

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 |

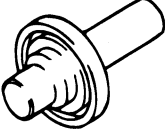
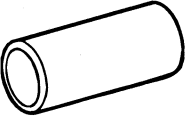
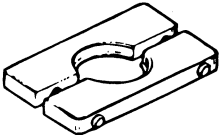
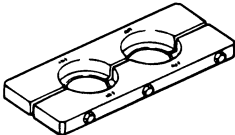
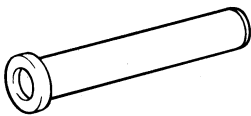
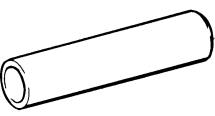


LUBRICATIONS


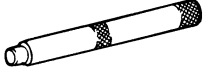

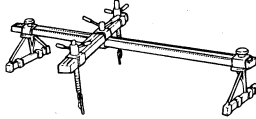
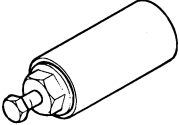
EMJA0040

| 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 |  <p>V5MT077G</p> | Removal of ball bearing and gear |
| 09500-21000 Driver |  <p>EMJA005H</p> | Installation of input shaft bearing |
| 09532-32000 Pinion bearing outer race installer |  <p>EMJA005I</p> | Installation of bearing outer race (use with 09500-21000) |
| 09200-38001 Engine support fixture |  <p>D0038001</p> | Removal and installation of transaxle |
| 09432-3A000 Output shaft puller |  <p>EMJA005J</p> | 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 poppet spring Replace synchronizer hub and sleeve |

SPECIFICATIONS(AT)

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 | 20-26 | 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 | 18 |
| | 2.0 | 20 |
| | 2.2 | 22 |
| | 2.4 | 24 |
| | 2.6 | 26 |
| | 2.8 | 28 |
| Snap ring (For adjustment of underdrive clutch and overdrive clutch end plays) | 1.6 | None |
| | 1.7 | Blue |
| | 1.8 | Brown |
| | 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 |
| 2.9 | Blue | |
| 3.0 | Brown | |
| Snap ring (For adjustment of low-reverse brake and second brake reaction plates end plays) | 2.2 | Blue |
| | 2.3 | Brown |
| | 2.4 | None |
| | 2.5 | Blue |
| Pressure plate (For adjustment of low-reverse brake and second brake end plays) | 1.6 | 6 |
| | 1.8 | 1 |
| | 2.0 | 0 |
| | 2.2 | 2 |
| | 2.4 | 4 |
| | 2.6 | 6 |
| | 2.8 | 8 |
| 3.0 | 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 | - |

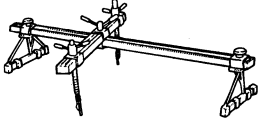

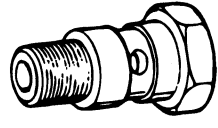

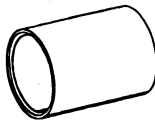
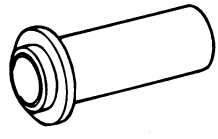
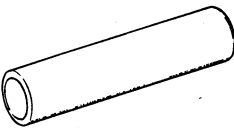

| Part name | Thickness mm | Identification Symbol |
|---|--------------|-----------------------|
| Spacer (For adjustment of pinion assembly endplay equipped with transfer case) | 1.25 - 1.28 | - |
| | 1.29 - 1.32 | - |
| | 1.33 - 1.36 | - |
| | 1.37 - 1.40 | - |
| | 1.41 - 1.44 | - |
| | 1.45 - 1.48 | - |
| | 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 | - | |

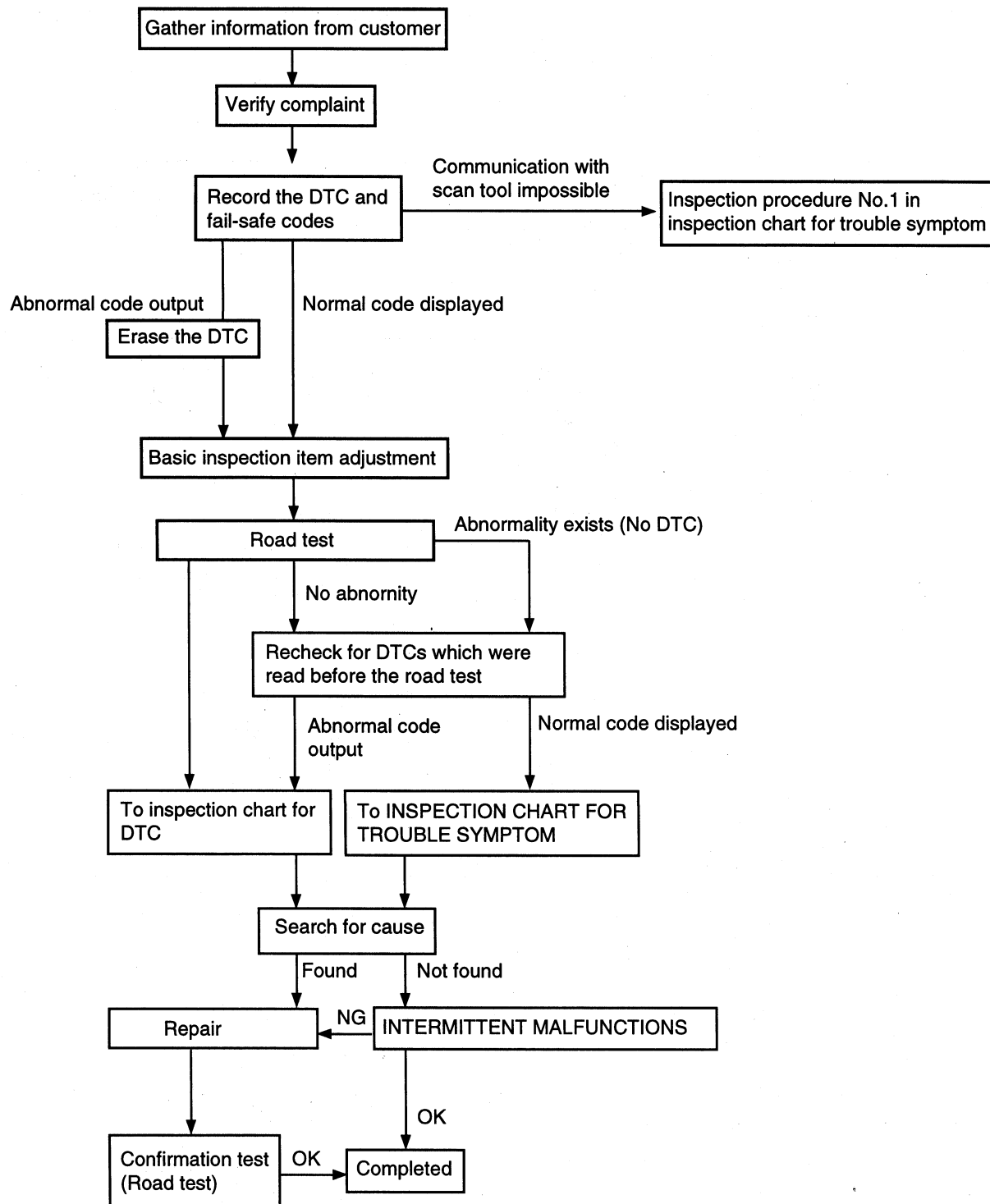
SPECIAL TOOLS

EKJA0060

| Tool (Number and name) | Illustration | Use |
|--|--|---|
| 09200-38001 Engine support fixture |  <p style="text-align: right;">D0038001</p> | Removal and installation of transaxle. |
| 09452-21001 Oil pressure gauge adapter |  <p style="text-align: right;">EKAA006A</p> | Measurement of the oil pressure. (use with 09452-21500 and 09452-21002) |
| 09452-21002 Oil pressure gauge adapter |  <p style="text-align: right;">EKAA006B</p> | Measurement of the oil pressure. (use with 09452-21500 and 09452-21001) |
| 09452-21500 Oil pressure gauge |  <p style="text-align: right;">EKAA006C</p> | Measurement of the oil pressure. (use with 09452-21002 and 09452-21002) |
| 09216-21300 Bearing installer |  <p style="text-align: right;">EKJA006A</p> | Installation of viscous coupling taper roller bearing |
| 09452-21200 Oil pump oil seal installer |  <p style="text-align: right;">EKJA006B</p> | Installation of transfer housing oil seal (Transfer case) |
| 09455-33200 Bearing installer |  <p style="text-align: right;">EKJA006C</p> | Installation of inner drive shaft bearing and hypoid gear bearing |
| 09495-33000 Drive shaft bearing remover |  <p style="text-align: right;">EKJA006D</p> | 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

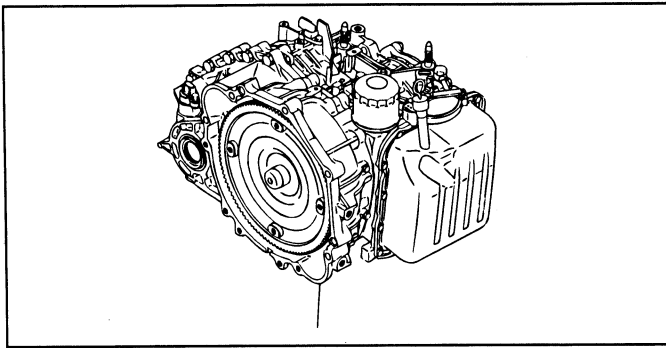
Stop pouring whenever the fluid overflows.

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

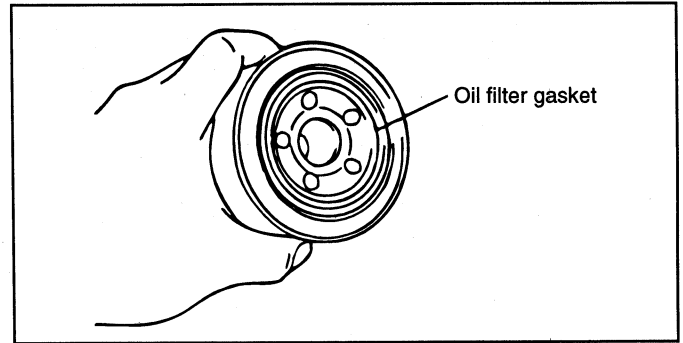
NOTE

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

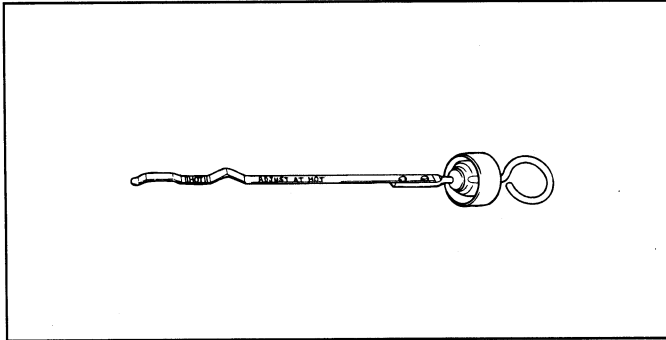
8. Pour the new fluid in through the oil filler tube.
9. Reconnect the hose which was disconnected in step (1) above, and firmly replace the oil level gauge.
10. Start the engine and let it idle for 1-2 minutes.
11. Move the select lever through all positions, and then move it to the N position.
12. 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

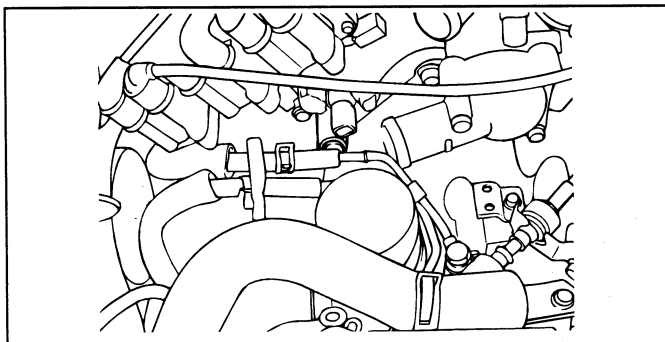
OIL FILTER REPLACEMENT

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.

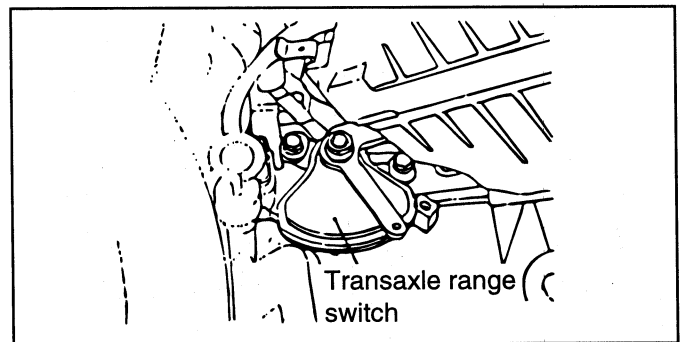


EKA9009C

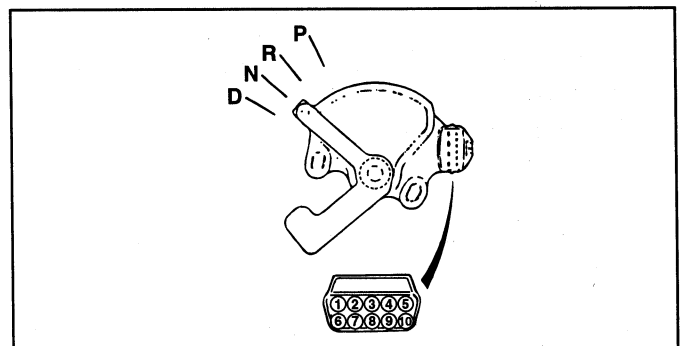
TRANSAXLE RANGE SWITCH CONTINUITY CHECK

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

EKJA008A



EKA9002A

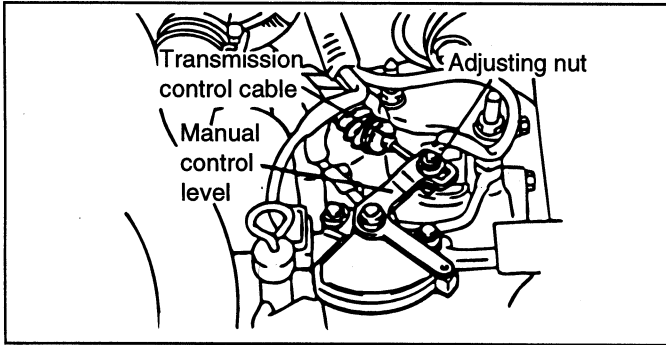


EKJA008B

TRANSAXLE RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

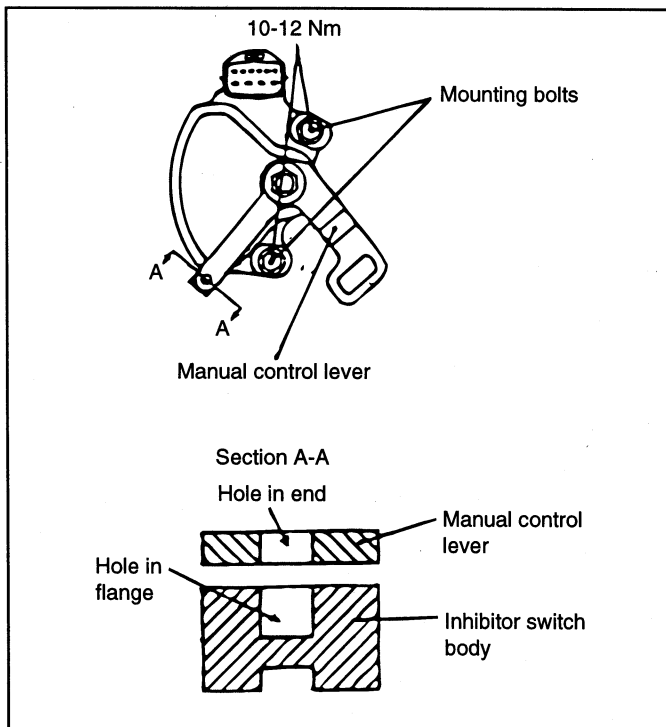
1. Set the selector lever to the "N" position.
2. Loosen the control cable to the manual control lever coupling nut to free the cable and lever.

- Set the manual control lever to the neutral position.



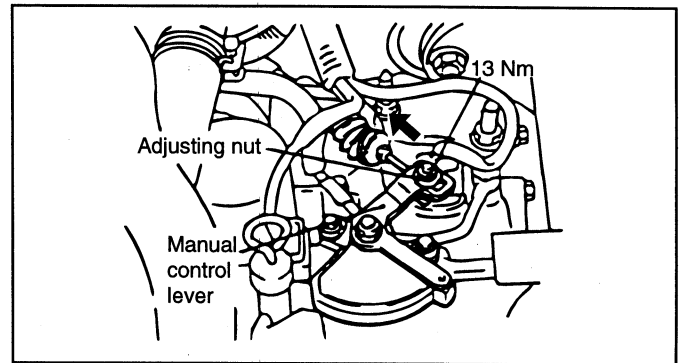
EKA9002C

- 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.
- 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

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



EKA9003B

- Check that the selector lever is in the "N" position.
- Check that each range on the transmission side operates and functions correctly for each position of the selector lever.

A/T CONTROL COMPONENT CHECK

- THROTTLE POSITION SENSOR CHECK.

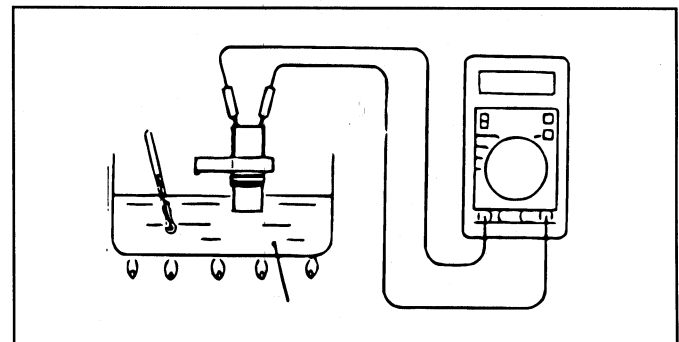
The TP Sensor is a variable resistor type that rotates with the throttle body shaft to sense the throttle valve angle. As the throttle shaft rotates, the output voltage of the TP Sensor changes. The ECM detects the throttle valve opening based on voltage change. (Refer to FL-section).

- 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 :

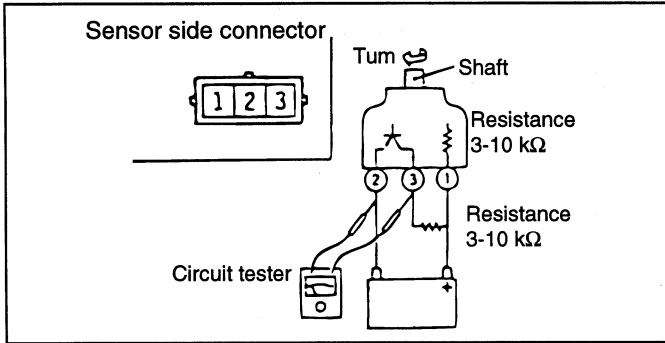
| Oil temperature (°C) | Resistance (KΩ) |
|----------------------|-----------------|
| 0 | 16.7-20.5 |
| 100 | 0.57-0.69 |



EKA9004A

- VEHICLE SPEED SENSOR CHECK

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

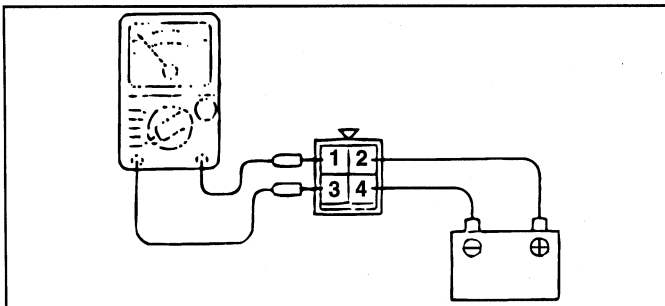


EKA9004B

4. A/T CONTROL RELAY CHECK

- a. Remove the A/T control relay.
- b. Use jumper wires to connect the A/T control relay terminal (2) to the battery (+) terminal and terminal (4) to the battery (-) terminal.
- c. 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.
- d. If there is a problem, replace the A/T control relay.

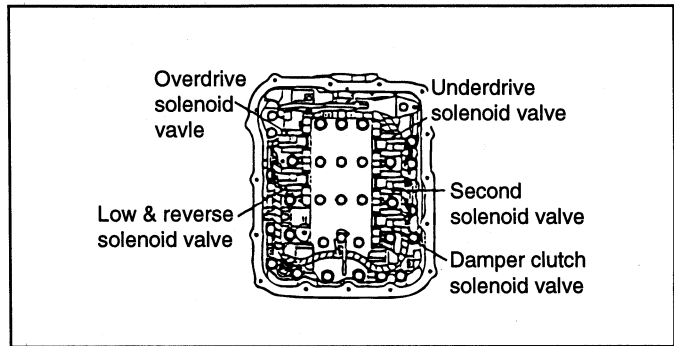
| | |
|--------------|----------------------------------|
| Jumper wire | Continuity between terminal No.1 |
| Connected | Continuity |
| Disconnected | No continuity |



EKJA008C

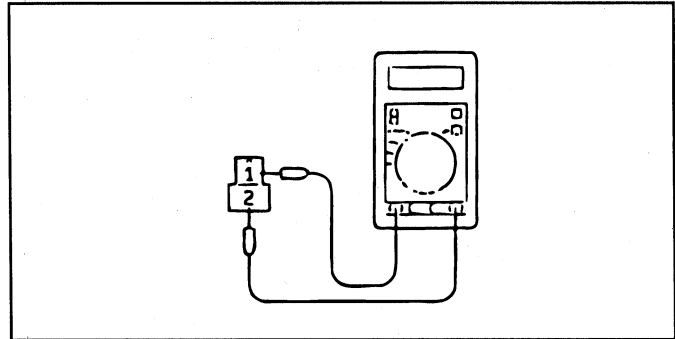
5. SOLENOID VALVE CHECK

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



EKA9005C

- c. Measure the resistance between terminals 1 and 2 of each solenoid valve.
Standard value :



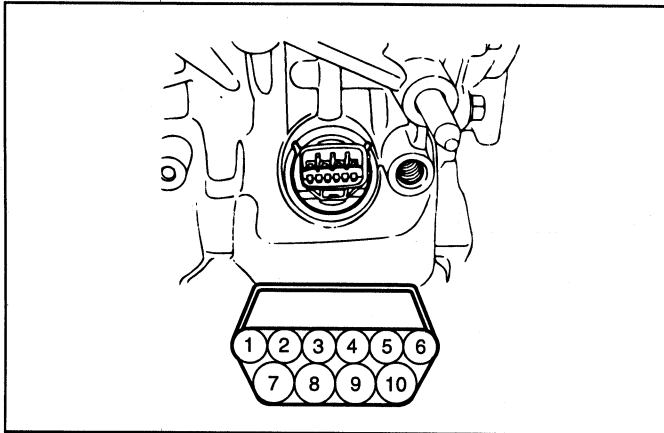
EKA9005D

- d. 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 | |



EKA9017B

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.

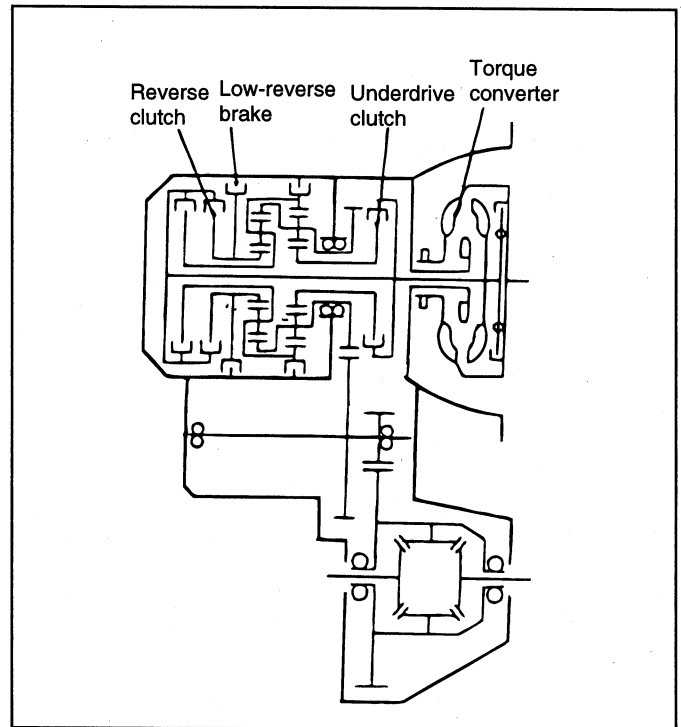
- a. Check the automatic transmission fluid level and temperature and the engine coolant temperature.
 - Fluid level : At the HOT mark on the oil level gauge
 - Fluid temperature : 80-100°C
 - Engine coolant temperature : 80-100°C
- b. Chock both rear wheels (left and right).
- c. Pull the parking brake 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

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

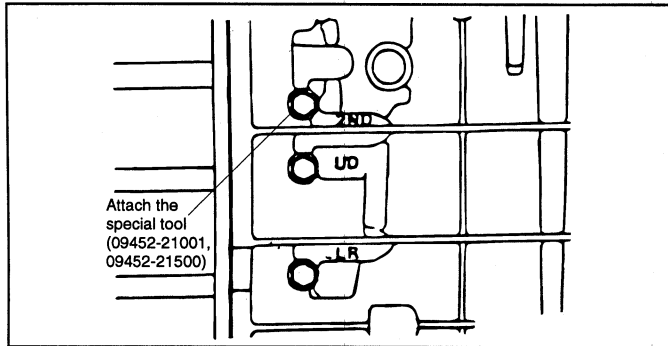


EKA9006A

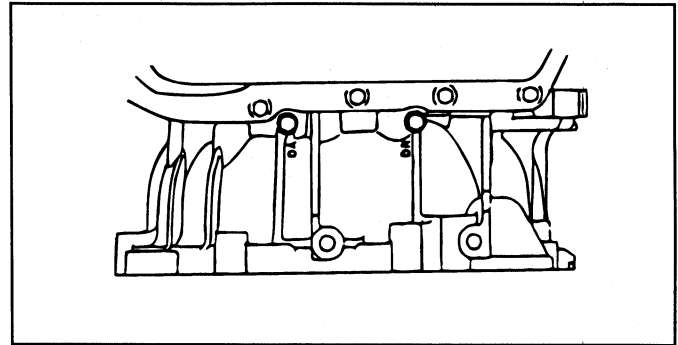
HYDRAULIC PRESSURE TEST

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.

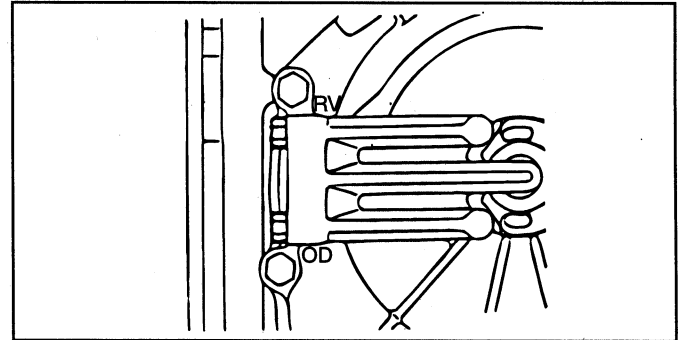
5. If a value is outside the standard range, correct the problem while referring to the hydraulic pressure test diagnosis table.



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 |
| 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 ranges 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 | (2) 1st, (4) 3rd, (3) 2nd, (5) 4th | Shift condition |
| | | 1. Idling in 1st gear (Vehicle stopped) | (2) 0%, (4) 100%, (3) 100%, (5) 100% | Low and reverse solenoid valve |
| | | 2. Driving at constant speed of 20 km/h in 1st gear | (2) 0%, (4) 0%, (3) 0% | Underdrive solenoid valve |
| | | 3. Driving at constant speed of 30 km/h in 2nd gear | (1)100%, (2)0%, (3) 100% | Second solenoid valve |
| | | 4. Driving at 50 km/h in 3rd gear with accelerator fully closed | (2) 100%, (3) 100%, (4)0% | Overdrive solenoid valve |
| | | 5. Driving at constant speed of 50 km/h in 4th gear | (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 Malfunction of connector Malfunction of the TCM |
| P1703 | | Open circuit | |
| P1702 | | Sensor Maladjustment | |
| 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 |
| P0755 | Underdrive solenoid valve system | Short circuit/Open circuit |
| P0760 | Second solenoid valve system | Short circuit/Open circuit |
| 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 |
| P0743 | Torque converter clutch solenoid valve system | Short circuit/Open circuit |
| 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 |
| 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 | <p>3rd gear ratio does not meet the specificationIf 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.</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 overdrive clutch system Noise generated</p> | |
| P0734 | <p>4th gear ratio does not meet the specificationIf 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.</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 low and reverse brake system Malfunction of the reverse clutch system Noise generated</p> | |
| P0736 | <p>Reverse gear ratio does not meet the specificationIf 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.</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 low and reverse brake system Malfunction of the reverse brake system Malfunction of the reverse clutch system Noise generated</p> | |
| P1749 | <p>Serial communicationIf 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.</p> | | |
| P1723 | <p>A/T control relay systemIf 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.</p> | <p>Short circuit to earth/ Open circuit</p> | <p>Malfunction of the A/T control relay Malfunction of connector Malfunction of the TCM</p> |

| Code | Diagnosis item | Probable cause | | | | |
|--------------------|--|--|--------------|--|---------------|---|
| P0707 P0708 | Transaxle range switch | <table border="1"> <tr> <td data-bbox="834 208 1101 293">Open circuit</td> <td data-bbox="1101 208 1511 293">No signal is continuous for > 30 seconds</td> </tr> <tr> <td data-bbox="834 293 1101 372">Short circuit</td> <td data-bbox="1101 293 1511 372">Above 2 kinds signals are continuous for 30 seconds</td> </tr> </table> | Open circuit | No signal is continuous for > 30 seconds | Short circuit | Above 2 kinds signals are continuous for 30 seconds |
| Open circuit | No signal is continuous for > 30 seconds | | | | | |
| 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 • Battery 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 Battery voltage > 10V continuously for 0.5 second • 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 • Battery 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 TROUBLE SYMPTOMS

EKJA0130

| Trouble symptom | Probable cause | |
|---|--|--|
| <p>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.</p> | <p>Malfunction diagnosis line Malfunction of connector Malfunction of the TCM or ECM</p> | |
| <p>Driving impossible</p> | <p>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.</p> | <p>Malfunction of the engine system Malfunction of the torque converter Malfunction of the oil pump Malfunction of the range switch</p> |
| | <p>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.</p> | <p>Abnormal line pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body Malfunction of the torque converter No transmission fluid Malfunction of the end clutch</p> |
| | <p>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.</p> | <p>Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse brake solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body</p> |
| | <p>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.</p> | <p>Abnormal line pressure Malfunction of power train Malfunction of the oil pump Malfunction of the valve body</p> |
| <p>Malfunction when starting</p> | <p>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).</p> | <p>Malfunction of the engine system Malfunction of the damper clutch control solenoid valve Malfunction of the valve body Malfunction of the torque converter Malfunction of the damper clutch</p> |
| | <p>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.</p> | <p>Abnormal underdrive clutch pressure Abnormal low and reverse brake pressure Malfunction of the underdrive solenoid valve Malfunction of the valve body Malfunction of the idle position switch</p> |

| 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>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</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> | <p>Abnormal line pressure Malfunction of the oil pump Malfunction of the 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> | <p>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</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>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</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> | <p>Malfunction of the valve body</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> | <p>Malfunction of the transaxle range Malfunction of the TCM</p> |
| Malfunction while driving | <p>Poor a 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> | <p>Malfunction of the engine system Malfunction of the brake of clutch</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> | <p>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</p> |

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

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

EKA90140

| Operating element | | Underdrive clutch (UD) | Reverse clutch (REV) | Overdrive clutch (OD) | Lowand re-verse 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 |

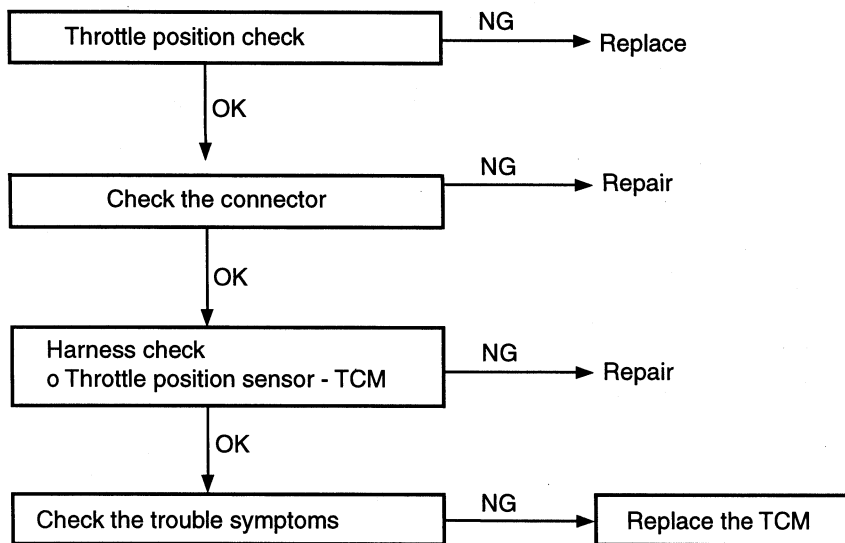
**OPERATING ELEMENT AND THEIR
FUNCTIONS**

| 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 overdruve planetary carrier |
| Second brake | 2ND | Locks reverse sun gear |

INSPECTION PROCESS FOR DIAGNOSTIC TROUBLE CODES

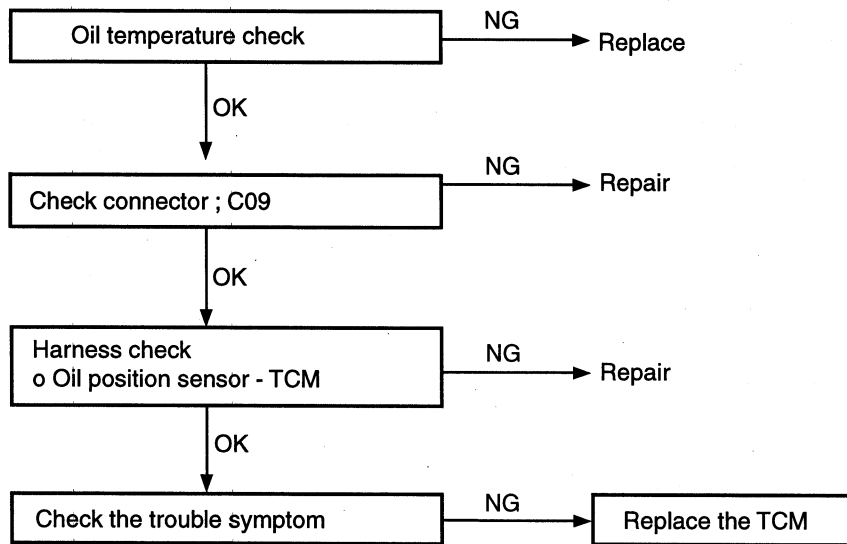
EKJA0270

| Code P1704, P1703, P1702 (throttle position sensor) | Probable cause |
|---|--|
| <p>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.</p> | <p>Malfunction of the throttle position sensor Malfunction of connector Malfunction of the TCM</p> |



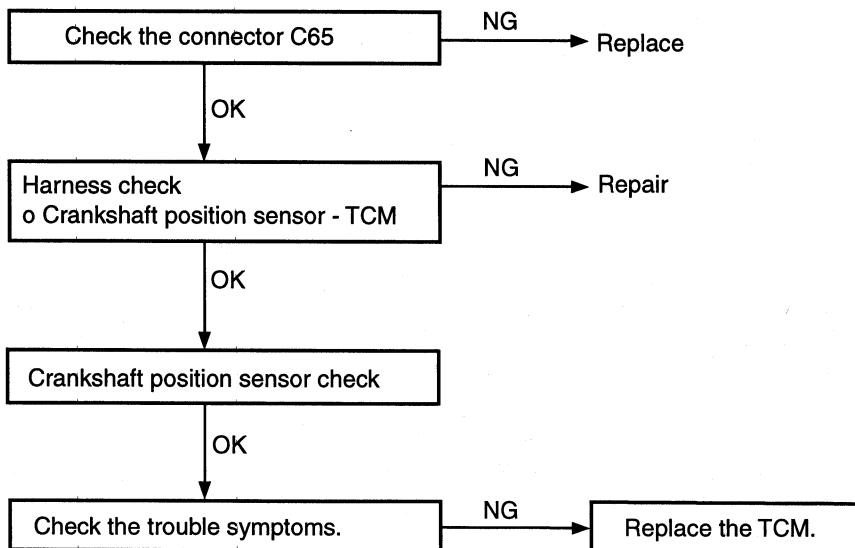
EKAA010A

| 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> |



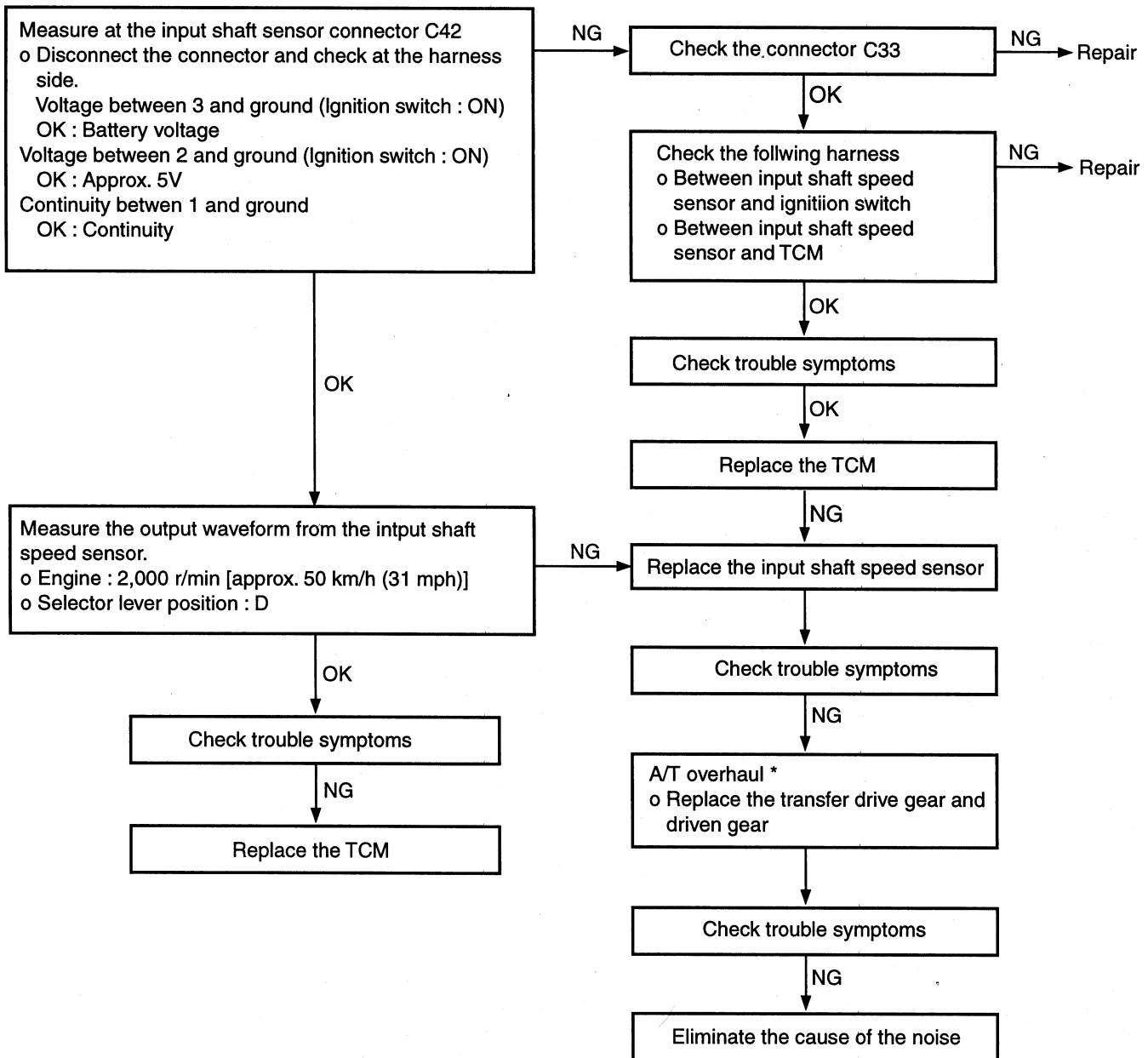
EKAA010B

| 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> |

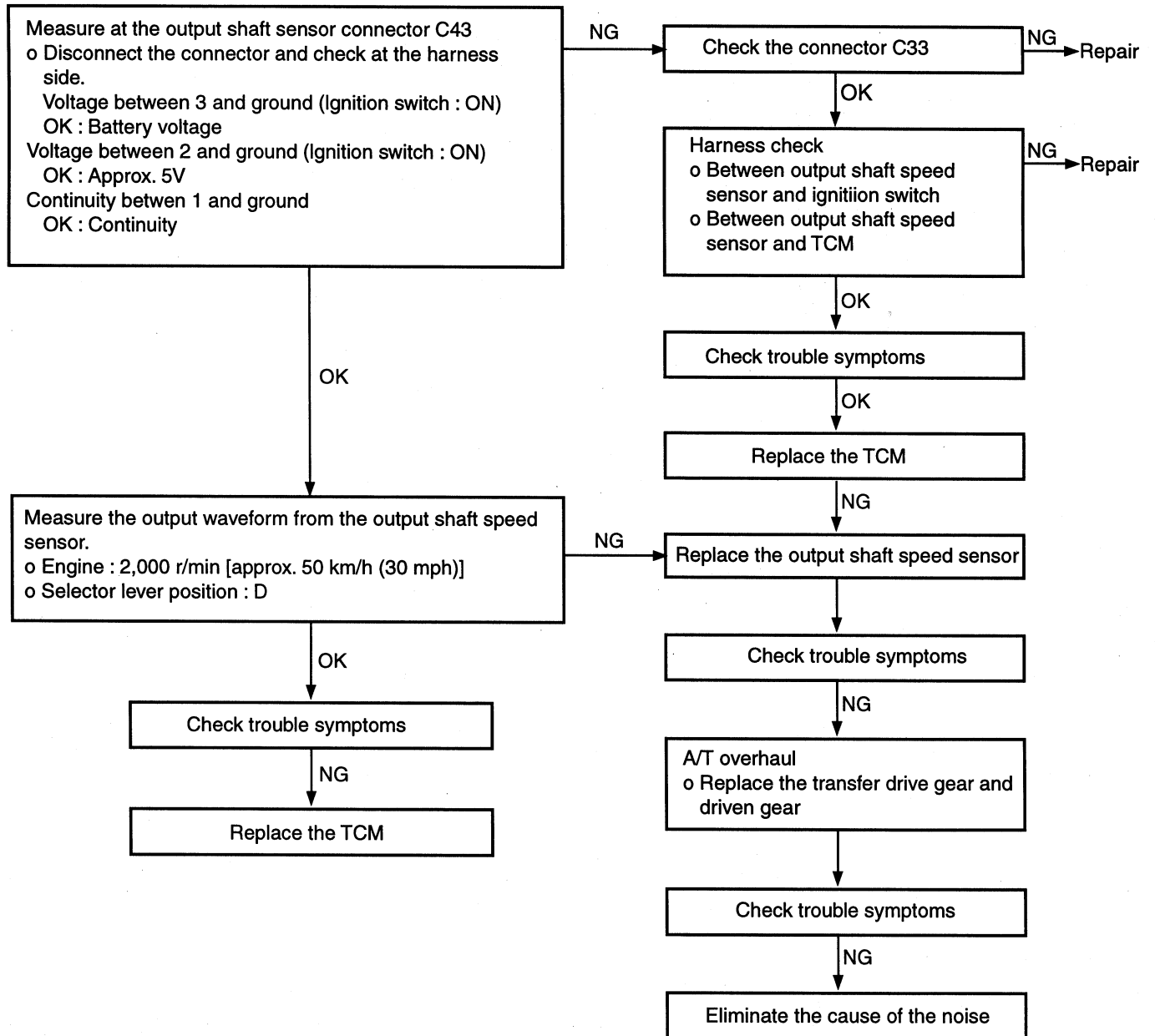


EKAA010C

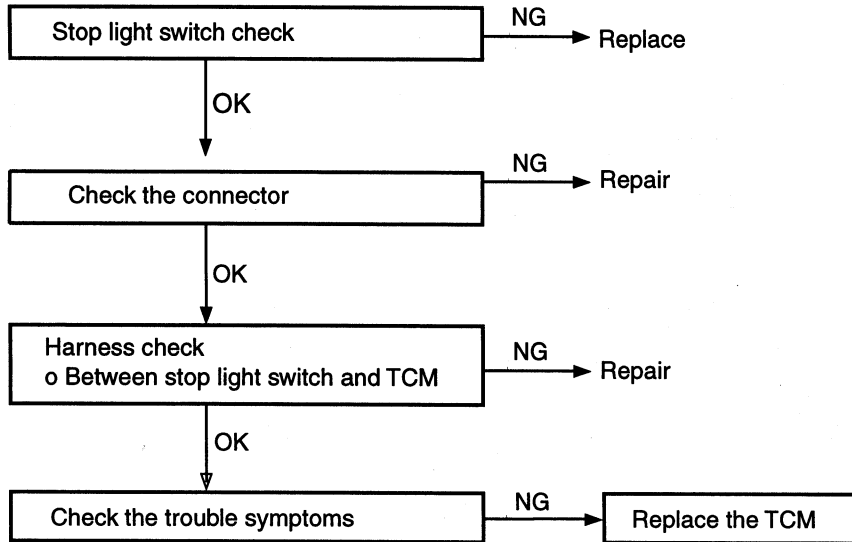
| Code P0715 input shaft speed sensor system (Pulse generator 'A') | Probable cause |
|--|--|
| If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h (19 mph) or more, it is judged to be an open circuit or short-circuit 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. | Malfunction of the input shaft speed sensor Malfunction of underdrive clutch retainer Malfunction of connector Malfunction of the TCM |



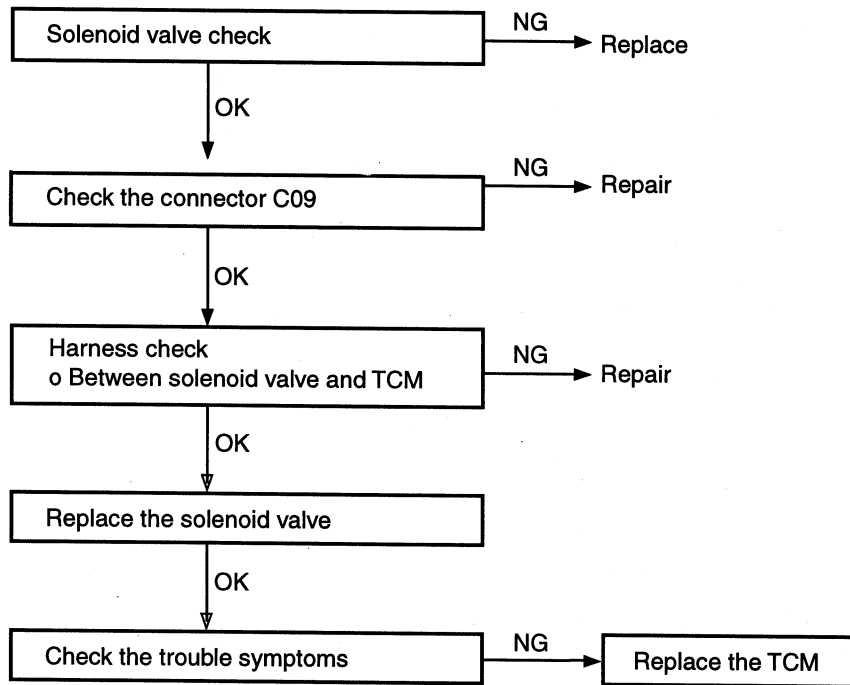
| | |
|---|---|
| Code P0720 Output shaft sensor system (Pulse generator 'B') | Probable cause |
| If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more, it is judged to be an open circuit or short circuit in the output shaft speed sensor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



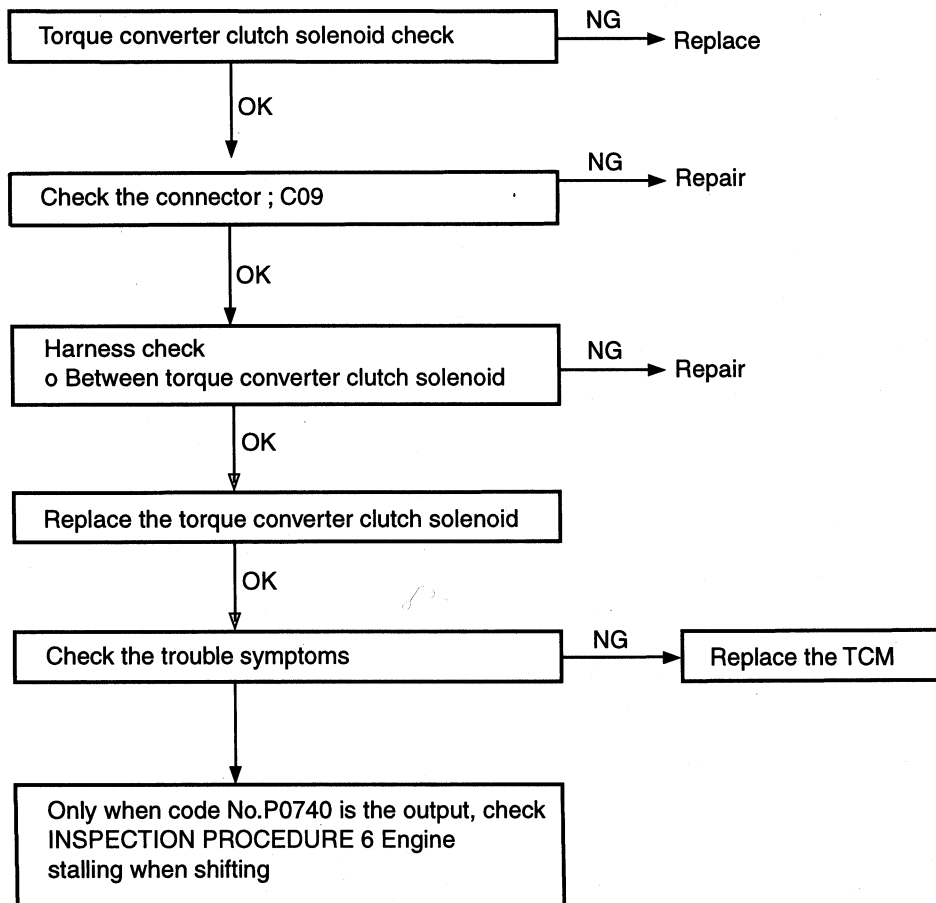
| Code P0703 Stop light switch system | Probable cause |
|--|--|
| If the stop light switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop light switch and diagnostic trouble code P0703 is output. | Malfunction of the stop light switch Malfunction of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



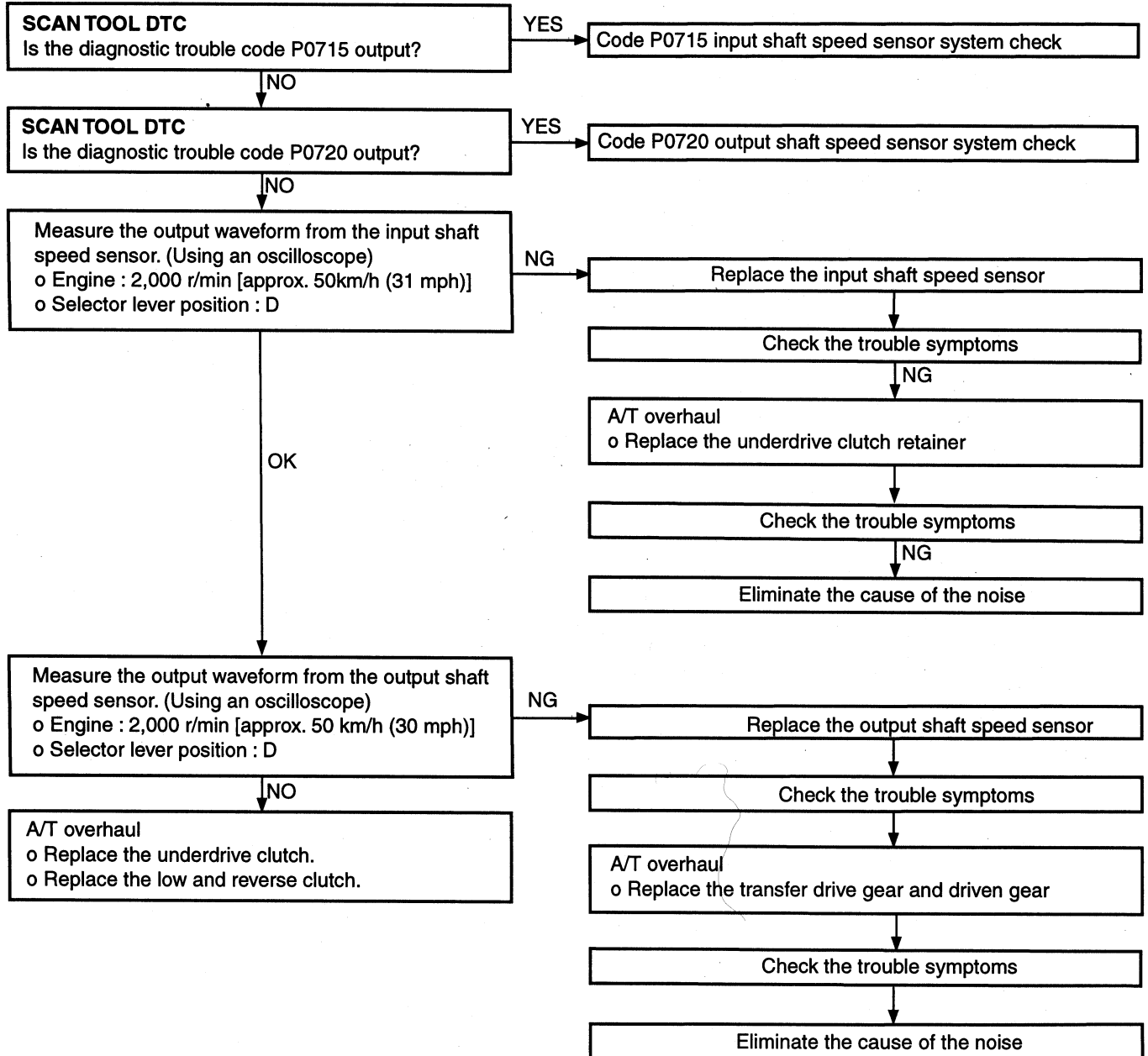
| | |
|---|----------------|
| Code P0750 Low and reverse solenoid valve system | Probable cause |
| Code P0755 Underdrive solenoid valve system | |
| Code P0760 Second solenoid valve system | |
| Code P0765 Overdrive solenoid valve system | |
| <p>If the resistance value for a solenoid valve is too 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.</p> | |
| <p>Malfunction of the solenoid valve Malfunction of connector Malfunction of the TCM</p> | |



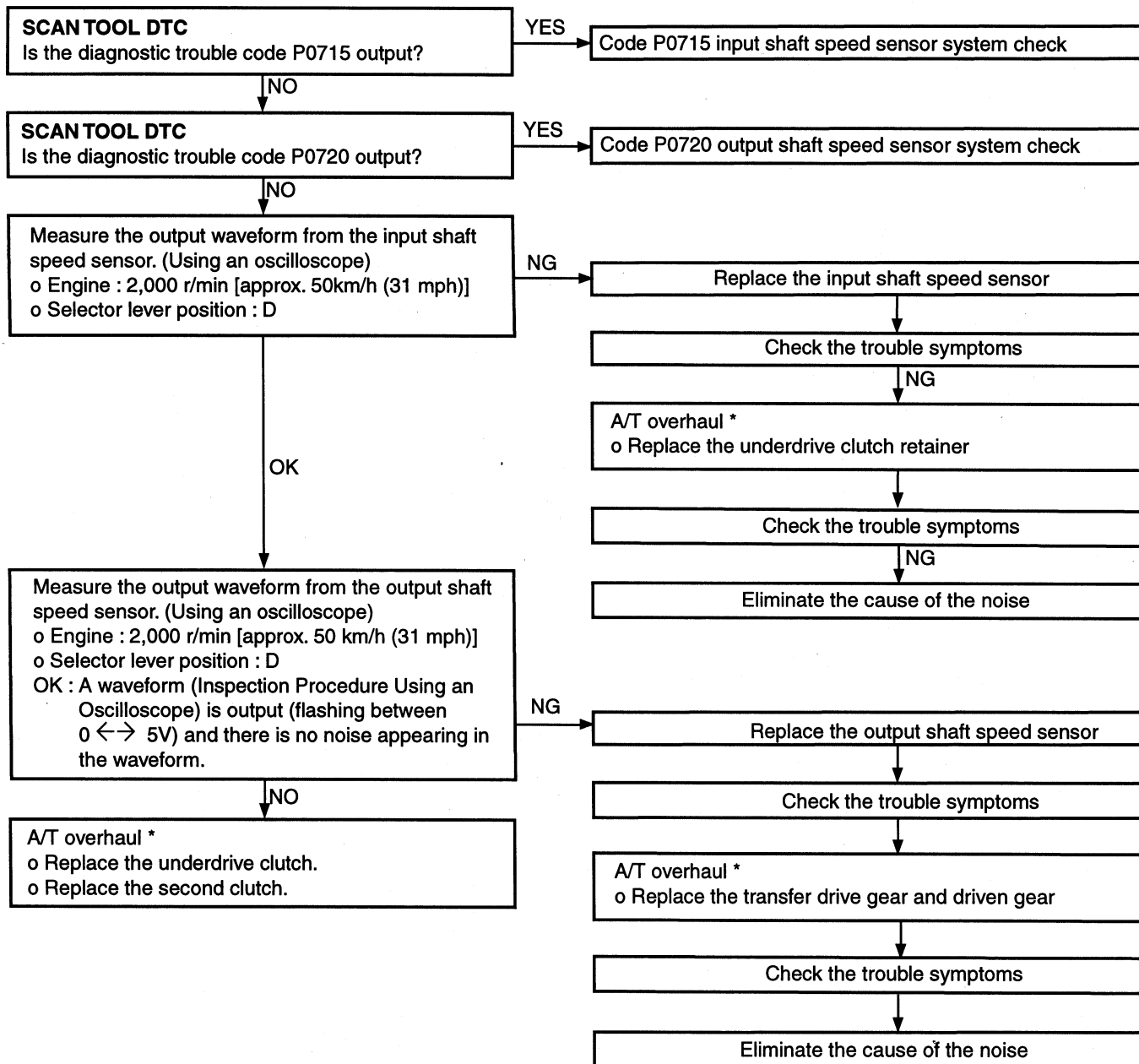
| Code P0743, P0740 Torque converter clutch system | Probable cause |
|--|--|
| <p>If the resistance value for the torque converter clutch solenoid is too large or too small, it is judged that there is a short-circuit or an open circuit in the torque converter clutch solenoid and diagnostic trouble code 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> |



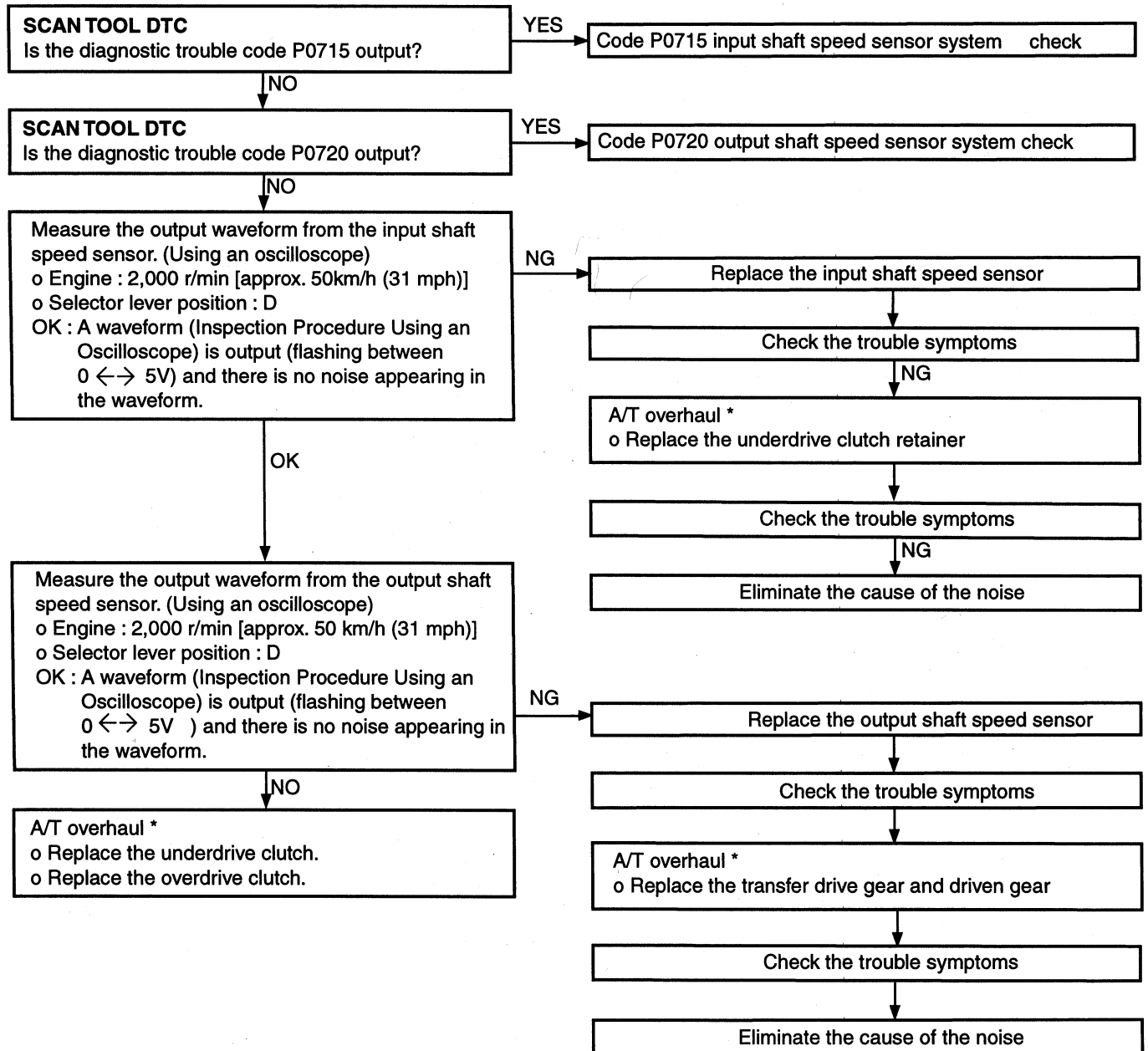
| Code P0731 1st gear incorrect ratio | Probable cause |
|--|--|
| If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, and diagnostic trouble code P0732 is output 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 |



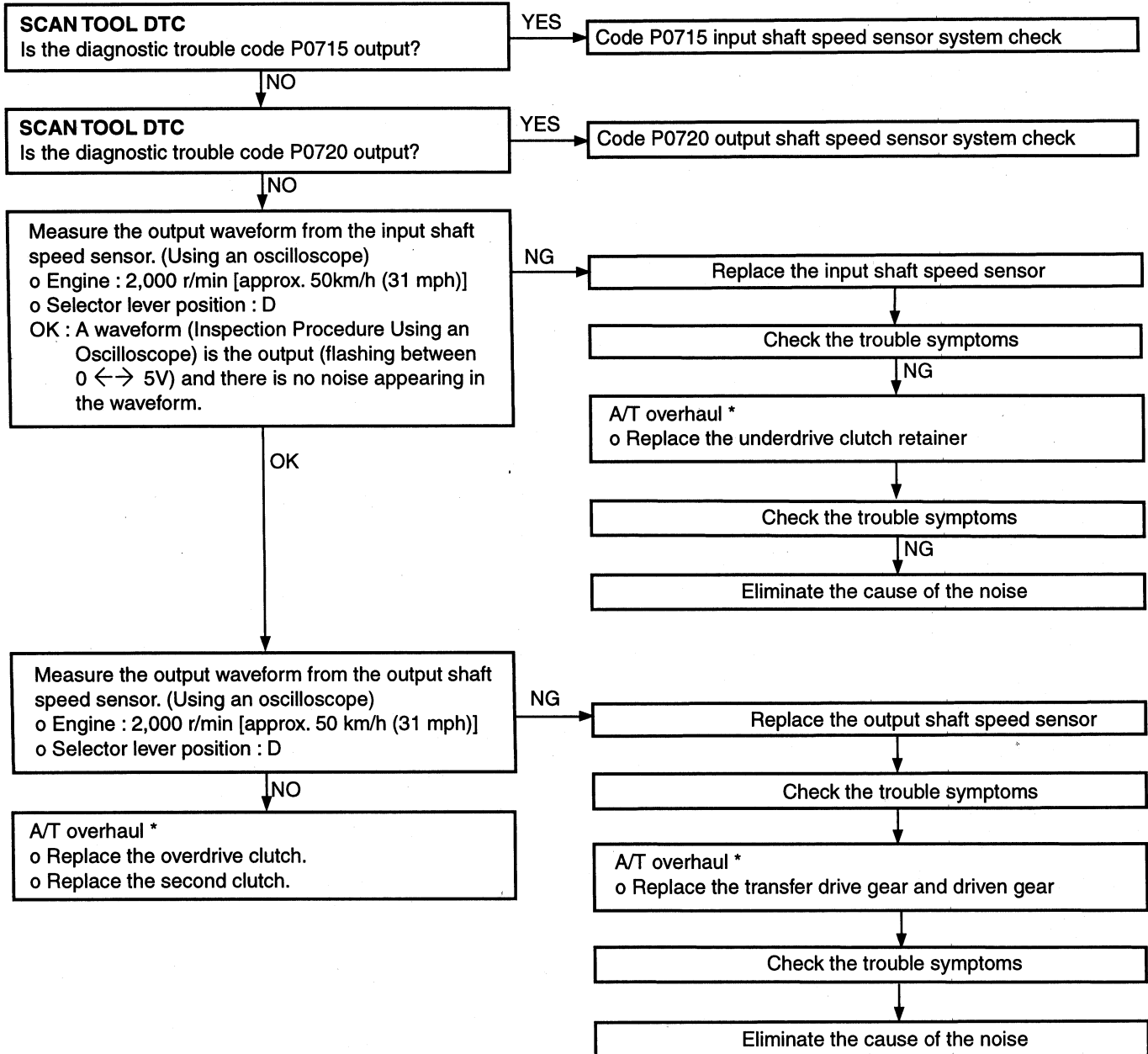
| Code P0732 2nd gear incorrect ratio | Probable cause |
|--|---|
| If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnostic trouble code P0732 is output. If diagnostic trouble code P0732 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure. | 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 |



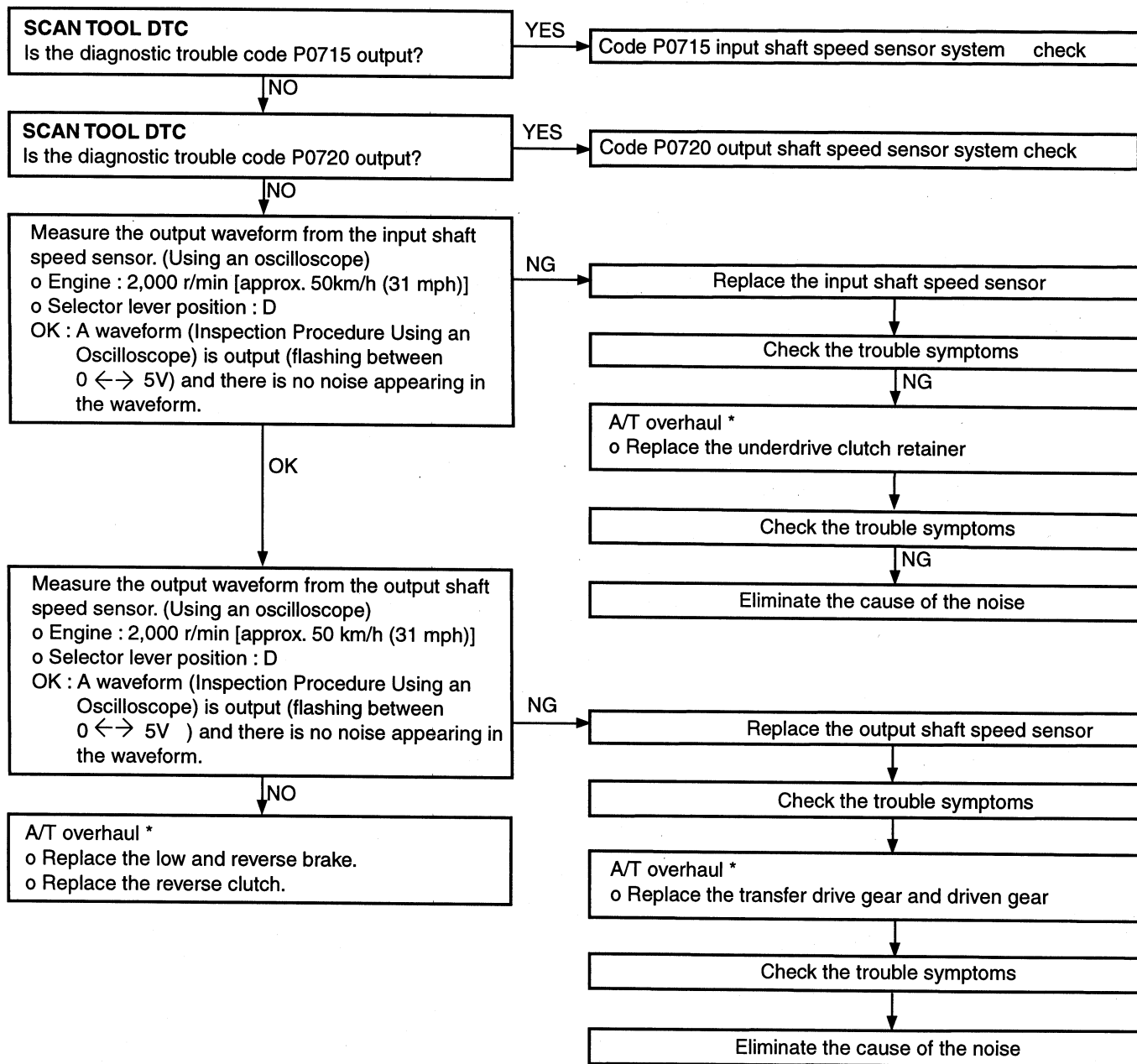
| Code P0733 3rd gear incorrect ratio | Probable cause |
|---|--|
| <p>If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnostic trouble code P0733 is output.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



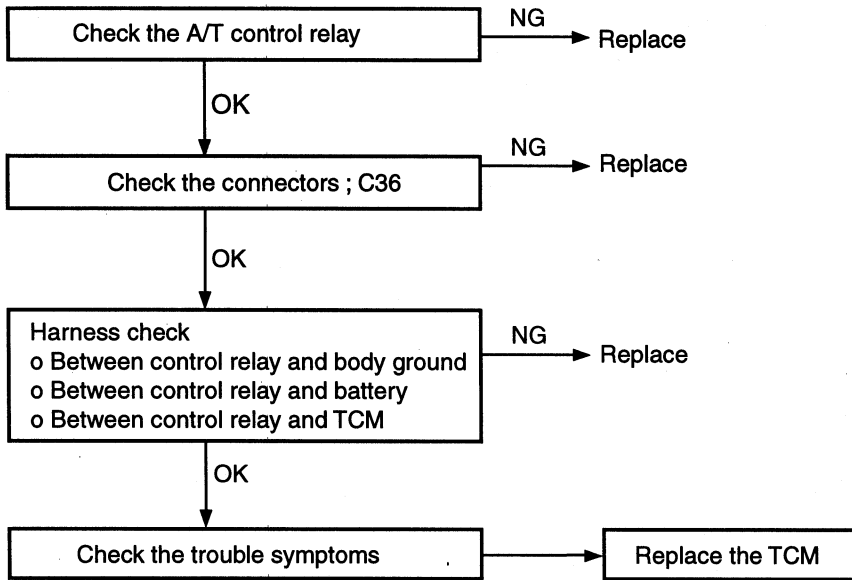
| Code P0734 4th gear incorrect ratio | Probable cause |
|--|--|
| If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnostic trouble code P0734 is output. 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 |
|--|--|
| <p>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</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 low and reverse brake system Malfunction of the reverse clutch system Noise generated</p> |



| Code P1723 A/T Control relay system | Probable cause |
|--|--|
| 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 oped 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. | Malfunction of the A/T control relay Malfunction of connector Malfunction of the TCM |

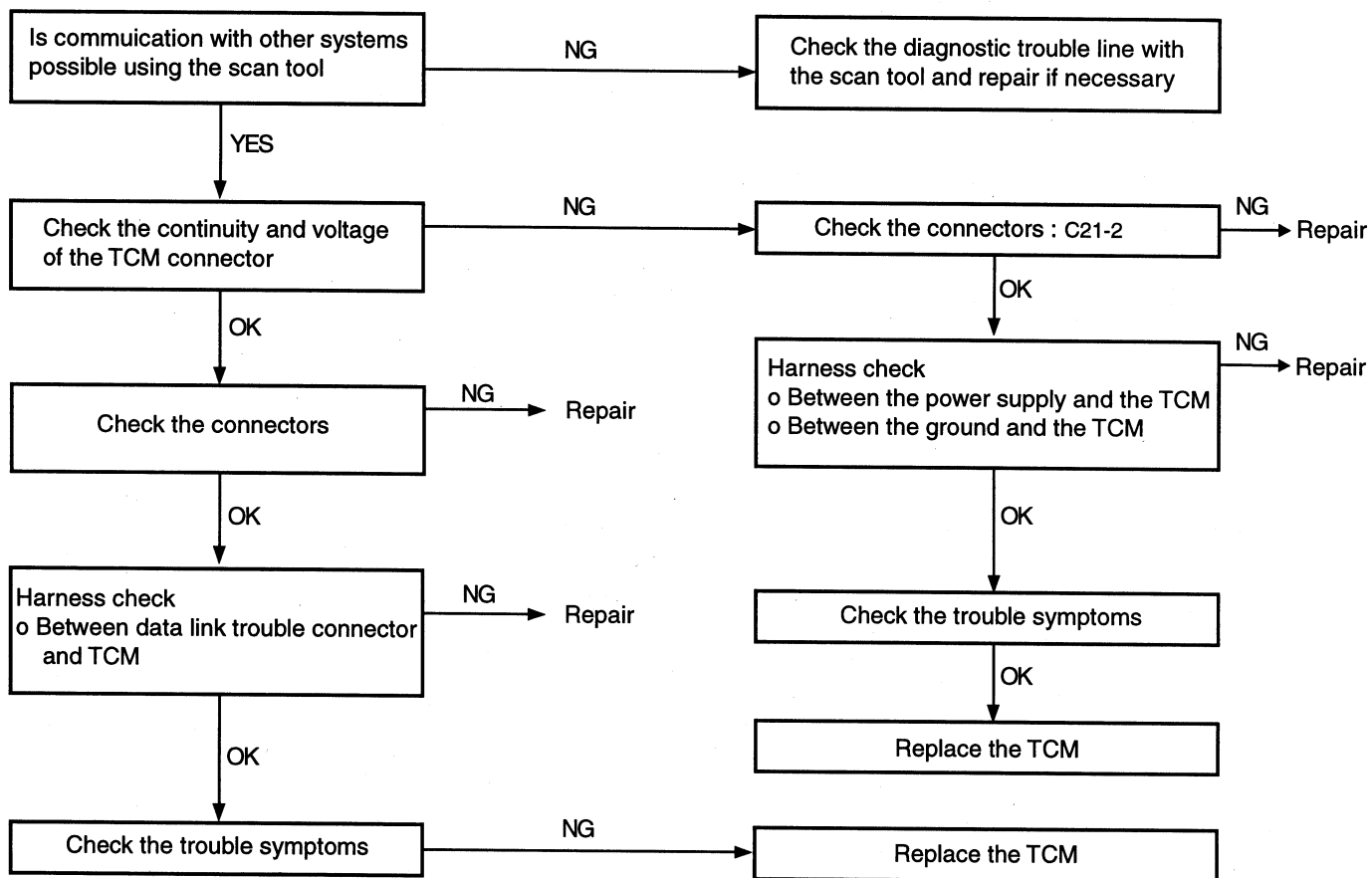


INSPECTION PROCESS FOR TROUBLE SYMPTOMS

EKJA0280

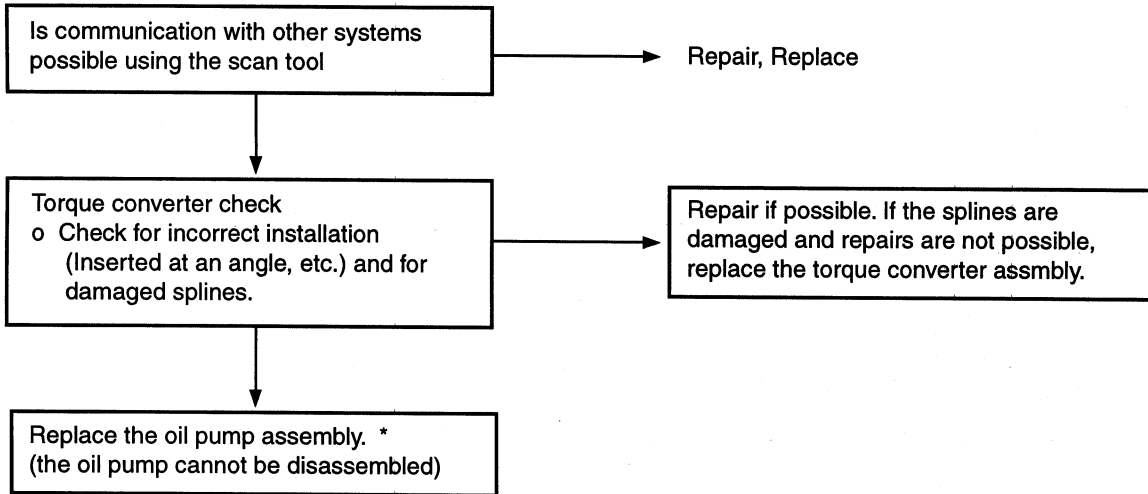
INSPECTION PROCEDURE 1

| 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

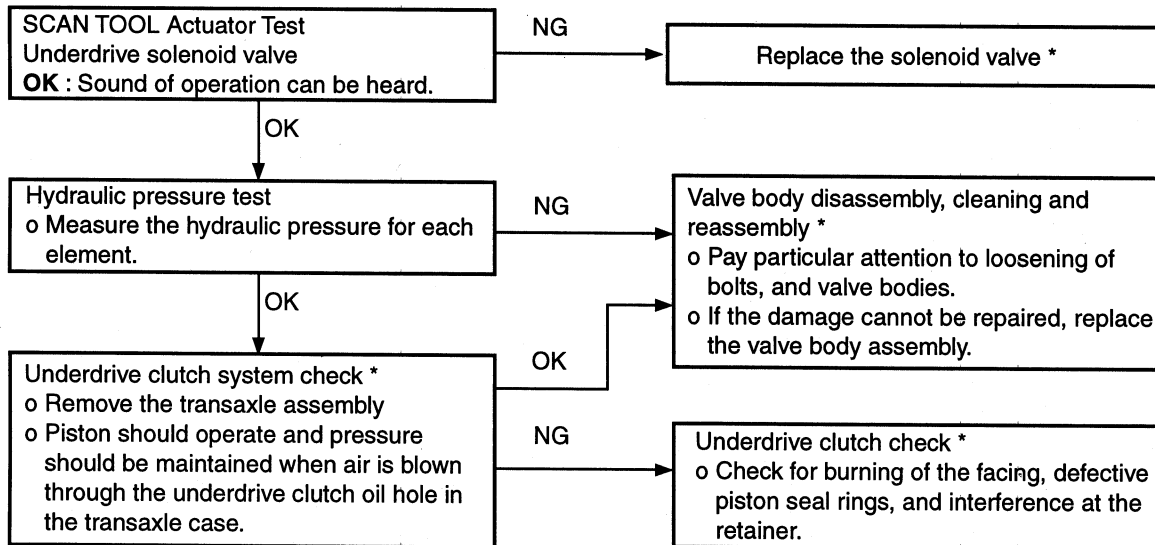
| Starting impossible | Probable cause |
|---|---|
| Starting is not possible when the selector lever is in P or N range. In such cases, the cause is probably a defective engine, torque converter or oil pump. | Malfunction of the engine Malfunction of the torque converter Malfunction of the oil pump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



EKAA011B

INSPECTION PROCEDURE 3

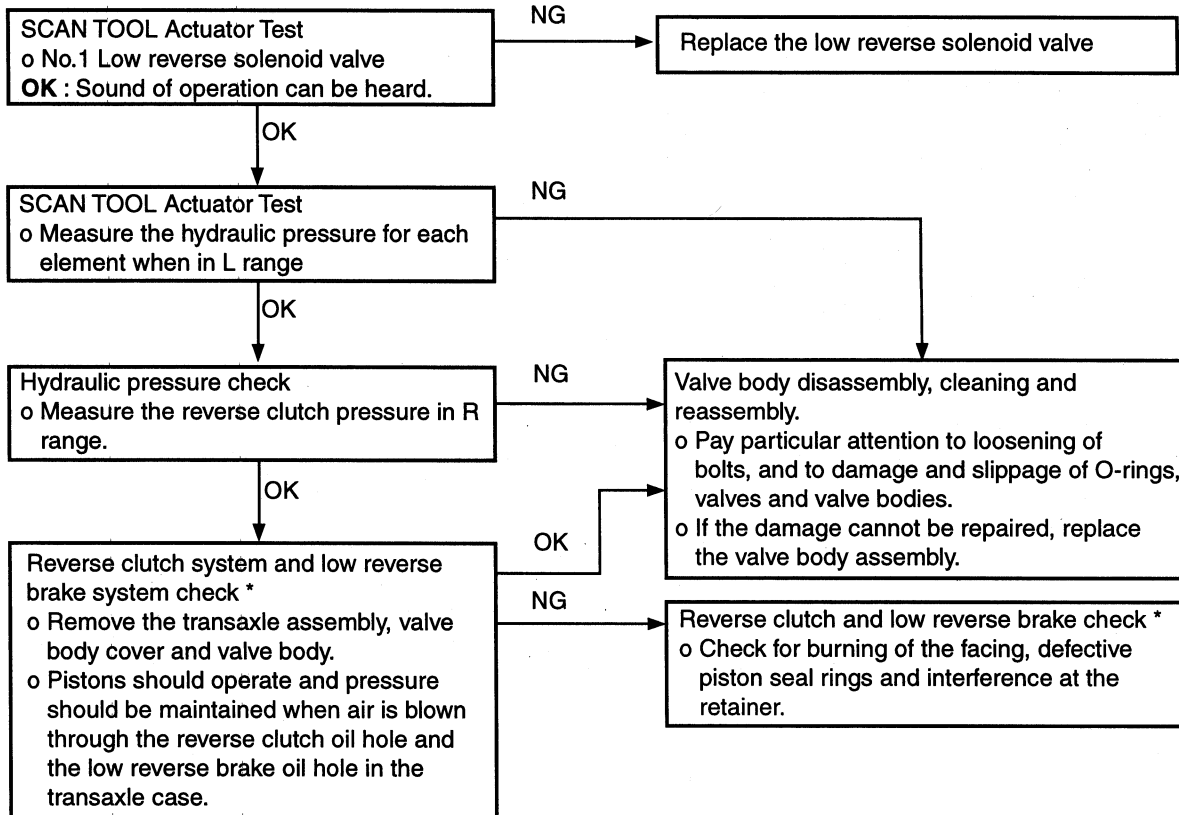
| Vehicle cannot move | Probable cause |
|--|---|
| If the vehicle does not move forward when the selector lever is shifted from N to D or L range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body. | Abnormal line pressure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



EKAA011C

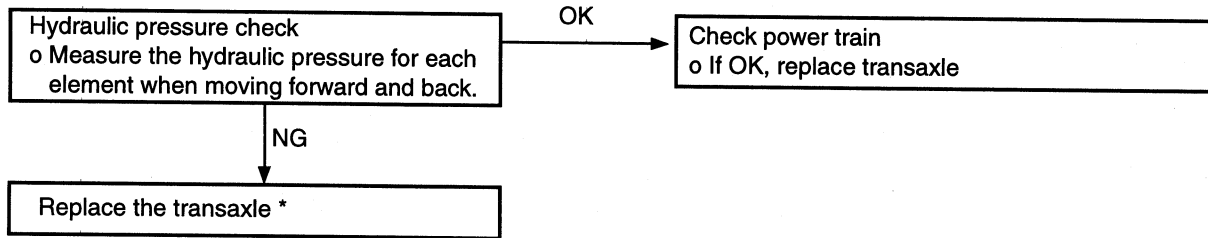
INSPECTION PROCEDURE 4

| 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

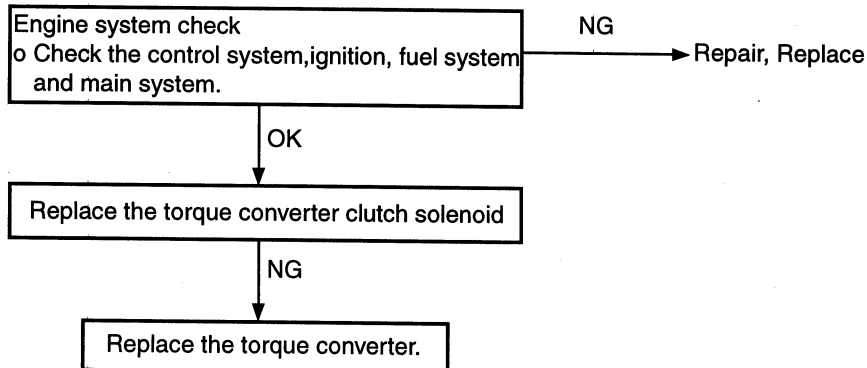
| Vehicle does not move (forward or reverse) | Probable cause |
|---|--|
| If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve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

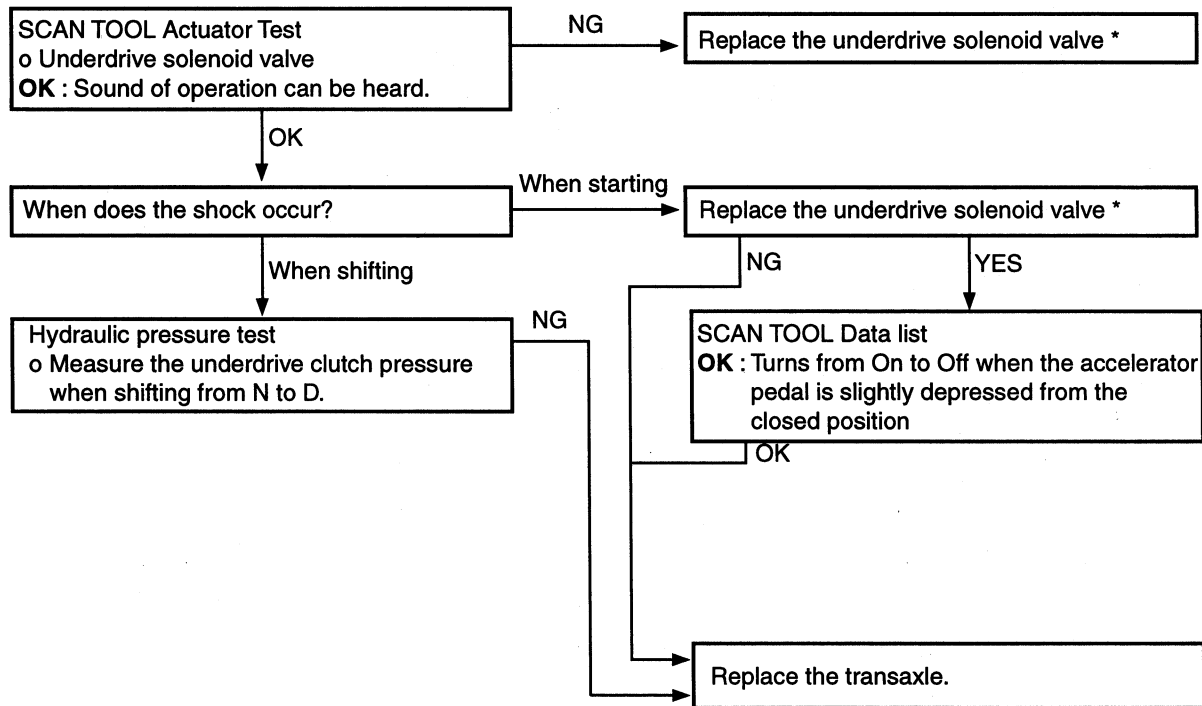
| Engine stalls when shifting | Probable cause |
|---|---|
| If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine, torque converter clutch soledoid, valve body or torque converter (torque converter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

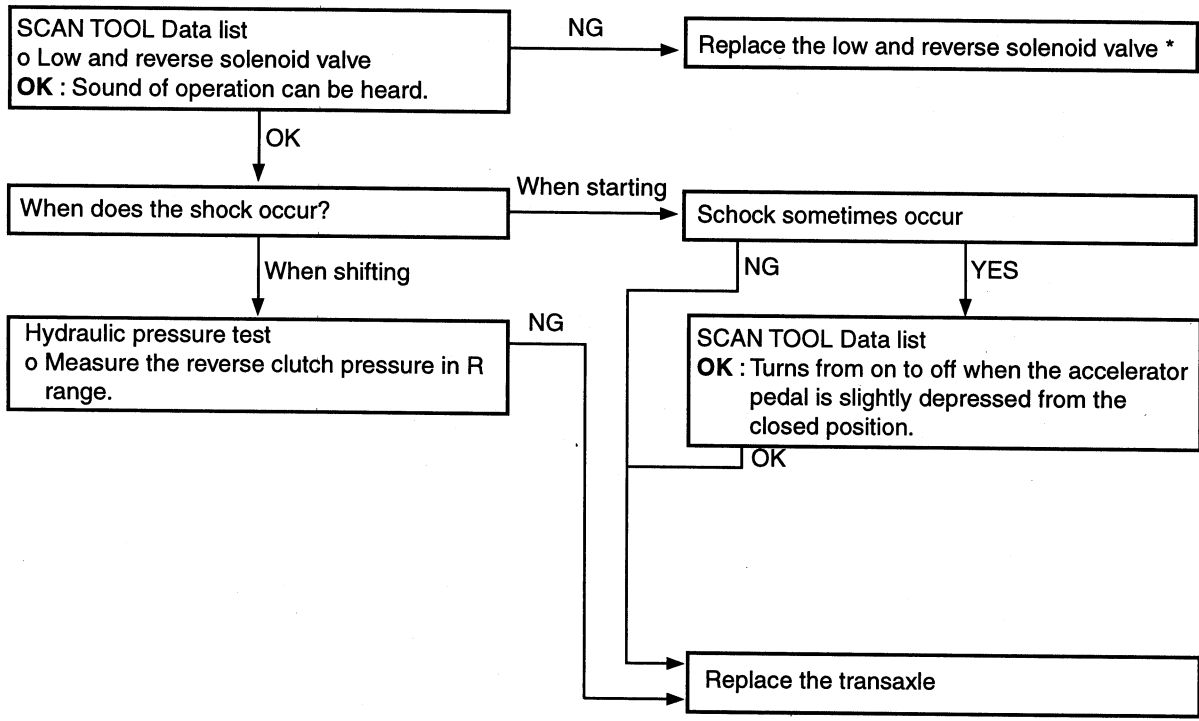
INSPECTION PROCEDURE 7

| 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 |



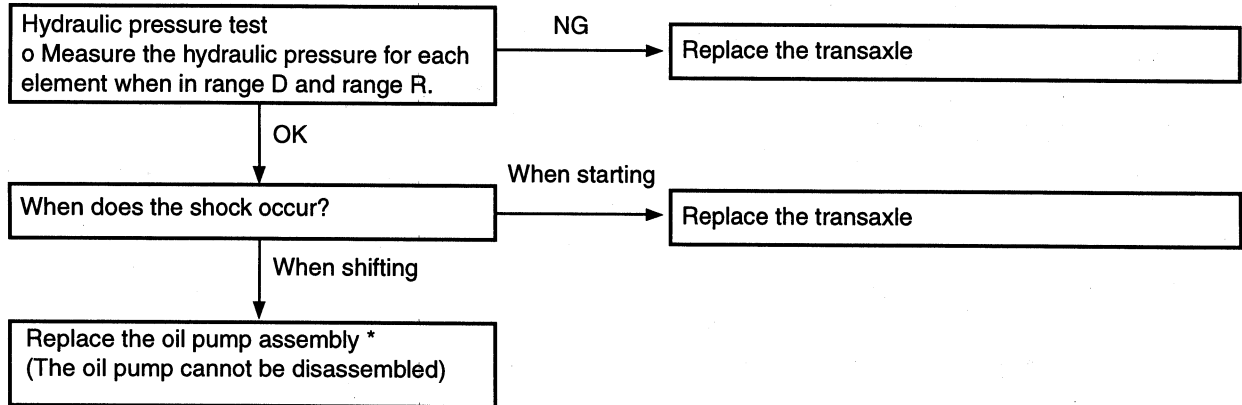
INSPECTION PROCEDURE 8

| 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 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

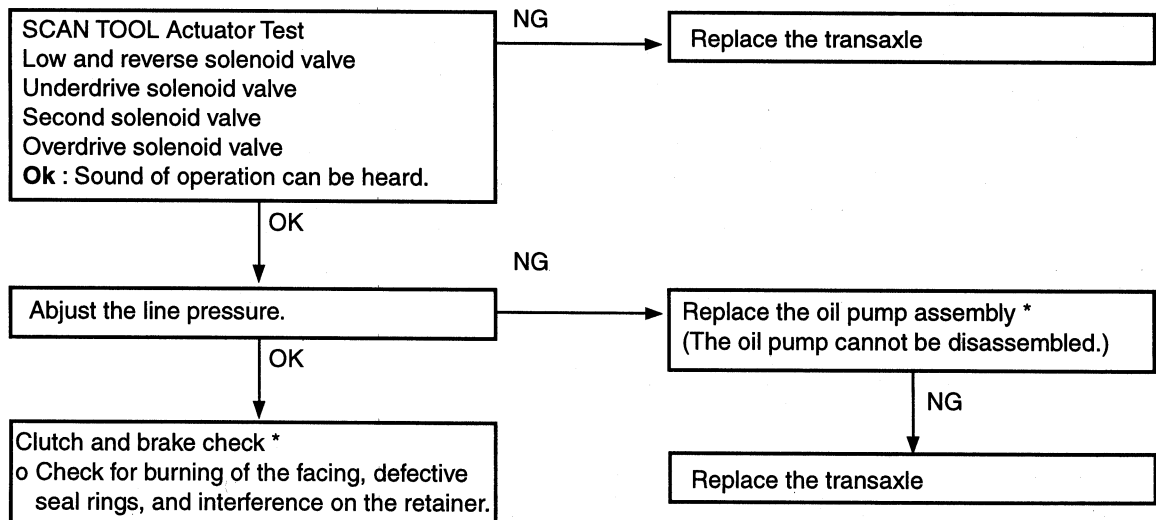
| Shock or delay when changing from N to D, N to R | Probable cause |
|---|--|
| If abnormal shock or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to D, N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil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



EKAA0111

INSPECTION PROCEDURE 10

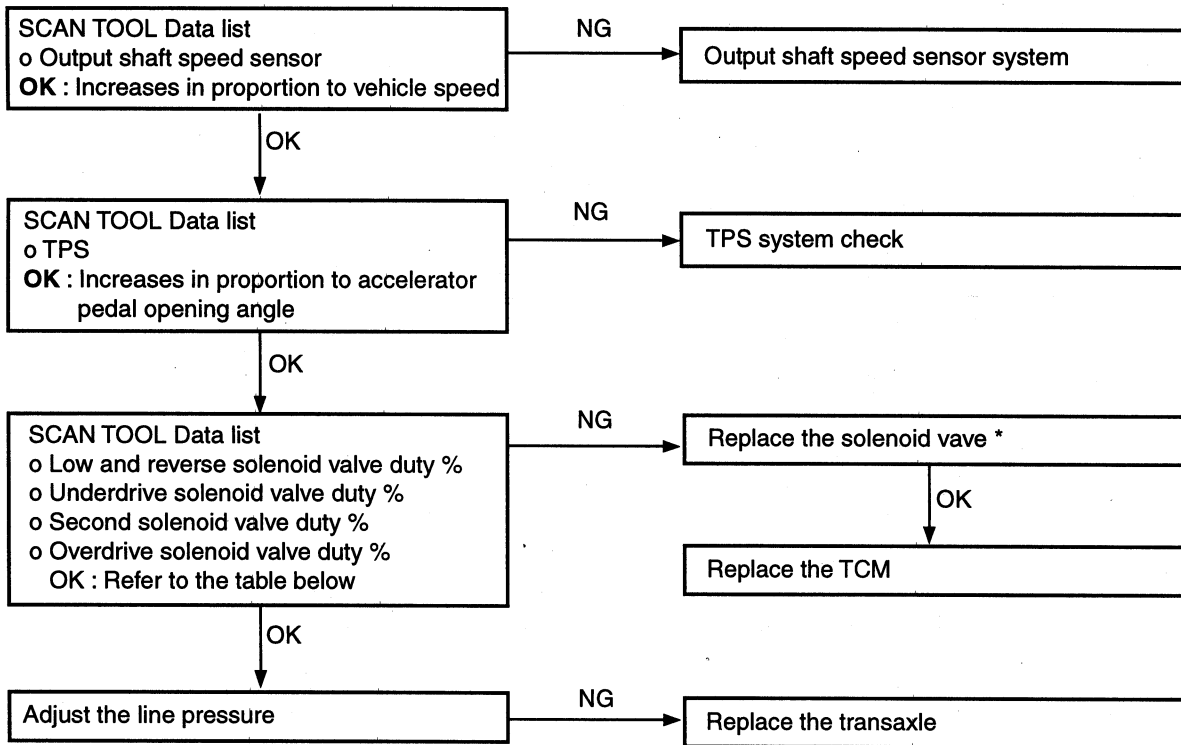
| Shocks and transaxle flare | Probable cause |
|---|--|
| If shocks occur when driving due to upshifting or downshifting and the transaxle speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake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

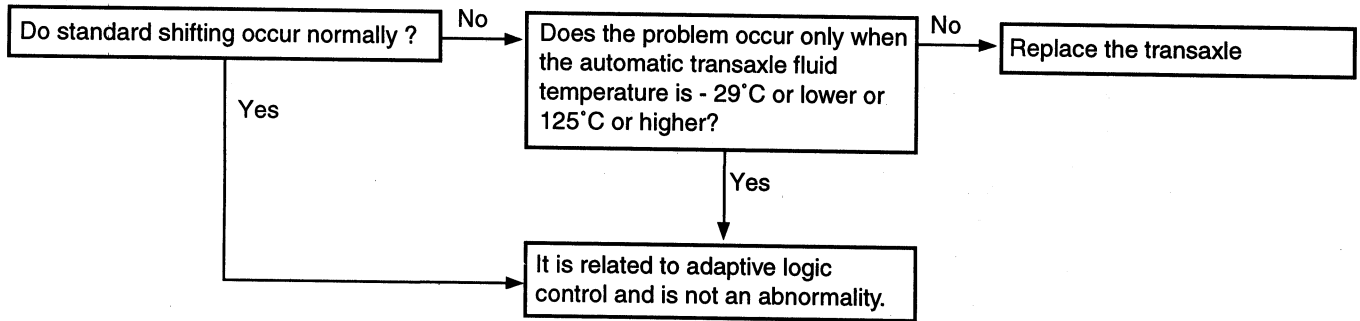
INSPECTION PROCEDURE 11

| 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 |



INSPECTION PROCEDURE 12

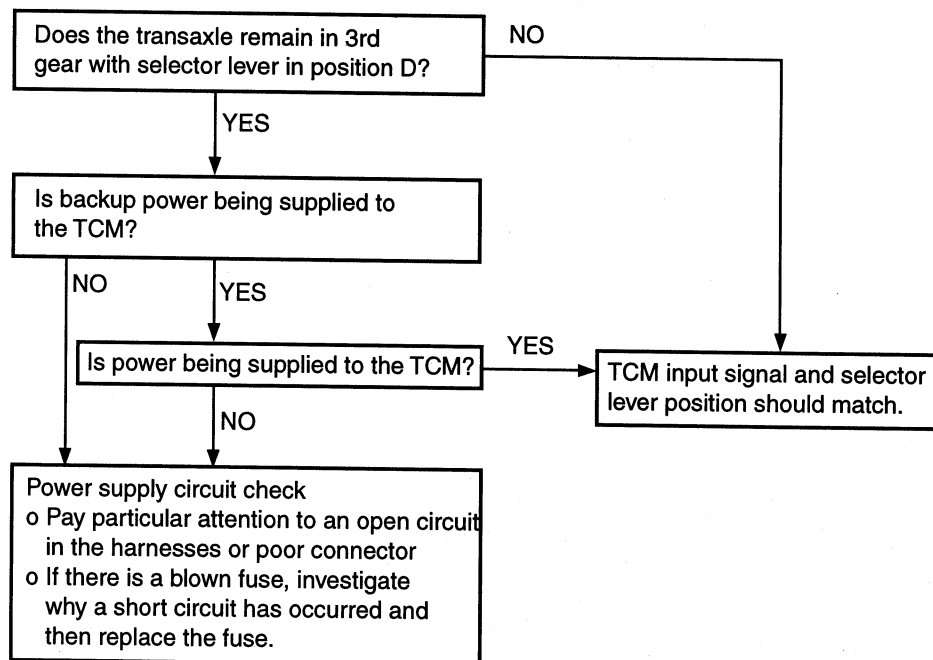
| Displaced shift points | Probable cause |
|---|-------------------------------|
| If some of the shift points are changed while driving, the cause is probably a malfunction of the valve body, or it is related to adaptive logic control and is not an abnormality. | Malfunction of the valve body |



EKAA011L

INSPECTION PROCEDURE 13

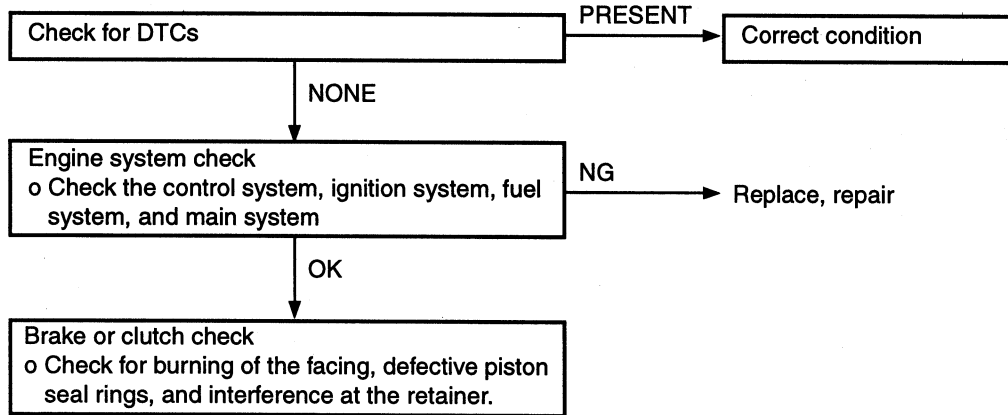
| No diagnostic trouble codes (Does not shift) | Probable cause |
|---|--|
| If shifting does not occur while driving and no diagnostic trouble codes are given, the cause is probably a malfunction of the Park/Neutral switch, or the TCM. | Malfunction of the Park/Neutral switch Malfunction of the TCM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



EKAA011M

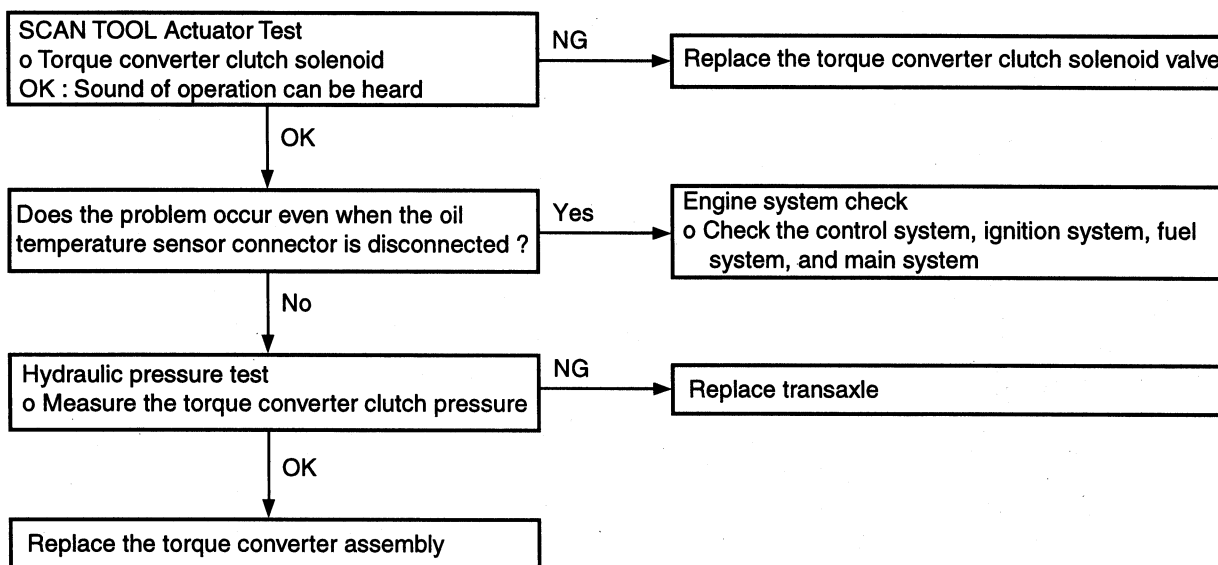
INSPECTION PROCEDURE 14

| 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 |



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 |



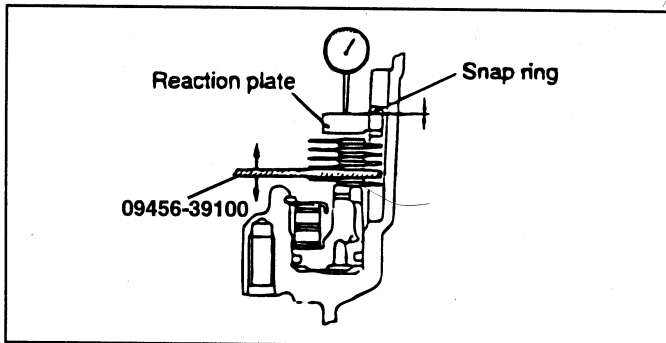
SERVICE ADJUSTMENT PROCEDURES EKHA0150

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

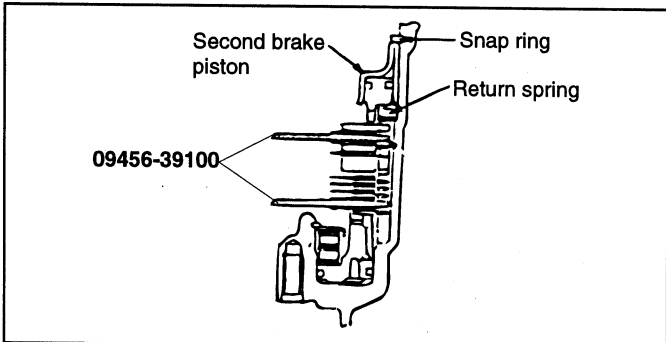
(Refer to the "Snap ring and spacer for adjustment")



EKA9011A

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.

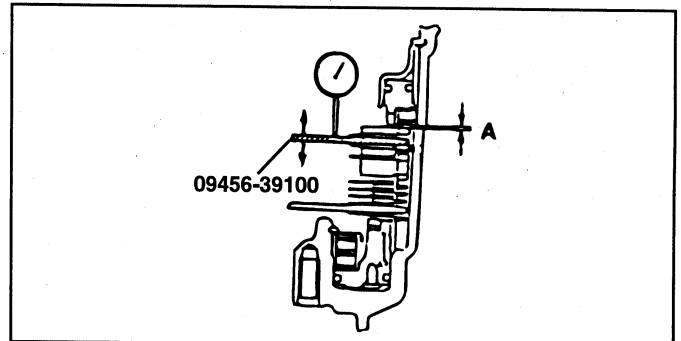


EKA9011B

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

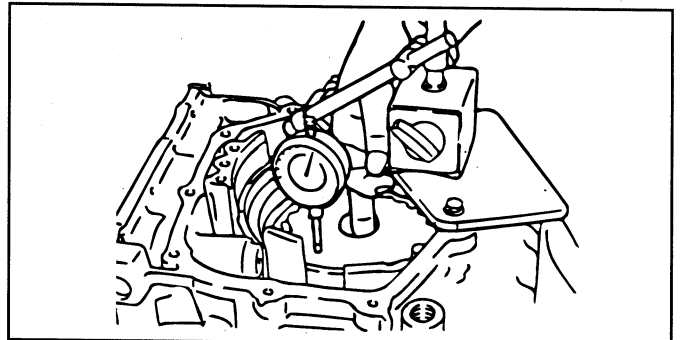
amount) + thickness of the special tool — 0.79]. (Refer to the "Snap ring and spacer for adjustment")



EKA9011E

LOW-REVERSE BRAKE END PLAY ADJUSTMENT

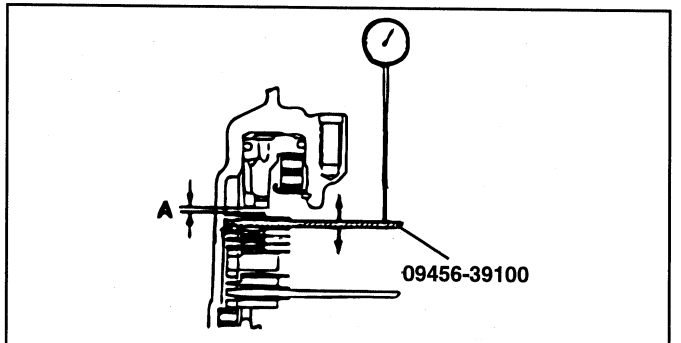
Reverse the transmission and install the dial gauge. Move the special tool up and down to measure the end play.



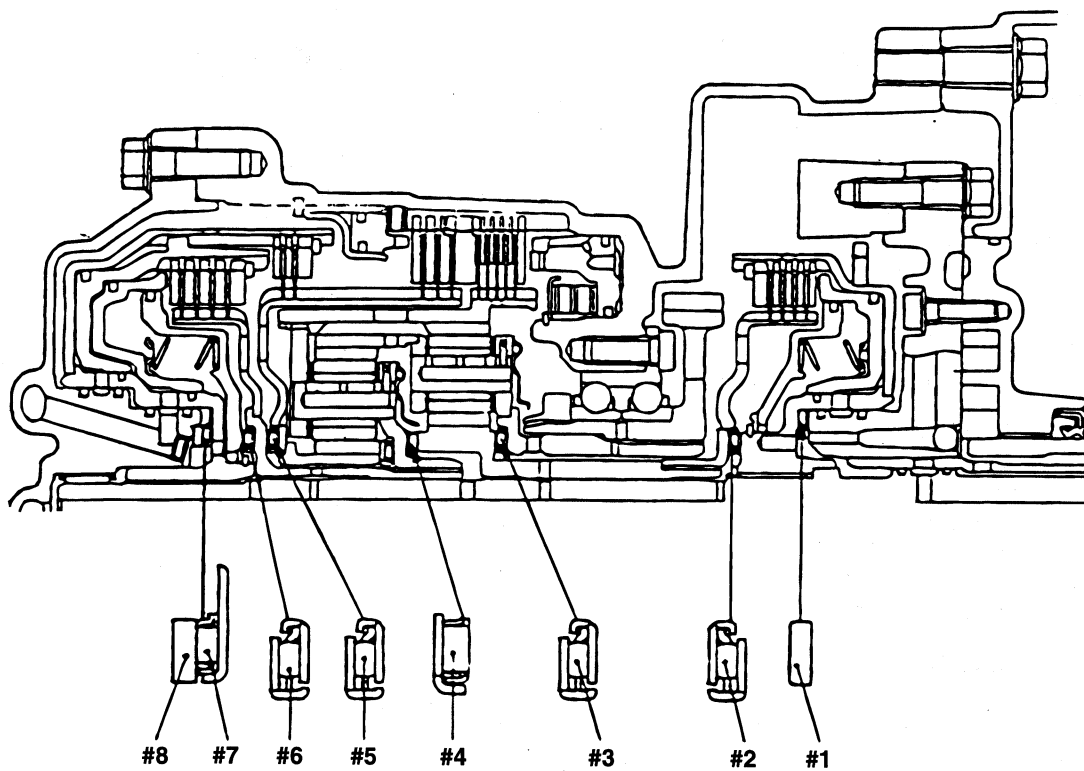
EKA9011D

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 | - | - | - | - |

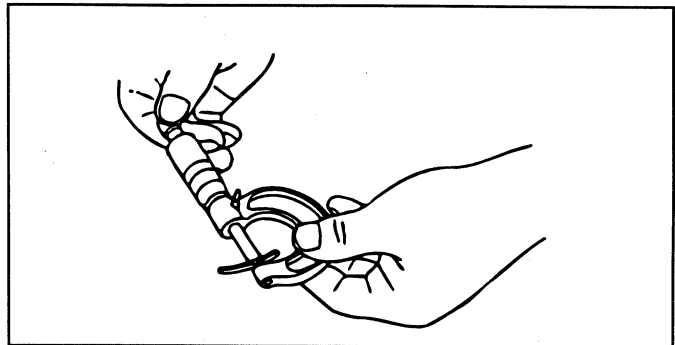
UNDERDRIVE SUN GEAR END PLAY ADJUSTMENT

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.

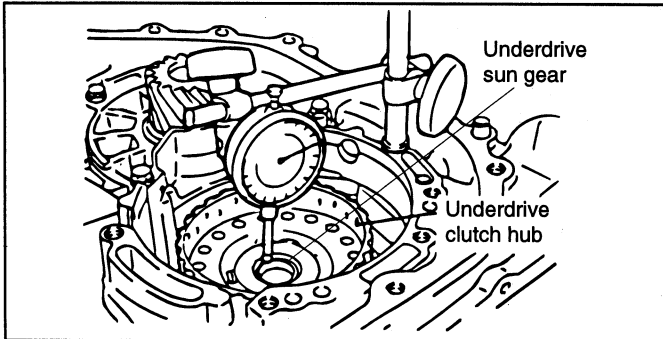
Standard value : 0.25-0.45 mm

NOTE

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



EKA9013C



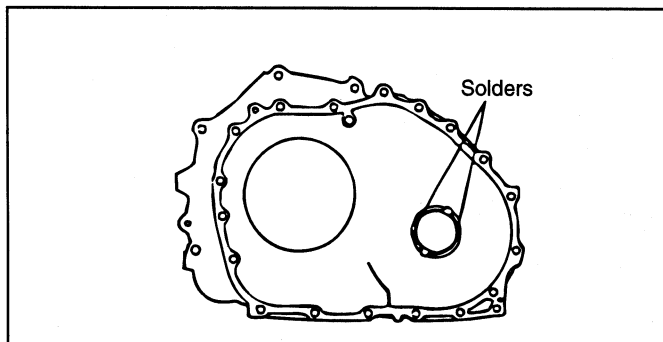
EKA9013A

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.

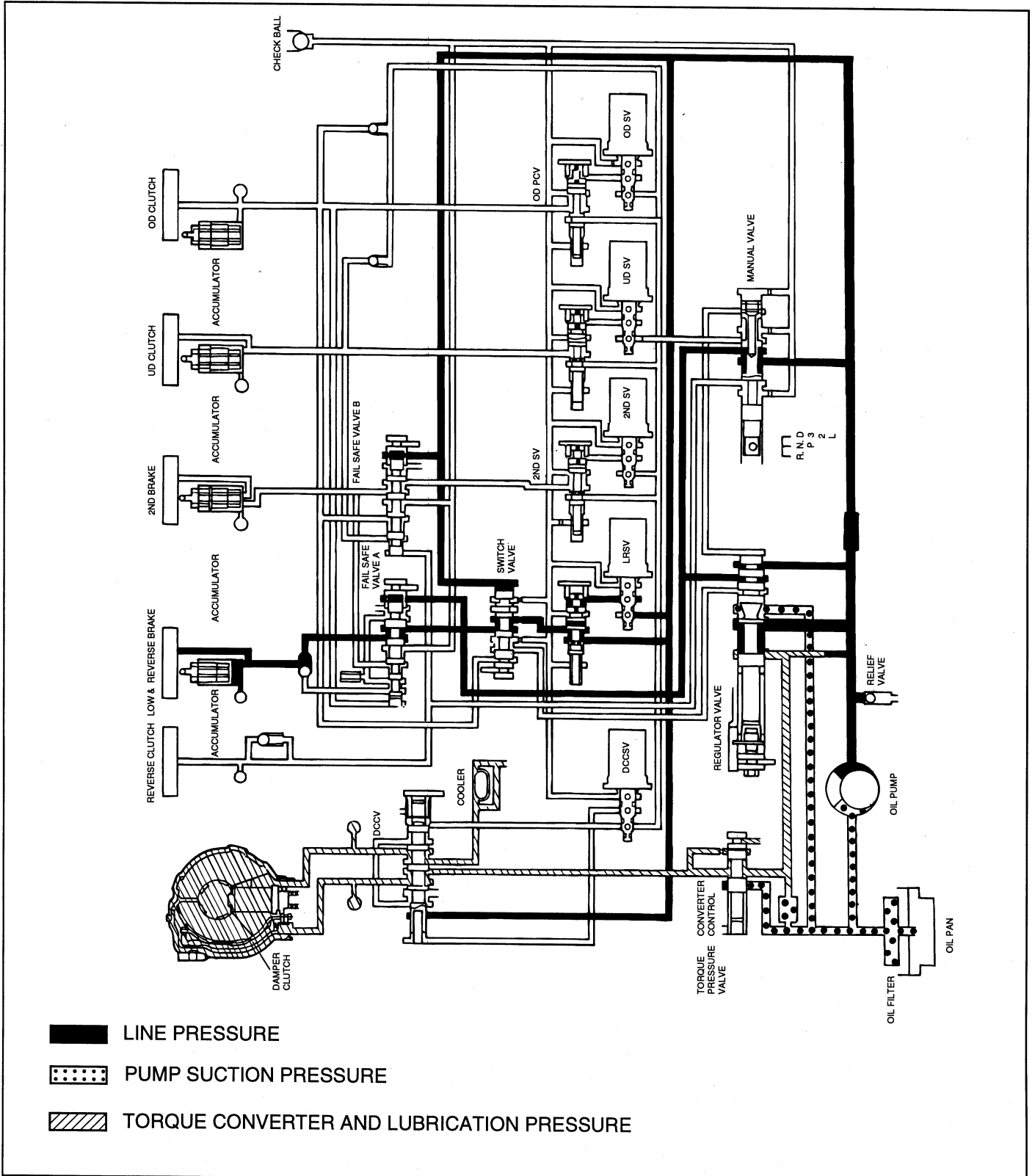
Standard value : (T+0.045 mm) to (T+0.105 mm)



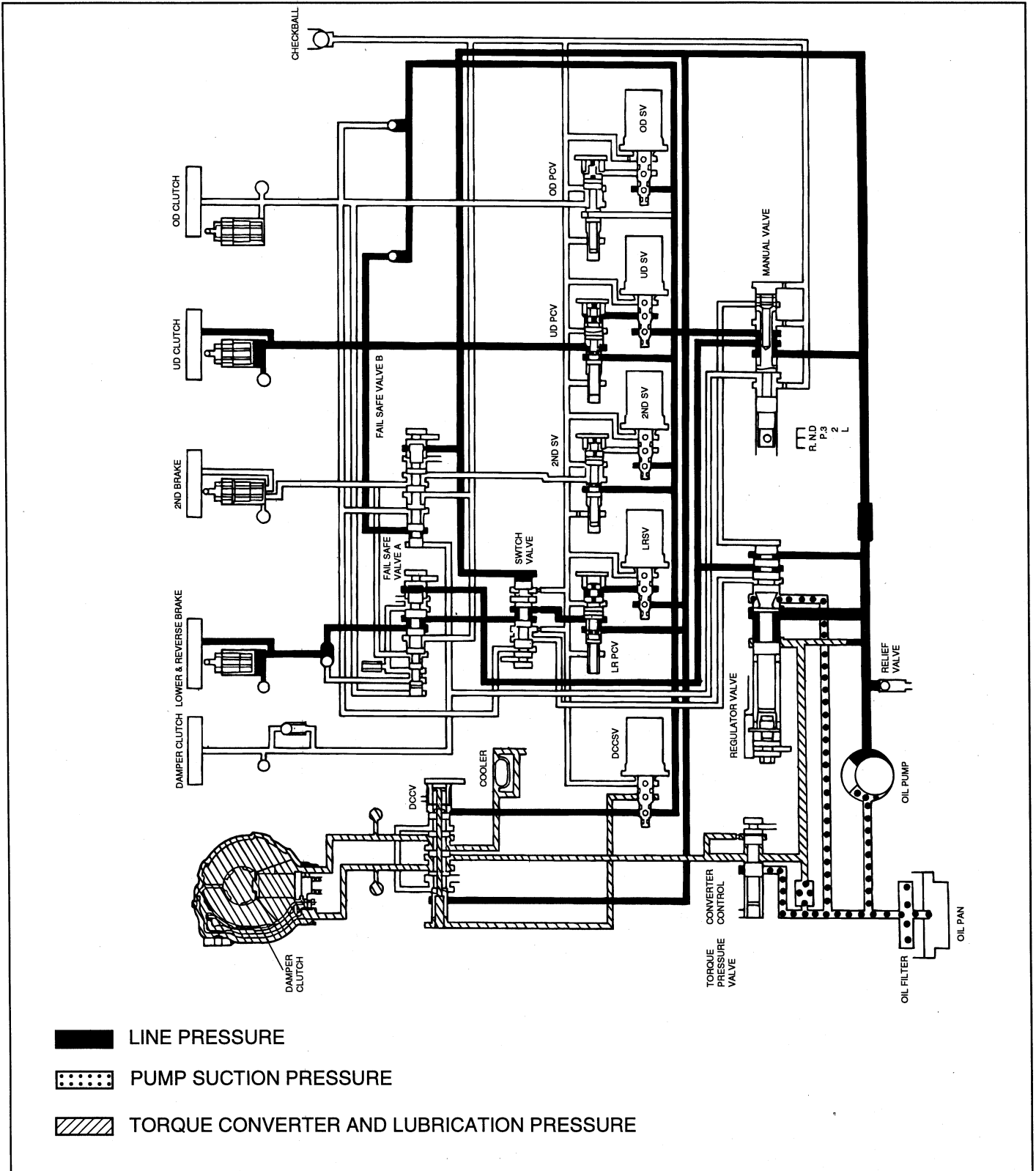
EKA9013B

**AUTOMATIC TRANSAXLE HYDRAULIC
CIRCUIT** EKA90170

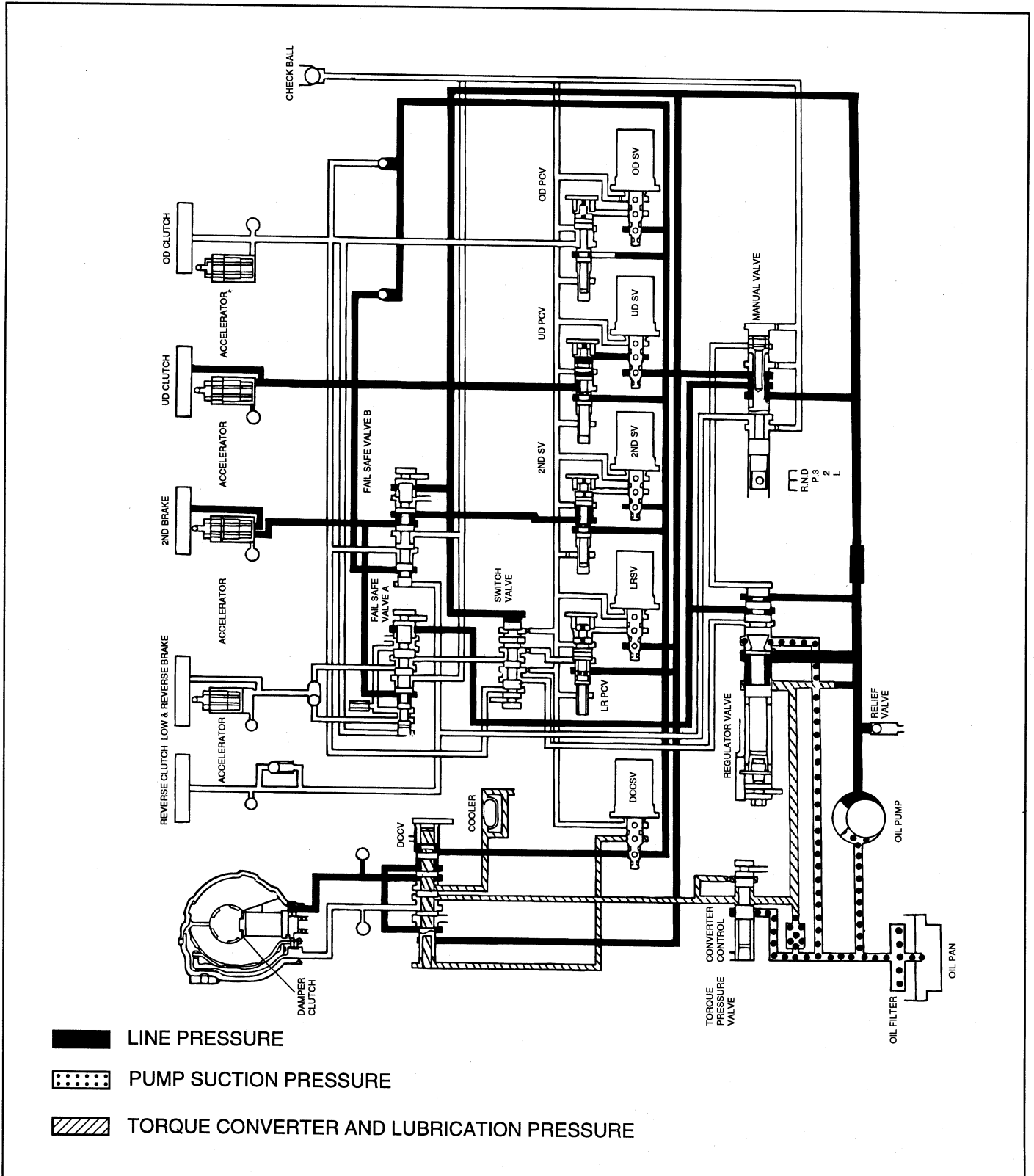
PARKING & NEUTRAL



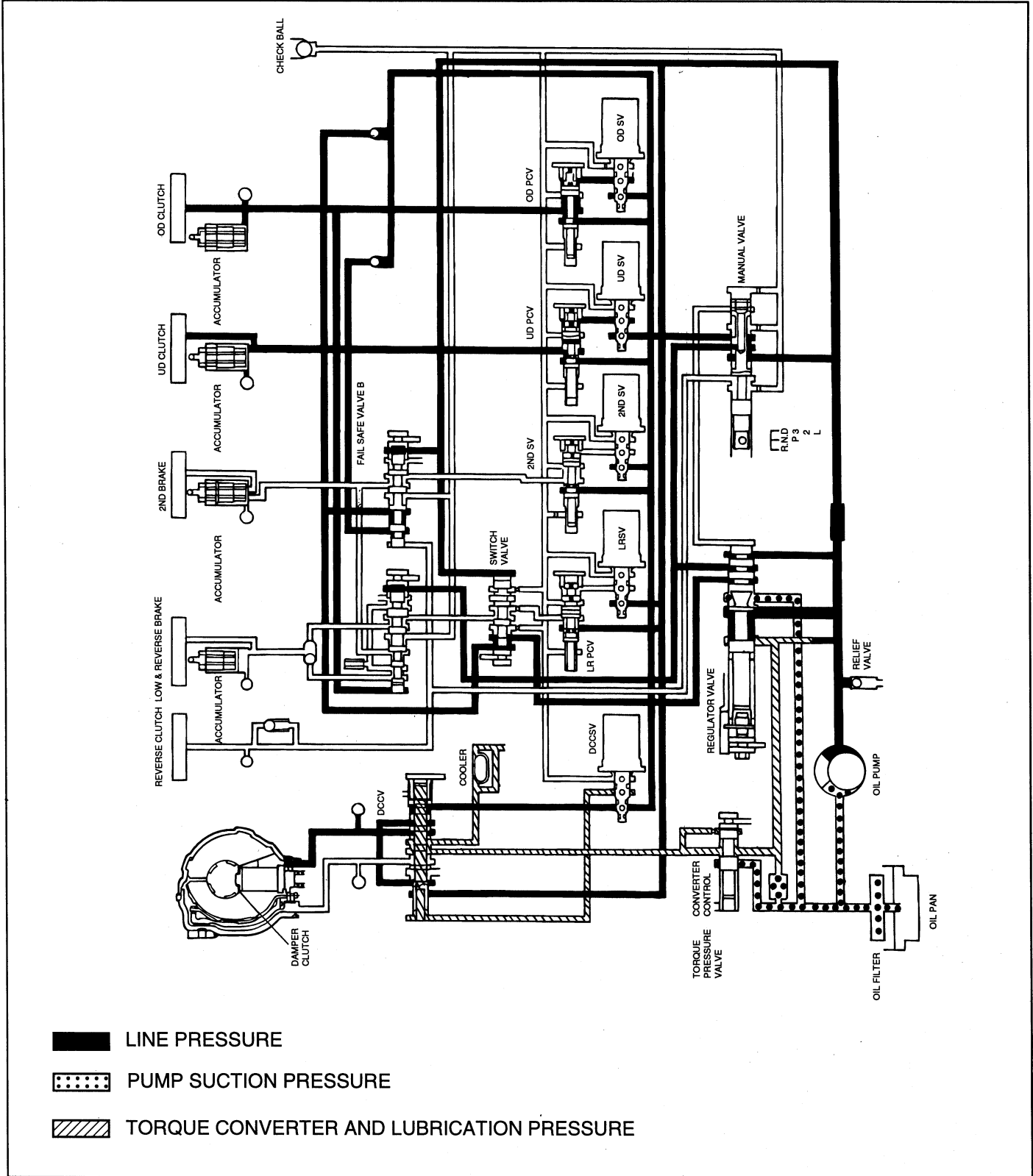
FIRST



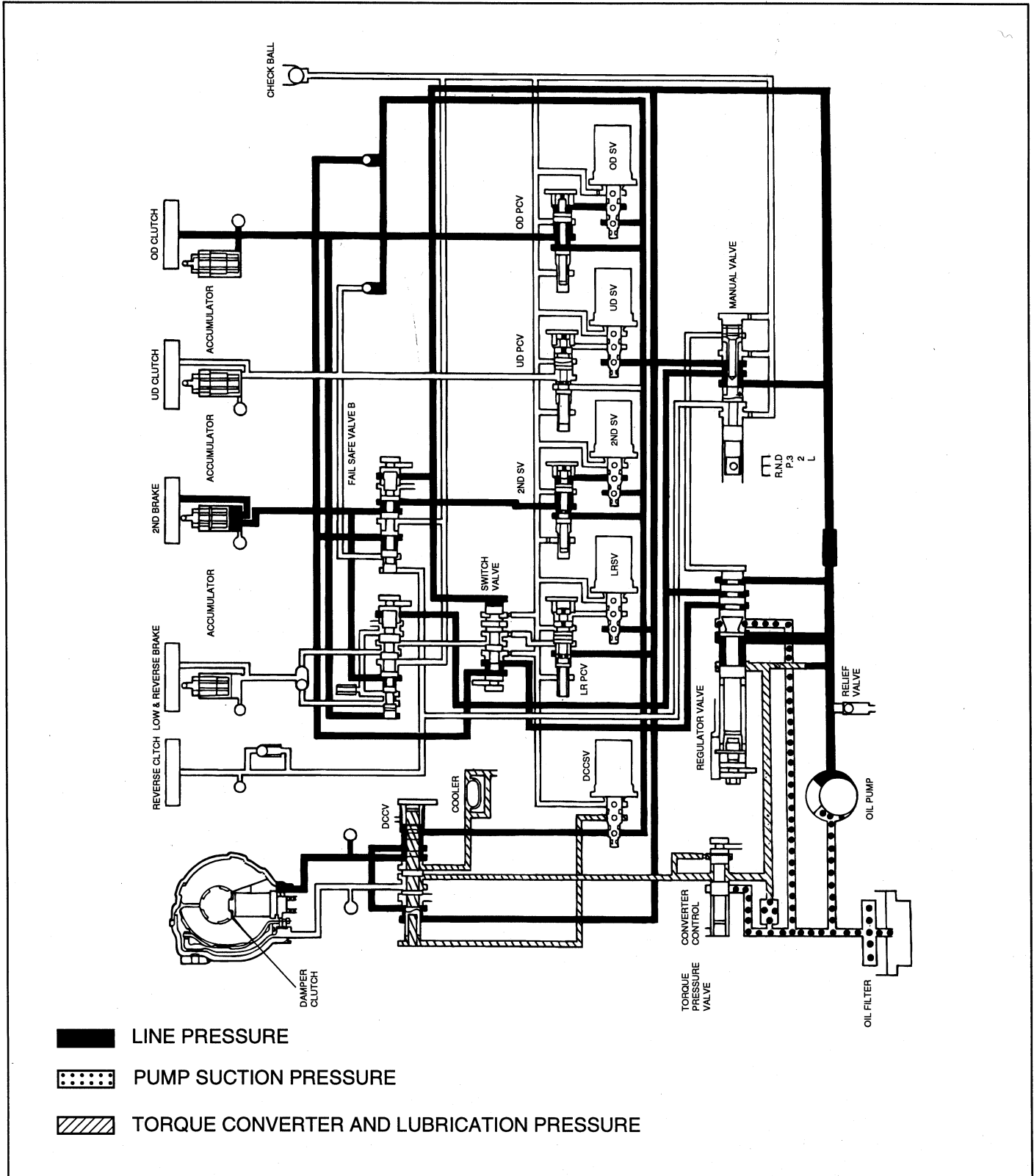
SECOND



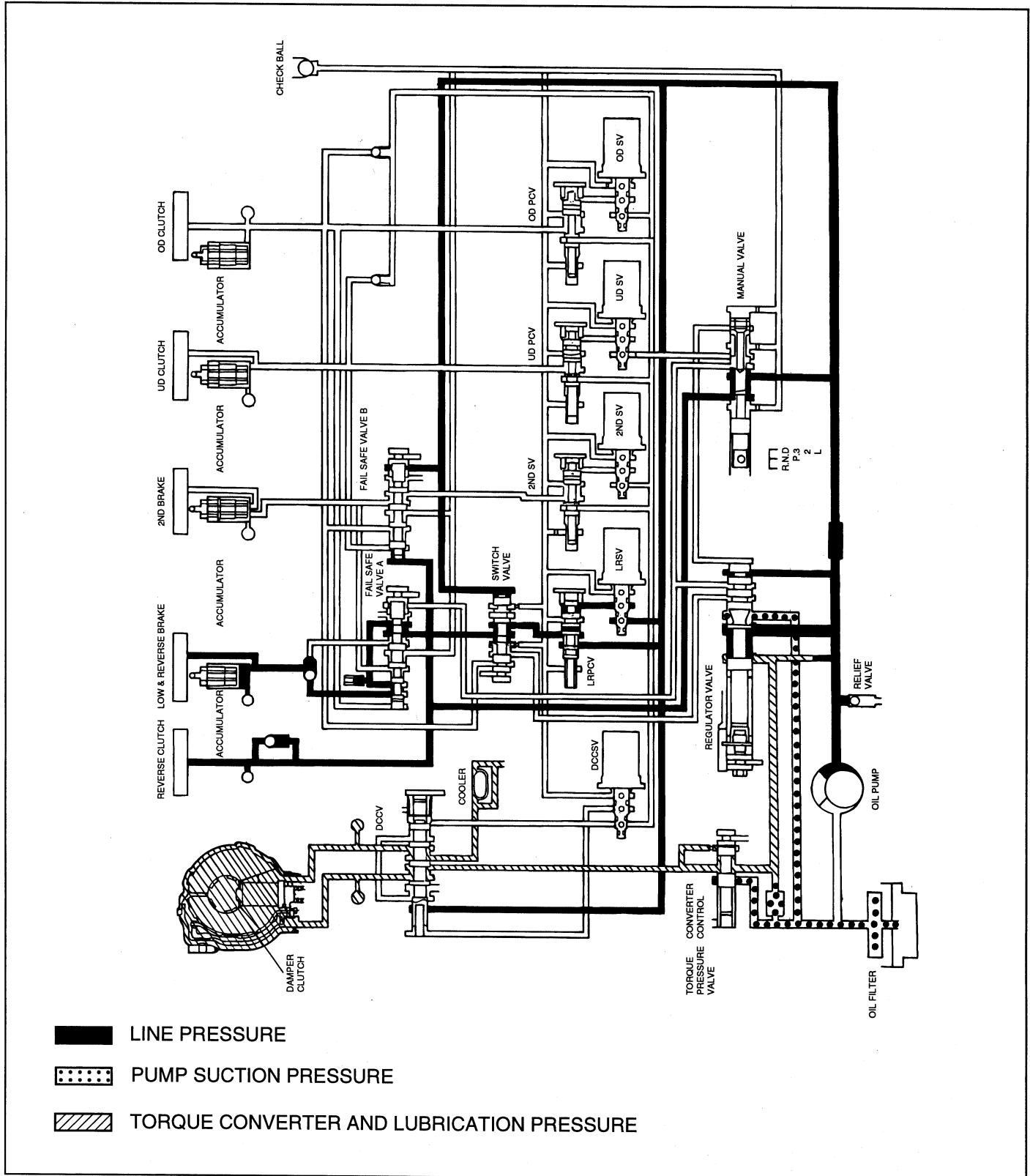
THIRD



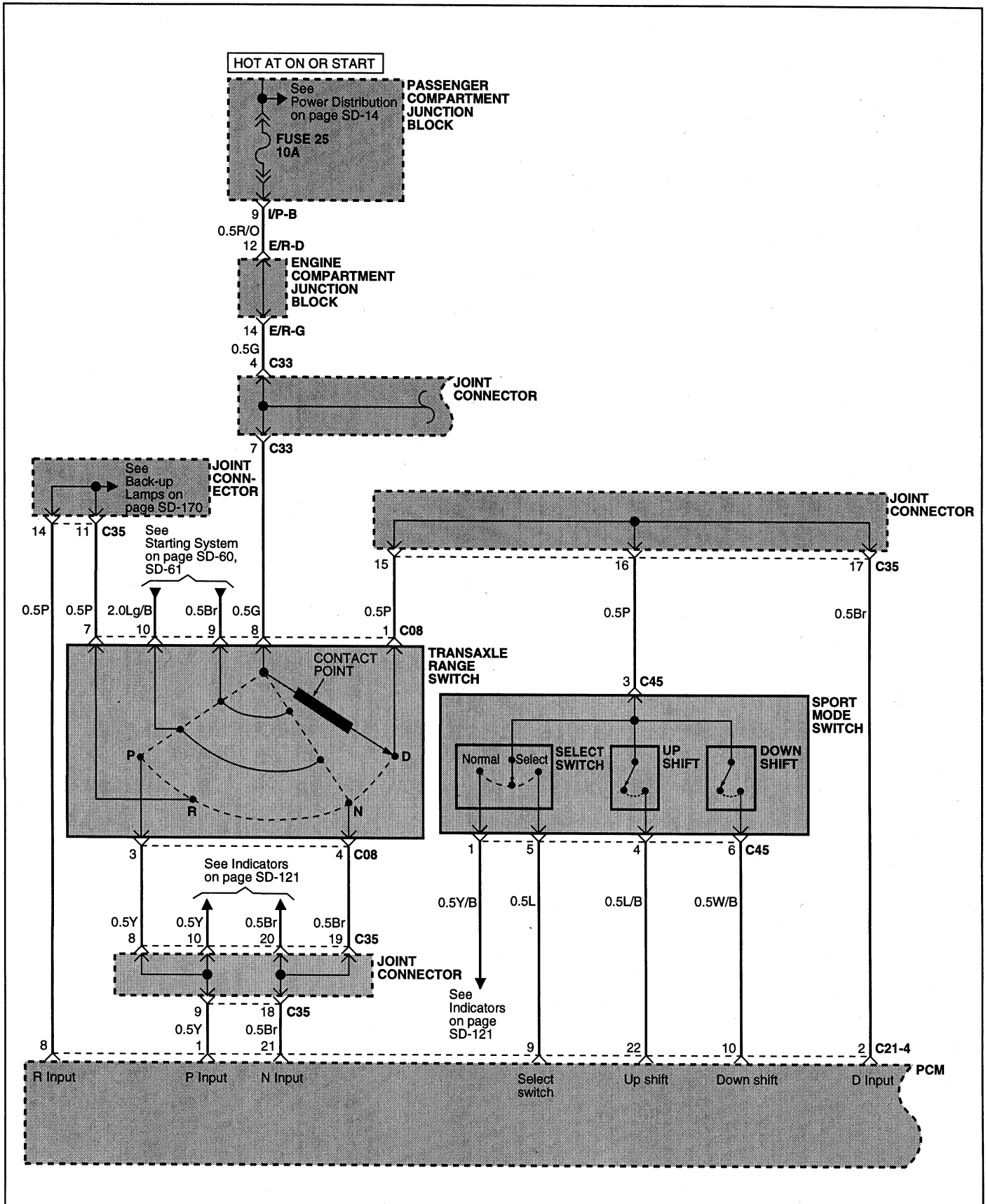
FOURTH

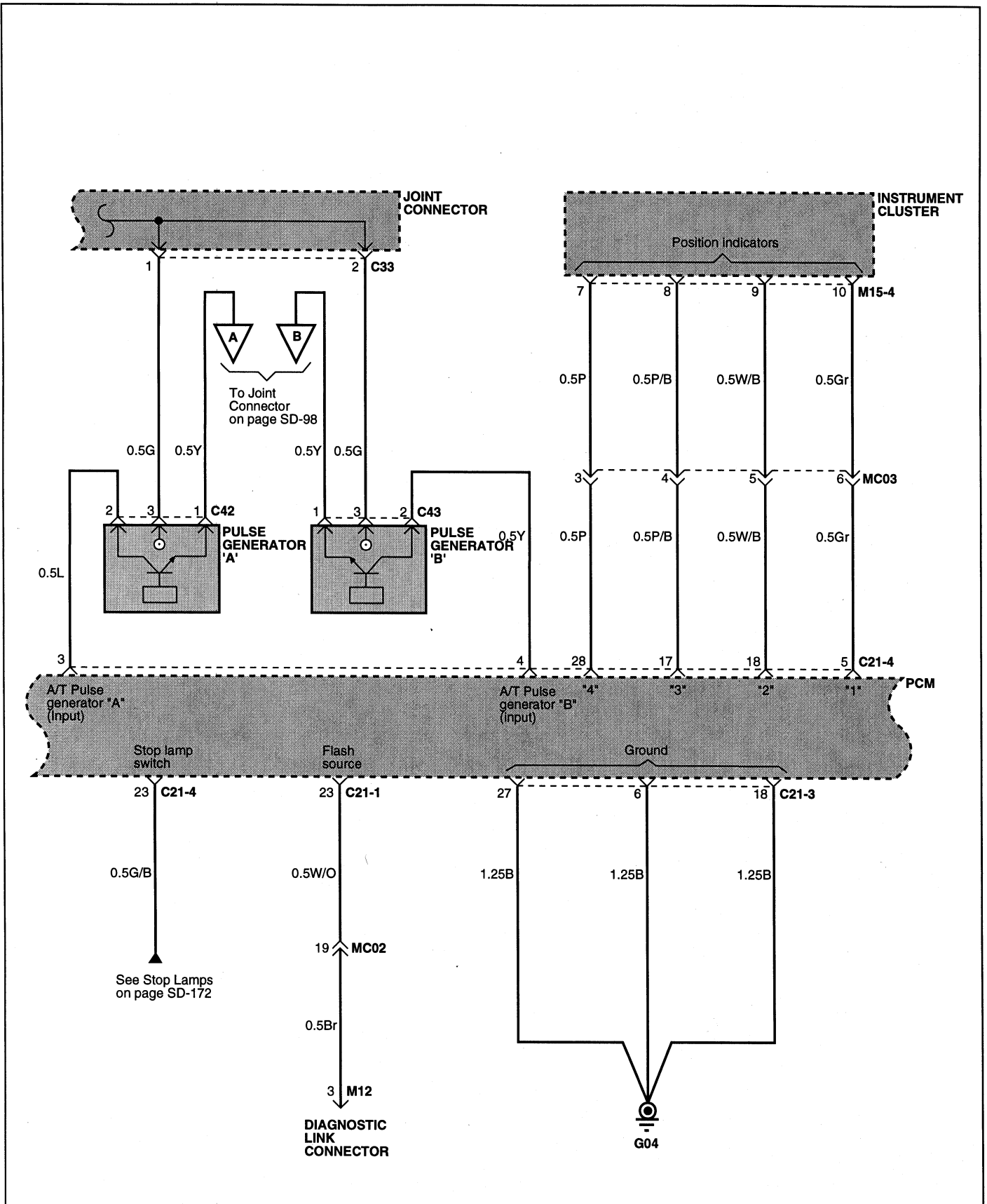


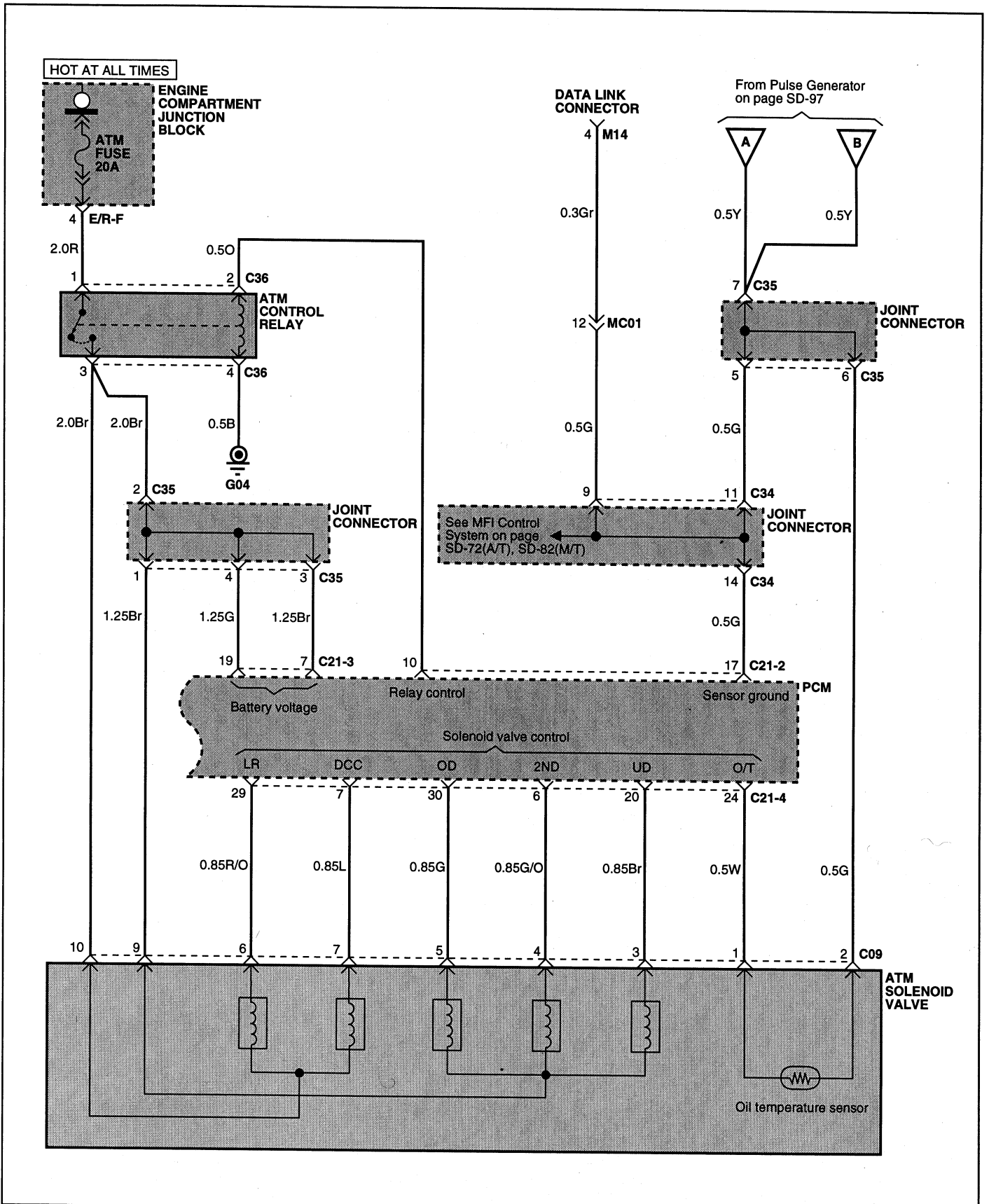
REVERSE



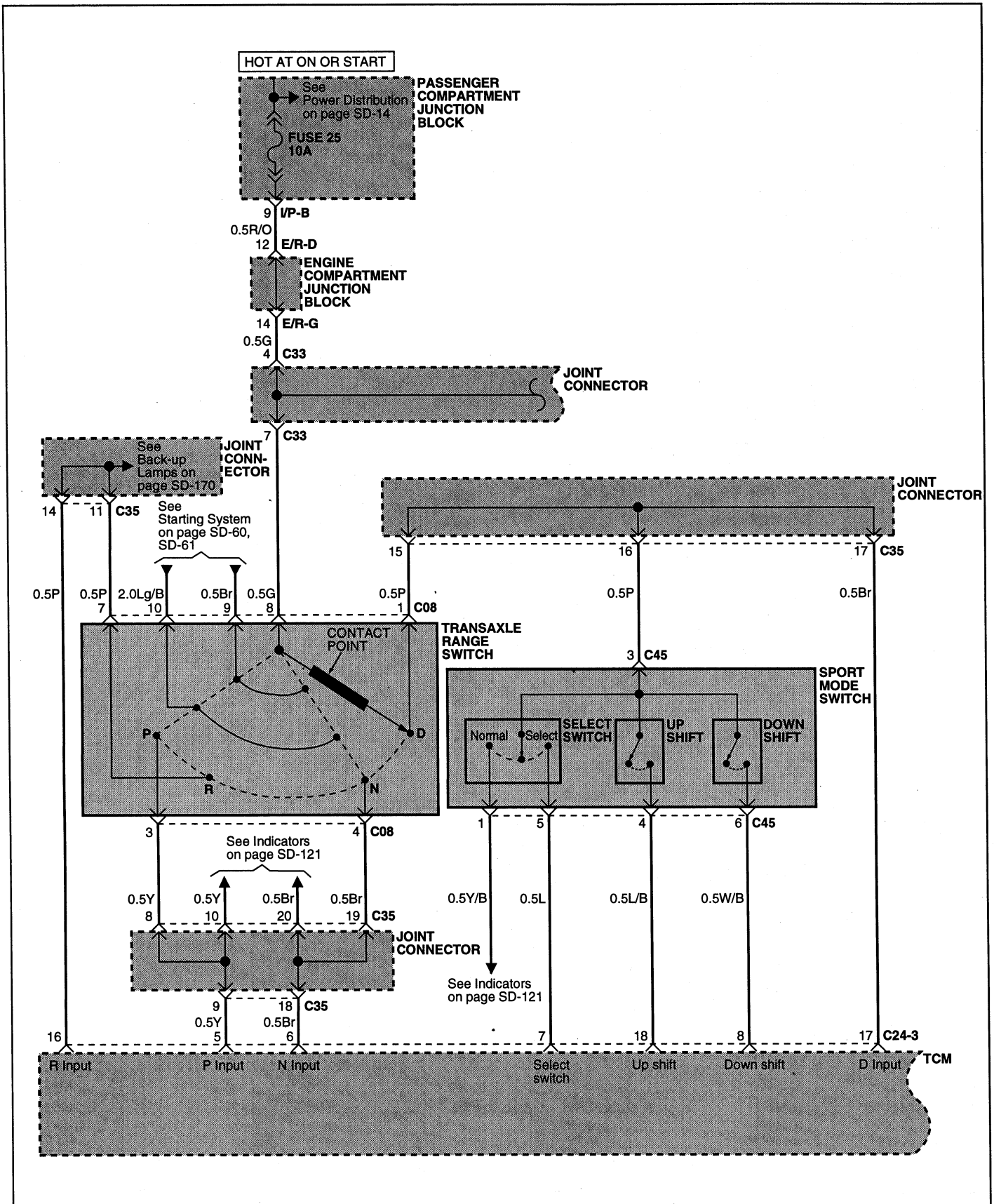
TCM CIRCUIT DIAGRAM (2.4L) (1) EKJA0300

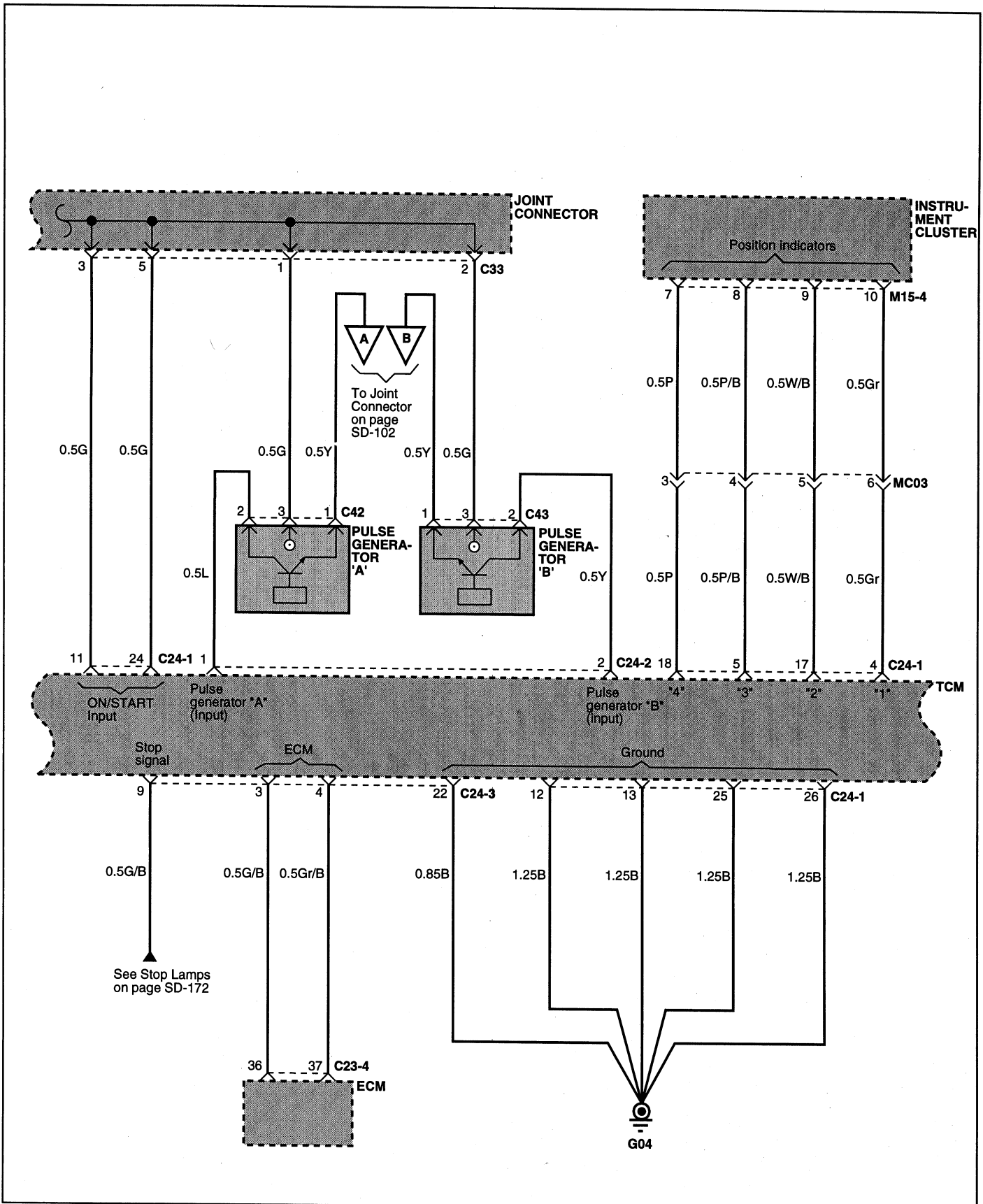


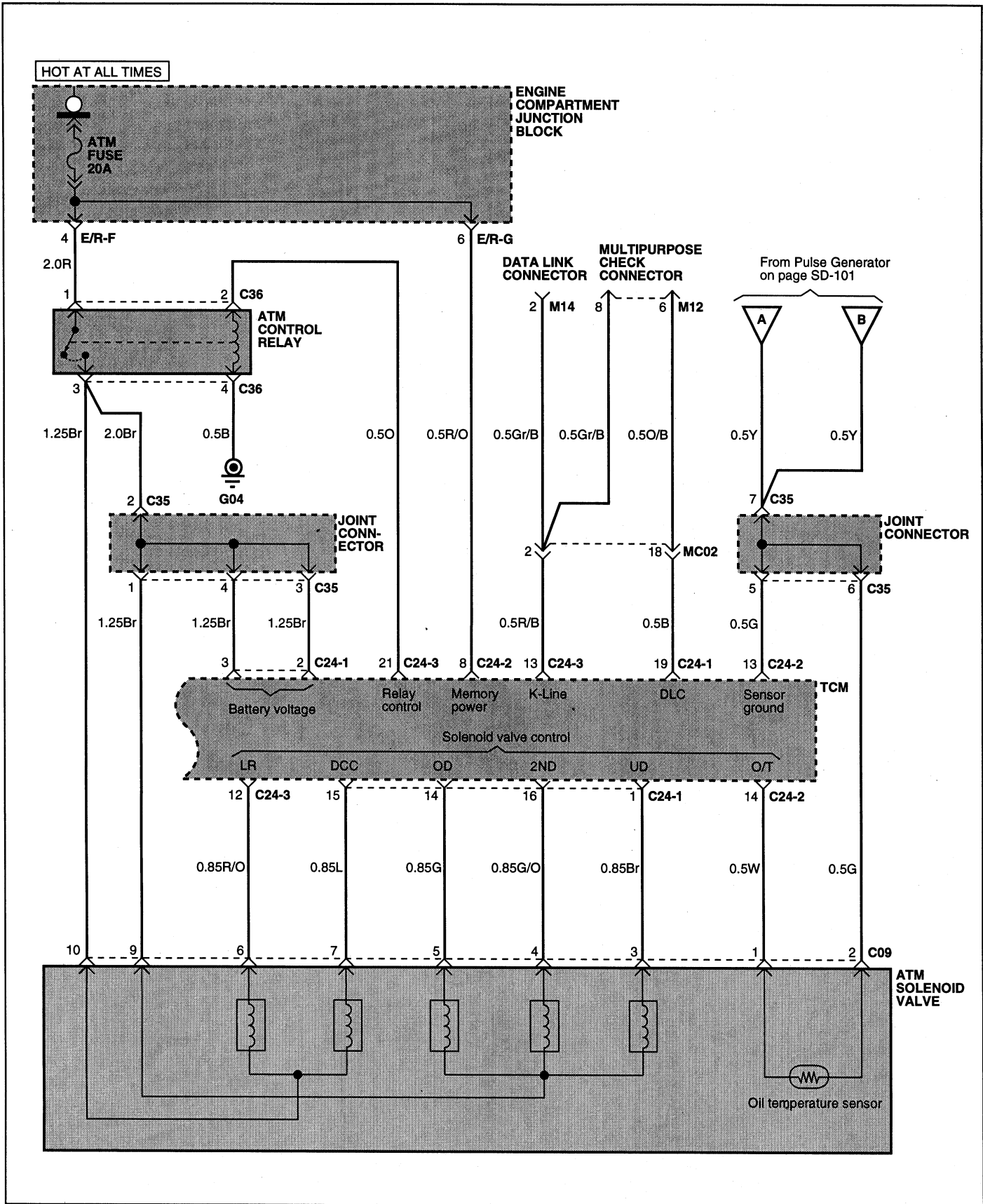




TCM CIRCUIT DIAGRAM (2.7L) (1)

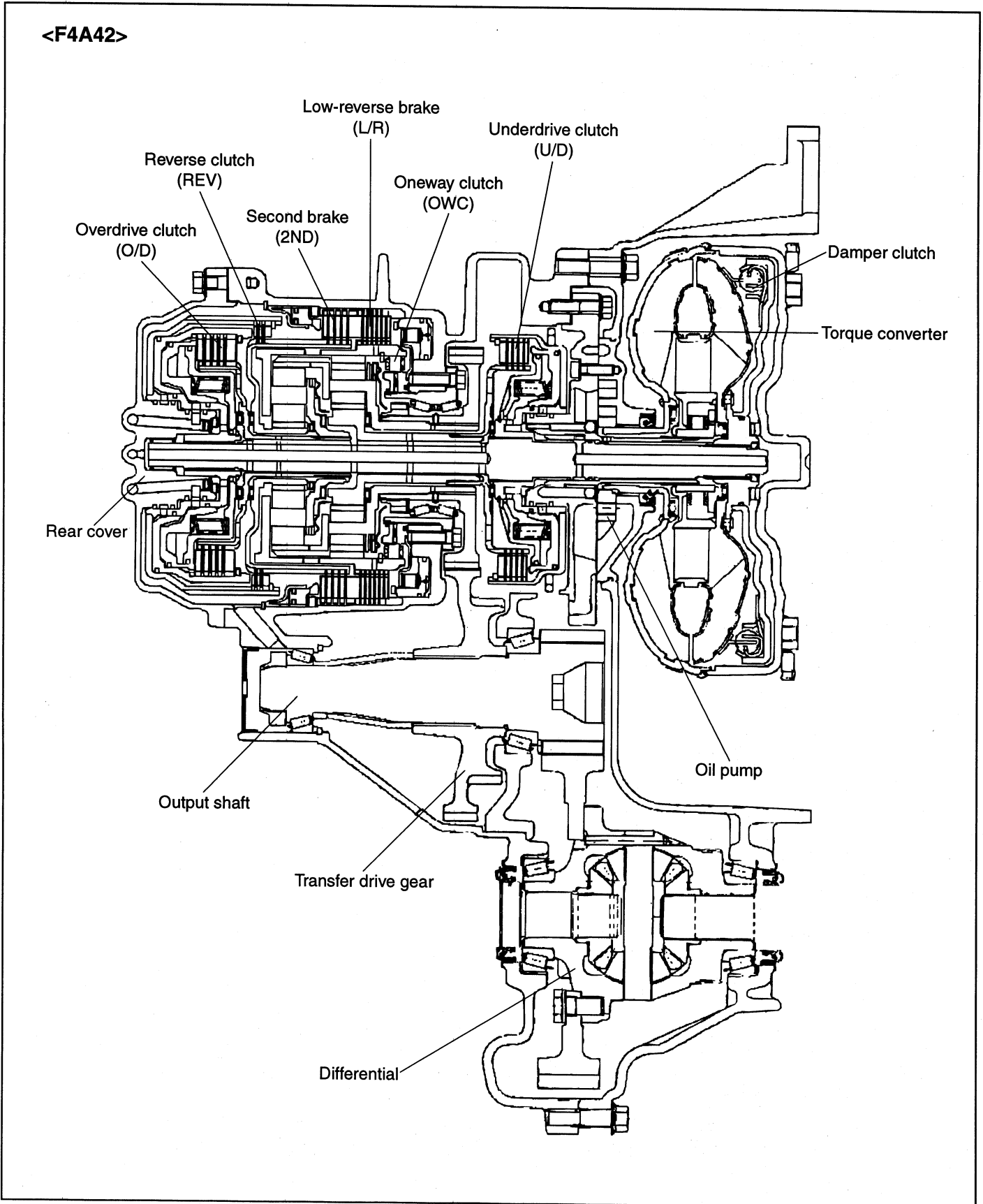






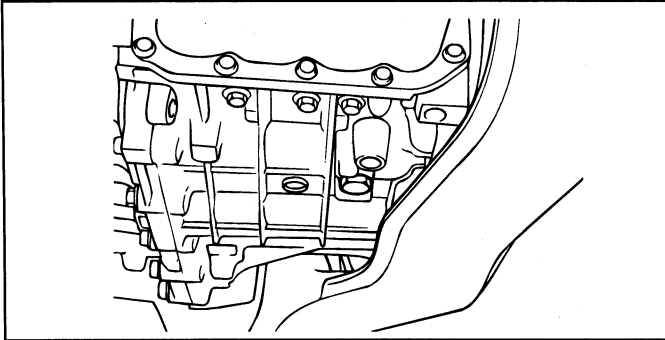
AUTOMATIC TRANSAXLE

COMPONENTS EKJA0240



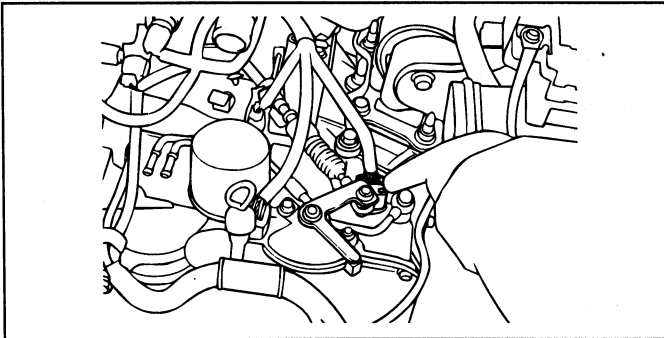
REMOVAL EKJA0250

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



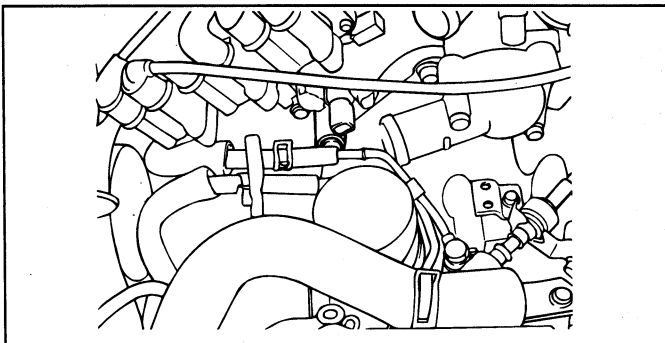
EKA9009A

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.



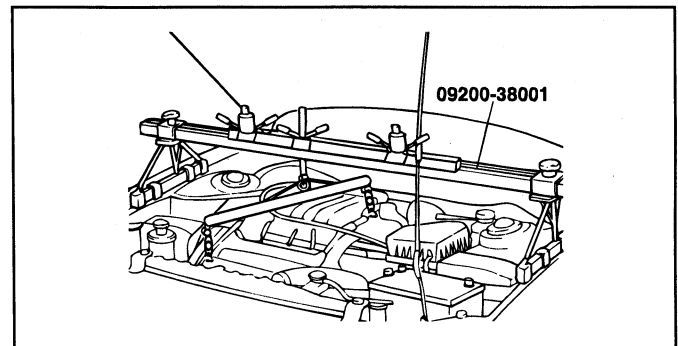
EKA9009B

6. Remove the oil cooler hose.



EKA9009C

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

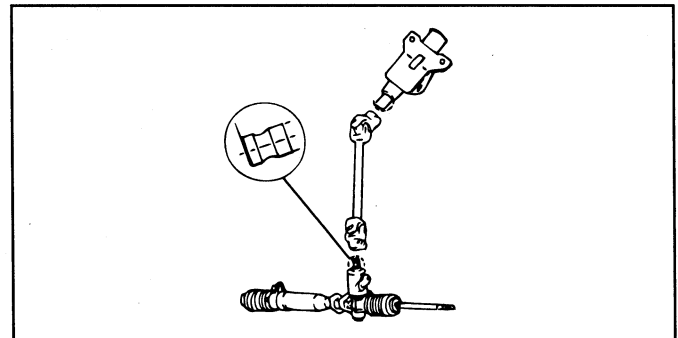


EKJA025A

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.

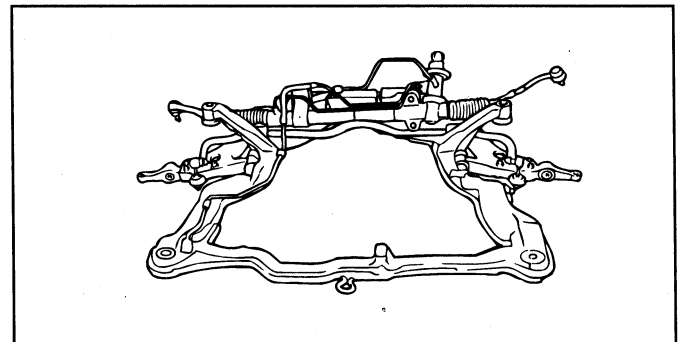
NOTE

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.

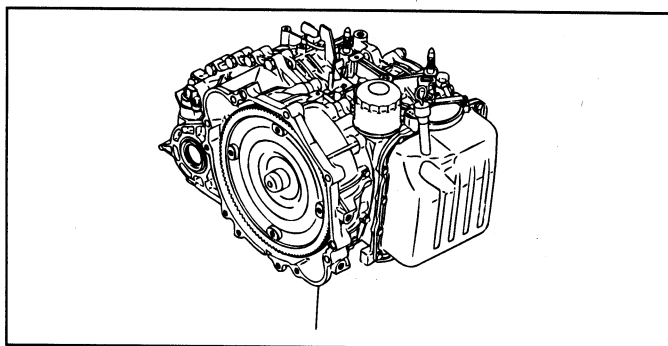


EKA9009F

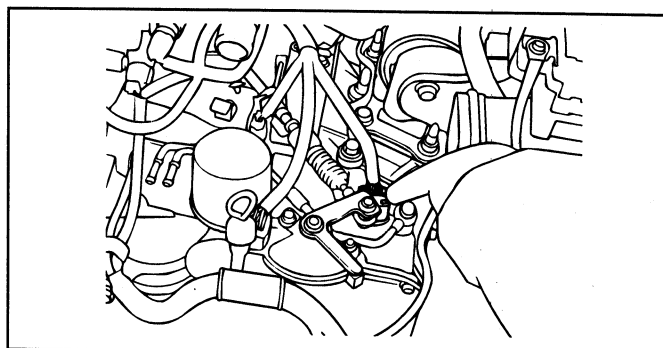
12. Remove the starter motor.
13. Remove the automatic transaxle mounting bolts.
14. Remove the engine to automatic transaxle bolts.
- *15. Remove the automatic transaxle assembly by jack.

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..



EKA9009E



EKA9009B

NOTE

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

INSTALLATION EKHA0260

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

CAUTION

If the torque conveter 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.

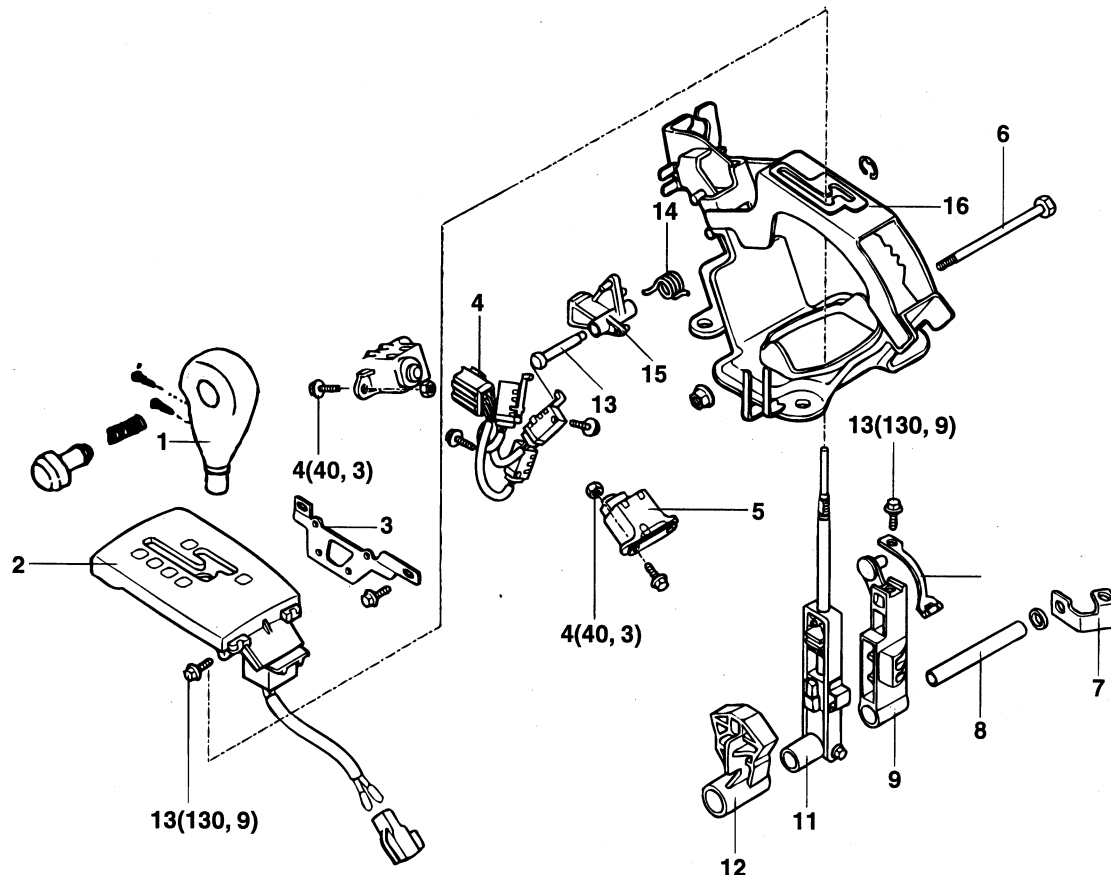
2. Install the transaxle control cable and adjust as follows:
 - a. Move the shift lever and the transaxle range swth to the "N" position and install the control cale.
 - b. When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts to the control cable.
 - 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>

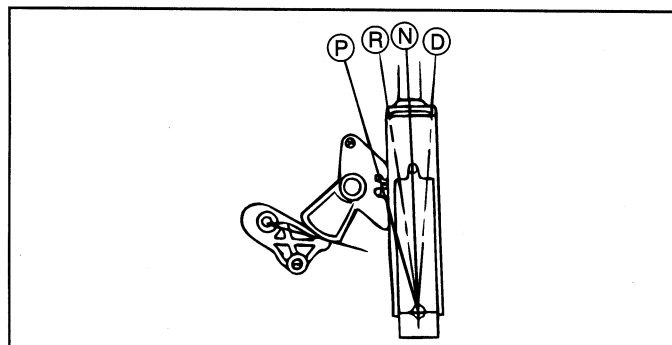
1. Shift knob
2. Indicator panel
3. Switch bracket
4. Magnetic switch
5. Detent
6. Bolt
7. Parking brake cable bracket

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)

INSTALLATION EKJA0200

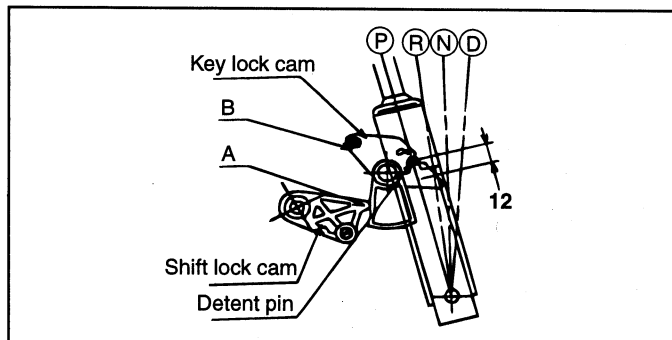
PROCEDURE TO INSTALL THE LOCK CAM



EKB9037A

1. 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".

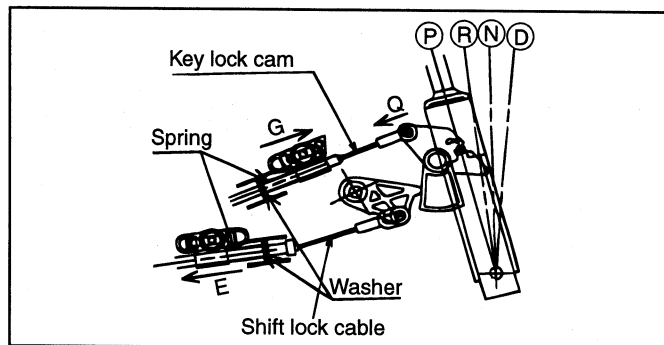


EKB9037B

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

PROCEDURE FOR ADJUSTING SHIFT LOCK AND KEY LOCK CABLE

1. Check that each lock cam is as shown in the figure.
2. 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.
3. 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

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

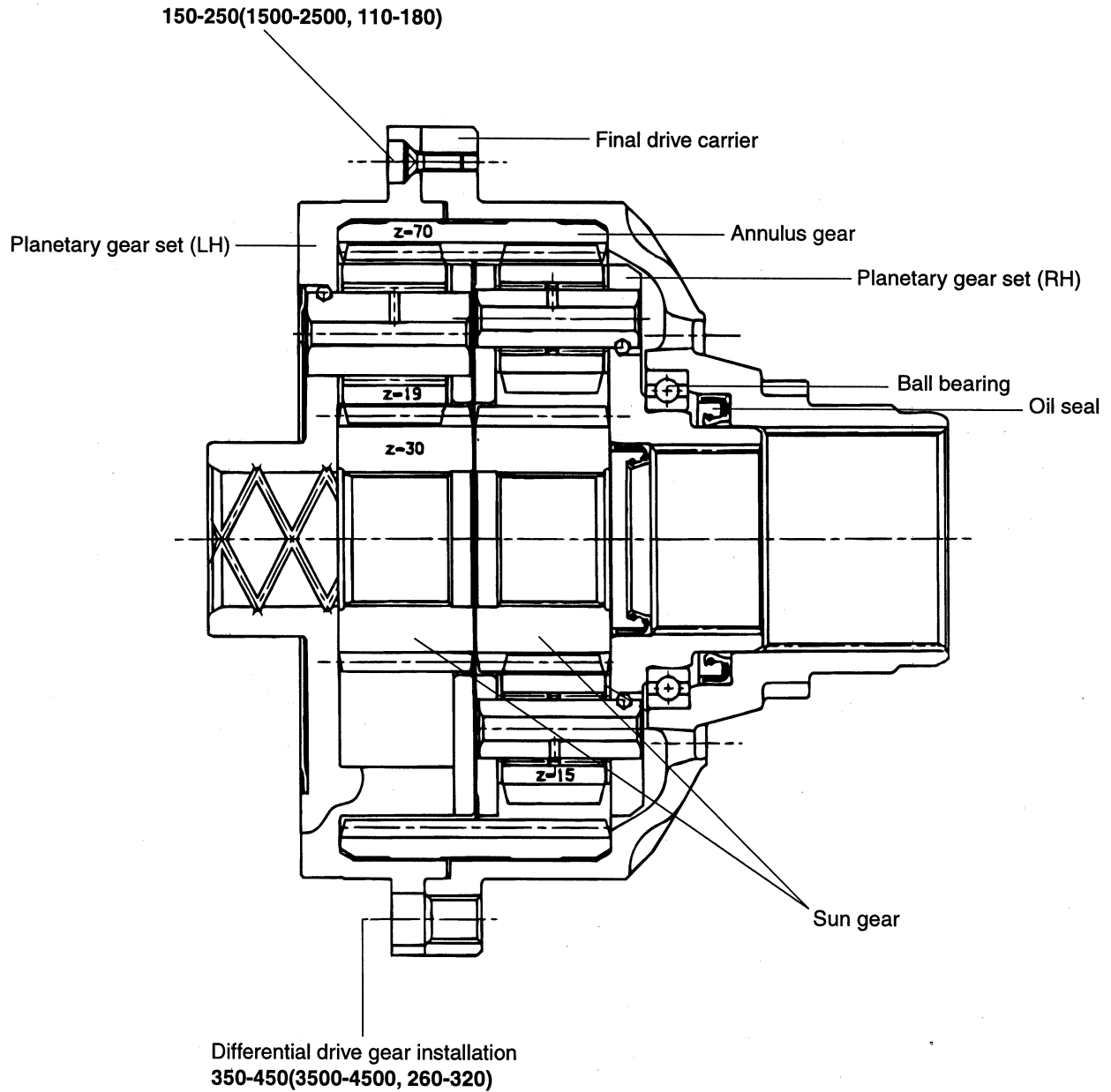
PROCEDURE FOR CHECKING THE SHIFT LOCK

1. 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".)
2. 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.
3. When the brake pedal is not depressed, the shift lever should shift smoothly to "P" position from all heading other positions.
4. The brake pedal must operate smoothly without catching.
5. When the ignition key is at the "LOCK" position, although brake pedal is depressed, the push button should be operable.
6. The Ignition key must not be able to be turned to the "LOCK" position except in the "P" position.
7. 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

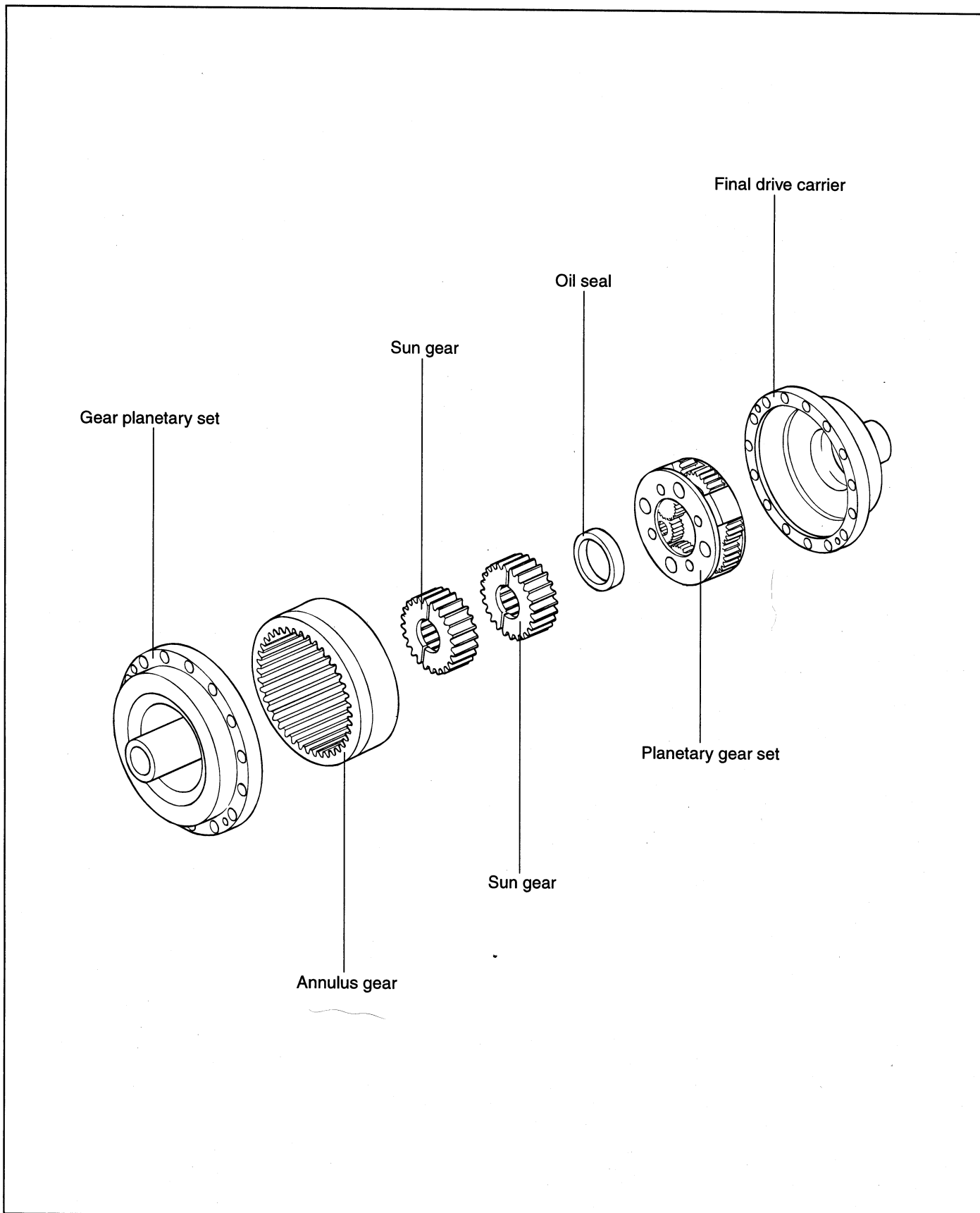
SECTION VIEW



TORQUE : N·m (kg·cm, lb·ft)

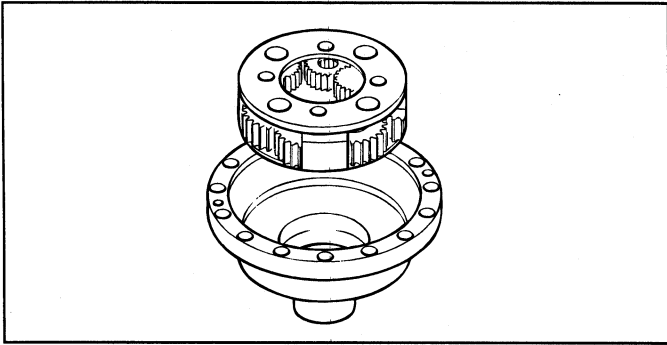
DOUBLE DIFFERENTIAL UNIT-4WD EKJA0390

COMPONENTS



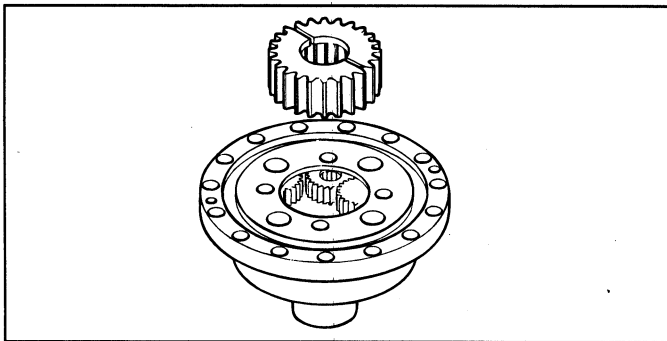
REASSEMBLY EKJA0400

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

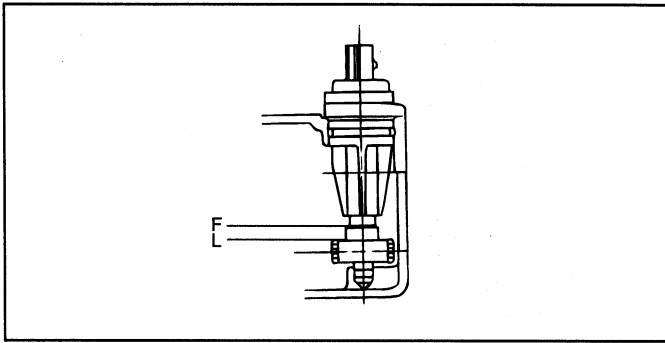
MANUAL TRANSAXLE SYSTEM

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)

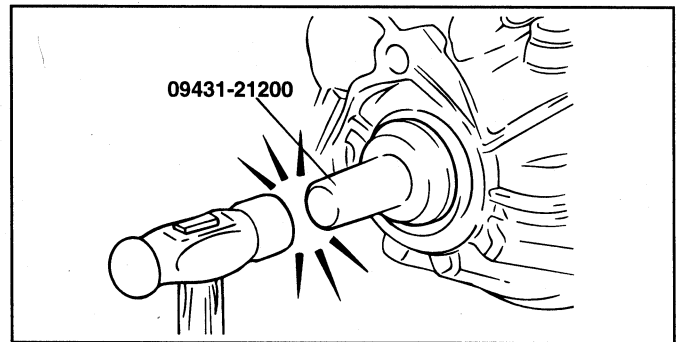
5. Verify that the oil level is between 'F' and 'L' on the speedometer gear.
6. Install the speedometer gear on the clutch housing of the transaxle.

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.

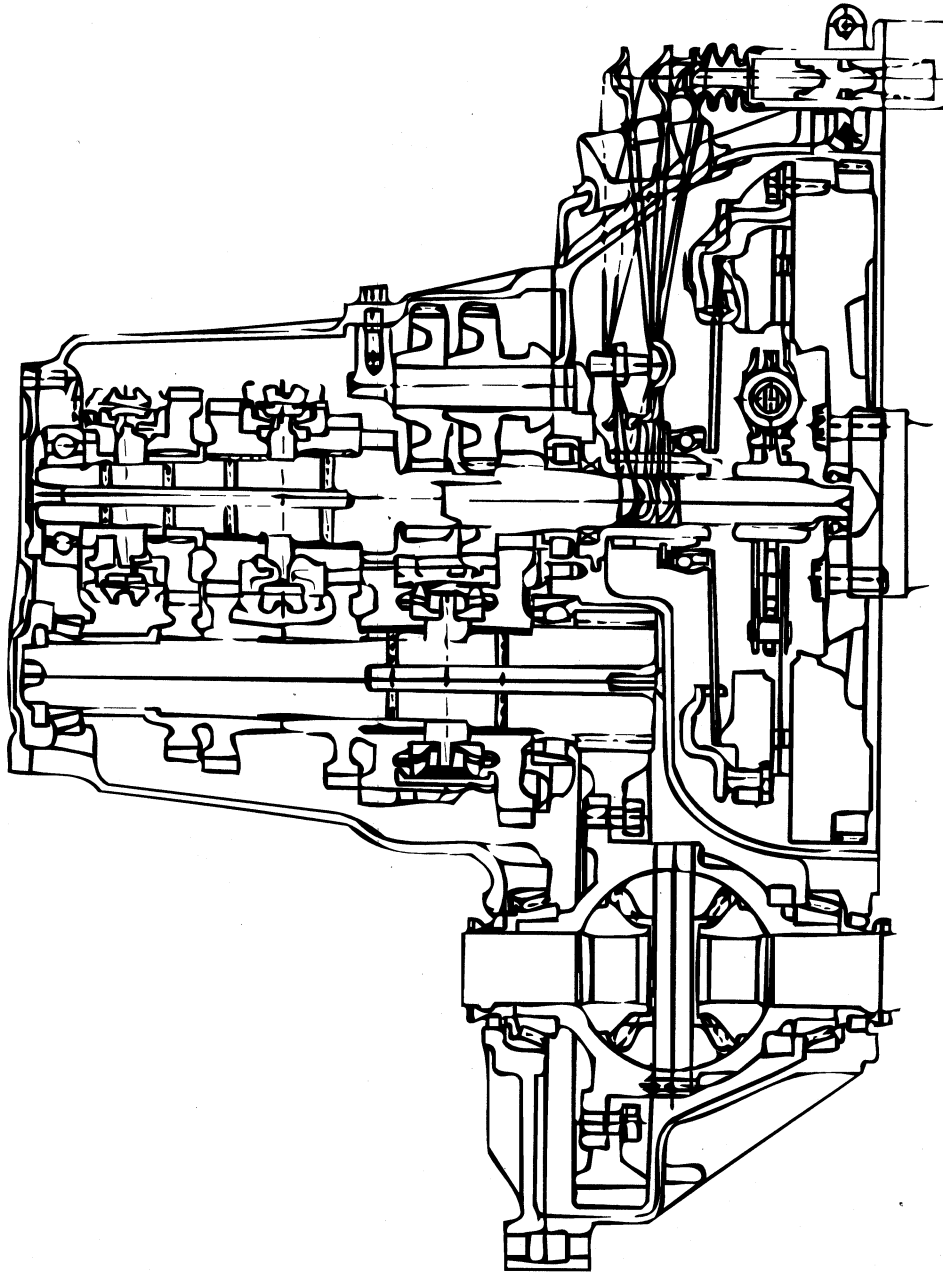
Transaxle gear oil : Hypoid gear oil, SAE 75W/90 conforming to API GL-4 or higher. Disconnect the drive shaft form the transaxle (Refer to "DS" group).



EMA9009G

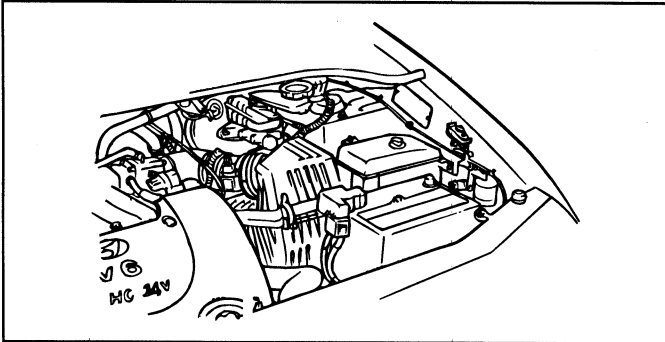
MANUAL TRANSAXLE

COMPONENTS EMJA0180



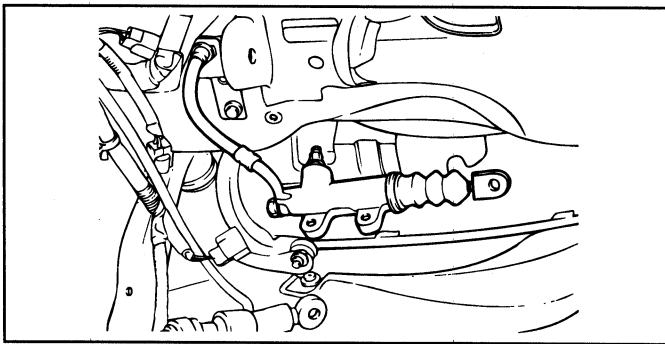
REMOVAL EMJA0190

1. Remove the battery (-) cable.



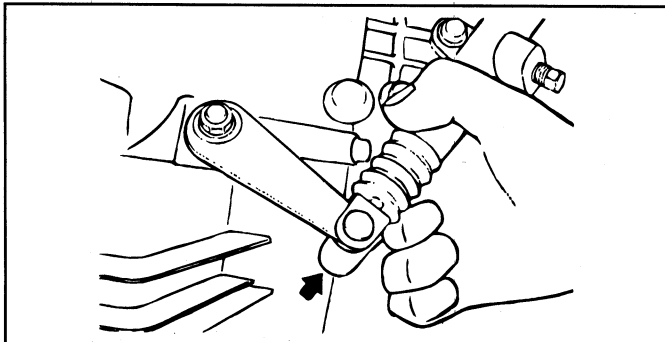
EMHA004A

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.



EOA9014D

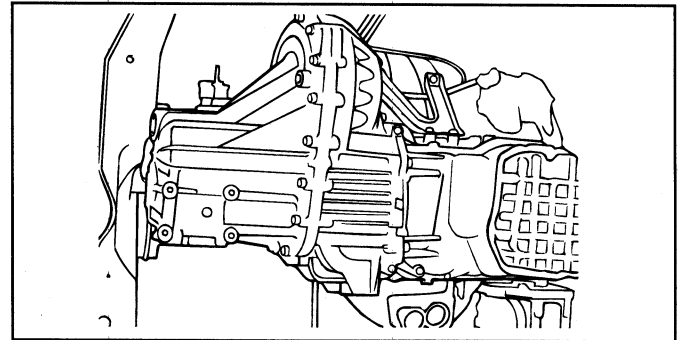
7. Remove the speedometer cable.
8. Remove the select or cable and shift cable.



V5CH026D

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.



EMA9019B

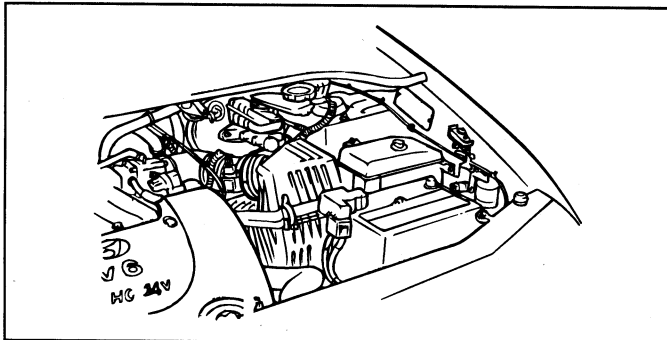
21. Lower the transaxle assembly, supporting it with a jack.

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.

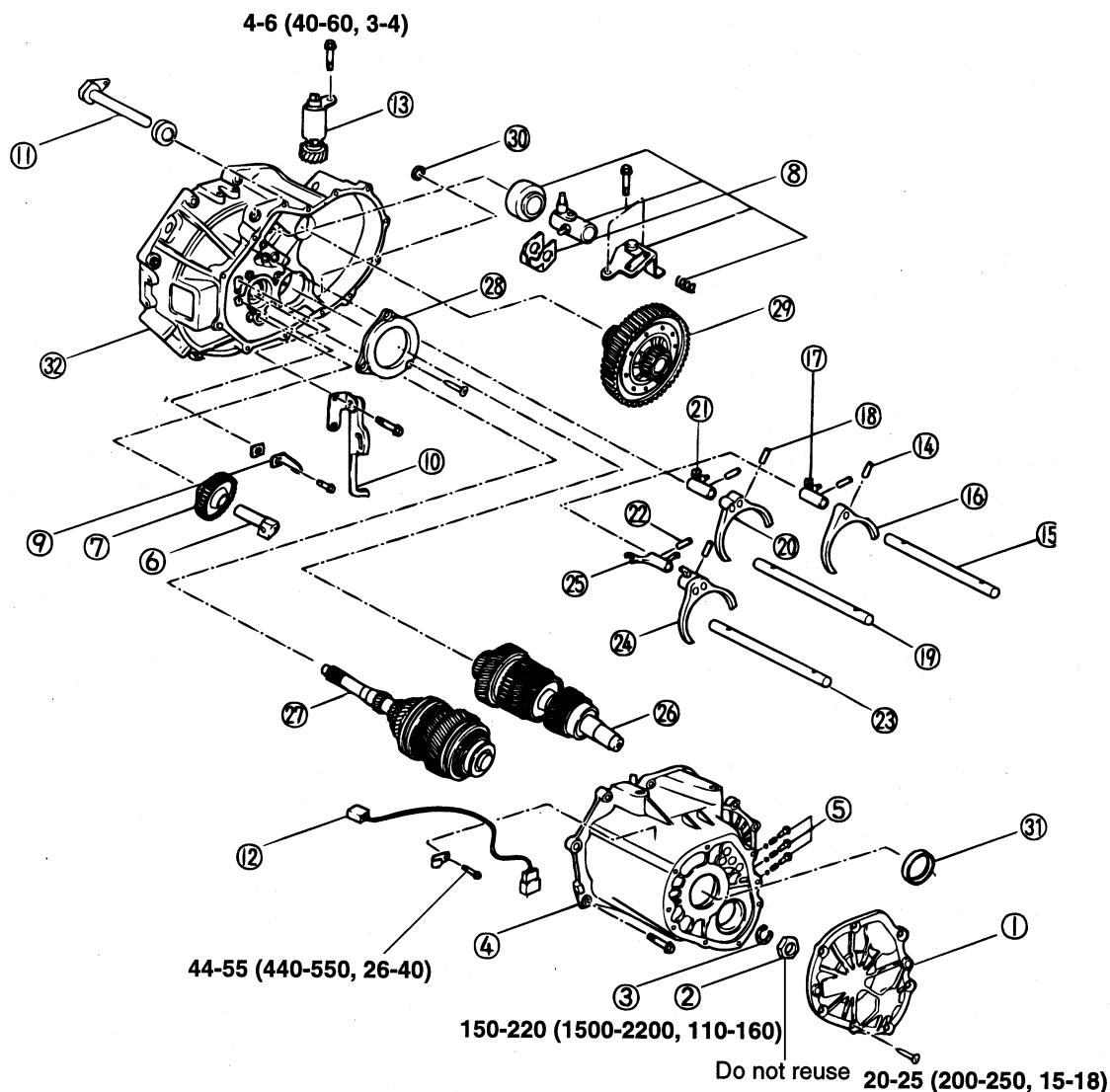


EMHA004A

INSTALLATION EMA90200

1. Installation is the reverse of removal.

COMPONENTS EMJA0220

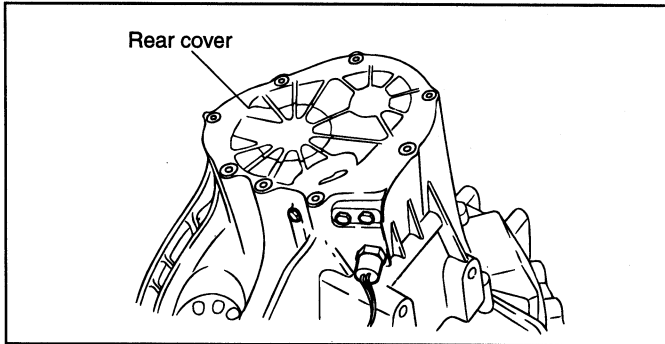


- | | | | |
|-------------------------------------|-----------------------------|-----------------------|---------------------------|
| 1. Rear cover | 9. Reverse lever spring set | 16. 1/2 shift fork | 25. 5/R shift rod end |
| 2. Lock nut | 10. Reverse shift lever | 17. 1/2 shift rod end | 26. Input 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)

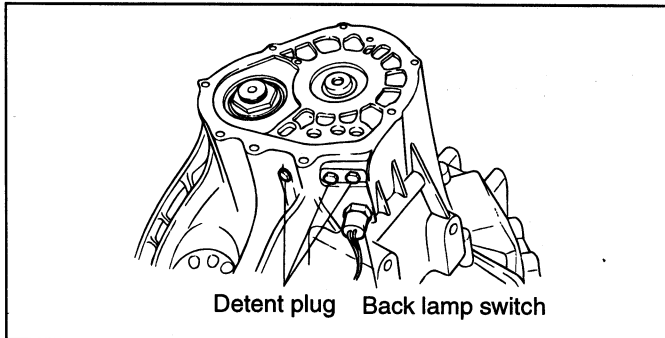
DISASSEMBLY EMJA0230

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



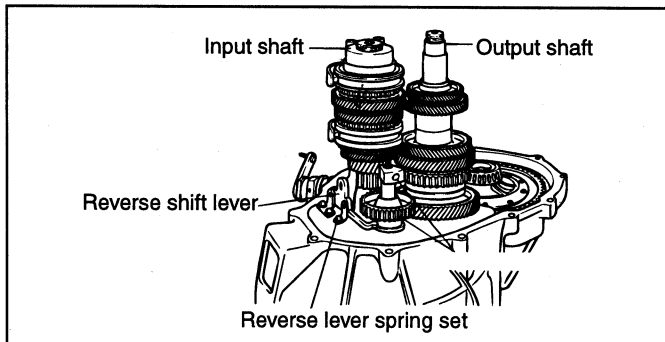
EMJA023A

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



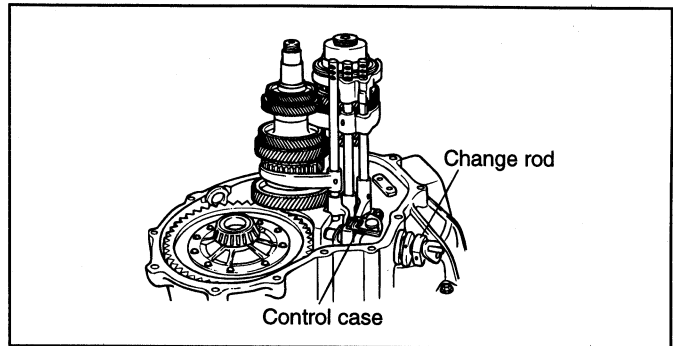
EMJA023B

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.



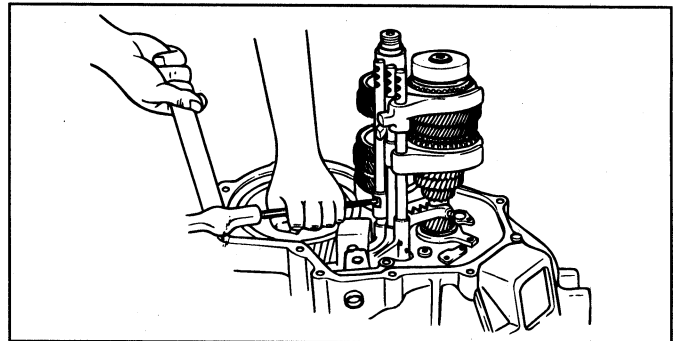
EMJA023C

7. Remove the change rod and the control case.



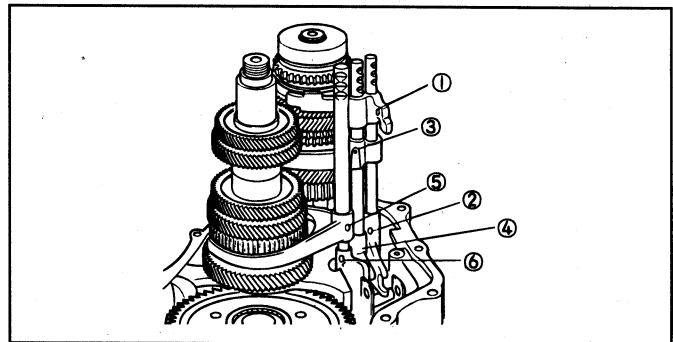
EMJA023D

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



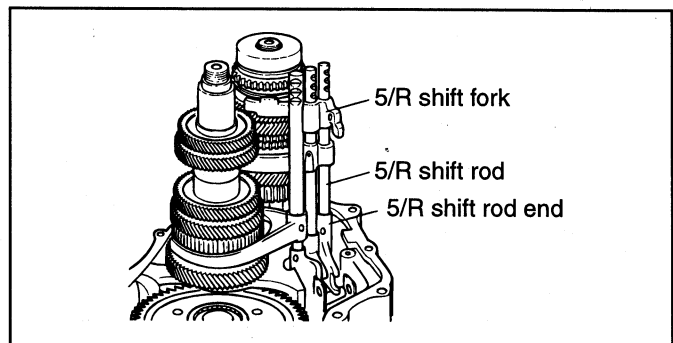
EMHA010A

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



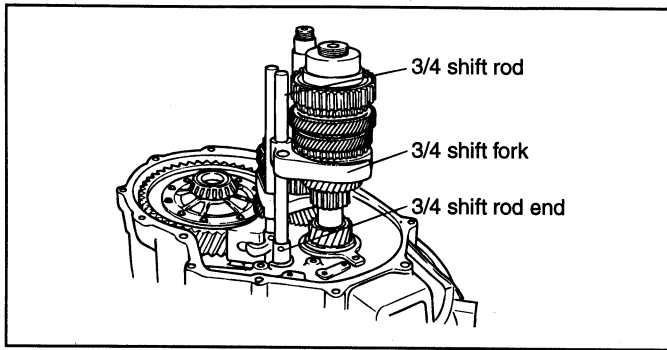
EMHA011A

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



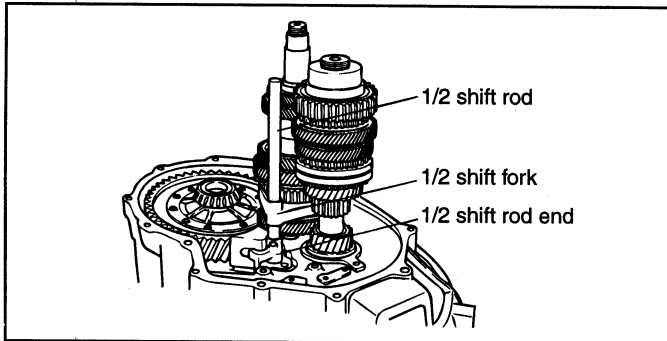
EMJA023E

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



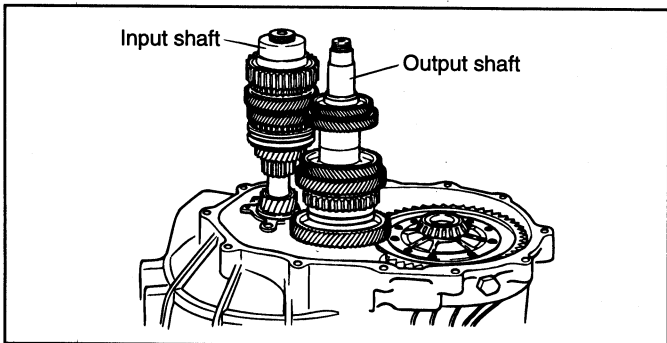
EMJA023F

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



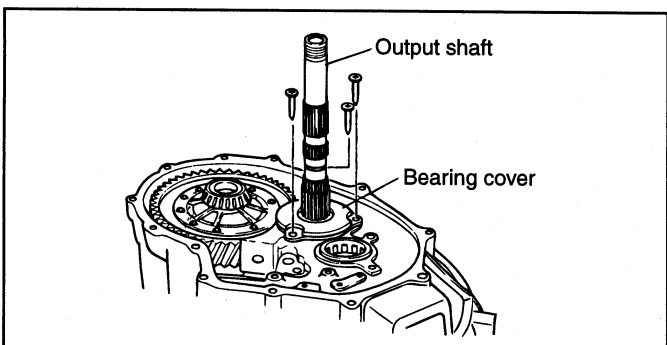
EMJA023G

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).



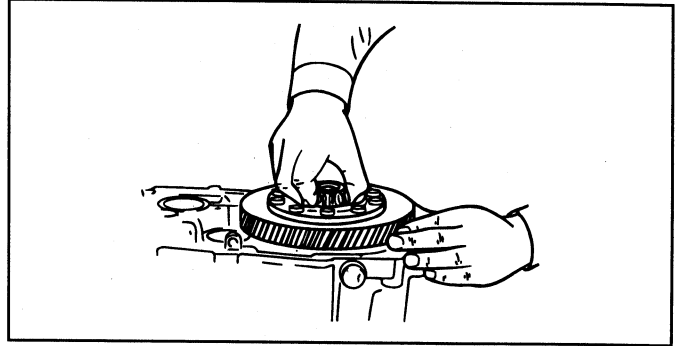
EMJA023H

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

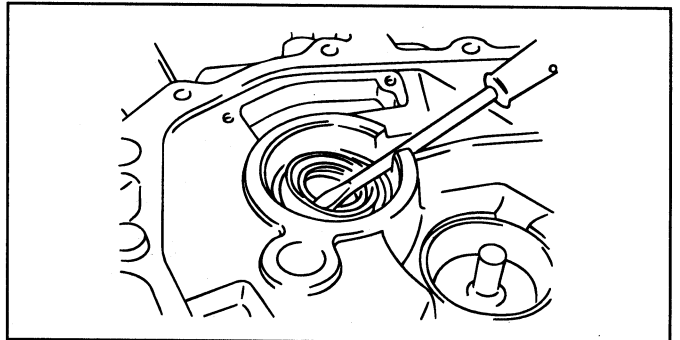
15. Remove the differential assembly.



EMHA013B

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

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

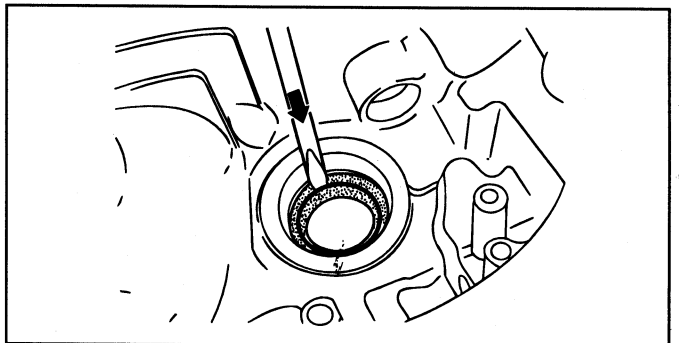


EMHA013C

18. Remove the sealing cap.

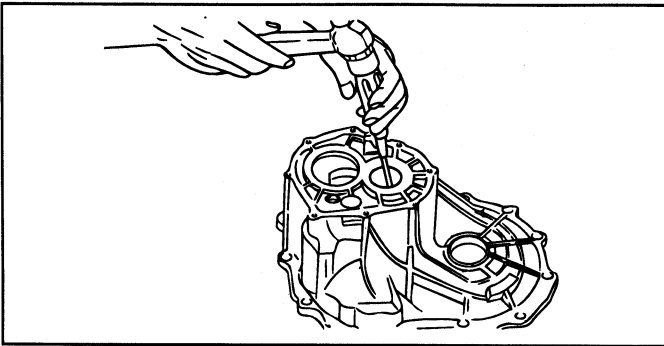
19. Remove the change rod oil seal with a screwdriver or suitable tool.

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

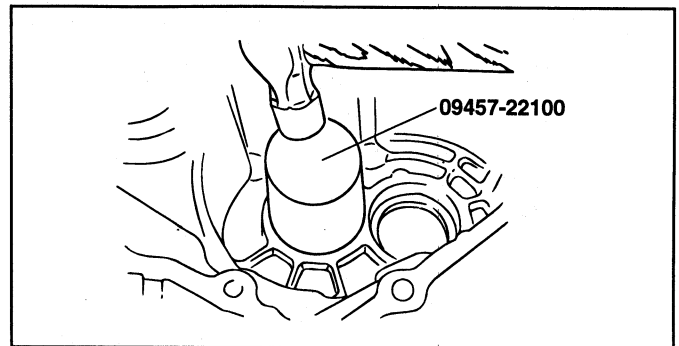


EMHA013D

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



EMHA013E

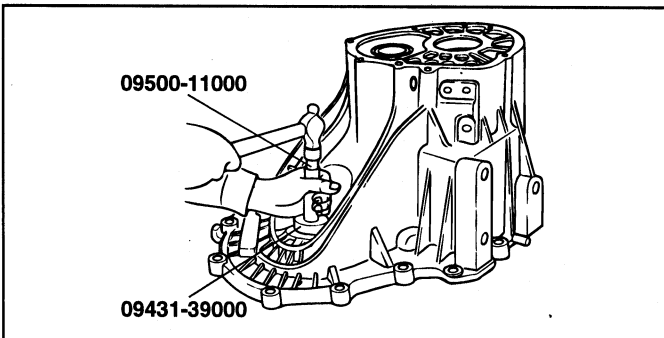


EMHA014C

EMJA0240

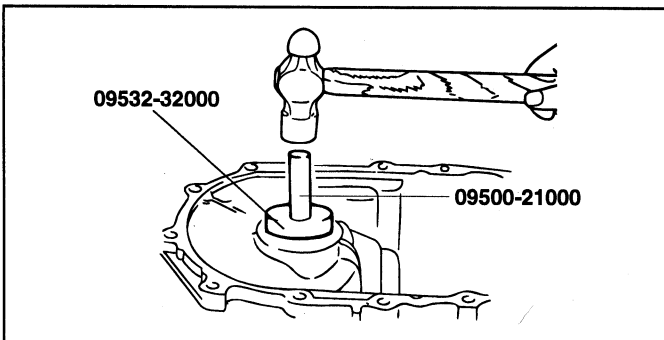
REASSEMBLY

1. Install the drive shaft oil seal.



EMHA014A

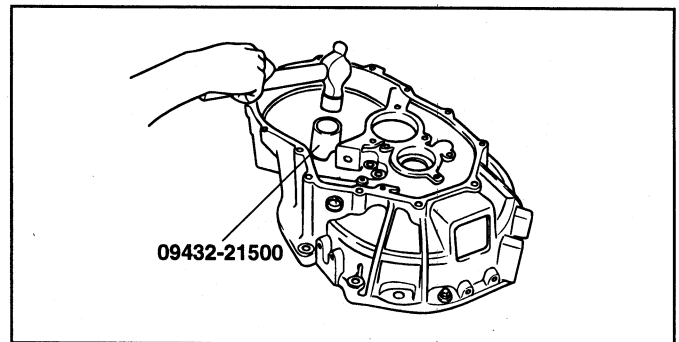
2. Apply transaxle oil to the bearing, and install in the differential case using the special tool.



EMHA014B

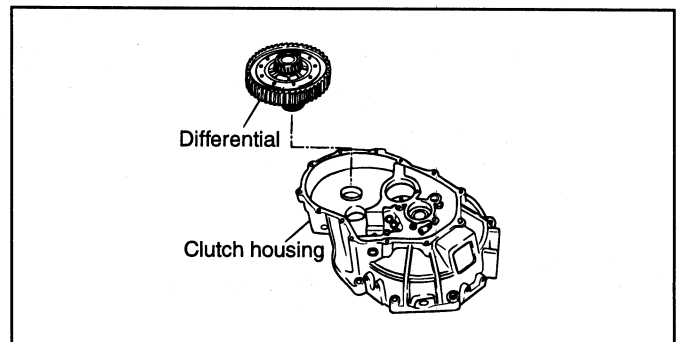
3. Apply transaxle oil to each bearing race, and install them to the transaxle case using the special tool.
4. Install the oil seal

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.



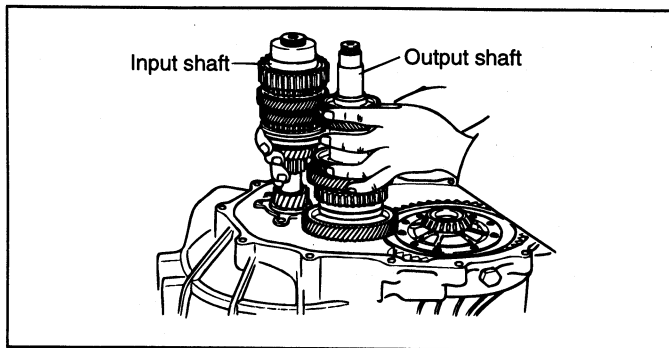
EMHA014D

7. Set the differential into the clutch housing.



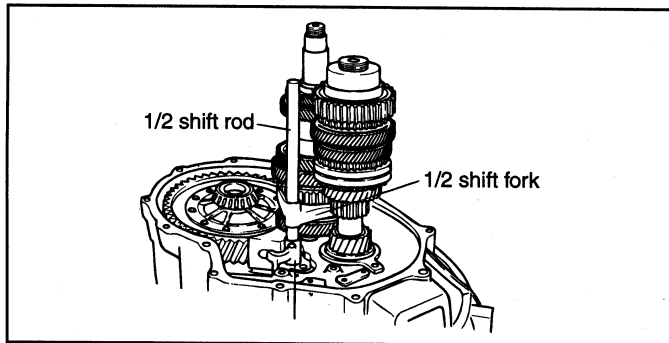
EMJA024A

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.



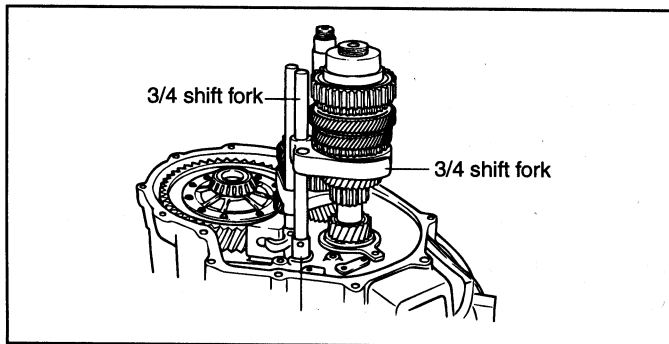
EMJA024B

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



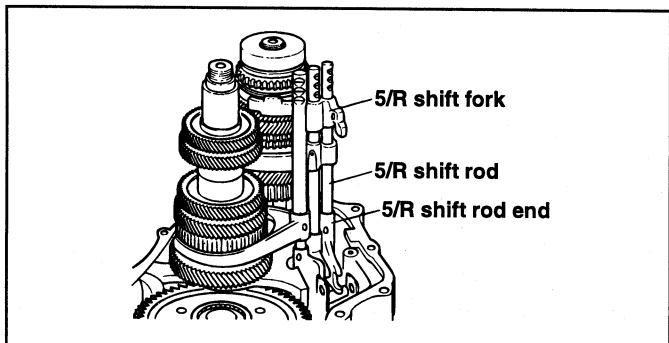
EMJA024C

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



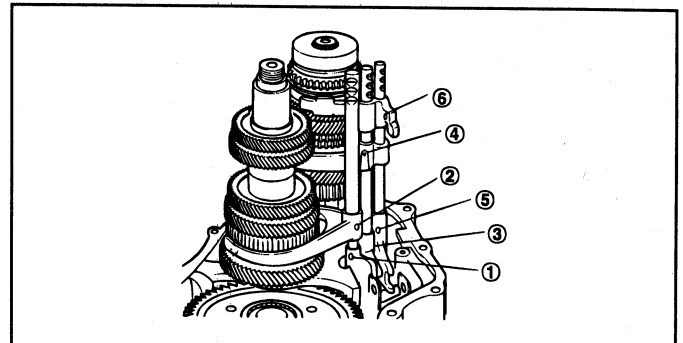
EMJA024D

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.



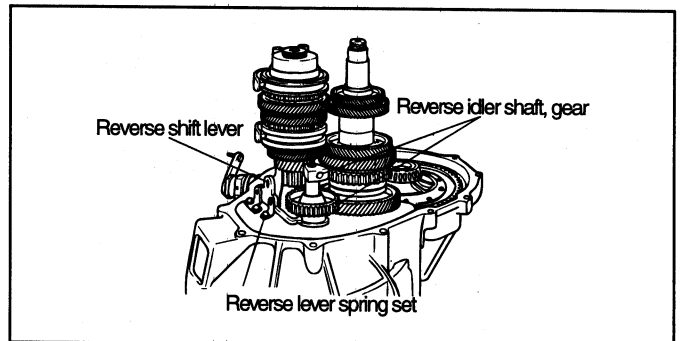
EMHA015E

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.

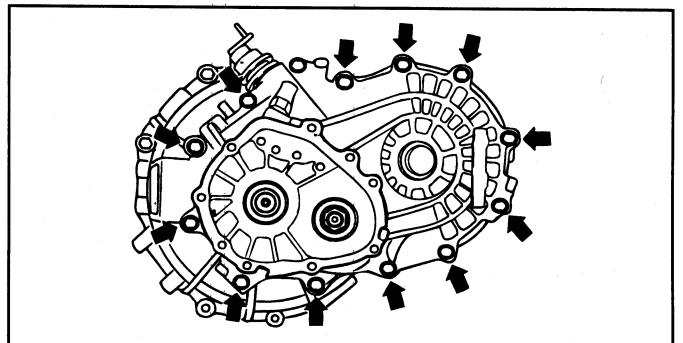


EMJA024F

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.

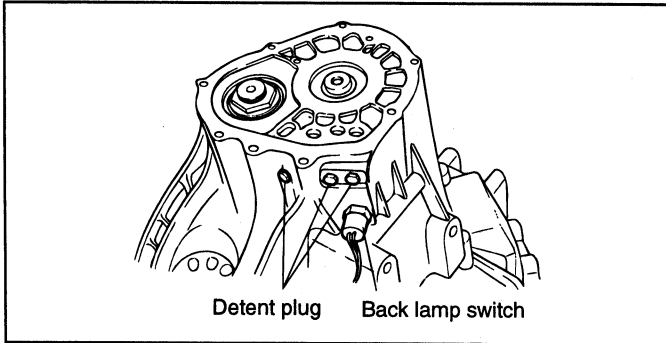


EMHA016B

21. Install the backup lamp switch.

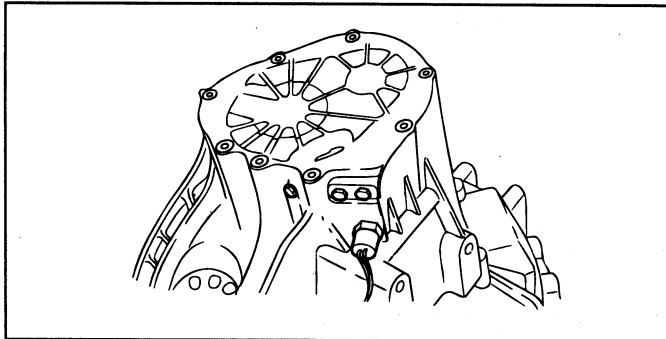
22. Install the detent plug, spring and steel ball.

23. Install the output shaft lock nut.



EMJA024G

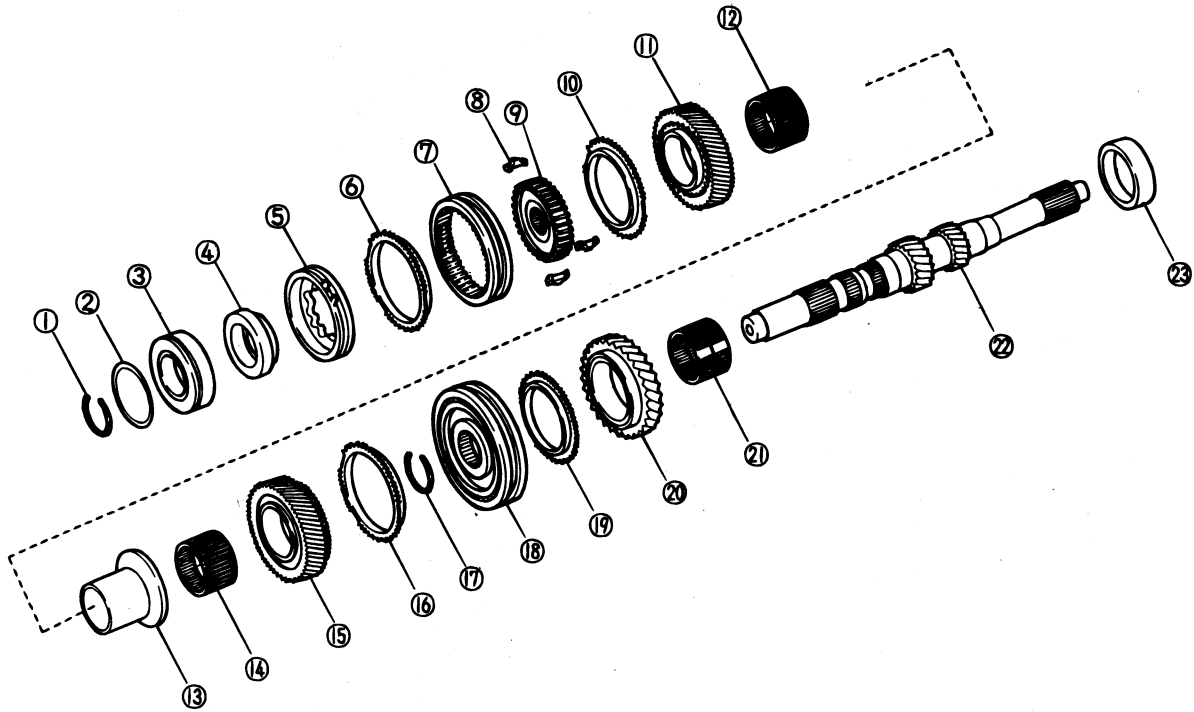
24. Install the rear cover.



EMHA006A

INPUT SHAFT

COMPONENTS EMJA0250



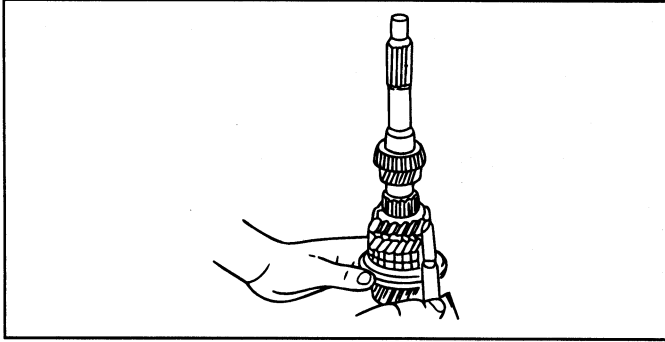
- 1. Retainer ring
- 2. Shim
- 3. Bearing
- 4. Reverse cone sleeve
- 5. Reverse cone
- 6. Synchronizer ring
- 7. Clutch hub sleeve
- 8. Syncronizer key
- 9. Clutch hub
- 10. Synchronizer ring
- 11. 5th gear
- 12. Needle bearing

- 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

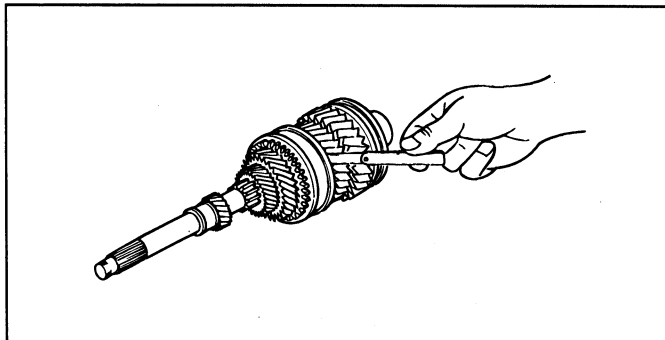
EMJA0260

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.

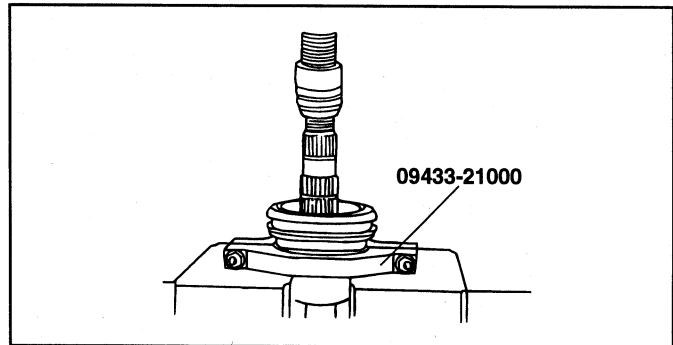


EMHA018C

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.

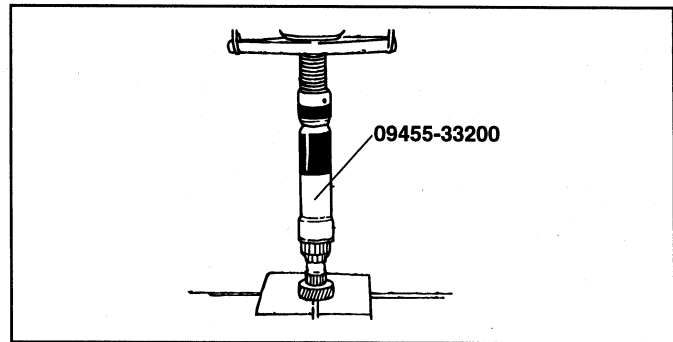


EMHA018A

REASSEMBLY

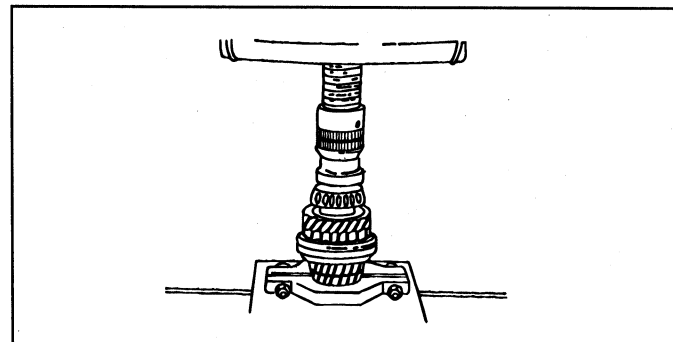
EMJA0280

1. Install a new bearing using the SST.



EMHA019A

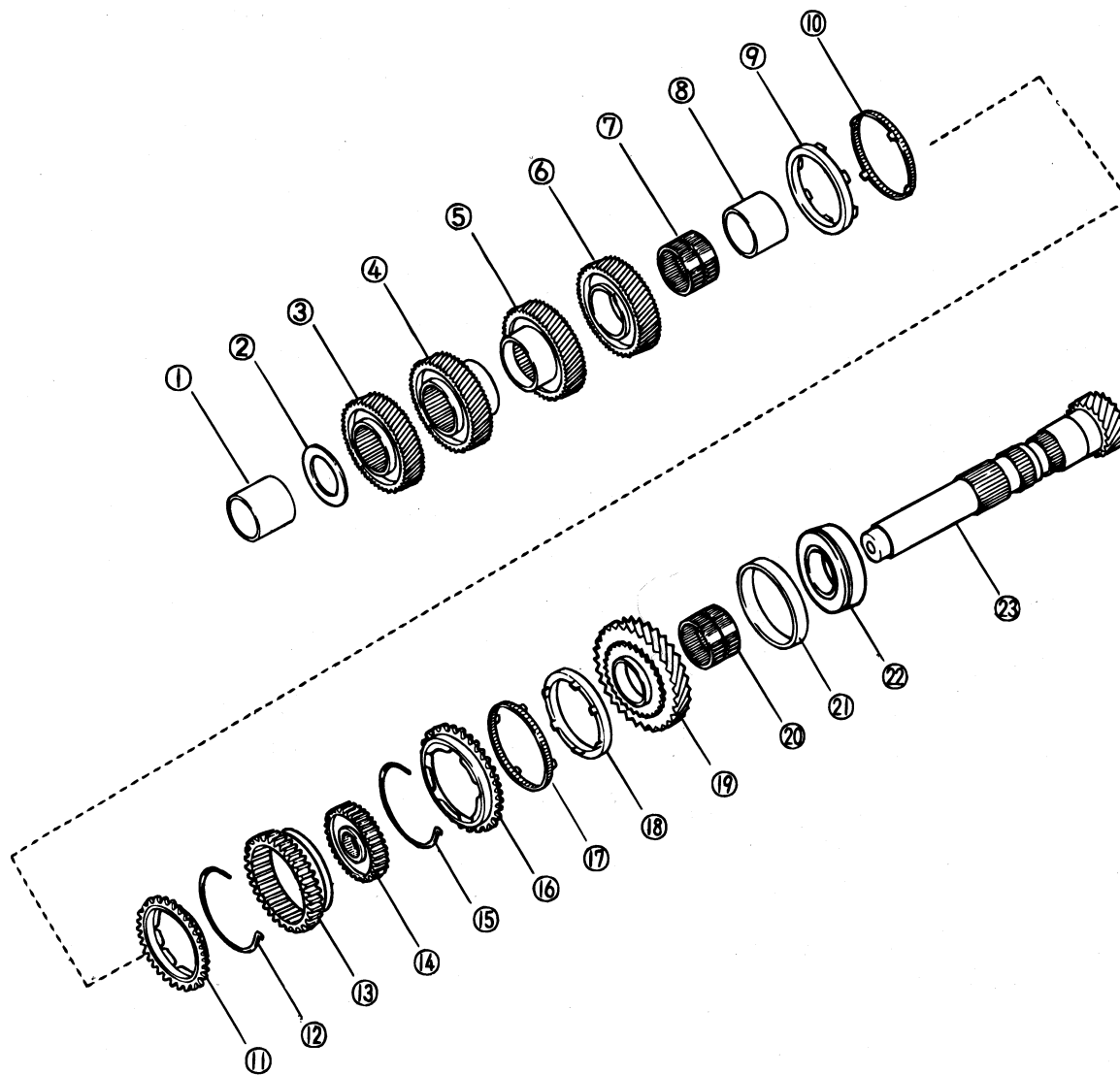
2. Install the 5th synchronizer ring, 5th gear, and a new bearing using the SST.



EMHA019B

OUTPUT SHAFT

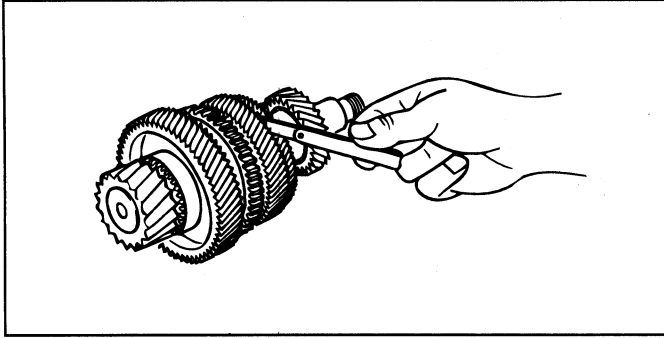
COMPONENTS EMJA0290



- | | | |
|-------------------|-----------------------------|-----------------------------|
| 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 | |

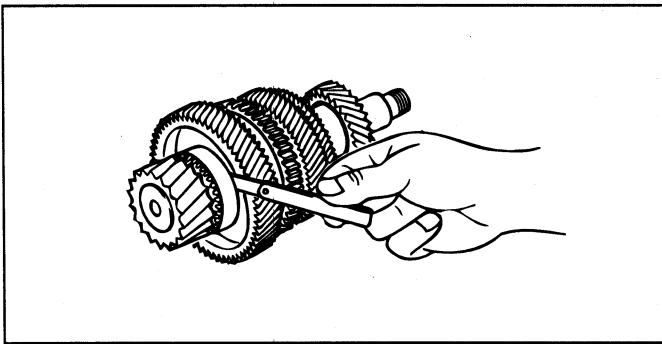
INSPECTION EMJA0300

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

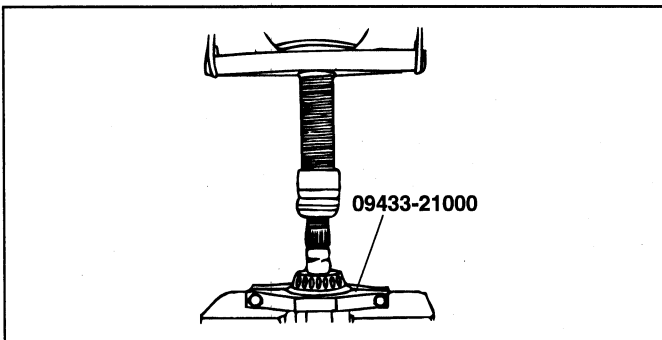
3. Measure the clearance between 2nd gear and 3rd gear.
4. If the clearance exceeds the maximum, check the contact surfaces of 2nd gear, 3rd gear, and the 1st/2nd clutch hub assembly. Replace worn and damaged parts.



EMHA021B

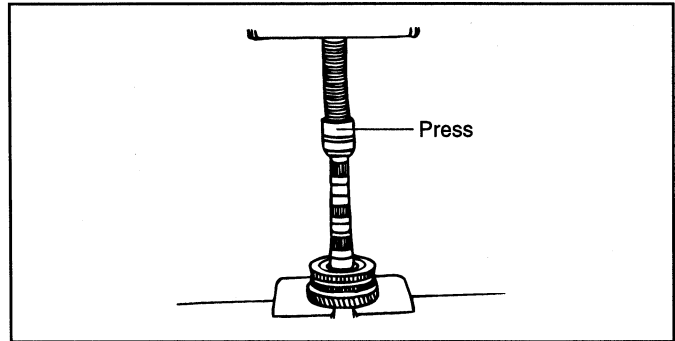
DISASSEMBLY EMJA0310

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



EMHA022A

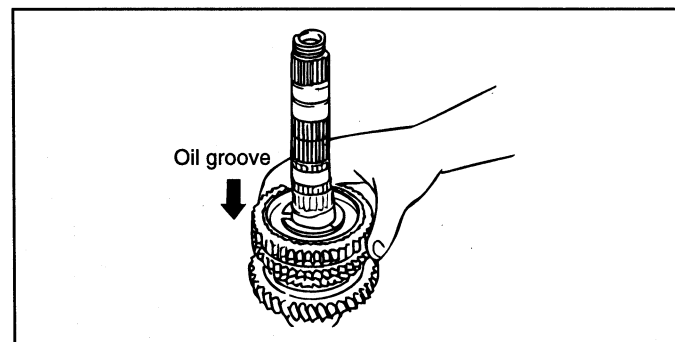
2. Remove the 1st/2nd clutch hub assembly, 1st synchronizer ring, and 1st gear, using a press.



EMJA031A

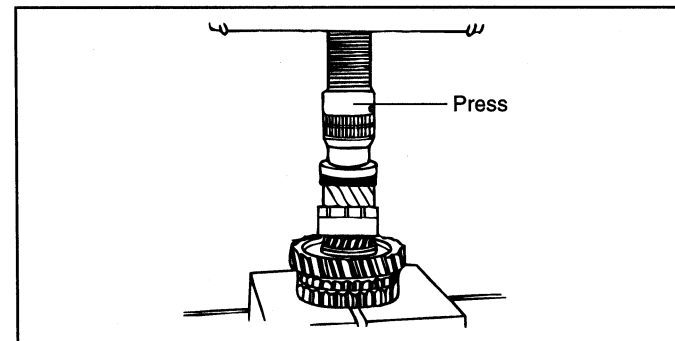
REASSEMBLY EMJA0320

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.



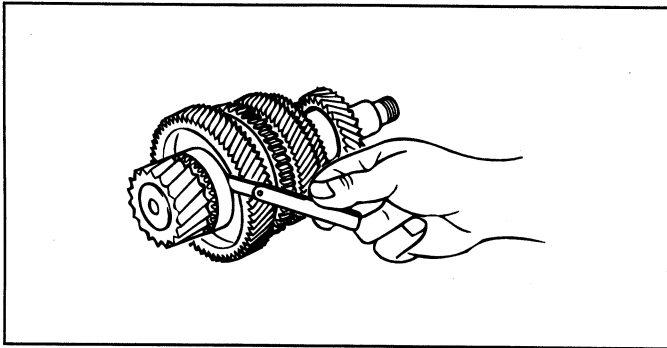
EMJA032A

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



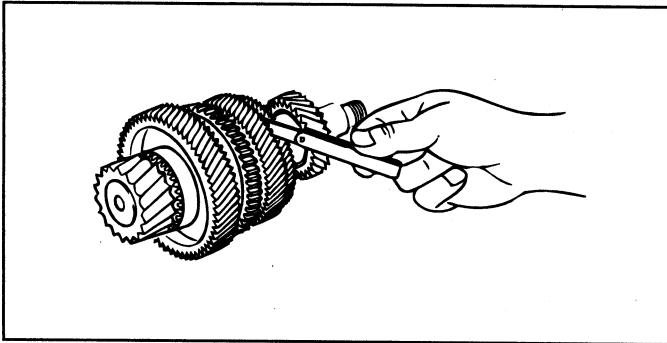
EMJA032B

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



EMHA022E

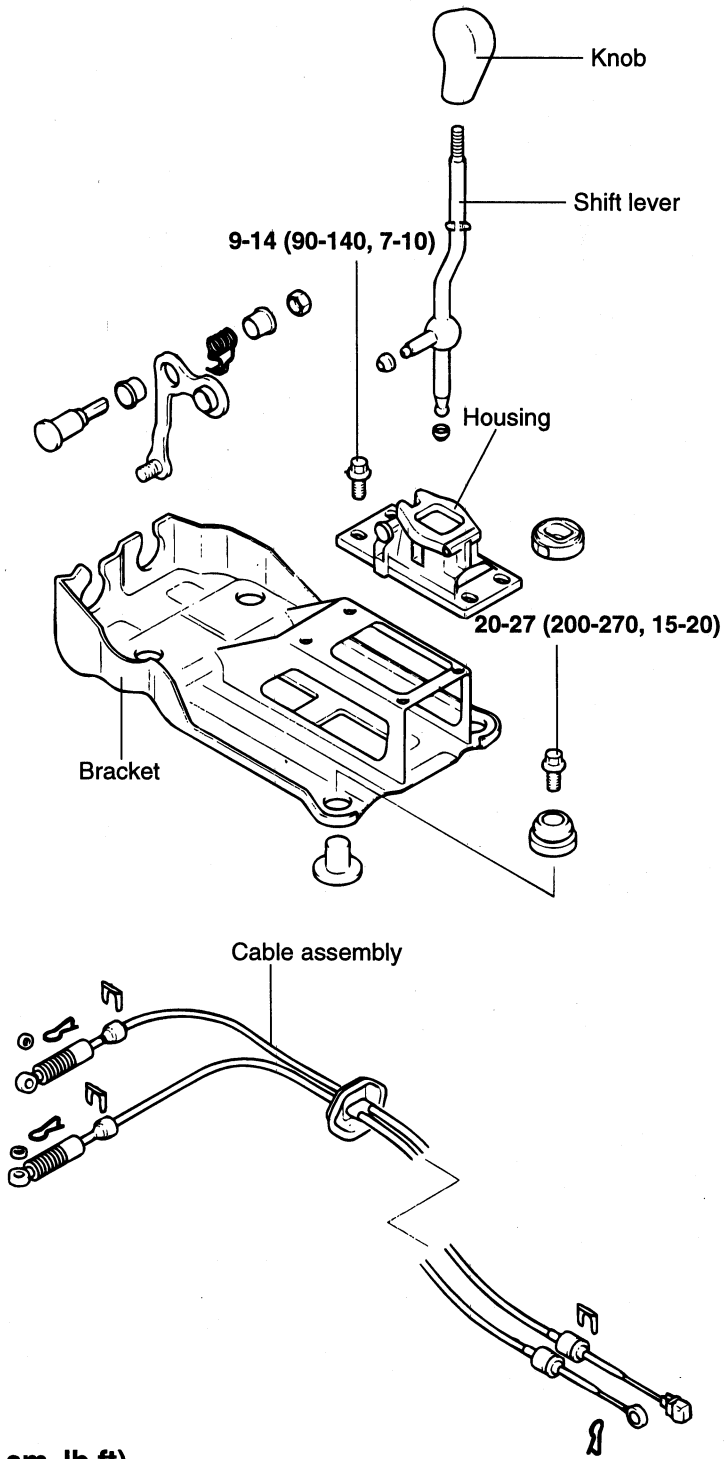
5. Measure the clearance between 2nd gear and 3rd gear.



EMHA022F

MANUAL TRANSAXLE SHIFT CONTROL

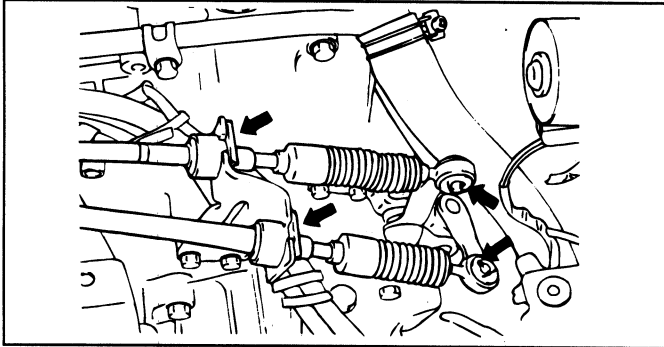
COMPONENTS EMJA0110



TORQUE : N·m (kg·cm, lb·ft)

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

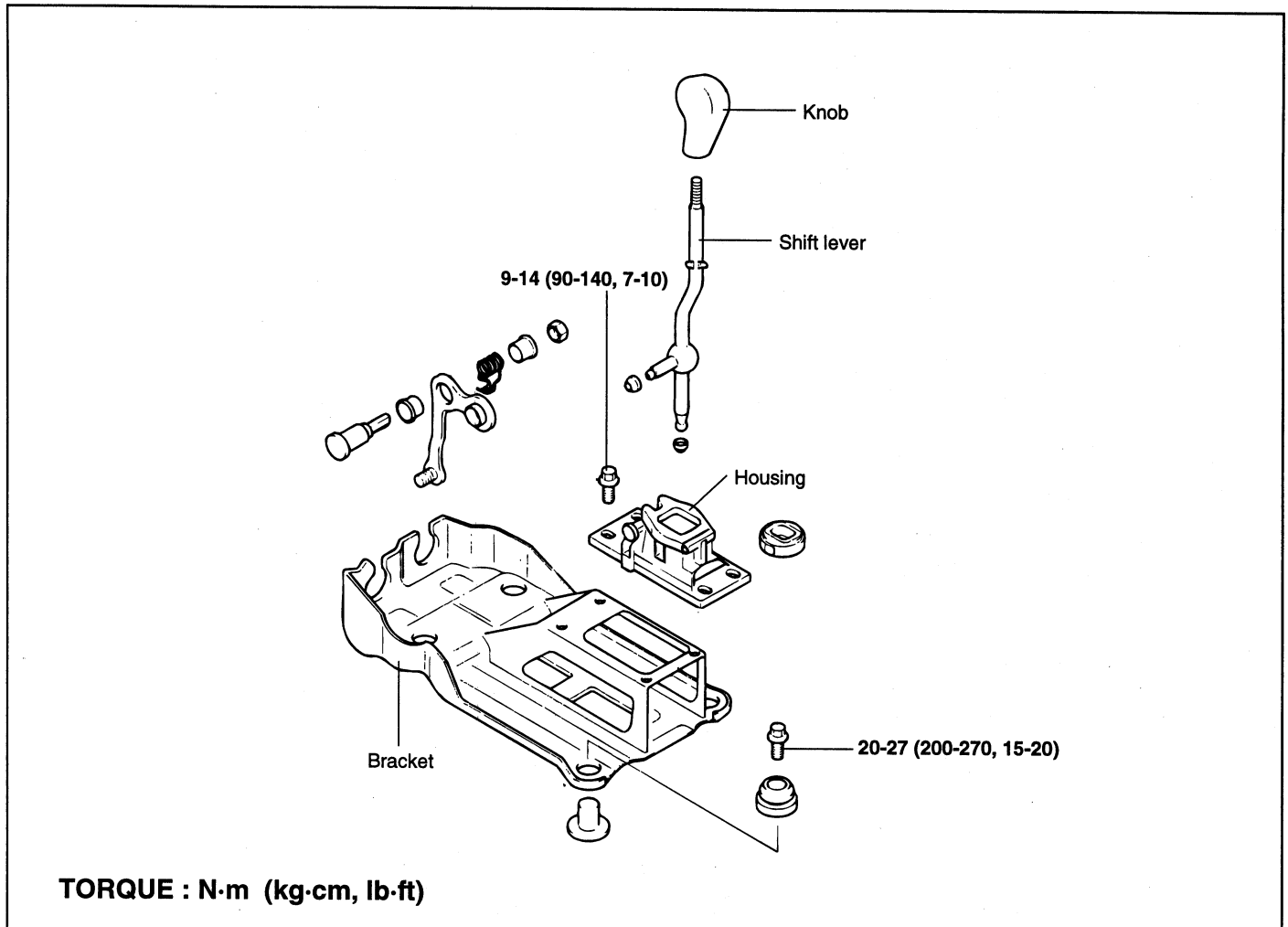
1. Check the select cable for proper operation and for damage.
2. Check the shift cable for proper operation and for damage.
3. Check the boot for damage.
4. Check each bushing for wear, abrasion, sticking, restricted movement or damage.
5. Check for a weak or damaged return spring.

REASSEMBLY EMA90140

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

SHIFT LEVER

COMPONENTS EMJA0150



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

EKJA0440

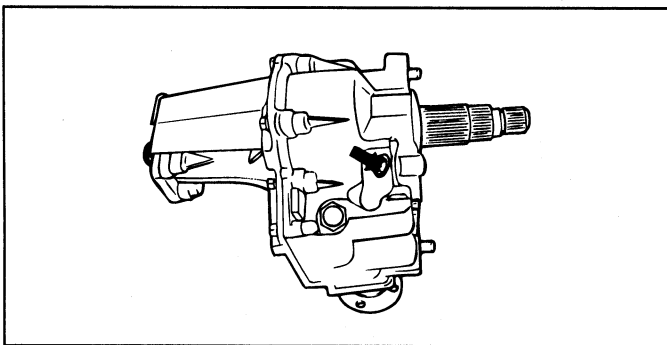
SYSTEM DESCRIPTION

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 slip-page 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.



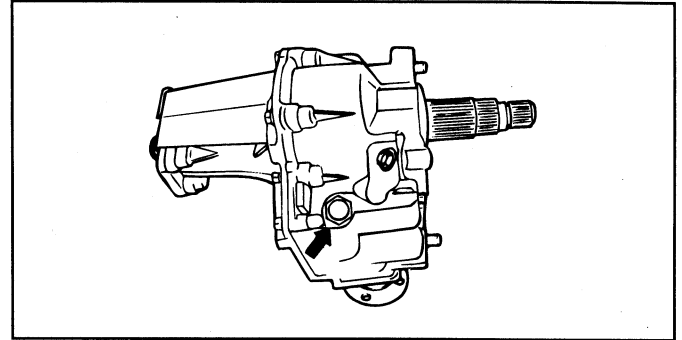
EFJA001A

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.

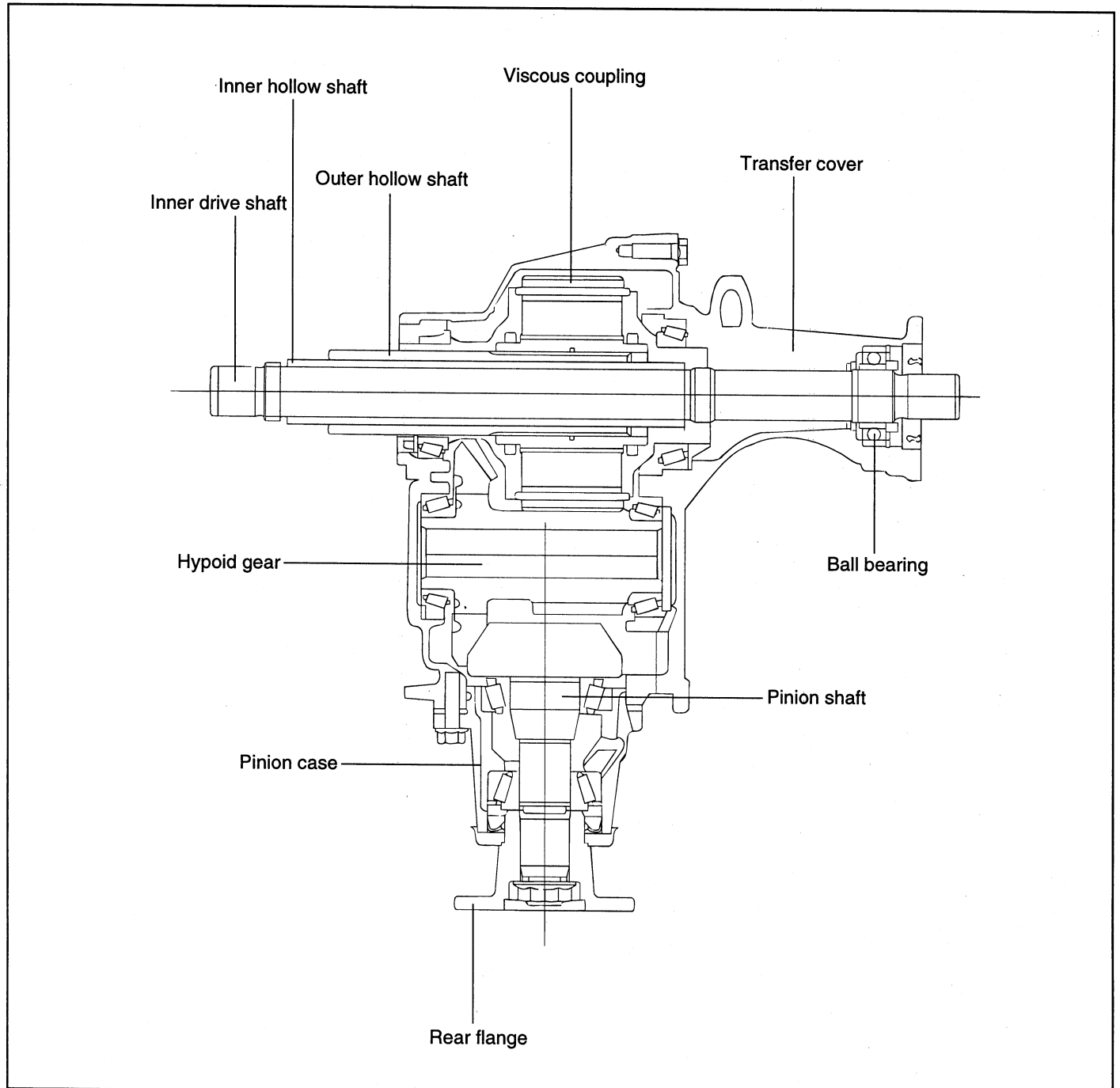


EKJA044A

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.

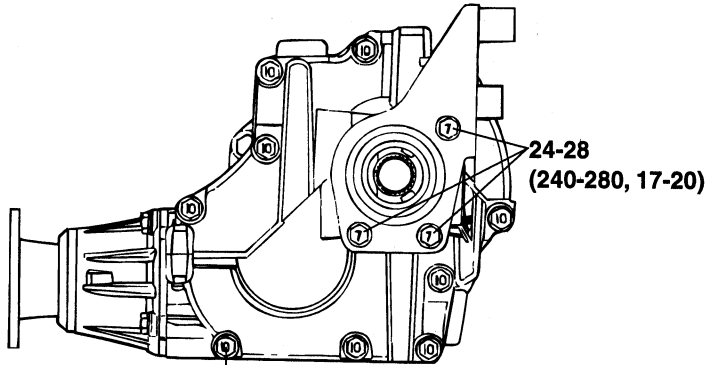
TRANSFER CASE

SECTION VIEW EKJA0420

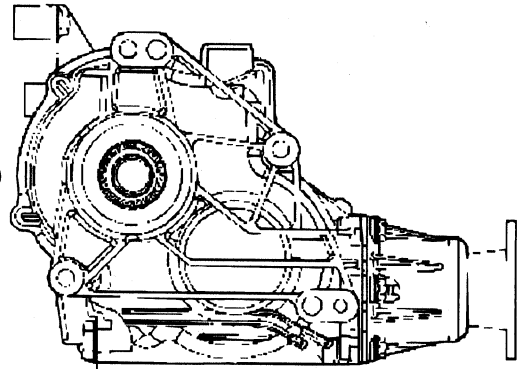


OUTSIDE VIEW EKJA0430

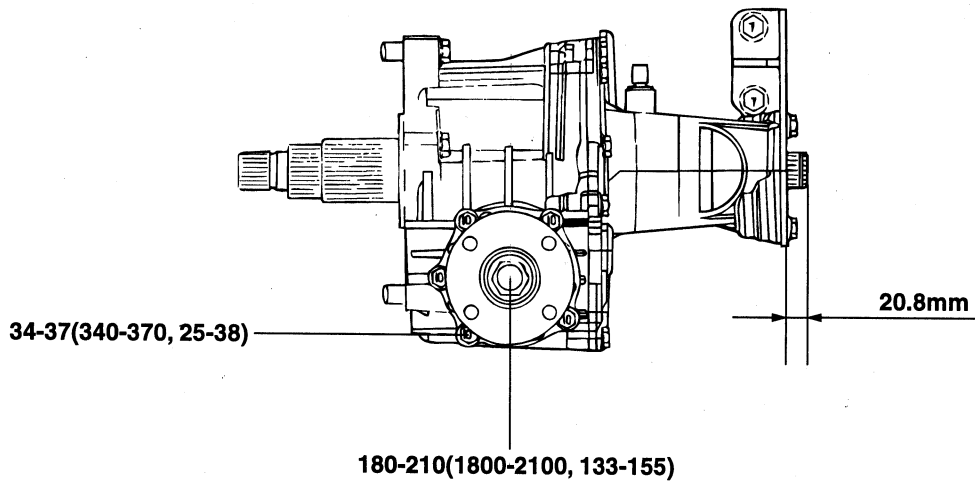
<Right view>



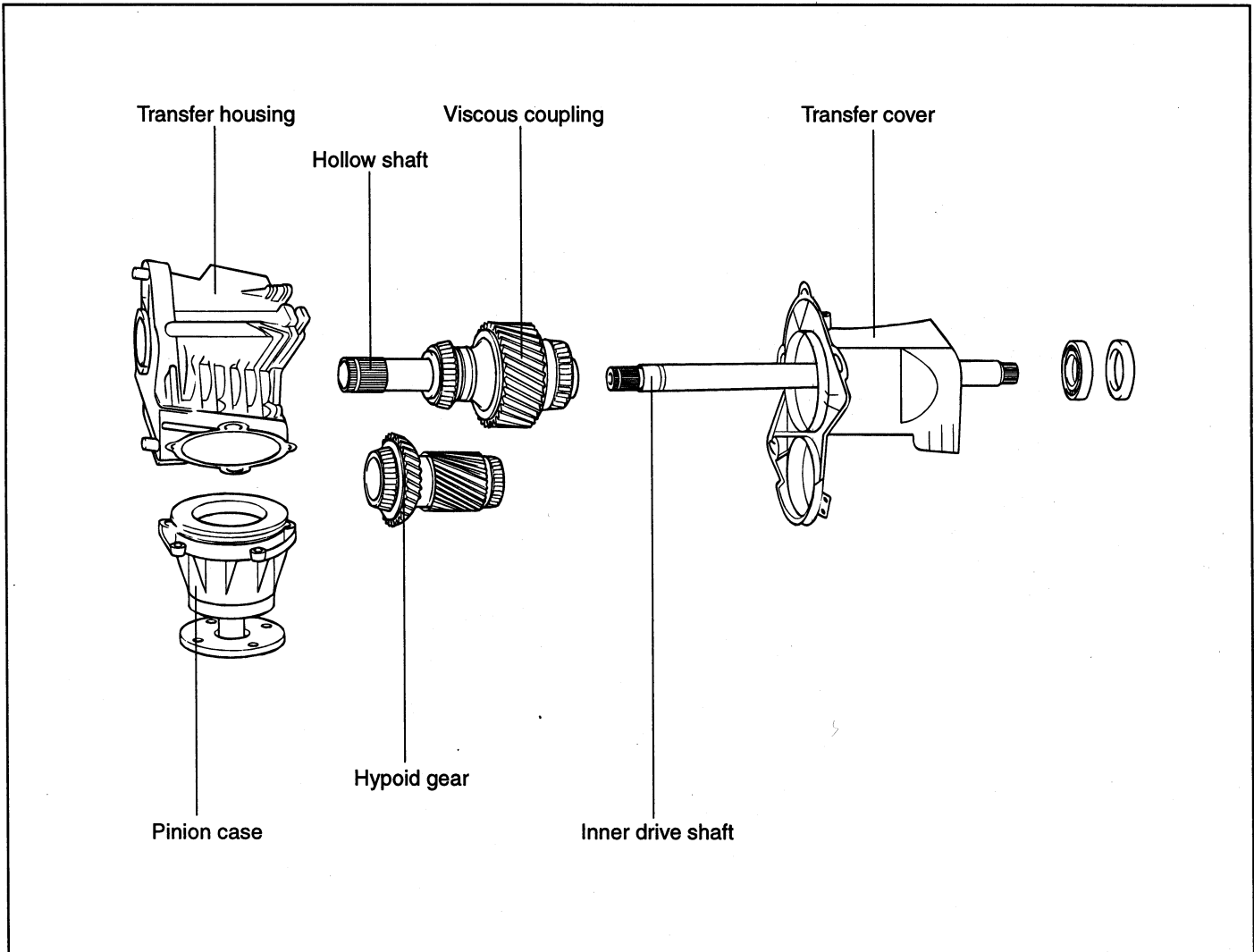
<Left view>



<Rear view>



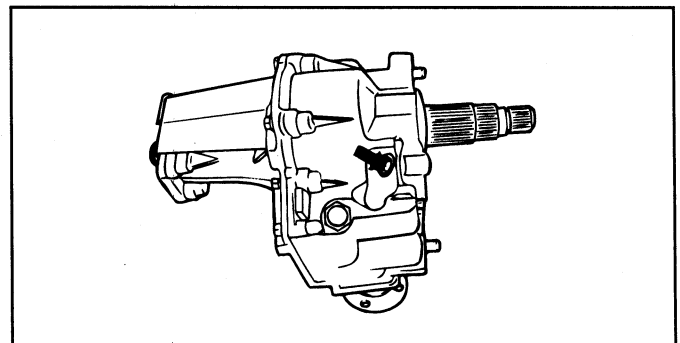
TORQUE : N·m (kg·cm, lb·ft)

TRANSFER CASE EKJA0450**COMPONENTS**

EKJA045A

REMOVAL EKJA0460

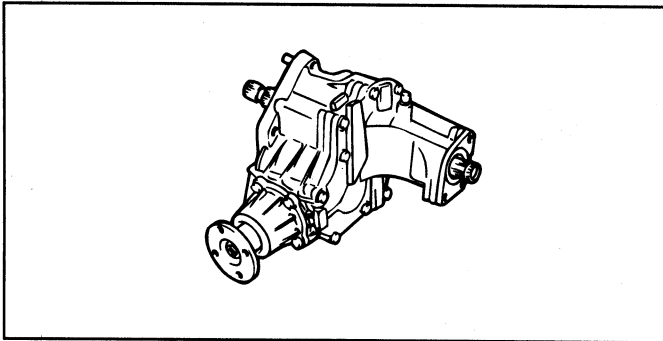
1. Attach the, engine support fixture (09200-38001) to the engine (if necessary).
2. Remove the transfer case and the sub-frame mounting bracket.
3. Raise the vehicle and remove the tires.
4. Remove the front muffler.
5. Drain the transfer case oil.



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.

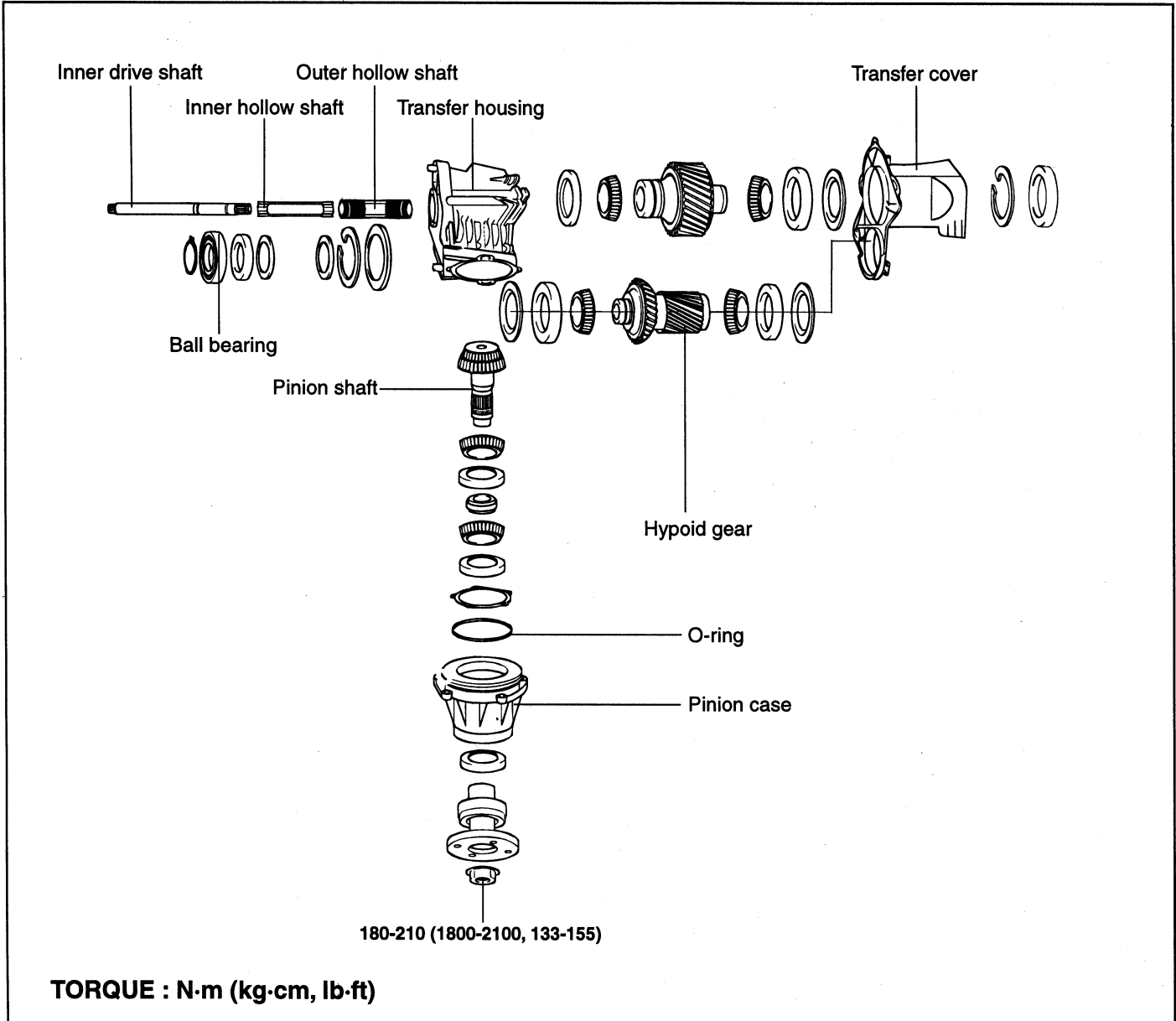
9. Remove the steering tube attached to the sub-frame.
10. Remove the bolts of the sub-frame and the sub-frame assembly.
11. Support the transfer case with a jack.
12. Remove the transfer case mounting bolts.
13. Remove the transfer case assembly.



EFJA001B

TRANSFER CASE EKJA0470

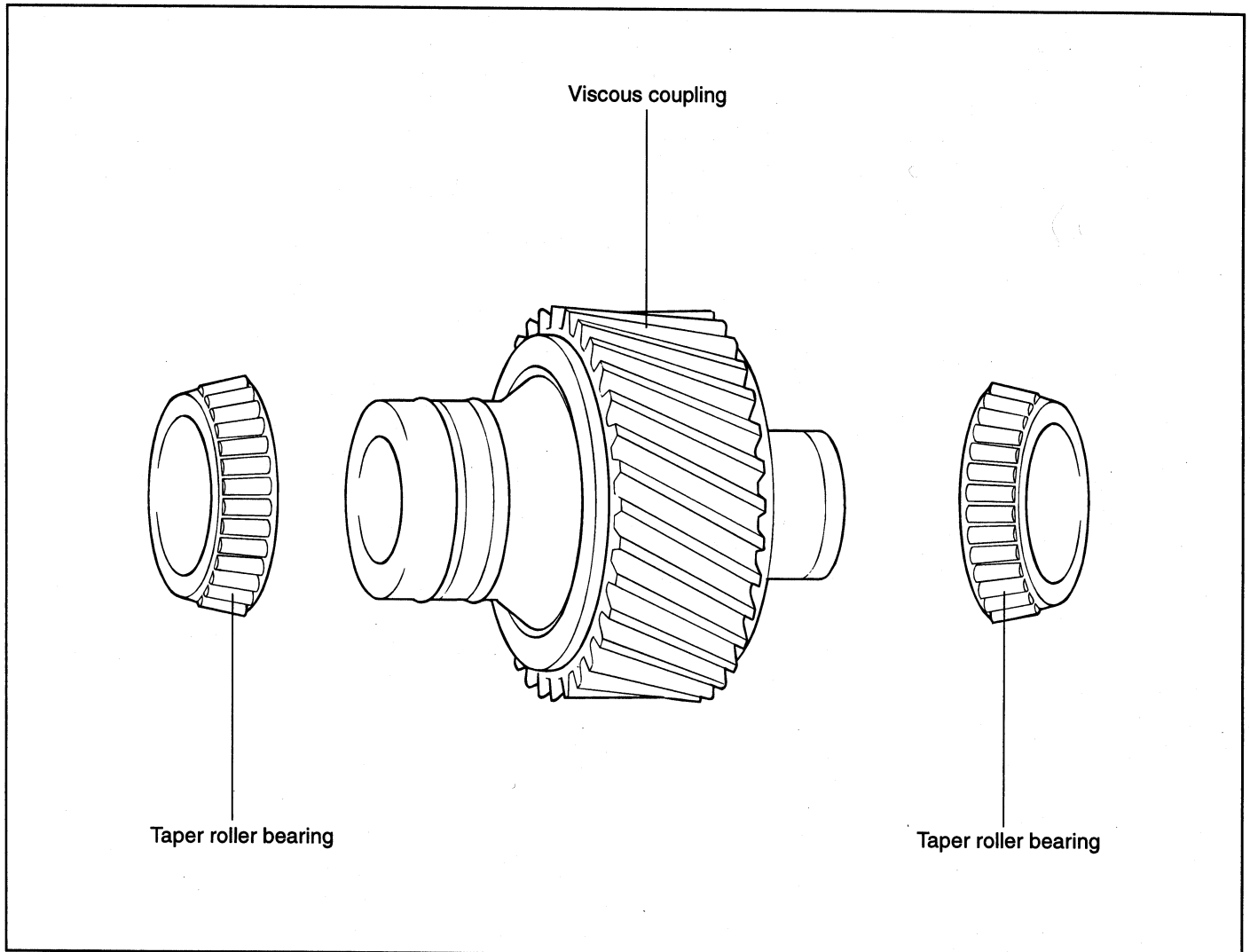
COMPONENTS



VISCOUS COUPLING

VISCOUS COUPLING EKJA0480

COMPONENTS



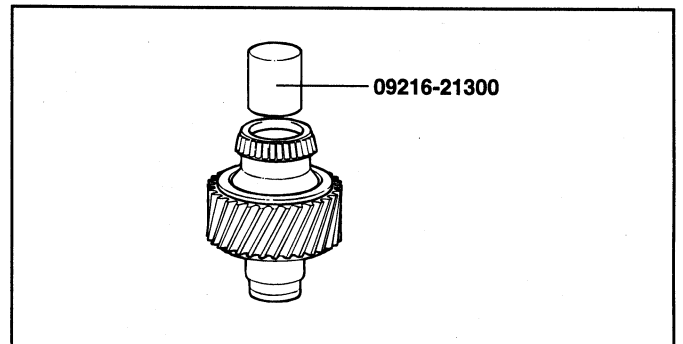
EKJA048A

NOTE

The viscous coupling is not serviceable

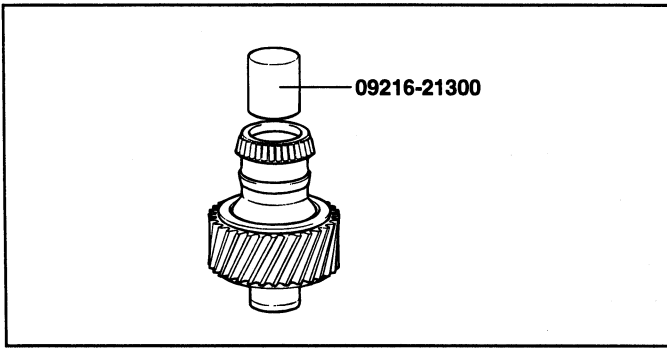
REASSEMBLY EKJA0490

1. Reassemble the taper roller bearing using special Tool.



EFJA007A

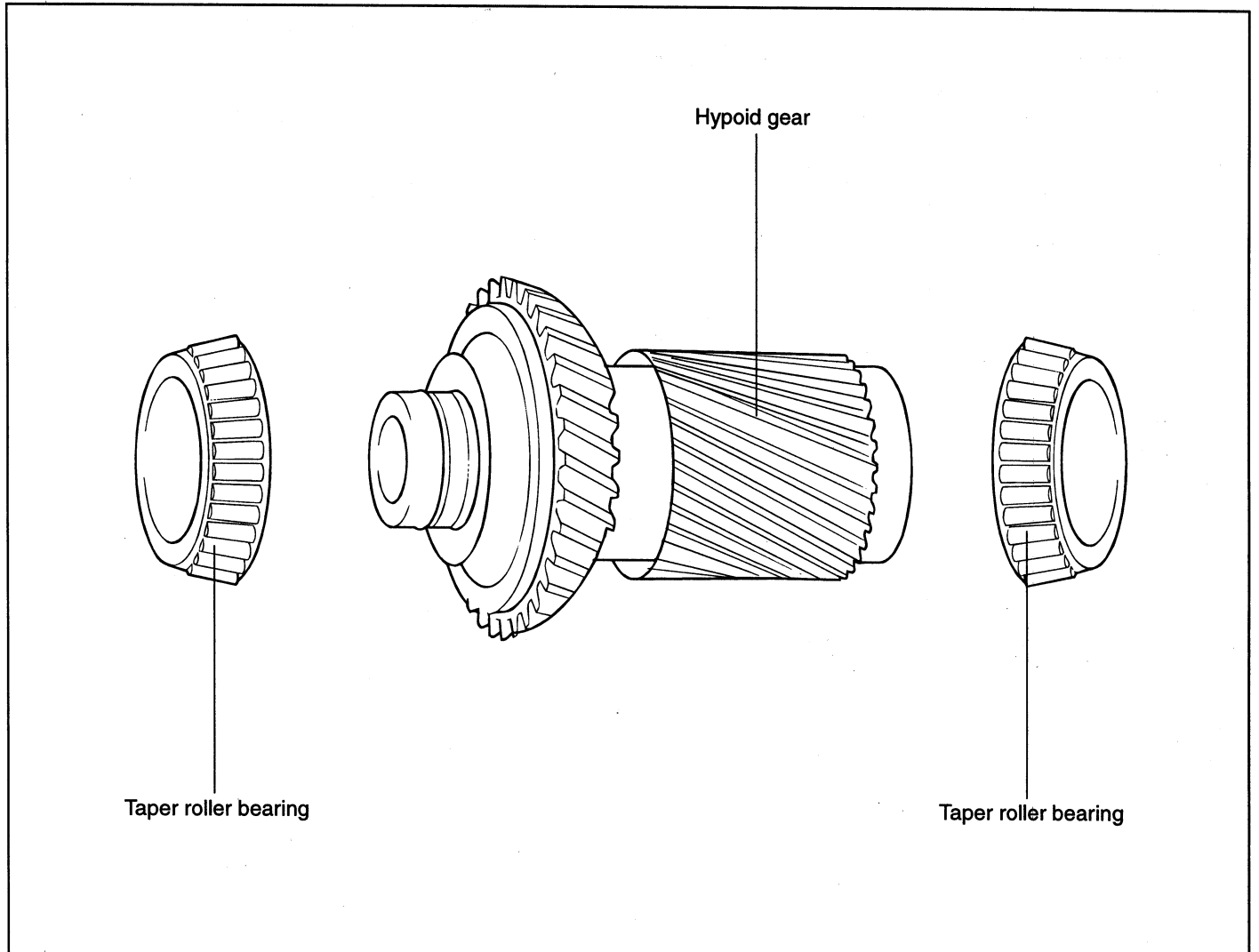
2. Reassemble the taper roller bearing (larger size) in opposite side using special Tool.



EFJA008A

HYPOID GEAR EKJA0500

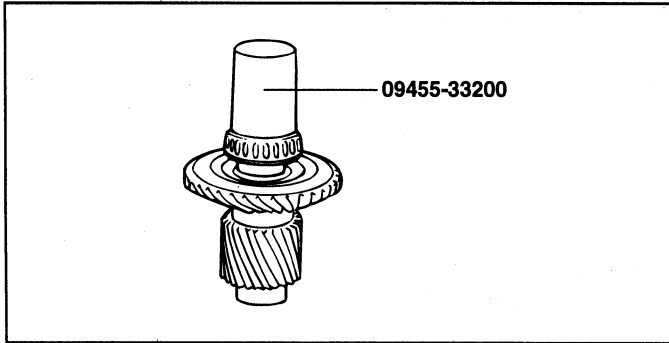
COMPONENTS



HYPOID GEAR

REASSEMBLY EKJA0510

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

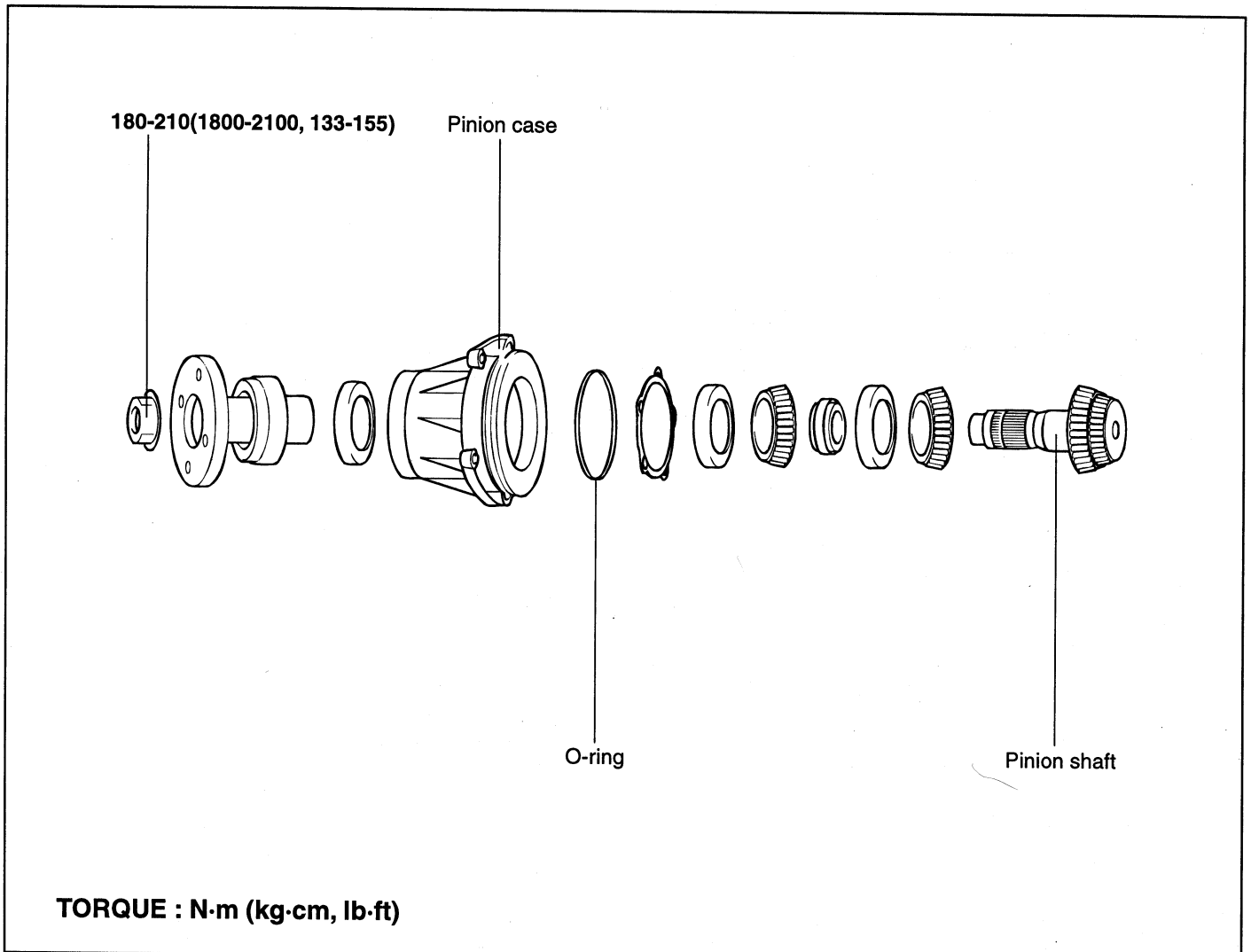


EFJA010A

PINION SHAFT AND CASE

PINION SHAFT AND CASE EKJA0520

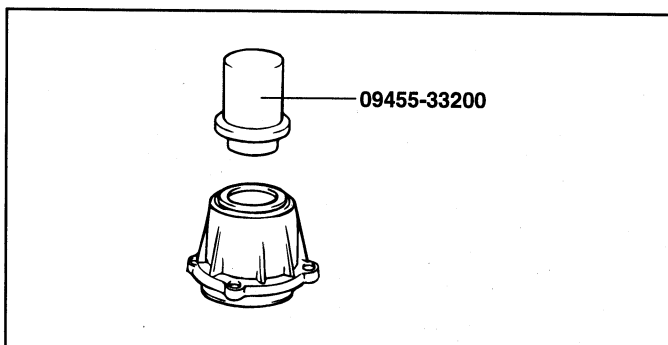
COMPONENTS



EKJA052A

REASSEMBLY EKJA0530

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

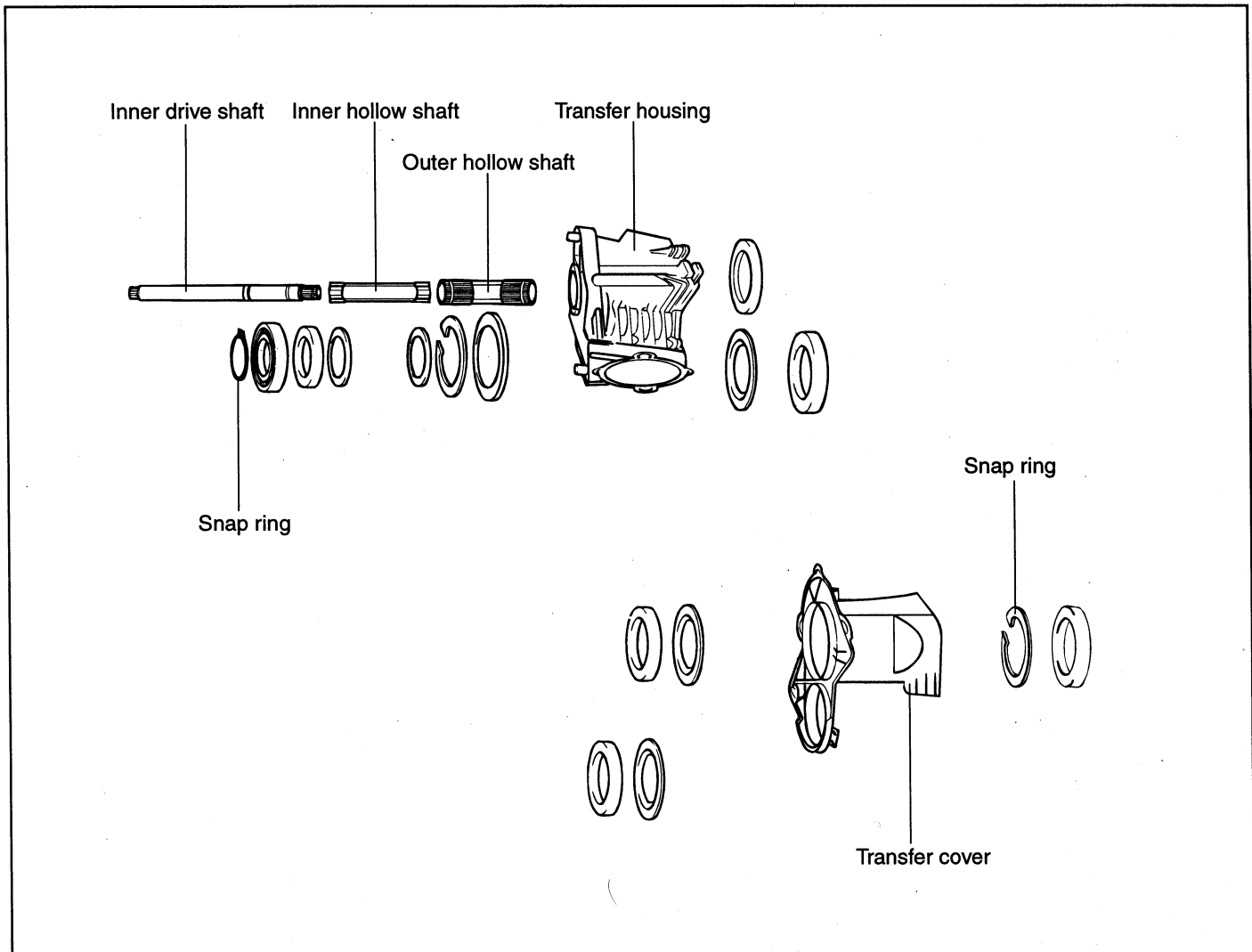


EFJA012A

TRANSFER HOUSING AND COVER

TRANSFER HOUSING AND COVER EKJA0540

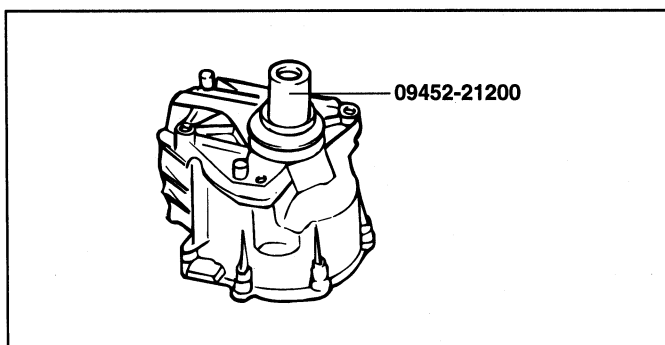
COMPONENTS



EKJA054A

REASSEMBLY EKJA0550

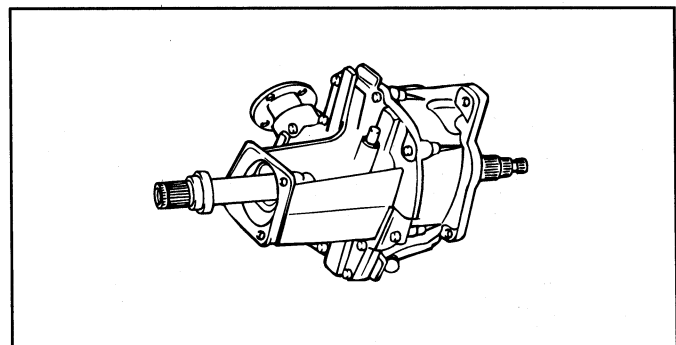
1. Reassemble the oil seal on the transfer housing using the special tool.



EFJA014A

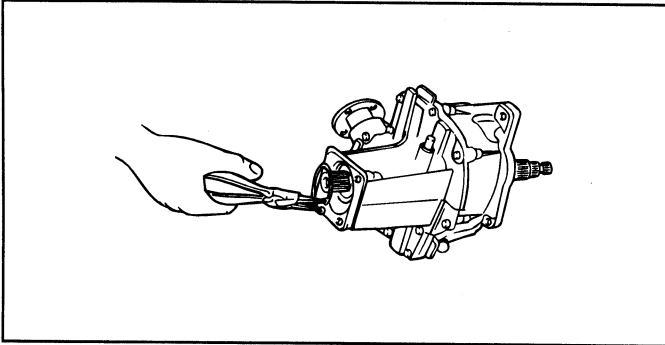
REMOVAL OF INNER DRIVE SHAFT

1. Remove the oil seal.

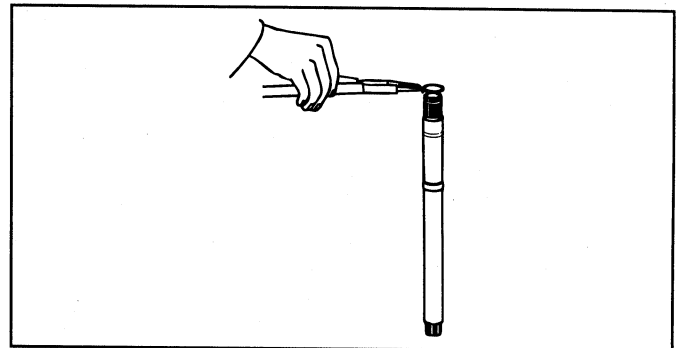


EFJA017A

2. Remove the snap ring.

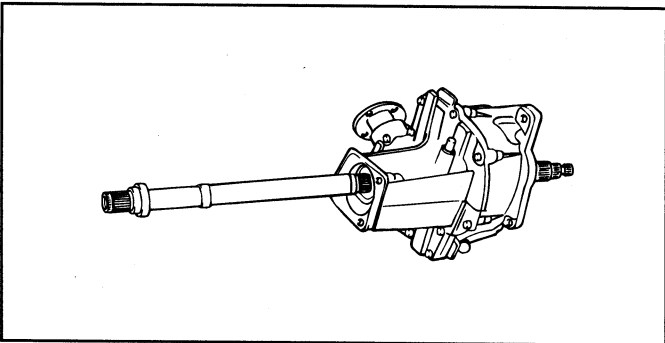


EFJA018A



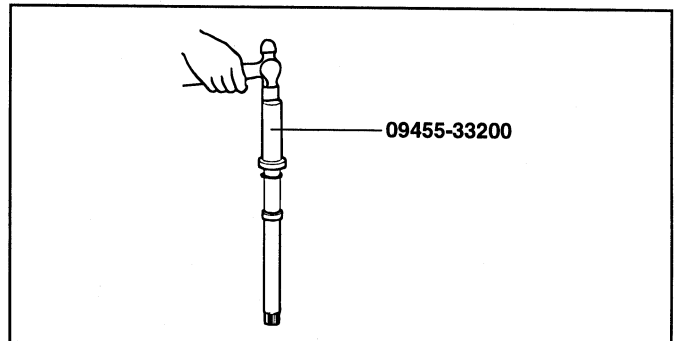
EFJA021A

3. Remove the inner drive shaft.



EFJA020A

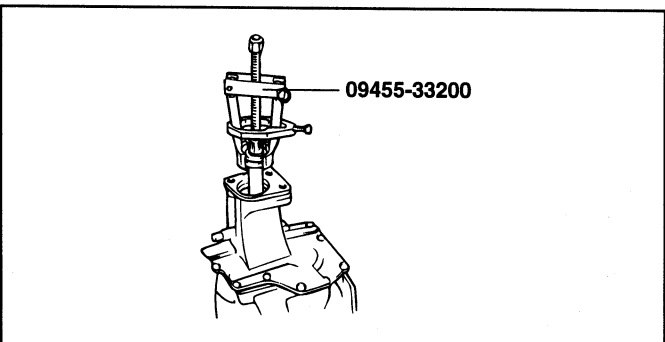
2. Reassemble the ball bearing and the hoop ring.



EFJA022A

REMOVAL OF INNER DRIVE SHAFT BEARING.

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

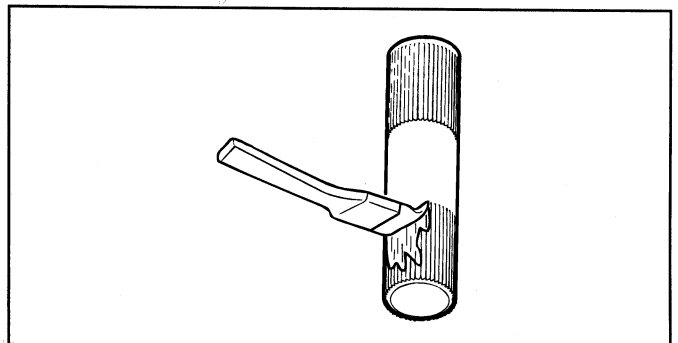


EFJA020B

REASSEMBLY OF HOLLOW SSHAFT

1. Apply grease to the spline surface.

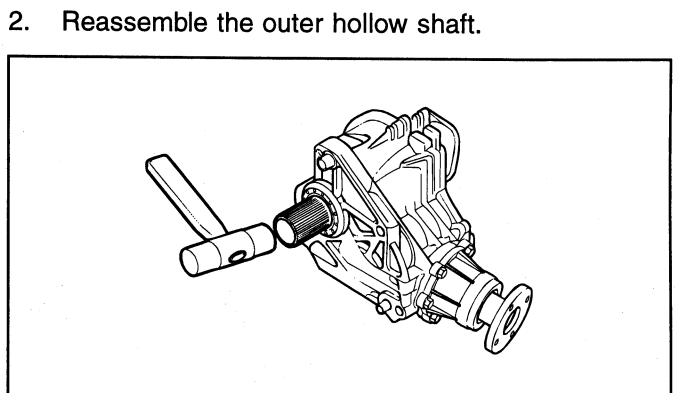
GREASE : KLUBER MICROLUBE GNY202equivalent



EFJA023A

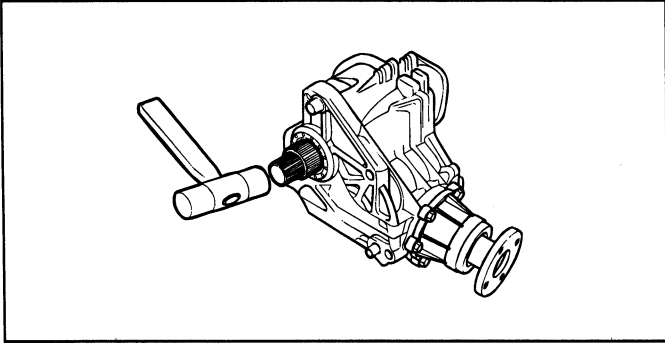
REASSEMBLY OF BEARING AND SNAP RING

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



EFJA025A

3. Reassemble the inner hollow shaft.



EFJA027A