MITSUBISHI
F4A3 W4A3

INDEX

Updated
April, 2003

INTRODUCTION
MITSUBISHI
F4A3 W4A3

There are two different models of this transaxle. The F4A3 is the two wheel drive model and the W4A3 is the all wheel drive or four wheel drive model, both of which are front wheel drive transaxles. The disassembly and assembly of these units are very similar. We have high lighted the differences in these units in the component rebuild section so that the technician will have the information necessary to service, repair or rebuild both of these units. This manual also contains the information necessary in diagnosing mechanical, hydraulic and electronic concerns on both units. We wish to thank the Missubishi Corporation for the illustrations and information that have made this booklet possible.

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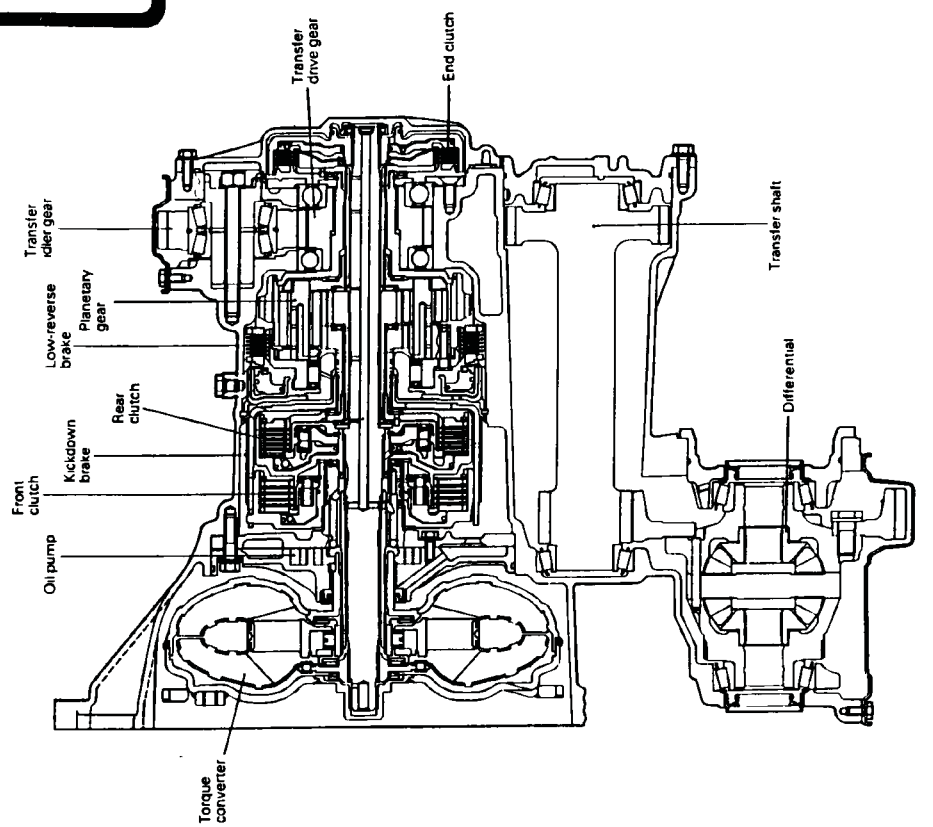
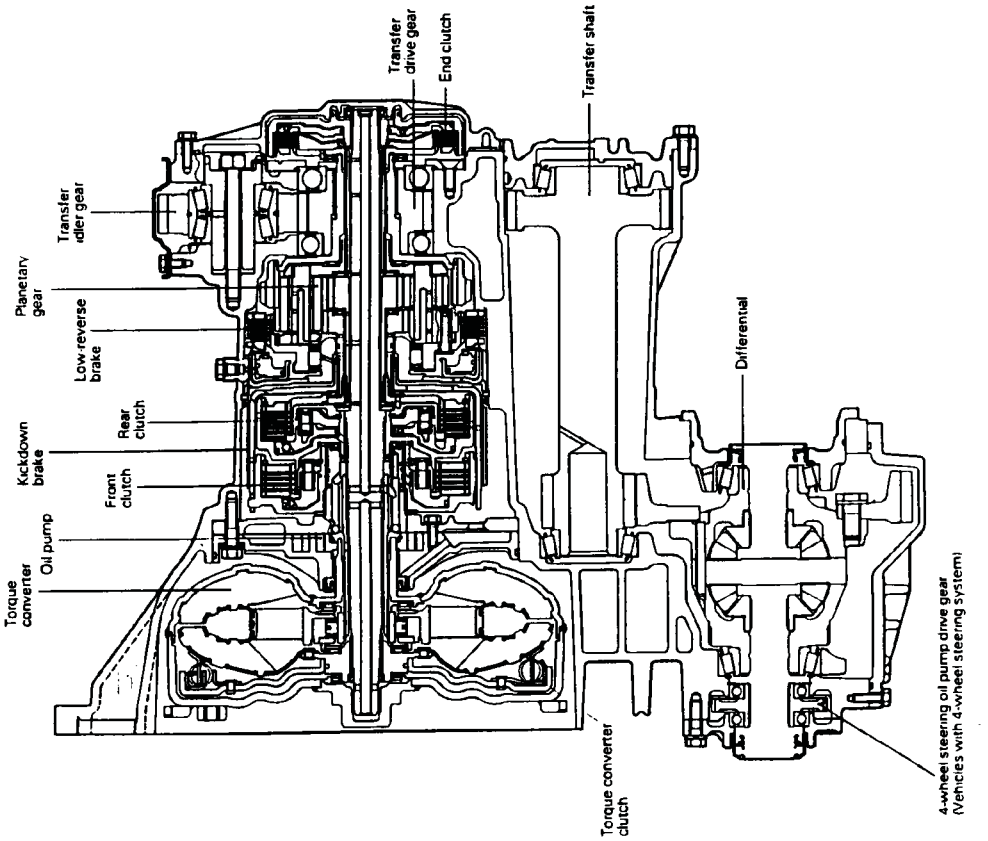
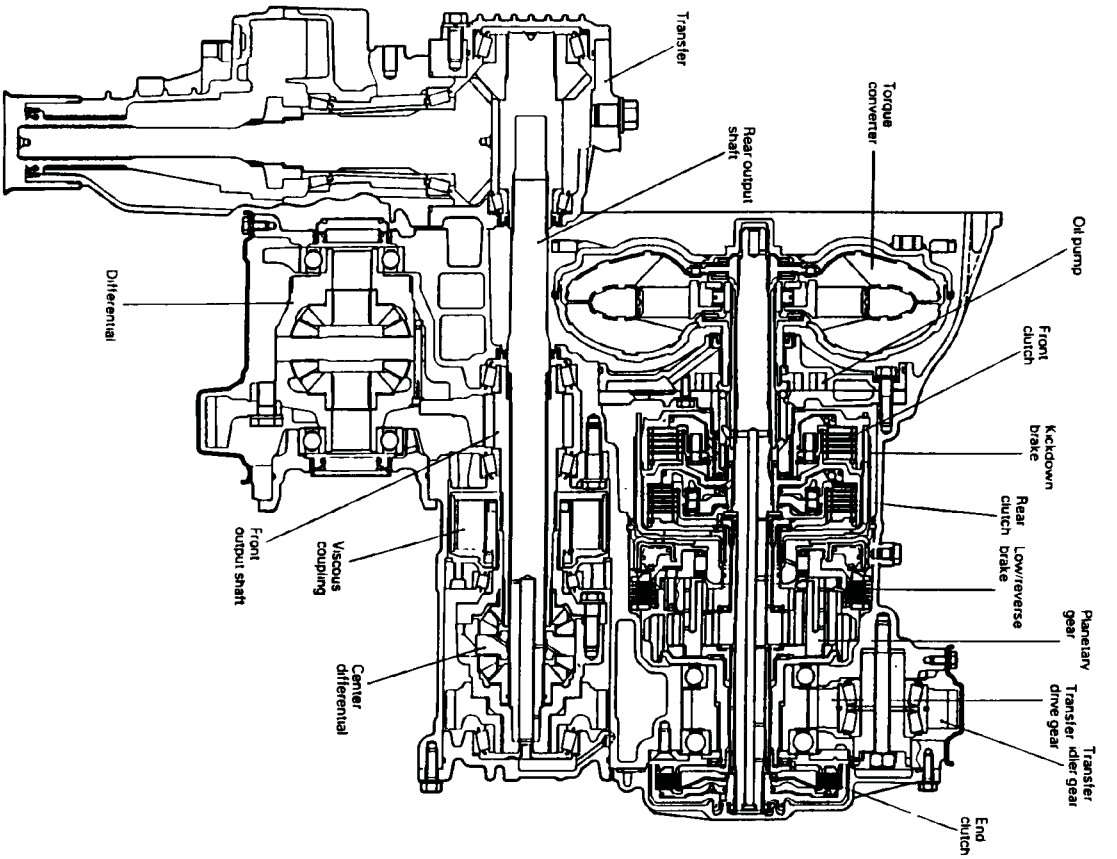
SECTIONAL VIEW – F4A33 without torque converter clutch



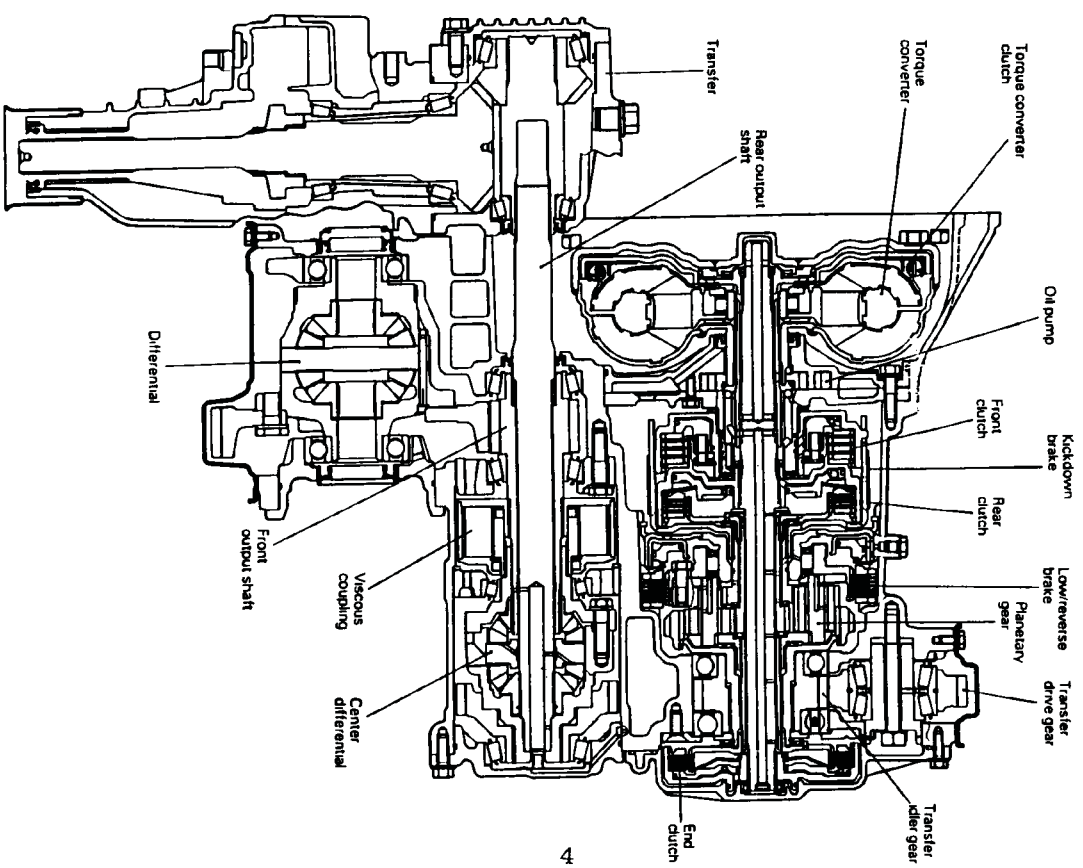
SECTIONAL VIEW – F4A33 with torque converter clutch



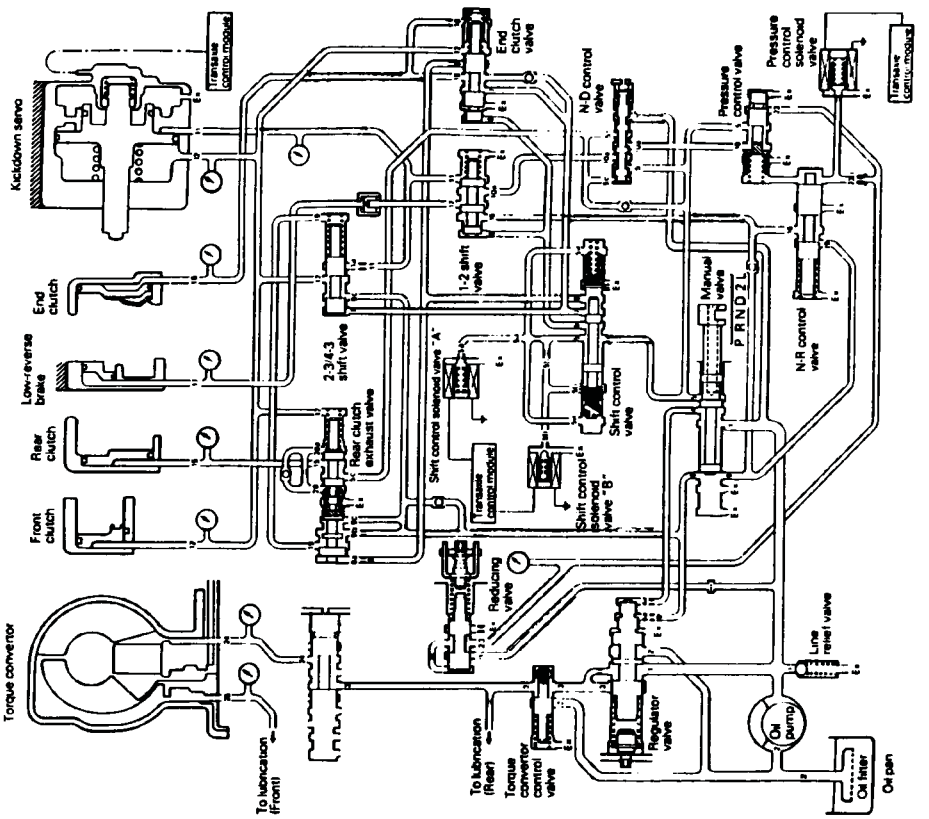
SECTIONAL VIEW – W4A33 without torque converter clutch



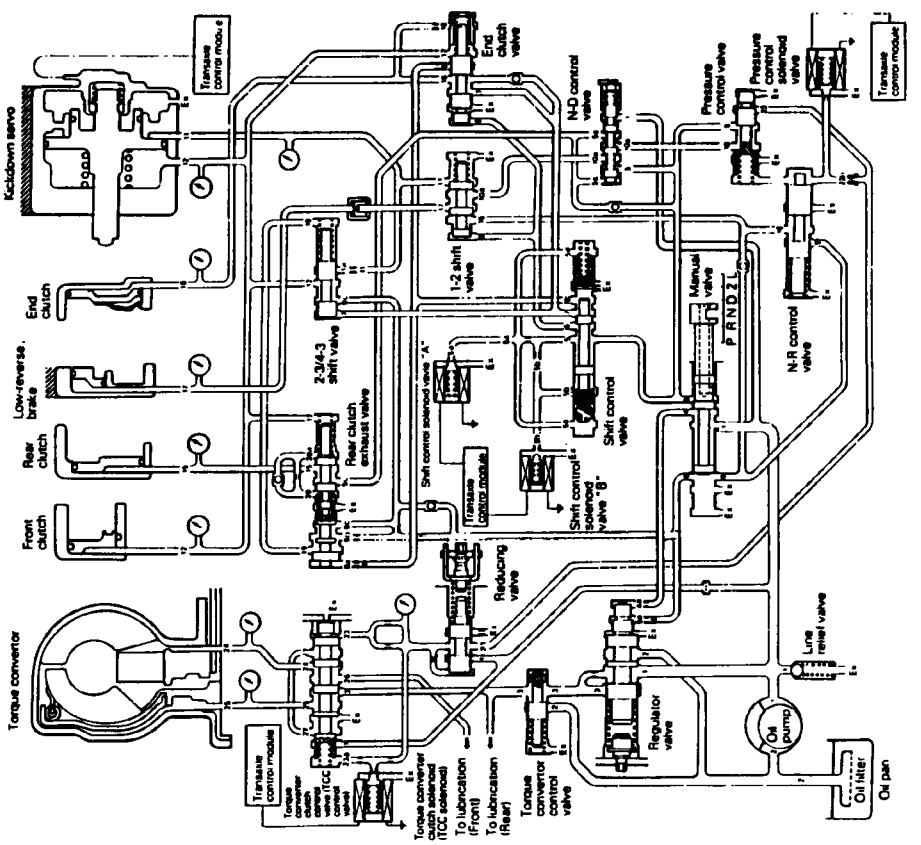
SECTIONAL VIEW – W4A32 with torque converter clutch



HYDRAULIC CONTROL SYSTEM (Without torque converter clutch)



HYDRAULIC CONTROL SYSTEM (With torque converter clutch)



SPECIFICATIONS

TRANSAXLE MODEL TABLE – MODEL 1992

Transaxle model	Gear ratio type	Speedometer gear ratio	Final gear ratio	Vehicle model	Engine model
F4A33-1-UP61*1	A	29/36	4.376	D22A	4G63-DOHC T/C
MNP2	A	28/36	3.958	Z11A	6G72-DOHC
MNN3	A	28/36	3.958	F16A	6G72
MNN4	A	28/36	3.958	F16A	6G72-DOHC
MNN5*2	A	28/36	3.958	F16A	6G72-DOHC
W4A32-1-UNN	A	28/36	4.422	N44W	4G64
WNA	B	28/36	4.750	N21W	4G93
UQA2	B	30/36	4.422	E38A	4G63-DOHC
W4A33-1-UP6*1	A	29/36	4.422	D27A	4G63-DOHC T/C

TRANSAXLE MODEL TABLE – MODEL 1993

Transaxle model	Gear ratio type	Speedometer gear ratio	Final gear ratio	Vehicle model	Engine model
F4A33-1-UP61*1	A	29/36	4.376	D22A	4G63-DOHC T/C
MNP8	A	28/36	3.958	Z11A	6G72-DOHC
MNP9	A	28/36	3.958	F16A	6G72
MNPC	A	28/36	3.958	F16A	6G72-DOHC
MNPE*2	A	28/36	3.958	F16A	6G72-DOHC
W4A32-1-UNQ	A	28/36	4.422	N24W, N44W	4G64
WNF1	B	28/36	4.750	N21W	4G93
W4A33-1-UP61*1	A	29/36	4.422	D27A	4G63-DOHC T/C

NOTE
*1: Model without torque converter clutch (TCC)
*2: Model with 4-wheel steering oil pump drive gear

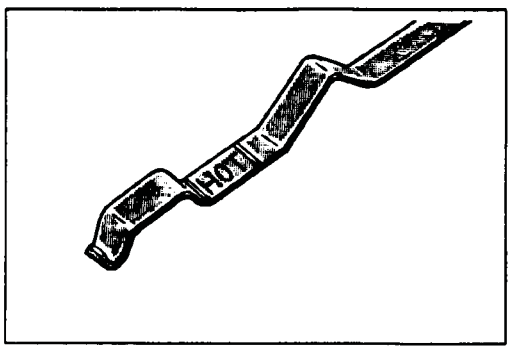
TRANSAXLE MODEL TABLE – MODEL 1994

Transaxle model	Gear ratio type	Speedometer gear ratio	Final gear ratio	Vehicle model	Engine model
F4A33-1-UP63*1	A	29/36	4.376	D22A	4G63-DOHC T/C
UPQ1	A	29/36	4.376	E56A	4G64-DOHC
MNQ2	A	28/36	3.958	Z11A	6G72-DOHC
MNQ3	A	28/36	3.958	F16A	6G72
MNQ4	A	28/36	4.376	F16A	6G72-DOHC
W4A32-1-UNQ	A	28/36	4.422	N24W, N44W	4G64
W4A33-1-UP61*	A	29/36	4.422	D27A	4G63-DOHC T/C

NOTE
*1: Model without torque converter clutch (TCC)

GEAR RATIO TABLE

	A	B
1st	2.551	2.846
2nd	1.488	1.581
3rd	1.000	1.000
4th	0.685	0.685
Reverse	2.176	2.176



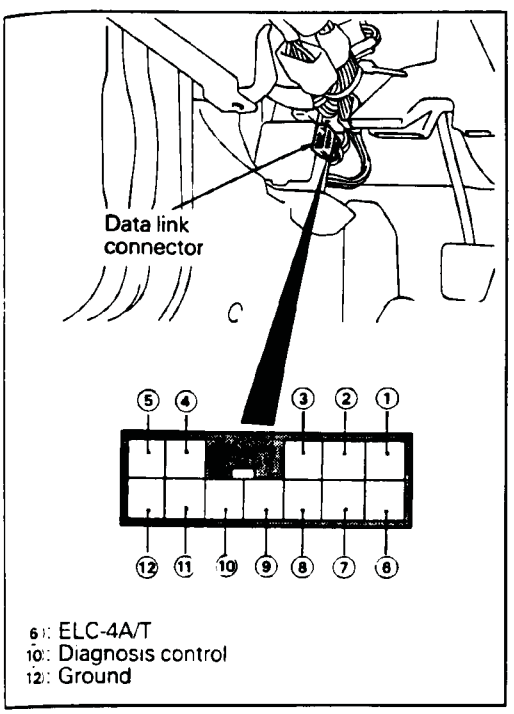
FLUID LEVEL AND CONDITION

1. Drive until the fluid temperature reaches the usual temperature [70 – 80°C (160 – 180°F)].
2. Place vehicle on level floor.
3. Move selector lever sequentially to every position to fill torque converter and hydraulic circuit with fluid, then place lever in "N" Neutral position. This operation is necessary to be sure that fluid level check is accurate.

CONTROL CABLE

Whether control cable is properly adjusted can be confirmed by checking whether park/neutral position switch is performing well.

1. Apply parking brakes and service brakes securely.
2. Place selector lever to "R" range.
3. Set ignition key to "ST" position.
4. Slowly move the selector lever upward until it clicks as it fits in notch of "P" range. If starter motor operates when lever makes a click, "P" position is correct.
5. Then slowly move selector lever to "N" range by the same procedure as in foregoing paragraph. If starter motor operates when selector lever fits in "N", "N" position is correct.
6. Also check to be sure the vehicle doesn't begin to move and the lever doesn't stop between P-R-N-D.
7. The control cable is properly adjusted if, as described above, the starter motor starts at both the "P" range and the "N" range.



⑥: ELC-4A/T
⑩: Diagnosis control
⑫: Ground

OBTAINING FAULT CODES

(1) Connect the voltmeter or scan tool to the connector for diagnosis.

(2) Read the output fault codes.
Then follow the remedy procedures according to the "FAULT CODE DESCRIPTION" on the following page.

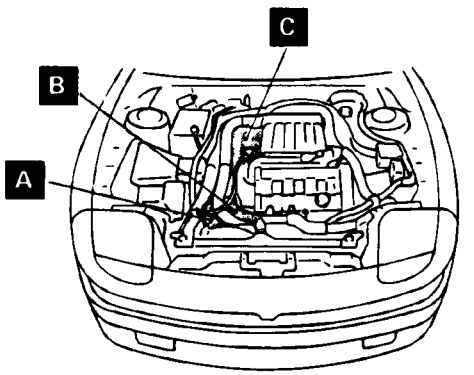
NOTE
- As many as a maximum of ten fault codes, in the sequence of occurrence, can be stored in the Random Access Memory (RAM) incorporated within the control unit.
- If the number of stored fault codes or fault patterns exceeds ten, already stored fault codes will be erased, in sequence beginning with the oldest.
- Do not disconnect the battery until all fault codes or fault patterns have been read out, because all stored fault codes or fault patterns will be canceled when the battery is disconnected.

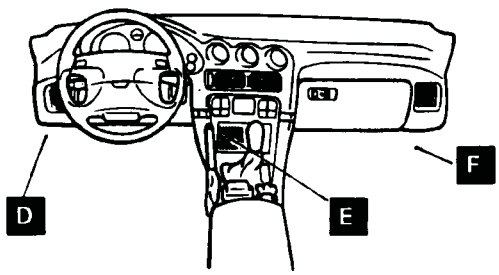
(3) If the fail-safe system is activated and the transaxle is locked in 3rd gear, the fault code in the Fail-Safe Code Description will be stored in the RAM.
Three of these fault codes can be stored.

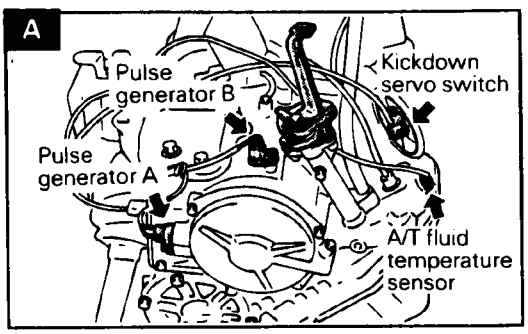
(4) The cancellation will occur if, with the transaxle locked in 3rd gear, the ignition key is turned to the OFF position, but the fault code is stored in the RAM.

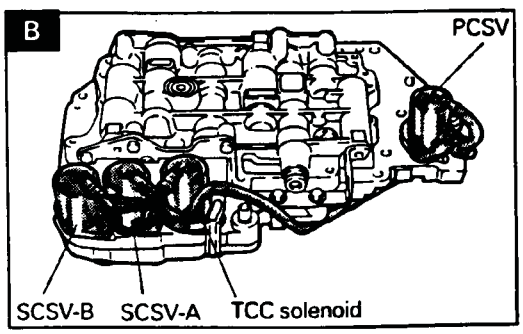
COMPONENT LOCATION

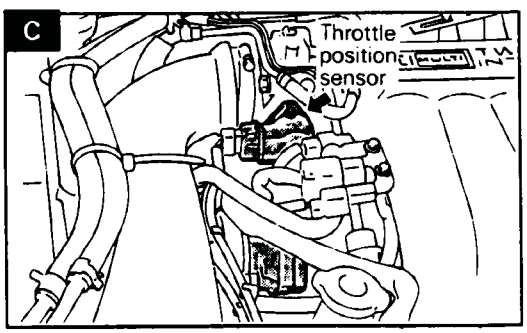
Name	Symbol	Name	Symbol
A/T fluid temperature sensor	A	Engine control module	D
A/T solenoid valve assembly (valve body)	B	Kickdown servo switch	A
Auto-cruise control unit	F	Pulse generator	A
Data link connector	D	Throttle position sensor	C
ELC-4 A/T control module	E	–	–

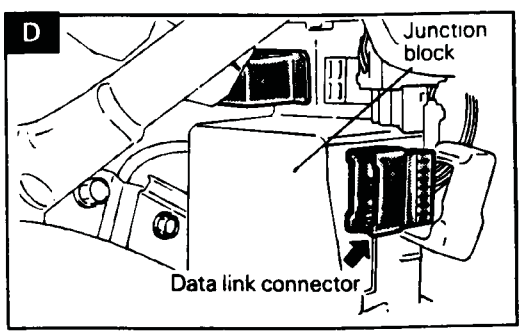


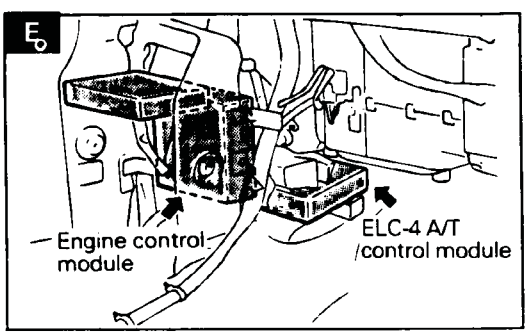


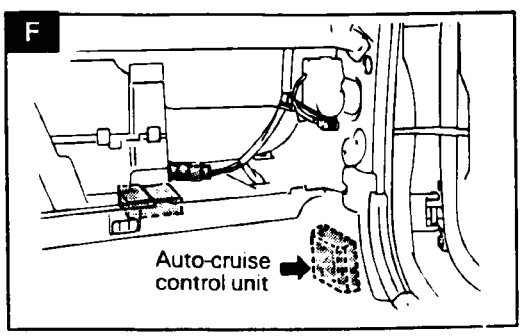












TROUBLESHOOTING GUIDE

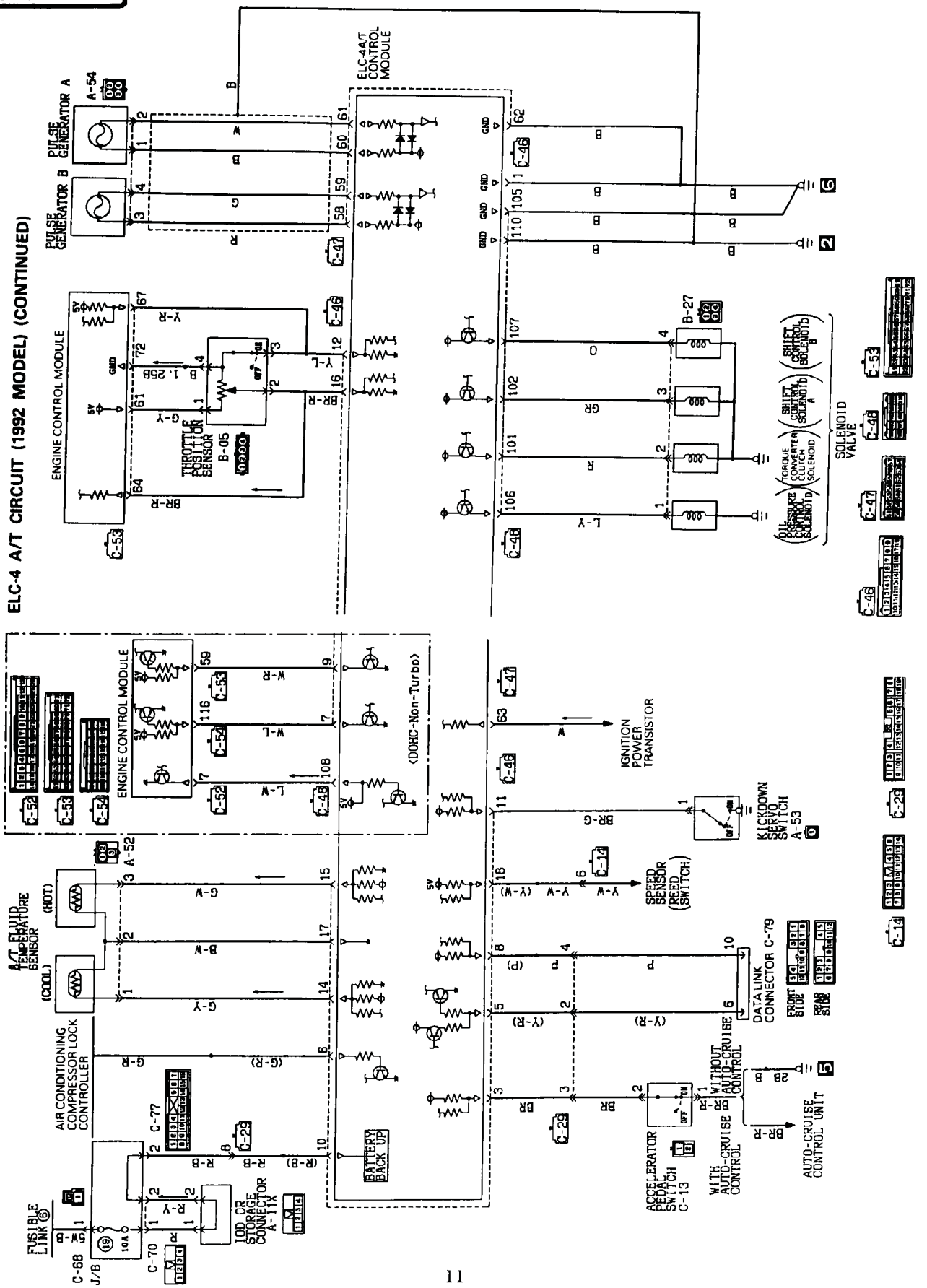
Presumed cause		Problem	Starter motor won't function	Forward/backward movement impossible	Forward movement impossible	Backward movement impossible	Engine stalls when N → D or R	Clutch slips at D (stall rpm too high)	Clutch slips at R (stall rpm too high)	Stall rpm too low	Vehicle moves at P or N	Engine starts, or vehicle moves, between N R or N D	Parking doesn't hold	Abnormal vibration shock when shift to D 2 L R
			Driving impossible or abnormal (before start-off)											
Engine	1	Abnormal idling rpm					⊗							X
	2	Performance malfunction					X			X				
Transaxle (power train)	3	Improper adjustment of manual linkage	X	⊗	⊗	⊗		⊗	⊗		⊗	⊗	⊗	⊗
	4	Malfunction of torque convertor		X	X	X	X	X	X	X				
	5	Operation malfunction of oil pump		X	X	X		X	X					
	6	Malfunction of one-way clutch			X			X						
	7	Damaged or worn gear or other rotating part, or improper adjustment of the preload												
	8	Malfunction of parking mechanism									X		X	
	9	Cracked drive plate, or loose bolt		X										
	10	Worn inside diameter of front clutch retainer				X			X					
Oil pressure system (including friction elements)	11	Low fluid level		⊗	⊗	⊗		X	X					
	12	Line pressure too low (seal damaged, leakage, looseness, etc.)		⊗	⊗	⊗		⊗	⊗					
	13	Malfunction of valve body (sticking valve, working cavity, adjustment, etc.)		⊗	⊗	⊗	X	X	X		X	X		X
	14	Malfunction of front clutch or piston				X			X					X
	15	Malfunction of rear clutch or piston			⊗			X			X			X
	16	Malfunction of kickdown band or piston												X
	17	Improper adjustment of kickdown servo												X
	18	Malfunction of low-reverse brake or piston				X			X					X
	19	O-ring of low-reverse brake circuit between valve body and case not installed				X			X					
	20	Malfunction of end clutch or piston (check ball hole, other)												
Electronic control system	21	Malfunction of park/neutral position switch, damaged or disconnected wiring, or improper adjustment	X									X		X
	22	Malfunction of TPS, or improper adjustment												X
	23	Pulse generator (A) damaged or disconnected wiring, or short-circuit												
	24	Pulse generator (B) damaged or disconnected wiring, or short-circuit												
	25	Malfunction of kickdown servo switch												
	26	SCSV-A or B damaged or disconnected wiring, or short-circuit or sticking (valve open)												
	27	Malfunction of ignition signal system												X
	28	Incorrectly grounded ground strap												
	29	PCSV damaged or disconnected wiring, or short-circuit												X
	30	PCSV damaged or disconnected wiring (valve open)		⊗	⊗	⊗		X	X					
	31	TCC solenoid damaged or disconnecting wiring (valve closed)						X						
	32	TCC solenoid short-circuit or sticking (valve open)					⊗							
	33	Malfunction of overdrive control switch												
	34	Malfunction of accelerator switch, or improper adjustment												X
	35	Malfunction of oil-temperature sensor												
	36	Malfunction of lead switch												
	37	Poor contact of ignition switch	X											
	38	Malfunction of transaxle control module												X

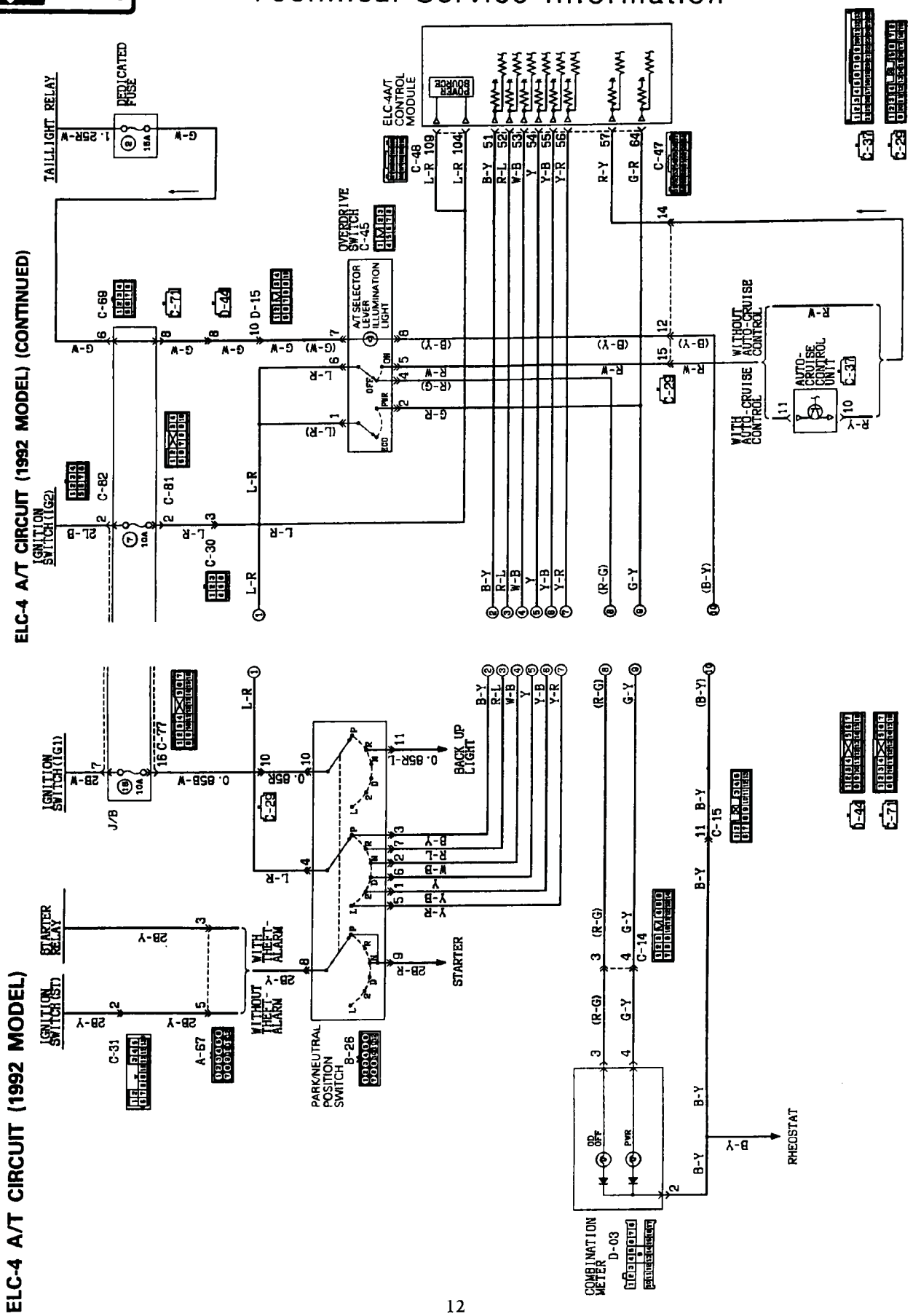
NOTE: ⊗ indicates items of priority during inspection.
PSCV = Pressure control solenoid valve

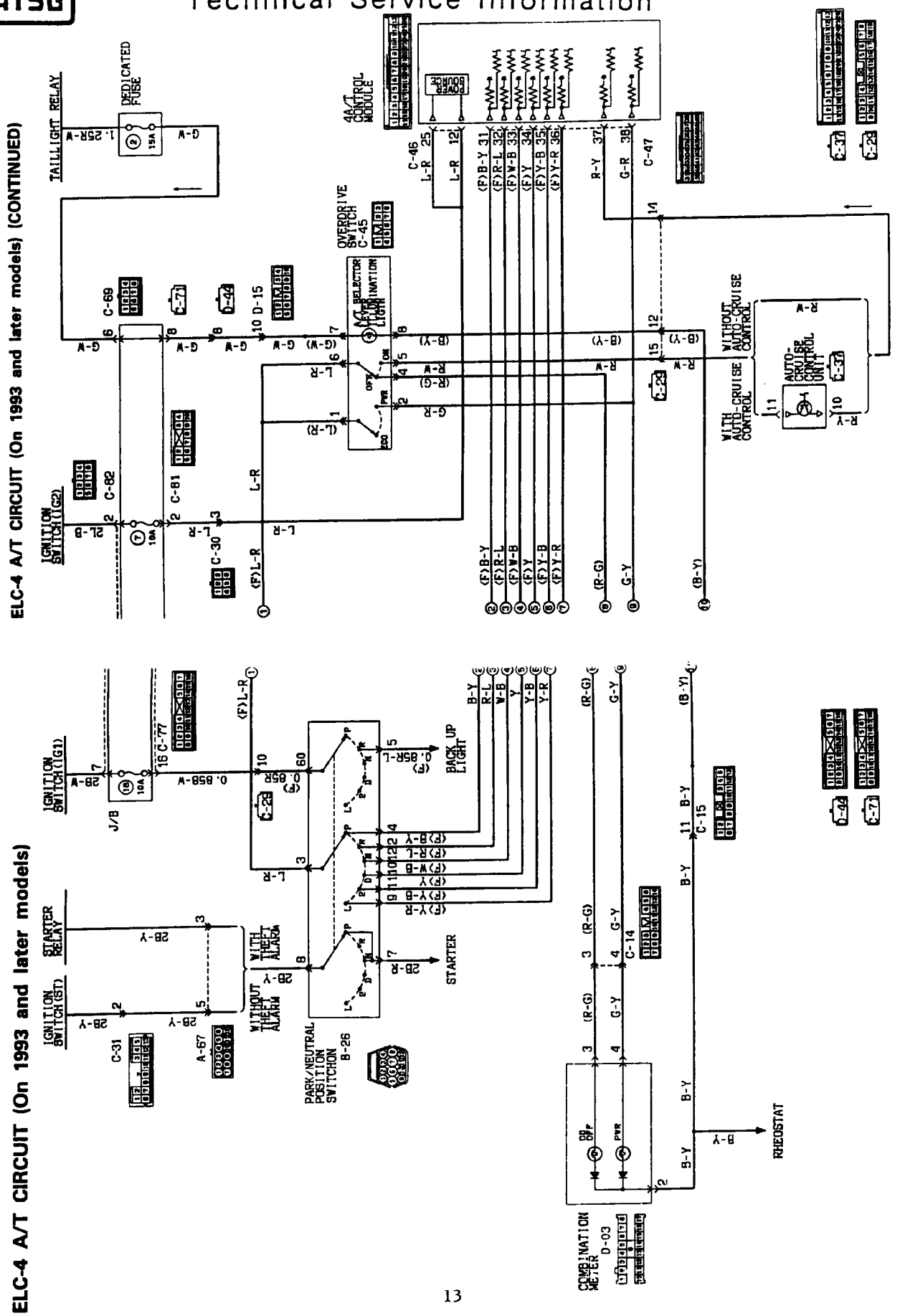
Abbreviations: TPS = Throttle position sensor
TCC solenoid = Torque converter clutch solenoid

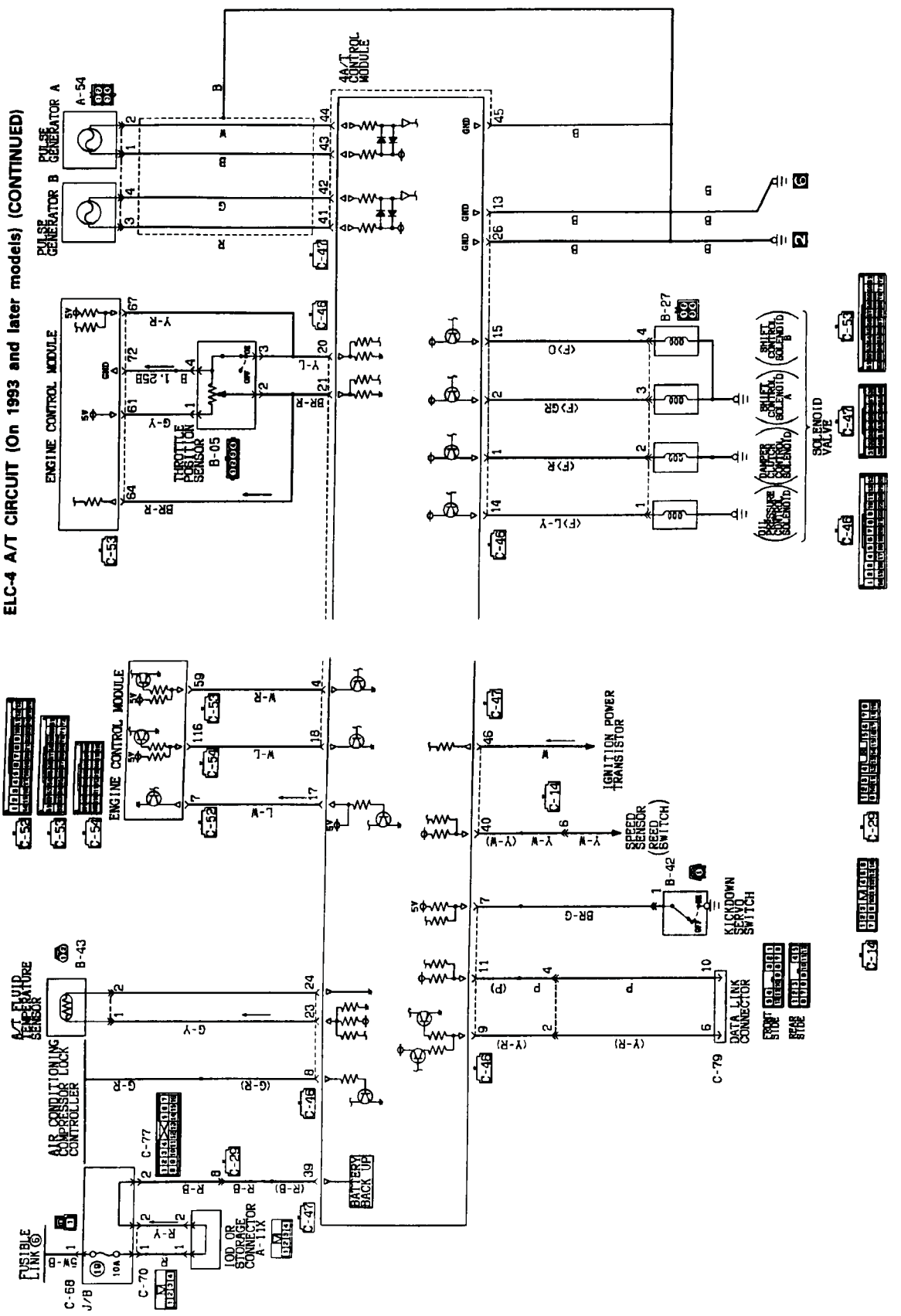
SCSV = Shift control solenoid valve
OD = Overdrive

	Transaxle malfunction of shift-shock (after start-off)																Abnormal noise, other			
	Won't shift from 2nd to 3rd	Won't shift to 4th	Overdrive control switch doesn't function	Doesn't shift according to shift pattern (shifting is possible)	Improper start-off (starts off from 2nd, etc.)	Excessive creeping or idling vibration	Excessive vibration-shock when shift 1-2 or 3-4	Excessive vibration-shock when shift 2-3 or 4-3	Excessive vibration-shock during upshift	Excessive vibration-shock during D-2 downshift	Sudden engine rpm increase during upshift	Sudden engine rpm increase during 3-2 shift, excessive vibration	Excessive vibration-shock only when cold	Excessive vibration-shock (other than already described)	Torque converter clutch won't function	Abnormal vibration in high-load region in low gear (approx. 1 Hz)	Abnormal noise from convertor housing together with engine rpm	Mechanical noise (clatter noise) from convertor housing	Abnormal noise inside transaxle case	3rd gear is held
1						X														
2					X		X	X	X	X			X	X		X				
3		X																		
4					X										X	X				
5											X	X					X			
6																				
7																			X	
8																				
9																		X		
10	X	X									X	X								
11											X	X								
12											⊗	⊗		X						
13	X	X		X	X		X	X	X	X	X	X	X	X	X	X				
14	X							X	X		X									
15																				
16							X			X	X	X								
17							X			X	X	X		X						
18																				
19																				
20		⊗					X				X									
21	X	X																		X
22				⊗			X	X	⊗	X	⊗	X		X	X	X				
23							X	X	X	X	X	X		X	X	X				
24				X											X	X				X
25							X			X	X	X								
26																				X
27															X					
28																				X
29														X						X
30											X	X								
31															X					
32																X				X
33		X	X																	
34					X	X									X					
35														X	X	X				
36																				X
37																				X
38	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X









FAULT CODE DESCRIPTION

Code No.	Display Pattern	Item	Remedial Action
11		Excessively large throttle position sensor output	• Check throttle position sensor connector. • Check throttle position sensor on bench. • Adjust throttle position sensor. • Check accelerator switch (whether code number 24 is being output).
12		Excessively small throttle position sensor output	
13		Defective or improperly adjusted throttle position sensor	
14		Improperly adjusted throttle position sensor	
15		•Open-circuited low-oil-temperature sensor <1992 model> •Open-circuited oil temperature sensor <1993 model>	• Check oil temperature sensor connector. • Check oil temperature sensor on bench.
16		Short-circuited high-oil-temperature sensor <1992 model only>	
17		Open-circuited high-oil-temperature sensor or short-circuited low-oil-temperature sensor <1992 model only>	
21		Open-circuited kickdown servo switch	• Check kickdown servo switch connector. • Check kickdown servo switch on bench.
22		Short-circuited kickdown servo switch	
23		Open-circuited ignition pulse pickup cable	• Check ignition pulse signal line.
24		Open-circuited or improperly adjusted accelerator switch <1992 model only>	• Check accelerator switch connector. • Check accelerator switch on bench. • Adjust accelerator switch.

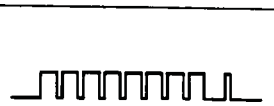
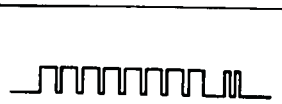
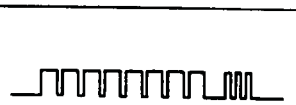
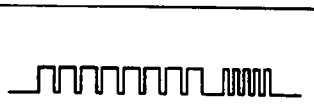
12A0104
12A0107

Code No.	Display Pattern	Item	Remedial Action
31		Open-circuited pulse generator A	• Check pulse generator A or B on bench. • Check vehicle-speed reed switch (chattering).
32		Open-circuited pulse generator B	
41		Open-circuited shift control solenoid valve A	• Check solenoid valve connector. • Check shift control solenoid valve A on bench.
42		Short-circuited shift control solenoid valve A	
43		Open-circuited shift control solenoid valve B	• Check solenoid valve connector. • Check shift control solenoid valve B on bench.
44		Short-circuited shift control solenoid valve B	
45		Open-circuited pressure control solenoid valve	• Check solenoid valve connector. • Check pressure control solenoid valve on bench.
46		Short-circuited pressure control solenoid valve	
47		Open-circuited torque converter clutch solenoid	• Check solenoid valve connector. • Check torque converter clutch solenoid on bench.
48		Short-circuited torque converter clutch solenoid	
49		Defective torque converter clutch system	• Check torque converter clutch hydraulic circuit. • Check torque converter clutch solenoid on bench. • Replace control unit.

Code No.	Display Pattern	Item	Remedial Action
51		1st gear incorrect ratio	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Rear clutch slipping
52		2nd gear incorrect ratio	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Rear clutch slipping • Kickdown brake slipping
53		3rd gear incorrect ratio	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Front clutch slipping • Rear clutch slipping
54		4th gear incorrect ratio	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • End clutch slipping • Kickdown brake slipping
61		Short-circuited torque reduction request signal line or open-circuited torque reduction execution signal line	• Check torque reduction request signal line. • Check torque reduction execution signal line.
62		Open-circuited torque reduction request signal line	• Check torque reduction request signal line.
63		Short-circuited torque reduction execution signal line	• Check torque reduction execution signal line.

12A0106

FAIL-SAFE CODE DESCRIPTION

Code No.	Display Pattern	Item	Fail-safe	Related Self-Diagnosis
81		Open-circuited pulse generator A	Fixed at 3rd (D) or 2nd (2, L)	31
82		Open-circuited pulse generator B	Fixed at 3rd (D) or 2nd (2, L)	32
83		Open- or short-circuited shift control solenoid valve A	Fixed at 3rd	41, 42
84		Open- or short-circuited shift control solenoid valve B	Fixed at 3rd	43, 44
85		Open- or short-circuited pressure control solenoid valve	Fixed at 3rd (D) or 2nd (2, L)	45, 46
86		Incorrect gear ratio	Fixed at 3rd (D) or 2nd (2, L)	51, 52 53, 54

12L0296

INSPECTION OF CONTROL SYSTEM

Check the control system by using the scan tool and following the procedure given below.

CONTROL SYSTEM INSPECTION TABLE

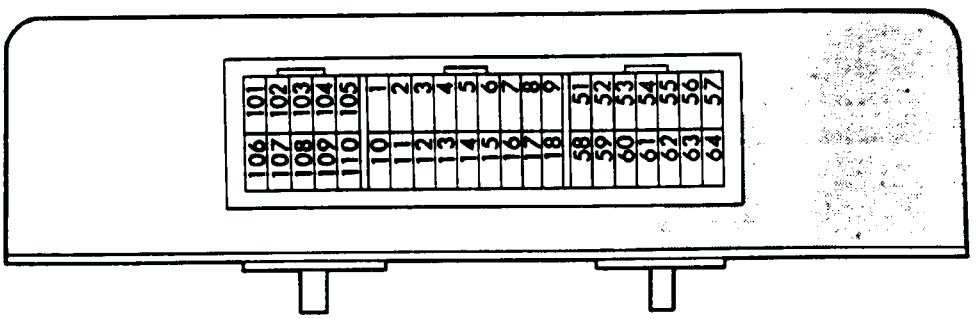
Check Item	Description		Possible Cause of Trouble (or Remedy)
	Condition	Criteria	
Throttle position sensor (TPS)	Accelerator pedal fully released	0.4 – 1.0 V	• TPS is improperly adjusted if voltage is high when accelerator pedal is fully depressed or released. • TPS or circuit harness is defective if there is no change. • TPS or accelerator pedal cable is defective if change is not smooth.
	Accelerator pedal slowly depressed	Varies with throttle opening degree	
	Accelerator pedal fully depressed	4.5 – 5.0 V	
Oil temperature sensor	Cold engine (before start)	Equivalent to outside temperature	• Defective oil temperature sensor or circuit harness
	Engine warming up	Gradually increases	
	After engine warming up	80 – 110°C	
Kickdown servo switch	L range, idle	ON	• Improperly adjusted kickdown servo • Defective kickdown servo switch or circuit harness • Defective kickdown servo
	D range, 1st or 3rd speed	ON	
	D range, 2nd or 4th speed	OFF	
Ignition signal line	N range, idle	650 – 900 rpm	• Defective ignition system • Defective ignition signal pickup circuit harness
	N range, 2,500 rpm (tachometer reading)	2,400 – 2,600 rpm	
Accelerator pedal switch <1992 model only>	Accelerator pedal fully released	ON	• Improperly adjusted accelerator pedal switch • Defective accelerator pedal switch or circuit harness
	Accelerator pedal slightly depressed	OFF	
Closed throttle position switch	Accelerator pedal fully released	ON	• Improperly adjusted TPS • Defective TPS or circuit harness
	Accelerator pedal slightly depressed	OFF	
Air conditioning compressor clutch relay signal	D range, air conditioning idle-up	ON	• Defective air-conditioning compressor clutch relay ON signal detection circuit harness
	D range, air conditioning idle OFF	OFF	
Transaxle gear position	D range, idle	C	• Defective TCM • Defective accelerator pedal switch circuit • Defective park/neutral position switch circuit • Defective TPS circuit
	L range, idle	1ST	
	2 range, 2nd speed	2ND	
	D range, O/D OFF, 3rd speed	3RD	
	D range, O/D, 4th speed	4TH	
Pulse generator A	D range, stop	0 rpm	• Defective pulse generator A or circuit harness • Defective pulse generator A shielded wire • External noise interference
	D range, 3rd speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
	D range, 4th speed, driven at 50 km/h (31 mph)	1,100 – 1,400 rpm	

Check Item	Description		Possible Cause of Trouble (or Remedy)
	Condition	Criteria	
Pulse generator B	D range, stop	0 rpm	• Defective pulse generator B or circuit harness • Defective pulse generator B shielded wire • External noise interference
	D range, 3rd speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
	D range, 4th speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
Overdrive switch	Overdrive switch in ON position	OD	• Defective overdrive switch or circuit harness
	Overdrive switch in OFF position	OD-OFF	
Power/economy select switch	Power pattern selected (including economy pattern control with low oil temperature)	Power	• Defective power/economy select switch or circuit harness
	Economy pattern selected	Economy	
Park/neutral position switch	Shifted to P range	P	• Improperly adjusted park/neutral position switch • Defective park/neutral position switch or circuit harness • Defective manual control cable • If selector lever does not move, check shift lock mechanism.
	Shifted to R range	R	
	Shifted to N range	N	
	Shifted to D range	D	
	Shifted to 2 range	2	
	Shifted to L range	L	
Vehicle-speed reed switch	Vehicle stationary	0 km/h (0 mph)	• Vehicle-speed reed switch is defective if a high-speed signal is output where vehicle is stationary. • Otherwise, vehicle-speed reed switch or circuit harness is defective.
	Driven at 30 km/h (19 mph)	30 km/h (19 mph)	
	Driven at 50 km/h (31 mph)	50 km/h (31 mph)	
PCSV duty	D range, idle	50 – 70%	• Duty should become 100% when accelerator pedal is depressed even a little from D range idle conditions. • Defective TCM • Defective TPS circuit • Defective accelerator pedal switch circuit
	D range, 1st speed	100%	
	D range, gear being shifted	Depends on conditions	
Torque converter clutch slip	D range, 3rd speed, 1,500 rpm (tachometer reading)	100 – 300 rpm	• Defective torque converter clutch • Defective ignition signal line or pulse generator B circuit • Incorrect transmission fluid pressure • Defective TCC solenoid
	D range, 3rd speed, 3,500 rpm (tachometer reading)	0 rpm	
TCC solenoid duty	D range, 3rd speed, 1,500 rpm (tachometer reading)	0%	• Defective TCM • Defective TPS circuit • Defective pulse generator B circuit
	D range, 3rd speed, 3,500 rpm (tachometer reading)	Depends on loads	

TRANSAXLE CONTROL UNIT

The connector has 42 pins to accommodate the increased number of sensor inputs. Here are the pin assignments.

<1992 model>

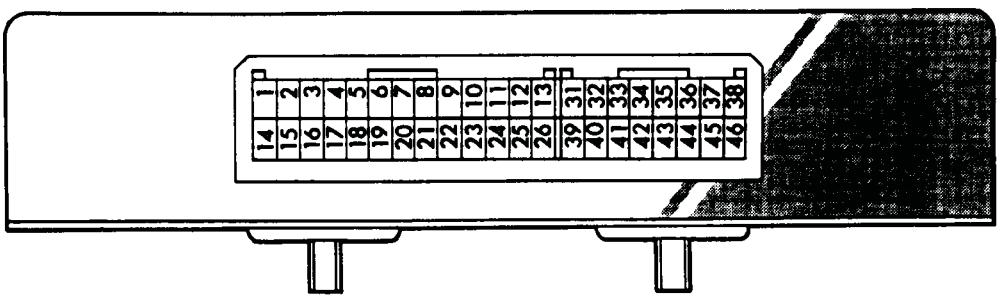


101. Torque converter clutch solenoid
102. Shift control solenoid valve A
103. –
104. Power source
105. Ground
106. Pressure control solenoid valve
107. Shift control solenoid valve B
108. Engine communication signal
109. Power source
110. Ground

1. Ground
2. –
3. Accelerator switch
4. –
5. On-board diagnostic output
6. Air conditioning compressor clutch relay signal
7. Engine communication signal
8. Diagnostic test mode control terminal
9. Engine communication signal
10. Power source (backup)
11. Kickdown servo switch
12. Closed throttle position switch
13. –
14. Oil temperature sensor (Low temperature side)
15. Oil temperature sensor (High temperature side)
16. Throttle position sensor
17. Sensor ground
18. Vehicle-speed reed switch

51. Park/neutral position switch (P)
52. Park/neutral position switch (R)
53. Park/neutral position switch (N)
54. Park/neutral position switch (D)
55. Park/neutral position switch (2)
56. Park/neutral position switch (L)
57. Overdrive switch
58. Pulse generator B
59. Pulse generator B
60. Pulse generator A
61. Pulse generator A
62. Ground
63. Ignition pulse
64. Power mode signal

<1993 model>



1. Torque converter clutch solenoid
2. Shift control solenoid valve A (SCSV-A)
3. –
4. Engine communication signal
5. –
6. –
7. Kickdown servo switch
8. Air conditioning relay signal
9. On-board diagnostic output terminal
10. Pulse generator B (PG-B) output
11. Diagnostic test mode control terminal
12. Power source
13. Ground
14. Pressure control solenoid valve (PCSV)
15. Shift control solenoid valve B (SCSV-B)
16. –
17. Engine communication signal
18. Engine communication signal
19. –
20. Closed throttle position switch
21. Throttle position sensor (TPS)
22. –
23. Oil temperature sensor
24. Sensor ground
25. Power source
26. Ground
31. Park/neutral position switch (P)
32. Park/neutral position switch (R)
33. Park/neutral position switch (N)
34. Park/neutral position switch (D)
35. Park/neutral position switch (2)
36. Park/neutral position switch (L)
37. Overdrive switch
38. Power mode signal
39. Power source (backup)
40. Vehicle-speed reed switch
41. Pulse generator B (PG-B)
42. Pulse generator B (PG-B)
43. Pulse generator A (PG-A)
44. Pulse generator A (PG-A)
45. Ground
46. Ignition pulse

ELEMENT IN USE AT EACH POSITION OF SELECTOR LEVER

Selector lever position	Overdrive control switch	Shifting gear	Gear ratio	Engine start	Parking mechanism	Clutch				Brake	
						C1	C2	C3	OWC	B1	B2
P	–	Neutral	–	Possible	•						
R	–	Reverse	2.176			•					•
N	–	Neutral	–	Possible							
D	ON	1st	2.551				•		•		
		2nd	1.488				•			•	
		3rd	1.000			•	•	•			
		OD	0.685					•		•	
D	OFF	1st	2.551				•		•		
		2nd	1.488				•			•	
		3rd	1.000			•	•	•			
2	–	1st	2.551				•		•		
		2nd	1.488				•			•	
L	–	1st	2.551				•				•

NOTE
C1 ... Front clutch
C2 ... Rear clutch
C3 ... End clutch
B1 ... Low reverse brake
B2 ... Kickdown brake
OWC ... One way clutch

SHIFT PATTERNS

Two shift patterns are pre-stored in the control unit of this transaxle. One is the power pattern (for more powerful performance), and the other is the economy pattern (for improved fuel consumption and quieter operation).
The driver can select and switch to the desired pattern by using the power/economy select switch on the center console.
The solid lines shown in these shift patterns indicate up-shifts, and the broken lines indicate down-shifts. The reason why there is a difference between the shift points for up-shifts and for down-shifts is so that up-shifts and down-shifts will not occur frequently when driving at a speed in the vicinity of the shift point.
When the vehicle is stopped, there is a shift to 2nd gear in order to obtain a suitable "creeping", but when the accelerator pedal is then depressed the vehicle starts off in 1st gear.

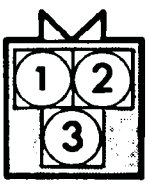
INSPECTION OF ELECTRONIC CONTROL SYSTEM COMPONENTS

1. Wiring

Based on the wiring diagram, check whether the continuity and grounding of each harness is OK.

- No continuity → Improper connection of connector, damaged or disconnected harness, or incorrect wiring connection. → Reconnect the connector; repair or replace the harness.
- Continuity → Normal

2. Oil-temperature sensor <1992 model>

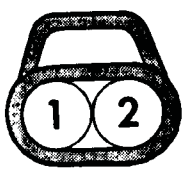


1 Low temperature side
2 Ground
3 High temperature side

Vary the thermo-sensitive part from low temperature to high temperature and check the resistance between the terminals 1 and 2 or 2 and 3.

- No continuity (resistance: ∞) → Damaged or disconnected wiring → Replace the oil-temperature sensor
- Changes of the resistance continuous and smooth. → Normal

3. Oil-temperature sensor <1993 model>



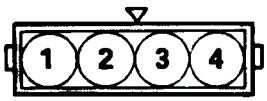
1 Oil temperature sensor
2 Ground

Vary the thermo-sensitive part temperature and check the resistance between the terminals 1 and 2.

- No continuity (resistance: ∞) → Damaged or disconnected wiring → Replace the oil-temperature sensor
- Changes of the resistance continuous and smooth. → Normal

4. Throttle-position sensor (TPS)

TPS terminal



1. Ground
2. Closed throttle position switch
3. Output
4. Power

Check the resistance between terminals 1 and 4 of the TPS.

Resistance: high or infinite → Damaged or disconnected wiring → Replace the TPS.

3.5 – 6.5 kΩ/20°C (68°F)

Check the resistance between terminals 4 and 2 with the engine idling after throttle-valve opening warm-up.

Resistance: more or less than 0.4 kΩ/20°C (68°F) → Improper adjustment → Readjust the TPS installation.

Resistance: approx. 0.4 kΩ/20°C (68°F)

Check for changes of the resistance between terminals 4 and 2 when the throttle valve is operated from the idling position to the fully open position.

Changes of the resistance are not continuous. → Poor contact → Replace the TPS.

Changes of the resistance continuous and smooth.

Normal

5. Pulse generator A or B

Check the resistance between terminals 1 and 2 or 3 and 4.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the pulse generator.

215–275 Ω/20°C (68°F) → Normal

Pulse generator terminals

2. pulse generator A
4. pulse generator B

6. Pulse generator A or B (checking by an oscilloscope)

Connect the pulse generator and body harness, and connect an oscilloscope. Check with the chassis on a dynamo or with the front wheels raised.

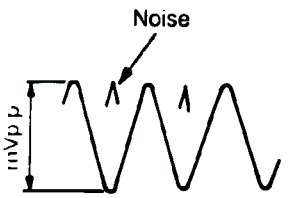
With the selector lever at the "L" position and the engine running at 1,000 rpm, check the voltage waveform between terminals 1 and 2.

Very low voltage → Incorrect installation of the pulse generator, or malfunction of the pulse generator. → Correct the installation condition, or replace the pulse generator.

Noise in the waveform → Improper grounding of the pulse generator circuit's shielded wiring. → Replace the pulse generator.

1,000 mVp-p or higher

Oscilloscope waveform

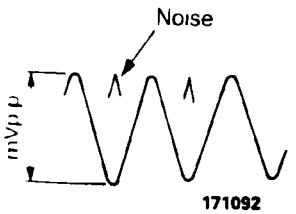


With the selector lever at the "L" position and the engine running at 1,000 rpm, check the voltage waveform between terminals 3 and 4.

Very low voltage → Incorrect installation of the pulse generator, or malfunction of the pulse generator. → Correct the installation condition, or replace the pulse generator.

Noise in the waveform → Improper grounding of the pulse generator circuit's shielded wiring. → Replace the pulse generator.

500 mVp-p or higher



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Normal

7. Pressure-control solenoid valve (PCSV)

Check the resistance between terminal 1 of the solenoid valve connector and the transaxle case.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the PCSV.

2.9 ± 0.3Ω / 20°C (68°F)

Connect 12 V between the transaxle case and terminal 1; switch ON and OFF and check for operation noise.

No operation noise. (stroke: 0.3 mm (.012 in.) or less) → Foreign material caught between the valve and guide → Replace the PCSV.

Noise exists.

Normal

Solenoid valve connector terminals

1: PCSV
2: TCC solenoid
3: SCSV-A
4: SCSV-B

8. Shift-control solenoid valve (SCSV) A or B

Check the resistance between terminal 3 or 4 of the solenoid valve connector and the transaxle case.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the SCSV.

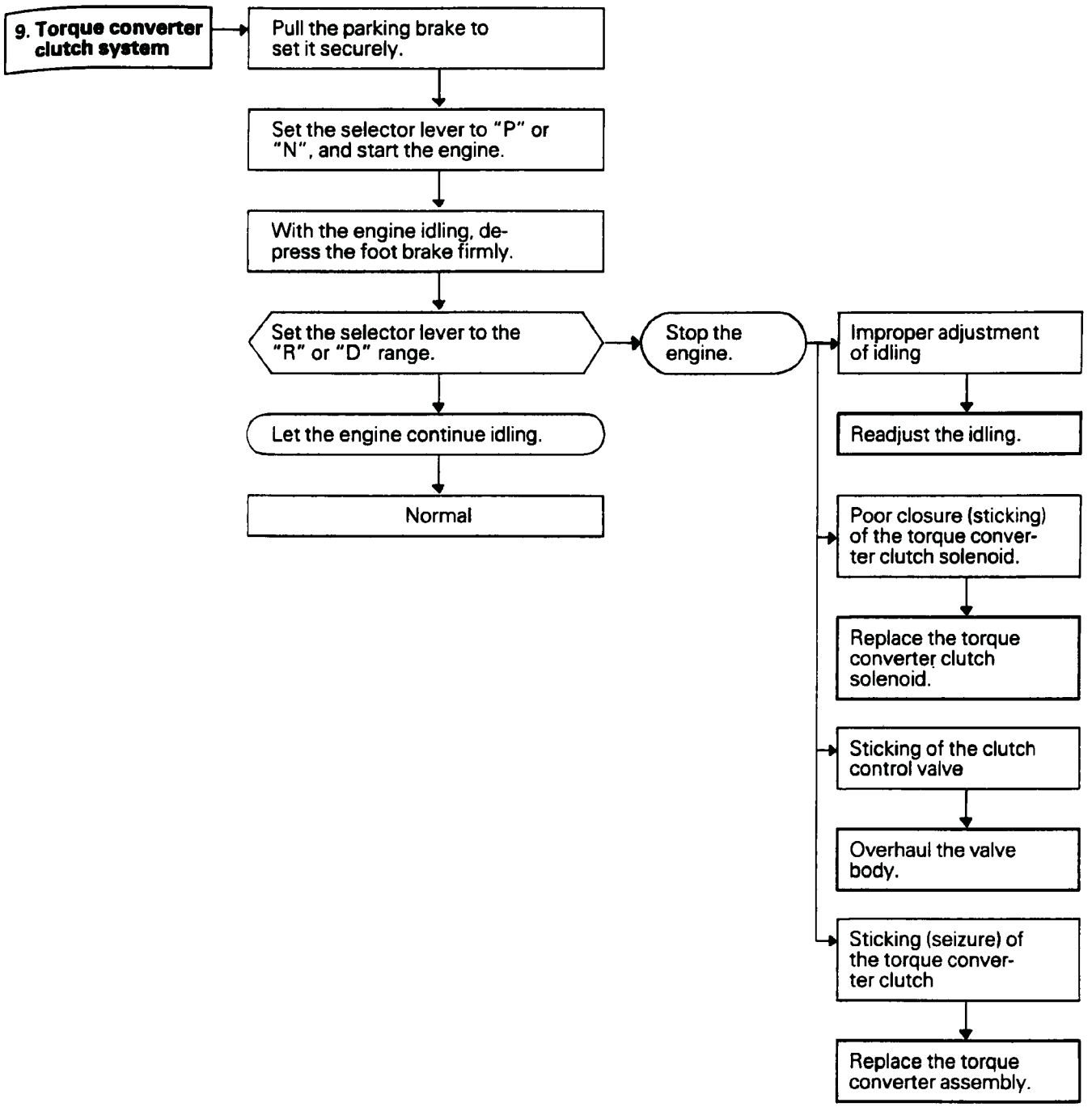
22.3 ± 1.5Ω / 20°C (68°F)

Connect 12V between the transaxle case and terminal 3 or 4; switch ON and OFF and check for operation noise of the solenoid valve, and check the valve stroke.

No operation noise. (stroke: 0.25 mm (.010 in.) or less) → Residue accumulated in valve and core. → Replace the SCSV.

Noise exists.

Normal



10. Torque converter clutch solenoid (TCC solenoid)

Check the resistance between terminal 2 of the solenoid valve connector and the transmission case.

Resistance: too low or too high

Short-circuit, or damaged or disconnected wiring.

Replace the TCC solenoid.

Standard value: 3 Ω/20%

Solenoid valve connector terminals

1: PCSV
2: TCC solenoid
3: SCSV-A
4: SCSV-B

Connect 12 V between the transmission case and terminal 2; switch ON and OFF and check for operation noise.

No operation noise. Check for sticking. * (Valve stroke: 0.3 mm (.012 in.) or less)

*Sticking is usually at the release side.

Foreign terminal caught between the valve and guide

Replace the TCC solenoid.

Noise exists.

Normal

11. Accelerator switch <1992 model only>

With the accelerator pedal not depressed, check the resistance between terminals 1 and 2.

No continuity (resistance: ∞)

Check the installation of the accelerator switch; adjust if necessary.

Problem not solved.

Replace the accelerator switch.

Continuity exists (resistance: 0)

With the accelerator pedal depressed slightly (about 5%), check the resistance between terminals 1 and 2.

Continuity exists (resistance: 0)

No continuity (resistance: ∞)

Normal

12. Park/neutral position switch <1992 model>

In the "P" range, check for continuity between terminals 3 and 4, and terminals 8 and 9.

Continuity exists

In the "R" range, check for continuity between terminals 4 and 7. and terminals 10 and 11.

Continuity exists

In the "N" range, check for continuity between terminals 2 and 4, and terminals 8 and 9.

Continuity exists

In the "D" range, check for continuity between terminals 4 and 6.

Continuity exists

In the "2" range, check for continuity between terminals 1 and 4.

Continuity exists

In the "L" range, check for continuity between terminals 4 and 5.

Continuity exists

Normal

No continuity → Poor contact, or damaged or disconnected wiring.

Replace the park/ neutral position switch.

13. Park/neutral position switch <1993 model>

In the "P" range, check for continuity between terminals 3 and 4, and terminals 7 and 8.

Continuity exists

In the "R" range, check for continuity between terminals 2 and 3, and terminals 5 and 6.

Continuity exists

In the "R" range, check for continuity between terminals 2 and 3, and terminals 5 and 6.

Continuity exists

In the "D" range, check for continuity between terminals 3 and 10.

Continuity exists

In the "2" range, check for continuity between terminals 3 and 11.

Continuity exists

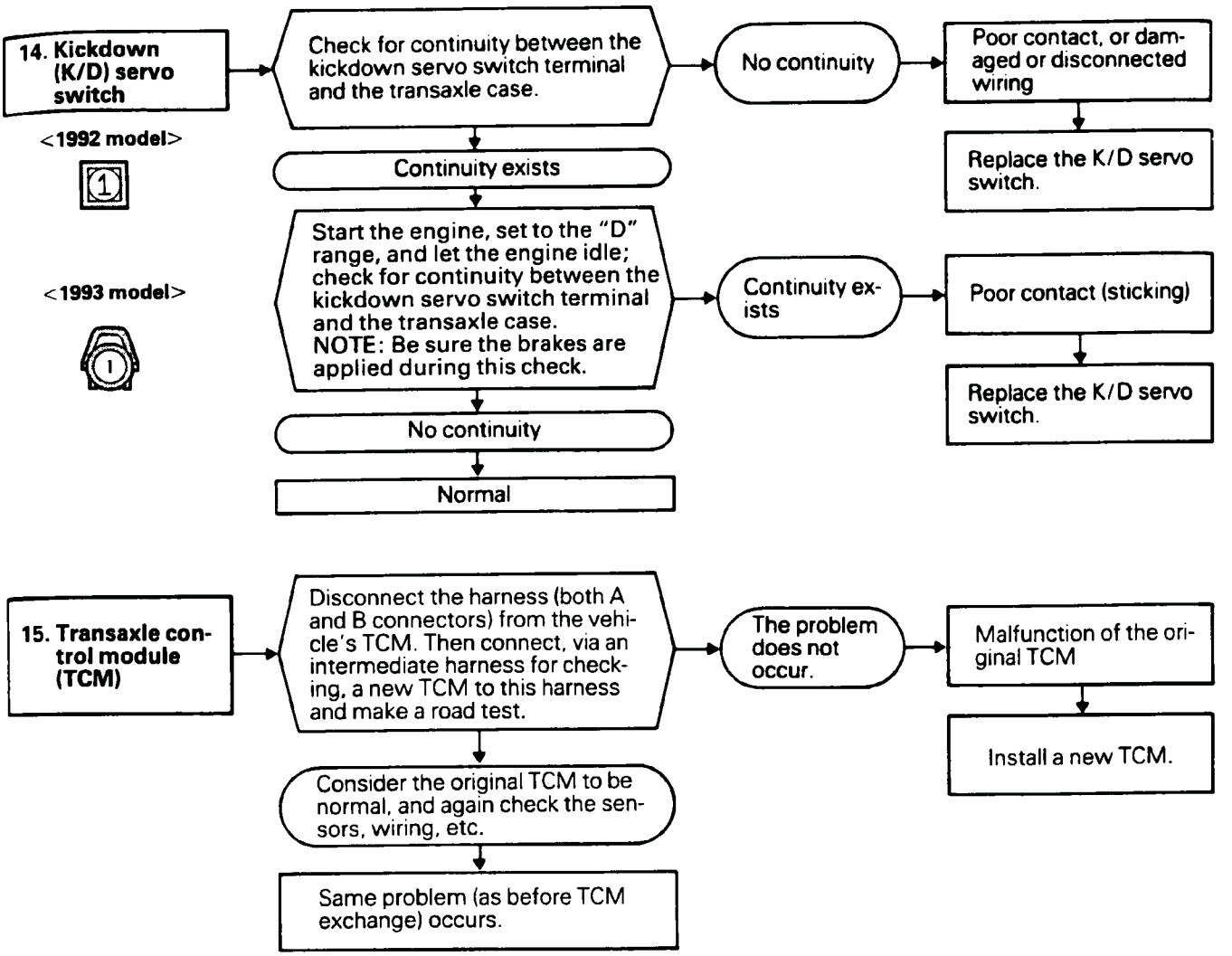
In the "L" range, check for continuity between terminals 3 and 9.

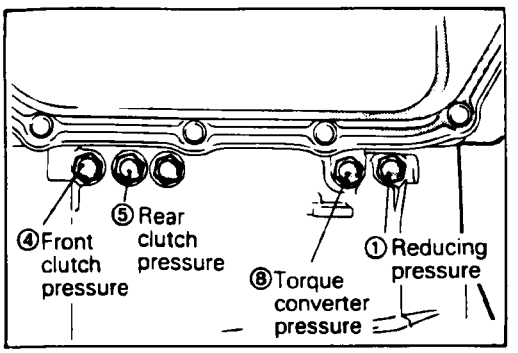
Continuity exists

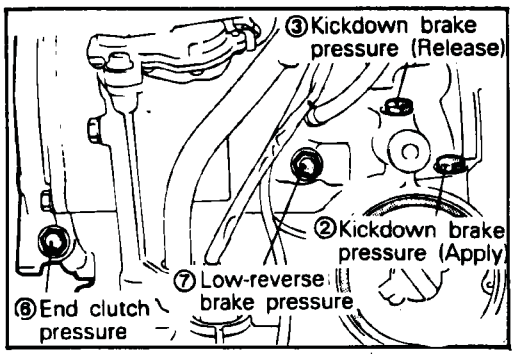
Normal

No continuity → Poor contact, or damaged or disconnected wiring.

Replace the park/neutral position switch.







OIL PRESSURE TESTS

1. Completely warm up the transaxle.
2. Raise the vehicle by using a jack so that the front wheels can be rotated.
3. Connect an engine tachometer and place it in a position where it's easy to see.
4. Attach the special oil-pressure gauge (MD998330 or MD999563) and the adaptor (MD998332) to each oil-pressure outlet port.
   When the reverse position pressure is to be tested, the 3,000 kPa (400 psi) type of gauge should be used.
5. Measure the oil pressure under various conditions, and check to be sure that the measured results are within the standard value range shown in the "Standard oil pressure table" below.
   If the oil pressure is not within the specified range, check and repair as described in the section "Remedial steps if oil pressure is not normal" on the next page.

Stall Speed Below Specification in "D" and "R"

If stall speed is lower than specification, insufficient engine output or faulty torque converter is suspected. Check for engine misfiring, ignition timing, valve clearance, etc. If these are good, torque converter is faulty.

Stall speed: 2,200 – 3,200 rpm

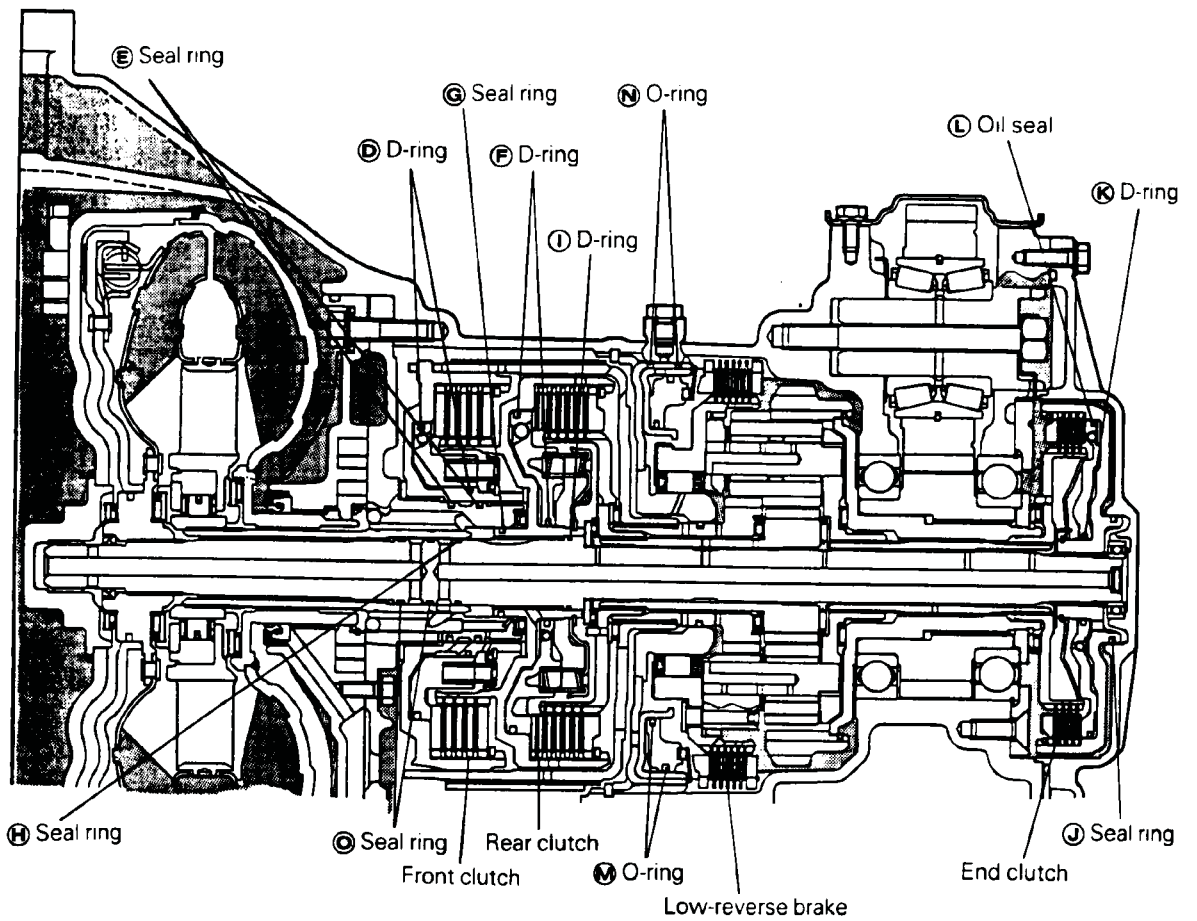
STANDARD OIL PRESSURE TABLE

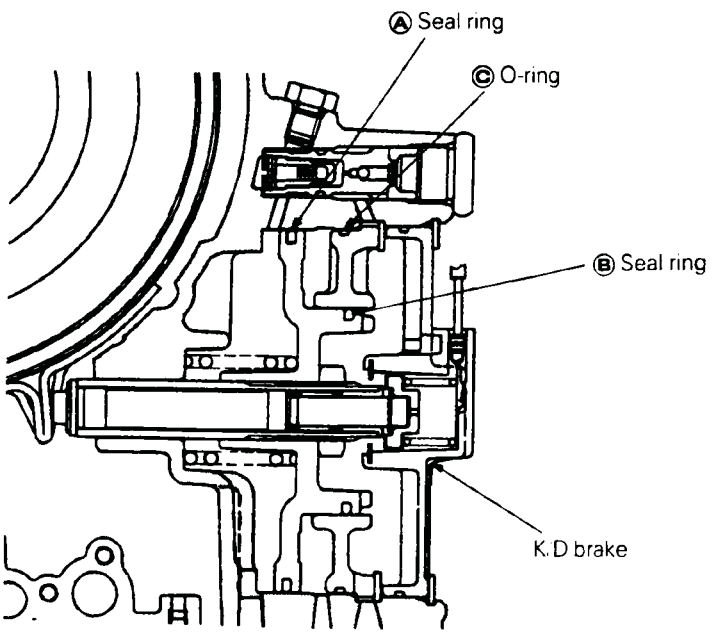
No.	Conditions			Standard oil pressure kPa (psi)							
	Select lever position	Engine speed rpm	Gear position	① Reducing pressure	② K/D brake pressure (application)	③ K/D brake pressure (release)	④ Front clutch pressure	⑤ Rear clutch pressure	⑥ End clutch pressure	⑦ Low-reverse brake pressure	⑧ Torque converter pressure
1	N	Idling	Neutral	360 – 480 (51 – 68)	–	–	–	–	–	–	☆
2	D	Idling	2nd	360 – 480 (51 – 68)	100 – 210 (14 – 30)	–	–	730 – 830 (104 – 118)	–	–	☆
3	D (SW-ON)	Approx. 2,500	4th	360 – 480 (51 – 68)	830 – 900 (118 – 128)	–	–	–	830 – 900 (118 – 128)	–	450 – 650 (64 – 92)
4	D (SW-OFF)	Approx. 2,500	3rd	360 – 480 (51 – 68)	830 – 900 (118 – 128)	830 – 900 (118 – 128)	830 – 900 (118 – 128)	830 – 900 (118 – 128)	830 – 900 (118 – 128)	–	450 – 650 (64 – 92)
5	2	Approx. 2,500	2nd	360 – 480 (51 – 68)	830 – 900 (118 – 128)	–	–	830 – 900 (118 – 128)	–	–	450 – 650 (64 – 92)
6	L	Approx. 1,000	1st	360 – 480 (51 – 68)	–	–	–	830 – 900 (118 – 128)	–	300 – 450 (43 – 64)	☆
7	R	Approx. 2,500	Reverse	360 – 480 (51 – 68)	–	1,640 – 2,240 (233 – 319)	1,640 – 2,240 (233 – 319)	–	–	1,640 – 2,240 (233 – 319)	450 – 650 (64 – 92)
		Approx. 1,000	Reverse	360 – 480 (51 – 68)	–	1,000 (142) or more	1,000 (142) or more	–	–	1,000 (142) or more	450 – 650 (64 – 92)

NOTE
(1) –: Indicates pressure is below 10 kPa (1.4 psi).
(2) SW-ON: OD switch in ON position.
(3) SW-OFF: OD switch in OFF position.
(4) ☆ Pressure is not standard.

REMEDIAL ACTION TO TAKE FOR INADEQUATE OIL PRESSURE

Symptom	Possible cause	Remedy
1. All line pressures are low (or high). NOTE: Line pressures are ②, ③, ④, ⑤, ⑥ and ⑦ shown on the Standard Oil Pressure Table on the preceding page.	a. Plugged oil filter b. Improperly adjusted regulator valve line pressure c. Defective valve body assembly d. Valve body left loose e. Improper oil pump delivery pressure	a. Visually check oil filter and replace it if plugged. b. Measure line pressure (②) (K/D brake pressure) and readjust line pressure if it is out of specifications. Or, replace valve body assembly. c. Replace valve body assembly. d. Torque valve body clamp bolt and mounting bolt to specification. e. Check oil pump gear side clearance and replace oil pump assembly as necessary.
2. Improper reducing pressure	a. Plugged reducing pressure circuit filter (L-shaped) b. Improperly adjusted reducing pressure c. Defective valve body assembly	a. Disassemble valve body assembly to check filter and replace filter if it is plugged. b. Measure reducing pressure (①) and readjust as necessary. c. Replace valve body assembly.
3. Improper K/D brake pressure (application)	a. Defective seal ring Ⓐ and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly.
4. Improper K/D brake pressure (release)	a. Defective seal ring Ⓐ and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly.
5. Improper front clutch pressure	a. Defective seal ring Ⓐ and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly c. Worn front clutch piston and retainer or defective D-ring Ⓓ or seal ring Ⓔ	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly. c. Disassemble transaxle and check front clutch piston and retainer for wear and D-ring and seal ring for damage. Replace piston, retainer, D-ring, or seal ring as necessary.
6. Improper rear clutch pressure	a. Defective D-ring Ⓕ of piston, seal ring Ⓖ of retainer, and seal ring Ⓗ and D-ring Ⓘ of input shaft b. Defective valve body assembly	a. Disassemble rear clutch and check input shaft D-ring, center support seal ring, and piston D-ring; replace if damaged or scratched. b. Replace valve body assembly.
7. Improper end clutch pressure	a. Defective seal ring Ⓙ, D-ring Ⓚ, and oil seal Ⓛ of end clutch b. Defective valve body assembly	a. Disassemble the end clutch and check piston oil seal, D-ring, and center support seal ring; replace if damage or scratches are evident. b. Replace valve body assembly.
8. Improper low-reverse brake pressure	a. Damaged O-ring between valve body and transmission b. Defective valve body assembly c. Defective D-ring Ⓜ of piston or O-ring Ⓝ of center support	a. Remove valve body assembly and check O-ring on top of upper valve body; replace if damage or scratches are evident. b. Replace valve body assembly. c. Disassemble transaxle and check D-ring and O-ring; replace if damage or scratches are evident.
9. Improper torque converter pressure	a. Sticking torque converter clutch solenoid (TCC solenoid) or torque converter clutch control valve b. Plugged or leaky oil cooler and pipings c. Damaged seal ring Ⓞ of input shaft d. Defective torque converter	a. Check torque converter clutch system and TCC solenoid for operation. b. Repair or replace cooler or pipings. c. Disassemble transaxle and check seal ring; replace if it is damaged. d. Replace torque converter.

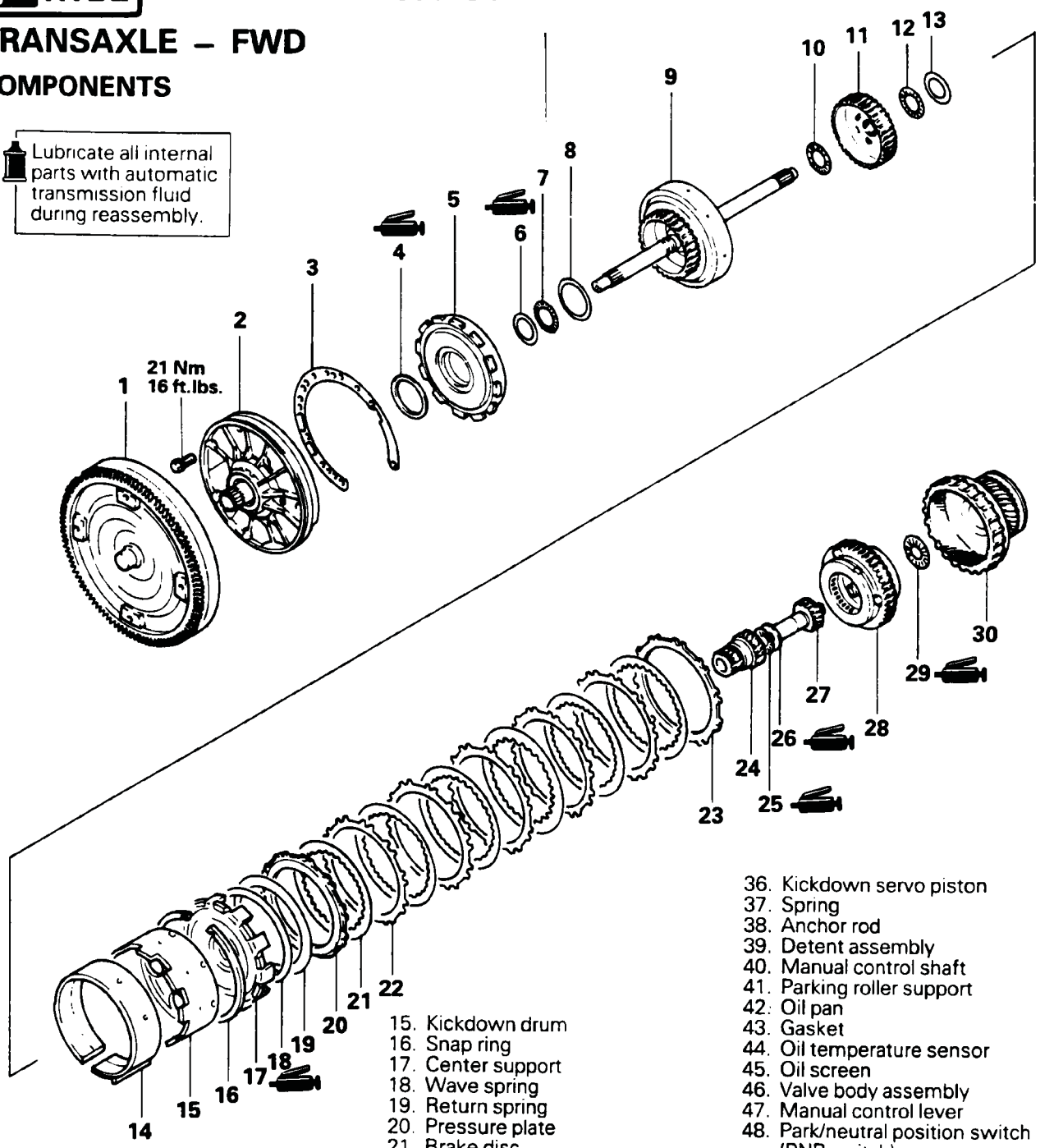




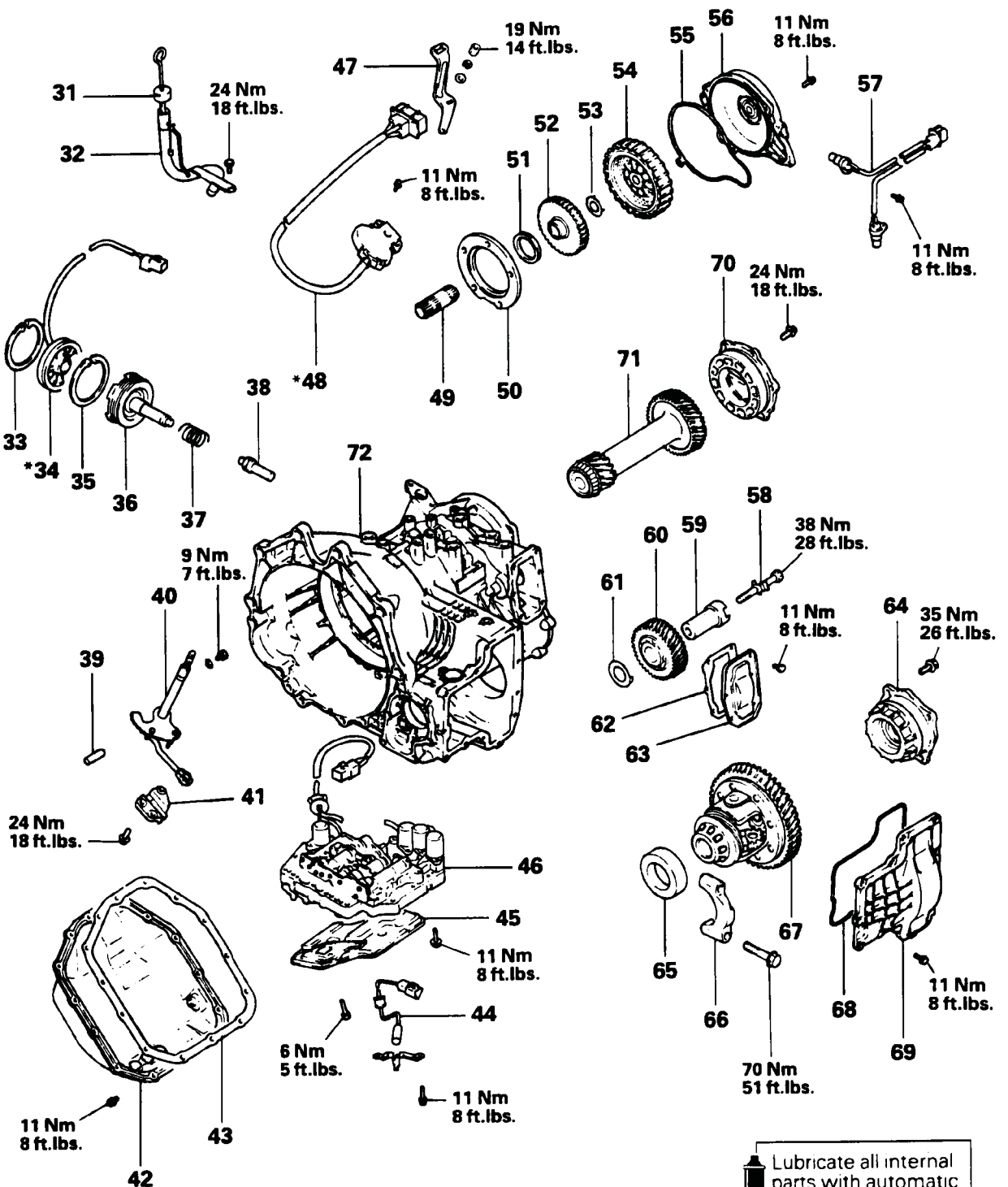
TRANSAXLE – FWD

COMPONENTS

Lubricate all internal parts with automatic transmission fluid during reassembly.



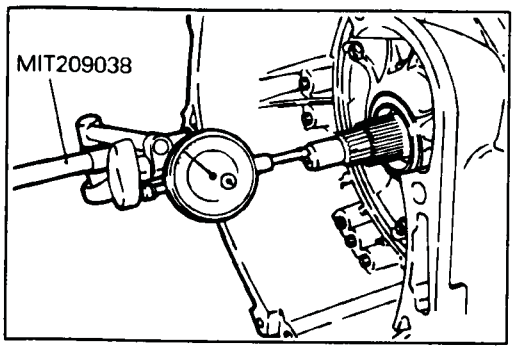
1. Torque converter
2. Oil pump assembly
3. Gasket
4. Thrust washer #1
5. Front clutch assembly
6. Thrust race #3
7. Thrust bearing #4
8. Thrust washer #2
9. Rear clutch assembly
10. Thrust bearing #5
11. Rear clutch hub
12. Thrust race #6
13. Thrust bearing #7
14. Kickdown band
15. Kickdown drum
16. Snap ring
17. Center support
18. Wave spring
19. Return spring
20. Pressure plate
21. Brake disc
22. Brake plate
23. Reaction plate
24. Reverse sun gear
25. Thrust bearing #8
26. Thrust race #9
27. Forward sun gear
28. Planetary carrier assembly
29. Thrust bearing #10
30. Output flange
31. Oil level gauge
32. Oil filler tube
33. Snap ring
34. Kickdown servo switch
35. Snap ring
36. Kickdown servo piston
37. Spring
38. Anchor rod
39. Detent assembly
40. Manual control shaft
41. Parking roller support
42. Oil pan
43. Gasket
44. Oil temperature sensor
45. Oil screen
46. Valve body assembly
47. Manual control lever
48. Park/neutral position switch (PNP switch)
49. End clutch shaft
50. Bearing retainer
51. Thrust bearing #11
52. End clutch hub
53. Thrust washer
54. End clutch assembly
55. O-ring
56. End clutch cover
57. Pulse generator
58. Lock bolt
59. Idler shaft
60. Idler gear
61. Spacer
62. Gasket



Lubricate all internal parts with automatic transmission fluid during reassembly.

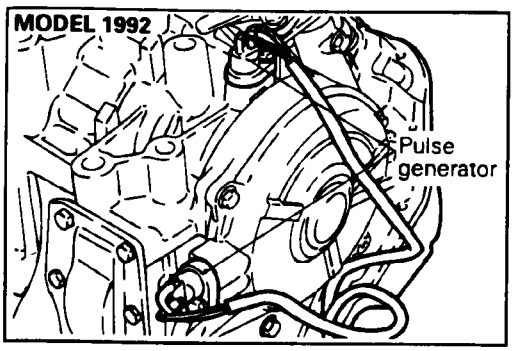
63. Idler gear cover
64. Differential bearing retainer
65. Outer race
66. Differential front bearing cap
67. Differential assembly
68. Gasket
69. Differential cover
70. Outer bearing retainer
71. Transfer shaft
72. Transaxle case

NOTE:
On 1993 and subsequent models, *-marked parts have the connecter directly attached, not via a harness.

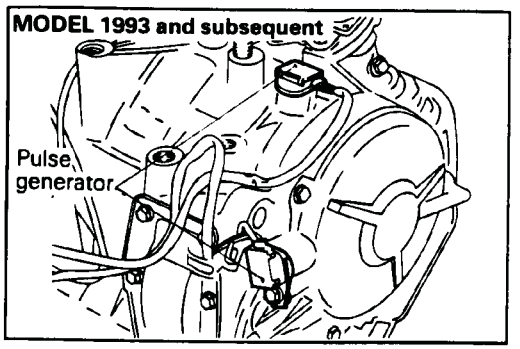


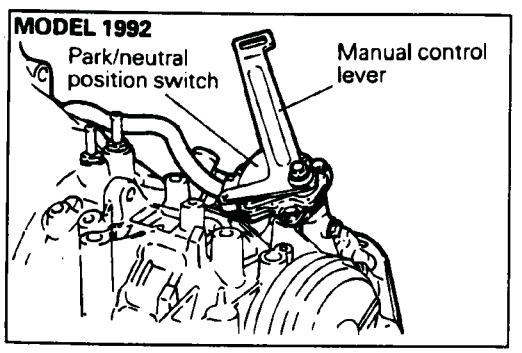
DISASSEMBLY

1. Clean away any sand, mud, etc. adhered around the transaxle.
2. Place the transaxle assembly on the workbench with the oil pan down.
3. Remove the torque converter.
4. Use the special tool to mount the dial gauge on the transmission case and measure the end play of the input shaft.

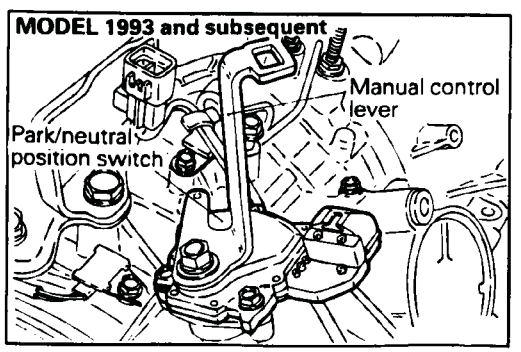


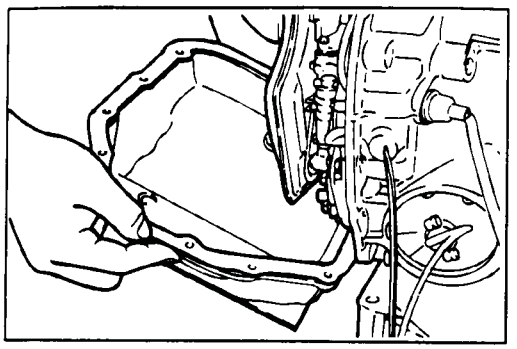
5. Remove the pulse generator "A" and "B".



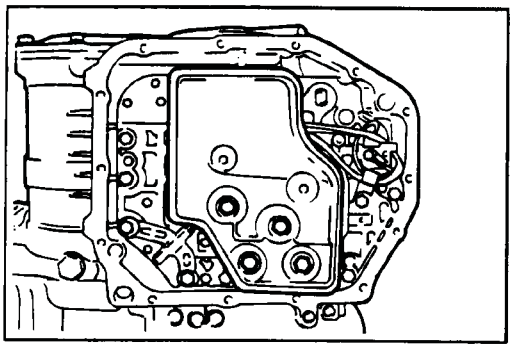


6. Remove manual control lever then remove park/neutral position switch (PNP switch).

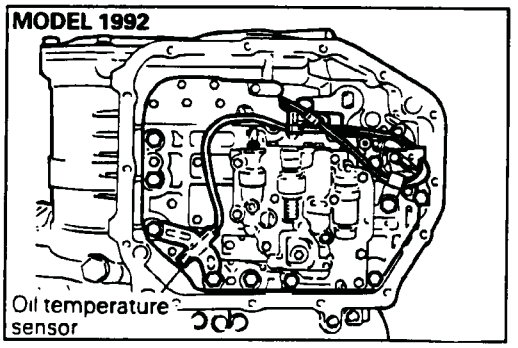




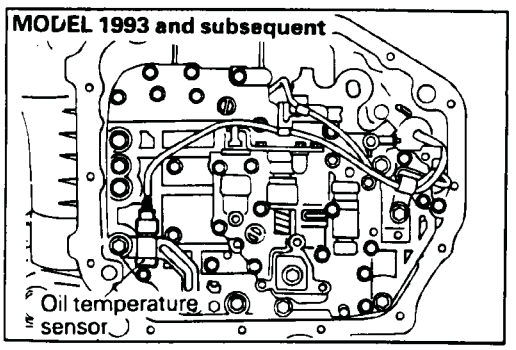
7. Remove the oil pan, magnets and gasket.

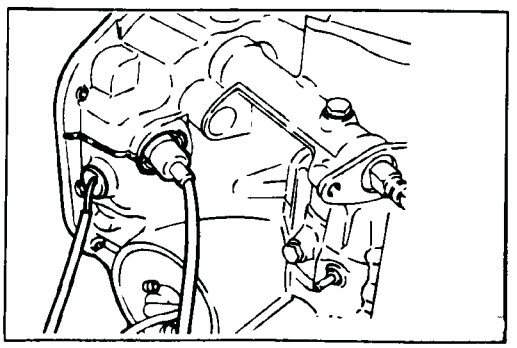


8. Remove the oil filter from the valve body.

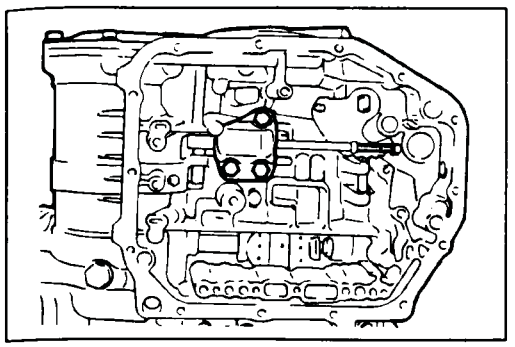


9. Remove the 10 valve body mounting bolts.
10. Remove the oil temperature sensor harness from the clamp.

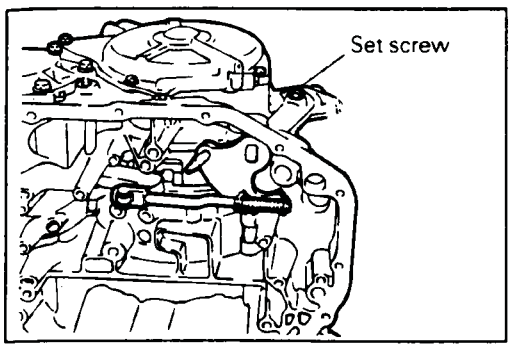




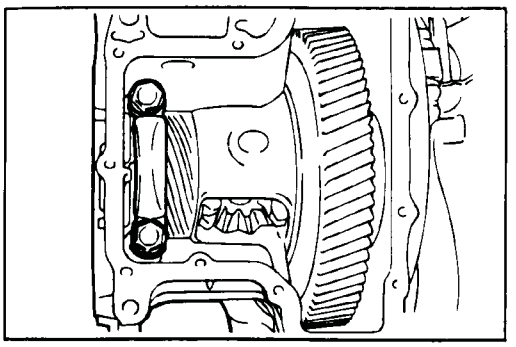
11. Press the finger of the solenoid valve harness grommet, push the grommet into the case and remove the valve body assembly.
12. Pull out the oil temperature sensor.



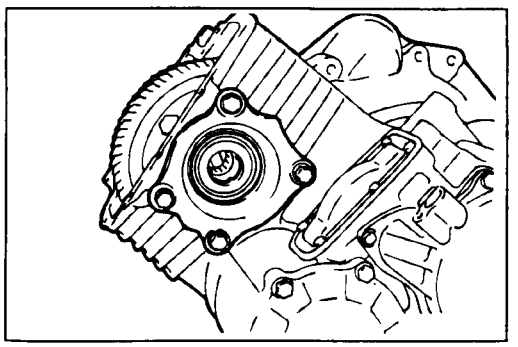
13. Remove the parking roller support.



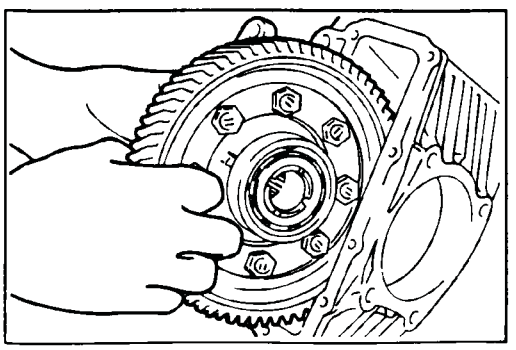
14. Remove the set screw of the manual control shaft and remove the manual control shaft assembly.
15. Remove the detent assembly.



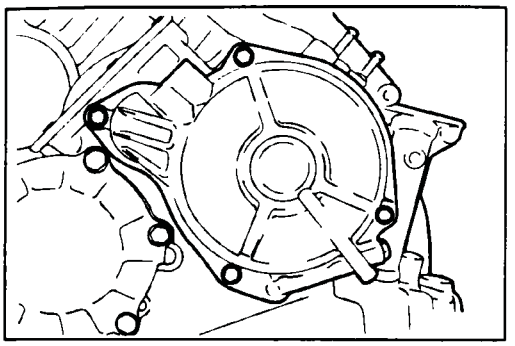
16. Remove the differential cover and gasket.
17. Remove the differential front bearing cap.



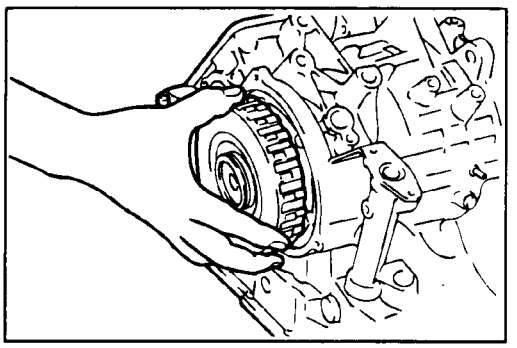
18. Remove the differential bearing retainer, spacer and outer race.



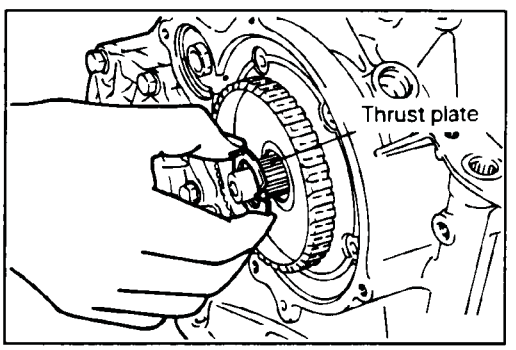
19. Remove the differential assembly.



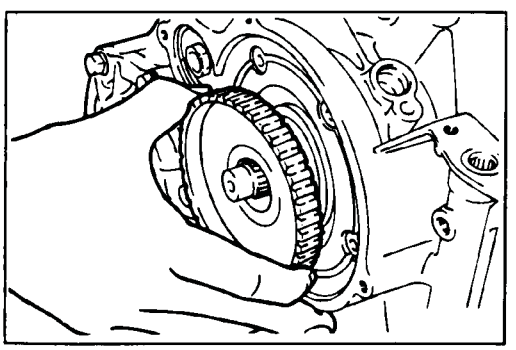
20. Take out the end clutch cover installation bolts, then remove the cover holder and end clutch cover.



21. Remove the end clutch assembly.

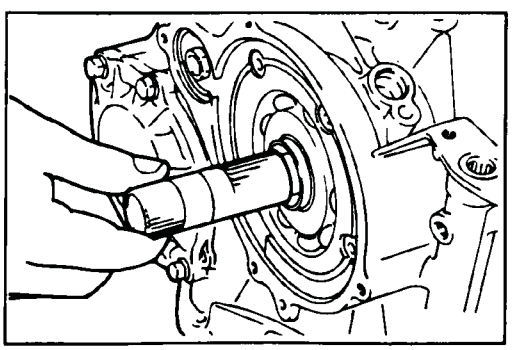


22. Remove the thrust plate.

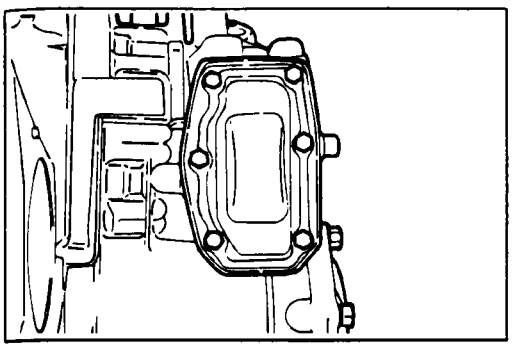


23. Remove the end clutch hub.
24. Remove the thrust bearing #11.

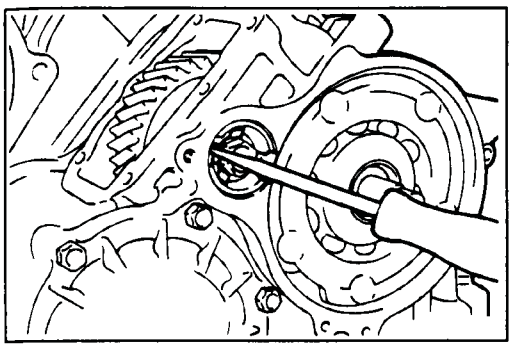
NOTE
It may be stuck to the end clutch hub.



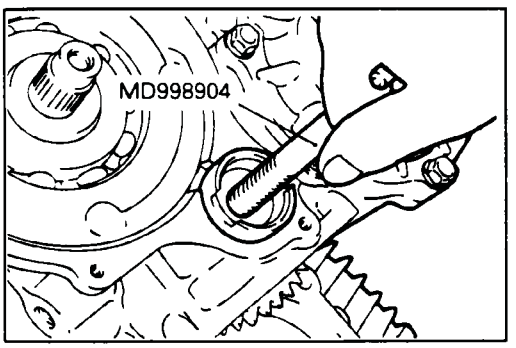
25. Pull out the end clutch shaft.



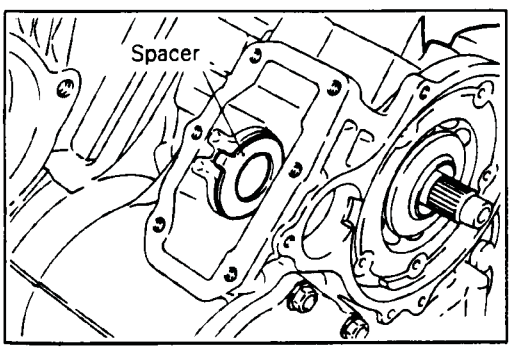
26. Remove the idler gear cover mounting bolts, then remove the idler gear cover and gasket.



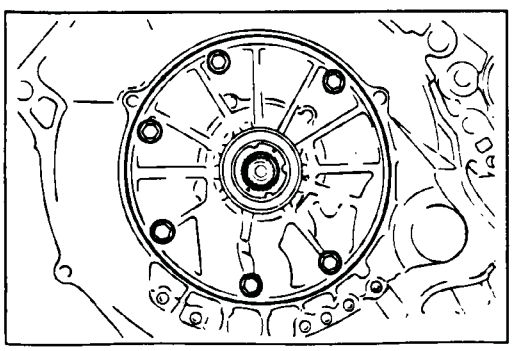
27. Disengage the bolt stopper and remove the bolt.



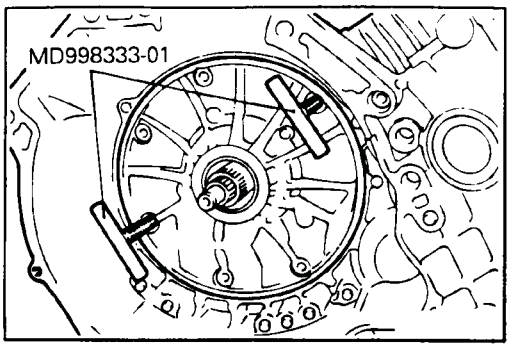
28. Using the special tool, pull out the idler shaft and then remove the idler gear and bearing inner race.



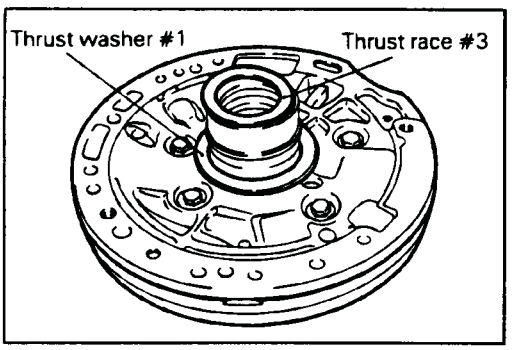
29. Remove the spacer.



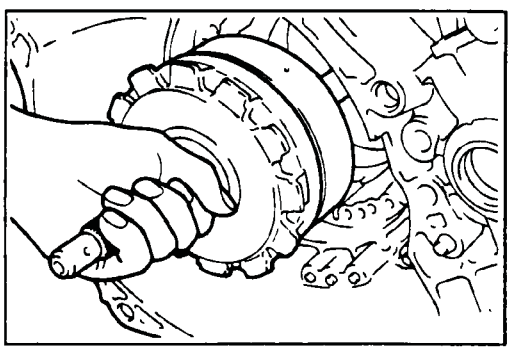
30. Remove oil pump installation bolts.



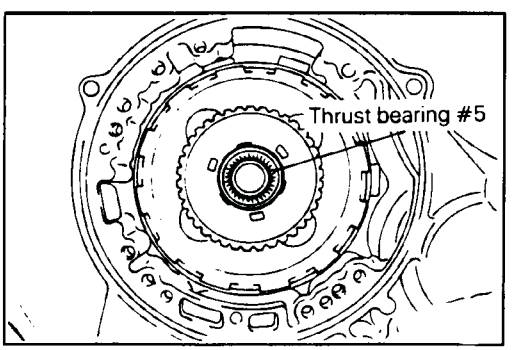
31. Use the special tool and remove the oil pump.



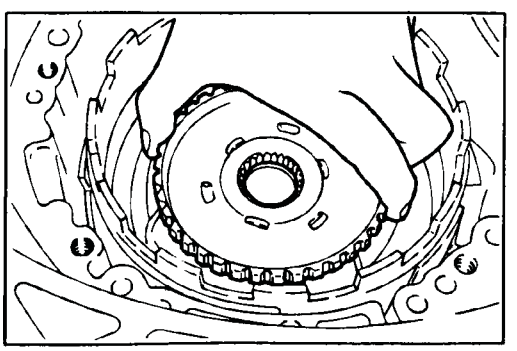
32. Remove thrust washer #1 and thrust race #3.



33. Hold the input shaft and remove the front clutch assembly and rear clutch assembly together.

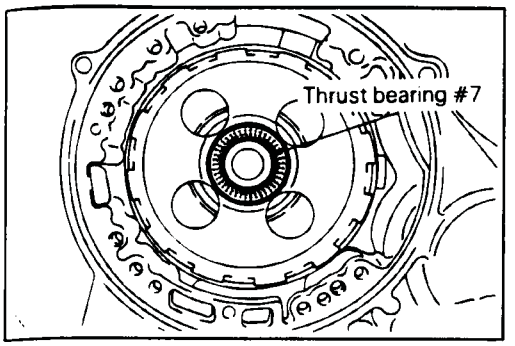


34. Remove the thrust bearing #5.

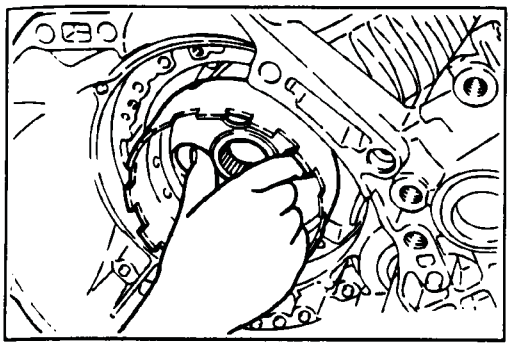


35. Remove the clutch hub.

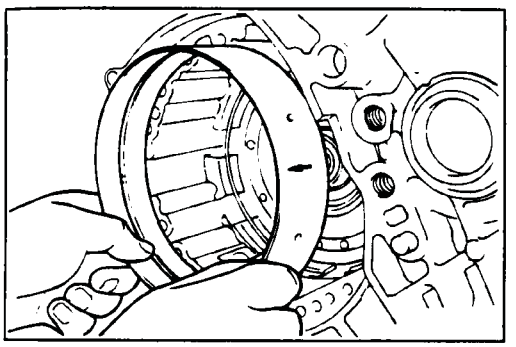
NOTE
The thrust race may be stuck to the clutch hub.



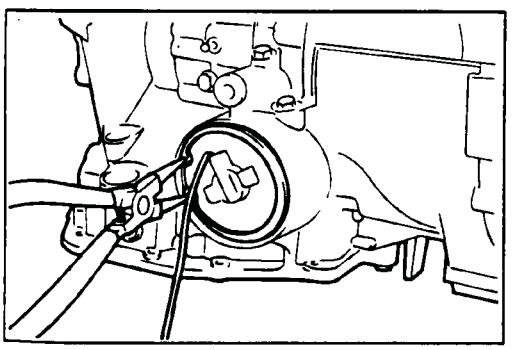
36. Remove the thrust bearing #7.



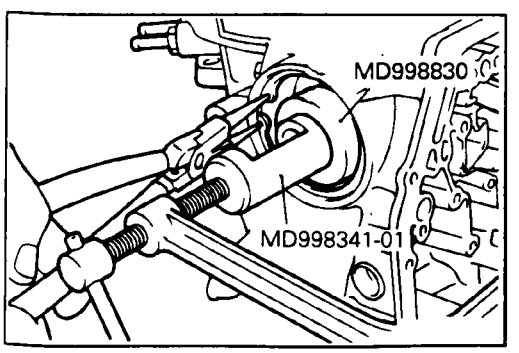
37. Remove the kickdown drum.



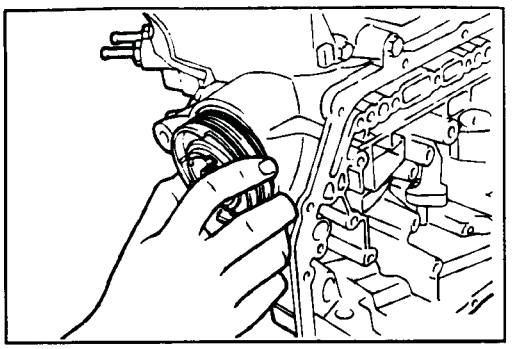
38. Remove the kickdown band.



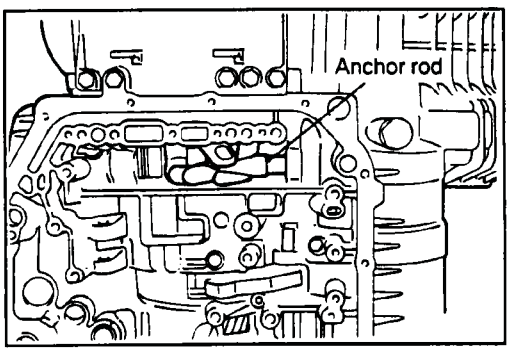
39. Remove the kickdown servo cover snap ring. Then remove the kickdown servo switch.



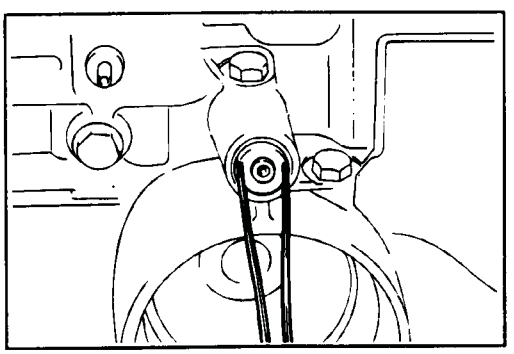
40. Using the special tool, push in the kickdown servo and remove the snap ring.



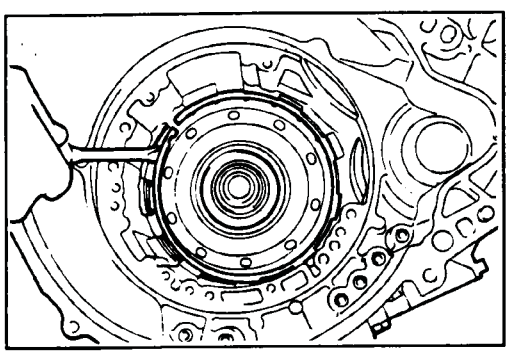
41. Remove the kickdown servo piston.



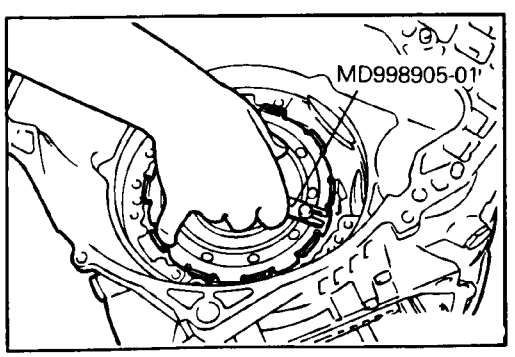
42. Remove the anchor rod.



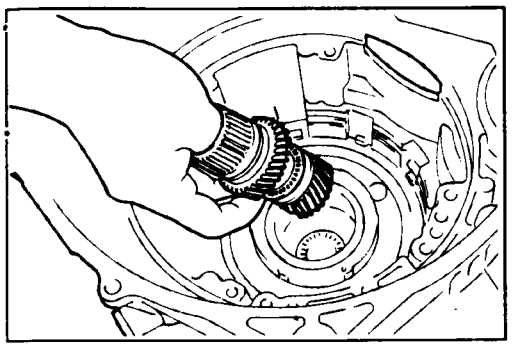
43. Remove the plug, then remove the air exhaust plug.



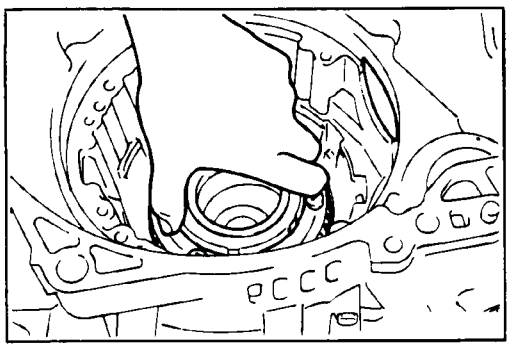
44. Remove the snap ring.



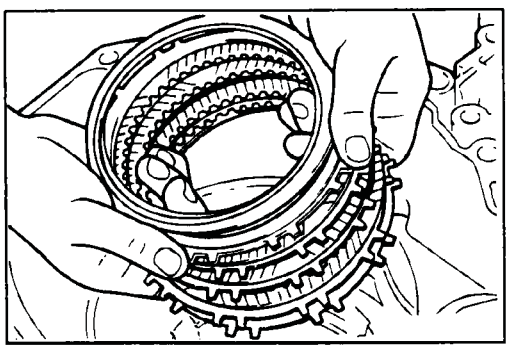
45. Using the special tool, remove the center support.



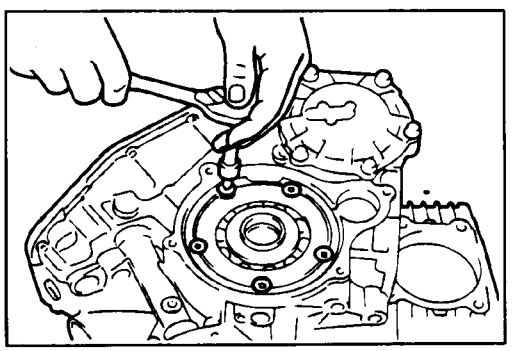
46. Remove reverse sun gear and forward sun gear together.



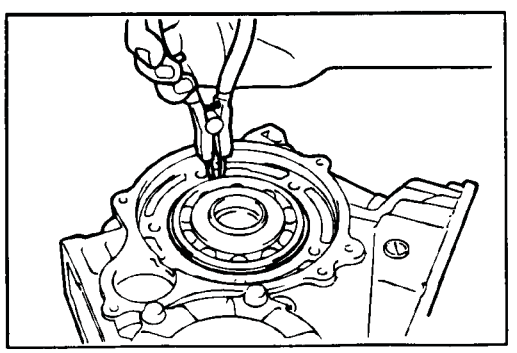
47. Remove planet carrier assembly.



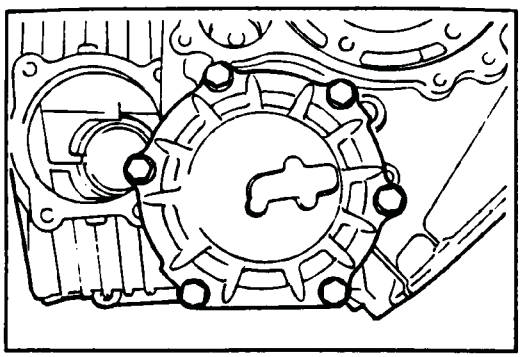
48. Remove the wave spring, return spring, reaction plate, brake discs, and brake plates.



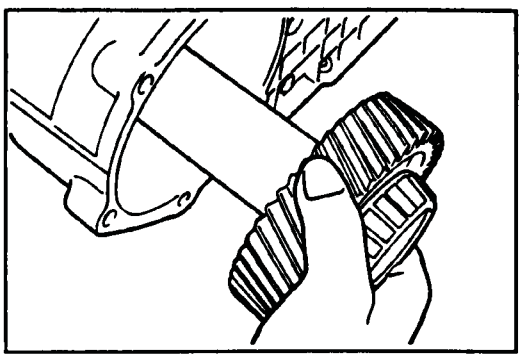
49. Remove the screws and the rear bearing retainer.



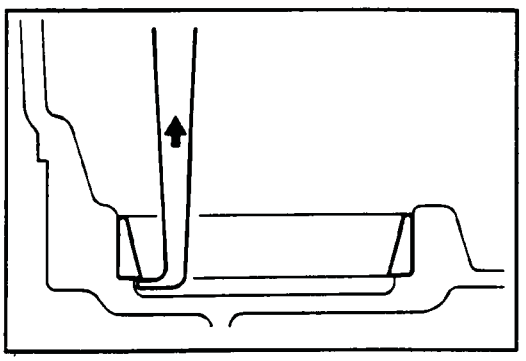
50. Remove the snap ring and then remove the output flange assembly.



51. Remove the output bearing retainer mounting bolts and then remove the output bearing retainer and outer race.



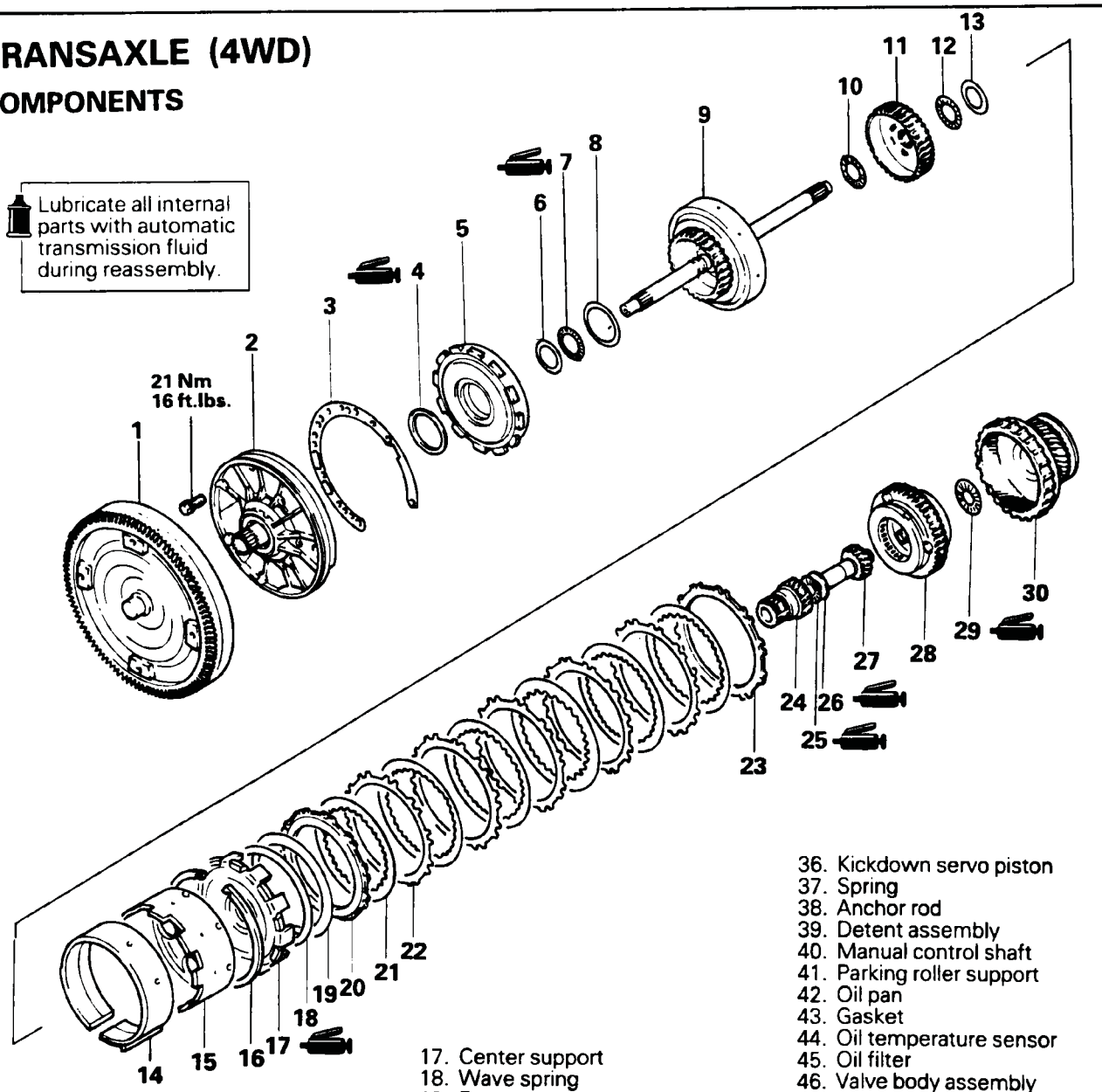
52. Remove the transfer shaft.



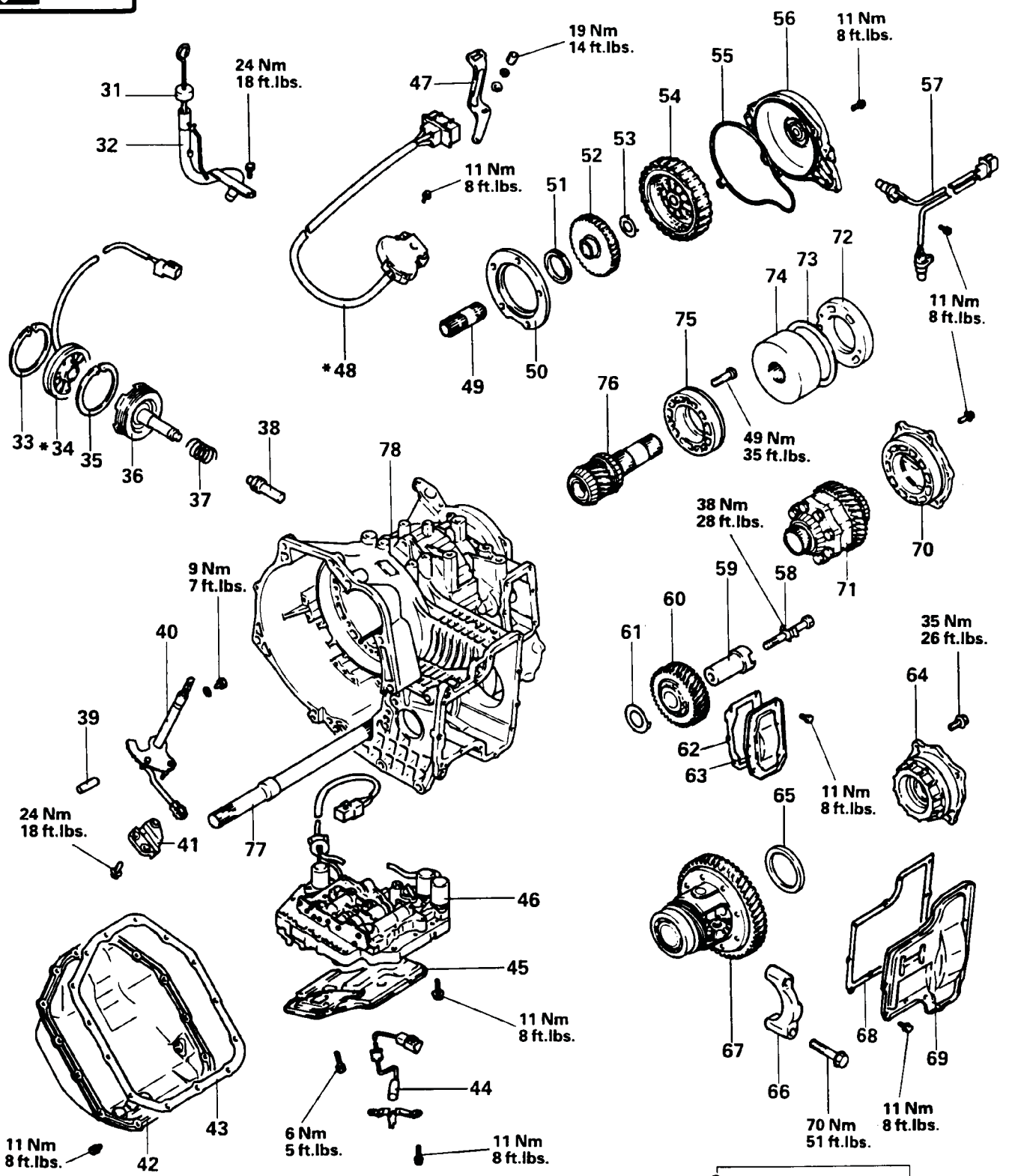
53. Use a sliding hammer, etc., to remove the outer race.
54. Remove all oil seals.

TRANSAXLE (4WD)

COMPONENTS



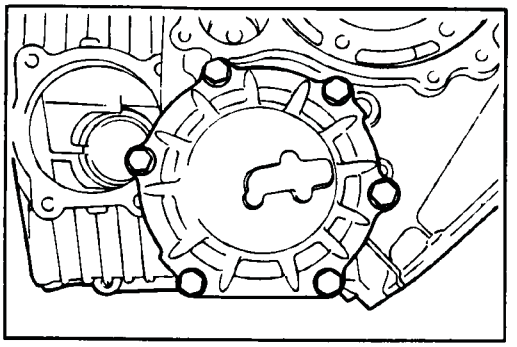
1. Torque converter
2. Oil pump assembly
3. Gasket
4. Thrust washer #1
5. Front clutch assembly
6. Thrust race #3
7. Thrust bearing #4
8. Thrust washer #2
9. Rear clutch assembly
10. Thrust bearing #5
11. Rear clutch hub
12. Thrust bearing #7
13. Thrust race #6
14. Kickdown band
15. Kickdown drum
16. Snap ring
17. Center support
18. Wave spring
19. Return spring
20. Pressure plate
21. Brake disc
22. Brake plate
23. Reaction plate
24. Reverse sun gear
25. Thrust bearing #8
26. Thrust race #9
27. Forward sun gear
28. Planetary carrier assembly
29. Thrust bearing #10
30. Output flange
31. Oil level gauge
32. Oil filler tube
33. Snap ring
34. Kickdown servo switch
35. Snap ring
36. Kickdown servo piston
37. Spring
38. Anchor rod
39. Detent assembly
40. Manual control shaft
41. Parking roller support
42. Oil pan
43. Gasket
44. Oil temperature sensor
45. Oil filter
46. Valve body assembly
47. Manual control lever
48. Park/neutral position switch (PNP switch)
49. End clutch shaft
50. Bearing retainer
51. Thrust bearing #11
52. End clutch hub
53. Thrust washer
54. End clutch assembly
55. O-ring
56. End clutch cover
57. Pulse generator
58. Lock bolt
59. Idler shaft
60. Idler gear
61. Spacer
62. Gasket



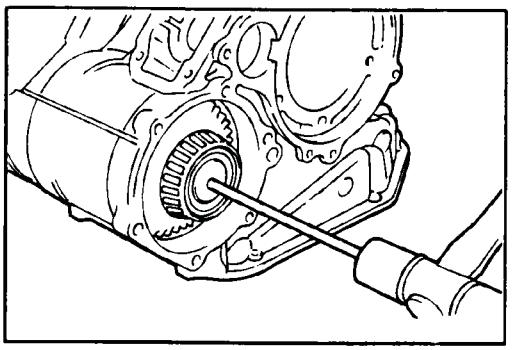
Lubricate all internal parts with automatic transmission fluid during reassembly.

63. Idler gear cover
64. Differential bearing retainer
65. Spacer
66. Differential front bearing cap
67. Differential assembly
68. Gasket
69. Differential cover
70. Output bearing retainer
71. Center differential assembly
72. Center bearing retainer
73. Stopper ring
74. Viscous coupling unit
75. Center bearing retainer
76. Front output shaft
77. Rear output shaft
78. Transaxle case

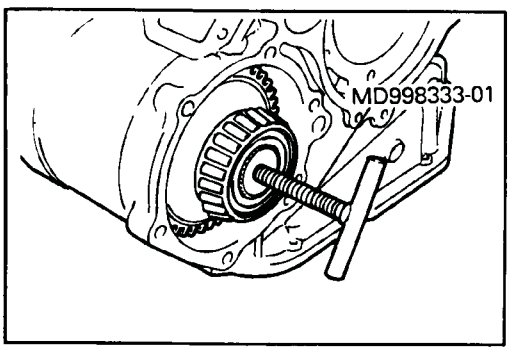
NOTE:
On 1993 and subsequent models, *-marked parts have the connecter directly attached, not via a harness.



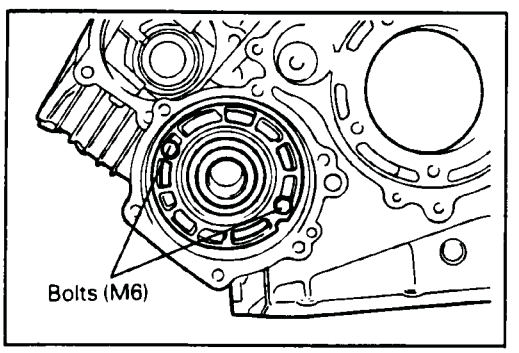
51. Remove the output bearing retainer mounting bolts and then remove the output bearing retainer and outer race.



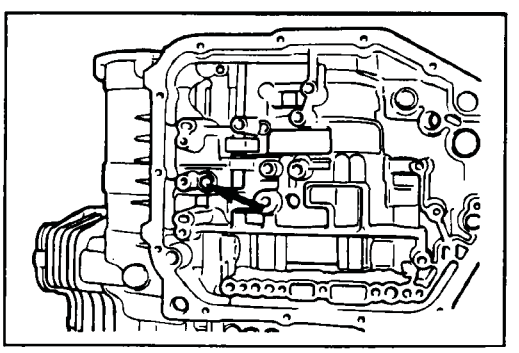
52. Insert a rod 8 mm (.31 in.) in diameter and 200 mm (7.87 in.) in length from the hole shown in the figure and punch out the rear output shaft.



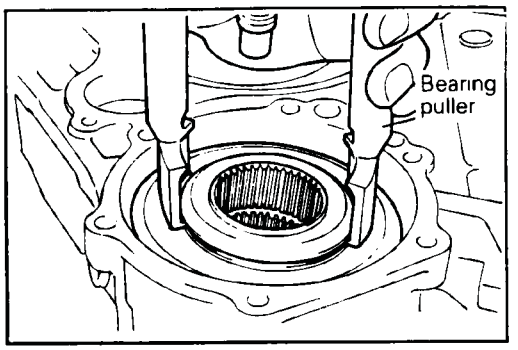
53. Using the special tool, remove the center differential.



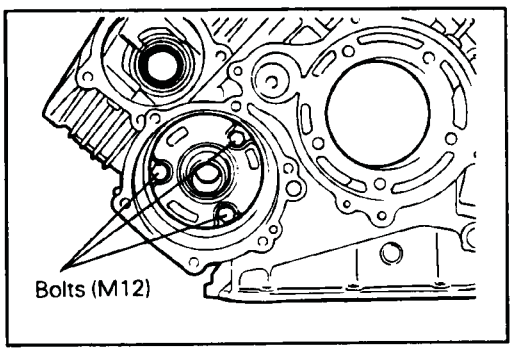
54. Put a bolt (M6) into the center bearing retainer and, holding that bolt, remove the center bearing retainer and outer race.



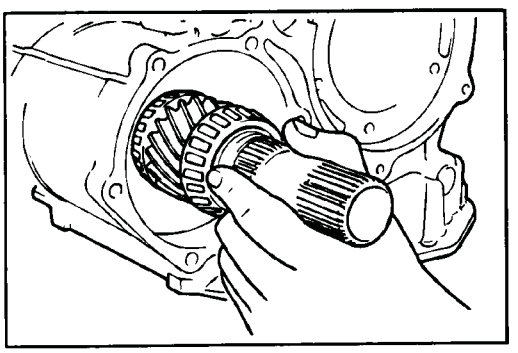
55. Remove the center bearing retainer stopper bolt.



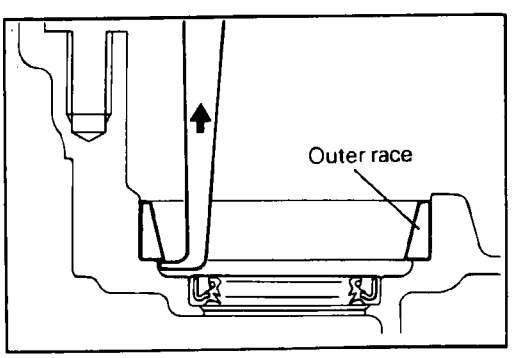
56. First remove the stopper ring and then put a bearing puller or similar tool in the viscous coupling groove and pull out the viscous coupling.



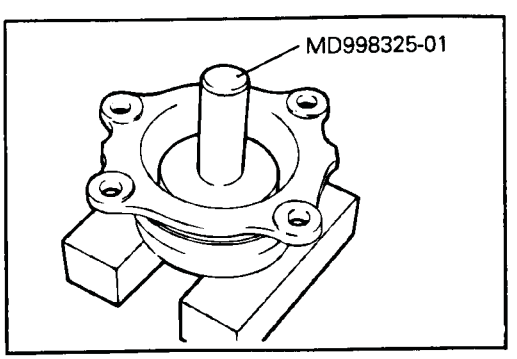
57. Remove the front bearing retainer mounting bolt (M10). Then, screw a bolt (M12) into the threaded hole of the front bearing retainer and, holding that bolt, remove the front bearing retainer and outer race.



58. Remove the front output shaft.

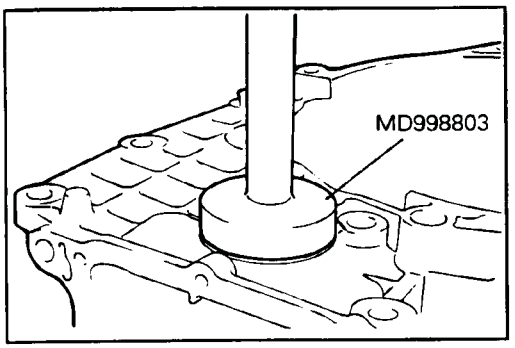


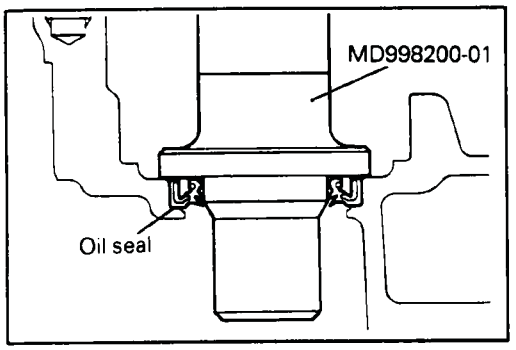
59. Using a sliding hammer or similar tool, remove the outer race.
60. Remove the oil seals.



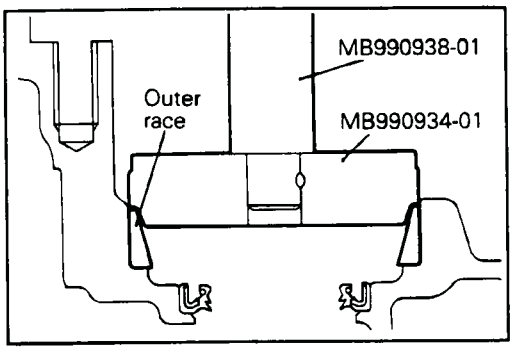
REASSEMBLY

1. Using the special tool, install the oil seals to the differential bearing retainer and transaxle case.

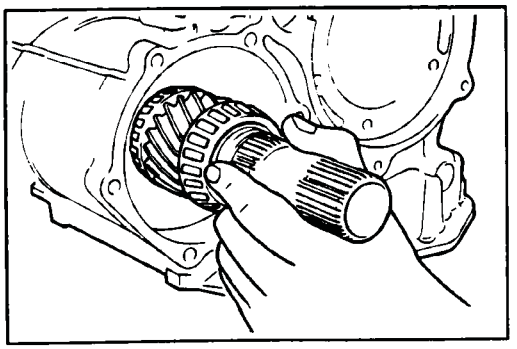




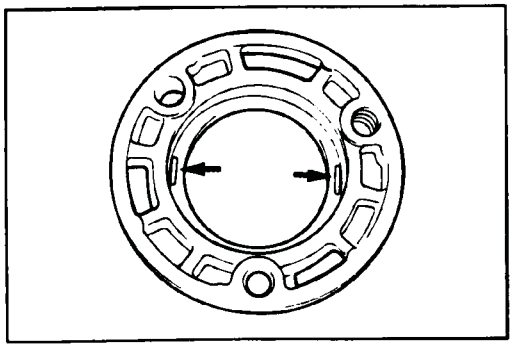
2. Using the special tool, install the rear output shaft oil seal.



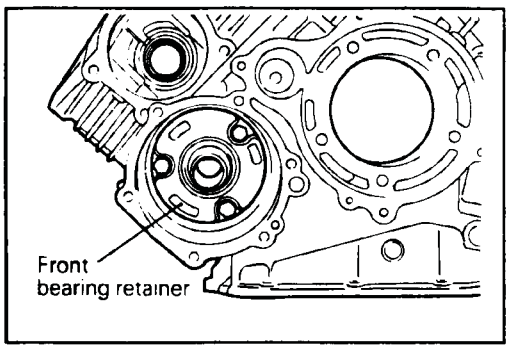
3. Using the special tool, press-fit the outer race in the transaxle case.

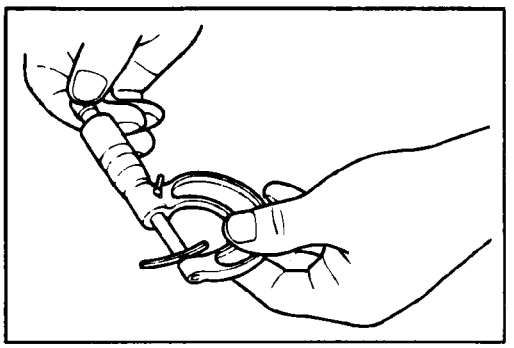


4. Install the front output shaft assembly.



5. Position the solder approx. 10 mm (40 in.) long by 1.6 mm (.06 in.) in diameter in the front bearing retainer in the position shown in the figure and then install the outer race.





6. Install the front bearing retainer and tighten the bolt with the specified torque.

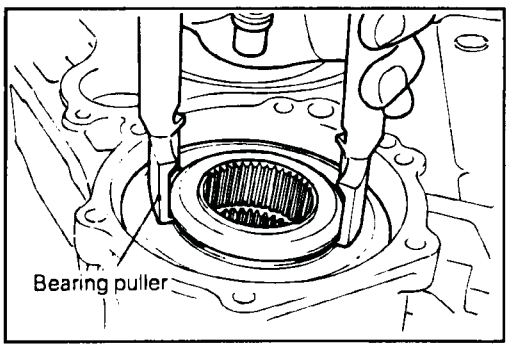
   Front bearing retainer mounting bolts:
   49 Nm (35 ft.lbs.)

7. Loosen the bolts and remove the front bearing retainer.
8. Remove the outer race from the front bearing retainer and remove the solder. If the solder does not break, perform the work in steps 5 – 8 with large diameter solder. Measure the thickness of the crushed solder with a micrometer and select a spacer with the correct thickness so the preload reaches the standard value.

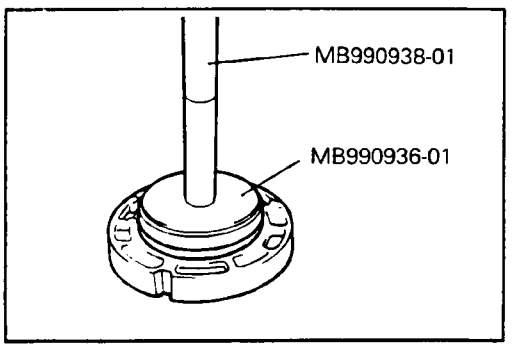
   Standard value: 0.055 – 0.115 mm (.0022 – .0045 in.)

9. Install the spacer selected in the previous step and the outer race in the front bearing retainer.
10. First install the front bearing retainer and apply sealant to the bolts and then tighten with the specified torque.

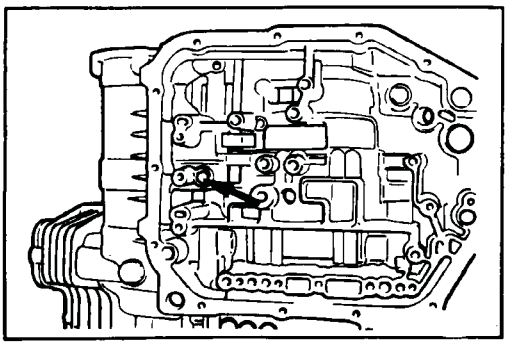
    Specified sealant:
    3M Stud Locking Part No. 4170 or equivalent
    Front bearing retainer mounting bolts:
    49 Nm (35 ft.lbs.)



11. Using a bearing puller, support the viscous coupling and insert in the case. Then, install the stopper ring.

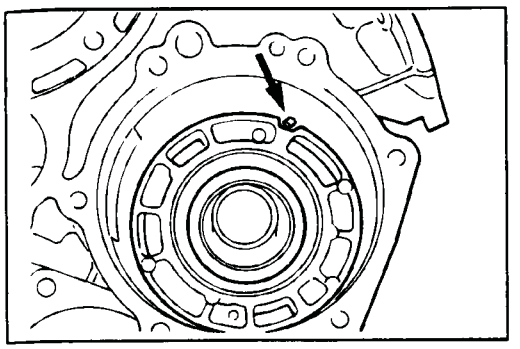


12. Using the special tool, install the outer race in the center bearing retainer.

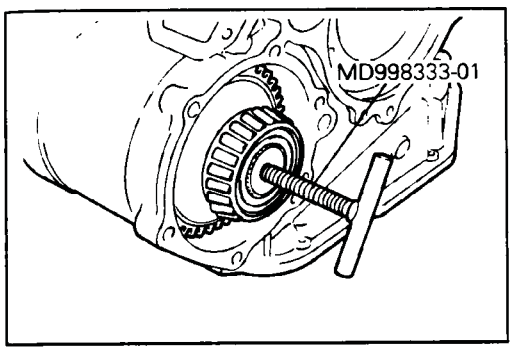


13. Install the center bearing retainer stopper bolt.

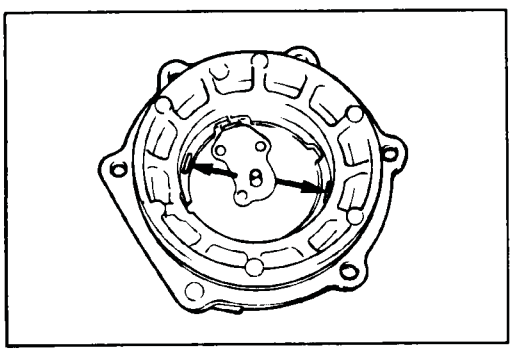
    Center bearing retainer stopper bolt: 5 Nm (4 ft.lbs.)



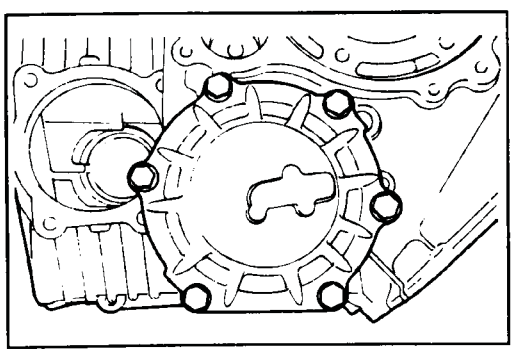
14. Install the center bearing retainer so the projection of the stopper bolt fits in the groove of the center bearing retainer.



15. Install the special tool in the center differential and install the center differential in the transaxle case.



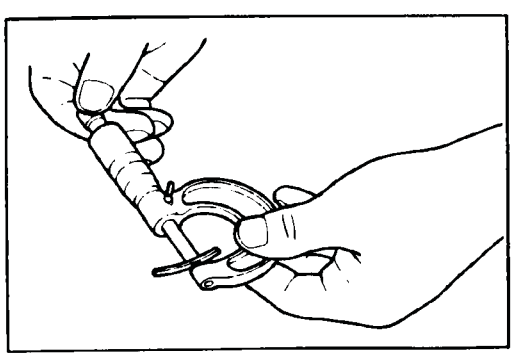
16. Place solder with a length approximately 10 mm (.39 in.) and diameter of 1.6 mm (.06 in.) on the output bearing retainer at the position shown in the diagram and install the outer race.



17. Install the output bearing retainer and tighten the bolts to the specified torque.

    Output bearing retainer mounting bolts:
    24 Nm (18 ft.lbs.)

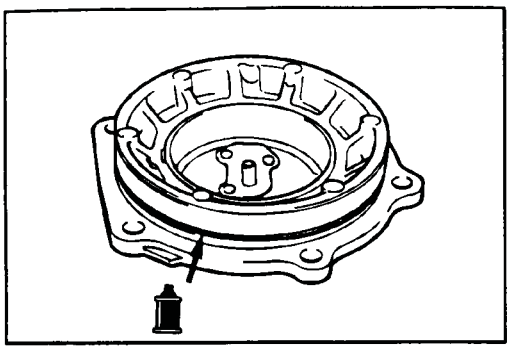
18. Loosen the bolts and remove the output bearing retainer.



19. Remove the outer race from the output bearing retainer and remove the solder. If the solder is not crushed, repeat steps (4) – (6), using the solder with diameter of 3 mm (.12 in.). Measure the thickness of the crushed solder with a micrometer and select a spacer with a thickness that will provide the standard value for the preload.

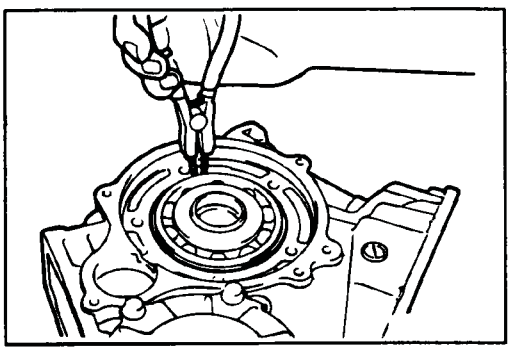
    Standard value: 0.075 – 0.135 mm (.003 – .0053 in.)

20. Install the spacer selected in the previous item and the outer race on the output bearing retainer.

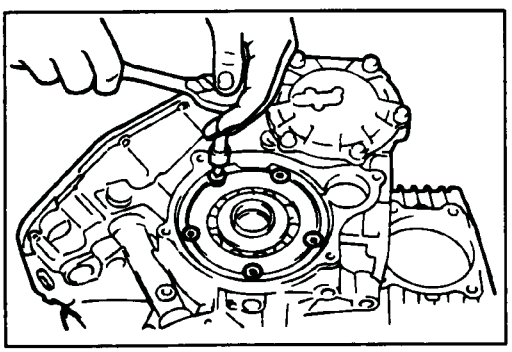


21. Install a new O-ring around the outer circumference of the outer bearing retainer.
22. Coat the O-ring with automatic transmission fluid and tighten the output bearing retainer mounting bolts to the specified torque.

    Output bearing retainer mounting bolts: 24 Nm (18 ft.lbs.)

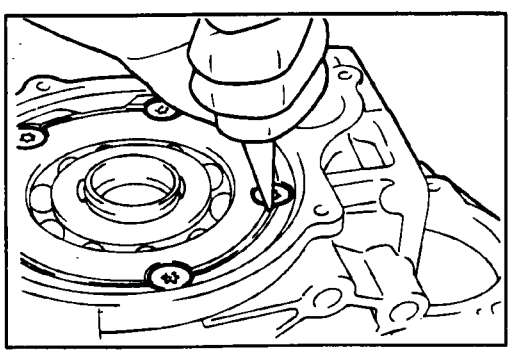


23. Insert the output flange into the case and install a snap ring around the bearing.

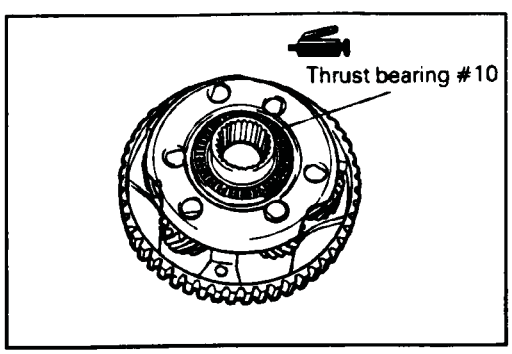


24. Install the bearing retainer using new bolts.

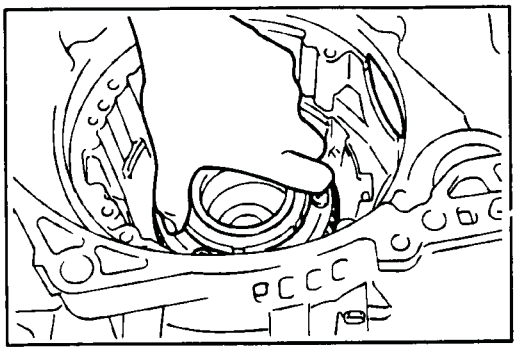
    Bearing retainer mounting bolts: 20 Nm (15 ft.lbs.)



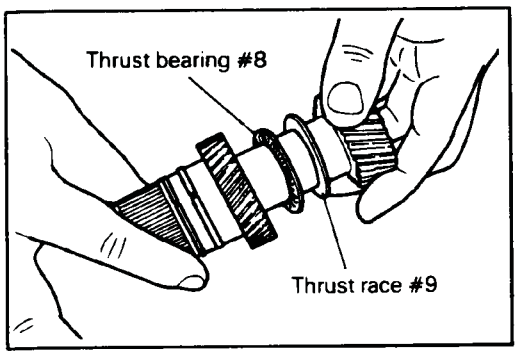
25. Caulk the heads of the bolts.



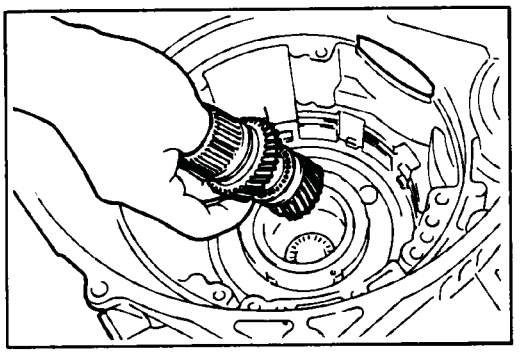
26. Apply a coating of petrolatum to thrust bearing #10 and attach to the planetary carrier.



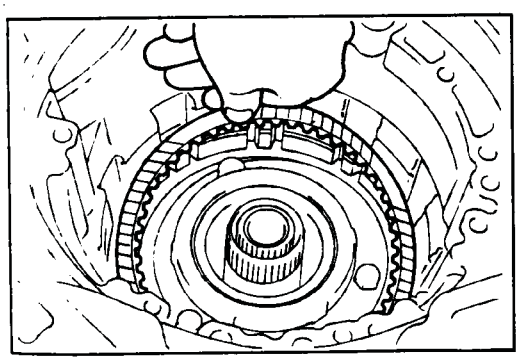
27. Assemble the planetary carrier.



28. Assemble the forward sun gear, thrust race #9, thrust bearing #8 and reverse sun gear.

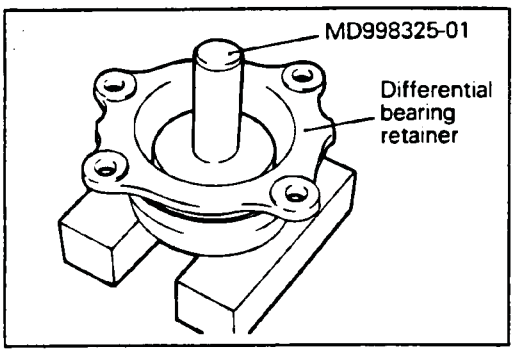


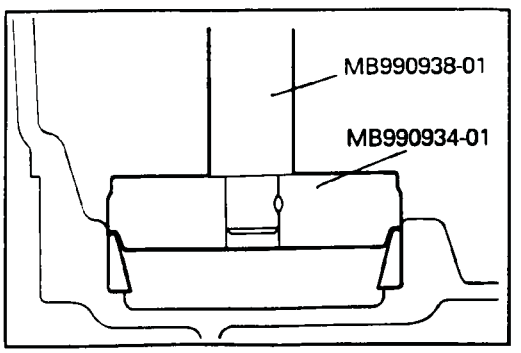
29. Install both sun gears assembled in the previous item into the planetary carrier.



30. Assemble the reaction plate, brake disc and brake plate.

REASSEMBLY



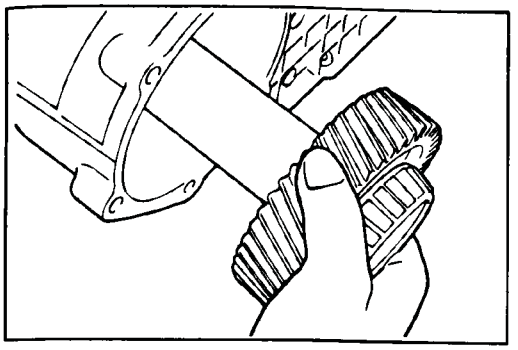


1. Using the special tool, install the oil seals to the differential bearing retainer and transaxle case.

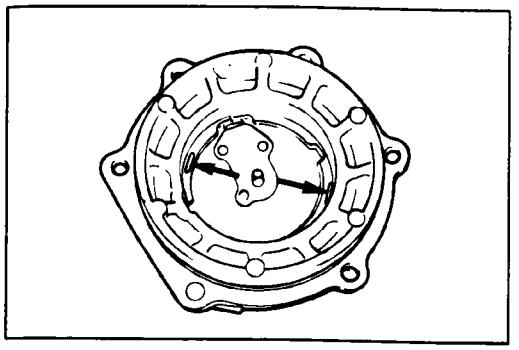
	Special tool
Oil seal for differential bearing retainer	MD998325-01
Oil seal for transaxle case	MD998325-01 (MD998803*)

*: Vehicles with 4-wheel steering oil pump

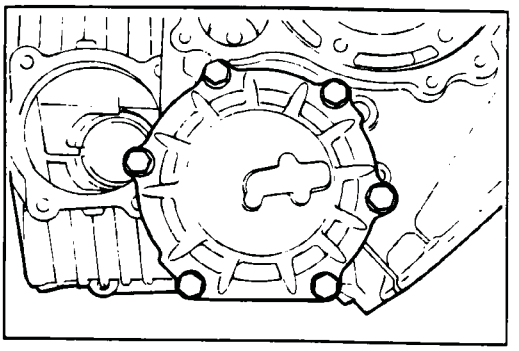
2. Use the special tool to press fit the outer race into the transaxle case.



3. Install the transfer shaft



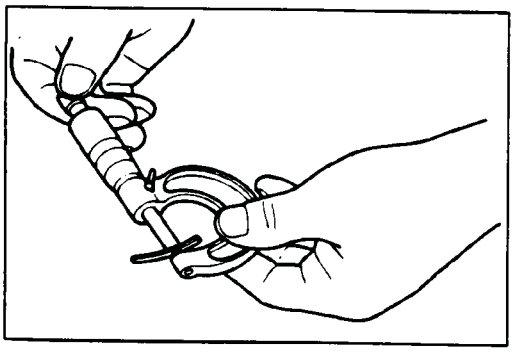
4. Place solder with a length of approximately 10 mm (.39 in.) and diameter of 1.6 mm (.06 in.) on the output bearing retainer at the position shown in the diagram and install the outer race.



5. Install the output bearing retainer and tighten the bolts to the specified torque.

   Output bearing retainer mounting bolts:
   24 Nm (18 ft.lbs.)

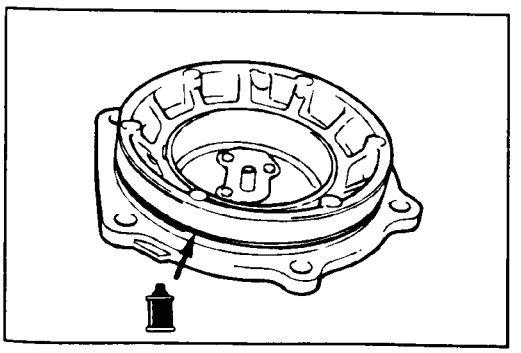
6. Loosen the bolts and remove the output bearing retainer.



7. Remove the outer race from the output bearing retainer and remove the solder. If the solder is not crushed, repeat steps (4) – (6),using the solder with diameter of 3 mm (.12 in.). Measure the thickness of the crushed solder with a micrometer and select a spacer with a thickness that will provide the standard value for the preload.

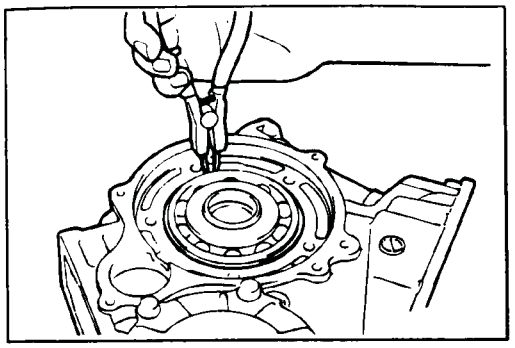
   Standard value: 0.075 – 0.135 mm (.003 – .0053 in.)

8. Install the spacer selected in the previous item and the outer race on the output bearing retainer.

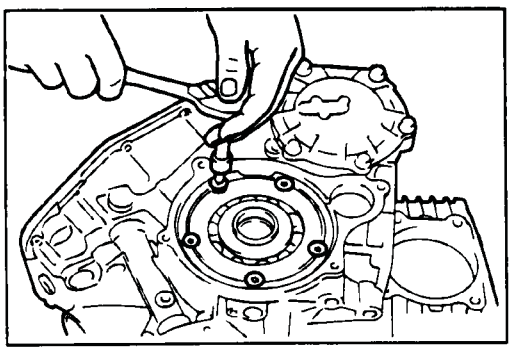


9. Install a new O-ring around the outer circumference of the outer bearing retainer.
10. Coat the O-ring with automatic transmission fluid and tighten the output bearing retainer mounting bolts to the specified torque.

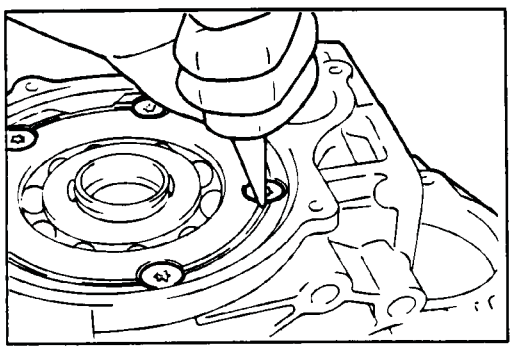
    Output bearing retainer mounting bolts:
    24 Nm (18 ft.lbs.)



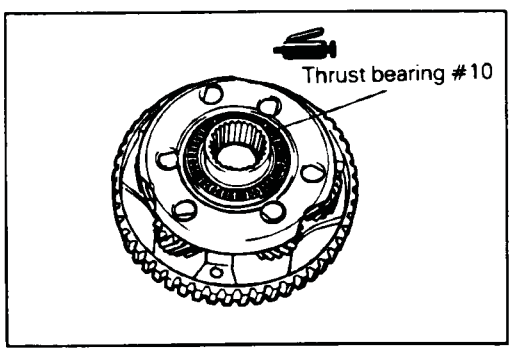
11. Insert the output flange into the case and install a snap ring around the bearing.



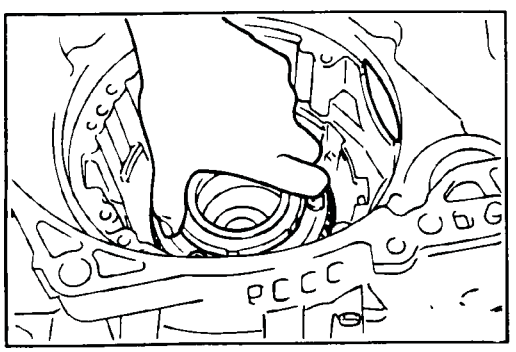
12. Install the bearing retainer using new bolts.
Bearing retainer mounting bolts: 20 Nm (15 ft.lbs.)



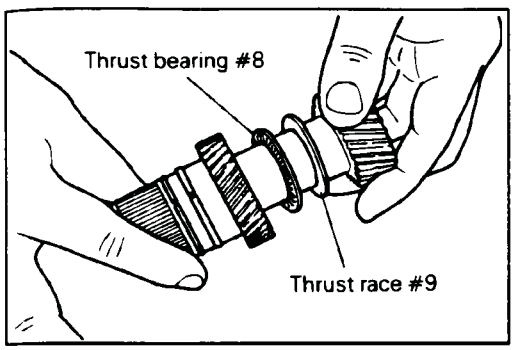
13. Caulk the heads of the bolts.



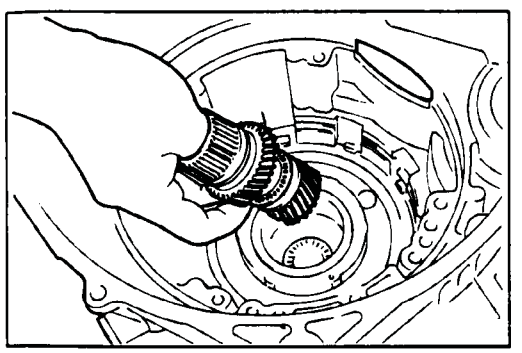
14. Apply a coating of petrolatum to thrust bearing #10 and attach to the planetary carrier.



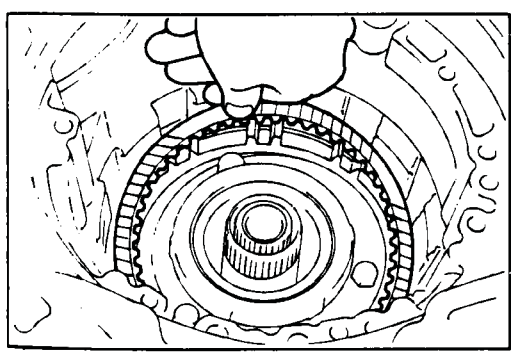
15. Assemble the planetary carrier.



16. Assemble the forward sun gear, thrust race #9, thrust bearing #8 and reverse sun gear.

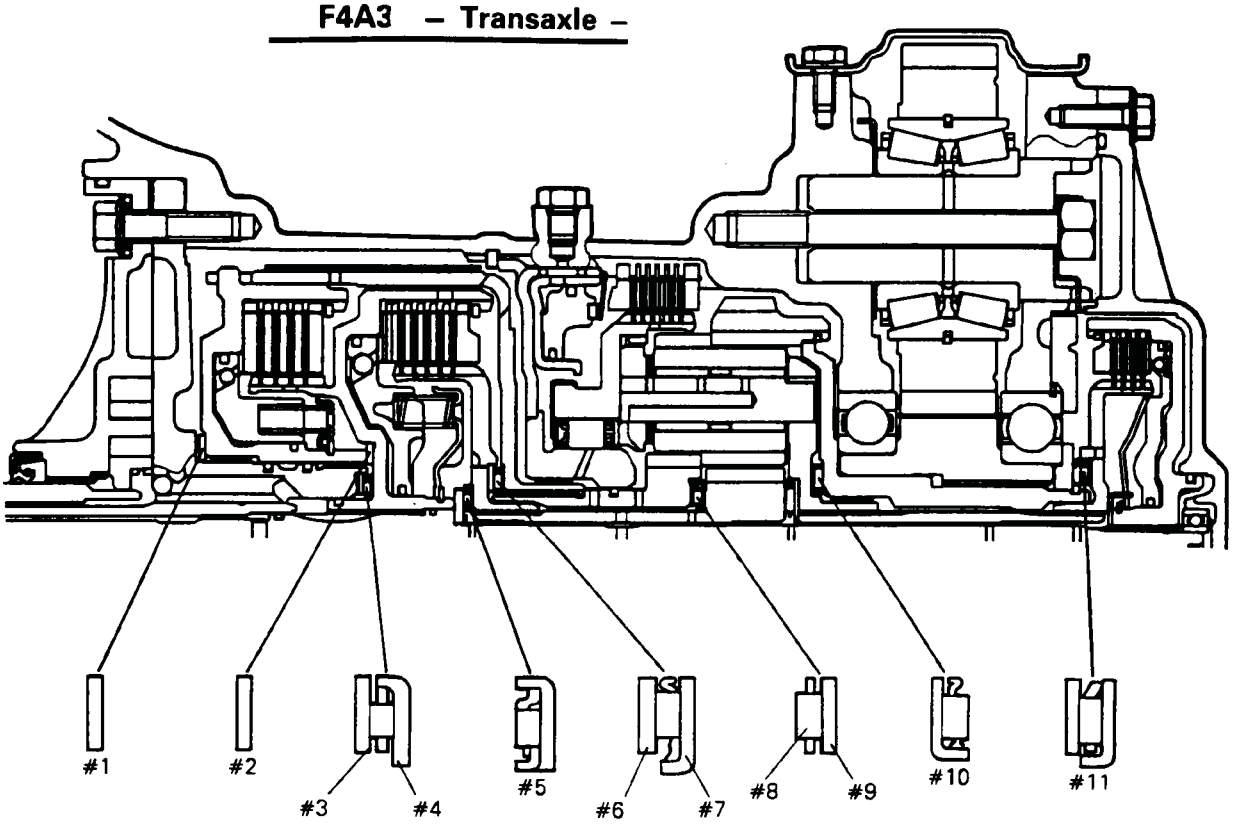


17. Install both sun gears assembled in the previous item into the planetary carrier.



18. Assemble the reaction plate, brake disc and brake plate.

F4A3 – Transaxle –

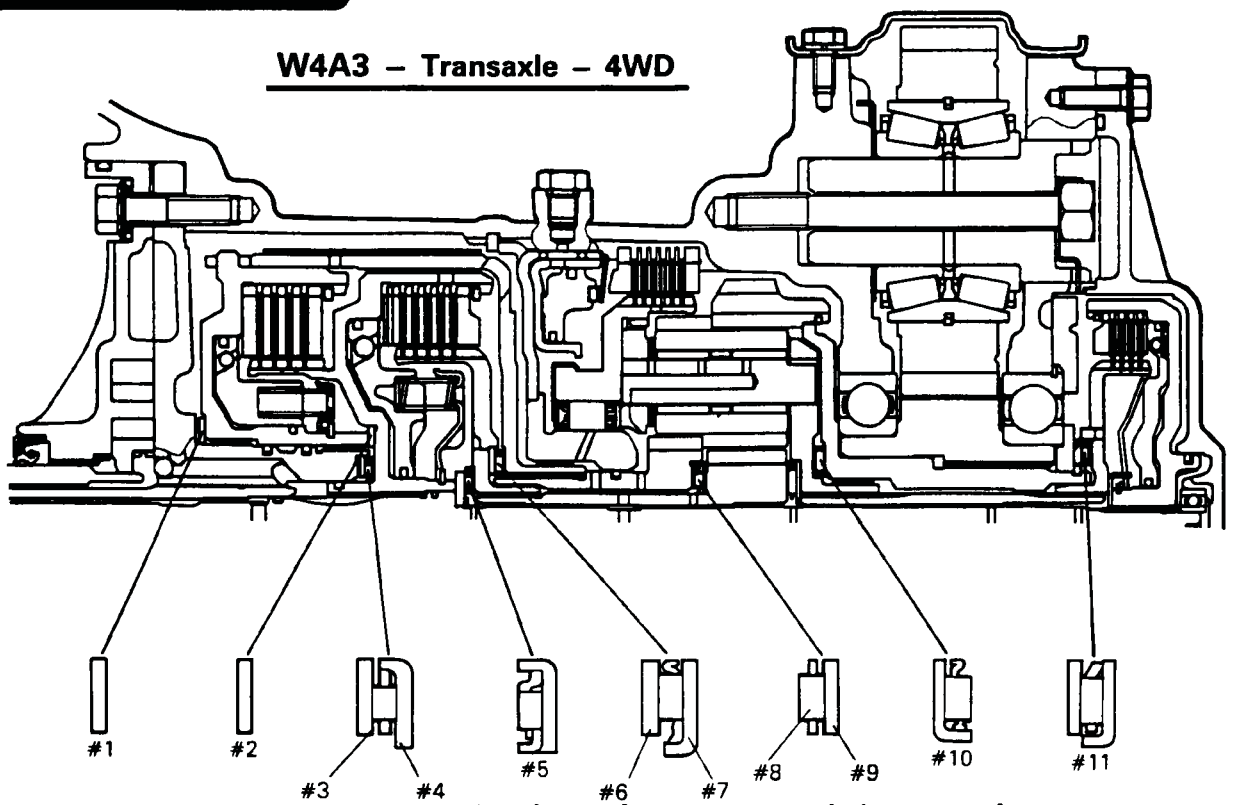


Identification of thrust bearings, thrust races and thrust washers

Unit: mm (in.)

D	d	t	Part No.	Sym-bol	D	d	t	Part No.	Sym-bol
70 (2.76)	55.7 (2.193)	1.4 (.055)	*1	#1	48.1 (1.894)	34.4 (1.354)	–	MD707271	#4
70 (2.76)	55.7 (2.193)	1.8 (.071)	*2		42.6 (1.677)	28 (1.10)	–	MD720753	#5
70 (2.76)	55.7 (2.193)	2.2 (.087)	*3		54 (2.13)	38.7 (1.524)	1.6 (.063)	MD704936	#6
70 (2.76)	55.7 (2.193)	2.6 (.102)	*4		52 (2.05)	36.4 (1.433)	–	MD720010	#7
66 (2.60)	54 (2.13)	1.8 (.071)	MD731212	#2	45 (1.77)	28 (1.10)	–	MD735062	#8
48.9 (1.925)	37 (1.46)	1.0 (.039)	MD997854 (incl. *1)	#3	46 (1.81)	31 (1.22)	0.8 (.031)	MD735063	#9
48.9 (1.925)	37 (1.46)	1.2 (.047)	MD997847 (incl. *1)						
48.9 (1.925)	37 (1.46)	1.4 (.055)	MD997848 (incl. *2)		52 (2.05)	36.4 (1.433)	–	MD720010	#10
48.9 (1.925)	37 (1.46)	1.6 (.063)	MD997849 (incl. *2)						
48.9 (1.925)	37 (1.46)	1.8 (.071)	MD997850 (incl. *3)		58 (2.28)	44 (1.73)	–	MD724206	#11
48.9 (1.925)	37 (1.46)	2.0 (.079)	MD997851 (incl. *3)						
48.9 (1.925)	37 (1.46)	2.2 (.087)	MD997852 (incl. *4)						
48.9 (1.925)	37 (1.46)	2.4 (.094)	MD997853 (incl. *4)						

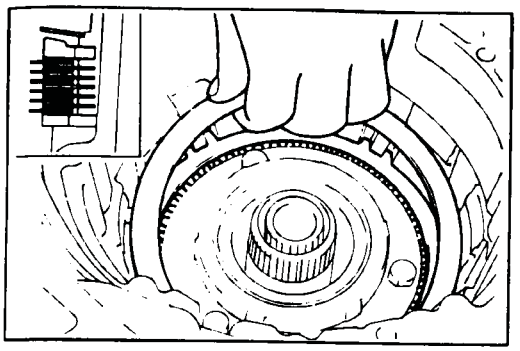
W4A3 – Transaxle – 4WD



Identification of thrust bearings, thrust races and thrust washers

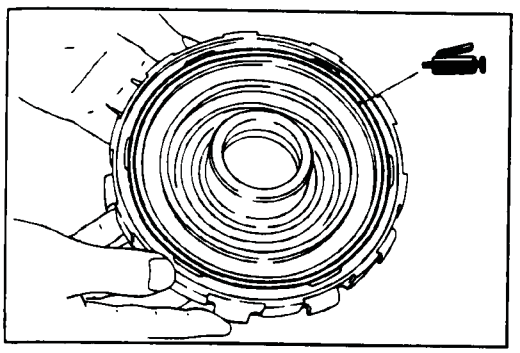
mm (in.)

Outer diameter	Inner diameter	Thickness	Part No.	Code No.	Outer diameter	Inner diameter	Thickness	Part No.	Code No.
70 (2.7559)	55.7 (2.1929)	1.4 (.0551)	*1	#1	48.1 (1.8937)	34.4 (1.3543)	–	MD707271	#4
70 (2.7559)	55.7 (2.1929)	1.8 (.0709)	*2		42.6 (1.6772)	28 (1.1024)	–	MD720753	#5
70 (2.7559)	55.7 (2.1929)	2.2 (.0866)	*3		54 (2.1260)	38.7 (1.5236)	1.6 (.0630)	MD704936	#6
70 (2.7559)	55.7 (2.1929)	2.6 (.1024)	*4		52 (2.0472)	36.4 (1.4331)	–	MD720010	#7
70 (2.7559)	55.7 (2.1929)	1.8 (.0709)	MD729336 (W4A32) MD731212 (W4A33)	#2	41 (1.6142)	28 (1.1024)	1.2 (.0472)	MD728763 (W4A32)	#8
48.9 (1.9252)	37 (1.4567)	1.0 (.0394)	MD997854 (incl *1)	#3	45 (1.7717)	28 (1.1024)	–	MD735062 (W4A33)	
48.9 (1.9252)	37 (1.4567)	1.2 (.0472)	MD997847 (incl *1)		39 (1.5354)	28 (1.1024)	–	MD728764 (W4A32)	#9
48.9 (1.9252)	37 (1.4567)	1.4 (.0551)	MD997848 (incl *2)		46 (1.8110)	31 (1.2205)	0.8 (.0315)	MD735063 (W4A33)	
48.9 (1.9252)	37 (1.4567)	1.6 (.0630)	MD997849 (incl *2)		52 (2.0472)	36.4 (1.4331)	–	MD720010	#10
48.9 (1.9252)	37 (1.4567)	1.8 (.0709)	MD997850 (incl *3)		58 (2.2835)	44 (1.7323)	–	MD724206	#11
48.9 (1.9252)	37 (1.4567)	2.0 (.0787)	MD997851 (incl *3)						
48.9 (1.9252)	37 (1.4567)	2.2 (.0866)	MD997852 (incl *4)						
48.9 (1.9252)	37 (1.4567)	2.4 (.0945)	MD997853 (incl *4)						

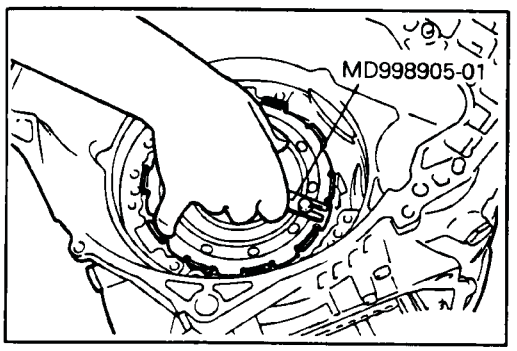


19. Assemble the pressure plate used in disassembly and install the return spring.

Caution
Position the return spring correctly when installing.

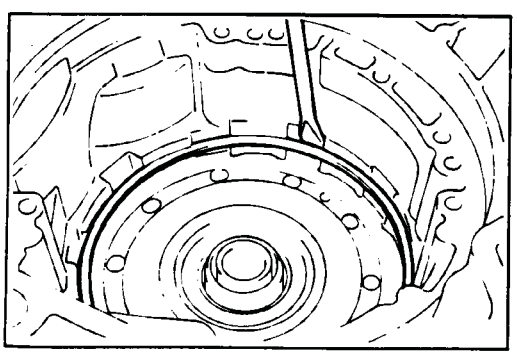


20. Apply a coating of petrolatum jelly to the wave spring and attach it to the center support.

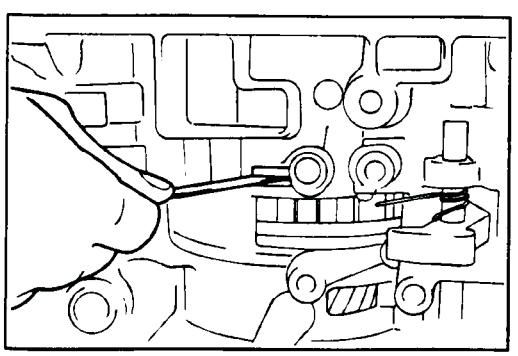


21. Mount the special tool on the center support, install 2 new O-rings and push into the transaxle case.

Caution
1. **Coat the O-rings with automatic transmission fluid and align the oil holes.**
2. **Do not move the wave spring out of position when installing.**

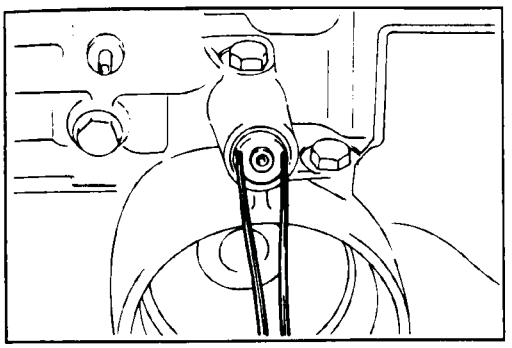


22. Install the snap ring.

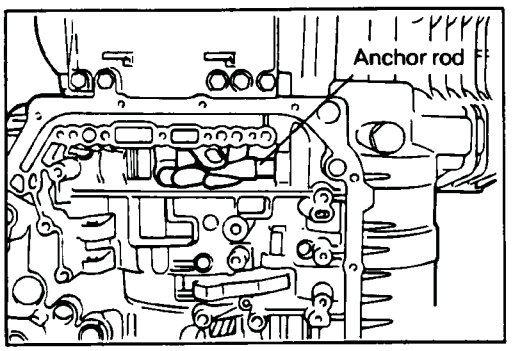


23. Use a thickness gauge and measure the end play of the low/reverse brake. Adjust to the standard value by selecting the proper pressure plate.

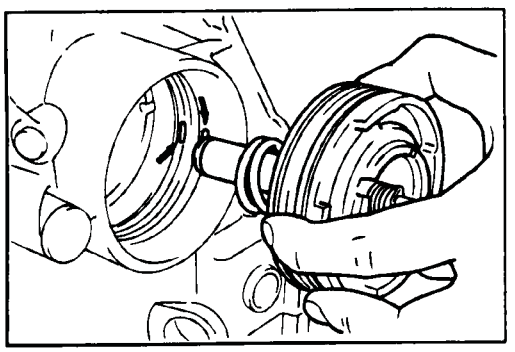
Standard value: 1.0 – 1.2 mm (.039 – .047 in.)



24. Install the air exhaust plug, and then install the plug.
Air exhaust plug: 33 Nm (24 ft.lbs.)

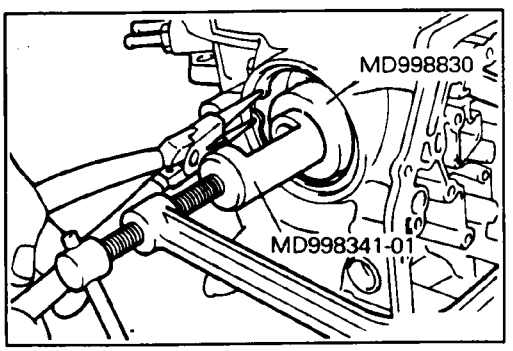


25. Install the anchor rod.

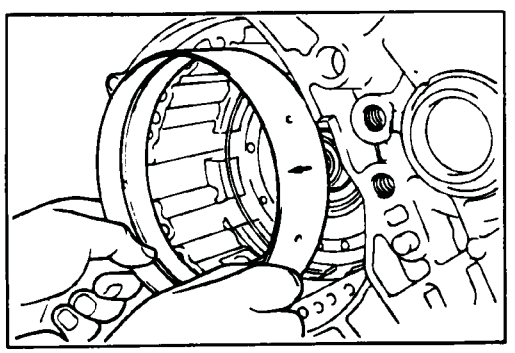


26. Install the kickdown servo spring, piston and sleeve.

Caution
The seal ring alignment hole of the kickdown servo piston must not overlap the oil filler port (indicated by the arrow in the diagram).

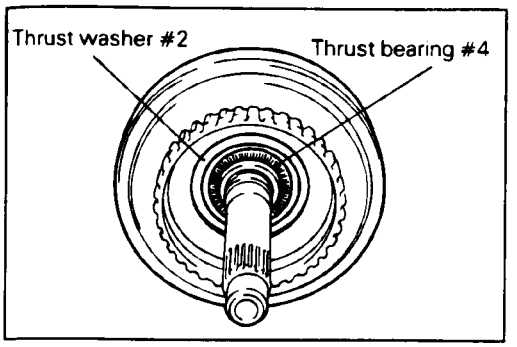


27. Use the special tool to push in the kickdown servo piston and sleeve, and then install a snap ring.

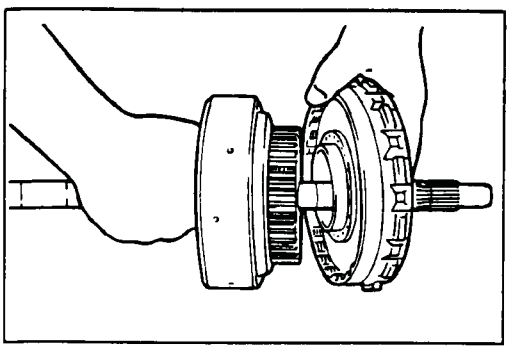


28. Install the kickdown band.

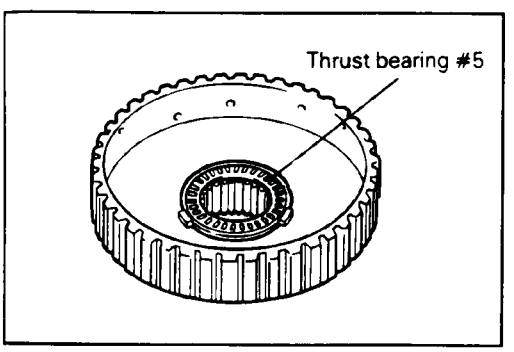
Caution
Install so the arrow mark is facing toward the front.



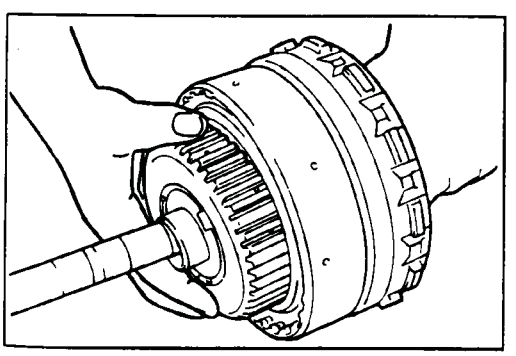
29. Install thrust bearing #4 and thrust washer #2 on the rear clutch.



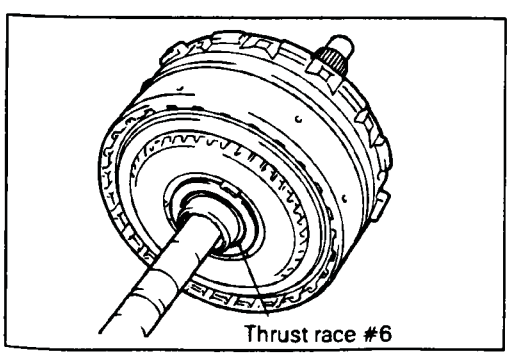
30. Combine the rear clutch assembly and the front clutch assembly.



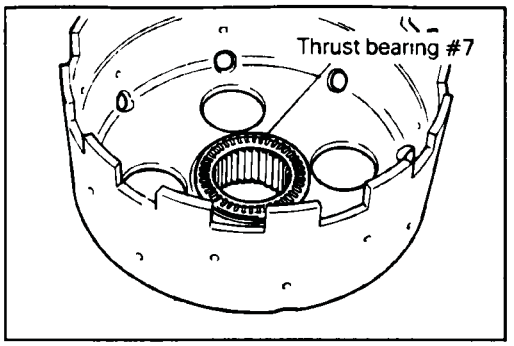
31. Install thrust bearing #5 on the rear clutch hub.



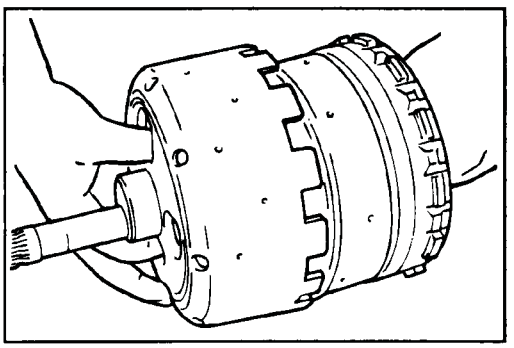
32. Install the rear clutch hub on the rear clutch.



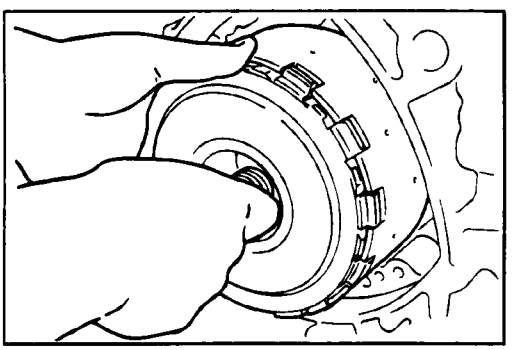
33. Install thrust race #6 on the end of the rear clutch hub.



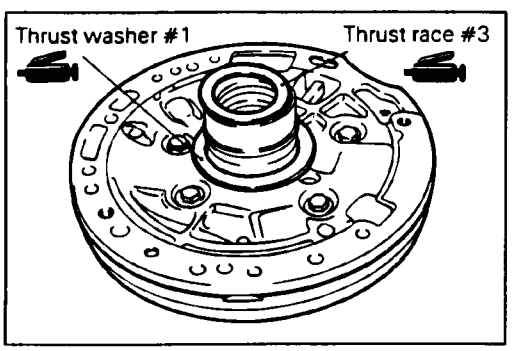
34. Install thrust bearing #7 in the kickdown drum.



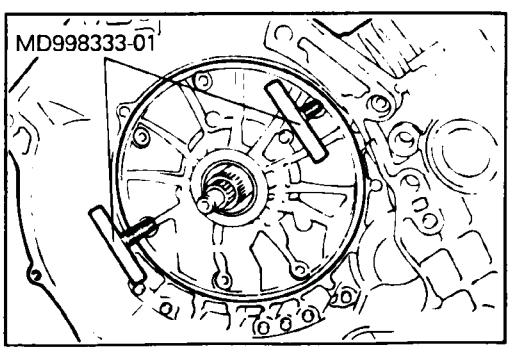
35. Install the clutch assembly in the kickdown drum.



36. Install the clutch assembly and kickdown drum into the transaxle case at the same time.

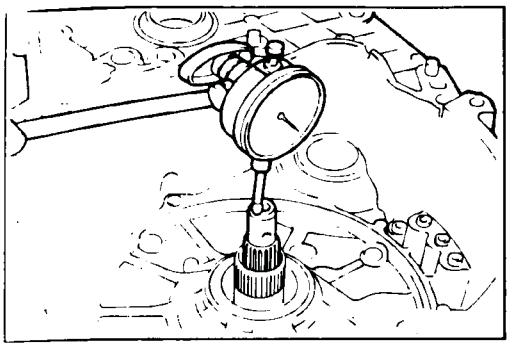


37. Adhere thrust race #3 and thrust washer #1 to the back of the oil pump with petrolatum.

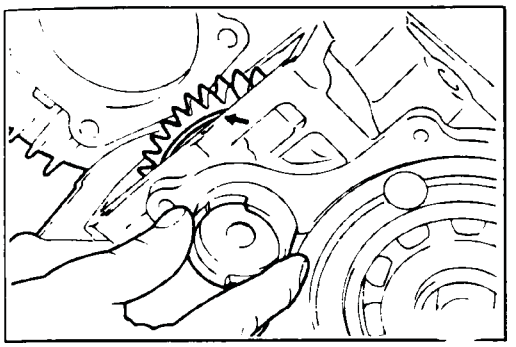


38. Use the special tool to install a new oil pump gasket and oil pump assembly.

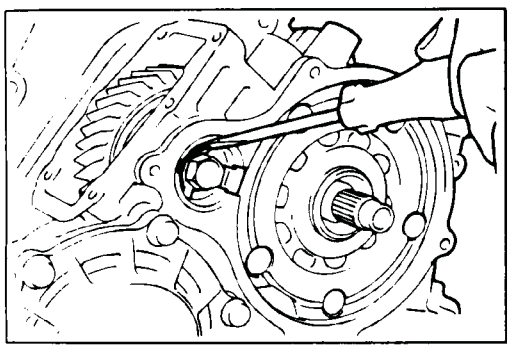
Oil pump assembly mounting bolts: 21 Nm (16 ft.lbs.)



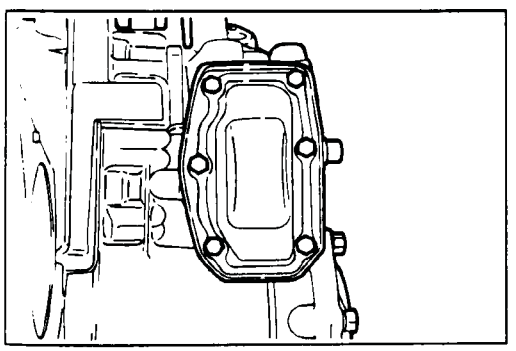
39. Measure the end play of the input shaft. If not the standard value, replace thrust race #3 and thrust washer #1 and adjust to the standard value.
Standard value: 0.3 – 1.0 mm (.012 – .039 in.)



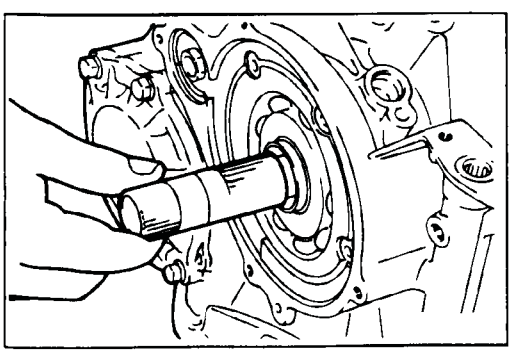
40. Install the spacer, idler gear and bearing and then insert the idler shaft.
Caution
Assemble so that the identification groove on the idler gear faces the rear.



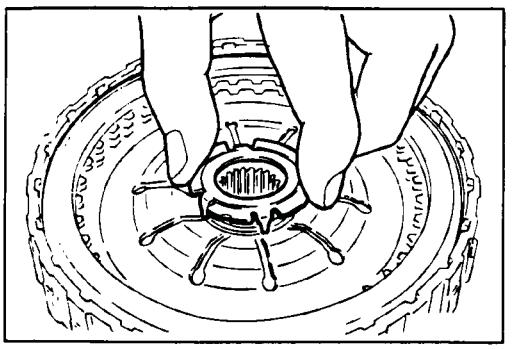
41. Tighten the idler shaft lock bolt together with the new lock plat to the specified torque. Bend the three fingers of the lock plate to prevent turning.
Idler shaft lock bolt: 38 Nm (28 ft.lbs.)



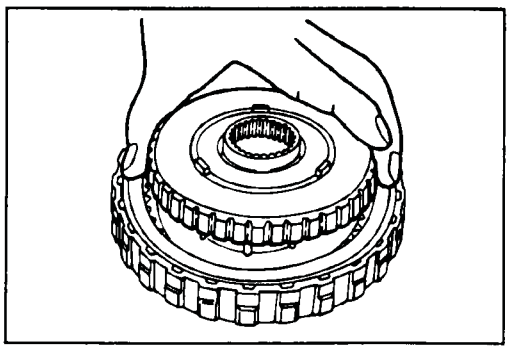
42. Install the idler gear cover and a new gasket.
Idler gear cover mounting bolt: 11 Nm (8 ft.lbs.)



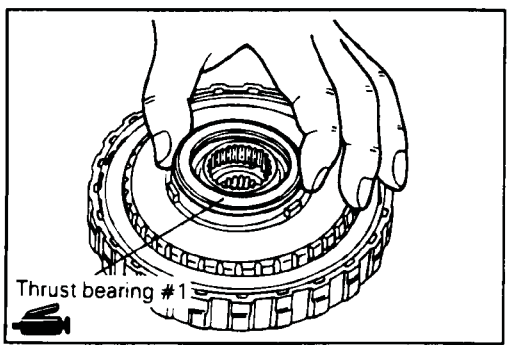
43. Insert the end clutch shaft from the end with the long spline.



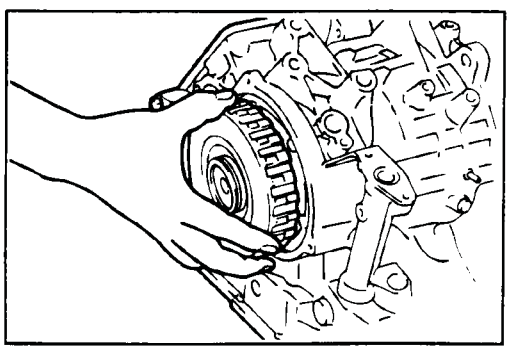
44. Fit the thrust washer on the return spring of the end clutch.



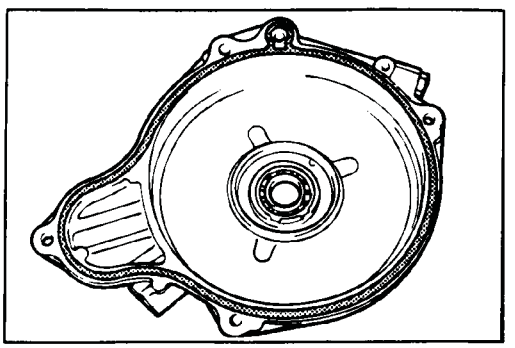
45. Install the end clutch hub on the end clutch assembly.



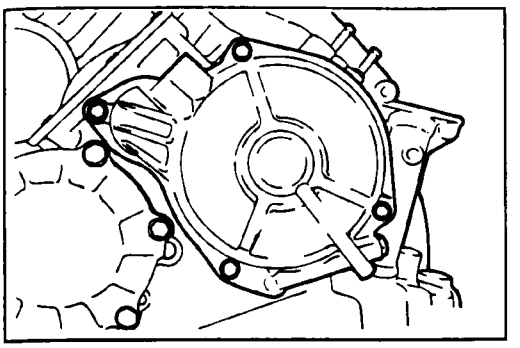
46. Adhere thrust bearing #1 to the end of the clutch hub with petrolatum.



47. Install end clutch assembly.

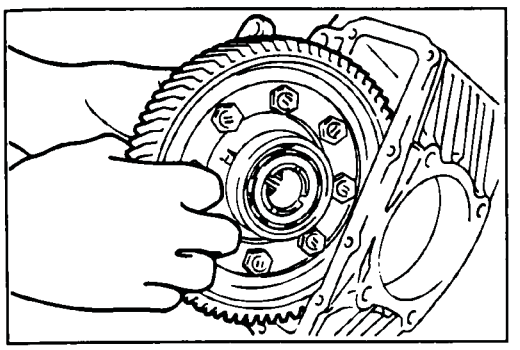


48. Attach a new O-ring to the end clutch cover.

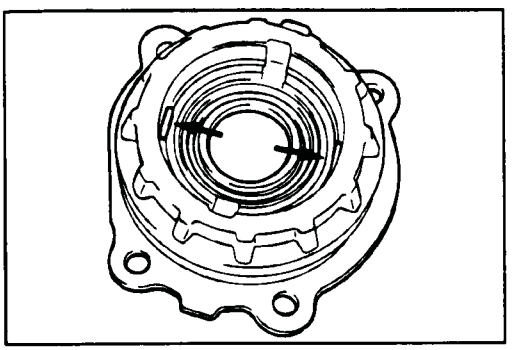


49. Install the end clutch cover and tighten the bolts to the specified torque.

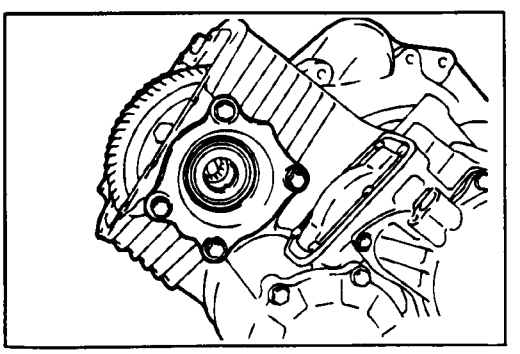
End clutch cover mounting bolts: 11 Nm (8 ft.lbs.)



50. Install the differential assembly.

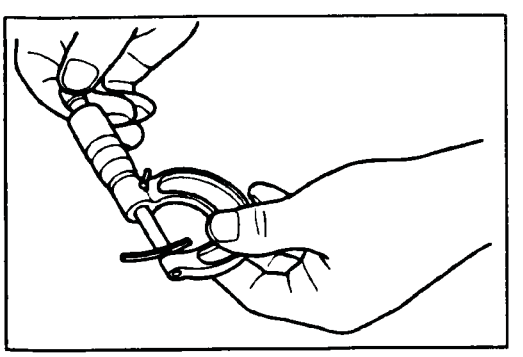


51. Place solder with a length of approximately 10 mm (.39 in.) and diameter of 1.6 mm (.06 in.) on the differential rear bearing retainer at the position shown in the diagram and install the outer race.



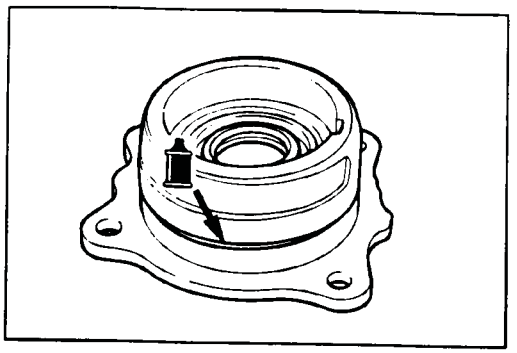
52. Install the differential rear bearing retainer and tighten the bolts to the specified torque.
53. Loosen the bolts, remove the differential rear bearing retainer and remove the solder. If the solder is not crushed, repeat steps (51) – (53), using the solder with the diameter of 3 mm.

Differential rear bearing retainer mounting bolts: 35 Nm (26 ft.lbs.)



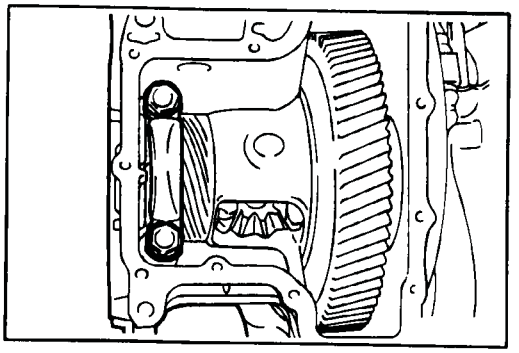
54. Measure the thickness of the crushed solder with a micrometer and adjust by selecting a spacer with a thickness that will provide the standard value for the end play and preload.

Standard value: 0.075 – 0.135 mm (.003 – .0053 in.)



55. Install a new O-ring on the differential rear bearing retainer, coat the O-ring with automatic transmission fluid; then install in the transaxle case and tighten the mounting bolts to the specified torque.

Differential rear bearing retainer mounting bolts: 35 Nm (26 ft.lbs.)

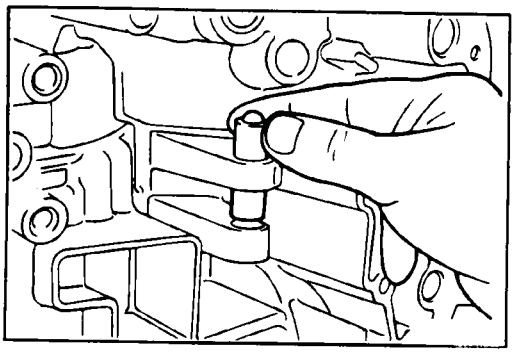


56. Install the front bearing cap and tighten the bolts to the specified torque.

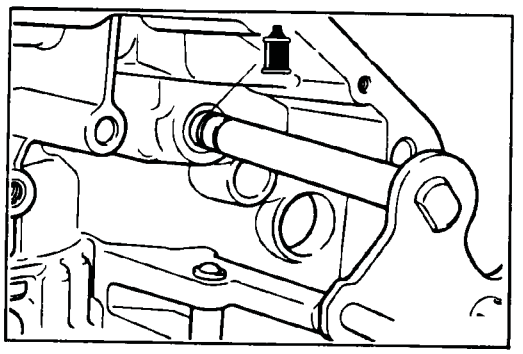
Differential front bearing cap mounting bolts: 70 Nm (51 ft.lbs.)

57. Install the differential cover and a new gasket.

Differential cover mounting bolts: 11 Nm (8 ft.lbs.)

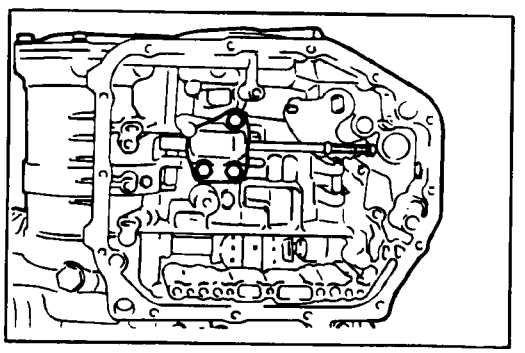


58. Install the detent assembly.



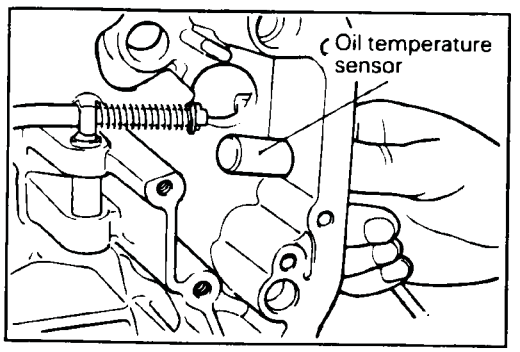
59. Install a new O-ring on the manual control shaft assembly, coat the O-ring with automatic transmission fluid and then insert into the transaxle case.
60. Align the groove in the manual control shaft and the set screw hole; then install the set screw.

Manual control shaft set screw: 9 Nm (7 ft.lbs.)

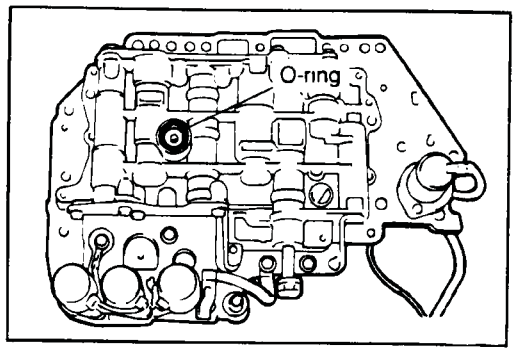


61. Install the parking roller support.

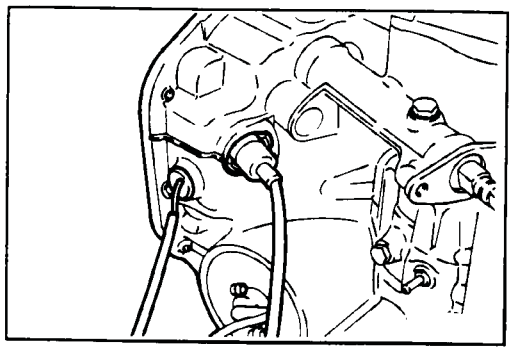
Parking roller support bolts: 24 Nm (18 ft.lbs.)



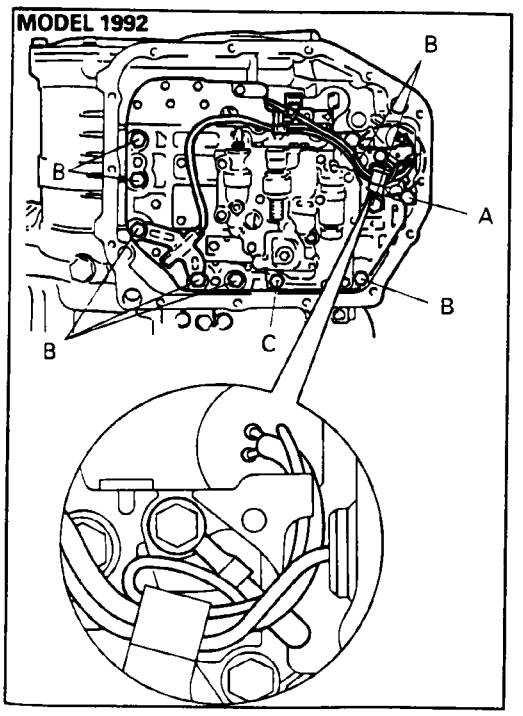
62. Insert the oil temperature sensor into the case.



63. Install an O-ring in the O-ring groove at the top of the valve body assembly.



64. Replace the solenoid valve harness grommet O-ring with a new one.
65. Pass the solenoid valve connector through the transaxle case hole from the inside.
66. Push the solenoid valve harness grommet into the case hole.

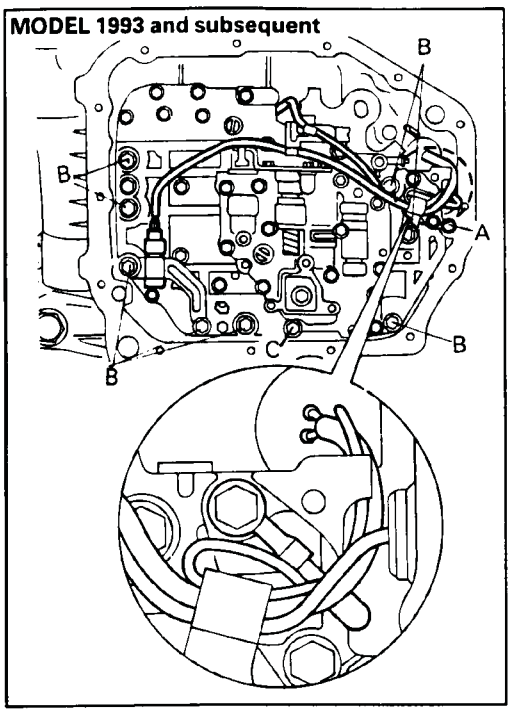


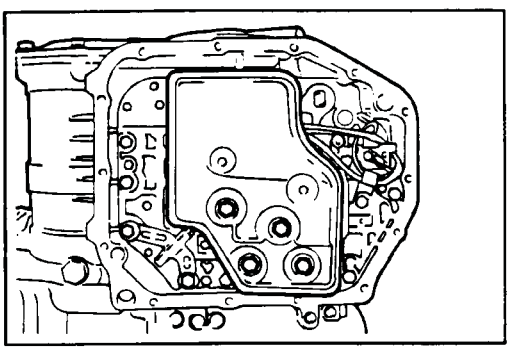
67. Insert the knock pin of the valve body into the case, keeping the detent plate pin in the manual valve groove. Temporarily install the valve body, install the oil temperature sensor and holder; then tighten the mounting bolts to the specified torque.

A bolt: 18 mm (.709 in.)
B bolt: 25 mm (.984 in.)
C bolt: 40 mm (1.575 in.)

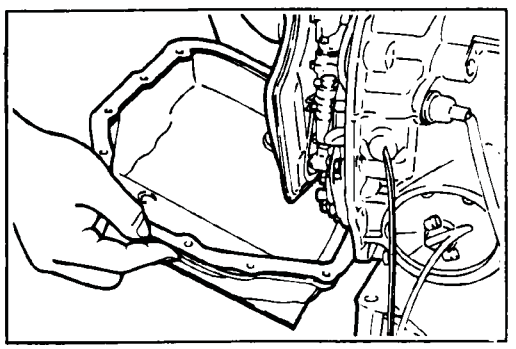
Valve body assembly mounting bolts: 11 Nm (8 ft.lbs.)

Caution
Firmly fasten the solenoid valve and oil temperature sensor harness at the position shown in the diagram. Especially, be sure to route the pressure control solenoid valve (PCSV) harness, which is separated from other harness, as shown in the diagram and fasten the harness with a clamp, Failure to fasten it may result in contact with the detent plate or parking rod.

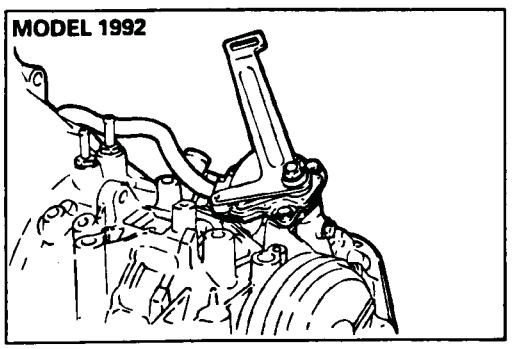




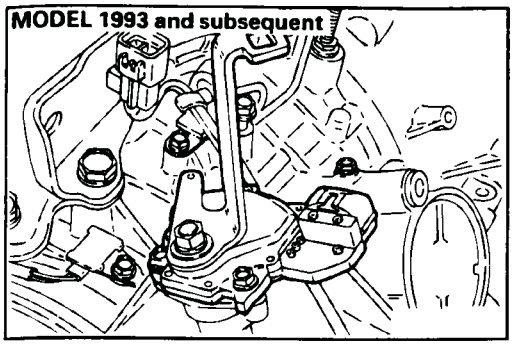
68. Install the oil screen.
    Oil filter mounting bolts: 6 Nm (5 ft.lbs.)

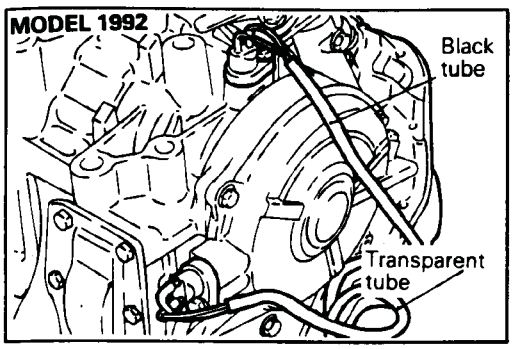


69. Install the magnets in the oil pan and install the oil pan.
    Oil pan mounting bolts: 11 Nm (8 ft.lbs.)

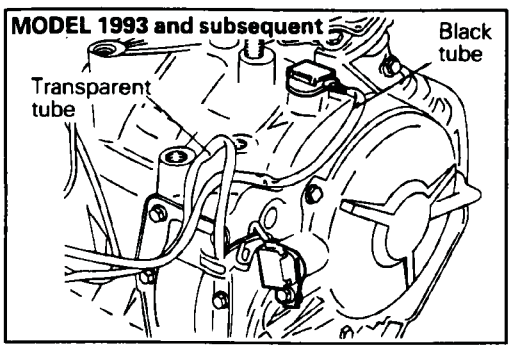


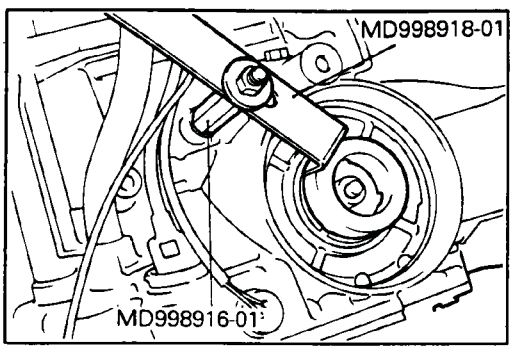
70. Install park/neutral position switch (PNP switch) and manual control lever.
    Park/neutral position switch mounting bolts: 11 Nm (8 ft.lbs.)
    Manual control lever mounting bolt: 19 Nm (14 ft.lbs.)
71. Install the speedometer gear assembly.
    Speedometer gear locking plate mounting bolt: 5 Nm (4 ft.lbs.)



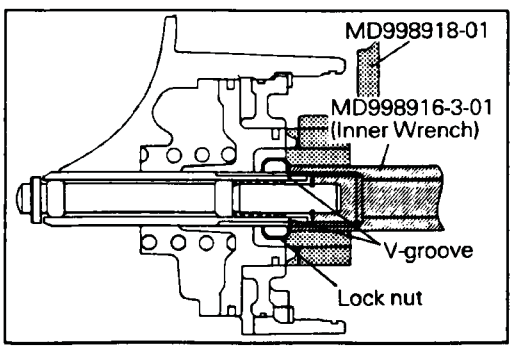


72. Install the pulse generator A and B.
Pulse generator mounting bolts: 11 Nm (8 ft.lbs.)
Caution
Install the black tube on the output gear side and the transparent tube on the end clutch side.
73. Install the oil filler tube and insert the level gauge.
Oil filter tube mounting bolt: 24 Nm (18 ft.lbs.)
74. Install the brackets.
Transaxle mounting bracket bolts: 70 Nm (51 ft.lbs.)
75. Adjust the kickdown servo.

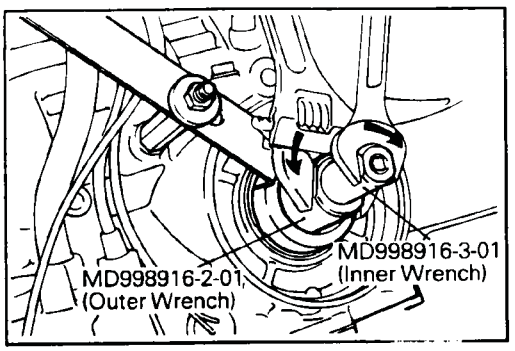




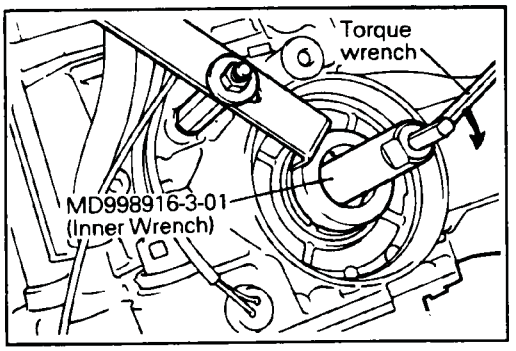
76. Adjust the kickdown servo by the following procedure:
(a) Fit the claw of the special tool in the notch of the piston to prevent the piston from turning, and use adapter to secure it as illustrated at left.
Caution
1. Do not push in the piston with the special tool.
2. When the adapter is installed to the transaxle case, do not apply excessive torque but tighten with a hand.



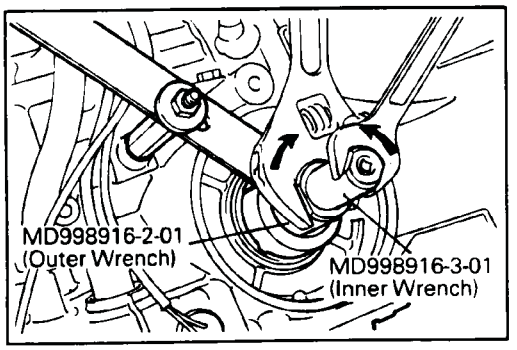
(b) Loosen the lock nut until it is about to reach the V groove in the adjusting rod. Tighten the special tool (inner) until it touches the lock nut.



(c) Fit the special tool (outer) to the lock nut. Turn the outer cylinder counterclockwise and the inner cylinder clockwise to lock the lock nut and the special tool (inner).

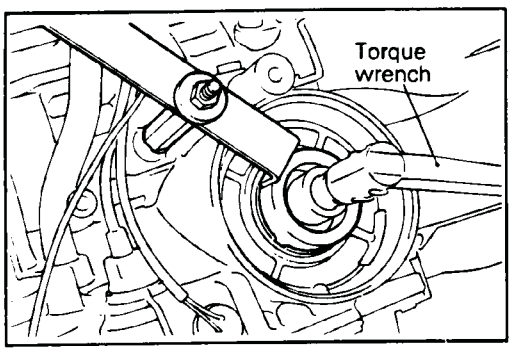


(d) Fit torque wrench to the special tool (inner) to tighten it to a torque of 10 Nm (7.2 ft.lbs.) and loosen. Repeat this sequence two times before tightening the special tool (inner) to 5 Nm (3.6 ft.lbs.) torque. Then back off the special tool (outer) 2 to 2¼ turns.



(e) Fit the special tool (outer) to the lock nut.
Turn the outer cylinder clockwise and the inner cylinder counterclockwise to unlock the lock nut and the special tool (inner).

Caution
When unlocking is carried out, apply equal force to both special tools to loosen.

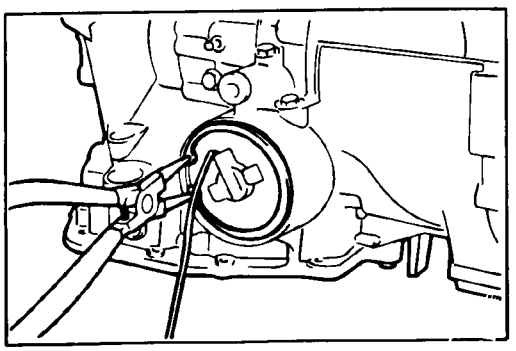


(f) Tighten the lock nut with a hand until it touches the piston.
Then, use torque wrench to tighten the lock nut to specified torque.

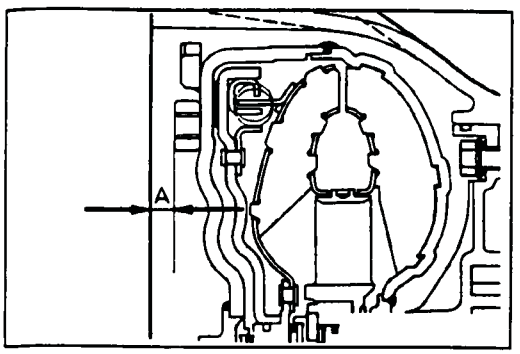
Lock nut: 29 Nm (21 ft.lbs.)

Caution
The lock nut may turn with the adjusting rod if tightened quickly with socket wrench or torque wrench.

(g) Remove the special tool for securing the piston. Install the plug to the Low/Reverse pressure outlet and tighten to specified torque.

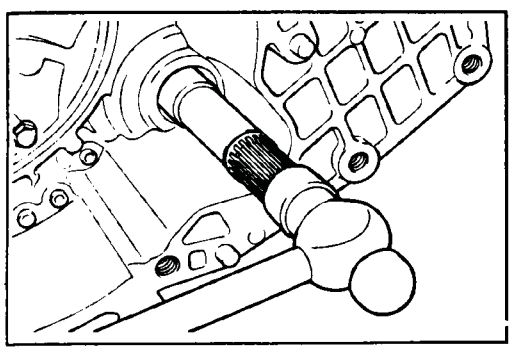


77. Install the kickdown servo switch and fasten with a snap ring.

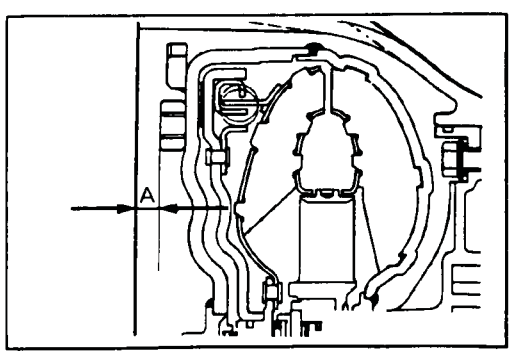


78. Coat the oil pump drive hub with automatic transmission fluid and install the torque converter. Push in firmly so that dimension A in the diagram is the standard value.
Standard value: approx. 16.3 mm (.642 in.)

W4A3



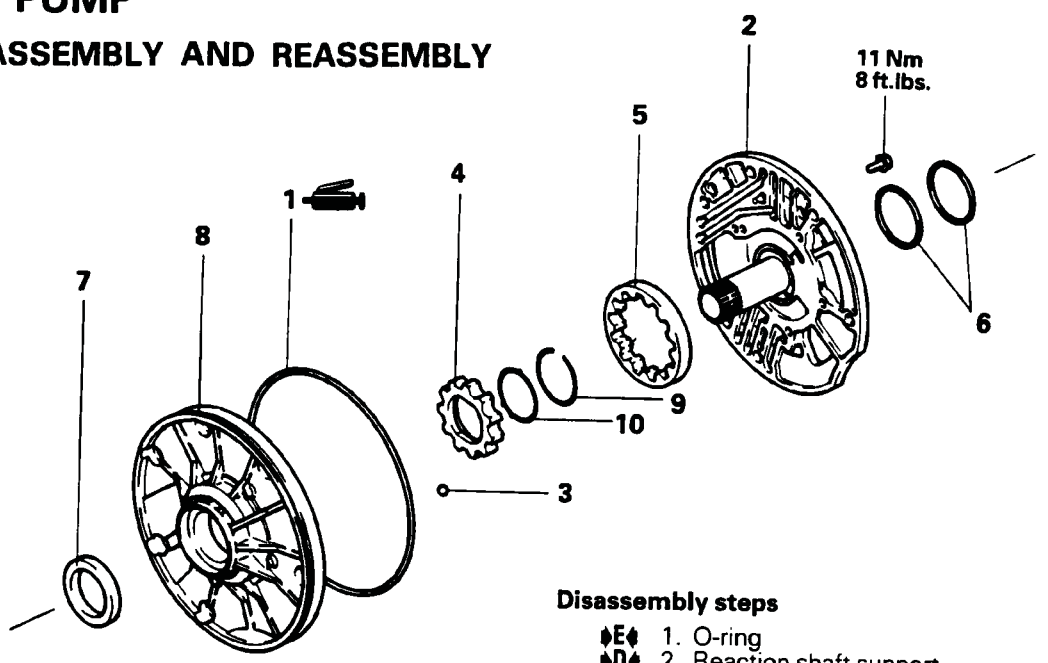
77.
(a) Insert the center shaft and hit it with a plastic hammer or similar instrument to install it securely.
NOTE
Apply ATF to the oil seal lip and do not scratch it.



78.
(a) Coat the oil pump drive hub with automatic transmission fluid and install the torque converter. Push in firmly so that dimension A in the diagram is the standard value.
Standard value:
W4A32 approx. 12.4 mm (.488 in.)
W4A33 approx. 16.3 mm (.642 in.)

OIL PUMP

DISASSEMBLY AND REASSEMBLY



Lubricate all internal parts with automatic transmission fluid during reassembly.

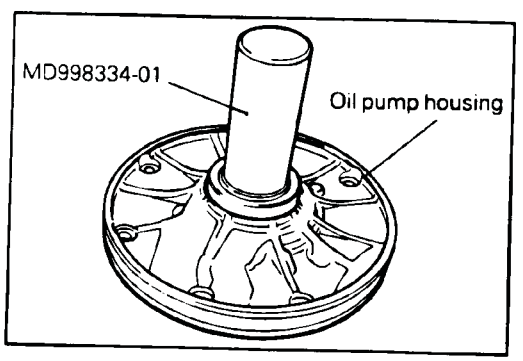
Disassembly steps

- ◆E◆ 1. O-ring
- ◆D◆ 2. Reaction shaft support
- ◆C◆ 3. Steel ball
- ◇A◇ ◆B◆ 4. Drive gear
- ◇A◇ ◆B◆ 5. Driven gear
- 6. Seal ring
- ◆A◆ 7. Oil seal
- 8. Oil pump housing
- 9. Snap ring (with torque converter clutch only)
- 10. Oil seal (with torque converter clutch only)

DISASSEMBLY SERVICE POINT

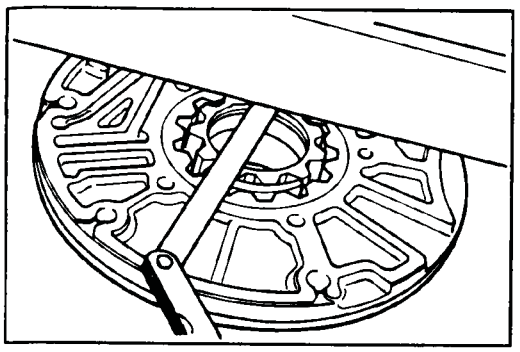
◇A◇ DRIVE GEAR / DRIVEN GEAR REMOVAL

(1) Make reassembly alignment marks on the drive and driven gears.



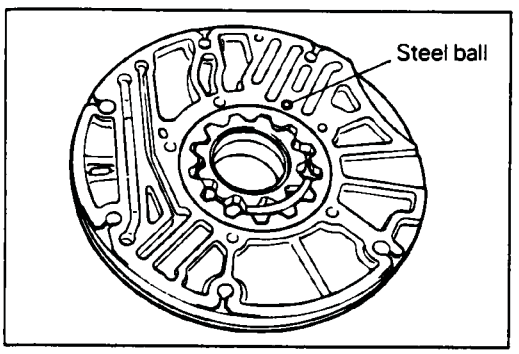
REASSEMBLY SERVICE POINTS

◆A◆ OIL SEAL INSTALLATION

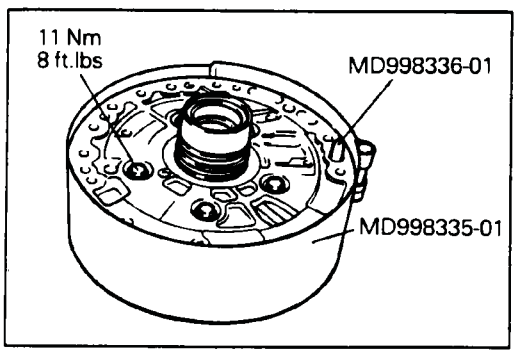


◆B◆ DRIVEN GEAR / DRIVE GEAR SIDE CLEARANCE MEASUREMENT

Standard value: 0.03 – 0.05 mm (.001 – .002 in.)



◆C◆ STEEL BALL LOCATION



◆D◆ REACTION SHAFT SUPPORT INSTALLATION

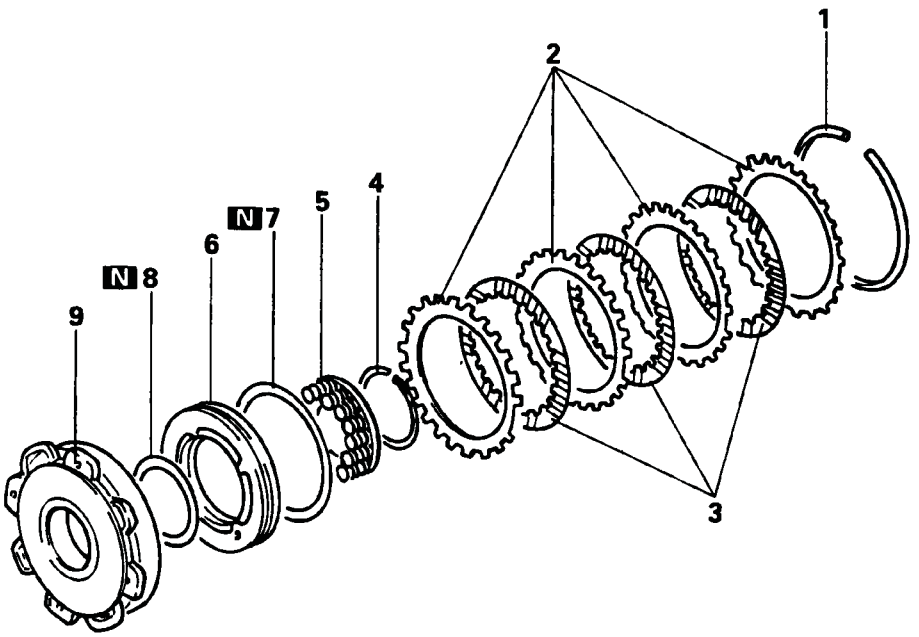
(1) Assemble the reaction shaft support and the pump housing, and tighten the five bolts by fingers.
(2) Insert the special tool, Guide Pin MD998336-01, in the oil pump bolt hole and tighten the peripheries of the support and housing with the special tool, Band MD998335-01, to locate the support and housing.
(3) Tighten the five bolts to the specified torque.
(4) Make sure that the oil pump gear turns freely.

◆E◆ O-RING INSTALLATION

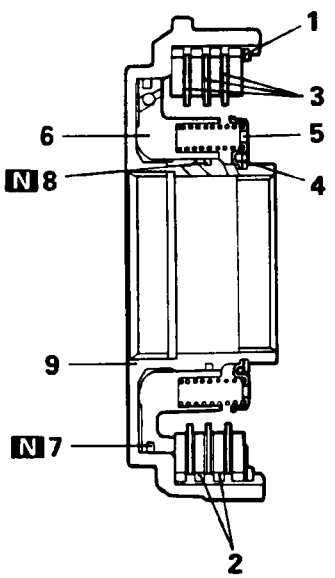
(1) Install a new O-ring in the groove of the pump housing and apply petrolatum jelly to the O-ring.

FRONT CLUTCH

DISASSEMBLY AND REASSEMBLY – W4A32



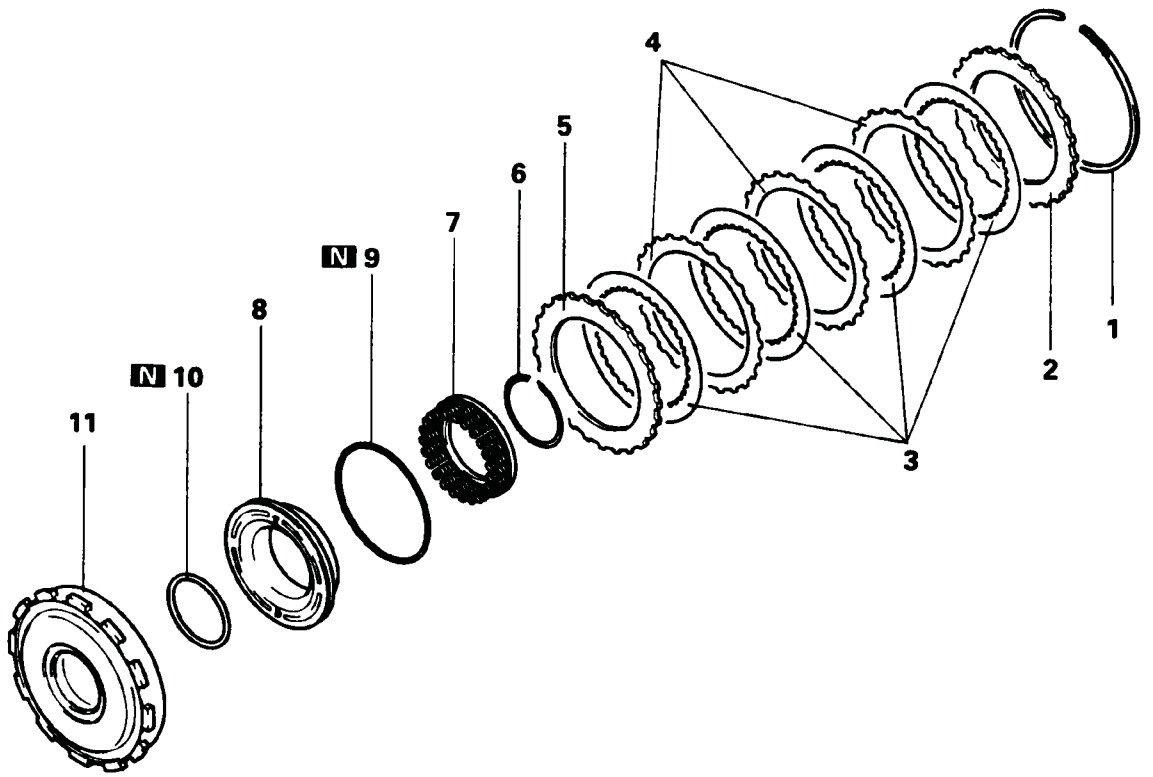
Lubricate all internal parts with automatic transmission fluid during reassembly.



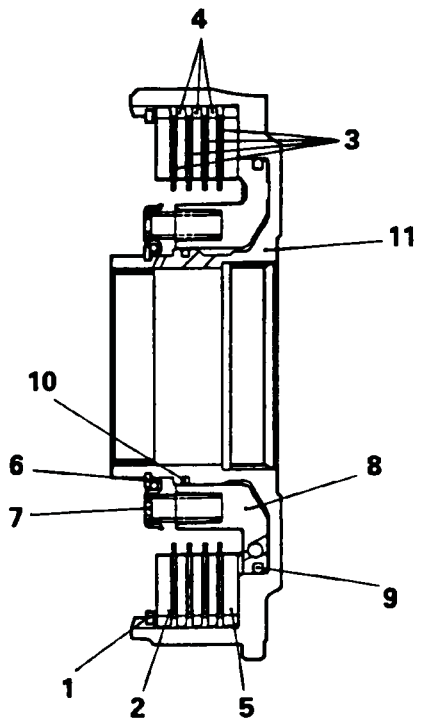
Disassembly steps

- ◆C◆ 1. Snap ring
- ◆B◆ 2. Clutch reaction plate
- 3. Clutch disc
- ◇A◇ ◆A◆ 4. Snap ring
- 5. Return spring
- 6. Front clutch piston
- 7. D-ring
- 8. D-ring
- 9. Front clutch retainer

DISASSEMBLY AND REASSEMBLY – F4A33, W4A33

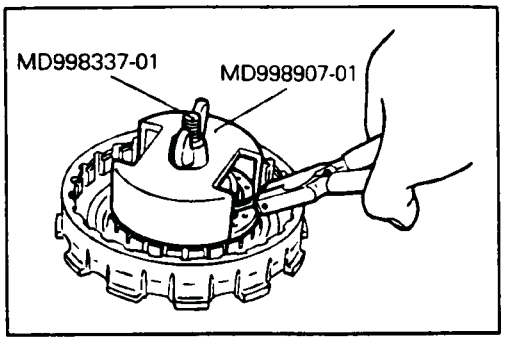


Lubricate all internal parts with automatic transmission fluid during reassembly.



Disassembly steps

- ◆C◆ 1. Snap ring
- ◆B◆ 2. Clutch reaction plate
- 3. Clutch disc
- ◆B◆ 4. Clutch plate
- ◆B◆ 5. Clutch pressure plate
- ◇A◇ ◆A◆ 6. Snap ring
- 7. Return spring
- 8. Front clutch piston
- 9. D-ring
- 10. D-ring
- 11. Front clutch retainer



DISASSEMBLY SERVICE POINT

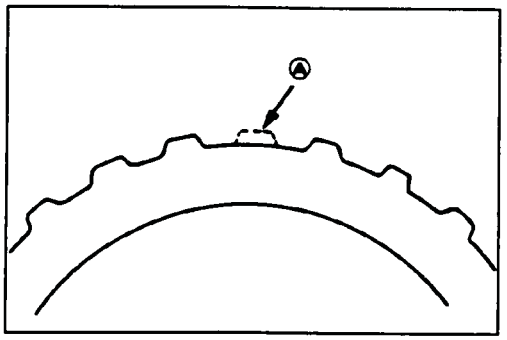
◇A◇ SNAP RING REMOVAL

(1) Compress the return spring with the special tool.
(2) Remove the snap ring.

REASSEMBLY SERVICE POINTS

◆A◆ SNAP RING INSTALLATION

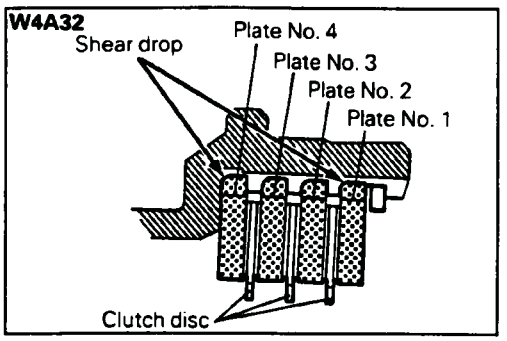
(1) Compress the return spring with the special tool.
(2) Install the snap ring.



◆B◆ CLUTCH PLATE INSTALLATION

(1) Install the clutch plate with their missing tooth portions (Ⓐ in the illustration) in alignment.

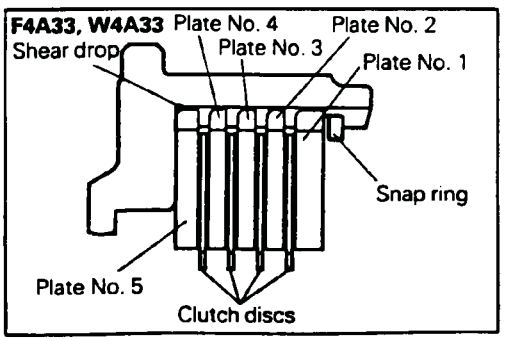
NOTE
This design is to facilitate escape of automatic transmission fluid and improve the cooling efficiency of the plate and disc.



(2) Install the innermost plate with their shear droops directed as shown in the illustration.

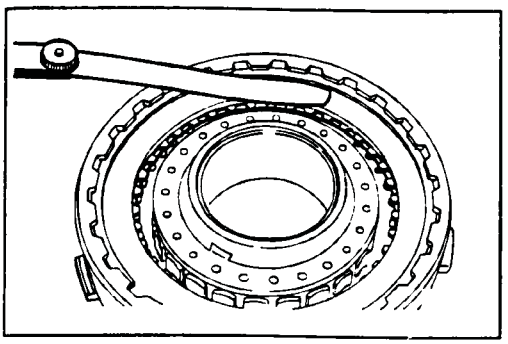
W4A32

Plate No.	Thickness mm (in.)	Identification mark
1	5.0 (.197)	A
2	3.1 (.122)	B
3	3.1 (.122)	B
4	3.7 (.146)	None



F4A33, W4A33

Plate No.	Thickness mm (in.)
1	5.0 (.197)
2	2.2 (.087)
3	2.2 (.087)
4	2.2 (.087)
5	3.8 (.150)



◆C◆ SNAP RING SELECTION

(1) Check clearance between the snap ring and clutch reaction plate. To check the clearance, hold entire circumference of the clutch reaction plate down with 50 N (11 lbs.) force. If clearance is out of standard value, select a snap ring to obtain the standard value.

Standard value:
W4A32 0.7 – 0.9 mm (.028 – .035 in.)
F4A33, W4A33 0.8 – 1.0 mm (.031 – .039 in.)

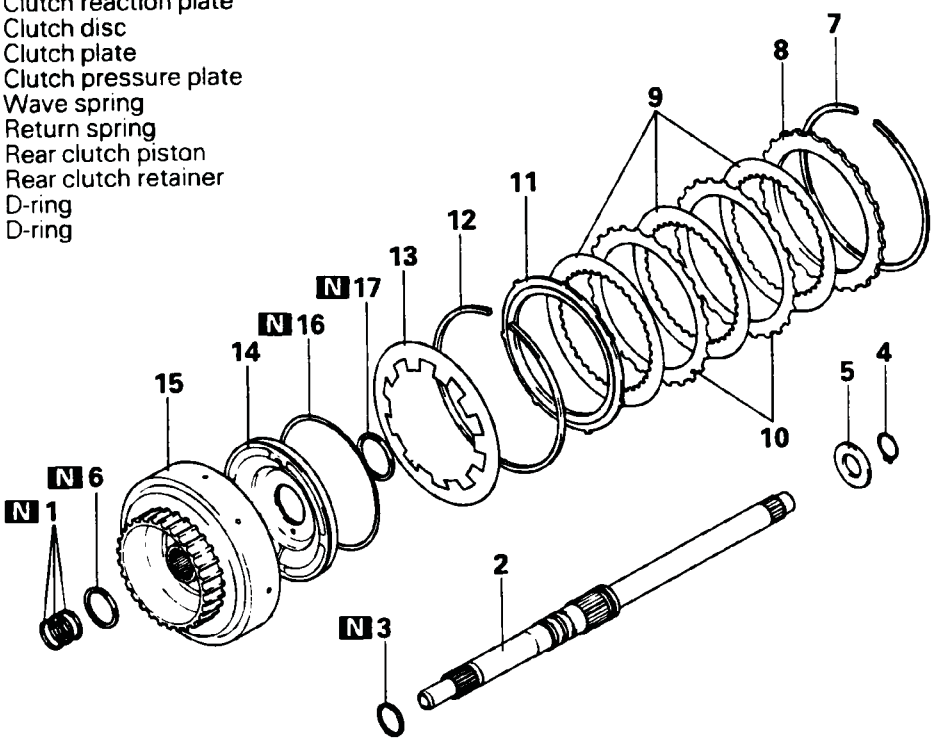
REAR CLUTCH

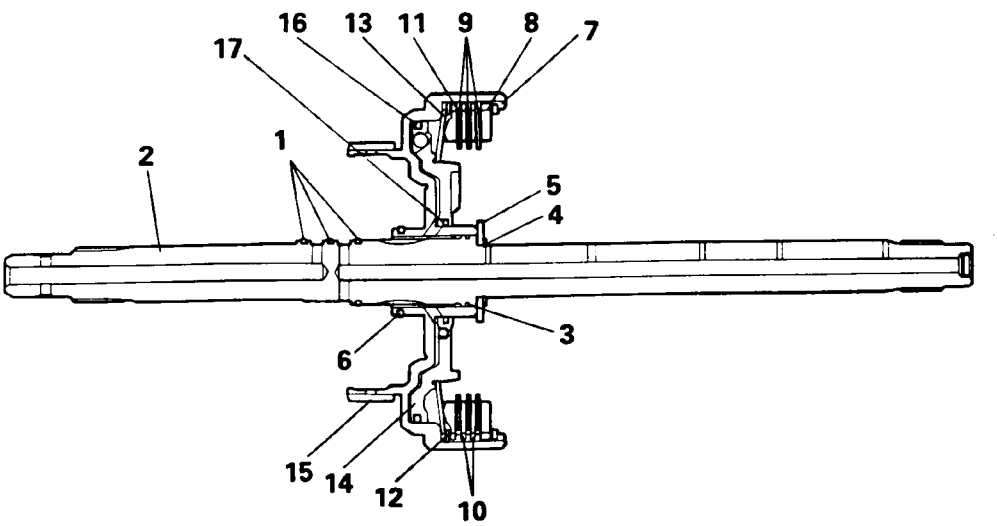
DISASSEMBLY AND REASSEMBLY – W4A32

Disassembly steps

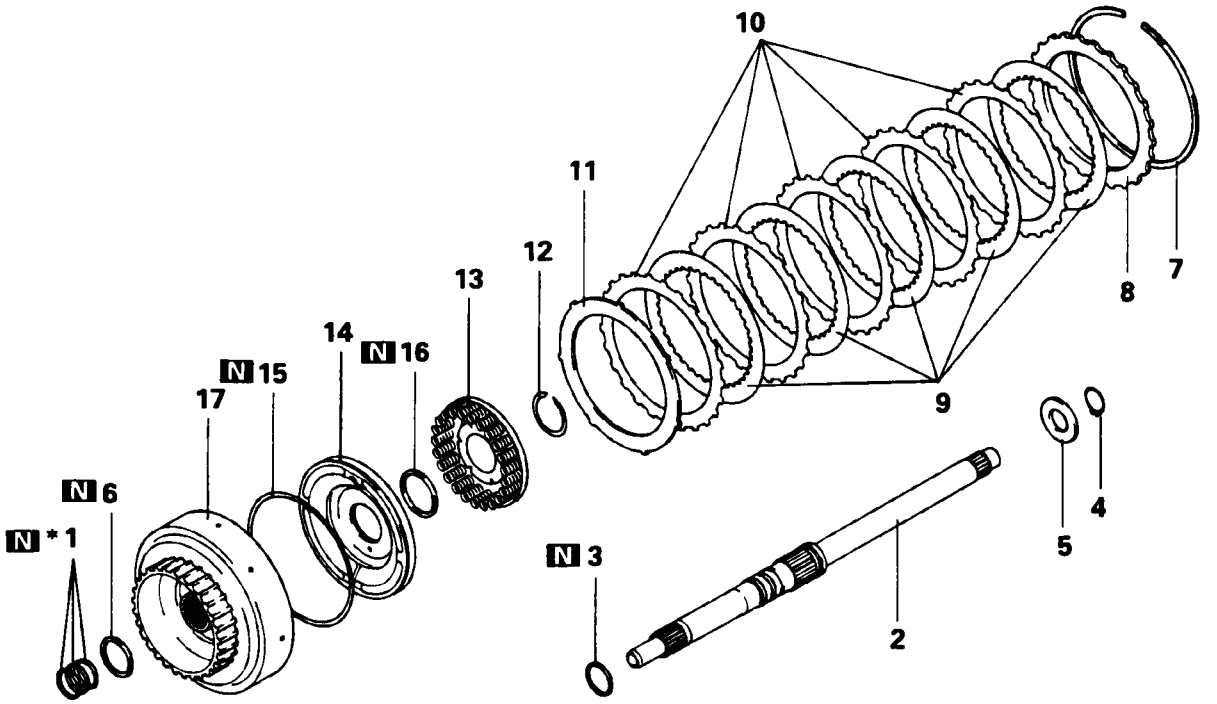
1. Seal ring
2. ♦E♦ Input shaft
3. O-ring
4. Snap ring
5. Thrust race
6. Seal ring
7. ♦D♦ Snap ring
8. ♦C♦ Clutch reaction plate
9. Clutch disc
10. ♦C♦ Clutch plate
11. ♦C♦ Clutch pressure plate
12. ◊A◊ ♦A♦ Wave spring
13. Return spring
14. Rear clutch piston
15. Rear clutch retainer
16. D-ring
17. D-ring

Lubricate all internal parts with automatic transmission fluid during reassembly.

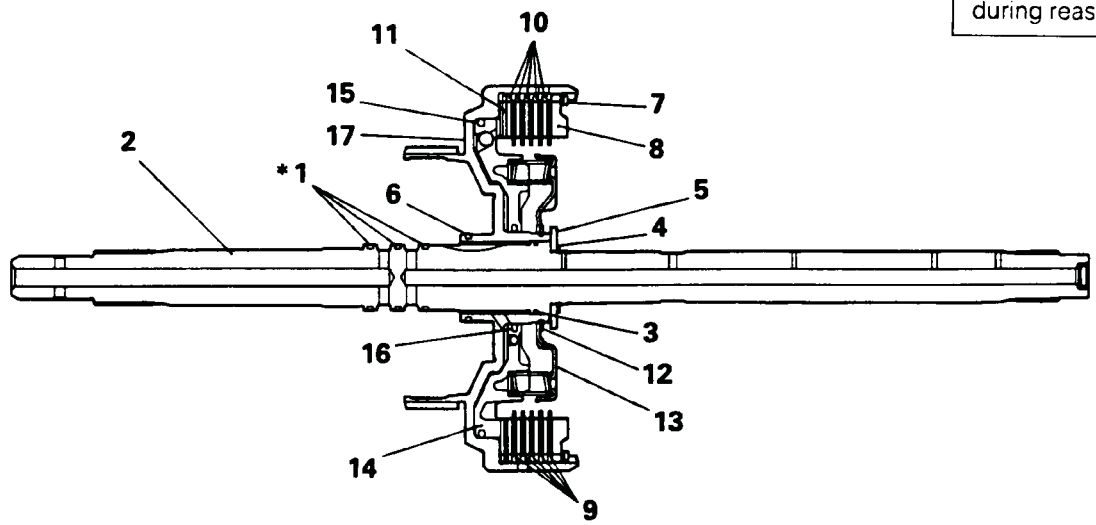




DISASSEMBLY AND REASSEMBLY – F4A33, W4A33 – Up to September 1992



Lubricate all internal parts with automatic transmission fluid during reassembly.



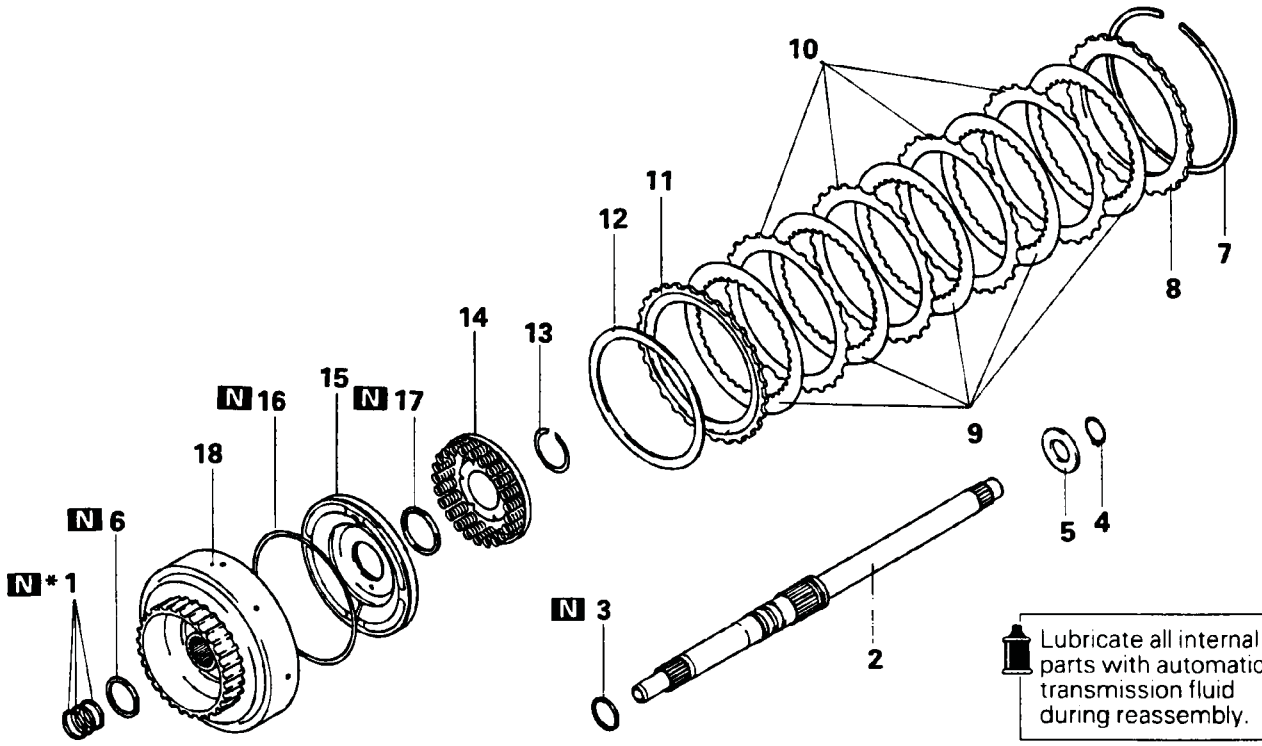
*: The number of seal rings varies with the transaxle model.

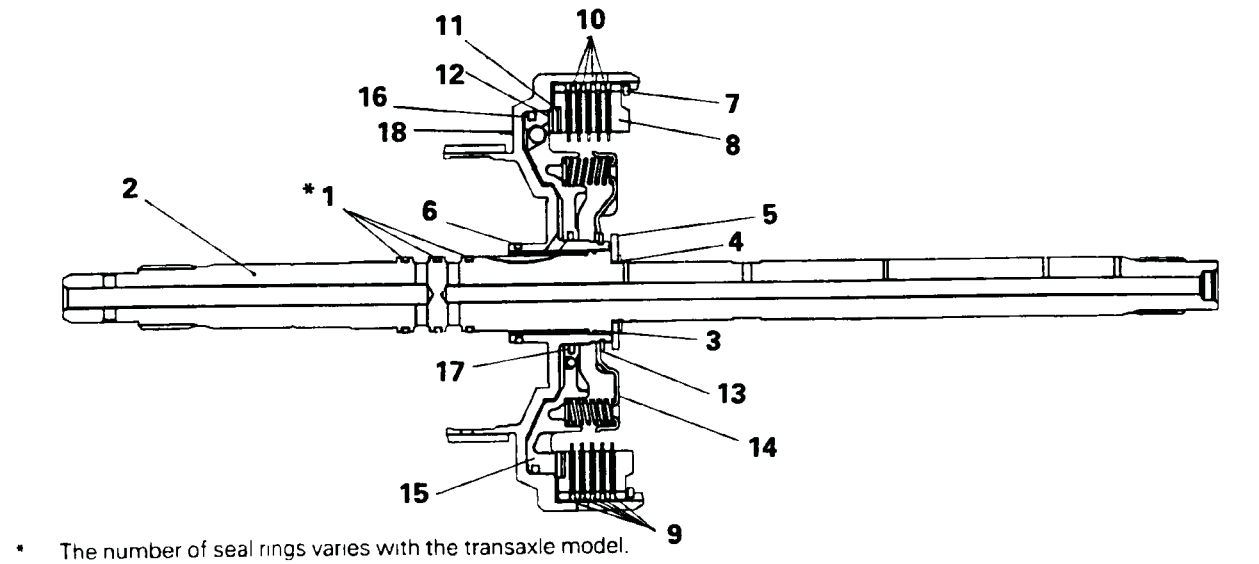
Models with torque converter clutch	3
Models without torque converter clutch	1

Disassembly steps

1. Seal ring*
◆E◆ 2. Input shaft
3. O-ring
4. Snap ring
5. Thrust race
6. Seal ring
◆D◆ 7. Snap ring
◆C◆ 8. Clutch reaction plate
9. Clutch disc
◆C◆ 10. Clutch plate
11. Wave spring
◇B◇ ◆B◆ 12. Snap ring
13. Return spring
14. Rear clutch piston
15. D-ring
16. D-ring
17. Rear clutch retainer

DISASSEMBLY AND REASSEMBLY – F4A33, W4A33 – From October 1992



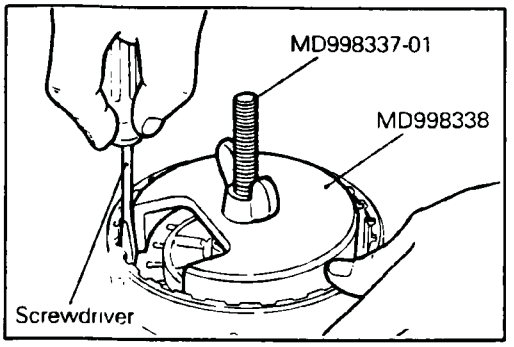


* The number of seal rings varies with the transaxle model.

Models with torque converter clutch	3
Models without torque converter clutch	1

Disassembly steps

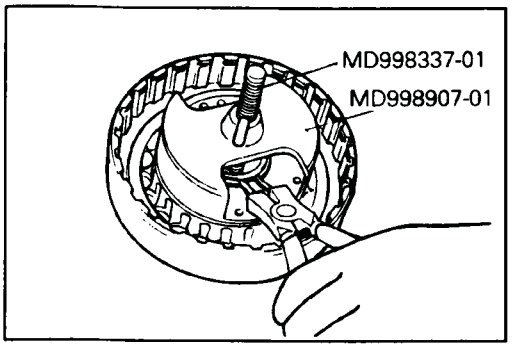
1. Seal ring*
◆E◆ 2. Input shaft
3. O-ring
4. Snap ring
5. Thrust race
6. Seal ring
◆D◆ 7. Snap ring
◆C◆ 8. Clutch reaction plate
9. Clutch disc
◆C◆ 10. Clutch plate
11. Clutch pressure plate
12. Wave spring
◇B◇ ◆B◆ 13. Snap ring
14. Return spring
15. Rear clutch piston
16. D-ring
17. D-ring
18. Rear clutch retainer



DISASSEMBLY SERVICE POINTS

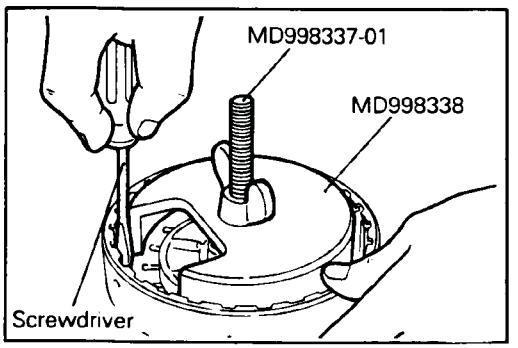
◊A◊ WAVE SPRING REMOVAL

(1) Compress the return spring with the special tool.
(2) Using a screwdriver, remove the wave spring.



◊B◊ SNAP RING REMOVAL

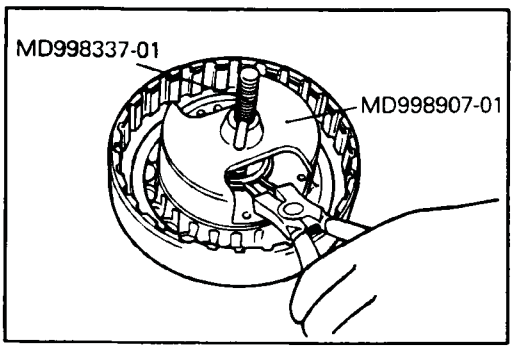
(1) Compress the return spring with the special tool.
(2) Using a screwdriver, remove the snap ring.



REASSEMBLY SERVICE POINTS

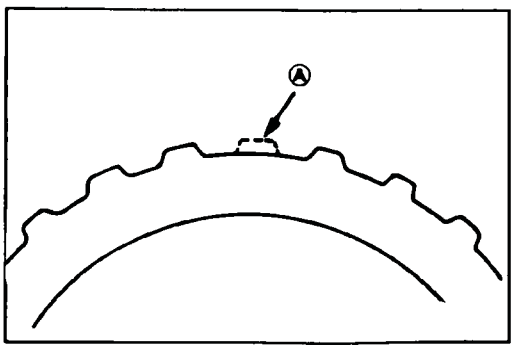
♦A♦ WAVE SPRING INSTALLATION

(1) Compress clutch reaction plate with the special tool.
(2) Install the wave spring.



♦B♦ SNAP RING INSTALLATION

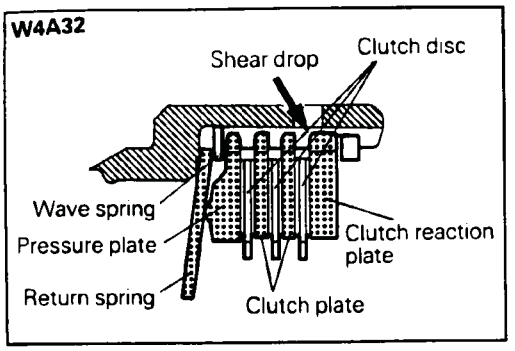
(1) Compress clutch reaction plate with the special tool.
(2) Install the snap ring.

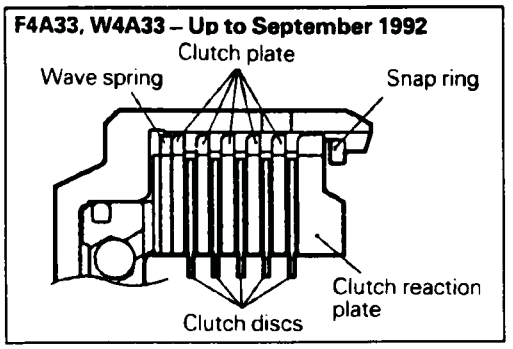


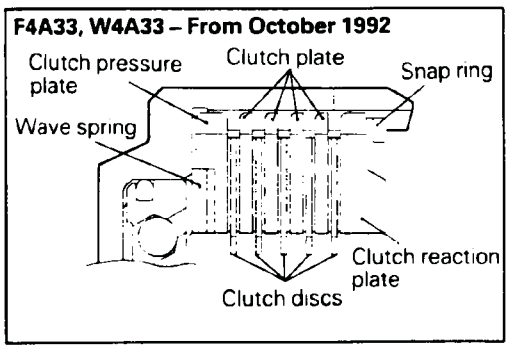
♦C♦ CLUTCH PRESSURE PLATE / CLUTCH PLATE / CLUTCH REACTION PLATE INSTALLATION

(1) Install the clutch pressure plate, clutch plates and clutch reaction plate with their missing tooth portions (Ⓐ in the illustration) in alignment.

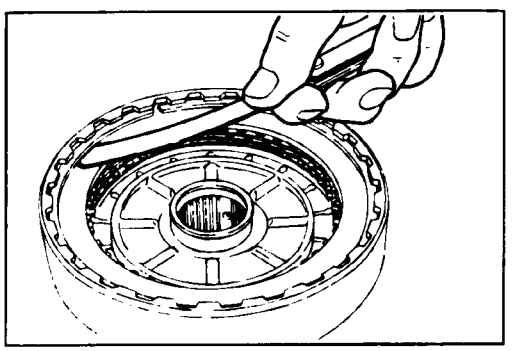
NOTE
This design is to facilitate escape of automatic transmission fluid and improve the cooling efficiency of the plates and disc.







(2) Install the clutch reaction plate with its shear droop directed as shown in the illustration.

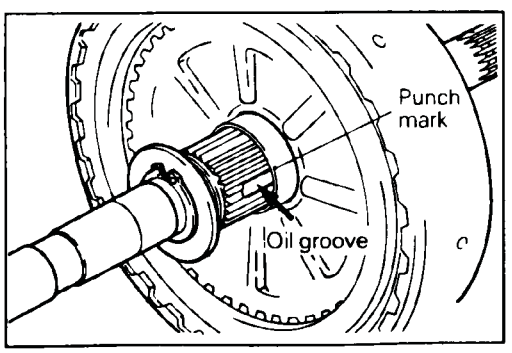


◆D◆ SNAP RING SELECTION

(1) Check clearance between the snap ring and clutch reaction plate. To check the clearance, hold entire circumference of the clutch reaction plate down with 50 N (11 lbs.) force. If clearance is out of standard value, select a snap ring to obtain the standard value.

Standard value:

W4A32	**0.4 – 0.6 mm (.016 – .024 in.)**
F4A33, W4A33	**1.0 – 1.2 mm (.039 – .047 in.)**

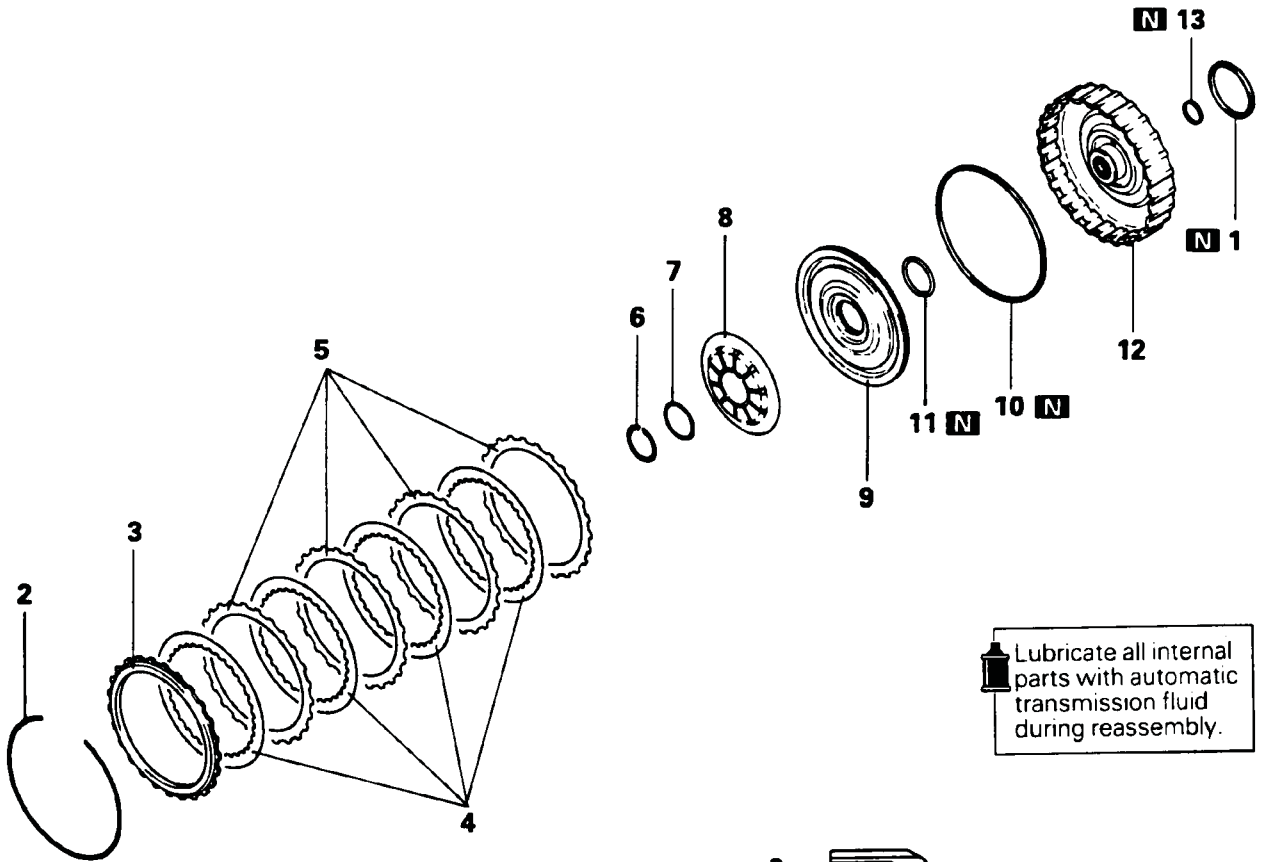


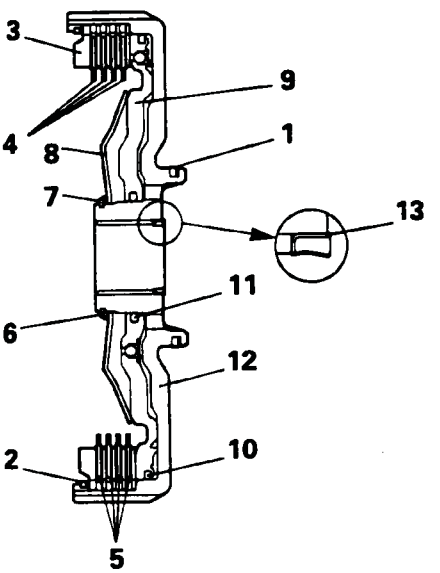
◆E◆ INPUT SHAFT INSTALLATION

(1) Install the input shaft with one of its oil groove aligned with the punch mark on the rear clutch retainer.

END CLUTCH

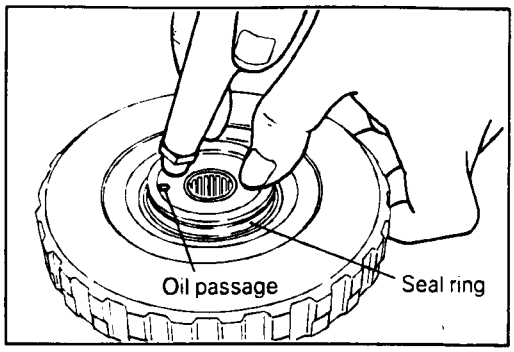
DISASSEMBLY AND REASSEMBLY





Disassembly steps

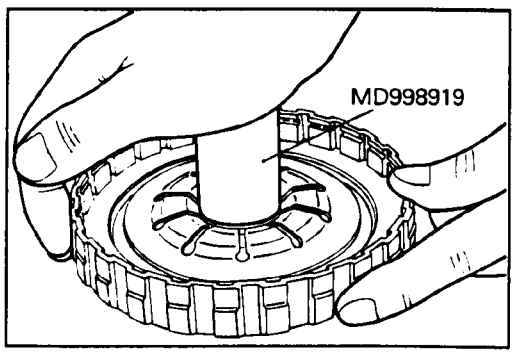
1. Seal ring
- ◆B◆ 2. Snap ring
3. Clutch reaction plate
4. Clutch disc
5. Clutch plate
- ◆A◆ 6. Snap ring
7. Washer
8. Return spring
- ◇A◇ 9. End clutch piston
10. Oil seal
11. D-ring
12. End clutch retainer
13. Oil seal



DISASSEMBLY SERVICE POINT

◇A◇ END CLUTCH PISTON REMOVAL

(1) Remove the piston. If it is hard to remove, place the retainer on the workbench with piston side down and blow air through the oil passage in the back of retainer.

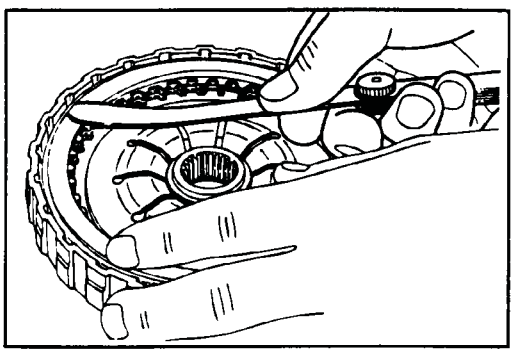


REASSEMBLY SERVICE POINTS

◆A◆ SNAP RING INSTALLATION

(1) Using the special tool, fit the snap ring.

Caution
Make sure that the snap ring is fitted in position in the groove.



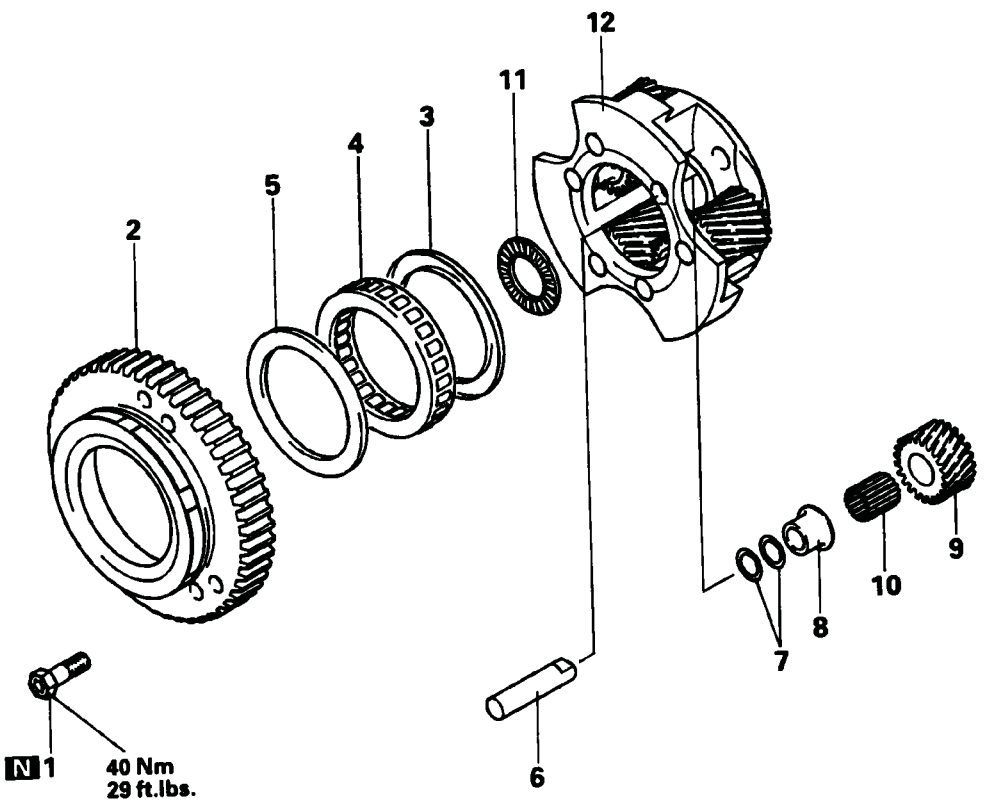
◆B◆ SNAP RING SELECTION

(1) Check clearance between the snap ring and clutch reaction plate. To check the clearance, hold entire circumference of the clutch reaction plate down with 50 N (11 lbs.) force. If clearance is out of standard value, select a snap ring to obtain the standard value.

Standard value: 0.6 – 0.85 mm (.024 – .031 in.)

PLANETARY GEAR

DISASSEMBLY AND REASSEMBLY – W4A32

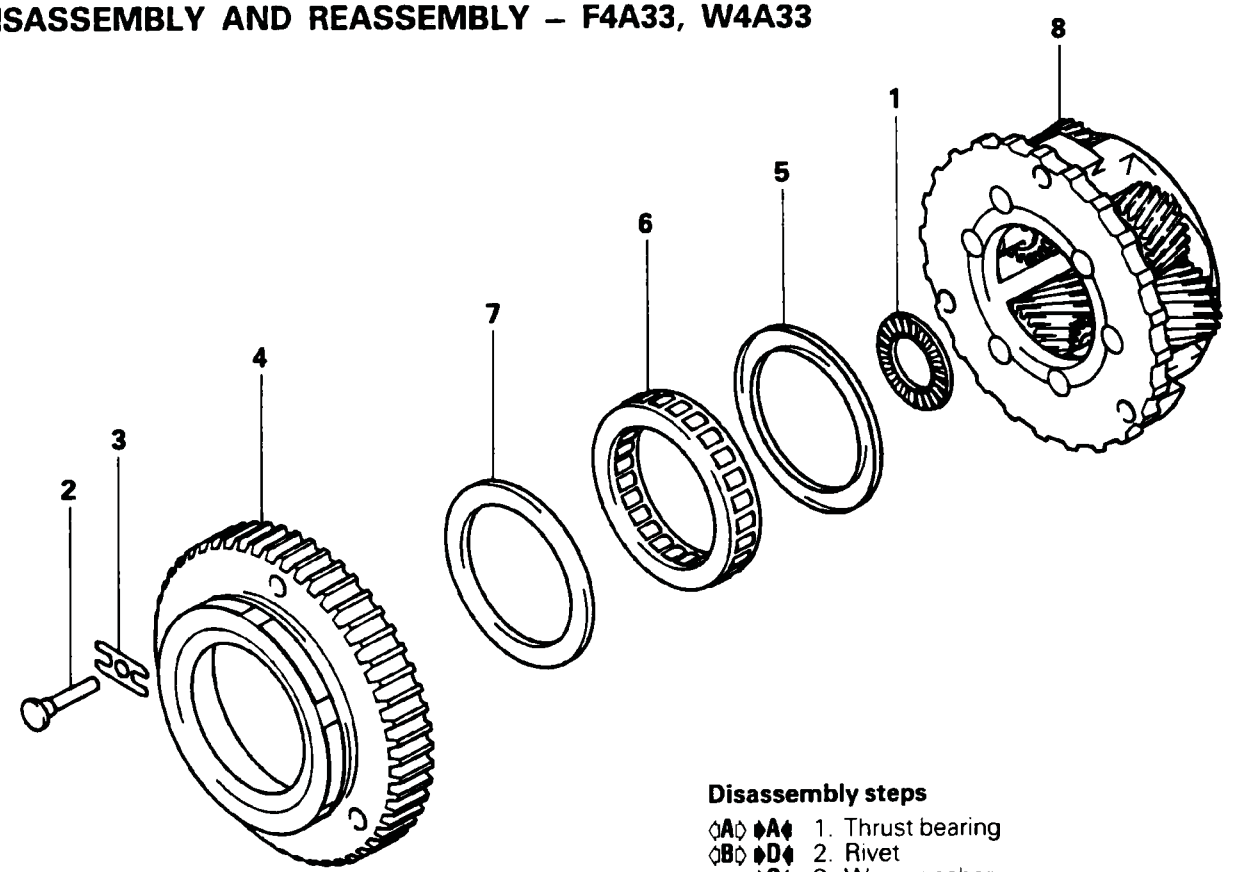


Disassembly steps

1. Bolt
2. One-way clutch outer race
3. End plate
◆B◆ 4. One-way clutch
5. End plate
6. Pinion shaft
7. Front thrust washer
8. Spacer bushing
9. Short pinion
10. Roller
◇A◇ ◆A◆ 11. Thrust bearing
12. Planetary carrier

Lubricate all internal parts with automatic transmission fluid during reassembly.

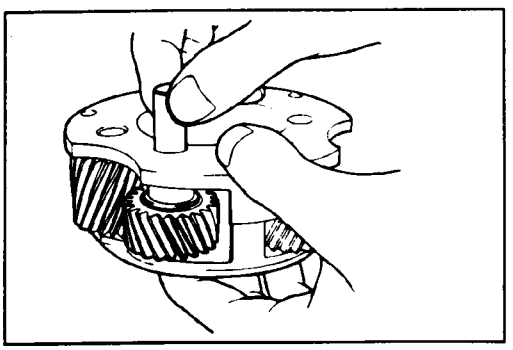
DISASSEMBLY AND REASSEMBLY – F4A33, W4A33

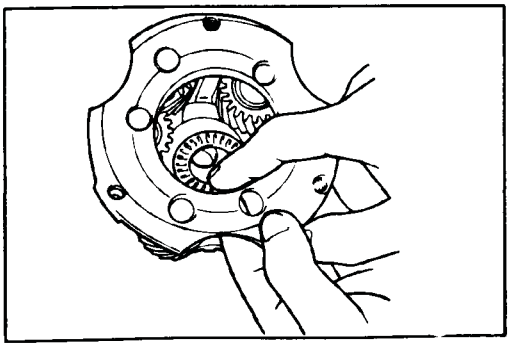


Disassembly steps

◇A◇ ◆A◆ 1. Thrust bearing
◇B◇ ◆D◆ 2. Rivet
◆C◆ 3. Wave washer
4. One way clutch outer race
5. End plate
◆B◆ 6. One way clutch
7. End plate
8. Planetary carrier

Lubricate all internal parts with automatic transmission fluid during reassembly.



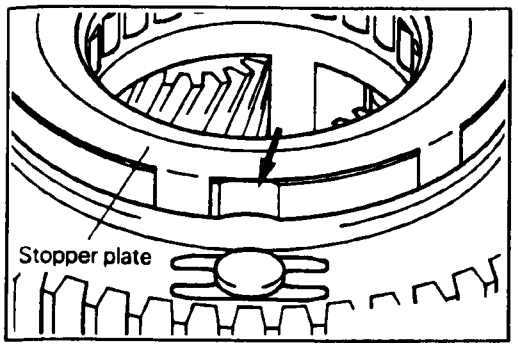


DISASSEMBLY SERVICE POINTS

◇A◇ THRUST BEARING REMOVAL

(1) Remove the only one short pinion. Use care not to drop and lose the 17 rollers in the short pinion. Do not remove the other short pinions.

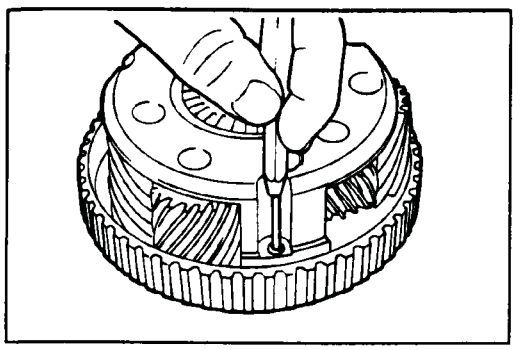
(2) Remove the thrust bearing.



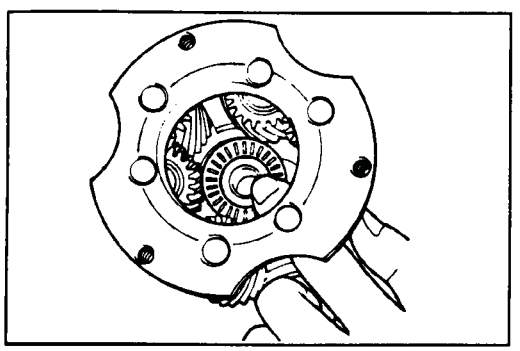
◊B◊ RIVET REMOVAL

(1) Shift the stopper plate to ensure that the rivet head does not hit it.

NOTE
Make sure that the stopper plate claw is not located at the groove in the one-way clutch outer race.



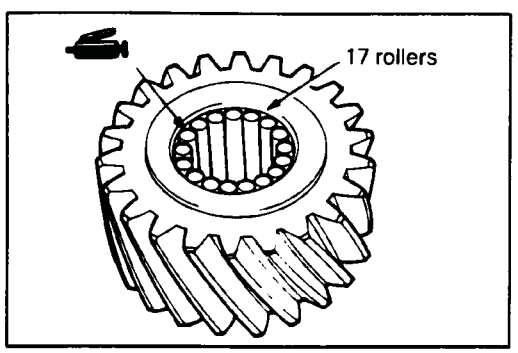
(2) Using a pin punch, drive out the rivet.



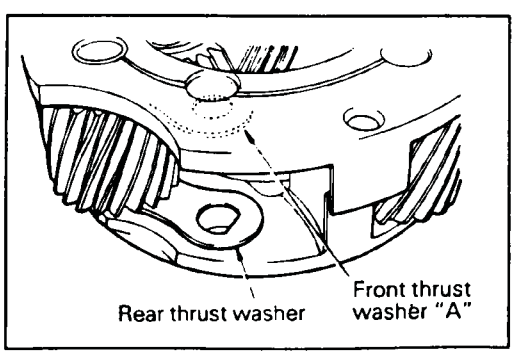
REASSEMBLY SERVICE POINTS

◊A◊ THRUST BEARING INSTALLATION

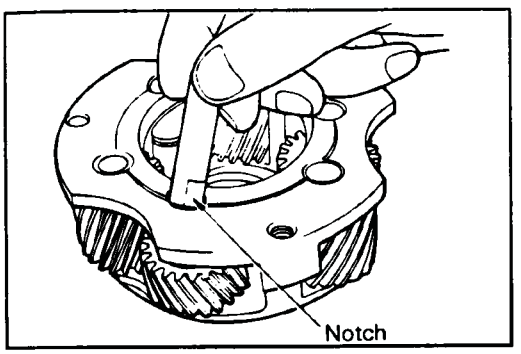
(1) Install a new thrust bearing on the carrier. Make sure that it fits correctly in the spot faced portion of the carrier.



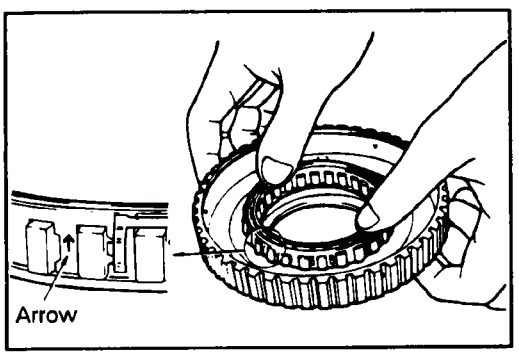
(2) Apply vaseline unsparingly to the inside surface of the short pinion and attach the 17 rollers on the surface.



(3) Line up the holes of the rear thrust washer and front thrust washer "A" with the shaft hole of the carrier.
(4) Install the short pinion, spacer bushing and front thrust washer and align the holes. Use care not to allow the rollers to get out of position.

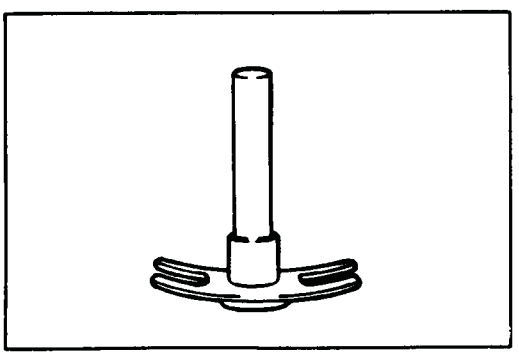


(5) Insert the pinion shaft. Make sure that the flattened end of pinion shaft is correctly fitted in the hole of the rear thrust plate when the pinion shafts is inserted.



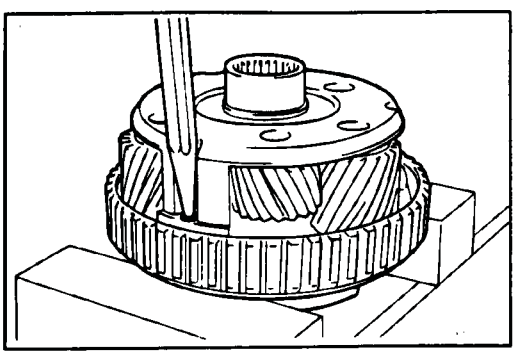
♦B♦ ONE-WAY CLUTCH INSTALLATION

(1) Push the one-way clutch into the outer race. Make sure that arrow on the outside circumference of cage is directed upward as shown in the illustration when the one-way clutch is pushed in.



♦C♦ WAVE WASHER INSTALLATION

(1) Install the wave washer to the rivet so that its indentation is placed on the outer race side.



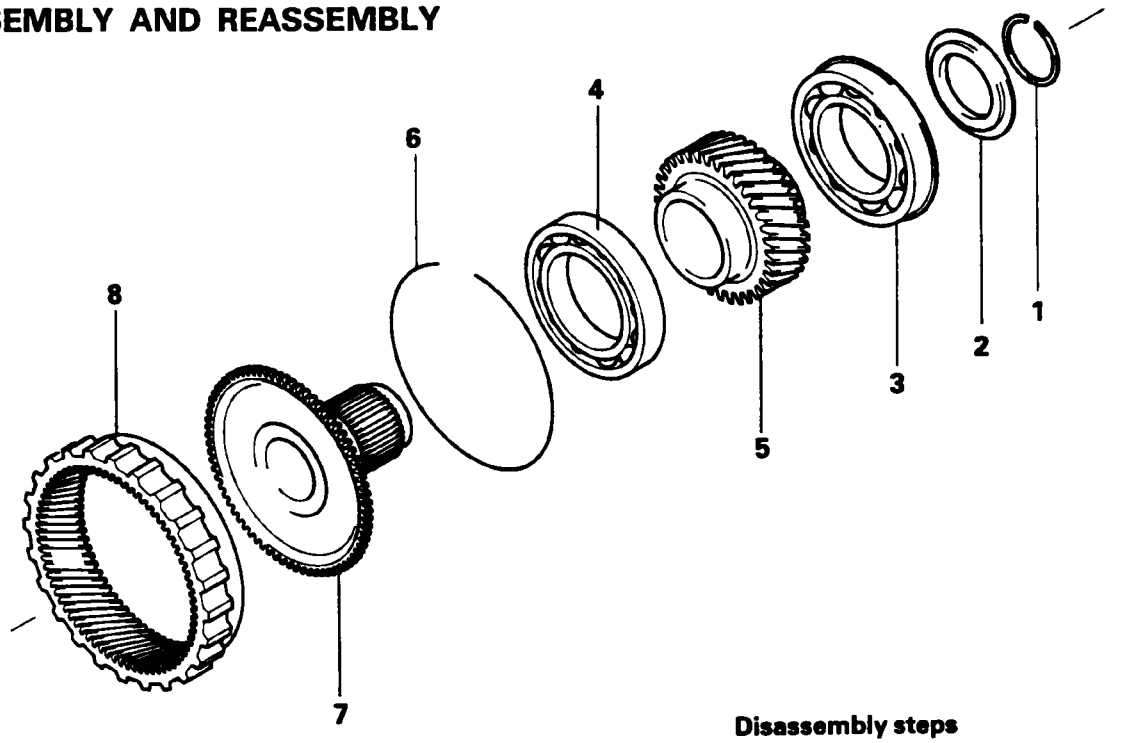
♦D♦ RIVET INSTALLATION

(1) Stake the rivet using a punch and press.

NOTE
(1) Use a punch with a 60° tip angle.
(2) Stake the rivet with a load of 11,000 – 13,000 N (2,425 – 2,866 lbs.).

ANNULUS GEAR AND TRANSFER DRIVE GEAR SET

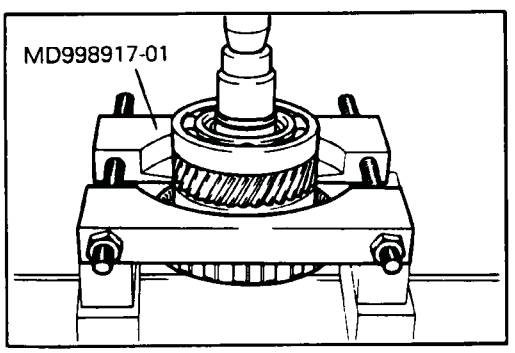
DISASSEMBLY AND REASSEMBLY

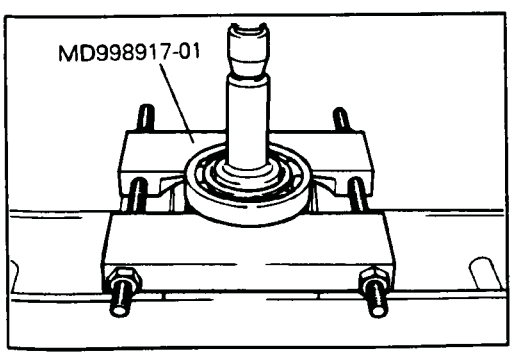


Disassembly steps

- ◆B◆ 1. Snap ring
- 2. Stopper plate
- ◇A◇ ◆A◆ 3. Bearing
- ◇A◇ ◆A◆ 4. Bearing
- ◇A◇ ◆A◆ 5. Transfer drive gear
- 6. Snap ring
- 7. Output flange
- 8. Annulus gear

Lubricate all internal parts with automatic transmission fluid during reassembly.





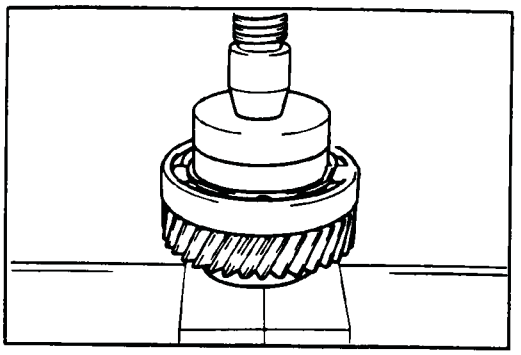
DISASSEMBLY SERVICE POINT

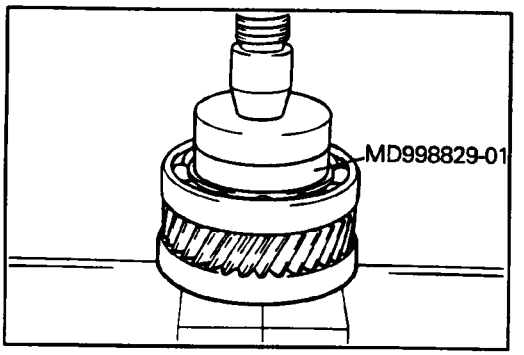
◇A◇ BEARING / TRANSFER DRIVE GEAR REMOVAL

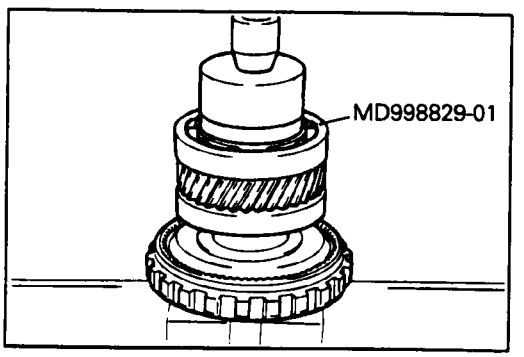
(1) Using the special tool, remove the transfer drive gear together with two bearings from the output flange.

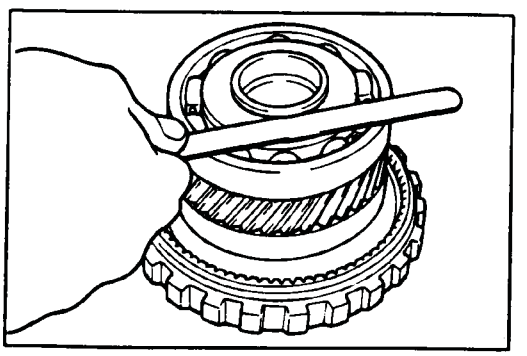
Caution
Install the special tool in position between the output flange and bearings.

(2) Using the special tool, remove the bearings from both sides of the transfer drive gear.









REASSEMBLY SERVICE POINTS

◆A◆ TRANSFER DRIVE GEAR / BEARING INSTALLATION

(1) Using the special tool, press-fit the bearings into both sides of the transfer drive gear.

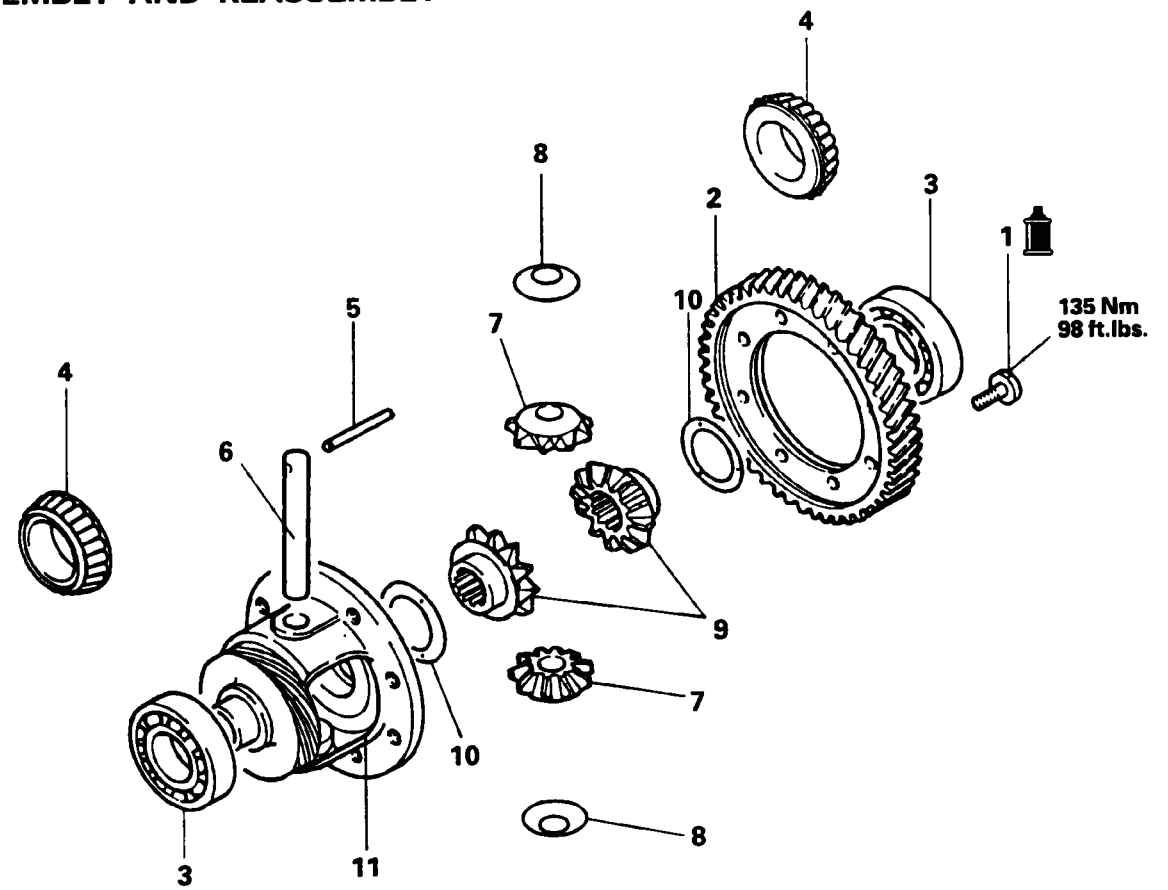
(2) Using the special tool, install the transfer drive gear to the output flange.

◆B◆ SNAP RING SELECTION

(1) Measure the snap ring groove clearance and select the appropriate spacer to obtain the specified end play.
Standard value: 0 – 0.09 mm (0 – .0035 in.)

DIFFERENTIAL

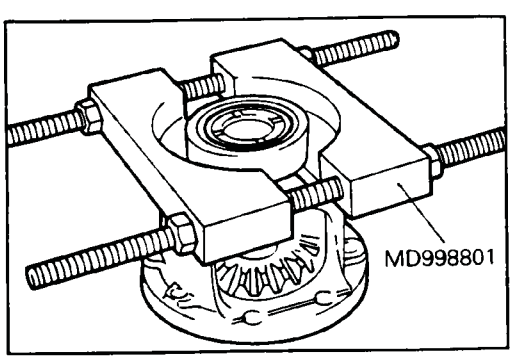
DISASSEMBLY AND REASSEMBLY



Disassembly steps

- ◆E◆ 1. Bolt
- 2. Differential drive gear
- ◇A◇ ◆D◆ 3. Ball bearing (W4A32, W4A33)
- ◇B◇ ◆C◆ 4. Taper roller bearing (F4A33)
- ◇C◇ ◆B◆ 5. Lock pin
- ◆A◆ 6. Pinion shaft
- ◆A◆ 7. Pinion
- ◆A◆ 8. Washer
- ◆A◆ 9. Side gear
- ◆A◆ 10. Spacer
- 11. Differential case

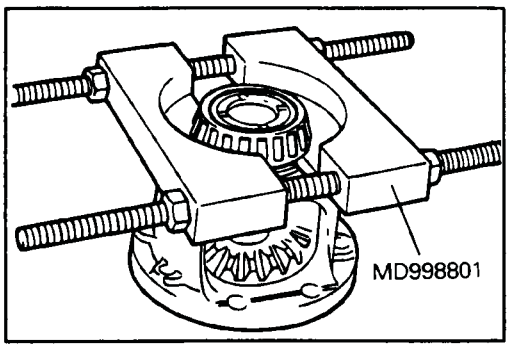
Lubricate all internal parts with automatic transmission fluid during reassembly.



DISASSEMBLY SERVICE POINTS

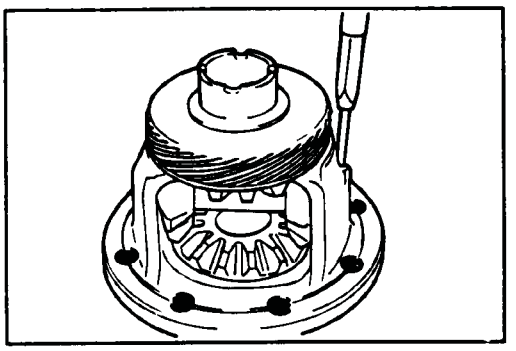
◇A◇ BEARING REMOVAL

(1) Using the special tool, remove the bearing.



◊B◊ TAPER ROLLER BEARING REMOVAL

(1) Using the special tool, remove the taper roller bearing.

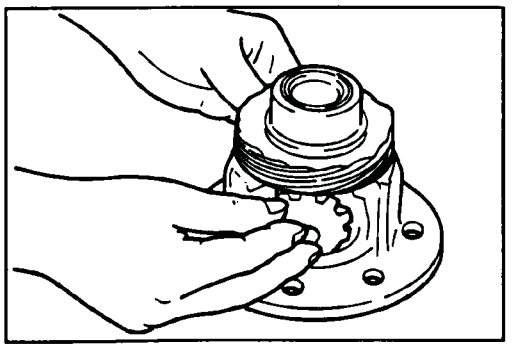


◊C◊ LOCK PIN REMOVAL

(1) Using a pin punch, drive out the lock pin.

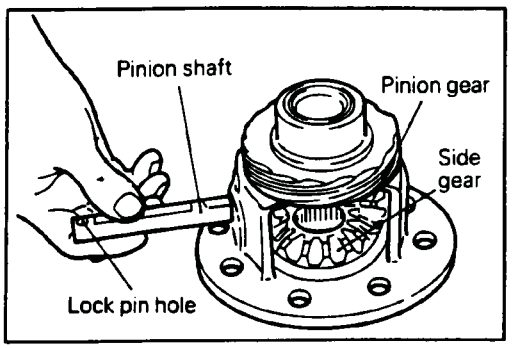
NOTE
Sometimes the lock pin is removed with a light punch.

REASSEMBLY SERVICE POINTS

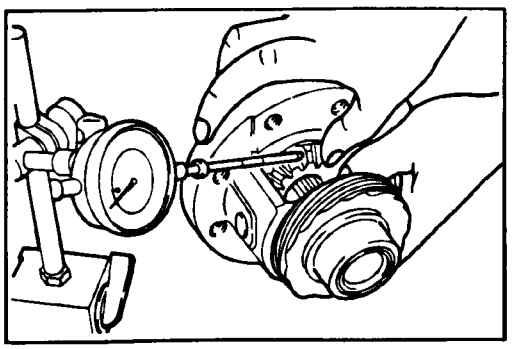


▶A◀ SPACER / SIDE GEAR WASHER / PINION / PINION SHAFT INSTALLATION

(1) Fit the spacer to the back face of the side gear, then install the gear into the differential case.
(2) Fit washer to back of pinion and rotate two pinions at the same time into position to mesh with the side gear.

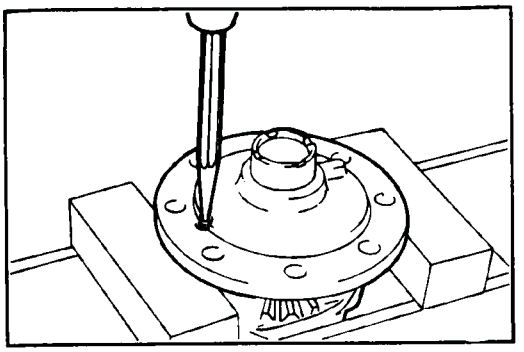


(3) Insert the pinion shaft.



(4) Measure the backlash between the side gear and pinion.
Standard value: 0.025 – 0.150 mm (.001 – .0059 in.)
(5) If the backlash is out of specification, select the appropriate spacer and disassemble and reassemble the gears as necessary.

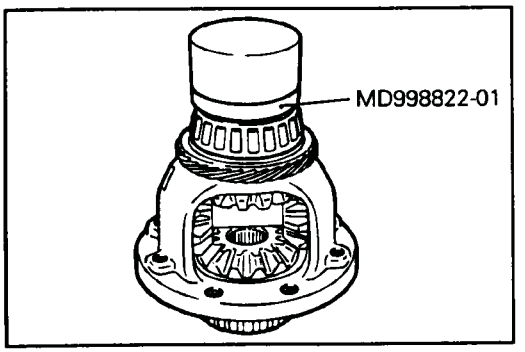
NOTE
Adjust so that the backlash in both side gears equals.



◆B◆ LOCK PIN INSTALLATION

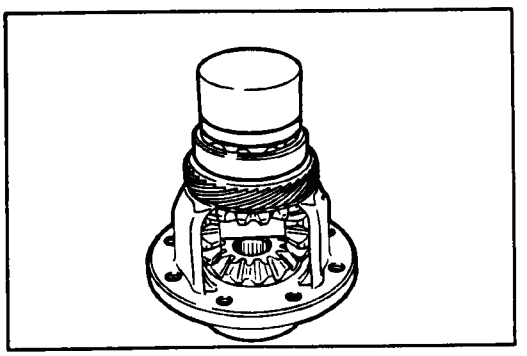
(1) Align the lock pin hole in pinion shaft with that in the case and install the lock pin.

Caution
1. **Do not reuse lock pins**
2. **Make the lock pin lower than the surface of the differential case flange.**
3. **Press-fitting load is over 5,000 N (1,100 lbs.)**

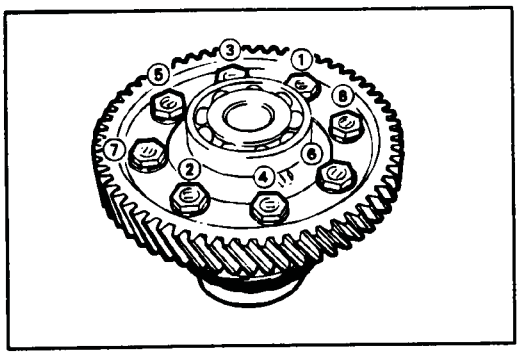


◆C◆ TAPER ROLLER BEARING INSTALLATION

(1) Using the special tool, press-fit the bearings into both sides of the differential case.



◆D◆ BEARING INSTALLATION

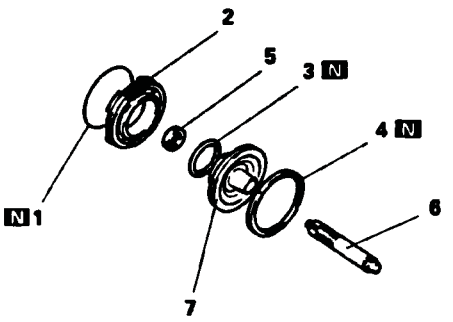


◆E◆ BOLTS INSTALLATION

(1) Apply ATF to the differential drive gear bolts, install and tighten with specified torque in the order shown in the figure.

Differential drive gear bolt: 135 Nm (98 ft.lbs.)

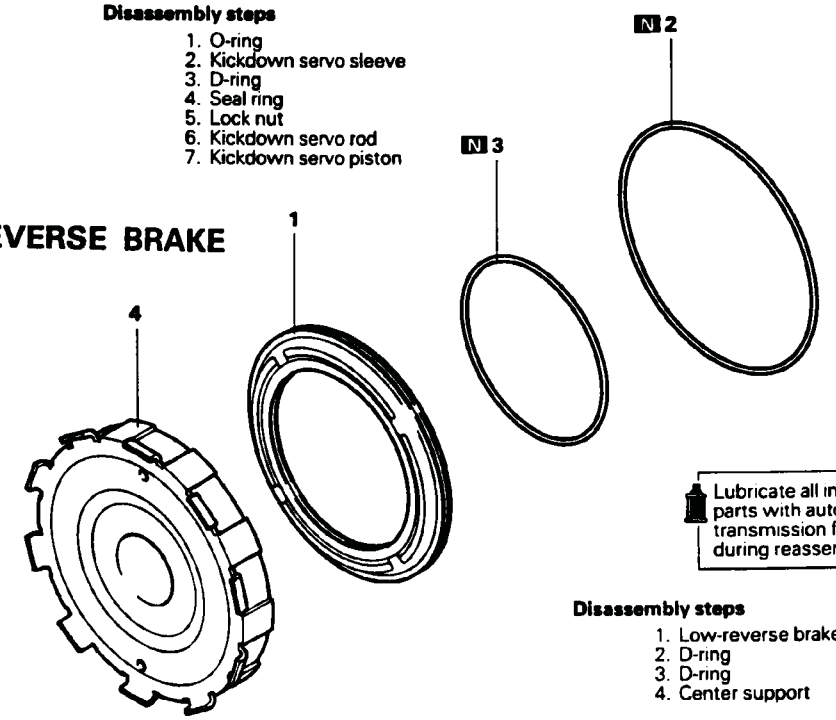
KICKDOWN SERVO



Disassembly steps

1. O-ring
2. Kickdown servo sleeve
3. D-ring
4. Seal ring
5. Lock nut
6. Kickdown servo rod
7. Kickdown servo piston

LOW-REVERSE BRAKE

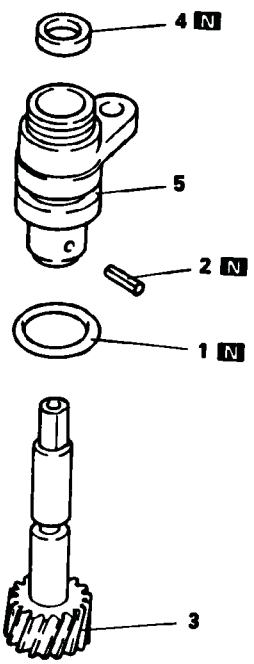


Lubricate all internal parts with automatic transmission fluid during reassembly.

Disassembly steps

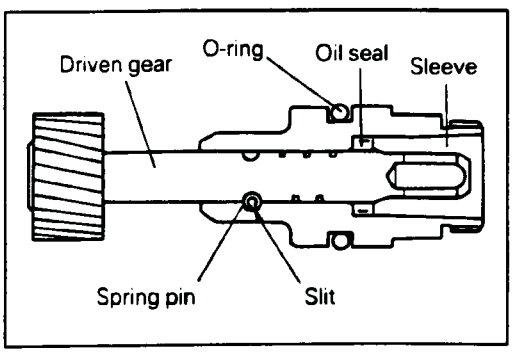
1. Low-reverse brake piston
2. D-ring
3. D-ring
4. Center support

SPEEDOMETER GEAR



Disassembly steps

1. O-ring
2. Spring pin ◆A◆
3. Driven gear
4. Oil seal
5. Sleeve



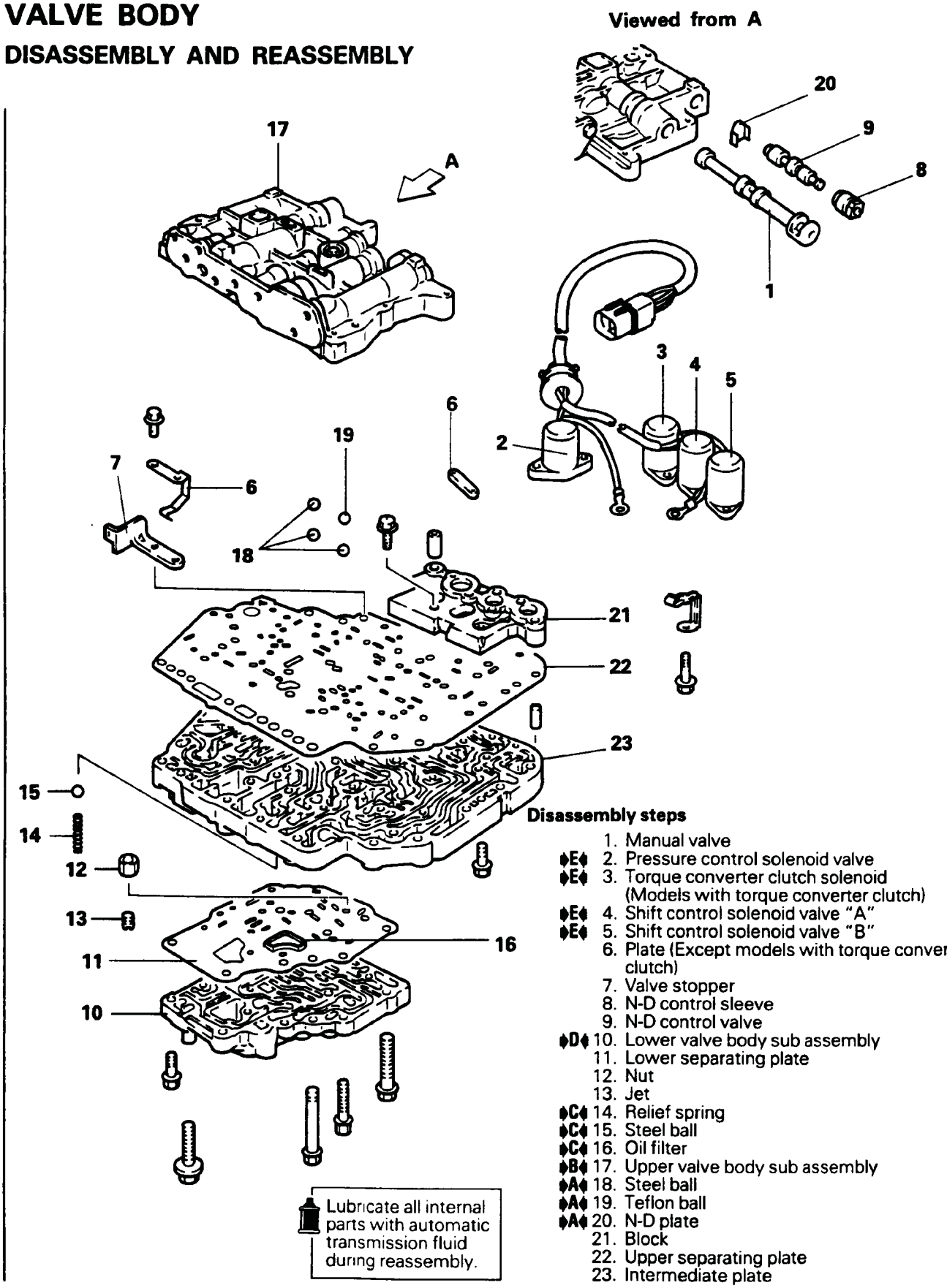
REASSEMBLY SERVICE POINT

◆A◆ SPRING PIN INSTALLATION

(1) Drive a new spring pin into the sleeve. Make sure that the slit in the spring pin does not face the gear.

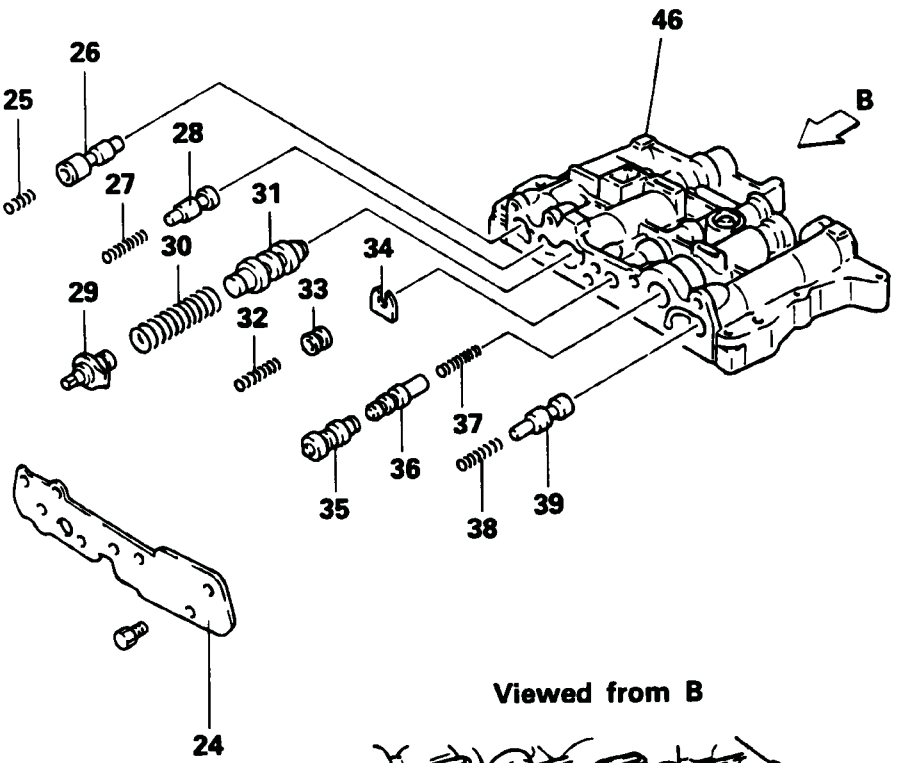
VALVE BODY

DISASSEMBLY AND REASSEMBLY

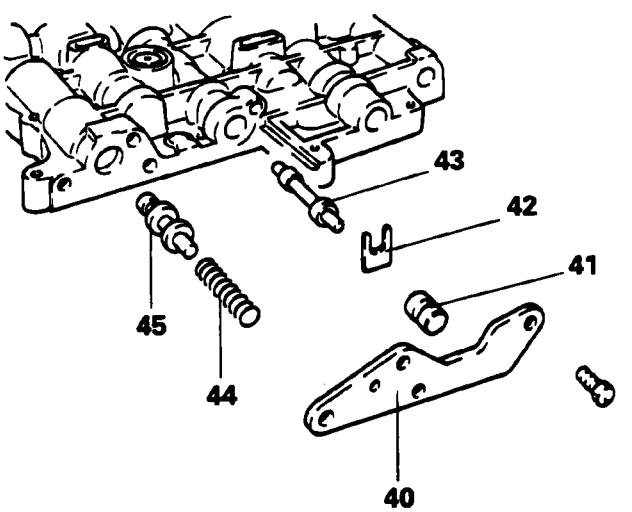


Disassembly steps

1. Manual valve
◆E◆ 2. Pressure control solenoid valve
◆E◆ 3. Torque converter clutch solenoid (Models with torque converter clutch)
◆E◆ 4. Shift control solenoid valve "A"
◆E◆ 5. Shift control solenoid valve "B"
6. Plate (Except models with torque converter clutch)
7. Valve stopper
8. N-D control sleeve
9. N-D control valve
◆D◆ 10. Lower valve body sub assembly
11. Lower separating plate
12. Nut
13. Jet
◆C◆ 14. Relief spring
◆C◆ 15. Steel ball
◆C◆ 16. Oil filter
◆B◆ 17. Upper valve body sub assembly
◆A◆ 18. Steel ball
◆A◆ 19. Teflon ball
◆A◆ 20. N-D plate
21. Block
22. Upper separating plate
23. Intermediate plate



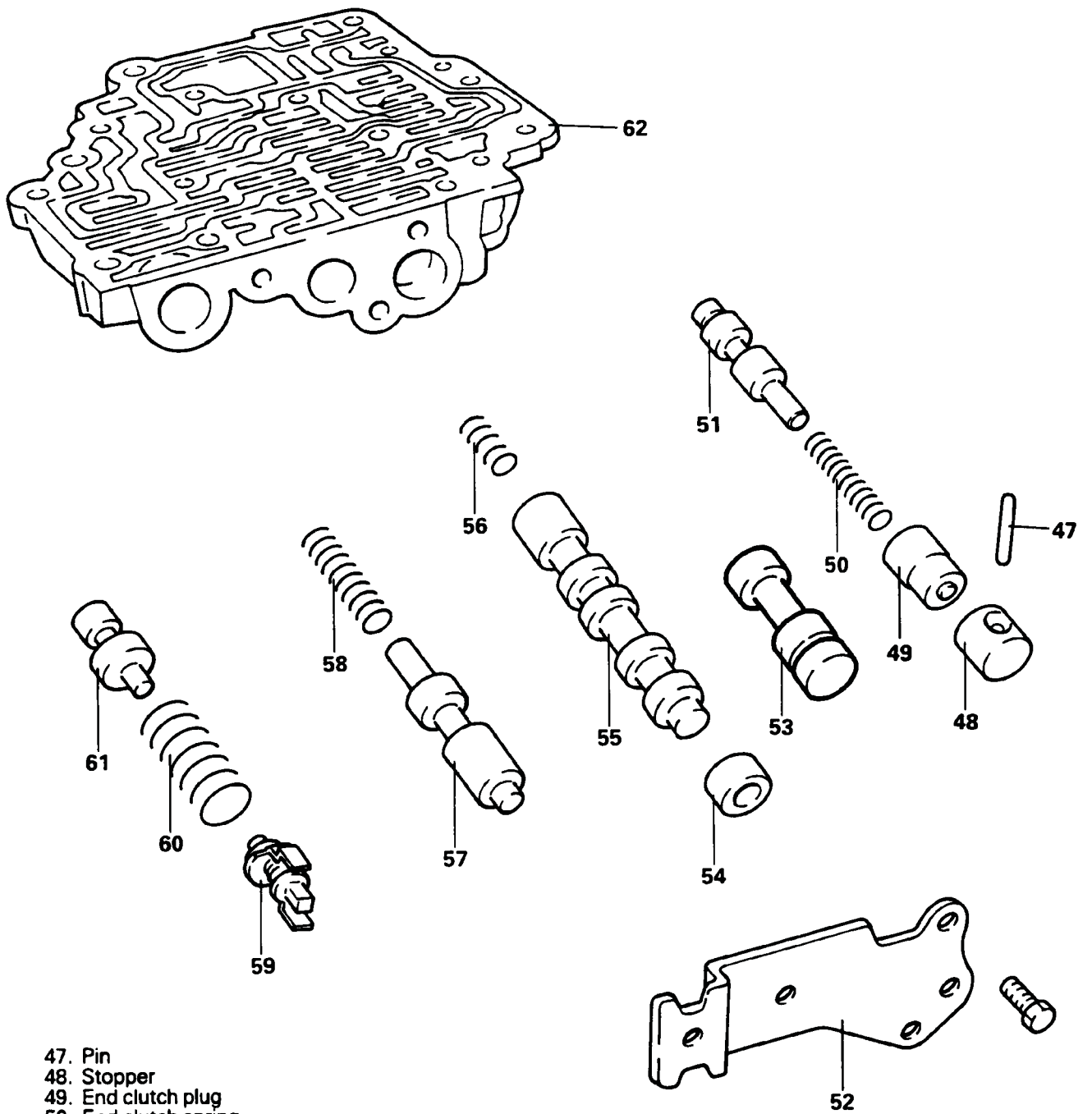
Viewed from B



Lubricate all internal parts with automatic transmission fluid during reassembly.

Disassembly steps

24. Front end cover
25. Pressure control spring
26. Pressure control valve
27. Torque converter control spring
28. Torque converter control valve
29. Adjusting screw
30. Regulator spring
31. Regulator valve
32. Shift control spring
◆A◆ 33. Stopper plate
34. Shift control plug
35. Rear clutch exhaust valve A
36. Rear clutch exhaust valve B
37. Rear clutch exhaust spring
38. 2-3/4-3 shift spring
39. 2-3/4-3 shift valve
40. Rear end cover
41. Shift control plug B
◆A◆ 42. Stopper plate
43. Shift control valve
44. 1-2 shift spring
45. 1-2 shift valve
46. Upper valve body

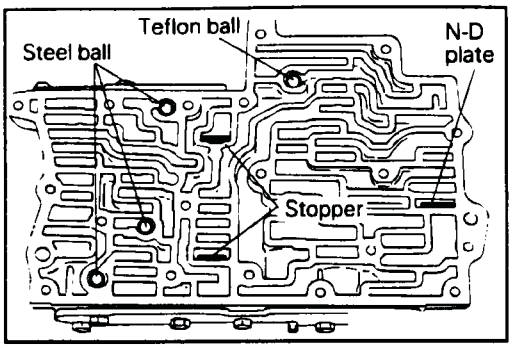


47. Pin
48. Stopper
49. End clutch plug
50. End clutch spring
51. End clutch valve
52. End cover
53. Plug (Except models with torque converter clutch)
54. Torque converter clutch control sleeve
55. Torque converter clutch control valve
56. Torque converter clutch control spring

} Models with torque converter clutch

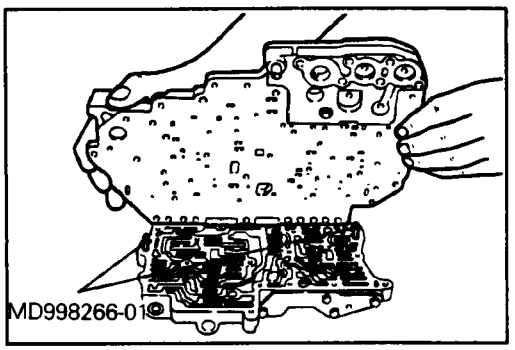
57. N-R control valve
58. N-R control spring
59. Adjusting screw
60. Reducing spring
61. Reducing valve
62. Lower valve body

Lubricate all internal parts with automatic transmission fluid during reassembly.



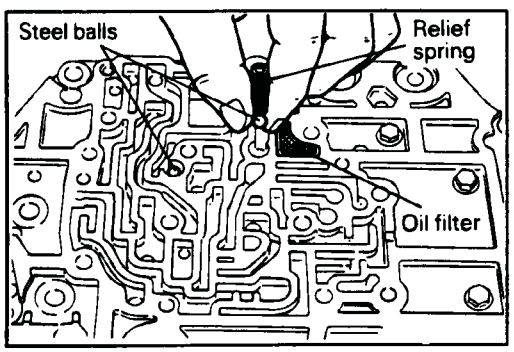
◆A◆ STOPPER PLATE / N-D PLATE / TEFLON BALL / STEEL BALL LOCATION

(1) Install the stopper plates, N-D plate, teflon ball, and steel balls into the upper valve body as shown.



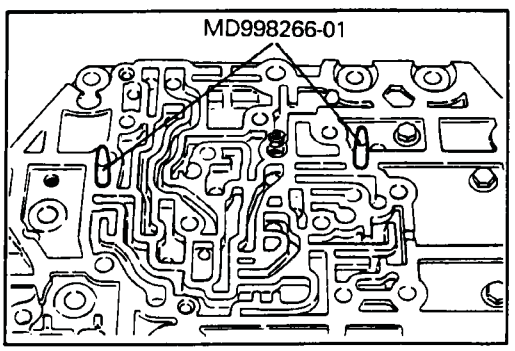
◆B◆ UPPER VALVE BODY SUB ASSEMBLY INSTALLATION

(1) Install the special tool and secure the upper separating plate and intermediate plate with eight mounting bolts. Then, remove the special tool.



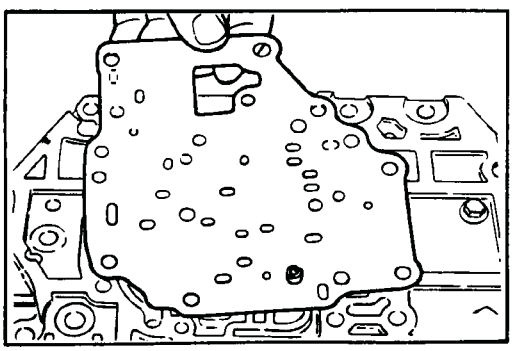
◆C◆ OIL FILTER / STEEL BALL / RELIEF SPRING INSTALLATION

(1) Install the oil filter, two steel balls, and spring to the intermediate plate.

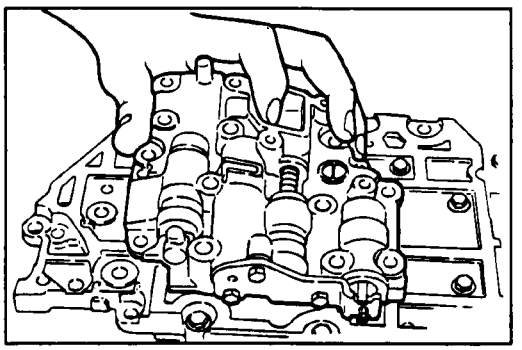


◆D◆ LOWER VALVE BODY SUB ASSEMBLY INSTALLATION

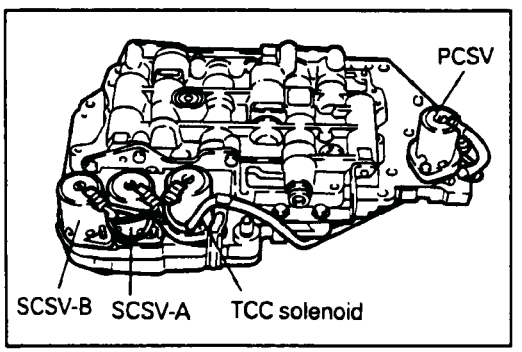
(1) Mount the special tool to the intermediate plate.



(2) Install the separating plate.



(3) Secure the lower valve body with mounting bolts and then remove the special tool.



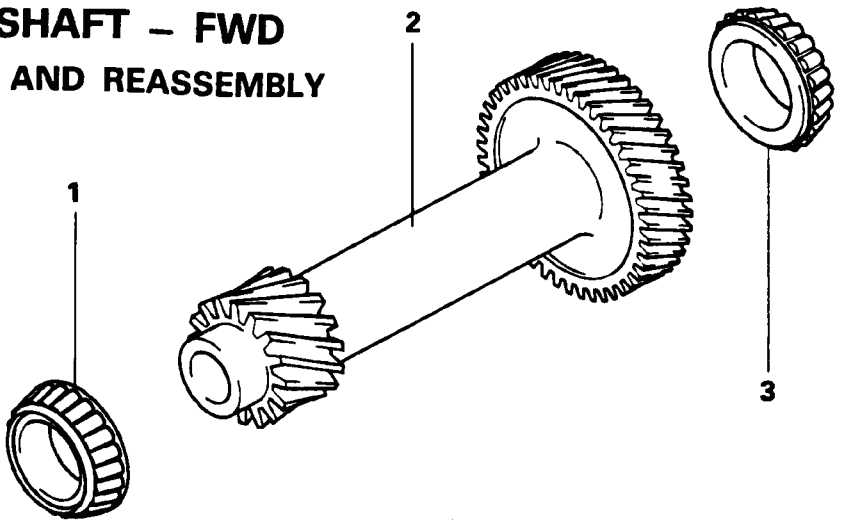
◆E◆ SOLENOID VALVE ASSEMBLY INSTALLATION

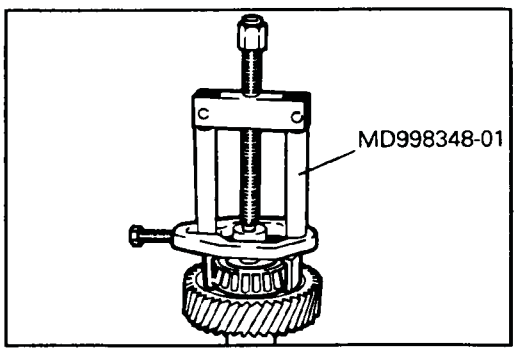
(1) Install the solenoid valves as shown.

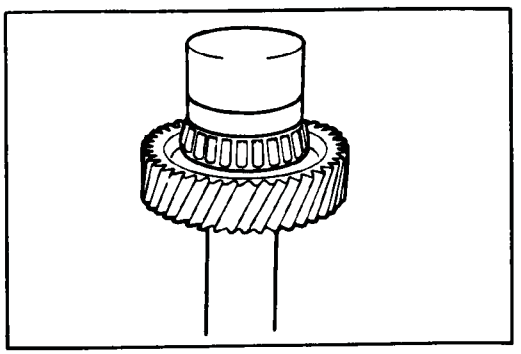
Solenoid valve	Wire color
Shift control solenoid valve A (SCSV-A)	Orange
Shift control solenoid valve B (SCSV-B)	Yellow
Torque converter clutch solenoid (TCC solenoid)	Red or Red/Black
Pressure control solenoid valve (PCSV)	Blue

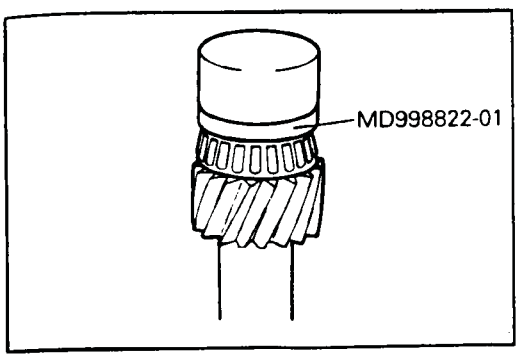
TRANSFER SHAFT – FWD

DISASSEMBLY AND REASSEMBLY









Disassembly steps

◊A◊ ◗B◖ 1. Taper roller bearing
2. Transfer shaft
◊A◊ ◗A◖ 3. Taper roller bearing

DISASSEMBLY SERVICE POINT

◊A◊ **TAPER ROLLER BEARING REMOVAL**

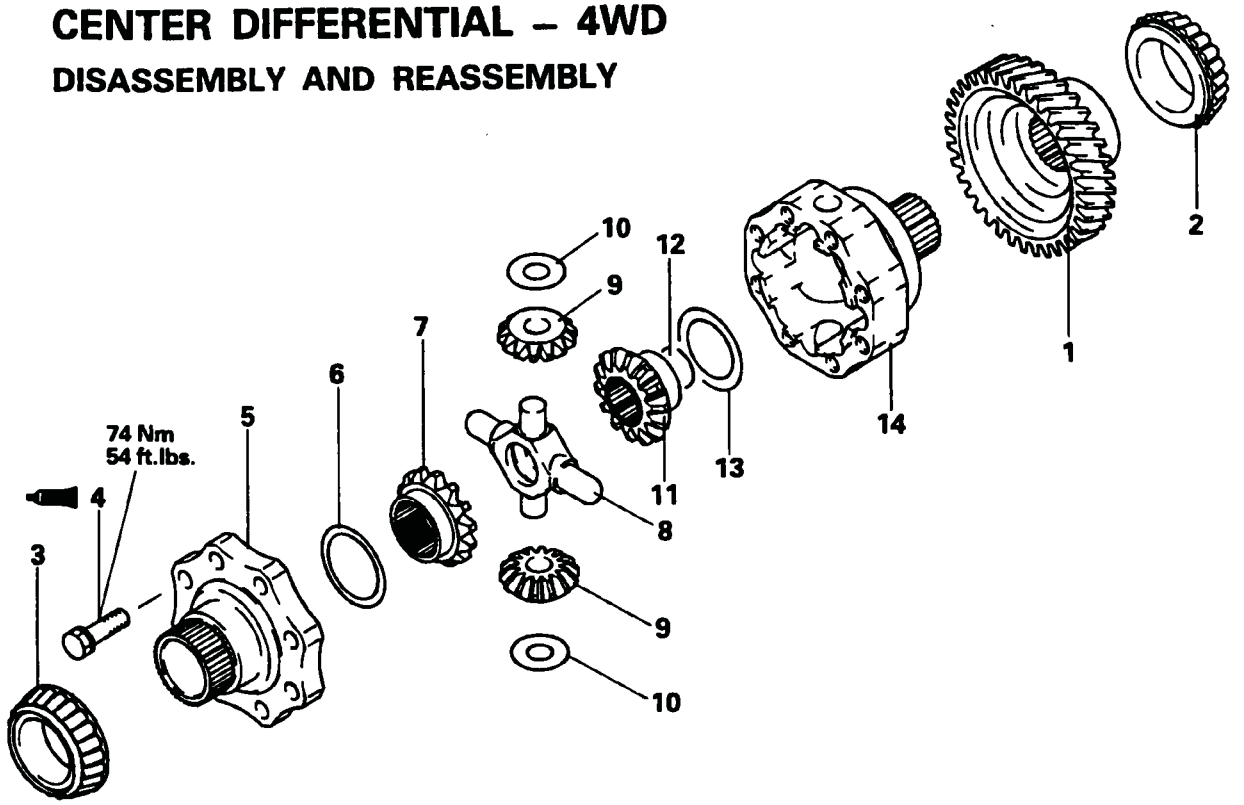
REASSEMBLY SERVICE POINTS

◗A◖ **TAPER ROLLER BEARING INSTALLATION**

◗B◖ **TAPER ROLLER BEARING INSTALLATION**

CENTER DIFFERENTIAL – 4WD

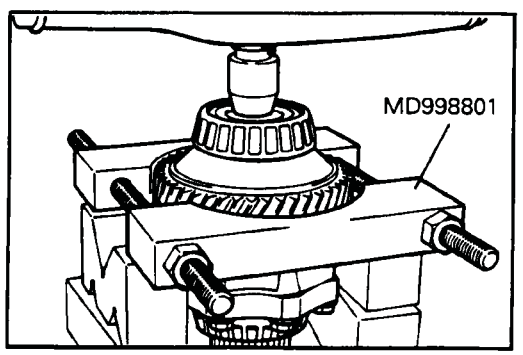
DISASSEMBLY AND REASSEMBLY



Disassembly steps

◇A◇ 1. Transfer driven gear
◇B◇ ◆D◆ 2. Taper roller bearing
◇C◇ ◆C◆ 3. Taper roller bearing
◆B◆ 4. Bolt
5. Center differential flange
◆A◆ 6. Spacer
7. Side gear (front)
8. Pinion shaft
9. Pinion
10. Washer
11. Side gear (rear)
12. Clip
◆A◆ 13. Spacer
14. Center differential case

Lubricate all internal parts with automatic transmission fluid during reassembly.

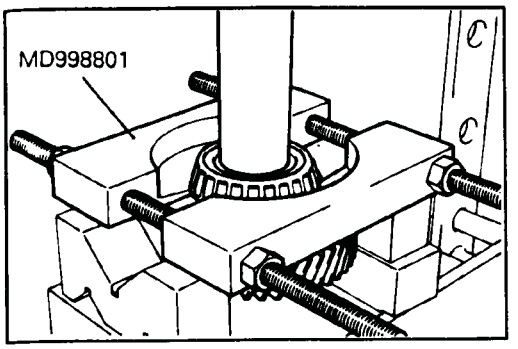


DISASSEMBLY SERVICE POINTS

◇A◇ TRANSFER DRIVEN GEAR REMOVAL

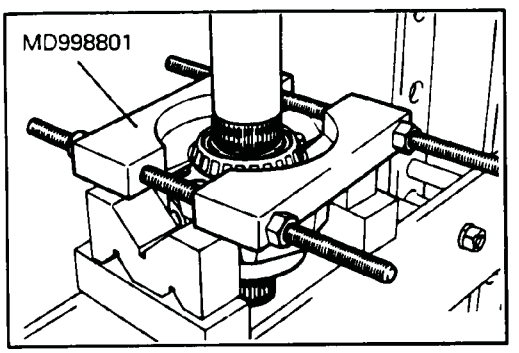
(1) Remove the transfer driven gear.

NOTE
If it is hard to remove, use the special tool to remove it.



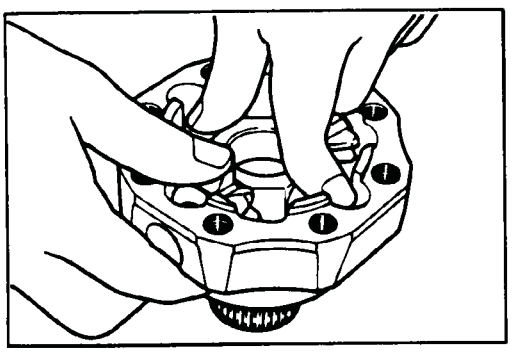
◊B◊ TAPER ROLLER BEARING REMOVAL

(1) Using the special tool, remove the taper roller bearing from the transfer driven gear.



◊C◊ TAPER ROLLER BEARING REMOVAL

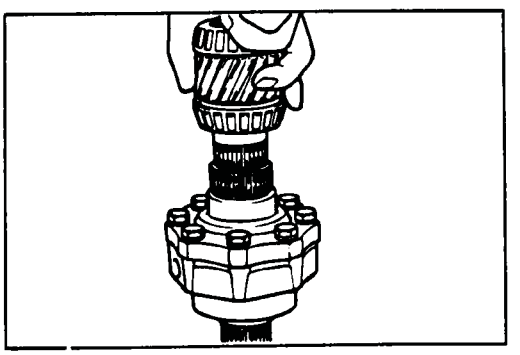
(1) Using the special tool, remove the taper roller bearing from the center differential flange.



REASSEMBLY SERVICE POINTS

♦A♦ SPACERS SELECTION

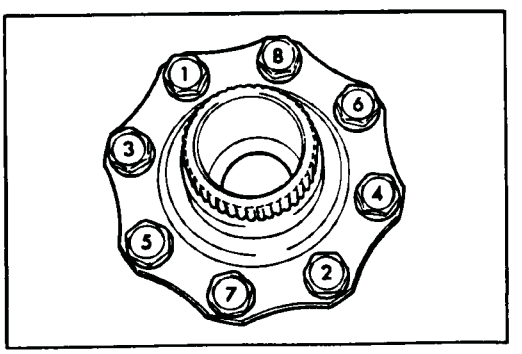
(1) Install the spacer, side gear (rear), pinion, washer and pinion shaft in the center differential case.
(2) While pressing the pinion shaft, select the thickest spacer to gently rotate the pinion.



(3) Install the side gear (front), spacer and center differential flange and tighten the bolts with the specified torque.

Center differential drive gear bolt: 75 Nm (54 ft.lbs.)

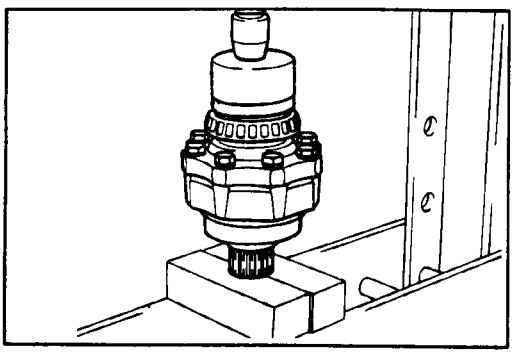
(4) Using the front output shaft, rotate the side gear front and select the thickest spacer to gently rotate the side gear front.



♦B♦ BOLT INSTALLATION

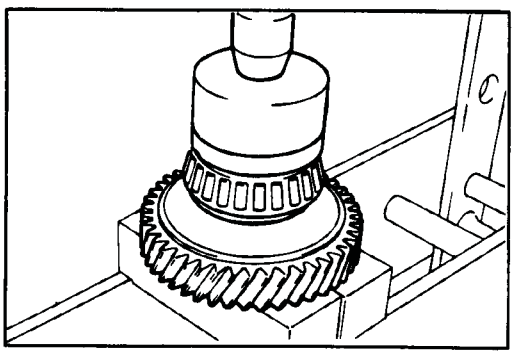
(1) First apply sealant to the end [5 mm (.2 in.)] of the bolt threads and then tighten to the specified torque in the order shown in the figure.

Center differential drive gear bolt: 75 Nm (54 ft.lbs.)
Specified adhesive:
3M Stud Locking Part No. 4170 or equivalent



◆C◆ TAPER ROLLER BEARING INSTALLATION

(1) Using the special tool, install the taper roller bearing on the center differential flange.

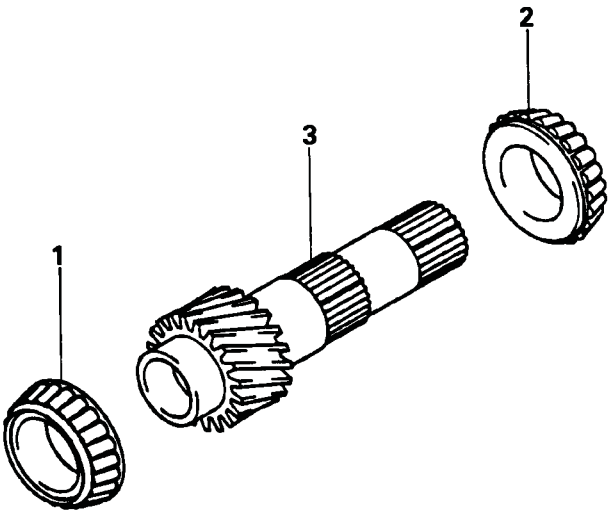


◆D◆ TAPER ROLLER BEARING INSTALLATION

(1) Using the special tool, install the taper roller bearing on the transfer driven gear.

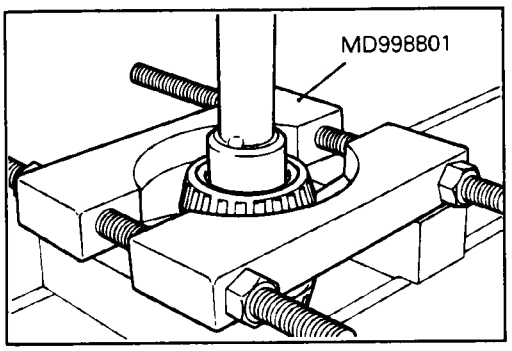
FRONT OUTPUT SHAFT – 4WD

DISASSEMBLY AND REASSEMBLY



Disassembly steps

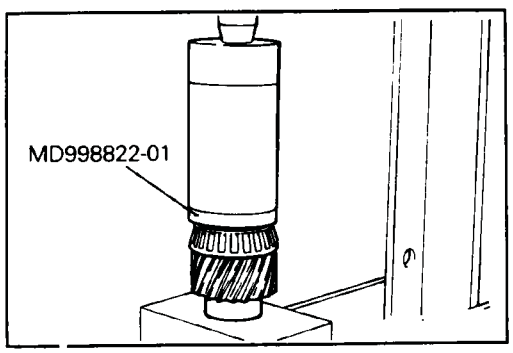
◇A◇ ◆A◆ 1. Taper roller bearing
◇A◇ ◆A◆ 2. Taper roller bearing
3. Front output shaft



DISASSEMBLY SERVICE POINT

◇A◇ **TAPER ROLLER BEARINGS REMOVAL**

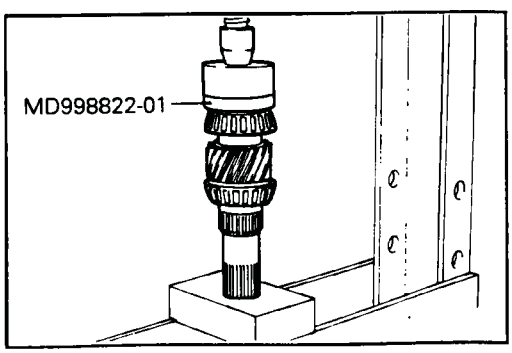
(1) Using the special tool, remove the taper roller bearings on both ends of the front output shaft.



REASSEMBLY SERVICE POINT

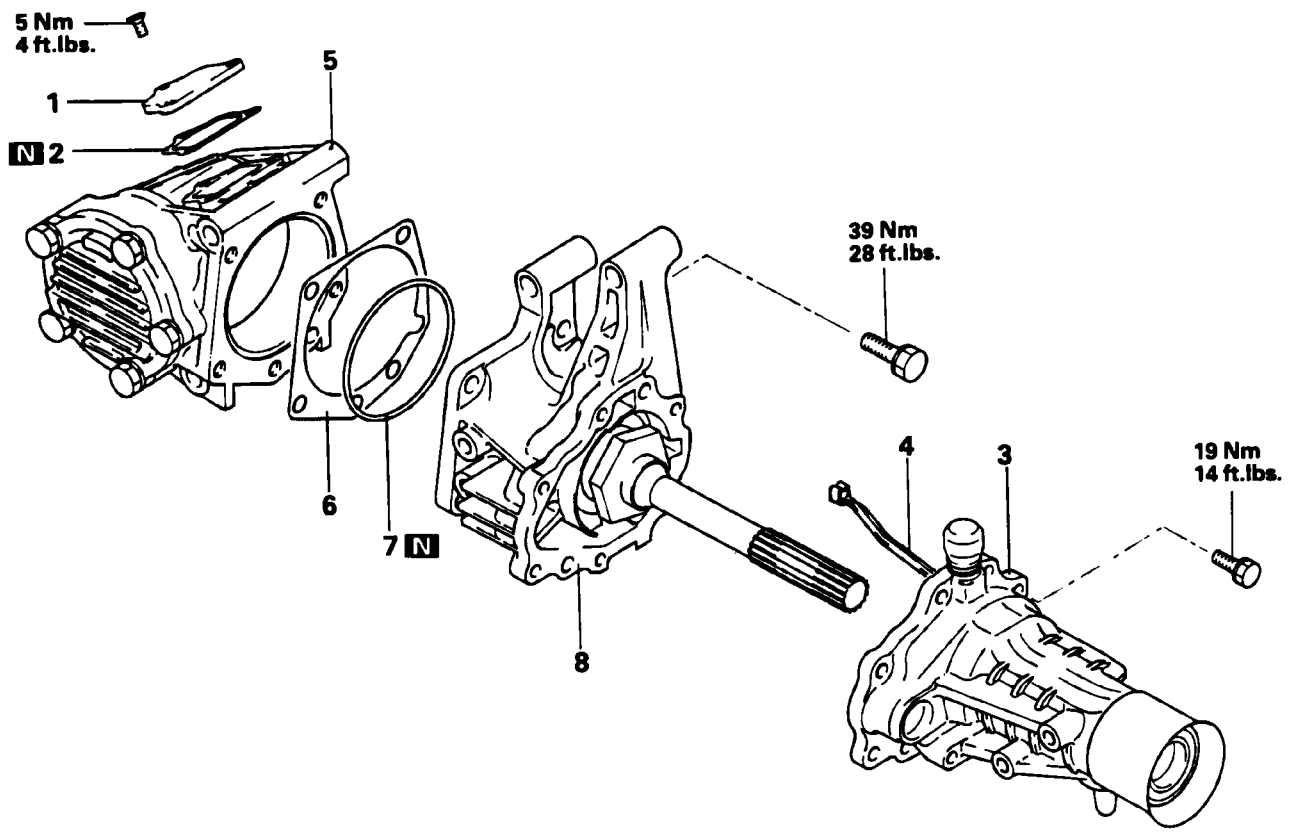
◆A◆ **TAPER ROLLER BEARINGS INSTALLATION**

(1) Using the special tool, press-fit the taper roller bearings on both ends of the front output shaft.



TRANSFER – 4WD

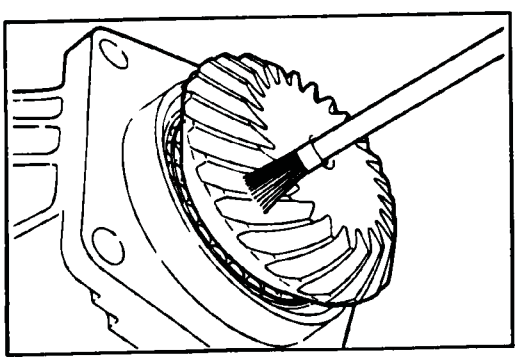
DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. Cover
◆E◆ 2. Cover gasket
◆D◆ 3. Extension housing assembly
4. Oil guide
◆C◆ 5. Transfer case sub assembly
◆B◆ 6. Spacer
7. O-ring
◆A◆ 8. Transfer case adapter sub assembly

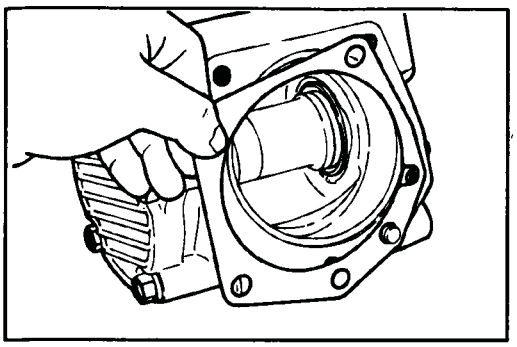
Lubricate all internal parts with gear oil during reassembly.



REASSEMBLY SERVICE POINTS

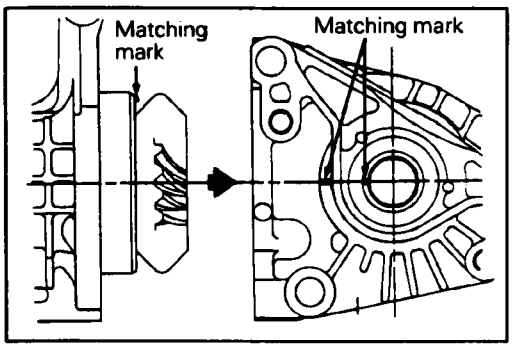
◆A◆ TRANSFER CASE ADAPTER SUB ASSEMBLY INSTALLATION

(1) Apply a light and uniform coat of machine blue or red lead to the driven bevel gear teeth (both sides) using a brush.



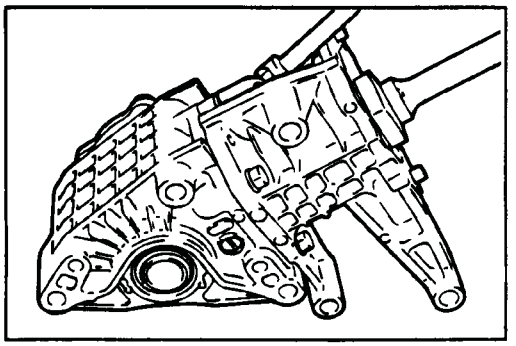
◆B◆ SPACER INSTALLATION

(1) Install the spacer that has been used.



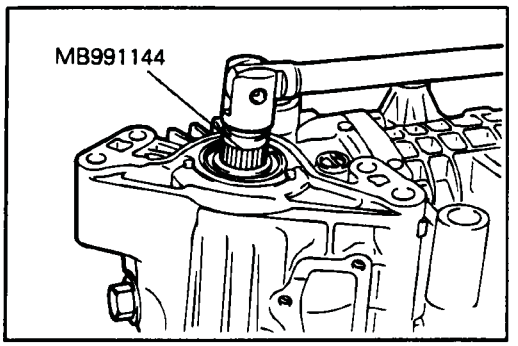
◆C◆ TRANSFER CASE SUB ASSEMBLY INSTALLATION

(1) With the matching marks in alignment, install the transfer case adapter sub assembly to the transfer case sub assembly.



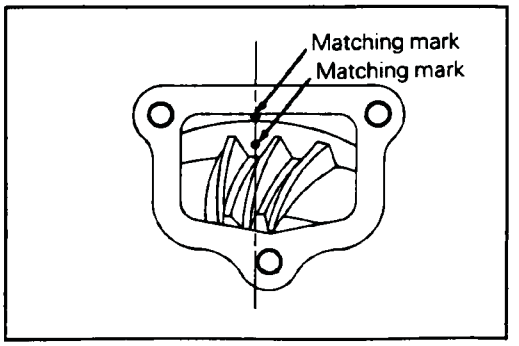
(2) Tighten the transfer case adapter sub assembly to the transfer case sub assembly to specified torque.

Transfer case adapter mounting bolt: 39 Nm (28 ft.lbs.)

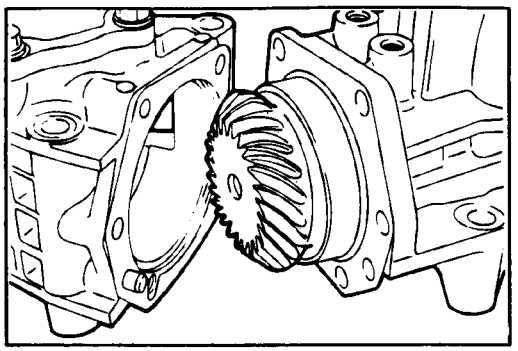


(3) Using the special tool, turn the drive bevel gear shaft (one turn in normal direction, one turn in reverse direction).

NOTE
Do not give the drive bevel gear shaft more than one turn in either direction as this causes unclear tooth contact pattern.

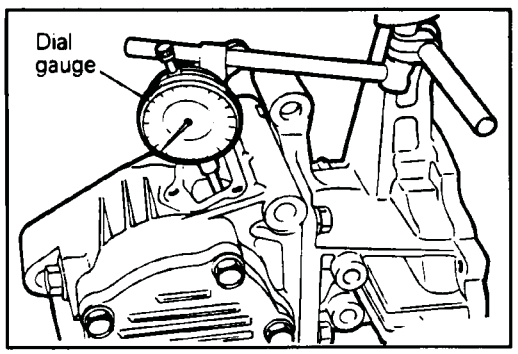


(4) Make sure that the driven bevel gear and transfer case matching marks are in alignment.



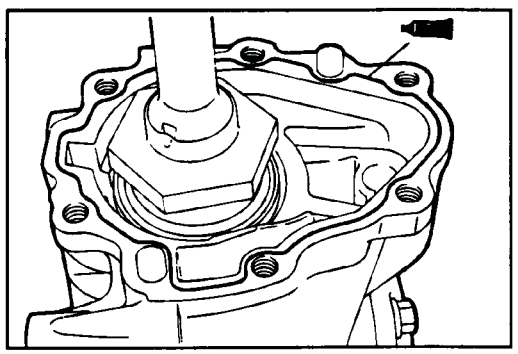
(5) Check to see if the drive bevel gear tooth contact is normal.

NOTE
Refer to the TOOTH CONTACT ADJUSTMENT PROCEDURES on next page (below) for the standard tooth contact.



(6) Check to see if the drive bevel gear and driven bevel backlash is as specified.

Standard value: Bevel gear set backlash
0.08 – 0.13 (.0031 – .0051 in.)

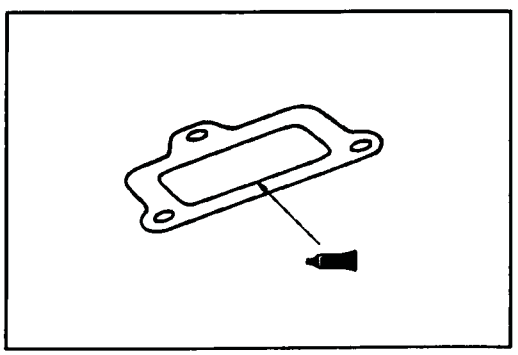


◆D◆ EXTENSION HOUSING INSTALLATION

(1) Apply sealant to the adapter flange surface and install the extension housing.

Specified sealant:
Mitsubishi genuine sealant Part No. MD997740 or equivalent

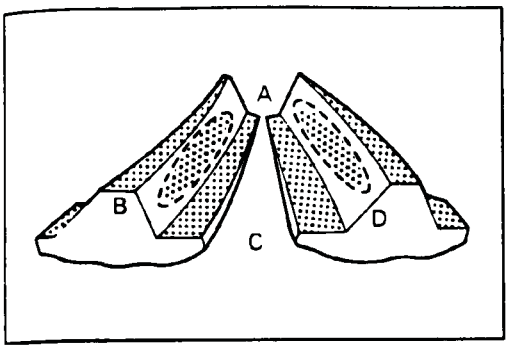
NOTE
Squeeze out sealant from the tube uniformly and continuously in adequante amount.



◆E◆ SEALANT TO COVER GASKET APPLICATION

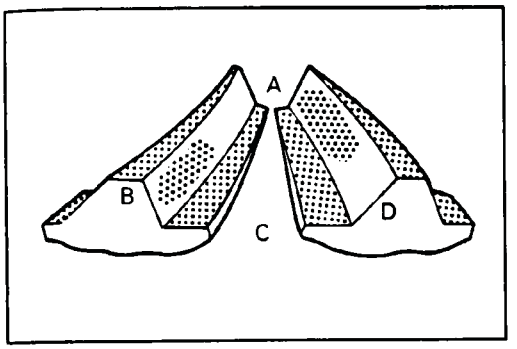
Specified sealant:
3M ATD Part No. 8660 or equivalent

TOOTH CONTACT ADJUSTING PROCEDURES



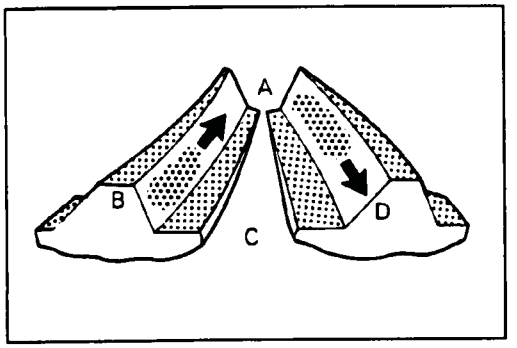
1. Standard tooth contact pattern

A .... Small end side
B .... Drive side tooth face
(Side on which force acts when running forward)
C .... Big end side
D .... Coast side tooth face
(Side on which force acts when reversing)

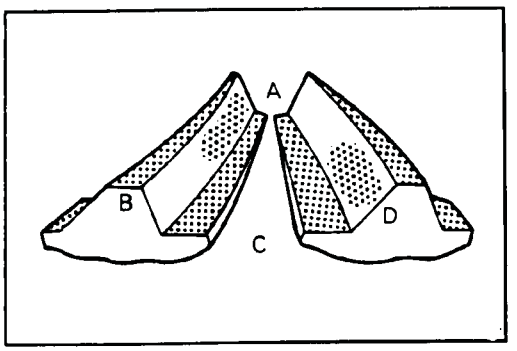


2. Tooth contact pattern produced when drive bevel gear height is too large

Cause
The driven bevel is too close to the drive bevel gear.

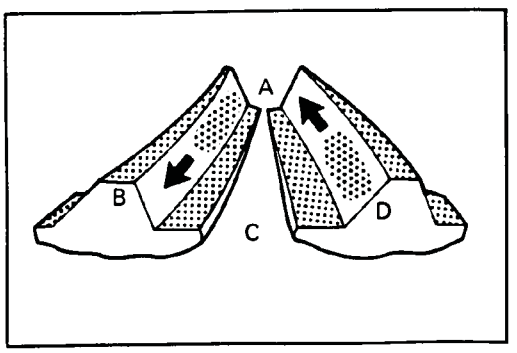


Remedy
Use thicker bevel gear mount adjusting spacer to separate the driven bevel gear more from the drive bevel gear.

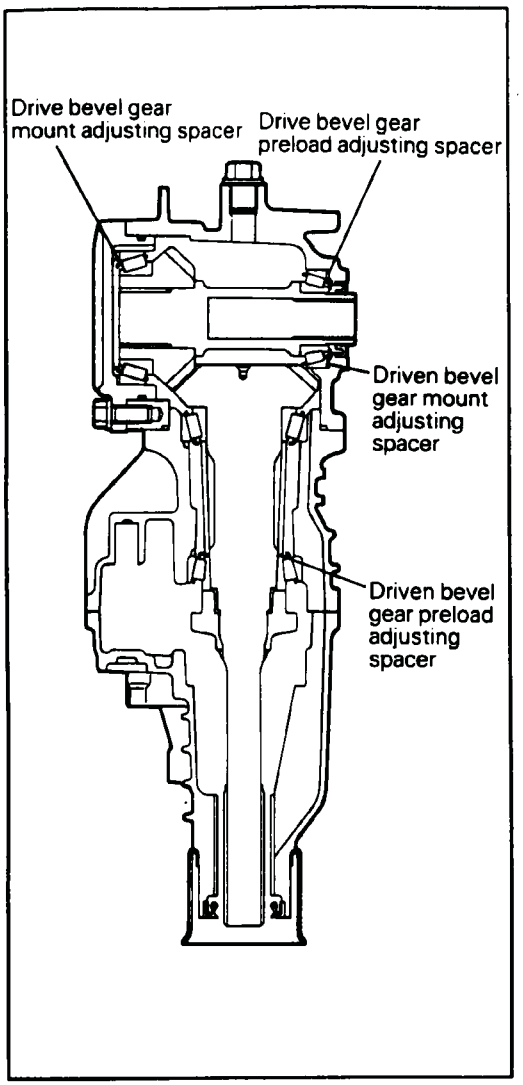


3. Tooth contact pattern produced when driven bevel gear height is too small

Cause
The driven bevel gear is too separated from the drive bevel gear.



Remedy
Use thinner driven bevel gear mount adjusting spacer to bring the driven bevel gear more closer to the drive bevel gear.



NOTE

(1) If correct tooth contact cannot be obtained even by change of the driven bevel gear mount adjusting spacer, increase or decrease the drive bevel gear preload adjusting spacer and the drive bevel gear mount adjusting spacer as described below and then adjust tooth contact again.

- When the driven bevel gear height is too small even if the thinnest driven bevel gear mount adjusting spacer 0.13 mm (.0051 in.) is used:

  Replace the drive bevel gear mount adjusting spacer that is in use with one that is one rank thicker and replace the drive bevel preload adjusting spacer that is in use with one that is one rank thinner.

- When the driven bevel gear height is too large even if the thickest driven bevel gear mount adjusting spacer 0.52 (.025 in.) is used:

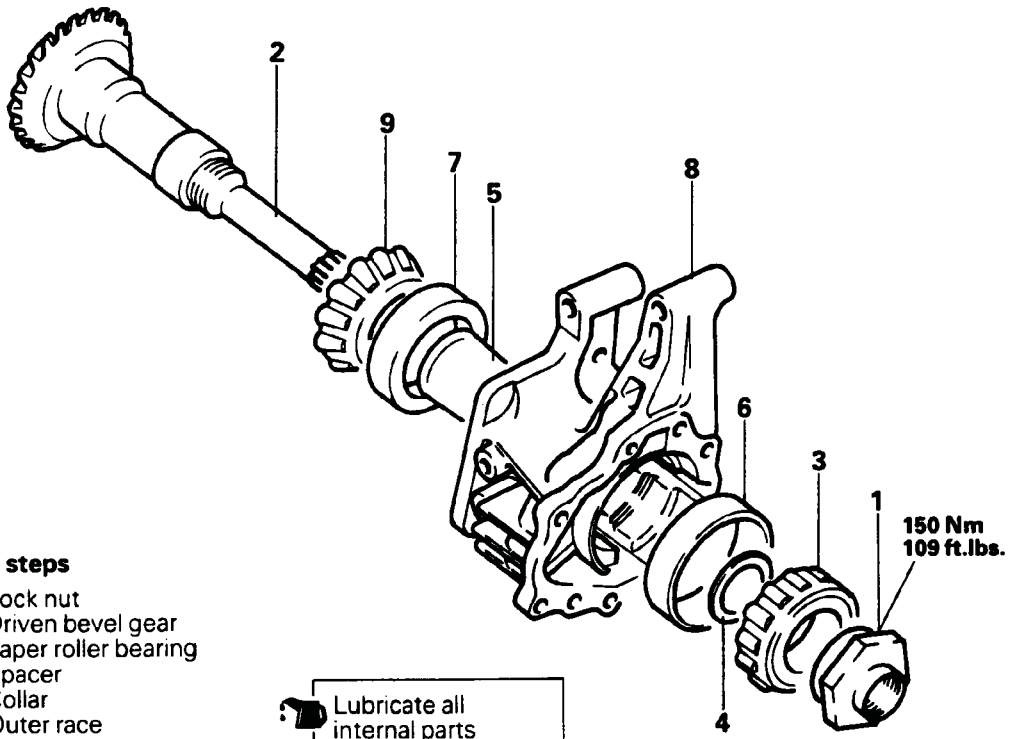
  Replace the drive bevel gear mount adjusting spacer that is in use with one that is one rank thinner and replace the drive bevel gear preload adjusting spacer that is in use with one that is one rank thicker.

  Repeat above steps until the tooth contact pattern equal or close to the standard pattern is obtained.

(2) If the tooth contact pattern cannot be adjusted close to the standard pattern by above adjustment, replace the drive bevel gear and driven bevel gear as a set and readjust the tooth contact.

TRANSFER CASE ADAPTER – 4WD

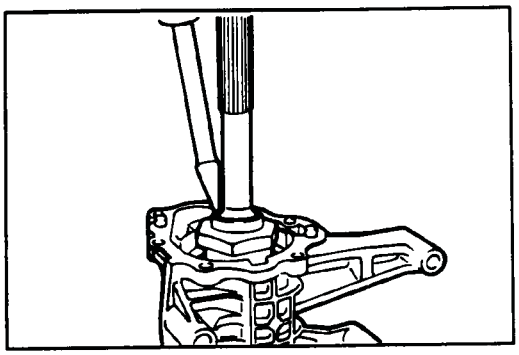
DISASSEMBLY AND REASSEMBLY



Disassembly steps

◊A◊ ◆E◆ 1. Lock nut
◊B◊ ◆D◆ 2. Driven bevel gear
◆C◆ 3. Taper roller bearing
◆B◆ 4. Spacer
5. Collar
◊C◊ 6. Outer race
◊C◊ 7. Outer race
8. Transfer case adapter
◊D◊ ◆A◆ 9. Taper roller bearing

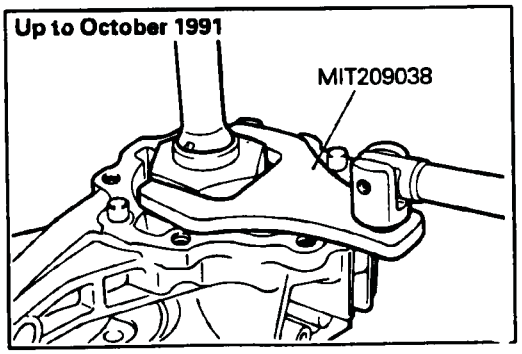
Lubricate all internal parts with gear oil during reassembly.



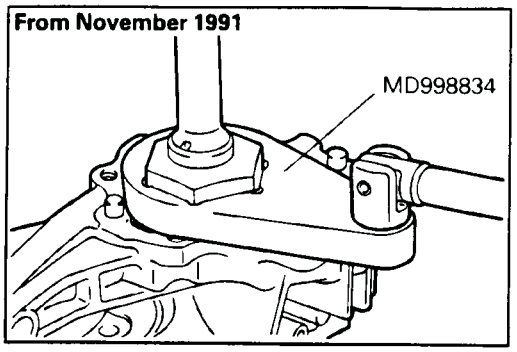
DISASSEMBLY SERVICE POINTS

◊A◊ LOCKNUT REMOVAL

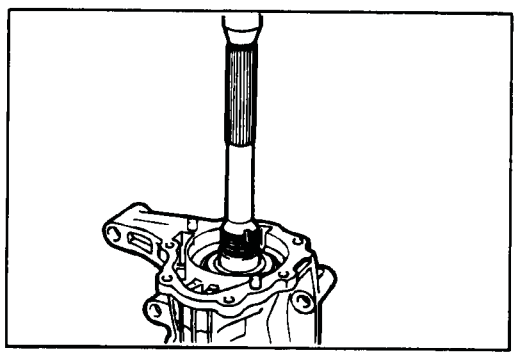
(1) Unlock the lock nut. (Straighten the bent nut.)



(2) Holding the driven bevel gear in a vice and using the special tool, remove the lock nut.

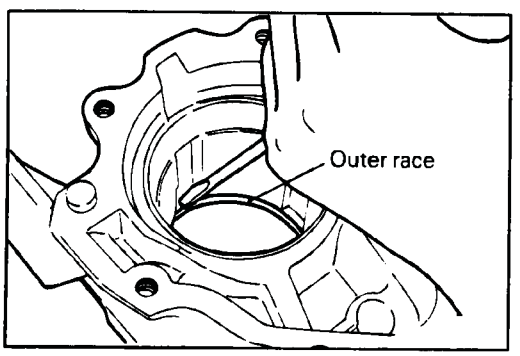


NOTE
The nut size has been changed from 55 to 50. (From November 1991)



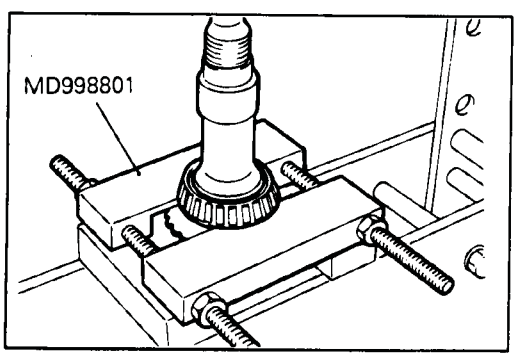
◊B◊ DRIVEN BEVEL GEAR ASSEMBLY REMOVAL

(1) Using a press, remove the driven bevel gear assembly.

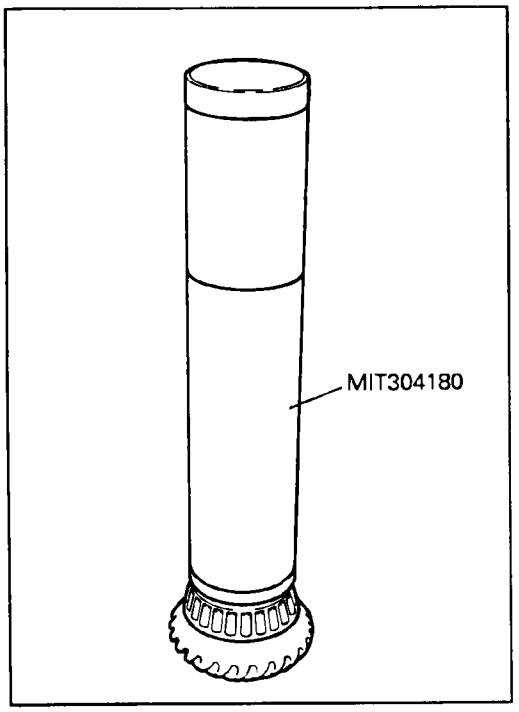


◊C◊ OUTER RACE REMOVAL

(1) Remove the outer race, striking lightly with a screwdriver, etc.

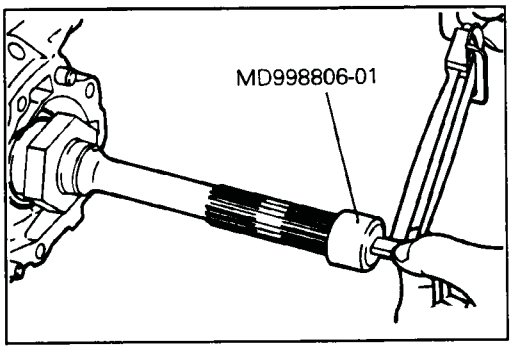


◊D◊ TAPER ROLLER BEARING REMOVAL



REASSEMBLY SERVICE POINTS

◆A◆ TAPER ROLLER BEARING INSTALLATION

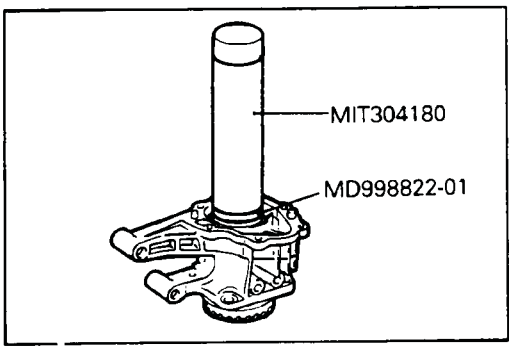


◆B◆ SPACER SELECTION

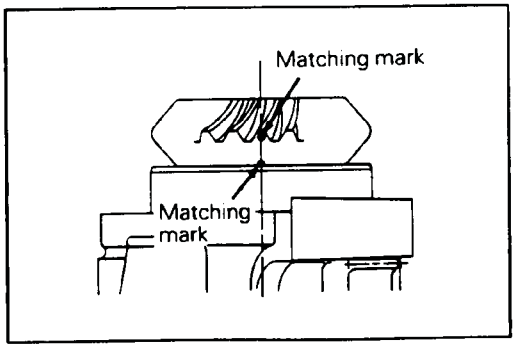
(1) Use the existing spacer to assemble the transfer case adapter.
(2) Using the special tool, check that the bevel gear rotating drive torque is within standard range.

Standard value: 1.0 – 1.7 Nm (.72 – 1.23 ft.lbs.)

(3) If the rotating drive torque is outside of the standard range, adjust using adjusting spacers.

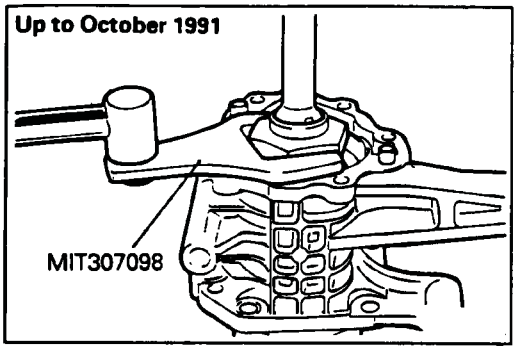


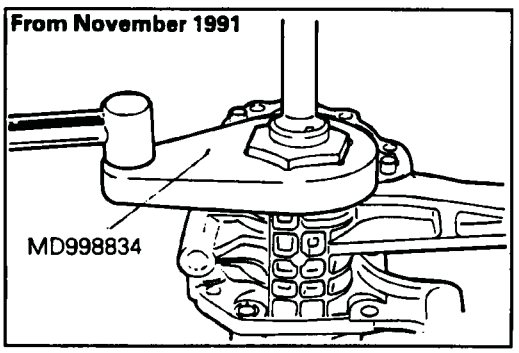
◆C◆ TAPER ROLLER BEARING INSTALLATION

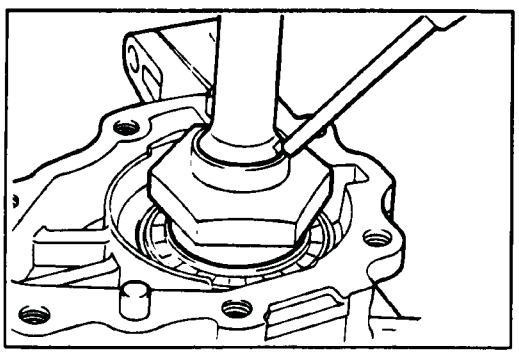


◆D◆ DRIVEN BEVEL GEAR INSTALLATION

(1) Attach the driven bevel gear to the transfer case adapter and then align their matching marks.







◆E◆ LOCK NUT INSTALLATION

(1) Holding the driven bevel gear in a vice and using the special tool, tighten the lock nut to specified torque.

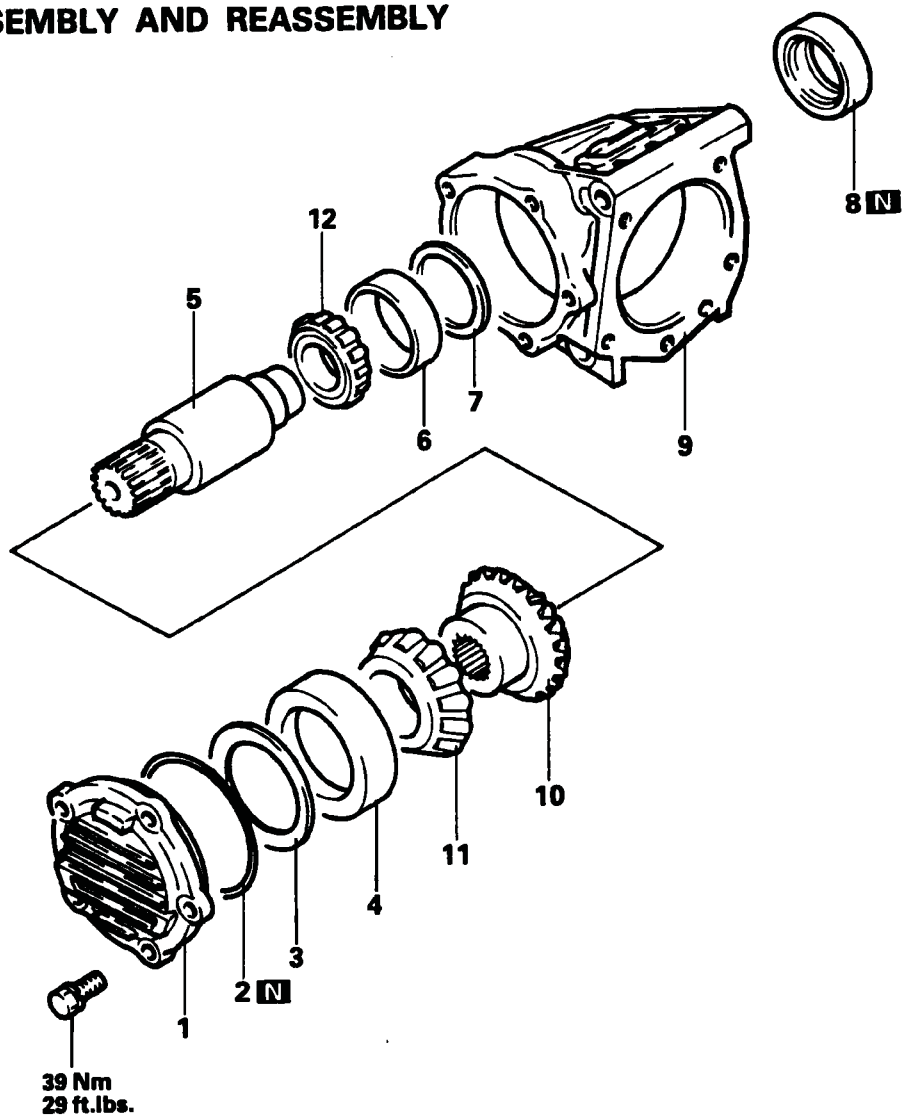
Driven bevel gear lock nut: 150 Nm (108 ft.lbs)

NOTE
The nut size has been changed from 55 to 50. (From November 1991)

(2) Lock the lock nut at two positions.

TRANSFER CASE – 4WD

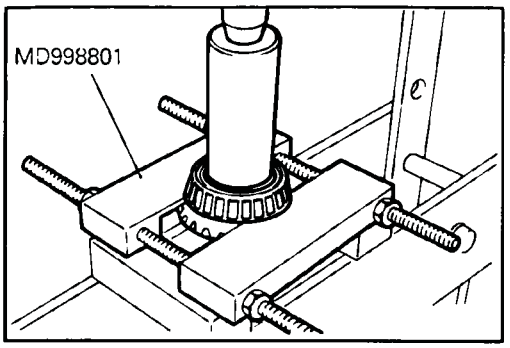
DISASSEMBLY AND REASSEMBLY



Disassembly steps

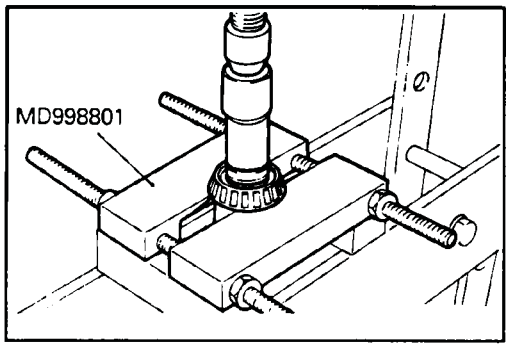
1. Transfer cover
2. O-ring
◆E◆ 3. Spacer
4. Outer race
◆D◆ 5. Drive bevel gear shaft
6. Outer race
◆E◆ 7. Spacer
◆C◆ 8. Oil seal
9. Transfer case
◆B◆ 10. Drive bevel gear
◇A◇ ◆A◆ 11. Taper roller bearing
◇A◇ ◆A◆ 12. Taper roller bearing

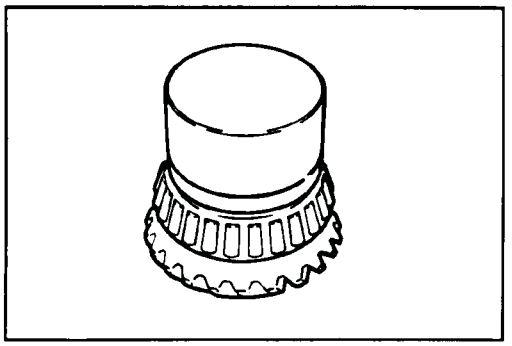
Lubricate all internal parts with gear oil during reassembly.



DISASSEMBLY SERVICE POINT

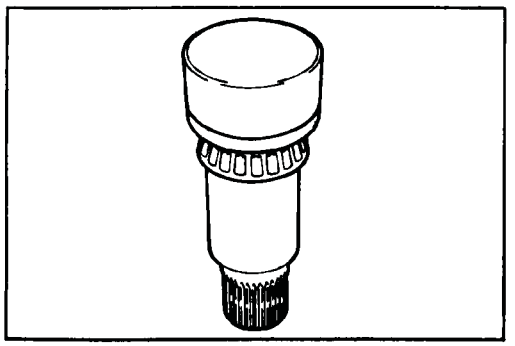
◊A◊ **TAPER ROLLER BEARINGS REMOVAL**

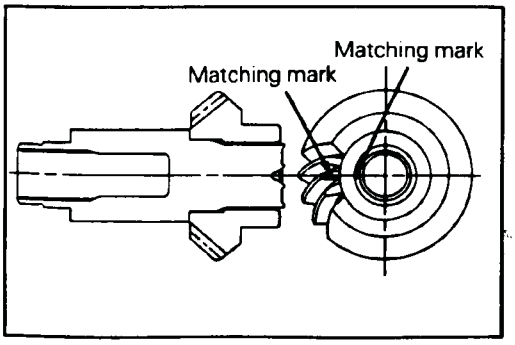




REASSEMBLY SERVICE POINTS

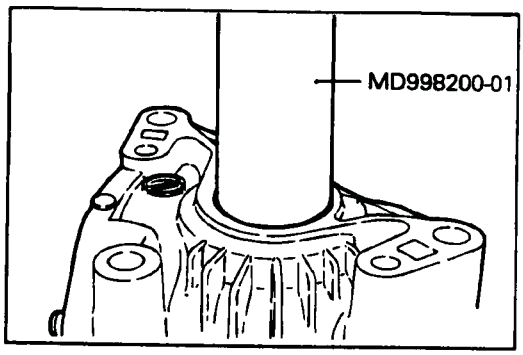
◆A◆ **TAPER ROLLER BEARING INSTALLATION**



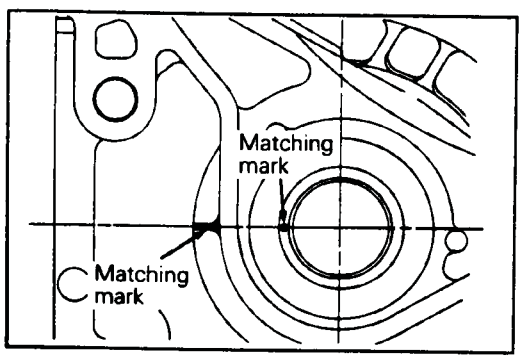


◆B◆ **DRIVE BEVEL GEAR INSTALLATION**

(1) Install the drive bevel gear to the drive bevel gear shaft with their matching marks in alignment.

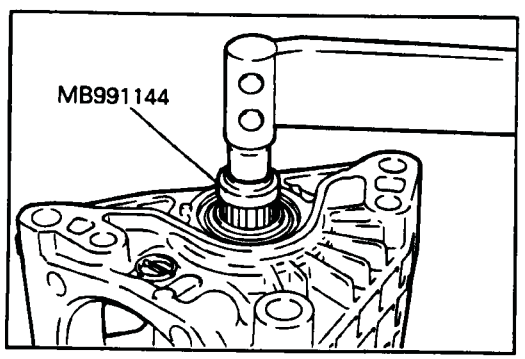


◆C◆ OIL SEAL INSTALLATION



◆D◆ DRIVE BEVEL GEAR SHAFT INSTALLATION

(1) Install the drive bevel gear shaft to the transfer case and align the matching mark on the transfer case with that on the drive bevel gear shaft.



◆E◆ SPACER SELECTION

(1) Use the existing spacer to assemble the transfer case.
(2) Using the special tool, check that the bevel gear rotating drive torque is within standard range.

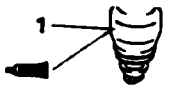
Standard value: 1.7 – 2.5 Nm (1.23 – 1.81 ft.lbs.)

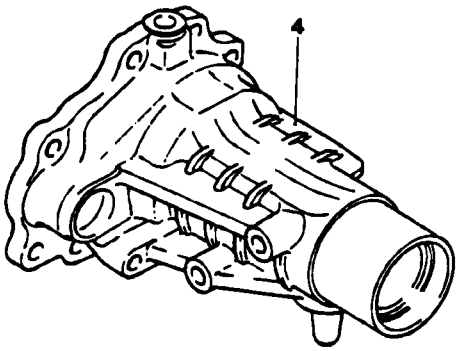
(3) If the rotating drive torque is outside of the standard range, adjust using adjusting spacers.

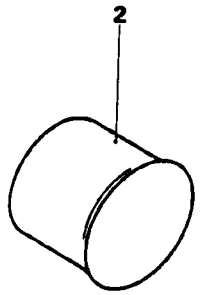
NOTE
For adjustment, use two spacers of which thickness is as close as possible to each other.

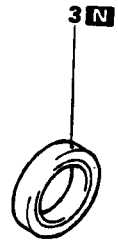
EXTENSION HOUSING – 4WD

DISASSEMBLY AND REASSEMBLY



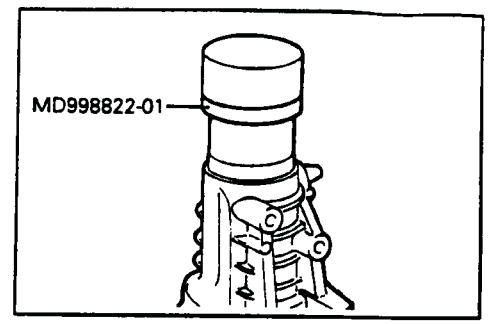






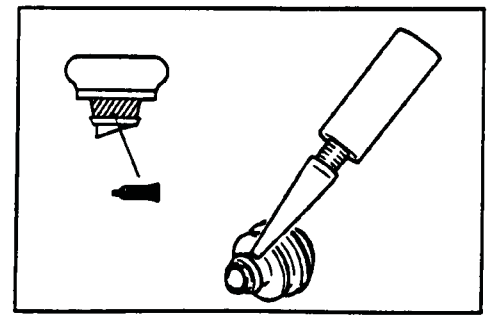
Disassembly steps

- ◆B◆ 1. Air breather
- 2. Dust seal guard
- ◆A◆ 3. Oil seal
- 4. Extension housing



REASSEMBLY SERVICE POINTS

◆A◆ **OIL SEAL INSTALLATION**



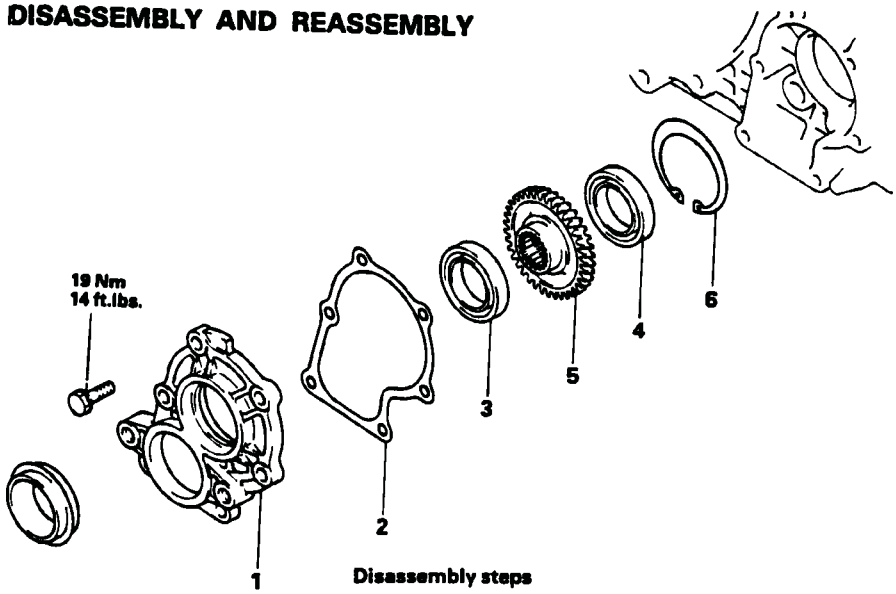
◆B◆ **AIR BLEEDER INSTALLATION**

(1) Install the air bleeder applying sealant to the inserting portion.

Specified sealant:
3M SUPER WETHERSTRIP No. 8001 or equivalent

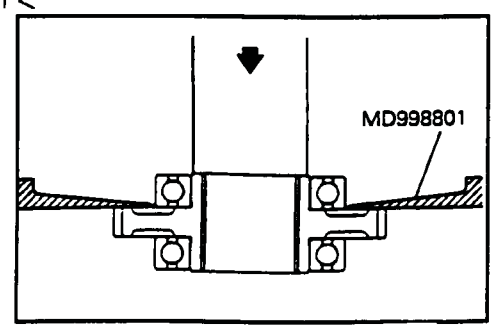
OIL PUMP DRIVE GEAR – F4A33-1-MNN5, MNPE

DISASSEMBLY AND REASSEMBLY



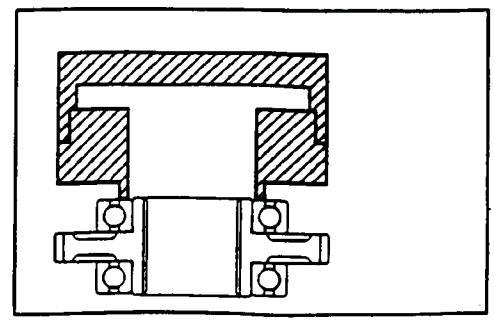
Disassembly steps

1. Front cover
2. Gasket
- ◇A◇ ◆A◆ 3. Bearing
- ◇A◇ ◆A◆ 4. Bearing
5. Oil pump drive gear
6. Snap ring



DISASSEMBLY SERVICE POINT

◇A◇ **BEARING REMOVAL**



REASSEMBLY SERVICE POINT

◆A◆ **BEARING INSTALLATION**