FOREWORD

This repair manual covers Disassembly, Inspection and Assembly procedures for the following Automatic Transaxles:

Automatic Transmission	Applicable Model
A540E A540H	'91 Camry

For On-vehicle Servicing (Inspection, Adjustment, Troubleshooting, Removal and Installation) of Automatic Transaxle, refer to the repair manual for the applicable vehicle model.

Pub. Name	Pub. No.
'91 Camry Repair Manual	RM199U

All information contained in this manual is the most up-to-data at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

HOW TO USE THIS MANUAL

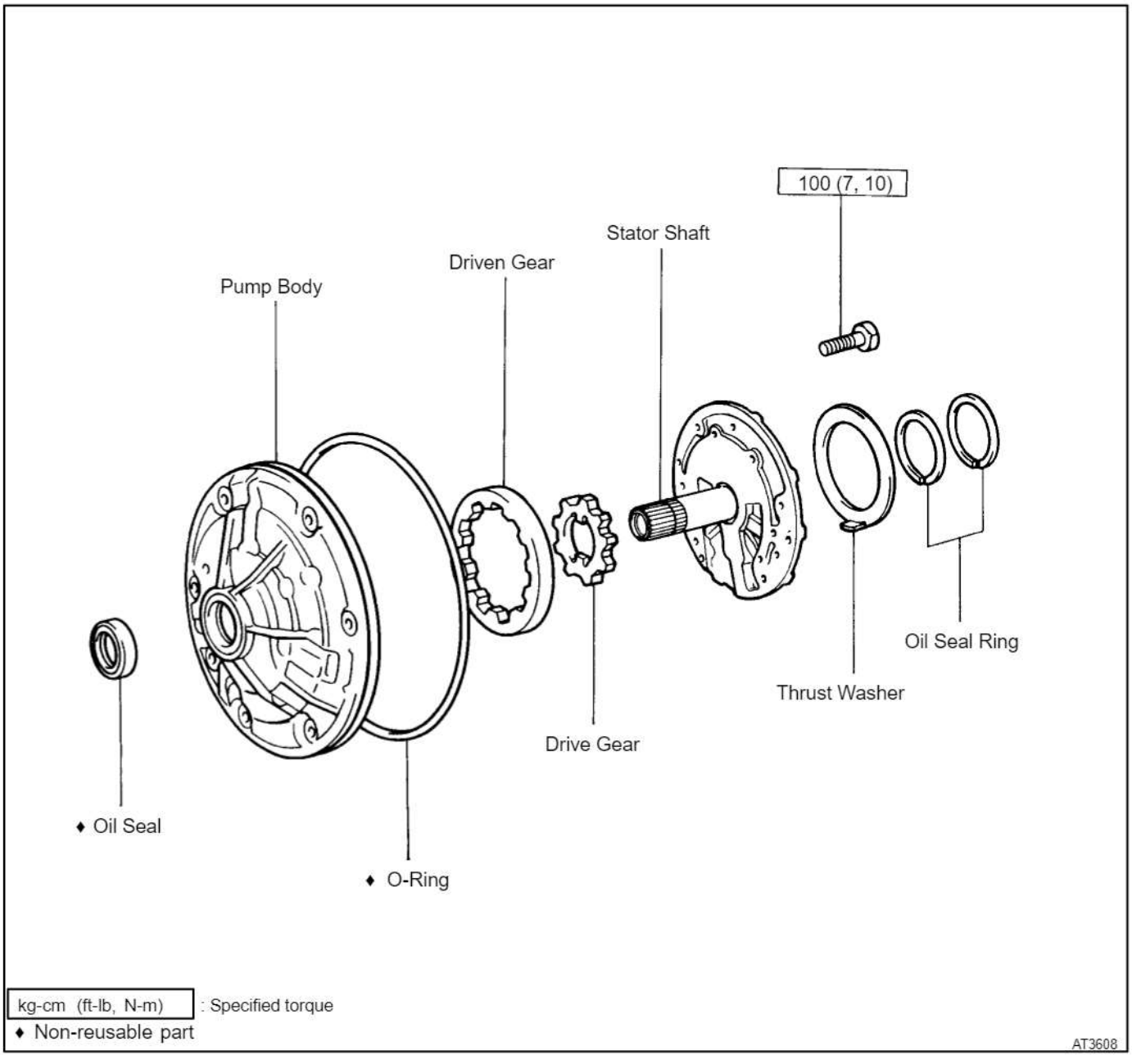
To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

An **INDEX** is provided on the 1st page of each section to guide you to the item to be repaired.

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:

- **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:

Illustration: what to do and where

Task heading: what to do

7. CHECK PISTON STROKE OF FORWARD CLUTCH

If replacing the disc, plate or flange, check the piston stroke:

Detail text: how to do it

Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi or 392 - 785 kPa) as shown.

SST 09350-32014 (09351-32190)

Set part No. *Component part No.*

Piston stroke: 1.41 - 1.82 mm (0.0555 - 0.0717 in.)

Specification

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 and only when necessary, 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 go to.

SPECIFICATIONS

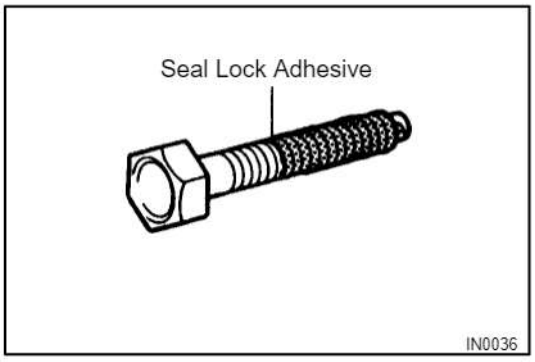
Specifications are presented in bold type throughout the text in the applicable step. You never have to leave the procedure to look up your specs. All specifications are also found in Appendix A, specifications for quick reference.

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 efficiently perform the repair.

GENERAL REPAIR INSTRUCTIONS

1. **Use fender, seat and floor covers to keep the vehicle clean and prevent damage.**
2. **During disassembly, keep parts in order to facilitate reassembly.**
3. **Observe the following:**
   (a) Before performing electrical work, disconnect the negative cable four the battery terminal.
   (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 it or prying it.
   (d) Clean the battery terminal posts and cable terminals with a shop rag. Do not scrape them with a file or other abrasive object.
   (e) Install the cable terminal to the battery post with the nut loose, and tighten the nut after installation. Do not use a hammer or such to tap the terminal onto the post.
   (f) Be sure the cover for the positive (+) terminals are properly in place.
4. **Check hoses 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 the bolts and nuts, which have been 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) Recoating of precoated parts
      (1) Clean off the old adhesive from the bolt, nut or installation part threads.
      (2) Dry with compressed air.
      (3) Apply the specified seal lock adhesive to the bolt or nut threads.
   (c) Precoated parts are indicated in the component illustrations by the "○" symbol.



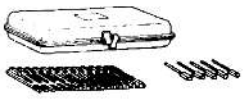
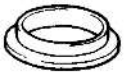
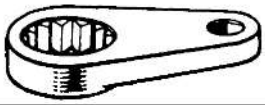
7. **When necessary, use a sealer on gaskets to prevent leaks.**
8. **Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.**
9. **Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be 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 back of this manual.**
10. **When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the fuse amp rating or use one of a lower rating.**
11. **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 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 the vehicle raised on jack alone, even for a small job that can be finished quickly.

ABBREVIATIONS USED IN THIS MANUAL

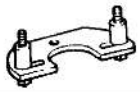
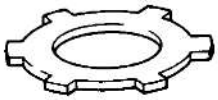
A/T ATM	Automatic Transmission
ATF	Automatic Transmission Fluid
B_0	Overdrive Brake
B_1	Second Coast Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_0	Overdrive Clutch
C_1	Forward Clutch
C_2	Direct Clutch
D	Disc
D/F	Differential
LH	Left
MP	Multipurpose
O/D	Overdrive
P	Plate
RH	Right
SSM	Special Service Materials
SST	Special Service Tools

PREPARATION

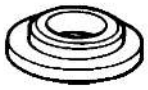
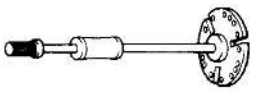
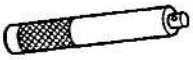
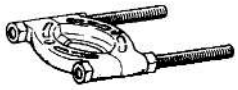
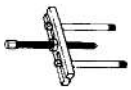
SST (SPECIAL SERVICE TOOLS)

Illustration	Part No.	Part Name	Note
	09226 - 10010	Crankshaft Front & Rear Bearing Replacer	A540H
	09240 - 00020	Wire Gauge Set	
	09308 - 00010	Oil Seal Puller	A540H
	09316 - 12010	Transfer Bearing Replacer	A540H
	09316 - 20011	Transfer Bearing Replacer	
	09316 - 60010	Transmission & Transfer Bearing Replacer	
	(09316 - 00010)	(Replacer Pipe)	
	(09316 - 00040)	(Replacer "C")	A540H
	(09316 - 00060)	(Replacer "E")	A540H
	09318 - 12010	Transfer Bearing Adjusting Nut Wrench	A540H
	09325 - 12010	Transmission Oil Plug	A540H
	09325 - 20010	Transmission Oil Plug	A540H
	09326 - 20011	Output Shaft Bearing Lock Nut Wrench	A540H
	09330 - 00021	Companion Flange Holding Tool	A540H
	09350 - 32014	TOYOTA Automatic Transmission Tool Set	

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration	Part No.	Part Name	Note
	(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 - 32090)	Oil Seal Remover & Replacer	A540H
	(09351 - 32100)	Drive Pinion Bearing Replacer	
	(09351 - 32111)	Side Bearing Race Replacer	A540H
	(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	

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration	Part No.	Part Name	Note
	**09502 - 12010**	Differential Bearing Replacer	A540H
	**09506 - 35010**	Differential Drive Pinion Rear Bearing Replacer	A540H
	**09520 - 32012**	Differential Side Gear Shaft Puller	A540H
	**09608 - 30022**	Front Hub Bearing Replacer Set	A540H
	**(09550 - 00050)**	(Replacer)	A540H
	**(09608 - 05010)**	(Handle)	A540H
	**09608 - 32010**	Steering Knuckle Oil Seal Replacer	A540H
	**09608 - 35014**	Axle Hub & Drive Pinion Bearing Tool Set	A540H
	**(09608 - 06020)**	(Handle)	A540H
	**(09608 - 06120)**	Front Hub Outer Bearing Cup Replacer	A540H
	**09612 - 65014**	Steering Worm Bearing Puller	Remove pinion shaft Bearing outer race
	**09950 - 00020**	Bearing Remover	A540H
	**09950 - 00030**	Bearing Remover Attachment	A540H
	**09950 - 20017**	Universal Puller	

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Use etc.
Seal packing 1281, Three bond 1281 or equivalent	**08826 - 00090**	Transfer right case · Transfer left case (A540H) Transfer inspection hole cover (A540H) Transfer case · Differential carrier cover Differential LH bearing retainer (A540E, A540H) Differential RH retainer (A540E) Transaxle · Transfer assembly (A540H)
Adhesive 1324, Three bond 1324 or equivalent	**08833 - 00070**	Differential LH bearing retainer set bolt Differential carrier cover set bolt Torque converter mounting bolt Differential RH retainer set bolt (A540E) Transfer set bolt (A540H)

RECOMMENDED TOOL

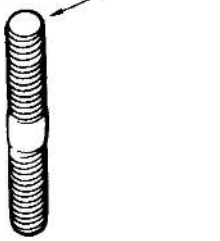
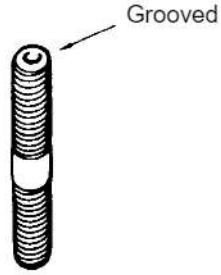
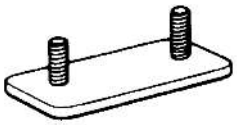
Illustration	Part No.	Part Name	Note
	**09031 - 00030**	Pin Punch	

EQUIPMENT

Part Name	Note
Feeler gauge	Check major clearance.
Vernier caliper with depth gauge	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	

STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 4- 5- 6- 7- 8- 9- 10- 11-	4T 5T 6T 7T 8T 9T 10T 11T	Stud bolt		4T
	 No mark	4T			
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T			6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	 Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 Three protruding lines	7T			
Hexagon head bolt	 Four protruding lines	8T			

SPECIFIED TORQUE FOR STANDARD BOLTS

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

AUTOMATIC TRANSAXLE (A540E)

Specifications

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	0.3 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	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	Maximum	48.27 mm	1.9004 in.
	Flange thickness		2.70 mm	0.1063 in.
			3.00 mm	0.1181 in.
Forward clutch	Piston stroke		1.41 - 1.82 mm	0.0555 - 0.0717 in.
	Flange thickness		3.00 mm	0.1181 in.
			3.37 mm	0.1327 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			
		STD	0.16 - 0.56 mm	0.0063 - 0.0220 in.
		Maximum	0.61 mm	0.024 in.
Rear planetary gear	Planetary pinion gear thrust clearance			
		STD	0.16 - 0.56 mm	0.0063 - 0.0220 in.
		Maximum	0.61 mm	0.024 in.
First and reverse brake	Pack clearance		0.85 - 2.05 mm	0.033 - 0.081 in.
Overdrive unit	Direct clutch piston stroke		1.75 - 2.49 mm	0.0689 - 0.0980 in.
	Direct clutch bushing inside diameter			
		Maximum	22.13 mm	0.8713 in.
	Counter drive gear preload	at Starting	940 - 1,560 g	2.1 - 3.4 lb 9.2 - 15.3 N
	Planetary pinion gear thrust clearance			
		STD	0.16 - 0.56 mm	0.0063 - 0.0220 in.
		Maximum	0.61 mm	0.024 in.

Specifications (Cont'd)

Valve body spring	Spring	Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
	(Upper valve body)				
	Second coast modulator valve	27.5 (1.083)	8.9 (0.350)	14.6	Brown
	B_1 orifice control valve	24.8 (0.976)	8.0 (0.315)	12.0	White
	Down-shift plug	29.8 (1.173)	8.7 (0.343)	13.5	Yellow
	Throttle valve	30.7 (1.209)	9.2 (0.362)	9.5	Purple
	Throttle modulator valve	21.7 (0.854)	9.5 (0.374)	9.5	Orange
	Cut-back valve	21.8 (0.858)	6.0 (0.236)	13.5	Red
	No. 1 accumulator control valve	28.1 (1.106)	10.6 (0.417)	13.0	Yellow
	Lock-up relay valve	26.6 (1.047)	10.2 (0.402)	11.5	Green
	(Lower valve body)				
	Pressure relief valve	11.2 (0.441)	6.4 (0.252)	7.5	None
	Check valve	19.9 (0.783)	11.0 (0.433)	8.5	None
	Secondary regulator valve	38.5 (1.516)	8.4 (0.331)	17.0	Purple
	No. 2 accumulator control valve	23.0 (0.906)	6.3 (0.248)	12.0	Gray
	Second lock valve	20.7 (0.815)	6.1 (0.240)	12.0	Orange
	3 - 4 shift valve	29.2 (1.150)	8.9 (0.350)	12.0	Light green
	Low coast modulator valve	20.2 (0.795)	7.9 (0.311)	11.9	Purple
	1 - 2 shift valve	29.2 (1.150)	8.9 (0.350)	12.0	Light green
	2 - 3 shift valve	28.0 (1.102)	9.4 (0.370)	10.3	None
	Primary regulator valve	64.2 (2.528)	18.6 (0.732)	12.5	None

Valve body retainer	Retainer	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
	(Upper valve body)			
	Lock-up relay valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
	Throttle modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
	Second coast modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
	Cut-back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
	No. 1 accumulator control valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
	B_1 orifice control valve	11.5 (0.453)	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)
	Secondary regulator valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
	No. 2 accumulator control valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
	Second lock valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	Low coast modulator valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	1 - 2 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
	2 - 3 shift valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
	3 - 4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)

Specifications (Cont'd)

Accumulator spring	Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
	C_1	Inner	43.4 (1.709)	17.8 (0.701)	9.0	Light Green
		Outer	71.2 (2.803)	24.4 (0.961)	11.5	Blue
	C_2		51.0 (2.008)	18.0 (0.709)	10.2	Red
	C_0	Inner	47.5 (1.870)	18.9 (0.744)	9.5	White
	(O/D case)	Outer	59.3 (2.335)	25.5 (1.004)	9.5	Gray
	B_2		58.5 (2.303)	15.2 (0.598)	15.9	Orange
	B_0 (Valve body)		62.2 (2.449)	14.8 (0.583)	17.0	None

Differential	Drive pinion preload (at starting)			
	New Bearing	10 - 16 kg-cm	8.7 - 13.9 in.-lb	1.0 - 1.6 N-m
	Reused bearing	5 - 8 kg-cm	4.3 - 6.9 in.-lb	0.5 - 0.8 N-m
	Total preload (at starting)	Add drive pinion preload		
	New bearing	2.8 - 4.4 kg-cm	2.4 - 3.8 in.-lb	0.3 - 0.4 N-m
	Reused bearing	1.4 - 2.2 kg-cm	1.2 - 1.9 in.-lb	0.1 - 0.2 N -
	Pinion to side gear backlash	0.05 - 0.20 mm	0.0020 - 0.0079 in.	
	Side gear thrust washer thickness	0.80 mm	0.0315 in.	
		0.90 mm	0.0354 in.	
		1.00 mm	0.0394 in.	
		1.10 mm	0.0433 in.	
		1.20 mm	0.0472 in.	
		1.30 mm	0.0512 in.	
		1.40 mm	0.0551 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	0.1103 in.	
	H	2.85 mm	0.1122 in.	

Torque Specifications

Part tightened	kg-cm	ft-lb	N-m
Oil cooler pipe union	275	20	27
Oil pan	50	43 in.-lb	4.9
Valve body · Transaxle case	110	8	11
Accumulator · Cover	100	7	10
Oil pump · Transaxle case	225	16	22
O/D case · Transaxle case	250	18	25
Differential LH side bearing retainer	195	14	19
Differential RH retainer	195	14	19
Differential carrier cover	400	29	39
Oil pump body · Stator shaft	100	7	10
Upper valve body · Lower valve body	67	58 in.-lb	6.6
Differential left case · Right case	640	46	63
Ring gear · Differential case	1,260	91	124

AUTOMATIC TRANSAXLE (A540H)

Specifications

Second coast brake	Same the A540E automatic transaxle (See page A-2)		
Oil pump	↑		
Direct clutch	Piston stroke	1.11 - 1.47 mm	0.0437 - 0.0579 in.
	Drum bushing inside diameter Maximum	48.27 mm	1.9004 in.
	Flange thickness	2.70 mm	0.1063 in.
		3.00 mm	0.1181 in.
Forward clutch	Same the A540E automatic transaxle (See page A-2)		
Front planetary gear	↑		
Rear planetary gear	↑		
First and reverse brake	Pack clearance	1.04 - 2.16 mm	0.0409 - 0.0850 in.
Over drive unit	Same the A540E automatic transaxle (See page A-2)		
Valve body spring	Same the A540E automatic transaxle (See page A-3)		
Valve body retainer	Same the A540E automatic transaxle (See page A-3)		
Accumulator spring	Same the A540E automatic transaxle (See page A-4)		

Specifications (Cont'd)

Differential	Drive pinion preload (at staring)				
	New bearing		10 - 16 kg-cm	8.7 - 13.9 in.-lb	1.0 - 1.6 N-m
	Reused bearing		5 - 8 kg-cm	4.3 - 6.9 in.-lb	0.5 - 0.8 N-m
	Total preload (at starting)				
	New bearing		2.3 - 3.7 kg-cm	2.0 - 3.2 in.-lb	0.2 - 0.4 N-m
	Reused bearing		1.2 - 1.9 kg-cm	1.0 - 1.6 in.-lb	0.1 - 0.2 N-m
	Pinion to side gear backlash		0.05 - 0.20 mm	0.0020 - 0.0079 in.	
	Side gear thrust washer thickness				
		Mark			
		A	1.00 mm	0.0394 in.	
		B	1.05 mm	0.0413 in.	
		C	1.10 mm	0.0433 in.	
		D	1.15 mm	0.0453 in.	
		E	1.20 mm	0.0472 in.	
		F	1.25 mm	0.0492 in.	
		G	1.30 mm	0.0512 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	0.1103 in.	
		H	2.85 mm	0.1122 in.	
	Differential end play		0.18 - 0.82 mm	0.0071 - 0.0323 in.	

TRANSFER (A540H)

Specifications

Transfer	Driven pinion preload (at starting)	0.9 - 1.4 kg	2.0 - 3.1 lb	8.8 - 13.7 N
	Total preload (at starting)	0.5 - 0.9 kg	1.1 - 2.0 lb	4.9 - 8.8 N
	Ring gear backlash	0.13 - 0.18 mm	0.0051 - 0.0071 in.	
	Driven pinion bearing cage			
	Driven pinion preload (at starting)			
	New bearing	1.8 - 2.9 kg	4.0 - 6.4 lb	18 - 28 N
	Reused bearing	0.9 - 1.4 kg	2.0 - 3.1 lb	9 - 13 N
	Center differential side gear backlash	0.05 - 0.20 mm	0.0020 - 0.0079	

Specifications (Cont'd)

Transfer (Cont'd)	Center differential left side gear thrust washer thickness	Mark		
		A	1.00 mm	0.0394 in.
		B	1.05 mm	0.0413 in.
		C	1.10 mm	0.0433 in.
		D	1.15 mm	0.0453 in.
		E	1.20 mm	0.0472 in.
		F	1.25 mm	0.0492 in.
		G	1.30 mm	0.0512 in.
		H	1.35 mm	0.0531 in.
		J	1.40 mm	0.0551 in.
	Center differential side gear thrust clearance		0.18 - 0.63 mm	0.0071 - 0.0248 in.
	Center differential right side gear thrust washer thickness	Mark		
		A	1.00 mm	0.0394 in.
		B	1.05 mm	0.0413 in.
		C	1.10 mm	0.0433 in.
		D	1.15 mm	0.0453 in.
		E	1.20 mm	0.0472 in.
		F	1.25 mm	0.0492 in.
		G	1.30 mm	0.0512 in.
		H	1.35 mm	0.0531 in.
		J	1.40 mm	0.0551 in.
		K	1.45 mm	0.0571 in.
		L	1.50 mm	0.0591 in.

Transfer lower valve body spring	Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
Transfer clutch modulator valve	32.2 (1.272)	7.6 (0.299)	16	None
No. 2 low-high shift valve	28.9 (1.138)	7.0 (0.276)	14	None
No. 1 low-high shift valve	28.9 (1.138)	7.0 (0.276)	14	None

Transfer lower valve body retainer	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
Transfer clutch modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
No. 2 low-high shift valve	↑	↑	↑
No. 1 low-high shift valve	↑	↑	↑

Center differential plate washer	Mark		
	71	2.13 mm	0.0839 in.
	72	2.16 mm	0.0850 in.
	73	2.19 mm	0.0862 in.
	74	2.22 mm	0.0874 in.
	75	2.25 mm	0.0886 in.
	76	2.28 mm	0.0898 in.
	77	2.31 mm	0.0909 in.
	78	2.34 mm	0.0921 in.
	79	2.37 mm	0.0933 in.
	80	2.40 mm	0.0945 in.

Specifications (Cont'd)

Transfer (Cont'd)		81	2.43 mm	0.0957 in.
		82	2.46 mm	0.0969 in.
		83	2.49 mm	0.0980 in.
		84	2.52 mm	0.0992 in.
		85	2.55 mm	0.1004 in.
		86	2.58 mm	0.1016 in.
		87	2.61 mm	0.1028 in.
		88	2.64 mm	0.1039 in.
		89	2.67 mm	0.1051 in.
		90	2.70 mm	0.1063 in.
		91	2.73 mm	0.1075 in.
		92	2.76 mm	0.1087 in.
		93	2.79 mm	0.1098 in.
		94	2.82 mm	0.1110 in.
	Ring gear adjusting shim	Mark		
		A	0.30 mm	0.0118 in.
		B	0.33 mm	0.0130 in.
		C	0.36 mm	0.0142 in.
		D	0.39 mm	0.0154 in.
		E	0.42 mm	0.0165 in.
		F	0.45 mm	0.0177 in.
		G	0.48 mm	0.0189 in.
		H	0.51 mm	0.0201 in.
		J	0.54 mm	0.0213 in.
		K	0.57 mm	0.0224 in.

Torque Specifications

Part tightened		kg-cm	ft-lb	N-m
Oil cooler pipe union and elbow		275	20	27
Oil pan		50	43 in.-lb	4.9
Valve body · Transaxle case		110	8	11
Accumulator · Cover		100	7	10
Oil pump · Transaxle case		225	16	22
O/D case · Transaxle case		250	18	25
Differential LH side bearing retainer		195	14	19
Differential carrier cover		400	29	39
Oil pump body · Stator shaft		100	7	10
Upper valve body · Lower valve body		67	58 in.-lb	6.6
Front differential right case · Front differential left case		340	25	33
Ring gear · Ring gear mounting case		1,260	91	124
Transfer right case retainer · Transfer right case		300	22	29
Transfer right case · Adjusting nut lock plate lock bolt		73	63 in.-lb	7.2
Transfer right case · Transfer left case		450	33	44
Transfer right case · Mode select lever and rod	Ⓐ	55	48 in.-lb	5.4
	Ⓑ	115	8	11

Torque Specifications (Cont'd)

Part tightened	kg-cm	ft-lb	N-m
Transfer right case · Oil strainer	55	48 in.-lb	5.4
Transfer left case · Rear wheel speed sensor	55	48 in.-lb	5.4
Transfer left case · Transfer inspection hole cover	160	12	16
Transfer left case · Drain plug	400	29	39
Transfer left case · Driven pinion bearing cage	400	29	39
Driven pinion bearing cage · Transfer extension housing	260	19	25
Transfer extension housing · Dynamic damper	260	19	25
Transfer right case · Oil pump cover	80	69 in.-lb	7.8
Transfer ring gear · Ring gear mounting case	985	71	97
Center differential control solenoid · Transfer valve body	145	10	14
Transfer valve body · Transfer left case	110	8	11
Neutral start switch bolt	55	48 in.-lb	5.4
Neutral start switch nut	70	61 in.-lb	6.9
Transfer assembly · Transaxle case	700	51	69

LUBRICANT

Item		Capacity			Classification
		Liters	US qts	Imp. qts	
Automatic transaxle fluid (w/o Differential oil)	A540E				ATF DEXRON○ II
	Dry fill	5.9	6.2	5.2	
	Drain and refill	2.5	2.6	2.2	
	A54H				ATF type T (08886 - 00405) or equivalent
	Dry fill	7.0	7.4	6.2	
	Drain and refill	3.3	3.5	2.9	
Differential oil (w/ Automatic transaxle)					ATF DEXRON○ II
	SV21 series	1.6	1.7	1.4	
	VZV21 series	1.0	1.1	0.9	
Transfer oil (A540H)		0.7	0.74	0.62	Transaxle oil E50 (08885 - 80206) or equivalent Recommended oil Oil grade: API GL-5 Viscosity: SAE 75W-90 or 80W-90 SAE 90W [above -18°C (0°F)] SAE 80W [below -18°C (0°F)]

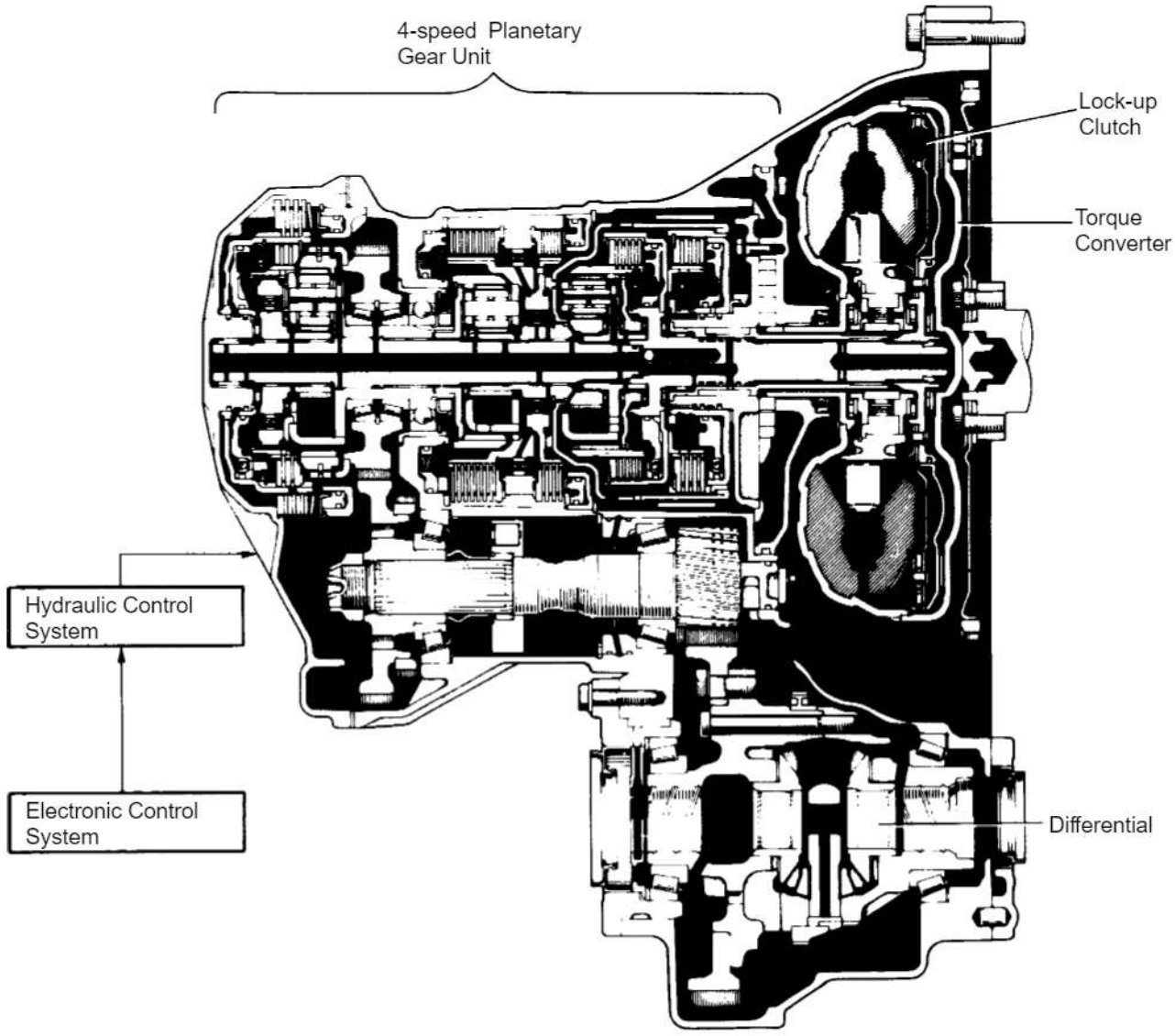
DESCRIPTION

GENERAL

(A540E)

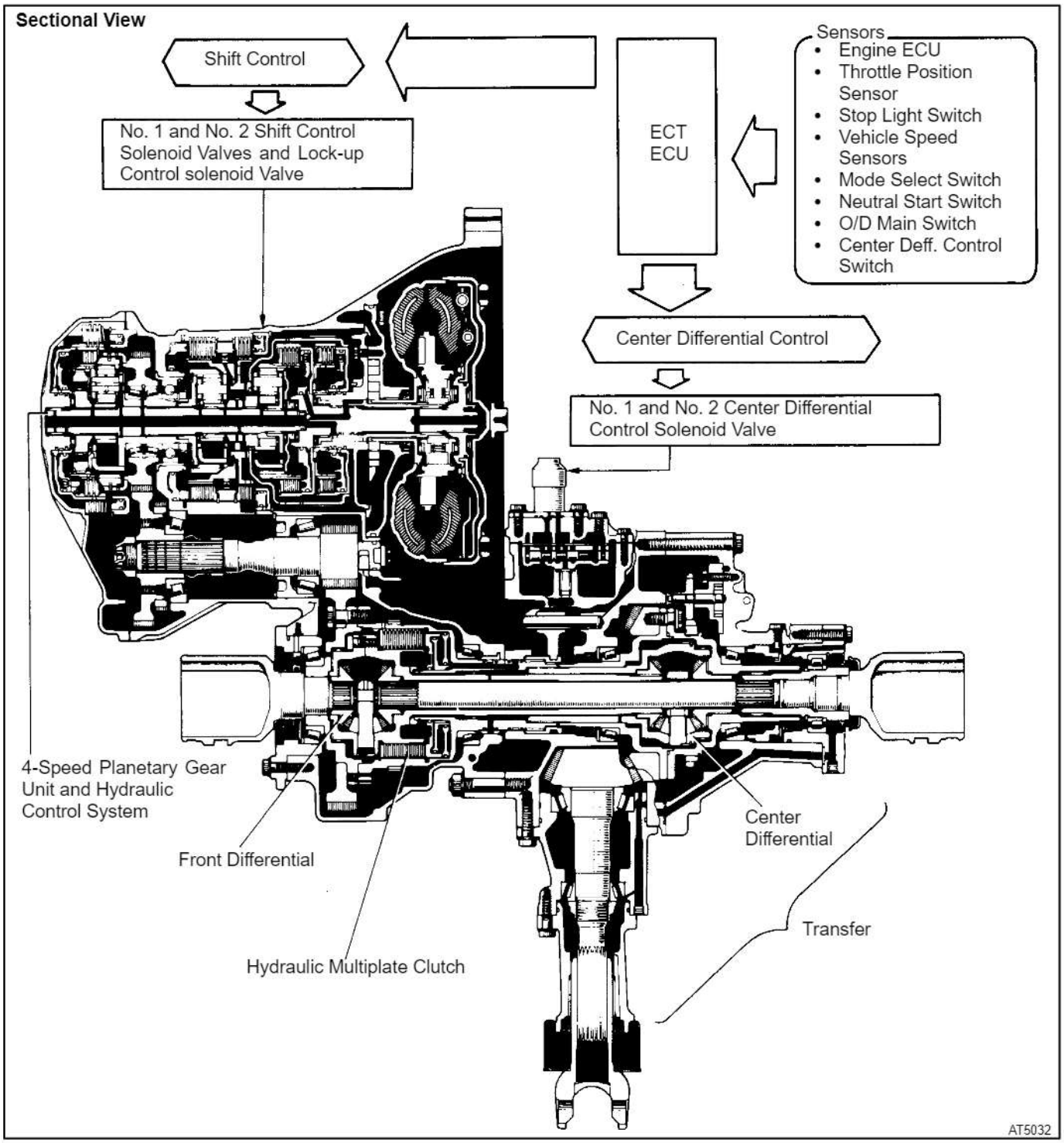
The A540E is a 4-speed, Electronic Controlled Transaxle (hereafter called ECT) developed exclusively for use with a transversely-mounted engine. A lock-up is built into the torque converter.
The A540E transaxle is mainly composed of the torque converter, the 4-speed planetary gear unit, the differential, the hydraulic control system and the electronic control system.

Sectional View



(A540H)

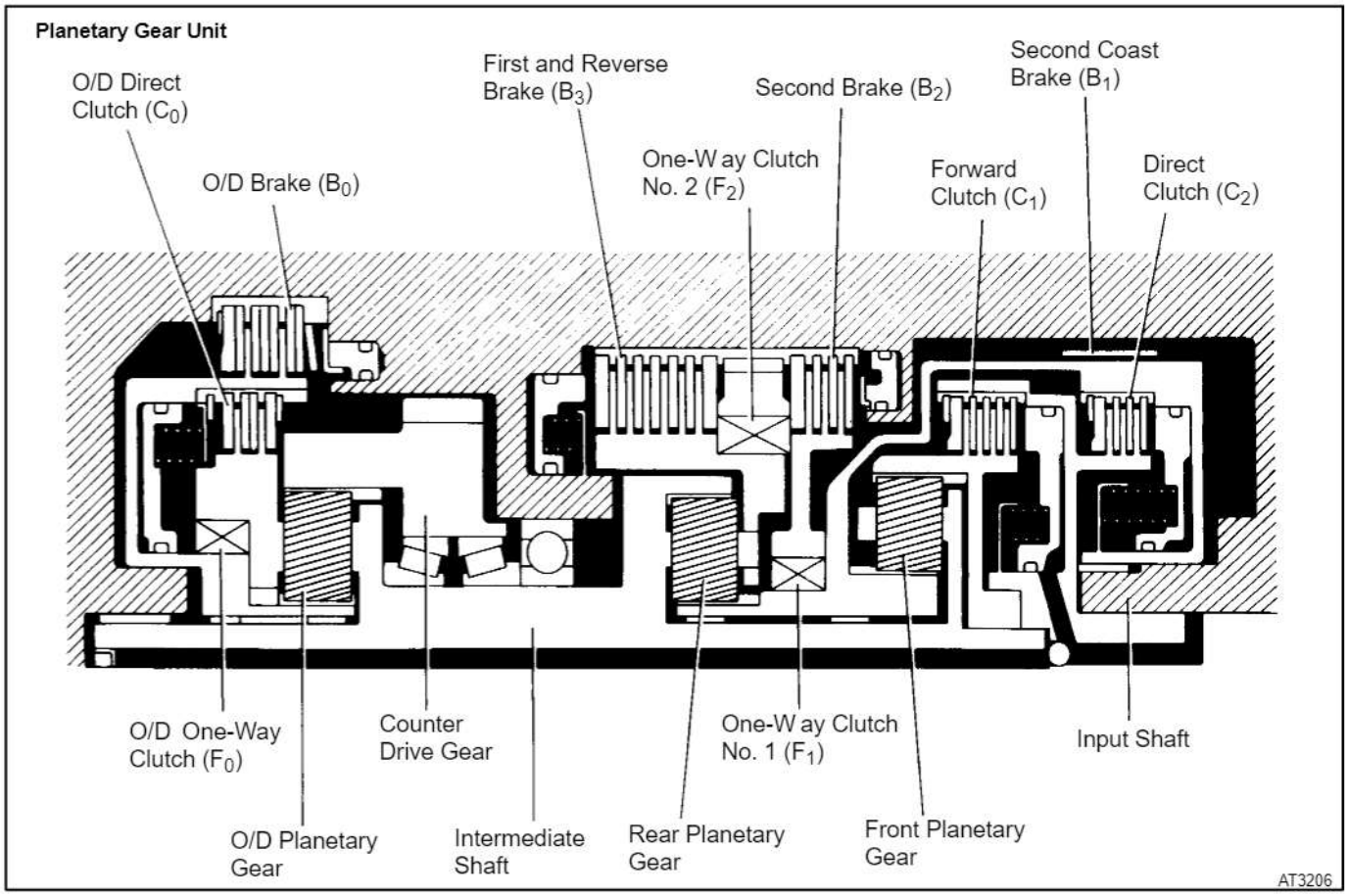
The A540H automatic transaxle design is based on the A540E automatic transaxle and equipped with a center differential and transfer.
This transaxle has the same hydraulic multiplate clutch in the center differential limiting control mechanism as the A241H automatic transaxle on the Corolla All-Trac/4WD Station Wagon. The fluid pressure acting on the hydraulic multiplate clutch of the A540H is controlled by the ECT ECU (Electronic Control Unit) according to the vehicle driving conditions. As a result, torque is distributed to the front and rear wheels appropriately at all times to maximize the overall performance of the 4WD vehicle.
NOTICE: Special handling methods are necessary for full-time 4WD vehicles during inspection and maintenance. Instructions concerning these handling methods are given on Camry Repair Manual (Pub. No. RM199U) on page IN-8.



General Specification

Type of Transmission				A540E	A540H
Type of Engine				2VZ-FE	3S-FE
Torque Converter	Stall Torque Ratio			1.9 : 1	2.0 : 1
	Lock-Up Mechanism			Equipped	←
Gear Ratio	1st Gear			2.810	←
	2nd Gear			1.549	←
	3rd Gear			1.000	←
	O/D Gear			0.734	←
	Reverse Gear			2.296	←
Number of Discs and Plates (Disc/Plate)	C_0	O/D Direct Clutch		2/2	←
	C_1	Forward Clutch		4/4	←
	C_2	Direct Clutch		3/3	←
	B_2	2nd Brake		3/3	←
	B_3	First & Reverse Brake		7/7	6/6
	B_0	O/D Brake		3/3	←
B_1 Band Width			mm (in.)	38 (1.50)	25 (0.98)
ATF	Type			ATF DEXRON★ II	ATF Type T or equivalent
	Capacity liter (US qts, Imp. qts)		A/T	5.9 (6.2, 5.2)	7.0 (7.4, 6.2)
			D/F	1.0 (1.1, 0.9)	—
Transfer Oil	Type			—	Transaxle oil E50, API GL5, SAE 75W-90 or equivalent
	Capacity liter (US qts, Imp. qts)			—	0.7 (0.7, 0.6)

OPERATION



A540E, A540H

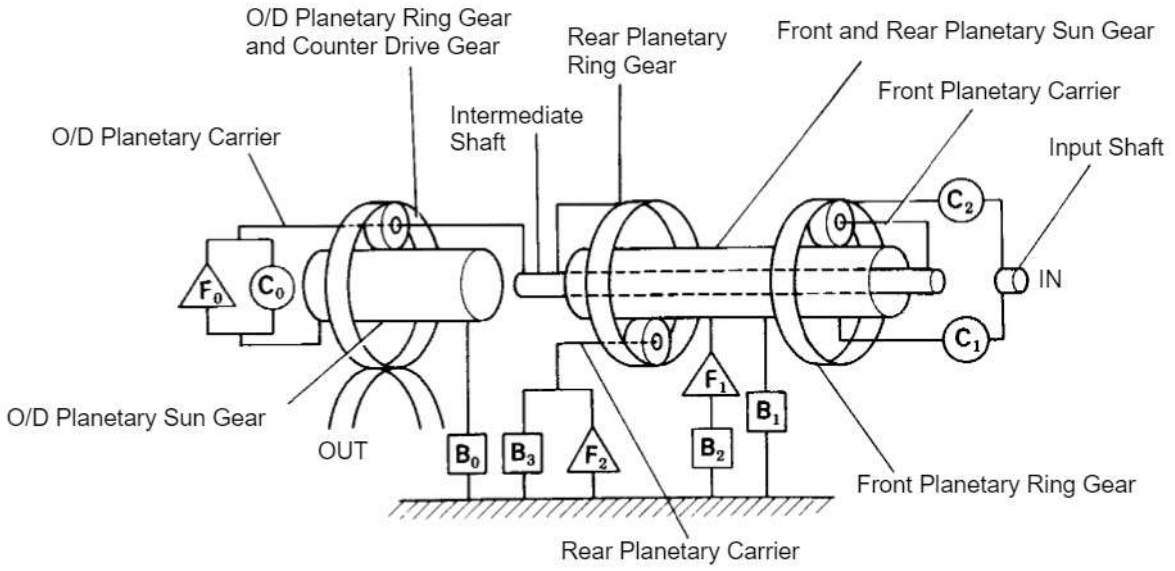
○..... **Operating**

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

FUNCTION OF COMPONENTS

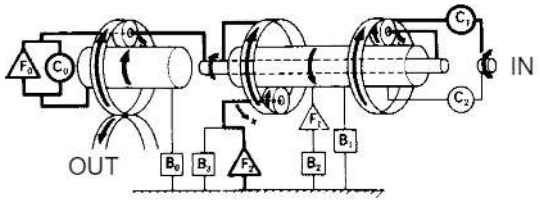
NOMENCLATURE		OPERATION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents 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	B_0	When transmission 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



AT3207

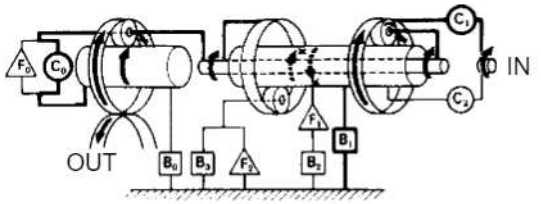
Power from the engine transmitted to the input shaft via the torque converter is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one-way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution 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 Range 1st Gear



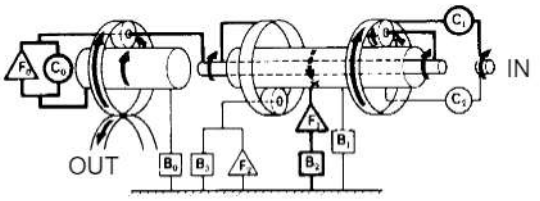
AT1097

2 Range 2nd Gear



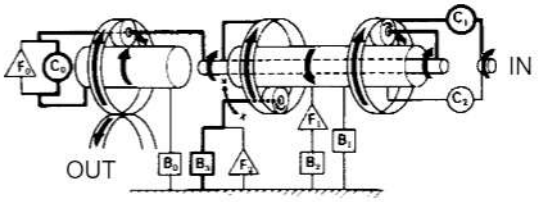
AT1102

D Range 2nd Gear



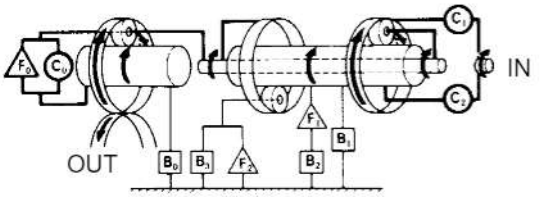
AT1098

L Range 1st Gear



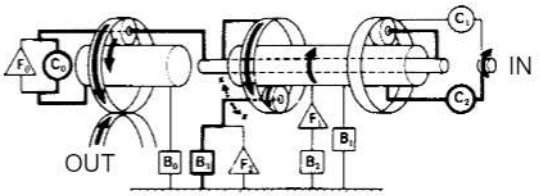
AT1103

D Range 3rd Gear



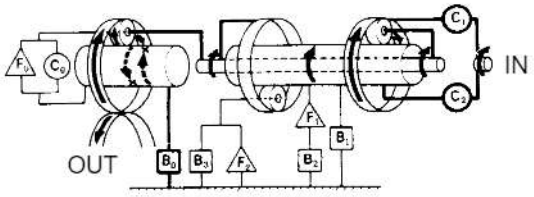
AT1099

R Range Reverse Gear



AT1101

D Range O/D Gear



AT1100

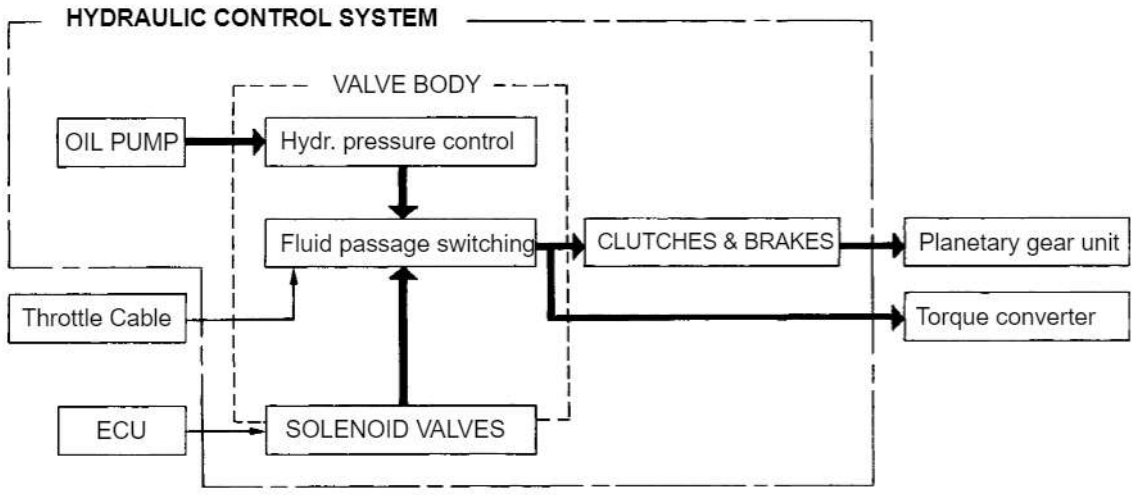
Hydraulic Control System

® A540E, A540H

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, 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 ECU to operate the shift valves and change the gear shift position.
The No. 3 solenoid valve is operated by signals from the ECU to engage or disengage the lock-up clutch of the torque converter.

® A540H

There are two center differential control solenoid valves on the transfer.
The solenoid valves are adjusting the center differential control pressure.



COMPONENT PARTS

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 can not 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: **A540E ATF DEXRON® II**
A540H ATF Type T or equivalent
Recommended oil for the transfer: Transaxle oil **E50, API GL5, SAE 75W-90** or equivalent

GENERAL CLEANING NOTES:

1. All disassembled parts should be washed clean, with 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 transaxle fluid or kerosene in your face.
3. The recommended automatic transaxle fluid or kerosene should be used for cleaning.

PARTS ARRANGEMENT:

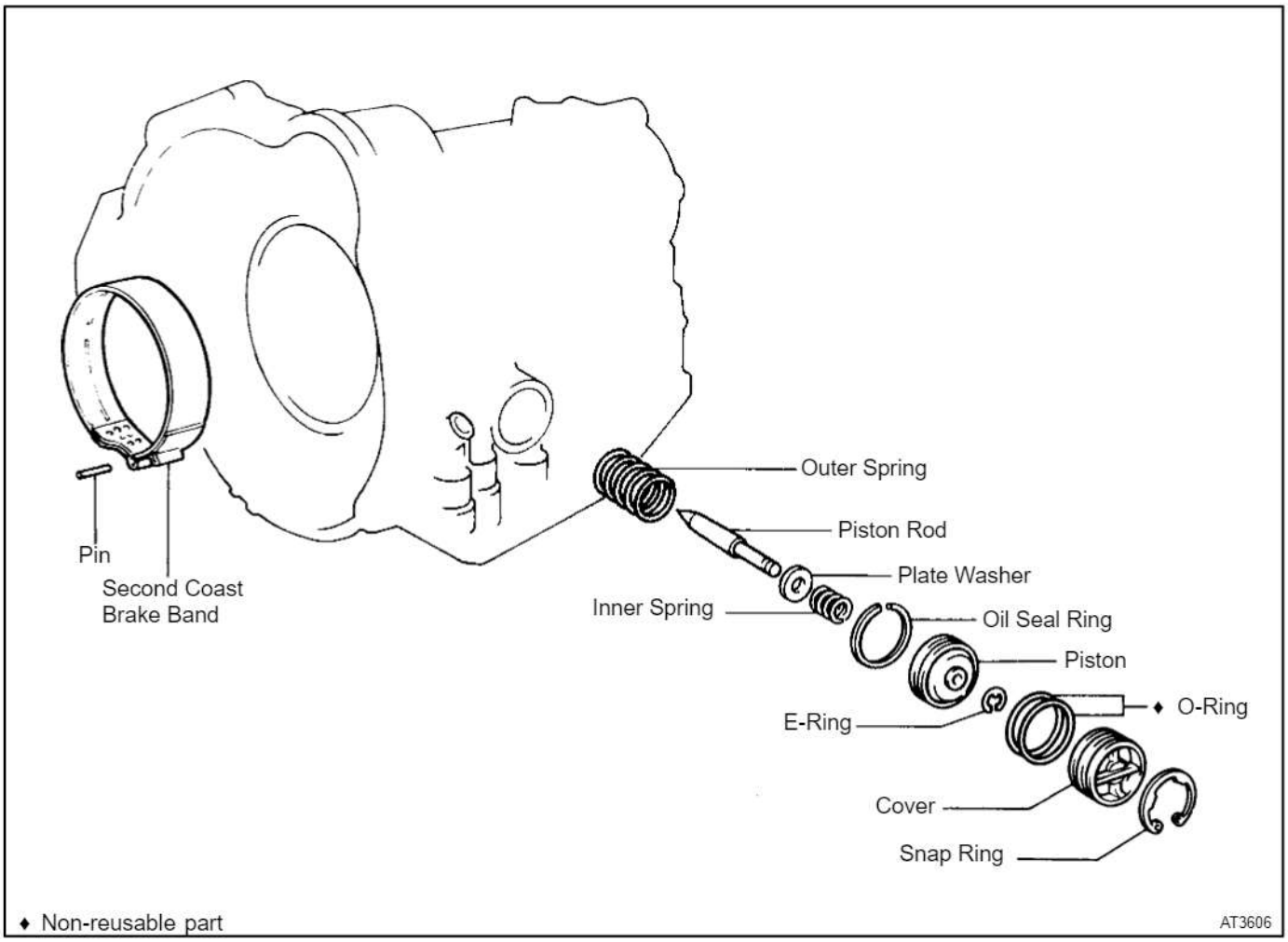
1. After cleaning, the parts should be arranged in proper order to allow efficient inspection, repairs, and reassembly.
2. When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
3. New brakes and clutches that are to be used for replacement must be soaked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

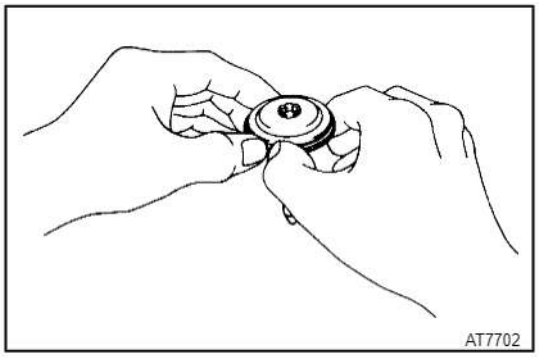
GENERAL ASSEMBLY:

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

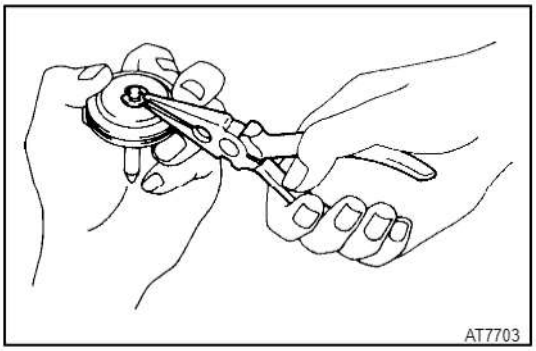




DISASSEMBLY OF SECOND COAST BRAKE PISTON

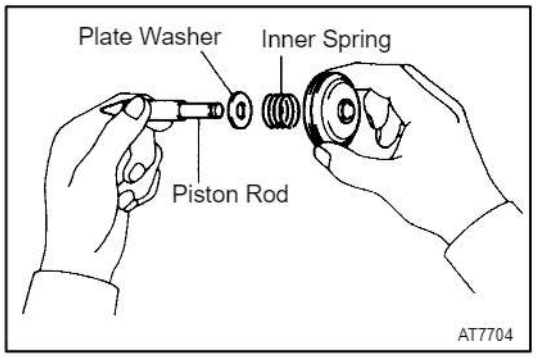
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

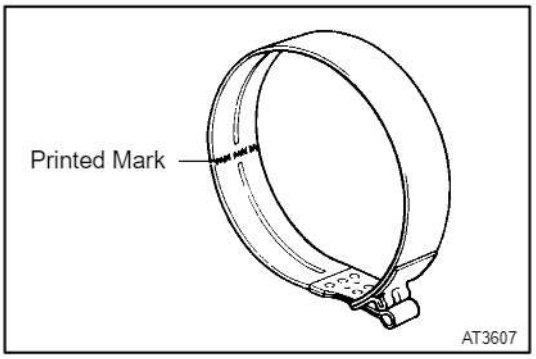


2. REMOVE PISTON ROD

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

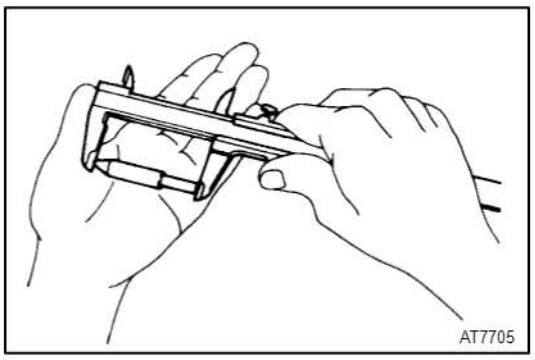


(b) Remove the inner spring, plate washer and piston rod.



INSPECTION OF SECOND COAST BRAKE COMPONENT

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



ASSEMBLY OF SECOND COAST BRAKE PISTON

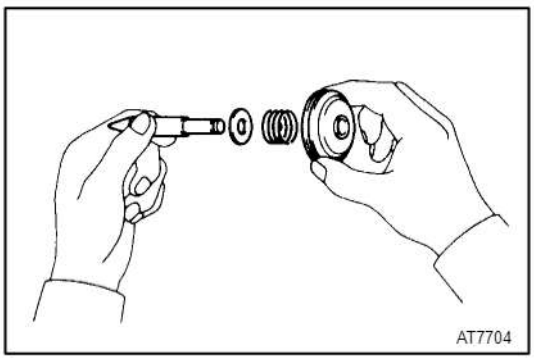
1. SELECT PISTON ROD

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

Piston stroke: 2.0 - 3.5 mm (0.079 - 0.138 in.)

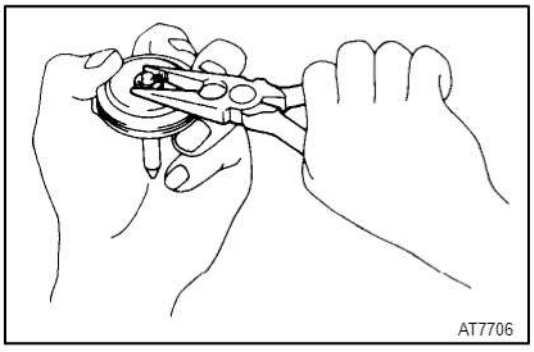
There are two lengths of piston rod.

Piston rod length: 95.2 mm (3.748 in.)
96.3 mm (3.791 in.)

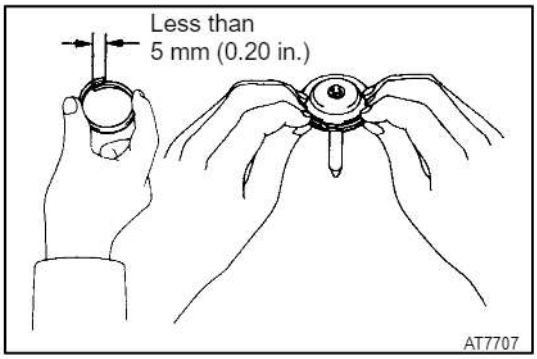


2. INSTALL PISTON ROD

(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

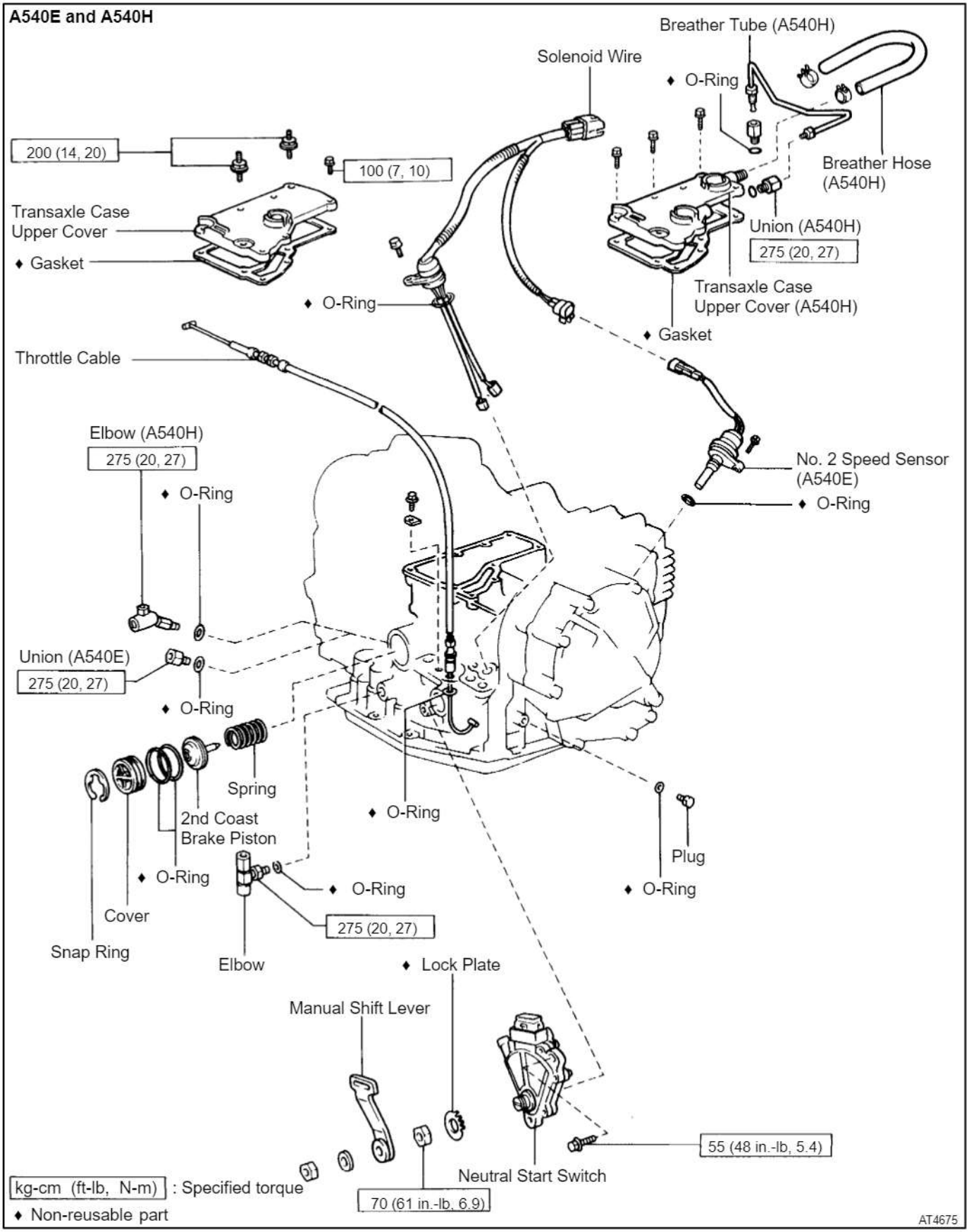
(a) Apply ATF to the oil seal ring.

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

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

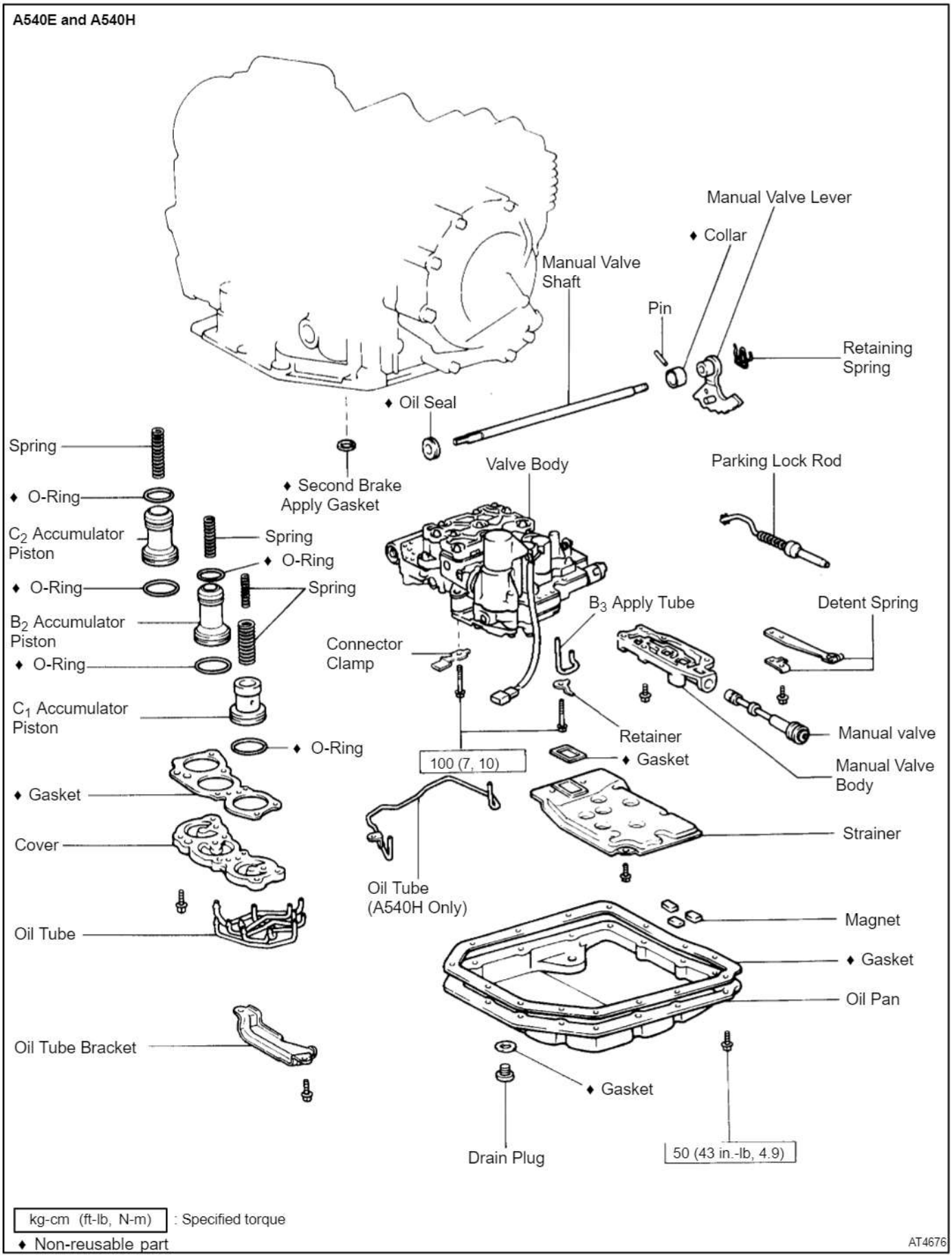
REMOVAL OF COMPONENT PARTS

COMPONENTS



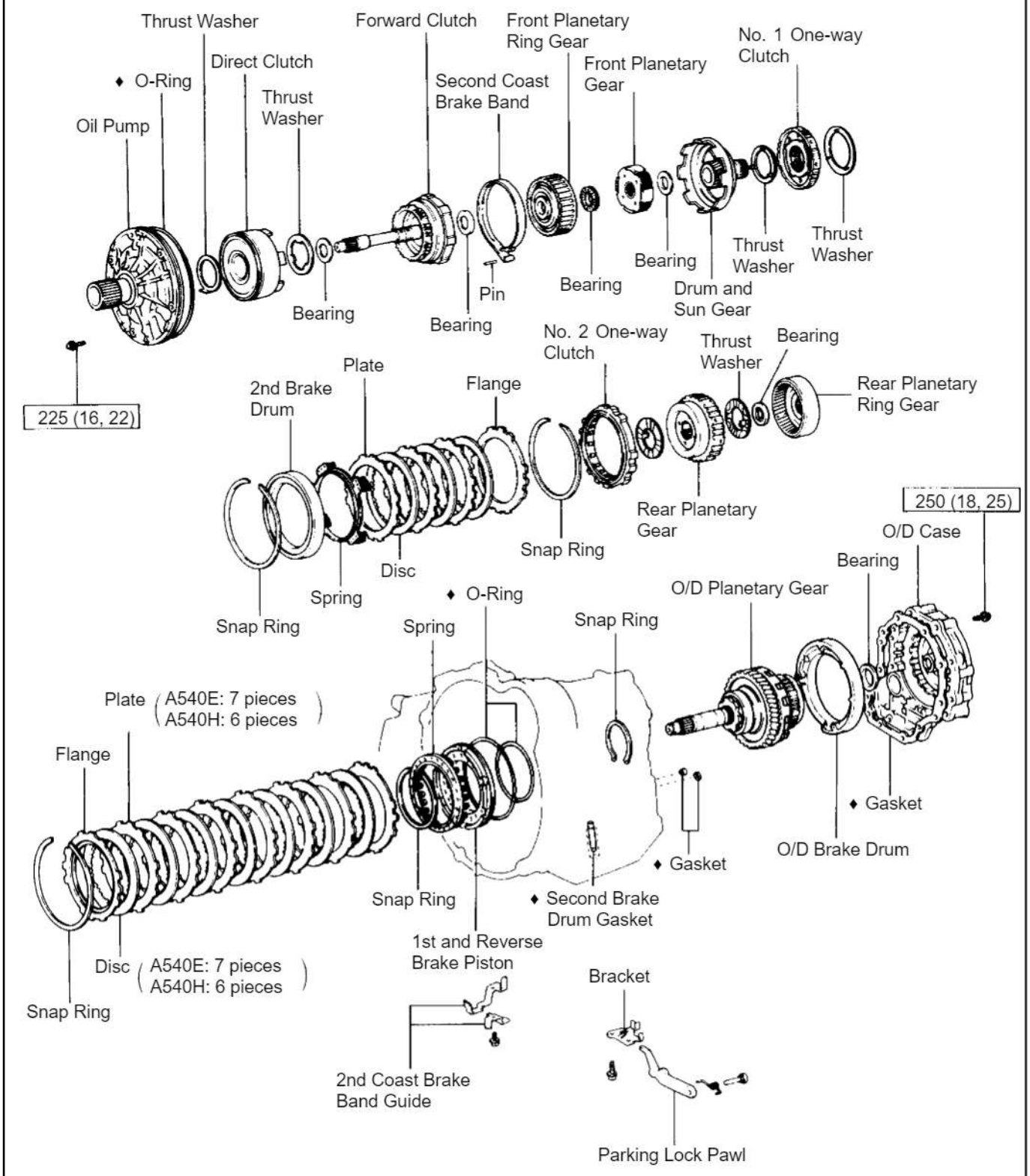
COMPONENTS (Cont'd)

A540E and A540H



COMPONENTS (Cont'd)

A540E and A540H



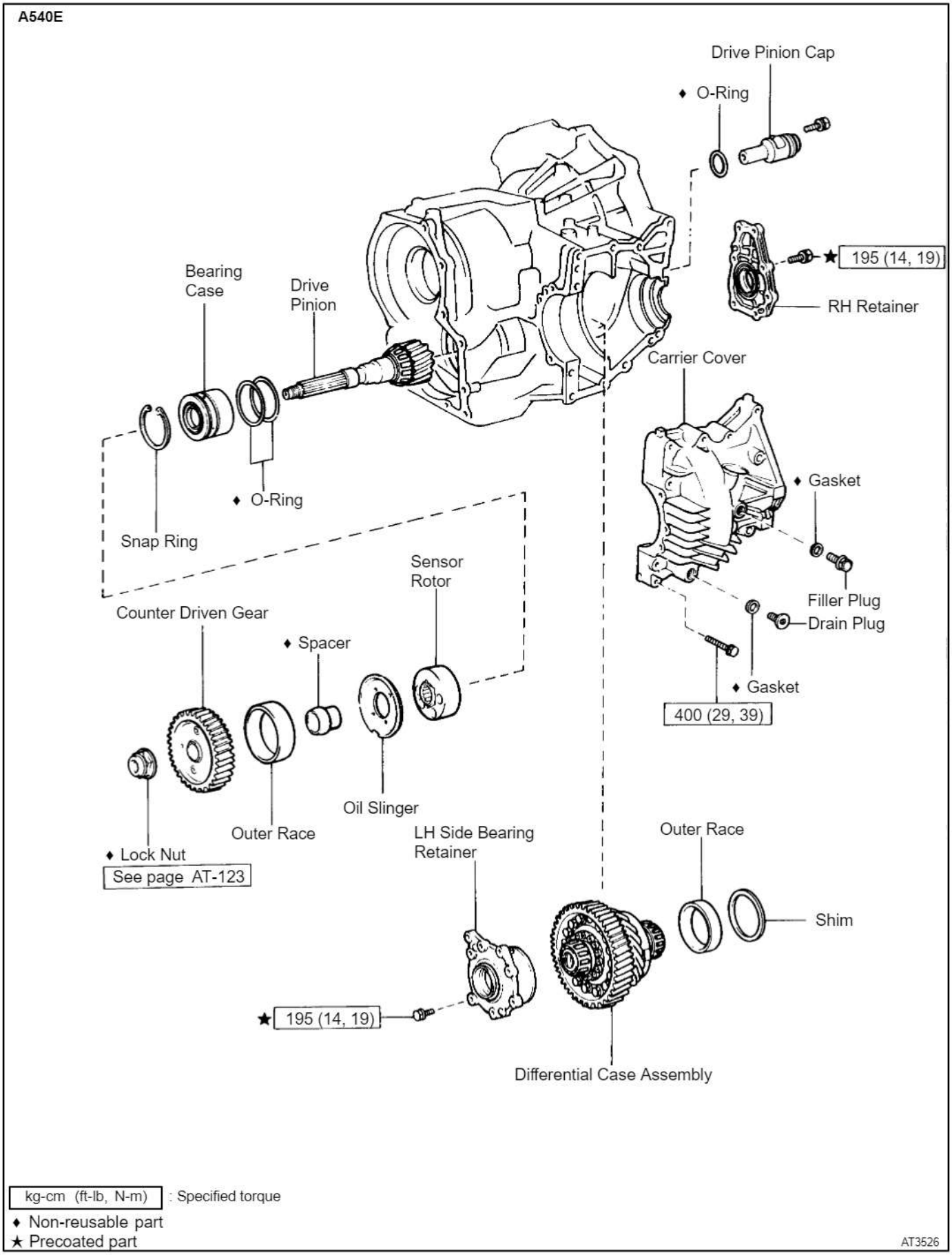
kg-cm (ft-lb, N-m) : Specified torque

♦ Non-reusable part

AT5020

COMPONENTS (Cont'd)

A540E



kg-cm (ft-lb, N-m) : Specified torque

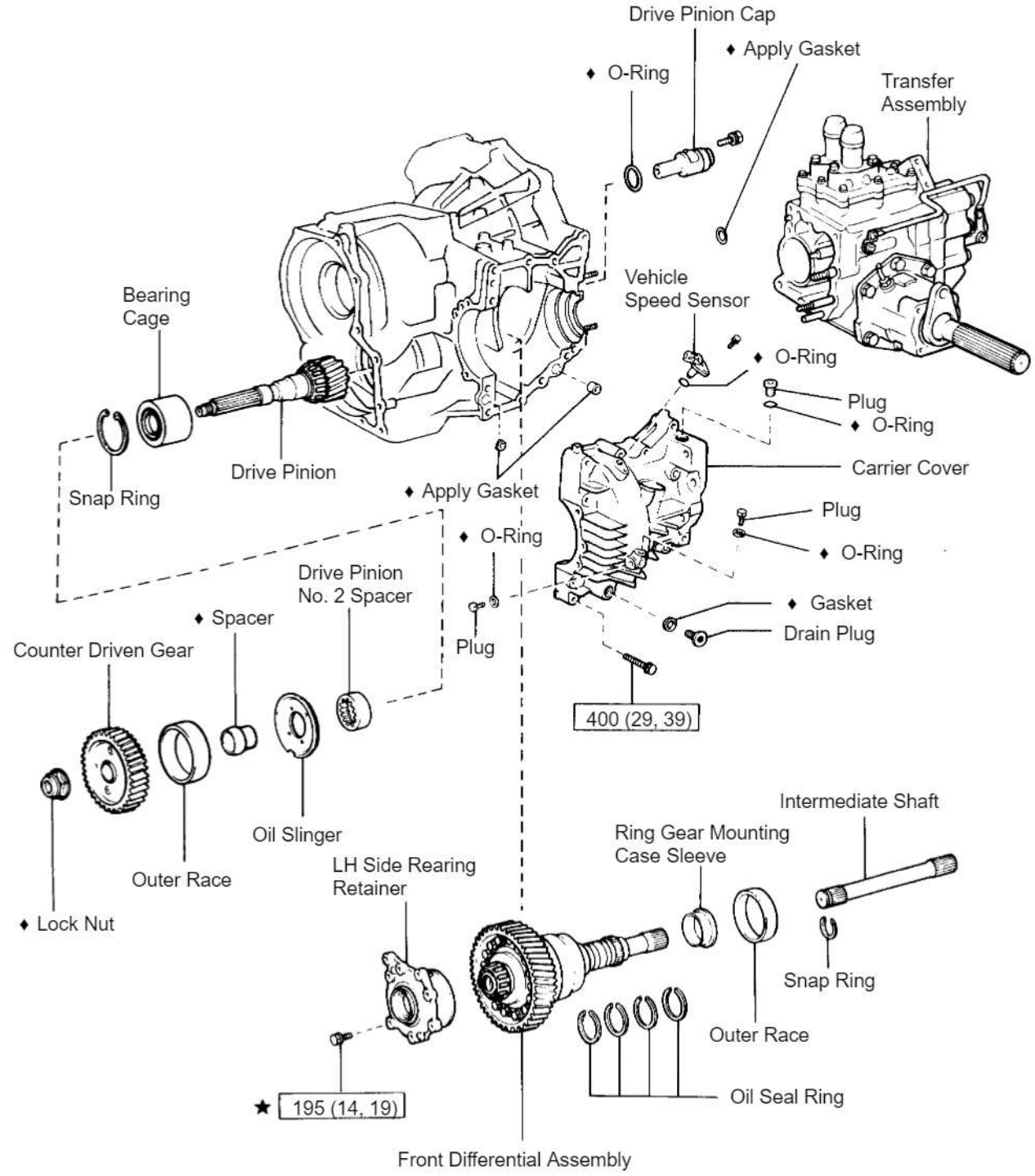
♦ Non-reusable part

★ Precoated part

AT3526

COMPONENTS (Cont'd)

A540H

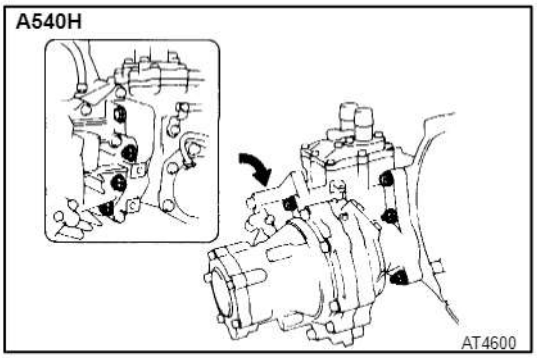


kg-cm (ft-lb, N-m) : Specified torque

♦ Non-reusable part

★Precoated part

AT4677

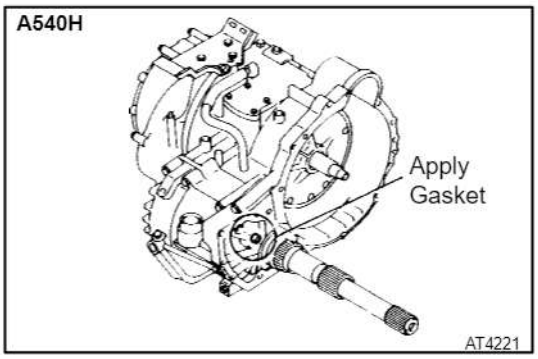


SEPARATE BASIC SUBASSEMBLY

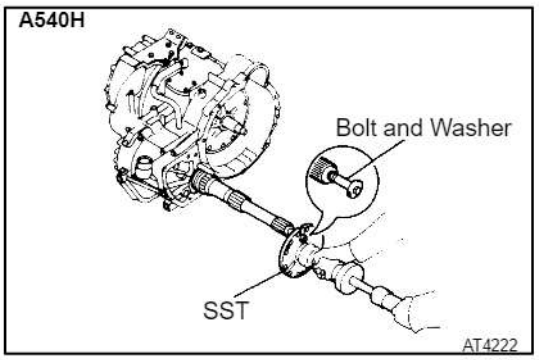
1. (A540H)
REMOVE TRANSFER ASSEMBLY

(a) Remove the five nuts and three bolts.

(b) Using a plastic hammer, remove the transfer assembly form the transaxle.



2. (A540H)
REMOVE APPLY GASKET

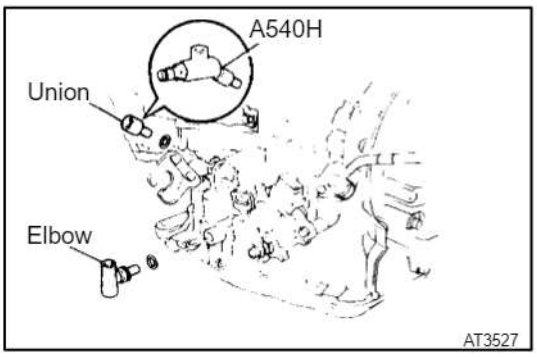


3. (A540H)
REMOVE DIFFERENTIAL SIDE GEAR INTERMEDIATE SHAFT

(a) Screw in suitable bolt with washer into the side gear intermediate shaft.

(b) Using SST, remove the side gear intermediate shaft.

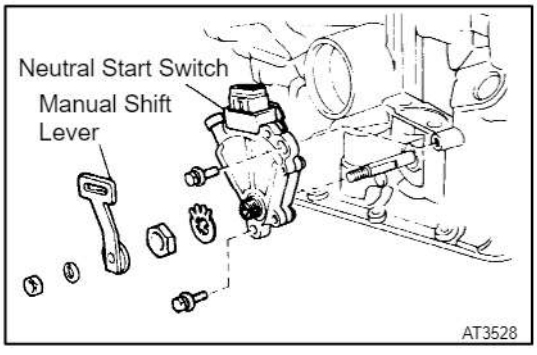
SST 09520-32012



4. REMOVE UNION AND ELBOW

(a) Using an open end wrench, remove the union and elbow.

(b) Remove the O-rings from the union and elbow.

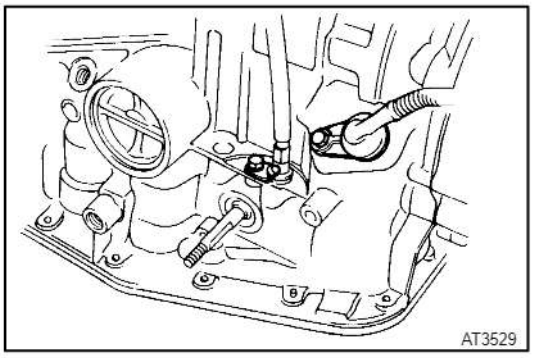


5. REMOVE NEUTRAL START SWITCH

(a) Remove the manual shift lever.

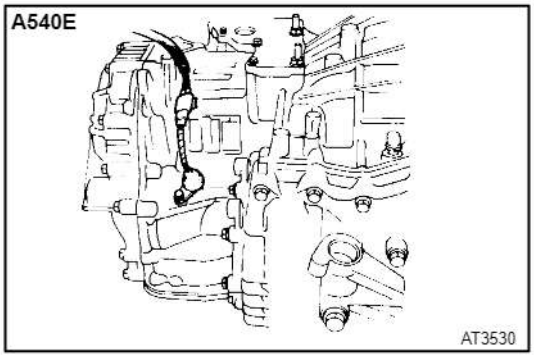
(b) Pry off the lock washer and remove the manual valve shaft nut.

(c) Remove the two bolts and pull out the neutral start switch.



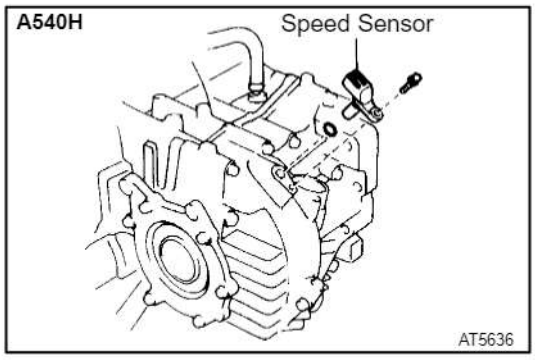
6. REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE

7. REMOVE SOLENOID WIRE RETAINING BOLT



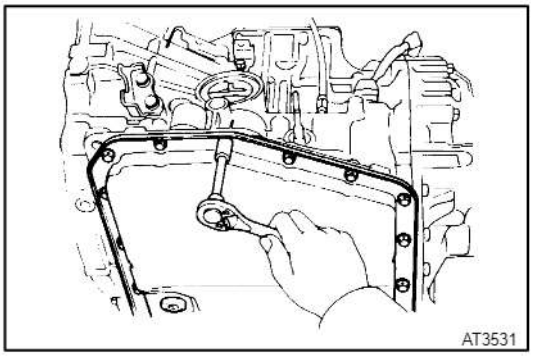
8. (A540E)
REMOVE NO. 2 SPEED SENSOR

(a) Disconnect the connector.
(b) Remove the bolt and pull out the speed sensor.
(c) Remove the O-ring from speed sensor.



9. (A540H)
REMOVE VEHICLE SPEED SENSOR

(a) Remove the bolt and pull out the speed sensor.
(b) Remove the O-ring from speed sensor.

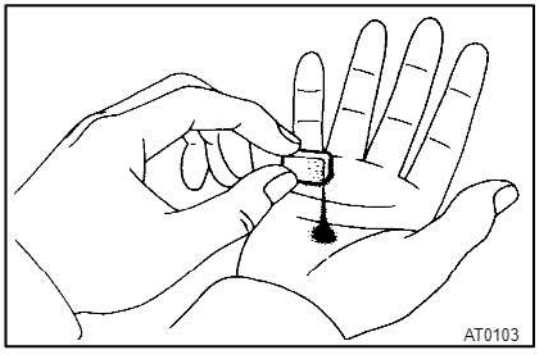


10. REMOVE OIL PAN AND GASKET

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

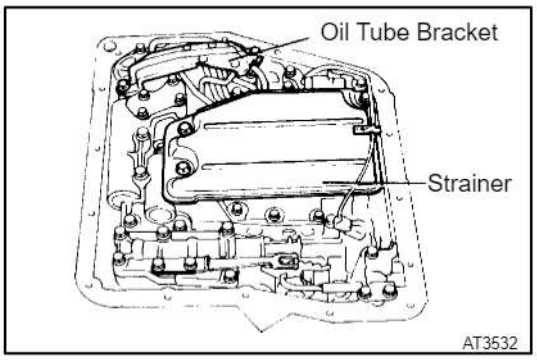
NOTICE: Do not turn the transaxle over as this will contaminate the valve body with the foreign materials in the bottom of the oil pan.

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

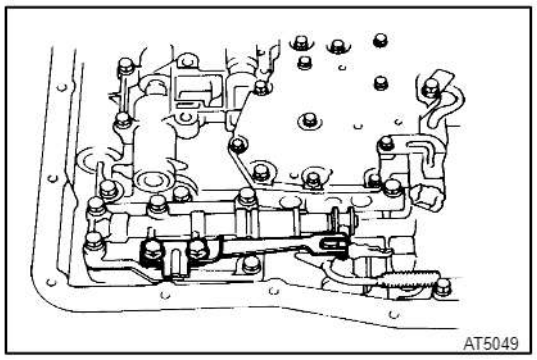


11. EXAMINE PARTICLES IN PAN

Remove the magnet and use it to collect any steel chips. Look carefully at the chips and particles in the oil pan and on the 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

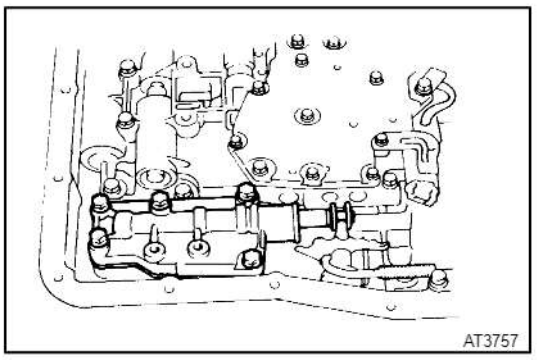


12. REMOVE OIL TUBE BRACKET AND STRAINER



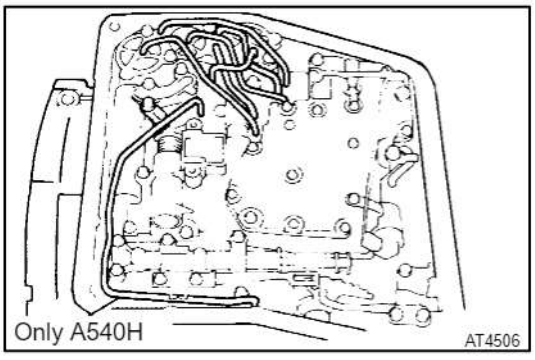
13. REMOVE MANUAL VALVE BODY

(a) Remove the two bolts and detent spring.



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

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



14. REMOVE OIL TUBES

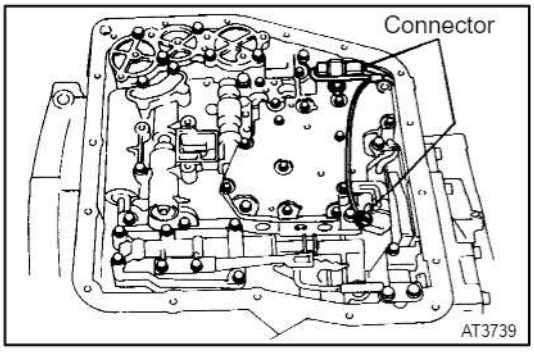
(A540E)

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

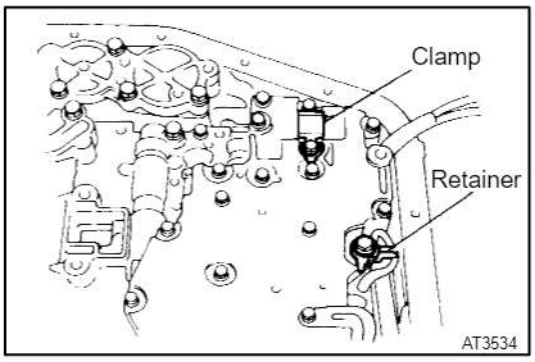
(A540H)

(a) Remove the bolt.

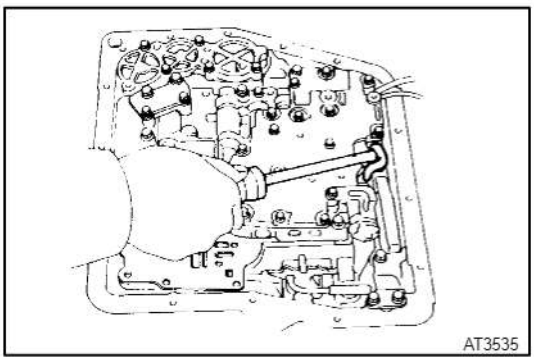
(b) Pry up both tube ends with a large screwdriver and remove the seven tubes.



15. DISCONNECT SOLENOID CONNECTORS

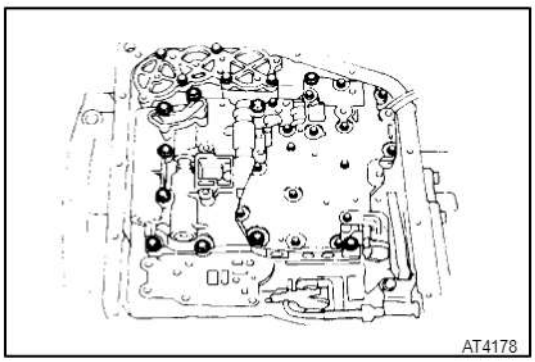


16. REMOVE CONNECTOR CLAMP AND TUBE RETAINER



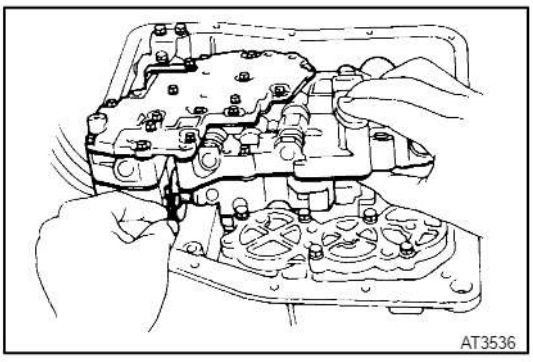
17. REMOVE B_3 APPLY TUBE

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

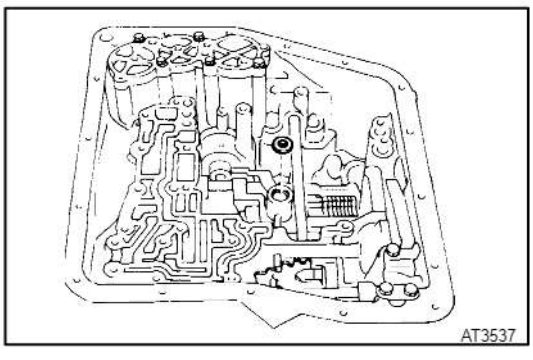


18. REMOVE VALVE BODY

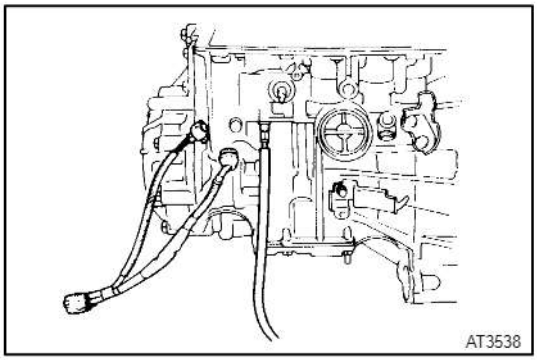
(a) Remove the ten bolts.



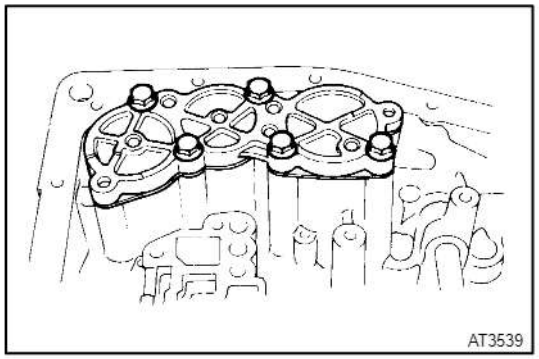
(b) Disconnect the throttle cable from the cam and remove the valve body.



19. REMOVE SECOND BRAKE APPLY GASKET



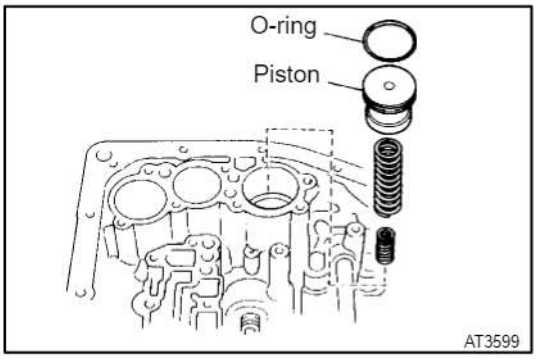
20. REMOVE THROTTLE CABLE AND SOLENOID WIRE



21. REMOVE ACCUMULATOR PISTONS AND SPRINGS

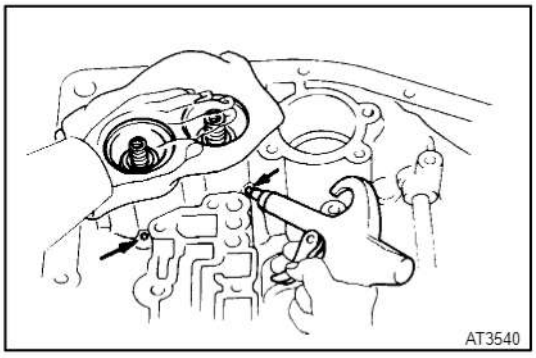
(a) Loosen the five bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



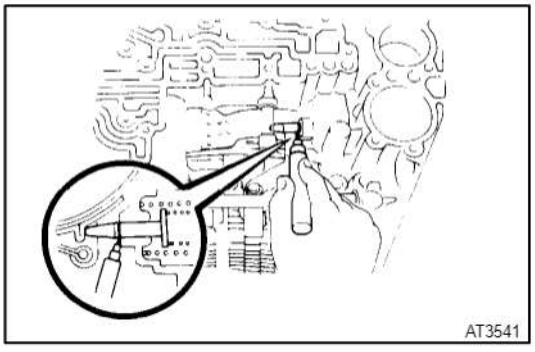
(c) Remove the C_1 accumulator piston.

(d) Remove the O-ring.



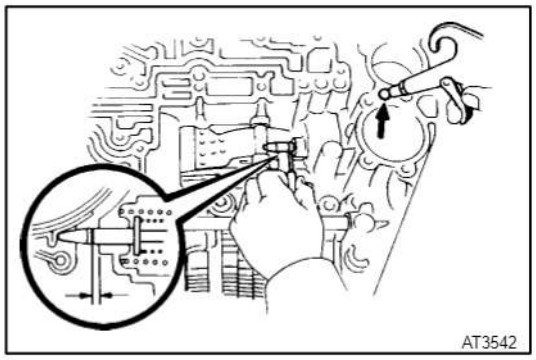
(e) Pop out pistons for C_2 and B_2 into a rag, using low-pressure compressed air (1 kg/cm^2, 14 psi or 98 kPa). Force air into the holes shown and remove the pistons and springs.

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



22. 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 as shown in the illustration.

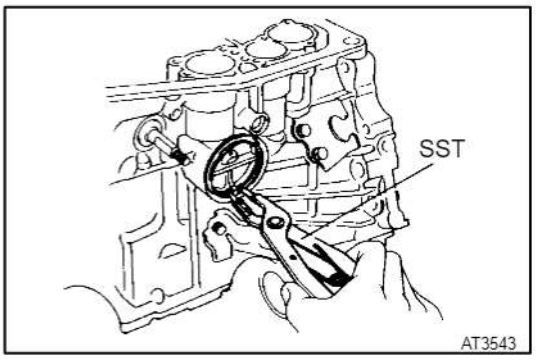


(b) Using SST, measure the piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2 57 - 114 psi or 392 - 785 kPa) as shown.

SST 09240-00020

Piston stroke: 2.0 - 3.5 mm (0.079 - 0.138 in.)

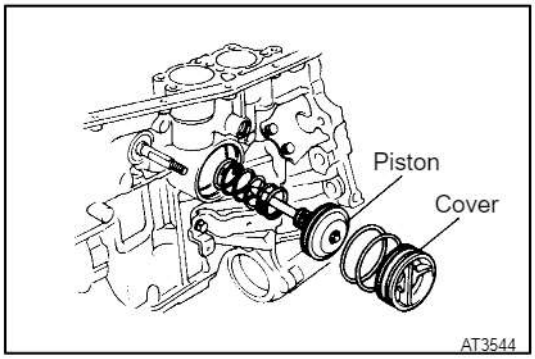
If the piston stroke exceeds the limit, inspect the second coast brake band (See page AT-41).



23. REMOVE SECOND COAST BRAKE PISTON

(a) Using SST, remove the snap ring.

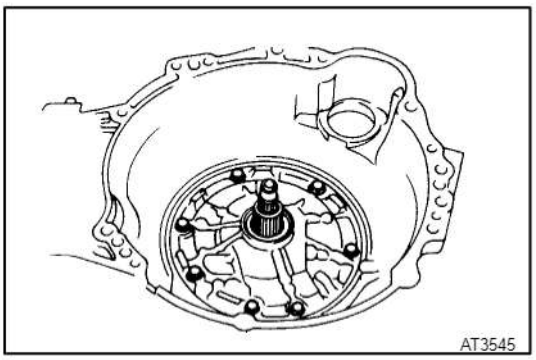
SST 09350-32014 (09351-32050)



(b) Remove the cover.

(c) Remove the piston and outer return spring.

(d) Remove the two O-rings from the cover.

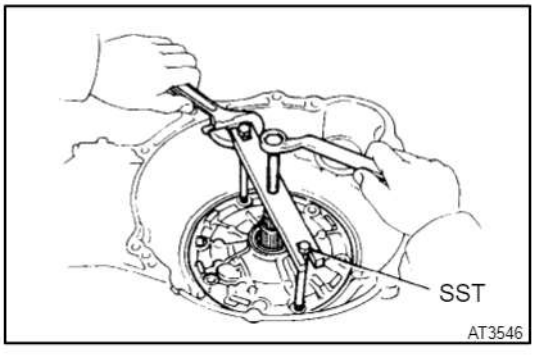


24. STAND TRANSAXLE ENGINE SIDE UPWARD

25. REMOVE OIL PUMP

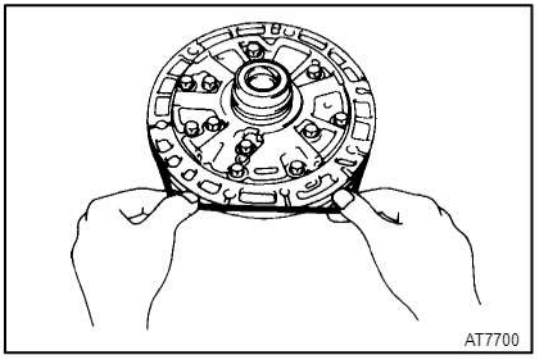
NOTICE: Before removing the oil pump, remove the second coast brake piston.

(a) Remove the seven bolts.

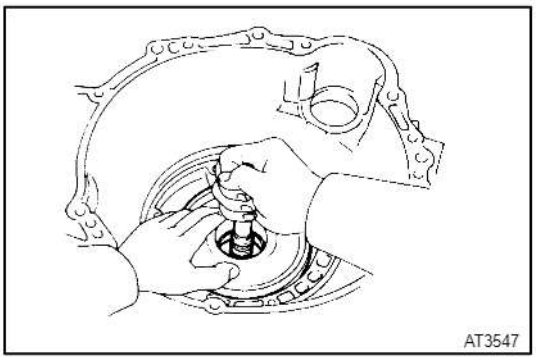


(b) Using SST, pull out the oil pump from the transaxle case.

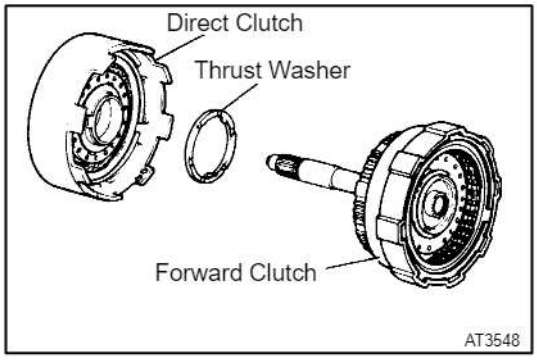
SST 09350-32014 (09351-32061)



26. REMOVE O-RING FROM OIL PUMP



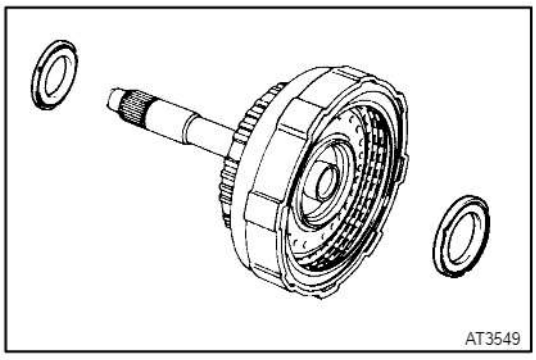
27. REMOVE DIRECT CLUTCH AND FORWARD CLUTCH



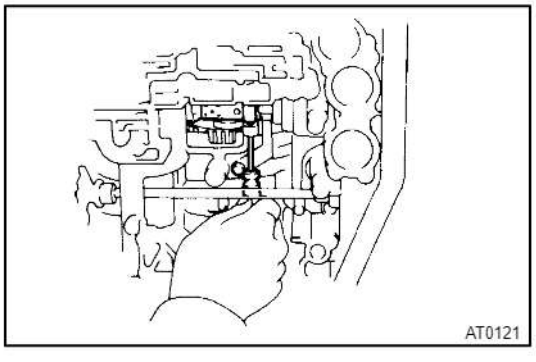
28. SEPARATE DIRECT CLUTCH AND FORWARD CLUTCH

(a) Separate the direct clutch and forward clutch.

(b) Remove the thrust washer from direct clutch.



29. REMOVE BEARINGS FROM FORWARD CLUTCH

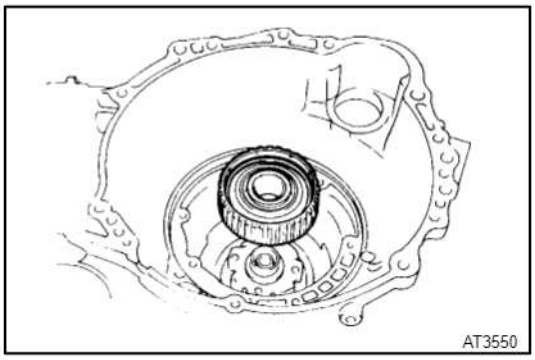


30. REMOVE SECOND COAST BRAKE BAND

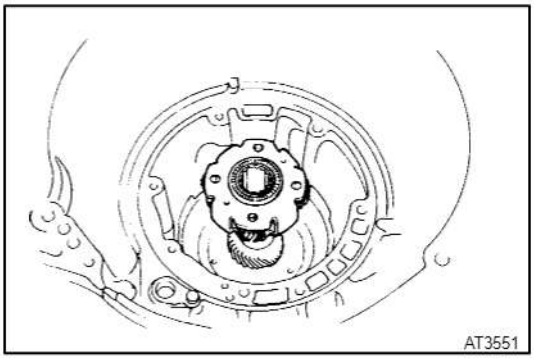
(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

HINT: For the method of inspection, refer to page AT-41.

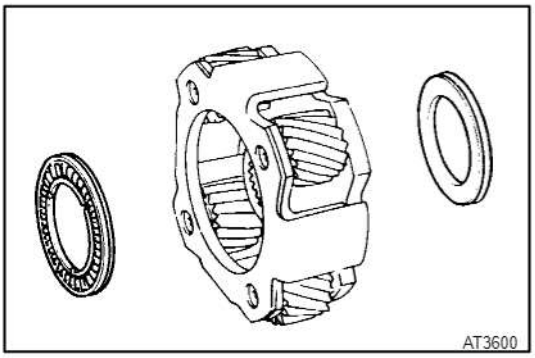


31. REMOVE FRONT PLANETARY RING GEAR

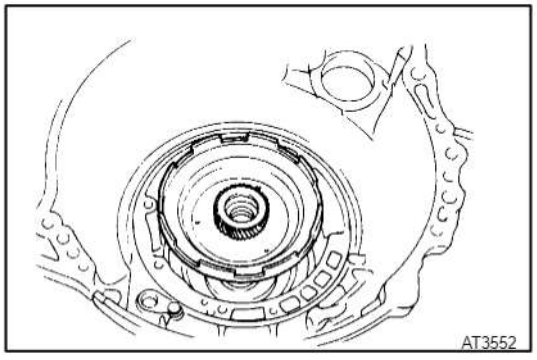


32. REMOVE FRONT PLANETARY GEAR

(a) Remove the front planetary gear.

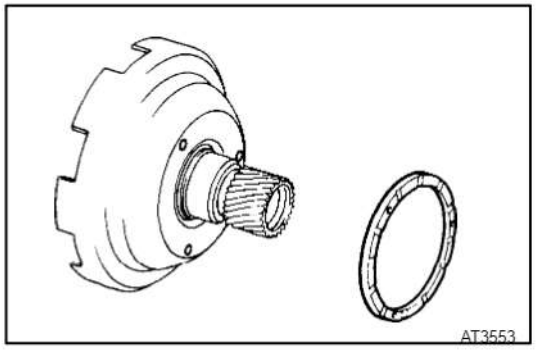


(b) Remove the two bearings from the planetary gear

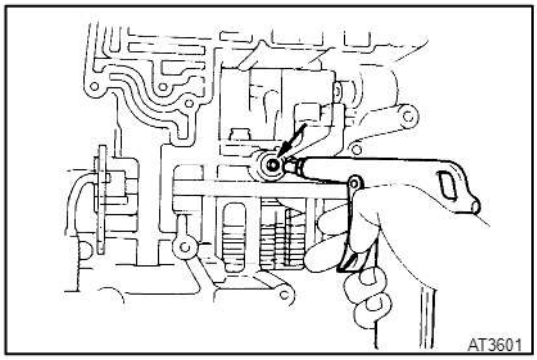


33. REMOVE SUN GEAR AND SUN GEAR INPUT DRUM

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

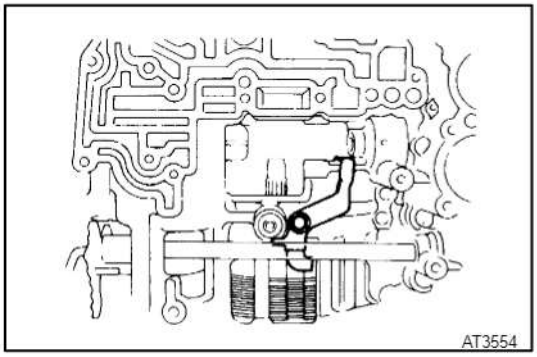


(b) Remove the thrust washer from sun gear input drum.

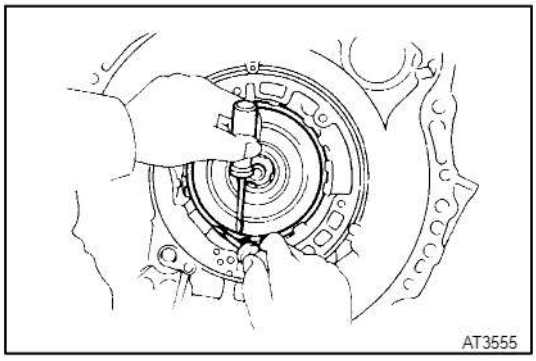


34. CHECK OPERATION OF SECOND BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassemble and inspect.

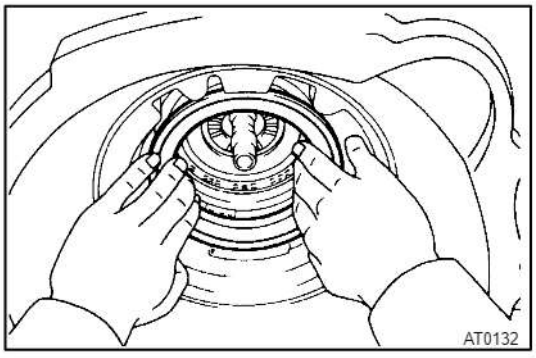


35. REMOVE SECOND COAST BRAKE BAND GUIDE

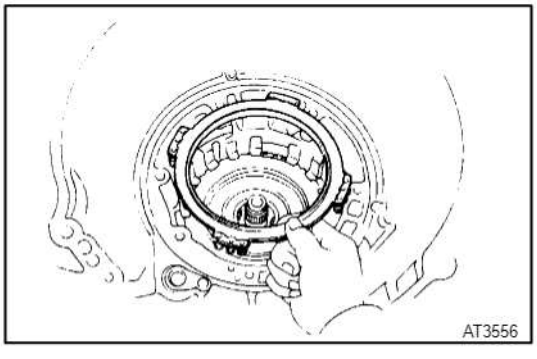


36. REMOVE SECOND BRAKE DRUM

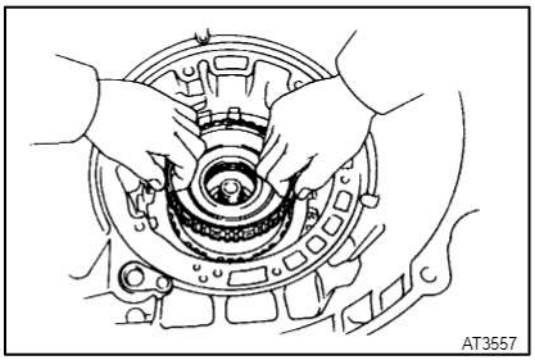
(a) Remove the snap ring.



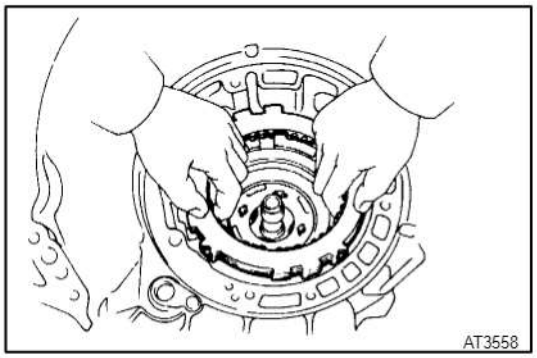
(b) Remove the second brake drum.



37. REMOVE SECOND BRAKE PISTON RETURN SPRING

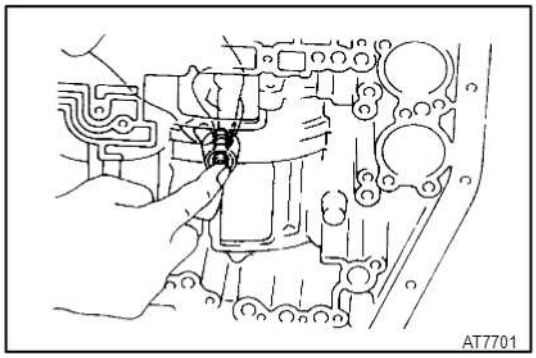


38. REMOVE NO. 1 ONE-WAY CLUTCH



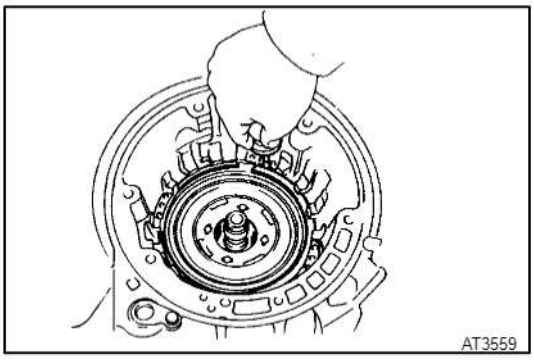
39. REMOVE PLATES, DISCS AND FLANGE

HINT: For the method of inspection, refer to page AT-62.



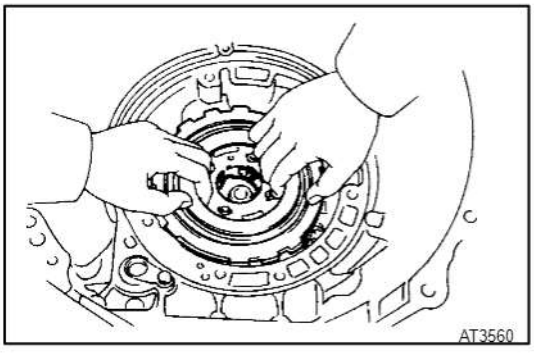
40. REMOVE SECOND BRAKE DRUM GASKET

Remove the gasket.

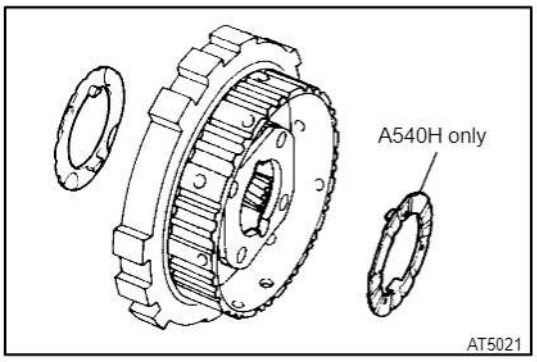


41. REMOVE NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR

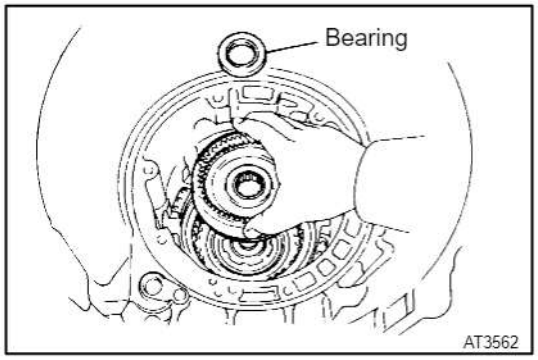
(a) Remove the snap ring.



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



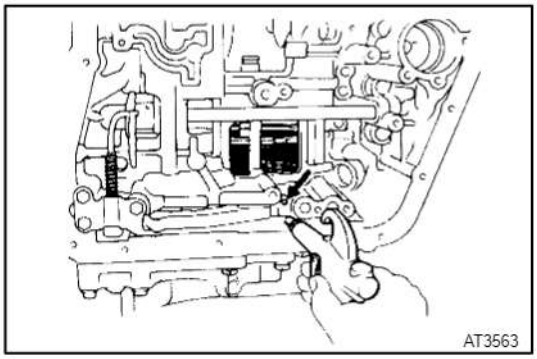
(c) Remove the thrust washer from the rear planetary gear.



42. REMOVE REAR PLANETARY RING GEAR

(a) Remove the rear planetary ring gear.

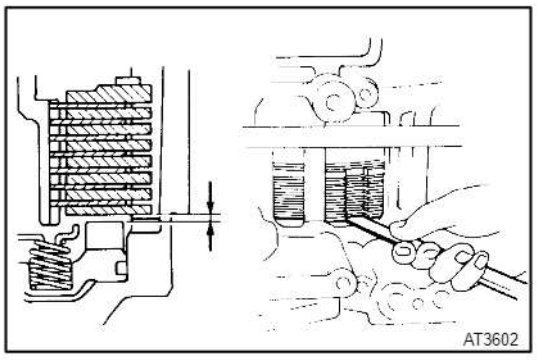
(b) Remove the bearing from the ring gear.



43. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston

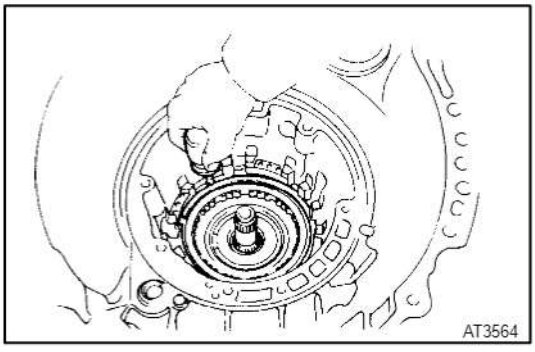
Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassemble and inspect.



(b) Using a filler gauge, check the pack clearance of the first and reverse brake.

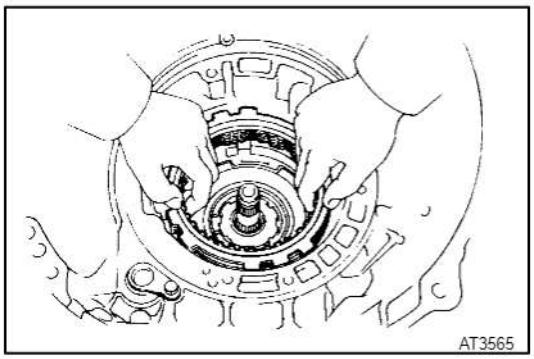
Clearance: A540E
0.85 - 2.05 mm (0.033 - 0.081 in.)
A540H
1.04 - 2.16 mm (0.041 - 0.085 in.)

If the pack clearance is not within specification, disassemble and inspect.

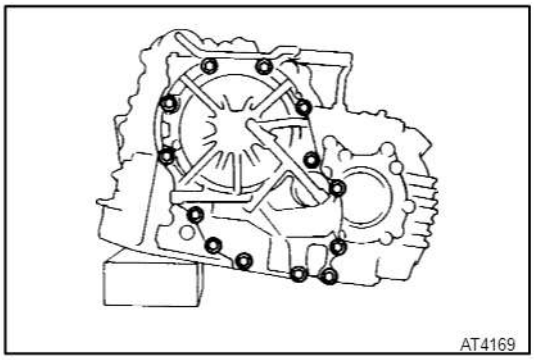


44. REMOVE FLANGE, DISCS AND PLATES OF FIRST AND REVERSE BRAKE

(a) Remove the snap ring.



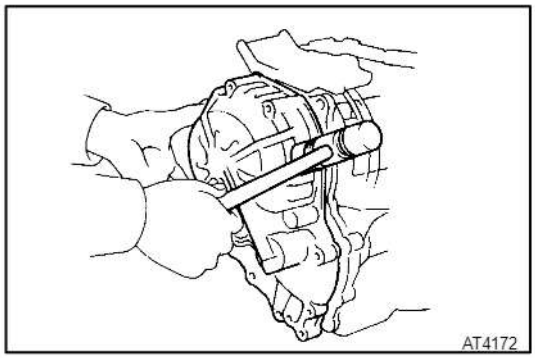
(b) Remove the flange, seven discs and seven plates.
HINT: For the method of inspection, refer to AT-66.



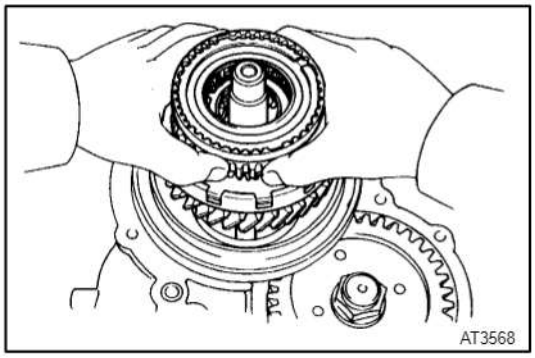
45. TURN TRANSAXLE CASE AROUND

46. REMOVE OVERDRIVE UNIT

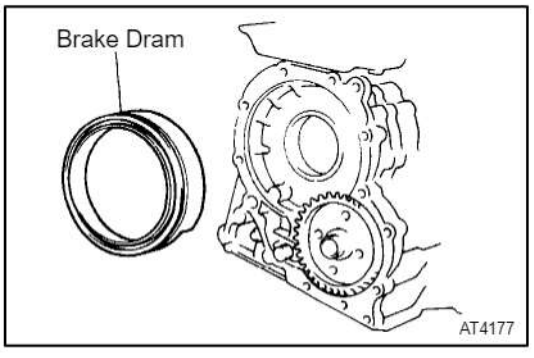
(a) Remove the thirteen bolts.



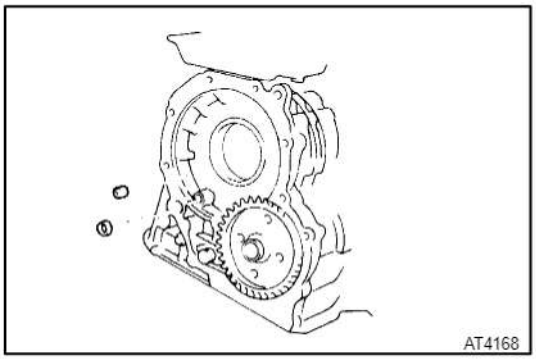
(b) Tap on the circumference of the overdrive case with a plastic hammer to remove the overdrive case and gasket.



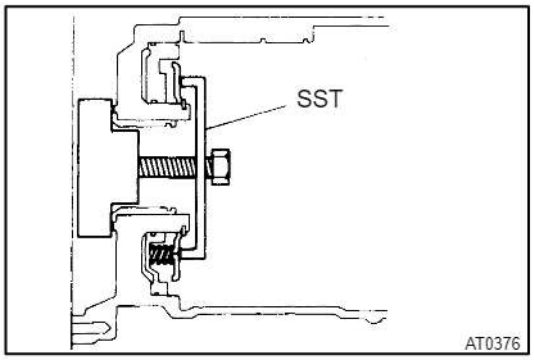
(c) Remove the overdrive planetary gear from transaxle case.



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



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

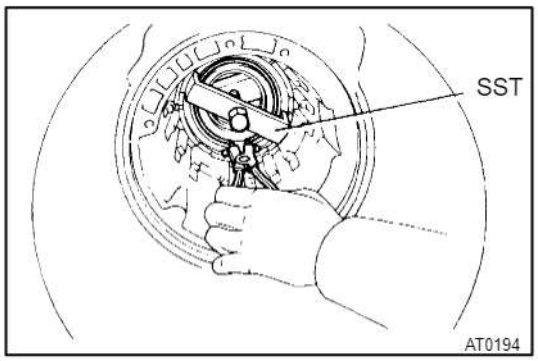


47. REMOVE FIRST AND REVERSE BRAKE PISTON

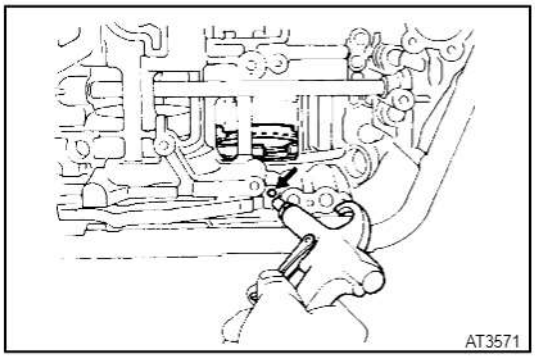
(a) Remove the piston return spring.

® **Place SST, and compress the return spring evenly by tightening the bolt gradually.**

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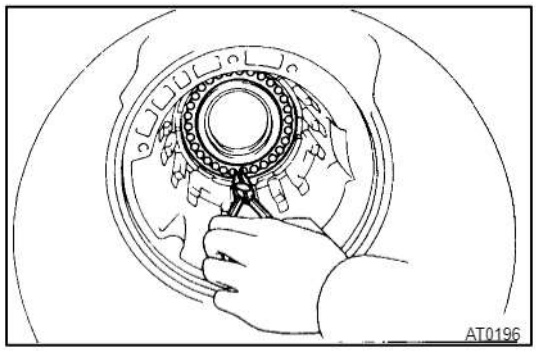


® **Using snap ring pliers, remove the snap ring.**
® **Remove SST.**
® **Remove the return spring from the case.**

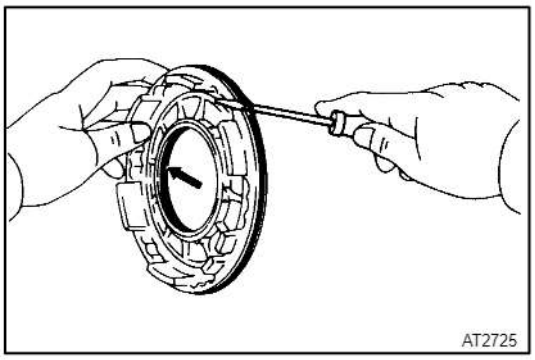


(b) Apply compressed air into the passage of the case to remove the piston.

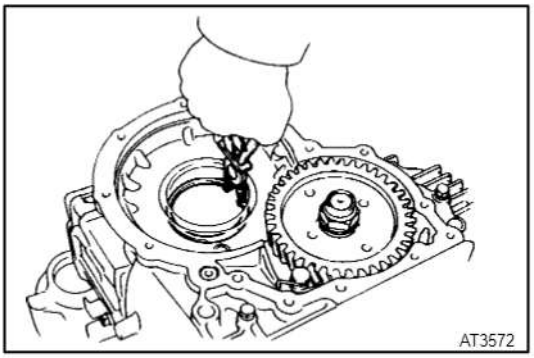
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



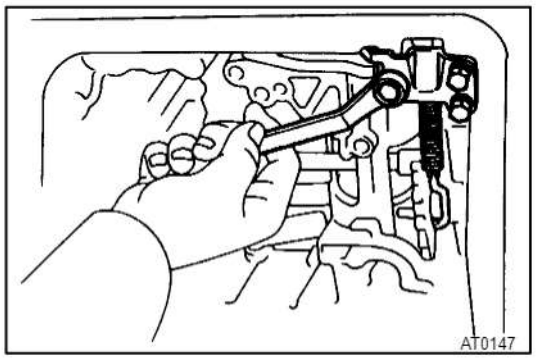
(c) If the piston does not pop out with compressed air, use needle-nose pliers to remove it.



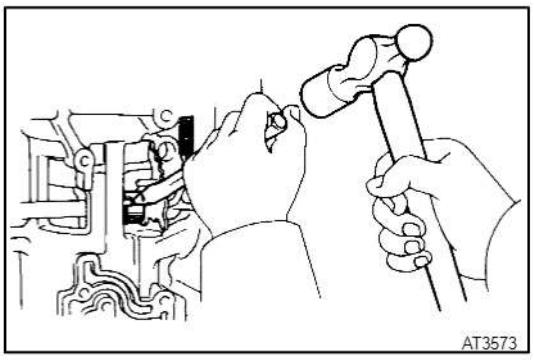
(d) Remove the two O-rings from the piston.



48. REMOVE SNAP RING FROM TRANSAXLE CASE

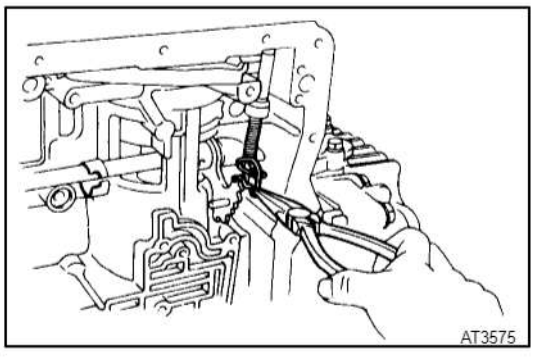


49. REMOVE PARKING LOCK PAWL BRACKET

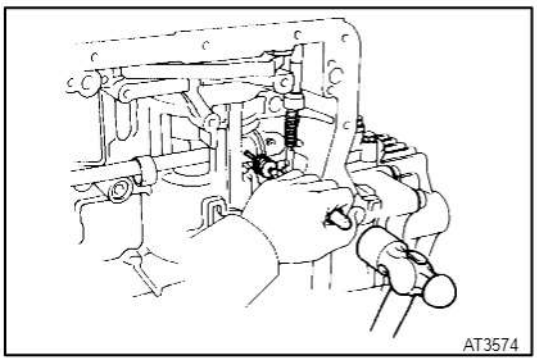


50. REMOVE MANUAL VALVE SHAFT

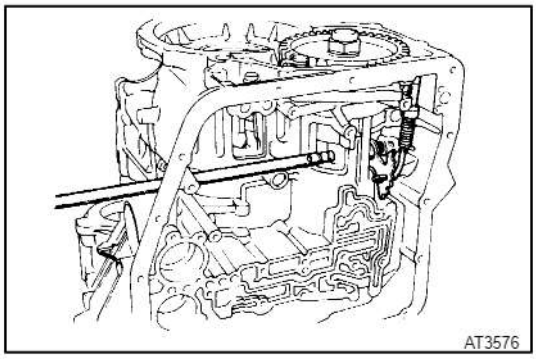
(a) Using a cold chisel and hammer, cut the collar.



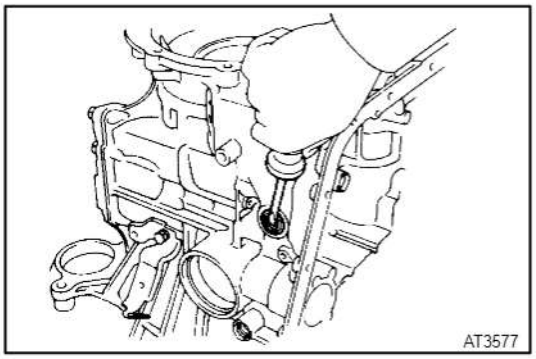
(b) Remove the retaining spring.



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

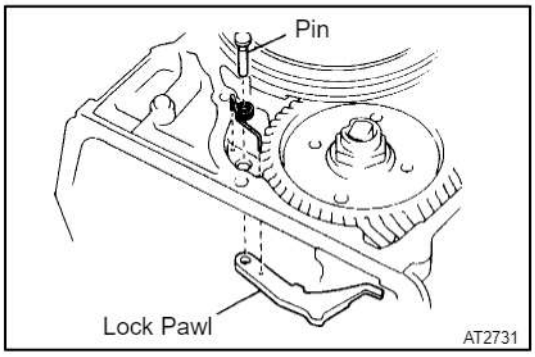


(d) Slide out the shaft from the transaxle case and remove the manual valve lever and parking lock rod.

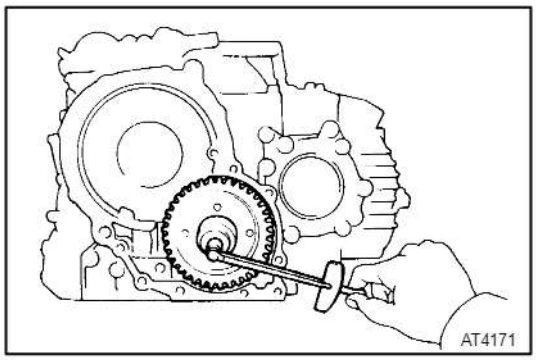


51. REMOVE MANUAL VALVE SHAFT OIL SEAL

Using a screwdriver, remove the oil seal.



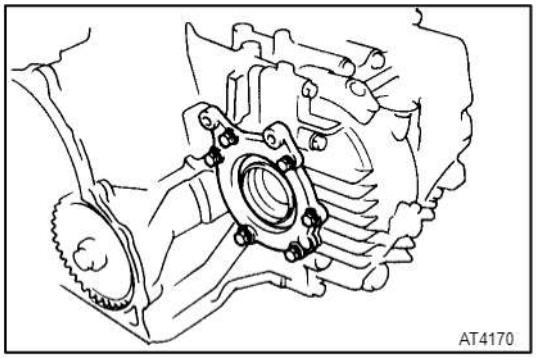
52. REMOVE PIN, SPRING AND PARKING LOCK PAWL



REMOVAL OF DIFFERENTIAL COMPONENT PARTS

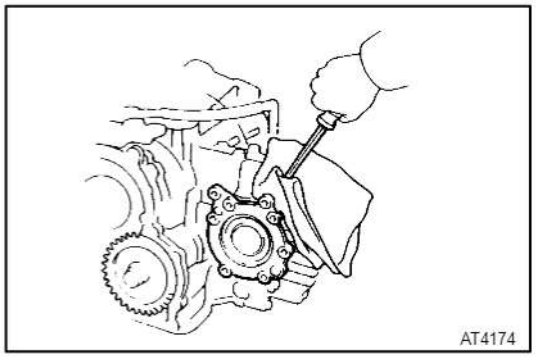
1. MEASURE DIFFERENTIAL TOTAL PRELOAD

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



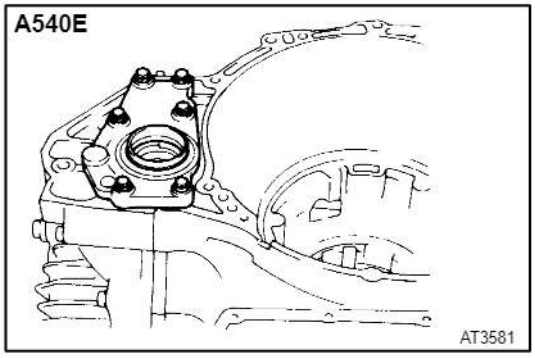
2. REMOVE LH BEARING RETAINER

(a) Remove the six bolts.



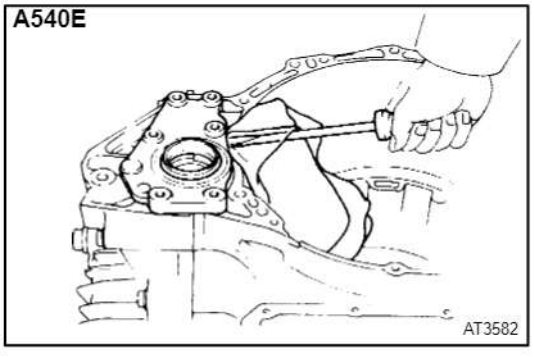
(b) Using a large screwdriver, remove the LH bearing retainer.

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



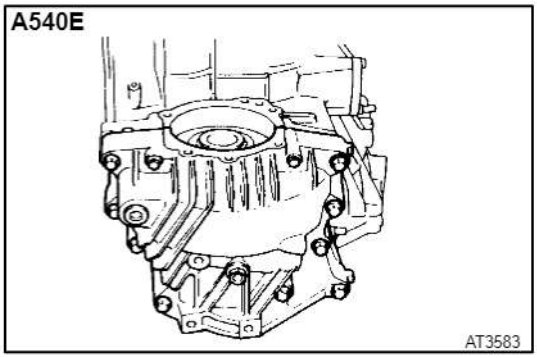
3. (A540E) REMOVE RH RETAINER

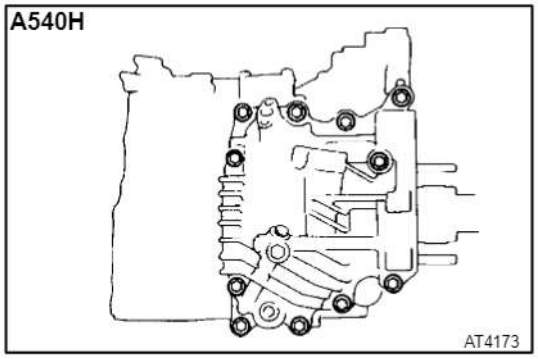
(a) Remove the six bolts.



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

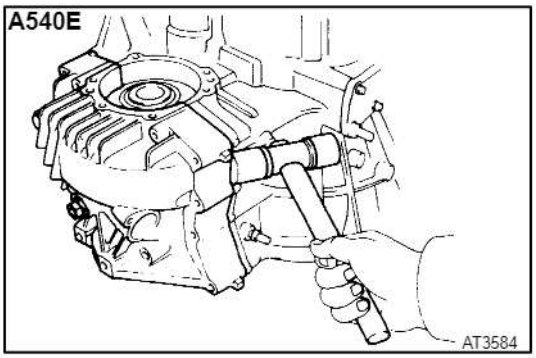
NOTICE: Wrap the screwdriver in a rag, etc. to avoid damage to the case and retainer.



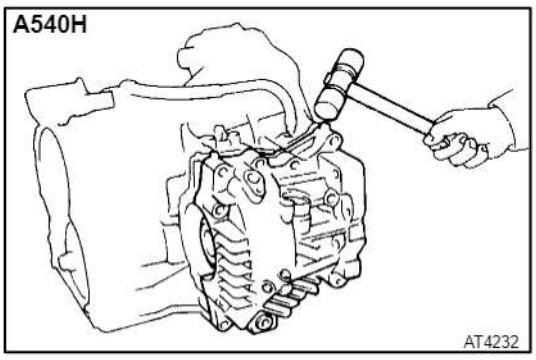


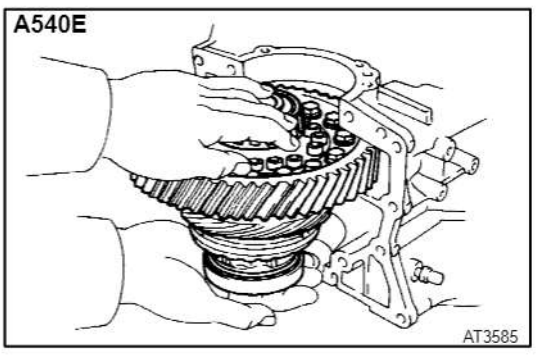
4. REMOVE CARRIER COVER

(a) Remove the eleven bolts.



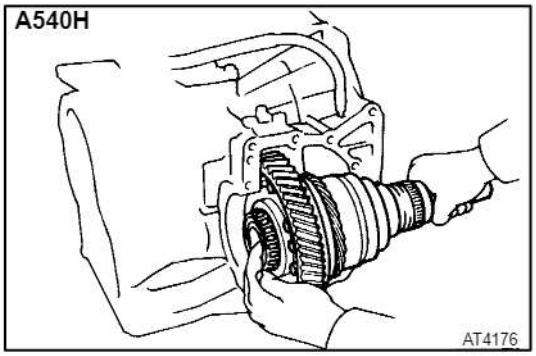
(b) Tap the carrier cover with a plastic hammer to remove it.



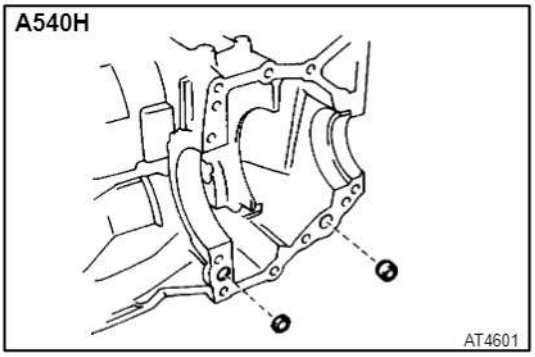


5. REMOVE DIFFERENTIAL CASE

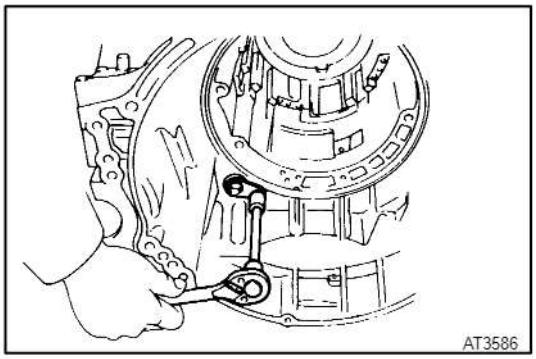
(a) (A540E)
Remove the differential case, outer race and shim from the transaxle case.



(A540H)
Remove the differential assembly.

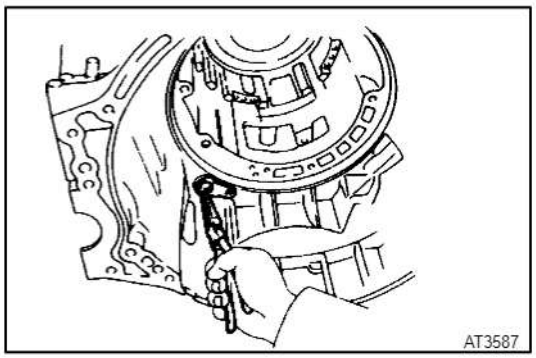


(b) Remove the two apply gaskets.



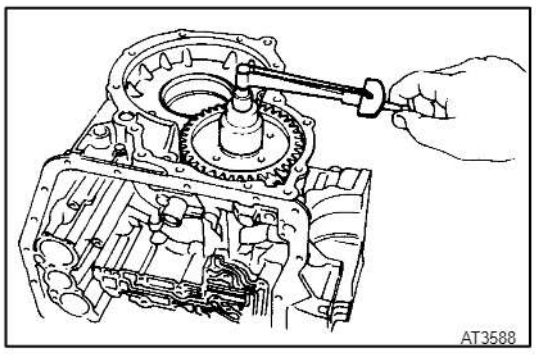
6. REMOVE DRIVE PINION CAP

(a) Remove the bolt.



(b) Using pliers, pull out the drive pinion cap.

(c) Remove the O-rings from the cap.

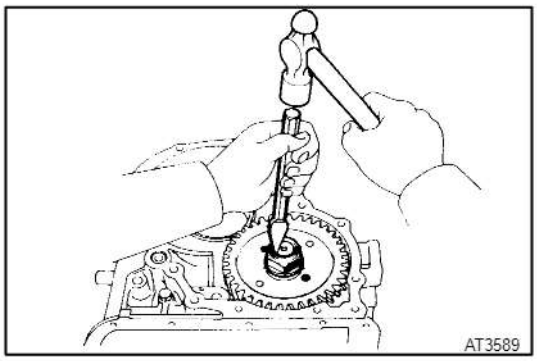


7. MEASURE DRIVE PINION PRELOAD

Using a torque meter, measure the drive pinion preload.

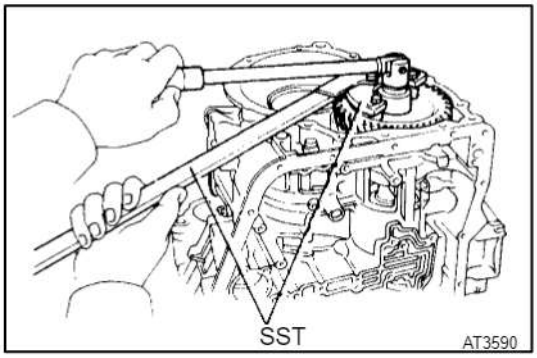
Preload (at starting): Reused bearing
5 - 8 kg-cm (4.3 - 6.9 in.-lb, 0.5 - 0.8 N-m)

The total preload measured in step 1 minus the drive pinion preload equals 1.3 - 2.0 kg-cm (1.1 - 1.7 in.-lb, 0.1 - 0.2 N-m). If the result is not within this specification, the side bearing preload is bad.

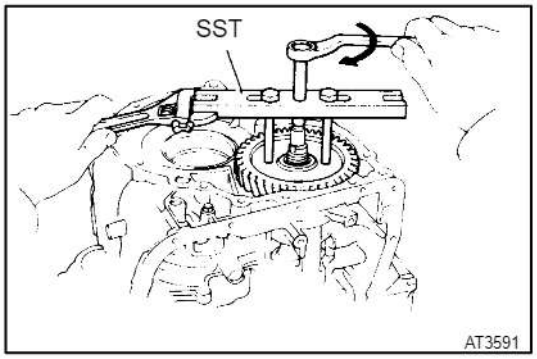


8. REMOVE COUNTER DRIVEN GEAR

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

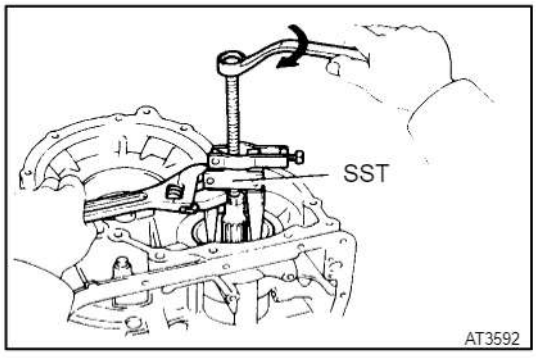


(b) Using SST to hold the gear, remove the nut.
SST 09330-00021,09350-32014 (09351-32032)

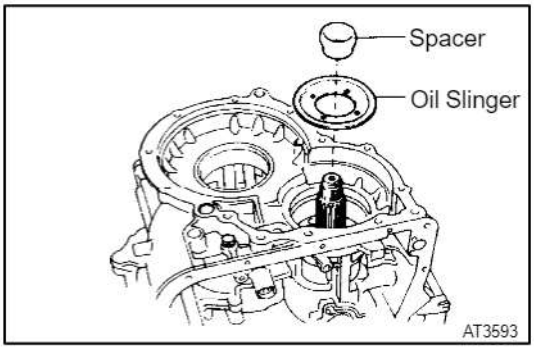


(c) Using SST, remove the gear and bearing.
SST 09350-32014 (09351-32061)

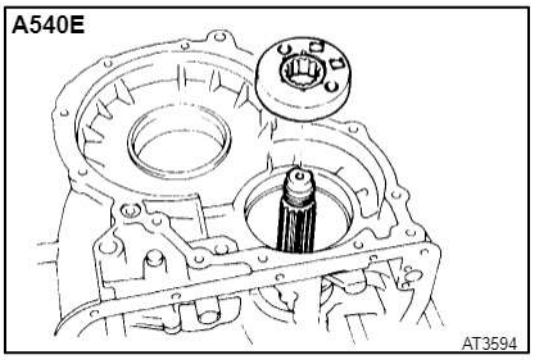
9. REMOVE OUTER RACE, SPACER AND OIL SLINGER



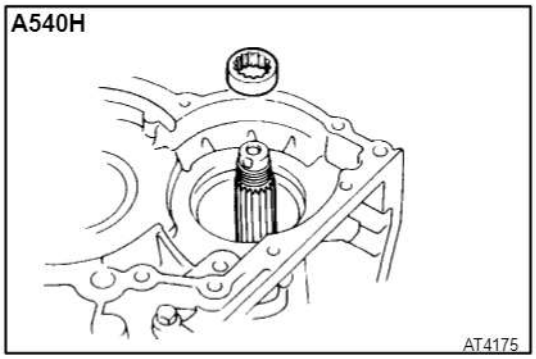
(a) Using SST, remove the outer race.
SST 09350-32014 (09308-10010)



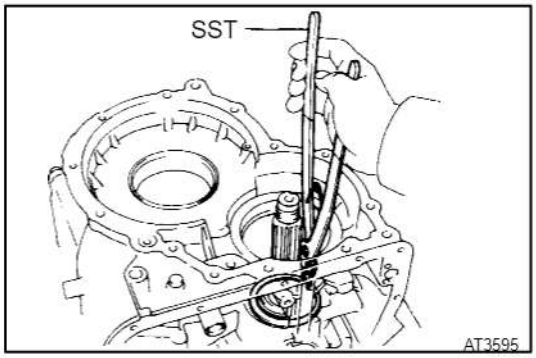
(b) Remove the spacer and oil slinger.



10. (A540E)
REMOVE SENSOR ROTOR

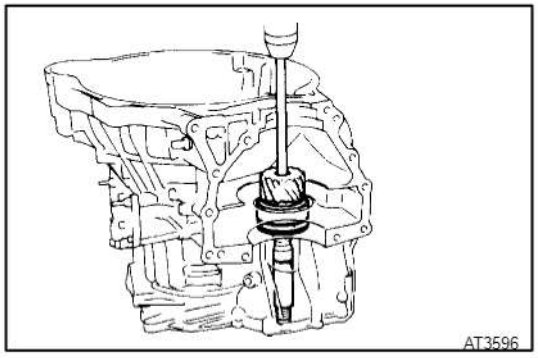


11. (A540H)
REMOVE DRIVE PINION BEARING NO. 2 SPACER



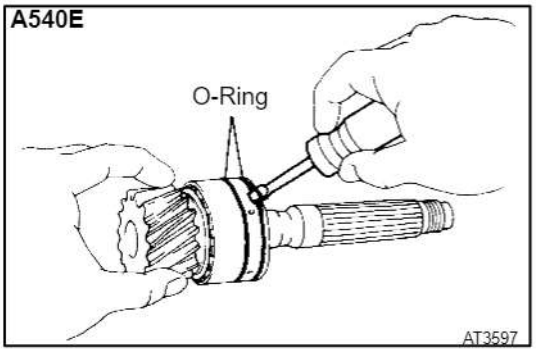
12. REMOVE DRIVE PINION

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

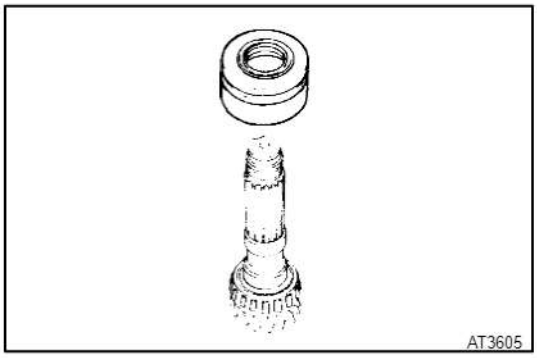


(b) Insert the bar into the case hole to drive out the drive pinion.

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



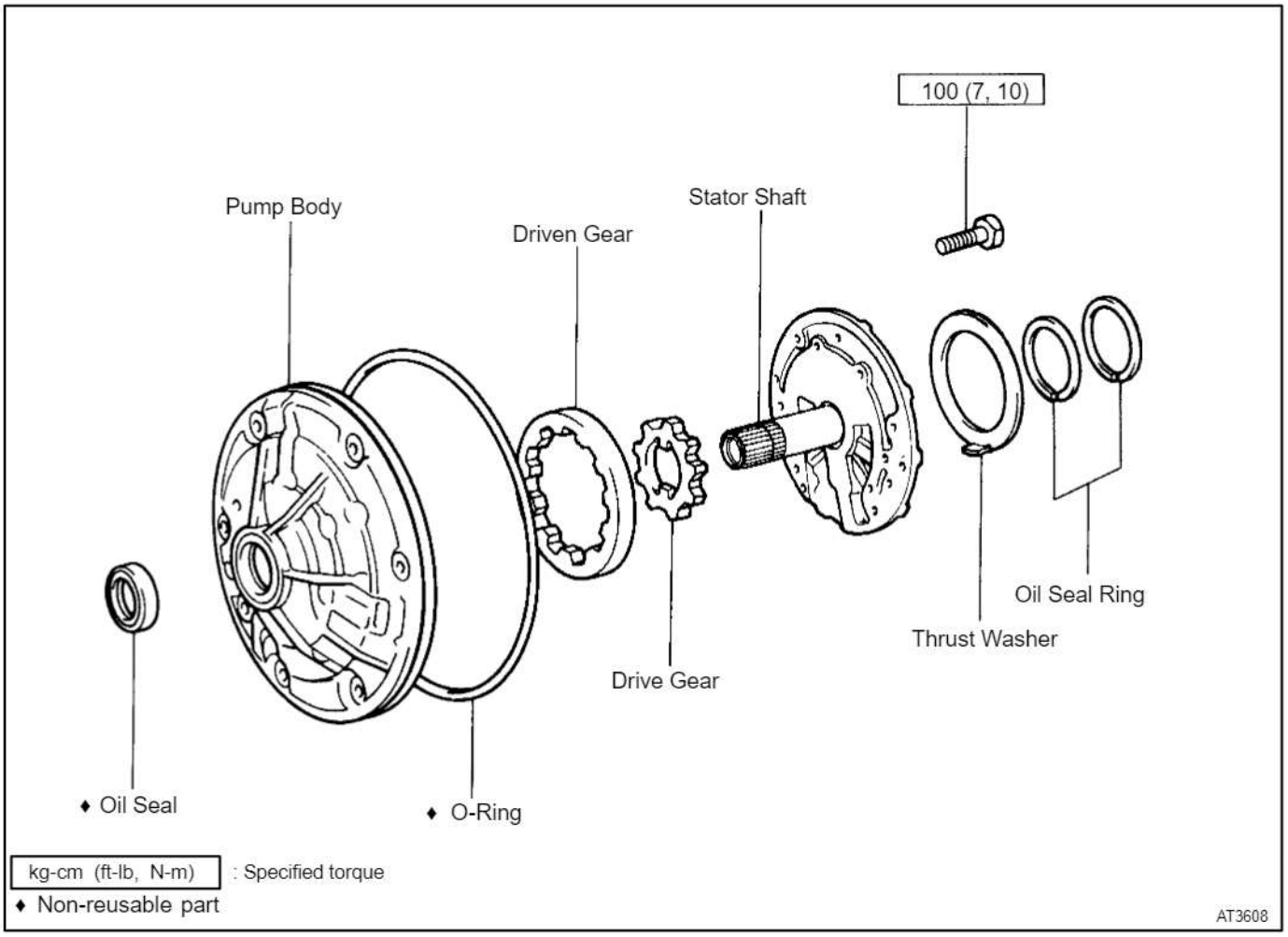
(d) (A540E)
Remove the two O-rings from the bearing cage.

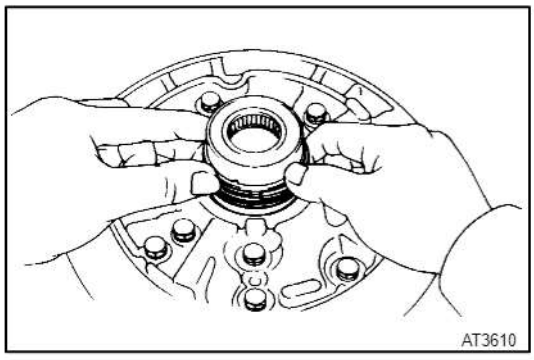


(e) Remove the bearing cage from drive pinion.

Oil Pump

COMPONENTS

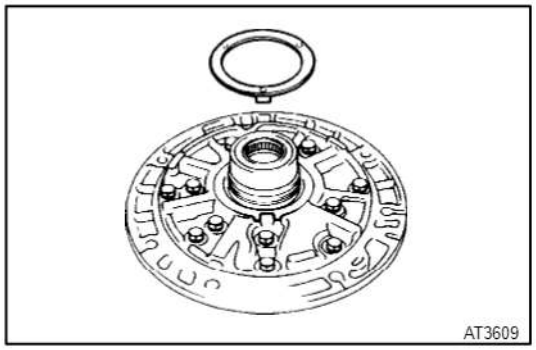




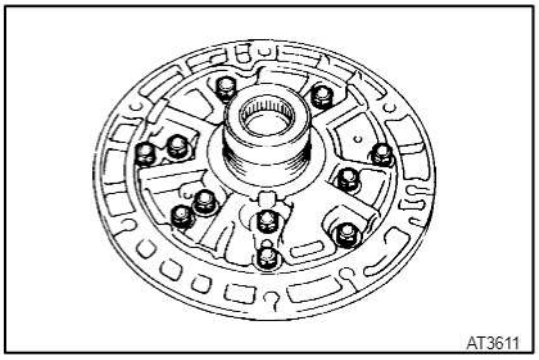
DISASSEMBLY OF OIL PUMP

1. REMOVE OIL SEAL RINGS

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

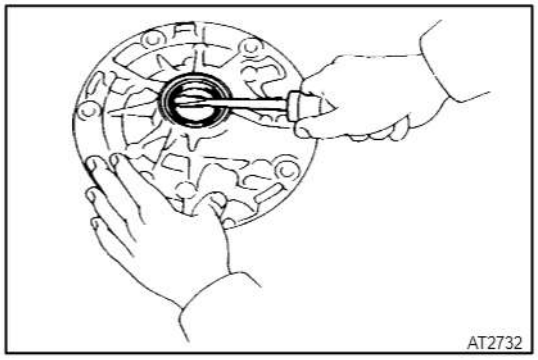


2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



3. REMOVE STATOR SHAFT

Remove the eleven bolts and stator shaft.
HINT: Keep the gears in assembly order.



4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.

INSPECTION OF OIL PUMP

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.

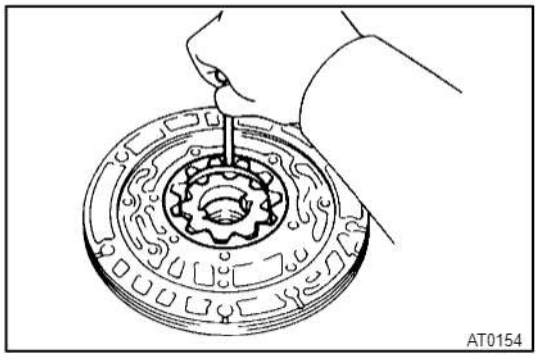


2. CHECK TIP CLEARANCE OF DRIVEN GEAR

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.)**

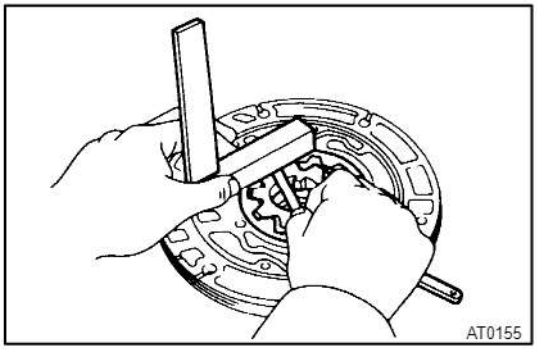
If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



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: **0.002 - 0.005 mm (0.0008 - 0.0020 in.)**
Maximum side clearance: **0.1 mm (0.004 in.)**

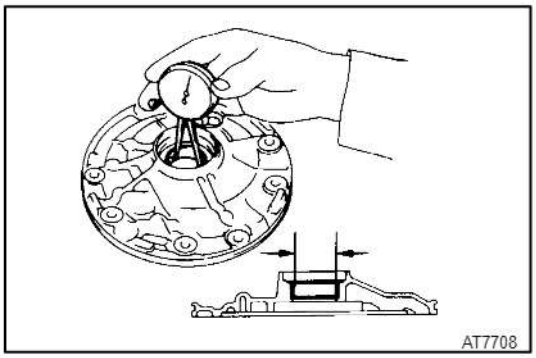


There are three different thicknesses for drive and driven gears.

Drive and driven gear thickness

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

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

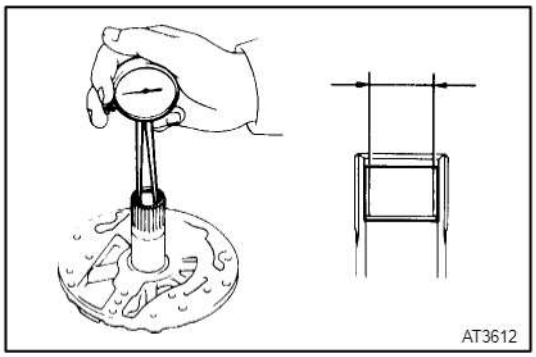


4. CHECK OIL PUMP BODY BUSHING

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.



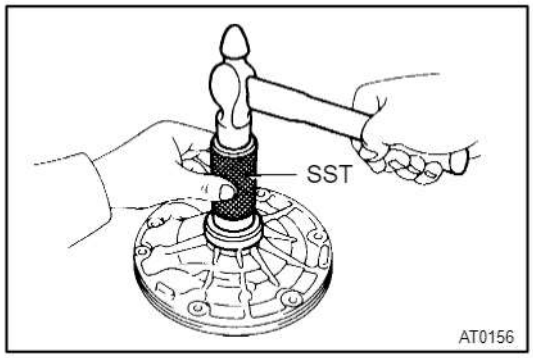
5. CHECK STATOR SHAFT BUSHING

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.

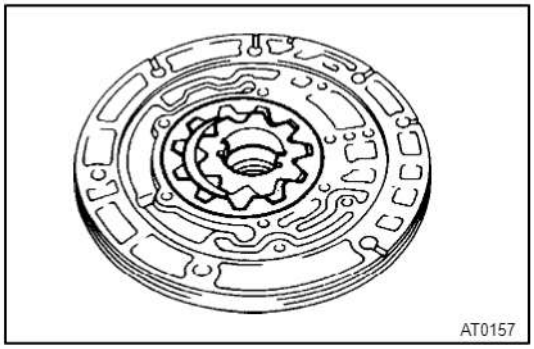
ASSEMBLY OF OIL PUMP



1. INSTALL FRONT OIL SEAL

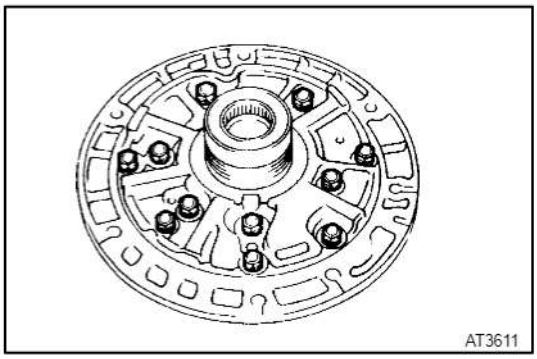
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350-32014 (09351-32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

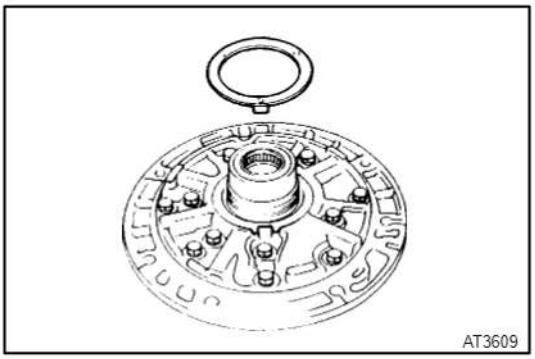


3. INSTALL STATOR SHAFT TO PUMP BODY

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

(b) Torque the eleven bolts.

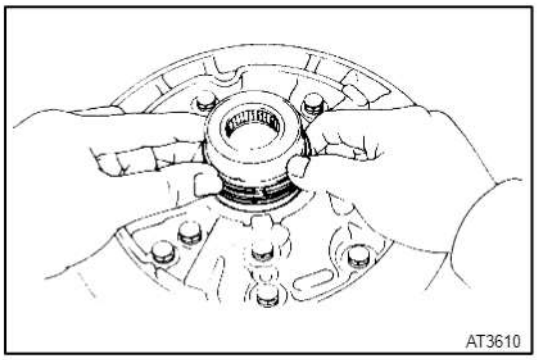
Torque: 100 kg-cm (7 ft-lb, 10 N-m)



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.

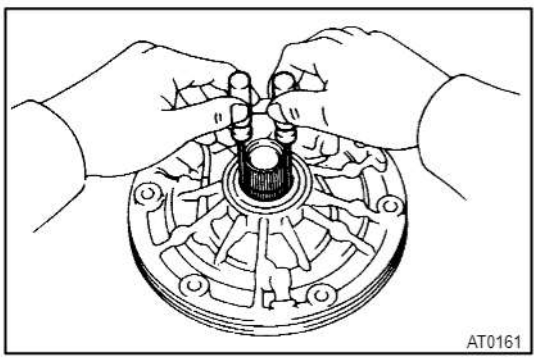


5. INSTALL OIL SEAL RINGS

Install the two 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.



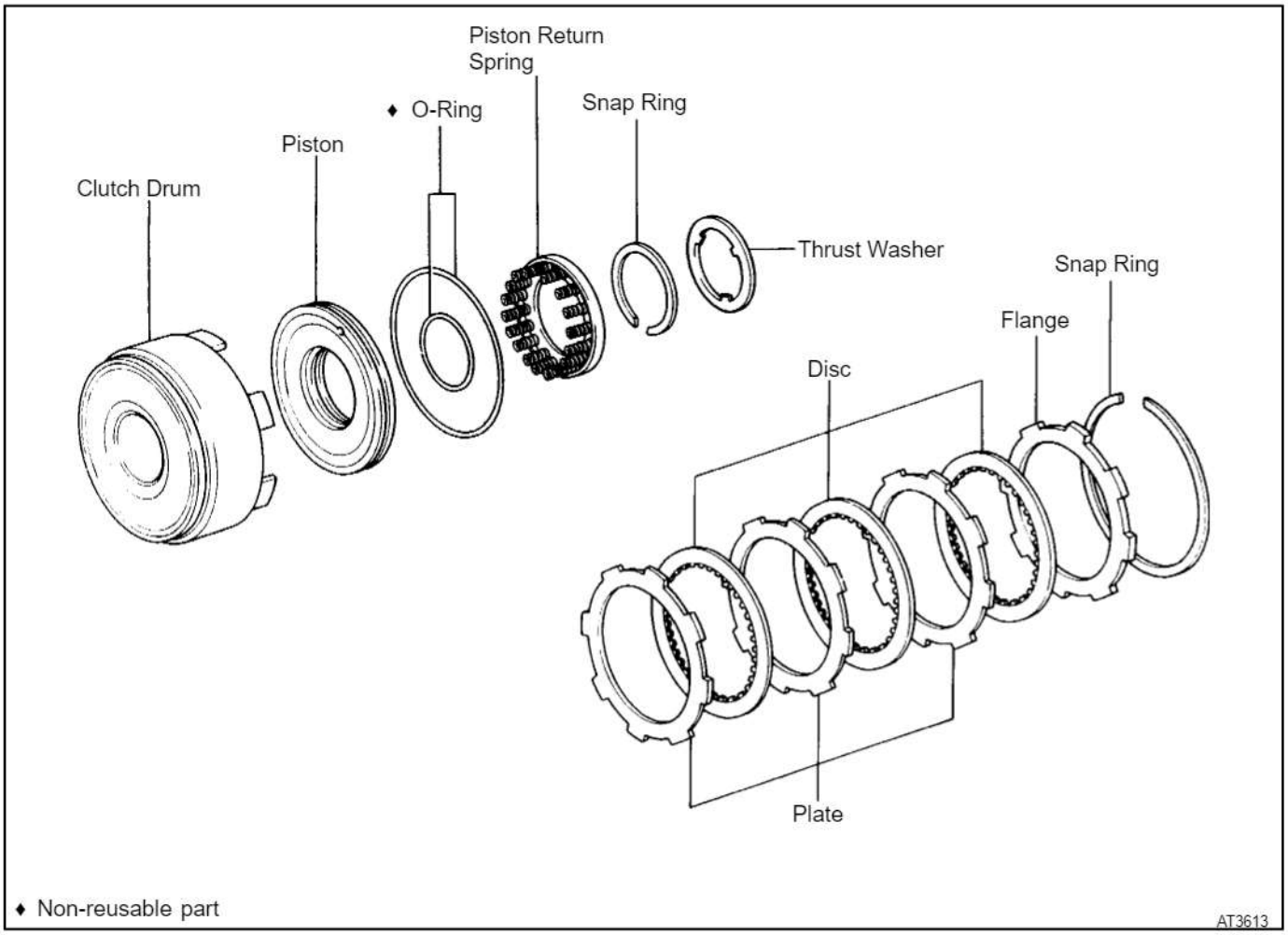
6. CHECK PUMP DRIVE GEAR ROTATION

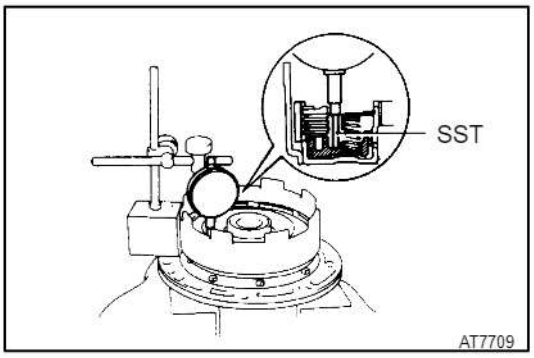
Turn the drive gear with two screwdrivers and make sure it rotates smoothly.

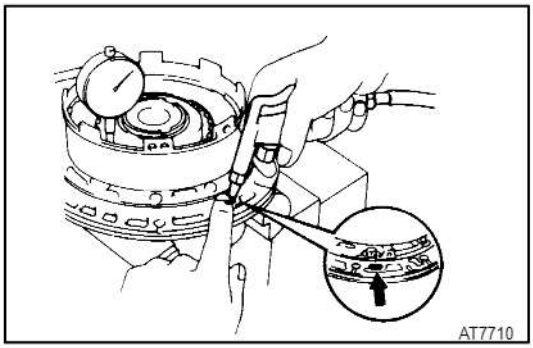
NOTICE: Be careful not to damage the oil seal lip.

Direct Clutch

COMPONENTS







DISASSEMBLY OF DIRECT CLUTCH

1. CHECK PISTON STROKE OF DIRECT CLUTCH

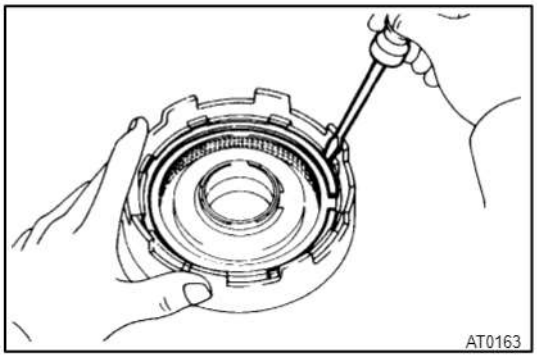
(a) Install the direct clutch on the oil pump.

(b) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi, 392 - 785 kPa) as shown.

SST 09350-32014 (09351-32190)

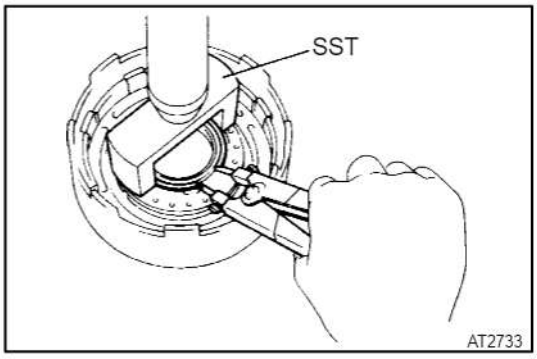
Piston stroke: A540E 0.91 - 1.35 mm (0.0358 - 0.0531 in.)
A540H 1.11 - 1.47 mm (0.0437 - 0.0579 in.)

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

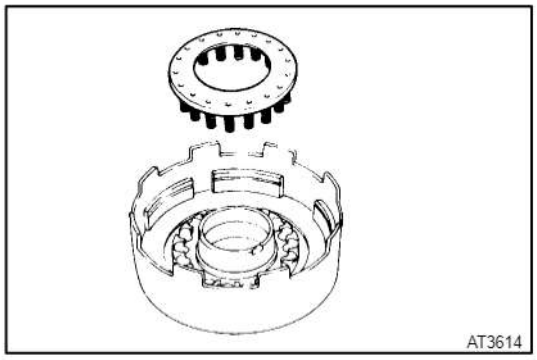


4. REMOVE PISTON RETURN SPRING

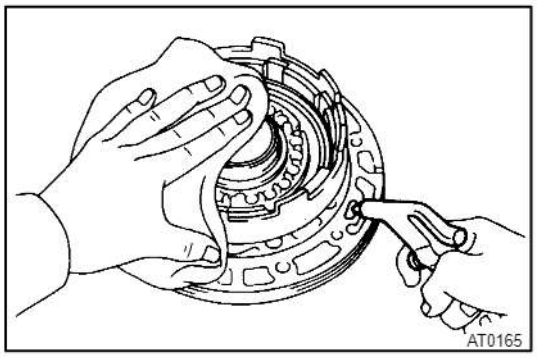
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

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



(c) Remove the piston return spring.

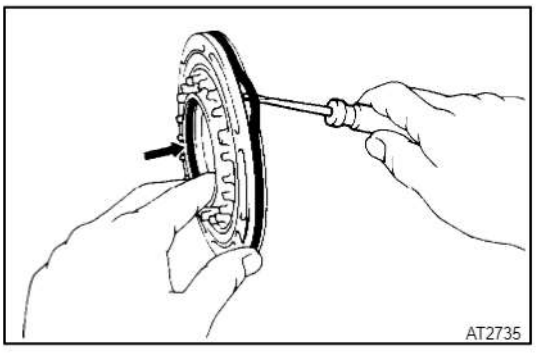


5. REMOVE CLUTCH PISTON

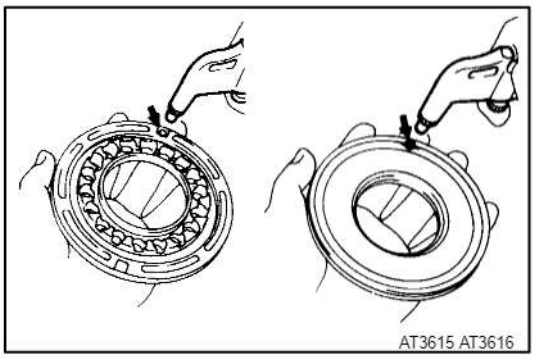
(a) Install the direct clutch onto the oil pump.

(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 two O-rings from the piston.

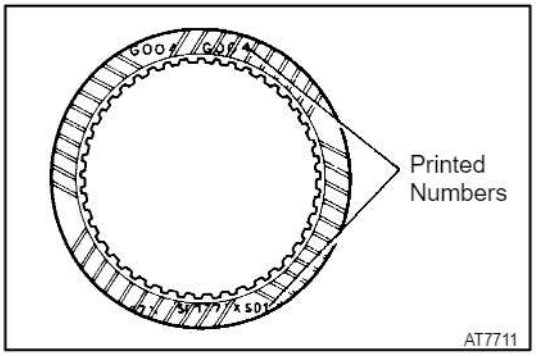

AT3615 AT3616

INSPECTION OF DIRECT CLUTCH

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.



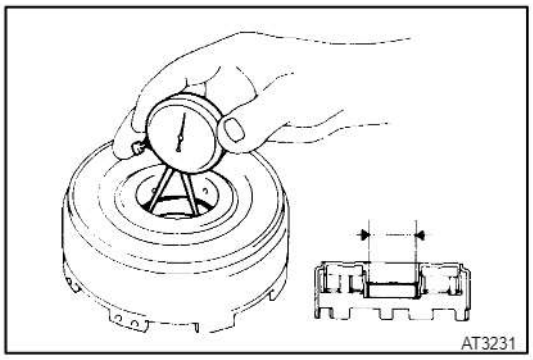
AT7711

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:

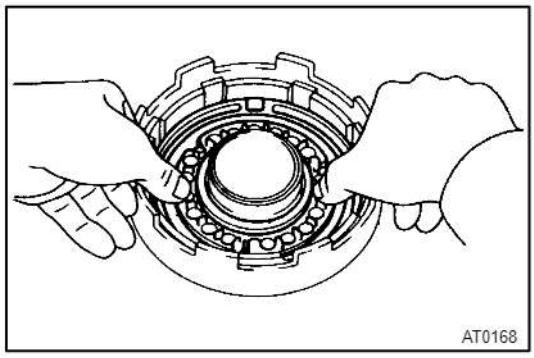
® If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.

® Before assembling new discs, soak them in ATF for at least fifteen minutes.


AT3231

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.

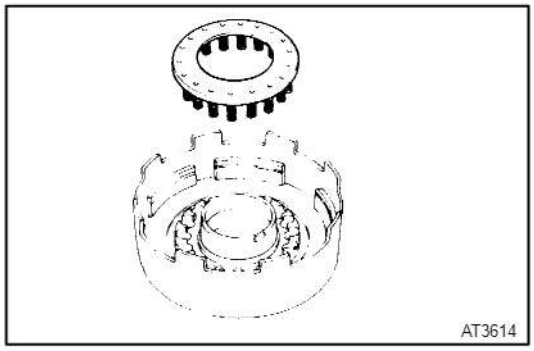

AT0168

ASSEMBLY OF DIRECT CLUTCH

1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

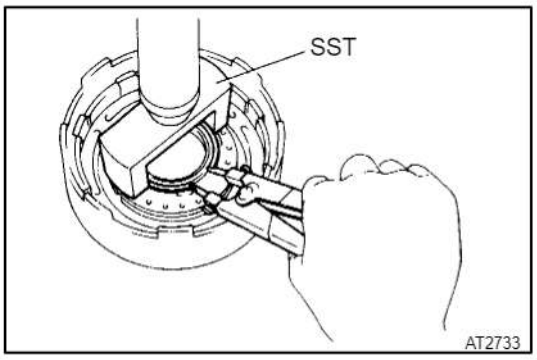
(a) Install new O-rings to the piston. Coat the O-rings with ATF.

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


AT3614

2. INSTALL PISTON RETURN SPRING

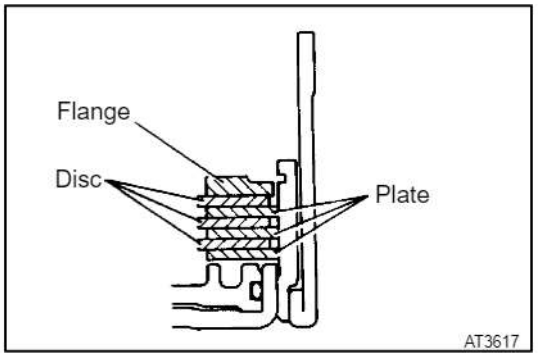
(a) Place the return spring and snap ring onto the piston.



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

SST 09350-32014 (09351-32070)

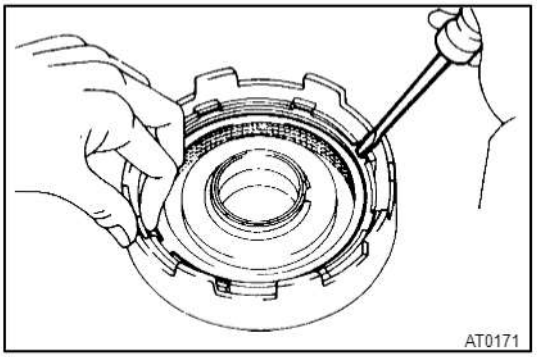
(c) Install the snap ring using snap ring pliers. Be sure the end gap of snap ring is not aligned with the spring retainer claw.



3. INSTALL PLATES, DISCS AND FLANGE

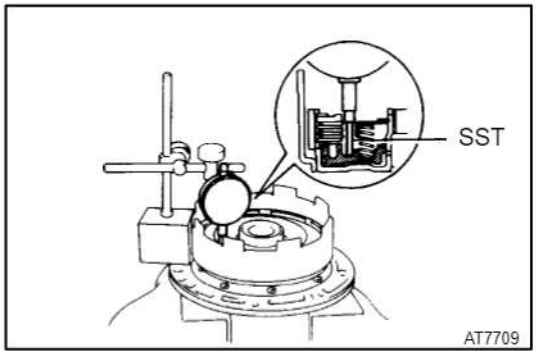
(a) Install plates and discs.
Install in order: P = Plate D = Disc
P-D-P-D-P-D

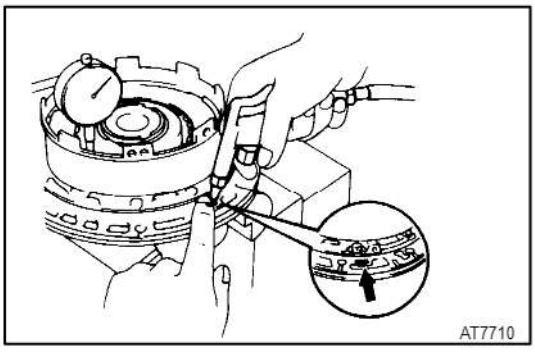
(b) Install the flange with the flat end facing downward.



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) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi, 392 - 785 kPa) as shown.

SST 09350-32014 (09351-32190)

Piston stroke: A540E 0.91 - 1.35 mm (0.0358 - 0.0531 in.)
A540H 1.11 - 1.47 mm (0.0437 - 0.0579 in.)

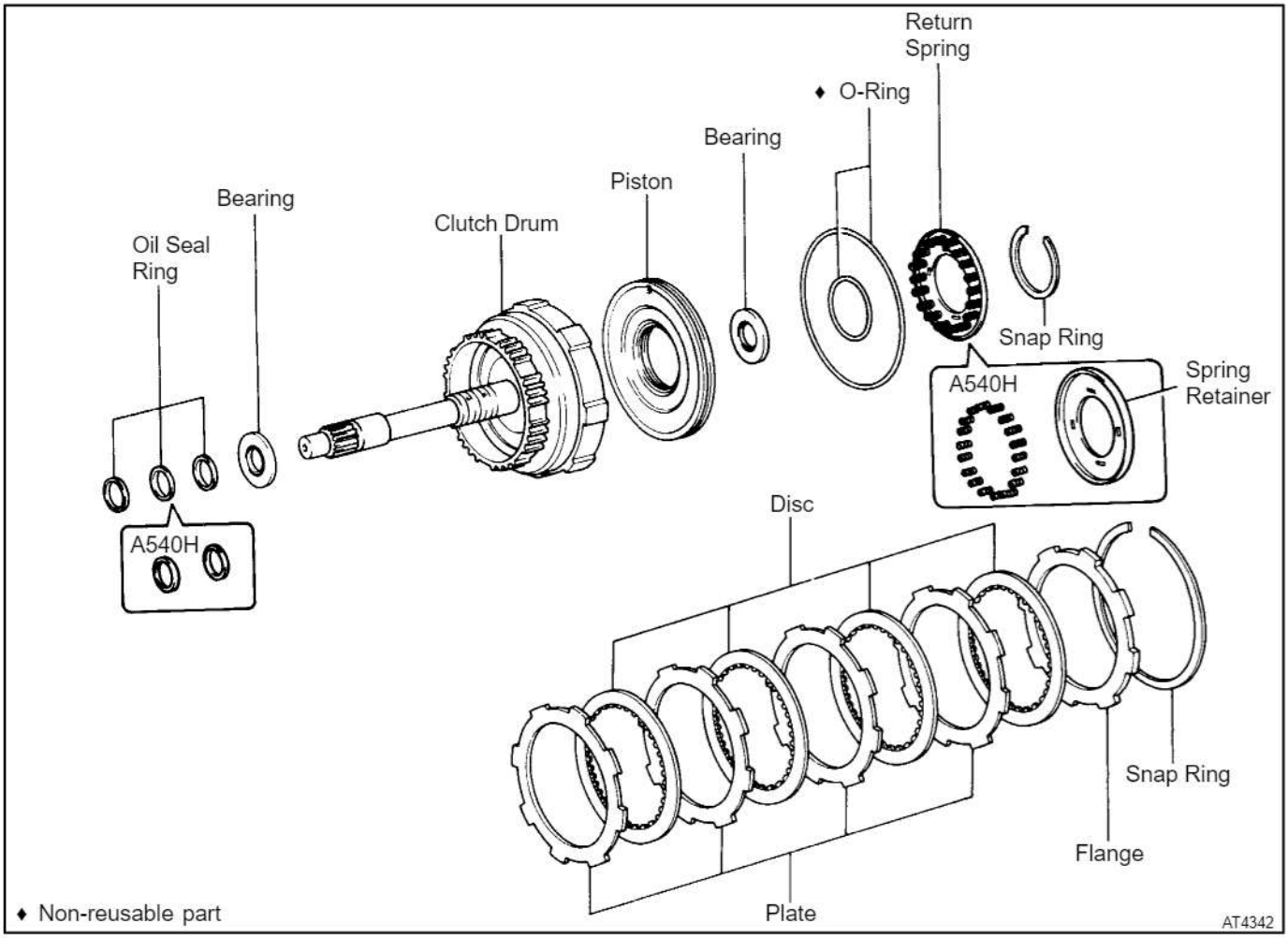
If the piston stroke is nonstandard, select another flange.

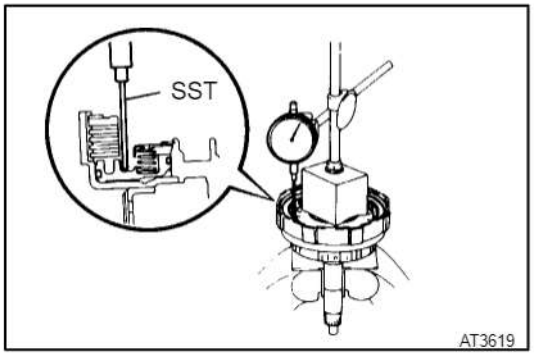
HINT: There are two different thicknesses for the flange.

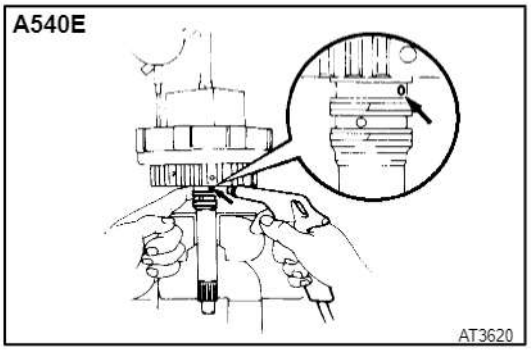
Flange thickness: 2.70 mm (0.1063 in.)
3.00 mm (0.1181 in.)

Forward Clutch

COMPONENTS







DISASSEMBLY OF FORWARD CLUTCH

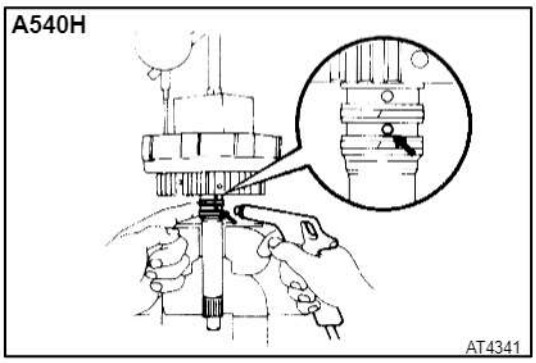
1. CHECK PISTON STROKE OF FORWARD CLUTCH

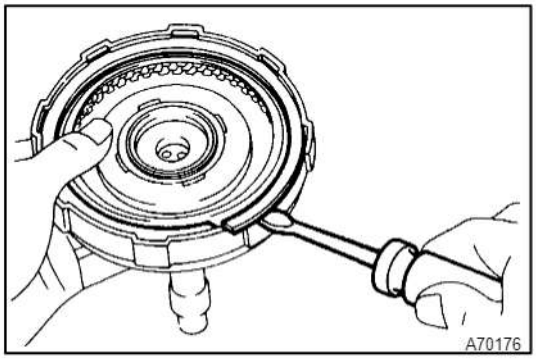
Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi, 392 - 785 kPa) as shown.

SST 09350-32014 (09351-32190)

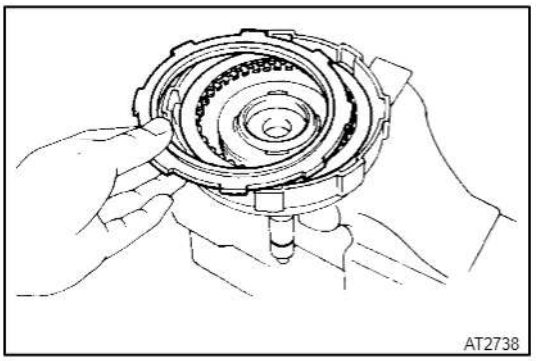
Piston stroke: 1.41 - 1.82 mm (0.0555 - 0.0717 in.)

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

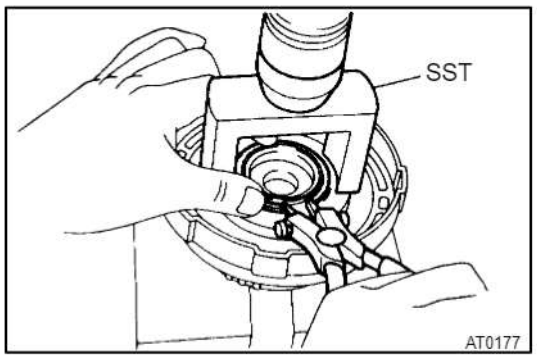




2. REMOVE SNAP RING FROM CLUTCH DRUM



3. REMOVE FLANGE, DISCS AND PLATES

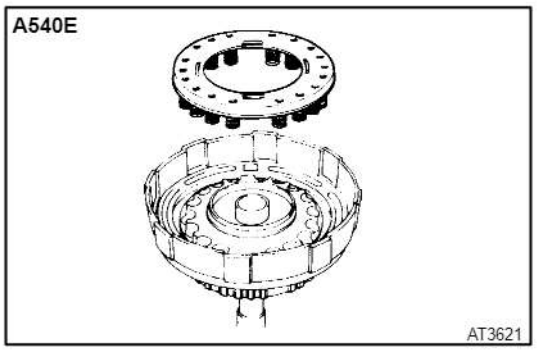


4. REMOVE RETURN SPRING

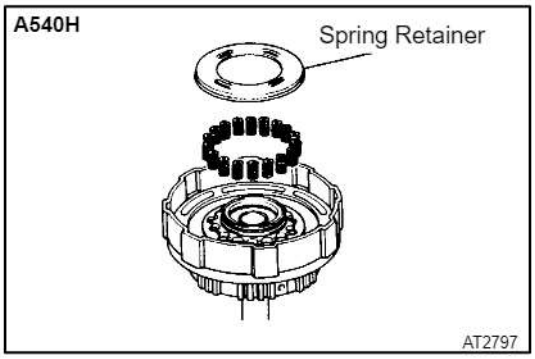
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

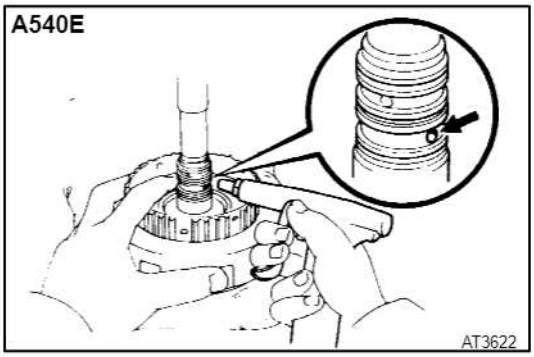
(b) Remove the snap ring using snap ring pliers.



(c) (A540E)
Remove the return spring.



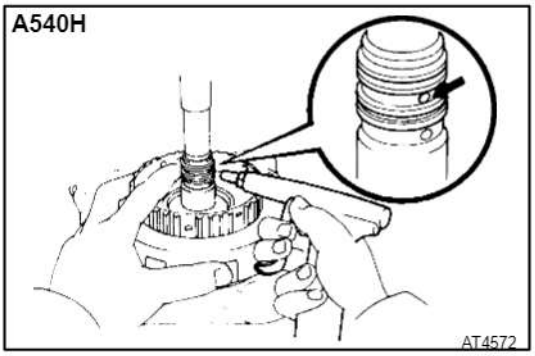
(A540H)
Remove the spring retainer and eighteen return springs.

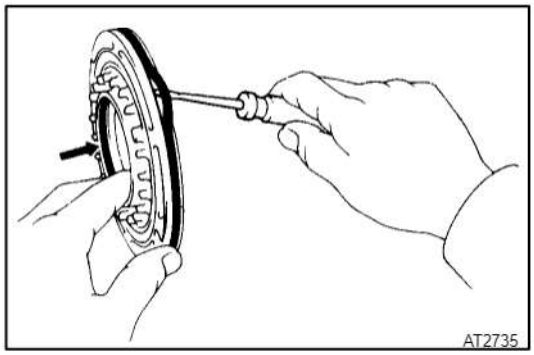


5. REMOVE CLUTCH PISTON

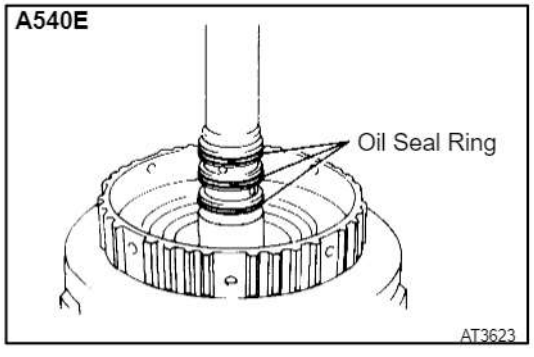
(a) Apply compressed air into the oil passage to remove the piston.

If the piston does not come out, use needle-nose pliers to remove it.



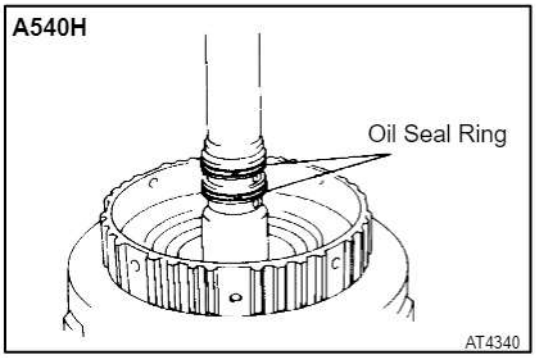


(b) Remove the two O-rings from the piston.

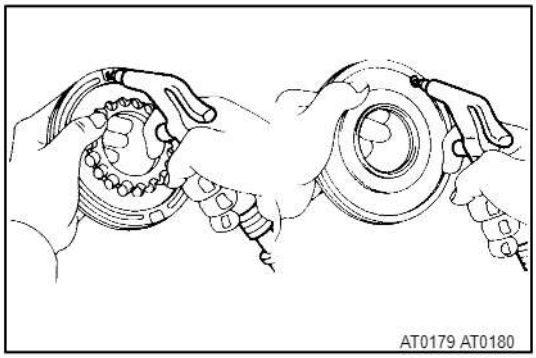


6. IF NECESSARY, REMOVE OIL SEAL RINGS

(A540E)
Remove the three oil seal rings from the shaft.



(A540H)
Remove the two oil seal rings from the shaft.

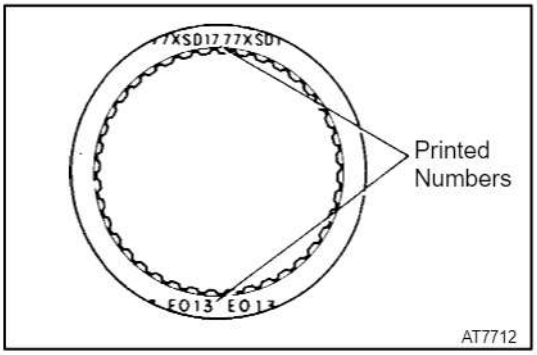


INSPECTION OF FORWARD CLUTCH

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:

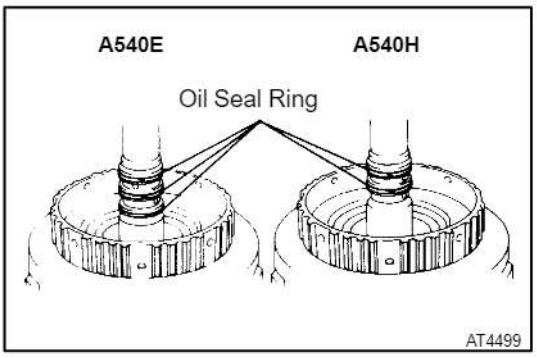
® If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.

® Before assembling new discs, soak them in ATF for at least fifteen minutes.

ASSEMBLY OF FORWARD CLUTCH

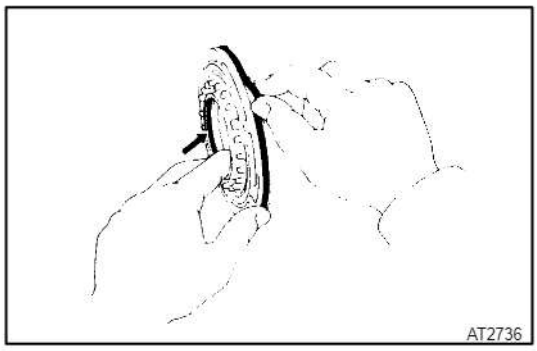
1. INSTALL OIL SEAL RINGS

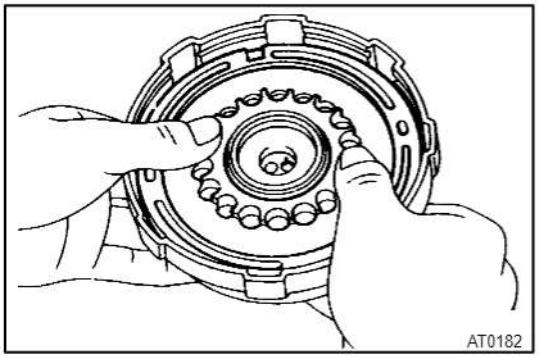
Install the three oil seal rings (A540E) or two oil seal rings (A540H) to the shaft.
NOTICE: Do not spread the ring ends more than necessary.
HINT: After installing the oil seal rings, check that they move smoothly.



2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

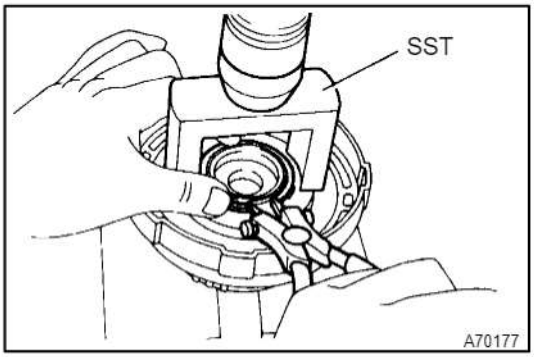
(a) Install the two new O-rings to the piston.





(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.



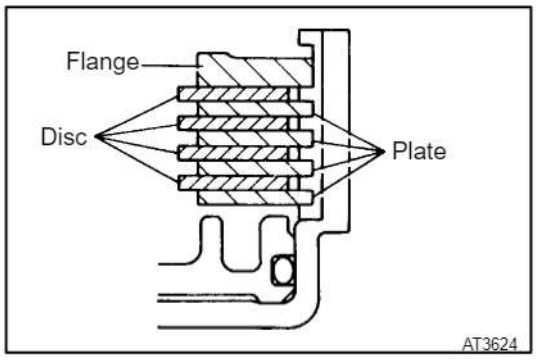
3. INSTALL PISTON RETURN SPRINGS

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

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

SST 09350-32014 (09351-32070)

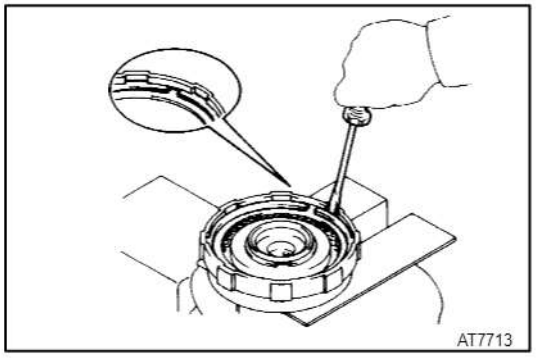
(c) Install the snap ring with snap ring pliers. Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

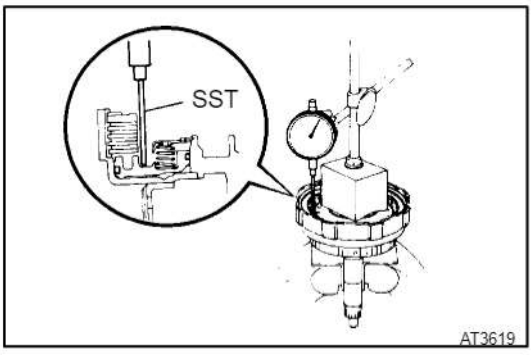
(a) Install the plates and discs.
Install in order: P = Plate D = Disc
P-D-P-D-P-D-P-D

(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.



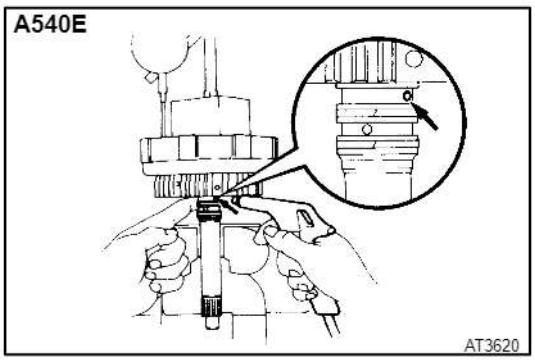
6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi, 392 - 785 kPa) as shown next page.

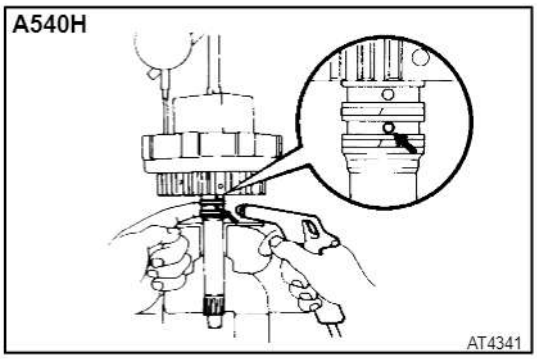
SST 09350-32014 (09351-32190)

Piston stroke: 1.41 - 1.82 mm (0.0555 - 0.0717 in.)

A540E



A540H

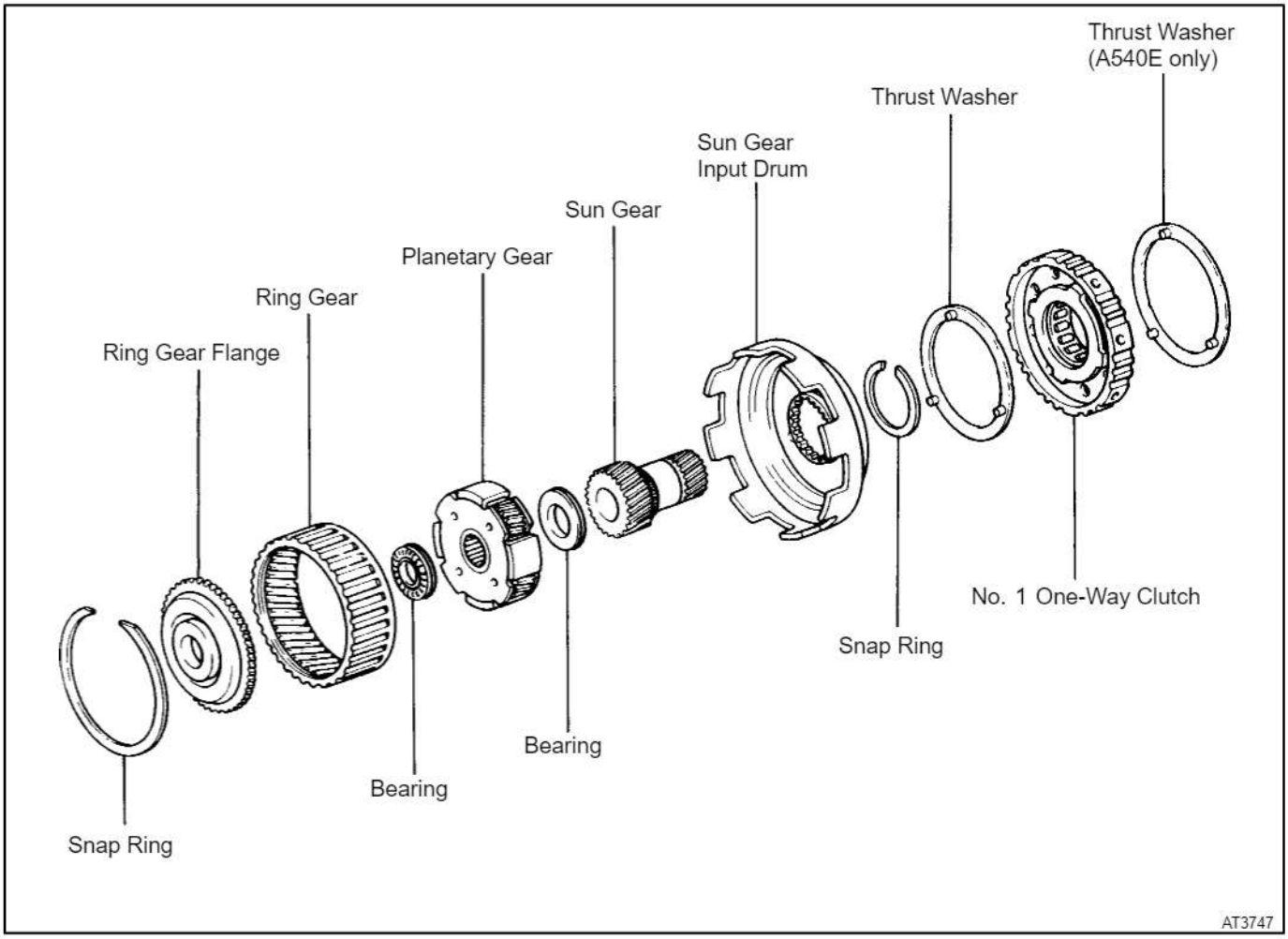


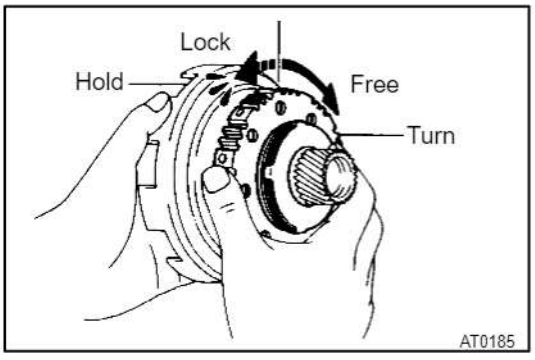
If the piston stroke is nonstandard, select another flange.
HINT: There are two different thicknesses for the flange.

Flange thickness: 3.00 mm (0.1181 in.)
3.37 mm (0.1327 in.)

Front Planetary Gear

COMPONENTS

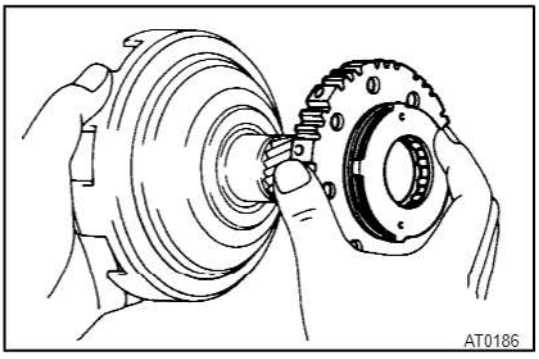




DISASSEMBLY OF NO. 1 ONE-WAY CLUTCH AND SUN GEAR

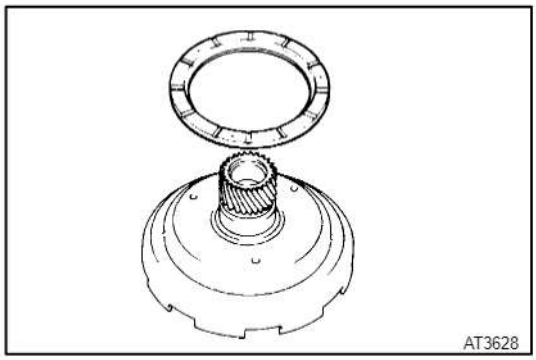
1. CHECK OPERATION OF NO. 1 ONE-WAY CLUTCH

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

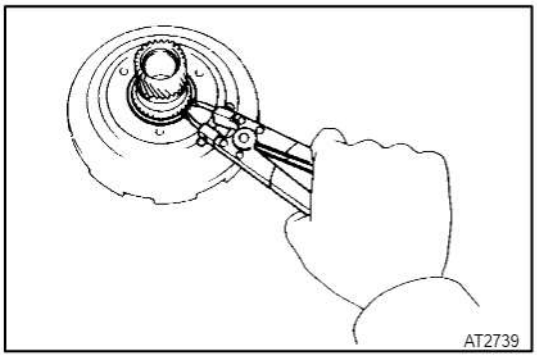


2. REMOVE NO. 1 ONE-WAY CLUTCH FROM SUN GEAR

While turning the hub clockwise, remove the No. 1 one-way clutch from the sun gear.



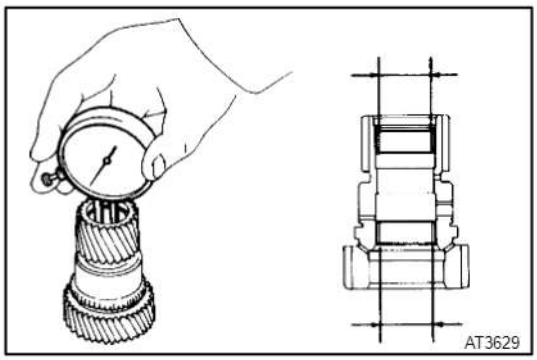
3. REMOVE THRUST WASHER FROM SUN GEAR INPUT DRUM



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.



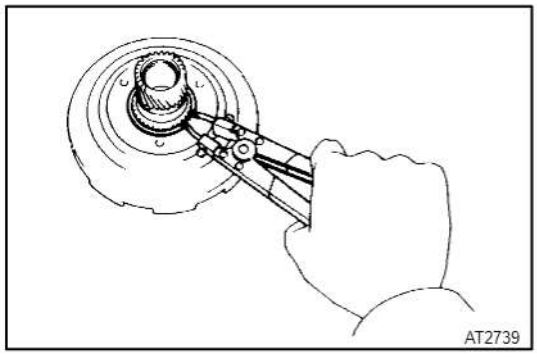
5. CHECK SUN GEAR BUSHINGS

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.

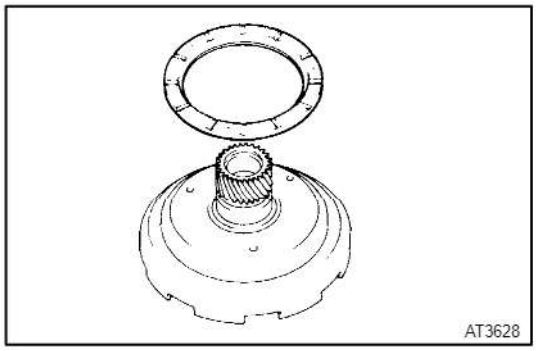
ASSEMBLY OF NO. 1 ONE-WAY CLUTCH AND SUN GEAR



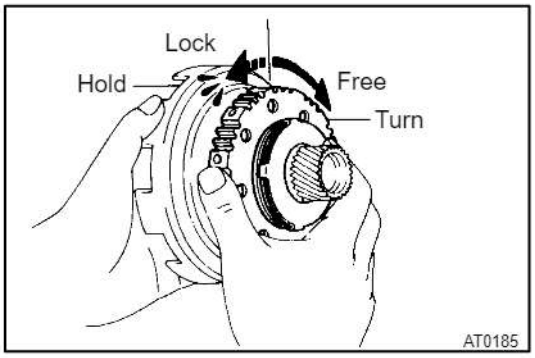
1. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

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



2. INSTALL THRUST WASHER TO SUN GEAR INPUT DRUM

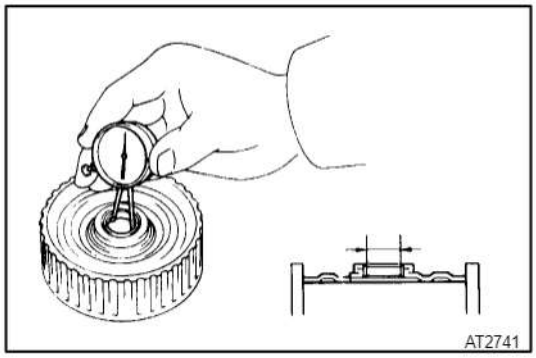


3. INSTALL NO. 1 ONE-WAY CLUTCH ON SUN GEAR

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

4. RECHECK OPERATION OF NO. 1 ONE-WAY CLUTCH

INSPECTION OF PLANETARY RING GEAR

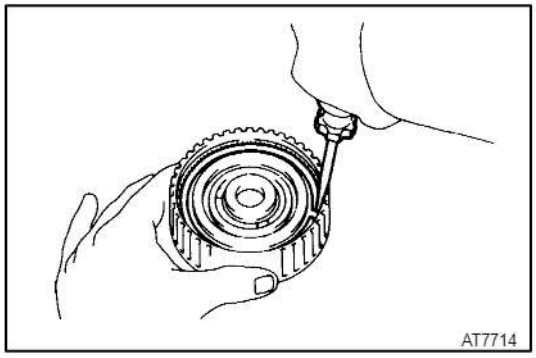


1. INSPECT RING GEAR FLANGE BUSHING

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

Maximum inside diameter: 30.08 mm (1.1842 in.)

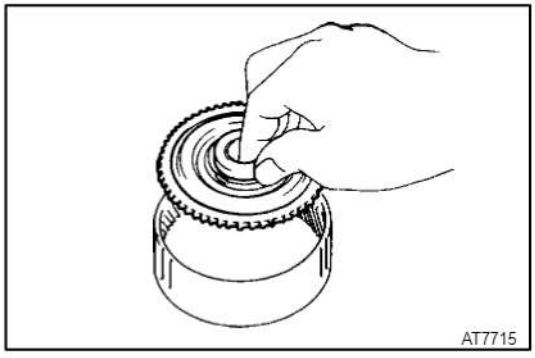
If the inside diameter is greater than the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

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

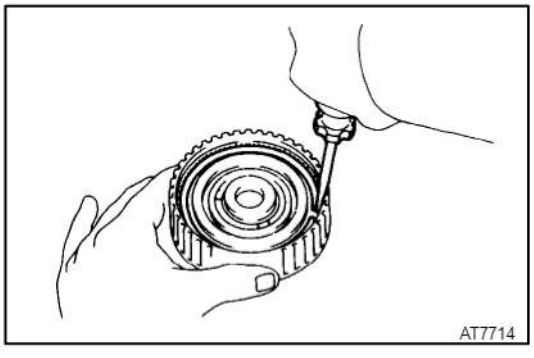
(b) Remove the flange from the ring gear.

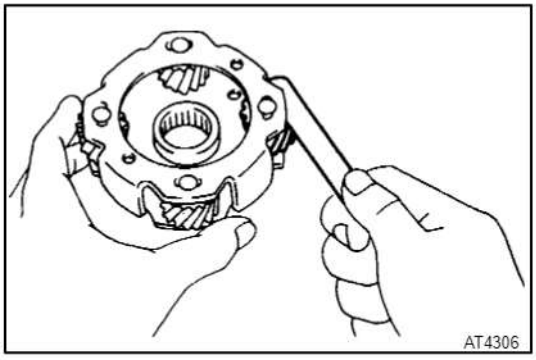


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.

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





INSPECTION OF FRONT PLANETARY GEAR

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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

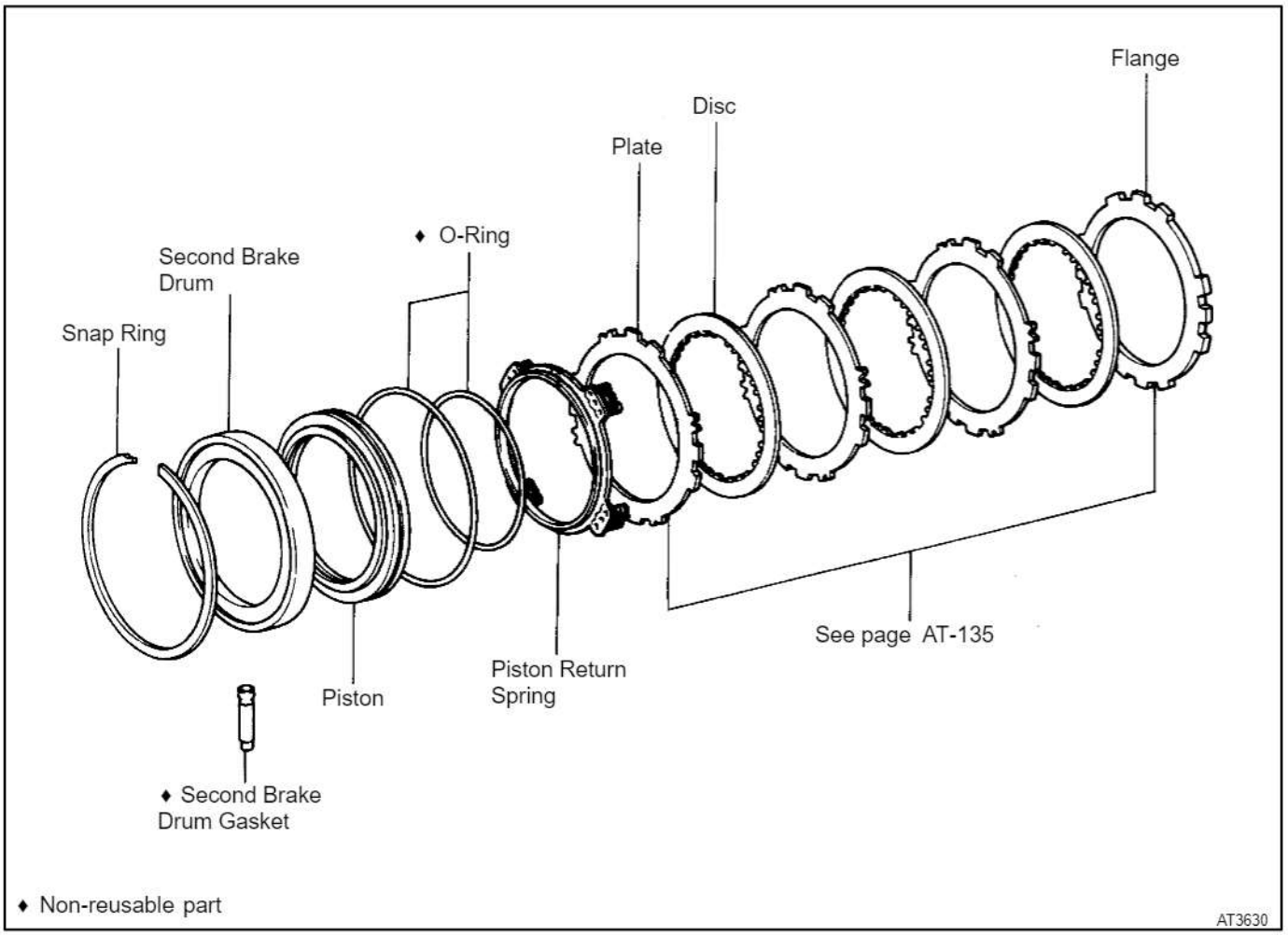
Standard clearance: **0.16 - 0.56 mm (0.0063 - 0.0220 in.)**

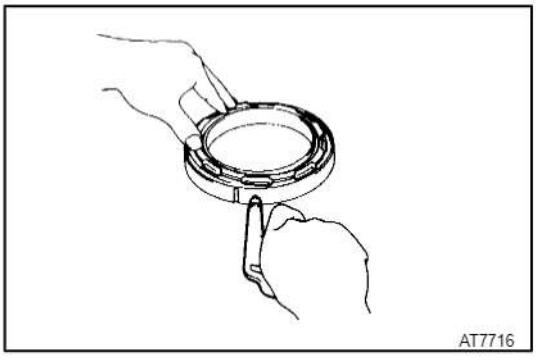
Maximum clearance: **0.61 mm (0.0240 in.)**

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

Second Brake

COMPONENTS

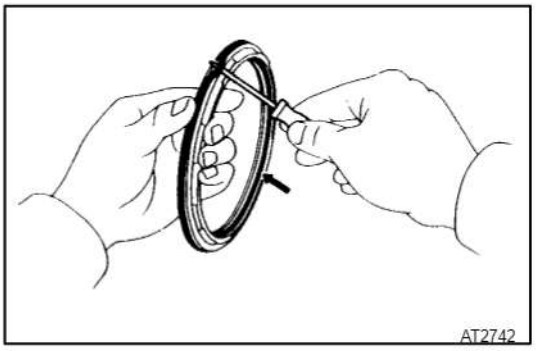




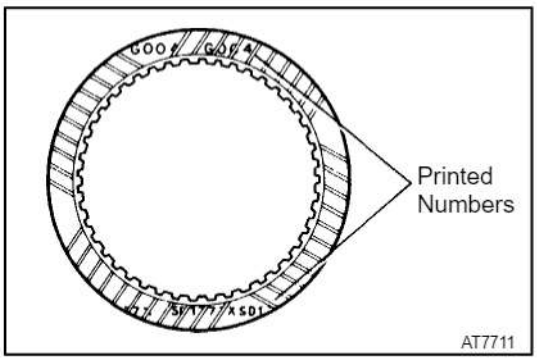
DISASSEMBLY OF SECOND BRAKE PISTON

REMOVE SECOND BRAKE PISTON

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



(b) Remove the two o-rings from the piston.

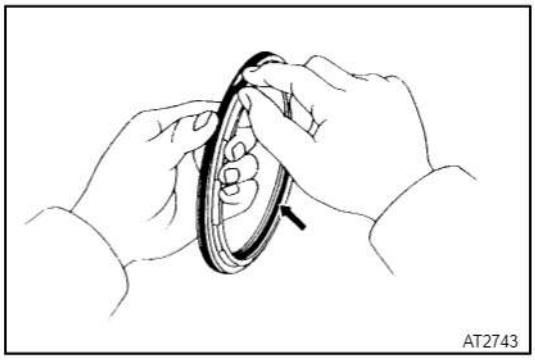


INSPECTION OF SECOND BRAKE COMPONENT

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 exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.
- ® Before assembling new discs, soak them in ATF for at least fifteen minutes.

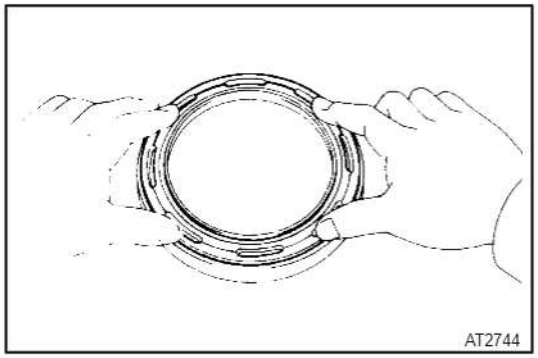


ASSEMBLY OF SECOND BRAKE PISTON

INSTALL PISTON

(a) Coat a new O-ring with ATF.

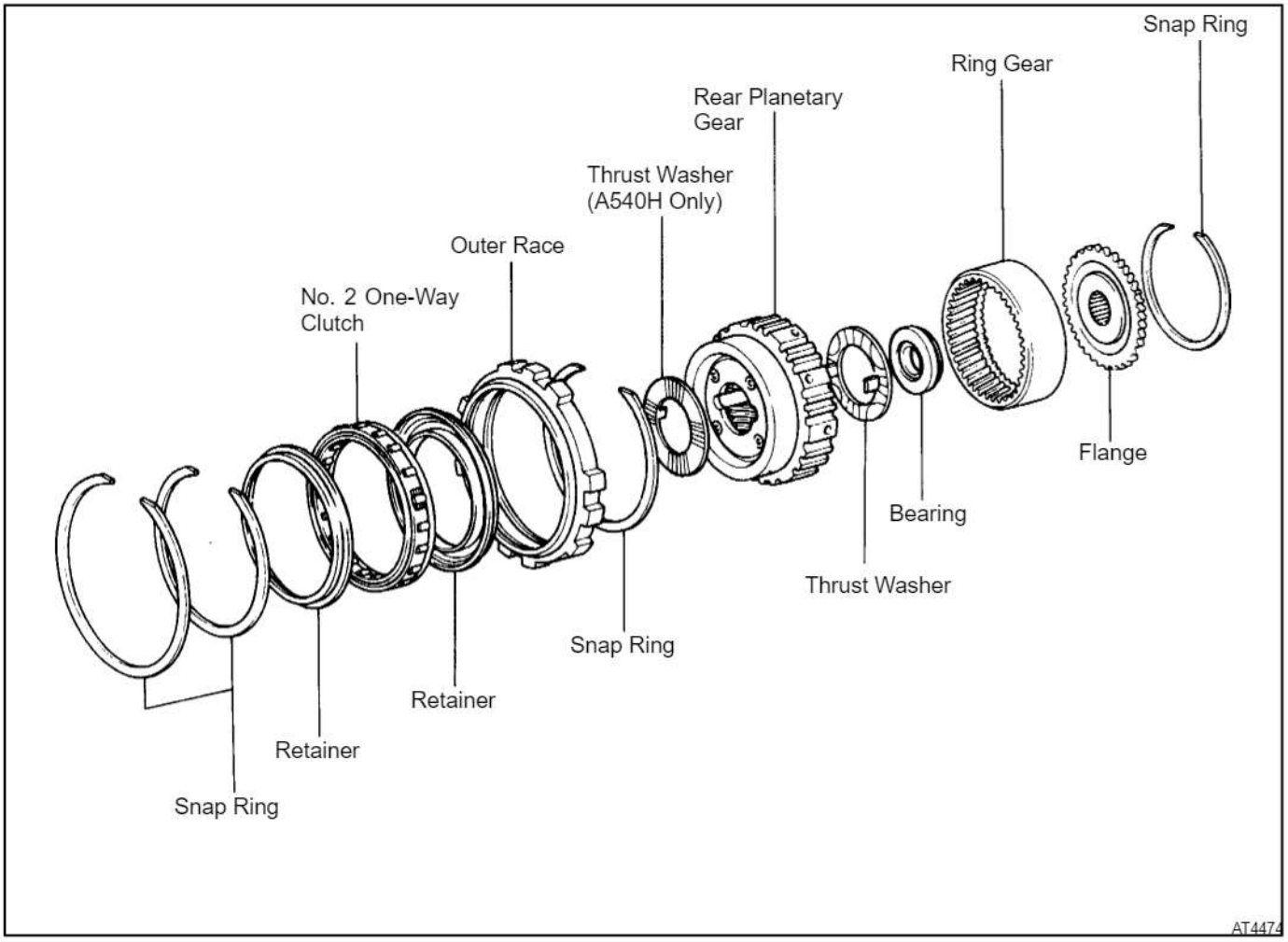
(b) Install the two O-rings on the piston.

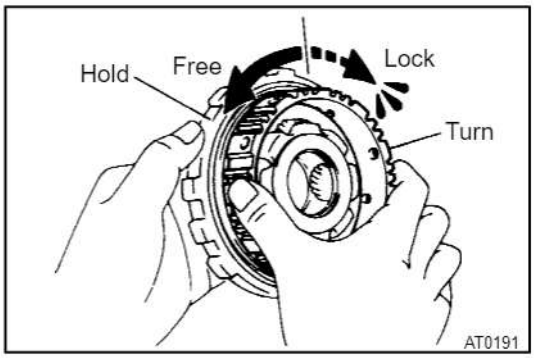


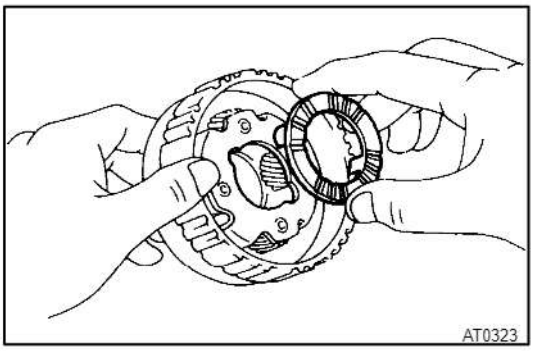
(c) Press the piston into the drum, being careful not to damage the O-rings.

Rear Planetary Gear

COMPONENTS







DISASSEMBLY OF NO. 2 ONE-WAY CLUTCH

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 counter-clockwise and should lock clockwise.

2. SEPARATE NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR

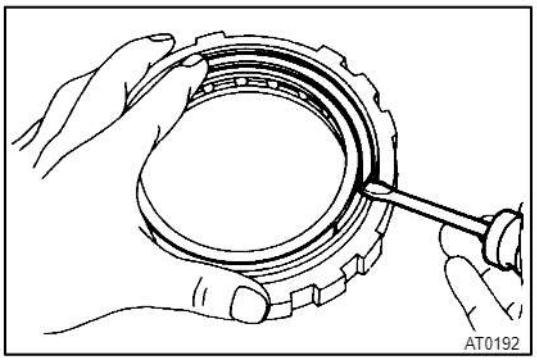
3. REMOVE THRUST WASHERS

(A540E)

Remove the thrust washer from the rear side of planetary gear.

(A540H)

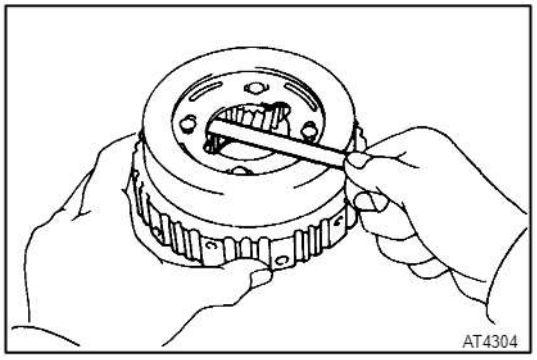
Remove the two thrust washers from both sides of planetary gear.



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

(a) Remove the two snap rings and retainers from both sides.

(b) Remove the No. 2 one-way clutch from the outer race.



INSPECTION OF REAR PLANETARY GEAR

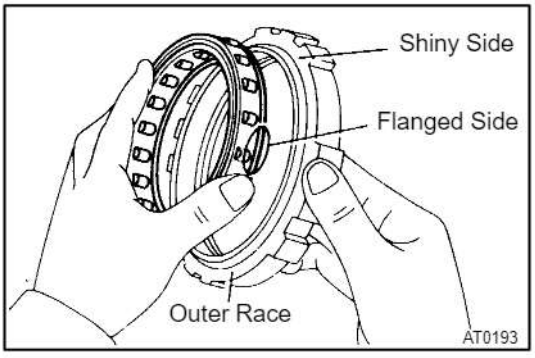
MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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.)

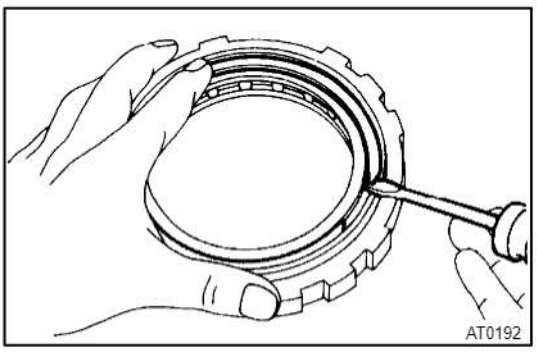
If the clearance is greater than the maximum, replace the planetary gear assembly.



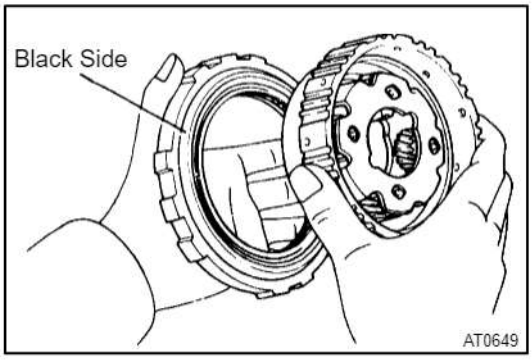
ASSEMBLY OF NO. 2 ONE-WAY CLUTCH

1. INSTALL ONE-WAY CLUTCH

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

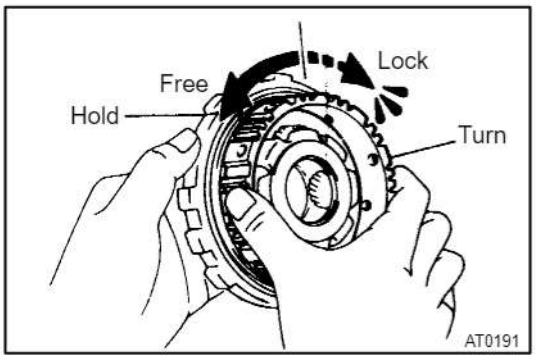


(b) Install the two retainers and snap rings to both sides.

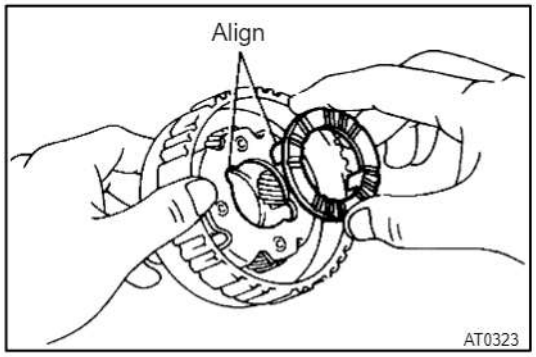


2. INSTALL PLANETARY GEAR INTO NO. 2 ONE-WAY CLUTCH

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 WASHERS

(A540E)

(a) Coat the thrust washer with petroleum jelly.

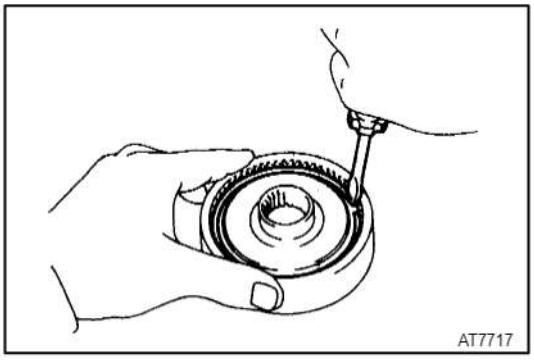
(b) Align the tab of the washer with the hollows of the carrier.

(A540H)

(a) Coat the two thrust washers with petroleum jelly.

(b) Align the tab of the washer with the hollows of the carrier.

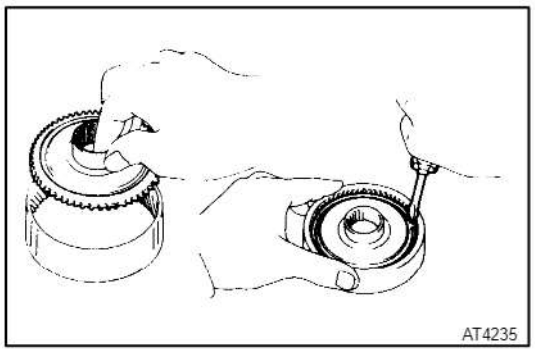
REPLACEMENT OF RING GEAR FLANGE



1. REMOVE RING GEAR FLANGE

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

(b) Remove the flange from the ring gear.



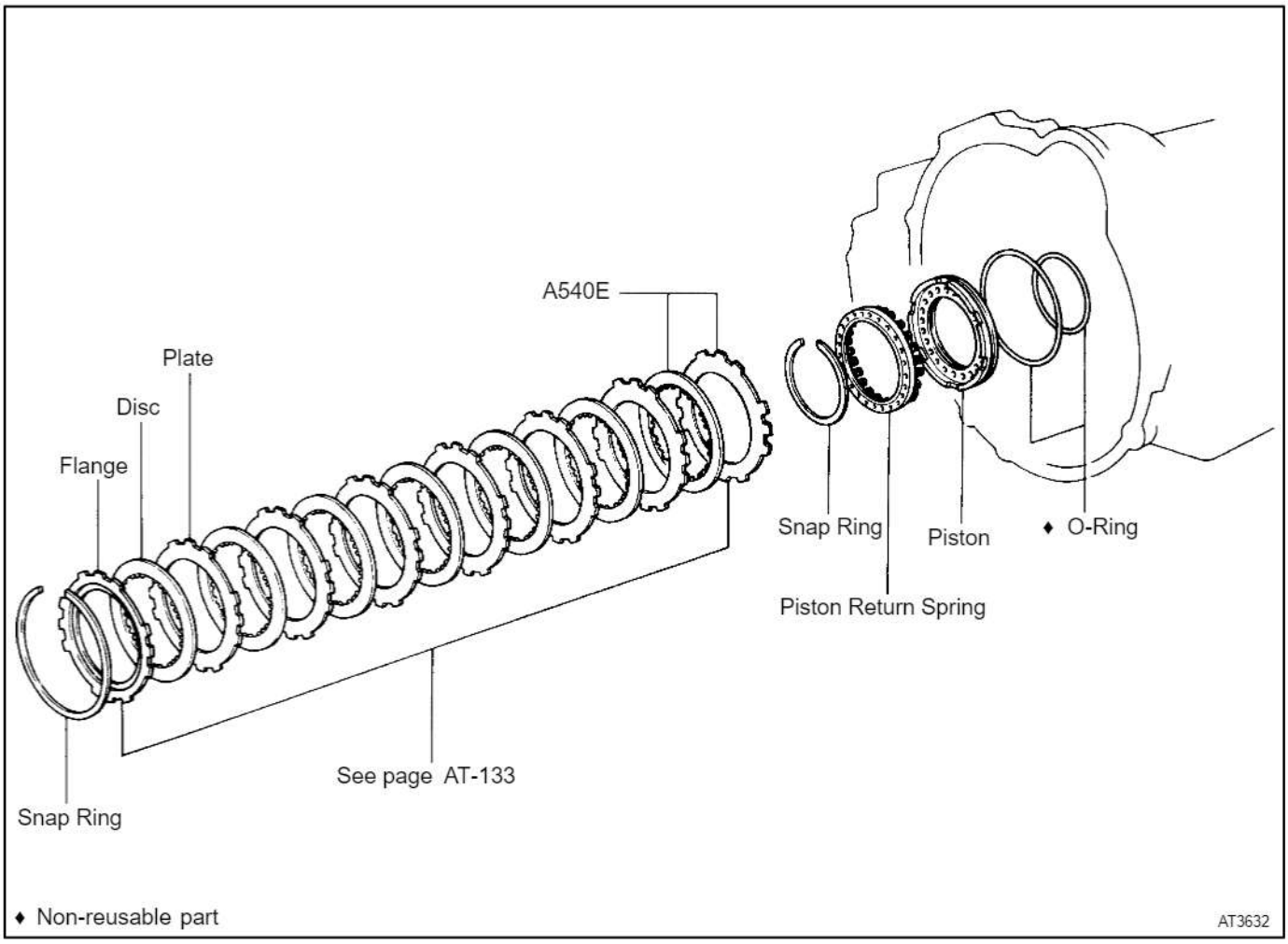
2. INSTALL RING GEAR FLANGE

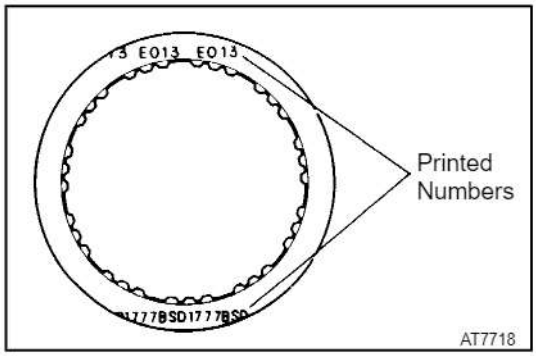
(a) Position the flange into the ring gear.

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

First and Reverse Brake

COMPONENTS





INSPECTION OF FIRST AND REVERSE BRAKE COMPONENTS

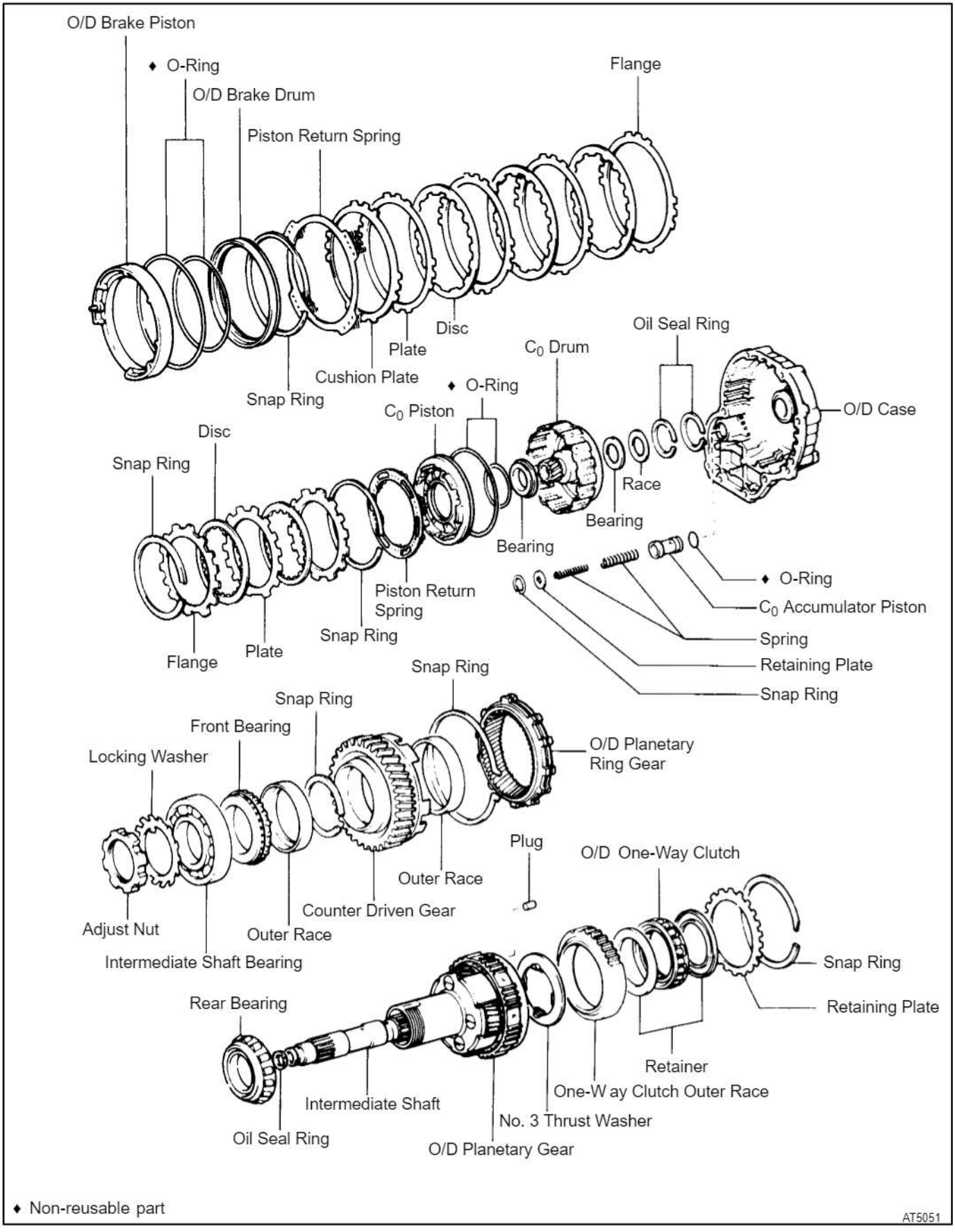
INSPECT DISCS, PLATES AND FLANGES

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 exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.
- ® Before assembling new discs, soak them in ATF for at least fifteen minutes.

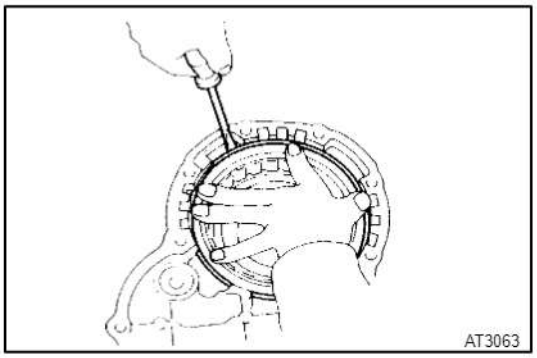
Overdrive Unit

COMPONENTS



♦ Non-reusable part

AT5051

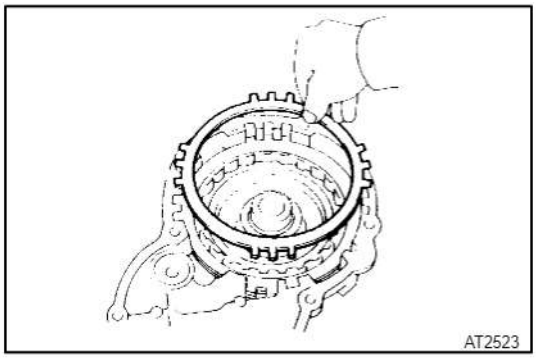


DISASSEMBLY OF OVERDRIVE BRAKE

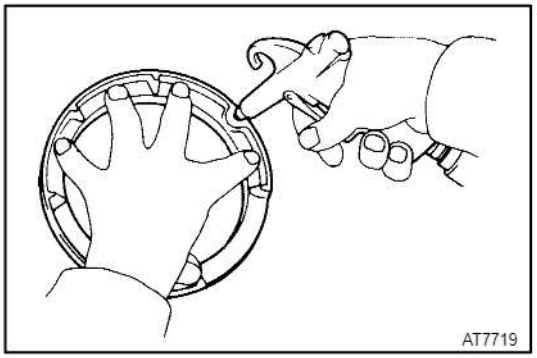
1. REMOVE PISTON RETURN SPRING

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

(b) Remove the piston return spring.

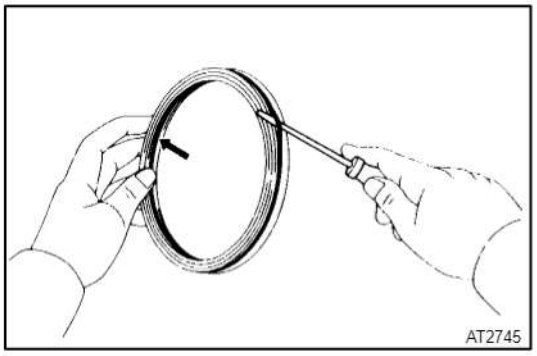


2. REMOVE PLATES, DISCS AND FLANGE



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 dose not tilt.



4. REMOVE O-RINGS

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

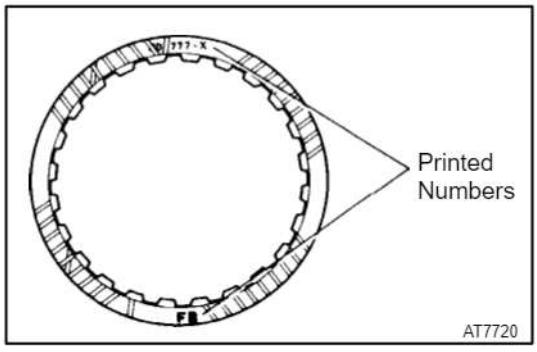
INSPECTION OF OVERDRIVE BRAKE

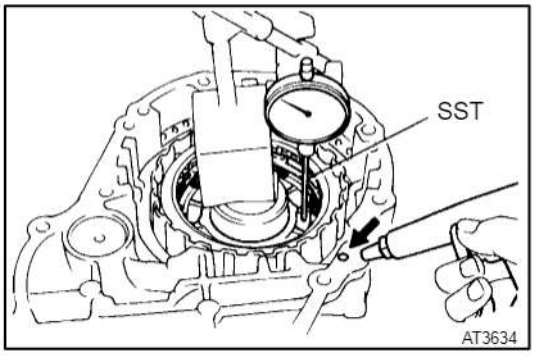
INSPECT DISCS, PLATES AND FLANGE

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 exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.

® Before assembling new discs, soak them in ATF for at least fifteen minutes.





DISASSEMBLY OF OVERDRIVE DIRECT CLUTCH

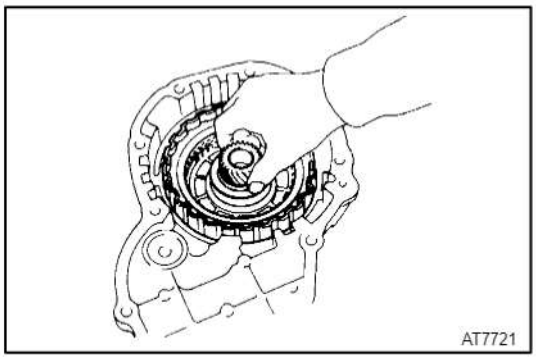
1. CHECK PISTON STROKE OF DIRECT CLUTCH

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

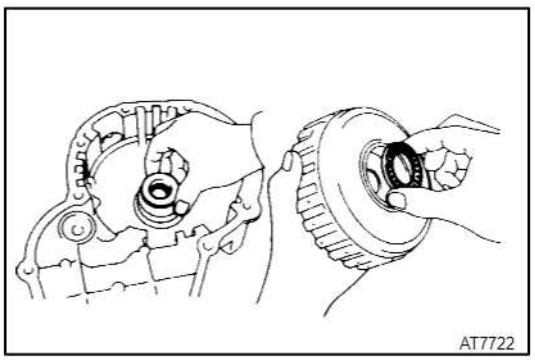
Piston stroke: 1.75 - 2.49 mm (0.0689 - 0.0980 in.)

SST 09350-32014 (09351-32190)

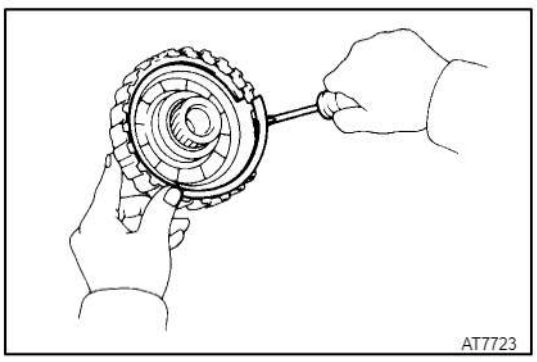
If the piston stroke is greater than the maximum, inspect each component.



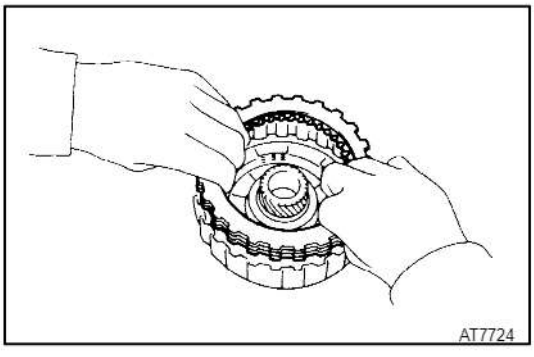
2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE



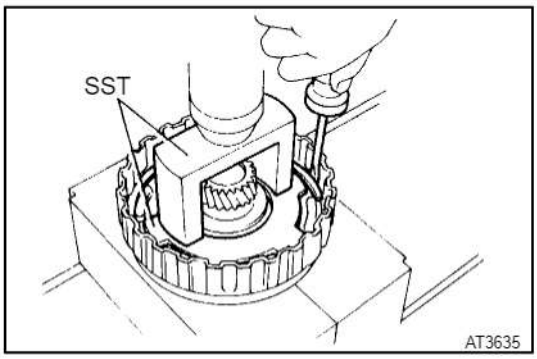
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



5. REMOVE FLANGES, DISCS AND PLATES

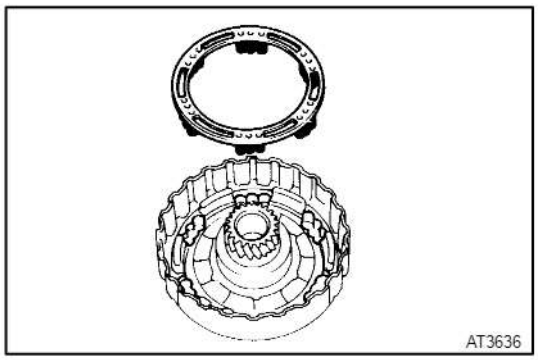


6. REMOVE PISTON RETURN SPRING

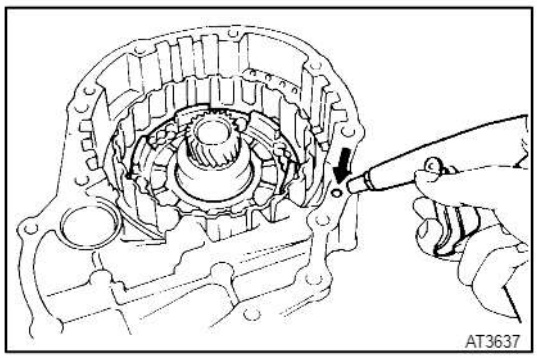
(a) Place SST on the spring retainer and compress the spring with a shop press.

SST 09350-32014 (09351-32070, 09351-32200)

(b) Remove the snap ring.



(c) Remove the piston return spring.



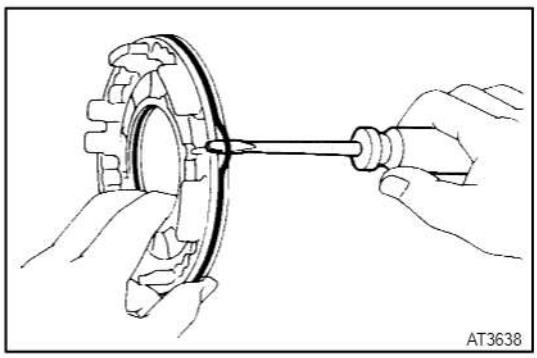
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum 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.

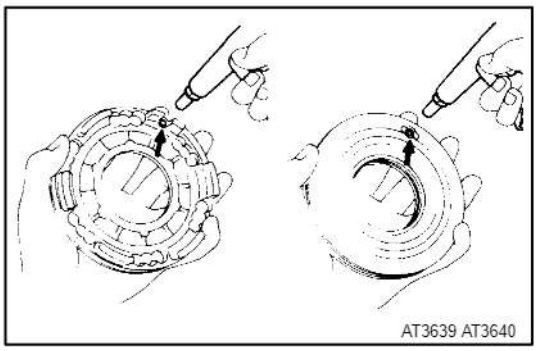
(d) Remove the clutch drum from the case.



8. REMOVE O-RINGS

Remove the two O-rings from the piston.

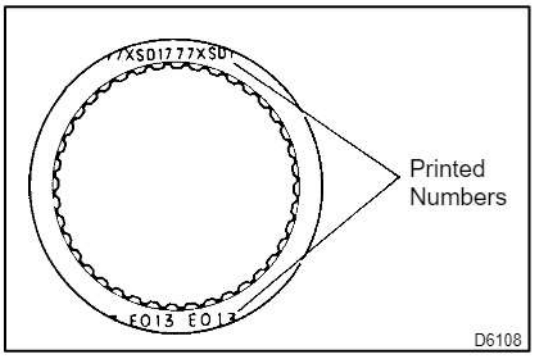
INSPECTION OF OVERDRIVE DIRECT CLUTCH



1. INSPECT OVERDRIVE DIRECT CLUTCH

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

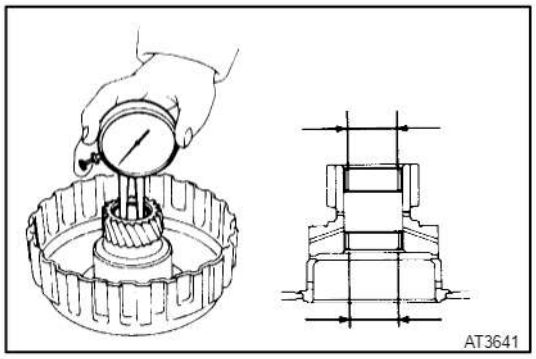
(b) Check that the valve does not leak by applying low-pressure compressed air.



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 exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.
- ® Before assembling new discs, soak them in ATF for at least fifteen minutes.



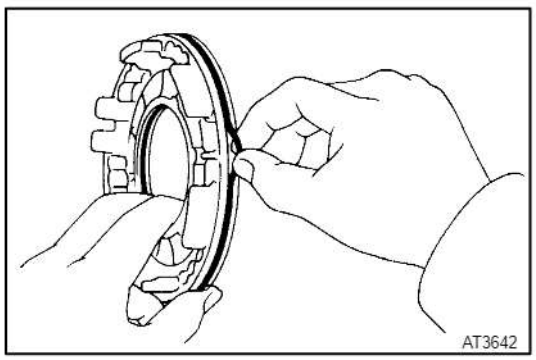
3. CHECK DIRECT CLUTCH BUSHING

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

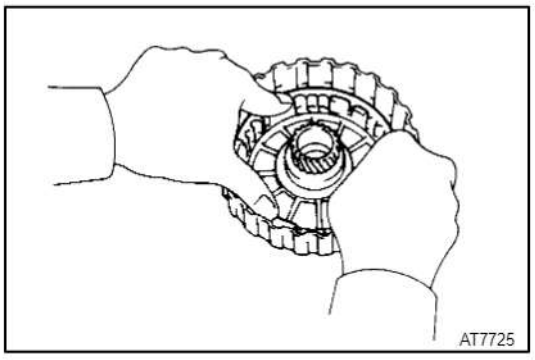
ASSEMBLY OF OVERDRIVE DIRECT CLUTCH

1. INSTALL CLUTCH PISTON

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

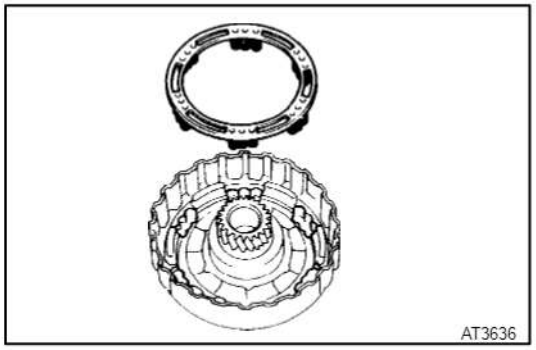


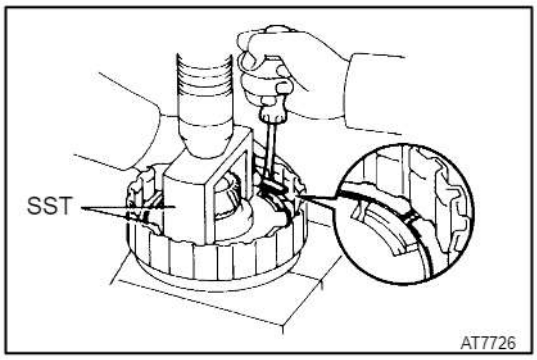
(b) Press the piston into the drum with the cup side up, being careful not to damage the O-ring.



2. INSTALL PISTON RETURN SPRING

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

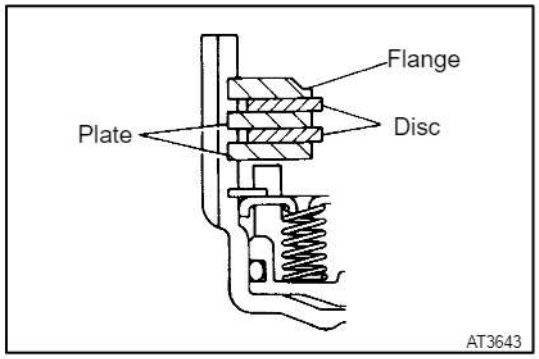




(b) Place SST on the spring retainer, and compress the spring with a shop press.

SST 09350-32014 (09351-32070, 09351-32200)

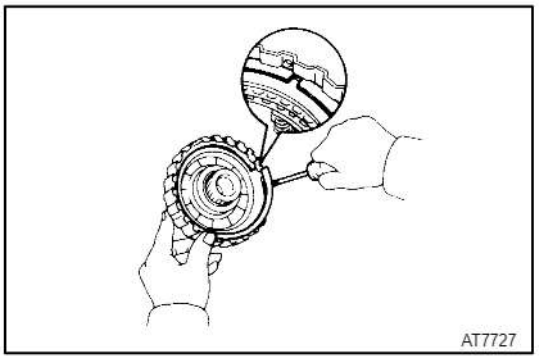
(c) Install the snap ring with a screwdriver. Be sure end gap of snap ring is aligned with the groove of the clutch drum.



3. INSTALL PLATES, DISCS AND FLANGE

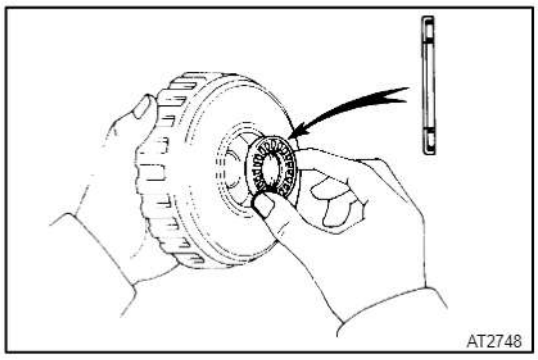
Install in order: P = Plate D = Disc

P-D-P-D-Flange



4. INSTALL SNAP RING

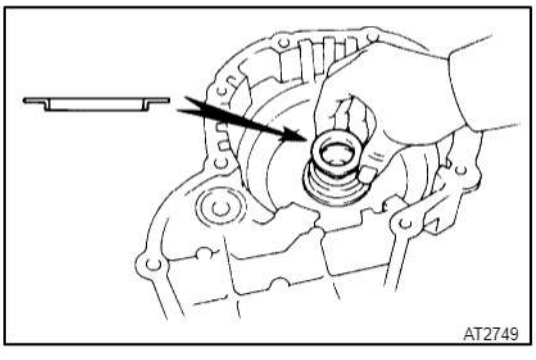
Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.



5. INSTALL BEARING AND RACE

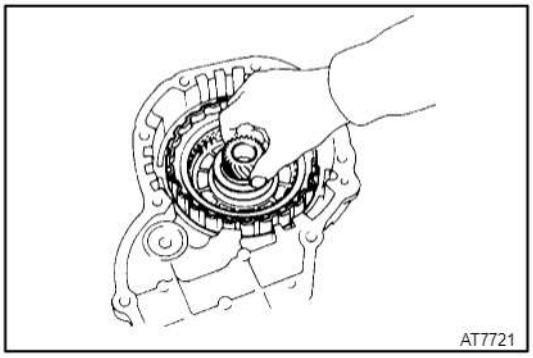
(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.

Bearing: outer diameter 46.3 mm (1.823 in.)
Inner diameter 26.2 mm (1.031 in.)

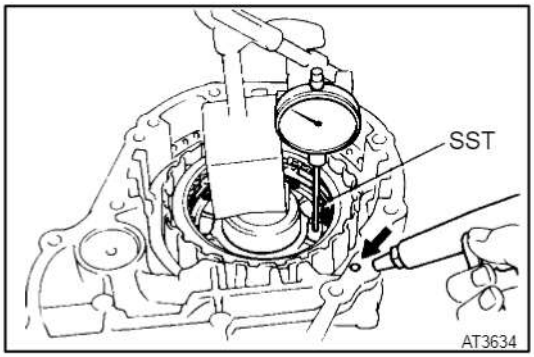


(b) Coat the race with petroleum jelly and install it to the case.

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



6. INSTALL DIRECT CLUTCH ON CASE



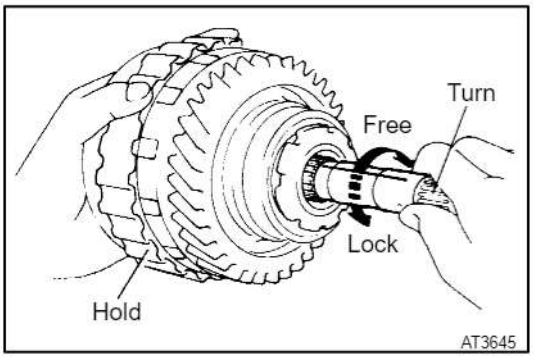
7. RECHECK PISTON STROKE OF DIRECT CLUTCH

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

Piston stroke: 1.75 - 2.49 mm (0.0689 - 0.0980 in.)

SST 09350-32014 (09351-32190)

DISASSEMBLY OF COUNTER DRIVE GEAR

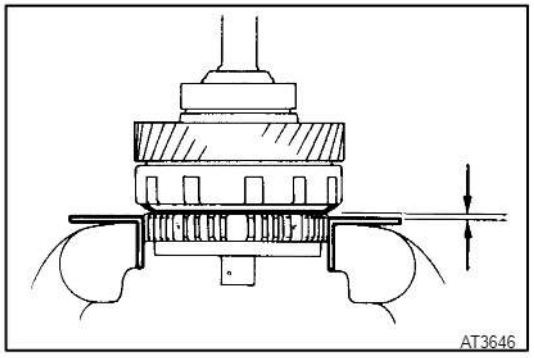


1. CHECK OPERATION OF ONE-WAY CLUTCH

(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.

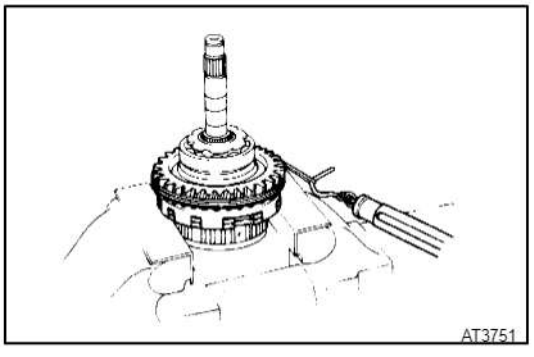
(c) Remove the overdrive direct clutch.



2. CHECK COUNTER DRIVE GEAR PRELOAD

(a) Hold the overdrive planetary gear in a vise with soft jaws.

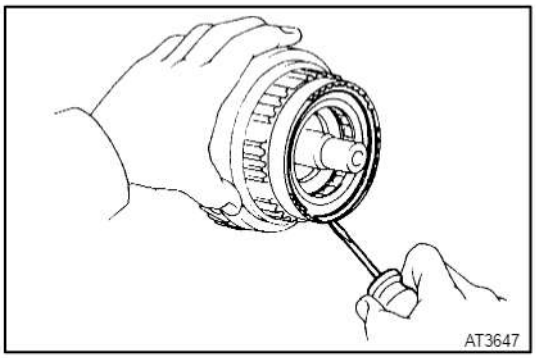
HINT: Do not let the counter drive gear touch the vise.



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

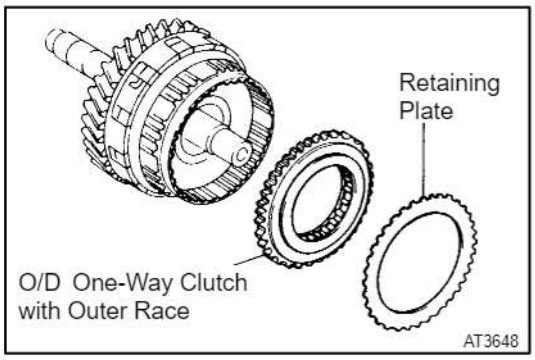
Preload (at starting): 940 - 1,560 g (2.1 - 3.4 lb, 9.2 - 15.3 N)

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



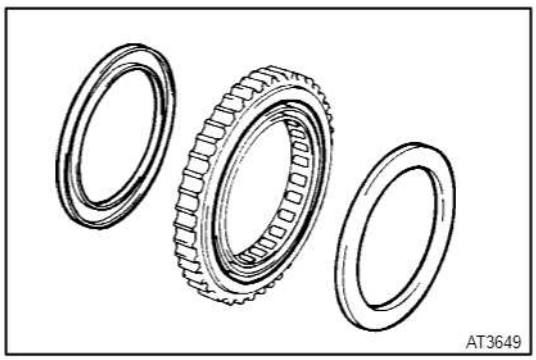
3. REMOVE O/D ONE-WAY CLUTCH AND OUTER RACE

(a) Remove the snap ring.

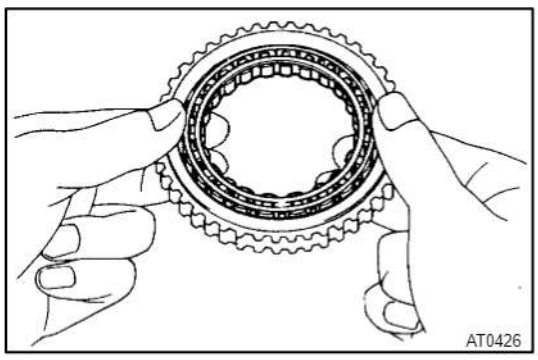


(b) Remove the retaining plate.

(c) Remove the O/D one-way clutch with outer race.

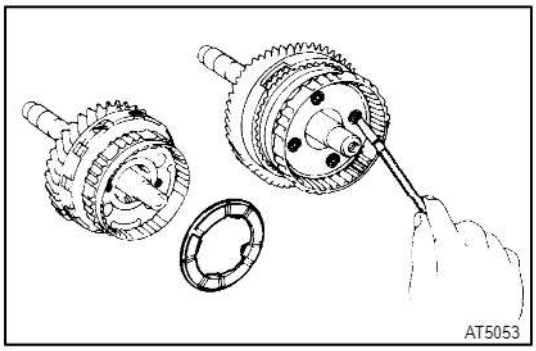


(d) Remove the two retainers from both sides of the O/D one-way clutch.



(e) Remove the O/D one-way clutch from the outer race.

HINT: Note the direction of the one-way clutch.

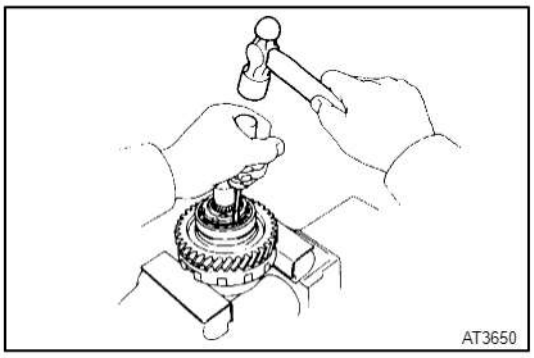


4. REMOVE NO. 3 PLANETARY THRUST WASHER

5. REMOVE PLUGS FROM PLANETARY GEAR

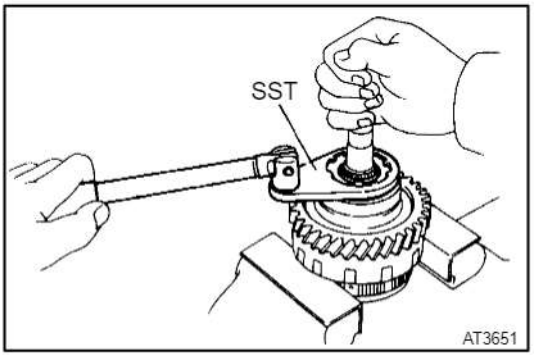
Remove the four plugs with a magnetic finger.

HINT: Be careful not to lose them.



6. REMOVE ADJUSTING NUT AND LOCKING WASHER

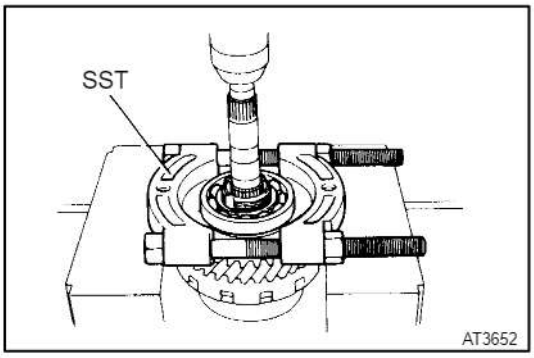
(a) Pry off the locking washer.



(b) Using SST, loosen the adjusting nut.

SST 09350-32014 (09351-32080)

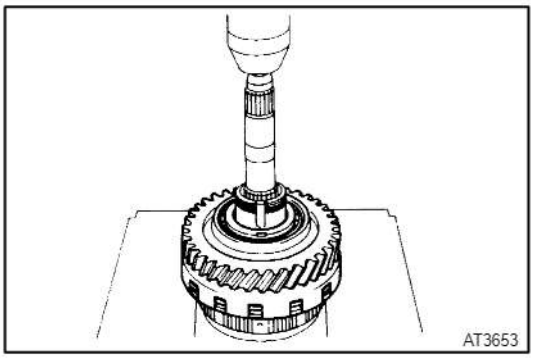
(c) Remove the adjusting nut and locking washer.



7. REMOVE INTERMEDIATE SHAFT BEARING

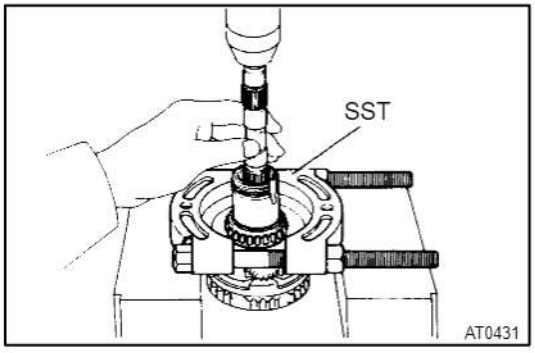
Using SST, press out the bearing from the shaft.

SST 09950-00020



8. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

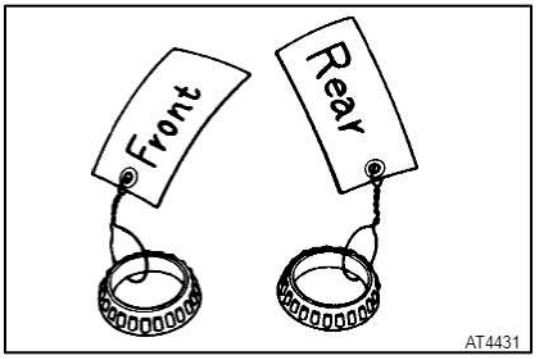
Press out the gear and bearing together.



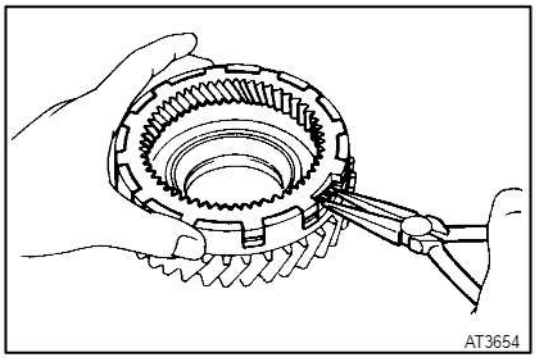
9. REMOVE REAR BEARING

(a) Using SST, press out the bearing.

SST 09950-00020



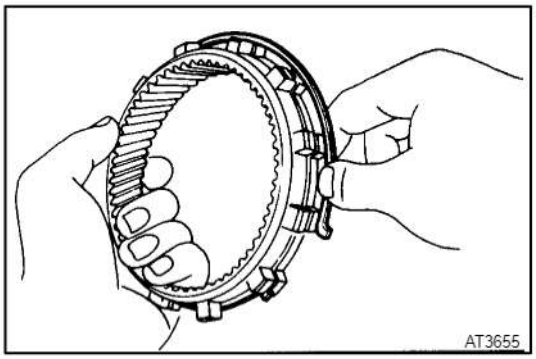
(b) Tag the bearings to show the location for reassembly.



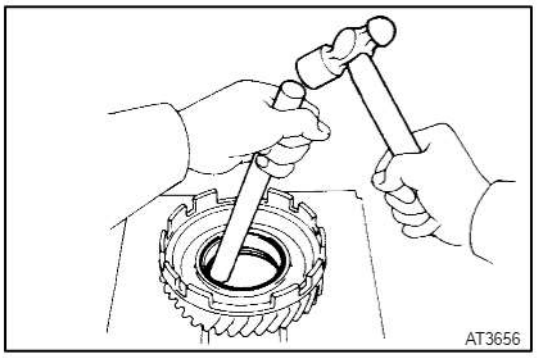
10. REMOVE OVERDRIVE PLANETARY RING GEAR FROM COUNTER DRIVE GEAR

(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.

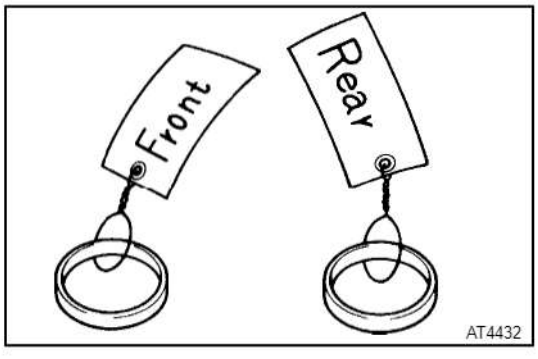


(c) Remove the snap ring from the ring gear.

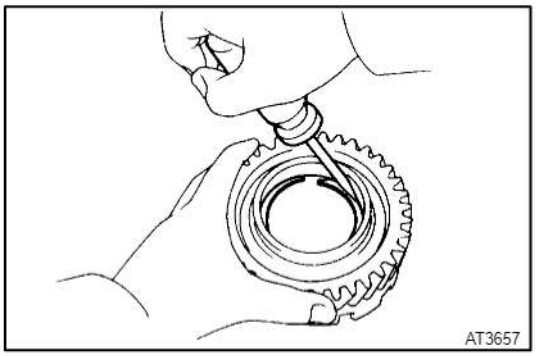


11. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

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

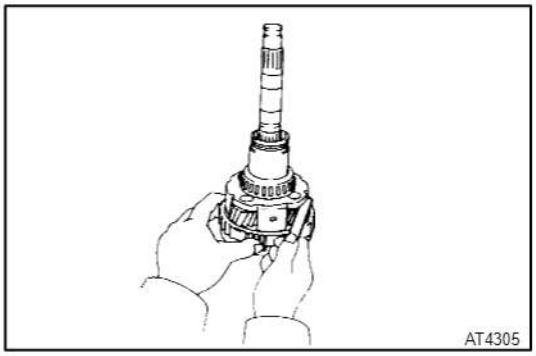


(b) Tag the races to show the location for reassembly.



12. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



INSPECTION OF OVERDRIVE PLANETARY GEAR

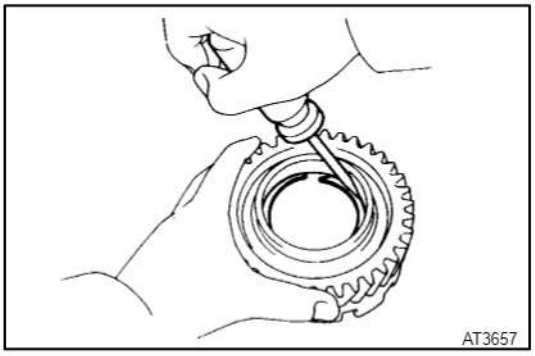
MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

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.)

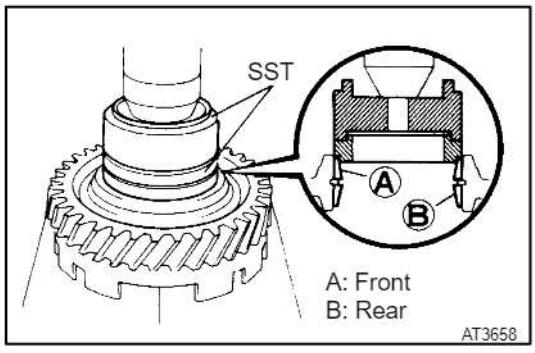
If the clearance is greater than the maximum, replace the planetary gear assembly.



ASSEMBLY OF COUNTER DRIVE GEAR

1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.

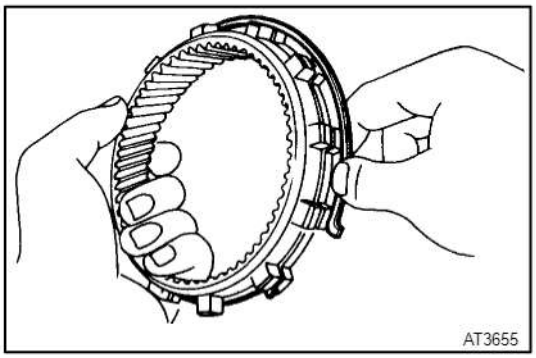


2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the two outer races to both sides of the gear.

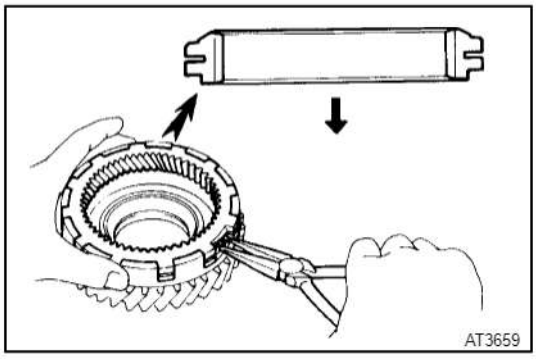
SST 09350-32014 (09351-32120, 09351-32150)

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

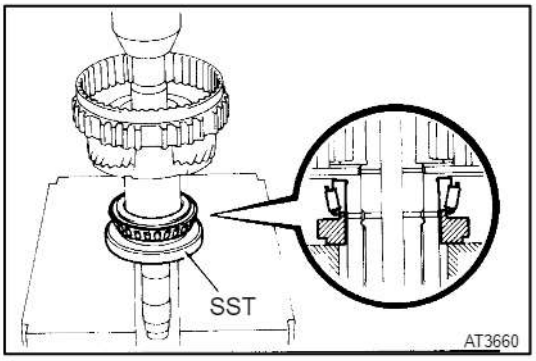


3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVE GEAR

(a) Install the snap ring to the ring gear.

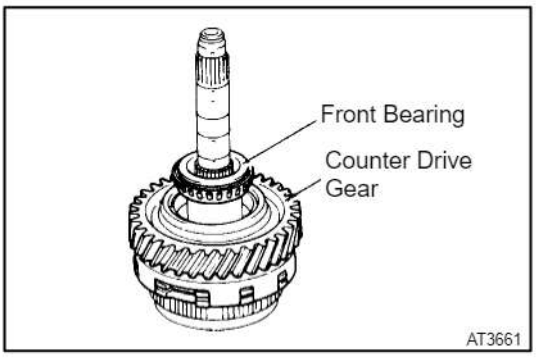


(b) While pushing down the ring gear, squeeze the snap ring end with needle-nose pliers, and install it into the groove.



4. INSTALL REAR BEARING

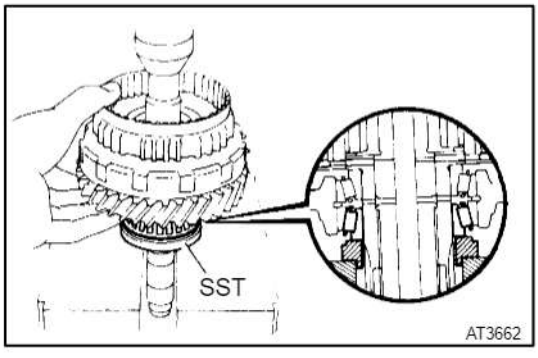
Using SST, press in the bearing onto the shaft.
SST 09350-32014 (09351-32120)
HINT: Press in the bearing until the side surface of the inner race touches the planetary carrier.



5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

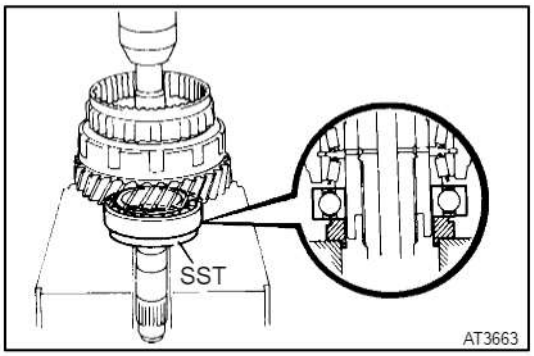
(a) Install the gear onto the shaft, and mesh the ring gear with the planetary pinions.

(b) Place the front bearing onto the shaft.



(c) Using SST, press in the bearing until slightly play between the bearings.

SST 09350-32014 (09351-32120)
HINT: Hold the ring gear to prevent it from falling.

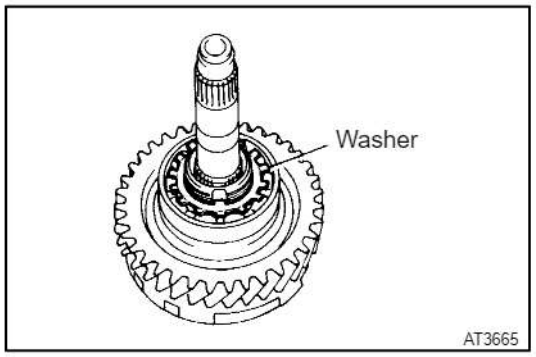


6. INSTALL INTERMEDIATE SHAFT BEARING

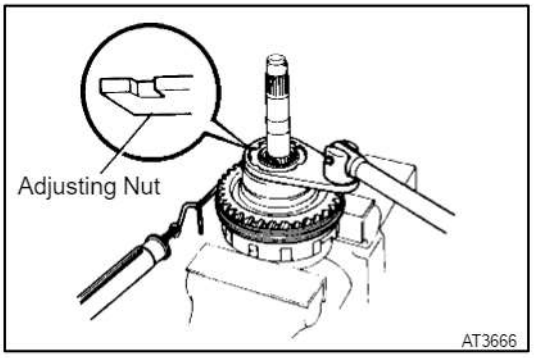
Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.

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.

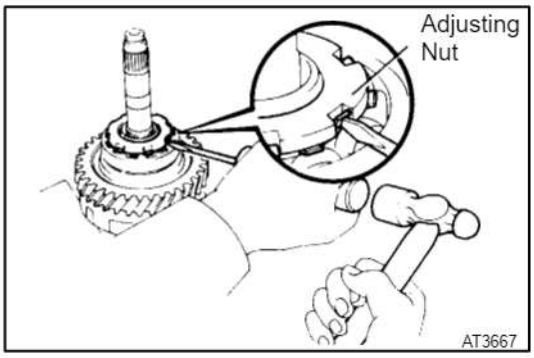
(b) Using SST, tighten the adjusting nut until the following gear starting load is reached on the tension gauge.

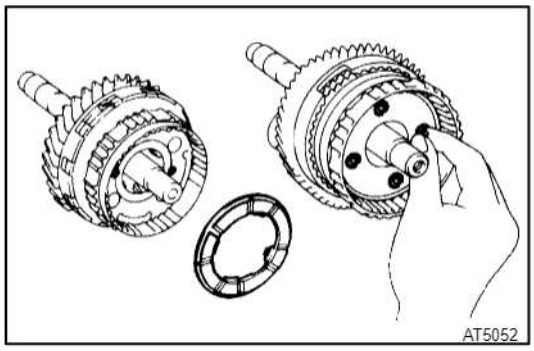
SST 09350-32014 (09351-32080)

Preload (at starting): 940-1,560 g (2.1-3.4 lb, 9.2-15.3 N)

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.

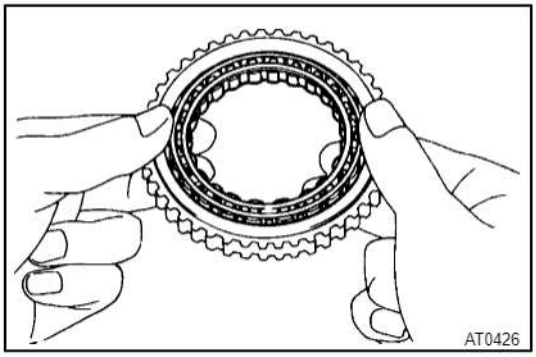




9. INSTALL NO. 3 OVERDRIVE PLANETARY THRUST WASHER

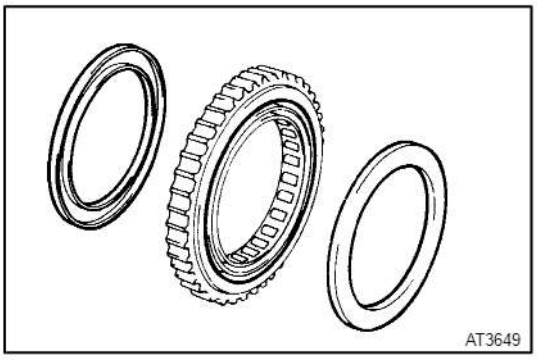
10. INSTALL PINION SHAFT PLUGS

Install the four plugs into the pinion shaft.

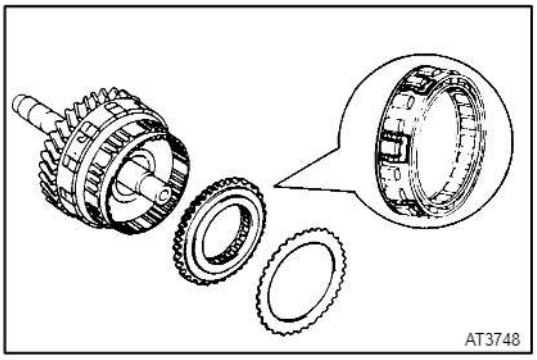


11. INSTALL OVERDRIVE ONE-WAY CLUTCH AND RETAINING PLATE

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



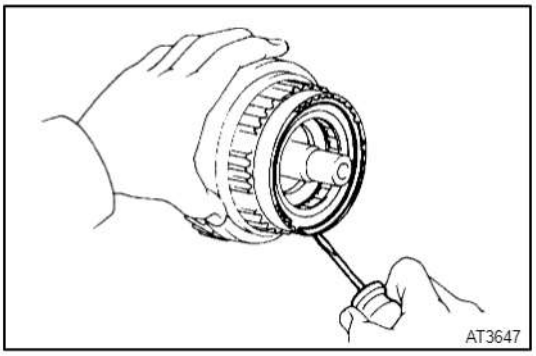
(b) Install the two retainer on both sides of the one-way clutch.



(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.



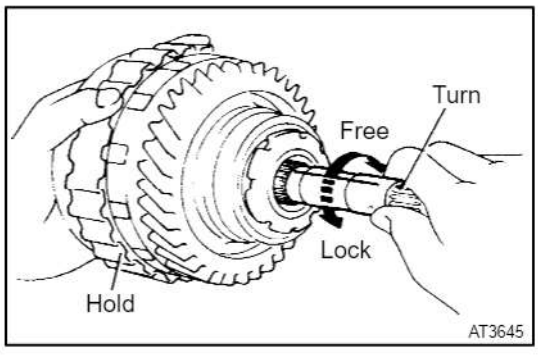
(e) Install the snap ring.

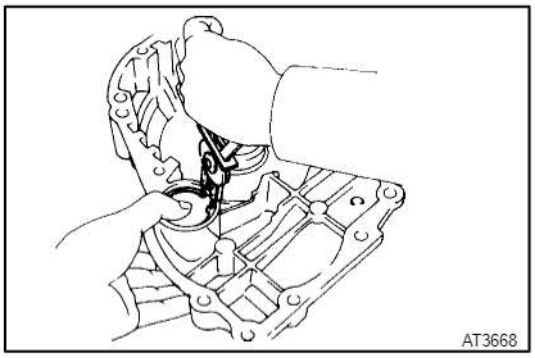
12. CHECK OPERATION OF O/D ONE-WAY CLUTCH

(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.

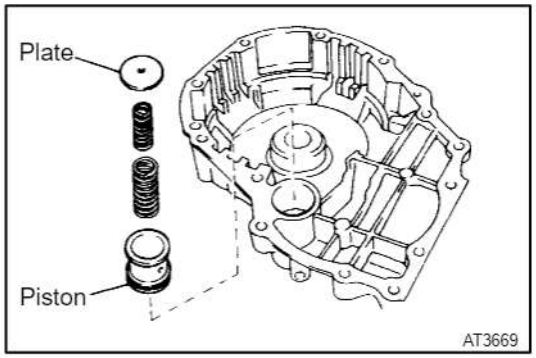




DISASSEMBLY OF OVERDRIVE CASE

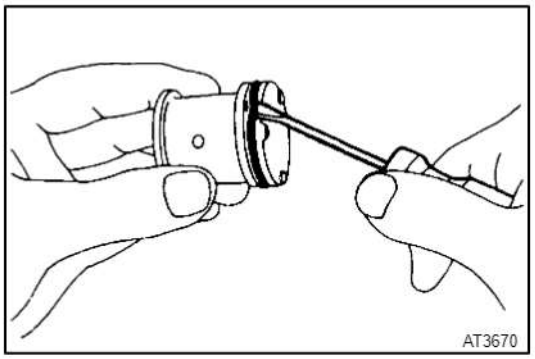
1. REMOVE C_0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

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



(b) Remove the retaining plate and two springs.

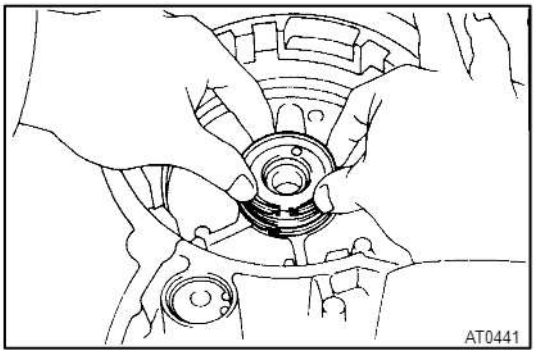
(c) Remove the accumulator piston.



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

2. REMOVE OIL SEAL RINGS

Spread the two rings apart and remove them.

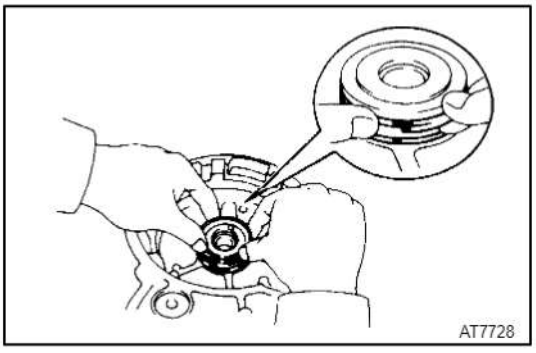


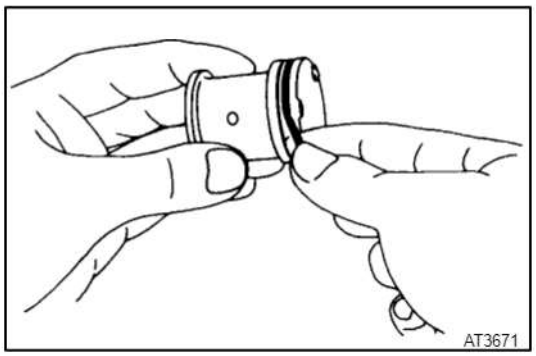
ASSEMBLY OF OVERDRIVE CASE

1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Spread the two rings apart and install them into the groove.

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

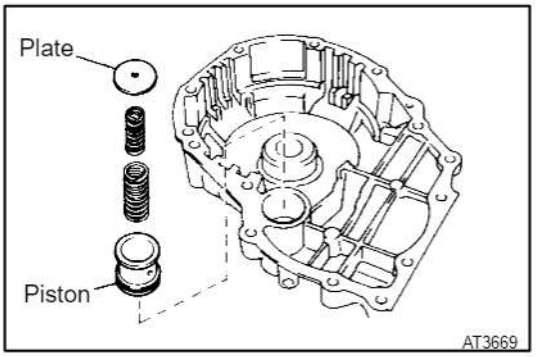




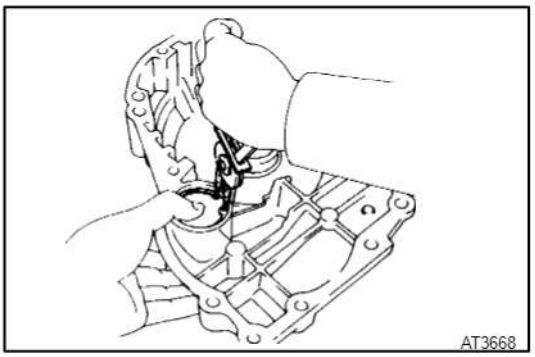
2. INSTALL C_0 ACCUMULATOR PISTON TO OVERDRIVE CASE

(a) Install a new O-ring to the accumulator piston.

(b) Coat the O-ring with ATF.



(c) Install the accumulator piston, two springs and retaining plate.

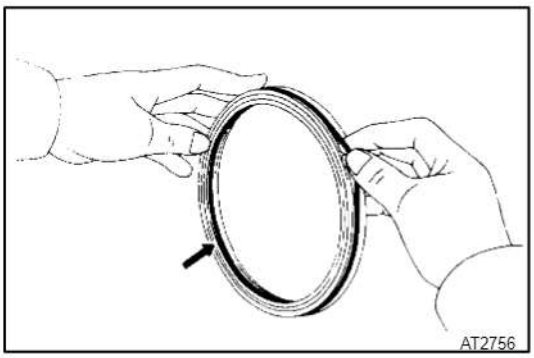


(d) Using snap ring pliers, install the snap ring.

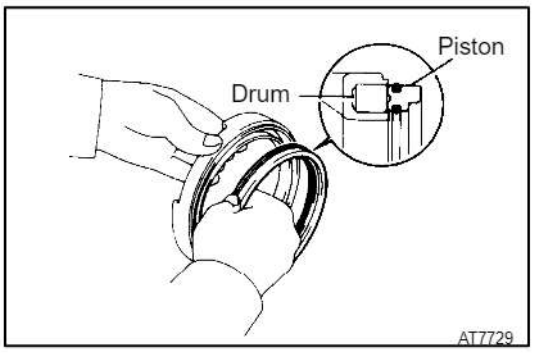
ASSEMBLY OF OVERDRIVE BRAKE

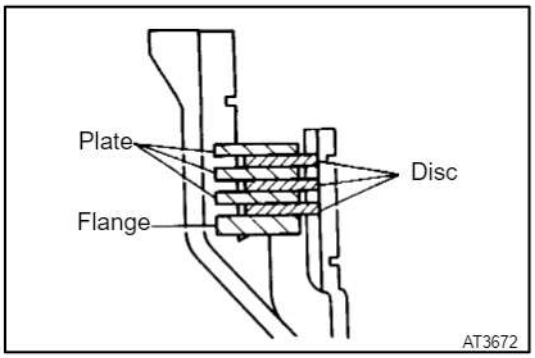
1. INSTALL PISTON INTO DRUM

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



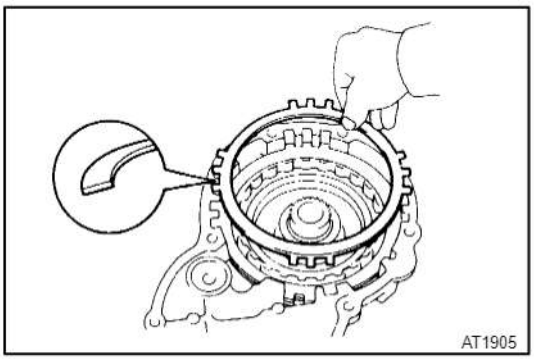
(b) Press the piston into the drum, being careful not to damage the O-rings.



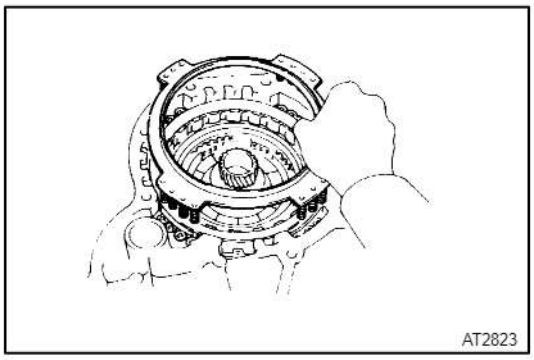


2. INSTALL FLANGE, DISCS AND PLATES

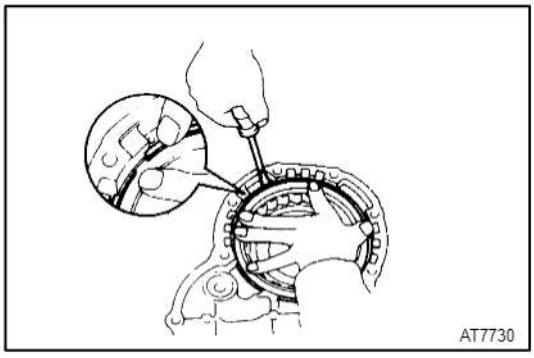
(a) Install the flange, discs and plates.
Install in order: P = Plate D = Disc
Flange-D-P-D-P-D-P



(b) Install the cushion plate with the rounded end facing upward.

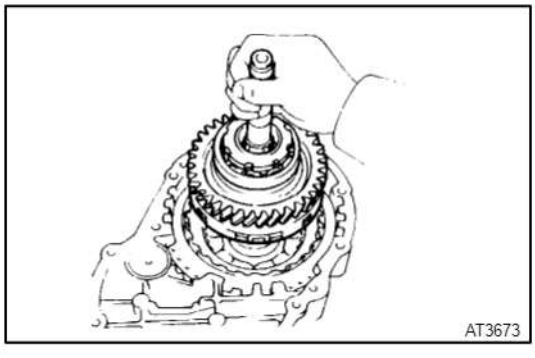


3. POSITION PISTON RETURN SPRING



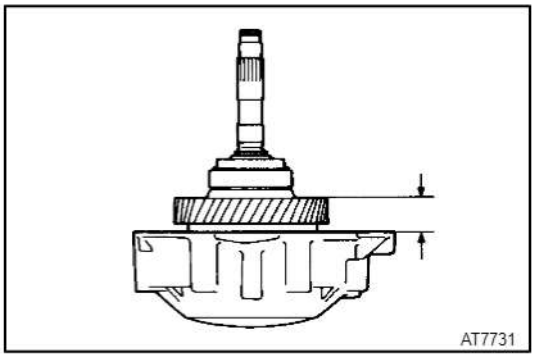
4. INSTALL SNAP RING INTO CASE

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

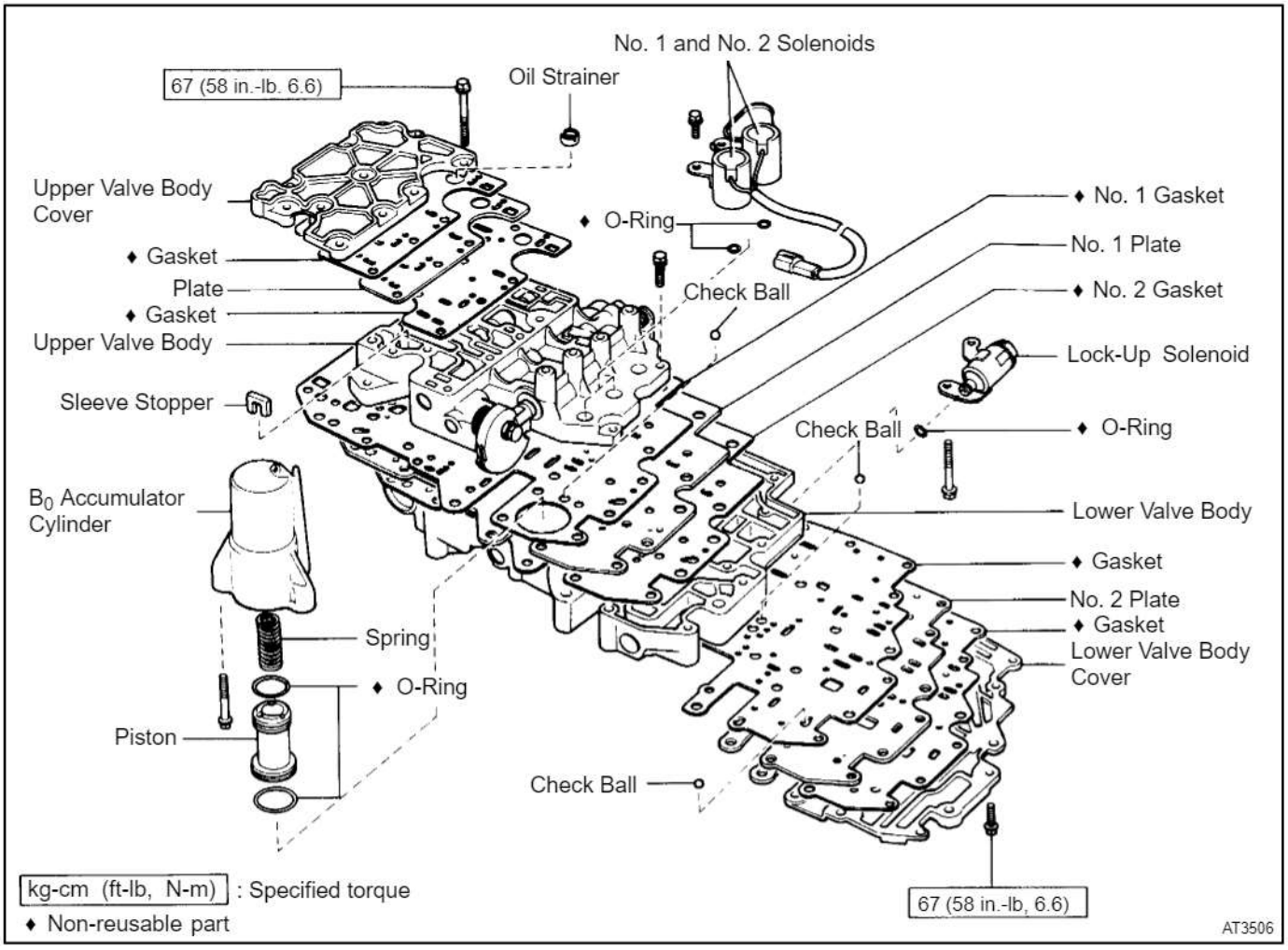
While turning the overdrive planetary gear clockwise, install it onto the overdrive direct clutch.

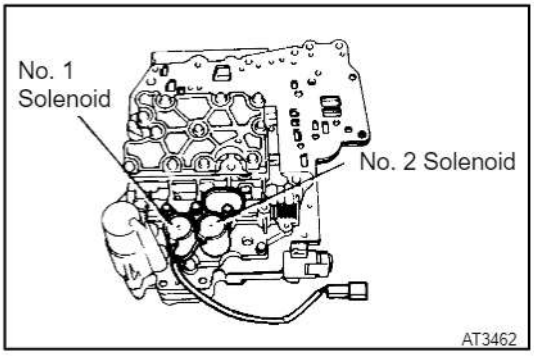


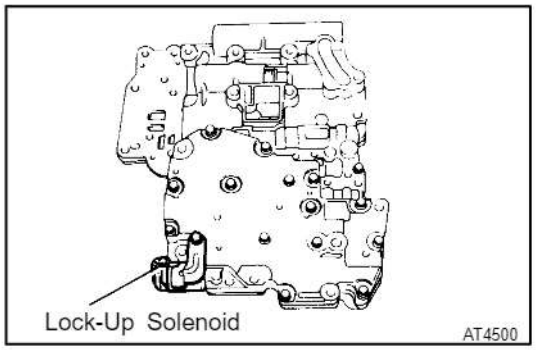
HINT: If the overdrive planetary gear is properly installed onto the direct clutch, the counter drive gear height from the overdrive case will be about 24 mm (0.94 in.).

Valve Body

COMPONENTS







(Disassembly of Valve Body)

NOTICE: When disassembling the valve body, be careful not to damage or deform the plate which overhangs the valve body.

1. REMOVE SOLENOIDS

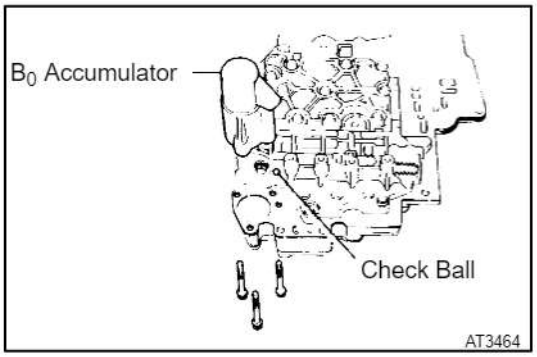
(a) Remove No. 1 and No. 2 solenoids.

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 lock-up solenoid.

(d) Remove the O-ring from the solenoid.

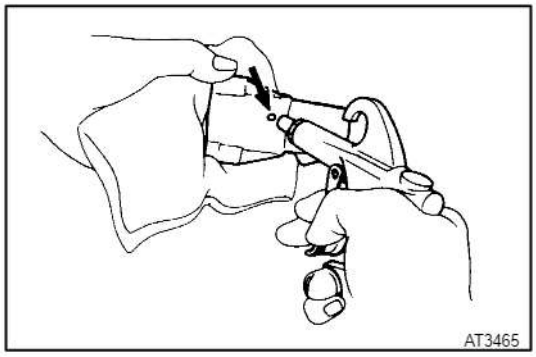


2. REMOVE B_0 ACCUMULATOR ASSEMBLY

(a) Remove the three bolts.

(b) Remove the B_0 accumulator assembly.

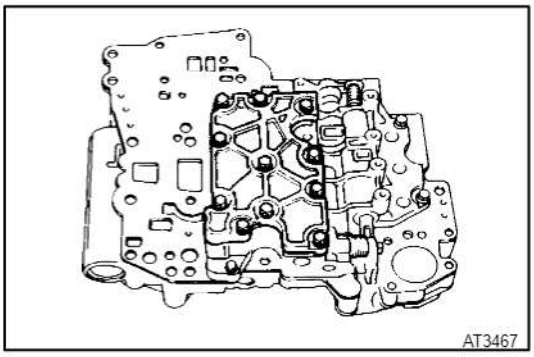
(c) Remove the check ball on No. 1 plate.



3. DISASSEMBLE B_0 ACCUMULATOR ASSEMBLY

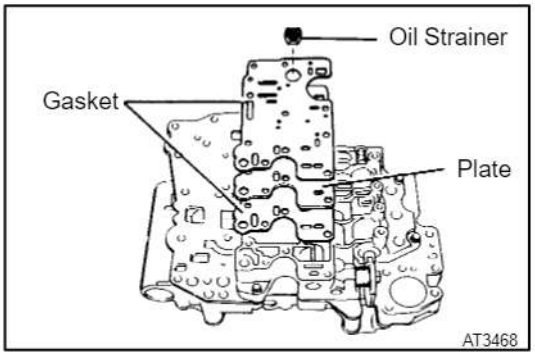
(a) Applying compressed air to the cylinder hole, remove the piston and spring.

(b) Remove the two O-ring from the piston.



4. REMOVE UPPER VALVE BODY COVER

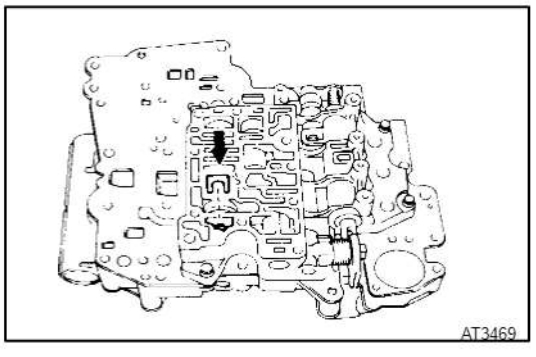
Remove the eleven bolts and upper valve body cover.



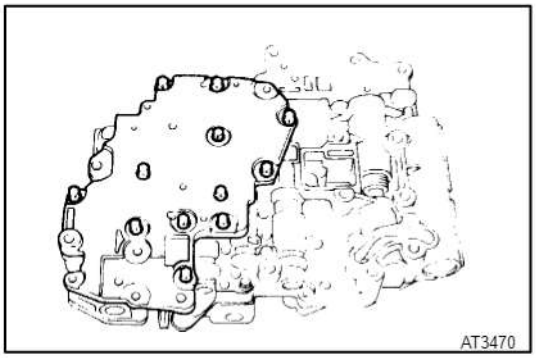
5. REMOVE OIL STRAINER, UPPER VALVE BODY COVER GASKETS AND PLATE

(a) Remove the oil strainer on the gasket.

(b) Remove the two gaskets and plate from the upper valve body.

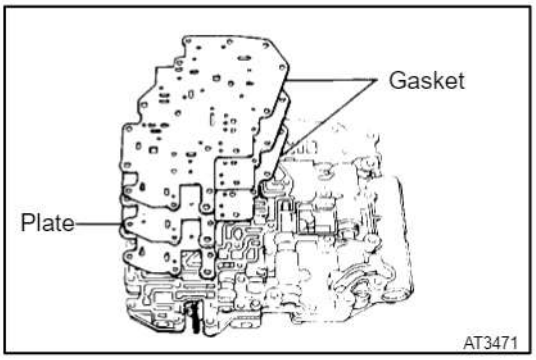


6. REMOVE LOCK-UP RELAY VALVE SLEEVE STOPPER

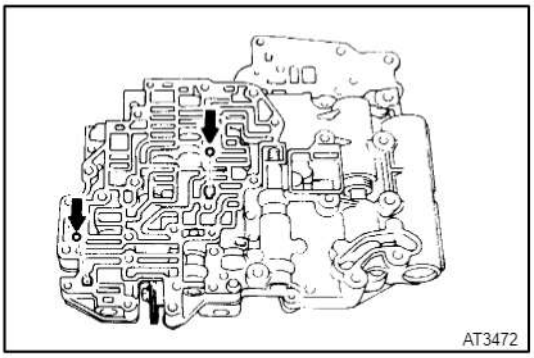


7. REMOVE LOWER VALVE BODY COVER

Remove the twelve bolts and lower valve body cover.

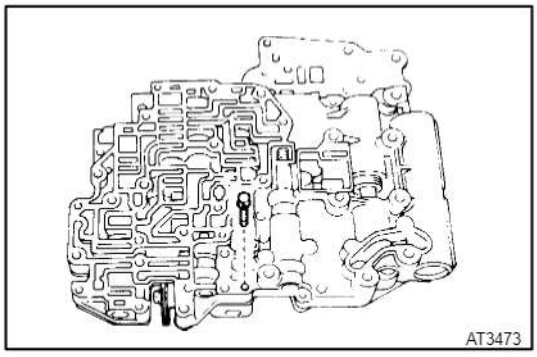


8. REMOVE LOWER VALVE BODY COVER GASKETS AND NO. 2 PLATE

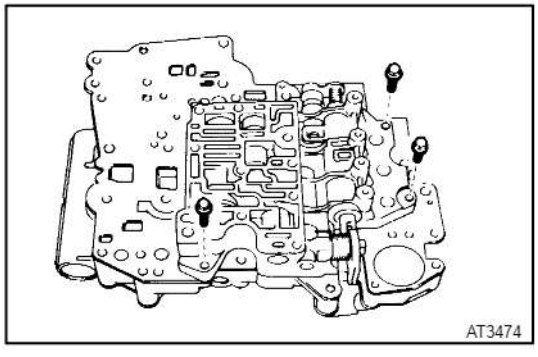


9. REMOVE CHECK BALLS

Remove the two check balls from the lower valve body.

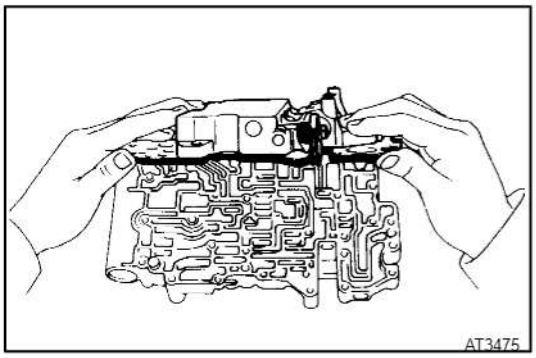


10. REMOVE BOLT FROM LOWER VALVE BODY



11. REMOVE BOLTS FORM UPPER VALVE BODY

Remove the three bolts.

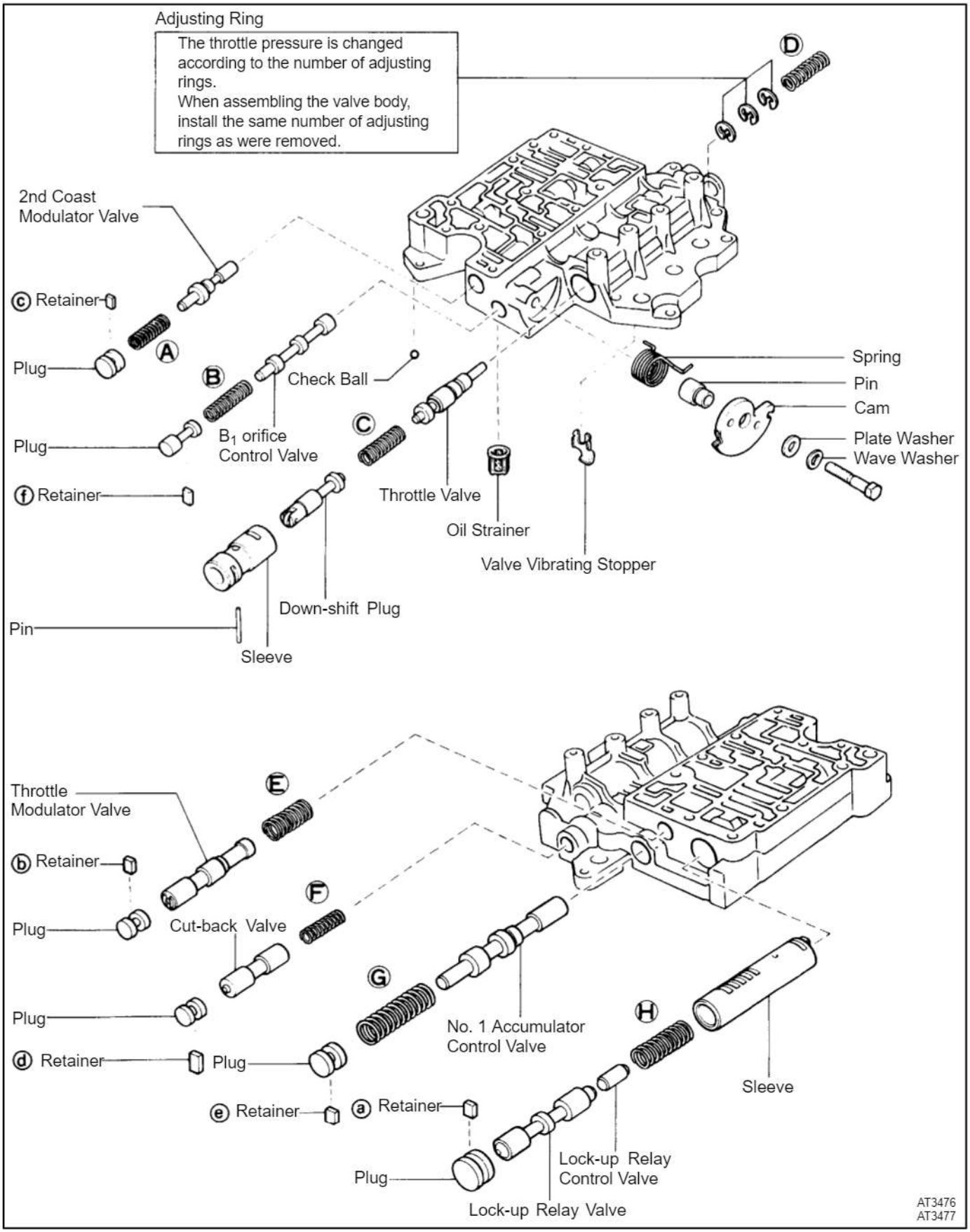


12. LIFT OFF UPPER VALVE BODY AND NO. 1 PLATE AS A SINGLE UNIT

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.

(Upper Valve Body)

COMPONENTS

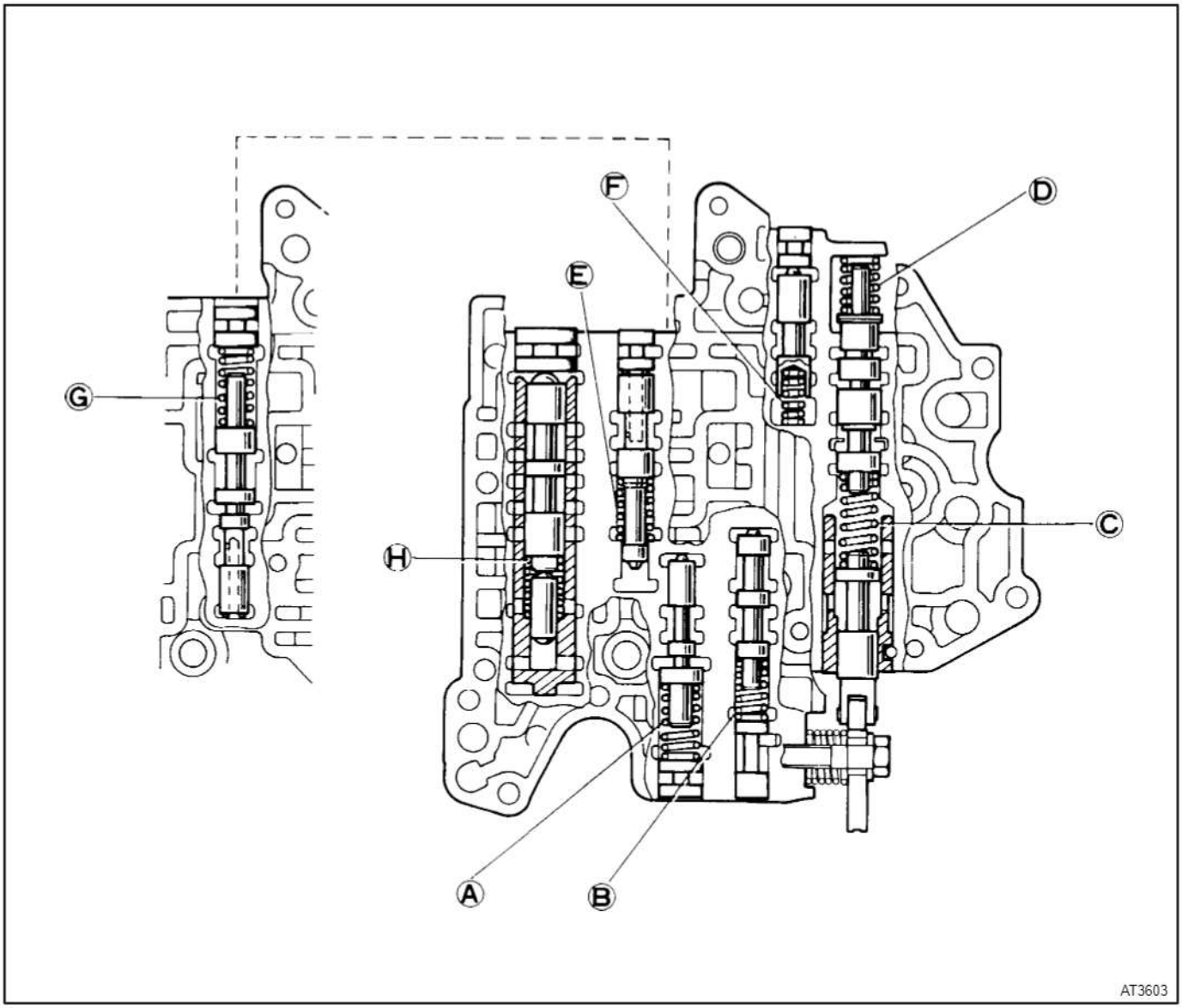


SPECIFICATIONS OF VALVE BODY SPRINGS

Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
Ⓐ	Second coast modulator valve	27.5 (1.083)	8.9 (0.350)	14.6	Brown
Ⓑ	B_1 orifice control valve	24.8 (0.976)	8.0 (0.315)	12.0	White
Ⓒ	Down-shift plug	29.8 (1.173)	8.7 (0.343)	13.5	Yellow
Ⓓ	Throttle valve	30.7 (1.209)	9.2 (0.362)	9.5	Purple
Ⓔ	Throttle modulator valve	21.7 (0.854)	9.5 (0.374)	9.5	Orange
Ⓕ	Cut-back valve	21.8 (0.858)	6.0 (0.236)	13.5	Red
Ⓖ	No. 1 accumulator control valve	28.1 (1.106)	10.6 (0.417)	13.0	Yellow
Ⓗ	Lock-up relay valve	26.6 (1.047)	10.2 (0.402)	11.5	Green

HINT: During reassembly please refer to the spring specifications above to help discriminate the different springs.

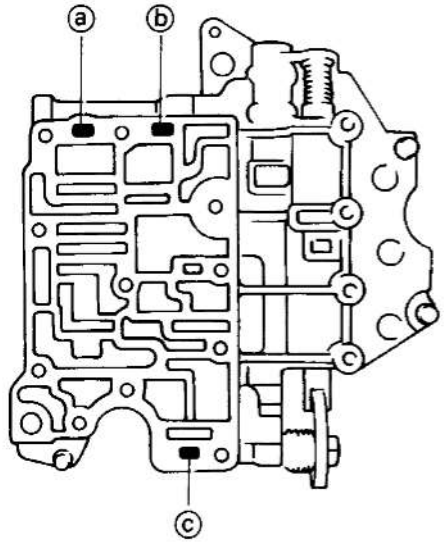
SECTIONAL VIEW OF VALVE BODY



LOCATION OF RETAINERS, PIN, STOPPER, CHECK BALL AND STRAINER

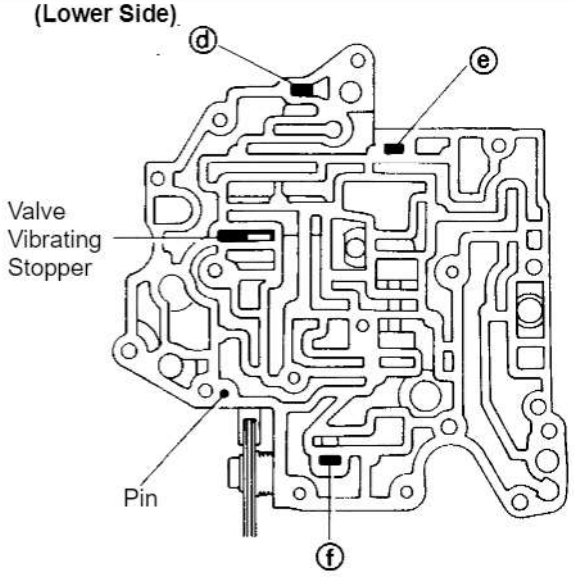
1. RETAINER, STOPPER AND PIN

(Upper Side)



AT3479

(Lower Side)

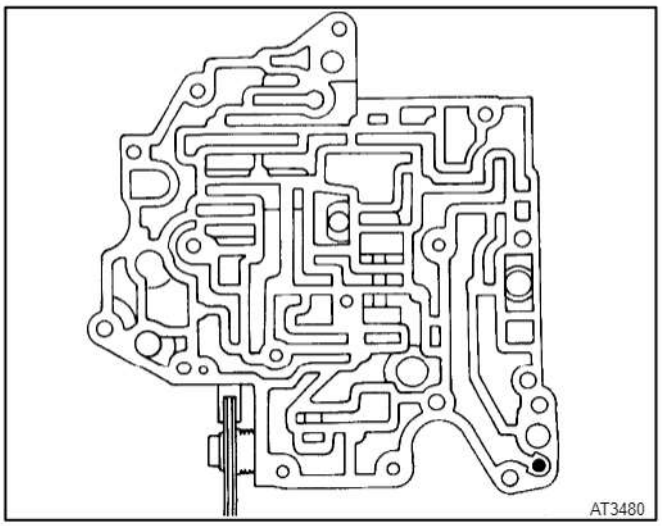


AT3478

mm (in.)

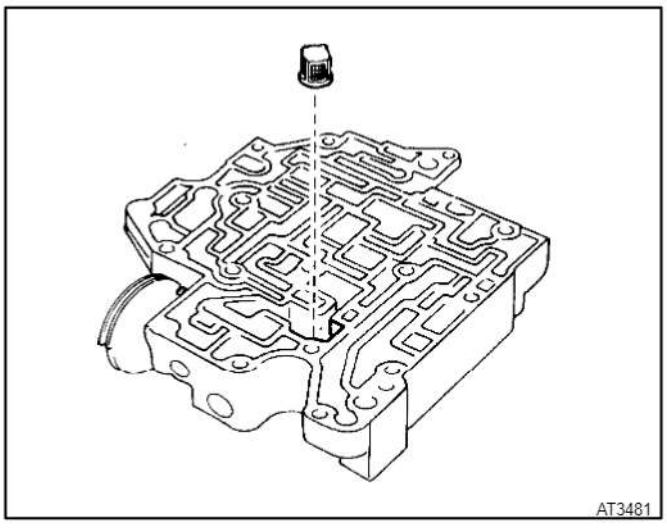
Retainer		Height	Width	Thickness
ⓐ	Lock-up relay valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓑ	Throttle modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓒ	Second coast modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓓ	Cut-back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
ⓔ	No. 1 accumulator control valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓕ	B_1 orifice control valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)

2. CHECK BALL



AT3480

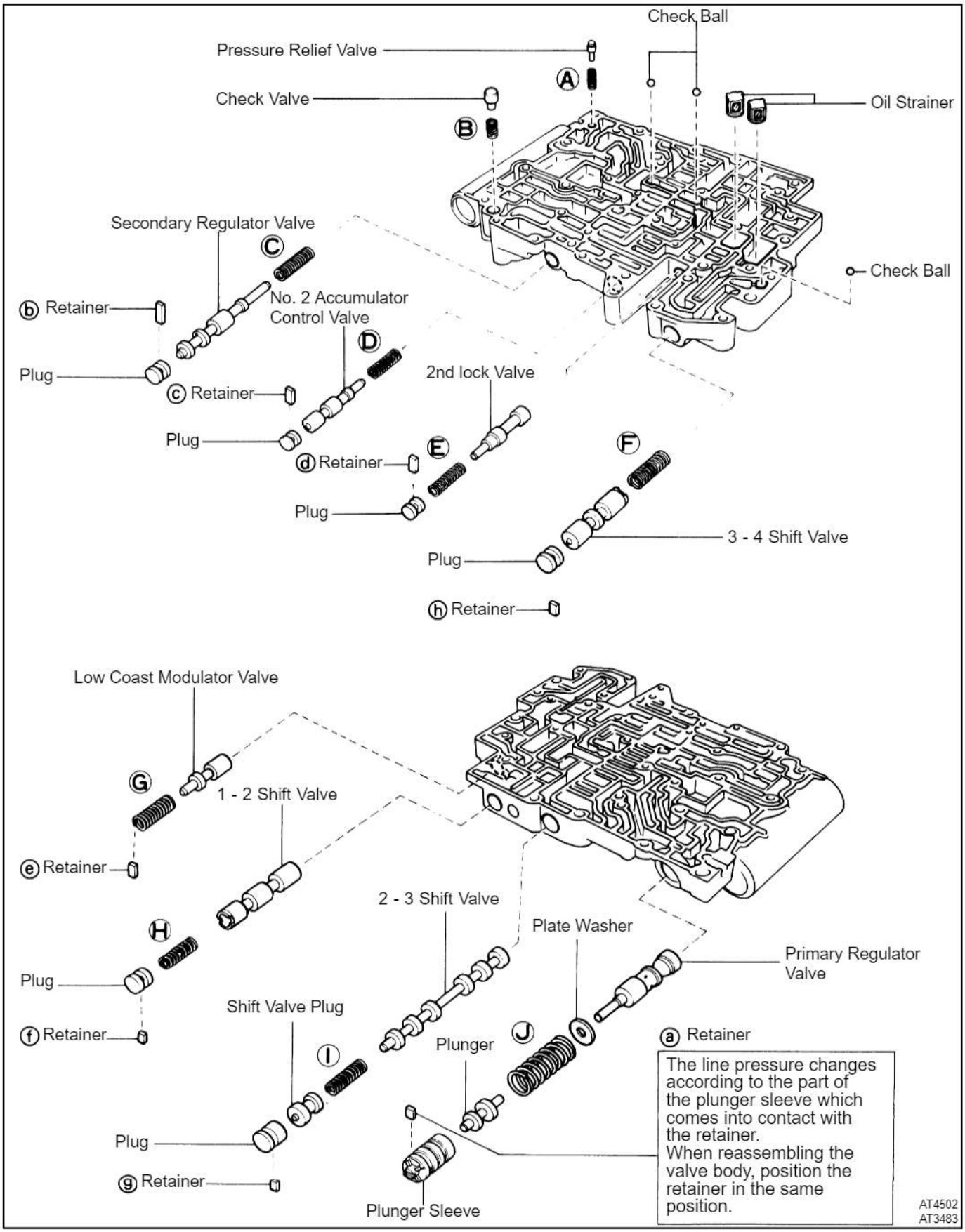
3. STRAINER



AT3481

(Lower Valve Body)

COMPONENTS

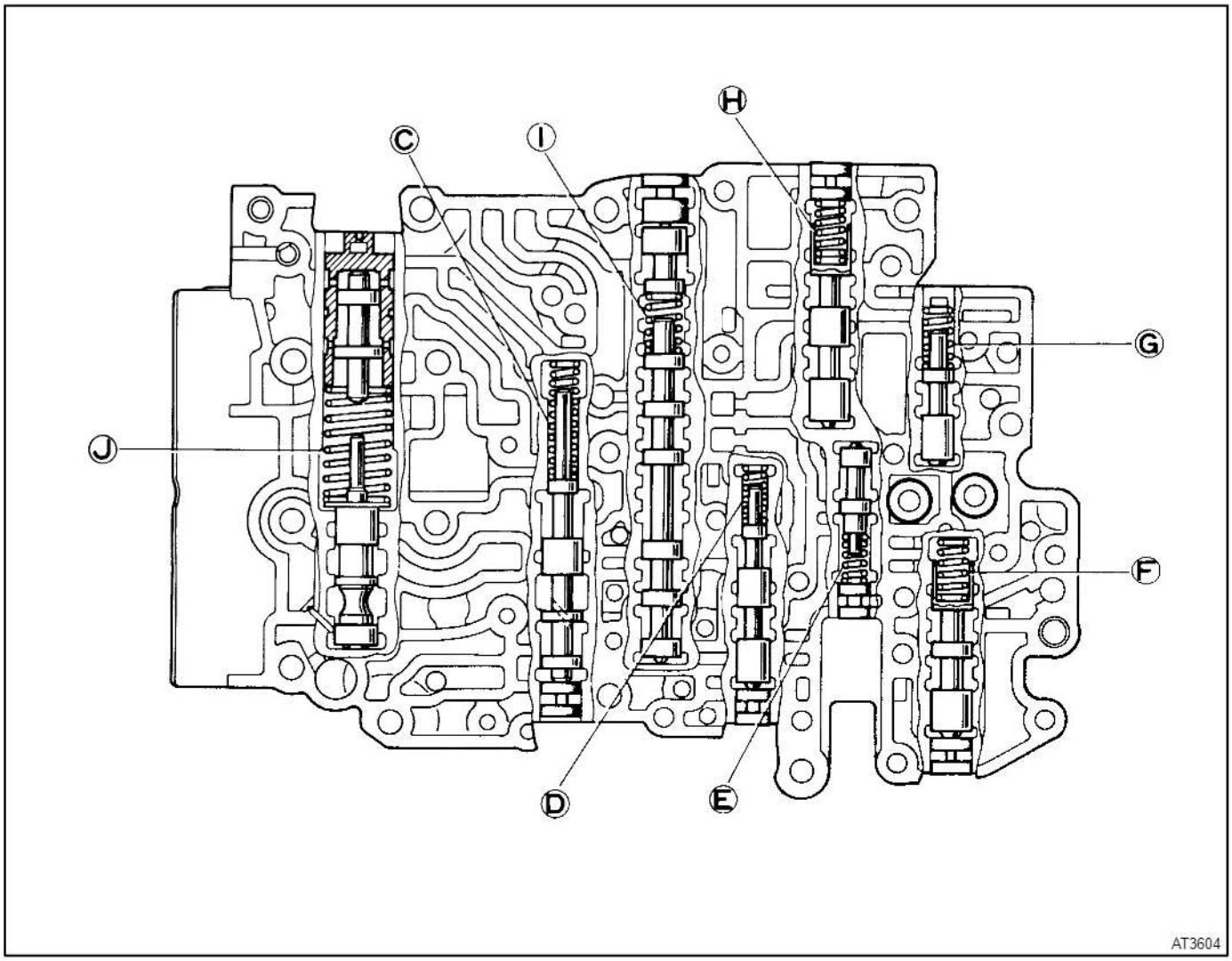


SPECIFICATIONS OF VALVE BODY SPRINGS

Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
Ⓐ	Pressure relief valve	11.2 (0.441)	6.4 (0.252)	7.5	None
Ⓑ	Check valve	19.9 (0.783)	11.0 (0.433)	8.5	None
Ⓒ	Secondary regulator valve	38.5 (1.516)	8.4 (0.331)	17.0	Purple
Ⓓ	No. 2 accumulator control valve	23.0 (0.906)	6.3 (0.248)	12.0	Gray
Ⓔ	Second lock valve	20.7 (0.815)	6.1 (0.240)	12.0	Orange
Ⓕ	3 - 4 shift valve	29.2 (1.150)	8.9 (0.350)	12.0	Light Green
Ⓖ	Low coast modulator valve	20.2 (0.795)	7.9 (0.311)	11.9	Purple
Ⓗ	1 - 2 shift valve	29.2 (1.150)	8.9 (0.350)	12.0	Light Green
Ⓘ	2 - 3 shift valve	28.0 (1.102)	9.4 (0.370)	10.3	None
Ⓙ	Primary regulator valve	64.2 (2.528)	18.6 (0.732)	12.5	None

HINT: During reassembly please refer to the spring specifications above to help discriminate the different springs.

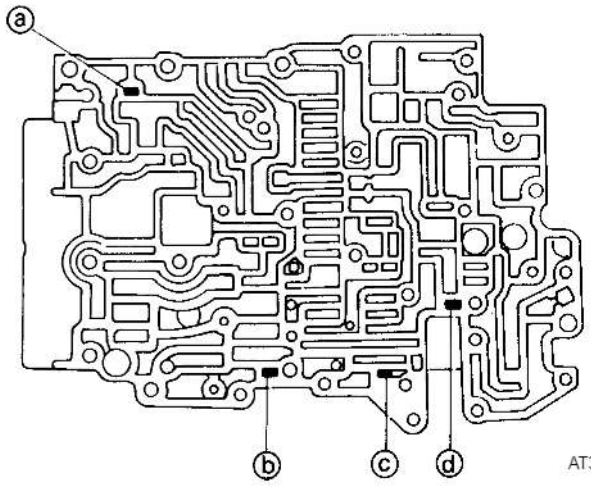
SECTIONAL VIEW OF VALVE BODY



LOCATION OF RETAINERS, CHECK BALLS AND STRAINERS

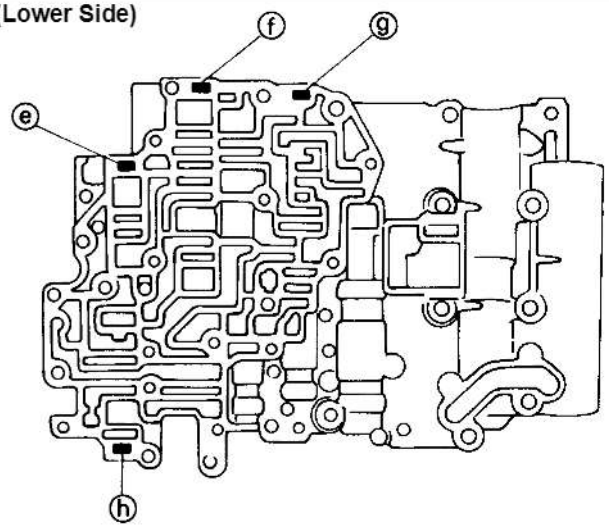
1. RETAINER

(Upper Side)



AT3484

(Lower Side)

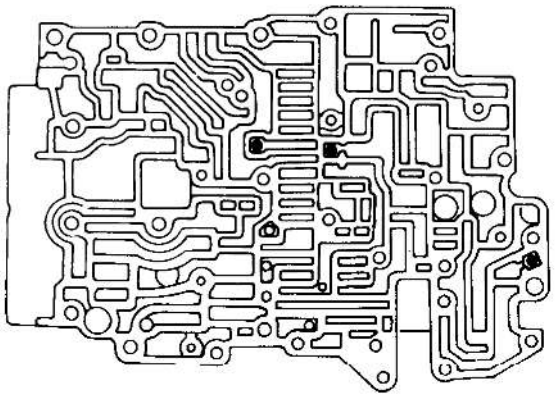


AT3485

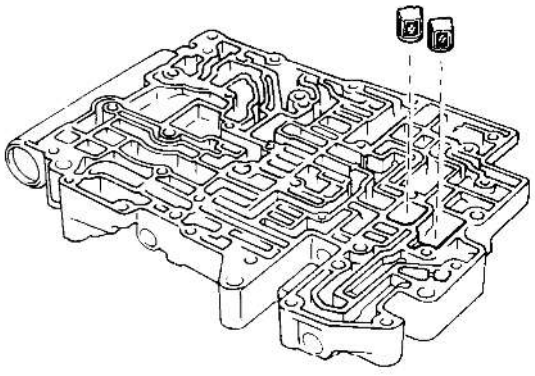
mm (in.)

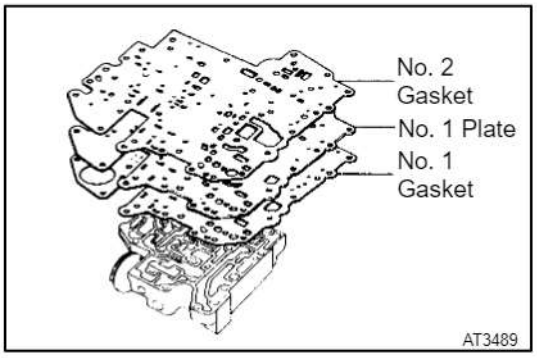
Retainer		Height	Width	Thickness
ⓐ	Primary regulator valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
ⓑ	Secondary regulator valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
ⓒ	No. 2 accumulator control valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
ⓓ	Second lock valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓔ	Low coast modulator valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓕ	1 - 2 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓖ	2 - 3 shift valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
ⓗ	3 - 4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)

2. CHECK BALL


AT4501

3. STRAINER


AT3487

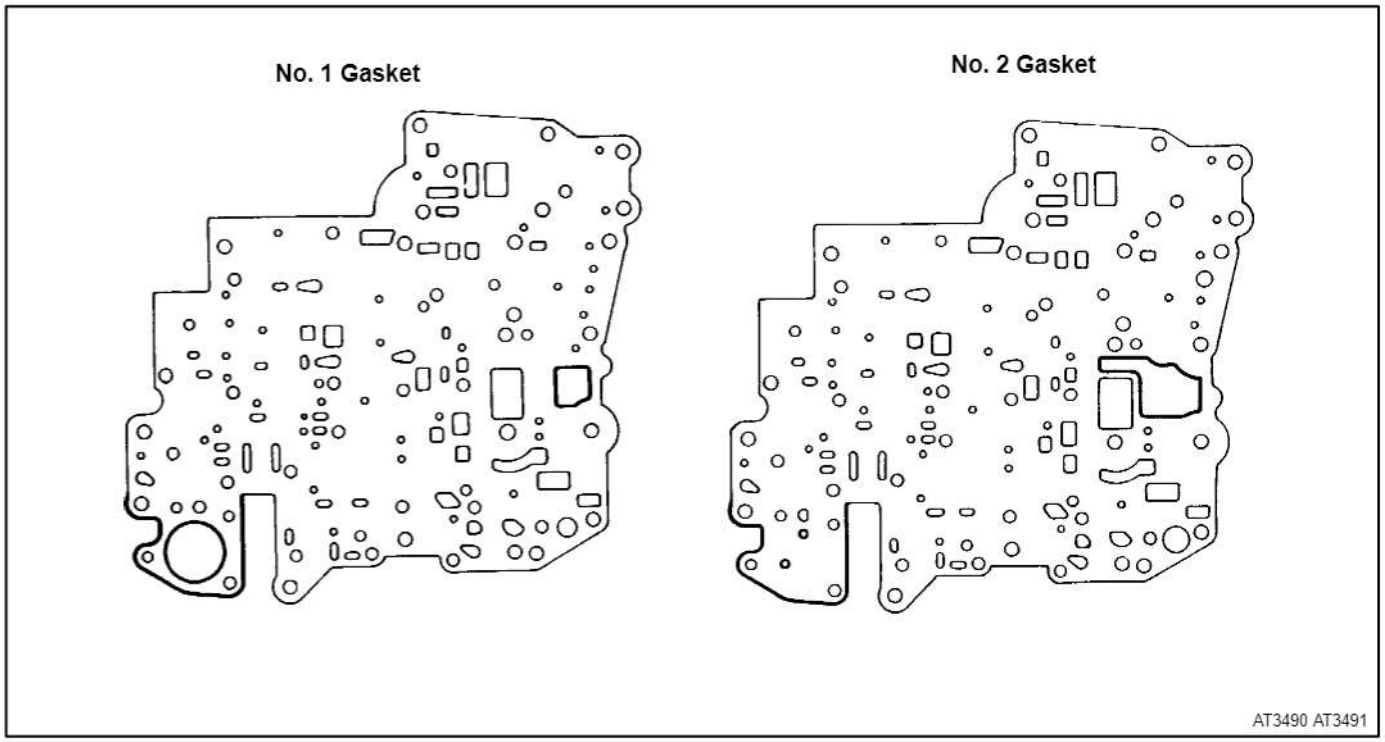


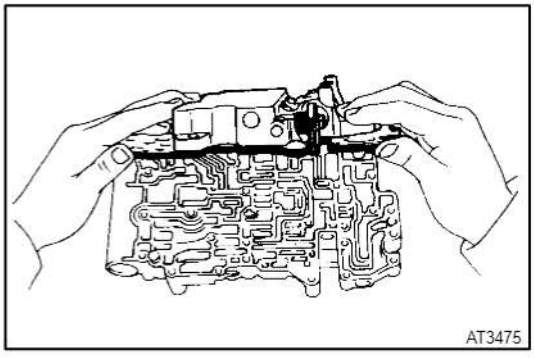
(Assembly of Valve Body)

(See page AT-85)

1. POSITION NO. 1 PLATE AND NEW GASKETS ON UPPER VALVE BODY

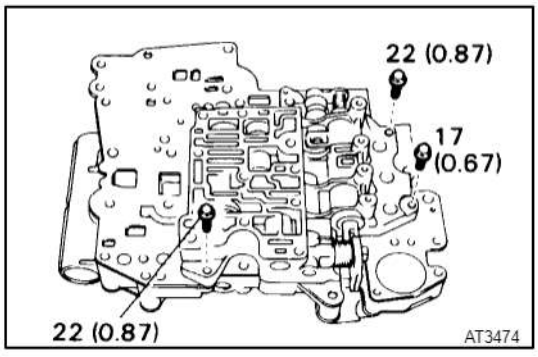
Position new No. 1 gasket, No. 1 plate and then new No. 2 gasket on the upper valve body.
HINT: Since No. 1 gasket and No. 2 gasket are similar, use the illustration below to discriminate between them.





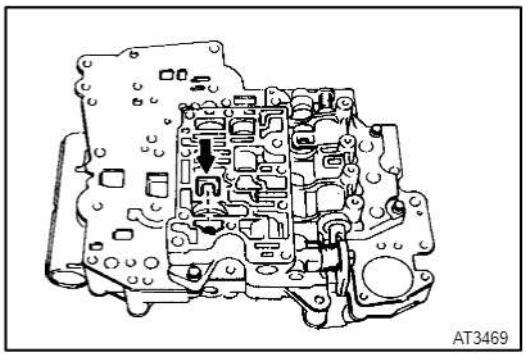
2. PLACE UPPER VALVE BODY WITH NO. 1 PLATE AND GASKETS ON LOWER VALVE BODY

Hold the upper valve body, No. 1 plate and gaskets securely so they do not separate.
Align each bolt hole in the valve bodies with the gaskets and plate.

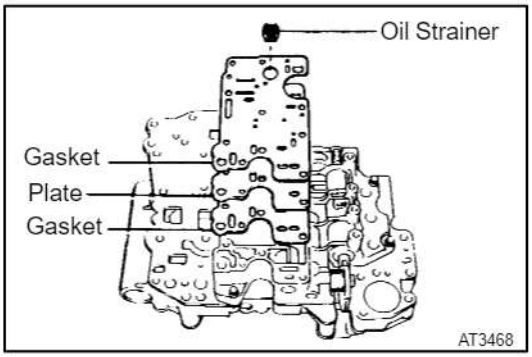


3. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY TO SECURE LOWER VALVE BODY

Install and finger tighten the three bolts.
HINT: Each bolt length (mm, in.) is indicated in the figure.



4. INSTALL LOCK-UP RELAY VALVE SLEEVE STOPPER

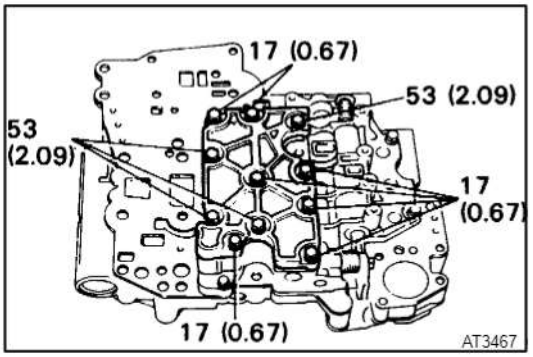


5. INSTALL UPPER VALVE BODY COVER GASKETS, PLATE AND THROTTLE MODULATOR OIL STRAINER

(a) Position a new gasket and plate and then another new gasket

HINT: Both gaskets are same one.

(b) Install the oil strainer onto the gasket.

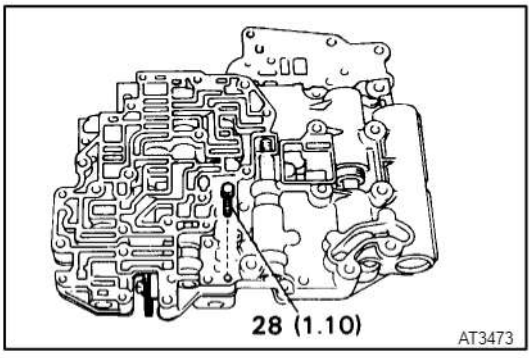


6. INSTALL UPPER VALVE BODY COVER

(a) Position the upper valve body cover.

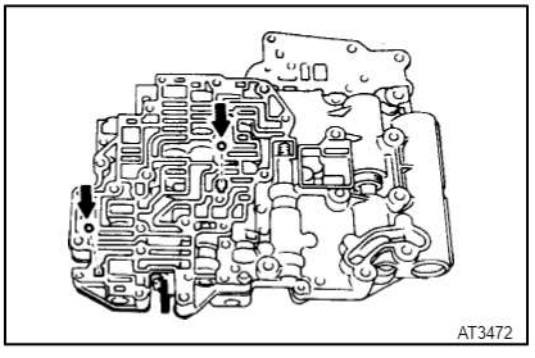
(b) Install and finger tighten the eleven bolts.

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



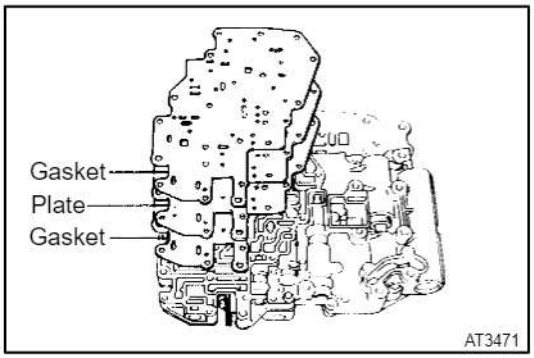
7. INSTALL AND FINGER TIGHTEN BOLT IN LOWER VALVE BODY

HINT: Bolt length (mm, in.) is indicated in the figure.



8. INSTALL CHECK BALLS

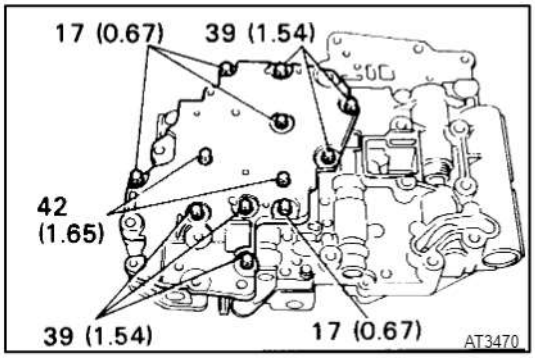
Install the two check balls into the lower valve body.



9. 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 same one.

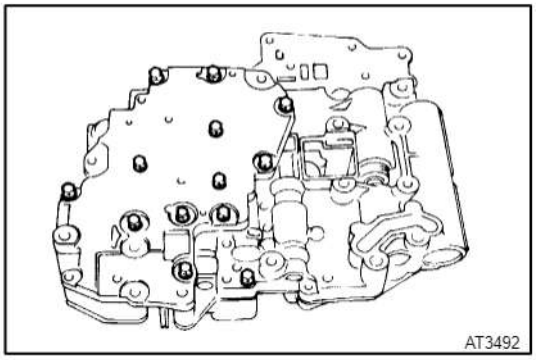


10. INSTALL LOWER VALVE BODY COVER

(a) Position the lower valve body cover.

(b) Install and finger tighten the twelve bolts.

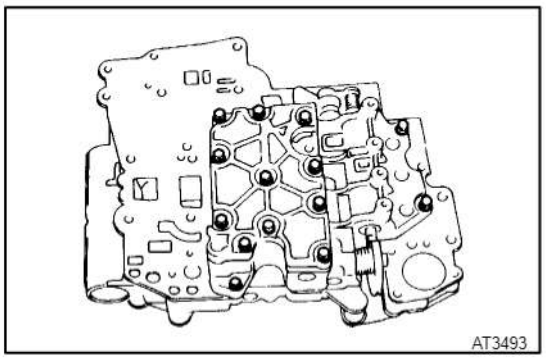
HINT: Each bolt length (mm, in.) is indicated in the figure.



11. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

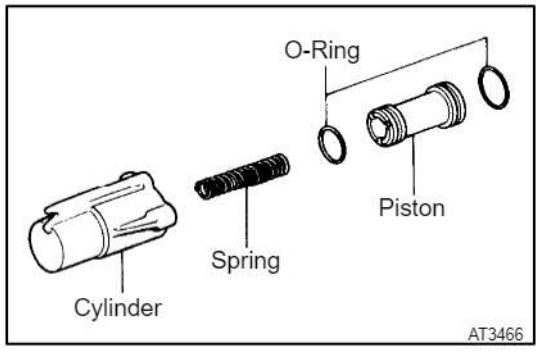
(a) Tighten the thirteen bolts in the lower valve body.

Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)



(b) Tighten the fourteen bolts in the upper valve body.

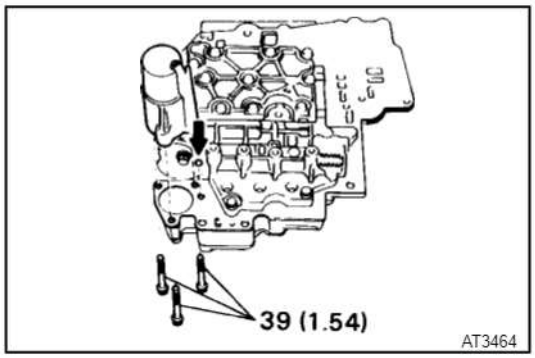
Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)



12. INSTALL B_0 ACCUMULATOR ASSEMBLY

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

(b) Insert the spring and piston into the cylinder.

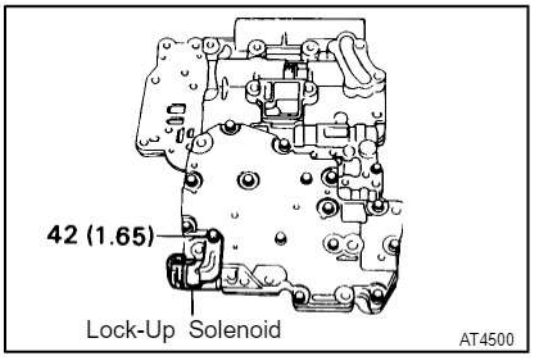


(c) Plate the check ball on No. 1 gasket.

(d) Install the B_0 accumulator assembly.

(e) Install and torque the three bolts.

HINT: Each bolt length (mm, in.) is indicated in the figure.
Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)



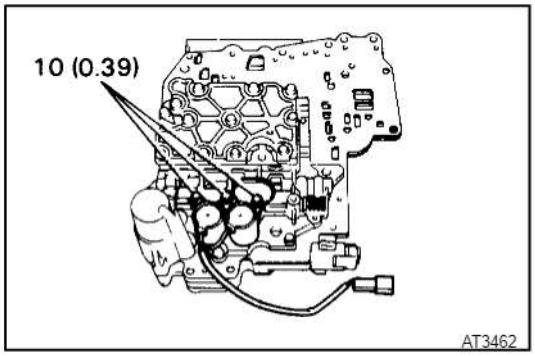
13. INSTALL SOLENOIDS

(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.

HINT: Bolt length (mm, in.) is indicated in the figure.
Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)



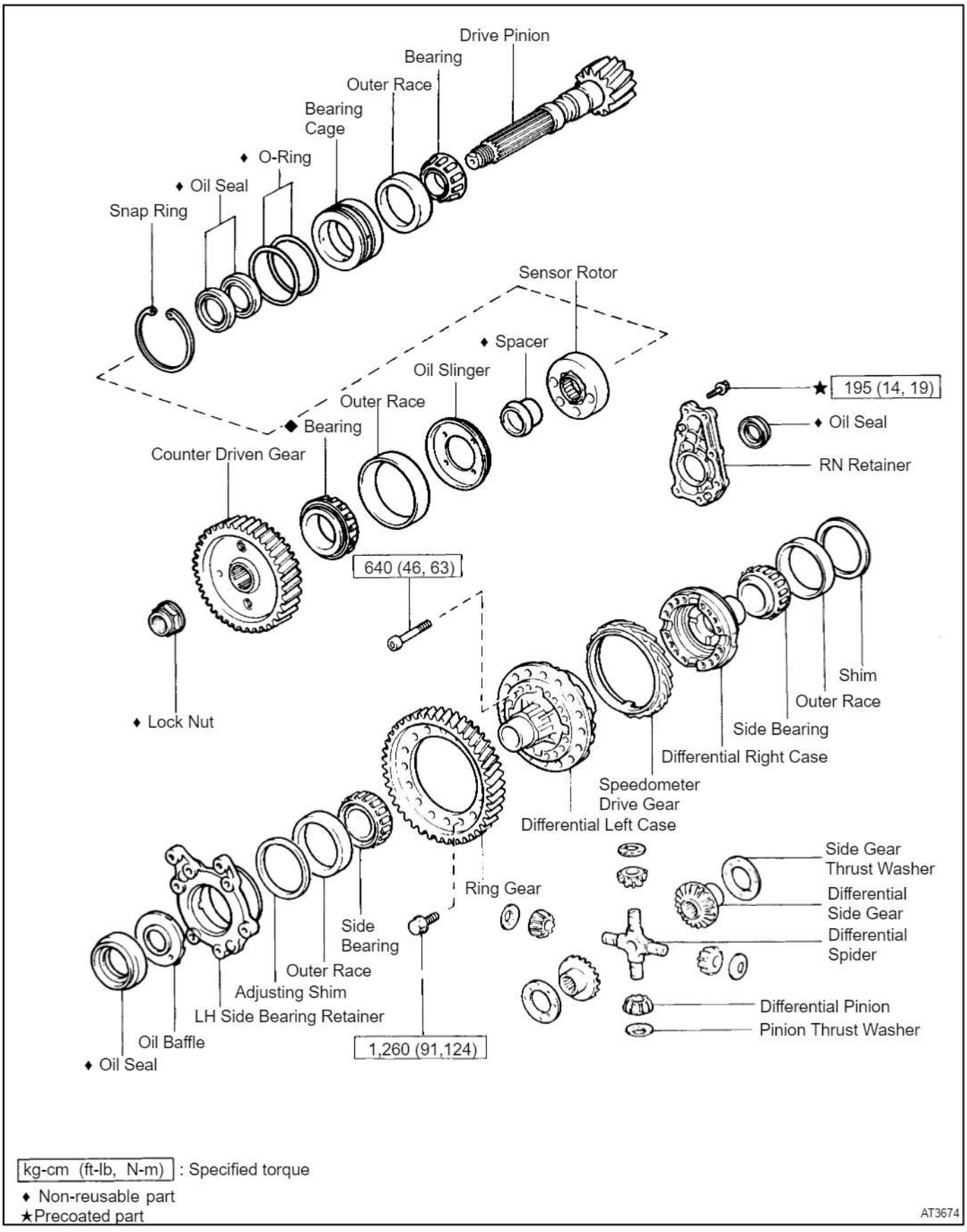
(d) Install No. 1 and No. 2 solenoids.

(e) Install and torque the three bolts.

HINT: Each bolt length (mm, in.) is indicated in the figure.
Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)

Differential Assembly (A540E)

COMPONENTS

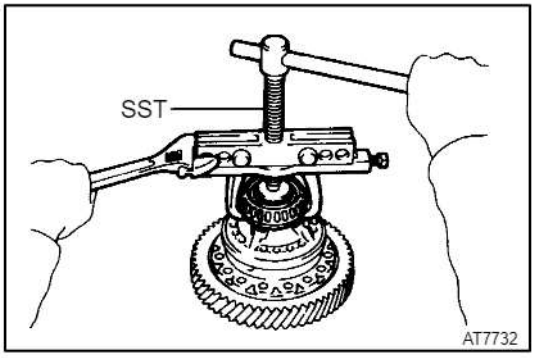


kg-cm (ft-lb, N-m) : Specified torque

♦ Non-reusable part

★Precoated part

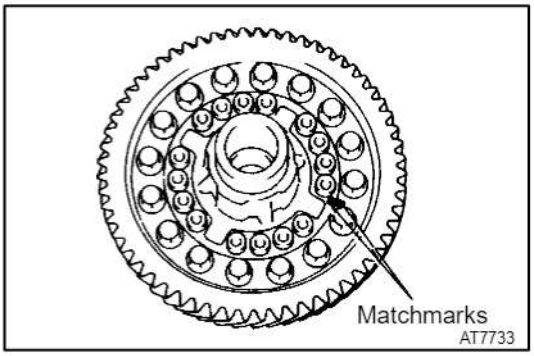
AT3674



DISASSEMBLY OF DIFFERENTIAL CASE

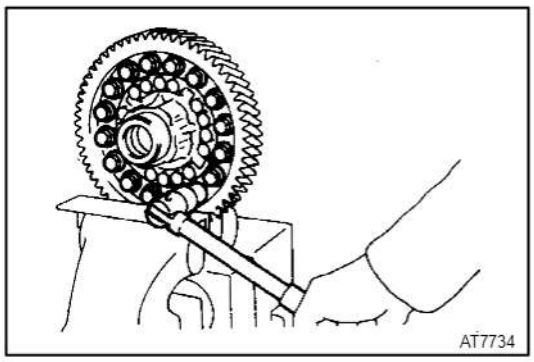
1. REMOVE SIDE BEARING

Using SST, remove the two side bearings.
SST 09950-20017

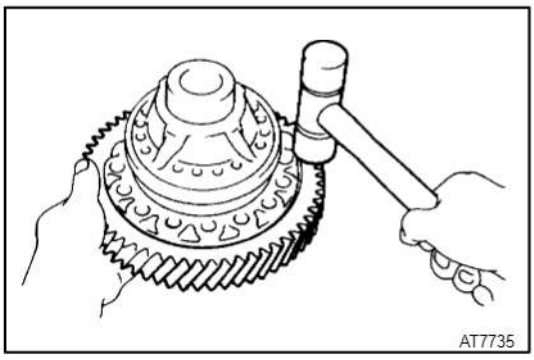


2. REMOVE RING GEAR

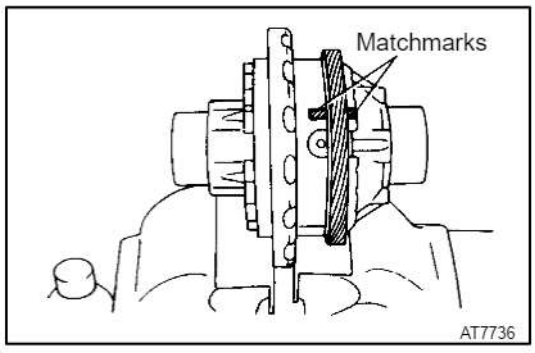
(a) Place the matchmarks on both the differential case and ring gear.



(b) Remove the sixteen bolts.

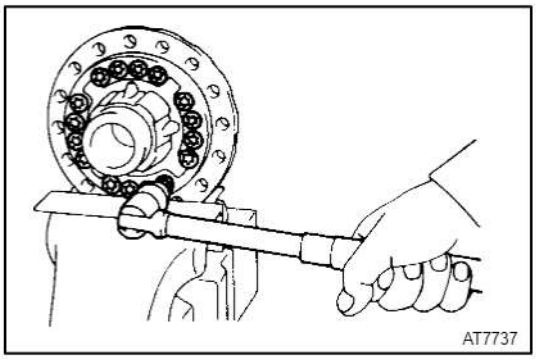


(c) Using a plastic hammer, tap out the ring gear.

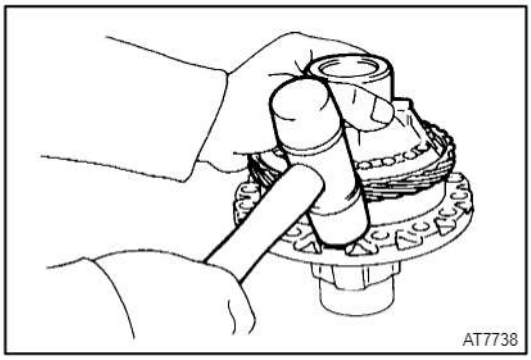


3. DISASSEMBLE OF DIFFERENTIAL CASE

(a) Place the matchmarks on the differential right and left case.

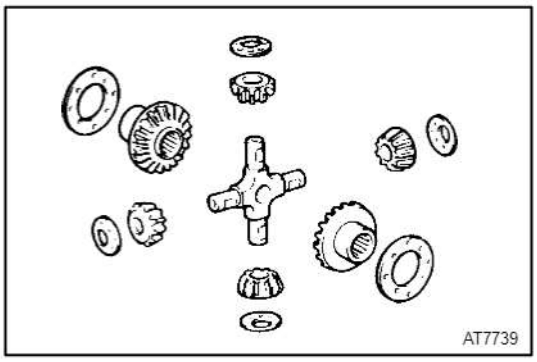


(b) Using a torx wrench, remove the sixteen torx screws.



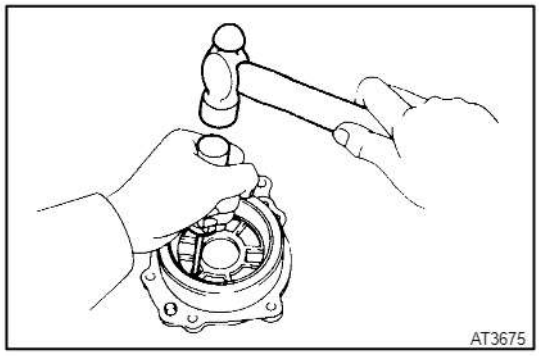
(c) Using a plastic hammer, tap out the differential left case.

(d) Remove the speedometer drive gear from the differential right case.



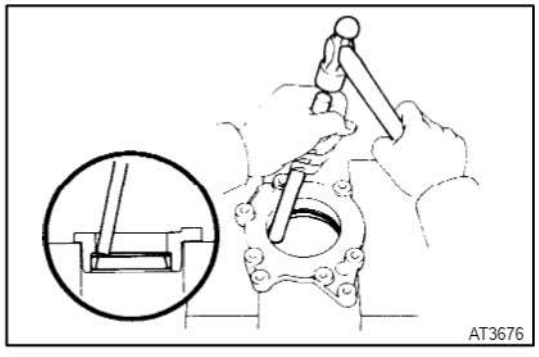
(e) Remove the two differential side gears, two side thrust washers, differential spider, four differential pinions and four pinion washers from the differential left case.

4. DISASSEMBLE LH BEARING RETAINER

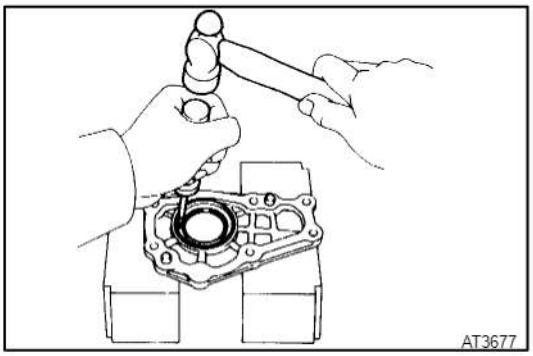


(a) Using a hammer and screwdriver, remove the oil seal.

(b) Remove the oil baffle from the LH bearing retainer.

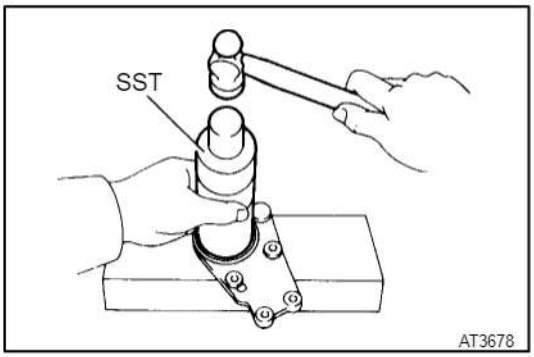


(c) Using a hammer and brass bar, drive out the outer race and adjusting shim from LH bearing retainer.



5. REMOVE RH OIL SEAL FROM RH RETAINER

Using a hammer and screwdriver, drive out the oil seal.



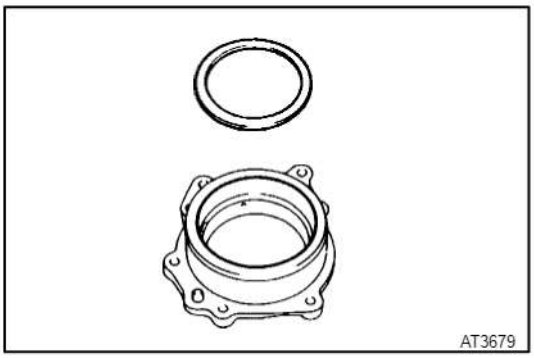
ASSEMBLY OF DIFFERENTIAL CASE

1. INSTALL RH OIL SEAL TO RH RETAINER

(a) Using SST, drive in a new oil seal until its surface is flush with the surface of RH retainer.

SST 09316-60010 (09316-00010)

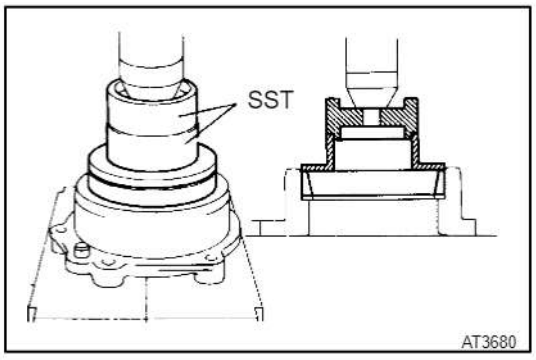
(b) Coat the oil seal lip with MP grease.



2. INSTALL ADJUSTING SHIM AND BEARING OUTER RACE TO LH BEARING RETAINER

(a) Place the adjusting shim into the LH bearing retainer.

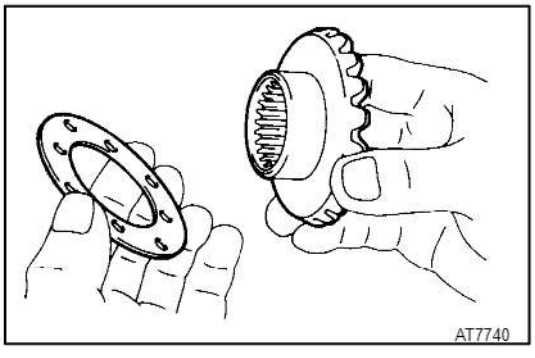
HINT: Use either the shim which was removed or one 2.40 mm (0.0945 in.).



(b) Using SST, press the outer race into the LH retainer.

SST 09316-2001 1, 09350-32014 (09351-32150)

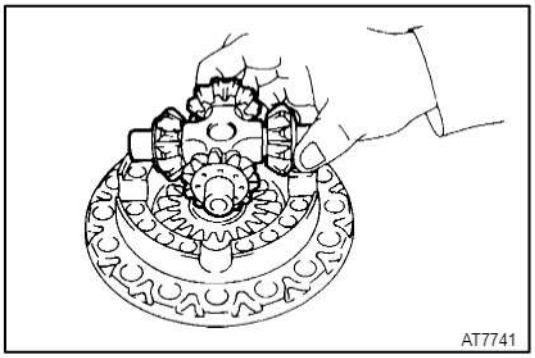
HINT: Install the oil baffle and oil seal after adjusting the differential side bearing preload.
(See page AT-126)



3. ASSEMBLE DIFFERENTIAL CASE

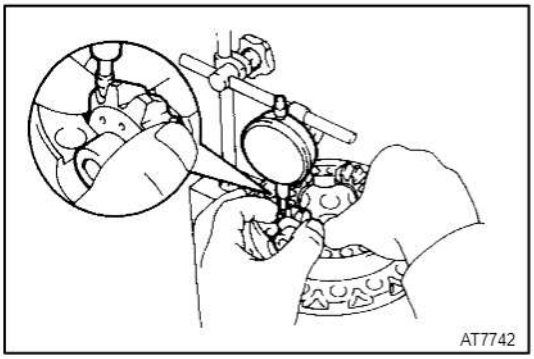
HINT: Coat all of the sliding and rotating surface with ATF before assembly.

(a) Install the thrust washer to the side gear.



(b) Install the four pinions and thrust washers to the spider.

(c) Install the side gear and spider with four pinions to the differential left case.



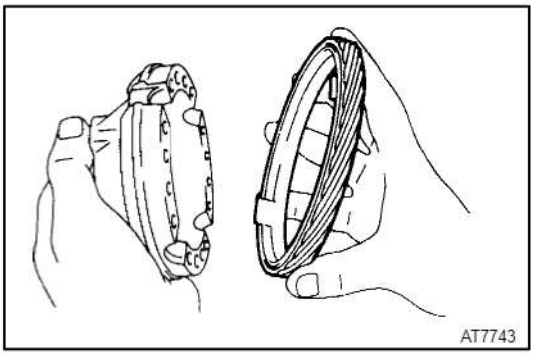
(d) Using a dial indicator, measure the backlash of one pinion gear while holding the side gear.

Standard backlash: 0.05 - 0.20 mm (0.0020 - 0.0079 in.)

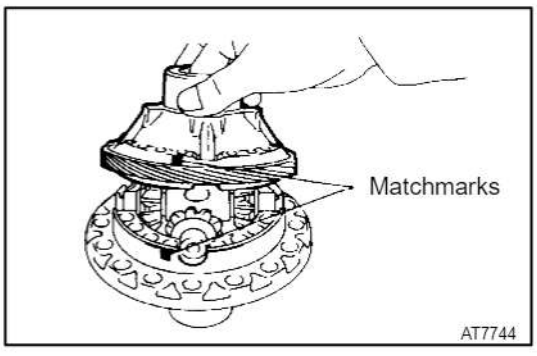
(e) Install the side gear and spider with four pinions to the right side of the differential case.
And check the pinion gear backlash.

(f) Referring to the table below, select the side gear thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

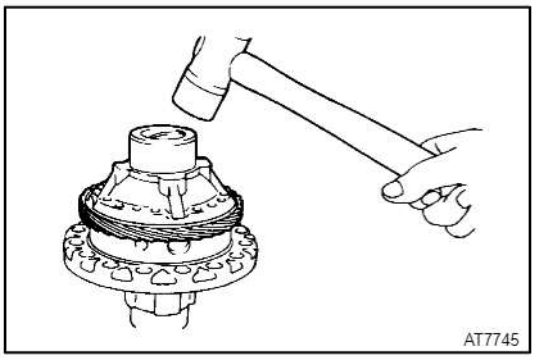
Thickness	mm (in.)
0.80 (0.0315)	1.20 (0.0472)
0.90 (0.0354)	1.30 (0.0512)
1.00 (0.0394)	1.40 (0.0551)
1.10 (0.0433)	



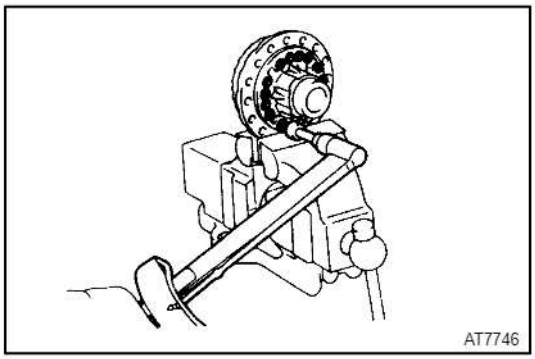
(g) Install the speedometer driven gear.



(h) Align the matchmarks on the differential cases.

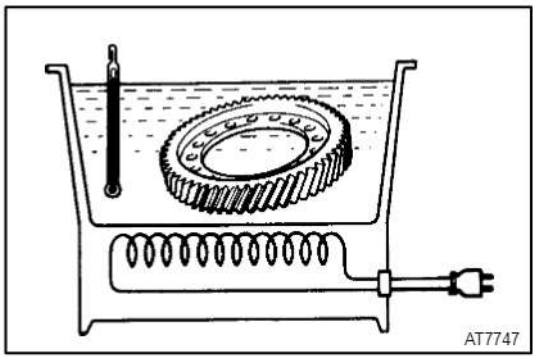


(i) Using a plastic hammer, carefully tap the differential right case.



(j) Using a torx wrench, install and torque the sixteen torx screws.

Torque: 640 kg-cm (46 ft-lb, 63 N-m)



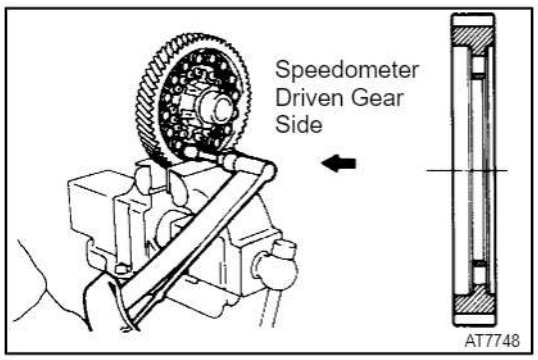
4. INSTALL RING GEAR

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 212°F (100°C) in an oil bath.

NOTICE: Do not heat the ring gear above 230°F (110°C).

(c) Clean the contact surface of the ring gear with cleaning solvent.

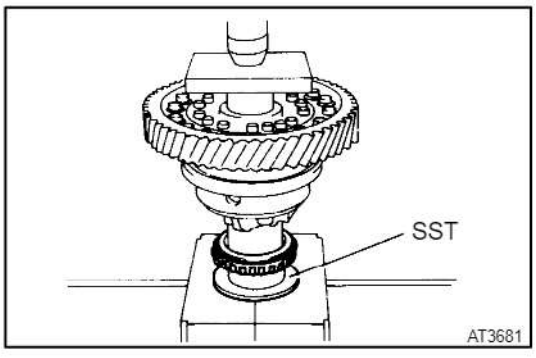


(d) Quickly install the ring gear on the differential case. Install the sixteen bolts.

HINT: Align the matchmarks on the differential left case and contact the ring gear.

(e) Tighten the set bolts uniformly and a little at a time. Torque the bolts.

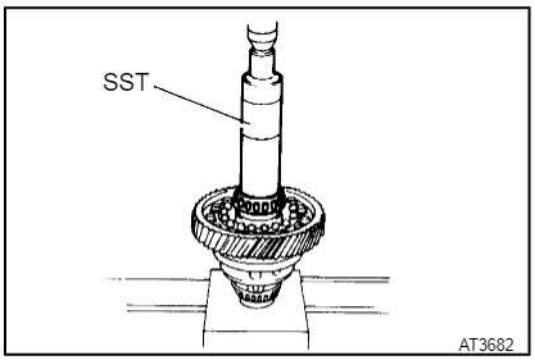
Torque: 1,260 kg-cm (91 ft-lb, 124 N-m)



5. INSTALL SIDE BEARINGS

(a) Using SST and a press, install the RH side bearing to the differential case.

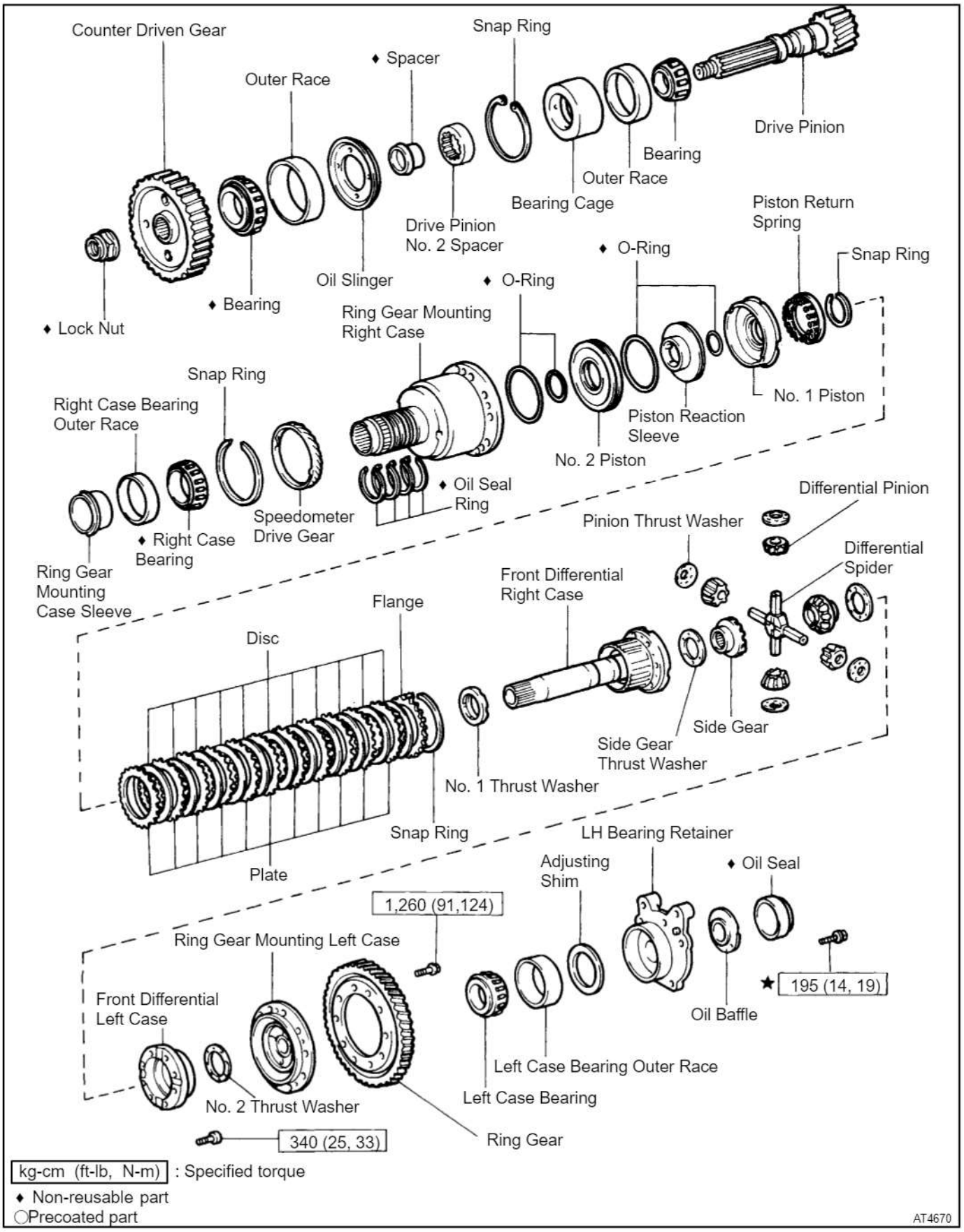
SST 09361-2001 1



(b) Using SST and a press, install the LH side bearing.
SST 09316-60010 (09316-00010)

Differential Assembly (A540H)

COMPONENTS

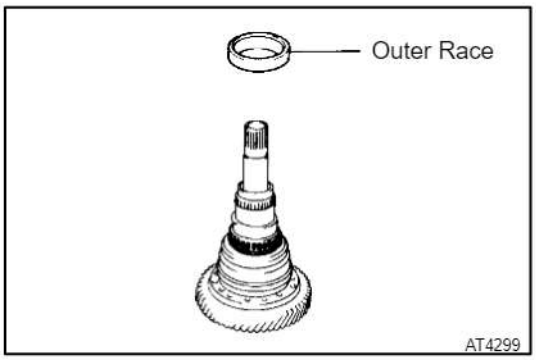


kg-cm (ft-lb, N-m) : Specified torque

♦ Non-reusable part

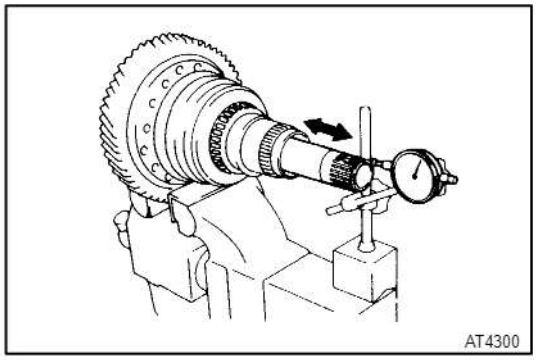
○Precoated part

AT4670



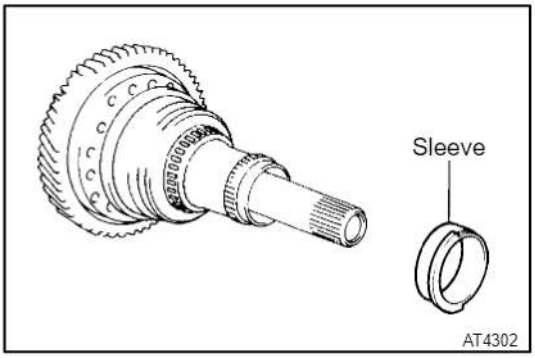
DISASSEMBLY OF DIFFERENTIAL ASSEMBLY

1. REMOVE RIGHT SIDE BEARING OUTER RACE

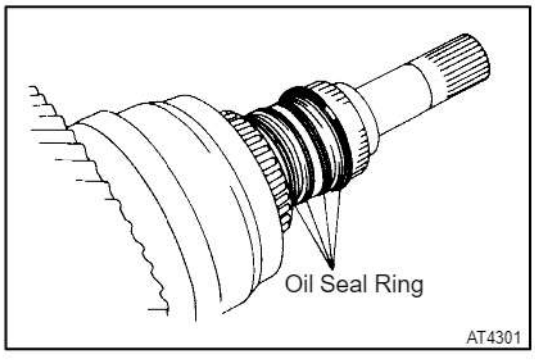


2. CHECK DIFFERENTIAL END PLAY

Using a dial indicator, measure the differential end play.
End play: 0.18 - 0.82 mm (0.0071 - 0.0323 in.)

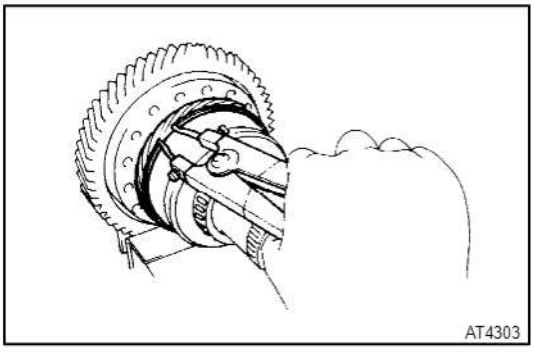


3. REMOVE RING GEAR MOUNTING CASE SLEEVE



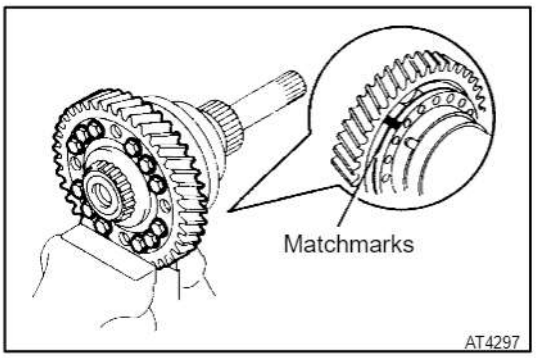
4. REMOVE OIL SEAL RINGS

Remove four oil seal rings from the ring gear mounting right case.



5. REMOVE SPEEDOMETER DRIVE GEAR

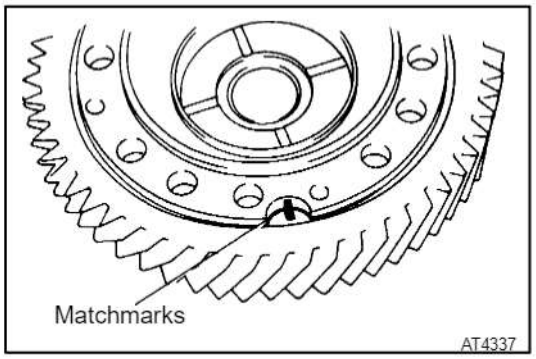
Using snap ring pliers, remove the snap ring and the speedometer drive gear.



6. REMOVE RING GEAR MOUNTING LEFT CASE

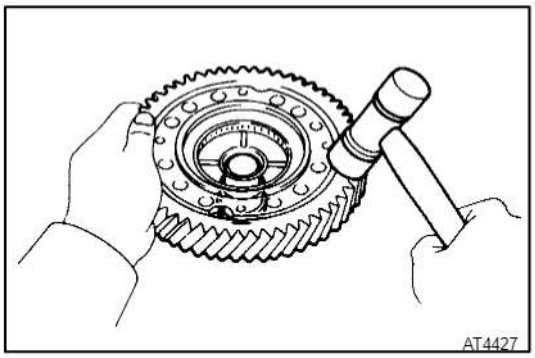
(a) Place matchmarks on the ring gear mounting left case and right case.

(b) Remove the twelve bolts and left case.



7. REMOVE RING GEAR

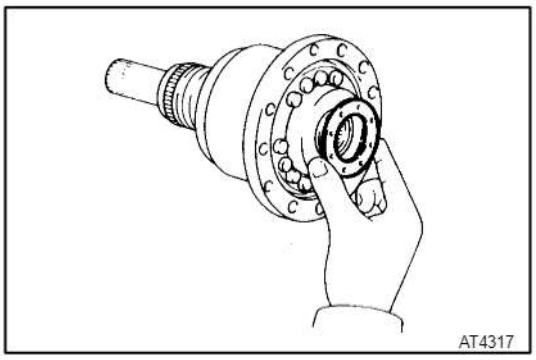
(a) Place matchmarks on the ring gear and left case.



(b) Place the left case on SST.

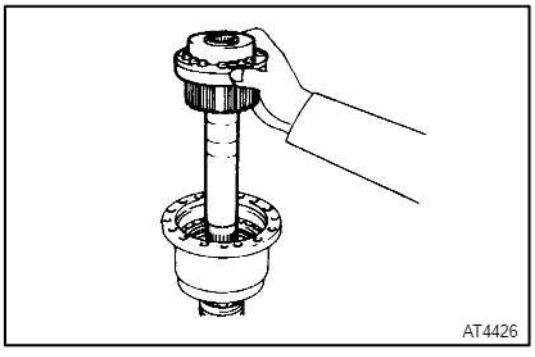
SST 09350-32014 (09351-32090)

(c) Using a plastic hammer, remove the ring gear from the left case.

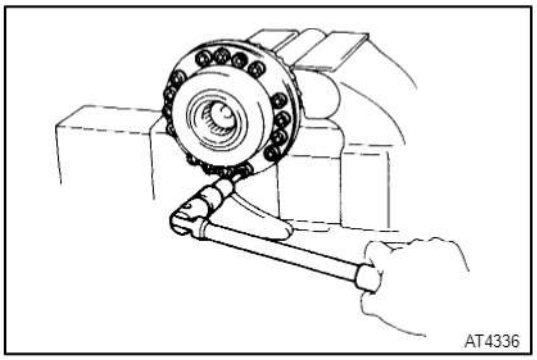


8. REMOVE FRONT DIFFERENTIAL CASE

(a) Remove the No. 2 thrust washer.



(b) Remove the front differential case from the ring gear mounting right case.

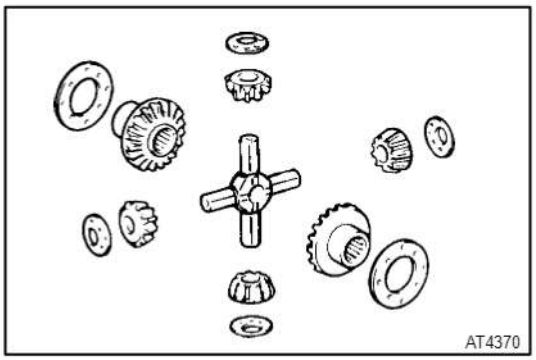


9. REMOVE FRONT DIFFERENTIAL LEFT CASE

(a) Using a torx wrench, remove the sixteen screws from the left case.

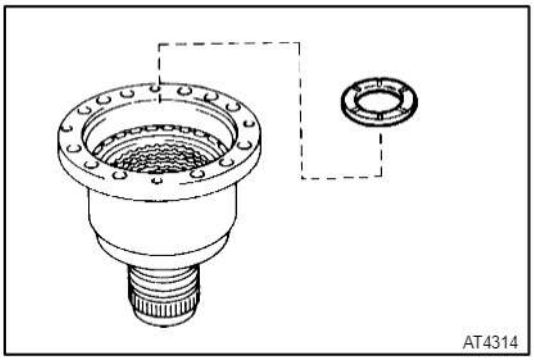
(b) Separate the left case and right case.

NOTICE: Do not scratch the contact surface of the needle bearing.

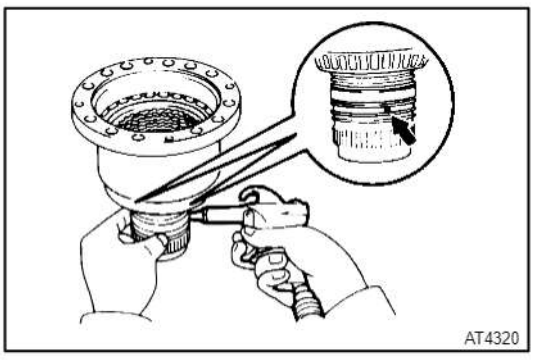


10. REMOVE DIFFERENTIAL PINIONS AND SIDE GEARS

Remove the two differential side gears, two side thrust washers, differential spider, four differential pinions and four pinion washers from the front differential cases.



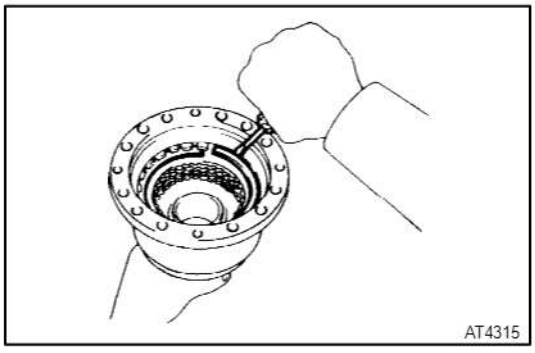
11. REMOVE NO. 1 THRUST WASHER



12. CHECK OPERATION OF CLUTCH PISTONS

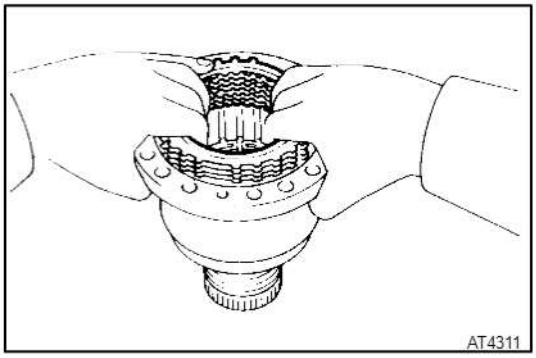
(a) Plug one hole of the right case with your hand.

(b) Apply compressed air into the other hole and confirm that the pistons move.

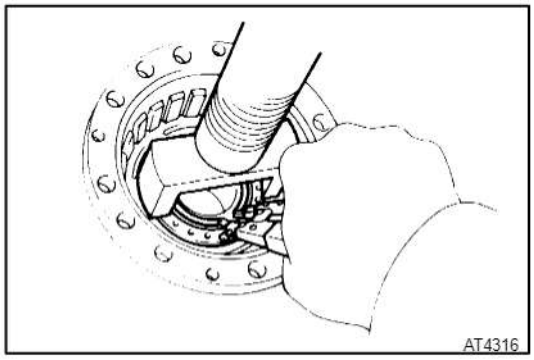


13. REMOVE HYDRAULIC MULTIPLATE CLUTCH DISCS AND PLATES

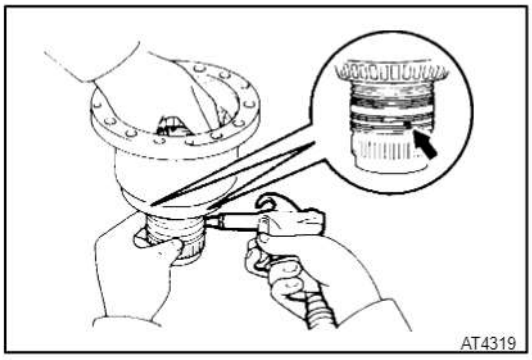
(a) Using a screwdriver, remove the snap ring.



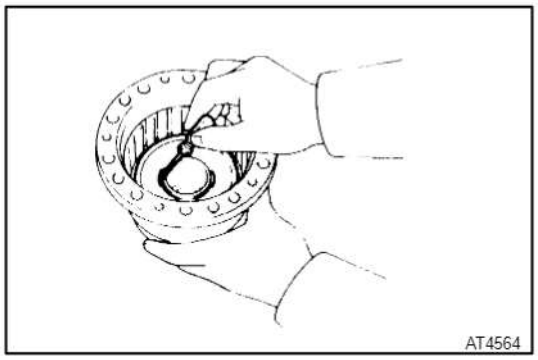
(b) Remove the flange, eleven discs and eleven plates.



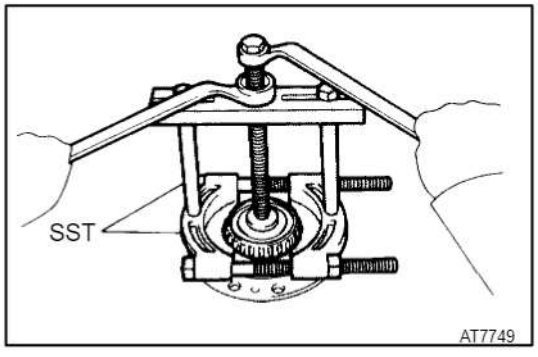
(c) Place SST, and compress the return spring.
SST 09350-32014 (09351-32070)
(d) Using snap ring pliers, remove the snap ring.



(e) Apply compressed air to the right case hole to remove the No. 1 piston.
(f) Remove the O-ring from the No. 1 piston.



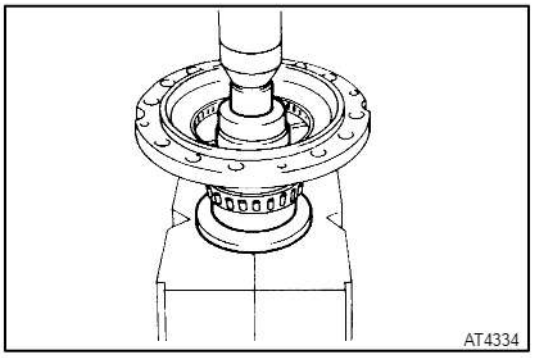
(g) Using a small screwdriver, remove the reaction sleeve and No. 2 piston.
(h) Remove the three O-rings from the reaction sleeve and No. 2 piston.



REPLACEMENT OF RING GEAR MOUNTING CASE BEARINGS

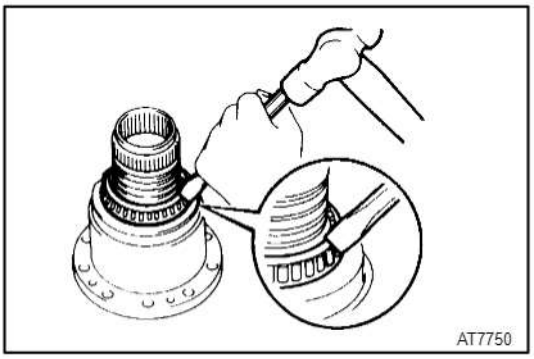
1. REMOVE RING GEAR MOUNTING LEFT CASE BEARING

Using SST, remove the bearing.
SST 09950-00020, 09950-00030



2. INSTALL RING GEAR MOUNTING LEFT CASE BEARING

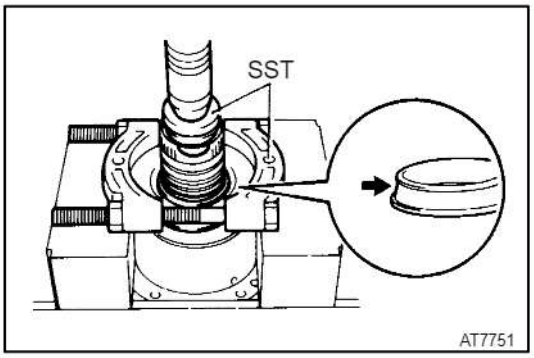
Using a press and SST, press in the bearing.
SST 09316-2001 1, 09350-32014 (09351-32090)



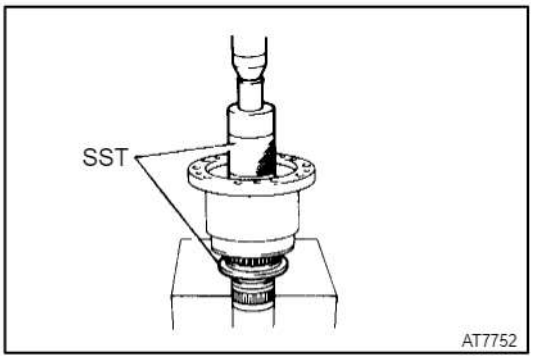
3. REMOVE RING GEAR MOUNTING RIGHT CASE BEARING

(a) Using a chisel and hammer, cut out the bearing cage.

NOTICE: Do not damage the right case.

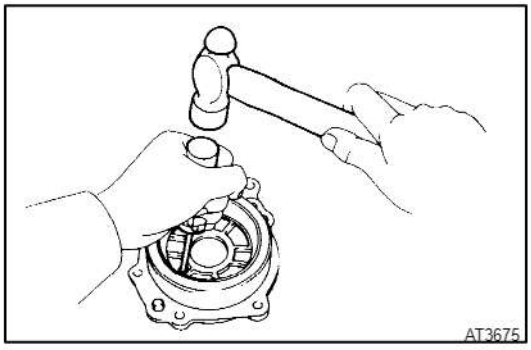


(b) Using a press and SST, press out the bearing inner race.
SST 09350-32014 (09351-32090), 09950-00020



4. INSTALL RING GEAR MOUNTING RIGHT CASE BEARING

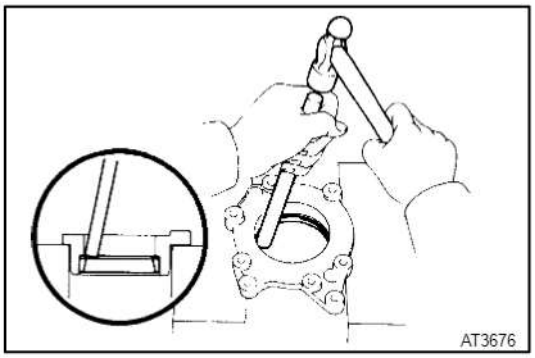
Using a press and SST, press in the new bearing.
SST 09316-60010 (09316-00010), 09502-12010



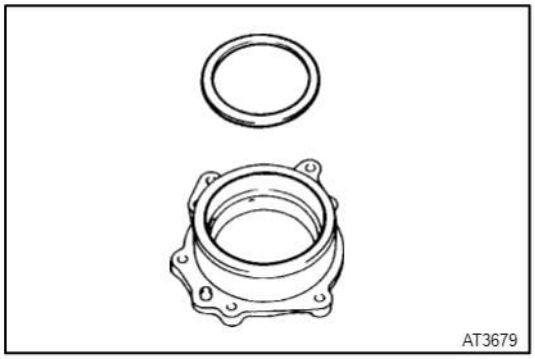
5. REMOVE RING GEAR MOUNTING LEFT CASE BEARING OUTER RACE FROM LH BEARING RETAINER

(a) Using a hammer and screwdriver, remove the oil seal.

(b) Remove the oil baffle from the LH bearing retainer.



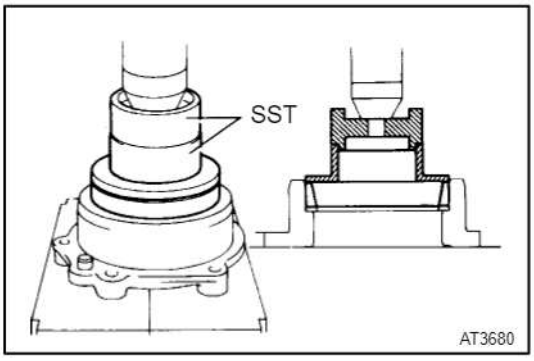
(c) Using a hammer and brass bar, drive out the outer race and adjusting shim from LH bearing retainer.



6. INSTALL ADJUSTING SHIM AND BEARING OUTER RACE TO LH BEARING RETAINER

(a) Place the adjusting shim into the LH bearing retainer.

HINT: Use either the shim which was removed or one 2.40 mm (0.0945 in.).

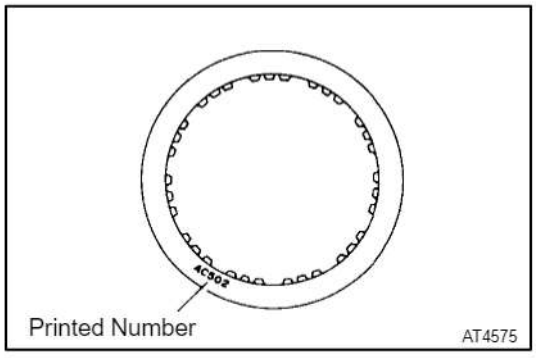


(b) Using SST, press the outer race into the LH retainer.

SST 09316-2001 1, 09350-32014 (09351-32150)

HINT: Install the oil baffle and oil seal after adjusting the differential side bearing preload.

(See page AT-126)



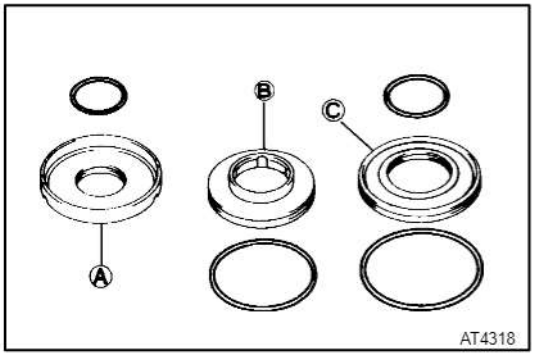
INSPECTION OF HYDRAULIC MULTIPLATE CLUTCH

INSPECT DISCS, PLATES AND FLANGE

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

HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed number is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least fifteen minutes.

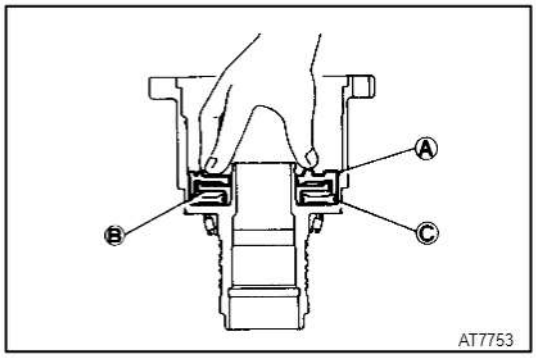


ASSEMBLY OF DIFFERENTIAL ASSEMBLY

1. INSTALL PISTONS AND SLEEVE

(a) Coat the four O-rings with ATF.

(b) Install the four O-rings to the reaction sleeve and pistons.



(c) Install the No. 1 (A), No. 2 (B) pistons and reaction sleeve (C) to the ring gear mounting right case.

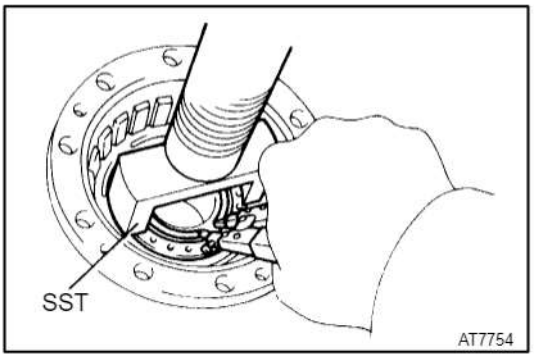
2. INSTALL PISTON RETURN SPRING

(a) Place the spring on the piston.

(b) Place SST on the spring retainer, and compress the spring with a press.

SST 09350-32014 (09351-32070)

(c) Using snap ring pliers, install the snap ring.

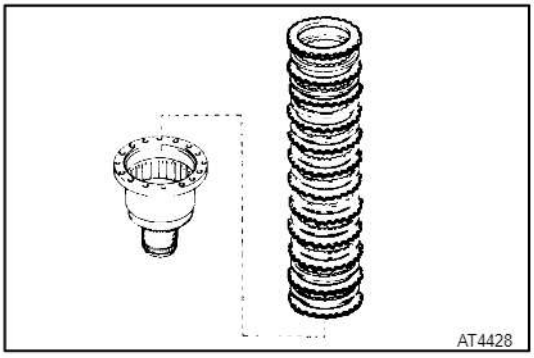


3. INSTALL PLATE, DISCS AND FLANGE

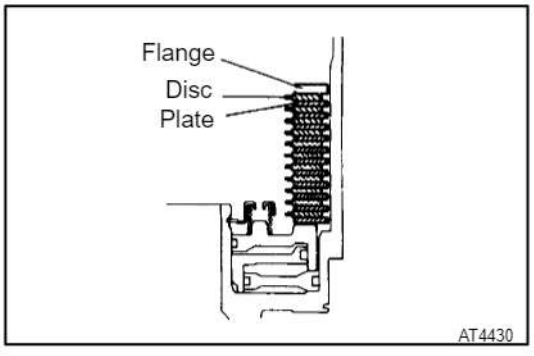
(a) Install the plate and discs.
Install in order: P = Plate D = Disc

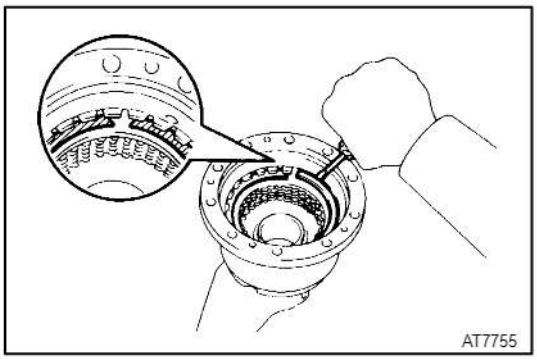
P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D-P-D

HINT: Before assembling new discs, soak them in ATF for at least fifteen minutes.

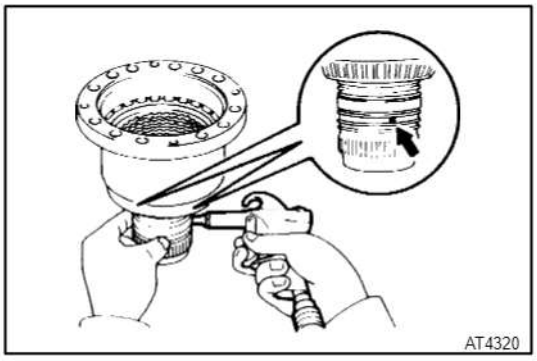


(b) Install the flange with the flat end facing downward.





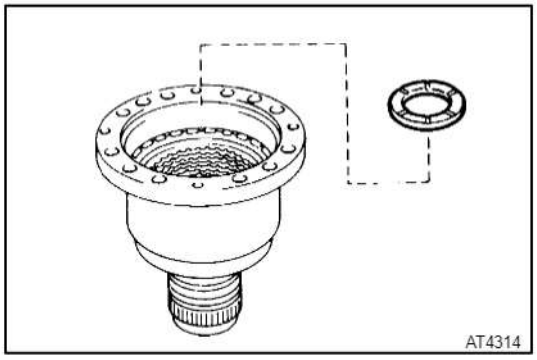
(c) Using a screwdriver, install the snap ring.



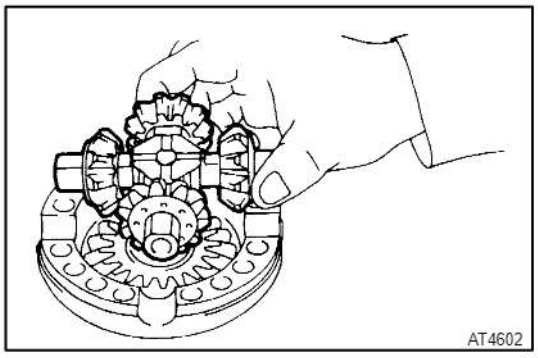
4. CHECK OPERATION OF CLUTCH PISTONS

(a) Plug one hole with your hand.

(b) Apply compressed air into the other hole and make sure that the pistons move.



5. INSTALL NO. 1 THRUST WASHER



6. CHECK AND ADJUST FRONT DIFFERENTIAL SIDE GEAR BACKLASH

(Front Differential Left Case)

(a) Install the following parts:
- Side gear thrust washer
- Side gear
- Four differential pinion gears
- Four pinion gear thrust washers
- Differential spider

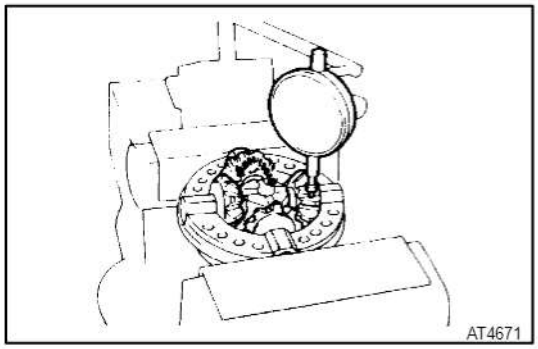
(b) Using a dial indicator, measure the backlash of one pinion gear while holding the side gear toward the case.

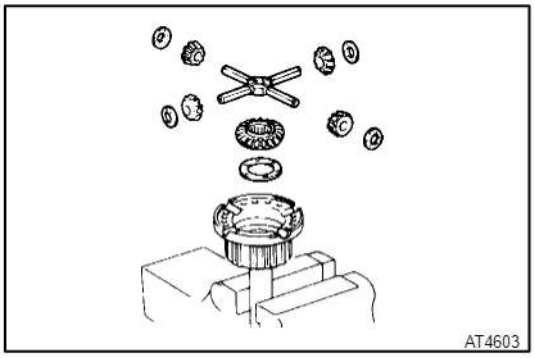
Backlash: 0.05 - 0.20 mm (0.0020 - 0.0079 in.)

If not within specification select the side gear thrust washer.

NOTICE: Do not tighten the vise too tight.

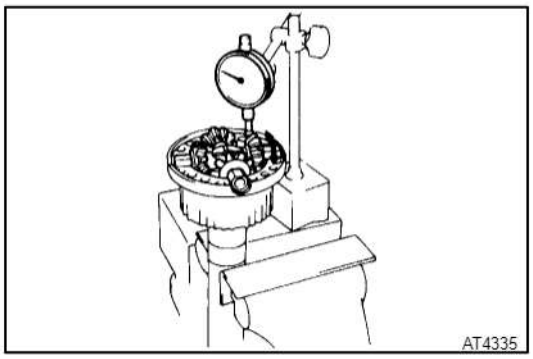
(c) Remove four pinion gears, four thrust washers and spider.





(Front Differential Right Case)

(a) Install the following parts:
- Side gear thrust washer
- Side gear
- Four differential pinion gears
- Four pinion gear thrust washers
- Differential spider

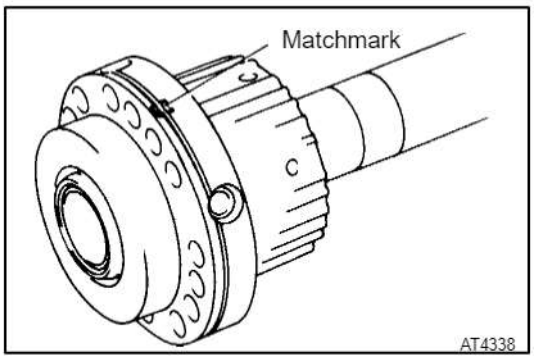


(b) Using a dial indicator, measure the backlash of one pinion gear while holding the side gear toward the case.

Backlash: 0.05 - 0.20 mrn (0.0020 - 0.0079 in.)

Referring to the table below, select the side gear thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

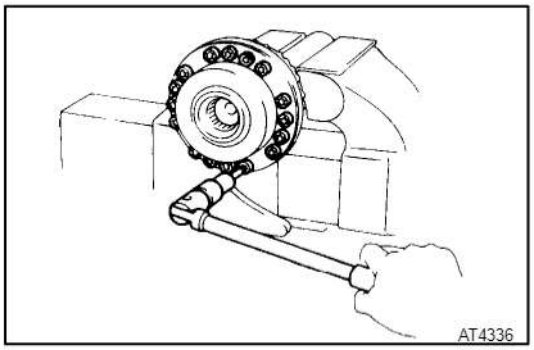
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	1.00 (0.0394)	E	1.20 (0.0472)
B	1.05 (0.0413)	F	1.25 (0.0492)
C	1.10 (0.0433)	G	1.30 (0.0512)
D	1.15 (0.0453)		



7. INSTALL FRONT DIFFERENTIAL LEFT CASE

(a) Install the left case to the right case.

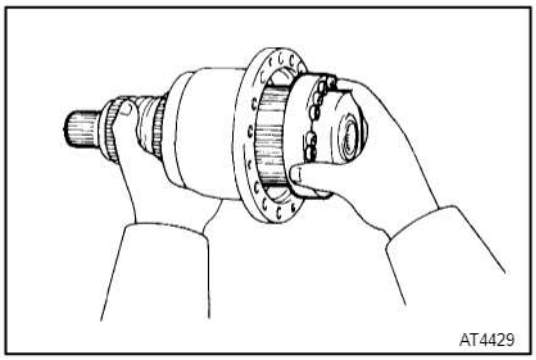
HINT: Align the matchmarks on the left case and right case.



(b) Using a torx wrench, torque the sixteen torx screws.

Torque: 340 kg-cm (25 ft-lb, 33 N-m)

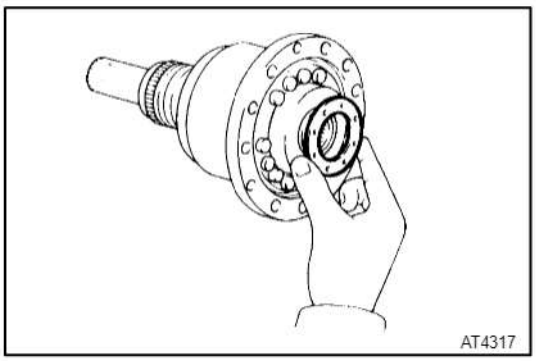
NOTICE: Do not scratch the contact surface of the needle bearing.



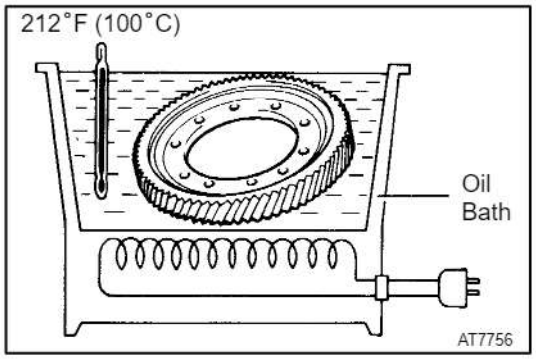
8. INSTALL FRONT DIFFERENTIAL CASE

(a) Install the front differential case to the ring gear mounting right case.

HINT: Align the flukes of the discs in the hydraulic multi-plate clutch.



(b) Install the No. 2 thrust washer.



9. INSTALL RING GEAR

(a) Clean the contact surface of the ring gear mounting left case.

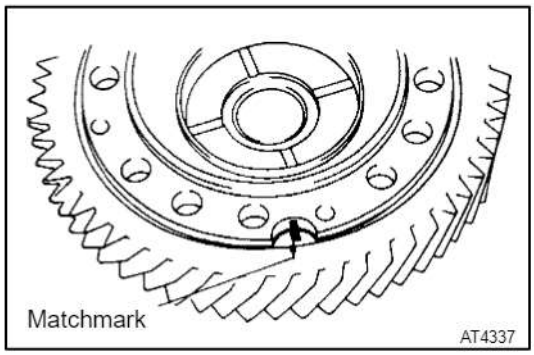
(b) Heat the ring gear to about 212°F (100°C) in an oil bath.

NOTICE: Do not heat the ring gear above 230°F (110°C).

(c) Clean the contact surface of the ring gear with cleaning solvent.

(d) Quickly install the ring gear on the ring gear mounting left case.

HINT: Align the matchmarks on the ring gear mounting left case and the ring gear.

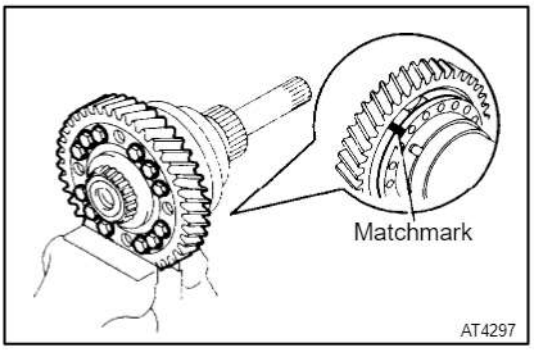


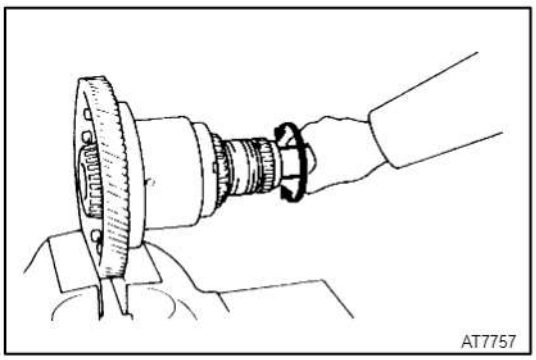
(e) Install the ring gear and ring gear mounting left case on the ring gear mounting right case. Install the twelve bolts.

HINT: Align the matchmarks on the ring gear mounting left case and contact the right case.

(f) Tighten the set bolts uniformly and a little at a time. Torque the bolts.

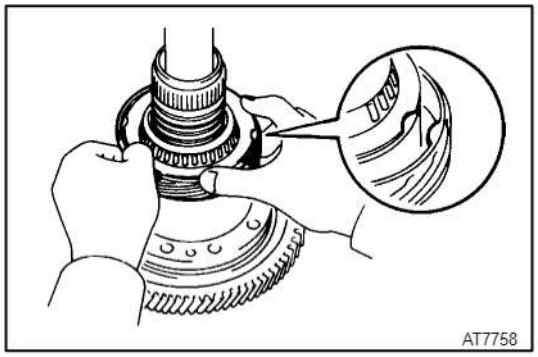
Torque: 1,260 kg-cm (91 ft-lb, 124 N-m)





10. CHECK OPERATION OF FRONT DIFFERENTIAL

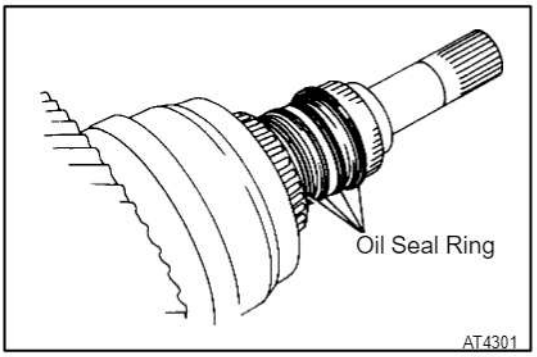
Check that the front differential turns smoothly.



11. INSTALL SPEEDOMETER DRIVE GEAR

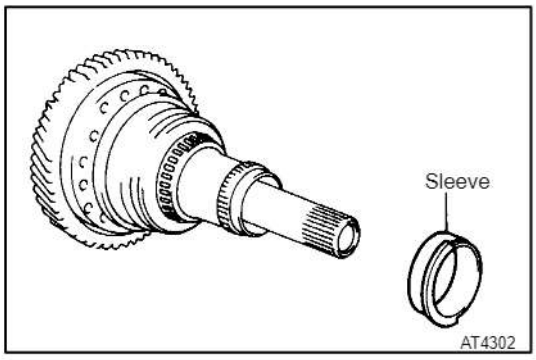
(a) Place the speedometer drive gear on the ring gear mounting case.

(b) Install the snap ring.

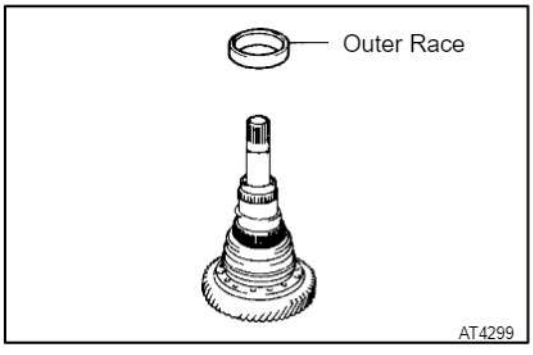


12. INSTALL OIL SEAL RINGS

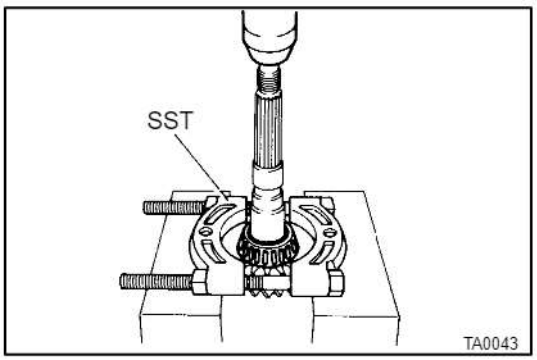
Install the four oil seal rings to the ring gear mounting right case.



13. INSTALL RING GEAR MOUNTING CASE SLEEVE



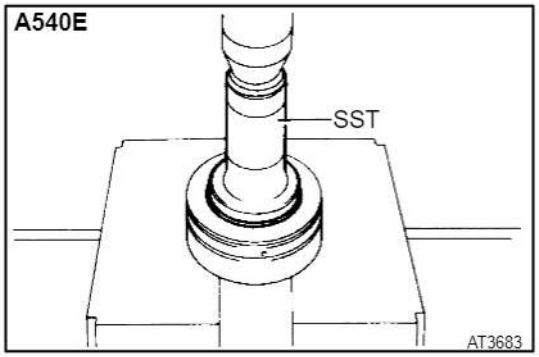
14. INSTALL RIGHT SIDE BEARING OUTER RACE



DISASSEMBLY OF DRIVE PINION

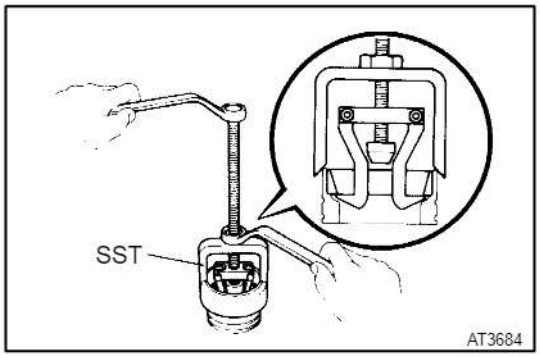
1. REMOVE DRIVE PINION SHAFT BEARING

Using SST and a press, remove the bearing.
SST 09950-00020



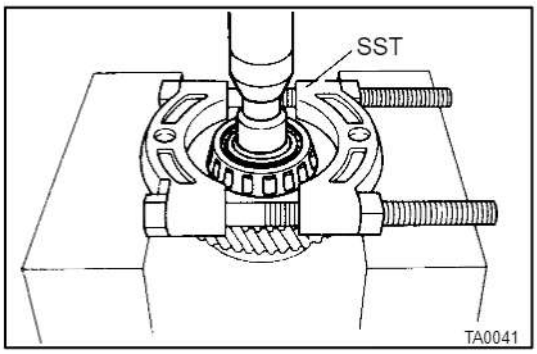
2. (A540E)
REMOVE OIL SEALS FROM CAGE

Using SST, press out the two oil seals.
SST 09325-12010



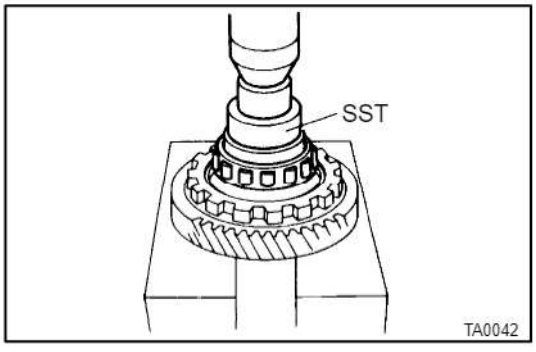
3. REMOVE PINION SHAFT BEARING OUTER RACE FROM CAGE

Using SST, remove the outer race.
SST 09612-65014



4. REMOVE COUNTER DRIVEN GEAR BEARING

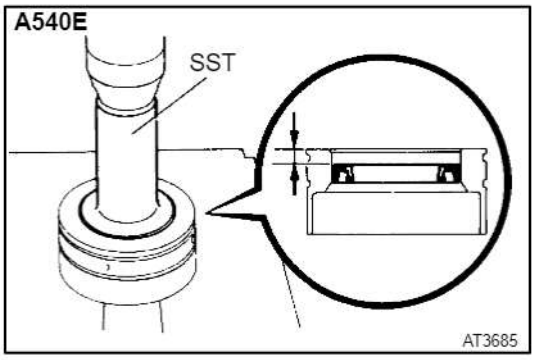
Using SST and a press, remove the bearing.
SST 09950-00020



ASSEMBLY OF DRIVE PINION SHAFT COMPONENTS

1. INSTALL COUNTER DRIVEN GEAR BEARING

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

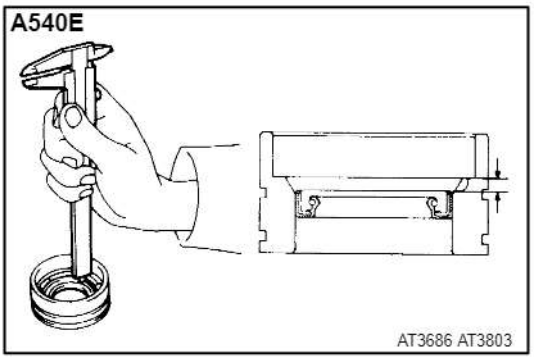


2. (A540E)
INSTALL OIL SEALS TO CAGE

(a) Using SST, press in a new oil seal with the lip facing downward.

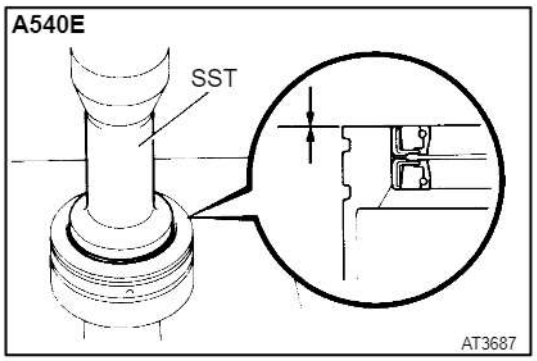
SST 09325-12010

Oil seal press in depth (from flat end):
8 mm (0.31 in.)



(b) Check the oil seal press in depth.

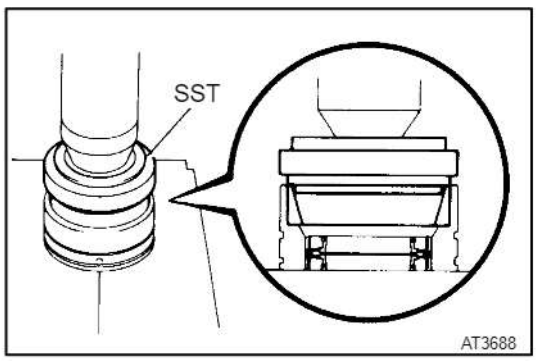
Oil seal press in depth: 4.3 mm (0.169 in.)



(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 09325-12010

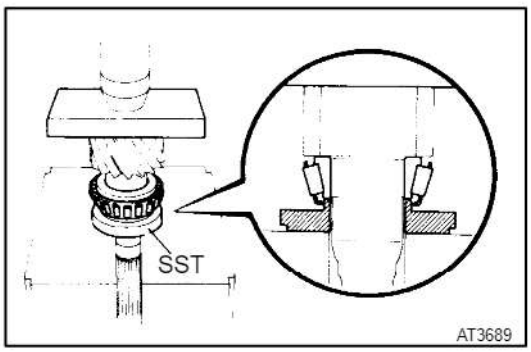
(d) Coat the oil seal lips with MP grease.



3. INSTALL SHAFT BEARING OUTER RACE TO CAGE

Using SST, press the outer race into the cage.

SST 09350-32014 (09351-32111)



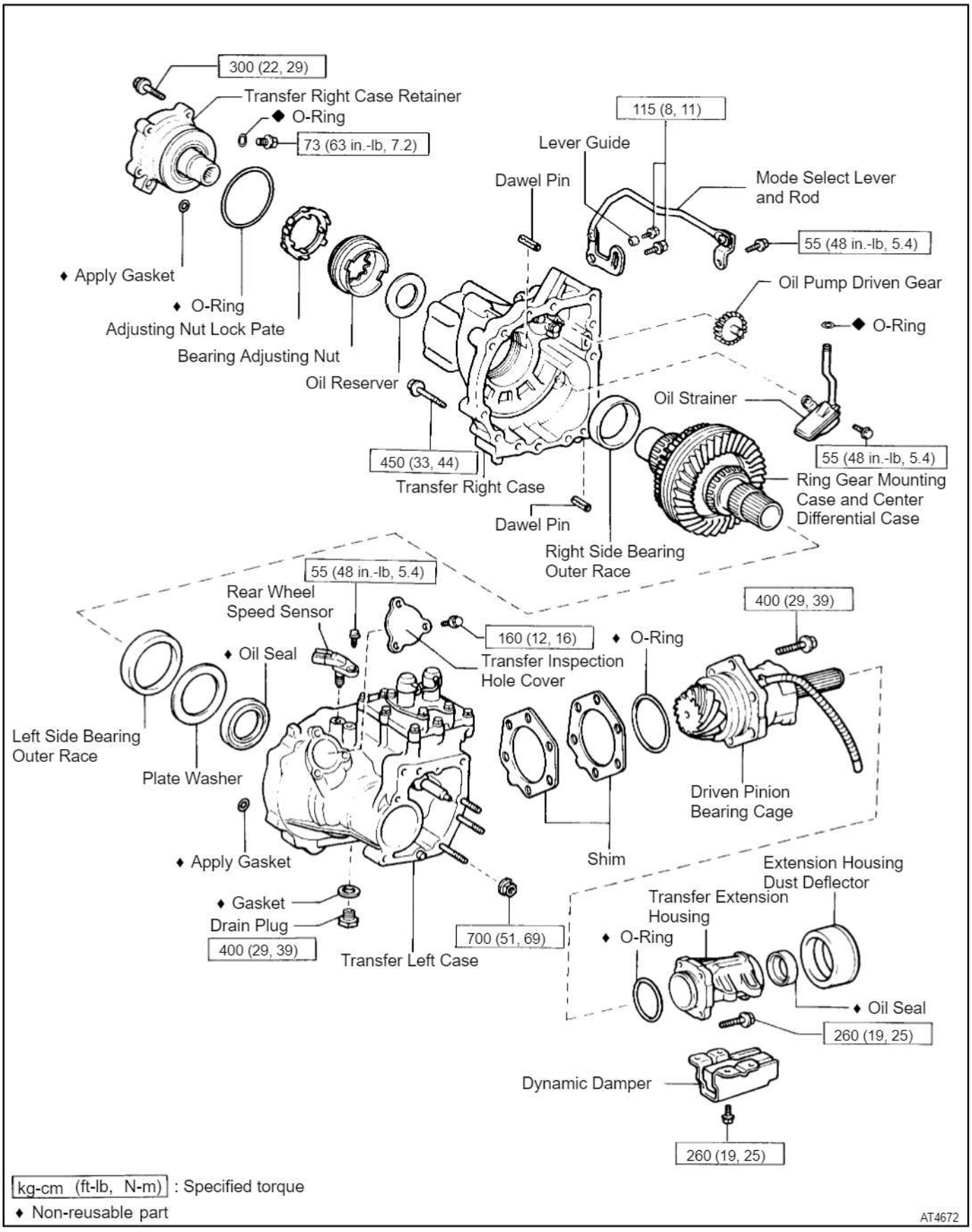
4. INSTALL DRIVE PINION SHAFT BEARING

Using SST, press in the bearing.

SST 09350-32014 (09351-32100)

Transfer (A540H)

COMPONENT PARTS



kg-cm (ft-lb, N-m) : Specified torque

♦ Non-reusable part

AT4672

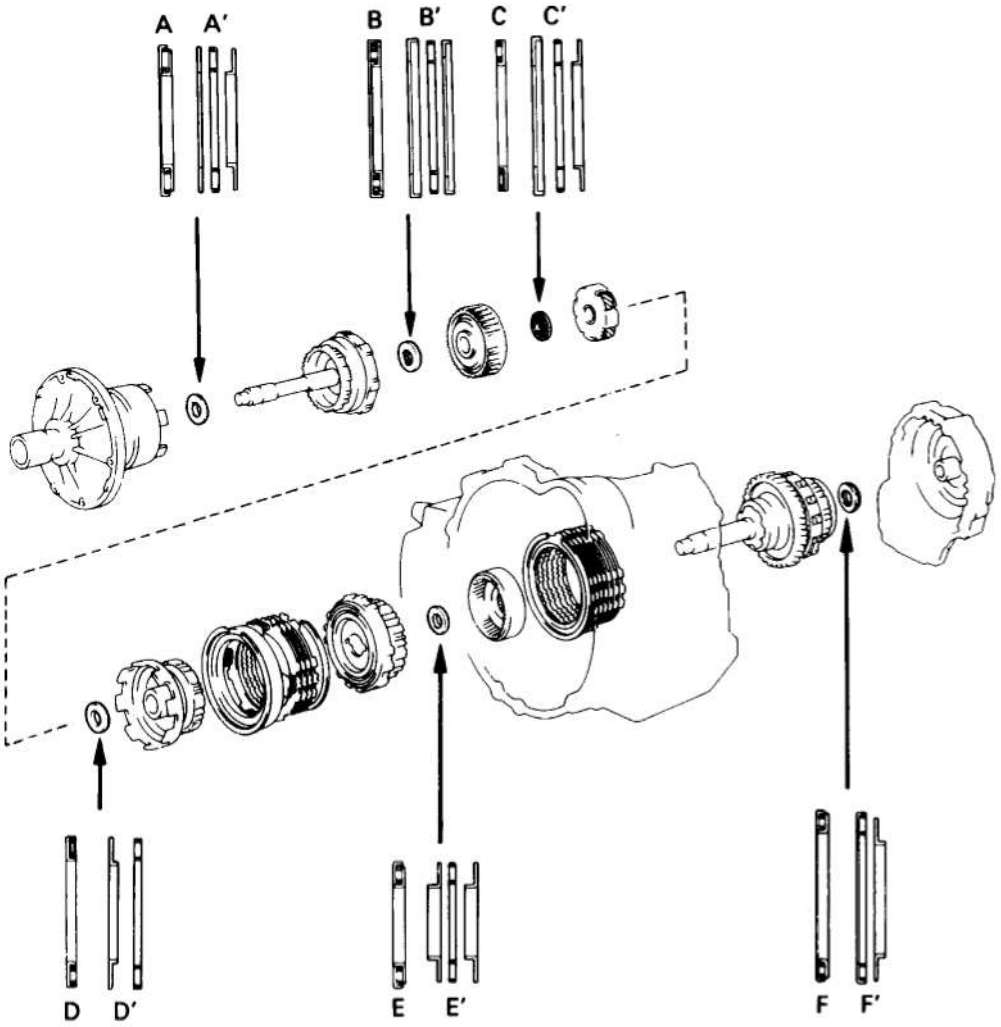
INSTALLATION OF COMPONENT PARTS

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® II (A540E)
Type T (08886 - 00405) or equivalent (A540H)

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 or affect performance.**
2. **Before assembling new clutch discs, soak them in automatic transaxle fluid for at least fifteen 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.**

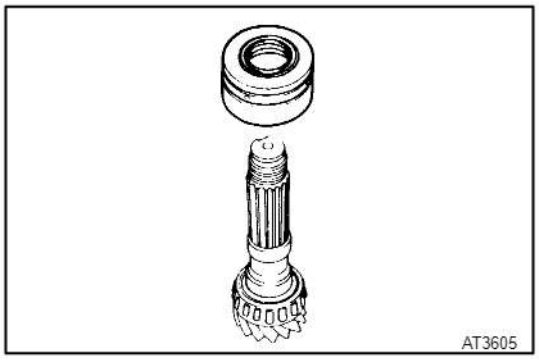
8. Be sure to install the thrust bearings and races in the correct direction and position.



AT5039

mm (in.)

A540E		A	B	C	D	E	F
Bearing (with race)	Outer Diameter	See page AT-354	47.6 (1.874)	45.5 (1.791)	←	38.7 (1.524)	54.0 (2.126)
	Inner Diameter	27.7 (1.091)	31.4 (1.236)	30.1 (1.185)	←	22.6 (0.890)	39.4 (1.551)
A540H		A'	B'	C'	D'	E'	F'
Front Bearing Race	Outer Diameter	43.0 (1.693)	37.9 (1.492)	←	45.0 (1.772)	37.3 (1.469)	—
	Inner Diameter	30.5 (1.201)	22.0 (0.866)	←	28.0 (1.102)	24.1 (0.949)	—
Thrust Bearing	Outer Diameter	42.0 (1.654)	36.1 (1.421)	←	45.0 (1.772)	37.6 (1.480)	46.3 (1.823)
	Inner Diameter	28.9 (1.138)	22.2 (0.874)	←	30.0 (1.181)	24.0 (0.974)	26.2 (1.031)
Rear Bearing Race	Outer Diameter	42.0 (1.654)	35.7 (1.406)	35.0 (1.378)	—	37.6 (1.480)	43.0 (1.693)
	Inner Diameter	27.1 (1.067)	23.0 (0.906)	19.0 (0.748)	—	22.2 (0.874)	24.5 (0.965)

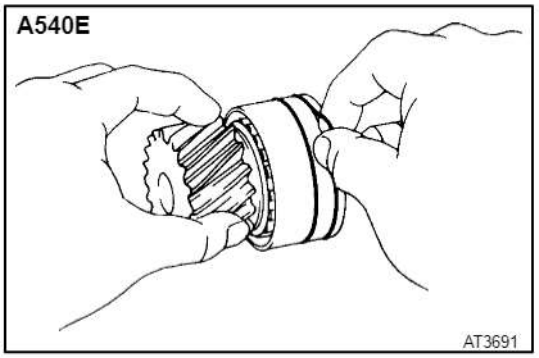


INSTALLATION OF DIFFERENTIAL AND DRIVE PINION

1. INSTALL DRIVE PINION INTO TRANSAXLE CASE

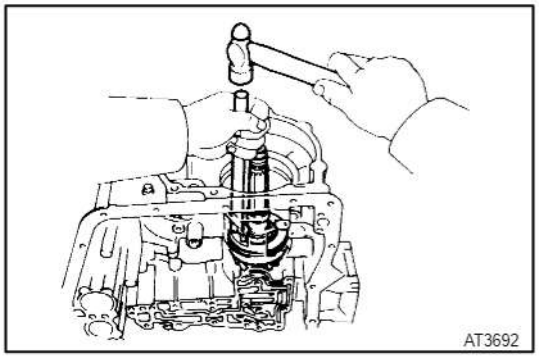
(a) Place the bearing cage onto the drive pinion shaft.

NOTICE: Be careful not to damage the oil seals with the pinion shaft. (A540E)

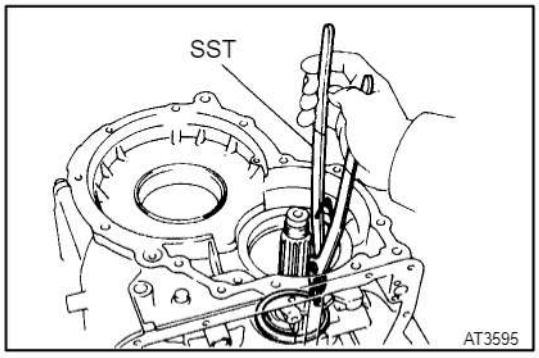


(b) Install the two new O-rings to the bearing cage. (A540E)

(c) Coat the O-rings with ATF. (A540E)

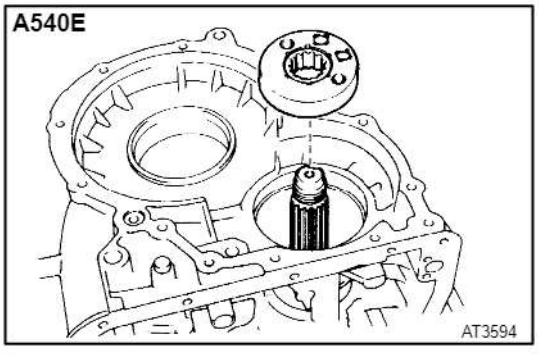


(d) Using a hammer and brass bar, slightly tap the bearing cage into the transaxle case until the snap ring groove in the bore can be seen.

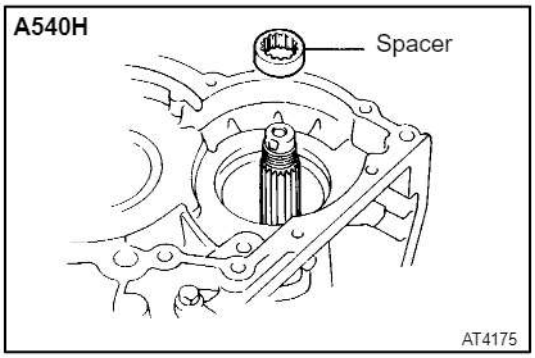


(e) Using SST, install snap ring into the bore.

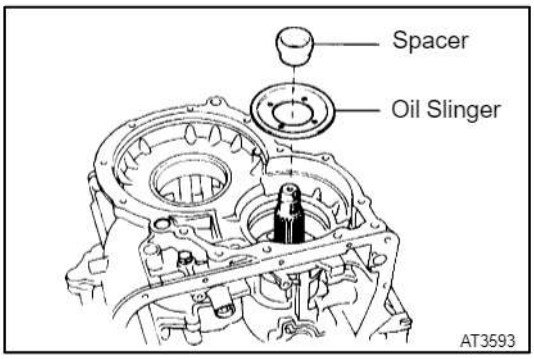
SST 09350-32014 (09351-32050)



2. (A540E) PLACE SENSOR ROTOR ONTO DRIVE PINION SHAFT

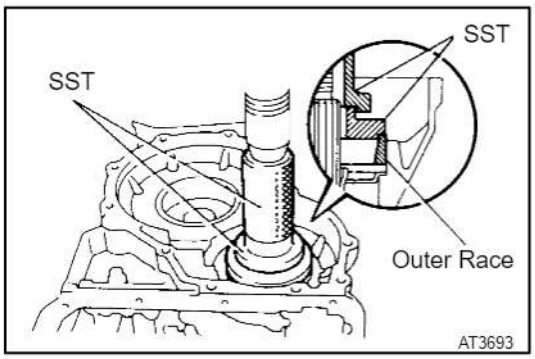


3. (A540H)
INSTALL DRIVE PINION BEARING NO. 2 SPACER



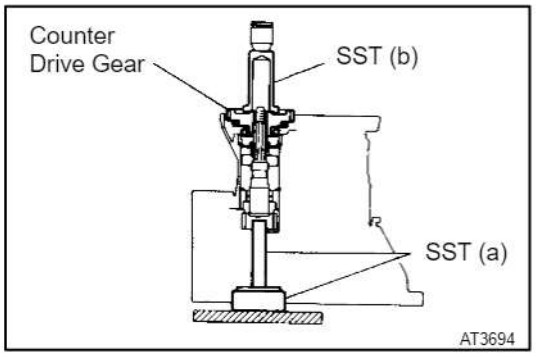
4. PLACE OIL SLINGER AND NEW SPACER

HINT: Install the spacer with the small end downward.



5. INSTALL OUTER RACE TO TRANSAXLE CASE

Using SST, press in the outer race.
SST 09350-32014 (09351-32100, 09351-32140)



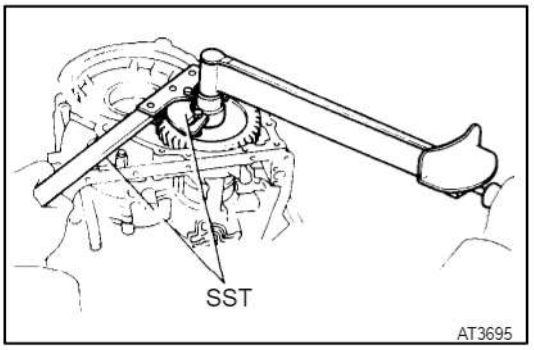
6. INSTALL COUNTER DRIVEN GEAR

(a) Place SST into the transaxle hole to hold the drive pinion shaft.

SST (a) 09350-32014 (09351-32130, 09351-32150)

(b) Using SST, press in the counter driven gear until slightly thickness between the counter driven gear bearing and outer race.

SST (b) 09350-32014 (09351-32140)

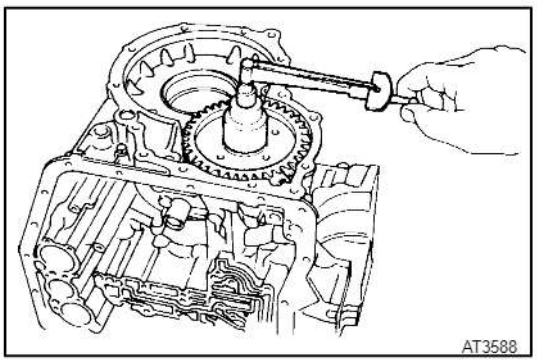


7. INSTALL NEW LOCK NUT AND ADJUST DRIVE PINION PRELOAD

(a) Install the new lock nut.

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

Torque: 2,100 kg-cm (152 ft-lb, 206 N-m)
SST 09330-00021, 09350-32014 (09351-32032)



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

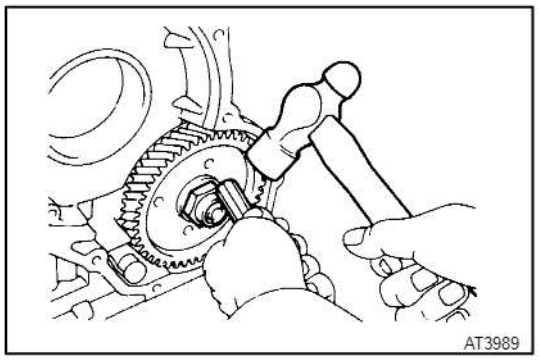
(d) Using a torque meter, measure the preload of the drive pinion.

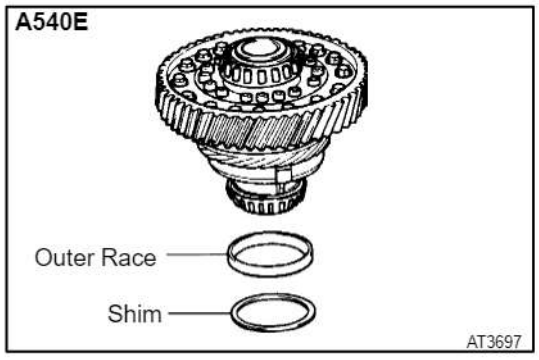
Drive pinion preload (at starting):
New bearing
10 - 16 kg-cm
(8.7 - 13.9 in.-lb, 1.0 - 1.6 N-m)
Reused bearing
5 - 8 kg-cm
(4.3 - 6.9 in.-lb, 0.5 - 0.8 N-m)
If the preload is greater than specified, replace the bearing spacer.
If the preload is less than specified, retighten the nut 130 kg-cm (9 ft-lb, 13 N-m) 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: 3,600 kg-cm (260 ft-lb, 353 N-m)

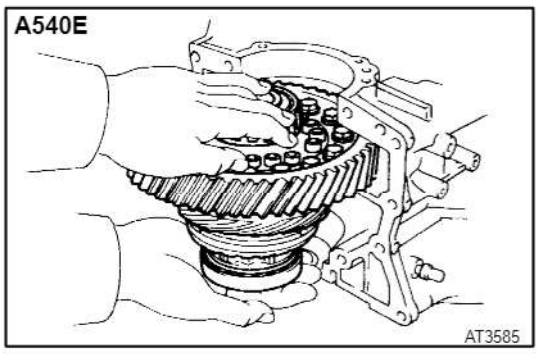
(e) If the preload is adjusted within specification, make a note of it.

(f) Stake the lock nut.



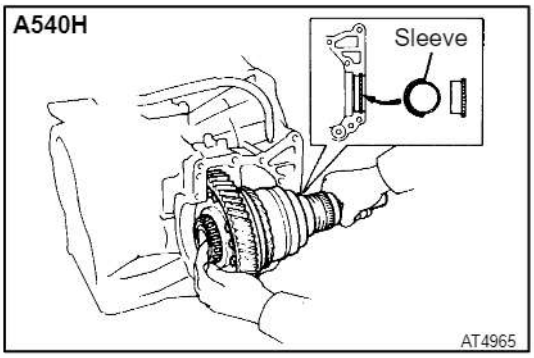


8. (A540E)
PLACE OUTER RACE AND SHIM ONTO RH SIDE BEARING

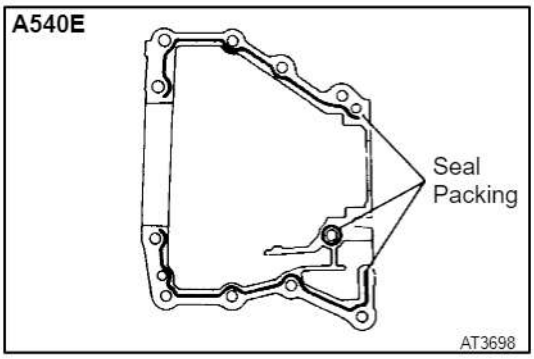


9. PLACE DIFFERENTIAL CASE INTO TRANSAXLE CASE

(A540E)
Be sure to install the shim and outer race into place.



(A540H)
Be sure to install the ring gear mount case sleeve and outer race into place.



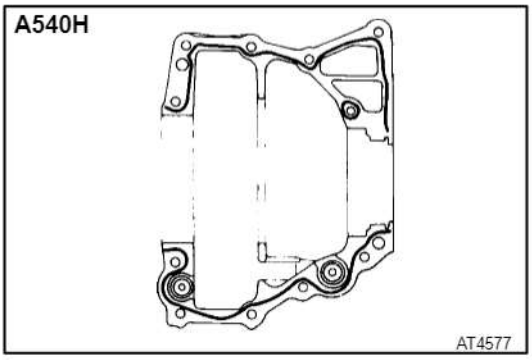
10. INSTALL CARRIER COVER

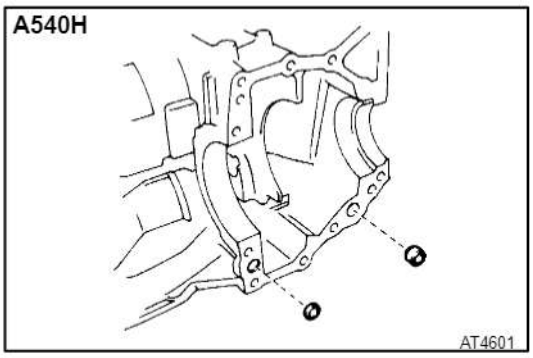
(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the carrier cover and transaxle case.

(b) Apply seal packing to the carrier cover as shown.

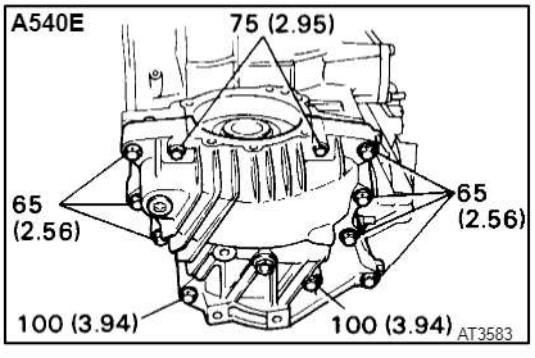
Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the carrier cover within ten minutes after applying seal packing.





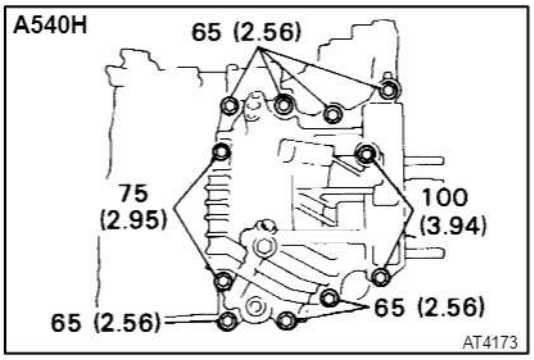
(c) Install the two apply gaskets.

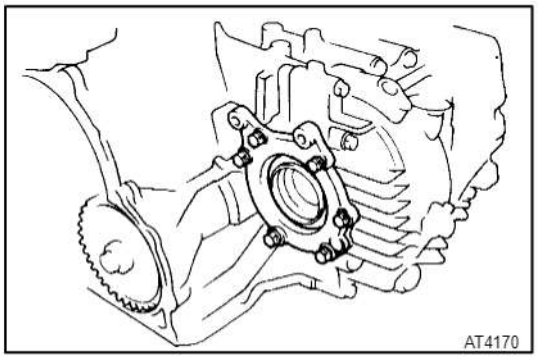


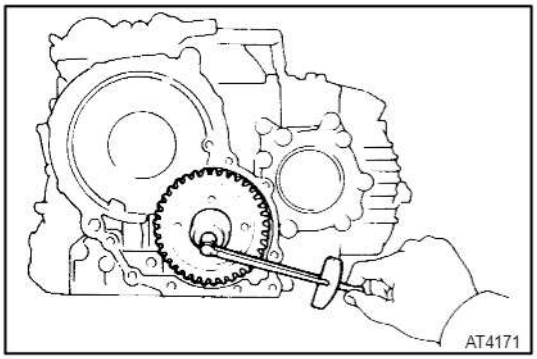
(d) Install and torque the eleven bolts.

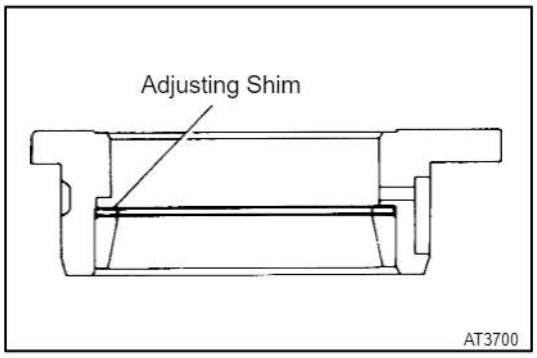
Torque: 400 kg-cm (29 ft-lb, 39 N-m)

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









11. ADJUST SIDE SEARING 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 six bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N-m)

(c) Snap down the bearings by turning the differential case several times.

(d) Using a torque meter, measure the differential total preload.

Total preload (at starting)
Add drive pinion preload

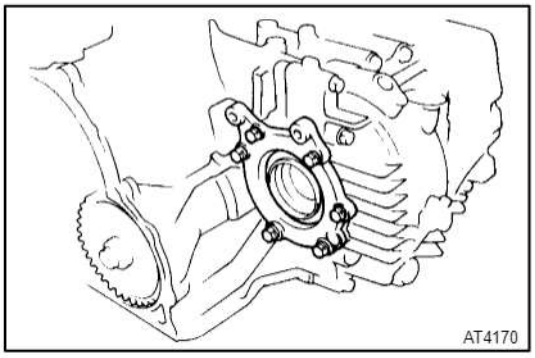
kg-cm (in.-lb, N-m)

	New Bearing	Reused Bearing
A540E	2.8 - 4.4 (2.4 - 3.8, 0.3 - 0.4)	1.4 - 2.2 (1.2 - 1.9, 0.1 - 0.2)
A540H	2.3 - 3.7 (2.0 - 3.2, 0.2 - 0.4)	1.2 - 1.9 (1.0 - 1.6, 0.1 - 0.2)

If the preload is not within specification, replace the adjusting shim in the LH bearing retainer with another thickness one.

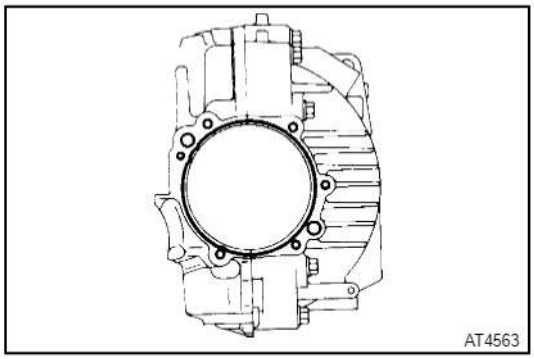
mm (in.)

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)



12. INSTALL LH BEARING RETAINER

(a) Remove the six bolts and LH bearing retainer.

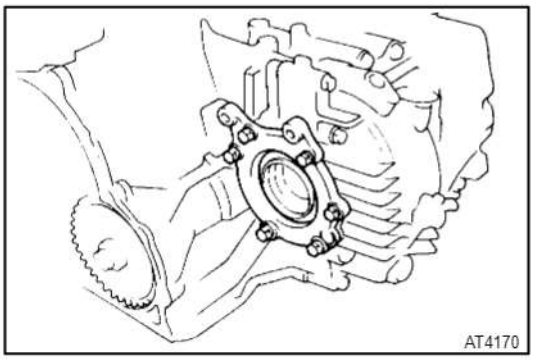


(b) Remove any packing material on the contacting surfaces of LH bearing retainer, transaxle case and carrier cover.

(c) Apply the seal packing to the transaxle case and carrier cover as shown.

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

HINT: Install the LH bearing retainer with ten minutes after applying seal packing.



(d) Install the LH bearing retainer.

(e) Coat the threads of bolts with sealer.

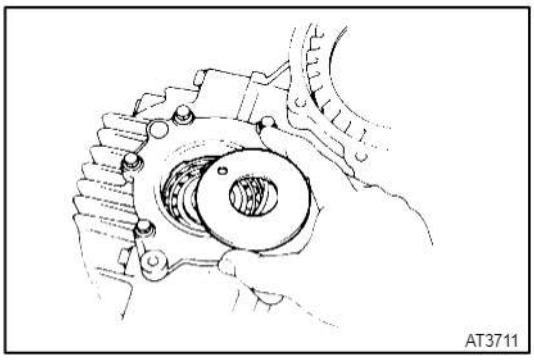
Sealer: Part No. 08833 - 00070, THREE BOND 1324 or equivalent

(f) Tighten the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N-m)

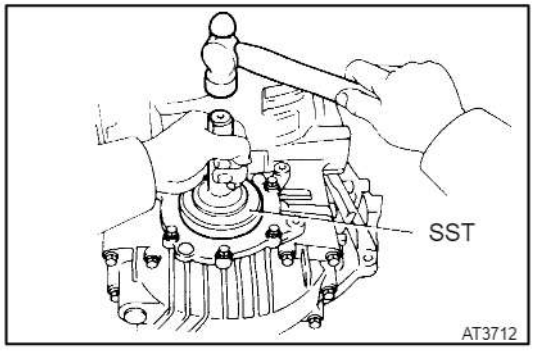
(g) Snap down the bearings.

(h) Recheck the differential total preload.



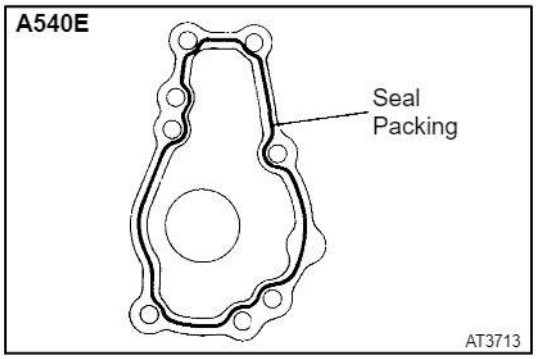
13. INSTALL NEW OIL SEAL

(a) Place the oil baffle onto the LH bearing retainer.



(b) Using SST, driven in a new oil seal until its end is flush with the surface of the LH bearing retainer.

SST 09223-15010



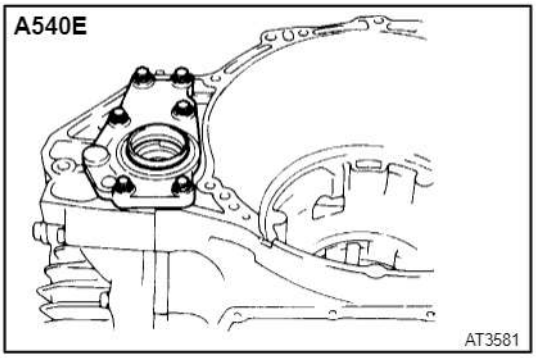
14. (A540E)
INSTALL RH RETAINER

(a) Remove any packing material on the contacting surfaces of RH retainer and transaxle case.

(b) Apply the seal packing to the RH retainer as shown.

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

HINT: Install the RH retainer within ten minutes after applying seal packing.

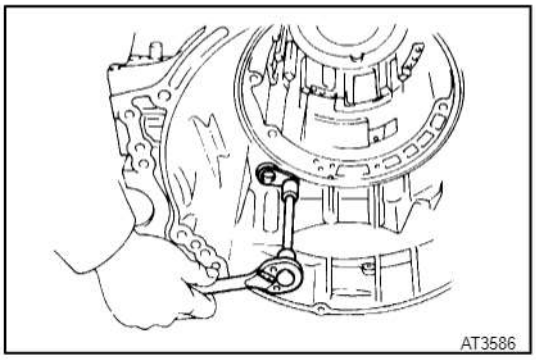


(c) Coat the threads of bolts with sealer.

Sealer: Part No. 08833 - 00070, THREE BOND 1324 or equivalent

(d) Tighten the bolts.

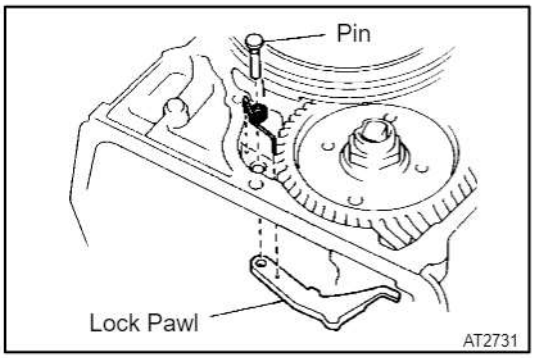
Torque: 195 kg-cm (14 ft-lb, 19 N-m)



15. INSTALL DRIVE PINION CAP

(a) Install a new O-ring to the cap.

(b) Install the drive pinion cap to the transaxle case.

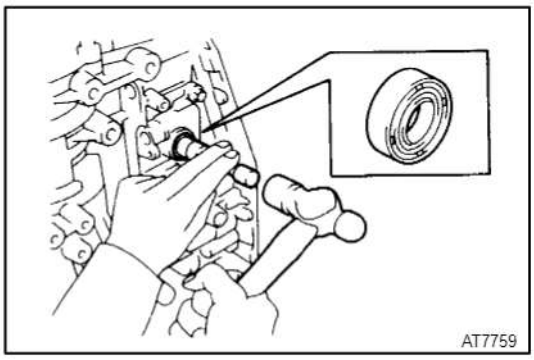


INSTALLATION OF 4-SPEED GEAR UNIT

1. INSTALL PARKING LOCK PAWL

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

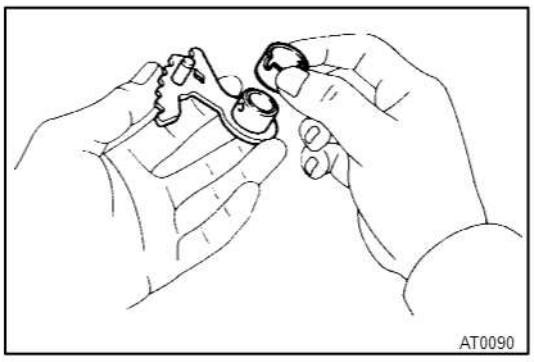
(b) Install the pin into the hole of the case through the spring and pawl.



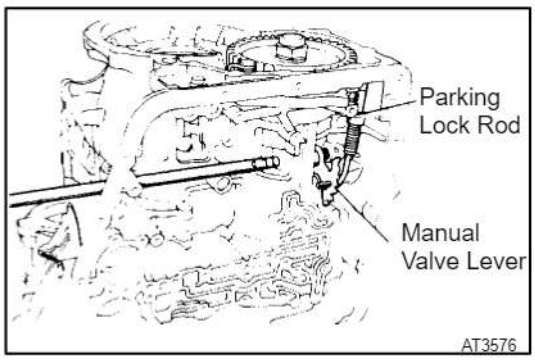
2. INSTALL MANUAL VALVE SHAFT

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

(b) Install the manual valve shaft oil seal to the case.

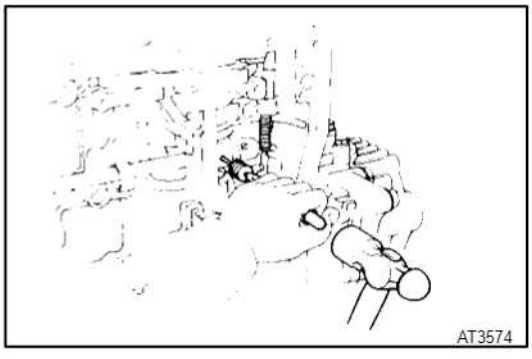


(c) Assemble a new collar to the manual valve lever.

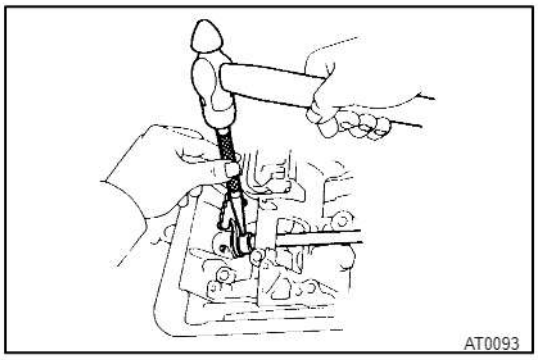


(d) Install the manual valve shaft to the transmission case through the manual valve lever.

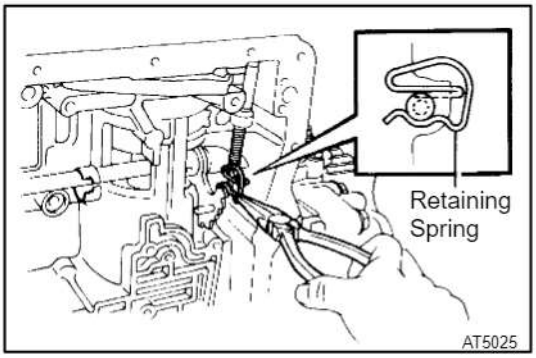
(e) Install the parking lock rod.



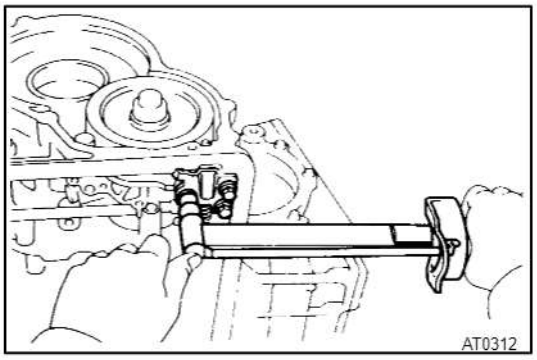
(f) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



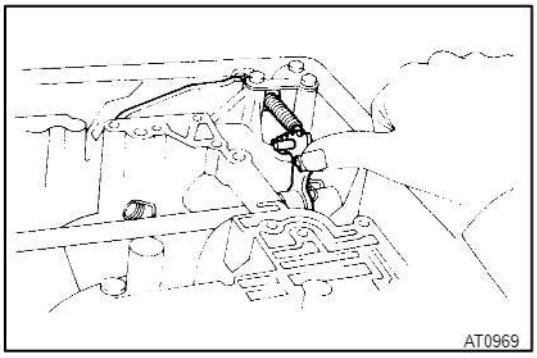
(g) Match the collar hole to the lever calking hollow and calk the collar to the lever.



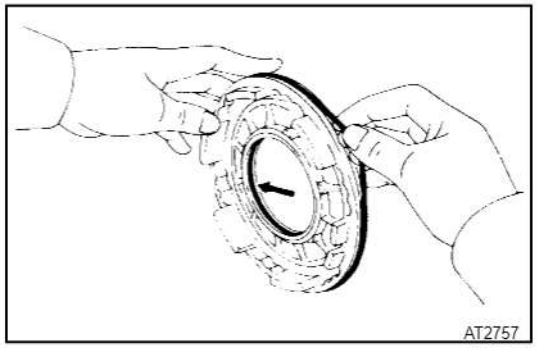
(h) Install the retaining spring.



3. INSTALL PARKING LOCK PAWL BRACKET
Torque: 75 kg-cm (65 in.-lb, 7.4 N-m)



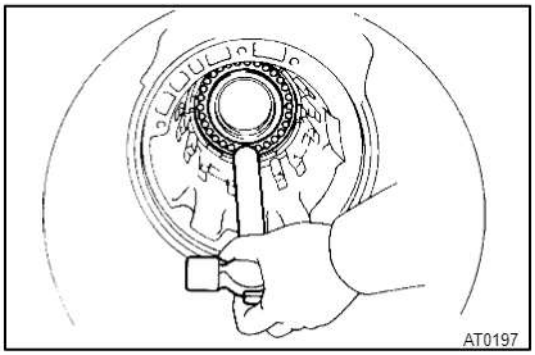
4. CHECK OPERATION OF PARKING LOCK PAWL
Make sure the counter driven gear is locked when the manual valve lever is in the P range.



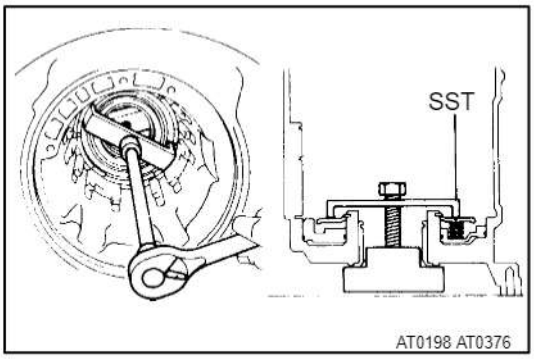
5. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

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

(b) Install the two O-rings on the piston.



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

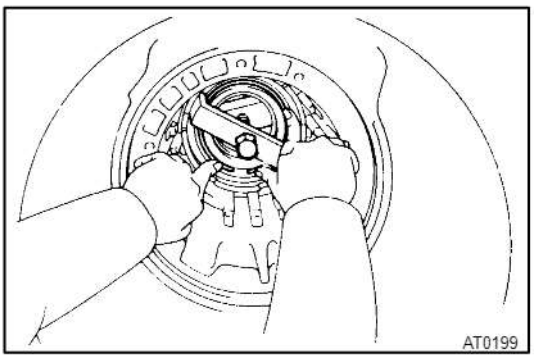


6. INSTALL PISTON RETURN SPRING

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

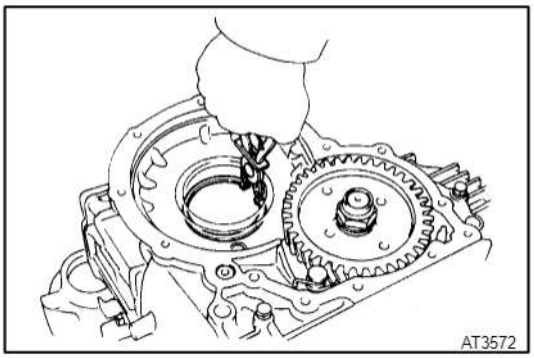
(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.

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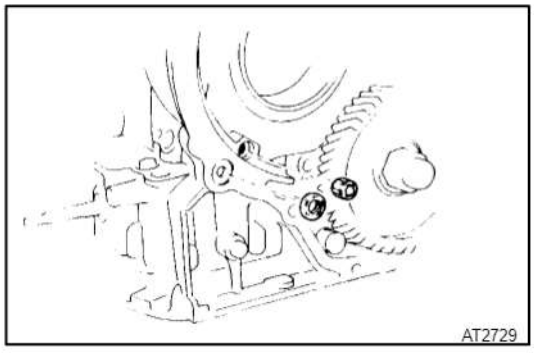


(c) Install snap ring. Visually check to make sure it is fully seated and centered by the three lugs on the spring retainer.
Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove SST.

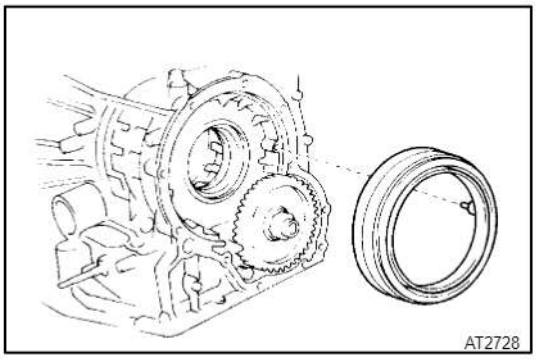


7. INSTALL SNAP RING TO TRANSAXLE CASE



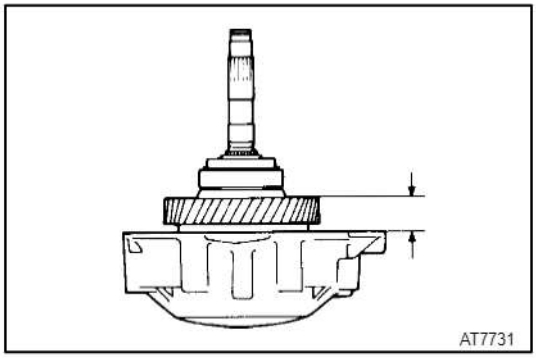
8. INSTALL OVERDRIVE UNIT

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

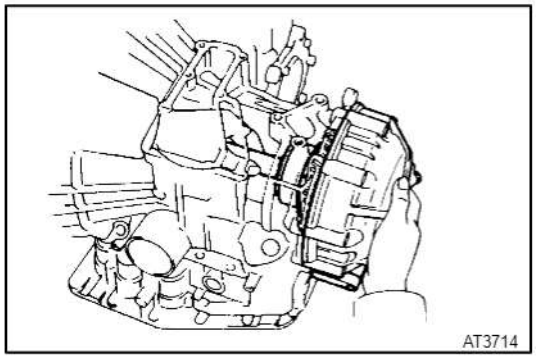


(b) Install the overdrive brake drum to the case.

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

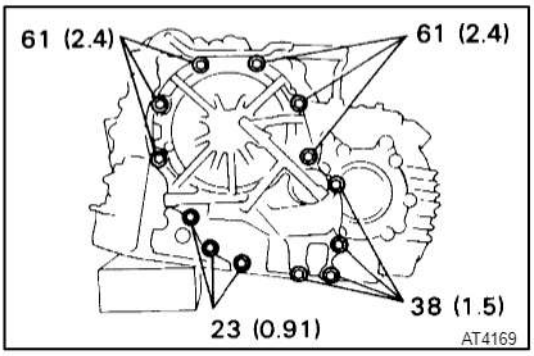


(d) Make sure that the length from the top surface of the case to the counter driven gear top surface should be about 24 mm (0.94 in.)



(e) Place the new gasket onto the transaxle case.

(f) Install the overdrive assembly with overdrive case to the transaxle case.



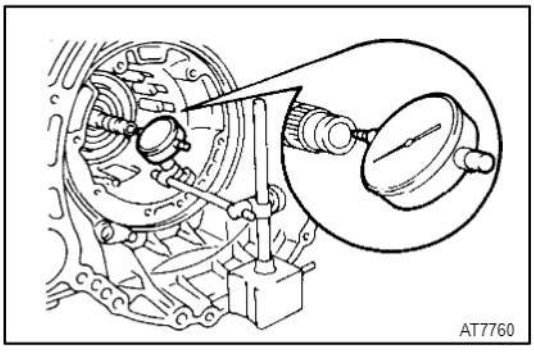
(g) Coat the threads of 23 mm (0.91 in.) bolts with sealer.

Sealer: Part No. 08833 - 00070, THREE BOND 1324 or equivalent.

(h) Install and tighten the thirteen bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N-m)

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



9. CHECK INTERMEDIATE SHAFT END PLAY

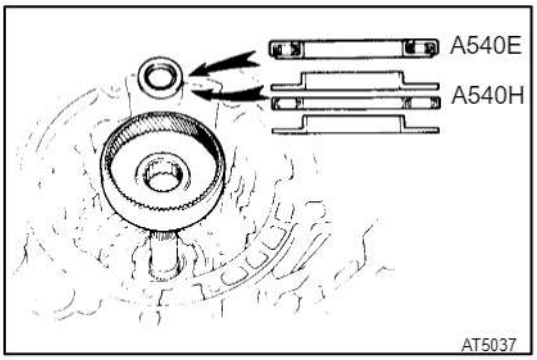
(a) Make sure that the intermediate shaft has thrust play in axial direction.

Thrust play: 0.47 - 1.50 mm (0.0185 - 0.0591 in.)

If the thrust play is not within specification, check the installation of intermediate shaft.

(See page AT-83)

(b) Make sure that the intermediate shaft turns smoothly.



10. INSTALL REAR PLANETARY GEAR

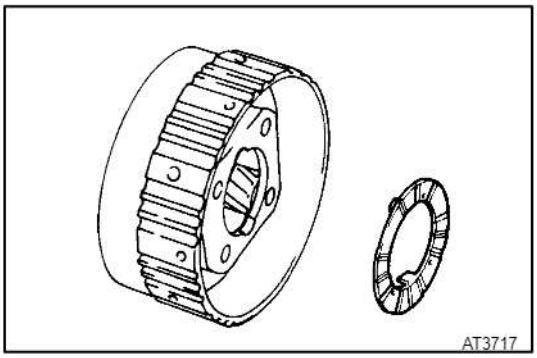
(a) Install the rear planetary ring gear.

(b) (A540E)
Place the bearing onto the ring gear.

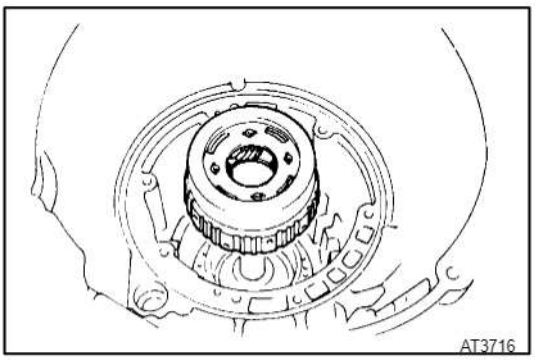
(c) (A540H)
Coat the races and bearing with petroleum jelly and install them onto the ring gear.

Bearing and race: mm (in.)

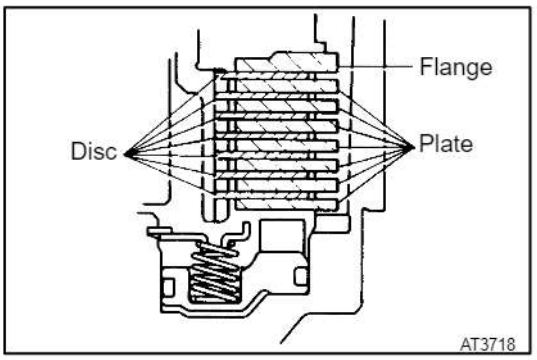
		Outer Diameter	Inner Diameter
A540E	Bearing	38.7 (1.524)	22.6 (0.890)
A540H	Front Race	37.3 (1.469)	24.1 (0.949)
	Bearing	37.6 (1.480)	24.0 (0.945)
	Rear Race	37.6 (1.480)	22.2 (0.874)



(d) Coat the thrust washer with petroleum jelly and place it onto the rear planetary gear.



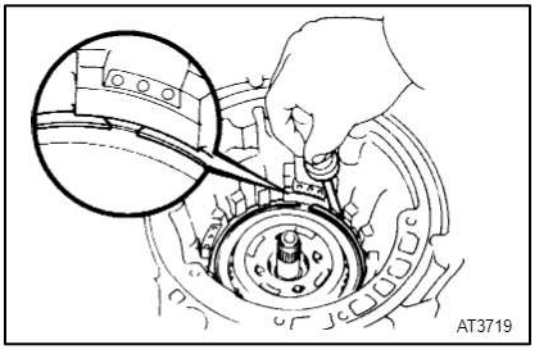
(e) Install the rear planetary gear.



11. INSTALL DISCS, PLATES AND FLANGE OF FIRST AND REVERSE BRAKE

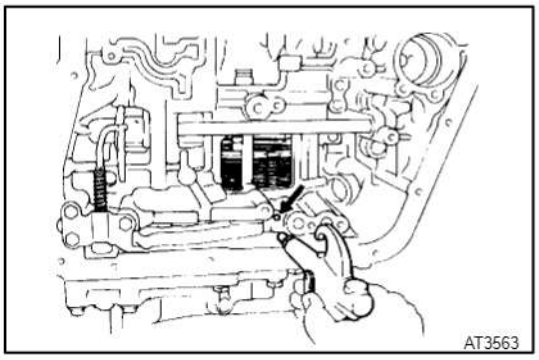
(a) Install the seven plates and seven discs.
Install in order: P = Plate D = Disc
A540E: P-D-P-D-P-D-P-D-P-D-P-D-P
A540H: P-D-P-D-P-D-P-D-P-D-P

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



(c) Install the snap ring.

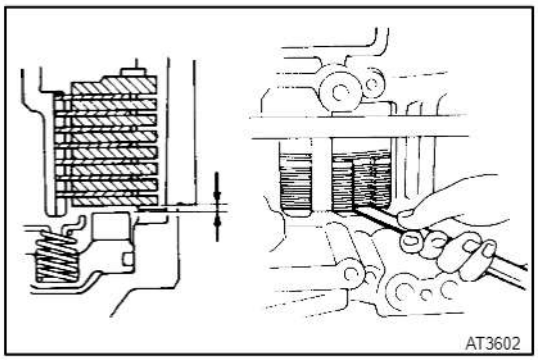
HINT: Be sure that the end gap of the snap ring is not aligned with one of cutouts.



12. CHECK FIRST AND REVERSE BRAKE

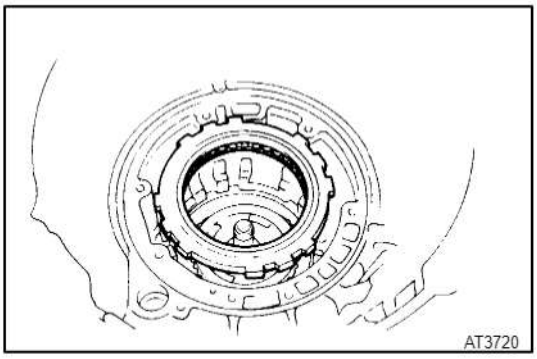
(a) Check the operation of the first and reverse brake piston.

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



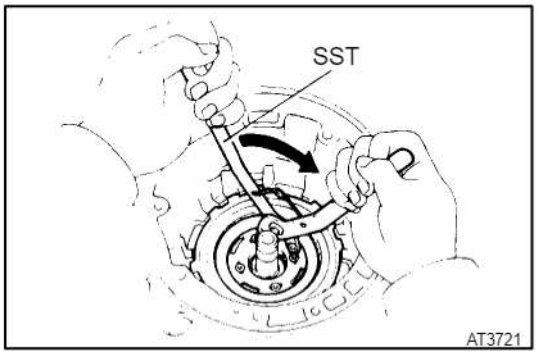
(b) Using a filler gauge, check the pack clearance of the first and reverse brake.

Clearance: A540E
0.85 - 2.05 mm (0.033 - 0.081 in.)
A540H
1.04 - 2.16 mm (0.041 - 0.085 in.)



13. INSTALL NO. 2 ONE-WAY CLUTCH INTO CASE

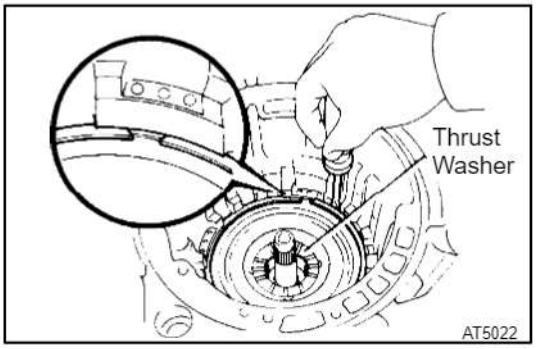
(a) Place the No. 2 one-way clutch with the shiny side of flange upward.



(b) Install the one-way clutch while turning the planetary gear clockwise with SST.

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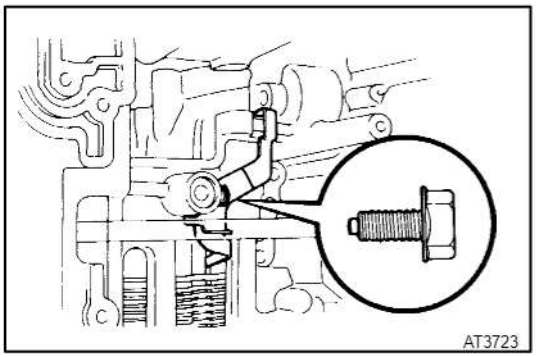
If can not turn the planetary gear clockwise, check the installation of the one-way clutch.



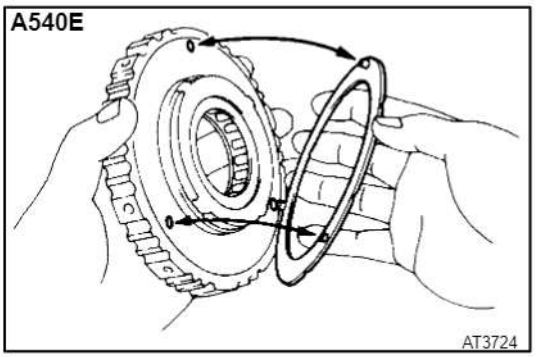
(c) Install the snap ring.

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

(d) (A540H only)
Coat the thrust washer with petroleum jelly and install it onto the rear planetary gear.

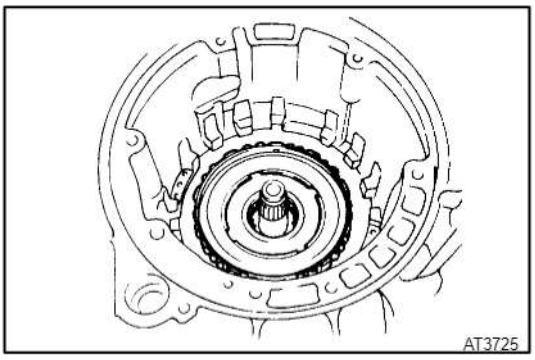


14. INSTALL SECOND COAST BRAKE BAND GUIDE

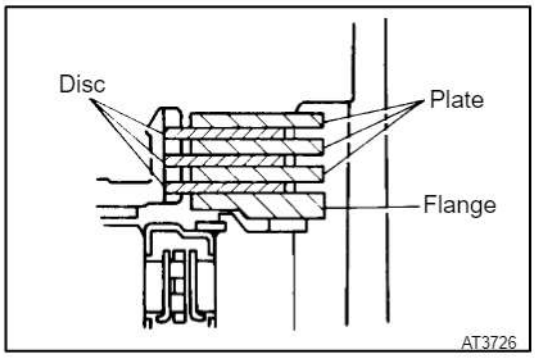


15. PLACE NO. 1 ONE-WAY CLUTCH

(a) Coat the thrust washer with petroleum jelly and install it on the No. 1 one-way clutch. (A540E)



(b) Place the No. 1 one-way clutch onto the rear planetary gear.

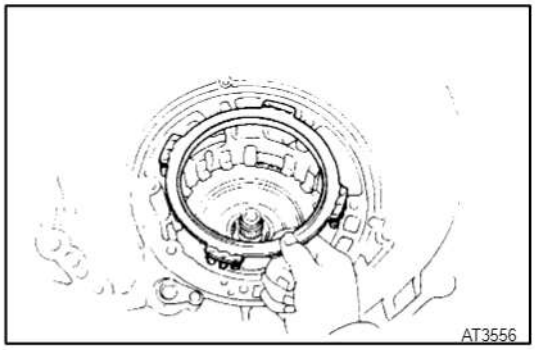


16. INSTALL SECOND BRAKE

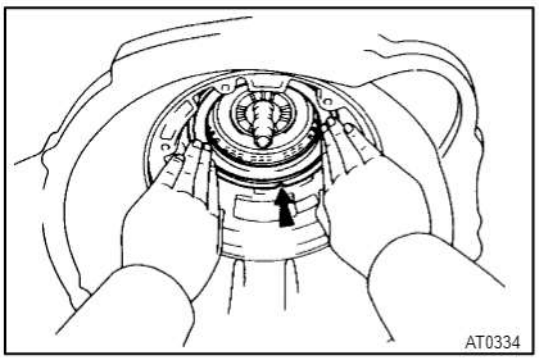
(a) Install the flange, facing the flat end upward.

(b) Install the three discs and plates.

Install in order: P = Plate D = Disc
D-P-D-P-D-P

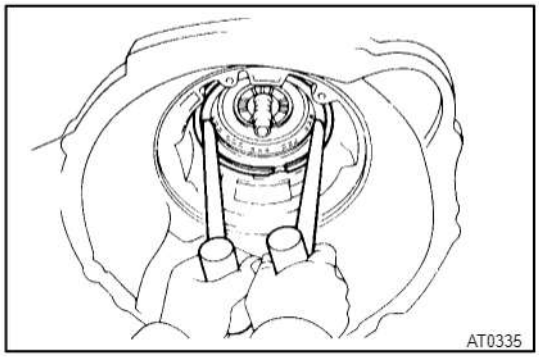


(c) Place the piston return spring into the case.



(d) Place the second brake drum into the case.

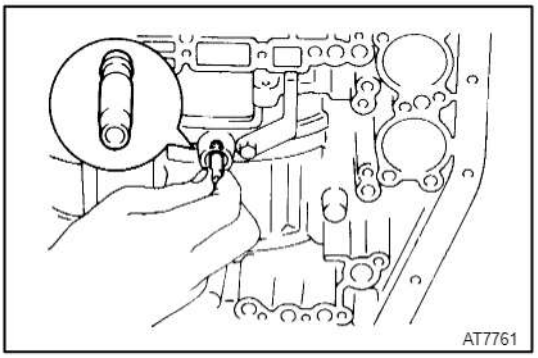
HINT: Align the groove of the drum with the bolt.



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

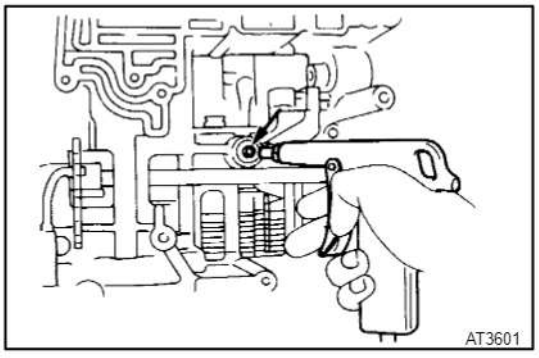
(f) While compressing the piston return springs over the drum with hammer handles, install the snap ring into the groove.

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



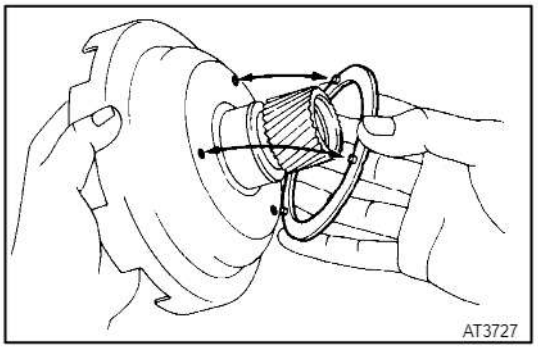
17. INSTALL NEW SECOND BRAKE GASKET

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



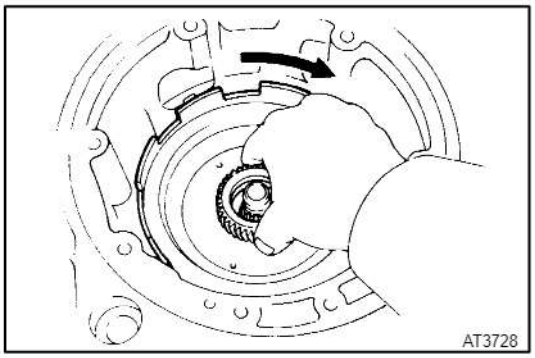
18. CHECK OPERATION OF SECOND BRAKE

Apply compressed air into the second brake gasket and confirm that the piston moves.

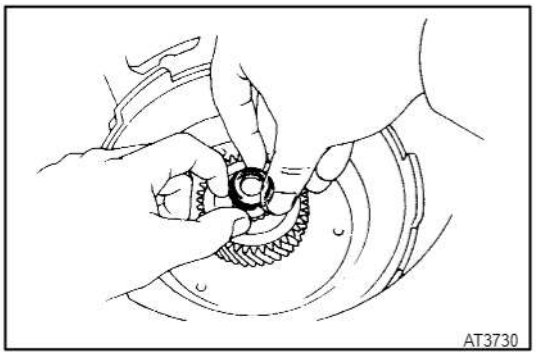


19. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.

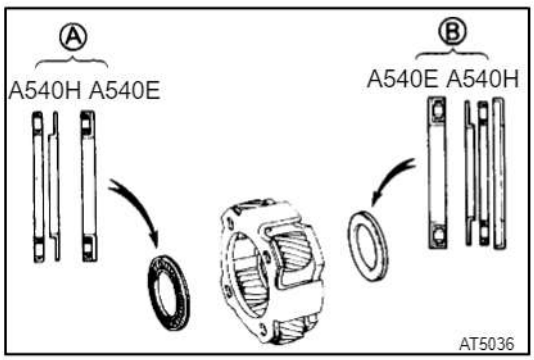


(b) While turning the sun gear clockwise, install it into the No. 1 one-way clutch.



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

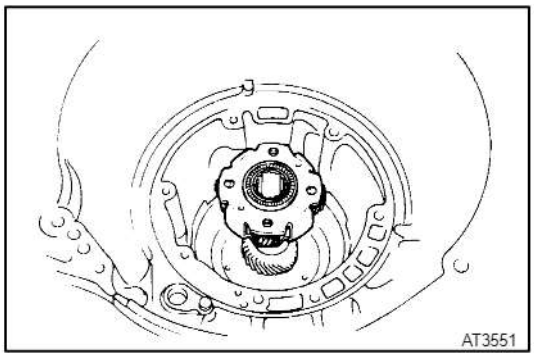
(a) Coat the races and bearings with petroleum jelly, and install them onto the both sides of planetary gear.

Bearing and race: Ⓐ mm (in.)

		Outer Diameter	Inner Diameter
A540E	Bearing	45.5 (1.791)	30.1 (1.185)
A540H	Bearing	45.0 (1.772)	30.0 (1.181)
	Race	45.0 (1.772)	28.0 (1.102)

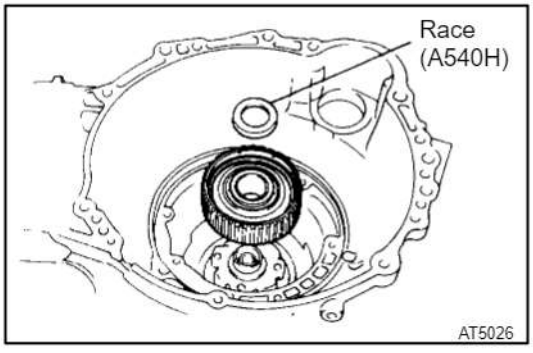
Bearing and race: Ⓑ mm (in.)

		Outer Diameter	Inner Diameter
A540E	Bearing	45.5 (1.791)	30.1 (1.185)
A540H	Front Race	37.9 (1.492)	22.0 (0.866)
	Bearing	36.1 (1.421)	22.2 (0.874)
	Rear Race	35.0 (1.378)	19.0 (0.748)



HINT: The bearings are the same on the Ⓐ and Ⓑ side (A540E).

(b) Install the planetary gear onto the sun gear.

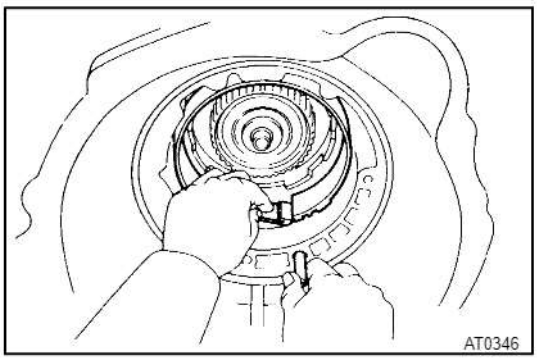


22. INSTALL FRONT PLANETARY RING GEAR

(A540H)

Coat the race with petroleum jelly and install it onto the tip of ring gear.

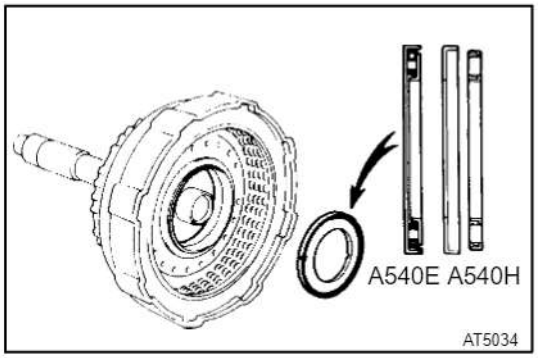
Race: Outer diameter 35.7 mm (1.406 in.)
Inner diameter 23.0 mm (0.906 in.)



23. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

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

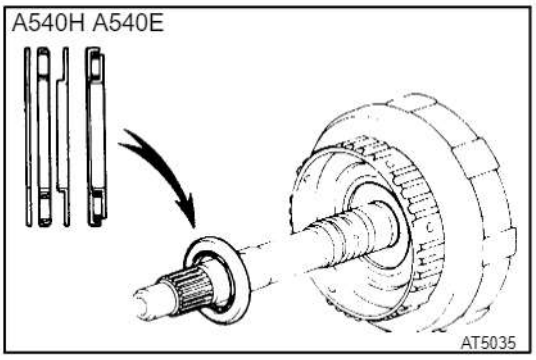


24. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the race and bearing with petroleum jelly and install it onto rear side of the forward clutch.

Bearing and race mm (in.)

		Outer Diameter	Inner Diameter
A540E	Bearing	47.6 (1.874)	31.4 (1.236)
A540H	Bearing	36.1 (1.421)	22.2 (0.874)
	Race	37.9 (1.492)	22.0 (0.866)



(b) Coat the race and bearing with petroleum jelly and install it onto front side of the forward clutch.

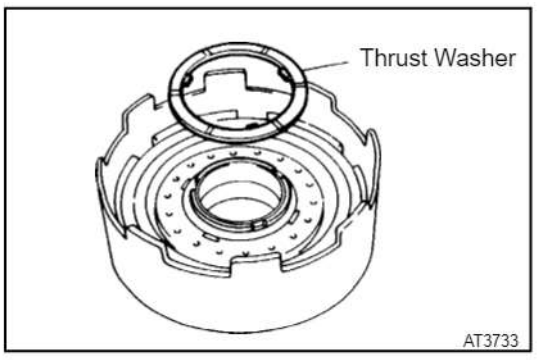
HINT: There are two different-thick races (A540H) and bearings (A540E) for adjustment of the input shaft thrust play.

Bearing: A540E mm (in.)

	Thickness	Outer Diameter	Inner Diameter
Bearing	3.60 (0.1417)	45.9 (1.807)	27.7 (1.091)
	4.19 (0.1650)	47.1 (1.854)	27.7 (1.091)

Bearing and race: A540H mm (in.)

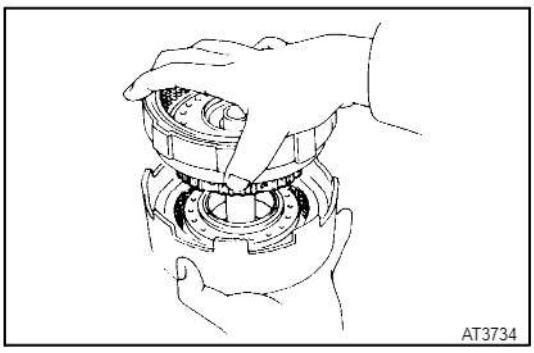
	Thickness	Outer Diameter	Inner Diameter
Front Race	0.8 (0.0315)	43.0 (1.693)	30.5 (1.201)
	1.4 (0.0551)		
Bearing	—	42.0 (1.654)	28.9 (1.138)
Rear Race	—	42.0 (1.654)	27.1 (1.067)

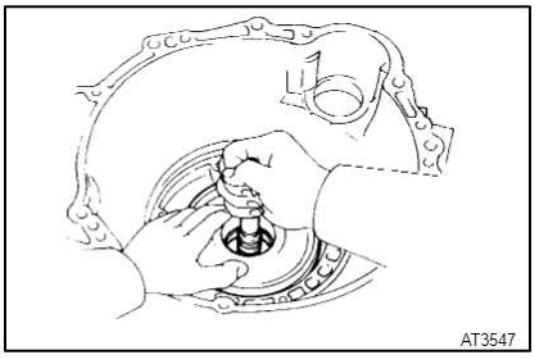


(c) Coat the thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.

(d) Mesh the hub of the forward clutch with flukes of the direct clutch discs.

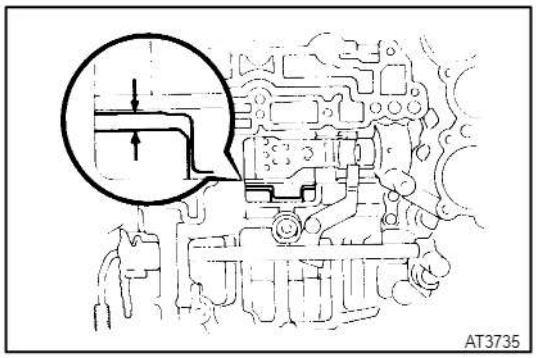
HINT: Be careful that the bearing and thrust washer do not get out of place.





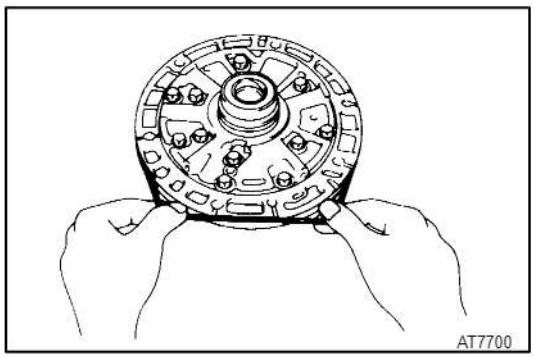
(e) Install the direct clutch and forward clutch into the case.

HINT: Hold the direct clutch toward the forward clutch to prevent the thrust washer from getting out of place.



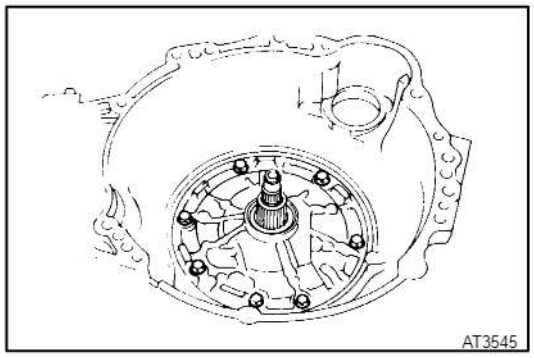
(f) Check the distance between the direct clutch drum and the sun gear input drum.

Distance: Approx. 3 mm (0.12 in.)



25. INSTALL OIL PUMP INTO CASE

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

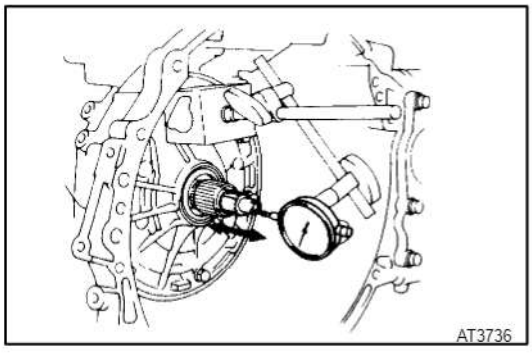


(b) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

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

(c) Install and tighten the seven bolts.

Torque: 225 kg-cm (16 ft-lb, 22 N-m)



26. MEASURE THRUST PLAY OF INPUT SHAFT

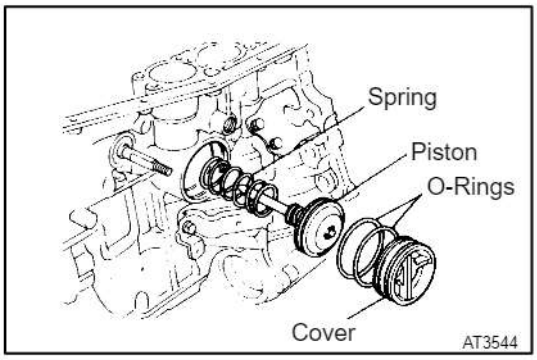
Measure the thrust play with a dial gauge.

Thrust play: 0.13 - 0.90 mm (0.0051 - 0.0354 in.)

HINT: There are two different-thick bearings (A540E) or races (A540H) for the end of stator shaft. If the thrust play is in excess of standard, select one of them.

(A540E)
Bearing thickness: 3.60 mm (0.1417 in.)
4.19 mm (0.1650 in.)

(A 540H)
Race thickness: 0.8 mm (0.031 in.)
1.4 mm (0.055 in.)



27. CHECK INPUT SHAFT ROTATION

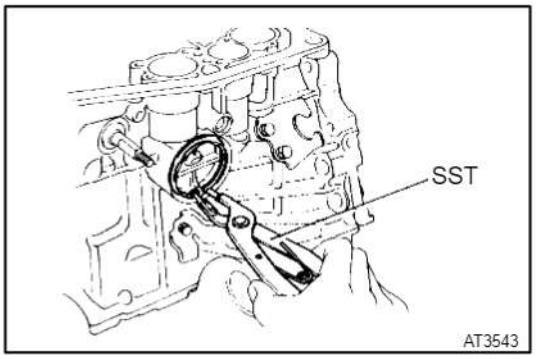
Make sure that the input shaft rotates smoothly.

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.

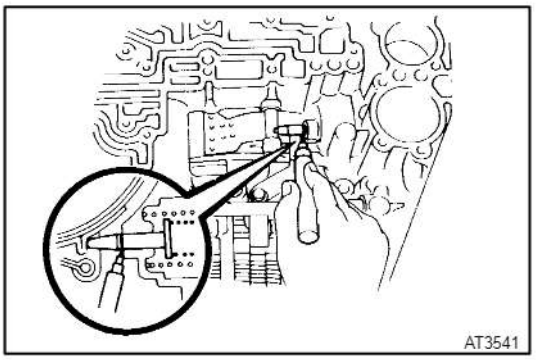
(c) Place the cover into the bore.



(d) Using SST, install the snap ring while pressing the cover.

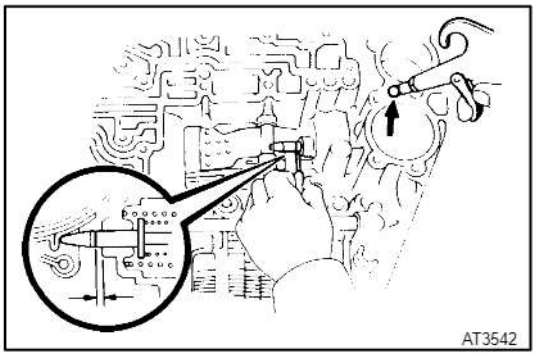
SST 09350-32014 (09351-32050)

(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 shown in the illustration.



(b) Using SST, measure the piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi or 392 - 785 kPa) as shown.

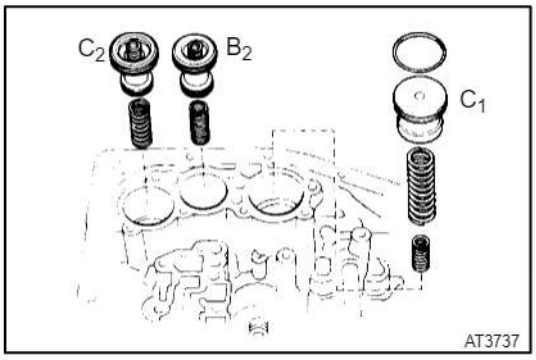
SST 09240-00020

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.)

It is still more than standard value, replace the brake band with a new one.



30. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the new O-rings to the pistons.

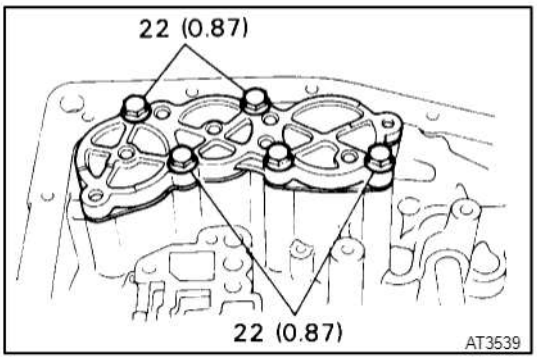
(b) Install the springs and pistons into the bores.

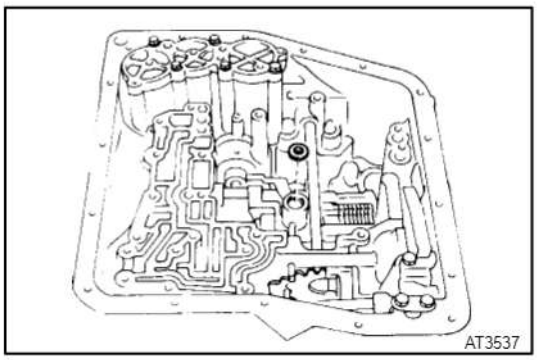
Spring		Free length mm (in.)	Outer diameter mm (in.)	Color
C_2		51.0 (2.008)	18.0 (0.709)	Red
B_2		58.5 (2.303)	15.2 (0.598)	Orange
C_1	Outer	71.2 (2.803)	24.4 (0.961)	Blue
	Inner	43.4 (1.709)	17.8 (0.701)	Light green

(c) Place the cover with a new gasket and gradually tighten the bolts a little a time in sequence.

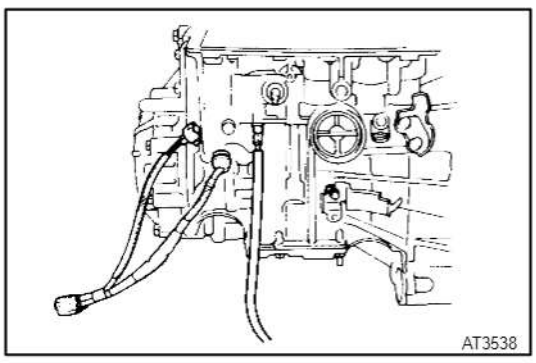
HINT: Each bolt length (mm, in.) is indicated in the figure.

Torque: 100 kg-cm (7 ft-lb, 10 N-m)

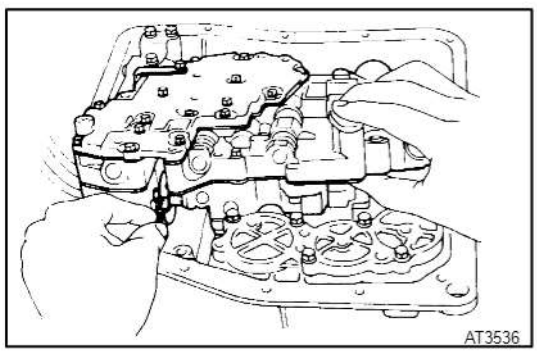




31. PLACE NEW SECOND BRAKE APPLY GASKET



32. INSTALL THROTTLE CABLE AND SOLENOID WIRE

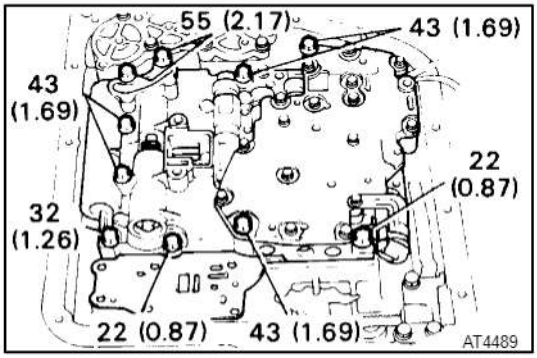


33. INSTALL VALVE BODY TO TRANSAXLE CASE

(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.

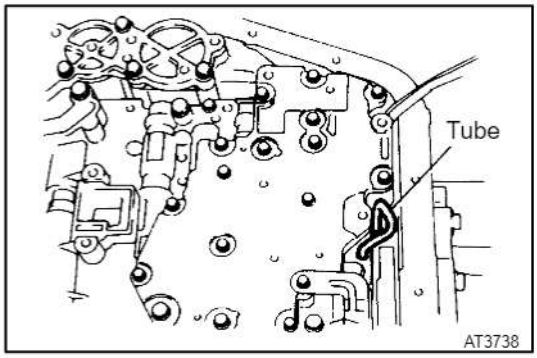


(c) Install and tighten the ten bolts.

HINT:

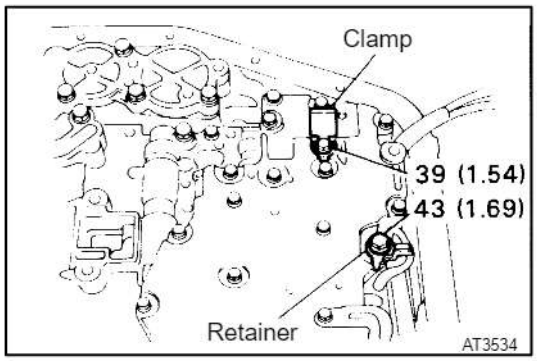
Each bolt length (mm, in.) is indicated in the figure. Hand tighten the ten bolts first, then torque with a torque wrench.

Torque: 110 kg-cm (8 ft-lb, 11 N-m)



34. INSTALL B_3 APPLY TUBE

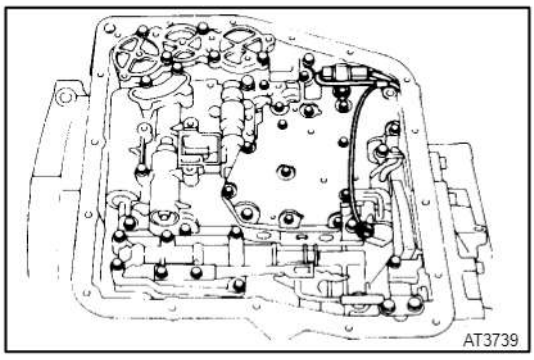
NOTICE: Be careful not to bend or damage the tube.



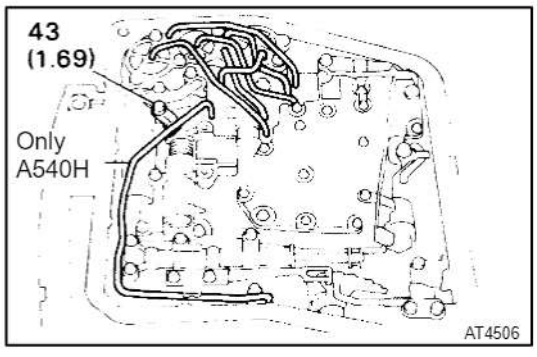
35. INSTALL CONNECTOR CLAMP AND TUBE RETAINER

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

Torque: 110 kg-cm (8 ft-lb, 11 N-m)



36. CONNECT SOLENOID CONNECTORS



37. INSTALL OIL TUBES

(A540E)

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

(A540H)

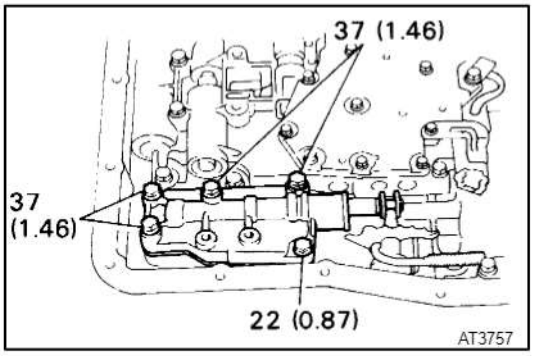
(a) Using a plastic hammer, install the tubes into the positions indicated in the figure.

(b) Install the bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)

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

NOTICE: Be careful not no bend or damage the tubes.



38. INSTALL MANUAL VALVE BODY AND DETENT SPRING

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

(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 five bolts first. Then, tighten them with a torque wrench.

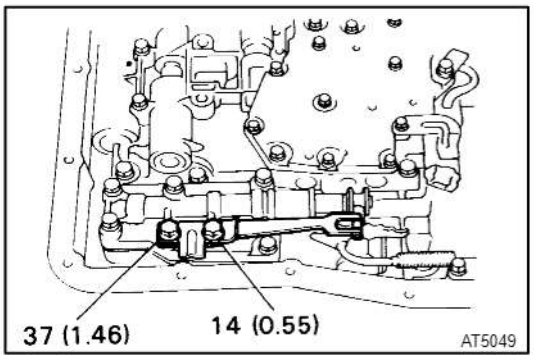
Torque: 110 kg-cm (8 ft-lb, 11 N-m)

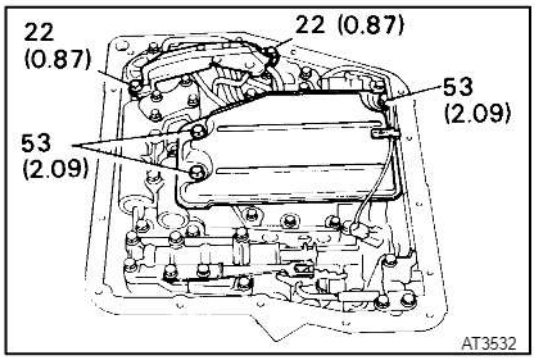
(d) Place the detent springs on the manual valve body and hand tighten the two bolts first.
Then, tighten them with a torque wrench.

Torque: 110 kg-cm (8 ft-lb, 11 N-m)

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

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



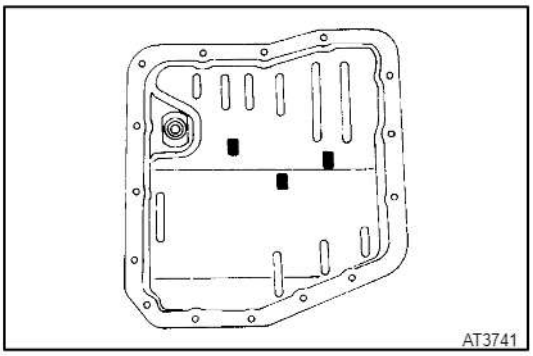


39. INSTALL TUBE BRACKET AND OIL STRAINER

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

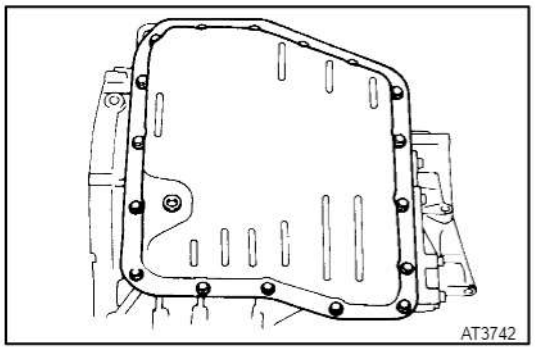
Torque:

Tube bracket	**100 kg-cm (7 ft-lb, 10 N-m)**
Oil strainer	**110 kg-cm (8 ft-lb, 11 N-m)**



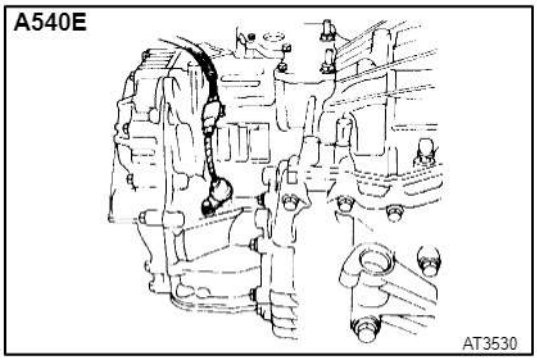
40. INSTALL MAGNETS IN PLACE AS SHOWN

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



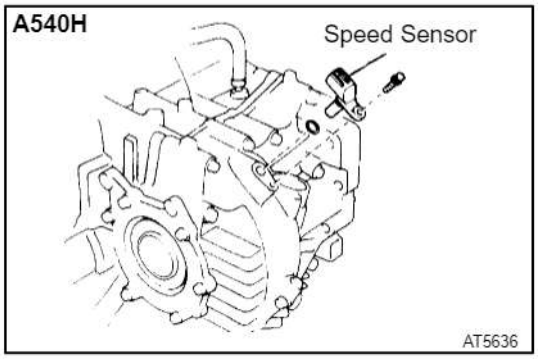
41. INSTALL OIL PAN WITH NEW GASKET

Torque: 50 kg-cm (43 in.-lb, 4.9 N-m)



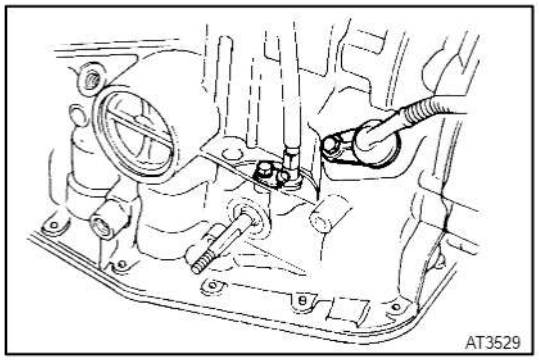
42. (A540E)
INSTALL SPEED SENSOR

(a) Install a new O-ring to the speed sensor.
(b) Install the speed sensor to the transaxle case.
(c) Tighten the bolt.
(d) Connect the sensor connector.



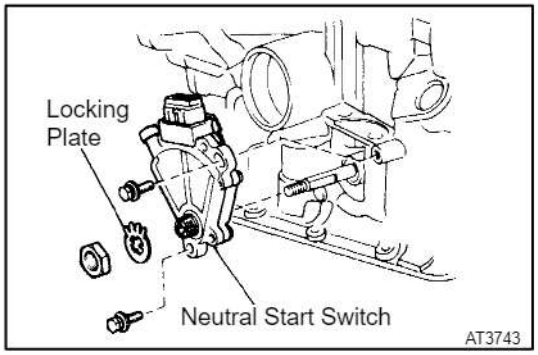
43. (A540H)
INSTALL VEHICLE SPEED SENSOR

(a) Install a new O-ring to the vehicle speed sensor.
(b) Install the vehicle speed sensor to the transaxle case.
(c) Install and tighten the bolt.



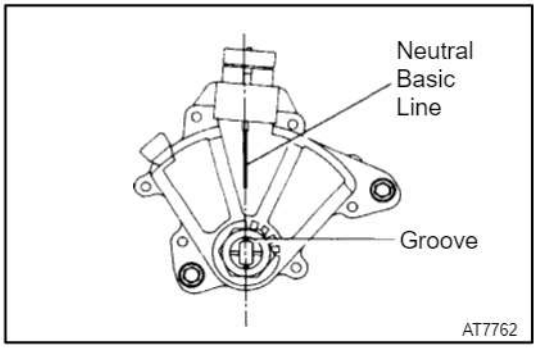
44. INSTALL THROTTLE CABLE RETAINING PLATE

45. INSTALL SOLENOID WIRE

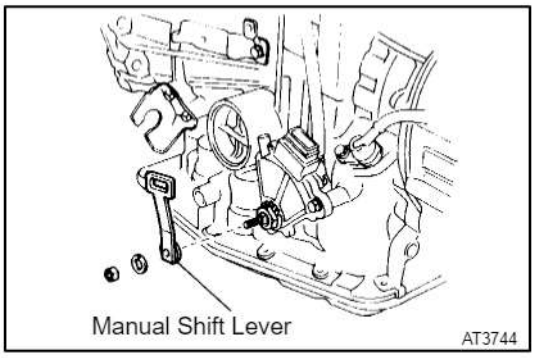


46. INSTALL NEUTRAL START SWITCH

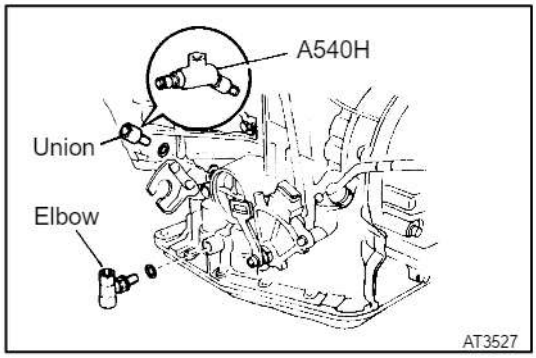
(a) Install the neutral start switch to the manual valve shaft.
(b) Place the new locking plate and tighten the nut.
(c) Stake the nut with locking plate.
(d) Install the two bolts.



(e) Adjust the neutral start switch.
HINT: Align the groove and neutral basic line.
(f) Tighten the two bolts.



47. INSTALL MANUAL SHIFT LEVER

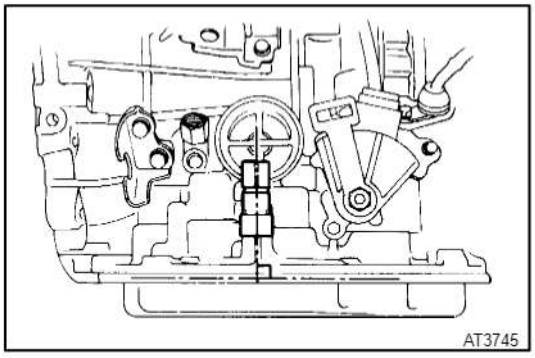


48. INSTALL UNION AND ELBOW

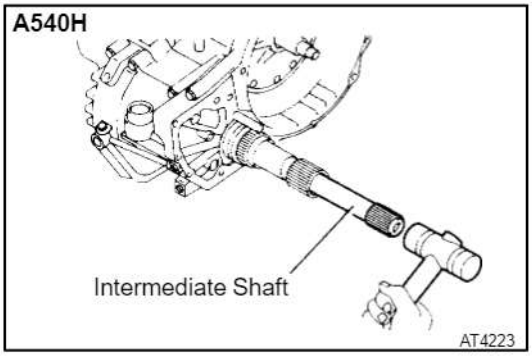
(a) Install the new O-rings to the union and elbow.

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

Torque: 275 kg-cm (20 ft-lb, 27 N-m)



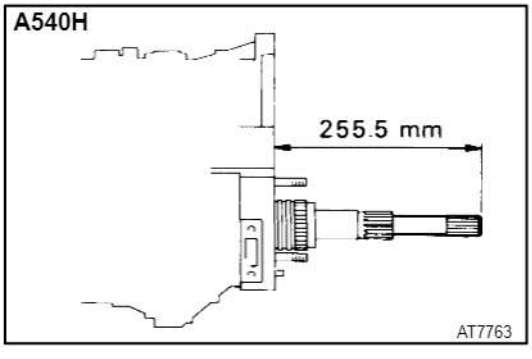
HINT: Install the elbow at right angles to the bottom of the transaxle case.



49. (A540H)
INSTALL DIFFERENTIAL SIDE GEAR INTERMEDIATE SHAFT

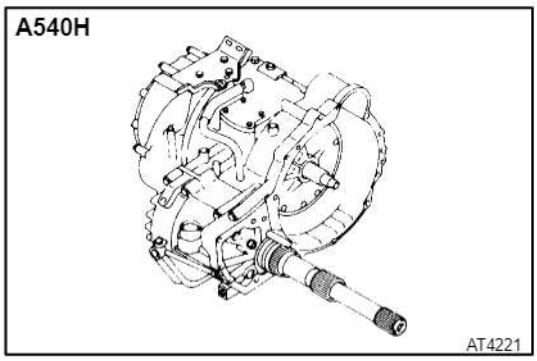
(a) Install a new snap ring to the shaft groove.

(b) Using a plastic hammer, install the shaft.



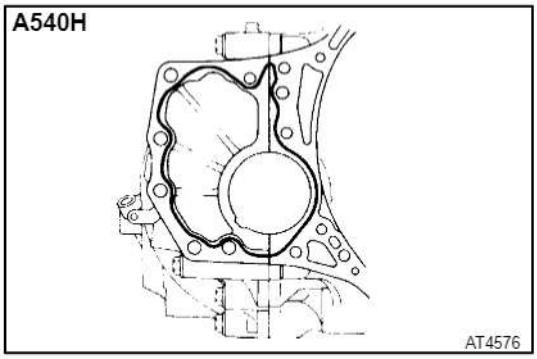
HINT: Keeping the intermediate shaft on the pinion shaft of differential, measure the point in the illustration.

Protrusion length (Reference): 255.5 mm (10.059 in.)



50. (A540H)
INSTALL APPLY GASKET

Install a new apply gasket to the differential carrier cover.



51. (A540H)
INSTALL TRANSFER ASSEMBLY

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transfer and transaxle.

(b) Apply seal packing to the transaxle as shown in the illustration.

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

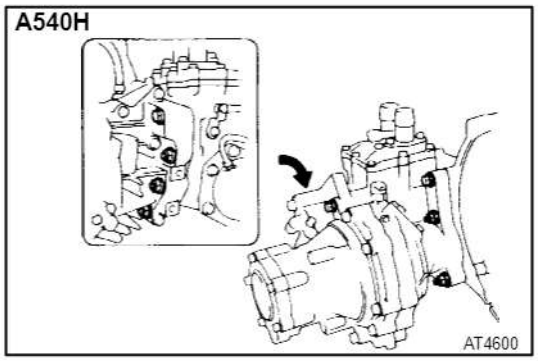
HINT: Install the transfer assembly as soon as the seal packing is applied.

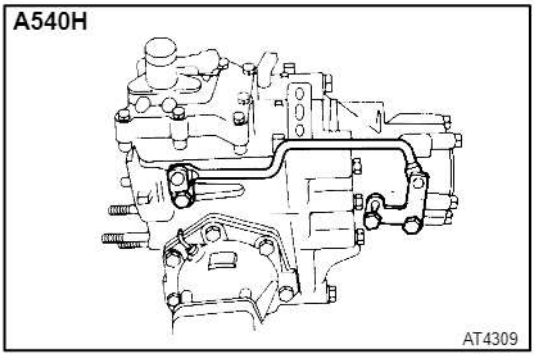
(c) Coat the threads of bolts with sealer.

Sealer: Part No. 08833 - 00070, THREE BOND 1324 or equivalent.

(d) Install and torque the five nuts and three bolts.

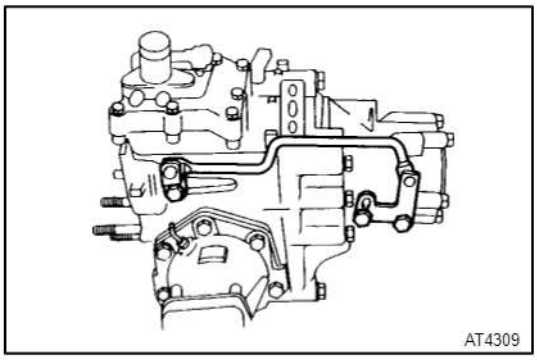
Torque: 700 kg-cm (51 ft-lb, 69 N-m)





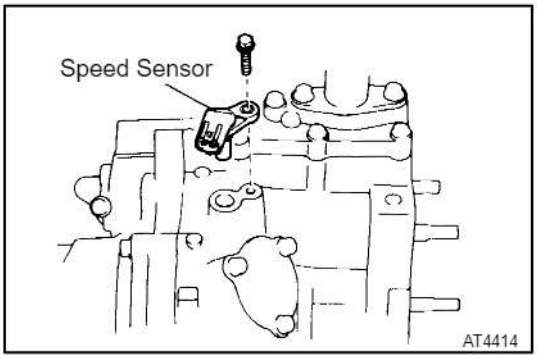
52. (A540H)
INSPECT MODE SELECT LEVER POSITION

After finishing inspection or repair the transaxte, be sure the select lever position to FREE mode and attach the lock bolt.



DISASSEMBLY OF COMPONENT PARTS

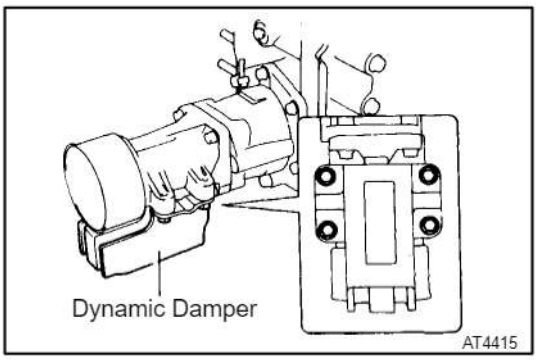
1. REMOVE TRANSFER MODE SELECT LEVER AND ROD



2. REMOVE REAR WHEEL SPEED SENSOR

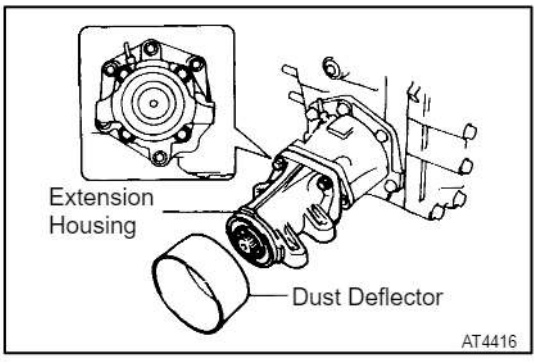
(a) Remove the bolt and pull out the speed sensor.

(b) Remove the O-ring from speed sensor.



3. REMOVE DYNAMIC DAMPER

Remove the four bolts and dynamic damper.

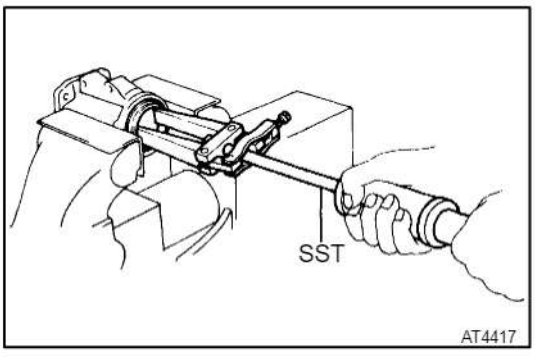


4. REMOVE EXTENSION HOUSING

(a) Remove the dust deflector from the extension housing.

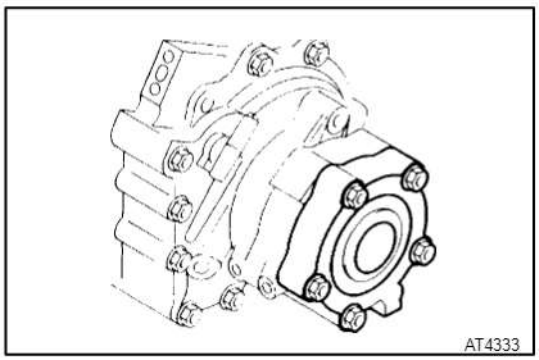
(b) Remove the four bolts and extension housing.

(c) Remove the O-ring from the extension housing.



(d) Using SST, remove the oil seal.

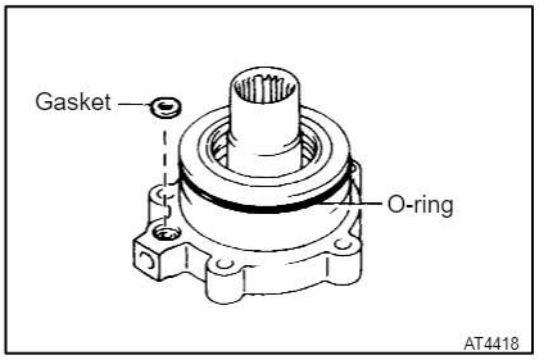
SST 09308-00010



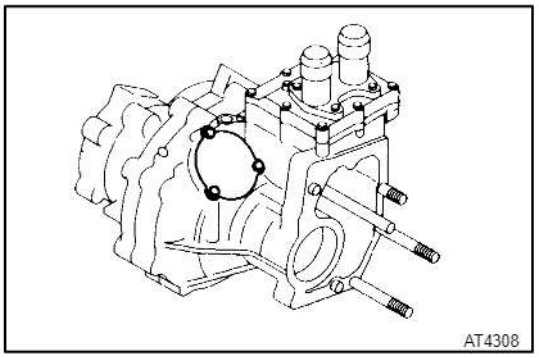
5. REMOVE TRANSFER RIGHT CASE RETAINER

(a) Remove the five bolts.

(b) Using a plastic hammer, remove the right case retainer.

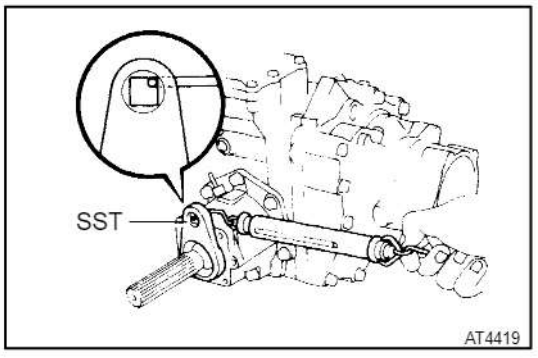


(c) Remove the O-ring and apply gasket from the right case retainer.



6. REMOVE TRANSFER INSPECTION HOLE COVER

Remove the three bolts and inspection hole cover.



7. CHECK PRELOAD

(a) Using SST and a spring tension gauge, measure the driven pinion preload of the backlash between the driven pinion and ring gear.

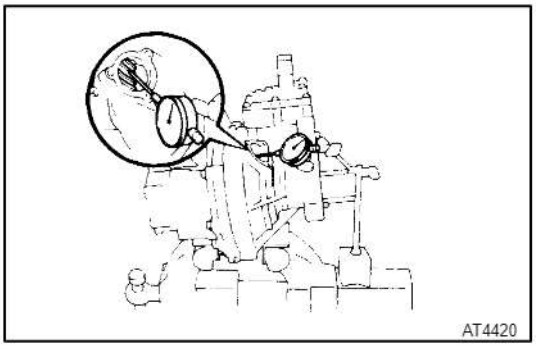
SST 09326-2001 1

Driven pinion preload (at starting):
0.9 - 1.4 kg (2.0 - 3.1 lb, 8.8 - 13.7 N)

(b) Using SST and a spring tension gauge, measure the total preload.

SST 09326-2001 1

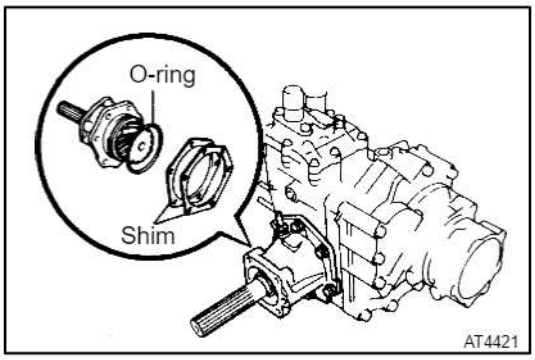
Total preload (at starting):
Add driven pinion preload
0.5 - 0.9 kg (1.1 - 2.0 lb, 4.9 - 8.8 N)



8. CHECK RING GEAR BACKLASH

Using a dial indicator, measure the ring gear backlash.
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

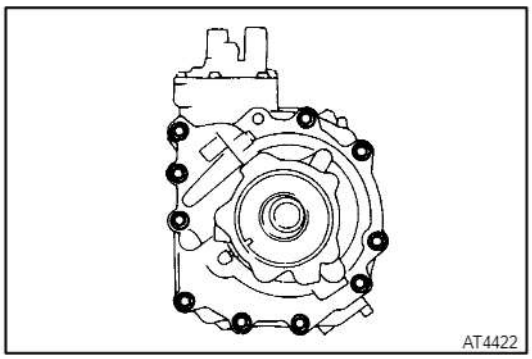
CHECK TOOTH CONTACT
(See page TF-34)



9. REMOVE DRIVEN PINION BEARING CAGE

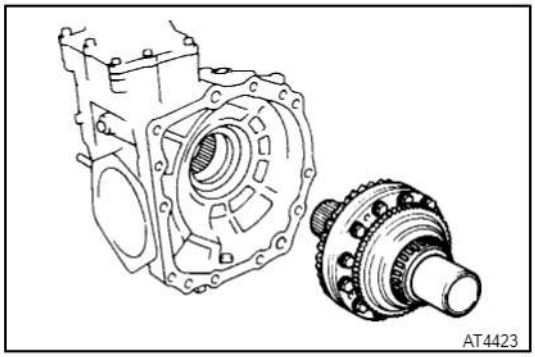
(a) Remove the six bolts and bearing cage.

(b) Remove the O-ring and the shims from the bearing cage.

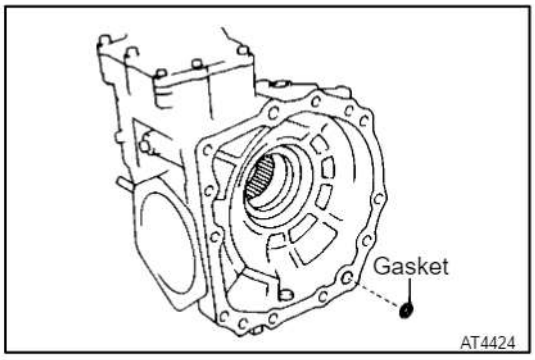


10. REMOVE TRANSFER RIGHT CASE

Remove the ten bolts and right case.

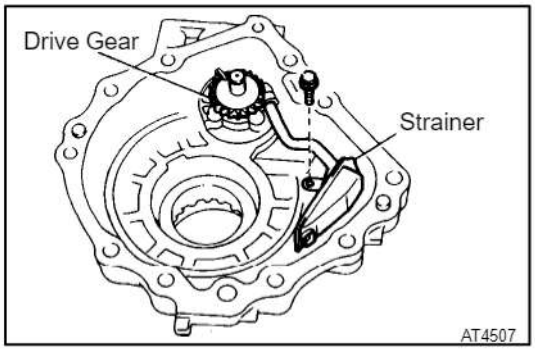


11. REMOVE CENTER DIFFERENTIAL ASSEMBLY



12. REMOVE APPLY GASKET

Remove the apply gasket from the left case.

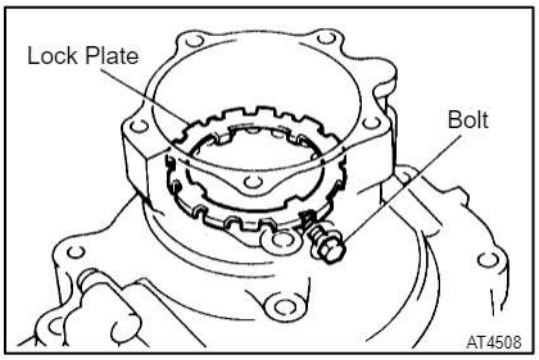


13. REMOVE OIL PUMP DRIVEN GEAR AND OIL PUMP STRAINER

(a) Remove oil pump driven gear.

(b) Remove the bolt and oil pump strainer.

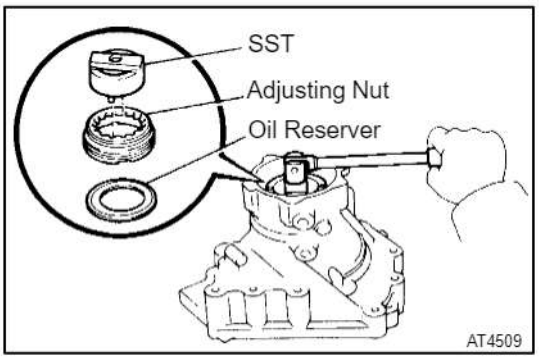
(c) Remove the O-ring from the oil pump strainer.



14. REMOVE ADJUSTING NUT LOCK PLATE

(a) Remove the bolt and nut lock plate from the right case.

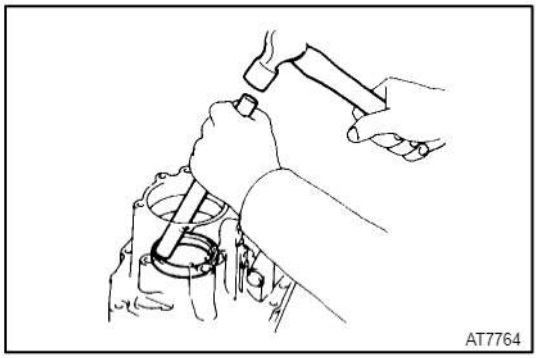
(b) Remove the O-ring from the bolt.



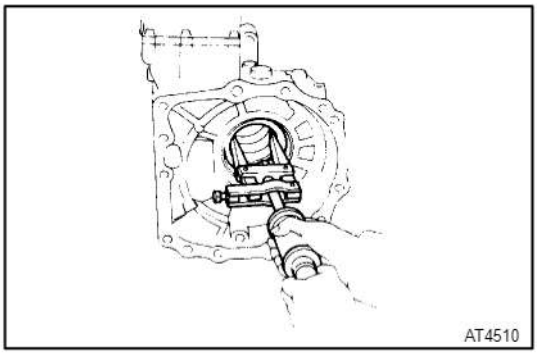
15. REMOVE DIFFERENTIAL RIGHT SIDE BEARING OUTER RACE

(a) Using SST, remove the adjusting nut and oil reserver from the right case.

SST 09318-12010



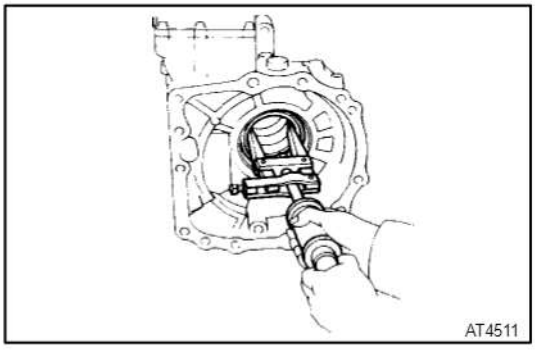
(b) Using a brass bar, remove the outer race.



16. REMOVE DIFFERENTIAL LEFT SIDE BEARING OUTER RACE

Using SST, remove the outer race and plate washer.

SST 09308-00010



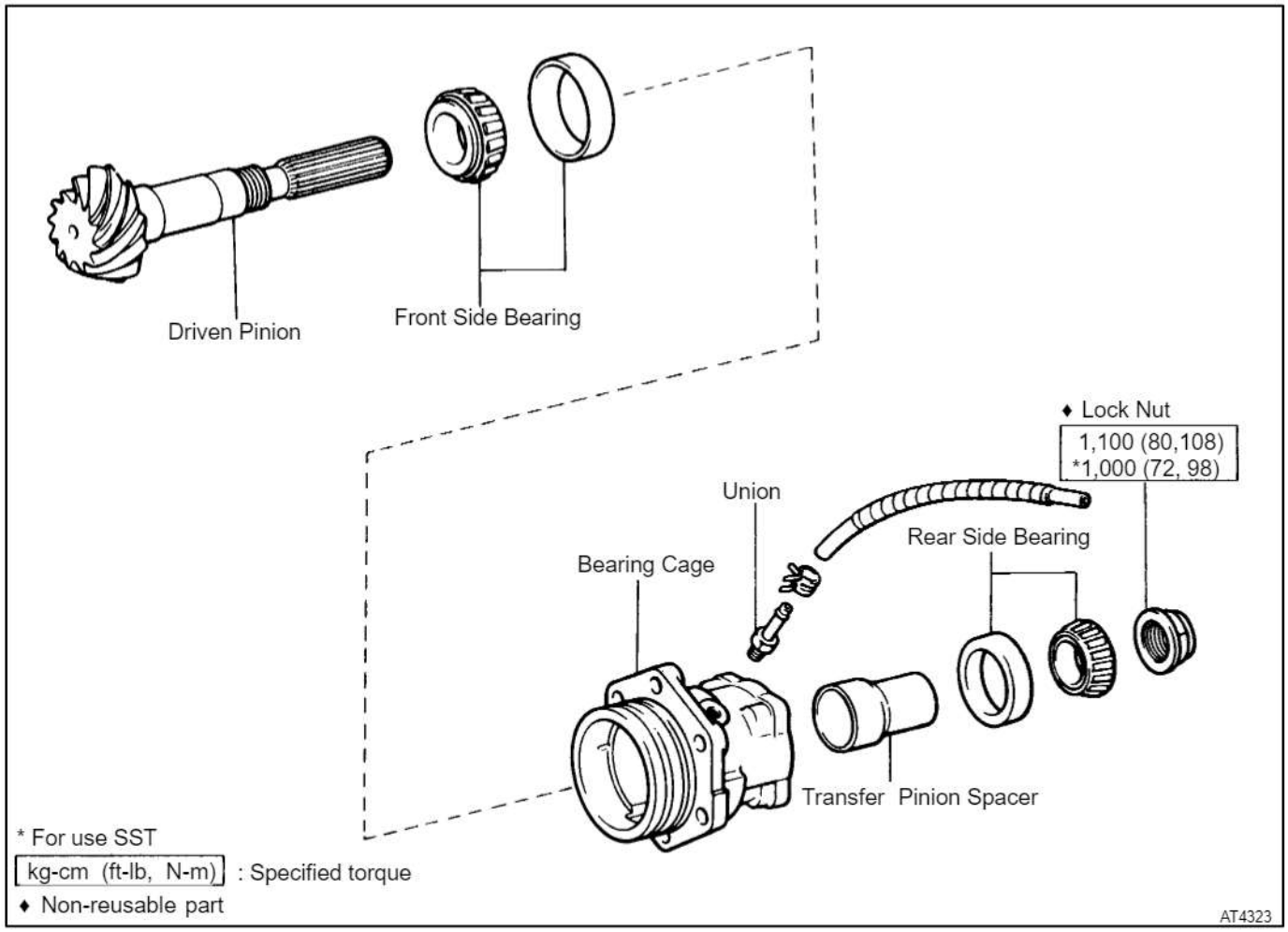
17. REMOVE LEFT CASE OIL SEAL

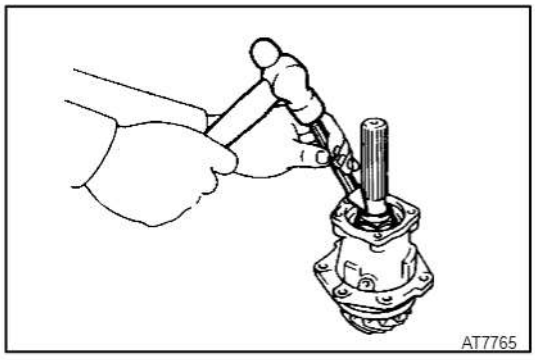
Using SST, remove the oil seal.

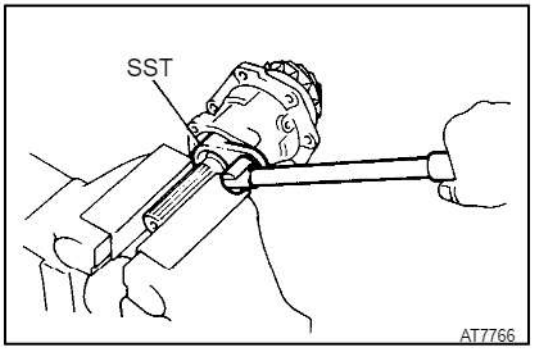
SST 09308-00010

Driven Pinion Bearing Cage

COMPONENTS







DISASSEMBLY OF DRIVEN PINION BEARING CAGE

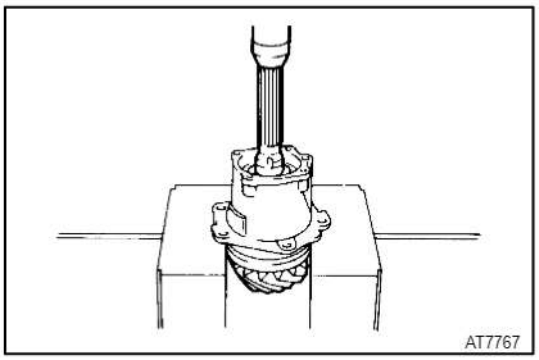
1. REMOVE LOCK NUT

(a) Using a chisel and hammer, unstake the lock nut.

(b) Using SST, remove the lock nut.

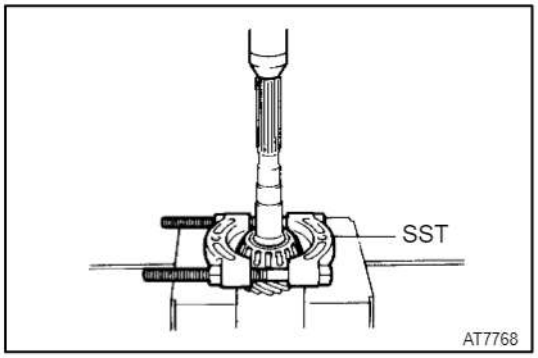
SST 09326-2001 1

NOTICE: Using soft jaws, hold the driven pinion in a vise.



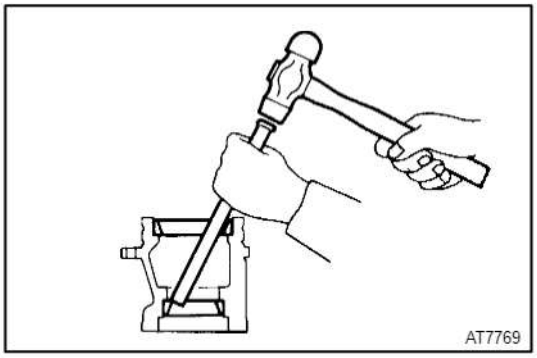
2. REMOVE DRIVEN PINION

Using a press, remove the driven pinion, rear side bearing and spacer.



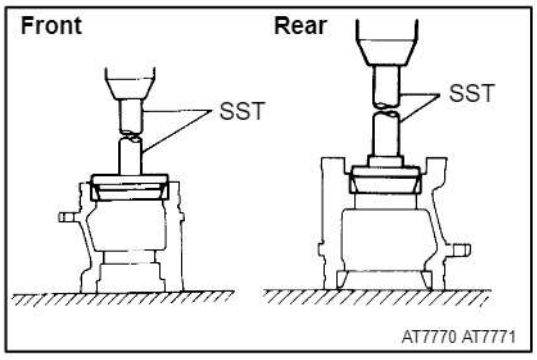
3. REMOVE FRONT SIDE BEARING

Using a press and SST, remove the front side bearing.
SST 09950-00020



4. REMOVE BEARING OUTER RACES

Using a brass bar and hammer, remove the two bearing outer races.

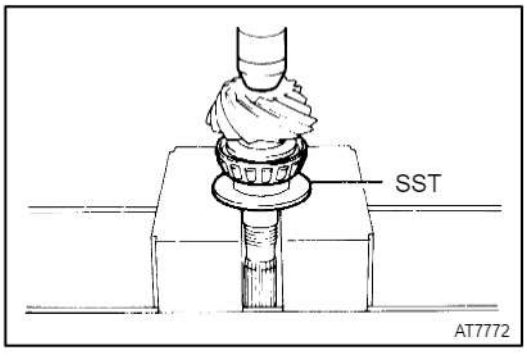


ASSEMBLY OF DRIVEN PINION BEARING CAGE

1. INSTALL BEARING OUTER RACES

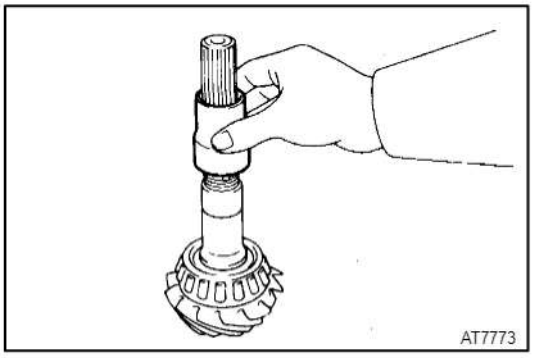
Using a press and SST, install the two bearing outer races to the bearing cage.
SST

Front side:
09608-35014 (09608-06020, 09608-06120)
Rear side:
09608-30022 (09608-05010, 09608-00050)



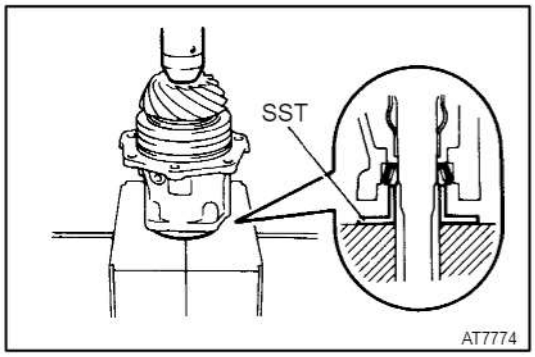
2. INSTALL DRIVEN PINION FRONT SIDE BEARING

Using a press and SST, install the front side bearing.
SST 09506-35010



3. INSTALL SPACER

Install a new spacer to the driven pinion.

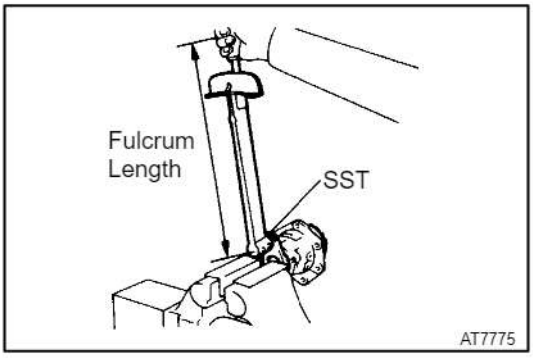


4. INSTALL DRIVEN PINION REAR SIDE BEARING

(a) Install the bearing cage to the driven pinion.

(b) Using a press and SST, install the rear side bearing to the driven pinion.

SST 09506-35010



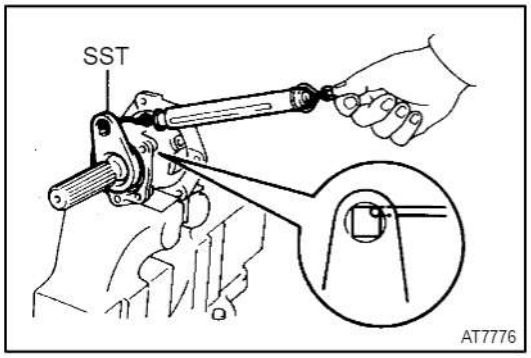
5. ADJUST DRIVEN PINION PRELOAD

(a) Using SST, torque a new nut.

SST 09326-2001 1

Torque: 1,000 kg-cm (72 ft-lb, 98 N-m)

HINT: Use a torque wrench with a fulcrum length of 42.5 cm (16.732 in.).



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

SST 09326-2001 1

HINT: Turn the driven pinion right and left two or three times to allow the bearings to settle.

Preload (at starting):

New bearing

1.8 - 2.9 kg (4.0 - 6.4 lb, 18 - 28 N)

Reused bearing

0.9 - 1.4 kg (2.0 - 3.1 lb, 9 - 14 N)

® **If preload is greater than specification, replace the bearing spacer.**

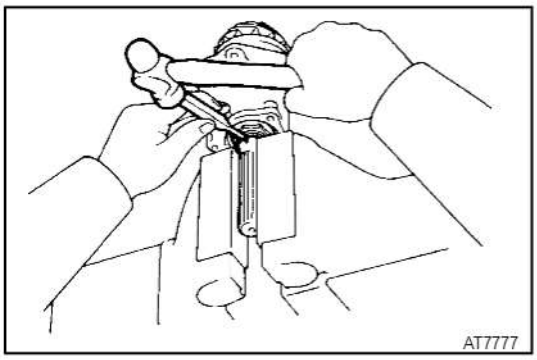
® **If preload is less than specification, retighten the nut 5° - 10°at a time until the specified preload is rechecked.**

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

Do not back off the pinion nut to reduce the preload.

Maximum torque: 2,400 kg-cm (174 ft-lb, 235 N-m)

NOTICE: Using the soft jaws, hold the bearing cage in a vise.

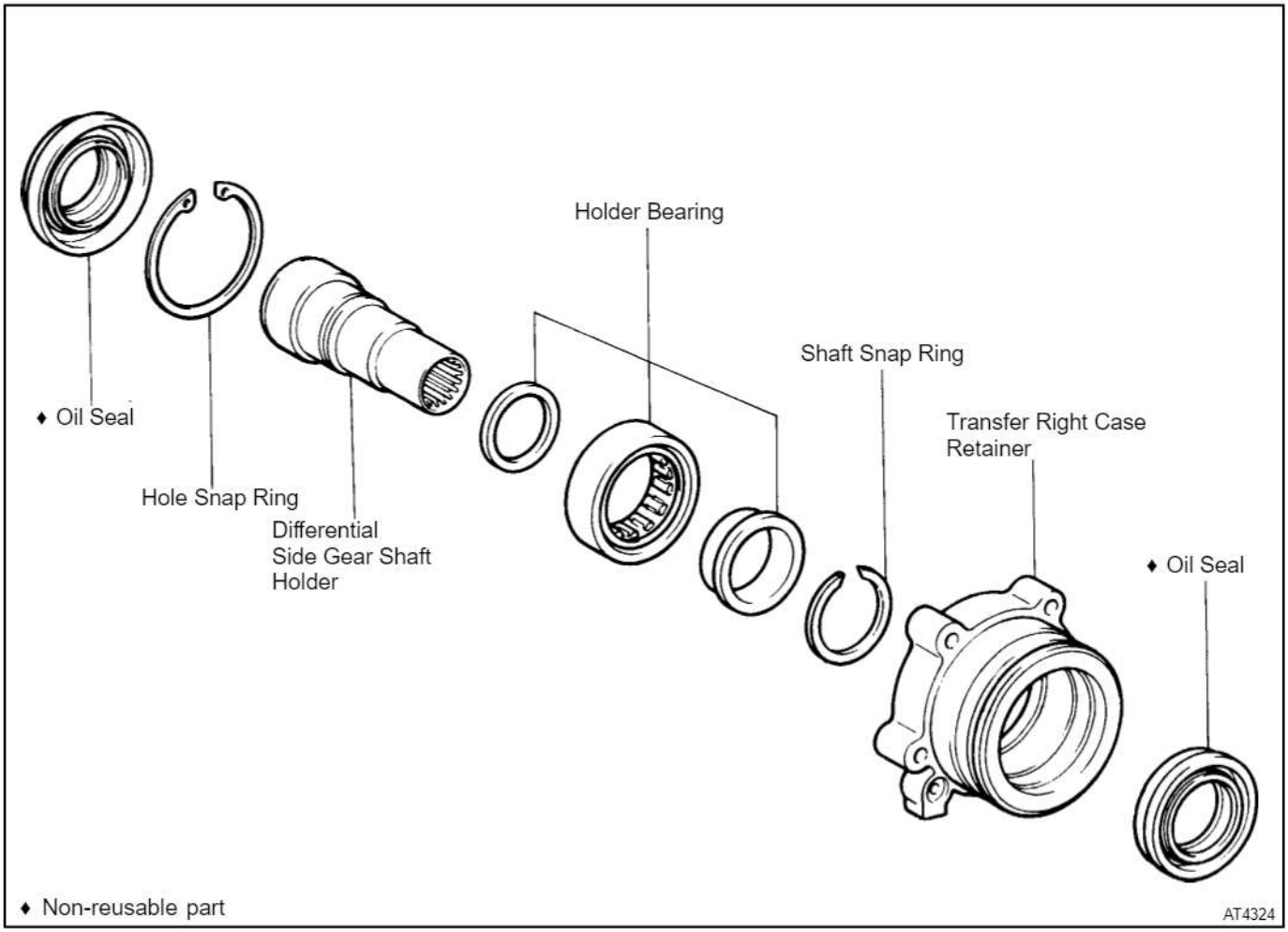


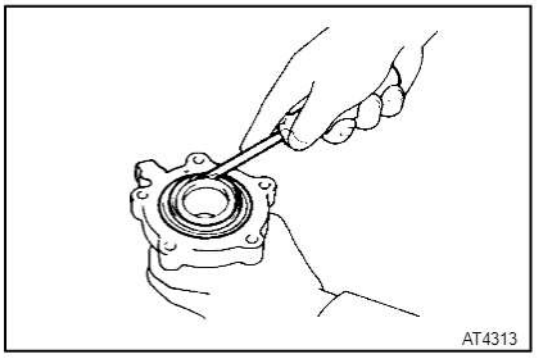
6. STAKE LOCK NUT

Using a pin punch and hammer, stake the nut.

Transfer Right Case Retainer

COMPONENTS

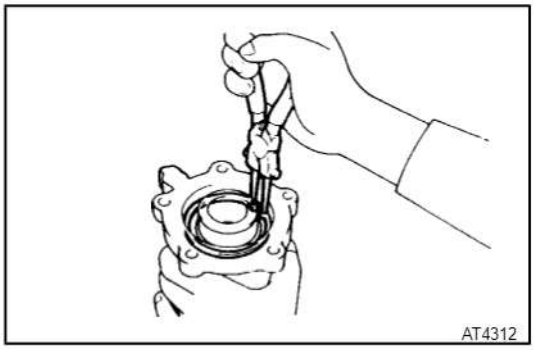




DISASSEMBLY OF TRANSFER RIGHT CASE RETAINER

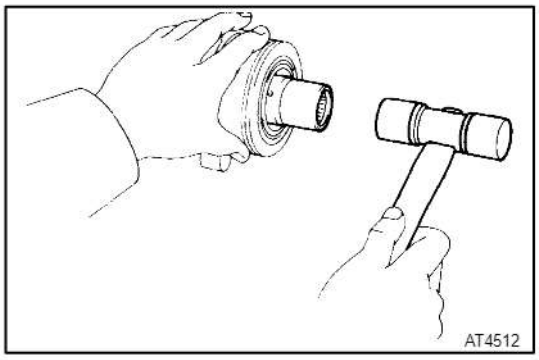
1. REMOVE OIL SEAL

Using a screwdriver, remove the oil seal.

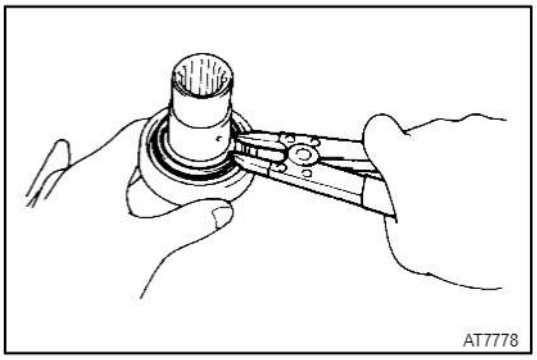


2. REMOVE SIDE GEAR SHAFT HOLDER

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

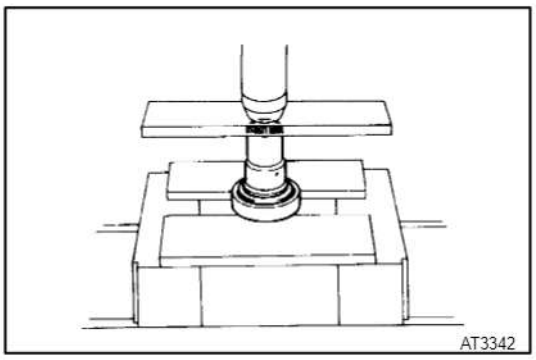


(b) Using a plastic hammer, remove the side gear shaft holder.

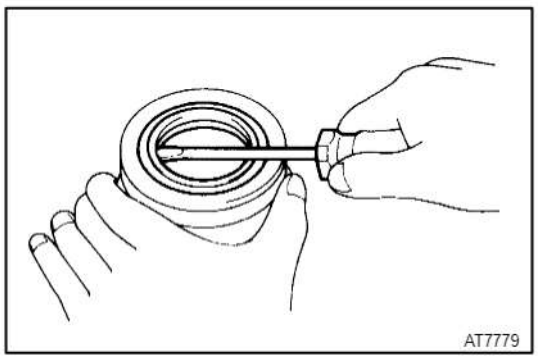


3. REMOVE HOLDER BEARING

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



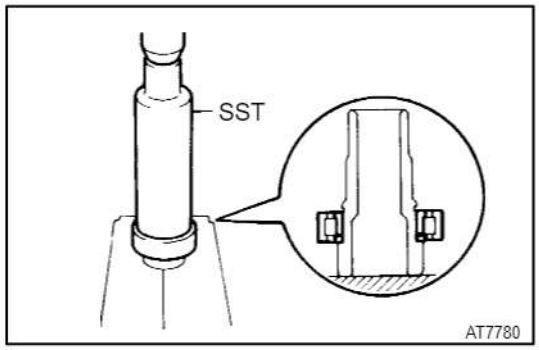
(b) Using a press, press out the bearing.



4. REMOVE OIL SEAL

Using a screwdriver, remove the oil seal.

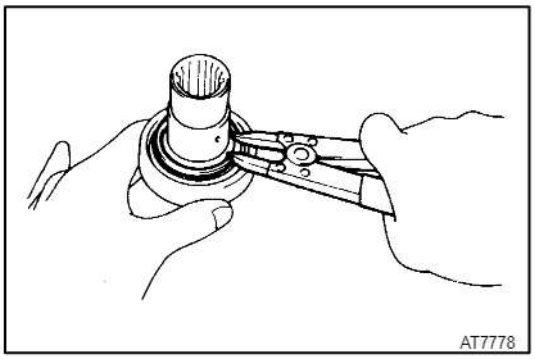
ASSEMBLY OF TRANSFER RIGHT CASE RETAINER



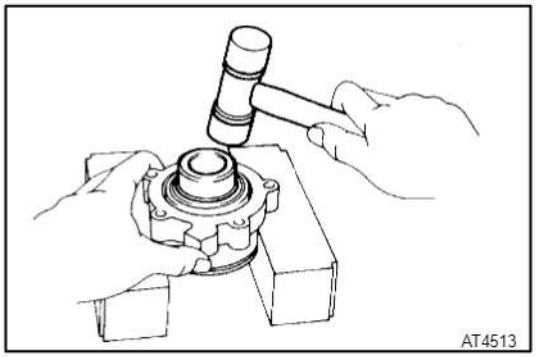
1. INSTALL HOLDER BEARING

(a) Using SST and a press, press in the holder bearing.

SST 09226-10010

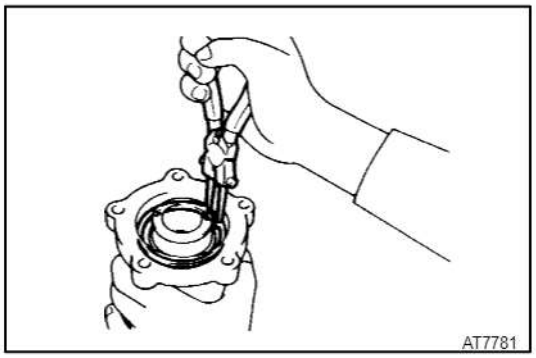


(b) Using snap ring pliers, install the snap ring.

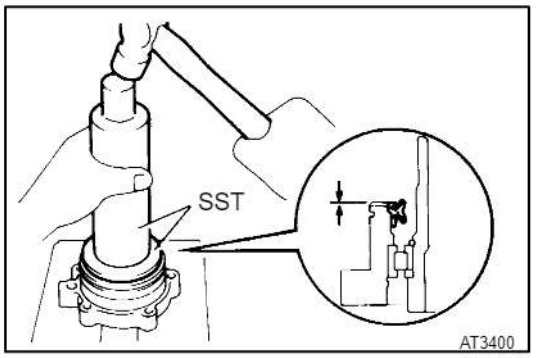


2. INSTALL SIDE GEAR SHAFT HOLDER

(a) Install the side gear shaft holder.



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



3. INSTALL OIL SEAL

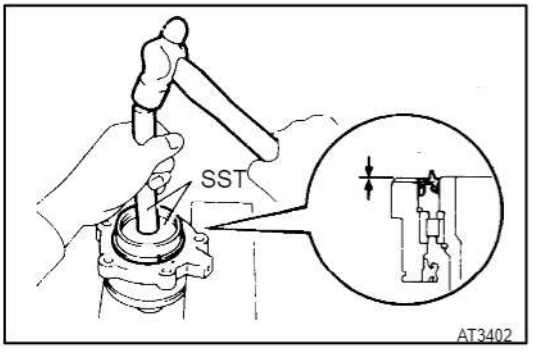
(Left side oil seal)

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

(b) Using a hammer and SST, drive in the oil seal.

SST 09316-60010 (09316-00010, 09316-00040)

Oil seal depth: 0 mm (0 in.)



(Right side oil seal)

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

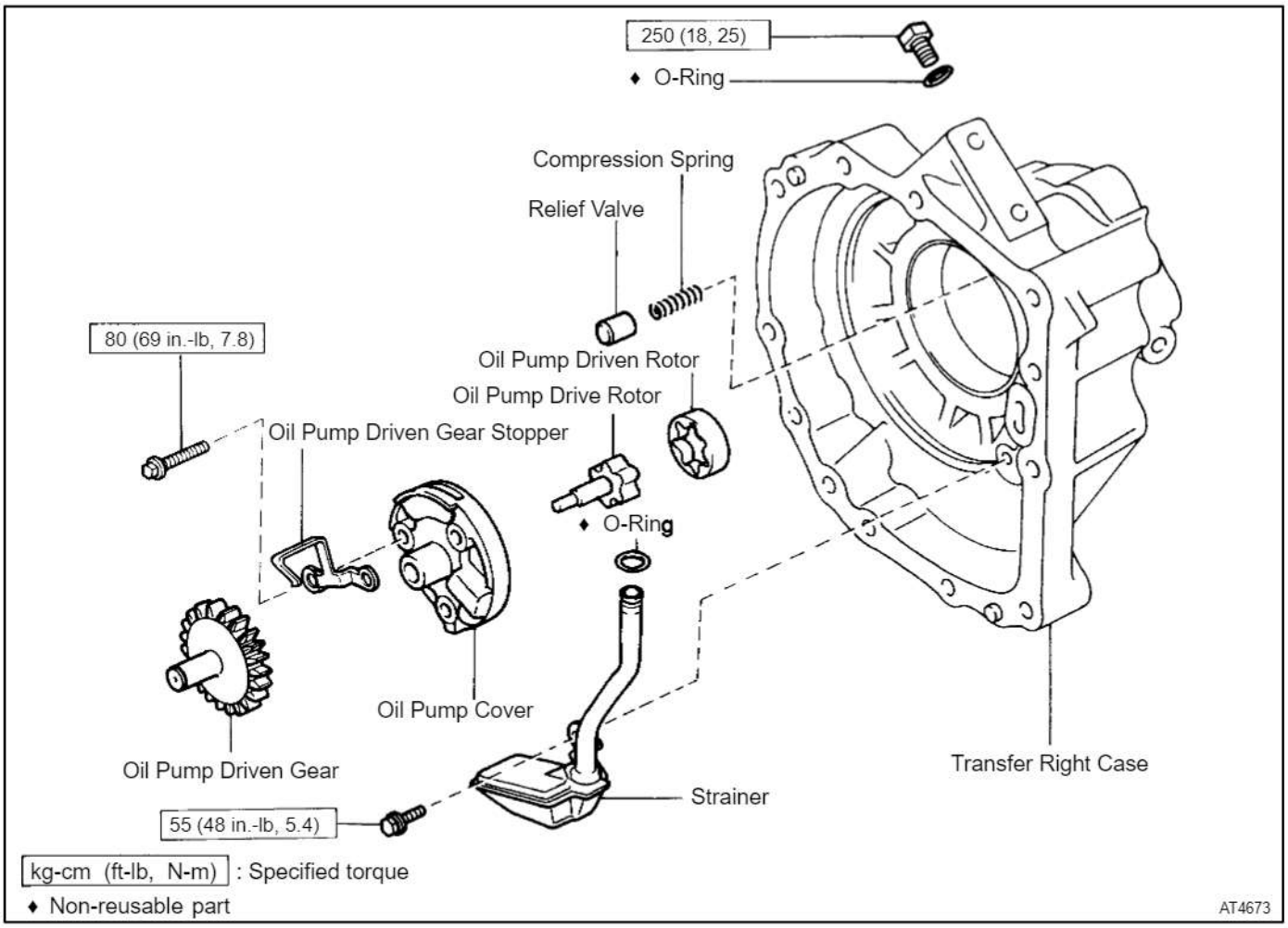
(b) Using a hammer and SST, drive in the oil seal.

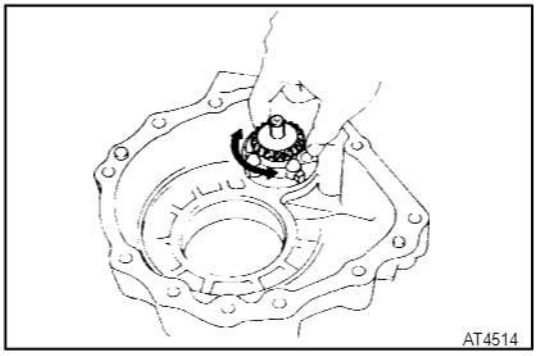
SST 09608-32010, 09608-35014 (09608-06020)

Oil seal depth: 0 mm (0 in.)

Transfer Right Case

COMPONENTS

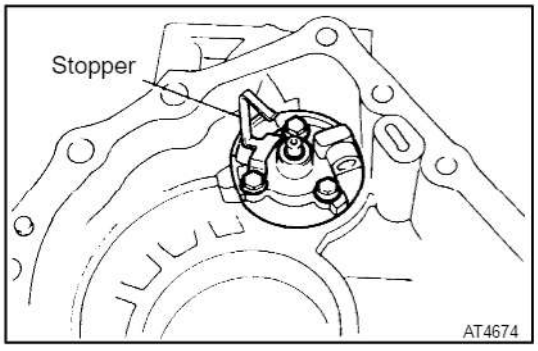




DISASSEMBLY OF TRANSFER RIGHT CASE

1. INSPECT OIL PUMP OPERATION

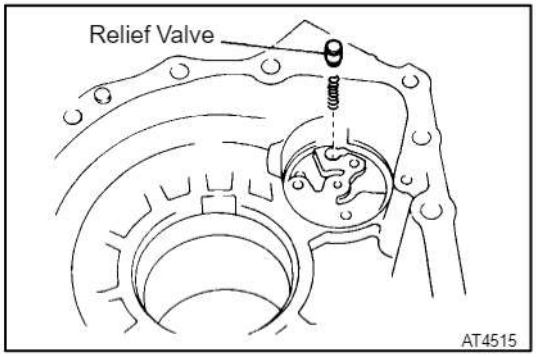
Check that the oil pump turns smoothly with oil pump driven gear.



2. REMOVE OIL PUMP DRIVEN GEAR STOPPER, OIL PUMP COVER, DRIVE ROTOR AND DRIVEN ROTOR

(a) Remove the three bolts and oil pump driven gear stopper.

(b) Pull out the oil pump cover, drive rotor and driven rotor.



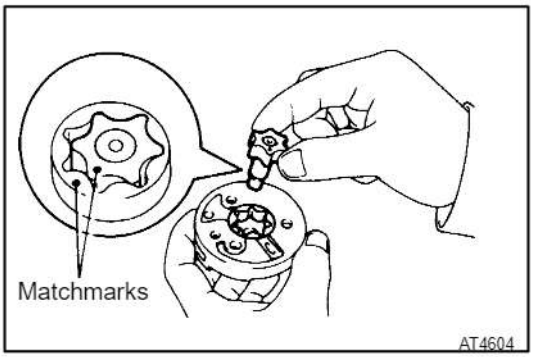
3. REMOVE RELIEF VALVE

Remove the relief valve and spring.

ASSEMBLY OF TRANSFER RIGHT CASE

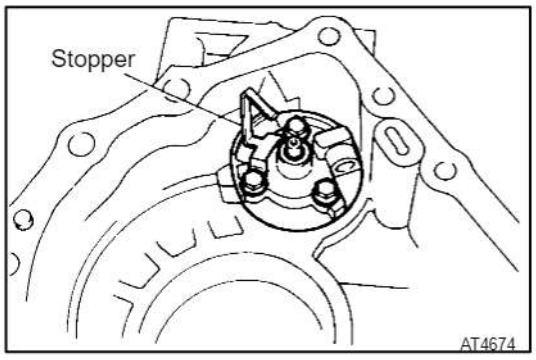
1. INSTALL RELIEF VALVE

Install the relief valve and spring.



2. INSTALL OIL PUMP DRIVE ROTOR AND DRIVEN ROTOR

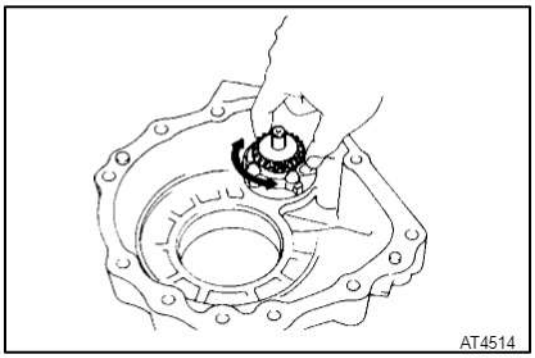
Align the matchmarks on the drive rotor and the driven rotor.



3. INSTALL OIL PUMP COVER AND DRIVEN GEAR STOPPER

Torque the three bolts evenly.

Torque: 80 kg-cm (69 in.-lb, 7.8 N-m)

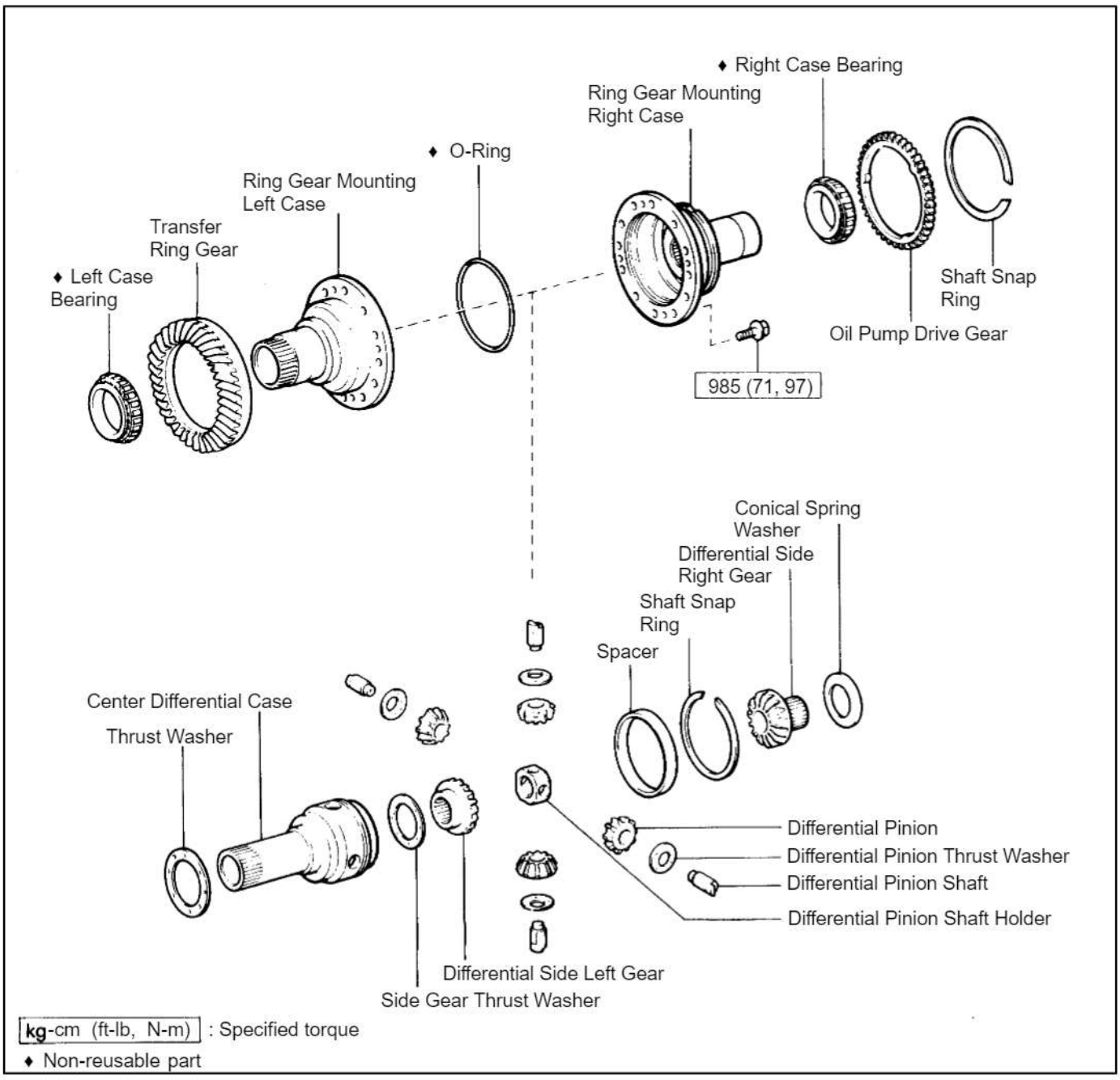


4. CHECK OPERATION OF OIL PUMP

Insert the oil pump driven gear to the drive rotor, check that the drive rotor turns smoothly.

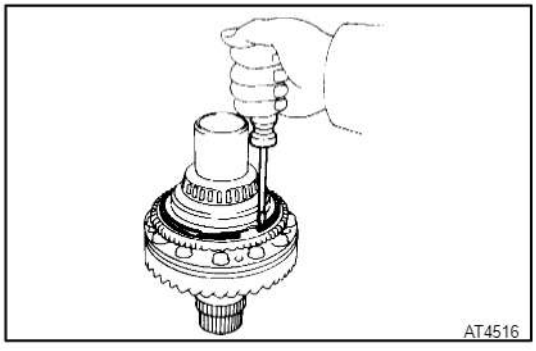
Ring Gear Mounting Case and Center Differential Case

COMPONENTS



kg-cm (ft-lb, N-m) : Specified torque

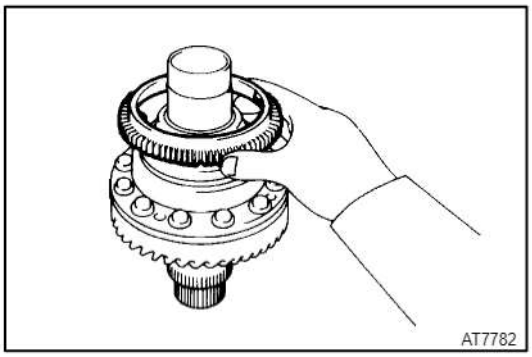
♦ Non-reusable part



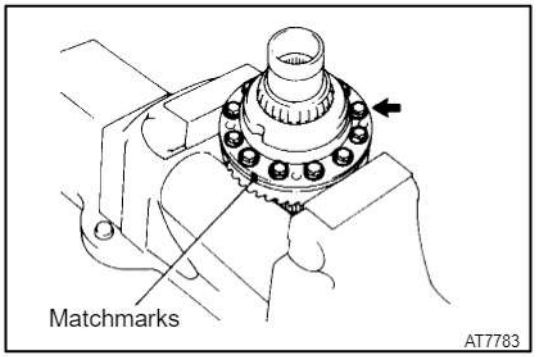
DISASSEMBLY OF RING GEAR MOUNTING CASE AND CENTER DIFFERENTIAL CASE

1. REMOVE OIL PUMP DRIVE GEAR

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



(b) Remove oil pump drive gear.

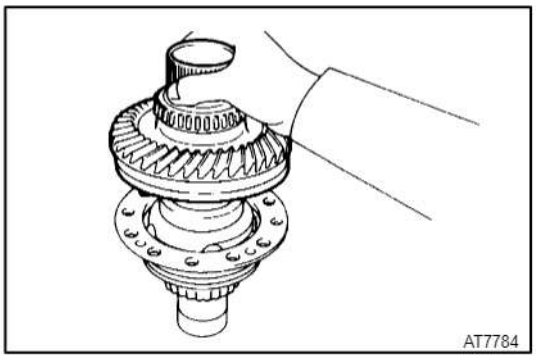


2. REMOVE RING GEAR MOUNTING LEFT CASE

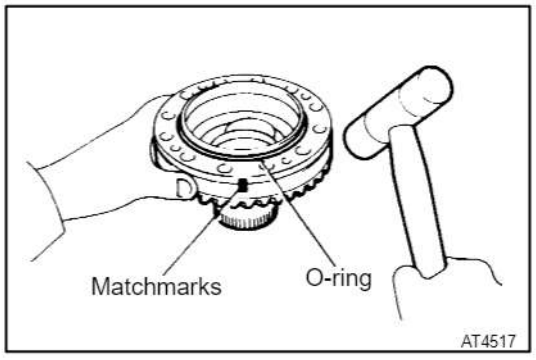
(a) Place matchmarks on the differential left case and the differential right case.

(b) Remove the twelve bolts.

NOTICE: Using the soft jaws, hold the left case in a vise.



(c) Remove the differential left case upward.

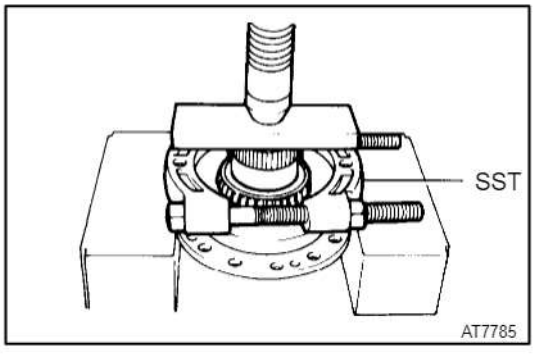


3. REMOVE RING GEAR

(a) Place matchmarks on the differential left case and ring gear.

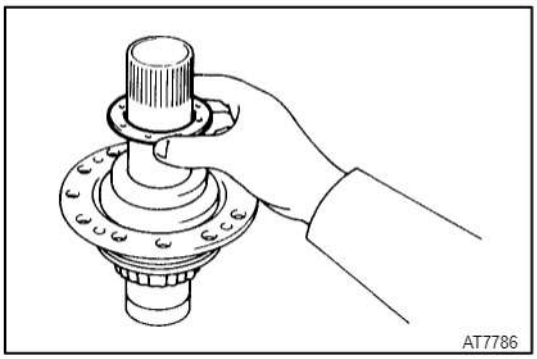
(b) Using a plastic hammer, tap out the ring gear.

(c) Remove the O-ring from the left case.

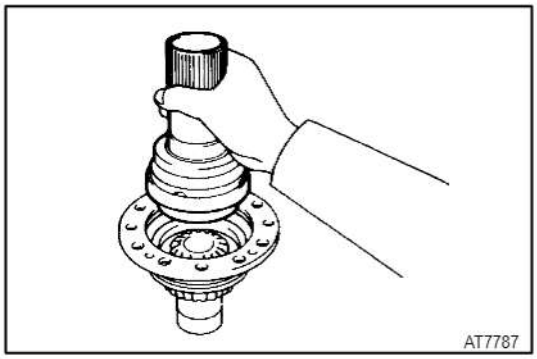


4. REMOVE LEFT CASE BEARING

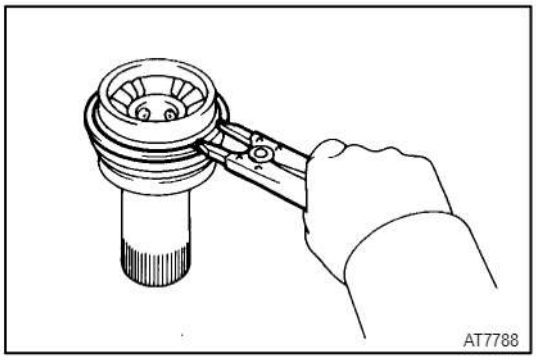
Using SST and a press, press out the bearing.
SST 09950-00020



5. REMOVE THRUST WASHER

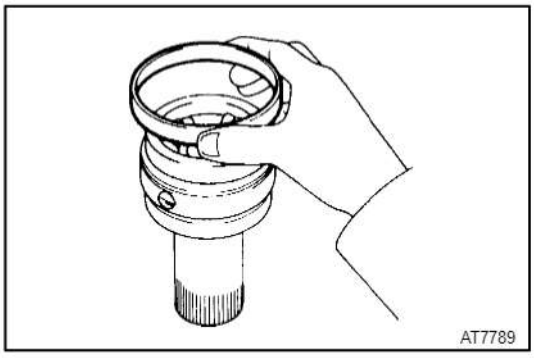


6. REMOVE CENTER DIFFERENTIAL CASE ASSEMBLY

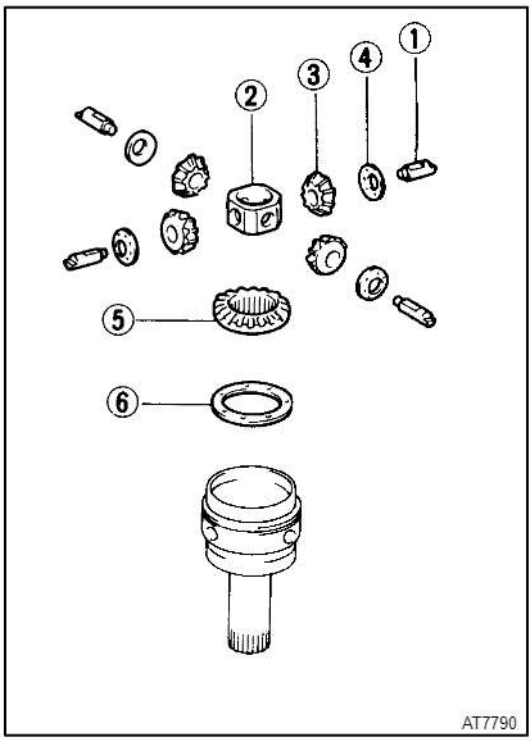


7. DISASSEMBLE CENTER DIFFERENTIAL CASE

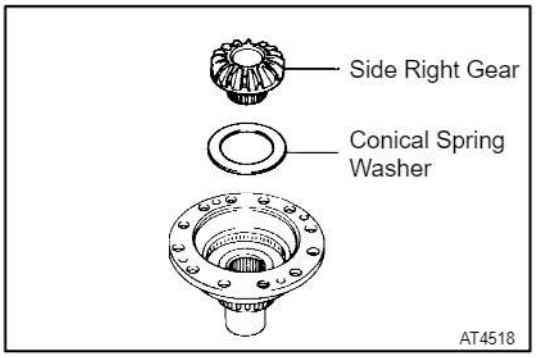
(a) Using snap ring pliers, remove the shaft snap ring.



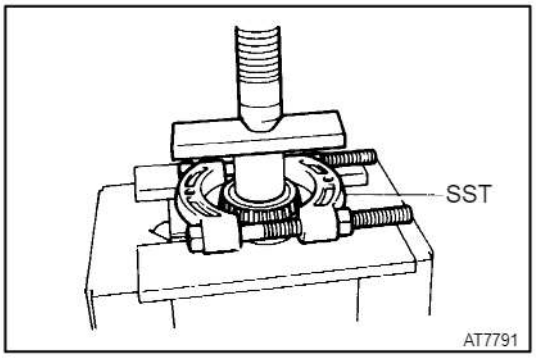
(b) Remove the spacer.



(c) Remove the following parts from the center differential case:
① Four pinion shafts
② Pinion shaft holder
③ Four differential pinions
④ Four pinion thrust washers
⑤ Differential side left gear
⑥ Side gear thrust washer

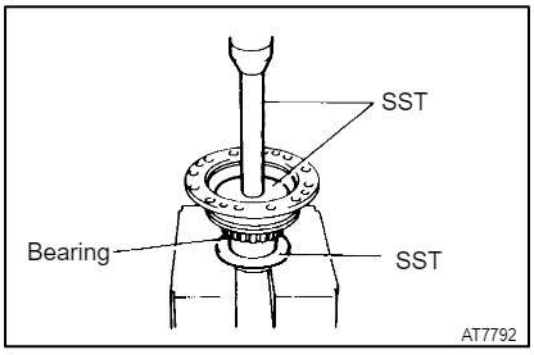


8. REMOVE DIFFERENTIAL SIDE RIGHT GEAR AND CONICAL SPRING WASHER



9. REMOVE RIGHT CASE BEARING

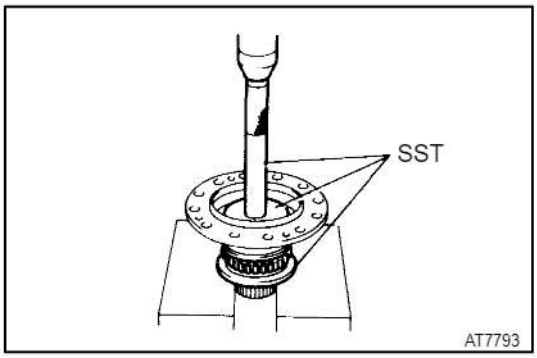
Using SST and a press, press out the bearing.
SST 09950-00020



ASSEMBLY OF RING GEAR MOUNTING CASE AND CENTER DIFFERENTIAL CASE

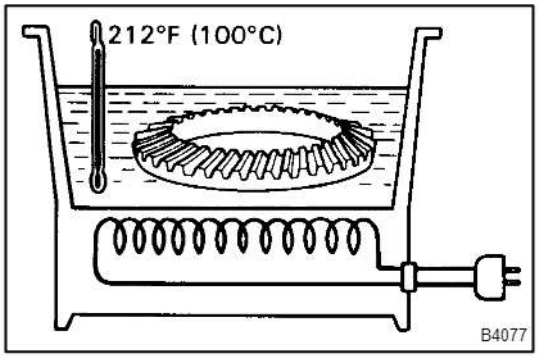
1. INSTALL RIGHT CASE BEARING

Using SST and a press, press in the bearing.
SST 09316-2001 1, 09608-35014
(09608-06020, 09608-06120)



2. INSTALL LEFT CASE BEARING

Using SST and a press, press in the left case.
SST 09316-12010, 09608-35014
(09608-06020, 09608-06120)



3. INSTALL RING GEAR

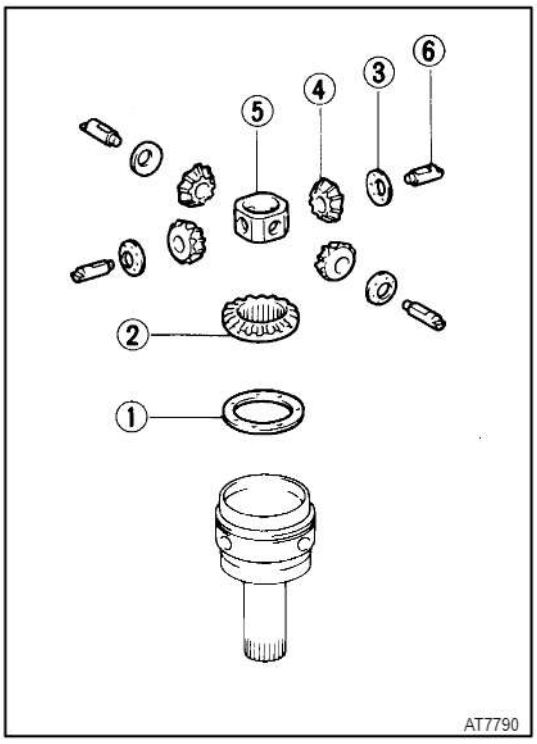
(a) Clean the contact surface of the ring gear mounting left case.

(b) Heat the ring gear to about 212°F (100°C) in an oil bath.

NOTICE: Do not heat the ring gear above 230°F (110°C).

(c) Clean the contact surface of the ring gear with cleaning solvent.

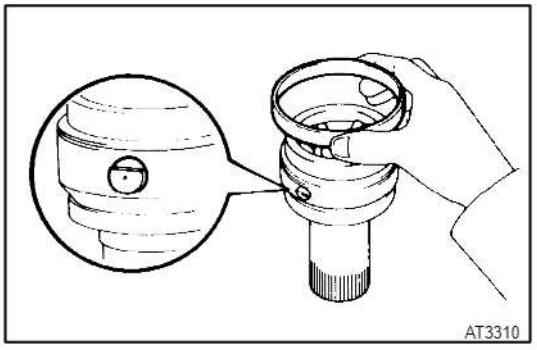
(d) Align the matchmarks and quickly install the ring gear on the ring gear mounting left case.



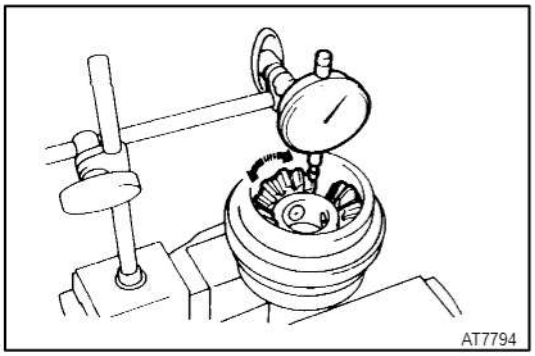
4. CHECK AND ADJUST CENTER DIFFERENTIAL SIDE GEAR BACKLASH

(a) Install the following parts to the center differential case:

① Side gear thrust washer
② Differential side left gear
③ Four pinion thrust washers
④ Four differential pinions
⑤ Pinion shaft holder
⑥ Four pinion shafts



(b) Install the spacer to the case as shown.

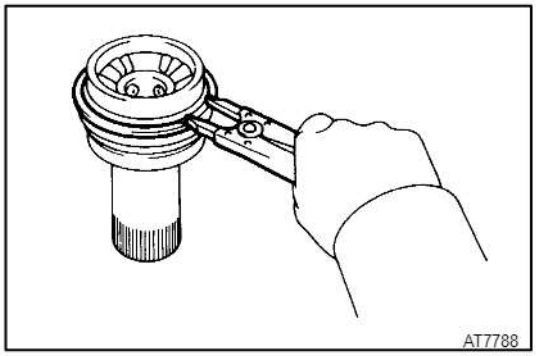


(c) Using a dial indicator, measure the backlash of one pinion gear while holding the side gear toward the case.

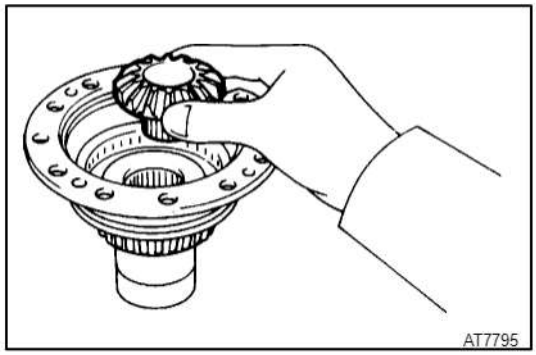
Standard backlash: 0.05 - 0.20 mm (0.002 - 0.0079 in.)

HINT: Do not place in a vise the surface of the center differential case which comes in contact with the bushing. Referring to the table below, select the thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	1.00 (0.0394)	F	1.25 (0.0492)
B	1.05 (0.0413)	G	1.30 (0.0512)
C	1.10 (0.0433)	H	1.35 (0.0531)
D	1.15 (0.0453)	J	1.40 (0.0551)
E	1.20 (0.0472)		



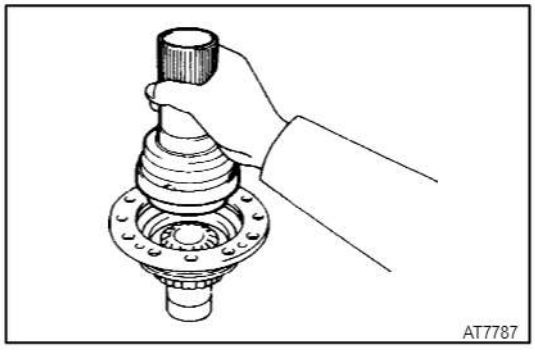
(d) Using snap ring pliers, install the shaft snap ring.



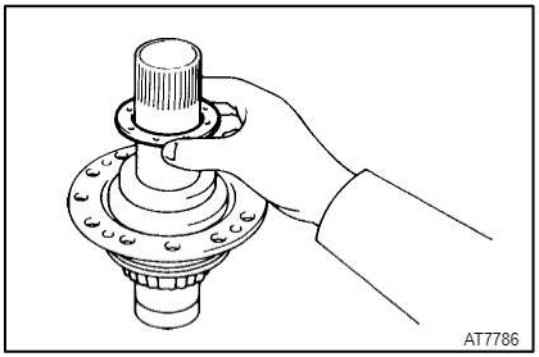
5. CHECK AND ADJUST CENTER DIFFERENTIAL SIDE GEAR THRUST CLEARANCE

(a) Install the differential side right gear.

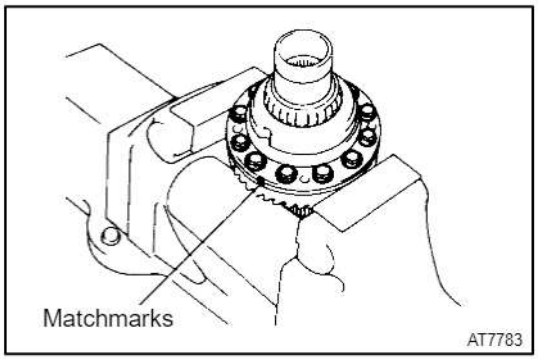
HINT: Do not install the conical spring washer.



(b) Install the center differential case.



(c) Install the thrust washer.



(d) Align the matchmarks on the ring gear mounting left and right case.

(e) Install and torque the twelve bolts.

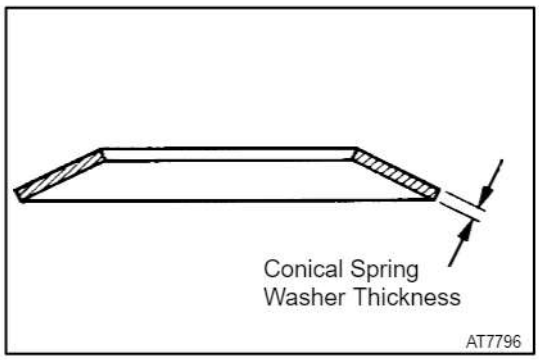
Torque: 985 kg-cm (71 ft-lb, 97 N-m)

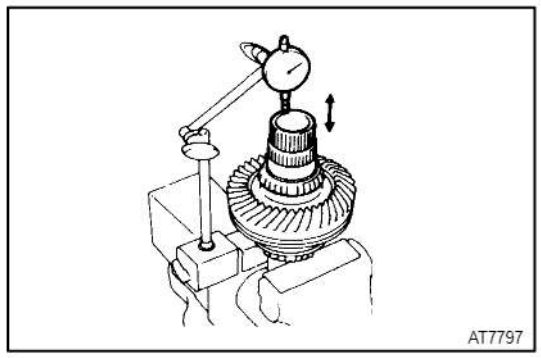
HINT: Do not install the O-ring.

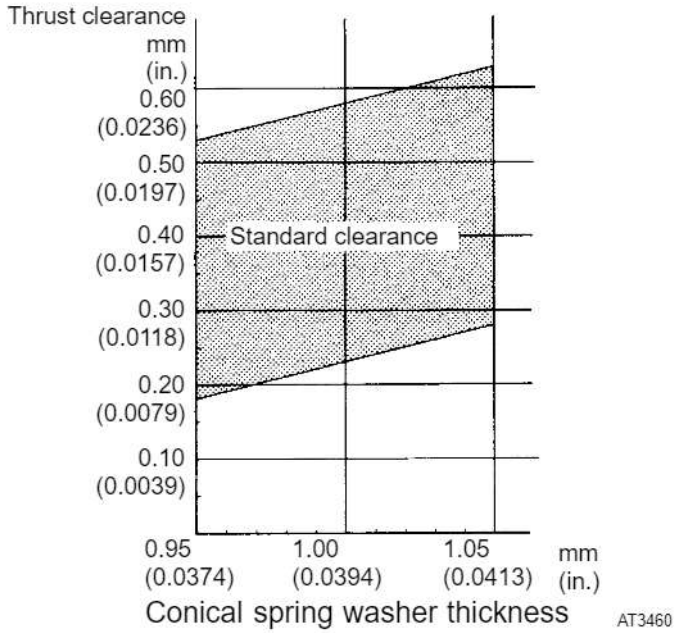
(f) Using a caliper, measure the conical spring washer thickness.

(g) Using a dial indicator, measure the thrust clearance of center differential case while holding the ring gear mounting case.

Standard clearance:



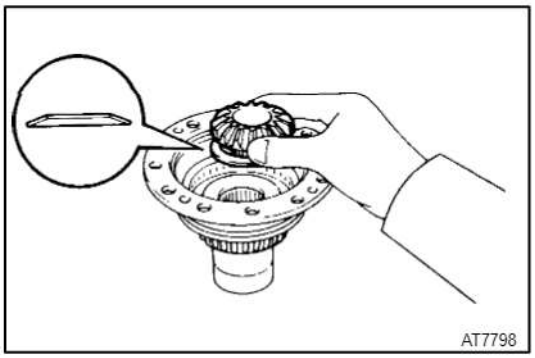




(h) Referring to the table below, select the thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

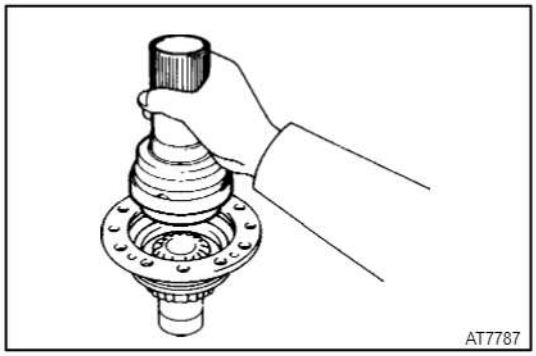
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	1.00 (0.0394)	G	1.30 (0.0512)
B	1.05 (0.0413)	H	1.35 (0.0531)
C	1.10 (0.0433)	J	1.40 (0.0551)
D	1.15 (0.0453)	K	1.45 (0.0571)
E	1.20 (0.0472)	L	1.50 (0.0591)
F	1.25 (0.0492)		

(i) Remove ring gear mounting right case.

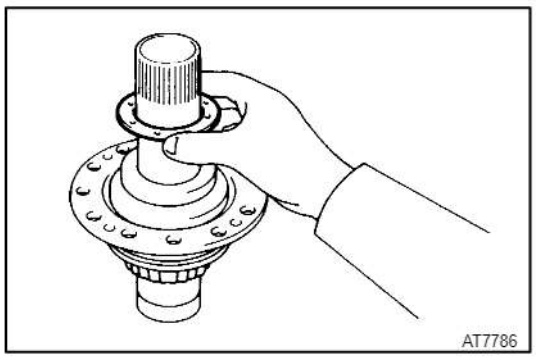


6. INSTALL DIFFERENTIAL SIDE GEAR AND CONICAL SPRING WASHER

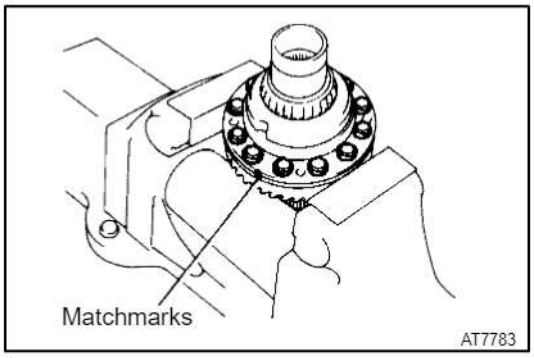
HINT: Be careful not to make a mistake in the direction of the conical spring washer.



7. INSTALL CENTER DIFFERENTIAL CASE



8. INSTALL THRUST WASHER (Previously selected)



9. INSTALL RING GEAR MOUNTING LEFT CASE

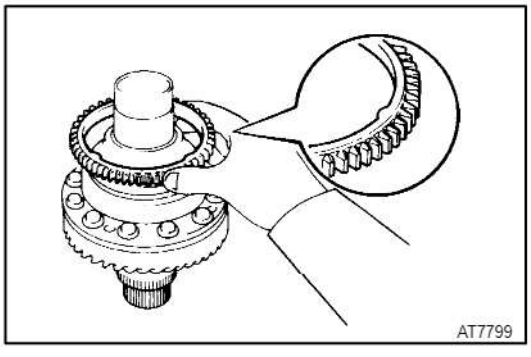
(a) Coat the new O-ring with ATF, and install it onto the left case.

(b) Align the matchmarks on the right and left case.

(c) Install and torque the twelve bolts.

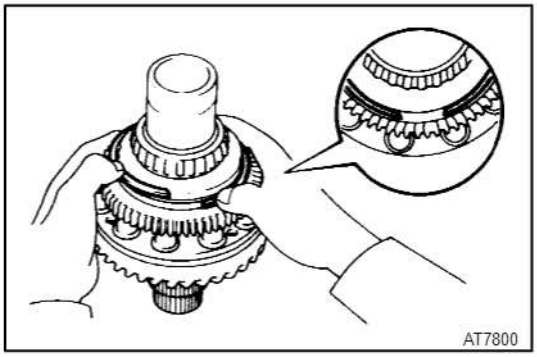
Torque: 985 kg-cm (71 ft-lb, 97 N-m)

NOTICE: Using the soft jaws, hold the left case in a vise.



10. INSTALL OIL PUMP DRIVE GEAR

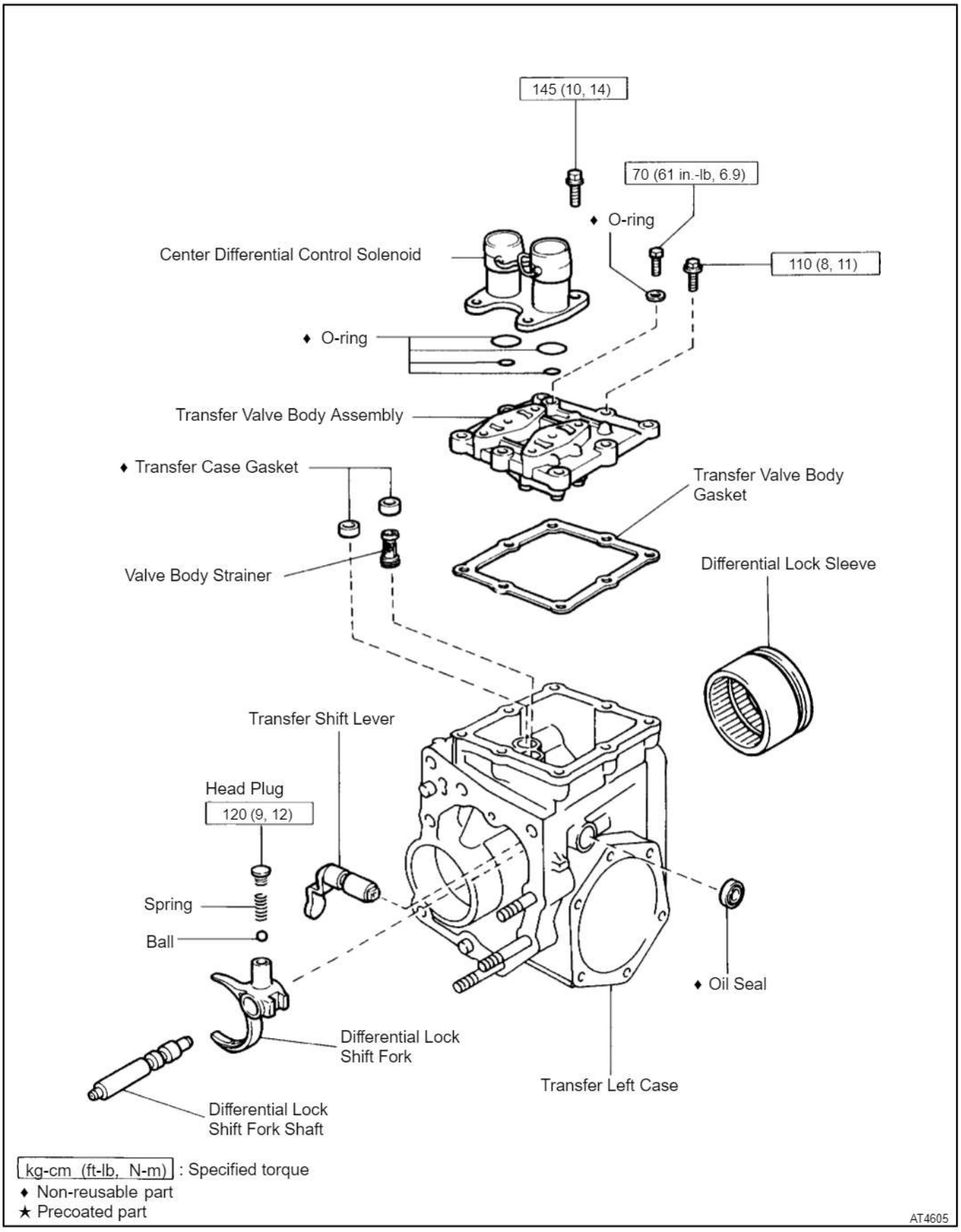
(a) Install the oil pump drive gear.



(b) Install the shaft snap ring.

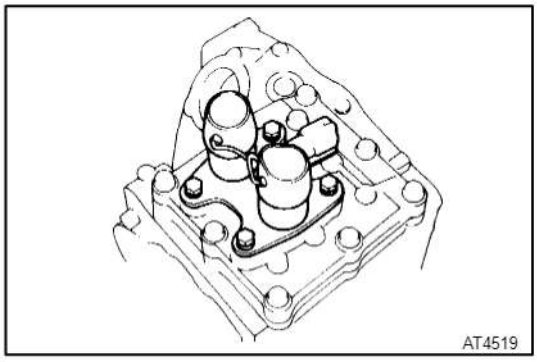
Transfer Left Case

COMPONENTS



kg-cm (ft-lb, N-m) : Specified torque
♦ Non-reusable part
★ Precoated part

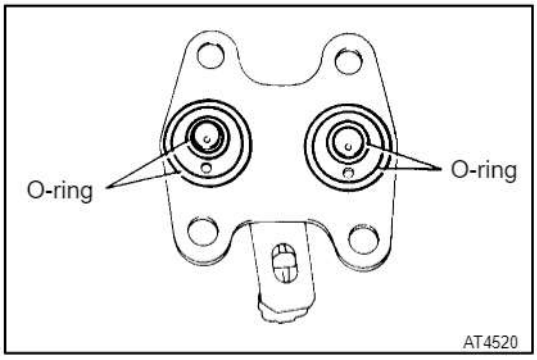
AT4605



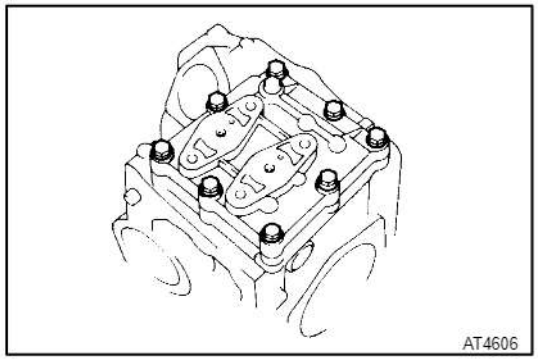
DISASSEMBLY OF TRANSFER LEFT CASE

1. REMOVE CENTER DIFFERENTIAL CONTROL SOLENOIDS

(a) Remove the four bolts and solenoid.



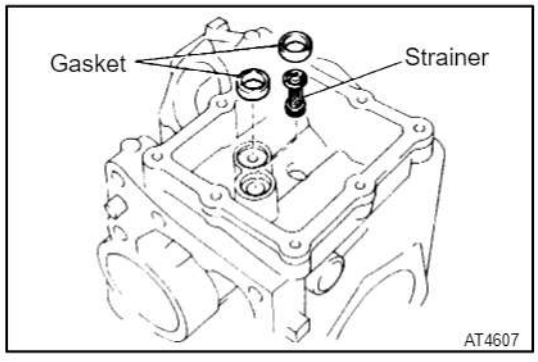
(b) Remove the four O-rings from the solenoids.



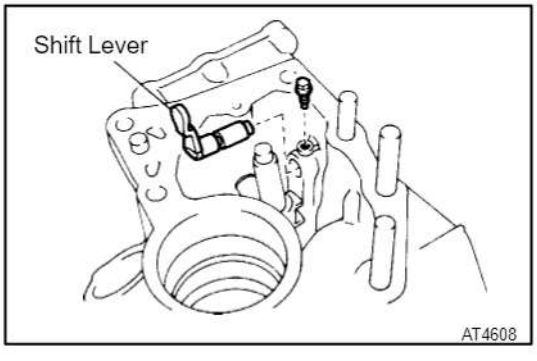
2. REMOVE TRANSFER VALVE BODY ASSEMBLY

(a) Remove the eight bolts and transfer valve body assembly.

(b) Remove the transfer valve body gasket.

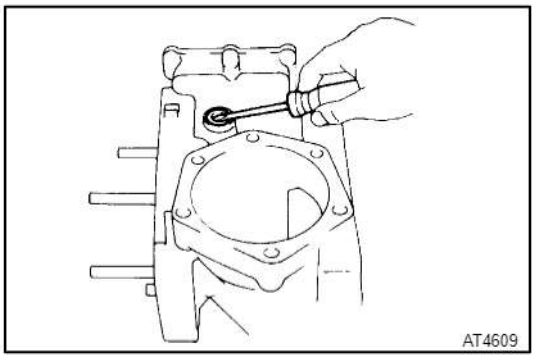


(c) Remove transfer case gaskets and valve body strainer.

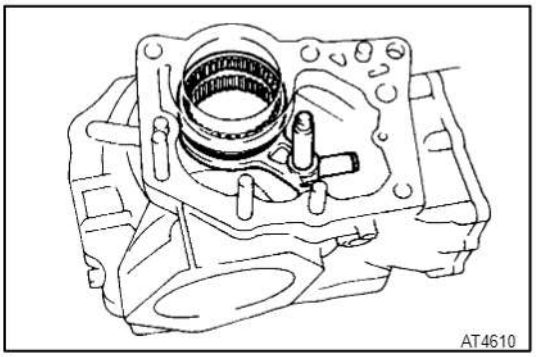


3. REMOVE TRANSFER SHIFT LEVER

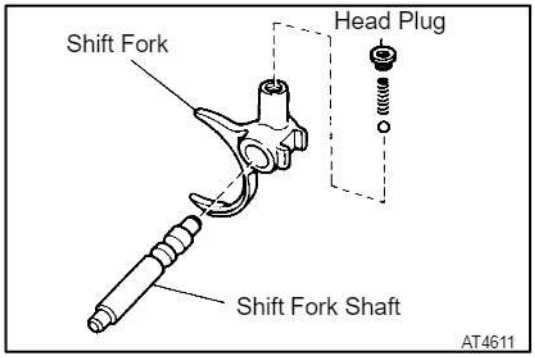
(a) Remove the lock bolt and transfer shift lever.



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



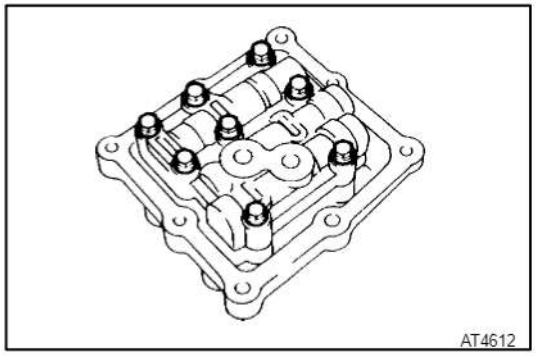
4. REMOVE SHIFT FORK SHAFT, SHIFT FORK AND SLEEVE



5. REMOVE SHIFT FORK SHAFT FROM SHIFT FORK

(a) Remove the head plug, spring and ball.

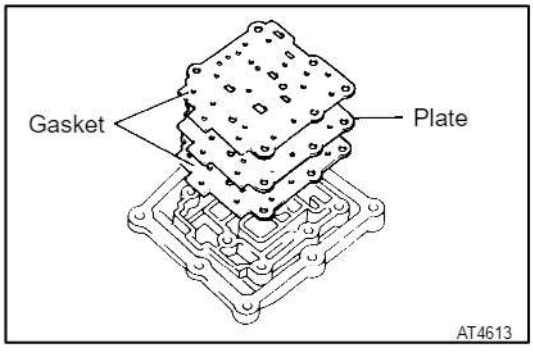
(b) Pull out the shift fork shaft from shift fork.



DISASSEMBLY OF TRANSFER VALVE BODY

REMOVE TRANSFER LOWER VALVE BODY

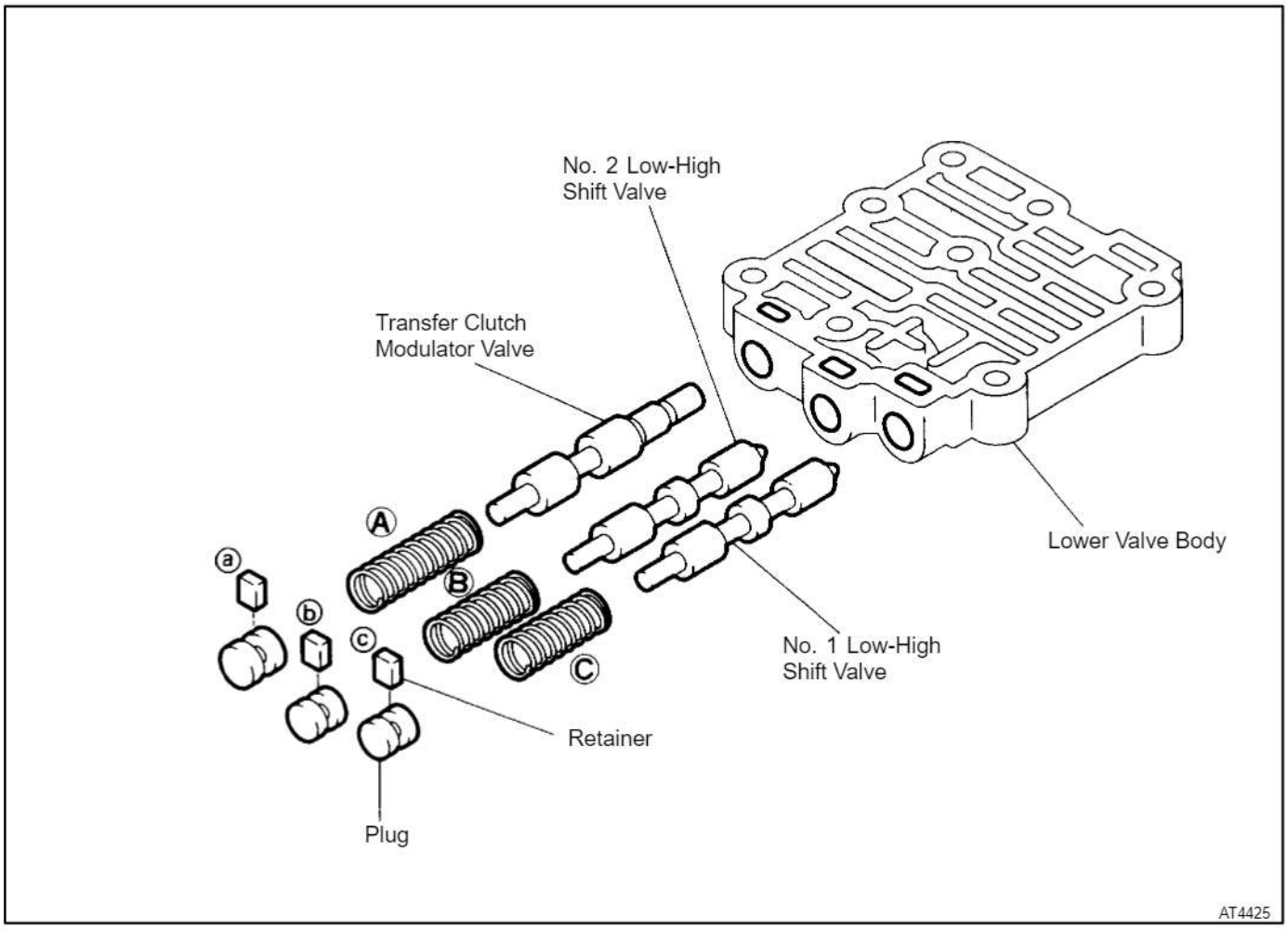
(a) Remove the eight bolts and transfer lower valve body.



(b) Remove the two gaskets and plate from the transfer upper valve body.

Transfer Lower Valve Body

COMPONENTS

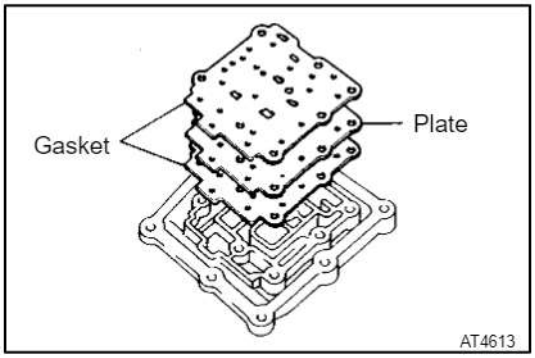


SPECIFICATIONS OF TRANSFER LOWER VALVE BODY SPRINGS AND RETAINERS

Spring		Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of Coils	Color
Ⓐ	Transfer clutch modulator valve	32.3 (1.272)	7.6 (0.299)	16	None
Ⓑ	No. 2 Low-high shift valve	28.9 (1.138)	7.0 (0.276)	14	None
Ⓒ	No. 1 Low-high shift valve				

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.

Retainer		Height mm (in.)	Width mm (in.)	Thickness mm (in.)
ⓐ	Transfer clutch modulator valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
ⓑ	No. 2 Low-high shift valve			
ⓒ	No. 1 Low-high shift valve			

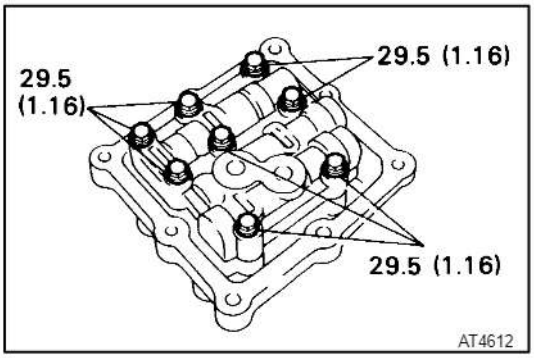


ASSEMBLY OF TRANSFER VALVE BODY

1. INSTALL PLATE AND NEW GASKETS ON TRANSFER LOWER VALVE BODY

Install a new gasket and plate and then the other new gasket.

HINT: Both gaskets are the same.



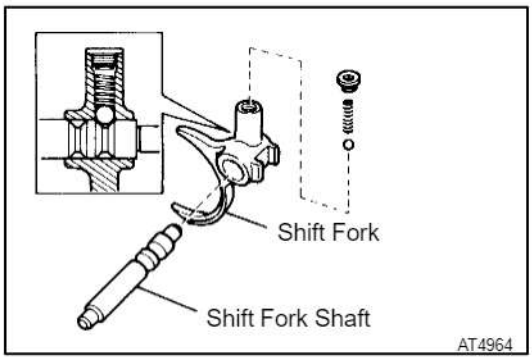
2. INSTALL TRANSFER LOWER VALVE BODY

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

(a) Lower the transfer lower valve body into place.

(b) Hand tighten the eight bolts first. Then, tighten them with a torque wrench.

Torque: 67 kg-cm (58 in.-lb, 6.6 N-m)



ASSEMBLY OF TRANSFER LEFT CASE

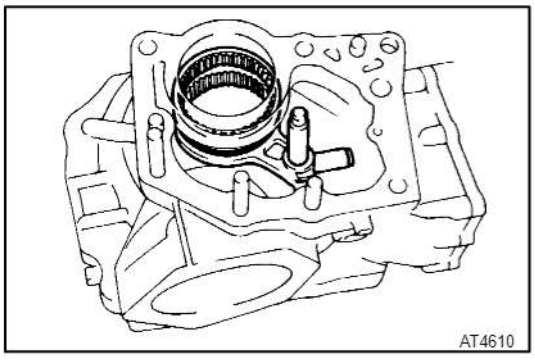
1. INSTALL SHIFT FORK SHAFT TO SHIFT FORK

(a) Insert the shift fork shaft into the shift fork.

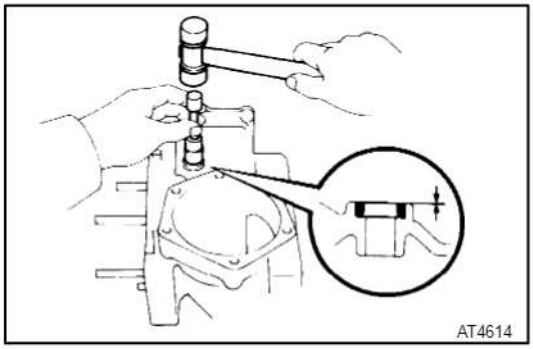
(b) Install the ball, spring and head plug.

(c) Tighten the plug.

Torque: 250 kg-cm (18 ft-lb, 25 N-m)



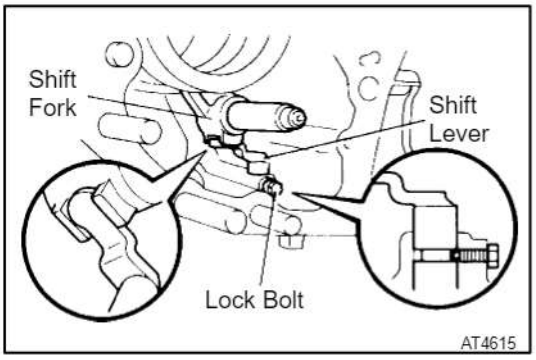
2. INSTALL SHIFT FORK SHAFT, SHIFT FORK AND SLEEVE



3. INSTALL TRANSFER SHIFT LEVER

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

(b) Using a 17 mm (0.67 in.) socket wrench and hammer, drive in the oil seal as shown.

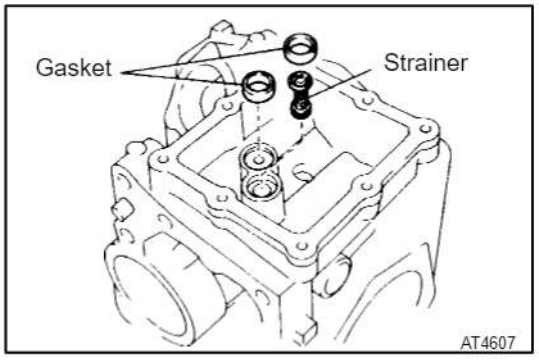


(c) Install transfer shift lever.

HINT: Engage shift fork and transfer shift lever.

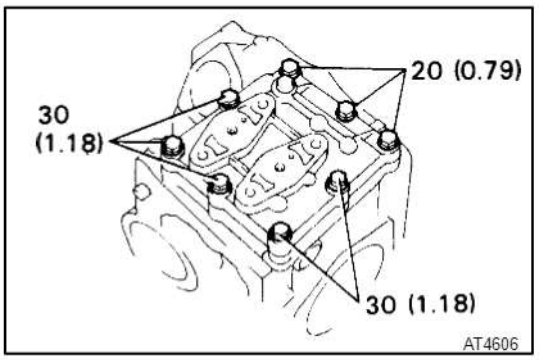
(d) Install and tighten the lock bolts.

Torque: 40 kg-cm (35 in.-lb, 3.9 N-m)



4. INSTALL TRANSFER VALVE BODY ASSEMBLY

(a) Install the new transfer case gaskets and valve body strainer.

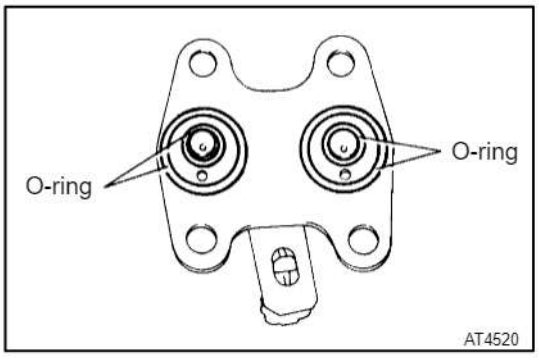


(b) Install the new transfer valve body gasket.

(c) Install the transfer valve body assembly.

(d) Tighten the bolts.

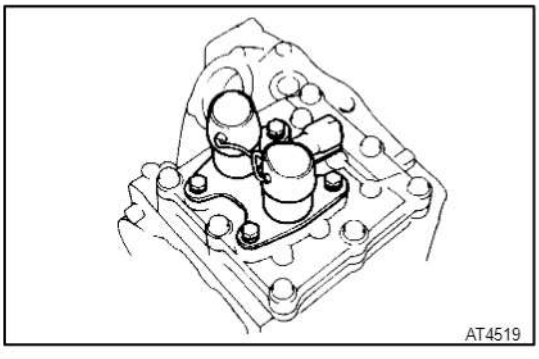
Torque: 110 kg-cm (8 ft-lb, 11 N-m)



5. INSTALL CENTER DIFFERENTIAL CONTROL SOLENOIDS

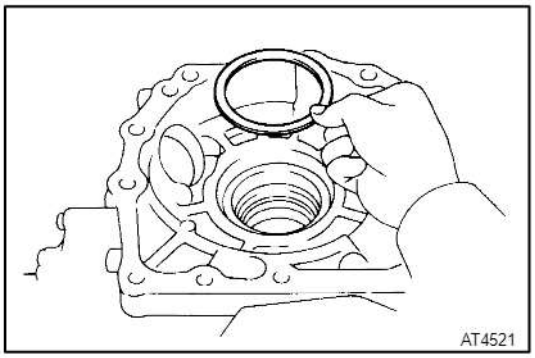
(a) Install the four new O-rings to the solenoids.

(b) Coat the O-rings with ATF.



(c) Install the solenoids.

Torque: 145 kg-cm (10 ft-lb, 14 N-m)

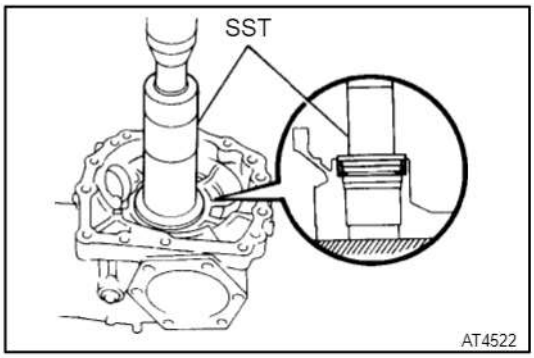


ASSEMBLY OF COMPONENT PARTS

1. INSTALL CASE SIDE

(a) Install the plate washer.

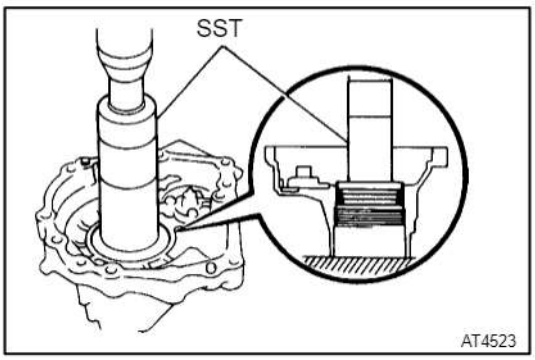
HINT: First install a washer of the same thickness as before.



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

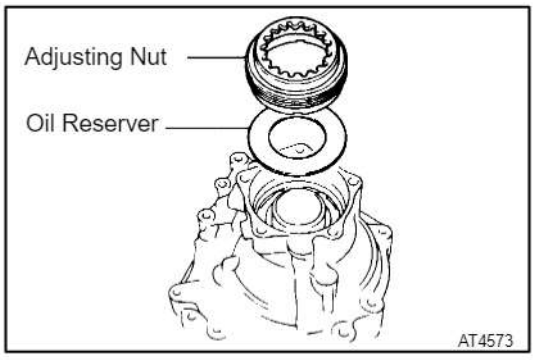
SST 09316-60010 (09316-00010, 09316-00060)

2. INSTALL RIGHT CASE SIDE



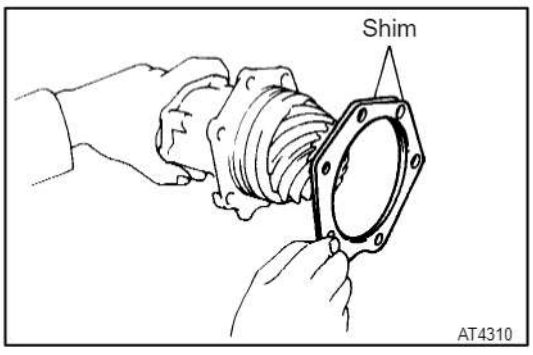
(a) Using SST and a press, press in outer race as shown.

SST 09316-60010 (09316-00010, 09316-00060)



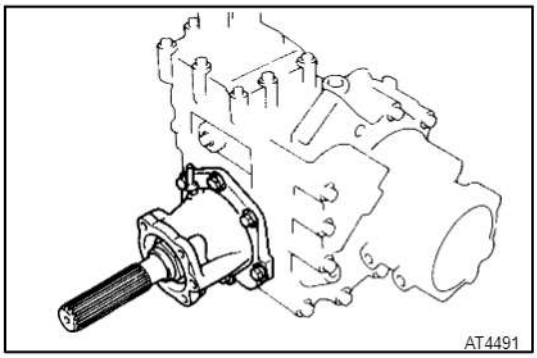
(b) Install the bearing adjusting nut and oil reserver, until it touches the outer race.

3. ADJUST RING GEAR BACKLASH



(a) Install the two shims to the driven pinion bearing cage assembly.

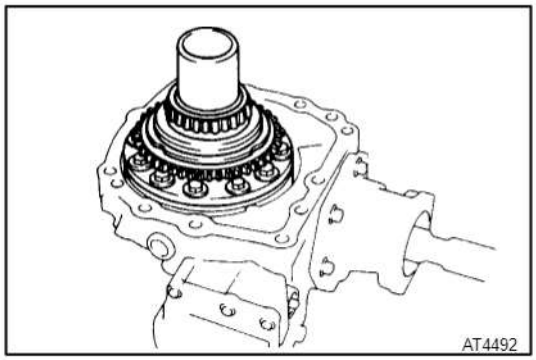
HINT: First install shims of the same thickness as before.



(b) Install the driven pinion bearing cage.

Torque: 400 kg-cm (29 ft-lb, 39 N-m)

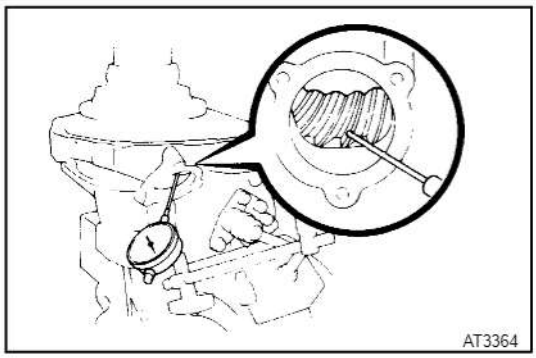
HINT: Do not install the O-ring.



(c) Install the ring gear mounting case and center differential case.

(d) Using a dial indicator, measure the ring gear backlash.

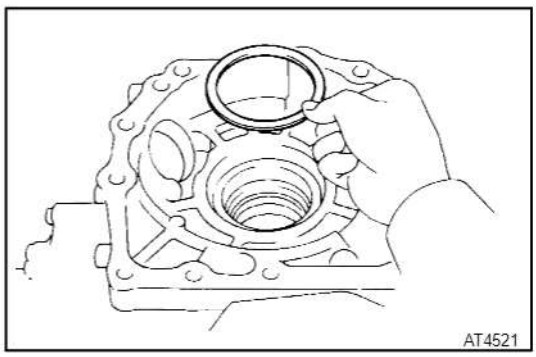
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

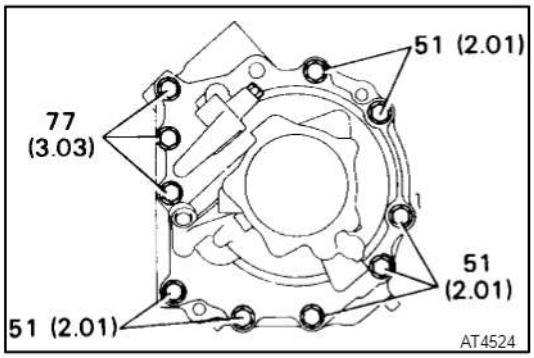


(e) Referring to the table below, select the plate washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

Plate washer thickness mm (in.)

Mark	Thickness	Mark	Thickness
71	2.13 (0.0839)	83	2.49 (0.0980)
72	2.16 (0.0850)	84	2.52 (0.0992)
73	2.19 (0.0862)	85	2.55 (0.1004)
74	2.22 (0.0874)	86	2.58 (0.1016)
75	2.25 (0.0886)	87	2.61 (0.1028)
76	2.28 (0.0898)	88	2.64 (0.1039)
77	2.31 (0.0909)	89	2.67 (0.1051)
78	2.34 (0.0921)	90	2.70 (0.1063)
79	2.37 (0.0933)	91	2.73 (0.1075)
80	2.40 (0.0945)	92	2.76 (0.1087)
81	2.43 (0.0957)	93	2.79 (0.1098)
82	2.46 (0.0969)	94	2.82 (0.1110)





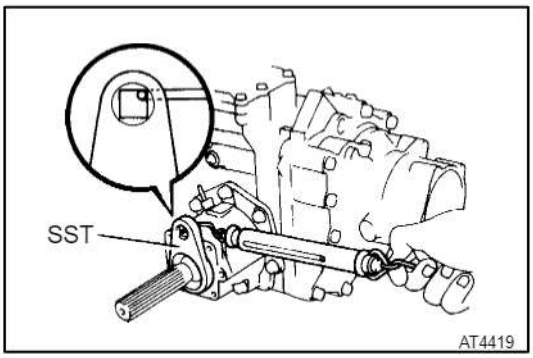
4. ADJUST TOTAL PRELOAD

(a) Install the transfer right case.

(b) Install and torque the ten bolts.

Torque: 450 kg-cm (33 ft-lb, 44 N-m)

HINT: Do not apply seal packing and do not install gasket.
Each bolt length (mm, in.) is indicated in the figure.



(c) Using SST and a spring tension gauge, measure the total preload.

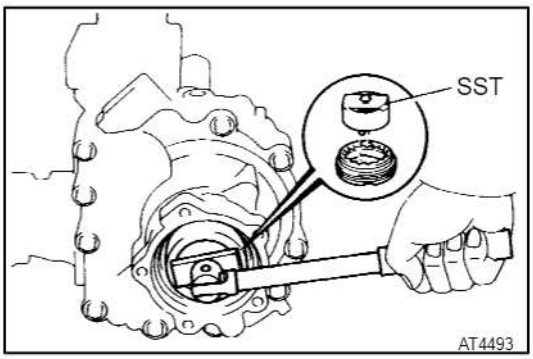
SST 09326-2001 1

Preload (at starting):

Add driven pinion preload

0.5 - 0.9 kg (1.1 - 2.0 lb, 4.9 - 8.8 N)

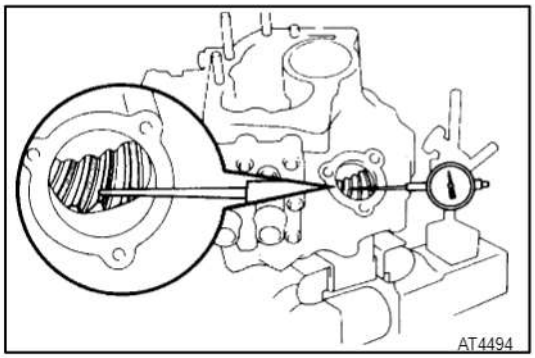
HINT: Turn the drive pinion counterclockwise and clockwise several times.



(d) Adjust the total preload by tightening the adjusting nut with SST.

SST 09318-12010

HINT: Measure the preload while tightening the bearing adjusting nut a little at a time.

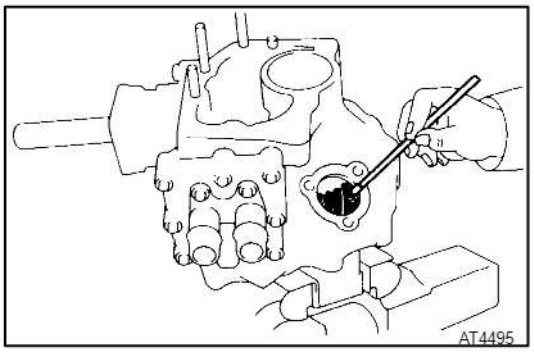


5. CHECK RING GEAR BACKLASH

(a) Using a dial indicator, measure the ring gear backlash.

Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

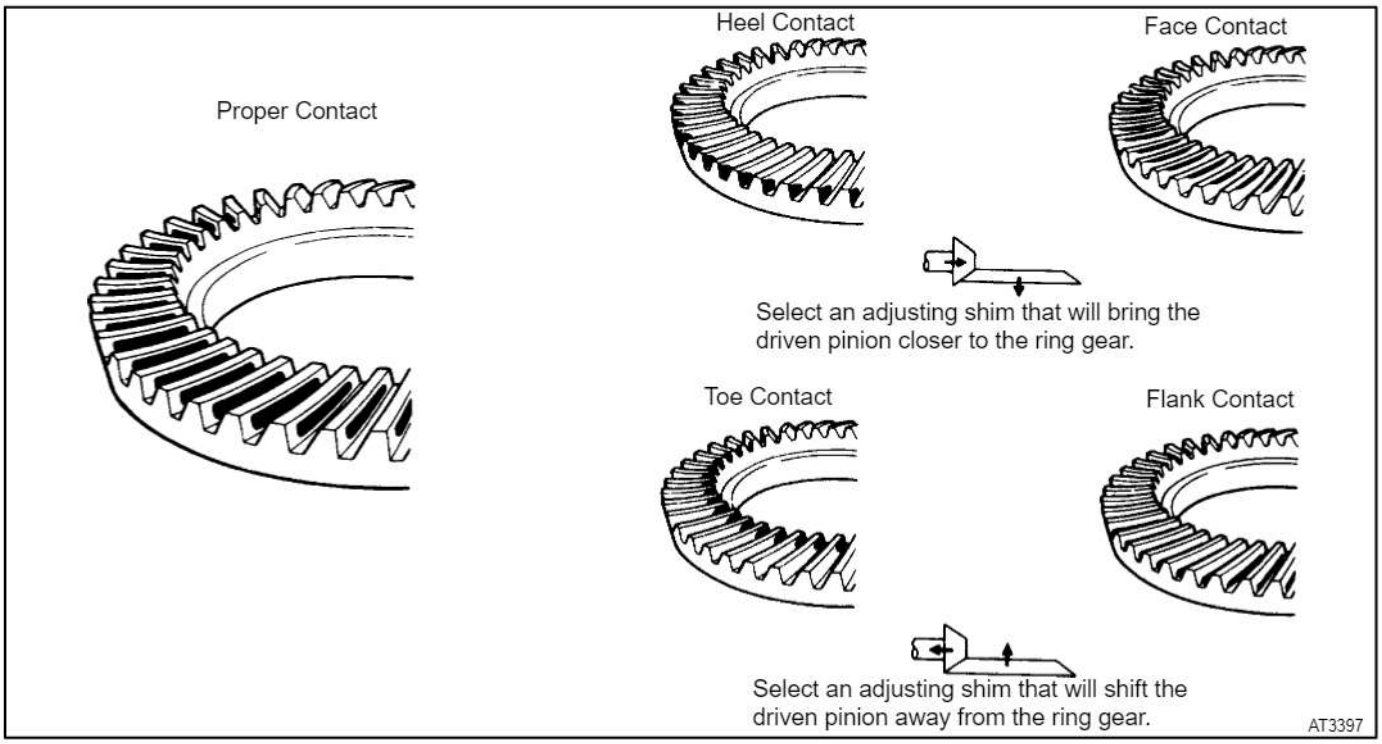
(b) When the backlash is outside the standard value, select a different plate washer to the one selected in step 3. Again adjust the backlash and total preload.

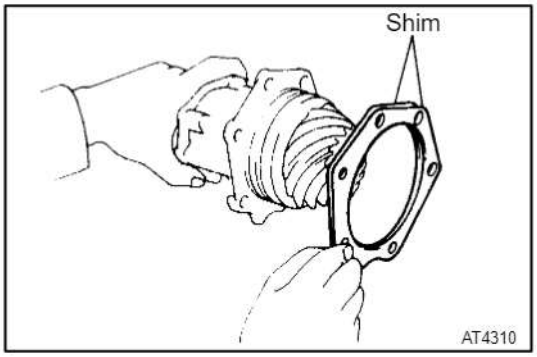


6. CHECK TOOTH CONTACT

(a) Coat 3 or 4 teeth at four different positions on the ring gear with red lead.

(b) Rotate the ring gear, inspect the teeth pattern.

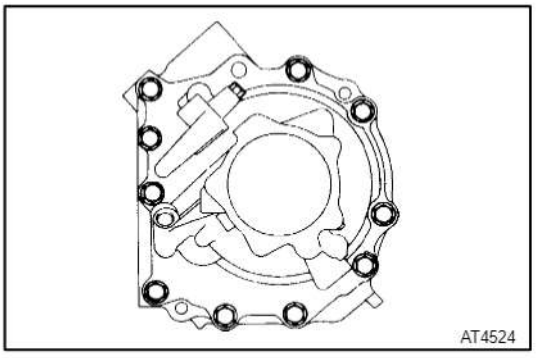




(c) If the teeth are not connecting properly, again the proper shim and plate washer.

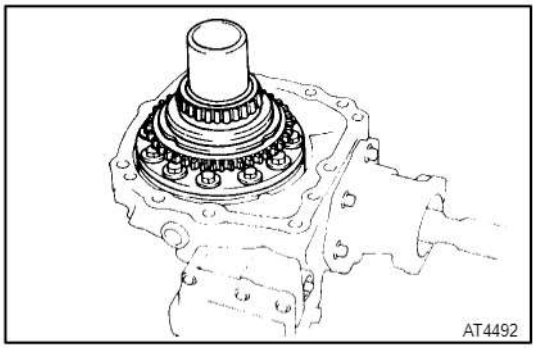
Shim thickness mm (in.)

Mark	Thickness	Mark	Thickness
A	0.30 (0.0118)	F	0.45 (0.0177)
B	0.33 (0.0130)	G	0.48 (0.0189)
C	0.36 (0.0142)	H	0.51 (0.0201)
D	0.39 (0.0154)	J	0.54 (0.0213)
E	0.42 (0.0165)	K	0.57 (0.0224)

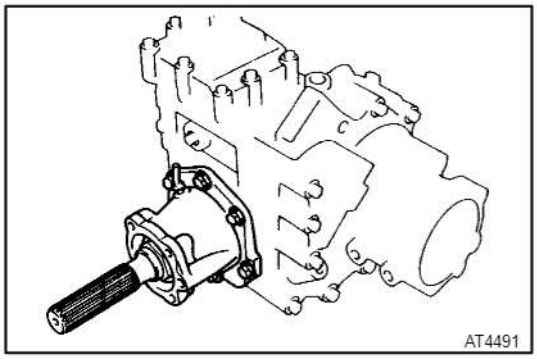


7. REMOVE TRANSFER RIGHT CASE

Remove the ten bolts and transfer right case.

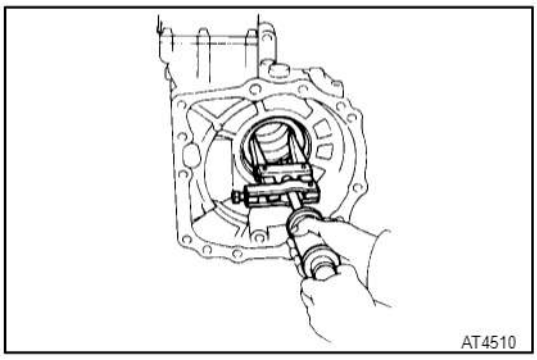


8. REMOVE RING GEAR MOUNTING CASE AND CENTER DIFFERENTIAL CASE



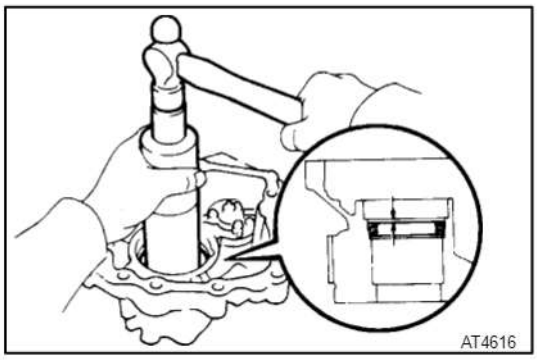
9. REMOVE DRIVEN PINION BEARING CAGE ASSEMBLY

Remove the six bolts and driven pinion bearing cage assembly.



10. REMOVE DIFFERENTIAL LEFT SIDE BEARING OUTER RACE AND PLATE WASHER

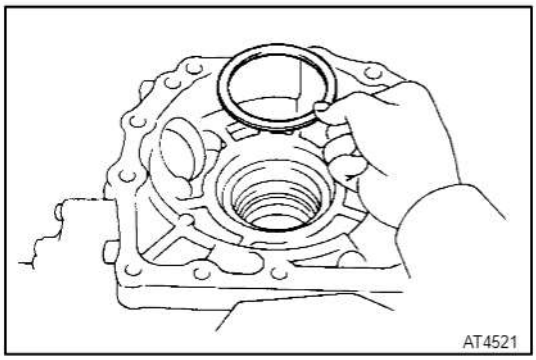
Using SST, remove the outer race and plate washer.
SST 09308-00010



11. INSTALL OIL SEAL

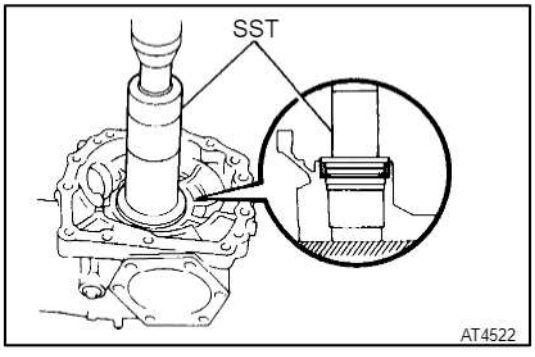
(a) Using SST, install a new oil seal as shown.
SST 09316-60010 (09316-00010, 09316-00030)
Oil seal depth: 3 mm (0.12 in.)

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

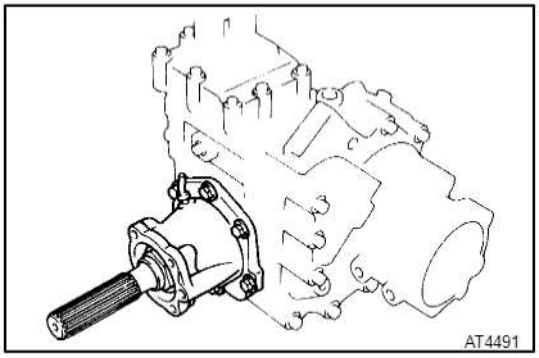


12. INSTALL LEFT CASE BEARING OUTER RACE

(a) Install the plate washer. (previously selected)



(b) Using SST and a press, press in the outer race.
SST 09316-60010 (09316-00010, 09316-00060)



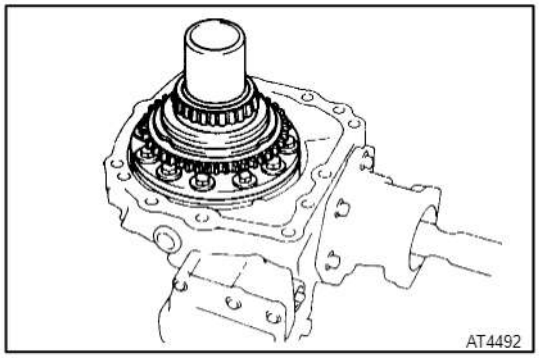
13. INSTALL DRIVEN PINION BEARING CAGE ASSEMBLY

(a) Coat the O-ring with gear oil, and install it to the bearing cage assembly.

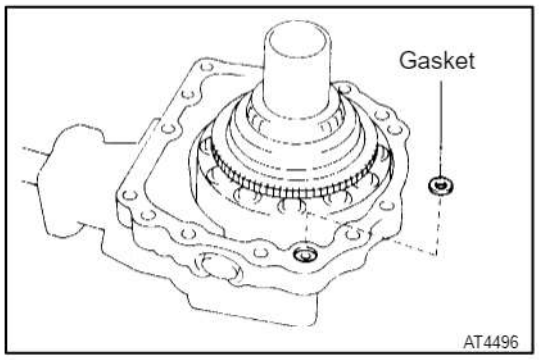
(b) Install the bearing cage with adjust shim (Previously selected) to the transfer left case.

(c) Install and torque the six bolts.

Torque: 400 kg-cm (29 ft-lb, 39 N-m)

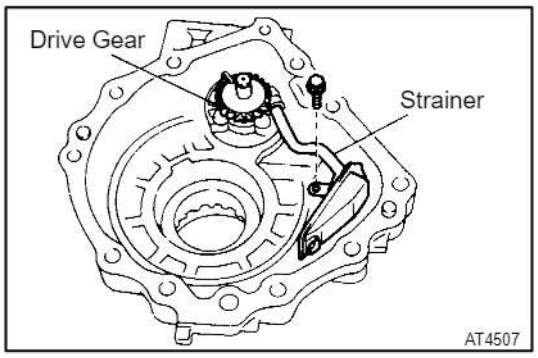


14. INSTALL RING GEAR MOUNTING CASE AND CENTER DIFFERENTIAL CASE



15. INSTALL TRANSFER RIGHT CASE

(a) Install a new apply gasket to the left case.



(b) Coat the O-ring with gear oil.

(c) Install the O-ring to the oil pump strainer.

(d) Install the oil pump strainer to the transfer right case.

(e) Install and torque the bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)

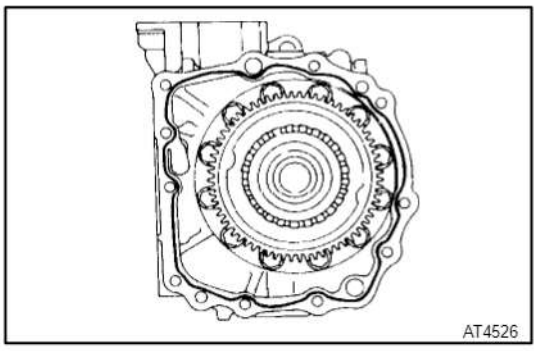
(f) Install the oil pump driven gear.

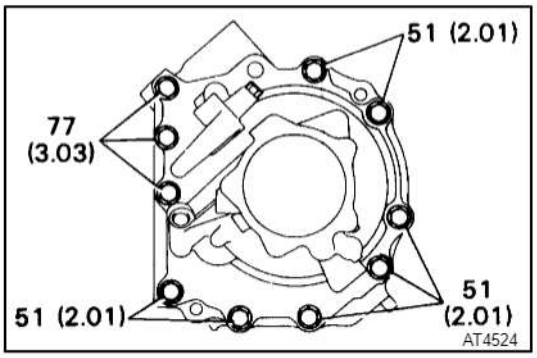
(g) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transfer left case or right case.

(h) Apply seal packing to the left case as shown in the figure.

Seal packing: Part No. 08826 - 00090 THREE BOND 1281 or equivalent

HINT: Install the right case as soon as the seal packing is applied.





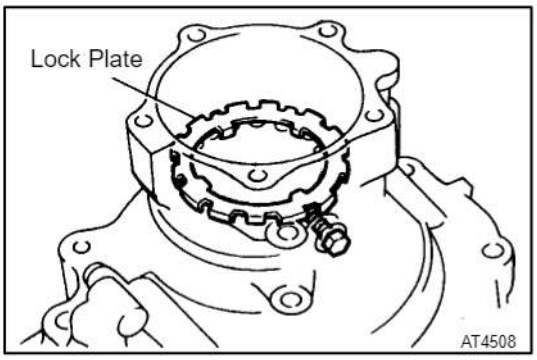
(i) Install the right case to the left case.

(j) Install and torque the ten bolts.

Torque: 450 kg-cm (33 ft-lb, 44 N-m)

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

16. CHECK TOTAL PRELOAD
(See page AT-126)

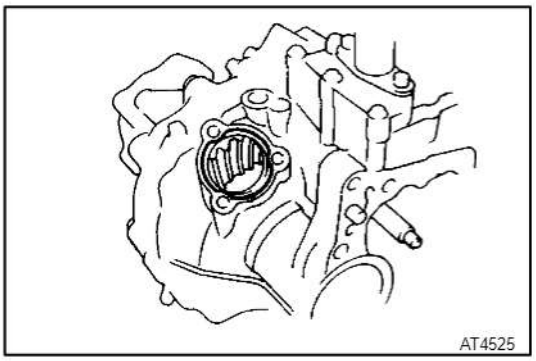


17. INSTALL ADJUSTING NUT LOCK PLATE

(a) Install the lock plate so that the projection from the lock plate fits properly into the groove of the adjusting nut.

HINT: When the lock plate cannot be installed, tighten the adjusting nut the smallest amount possible.

(b) Coat a new O-ring with gear oil and install it to the lock bolt.



(c) Install and torque the lock bolt.

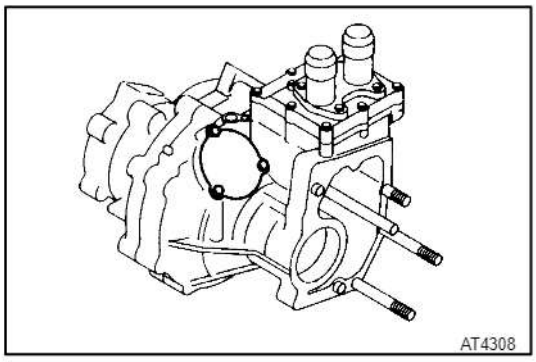
Torque: 73 kg-cm (63 in.-lb, 7 N-m)

18. INSTALL TRANSFER INSPECTION HOLE COVER

(a) Apply seal packing to the left case as shown in the figure.

Seal packing: Part No. 08826-00090 THREE BOND 1281 or equivalent

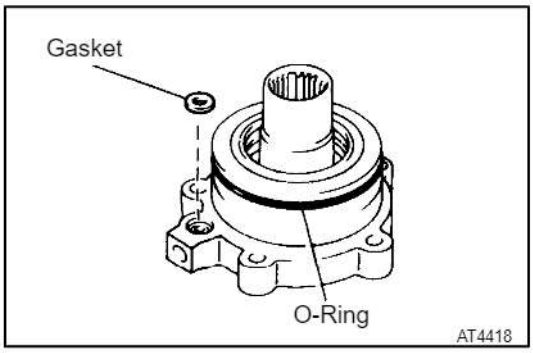
HINT: Install the cover as soon as the seal packing is applied.



(b) Install the hole cover to the transfer left case.

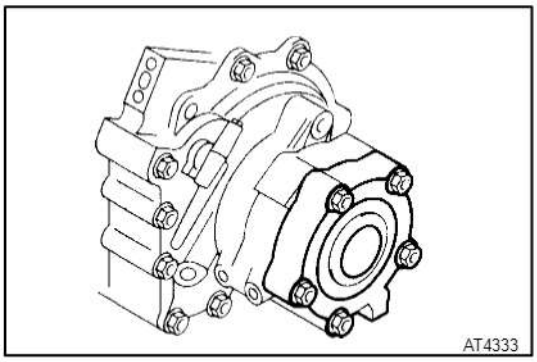
(c) Install and torque the three bolts.

Torque: 160 kg-cm (12 ft-lb. 16 N-m)



19. INSTALL TRANSFER RIGHT CASE RETAINER

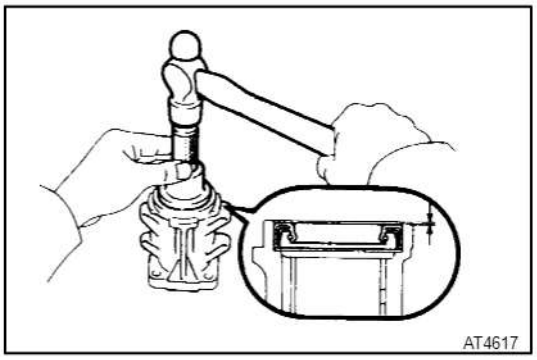
(a) Coat a new O-ring with gear oil, and install it and new apply gasket.



(b) Install the right case retainer to the transfer right case.

(c) Install and torque the five bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N-m)

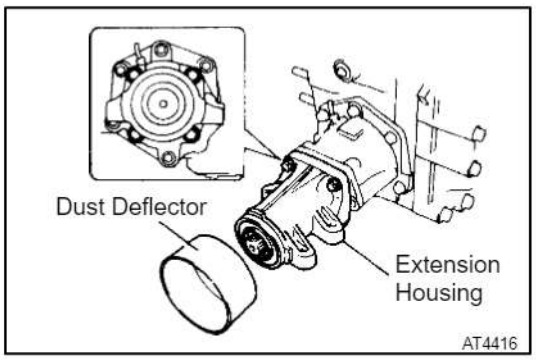


20. INSTALL EXTENSION HOUSING

(a) Using SST and a hammer, drive in a new oil seal as shown.

SST 09325-20010

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



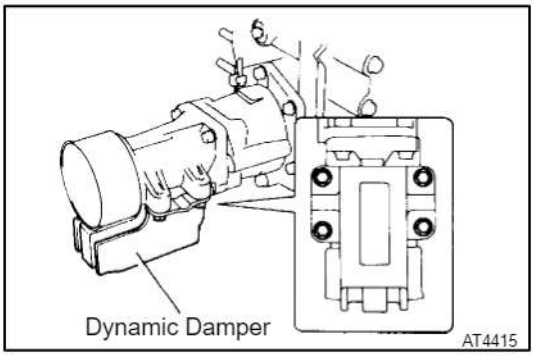
(c) Coat a new O-ring with gear oil and install it to the extension housing.

(d) Install the extension housing to the driven pinion bearing cage.

(e) Install and torque the four bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N-m)

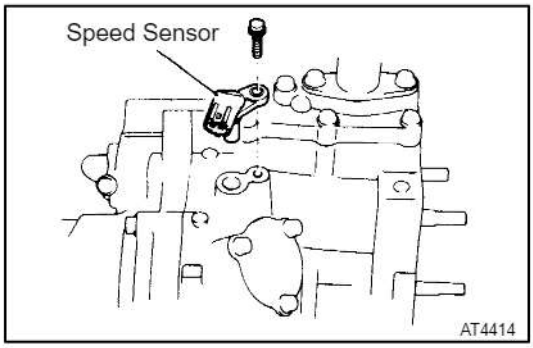
(f) Using a plastic hammer, install the dust deflector.



21. INSTALL DYNAMIC DAMPER

Install and torque the four bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N-m)



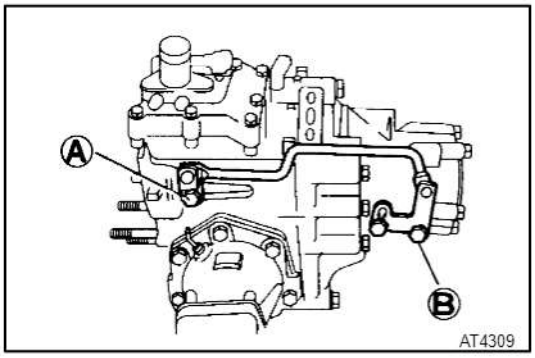
22. INSTALL REAR WHEEL SPEED SENSOR

(a) Install a new O-ring to the speed sensor.

(b) Install the speed sensor to the transfer left case.

(c) Install and torque a bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)

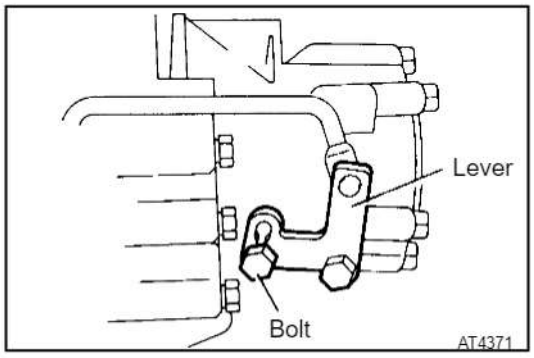


23. INSTALL TRANSFER MODE SELECT LEVER AND ROD

(a) Install the lever, rod and lever guide.

(b) Install and torque the two bolts.

Torque: Ⓐ 55 kg-cm (48 in.-lb, 5.4 N-m)
Ⓑ 115 kg-cm (8 ft-lb, 11 N-m)



(c) Install the bolt while setting the lever as shown.

Torque: 115 kg-cm (8 ft-lb, 11 N-m)