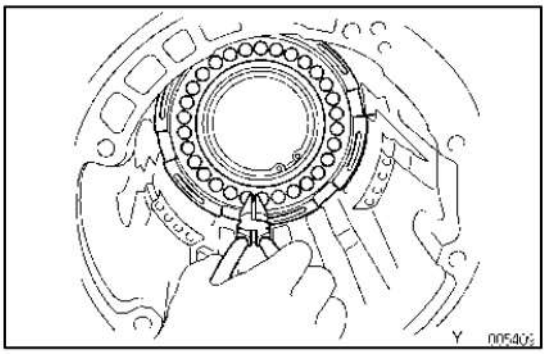
★ Using snap ring pliers, remove the snap ring.

★ Remove the SST.

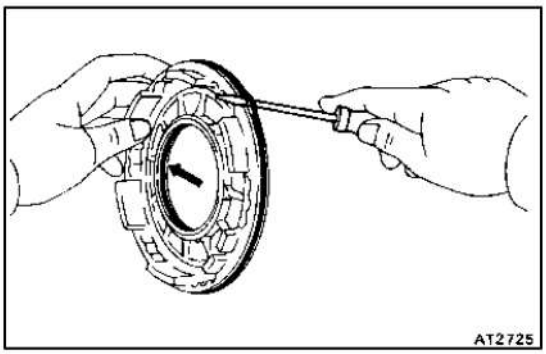
★ Remove the return spring from the case.



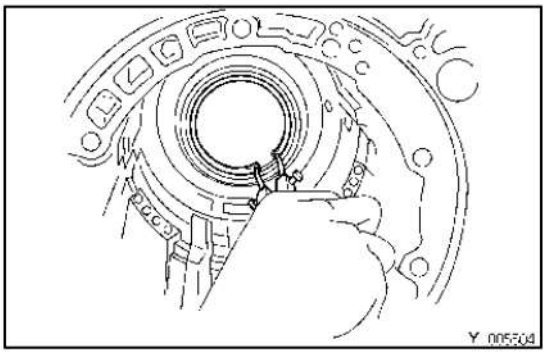
(b) Apply compressed air into the passage of the case to remove the piston.
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



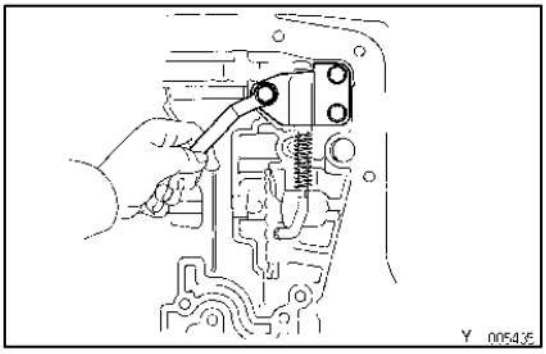
(c) If the piston does not pop out with compressed air, use needle–nose pliers to remove it.



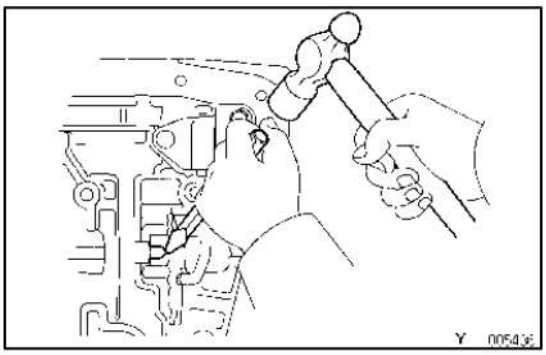
(d) Remove the 2 O–rings from the piston.



(e) Remove the snap ring.

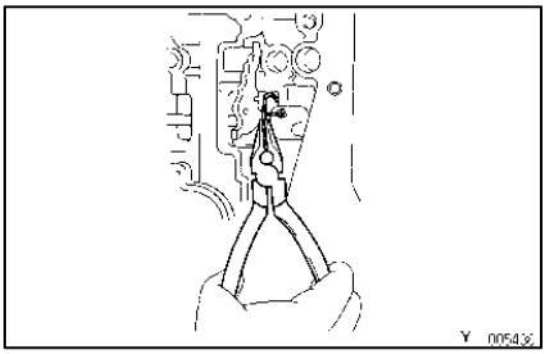


46. REMOVE PARKING LOCK PAWL BRACKET AND GUIDE

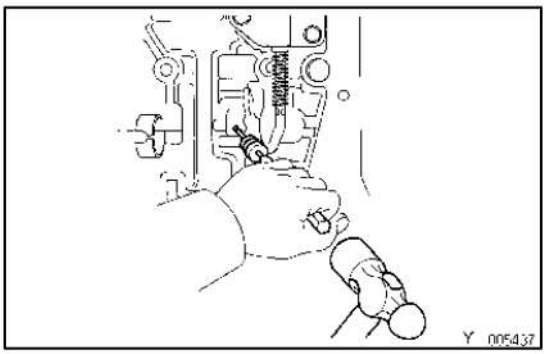


47. REMOVE MANUAL VALVE SHAFT

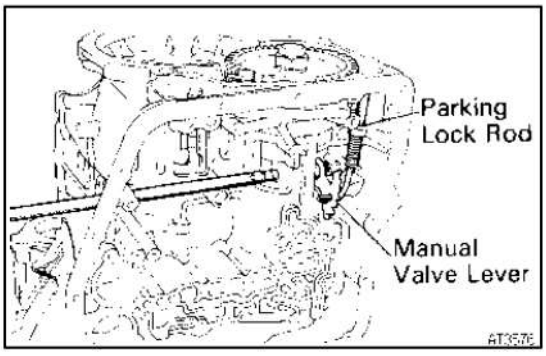
(a) Using a chisel and hammer, cut the collar.



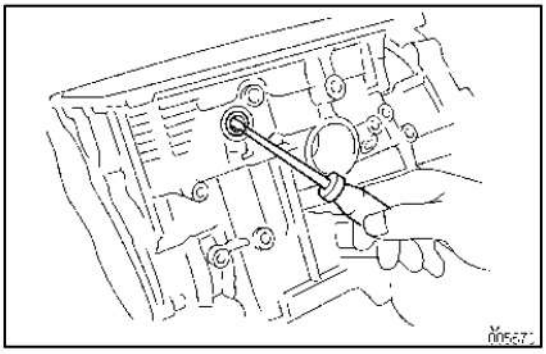
(b) Remove the retaining spring.



(c) Using a pin punch and hammer, drive out the pin.

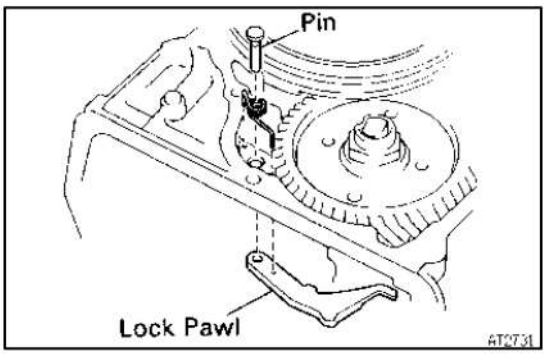


(d) Slide out the shaft from the transaxle case and remove the manual valve lever and parking lock rod.

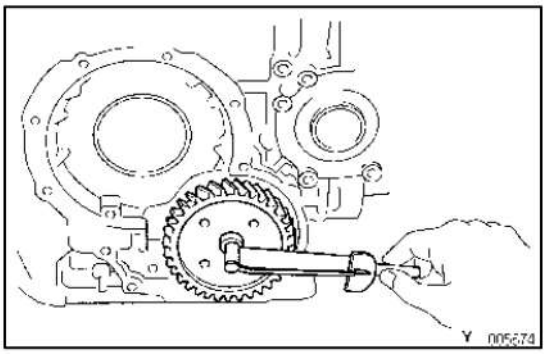


48. REMOVE MANUAL VALVE SHAFT OIL SEAL

Using a screwdriver, remove the oil seal.



49. REMOVE PIN, SPRING AND PARKING LOCK PAWL

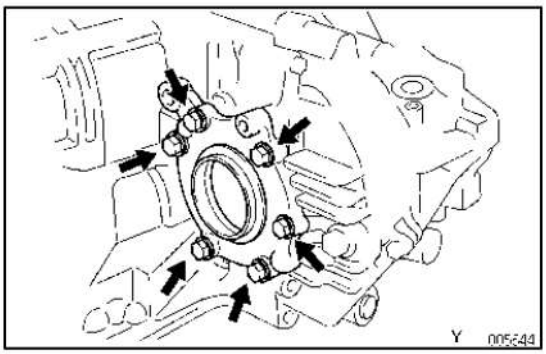


AX02S–04

DIFFERENTIAL COMPONENT PARTS REMOVAL

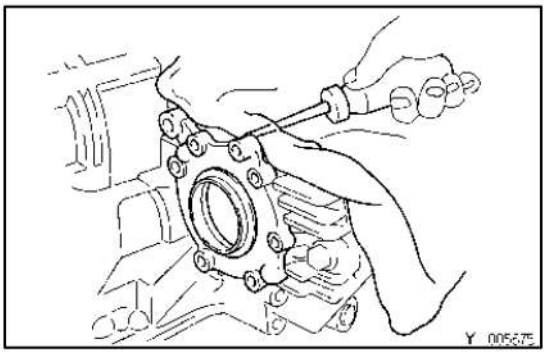
1. MEASURE DIFFERENTIAL TOTAL PRELOAD

Using a small torque wrench, measure the total preload and make a note of it.



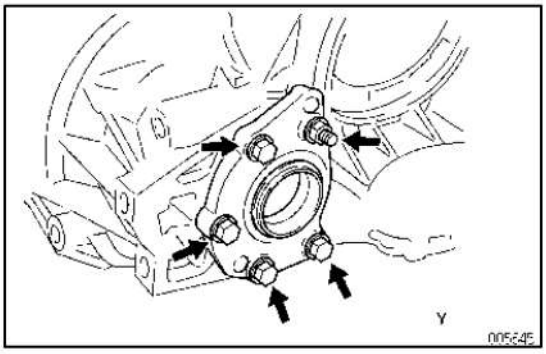
2. REMOVE LH BEARING RETAINER

(a) Remove the 6 bolts.



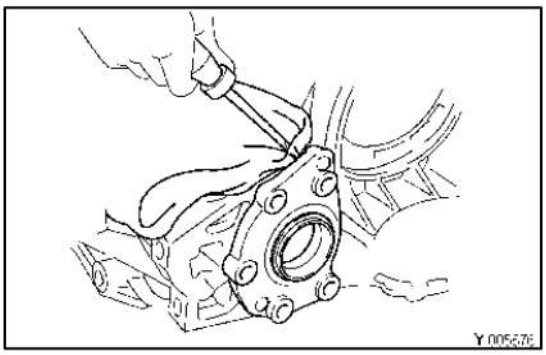
(b) Using a large screwdriver, remove the LH bearing retainer.

NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

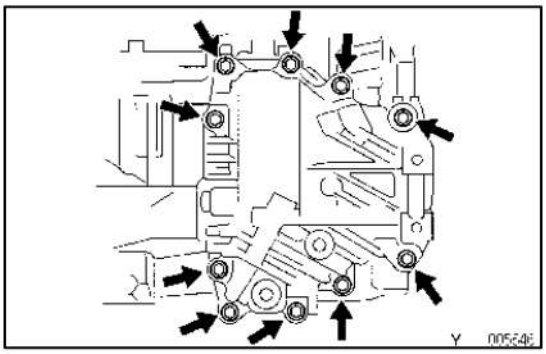


3. REMOVE RH RETAINER

(a) Remove the 5 bolts.

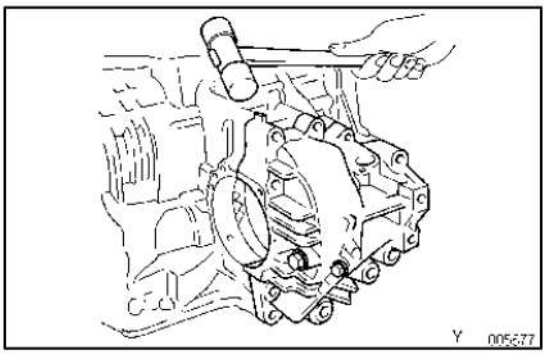


(b) Using a large screwdriver, remove the RH retainer.
NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

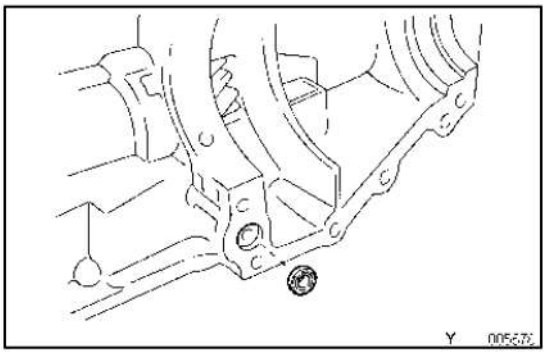


4. REMOVE CARRIER COVER

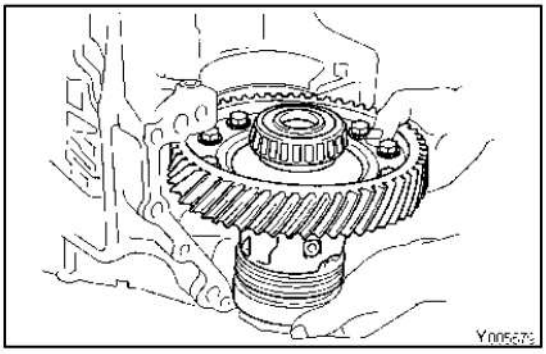
(a) Remove the 10 bolts.



(b) Tap the carrier cover with a plastic hammer to remove it.

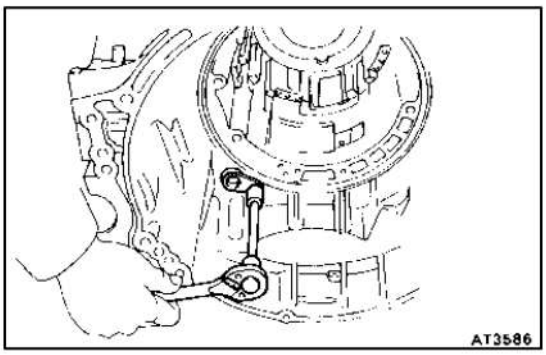


(c) Remove the apply gasket.



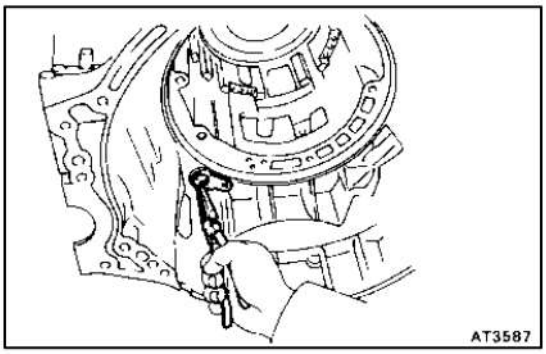
5. REMOVE DIFFERENTIAL CASE

Remove the differential case, outer case and shim from the transaxle case.

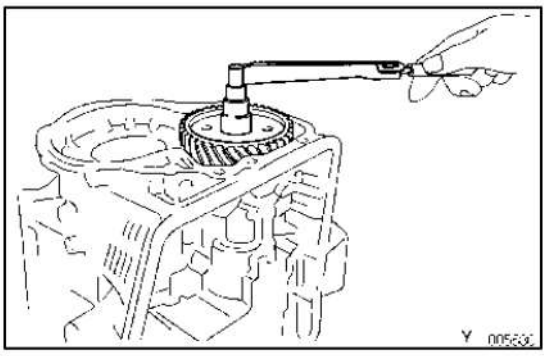


6. REMOVE TRANSAXLE CAP

(a) Remove the bolt.



(b) Using pliers, pull out the drive pinion cap.
(c) Remove the O–rings from the cap.



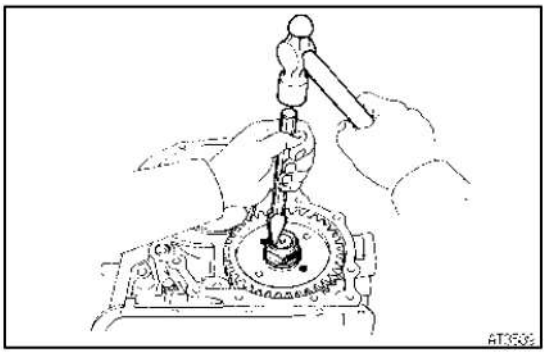
7. MEASURE DRIVE PINION PRELOAD

Using a small torque wrench, measure the drive pinion preload.

Preload (Reused bearing at starting):

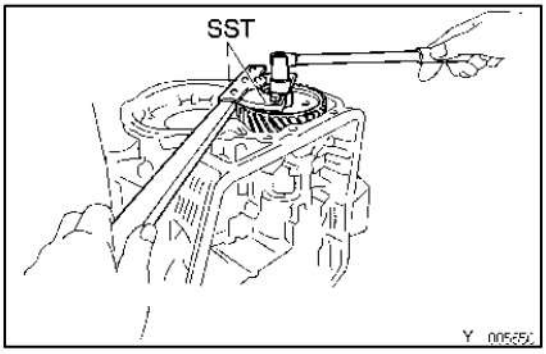
0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 in.·lbf)

The total preload measured in step 1 minus the drive pinion preload equals 0.1–0.2 N·m (1.3–2.0 kgf·cm, 1.1–1.7 in.·lbf). If the result is not within this specification, the side bearing preload is suspect.

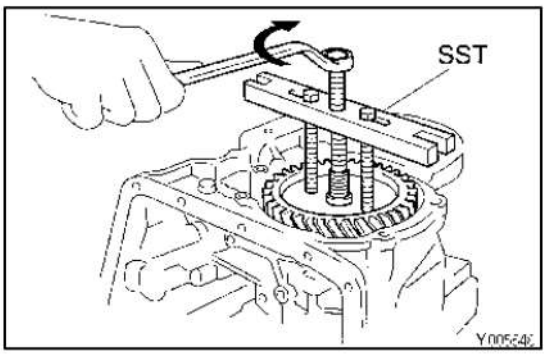


8. REMOVE COUNTER DRIVEN GEAR

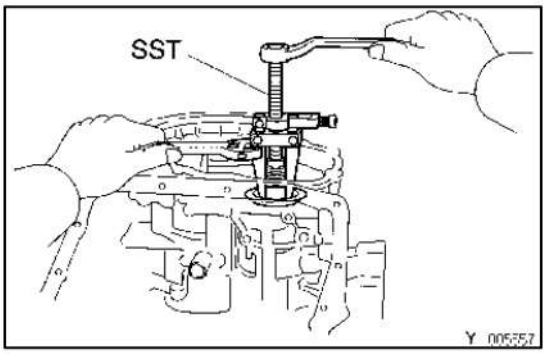
(a) Using a chisel and hammer, loosen the staked part of the nut.



(b) Using SST to hold the gear, remove the nut.
SST 09330–00021, 09350–32014 (09351–32032)

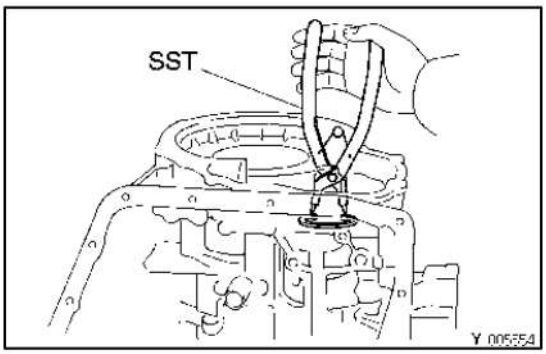


(c) Using SST, remove the gear and bearing.
SST 09350–32014 (09351–32061)

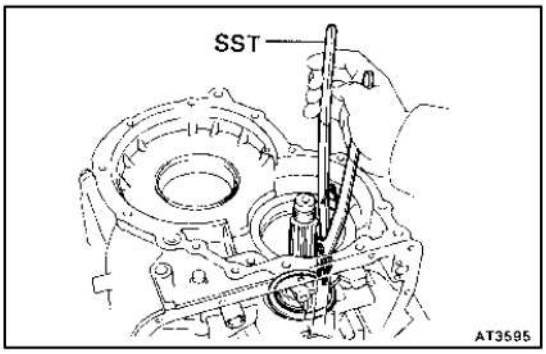


9. REMOVE OUTER RACE, SPACER AND OIL SLINGER

(a) Using SST, remove the outer race with oil slinger and spacer.
SST 09350–32014 (09308–10010)

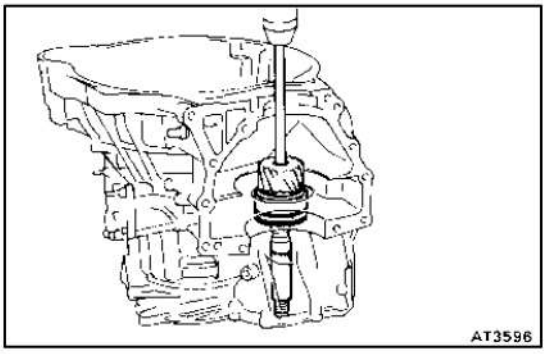


(b) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)



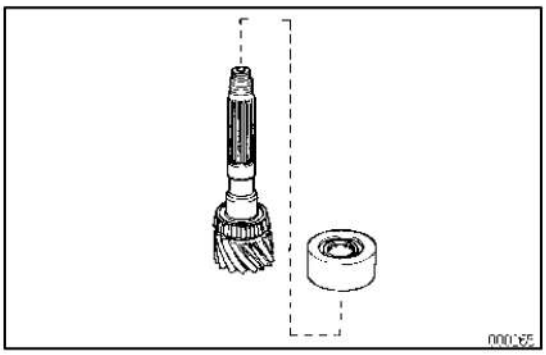
10. REMOVE DRIVE PINION

(a) Using SST, remove the snap ring.
SST 09350–32014 (09351–32050)

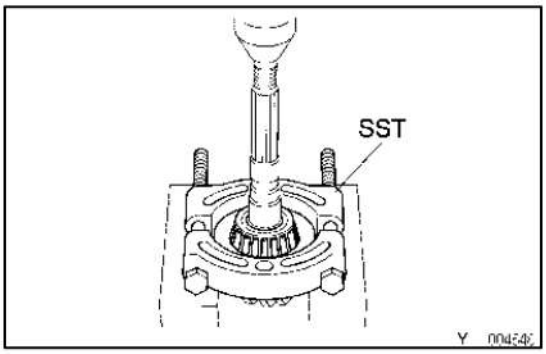


(b) Install the bar into the case hole to drive out the drive pinion.

(c) Using a press, drive out the drive pinion from transaxle case.



(d) Remove the bearing cage from drive pinion.



(e) Using SST, press out the bearing.
SST 09950–00020

AX02T-07

GENERAL NOTES

The instructions here are organized so that you work on only one component group at a time.
This will help avoid confusion from similar–looking parts of different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the converter housing side.
As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.
Recommended fluid for the automatic transaxle: ATF D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

1. GENERAL CLEANING NOTES:

(a) All disassembled parts should be washed clean and any fluid passages and holes blown through with compressed air.
(b) When using compressed air to dry parts, always aim away from yourself to prevent accidentally spraying automatic transaxle fluid or kerosene in your face.
(c) The recommended automatic transaxle fluid or kerosene should be used for cleaning.

2. PARTS ARRANGEMENT:

(a) After cleaning, the parts should be arranged in the correct order to allow efficient inspection, repairs, and reassembly.
(b) When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
(c) New brakes and clutches that are to be used for replacement must be soaked in transaxle fluid for at least fifteen minutes before assembly.

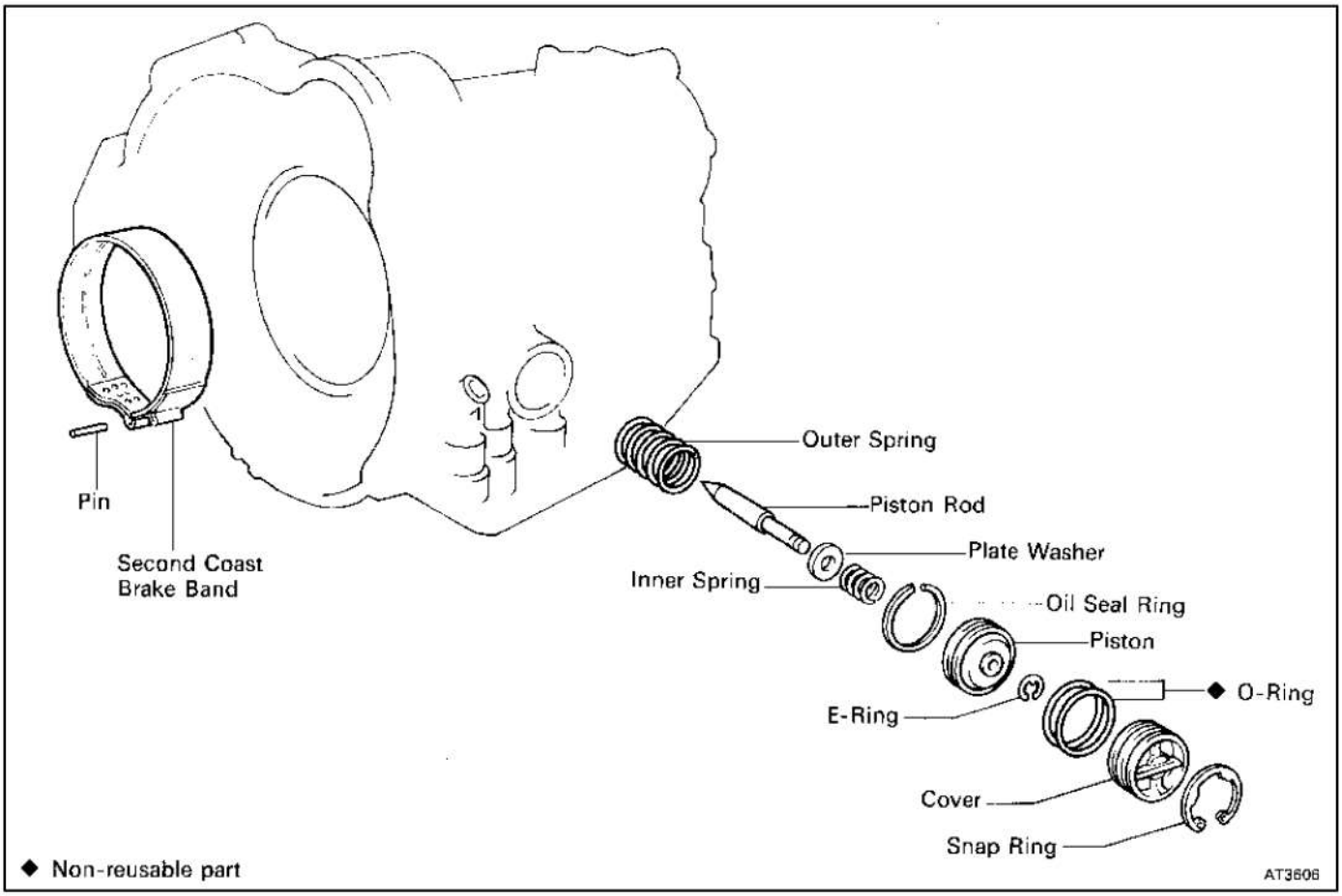
3. GENERAL ASSEMBLY:

(a) All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
(b) All gaskets and rubber O–rings should be replaced.
(c) Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
(d) If a worn bushing is to be replaced, the subassembly containing that bushing must be replaced.
(e) Check thrust bearings and races for wear or damage. Replace if necessary.
(f) Use petroleum jelly to keep parts in place.

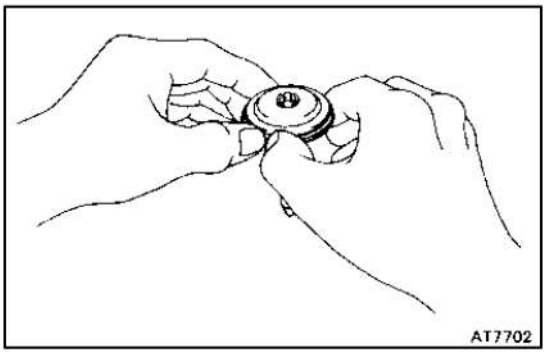
SECOND COAST BRAKE

COMPONENTS

AX02U–02



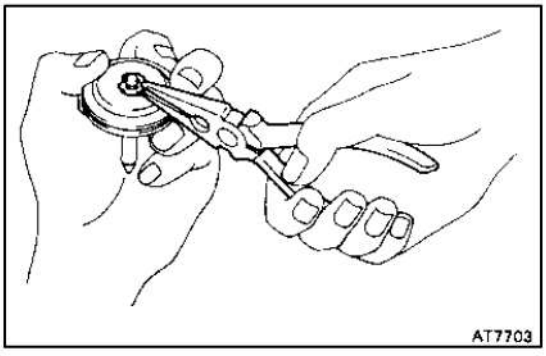
AX02V–02



SECOND COAST BRAKE PISTON DISASSEMBLY

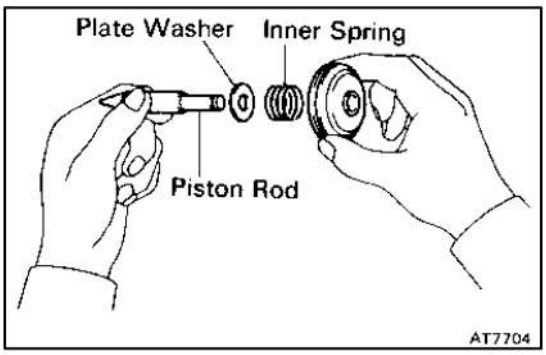
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

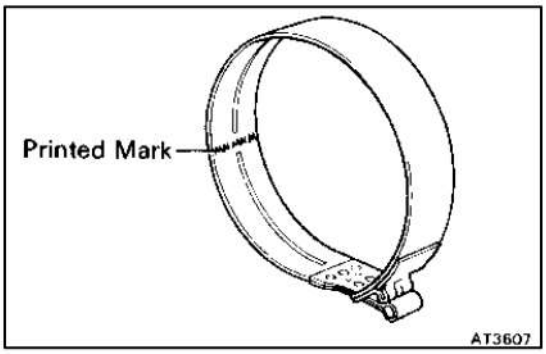


2. REMOVE PISTON ROD

(a) Remove the E–ring while pushing the piston with needle–nose pliers.



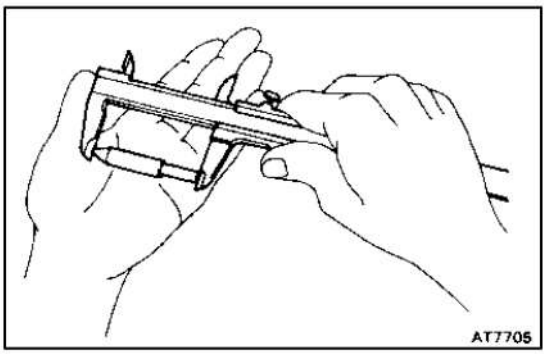
(b) Remove the inner spring, plate washer and piston rod.



SECOND COAST BRAKE COMPONENT INSPECTION

AX02W–03

If the lining of the brake band is peeling off or discolored, or even part of the printed mark is defaced, replace the brake band.



SECOND COAST BRAKE PISTON ASSEMBLY

AX02X–03

1. SELECT PISTON ROD

If the band is OK but piston stroke not within the standard value, select a new piston rod.

Piston stroke:

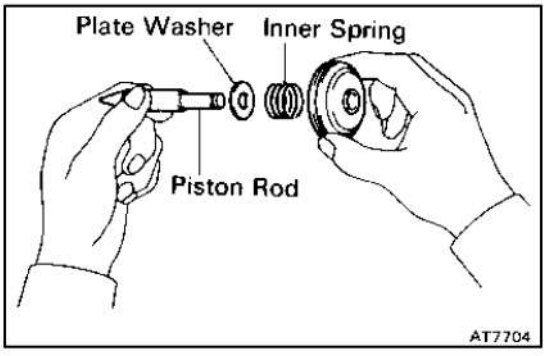
2.0–3.5 mm (0.079–0.138 in.)

There are 2 lengths of piston rod.

Piston rod length:

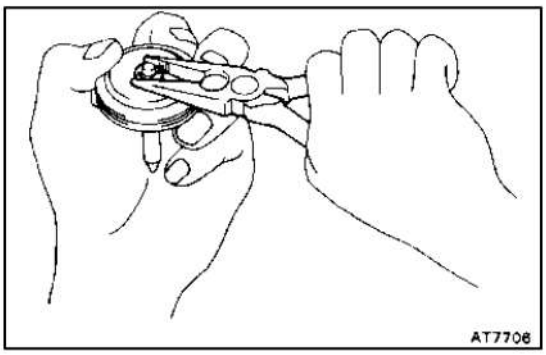
95.2 mm (3.748 in.)

96.3 mm (3.791 in.)

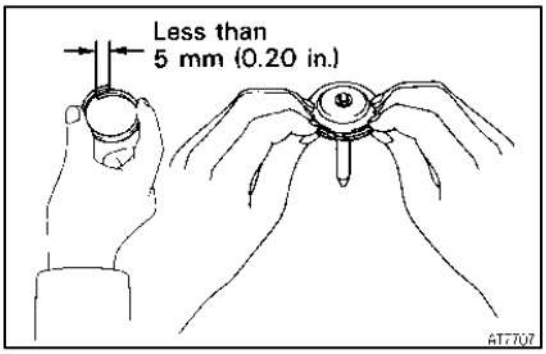


2. INSTALL PISTON ROD

(a) Install the plate washer and inner spring to the piston rod.



(b) Install the E–ring while pushing the piston.



3. INSTALL OIL SEAL RING

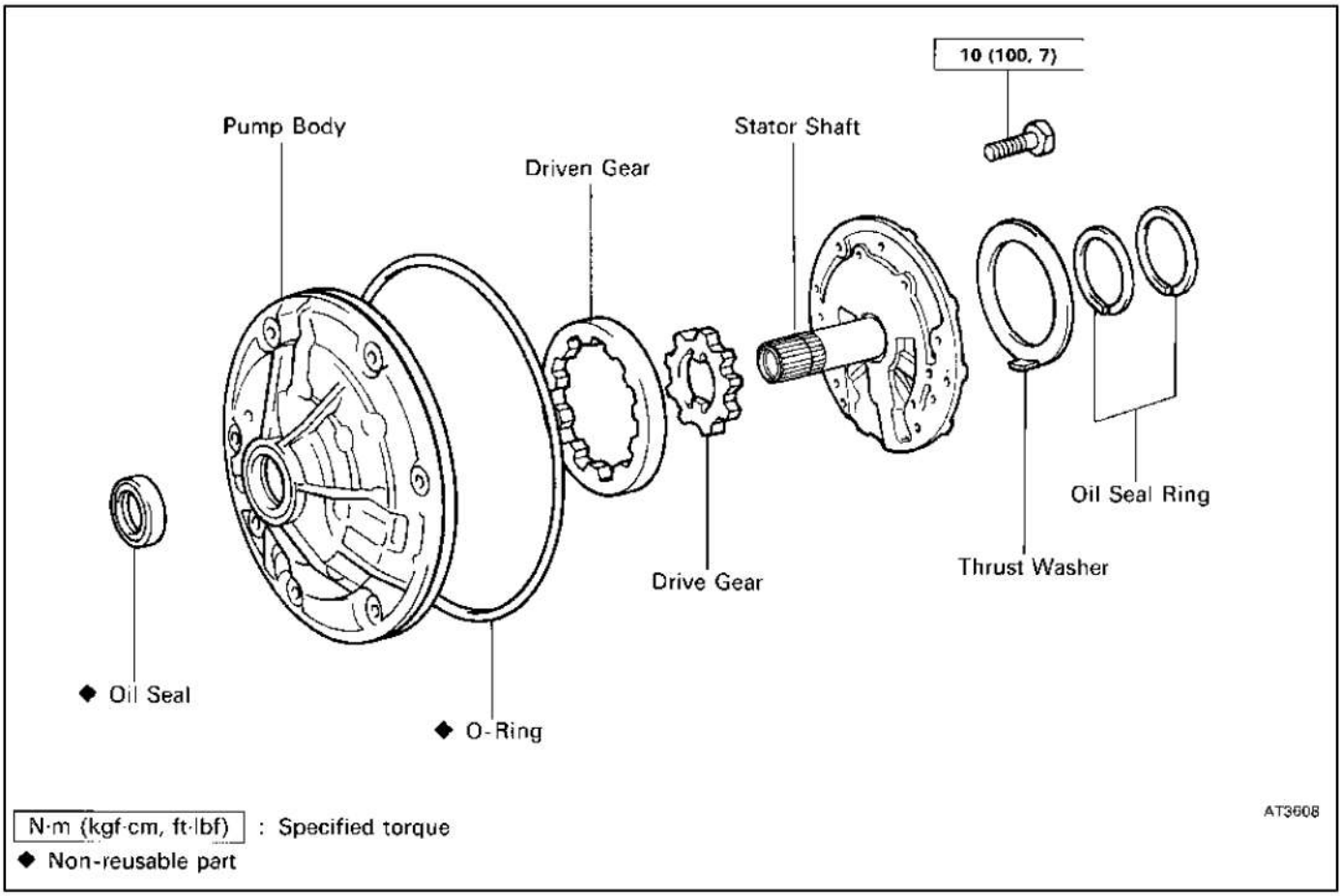
(a) Apply ATF to the oil seal ring.

(b) Install the oil seal ring to the piston.

NOTICE: Do not spread the ring ends more than necessary.

OIL PUMP
COMPONENTS

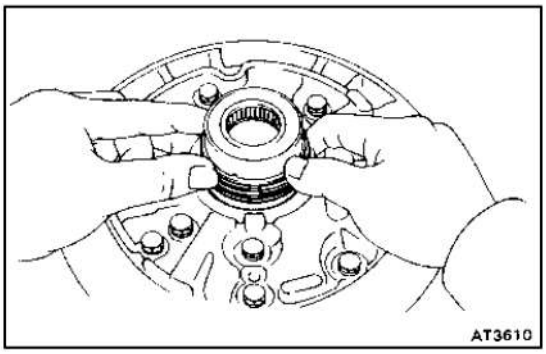
AX02Y-02



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

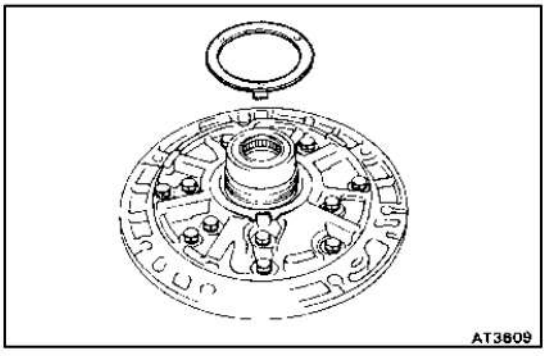
AX02Z-02

OIL PUMP DISASSEMBLY

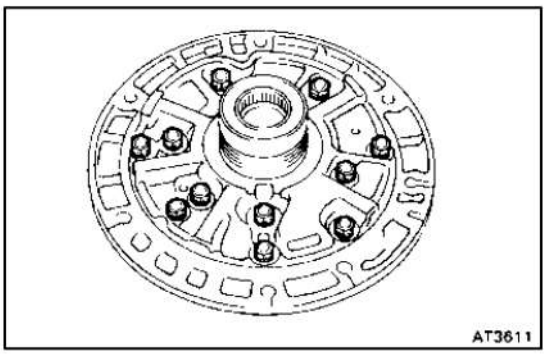


1. REMOVE OIL SEAL RINGS

Remove the 2 oil seal rings from the stator shaft back side.



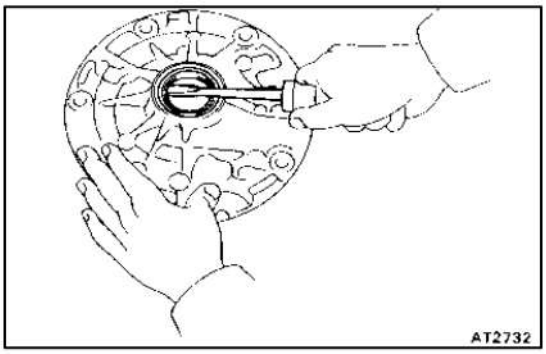
2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



3. REMOVE STATOR SHAFT

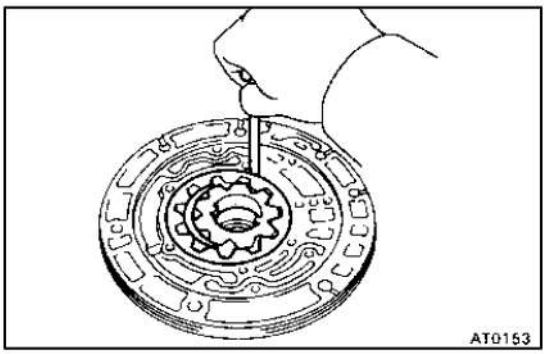
Remove the 11 bolts and stator shaft.

HINT: Keep the gears in assembly order.



4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.



AX030-06

OIL PUMP BUSHING INSPECTION

1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.

Using a feeler gauge, measure the clearance.

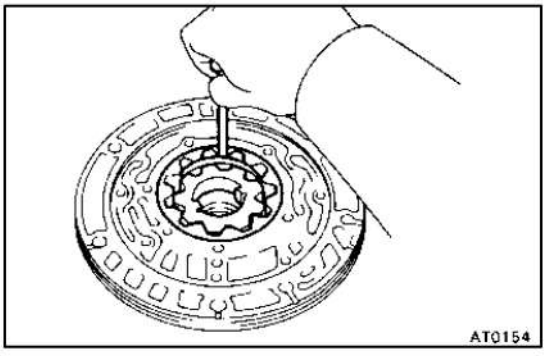
Standard body clearance:

0.07–0.15 mm (0.0028–0.0059 in.)

Maximum body clearance:

0.30 mm (0.0118 in.)

If the body clearance is greater than the maximum, replace the oil pump body subassembly.



2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescent–shaped part of the pump body.

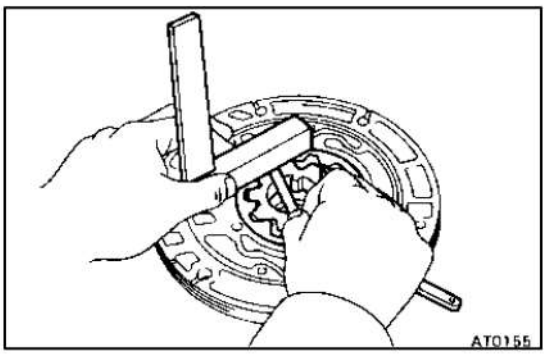
Standard tip clearance:

0.11–0.14 mm (0.0043–0.0055 in.)

Maximum tip clearance:

0.30 mm (0.0118 in.)

If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and feeler gauge, measure the side clearance of both gears.

Standard side clearance:

0.002–0.005 mm (0.0008–0.0020 in.)

Maximum side clearance:

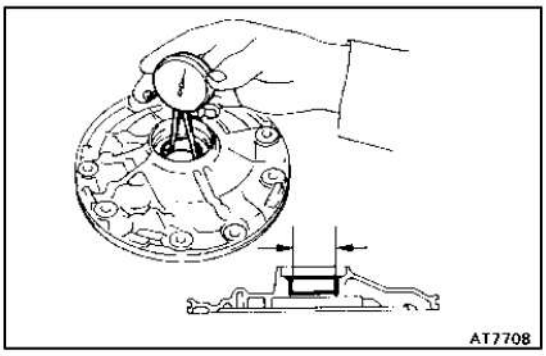
0.100 mm (0.0039 in.)

There are 3 different thicknesses for drive and driven gears.

Drive and driven gear thickness

Mark	Thickness mm (in.)
A	9.440–9.456 (0.3717–0.3723)
B	9.456–9.474 (0.3723–0.3730)
C	9.474–9.490 (0.3730–0.3736)

If the thickest gear can not make the side clearance within standard specification, replace the oil pump body subassembly.



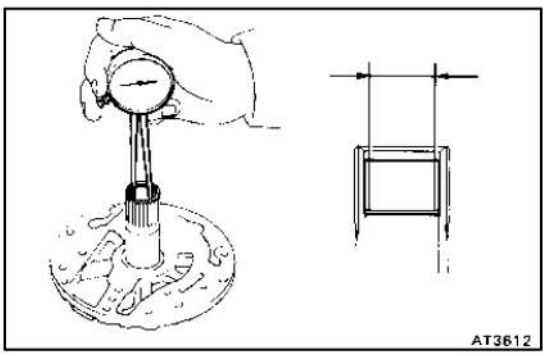
4. CHECK OIL PUMP BODY BUSHING

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

Maximum inside diameter:

38.18 mm (1.5031 in.)

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



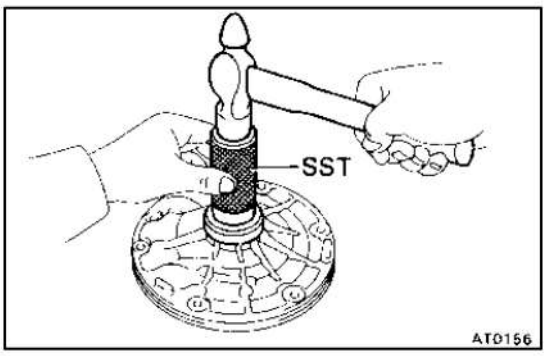
5. CHECK STATOR SHAFT BUSHING

Using a dial indicator, measure the inside diameter stator shaft bushing.

Maximum inside diameter:

21.57 mm (0.8492 in.)

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



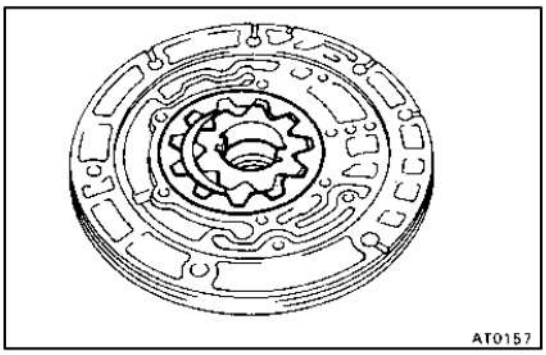
AX031–02

OIL PUMP ASSEMBLY

1. INSTALL FRONT OIL SEAL

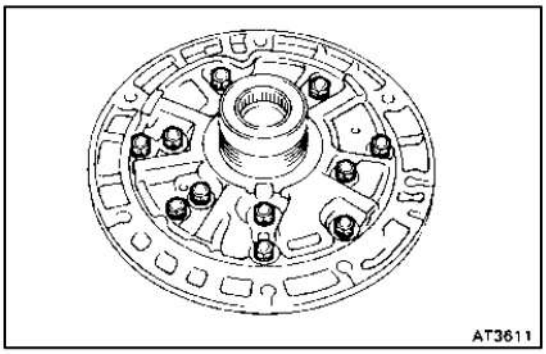
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350–32014 (09351–32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

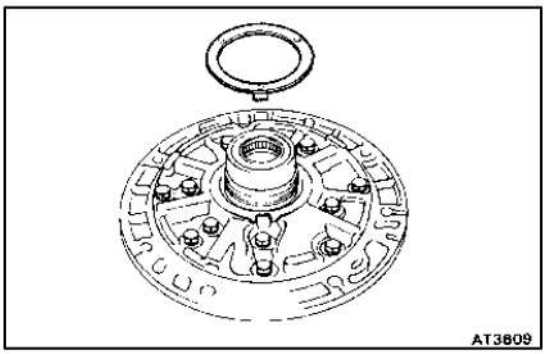


3. INSTALL STATOR SHAFT TO PUMP BODY

(a) Align the stator shaft with each bolt hole.

(b) Torque the 11 bolts.

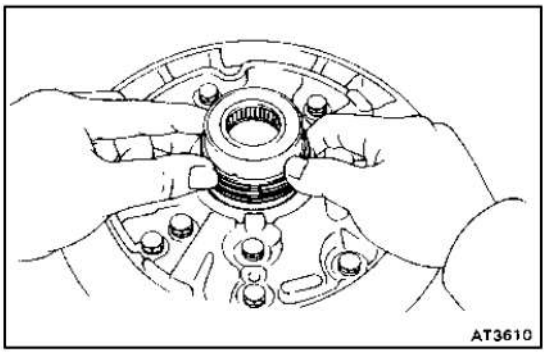
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollow of the pump body.

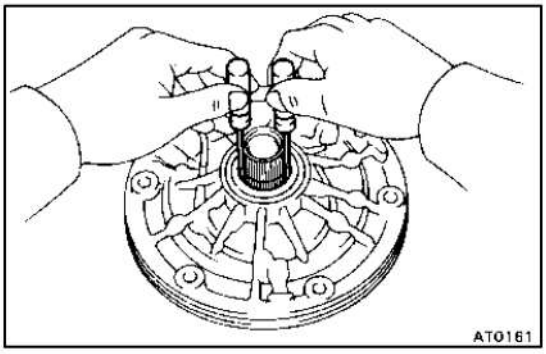


5. INSTALL OIL SEAL RINGS

Install the 2 oil seal rings to the stator shaft back side.

NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.



6. CHECK PUMP DRIVE GEAR ROTATION

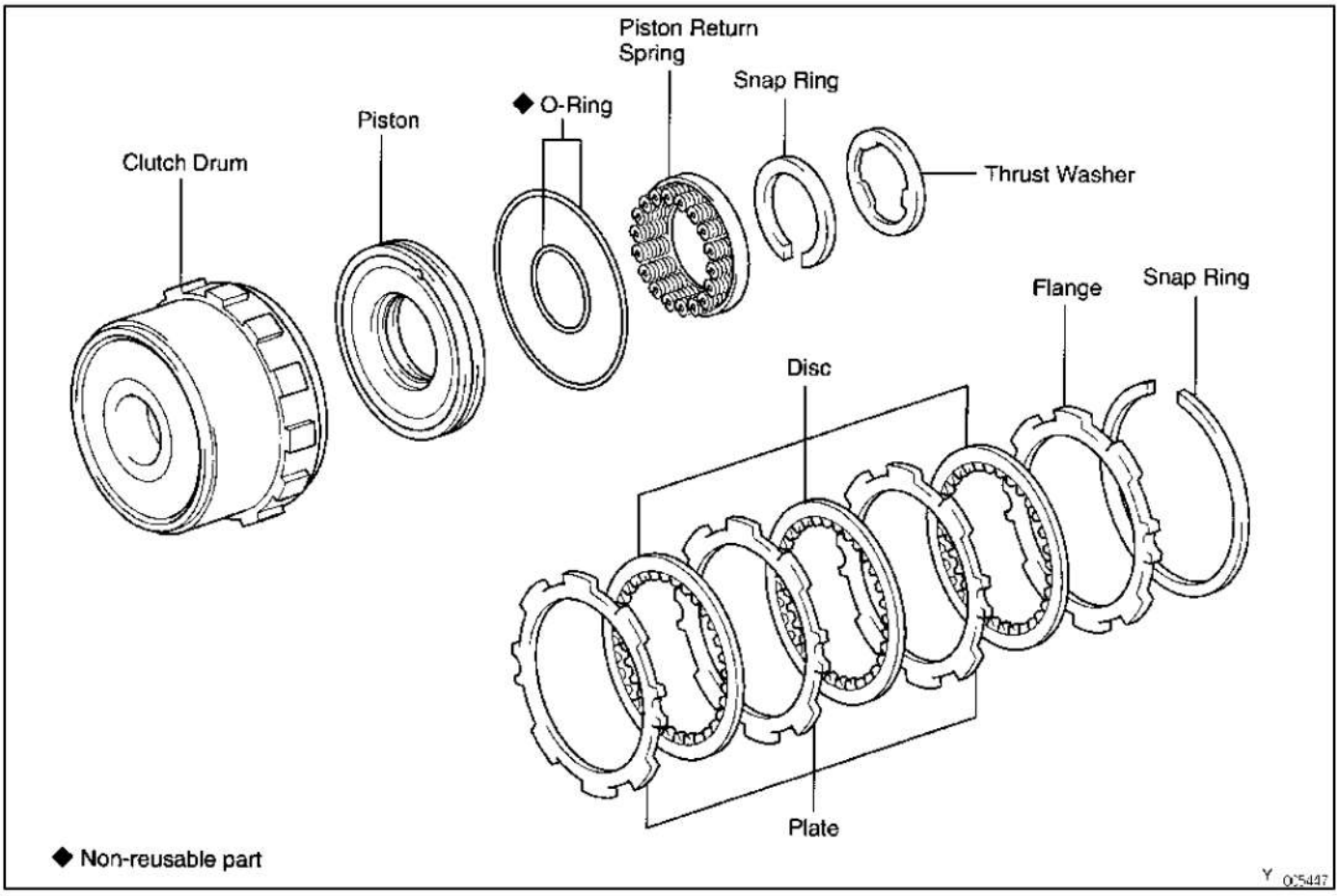
Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

NOTICE: Be careful not to damage the oil seal lip.

DIRECT CLUTCH

COMPONENTS

AX032-02



AX033-05

DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

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

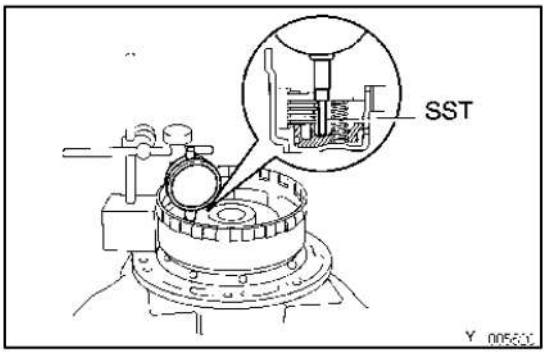
(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kg/cm^2, 57–114 psi).

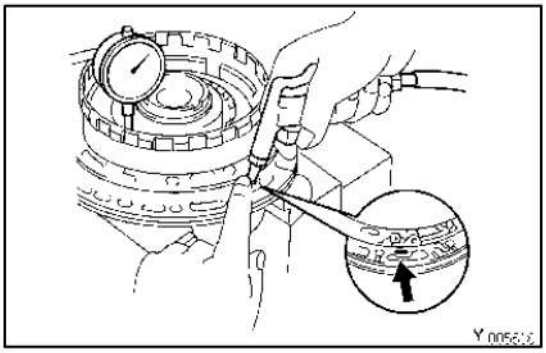
SST 09350–32014 (09351–32190)

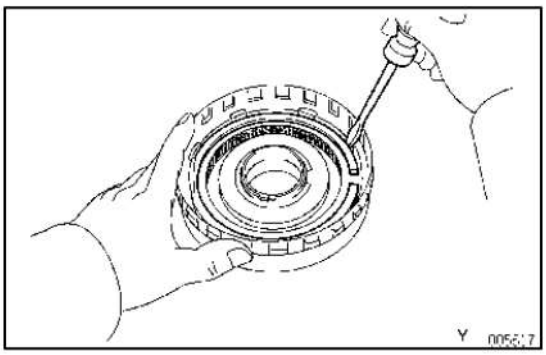
Piston stroke:

0.91–1.35 mm (0.0358–0.0531 in.)

If the piston stroke is greater than the maximum, inspect each component.

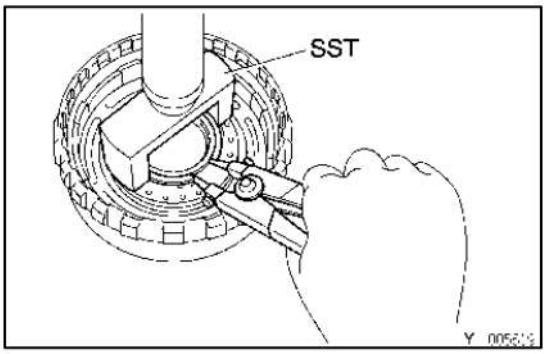






2. REMOVE SNAP RING FROM CLUTCH DRUM

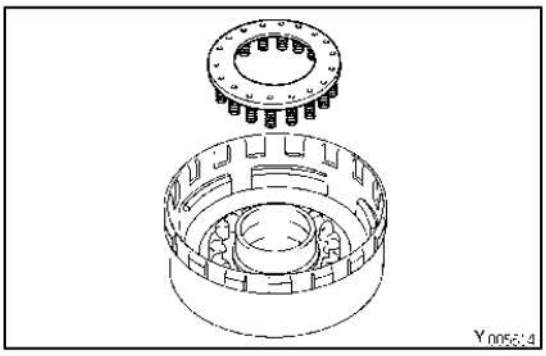
3. REMOVE FLANGE, DISCS AND PLATES



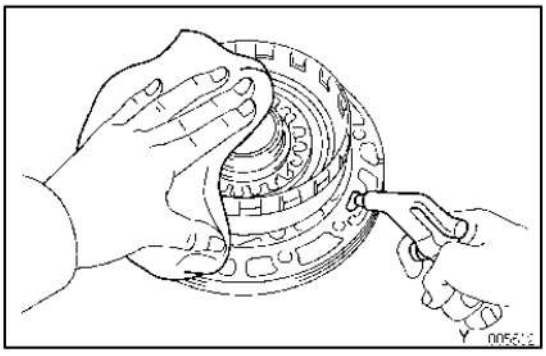
4. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350–32014 (09351–32070)

(b) Remove the snap ring with snap ring pliers.



(c) Remove the piston return spring.

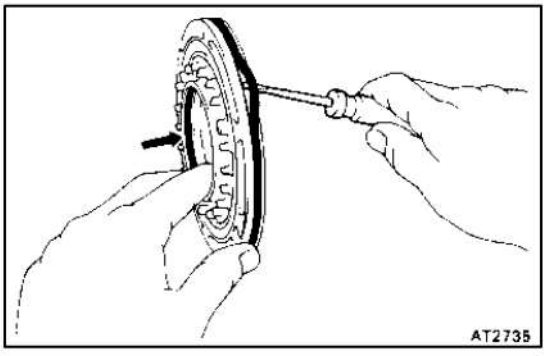


5. REMOVE CLUTCH PISTON

(a) Install the direct clutch onto the oil pump.

(b) Apply compressed air to the oil pump to remove the piston (if the piston does not come out completely, use needle–nose pliers to remove it).

(c) Remove the direct clutch from the oil pump.

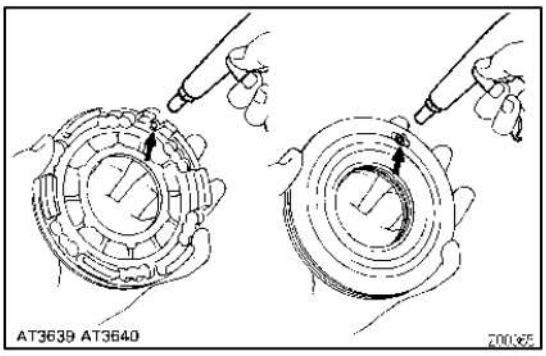


(d) Remove the 2 O–rings from the piston.

AX034-03

DIRECT CLUTCH INSPECTION

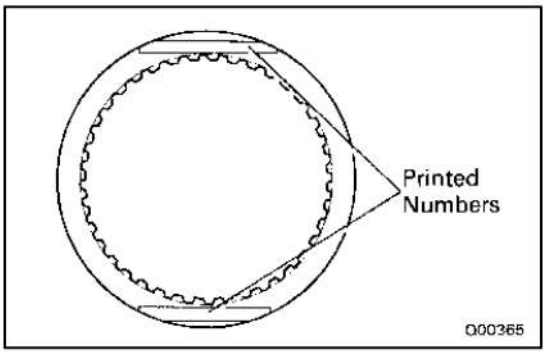
1. INSPECT CLUTCH PISTON



(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.

2. INSPECT DISCS, PLATES AND FLANGE



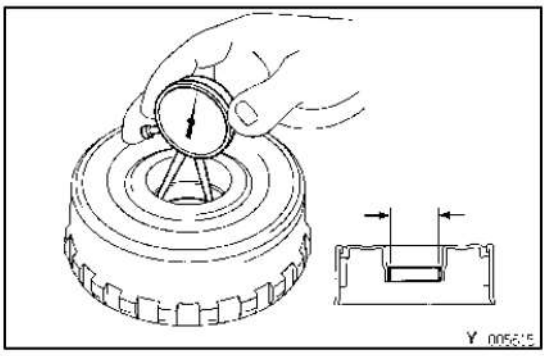
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

3. CHECK DIRECT CLUTCH BUSHING



Using a dial indicator, measure the inside diameter of the direct clutch bushing.

Maximum inside diameter:

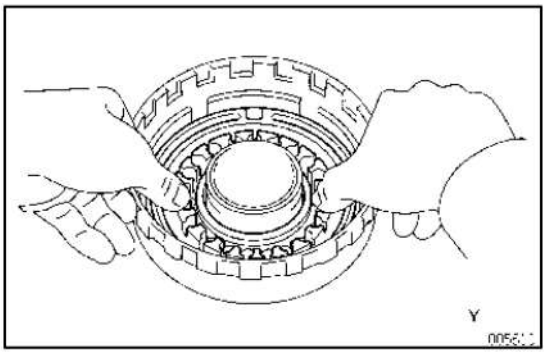
48.27 mm (1.9004 in.)

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

AX035-06

DIRECT CLUTCH ASSEMBLY

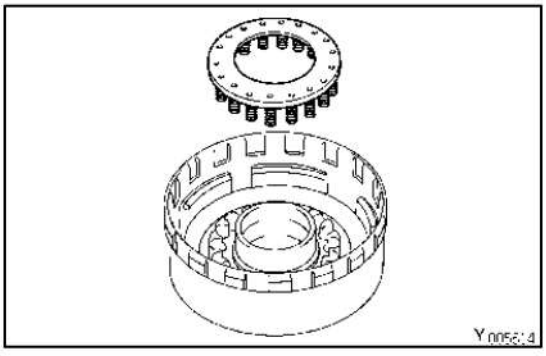
1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM



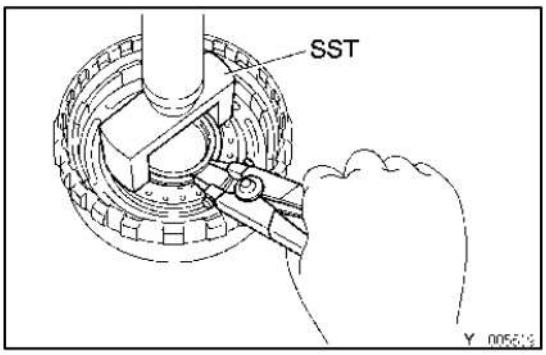
(a) Install new O–rings to the piston. Coat the O–rings with ATF.

(b) Being careful not to damage the O–rings, press the piston into the drum with the cup side up.

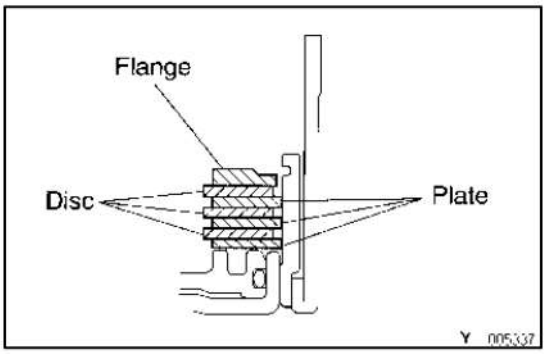
2. INSTALL PISTON RETURN SPRING



(a) Place the return spring and snap ring onto the piston.

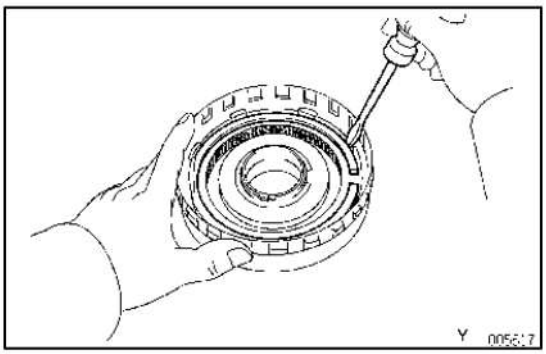


(b) Place SST on the spring retainer, and compress the return spring with a press.
SST 09350–32014 (09351–32070)
(c) Install the snap ring using snap ring pliers. Be sure the end gap of snap ring is aligned with the spring retainer claw.



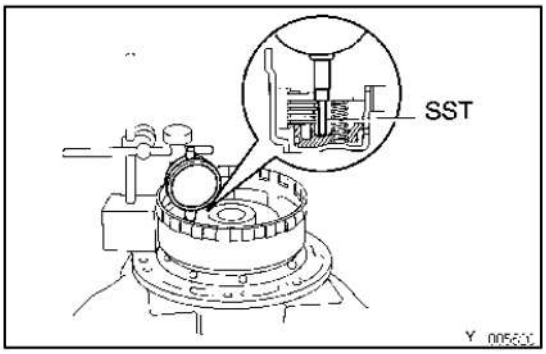
3. INSTALL PLATES, DISCS AND FLANGE

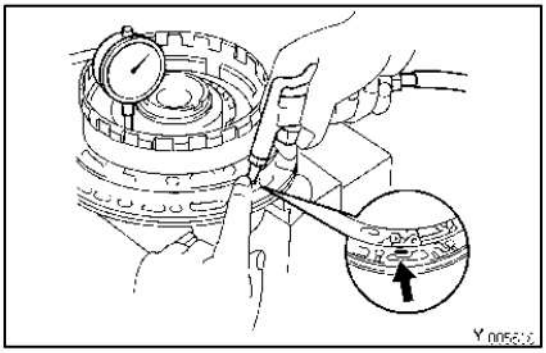
(a) Install plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D
(b) Install the flange with the flat end facing downward.



4. INSTALL SNAP RING

Check that the end gap of the snap ring is not aligned with one of the cutouts.





5. RECHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch on the oil pump.
(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09350–32014 (09351–32190)

Piston stroke:

0.91–1.35 mm (0.0358–0.0531 in.)

If the piston stroke is non–standard, select another flange.
HINT: There are 2 different thickness for the flange.

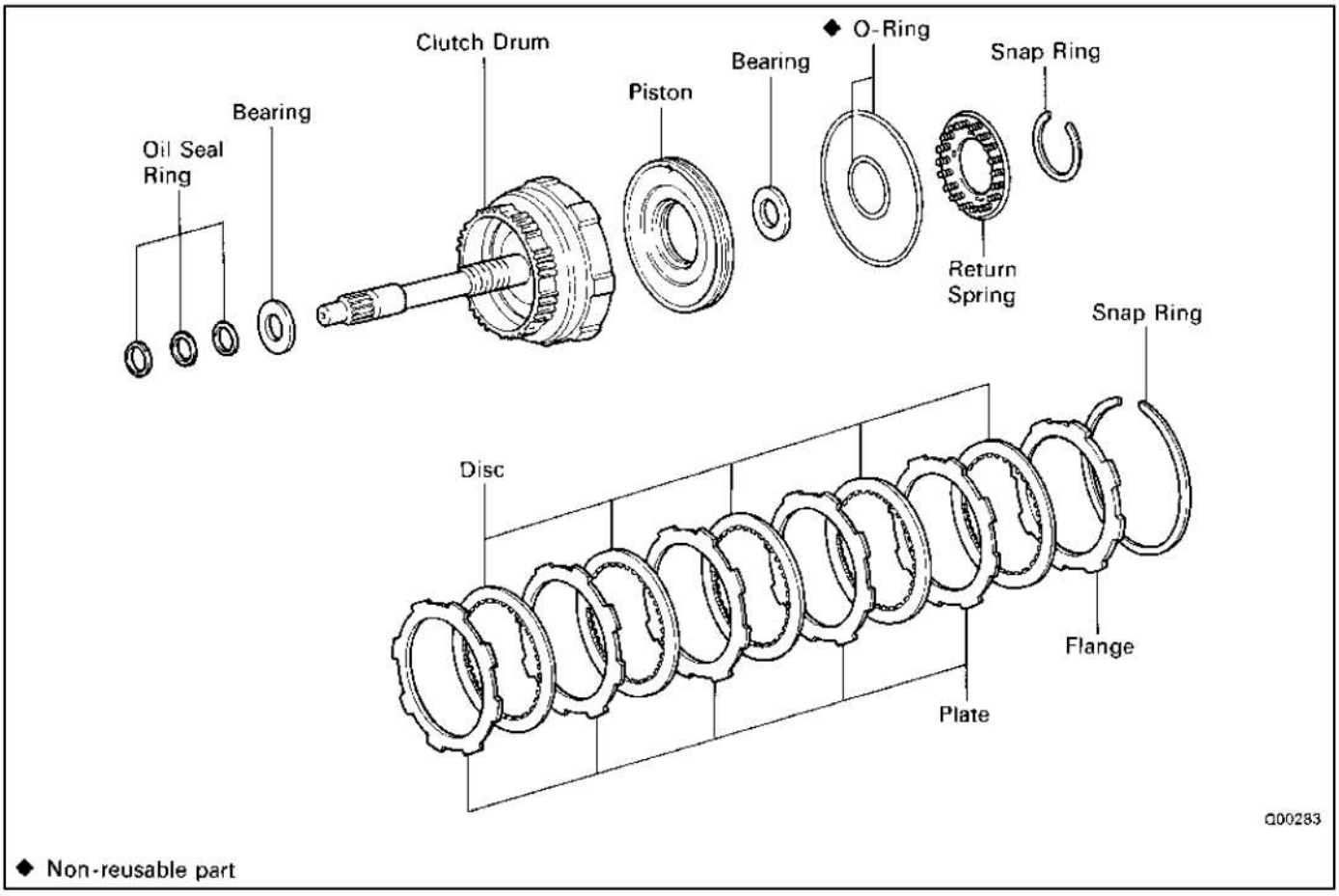
Flange thickness:

2.70 mm (0.1063 in.)
3.00 mm (0.1181 in.)

FORWARD CLUTCH

AX036-02

COMPONENTS



◆ Non-reusable part

AX037-04

FORWARD CLUTCH DISASSEMBLY

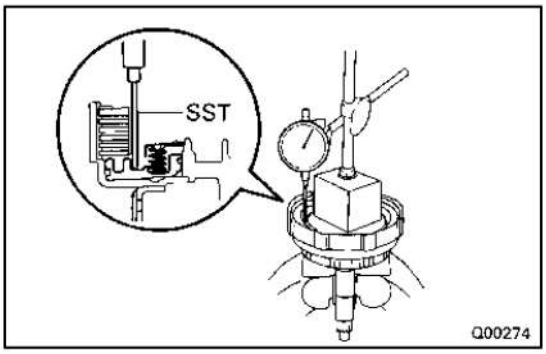
1. CHECK PISTON STROKE OF FORWARD CLUTCH

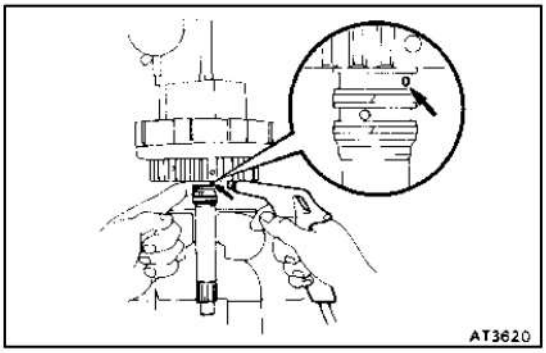
Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).

SST 09350–32014 (09351–32190)

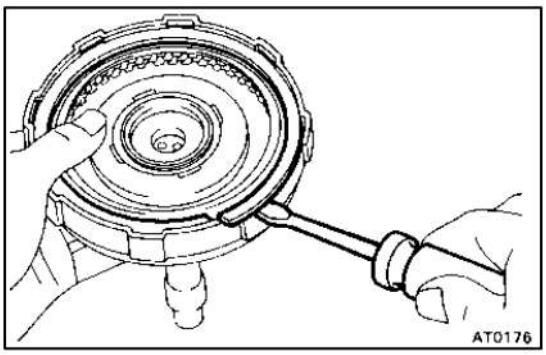
Piston stroke:

1.79–2.21 mm (0.0704–0.0870 in.)

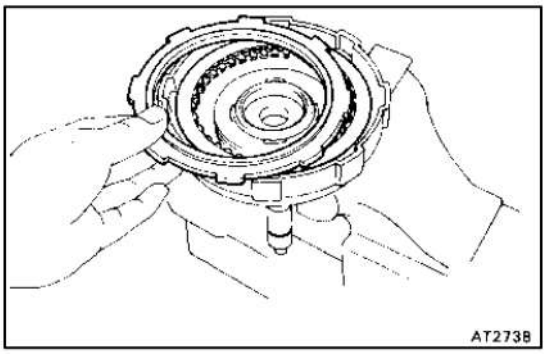




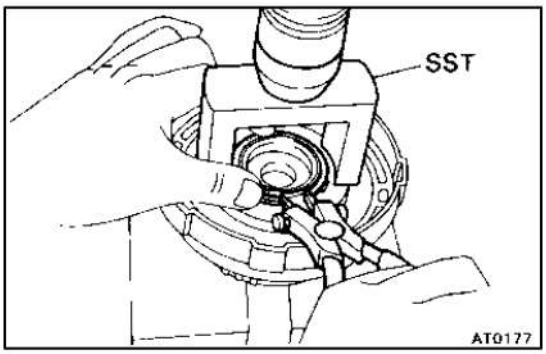
each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM



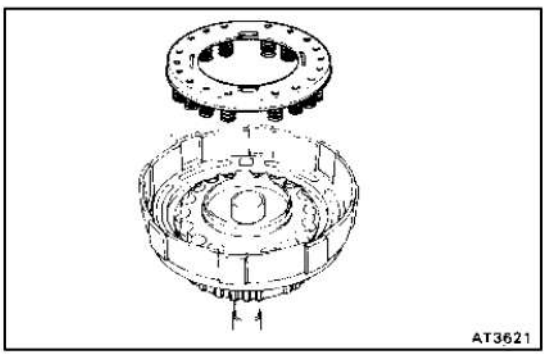
3. REMOVE FLANGE, DISCS AND PLATES



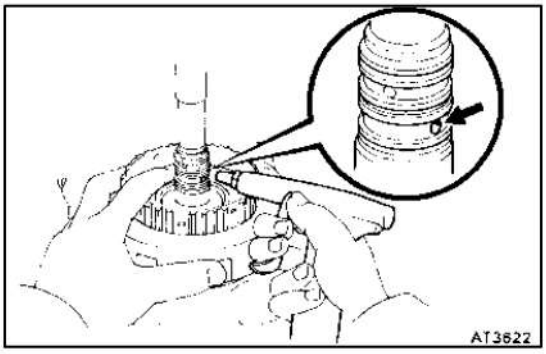
4. REMOVE RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350–32014 (09351–32070)

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

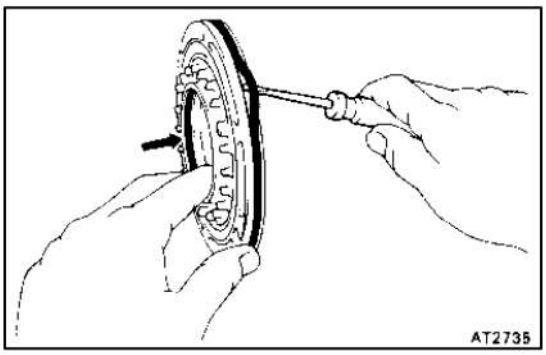


(c) Remove the return spring.

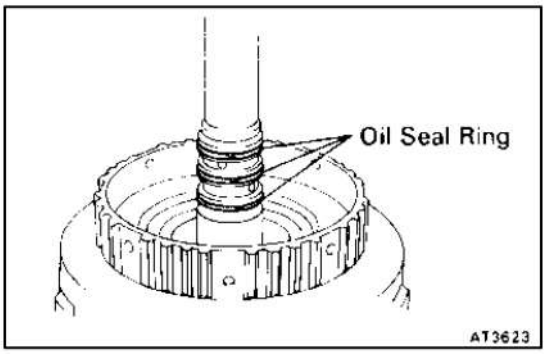


5. REMOVE CLUTCH PISTON

(a) Apply compressed air into the oil passage to remove the piston.
If the piston does not come out, use needle–nose pliers to remove it.



(b) Remove the 2 O–rings from the piston.



6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the 3 oil seal rings from the shaft.

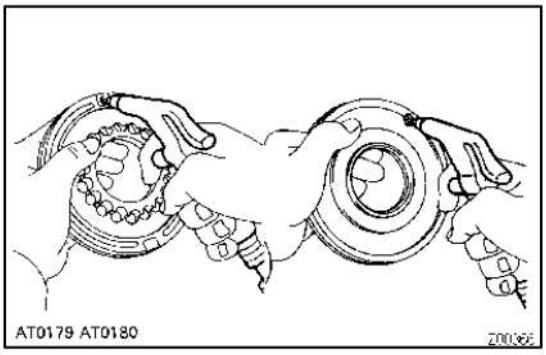
AX038-03

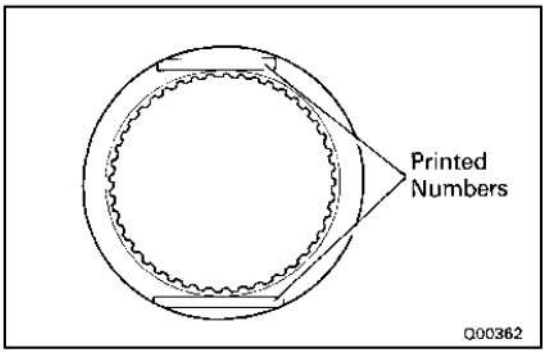
FORWARD CLUTCH INSPECTION

1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.





2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

AX039-04

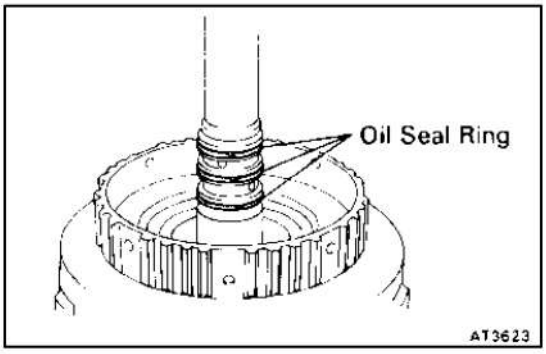
FORWARD CLUTCH ASSEMBLY

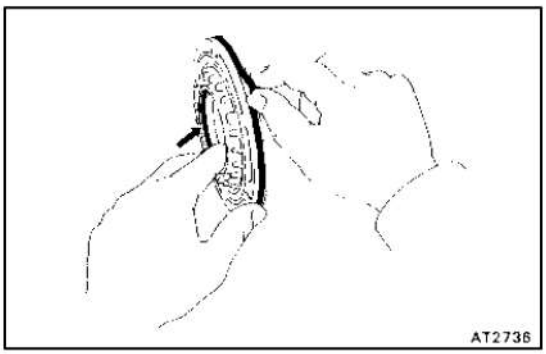
1. INSTALL OIL SEAL RINGS

Install the 3 oil seal rings to the shaft.

NOTICE: Do not spread the ring ends more than necessary.

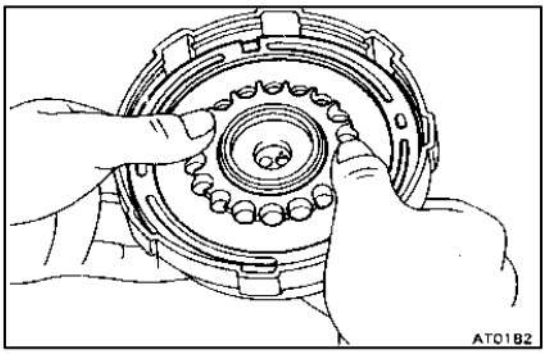
HINT: After installing the oil seal rings, check that they move smoothly.





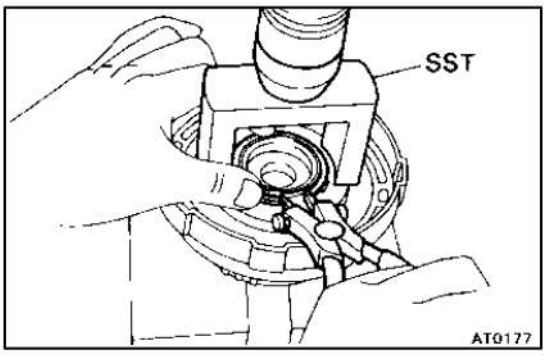
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

(a) Install the 2 new O–rings to the piston.



(b) Coat the O–ring with ATF.

(c) Press the piston into the drum with the cup side up, being careful not to damage the O–rings.

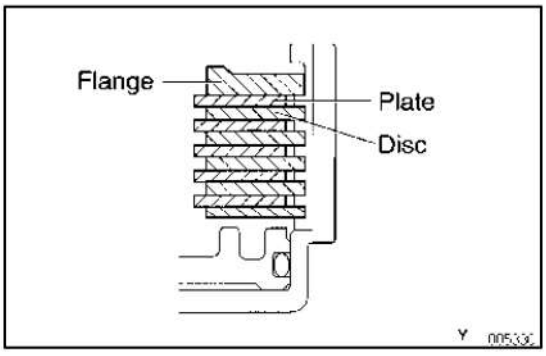


3. INSTALL PISTON RETURN SPRINGS

(a) Place the return spring and snap ring onto the piston.

(b) Place SST on the spring retainer, and compress the springs with a press.
SST 09350–32014 (09351–32070)

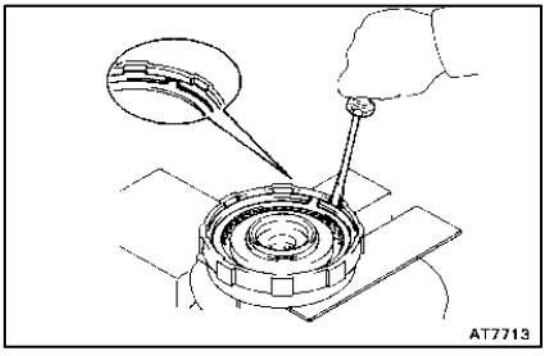
(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

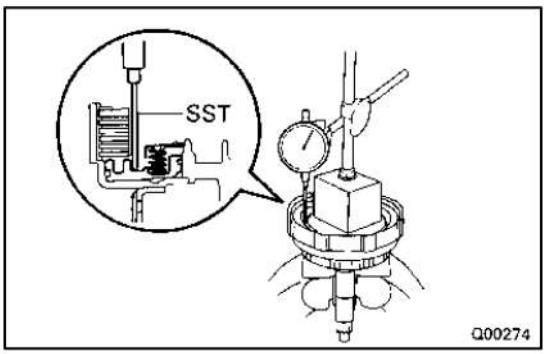
(a) Install the plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D–P–D–P–D

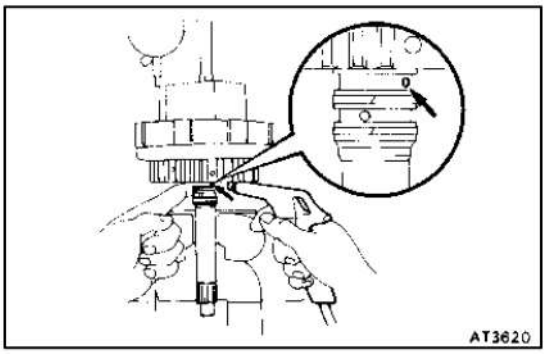
(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.





6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).

SST 09350–32014 (09351–32190)

Piston stroke:

1.79–2.21 mm (0.0704–0.0870 in.)

If the piston stroke is non–standard, select another flange.

HINT: There are 2 different thicknesses for the flange.

Flange thickness:

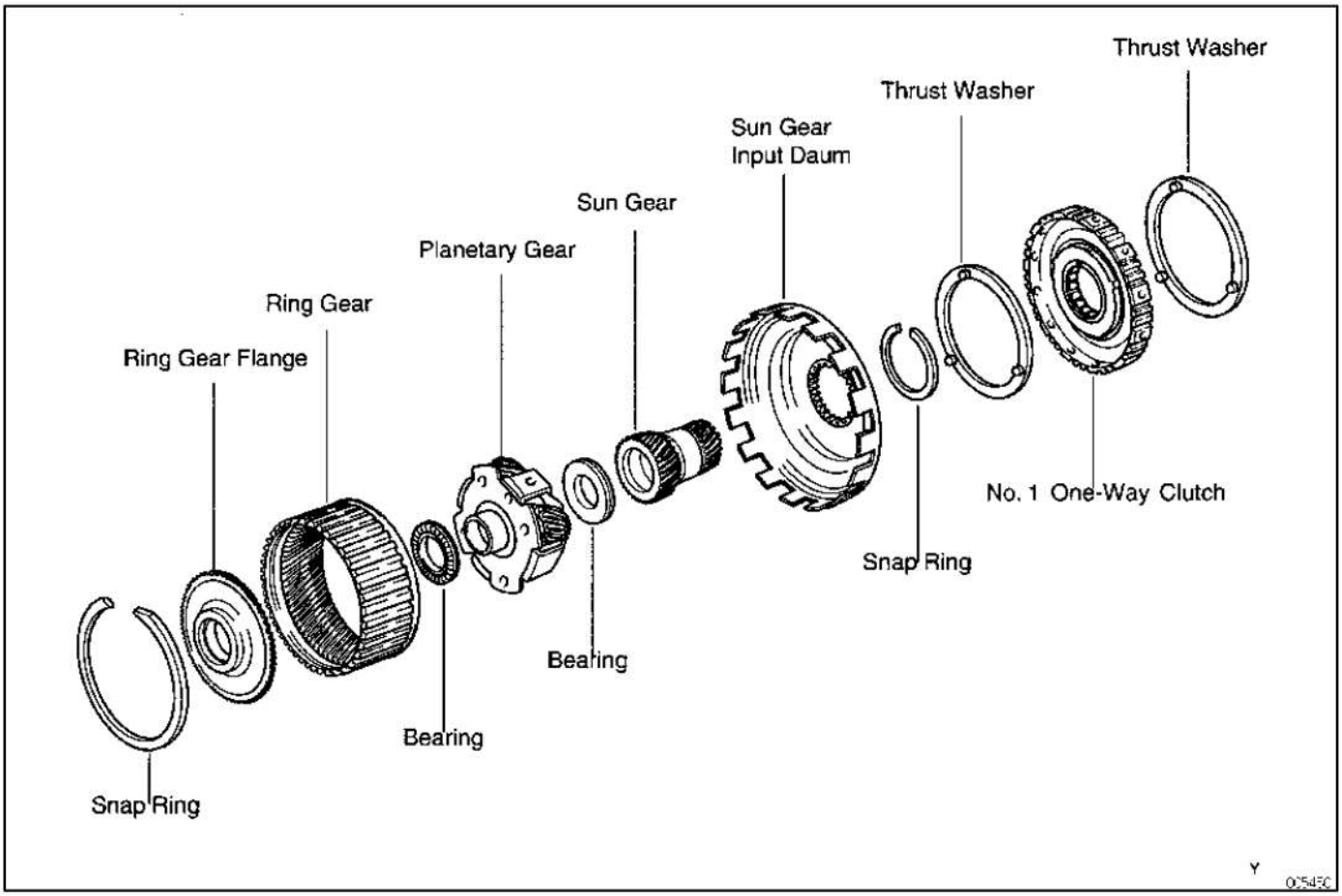
2.30 mm (0.0906 in.)

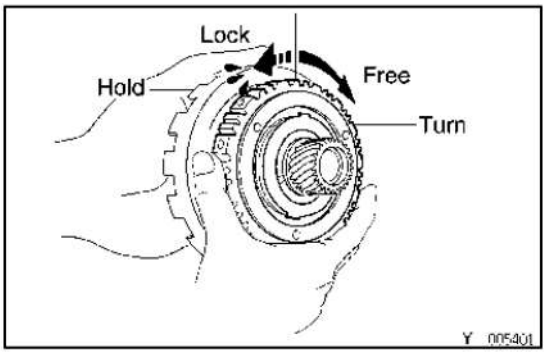
2.70 mm (1.0630 in.)

FRONT PLANETARY GEAR

COMPONENTS

AX03A-02

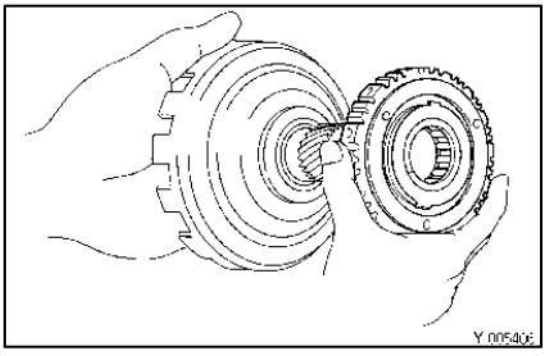




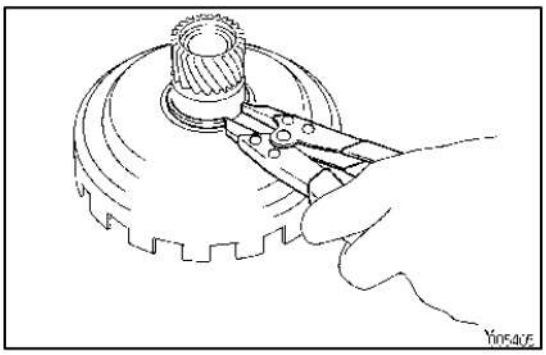
AX0TU-03

NO.1 ONE–WAY CLUTCH AND SUN GEAR DISASSEMBLY

1. **CHECK OPERATION OF NO.1 ONE–WAY CLUTCH**
   Hold the sun gear and turn the hub. The hub should turn freely clockwise and should lock counterclockwise.



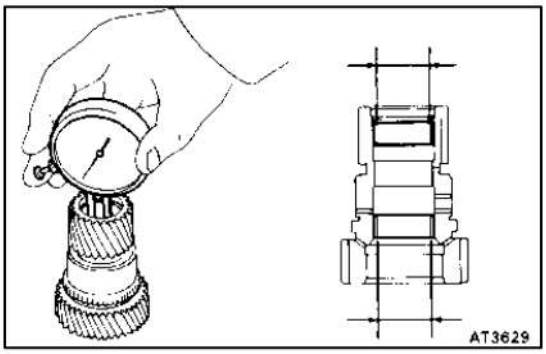
2. **REMOVE NO.1 ONE–WAY CLUTCH FROM SUN GEAR**
   While turning the hub clockwise, remove the No.1 one–way clutch from the sun gear.



3. REMOVE SUN GEAR FROM DRUM

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

(b) Remove the sun gear from the drum.



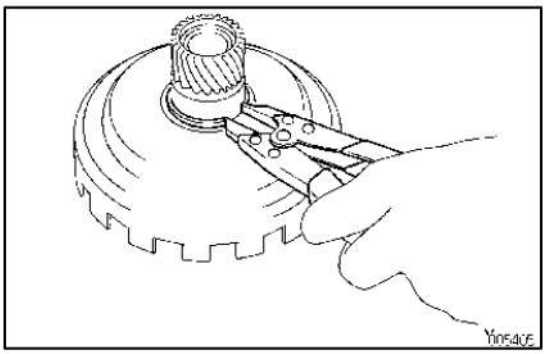
4. CHECK SUN GEAR BUSHINGS

Using a dial indicator, measure the inside diameter of the sun gear bushings.

Maximum inside diameter:

22.59 mm (0.8894 in.)

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



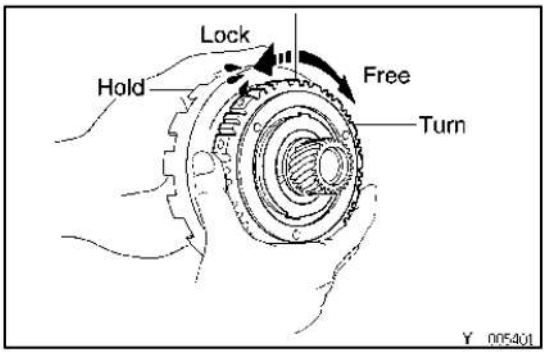
NO.1 ONE–WAY CLUTCH AND SUN GEAR ASSEMBLY

AX0TV–01

1. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

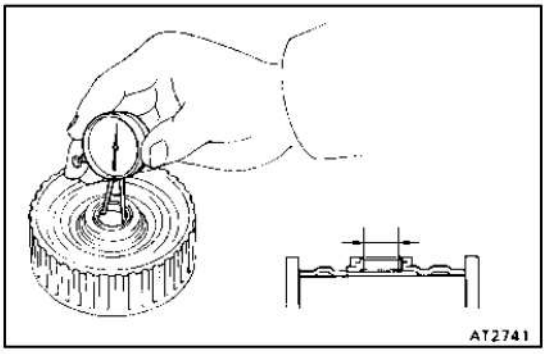
(b) Using snap ring pliers, install the snap ring to drum.



2. INSTALL NO.1 ONE–WAY CLUTCH ON SUN GEAR

While turning the hub clockwise, slide the No.1 one–way clutch onto the sun gear.

3. RECHECK OPERATION OF NO.1 ONE–WAY CLUTCH



PLANETARY RING GEAR INSPECTION

AX03D–02

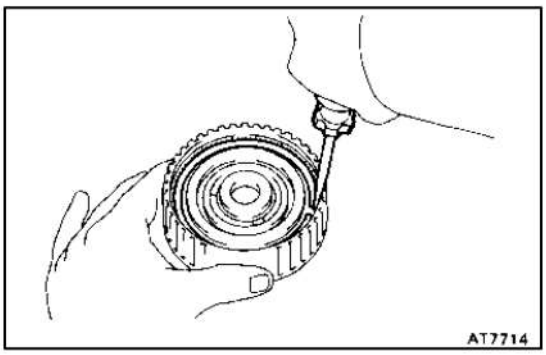
1. INSPECT RING GEAR FLANGE BUSHING

Using a dial indicator, measure the inside diameter of the flange bushing.

Maximum inside diameter:

30.08 mm (1.1842 in.)

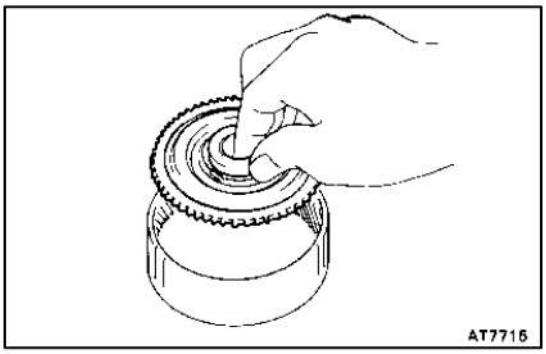
If the inside diameter is greater than the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

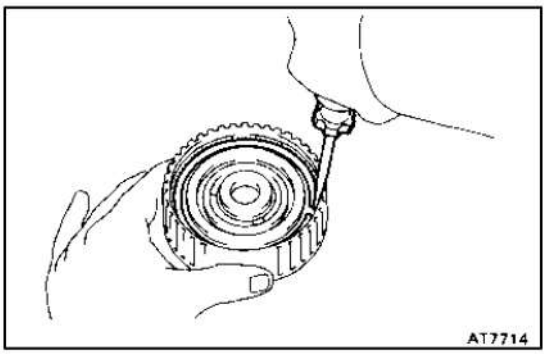
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

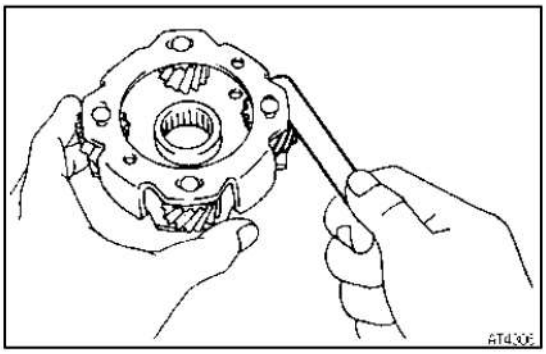


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



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



FRONT PLANETARY GEAR INSPECTION AX03E–03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

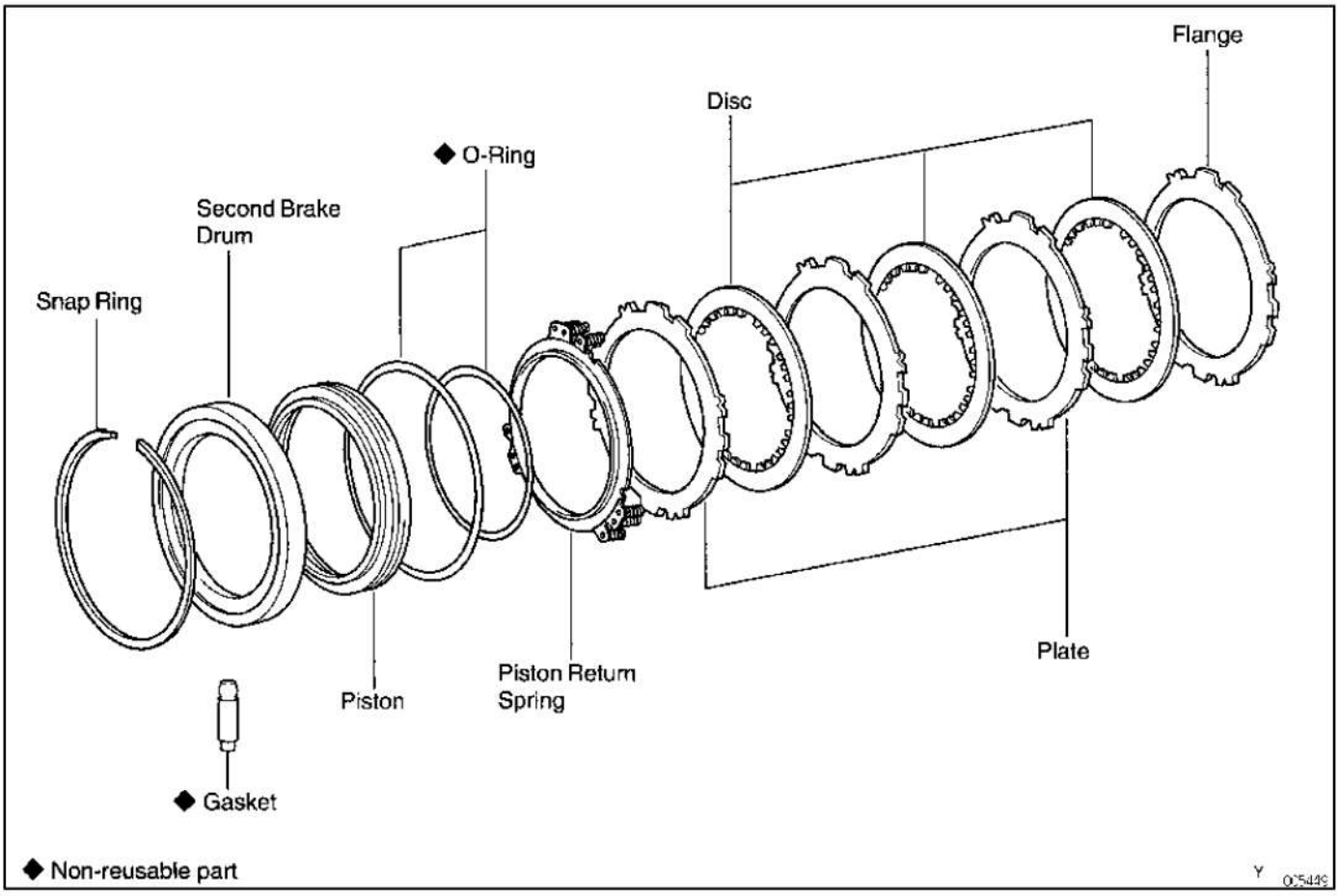
Maximum clearance:

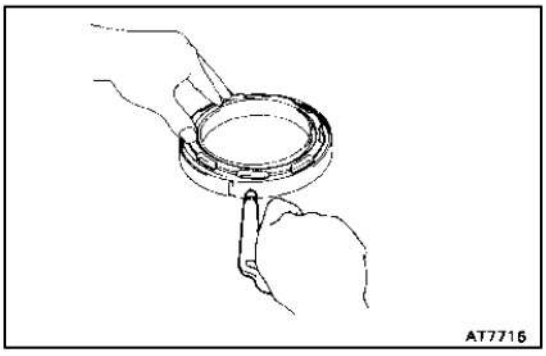
0.61 mm (0.0240 in.)

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

SECOND BRAKE
COMPONENTS

AX03F-02



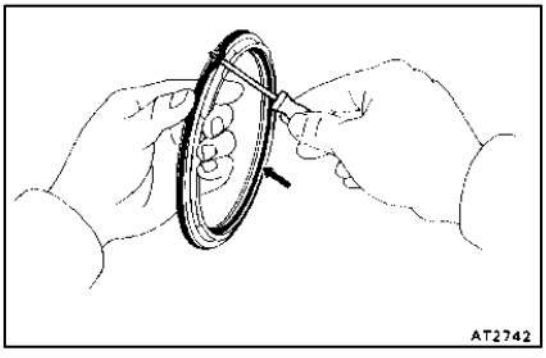


SECOND BRAKE PISTON DISASSEMBLY

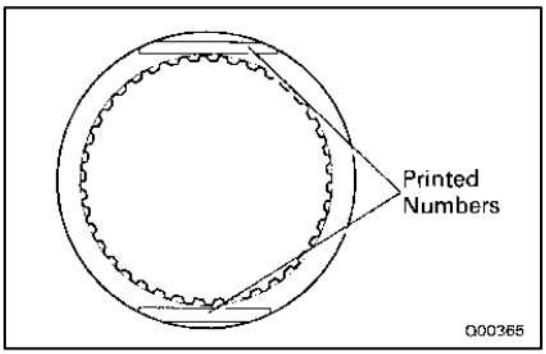
AX03G-03

REMOVE SECOND BRAKE PISTON

(a) Apply compressed air to the oil hole to remove the piston.



(b) Remove the 2 O–rings from the piston.



SECOND BRAKE COMPONENT INSPECTION

AX03H–03

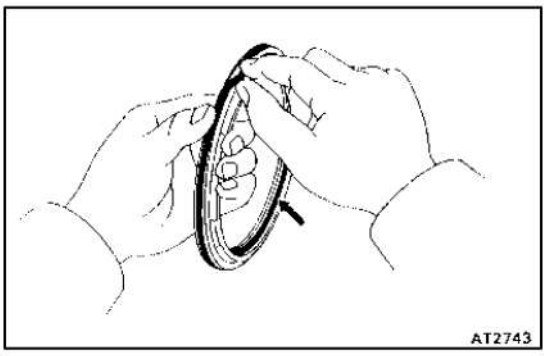
INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



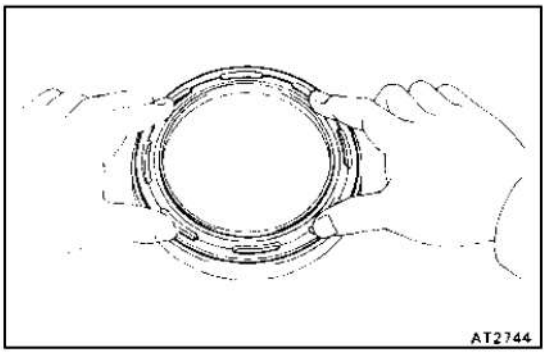
SECOND BRAKE PISTON ASSEMBLY

AX03J–06

INSTALL PISTON

(a) Coat a new O–ring with ATF.

(b) Install the 2 new O–rings on the piston.

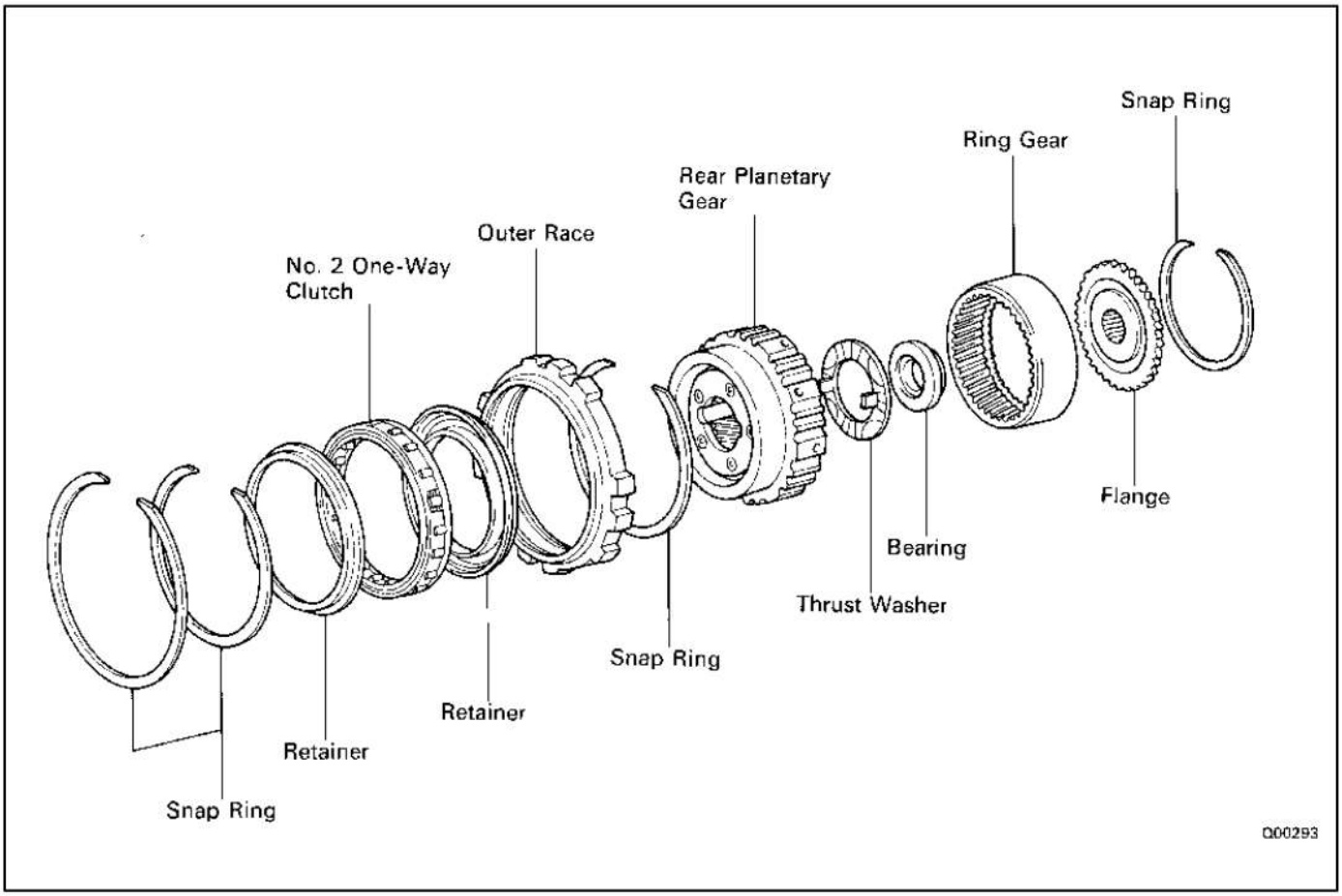


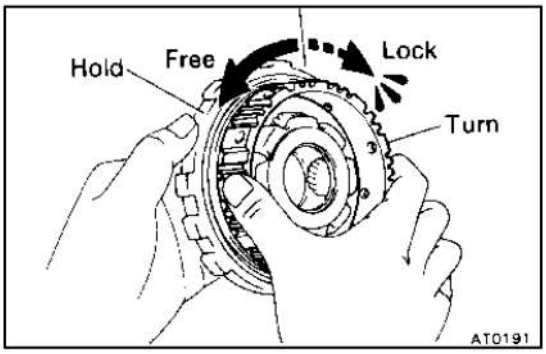
(c) Press the piston into the drum, being careful not to damage the O–rings.

REAR PLANETARY GEAR

COMPONENTS

AX03K-02

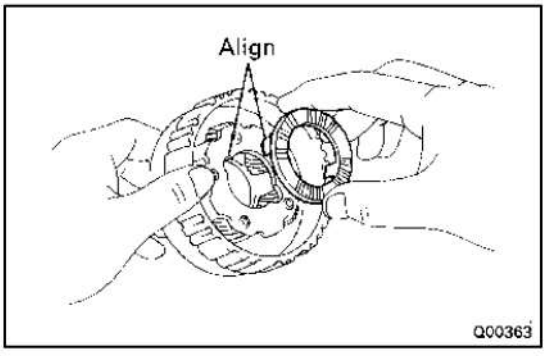




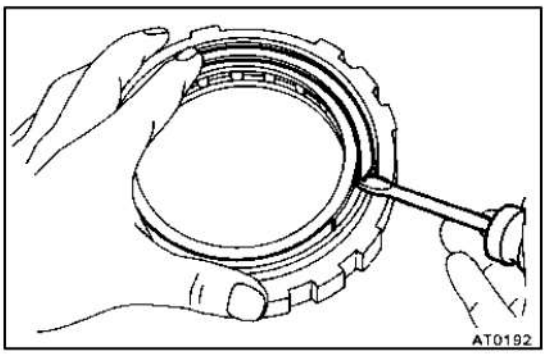
NO.2 ONE–WAY CLUTCH DISASSEMBLY

AX03L-02

1. **CHECK OPERATION OF NO.2 ONE–WAY CLUTCH**
   Hold the outer race and turn the rear planetary gear. The rear planetary gear should turn freely counterclockwise and should lock clockwise.

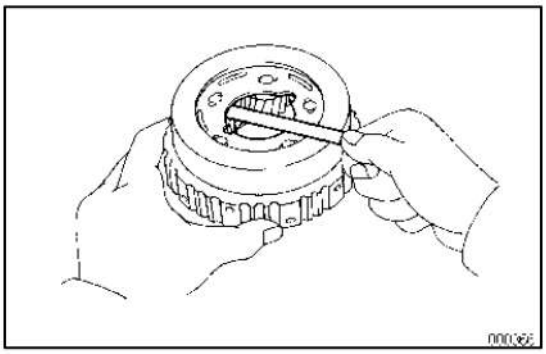


2. **SEPARATE NO.2 ONE–WAY CLUTCH AND REAR PLANETARY GEAR**
3. **REMOVE THRUST WASHER**
   Remove the thrust washer from the rear side of planetary gear.



4. REMOVE NO.2 ONE–WAY CLUTCH FROM OUTER RACE

(a) Remove the 2 snap rings and retainers from both sides.
(b) Remove the No.2 one–way clutch from the outer race.



REAR PLANETARY GEAR INSPECTION

AX03M–03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

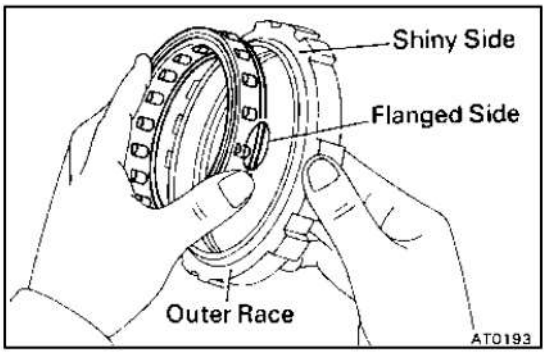
Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

Maximum clearance:

0.61 mm (0.0240 in.)

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

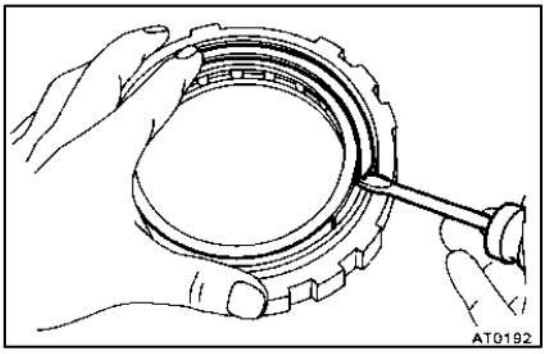


NO.2 ONE–WAY CLUTCH ASSEMBLY

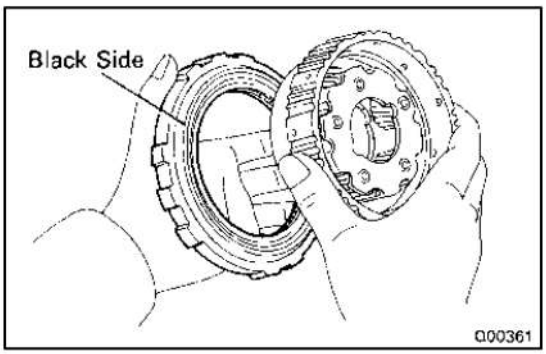
AX03N–02

1. INSTALL ONE–WAY CLUTCH

(a) Install the No.2 one–way clutch into the outer race, facing the flange side of the No.2 one–way clutch toward the shiny side of the outer race.

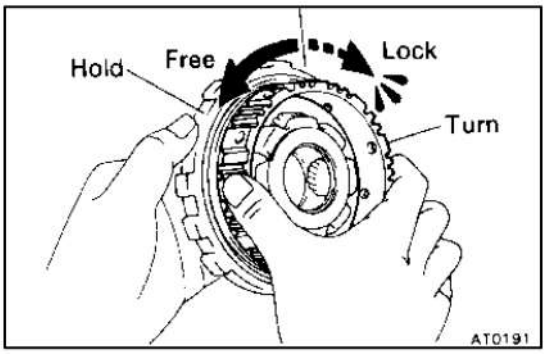


(b) Install the 2 retainers and snap rings to both sides.

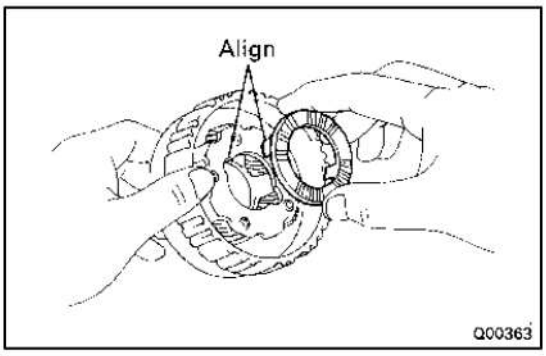


2. INSTALL PLANETARY GEAR INTO NO.2 ONE–WAY CLUTCH

Install the planetary gear into the No.2 one–way clutch, facing the inner race of the rear planetary gear toward the black side of the No.2 one–way clutch outer race.



3. CHECK OPERATION OF NO.2 ONE–WAY CLUTCH

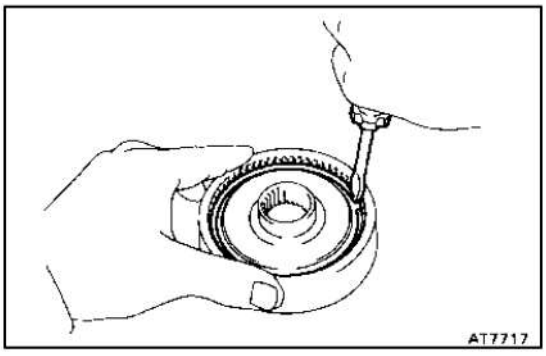


4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.
(b) Align the tab of the washer with the hollows of the carrier.

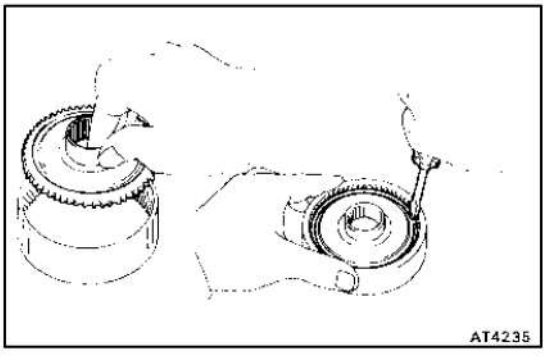
AX03P–02

RING GEAR FLANGE REPLACEMENT



1. REMOVE RING GEAR FLANGE

(a) Using a screwdriver, remove the snap ring.
(b) Remove the flange from the ring gear.

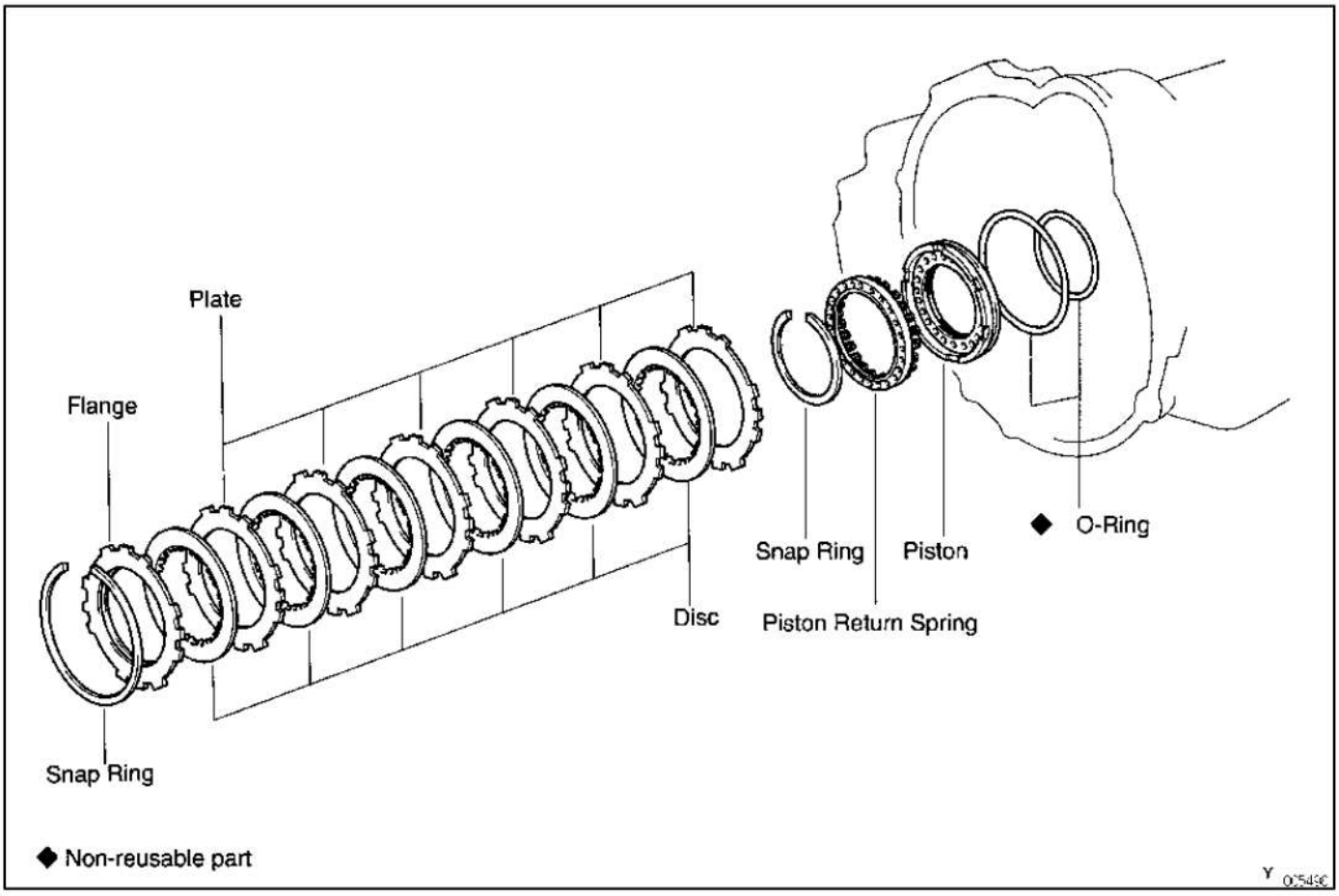


2. INSTALL RING GEAR FLANGE

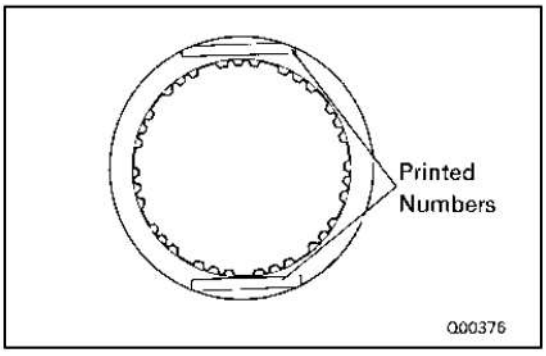
(a) Position the flange into the ring gear.
(b) Using a screwdriver, install the snap ring.

FIRST AND REVERSE BRAKE
COMPONENTS

AX03Q-02



AX03R-03



FIRST AND REVERSE BRAKE COMPONENTS INSPECTION

INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

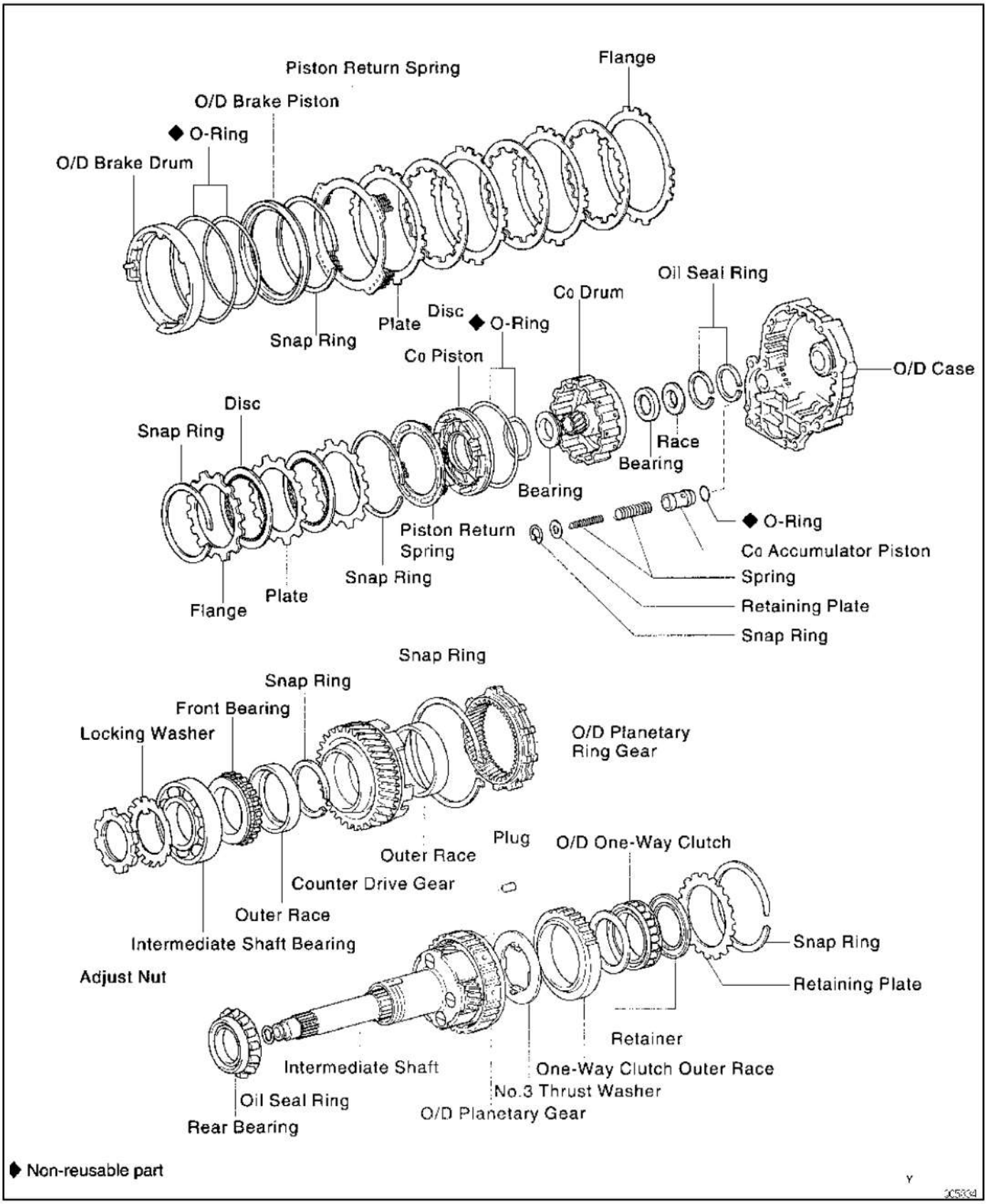
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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

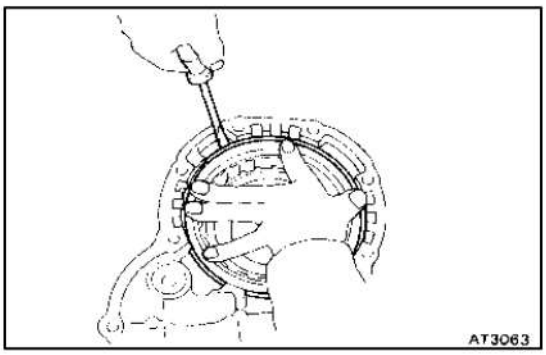
OVERDRIVE UNIT
COMPONENTS

AX03S-02



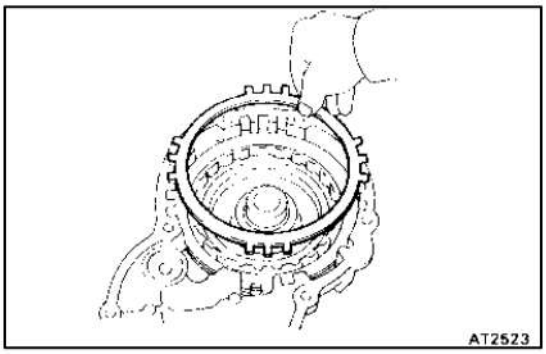
AX03T-03

OVERDRIVE BRAKE DISASSEMBLY

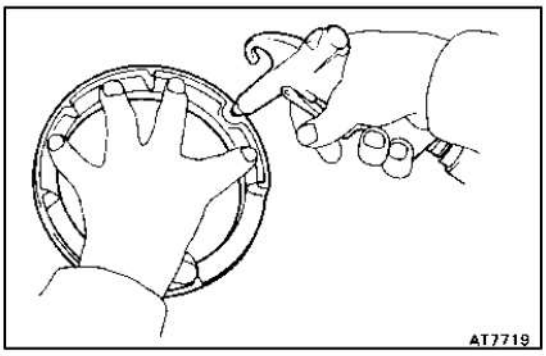


1. REMOVE PISTON RETURN SPRING

(a) While pushing the return spring, remove the snap ring with a screwdriver.
(b) Remove the piston return spring.

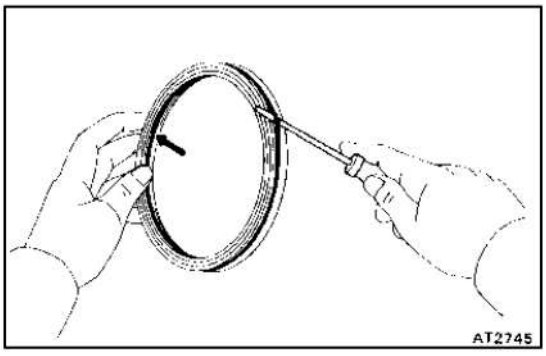


2. REMOVE PLATES, DISCS AND FLANGE



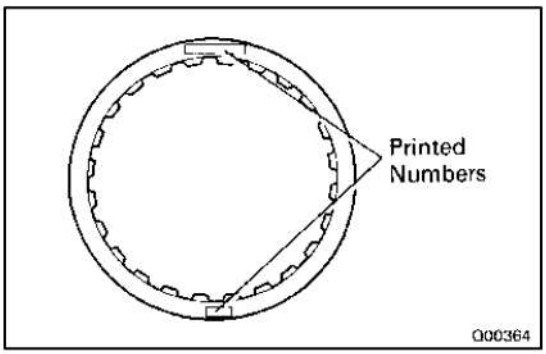
3. REMOVE PISTON FROM DRUM

Apply compressed air to oil hole to remove the piston.
HINT: Blow with the gun slightly away from the oil hole, and be careful that the piston does not tilt.



4. REMOVE O–RINGS

Remove the inner and outer O–rings from the piston.



AX03U-03

OVERDRIVE BRAKE INSPECTION

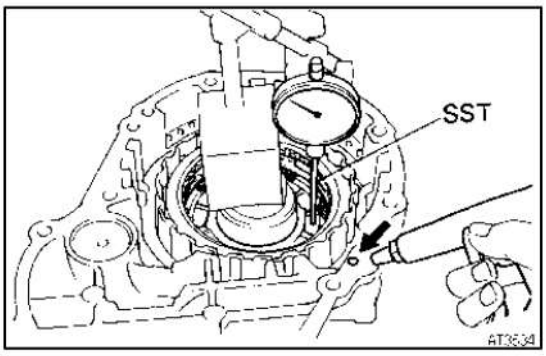
INSPECT DISCS, PLATES AND FLANGE

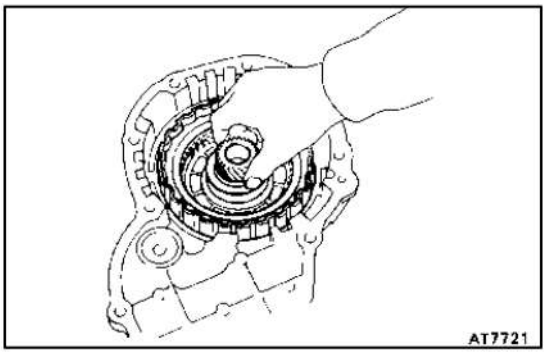
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

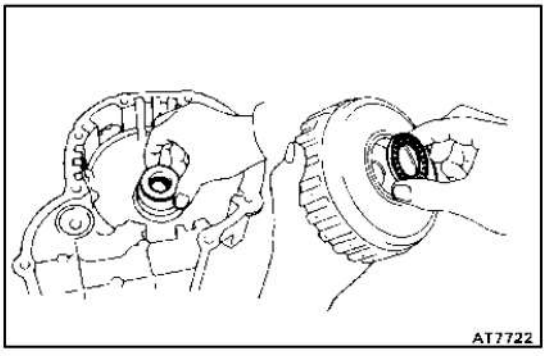
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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







AX03V-05

OVERDRIVE DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 5–8 kgf/cm^2, 57–114 psi).

Piston stroke:

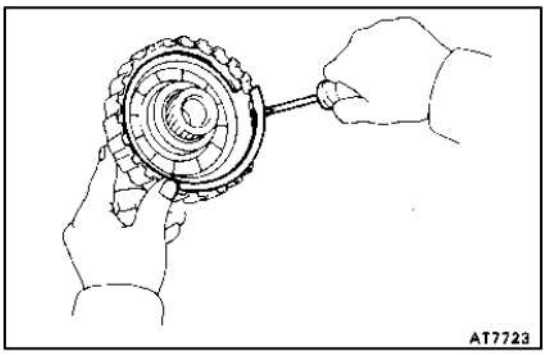
1.75–2.49 mm (0.0689–0.0980 in.)

SST 09350–32014 (09351–32190)

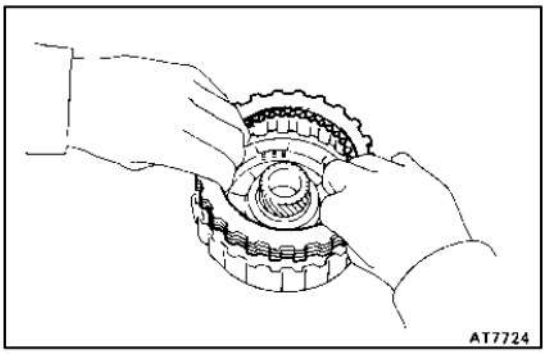
If the piston stroke is greater than the maximum, inspect each component.

2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE

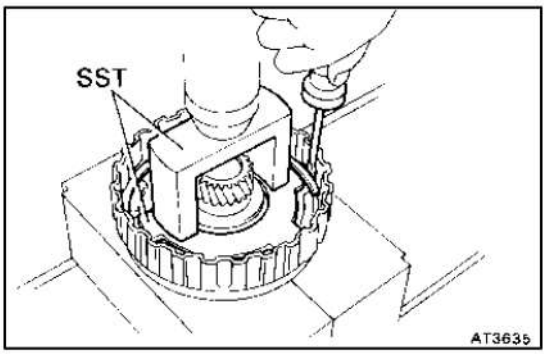
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



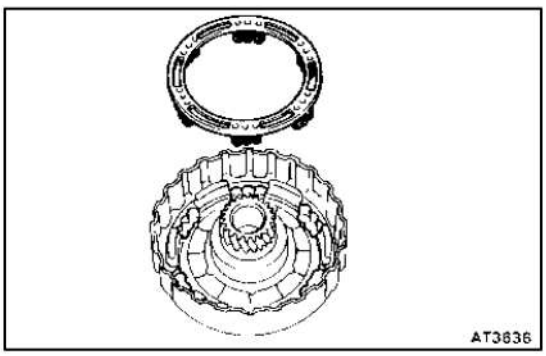
5. REMOVE FLANGES, DISCS AND PLATES



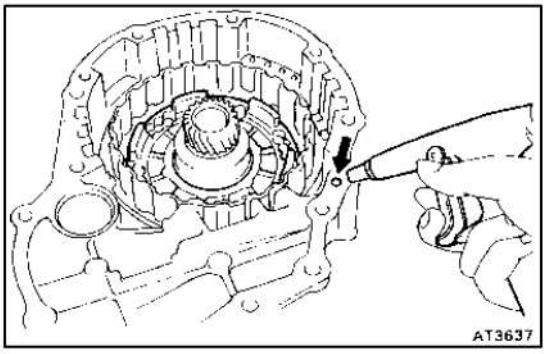
6. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the spring with a press.
SST 09350–32014 (09351–32070, 09351–32200)

(b) Remove the snap ring.



(c) Remove the piston return spring.



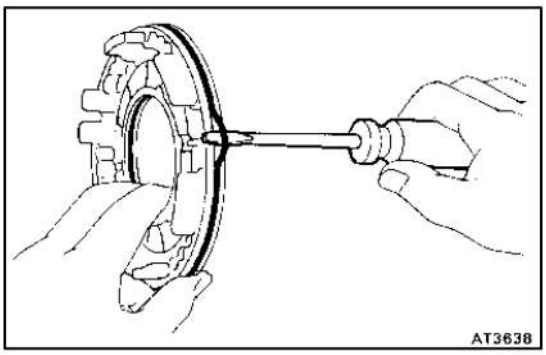
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum on the case.

(b) Apply compressed air to the pressure apply hole of the case.

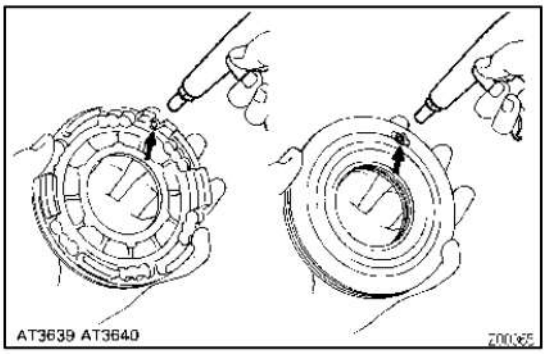
(c) Remove the piston from the clutch drum.
If the piston does not come out completely, use needle–nose pliers to remove it.

(d) Remove the clutch drum from the case.



8. REMOVE O–RINGS

Remove the 2 O–rings from the piston.



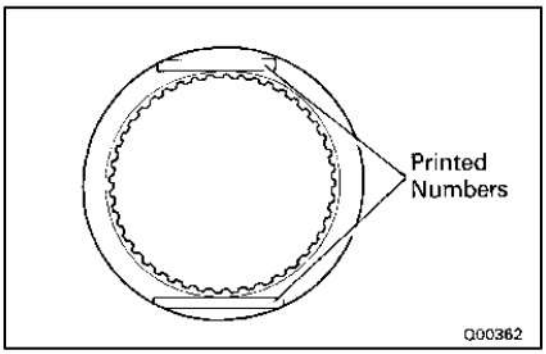
OVERDRIVE DIRECT CLUTCH INSPECTION

AX03W–03

1. INSPECT OVERDRIVE DIRECT CLUTCH

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low–pressure compressed air.



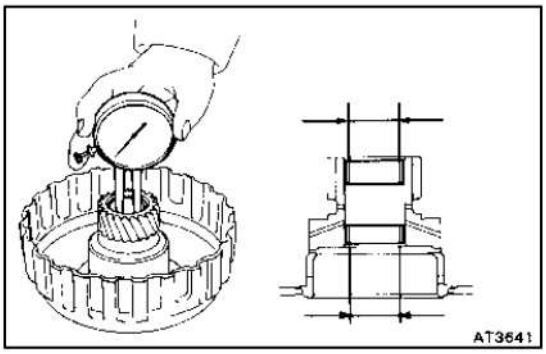
2. INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

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



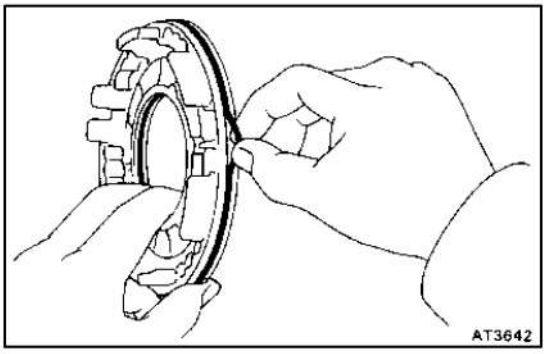
3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the 2 direct clutch bushings.

Maximum inside diameter:

22.13 mm (0.8713 in.)

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

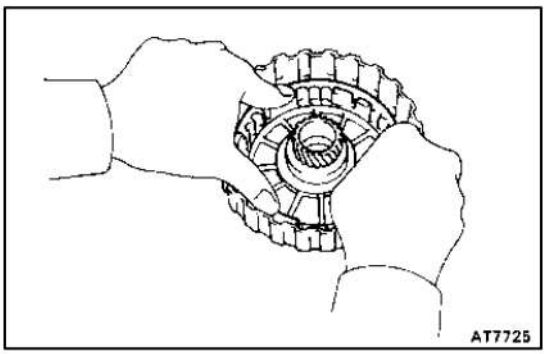


OVERDRIVE DIRECT CLUTCH ASSEMBLY

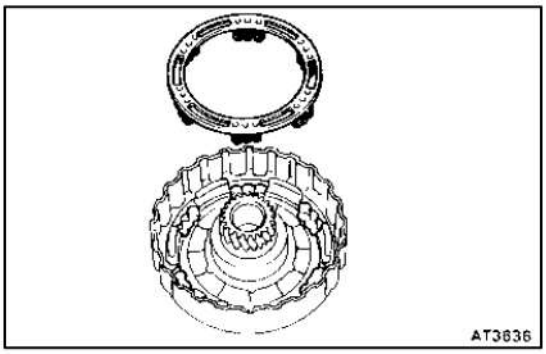
AX03X–06

1. INSTALL CLUTCH PISTON

(a) Install new O–rings to the piston. Coat the O–rings with ATF.

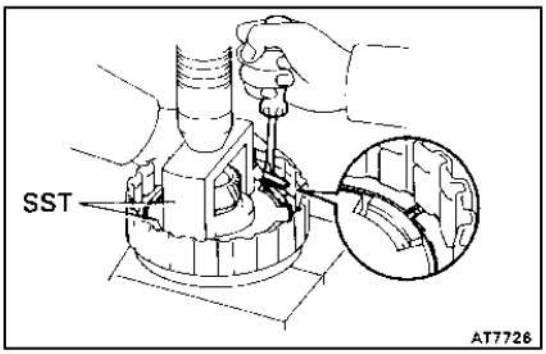


(b) Press the piston into the drum with the cup side up, being careful not to damage the O–ring.



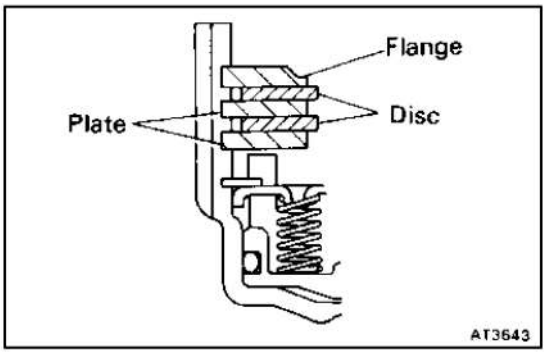
2. INSTALL PISTON RETURN SPRING

(a) Install the return spring and seat snap ring in place.



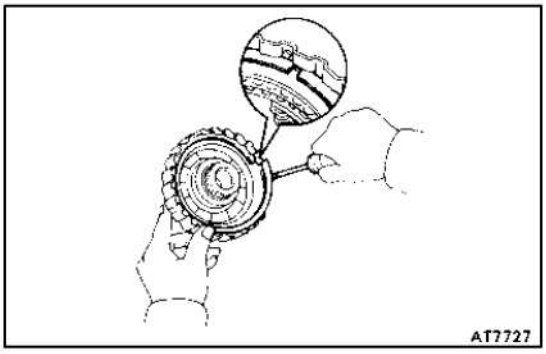
(b) Place SST on the spring retainer, and compress the spring with a press.
SST 09350–32014 (09351–32070, 09351–32200)

(c) Install the snap ring with a screwdriver. Be sure end gap of snap ring is aligned with the groove of the clutch drum.



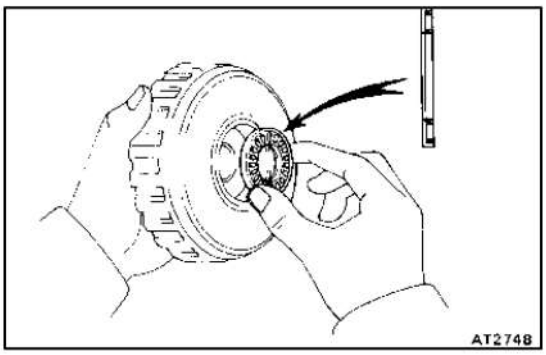
3. INSTALL PLATES, DISCS AND FLANGE

Install in order:
P=Plate D=Disc
P–D–P–D–Flange



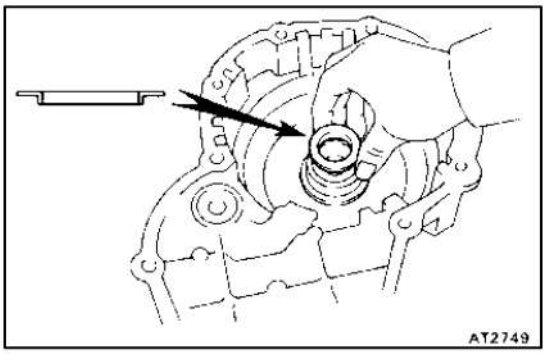
4. INSTALL SNAP RING

Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.

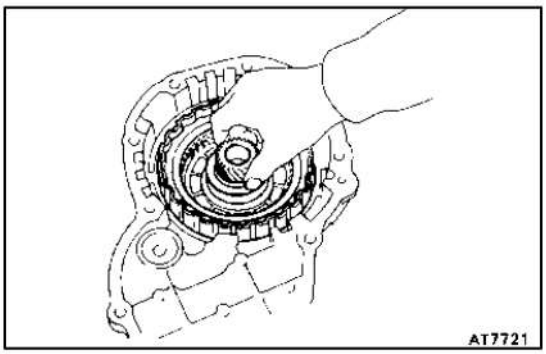


5. INSTALL BEARING AND RACE

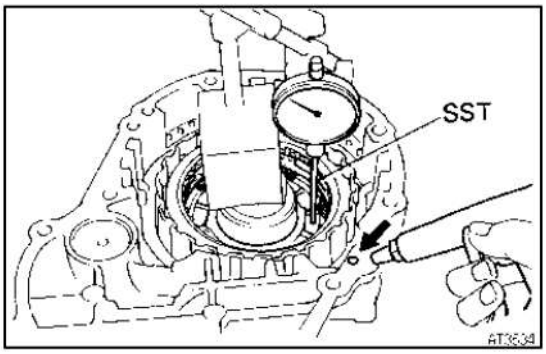
(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.
Bearing outer diameter: 46.3 mm (1.823 in.)
Bearing inner diameter: 26.2 mm (1.031 in.)



(b) Coat the race with petroleum jelly and install it to the case.
Race outer diameter: 43.0 mm (1.693 in.)
Race inner diameter: 24.5 mm (0.965 in.)

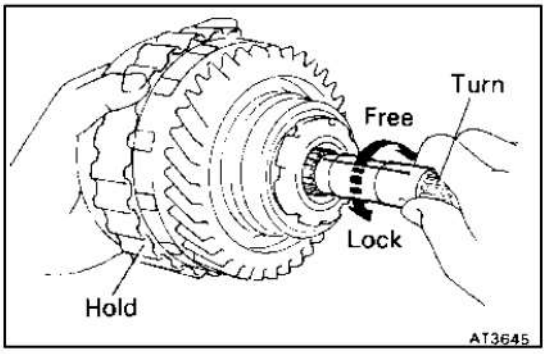


6. INSTALL DIRECT CLUTCH ON CASE



7. RECHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
Piston stroke:
1.75–2.49 mm (0.0689–0.0980 in.)
SST 09350–32014 (09351–32190)

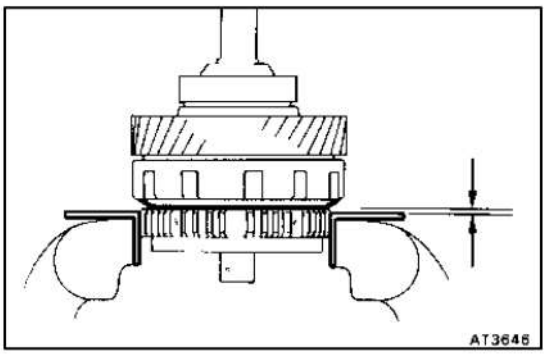


COUNTER DRIVE GEAR DISASSEMBLY

AX03Y–03

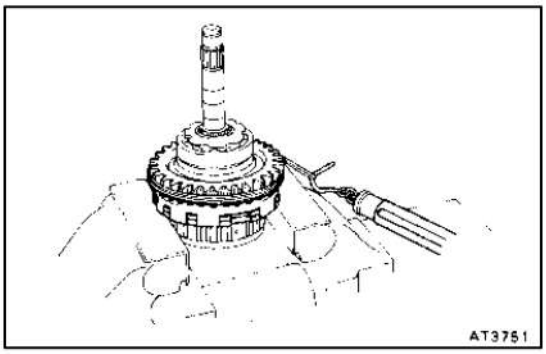
1. CHECK OPERATION OF ONE–WAY CLUTCH

(a) Install the O/D direct clutch into the one–way clutch.
(b) Hold the O/D direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the O/D direct clutch.

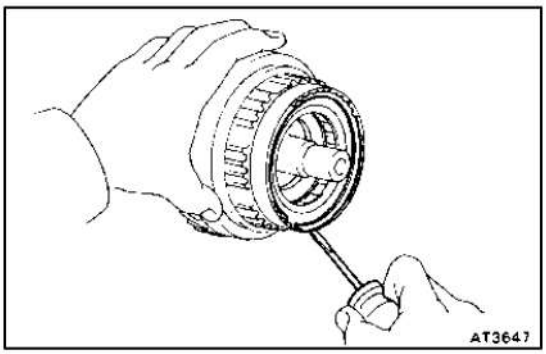


2. CHECK COUNTER DRIVE GEAR PRELOAD

(a) Hold the O/D planetary gear in a vise with soft jaws.
HINT: Do not let the counter drive gear touch the vise.

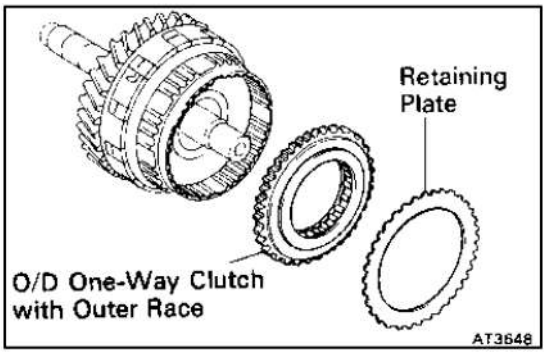


(b) Using a tension gauge, measure the preload.
Preload (at starting):
9.2–15.3 N (940–1,560 g, 2.1–3.4 lb)
HINT: Turn the counter drive gear right and left several times before measuring the preload.

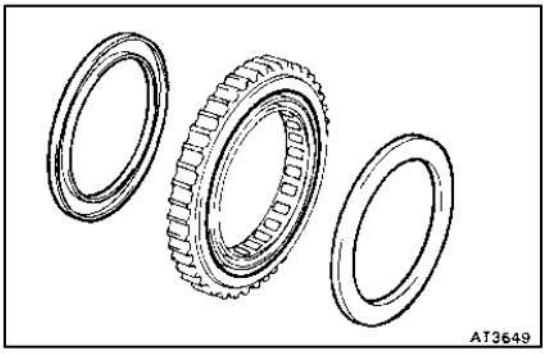


3. REMOVE O/D ONE–WAY CLUTCH AND OUTER RACE

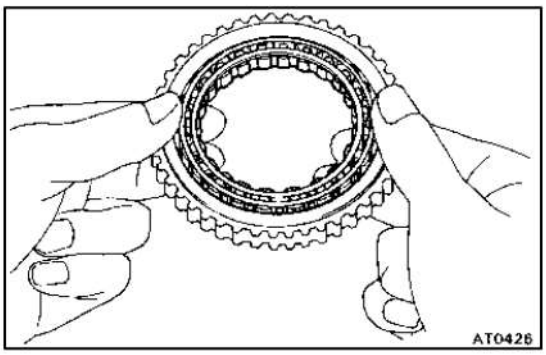
(a) Remove the snap ring.



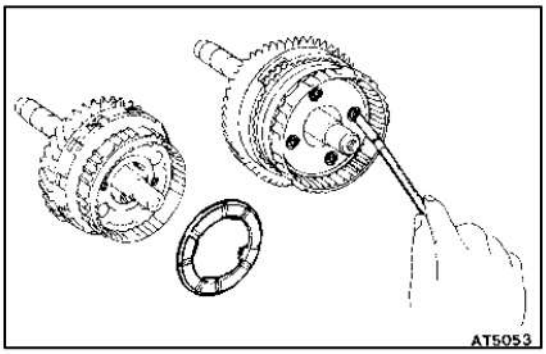
(b) Remove the retaining plate.
(c) Remove the O/D one–way clutch with outer race.



(d) Remove the 2 retainers from both sides of the O/D one–way clutch.



(e) Remove the O/D one–way clutch from the outer race.
HINT: Note the direction of the one–way clutch.

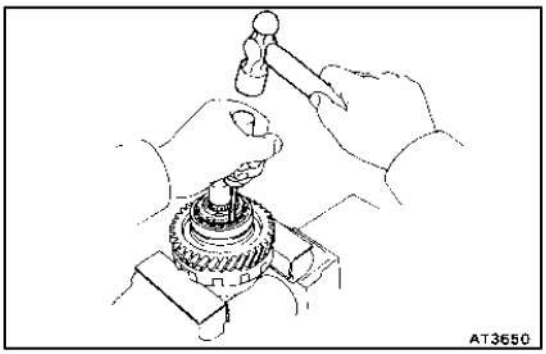


4. REMOVE NO.3 PLANETARY THRUST WASHER

5. REMOVE PLUGS FROM PLANETARY GEAR

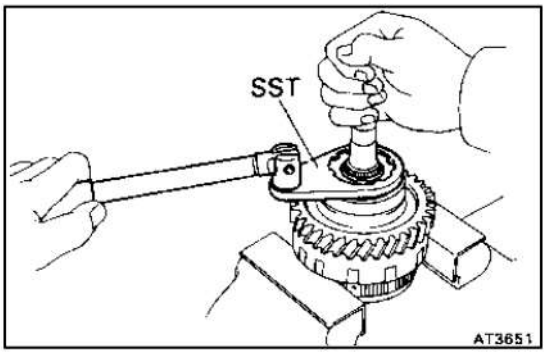
Remove the 4 plugs with a magnetic finger.

NOTICE: Be careful not to lose them.



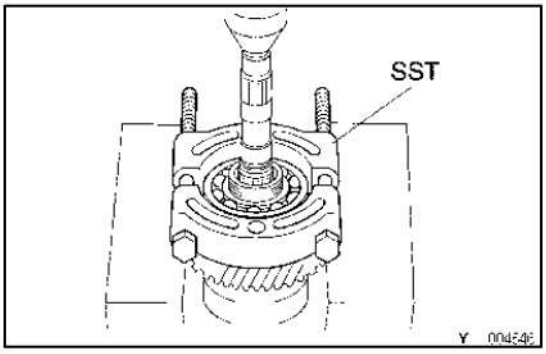
6. REMOVE ADJUSTING NUT AND LOCKING WASHER

(a) Pry off the locking washer.



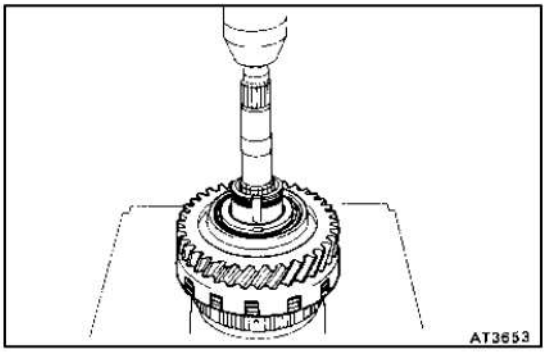
(b) Using SST, loosen the adjusting nut.
SST 09350–32014 (09351–32080)

(c) Remove the adjusting nut and locking washer.



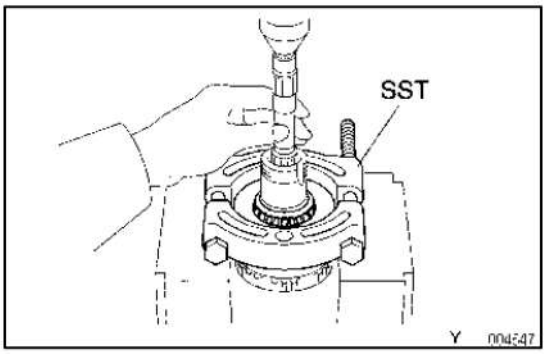
7. REMOVE INTERMEDIATE SHAFT BEARING

Using SST, press out the bearing from the shaft.
SST 09950–00020



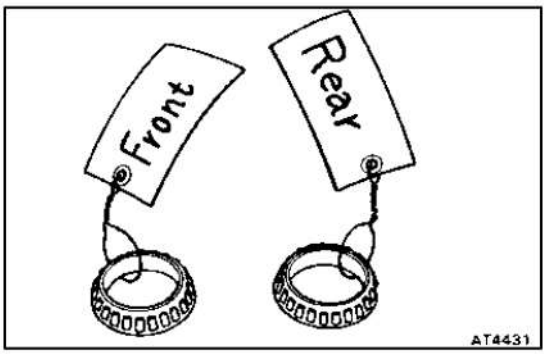
8. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

Press out the gear and bearing together.

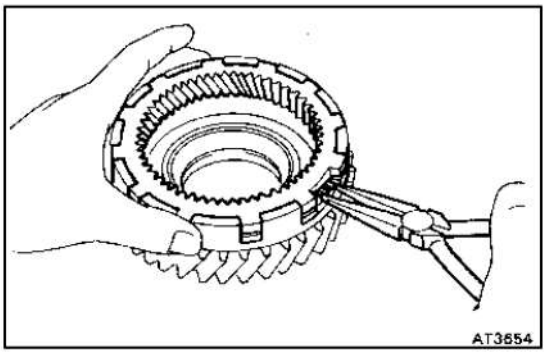


9. REMOVE REAR BEARING

(a) Using SST, press out the bearing.
SST 09950–00020

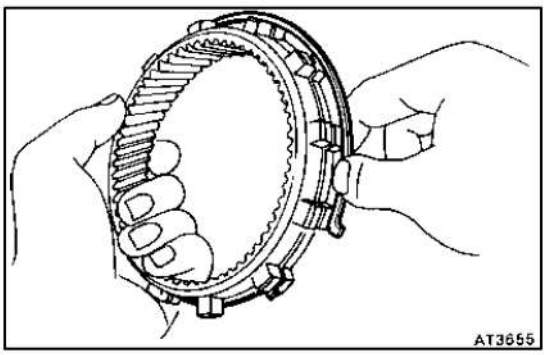


(b) Tag the bearings to show the location for reassembly.

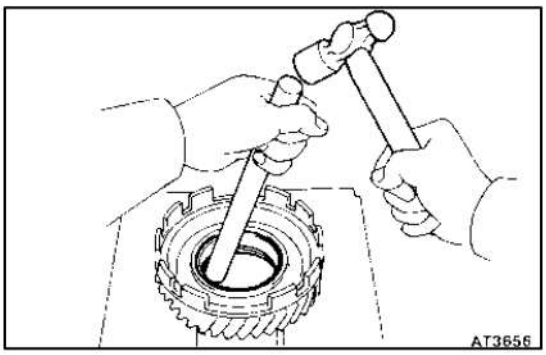


10. REMOVE O/D PLANETARY RING GEAR FROM COUNTER DRIVE GEAR

(a) While pulling up the ring gear, compress the snap ring with needle–nose pliers and remove it from the groove.
(b) Remove the ring gear from the counter drive gear.

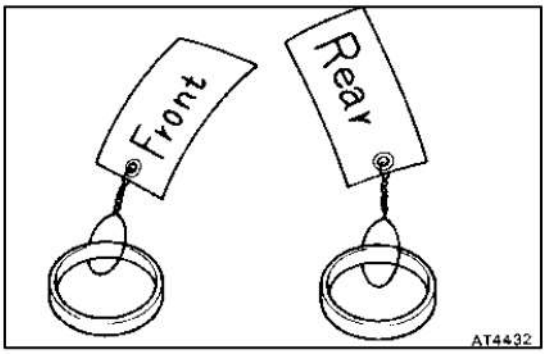


(c) Remove the snap ring from the ring gear.

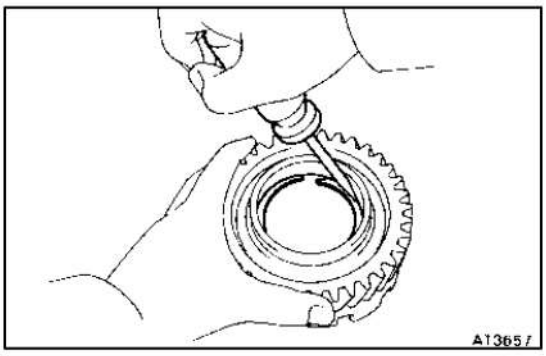


11. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

(a) Drive out the 2 races with a brass bar and hammer.

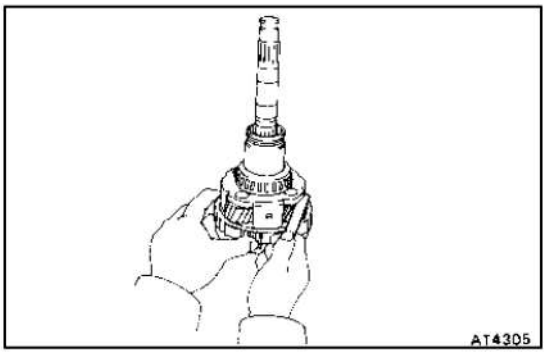


(b) Tag the races to show the location for reassembly.



12. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



AX03Z-03

OVERDRIVE PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16–0.56 mm (0.0063–0.0220 in.)

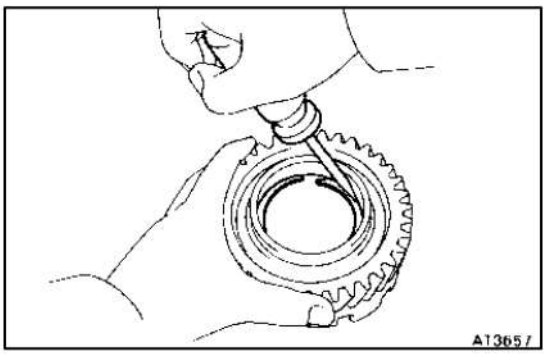
Maximum clearance:

0.61 mm (0.0240 in.)

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

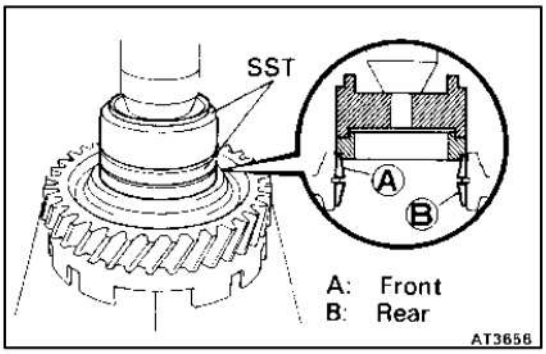
AX040-03

COUNTER DRIVE GEAR ASSEMBLY



1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.

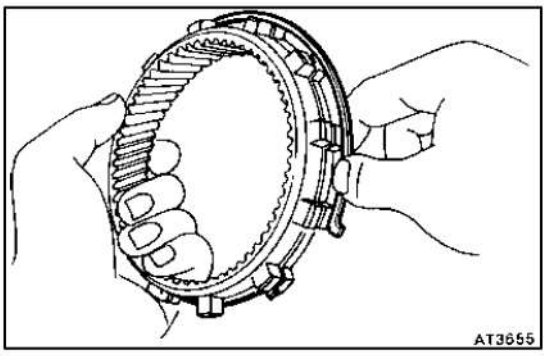


2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the 2 outer races to both sides of the gear.

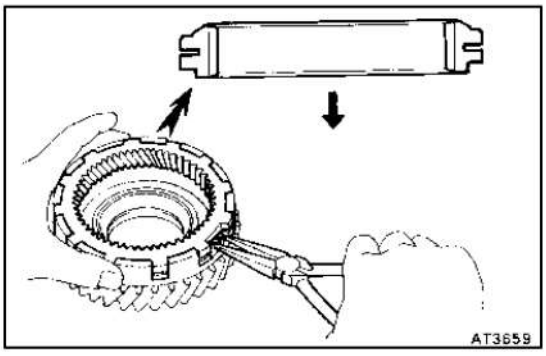
SST 09350–32014 (09351–32120, 09351–32150)

HINT: Press in the 2 outer races until they touch the snap ring. Tap the races in straight, so that they do not tilt.

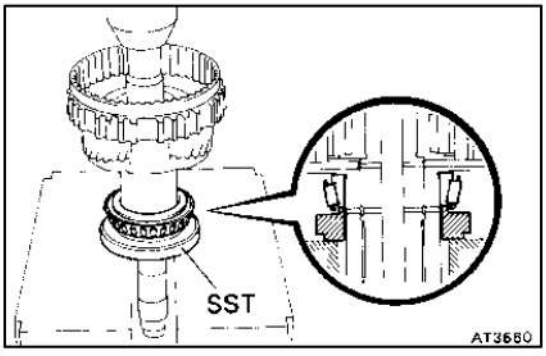


3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVE GEAR

(a) Install the snap ring to the ring gear.



(b) While pushing down the ring gear, squeeze the snap ring end with needle–nose pliers, and install it into the groove.

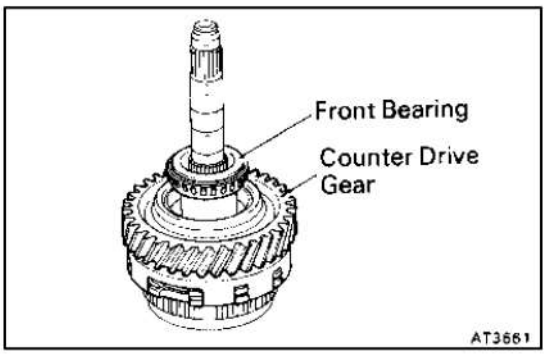


4. INSTALL REAR BEARING

Using SST, press in the bearing onto the shaft.

SST 09350–32014 (09351–32120)

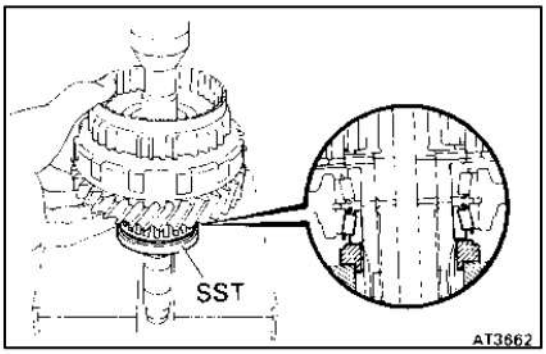
HINT: Press in the bearing until the side surface of the inner race touches the planetary carrier.



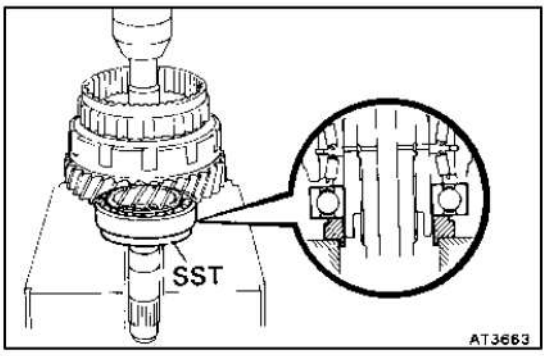
5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

(a) Install the gear onto the shaft, and mesh the ring gear with the planetary pinions.

(b) Place the front bearing on to the shaft.

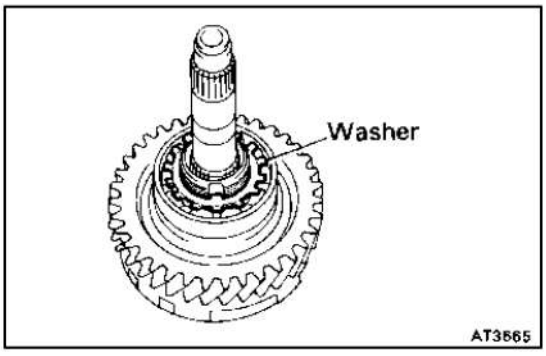


(c) Using SST, press in the bearing until there is slight play between the bearings.
SST 09350–32014 (09351–32120)
HINT: Hold the ring gear to prevent it from falling.

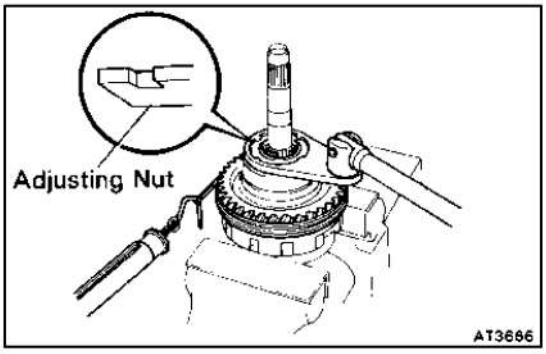


6. INSTALL INTERMEDIATE SHAFT BEARING

Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.
SST 09350–32014 (09351–32120)
HINT: The counter drive gear can be turned lightly.



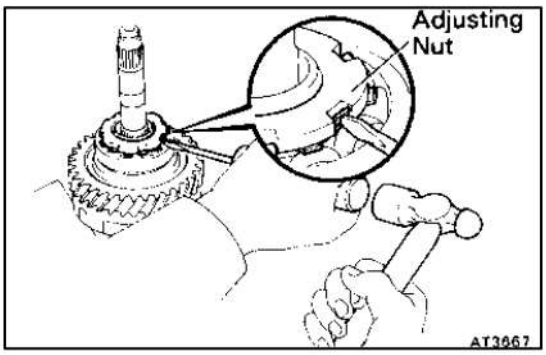
7. PLACE NEW LOCKING WASHER



8. INSTALL ADJUSTING NUT AND ADJUST PRELOAD OF COUNTER DRIVE GEAR

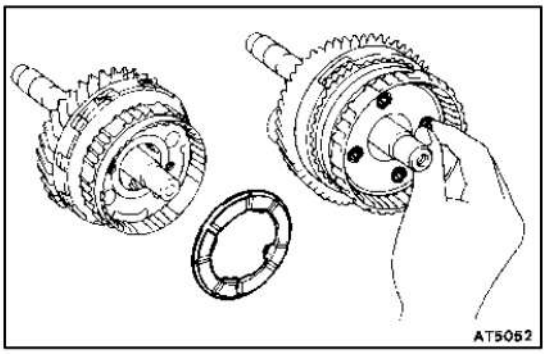
(a) Hold the overdrive planetary gear in a vise with soft jaws.

(b) Using SST, tighten the adjusting nut until the following gear starting load is reached on the tension gauge.
SST 09350–32014 (09351–32080)
Preload (at starting):
9.2–15.3 N (940–1,560 g, 2.1–3.4 lb)



HINT: Turn the counter drive gear right and left several times before measuring the preload.

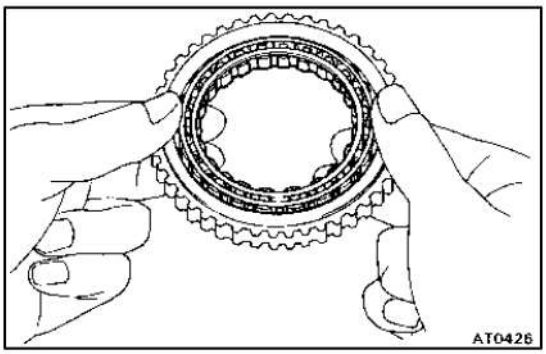
(c) Lock the adjusting nut with one locking washer tab. Bend the locking washer tab until it is flat with the adjusting nut groove.



9. INSTALL NO.3 OVERDRIVE PLANETARY THRUST WASHER

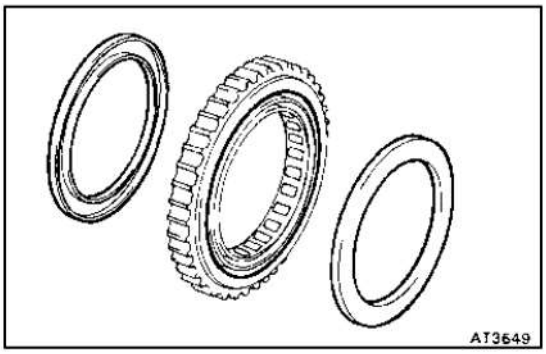
10. INSTALL PINION SHAFT PLUGS

Install the 4 plugs into the pinion shaft.

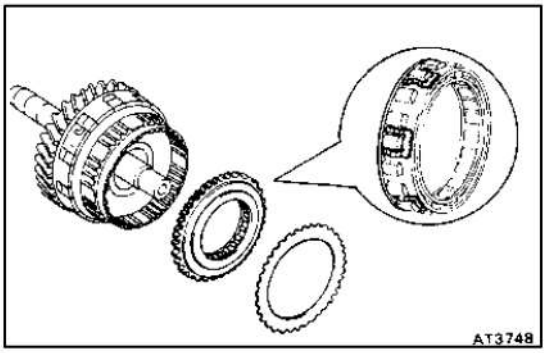


11. INSTALL OVERDRIVE ONE–WAY CLUTCH AND RETAINING PLATE

(a) Install the one–way clutch into the outer race.



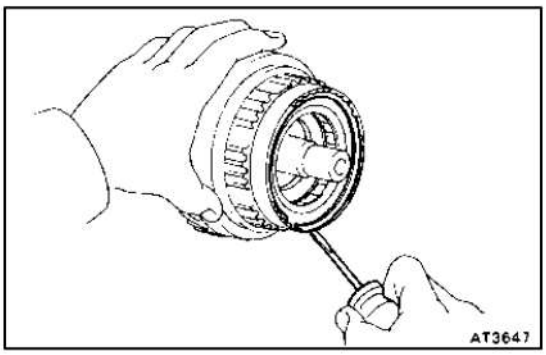
(b) Install the 2 retainers on both sides of the one–way clutch.



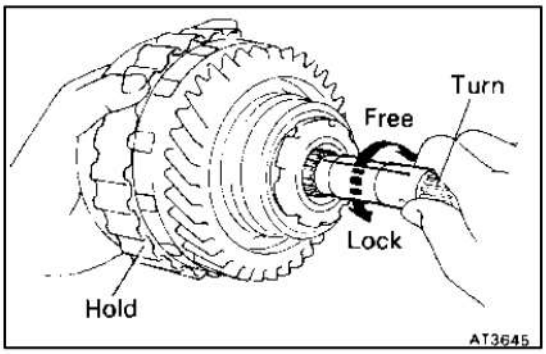
(c) Install the one–way clutch into the overdrive planetary gear.

HINT: Be sure that the one–way clutch is installed in the correct direction.

(d) Install the retaining plate.



(e) Install the snap ring.

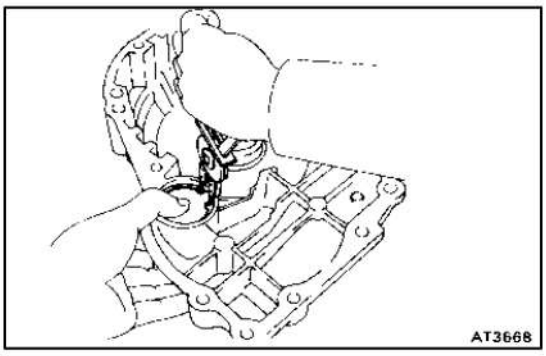


12. CHECK OPERATION OF O/D ONE–WAY CLUTCH

(a) Install the overdrive direct clutch into the one–way clutch.
(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the overdrive direct clutch.

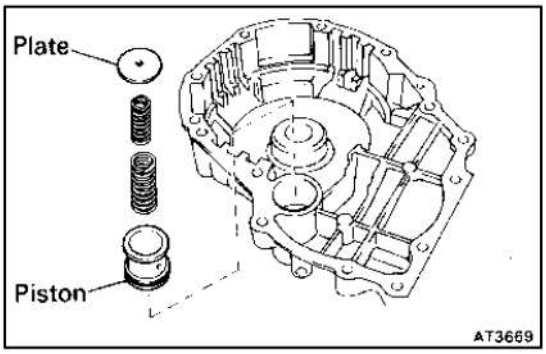
AX041–02

OVERDRIVE CASE DISASSEMBLY

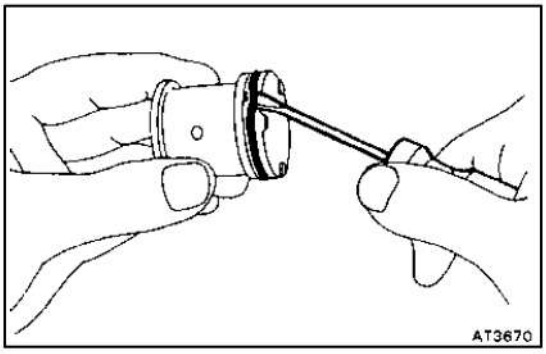


1. REMOVE C_0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

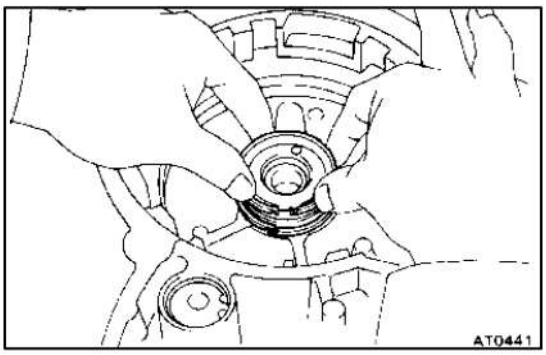
(a) Using snap ring pliers, remove the snap ring.



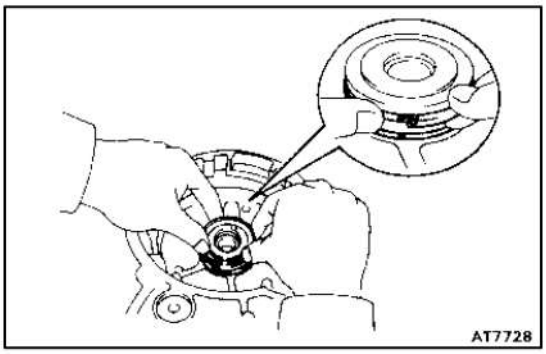
(b) Remove the retaining plate and 2 springs.
(c) Remove the accumulator piston.



(d) Remove the O–ring from the piston.



2. REMOVE OIL SEAL RINGS

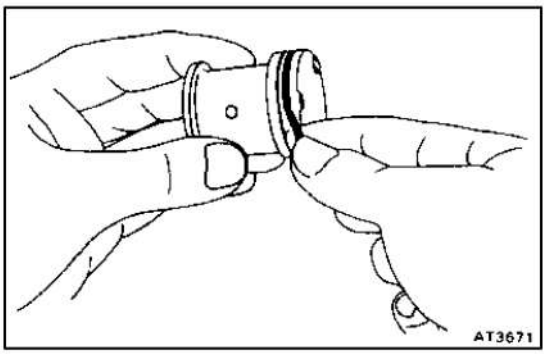


AX042-02

OVERDRIVE CASE ASSEMBLY

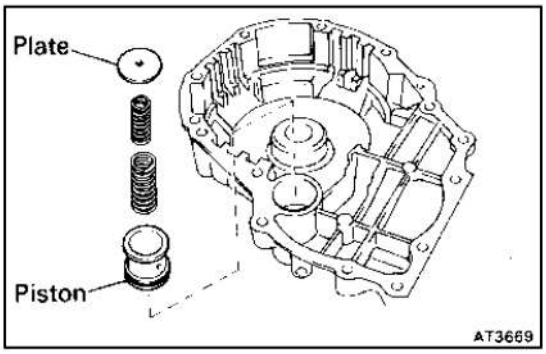
1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Install the 2 oil seal rings to the overdrive case groove, then snug them down by squeezing their ends together.
HINT: After installing the oil seal rings, check that they move smoothly.

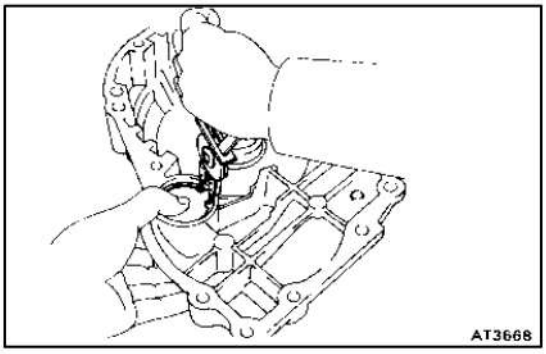


2. INSTALL C0 ACCUMULATOR PISTON TO OVERDRIVE CASE

(a) Install a new O–ring to the accumulator piston.
(b) Coat the O–ring with ATF.



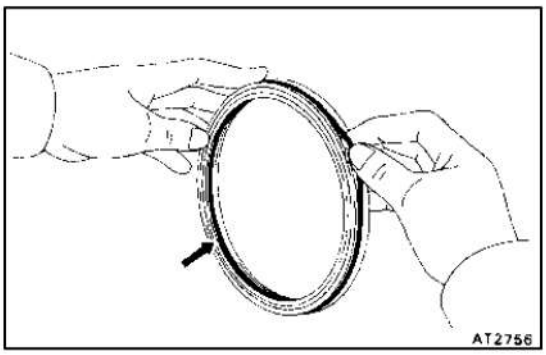
(c) Install the accumulator piston, 2 springs and retaining plate.



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

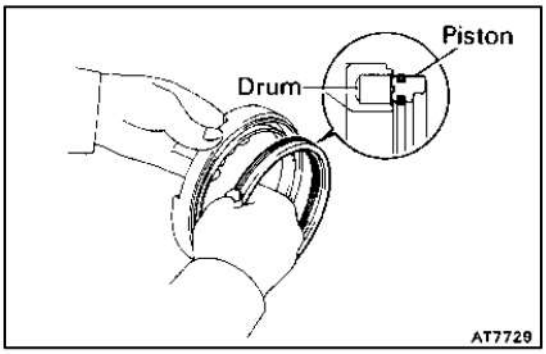
AX043-05

OVERDRIVE BRAKE ASSEMBLY

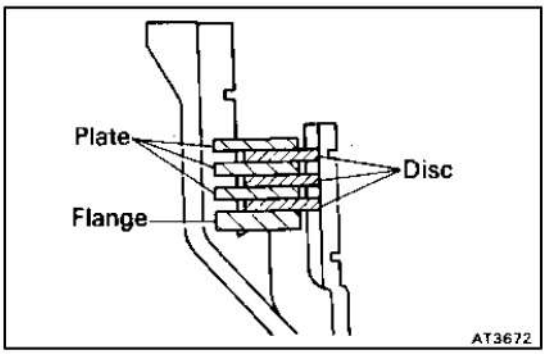


1. INSTALL PISTON INTO DRUM

(a) Install new O–rings to the piston.
Coat the new O–rings with ATF.

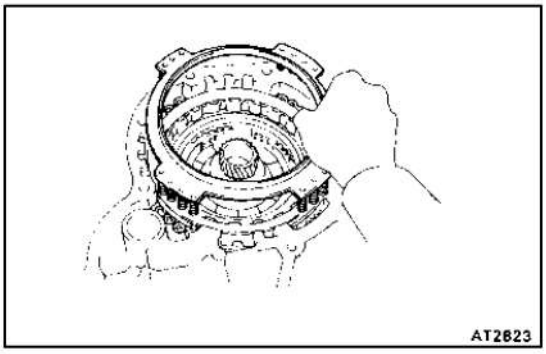


(b) Press the piston into the drum, being careful not to damage the O–rings.

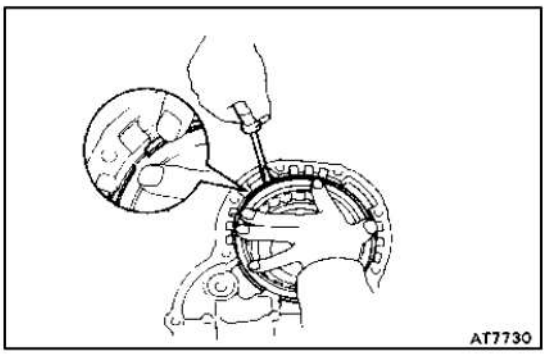


2. INSTALL FLANGE, DISCS AND PLATES

Install the flange, discs and plates.
Install in order:
P=Plate D=Disc
Flange–D–P–D–P–D–P

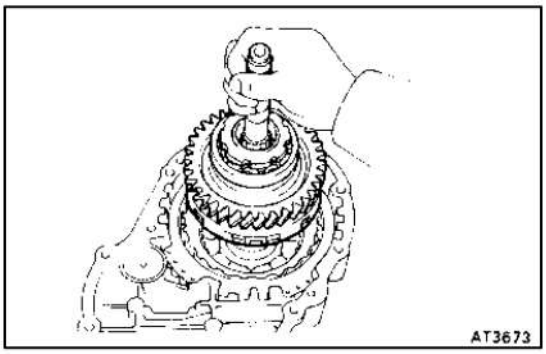


3. POSITION PISTON RETURN SPRING



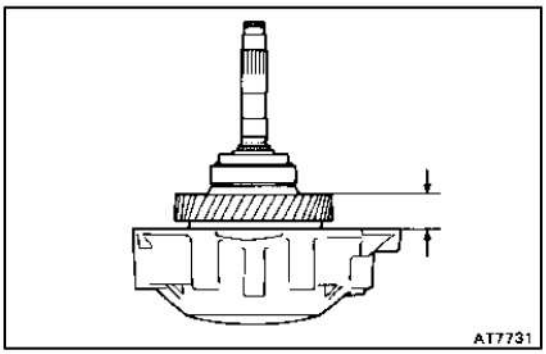
4. INSTALL SNAP RING INTO CASE

Be sure the end gap of the snap ring is not aligned with one of cutouts.



5. INSTALL OVERDRIVE PLANETARY GEAR ONTO OVERDRIVE DIRECT CLUTCH

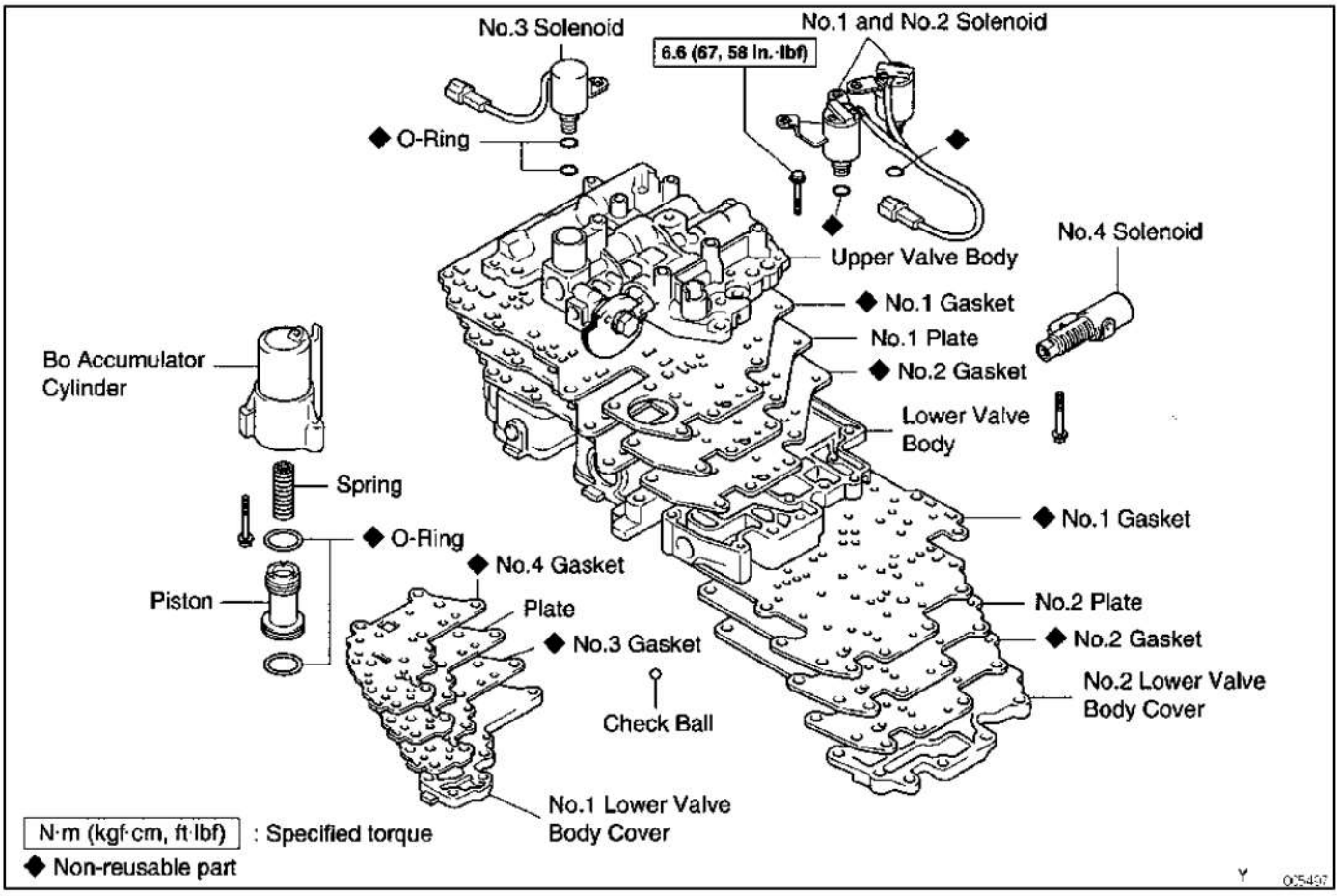
While turning the overdrive planetary gear clockwise, install it onto the overdrive direct clutch.

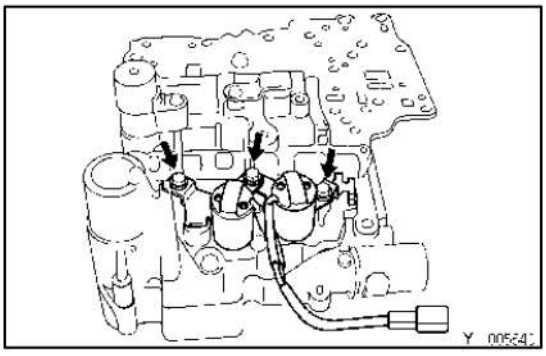


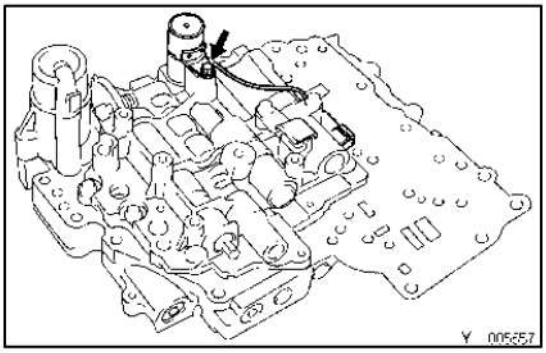
HINT: If the overdrive planetary gear is properly installed onto the direct clutch, the counter drive gear height from the overdrive case will be about 24 mm (0.94 in.).

VALVE BODY
COMPONENTS

AX044-02







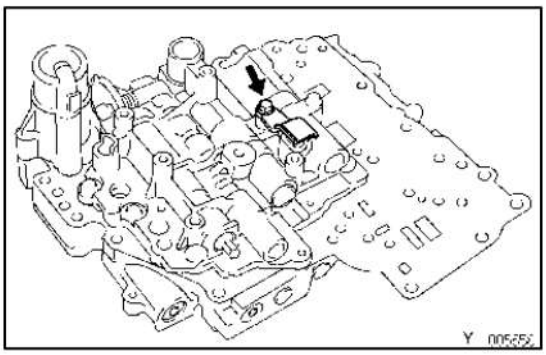
AX0TW-01

VALVE BODY DISASSEMBLY

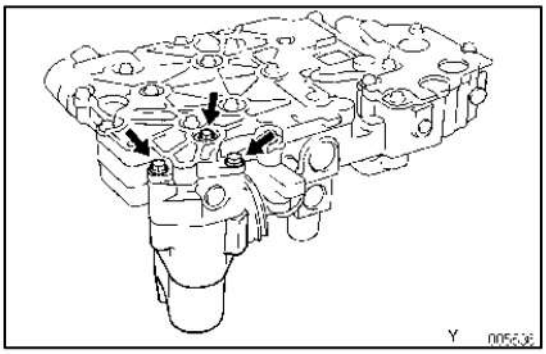
NOTICE: When disassembling the valve body, be careful not to damage or deform the plate which overhangs the valve body.

1. REMOVE SOLENOIDS

(a) Remove No.1 and No.2 solenoids with the retainer.
NOTICE: When removing the solenoid, do not use a screwdriver, etc. to pry up the solenoid.
(b) Remove the O–ring from each solenoid.
(c) Remove the No.3 solenoid.
(d) Remove the O–ring from the solenoid.

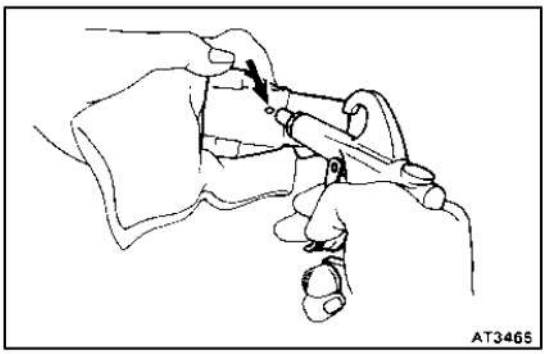


2. REMOVE LOCK PLATE



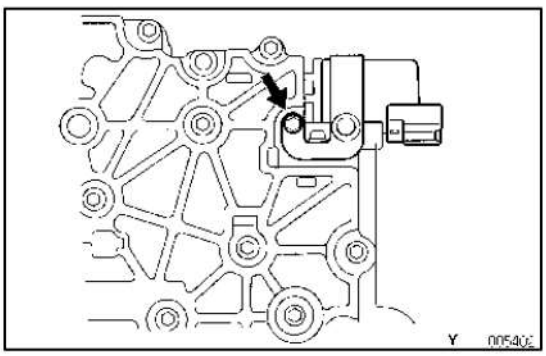
3. REMOVE B_0 ACCUMULATOR ASSEMBLY

(a) Remove the 3 bolts.
(b) Remove the B_0 accumulator assembly.



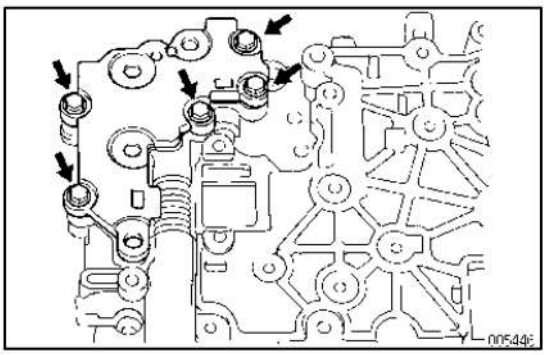
4. DISASSEMBLE B_0 ACCUMULATOR ASSEMBLY

(a) Applying compressed air to the cylinder hole, remove the piston and spring.
(b) Remove the 2 O–rings from the piston.



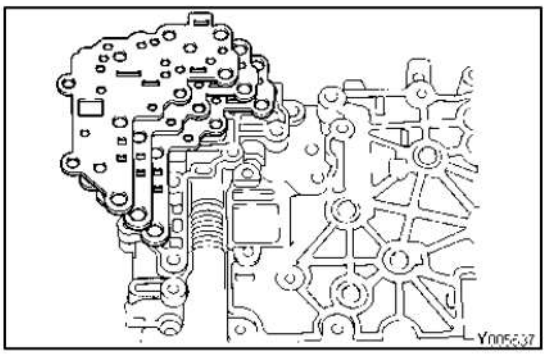
5. REMOVE NO.4 SOLENOID

(a) Remove the No.4 solenoid.
(b) Remove the O–ring from the solenoid.



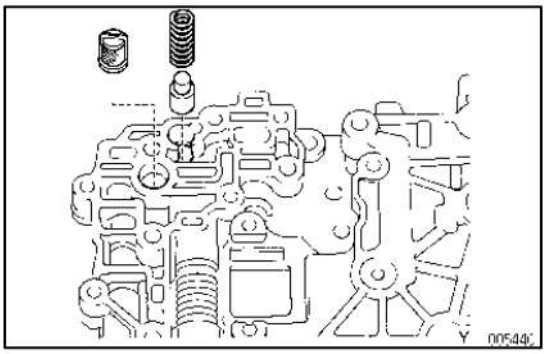
6. REMOVE NO.1 LOWER VALVE BODY COVER

Remove the 5 bolts and No.1 lower valve body cover.

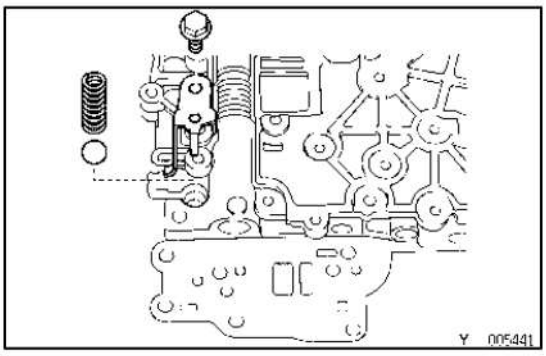


7. REMOVE OIL STRAINER, NO.1 LOWER VALVE BODY COVER GASKETS AND CHECK VALVE

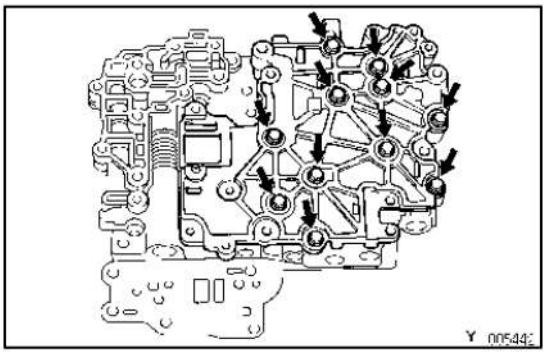
(a) Remove the 2 gaskets and plate from the lower valve body.



(b) Remove the oil strainer, check valve and spring.

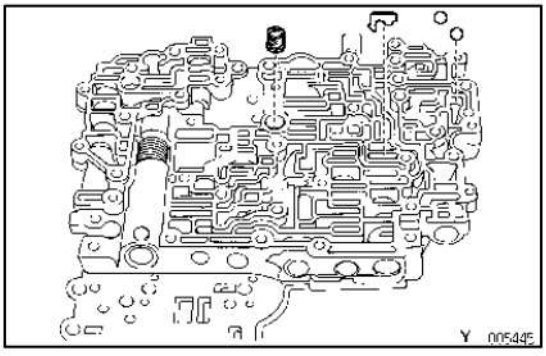


8. REMOVE PRESSURE RELIEF VALVE

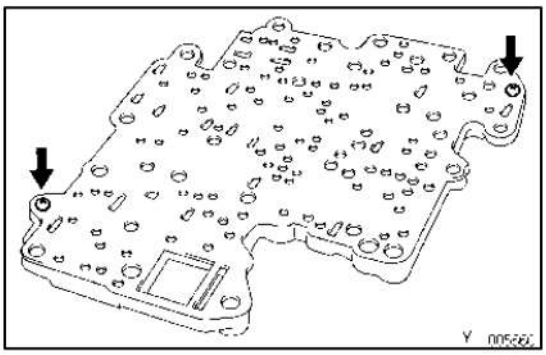


9. REMOVE NO.2 LOWER VALVE BODY COVER, OIL STRAINER, CHECK BALLS AND VIBRATING STOPPER

Remove the 11 bolts and lower valve body cover.

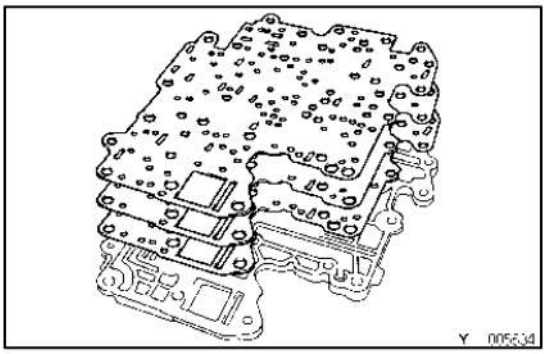


(b) Remove the 2 check balls, oil strainer and vibrating stopper.

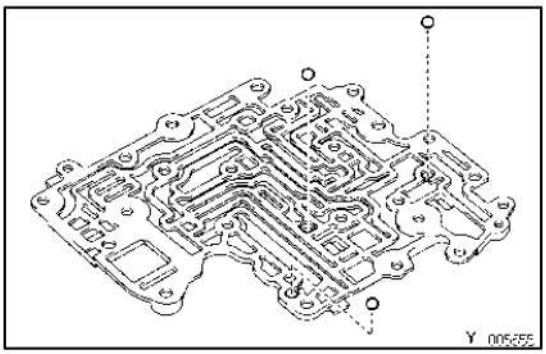


10. REMOVE NO.2 LOWER VALVE BODY COVER GASKETS AND CHECK BALLS

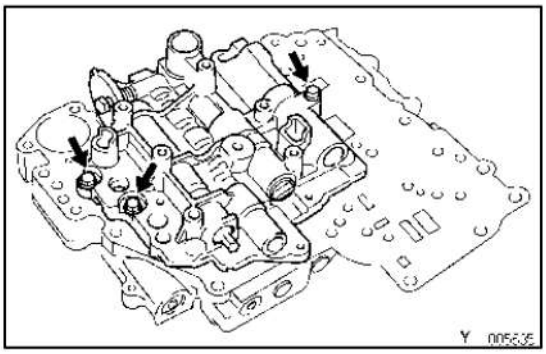
(a) Remove the 2 screws from the lower valve body cover.



(b) Remove the 2 gaskets and plate.

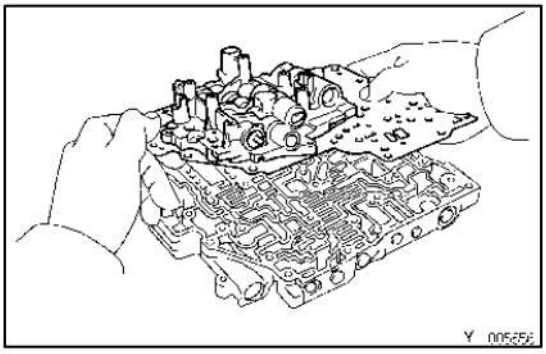


(c) Remove the 3 check balls from the cover.



11. REMOVE BOLTS FROM UPPER VALVE BODY

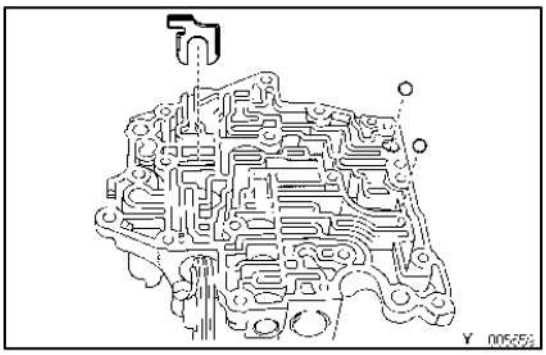
Remove the 3 bolts.



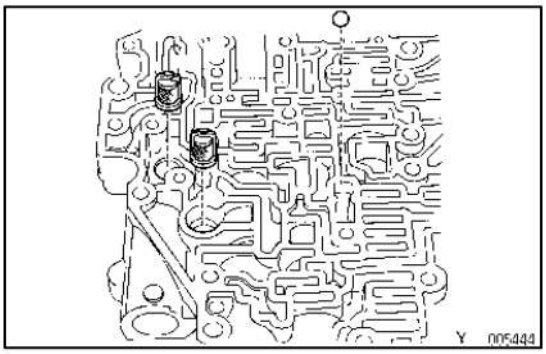
12. LIFT OFF UPPER VALVE BODY AND NO.1 PLATE AS A SINGLE UNIT

Hold No.1 plate to the upper valve body and lift off the upper valve body.

HINT: Be careful that the check balls and oil strainer do not fall out.



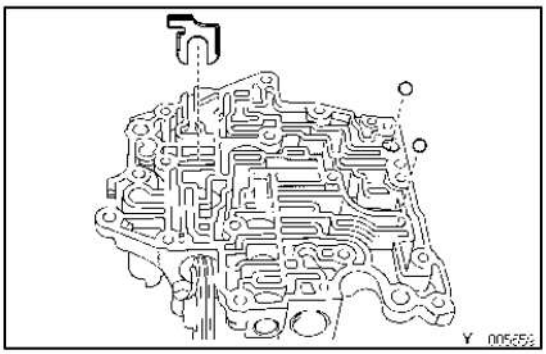
13. REMOVE 2 CHECK BALLS AND VIBRATING STOPPER FROM UPPER VALVE BODY



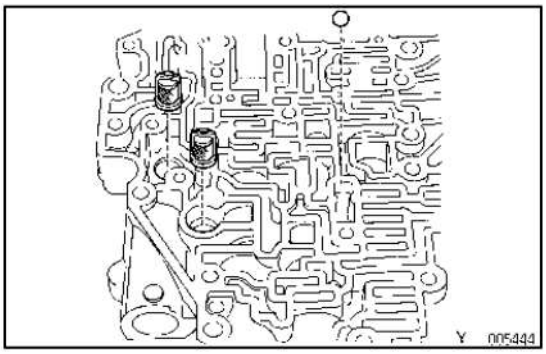
14. REMOVE 2 OIL STRAINERS AND CHECK BALL FROM LOWER VALVE BODY

VALVE BODY ASSEMBLY

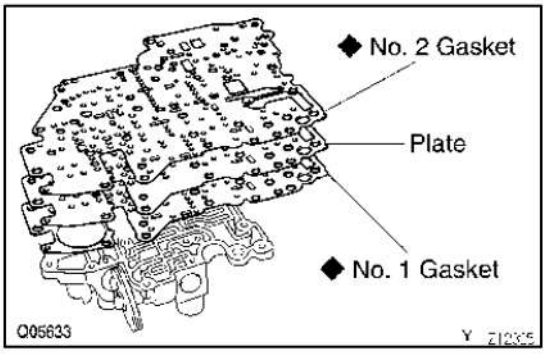
AX0TX–01



1. INSTALL 2 CHECK BALLS AND VIBRATING STOPPER TO UPPER VALVE BODY



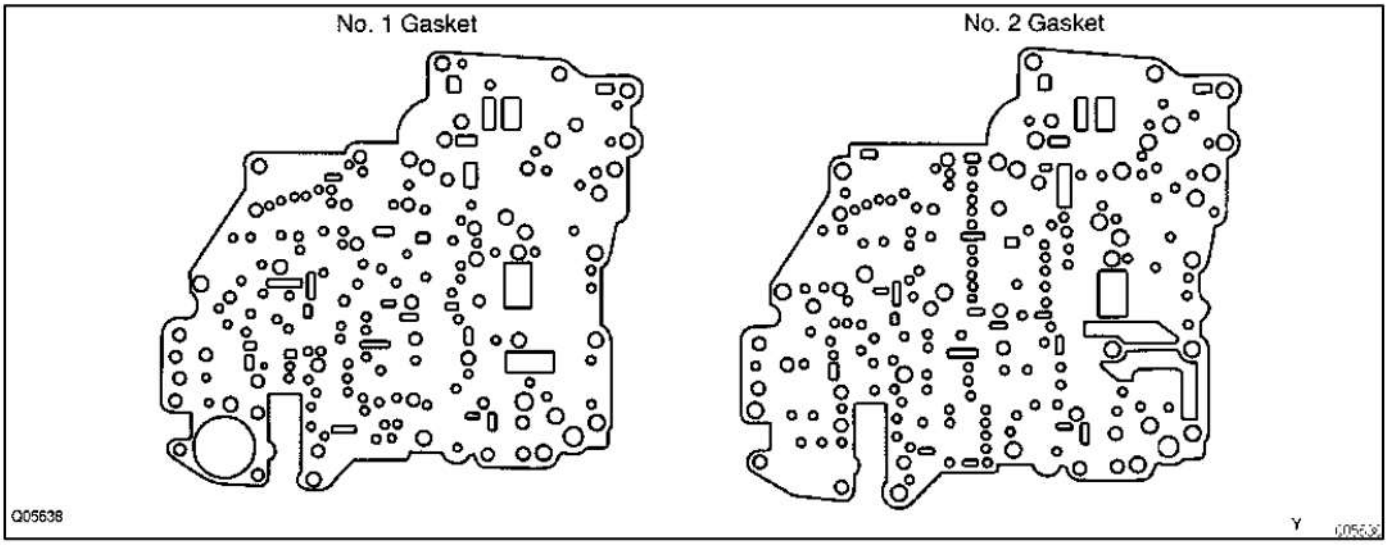
2. INSTALL 2 OIL STRAINERS AND CHECK BALL TO LOWER VALVE BODY

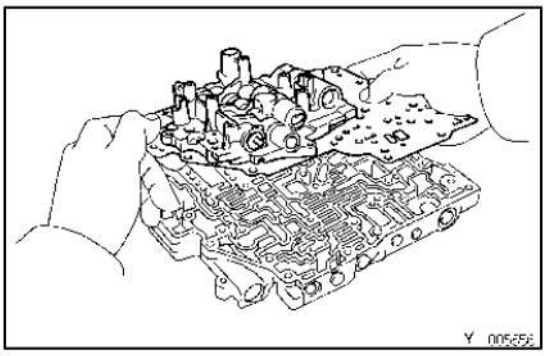


3. POSITION PLATE AND NEW GASKETS ON UPPER VALVE BODY

Position new No.1 gasket, plate and the new No.2 gasket on the upper valve body.

HINT: Since No.1 gasket and No.2 gasket are similar, use the illustration below to discriminate between them.

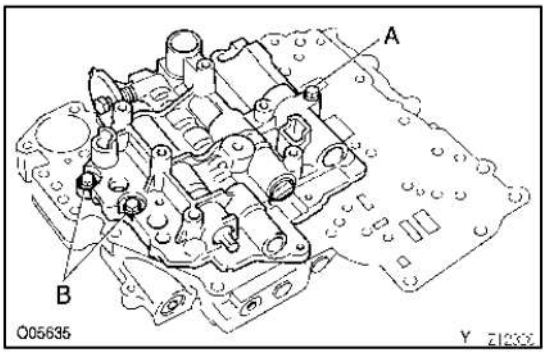




4. PLACE UPPER VALVE BODY WITH PLATE AND GASKETS ON LOWER VALVE BODY

Hold the upper valve body, plate and gaskets securely so they do not separate.

Align each bolt hole in the valve bodies with the gaskets and plate.



5. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY TO SECURE LOWER VALVE BODY

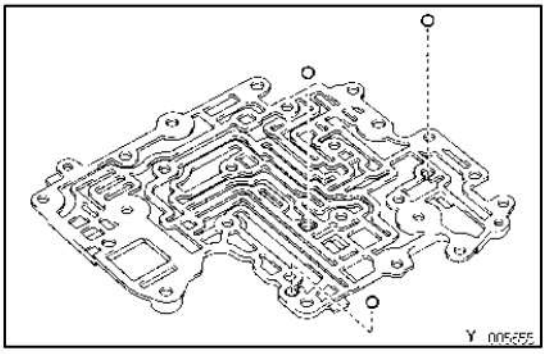
Install and finger tighten the 3 bolts.

HINT: Each bolt length is indicated below.

Bolt length:

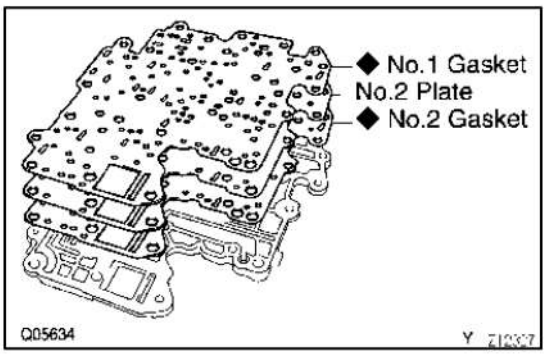
Bolt A: 44 mm (1.732 in.)

Bolt B: 16 mm (0.630 in.)

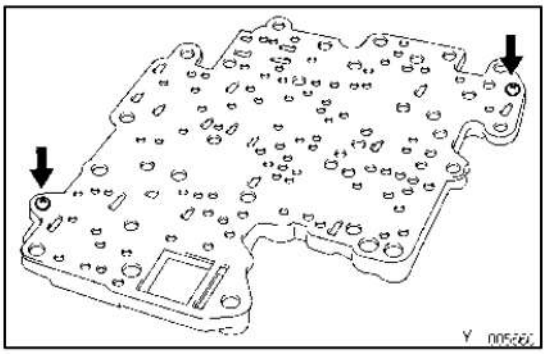


6. INSTALL NO.2 LOWER VALVE BODY COVER GASKETS, PLATE AND 3 CHECK BALLS

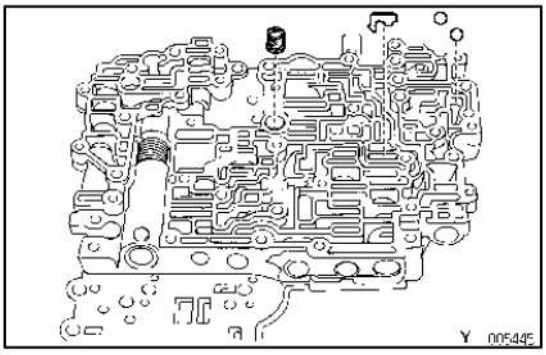
(a) Install the 3 check balls into the No.2 lower valve body cover.

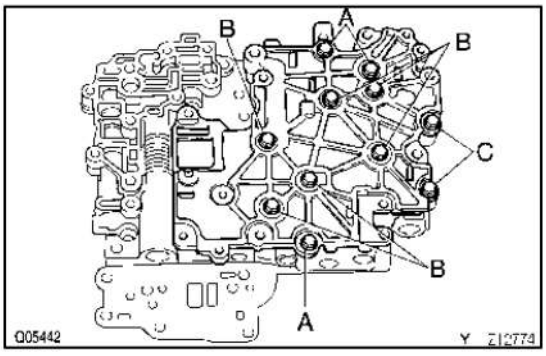


(b) Position a new gasket and plate and then another new gasket.
HINT: Both gaskets are identical.



(c) Install the 2 screws.

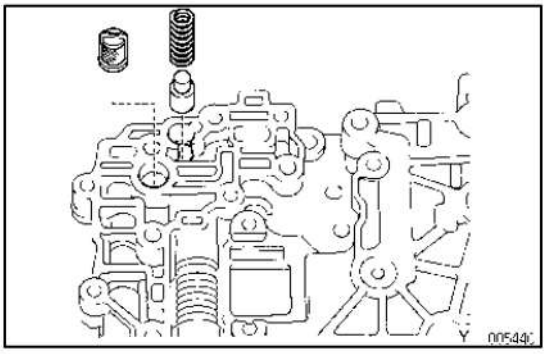




8. INSTALL NO.2 LOWER VALVE BODY COVER

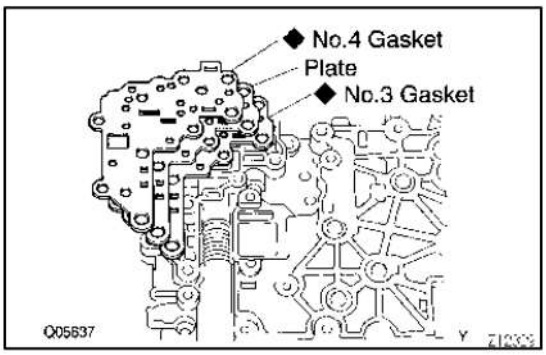
(a) Position the No.2 lower valve body cover.

(b) Install and finger tighten the 11 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 40 mm (1.575 in.)
Bolt B: 44 mm (1.732 in.)
Bolt C: 14 mm (0.551in.)



9. INSTALL OIL STRAINER AND CHECK VALVE

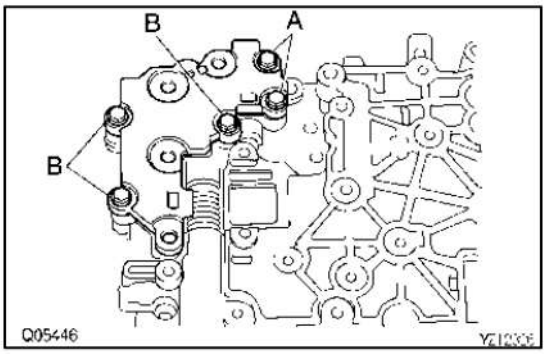
Install the oil strainer and check valve into the lower valve body.



10. INSTALL LOWER VALVE BODY COVER GASKETS AND NO.2 PLATE

Position a new gasket and plate and then another new gasket.

HINT: Both gaskets are identical.



11. INSTALL LOWER VALVE BODY COVER

(a) Position the lower valve body cover.

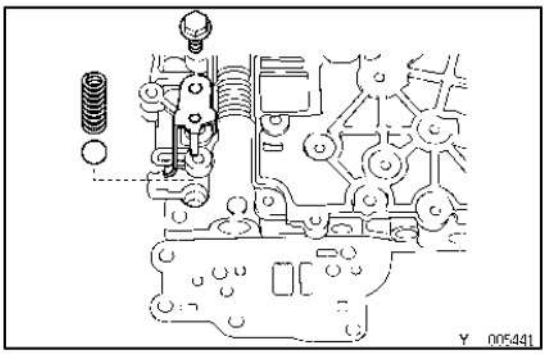
(b) Install and finger tighten the 5 bolts.

HINT: Each bolt length is indicated below.

Bolt length

Bolt A: 47 mm (1.850 in.)

Bolt B: 14 mm (0.551 in.)

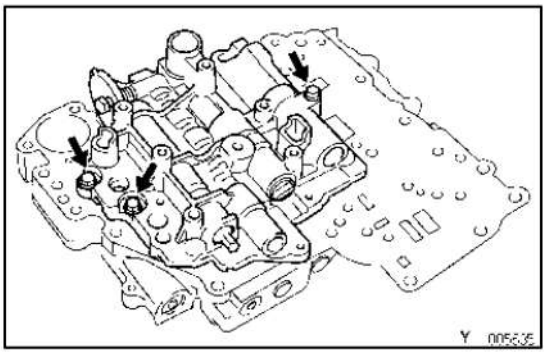


12. INSTALL PRESSURE RELIEF VALVE

13. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

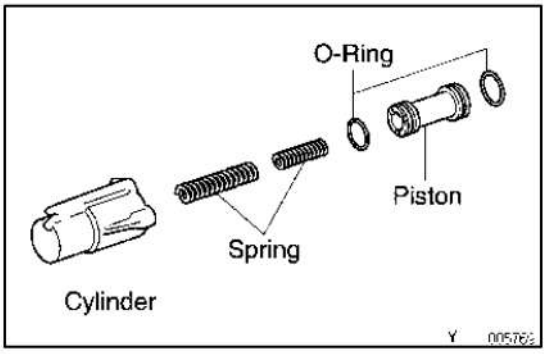
(a) Tighten the 16 bolts in the lower valve body.

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



(b) Tighten the 3 bolts in the upper valve body.

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



14. INSTALL B_0 ACCUMULATOR ASSEMBLY

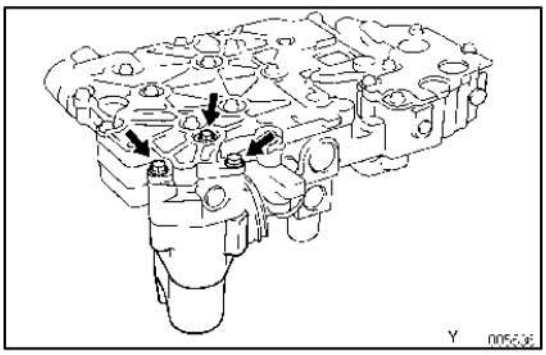
(a) Coat new O–rings with ATF and install them to the piston.

(b) Install the spring and piston into the cylinder.

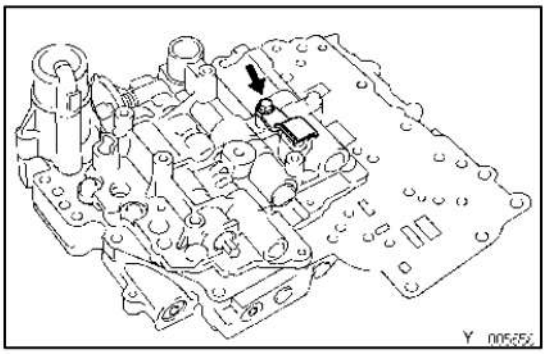
Spring dimensions

mm (in.)

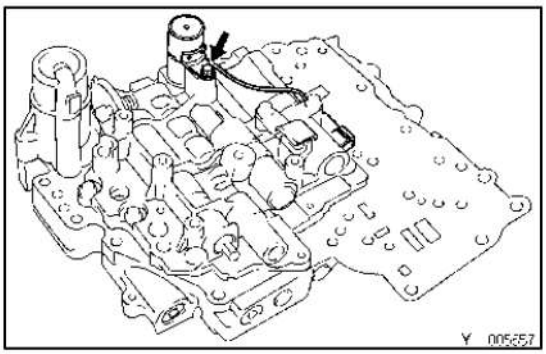
	Color	Free length	Coil outer diameter
Inner	White	47.5 (1.870)	18.9 (0.744)
Outer	None	16.3 (0.642)	20.7 (0.815)



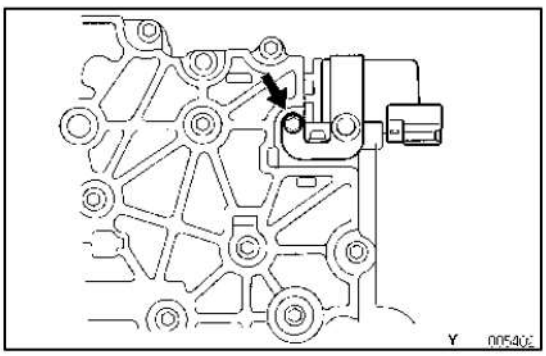
(d) Install the B_0 accumulator assembly.
(e) Install the torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



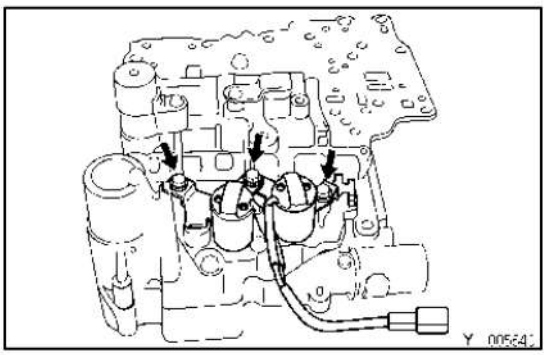
15. INSTALL LOCK PLATE



16. INSTALL SOLENOIDS
(a) Coat new O–rings with ATF and install them to the solenoids.
(b) Install the lock–up solenoid.
(c) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



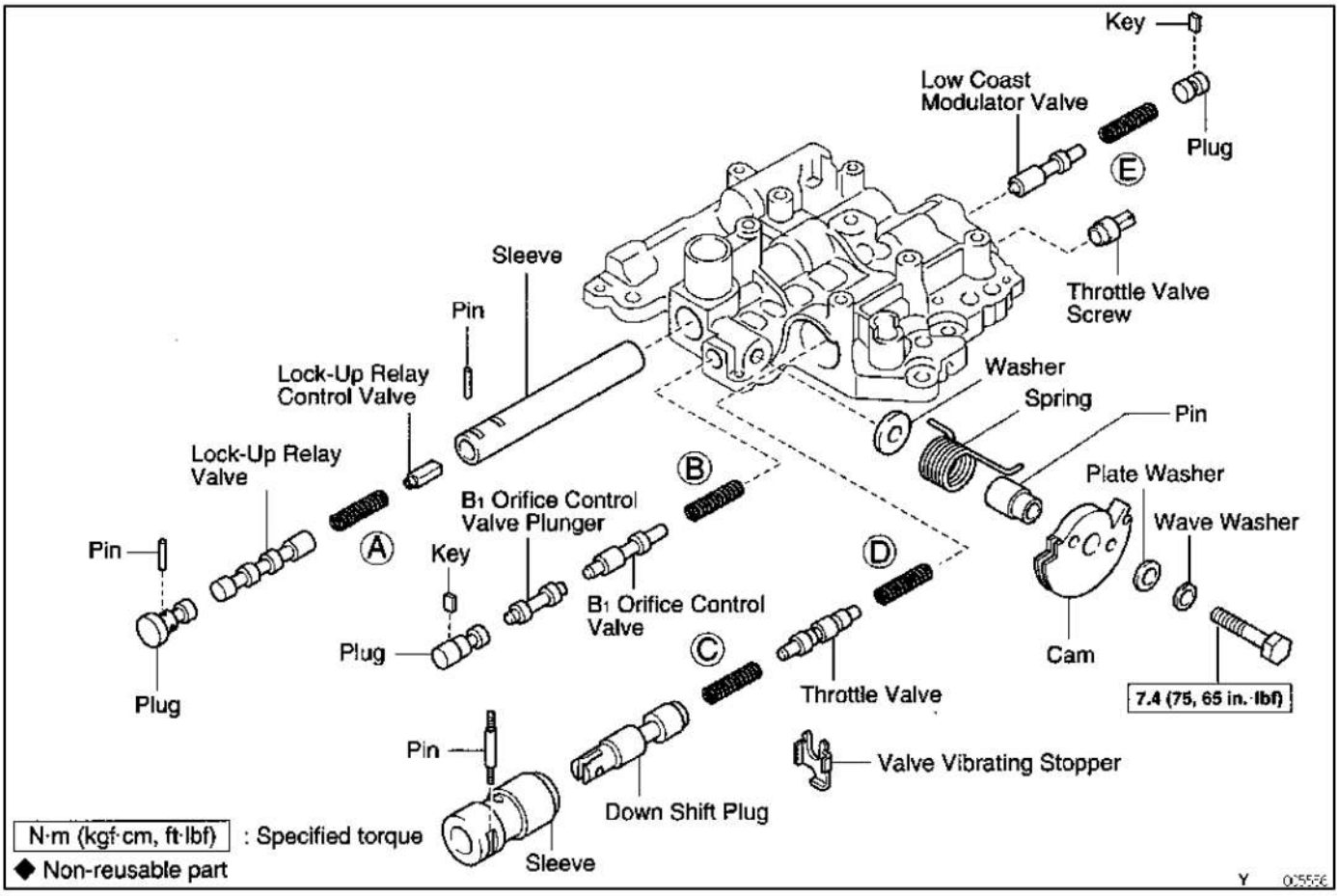
(d) Install the No.4 solenoid.
(e) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



(d) Install No.1 and No.2 solenoids.
(e) Install and torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

UPPER VALVE BODY
COMPONENTS

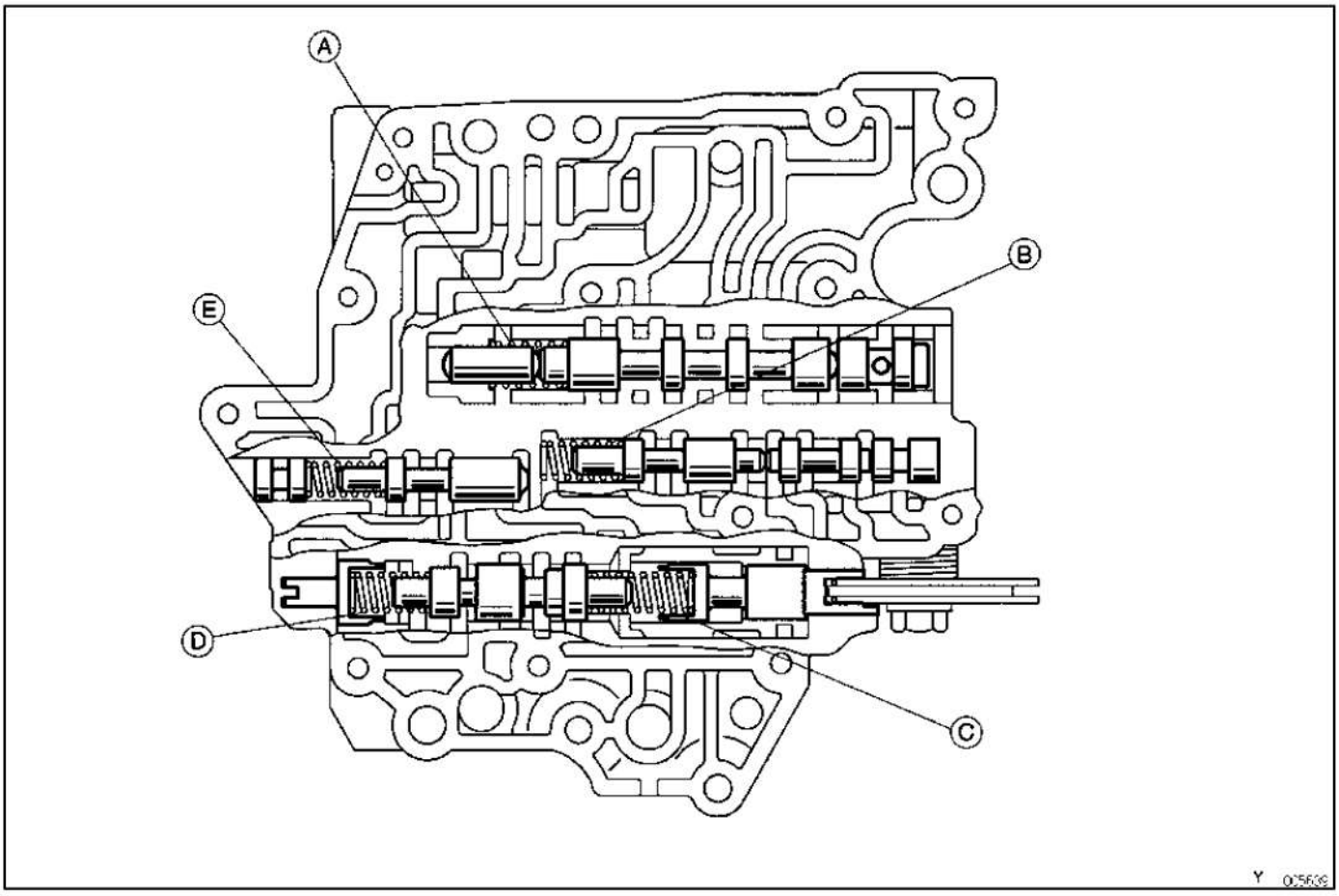
AX047-03



AX048-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.



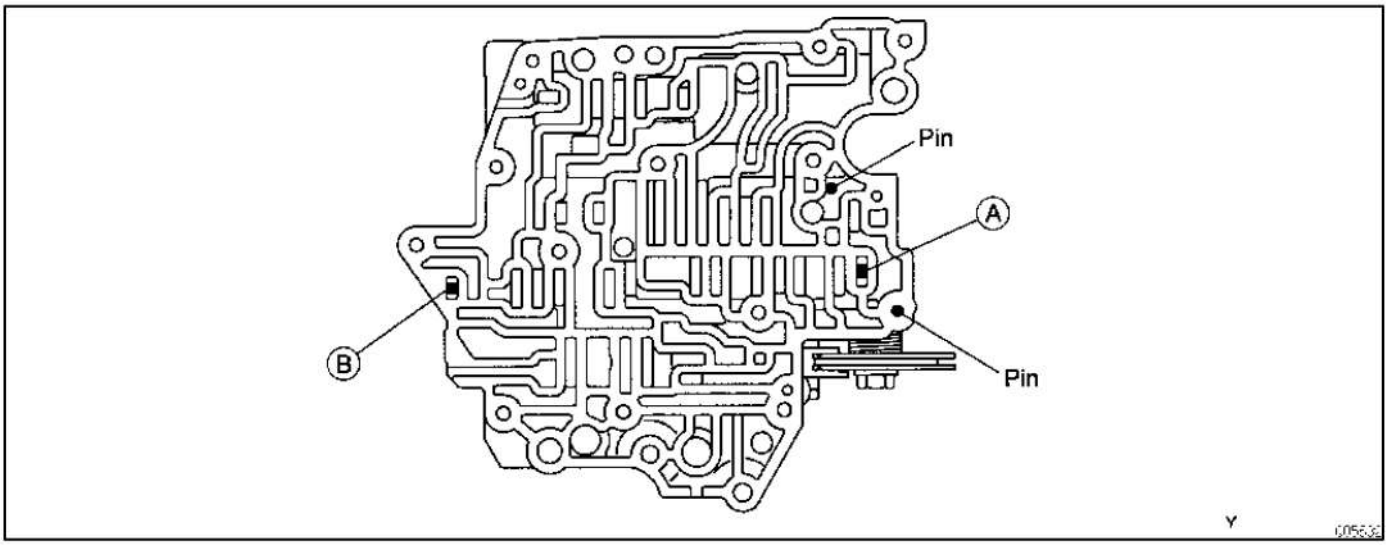
Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
@@@@@: [c A]	Lock–Up Relay Valve (Yellow)	26.8 (1.055) / 10.2 (0.402)	10.8
@@@@@: [c B]	B_1 Orifice Control Valve (White)	24.8 (0.976) / 6.4 (0.252)	12.0
@@@@@: [c C]	Throttle Valve (Green)	31.5 (1.240) / 7.0 (0.276)	11.4
@@@@@: [c D]	Down–Shift Plug (None)	15.0 (0.591) / 11.0 (0.433)	7.0

@@ @@ @: [c E]	Low Coast Modulator Valve (Purple)	20.2 (0.795) / 7.9 (0.311)	11.9

AX0GZ-02

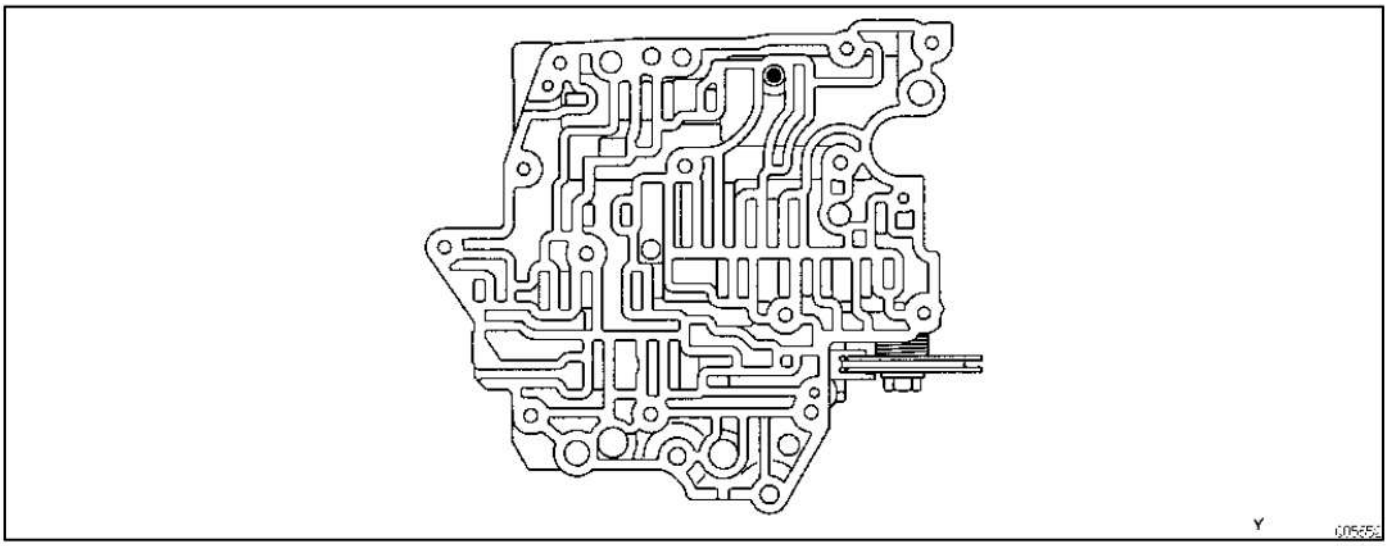
RETAINERS, PIN, AND CHECK BALLS LOCATION

1. PIN, RETAINERS



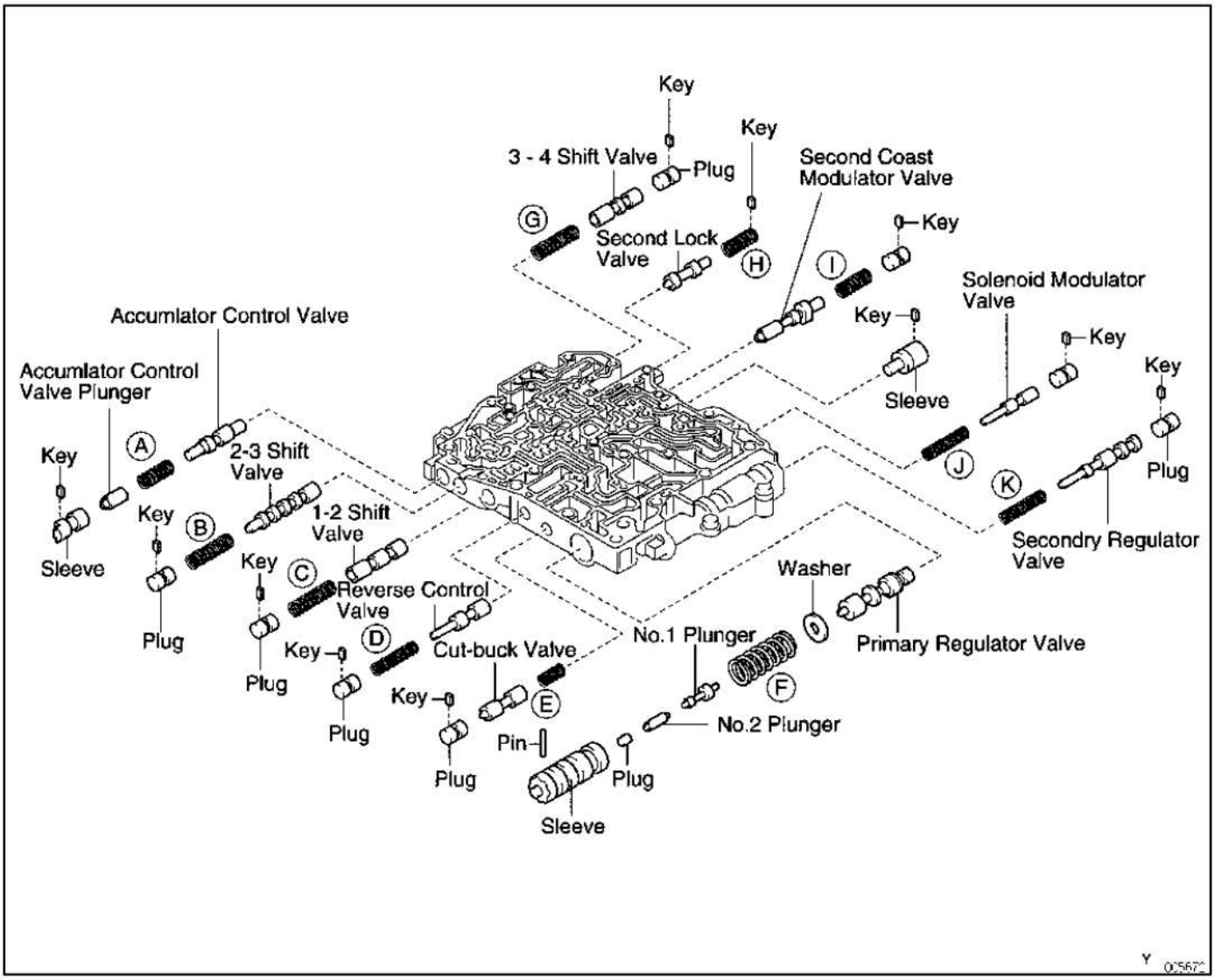
Mark	Name	Height / Width / Thickness mm (in.)
@@@@@: [c A]	B_1 Orifice Control Valve	8.9 (0.350) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c B]	Low Coast Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALLS



LOWER VALVE BODY
COMPONENTS

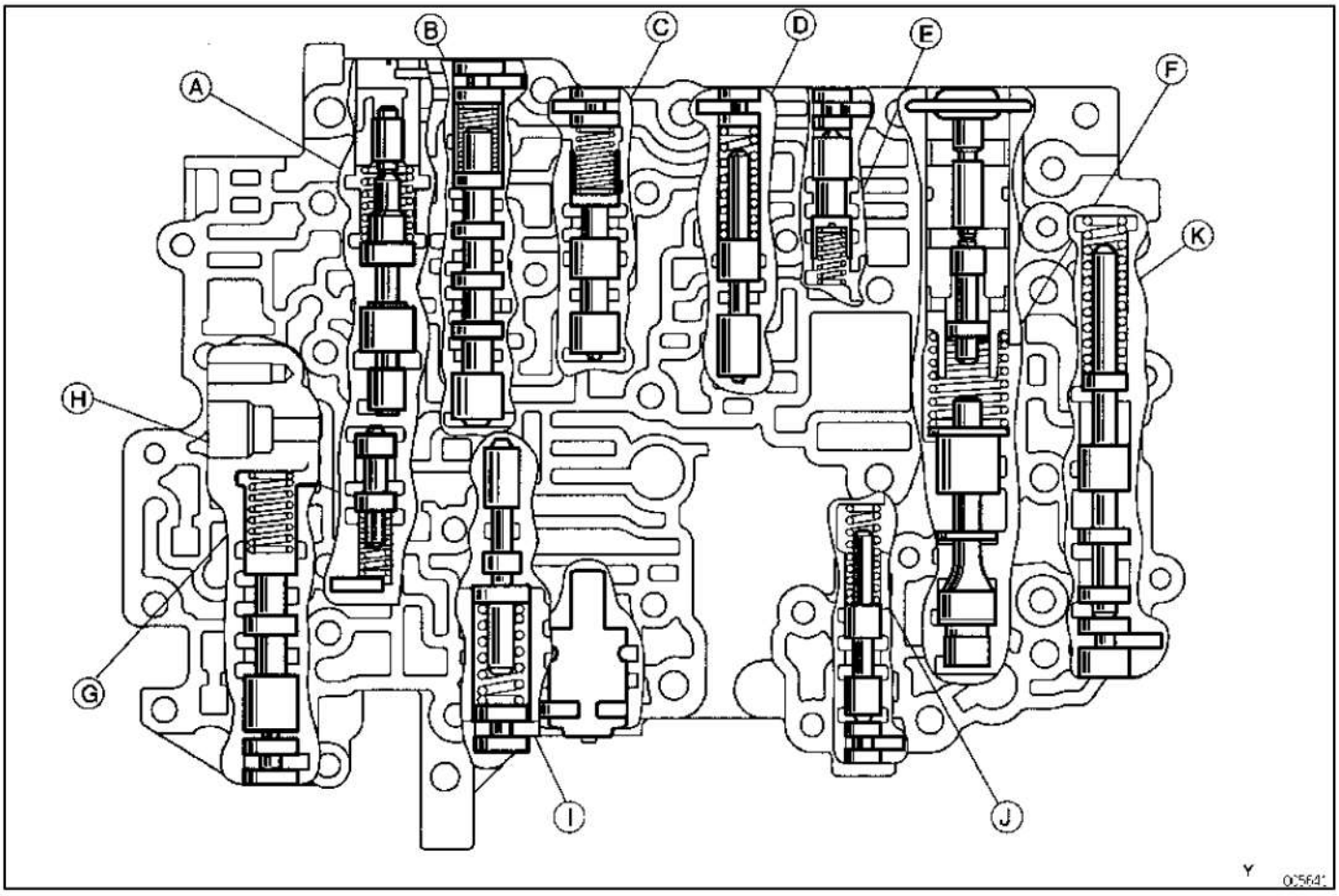
AX04A-03



AX04B-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.



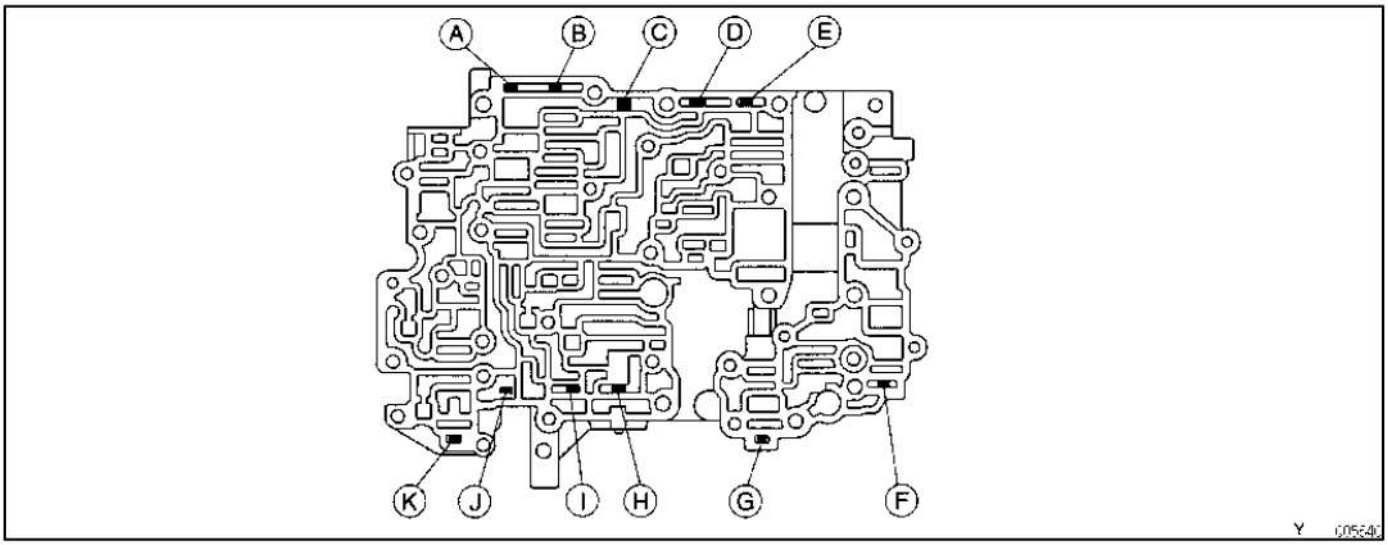
Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
@@@@@: [c A]	Accumulator Control Valve (Red)	25.1 (0.988) / 8.6 (0.339)	8.0
@@@@@: [c B]	2–3 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
@@@@@: [c C]	1–2 Shift Valve (Light Green)	29.2 (1.150) / 8.9 (0.350)	12.0
@@@@@: [c D]	Reverse Control Valve (White/Purple)	38.1 (1.500) / 6.5 (0.256)	19.0

@@@@@: [c E]	Cut–Back Valve (None)	21.8 (0.858) / 6.0 (0.236)	13.5
@@@@@: [c F]	Primary Regulator Valve (None)	36.6 (1.441) / 16.1 (0.634)	6.3
@@@@@: [c G]	3–4 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
@@@@@: [c H]	Second Lock Valve (None)	20.7 (0.815) / 7.4 (0.291)	9.5
@@@@@: [c I]	Second Coast Modulator Valve (White)	32.2 (1.268) / 9.0 (0.354)	11.4
@@@@@: [c J]	Solenoid Modulator Valve (Purple/Pink)	30.2 (1.189) / 5.6 (0.220)	15.3
@@@@@: [c K]	Secondary Regulator Valve (None)	46.9 (1.846) / 5.9 (0.232)	21.8

AX0TY-01

RETAINERS AND CHECK BALLS LOCATION

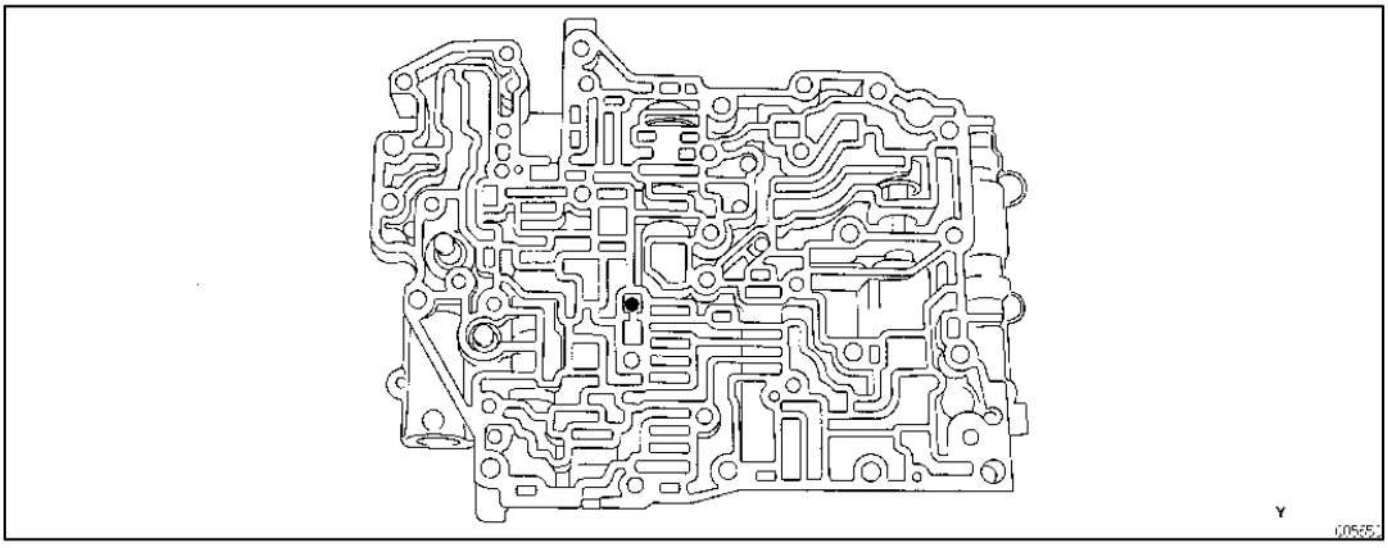
1. RETAINERS



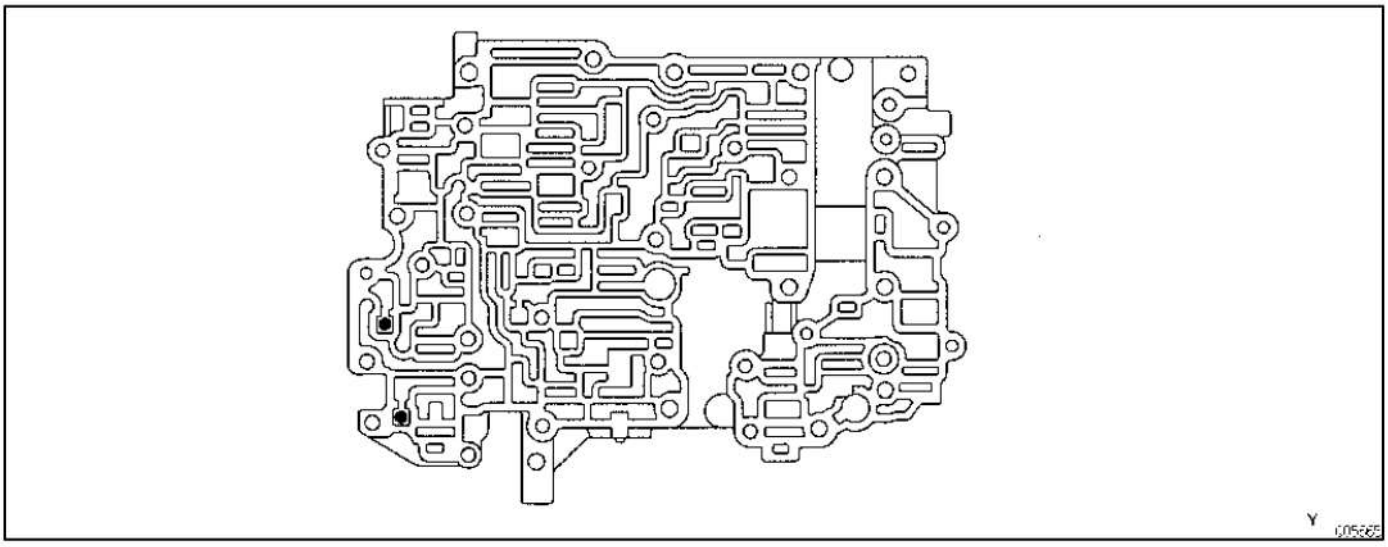
Mark	Name	Height / Width / Thickness mm (in.)
@@@@@: [c A]	Accumulator Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c B]	2–3 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c C]	1–2 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c D]	Reverse Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c E]	Cut–Back Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c F]	Secondary Regulator Valve	11.0 (0.433) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c G]	Solenoid Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c H]	Lock–Up Control Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c I]	Second Coast Modulator Valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
@@@@@: [c J]	Second Lock Valve	9.2 (0.362) / 11.5 (0.453) / 3.2 (0.126)
@@@@@: [c K]	3–4 Shift Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALLS

Upper Side



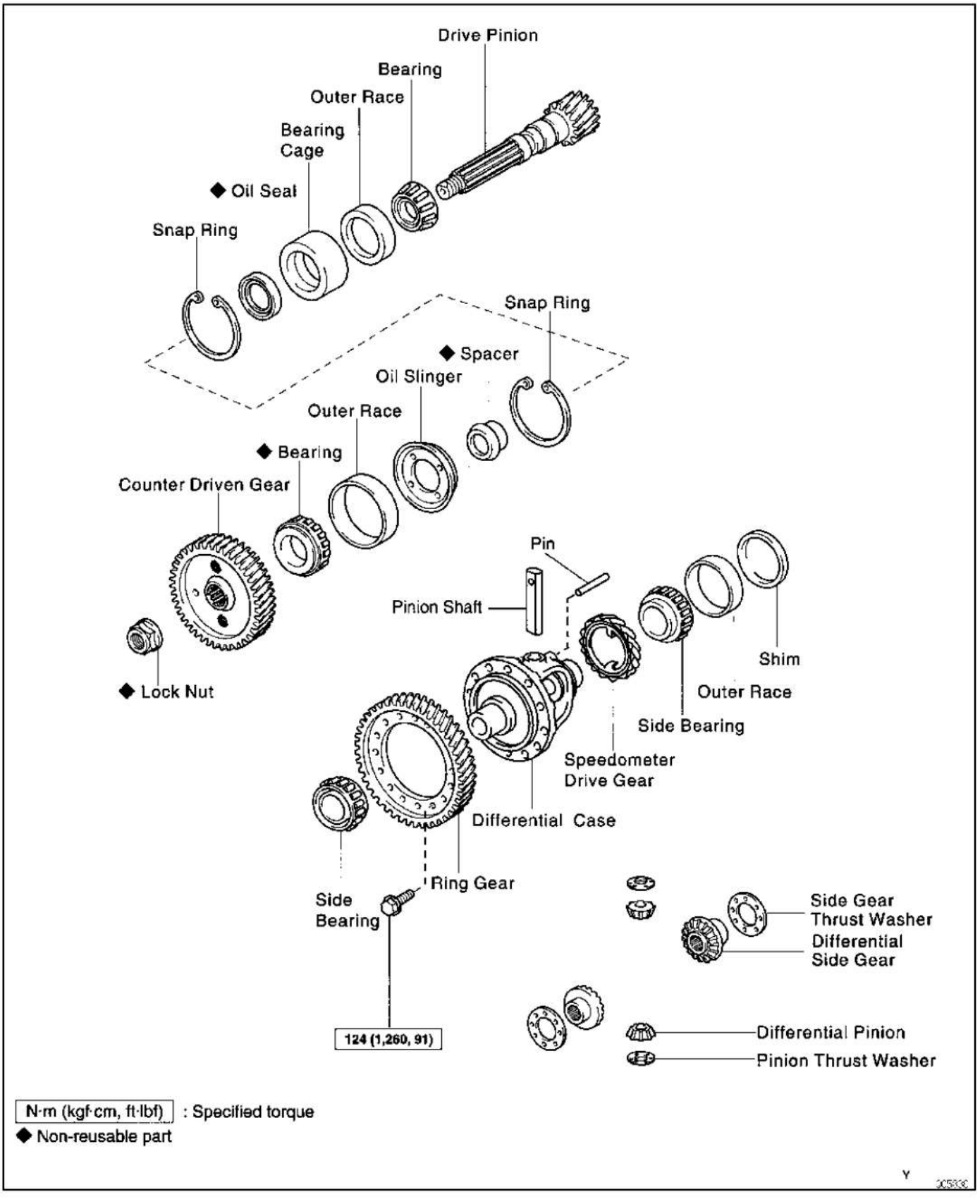
Lower Side



DIFFERENTIAL ASSEMBLY

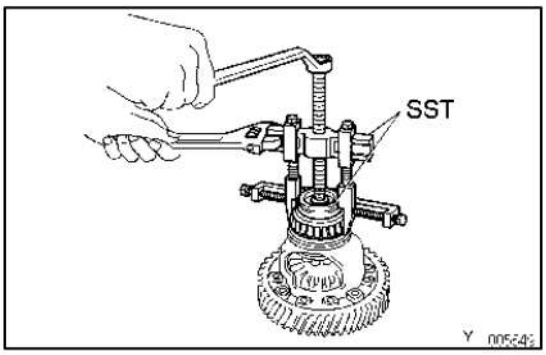
COMPONENTS

AX04D-02



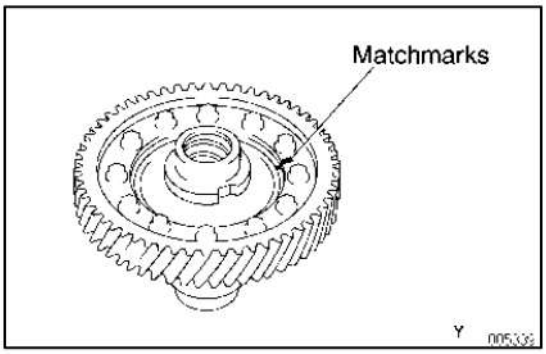
AX0TZ-02

DIFFERENTIAL CASE DISASSEMBLY



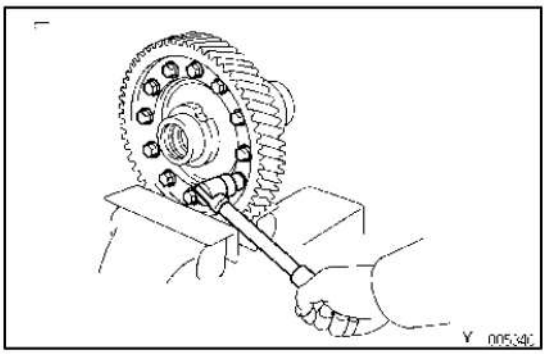
1. REMOVE SIDE BEARING

Using SST, remove the 2 side bearings.
SST 09608–16011, 09550–40010

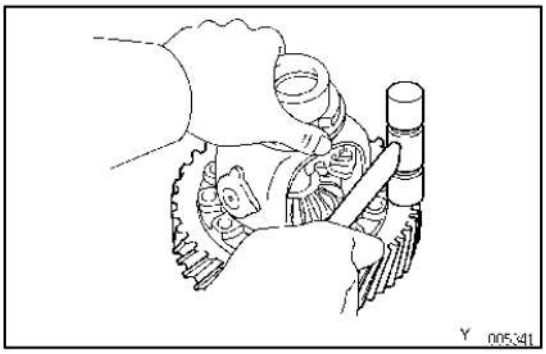


2. REMOVE RING GEAR

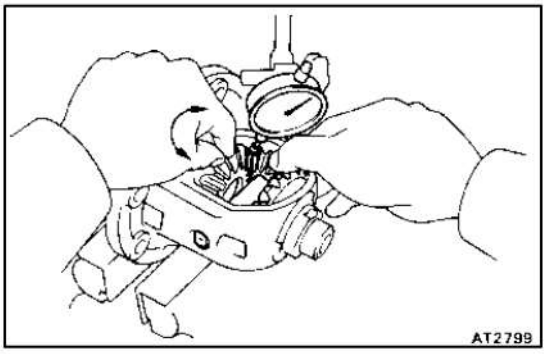
(a) Place matchmarks on both the differential case and ring gear.



(b) Remove the 12 bolts.



(c) Using a plastic hammer, tap out the ring gear.

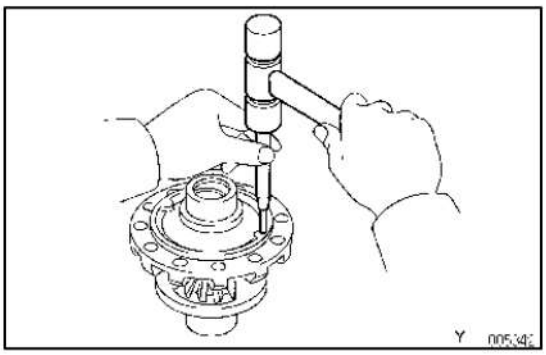


3. CHECK SIDE GEAR BACKLASH

Using a dial gauge, measure the backlash of each side gear while holding one pinion toward the case.

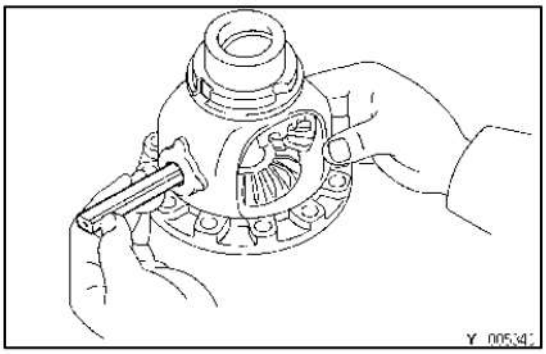
Standard backlash:

0.05 – 0.20 mm (0.0020 – 0.0079 in.)



4. DISASSEMBLE DIFFERENTIAL CASE

(a) Drive out the pinion shaft lock pin from the side on which the ring gear is installed.



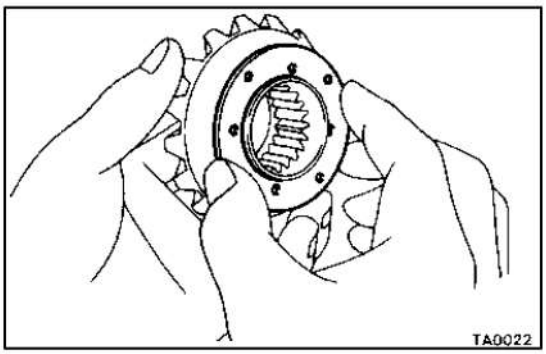
(b) Remove the pinion shaft from the case.
(c) Remove the 2 pinions and side gears with the 4 thrust washers.

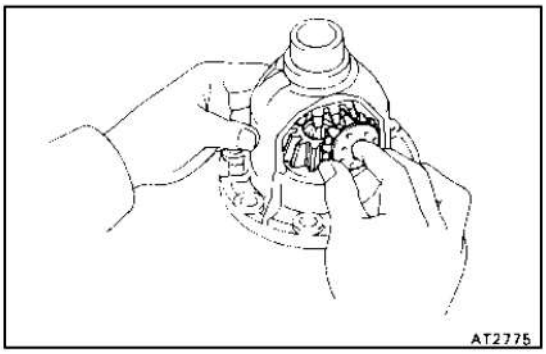
AX0U0-02

DIFFERENTIAL CASE ASSEMBLY

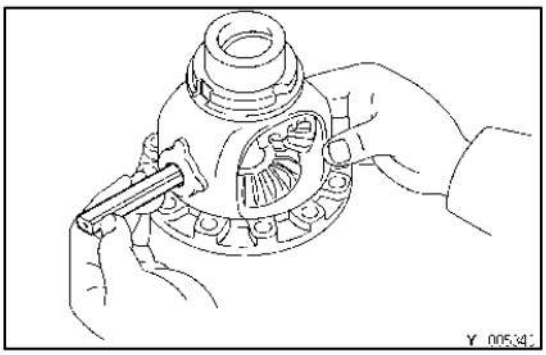
1. ASSEMBLE DIFFERENTIAL CASE

(a) Install the removed thrust washers to the side gears.

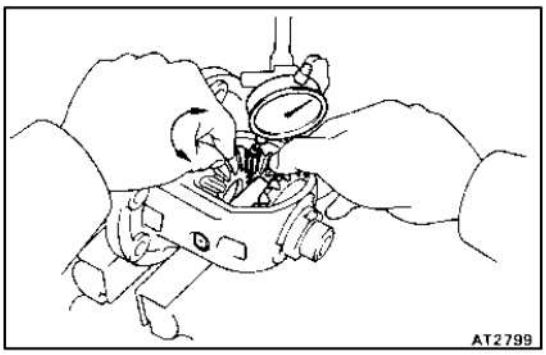




(b) Install the side gears with thrust washers, pinion thrust washers and pinion gears.



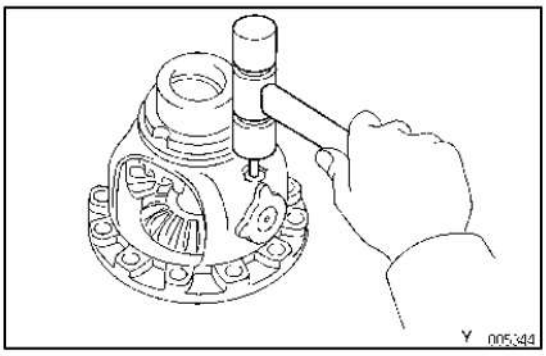
(c) Install the pinion shaft.



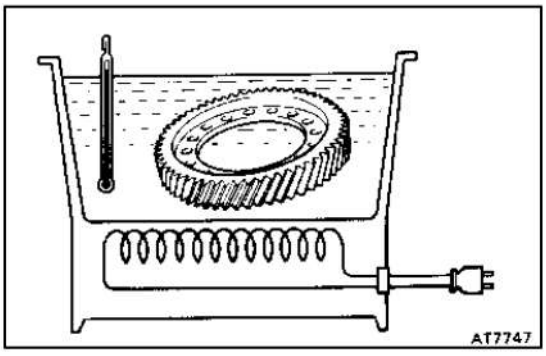
(d) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.
Standard backlash:
0.05–0.20 mm (0.0020–0.0079 in.)
Refering to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.
Thrust washer thickness
mm (in.)

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.0630)	1.70 (0.0670)
1.80 (0.0709)	

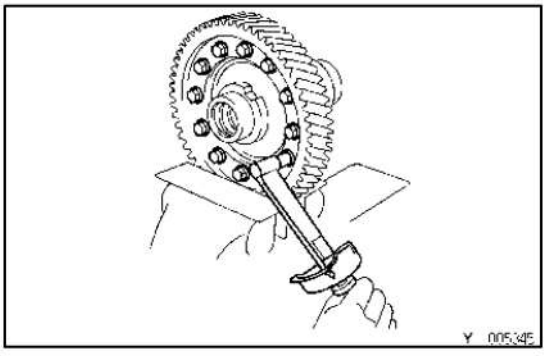
If the backlash is not within specification, install a thrust washer of a different thickness.



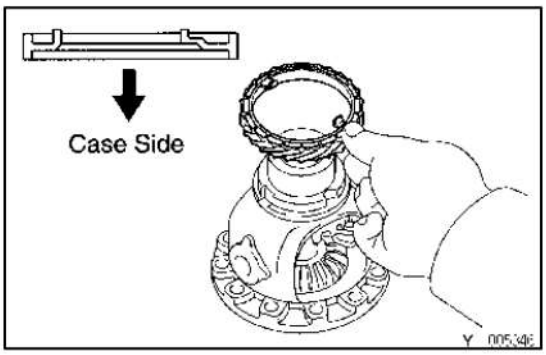
(e) Using a pin punch and hammer, drive the lock pin through the case and hole in the pinion shaft.
(f) Stake the differential case.



2. INSTALL RING GEAR
(a) Clean the contact surface of the differential case.
(b) Heat the ring gear to about 100°C (212°F) in an oil bath.
NOTICE: Do not heat the ring gear above 110°C (230°F).
(c) Carefully remove the ring gear from the oil bath.
(d) Clean the contact surface of the ring gear with cleaning solvent.

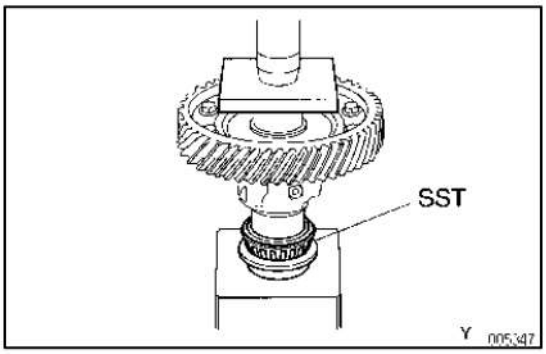


(e) Quickly install the ring gear on the differential case.
Install the 12 bolts.
HINT: Align the matchmarks on the differential left case and contact the ring gear.
(f) Tighten the set bolts uniformly a little at a time.
Torque the bolts.
Torque: 124 N·m (1,260 kgf·cm, 91 ft·lbf)

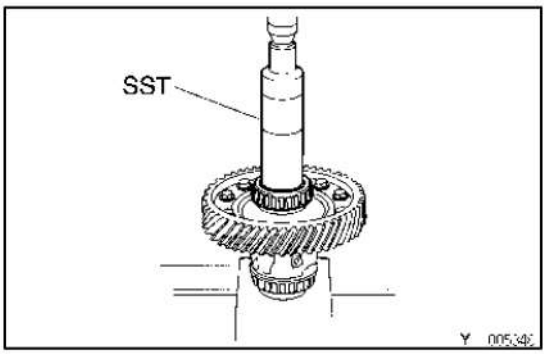


3. INSTALL SIDE BEARING

(a) Install the speedometer drive gear onto the differential case.



(b) Using SST and a press, press in the RH side bearing onto the differential case.
SST 09316–20011



(c) Using SST and a press, press in the LH side bearing onto the differential case.
SST 09316–60010 (09316–00010)

COMPONENT PARTS INSTALLATION

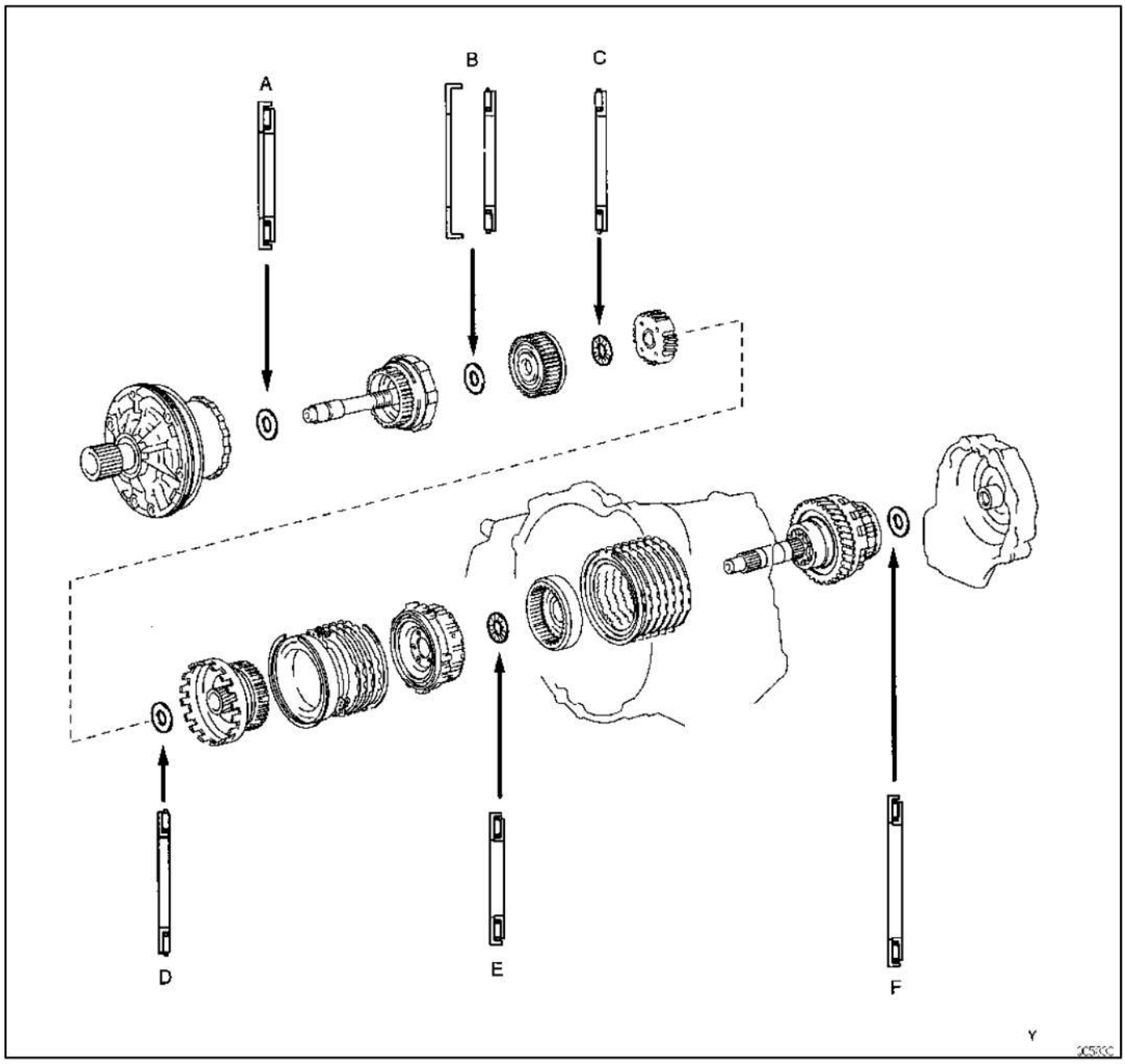
AX04G–06

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure, again, that all component groups are assembled correctly.
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.
Recommended ATF: D–@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

AX04H–03

GENERAL INSTALLATION NOTES:

(a) The automatic transaxle is composed of highly precision–finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
(b) Before assembling new clutch discs, soak them in automatic transaxle fluid for at least 15 minutes.
(c) Apply automatic transaxle fluid on the sliding or rotating surfaces of parts before assembly.
(d) Use petroleum jelly to keep small parts in their places.
(e) Do not use adhesive cements on gaskets and similar parts.
(f) When assembling the transaxle, be sure to use new gaskets and O–rings.
(g) Dry all parts with compressed air–never use shop rags.
(h) Be sure to install the thrust bearings and races in the correct direction and position.

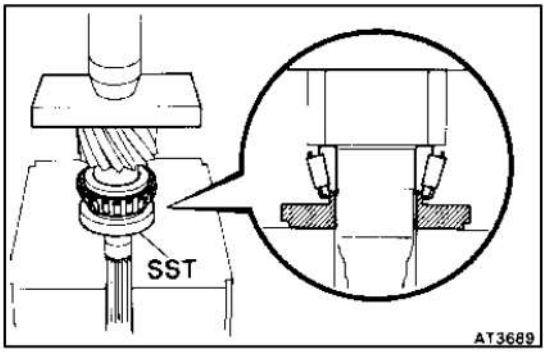


Mark	Thrust Bearing Outside Diameter mm (in.)	Thrust Bearing Inside Diameter mm (in.)
A	See page AX–118	27.7 (1.091)
B	47.6 (1.874)	31.4 (1.236)
C	45.5 (1.791)	30.1 (1.185)
D	45.5 (1.791)	30.1 (1.185)
E	38.7 (1.524)	22.6 (0.890)
F	46.3 (1.823)	28.6 (1.126)

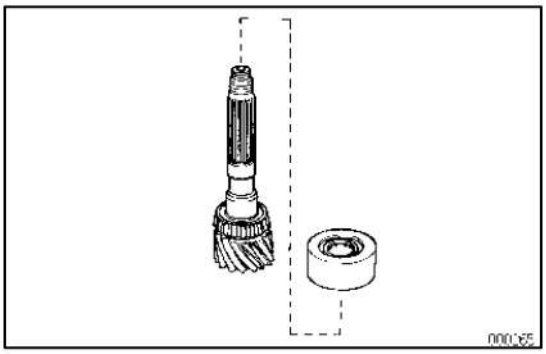
AX0U1-02

DIFFERENTIAL AND DRIVE PINION INSTALLATION

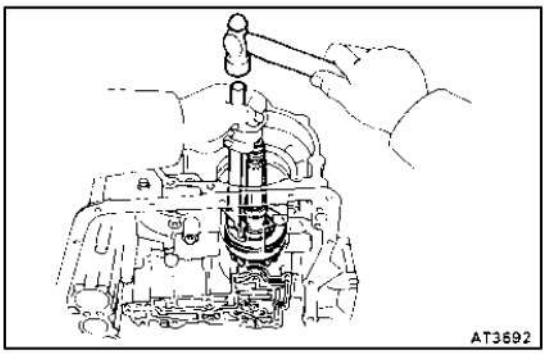
1. INSTALL DRIVE PINION INTO TRANSAXLE CASE



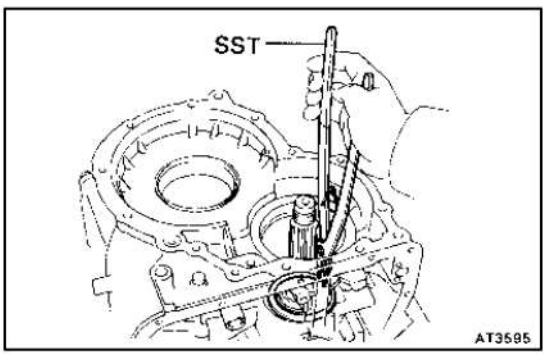
(a) Using SST, install the bearing to the drive pinion shaft.
SST 09350–32014 (09351–32120)



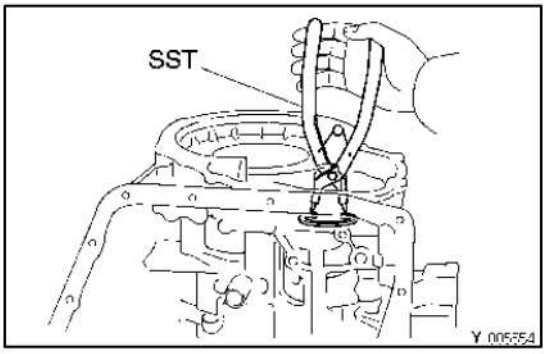
(b) Place the bearing cage onto the drive pinion shaft.
NOTICE: Be careful not to damage the oil seals with the pinion shaft.



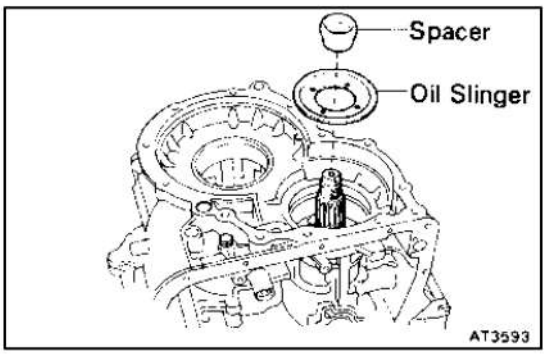
(c) Using a brass bar and hammer, slightly tap the bearing cage into the transaxle case until the snap ring groove in the bore can be seen.



(d) Using SST, install snap ring into the bore.
SST 09350–32014 (09351–32050)

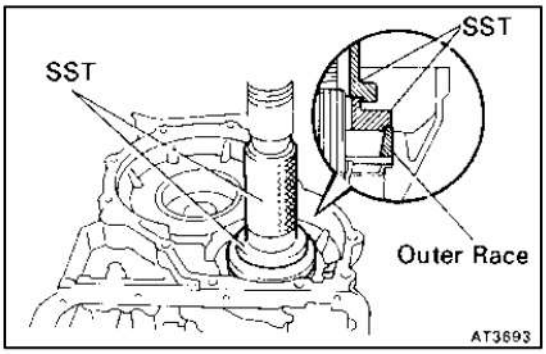


(e) Using SST, install the snap ring.
SST 09350–32014 (09351–32050)



2. PLACE OIL SLINGER AND NEW SPACER

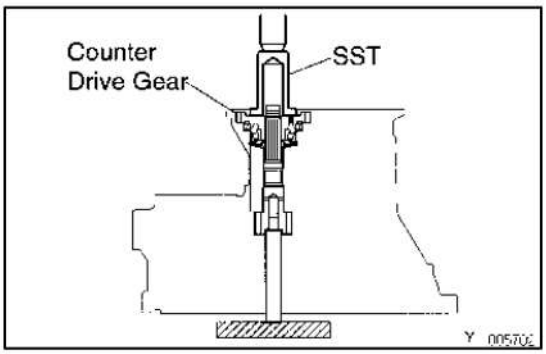
HINT: Install the spacer with the small end downward.



3. INSTALL OUTER RACE TO TRANSAXLE CASE

Using SST, press in the outer race.

SST 09350–32014 (09351–32100, 09351–32140)

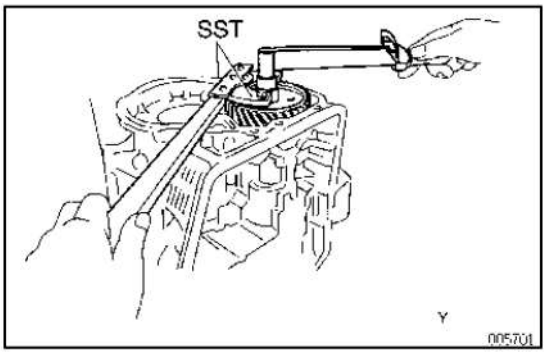


4. INSTALL COUNTER DRIVE GEAR

(a) Place a brass bar into the transaxle hole to hold the drive pinion shaft.

(b) Using SST, press in the counter driven gear until the counter driven gaer bearing almost touches the counter gear.

SST 09350–32014 (09351–32140)



5. INSTALL NEW LOCK NUT AND ADJUST DRIVE PINION PRELOAD

(a) Install the new lock nut.

(b) Using SST to hold the gear, tighten the nut.

Torque: 280 N·m (2,855 kgf·cm, 206 ft·lbf)

SST 09330–00021, 09350–32014 (09351–32032)

(c) Turn the gear counterclockwise and clockwise several times.

(d) Using a small torque wrench, measure the preload of the drive pinion.

Drive pinion preload (at starting):

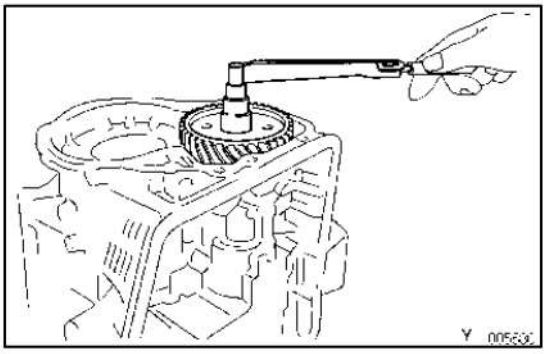
New bearing

1.0–1.6 N·m (10–16 kgf·cm, 8.7–13.9 in.·lbf)

Reused bearing

0.5–0.8 N·m (5–8 kgf·cm, 4.3–6.9 in.·lbf)

★ If the preload is greater than specified, replace the bearing spacer.

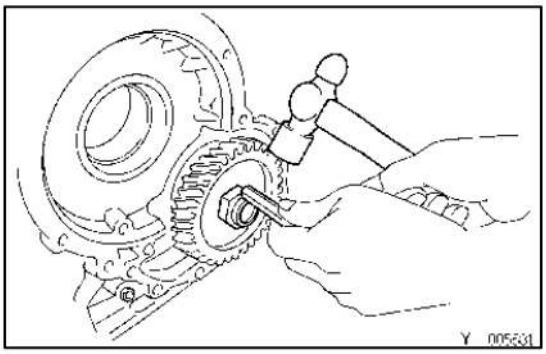


★ If the preload is less then specified, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

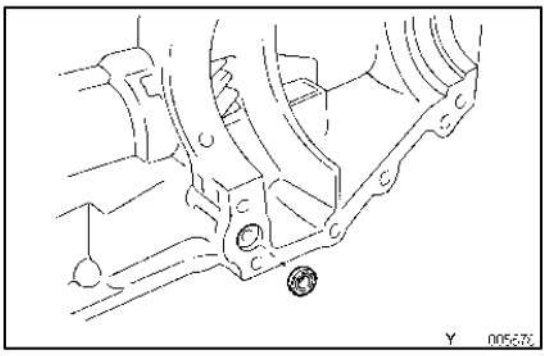
Do not back off the nut to reduce the preload.

Maximum torque: 353 N·m (3,600 kgf·cm, 260 ft·lbf)

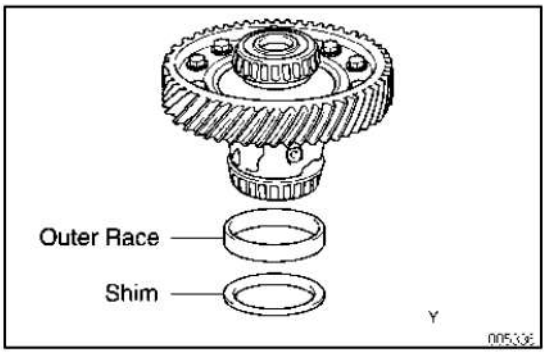


(e) If the preload is adjusted within specification, make a note of it.

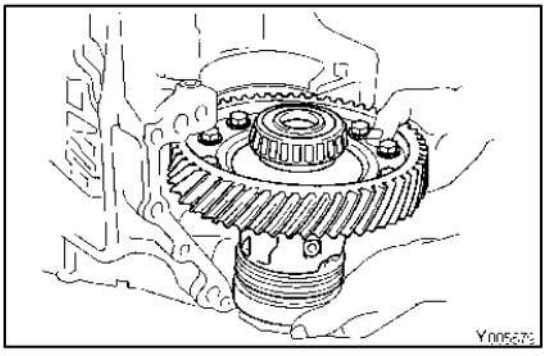
(f) Stroke the lock nut.



6. INSTALL APPLY GASKET

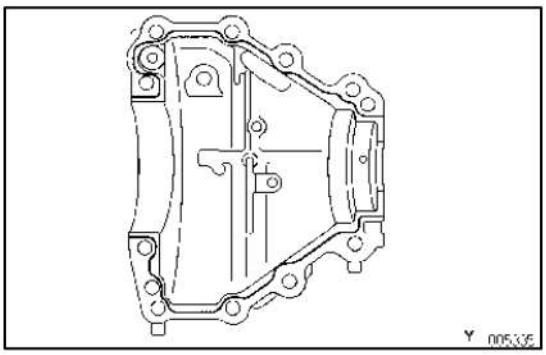


7. PLACE OUTER RACE AND SHIM ONTO RH SIDE BEARING



8. PLACE DIFFERENTIAL CASE INTO TRANSAXLE CASE

Be sure to install the shim and outer race into place.



9. INSTALL CARRIER COVER

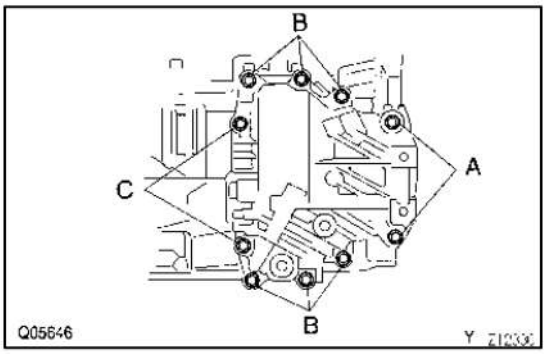
(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the carrier cover and transaxle case.

(b) Apply seal packing to the carrier cover.

Seal packing:

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

HINT: Install the carrier cover within 10 minutes after applying seal packing.



(c) Install and torque the 11 bolts.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

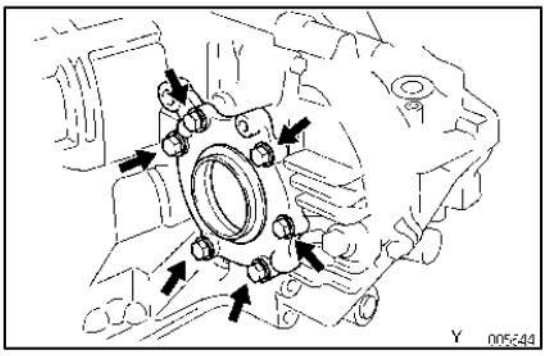
HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 100 mm (3.937 in.)

Bolt B: 65 mm (2.559 in.)

Bolt C: 75 mm (2.953 in.)



10. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material on the contacting surfaces of the LH bearing retainer and transaxle case.

HINT: Do not apply seal packing yet.

(b) Install the LH bearing retainer and torque the 6 bolts.

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

(c) Snap down the bearings by turning the differential case several times.

(d) Using a small torque wrench, measure the differential total preload.

Total preload (at starting):

New bearing

Drive pinion preload plus 0.2–0.4 N·m

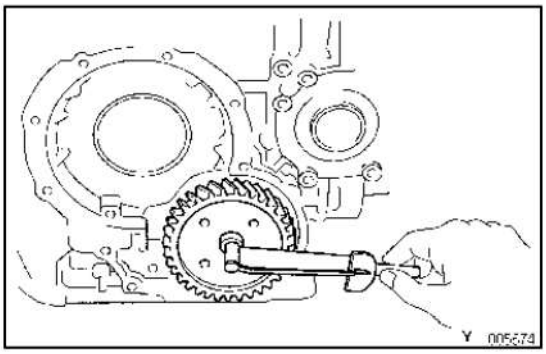
(2.5–5.1 kgf·cm, 2.2–3.6 in.·lbf)

Reused bearing

Drive pinion preload plus 0.1–0.2 N·m

(1.3–2.0 kgf·cm, 1.1–1.7 in.·lbf)

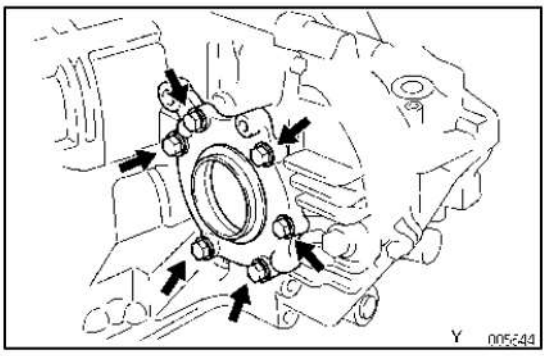
If the preload is not within specification, replace the adjusting shim in the LH bearing retainer with one of a different thickness.



AT3700:Adjusting shim thickness

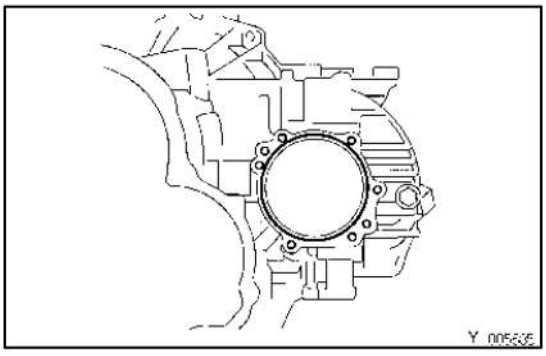
mm (in.)

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)



11. INSTALL LH BEARING RETAINER

(a) Remove the 6 bolts and LH bearing retainer.



(b) Remove any FIPG material on the contacting surfaces of LH bearing retainer, transaxle case and carrier cover.

(c) Apply FIPG to the transaxle case and carrier cover.

FIPG: Part No.08826–00090, THREE BOND 1281 or equivalent

HINT: Install the LH bearing retainer within 10 minutes after applying FIPG.

(d) Install the LH bearing retainer.

(e) Coat the threads of bolts with sealer.

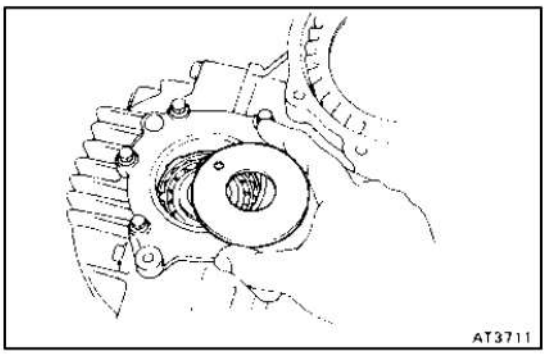
Sealer: Part No.08833–00070, THREE BOND 1324 or equivalent

(f) Tighten the bolts.

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

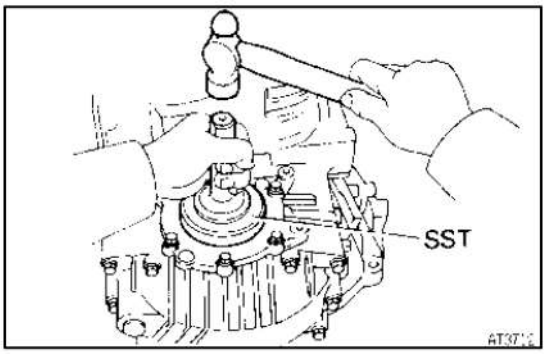
(g) Snap down the bearings.

(h) Recheck the differential total preload.

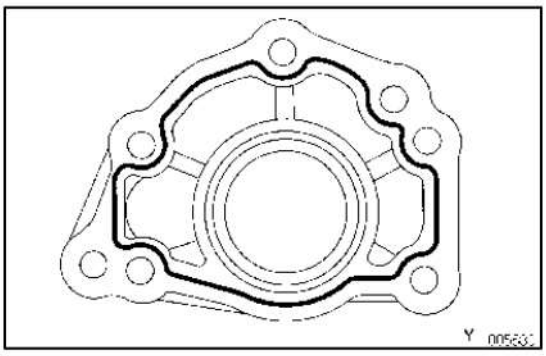


12. INSTALL NEW OIL SEAL

(a) Place the oil baffle onto the LH bearing retainer.



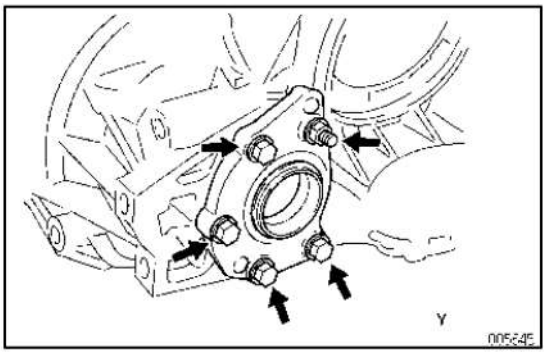
(b) Using SST, drive in a new oil seal unit its end is flush with surface of the LH bearing retainer.
SST 09223–15010



13. INSTALL RH RETAINER

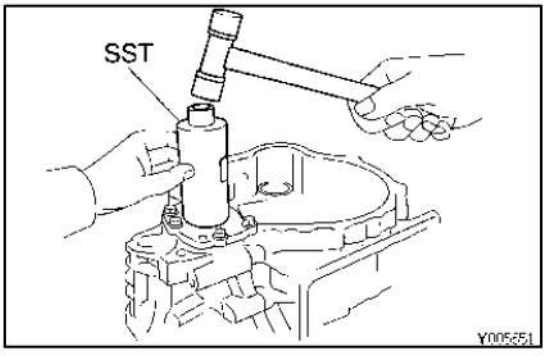
(a) Remove any FIPG material on the contacting surfaces of RH retainer and transaxle case.

(b) Apply FIPG to the RH retainer.
FIPG: Part No.08826–00090, THREE BOND 1281 or equivalent
HINT: Install the RH retainer within 10 minutes after applying FIPG.

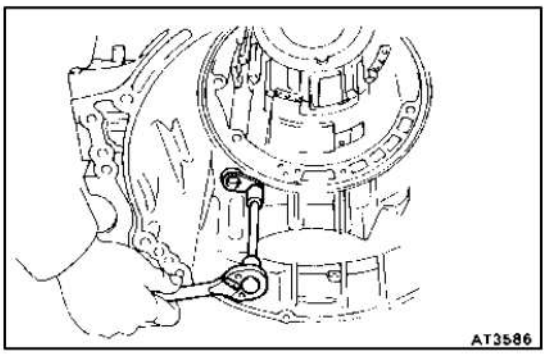


(c) Coat the bolts' threads with sealer.
Sealer: Part No.08833–00070, THREE BOND 1324 or equivalent

(d) Tighten the bolts.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

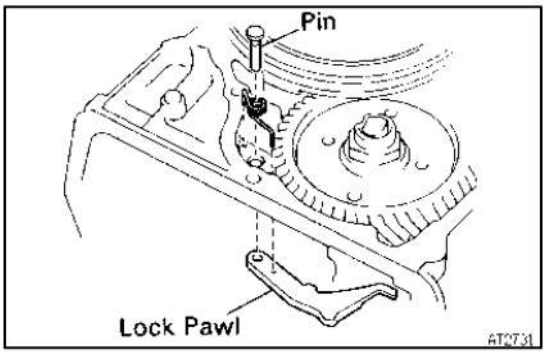


(e) Using SST, press in the oil seal.
SST 09226–10010



14. INSTALL DRIVE PINION CAP

(a) Install a new O–ring to the cap.
(b) Install the drive pinion cap to the transaxle case.

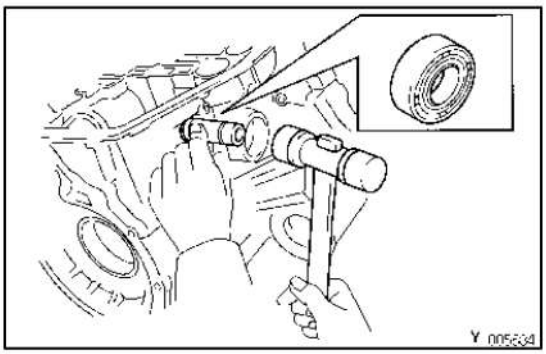


AX0U2-03

4–SPEED GEAR UNIT INSTALLATION

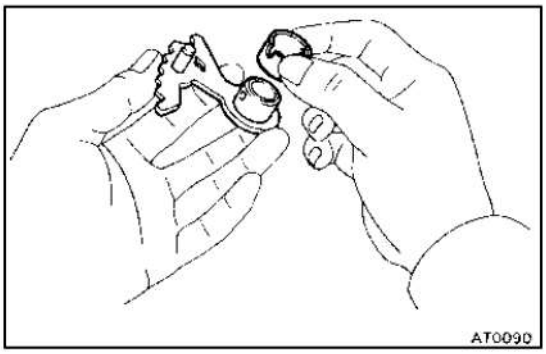
1. INSTALL PARKING LOCK PAWL

(a) Place the parking lock pawl onto the case.
Hook the spring ends to the case and pawl.
(b) Instal the pin into the hole of the case through the spring and pawl.

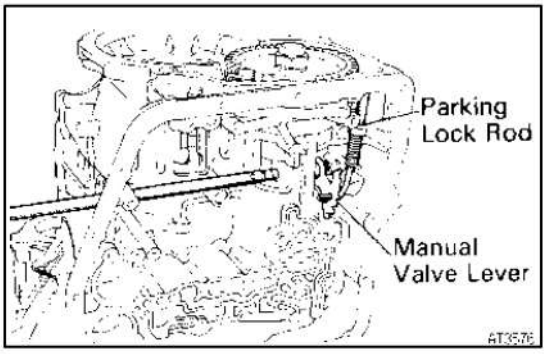


2. INSTALL MANUAL VALVE SHAFT

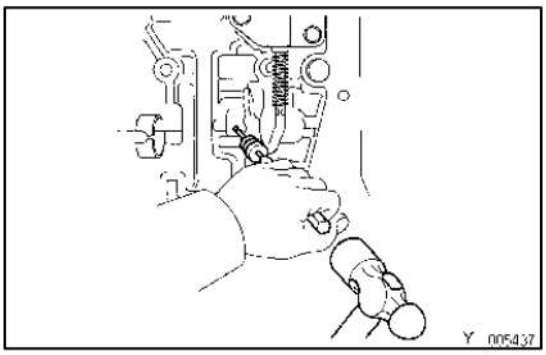
(a) Coat the oil seal lip with MP grease.
(b) Install the manual valve shaft oil seal to the case.



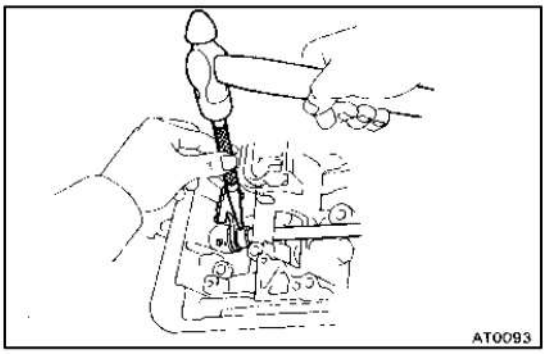
(c) Assembly a new collar to the manual valve lever.



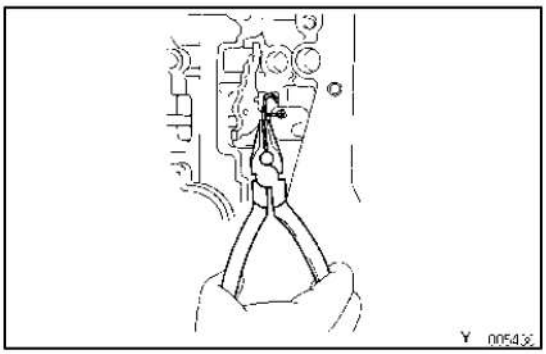
(d) Install the manual valve shaft to the transmission case through the manual lever.
(e) Install the parking lock rod.



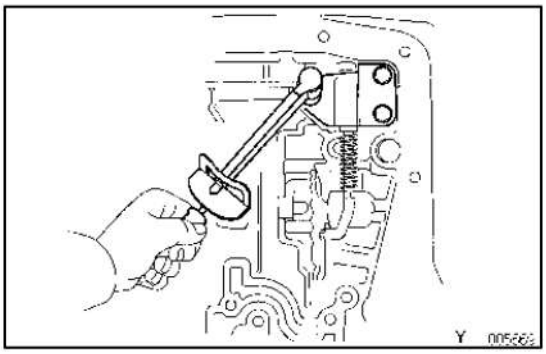
(f) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



(g) Match the collar hole to the lever caulking hollow and caulk the collar to the lever.

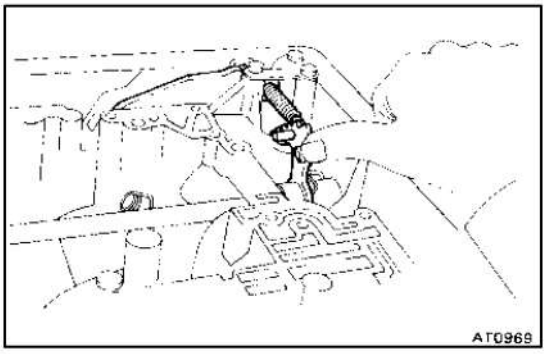


(h) Install the retaining spring.



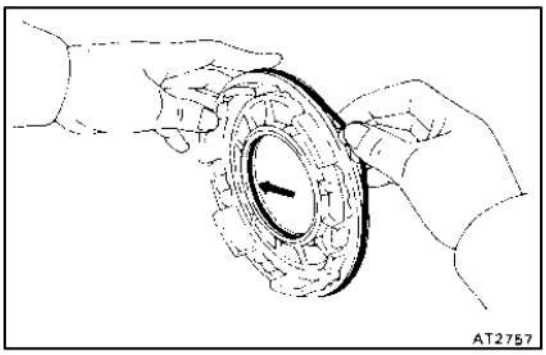
3. INSTALL PARKING LOCK PAWL BRACKET AND GUIDE

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



4. CHECK OPERATION OF PARKING LOCK PAWL

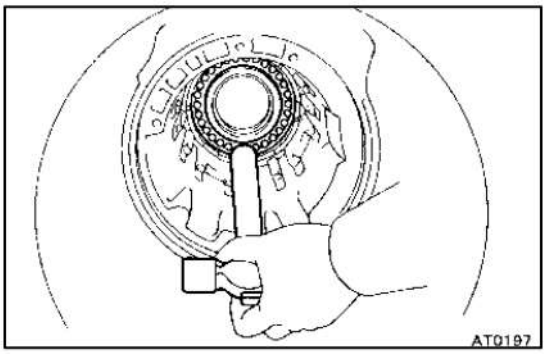
Make sure the counter driven gear is locked when the manual valve lever is in the P position.



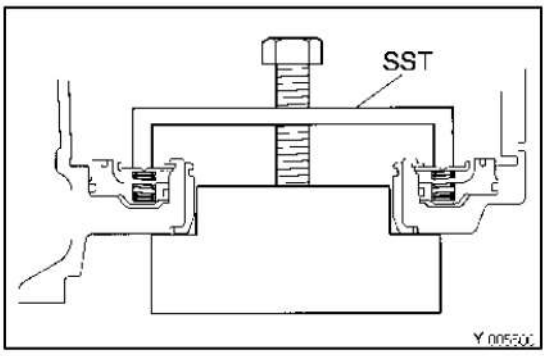
5. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

(a) Coat the new O–rings with ATF.

(b) Install the 2 O–rings on the piston.



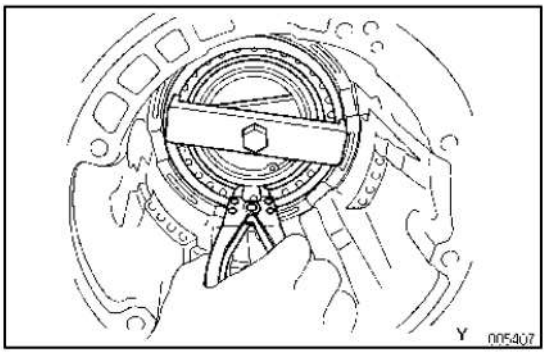
(c) Push the piston into the bore of the case, facing the spring seat upward.



6. INSTALL PISTON RETURN SPRING

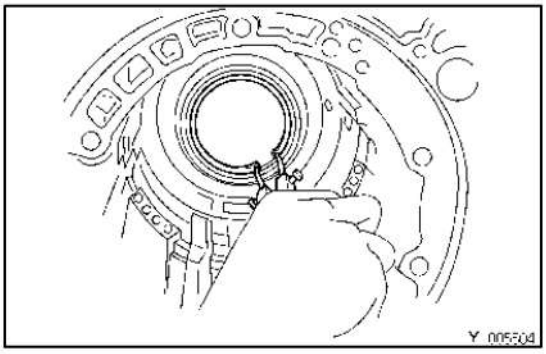
(a) Place the return spring and snap ring on the piston.

(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.
SST 09350–32014 (09351–32040)

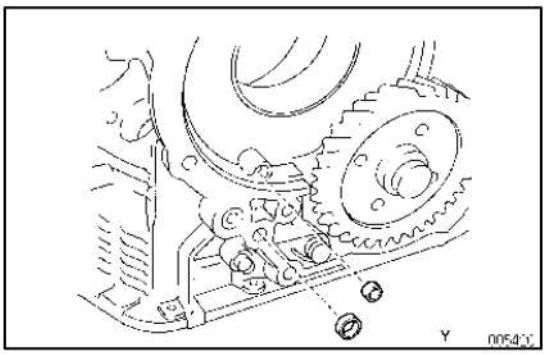


(c) Install snap ring. Visually check to make sure it is fully seated and centered by the 3 lugs on the spring retainer. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove the SST.

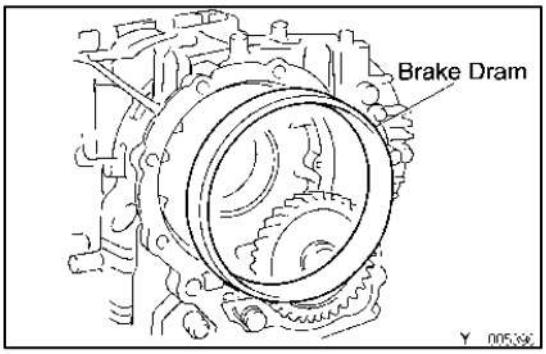


7. INSTALL SNAP RING TO TRANSAXLE CASE

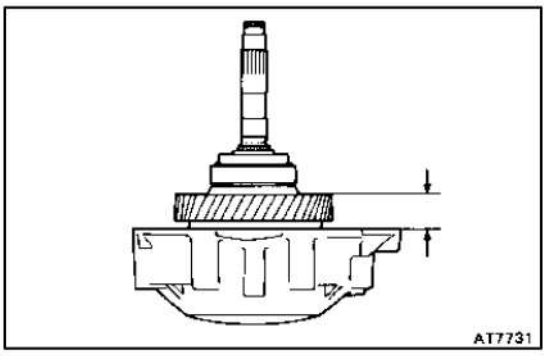


8. INSTALL OVERDRIVE UNIT

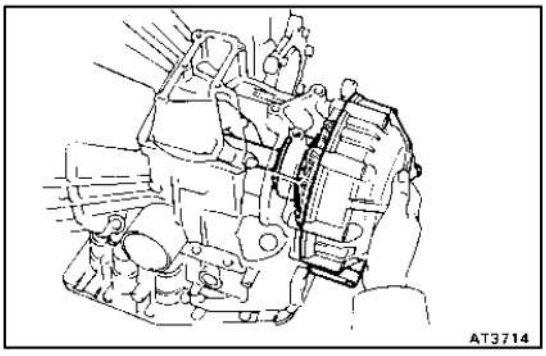
(a) Install the overdrive brake apply gasket and overdrive clutch apply gasket.



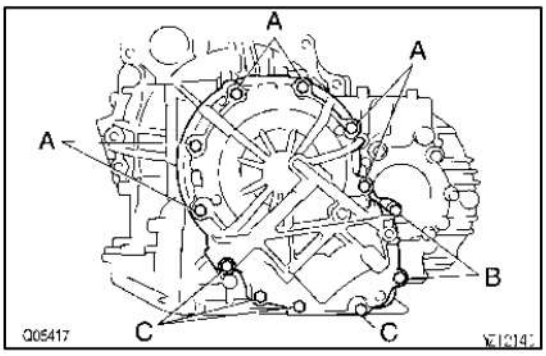
(b) Install the overdrive brake drum to the case.
(c) Install the new case gasket to the case.



(d) Make sure that the length from the top surface of the case to the counter driven gear surface should be about 24 mm (0.94 in.).

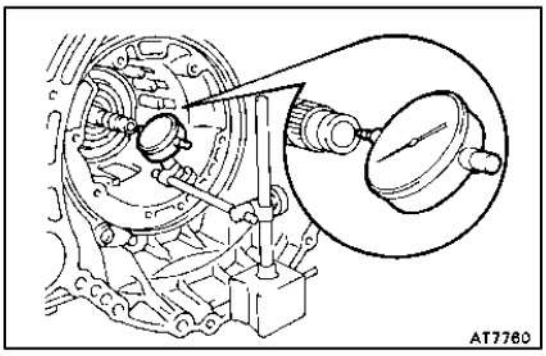


(e) Place the new gasket onto the transaxle case.
(f) Install the overdrive assembly with overdrive case to the transaxle case.



(g) Coat the threads of 23 mm (0.91 in.) bolts with sealer.
Sealer:
Part No.08833–00070, THREE BOND 1324 or equivalent

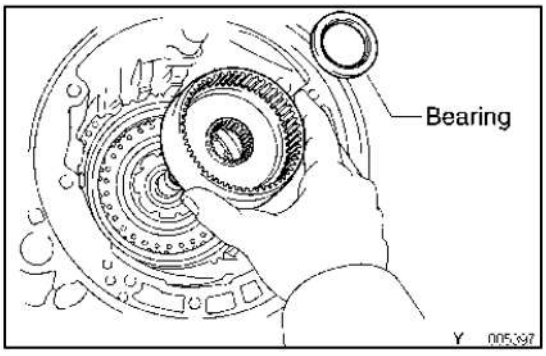
(h) Install and tighten the 13 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 61 mm (2.402 in.)
Bolt B 38 mm (1.496 in.)
Bolt C: 23 mm (0.906 in.)
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



9. CHECK INTERMEDIATE SHAFT END PLAY

(a) Make sure that the intermediate shaft as end play in axial direction.
End play: 0.47–1.50 mm (0.0185–0.0591 in.)
If the end play is not within specification, check the installation of intermediate shaft.

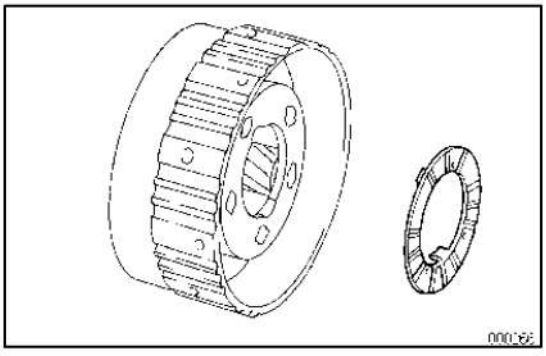
(b) Make sure that the intermediate shaft turns smoothly.



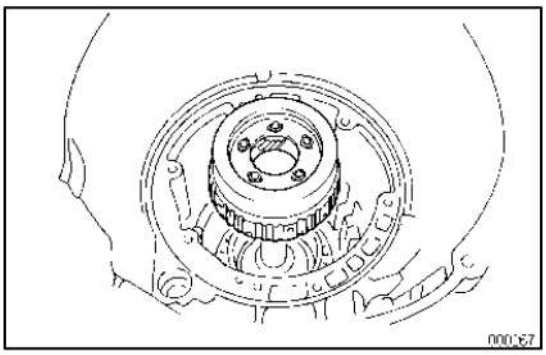
10. INSTALL REAR PLANETARY GEAR

(a) Install the rear planetary ring gear.

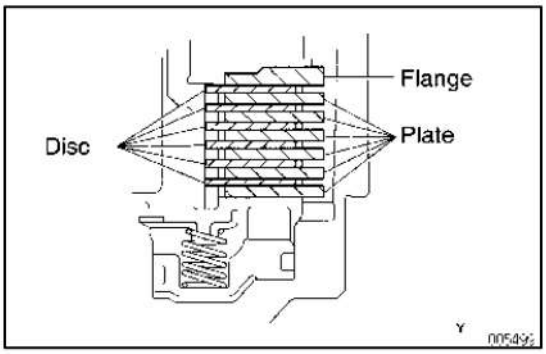
(b) Place the bearing onto the ring gear.
Bearing outer diameter: 38.7 mm (1.524 in.)
Bearing inner diameter: 22.6 mm (0.890 in.)



(c) Coat the thrust washer with petroleum jelly and place it onto the rear planetary gear.



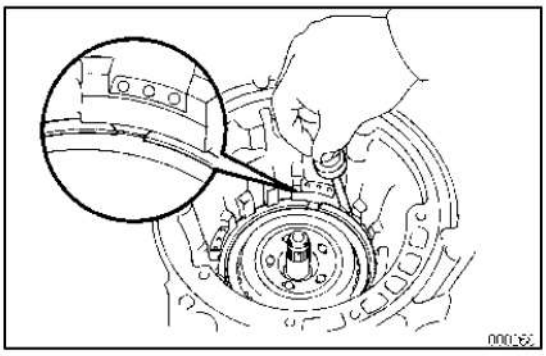
(d) Install the rear planetary gear.



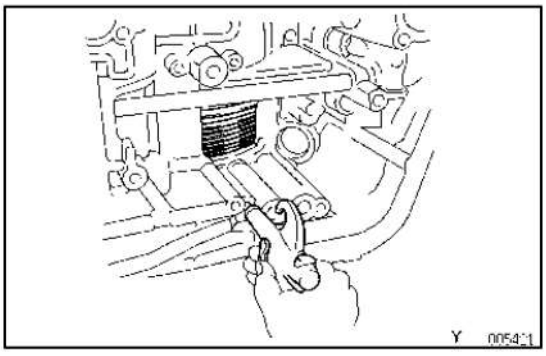
11. INSTALL DISCS, PLATES AND FLANGE OF FIRST AND REVERSE BRAKE

(a) Install the 6 plates and discs.
Install in order:
P=Plate D=Disc
P–D–P–D–P–D–P–D–P–D–P–D

(b) Install the flange, facing the flat end downward.

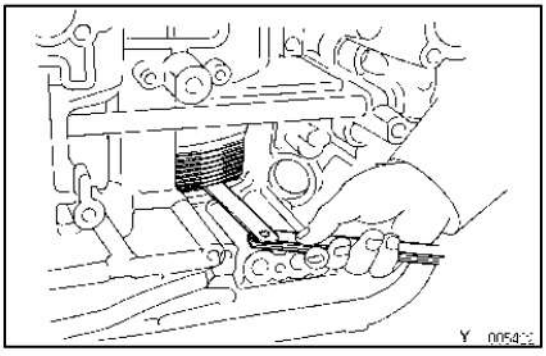


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of the cutouts.

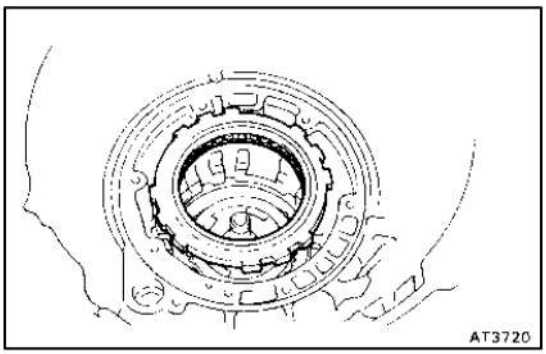


12. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.

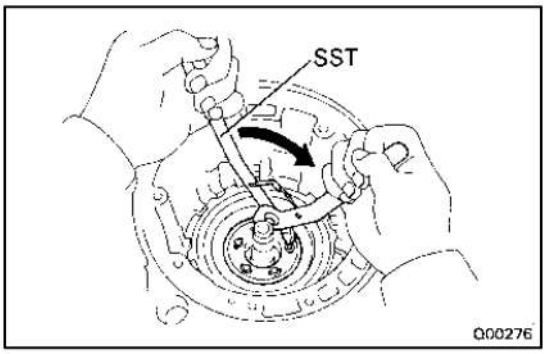


(b) Using a filler gauge, check that pack clearance of the first and reverse brake.
Clearance:
1.92–2.68 mm (0.0756–0.1055 in.)

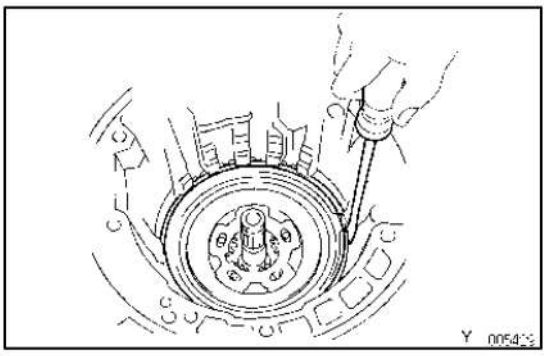


13. INSTALL NO.2 ONE–WAY CLUTCH INTO CASE

(a) Place the No.2 one–way clutch with the shiny side of flange upward.

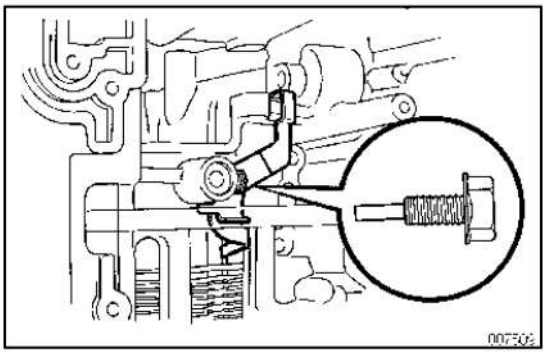


(b) Install the one–way clutch while turning the planetary gear clockwise with SST.
SST 09350–32014 (09351–32050)
If the planetary gear cannot turn clockwise, check the installation of the one–way clutch.

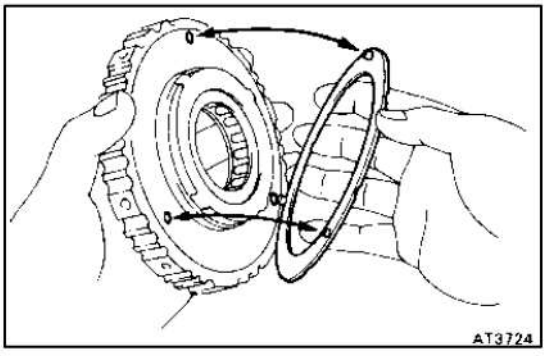


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of cutouts.

(d) Coat the thrust washer with petroleum jelly and install it onto the rear planetary gear.

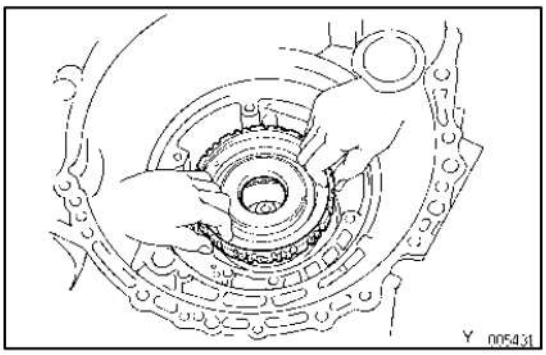


14. INSTALL SECOND COAST BRAKE BAND GUIDE

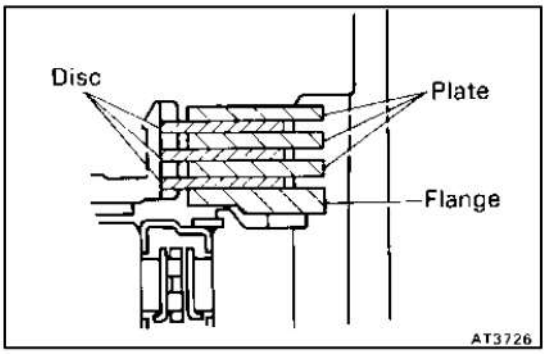


15. PLACE NO.1 ONE–WAY CLUTCH

(a) Coat the thrust washer with petroleum jelly and install it on the No.1 one–way clutch.



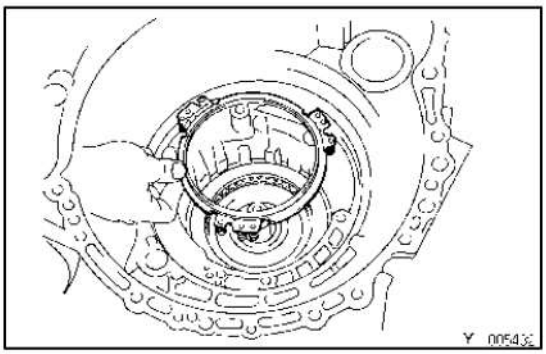
(b) Place the No.1 one–way clutch onto the rear planetary gear.



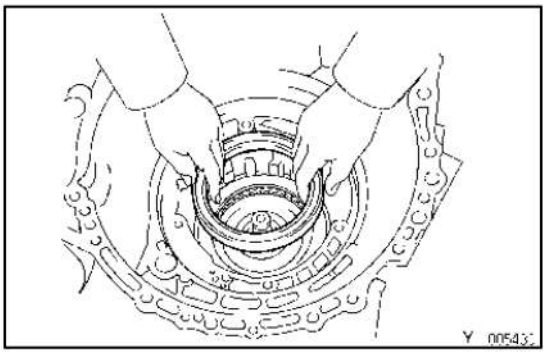
16. INSTALL SECOND BRAKE

(a) Install the flange, facing the flat end upward.

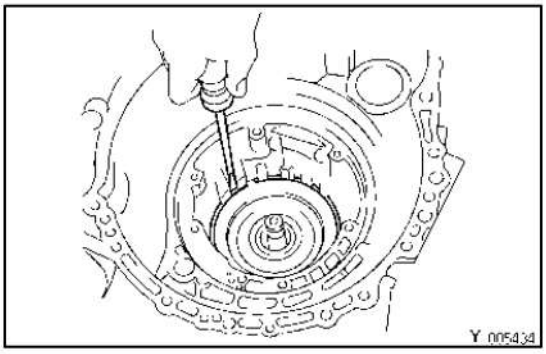
(b) Install the 3 discs and plates.
Install in order:
P=Plate D=Disc
D–P–D–P–D–P



(c) Place the piston return spring into the case.



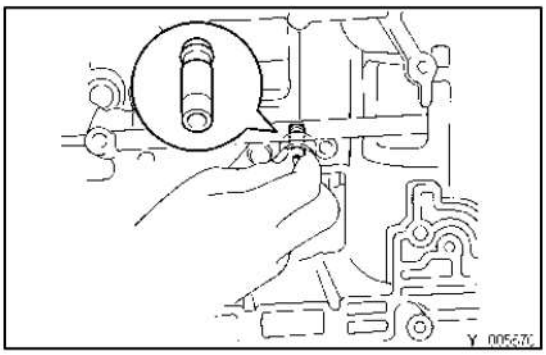
(d) Place the second brake drum into the case.
HINT: Align the groove of the drum with the bolt.



(e) Place the snap ring into the case so that end gap is installed into the groove.

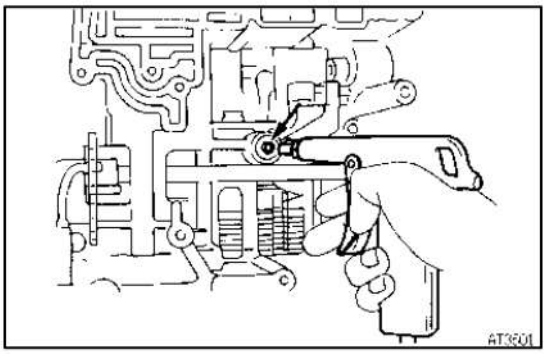
(f) While compressing the piston return spring over the drum with screwdriver, install the snap ring into the groove.

(g) Be sure that the end gap of the snap ring is not aligned with one of cutouts.



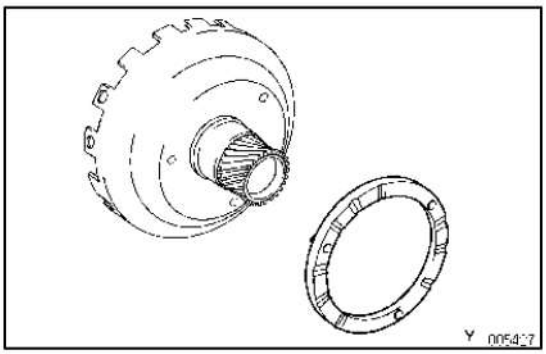
17. INSTALL NEW SECOND BRAKE GASKET

Install a new gasket until it makes contact with the second brake drum.



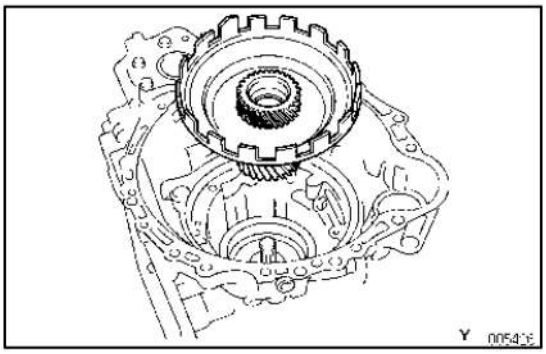
18. CHECK OPERATION OF SECOND BRAKE

Apply compressed air into the second brake gasket and confirm that the piston moves.

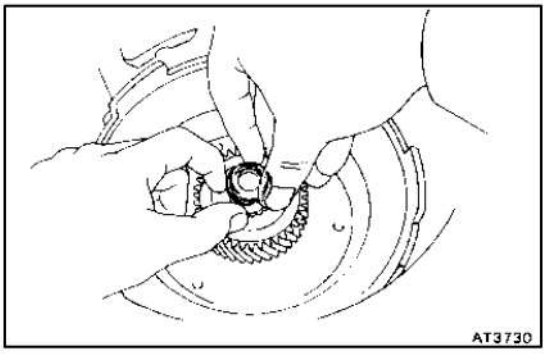


19. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.

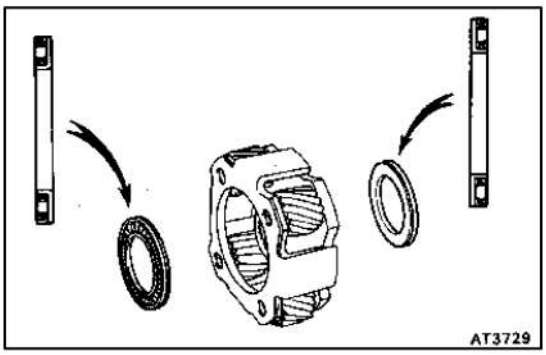


(b) While turning the sun gear clockwise, install it into the No.1 one–way clutch.



20. INSTALL OIL SEAL RING TO INTERMEDIATE SHAFT

HINT: After installing the oil seal ring, check that it moves smoothly.

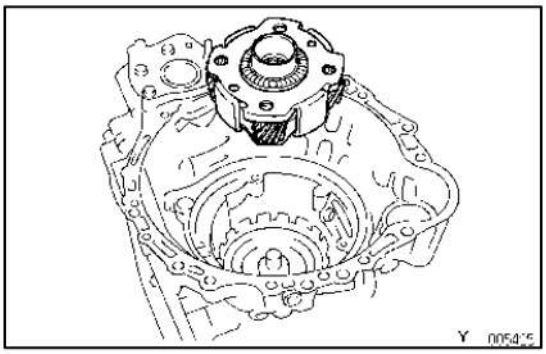


21. INSTALL FRONT PLANETARY GEAR

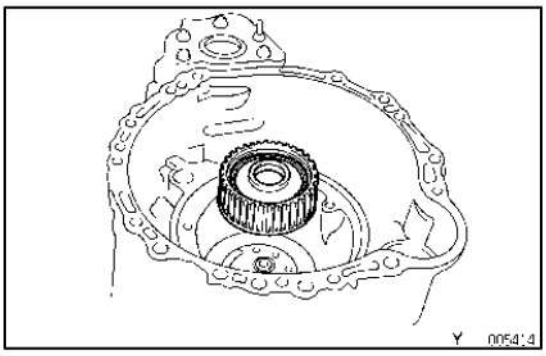
(a) Coat the bearings with petroleum jelly, and install them onto the both sides of planetary gear.

Bearing outer diameter: 45.5 mm (1.791 in.)

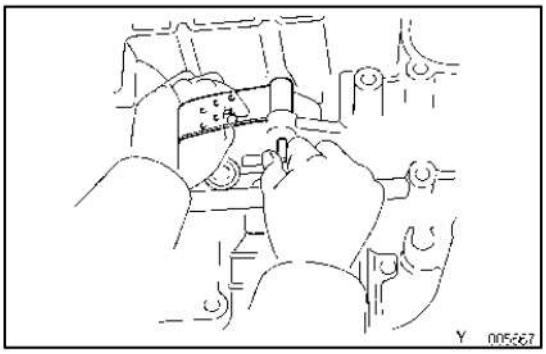
Bearing inner diameter: 30.1 mm (1.185 in.)



(b) Install the planetary gear onto the sun gear.



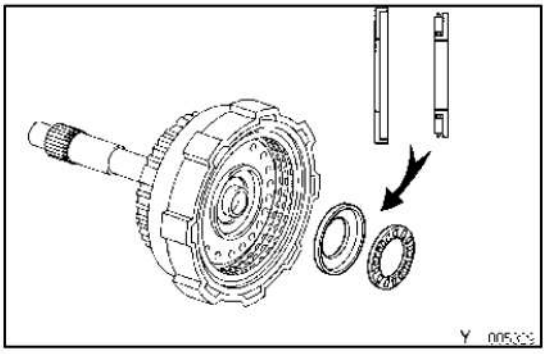
22. INSTALL FRONT PLANETARY RING GEAR



23. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

(b) Install the pin through the oil pump mounting bolt hole.

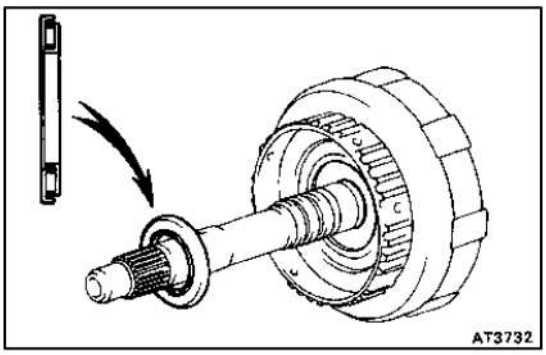


24. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the bearing with petroleum jelly and install it onto rear side of the forward clutch.

Bearing outer diameter: 47.6 mm (1.874 in.)

Bearing inner diameter: 31.4 mm (1.236 in.)

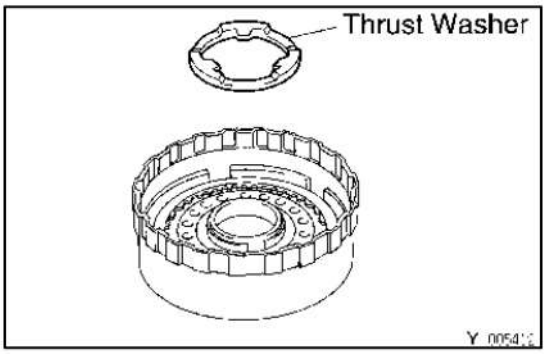


(b) Coat the bearing with petroleum jelly and install it onto the front side of the forward clutch.
HINT: There are 2 different thickness bearings for adjustment of the input shaft thrust play.

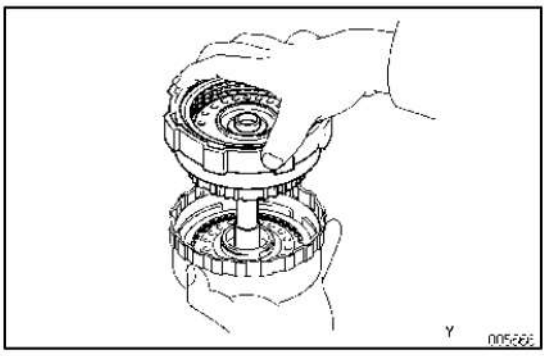
Bearing thickness

mm (in.)

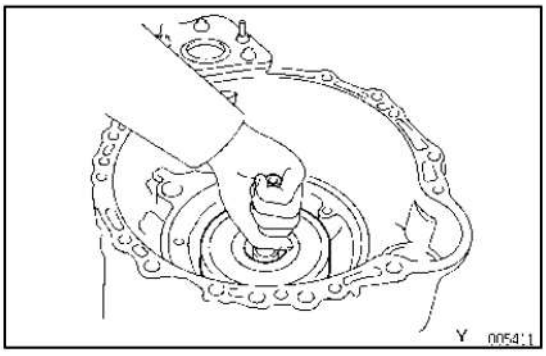
Thickness	Outer diameter	Inner diameter
3.60 (0.1417)	45.9 (1.807)	27.7 (1.091)
4.19 (0.1650)	47.1 (1.854)	27.7 (1.091)



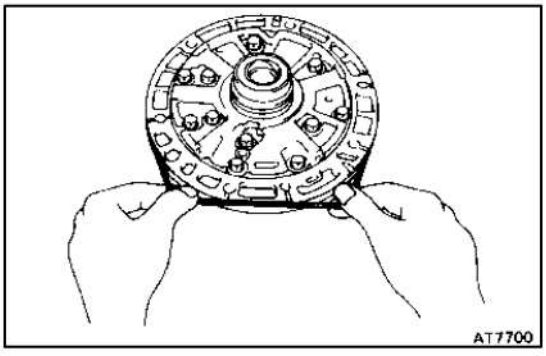
(c) Coat the thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.



(d) Mesh the hub of the forward clutch flukes with the direct clutch discs.
HINT: Be careful that the bearing and thrust washer do not get out of place.

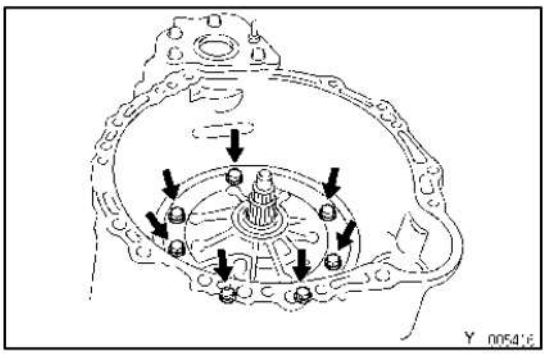


(e) Install the direct clutch and forward clutch into the case.
HINT: Hold the direct clutch toward the forward clutch to prevent the thrust washer from getting out of place.



25. INSTALL OIL PUMP INTO CASE

(a) Coat a new O–ring with ATF and install it to the oil pump.



(b) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

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

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

26. MEASURE END PLAY OF INPUT SHAFT

Measure the end play with a dial gauge.

End play:

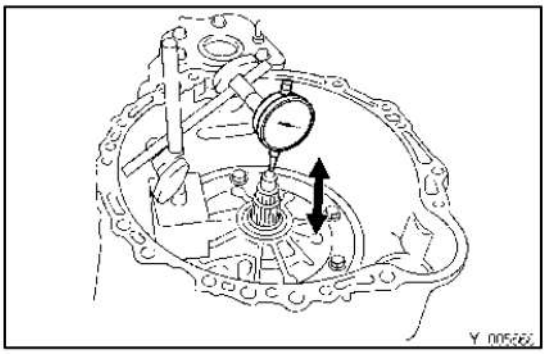
0.25–0.90 mm (0.0098–0.0354 in.)

HINT: There are 2 different thickness bearings for end of stator shaft. If the end play is in excess of standard, select one of them.

Bearing thickness:

3.60 mm (0.1417 in.)

4.19 mm (0.1650 in.)



27. CHECK INPUT SHAFT ROTATION

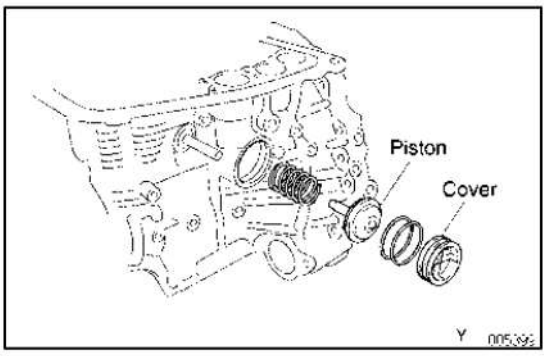
Make sure that the input shaft rotates smoothly.

28. INSTALL SECOND COAST BRAKE PISTON

(a) Coat the new O–rings with ATF and install it to the cover.

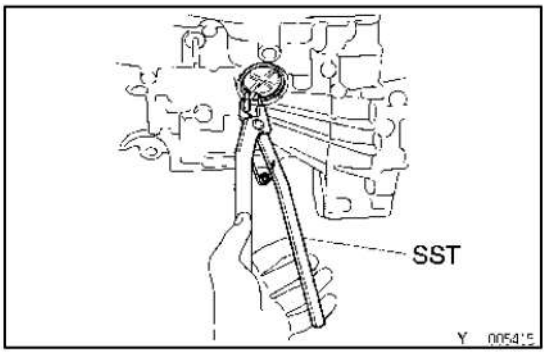
(b) Install the outer spring with the piston.

(c) Place the cover into the bore.



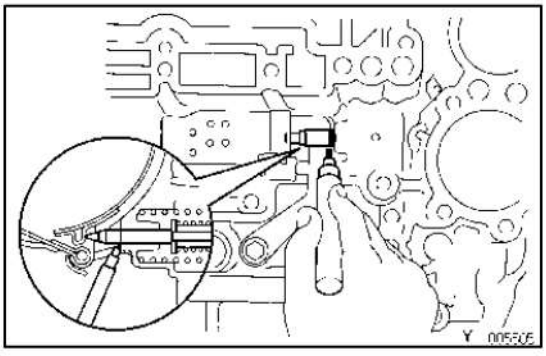
(d) Using SST, install the snap ring while pressing the cover.
SST 09350–32014 (09351–32050)

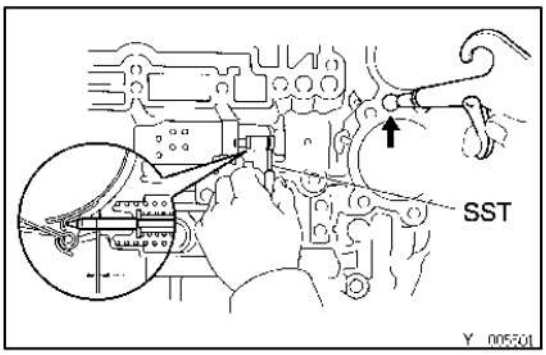
(e) Check that the front end of the piston rod contacts the center of the second brake band depression.



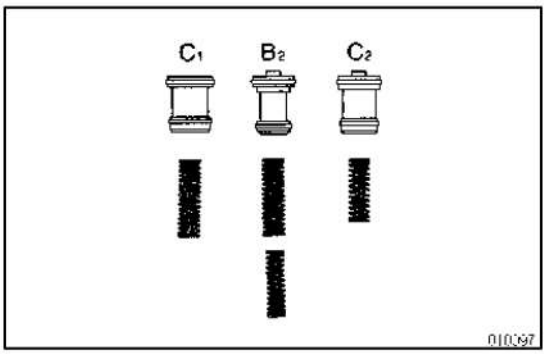
29. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.





(b) Using SST, measure the piston stroke while applying and releasing compressed air (392–785 kPa, 4–8 kgf/cm^2, 57–114 psi).
SST 09240–00020
Piston stroke:
2.0–3.5 mm (0.079–0.138 in.)
If the stroke is more than specified, replace the piston rod with a longer one.
Piston rod length:
95.2 mm (3.748 in.)
96.3 mm (3.791 in.)
If the still more than standard value, replace the brake band with a new one.

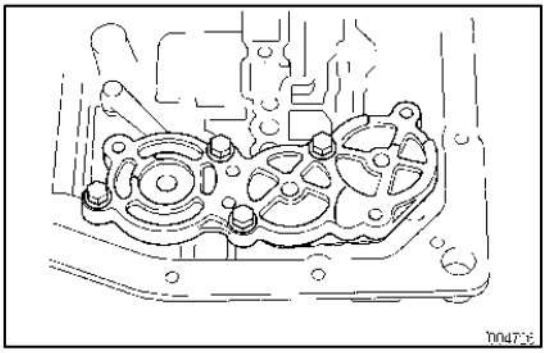


HYDRAULIC CONTROL UNIT INSTALLATION
AX0U3-02

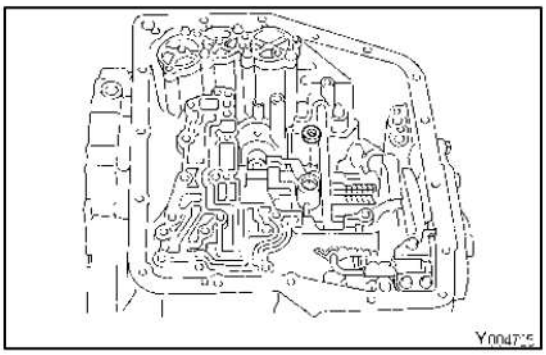
1. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the new O–rings to the pistons.
(b) Install the springs and pistons into the bores.
Spring dimensions
mm (in.)

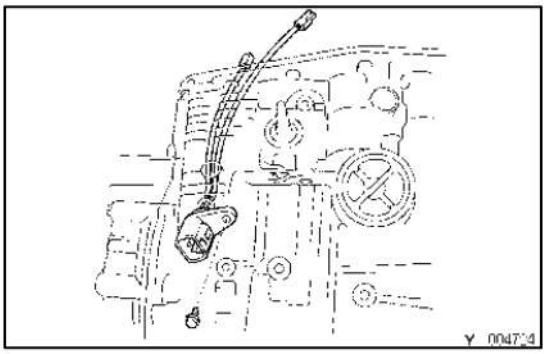
Spring	Color	Free length
C_2	Yellow/Purple	51.8 (2.039)
B_2	None	88.2 (3.473)
B_2	None	70.3 (2.767)
C_1	None	73.6 (2.898)



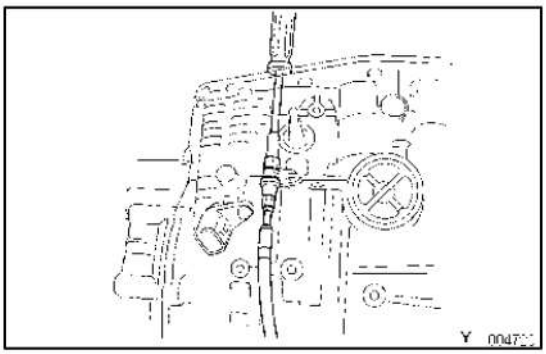
(c) Place the cover with a new gasket and gradually tighten the bolts a little at a time in sequence.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



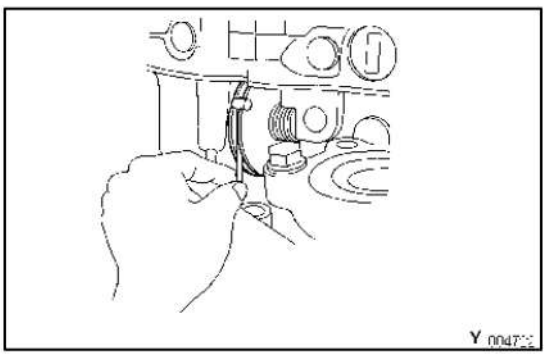
2. PLACE NEW SECOND BRAKE APPLY GASKET



3. INSTALL SOLENOID WIRE



4. INSTALL THROTTLE CABLE

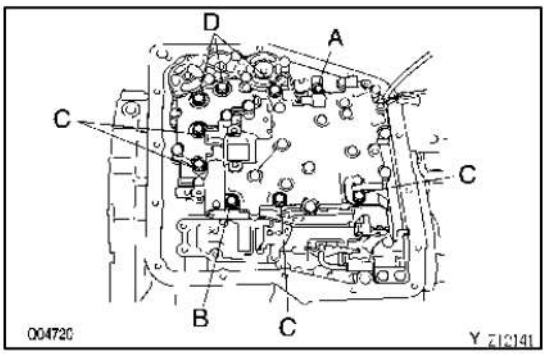


5. INSTALL VALVE BODY TO TRANSAXLE CASE

(a) While holding the cam down with your hand, slip the cable end into the slot.

(b) Lower the valve body into place.

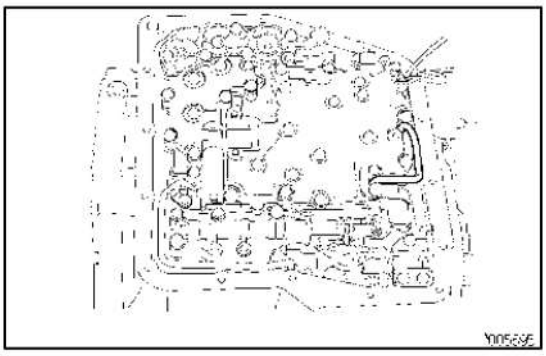
NOTICE: Do not entangle the solenoid wire.



(c) Install and tighten the 9 bolts.
HINT:
★ Each bolt length is indicated below.
★ Hand tighten the 9 bolts first, then torque with a torque wrench.

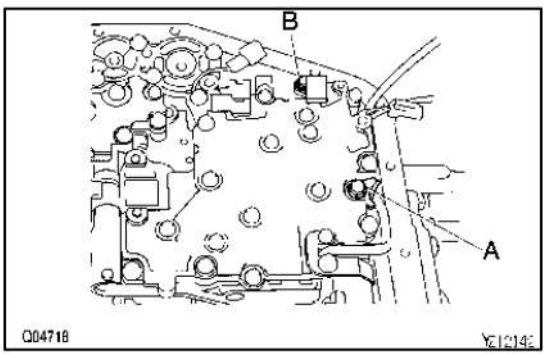
Bolt length:
Bolt A: 30 mm (1.181 in.)
Bolt B: 43 mm (1.693 in.)
Bolt C: 48 mm (1.890 in.)
Bolt D: 52 mm (2.047 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



6. INSTALL B_3 APPLY PIPE

NOTICE: Be careful not to bend or damage the pipe.

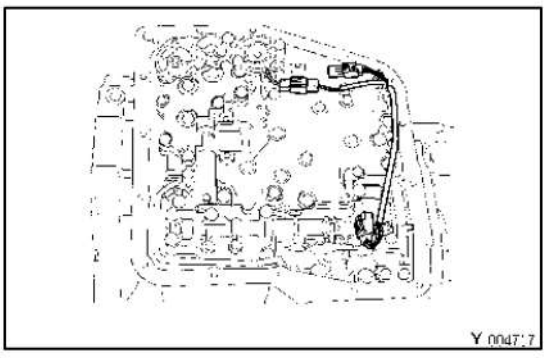


7. INSTALL CONNECTOR CLAMP AND PIPE RETAINER

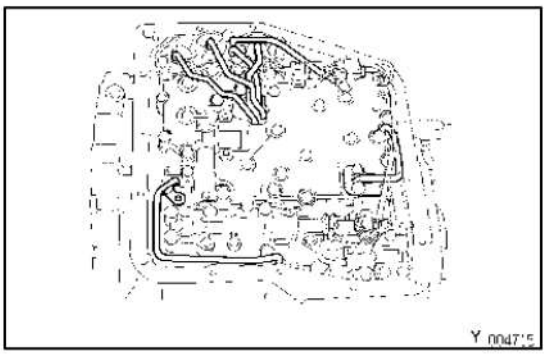
HINT: Each bolt length is indicated below.

Bolt length:
Bolt A: 48 mm (1.890 in.)
Bolt B: 39 mm (1.535 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



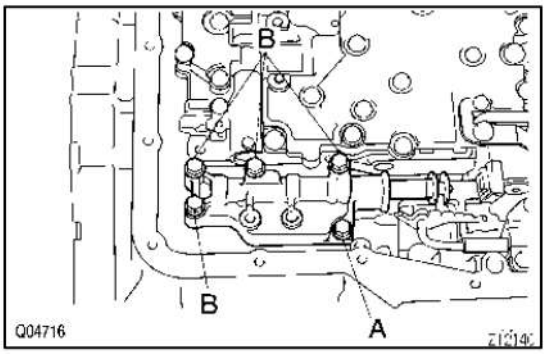
8. CONNECT SOLENOID CONNECTORS

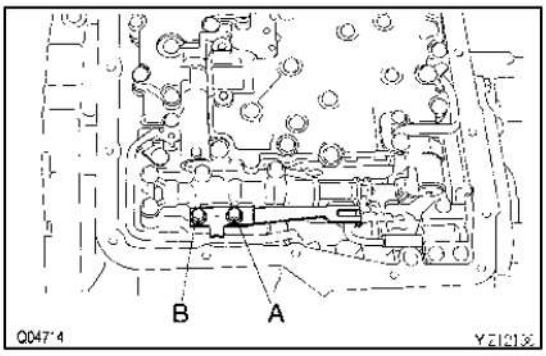


9. INSTALL OIL PIPES

Using a plastic hammer, install the pipes into the positions.

NOTICE: Be careful not to bend or damage the pipes.





10. INSTALL MANUAL VALVE BODY AND DETENT SPRING

HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 22 mm (0.866 in.)

Bolt B: 37 mm (1.457 in.)

(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the manual valve body into place.

(c) Hand tighten the 5 bolts first. Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

(d) Place the detent springs on the manual valve body and hand tighten the 2 bolts first.

Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

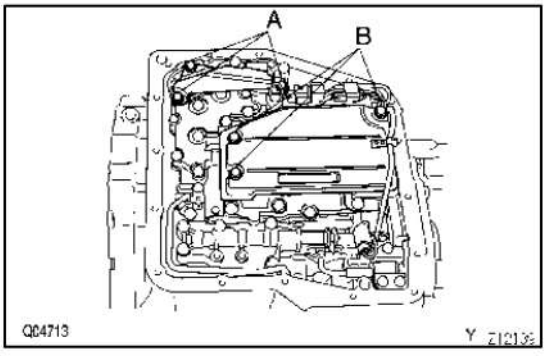
HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 14 mm (0.551 in.)

Bolt B: 37 mm (1.457 in.)

(e) Check that the manual valve lever is touching the center of the detent spring tip roller.



11. INSTALL PIPE BRACKET AND OIL STRAINER

Each bolt length is indicated below.

Bolt length:

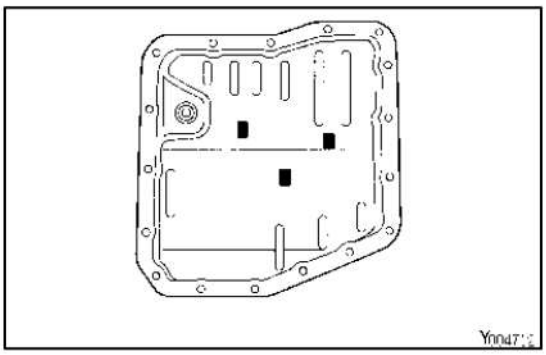
Bolt A: 22 mm (0.866 in.)

Bolt B: 53 mm (2.087 in.)

Torque:

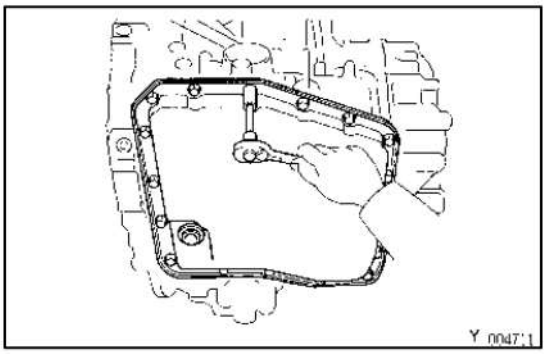
Pipe bracket: 10 N·m (100 kgf·cm, 7 ft·lbf)

Oil strainer: 11 N·m (110 kgf·cm, 8 ft·lbf)



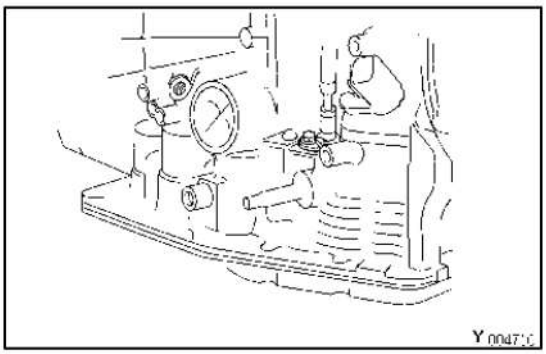
12. INSTALL MAGNETS IN PLACE

NOTICE: Make sure that the magnets do not interfere with the oil pipes.

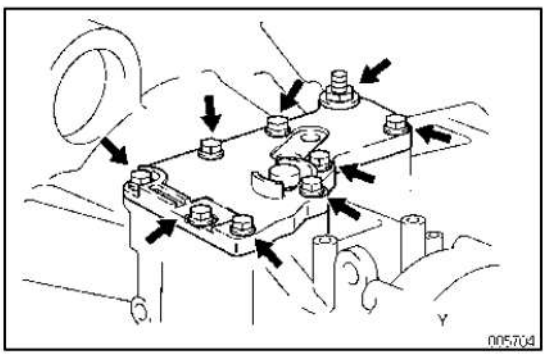


13. INSTALL OIL PAN WITH NEW GASKET

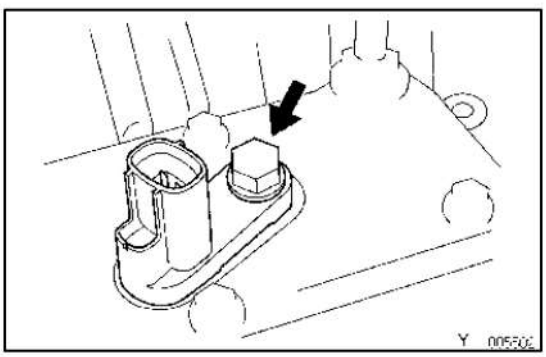
(a) Install a new gasket and oil pan.
(b) Install and torque the 17 bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



14. INSTALL THROTTLE CABLE RETAINING PLATE

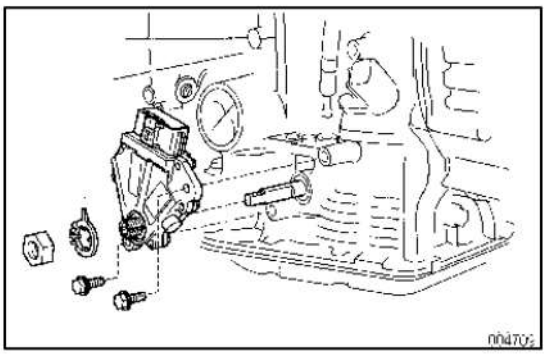


15. INSTALL TRANSAXLE UPPER COVER



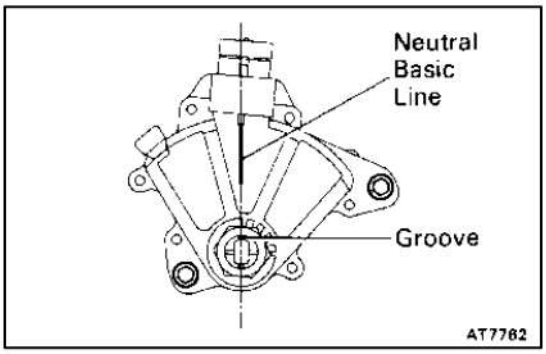
16. INSTALL T/M REVOLUTION SENSOR

(a) Install a new O–ring to the T/M revolution sensor.
(b) Install the T/M revolution sensor with the bolt.

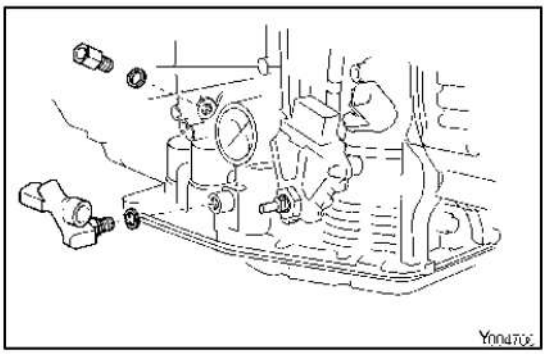


17. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch to the manual valve shaft.
(b) Place the new locking plate and tighten the nut.
(c) Stake the nut with locking plate.
(d) Install the 2 bolts.

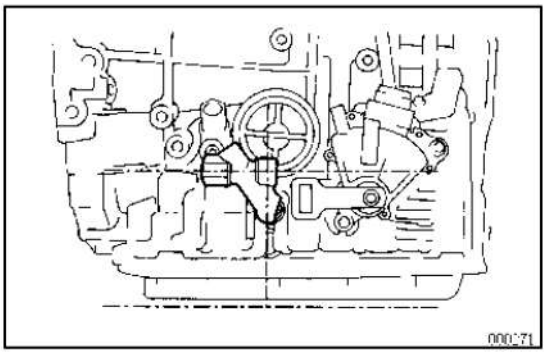


(e) Adjust the park/neutral position switch.
HINT: Align the groove and neutral basic line.
(f) Tighten the 2 bolts.

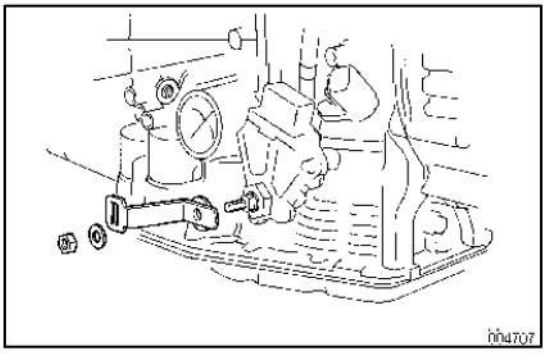


18. INSTALL UNION AND ELBOW

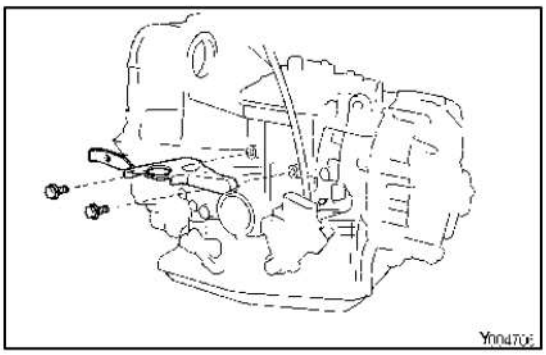
(a) Install the new O–rings to the union and elbow.
(b) Install the union elbow to the transaxle case.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



HINT: Install the elbow, as shown in the illustration.



19. INSTALL MANUAL SHAFT LEVER



20. INSTALL SHIFT CONTROL CABLE BRACKET

SERVICE SPECIFICATIONS

SERVICE DATE

AX0H1-06

Second Coast Brake

Piston stroke	2.0 – 3.5 mm 0.079 – 0.138 in.
Piston rod length	95.2 mm 3.748 in.
	96.3 mm 3.791 in.

Oil Pump

Body clearance	STD	0.07 – 0.15 mm 0.0028 – 0.0059 in.
	Maximum	0.30 mm 0.0118 in.
Tip clearance	STD	0.11 – 0.14 mm 0.0043 – 0.0055 in.
	Maximum	0.30 mm 0.0118 in.
Side clearance	STD	0.02 – 0.05 mm 0.0008 – 0.0020 in.
	Maximum	0.10 mm 0.0039 in.
Pump body bushing inside diameter	Maximum	38.18 mm 1.5031 in.
Stator shaft bushing inside diameter		
Front side	Maximum	21.57 mm 0.8492 in.
Rear side	Maximum	27.07 mm 1.0657 in.

Direct Clutch

Piston stroke	0.91 – 1.35 mm 0.0358 – 0.0531 in.
Drum bushing inside diameter	48.27 mm 1.9004 in.
Flange thickness	2.70 mm 0.1063 in. 3.00 mm 0.1181 in.

Forward Clutch

Piston stroke	1.79 – 2.21 mm 0.0704 – 0.0870 in.
Flange thickness	2.30 mm 0.0906 in. 2.70 mm 0.1063 in.

Front Planetary Gear

Sun gear bushing inside diameter	Maximum	22.59 mm 0.8894 in.
Ring gear flange bushing inside diameter	Maximum	30.08 mm 1.1842 in.
Planetary pinion gear thrust clearance	Maximum	0.61 mm 0.024 in.

Rear Planetary Gear

Planetary pinion gear thrust clearance	Maximum	0.61 mm 0.024 in.

First and Reverse Brake

Pack clearance		1.92 – 2.68 mm 0.0756 – 0.1055 in.

Overdrive Unit

Piston stroke		1.75 – 2.49 mm 0.0689 – 0.0980 in.
Direct clutch bushing inside diameter	Maximum	22.13 mm 0.8713 in.
Planetary pinion gear thrust clearance	STD	0.16 – 0.56 mm 0.0063 – 0.0220 in.
	Maximum	0.61 mm 0.024 in.

Valve Body Spring

Spring	Free length / Coil outer diameter mm (in.)	Total No. of coils / Color
Upper valve body		
Low coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
B_1 orifice control valve	24.8 (0.976) / 6.4 (0.252)	12.0 / White
Down–shift plug	15.0 (0.591) / 11.0 (0.433)	7.0 / None
Throttle valve	31.5 (1.240) / 7.0 (0.276)	11.4 / Green
Lock–up relay valve	26.8 (1.055) / 10.2 (0.402)	10.8 / Yellow
Lower valve body		
2–3 shift valve	28.0 (1.102) / 9.4 (0.370)	10.3 / None
Second coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
Accumulator control vavle	25.1 (0.988) / 8.6 (0.339)	8.0 / Red
Secondary regulator valve	46.9 (1.846) / 5.9 (0.232)	21.8 / None
Second lock valve	20.7 (0.815) / 7.4 (0.291)	9.5 / None
Reverse control valve	38.1 (1.500) / 6.5 (0.256)	19.0 / White/Purple
1–2 shift valve	29.2 (1.150) / 8.9 (0.350)	12.0 / Light Green
3–4 shift valve	28.0 (1.102) / 7.6 (0.299)	10.3 / None
Primary regulator valve	36.6 (1.441) / 16.1 (0.634)	6.3 / None
Cut–back valve	21.8 (0.858) / 6.0 (0.236)	13.5 / None
Solenoid modulator valve	30.2 (1.189) / 5.6 (0.220)	15.3 / Purple/Pink

Valve Body Key

Key	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
Upper valve body			
B_1 orifice control valve	8.9 (0.350)	5.0 (0.197)	3.2 (0.126)
Low coast modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lower valve body			
Accumulator control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Secondary regulator valve	11.0 (0.433)	5.0 (0.197)	3.2 (0.126)
1–2 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
2–3 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
3–4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
Second lock valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Second coast modulator valve	8.0 (0.315)	5.0 (0.197)	3.2 (0.126)
Reverse control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Cut–back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Solenoid modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lock–up control valve	9.2 (0.315)	5.0 (0.197)	3.2 (0.126)

Accumulator Spring

Spring		Free length mm (in.)	Color
C_0	Inner	47.5 (1.870)	White
	Outer	16.3 (0.642)	None
C_1		73.6 (2.898)	None
C_2		51.8 (2.039)	Yellow / Purple
B_0		66.8 (2.630)	Red / Yellow
B_2	Inner	70.3 (2.767)	None
	Outer	88.2 (3.473)	None

Differential Assembly

Drive pinion preload (at Starting)	
New bearing	1.0 – 1.6 N·m 10 – 16 kgf·cm 8.7 – 13.9 in.·lbf
Reused bearing	0.5 – 0.8 N·m 5 – 8 kgf·cm 4.3 – 6.9 in.·lbf
Total preload (at starting)	
New bearing	Drive pinion preload plus 0.3 – 0.4 N·m 2.8 – 4.4 kgf·cm 2.4 – 3.8 in.·lbf
Reused bearing	Drive pinion preload plus 0.1 – 0.2 N·m 1.4 – 2.2 kgf·cm 1.2 – 1.9 in.·lbf
Pinion to side gear backlash	0.05 – 0.20 mm 0.0020 – 0.0079 in.
Side gear thrust washer thickness	1.60 mm 0.0630 in. 1.70 mm 0.0670 in. 1.80 mm 0.0709 in.

Side bearing adjusting shim 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.
	7	2.35 mm 0.0925 in.
	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.

TORQUE SPECIFICATIONS

AX04N-03

Part tightened	N·m	kgf·cm	ft·lbf
Oil cooler pipe union	27	275	20
Oil pan	4.9	50	43 in.·lbf
Valve body x Transaxle case	11	110	8
Accumulator x Cover	10	100	7
Oil pump x Transaxle case	22	225	16
O/D case x Transaxle case	25	250	18
Differential LH side bearing retainer	19	195	14
Differential RH retainer	19	195	14
Differential carrier cover	39	400	29
Oil pump body x Stator shaft	10	100	7
Ring gear x Differential case	124	1,260	91
Upper valve body x Lower valve body	6.6	67	58 in.·lbf
Accumulator cylinder x Valve body	6.6	67	58 in.·lbf
Solenoid x Valve body	6.6	67	58 in.·lbf
Counter drive gear lock nut	280	2,855	206
Carrire cover x Transaxle case	39	400	29
Parking lock pawl bracket	7.4	75	65 in.·lbf
Oil strainer x Transaxle case	11	110	8