AUTOMATIC TRANSAXLE

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GENERAL
SPECIFICATIONS

Type	Automatic four speed with torque converter and internal differential KM 175
Torque converter	
Type	Spring type damper clutch
Engine stall speed	2000 ± 200 rpm
Stall torque ratio	2.17
Transaxle	
Type	Electronically controlled 4-speed full-automatic
Gear ratio	
First	2.846
Second	1.581
Third	1.000
Fourth	0.685
Reverse	2.176
Final gear ratio	4.350
Speedometer gear ratio	Drive 36/Driven 32

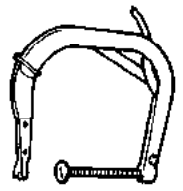
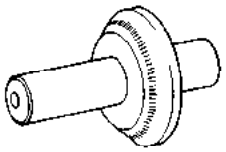
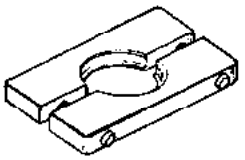
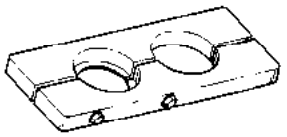
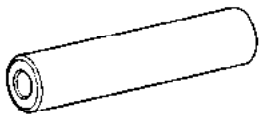
TIGHTENING TORQUE

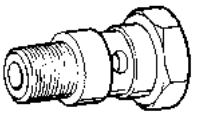
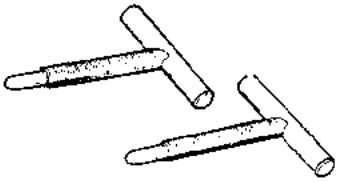
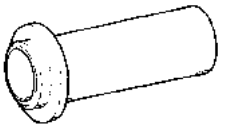
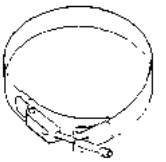
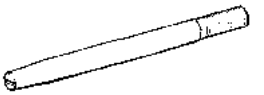
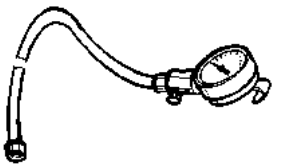
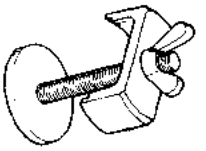
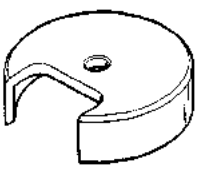
Items	Nm	kg.cm	lb.ft
Oil pan bolts	10-12	100-120	7-9
Tie rod end to knuckle	24-35	240-350	17-25
Lower arm ball joint to knuckle	60-72	600-720	43-52
Transaxle mounting bracket to transaxle	60-80	600-800	43-58
Special bolts	46-53	460-530	33-38
Selector lever assembly mounting bolts	9-14	90-140	7-10
Starter motor mounting bolt	27-34	270-340	20-25
Oil cooler hose clamp	4-6	40-60	3-4
Hose bracket	3-5	30-50	2-4
Cover to selector knob	2.0 or more	20 or more	1.4 or more
Selector knob to lever assembly	2.0 or more	20 or more	1.4 or more
Bell housing cover to engine	10-12	100-120	7-9
Transaxle mounting bolt [10 mm (0.40 in.) diameter bolt]	43-53	430-530	31-38
Transaxle mounting bolt [8 mm (0.31 in.) diameter bolt]	30-35	300-350	22-25
Control cable to body	9-14	90-140	7-10
Indicator panel	1.5 or more	15 or more	1.1 or more
Lever assembly to bracket assembly	14-20	140-220	10-14
Drive plate-to-converter tightening bolt	46-53	460-530	34-38
Drain plug	30-35	300-350	22-25
Pressure check plug	8-10	80-100	6-7
Pulse generator mounting bolt	10-12	100-120	7-9
Bearing retainer screw	17-22	170-220	12-15
Lock plate bolt	48-60	480-600	35-43
Converter housing bolt	19-23	190-230	14-16
One-way clutch outer race bolt	25-35	250-350	18-25
Differential drive gear bolt	130-140	1300-1400	94-101
Manual control lever nut	17-21	170-210	13-15
Manual control shaft set screw	8-10	80-100	6-7
Transaxle range switch	10-12	100-120	7-9
Sprag rod support bolt	20-27	200-270	15-19
Pump housing-to-reaction shaft support bolt	10-12	100-120	7-9
Oil pump assembly mounting bolt	15-22	150-220	11-15
Valve body bolt	4-6	40-60	3-4
Valve body assembly mounting bolt	10-12	100-120	7-9
Oil filter bolt	5-7	50-70	4-5
Speedometer sleeve locking plate bolt	3-5	30-50	2-4
End clutch cover	6-8	60-80	5-6
Kickdown lock nut	25-32	250-320	13-23

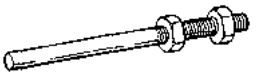
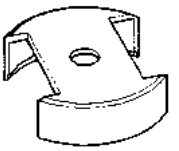
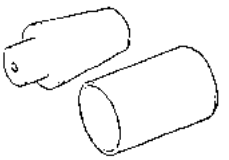
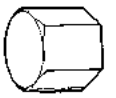
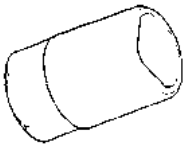
LUBRICANTS

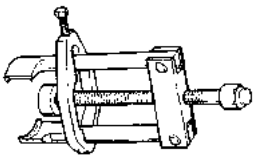
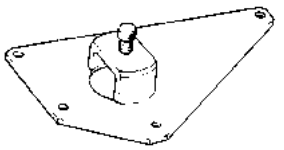
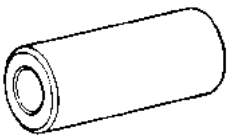
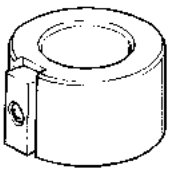
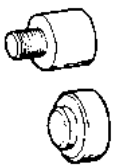
Items	Specified lubricant	Quantity
Transaxle fluid lit. (U.S. qts., lmp.qts.)	GENUINE HYUNDAI ATF AUTOMATIC TRANSAXLE FLUID, MOPAR ATF PLUS TYPE 7176, DIAMOND ATF SP, BP AUTRANMMSP, MMC AUTRAN SP OR EQUIVALENT.	6.1 (6.4, 5.4)
Drive shaft oil seal lip	Automatic transaxle fluid	As required
Sliding part of bushing	Chassis grease SAE J310, NLGI No.0	As required
Selector lever sliding portion	Multipurpose grease SAE J310, NLGI No.2	As required

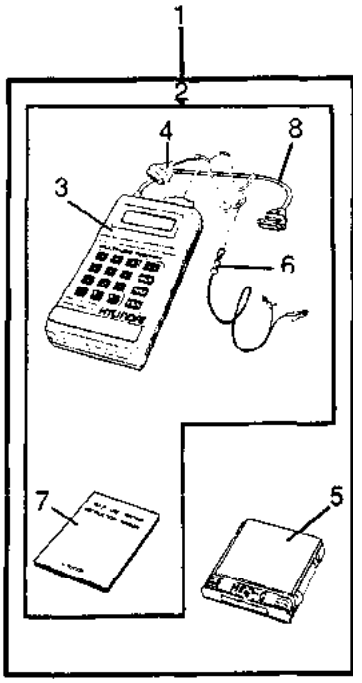
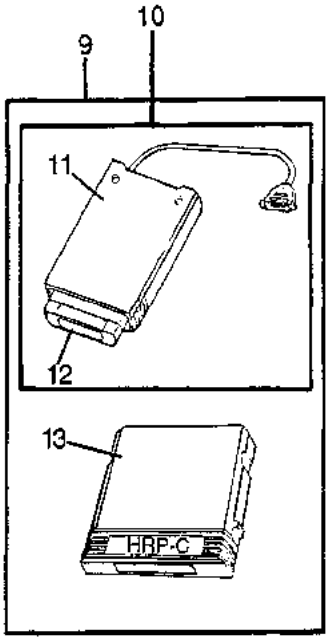
SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09222-28000 Valve spring compressor		Removal and installation of the kickdown servo. (use with 09222-28100)
09222-28100 Valve spring compressor holder		Removal and installation of the kick down servo (use with 09222-28000)
09431-21200 Oil seal installer		Installation of differential oil seal.
09433-21000 Removing plate		1) Removal of transfer driven gear taper bearing .(use with 09432-33800). 2) Removal of differential ball bearing.
09432-33200 Removing plate		Removal of transfer shaft bearing.
09432-33800 Bearing installer		Installation of transfer shaft bearing
09452-21001 Oil pressure gauge adapter		Measurement of the oil pressure. (use with 09452-21500 and 09452-21002)

Tool (Number and name)	Illustration	Use
09453-21102 Oil pressure gauge adapter		Measurement of the oil pressure. (use with 09452-21500 and 09452-21001)
09452-21100 Oil pump remover		Removal of the oil pump.
09452-21200 Oil pump oil seal installer		Installation of the oil pump oil seal.
09452-21301 Oil pump band		Assembling the oil pump. (use with 09452-21401)
09452-21401 Guide pin		Installation of the oil pump. (use with 09452-21301)
09452-21500 Oil pressure gauge		Measurement of the oil pressure. (use with 09452-21001 and 09452-21002)
09453-21000 Spring compressor		Removal and installation of the snap ring and return spring of the front clutch.
09453-21100 Spring compressor		Removal and installation of the rear clutch (use with 09453-21000)

Tool (Number and name)	Illustration	Use
09453-21200 Spring compressor		Removal and installation of snap ring of low-reverse brake. (use with 09454-33000)
09453-21310 Center support remover and installer		Removal and installation of the center sup-
09453-21400 Dial gauge support		Measurement of the input shaft and transfer shaft end play. (use with dial gauge)
09453-24000 Spring compressor		Removal and installation of snap ring and return spring of front clutch. (use with 09453-21000)
09453-33000 Snap ring installer		Installation of end clutch snap ring.
09453-33100 Dial gauge extension		Measurement of the low and reverse brake end play (use with dial gauge)
09454-21100 Wrench adapter		Loosening and tightening of the transfer idler shaft.
09454-33101A Kickdown servo socket wrench-A		Adjustment of kickdown servo. (use with 09454-33101B)

Tool (Number and name)	Illustration	Use
09454-33101B Kickdown servo socket wrench-B		Adjustment of kickdown. (use with 09454-33101A)
09455-21000 Bearing and gear puller		Removal of ball bearing and transfer drive gear.
09455-21100 Bearing installer		1) Installation of differential ball bearing. 2) Installation of ball bearing and transfer drive gear.
09455-21301 Transfer shaft retainer		Supporting the transfer shaft.
09455-33200 Bearing installer		1) Installation of ball bearing and transfer drive gear 2) Installation of the transfer shaft rear side bearing
09456-21000 Guide pin		Assembling of the valve body and transfer plate.
09458-33001 Wrench adapter		Preload measurement of transfer idler shaft.
09456-21100 Adapter set		Removal and installation of kickdown servo. (use with 09222-28000, 09222-28100)

Tool (Number and name)	Illustration	Use
09391-33002 1. Scan tool assy (Without Adapter Ass'y) 09391-33100 2. Scan tool sub assy 09391-33200 3. Scan tool main body **09391-33300** 4. Wiring harness 09391-33453 5. Rom-pack (HRP-C) **09391-33500** 6. Battery harness **09391-33600** 7. Instruction manual		Diagnostic tester for MFI, automatic transaxle and cruise control systems.
09391-33700 8. D/C connector (RS-232C)		For connection to the external communication device such as personal computer etc. in using Scan tool.
09391-33902 9. Adapter ass'y 09391-33802 10. Adapter sub asse'y 09391-33810 11. Adapter body 09391-33822 12. Adapter system pack-B 09391-33453 13. Rom-pack (HRP-C)		

Tool (Number and name)	Illustration	Use
09500-11000 Bar		Installation of differential bearing outer race and output shaft bearing outer race. (use with 09532-11500)
09500-21000 Bar		Installation of transfer shaft bearing outer race. (use with 09532-32000)
09352-11500 Pinion bearing outer race installer		1) Installation of transfer shaft front bearing outer race. (use with 09500-11000). 2) Installation of differential bearing outer race and output shaft bearing outer race. (use with 09500-11000)
09532-32000 Bearing installer		Installtion of transfer shaft bearing outer race. (use with 09500-21000)

TROUBLESHOOTING

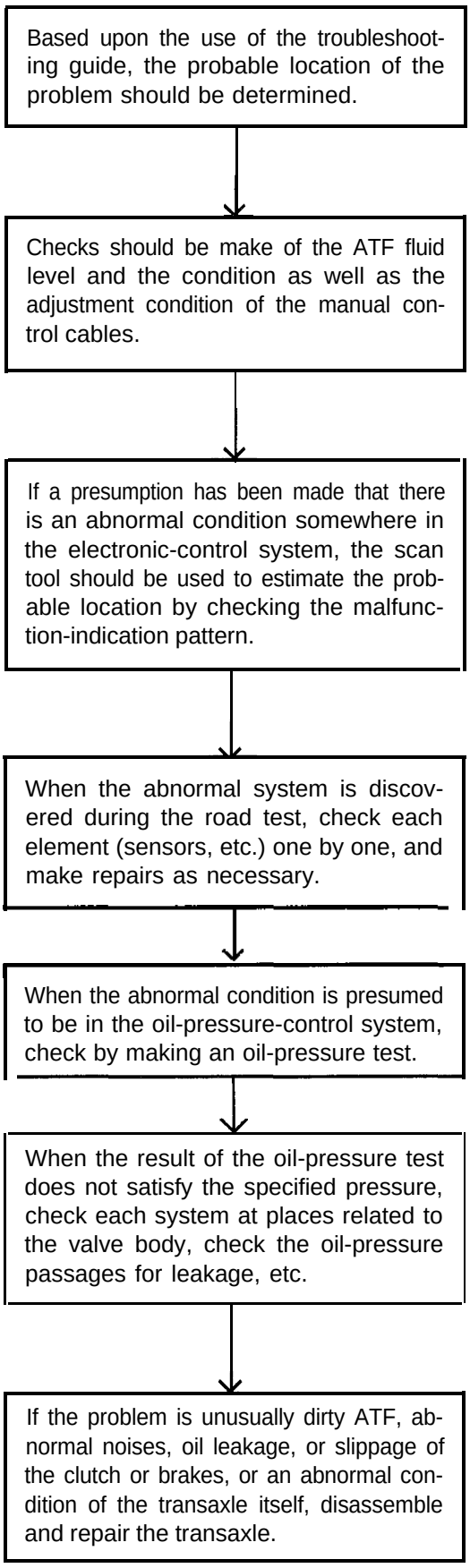
Malfunctions of the auto transaxle can lead to other problems, such as those described below:

1. Improper maintenance and/or adjustments
2. Electronic control malfunctions
3. Mechanical functions
4. Hydraulic control
5. Engine performance malfunctions

etc.

In order to properly troubleshoot the source of these malfunctions, it is first essential to methodically question the owner concerning the problem. The driver should also be asked whether or not the problem has occurred more than once.

Tests should be conducted troubleshooting, as described at the right.



TROUBLESHOOTING GUIDE

	Problem / Presumed cause	Driving impossible or abnormal (before start-off)												
		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 NR ro ND	Parking doesn't hold	Abnormal vibration-shock when shift to D-2-L-R
1	Abnormal idle rpm					X							X
2	Poor performance					X			X				
3	Improper adjustment of manual linkage	X	X	X	X		X	X		X	X	X	X
4	Malfunction of torque converter (including damper clutch)		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			X									
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					
11	Low fluid level		X	X	X		X	X					
12	Line pressure too low (seal damaged, leakage, looseness, etc.)		X	X	X		X	X					
13	Malfunction of valve body (sticking valve, working cavity, adjustment, etc.)		X	X	X	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												
17	Improper adjustment of kickdown servo												
18	Malfunction of low-reverse brake or pislon		X		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)												
21	Malfunction of inhibitors switch, damaged or disconnected wiring, or improper adjustment	X								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				X								
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												
28	Incorrectly grounded ground strap												
29	PCSV damaged or disconnected wiring, or short-circuit												
30	PCSV damaged or disconnected wiring (valve open)		X	X	X		X	X					
31	DCCSV damaged or disconnected wiring (valve closed)												
32	DCCSV short-circuit or sticking (valve open)					X							
33	Malfunction of OD switch												
34	Malfunction of accelerator switch, or improper adjustment (Untill 1993 model)												X
35	Malfunction of oil-temperature sensor												
36	Malfunction of reed switch												
37	Poor contact of ignition switch												
38	Malfunction of transaxle control module												X

NOTE: X indicates items of high priority during inspection.
Abbreviations: TPS = Throttle Position Sensor SCSV = Shift Control Solenoid Valve

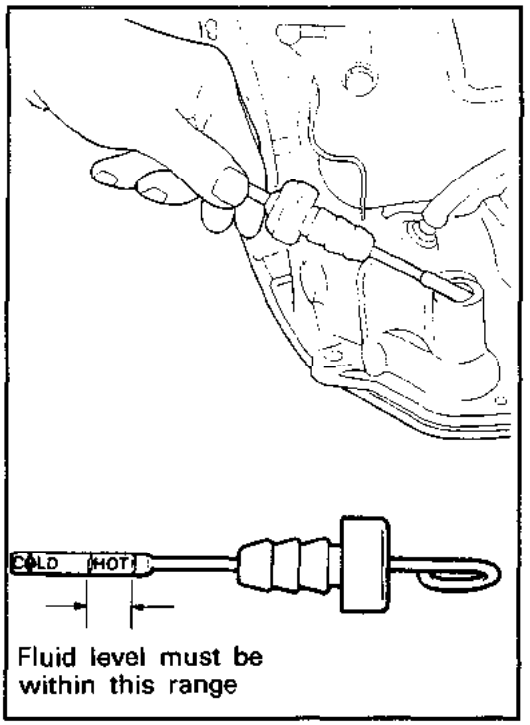
	Transaxle malfunction of shift-shock (after start-off)																Abnormal noise, other			
	Won't shift from 2nd to 3rd	Won't shift to 4th	OD switch doesn't function	Doesn't shift according to shift pattern (shifting is possible)	Improper start-off (starts off from 2nd, etc.)	Excessive creeping or 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 (other than already described)	Excessive vibration shock only when cold	Damper 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	Locked in 3rd gear
1						X														
2					X		X	X	X	X			X	X		X				
3		X			X															X
4					X										X	X				
5												X					X			
6																				
7																			X	
8																			X	
9																				
10	X	X									X	X						X		X
11												X								X
12											X	X		X						X
13	X			X	X		X	X	X	X	X	X	X	X	X	X				X
14	X							X	X		X									X
15																				X
16							X				X	X								X
17							X				X	X		X						X
18										X										X
19																				X
20		X					X				X									X
21		X			X															X
22				X			X	X	X	X	X	X		X	X	X				
23							X	X	X	X	X	X		X	X	X				X
24				X											X	X				X
25							X					X								X
26																				X
27							X	X	X	X	X	X		X	X					
28																				X
29																				X
30	X	X									X	X								X
31			X												X					
32																X				X
33		X																		
34					X	X									X					
35														X	X	X				
36			X																	X
37				X																X
38	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X

PCSV = Pressure control solenoid valve
DCCSV ▫ Damper clutch control solenoid valve

DIAGNOSIS AND TEST

FLUID LEVEL AND CONDITION

1. Place the vehicle on level floor.
2. Before removing the dipstick, wipe all dirt from the area around the dipstick.
3. With the selector lever in “P” (Park), and the parking brakes applied, start the engine.
4. The engine should be running at idle speed. Fluid should be at normal operating temperature [70-80X (160-180°F)].
5. Move the selector lever sequentially to every position to fill the torque converter and hydraulic system with fluid, then place the selector lever in “N” (Neutral) position. This operation is necessary to be sure that the fluid level check is accurate.
6. Check to see if the fluid level is in “HOT” range on dipstick. If fluid is low, add automatic transaxle fluid until level reaches the “HOT” range.
   Low fluid level can cause a variety of conditions because it allows the pump to take in air along with fluid. Air trapped in the hydraulic system forms bubbles, which are compressable. Therefore, the pressure will be erratic.
   Improper filling can also cause the fluid level to be too high. When transaxle has too much fluid, gears churn up foam and cause the same conditions which occur with low fluid level. This results in accelerated deterioration of the automatic transaxle fluid. In either case, air bubbles can cause overheating, fluid oxidation, and varnshing, which can interfere with normal valve, clutch, and servo operation.
   Foaming can also result in fluid escaping from the transaxle vent, where it may be mistaken for a leak.



MANUAL CONTROL CABLE

Proper manual control linkage adjustment can be determined by checking whether inhibitor switch is performing correctly.

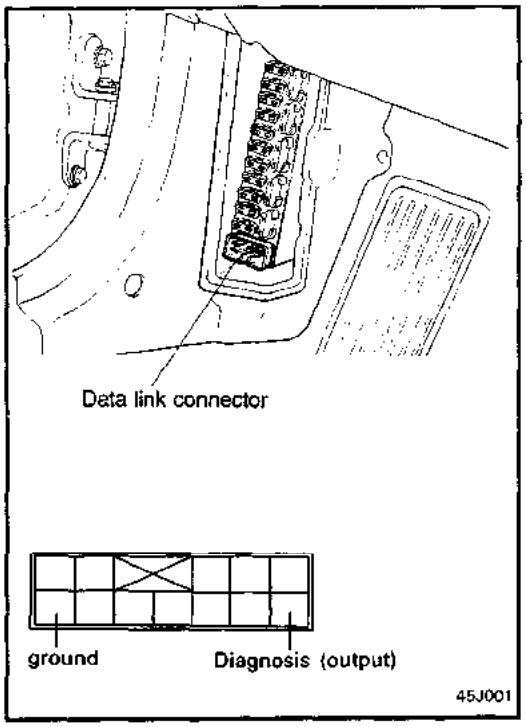
1. Apply parking and service brakes securely.
2. Place the selector lever in "R" range.
3. Set the ignition key to “ST” position.
4. Slowly move the selector lever upward until it clicks as it fits in the notch of the “P” range. If the starter motor operates when the lever makes a click, “P” range. If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

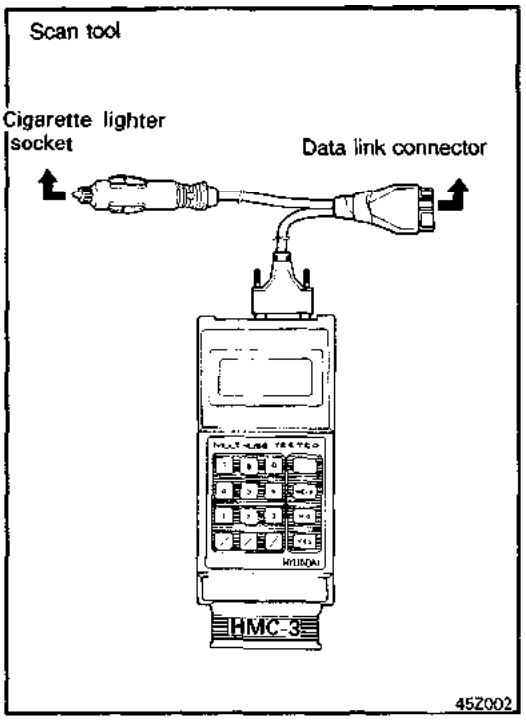
OBTAINING DIAGNOSTIC TROUBLE CODES

1. Connect the voltmeter or scan tool to the connector for diagnosis.
2. Read the output diagnostic trouble codes.
   Then follow the remedy procedures according to the "DIAGNOSTIC TROUBLE CODE DESCRIPTION" on the following page.

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

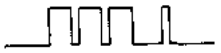
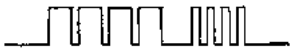
3. If the fail-safe system is activated and the transaxle is locked in third gear, the diagnostic trouble code in the Fail-Safe Code Description will be stored in the RAM.
   Three of these diagnostic trouble codes can be stored.
4. The cancelation will occur if, with the transaxle locked in third gear, the ignition key is turned to the OFF position, but the diagnostic trouble code is stored in the RAM.





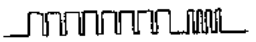
DIAGNOSTIC TROUBLE CODE DESCRIPTION

code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
11		Excessively high throttle position sensor output	o Check the throttle position sensor connector. o Check the throttle position sensor itself. o Adjust the throttle position sensor. o Check the accelerator switch (No.24 : output or not).
12		Excessively low throttle position sensor output	
13		Throttle position sensor malfunction	
14		Improperly adjusted throttle position sensor system	
15		Open in the low-temperature side of the oil temperature sensor circuit.	o Oil temperature sensor connector inspection o Oil temperature sensor inspection
16		Short in the high-temperature side of the oil temperature sensor circuit.	
17		Open in the high-temperature side of the oil temperature sensor circuit or short in the low-temperature side circuit	
21		Open kickdown servo switch circuit	o Check the kickdown servo switch connector. o Check the kickdown servo switch.
22		Shorted kickdown servo switch circuit	
23		Open ignition pulse pickup cable circuit	o Check the ignition pulse signal line.

code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
24		Open-circuited or improperly adjusted accelerator switch	o Check the accelerator switch connector o Check the accelerator switch itself o Adjust the accelerator switch.
31		Open pulse generator A circuit	o Check the pulse generator A and pulse generator B. o Check the vehicle speed reed switch (for chattering)
32		Open pulse generator B circuit	
41		Open shift control solenoid valve A circuit	o Check the solenoid valve connector. o Check shift control solenoid valve A.
42		Shorted shift control solenoid valve A circuit	
43		Open shift control solenoid valve B	o Check the solenoid valve connector. o Check shift control solenoid valve B
44		Shorted shift control solenoid valve	
45		Open pressure control solenoid valve circuit	o Check the solenoid valve connector. o Check the pressure control solenoid valve.
46		Shorted pressure control solenoid valve circuit	

code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
47		Open circuit in damper clutch control solenoid valve	o Inspection of solenoid valve connector. o Individual inspection of damper clutch control solenoid valve
48		Short circuit in damper clutch control solenoid valve	
49		Defect in the damper clutch system	o **Inspection of damper clutch** hydraulic system o Individual inspection of damper clutch control solenoid valve o Replacement of control module
51		Shifting to first gear does not match the engine speed.	o Check the pulse generator A and pulse generator B. o Check pulse generator A and pulse generator B. o Rear clutch slippage.
52		Shifting to second gear does not match the engine speed.	o Check the pulse generator A connector o Check pulse generator A o Kickdown brake slippage.
53		Shifting to third gear does not match the engine speed.	o Check the pulse generator A and pulse generator B connector o Check pulse generator A and pulse generator B. o Front clutch slippage. o Rear clutch slippage.
54		Shifting to fourth gear does not match the engine speed.	o Check the pulse generator A connector. o Check pulse generator A. o Kickdown brake slippage.
	 (Continue)	Normal	
	Constant output (or 0V)	Defective transaxle control module (TCM)	o TCM power supply inspection o TCM earth inspection o TCM replacement

FAIL-SAFE ITEM

Output code		Description	Fail-safe	Note (relation to diagnostic trouble code)
Code No.	Output pattern (for voltmeter)			
81		Open-circuited pulse generator A	Locked in third (D) or second	When code No. 31 is generated fourth time
82		Open-circuited pulse generator B	Locked in third (D) or second (2, L) gear	When code No. 32 is generated fourth time
83		Open-circuited or shorted shift control solenoid valve A	Lock in third	When code No. 41 or 42 is generated fourth time
84		Open-circuited or shorted shift control solenoid valve B	Lock in third gear	When code No. 43 or 44 is generated fourth time
85		Open-circuited or shorted pressure control solenoid valve	Locked in third (D) or second (2, L)	When code No. 45 or 46 is generated fourth time.
86		Gear shifting does not match the engine speed	Locked in third (D) or second (2, L)	When either code No. 51, 52, 53 or 54 is generated fourth time.
	Constant output (or 0V)	Defective transaxle control module (TCM)	Fixed for third speed	

CHECKING THE CONTROL SYSTEM (WHEN A SCAN TOOL IS USED)

Check items	Check procedures		Probalbe cause (or remedy) if a malfunction is found
	Check conditions	Normal value	
Throttle position sensor (TP Sensor) o Data list o Item No. 11	Accelerator pedal fully released	0.5-0.6 V	o TP Sensor adjusted improperly if voltage is high when accelerator fully released or pressed to floor o TP Sensor or circuit harness is fault if no change occurs o Falulty TP Sensor or accelerator pedal cable is faulty if gradual change is not noted
	Press accelerator pedal slowly	Varies with accelerator opening	
	Accelerator pedal pressed to floor	4.5-5.0 V	
Oil temperature sensor o Data list o Item No. 15	Cold engine (before starting)	Equivalent to outside air temperature	o Faulty oil temperature sensor or circuit harness
	While warming up engine	Gradual increase	
	After warming up engine	80-110°C	
Kickdown servo switch o Data list o Item No. 21	L range : Idling	ON	o Kickdown servo maladjusted o Faulty kickdown servo switch or circuit harness o Faulty kickdown servo
	D range : first or third gear	ON	
	D range : second or fourth gear	OFF	
Ignition signal wire o Data lit o Item No.23	N range : Idling	650-900 rpm	o Faulty ignition system o Faulty ignition signal pick-up circuit harness
	N range : 2,500 rpm (tachometer reading)	2,400-2,600 rpm	
Idle switch o Data list o Item No. 25	Accelerator pedal fully released	ON	o Idle position switch (fixed SAS) mal-adjusted. o Faulty idle position switch or circuit harness
	Accelerator pedal pressed very slightly	OFF	
Air conditioning relay signals o Data list o Item No. 26	D range : air conditioning idle up	ON	o Air conditioning power relay ON signal detection circuit harness faulty
	D range : air conditioning switch OFF	OFF	
Transaxle gear position o Data list o Item No. 27	D range : idling	C	o Faulty TCM o Faulty accelerator pedal switch system o Faulty transaxle range switch system o Faulty TP Sensor system
	L range : idling	First	
	2 range : second gear	Second	
	D range : overdrive-OFF : third gear	Third	
	D range : overdrive-ON : fourth gear	Fourth	
Pulse generator A o Data list o Item No.31	D range : driving at 30 km/h (19 mph) in second gear	0 rpm	o Pulse generator A or circuit harness faulty o Faulty pulse generator A shielded wire o Incoming noise from outside o Slipping kickdown brake
	D range : driving at 50 km/h (31 mph) in third gear	1,600-2,000 rpm	
	D range : driving at 50 km/h (31 mph) in fourth gear	0 rpm	

Check items	Check procedures		Probalbe cause (or remedy) if a malfunction is found
	Check conditions	Normal value	
Pulse generator B o Data list o Item No. 32	D range : stopped	0 rpm	o Pulse generator B or circuit harness faulty o Faulty pulse generator B shielded wire o Incoming noise from outside
	D range : driving at 50 km/h (31 mph) in third gear	1,600-2,000 rpm	
	D range : driving at 50 km/h (31 mph) in fourth gear	1,600-2,000 rpm	
Overdrive switch o Data list o Item No. 35	Overdrive switch is turned ON	OD-ON	o Overdrive switch or circuit harness faulty
	Overdrive switch is turned OFF	OD-OFF	
Normal/Economy select switch o Data reading o Item No. 36	Selection of the normal pattern (including during E pattern control when oil temperature is low)	Normal	o Normal/Economy select switch or circuit harness malfunction
	Selection of the Economy pattern	Economy	
Transaxle range switch o Data list o Item No. 37	Shift selector lever to P range	P	o Transaxle range switch maladjusted o Transaxle range switch or circuit harness faulty o Faulty manual control cable o If selector lever is inoperative, check shift lock mechanism
	Shift selector lever to R range	R	
	Shift selector lever to N range	N	
	Shift selector lever to D range	D	
	Shift selector lever to 2 range	2	
	Shift selector lever to L range	L	
Vehicle speed reed switch o Data list o Item No. 38	Keep vehicle stopped	0 km/h	o Vehicle speed reed switch is faulty if high speed signal is delivered while vehicle is stopping o In other cases, vehicle speed reed switch or circuit harness is faulty
	Driving at 30 km/h (19 mph)	30 km/h (19 mph)	
	Driving at 50 km/h (31 mph)	50 km/h (31 mph)	
PCSV duty o Data list o Item No. 45	D range : idling	50-70%	o When accelerator pedal is slightly pressed while idling in D range, duty should become 100 % o Faulty TCM o Faulty TP Sensor system o Faulty accelerator pedal switch system
	D range : first gear	100 %	
	D range : during shift	Varies with condition	
Damper clutch slippage amount o Data list o Item No. 47	D range ; third gear 1,500 rpm (tachometer reading)	200-300 rpm	o Faulty damper clutch o Ignition signal wire or pulse generator B system faulty o Inappropriate transaxle fluid pressure o Faulty DCCSV
	D range ; third gear 3,500 rpm (tachometer reading)	0 rpm	
DCCSV duty o Data list o Item No. 49	D range ; third gear 1,500 rpm (tachometer reading)	0%	o Faulty TCM o Faulty TP Sensor system o Pulse generator B system faulty
	D range ; third gear 3,500 rpm (tachometer reading)	Varies with load	

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	2.846				○		○		
		2nd	1.581				○			○	
		3rd	1.000			○	○	○			
		OD	0.685					○		○	
D	OFF	1st	2.846				○		○		
		2nd	1.581				○			○	
		3rd	1.000			○	○	○			
2	-	1st	2.846				○		○		
		2nd	1.581				○			○	
L	-	1st	2.846				○				○

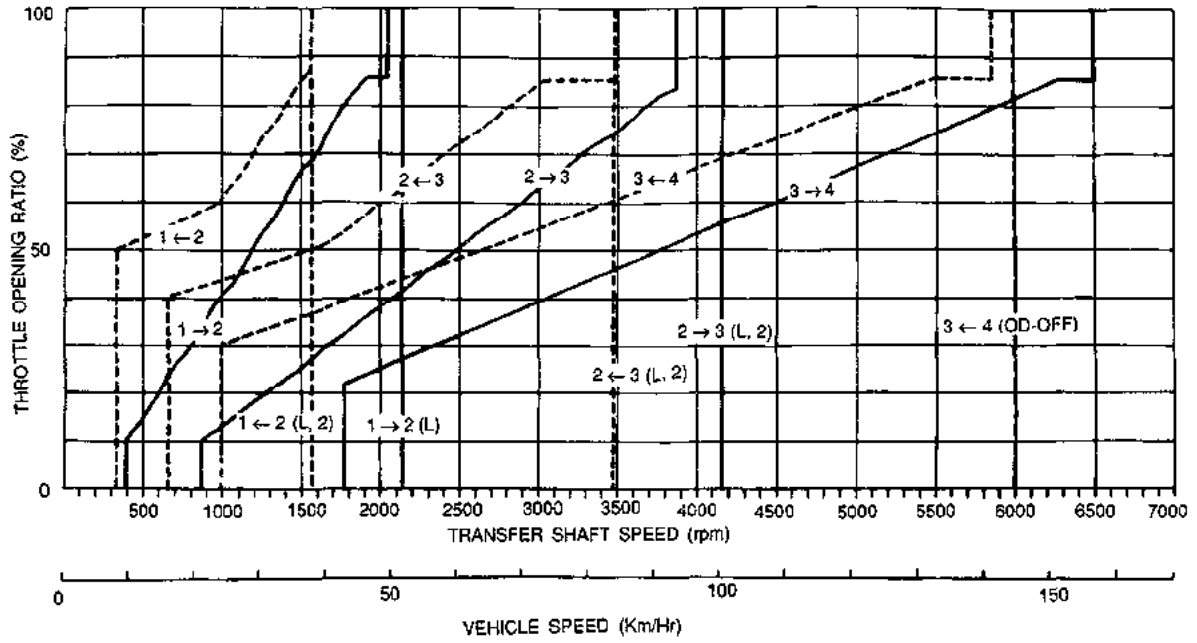
C1 : Front clutch
C2 : Rear clutch
C3 : End clutch
OWC : One way clutch
B1 : Kickdown brake
B2 : Low & reverse brake

SHIFT PATTERNS

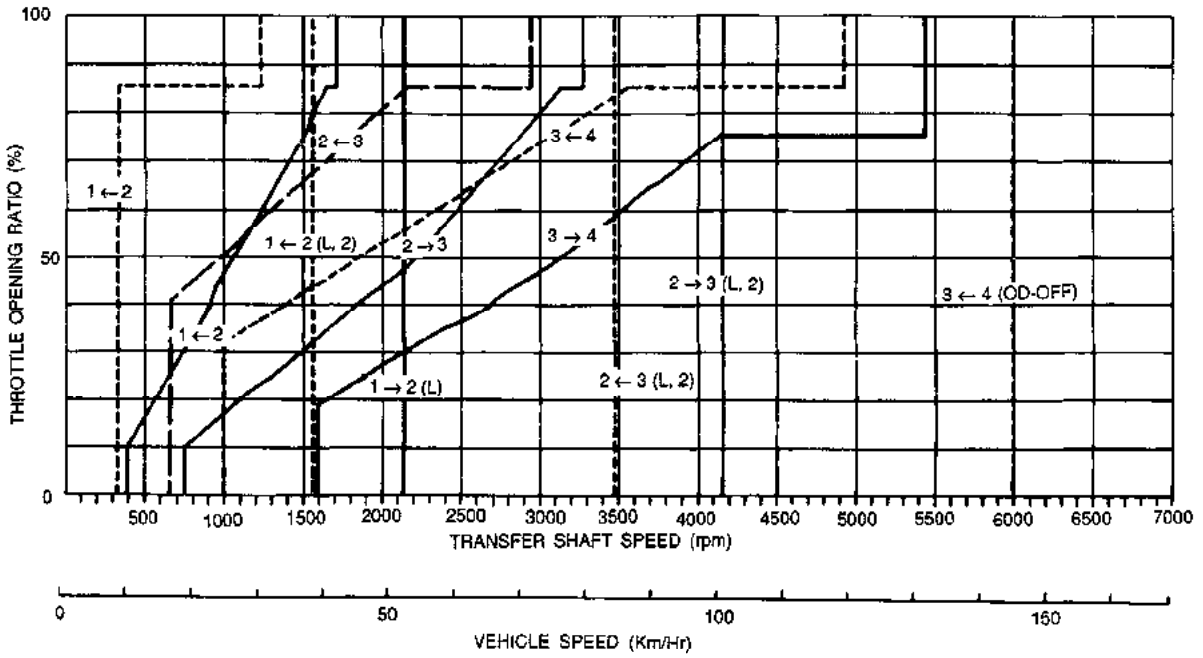
Two shift patterns are stored in the control module of this transaxle. One is the Normal pattern (for more powerful performance), and the other is the Economy pattern (for improved fuel consumption and quieter operation) (Refer to the diagram next page).
The driver can switch to the desired pattern by using the Normal/ Economy select switch on the center console.
The solid lines shown on these shift patterns graphs indicate up-shifts, and the broken lines indicate down-shifts. The difference between the shift points for up-shifts and for down-shifts is because up-shifts and down-shifts will not occur when driving at a speed close to that of the shift point.
When the vehicle is stopped, the transaxle is shifted into second gear in order to prevent vehicle creep “creeping”. Then when the accelerator pedal is depressed, the vehicle starts off in first gear.

SHIFT PATTERN

NORMAL RANGE



)NOMY RANGE



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.

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

→ Continuity

→ Normal

2. Oil-temperature sensor

Sensor side connector terminal

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 1 and 2 or 2 and 3.

→ No continuity (resistance: ∞) → Damaged or disconnected wiring

→ Replace the oil-temperature sensor.

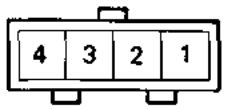
Vary the thermo-sensitive part from low temperature to high temperature and check the resistance between the 1 and 2 or 2 and 3.

→ Changes of the resistance continuous and smooth.

→ Normal

3. Throttle-position sensor (TPS)

Sensor side connector terminal



1: ground
3: output
4: power supply

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

→ Resistance: high or infinite → Damaged or disconnected wiring

→ Replace the TPS.

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

→ 3.5-6.5 KΩ/20°C (68°F)

→ Check the resistance between terminals 3 and 1 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

Check the resistance between terminals 3 and 1 with the engine idling after throttle-valve opening warm-up.

→ Resistance (actual measurement) between terminals 1-3: approx. 0.4 KΩ/20°C (68°F)

→ Check for changes of the resistance between terminals 1 and 3.

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

→ Replace the TPS.

Check for changes of the resistance between terminals 1 and 3.

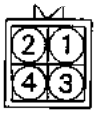
→ Changes of the resistance continuous and smooth.

→ Normal

4. Pulse generator A or B

Pulse generator side connector terminals

1-2: pulse generator A
3-4: pulse generator B



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

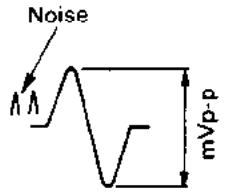
- Resistance: very low or very high → Short-circuit, damaged or disconnected wiring. → Replace the pulse generator.
- 215-275 Ω/20°C (68°F) → Normal

5. Pulse generator A or B (check by using an oscilloscope)

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

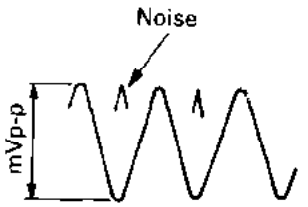
Oscilloscope waveform

Oscilloscope waveform



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, 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



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 → Normal

6. Pressure-control solenoid valve (PCSV)

Solenoid valve side connector terminals

1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A

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

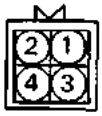
- Resistance; too low or too high → Short-circuit, damaged or disconnected wiring → Replace the PCSV.
- 2.9±0.3Ω/20°C (68°F)

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

- No operation noise. (stroke: 0.3 mm (0.012 in. or less) → Foreign material caught between the valve and guide → Replace the PCSV.
- Noise exists
- Normal

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

Solenoid valve side connector terminals



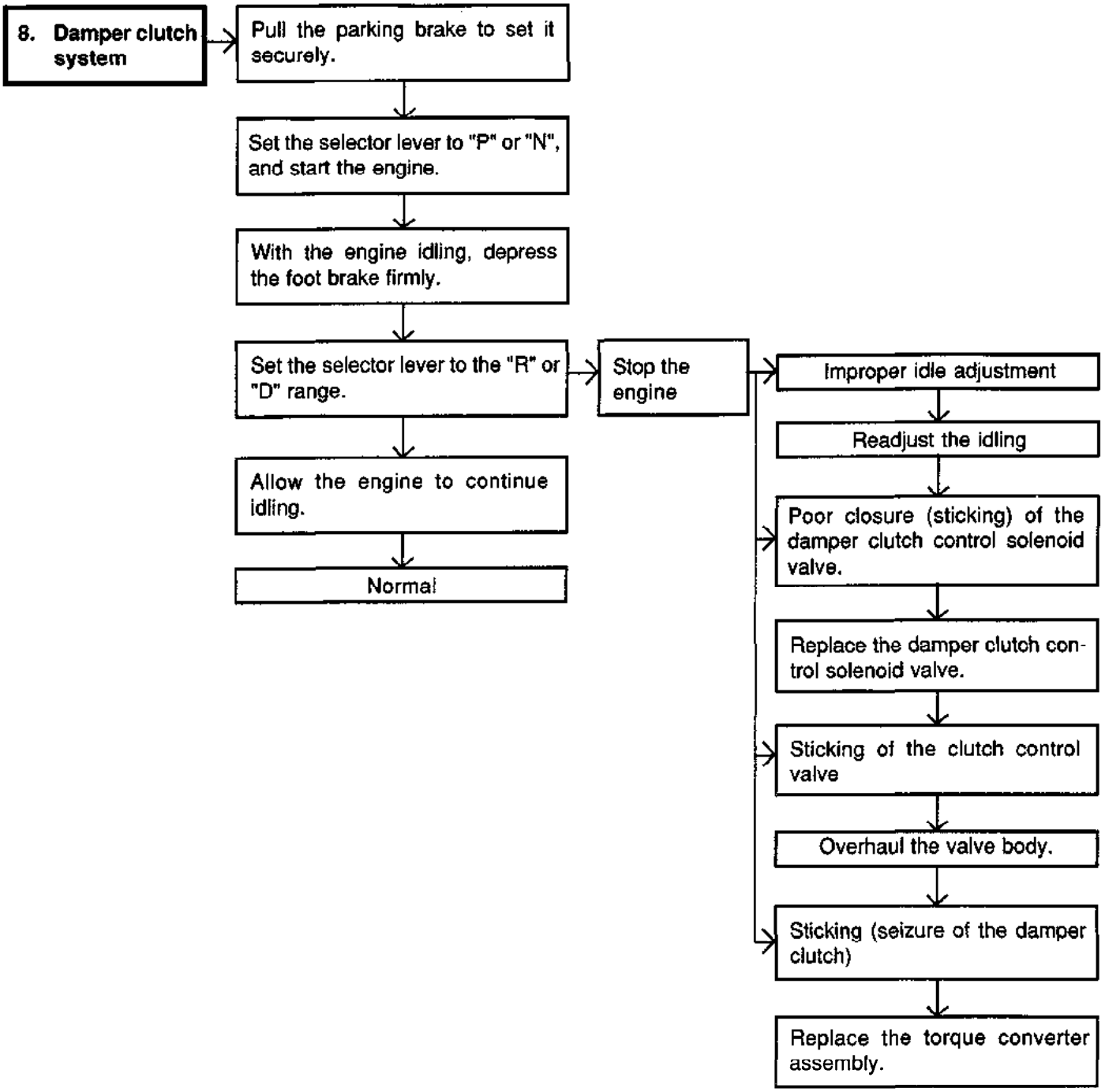
1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A

Check the resistance between terminal 3 and 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 and 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 (0.010 in. or less) → Residue accumulated in valve and core. → Replace the SCSV.
- Noise exists.
- Normal


8. Damper clutch system
Pull the parking brake to set it securely.
Set the selector lever to "P" or "N", and start the engine.
With the engine idling, depress the foot brake firmly.
Set the selector lever to the "R" or "D" range.
Allow the engine to continue idling.
Normal
Stop the engine
Improper idle adjustment
Readjust the idling
Poor closure (sticking) of the damper clutch control solenoid valve.
Replace the damper clutch control solenoid valve.
Sticking of the clutch control valve
Overhaul the valve body.
Sticking (seizure of the damper clutch)
Replace the torque converter assembly.

9. Damper clutch control solenoid valve (DCCSV)

Solenoid valve side connector terminals

1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A

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

Standard value: 3Ω/20°C

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

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

Noise exists.

Normal

No operation noise. Check for sticking. * (Valve stroke: 0.3 mm (0.012 in.) or less) → Foreign material caught between the valve and guide → Replace the DCCSV.

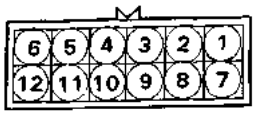
* Sticking is usually at the release side.

10. Idle switch

Refer to 31 Group (MFI COMPONENTS INSPECTION

11. Transaxle range switch

Switch side connector terminal



In the "P" range, check for continuity between terminals 3 and 4, and terminals 10 and 11.

Continuity exists

In the "R" range, check for continuity between terminals 3 and 12, and terminals 8 and 9.

Continuity exists

In the "N" range, check for continuity between terminals 3 and 5, and terminals 10 and 11.

Continuity exists

In the "D" range, check for continuity between terminals 1 and 3.

Continuity exists

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

Continuity exists

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

Continuity exists

Normal

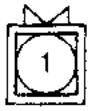
No continuity

Poor contact, or damaged or disconnected wiring.

Replace the transaxle range switch.

12 .Kickdown (K/D) servo switch

Switch side connector terminal



Check for continuity between the kickdown servo switch terminal 1 and the transaxle case.

- No continuity → Poor contact, or damaged or disconnected wiring. → Replace the K/D servo switch.
- Continuity exists → Start the engine, set to the "D" range, and let the engine idle; check for continuity between the kickdown servo switch terminal and the transaxle case.
  NOTE: Be sure the brakes are applied during this check.
  - Continuity exists → Poor contact (sticking) → Replace the K/D servo switch
  - No continuity → Normal

13.Transaxle control moduel(TCM)

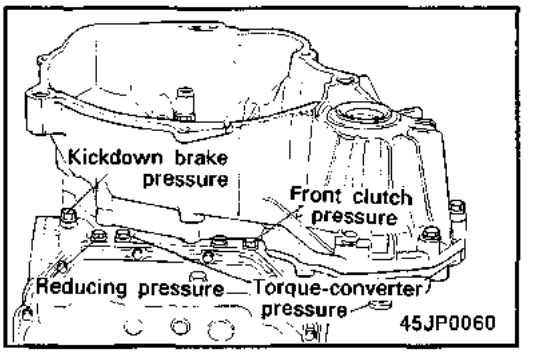
Disconnect the harness (both A and B connectors) from the vehicle's TCM. Then connect, (via an intermediate harness for checking), a new TCM to this harness and make a road test.

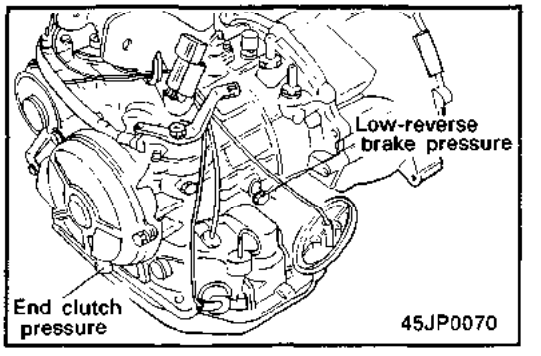
- The problem does not occur. → Malfunction of the original TCM. → Install a new TCM.
- Consider the original TCM to be normal, and again check the sensors, wiring, etc.

OIL PRESSURE TESTS

1. Completely warm up the transaxle.
2. Raise the front of the vehicle 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 (09452-21500) and the adapter (09452-21001, 09452-21002) to each oil-pressure outlet port.
   When the reverse 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. 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 "Preliminary Steps If Oil Pressure Is Not Normal" on the next page.





Standard Oil Pressure Table

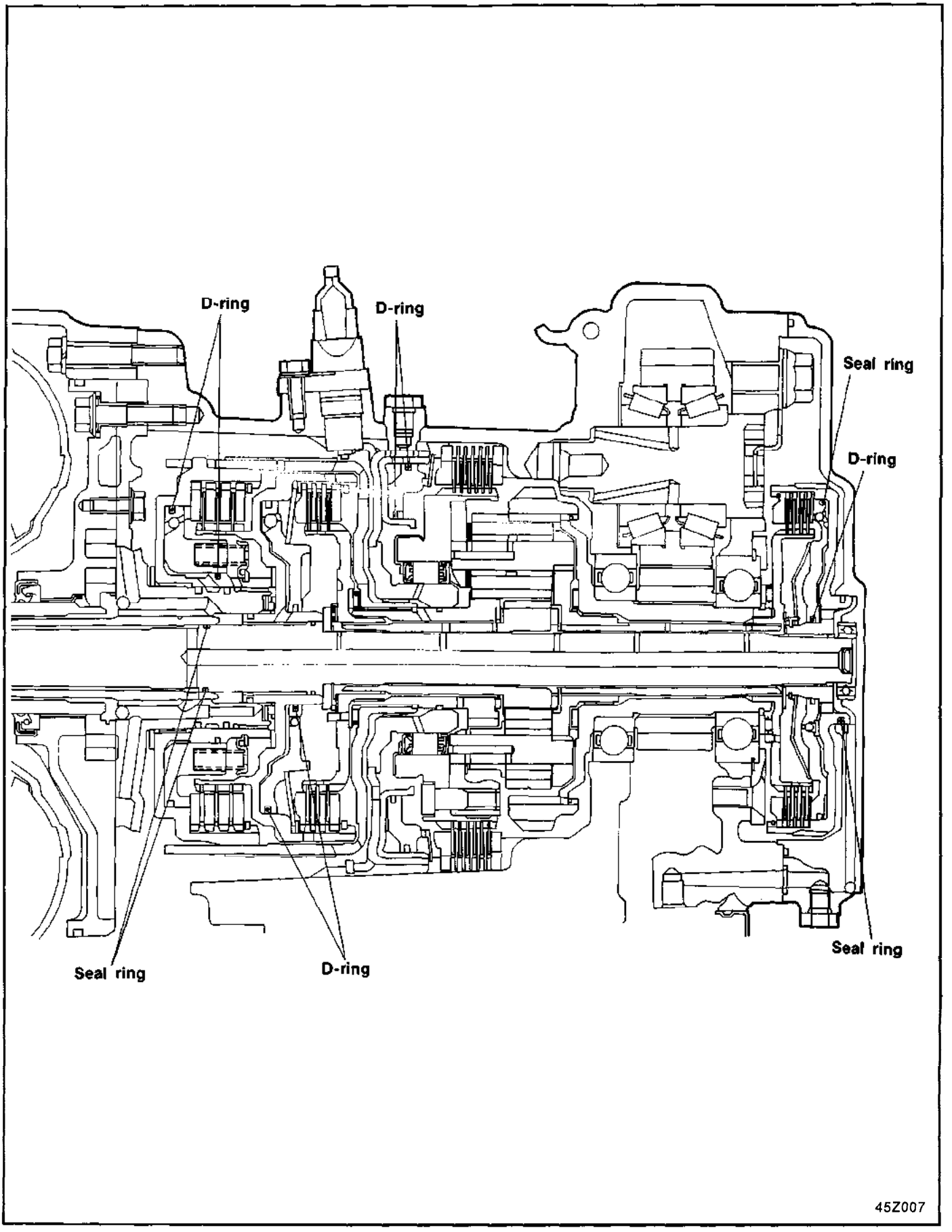
No.	Conditions				Standard oil pressure KPa (psi)					
	Selector lever position	(Reference) vehicle speed km/h (mph)	Engine speed rpm	Shift position	1 Reducing pressure	2 Kickdown brake pressure	3 Front clutch pressure	4 End clutch pressure	5 Low-reverse brake pressure	6 Torque-converter pressure
1	N	0 (0)	Idle	Neutral	353-470 (51-68)	-	-	-	-	*
2	D	0 (0)	Idle	second gear	353-470 (51-68)	100-210 (14-30)	-	-	-	*
3	D (SW-ON)	110 (68)	Approx. 2,500	fourth gear	353-470 (51-68)	830-900 (120-130)	-	830-900 (120-130)	-	450-650 (65-94)
4	D (SW-OFF)	75 (47)	Approx. 2,500	third gear	353-470 (51-68)	830-900 (120-130)	830-900 (120-130)	830-900 (120-130)	-	450-650 (65-94)
5	2	50 (31)	Approx. 2,500	second gear	353-470 (51-68)	830-900 (120-130)	-	-	-	450-650 (65-94)
6	L	0 (0)	Approx. 1,000	first gear	353-470 (51-68)	-	-	-	300-450 (44-60)	*
7	R	35 (22)	Approx. 2,500	Reverse	353-470 (51-68)	-	1,640-2,240 (238-325)	-	1,640-2,240 (233-328)	450-650 (65-94)
		0 (0)	Approx. 1,000				1,000 (145) or more		1,000 (145) or more	

NOTE:
- must be 9.8 kPa (1.4 psi) or less.
SW-ON : Switch ON the overdrive control switch.
SW-OFF : Switch OFF the overdrive control switch.
***: Hydraulic pressure is generated, but not the standard value.**

Preliminary Steps If Oil Pressure Is Not Normal

Trouble symptom	Probable cause	Remedy
1. *Line pressures are all low (or high). NOTE "Line pressures" refers to oil pressures 2, 3, 4, 5, 6 and 7 in the "Standard oil pressure table" on the pre vious page.	a. Clogging on oil filter	a. Visually inspect the oil filter; replace the oil filter if it is clogged.
	b. Improper adjustment of oil pressure (line pressure) regulator valve	b. Measure line pressure 2 (kickdown brake pressure); if the pressure is not the standard value, readjust the line pressure, or if necessary, replace the valve body assembly.
	c. Sticking of regulator valve	c. Check the operation of the regulator valve; repair if necessary, or replace the valve body assembly.
	d. Looseness of valve body tightening part	d. Tighten the valve body tightening bolt and installation bolt.
	e. improper oil pump discharge pressure	e. Check the side clearance of the oil pump gear; replace the oil pump assembly if necessary.
2. Improper reducing pressure	a. Improper line pressure	a. Check the 2 kickdown brake pressure (line pressure); if the line pressure is not the standard value, check as described in item 1 above.
	b. Clogging of the filter (L-shaped type) of the reducing-pressure circuit	b. Disassemble the valve body assembly and check the filter; replace the filter if it is restricted.
	c. Improper adjustment of the reducing pressure	c. Measure the 1 reducing pressure; if it is not the standard value, readjust, or replace the valve body assembly.
	d. Sticking of the reducing valve	d. Check the operation of the reducing valve; if necessary, repair it, or replace the valve body assembly.
	e. Looseness of valve body tightening part	e. Tighten the valve body tightening bolt and installation bolt.
3. Improper kickdown brake pressure	a. Malfunction of the D-ring or seal ring of the sleeve or kickdown servo piston.	a. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring.
	b. Looseness of valve body tightening part	b. Tighten the valve body tightening bolt and installation bolt.
	c. Functional malfunction of the valve body assembly.	c. Replace the valve body assembly.

Trouble symptom	Probable cause	Remedy
4. Improper front clutch pressure	a. Malfunction of the D-ring or seal ring of the sleeve or kickdown servo piston.	a. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring.
	b. Looseness of valve body tightening part	b. Tighten the valve body tightening bolt and installation bolt.
	c. Malfunction of the valve body assembly.	c. Replace the valve body assembly.
	d. Wear of the front clutch piston or retainer, or malfunction of the D-ring. (Refer to the figure on the next page.)	d. Disassemble the transaxle itself and check whether or not there is wear of the front clutch piston and retainer inner circumference, or damage of the D-ring. If there is any wear or damage, replace the piston, retainer, D-ring and/or seal ring.
5. Improper end clutch pressure	a. Malfunction of a D-ring, seal ring of the end clutch or O-ring of the pipe (Refer to the following figure.)	a. Disassemble the end clutch and check the seal ring, D-ring of the piston, seal ring of the retainer, etc.; replace if there are cuts, scars, scratches or damage.
	b. Looseness of valve body tightening part.	b. Tighten the valve body tightening bolt and installation bolt.
	c. Malfunction of the valve body assembly	c. Replace the valve body assembly.
6. Improper low-reverse brake pressure	a. O-ring between valve body and transaxle damaged or missing	a. Remove the valve body assembly and check to be sure that the O-ring at the upper surface of the upper valve body is not missing or damaged; install or replace the O-ring if necessary.
	b. Looseness of valve body tightening part	b. Tighten the valve body tightening bolt and installation bolt.
	c. Malfunction of the valve body assembly	c. Replace the valve body assembly.
	d. Malfunction of the O-ring of the low-reverse brake piston or the O-ring of the retainer (Refer to the following figure.)	d. Disassemble the transaxle itself and check the O-ring for damage; replace if there are cuts, scars, scratches or damage.
7. Improper torque con verter pressure	a. Sticking of the damper clutch control solenoid valve (DCCSV) or the damper clutch control valve.	a. Check the operation of the damper clutch system and the DCCSV.
	b. Clogging or leaking of the oil cooler and/or lines.	b. Repair or replace, as necessary, the cooler and/or lines.
	c. Damaged seal ring of the input shaft (Refer to the following the figure)	c. Disassemble the transaxle itself and check for damage of the seal ring; replace the seal ring if there is damage.
	d. Malfunction of the torque converter	d. Replace the torque converter.


D-ring
D-ring
Seal ring
D-ring
Seal ring
D-ring
Seal ring
45Z007

CONVERTER STALL TEST

Stall test consist of determining maximum engine speed obtained at full throttle in “D” and “R” positions. This test checks torque converter stator overrunning clutch operation, and holding ability of transaxle clutches and low-reverse brake.

Warning:
During this test, make sure that no one stand in front of or behind vehicle.

1. Check transaxle fluid level. Fluid should be at normal operating temperature [70-80°C (158-176°F). Engine coolant should also be at normal operating temperature] 80-90°C (176-205°F).
2. Apply chocks to both rear wheels.
3. Attach an engine tachometer.
4. Apply the parking and service brakes fully.
5. Start the engine.
6. With the selector lever in the "ID" position, depress the accelerator pedal fully to read maximum engine rpm. Do not hold the throttle wide open any longer than is necessary to obtain maximum engine rpm reading, and never longer than 5 seconds at a time. If more than one stall test is required, operate the engine at approximately 1,000 rpm in neutral for 2 minutes to cool the transaxle fluid between tests.

   Stall speed : 1,800.2200 rpm

7. Place the selector lever in the “R” position and perform the stall test by the same procedure as previously described.

Stall Speed Above Specification in “D”

If stall speed is higher than specification, rear clutch or overrunning clutch of transaxle is slipping. In this case, perform hydraulic test to locate cause of slippage.

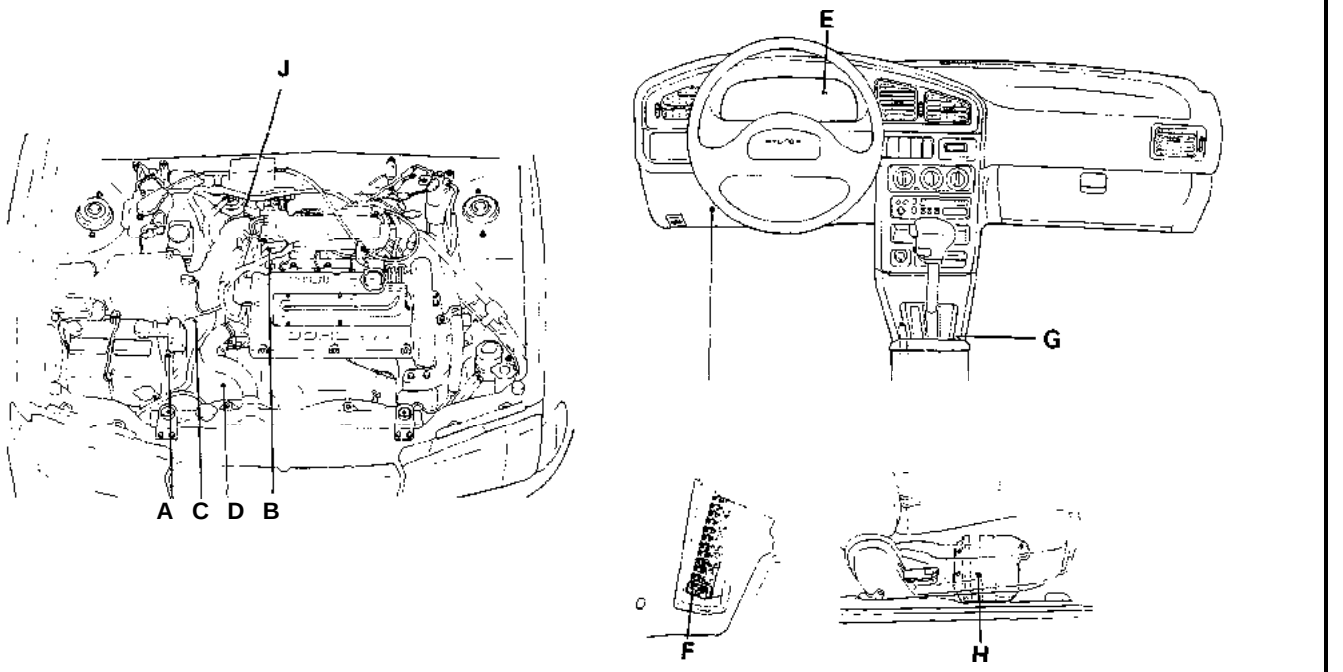
Stall Speed Above Specification in “R”

If the stall speed is higher than specification, the front clutch of the transaxle or low-reverse brake is slipping. In this case, perform the hydraulic test to locate the cause of slippage.

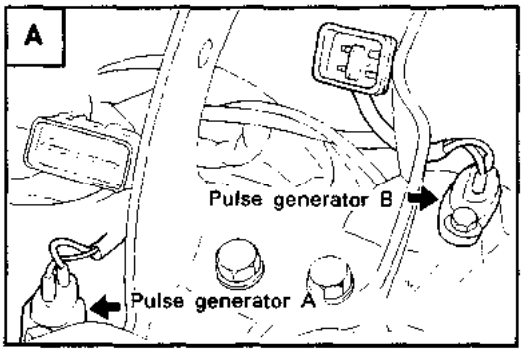
Stall Speed Below Specification in “D” and “R”

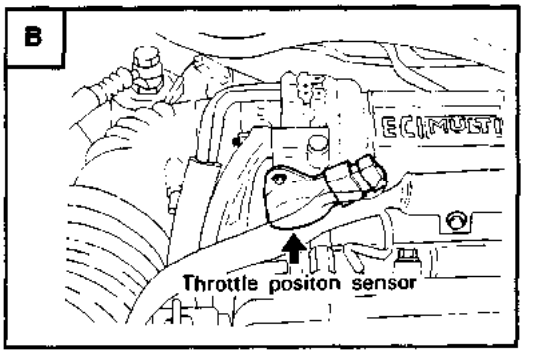
If the stall speed is lower than specification, insufficient engine output or a faulty torque converter is suspected. Check for engine misfiring, improper ignition timing, or valve clearance etc. If these are good, the torque converter is faulty.

E.L.C. 4-SPEED AUTOMATIC TRANSAXLE CONTROL COMPONENTS

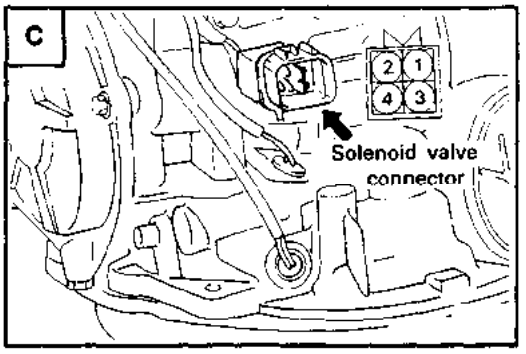


Name	Symbol	Name	Symbol
Pulse generator A, B	A	Data link connector	F
Throttle position sensor	B	Normal/Economy switch	G
Solenoid valve connector	C	4 A/T control module	H
Oil temperature sensor	D	M.F.I control module	I
Vehicle speed sensor	E	Idle switch	J

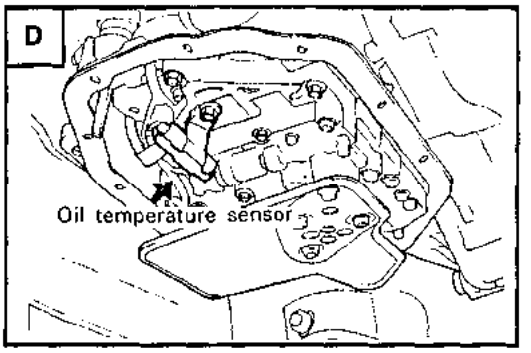




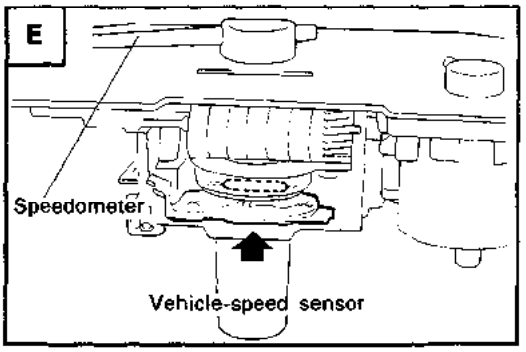
C


Solenoid valve
connector

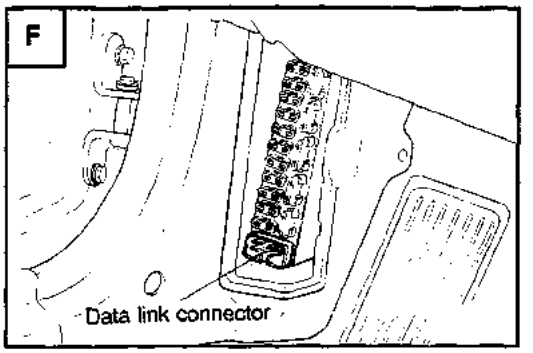
D


Oil temperature sensor

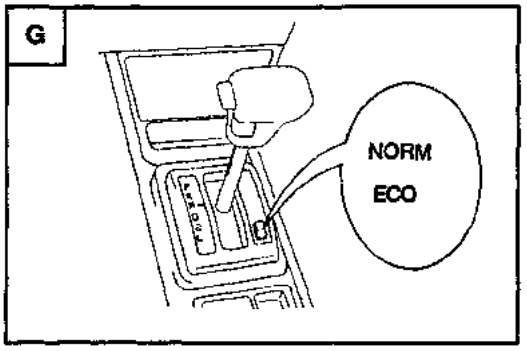
E


Speedometer
Vehicle-speed sensor

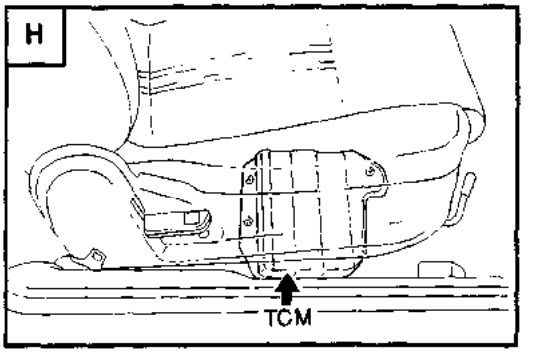
F


Data link connector

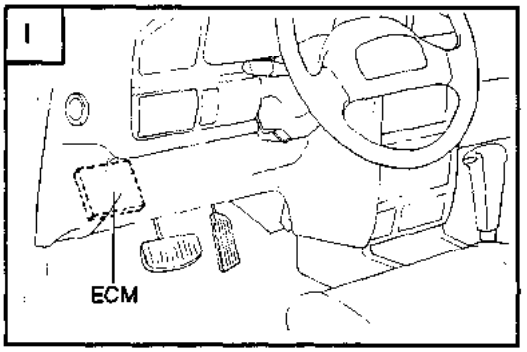
G


NORM
ECO

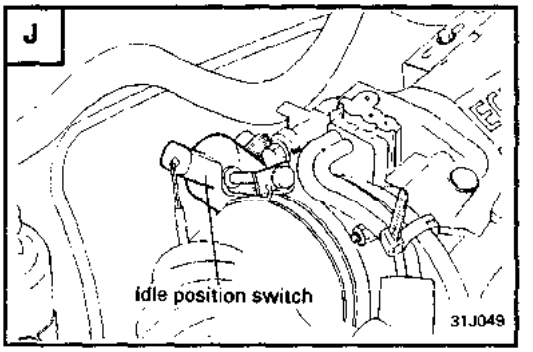
H


TCM

I

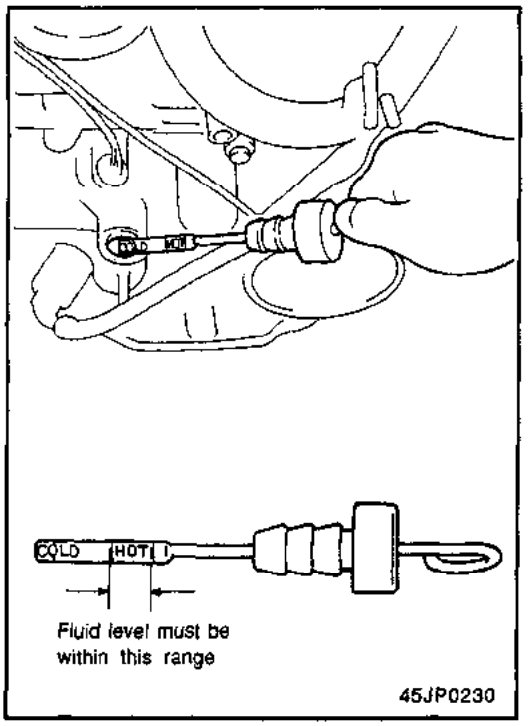

ECM

J


Idle position switch
31J049

SERVICE ADJUSTMENT PROCEDURES

TRANSAXLE FLUID LEVEL INSPECTION



1. Drive the vehicle until the fluid temperature reaches normal operating temperature [70-80°C (158-176°F)].
2. Place the vehicle on a level floor.
3. Move the selector lever sequentially to every position, This will fill the torque converter and hydraulic system with fluid, then place lever in “N” (Neutral) position.
4. Before removing the dipstick, wipe all contaminante from area around the dipstick. Then take out the dipstick and check the condition of the fluid.
5. Check to see if the fluid level is in the “HOT” range on dipstick. If fluid level is low, add automatic transaxle fluid until the level reaches the “HOT” range.

   Transaxle fluid :
   GENUINE HYUNDAI ATF AUTOMATIC TRANSAXLE FLUID OR MOPAR ATF PLUS TYPE 7176, DIAMOND ATF SP OR EQUIVALENT.

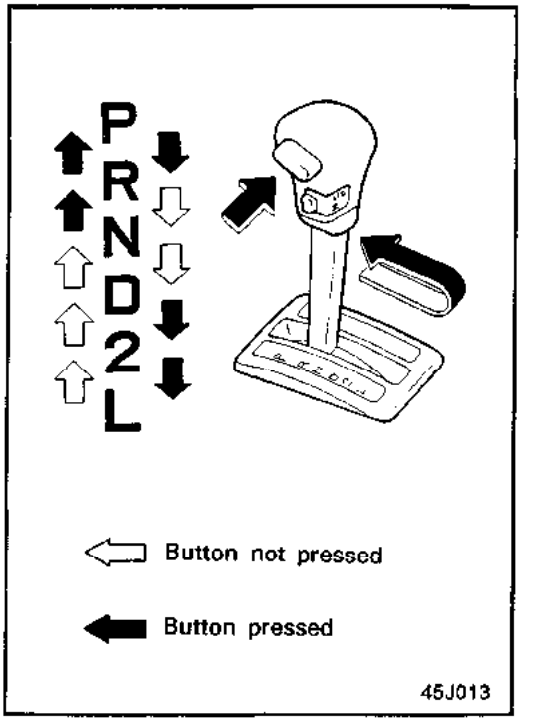
   Low fluid level can cause a variety of abnormal conditions because it allows the pump to take in air along with fluid. Air trapped in the hydraulic system forms bubbles which are compressable. Therefore, pressures will be erratic, causing delayed shifting, sliping clutch and brakes, etc.
   Improper filling can also raise fluid level too high. When the transaxle has too much fluid, gears churn up foam and cause the same conditions which occur with low fluid level, resulting in accelerated deterioration of automatic transaxle fluid.
   In either case, air bubbles can cause overheating, and fluid oxidation, which can interfere with normal valve, clutch, and servo operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.
6. Be sure to examine the fluid on the dipstick closely.

TRANSAXLE FLUID REPLACEMENT

Refer to GROUP 10-Lubrication and Maintenance.

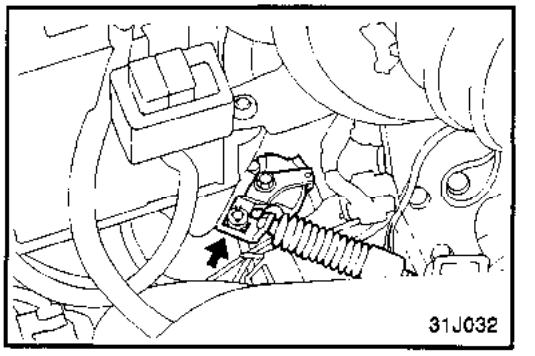
SELECTOR LEVER OPERATION CHECK

1. Shift the selector lever to each range and check to see that the lever moves smoothly and is controlled. Check to see that the position indicator is correct.
2. Check to be sure that the selector lever can be shifted to each position (by button operation as shown in the illustration).
3. Start the engine and check to see if the vehicle moves forward when the selector lever is shifted from “N” to “D”, and moves backward when shifted to “R”.
4. When the shift lever malfunctions, adjust the control cable and the selector lever sleeve. Check for worn shift lever assembly sliding parts.



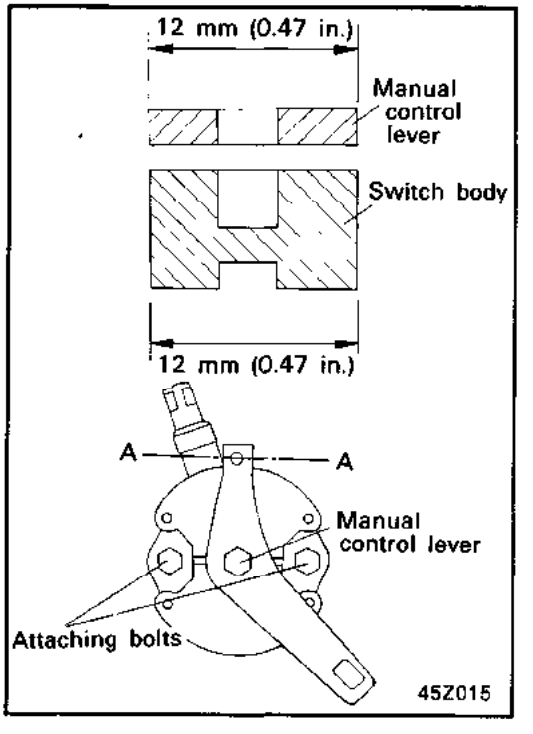
TRANSAXLE RANGE SWITCH ADJUSTMENT

1. Place selector lever in "N" (Neutral) position.
2. Loosen the manual control lever flange nut to separate the cable and lever.

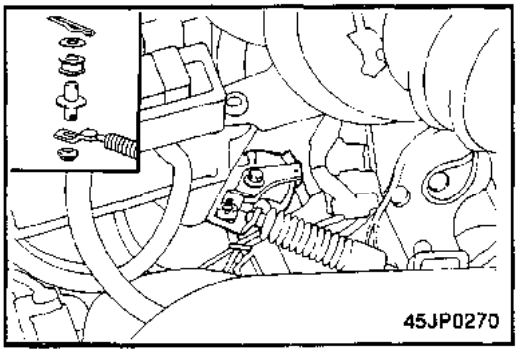


3. Place the manual control lever in the "IN" (Neutral) position.
4. Turn the transaxle range switch body until the 12 mm (.47 in.) wide end of the manual control lever aligns with the switch body flange [12 mm (0.472 in.) wide portion].
5. Tighten the attaching bolts (2 pcs.) to the specified torque.
   Transaxle range switch attaching Bolt:
   10-12 Nm (100-120 kg.cm, 7-9 lb.ft)

   NOTE
   When setting up the switch body, be careful not to drop the O-ring from switch body.
   Tighten the attaching bolts carefully.

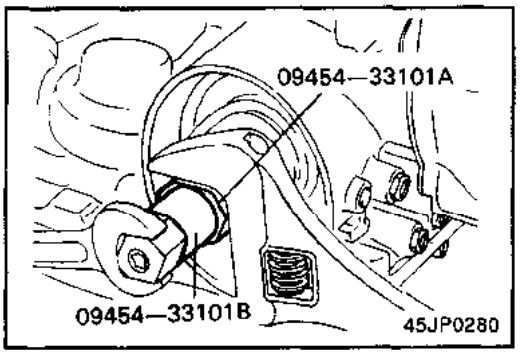


6. Make sure that the selector lever is in the “N” (Neutral) position.
7. Adjust the flange nut so that there is no slack in the control cable and make sure that the selector lever operates smoothly.
8. Run the vehicle and confirm that the transaxle is set in each range when the selector lever is shifted to each position.



KICKDOWN SERVO ADJUSTMENT

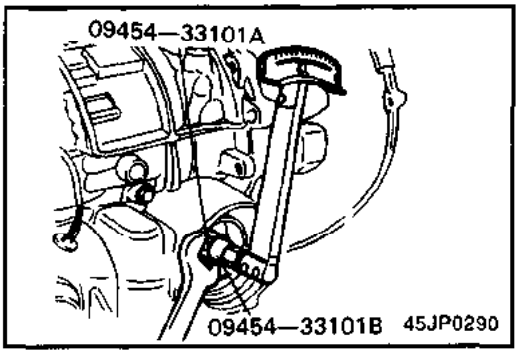
1. Completely remove all dirt and other contaminating materials adhered around the kickdown servo switch.
2. Remove the snap ring.
3. Remove the kickdown servo switch.
4. Loosen the lock nut.

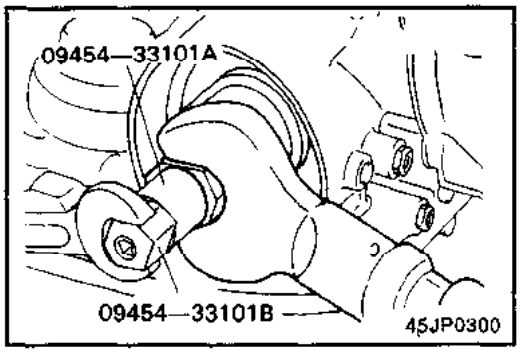


5. While holding with the special tool (09454-33101A) so that the kickdown servo piston won’t turn, use a kickdown servo socket wrench-B (09454-33101B) to “tighten”, the adjustment screw at 10 Nm (7.2 lb.ft). Loosen and tighten the adjustment screw two turns, and then finish tighten at a torque of 5 Nm (3.6 lbft). Again loosen the adjustment screw 2 to 2-1/4 turns.
6. While holding with special tool (09454-331018) so that the kickdown servo piston won’t turn, tighten the lock nut to the specified torque use special tool (09454-33101A).

   Lock nut: 25-32 Nm (250-320 kg.cm, 18-23 lb.ft)

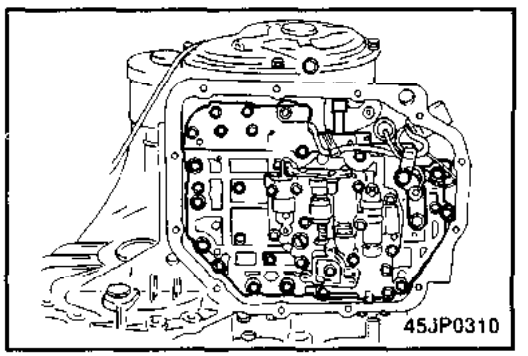
7. After installing a new O-ring in the groove surrounding the kickdown servo switch, arrange the O-ring so that it is not twisted. Install the kickdown servo switch into the case, and then install the snap ring.



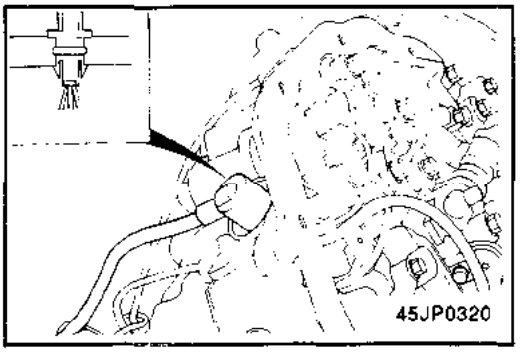


LINE PRESSURE ADJUSTMENT

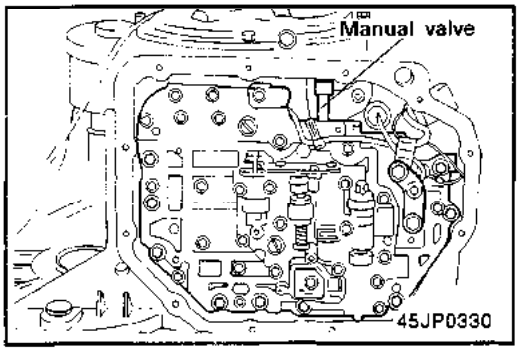
1. Drain the automatic transaxle fluid.
2. Remove the oil pan.
3. Remove the oil filter.
4. Remove the oil-temperature sensor.



5. Press the tab of the solenoid valve harness grommet and push in.

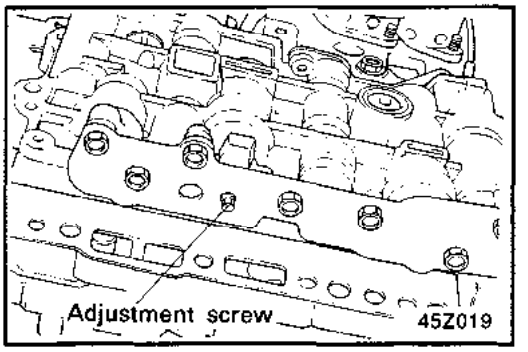


6. Remove the valve body assembly.
   Be careful not to drop the manual valve.

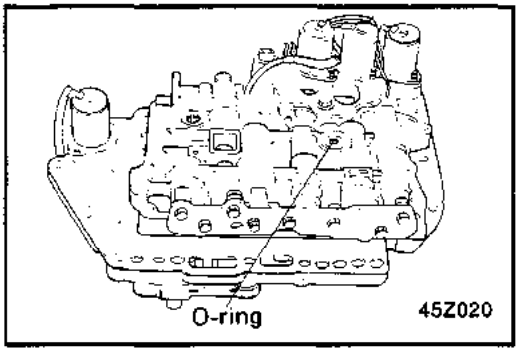


7. If the line pressure needs adjustment, then turning the screw clockwise, will lower to pressure, while turning the screw counter-clockwise, increase the pressure.

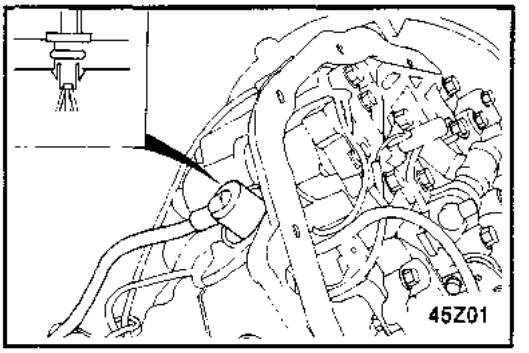
   Standard value :
   870-890 kPa (124-127 psi, 8.87-9.08 kg/cm^2)
   Oil pressure change for each turn of adjustment screw :
   38 kPa (54 psi, 0.39 kg/cm^2)



8. Check to be sure that the O-ring is installed on the upper surface of the valve body at the place shown in the figure.
9. Replace the O-ring of the solenoid valve connector with a new one.



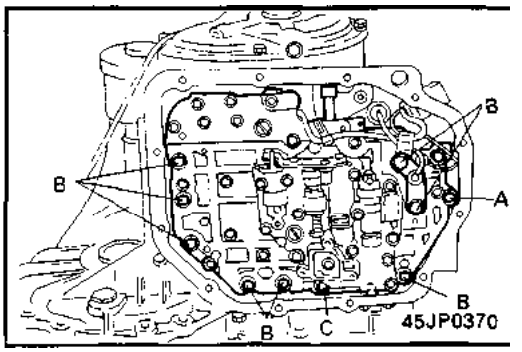
10. Install the valve body assembly to the case and then insert the solenoid valve connector into the case. Be sure, at this time, that the notched part of the connector faces as shown in the figure.
    Also be careful that the lead wiring isn't caught.



11. Tighten the ten(10) valve body assembly mounting bolts to 10-12Nm(100-120kg.cm,7-9lb.ft).

    A : 18 mm (0.709 in.) long
    B : 25 mm (0.984 in.) long
    C : 40 mm (1.575 in.) long

12. Install the oil filter.
13. Install a new oil pan gasket with the oil pan.
14. Pour in the specified amount of Automatic transaxle fluid.
15. Make the oil pressure test. Readjust if necessary.



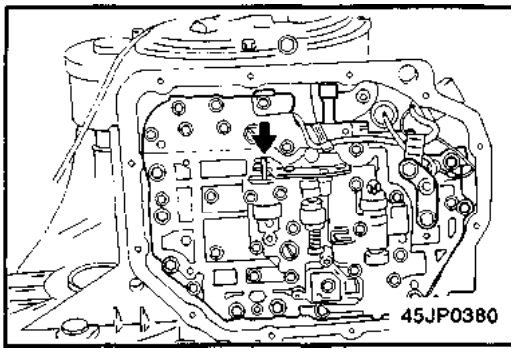
REDUCING PRESSURE ADJUSTMENT

(If the Scan Tool is not available)

1. Remove parts up to the oil filter in the same way as for adjustment of the line pressure. The valve body need not be removed.
2. Turn the adjustment screw of the lower valve body and adjust so that the reducing pressure is the standard value.
   When the adjustment screw is turned clock wise, the reducing pressure becomes lower; when it is turned to the counter clock wise, it becomes higher.

   NOTE:
   When adjusting the reducing pressure, aim for the center value (425 kPa, 60 psi) of the standard value allowance.

   Standard value :
   425 ± 10 kPa (60 ± 1 psi, 4.3 ± 1 kg/cm^2)
   Oil pressure change for each turn of the adjustment screw: 30 kPa (4.3 psi, 0.3 kg/cm^2)



3. Install the oil filter and oil pan in the same way as for adjustment of the line pressure.
4. Make the oil pressure test. Readjust if necessary.

(If the Scan Tool is used)

1. Adjust to obtain the specified kick down brake pressure when the pressure contued solenoid is activated at 50% duty ratio with the multi-use tester.

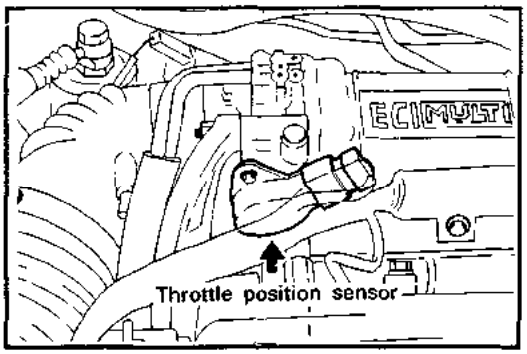
   Standard value :
   275 ± 10 kPa (39 ± 1 psi, 2.8 ± 1 kg/.cm^2)
   Oil pressure change for each turn of the adjustment screw: 20 kPa (3 psi, 0.2 kg/cm^2)

2. Check to be sure that the reducing pressure (after the adjustment is completed) is within the range of 370-490 kPa (53-70 psi, 3.8-5.0 kg/cm^2)

NOTE:
This adjustment should be made at an oil temperature of 70-60°C(156-176°F).
If the adjustment is made at a temperature that is too high, the line pressure will drop during idling, with the result that it might not be possible to make the correct adjustment.

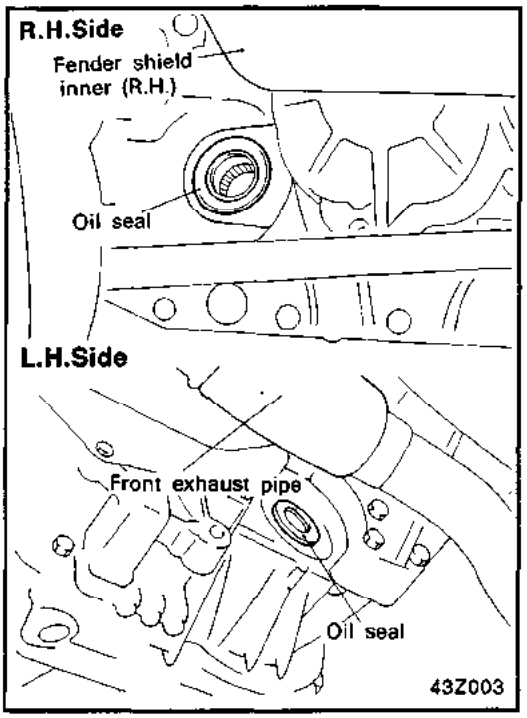
THROTTLE-POSITION SENSOR ADJUSTMENT

Refer to GROUP 31 -FUEL SYSTEM.

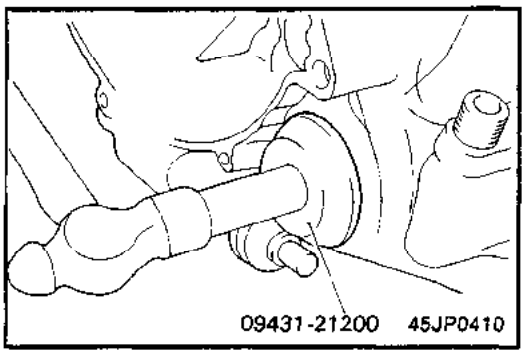


DRIVE SHAFT OIL SEALS REPLACEMENT

1. Disconnect the drive shaft from the transaxle. (Refer to FRONT SUSPENSION-Drive Shaft)
2. Using a flat-tip (-) screwdriver, remove the oil seal.

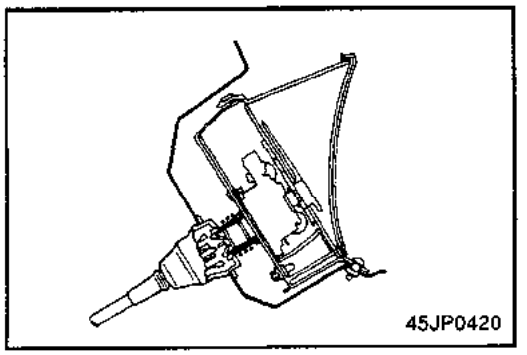


3. Using the special tool (09431-21200), tap the drive shaft oil seal into the transaxle.
4. Apply a coating of the transaxle fluid to the lip of the oil seal.



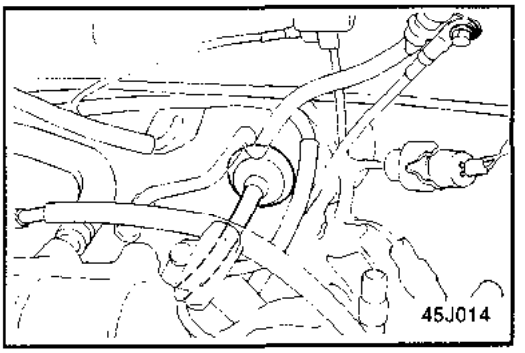
SPEEDOMETER CABLE REPLACEMENT

1. Correctly insert the adapter into the instrument panel, and fasten the new speedometer cable.



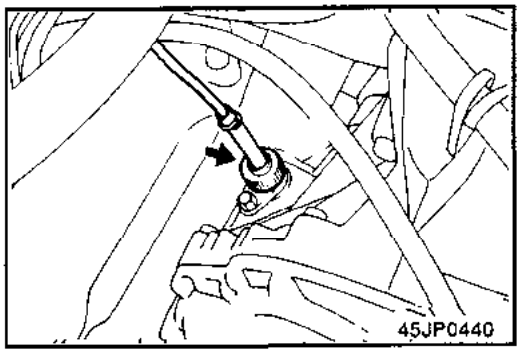
2. Install the grommet so that, as shown in the illustration, the cable attachment part and the projection part are horizontal.

NOTE:
The cable arrangement should be made so that the radius of the cable bends is 150 mm (5.9 in.) or more.

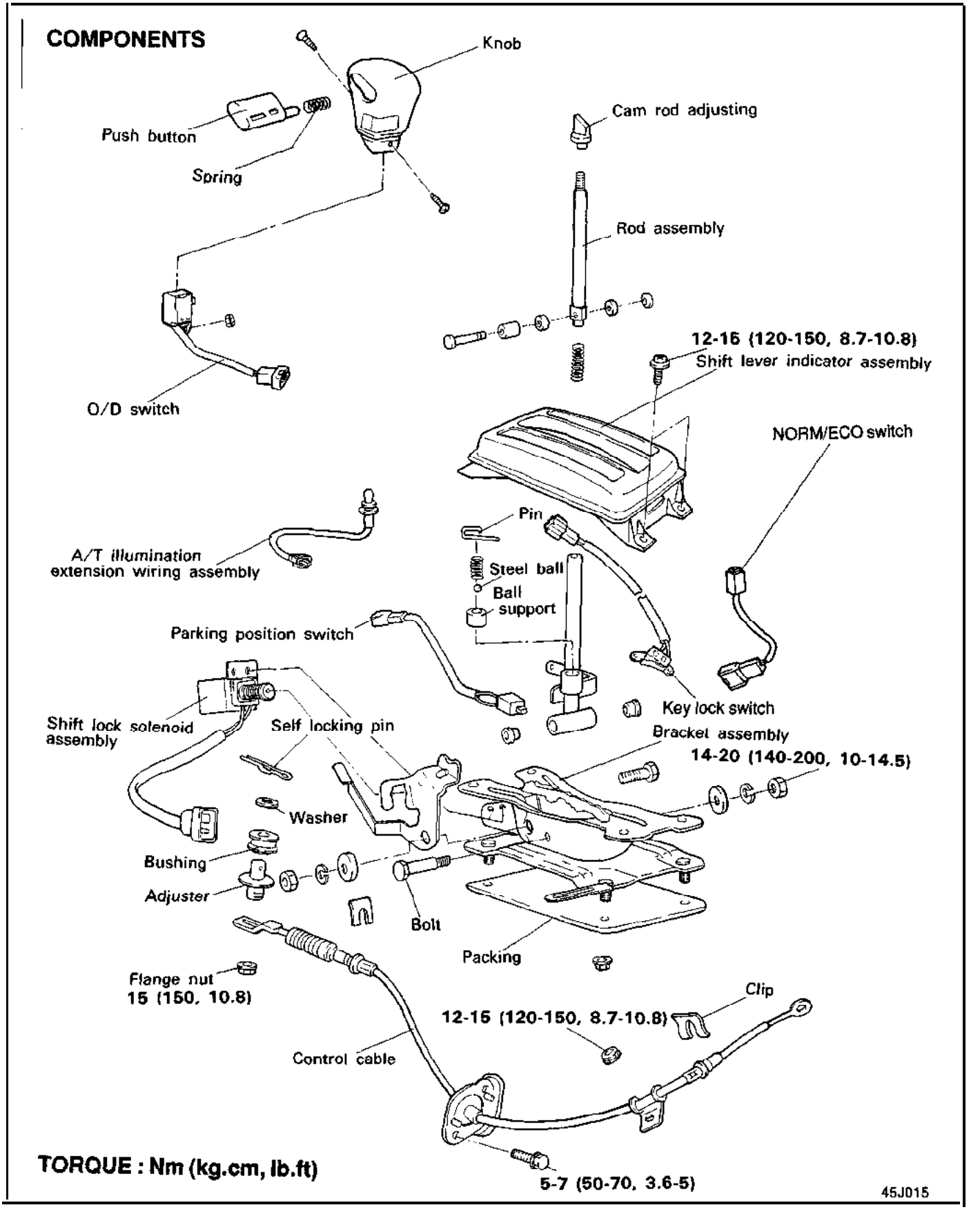


3. At the transaxle end of the speedometer cable, the key joint should be inserted into the transaxle, and the nut should be securely tightened.

NOTE:
If the cable is not correctly and securely connected, it may cause an incorrect reading on the speedometer, or abnormal noise. Be sure to connect it correctly.

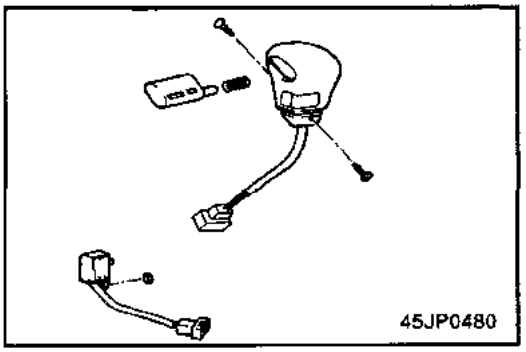


TRANSAXLE CONTROL

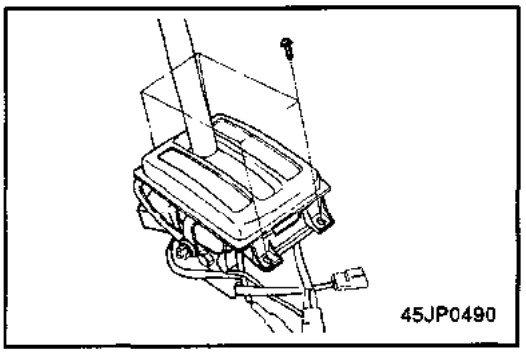


REMOVAL

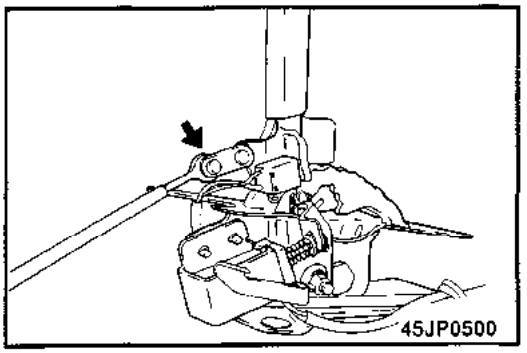
1. Remove the console box assembly. (Refer to Body Group).
2. Remove the knob installation screws.
3. Disconnect the overdrive switch connector and then remove the knob.



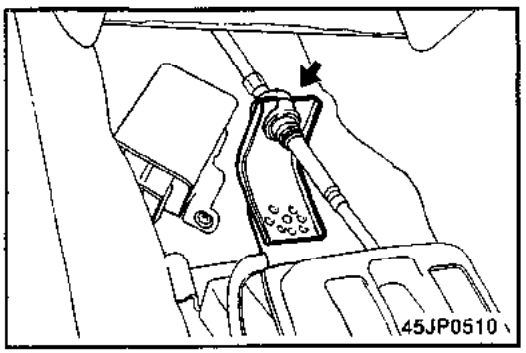
4. Remove the shift lever indicator assembly.
5. Disconnect the position indicator light connector and normal/ economy select switch connector.



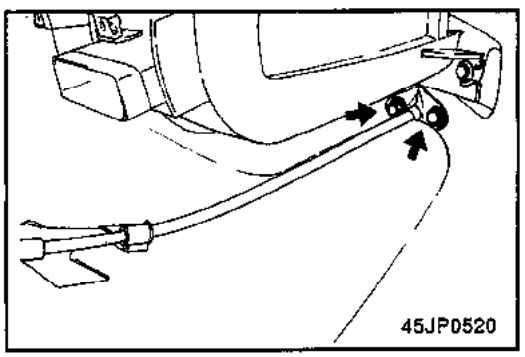
6. Remove the pin, self lock pin from the link.



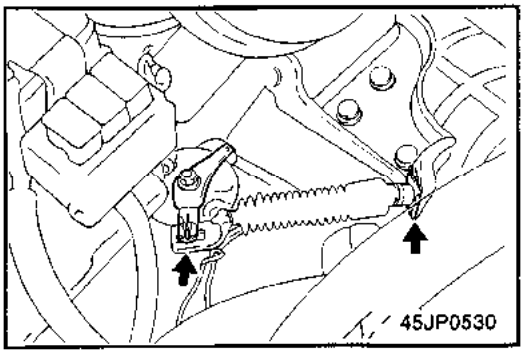
7. Remove the clip, nut from the shift lever side.



8. Remove the bolt-washer assembly located on dash panel.

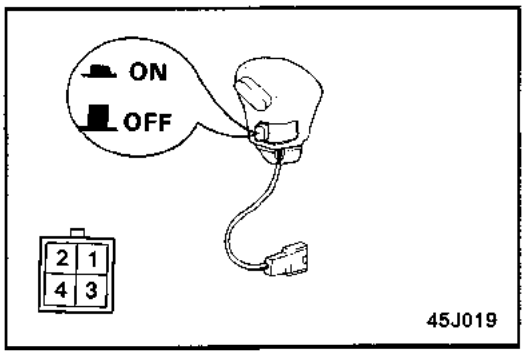


9. Remove the clip, flange nut from the transaxle side.
10. Remove the transaxle control cable assembly.



INSPECTION

1. Check the control cable for function and for damage.
2. Check the bushing for wear or damage.
3. Check the spring for damage or deterioration.
4. Check the overdrive switch for continuity.



O—O : Continuity

Terminal / Switch position	1 (0.3-RW)*	2 (0.3-LR)*	3 (0.3-BW)*
Overdrive activation	O	O	
Overdrive non-activation	O		O

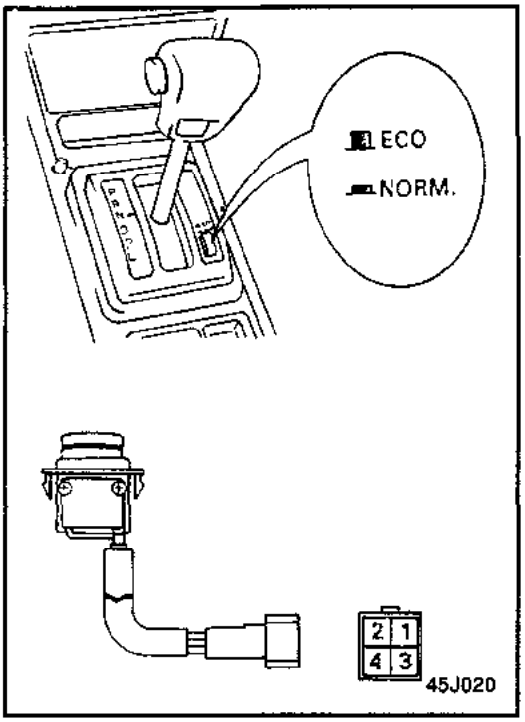
NOTE

*Color code	Color of wire	*Color code	Color of wire
R	Red	B	Black
W	White	L	Blue

5. Check the P/N switch for continuity.

O—O : Continuity

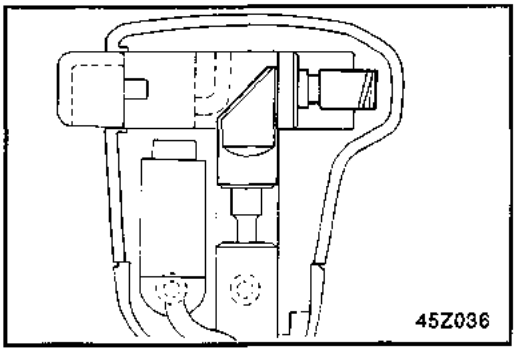
Terminal / Position	1	2	4
ECO (Free)	O		O
NORM (Push)	O	O	



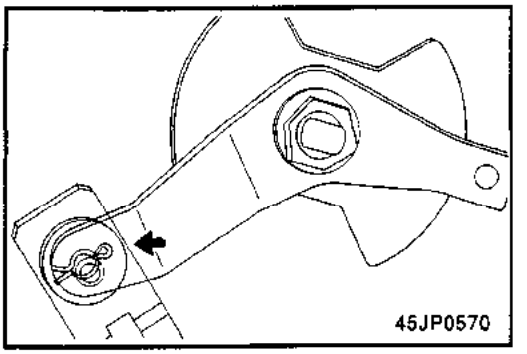
INSTALLATION

1. Apply a coating of the specified grease to the interior of the bushing.

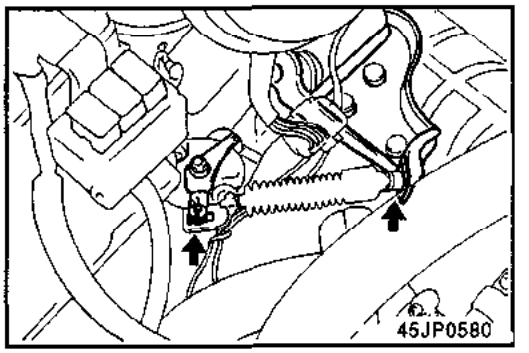
   Specified grease : Chassis grease SAE 5310, NLGI No.2



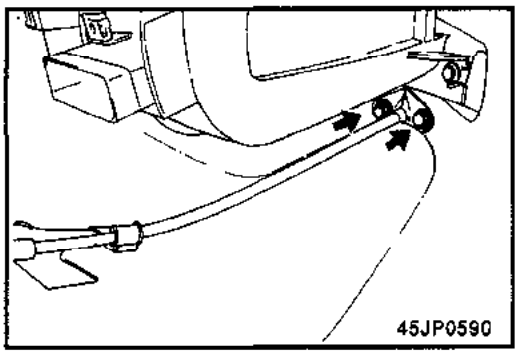
2. Move the shift lever and the transaxle range switch to the "IN" position, and install the control cable.



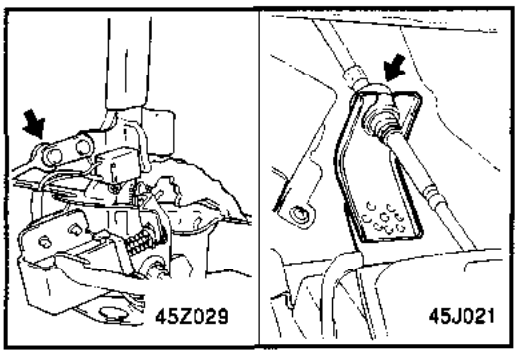
3. When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts the control cable, in position switch in the figure.



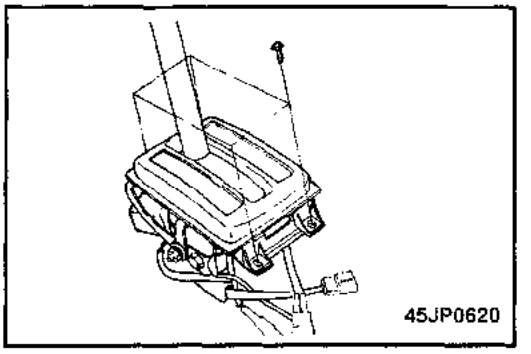
4. Install the bolt-washer assembly, nut.



5. Install the clip pin, self lock pin. (shift lever side).

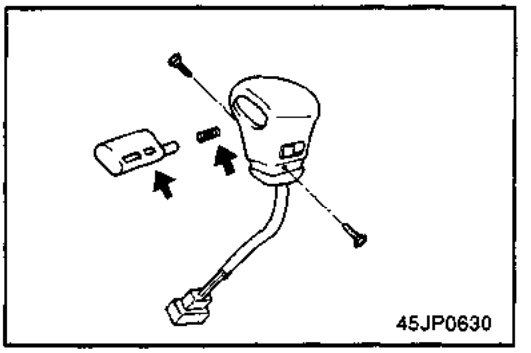


6. Connect the position indicator light connector, the O/D switch connector, the parking position switch connector, power/ normal select switch connector, and the shift lock solenoid connector.
7. Install the shift lever indicator assembly.



8. Apply the specified grease at the place shown in the figure.

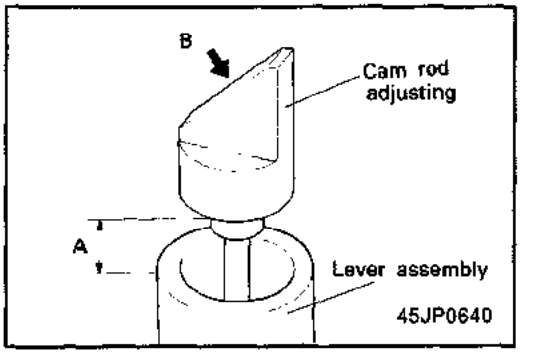
   Specified grease : Multipurpose grease SAE 5310, NLGI No.2



9. Place the shift lever in the “N” position, and then turn the cam adjusting so that the clearance between the cam adjusting and the lever assembly end in within the standard value.

   Standard value (A) : 15.2-15.9 mm (0.598-0.825 in.)

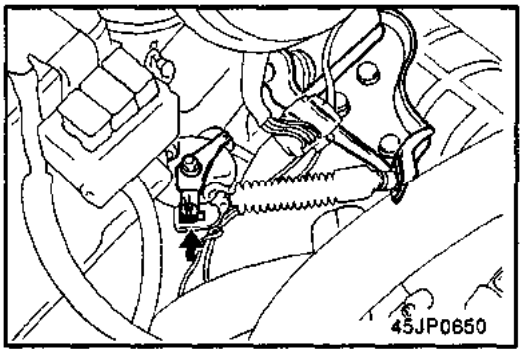
   NOTE
   Be sure to face B of the adjusting cam to the push button (driver’s side).



10. Install the selector knob.
11. Install the console box. (Refer to BODY GROUP).

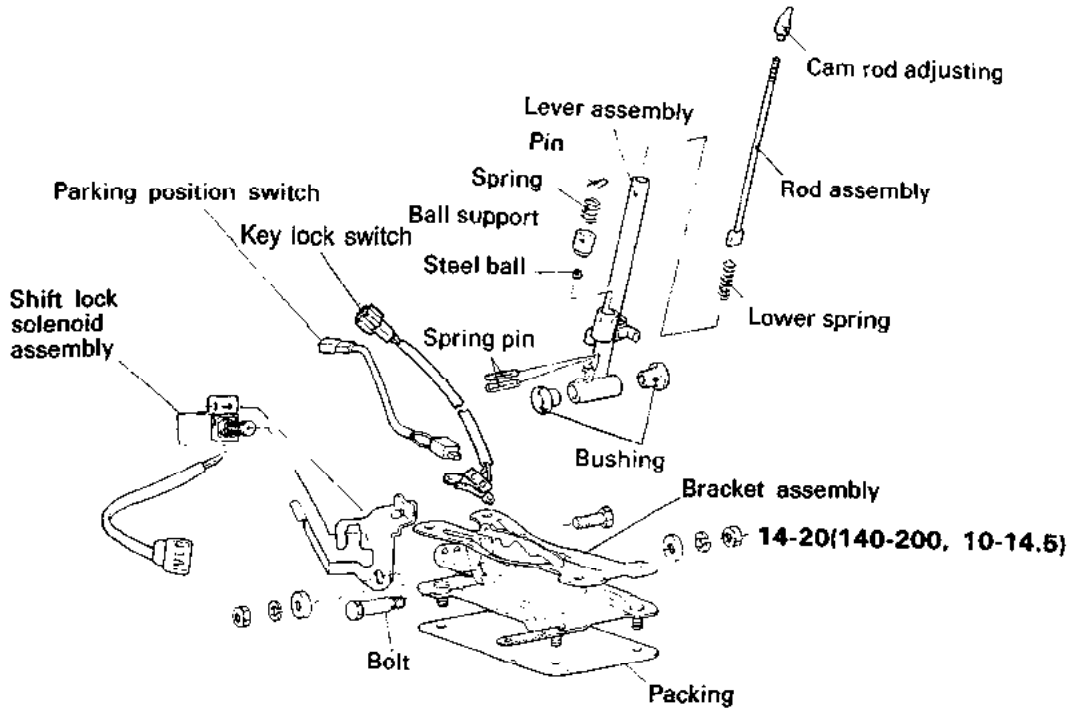
ADJUSTMENT OF CONTROL CABLE

1. Eliminate slack from the control cable with the adjusting flange nut and check that the select lever operates smoothly.
2. Driving the car, check that the transaxle is set in the proper range when the select lever is shifted to each position.



SHIFT LEVER ASSEMBLY

COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

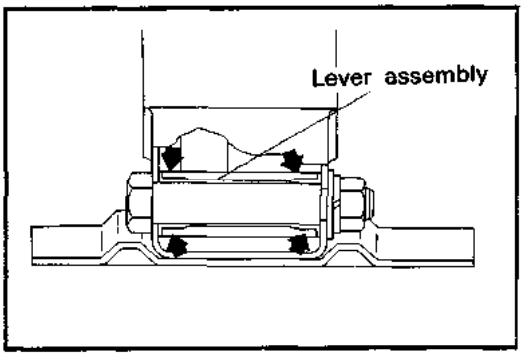
INSPECTION

- Check the detent place for wear.
- Check the bushing for wear or damage.
- Check the spring for damage or deterioration.
- Check the pin at the end of rod assembly for wear.

ASSEMBLY

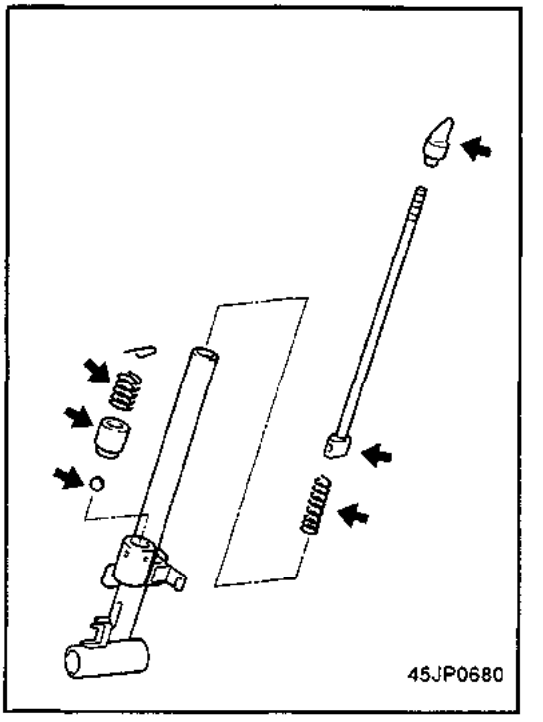
1. Apply a coating of grease to the sliding part of the bushing.

   Specified grease : Chassis grease SAE 5310, NLGI No.2



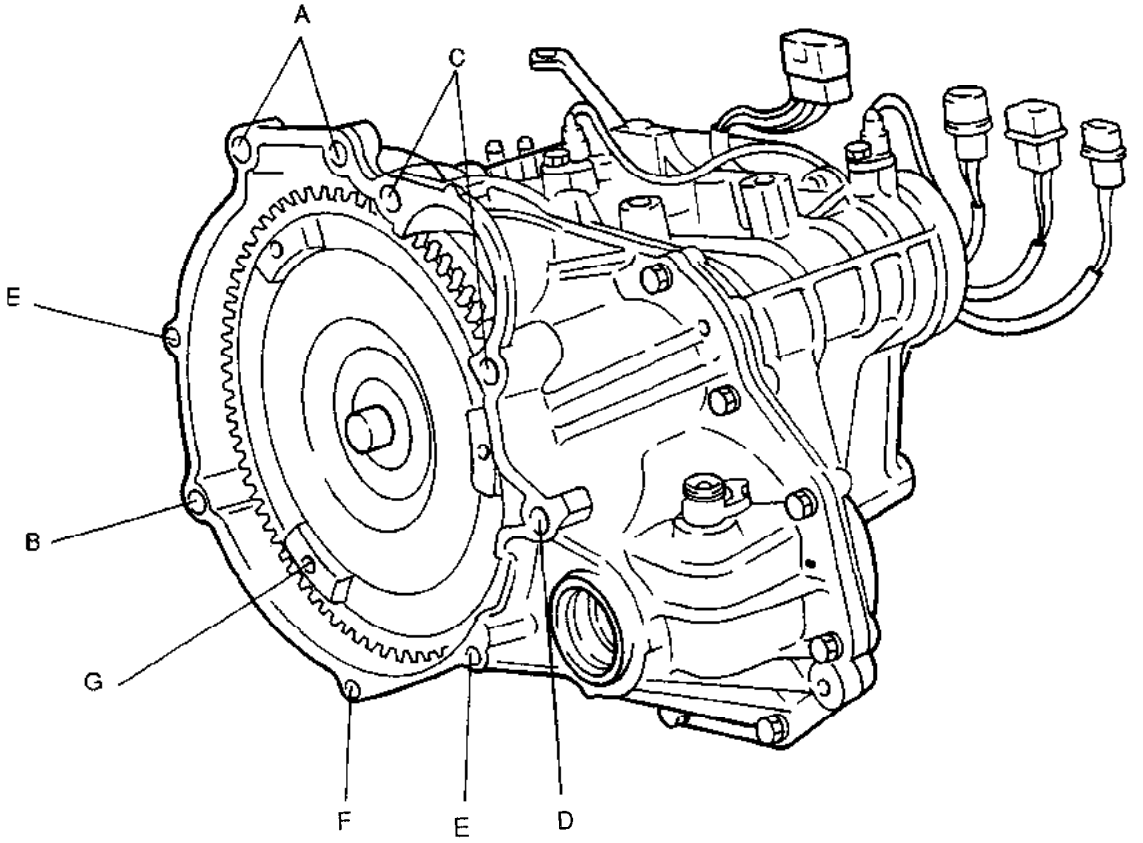
2. Apply the specified grease at the places shown in the figure.

Specified grease : Multipurpose grease SAE J310, NLGI No.2

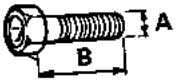


AUTOMATIC TRANSAXLE

COMPONENTS

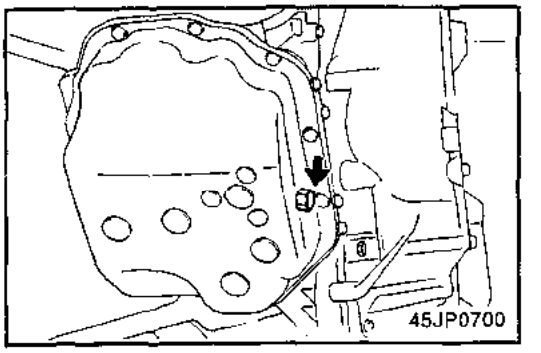


	Nm	Kg.cm	lb.ft	O.D. x Length mm (in.)	Bolt identification
A	43-55	430-550	31-40	7 10x40(1.6)	7 A x B
B	43-55	430-550	31-40	7 10x65(2.6)	
C	27-34	270-340	20-24	7 10x55(2.2)	
D	30-35	300-350	22-25	10 8x60(2.4)	
E	10-12	100-120	7-9	7 6x12(0.5)	
F	30-35	300-350	22-25	7 8x12(0.5)	
G	46-53	460-530	34-38		



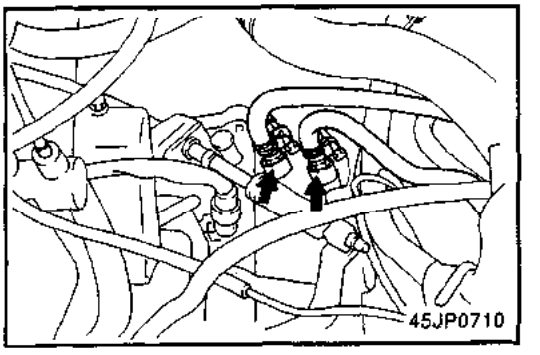
REMOVAL AND INSTALLATION

1. Remove the drain plug and drain the transaxle fluid.
2. Disconnect and remove the air cleaner assembly.

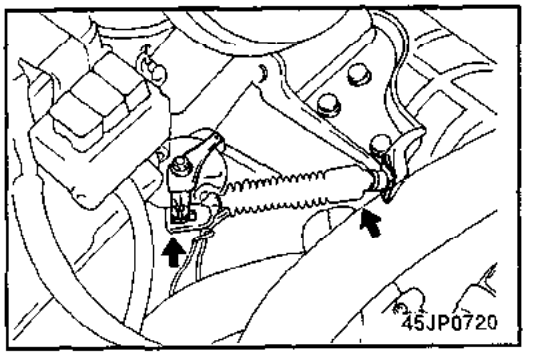


3. Loosen the mounting clamps and disconnect the return and supply hose.

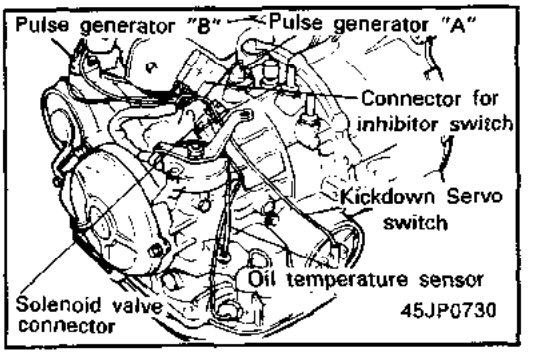
NOTE
To prevent to entry of dust and foreign matter, plug the disconnected hoses and the transaxle fitting part.



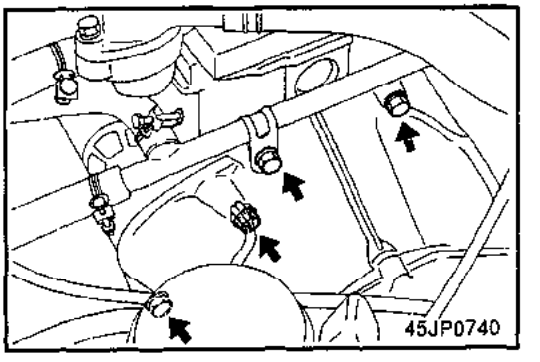
4. Remove the control cable.
5. Remove the speedometer cable.



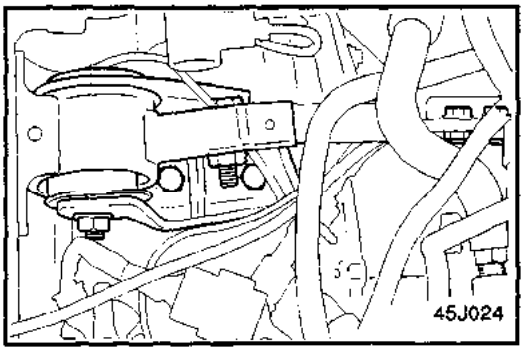
6. Separate the pulse generator connector, transaxle range switch connector, kickdown servo switch connector, solenoid valve connector, and the oil temperature sensor connector.



7. Remove the transaxle-to-engine bolt from the upper portion of the transaxle.

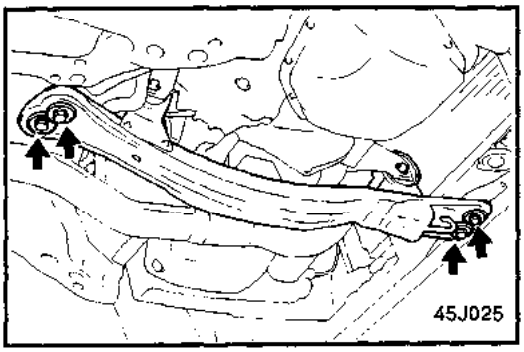


8. Remove the transaxle mounting bracket.



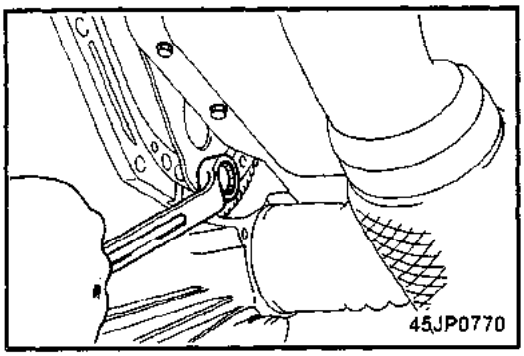
9. While supporting the lower part of the transaxle by using a jack, remove the center member mounting bolts.

CAUTION:
Support a wide area of the transaxle so that an excessive amount of pressure is not applied to the oil pan.

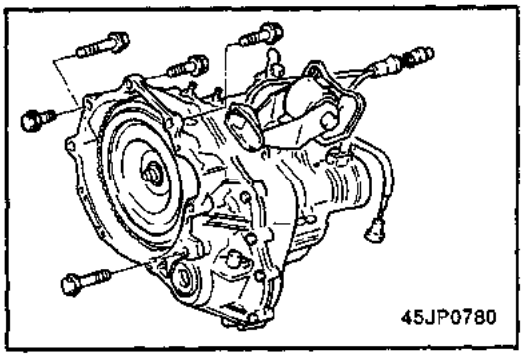


10. Remove the bell housing cover.
11. Remove the three special bolts connecting the converter to the drive plate.

NOTE
To remove the special bolts of torque converter, turn engine crankshaft with a box wrench to bring one of the bolts to the position appropriate for removal.
After removing the bolt, turn the crankshaft in the same manner as above and remove all remaining bolts one after another.
Bring the transaxle shift lever into the "N" (Neutral) position.

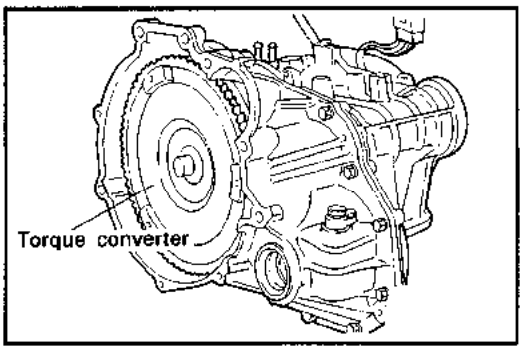


12. After removing the special bolts, re-install the center member assembly.
13. Remove the lower arm ball joint (Refer to DRIVE SHAFT GROUP)
14. Remove the remaining engine connecting bolts while at the same time supporting the transaxle with a floor jack.



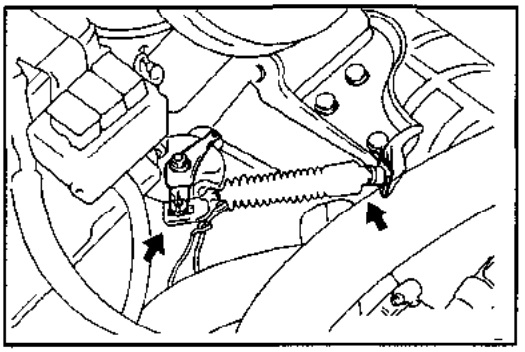
INSTALLATION

1. Attach the torque converter on the transaxle side and mount the transaxle assembly onto the engine.



CAUTION
If the torque converter is mounted first on the engine, the oil seal on the transaxle side may be damaged. Therefore, be sure to first assemble the torque converter to the transaxle.

2. Install the transaxle control cable and adjust as follows.
1) Move the shift lever and the inhibitor switch to the "IN" position, and install the control cable.
2) When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts the control cable. (as shown in the illustration)
3) Remove any free-play in the control cable by adjusting nut and then check to see that the selector lever moves smoothly.
4) Check to see that the control cable has been adjusted correctly.

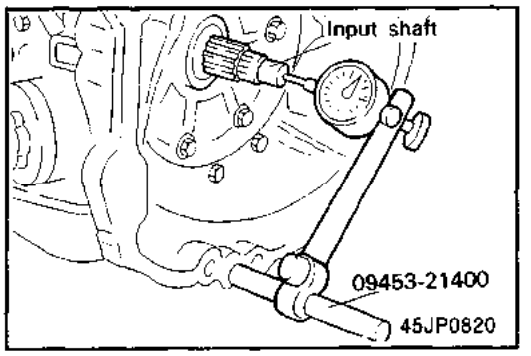


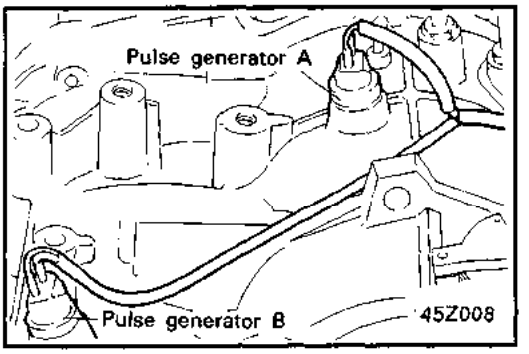
DISASSEMBLY

NOTE

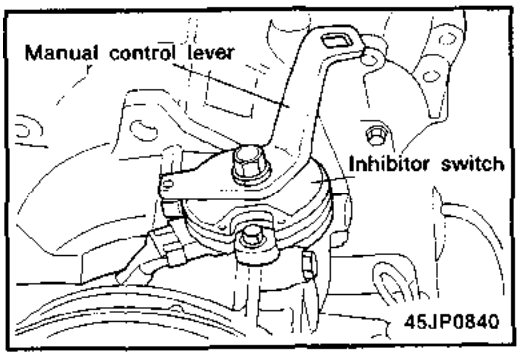
The automatic transaxle is composed of precision component parts, these parts should be very carefully handled during disassembly and assembly, to prevent and damage.
During disassembly, cloth gloves or rags should not not be used.
If such items must be used, use nylon, or use paper towels.
All disassembled parts must be thoroughly cleaned. Metal parts may be cleaned with ordinary detergents, but must be thoroughly air dried.
Clean the clutch disc, resin thrust plate and rubber parts by using ATF (automatic transaxle fluid), being careful that dust, dirt, etc. do not adhere.
If the transaxle pan has excessive metal residue, flush the radiator transaxle cooler system.

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. Measuring input shaft end play before disassembly will usually indicate when a thrust washer change is required (except when major parts are replaced).
   Thrust washer are located between the reaction shaft support and rear clutch retainer, and between the reaction shaft support and front clutch retainer.
   Mount a dial indicator to the converter housing with the dial indicator support.
   Make sure that the indicator plunger is seated against the end of the input shaft.
   When checking end play, pull out or push in the input shaft with pliers. Be careful not to scratch the input shaft. Record indicator reading for reference when reassembling the transaxle.
5. Remove the pulse generators “A” and “B”.

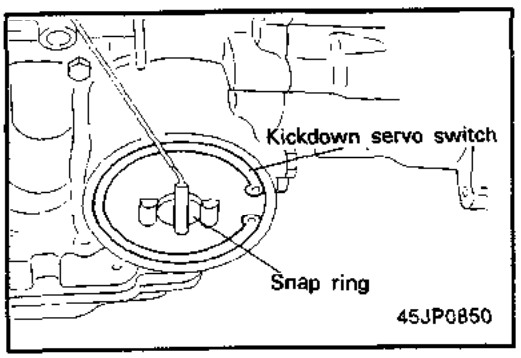




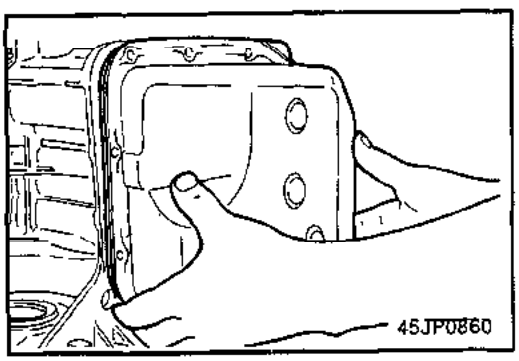
6. Remove manual control lever, then remove the transaxle range switch.



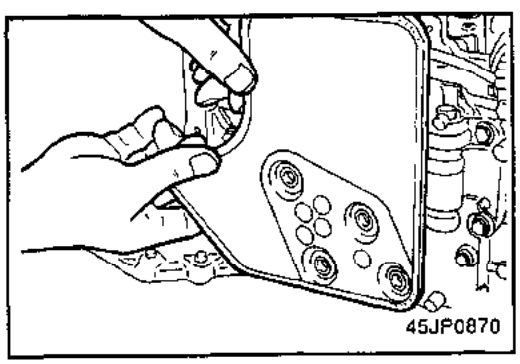
7. Remove the snap ring and kickdown servo switch.



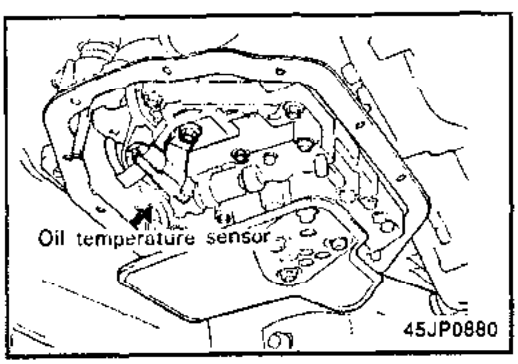
8. Remove the oil pan and gasket.



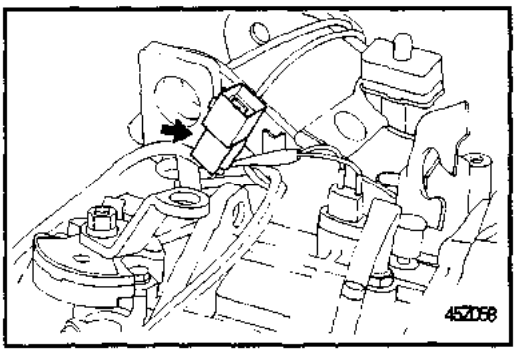
9. Remove the oil filter from the valve body.



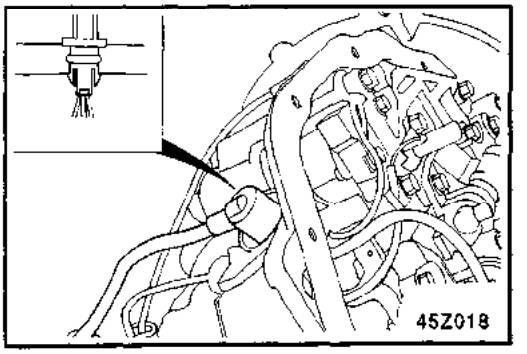
10. Remove the oil-temperature sensor installation bolt; then, after removal from the bracket, pull out from the connector side.



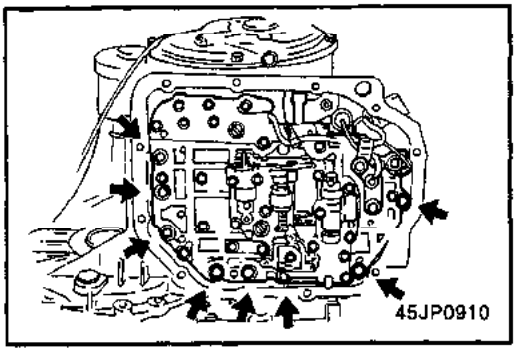
11. Pull up the solenoid valve connector.



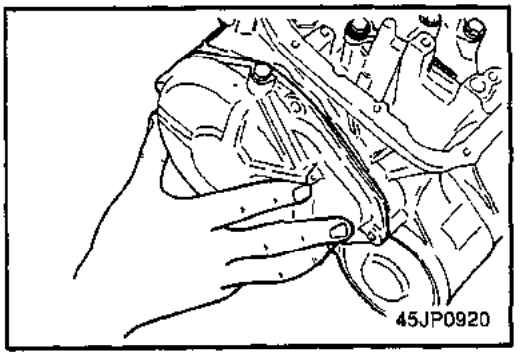
12. Press the tab of the solenoid valve harness grommet and push in.



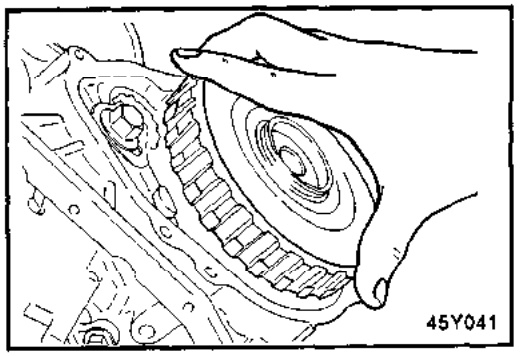
13. Remove the 8 valve body bolts. Remove the valve body.



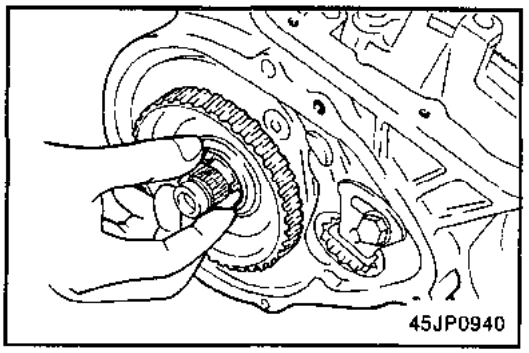
14. Remove the end clutch cover mounting bolts, the cover holder, and the end clutch cover.



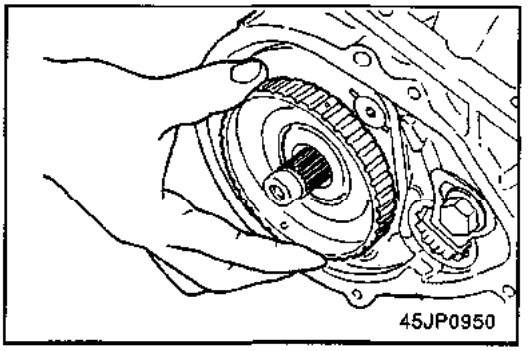
15. Remove the end clutch assembly.



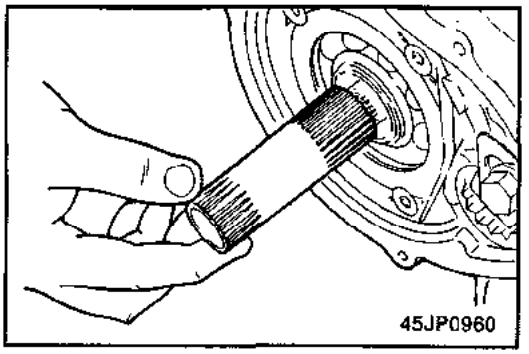
16. Remove the thrust plate.



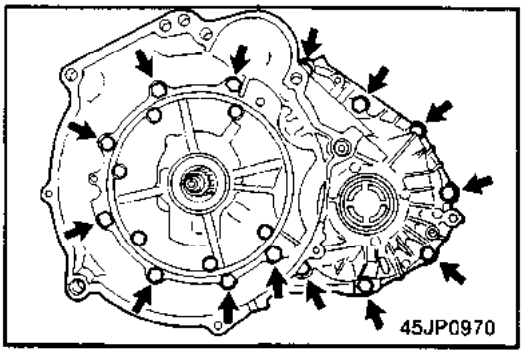
17. Remove the end clutch hub and thrust bearing.



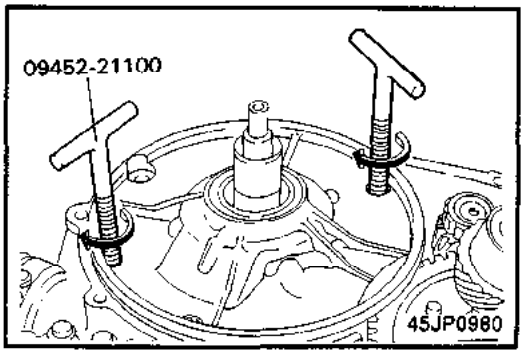
18. Pull out the end clutch shaft.



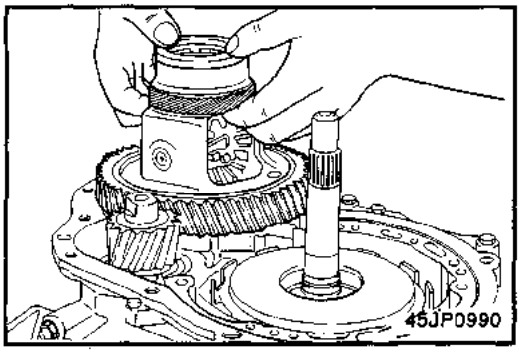
19. Remove the 14 converter bolts. Remove the converter housing.



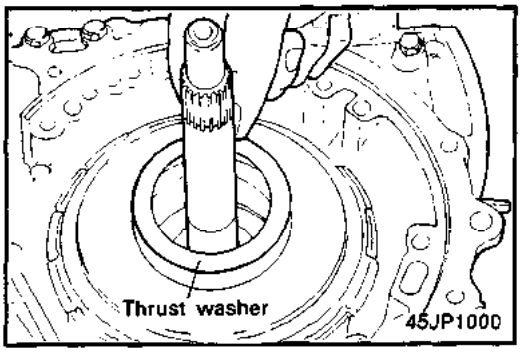
20. Using the special tool (09452-21100) remove the 6 oil pump assembly bolts. Remove the oil pump assembly.



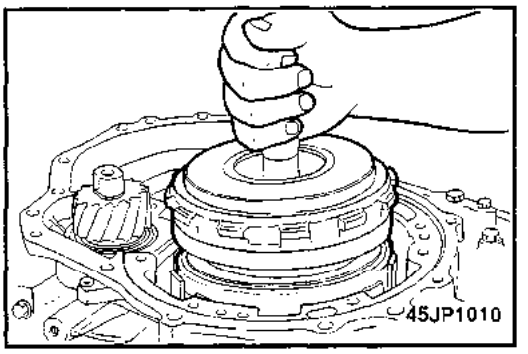
21. Remove the spacer and the differential assembly.



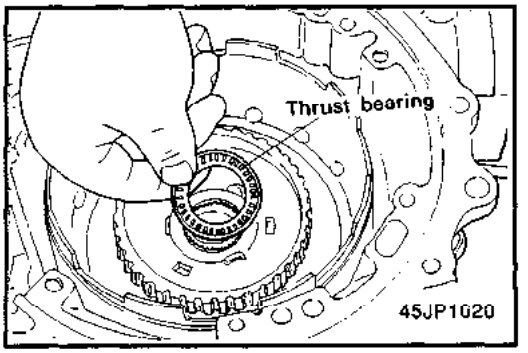
22. Remove the fiber thrust washer.



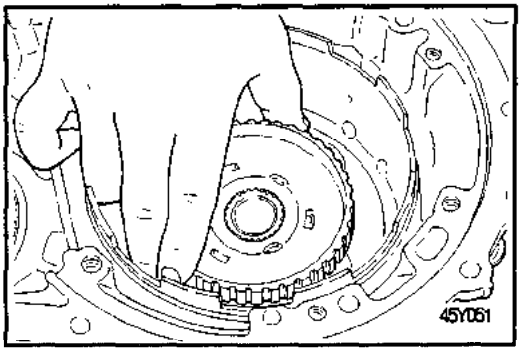
23. Pull up the input shaft, and remove the front clutch assembly and the rear clutch assembly together.



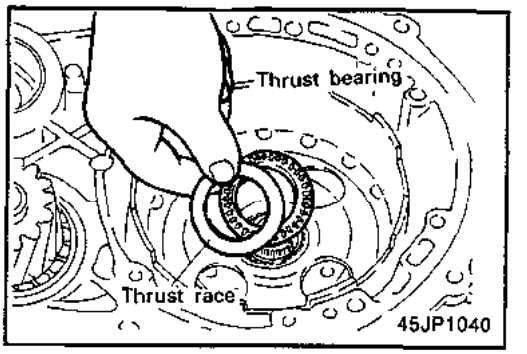
24. Remove the thrust bearing.



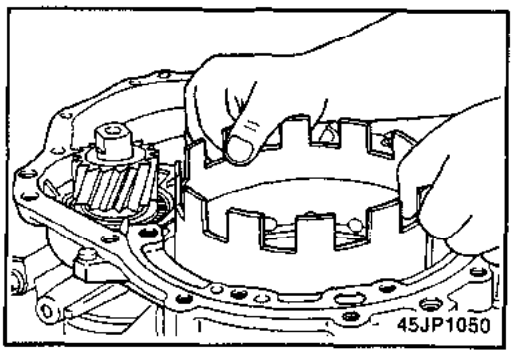
25. Remove the clutch hub.



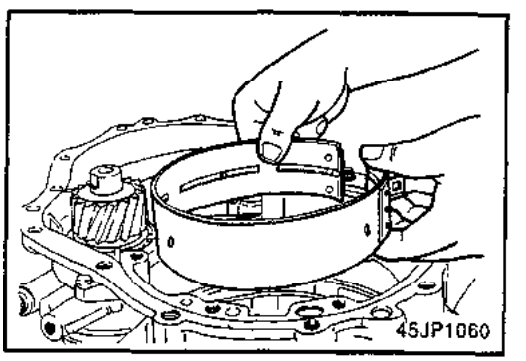
26. Remove the thrust race and bearing.



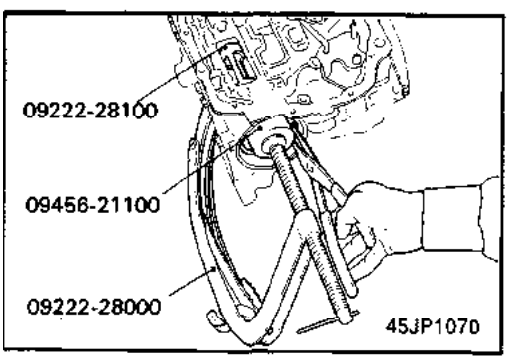
27. Remove the kickdown drum.



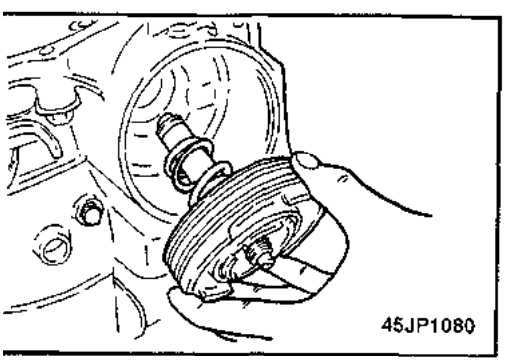
28. Remove the kickdown band.



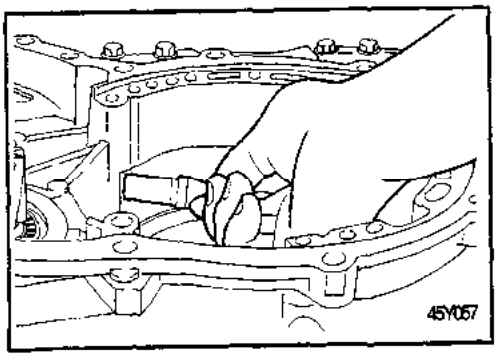
29. Using the special tools (09222-28000, 09222-28100, 09456-21100), push in the kickdown servo and remove the snap ring.



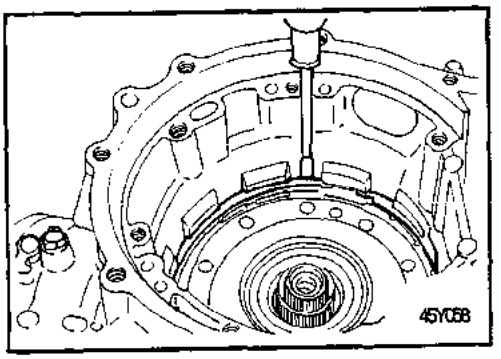
30. Remove the kickdown servo piston and spring.



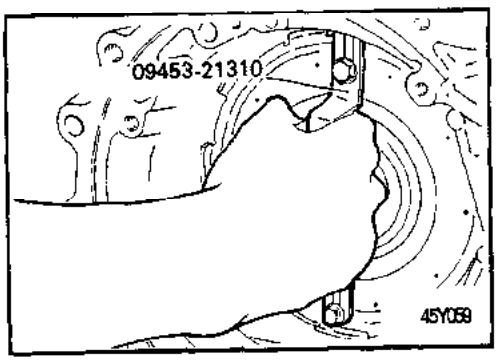
31. Remove the anchor rod.



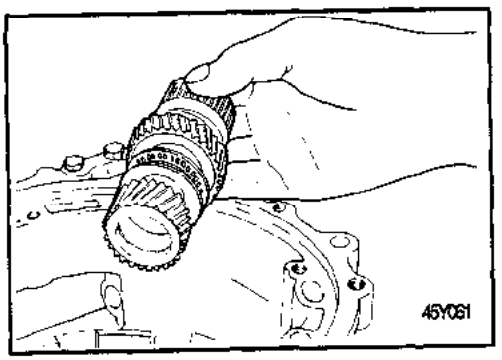
32. Remove the snap ring.



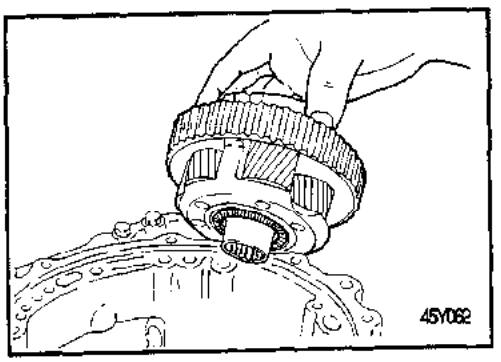
33. Attach the special tool (09453-21310) on the center support. Holding the handle of the tool, pull the center support straight upward.



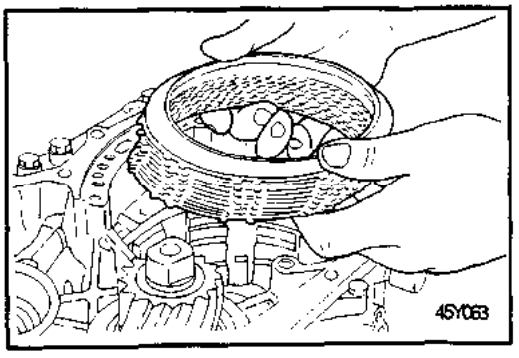
34. Remove the reverse sun gear and the forward sun gear together.



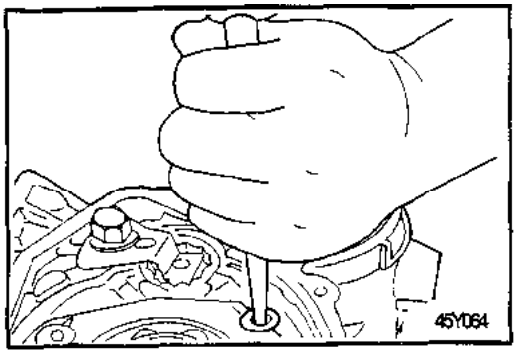
35. Remove the planet carrier assembly and thrust bearing.



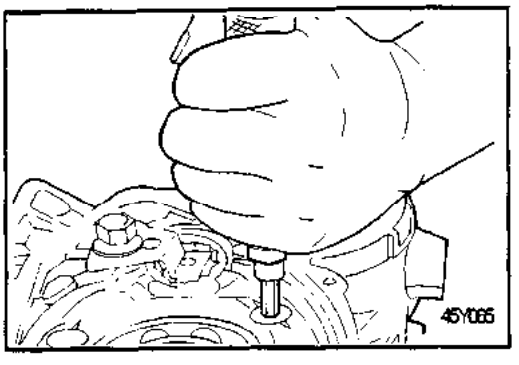
36. Remove the wave spring, return spring, reaction plate, brake disc, and brake plate.



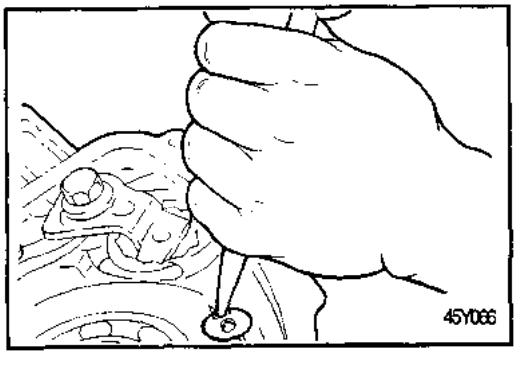
37. Since a thread locking compound is applied to the bolt threads, tap the bolt head for easier removal.



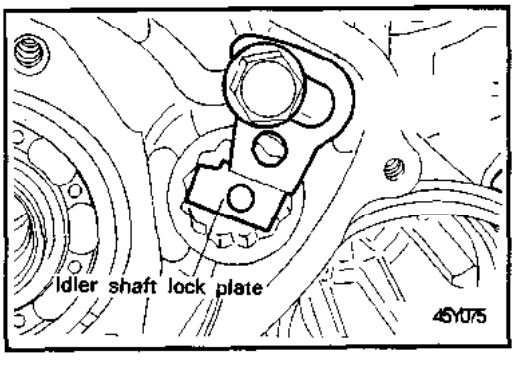
38. Using an impact driver, loosen the bolt.



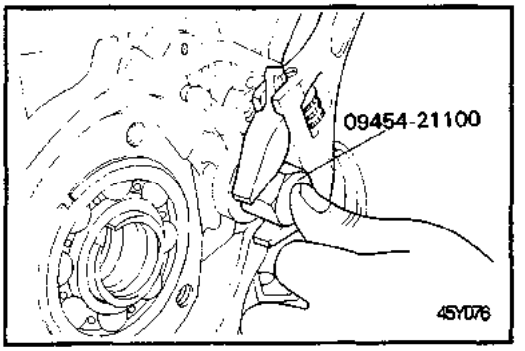
If an impact driver is not available, use a punch or something similar.



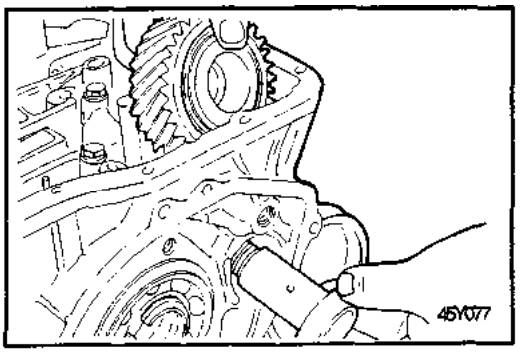
39. Remove the idler shaft lock plate.



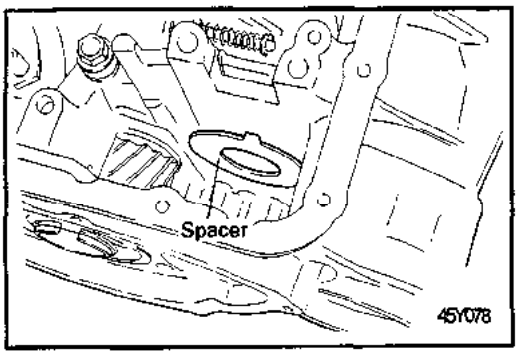
40. Loosen the transfer idler shaft with the special tool (09454-21100).



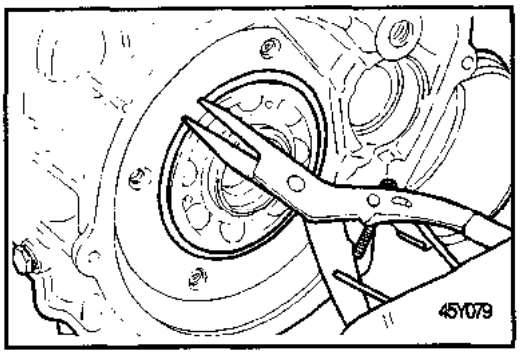
41. Remove the transfer idler shaft. Remove the transfer idle gear bearing inner races (2 pieces) from inside the case.



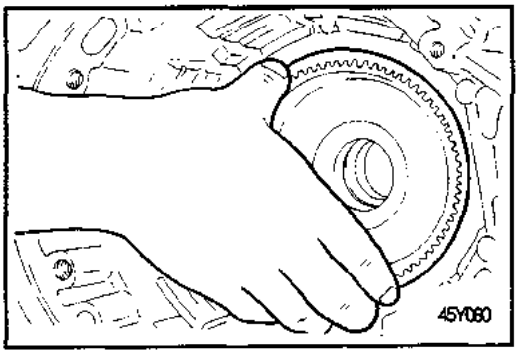
42. Remove the spacer.



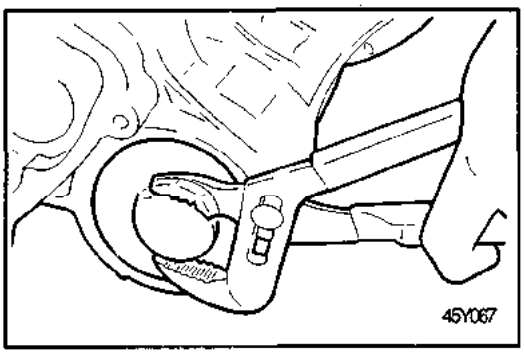
43. Remove the snap ring from the bearing.



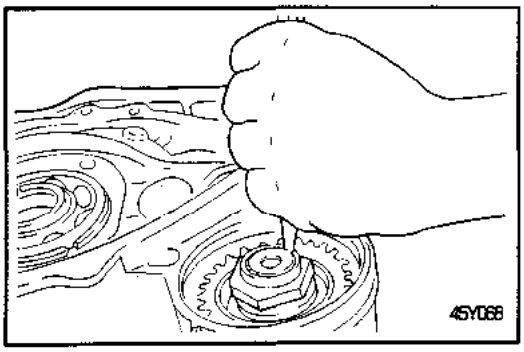
44. Remove the internal gear, output flange, transfer drive gear and bearing as an assembly from the case.



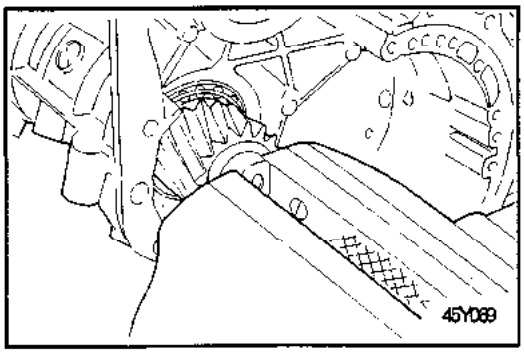
45. Remove the transfer shaft cover.



46. Unstake the transfer shaft lock nut.

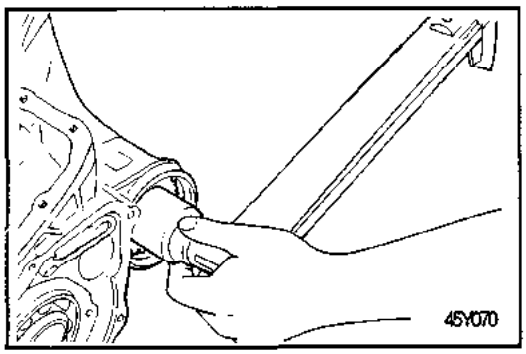


47. Fix the transfer shaft converter housing side.

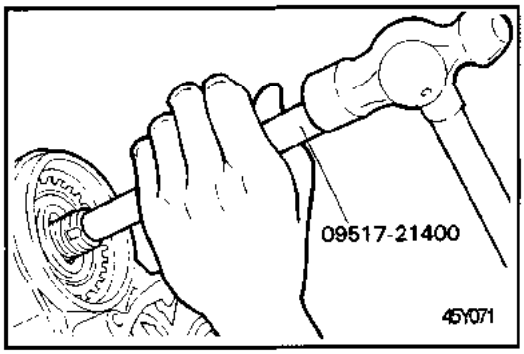


48. Remove the locking nut.

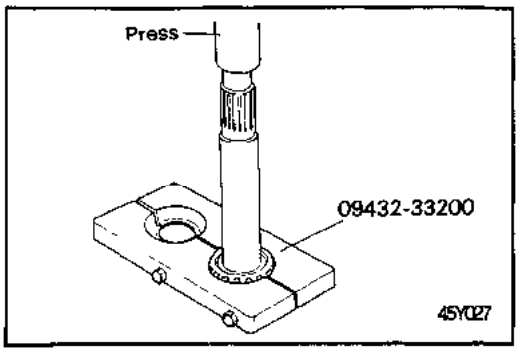
NOTE:
The lock nut has left-hand threads.



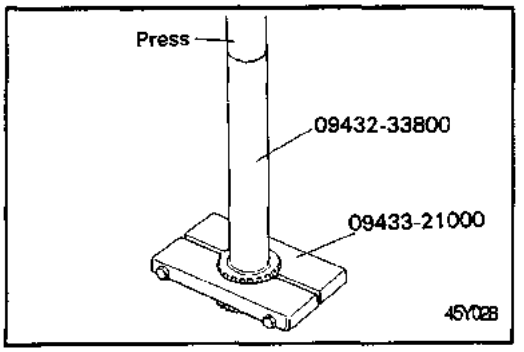
49. Knock off the transfer shaft to the converter housing side.



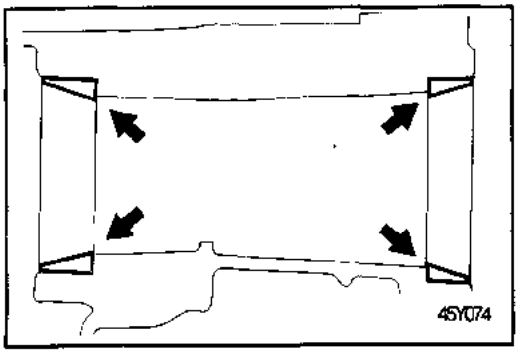
50. Using the special tool (09432-33200), pull the bearing from the transfer shaft.



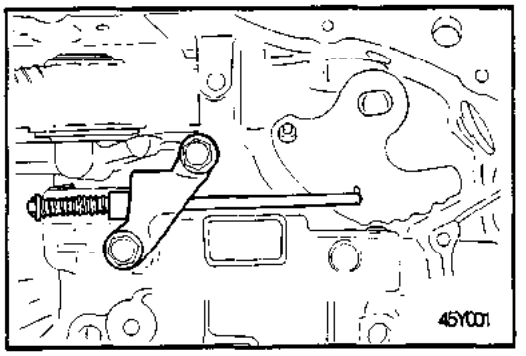
51. Using the special tools (09432-33800, 09433-21000), pull the bearing from the transfer driven gear.



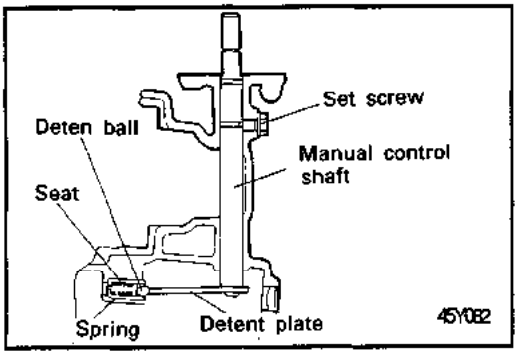
52. Using a screwdriver, remove the outer race.



53. Remove two bolts and the parking sprag rod.



54. Remove the set screw and the manual control shaft assembly. Remove the steel ball, the seat and the spring together at this time.



ASSEMBLY

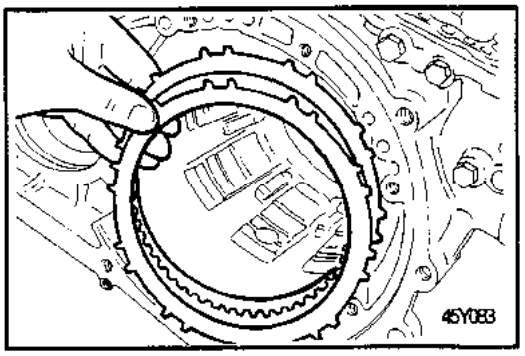
NOTE:
Do not reuse gaskets, oil seals and rubber parts. Replace them with new ones. The O-ring of the oil level dipstick need not be replaced.
Do not use grease other than petrolatum or industrial Vaseline.
Apply automatic transaxle fluid to friction elements, rotating parts, and sliding parts before installation. Refer to page 45-4 concerning automatic transaxle fluid. New clutch discs should be immersed in automatic transaxle fluid for a minimum of two hours before installation.
Do not apply sealer or adhesive to gaskets.
When bushings must be replaced, replace their complete assembly which.
Do not use shop towels during disassembly and reassembly operation.
The oil in the cooler should also be replaced.

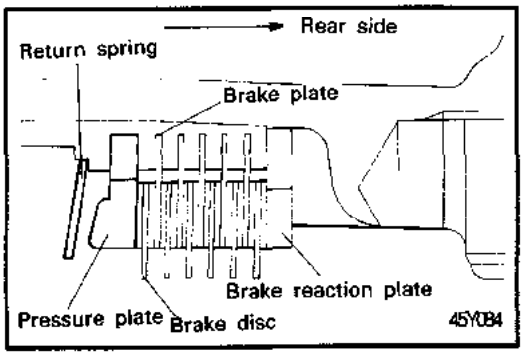
1. Before assembly of the transaxle, measure the end play of the low-reverse brake, and select a pressure plate to be used so that the end play will be the standard value.
   1) Install the brake reaction plate, brake plate and brake disc to the transaxle case.

      NOTE :
      If new brake discs are used, be sure to immerse them in ATF for a minimum of two hours.

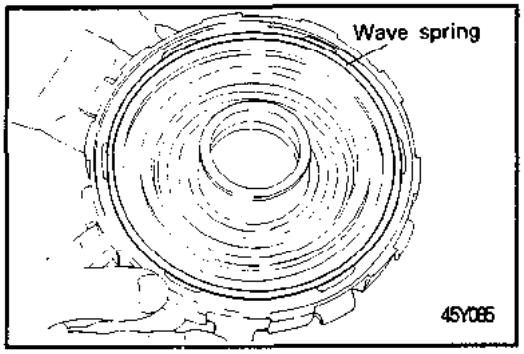
   2) Install the appropriate pressure plate and then install the return spring.

      NOTE :
      Be sure that the return spring is installed so that it faces in the correct direction.

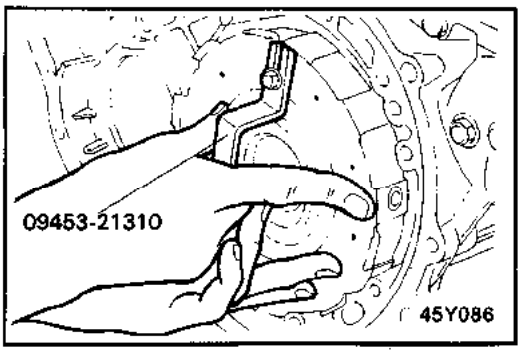




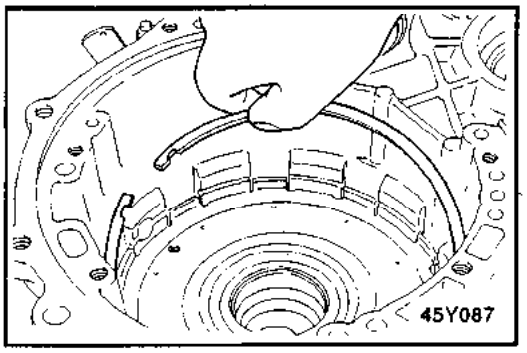
   3) Apply a coating of petroleum jelly to the wave spring and attach it to the center support.



4) Install the special tool (09453-21310) to the center support.

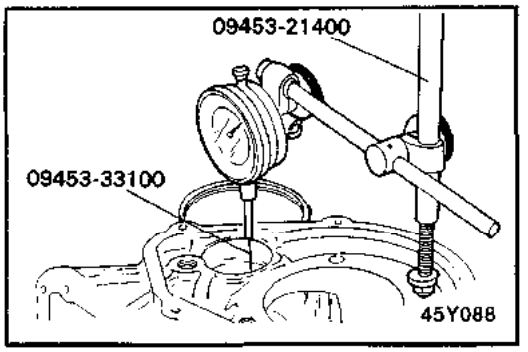


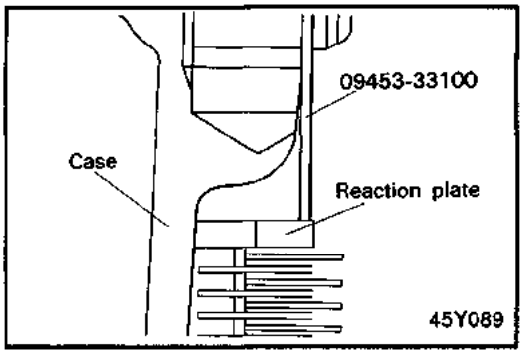
5) Install the snap ring.



6) Install the special tools (09453-21400, 09453-33100) and a dial gauge at the rear side of the transaxle case.

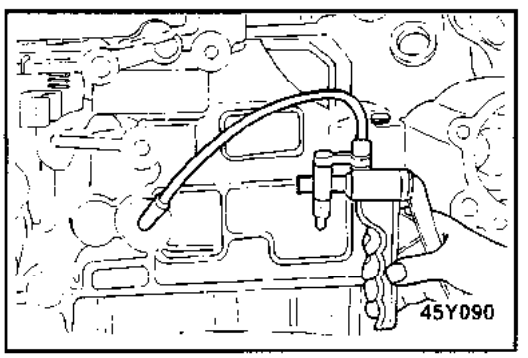
NOTE :
Install the dial gauge so that it contacts the brake reaction plate at a right angle from the transfer idler shaft hole.



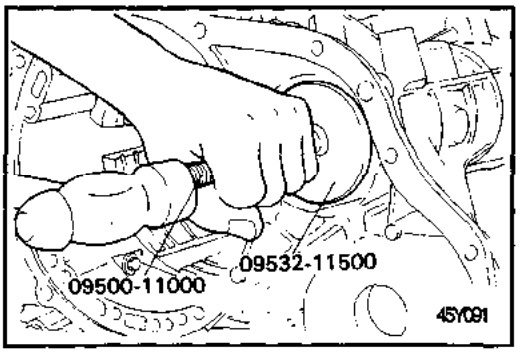


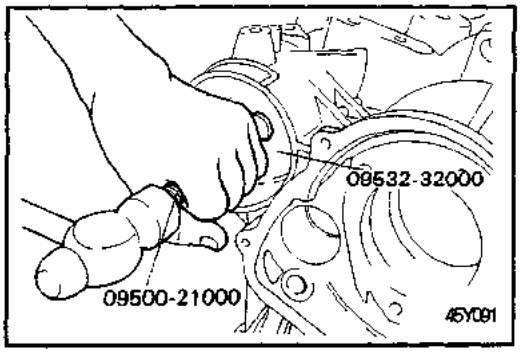
7) Using a manual pump, pump air in from the position shown in the illustration. Read the dial indicator gauge, and select the pressure plate that will provide the standard value.

Standard value: 0.78-1.09 mm (0.0307-0.043 in.)



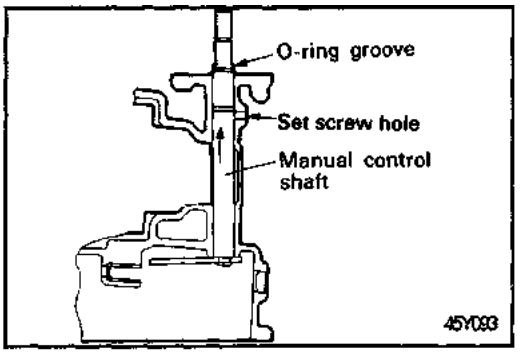
2. Using the special tools (09500-11000, 09500-21000, 09532-11500, 09532-32000) tap in the bearing outer race.



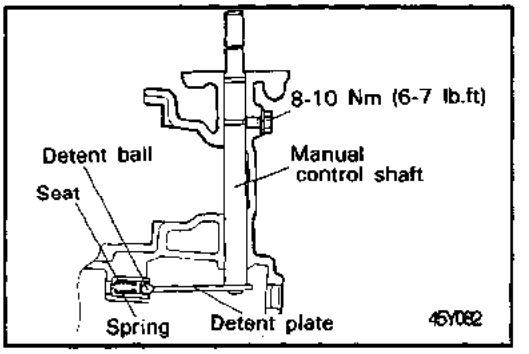


3. Insert manual control shaft into the transaxle case and push it toward the manual control lever.
   At this time, do not install the larger one of the two O-rings on the manual control shaft.

   NOTE
   If installed before inserting the shaft, the O-ring will interfere with shaft set screw hole.

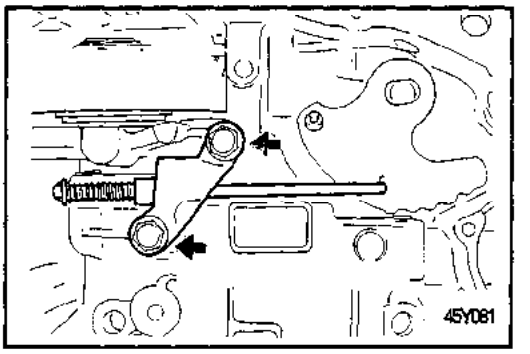


4. After installing the new O-ring on manual control shaft, draw shaft back into case. Install the set screw and gasket. Install the detent steel ball, seat and spring at the same time.

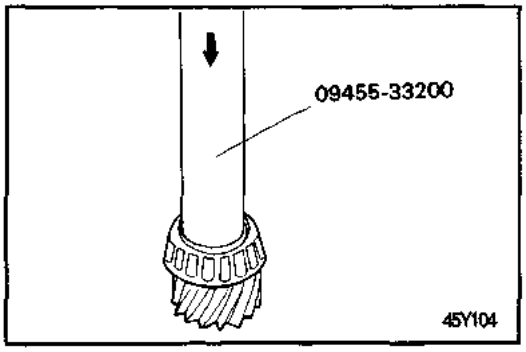


5. Install the parking sprag rod to the detent plate (manual control shaft).
   install the sprag rod support and tighten the two bolts.

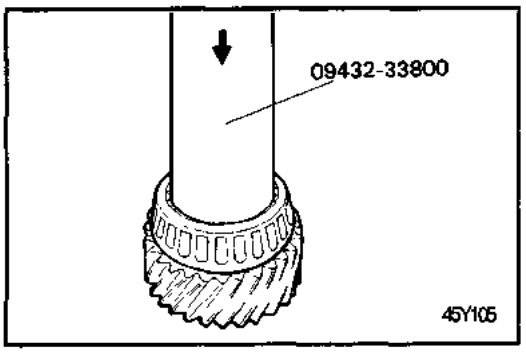
   Sprag rod support bolts:
   20-27 Nm (200-270 kg.cm, 15-19 lb.ft)



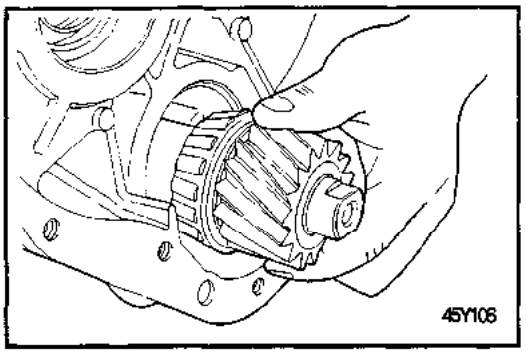
6. Press-fit the bearing inner race to the transfer driven gear, then press-fit the bearing outer race to the transaxle end clutch side.



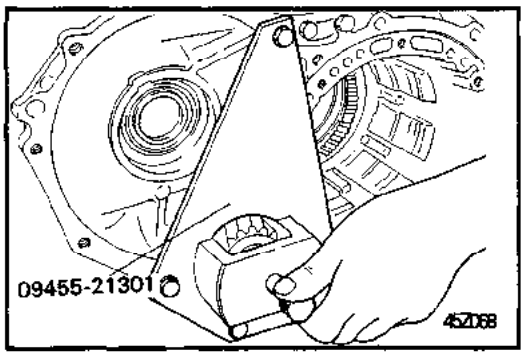
7. Press-fit the bearing inner race to the transfer shaft, then press-fit the bearing outer race to the transaxle case converter housing side.



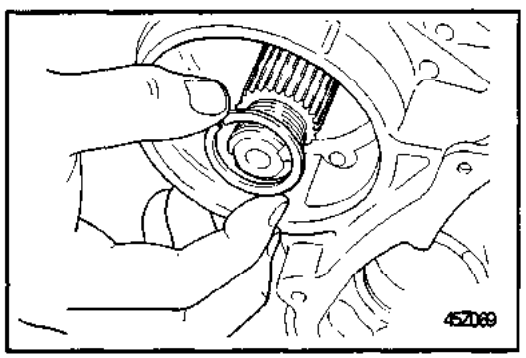
8. Attach the transfer shaft to the transaxle case.



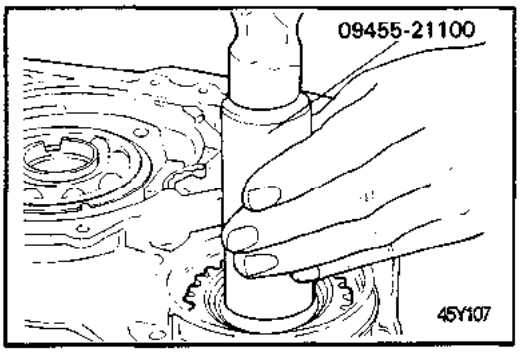
9. Install the special tool (09455-21301) to the transaxle case to support the transfer shaft.



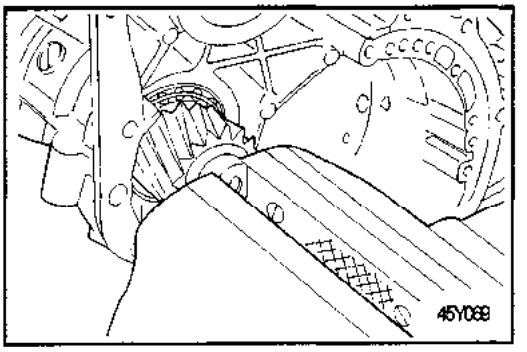
10. Insert the thickest spacer 1.80 mm (0.0709 in.).



11. Attach the transfer driven gear.

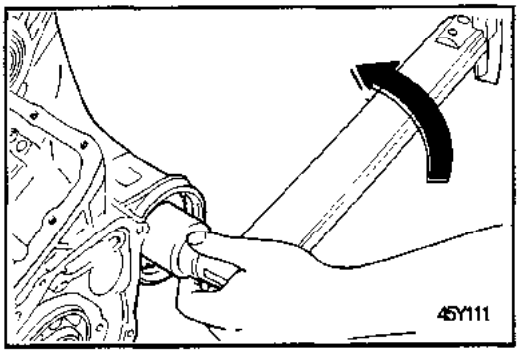


12. After removing the special tool, place the converter housing side of the transfer shaft in a vise.



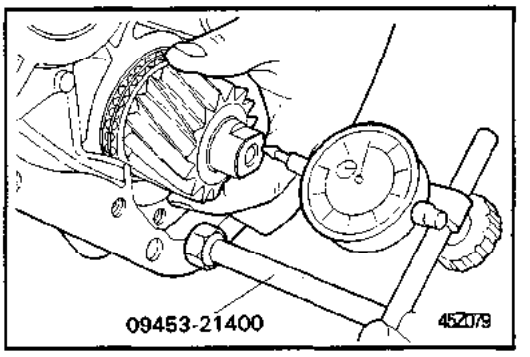
13. Tighten the lock nut to the specified torque.

Transfer lock nut:
200-230 Nm (2000-2300 kg.cm, 145-166 lb.ft)

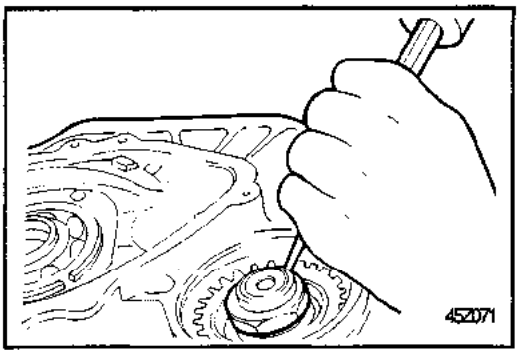


14. After installing the special tool (09453-21400), measure the end play of the transfer shaft; then select the spacer(s) needed to obtain the standard value, and refit.

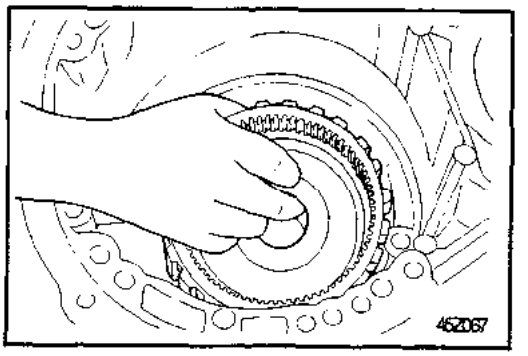
Transfer shaft end play: 0-0.025 mm (0-.0010 in.)



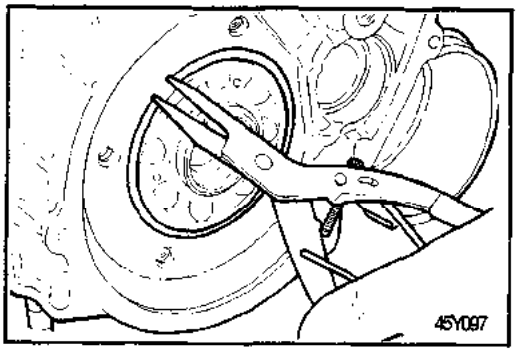
15. Using a punch, lock the lock nut to prevent rotation.
16. Attach the transfer cover.



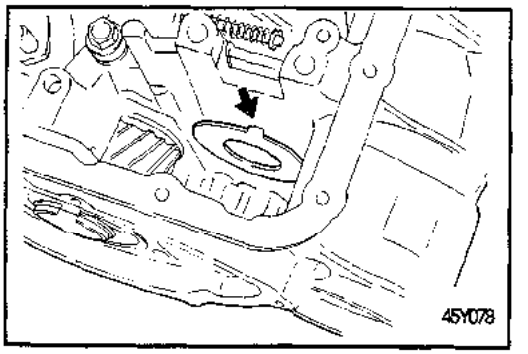
17. Insert the internal gear, output flange transfer drive gear and bearing assembly into the case.



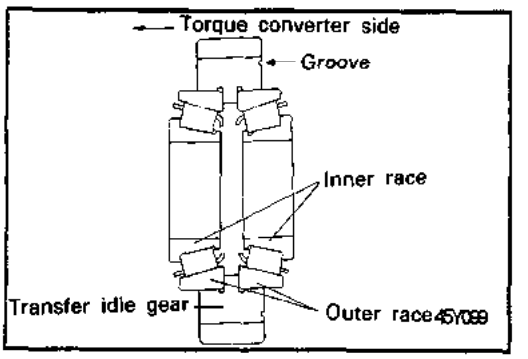
18. Install the snap ring on the output flange rear bearing.



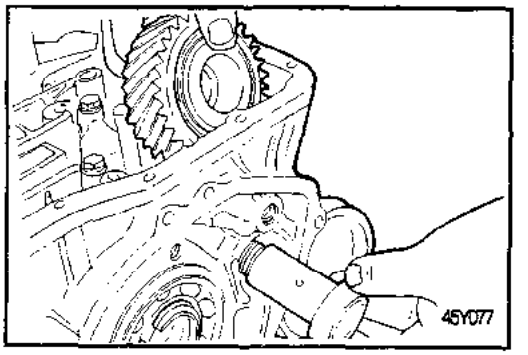
19. Coat petroleum jelly on the spacer and attach it to the transaxle case.



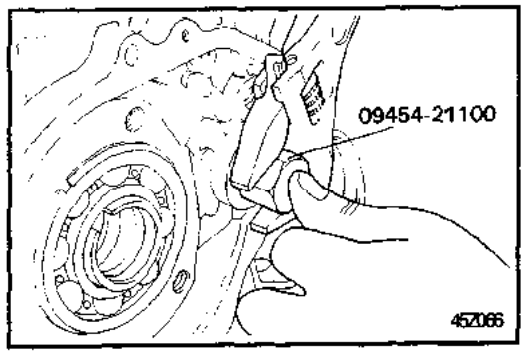
20. Install the two taper roller bearings and spacer onto the transfer idler gear.



21. Place the transfer idler gear (assembled in the preceding section) into the case, and then insert the idler shaft from the outer side of the case and screw it in.

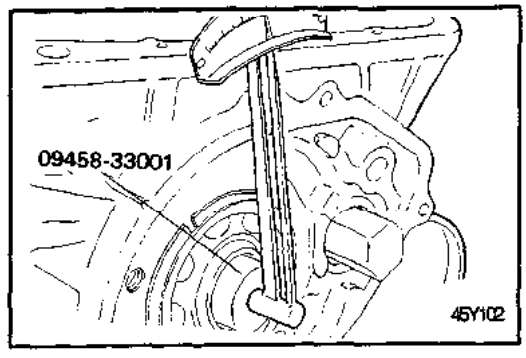


22. Tighten the idler shaft by using the special tool (09454-21100).



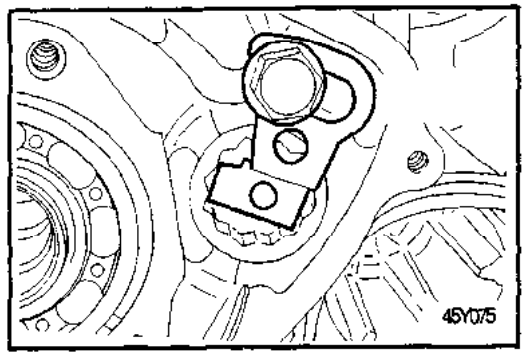
23. Insert the special tool (09458-33001) into the output flange and measure the preload using a torque wrench.
Adjust preload by tightening or loosening the transfer idler shaft.

Preload: 1.5 Nm (15 kg.cm, 1.0 lb.ft)



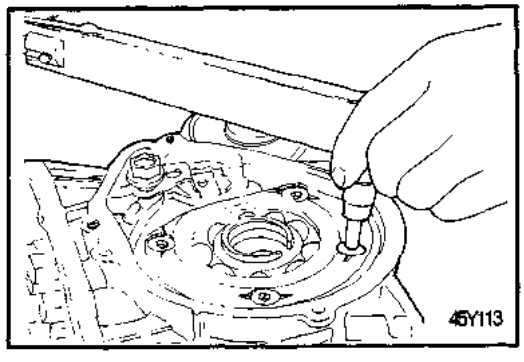
24. After the preload adjustment is completed, eliminate the back lash between the idler shaft and the lock plate by moving the idler shaft in the loosening direction. Attach the lock plate and tighten the lock plate bolt.

Lock plate bolt:
48-60 Nm (480-600 kg-cm, 35-43 lb.ft)

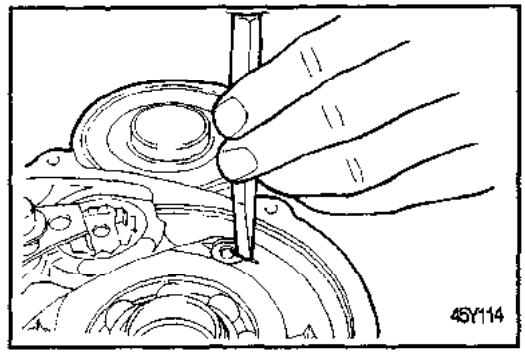


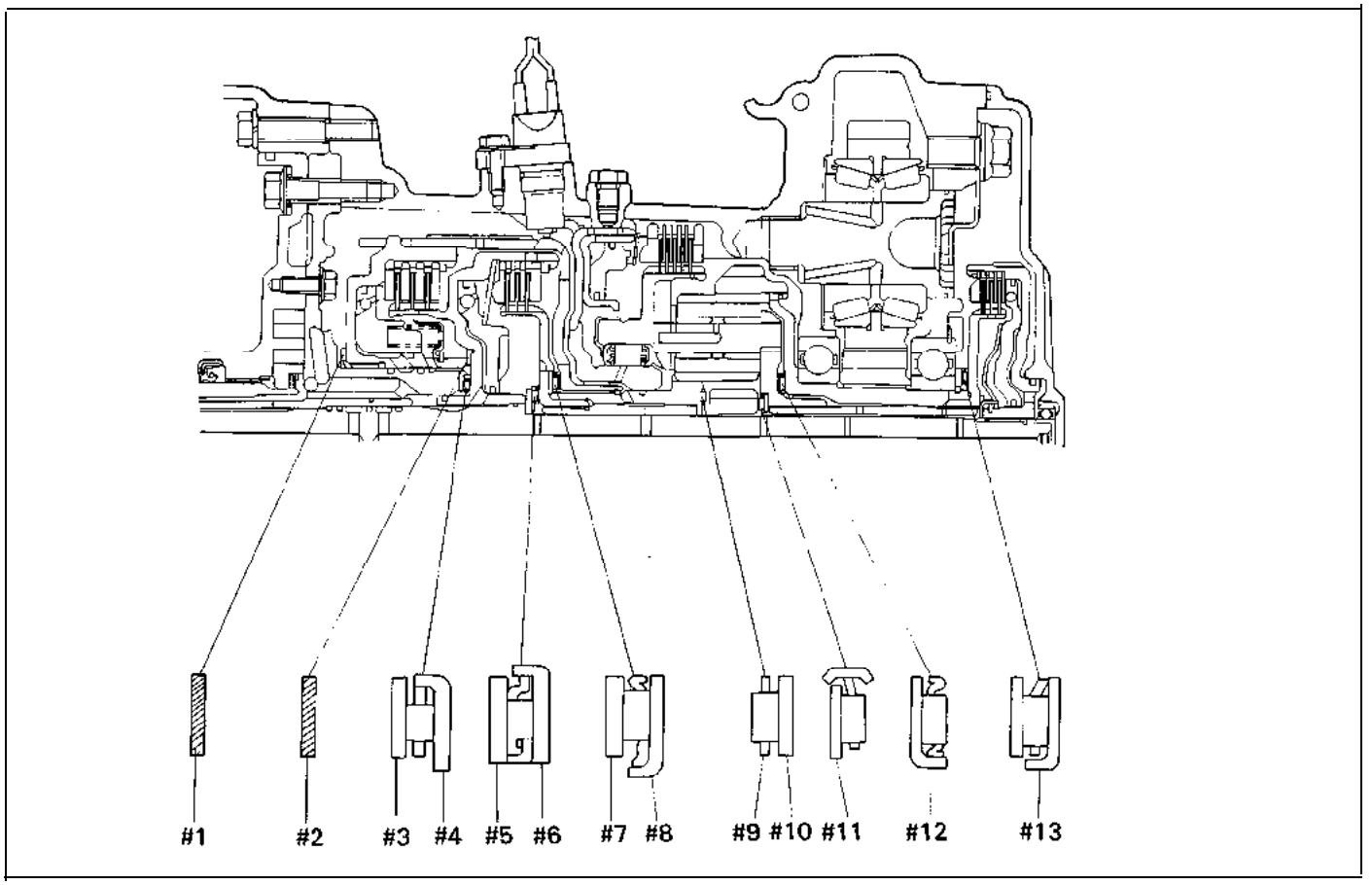
25. Install the bearing retainer. Tighten the screws to the specified torque. Apply a 5 mm (0.2 in.) width of sealant (3M Stud Locking No, 4176). Sealant should not stick out of screw head.

Screw: 17-22 Nm (170-220 kg.cm, 13-15 lb.ft)



26. Using a punch, lock the flush head screw to prevent rotation.



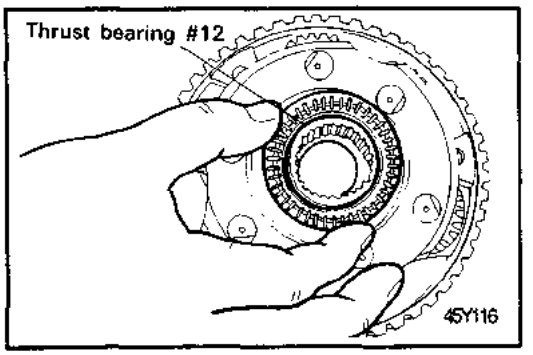


Identification of thrust bearings, thrust races and thrust washers

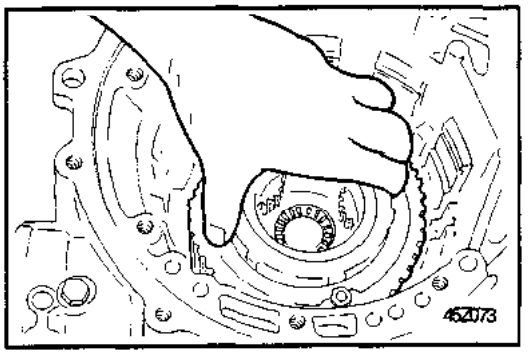
Unit: mm (in.)

Outer diameter	Inner diameter	Thickness	Code No.	Outer diameter	Inner diameter	Thickness	Code No.
70 (2.756)	55.7 (2.193)	1.4 (0.055)	#1	48.1 (1.894)	34.4 (1.354)	-	#4
70 (2.756)	55.7 (2.193)	1.8 (0.071)		40 (1.575)	21 (0.827)	2.4 (0.094)	#5
70 (2.756)	55.7 (2.193)	2.2 (0.087)		42.6 (1.677)	28 (1.102)	-	#6
70 (2.756)	55.7 (2.193)	2.6 (0.103)		54 (2.126)	38.7 (1.524)	1.6 (0.063)	#7
70 (2.756)	55.7 (2.193)	1.8 (0.071)	#2	52 (2.047)	36.4 (1.433)	-	#8
48.9 (1.925)	37 (1.457)	1.0 (0.040)	#3	41 (1.614)	28 (1.102)	-	#9
48.9 (1.925)	37 (1.457)	1.2 (0.047)		39 (1.535)	28 (1.102)	1.2 (0.047)	#10
48.9 (1.925)	37 (1.457)	1.4 (0.055)		38 (1.496)	22.2 (0.874)	-	#11
48.9 (1.925)	37 (1.457)	1.6 (0.063)		52 (2.047)	36.4 (1.433)	-	#12
48.9 (1.925)	37 (1.457)	1.8 (0.071)		58 (2.283)	44 (1.732)	-	#13
48.9 (1.925)	37 (1.457)	2.0 (0.079)					
48.9 (1.925)	37 (1.457)	2.2 (0.087)					
48.9 (1.925)	37 (1.457)	2.4 (0.094)					

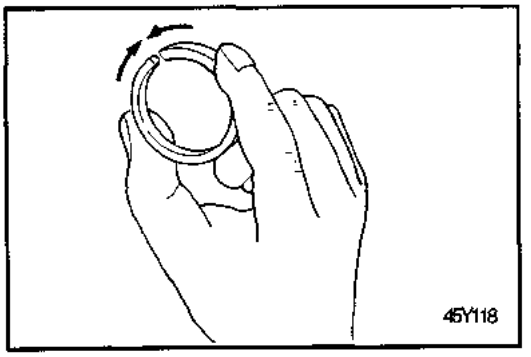
27. Apply a coating of petroleum jelly to thrust bearing #12 and attach to the planetary carrier.



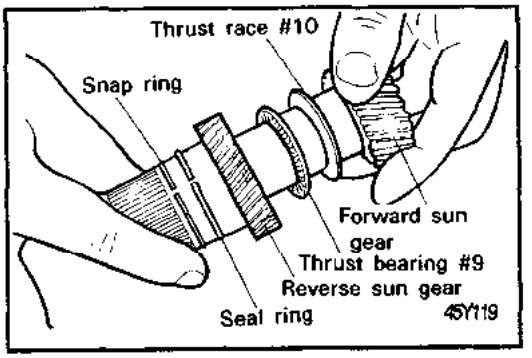
28. Install the planetary carrier to the case.



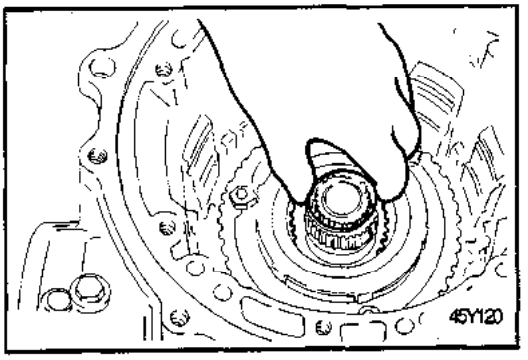
29. Assemble the reverse sun gear and the forward sun gear in the following order:
    1) Attach the seal ring and the snap ring to the reverse sun gear. When attaching, squeeze the seal ring as shown in the figure.
    2) Attach thrust bearing #9 to the forward sun gear.
    3) Attach thrust race #10 to the forward sun gear.



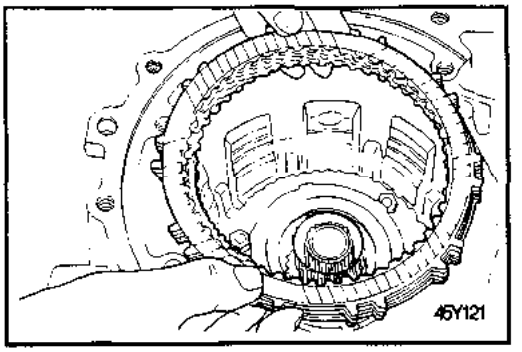
    4) Assemble the reverse sun gear, and then the forward sun gear.



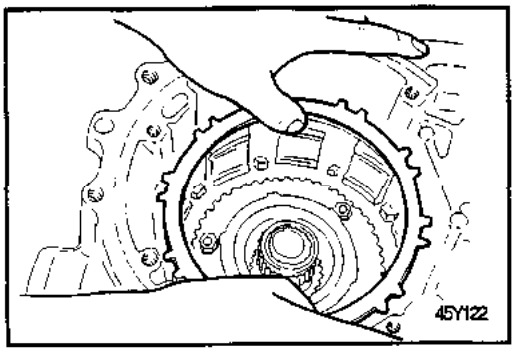
30. Install both of the previously assembled sun gears inside the planetary carrier.



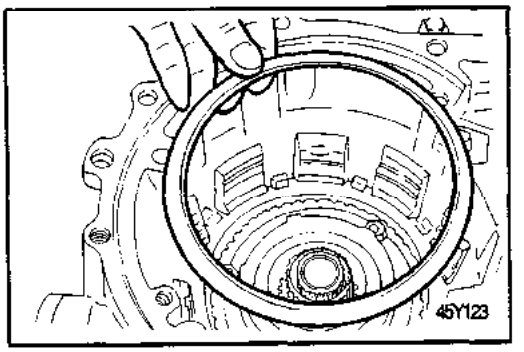
31. Install the brake disc and brake plate.



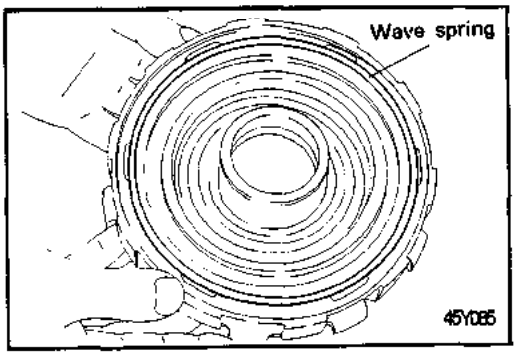
32. Install the selected brake pressure plate.



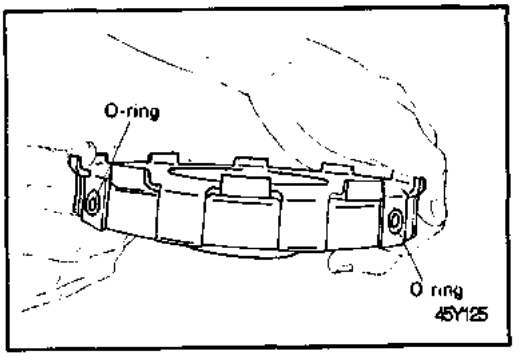
33. Install the return spring.



34. Apply a coating of petroleum jelly to the wave spring and attach it to the center support.

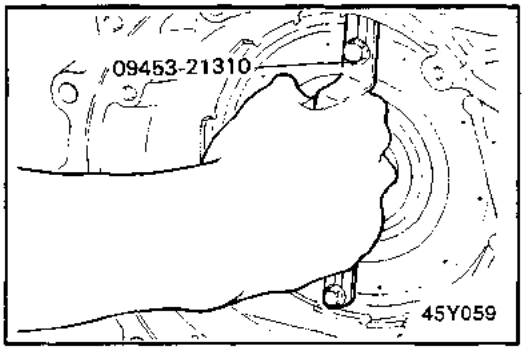


35. Install the two new O-rings to the center support.



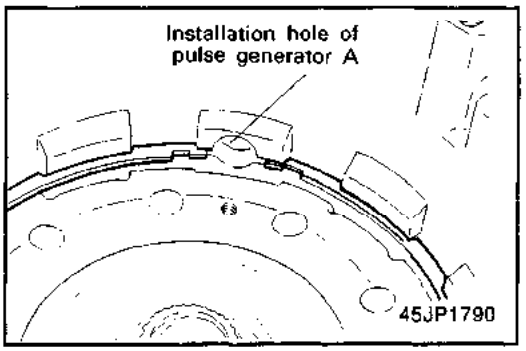
36. After applying a coating of ATF to the O-rings, install the special tool (09453-21310) to the center support, and install into the case.

Caution:
Be sure that the wave spring is not out of position.

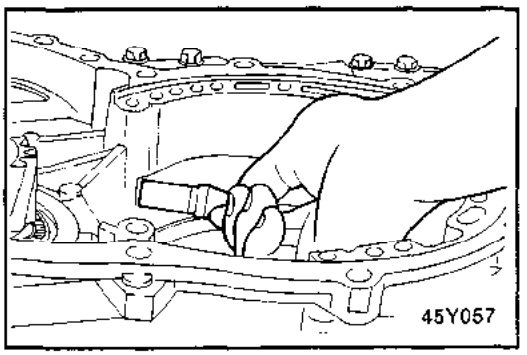


37. Install the snap ring.

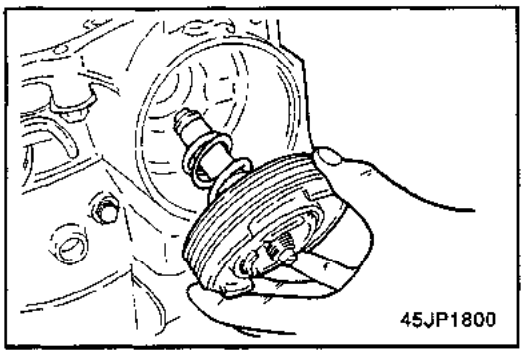
Caution:
The mating hole of the snap ring must be aligned with the installation hole of pulse generator A.



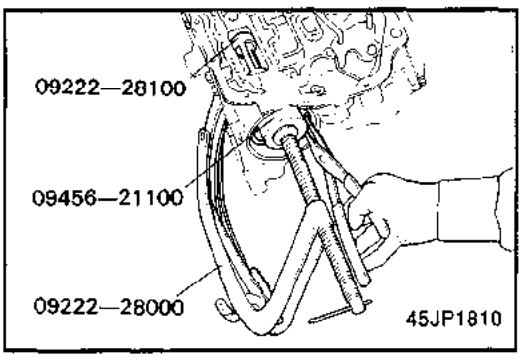
38. Install the anchor rod.



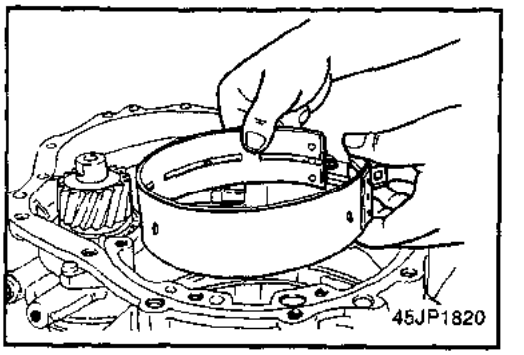
39. Assemble a new seal ring (large diameter) and D-ring (small diameter) to the kickdown servo piston, and install a new O-ring in the groove around the sleeve; then assemble the kickdown servo spring, piston and sleeve in the transaxle case.



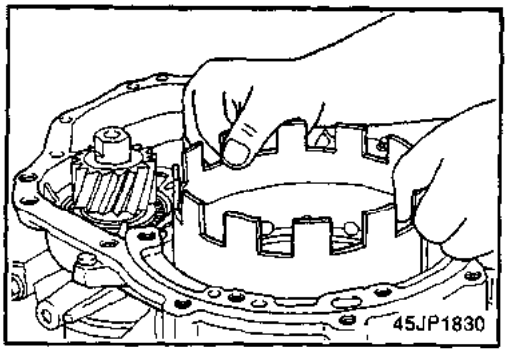
40. Press the kickdown servo and sleeve in by using the valve spring compressor and special tools (09456-21100,09222-28000,09222-28100), install the snap ring.



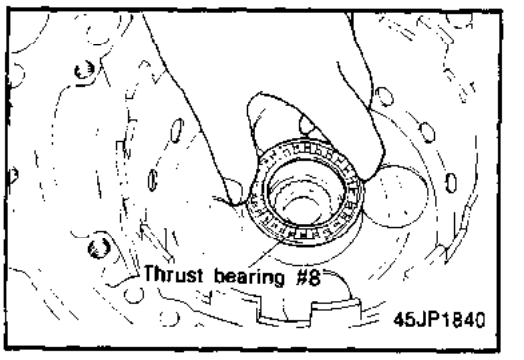
41. install the kickdown band; attach the ends of band to the end of the anchor rod and servo piston rod.



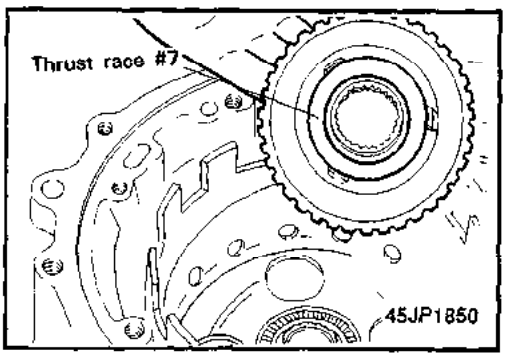
42. Install kickdown drum with its splines in mesh with the sun gear. Place the kickdown band on the kickdown drum and tighten the kickdown servo adjusting screw to keep the band in position.



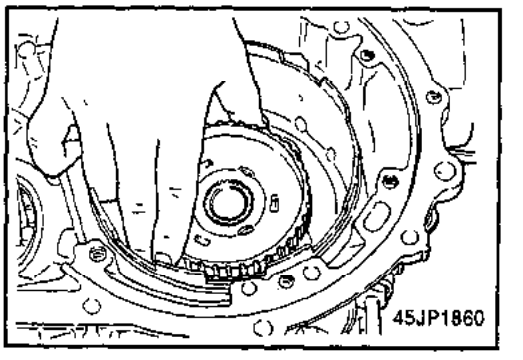
43. Apply a coating of petroleum jelly to thrust bearing #8, and then attach to the kickdown drum.



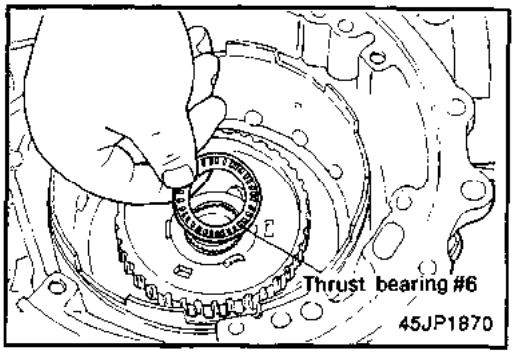
44. Apply a coating of petroleum jelly to thrust race #7, and then attach to the rear clutch hub.



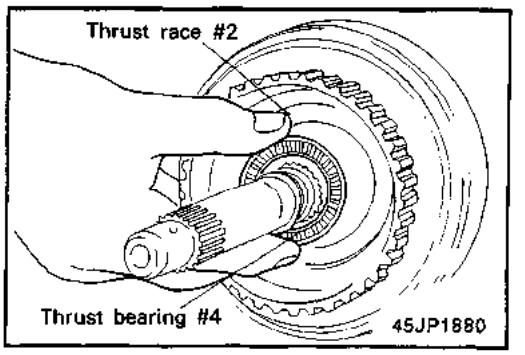
45. Install the clutch hub to the sun gear splines.



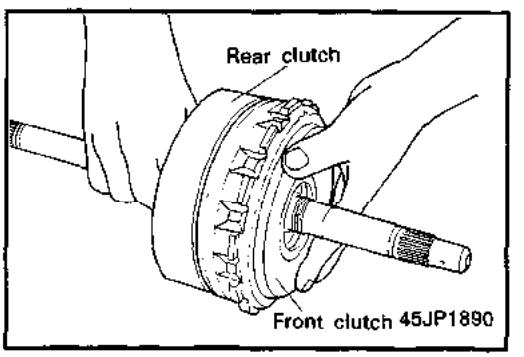
46. Attach thrust bearing #6 onto the hub using petroleum jelly.



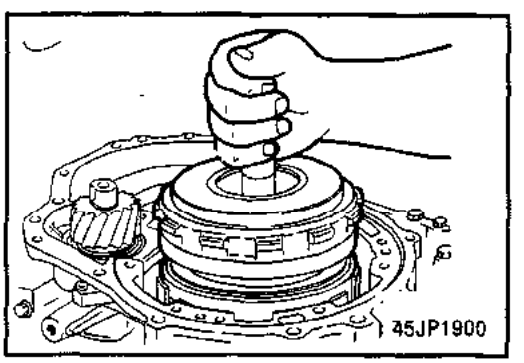
47. Apply a coating of petroleum jelly to thrust race #2 and thrust bearing #4. Attach to the rear clutch assembly.



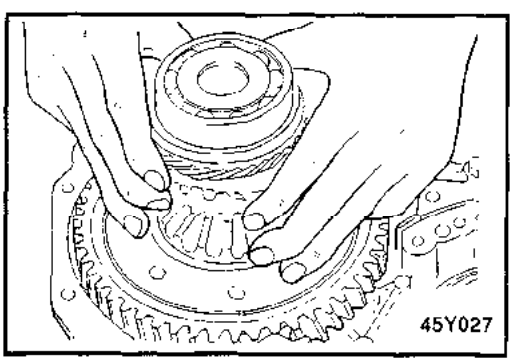
48. Combine the rear clutch and the front clutch assemblies.



49. Install the clutch assembly.



50. Install the differential assembly.



51. If end play which was measured and recorded at disassembly is not within standard value, adjust to specification by selecting thrust race #3.

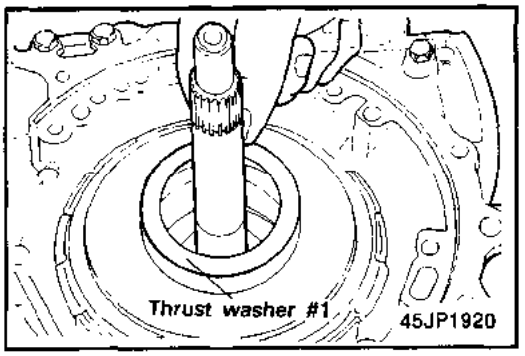
Standard value: 0.3-1.0 mm (0.012-0.040 in.)

When the thrust race is replaced with that of a different thickness, also replace thrust washer #1 located between the oil pump and front clutch. Use a washer of proper corresponding thickness corresponding to thrust race.
Find correct pair of thrust races (metal) and thrust washers (fiber) from following table.

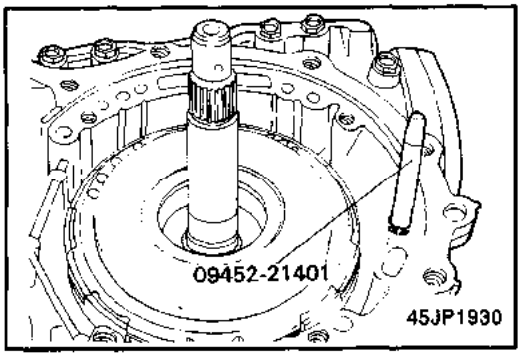
Thrust washer #1 (fiber)	Thrust race #3 (metal)
Thickness mm (in.)	Thickness mm (in.)
1.4 (0.055)	1.0 (0.039)
1.4 (0.055)	1.2 (0.047)
1.8 (0.071)	1.4 (0.055)
1.8 (0.071)	1.6 (0.063)
2.2 (0.087)	1.8 (0.071)
2.2 (0.087)	2.0 (0.079)
2.6 (0.102)	2.2 (0.087)
2.6 (0.102)	2.4 (0.095)

Note:
When a different thickness thick thrust race is selected, a corresponding thrust washer must be paired with it.

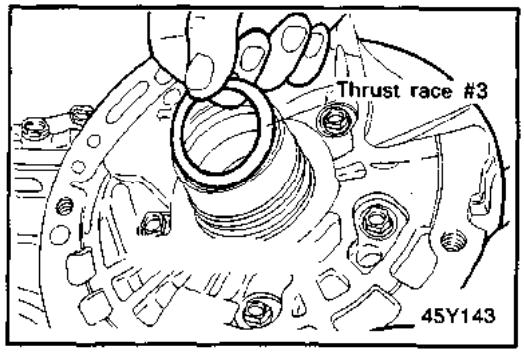
52. Attach the reused thrust washer #1, or the one selected in step 51, to the front clutch by using petroleum jelly.



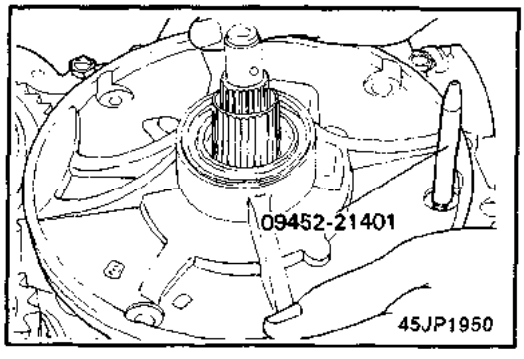
53. Install the special tool (09452-21401) to the case.



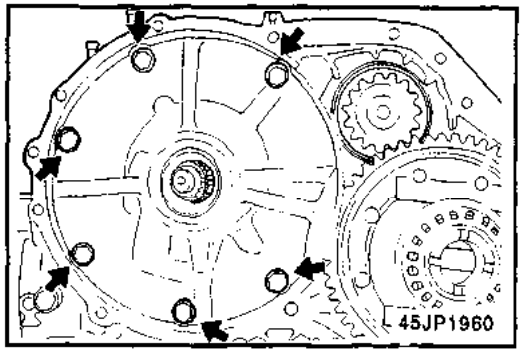
54. Attach the reused thrust race #3 or the one selected in step 51, to the oil pump by using petroleum jelly.



55. Install a new oil pump gasket and the oil pump assembly.

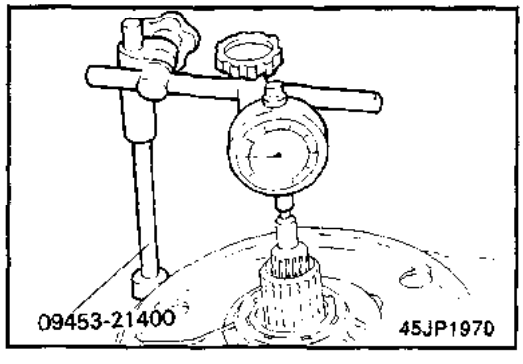


56. Install a new O-ring in the groove of the oil pump housing and lightly apply automatic transaxle fluid to the outside surface of the O-ring.
57. Install the oil pump assembly by tightening the six bolts evenly. When installing this oil pump assembly, be careful that the thrust washer remains in place.

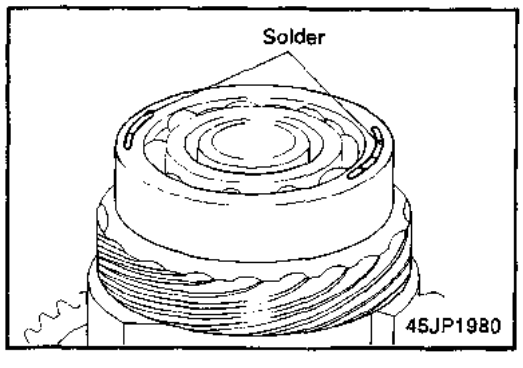


58. Check the input shaft end play. Readjust if necessary (see step 51).

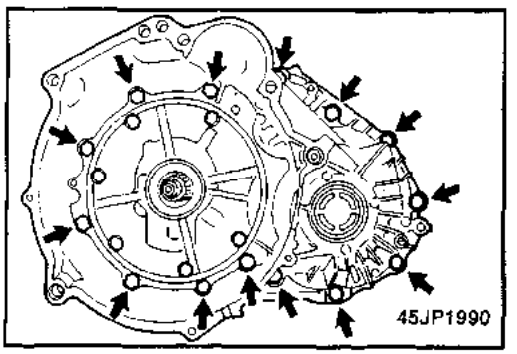
Standard value: 0.3-1.0 mm (0.012-0.040 in.)



59. Apply solder [10 mm (0.40 in.) in length and 3 mm (0.118 in.) in diameter] to the locations shown in the illustration.

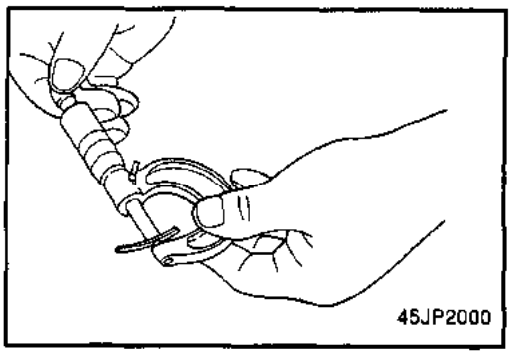


60. Install a new case gasket to the transaxle case.
61. Install the converter housing and tightening the 14 bolts to 19-23 Nm (190-230 kg.cm, 14-16 Ib.ft).

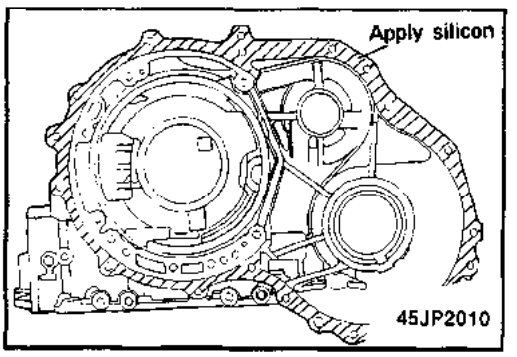


62. Remove the converter housing and gasket.
63. Remove the crushed solder from the outer race of the differential bearing.
64. Measure the thickness of the crushed solder using an outside micrometer and select and install a spacer that produces a standard preload.

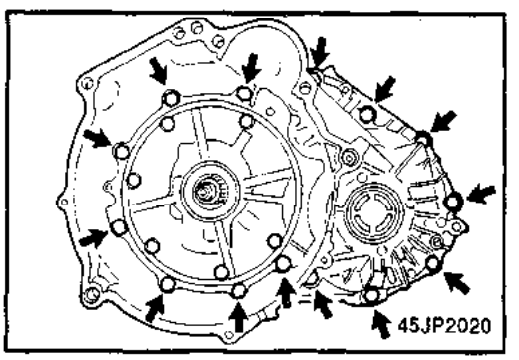
Standard value: 0.080-0.130 mm (0.003-0.005 in.)



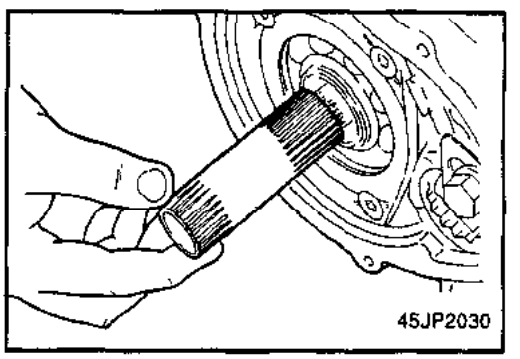
65. Apply silicone to the mating surface hatched area of the transaxle case.
66. Install a new case gasket on the transaxle case.



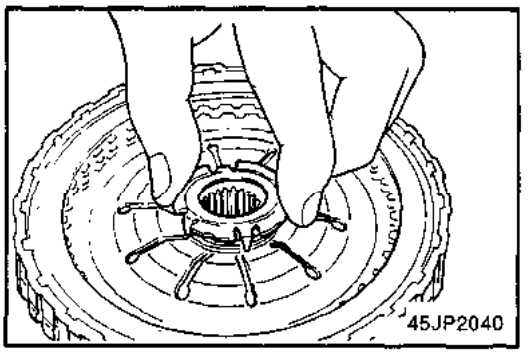
67. Install the converter housing and tighten the 14 bolts to 19-23 Nm (190-230 kg.cm, 14-16 Ib.ft)



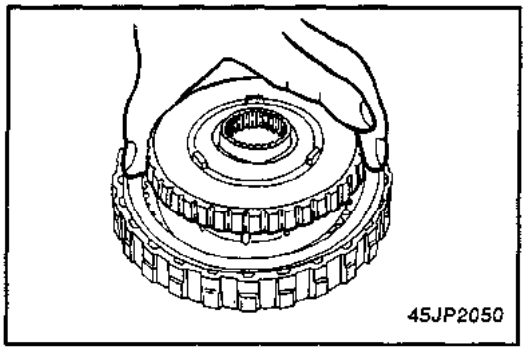
66. Install the end clutch shaft. Be sure to install the longer spline toward the front as shown.



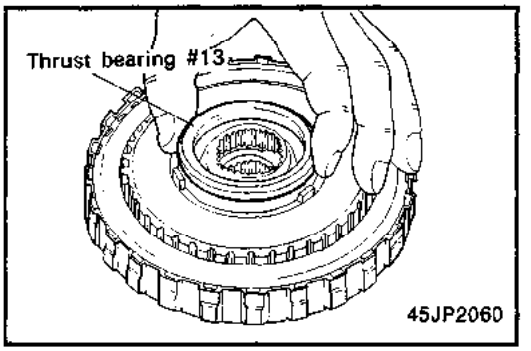
69. Fit the thrust washer toward the return spring at the end clutch side.



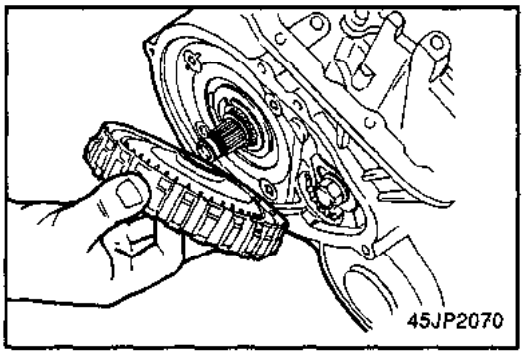
70. Install the end clutch hub to end clutch.



71. Attach, using petroleum jelly, thrust bearing #13 to the end clutch hub.

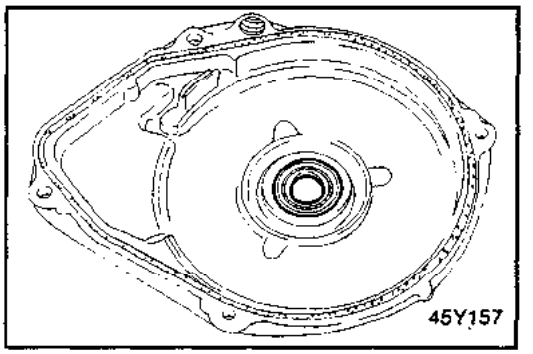


72. Install end clutch assembly.



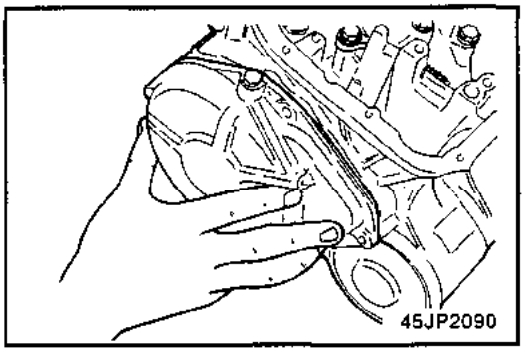
73. Attach a new O-ring and D-ring to the end clutch cover.

NOTE :
install so that the D-ring is not twisted.
Apply a sufficient amount of automatic transaxle fluid to the bearing.

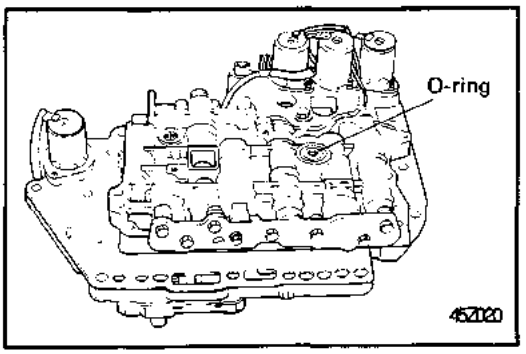


74. Attach the end cover and fasten it with four bolts.

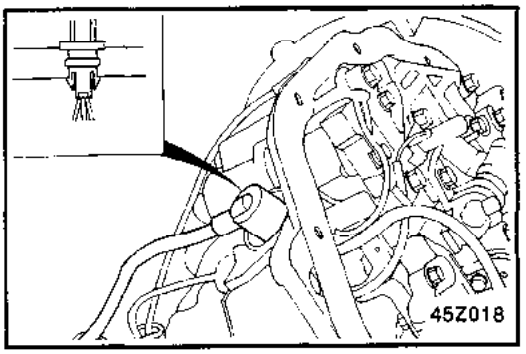
NOTE :
When installing the end cover, be sure the screw hole is correctly aligned. If the end cover is turned (after it is installed) in order to align with the screw hole, the O-ring and/or the D-ring may be twisted as a result.



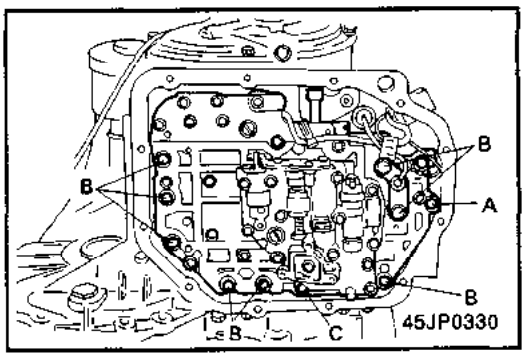
75. Install the O-ring at the center of the top of the valve body assembly (brake oil pressure passage).
76. Install the valve body assembly to the case, fitting the detent plate (manual control shaft) pin in the slot of the manual valve.



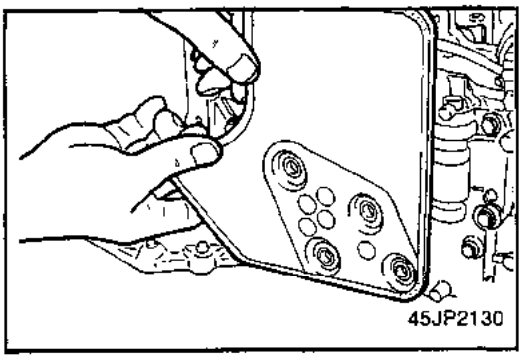
77. Replace the O-ring of the solenoid valve connector with a new one.
78. Insert the solenoid valve connector into the case. Be sure that the notched part of the connector faces as shown in the illustration.



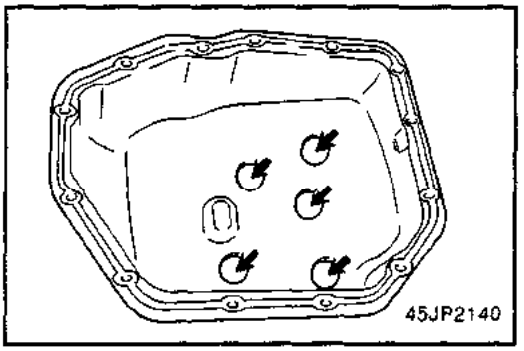
79. Install the oil-temperature sensor, and then tighten the ten(10) valve body assembly mounting bolts to 10-12 Nm (100-120 kg.cm, 7-9 lb.ft)
A : 18 mm (0.709 in.) long
B : 25 mm (0.984 in.) long
C : 40 mm (1.575 in.) long



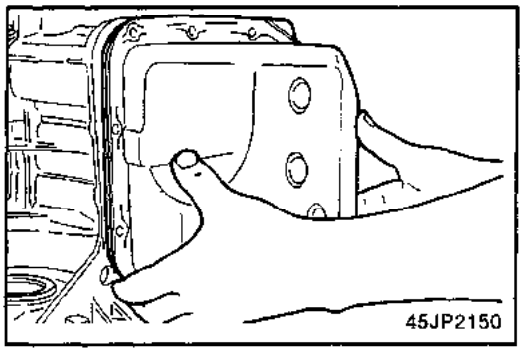
80. Install the oil filter. Tighten the four oil filter mounting bolts to 5-7 Nm (50-70 kg.cm, 4-5 lb.ft)



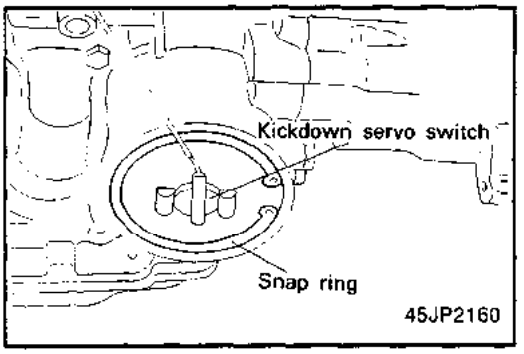
81. Install five magnets into the five depressions provided in the oil pan.



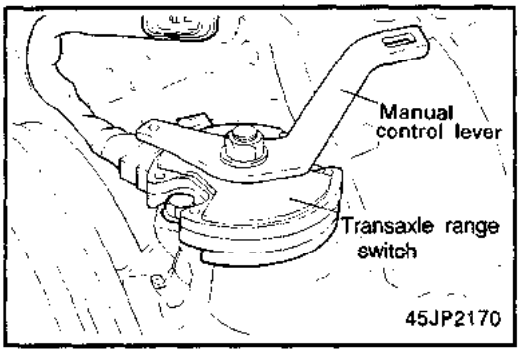
82. Install a new oil pan gasket and oil pan. Tightening 12 bolts to 10-12 Nm (100-120 kg.cm, 7-9 lb.ft).



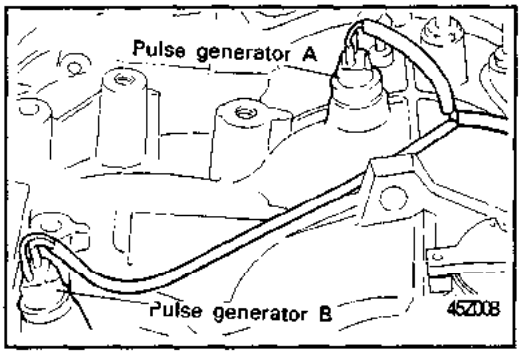
83. Install a new D-ring to the kickdown servo switch. Press into the case and secure using the proper snap ring.



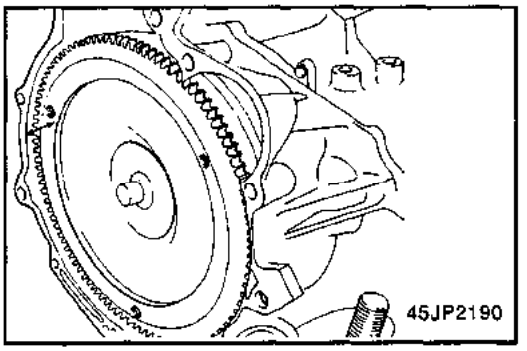
84. Install the inhibitor switch and manual lever. Adjust the inhibitor switch.



85. Install the pulse generator A and B.

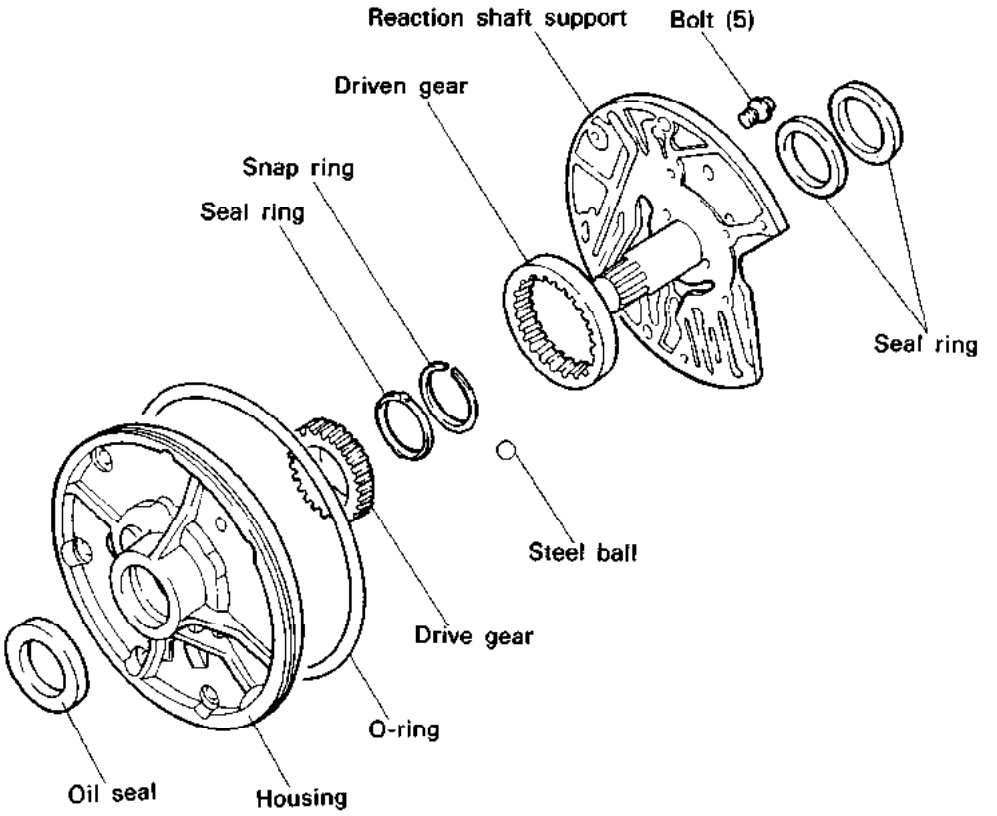


86. After applying automatic transaxle fluid to the outside surface of the oil pump-side cylindrical portion of the torque converter, install the torque converter carefully so as not to damage the seal lip. Make certain that the torque converter is in mesh with oil pump drive gear.
    Measure the distance between the ring gear end and the converter housing end. The torque converter has been properly installed when measurement is approximately 12 mm (0.47 in.).



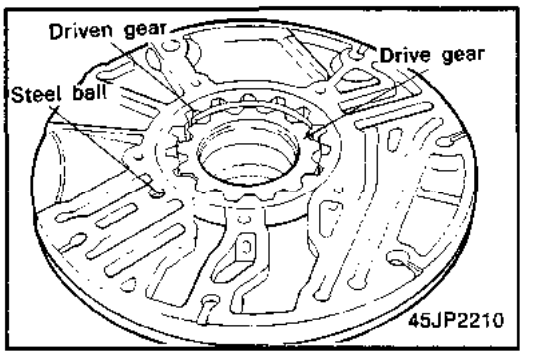
OIL PUMP ASSEMBLY

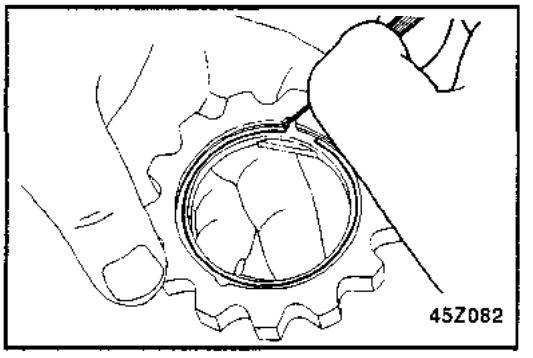
COMPONENTS



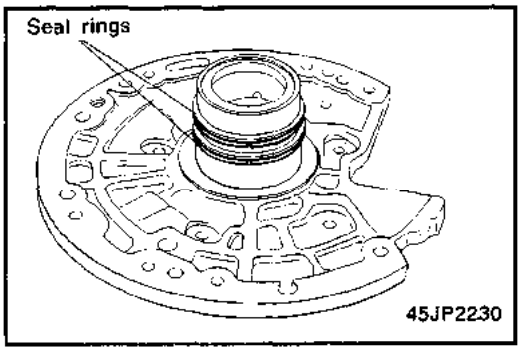
DISASSEMBLY

1. Remove the O-ring from oil pump housing.
2. Remove the five bolts and reaction shaft support from the housing.
3. Remove the oil pump drive and driven gears from the pump housing.
4. Make reassembly alignment marks on the drive and driven gears.
5. Remove the steel ball from the housing.
6. Remove the snap ring and oil seal from the oil pump drive gear.





7. Remove the two seal rings from the reaction shaft support.

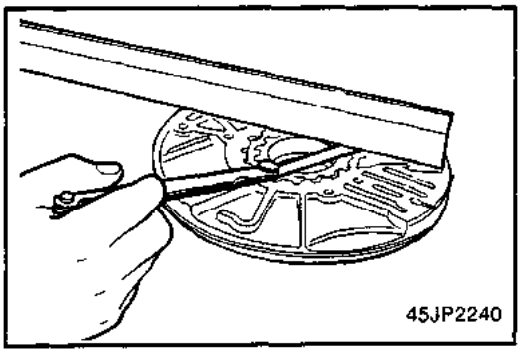


INSPECTION

1. Measure the side clearance of the oil pump gear. If the clearance exceeds the standard value, or if an inspection of the surface area (of the oil pump housing) that contacts the oil pump gear reveals indications of interference, replace the entire oil pump assembly.

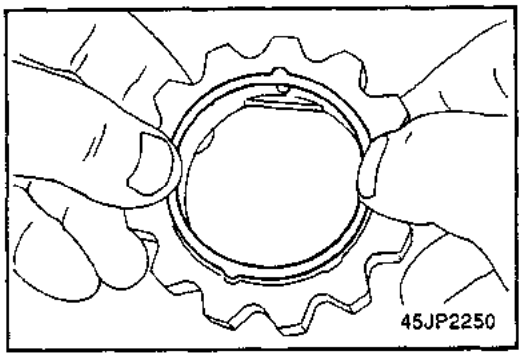
   Standard value: 0.03-0.05 mm (0.0012-0.0020 in.)

2. Check the surface of the reaction shaft support that contacts the oil pump gear. If there are indications of interference, replace the entire oil pump assembly.

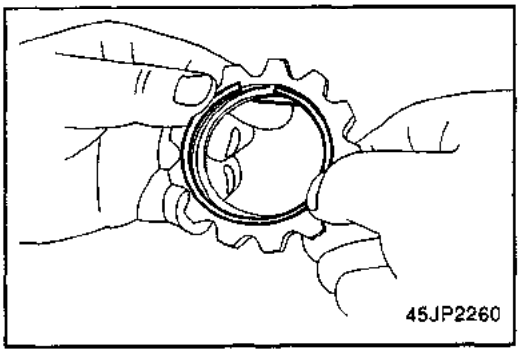


ASSEMBLY

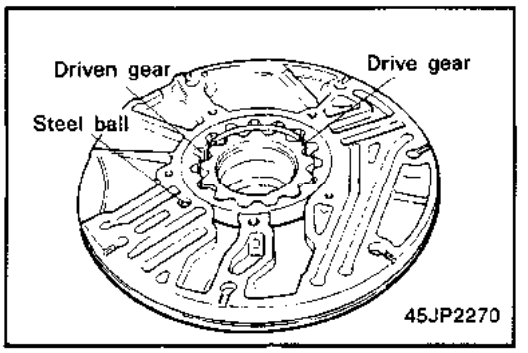
1. Install the oil seal to the oil pump drive gear.



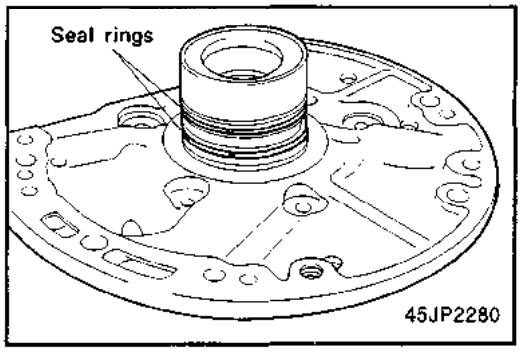
2. Install the snap ring.



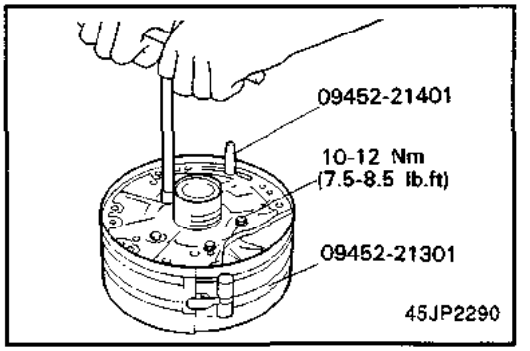
3. After immersing the drive and driven gears in automatic transaxle fluid, install them into pump housing. When reusing gears, install with mating marks properly aligned.
4. Fit a new O-ring into the groove at the inner circumference of the drive gear.
5. Install the steel ball in the hole as shown in the illustration.



6. Install the two seal rings, coated with automatic transaxle fluid, to the reaction shaft support.

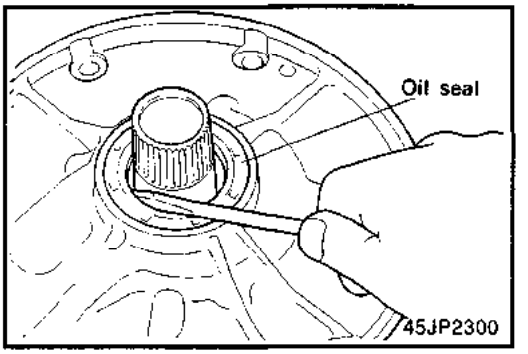


7. Make sure that oil pump gear turns freely.
8. Install a new O-ring in the groove provided in the circumference of the pump housing and apply petroleum jelly to the circumference of the O-ring.
9. Loosely install the reaction shaft support on the pump housing. Tighten the five bolts fingertight.
10. With the reaction shaft support properly positioned on the pump housing, using special tools (09452-21401, 09452-21301) tighten the five bolts to 10-12 Nm (100-120 kg.cm, 7.5-8.5 lbft).

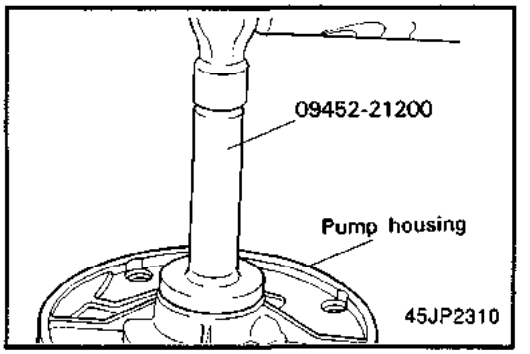


OIL SEAL REPLACEMENT

1. Pry off the pump housing oil seal using a screwdriver.

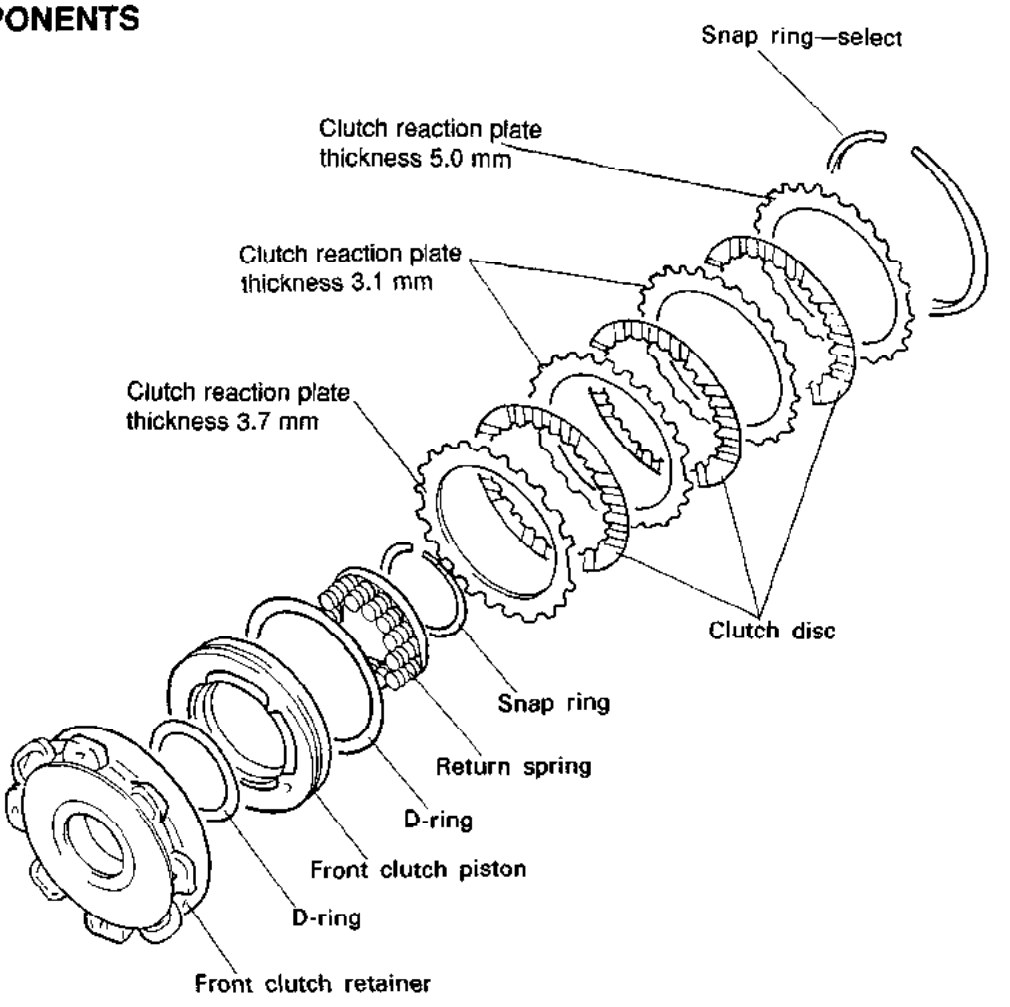


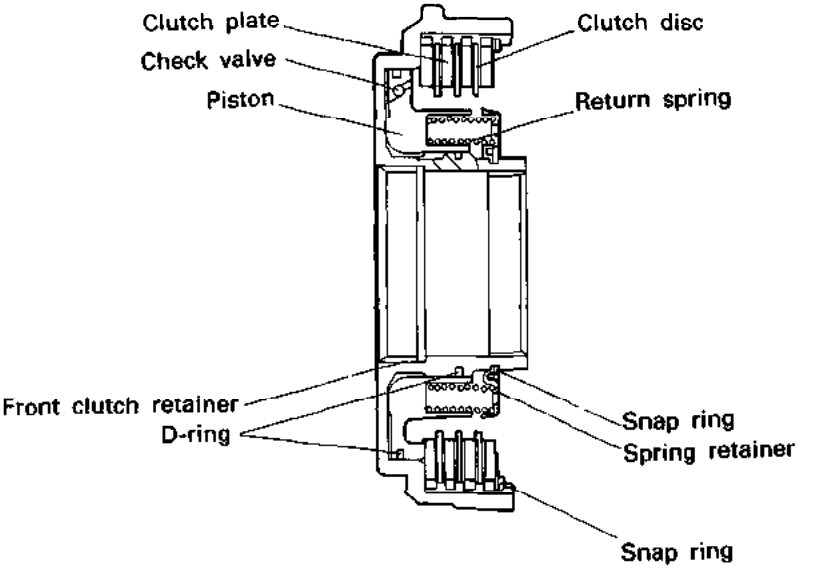
2. Using the special tool (09452-21200), install the oil seal to the pump housing. Apply a thin coat of automatic transaxle fluid to the lip of the oil seal before installation.



FRONT CLUTCH ASSEMBLY

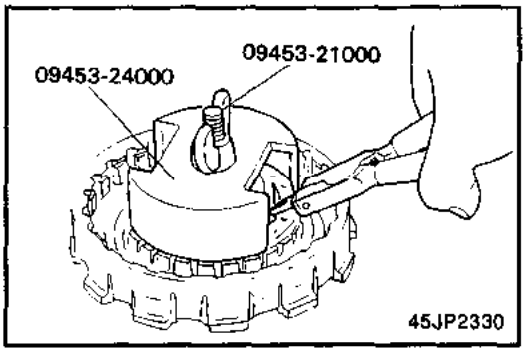
COMPONENTS





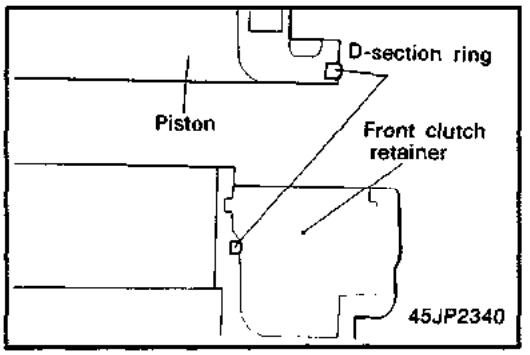
DISASSEMBLY

1. Remove the snap ring from the clutch retainer.
2. Take out the three clutch reaction plates and two clutch discs. If the clutch reaction plates and the clutch discs are to be reused, be sure not to change the installation order or direction.
3. With return spring compressed with the special tool (09453-21000, 09453-24000), Spring Compressor, remove snap ring, then spring retainer and return spring.
4. Remove the piston from the retainer.
5. Remove the D-section rings from the inner and outer circumferences of the piston.

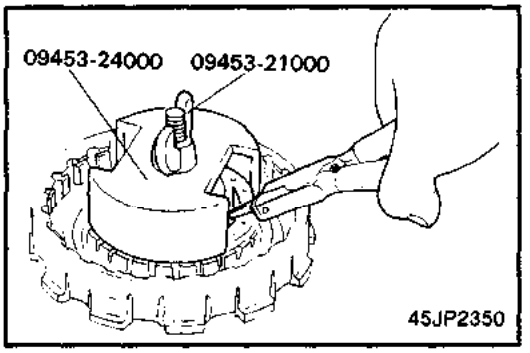


ASSEMBLY

1. Install the D-section ring in the groove on the outside surface of the piston with its round side out. Install another D-section ring to the front clutch retainer.
2. Apply automatic transaxle fluid to the outside surface of the D-section rings. Then push the piston into front clutch retainer by hand.

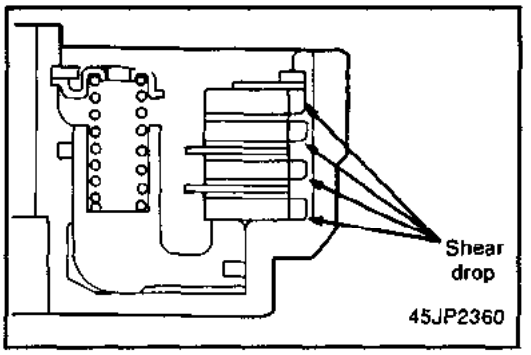


3. Install the return spring and spring retainer.
4. Compress the return spring with the special tool (09453-21000, 09453-24000) and install the snap ring.

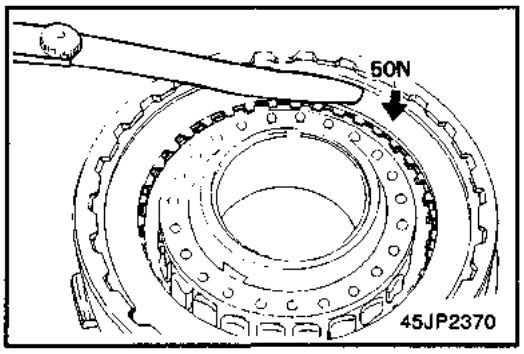


5. install the three clutch reaction plates and two clutch discs. Prior to installation, apply automatic transaxle fluid to them.

NOTE:
When new clutch discs are used, they should be immersed in automatic transaxle fluid a minimum of two hours prior to installation.

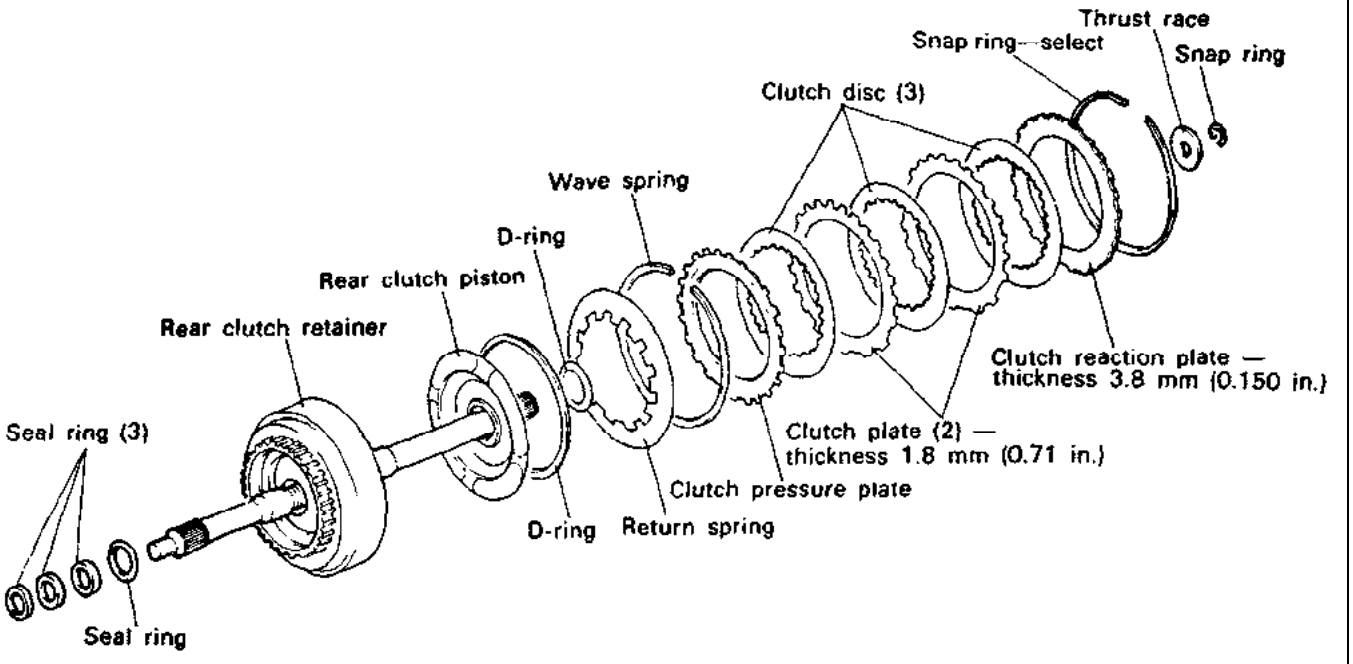


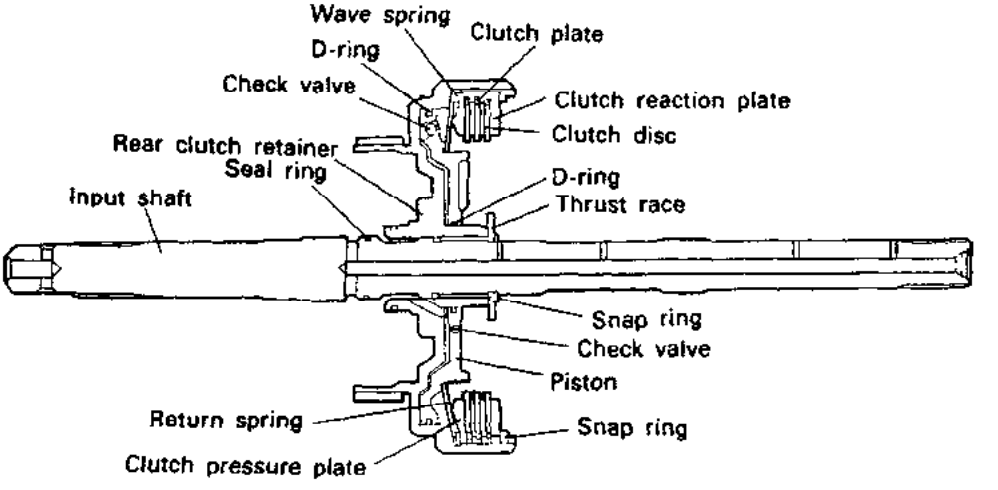
6. After installing the snap ring, check to see if there is a 0.4-0.6 mm (0.0157-0.0236 in.) clearance between the snap ring and the clutch reaction plate.
   To check clearance, hold the entire circumference of the clutch reaction plate down with 50 N (11 lb.) force. If clearance is out of specification, adjust the clearance by selecting the proper snap ring.



REAR CLUTCH ASSEMBLY

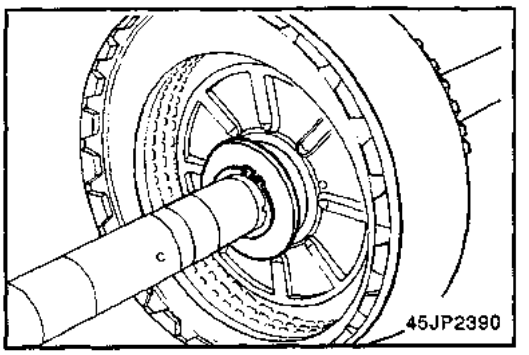
COMPONENTS



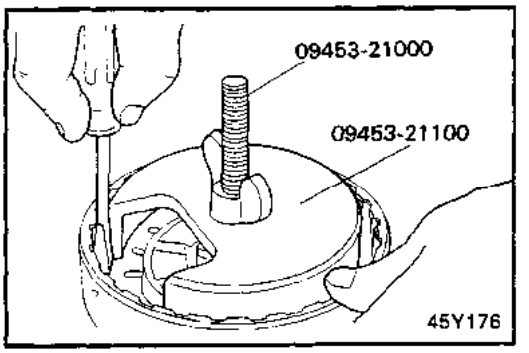


DISASSEMBLY

1. Remove the snap ring and thrust race.
2. Remove the input shaft from the rear clutch retainer.
3. Remove the snap ring from the clutch retainer.
4. Remove the clutch reaction plate, one clutch plates, two clutch discs and clutch pressure plate from the retainer.

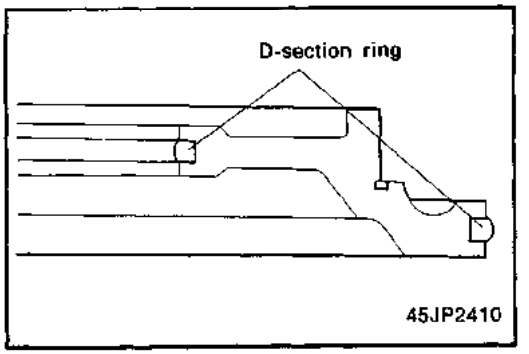


5. Compress the return spring by using the spring compressor.
6. Using a screwdriver, remove the wave spring.
7. Remove the return spring and piston.
8. Remove the two D-section rings from the piston.



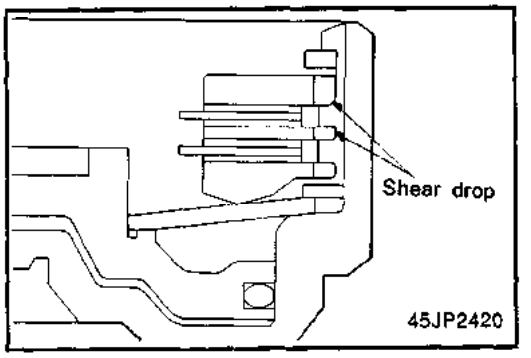
ASSEMBLY

1. Install the D-section rings in the grooves in the outside and inside surfaces of the piston.
2. After applying automatic transaxle fluid to the outside surface of the D-section rings, push the piston into the rear clutch retainer by hand.
3. Install the return spring on the piston.
4. Compress the return spring with the snap ring, by pushing down with a screwdriver and setting the snap ring in its groove.

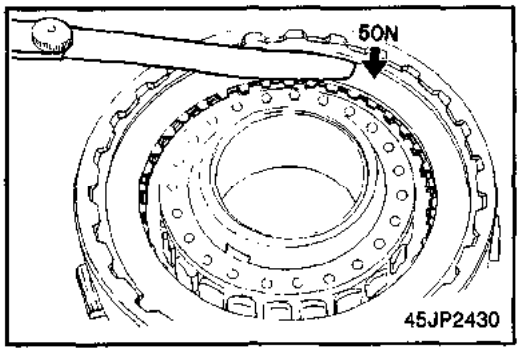


5. Install clutch pressure plate, two clutch discs, clutch plate and clutch reaction plate into the rear clutch retainer.
   When the reaction plate, clutch plate and clutch disc are removed, reinstall them by reversing the order of disassembly. Prior to installing, apply automatic transaxle fluid to the plates and discs.

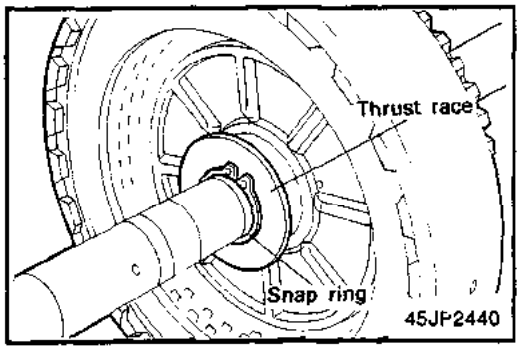
   NOTE :
   When new clutch discs are used, immerse them in automatic transaxle fluid for a minimum of two hours prior to installation



6. Install the snap ring. Check to see that the clearance between the snap ring and clutch reaction plate is 0.3-0.5 mm (0.012-0.020 in.). To check clearance, hold the entire circumference of the clutch reaction plate down with 50N (11 Ibs.) force. If clearance is out of specification, adjust by selecting the proper snap ring. Snap rings are the same as those used for the front clutch.
7. Insert the input shaft into the clutch retainer.

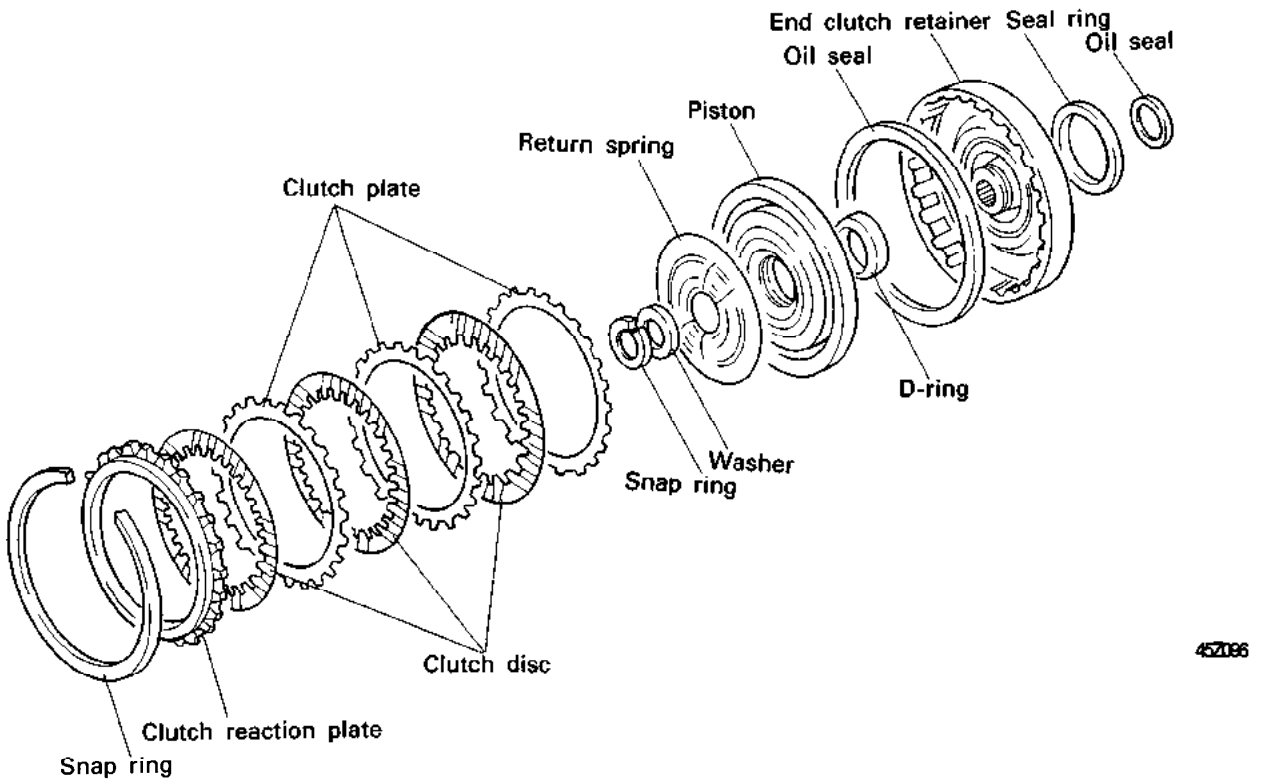


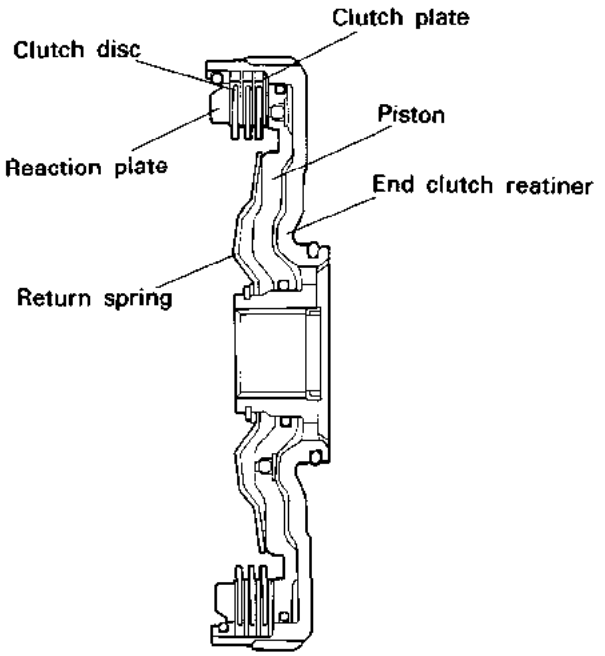
8. Install the thrust race, and snap ring.
9. Install the three seal rings to the grooves in the input shaft.



END CLUTCH ASSEMBLY

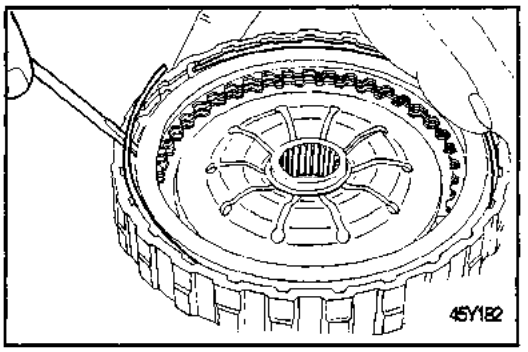
COMPONENTS



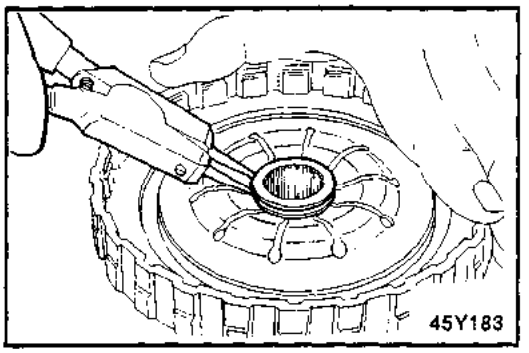


DISASSEMBLY

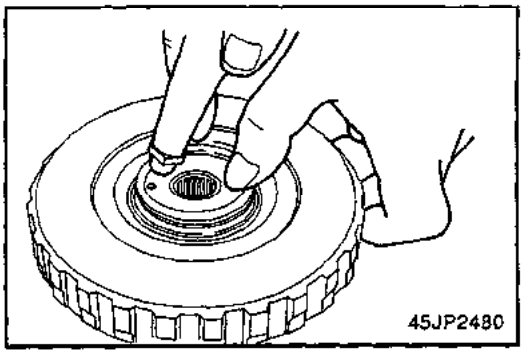
1. Remove the snap ring, clutch reaction plate, clutch disc, and the clutch plate. If the disc and plate are reused, note the installation order and direction when they are disassembled.



2. Remove the snap ring with snap-ring pliers, and then remove the washer and return spring.

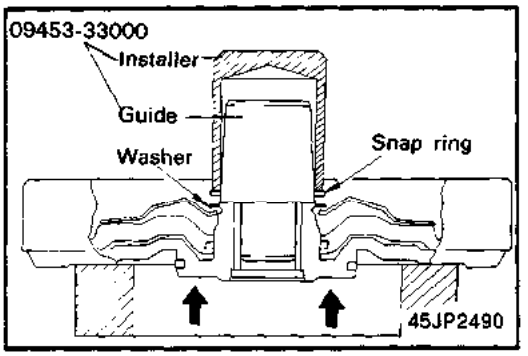


3. Remove the piston. If it is difficult to remove, face the piston side downward, and, with the retainer on a base, blow air in through the oil passage on the rear surface.
4. Remove the seal ring from the retainer.
5. Remove the two D-section rings and oil seal from the piston.



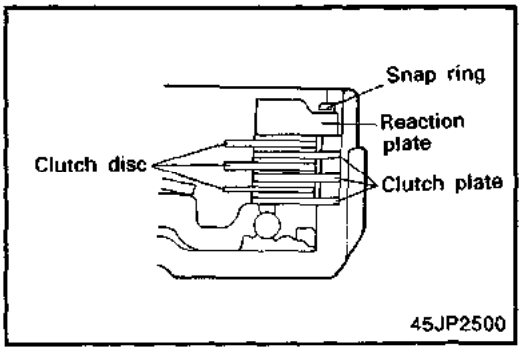
ASSEMBLY

1. Install the D-section rings and oil seal in the piston inner and outer grooves.
2. After applying a coating of automatic transaxle fluid to the D-section rings outer circumference, manually press the piston into the end clutch retainer.
3. Install the return spring and washer.
4. After fitting a new snap ring into the guide of the special tool (09453-33000), install the retainer. Push the snap ring as far down on the guide as possible.
   Attach the installer and press until the snap ring enters the groove. Do not press more than necessary. The places indicated by arrows in the illustration (center projections) are not to be supported.

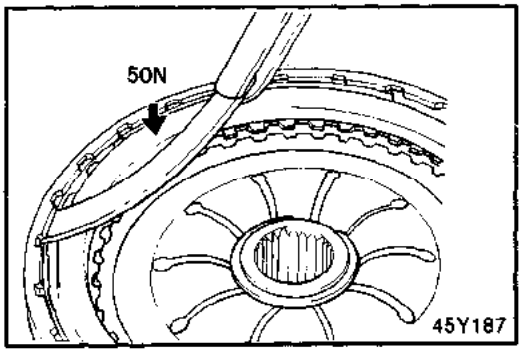


5. Install the clutch plate, clutch disc and reaction plate to the end clutch retainer.
   If the reaction plate, clutch plate and clutch disc are reused, install them in the same order they were disassembled. Apply a coating of automatic transaxle fluid.

   MOTE :
   When a new clutch disc is used, soak it in automatic transaxle fluid for 2 hours before using it.

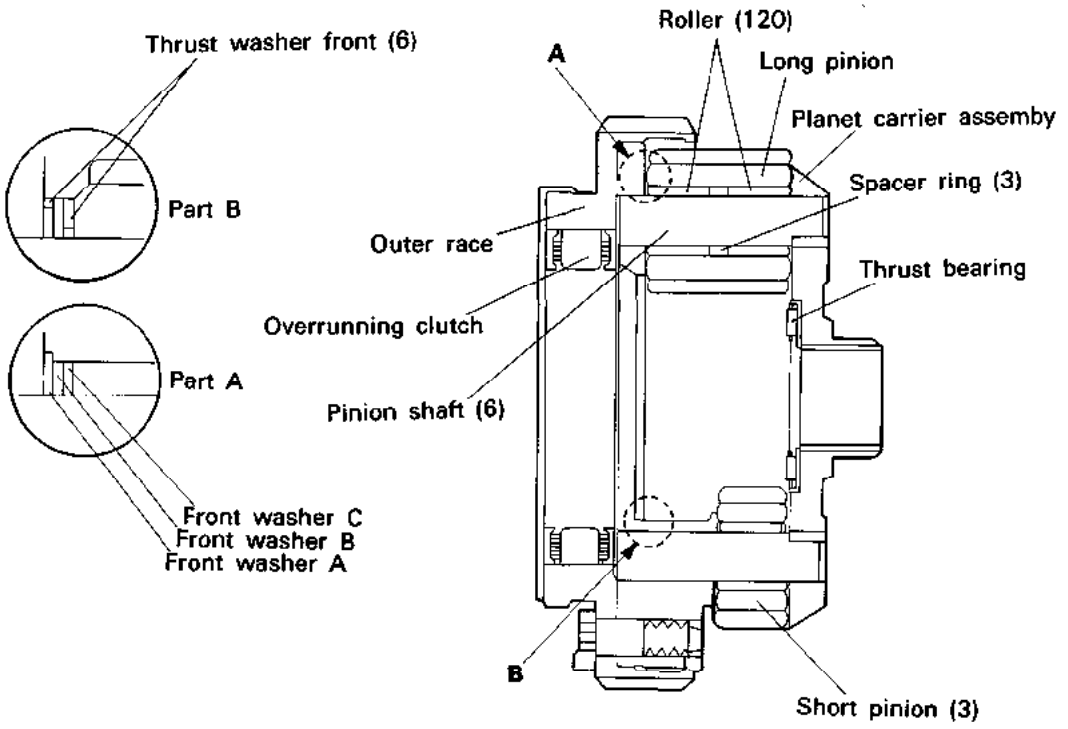


6. Install the snap ring. Check that the clearance between the snap ring and the clutch reaction plate is 0.4-0.65 mm (0.016-**0.026** in.).
   To check the clearance, hold the circumference of the clutch reaction plate down with 50N (17 lb.) force.
   If clearance is out of specifications, adjust the clearance by selecting the proper snap ring.



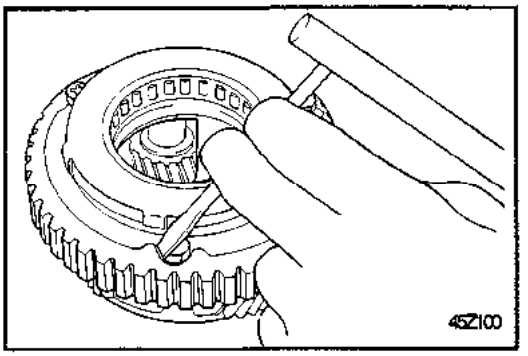
PLANETARY GEAR SET

COMPONENTS

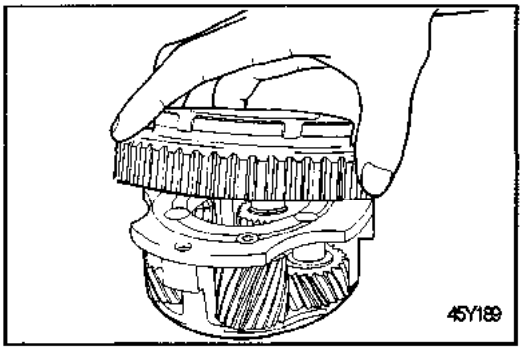


DISASSEMBLY

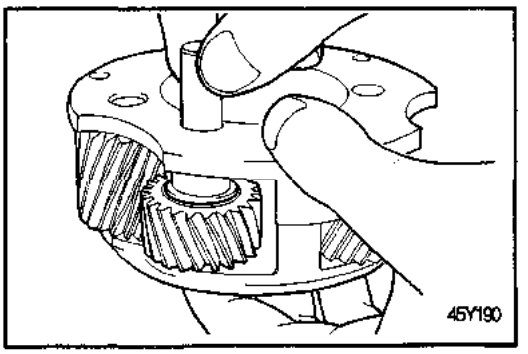
1. Remove three bolts.



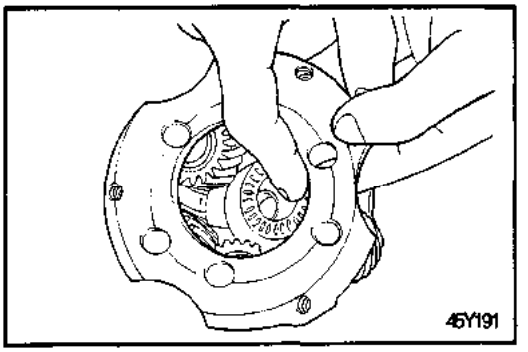
2. Remove the overrunning clutch outer race assembly. Remove the overrunning clutch end plate.



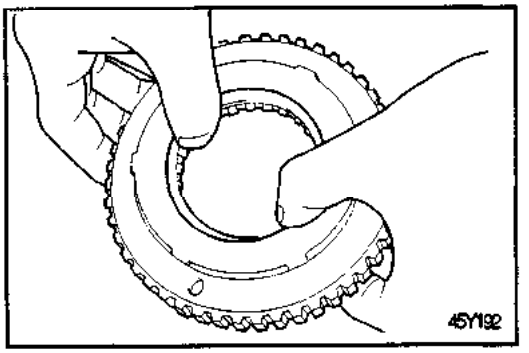
3. Remove the shaft of only one short pinion.
4. Remove the spacer bushing and two front thrust washers.
5. Remove the pinion. Do not drop the 17 roller bearings in the pinion.



6. Remove the thrust bearing.

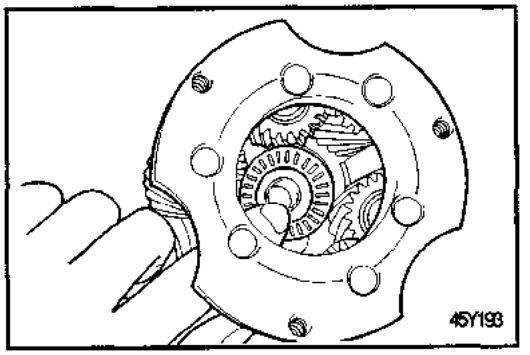


7. Push the overrunning clutch out of the outer race by hand.

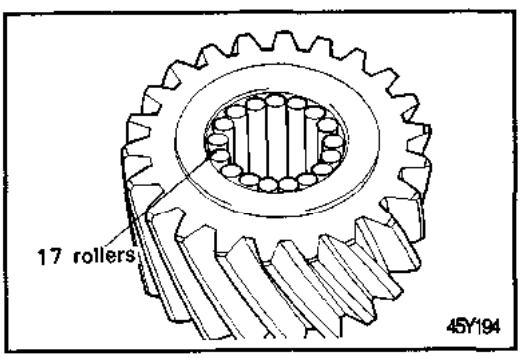


ASSEMBLY

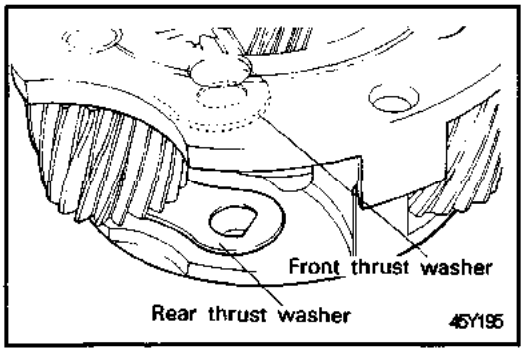
1. Install the thrust bearing in the carrier. Be sure that it fits correctly in the carrier.



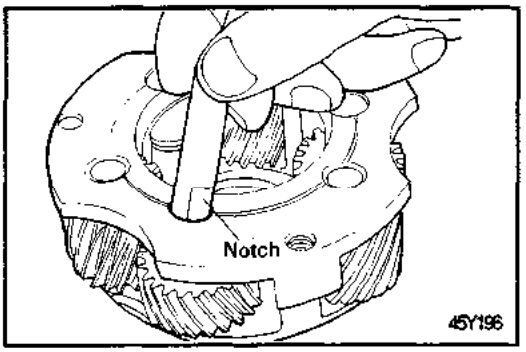
2. Apply a generous amount of petroleum jelly to the inside of the short pinion to hold the 17 rollers bearings in place.



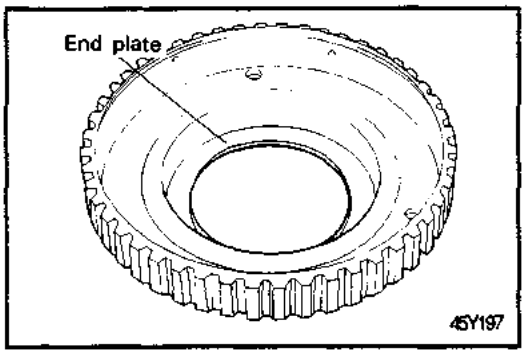
3. Line up the holes in the rear thrust washer and front thrust washer with the shaft of the carrier.
4. Install the short pinion, spacer bushing and two front thrust washers and align the holes. Use care not to allow the rollers to move out of position.



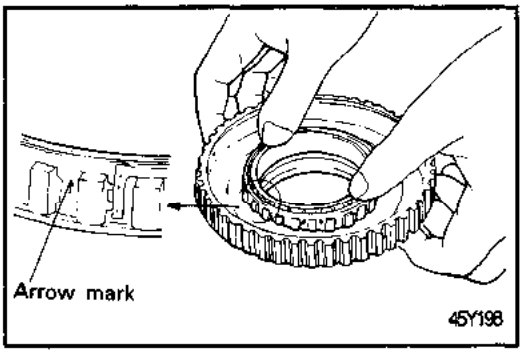
5. Insert the pinion shaft. Be sure that the flattened end of the pinion shaft fits properly into the hole in the rear thrust plate when the pinion shaft is inserted.



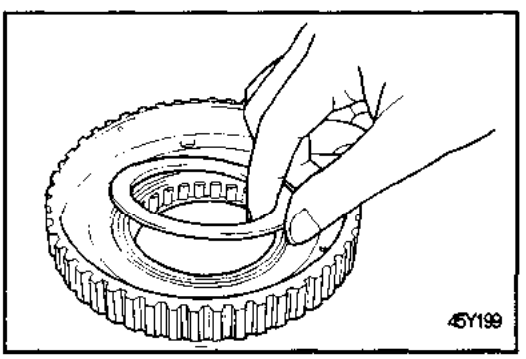
6. Install the end plate in the outer race.



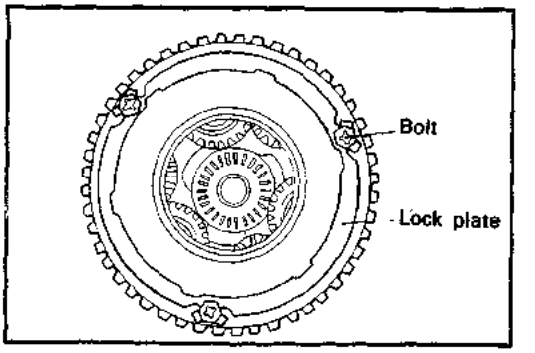
7. Press the overrunning clutch into the outer race. Be sure that the arrow on the outside circumference of the cage is pointing upward as shown in the illustration when the overrunning clutch is installed.



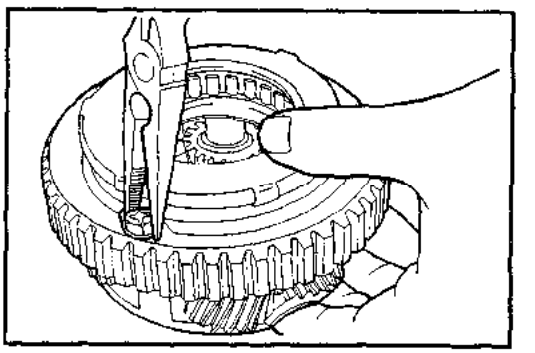
8. Apply petroleum jelly to the overrunning clutch end plate to retain it inside the overrunning clutch. Install the end plate in the clutch.



9. Install overrunning clutch assembly to carrier and align bolt holes.
10. Install three bolts and tighten three bolts to 2535Nm (18-25 ft.lbs.)

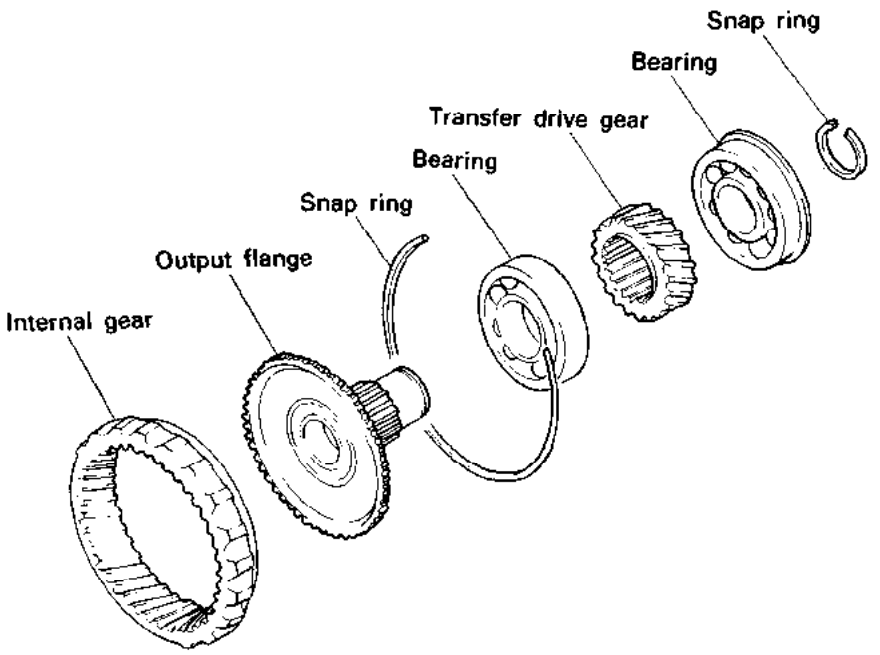


11. Bend the lock plate over the bolt head.



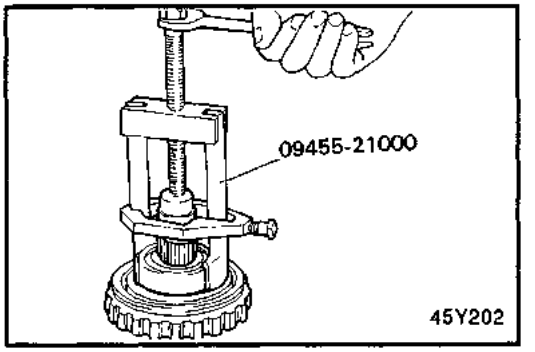
INTERNAL GEAR AND TRANSFER DRIVE GEAR SET ASSEMBLY

COMPONENTS

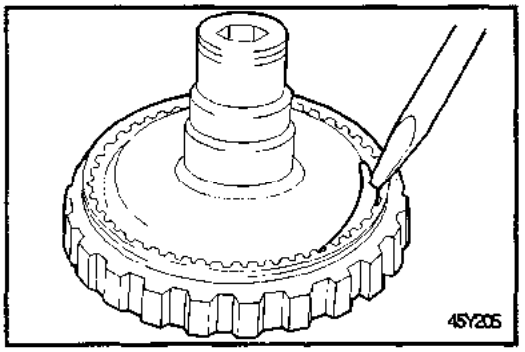


DISASSEMBLY

1. Remove the snap ring from the rear of the output flange.
2. Using the special tool (09455-21000) remove the bearing from the output flange.



3. Remove the snap ring, and separate the internal gear from the output flange.

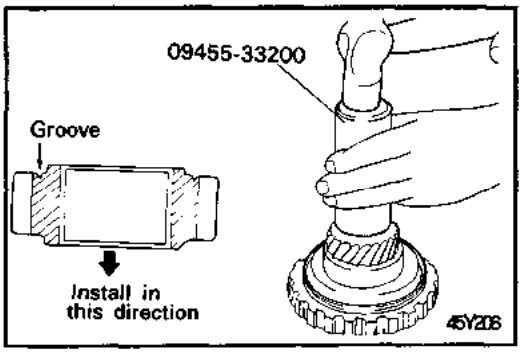


ASSEMBLY

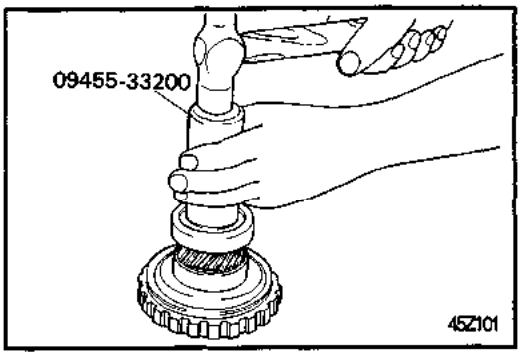
1. Using the special tool (09455-33200) press the bearing and transfer drive gear onto output flange.

   CAUTION
   Replace the output flange and transfer drive gear as a set.

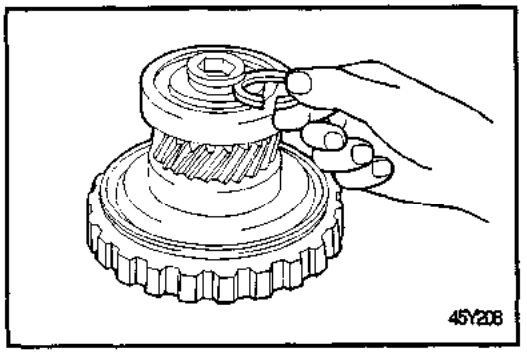
2. Install the transfer drive gear in the proper direction as shown in the illustration.



3. Install the ball bearing

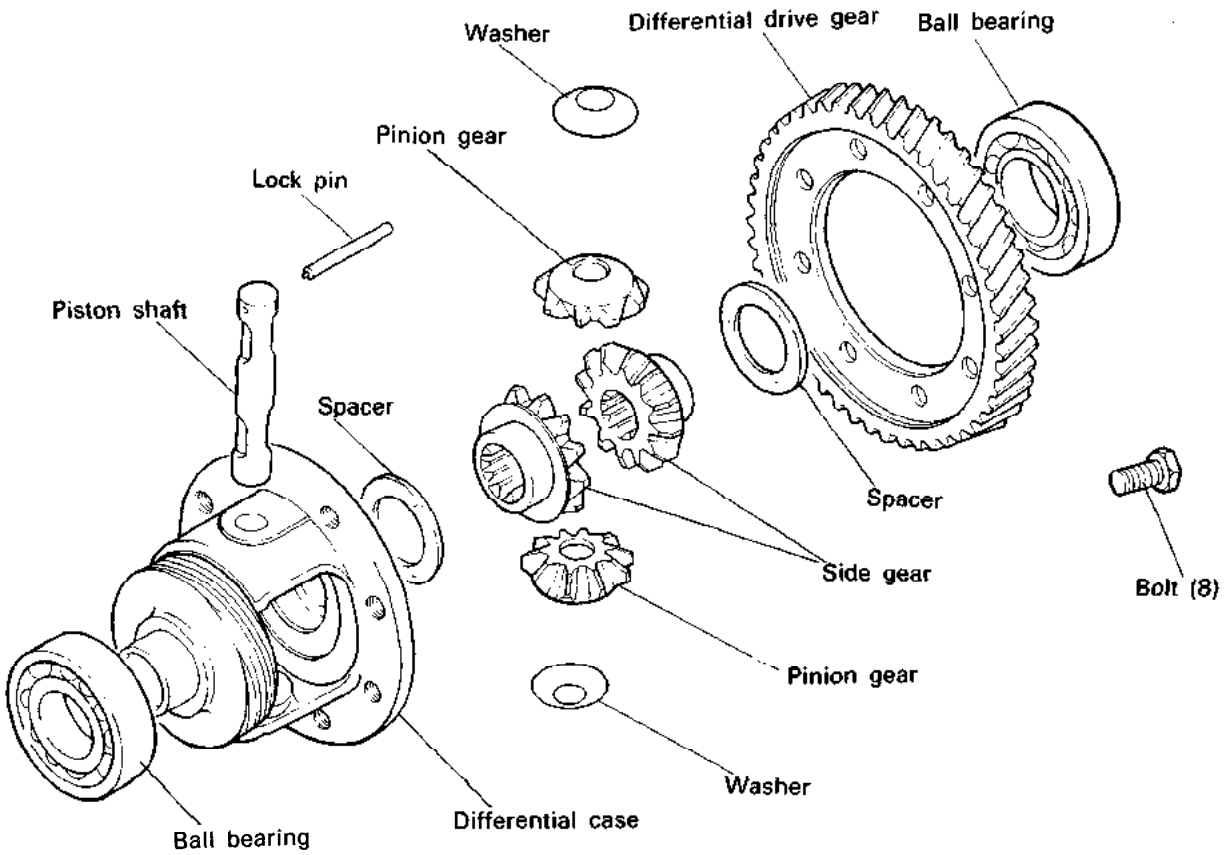


4. Select the thickest snap ring that can be installed in groove.



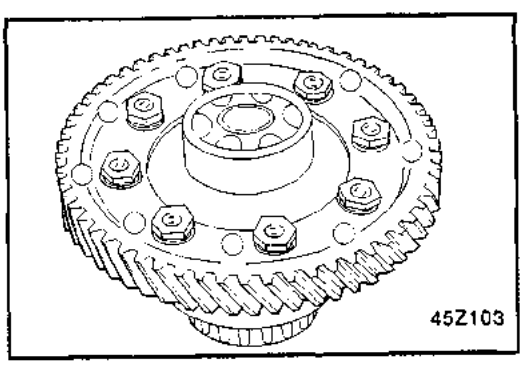
DIFFERENTIAL

COMPONENTS

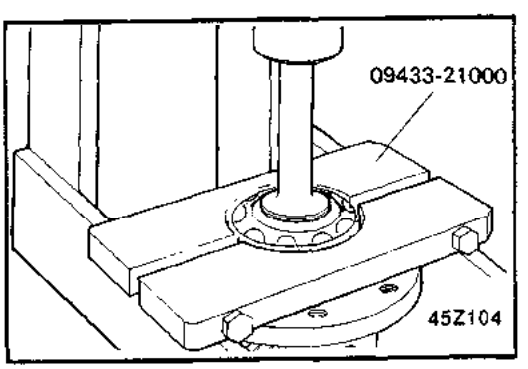


DISASSEMBLY

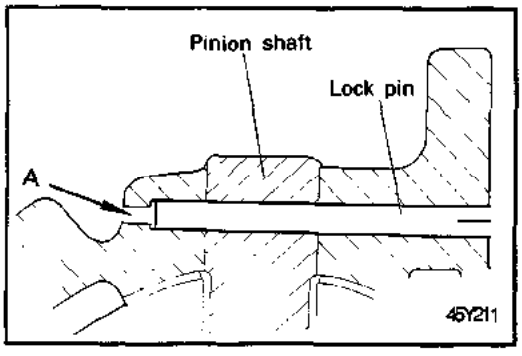
1. Remove the drive gear retaining bolts and drive gear from the differential case.



2. Remove the ball bearing with the special tool (09433-21000).



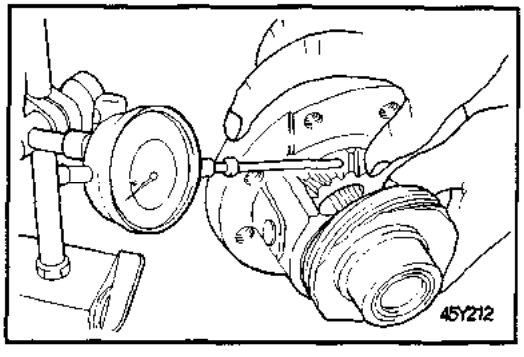
3. Drive out the lock pin with a punch inserted in hole “A”.
4. Remove the pinion shaft, pinion gears and washers.
5. Remove the side gears and spacers.
   Do not mix the gears and spacers between the left and right sides.



ASSEMBLY

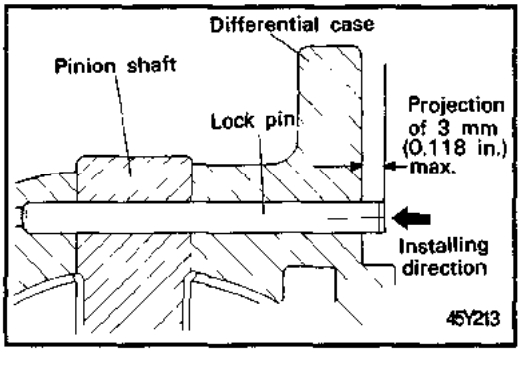
1. With the spacers installed on the back of the differential side gears, install the gears into the differential case. If reusing parts, install them in their original positions noted during disassembly.
   If using new differential side gears, install medium thickness spacers 1.0mm (0.039in.).
2. Install the washers on the back of the pinion gears. Install gears into the differential case, then insert the pinion shaft.
3. Measure the backlash between the side gear and the pinion gear.
   Backlash should be 0.025-0.150 mm (.0010-.0059 in.) and the right and left hand gear pairs should have equal backlash. If the backlash is out of specification, disassemble and reassemble using different spacers for the correct backlash.-

   Standard value: 0.025-0.150 mm (.0010-.0059 in.)

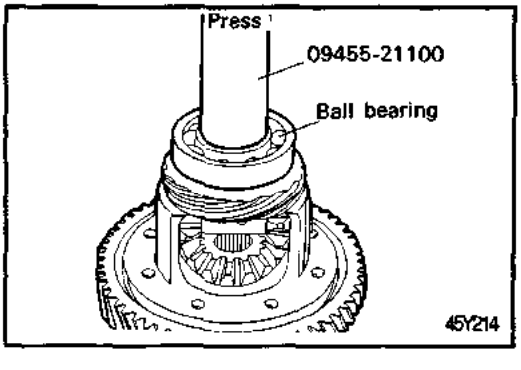


4. Install the pinion shaft lock pin in the direction specified in the illustration. After installation, check that the projection is less than 3 mm (.118 in.).-

   NOTE :
   The lock pin must not be reused.

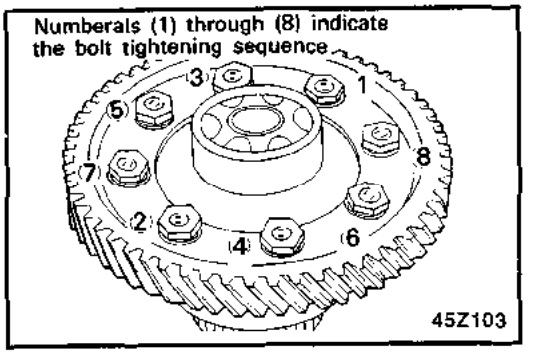


5. Press the bearings onto both ends of differential case. Press on the inner race when installing the bearings. Do not apply load to outer race.
6. Install the differential drive gear onto the case.



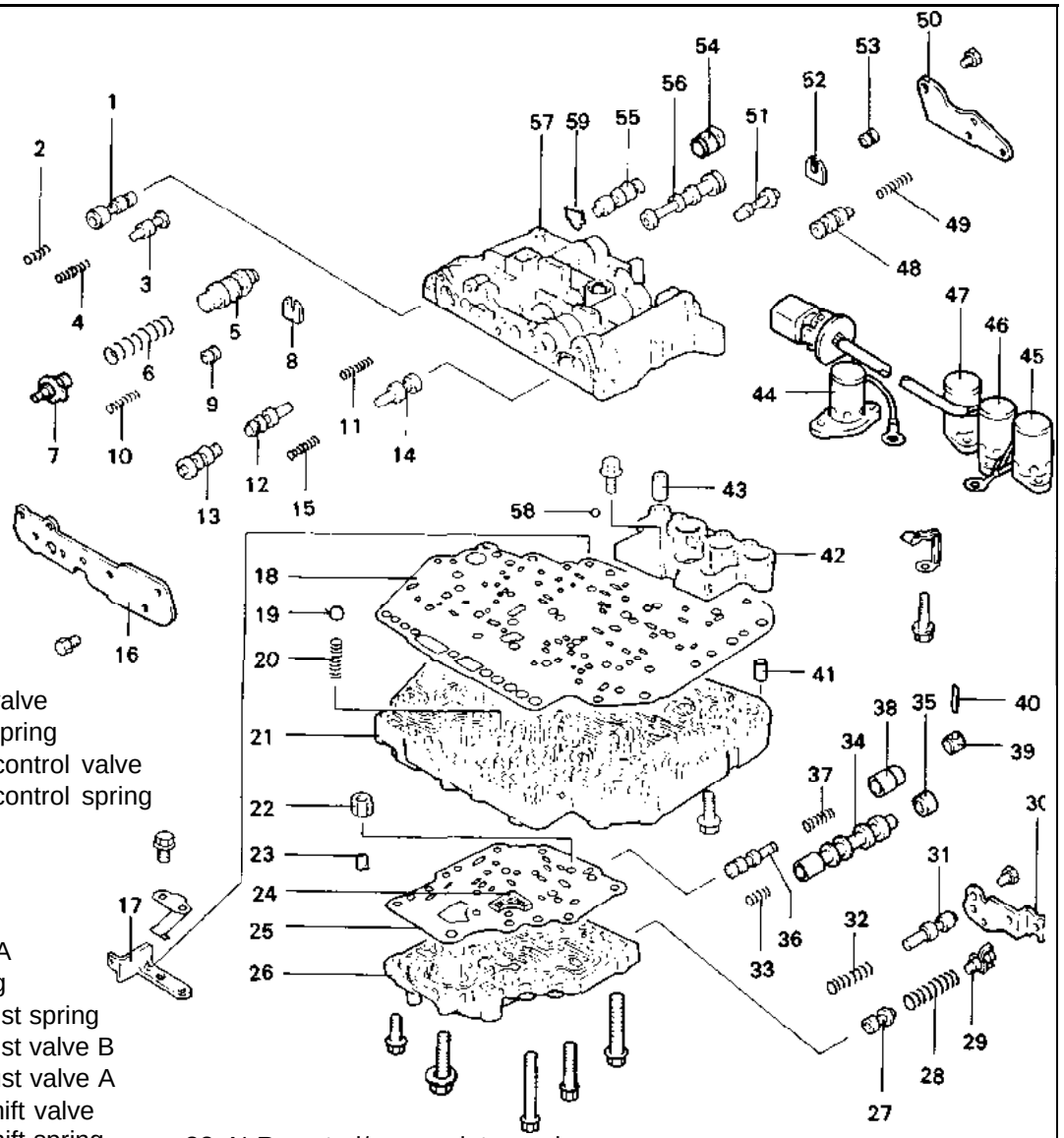
7. Apply ATF to the bolts and tighten the bolts to the specified torque in the sequence shown in the illustration.-

Tightening torque:
130-140 Nm (1300-1400 kg.cm, 94-101 lb.ft)



VALVE BODY

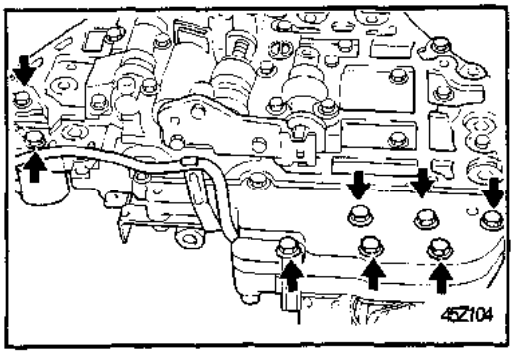
COMPONENTS



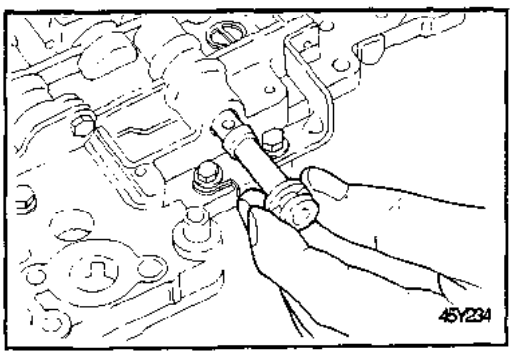
1. Pressure control valve
2. Pressure control spring
3. Torque converter control valve
4. Torque converter control spring
5. Regulator valve
6. Regulator spring
7. Adjusting screw
8. Stopper plate
9. Shift control plug A
10. Shift control spring
11. Rear clutch exhaust spring
12. Rear clutch exhaust valve B
13. Rear clutch exhaust valve A
14. 2nd-3rd/4th-3rd shift valve
15. 2nd-3rd/4th-3rd shift spring
16. Front end cover
17. Valve stopper
18. Upper separating plate
19. Steel ball
20. Relief spring
21. Intermediate plate
22. Nut
23. Jet
24. Oil filter
25. Lower separating plate
26. Lower valve body
27. Reducing valve
26. Reducing spring
29. Adjusting screw
30. End cover
31. N-R control/accumulator valve
32. N-R control/accumulator spring
33. Damper clutch control spring
34. Damper clutch control valve
35. Damper clutch control sleeve
36. End clutch valve
37. End clutch spring
38. End clutch plug
39. Stopper
40. Pin
41. Dowel bushing
42. Block
43. Pipe
44. Pressure control solenoid valve (PCSV)
45. Shift control solenoid valve B (SCSV-B)
46. Shift control solenoid valve A (SCSV-A)
47. Damper clutch control solenoid valve (DCCSV)
48. 1-2 shift valve
49. 1-2 shift spring
50. Rear end cover
51. Shift control cover
52. Stopper plate
53. Shift control plug B
54. N-D control sleeve
55. N-D control valve
56. Manual valve
57. Upper valve body
56. Teflon ball
59. N-D plate

DISASSEMBLY

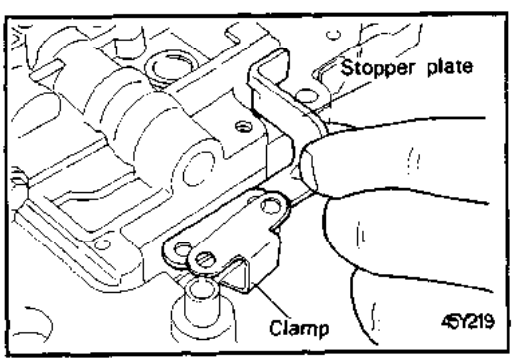
1. Remove the 4 solenoid valves.



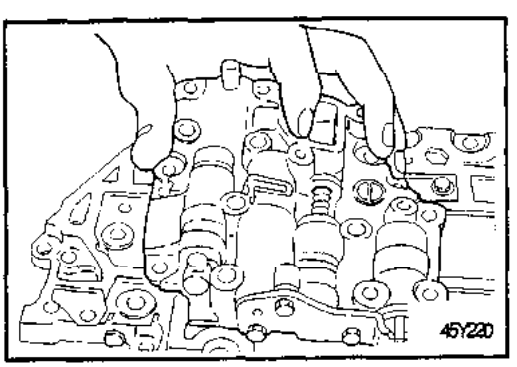
2. Remove the manual valve.



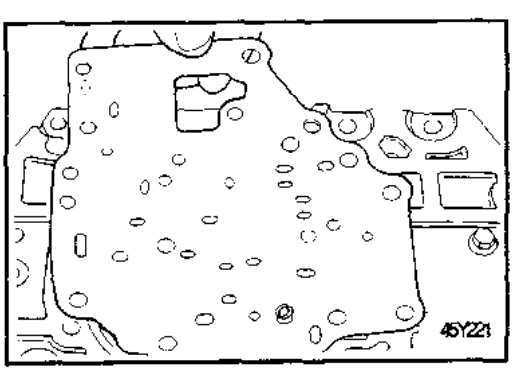
3. Remove the valve stopper and clamp.



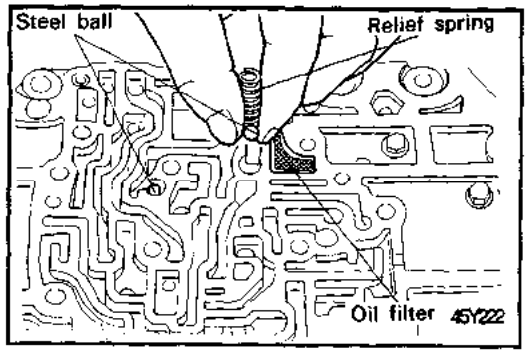
4. Remove the bolts (13), and then remove the lower valve body.



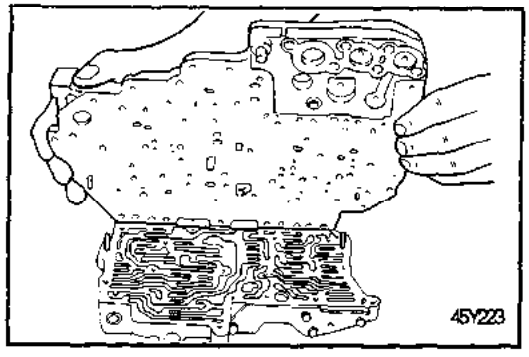
5. Remove the separating plate.



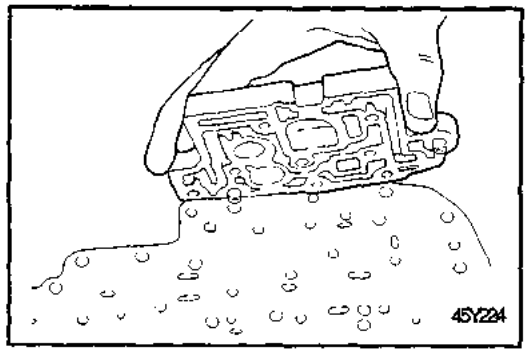
6. Remove the relief spring, two steel balls and oil filter from the intermediate plate.



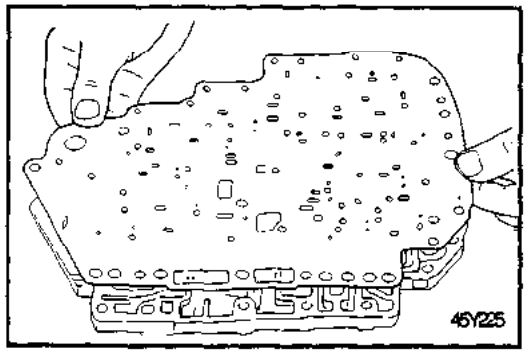
7. Remove the bolts (a), and then remove the intermediate and upper separation plates.



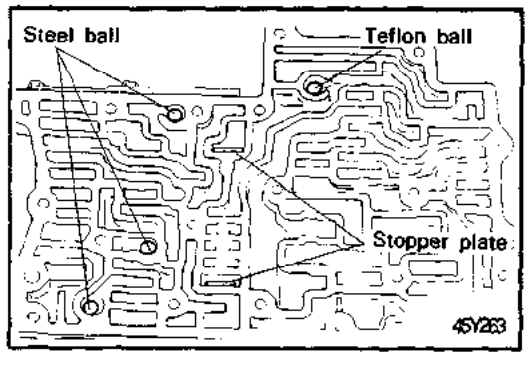
8. Remove the block.



9. Remove the upper separating plate.

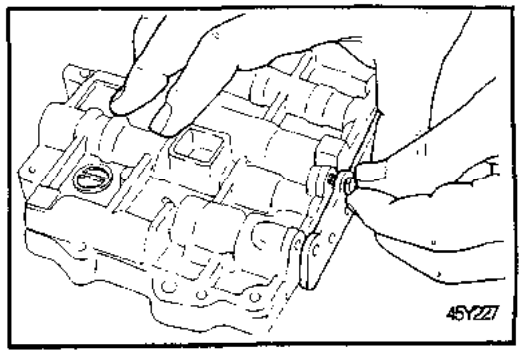


10. Remove, from the upper valve body, the three steel balls, the teflon ball, and the two stopper plates.

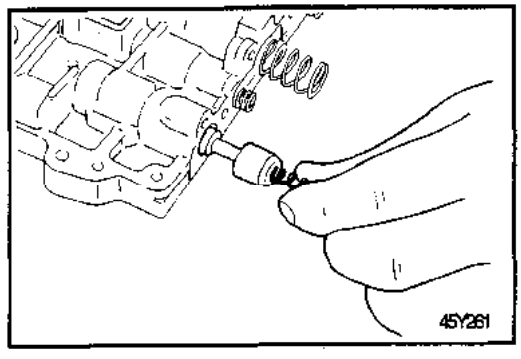


11. Remove from the upper valve body, the seven bolts. Then remove the front end cover and the adjustment screw.-

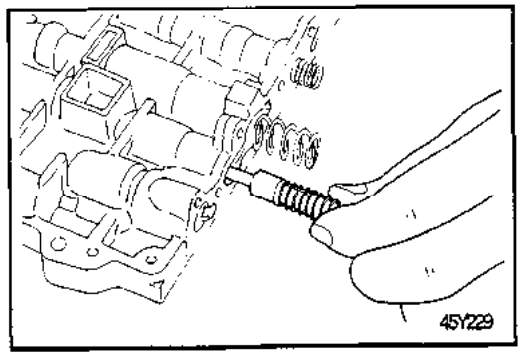
NOTE :
When removing the bolts, be sure to hold the front end cover (as shown in the illustration) to prevent the spring from causing the adjustment screw to fall out.



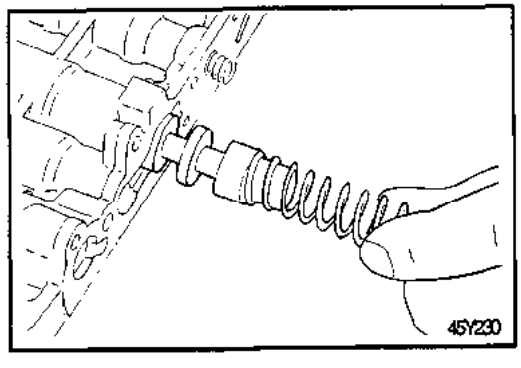
12. Remove the pressure control spring and the pressure control valve.



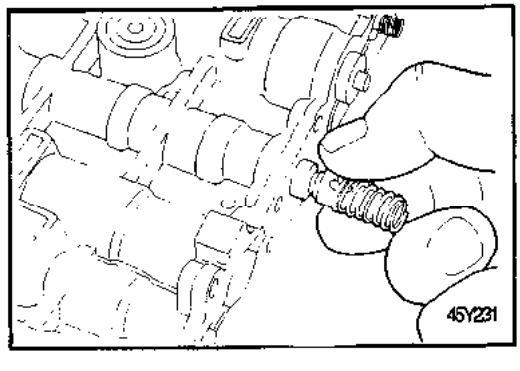
13. Remove the torque converter control spring and the torque converter control valve.



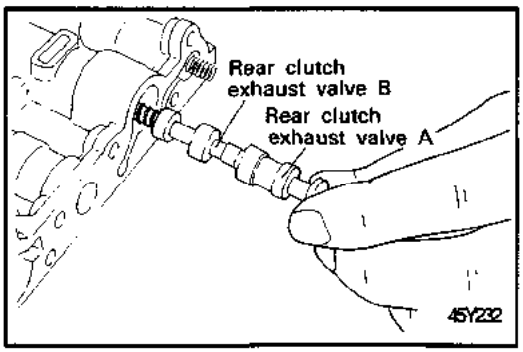
14. Remove the regulator spring and the regulator valve.



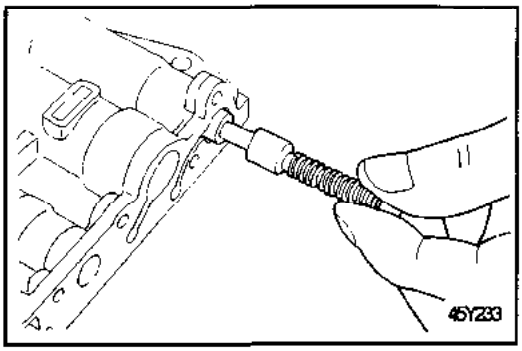
15. Remove the shift-control spring and shift-control plug A.



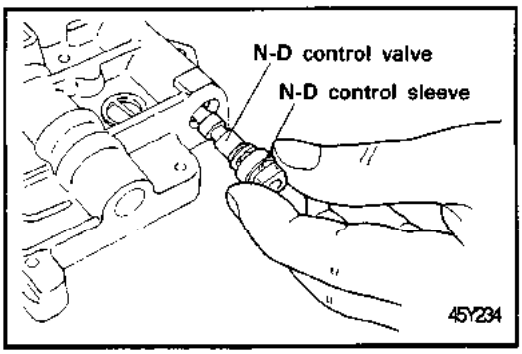
16. Remove the rear clutch exhaust valves A and B as well as the rear clutch exhaust spring.



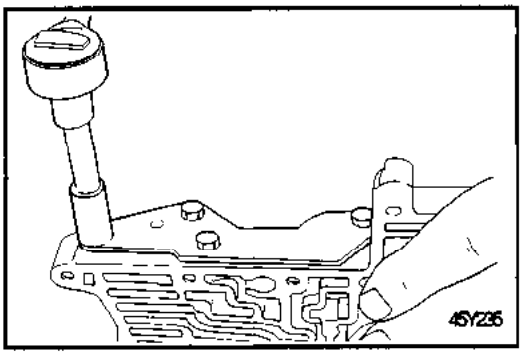
17. Remove the 2-3/4-3 shift spring and the shift valve.



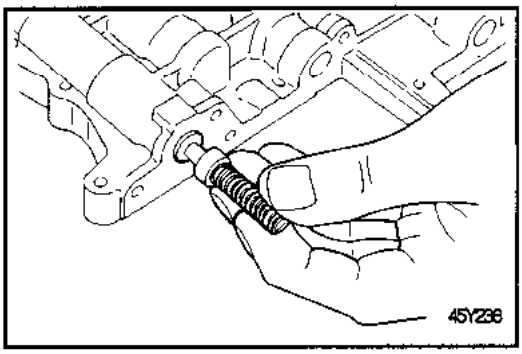
18. Remove, from the rear side of the upper valve body, the N-D plate, the N-D control sleeve and the N-D control valve.



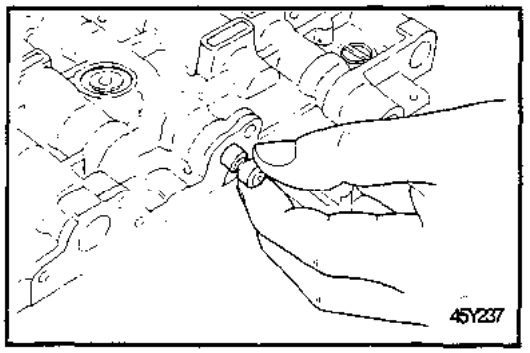
19. Remove the four bolts, and then remove the rear end cover.



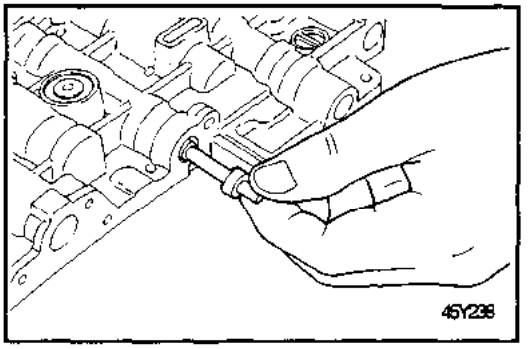
20. Remove the 1-2 shift spring and the 1-2 shift valve.



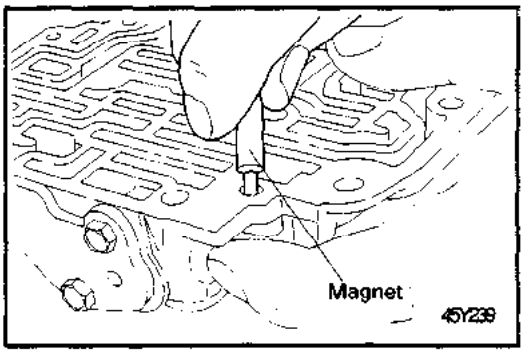
21. Remove shift-control plug B.



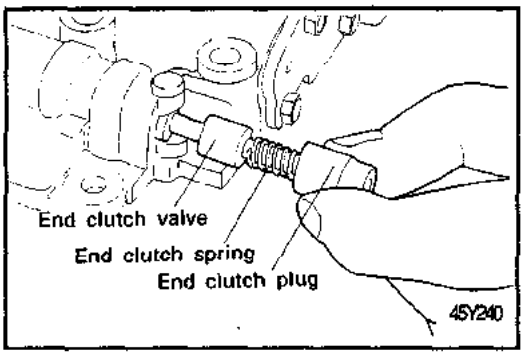
22. Remove the shift-control valve.



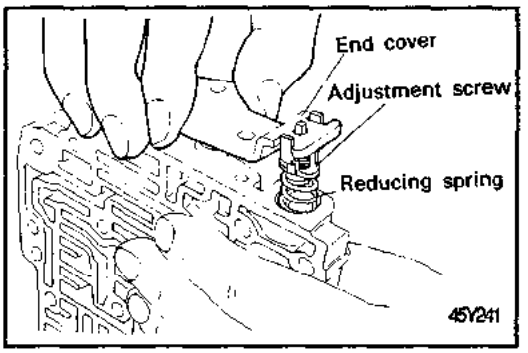
23. Using a magnet, extract the pin from the lower valve body, and then remove the stopper.



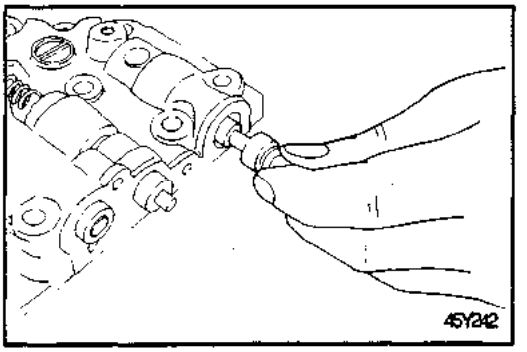
24. Remove the end clutch valve plug, end clutch spring, and end clutch valve.



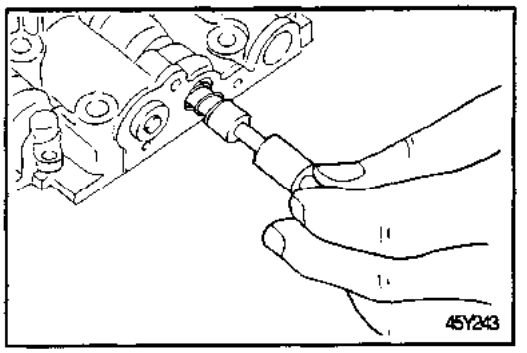
25. Remove the three bolts from the lower valve body, and then remove the end cover, adjustment screw, and reducing spring.



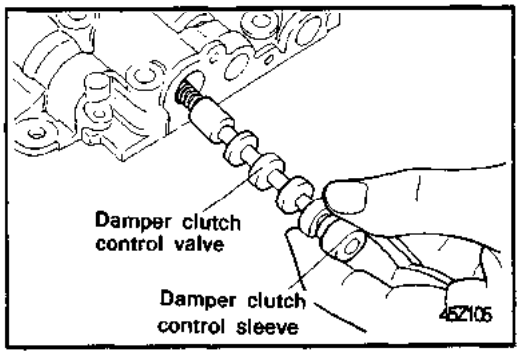
26. Remove the reducing valve.



27. Remove the N-R control/accumulator valve and the N-R con trol/accumulator spring.

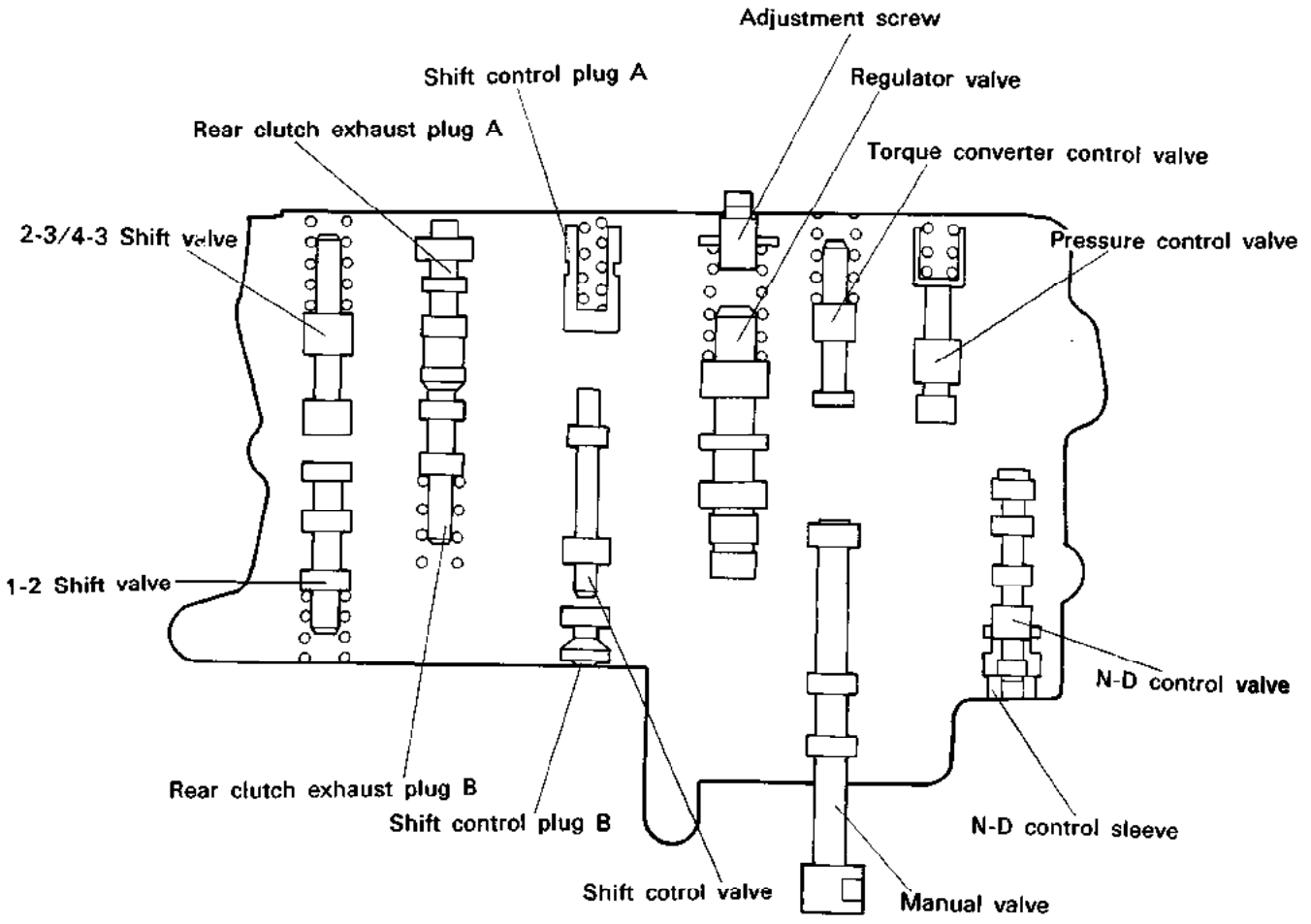


28. Remove the damper clutch control sleeve, damper clutch control valve, and the damper clutch control spring.

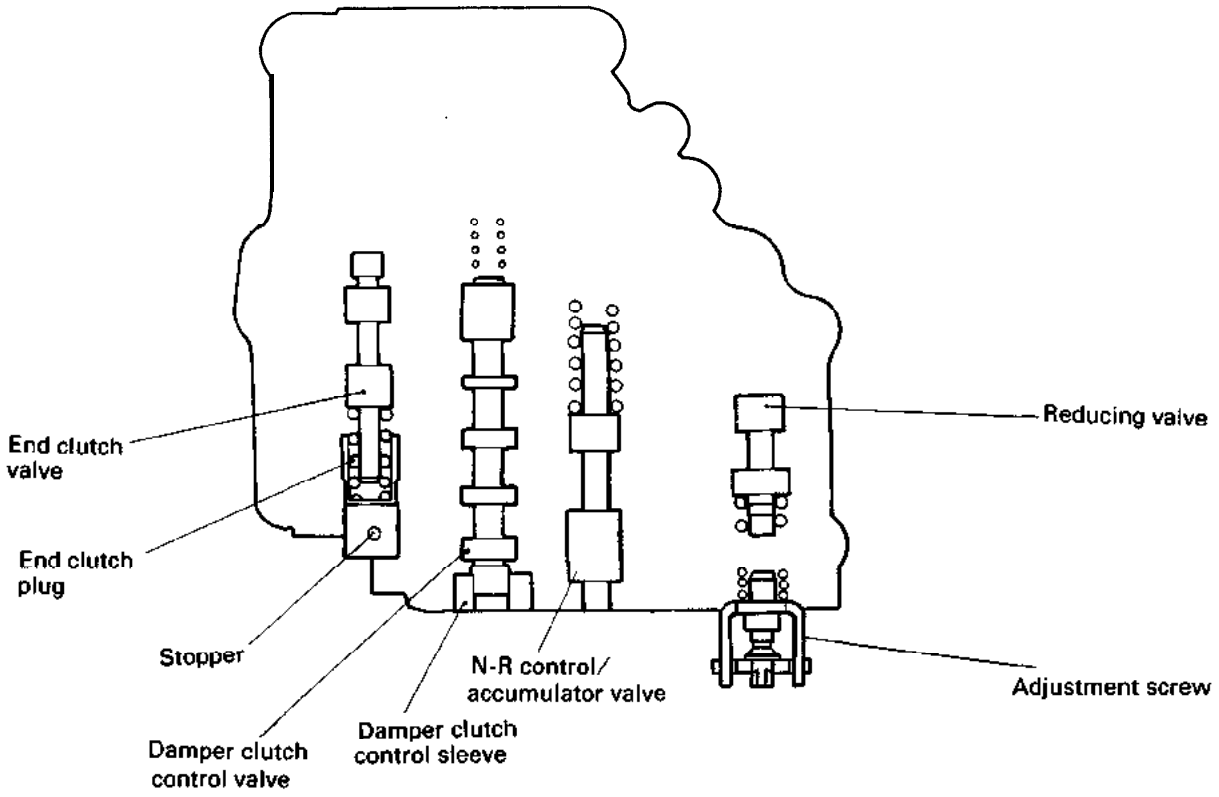


VALVE INSTALLATION POSITIONS

Upper Valve Body

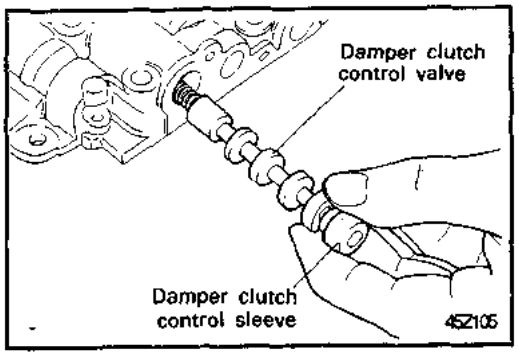


Lower Valve Body

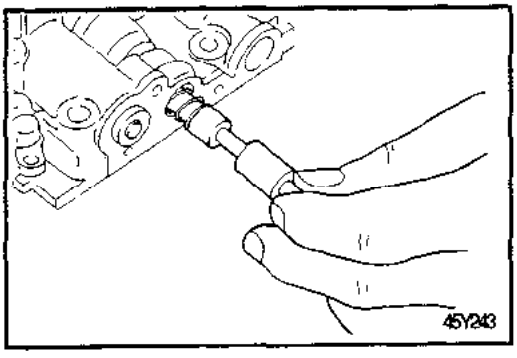


ASSEMBLY

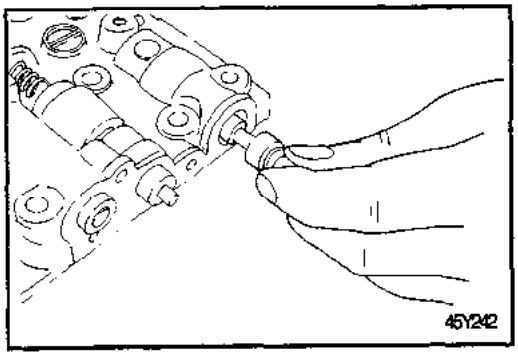
1. Install in the lower valve body, the damper clutch control spring, damper clutch control valve, and the damper clutch control sleeve.



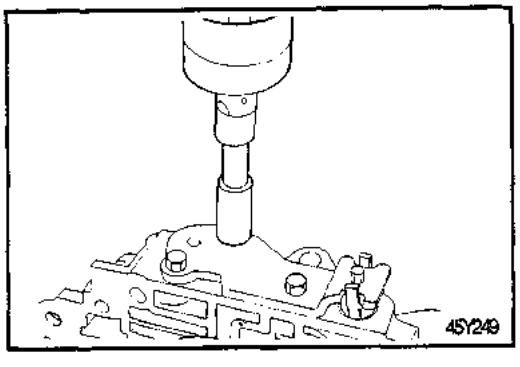
2. Install the N-R control/accumulator spring and the N-R control/accumulator valve.



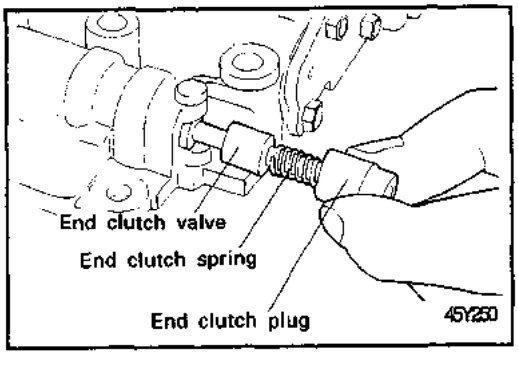
3. Install the reducing valve.



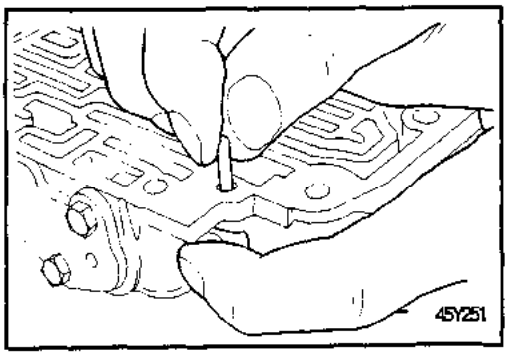
4. Install the reducing spring, adjustment screw, and end cover. Tighten the bolts to the specified torque.



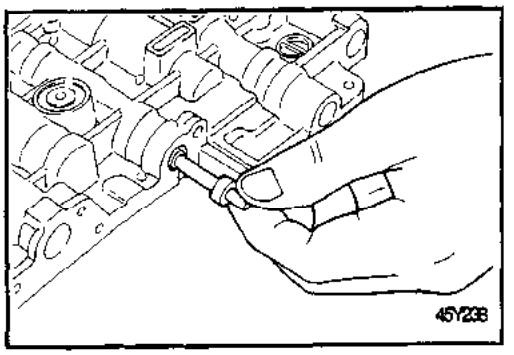
5. Install the end clutch valve, end clutch spring, and end clutch plug.



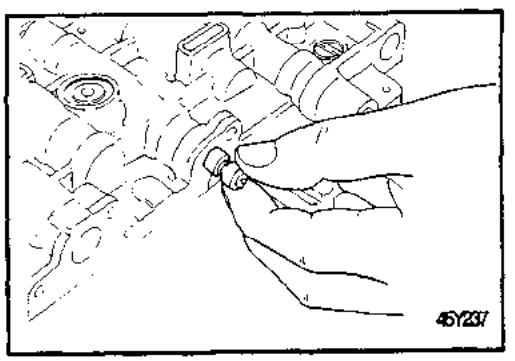
6. Install the stopper and secure it with the pin.



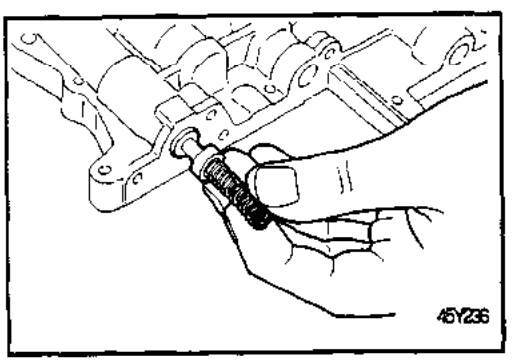
7. Install the 1-2 shift-control valve to the upper valve body.



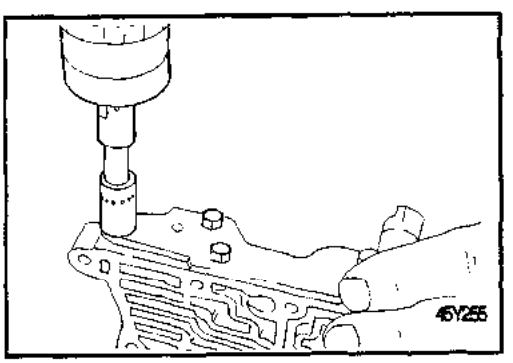
8. Install the 1-2 shift-control plug.



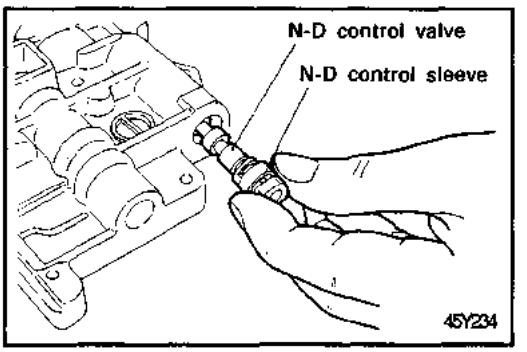
9. Install the 1-2 shift valve and 1-2 shift spring.



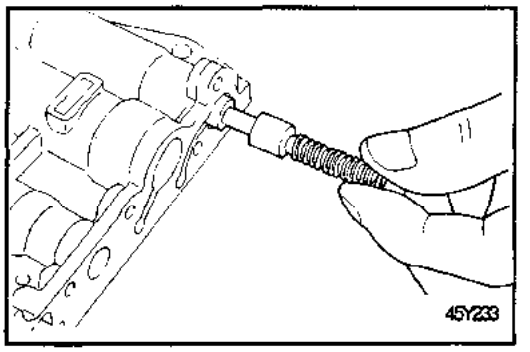
10. Install the rear and cover.



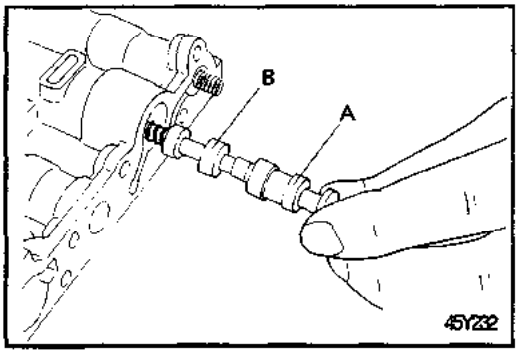
11. Install the N-D control valve, N-D control sleeve, and N-D plate.



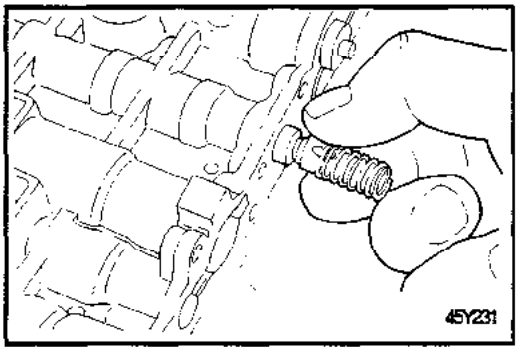
12. Install the 2-3/4-3 shift valve and the 2-3/4-3 shift spring.



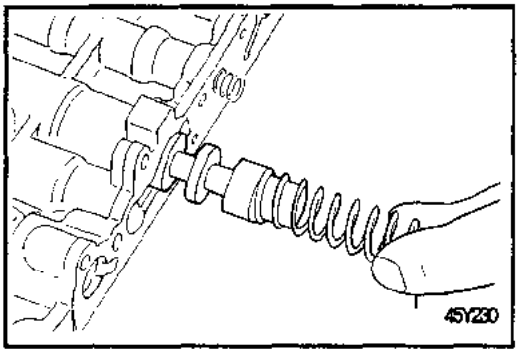
13. Install the rear clutch exhaust spring and rear clutch exhaust valves A and B.



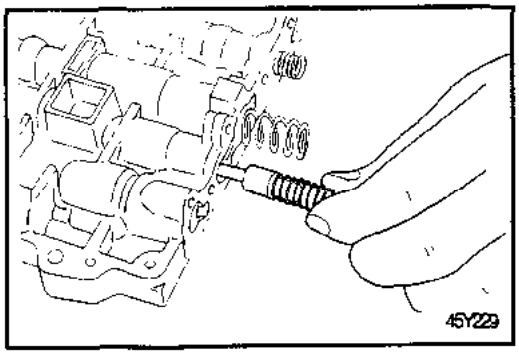
14. Install the shift-control valve and shift control spring.



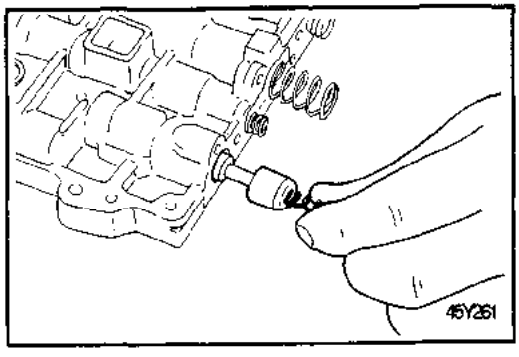
15. Install the regulator valve and regulator spring.



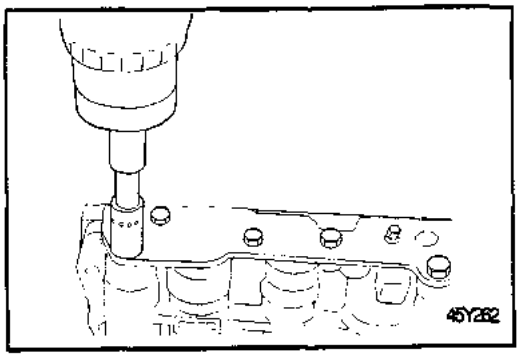
16. Install the torque converter control valve and torque converter control spring.



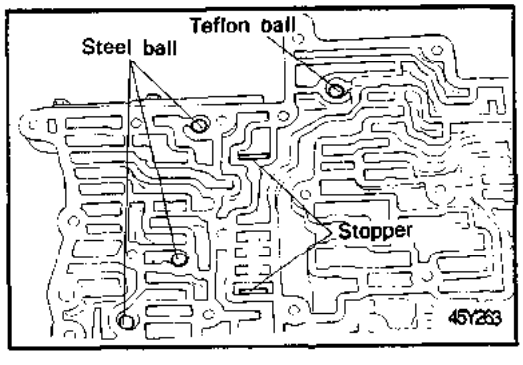
17. Install the pressure control valve and pressure control spring.



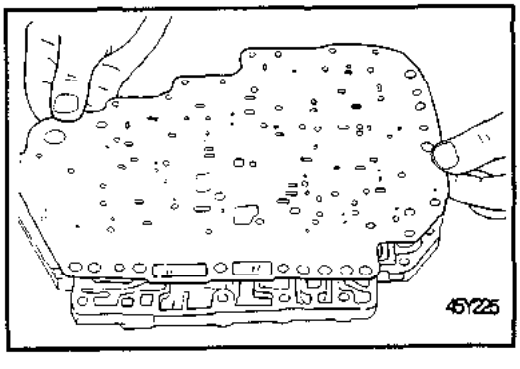
18. Install the adjustment screw and front end cover. Tighten the bolts to the specified torque.



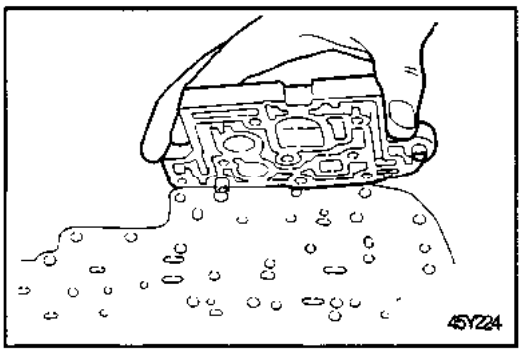
19. Install, in the upper valve body, the three steel balls, the teflon ball, and the stopper plate.



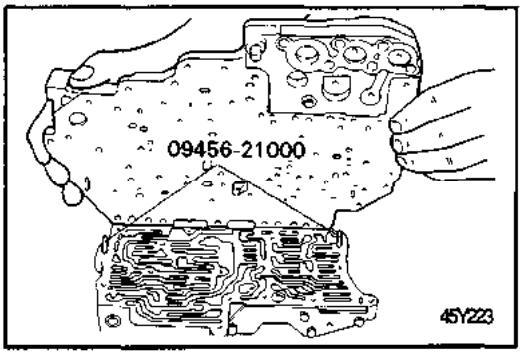
20. Install the upper separating plate.



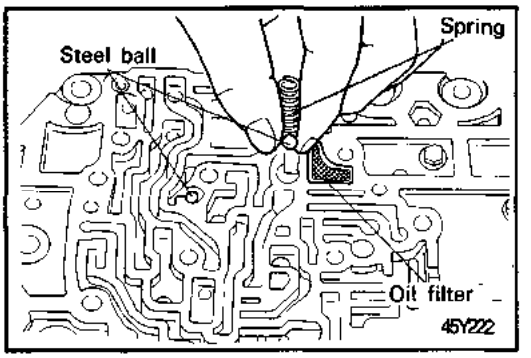
21. Install the block.



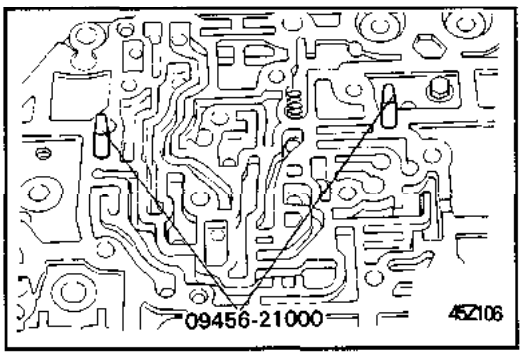
22. Install the special tool (09456-21000). Then, after securing the upper separating plate and the intermediate plate with the eight installation bolts, remove the special tool.



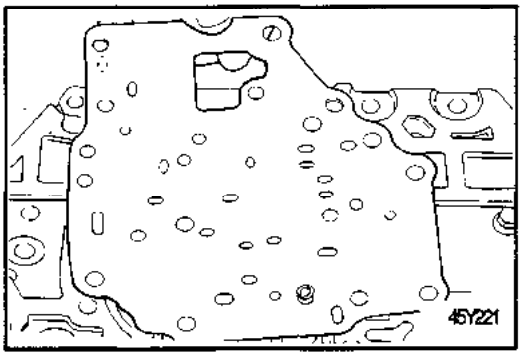
23. Install to the intermediate plate, the oil filter, the two steel balls, and the spring.



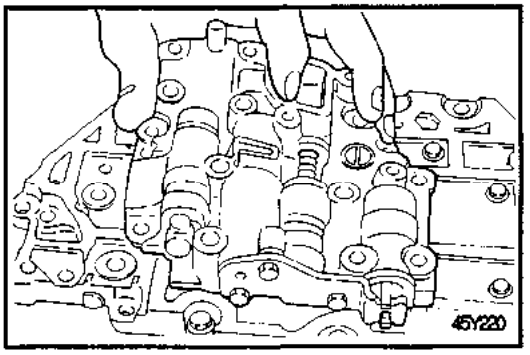
24. Install the special tool (09456-21000) to the intermediate plate.



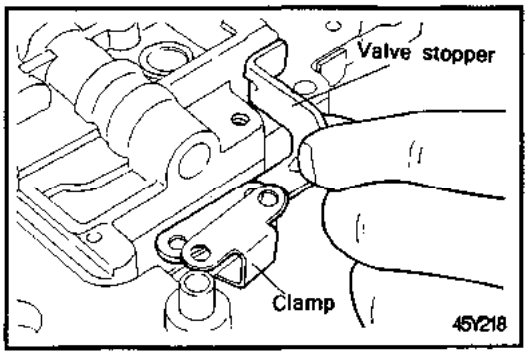
25. Install the separating plate.



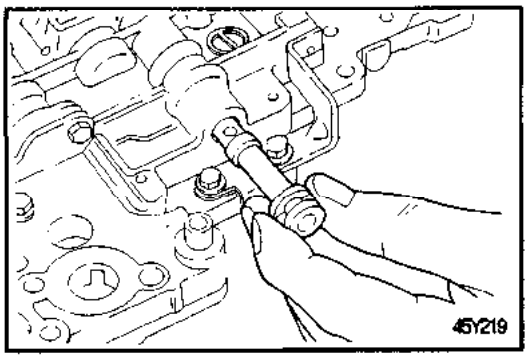
26. After securing the lower valve body using the 13 installation bolts, remove the special tool.



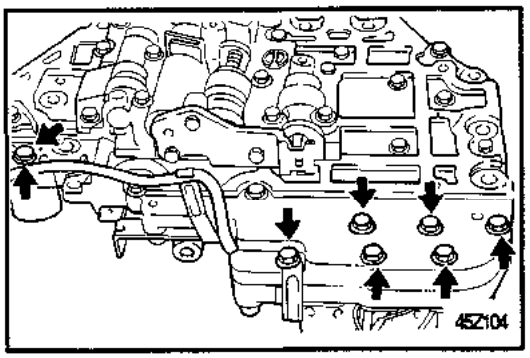
27. Install the valve stopper and clamp.



28. Install the manual valve.

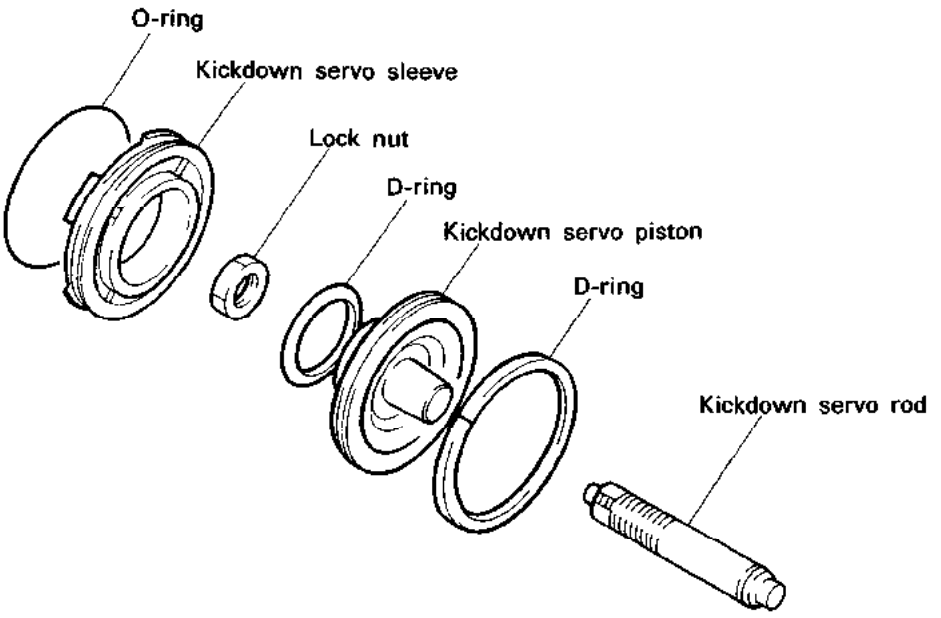


29. Secure the four solenoid valves using the installation bolts.



KICKDOWN SERVO

COMPONENTS

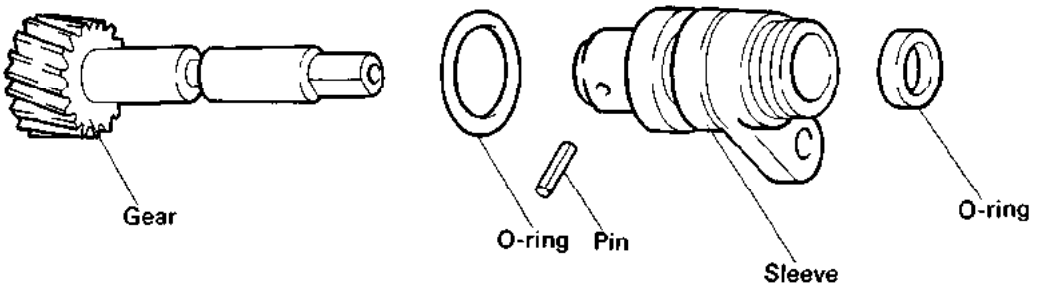


ASSEMBLY

1. Install the rod and nut to the kickdown servo piston.
2. Install two new D-rings (one large and one small) around the circumference of the piston, and then apply a coating of ATF to the D-rings.
3. Install the kickdown servo piston in the sleeve.
4. Install a new O-ring around the circumference of the sleeve, and apply a coating of ATF to the O-ring.

SPEEDOMETER SLEEVE

COMPONENTS



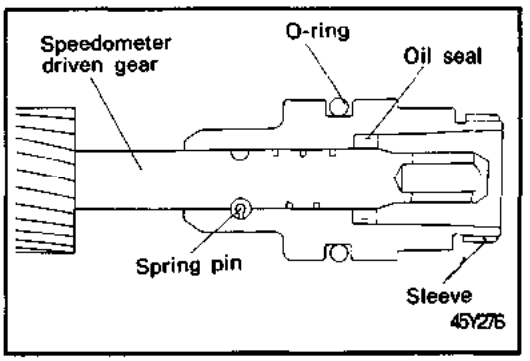
DISASSEMBLY

Drive the spring pin out, and disassemble the gear and sleeve.

NOTE:
Do not reuse the O-rings and spring pin.

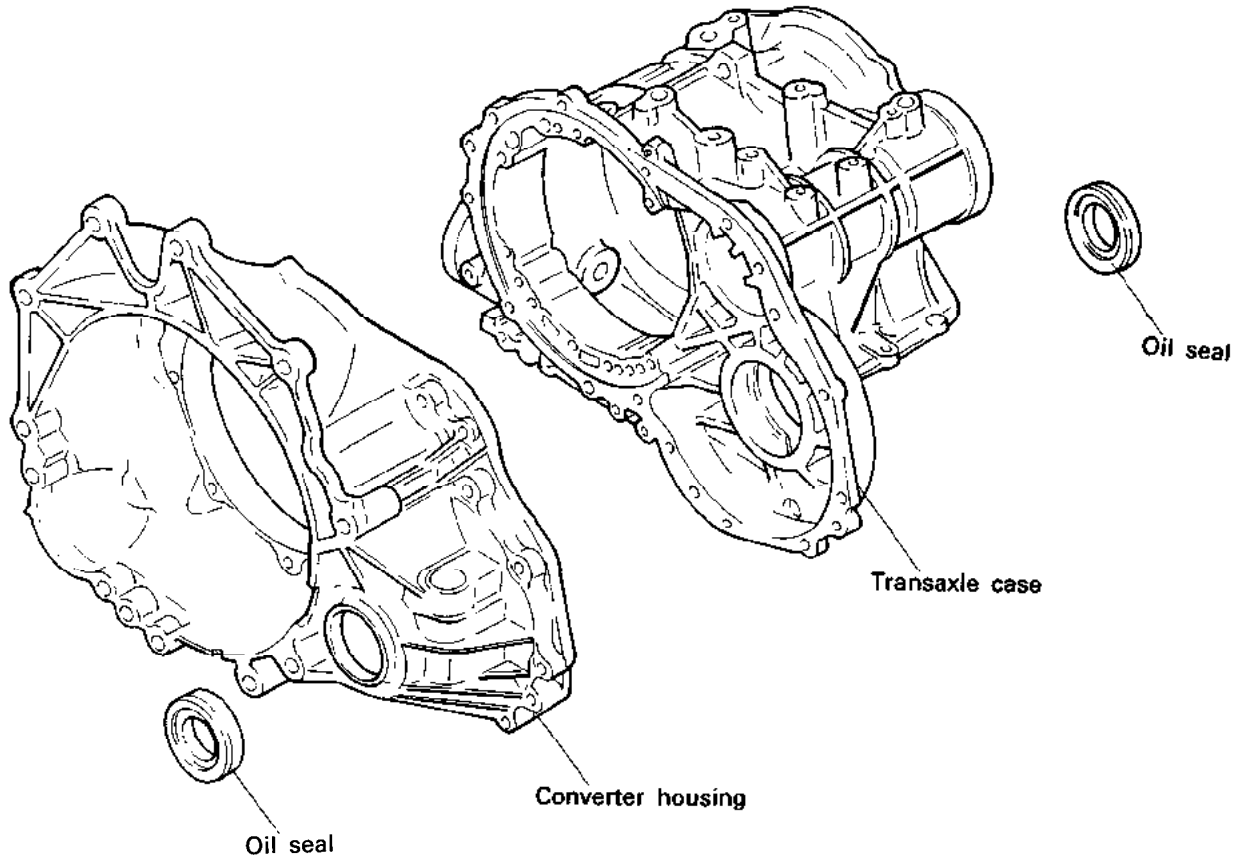
ASSEMBLY

1. Install a new O-ring to the shaft part of the gear, and apply ATF to the O-ring.
2. Insert the gear into the sleeve, and align the pin hole and the groove of the gear's shaft.
3. Tap a new spring pin into the sleeve. When tapping it in, be sure that the slit is not at the gear side.
4. Install a new O-ring into the outer groove of the sleeve, and apply a coating of ATF to the outer circumference of the O-ring.



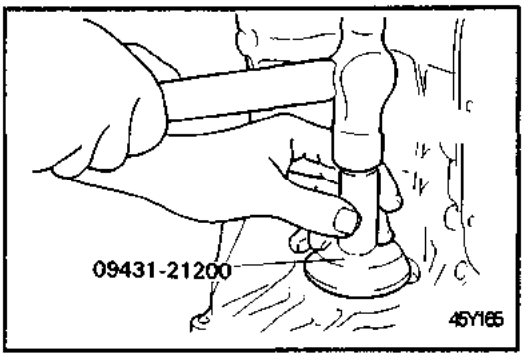
TRANSAXLE CASE

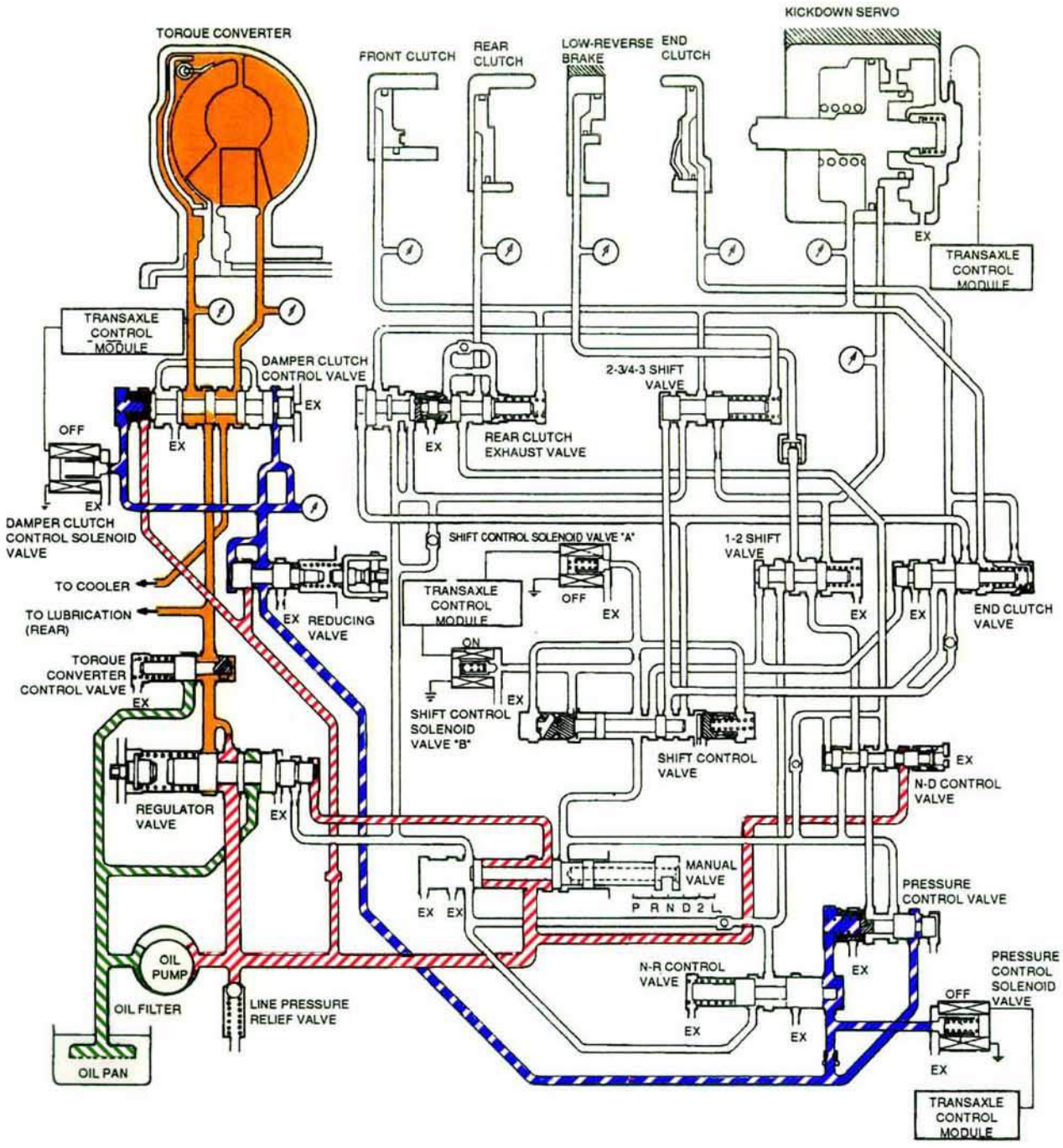
COMPONENTS



ASSEMBLY

1. Using the special tool (09431-21200), drive the shaft oil seal into the transaxle case.



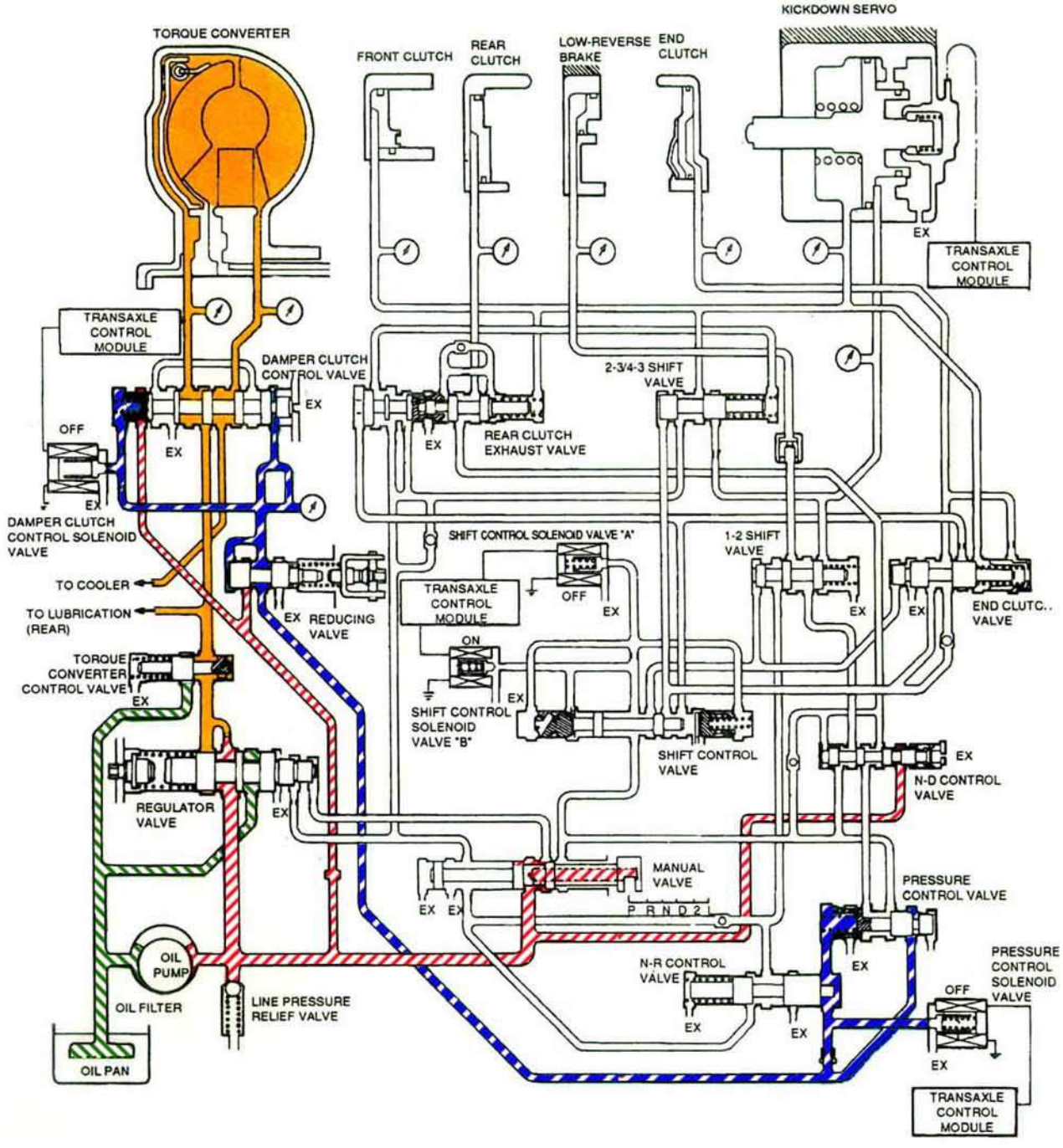


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE

NEUTRAL

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

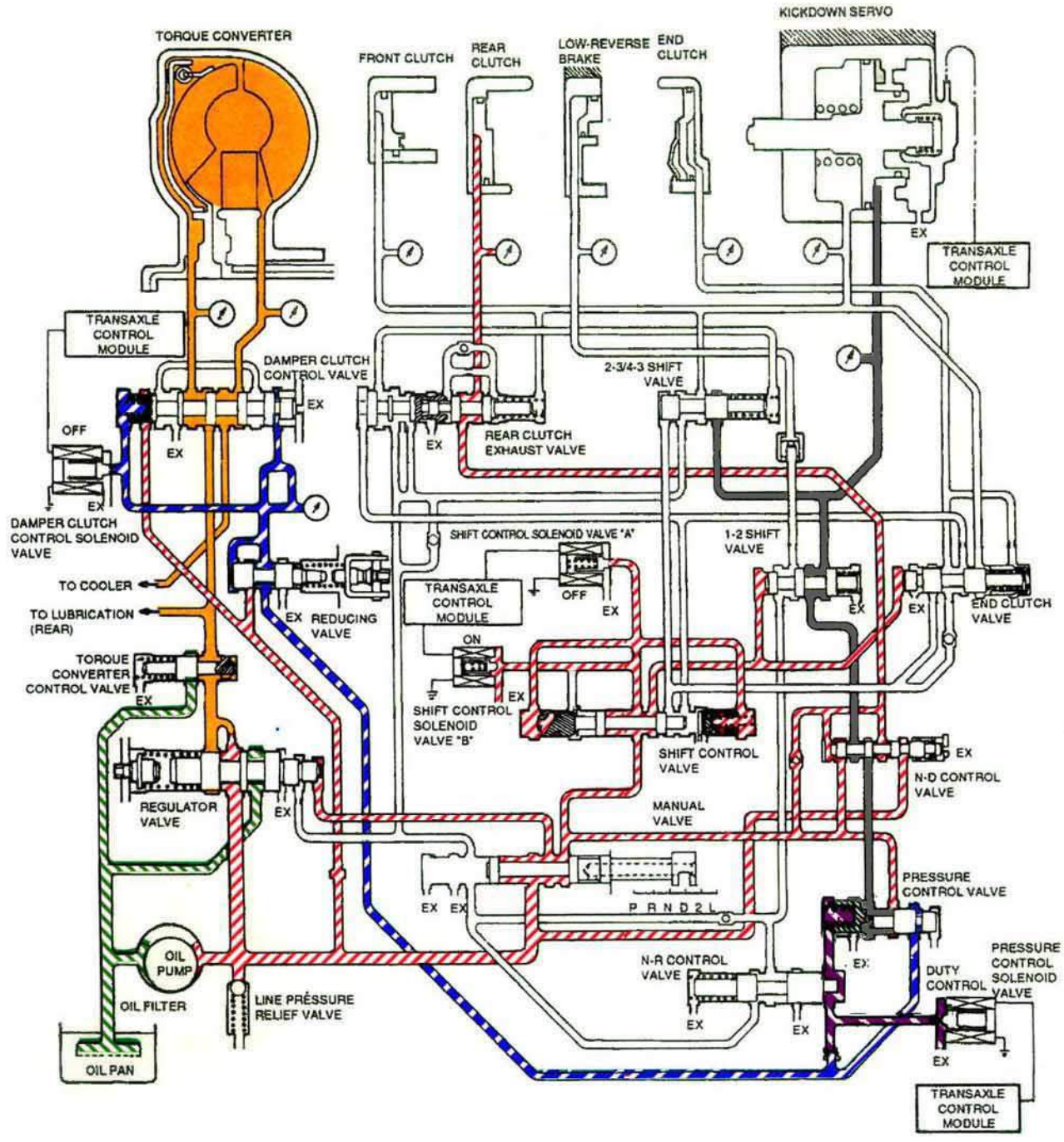


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE

PARKING

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

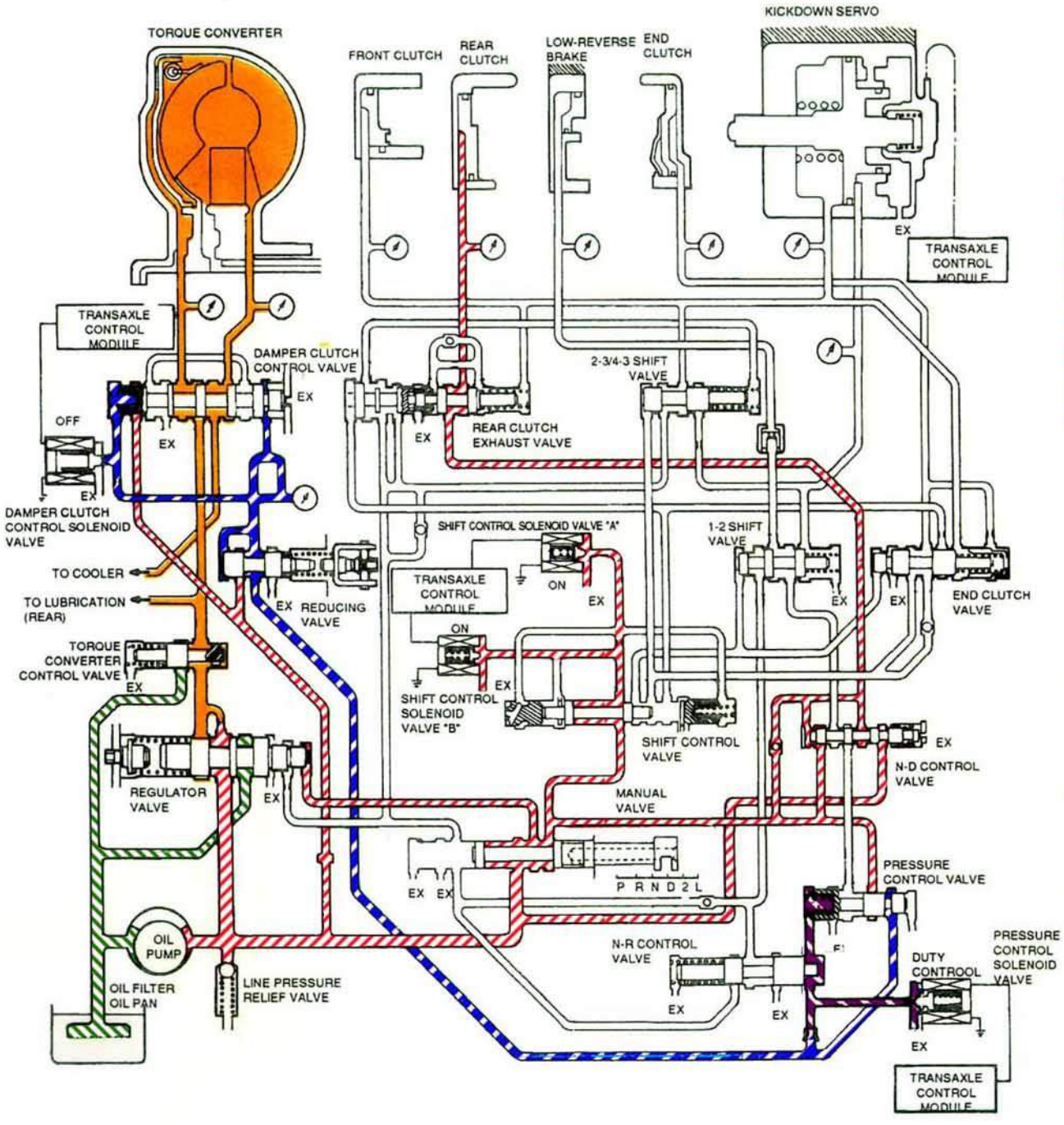


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- LINE PRESSURE (SECOND HOLD PRESSURE)
- CONTROL PRESSURE

DRIVE (STOPPING)

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

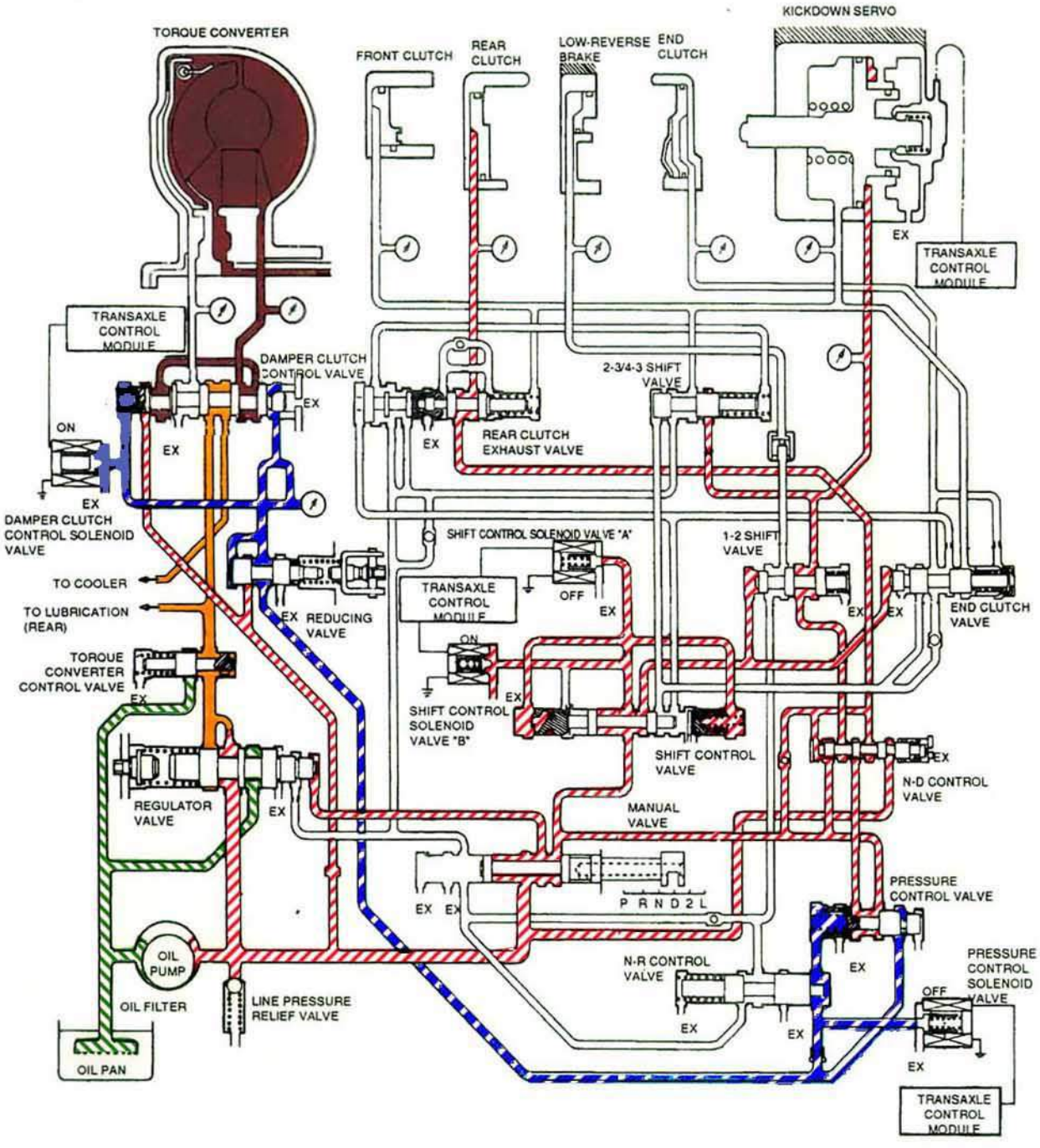


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- CONTROL PRESSURE

DRIVE (FIRST)

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

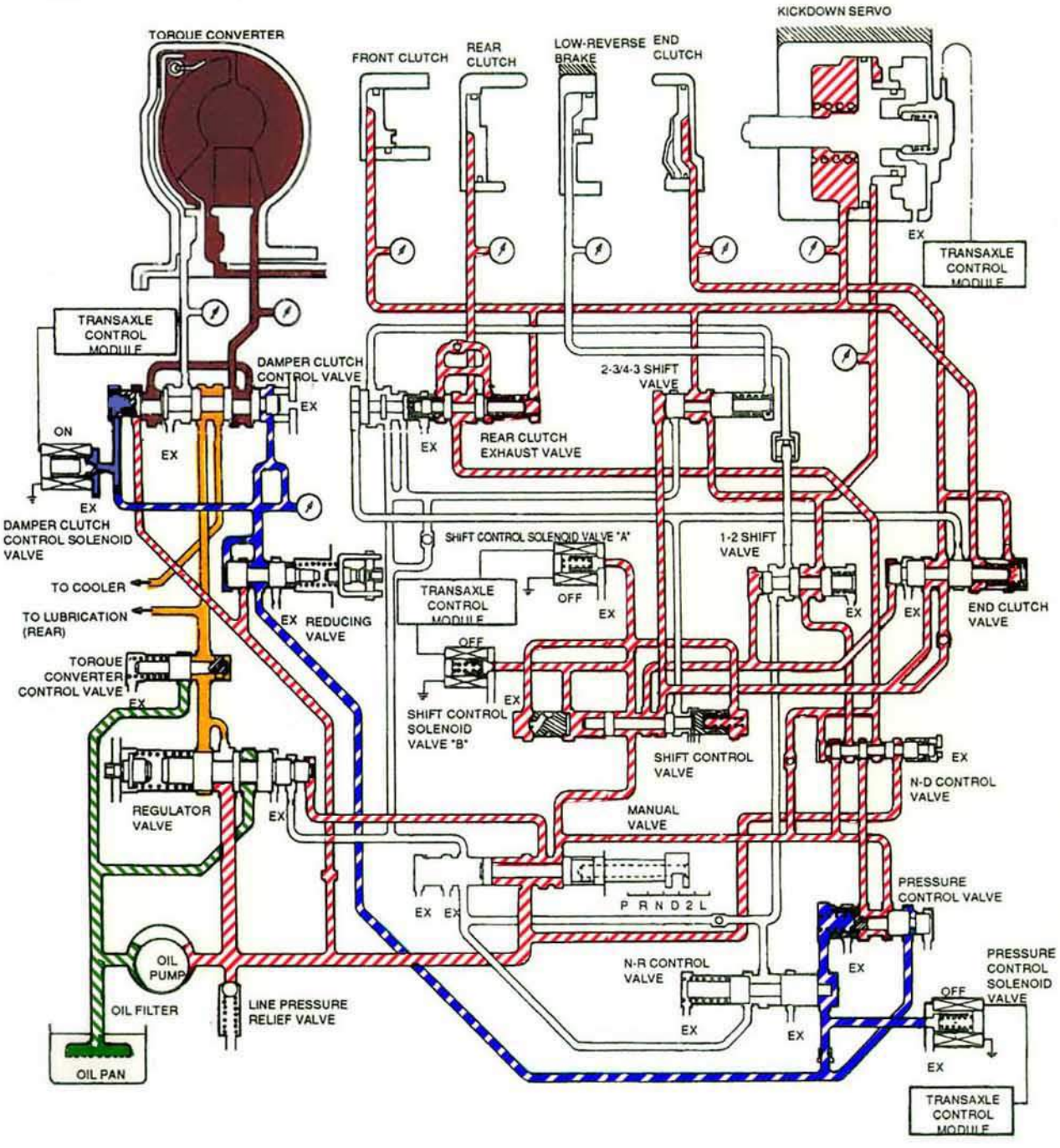


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- DAMPER CLUTCH PRESSURE
- DAMPER CLUTCH CONTROL SOLENOID VALVE PRESSURE

DRIVE (SECOND)

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

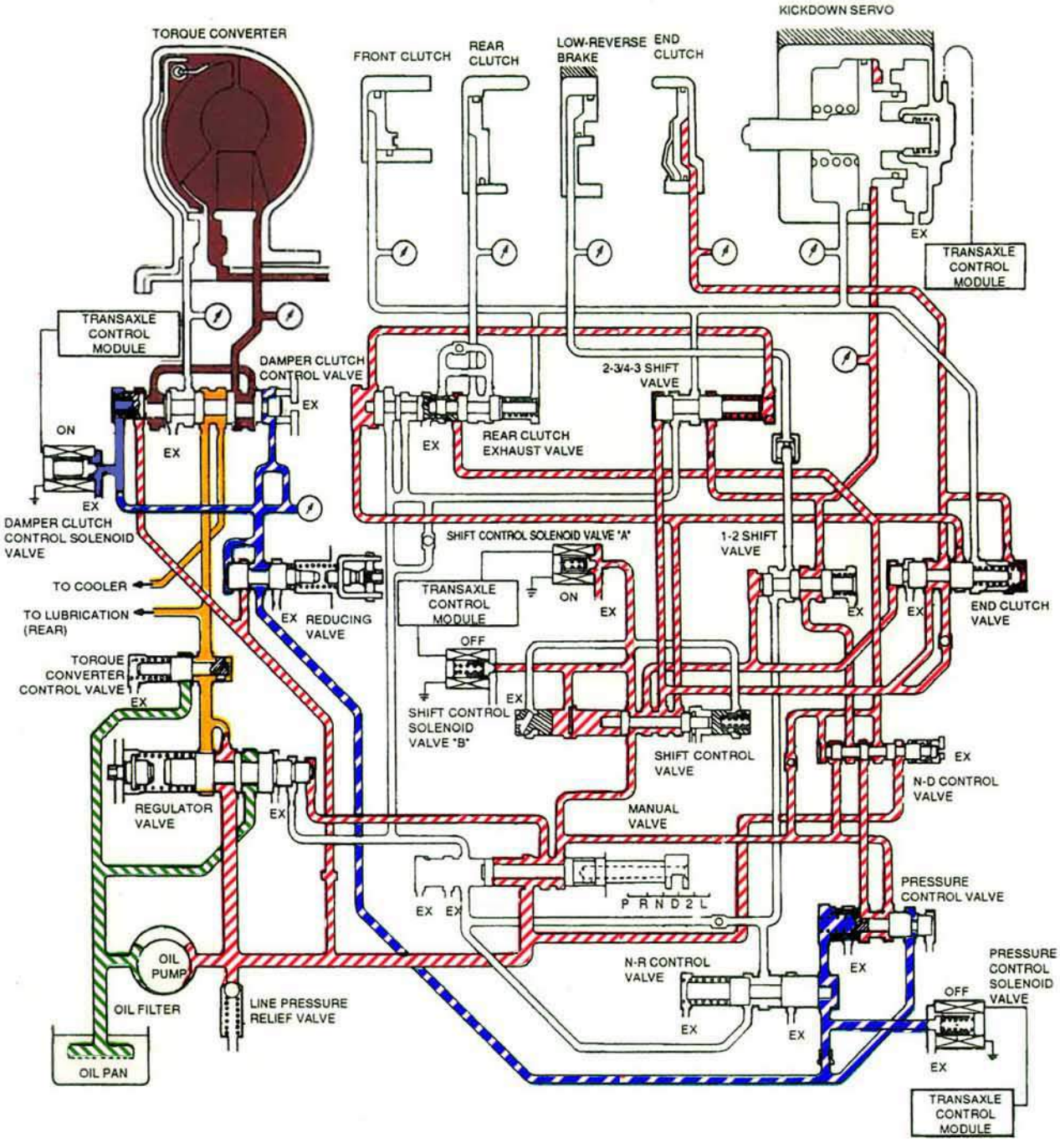


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- DAMPER CLUTCH PRESSURE
- DAMPER CLUTCH CONTROL SOLENOID VALVE PRESSURE

DRIVE (THIRD)

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

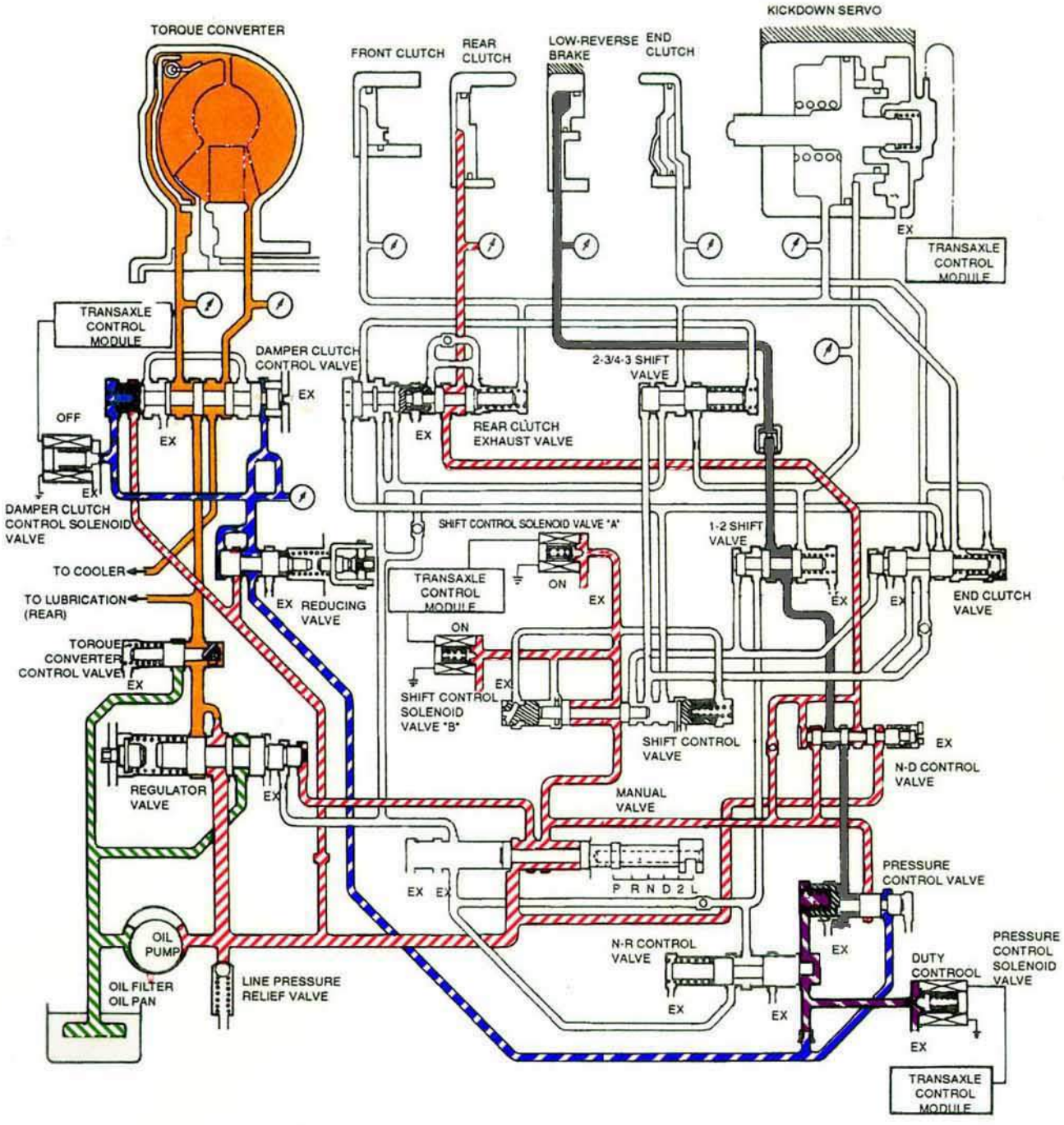


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- DAMPER CLUTCH PRESSURE
- DAMPER CLUTCH CONTROL SOLENOID VALVE PRESSURE

DRIVE (FOURTH)

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

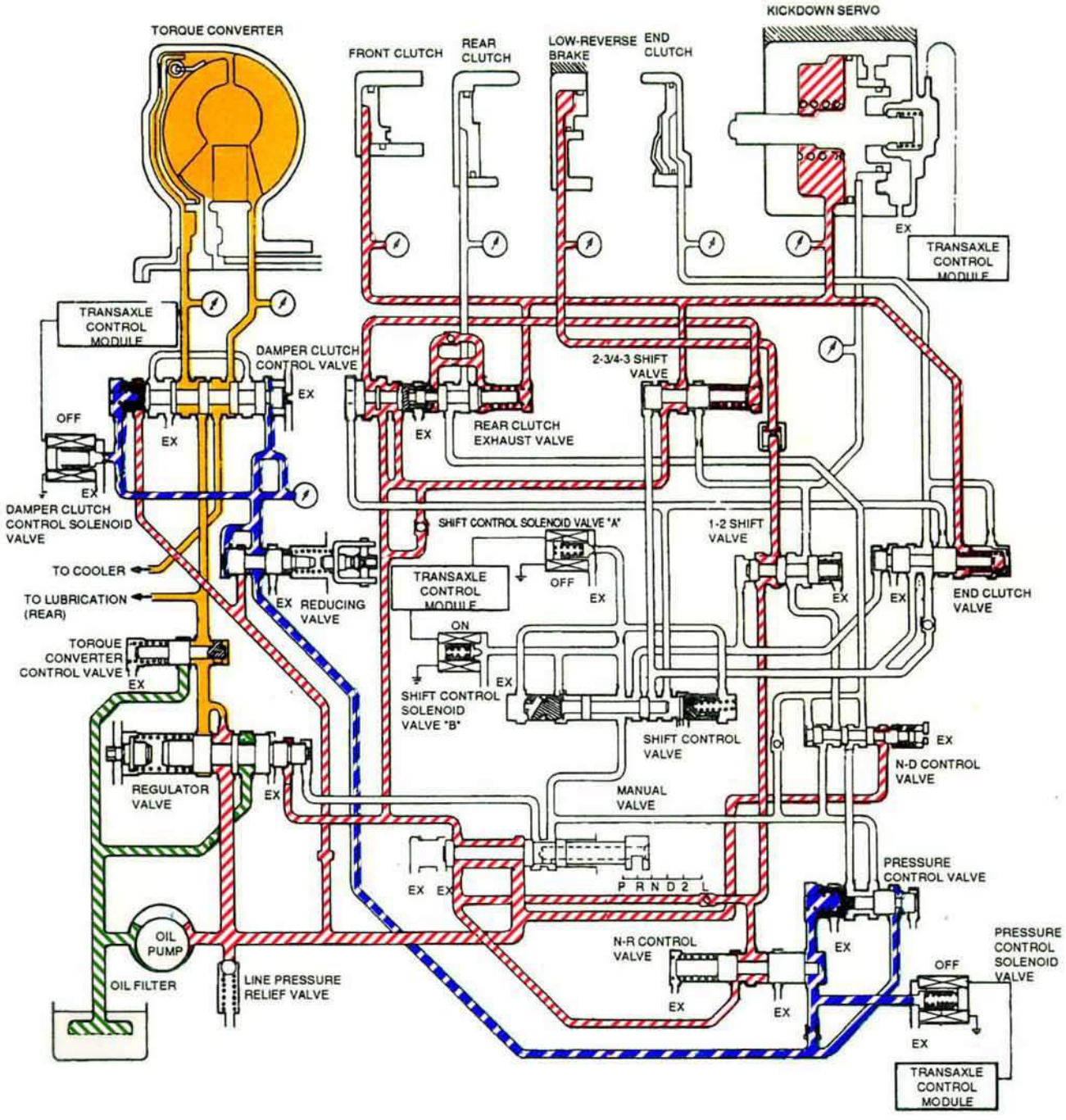


LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE
- LINE PRESSURE "L" RANGE
- CONTROL PRESSURE

LOCK UP

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT



LEGEND

- LINE PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE
- REDUCING PRESSURE
- PUMP SUCTION PRESSURE

REVERSE

AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT