

Transaxle/ Transmission

GENERAL	TR-2
AUTOMATIC TRANSAXLE SYSTEM	TR-18
MANUAL TRANSAXLE SYSTEM	TR-87
TRANSFER CASE ASSEMBLY	TR-105

NOTE : Overhaul procedures for automatic transaxle
is given in separate manual.

GENERAL

EMJA0010

SPECIFICATIONS(M/T)

Model	HTX	
Type	5 speeds forward, 1 reverse	
Gear ratio	First	3.917
	Second	1.950
	Third	1.300
	Fourth	0.941
	Fifth	0.750
	Reverse	3.462
Final gear ratio		4.563

SERVICE STANDARD

EMJA0020

Standard value	mm (in.) (T=tightness, L=looseness)
Differential side bearing end play	0.10T-0.20T (0.0039T-0.0078T)
Gear backlash in differential	0.025L-0.150L (0.00095L-0.0057L)
Input rear bearing snap ring end play	0-0.1L (0-0.0039L)
Output rear bearing snap ring end play	0.03L-0.1L (0.00114L-0.0039L)

TIGHTENING TORQUE

EMJA0030

Item	Nm	Kg.cm	lb.ft
Release bearing sleeve bolt	6-8	60-80	4-6
Release cylinder assembly	15-22	150-220	11-16
Select lever	20-27	200-270	15-20
Oil drain plug	40-60	400-600	29-43
Interlock bolt	43-50	430-500	32-36
Clutch housing case	44-55	440-550	32-40
Speedometer driven gear	4-6	40-60	3-4
Reverse idler bolt	43-55	430-550	32-40
Rear cover	20-25	200-250	15-18
Shift control cable bracket	20-27	200-270	15-20
Transaxle case bolt	44-55	440-550	26-40
Shift lever mounting bolt	20-27	200-270	15-20
Front roll stopper bracket to subframe bolts	40-50	400-500	29-36
Front roll stopper insulator bolt and nut	50-65	500-650	36-47
Front roll stopper bracket to transaxle bolts	60-80	600-800	43-58
Rear roll stopper bracket to subframe bolts	40-55	400-550	29-40
Rear roll stopper insulator bolt and nut	50-65	500-650	36-47
Rear roll stopper bracket to transaxle bolts	60-80	600-800	43-58
Transaxle mounting sub bracket nut	60-80	600-800	43-58
Transaxle mounting bracket bolts	40-55	400-550	29-40
Transaxle mounting insulator bolt	90-110	900-1100	65-80
Front bearing retainer & detent body cover bolt	15-22	150-220	10-16
Detent spring lock nut	15-21	150-210	10-16
Output shaft lock nut	150-220	1500-2200	10-16

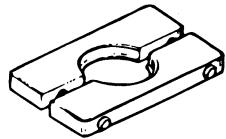
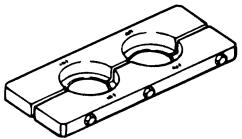
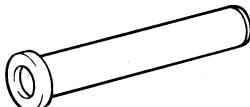
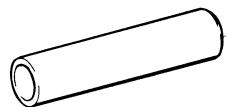
LUBRICATIONS

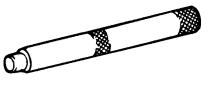
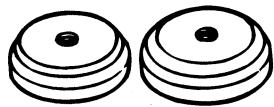
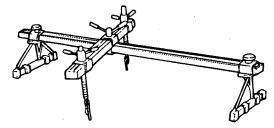
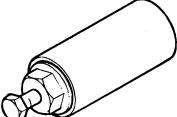
EMJA0040

Item	Recommended lubricant	Quantity
Transaxle gear oil lit. (U.S. Imp.qts.)	Hypoid gear oil, SAE 75W/90, API-GL4	2.3 (2.4, 1.9)
Transaxle input shaft spline	CASMOLY L9508	As required
Transaxle oil seal lip	RETINAX AM, MOLYTEX GREASE EP-2	As required
Transaxle case and clutch housing alignment surface	THREE BOND 1216	As required
Transaxle case and rear cover alignment surface	THREE BOND 1216	As required
Bearing retaining bolt (flush bolt only)	THREE BOND1303	As required

SPECIAL TOOLS

EMJA0050

Tool(Number and Name)	Illustration	Use
09431-39000 Oil seal installer	 EMJA005A	Installation of differential oil seal (use with 09500-11000)
09455-33200 Bearing installer	 EMJA005B	Installation of output gear, bearing, sleeve
09433-21000 Bearing plate	 EMJA005C	Removal of differential bearing
09455-33200 Bearing installer	 V5MT007E	Removal of input shaft bearing Removal of output shaft bearing
09457-22100 Bearing installer	 EMJA005D	Installation of input shaft bearing
09432-21500 Oil seal installer	 EMJA005E	Installation of input shaft oil seal
09532-11500 Outer race installer	 EMJA005F	Installation of differential bearing race (use with 09500 -11000)
09500-11000 Driver	 EMJA005G	Installation of bearing outer race

Tool(Number and Name)	Illustration	Use
09495-33000 Bearing and gear puller	 V5MT077G	Removal of ball bearing and gear
09500-21000 Driver	 EMJA005H	Installation of input shaft bearing
09532-32000 Pinion bearing outer race installer	 EMJA005I	Installation of bearing outer race (use with 09500-21000)
09200-38001 Engine support fixture	 D0038001	Removal and installation of transaxle
09432-3A000 Output shaft puller	 EMJA005J	Removal of output shaft

TROUBLESHOOTING

EMA90060

Symptom	Probable cause	Remedy
Vibration, noise	Loose or damaged transaxle and engine mounts Inadequate shaft end play Worn or damaged gears Use of an inadequate grade of oil Low oil level Inadequate engine idle speed	Tighten or replace the mounts Correct end play Replace gears Replace with specified oil Replenish Adjust idle speed
Oil leakage	Broken or damaged oil seal or O-ring	Replace oil seal or O-ring
Hard shift	Faulty control cable Poor contact or wear of synchronizer ring and gear cone Weakened synchronizer spring Use of an inadequate grade of oil	Replace control cable Correct or replace Replace synchronizer spring Replace with specified oil
Jumps out of gear	Worn gear shift fork or broken poppet spring Synchronizer hub to sleeve spline clearance too large	Replace shift fork or popet spring Replace synchronizer hub and sleeve

SPECIFICATIONS(A/T)

EKJB0010

Item	F4A42-2	F4A51-2
Torque converter type	3-element, 1-stage, 2-phase type	
Transmission type	4-speed forward, 1-speed reverse	
Engine displacement	2.0D	2.4D, 2.7D
Gear ratio		
1st	2.842	2.842
2nd	1.529	1.495
3rd	1.000	1.000
4th	0.712	0.731
Reverse	2.480	2.720
Final gear ratio	4.407	4.520

SERVICE SPECIFICATIONS

EKJA0020

Items	Standard value
Output shaft preload	0.01-0.09 mm
Brake reaction plate end play	0-0.16 mm
Low-reverse brake end play	1.65-2.11 mm
Second brake end play	0.79-1.25 mm
Underdrive sun gear end play	0.25-0.45 mm
Input shaft end play	0.25-0.45 mm
Differential case preload	0.045-0.105 mm
Underdrive clutch end play	1.65-1.85 mm
Reverse and overdrive clutch return spring end play	0-0.09 mm
Overdrive clutch end play	1.6-1.8 mm
Reverse clutch end play	1.5-1.7 mm
Backlash between differential side gear and pinion	0.025-0.150 mm

TIGHTENING TORQUE

EKJA0030

Item	Nm	kg·cm	lb·ft
Wiring harness bracket	20-26	200-260	14-18
Control cable bracket bolt	20-26	200-260	14-18
Fluid temperature sensor	27-33	270-330	19-23
Eye bolt	10-12	100-120	7-8
Oil cooler feed tube	11-13	110-130	8-9
Oil filter	10-12	100-120	7-8
Input shaft speed sensor	10-12	100-120	7-8
Output shaft speed sensor	18-25	180-250	13-18
Manual control lever	10-12	100-120	7-8
Transaxle range switch	4-6	40-60	3-4
Speedometer gear	8-10	80-100	6-7
Valve body cover	10-12	100-120	7-8
Valve body mounting bolt	10-12	100-120	7-8
Manual control shaft detent	5-7	50-70	4-5
Rear cover	20-26	200-260	14-18
Torque converter housing	42-54	420-540	29-38
Oil pump	20-261	200-260	14-18
Transfer drive gear	6-22	160-220	11-15
Output shaft lock nut	160-180	1600-1800	110-126
Output shaft bearing retainer	20-26	200-260	14-18
Oil filler plug	29-34	290-340	20-24
Oil drain plug	29-34	290-340	20-24
Transfer drive gear lock nut	180-210	1800-2100	126-147
Differential drive gear to subframe bolts	130-140	1300-1400	91-98
Valve body	10-12	100-120	7-8
Solenoid valve support	5-7	50-70	4-5
Plate	5-7	50-70	4-5
Pressure check plug	8-10	80-100	6-7
Front roll stopper bracket to subframe bolts	40-55	400-550	29-38
Front roll stopper insulator bolt and nut	50-65	500-650	36-47
Front roll stopper bracket to transaxle bolts	60-80	600-800	43-58
Rear roll stopper bracket	40-55	400-550	29-38
Rear roll stopper insulator bolt and nut	50-60	500-650	36-47
Rear roll stopper bracket to transaxle bolts	60-80	600-800	43-58

Item	Nm	kg·cm	lb·ft
Transfer case assembly to transaxle mounting bolt	64-70	640-700	47-51
Transfer case bracket bolt	24-28	240-280	17-20
Transfer case assembly to engine block	50-54	500-540	36-39
Transfer case oil drain plug	34-38	340-380	25-28
Transfer case oil filler plug	34-38	340-380	25-28
Transfer case flange bolt	34-37	340-370	25-28
Pinion case flange bolt	34-37	340-370	25-28
Transaxle mounting sub bracket nut	60-80	600-800	43-58
Transaxle mounting bracket bolts	40-55	400-550	29-38
Transaxle mounting insulator bolt	90-110	900-1100	65-80

EKJB0040

LUBRICATIONS

Items	Specified lubricant	Quantity
Transaxle fluid lit. (U.S. qts., Imp,qts.)	GENUINE DIAMOND ATF SP-II M	8.5 (8.9,7.5) : F4A51 7.8 (8.2,6.9) : F4A42
Transfer case oil	SHELL SPIRAX AX (SAE 80W/90, API GL-5)	0.8L
Inner Hollow shaft	KLUBER MICROLUBE GNY 202	As required
Outer Hollow shaft	KLUBER MICROLUBE GNY 202	As required

SEALANTS

Items	Specified sealant
Rear cover	Hyundai genuine sealant TB1281B or equivalent
Torque converter housing	Hyundai genuine sealant TB1281B or equivalent
Valve body cover	Hyundai genuine sealant TB1281B or equivalent

**SNAP RING FOR ADJUSTMENT AND
SPACER**

EKJA0050

Part name	Thickness mm	Identification Symbol
Thrust washer (For adjustment of input shaft end play)	1.8 2.0 2.2 2.4 2.6 2.8	18 20 22 24 26 28
Snap ring (For adjustment of underdrive clutch and overdrive clutch end plays)	1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0	None Blue Brown None Blue Brown None Blue Brown None Blue Brown None Blue Brown
Snap ring (For adjustment of low-reverse brake and second brake reaction plates end plays)	2.2 2.3 2.4 2.5	Blue Brown None Blue
Pressure plate (For adjustment of low-reverse brake and second brake end plays)	1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0	6 1 0 2 4 6 8 D

Part name	Thickness mm	Identification Symbol
Snap ring (For adjustment of reverse clutch end play)	1.9	None
	2.0	Blue
	2.1	Brown
	2.2	None
	2.3	Blue
	2.4	Brown
	2.5	None
	2.6	Blue
	2.7	Brown
	2.8	None
Snap ring (For adjustment of reverse clutch and overdrive clutch spring retainers end plays)	1.48	Brown
	1.53	None
	1.58	Blue
	1.63	Brown
Thrust race (For adjustment of underdrive sun gear end play)	1.6	-
	1.7	-
	1.8	-
	1.9	-
	2.0	-
	2.1	-
	2.2	-
	2.3	-
	2.4	-
	2.5	-
	2.6	-

Part name	Thickness mm	Identification Symbol
Spacer (For adjustment of output shaft preload)	1.88	88
	1.92	92
	1.96	96
	2.00	00
	2.04	04
	2.08	08
	2.12	12
	2.16	16
	2.20	20
	2.24	24
	2.28	28
	2.32	32
	2.36	36
	2.40	40
	2.44	44
	2.48	48
	2.52	52
	2.56	56
	2.60	60
	2.64	64
	2.68	68
	2.72	72
	2.76	76

Part name	Thickness mm	Identification Symbol
Spacer (For adjustment of differential case preload)	0.71	71
	0.74	74
	0.77	77
	0.80	80
	0.83	83
	0.86	86
	0.89	89
	0.92	92
	0.95	95
	0.98	98
	1.01	01
	1.04	04
	1.07	07
	1.10	J
	1.13	D
	1.16	K
	1.19	L
	1.22	G
	1.25	M
	1.28	N
	1.31	E
	1.34	O
	1.37	P
Spacer (For adjustment of backlash between differential side gear and pinion)	0.75 - 0.82	-
	0.83 - 0.92	-
	0.93 - 1.00	-
	1.01 - 1.08	-
	1.09 - 1.16	-

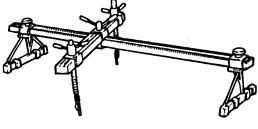
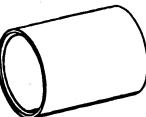
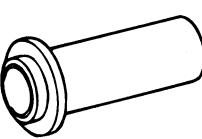
Part name	Thickness mm	Identification Symbol
Spacer (For adjustment of pinion assembly endplay equipped with transfer case)	1.25 - 1.28	-
	1.29 - 1.32	-
	1.33 - 1.36	-
	1.37 - 1.40	-
	1.41 - 1.44	-
	1.45 - 1.48	-
	1.49 - 1.52	-
	1.53 - 1.56	-
	1.57 - 1.60	-
	1.61 - 1.64	-
	1.65 - 1.68	-
	1.69 - 1.72	-
	1.73 - 1.76	-
	1.77 - 1.80	-
	1.81 - 1.84	-
	1.85 - 1.88	-
	1.89 - 1.92	-
	1.93 - 1.96	-
	1.97 - 2.00	-
	2.01 - 2.04	-
	2.05 - 2.08	-
	2.09 - 2.12	-
	2.13 - 2.16	-
	2.17 - 2.20	-
	2.21 - 2.24	-
	2.25 - 2.28	-
	2.29 - 2.32	-
	2.33 - 2.36	-

Part name	Thickness mm	Identification Symbol
Spacer (For adjustment of hypoid gear side end play equipped with transfer case)	1.30 - 1.33	-
	1.34 - 1.37	-
	1.38 - 1.41	-
	1.42 - 1.45	-
	1.46 - 1.49	-
	1.50 - 1.53	-
	1.54 - 1.57	-
	1.58 - 1.61	-
	1.62 - 1.65	-
	1.66 - 1.69	-
	1.70 - 1.73	-
	1.74 - 1.77	-
	1.78 - 1.81	-
	1.82 - 1.85	-
	1.86 - 1.89	-
	1.90 - 1.93	-
	1.94 - 1.97	-
	1.98 - 2.01	-
	2.02 - 2.05	-
	2.06 - 2.09	-
	2.10 - 2.13	-
	2.14 - 2.17	-
	2.18 - 2.21	-
	2.22 - 2.25	-
	2.26 - 2.29	-
	2.30 - 2.33	-
	2.34 - 2.37	-
	2.38 - 2.41	-
	2.42 - 2.45	-
	2.46 - 2.49	-
	2.50 - 2.53	-

Part name	Thickness mm	Identification Symbol
Spacer (For adjustment of viscous coupling right side end play equipped transfer case)	1.53 - 1.56	-
	1.57 - 1.60	-
	1.61 - 1.64	-
	1.65 - 1.68	-
	1.69 - 1.72	-
	1.73 - 1.76	-
	1.77 - 1.80	-
	1.81 - 1.84	-
	1.85 - 1.88	-
	1.89 - 1.92	-
	1.93 - 1.96	-
	1.97 - 2.00	-
	2.01 - 2.04	-
	2.05 - 2.08	-
	2.09 - 2.12	-
	2.13 - 2.16	-
	2.17 - 2.20	-
	2.21 - 2.24	-
	2.25 - 2.28	-
	2.29 - 2.32	-
	2.33 - 2.36	-

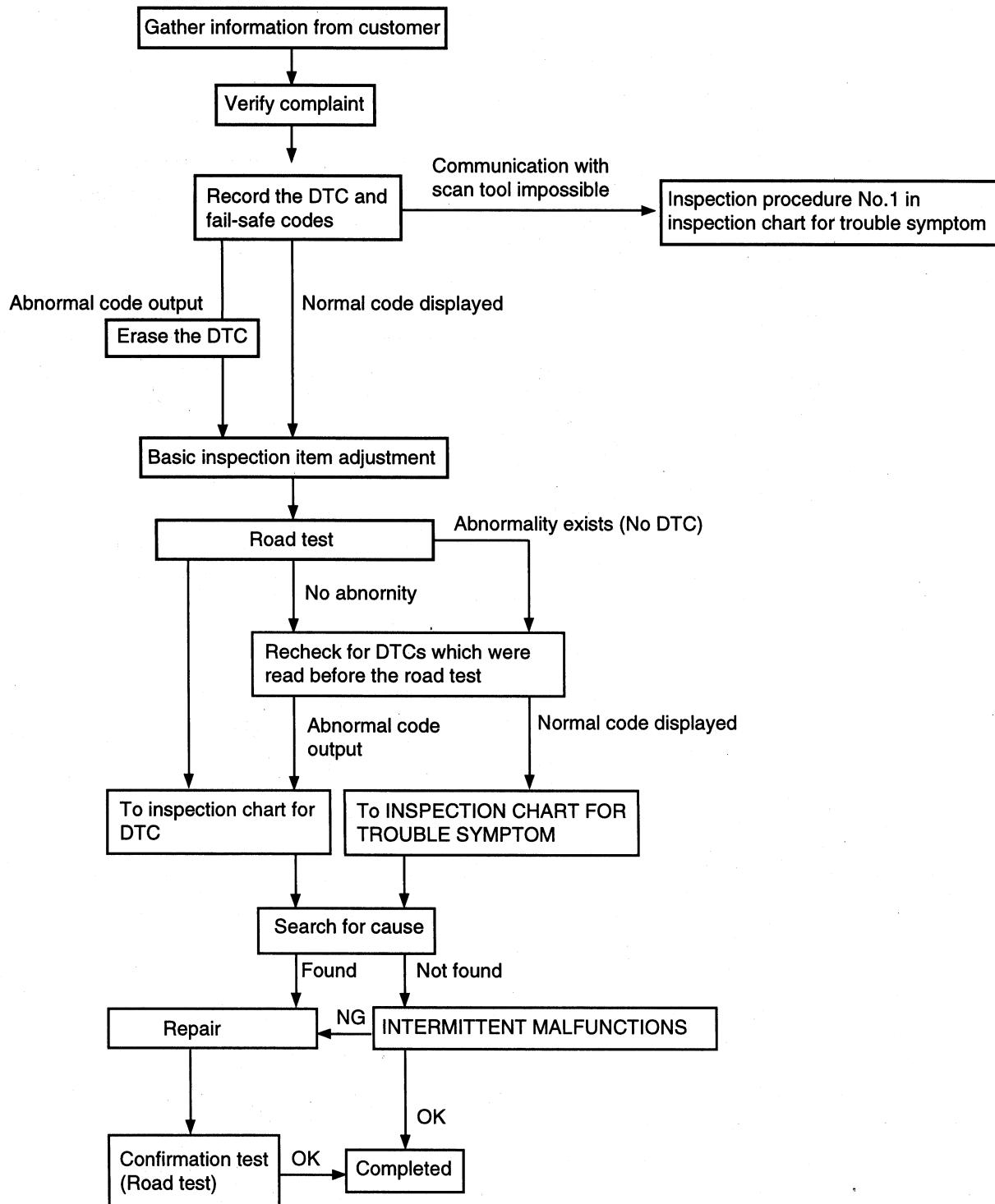
SPECIAL TOOLS

EKJA0060

Tool (Number and name)	Illustration	Use
09200-38001 Engine support fixture		Removal and installation of transaxle.
09452-21001 Oil pressure gauge adapter		Measurement of the oil pressure. (use with 09452-21500 and 09452-21002)
09452-21002 Oil pressure gauge adapter		Measurement of the oil pressure. (use with 09452-21500 and 09452-21001)
09452-21500 Oil pressure gauge		Measurement of the oil pressure. (use with 09452-21002 and 09452-21002)
09216-21300 Bearing installer		Installation of viscous coupling taper roller bearing
09452-21200 Oil pump oil seal installer		Installation of transfer housing oil seal (Transfer case)
09455-33200 Bearing installer		Installation of inner drive shaft bearing and hypoid gear bearing
09495-33000 Drive shaft bearing removerr		Removal of taper roller bearing and inner drive shaft

AUTOMATIC TRANSAXLE SYSTEM

TROUBLESHOOTING (A/T) EKA90070



BASIC INSPECTION ITEM**ADJUSTMENT** EKJA0080**AUTOMATIC TRANSMISSION FLUID CHECK**

1. Drive the vehicle until the fluid temperature rises to the normal temperature (70-80°C).
2. Park the vehicle on a level surface.
3. Move the selector lever through all positions to fill the torque converter and the hydraulic circuits with fluid, and then move the selector lever to the N position.
4. After wiping off any dirt around the dipstick, remove the dipstick and check the condition of the fluid.

NOTE

If the fluid smells as if it is burning, it means that the fluid has been contaminated by fine particles from the friction materials. A transmission overhaul may be necessary.

5. Check that the fluid level is at the HOT mark on the dipstick. If the fluid level is lower than this, pour in more fluid until the level reaches the HOT mark. Automatic transmission fluid : GENUINE HYUNDAI ATF SP-II M.

NOTE

If the fluid level is low, the oil pump will draw in air along with the fluid, which will cause bubbles to form inside the hydraulic circuit. This will in turn cause the hydraulic pressure to drop, which will result in late shifting and slipping of the clutches and brakes. If there is too much fluid, the gears can churn it up into foam and cause the same conditions that can occur with low fluid levels. In either case, air bubbles can cause overheating and oxidation of the fluid which can interfere with normal valve, clutch, and brake operation. Foaming can also result in fluid escaping from the transmission vent, in which case it may be mistaken for a leak.

6. Insert the dipstick securely.
7. The fluid and the oil filters should always be replaced when overhauling the transmission or after the vehicle has been driven under severe conditions. The replacement procedures are given below.

CAUTION

The oil filters are special filters which are only to be used for the automatic transmission.

AUTOMATIC TRANSMISSION FLUID**REPLACEMENT**

If you have a fluid changer, use this changer to replace the fluid. If you do not have a fluid changer, replace the fluid by the following procedure.

1. Disconnect the hose which connects the transmission and the oil cooler (inside the radiator).
2. Start the engine and let the fluid drain out.

Running conditions : N range with engine idling.

CAUTION

The engine should be stopped within one minute after it is started. If the fluid has all drained out before then, the engine should be stopped at that point.

3. Remove the drain plug from the bottom of the transmission case to drain the remaining fluid.
4. Replace the oil filter.
5. Install the drain plug and its gasket, and tighten it the specified torque.

Tightening torque : 32 Nm

6. Pour the new fluid in through the oil filler tube.

CAUTION

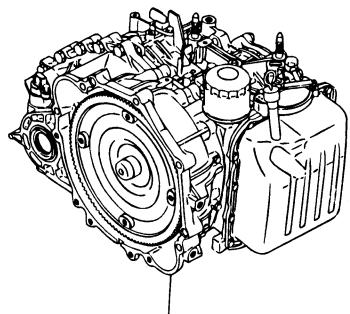
Stop pouring whenever the fluid overflows.

7. Start the engine and let the fluid drain out.

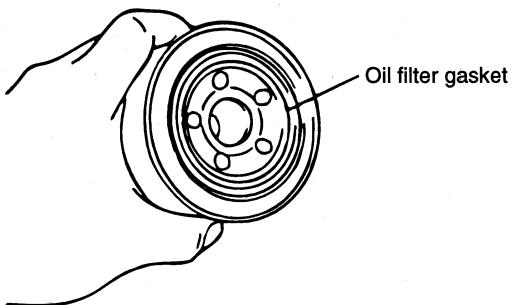
NOTE

Check the old fluid for contamination. If it has been contaminated, repeat the steps (6) and (7).

8. Pour the new fluid in through the oil filler tube.
9. Reconnect the hose which was disconnected in step (1) above, and firmly replace the oil level gauge.
10. Start the engine and let it idle for 1-2 minutes.
11. Move the select lever through all positions, and then move it to the N position.
12. Drive the vehicle until the fluid temperature rises to the normal temperature (70-80°C), and then check the fluid level again. The fluid level must be at the HOT Mark.
13. Firmly insert the dipstick into the oil filler tube.



EKA9009E



EKA9001A



EKA9059A

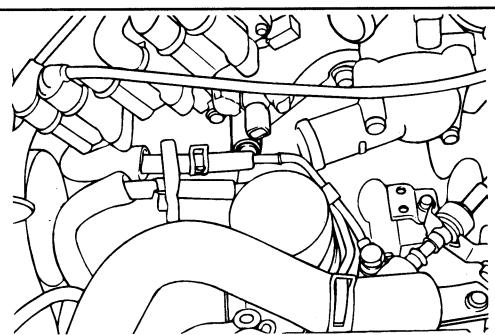
OIL FILTER REPLACEMENT

1. Remove the automatic transmission oil filter using a filter wrench (chain, etc.) if available, after removing the air cleaner assembly.
2. After removing the filter, clean away any automatic transaxle fluid, mud etc. around the transaxle using cloth gloves or rags.
3. Clean the filter bracket side mounting surface.
4. Apply a small amount of automatic transmission fluid to the O-ring of the new oil filter.
5. Install the automatic transmission oil filter hand tight.

NOTE

Tightening torque : 11-13 Nm

6. Check the level of the automatic transmission fluid.

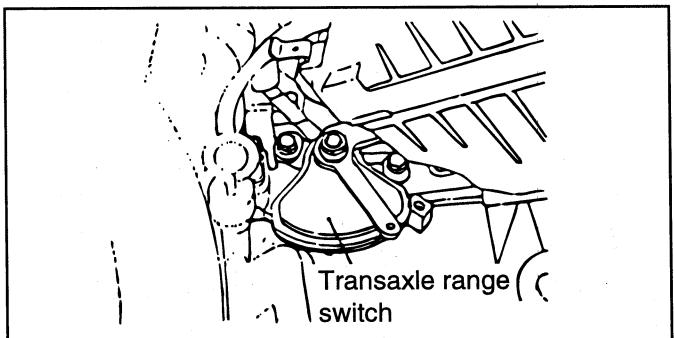


EKA9009C

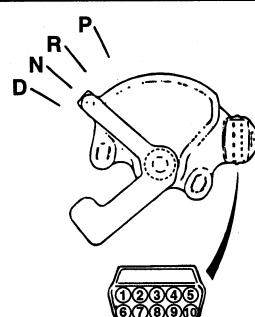
TRANSAXLE RANGE SWITCH CONTINUITY CHECK

Items	Terminal No.									
	6	5	4	3	2	1	10	9	8	7
P					○				○	
R									○	○
N			○					○	○	
D						○			○	

EKJA008A



EKA9002A

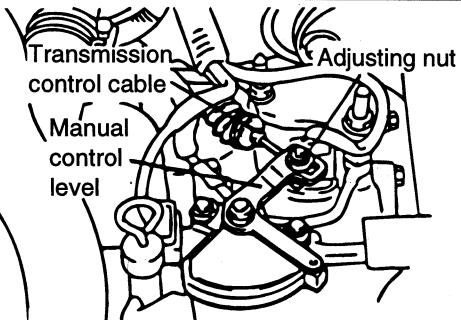


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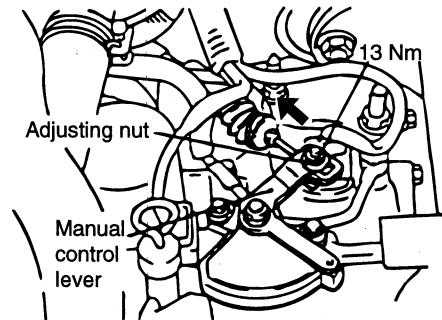
TRANSAXLE RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

1. Set the selector lever to the "N" position.
2. Loosen the control cable to the manual control lever coupling nut to free the cable and lever.

3. Set the manual control lever to the neutral position.



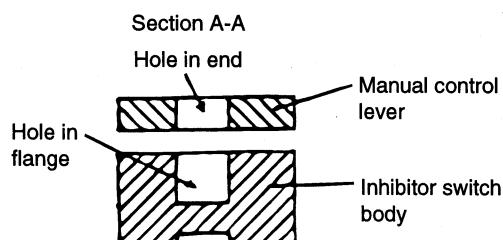
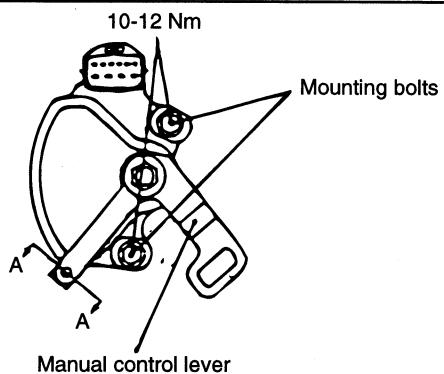
EKA9002C



EKA9003B

4. Loosen the transaxle range switch mounting bolts and then turn the transaxle range switch body so the hole in the end of the manual control lever and the hole (cross section A-A in the figure) in the flange of the transaxle range switch body are aligned.

5. Tighten the transaxle range switch body mounting bolts to the specified torque. Be careful at this time not to change the position of the switch body.



EKA9003A

6. Gently pull the transmission control cable in the direction of the arrow, and then tighten the adjusting nut.

7. Check that the selector lever is in the "N" position.

8. Check that each range on the transmission side operates and functions correctly for each position of the selector lever.

A/T CONTROL COMPONENT CHECK

1. THROTTLE POSITION SENSOR CHECK.

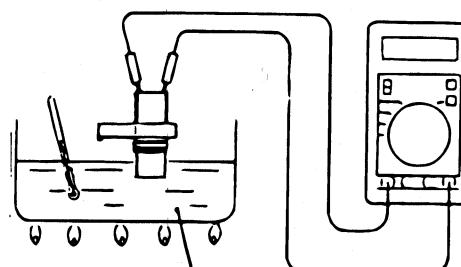
The TP Sensor is a variable resistor type that rotates with the throttle body shaft to sense the throttle valve angle. As the throttle shaft rotates, the output voltage of the TP Sensor changes. The ECM detects the throttle valve opening based on voltage change. (Refer to FL-section).

2. OIL TEMPERATURE SENSOR CHECK

- Remove the oil temperature sensor.
- Measure the resistance between terminals No.1 and No.2 of the oil temperature sensor connector.

Standard value :

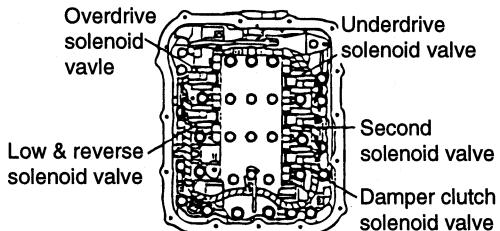
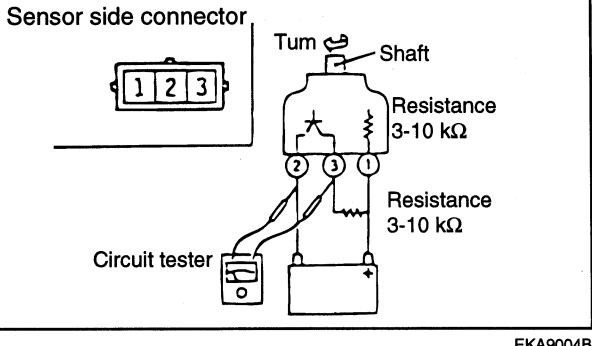
Oil temperature (°C)	Resistance (KΩ)
0	16.7-20.5
100	0.57-0.69



EKA9004A

3. VEHICLE SPEED SENSOR CHECK

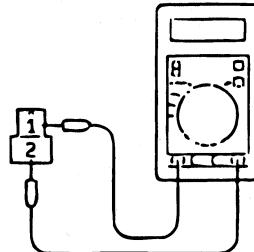
- Remove the vehicle speed sensor and connect a 3-10 kΩ resistance as shown in the illustration.
- Turn the shaft of the vehicle speed sensor and check that there is voltage between terminals 2-3 (1 turn=4 pulses).



EKA9005C

- Measure the resistance between terminals 1 and 2 of each solenoid valve.

Standard value :



EKA9005D

- If the resistance is outside the standard value, replace the solenoid valve.

NOTE

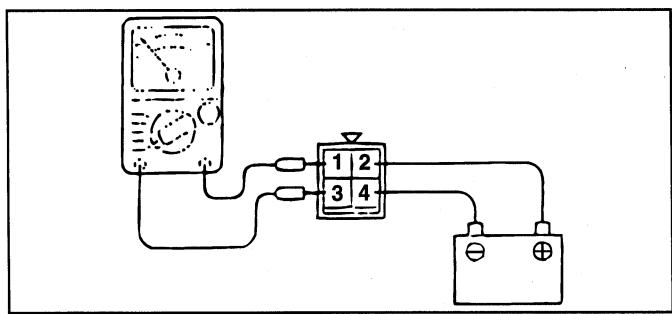
Resistance of the solenoid valve connector.

Terminal No.	Name	Resistance
7 & 10	Damper clutch solenoid valve	2.7-3.4 Ω (at 20°C)
10 & 6	Low and reverse solenoid valve	
9 & 4	Second solenoid valve	
9 & 3	Underdrive solenoid valve	
9 & 5	Overdrive solenoid valve	

4. A/T CONTROL RELAY CHECK

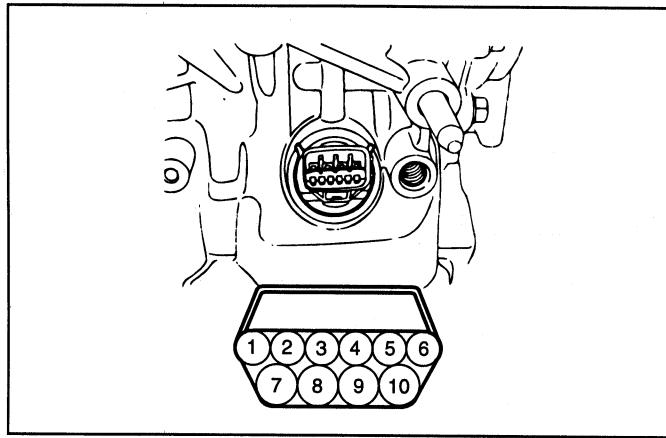
- Remove the A/T control relay.
- Use jumper wires to connect the A/T control relay terminal (2) to the battery (+) terminal and terminal (4) to the battery (-) terminal.
- Check the continuity between terminal (1) and terminal (3) of the A/T control relay when the jumper wires are connected to and then disconnected from the battery.
- If there is a problem, replace the A/T control relay.

Jumper wire	Continuity between terminal No.1
Connected	Continuity
Disconnected	No continuity



5. SOLENOID VALVE CHECK

- Remove the valve body cover.
- Disconnect the connectors of each solenoid valve.



EKA9017B

TORQUE CONVERTER STALL TEST RESULTS

1. Stall speed is too high in both D and R ranges
 - Low line pressure
 - Low & reverse brake Slippage
2. Stall speed is too high in D range only
 - Underdrive clutch slippage
3. Stall speed is too high in R range only
 - Reverse clutch slippage
4. Stall speed too low in both D and R ranges
 - Malfunction of torque converter
 - Insufficient engine output

TORQUE CONVERTER STALL TEST

This test measures the maximum engine speed when the selector lever is at the D or R position. The torque converter stalls to test the operation of the torque converter, starter motor, one-way clutch operation, the holding performance of the clutches, and brakes in the transmission.

CAUTION

Do not let anybody stand in front of or behind the vehicle while this test is being carried out.

- a. Check the automatic transmission fluid level and temperature and the engine coolant temperature.
 - Fluid level : At the HOT mark on the oil level gauge
 - Fluid temperature : 80-100°C
 - Engine coolant temperature : 80-100°C
- b. Chock both rear wheels (left and right).
- c. Pull the parking brake lever on with the brake pedal fully depressed.
- d. Start the engine.
- e. Move the selector lever to the D position, fully depress the accelerator pedal and take a reading of the maximum engine speed at this time.

CAUTION

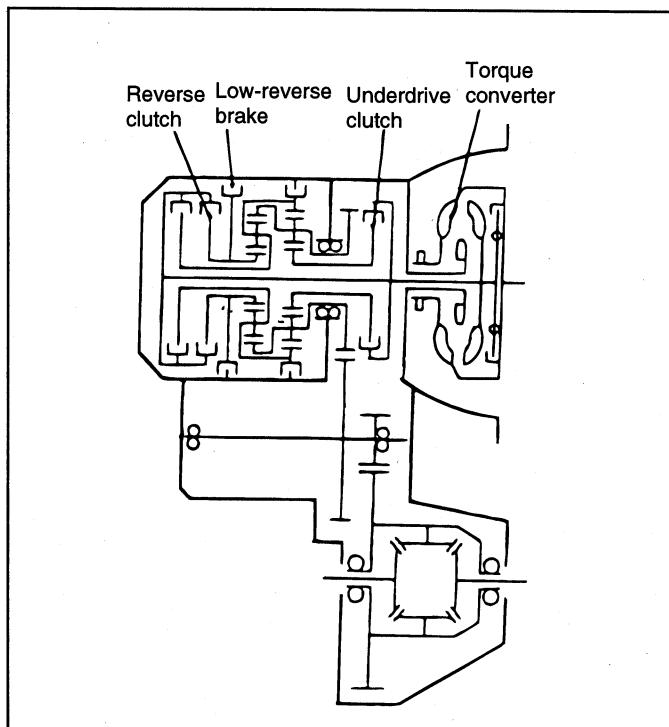
1. The throttle should not be left fully open for more than eight seconds.
2. If carrying out the stall test two or more times, move the selector lever to the N position and run the engine at 1,000 rpm to let the automatic transmission fluid cool down before carrying out subsequent tests.

Standard value

Stall speed : 2,100-2,900 r/min

3. Move the selector lever to the R position and carry out the same test again.

Standard value Stall speed : 2,100-2,900 r/min

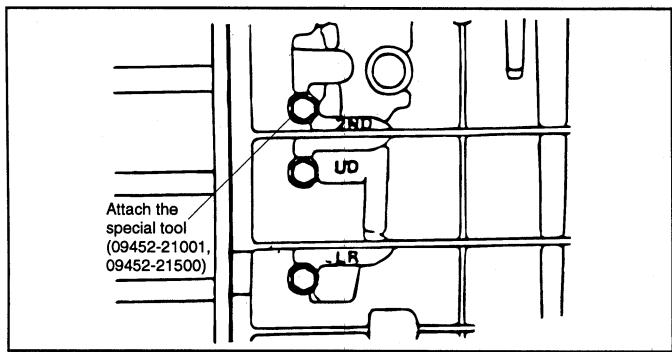


EKA9006A

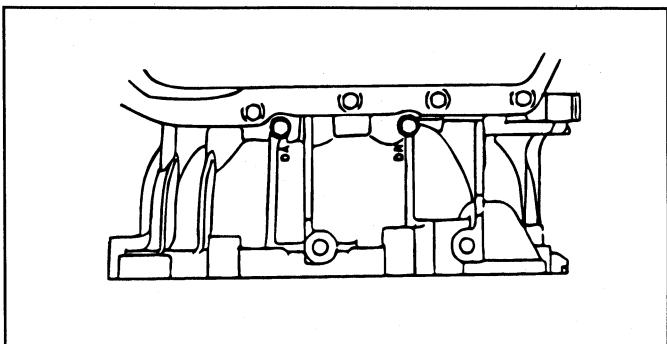
HYDRAULIC PRESSURE TEST

1. Warm up the engine until the automatic transmission fluid temperature is 80-100°C.
2. Jack up the vehicle so that the wheels are free to turn.
3. Connect an oil pressure gauge set to each pressure discharge port.
4. Measure the hydraulic pressure at each port under the conditions given in the standard hydraulic pressure table, and check that the measured values are within the standard value ranges.

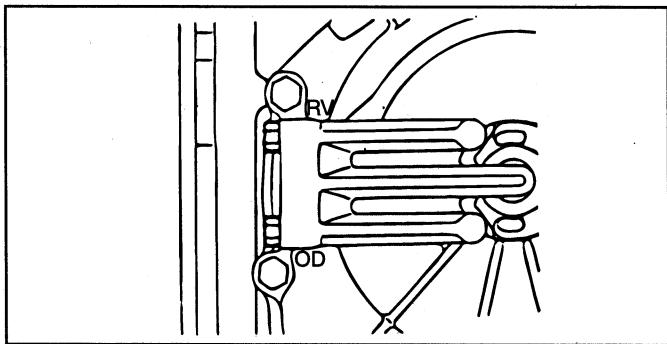
5. If a value is outside the standard range, correct the problem while referring to the hydraulic pressure test diagnosis table.



EKA9007A



EKA9007B



EKA9007C

STANDARD HYDRAULIC PRESSURE TEST

Measurement condition			Standard hydraulic pressure kPa							
Selector lever position	Shift position	Engine speed (rpm)	Under drive clutch pressure(UD)	Reverse clutch pressure(REV)	Over-drive clutch pressure(OD)	Low and reverse brake pressure(LR)	Second brake pressure(2ND)	Damper clutch apply pressure(DA)	Damper clutch release pressure(DR)	
P	-	2,500	-	-	-	260-340	-	-	220-360	
R	Reverse	2,500	-	1,270-1,770	-	1,270-1,770	-	-	500-700	
N	Neutral	-	-	-	-	260-340	-	-	220-360	
D	1st gear	2,500	1,010-1,050	-	-	1,010-1,050	-	-	500-700	
	2nd gear	2,500	1,010-1,050	-	-	-	1,010-1,050	-	500-700	
	3rd gear	2,500	780-880	-	780-880	-	-	More than 750	450-650	
	4th gear	2,500	-	-	780-880	-	780-880	More than 750	450-650	

HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

Trouble symptom	Probable cause
All hydraulic pressures are high	Incorrect transmission control cable adjustment Malfunction of the regulator valve
All hydraulic pressures are low	Incorrect transmission control cable adjustment Malfunction of the oil pump Clogged internal oil filter Clogged external oil filter Clogged oil cooler Malfunction of the regulator valve Malfunction of the relief valve Incorrect valve body installation
Hydraulic pressure is abnormal in "R" range only	Malfunction of the regulator valve Clogged orifice Incorrect valve body installation
Hydraulic pressure is abnormal in "3" or "4" range only	Malfunction of the regulator valve Clogged orifice Incorrect valve body installation Malfunction of the overdrive solenoid valve Malfunction of the overdrive pressure control valve Malfunction of the regulator valve Malfunction of the switch valve Clogged orifice Incorrect valve body installation
Only underdrive hydraulic pressure is abnormal	Malfunction of the oil seal K Malfunction of the oil seal L Malfunction of the oil seal M Malfunction of the underdrive solenoid valve Malfunction of the underdrive pressure control valve Malfunction of check ball Clogged orifice Incorrect valve body installation
Only reverse clutch hydraulic pressure is abnormal	Malfunction of the oil seal A Malfunction of the oil seal B Malfunction of the oil seal C Clogged orifice Incorrect valve body installation

Trouble symptom	Probable cause
Only overdrive hydraulic pressure is abnormal	Malfunction of the oil seal D Malfunction of the oil seal E Malfunction of the oil seal F Malfunction of the overdrive solenoid valve Malfunction of the overdrive pressure control valve Malfunction check ball Clogged orifice Incorrect valve body installation
Only low and reverse hydraulic pressure is abnormal	Malfunction of the oil seal I Malfunction of the oil seal J Malfunction of the low and reverse solenoid valve Malfunction of the low and reverse pressure control valve Malfunction of the switch valve Malfunction of the fail safe valve A Malfunction of check ball Clogged orifice Incorrect valve body installation
Only second hydraulic pressure is abnormal	Malfunction of the oil seal G Malfunction of the oil seal H Malfunction of the oil seal O Malfunction of the second solenoid valve Malfunction of the second pressure control valve Malfunction of the fail safe valve B Clogged orifice Incorrect valve body installation
Only reverse clutch hydraulic pressure is abnormal	Malfunction of the oil cooler Malfunction of the oil seal N Malfunction of the damper clutch control solenoid valve Malfunction of the damper clutch control valve Malfunction of the torque converter pressure control valve Clogged orifice
Pressure applied to non - operating element	Incorrect valve body installation Incorrect transmission control cable adjustment Malfunction of the manual valve Malfunction of check ball Incorrect valve body installation

DIAGNOSIS FUNCTION

EKAA0090

1. Connect the HI-SCAN PRO to the diagnostic connector (DLC).
2. Read the diagnostic trouble codes. Follow the remedy procedures according to the "DIAGNOSTIC TROUBLE CODE DESCRIPTION" on the following page.

NOTE

- A maximum of 8 diagnostic trouble codes (in the sequence of occurrence) can be stored in the Random Access Memory (RAM) incorporated within the control module.
- The same diagnostic trouble code can not be stored more than one time.
- If the number of stored diagnostic trouble codes or diagnostic trouble patterns exceeds 8, already stored diagnostic trouble codes will be erased in sequence, beginning with the oldest.
- 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 cancelled 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 for Fail-safe will be stored. Three of these diagnostic trouble codes can be stored.
4. With the transaxle locked in third gear and, the ignition key turned to the OFF position, the diagnostic trouble code will be stored in RAM.
5. Memorization.
 - Up to 8 diagnostic items and 3 fail-safe items can be memorized.
 - If the memory capacity is exceeded, diagnosis and fail-safe items in the memory are overwritten, starting with the oldest.
 - No code can be memorized more than once.
6. Diagnosis Code Deletion.
 - 1) Automatic Deletion
All diagnosis codes are deleted from memory the 200th time the ATF temperature reaches 50°C after memorization of the most recent diagnosis code.
 - 2) Forced Deletion.

Memorized diagnosis codes can be deleted using the provided the following conditions are satisfied :

- The ignition switch is ON.
- There is no pulse from the crank angle sensor.
- There is no pulse from the output shaft speed sensor.
- There is no pulse from the vehicle speed sensor.
- The fail-safe function is not operational.

EKJA0100

ROAD TEST

No	Condition	Operation	Judgement : Value	Check item
1	Ignition switch OFF	Ignition switch (1) ON	Battery voltage (mV)	Control relay
2	Ignition switch : ON Engine Stopped Select lever position P	Selector lever position (1) P, (2) R, (3) N, (4) D	(1) P, (2) R, (3) N, (4) D	Transaxle range switch
		Accelerator pedal 1. Released 2. Half depressed 3. Depressed	1. 400-1,000 mV 2. Gradually rises from (1) 3. 4,500-5,000 mV	Throttle position sensor
		Brake pedal • Depressed • Released		Stop lamp switch
3	Ignition switch ST Engine Stopped	Starting test with lever P or N range	Starting should be possible	Starting possible or impossible
4	Warming up	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70-90°C	Gradually rises to 70-90°C	Oil temperature sensor
5	Engine Idling Selector lever position N	A/C switch 1. ON 2. OFF	1. ON 2. OFF	Triple pressure switch
		Accelerator pedal 1. Released 2. Half depressed	1. ON 2. OFF	Idle position
			1. 600-900 rpm 2. Gradually rises from (1)	
			1. Data changes	Communication with engine-ECU
		Selector lever position 1. N → D 2. N → R	Should be no abnormal shift shock Time lag should be within 2 seconds	Malfunction when starting
				Malfunction when starting

No	Condition	Operation	Judgement : Value	Check item
6	Selector lever position D (Carry out on a flat and straight road)	Selector lever position and vehicle speed 1. Idling in 1st gear (Vehicle stopped) 2. Driving at constant speed of 20 km/h in 1st gear 3. Driving at constant speed of 30 km/h in 2nd gear 4. Driving at 50 km/h in 3rd gear with accelerator fully closed 5. Driving at constant speed of 50 km/h in 4th gear	(2) 1st, (4) 3rd, (3) 2nd, (5) 4th	Shift condition
			(2) 0%, (4) 100%, (3) 100%, (5) 100%	Low and reverse solenoid valve
			(2) 0%, (4) 0%, (3) 0%	Underdrive solenoid valve
			(1) 100%, (2) 0%, (3) 100%	Second solenoid valve
			(2) 100%, (3) 100%, (4) 0%	Overdrive solenoid valve
			(1) 0 km/h (4) 50 km/h	Vehicle speed sensor
			(4) 1,800-2,100 rpm	Input shaft speed sensor
			(4) 1,800-2,100 rpm	Output shaft speed sensor
7	Selector lever position D (Carry out on a flat and straight road)	1. Accelerator to 4th gear at a throttle position sensor output of 1.5V (accelerator opening angle of 30%). 2. Gently decelerate to a standstill 3. Accelerate to 4th gear at a throttle position sensor output of 2.5 V (accelerator opening angle of 50%). 4. While driving at 40 km/h in 4th gear, shift down to 3rd gear. 5. While driving at 30 km/h in 3rd gear, shift down to 2nd gear. 6. While driving at 20 km/h in 2nd gear, shift down to 1st gear.	For (1),(2), and (3), the reading should be the same as the specified output shaft torque, and no abnormal shocks should occur. For (4),(5), and (6), downshifting should occur immediately after the shifting operation is made.	Malfunction when shifting
				Displaced shift points
				Does not shift
				Does not shift from 1 to 2 or 2 to 1
				Does not shift from 2 to 3 or 3 to 2
				Does not shift from 3 to 4 or 4 to 3
8	Selector lever position N (Carry out on a flat and straight road).	Move selector lever to R range drive at constant speed of 10 km/h	The ratio between input and output speed sensor data should be the same as the gear ratio when reversing.	Does not shift

DIAGNOSTIC TROUBLE CODE
DESCRIPTION

EKA90110

DTC No	Diagnosis item		Probable cause
P1704	Throttle position sensor	Short circuit	TPS output > 4.8 V with engine idling
P1703		Open circuit	TPS output < 0.2V with engine not idling
P1702		Sensor Faulty	TPS output < 0.2V or > 1.2V with engine idling
P0713	Fluid temperature sensor	Open circuit	Oil temperature sensor output > 4.57 V for 1 second or longer (oil temperature does not increase)
P0712		Short circuit	Output < 0.49V for 1 second
P0725	CKP sensor	Open circuit	No crank angle sensor output detected for 5 seconds at a vehicle speed of 25 km/h
P0715	Input speed sensor	Short circuit/open circuit	No input speed sensor output pulse detected for > 1 second at vehicle speed of > 30 km/h
P0720	Output speed sensor	Short circuit/open circuit	At vehicle speed of > 30 km/h, output speed sensor output < 50% of vehicle speed sensor output for > 1 second.
P0703	Stop lamp switch	Short circuit/open circuit	At vehicle speed of 6 km/h, stop lamp switch is ON continuously for 5 minutes.
P0750	LR solenoid valve	Short circuit/open circuit	With relay voltage > 10V, open or short circuit is continuous for 5 minutes.
P0755	UD solenoid valve	Short circuit/open circuit	
P0760	2nd solenoid valve	Short circuit/open circuit	
P0765	UD solenoid valve	Short circuit/open circuit	
P0743	TCC solenoid valve	Short circuit/open circuit	
P0731	Gear shift incomplete	1st	After gear shift, output shaft speed sensor output x gear ratio of new gear = input shaft speed sensor output
P0732		2nd	
P0733		3rd	
P0734		4th	
P0736		Reverse	
P1749	Serial communication	Short circuit/open circuit	With ignition ON, battery voltage > 10V, and engine speed > 450 r/min, communication is continuously irregular for 1 second or communication error signal is received for > 4 seconds continuously
P0740	TCC solenoid valve	System defect/stuck on	DCC solenoid valve drive duty ratio is 100% for 4 seconds continuously
P1723	A/T control relay	Earth short circuit/open circuit	After ignition ON, A/T control relay voltage < 7V

DTC No	Diagnosis item		Probable cause
P0707	Transaxle range switch	Open circuit	No signal for > 30 seconds
P0708		Short circuit	More than 2 kinds signals are continuous for 30 seconds
P1630	CAN-BUS OFF	TCU Fail/open/short	Receive BUS-OFF information from CAN CONTROLLER
P1631	CAN-TIME OUT ECU	ECU Fail/open/short	No output signal for 1.5 second
P1764	CAN CONTROLLER CIRCUIT	Circuit malfunction	Communication error output is continuously for > 1 second

**INSPECTION CHART FOR DIAGNOSIS
CODES**

EKHA0120

Code	Diagnosis item	Probable cause	
P1704	Throttle position sensor system If the TPS output voltage is 4.8 V or higher when the engine is idling, the output is judged to be too high and diagnosis code P1704 is the output. If the TPS output voltage is 0.2 V or lower at times other than when the engine is idling the output is judged to be too low and diagnosis code P1703 is the output. If the TPS output voltage is 0.2 V or lower or if it is 1.2 V or higher when the engine is idling, the TPS adjustment is judged to be incorrect and diagnosis code P1702 is the output.	Short circuit	Malfunction of the throttle position sensor
P1703		Open circuit	Malfunction of connector
P1702		Sensor Maladjustment	Malfunction of the TCM
P0713 P0712	Fluid temperature sensor system If the fluid temperature sensor output voltage is 4.57 V or more even after driving for 10 minutes or more (if the fluid temperature does not increase), it is judged that there is an open circuit in the fluid temperature sensor and diagnosis code P0713 is the output.	Open circuit	Malfunction of the oil temperature sensor Malfunction of connector Malfunction of the TCM
P0725	CKP sensor system If no output pulse is detected from the crank angle sensor for 5 seconds or more while driving at 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor and diagnosis code P0725 is the output.	Open circuit	Malfunction of the crank angle sensor Malfunction of connector Malfunction of the TCM
P0715	Input speed sensor system If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short. Circuit in the input shaft speed sensor and diagnosis code P0715 is the output. If diagnosis code P0715 is the output four times, the transmission is locked into 3rd gear (D range) or 2nd gear as a fail-safe measure.	Short circuit/open circuit	Malfunction of the input shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of connector Malfunction of the TCM
P0720	Output speed sensor system If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the output shaft speed sensor and diagnosis code P0720 is output. If diagnosis code P0720 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. Malfunction of the input shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of connector Malfunction of the TCM	Short circuit/open circuit	Malfunction of the wide open throttle switch Malfunction of connector Malfunction of the TCM Malfunction of solenoid valve Malfunction of connector Malfunction of the TCM

Code	Diagnosis item	Probable cause
P0703	Stop lamp switch system If the stop lamp switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop lamp switch and diagnosis code P0703 is the output.	Short circuit/open circuit Malfunction of the stop lamp switch Malfunction of connector Malfunction of the TCM
P0750	Low and reverse solenoid valve system	Short circuit/Open circuit Malfunction of solenoid valve
P0755	Underdrive solenoid valve system	Short circuit/Open circuit Malfunction of connector Malfunction of the TCM
P0760	Second solenoid valve system	Short circuit/Open circuit Malfunction of the TCM
P0765	Overdrive solenoid valve system If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the solenoid valve and the respective diagnosis code is output. The transmission is locked into 3rd gear as a fail-safe measure.	Short circuit/Open circuit Malfunction of solenoid valve
P0743	Torque converter clutch solenoid valve system	Short circuit/Open circuit Malfunction of solenoid valve
P0740	If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the solenoid valve and the respective diagnosis code is output. The transmission is locked into 3rd gear as a fail-safe measure.	Defective system Malfunction of connector Malfunction of the TCM
P0731	1st gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 1st gear ratio is not the same as the output from the input shaft speed sensor after shifting to 1st gear has been completed, diagnosis code P0731 is the output. If diagnosis code P0731 is output four times, the transmission is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the low ad reverse brake system Malfunction of the underdrive clutch system Noise generated
P0732	2nd gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnosis code P0732 is the output. If diagnosis code P0732 is the output four times, the transmission is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the underdrive clutch system Malfunction of the overdrive clutch system Noise generated

Code	Diagnosis item	Probable cause	
P0733	3rd gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnosis code P0733 is the output. If diagnosis code P0733 is the output four times, the transmission is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the second brake system Malfunction of the overdrive clutch system Noise generated	
P0734	4th gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnosis code P0734 is the output. If diagnosis code P0734 is the output four times, the transmission is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the low and reverse brake system Malfunction of the reverse clutch system Noise generated	
P0736	Reverse gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the reverse gear ratio is not the same as the output from the input shaft speed sensor after shifting to reverse gear has been completed, diagnosis code P0736 is the output. If diagnosis code P0736 is the output four times, the transmission is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the low and reverse brake system Malfunction of the reverse brake system Malfunction of the reverse clutch system Noise generated	
P1749	Serial communication If normal communication is not possible for a continuous period of 1 second or more when the ignition switch is at the ON position, the battery voltage is 10 V or more and the engine speed is 450 r/min or more, diagnosis code No.51 is the output. Diagnosis code No.51 is also output if the data being received is abnormal for a continuous period of 4 seconds under the same conditions.	Malfunction of connector Malfunction of the engine-ECU Malfunction of the TCM	
P1723	A/T control relay system If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay earth and diagnosis code P1723 is the output. Then the transmission is locked into 3rd gear as a fail-safe measure.	Short circuit to earth/ Open circuit	Malfunction of the A/T control relay Malfunction of connector Malfunction of the TCM

Code	Diagnosis item	Probable cause	
P0707	Transaxle range switch	Open circuit	No signal is continuous for > 30 seconds
P0708		Short circuit	Above 2 kinds signals are continuous for 30 seconds
P1630	CAN-BUS OFF <ul style="list-style-type: none"> • No 3 speed hold fail • No PGA, B fail • Batttry voltage > 10V continuously for 0.5 second • No engine stop • Receive BUS OFF information from CAN CONTROLLER 		<ul style="list-style-type: none"> • TCM Fail • TCM side open & short
P1631	CAN-TIME OUT ECM <ul style="list-style-type: none"> • No 3 speed hold fail • No PGA, B fail o Batttry voltage > 10V continuously for 0.5 sec-ond • No engine stop • No output signal for 1.5 second 		<ul style="list-style-type: none"> • ECM fail • ECM side open & short
P1764	TCM CAN CAN CONTROLLER <ul style="list-style-type: none"> • No 3 speed hold fail • No PGA, B fail • Batttry voltage > 10V continuously for 0.5 second • No engine stop • Communication error output is continuously for > 1 second 		<ul style="list-style-type: none"> • CAN CONTROLLER circuit malfunction

INSPECTION CHART FOR THROUBLE SYMPTOMS

EKJA0130

Trouble symptom	Probable cause
Communication with HI-SCAN PRO is not possible If communication with the HI-SCAN PRO is not possible, the cause is probably a defective diagnosis line or the ECM or TCM is not functioning.	Malfunction diagnosis line Malfunction of connector Malfunction of the TCM or ECM
Driving impossible	Starting impossible Starting is not possible when the selector lever is in P or N range. In such cases, the cause is probably a defective range switch, engine system, torque converter or oil pump.
	Does not move forward If the vehicle does not move forward when the selector lever is shifted from N to D while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.
	Does not reverse If the vehicle does not reverse when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low and reverse brake, or a malfunction of the reverse clutch, low and reverse brake or valve body.
	Does not move (forward or reverse) If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the power train, oil pump or valve body.
Malfunction when starting	Engine stalling when shifting If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch malfunction).
	Shift shock when changing from N to D and large time lag If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or idle position switch.

Trouble symptom	Probable cause
Malfunction when starting	<p>Shift shock when changing from N to R and large time lag. If abnormal shock or a time lag of 2 seconds or more occur when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body or idle position switch.</p>
	<p>Shift shock when changing from N to D, N to R and large time lag. If abnormal shock or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range and from N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.</p>
Malfunction when shifting	<p>Shift shock and rpm increase. If shocks occur when driving due to upshifting or downshifting and the transmission speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.</p>
Displaced shifting points	<p>All points. If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or a solenoid valve.</p>
	<p>Some points. If some of the shift points are displaced while driving, the cause is probably a malfunction of the valve body, or it is related to adaptive control and is not an abnormality.</p>
Does not shift	<p>No diagnosis codes. If shifting does not occur while driving and no diagnosis codes are output, the cause is probably a malfunction of the transaxle range switch, or TCM</p>
Malfunction while driving	<p>Poor acceleration. If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system, Transaxle in fail-safe a brake or clutch or the transaxle is in fail-safe.</p>
Malfunction while driving	<p>Vibration. If vibration occurs when driving at constant speed or when accelerating and deceleration in top range, the cause is probably abnormal damper clutch pressure or a malfunction of the engine system, damper clutch control solenoid valve, torque converter or valve body.</p>
	Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body Malfunction of the idle position switch
	Abnormal line pressure Malfunction of the oil pump Malfunction of the valve body
	Abnormal line pressure Malfunction of each solenoid valve Malfunction of the oil pump Malfunction of the valve body Malfunction of each brake or each clutch
	Malfunction of the output shaft speed sensor Malfunction of the throttle position sensor Malfunction of each solenoid valve Abnormal line pressure Malfunction of the valve body Malfunction of the TCM
	Malfunction of the valve body
	Malfunction of the transaxle range Malfunction of the TCM
	Malfunction of the engine system Malfunction of the brake or clutch
	Abnormal damper clutch pressure Malfunction of the engine system Malfunction of the damper clutch control solenoid valve Malfunction of the torque converter Malfunction of the valve body

Trouble symptom	Probable cause
Transaxle range switch system. The cause is probably a malfunction of the inhibitor switch circuit, ignition switch circuit or a defective TCM.	Malfunction of the transaxle range switch Malfunction of the ignition switch Malfunction of connector Malfunction of the TCM
Idle position switch system. The cause is probably a defective idle position switch circuit, or a defective TCM.	Malfunction of the triple pressure switch Malfunction of connector Malfunction of the TCM
Triple pressure switch system. The cause is probably a defective triple pressure switch circuit or a defective TCM.	Malfunction of the triple pressure switch Malfunction of connector Malfunction of A/C system Malfunction of the TCM
Vehicle speed sensor system. The cause is probably a defective vehicle speed sensor circuit or a defective TCM.	Malfunction of the vehicle speed sensor Malfunction of connector Malfunction of the TCM

**ELEMENT IN USE AT EACH POSITION OF
SELECTOR LEVER**

EKA90140

Operating element		Underdrive clutch (UD)	Reverse clutch (REV)	Overdrive clutch (OD)	Low and reverse brake (LR)	Second brake (2nd)	One way clutch (OWC)
Selector lever position							
P	Parking	-	-	-	O	-	-
R	Reverse	-	O	-	O	-	-
N	Neutral	-	-	-	O	-	-
D	1st	O	-	-	O	-	O
	2nd	O	-	-	-	O	-
	3rd	O	-	O	-	-	-
	4th	-	-	O	-	O	-
3	1st	O	-	-	O	-	O
	2nd	O	-	-	-	O	-
	3rd	O	-	O	-	-	-
2	1st	O	-	-	O	-	O
	2nd	O	-	-	-	O	-
L	1st	O	-	-	O	-	O

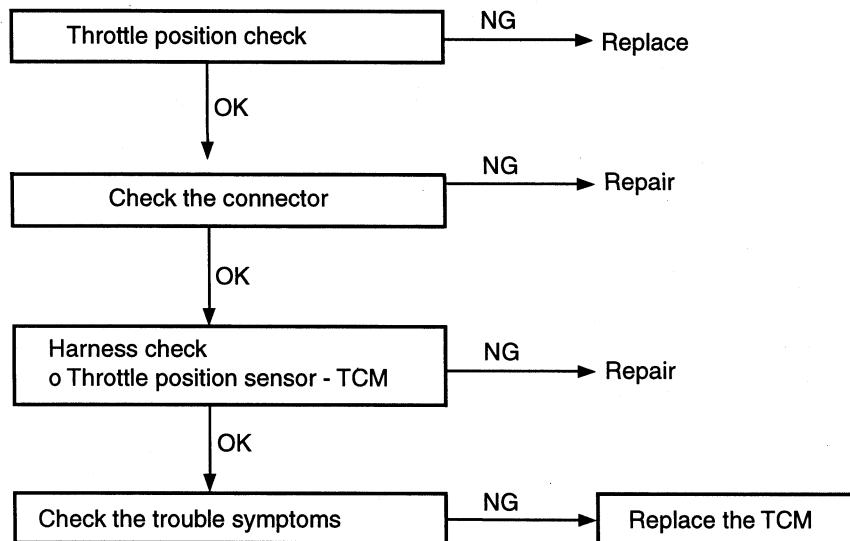
**OPERATING ELEMENT AND THEIR
FUNCTIONS**

Operating element	Code	Function
Underdrive clutch	UD	Connects the input shaft to the underdrive sun gear
Reverse clutch	REV	Connects the input shaft and reverse sun gear
Overdrive clutch	OD	Connects the input shaft and overdrive planetary carrier
Low-and-reverse brake	LR	Locks low-and-reverse annulus gear and overdrive planetary carrier
Second brake	2ND	Locks reverse sun gear

INSPECTION PROCESS FOR DIAGNOSTIC TROUBLE CODES

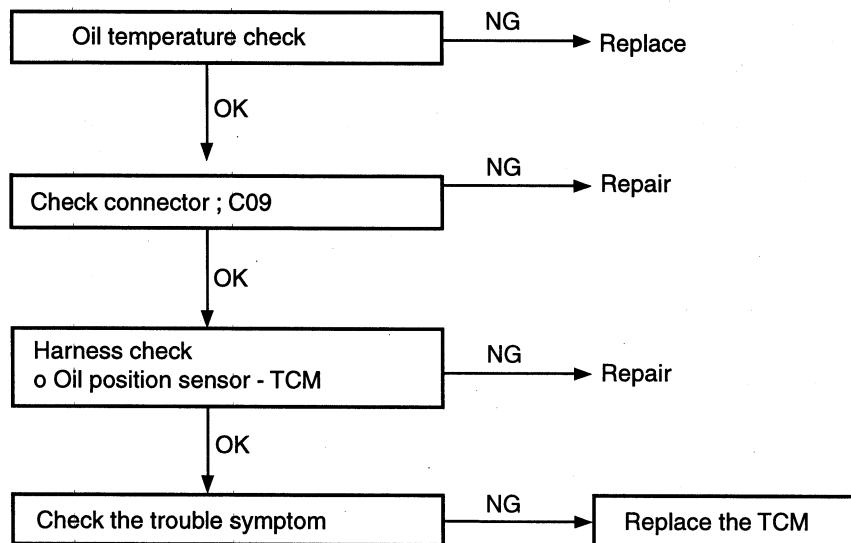
EKJA0270

Code P1704, P1703, P1702 (throttle position sensor)	Probable cause
If the TPS output voltage is 4.8 V or higher when the engine is idling, the output is judged to be too high and diagnostic trouble code P1704 is output. If the TPS output voltage is 0.2 V or lower at times other than when the engine is idling, the output is judged to be too low and diagnostic trouble code P1703 is output. If the TPS output voltage is 0.2 V or lower or if it is 1.2 V or higher when the engine is idling, the TPS adjustment is judged to be incorrect and diagnostic trouble code P1702 is output.	Malfunction of the throttle position sensor Malfunction of connector Malfunction of the TCM



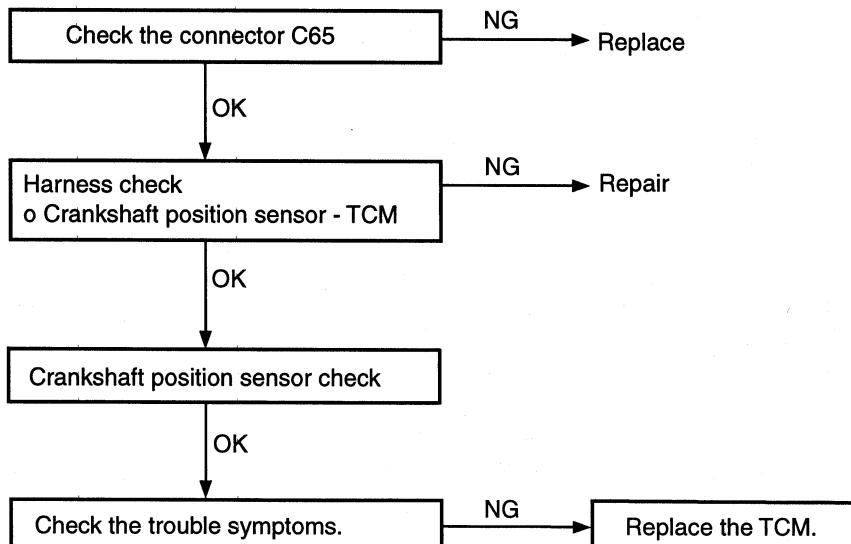
EKAA010A

Code P0710,Oil temperature sensor system	Probable cause
<p>If the oil temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (If the oil temperature does not increase), it is judged that there is an open circuit in the oil temperature sensor and diagnostic trouble code P0710 is output. If the oil temperature sensor output detects the voltage which corresponds to 200°C(392°F) or more for more than one second, it is judged that there is an open circuit in oil temperature sensor and diagnostic trouble code P0710 is output.</p>	<p>Malfunction of the oil temperature sensor Malfunction of connector Malfunction of the TCM</p>



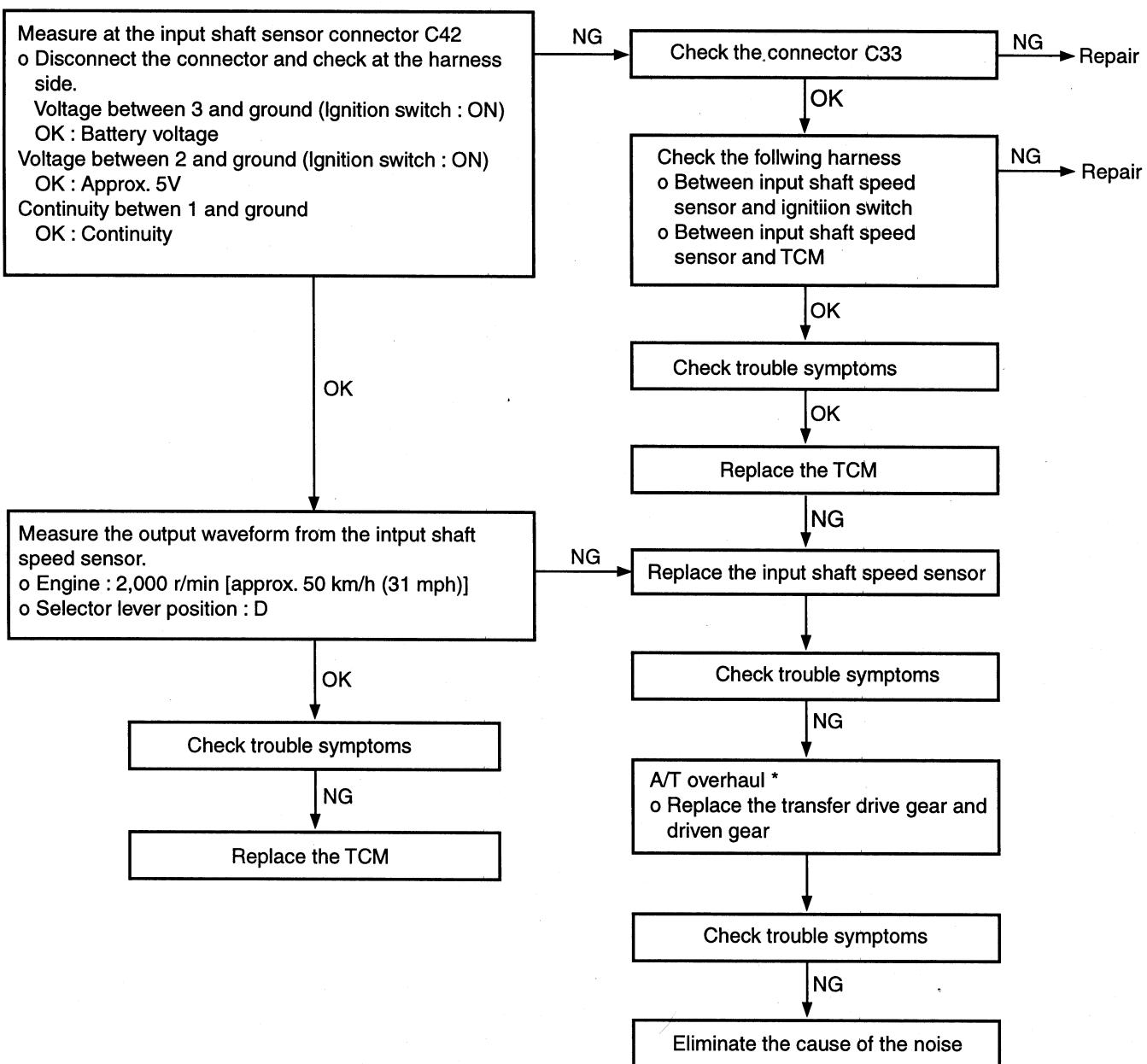
EKAA010B

Code No. P0725 Crankshaft position sensor system	Probable cause
<p>If no output pulse is detected from the crankshaft position sensor for 5 seconds or more while driving at 25 km/h (16 mph) or more, it is judged that there is an open circuit in the crankshaft position sensor and diagnostic trouble code P0725 is output.</p>	<p>Malfunction of the crankshaft position sensor Malfunction of connector Malfunction of the TCM</p>

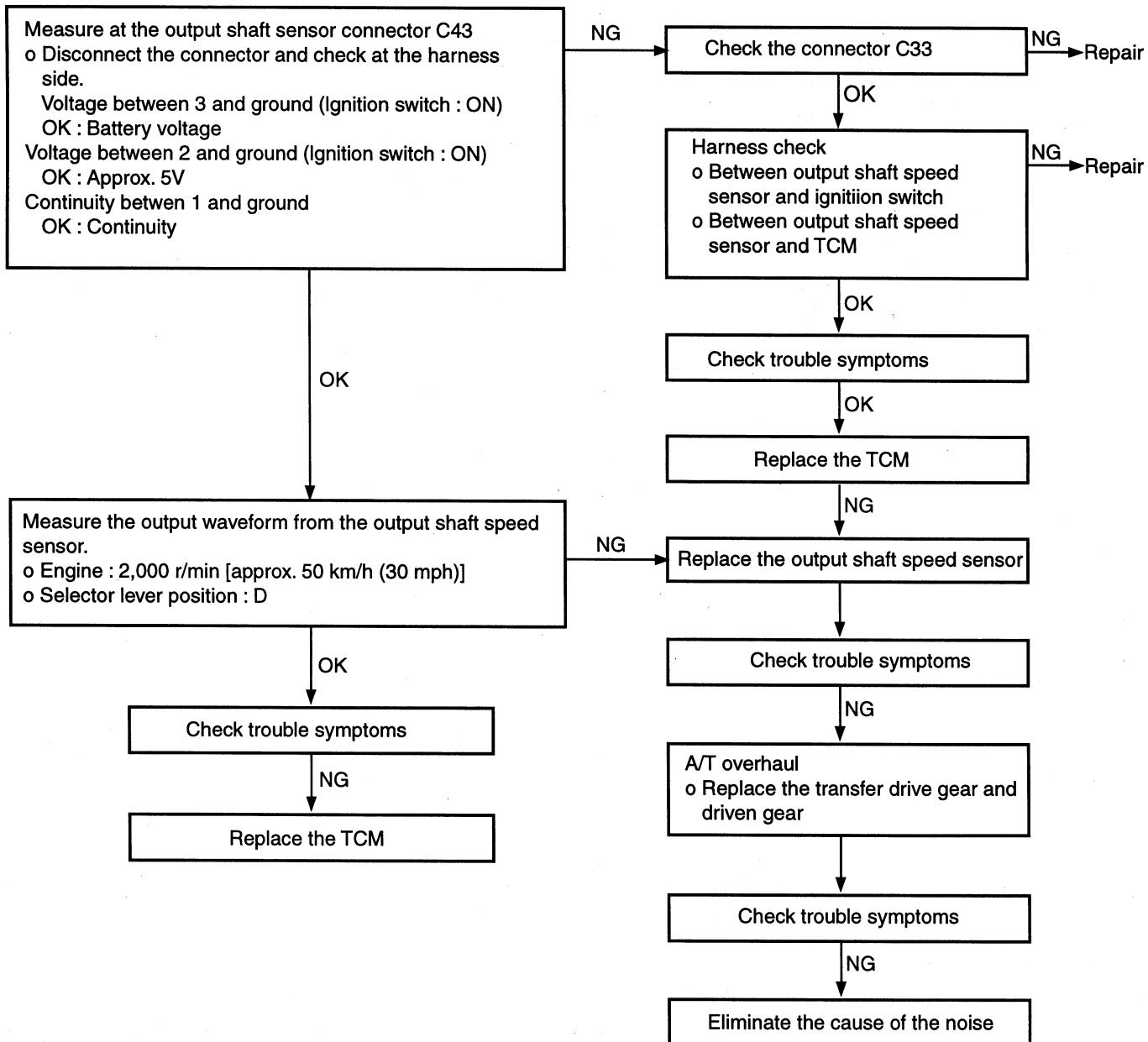


EKAA010C

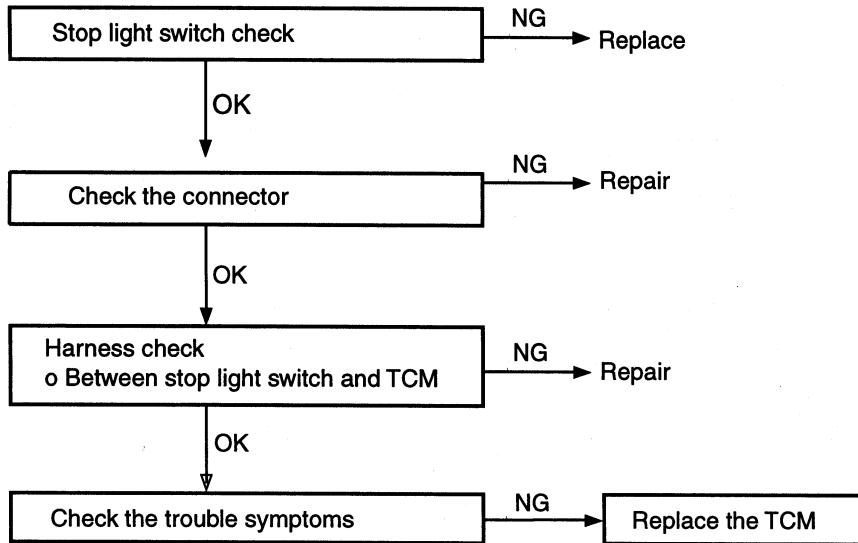
Code P0715 input shaft speed sensor system (Pulse generator 'A')	Probable cause
<p>If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h (19 mph) or more, it is judged to be an open circuit or short-circuit in the input shaft speed sensor and diagnostic trouble code P0715 is output. If diagnostic trouble code P0715 is the output four times, the transaxle is locked into 3rd gear or 2nd gear as a fail-safe measure.</p>	<p>Malfunction of the input shaft speed sensor Malfunction of underdrive clutch retainer Malfunction of connector Malfunction of the TCM</p>



Code P0720 Output shaft sensor system (Pulse generator 'B')	Probable cause
<p>If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more, it is judged to be an open circuit or short circuit in the output shaft speed sensor and diagnostic trouble code P0720 is output.</p>	<p>Malfunction of the throttle position sensor Malfunction of connector Malfunction of the TCM</p>

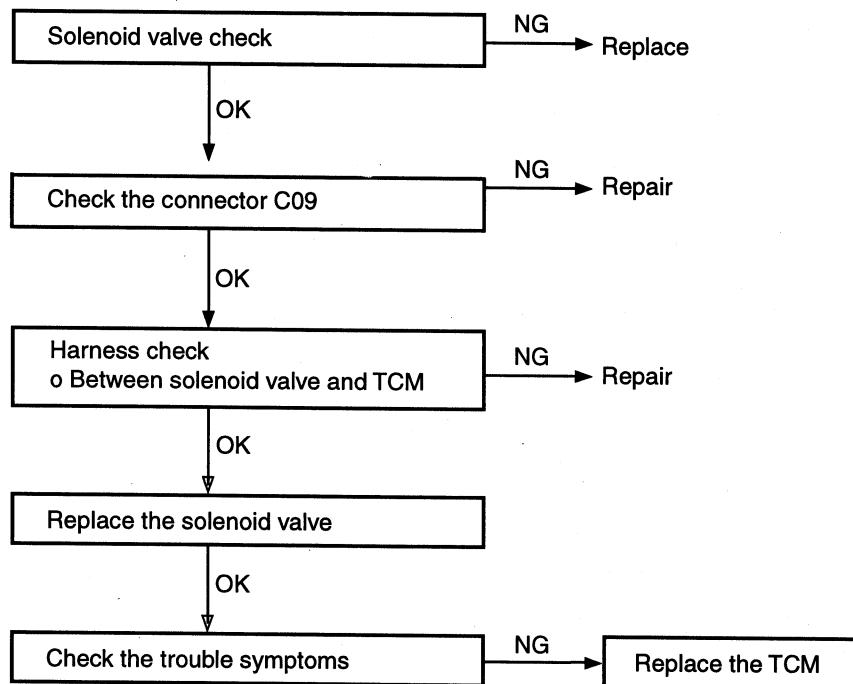


Code P0703 Stop light switch system	Probable cause
If the stop light switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop light switch and diagnostic trouble code P0703 is output.	Malfunction of the stop light switch Malfunction of connector Malfunction of the TCM

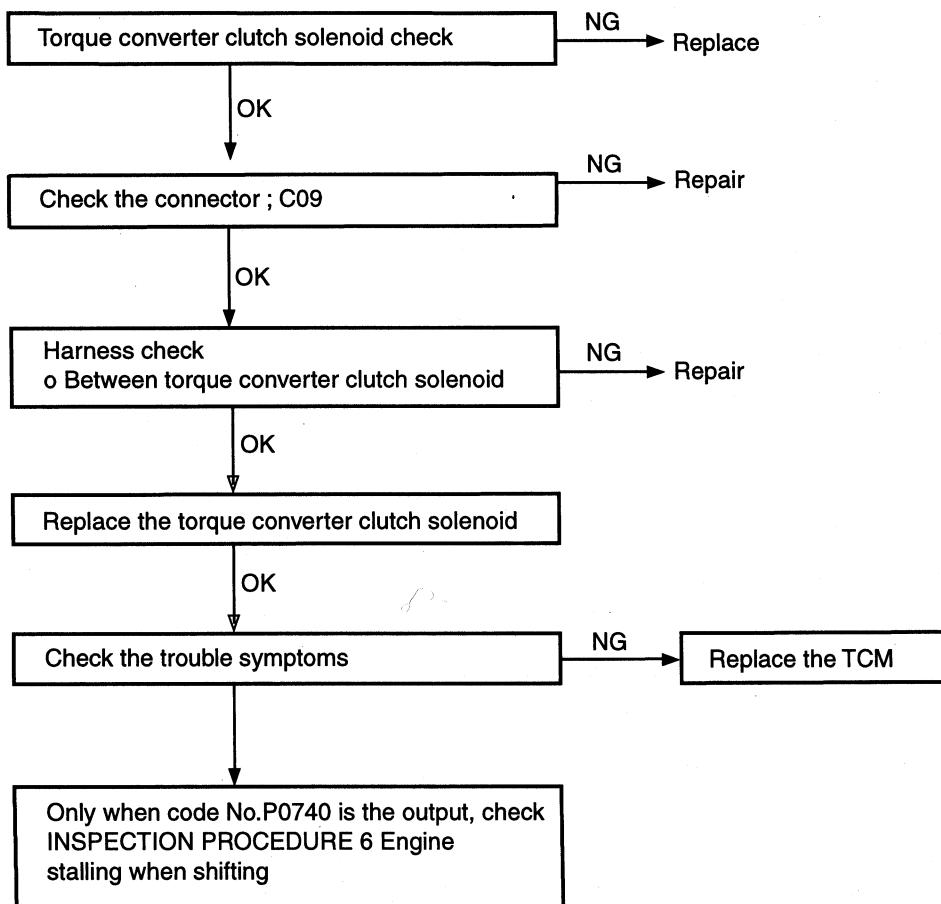


EJAA010F

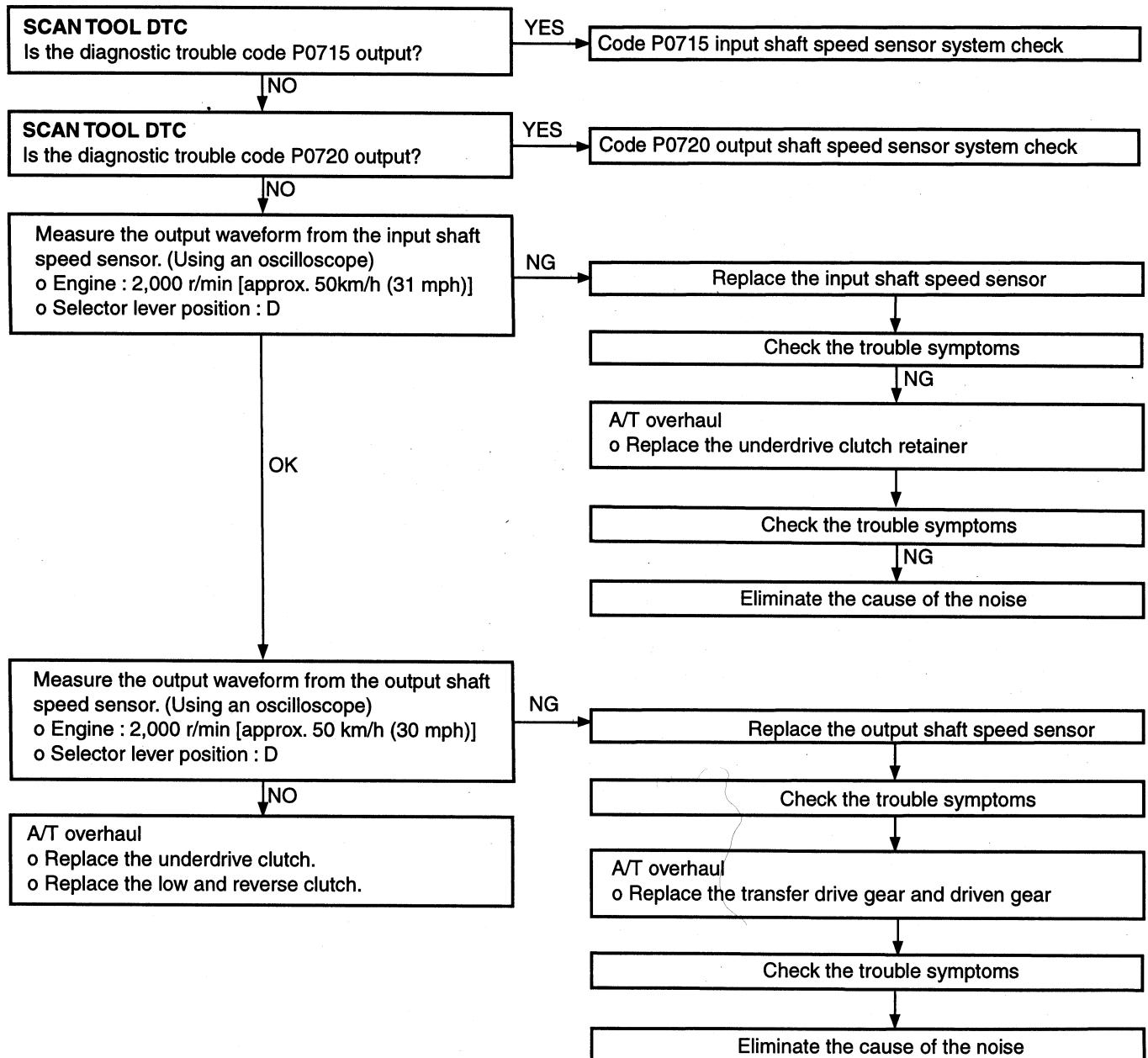
Code P0750 Low and reverse solenoid valve system	Probable cause
Code P0755 Underdrive solenoid valve system	
Code P0760 Second solenoid valve system	
Code P0765 Overdrive solenoid valve system	
If the resistance value for a solenoid valve is too large or too small, it is judged that there is a shortcircuit or an open circuit in the solenoid valve and the respective diagnostic trouble code is output. The transaxle is locked into 3rd gear as a fail-safe measure.	Malfunction of the solenoid valve Malfunction of connector Malfunction of the TCM



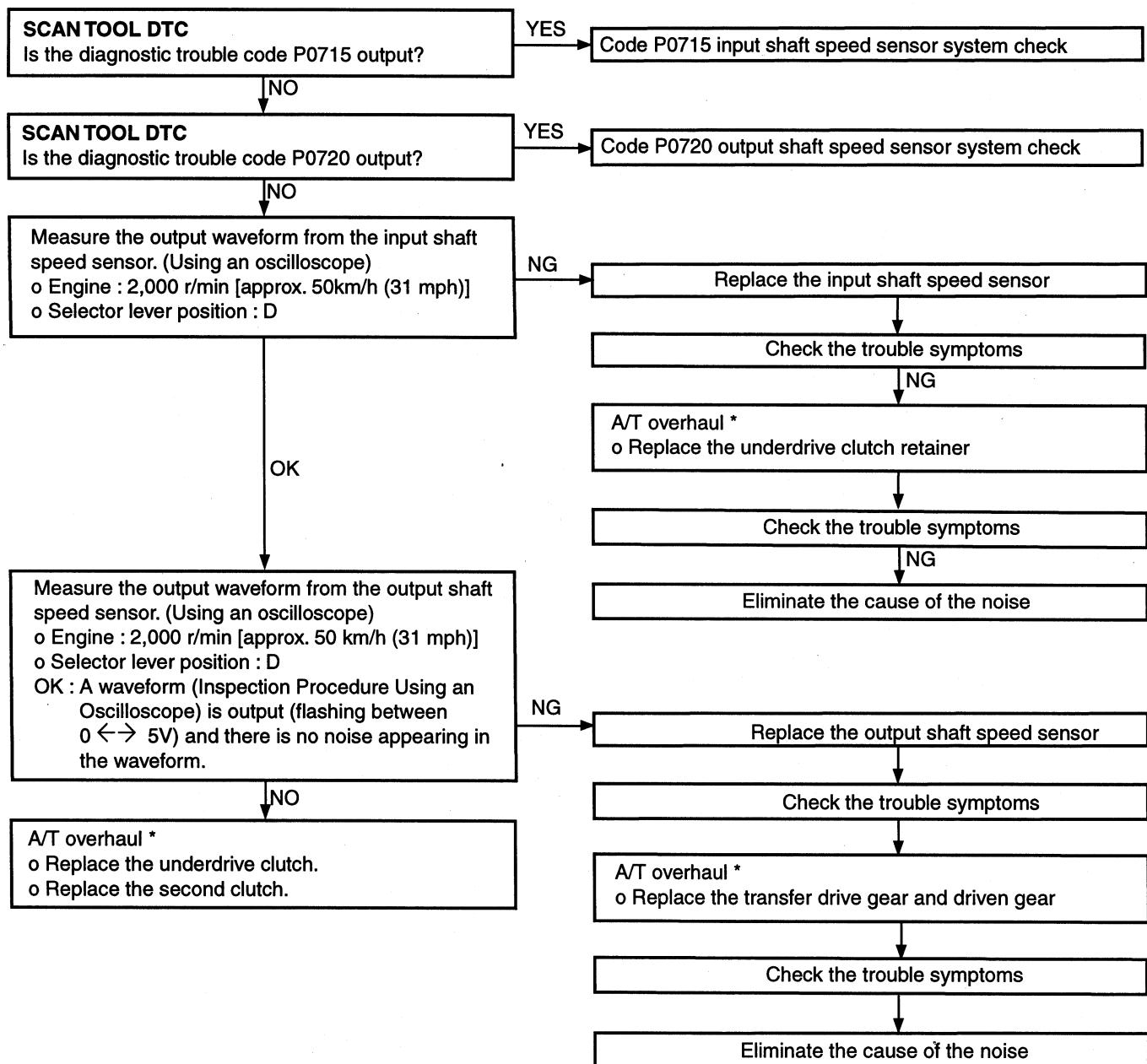
Code P0743, P0740 Torque converter clutch solenoid system	Probable cause
<p>If the resistance value for the torque converter clutch solenoid is too large or too small, it is judged that there is a short-circuit or an open circuit in the torque converter clutch solenoid and diagnostic trouble code P0743 is output. If the drive duty rate for the torque converter clutch solenoid is 100% for a continuous period of 4 seconds or more, it is judged that there is an abnormality in the torque converter clutch system and diagnostic trouble code P0740 is output. When diagnostic trouble code P0743 is output, the transaxle is locked into 3rd gear as a fail-safe measure.</p> <p>If the lock-up clutch remains engaged for a continuous period of 10 seconds when the TCM is attempting to disengage the lock-up clutch, it is judged that the torque converter clutch is stuck on and diagnostic trouble code P0740 is output.</p>	<p>Malfunction of the torque converter clutch solenoid Malfunction of connector Malfunction of the TCM</p>



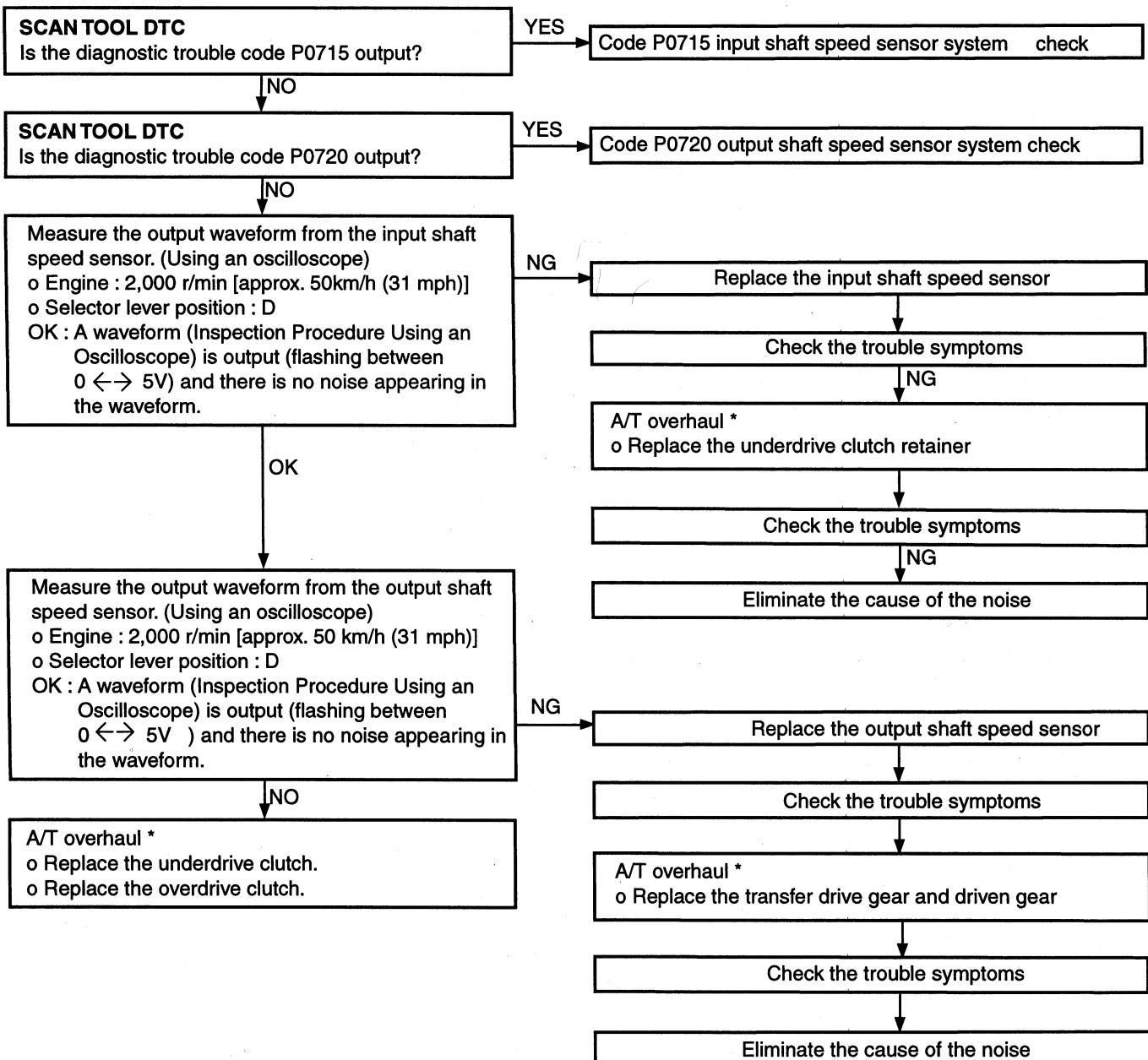
Code P0731 1st gear incorrect ratio	Probable cause
If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, and diagnostic trouble code P0732 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the low and reverse brake system Malfunction of the underdrive clutch system Noise generated



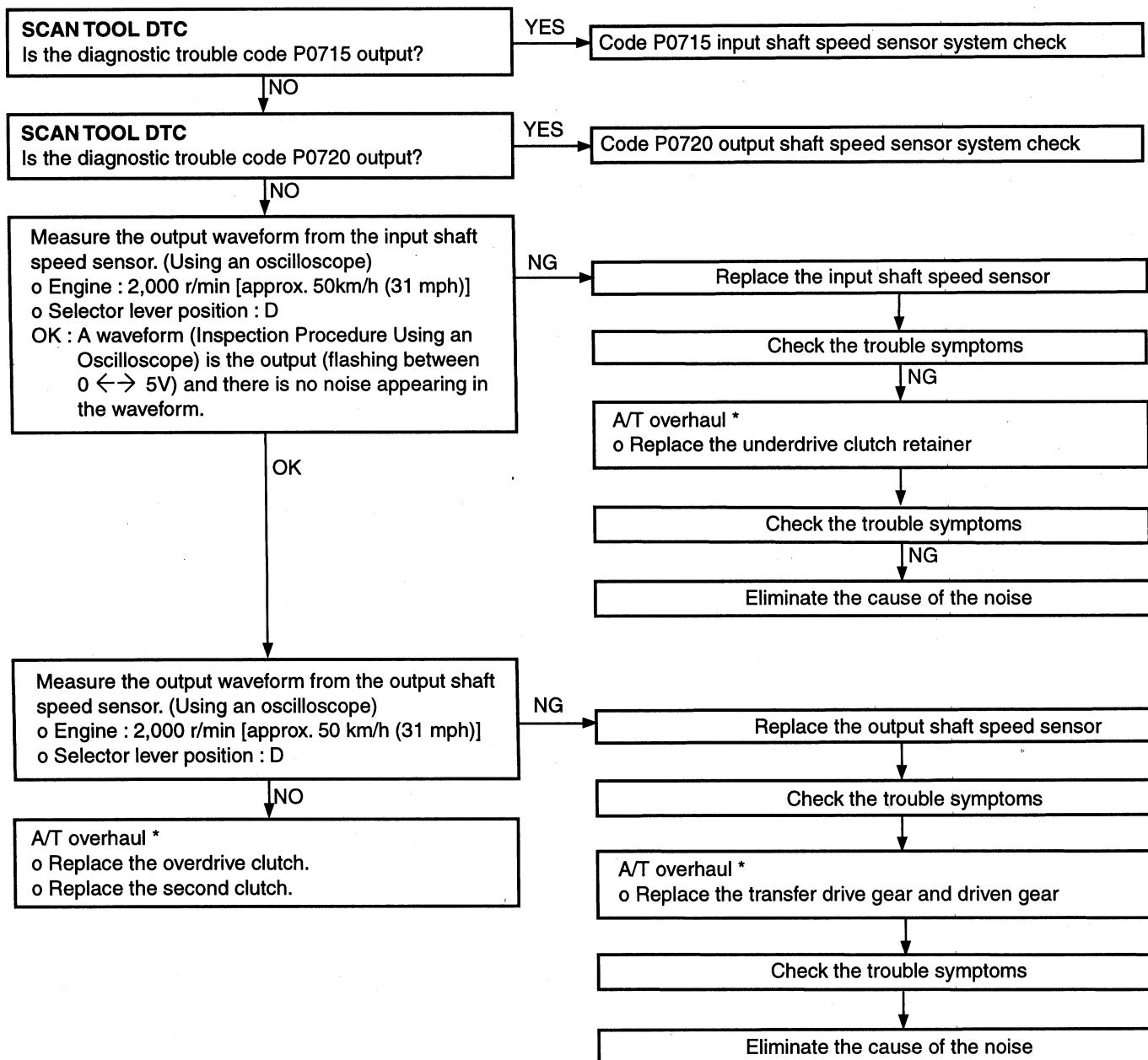
Code P0732 2nd gear incorrect ratio	Probable cause
<p>If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnostic trouble code P0732 is output. If diagnostic trouble code P0732 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<p>Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the second brake system Malfunction of the underdrive clutch system Noise generated</p>



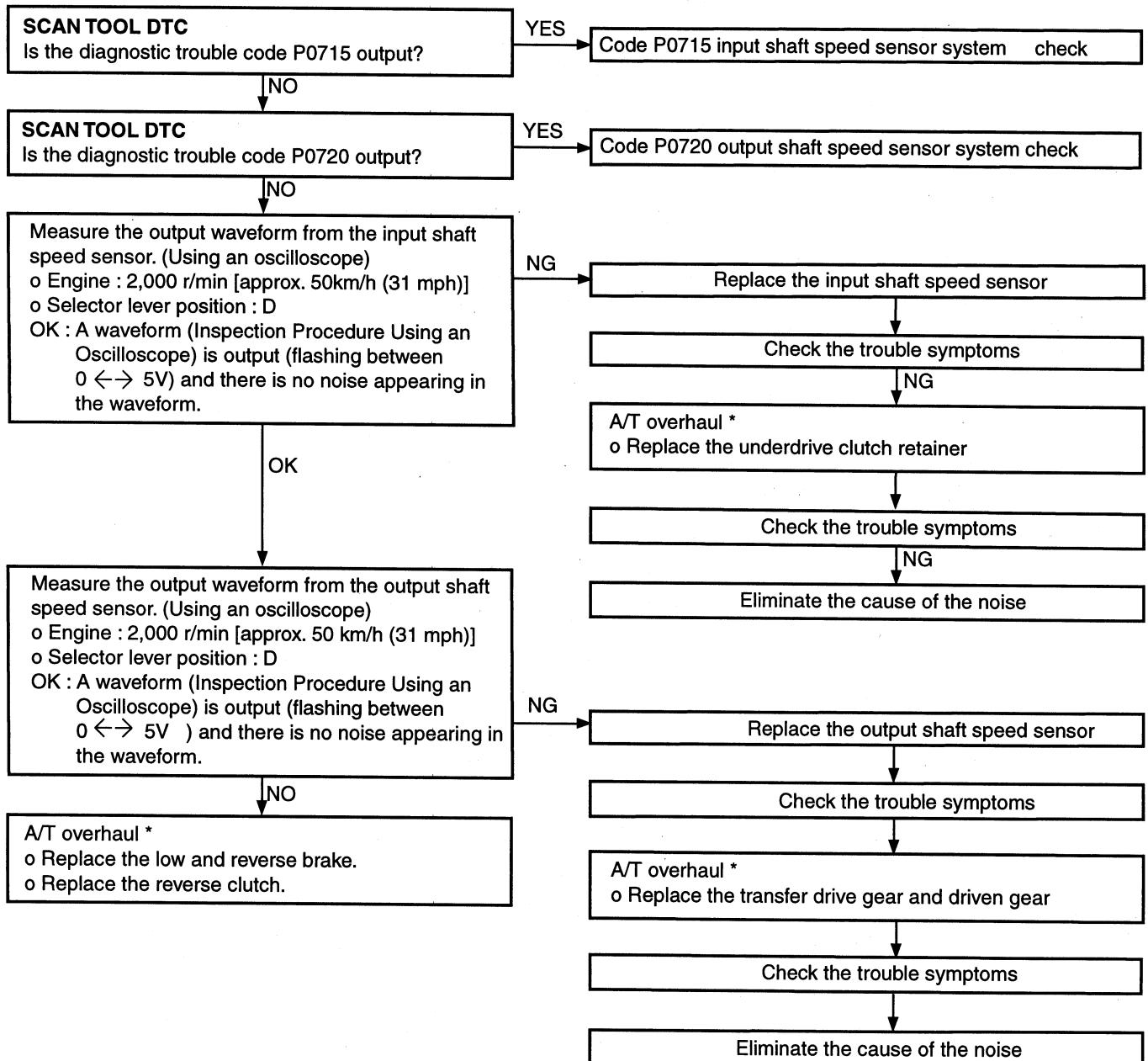
Code P0733 3rd gear incorrect ratio	Probable cause
If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnostic trouble code P0733 is output. If diagnostic trouble code P0733 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the overdrive clutch system Malfunction of the underdrive clutch system Noise generated



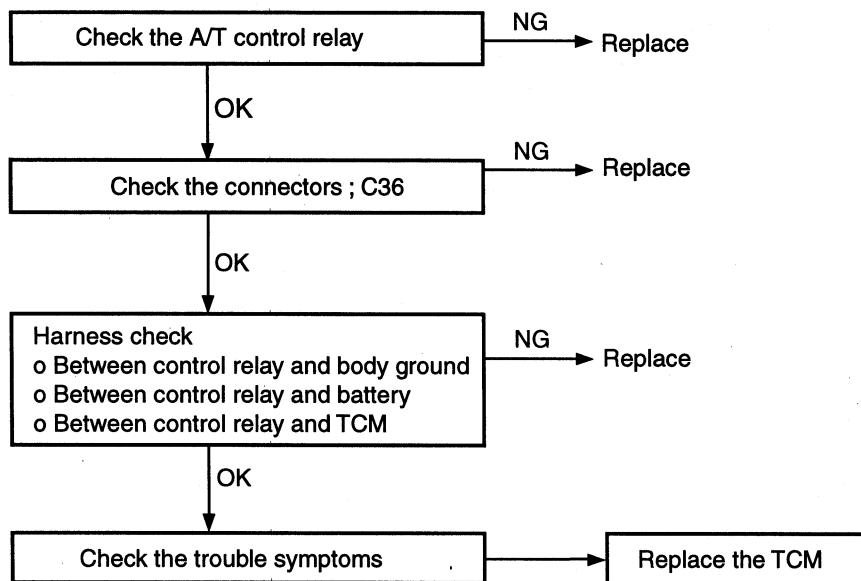
Code P0734 4th gear incorrect ratio	Probable cause
If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnostic trouble code P0734 is output. If diagnostic trouble code P0734 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the second brake system Malfunction of the overdrive clutch system Noise generated



Code P0736 reverse gear incorrect ratio	Probable cause
If the output from the output shaft speed sensor multiplied by the reverse gear ratio is not the same as the output from the input shaft speed sensor after shifting to reverse gear has been completed, diagnostic trouble code P0736 is output. If diagnostic trouble code P0736 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure	Malfunction of the input shaft speed sensor Malfunction of the output shaft speed sensor Malfunction of the underdrive clutch retainer Malfunction of the transfer drive gear or driven gear Malfunction of the low and reverse brake system Malfunction of the reverse clutch system Noise generated



Code P1723 A/T Control relay system	Probable cause
<p>If the relay voltage is less than 7 V after the ignition switch has been turned to ON, it is judged that there is an opened circuit or a short-circuit in the A/T control relay earth and diagnostic trouble code P1723 is output. The transaxle is locked into 3rd gear as a fail-safe measure.</p>	<p>Malfunction of the A/T control relay Malfunction of connector Malfunction of the TCM</p>

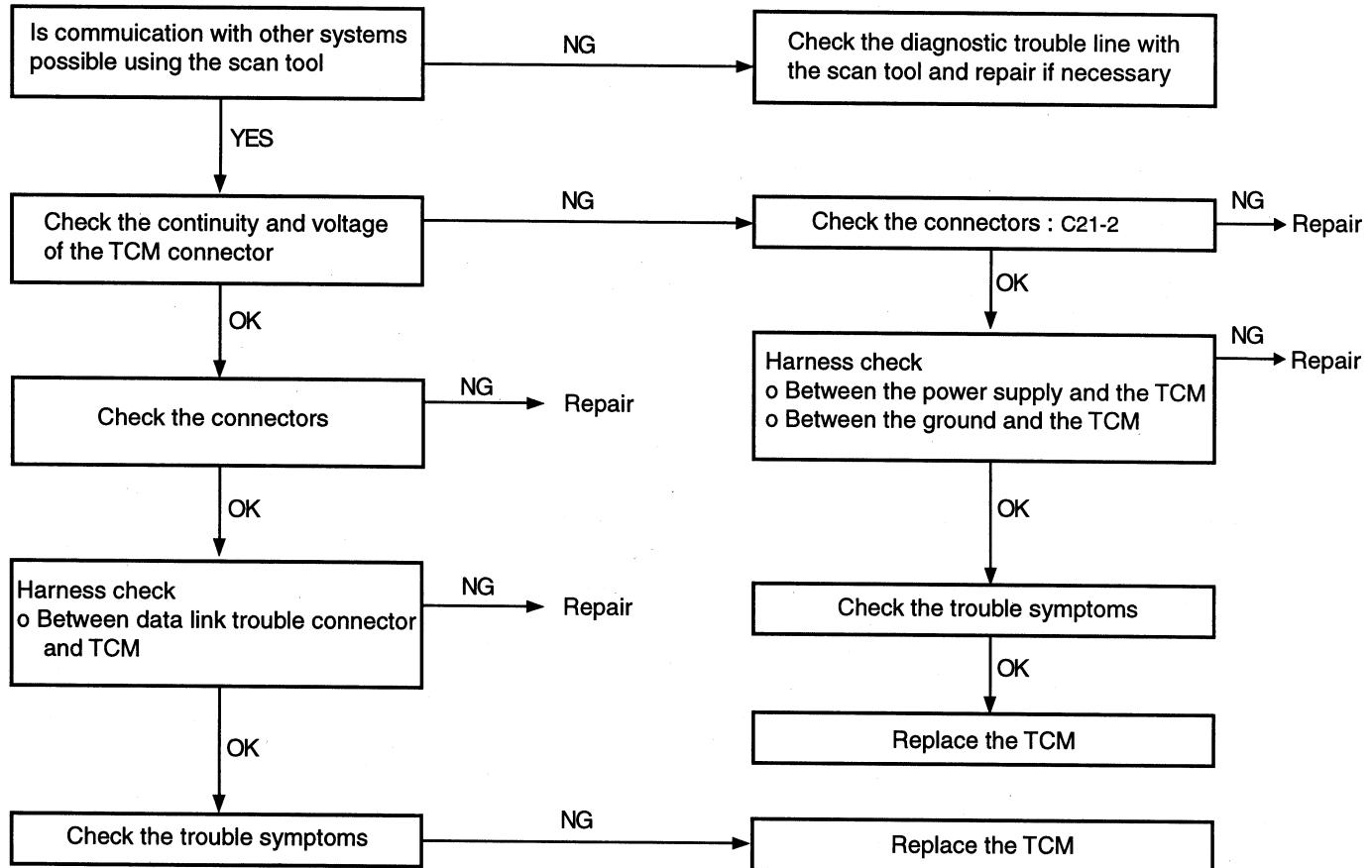


INSPECTION PROCESS FOR TROUBLE SYMPTOMS

EKJA0280

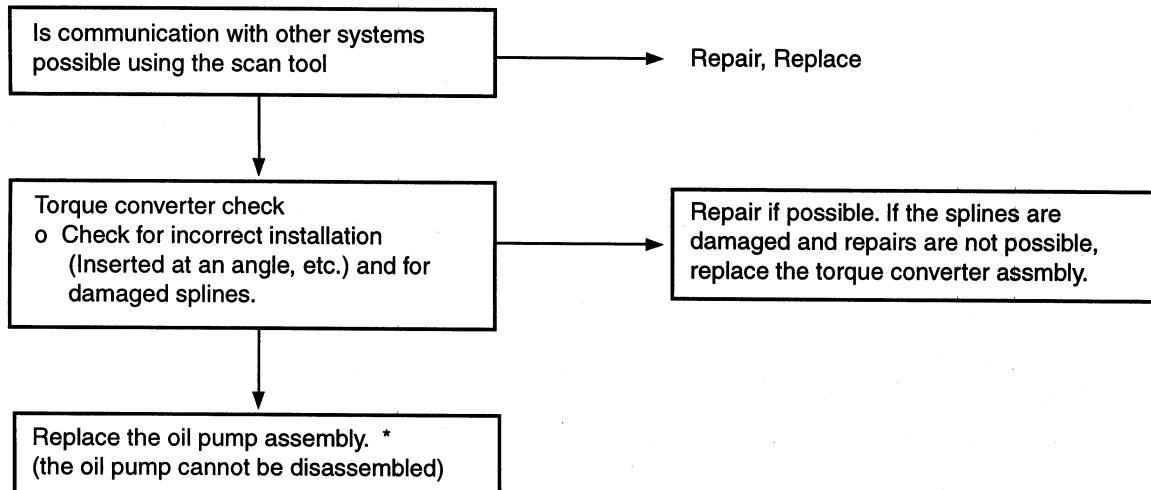
INSPECTION PROCEDURE 1

No communication with the scan tool	Probable cause
If communication with the scan tool is not possible, the cause is probably a defective diagnostic trouble line or the TCM is not functioning.	Malfunction of diagnostic trouble line Malfunction of connector Malfunction of the TCM



INSPECTION PROCEDURE 2

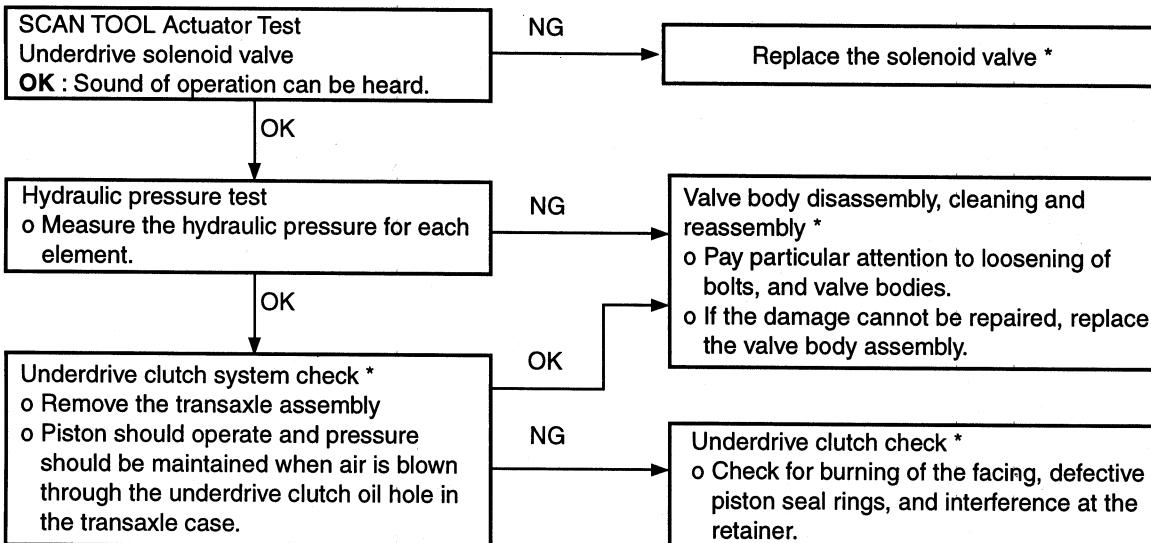
Starting impossible	Probable cause
Starting is not possible when the selector lever is in P or N range. In such cases, the cause is probably a defective engine, torque converter or oil pump.	Malfunction of the engine Malfunction of the torque converter Malfunction of the oil pump



EKAA011B

INSPECTION PROCEDURE 3

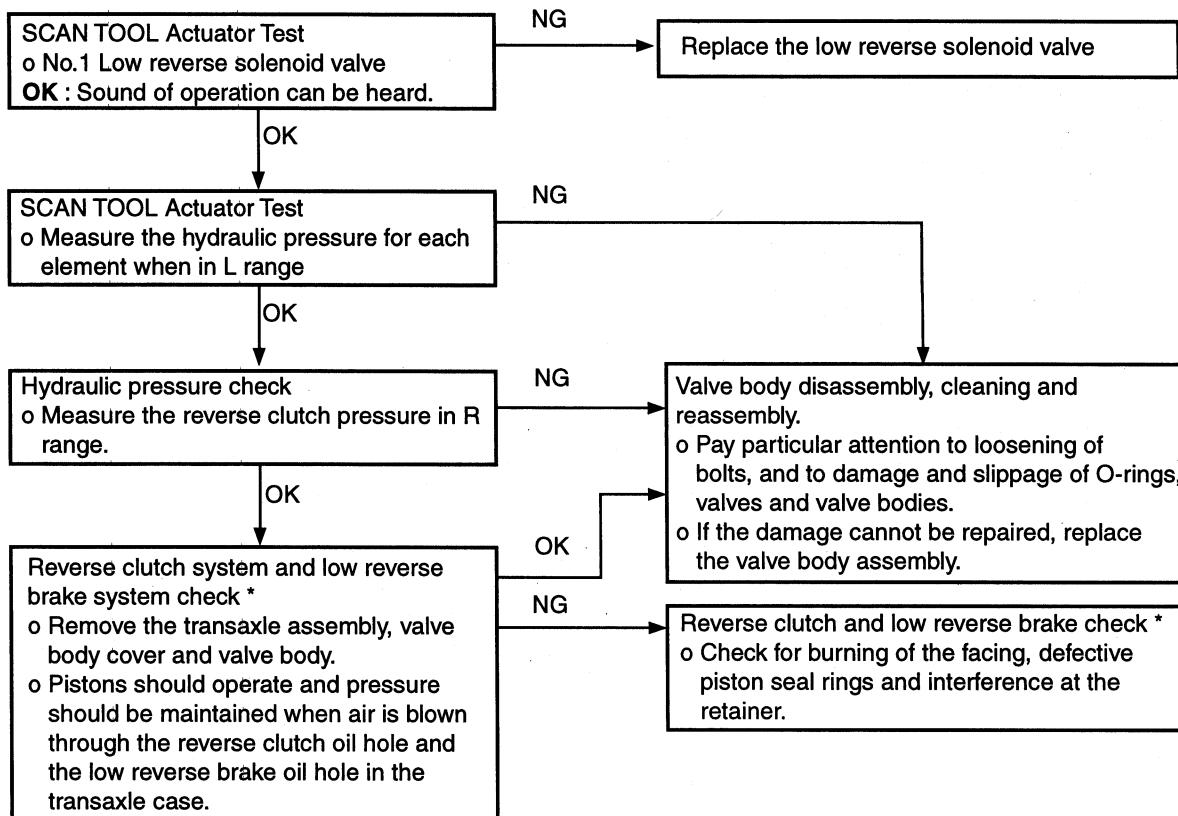
Vehicle cannot move	Probable cause
If the vehicle does not move forward when the selector lever is shifted from N to D or L range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.	Abnormal line pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body



EKAA011C

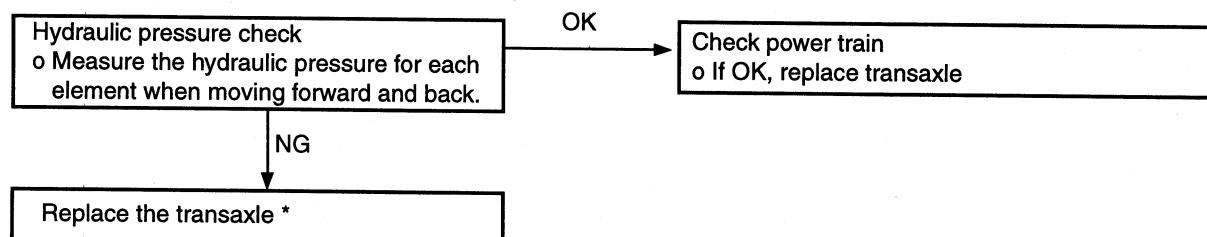
INSPECTION PROCEDURE 4

Vehicle does not reverse	Probable cause
If the vehicle does not reverse when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low reverse brake or a malfunction of the reverse clutch, low reverse brake or valve body.	Abnormal reverse clutch pressure Abnormal low reverse brake pressure Malfunction of the low reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low reverse brake Malfunction of the valve body



INSPECTION PROCEDURE 5

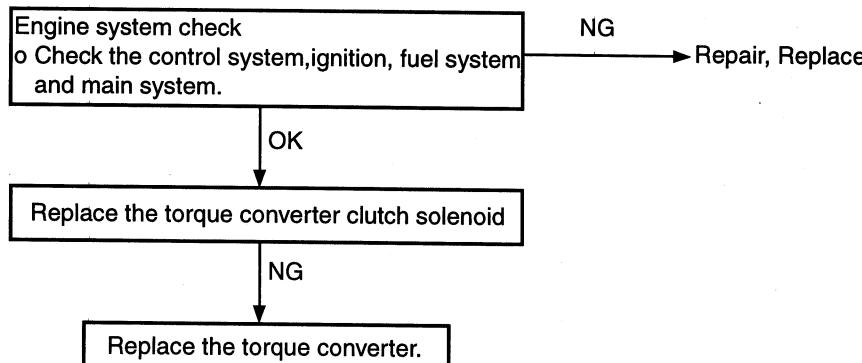
Vehicle does not move (forward or reverse)	Probable cause
If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body.	Abnormal line pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body Malfunction of the power train



EKAA011E

INSPECTION PROCEDURE 6

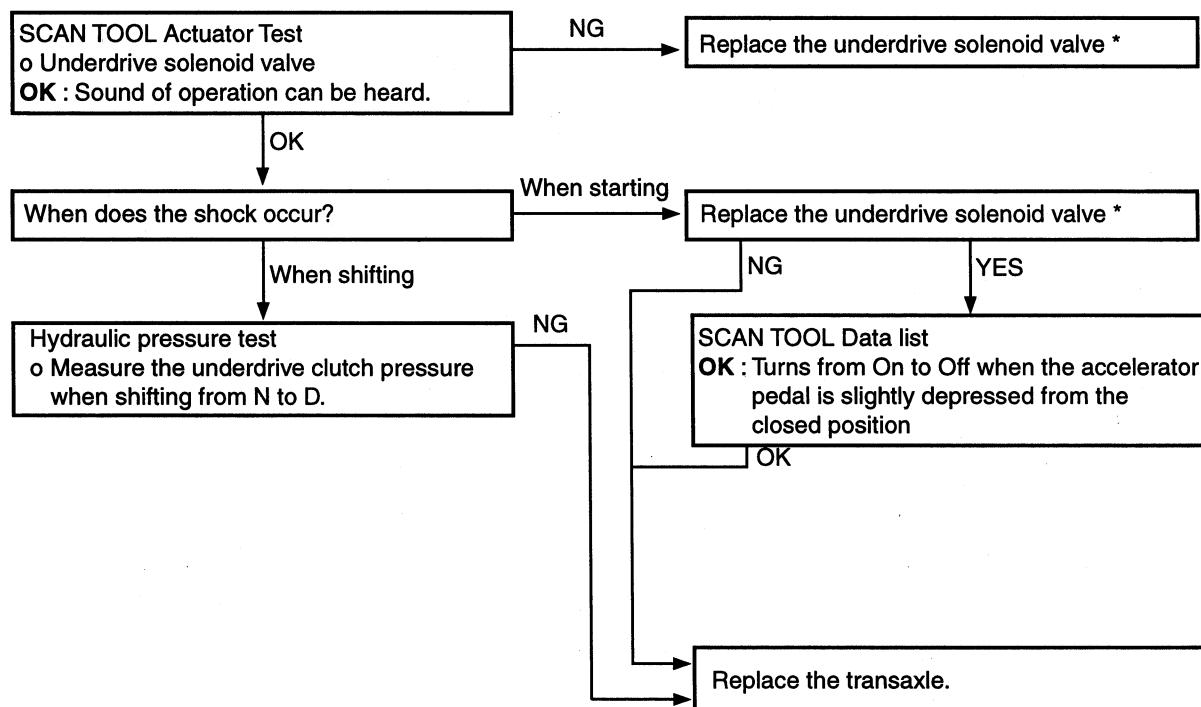
Engine stalls when shifting	Probable cause
If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine, torque converter clutch solenoid, valve body or torque converter (torque converter clutch malfunction).	Malfunction of the engine Malfunction of the torque converter clutch solenoid Malfunction of the valve body Malfunction of the torque converter (Malfunction of the torque converter clutch)



EKAA011F

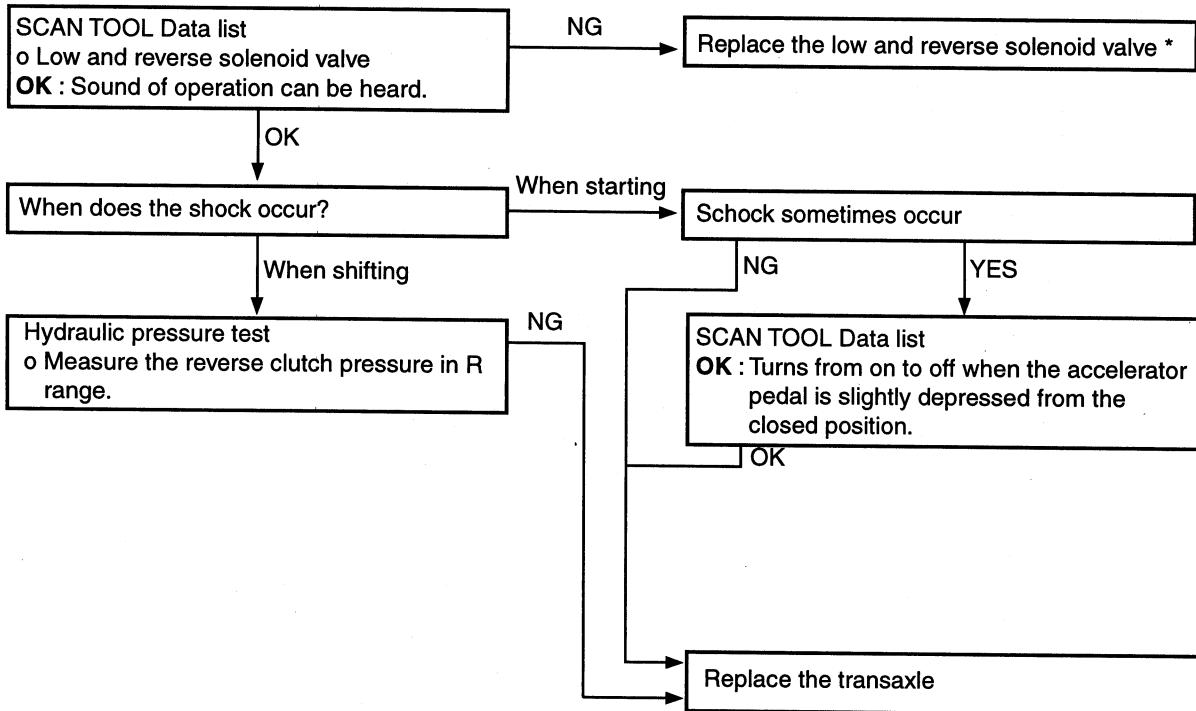
INSPECTION PROCEDURE 7

Shock or delay when changing from N to D	Probable cause
If abnormal shocks or a time lag of 2 second or more occurs when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or closed throttle position switch.	Abnormal line pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body Malfunction of the closed throttle position switch



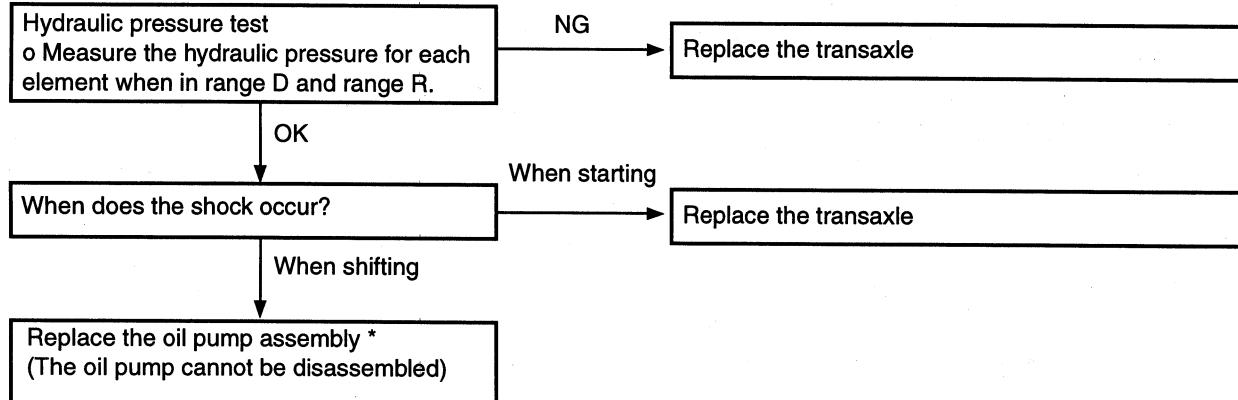
INSPECTION PROCEDURE 8

Shock or delay when changing from N to R	Probable cause
If abnormal shock or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body.	Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body



INSPECTION PROCEDURE 9

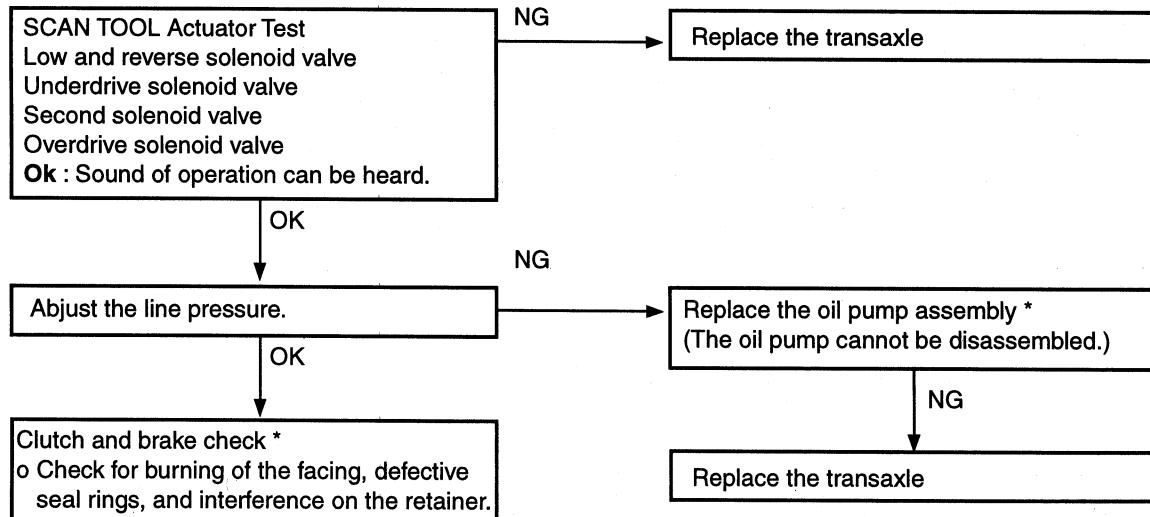
Shock or delay when changing from N to D, N to R	Probable cause
If abnormal shock or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to D, N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.	Abnormal line pressure Malfunction of the oil pump Malfunction of the valve body



EKAA011

INSPECTION PROCEDURE 10

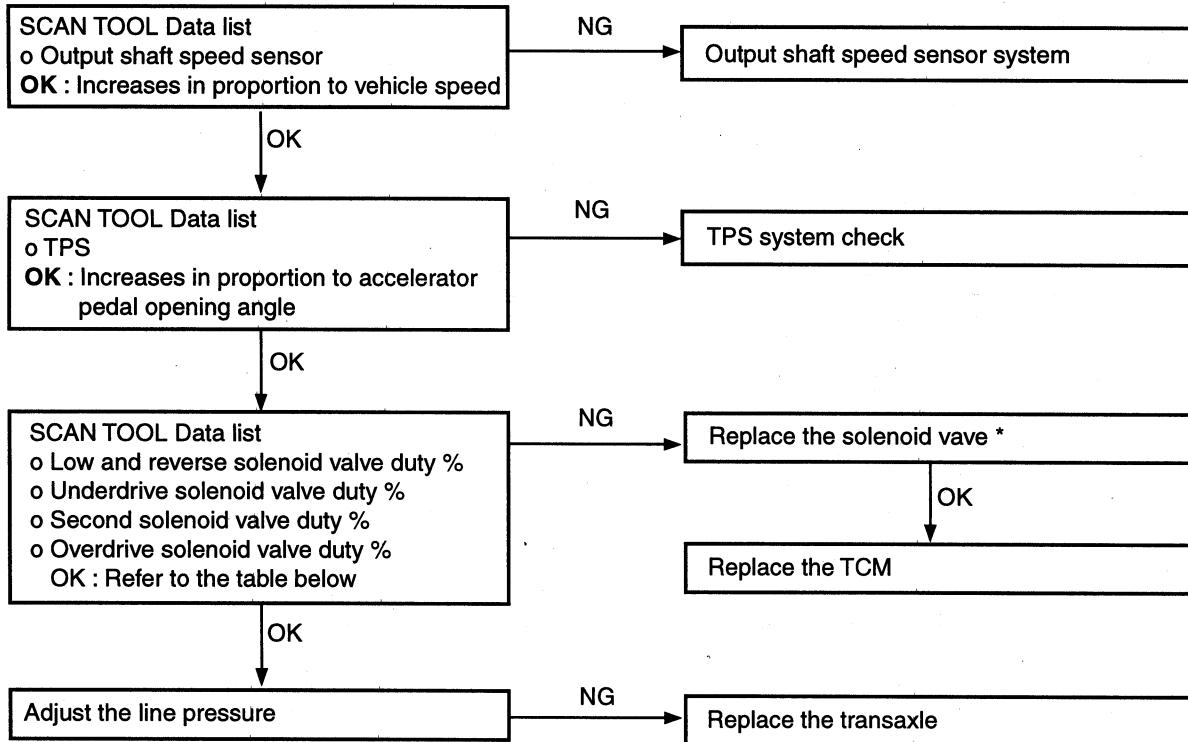
Shocks and transaxle flare	Probable cause
If shocks occur when driving due to upshifting or downshifting and the transaxle speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.	Abnormal line pressure Malfunction of each solenoid valve Malfunction of the oil pump Malfunction of the valve body Malfunction of each brake or each clutch



EJAA011J

INSPECTION PROCEDURE 11

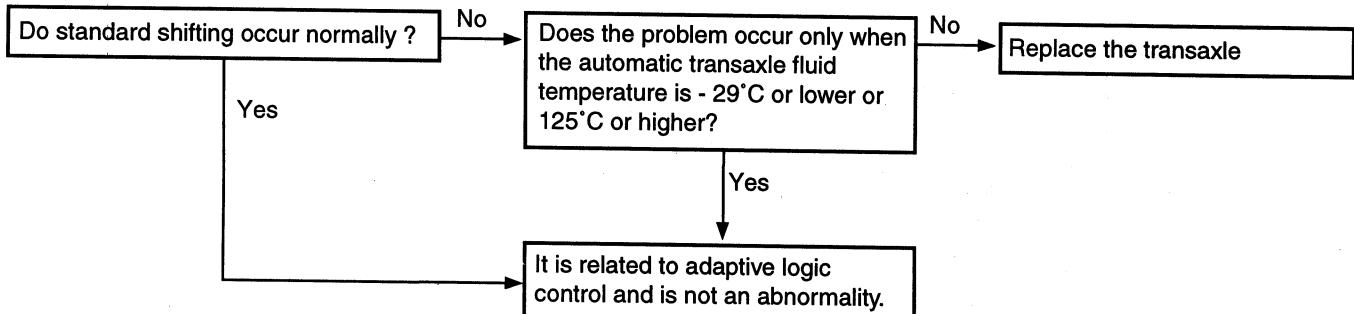
Changed shift points	Probable cause
If all shift points are changed while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or a solenoid valve.	Malfunction of the output shaft speed sensor Malfunction of the throttle position sensor Malfunction of each solenoid valve Abnormal line pressure Malfunction of the valve body Malfunction of the TCM



EJAA011K

INSPECTION PROCEDURE 12

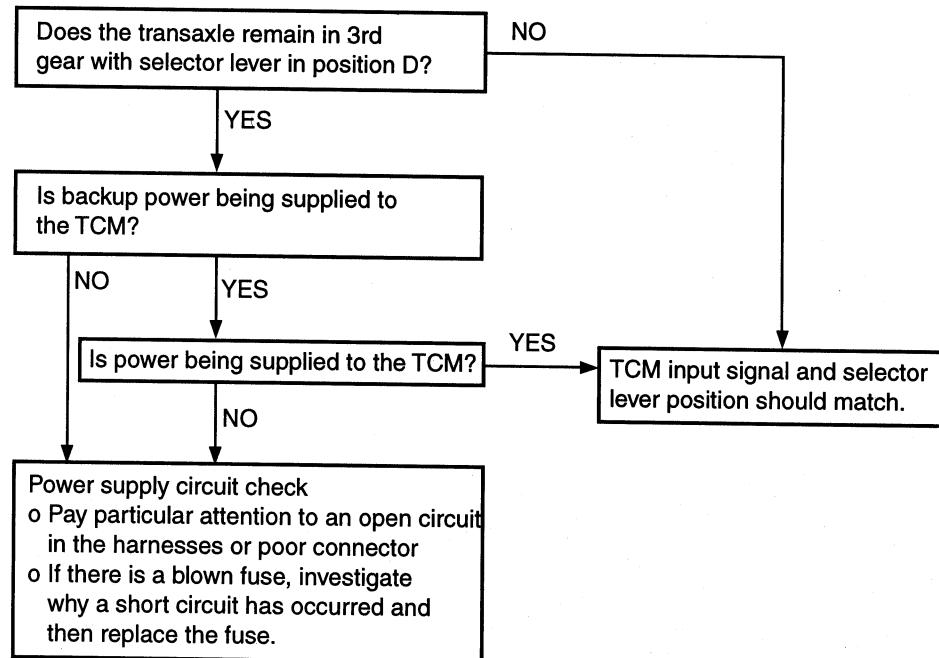
Displaced shift points	Probable cause
If some of the shift points are changed while driving, the cause is probably a malfunction of the valve body, or it is related to adaptive logic control and is not an abnormality.	Malfunction of the valve body



EKAA011L

INSPECTION PROCEDURE 13

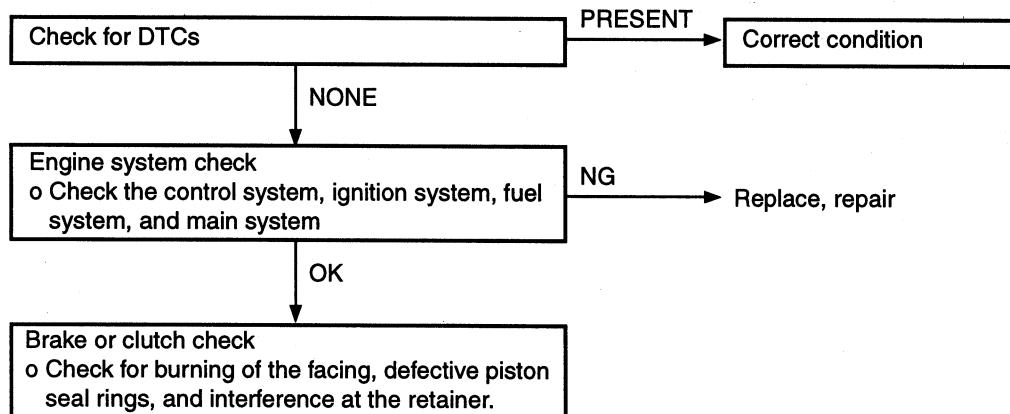
No diagnostic trouble codes (Does not shift)	Probable cause
If shifting does not occur while driving and no diagnostic trouble codes are given, the cause is probably a malfunction of the Park/Neutral switch, or the TCM.	Malfunction of the Park/Neutral switch Malfunction of the TCM



EKAA011M

INSPECTION PROCEDURE 14

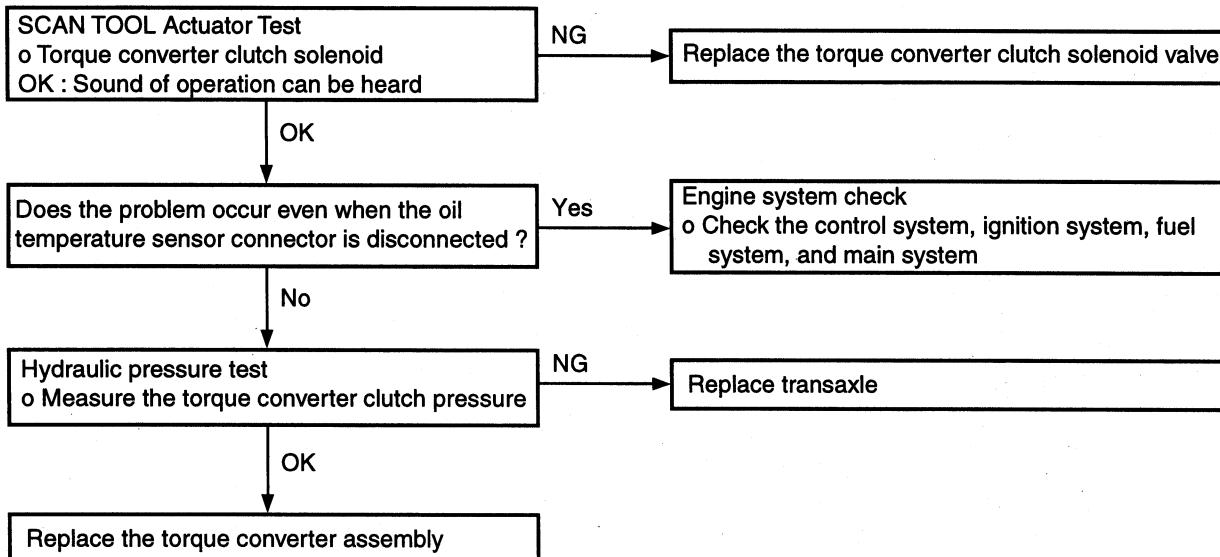
Poor acceleration	Probable cause
If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system, a brake or clutch, or the transaxle is in fail-safe.	Malfunction of the engine system Malfunction of the brake or clutch Transaxle in fail-safe



EKAA011N

INSPECTION PROCEDURE 15

Vibration	Probable cause
If vibration occurs when driving at constant speed or when accelerating in top range, the cause is probably abnormal torque converter clutch pressure or a malfunction of the engine, torque converter clutch solenoid, torque converter or valve body.	Abnormal torque converter clutch pressure Malfunction of the engine Malfunction of the torque converter clutch solenoid Malfunction of the torque converter Malfunction of the valve body



SERVICE ADJUSTMENT

PROCEDURES

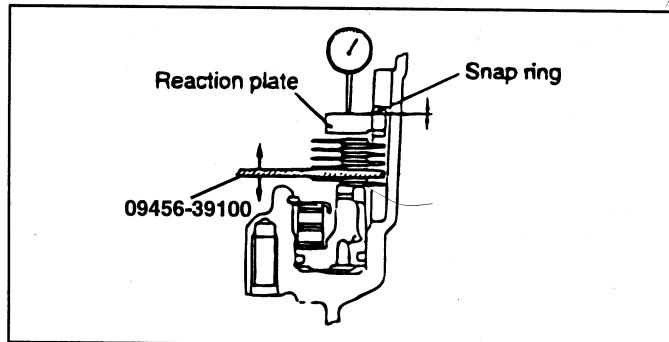
EKHA0150

BRAKE REACTIONPLATE END PLAY

ADJUSTMENT Replace the pressure plate of the low-reverse brake with the special tool, and then install the brake disc, brake plate, and snap ring as shown in the figure. Install the reaction plate and the used snap ring. Move the special tool to measure the end play, and then replace the snap ring to adjust the end play to standard value.

Standard value : 0-0.16 mm

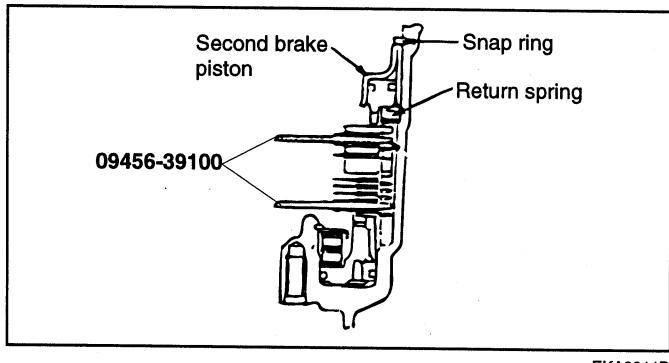
(Refer to the "Snap ring and spacer for adjustment")



EKA9011E

SECOND BRAKE END PLAY ADJUSTMENT

Replace the pressure plate of the second brake with the special tool, and then install the brake disc and brake plate as shown in the figure. Install the return spring, second brake piston, and snap ring.

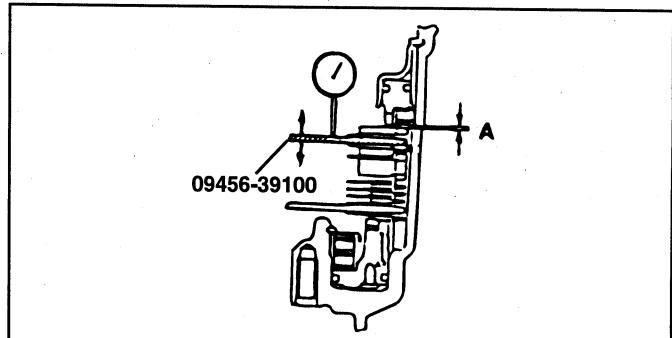


EKA9011B

Standard value : 0.79-1.25 mm

Reference Select a pressure plate whose thickness is within the following value. [A (moving amount) + thickness of the special tool — 1.25] to [A (moving

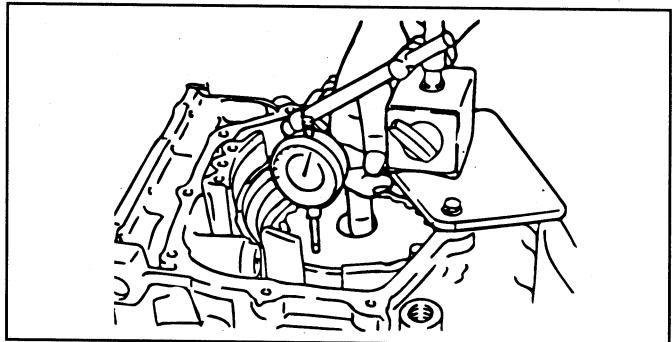
amount) + thickness of the special tool — 0.79]. (Refer to the "Snap ring and spacer for adjustment")



EKA9011C

LOW-REVERSE BRAKE END PLAY ADJUSTMENT

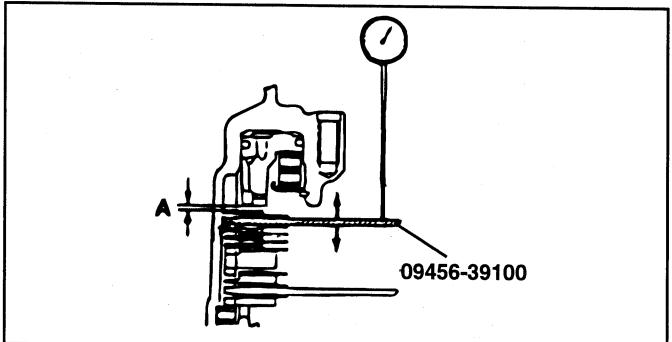
Reverse the transmission and install the dial gauge. Move the special tool up and down to measure the end play.



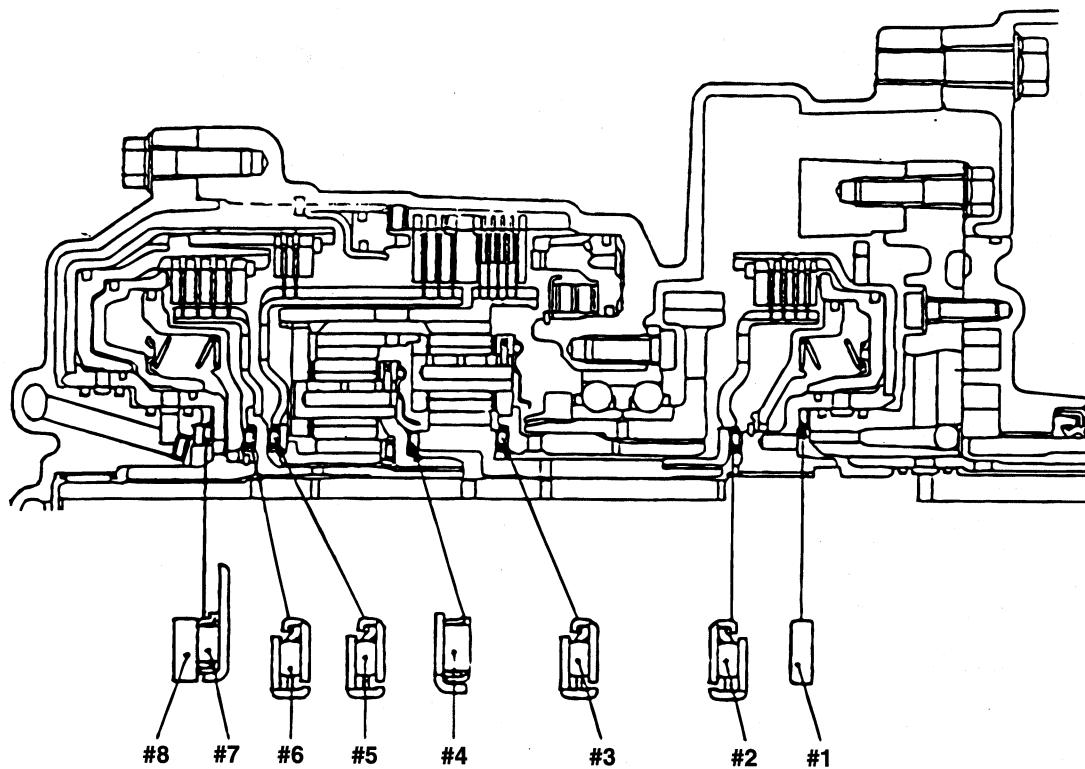
EKA9011D

Standard value : 1.35-1.81 mm

Reference Select a pressure plate whose thickness is within the following value. [A (moving amount) + thickness of the special tool — 1.81] to [A (moving amount) + thickness of the special tool — 1.35]. (Refer to the "Snap ring and spacer for adjustment").



EKA9011F



EKA9012A

**IDENTIFICATION OF THRUST BEARING,
THRUST RACES, AND THRUST WASHERS**

O.D.	I.D.	Thickness	Symbol	O.D.	I.D.	Thickness	Symbol
59	47	1.8	#1	48.9	37	1.6	#8
59	47	2.0	#1	48.9	37	1.7	#8
59	47	2.2	#1	48.9	37	1.8	#8
59	47	2.4	#1	48.9	37	1.9	#8
59	47	2.6	#1	48.9	37	2.0	#8
59	47	2.8	#1	48.9	37	2.1	#8
49	36	3.6	#2	48.9	37	2.2	#8
49	36	3.6	#3	48.9	37	2.3	#8
45.3	31	3.3	#4	48.9	37	2.4	#8
49	36	3.6	#5	48.9	37	2.5	#8
49	36	3.6	#6	48.9	37	2.6	#8
59	37	2.8	#7	-	-	-	-

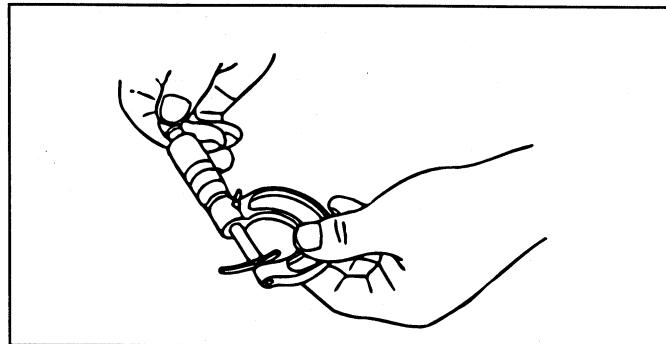
UNDERDRIVE SUN GEAR END PLAY ADJUSTMENT

Install the used thrust race #8, and then the rear cover. Measure end play of the underdrive sun gear. Replace thrust race #8 to adjust the play to the standard value.

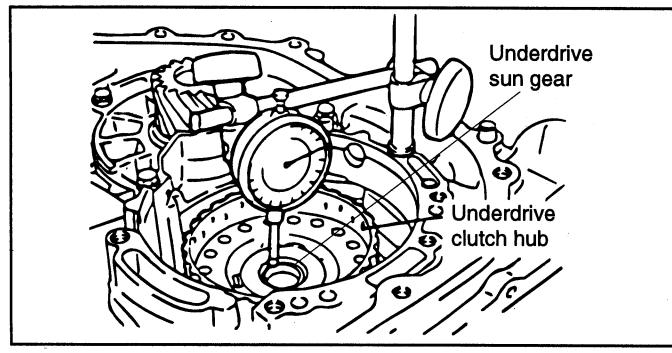
Standard value : 0.25-0.45 mm

NOTE

Installing the underdrive clutch hub makes it easy to measure the end play of the underdrive sun gear.



EKA9013C



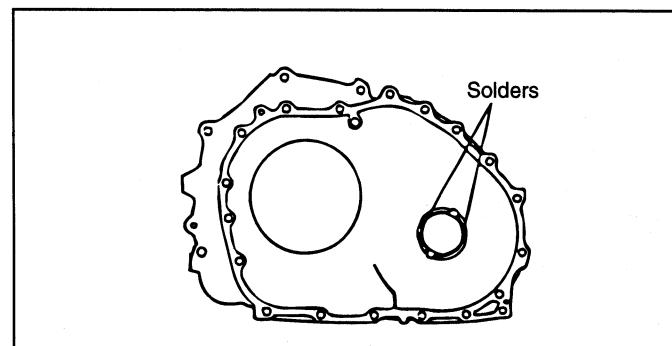
EKA9013A

DIFFERENTIAL CASE PRELOAD ADJUSTMENT

Place a solder (approx. 10 mm in length, 3 mm in diameter) on the torque converter housing as shown in the figure.

Install the torque converter housing to the transmission case without applying sealant. Tighten its mounting bolts to the specified torque. Loosen the bolts, and remove the solder. Use a micrometer to measure the thickness (T) of the pressed solder. Select a spare with a thickness that is within the following value.

Standard value : (T+0.045 mm) to (T+0.105 mm)

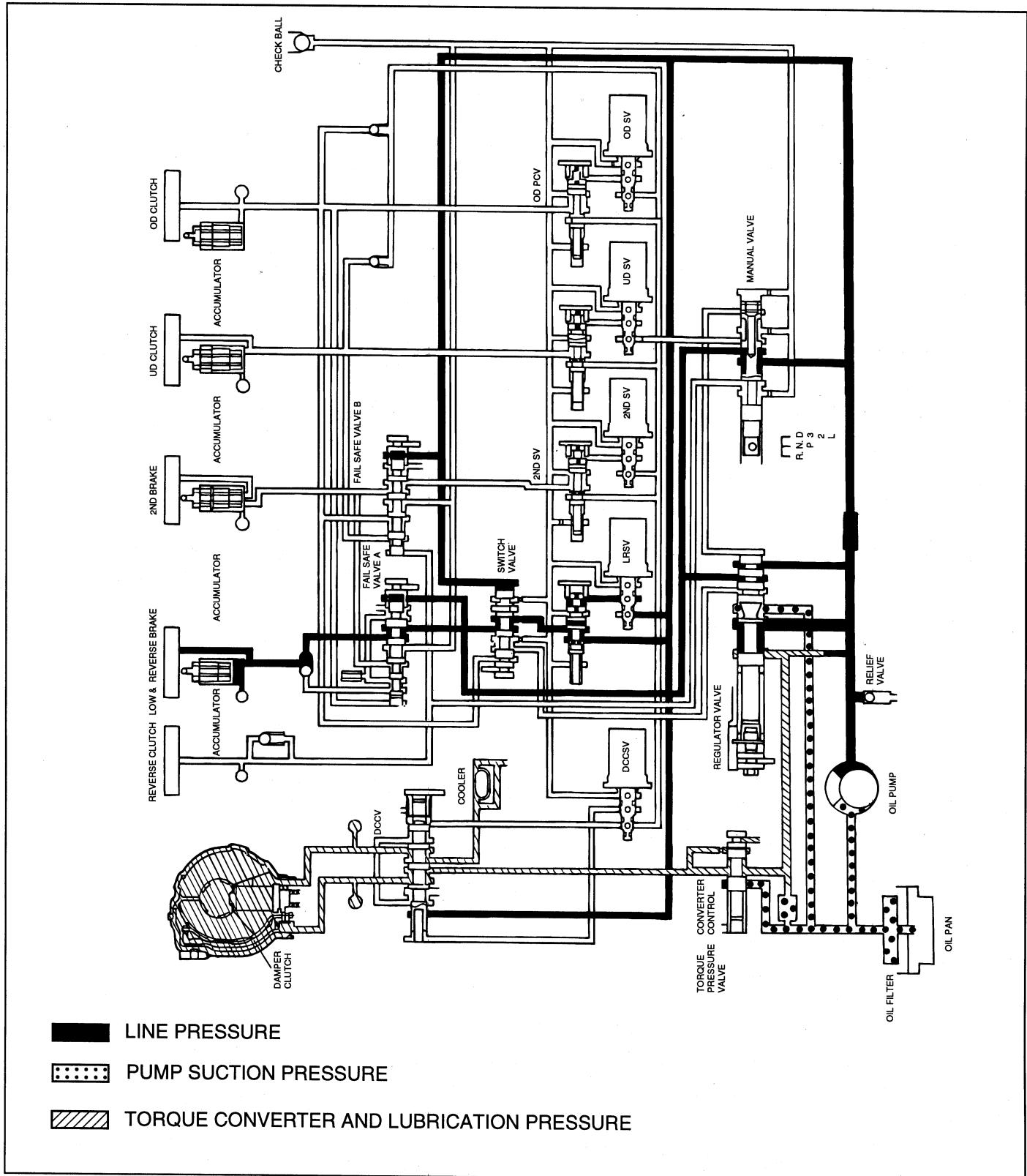


EKA9013B

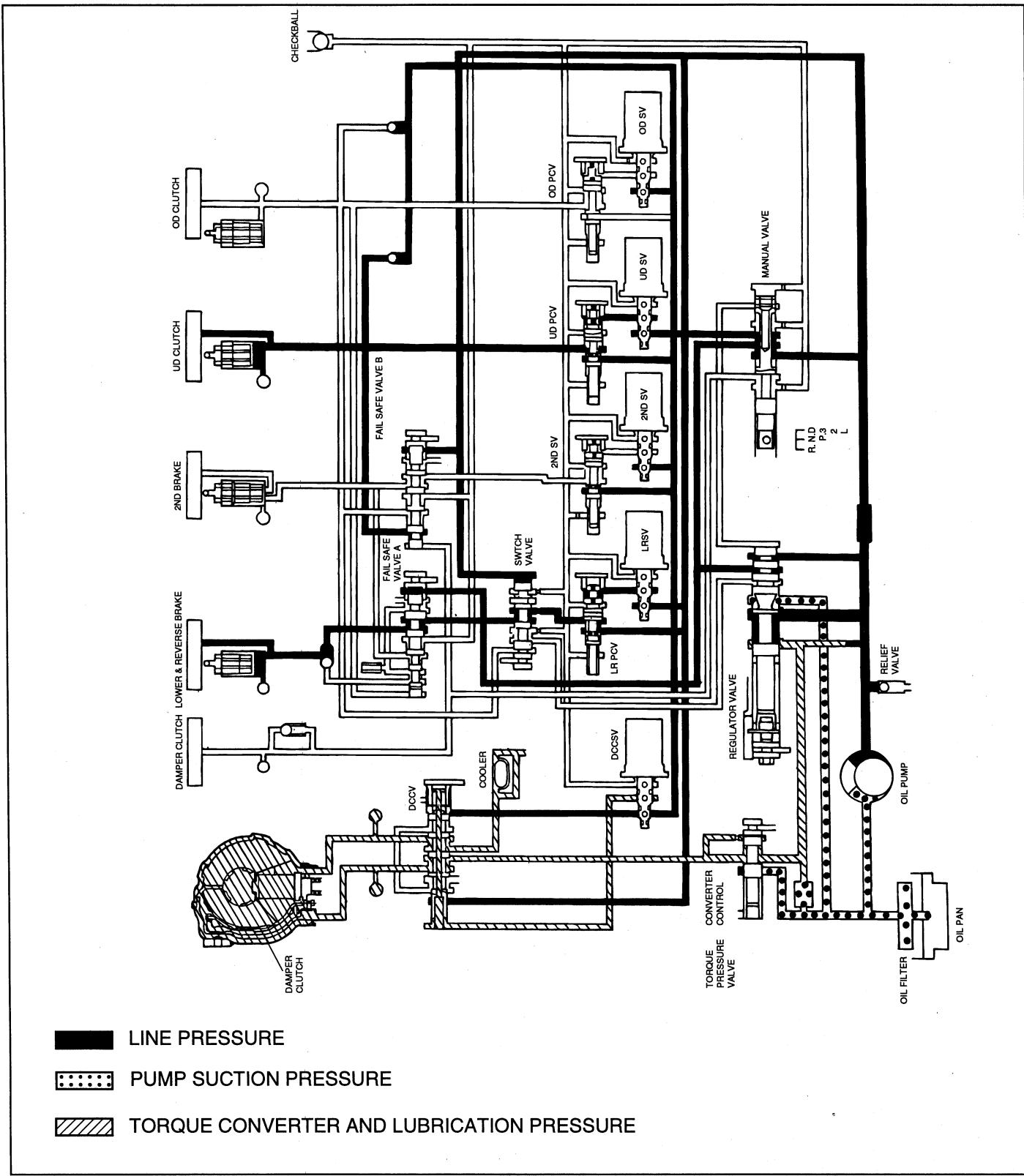
AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT

EKA90170

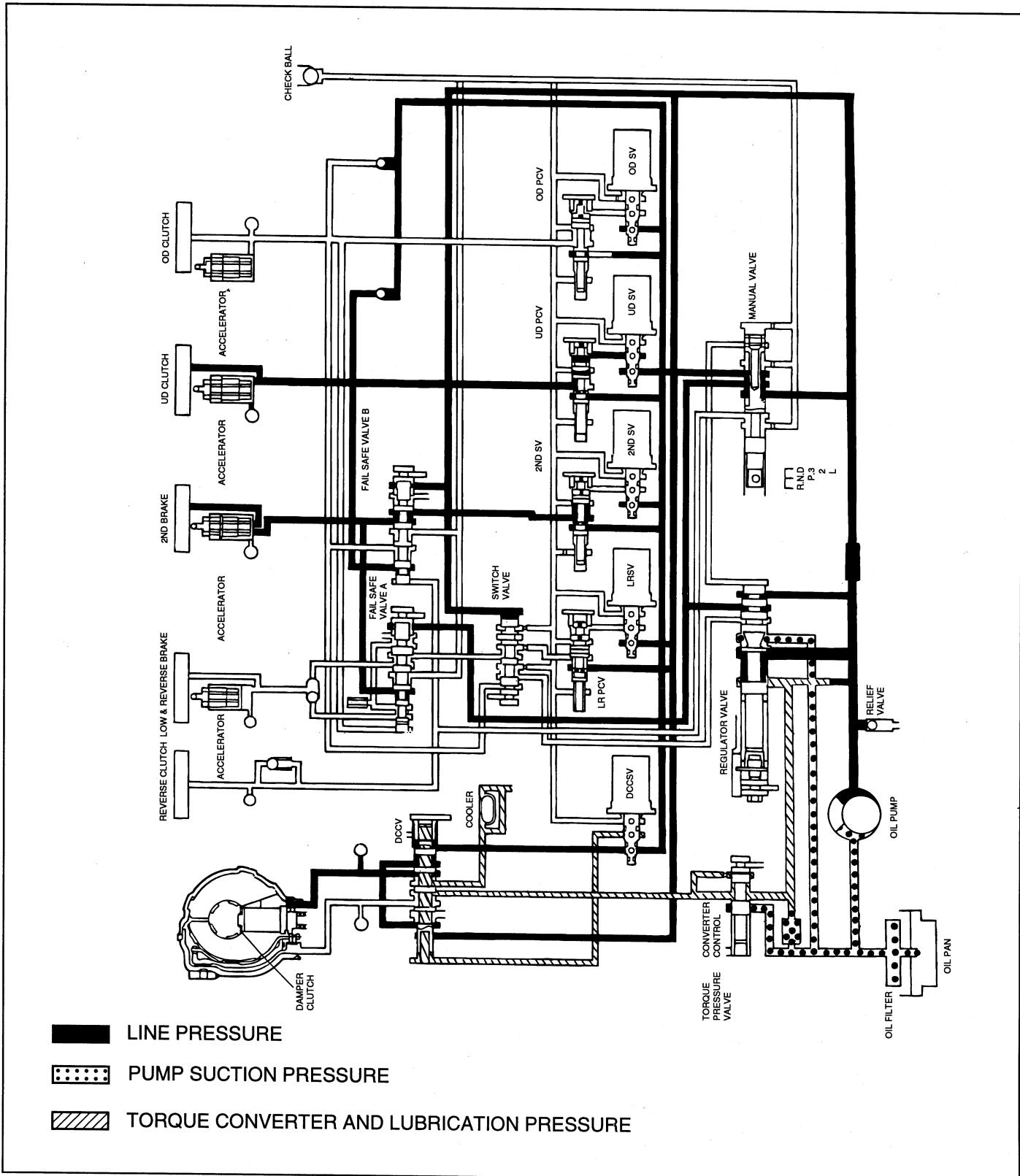
PARKING & NEUTRAL



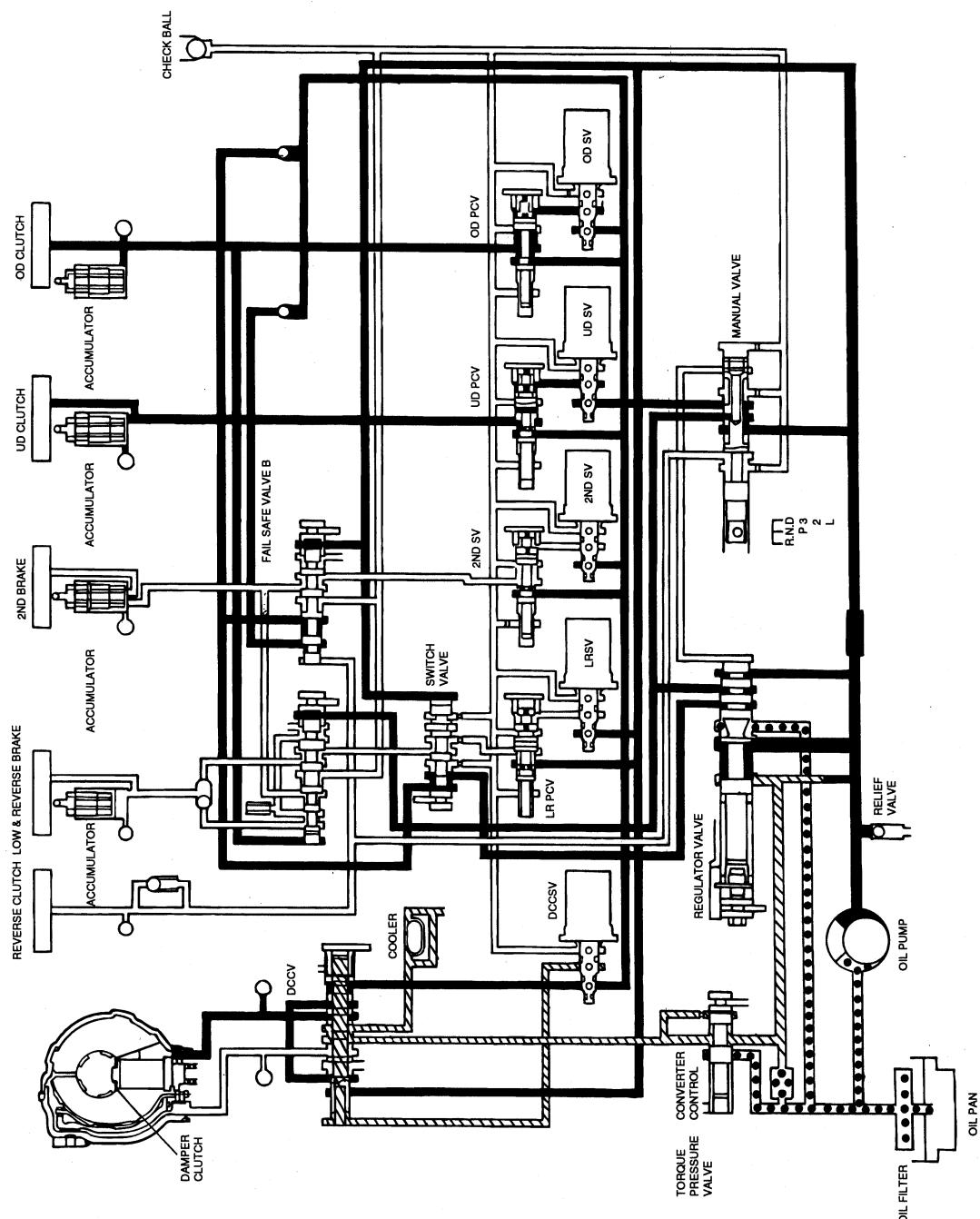
FIRST



SECOND



THIRD

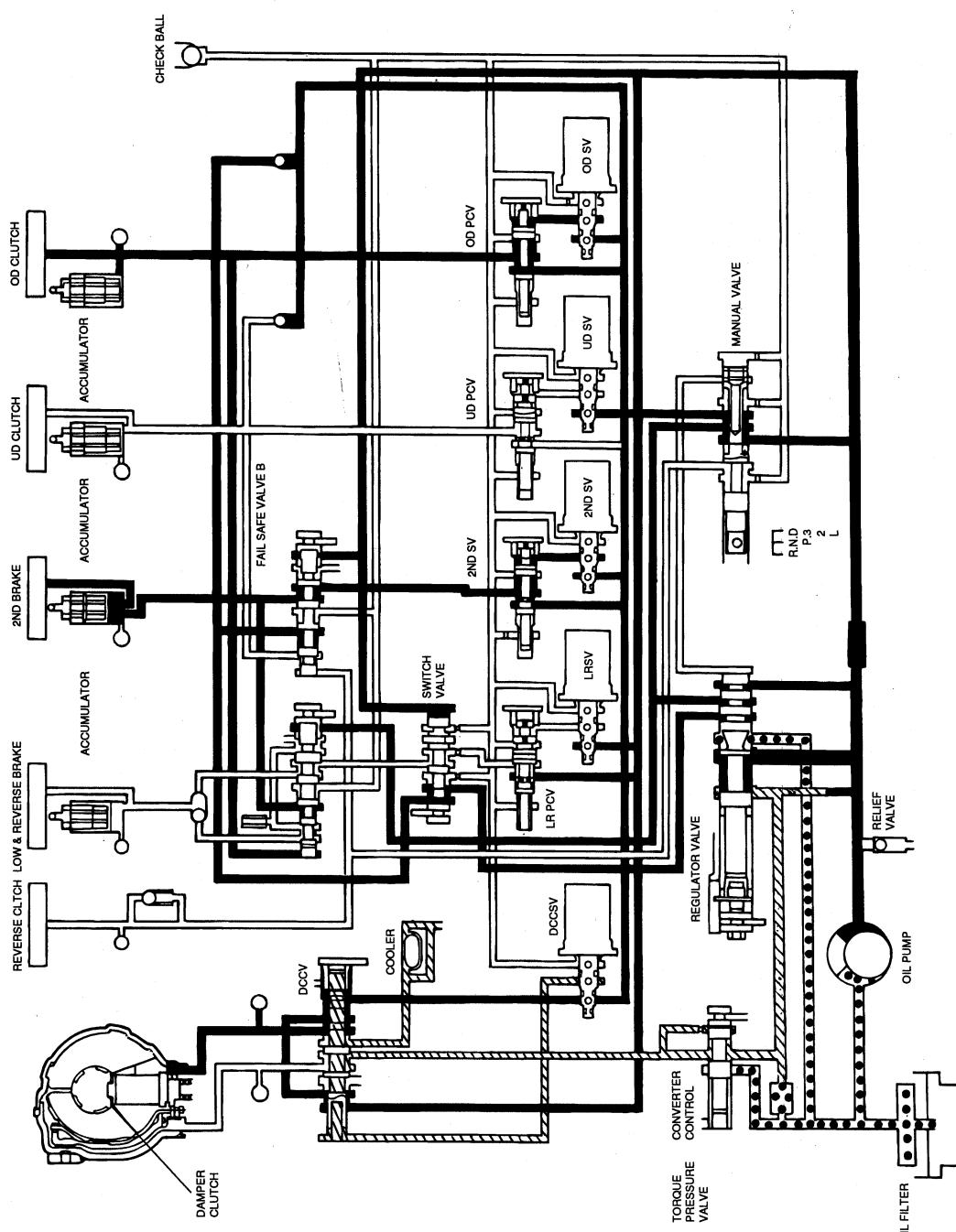


LINE PRESSURE

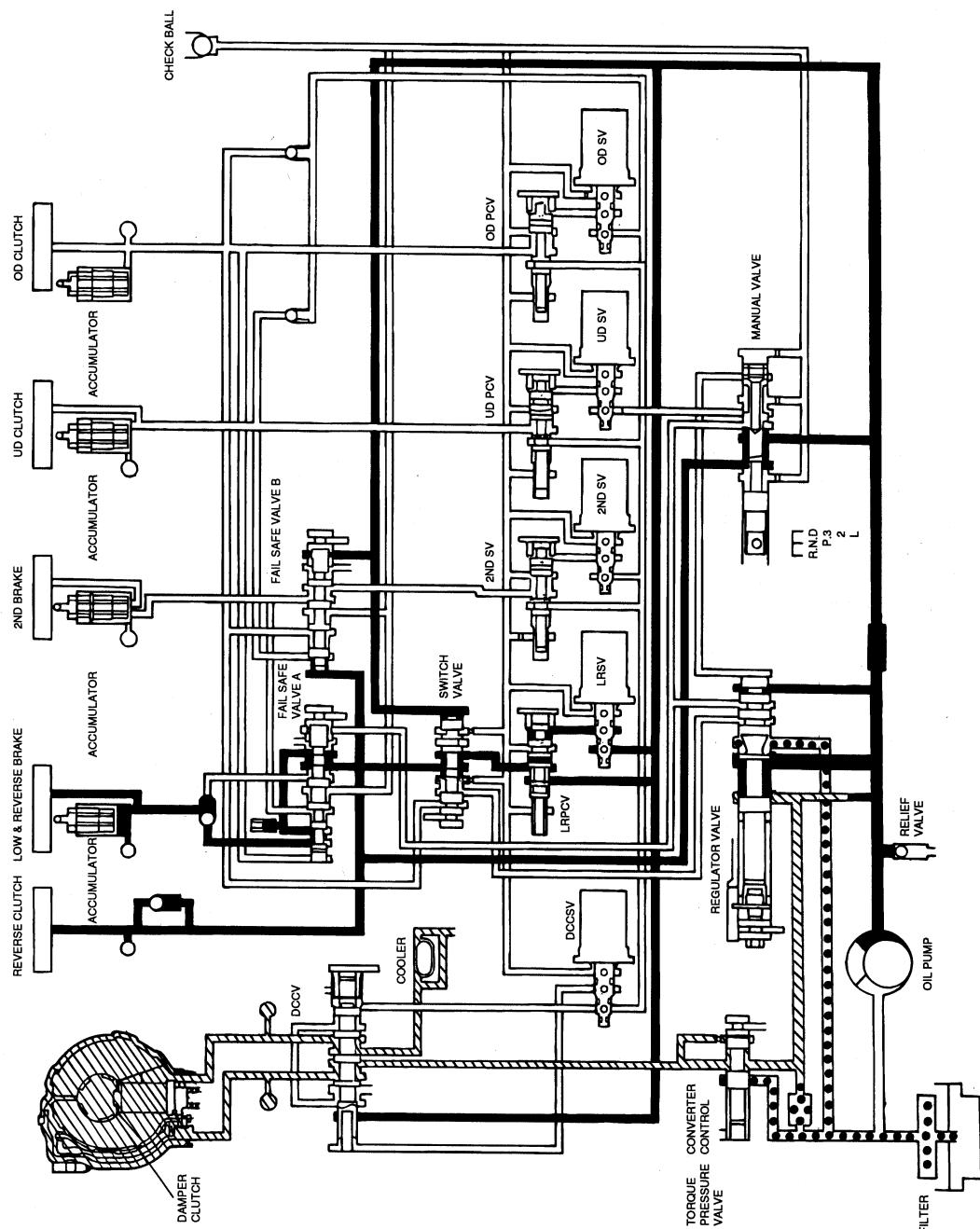
PUMP SUCTION PRESSURE

 TORQUE CONVERTER AND LUBRICATION PRESSURE

FOURTH



REVERSE



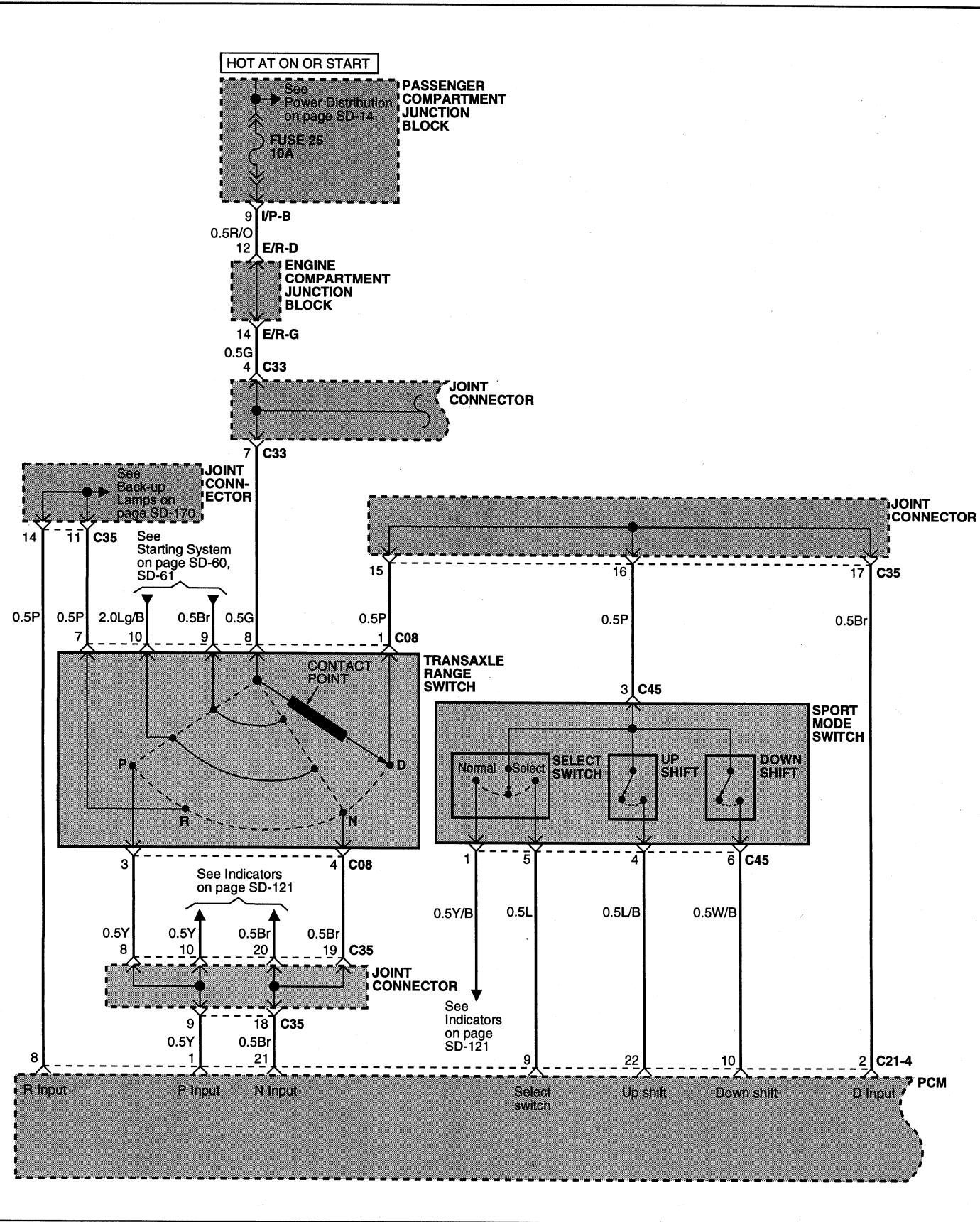
■ LINE PRESSURE

■ PUMP SUCTION PRESSURE

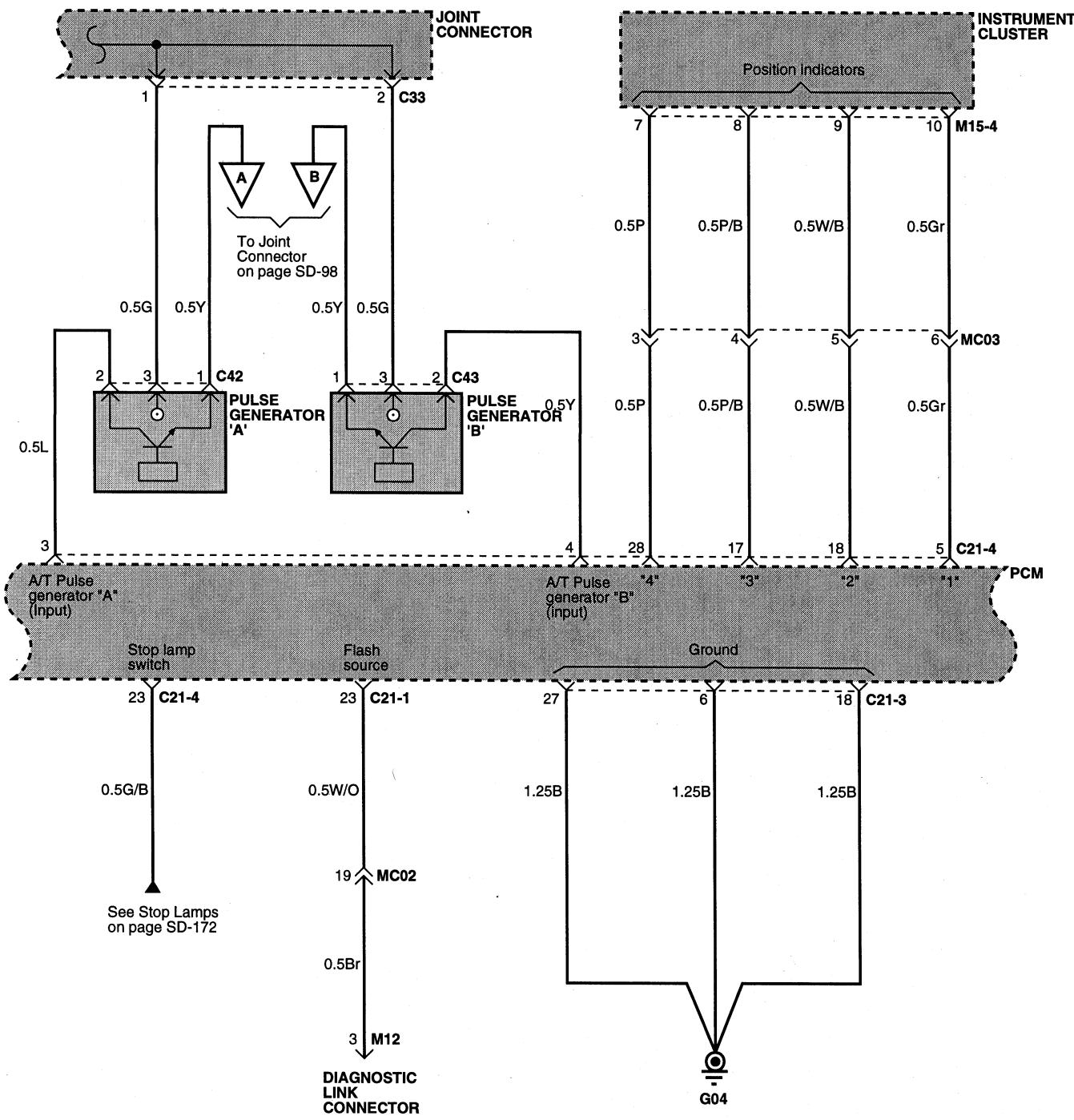
■ TORQUE CONVERTER AND LUBRICATION PRESSURE

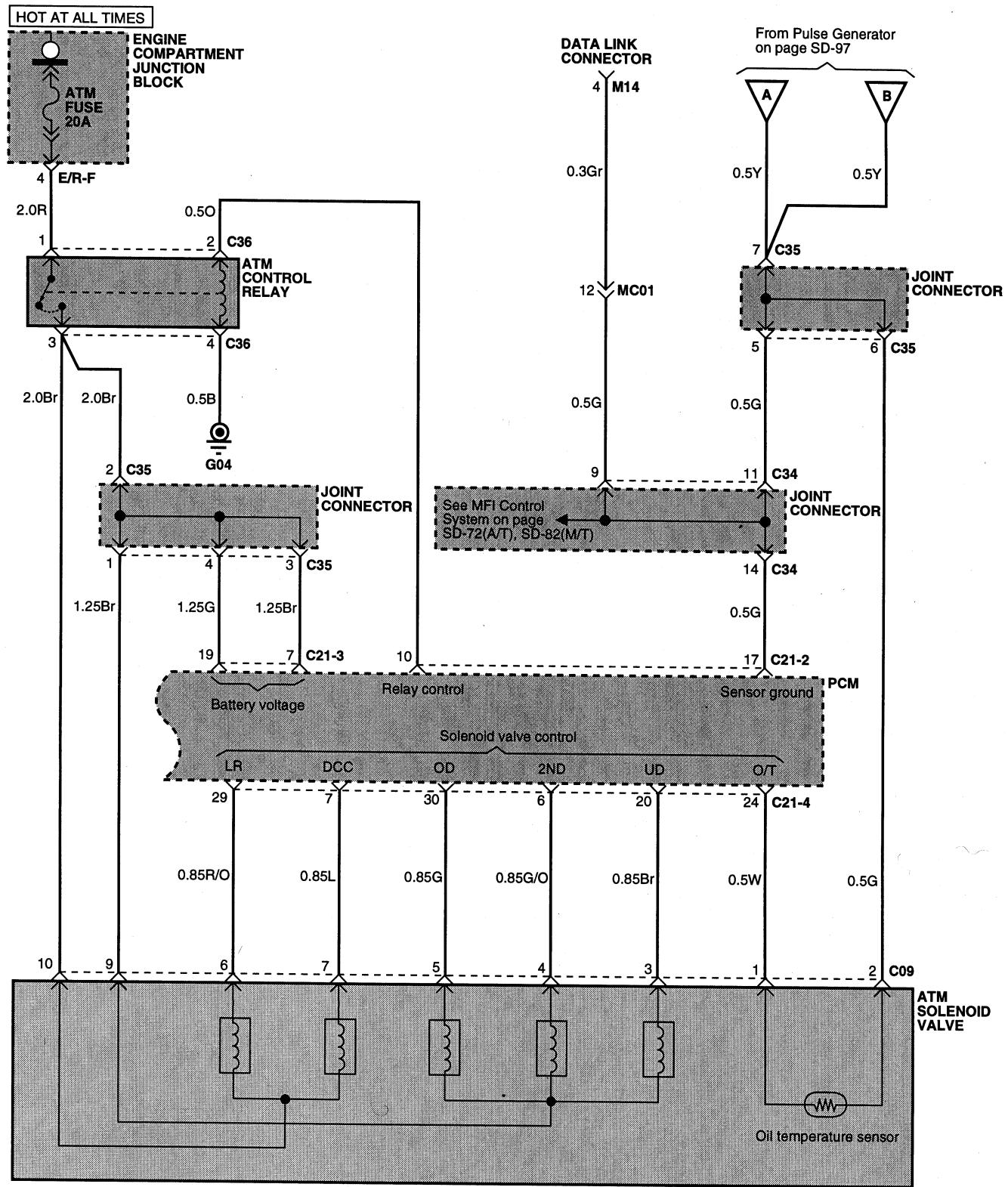
TCM CIRCUIT DIAGRAM (2.4L) (1)

EKJA0300

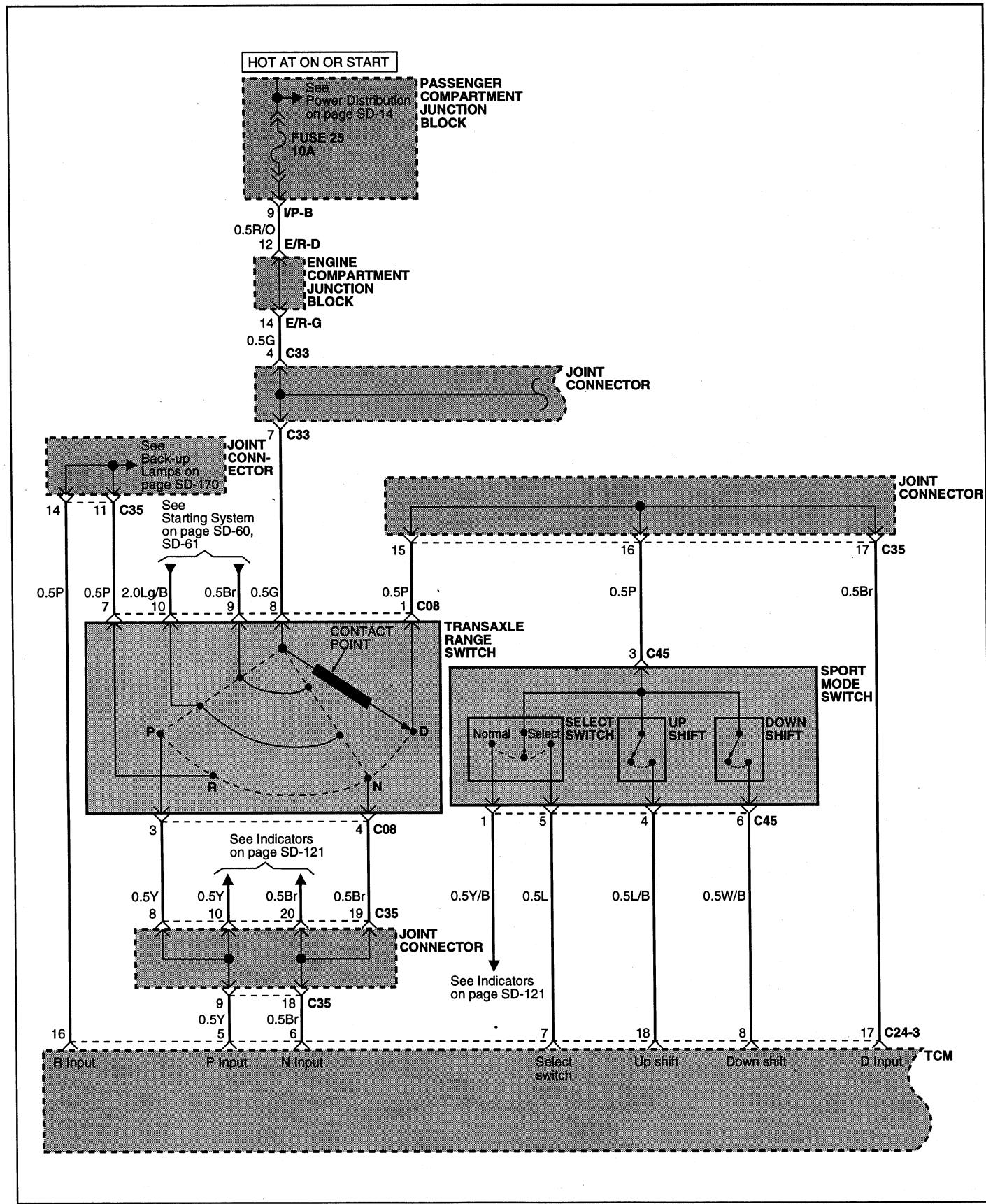


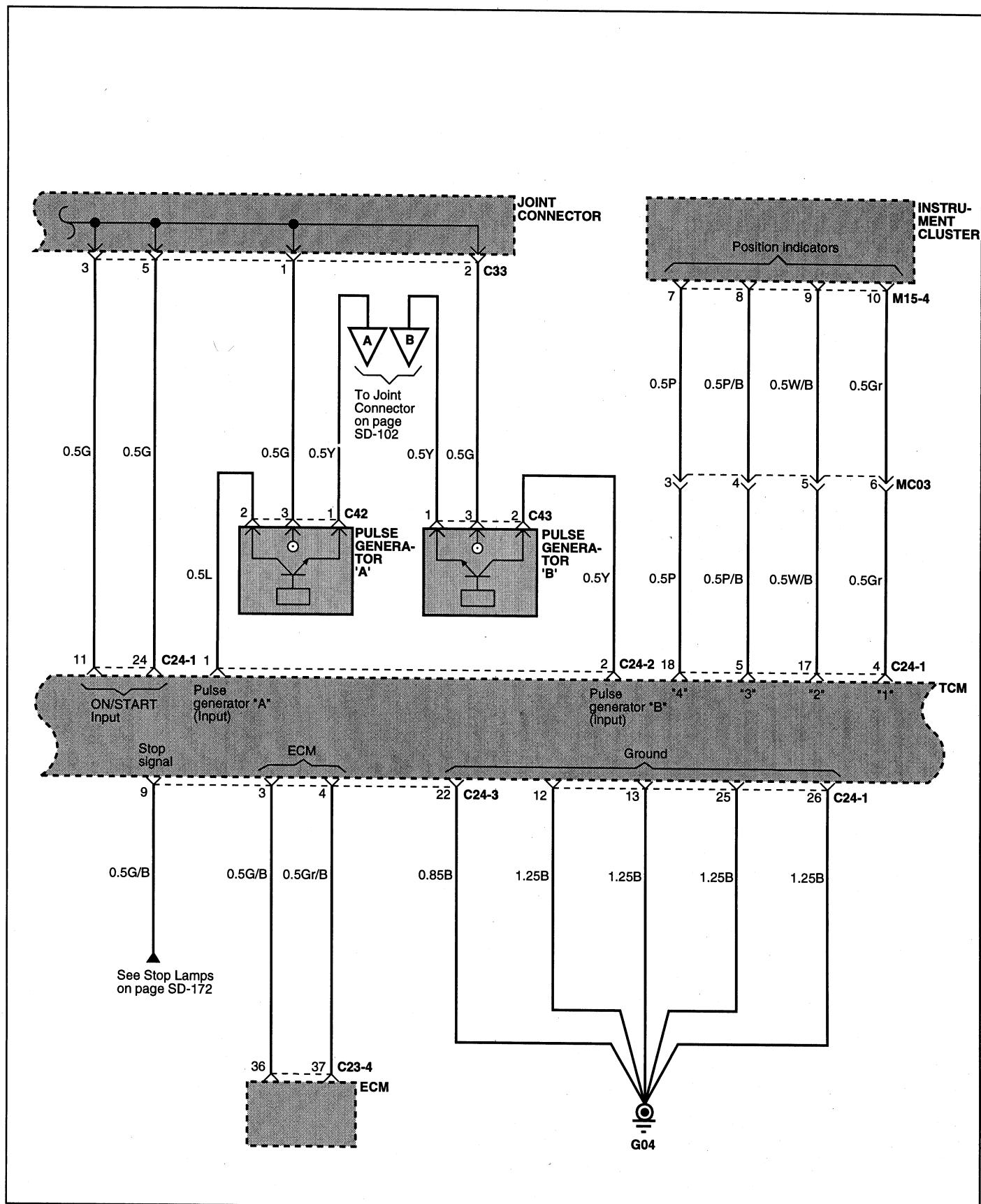
EKJA030A

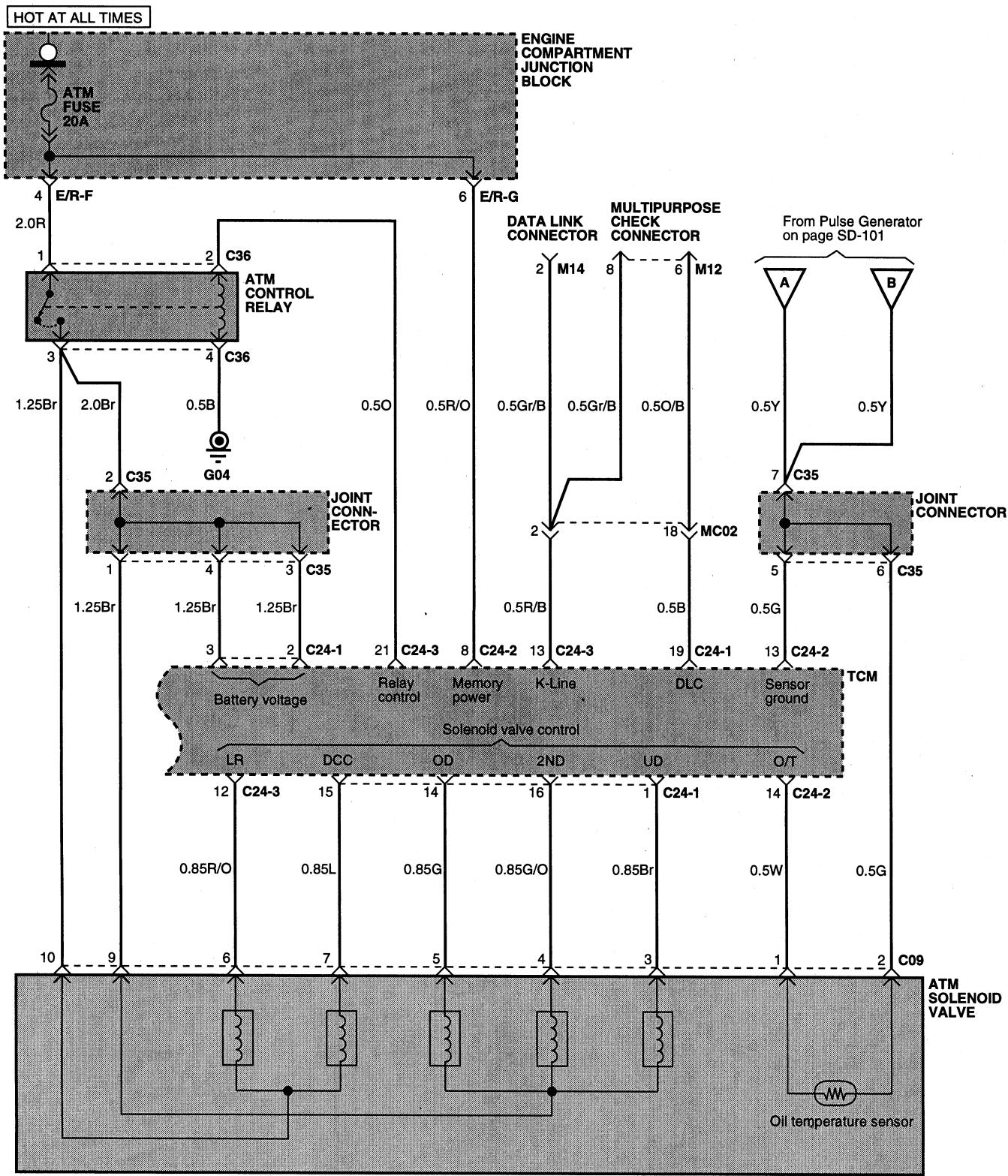




TCM CIRCUIT DIAGRAM (2.7L) (1)





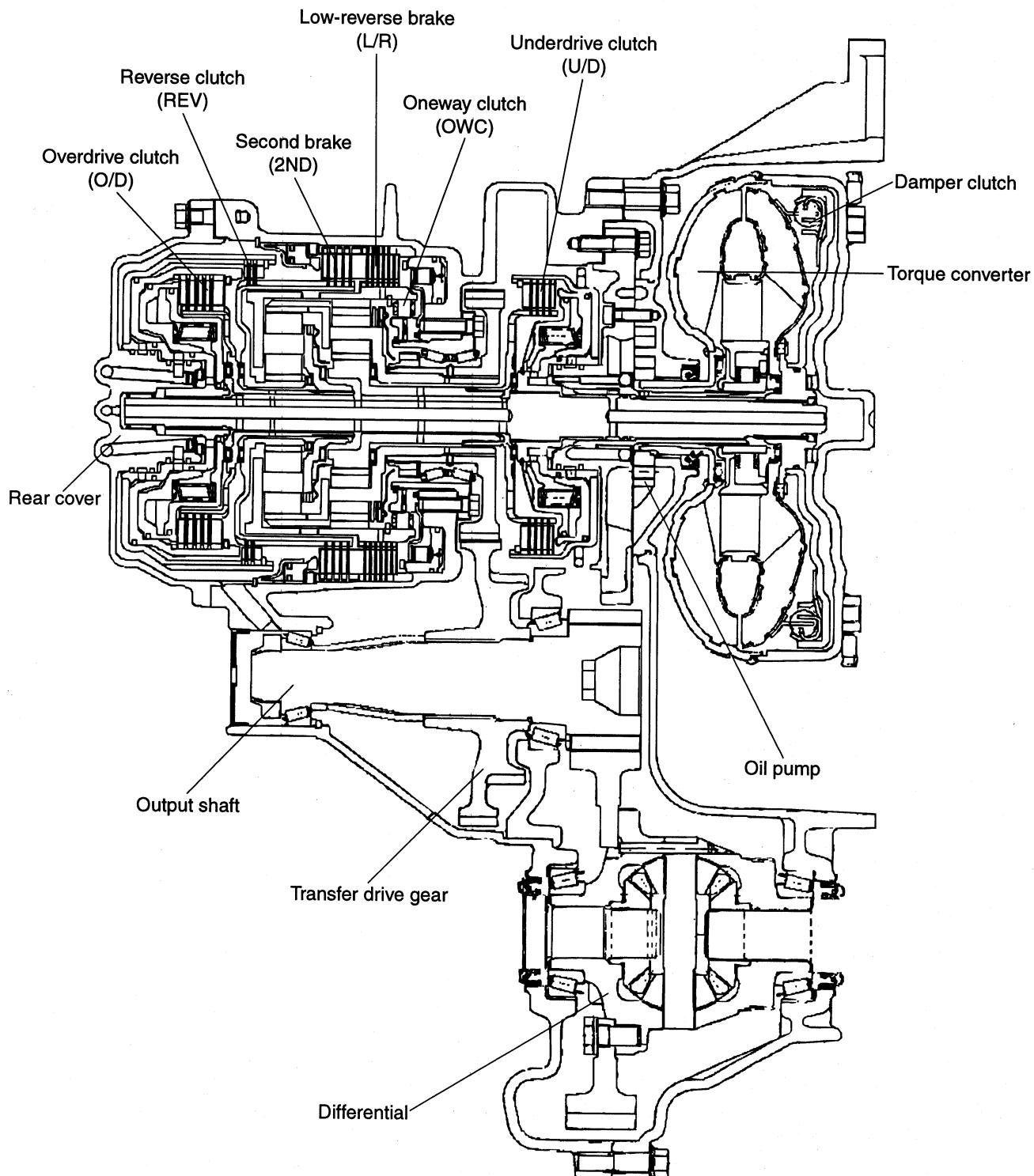


AUTOMATIC TRANSAXLE

COMPONENTS

EKJA0240

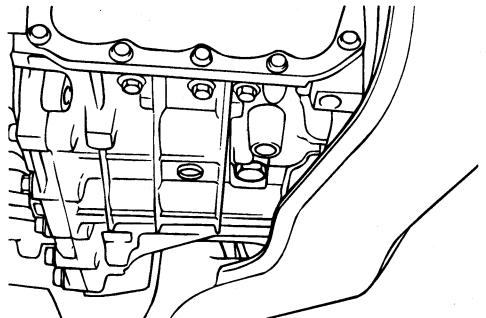
<F4A42>



EKJA024A

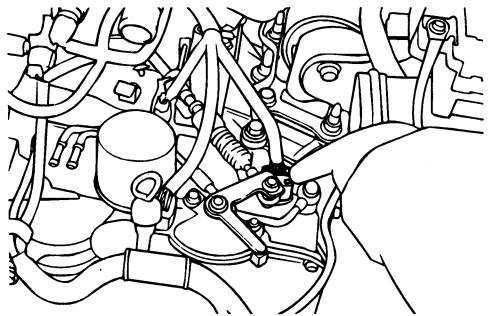
REMOVAL EKJA0250

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



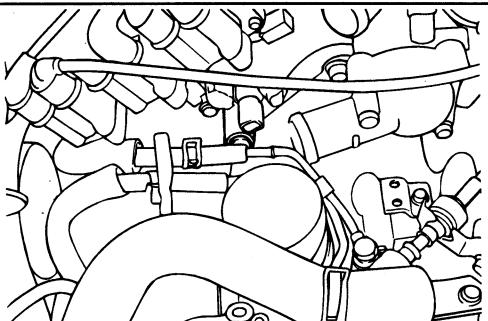
EKA9009A

3. Remove the control cable.
4. Disconnect the speedometer sensor connector.
5. Disconnect the transaxle range switch connector, solenoid connector, and oil temperature sensor connector.



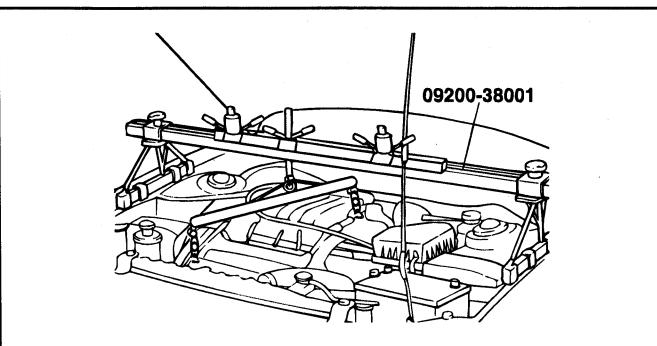
EKA9009B

6. Remove the oil cooler hose.



EKA9009C

7. Attach the special tool (09200-38001), an engine support fixture to the engine hooks.

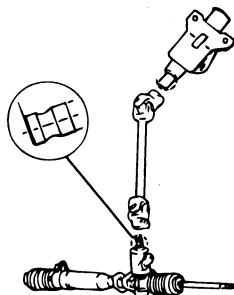


EKJA025A

8. Lift up the vehicle.
9. Remove the gear box, stabilizer bar, tie rod end, lower arm ball joint, and drive shaft.
10. Remove the steering u-joint bolt and return tube mounting bolts.

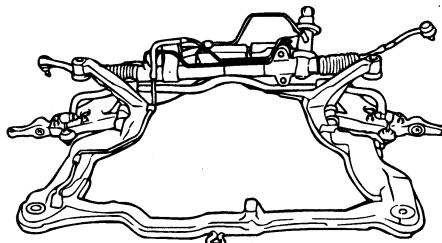
NOTE

Mark a mating line on the steering column universal joint and the gear box before disassembling to make the installation easier.



HCT56-39

11. Remove the subframe mounting bolts and the subframe.

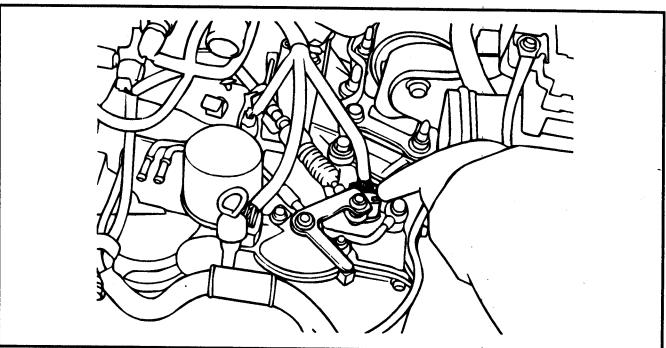


EKA9009F

12. Remove the starter motor.
13. Remove the automatic transaxle mounting bolts.
14. Remove the engine to automatic transaxle bolts.
15. Remove the automatic transaxle assembly by jack.

CAUTION

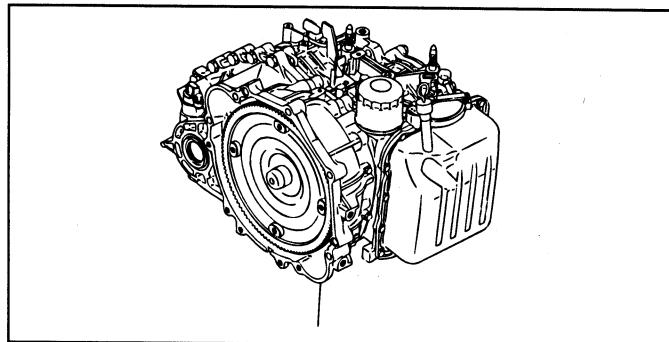
- a. Engine and transmission mounting insulators should be installed as specified them.
- b. Mounting bracket installation procedures.
 - Engine mounting bracket.
 - T/M mounting bracket.
 - Rear roll stopper mounting bracket.
 - Front roll stopper mounting bracket.
- c. When installing the front roll stopper mounting bracket, be especially careful not to crush the insulator. If crushed, idle vibration will most probably occur..



EKA9009B

NOTE

For Automatic Transaxle overhaul, please refer to the "Overhaul Manual".



EKA9009E

INSTALLATION

EKHA0260

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 may be damaged. Therefore, first be sure to assemble the torque converter to the transaxle.

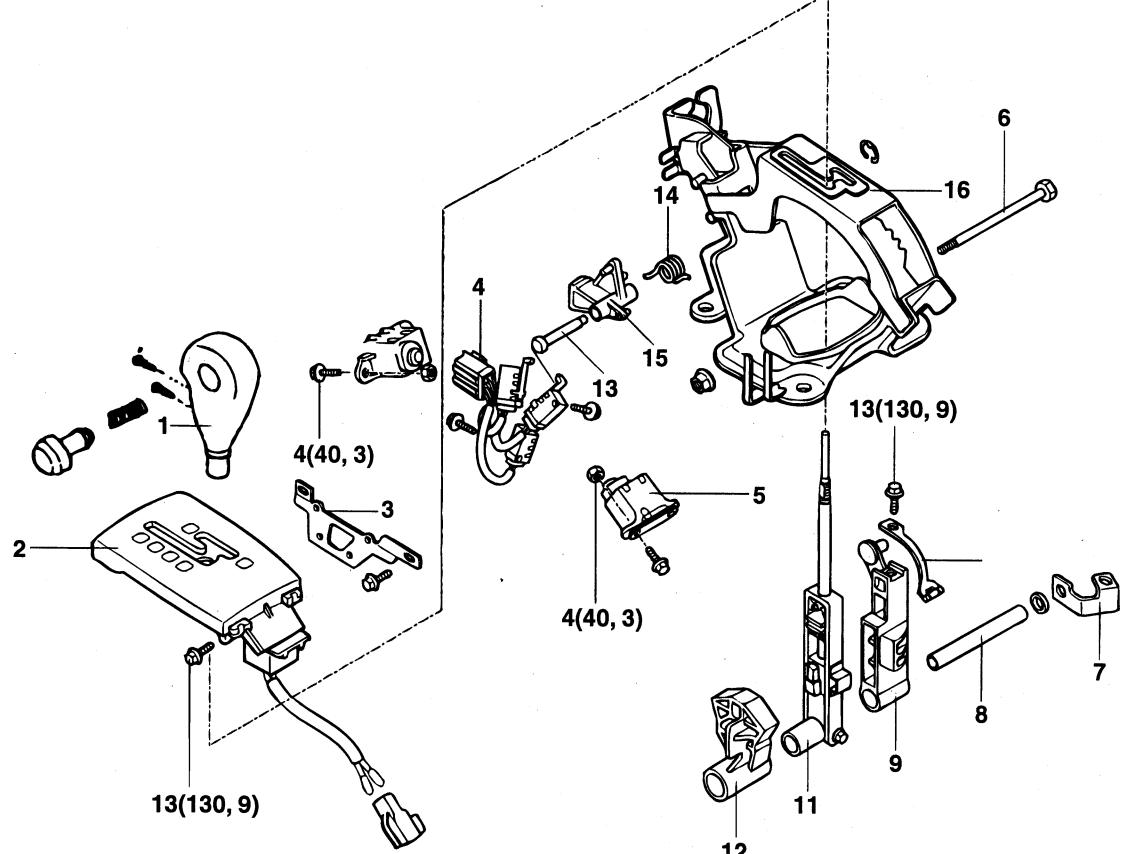
2. Install the transaxle control cable and adjust as follows:
 - a. Move the shift lever and the transaxle range switch to the "N" position and install the control cable.
 - b. When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts to the control cable.
 - c. Remove any free-play in the control cable by adjusting the nut and then check to see that the selected lever moves smoothly.
 - d. Check to see that the control cable has been adjusted correctly.
3. Installation is the reverse of removal.

AUTOMATIC TRANSAXLE SHIFT CONTROL

AUTOMATIC TRANSAXLE CONTROL SYSTEM

EKJA0180

AUTOMATIC TRANSAXLE SHIFT CONTROL



<Disassembly step>

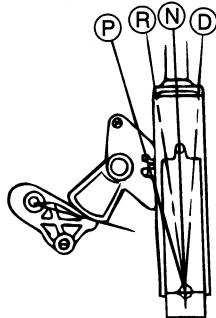
1. Shift knob
2. Indicator panel
3. Switch bracket
4. Magnetic switch
5. Detent
6. Bolt
7. Parking brake cable bracket
8. Shaft
9. Cable lever
10. Detent spring
11. Lever assembly
12. Switch lever
13. Clevis pin
14. Cam spring
15. Lock cam
16. Bracket assembly

TORQUE : N·m (kg·cm, lb·ft)

KFW9002A

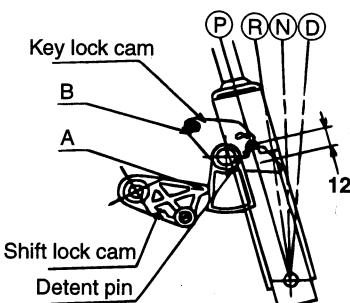
INSTALLATION EKJA0200

PROCEDURE TO INSTALL THE LOCK CAM



EKB9037A

- Move A/T lever to "P" position to set the key lock cam and the shift lock cam as shown in the figure.
 - Check that the key lock cam is located at "B" by the detent pin.
 - Check that the shift lock cam is located at "A".

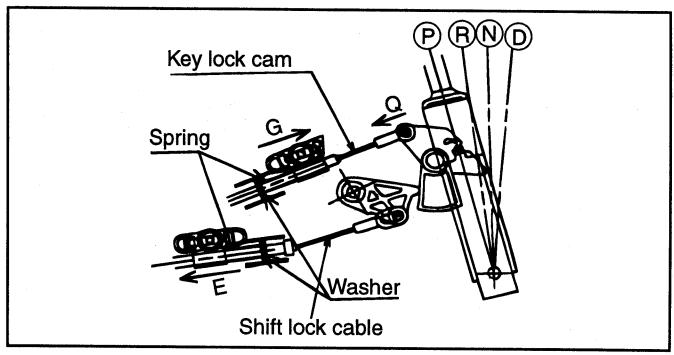


EKB9037B

- Check that the key cylinder is at "LOCK".

PROCEDURE FOR ADJUSTING SHIFT LOCK AND KEY LOCK CABLE

- Check that each lock cam is as shown in the figure.
- Install the shift lock and key lock cable in position. In this case, the shift lock cable must be fixed to the brake pedal and the key lock cable must be fixed to the key cylinder.
- Temporarily install each cable to the A/T lever assembly as shown in the figure. Securely insert the cable end into the fixing pin of each cam.



EKB9037C

- Slightly pull the shift lock cable in the direction "E".
- After checking that the portion of the cable end touches the cable fixing pin, fix with the self-tapping bolt.
- Slightly push the key lock cam to direction "Q".
- Slightly pull the key lock cable in the direction "G" to stretch the cable. Then fix the cable with the self-tapping bolt.
- Check that the key lock and the shift lock cable are secure.

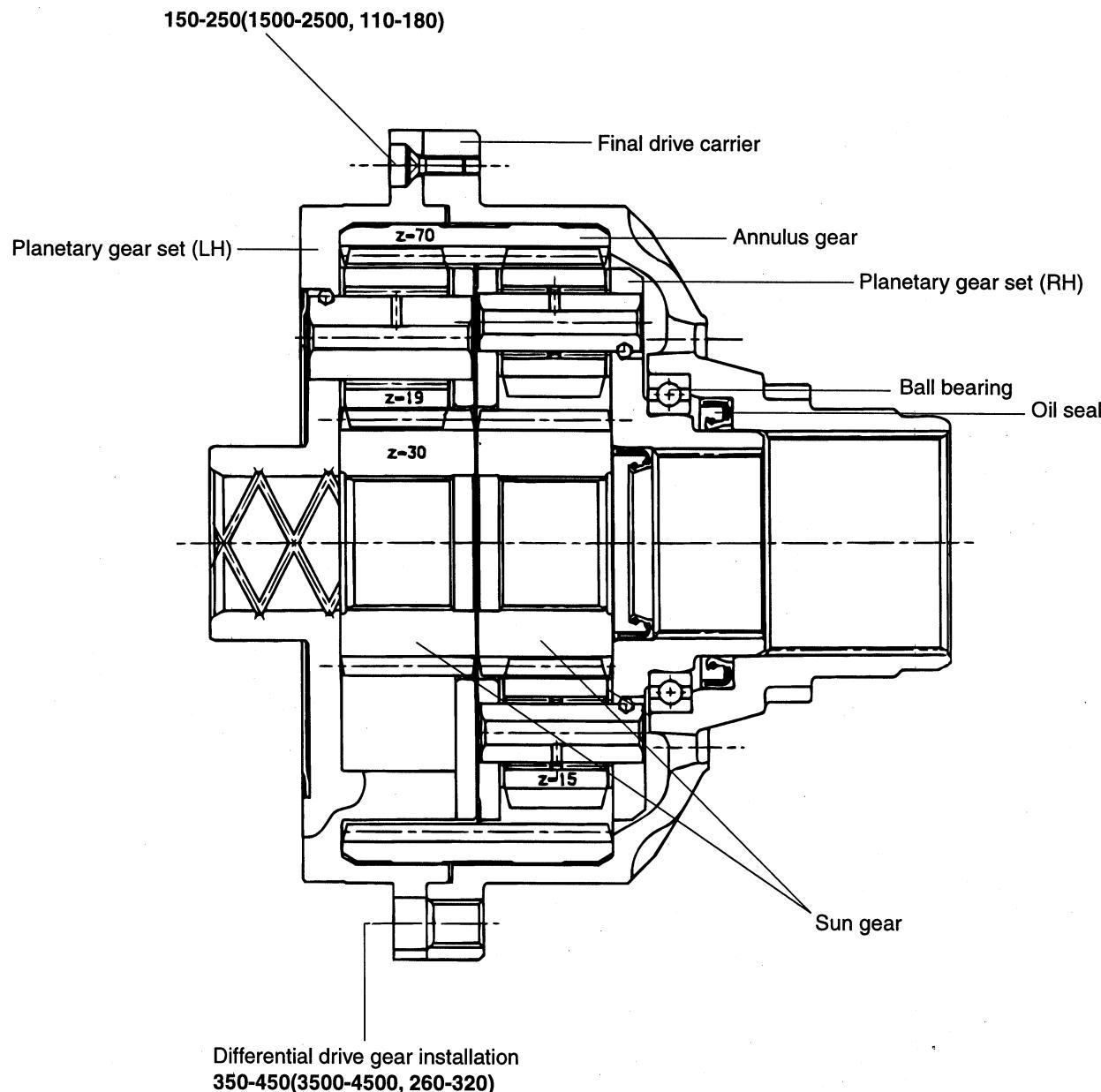
PROCEDURE FOR CHECKING THE SHIFT LOCK

- When the brake pedal is not depressed, the push button of the shift lever at "P" position must not be operable. (Shift lever cannot be shifted at the other positions from "P".)
- When the brake pedal stroke is 15~22mm (with shift lever at "P" position), the push button should be operable without catching and the shift lever should be shift smoothly to other positions.
- When the brake pedal is not depressed, the shift lever should shift smoothly to "P" position from all heading other positions.
- The brake pedal must operate smoothly without catching.
- When the ignition key is at the "LOCK" position, although brake pedal is depressed, the push button should be operable.
- The Ignition key must not be able to be turned to the "LOCK" position except in the "P" position.
- If the shift lever is shifted to the "P" position, the ignition key must turn to the "LOCK" position smoothly.

DOUBLE DIFFERENTIAL UNIT

DOUBLE DIFFERENTIAL UNIT-4WD EKJA0380

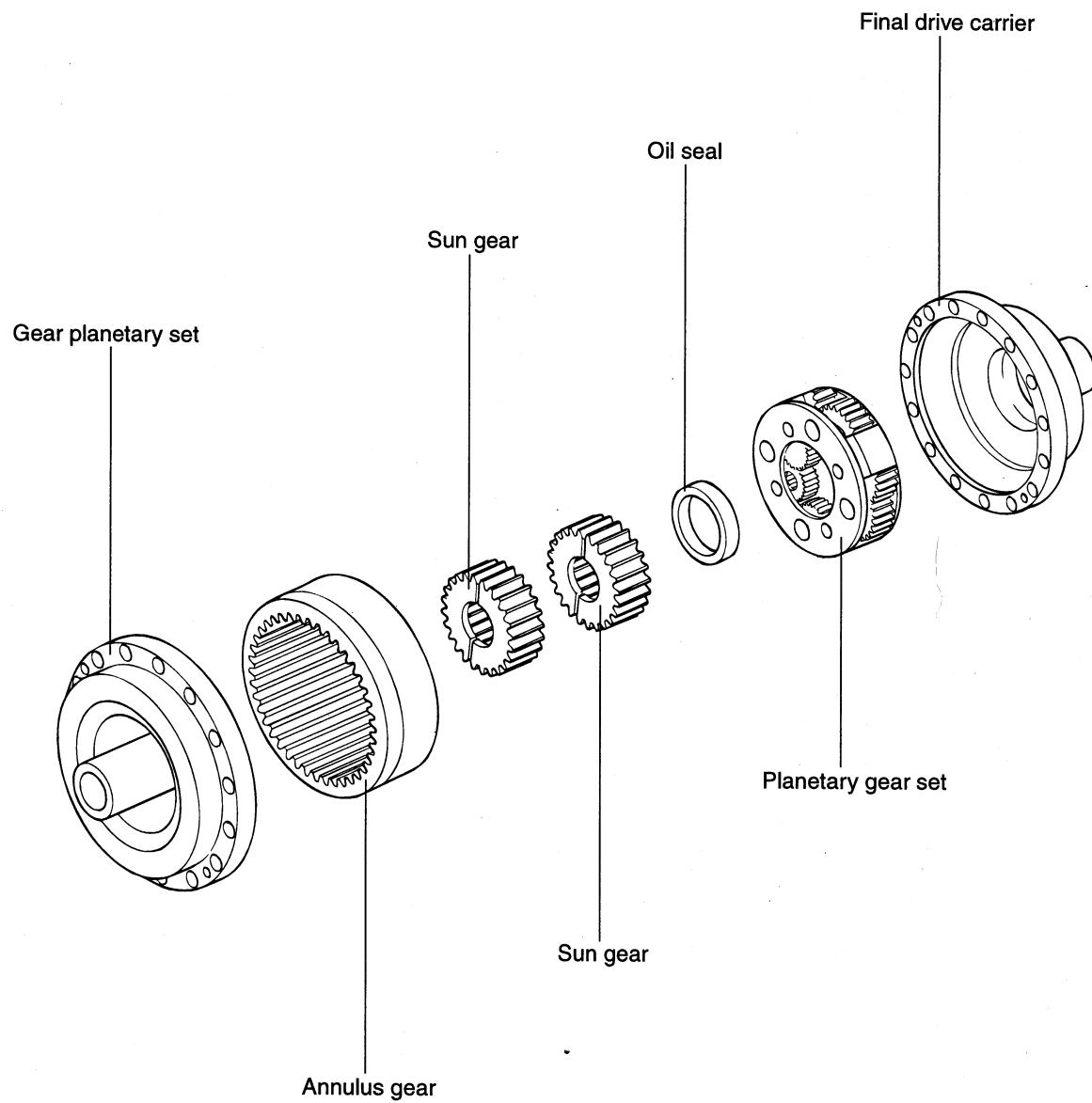
SECTION VIEW



TORQUE : N·m (kg·cm, lb·ft)

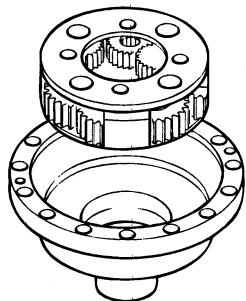
DOUBLE DIFFERENTIAL UNIT-4WD

EKJA0390

COMPONENTS

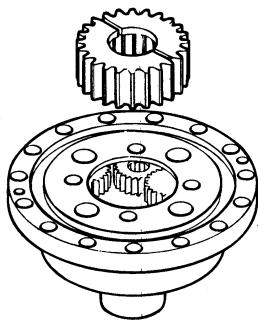
REASSEMBLY EKJA0400

1. When reassembling the planetary gear (LH, RH), apply LOCTITE 242e or equivalent.



EKJA001D

2. Be careful not to damage on the oil seal



EKJA001E

MANUAL TRANSAXLE SYSTEM

SERVICE ADJUSTMENT

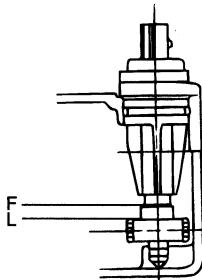
PROCEDURES

EMJA0070

TRANSAXLE GEAR OIL INSPECTION

Inspect each component for evidence of leakage. Check the gear oil level by removing the speedometer driven gear. If the oil is contaminated, replace it with new oil.

1. Remove the speedometer driven gear and check the level with your finger.
2. Verify that the oil level is between 'F' and 'L' on the speedometer driven gear.



EMJA007A

3. If oil level is 'L', fill with the specified type of oil until the level reaches 'F'.

REPLACEMENT OF TRANSAXLE GEAR OIL

EMJA0080

Use HP Gear Oil SAE 75W/90 (API-GL-4).

1. With the vehicle parked on a level surface, remove the drain plug and drain the transaxle oil.
2. Replace the gasket with a new one and install the drain plug.
3. Remove the speedometer gear.
4. Add the specified amount and type of oil into the speedometer gear hole until the level reaches 'F' on the speedometer driven gear.

Capacity : 2.43 US qt (2.3 lit, 2.1 Imp qt)

5. Verify that the oil level is between 'F' and 'L' on the speedometer gear.
6. Install the speedometer gear on the clutch housing of the transaxle.

7. Warm up the vehicle until the transaxle oil reaches its normal temperature, then check for leakage of transaxle oil.

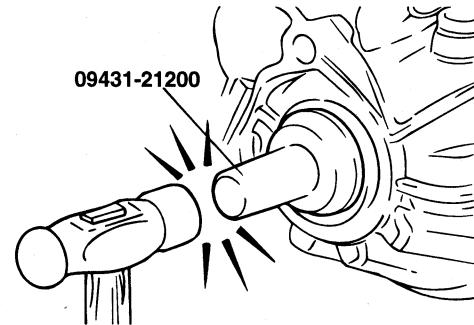
DRIVE SHAFT OIL SEAL

REPLACEMENT

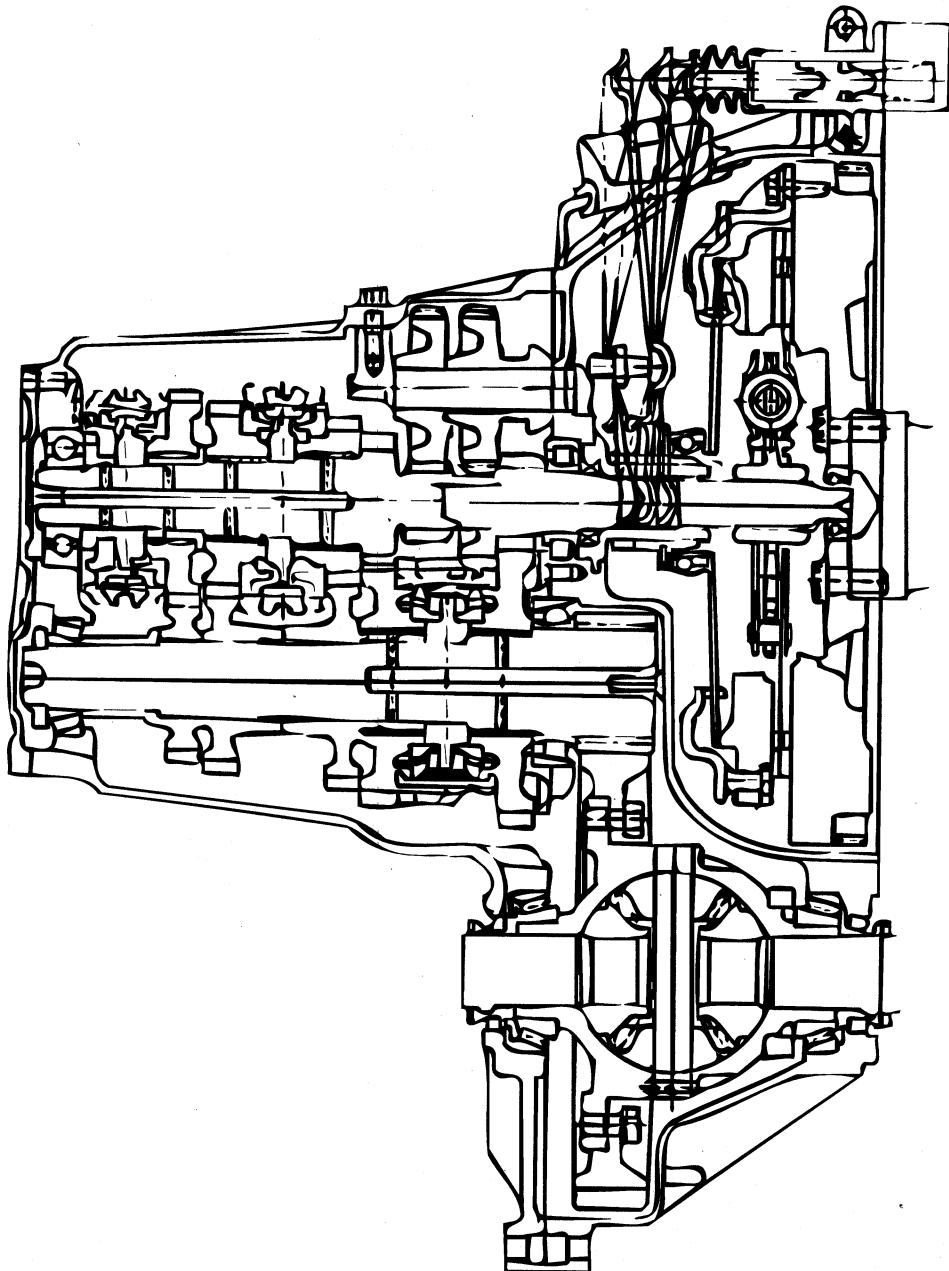
EMJA0090

1. Disconnect the drive shaft form the transaxle (Refer to "DS" group).
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 gear oil to the oil seal.

Transaxle gear oil : Hypoid gear oil, SAE 75W/90 conforming to API GL-4 or higher. Disconnect the drive shaft form the transaxle (Refer to "DS" group).

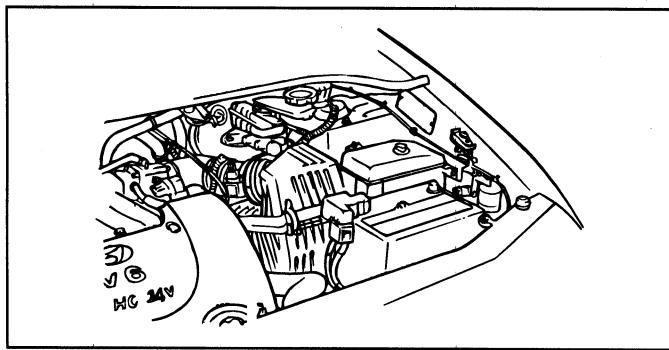


EMA9009G

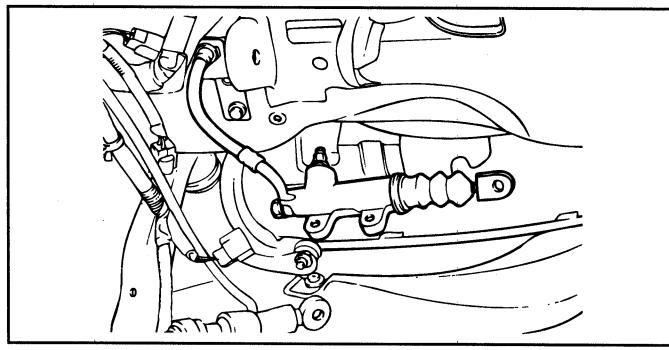
MANUAL TRANSAXLE**COMPONENTS** EMJA0180

REMOVAL EMJA0190

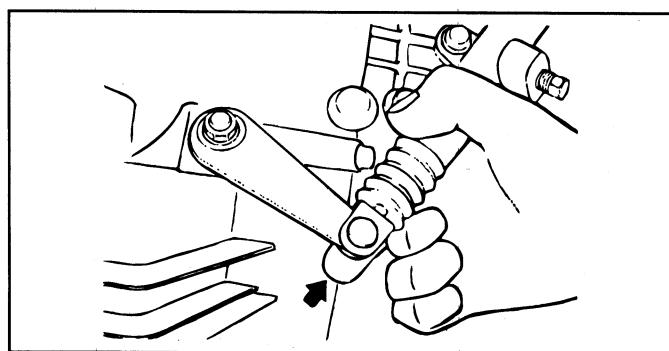
1. Remove the battery (-) cable.



2. Remove the air cleaner duct.
3. Remove the air cleaner and air flow hose assembly.
4. Disconnect the backup light switch connector.
5. Disconnect the clutch line and clip.
6. Remove the clutch release cylinder.

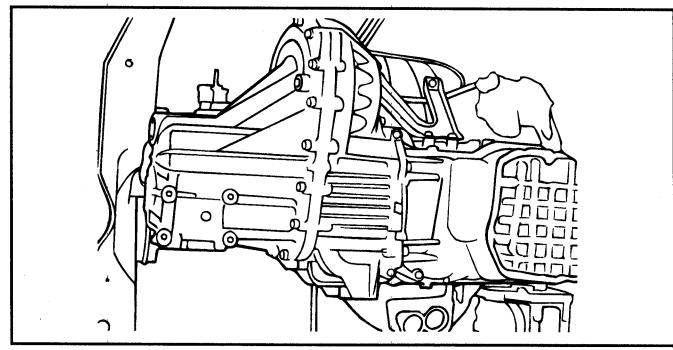


7. Remove the speedometer cable.
8. Remove the select or cable and shift cable.



9. Remove the starter motor mounting bolts, and remove the transaxle assembly upper connecting bolts.

10. Attach engine hooks using special tool (09200-38001).
11. Remove the transaxle mounting bracket and insulator.
12. Lift the vehicle up.
13. Remove the front tire.
14. Remove the drain plug and drain the transaxle gear oil.
15. Disconnect the tie rod end, lower arm ball joint and drive shaft. (Refer to "DS" Group).
16. Remove the gear box u-joint bolt and the return tube mounting bolts.
17. Remove the front muffler.
18. Remove the sub-frame mounting bolts and the sub-frame.
19. Remove the transaxle front and rear mounting bracket.
20. Remove the transaxle side mounting bolts.



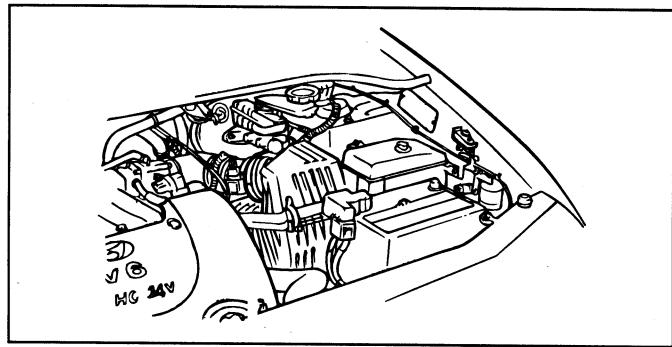
21. Lower the transaxle assembly, supporting it with a jack.

NOTE

When supporting the transaxle assembly, make sure that the lifting force is applied to a wide area and, not to a small localized area.

CAUTION

1. **Engine and transmission mounting insulators should be installed in the following order :**
 - 1) Engine mounting bracket.
 - 2) T/M mounting bracket.
 - 3) Rear roll stopper mounting bracket.
 - 4) Front roll stopper mounting bracket.
2. **When installing the front roll stopper mounting bracket, be especially careful not to crush the insulator. If crushed, idle vibration will most probably result.**



EMHA004A

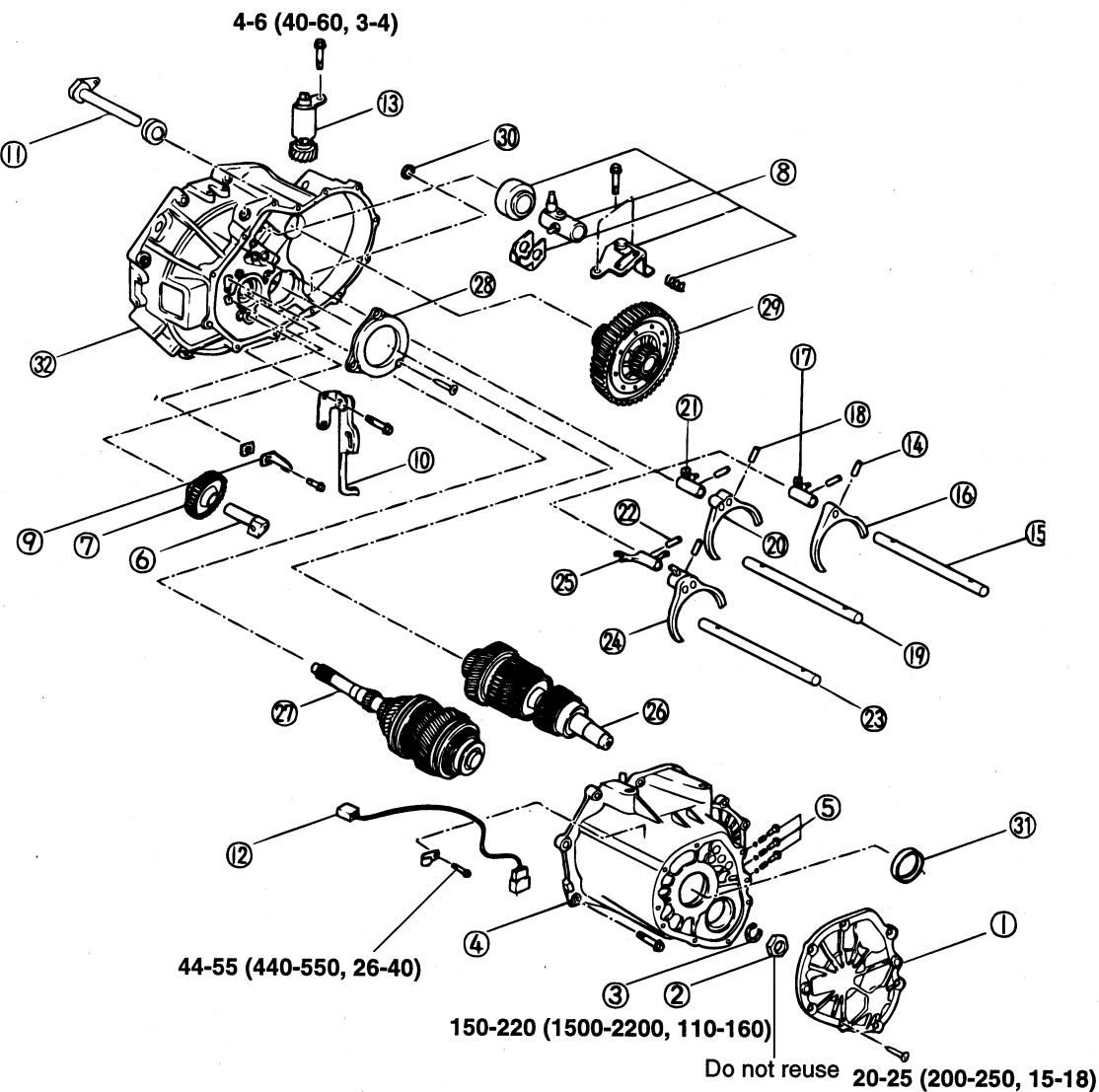
INSTALLATION

EMA90200

1. Installation is the reverse of removal.

COMPONENTS

EMJA0220



1. Rear cover	9. Reverse lever spring set	16. 1/2 shift fork	25. 5/R shift rod end
2. Lock nut	10. Reverse shift lever	17. 1/2 shift rod end	26. Input shaft
3. Retainer ring	11. Change rod	18. Roll pins	27. Output shaft
4. Transaxle case	12. Back lamp switch	19. 3/4 shift rod	28. Bearing cover
5. Detent plug & spring, steel ball	13. Speedometer driven gear	20. 3/4 shift fork	29. Differential assembly
6. Reverse idle shaft	14. Roll pins	21. 3/4 shift rod end	30. Magnet
7. Reverse idle gear	15. 1/2 shift rod	22. Roll pins	31. Oil seal
8. Control case assembly		23. 5/R shift rod	32. Clutch housing
		24. 5/R shift fork	

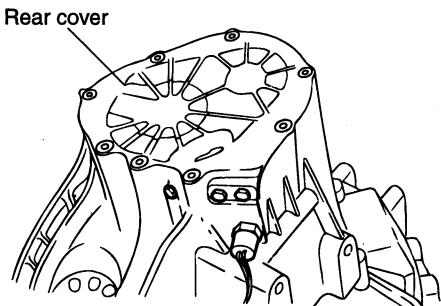
TORQUE : N·m (kg·cm, lb·ft)

EMJA022A

DISASSEMBLY

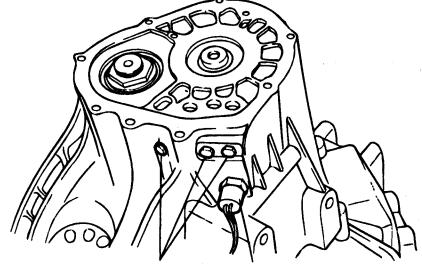
EMJA0230

1. Remove the rear cover, lock nut and retainer ring.



EMJA023A

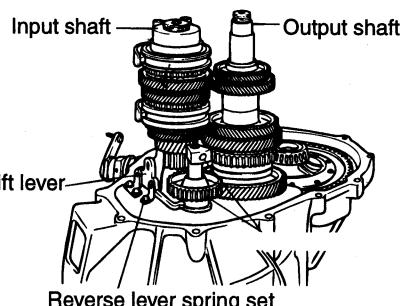
2. Remove the detent plug, spring and steel ball.
3. Remove the back-up lamp switch.



Detent plug Back lamp switch

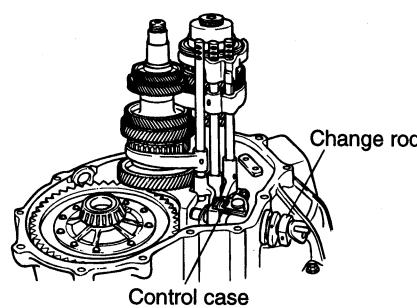
EMJA023B

4. Remove the bolts holding the rear case to the main case.
5. Remove the reverse idler shaft and gear.
6. Remove the reverse lever spring set.



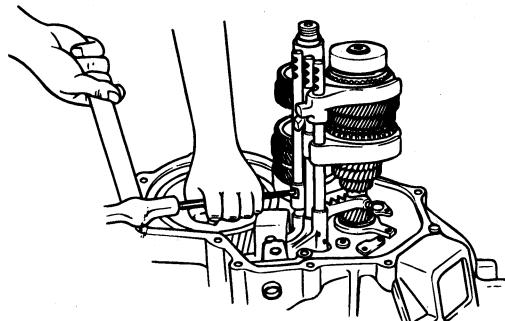
EMJA023C

7. Remove the change rod and the control case.



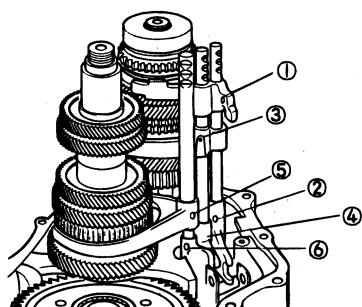
EMJA023D

8. Carefully remove the roll pins from the rod/fork assembly with a pin punch.



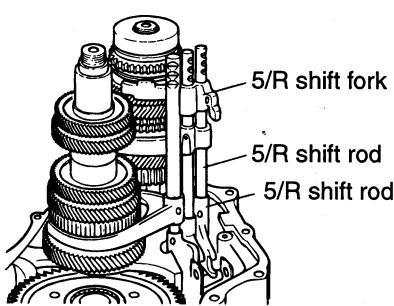
EMHA010A

9. Refer to the order of removal in the figure. Discard the used pins.



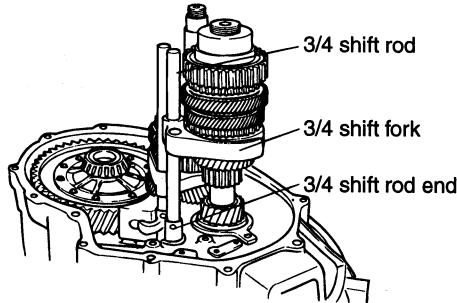
EMHA011A

10. Remove the 5/R shift rod, 5/R shift fork and 5/R shift rod end.



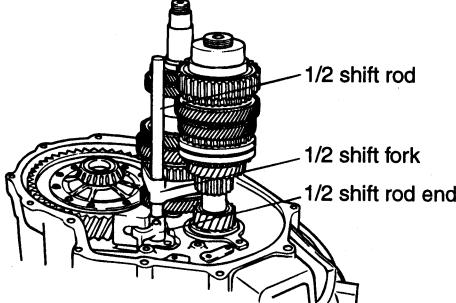
EMJA023E

11. Remove the 3/4 shift rod, 3/4 shift fork, 3/4 shift rod end.



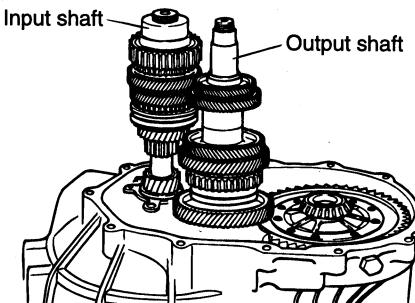
EMJA023F

12. Remove the 1/2 shift rod, 1/2 shift fork and 1/2 shift rod end.



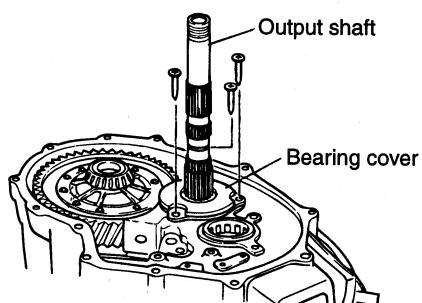
EMJA023G

13. Remove gears and clutch hub assemblies of the input and output shaft in order and then remove the primary shaft (Remove the gears and hubs from both the input shaft and output shaft).



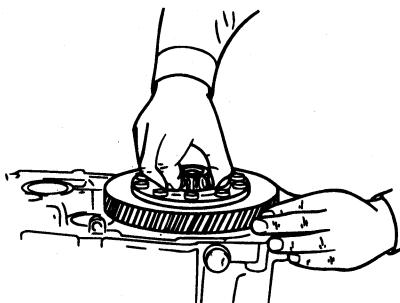
EMJA023H

14. Remove the rings, bearings, and clutch hub assemblies of the input shaft. Loosen the four bearing cover screws and then remove the output shaft.



EMJA023I

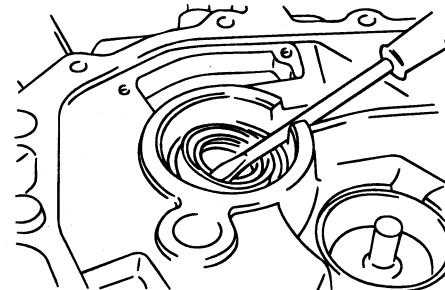
15. Remove the differential assembly.



EMHA013B

16. Remove the speedometer driven gear after loosening the bolt.

17. Remove the input shaft oil seal with a screwdriver or suitable tool.

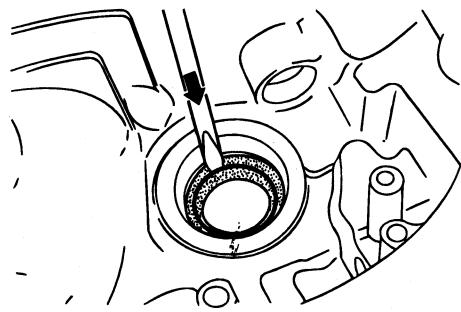


EMHA013C

18. Remove the sealing cap.

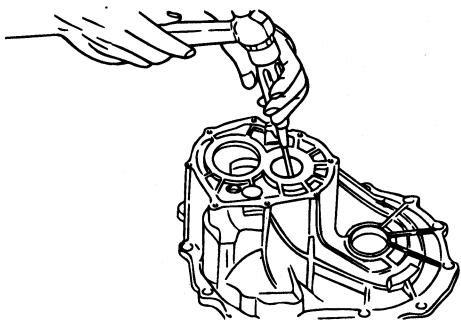
19. Remove the change rod oil seal with a screwdriver or suitable tool.

20. Remove the differential oil seal with a screwdriver or suitable tool.

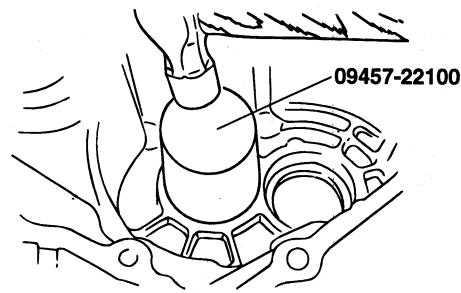


EMHA013D

21. Remove the output shaft bearing outer race of the transaxle case with a screwdriver or suitable tool.



EMHA013E

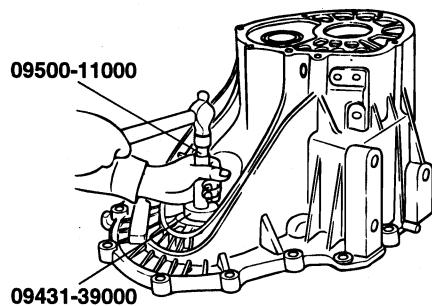


EMHA014C

EMJA0240

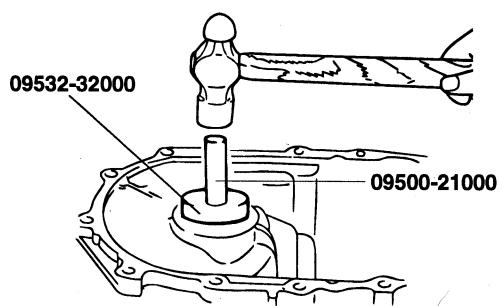
REASSEMBLY

1. Install the drive shaft oil seal.



EMHA014A

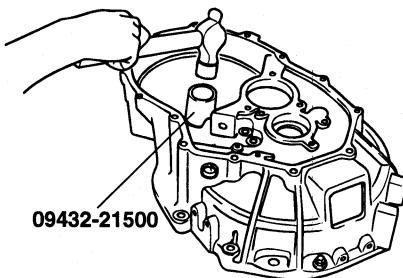
2. Apply transaxle oil to the bearing, and install in the differential case using the special tool.



EMHA014B

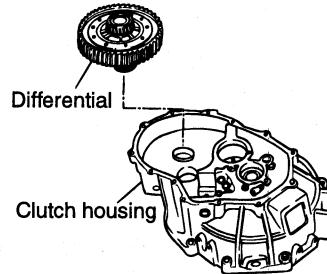
3. Apply transaxle oil to each bearing race, and install them to the transaxle case using the special tool.
4. Install the oil seal

5. Install the speedometer driven gear.
6. Apply transaxle oil to the input shaft oil seal, and install it to transaxle case using the special tool.



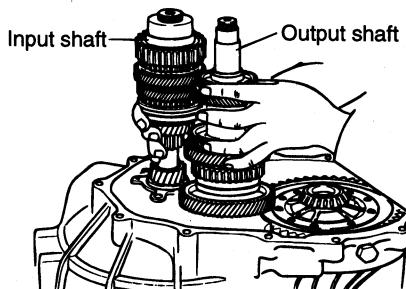
EMHA014D

7. Set the differential into the clutch housing.

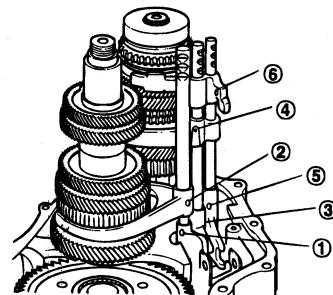


EMJA024A

8. Install the input and output shafts in the clutch housing.
9. Install the gears and clutch hub assemblies into the input and output shaft in order.

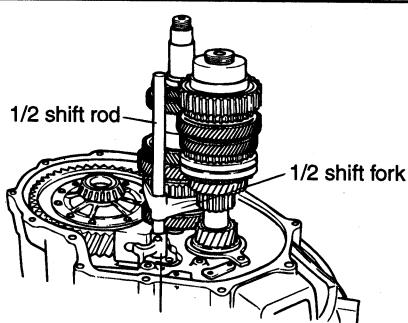


EMJA024B



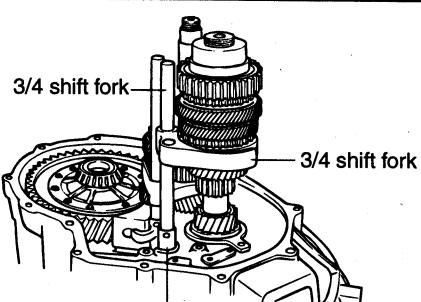
EMHA015E

10. Install the 1/2 shift rod, 1/2 shift fork and 1/2 shift rod end.



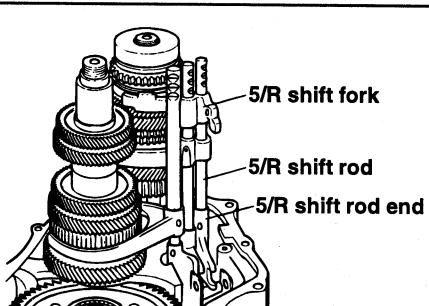
EMJA024C

11. Install the 3/4 shift rod, 3/4 shift fork and 3/4 shift rod end.



EMJA024D

12. Install the 5/R shift rod, 5/R shift fork and 5/R shift rod end.



EMJA024E

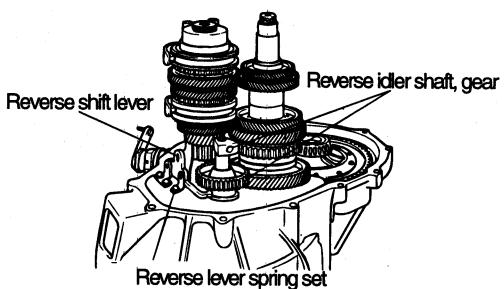
13. Install the roll pins to the rod/fork assembly with a pin punch in the order shown in the figure.

14. Install the control case assembly and the change rod and then tighten the two control case assembly bolts.

15. Install the reverse shift lever and tighten the two reverse shift lever bolts.

16. Install the reverse lever spring set.

17. Install the reverse idler shaft and gear.

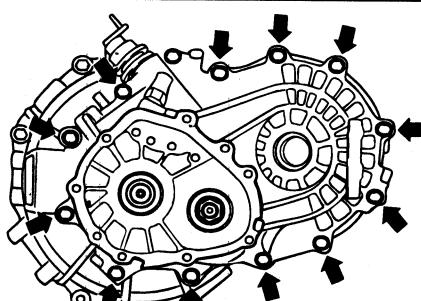


EMJA024F

18. Attach the magnet to the clutch housing.

19. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transaxle case.

20. Tighten the transaxle installation bolts.

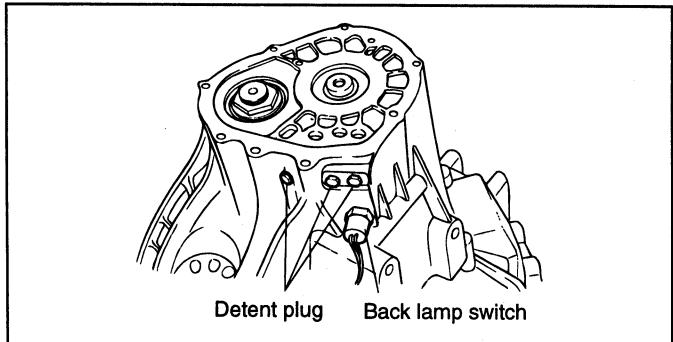


EMHA016B

21. Install the backup lamp switch.

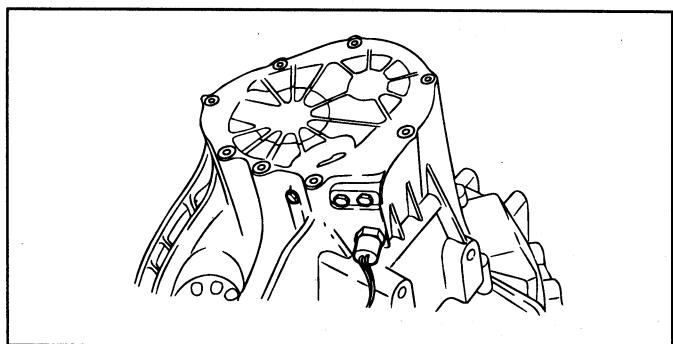
22. Install the detent plug, spring and steel ball.

23. Install the output shaft lock nut.



EMJA024G

24. Install the rear cover.

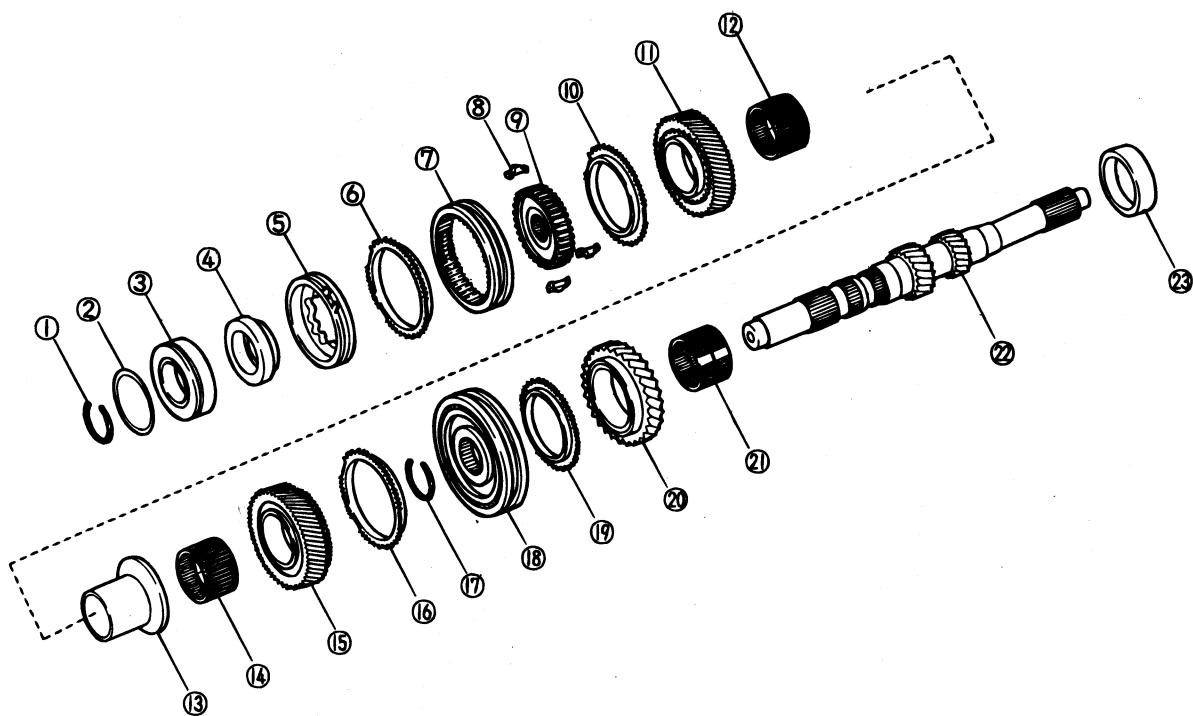


EMHA006A

INPUT SHAFT

COMPONENTS

EMJA0250



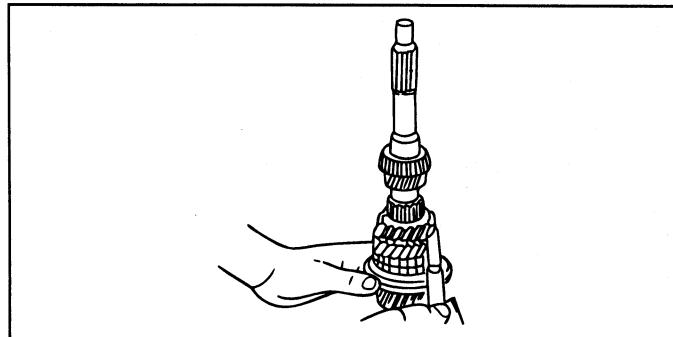
1. Retainer ring
2. Shim
3. Bearing
4. Reverse cone sleeve
5. Reverse cone
6. Synchronizer ring
7. Clutch hub sleeve
8. Syncronizer key
9. Clutch hub
10. Synchronizer ring
11. 5th gear
12. Needle bearing

13. Gear sleeve
14. Needle bearing
15. 4th gear
16. Synchronizer ring
17. Retainer ring
18. Clutch hub sleeve
19. Syncronizer ring
20. 3rd gear
21. Needle bearing
22. Input shaft
23. Bearing

INSPECTION

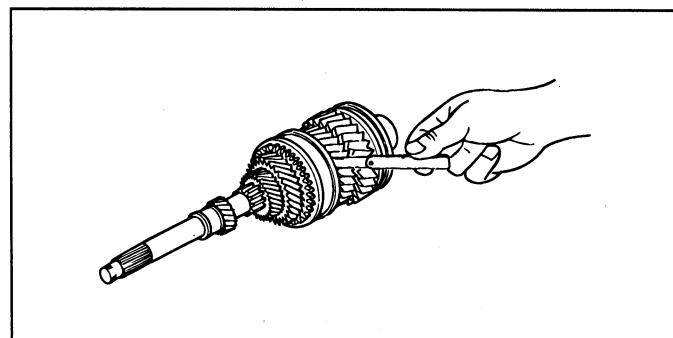
EMJA0260

1. Measure the clearance between 3rd gear and 2nd gear.
2. If the clearance exceeds the maximum specified, check the contact surface of 3rd gear, 2nd gear and clutch hub (3rd/4th). Replace worn and damaged parts.

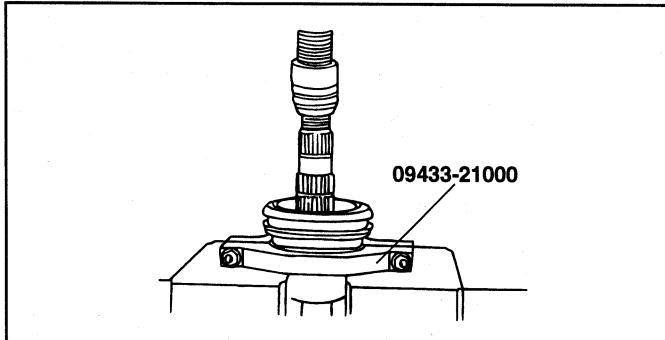


EMHA018B

3. Measure the clearance between 4th gear and 5th gears.
4. If the clearance exceeds the maximum, check the contact surfaces of 4th gear, 5th gear, clutch hub (3rd/4th), and clutch hub(5th). Replace worn and damaged parts.



EMHA018C

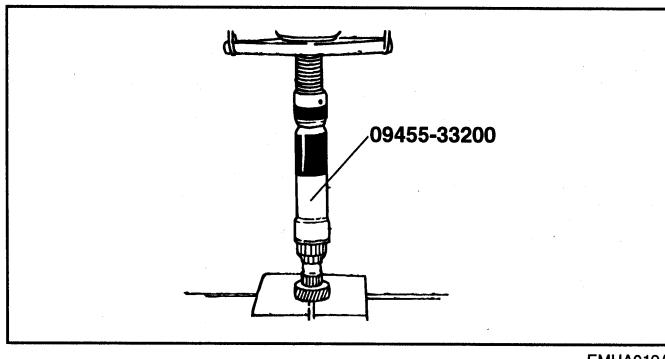


EMHA018A

REASSEMBLY

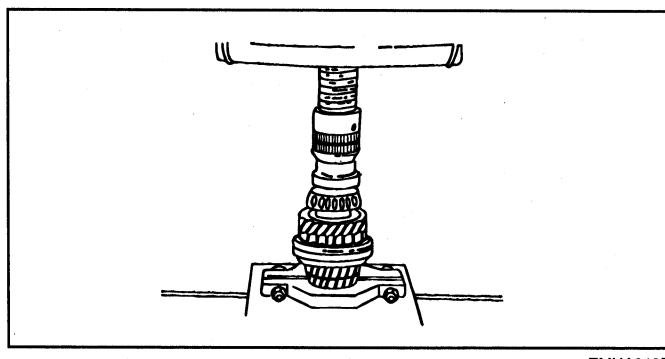
EMJA0280

1. Install a new bearing using the SST.



EMHA019A

2. Install the 5th synchronizer ring, 5th gear, and a new bearing using the SST.



EMHA019B

DISASSEMBLY

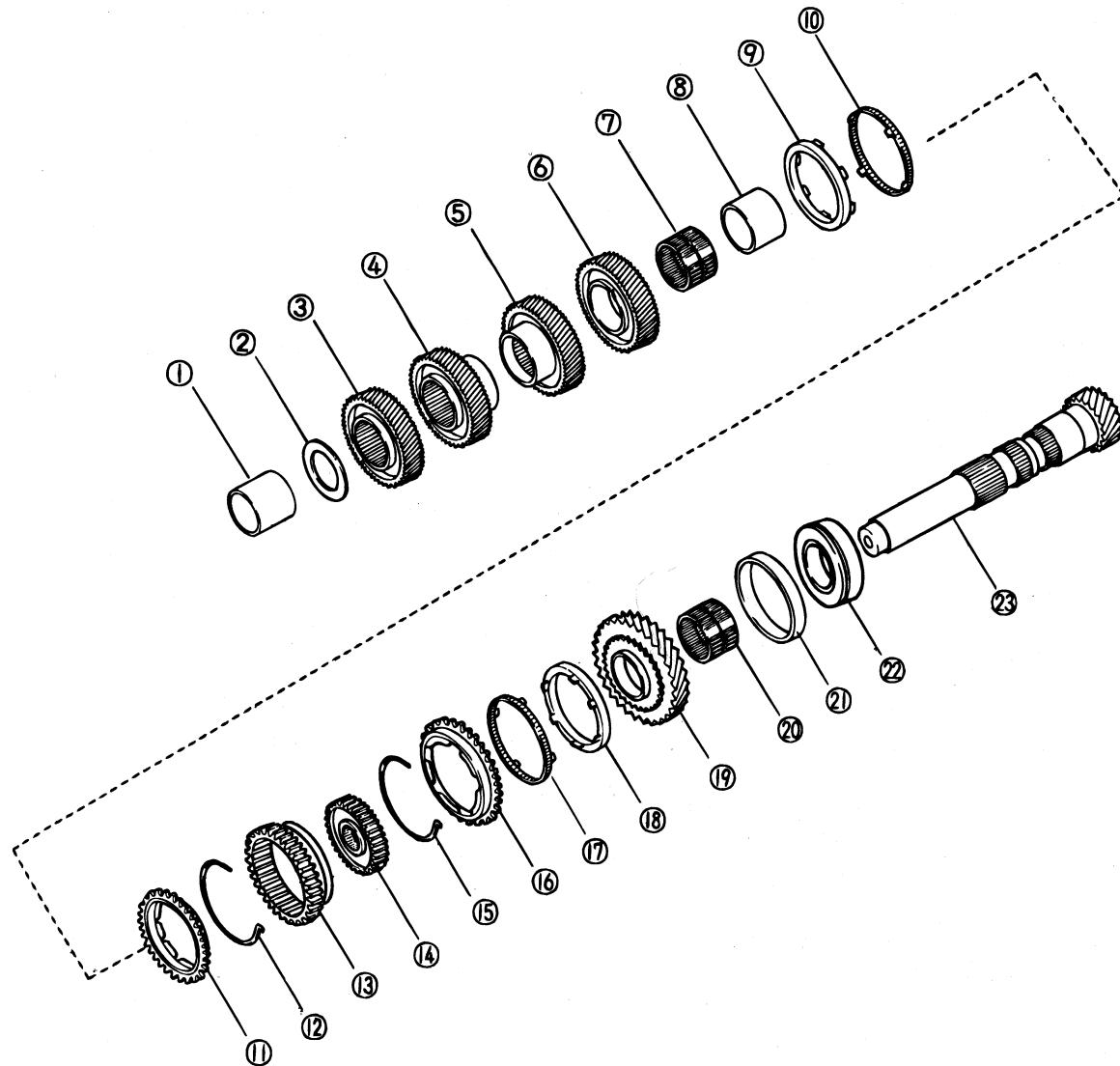
EMJA0270

1. Remove the 5th clutch hub assembly, 5th synchronizer ring, and 5th gear using the SST.
2. Remove 3rd/4th clutch hub assembly, 3rd synchronizer ring, and 3rd gear using the SST.

OUTPUT SHAFT

COMPONENTS

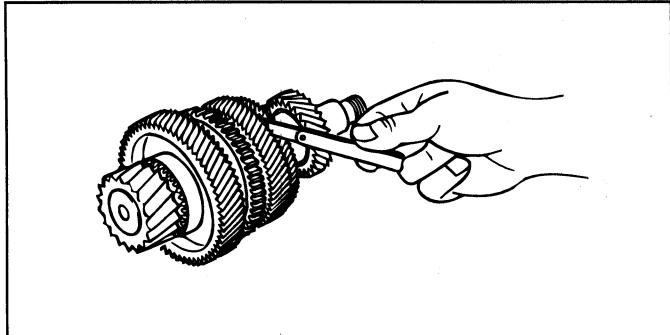
EMJA0290



1. Spacer	9. Synchronizer inner ring	17. Double cone
2. Retainer ring	10. Double cone	18. Synchronizer inner ring
3. 5th gear	11. Synchronizer ring	19. 1st gear
4. 4th gear	12. Synchronizer key spring	20. Needle bearing
5. 3rd gear	13. Reverse gear	21. Cap bearing
6. 2nd gear	14. Clutch hub sleeve	22. Cone bearing
7. Needle bearing	15. Synchronizer key spring	23. Output shaft
8. Sleeve	16. Synchronizer ring	

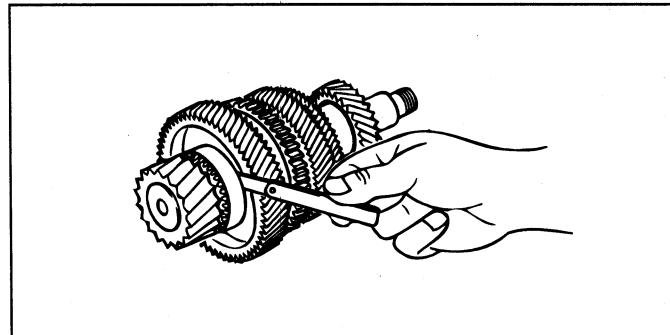
INSPECTION EMJA0300

1. Measure the clearance between the output shaft and its bearing.
2. If the clearance exceeds the maximum, check the contact surface of the output shaft 1st gear, bearing of shaft, and 1st/2nd clutch hub assembly. Replace worn and damaged parts.



EMHA021A

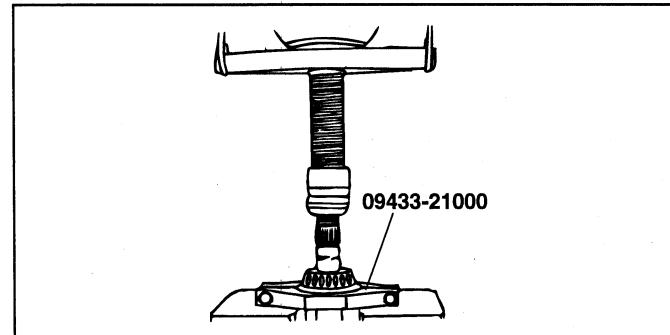
3. Measure the clearance between 2nd gear and 3rd gear.
4. If the clearance exceeds the maximum, check the contact surfaces of 2nd gear, 3rd gear, and the 1st/2nd clutch hub assembly. Replace worn and damaged parts.



EMHA021B

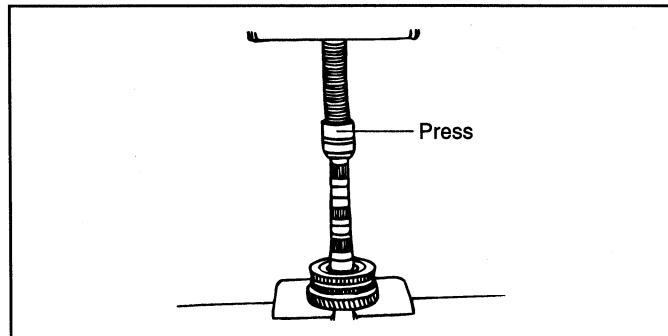
DISASSEMBLY EMJA0310

1. Remove the bearing and 5th gear using the SST.



EMHA022A

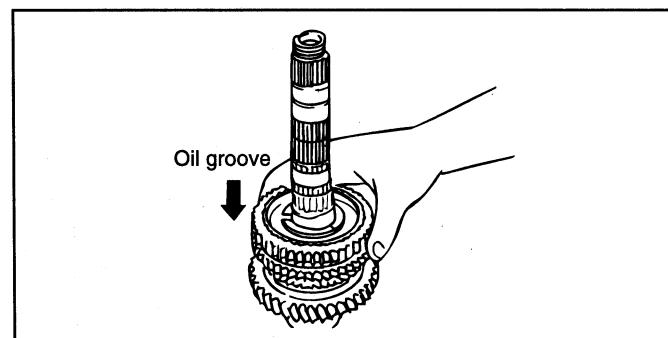
2. Remove the 1st/2nd clutch hub assembly, 1st synchronizer ring, and 1st gear, using a press.



EMJA031A

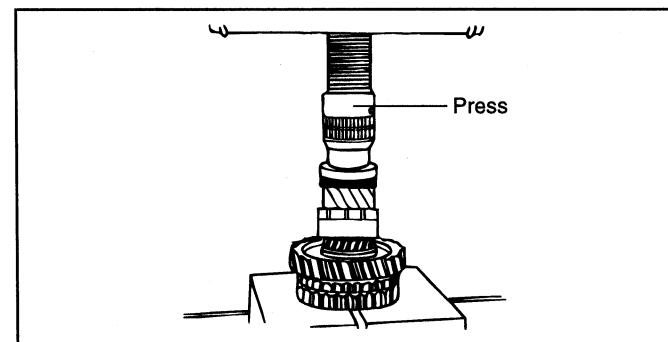
REASSEMBLY EMJA0320

1. Assemble the 1st gear, 1st synchronizer ring, and 1st/2nd clutch hub assembly, as shown in the figure.
2. Align the synchronizer ring grooves and synchronizer keys.



EMJA032A

3. Press on the 1st/2nd clutch hub assembly.



EMJA032B

4. Measure the clearance between 1st gear and the differential drive gear.



EMHA022E

5. Measure the clearance between 2nd gear and 3rd gear.

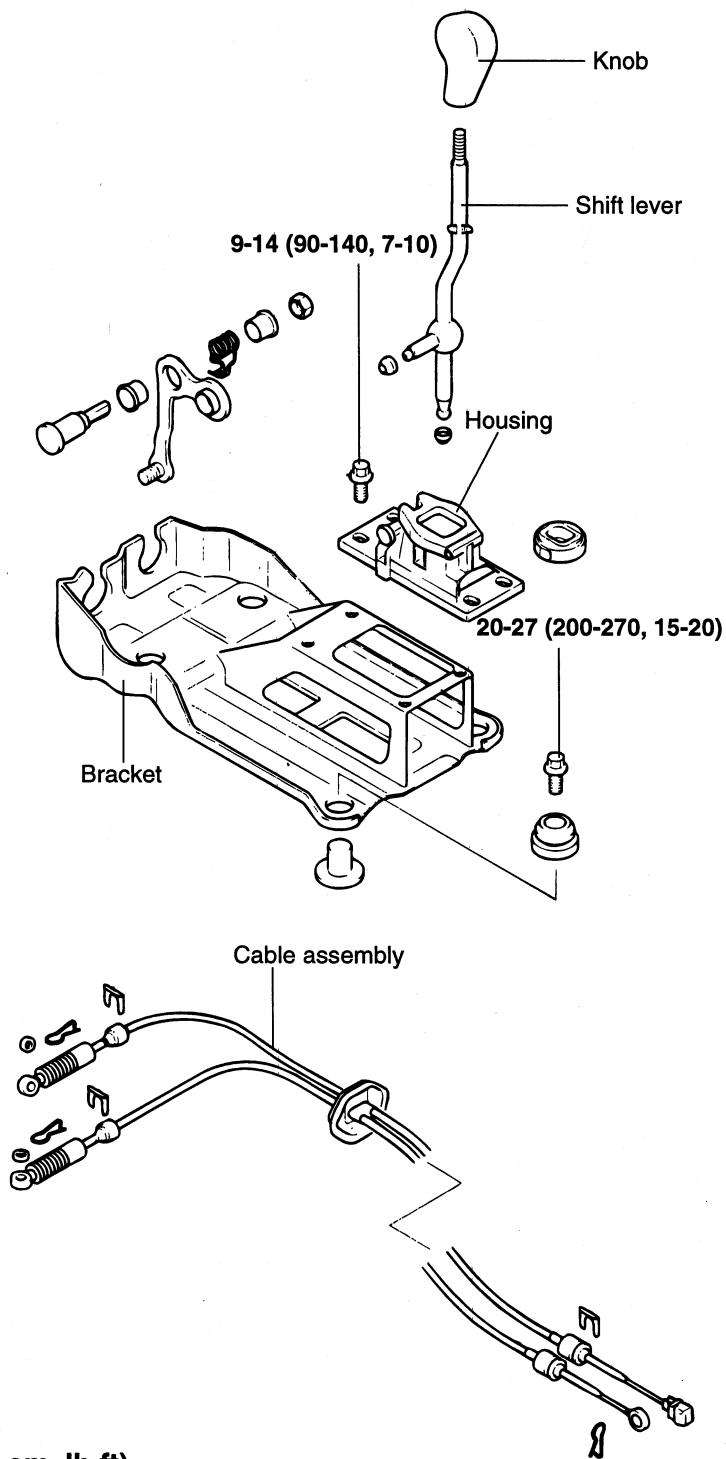


EMHA022F

MANUAL TRANSAXLE SHIFT CONTROL

COMPONENTS

EMJA0110

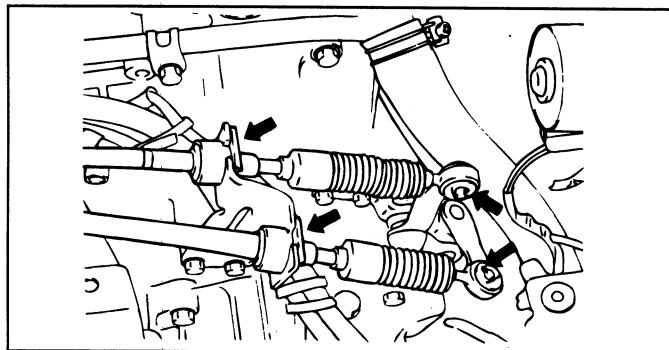


TORQUE : N·m (kg·cm, lb·ft)

EMJA011A

REMOVAL EMA90120

1. Remove the console assembly.
2. Remove the cotter pins and clips (shift lever side).
3. Remove the shift lever assembly.
4. Remove the retainer and bolts.
5. Remove the cotter pins and clips (Transaxle side).
6. Remove the shift cable and select cable.



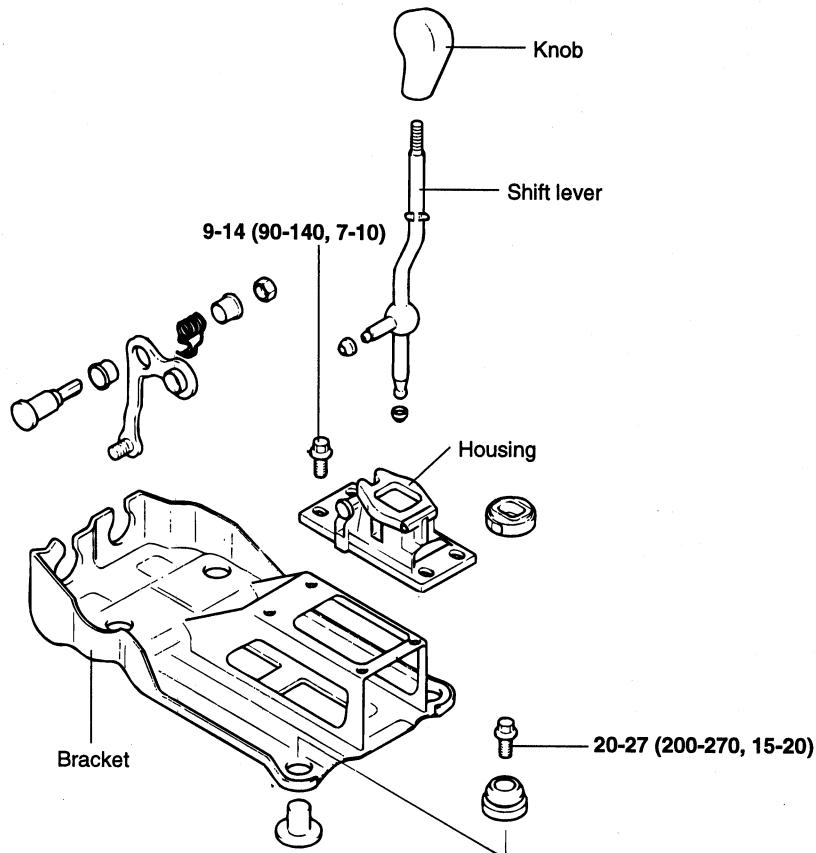
EMA9012E

INSPECTION EMA90130

1. Check the select cable for proper operation and for damage.
2. Check the shift cable for proper operation and for damage.
3. Check the boot for damage.
4. Check each bushing for wear, abrasion, sticking, restricted movement or damage.
5. Check for a weak or damaged return spring.

REASSEMBLY EMA90140

1. Install the shift lever assembly.
2. Install the shift lever and select cable.

SHIFT LEVER**COMPONENTS** EMA0150

TORQUE : N·m (kg·cm, lb·ft)

EMJA015A

INSPECTION EMA90160

1. Inspect the bushing for wear or damage.
2. Inspect the return spring for damage or deterioration.

REASSEMBLY EMA90170

1. Apply multi-purpose grease to the sliding parts of the bushings.
2. Reassembly is reverse of disassembly.

TRANSFER CASE ASSEMBLY

REPLACEMENT OF TRANSFER CASE OIL

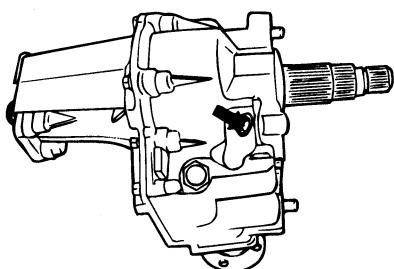
SYSTEM DESCRIPTION

1. The transfer case is a full-time four-wheel drive system developed for stable driving in the worst conditions. It improves not only driving safety on a normal road but also the performance of the vehicle in a slippery road by distributing the power to both, front and rear wheels.
2. A driver may not control front or rear wheel drive directly like a four-wheel drive vehicle.
3. When the front or rear wheels slip, the viscous generates the effect of differential limitation made by viscosity torque of silicon oil inside the viscous coupling, caused by relative revolution difference among interior plates.
4. This system secures optimum drive performance and vehicle safety according to a road by transmitting viscous torque to the side there is a little slippage between front wheels and rear wheels.
5. Rear wheel power set by the above system is transmitted to the rear wheel through the hypoid gear.

TRANSFER CASE OIL INSPECTION

Check the gear oil level by removing the filler plug. If the oil is contaminated, it is necessary to replace it with new oil.

1. With the vehicle parked on a level surface, remove the oil filler plug.



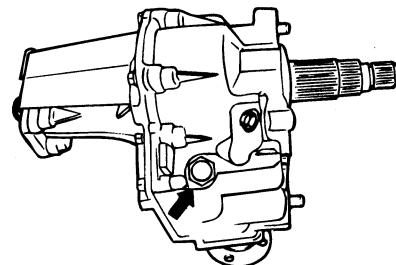
EFJA001A

2. Inspect the oil level.

REPLACEMENT OF TRANSFER CASE OIL

USE SHELL SPIRAX AX (SAE 80W/90, API GL-5)

1. With the vehicle parked on a level surface, remove the drain plug and drain the transfer case oil.
2. Install the drain plug.



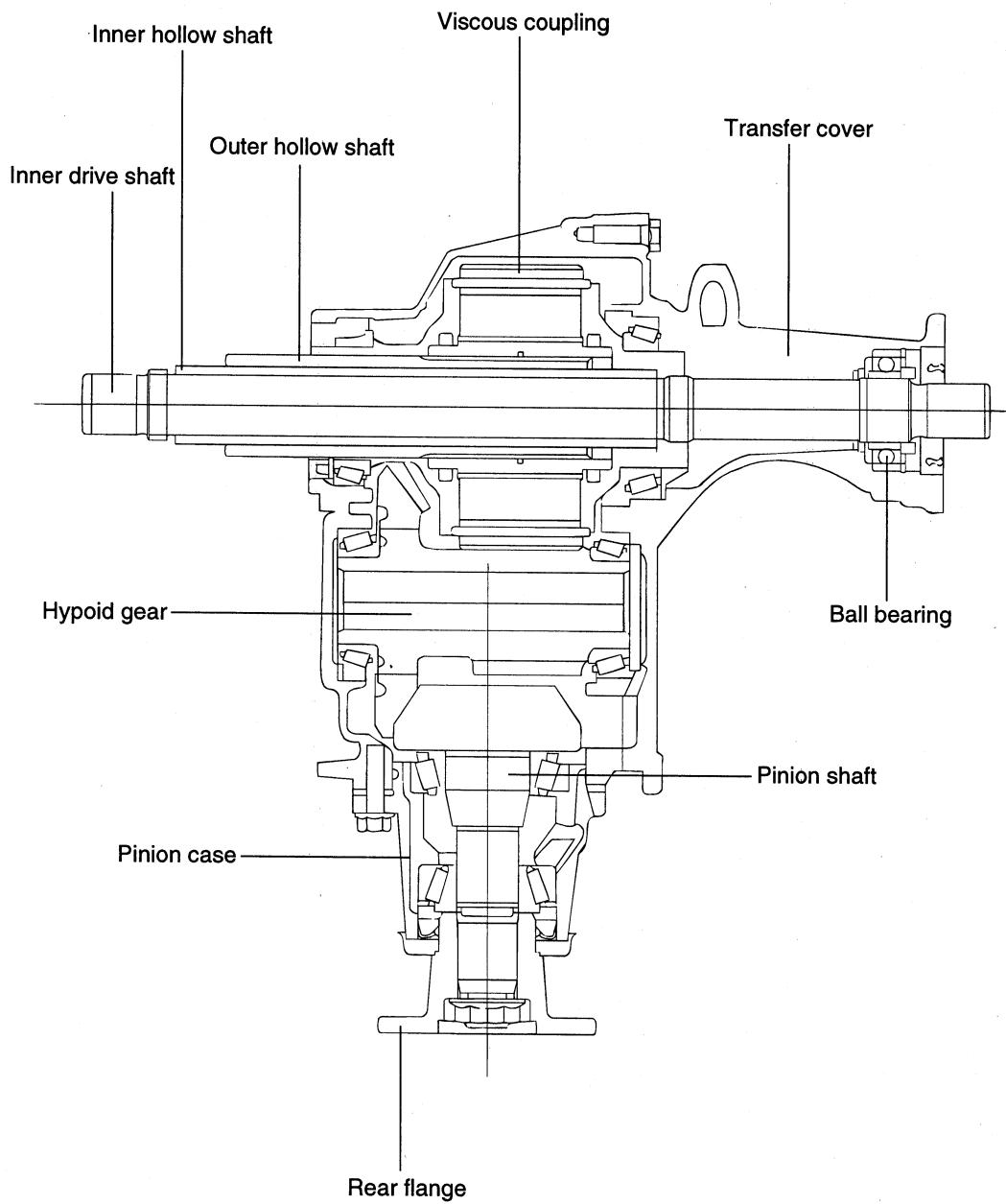
EKJA044A

3. Remove the oil filler plug.
4. Add the specified amount and type of oil into the oil filler hole
5. Install the oil filler plug.

TRANSFER CASE

SECTION VIEW

EKJA0420

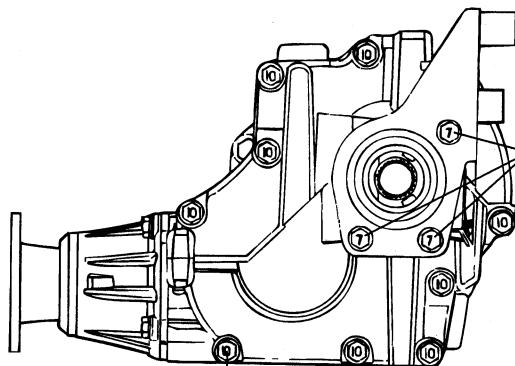


EKJA042A

OUTSIDE VIEW

EKJA0430

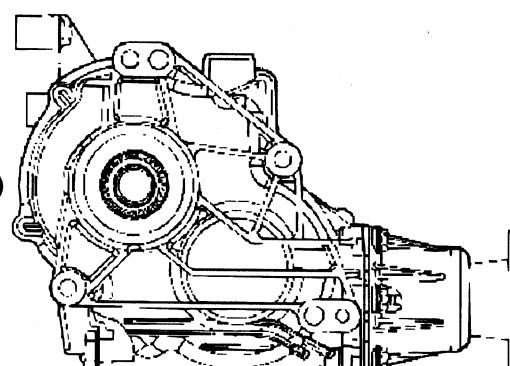
<Right view>



34-37(340-370, 25-38)

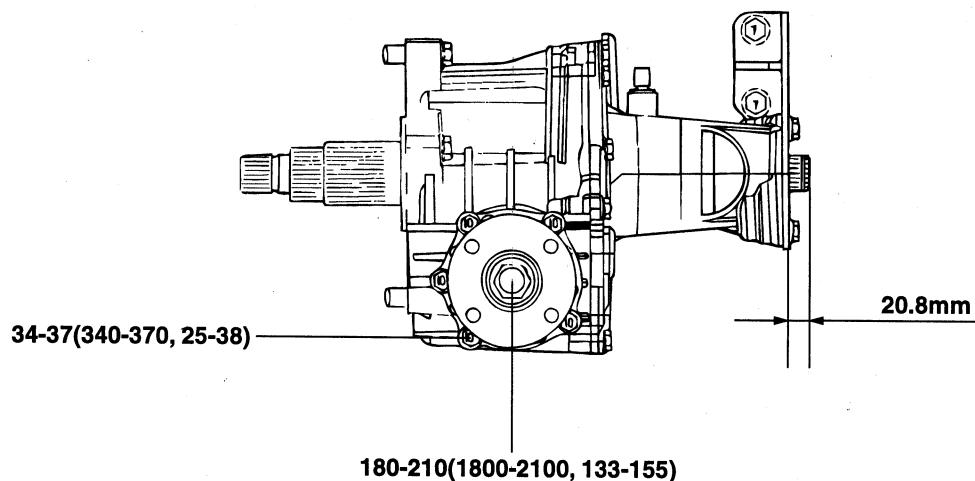
24-28
(240-280, 17-20)

<Left view>



34-38(340-380, 25-38)

<Rear view>



34-37(340-370, 25-38)

20.8mm

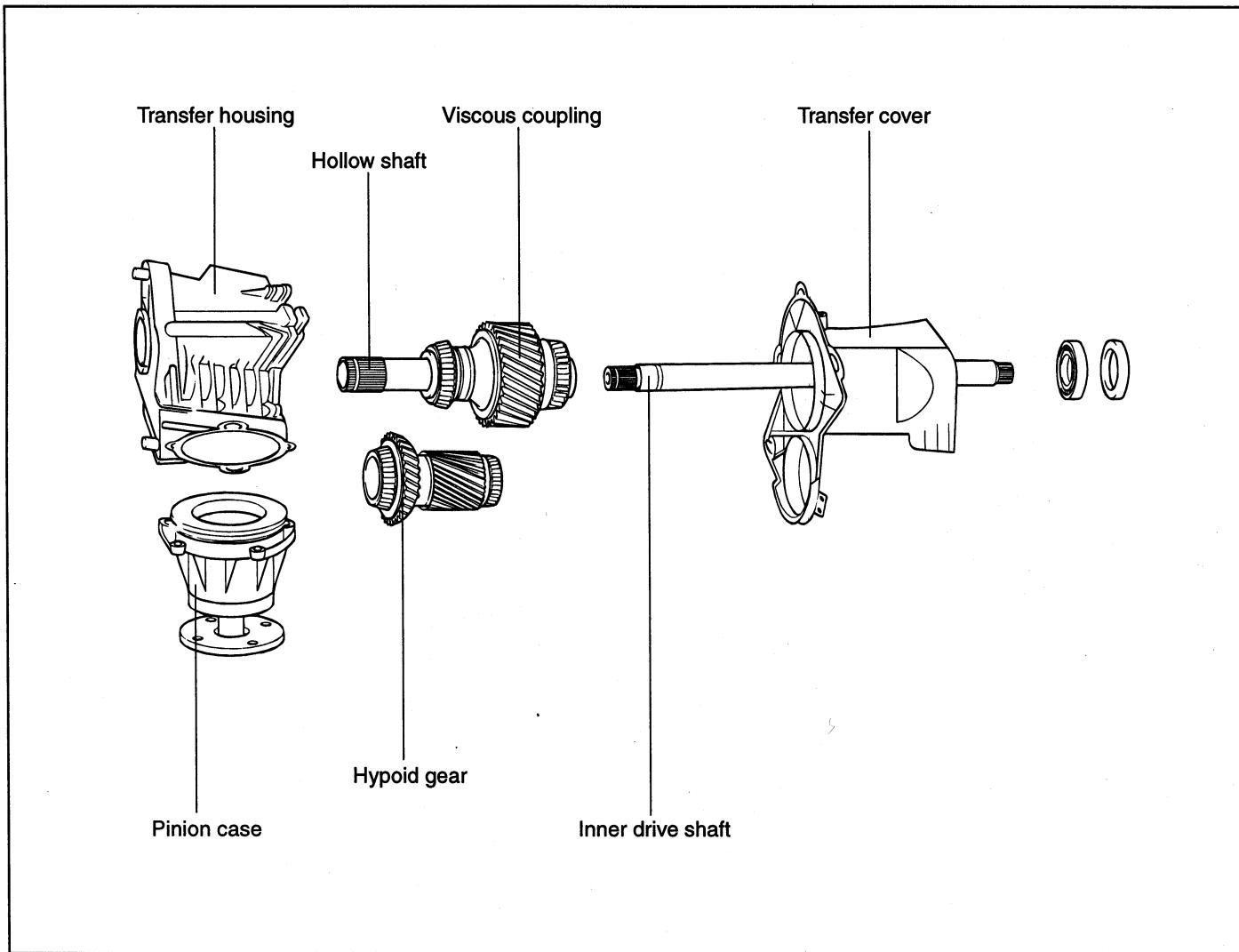
180-210(1800-2100, 133-155)

TORQUE : N·m (kg·cm, lb·ft)

EKJA043A

TRANSFER CASE EKJA0450

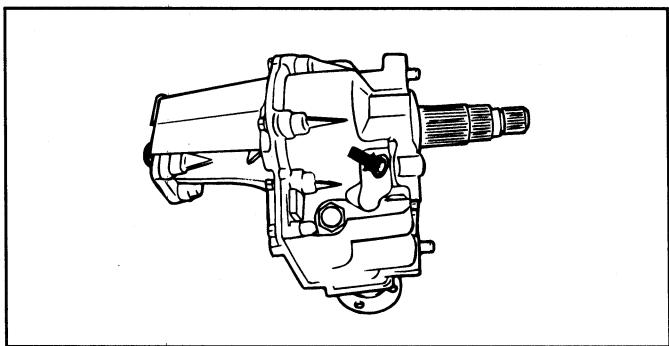
COMPONENTS



EKJA045A

REMOVAL EKJA0460

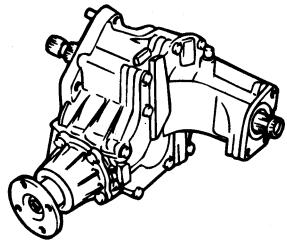
1. Attach the engine support fixture (09200-38001) to the engine (if necessary).
2. Remove the transfer case and the sub-frame mounting bracket.
3. Raise the vehicle and remove the tires.
4. Remove the front muffler.
5. Drain the transfer case oil.



EFJA001A

6. Remove the engine lower cover and side cover.
7. Remove the brake calipers, the shock-absorbers and the drive shaft.
8. Remove the alternator, exhaust manifold and the rear propeller shaft.

9. Remove the steering tube attached to the sub-frame.
10. Remove the bolts of the sub-frame and the sub-frame assembly.
11. Support the transfer case with a jack.
12. Remove the transfer case mounting bolts.
13. Remove the transfer case assembly.

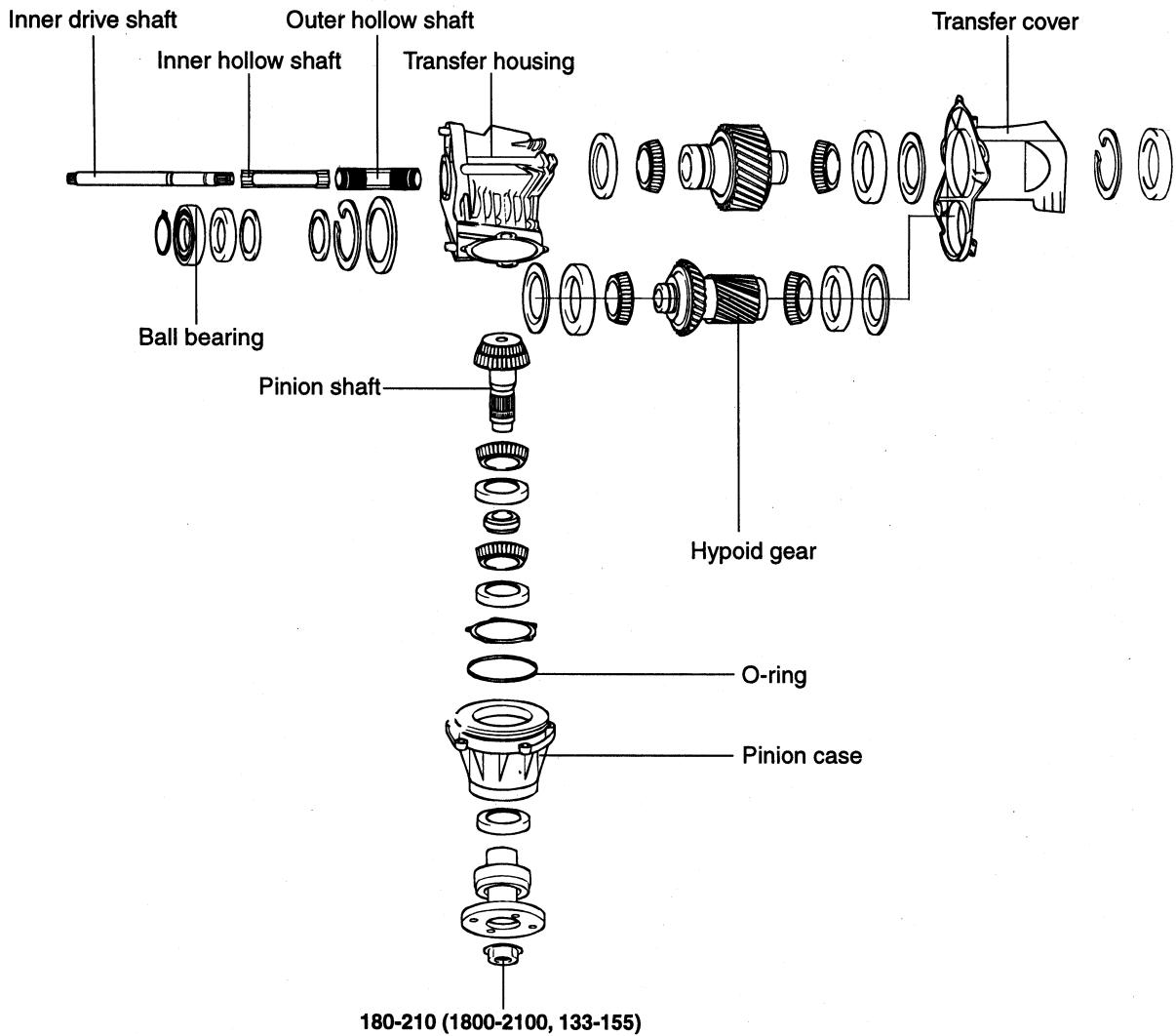


EFJA001B

TRANSFER CASE

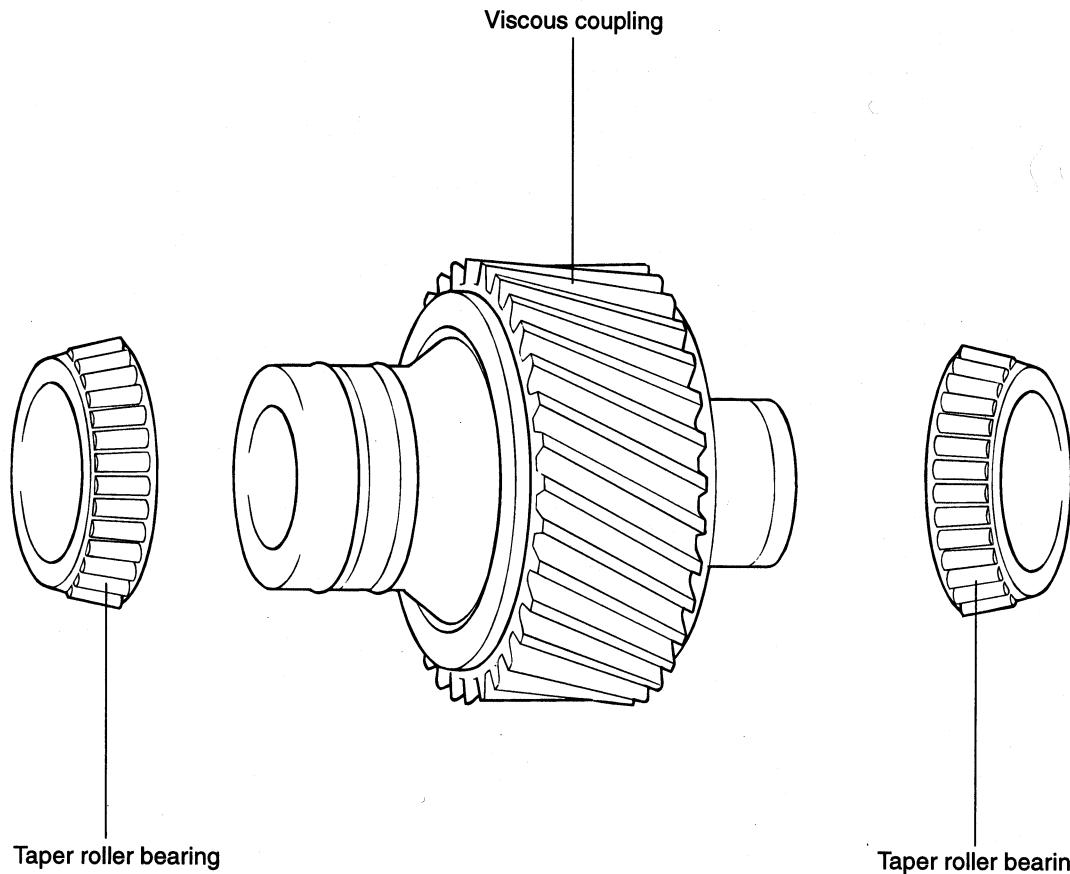
EKJA0470

COMPONENTS



TORQUE : N·m (kg·cm, lb·ft)

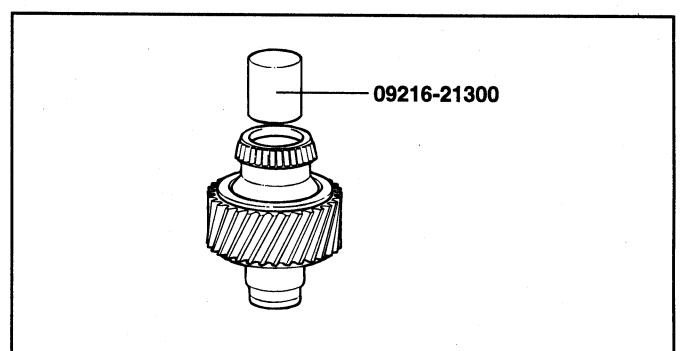
EKJA047A

VISCOUS COUPLING**VISCOUS COUPLING** EKJA0480**COMPONENTS**

EKJA048A

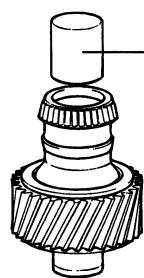
NOTE**The viscous coupling is not serviceable****REASSEMBLY** EKJA0490

1. Reassemble the taper roller bearing using special Tool.



EFJA007A

2. Reassemble the taper roller bearing (larger size) in opposite side using special Tool.

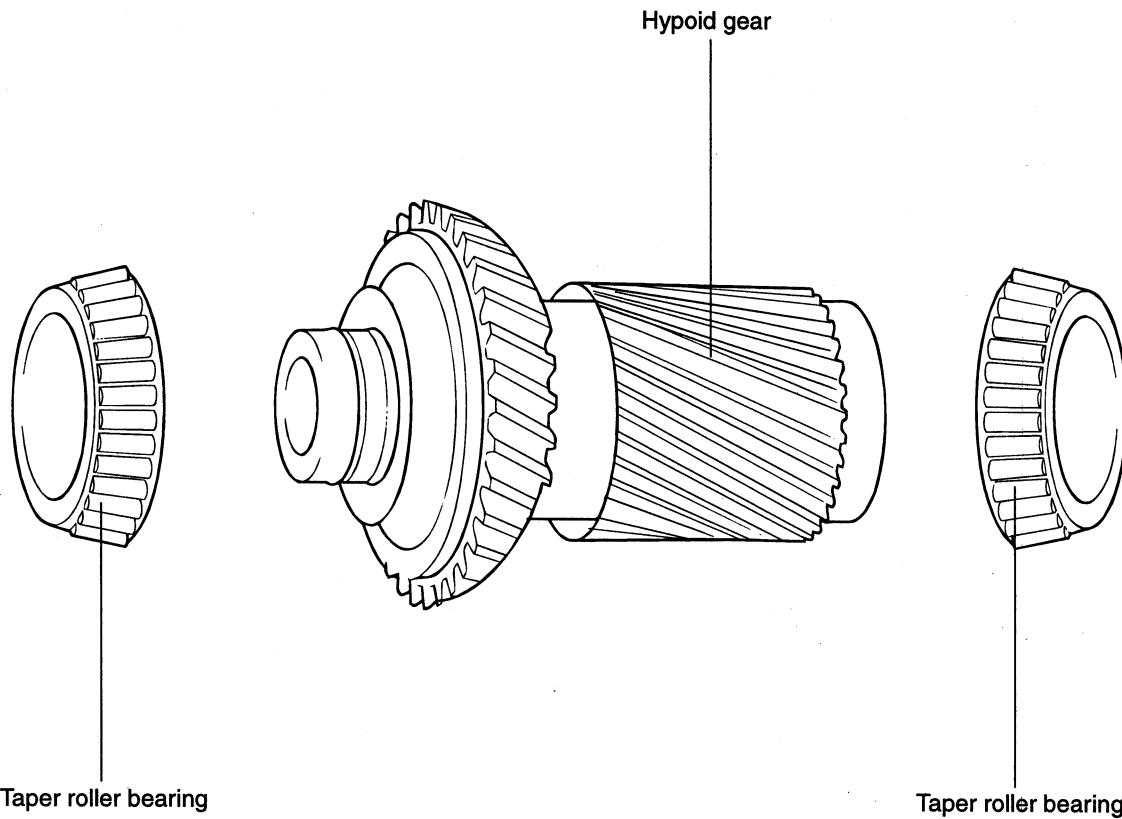


09216-21300

EFJA008A

HYPOID GEAR EKJA0500

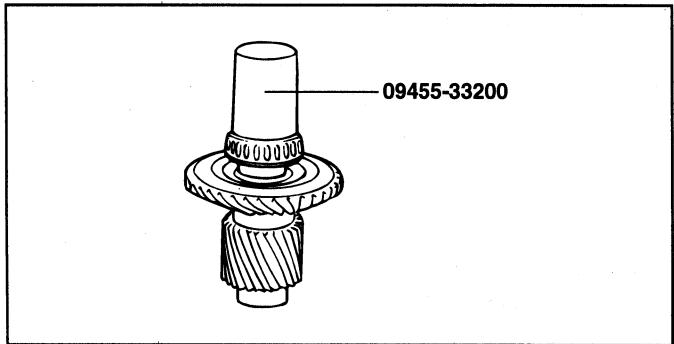
COMPONENTS



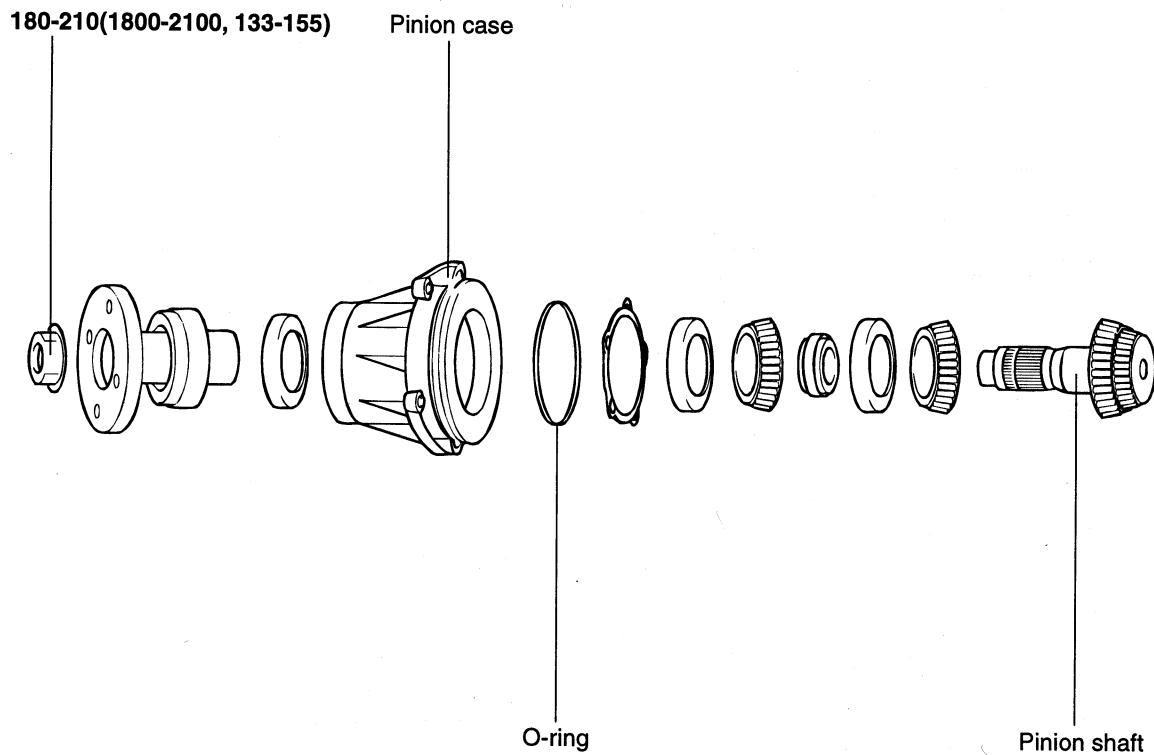
EKJA050A

HYPOID GEAR**REASSEMBLY** EKJA0510

1. Reassemble two (front & rear side) taper roller bearings using the special tool.



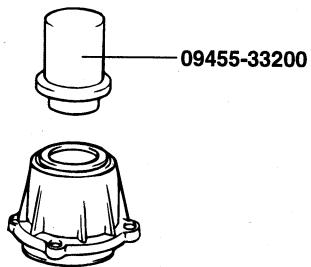
EFJA010A

PINION SHAFT AND CASE**PINION SHAFT AND CASE** EKJA0520**COMPONENTS****TORQUE : N·m (kg·cm, lb·ft)**

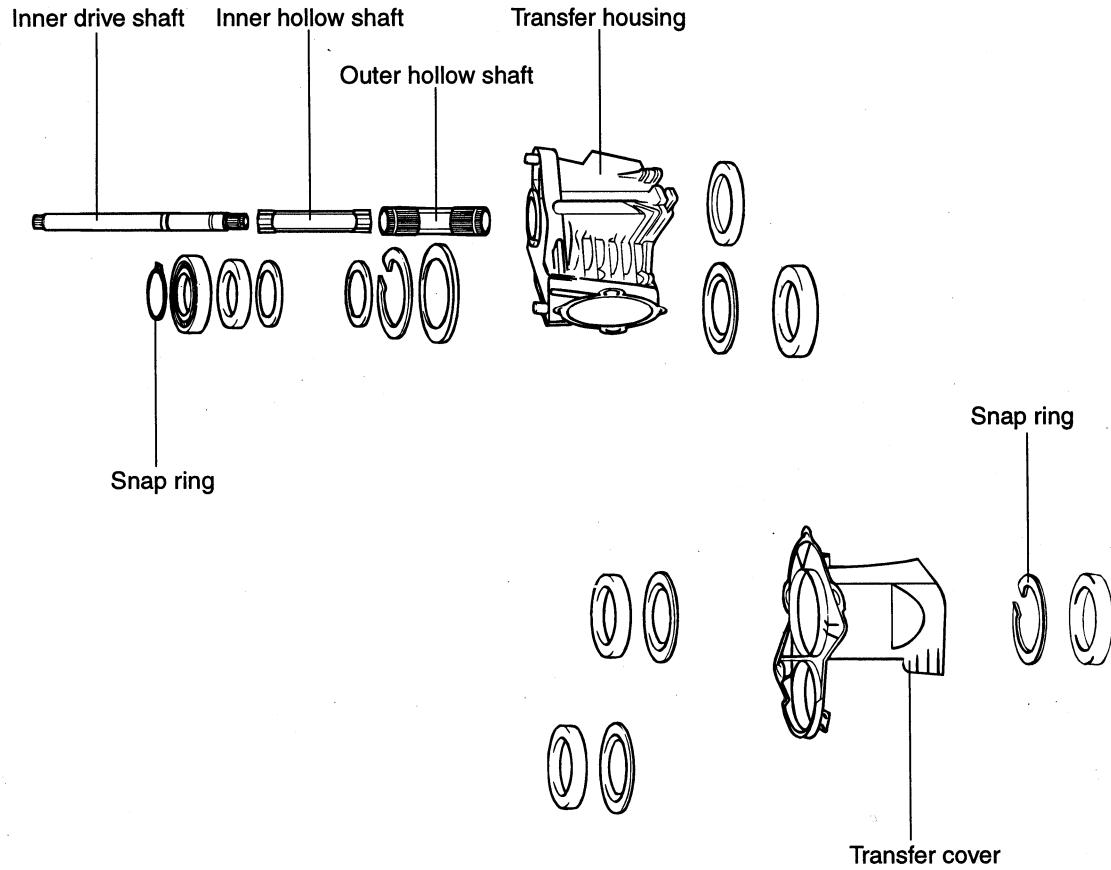
EKJA052A

REASSEMBLY EKJA0530

1. Reassemble the oil seal on the pinion case using special Tool.



EFJA012A

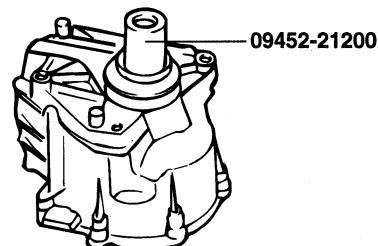
TRANSFER HOUSING AND COVER**TRANSFER HOUSING AND COVER** EKJA0540**COMPONENTS**

EKJA054A

REASSEMBLY

EKJA0550

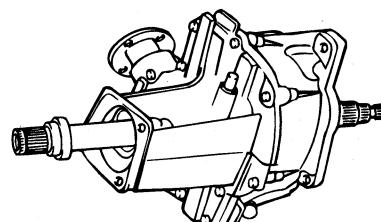
1. Reassemble the oil seal on the transfer housing using the special tool.



EFJA014A

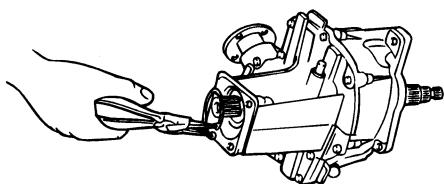
REMOVAL OF INNER DRIVE SHAFT

1. Remove the oil seal.

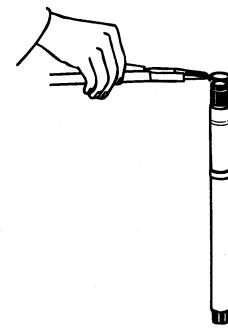


EFJA017A

2. Remove the snap ring.

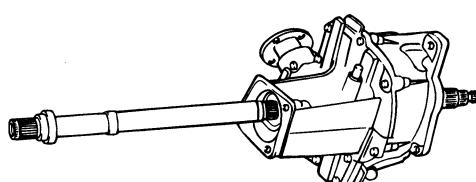


EFJA018A



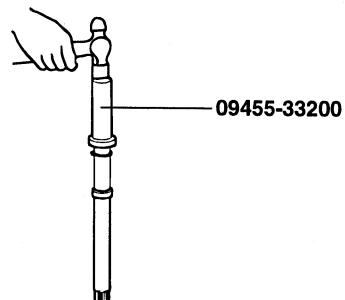
EFJA021A

3. Remove the inner drive shaft.



EFJA020A

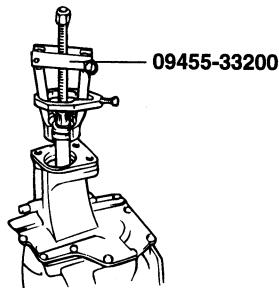
2. Reassemble the ball bearing and the hoop ring.



EFJA022A

REMOVAL OF INNER DRIVE SHAFT BEARING.

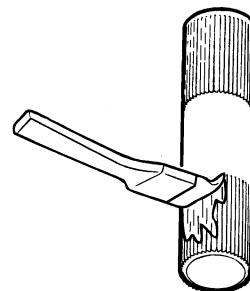
1. Remove the inner drive shaft bearing using the special tool.



EFJA020B

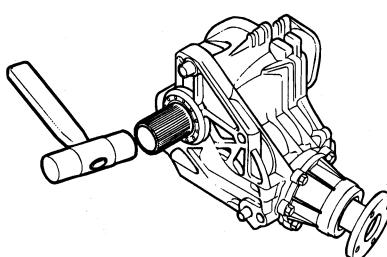
REASSEMBLY OF BEARING AND SNAP RING

1. Reassemble the snap ring on the inner drive shaft.



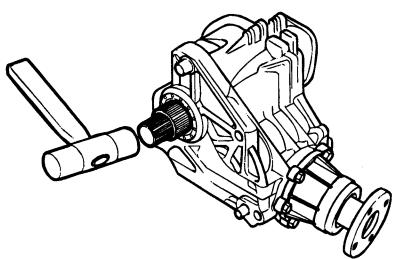
EFJA023A

2. Reassemble the outer hollow shaft.



EFJA025A

3. Reassemble the inner hollow shaft.



EFJA027A