


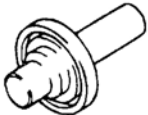


2002 AUTOMATIC TRANSMISSIONS

Diagnosis & Overhaul - Sedona

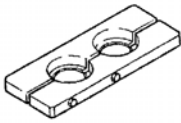
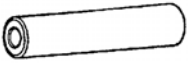
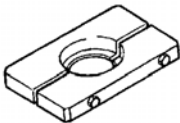

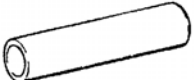
GENERAL

SPECIAL SERVICE TOOLS

Tool (Number and Name)	Illustration	Use
09453-24000 Snap ring compressor		Removal and installation of the underdrive clutch snap ring.
09452-21401 Guide pin		Installation of the oil pump and transfer drive gear. (use with 09452-21301)
09453-33100 Dial gauge extension		Measurement of the low and reverse and second brake end play.
09431-39000 Oil seal installer		Installation of the drive shaft oil seal.






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Fig. 1: Illustrating Special Service Tools (1 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

Tool (Number and Name)	Illustration	Use
09432-33200 Remover plate		Removal of the transfer shaft bearing.
09432-33800 Bearing installer		<ol style="list-style-type: none"> 1. Removal of the transfer drive gear taper bearing. (use with 09433-21000) 2. Installation of the transfer shaft bearing.
09433-21000 Remover plate		<ol style="list-style-type: none"> 1. Removal of the transfer drive gear taper bearing. (use with 09432-33800) 2. Removal of the differential ball bearing.
09500-11000 Bar		Installation of the differential outlace bearing. (use with 09532-11500)
09455-33200 Bearing installer		Installation of the differential ball bearing and output shaft taper roller bearing.




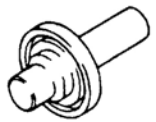
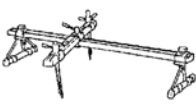
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Fig. 2: Illustrating Special Service Tools (2 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

Tool (Number and Name)	Illustration	Use
09453-21100 Snap ring compressor		Removal and installation of the low and reverse brake snap ring. (use with 09453-2100)
09455-21000 Bearing and gear puller		Removal of the transfer drive gear and bearing.
09455-21100 Bearing installer		<ol style="list-style-type: none"> 1. Installation of the transfer drive gear and bearing. 2. Installation of the transfer drive gear taper bearing.
09532-11500 Bearing installer		Installation of the differential outlace bearing. (use with 09500-11000)
09453-21000 Snap ring compressor		<ol style="list-style-type: none"> 1. Removal and installation to the low & reverse brake snap ring. 2. Removal and installation to the overdrive clutch snap ring. (use with 09456-39000)

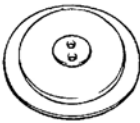
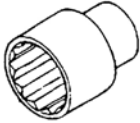
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Fig. 3: Illustrating Special Service Tools (3 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

Tool (Number and Name)	Illustration	Use
09456-39000 Spring compressor		Removal and installation of the low and reverse brake and overdrive clutch snap ring.
09432-21701 Bearing outlace installer		Installation of the output shaft outlace.
09452-33100 Oil pump remover		Removal of the oil pump.
09452-21200 Oil pump oil seal installer		Installation of the oil pump oil seal.
09200-38001 Engine support		Removal and installation of the transaxle.

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Fig. 4: Illustrating Special Service Tools (4 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

Tool (Number and Name)	Illustration	Use
09456-39100A/B Clearance dummy plate		Measurement of the low and reverse and second brake end play.
09457-39000 Socket wrench (41)		Removal and installation of the output lock nut.

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Fig. 5: Illustrating Special Service Tools (5 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

SPECIFICATIONS

Items		Model	F5A51-3
Torque converter type			3 elements, 1 stage, 2 phase
Transaxle type			5-speed forward, 1-speed reverse
Engine type			Σ 3.5 DOHC
Gear ratio	First		3.789
	Second		2.057
	Third		1.421
	Fourth		0.000
	Fifth		0.731
	Reberse		3.865
Final gear ratio			3.333

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Fig. 6: Service Specifications (1 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

Item	Model	F5A51-3
Underdrive clutch end play		0.063 ~ 0.071(1.6~1.8)
Overdrive clutch end play		0.063 ~ 0.071(1.6~1.8)
Reverse clutch end play		0.059~ 0.067(1.5~1.7)
Second brake end play		0.043 ~ 0.061(1.09~1.55)
Low and reverse brake end play		0.065 ~ 0.083(1.65~2.11)
Direct clutch end play		0.024 ~ 0.031(0.6~0.8)
Underdrive sun gear end play		0.0098 ^L ~ 0.0177 ^L (0.25 ^L ~0.45 ^L)
Input shaft end play		0.027 ^L ~ 0.057 ^L (0.70 ^L ~1.45 ^L)
Differential case end play		0.0177 ^T ~ 0.0041 ^T (0.45 ^T ~0.105 ^T)
Differential side gear and pinion gear end play		0.00098 ^L ~ 0.0059 ^L (0.025 ^L ~0.150 ^L)
Brake reaction plate end play		0 ~ 0.0063 ^L (0~0.16 ^L)

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Fig. 7: Service Specifications (2 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

SNAP, RING, SPACER, THRUST WASHER AND PRESSURE PLATE SPECIFICATIONS

Part name	Models	Thickness in(mm)	Identification symbol
Thrust washer (For adjustment of input shaft end play)	F5A51- 3	0.071(1.8)	18
		0.079(2.0)	20
		0.087(2.2)	22
		0.094(2.4)	24
		0.102(2.6)	26
		0.110(2.8)	28
Snap ring (For adjustment of underdrive clutch and overdrive clutch end play)	F5A51- 3	0.079(2.0)	colorless
		0.083(2.1)	blue
		0.087(2.2)	brown
		0.091(2.3)	colorless
		0.094(2.4)	blue
		0.098(2.5)	brown
		0.102(2.6)	colorless
		0.106(2.7)	blue
		0.110(2.8)	brown
		0.114(2.9)	colorless
		0.118(3.0)	blue
		0.075(1.9)	brown
		0.071(1.8)	blue
		0.067(1.7)	colorless
		0.063(1.6)	brown

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Fig. 8: Snap, Ring, Spacer, Thrust Washer And Pressure Plate Specifications (1 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.

Part name	Models	Thickness in(mm)	Identification symbol
Snap ring (For adjustment of low and reverse brake and second brake reaction plate end play)	F5A51-3	0.085(2.2)	colorless
		0.091(2.3)	blue
		0.094(2.4)	brown
		0.098(2.5)	colorless
Pressure plate (For adjustment of low and reverse brake and second brake reaction plate end play)	F5A51-3	0.071(1.8)	E
		0.079(2.0)	D
		0.087(2.2)	C
		0.094(2.4)	B
		0.102(2.6)	A
		0.110(2.8)	O
		0.118(3.0)	I
		0.063(1.6)	F
Snap ring (For adjustment of reverse clutch end play)	F5A51-3	0.079(2.0)	blue
		0.083(2.1)	brown
		0.087(2.2)	colorless
		0.091(2.3)	blue
		0.094(2.4)	brown
		0.098(2.5)	colorless
		0.102(2.6)	blue
		0.106(2.7)	brown
		0.110(2.8)	colorless
		0.075(1.9)	colorless
		0.071(1.8)	brown
		0.067(1.7)	blue
		0.063(1.6)	colorless
Snap ring (For adjustment of reverse brown and overdrive clutch spring retainer colorless end play)	F5A51-3	0.0583(1.48)	brown
		0.0602(1.53)	colorless
		0.0622(1.58)	blue
		0.0642(1.63)	brown

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Fig. 9: Snap, Ring, Spacer, Thrust Washer And Pressure Plate Specifications (2 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.

Part name	Models	Thickness in(mm)	Identification symbol
Thrust washer (For adjustment of underdrive sun gear end play) Snap ring (For adjustment of direct clutch end play) Spacer (For adjustment of output shaft preload)	F5A51-3	0.036(1.6)	-
		0.067(1.7)	-
		0.071(1.8)	-
		0.075(1.9)	-
		0.079(2.0)	-
		0.083(2.1)	-
		0.087(2.2)	-
		0.091(2.3)	-
		0.094(2.4)	-
		0.098(2.5)	-
		0.102(2.6)	-
		0.075(1.9)	brown
		0.079(2.0)	colorless
		0.083(2.1)	blue
		0.087(2.2)	brown
		0.091(2.3)	colorless
		0.094(2.4)	blue
		0.098(2.5)	brown
		0.102(2.6)	colorless
		0.106(2.7)	blue
		0.110(2.8)	brown
		0.114(2.9)	colorless
		0.118(3.0)	blue
		0.074(1.88)	88
		0.076(1.92)	92
		0.077(1.96)	96
		0.079(2.00)	00
		0.080(2.04)	04
		0.082(2.08)	08
		0.083(2.12)	12
		0.085(2.16)	16
		0.087(2.20)	20
		0.088(2.24)	24
		0.089(2.28)	28
		0.091(2.32)	32
		0.093(2.36)	36
		0.094(2.40)	40
		0.096(2.44)	44
		0.097(2.48)	48

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Fig. 10: Snap, Ring, Spacer, Thrust Washer And Pressure Plate Specifications (3 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.

Part name	Models	Thickness in(mm)	Identification symbol
Thrust washer (For adjustment of underdrive sun gear end play) Snap ring (For adjustment of direct clutch end play) Spacer (For adjustment of output shaft preload)	F5A51-3	0.099(2.52)	52
		0.101(2.56)	56
		0.102(2.60)	60
		0.104(2.64)	64
		0.106(2.68)	68
		0.107(2.72)	72
		0.109(2.76)	76
Spacer (For adjustment of differential gear backlash) Spacer (For adjustment of differential case preload)	F5A51-3	0.024(0.6)	-
		0.027(0.7)	-
		0.031(0.8)	-
		0.035(0.9)	-
		0.039(1.0)	-
		0.043(1.1)	-
		0.047(1.2)	-
		0.051(1.3)	-
		0.055(1.4)	-
		0.033(0.83)	83
		0.034(0.86)	86
		0.035(0.89)	89
		0.036(0.92)	92
		0.037(0.95)	95
		0.038(0.98)	98
		0.040(1.01)	01
		0.041(1.04)	04
		0.042(1.07)	07
		0.043(1.10)	10
		0.044(1.13)	13
		0.046(1.16)	16
		0.047(1.19)	19
		0.048(1.22)	22
		0.049(1.25)	25
		0.050(1.28)	28
		0.052(1.31)	31
		0.053(1.34)	34
		0.054(1.37)	37

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Fig. 11: Snap, Ring, Spacer, Thrust Washer And Pressure Plate Specifications (4 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.

TIGHTENING TORQUE

Item	N·m	kg·cm	lb·ft
Wiring harness bracket	20-26	200-260	14-18
Control cable bracket	20-26	200-260	14-18
Eye bolt	27-33	270-330	19-23
Oil cooler feed tube	10-12	100-120	7-8
Input shaft speed sensor	10-12	100-120	7-8
Output shaft speed sensor	10-12	100-120	7-8
Manual control lever	18-25	180-250	13-18
Transaxle range switch	10-12	100-120	7-8
Vehicle speed sensor	4-6	40-60	3-4
Valve body cover	8-10	80-100	6-7
Valve body mounting bolt	10-12	100-120	7-8
Oil temperature sensor	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	31-36	320-370	23-27
Output shaft lock nut	160-180	1600-1800	110-126
Output shaft bearing retainer	20-26	200-260	14-18
Oil filler tube	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	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 cross member bolts	60-80	600-800	43-58
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 cross member bolts	50-65	500-650	36-47
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	60-80	600-800	43-58
Transaxle mounting insulator bolt	90-110	900-1100	65-80

G01092310

Fig. 12: Torque Specifications

Courtesy of KIA MOTORS AMERICA, INC.

WARNING: Always follow torque tightening levels. Failure to follow such levels can result in parts breaking if over-tightened or loosening if under-tightened.

in either case, serious personal injury or death could result to the vehicle occupants.

LUBRICANT

Items	Specified lubricant	Quantity
Transaxle fluid lit.	GENUINE DIAMOND ATF SP-III	8.5lit (8.9US qt, 7.4 Imp qt)

G01092311

Fig. 13: Lubricant Specifications
Courtesy of KIA MOTORS AMERICA, INC.

SEALANTS

Items	Specified sealant
Rear cover Torque converter housing Valve body cover	HMC's approved sealant TB 1281B or LOCTITE FMD546

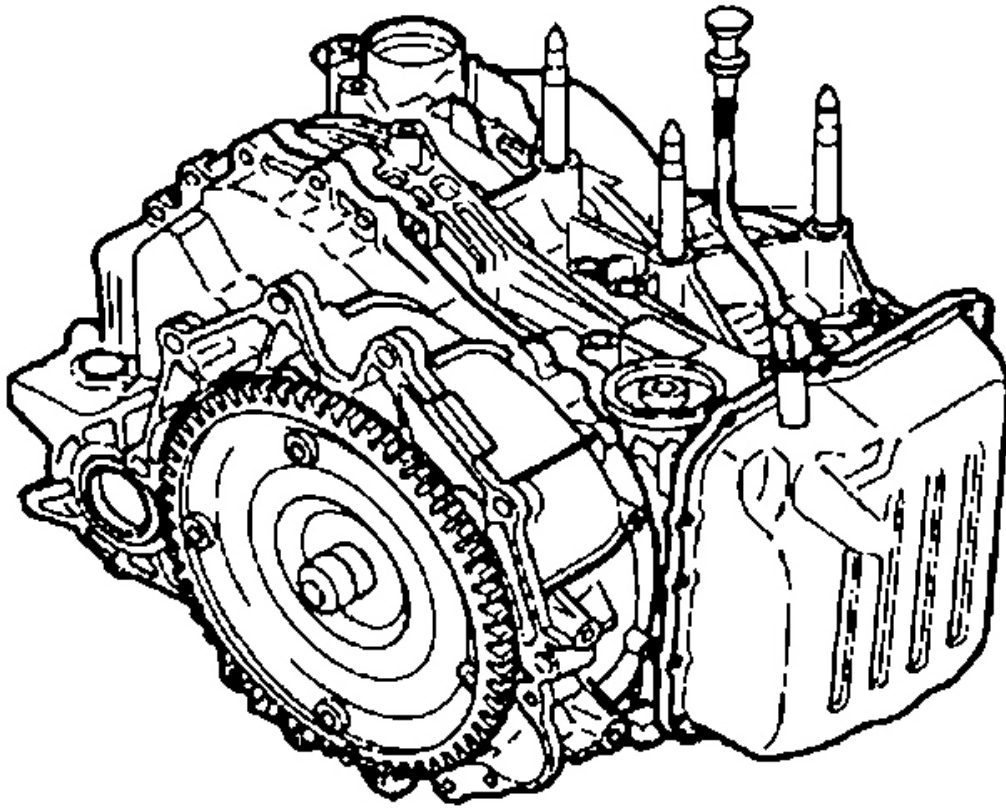
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Fig. 14: Sealants Specifications
Courtesy of KIA MOTORS AMERICA, INC.

SERVICE & ADJUSTMENTS

ATF CHECKING

1. Drive the vehicle to warm ATF up to operating temperature (70-80 °C).
2. Park the vehicle at even surface and engage the parking brake. (Depress the parking brake pedal for foot type)
3. Move the selector lever through all positions and place it at position "P" or "N".

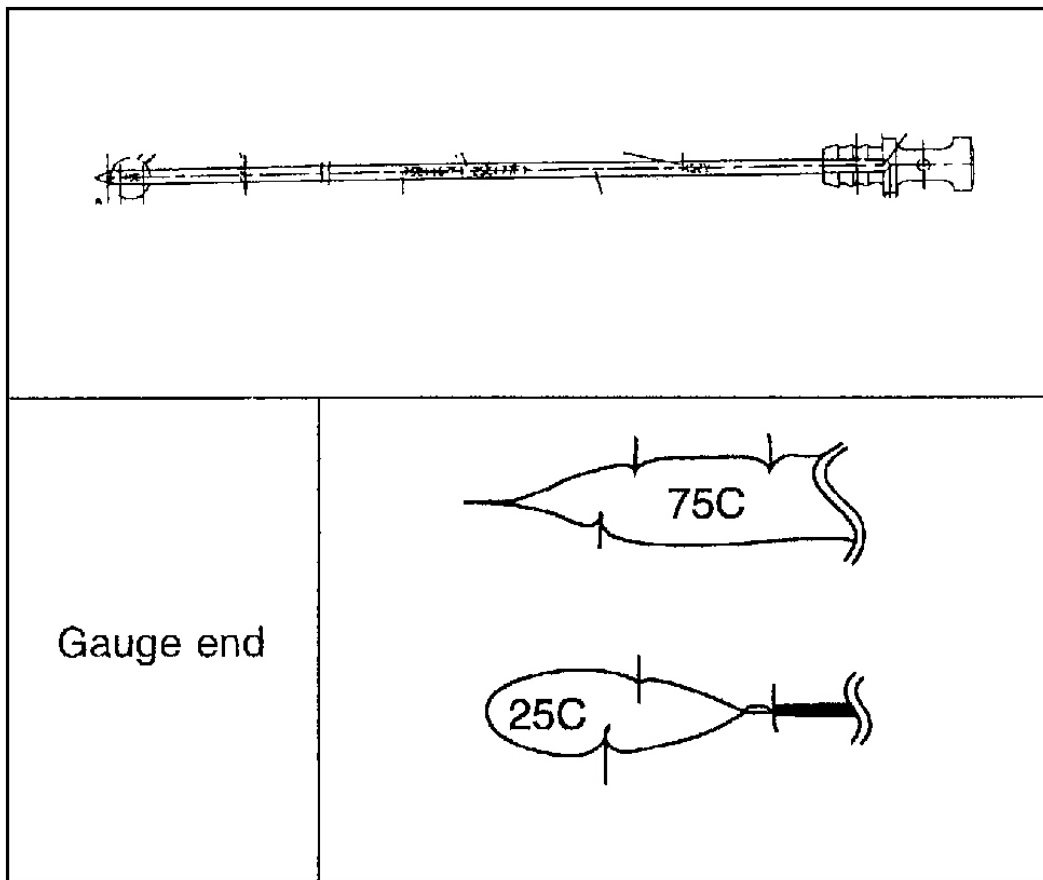


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Fig. 15: Checking ATF Fluid Level
Courtesy of KIA MOTORS AMERICA, INC.

4. Remove dirt around the fluid level gauge and clean the gauge to check ATF.

NOTE: If there's burnt odor, it means that ATF is contaminated by fine particles from bush (metal) or abrasive materials. Then you must overhaul the transaxle and cleanse the cooler line.



G01092315

Fig. 16: Illustrating Gauge
Courtesy of KIA MOTORS AMERICA, INC.

5. Check the ATF level. ATF shall reach "75°C" range of the fluid level gauge. Otherwise, add the fluid to "75°C" range.

Use GENUINE DIAMOND ATF SP-III fluid.

NOTE:

1. Low ATF level will make fluid pump inhale outside air to generate bubbles within the fluid pressure line. Then fluid pressure will be decreased to cause retarded shift or slip of the clutches and the brakes.
2. Surplus fluid will make gears pump up fluid to generate bubbles resulting to the same effect as low fluid level.
3. High or low fluid level will cause fluid overheating and oxidation, and

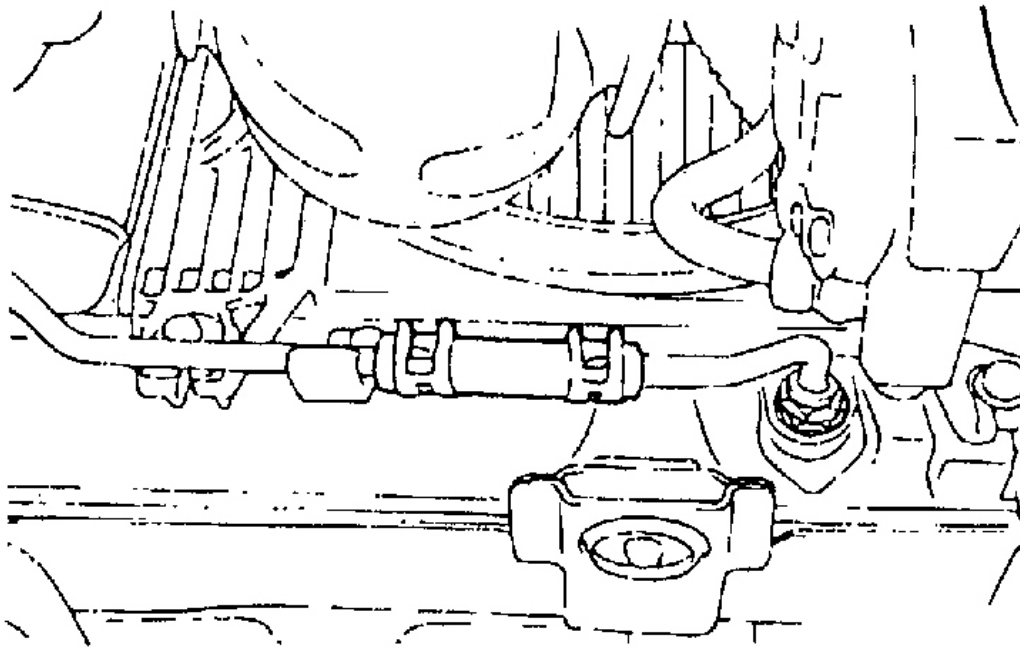
the valves, the clutches, and the brake will not operate properly. Besides, bubble will make fluid overflow into air bleeder or fluid filter tube though there is no fluid leakage.

6. Insert the fluid level gauge correctly.

AUTOMATIC TRANSAXLE FLUID REPLACEMENT

1. Warm up ATF to operation temperature, 70-80 °C.
2. Disconnect the out hose of the oil cooler.
3. Start the engine and drain the fluid, at "N" range and idling.

CAUTION: Stop the engine for one minute after start-up or when ATF is drained up, at either time which ever is earlier.



G01092316

Fig. 17: Disconnecting Oil Cooler Hose
Courtesy of KIA MOTORS AMERICA, INC.

4. Open the drain plug and drain up fluid, then tighten the plug with tightening torque.

Tightening torque

29-34 N.m (290-340 kg.Cm, 20-24 lb.ft)

5. Reconnect the fluid cooler hose and fill ATF through the fluid filler tube.

Type	Capacity	Specified ATF
F5A51-3	8.5 lit98.9 US qt, 7.4 Imp qt)	GENUINE DIAMOND ATF SP-III

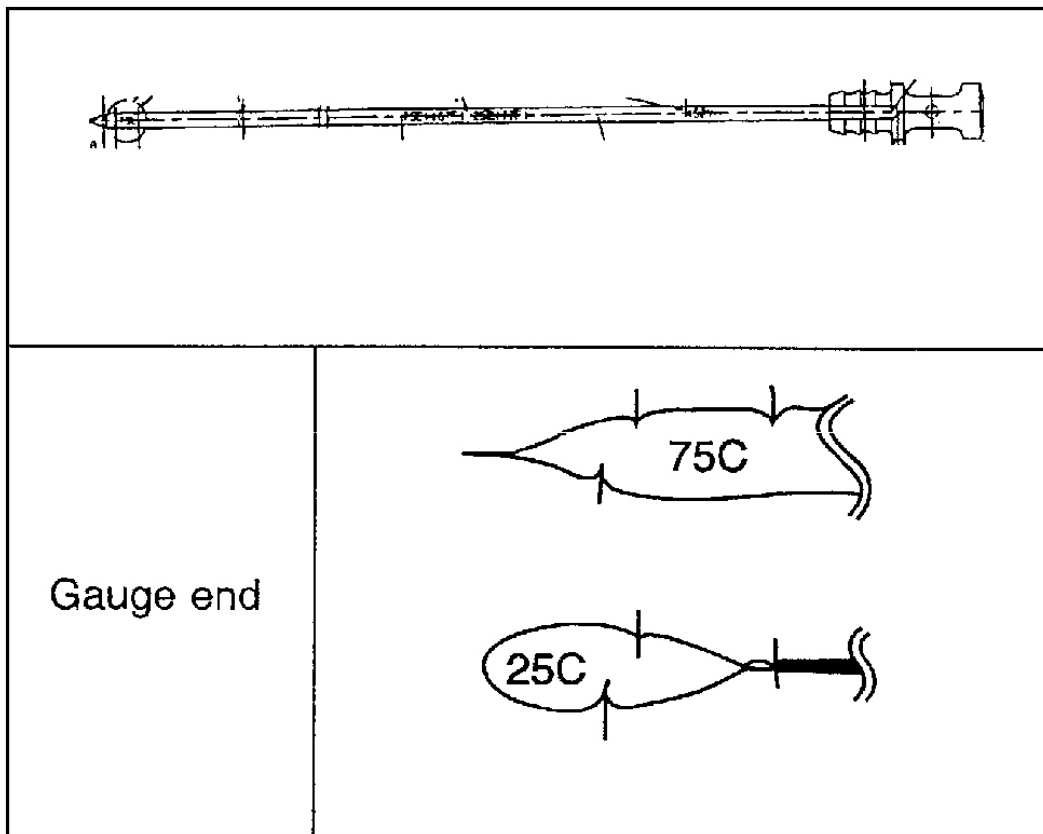
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Fig. 18: ATF Oil Specifications

Courtesy of KIA MOTORS AMERICA, INC.

6. Start the engine and idle it for one or two minutes.
7. Move the selector lever through every position and place the lever at "P" or "N" position.
8. Check the fluid level gauge if the ATF level is within the range marked "25°C". Add fluid if necessary.
9. Run the vehicle to warm up ATF to operating temperature (70-80°C) and check the ATF level again. ATF level shall be within the range marked 75°C.

NOTE: "75°C" level is more important than "25°C" level. "25°C" level is only for complementary information.

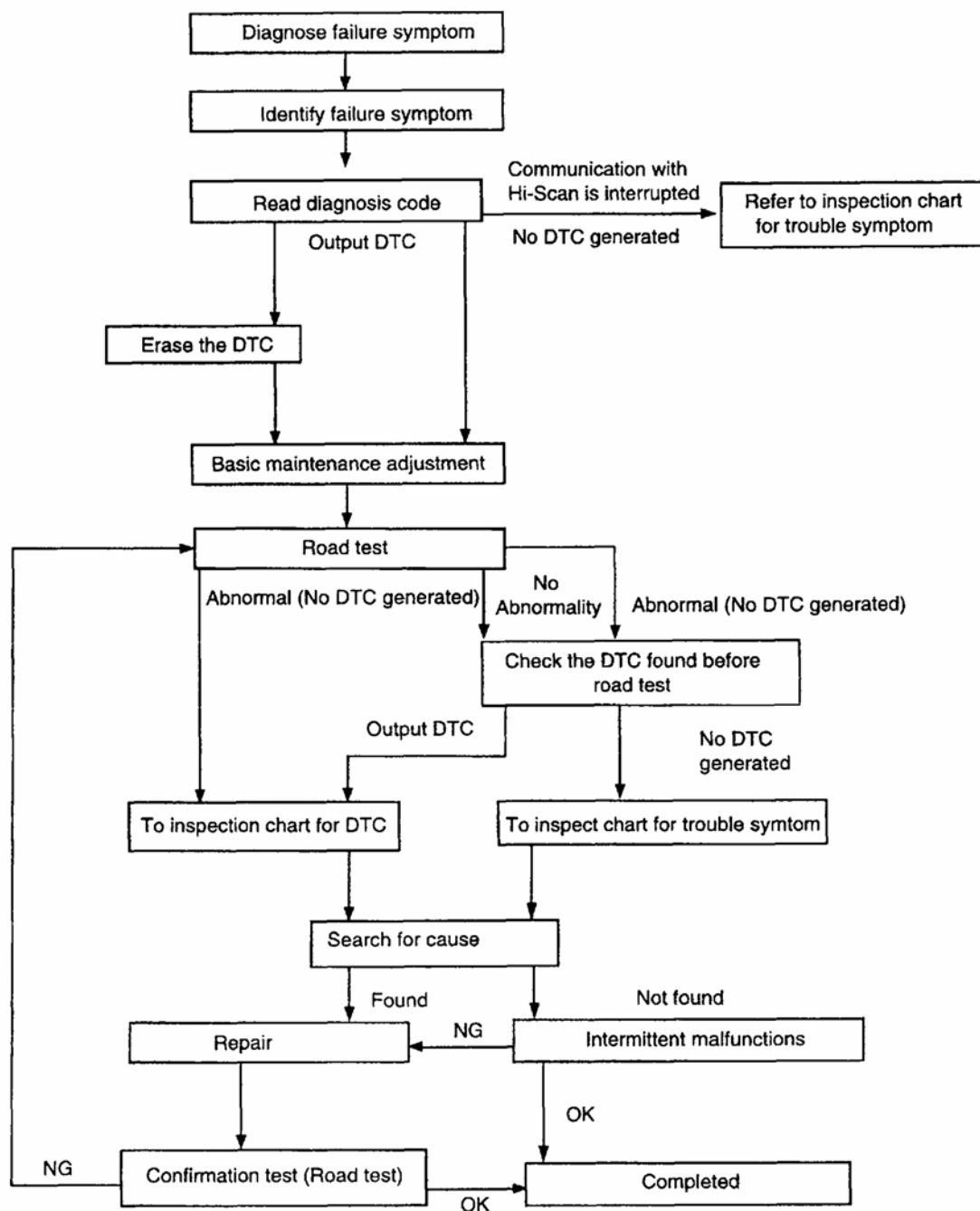


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Fig. 19: Illustrating Gauge
Courtesy of KIA MOTORS AMERICA, INC.

10. Install the fluid level gauge into fluid filler tube.

TROUBLESHOOTING



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Fig. 20: Troubleshooting Guide
Courtesy of KIA MOTORS AMERICA, INC.

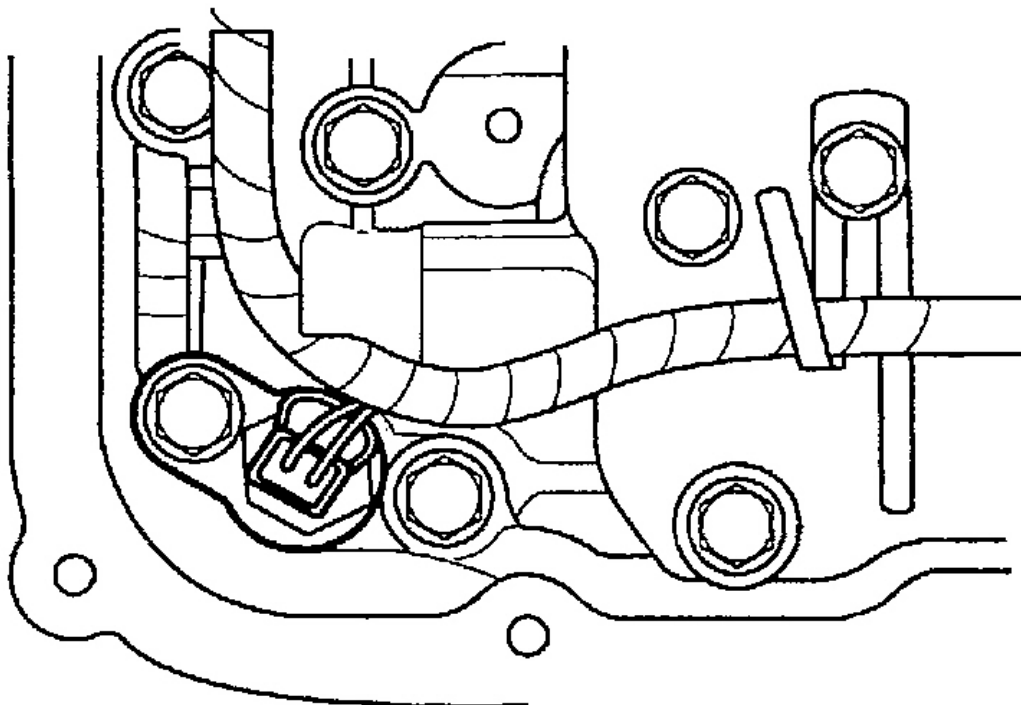
THROTTLE POSITION SENSOR CHECKING

The TPS 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 TPS changes. The ECM detects the throttle valve opening

based on voltage change.

FLUID TEMPERATURE SENSOR CHECKING

1. Remove the fluid temperature sensor.

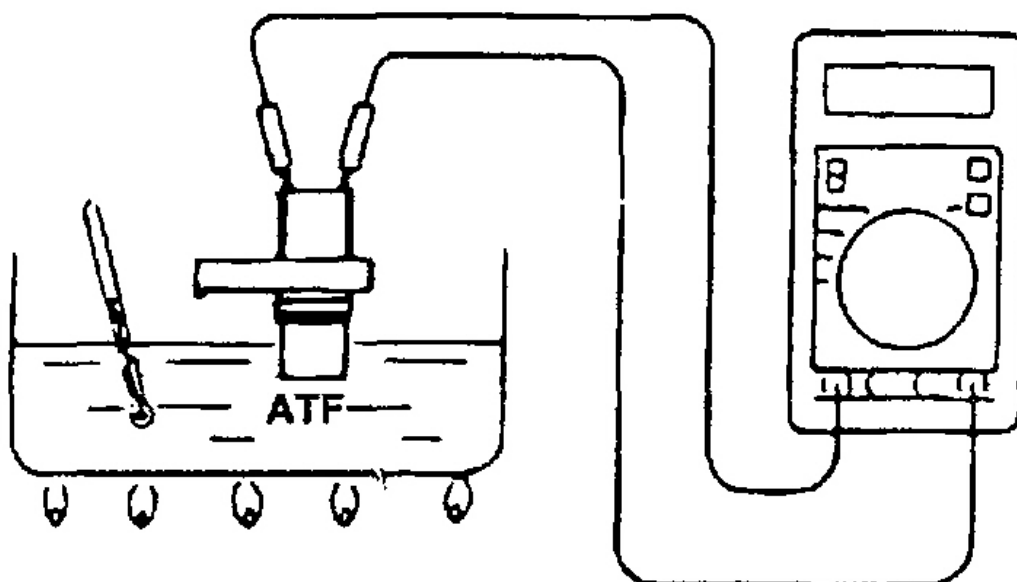


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Fig. 21: Removing The Fluid Temperature Sensor
Courtesy of KIA MOTORS AMERICA, INC.

2. Check the resistance between the connector terminal No.1 and 2 at the fluid temperature sensor side.

STANDARD VALVE



G01092321

Fig. 22: Testing Fluid Temperature Sensor
Courtesy of KIA MOTORS AMERICA, INC.

Temp. (°C)	Resistance (kΩ)	Temp. (°C)	Resistance (kΩ)
-40	139.5	80	1.08
-20	47.7	100	0.63
0	18.6	120	0.38
20	8.1	140	0.25
40	3.8	160	0.16
60	1.98		

G01092320

Fig. 23: Fluid Temperature Sensor Specifications
Courtesy of KIA MOTORS AMERICA, INC.

3. If the resistance deviates from the standard value, then replace the temperature sensor.

CHECKING VEHICLE SPEED SENSOR

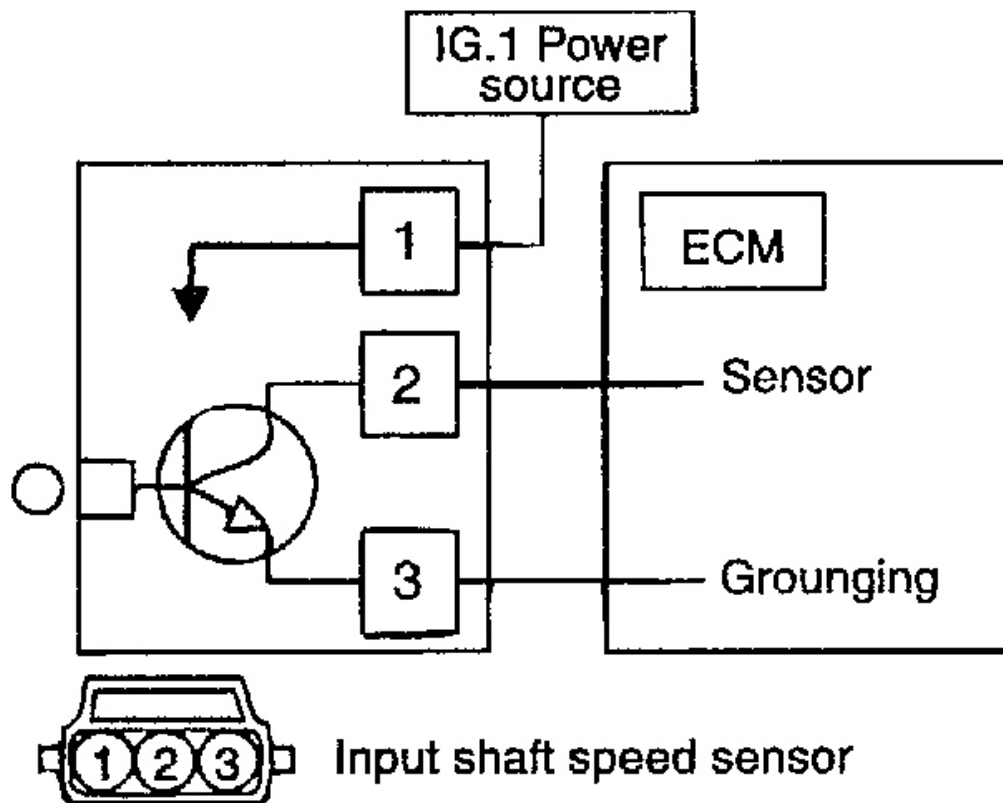
1. The sensor will detect the vehicle running speed at speedometer's gear part.
2. Remove the speed sensor and measure resistance.

Standard value: 3000-10,000 ohms

3. Turn axis of the speed sensor and check the output voltage between terminal No. 2 and 1.

CHECKING INPUT AND OUTPUT SHAFT SPEED SENSOR

1. Measure the wave pattern between No.2 and 3 using Hi-Scan.



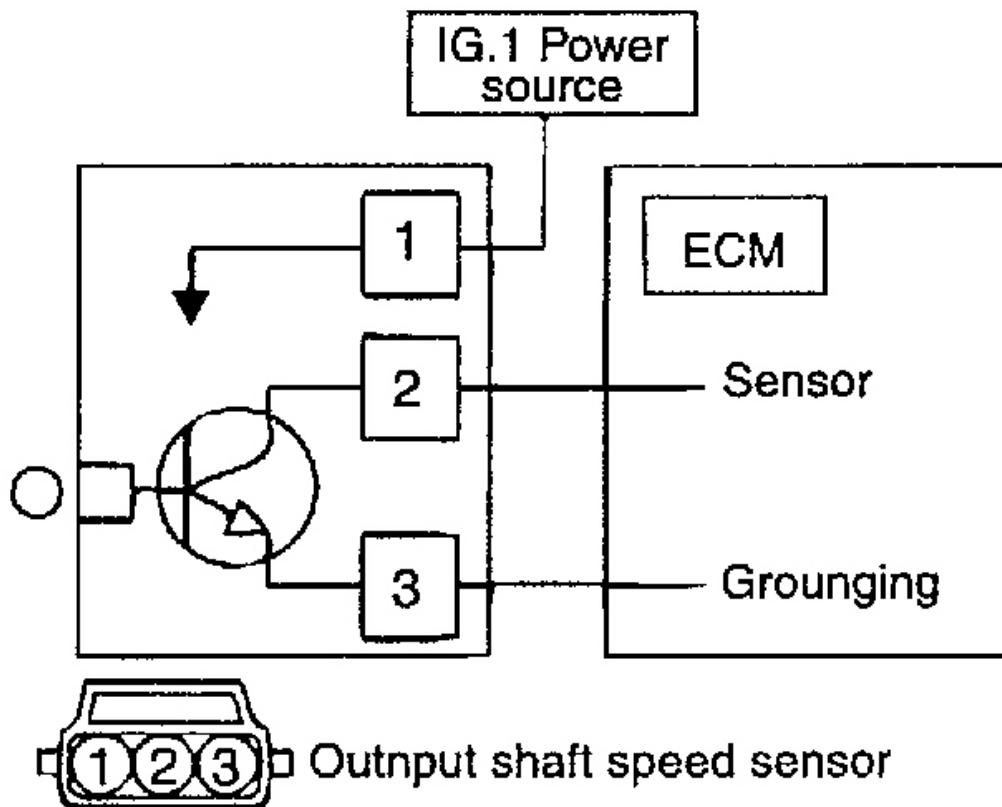
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Fig. 24: Connector Terminals For Testing Input Shaft Sensor Wave Pattern
 Courtesy of KIA MOTORS AMERICA, INC.

	Check item	Standard value
Air gap	Input shaft speed sensor	0.051 in (1.3 mm)
	Output shaft speed sensor	0.0335 in (0.85 mm)
Coil in- sulation resis- tance	Input shaft speed sensor	1 m Ω or more
	Output shaft speed sensor	1 m Ω or more
Output voltage	HIGH side	4.8~5.2 V
	LOW side	0.8 V or less

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Fig. 25: Shaft Sensor Specifications
Courtesy of KIA MOTORS AMERICA, INC.

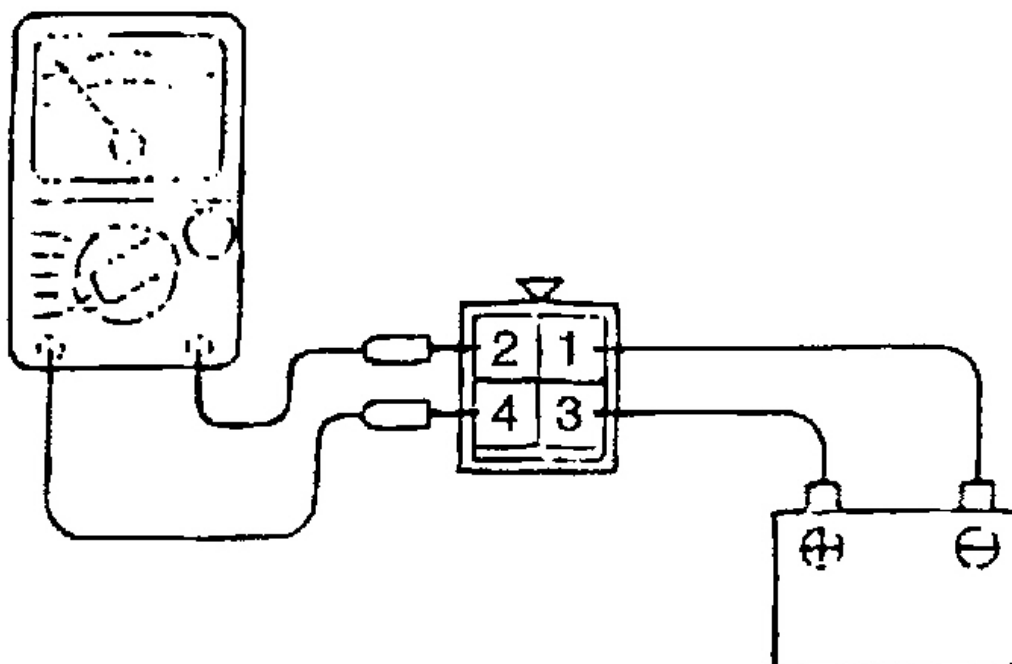


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Fig. 26: Testing Output Shaft Sensor Wave Pattern
Courtesy of KIA MOTORS AMERICA, INC.

A/T CONTROL RELAY CHECKING

1. Remove the A/T control relay in the fuse box.
2. Use jumper wires to connect A/T control relay terminal (1) to the battery (-) terminal and terminal (3) to the battery (+) terminal.



G01092325

Fig. 27: Testing A/T Control Relay
 Courtesy of KIA MOTORS AMERICA, INC.

3. Check the continuity between terminal (2) and terminal (4) of the A/T control relay when the jumper wires are connected to and disconnected from the battery.

Jumper wire	Continuity between terminals No.2 and No.4
Connected	Continuity
Disconnect	No continuity

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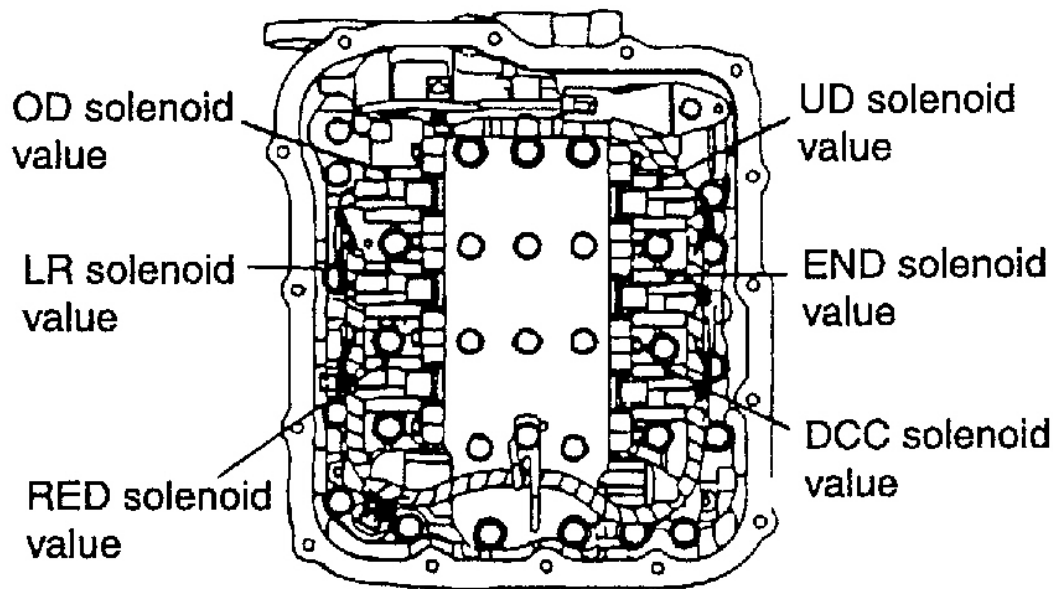
Fig. 28: Continuity Chart

Courtesy of KIA MOTORS AMERICA, INC.

4. If there is a problem, replace the A/T control relay.

SOLENOID VALVE CHECKING

1. Remove the valve body cover.



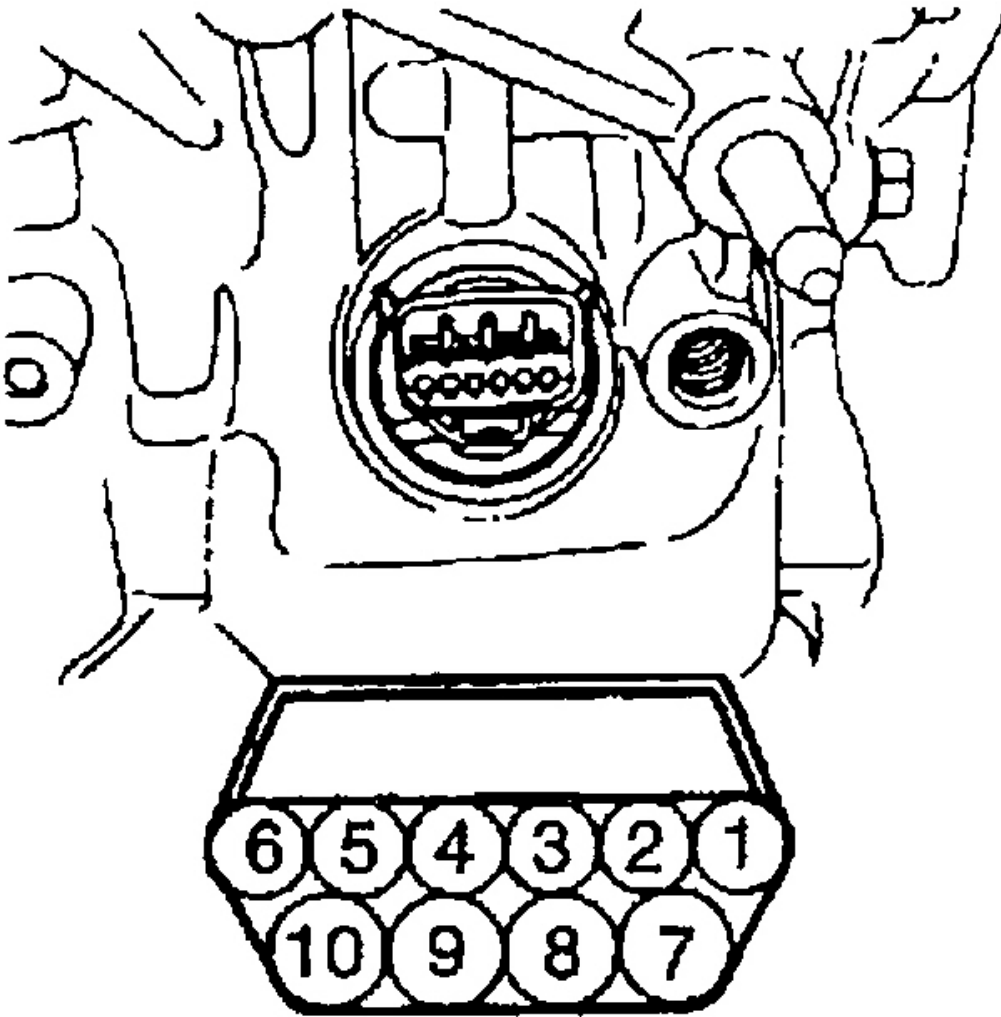
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Fig. 29: Illustrating Solenoid Positions
Courtesy of KIA MOTORS AMERICA, INC.

2. Disconnect the connectors of each solenoid valve.

Standard value (at 20 °C): 2.7-3.4 ohms

3. If the resistance is outside the standard value, replace the solenoid valve.
4. Measure the resistance of the solenoid valve.



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Fig. 30: Identifying Terminals To Measure Solenoid Resistance
Courtesy of KIA MOTORS AMERICA, INC.

Terminal No.	Name	Resistance
7 & 10	Damper clutch solenoid valve	2.7~3.4 Ω (at 20°C)
7 & 1	Low and reverse solenoid valve	
8 & 3	Second solenoid valve	
8 & 4	Underdrive solenoid valve	
8 & 2	Overdrive solenoid valve	

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Fig. 31: Solenoid Resistance Specifications
Courtesy of KIA MOTORS AMERICA, INC.

TORQUE CONVERTER STALL TEST

TESTING

This test measures the maximum engine speed when the selector lever is at the D or R position and the torque converter stalls to test the operation of the torque converter, starter motor and one way clutch operation and 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.

1. Check the automatic transmission fluid level and temperature and the engine coolant temperature.
 - ATF level: At the "75°C" mark on the oil level gauge.
 - ATF temperature: 70-80°C
 - Engine coolant temperature: 80-100°C
2. Check both rear wheels. (left and right)
3. Pull the parking brake lever on, with the brake pedal fully depressed.

4. Start the engine.
5. 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:

- The throttle should not be left fully open for any more than eight seconds.
- If carrying out the stall 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: 1,800-2,600 RPM

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

Standard value

Stall speed: 1,800-2,600 RPM

RESULTS

1. Stall speed is too high in both D and R ranges.
 - Low line pressure
 - Low and 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

HYDRAULIC PRESSURE TEST

Hydraulic pressure test is used to indirectly check the normal operation of fluid pump and piston oil seal of each element by measuring operating pressure of each element in case of transaxle shock or slip.

It will be required to perform basic checks and inspect the electronic control system before testing the hydraulic pressure.

PROCEDURE

1. Warm up the ATF to 70-80 °C.
2. Suspend the vehicle to idle wheels.
3. Install the special tools; fluid pressure gauge 2943kpa (30kg/cm² , 426.6psi) and adapter (RED, DIR pressure) at each fluid pressure outlet.
4. Measure fluid pressure at each outlet and compare it with standard value referring to standard fluid pressure table.
5. If the pressure deviates from standard value, take corrective measure referring to fluid pressure test diagnosis chart.

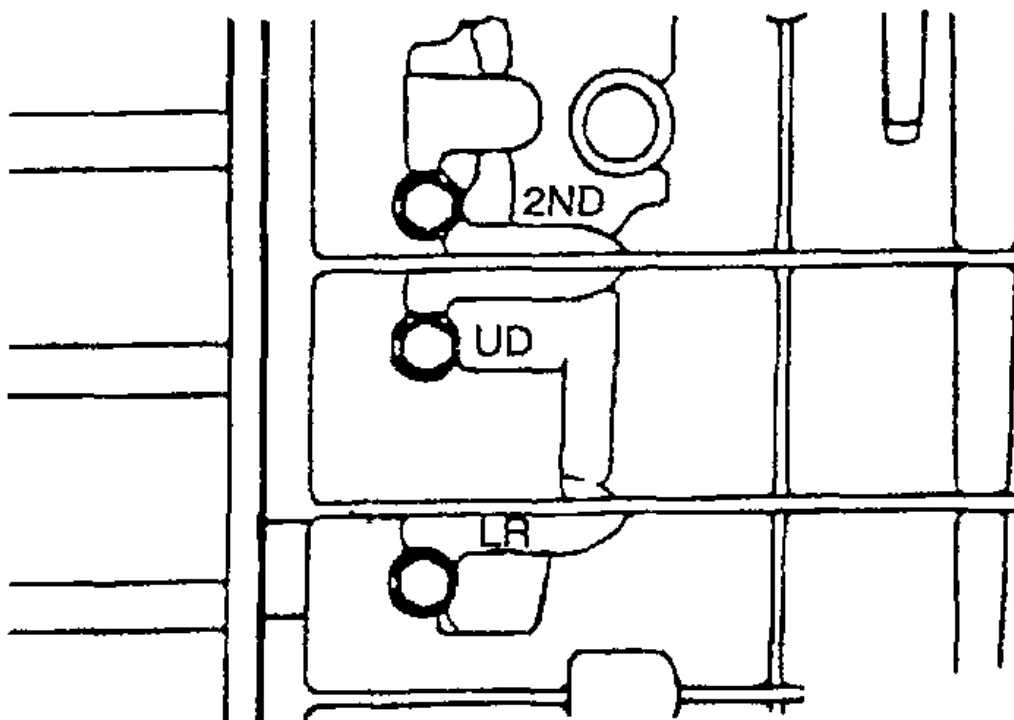
ABBREVIATION

Abbreviation	Description
UD	Underdrive clutch operating pressure
LR	Low and reverse brake operating pressure
2ND	Second brake operating pressure
DA	Damper clutch operating pressure
DR	Damper clutch release pressure
RV	Reverse clutch operating pressure
OD	Overdrive clutch operating pressure
RED	Reduction clutch operating pressure
DIR	Direct clutch operating pressure

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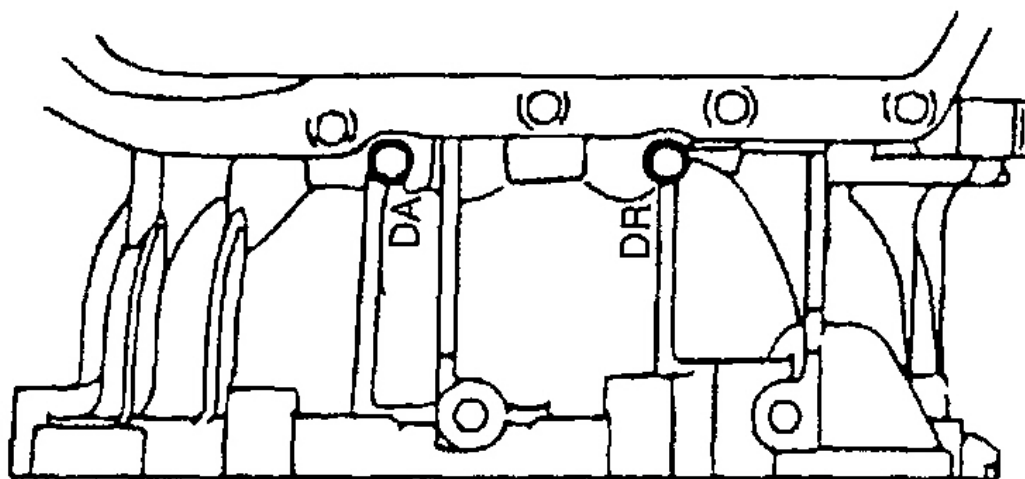
Fig. 32: Abbreviation List
Courtesy of KIA MOTORS AMERICA, INC.

Hydraulic Pressure Test Points



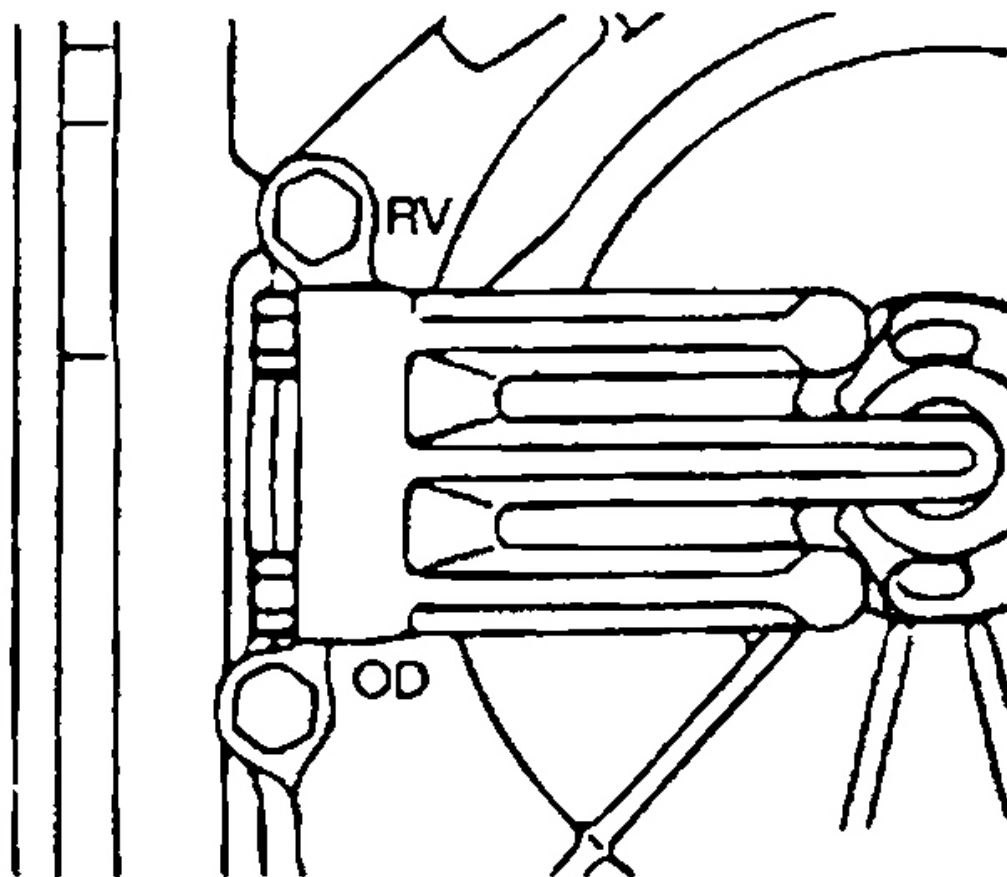
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Fig. 33: Illustrating Hydraulic Pressure Test Points (1 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.



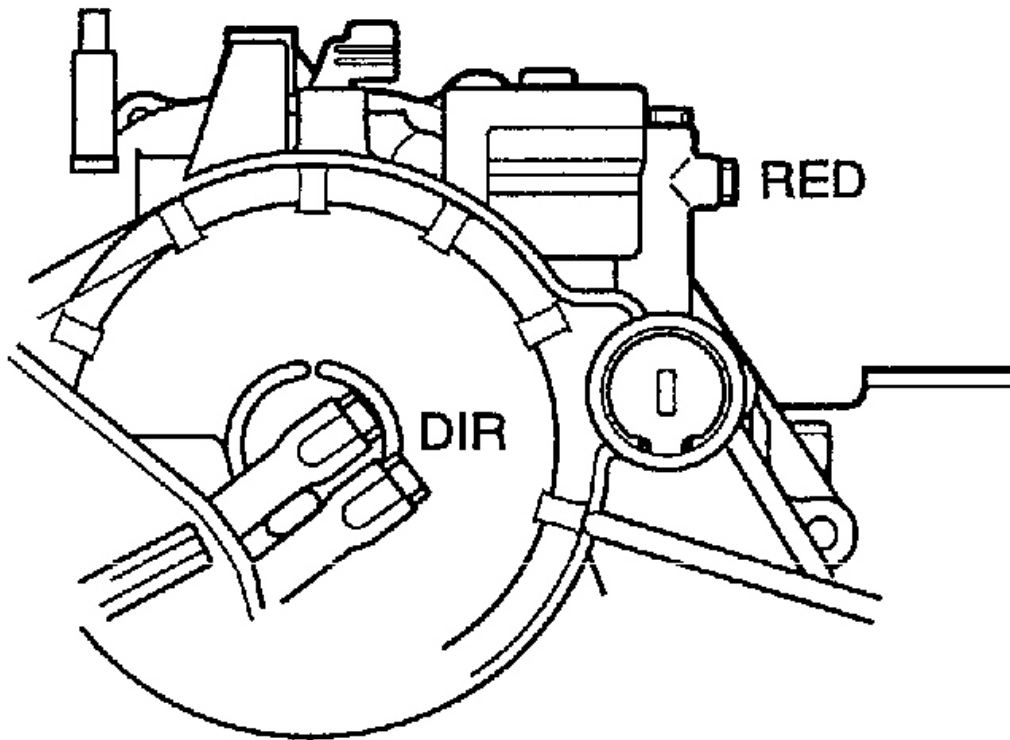
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Fig. 34: Illustrating Hydraulic Pressure Test Points (2 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.



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Fig. 35: Illustrating Hydraulic Pressure Test Points (3 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.



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Fig. 36: Illustrating Hydraulic Pressure Test Points (4 Of 4)
Courtesy of KIA MOTORS AMERICA, INC.

NORMAL FLUID PRESSURE SPECIFICATION TABLE

Condition			Normal pressure kpa (kg/cm ² , psi)							
Selector lever position	Shifting range	Engine rpm (r/min)	Underdrive clutch pressure (UD pressure)	Reverse clutch pressure (REV pressure)	Overdrive clutch pressure (OD pressure)	Directer clutch pressure (DIR pressure)	Low& reverse brake pressure (LR pressure)	Second brake pressure (2ND pressure)	Reduction brake pressure (RED pressure)	Torque converter pressure (DR pressure)
P	-	2500	-	-	-	-	265-343 (2.7-3.5, 38.4-49.8)	-	265-343 (2.7-3.5, 38.4-49.8)	216-363 (2.2-3.7, 31.3-52.6)
R	Reverse	2500	-	1275-1766 (13.0-18.0, 184.9-256.0)	-	-	1275-1766 (13.0-18.0, 184.9-256.0)	-	1275-1766 (13.0-18.0, 184.9-256.0)	500-697 (5.1-7.1, 72.5-101.0)
N	-	2500	-	-	-	-	265-343 (2.7-3.5, 38.4-49.8)	-	265-343 (2.7-3.5, 38.4-49.8)	216-363 (2.2-3.7, 31.3-52.6)
D	First speed	2500	1010-1050 (10.3-10.7, 146.5-152.2)	-	-	-	1010-1050 (10.3-10.7, 146.5-152.2)	-	78.5-883 (8.0-9.0, 113.8-128.0)	500-697 (5.1-7.1, 72.5-101.0)
	Second speed	2500	1010-1050 (10.3-10.7, 146.5-152.2)	-	-	-	-	1010-1050 (10.3-10.7, 146.5-152.2)	1010-1050 (10.3-10.7, 146.5-152.2)	500-697 (5.1-7.1, 72.5-101.0)
	Third speed	2500	78.5-883 (8.0-9.0, 113.8-128.0)	-	78.5-883 (8.0-9.0, 113.8-128.0)	-	-	-	78.5-883 (8.0-9.0, 113.8-128.0)	451-647 (4.6-6.6, 65.4-93.9)
	Fourth speed	2500	78.5-883 (8.0-9.0, 113.8-128.0)	-	78.5-883 (8.0-9.0, 113.8-128.0)	78.5-883 (8.0-9.0, 113.8-128.0)	-	-	-	451-647 (4.6-6.6, 65.4-93.9)
	Fifth speed	2500	-	-	78.5-883 (8.0-9.0, 113.8-128.0)	78.5-883 (8.0-9.0, 113.8-128.0)	-	78.5-883 (8.0-9.0, 113.8-128.0)	-	451-647 (4.6-6.6, 65.4-93.9)

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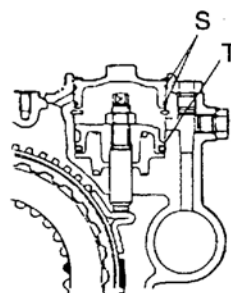
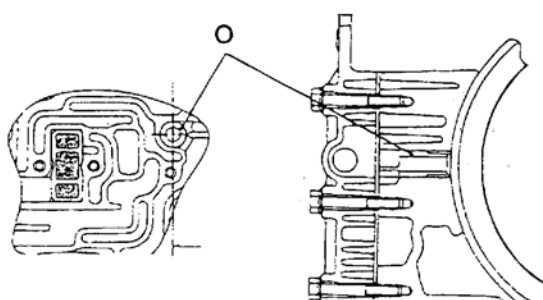
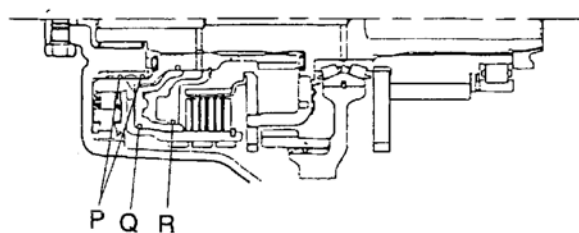
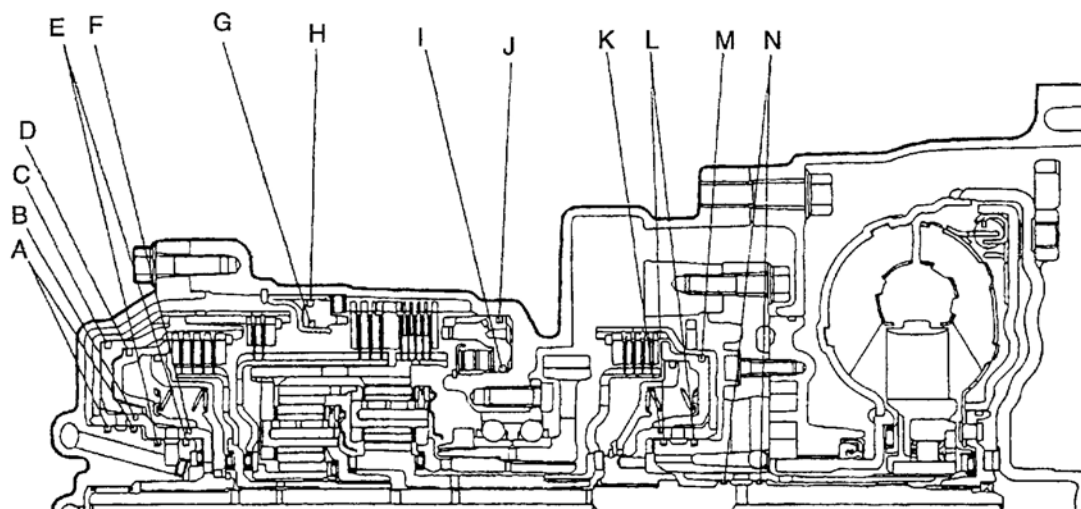
Fig. 37: Normal Fluid Pressure Specification Table
Courtesy of KIA MOTORS AMERICA, INC.

HYDRAULIC PRESSURE TEST DIAGNOSIS CHART

Item	All pressures high	All pressures low	R abnormal	3-4 speed abnormal	UD abnormal	REV abnormal	OD abnormal	*DIR abnormal	*LR abnormal	2ND abnormal	RED abnormal	DR abnormal	Pressurization outside of operating area
Transaxle control cable adjustment improper													O
Oil pump failure		O											O
Oil cooler clogged		O											O
Oil seal A failed						O							
Oil seal B failed						O							
Oil seal C failed						O							
Oil seal D failed							O						
Oil seal E failed							O						
Oil seal F failed							O						
Oil seal G failed										O			
Oil seal H failed										O			
Oil seal I failed									O				
Oil seal J failed									O				
Oil seal K failed					O								
Oil seal L failed					O								
Oil seal M failed					O								
Oil seal N failed												O	
Oil seal O failed										O			
Oil seal P failed								O					
Oil seal Q failed								O					
Oil seal R failed								O					
Oil seal S failed											O		
Oil seal T failed											O		
Underdrive solenoid valve failed					O								
Overdrive solenoid valve failed							O						
Low&reverse solenoid valve failed (dual use with DIR)								O	O				
Second solenoid valve failed										O			
Damper clutch control solenoid valve failed												O	
Reduction solenoid valve failed											O		
Underdrive pressure control valve failed					O								
Overdrive pressure control valve failed							O						
Low&reverse pressure control valve failed								O	O				
Second pressure control valve failed										O			
Damper clutch control valve failed												O	
Torque converter pressure control valve failed												O	
Reduction pressure control valve failed											O		
Regulator valve failed	O	O	O	O									
Manual valve failed													O
Switch valve failed				O				O	O				
Fail-safe valve A failed									O				
Fail-safe valve B failed										O			
Fail-safe valve C failed								O					
Relief valve failed		O											
Each check-ball failed					O	O	O		O				
Each orifice failed					O	O	O	O	O	O	O	O	
Valve body installation failure		O			O	O	O	O	O	O	O	O	O

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Fig. 38: Hydraulic Pressure Test Diagnosis Chart
Courtesy of KIA MOTORS AMERICA, INC.



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Fig. 39: Oil Seal Locations
 Courtesy of KIA MOTORS AMERICA, INC.

DIAGNOSIS & TESTING

SELF DIAGNOSIS

PROCEDURE

1. Connect Hi-Scan with the self-diagnosis connector and the cigar-lighter socket.
2. Wait 3-4 seconds and select the vehicle model.
3. Upon selecting vehicle, press "YES" button.
4. Screen will display MENU and then chose diagnosis code or maintenance data item to output.

NOTE:

- **Hi-Scan, will store max, 8 diagnosis codes and max. 3 fail safe items in the order of generation in RAM.**
- **The same code will not be stored twice or more.**
- **If codes or failsafe items occur more than RAM capacity, they will be erased in the order of generation.**
- **Upon disconnecting battery power of all stored codes and failsafe items will be erased. Do not separate battery power before completing the procedure.**
- **Place shift lever at "P" or "N" and stop the vehicle.**

HOW TO ERASE DIAGNOSIS CODES

1. Spontaneous erasing.

When ATF warms up and reaches to temperature 50°C, 200 times after the last generated fail or code stored in the memory, all stored codes will be erased.

2. Forced erasing. Use Hi-Scan to erase codes with the below condition:
 - Ignition key "ON"
 - Detect no engine revolution (engine off)
 - No detection from output speed sensor (vehicle stop)
 - No detection from vehicle speed sensor (vehicle stop)
 - Failsafe not operating
3. 15 seconds after disconnecting the battery terminal (-)
4. 15 seconds after removing the back-up fuse

ACTUATOR CHECKING

No.	Items	Forced operation details	Forced operation conditions
1	L & R solenoid valve	Operate the solenoid valve using Hi-Scan for five seconds. (Other solenoid valves shall not be energized.)	1. Ignition key "ON" 2. Transaxle range switch normal 3. Shift lever "P" range 4. Vehicle speed 0 km/h 5. Engine stop
2	Underdrive solenoid valve		
3	Second solenoid valve		
4	OD solenoid valve		
5	Reduction solenoid valve		
6	Damper clutch solenoid valve		
7	Auto control relay	Off for 3 seconds	
8	HIVEC control inhibition	Inhibit until ignition off	

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Fig. 40: Actuator Checking Chart
Courtesy of KIA MOTORS AMERICA, INC.

ROAD TEST

No.	Condition	Operation	Judgement: value	Check	DTC	Probable cause
1	Ignition switch OFF	Ignition switch (1) ON	Data list No.54 (1) battery voltage (mV)	A/T control relay	P1723	A/T control relay line
2	Ignition switch ON Engine stop Selector lever position "P"	Selector lever position (1) P (2) R (3) N (4) D	Data list No.61 (1) P (2) R (3) V (4) D	Transaxle range switch	P0707 P0708 (P0705)	Inhibitor line
		Accelerator pedal (1) close (2) press (3) wide open	Data list No.11 (1) 400~1000mV (2) Rise little by little from (3) 4500~5000mV	TPS	P1704 P1702 P1703 (P1701)	TPS line
		Brake pedal (1) press (2) release	Data list No.26 (1) ON (2) OFF	Stop lamp switch	P0703	Stop lamp switch line
3	Ignition switch START	Start-up test at position "P", "N"	Engine start-up	Start or not	-	No start-up
4	Engine stop Warning-up running	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70~90 °C.	Data list No.15 rise little by little to 70~90 °C	Fluid temperature sensor	P0713 P0712 (P0710)	A/T oil temperature sensor line

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Fig. 41: Road Test Chart (1 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

No.	Condition	Operation	Judgement: value	Check	DTC	Probable cause
5	Engine idling Selector lever position "N"	Brake pedal (re-test) (1) press (2) release	Data list No.20 (1) ON (2) OFF	Stop lamp switch	P0703	Stop lamp switch line
		A/C switch (1) ON (2) OFF	Data list No.65 (1) ON (2) OFF	Triple switch	-	Triple switch line
		Accelerator pedal (1) close (2) press	Data list No.64 (1) ON (2) OFF	Idle switch	-	Idle switch line
			Data list No.21 (1) 600-900rpm (2) Rise little by little from	Crank angle sensor	P0725	Crank angle sensor line
			(1) Data list No.57 (2) Data will change	Communication with engine ECM	P1749	Serial communication line
		Selector lever position (1) N→D (2) N→R	No shifting shock Retardation shall be 2 seconds or less	Vehicle-starting trouble Unable to run	-	Engine stall during shift
					-	N→D shock, longer retardation
					-	N→R shock, longer retardation
					-	N→D shock, N→R shock longer retardation

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Fig. 42: Road Test Chart (2 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

No.	Condition	Operation	Judgement: value	Check	DTC	Probable cause
6	Selector lever position "D" (at even straight road)	Selector lever position and engine condition (1) Idling at first speed (vehicle stop) (2) Running at constant speed, 6.2mph(10km/h) at first speed (3) Running at constant speed, 18.6mph (30km/h) at second speed (4) Running at constant speed, 31mph(50km/h) at third speed (5) Running at constant speed, 31mph (50km/h) at fourth speed(maintain each step at least 10 seconds) (6) Running at constant speed, 43.4mph(70km/h) at fifth speed	Data list No. 63 (2) First speed (3) Second speed (4) Third speed (5) Fourth speed (6) Fifth speed	Shift condition	-	
			Data list No. 31 (2) 0 % (3) 100 % (4) 100 % (5) 100 %	LR DIR solenoid valve	P0750	LR DIR solenoid valve line
			Data list No. 32 (2) 0 % (3) 0 % (4) 0 % (6) 100 %	UD solenoid valve	P0755	UD solenoid valve line
			Data list No. 33 (1)100 % (2) 0 % (4) 100 % (6) 0 %	2ND solenoid valve	P0760	2ND solenoid valve line
			Data list No. 34 (2) 100 % (3) 100 % (4) 0 % (6) 0 %	OD solenoid valve	P0765	OD solenoid valve lind
			Data list No. 35 (2) 0 % (3) 0 % (5) 100 % (6) 100 %	RED solenoid valve	P0770	RED solenoid valve line
			Data list No. 29 (1) 0km/h (5) 50km/h	Vehicle speed sensor	-	Vehicle speed sensor line
			Data list No. 22 (5) 1800~2100rpm	Input speed sensor	P0715	Input speed sensor line
			Data list No. 23 (5) 1800~2100rpm	Output speed sensor	P0720	Output speed sensor line
			Data list No. 36 (3) 0 % (6) approx. 70~90 %	DCC solenoid valve	P0743 (P0740)	DCC solenoid valve line
			Data list No. 52 (3) approx. 100~300rpm (6) approx. 0~10rpm			

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Fig. 43: Road Test Chart (3 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

No.	Condition	Operation	Judgement: value	Check	DTC	Probable cause
7	Stop HIVEC function using Hi-Sca Selector lever position "D" (at even straight road)	Monitor data list No. 11, 23, 63 using Hi-Scan (1) Speed up to fifth speed with TPS output 1.5 V (30% open) (2) Reduce speed slow-ly and stop (3) Speed up to fifth speed with TPS output 2.5V (50% open) (4) Down-shift to fourth speed from fifth speed, 37.2mph (60km/h) using selector lever (5) Down-shift to third speed from fourth speed, 24.8mph (40km/h) (6) Down-shift to second speed from third speed, 30km/h (7) Down-shift to first speed from second speed, 12.4 mph (20km/h)	Steps (1), (2) and (3) shall generate normal output speed (vehicle speed) and no abnormal shock. Down-shift right after each of (4), (5), (6) steps	Shifting trouble	-	Shock, turbine rpm valve
				Shift timing failure	-	Every shifting time
					-	One or some shifting time
				No shift	-	No diagnosis code
					P0715	Input speed sensor line
					P0720	Output speed sensor line
				No 1 → 2 shift or No 2 → 1 shift	P0750	LR solenoid valve line
					P0760	2ND solenoid valve line
					P0731	First speed before completing shift
					P0732	Second speed before completing shift
				No 2 → 3 shift or No 3 → 2 shift	P0760	2ND solenoid valve line
					P0765	OD solenoid valve line
					P0732	Second speed before completing shift
					P0733	Third speed before completing shift
				No 3 → 4 shift or No 4 → 3 shift	P0755	LR solenoid valve line
					P0760	RED Solenoid valve line
					P0733	Third speed before completing shift
					P0734	Fourth speed before completing shift
				No 4 → 5 shift or No 5 → 4 shift	P0755	UD solenoid valve line
					P0760	2ND solenoid valve line
					P0734	Fourth speed before completing shift
					P0735	Fifth speed before completing shift

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Fig. 44: Road Test Chart (4 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

No.	Condition	Operation	Judgement: value	Check	DTC	Probable cause
8	Selector lever position "N"	Monitor data list No.22 and 23 using Hi-Scan (1) Move Selector lever to "R" and run vehicle at constant speed 6.2mph(10kg/h)	Ratios at data list No.22 and 23 coincide with shift ratio in reversing	No shift	P0715	Input speed sensor line
					P0720	Output speed sensor line
					P0736	Reversing before completing shift

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Fig. 45: Road Test Chart (5 Of 5)
Courtesy of KIA MOTORS AMERICA, INC.

TROUBLE SYMPTOM CHART

Trouble symptom		Probable causes
Data communication trouble with Hi-Scan Trouble in communication with Hi-Scan may be caused by diagnosis line failure or failed ECM.		Diagnosis line failure Connector failure ECM failure
Driving trouble	No start up No start-up with the shift lever at position "P" or "N". It may be caused by the engine system failure, the torque converter failure, or the oil pump failure.	Engine system failure Connector failure ECM failure
	No forward motion Vehicle does not move forward when the shift lever moves from "N" to "D" with the engine running. It may be caused by the abnormal line pressure, the underdrive clutch failure, or the valve body failure.	Abnormal line pressure UD solenoid valve failure UD clutch failure Valve body failure
	No reverse motion Vehicle does not move backward when the shift lever moves from "N" to "R" with engine running. It may be caused by abnormal pressure in the reverse clutch or the LR brake, or the reverse clutch failure, the LR brake failure, or the valve body failure.	Abnormal reverse clutch pressure Abnormal LR brake pressure LR brake solenoid valve failure Reverse clutch failure LR brake failure Valve body failure
	No forward and backward motion Vehicle moves neither forward nor backward in any position of the shift lever with the engine running. It may be caused by the abnormal line pressure, failed powertrain, failed oil pump, or failed valve body.	Abnormal line pressure Powertrain failure Oil pump failure Valve body failure
Malfunction in start-up	Engine stops in shift in If the engine stops when shifting N→D or N→R with the engine idling, it may be caused by failure in the engine system, the damper clutch, the solenoid valve, the valve body or the torque converter (the damper clutch).	Engine system failure DCC solenoid valve failure Valve failure Valve body failure Torque converter failure (Damper clutch failure)
Shifting shock	Shock and retardation in shifting N→D If there is abnormal shock and retardation longer than 2 seconds in shifting N→D with the engine idling, it may be caused by abnormal the UD clutch pressure or the UD clutch failure, the valve body failure or the throttle position sensor failure.	Abnormal UD clutch pressure Abnormal LR brake pressure UD solenoid valve failure Valve body failure Idling position switch failure
Shifting shock	Shock and retardation in shifting N→R If there is abnormal shock and retardation longer than 2 seconds in shifting N→R with the engine idling, it may be caused by an abnormal reverse clutch pressure or abnormal LR brake pressure, or the reverse clutch failure, the LR brake failure, the valve body failure, or the throttle position sensor failure.	Abnormal reverse clutch pressure Abnormal low pressure and reverse brake pressure Low pressure and reverse solenoid valve failure Reverse clutch failure Low pressure and reverse brake failure Valve body failure Throttle position switch failure
	Shock and retardation in shifting N D and N→R If there is abnormal shock and retardation longer than 2 seconds in shifting N→D and N→R with the engine idling, it may be caused by abnormal line pressure, the fluid pump failure or the valve body failure.	Abnormal line pressure Oil pump failure Valve body failure

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Fig. 46: Trouble Symptom Chart (1 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

Trouble symptom		Probable causes
Malfunction in shifting	Shock, turbine rpm increase If up-shifting or down-shifting shock occurs or the transaxle speed is higher than the engine speed during driving, it may be caused by abnormal line pressure, the solenoid valve failure, the oil pump failure, the valve body failure or the clutch brake failure.	Abnormal line pressure Each solenoid valve failure Oil pump failure Valve body failure Each clutch brake failure
Incorrect shifting range	Shifting range error at every shifting point (shift timing error) If timing error occurs in every shifting point during driving, it may be caused by the speed sensor failure, the TPS failure, or the solenoid valve failure	Output shaft speed sensor failure Throttle position sensor failure Each solenoid valve failure Abnormal line pressure Valve body failure ECM failure
	One or some shifting points (shift timing error) If timing error occurs in one or some shifting points during driving, it may be caused by faulty valve body or faulty control. It is not a failure.	Valve body failure
No shifting	No trouble code output No shifting and no trouble code output during driving, may be caused by the transaxle range switch failure or ECM failure.	Transaxle range switch failure ECM failure
Trouble during driving	Poor acceleration If there occurs downshifting but no acceleration during driving, it may be caused by the engine system failure, the clutch failure, or the brake failure	Engine system failure Clutch or brake failure
	Vibration If there occurs vibration during driving at a constant speed or during acceleration/deceleration at the highest range, it may be caused by abnormal damper clutch pressure, or the engine system failure, the damper clutch control solenoid valve failure, the torque converter failure, or the valve body failure.	Abnormal clutch pressure Engine system failure Damper clutch control solenoid valve failure Torque converter failure Valve body failure
Others	Transaxle inhibitor switch line Caused by the transaxle range switch circuit failure, the ignition switch circuit failure, or the ECM failure.	Transaxle range switch failure Ignition switch failure Connector failure ECM failure
	Throttle position sensor line Caused by the throttle position sensor circuit faultiness, or the ECM failure.	Throttle position sensor Connector failure ECM failure
	Triple switch line Caused by the triple switch circuit faultiness or the ECM failure.	Triple switch failure Connector failure A/C system failure ECM failure
	Vehicle speed sensor line Caused by the vehicle speed sensor circuit faultiness or the ECM failure	Vehicle speed sensor failure Connector failure ECM failure

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Fig. 47: Trouble Symptom Chart (2 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

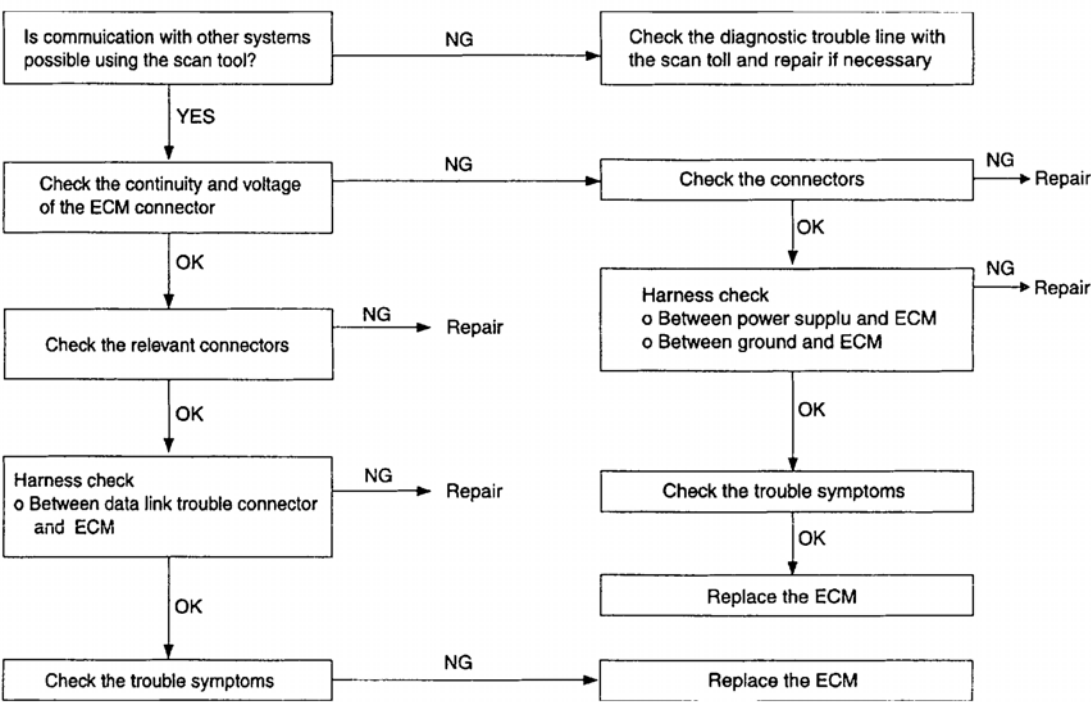
INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

COMMUNICATION WITH SCAN TOOL - INSPECTION PROCEDURE 1

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 ECM is not functioning.	<ul style="list-style-type: none">• Malfunction of diagnostic trouble line• Malfunction of connector• Malfunction of the ECM

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Fig. 48: Probable Cause Chart: Communication With Scan Tool
Courtesy of KIA MOTORS AMERICA, INC.



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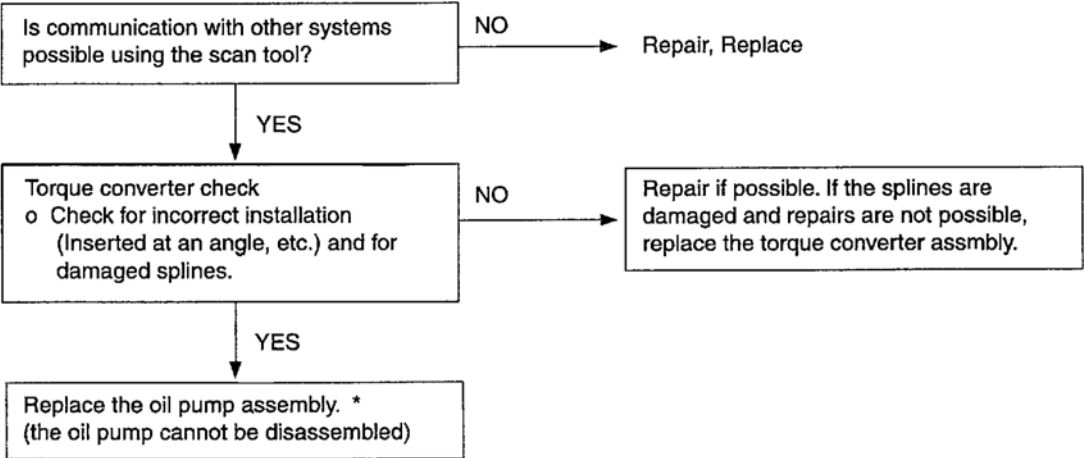
Fig. 49: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

STARTING IMPOSIBLE - 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 system, torque converter or oil pump.	<ul style="list-style-type: none">• Malfunction of the engine system• Malfunction of the torque converter• Malfunction of the oil pump

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Fig. 50: Probable Cause Chart: Starting Impossible
Courtesy of KIA MOTORS AMERICA, INC.



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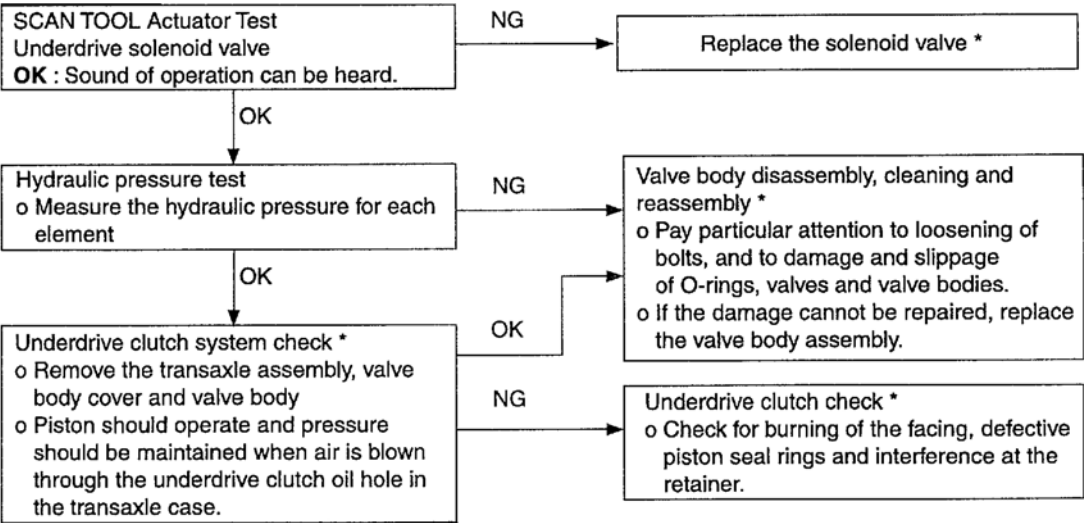
Fig. 51: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DOES NOT MOVE - INSPECTION PROCEDURE 3

Does not move	Probable cause
If the vehicle does not move forward when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.	<ul style="list-style-type: none">Abnormal line pressureMalfunction of the underdrive solenoid valveMalfunction of the underdrive clutchMalfunction of the valve body

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Fig. 52: Probable Cause Chart: Does Not Move
Courtesy of KIA MOTORS AMERICA, INC.



G01092358

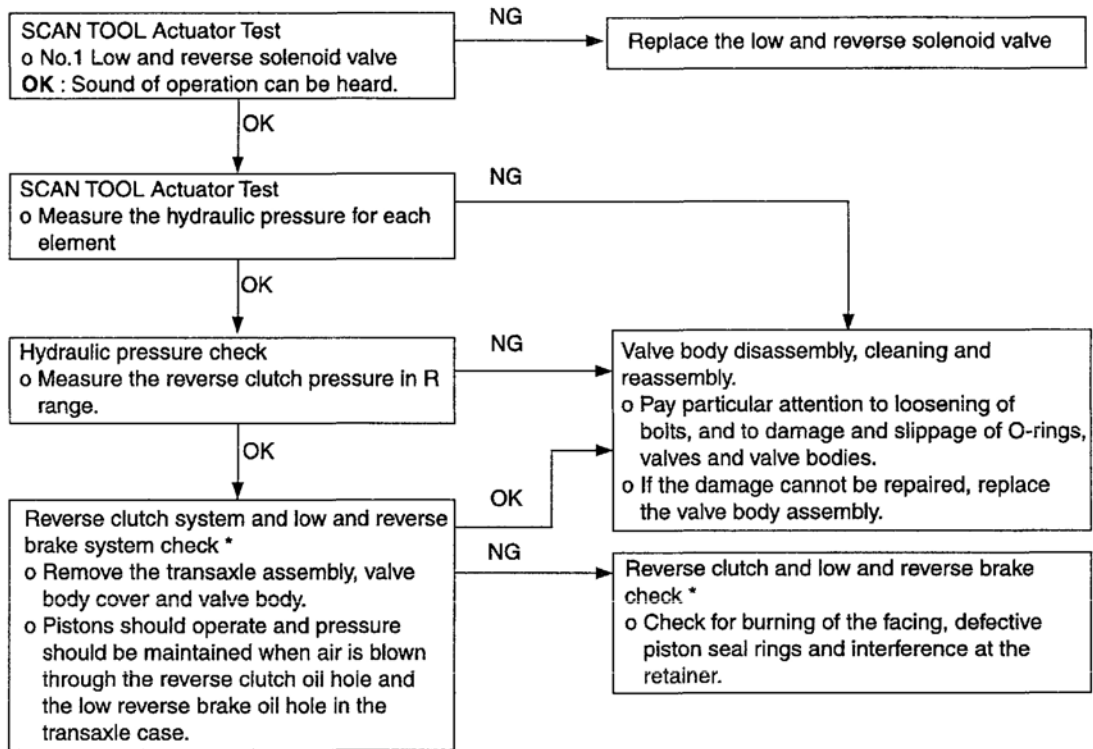
Fig. 53: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DOES NOT REVERSE - INSPECTION PROCEDURE 4

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 and reverse brake or a malfunction of the reverse clutch, low and reverse brake or valve body.	<ul style="list-style-type: none">• 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

G01092359

Fig. 54: Probable Cause Chart: Does Not Reverse
Courtesy of KIA MOTORS AMERICA, INC.



G01092360

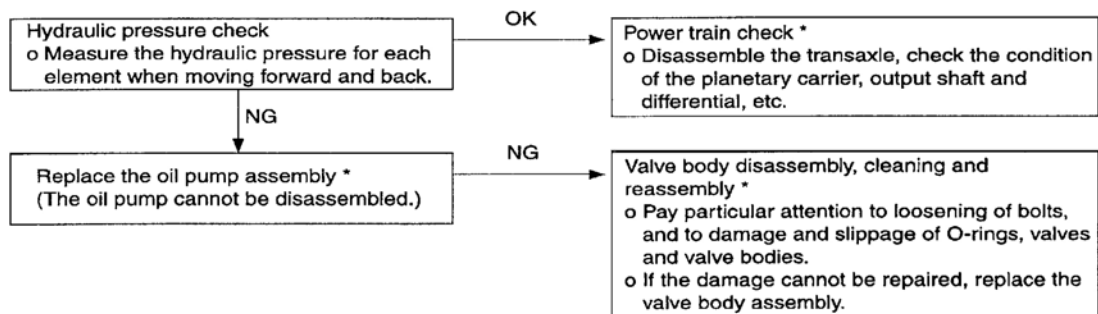
Fig. 55: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DOES NOT MOVE (FORWARD REVERSE) - INSPECTION PROCEDURE 5

Does not move (Forward 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.	<ul style="list-style-type: none"> Abnormal line pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body

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Fig. 56: Probable Cause Chart: Does Not Move (Forward Reverse)
Courtesy of KIA MOTORS AMERICA, INC.



G01092362

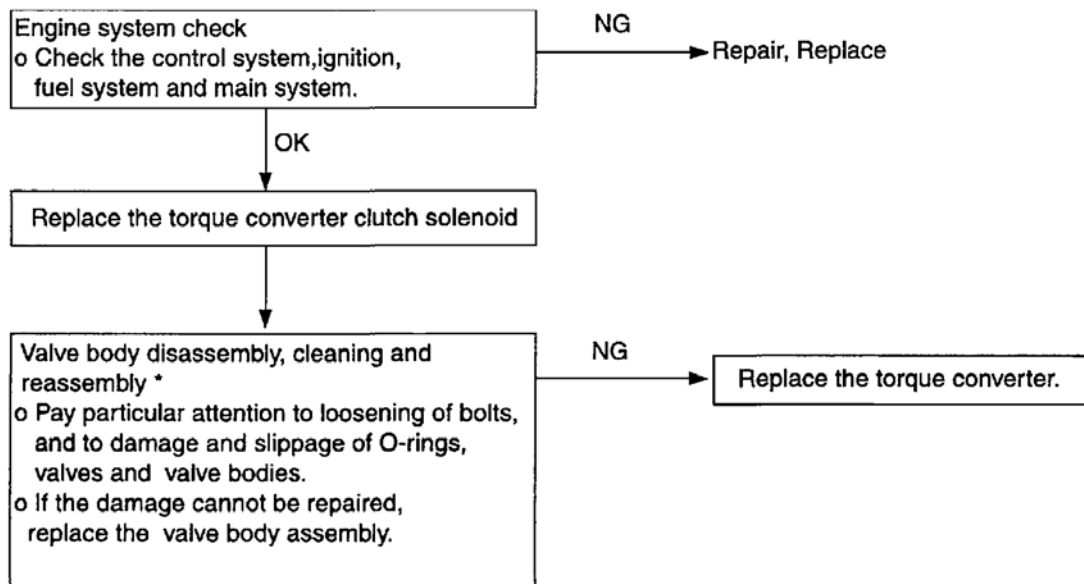
Fig. 57: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

ENGINE STALLING WHEN SHIFTING - INSPECTION PROCEDURE 6

Engine stalling 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 system, torque converter clutch solenoid, valve body or torque converter (torque converter clutch malfunction)	<ul style="list-style-type: none"> • Malfunction of the engine system • Malfunction of the torque converter clutch solenoid • Malfunction of the valve body • Malfunction of the torque converter (Malfunction of the torque converter clutch)

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Fig. 58: Probable Cause Chart: Engine Stalling When Shifting
Courtesy of KIA MOTORS AMERICA, INC.



G01092364

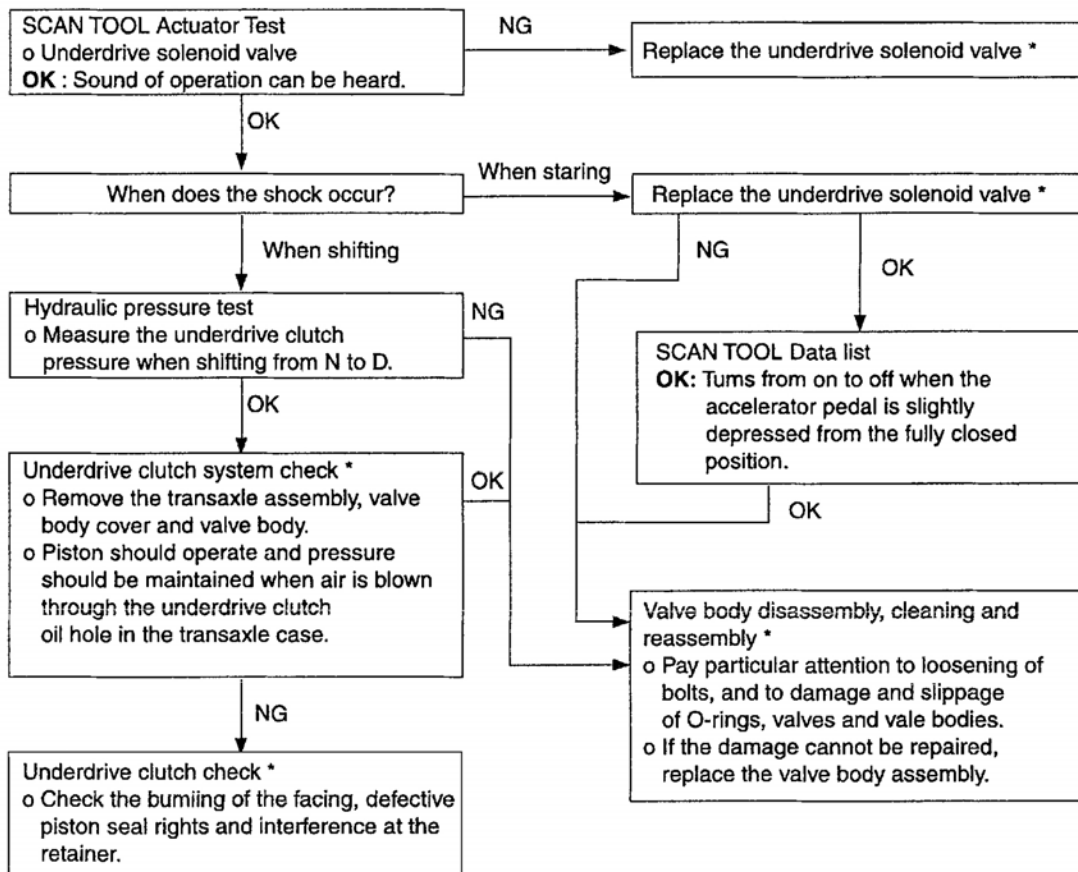
Fig. 59: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

SHOCKS WHEN CHANGING FROM N TO D AND RANGE TIME LAG - INSPECTION PROCEDURE 7

Shocks when changing from N to D and range time lag	Probable cause
If abnormal shocks or a time lag of 2 second 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 closed throttle position switch	<ul style="list-style-type: none"> • 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

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Fig. 60: Probable Cause Chart: Shocks When Changing From N To D And Range Time Lag
Courtesy of KIA MOTORS AMERICA, INC.



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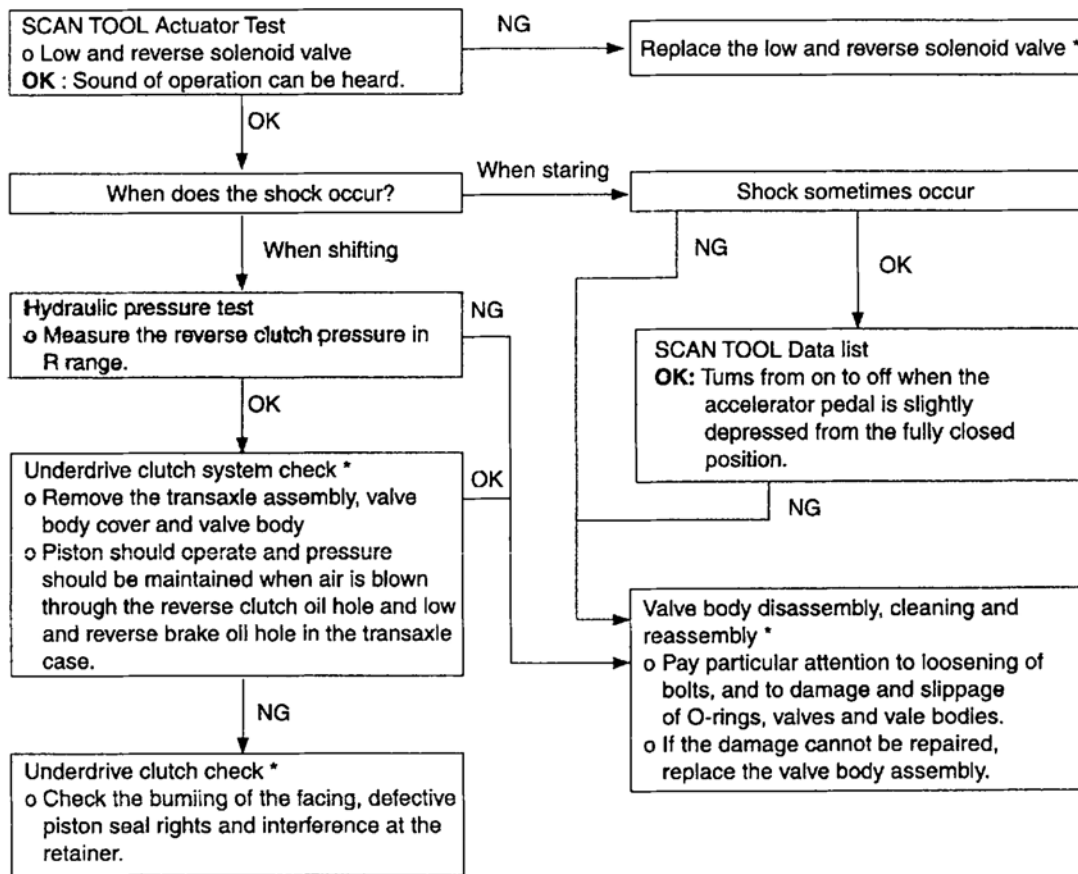
Fig. 61: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

SHOCK WHEN CHANGING FROM N TO R AND LARGE TIME LAG - INSPECTION PROCEDURE 8

Shock when changing from N to R and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body or closed throttle position switch.	<ul style="list-style-type: none"> 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 closed throttle position switch

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Fig. 62: Probable Cause Chart: Shock When Changing From N To R And Large Time Lag
Courtesy of KIA MOTORS AMERICA, INC.



G01092368

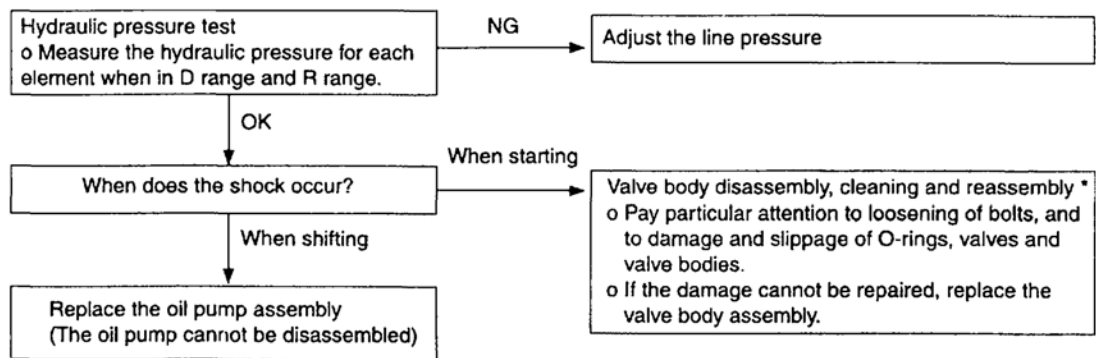
Fig. 63: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

SHOCKS WHEN CHANGING FROM N TO R AND LARGE TIME LAG - INSPECTION PROCEDURE 9

Shocks when changing from N to R and large time lag	Probable cause
If abnormal shocks 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.	<ul style="list-style-type: none"> • Malfunction of the valve body • Abnormal line pressure • Malfunction of the oil pump

G01092369

Fig. 64: Probable Cause Chart: Shocks When Changing From N To R And Large Time Lag
Courtesy of KIA MOTORS AMERICA, INC.



G01092370

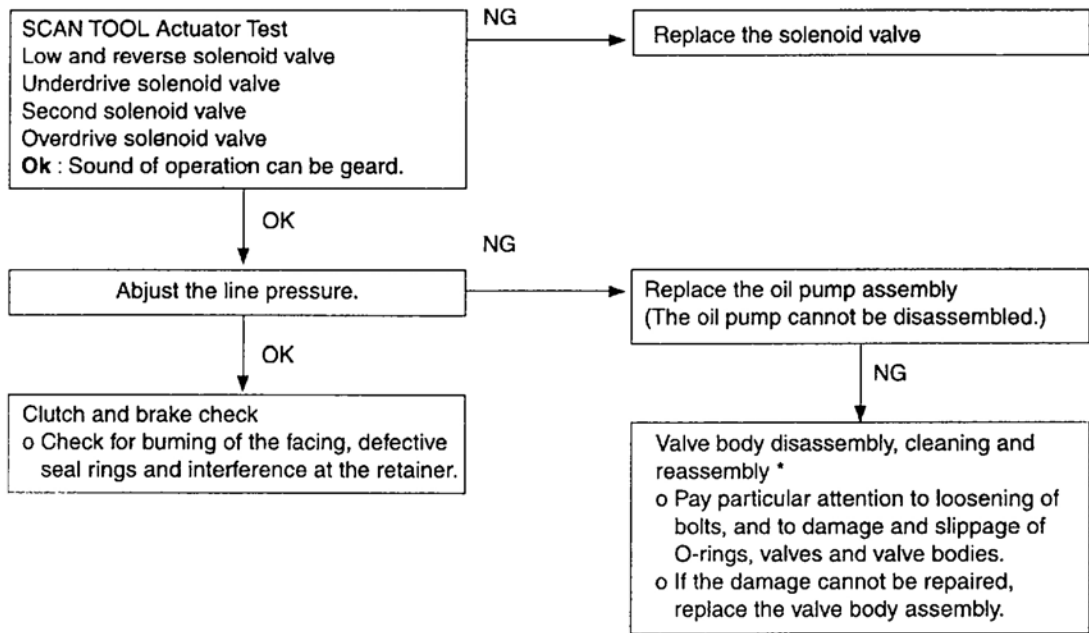
Fig. 65: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

SHOCKS AND RUNNING UP - INSPECTION PROCEDURE 10

Shocks and running up	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 a brake or clutch.	<ul style="list-style-type: none"> • 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

G01092371

Fig. 66: Probable Cause Chart: Shocks And Running Up
Courtesy of KIA MOTORS AMERICA, INC.



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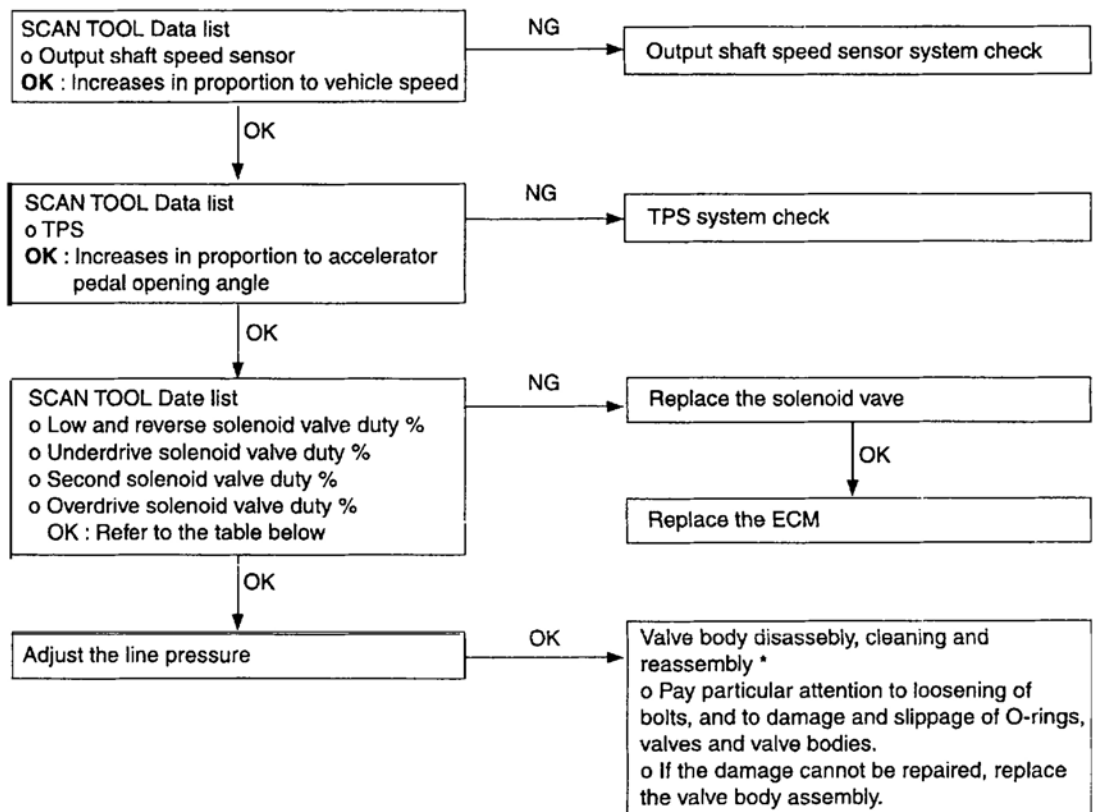
Fig. 67: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

ALL POINTS (DISPLACED SHIFTING POINTS) - INSPECTION PROCEDURE 11

All points (Displaced shifting points)	Probable cause
If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or of a solenoid valve.	<ul style="list-style-type: none"> • 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 ECM

G01092373

Fig. 68: Probable Cause Chart: All Points (Displaced Shifting Points)
Courtesy of KIA MOTORS AMERICA, INC.



G01092374

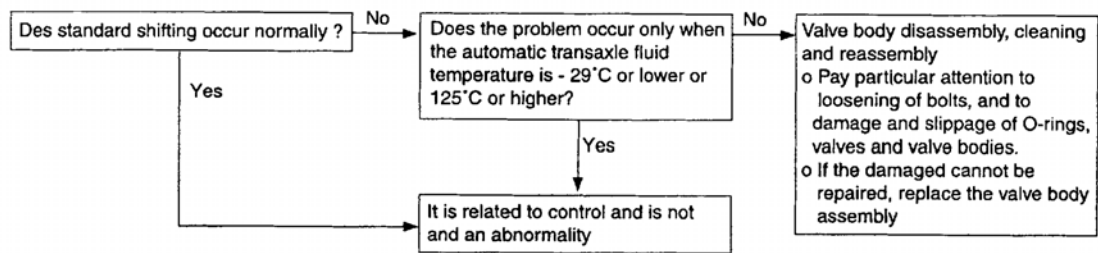
Fig. 69: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

SOME POINTS (DISPLACED SHIFTING POINTS) - INSPECTION PROCEDURE 12

Some points (Displaced shifting points)	Probable cause
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 control and is not an abnormality.	<ul style="list-style-type: none"> Malfunction of the valve body

G01092375

Fig. 70: Probable Cause Chart: Some Points (Displaced Shifting Points)
Courtesy of KIA MOTORS AMERICA, INC.



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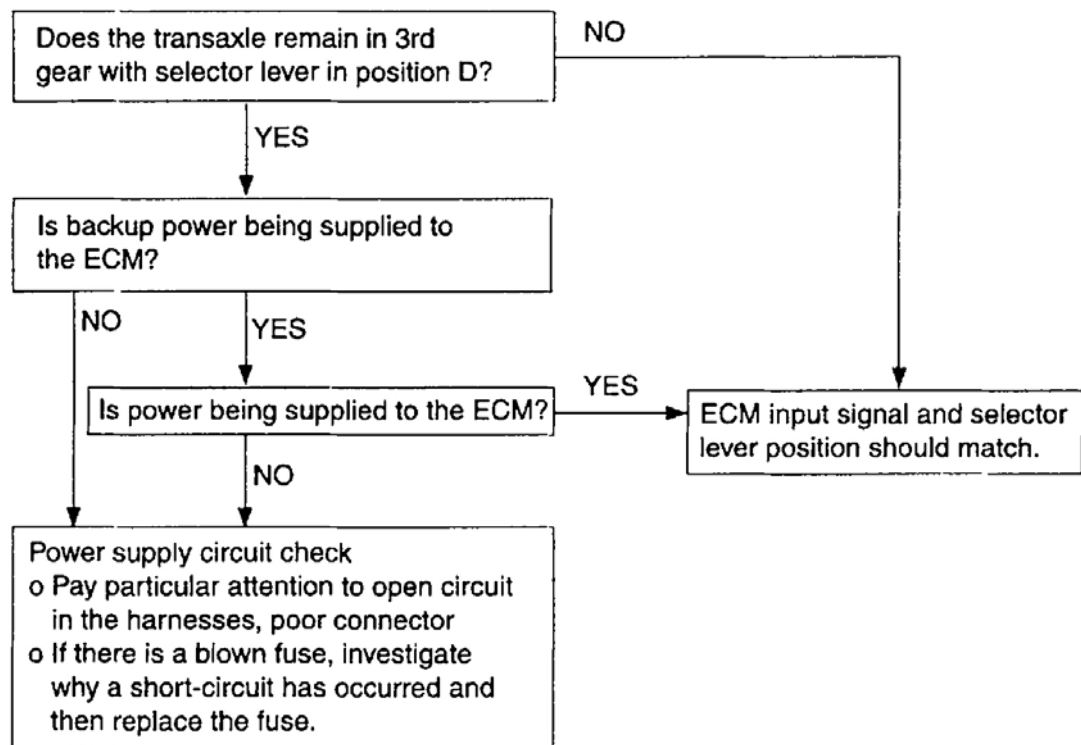
Fig. 71: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

NO DIAGNOSTIC TROUBLE CODES (DOES NOT SHIFT) - 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 output, the cause is probably a malfunction of the Park/Neutral position switch, or ECM.	<ul style="list-style-type: none"> • Malfunction of the Park/Neutral position switch • Malfunction of the ECM

G01092377

Fig. 72: Probable Cause Chart: No Diagnostic Trouble Codes (Does Not Shift)
Courtesy of KIA MOTORS AMERICA, INC.



G01092378

Fig. 73: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

POOR ACCELERATION - INSPECTION PROCEDURE 14

Poor accelerator	Probable cause
If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system or of a brake or clutch.	<ul style="list-style-type: none"> • Malfunction of the engine system • Malfunction of the brake or clutch

G01092379

Fig. 74: Probable Cause Chart: Poor Acceleration
Courtesy of KIA MOTORS AMERICA, INC.

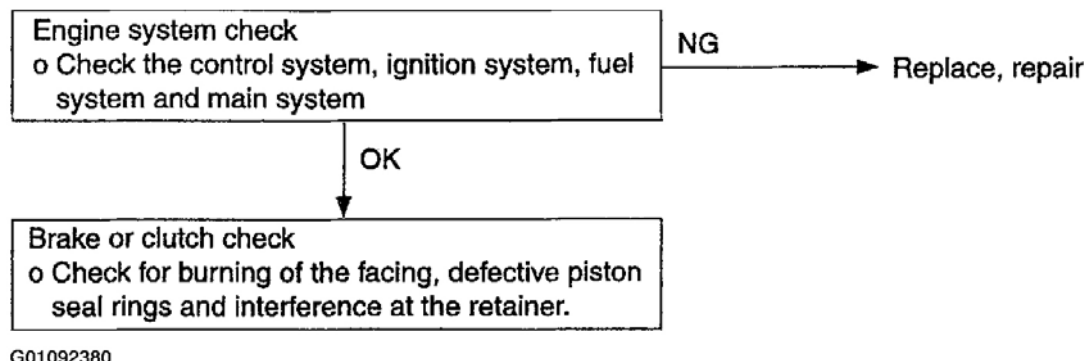


Fig. 75: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

VIBRATION - 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 system, torque converter clutch solenoid, torque converter or valve body.	<ul style="list-style-type: none"> • Abnormal torque converter clutch pressure • Malfunction of the engine system • Malfunction of the torque converter clutch solenoid • Malfunction of the torque converter • Malfunction of the valve body

G01092381

Fig. 76: Probable Cause Chart: Vibration
Courtesy of KIA MOTORS AMERICA, INC.

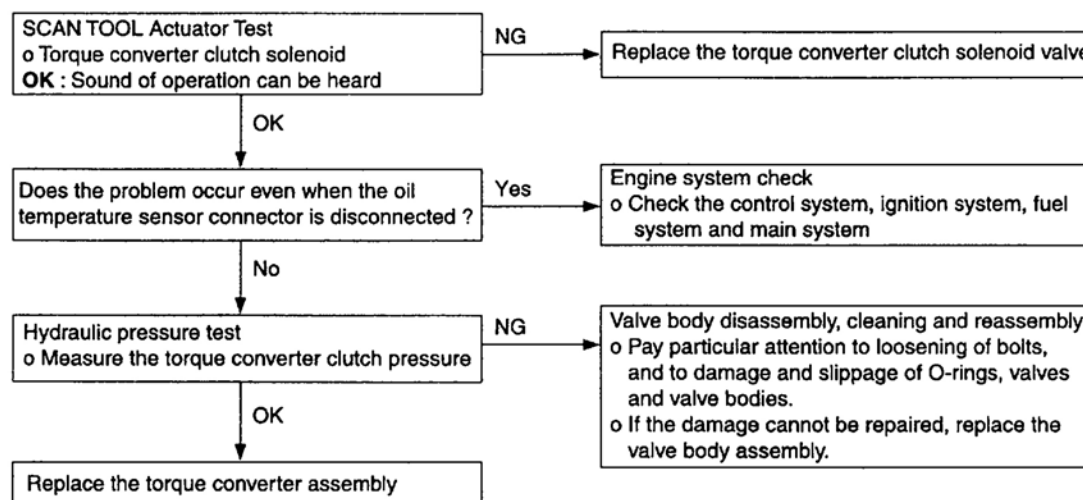


Fig. 77: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

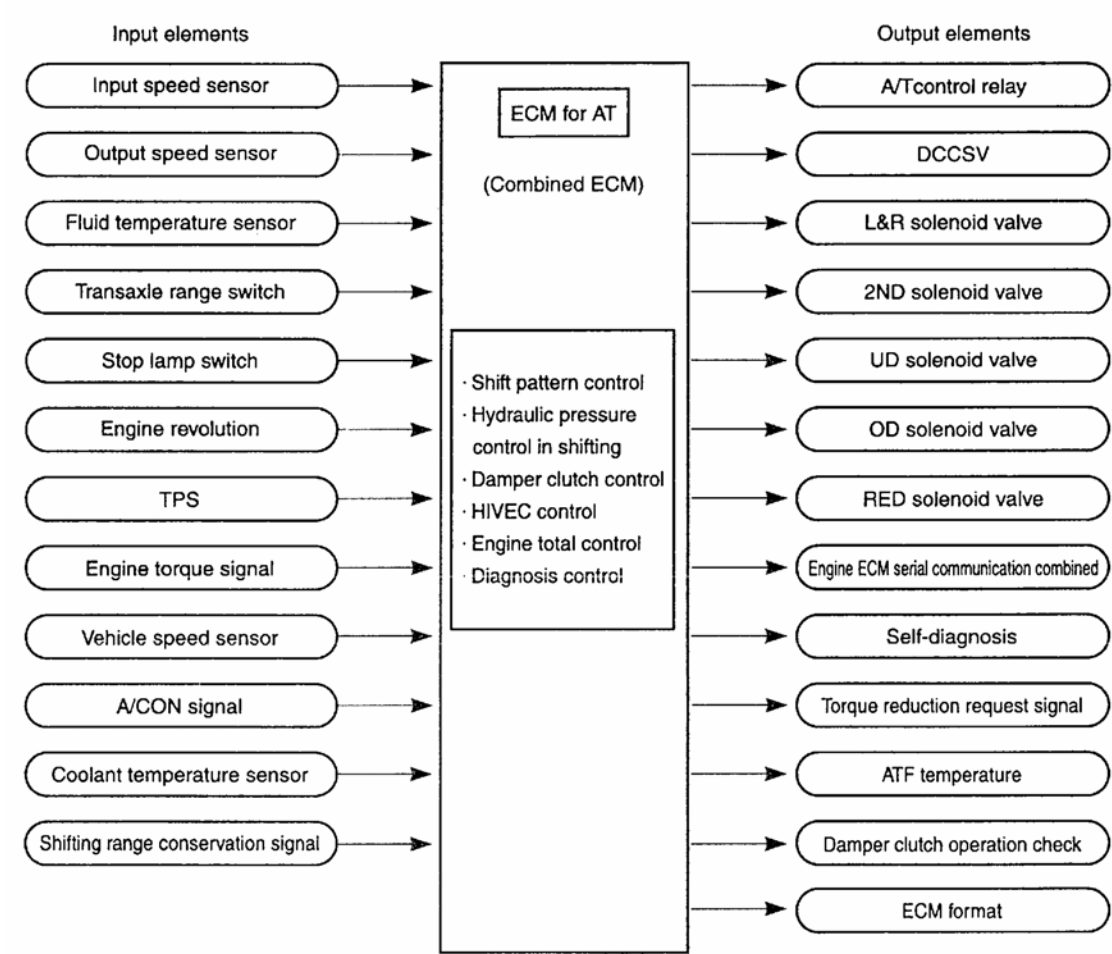
ELECTRONIC CONTROL SYSTEM

SUMMARY

HMC has integrated nervous network and artificial intelligence onto HIVEC (Hyundai Intelligent Vehicle Electronic Control) Control System.

INPUT/OUTPUT CHART

HIVEC System will provide optimum shift control in accordance with driver's habit and driving condition. Each clutch or brake has its own solenoid valve to implement clutch-to-clutch control, and then most comfortable shifting and durability are ensured.



G01092383

Fig. 78: Input/Output Chart
Courtesy of KIA MOTORS AMERICA, INC.

SENSOR AND ACTUATOR FUNCTIONS

Item	Functions
Input speed sensor	Detect the turbine rpm at the UD retainer part
Output speed sensor	Detect at the direct planetary carrier part
Crank angle sensor	Detect the engine rpm at the crankshaft part
TPS	Detect the pedal press level through the potentiometer
Fluid temperature sensor	Detect the ATF temperature through the thermistor
Transaxle range switch	Detect the shift lever position by the contact switch
Stop lamp switch	Detect the brake operation by the contact switch at the brake pedal part
Vehicle speed sensor	Detect the vehicle speed at the speedometer gear part
Air conditioner load switch	Detect the compressor operation through the hydraulic pressure switch
A/T control relay	Power supply to the solenoid valve
DCC solenoid valve	Control the fluid pressure to the pressure control valve for shift control
LR (DIR) solenoid valve	Control the fluid pressure to the pressure control valve for shift control
2ND solenoid valve	Control the fluid pressure to the pressure control valve for shift control
UD solenoid valve	Control the fluid pressure to the pressure control valve for shift control
OD solenoid valve	Control the fluid pressure to the pressure control valve for shift control
RED solenoid valve	Control the fluid pressure to the pressure control valve for shift control
Engine ECM	Receive the control signals via communication with A/T ECM

G01092395

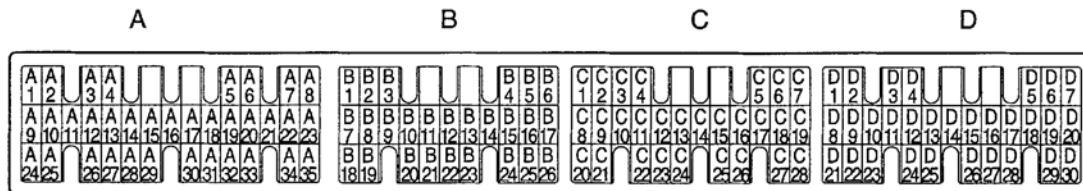
Fig. 79: Sensor And Actuator Function Chart
Courtesy of KIA MOTORS AMERICA, INC.

COMBINED ECM (ONLY AT) CONNECTOR PIN NO. AND NAME

Pin No.	Pin Name	Pin No.	Pin Name
A30	TPS output	D04	Output speed sensor
B10	AT control relay	D06	2ND solenoid
B17	Oil temperature sensor ground	D04	DCC solenoid
C06	Power ground	D08	Inhibitor SW (R)
C07	AT battery	D09	O/D OFF SW
C08	TPS	D10	Inhibitor SW (L)
C10	Vehicle speed sensor	D19	RED solenoid
C15	Diagnosis K terminal	D20	U/D solenoid
C18	Power ground	D21	Inhibitor SW (N)
C19	AT battery	D22	Inhibitor SW (3)
C27	Power ground	D23	Stop lamp SW
C28	IG SW	D24	Oil temperature sensor
D01	Inhibitor SW (P)	D29	LR solenoid
D02	Inhibitor SW (D)	D30	O/D solenoid
D03	Input speed sensor		

G01092346

Fig. 80: Combined ECM Connector Pin No. And Name Chart
Courtesy of KIA MOTORS AMERICA, INC.



G01092347

Fig. 81: Identifying ECM Connector Pins
Courtesy of KIA MOTORS AMERICA, INC.

TROUBLE CODES AND DETAILS

Code	Conditions	Probable cause
P1704 P1703 P1702 (P1701)	Throttle position sensor line If TPS output voltage is higher than 4.8V during engine idling, Hi-Scan will determine too high output and generate trouble code P0123. If TPS output voltage often goes below 0.2V when engine is not idling, it will determine too low output and generate trouble code P0122. If TPS output voltage goes above 1.2V or below 0.2V during engine idling, it will determine mis-adjusted TPS and generate trouble code P0121.	Circuit open/short circuit Malfunction of adjustment TPS failure (TCL unequipped vehicle) APS failure (TCL equipped vehicle) Connector failure ECM failure
P0713 P0712 (P0710)	Fluid temperature sensor line If fluid temperature sensor output is 4.57V or above (oil temperature does not rise) after driving 10 minutes or longer, it will determine fluid temperature sensor breakage and generate trouble code P0713. If the sensor output voltage is below 0.49V for 1 second or longer, it will generate P0712.	Circuit open/short circuit Fluid temperature sensor failure Connector failure ECM failure
P0725	Crank angle sensor line No signal from the crank angle sensor line for 5 seconds or more in running at a speed of 15.5mph(25km/h) or more is regarded that the crank angle sensor is disconnected, and the trouble code P0335 is generated.	Circuit open/short circuit Crank angle sensor failure Connector failure ECM failure
P0715	Input speed sensor line If it fails to receive input speed sensor signal for 1second or more at third speed or fourth speed and above vehicle speed 18.6mph(30km/h), it will determine broken or short circuit from input speed sensor, and generate trouble code P0715. If trouble code P0715 is generated four times or more, gear will be locked at third ("D" range) or second speed for safety.	Circuit open/short circuit Input speed sensor failure UD clutch retainer failure Connector failure ECM failure

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Fig. 82: Trouble Codes And Details (1 Of 3)
Courtesy of KIA MOTORS AMERICA, INC.

Code	Conditions		Probable cause
P0720	Output speed sensor line If output shaft speed sensor output continues to be lower than 50% of the vehicle speed at third speed or fourth speed and above vehicle speed 30km/h, it will determine broken or short circuit from the output speed sensor, and generate trouble code P0720. If trouble code P0720 is generated four times or more, gear will be locked at third ("D" range) or second speed for safety.	Circuit open/short circuit	Output speed sensor failure Dir planetary carrier failure Connector failure ECM failure
P0703	Stop lamp switch line If stop lamp lights up for five minutes or more during driving, it will determine short circuit in stop lamp switch, and generate trouble code P0703.	Short circuit	Stop lamp switch failure Connector failure ECM failure
P0750	LR solenoid valve line	Short circuit/open	Solenoid valve failure Connector failure ECM failure
P0755	UD solenoid valve line		
P0760	2ND solenoid valve line		
P0765	OD solenoid valve line		
P0770	RED solenoid valve line If the solenoid valve resistance is too high or too low, it will determine broken or short circuit in solenoid valve, and generate trouble code. The gear will be locked for safety at third gear.		
P0740	DCC solenoid valve line If the DCC solenoid valve resistance is too low, it will determine the DCC solenoid valve's broken or short circuit and generate trouble code P0740. If the DCC solenoid valve's drive duty is 100% continually for 4 seconds, it will determine the damper clutch control system failure and generate the trouble code P0740. Upon output of trouble code P0740 the gear will be locked for safety at third gear.		
P0731	First gear incorrect ratio If (the output speed sensor output at first gear X first gear ratio) is not same as input speed sensor output, it will generate the trouble code P0731. If the trouble code P0731 is output 4 times or more, the gear will be locked for safety at third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure LR brake line failure UD brake line failure RED brake line failure
P0732	Second gear incorrect ratio If (the output shaft speed sensor output at second gear X second gear ratio) is not same as input shaft speed sensor output, it will generate the trouble code P0732. If the trouble code P0732 is output 4 times or more, the gear will be locked for safety at third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure 2ND brake line failure UD brake line failure RED brake line failure
P0733	Third gear incorrect ratio If (the output speed sensor output at third gear X third gear ratio) is not same as the input speed sensor output, it will generate the trouble code P0733. If the trouble code P0733 is output 4 times or more, the gear will be locked for safety at the third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure 2ND brake line failure UD brake line failure RED brake line failure

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Fig. 83: Trouble Codes And Details (2 Of 3)
Courtesy of KIA MOTORS AMERICA, INC.

Code	Conditions		Probable cause
P0734	Fourth gear incorrect ratio If (the output speed sensor output at fourth gear X fourth gear ratio) is not same as the input speed sensor output, it will generate the trouble code P0734. If the trouble code P0734 is output 4 times or more, the gear will be locked for safety at the third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure DIR clutch line failure
P0735	Fifth gear incorrect ratio If (the output speed sensor output at fifth gear X fifth gear ratio) is not same as the input speed sensor output, it will generate the trouble code P0735. If the trouble code P0735 is output 4 times or more, the gear will be locked for safety at the third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure DIR clutch line failure
P0736	Reverse gear incorrect ratio If (the output speed sensor output at fourth gear X reverse gear ratio) is not same as the input speed sensor output, it will generate the trouble code P0736. If the trouble code P0736 is output 4 times or more, the gear will be locked for safety at the third gear.		Input speed sensor failure Output speed sensor failure UD clutch retainer failure DIR planetary carrier failure LR brake line failure Reverse clutch line failure RED brake line failure Noise
P1723	A/T control relay line If the A/T control voltage is lower than 7V with ignition switch on, it will determine breakage or short-circuit at the A/T control relay grounding, and generate the trouble code P1723. The gear will be locked for safety at the third gear	Short circuit/open	A/T control relay failure Connector failure ECM failure
P0707 P0708 (P0705)	Transaxle range switch No signal continually for 30 seconds. 2 or more signals continually for 30 seconds.	Open/short circuit	Transaxle range switch failure
P0500	Vehicle speed sensor No signal continually for 30 seconds at above vehicle speed 18.6mph(30km/h)	Open/short circuit	Vehicle speed sensor failure

G01092350

Fig. 84: Trouble Codes And Details (3 Of 3)
 Courtesy of KIA MOTORS AMERICA, INC.

INSPECTION PROCEDURES FOR DIAGNOSTIC TROUBLE CODES

DTC INDEX

DTC	Description
DTC P0710	OIL TEMPERATUR SENSOR SYSTEM
DTC P0725	CRANKSHAFT ANGLE SENSOR SYSTEM
DTC P0715	INPUT SHAFT SPEED SENSOR SYSTEM
DTC P0720	OUTPUT SHAFT SPEED SENSOR SYSTEM
DTC P0703	STOP LIGHT SWITCH SYSTEM
DTC P0750, P0755, P0760, P0765, P0770	LOW AND REVERSE SOLENOID VALVE SYSTEM
DTC P0743, P0740	TORQUE CONVERTER CLUTCH SOLENOID SYSTEM
DTC P0731	1ST GEAR INCORRECT RATIO
DTC P0732	2ND GEAR INCORRECT RATIO
DTC P0733	3RD GEAR INCORRECT RATIO
DTC P0734	4TH GEAR INCORRECT RATIO
DTC P0735	5TH GEAR INCORRECT RATIO

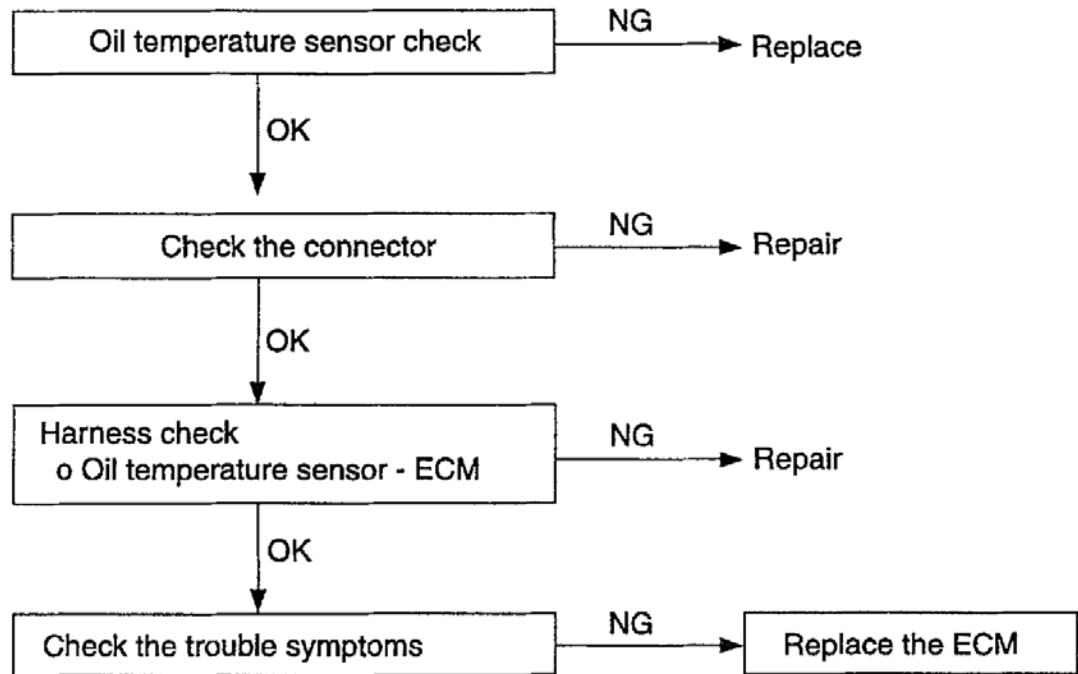
DTC P0736	REVERSE GEAR INCORRECT RATIO
DTC P1723	A/T CONTROL RELAY SYSTEM
DTC P1704, P1703, P1702	THROTTLE POSITION SENSOR SYSTEM

DTC P0710: OIL TEMPERATUR SENSOR SYSTEM

Code No.P0710 Oil temperature sensor system	Probable cause
If the oil temperature sensor output voltage is 2.6V 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 No. 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 No. P0710 is output.	<ul style="list-style-type: none"> • Malfunction of the oil temperature sensor • Malfunction of connector • Malfunction of the ECM

G01092398

Fig. 85: Probable Cause Chart: P0710
Courtesy of KIA MOTORS AMERICA, INC.



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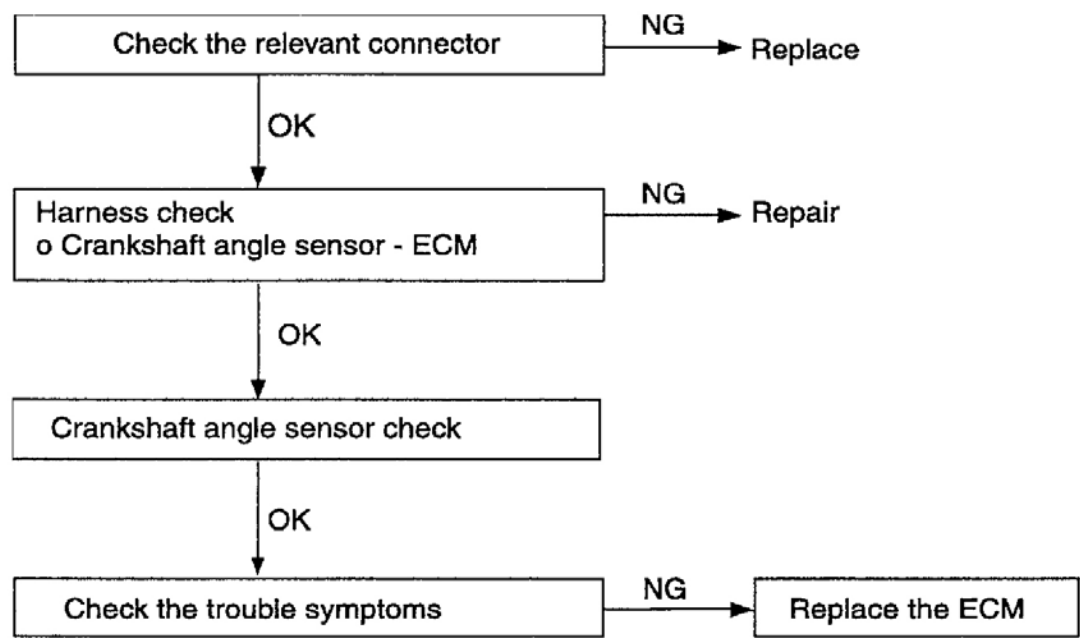
Fig. 86: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0725: CRANKSHAFT ANGLE SENSOR SYSTEM

Code No.P0725 Crankshaft angle sensor system	Probable cause
If no output pulse is detected from the crankshaft position sensor for 5 seconds or more while driving at 16mph(25 km/h) or more, it is judged that there is an open circuit in the crankshaft angle sensor and diagnostic trouble code No.P0335 is output.	<ul style="list-style-type: none"> • Malfunction of the crankshaft angle sensor • Malfunction of connector • Malfunction of the ECM

G01092400

Fig. 87: Probable Cause Chart: P0725
Courtesy of KIA MOTORS AMERICA, INC.



G01092401

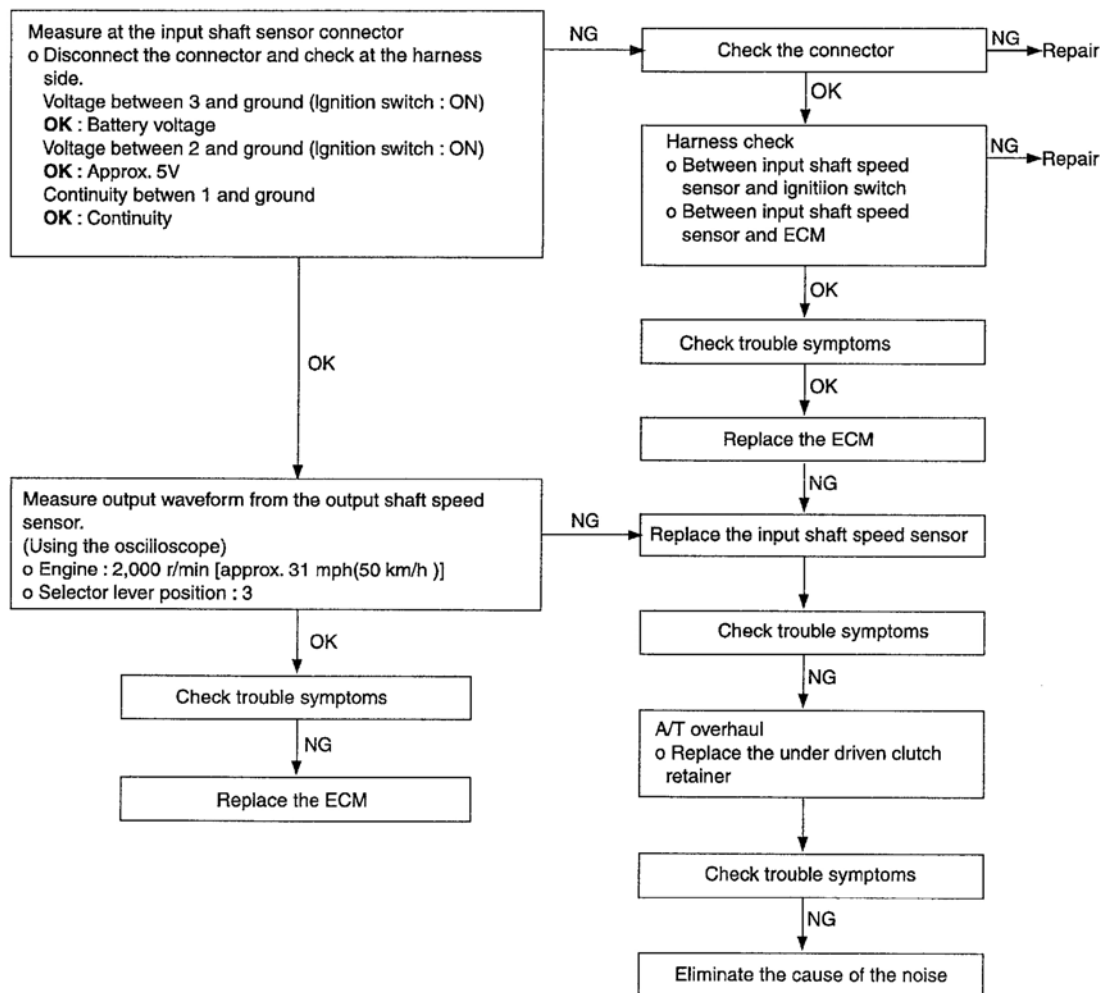
Fig. 88: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0715: INPUT SHAFT SPEED SENSOR SYSTEM

Code No.P0715 Input shaft speed sensor system	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 19mph(30 km/h) or more, it is judged to be an open circuit or short circuit in the input shaft speed sensor and diagnostic trouble code No.P0715 is output. If diagnostic trouble code P0715 is output four times, the transaxle is locked into 3rd gear or 2nd gear as a fail-safe measure.	<ul style="list-style-type: none"> • Malfunction of the input shaft speed sensor • Malfunction of the underdrive clutch retainer • Malfunction of connector • Malfunction of the ECM

G01092402

Fig. 89: Probable Cause Chart: P0715
Courtesy of KIA MOTORS AMERICA, INC.



G01092403

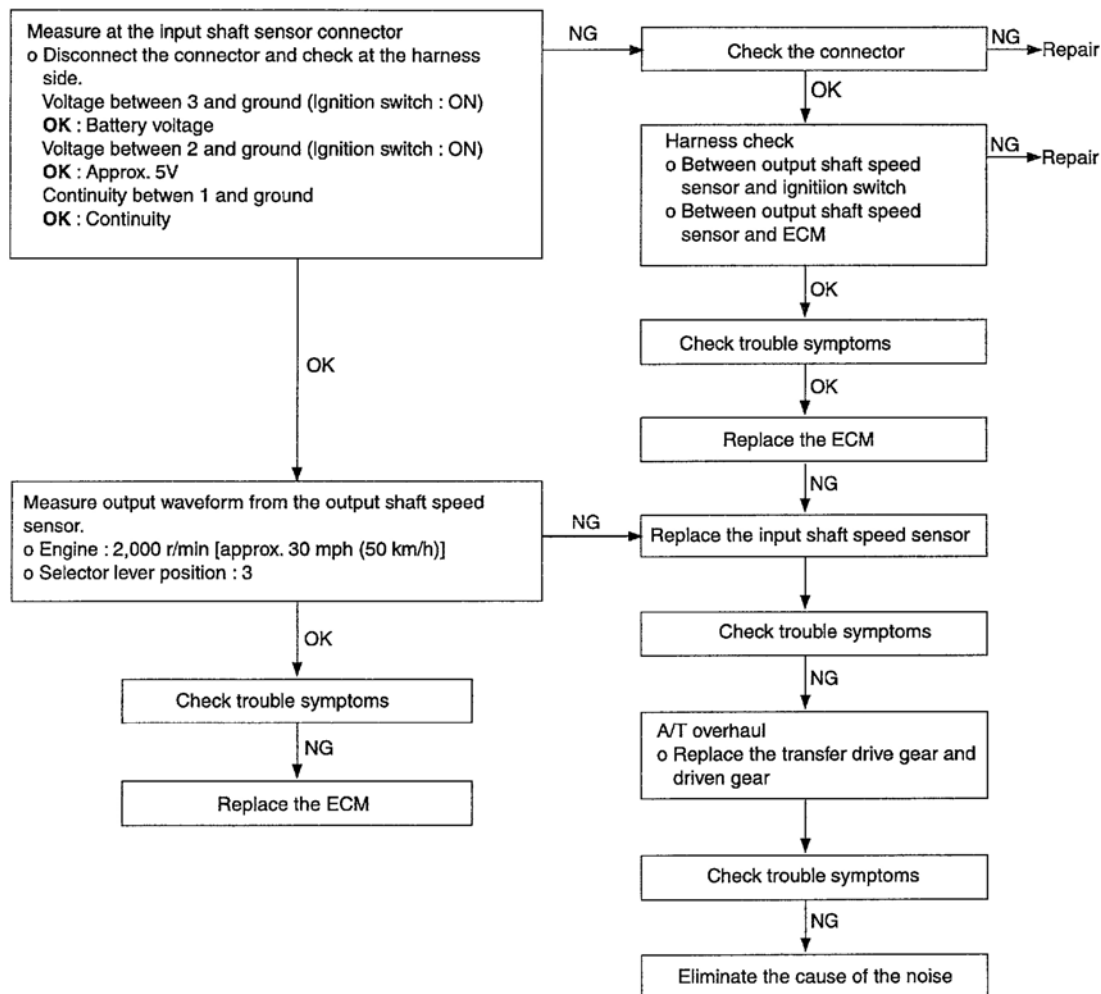
Fig. 90: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0720: OUTPUT SHAFT SPEED SENSOR SYSTEM

Code No.P0720 Output shaft speed sensor system	Probable cause
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, it is judged to be an open circuit or short circuit in the output shaft speed sensor and diagnostic trouble code No.P0720 is output. If diagnostic trouble code No.P0720 is output four times, the transmission is locked into 3rd gear or 2nd gear as a fail-safe measure.	<ul style="list-style-type: none"> • Malfunction of the output shaft speed sensor • Malfunction of the transfer drive gear or driven gear • Malfunction of connector • Malfunction of the ECM

G01092404

Fig. 91: Probable Cause Chart: P0720
Courtesy of KIA MOTORS AMERICA, INC.



G01092405

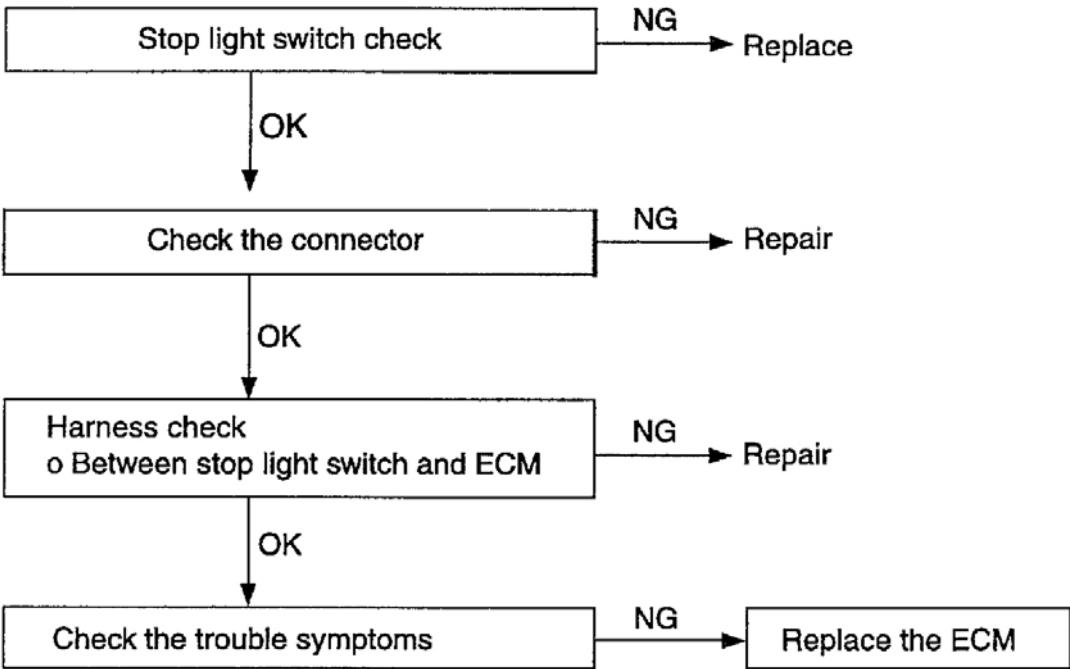
Fig. 92: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0703: STOP LIGHT SWITCH SYSTEM

Code No.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.	<ul style="list-style-type: none"> Malfunction of the stop light switch Malfunction of connector Malfunction of the ECM

G01092406

Fig. 93: Probable Cause Chart: P0703
Courtesy of KIA MOTORS AMERICA, INC.



G01092407

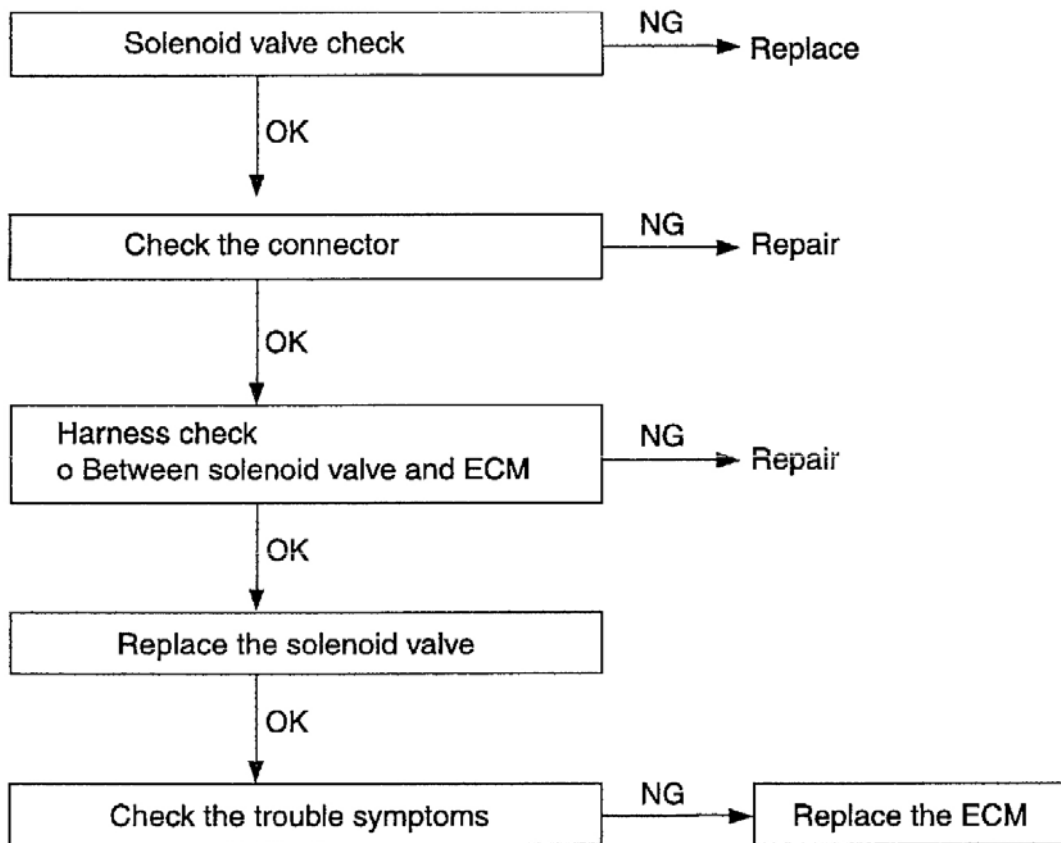
Fig. 94: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0750, P0755, P0760, P0765, P0770: LOW AND REVERSE SOLENOID VALVE SYSTEM

Code No.P0750 Low and reverse solenoid valve system	Probable cause
Code No.P0755 Underdrive solenoid valve system	
Code No.P0760 Second solenoid valve system	
Code No.P0765 Overdrive solenoid valve system	
Code No.P0770 Reduction 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 diagnostic trouble code is output. The transaxle is locked into 3rd gear as a fail-safe measure.	<ul style="list-style-type: none">• Malfunction of the oil temperature sensor• Malfunction of connector• Malfunction of the ECM

G01092408

Fig. 95: Probable Cause Chart: P0750, P0755, P0760, P0765, P0770
Courtesy of KIA MOTORS AMERICA, INC.



G01092409

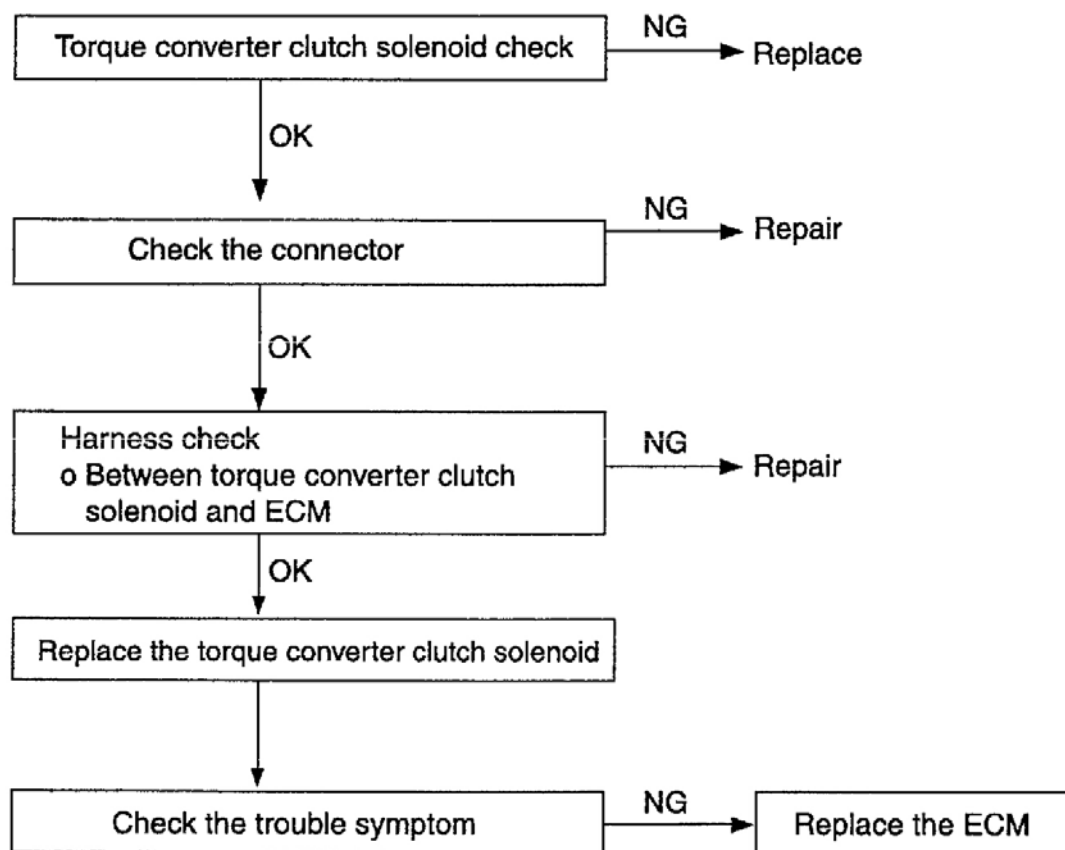
Fig. 96: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0743, P0740: TORQUE CONVERTER CLUTCH SOLENOID SYSTEM

Code No. P0743/P0740 Torque converter clutch solenoid system	Probable cause
<p>If the resistance value for the torque converter clutch solenoid is too large or too small, it is judged that there is a short circuit or an open circuit in the torque converter clutch solenoid and diagnostic trouble code No.P0740 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 NO.P0743 is output. When diagnostic trouble code No.P0740 is output, the transaxle is locked into 3rd gear as a fail-safe measure. If the lock-up clutch remains engaged for a continuous period of 10 seconds when the ECM is attempting to disengage the lock-up clutch, it is judged that the torque converter clutch is stuck on and diagnostic trouble code P0740.</p>	<ul style="list-style-type: none"> • Malfunction of the torque converter clutch solenoid • Malfunction of connector • Malfunction of the ECM

G01092410

Fig. 97: Probable Cause Chart: P0743, P0740



G01092411

Fig. 98: Troubleshooting Chart

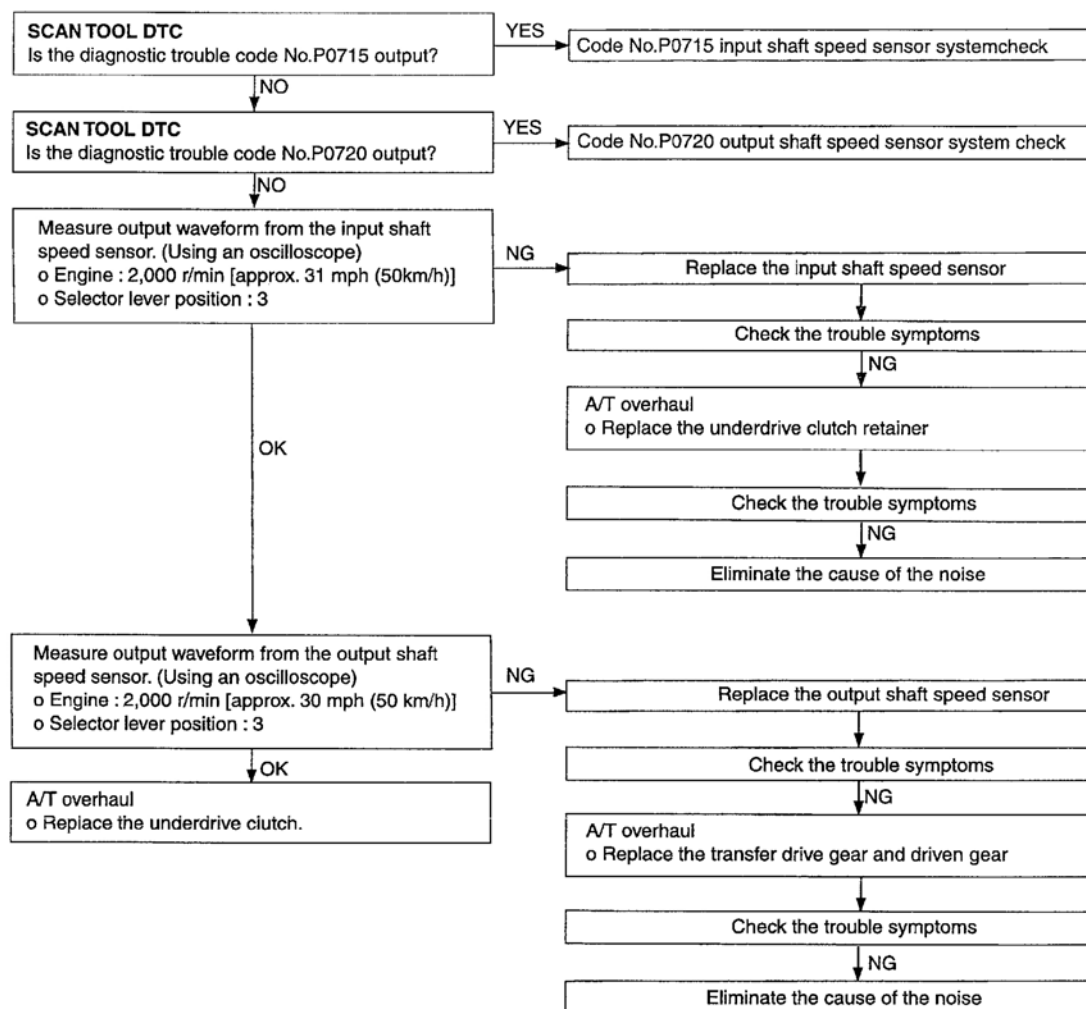
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0731: 1ST GEAR INCORRECT RATIO

Code No.P0731 1st gear incorrect ratio	Probable cause
<p>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, diagnostic trouble code NO.P0731 is output. If diagnostic trouble code No.P0731 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<ul style="list-style-type: none">• 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• Malfunction of the reduction brake system• Noise generated

G01092412

Fig. 99: Probable Cause Chart: P0731
Courtesy of KIA MOTORS AMERICA, INC.



G01092413

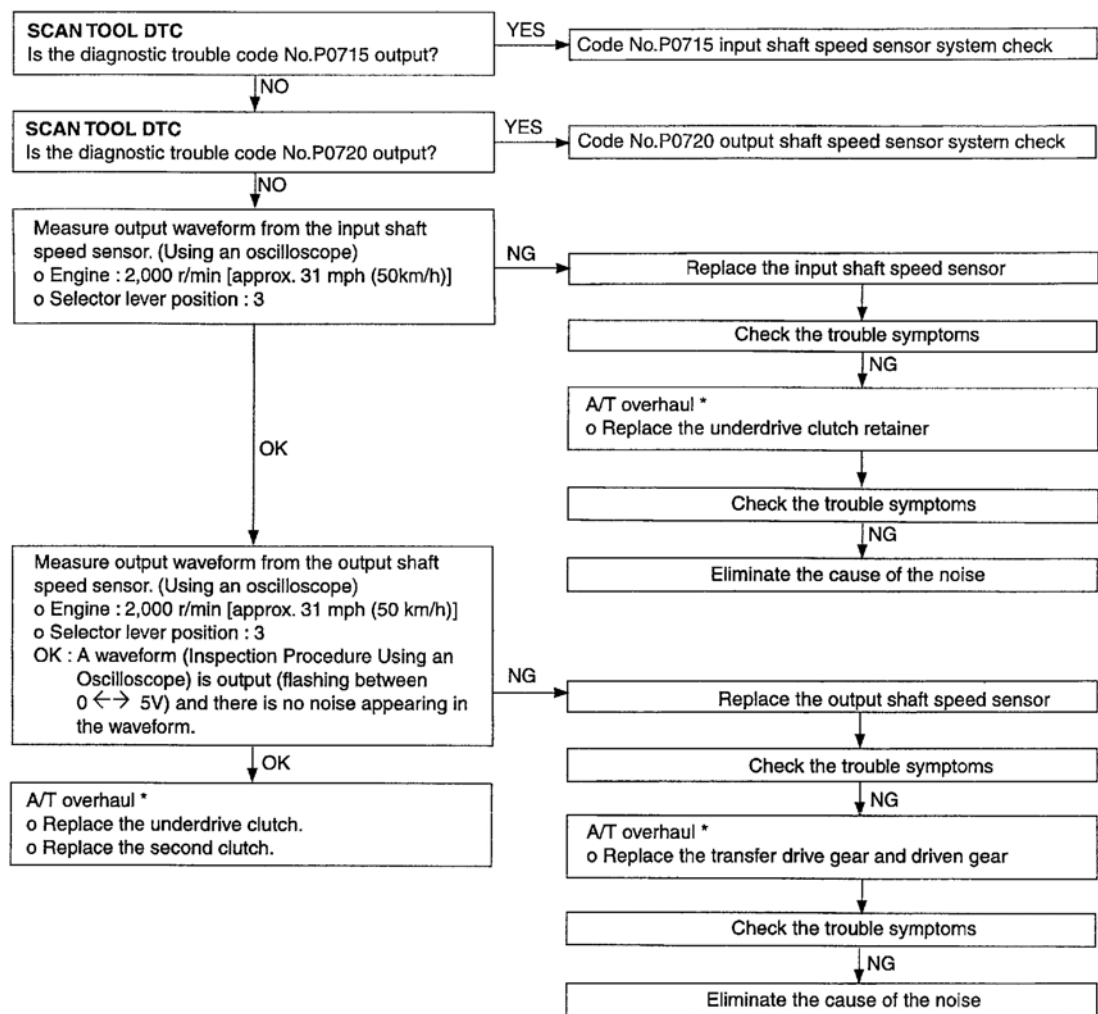
Fig. 100: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0732: 2ND GEAR INCORRECT RATIO

Code No.P0732 2nd gear incorrect ratio	Probable cause
<p>If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnostic trouble code No.P0732 is output. If diagnostic trouble code No.P0732 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<ul style="list-style-type: none"> • 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 • Malfunction of the reduction brake system • Noise generated

G01092414

Fig. 101: Probable Cause Chart: P0732
Courtesy of KIA MOTORS AMERICA, INC.



G01092415

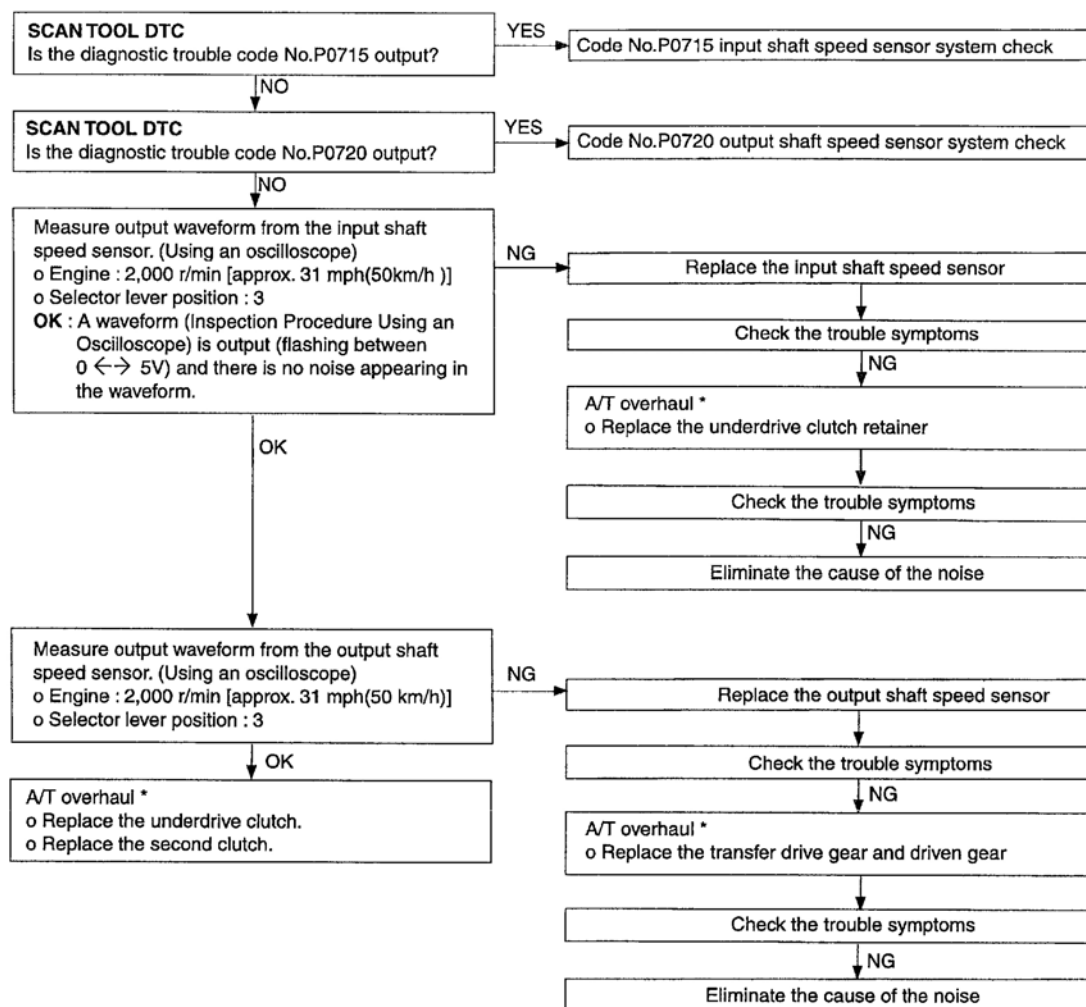
Fig. 102: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0733: 3RD GEAR INCORRECT RATIO

Code No.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 NO.P0733 is output. If diagnostic trouble code No.P0733 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<ul style="list-style-type: none">• 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• Malfunction of the reduction brake system• Noise generated

G01092416

Fig. 103: Probable Cause Chart: P0733
Courtesy of KIA MOTORS AMERICA, INC.



G01092417

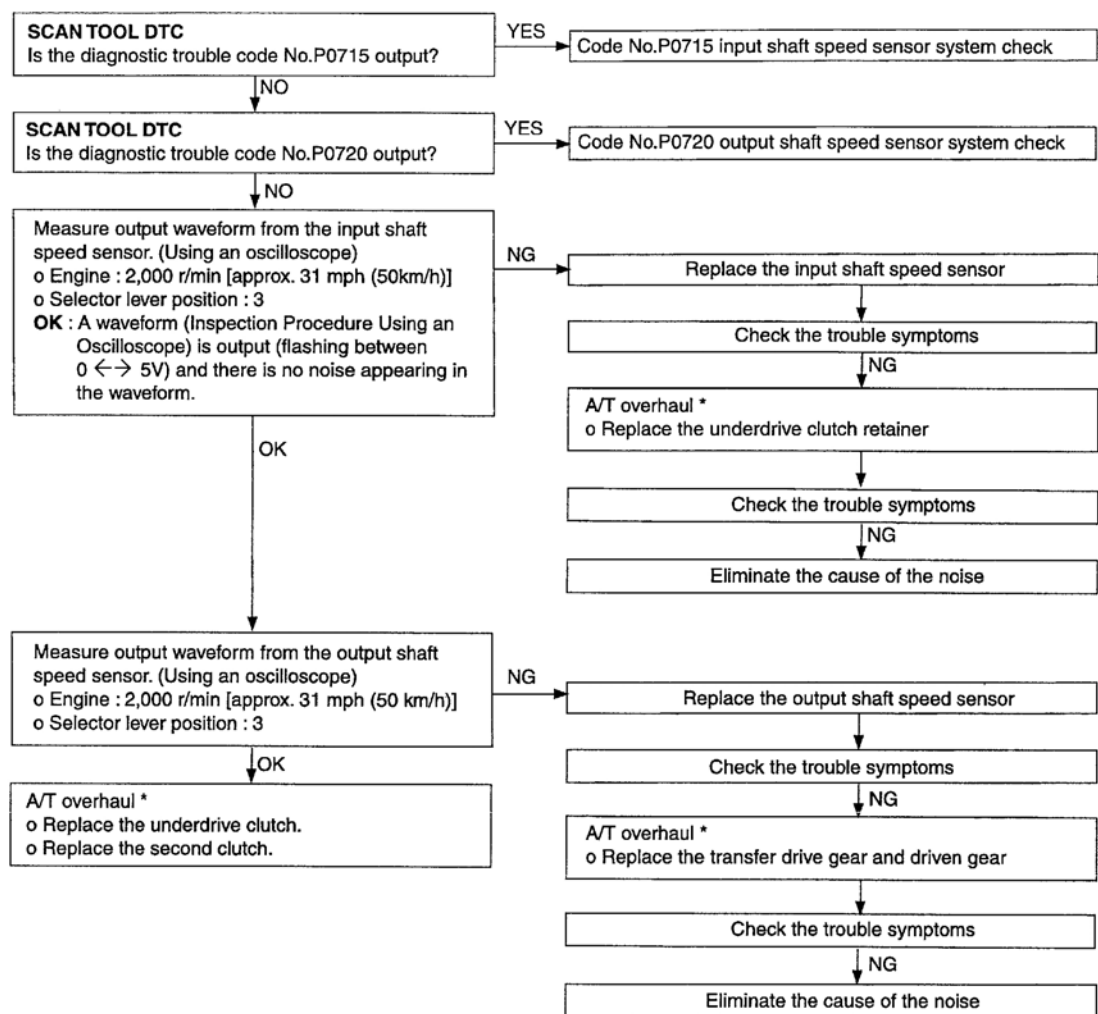
Fig. 104: Troubleshooting Chart
 Courtesy of KIA MOTORS AMERICA, INC.

DTC P0734: 4TH GEAR INCORRECT RATIO

Code No.P0734 4th gear incorrect ratio	Probable cause
<p>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 NO.P0734 is output. If diagnostic trouble code No.P0734 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<ul style="list-style-type: none"> • 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 direct planetary system • Malfunction of the direct clutch system • Noise generated

G01092418

Fig. 105: Probable Cause Chart: P0734
Courtesy of KIA MOTORS AMERICA, INC.



G01092419

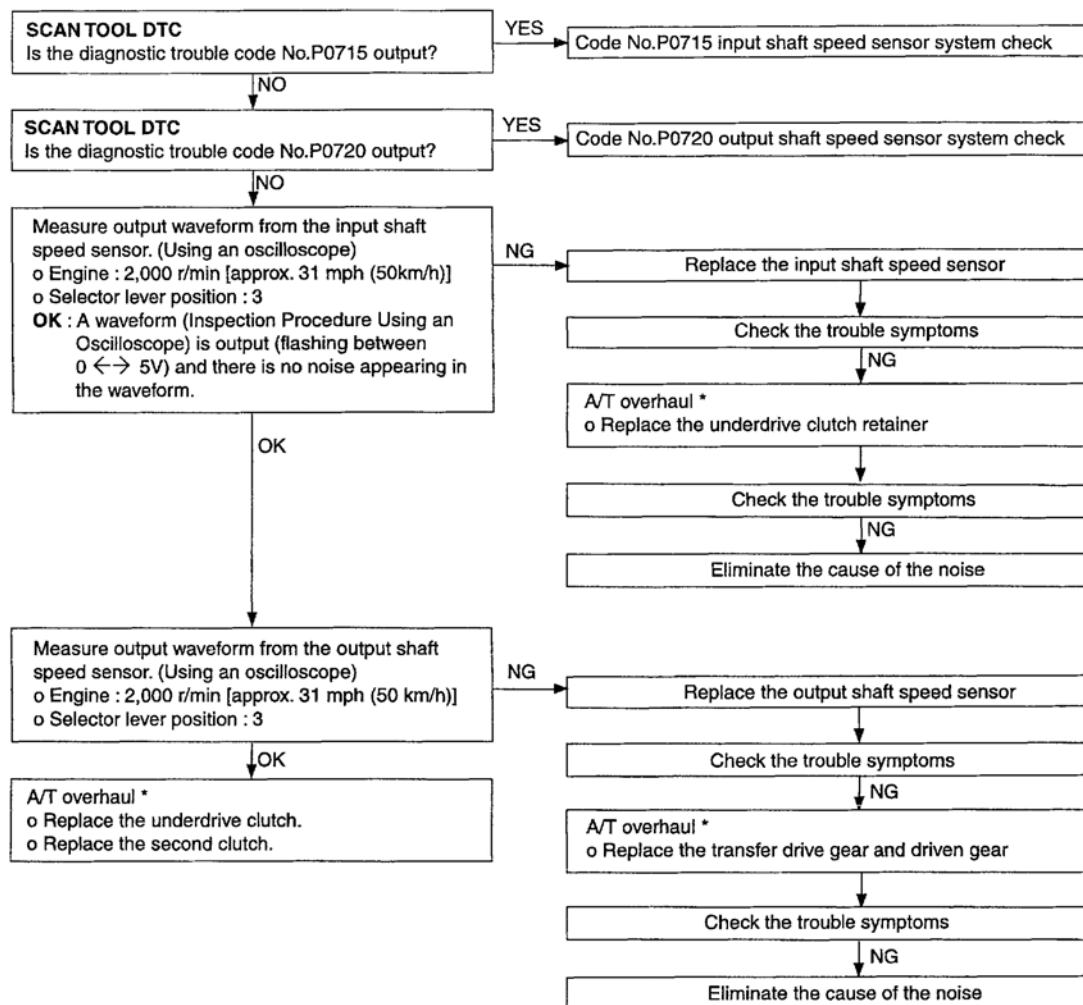
Fig. 106: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P0735: 5TH GEAR INCORRECT RATIO

Code No.P0735 5th gear incorrect ratio	Probable cause
If the output from the output shaft speed sensor multiplied by the 5th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 5th gear has been completed, diagnostic trouble code NO.P0735 is output. If diagnostic trouble code No.P0735 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.	<ul style="list-style-type: none">• Malfunction of the input shaft speed sensor• Malfunction of the output shaft speed sensor• Malfunction of the direct planetary carrier• Malfunction of the second brake system• Malfunction of the overdrive clutch system• Malfunction of the direct clutch system• Noise generated

G01092420

Fig. 107: Probable Cause Chart: P0735
Courtesy of KIA MOTORS AMERICA, INC.



G01092421

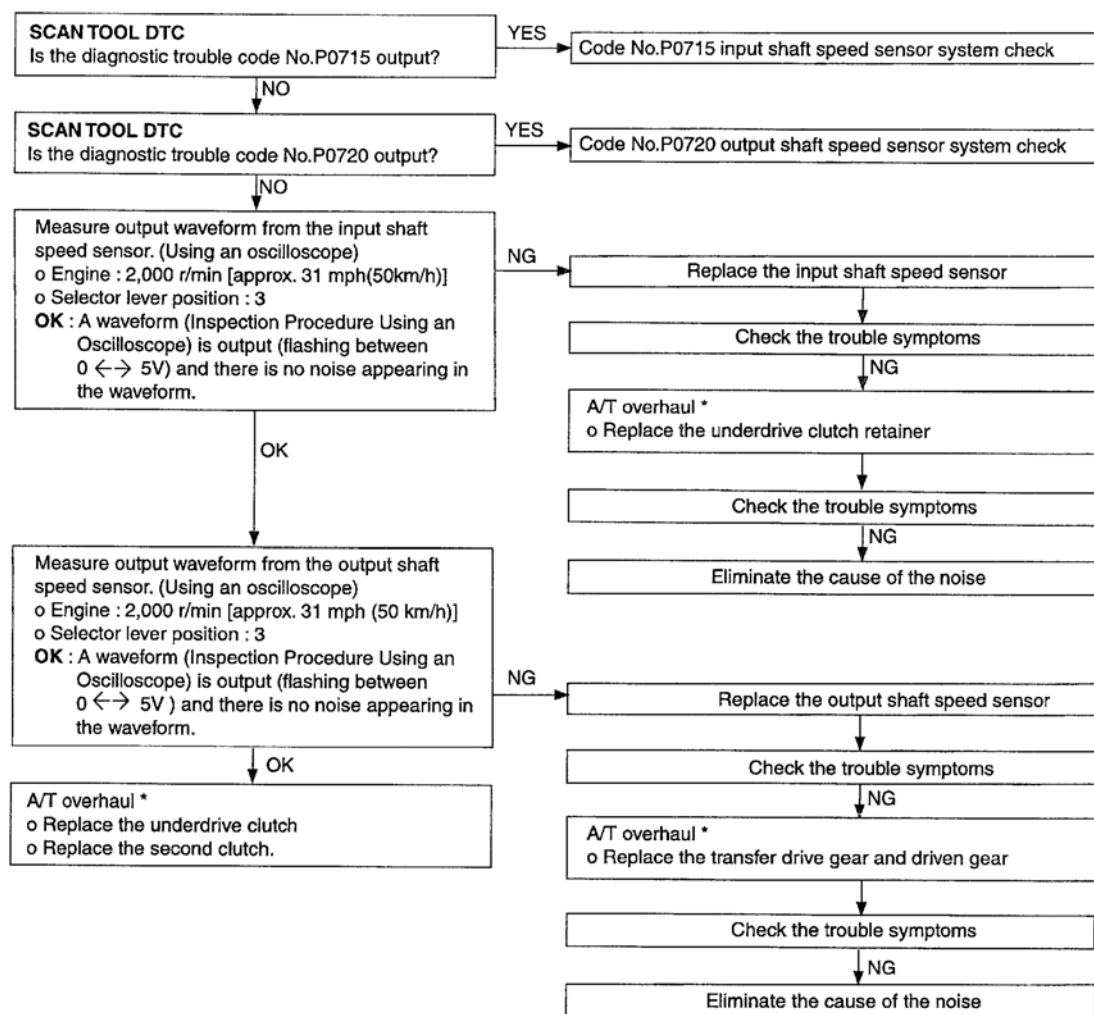
Fig. 108: Troubleshooting Chart
 Courtesy of KIA MOTORS AMERICA, INC.

DTC P0736: REVERSE GEAR INCORRECT RATIO

Code No.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 NO.P0736 is output. If diagnostic trouble code No.P0736 is output four times, the transaxle is locked into 3rd gear as a fail-safe measure.</p>	<ul style="list-style-type: none"> • Malfunction of the input shaft speed sensor • Malfunction of the output shaft speed sensor • Malfunction of the transfer drive gear or driven gear • Malfunction of the low and reverse brake system • Malfunction of the direct planetary carrier • Malfunction of the reduction brake system • Noise generated

G01092422

Fig. 109: Probable Cause Chart: P0736
Courtesy of KIA MOTORS AMERICA, INC.



G01092423

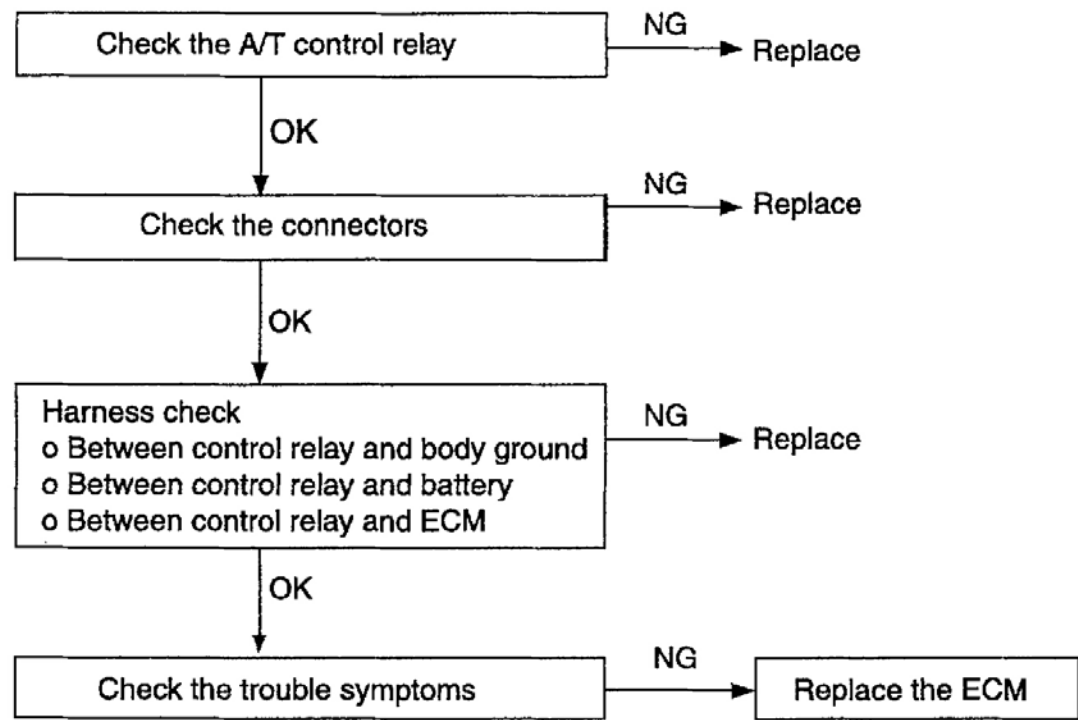
Fig. 110: Troubleshooting Chart

DTC P1723: A/T CONTROL RELAY SYSTEM

Code No.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 open 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.	<ul style="list-style-type: none">• Malfunction of the A/T control relay• Malfunction of connector• Malfunction of the ECM

G01092424

Fig. 111: Probable Cause Chart: P1723
Courtesy of KIA MOTORS AMERICA, INC.



G01092425

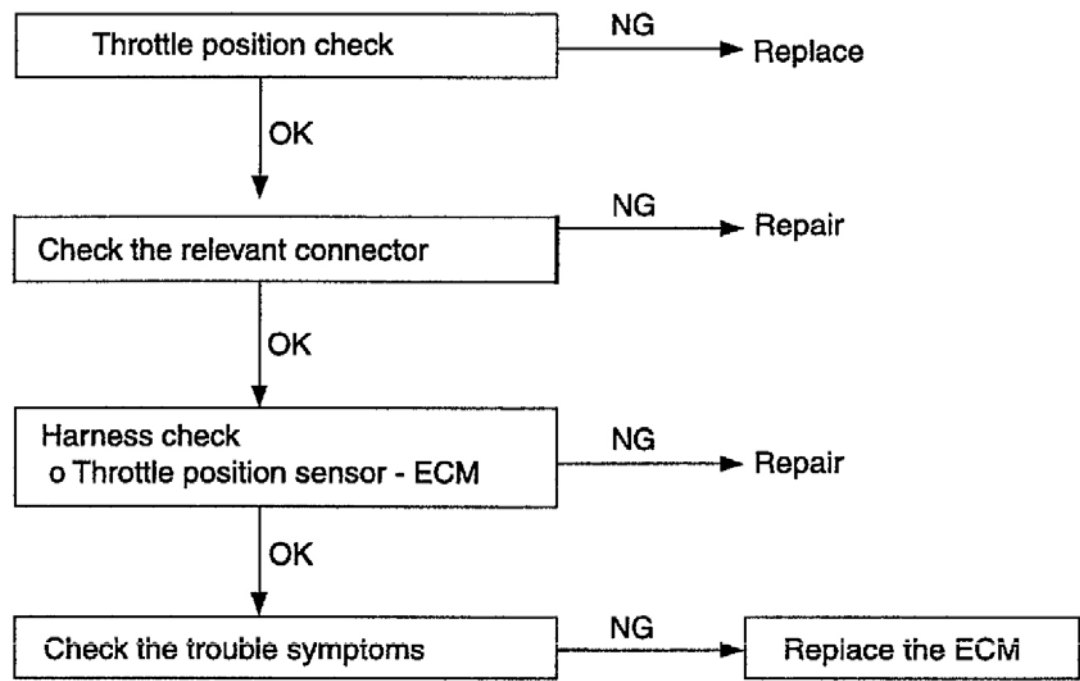
Fig. 112: Troubleshooting Chart
Courtesy of KIA MOTORS AMERICA, INC.

DTC P1704, P1703, P1702: THROTTLE POSITION SENSOR SYSTEM

Code No. P1704, P1703, P1702 Throttle position sensor system	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 No.P0123 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 No.P0122 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 No.P0121 is output.</p>	<ul style="list-style-type: none"> • Malfunction of the throttle position sensor • Malfunction of connector • Malfunction of the ECM

G01092426

Fig. 113: Probable Cause Chart: P1704, P1703, P1702
 Courtesy of KIA MOTORS AMERICA, INC.

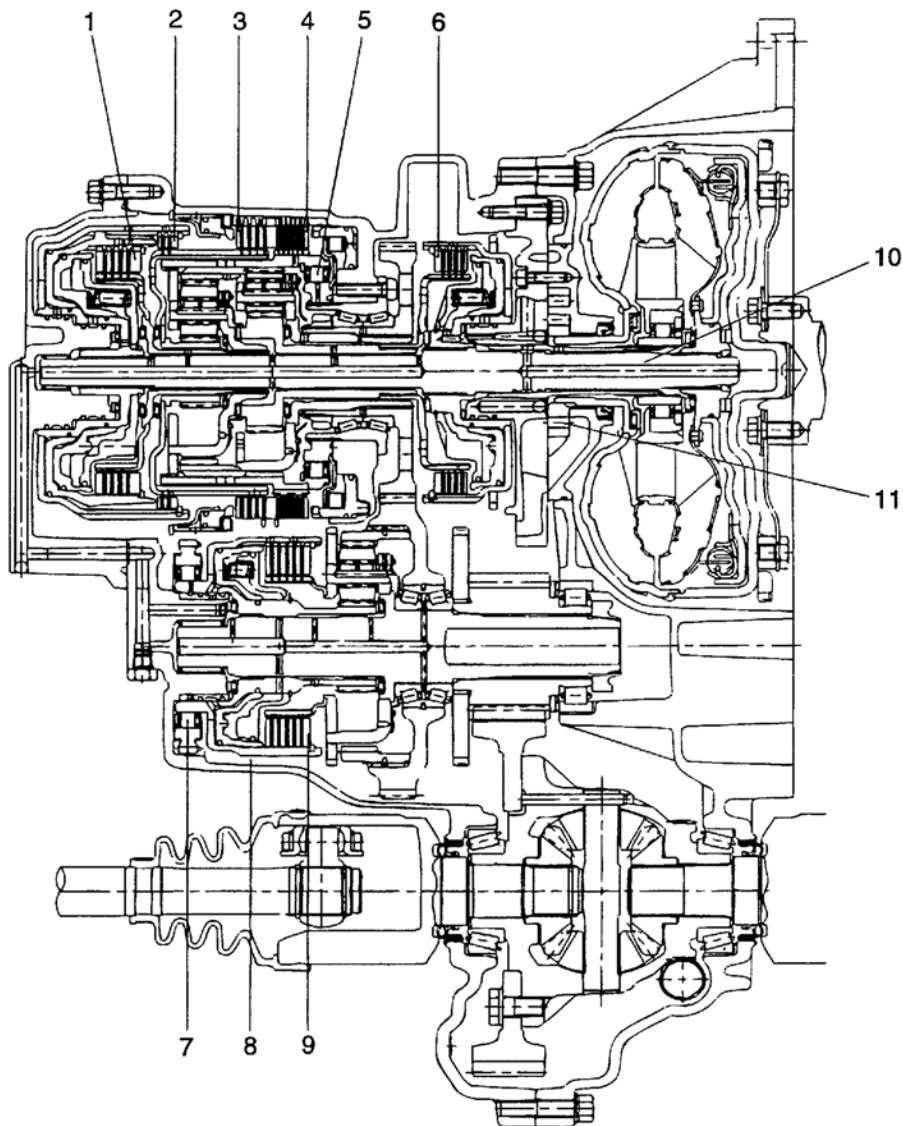


G01092427

Fig. 114: Troubleshooting Chart
 Courtesy of KIA MOTORS AMERICA, INC.

SERVICE ADJUSTMENTS & PROCEDURES

SECTIONAL VIEW



- 1. Overdrive clutch
- 2. Reverse clutch
- 3. Second clutch
- 4. Low and reverse clutch
- 5. One way clutch
- 6. Underdrive clutch

- 7. One way clutch
- 8. Reduction clutch
- 9. Director clutch
- 10. Input shaft
- 11. Oil pump

G01092384

Fig. 115: Transaxle Sectional View
Courtesy of KIA MOTORS AMERICA, INC.

OPERATING ELEMENTS & FUNCTION

CLUTCH AND BRAKE FUNCTION

Operating elements	Symbol	Function
Underdrive clutch	UD	Connect between input shaft and underdrive sun gear
Reverse clutch	REV	Connect between input shaft and reverse sun gear
Overdrive clutch	OD	Connect between input shaft and overdrive carrier
Director clutch	DIR	Connect between director sun gear and director carrier
Low and reverse brake	LR	Hold annulus gear and overdrive carrier
Second brake	2ND	Hold reverse sun gear
Reduction brake	RED	Hold director sun gear
One way clutch	OWC	Restrict director sun gear turning direction
One way clutch 1	OWC1	Restrict low and reverse ring gear turing direction

G01092386

Fig. 116: Clutch And Brake Function Chart
Courtesy of KIA MOTORS AMERICA, INC.

SOLENOID VALVE OPERATING ELEMENTS OF EACH SHIFT RANGE

Item	Solenoid valve					
	LR (DIR)	2ND	UD	OD	RED	DCC(refer- ence)
First speed	OFF (LR)	ON	OFF	ON	OFF	OFF
Second speed	ON (LR)	OFF	OFF	ON	OFF	OFF
Third speed	ON (DIR)	ON	OFF	OFF	OFF	OFF
Fourth speed	OFF (DIR)	ON	OFF	OFF	ON	ON
Fifth speed	OFF (DIR)	OFF	ON	OFF	ON	ON
Reverse	OFF (LR)	ON	ON	ON	OFF	OFF
Neutral, parking	OFF (LR)	ON	ON	ON	OFF	OFF

G01092387

Fig. 117: Solenoid Valve Operating Elements Chart
Courtesy of KIA MOTORS AMERICA, INC.

CLUTCH AND BRAKE OPERATING ELEMENTS OF EACH SHIFTING RANGE

Range		UD clutch	OD clutch	2ND brake	LR brake	REV clutch	RED brake	DIR clutch	OWC	OWC1
P		-	-	-	0	-	0	-	-	-
R		-	-	-	0	0	0	-	-	-
N		-	-	-	0	-	0	-	-	-
D	First speed	0	-	-	(0)	-	0	-	0	0
	Second speed	0	-	0	-	-	0	-	0	-
	Third speed	0	0	-	-	-	0	-	0	-
	Fourth speed	0	0	-	-	-	-	0	-	-
	Fifth speed	-	0	0	-	-	-	0	-	-

G01092385

Fig. 118: Clutch And Brake Operating Elements Chart
Courtesy of KIA MOTORS AMERICA, INC.

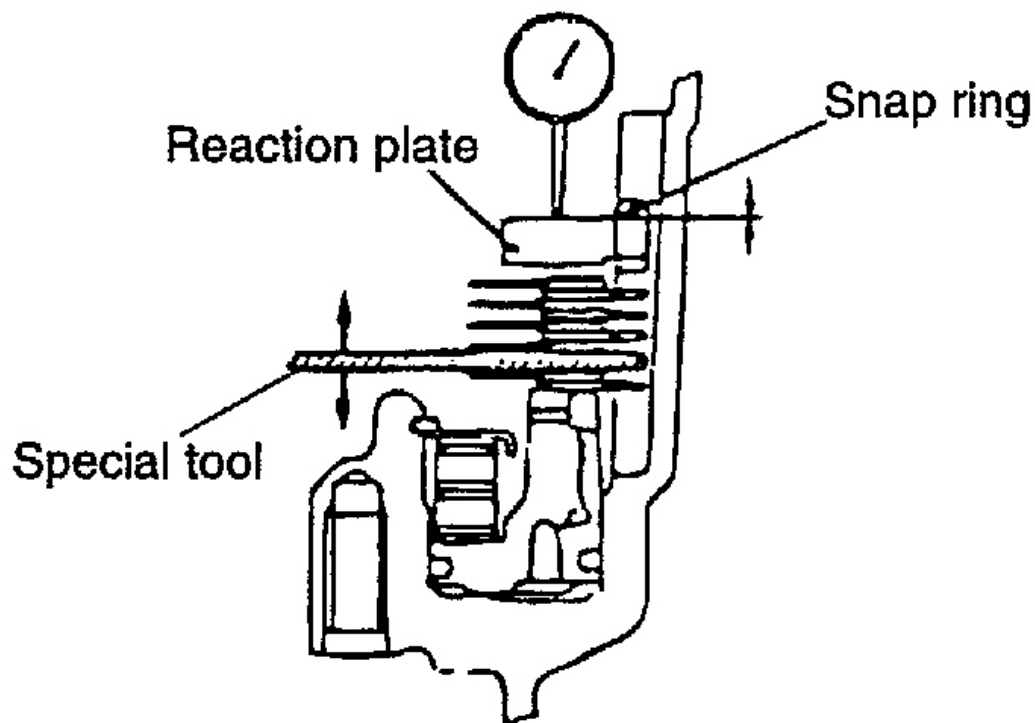
ADJUSTMENTS

END PLAY ADJUSTMENT PROCEDURE

Adjusting the brake reaction plate end play.

Replace/LR brake plate using the special tool, and install the brake disc, the brake plate, and the snap ring as illustrated on the figure. Install the reaction plate and the snap ring. Move the special tool and measure the end play. Adjust the end play into standard range using a new snap ring.

Standard end play,: F5A52-3: 0-0.0063 in (0-0.16mm)

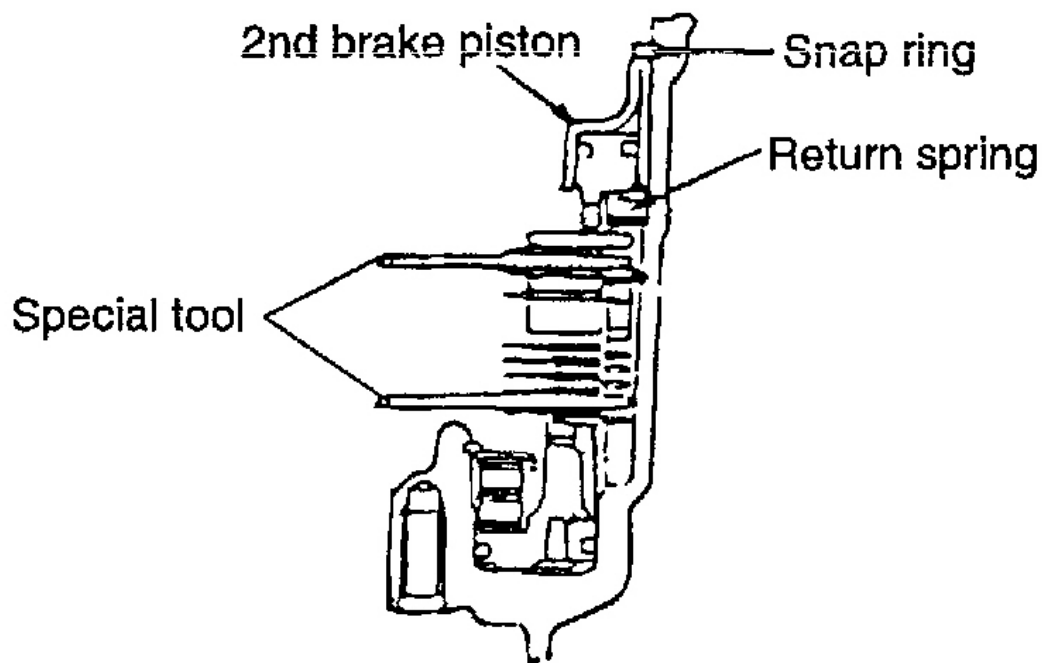


G01092388

Fig. 119: Illustrating End Play Adjustment Procedure
Courtesy of KIA MOTORS AMERICA, INC.

ADJUSTING 2ND BRAKE END PLAY

Replace the second brake pressure plate using the special tool and install the brake disc and the brake plate as illustrated on the figure. Install the return spring, the second brake piston and the snap ring.



G01092389

Fig. 120: Illustrating Adjusting 2ND Brake End Play
Courtesy of KIA MOTORS AMERICA, INC.

Standard end play

F5A51-3: 0.039-0.061 in (1.09-1.55mm)

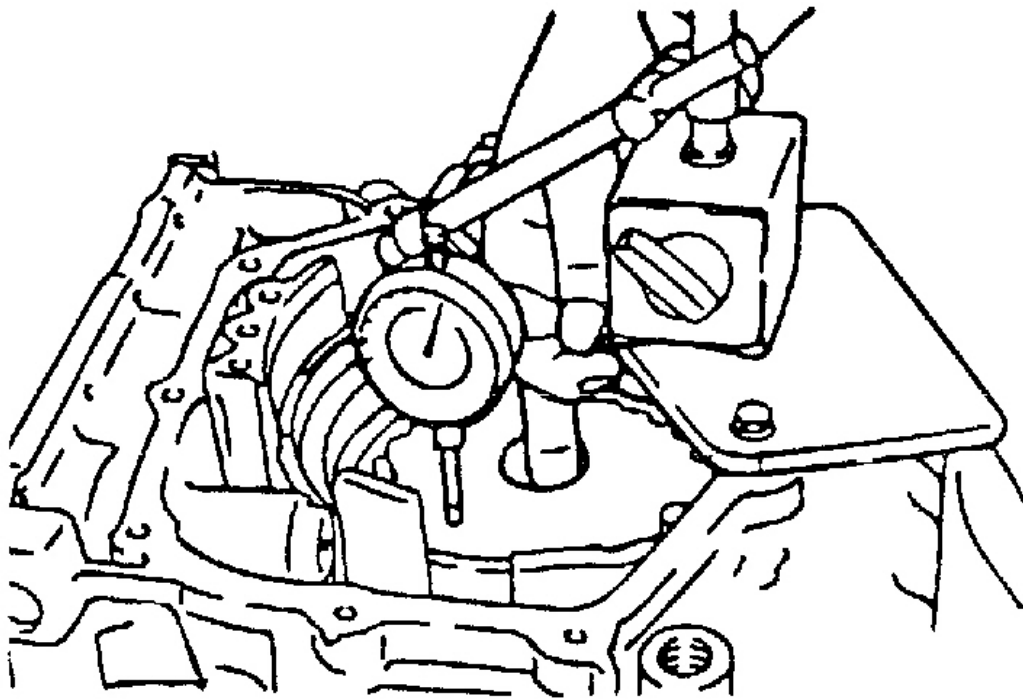
ADJUSTING LR BRAKE END PLAY

Rotate transaxle.

Adjust the end play of the pivot.

Standard end play

F5A51-3: 0.065-0.083 in (1.65-2.11 mm)

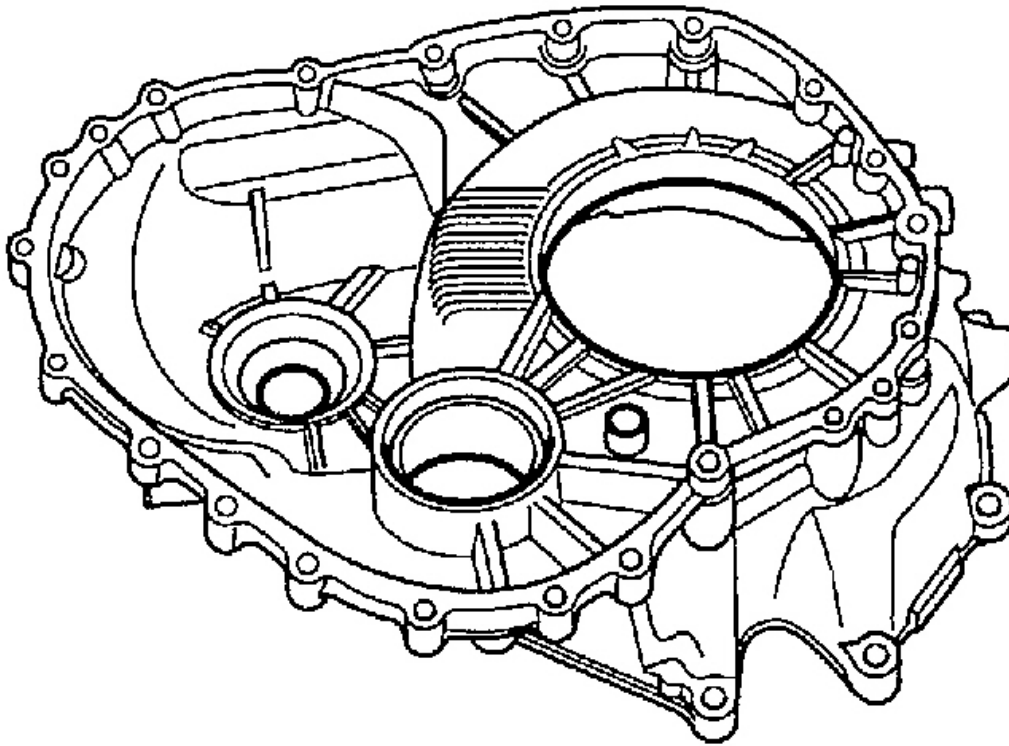


G01092391

Fig. 121: Illustrating Adjusting LR Brake End Play
Courtesy of KIA MOTORS AMERICA, INC.

ADJUSTING DIFFERENTIAL CASE PRELOAD

Place 3 solders (length 10mm, approximate diameter is 3mm) on the torque converter housing as illustrated on the figure.



G01092393

Fig. 122: Illustrating Adjusting Differential Case Preload
Courtesy of KIA MOTORS AMERICA, INC.

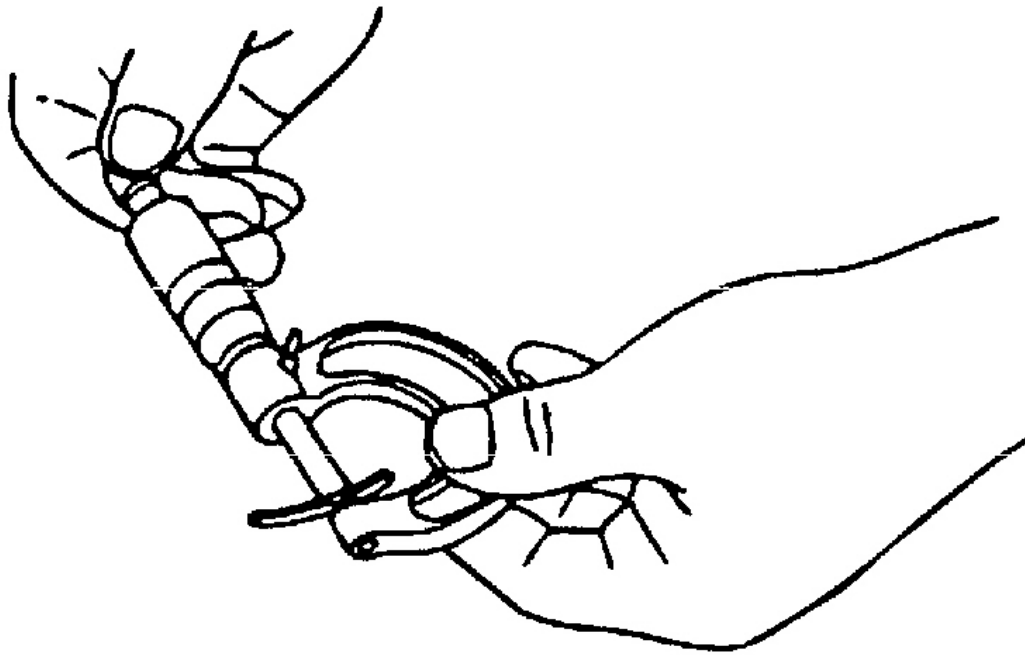
Assemble the torque converter housing on the transaxle case without applying sealant.

Tighten the connecting bolts with tightening torque. Release the bolts and remove the solders.

Measure solder's compressed thickness (T) using a micrometer. Use one within standard value.

Standard value

F5A52-3: 0.0177-0.0041 in. (0.45-0.105 mm)



G01092394

Fig. 123: Measuring Solder Thickness
Courtesy of KIA MOTORS AMERICA, INC.

ADJUSTING UNDERDRIVE SUN GEAR END PLAY

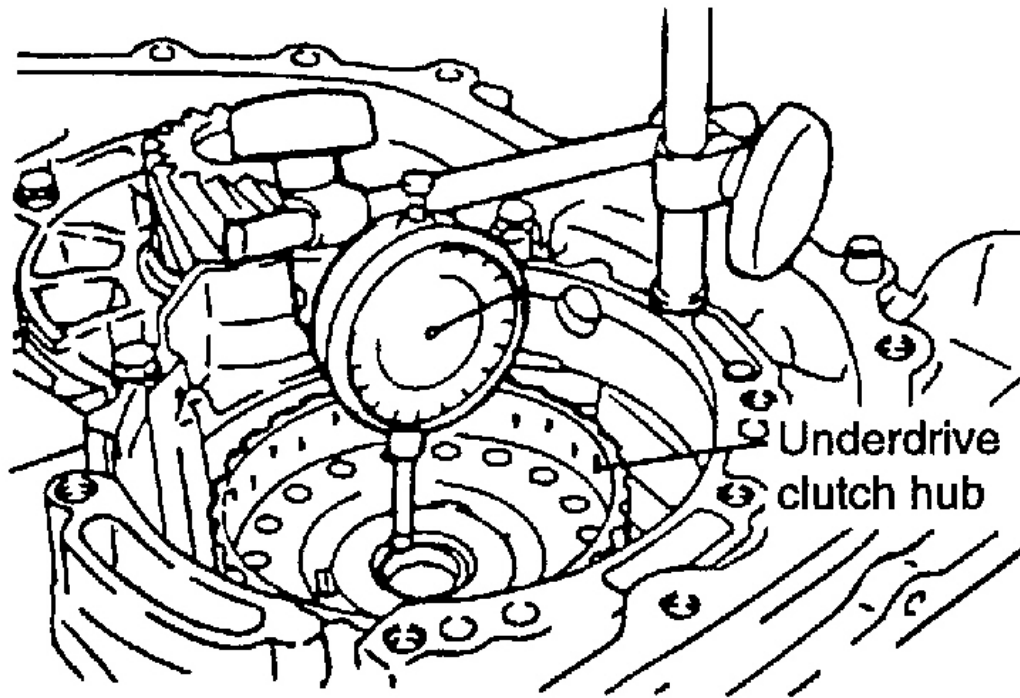
Assemble the used thrust race (No. 8) and the rear cover.

Measure the underdrive sun gear.

Adjust the end play to standard value using a new thrust race (No.8).

Standard value

F5A52-3: 0.0098-0.0177 in. (0.25L-0.45L mm)

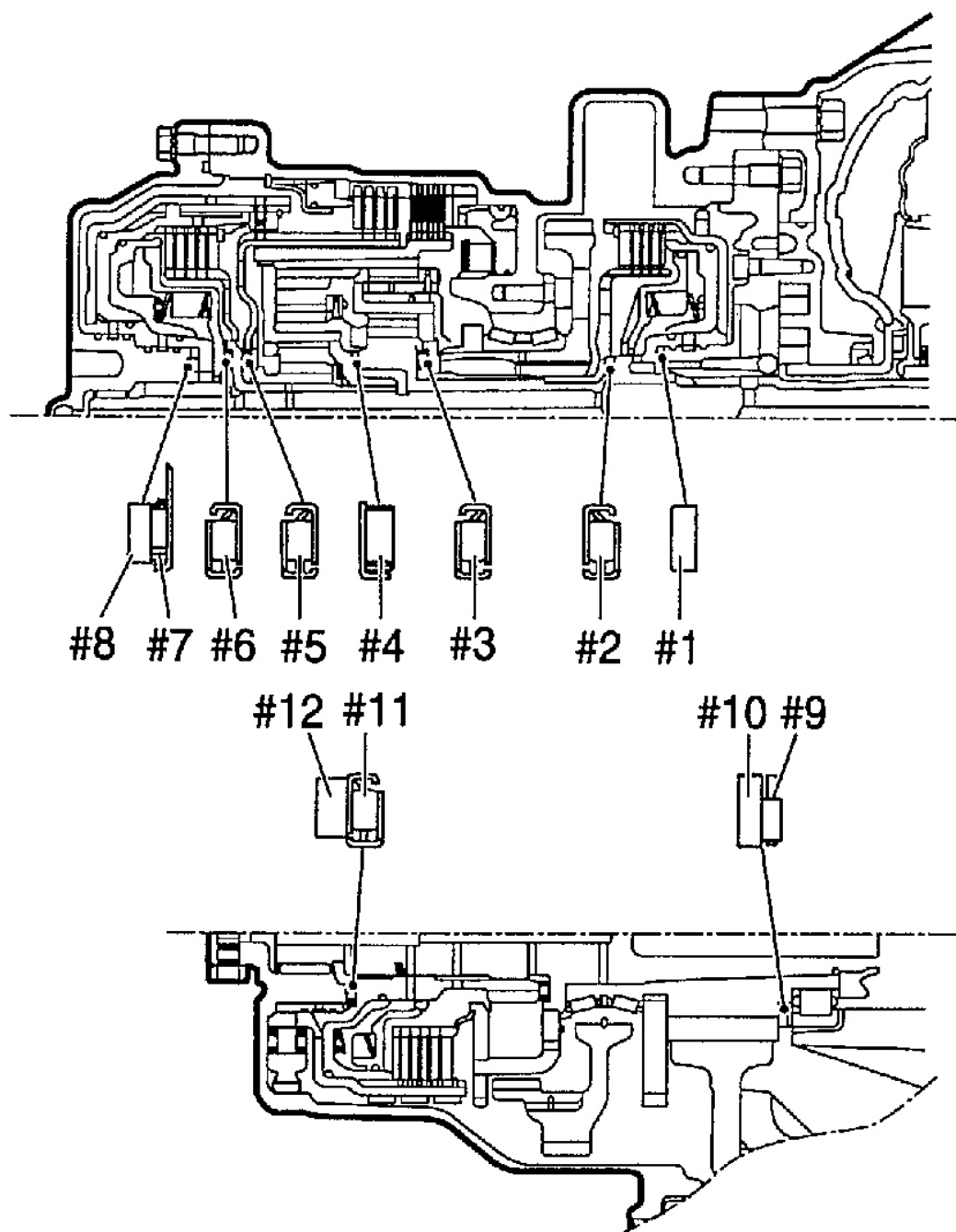


G01092392

Fig. 124: Illustrating Adjusting Underdrive Sun Gear End Play
Courtesy of KIA MOTORS AMERICA, INC.

Assemble underdrive clutch hub, then it will be easy to measure underdrive sun gear.

THRUST BEARING AND THRUST RACE IDENTIFICATION



G01092396

Fig. 125: Locating Thrust Bearing And Thrust Race
Courtesy of KIA MOTORS AMERICA, INC.

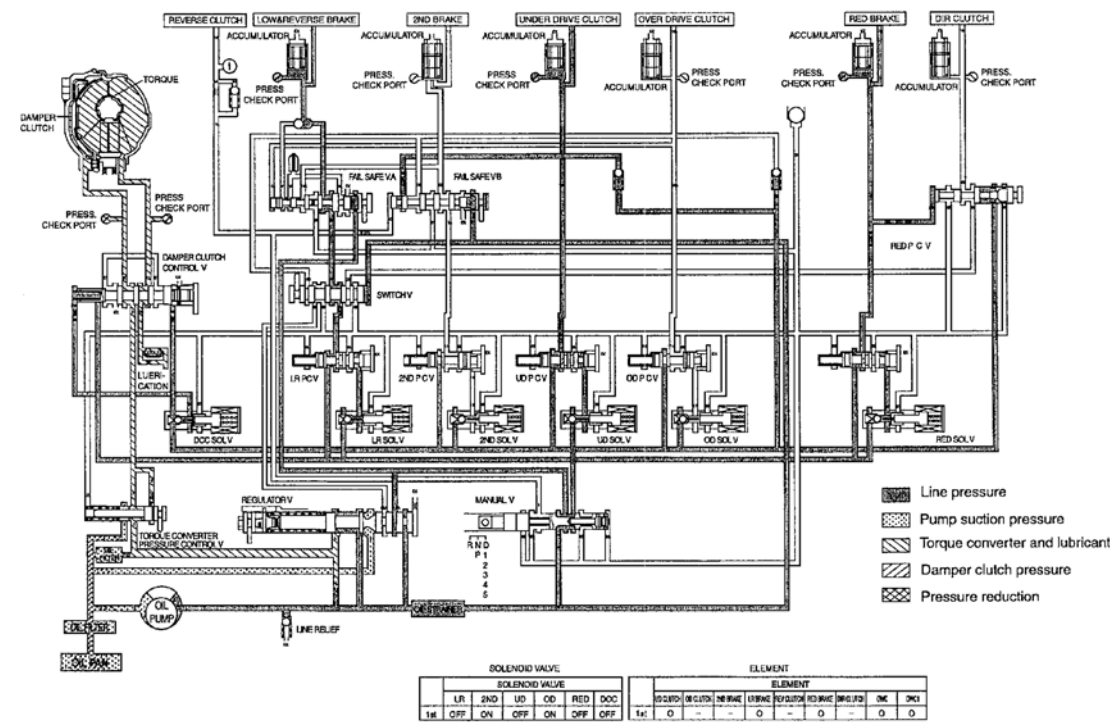
OD	ID	Thickness (in (mm))	Symbol	OD	ID	Thickness (in (mm))	Symbol
59	47	0.071(1.8) 0.079(2.0) 0.087(2.2) 0.094(2.4) 0.102(2.6) 0.110(2.8)	#1	48.9	37	0.071(1.8) 0.075(1.9) 0.079(2.0) 0.083(2.1) 0.087(2.2) 0.091(2.3)	#8
49	36	0.142(3.6)	#2			0.094(2.4)	
57	38.5	0.162(4.12)	#3			0.098(2.5)	
54.4	38.5	0.130(3.3)	#4			0.102(2.6)	
57	38.5	0.162(4.12)	#5	78.5	60	0.098(2.5)	#9
57	38.5	0.162(4.12)	#6	80	60	0.098(2.5)	#10
59	37	0.110(2.8)	#7	58	40.7	0.162(4.2)	#11
48.5	37	0.063(1.6) 0.067(1.7)	#8	54.7	43	0.118(3.0)	#12

G01092397

Fig. 126: Thrust Bearing And Thrust Race Specifications
Courtesy of KIA MOTORS AMERICA, INC.

HYDRAULIC PRESSURE CIRCUIT

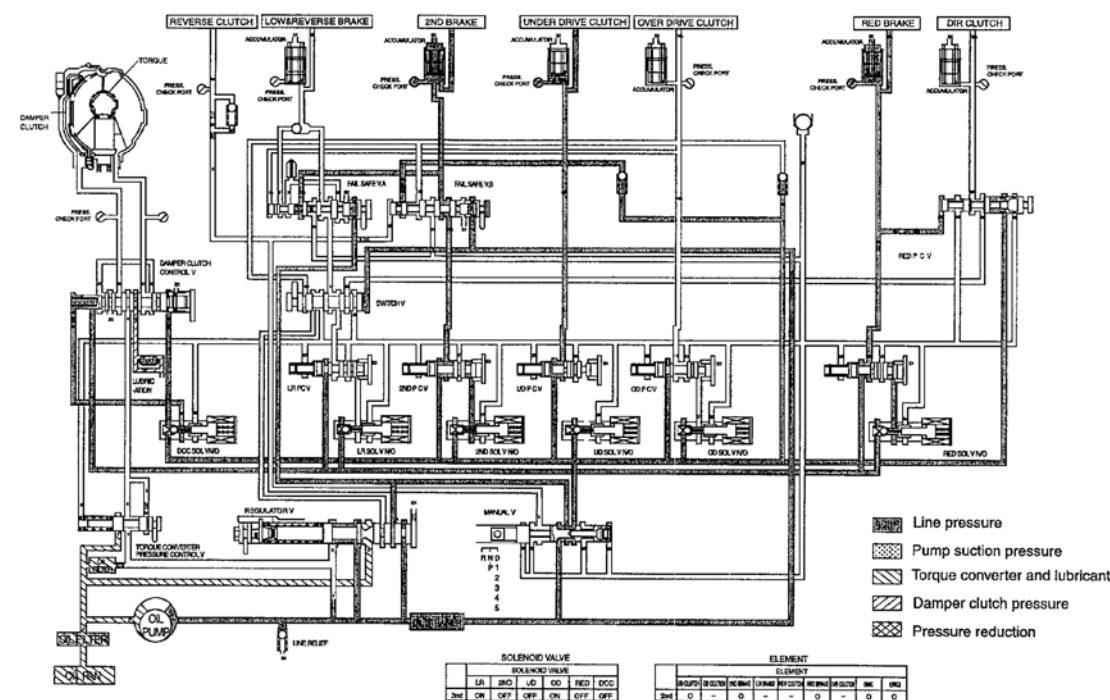
FIRST SPEED



G01092428

Fig. 127: First Speed Hydraulic Pressure Circuit

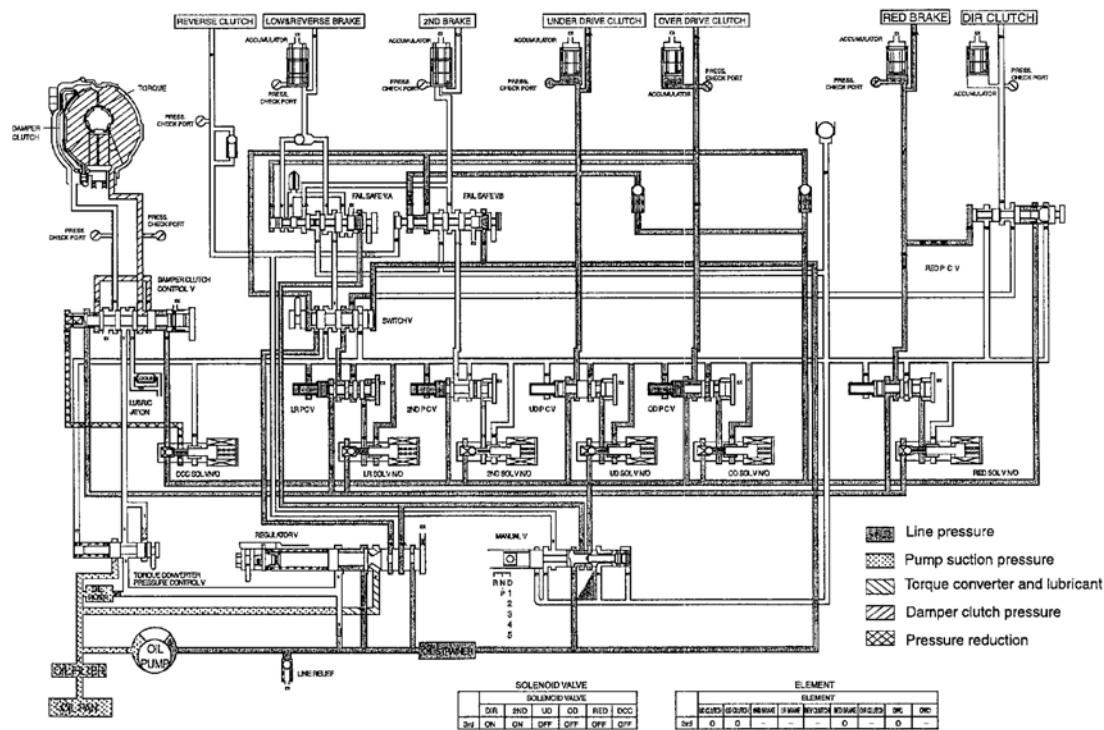
SECOND SPEED



G01092429

Fig. 128: Second Speed Hydraulic Pressure Circuit
Courtesy of KIA MOTORS AMERICA, INC.

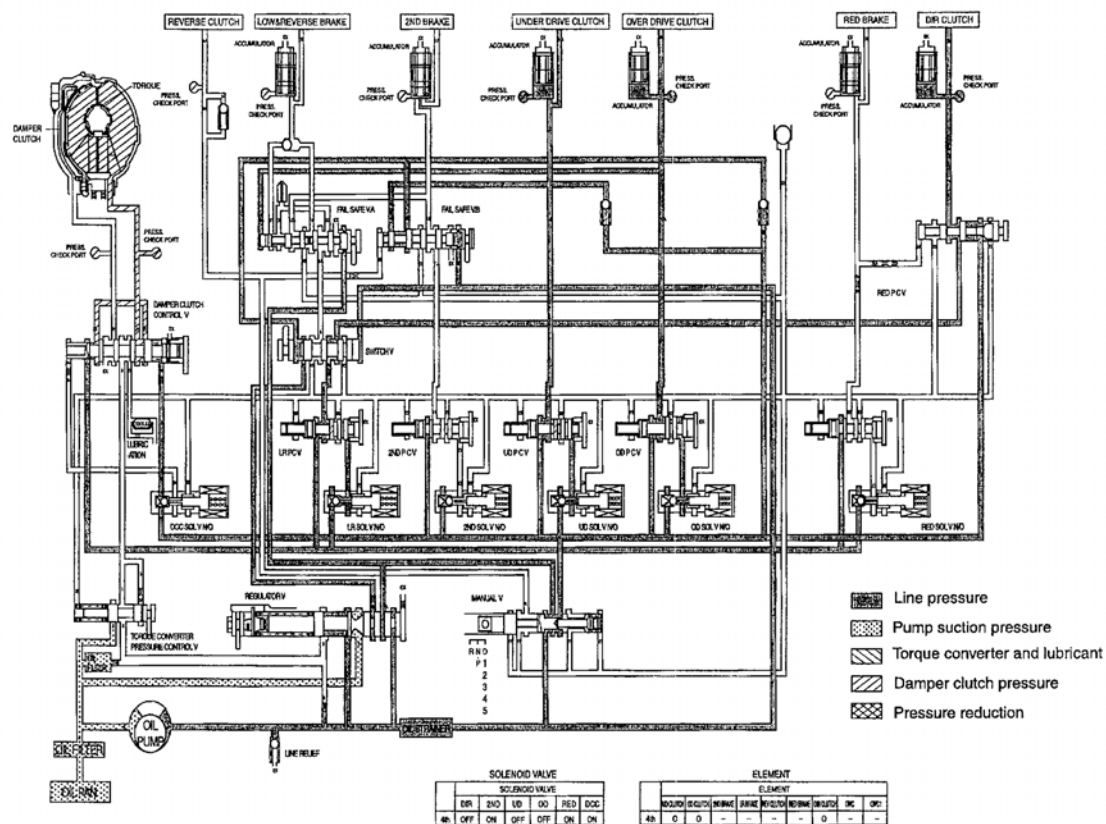
THIRD SPEED



G01092430

Fig. 129: Third Speed Hydraulic Pressure Circuit
 Courtesy of KIA MOTORS AMERICA, INC.

FOURTH SPEED



G01092431

Fig. 130: Fourth Speed Hydraulic Pressure Circuit
 Courtesy of KIA MOTORS AMERICA, INC.

FIFTH SPEED

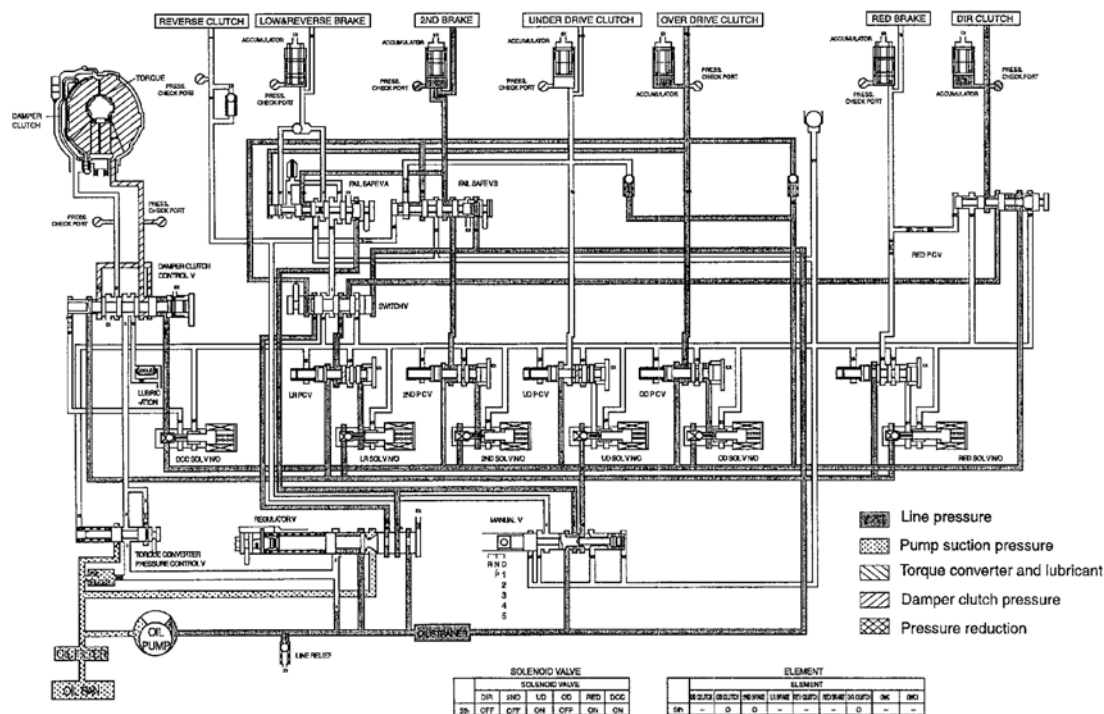
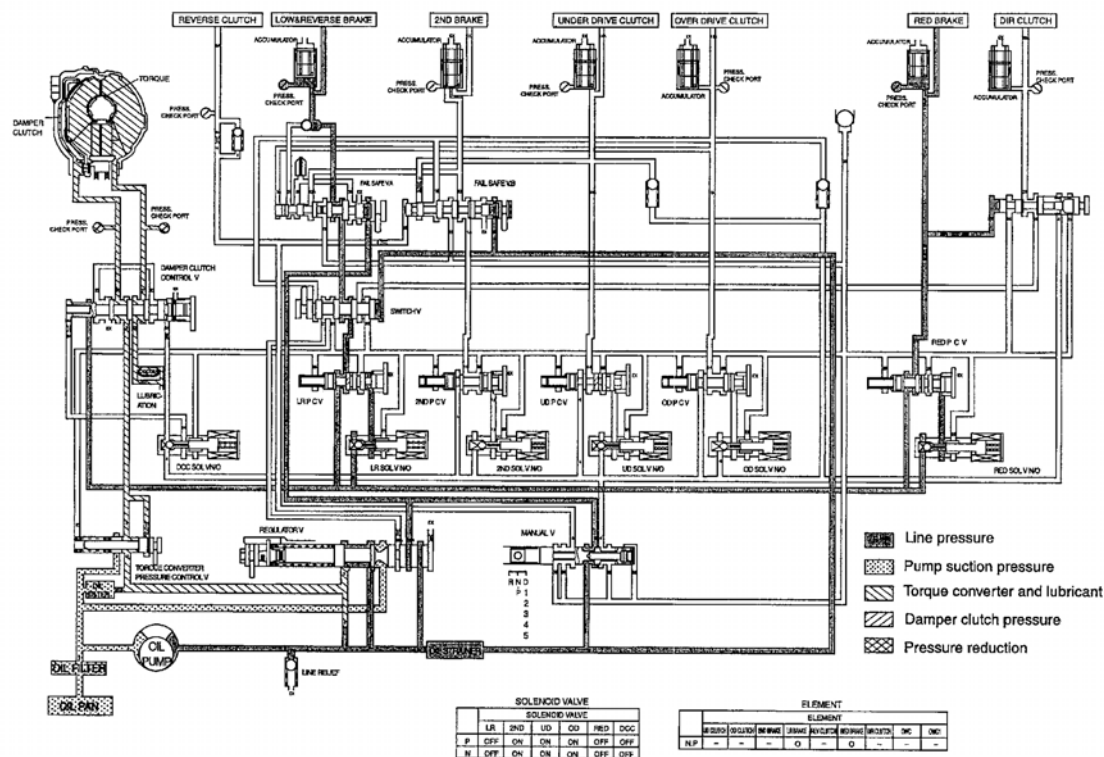


Fig. 131: Fifth Speed Hydraulic Pressure Circuit
 Courtesy of KIA MOTORS AMERICA, INC.

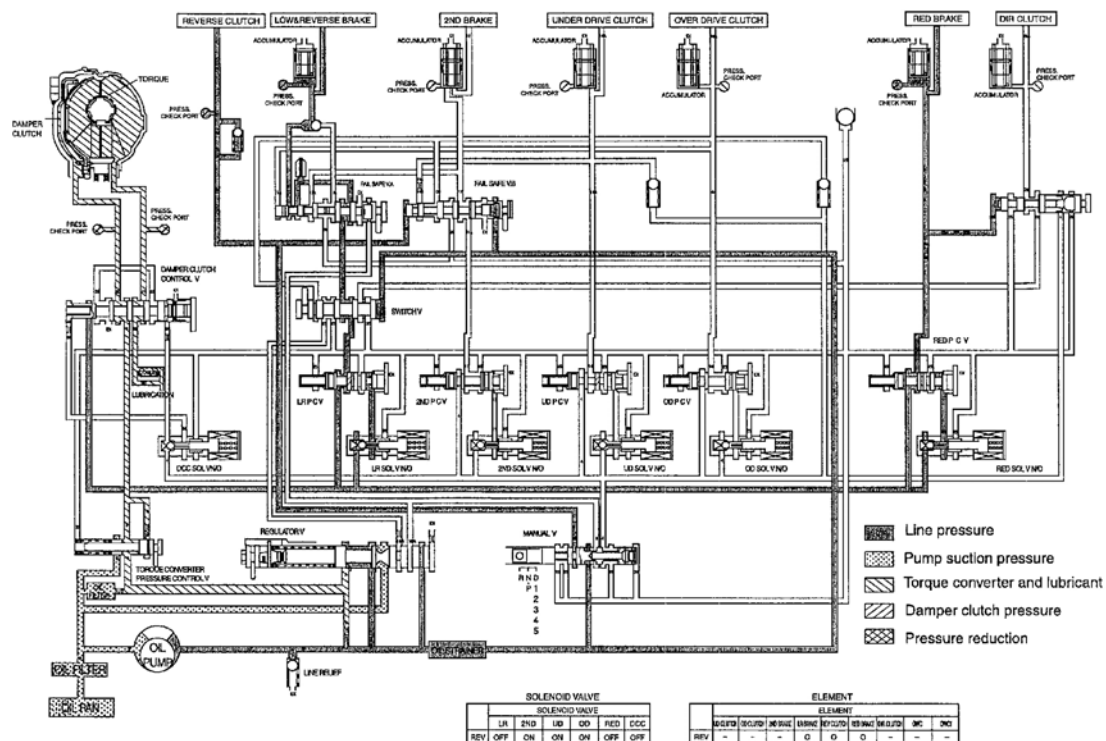
NEUTRAL AND PARKING



G01092433

Fig. 132: Neutral And Parking Hydraulic Pressure Circuit
Courtesy of KIA MOTORS AMERICA, INC.

REVERSE

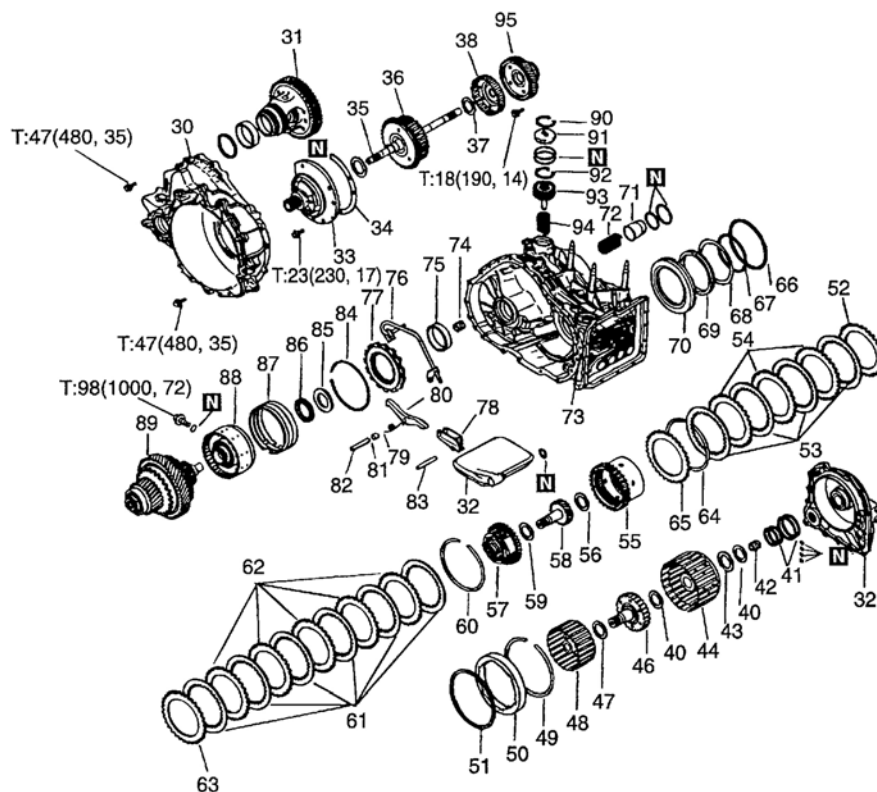


G01092434

Fig. 133: Reverse Hydraulic Pressure Circuit
Courtesy of KIA MOTORS AMERICA, INC.

TRANSAXLE DISASSEMBLY & REASSEMBLY

COMPONENTS



Marked part shall be replaced with new part.

TORQUE : N.m(kg.cm, lb.ft)

- | | | |
|--|---------------------------------|----------------------------------|
| 30. Converter housing | 52. Pressure plate | 74. Needle bearing |
| 31. Differential | 53. Second brake disc | 75. Outer race |
| 32. Fluid filter | 54. Second brake plate | 76. Pipe |
| 33. Fluid pump | 55. Overdrive planetary carrier | 77. One way clutch |
| 34. Gasket | 56. Thrust bearing #4 | 78. Parking roller support |
| 35. Thrust washer #1 | 57. Output planetary carrier | 79. Hole spring |
| 36. Underdrive clutch and input shaft | 58. Underdrive sun gear | 80. Parking ball spring |
| 37. Thrust bearing #2 | 59. Thrust bearing #3 | 81. Spacer |
| 38. Underdrive clutch hub | 60. Snap ring | 82. Parking pole shaft |
| 39. Rear cover | 61. LR brake disc | 83. Parking roller support shaft |
| 40. Thrust race #8 | 62. LR brake plate | 84. Snap ring |
| 41. Sealing | 63. Pressure plate | 85. Thrust race |
| 42. Input shaft rear bearing | 64. Snap ring | 86. Thrust bearing |
| 43. Thrust bearing #7 | 65. Rear cushion plate | 87. Reduction brake band |
| 44. Reverse and overdrive clutch | 66. Wave spring | 88. Direct clutch |
| 45. Thrust bearing #6 | 67. Snap ring | 89. Direct planetary carrier |
| 46. Overdrive clutch hub | 68. Spring retainer | 90. Snap ring |
| 47. Thrust bearing #5 | 69. Return spring | 91. Brake piston cover |
| 48. Planetary carrier reverse sun gear | 70. LR brake piston | 92. Snap ring |
| 49. Snap ring | 71. Accumulator piston | 93. Brake piston |
| 50. Second brake piston | 72. Spring | 94. Brake spring |
| 51. Return spring | 73. Transaxle case | 95. Transfer drive gear set |

G01092436

Fig. 135: Exploded View Of Transaxle (2 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

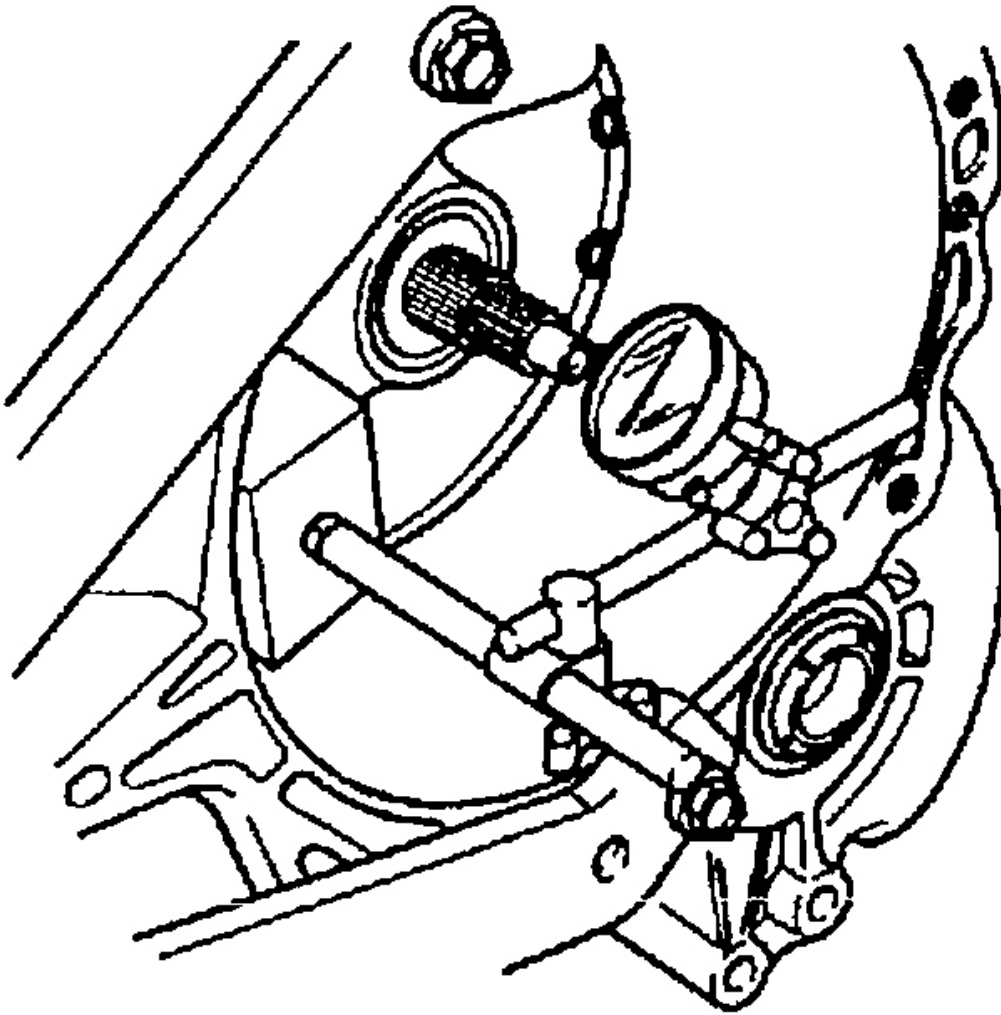
DISASSEMBLY

CAUTION:

- Automatic transaxle consists of precision parts. Be careful not to damage them in disassembly and assembly.

- **Keep clean workbench, and rubber and mat thereon.**
- **DO NOT use cotton or muslim fiber. Use nylon fabric or paper towel.**
- **Clean the disassembled components. Clean the metal parts with cleaning agent or dry them with a blower.**
- **Clean the clutch disc, thrust plate made of resin, and rubber parts with ATF and keep them dust free.**
- **If transaxle body is damaged, disassemble and clean the cooler line.**

1. Remove the torque converter.
2. Measure the input shaft end play using a dial gauge.

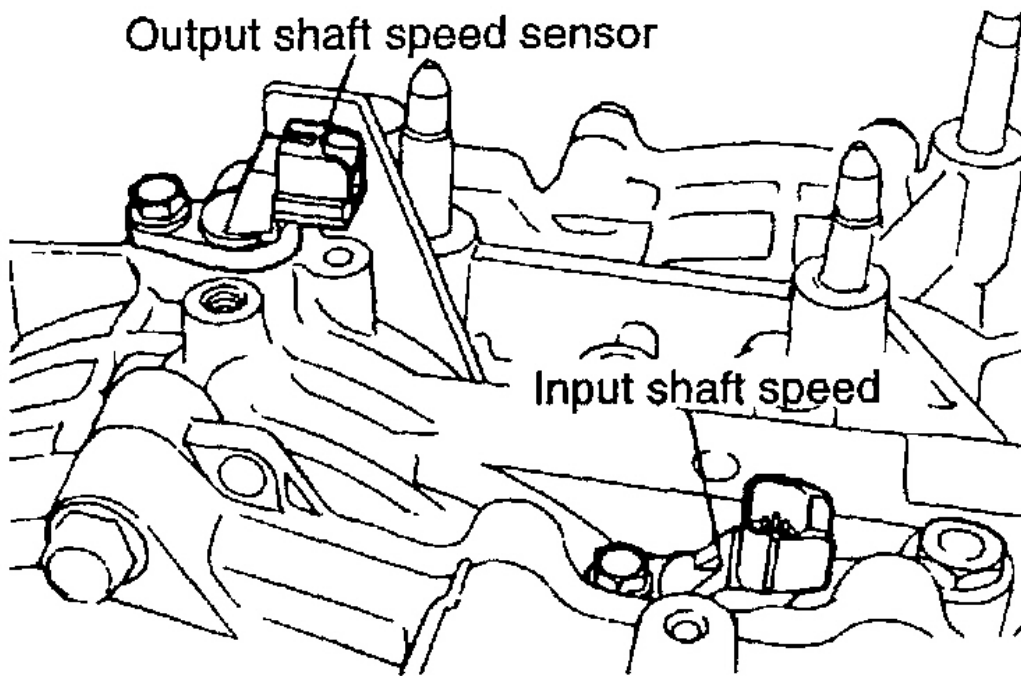


G01092443

Fig. 136: Measuring The Input Shaft End Play Using A Dial Gauge
Courtesy of KIA MOTORS AMERICA, INC.

3. Remove each bracket.
4. Remove the wiring harness bracket.
5. Remove the shift control cable bracket.
6. Remove the fluid level gauge.
7. Remove the eyebolt, gasket, and the fluid cooler feed tube.

8. Remove the fluid filter.
9. Remove input speed sensor and the output speed sensor.

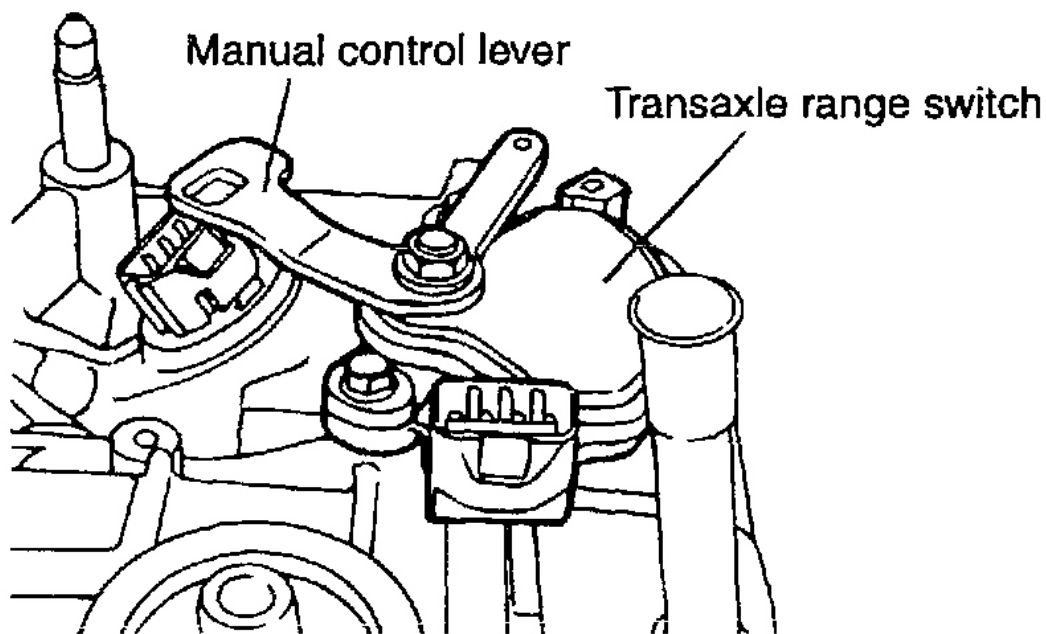


G01092444

Fig. 137: Removing Input And Output Speed Sensor
Courtesy of KIA MOTORS AMERICA, INC.

10. Remove the manual control lever and transaxle range switch.

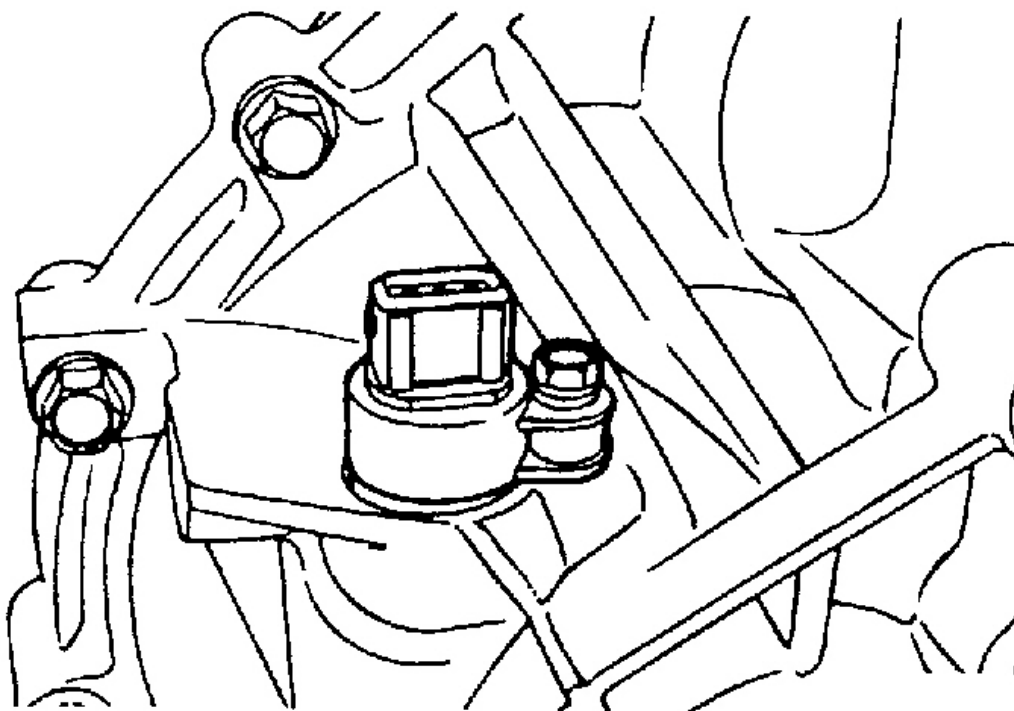
CAUTION: Remove transaxle range switch with valve body installed without fail.



G01092445

Fig. 138: Removing The Manual Control Lever And Transaxle Range Switch
Courtesy of KIA MOTORS AMERICA, INC.

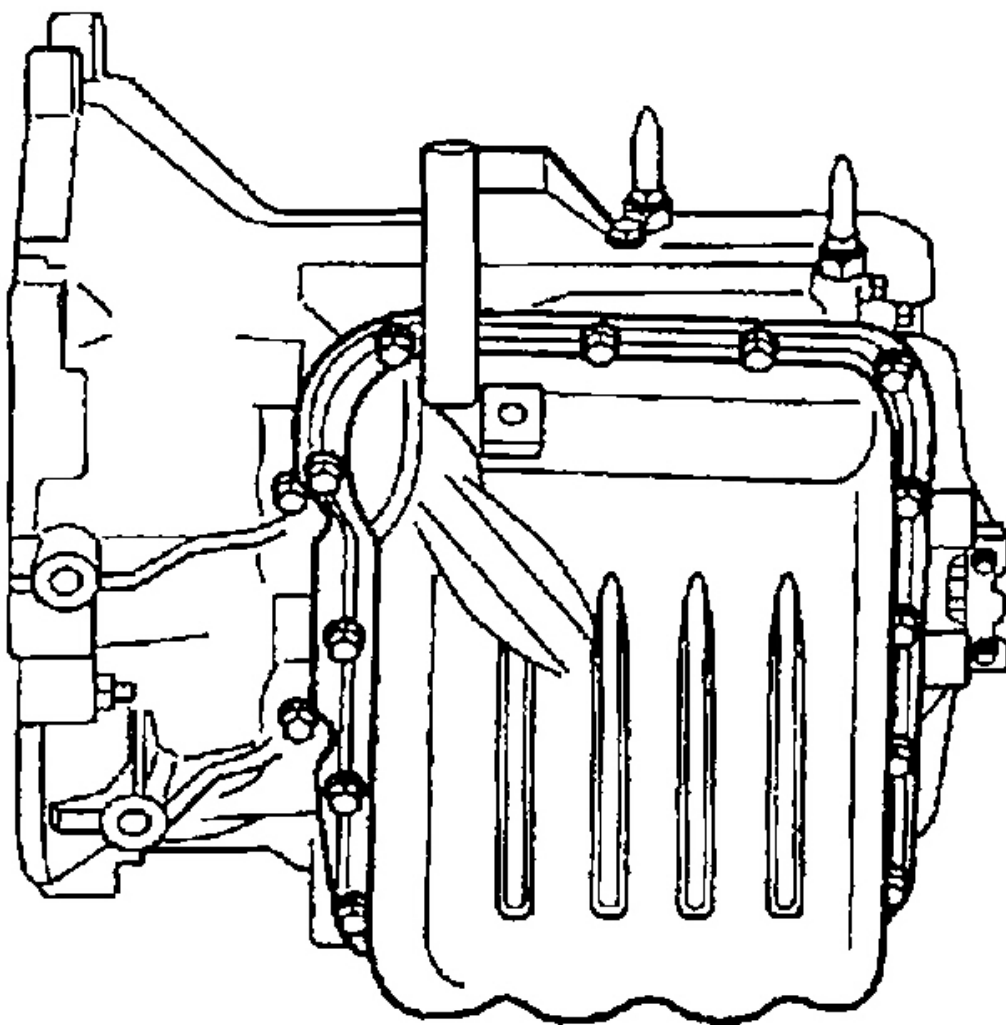
11. Remove the speedometer gear.



G01092446

Fig. 139: Removing The Speedometer Gear
Courtesy of KIA MOTORS AMERICA, INC.

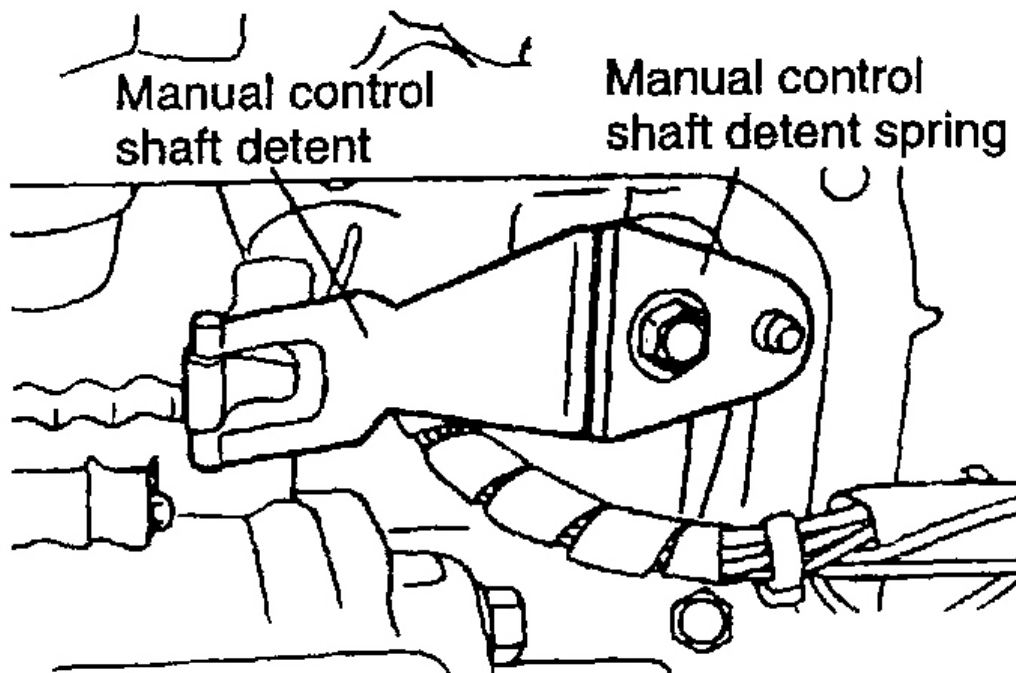
12. Remove the valve body cover.



G01092447

Fig. 140: Removing Valve Body Cover
Courtesy of KIA MOTORS AMERICA, INC.

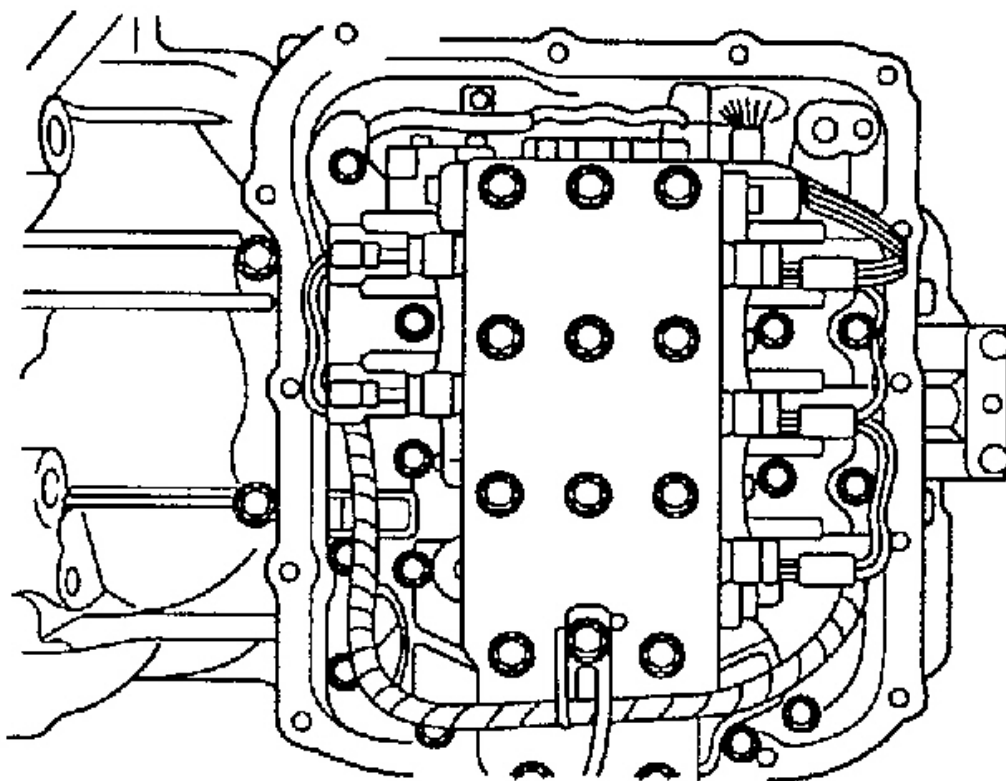
13. Remove the manual control shaft detent spring and the detent.



G01092448

Fig. 141: Removing The Manual Control Shaft Detent Spring And The Detent
Courtesy of KIA MOTORS AMERICA, INC.

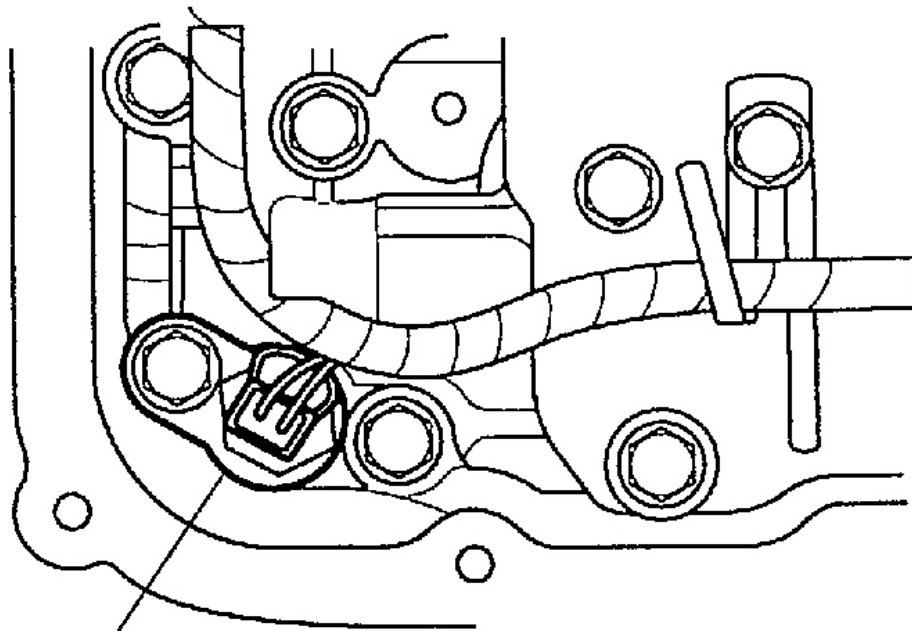
14. Disconnect the harness connector from the valve body.
15. Remove the valve body mounting bolts (28), except those bolts marked on illustration with arrow.



G01092449

Fig. 142: Removing The Valve Body Mounting Bolts
Courtesy of KIA MOTORS AMERICA, INC.

16. Remove the fluid temperature sensor.



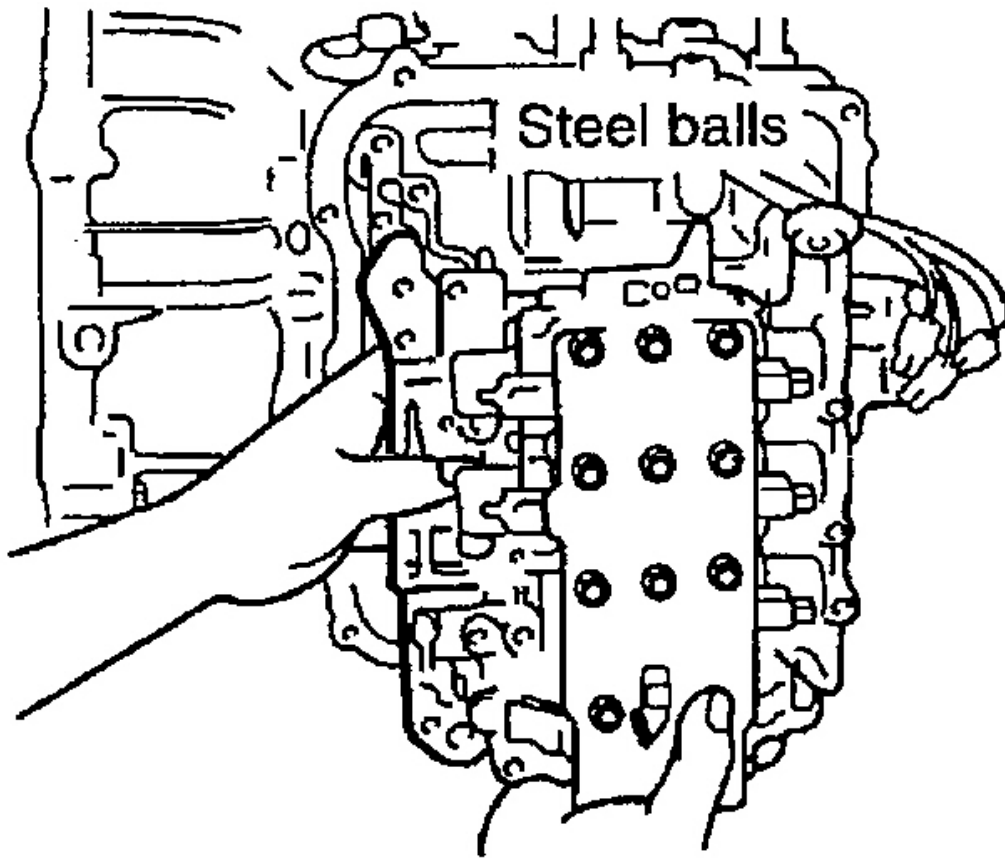
Fluid temperature sensor

G01092450

Fig. 143: Removing The Fluid Temperature Sensor
Courtesy of KIA MOTORS AMERICA, INC.

17. Remove the valve body, the gasket and the steel balls (two).

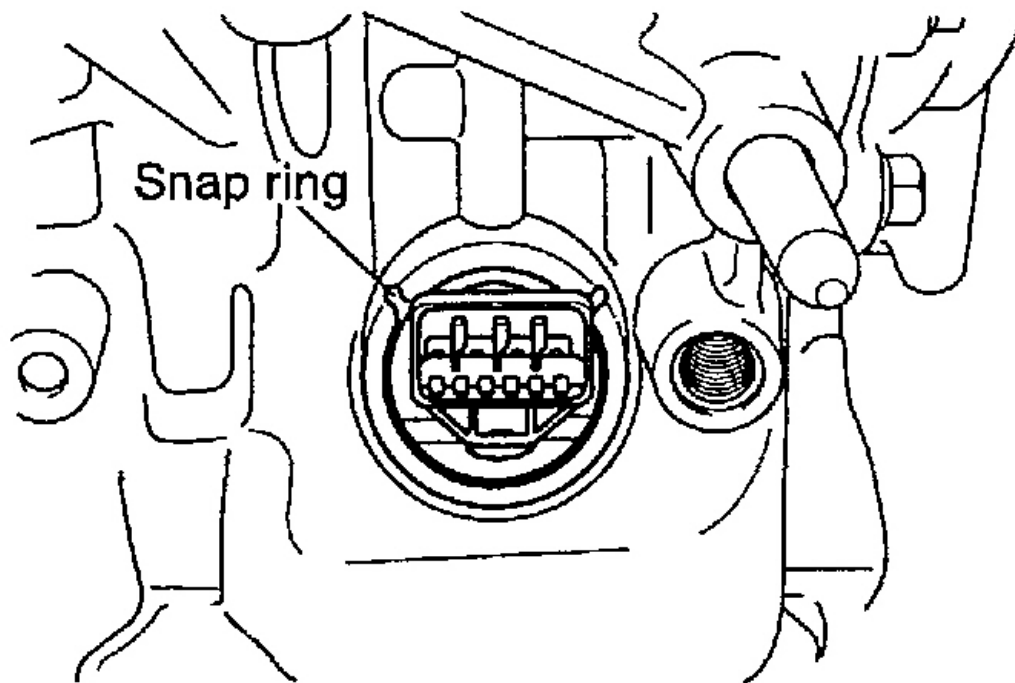
CAUTION: DO NOT lose the steel balls.



G01092451

Fig. 144: Removing The Valve Body, The Gasket And The Steel Balls
Courtesy of KIA MOTORS AMERICA, INC.

18. Remove the solenoid valve harness snap ring.

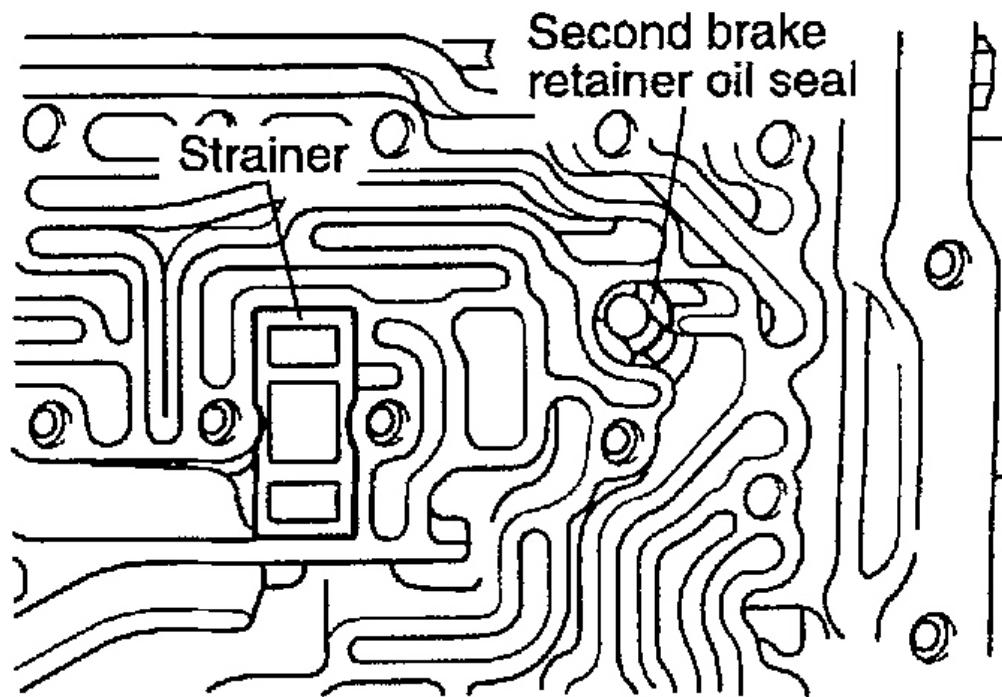


G01092452

Fig. 145: Removing The Solenoid Valve Harness Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

19. Remove the solenoid valve harness.
20. Remove the strainer.
21. Remove the second brake retainer oil seal.

CAUTION: If the second brake retainer oil seal is not removed, it may be damaged when removing and installing the second brake piston.

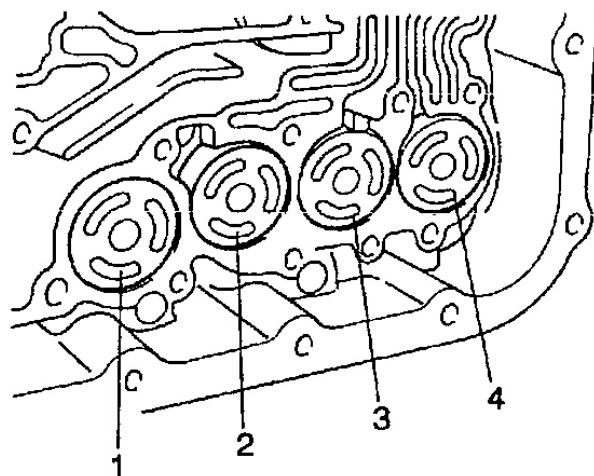


G01092453

Fig. 146: Removing The Second Brake Retainer Oil Seal
Courtesy of KIA MOTORS AMERICA, INC.

22. Remove each accumulator piston and spring.

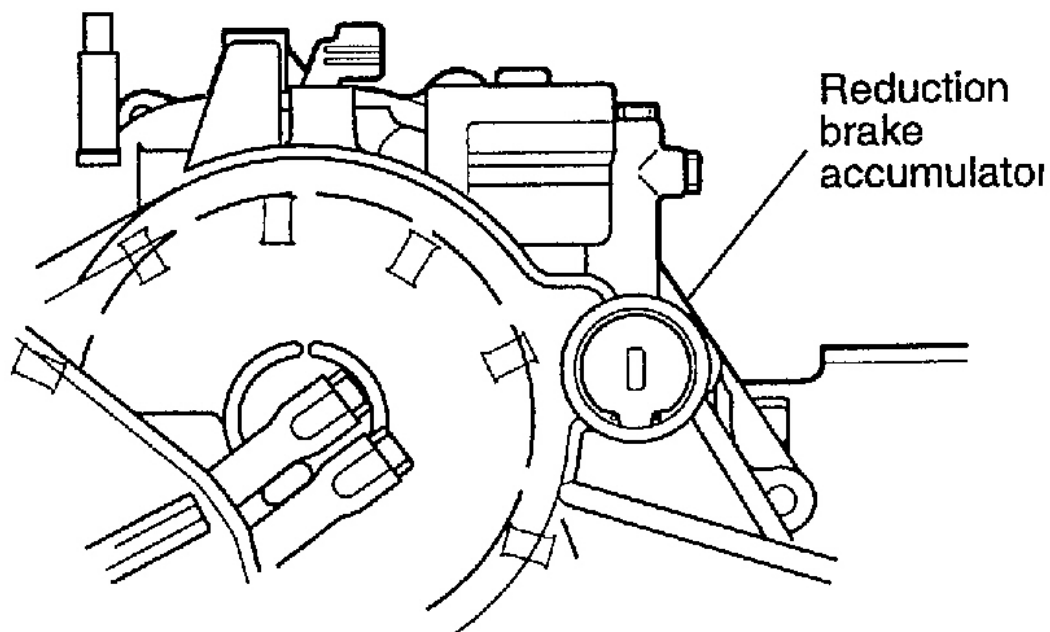
No.	Use
1	LR brake
2	UD clutch
3	Second brake
4	OD clutch



G01092454

Fig. 147: Removing Each Accumulator Piston And Spring
 Courtesy of KIA MOTORS AMERICA, INC.

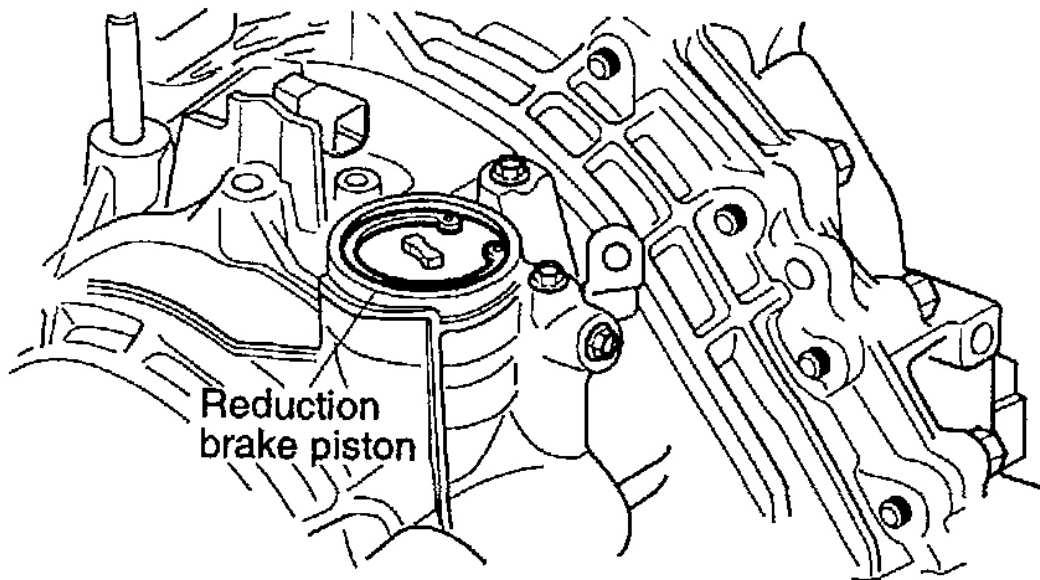
23. Remove the snap ring and then the reduction brake accumulator and the spring.



G01092455

Fig. 148: Removing The Snap Ring And Then The Reduction Brake Accumulator And The Spring
Courtesy of KIA MOTORS AMERICA, INC.

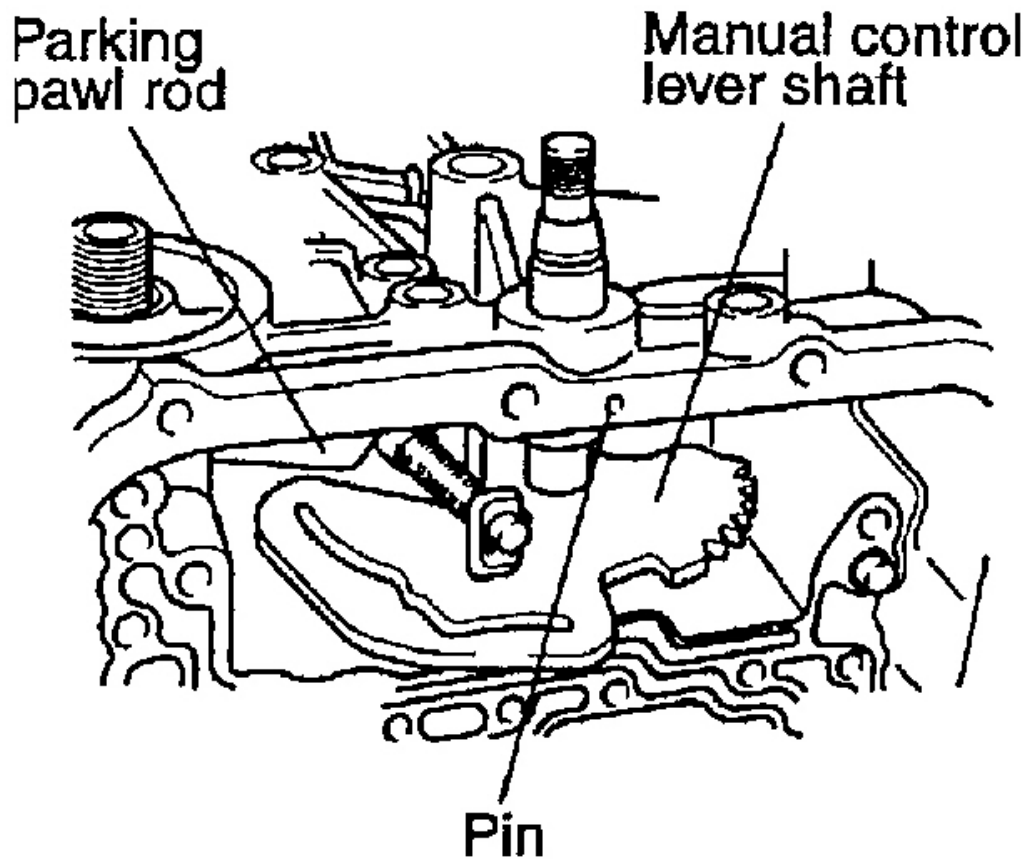
24. Remove the snap ring and the reduction brake piston.



G01092456

Fig. 149: Removing The Snap Ring And The Reduction Brake Piston
Courtesy of KIA MOTORS AMERICA, INC.

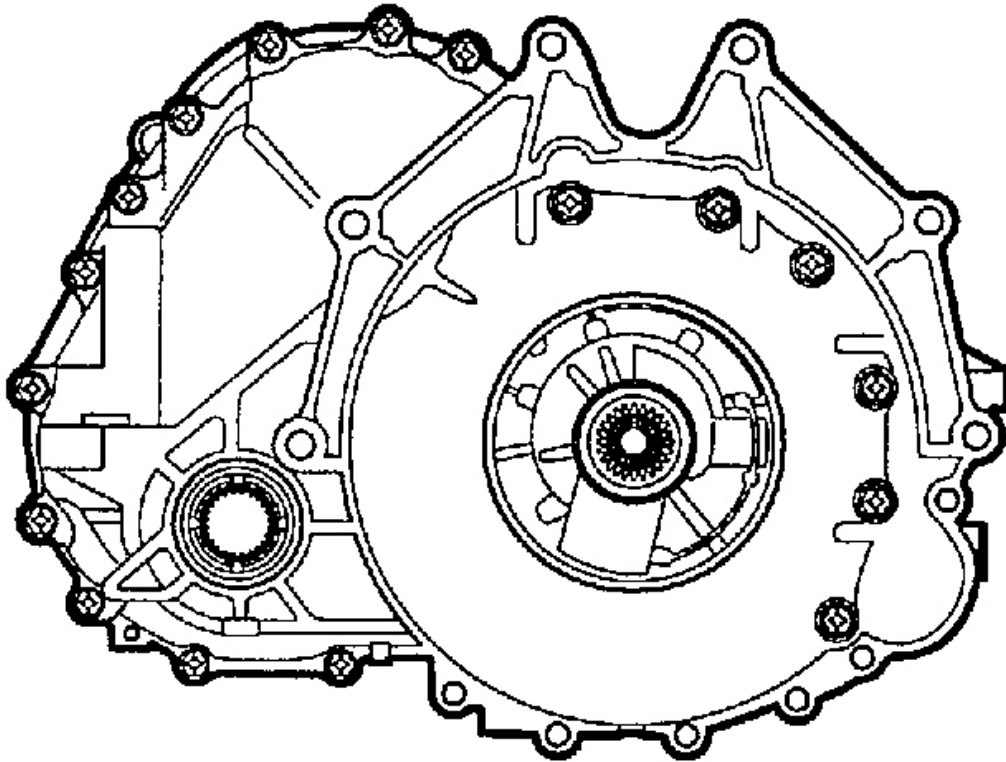
25. Remove the inner snap ring, and then the brake piston and the spring.
26. Remove the manual control shaft pin.
27. Remove the manual control shaft.



G01092457

Fig. 150: Removing The Manual Control Shaft
Courtesy of KIA MOTORS AMERICA, INC.

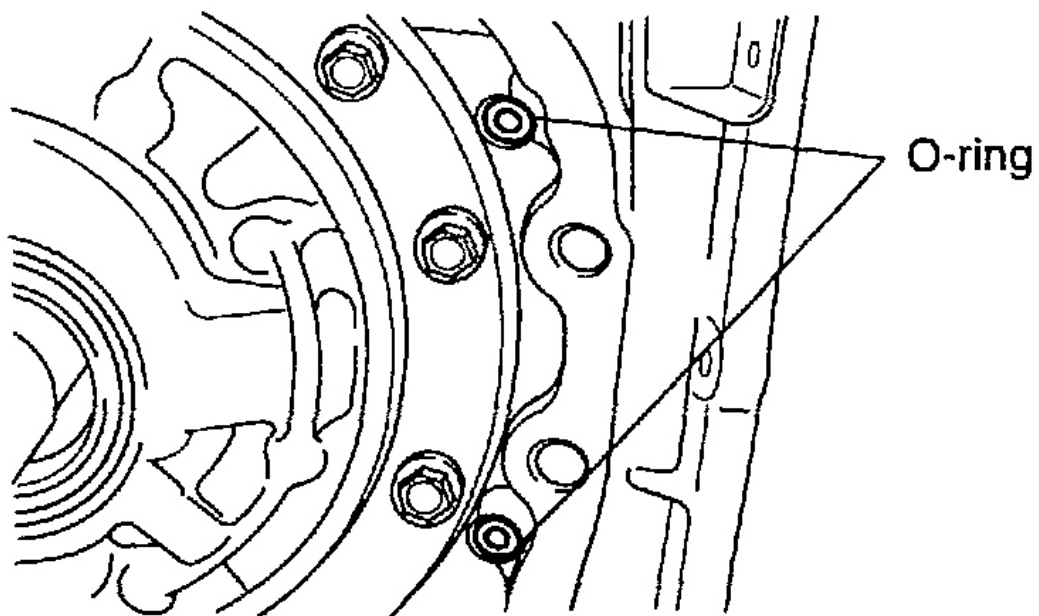
28. Remove the parking roller rod assembly.
29. Remove the converter housing mounting bolts (twenty) and the converter housing.



G01092458

Fig. 151: Removing The Converter Housing Mounting Bolts And The Converter Housing
Courtesy of KIA MOTORS AMERICA, INC.

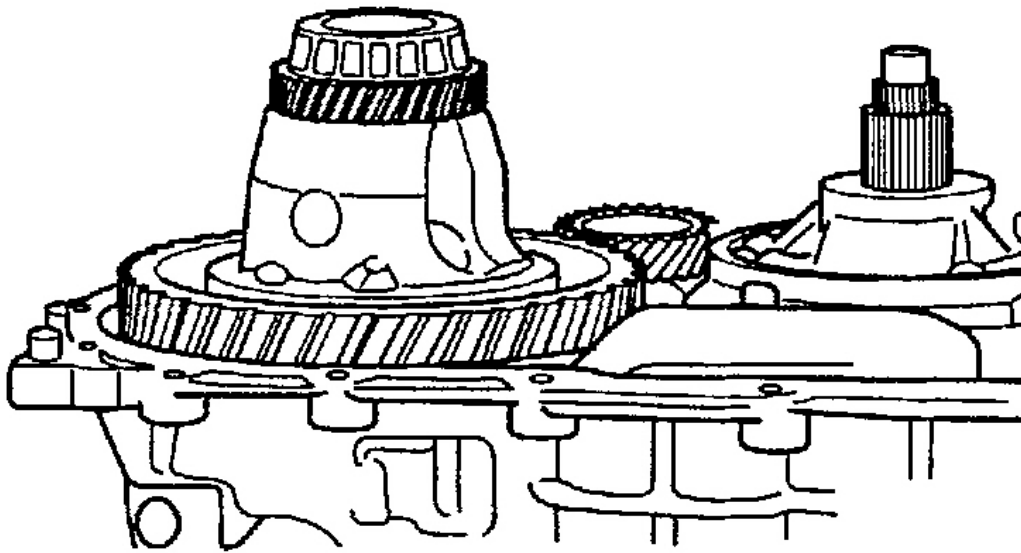
30. Remove the O-ring (two).



G01092459

Fig. 152: Removing The O-Ring
Courtesy of KIA MOTORS AMERICA, INC.

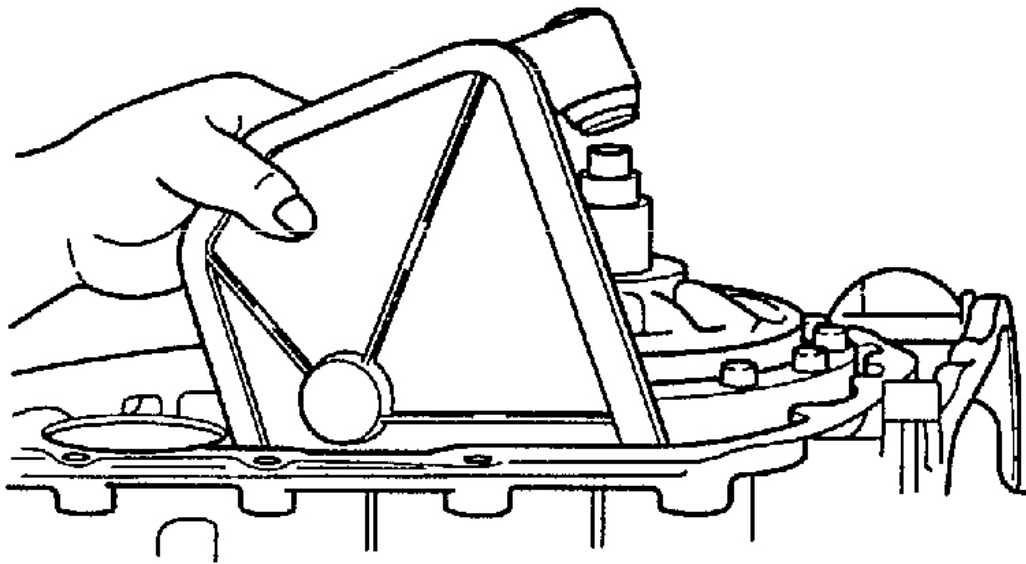
31. Remove the differential.



G01092460

Fig. 153: Removing The Differential
Courtesy of KIA MOTORS AMERICA, INC.

32. Remove the main oil filter.

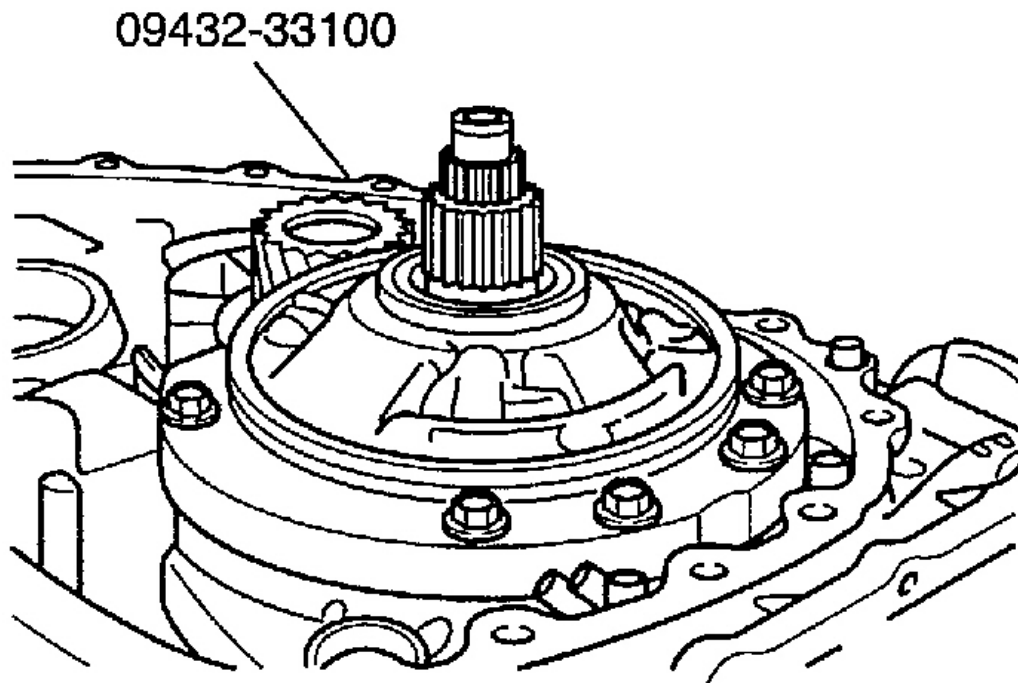


G01092461

Fig. 154: Removing The Main Oil Filter
Courtesy of KIA MOTORS AMERICA, INC.

33. Release the fluid pump mounting bolts (six).

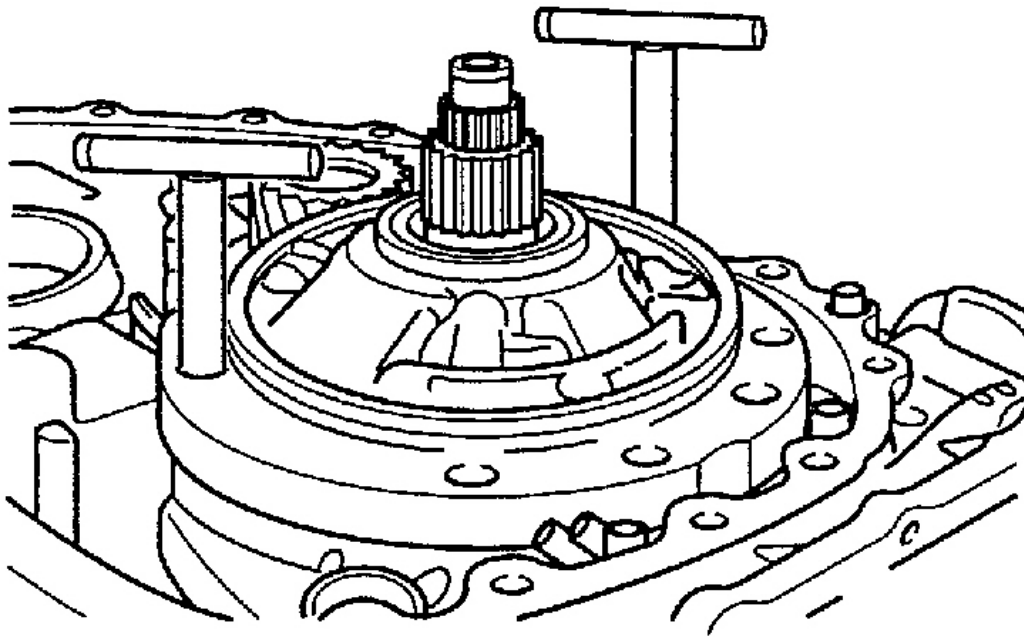
CAUTION: DO NOT disassemble the fluid pump. Misalignment during assembly may damage the pump and the transaxle.



G01092462

Fig. 155: Releasing The Fluid Pump Mounting Bolts
Courtesy of KIA MOTORS AMERICA, INC.

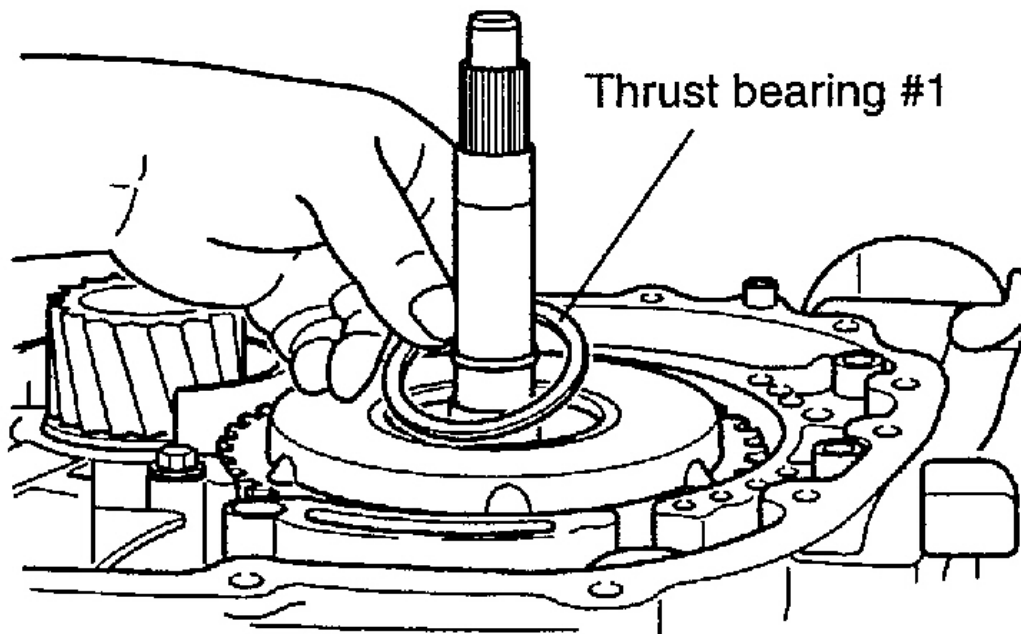
34. Install the special tool (09452-33100).



G01092463

Fig. 156: Installing The Special Tool (09452-33100)
Courtesy of KIA MOTORS AMERICA, INC.

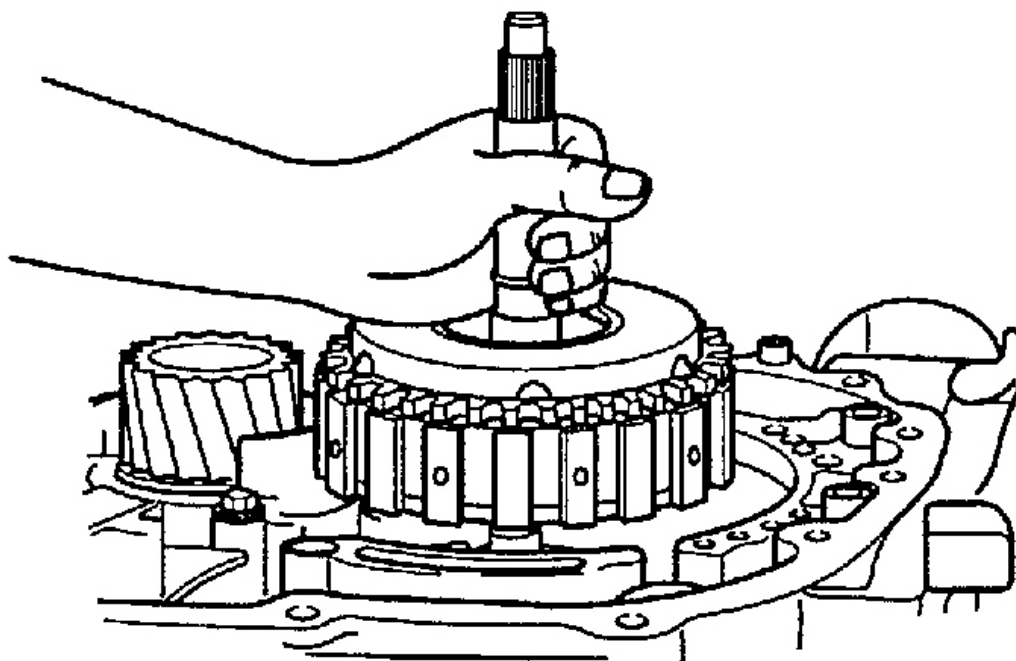
35. Remove the fluid pump using the special too.
36. Remove the fluid pump gasket.
37. Remove the thrust washer #1.



G01092464

Fig. 157: Removing The Thrust Washer #1
Courtesy of KIA MOTORS AMERICA, INC.

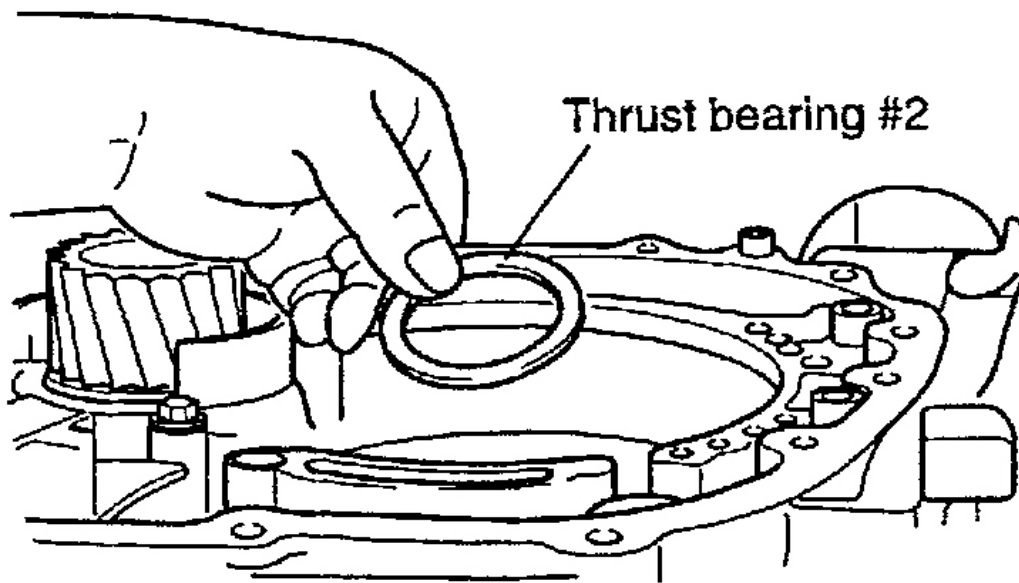
38. Hold the input shaft with one hand and remove the drive clutch.



G01092465

Fig. 158: Removing The Drive Clutch
Courtesy of KIA MOTORS AMERICA, INC.

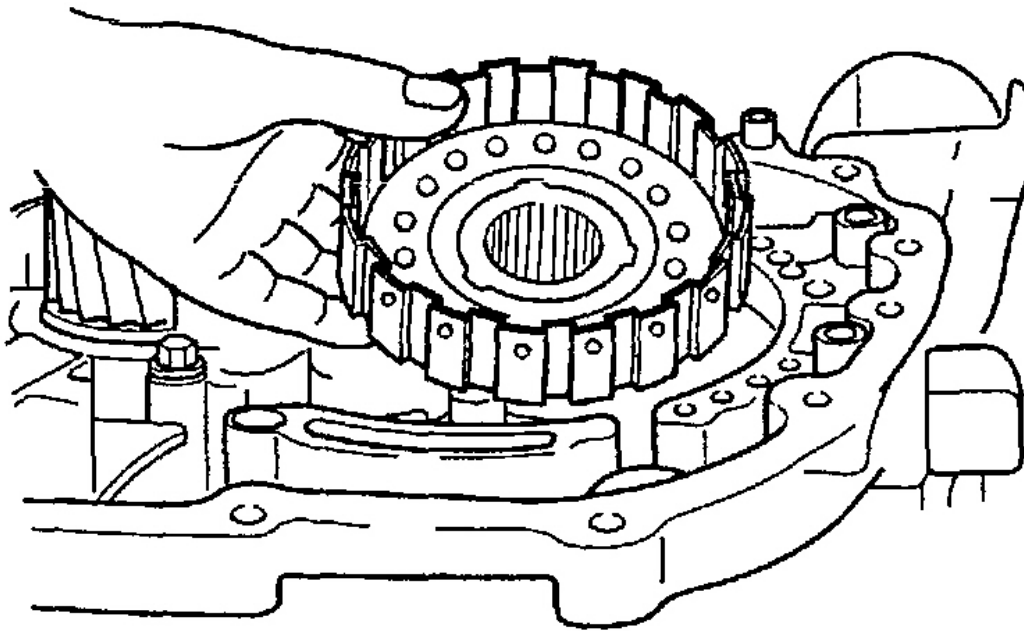
39. Remove the thrust bearing #2.



G01092466

Fig. 159: Removing The Thrust Bearing #2
Courtesy of KIA MOTORS AMERICA, INC.

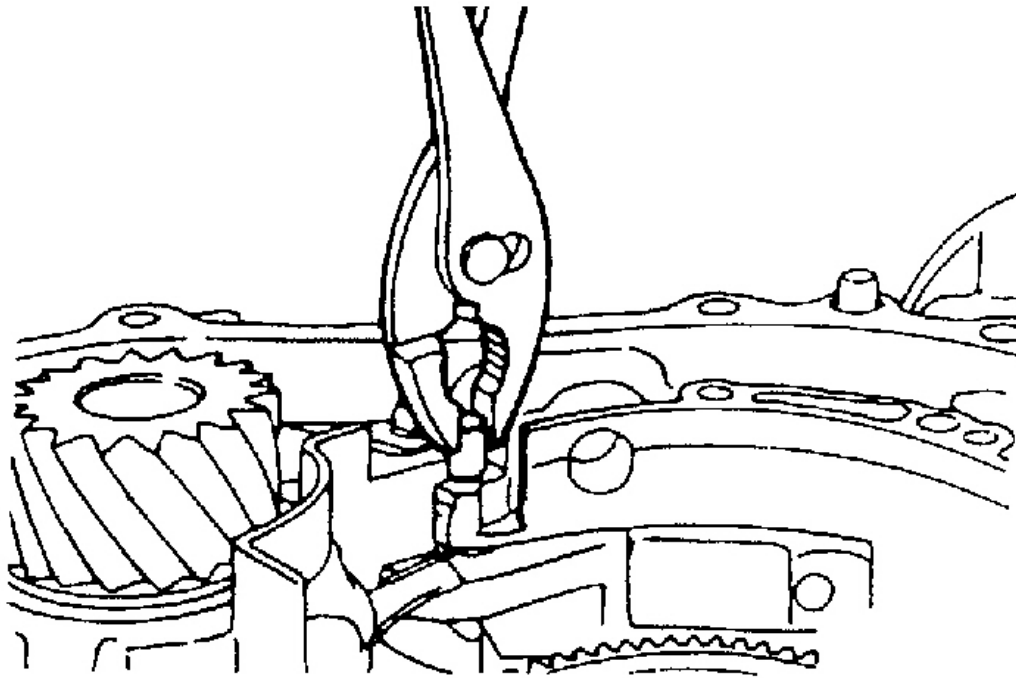
40. Remove the underdrive clutch hub.



G01092467

Fig. 160: Removing The Underdrive Clutch Hub
Courtesy of KIA MOTORS AMERICA, INC.

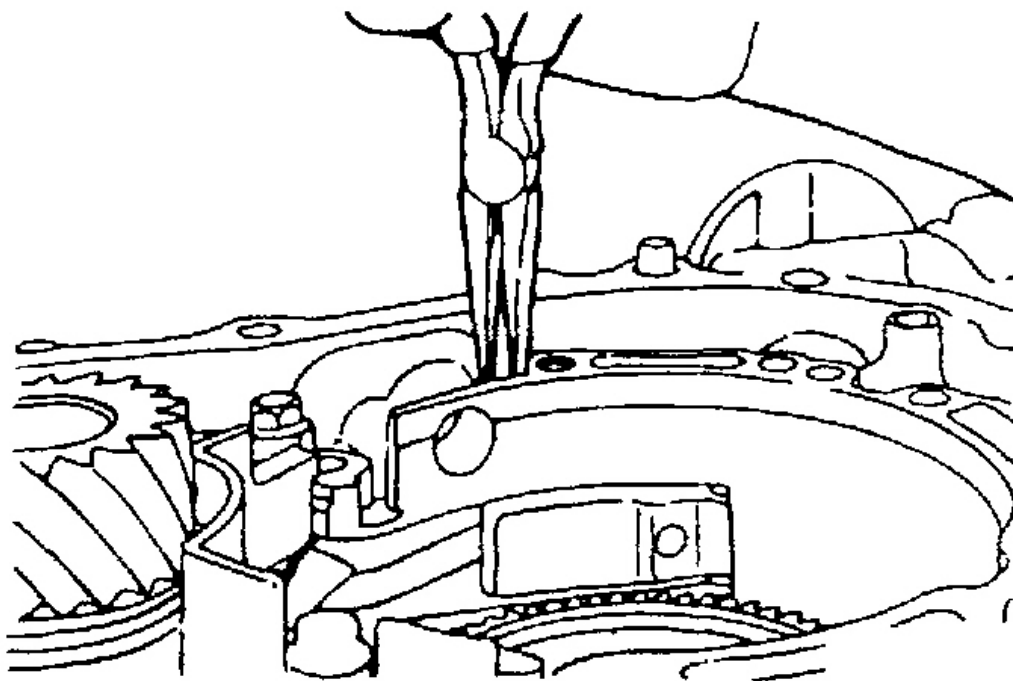
41. Remove the parking sprag shaft.



G01092468

Fig. 161: Removing The Parking Sprag Shaft
Courtesy of KIA MOTORS AMERICA, INC.

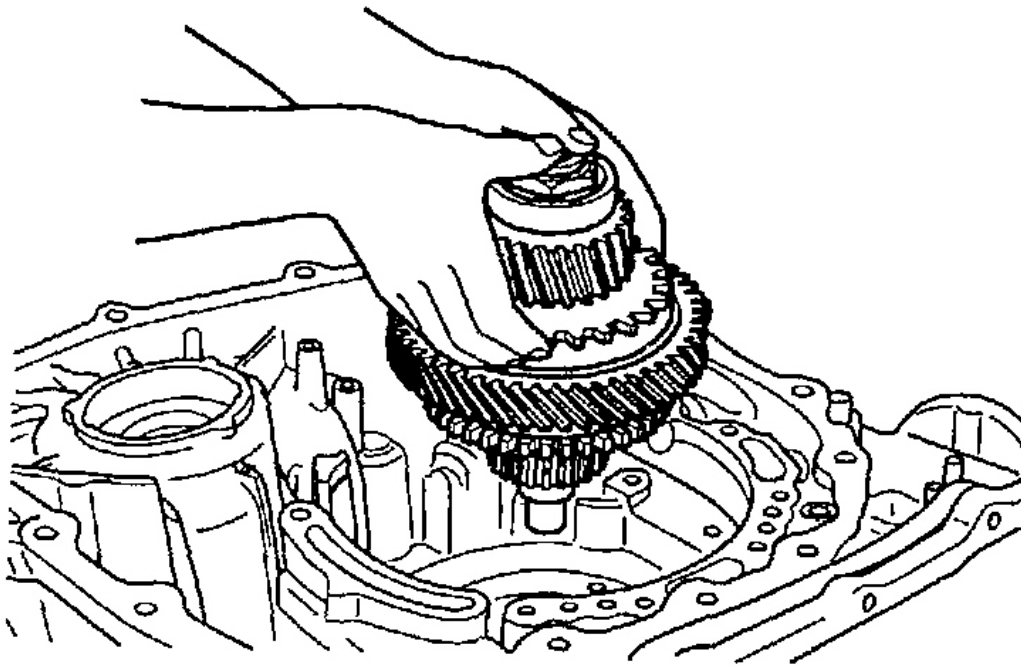
42. Remove the parking sprag shaft spacer and spring.
43. Remove the parking roller support shafts (two).



G01092469

Fig. 162: Removing The Parking Roller Support Shafts
Courtesy of KIA MOTORS AMERICA, INC.

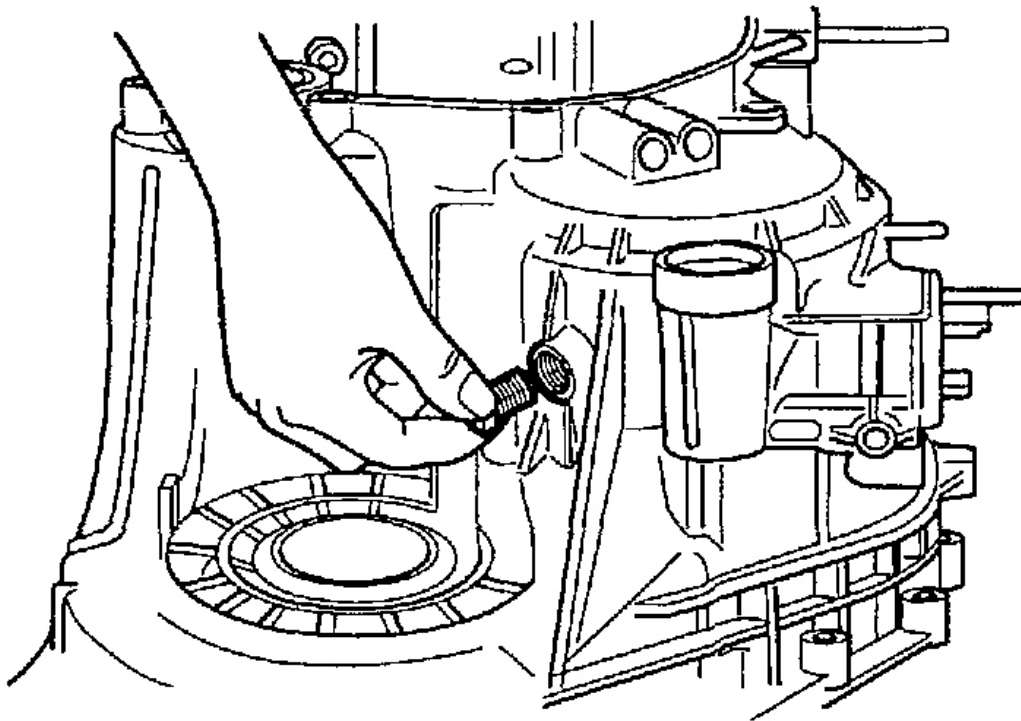
44. Remove the parking roller support.
45. Remove the director planetary carrier assembly.



G01092470

Fig. 163: Removing The Director Planetary Carrier Assembly
Courtesy of KIA MOTORS AMERICA, INC.

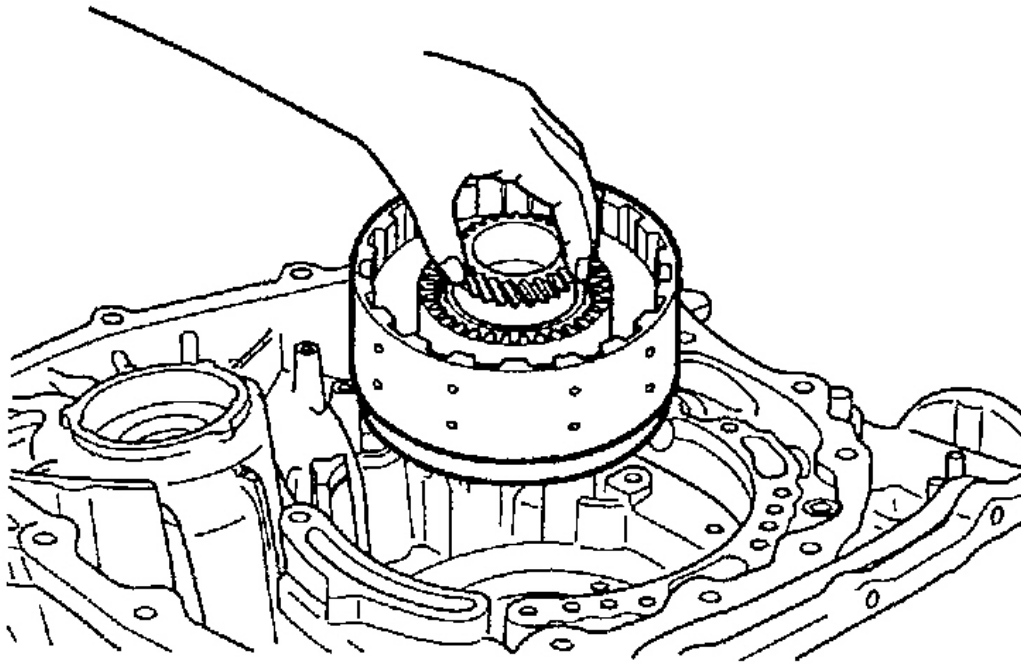
46. Remove the anchor plug and O-ring.



G01092471

Fig. 164: Removing The Anchor Plug And O-Ring
Courtesy of KIA MOTORS AMERICA, INC.

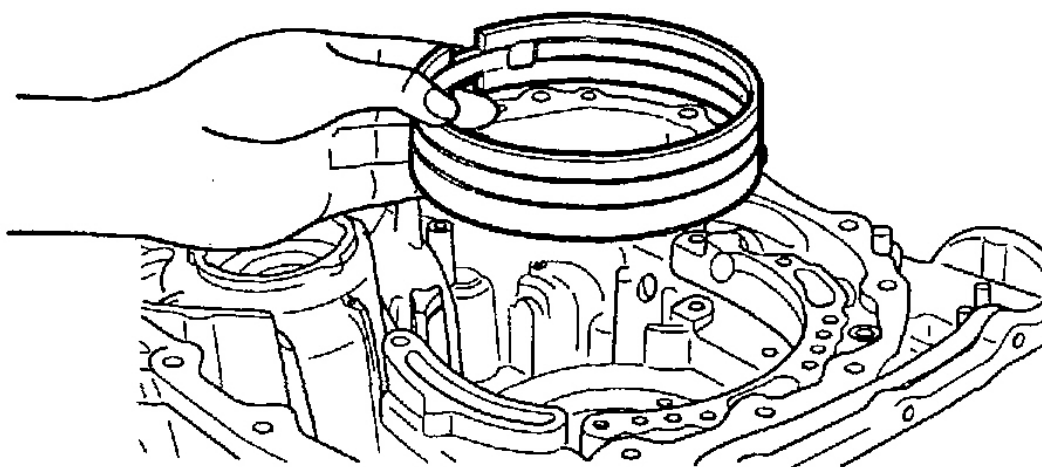
47. Remove the direct clutch assembly.



G01092472

Fig. 165: Removing The Direct Clutch Assembly
Courtesy of KIA MOTORS AMERICA, INC.

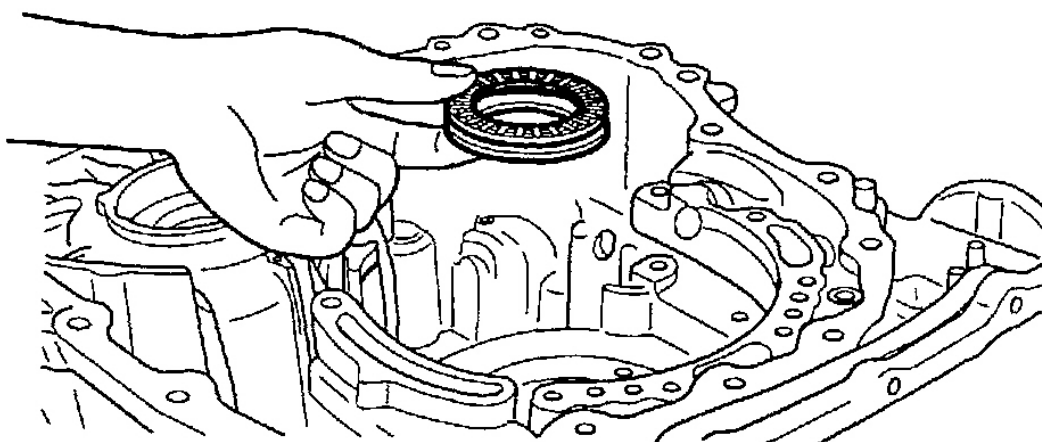
48. Remove the reduction brake band.



G01092473

Fig. 166: Removing The Reduction Brake Band
 Courtesy of KIA MOTORS AMERICA, INC.

49. Remove the thrust bearing #11.

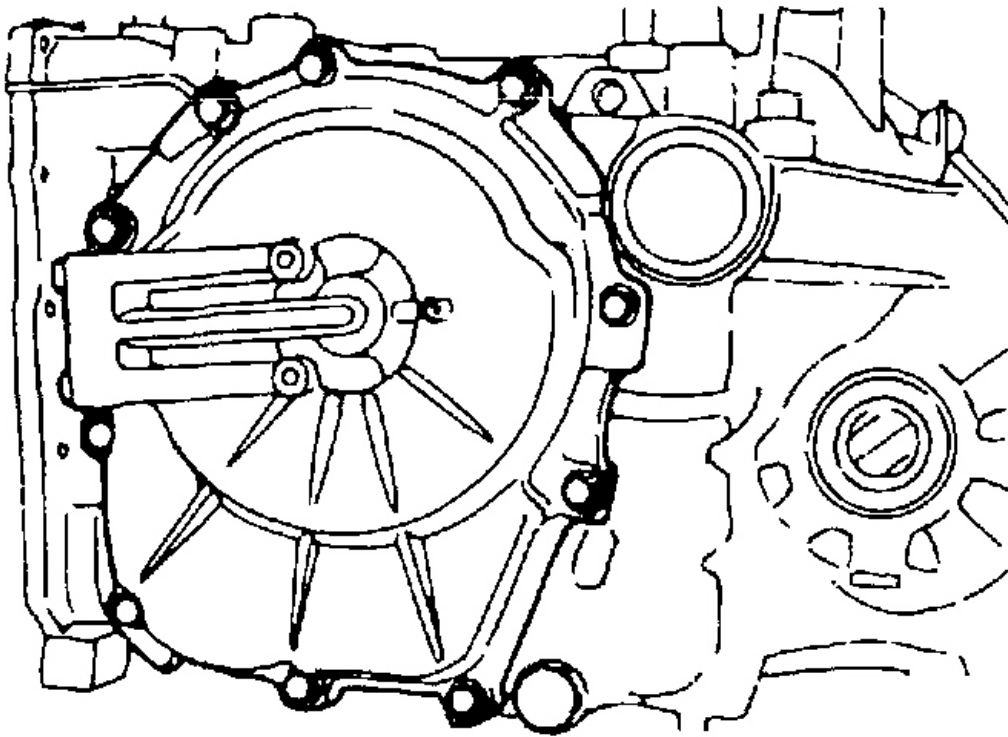


G01092474

Fig. 167: Removing The Thrust Bearing #11
 Courtesy of KIA MOTORS AMERICA, INC.

50. Remove the thrust bearing #12.

51. Remove the rear cover.

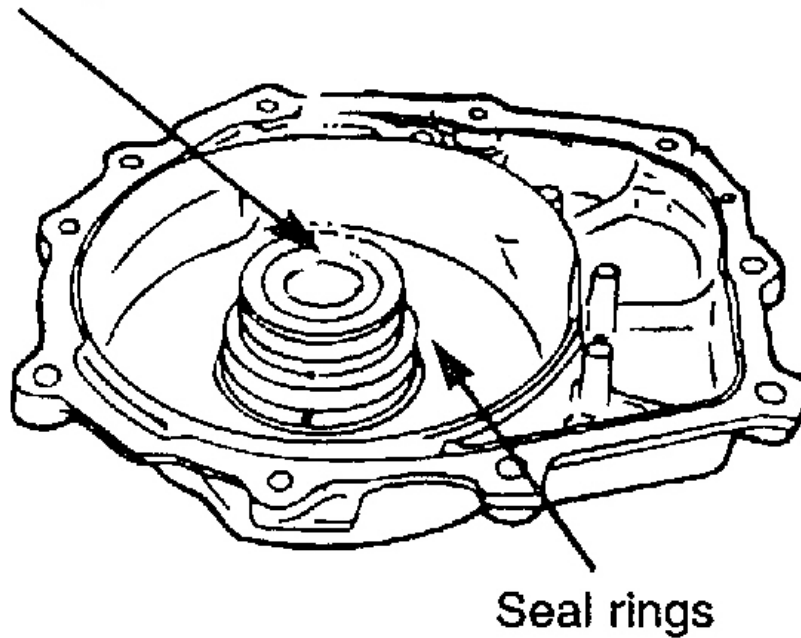


G01092475

Fig. 168: Removing The Rear Cover
Courtesy of KIA MOTORS AMERICA, INC.

52. Remove the thrust bearing #8.

Thrust bearing #8



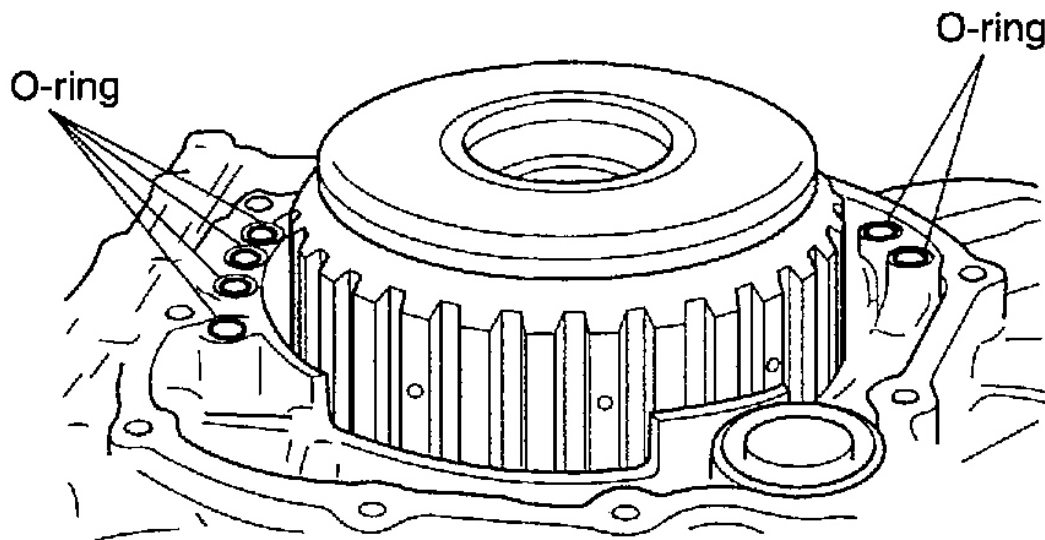
G01092476

Fig. 169: Removing The Thrust Bearing #8
Courtesy of KIA MOTORS AMERICA, INC.

- 53. Remove the seal rings (four).
- 54. Remove the input shaft rear bearing.

CAUTION: The rear cover may be damaged in replacing the rear bearing, therefore do not replace it if not faulty after checking.

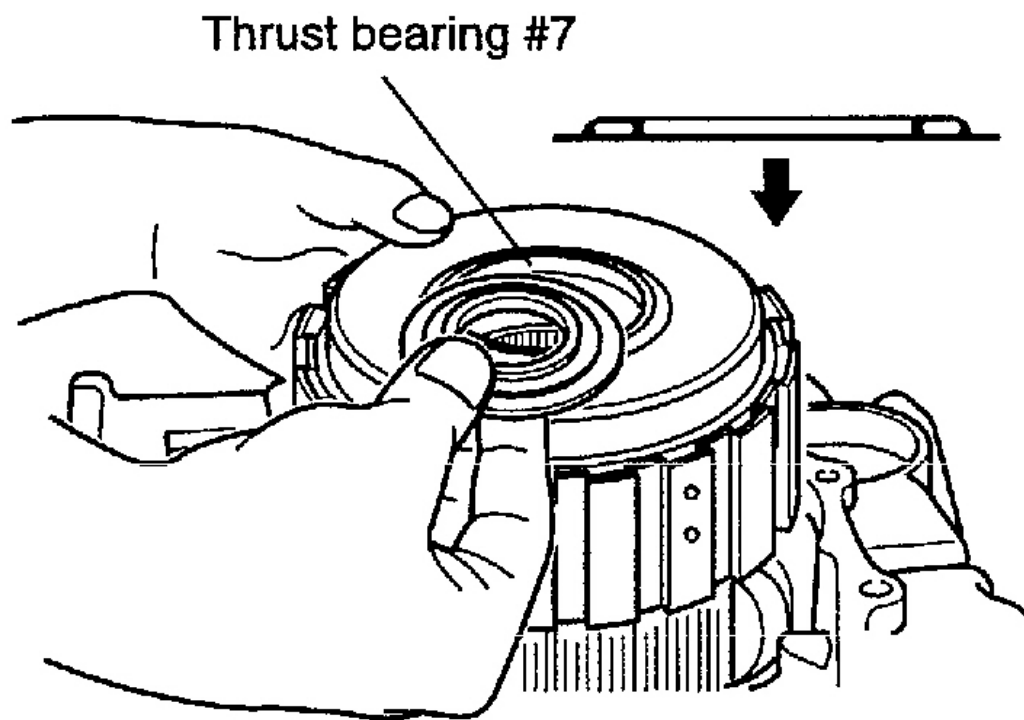
- 55. Remove O-rings (six).



G01092477

Fig. 170: Removing O-Rings
Courtesy of KIA MOTORS AMERICA, INC.

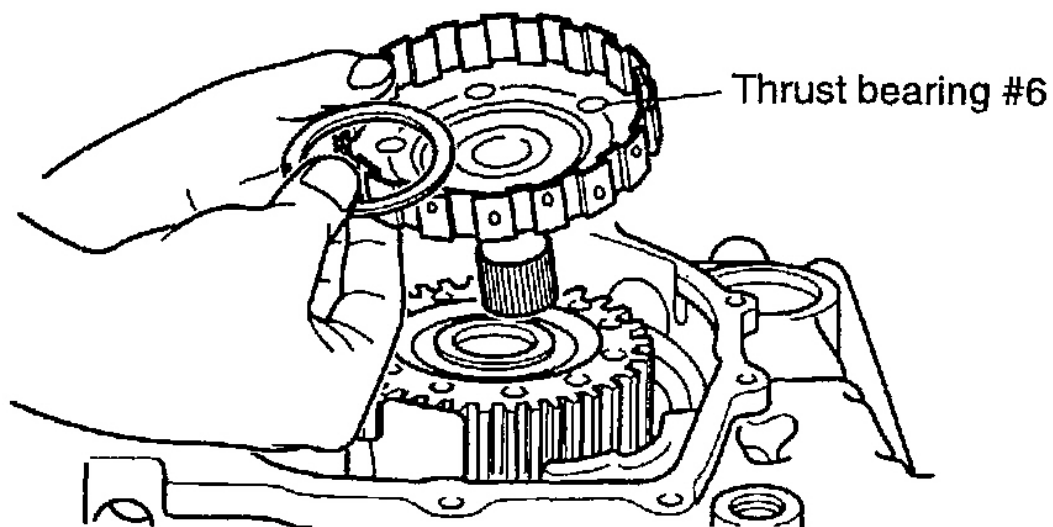
56. Remove the thrust bearing #7.



G01092478

Fig. 171: Removing The Thrust Bearing #7
Courtesy of KIA MOTORS AMERICA, INC.

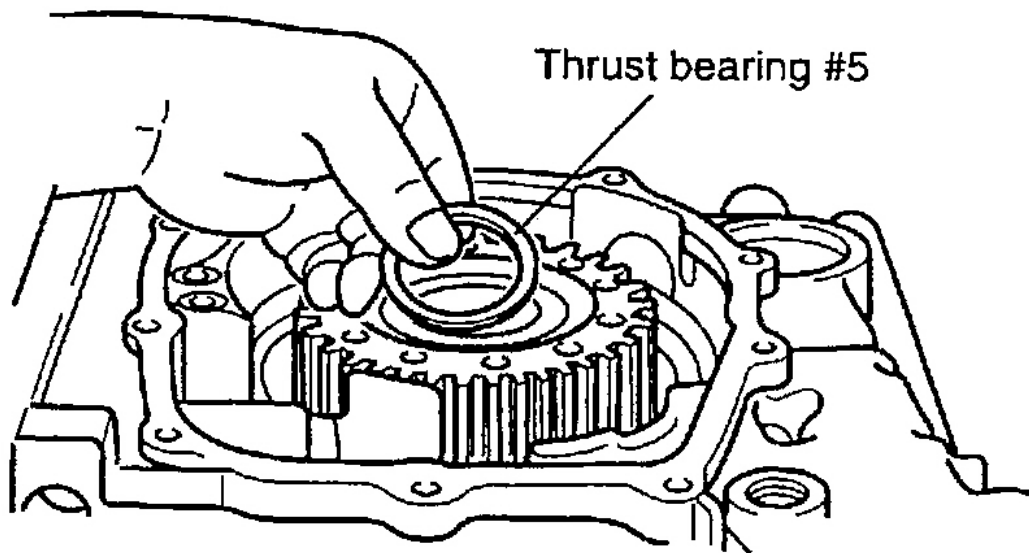
57. Remove the reverse and overdrive clutch.
58. Remove the thrust bearing #6.



G01092479

Fig. 172: Removing The Thrust Bearing #6
Courtesy of KIA MOTORS AMERICA, INC.

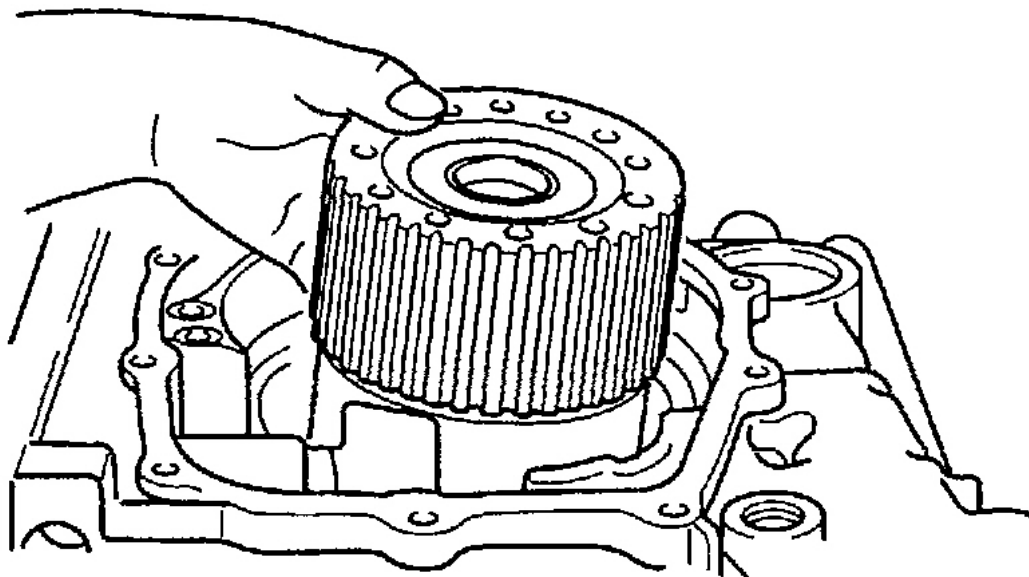
59. Remove the overdrive clutch hub.
60. Remove the thrust bearing #5.



G01092480

Fig. 173: Removing The Thrust Bearing #5
Courtesy of KIA MOTORS AMERICA, INC.

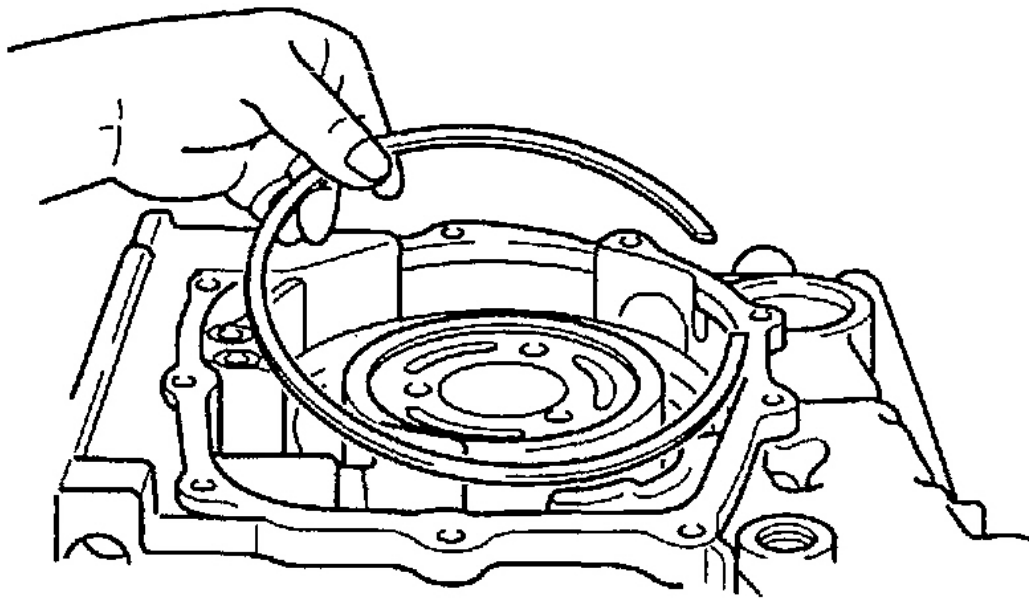
61. Remove the planetary gear reverse sun gear.



G01092481

Fig. 174: Removing The Planetary Gear Reverse Sun Gear
Courtesy of KIA MOTORS AMERICA, INC.

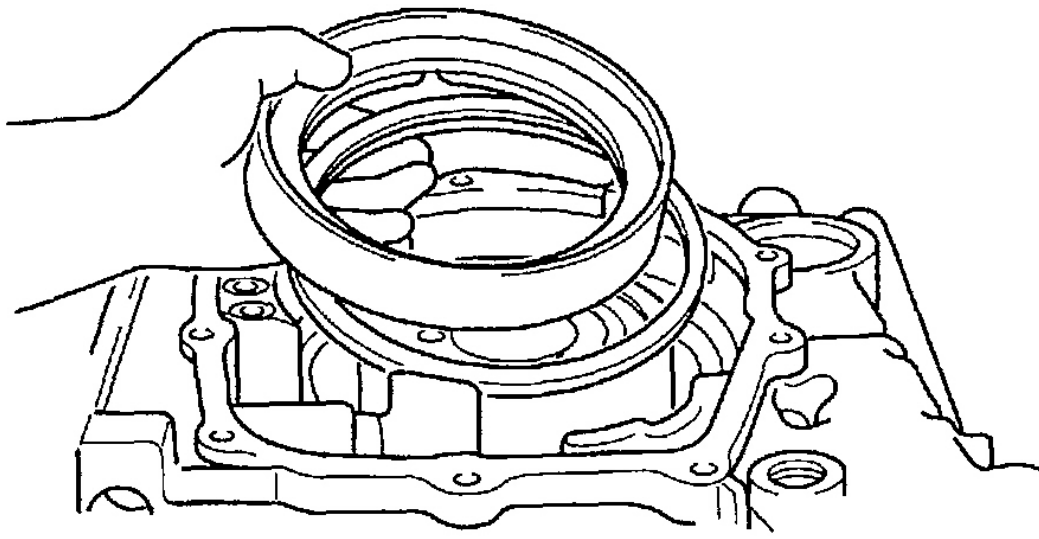
62. Remove the second brake piston snap ring.



G01092482

Fig. 175: Removing The Second Brake Piston Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

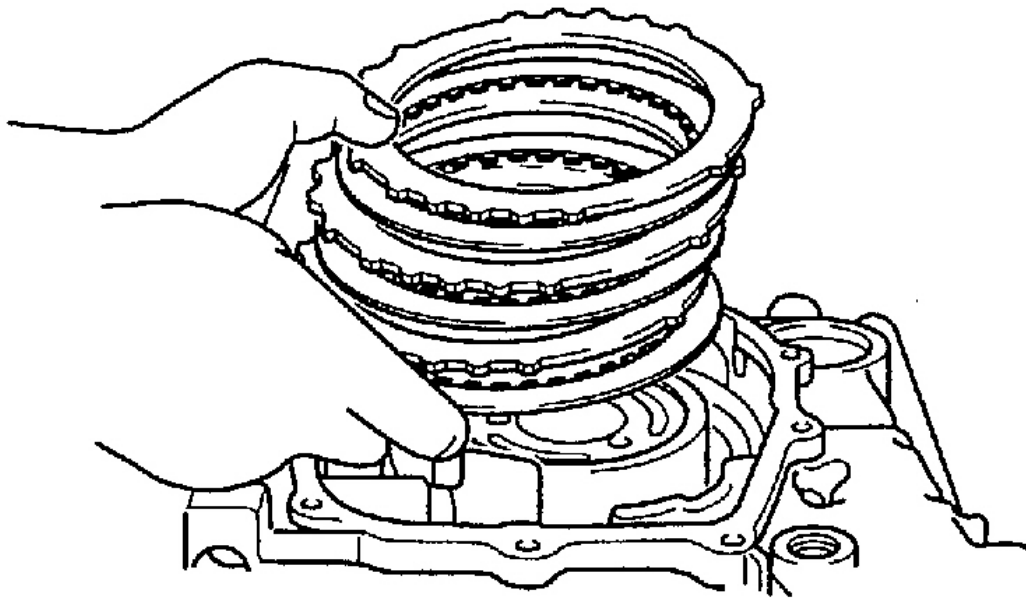
63. Remove the second brake piston and return spring.



G01092483

Fig. 176: Removing The Second Brake Piston And Return Spring
Courtesy of KIA MOTORS AMERICA, INC.

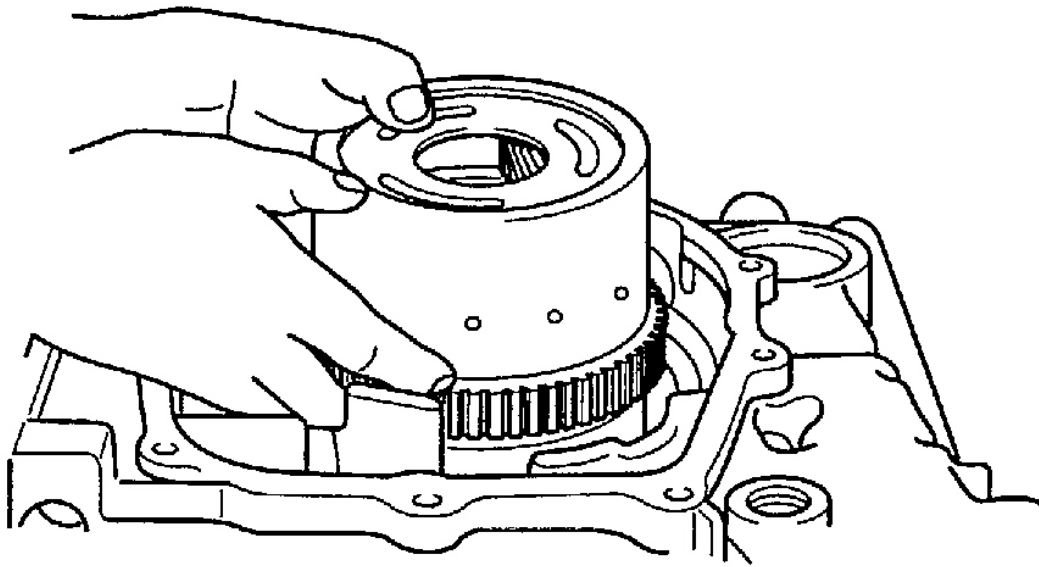
64. Remove the pressure plate, brake disc and brake plate.



G01092484

Fig. 177: Removing The Pressure Plate, Brake Disc And Brake Plate
Courtesy of KIA MOTORS AMERICA, INC.

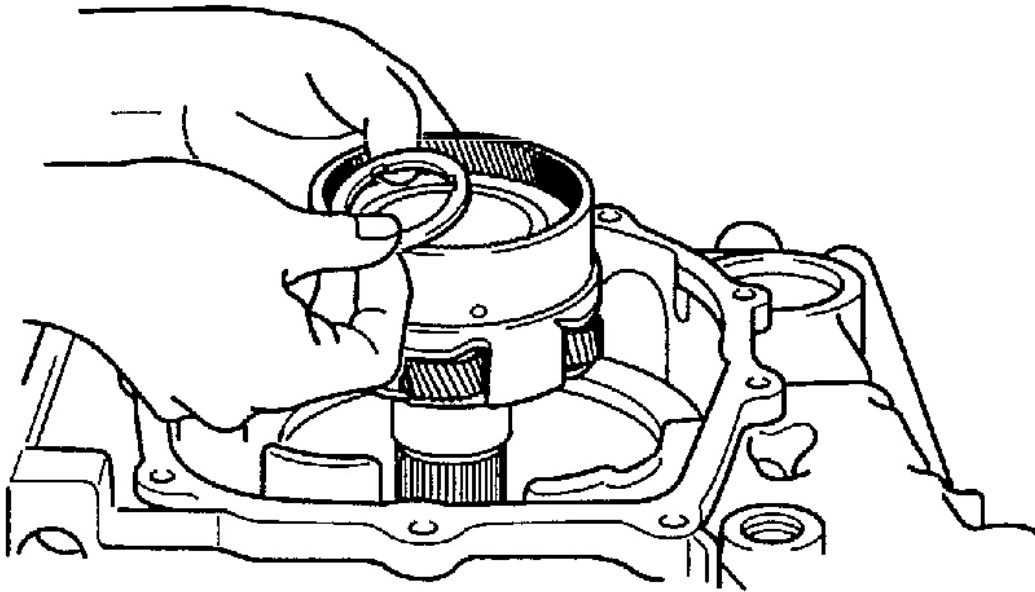
65. Remove the overdrive planetary carrier.



G01092485

Fig. 178: Removing The Overdrive Planetary Carrier
Courtesy of KIA MOTORS AMERICA, INC.

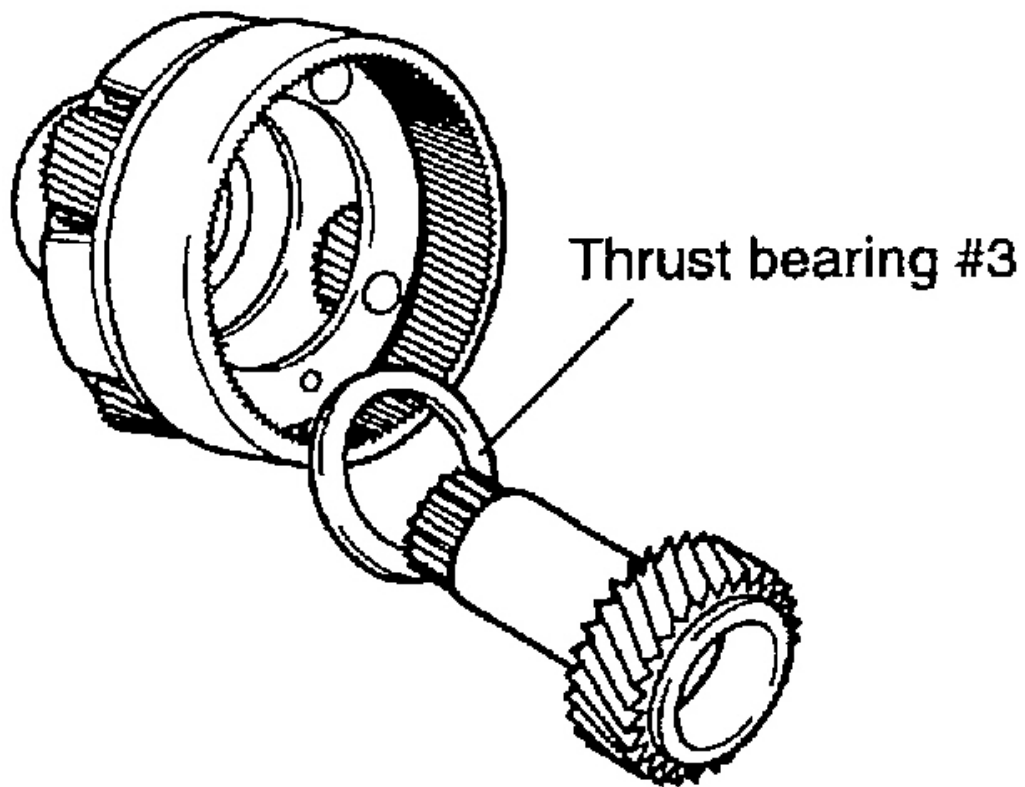
66. Remove the output planetary carrier thrust bearing #4.



G01092486

Fig. 179: Removing The Output Planetary Carrier Thrust Bearing #4
Courtesy of KIA MOTORS AMERICA, INC.

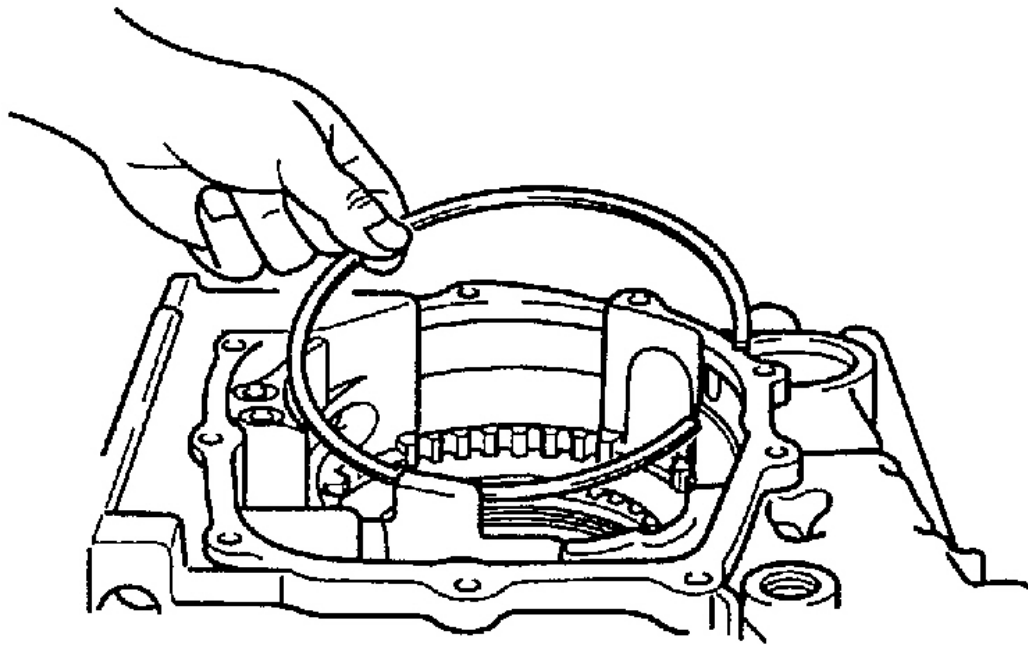
67. Remove the output planetary carrier.
68. Remove the underdrive sun gear.
69. Remove the thrust bearing #3.



G01092487

Fig. 180: Removing The Thrust Bearing #3
Courtesy of KIA MOTORS AMERICA, INC.

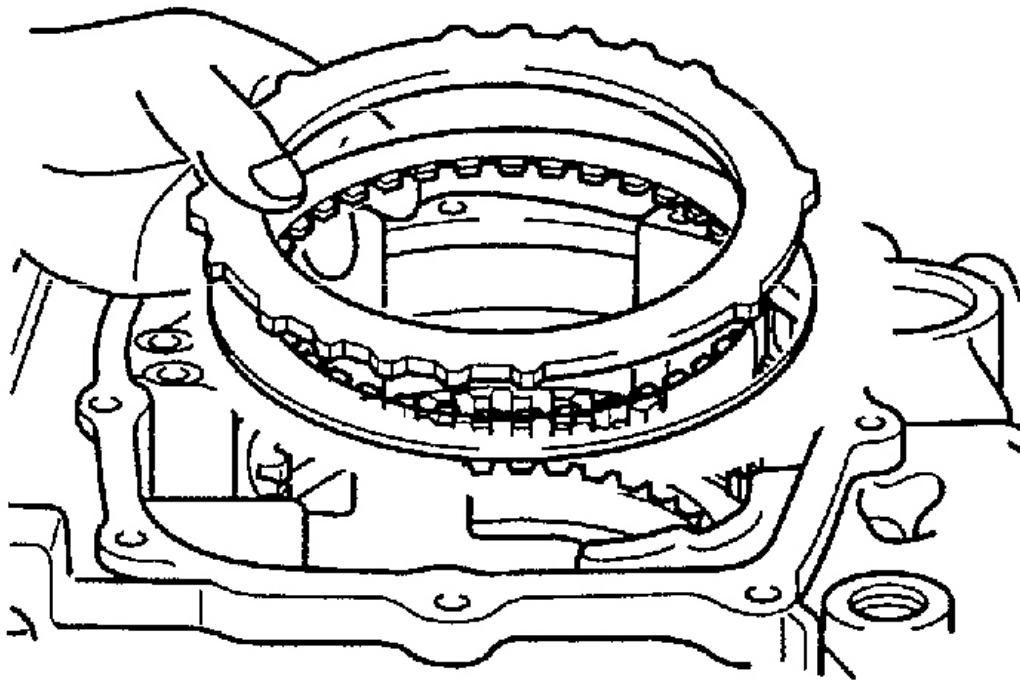
70. Remove the LR reaction plate snap ring.



G01092488

Fig. 181: Removing The LR Reaction Plate Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

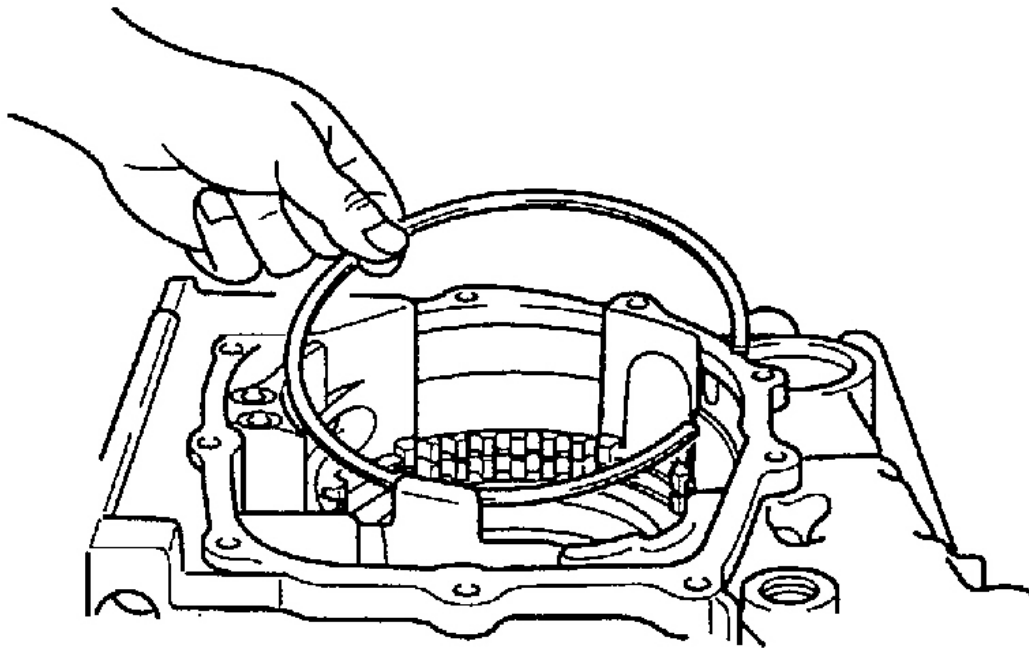
71. Remove the reaction plate and brake disc.



G01092489

Fig. 182: Removing The Reaction Plate And Brake Disc
Courtesy of KIA MOTORS AMERICA, INC.

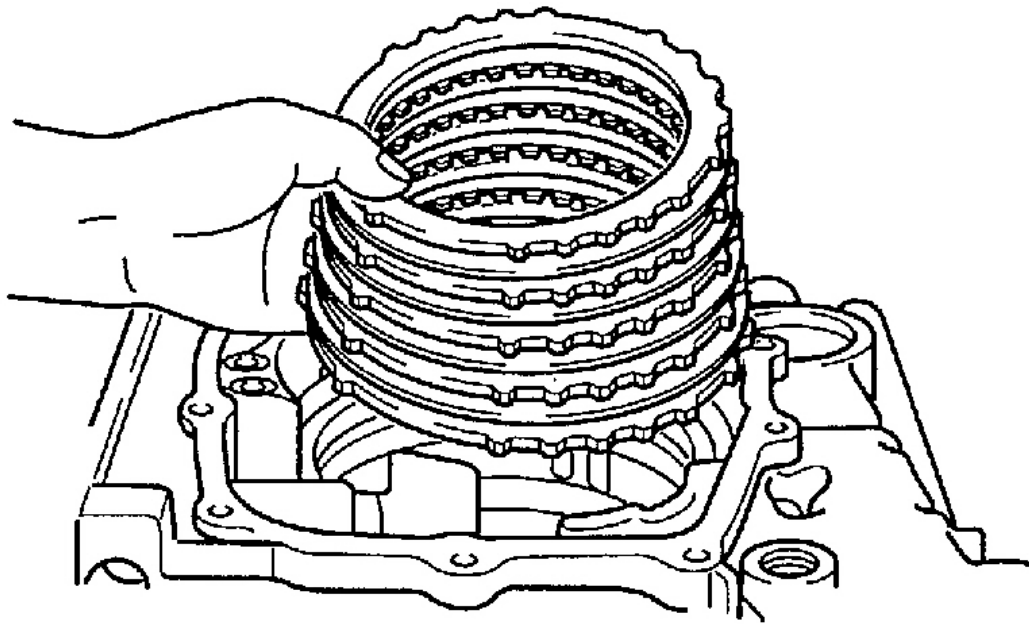
72. Remove the LR brake snap ring.



G01092490

Fig. 183: Removing The LR Brake Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

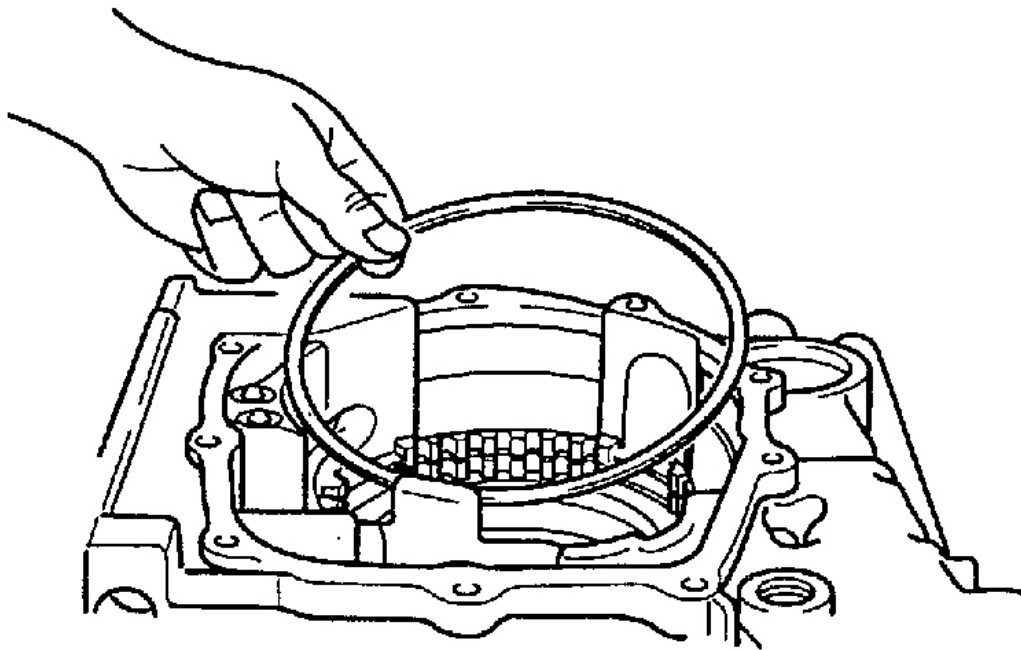
73. Remove the brake plate, the brake disc, and the pressure plate.



G01092491

Fig. 184: Removing The Brake Plate, The Brake Disc, And The Pressure Plate
Courtesy of KIA MOTORS AMERICA, INC.

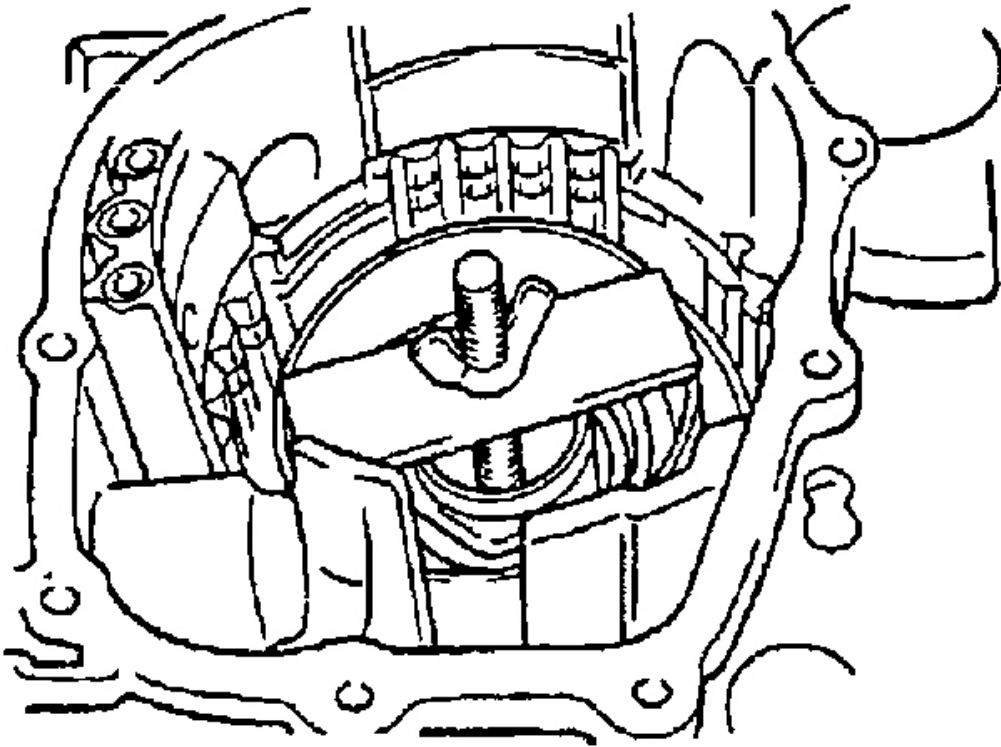
74. Remove the wave spring.



G01092492

Fig. 185: Removing The Wave Spring
Courtesy of KIA MOTORS AMERICA, INC.

75. Remove the snap ring using special tool.

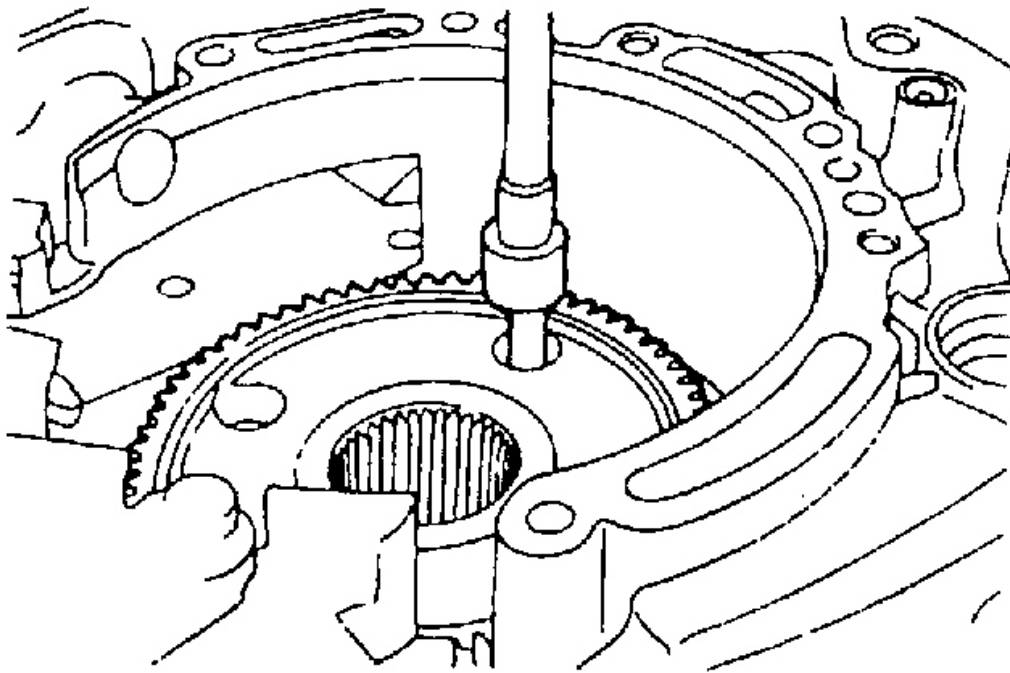


G01092493

Fig. 186: Removing The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

76. Remove the one way clutch inner race.
77. Remove the spring retainer, return spring and LR brake piston.
78. Release the transfer drive gear mounting bolts (eight).

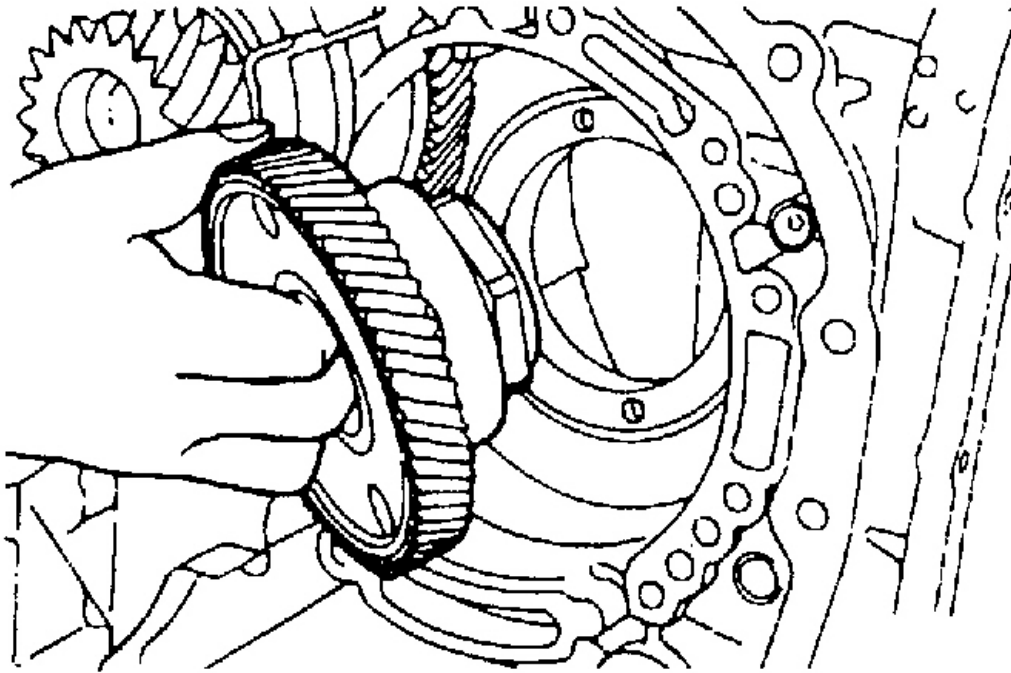
NOTE: Remove the revolving drive gear by turning it.



G01092494

Fig. 187: Releasing The Transfer Drive Gear Mounting Bolts
Courtesy of KIA MOTORS AMERICA, INC.

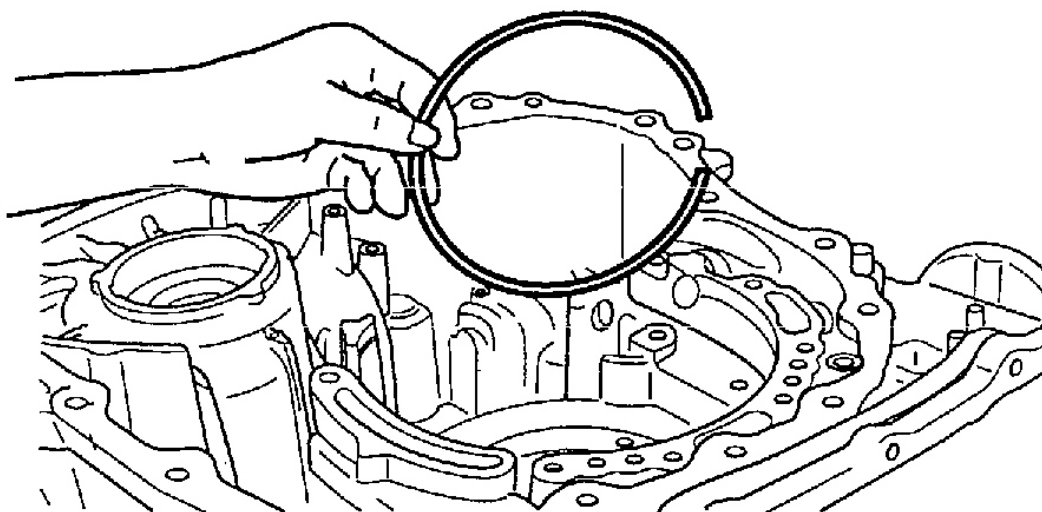
79. Remove the transfer drive gear.



G01092495

Fig. 188: Removing The Transfer Drive Gear
Courtesy of KIA MOTORS AMERICA, INC.

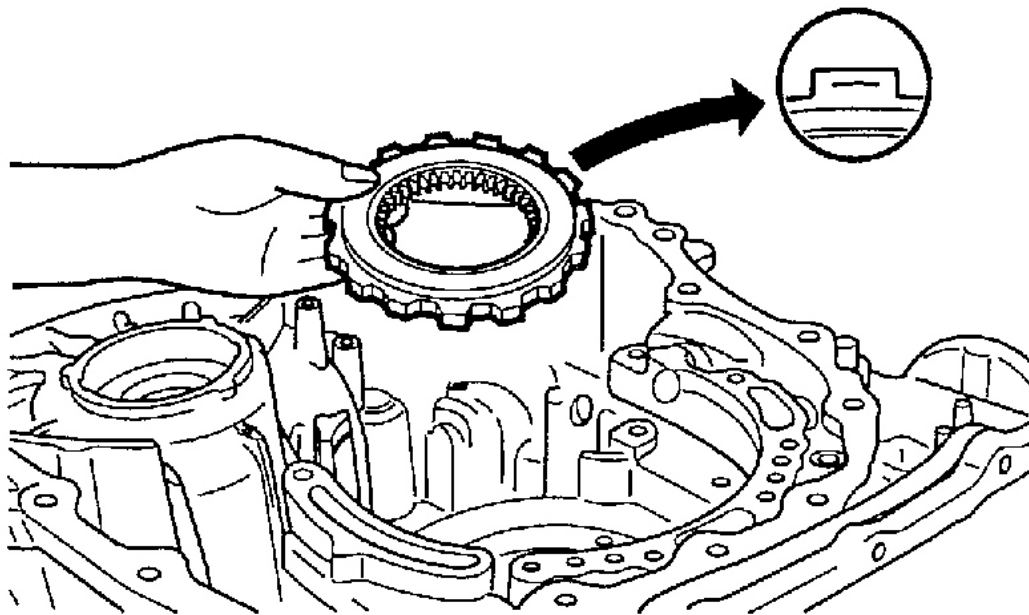
80. Remove the one way clutch holding snap ring.



G01092496

Fig. 189: Removing The One Way Clutch Holding Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

81. Remove the one way clutch assembly.



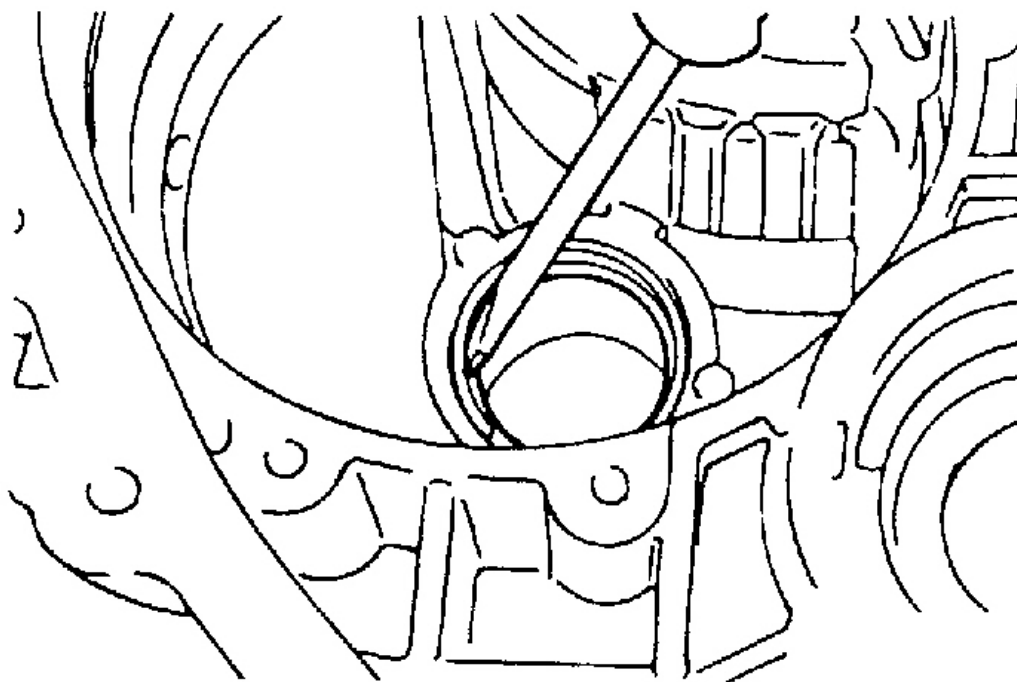
G01092497

Fig. 190: Removing The One Way Clutch Assembly
Courtesy of KIA MOTORS AMERICA, INC.

- 82. Remove the seal rings (two).
- 83. Remove the needle bearing.

CAUTION: Transaxle case may be damaged in replacing the output shaft rear bearing, therefore **DO NOT** replace it if not faulty after checking.

- 84. Remove the differential bearing output race and spacer out of converter housing.



G01092498

Fig. 191: Removing The Differential Bearing Output Race And Spacer Out Of Converter Housing
Courtesy of KIA MOTORS AMERICA, INC.

85. Remove the differential bearing output race out of the transaxle case.

REASSEMBLY

Reassembly Precautions

1. Keep the workbench and parts always clean and dirt free.
2. **DO NOT** use cotton gloves. Use paper towel and nylon rag. **DO NOT** use nappy fabric. Kimberly's Kim towel J130, Kim WIPE L-100 or equivalent.
3. **DO NOT** use grease at any place otherwise specified. Use white vaseline or blue mineral oil if necessary.
4. Insert each snap ring firmly into the seat. **DO NOT** use deformed rings.
5. **DO NOT** allow dirt remain on the surface to apply liquid gasket during reassembly.
6. Gasket, O-ring, and oil shall not be used again, and use new ones in assembly.
7. A new clutch disc and a new brake disc shall be dipped in ATF for 2 hours or more before use.
8. Replace the ATF and clean the filter thoroughly in reassembly. Replace the damaged filter element with a

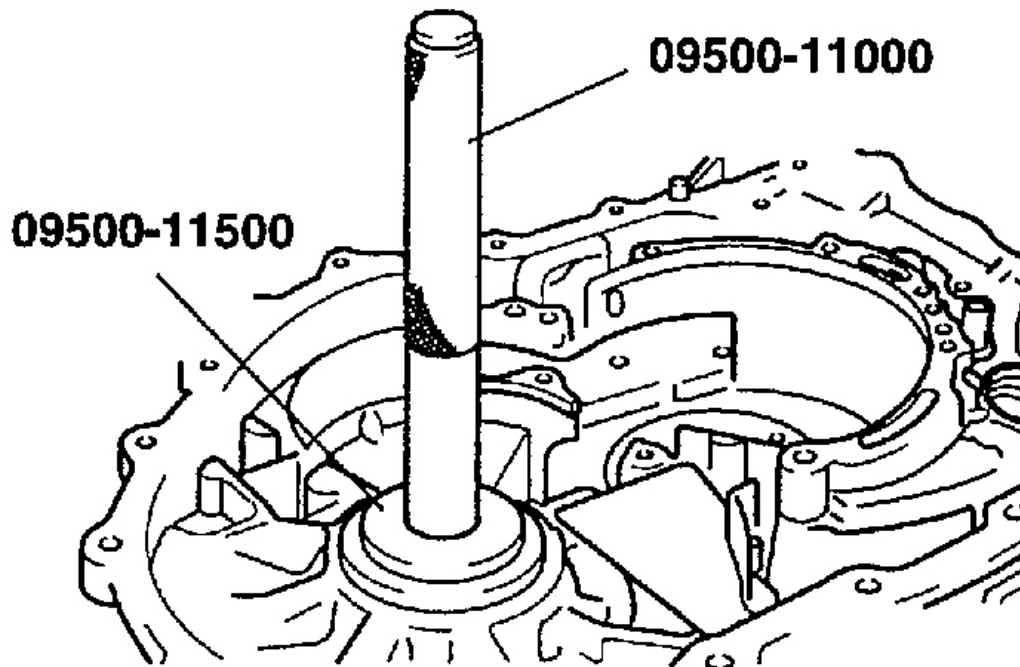
new one.

9. Apply required minimum quantity of white vaseline, blue mineral oil, or ATF on each of the bearing part, the thrust face moving part, the fluid pump moving part, the seal ring, and the O-ring.
10. **DO NOT** replace the ATF in the fluid cooler.
11. **DO NOT** allow dirt to come through the transaxle openings before mounting onto the vehicle. (including electronic part connector)

Reassembly

NOTE: Also see TIGHTENING TORQUE .

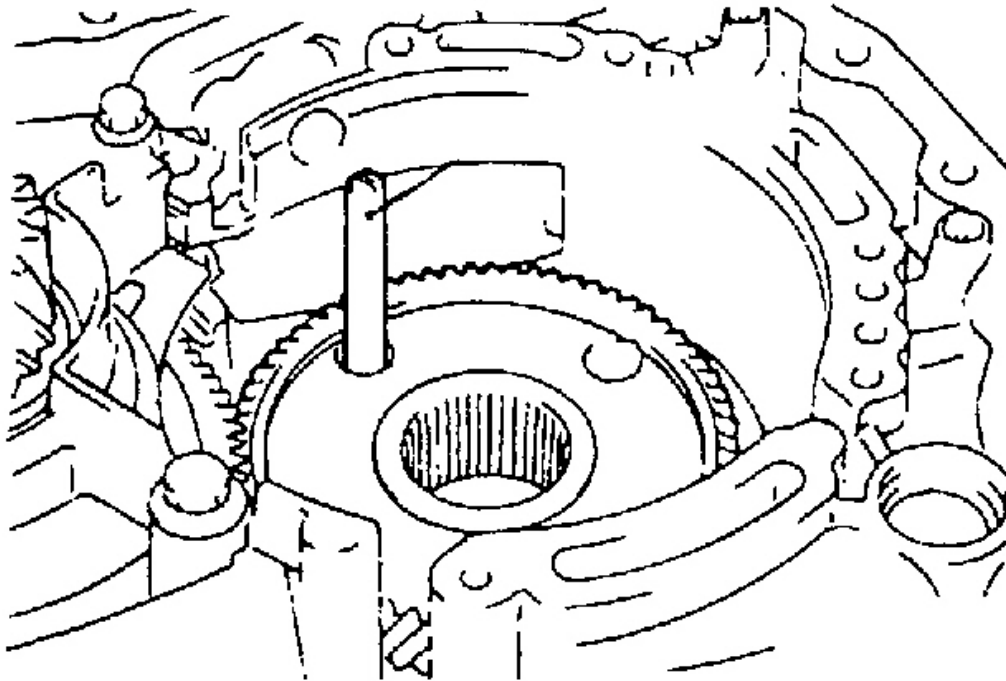
1. Install the differential bearing output race on the transaxle case using the special tool.



G01092499

Fig. 192: Installing The Differential Bearing Output Race
Courtesy of KIA MOTORS AMERICA, INC.

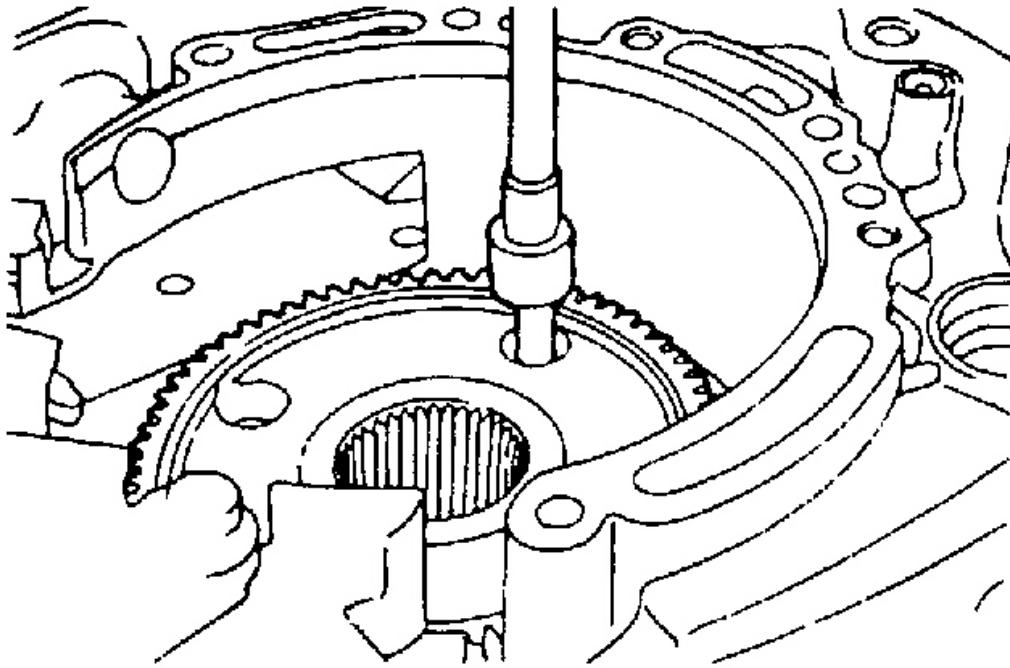
2. Apply ATF on the transaxle case and install 2 guide pins.
3. Install the transfer drive gear.



G01092500

Fig. 193: Installing The Transfer Drive Gear
Courtesy of KIA MOTORS AMERICA, INC.

4. Connect the transfer drive gear mounting bolts (eight) using tightening torque.



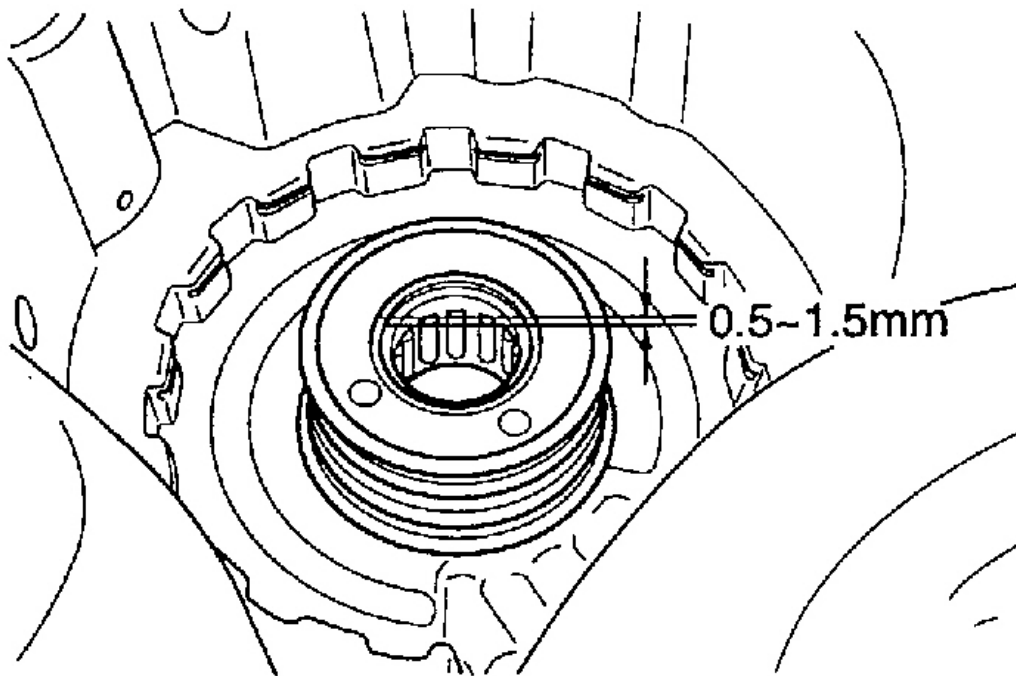
G01092501

Fig. 194: Connecting The Transfer Drive Gear Mounting Bolts
Courtesy of KIA MOTORS AMERICA, INC.

Tightening torque, F5A51-3 : 31.4-36.3 N.m (320-370 kg.Cm, 23-27 lb.ft)

NOTE: Turn the transfer drive gear one revolution and ensure no interference with bolts.

5. Install the output shaft rear bearing.

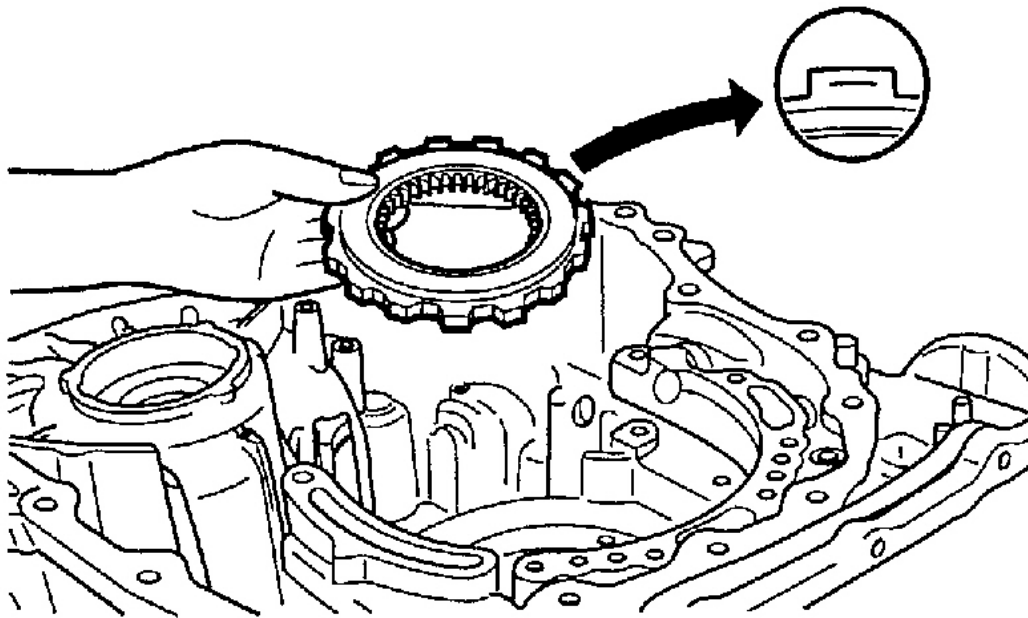


G01092502

Fig. 195: Installing Output Shaft Rear Bearing
Courtesy of KIA MOTORS AMERICA, INC.

6. Install the 4 seal rings.
7. Install the one way clutch.

NOTE: Be cautious to the direction of the one way clutch. Line marked side shall be located forward. See Fig. 196 .

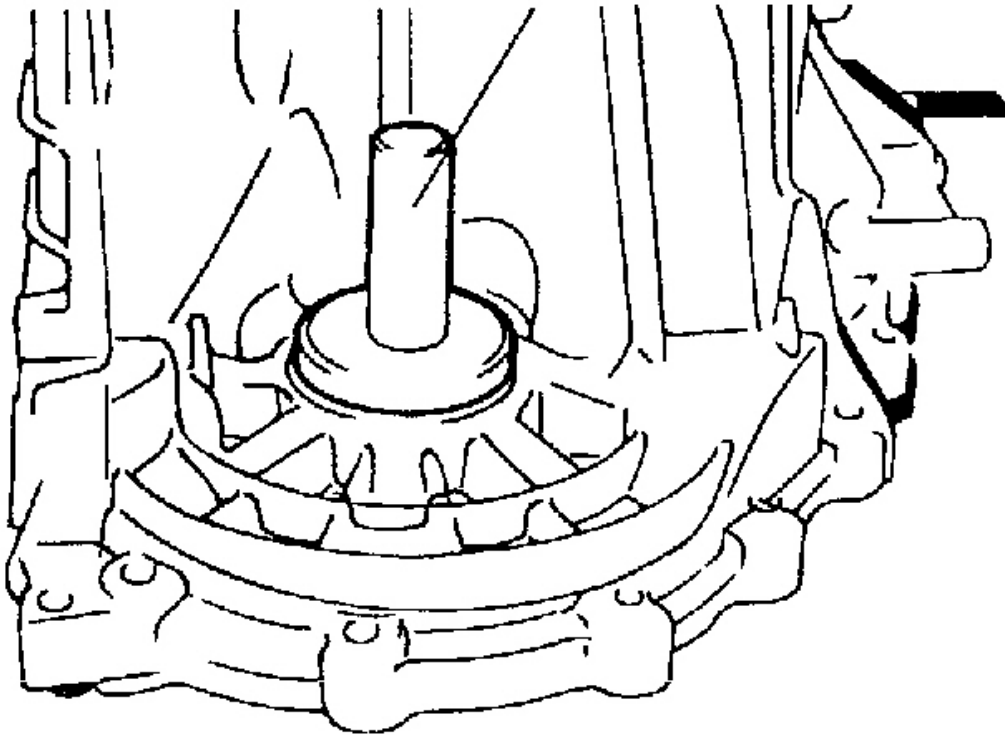


G01092503

Fig. 196: Installing The One Way Clutch
Courtesy of KIA MOTORS AMERICA, INC.

8. Install the one way clutch holding snap ring.
9. Install the driveshaft oil seal on the transaxle case.

09431-39000

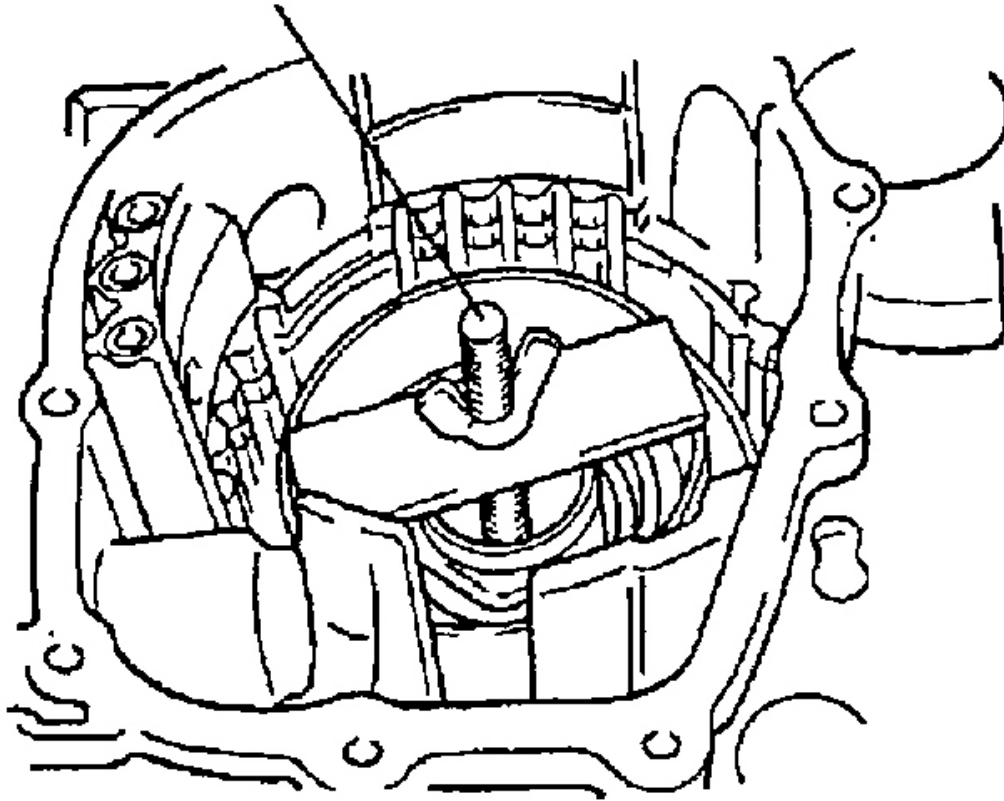


G01092504

Fig. 197: Installing The Driveshaft Oil Seal On The Transaxle Case
Courtesy of KIA MOTORS AMERICA, INC.

10. Install the LR brake piston and the return spring.
11. Install the spring retainer.
12. Install the one way clutch inner race.
13. Install the snap ring using the special tool.

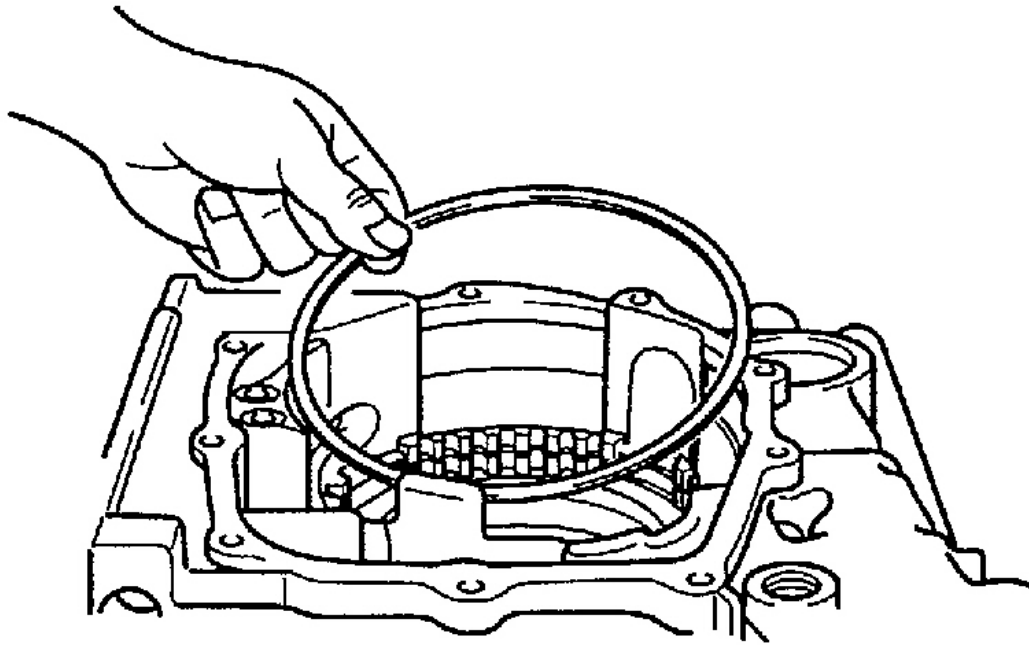
09453-21000



G01092505

Fig. 198: Installing The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

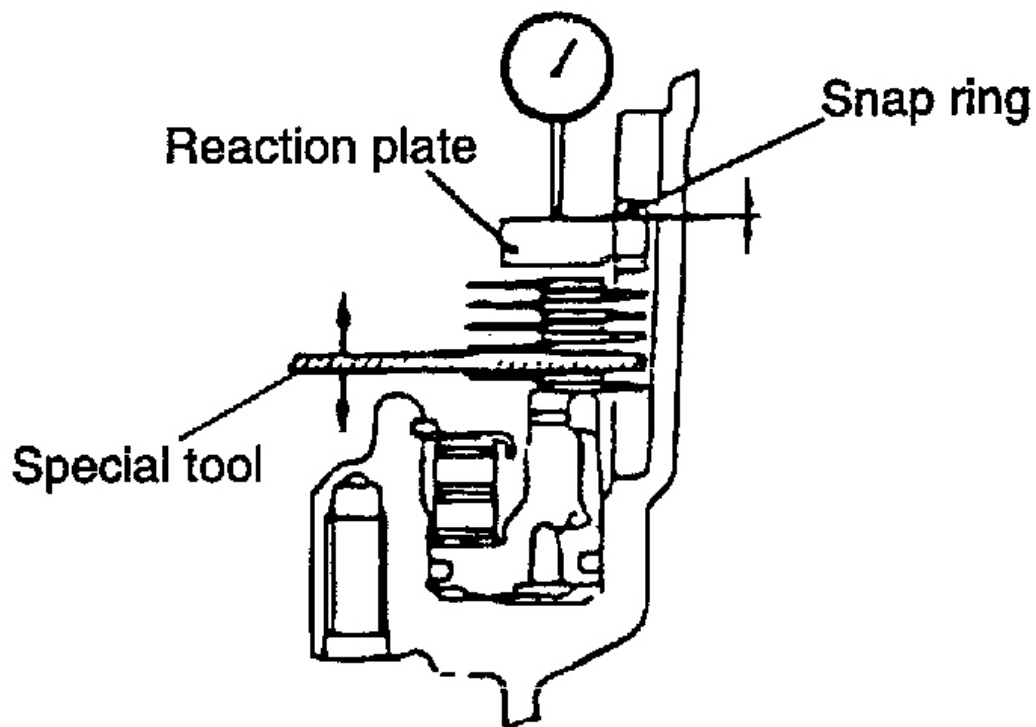
14. Install the wave spring.



G01092506

Fig. 199: Installing The Wave Spring
Courtesy of KIA MOTORS AMERICA, INC.

15. Install the LR brake pressure plate on the special tool, and install the brake disc, the brake plate and the snap ring as illustrated in **Fig. 200** .



G01092508

Fig. 200: Installing The Brake Pressure Plate/Disc
 Courtesy of KIA MOTORS AMERICA, INC.

Brake disc	Brake plate
6	5

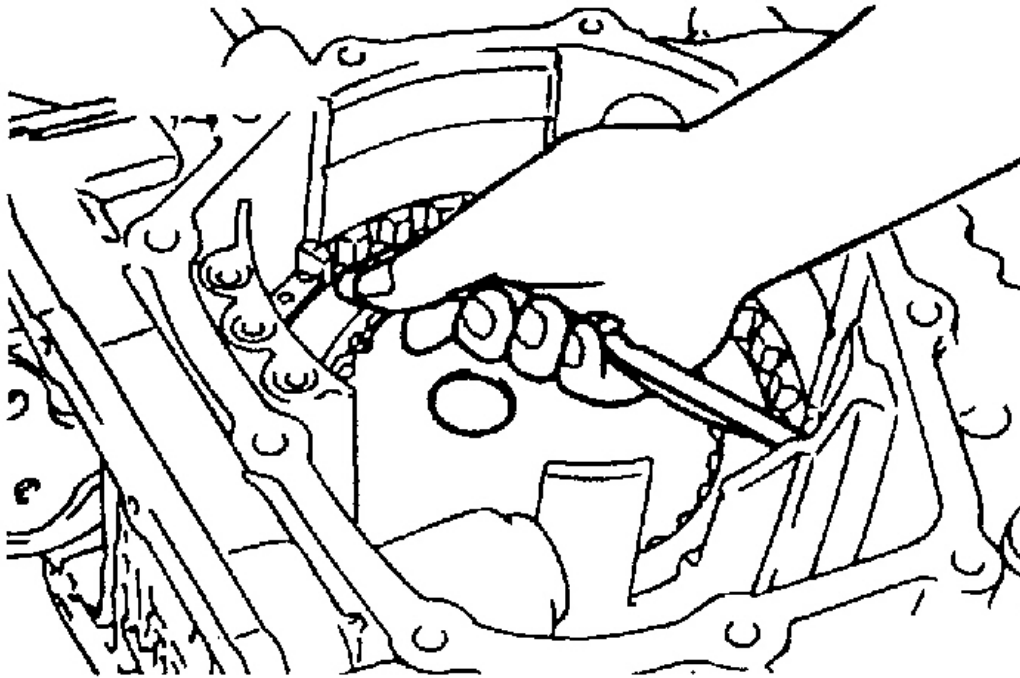
G01092507

Fig. 201: Brake Disc/Plate Specifications Chart
 Courtesy of KIA MOTORS AMERICA, INC.

16. Install the reaction plate and the used snap ring.
17. Move special tool and check the end play, and install appropriate snap rings (8 sizes).

Standard value: 0-0.0063 in. (0-0.16mm)

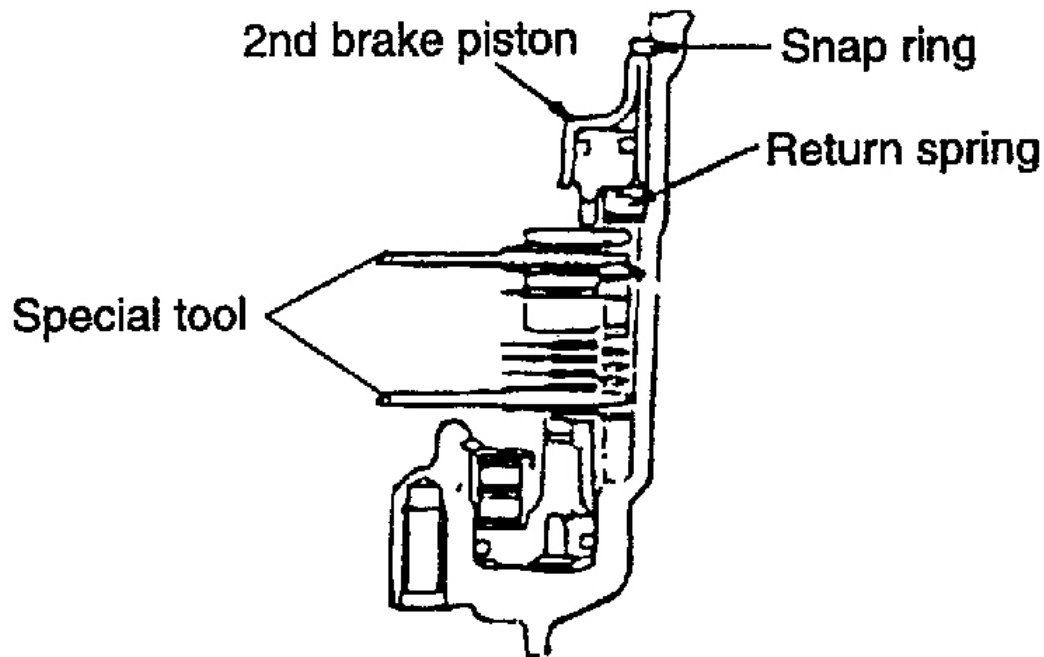
NOTE: Upon releasing the clutch, determine the actual gap between the LR brake disc and the plate.



G01092509

Fig. 202: Measuring Gap Between The LR Brake Disc And The Plate
Courtesy of KIA MOTORS AMERICA, INC.

18. Install the brake disc, the brake plate, and second brake pressure plate using special tool as illustrated on **Fig. 203** .



G01092511

Fig. 203: Installing The Brake Pressure Plate/Disc
 Courtesy of KIA MOTORS AMERICA, INC.

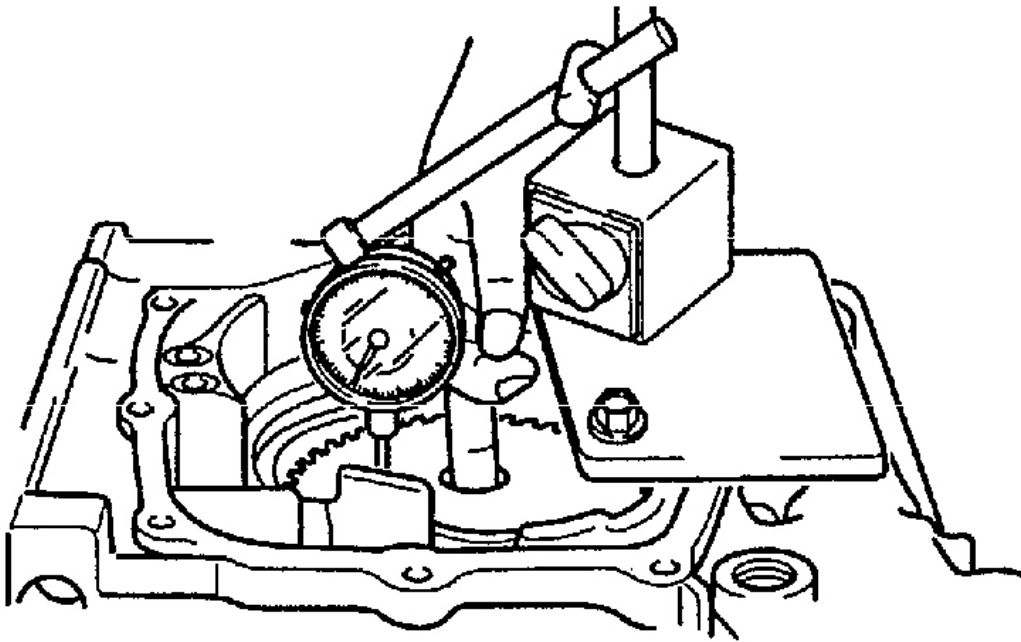
Model	Brake disc	Brake plate
F5A51-3	4	4

G01092510

Fig. 204: Brake Disc/Plate Specification Chart
 Courtesy of KIA MOTORS AMERICA, INC.

19. Install the return spring, the second brake piston, and the snap ring.
20. Move the special tool and check the end play.

Standard value, F5A51-3: 0.043-0.061 in. (1.09-1.55 mm)

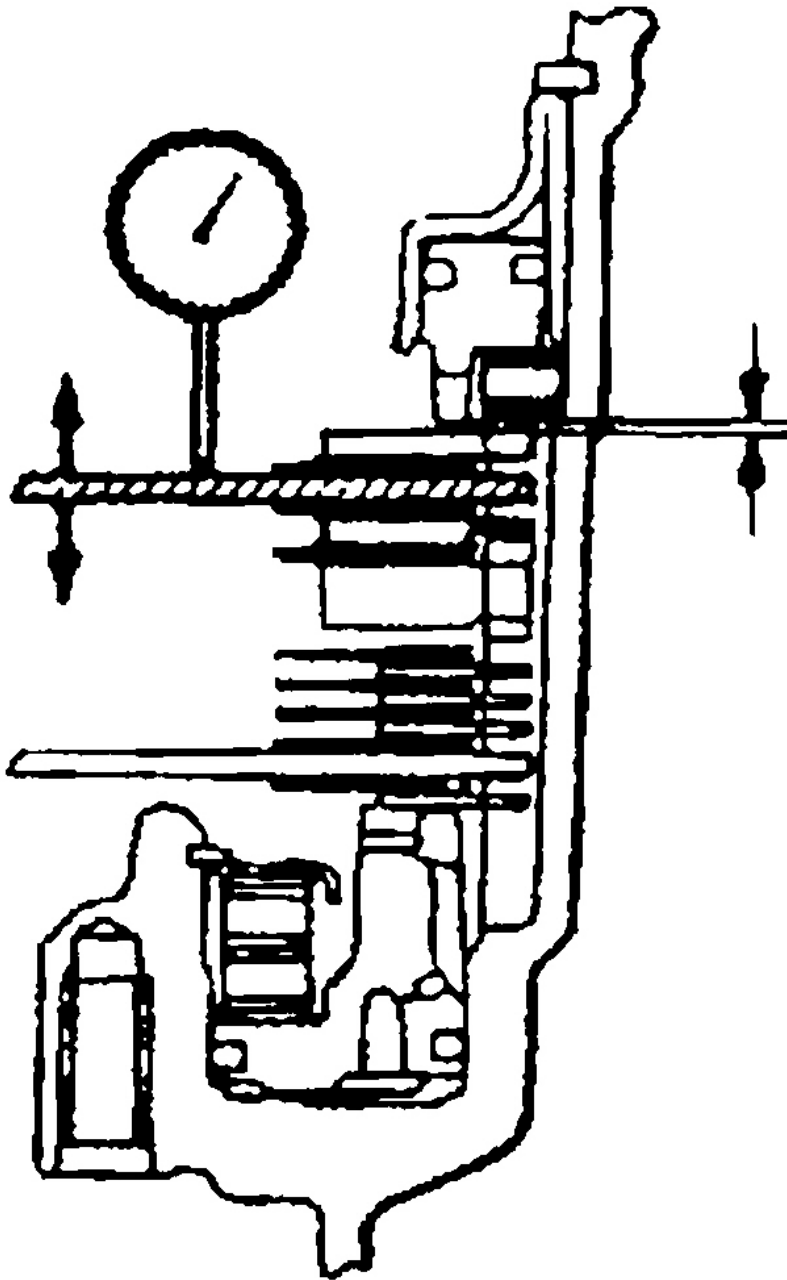


G01092512

Fig. 205: Measuring End Play

Courtesy of KIA MOTORS AMERICA, INC.

21. Using the below formula and the special tool installed (see **Fig. 206**), choose a pressure plate:
- $[A \text{ (travel)} + \text{special tool thickness } 0.079 \text{ in (2.0 mm)} - 0.061 \text{ in. (1.55 mm)}] - [A \text{ (travel)} + \text{special tool thickness } 0.079 \text{ in. (2.0 mm)} - 0.043 \text{ in. (1.09mm)}]$



G01092513

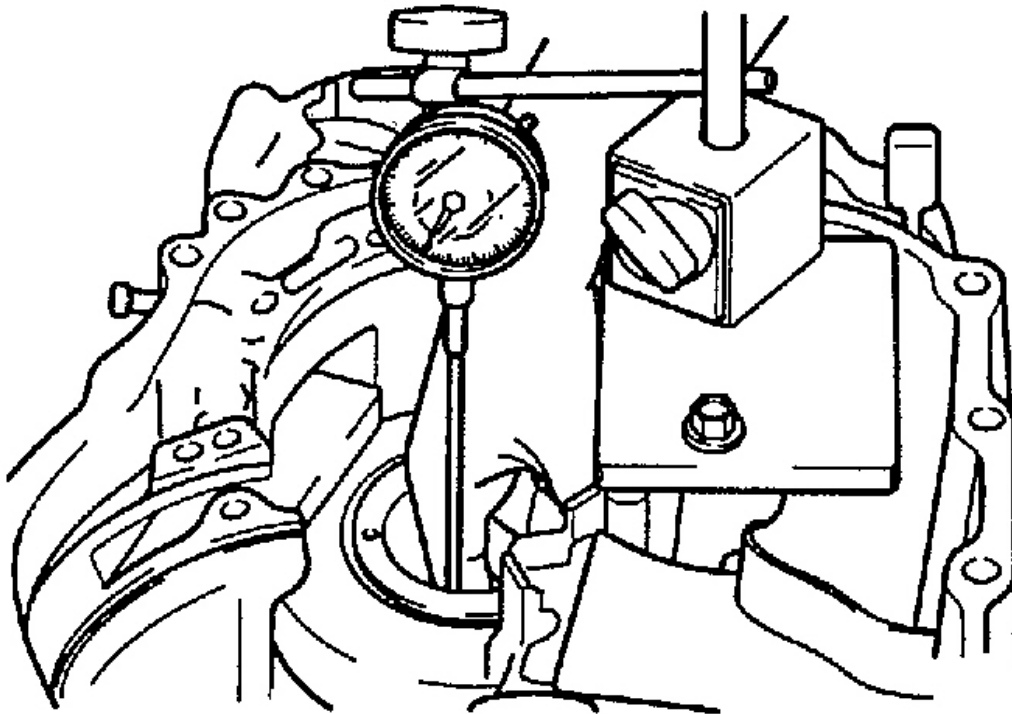
Fig. 206: Measuring For Proper Pressure Plate
Courtesy of KIA MOTORS AMERICA, INC.

22. Turn the transaxle upside down.

23. Connect the special tool (09453-33100) with dial gauge, and move the special tool to check the end play. See **Fig. 207** .

Standard value:

F5A51-3: 0.065-0.083 in. (1.65-2.11 mm)



G01092514

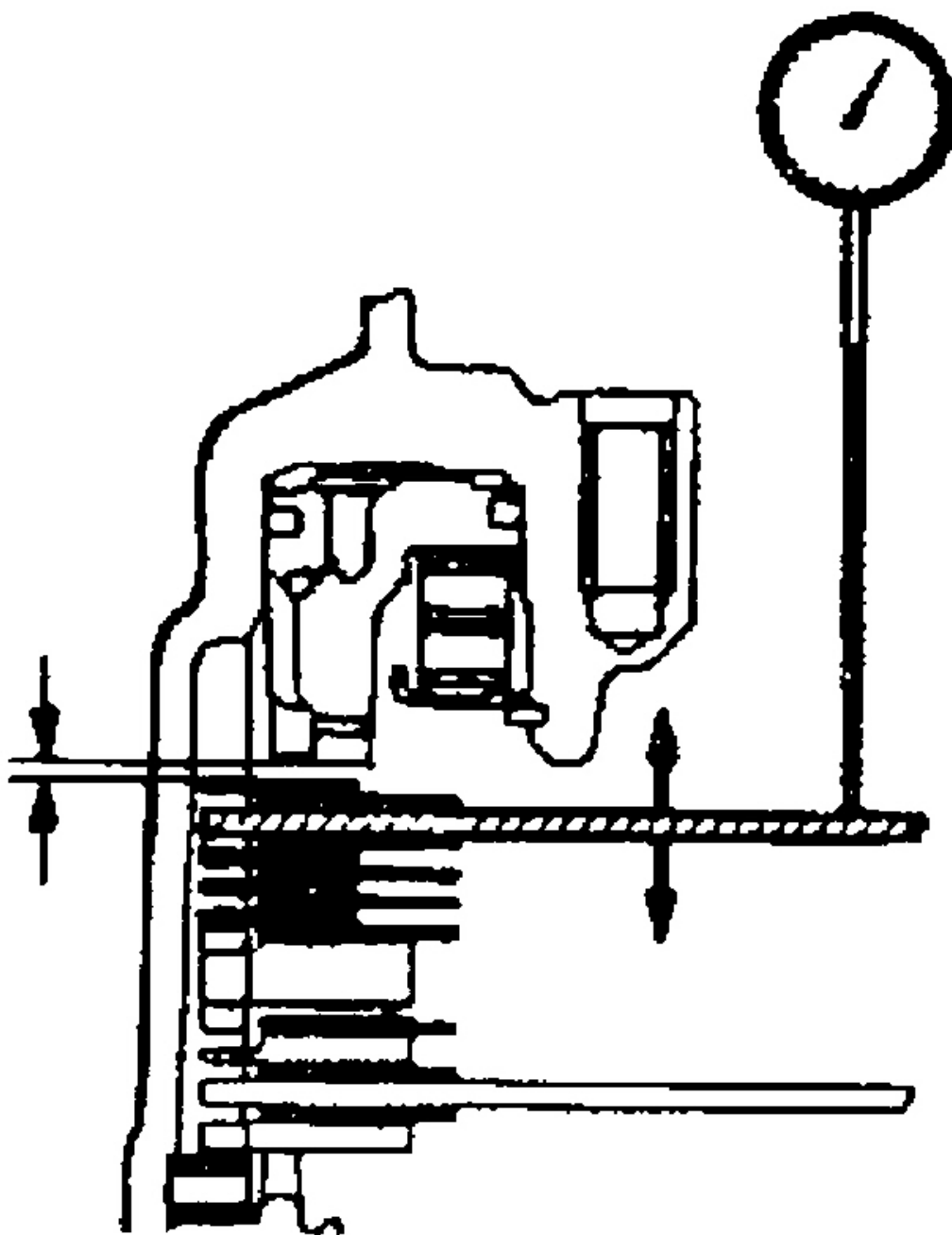
Fig. 207: Measuring End Play

Courtesy of KIA MOTORS AMERICA, INC.

24. Using the below formula and the special tool installed (see **Fig. 208**), choose a pressure plate:

F5A51-3

$$[A \text{ (travel)} + \text{special tool thickness } 0.079 \text{ in (2.0mm)} - 0.083 \text{ in (2.11mm)}] - [A \text{ (travel)} + \text{special tool thickness } 0.079 \text{ in. (2.0mm)} - 0.065 \text{ in. (1.65mm)}]$$

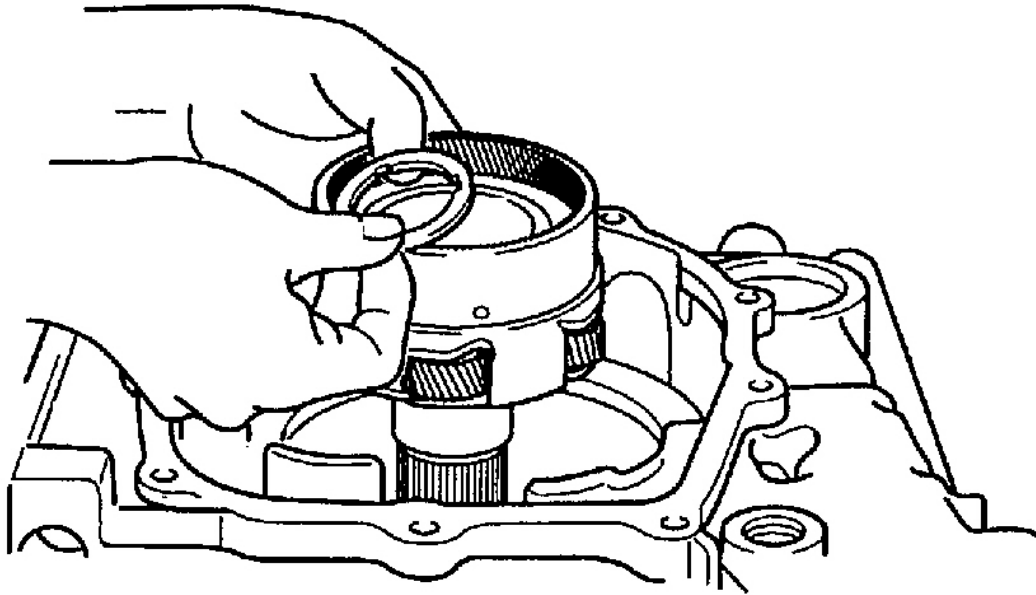


G01092515

Fig. 208: Measuring For Proper Pressure Plate
Courtesy of KIA MOTORS AMERICA, INC.

25. Remove special tools.
26. Install the output planetary carrier and the thrust bearing #4.

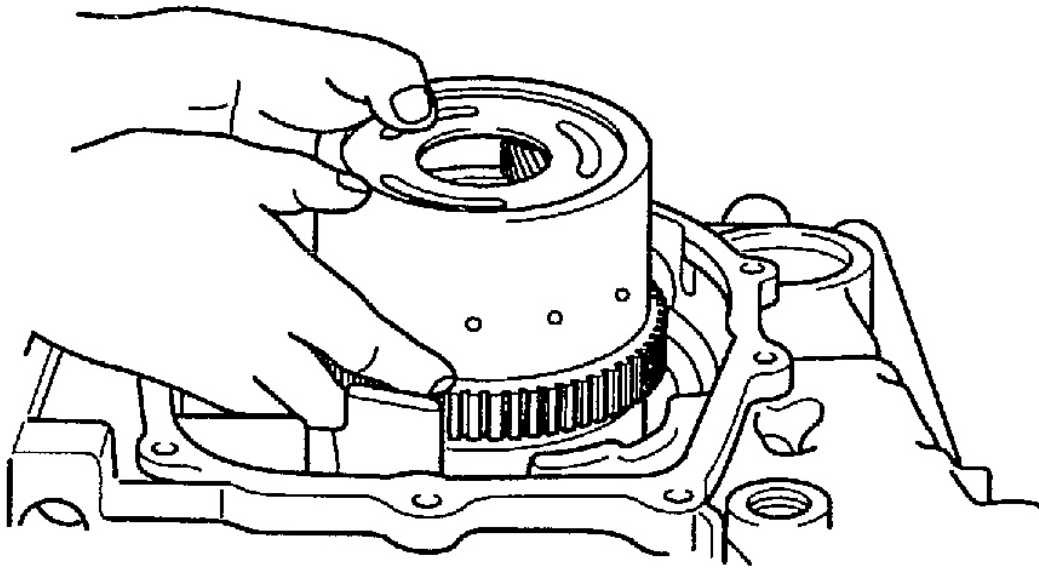
NOTE: Be careful not to reverse the direction of the thrust bearing.



G01092516

Fig. 209: Installing The Output Planetary Carrier And The Thrust Bearing #4
Courtesy of KIA MOTORS AMERICA, INC.

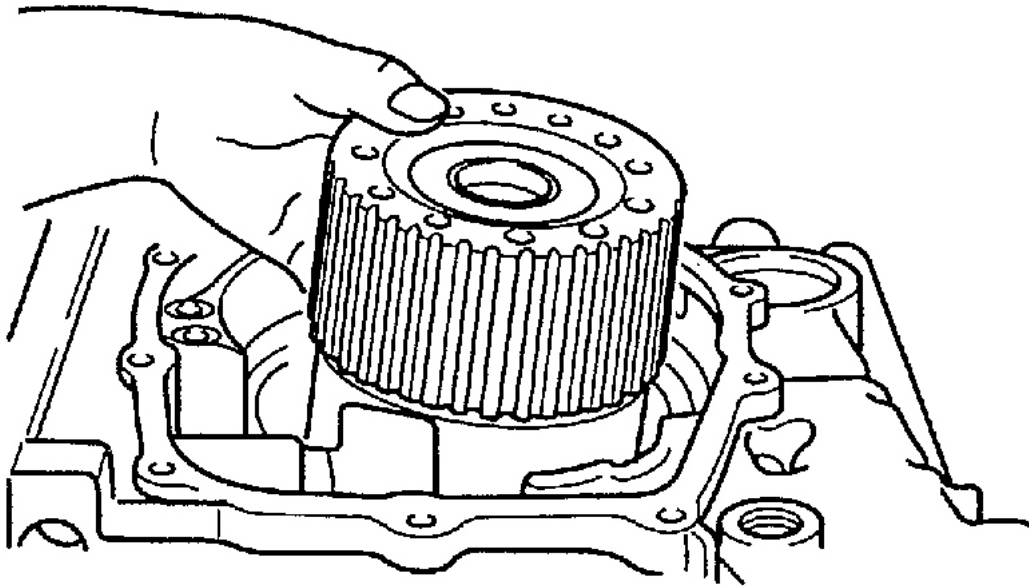
27. Install the overdrive planetary carrier.



G01092517

Fig. 210: Installing The Overdrive Planetary Carrier
Courtesy of KIA MOTORS AMERICA, INC.

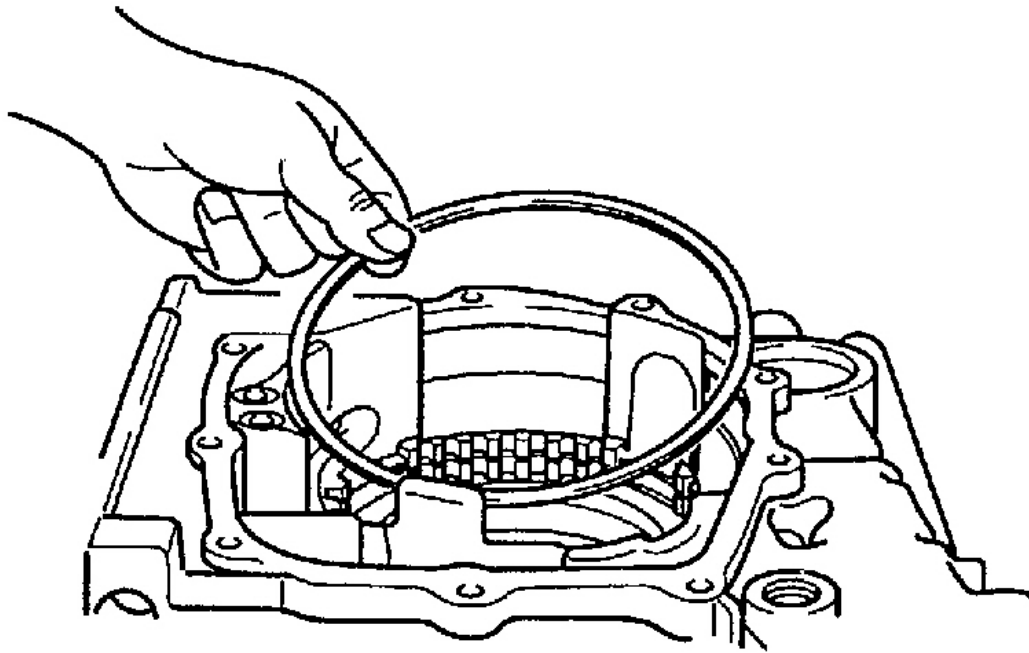
28. Install the planetary gear reverse sun gear.



G01092518

Fig. 211: Installing The Planetary Gear Reverse Sun Gear
Courtesy of KIA MOTORS AMERICA, INC.

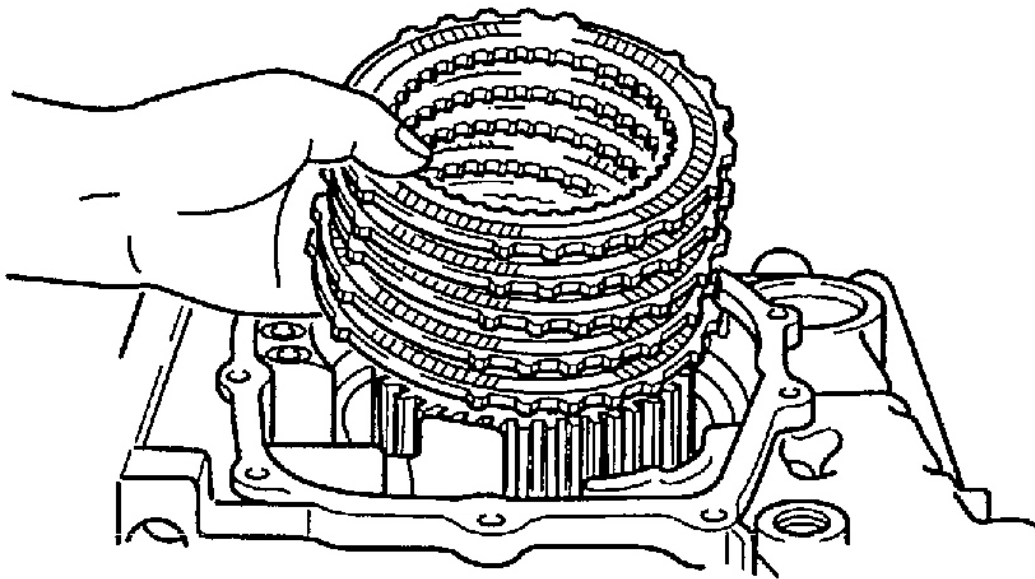
29. Install the wave spring.



G01092519

Fig. 212: Installing The Wave Spring
Courtesy of KIA MOTORS AMERICA, INC.

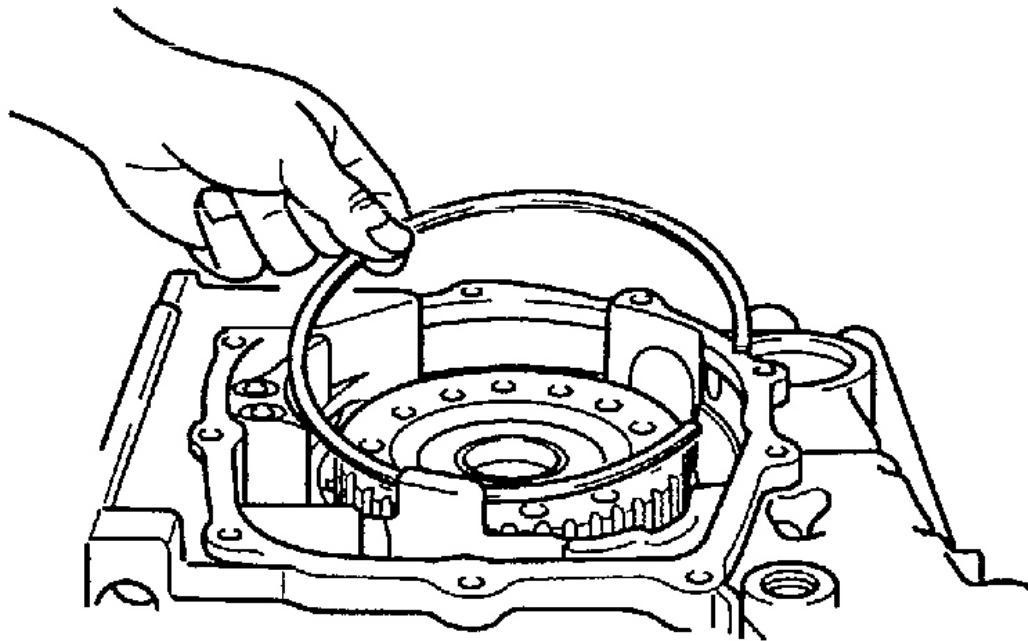
30. Install the pressure plate, the brake disc, and the brake plate.



G01092520

Fig. 213: Installing The Pressure Plate, The Brake Disc, And The Brake Plate
Courtesy of KIA MOTORS AMERICA, INC.

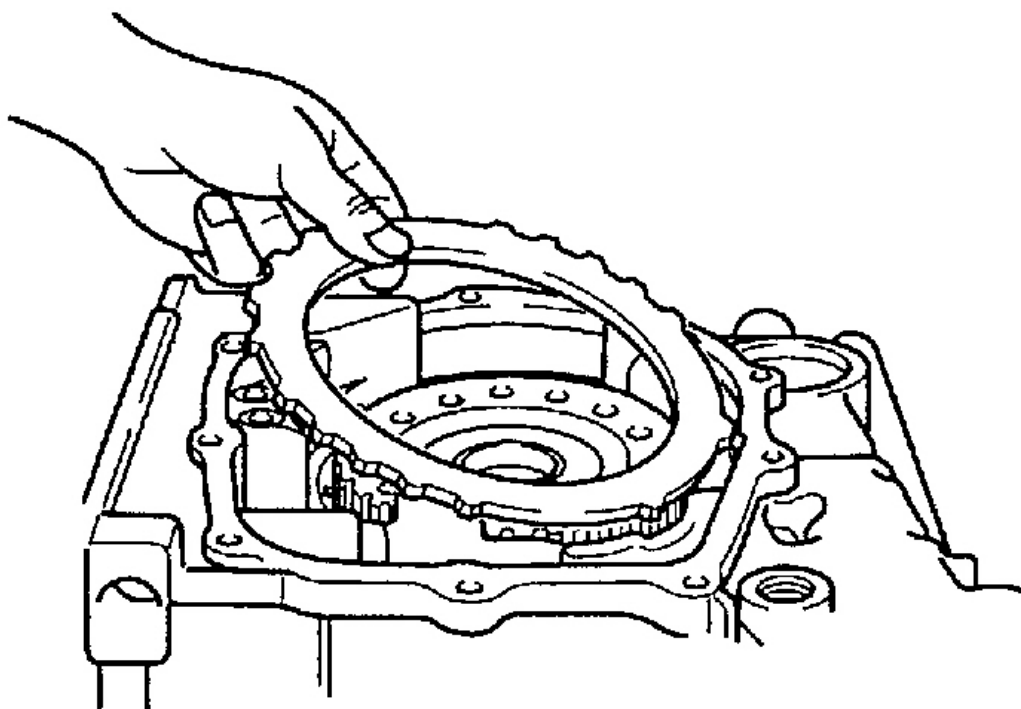
31. Install the snap ring.



G01092521

Fig. 214: Installing The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

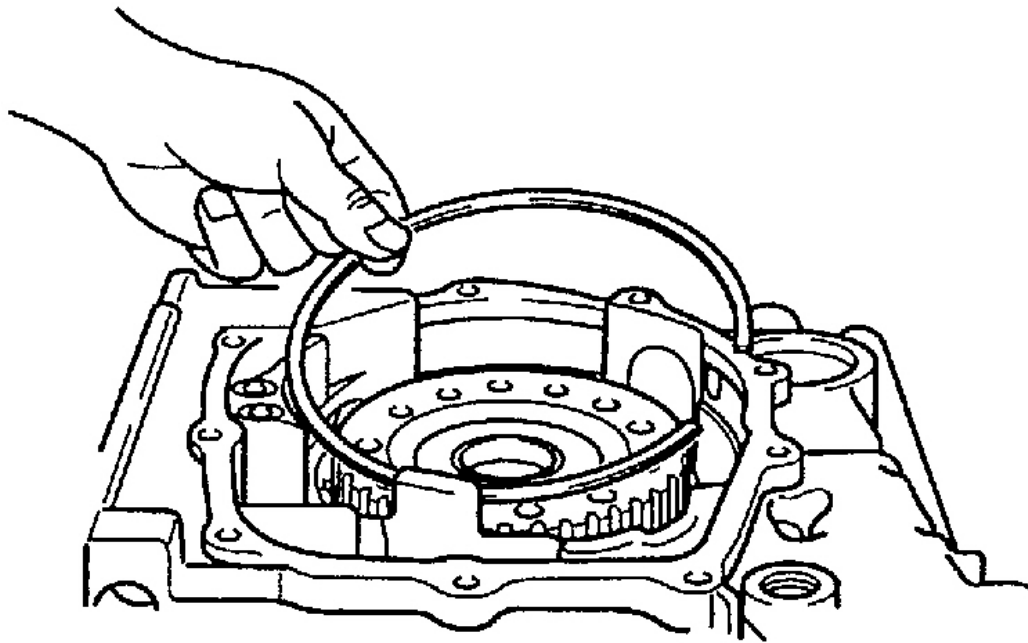
32. Install the reaction plate.



G01092522

Fig. 215: Installing The Reaction Plate
Courtesy of KIA MOTORS AMERICA, INC.

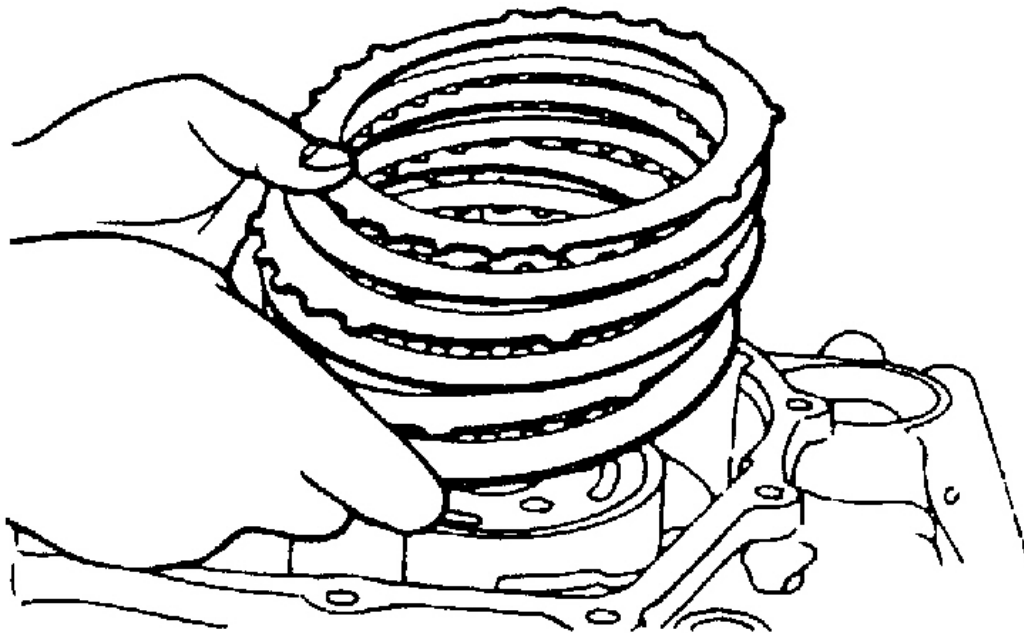
33. Install the snap ring.



G01092523

Fig. 216: Installing The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

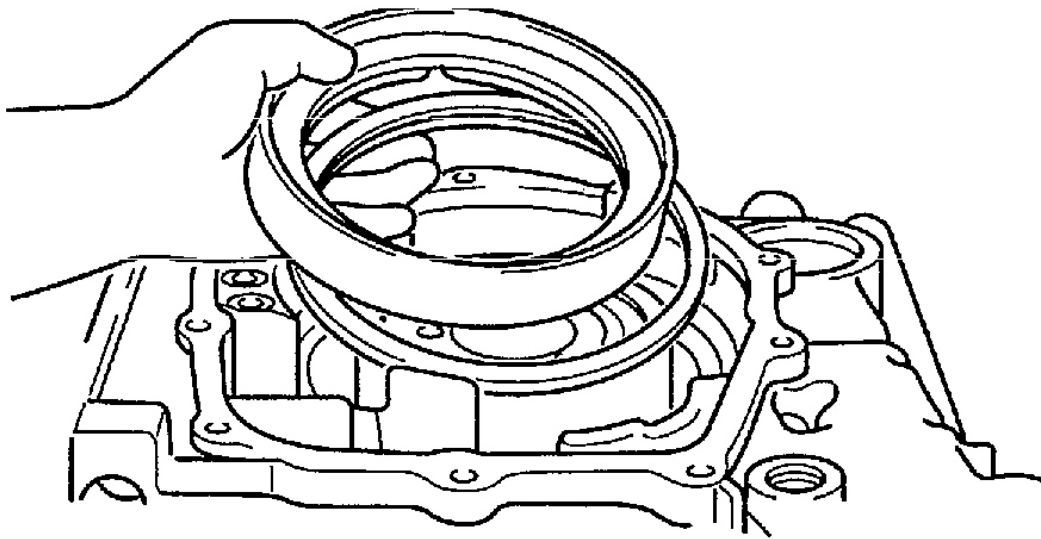
34. Install the brake disc, the brake plate, and the pressure plate.



G01092524

Fig. 217: Installing The Brake Disc, The Brake Plate, And The Pressure Plate
Courtesy of KIA MOTORS AMERICA, INC.

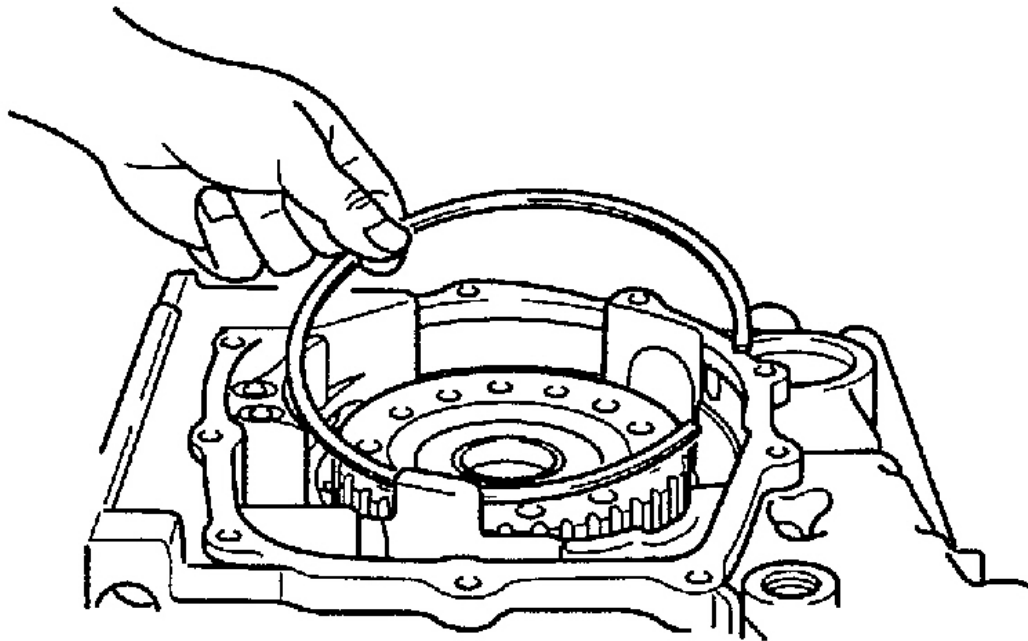
35. Install the return spring and the second brake piston.



G01092525

Fig. 218: Installing The Return Spring And The Second Brake Piston
Courtesy of KIA MOTORS AMERICA, INC.

36. Install the snap ring.

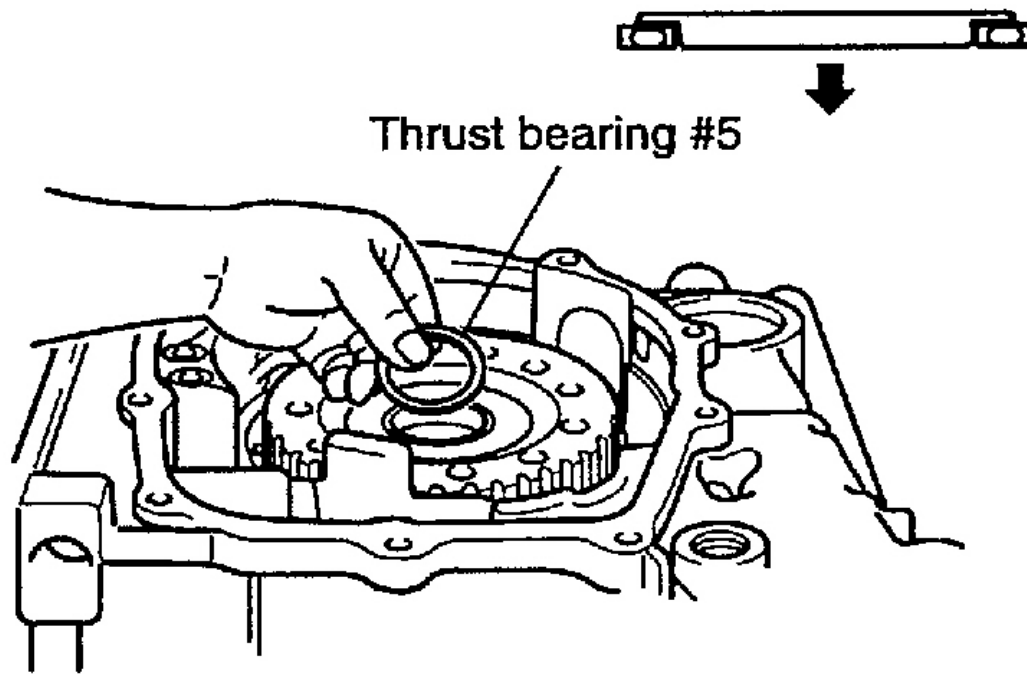


G01092526

Fig. 219: Installing The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

37. Install the thrust bearing #5.

CAUTION: DO NOT reverse the direction of the thrust bearing.

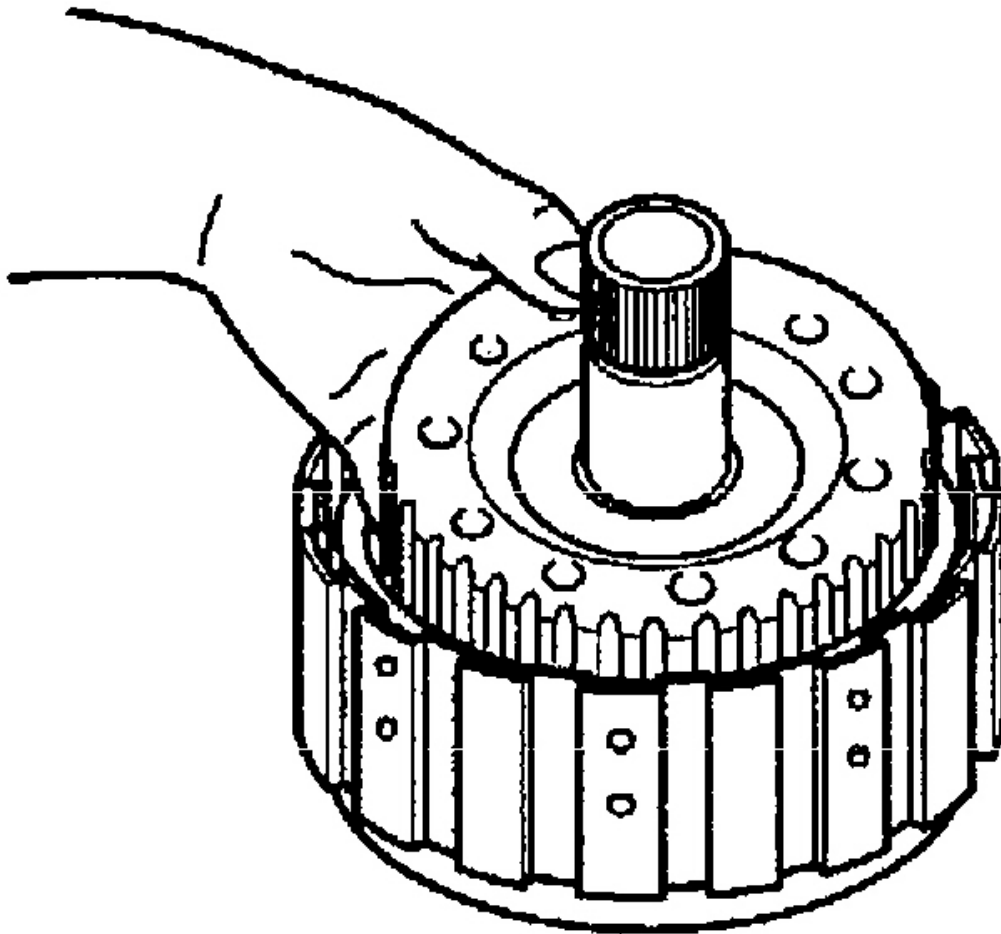


G01092527

Fig. 220: Installing The Thrust Bearing #5
Courtesy of KIA MOTORS AMERICA, INC.

38. Assemble the overdrive clutch hub and the thrust bearing #6 into the reverse & overdrive clutch.

CAUTION: DO NOT reverse the direction of the thrust bearing.

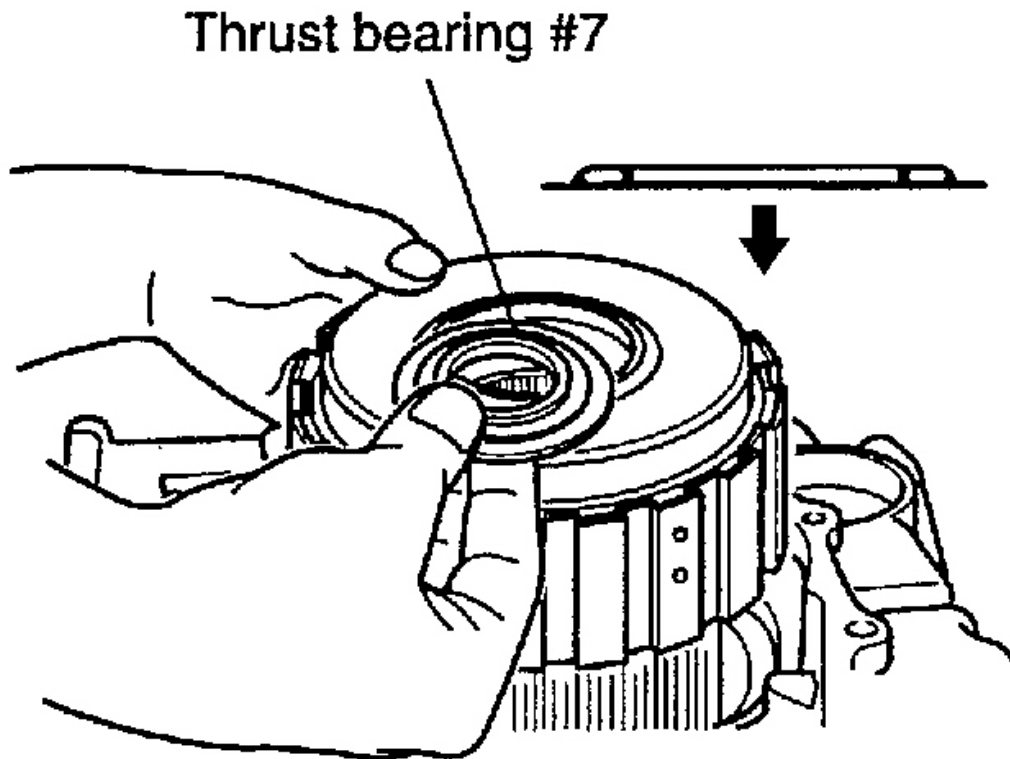


G01092528

Fig. 221: Assembling The Overdrive Clutch Hub
Courtesy of KIA MOTORS AMERICA, INC.

39. Install the reverse and overdrive clutch and the thrust bearing #7.

CAUTION: DO NOT reverse the direction of the thrust bearing.

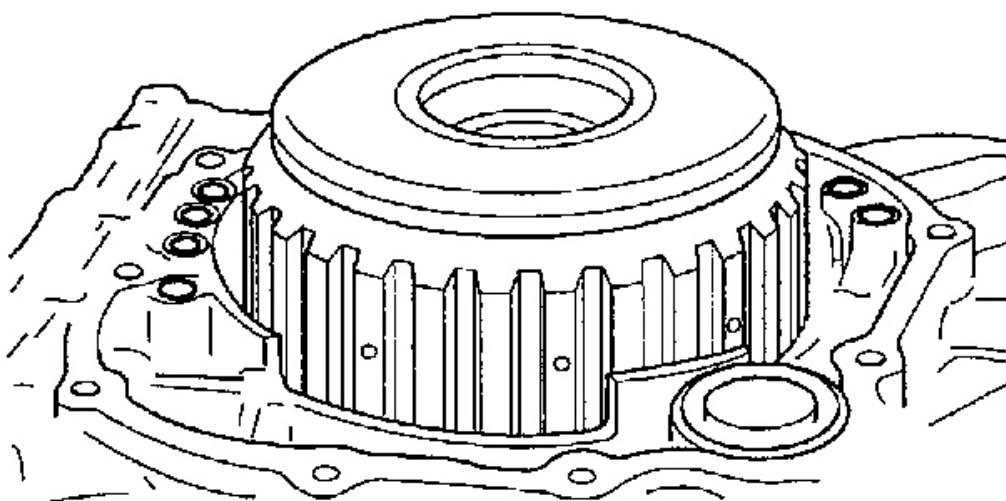


G01092529

Fig. 222: Installing The Reverse And Overdrive Clutch And The Thrust Bearing #7
Courtesy of KIA MOTORS AMERICA, INC.

40. Install the overdrive clutch assembly.

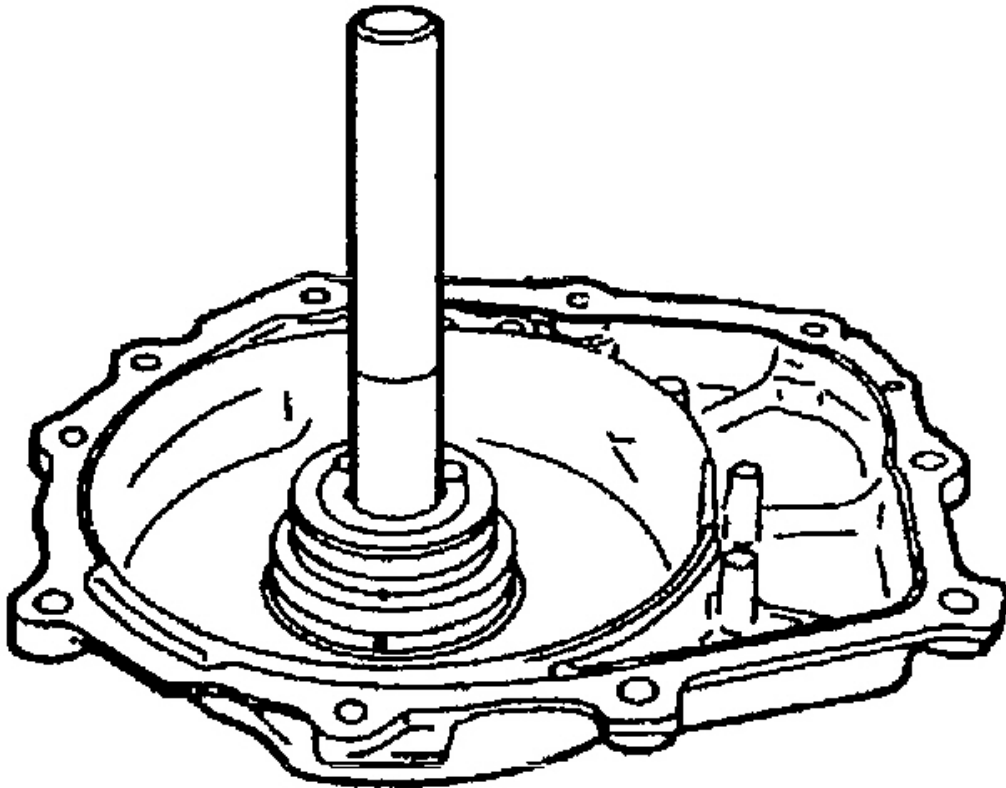
NOTE: Upon correct assembly the clutch retainer hole will match with the case surface.



G01092530

Fig. 223: Installing The Overdrive Clutch Assembly
Courtesy of KIA MOTORS AMERICA, INC.

41. Install O-rings (six).
42. Install the input shaft bearing.



G01092531

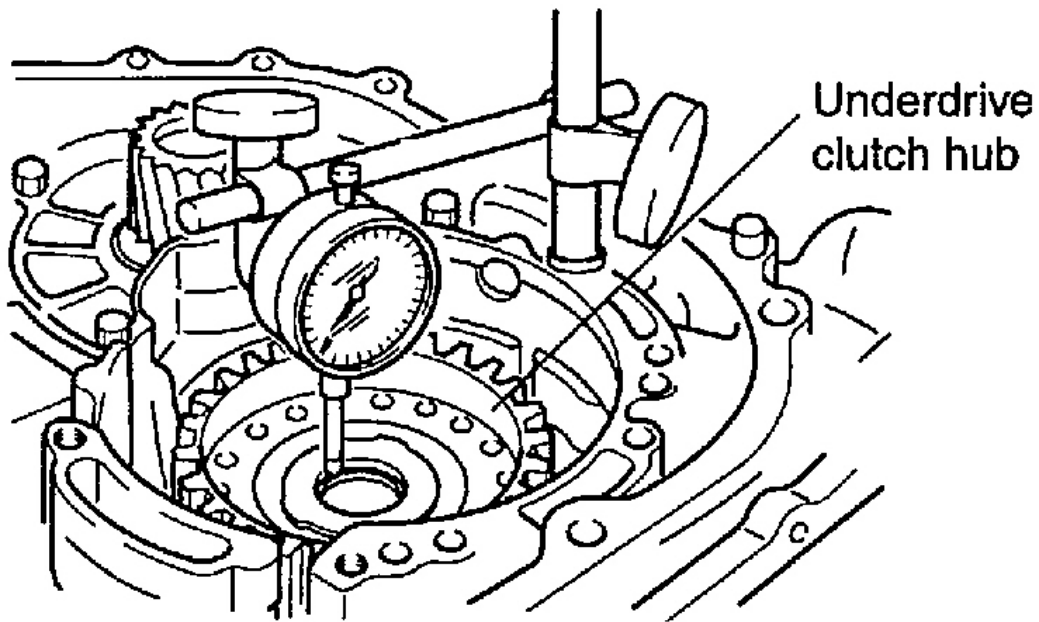
Fig. 224: Installing The Input Shaft Bearing
Courtesy of KIA MOTORS AMERICA, INC.

43. Install the seal rings (four).
44. Insert the used thrust bearing #8 and install the rear cover.

NOTE: **Rear cover will be installed in order to check the underdrive sun gear gap.**

45. Measure the underdrive sun gear end play. Choose the installed thrust race in the order of standard value, and install it.

Standard value: 0.0098-0.0177 in. (0.25-0.45mm)

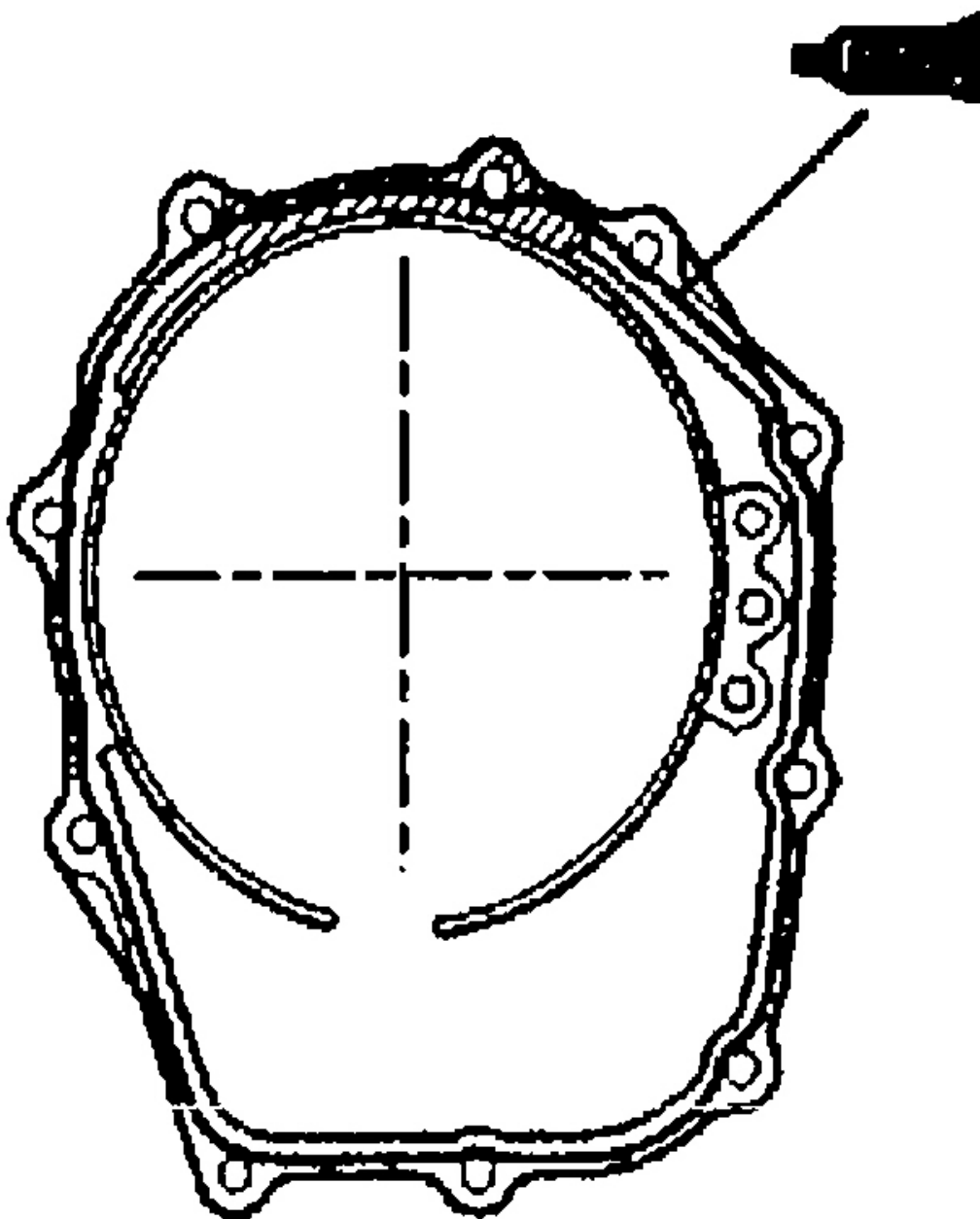


G01092532

Fig. 225: Measuring The Underdrive Sun Gear End Play
Courtesy of KIA MOTORS AMERICA, INC.

46. Continue to apply liquid gasket at application points at the rear cover with 01.6 mm thickness.

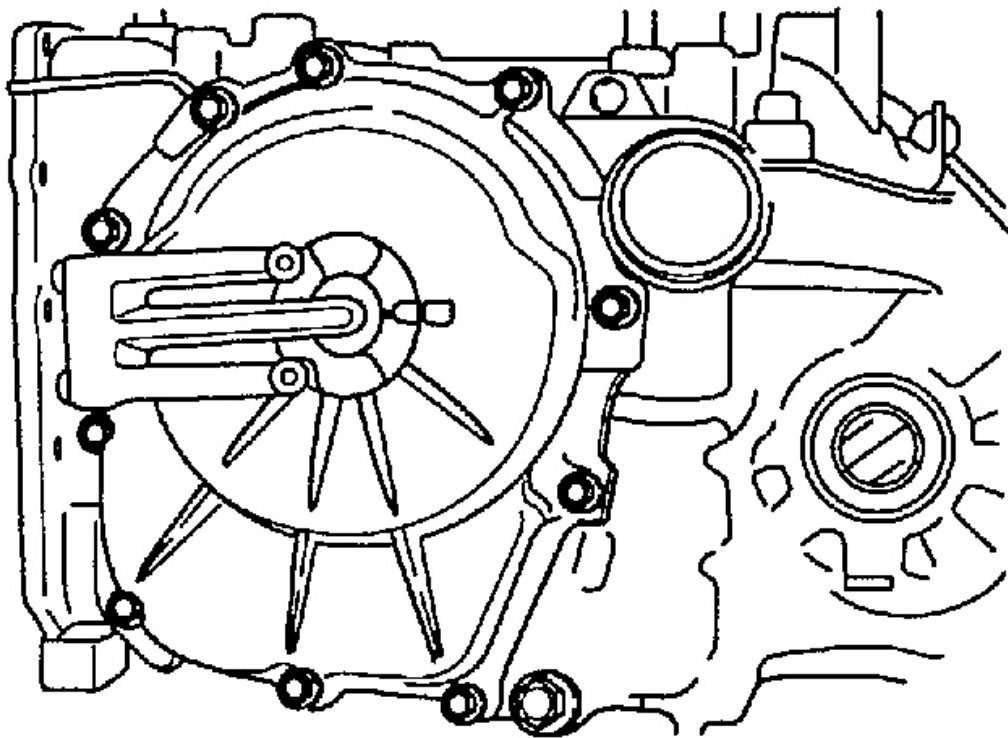
Liquid gasket part name: Threebond 1281B or LOCTITE FMD546



G01092533

Fig. 226: Applying Liquid Gasket
Courtesy of KIA MOTORS AMERICA, INC.

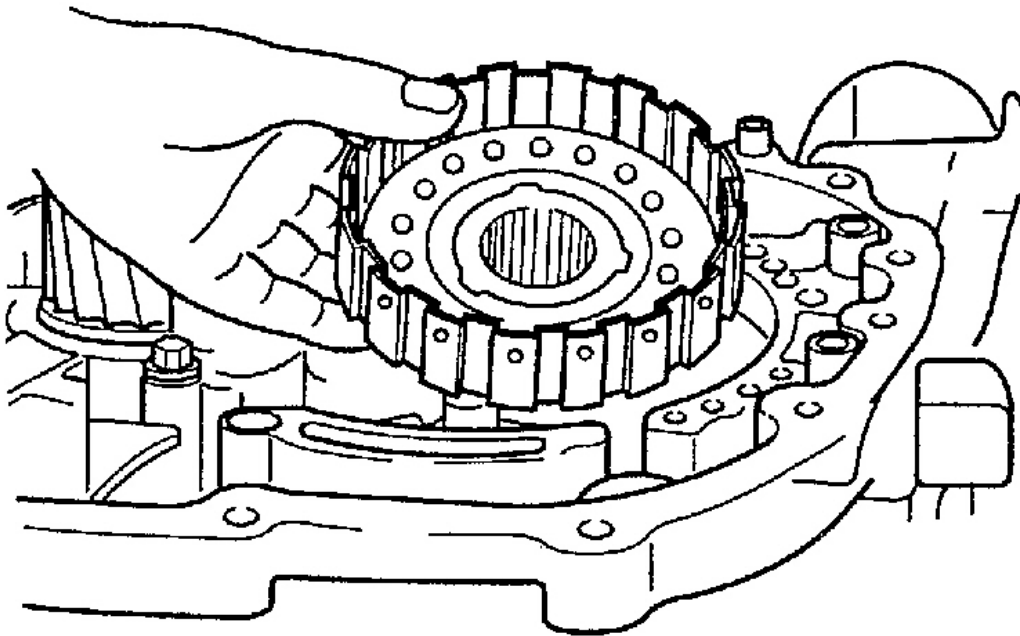
47. Install the rear cover and tighten it with tightening torque.



G01092534

Fig. 227: Installing The Rear Cover
Courtesy of KIA MOTORS AMERICA, INC.

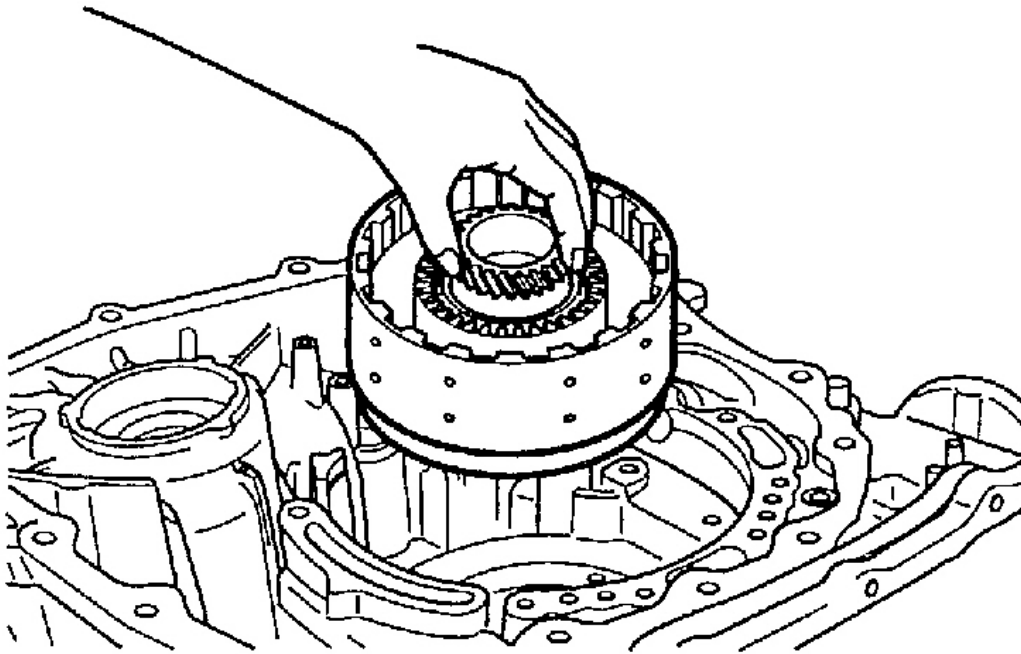
48. Install the underdrive clutch hub.



G01092535

Fig. 228: Installing The Underdrive Clutch Hub
Courtesy of KIA MOTORS AMERICA, INC.

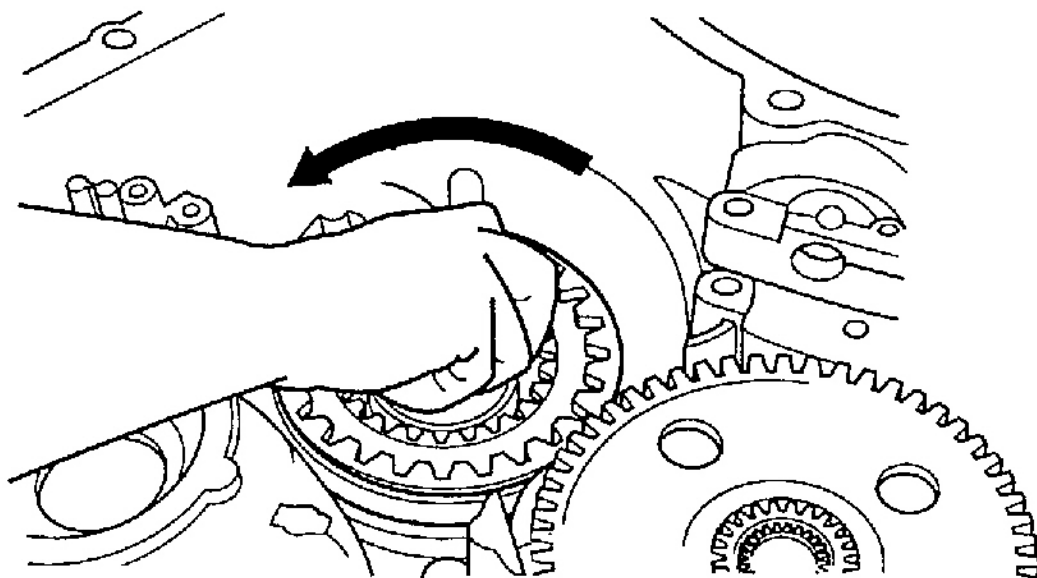
49. Install the director clutch assembly.
50. Install the reduction brake band.



G01092536

Fig. 229: Installing The Reduction Brake Band
Courtesy of KIA MOTORS AMERICA, INC.

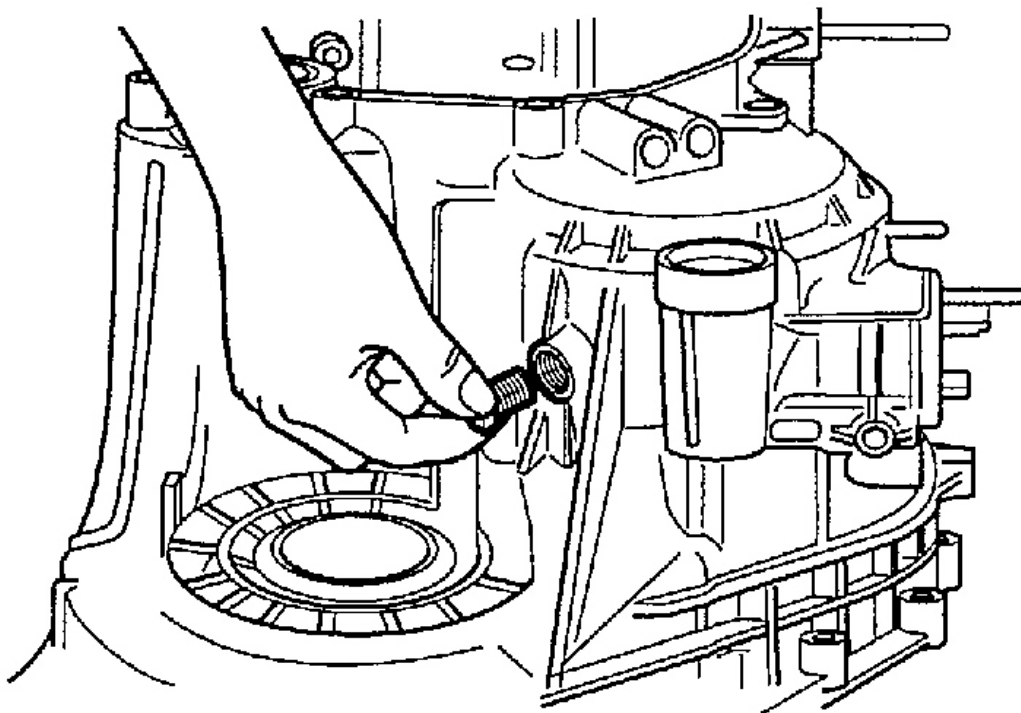
NOTE: Turn the direct clutch counterclockwise to install.



G01092537

Fig. 230: Turn The Direct Clutch Counterclockwise To Install
Courtesy of KIA MOTORS AMERICA, INC.

51. Insert the anchor plug with hand matching into the reduction brake band hole.



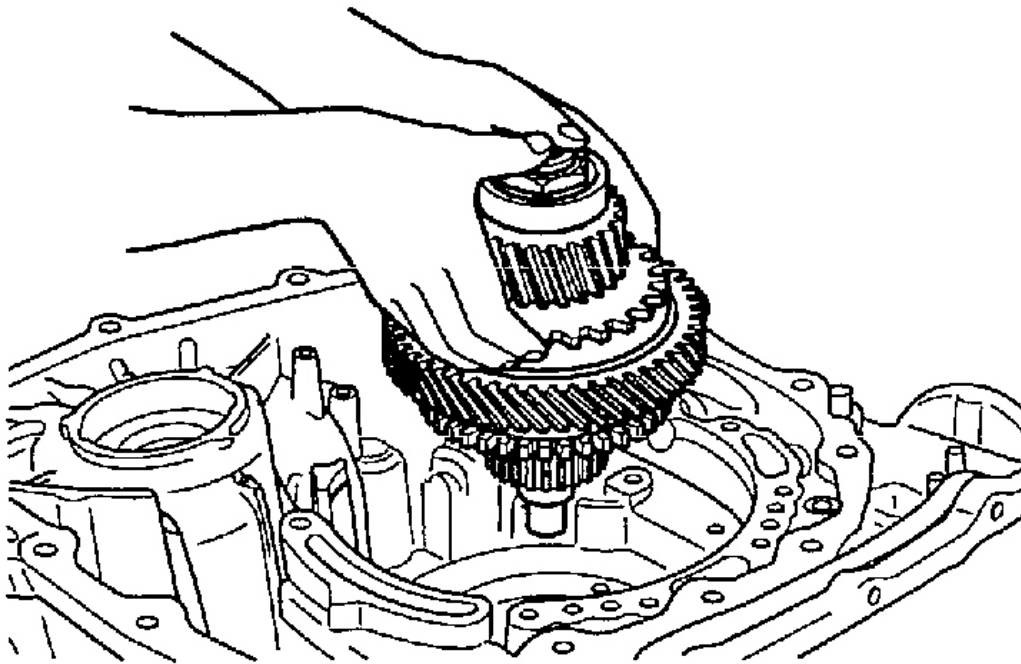
G01092538

Fig. 231: Inserting The Anchor Plug With Hand Matching Into The Reduction Brake Band Hole
Courtesy of KIA MOTORS AMERICA, INC.

52. Install the director planetary carrier assembly.

NOTE: Look into the hole where output speed sensor will be installed, in order to check if direct planetary carrier assembly is seated correctly.

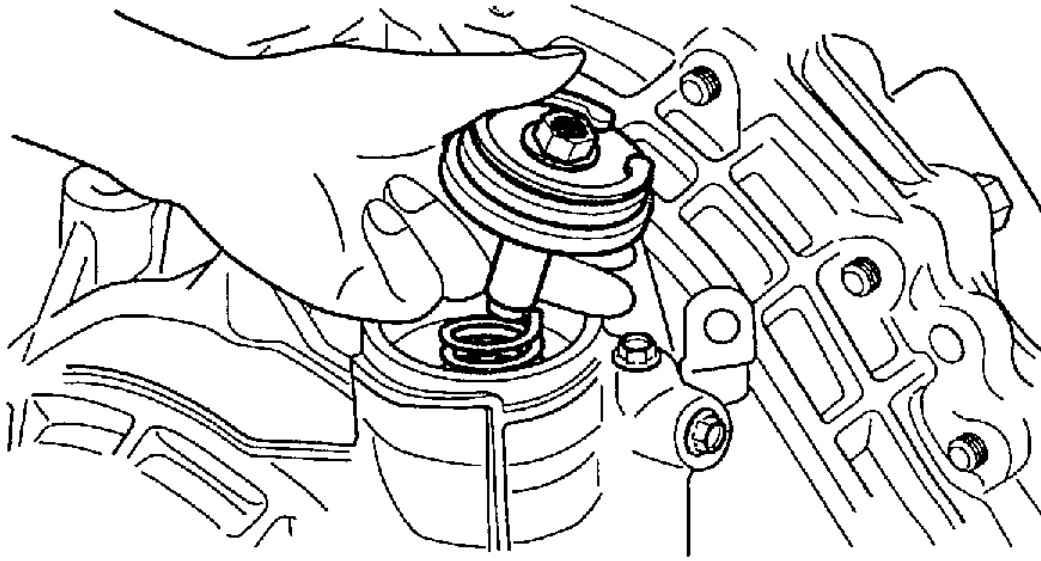
CAUTION: On moving the transaxle case, be careful that the director assembly do not slide out.



G01092539

Fig. 232: Installing The Director Planetary Carrier Assembly
Courtesy of KIA MOTORS AMERICA, INC.

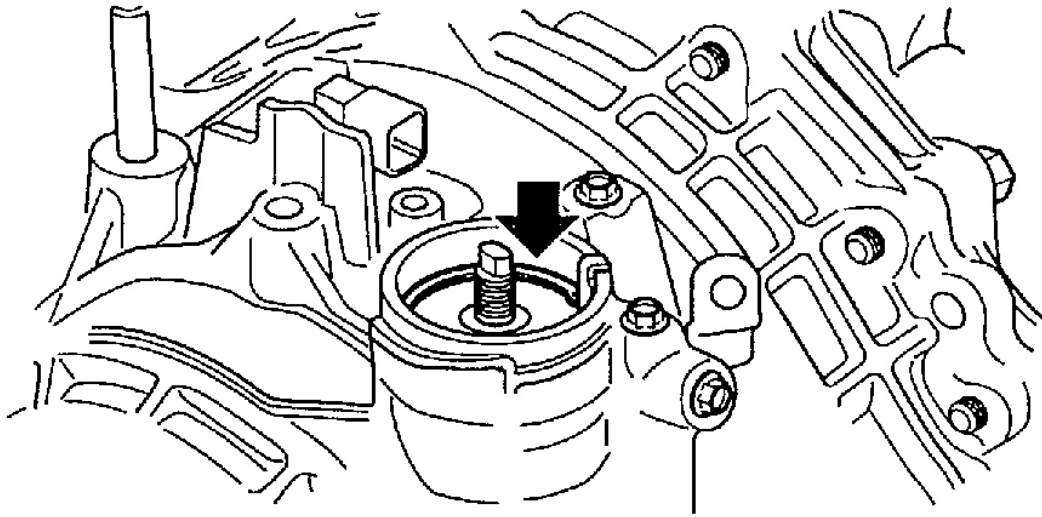
53. Install the spring and reduction brake piston assembly.



G01092540

Fig. 233: Installing The Spring And Reduction Brake Piston Assembly
Courtesy of KIA MOTORS AMERICA, INC.

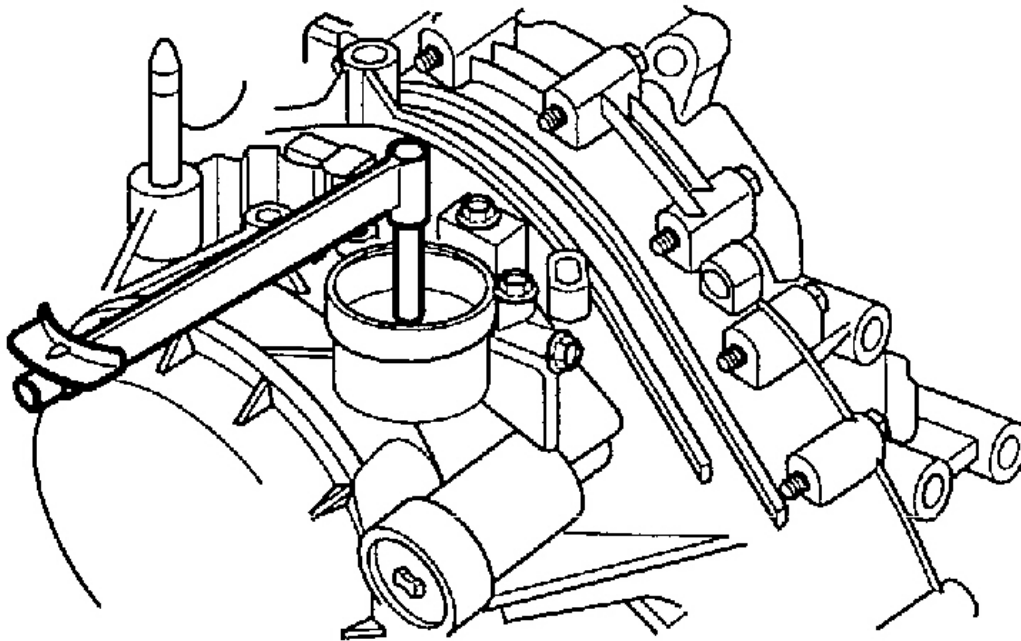
54. Adjust the reduction brake band in the following procedure:
 1. Install the reduction brake piston snap ring.



G01092541

Fig. 234: Installing The Reduction Brake Piston Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

2. Hold the reduction brake piston not to turn and tighten and release the adjustor rod 2 times with tightening torque (100 kg.cm).
3. Tighten with 50 kg.cm torque again and release 5.5-5.75 times.

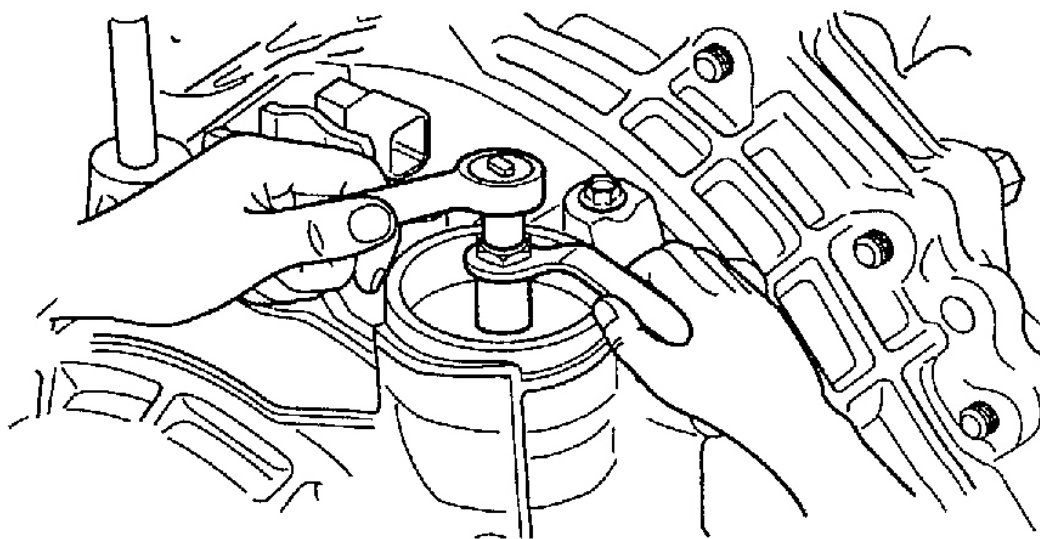


G01092542

Fig. 235: Tightening Reduction Brake Piston To Specification
Courtesy of KIA MOTORS AMERICA, INC.

4. Tighten the reduction brake piston rod holding nut with tightening torque.

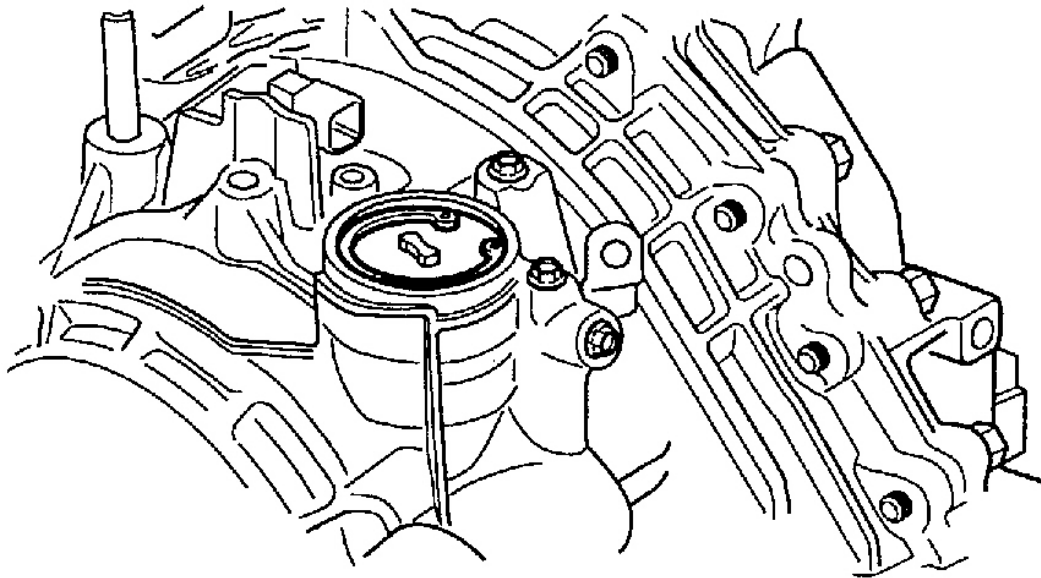
Tightening torque: 14.7-21.6 N.m (150-220 kg.Cm, 10.8-15.9 lb.ft)



G01092543

Fig. 236: Tightening Reduction Brake Piston Holding Rod & Nut
Courtesy of KIA MOTORS AMERICA, INC.

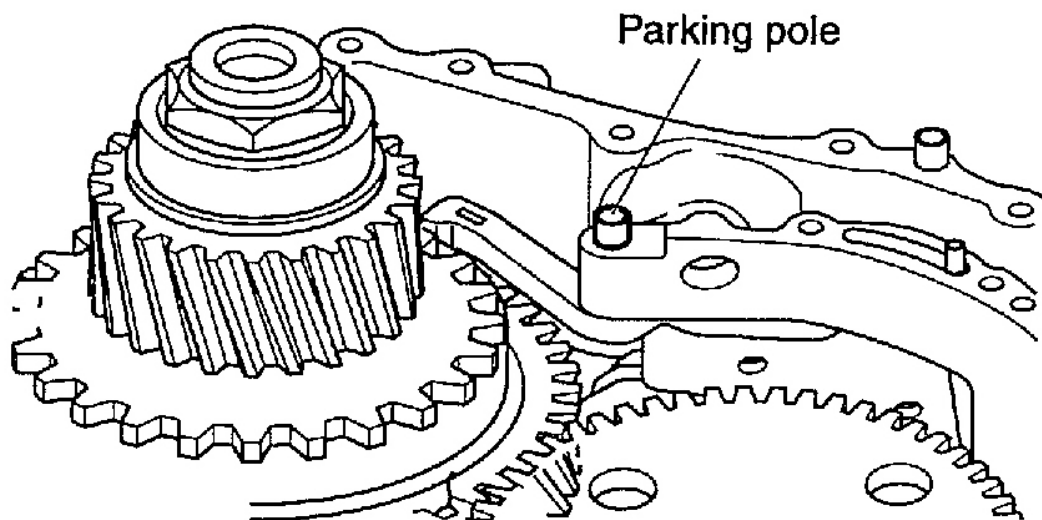
55. Install the outer reduction brake piston and the snap ring.



G01092544

Fig. 237: Installing The Outer Reduction Brake Piston And The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

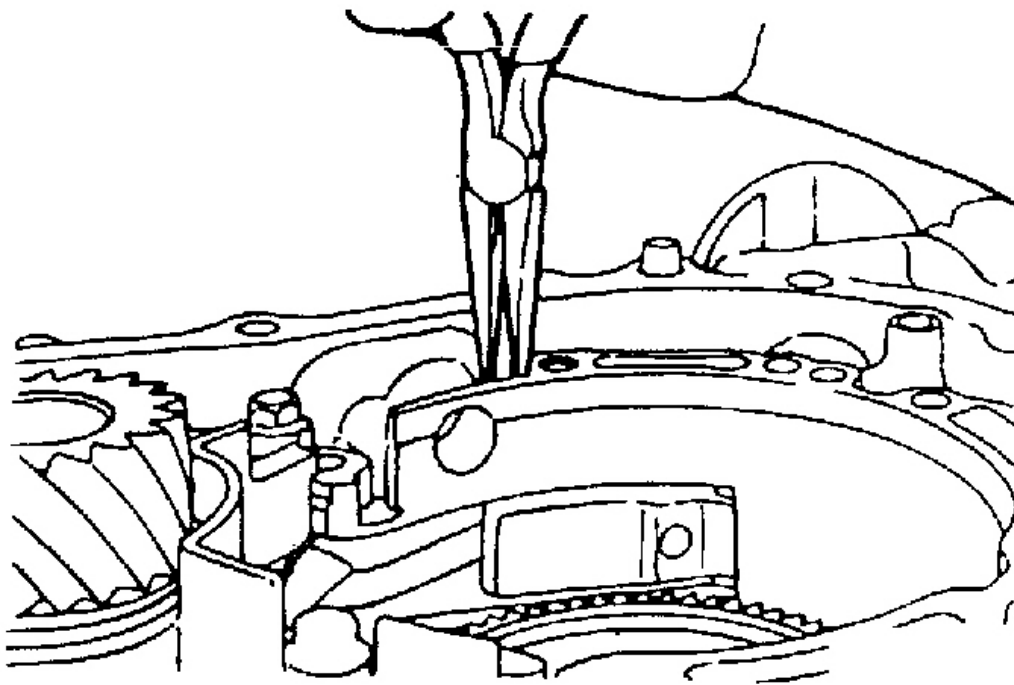
56. Install the parking pole, the spacer and the spring and then the parking pole shaft.



G01092545

Fig. 238: Installing The Parking Pole, The Spacer And The Spring And Then The Parking Pole Shaft
Courtesy of KIA MOTORS AMERICA, INC.

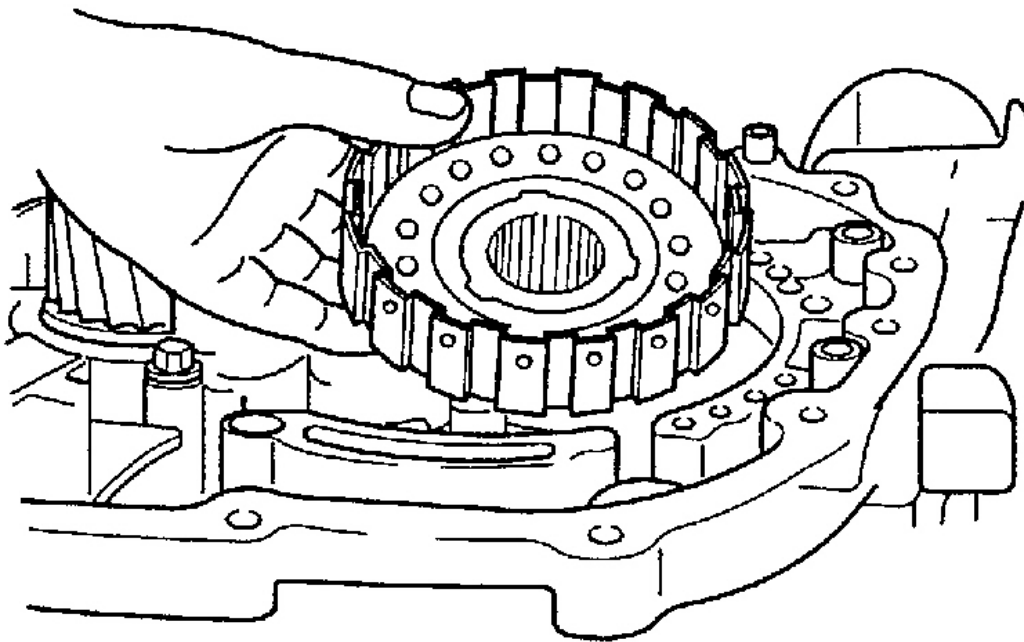
57. Install the parking roller support and the roller shafts (two).



G01092546

Fig. 239: Installing The Parking Roller Support And The Roller Shafts
Courtesy of KIA MOTORS AMERICA, INC.

58. Install the underdrive clutch hub.

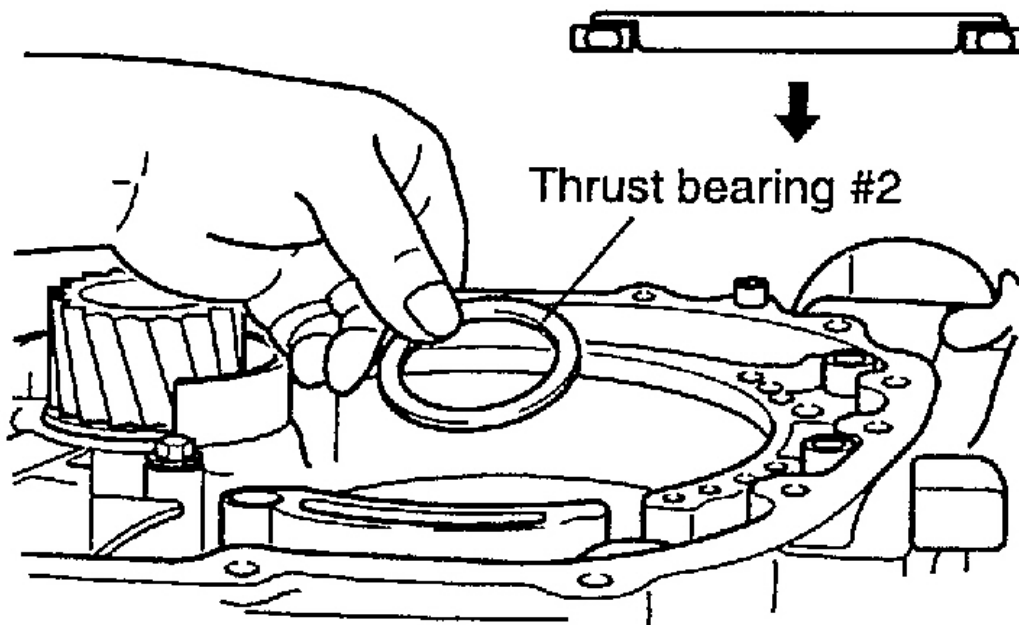


G01092547

Fig. 240: Installing The Underdrive Clutch Hub
Courtesy of KIA MOTORS AMERICA, INC.

59. Install the thrust bearing #2.

CAUTION: DO NOT reverse the direction of the thrust bearing.

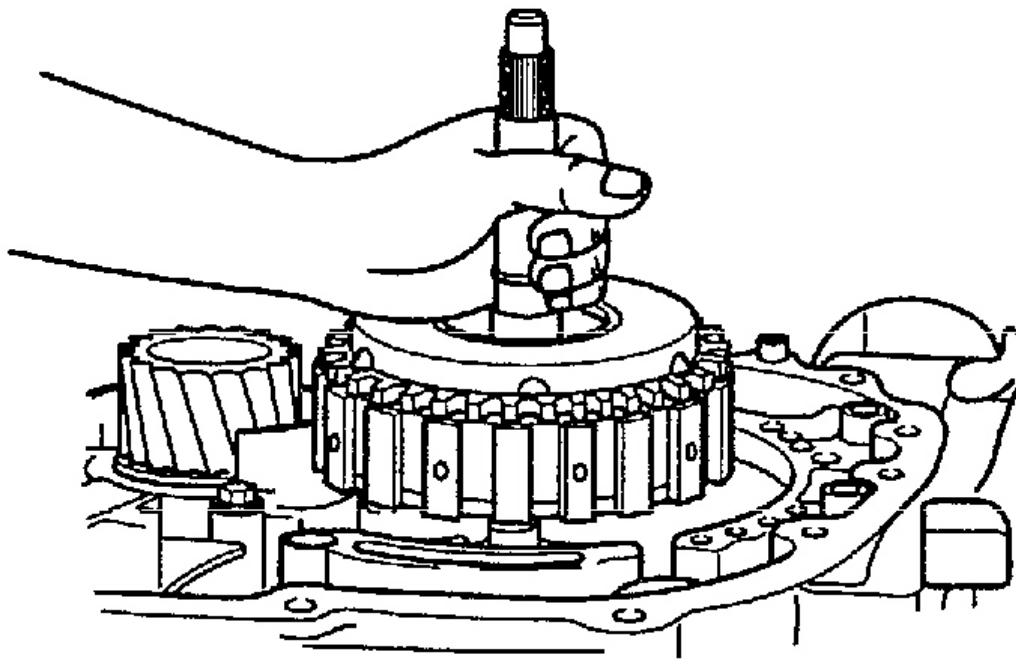


G01092548

Fig. 241: Installing The Thrust Bearing #2
Courtesy of KIA MOTORS AMERICA, INC.

60. Hold the input shaft and install the underdrive clutch.

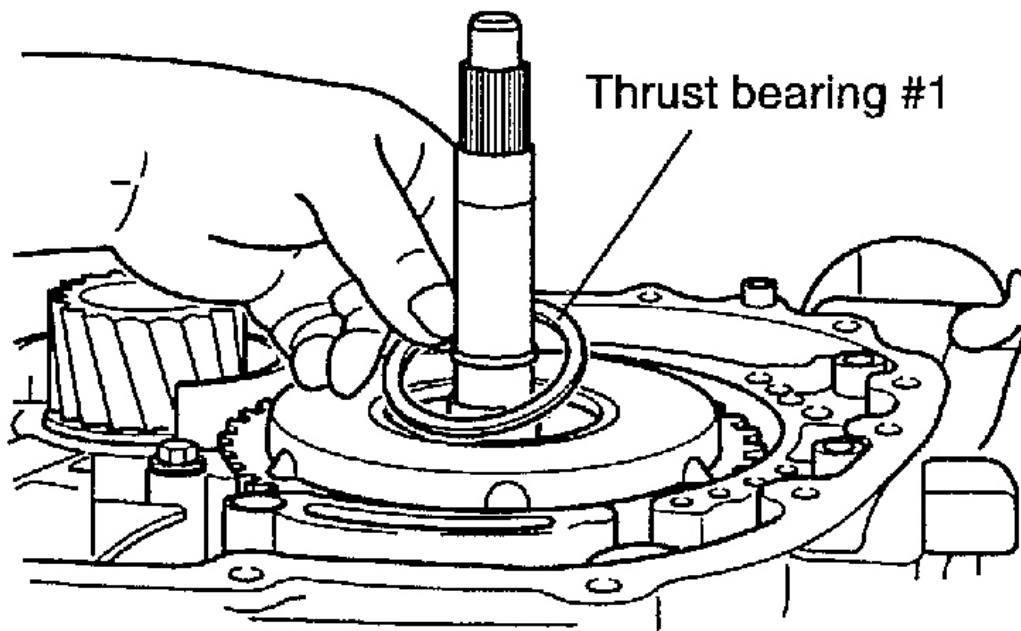
NOTE: Look into the hole where the output speed sensor will be installed, in order to check if direct planetary carrier assembly is seated correctly.



G01092549

Fig. 242: Installing The Underdrive Clutch
Courtesy of KIA MOTORS AMERICA, INC.

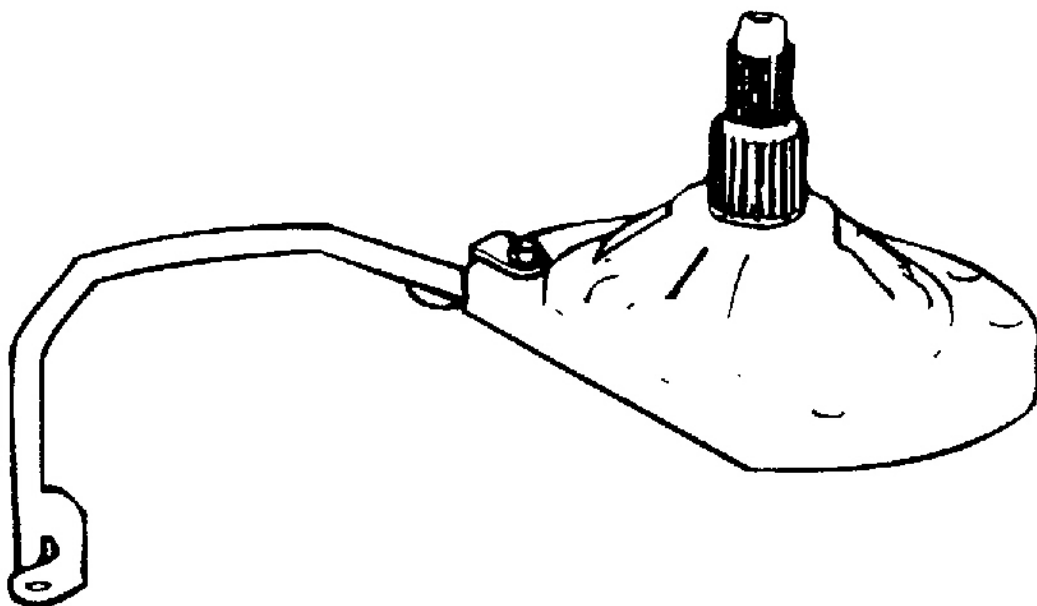
61. Install the used thrust washer #1.



G01092550

Fig. 243: Installing The Used Thrust Washer #1
Courtesy of KIA MOTORS AMERICA, INC.

62. Connect the pipe to the fluid pump.

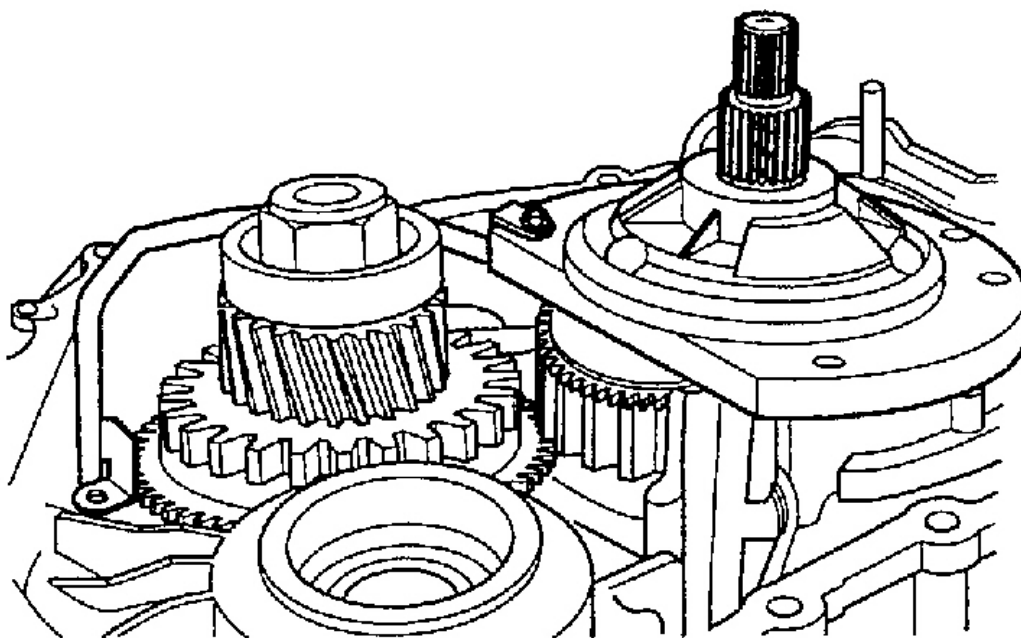


G01092551

Fig. 244: Connecting The Pipe To The Fluid Pump
Courtesy of KIA MOTORS AMERICA, INC.

63. Install the new fluid pump gasket and the oil pump assembly.

CAUTION: DO NOT reuse used gasket.



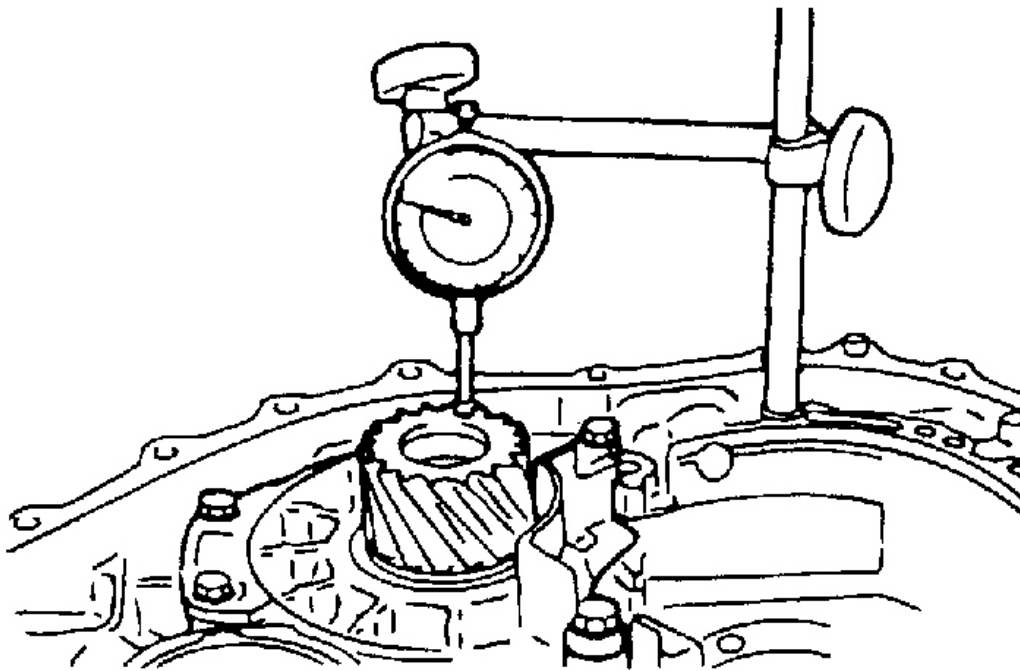
G01092552

Fig. 245: Installing The New Fluid Pump Gasket And The Oil Pump Assembly
Courtesy of KIA MOTORS AMERICA, INC.

64. Tighten the fluid pump mounting bolt with tightening torque.
65. Check the input shaft end play and install the appropriate thrust washer. For installation of proper thrust washer, return to 61 .

Standard range

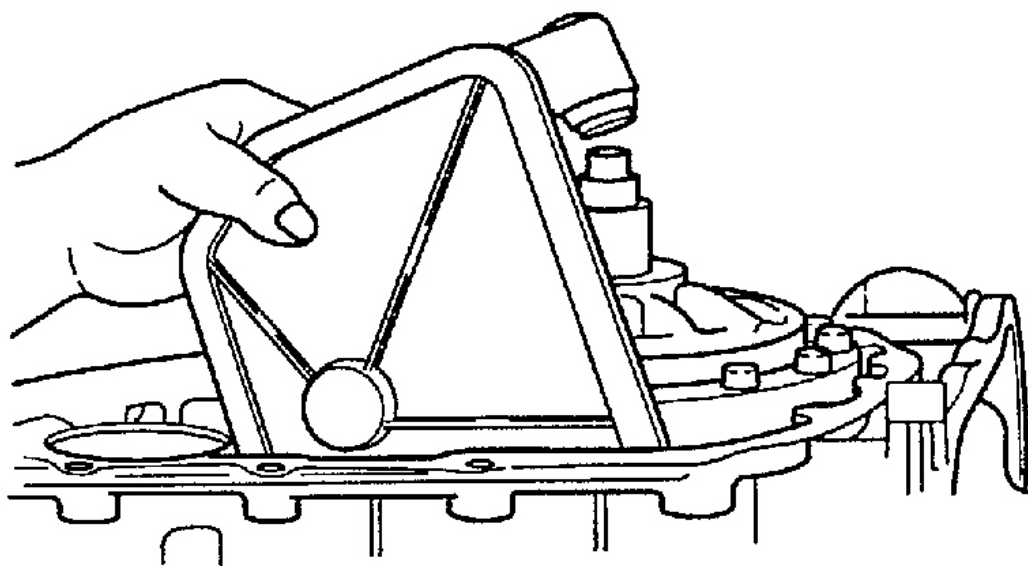
F5A51-3: 0.027-0.057 in. (0.70-1.45mm)



G01092553

Fig. 246: Measuring Input Shaft End Play
Courtesy of KIA MOTORS AMERICA, INC.

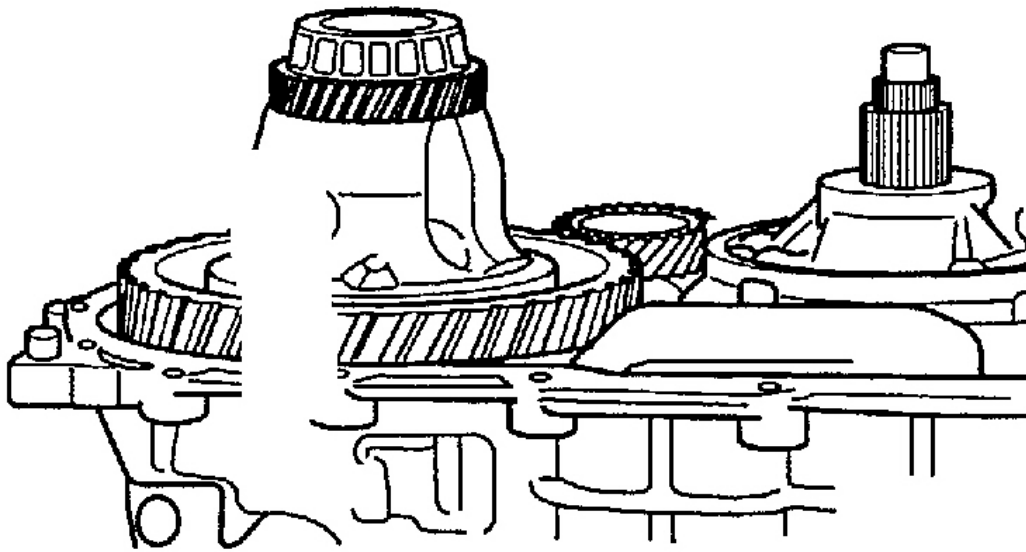
66. Install the main fluid filter.



G01092554

Fig. 247: Installing The Main Fluid Filter
Courtesy of KIA MOTORS AMERICA, INC.

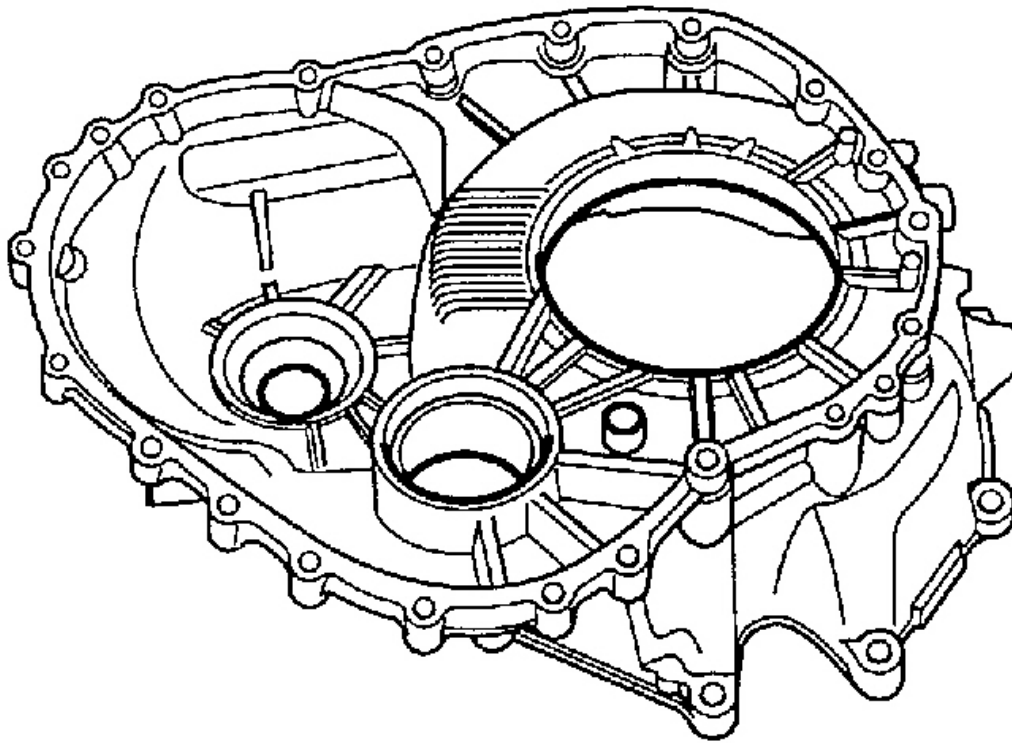
67. Install the differential assembly.



G01092555

Fig. 248: Installing The Differential Assembly
Courtesy of KIA MOTORS AMERICA, INC.

68. Install 3 solders of length approx 0.39 in (10mm) and thickness 0.12 in (3mm) on the torque converter housing at positions illustrated on **Fig. 249** .

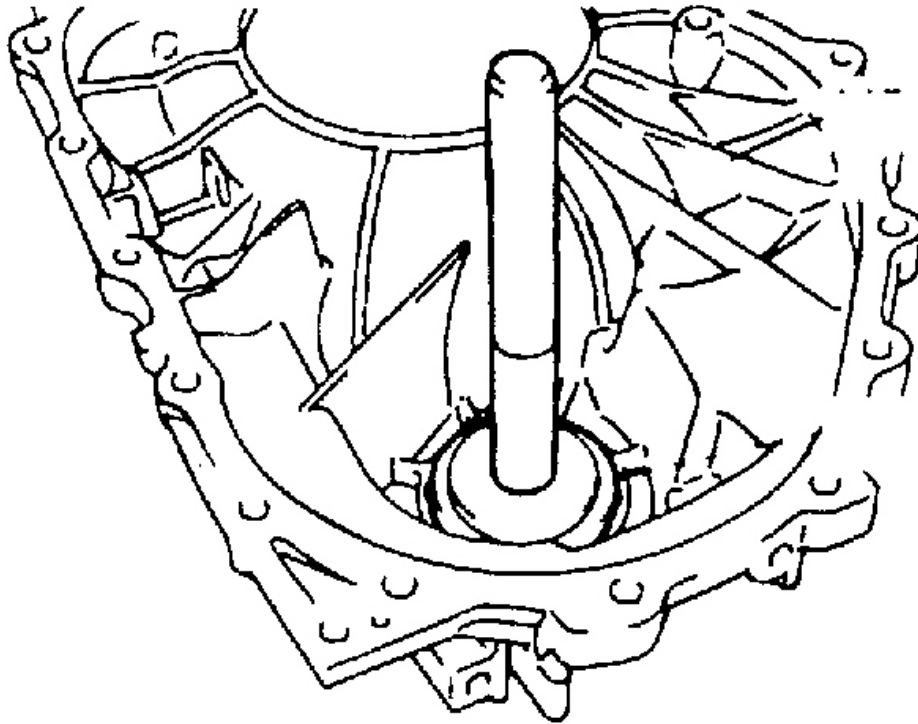


G01092556

Fig. 249: Installing Solders

Courtesy of KIA MOTORS AMERICA, INC.

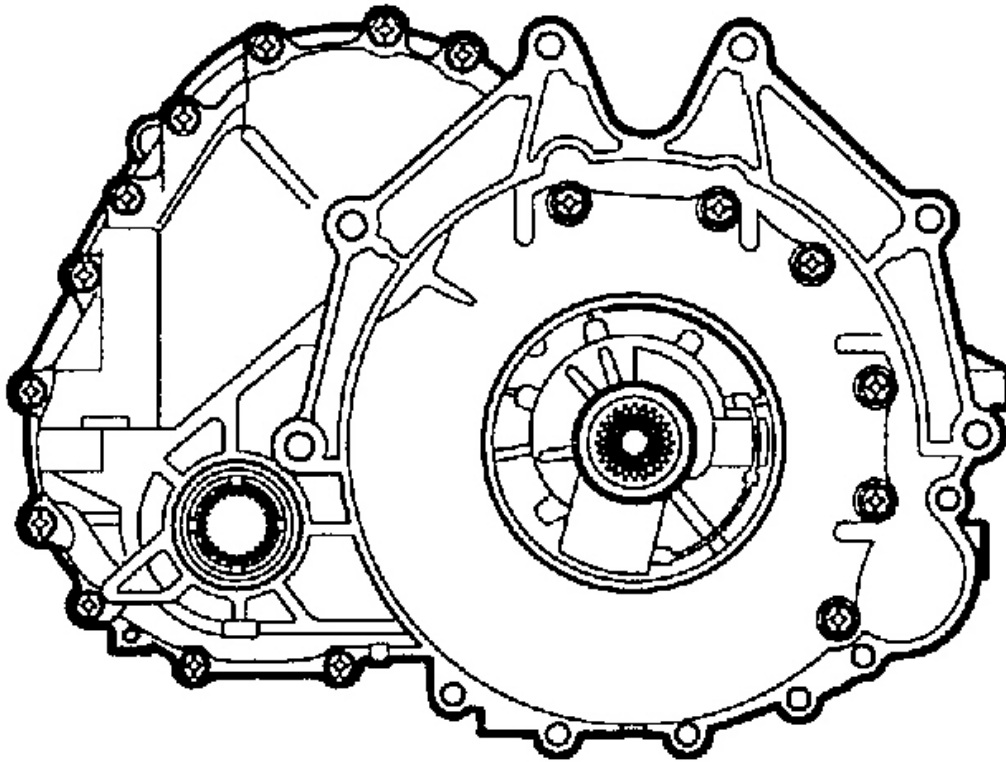
69. Hit output race into the housing using the special tool.



G01092557

Fig. 250: Installing Output Race
Courtesy of KIA MOTORS AMERICA, INC.

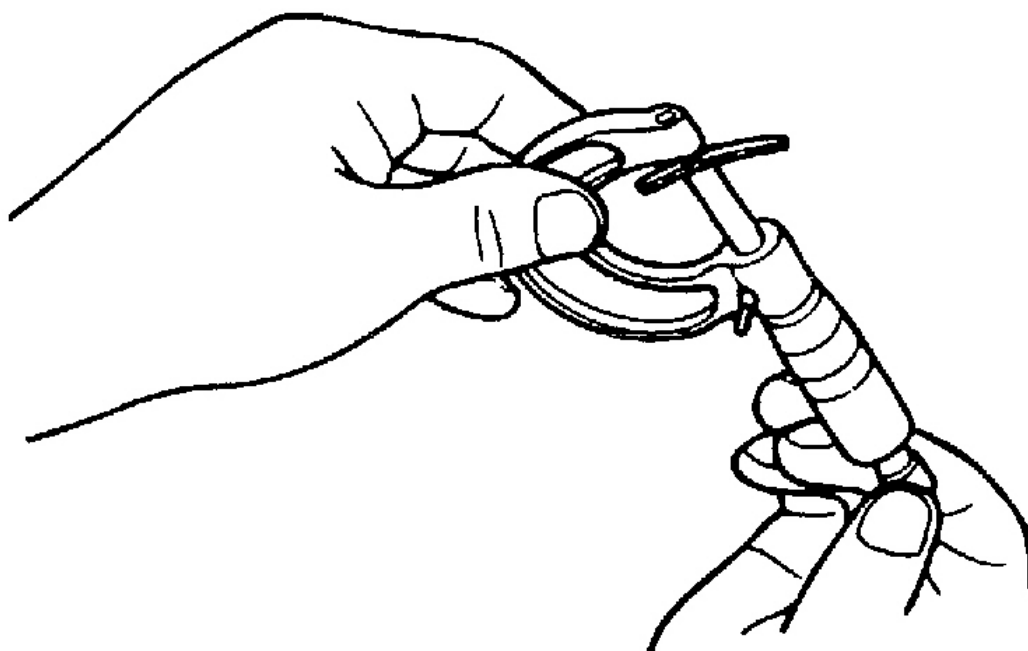
70. Install the torque converter housing onto the transaxle case without applying sealing material and tighten with tightening torque.



G01092558

Fig. 251: Installing The Torque Converter Housing Onto The Transaxle Case
Courtesy of KIA MOTORS AMERICA, INC.

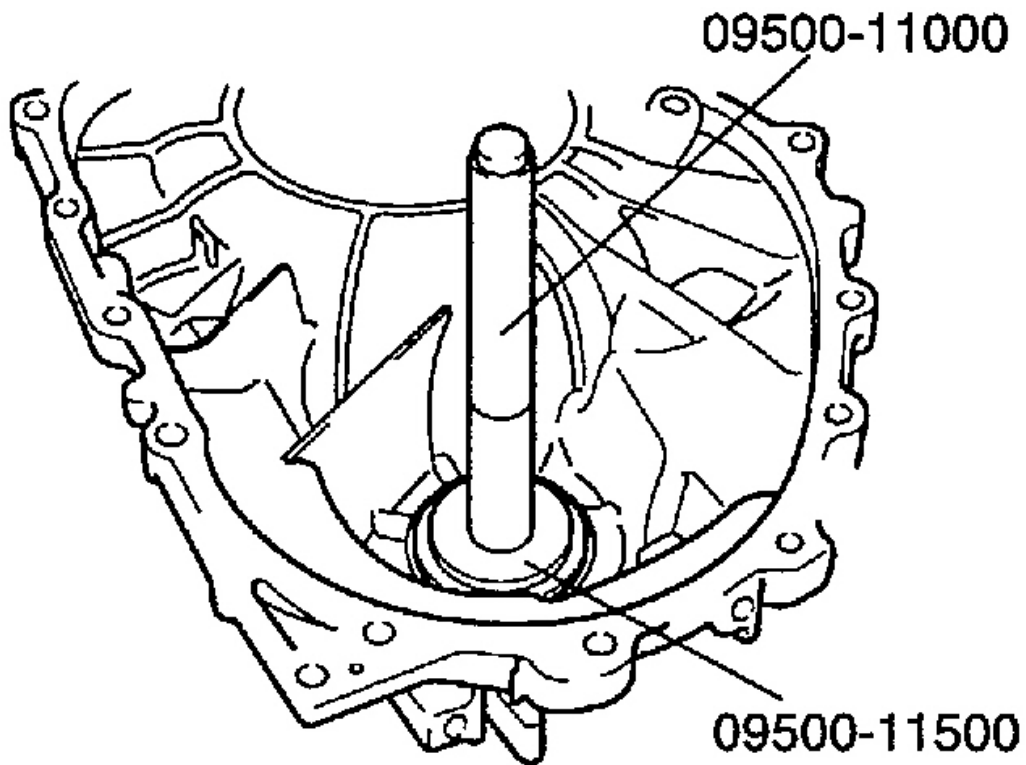
71. Release the bolts and remove the solders.
72. Measure the solder thickness with a micrometer and choose a spacer using the formula: $(T+0.0022 \text{ in } (0.056 \text{ mm}) - (T+0.0041 \text{ in } (0.105 \text{ mm})). T \text{ equals thickness.}$



G01092559

Fig. 252: Measuring The Solder Thickness
Courtesy of KIA MOTORS AMERICA, INC.

73. Install the spacer chosen at procedure 70 on the converter housing. Tap the output race into it using the special tool.



G01092560

Fig. 253: Installing The Output Race
Courtesy of KIA MOTORS AMERICA, INC.

74. Install the driveshaft oil seal on the torque converter housing case.

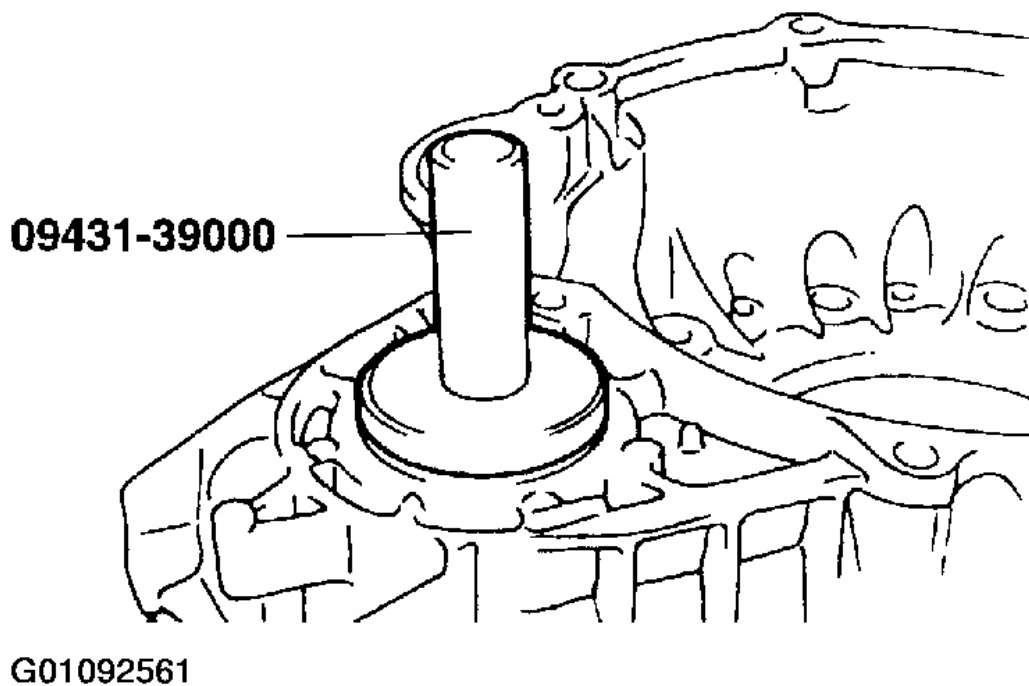
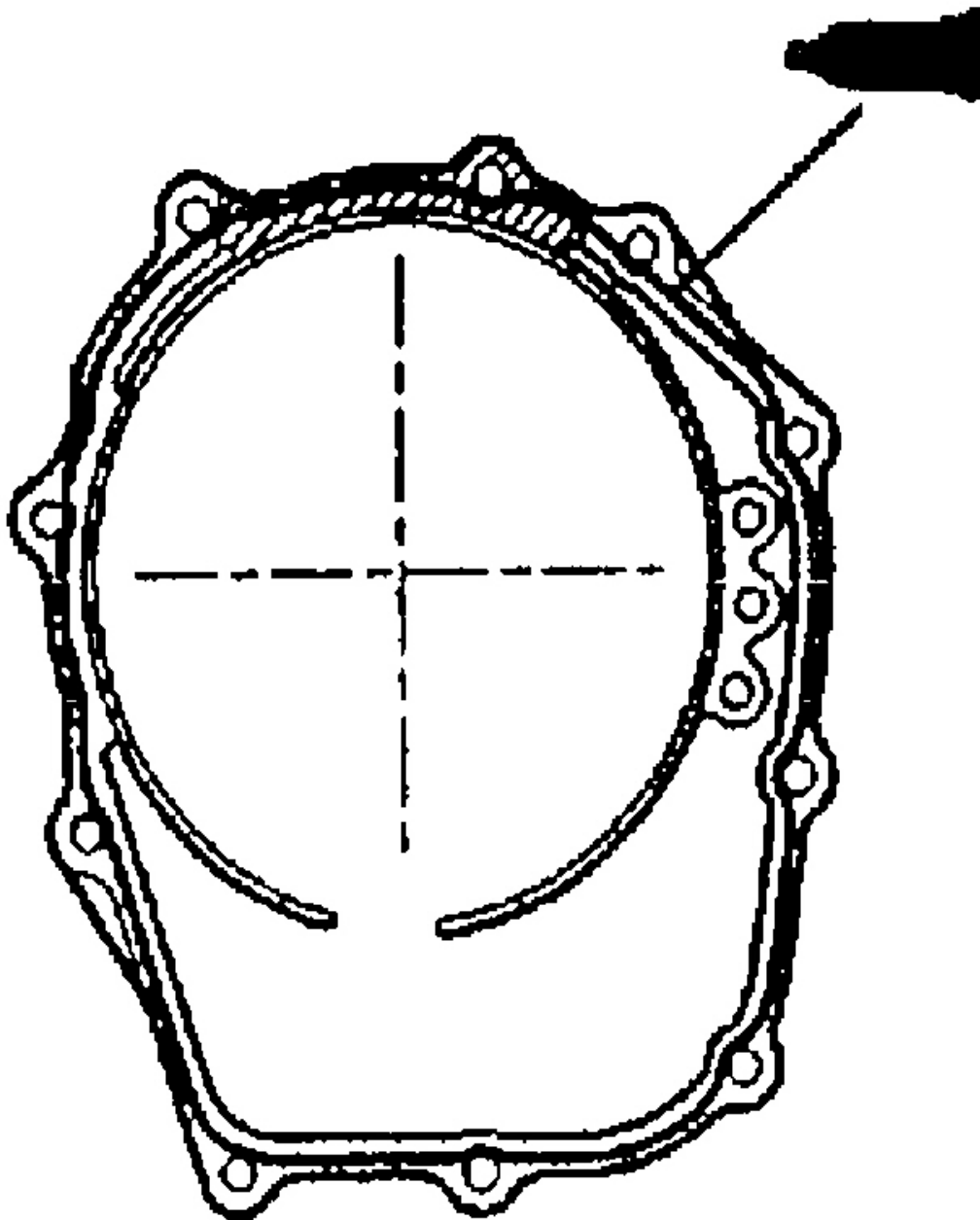


Fig. 254: Installing The Driveshaft Oil Seal
Courtesy of KIA MOTORS AMERICA, INC.

75. Continually apply liquid gasket at the torque converter housing at 01.6mm thickness as the figure.

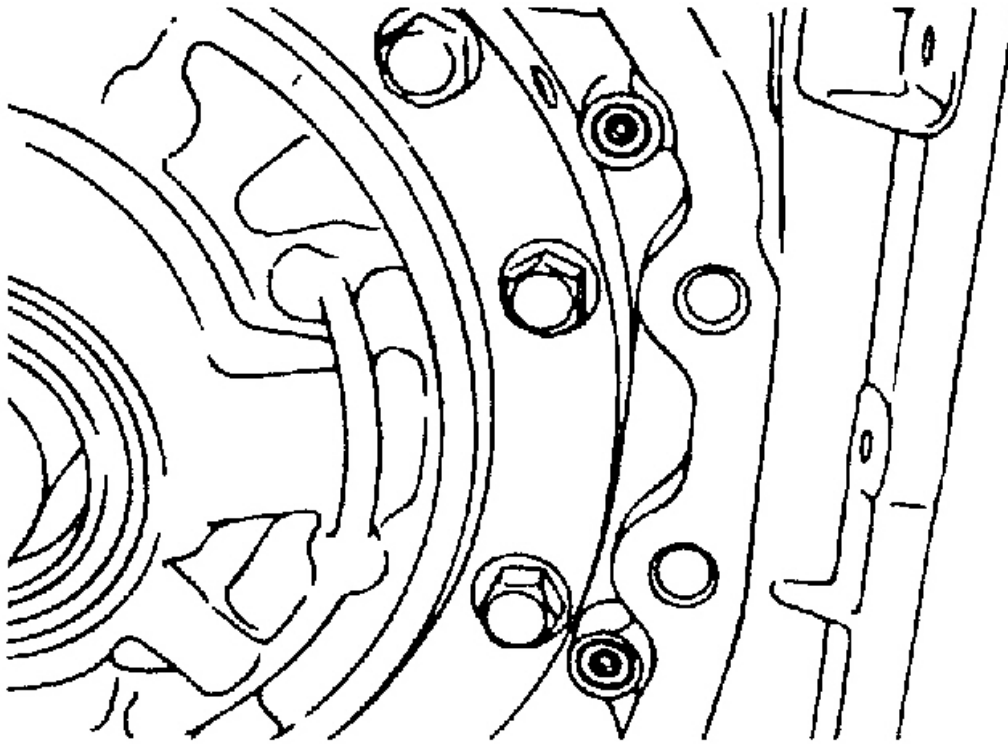
Standard sealant: Threebond 1281B or LOCTITE FMD546



G01092562

Fig. 255: Applying Liquid Gasket
Courtesy of KIA MOTORS AMERICA, INC.

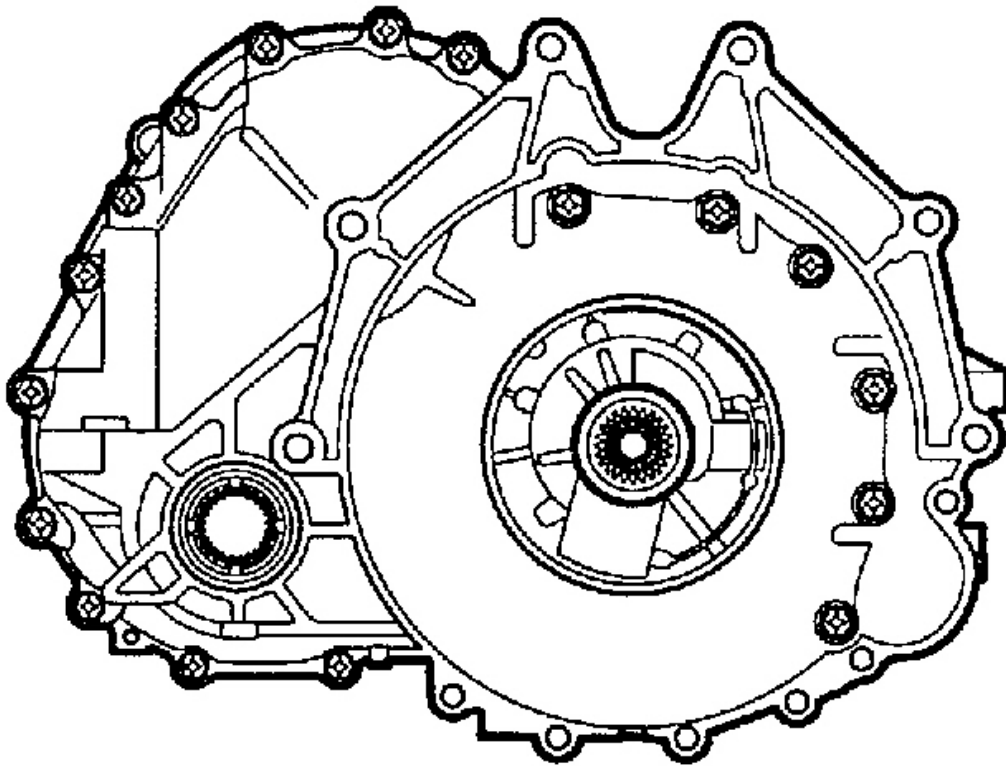
76. Install new O-rings (two).



G01092563

Fig. 256: Installing New O-Rings
Courtesy of KIA MOTORS AMERICA, INC.

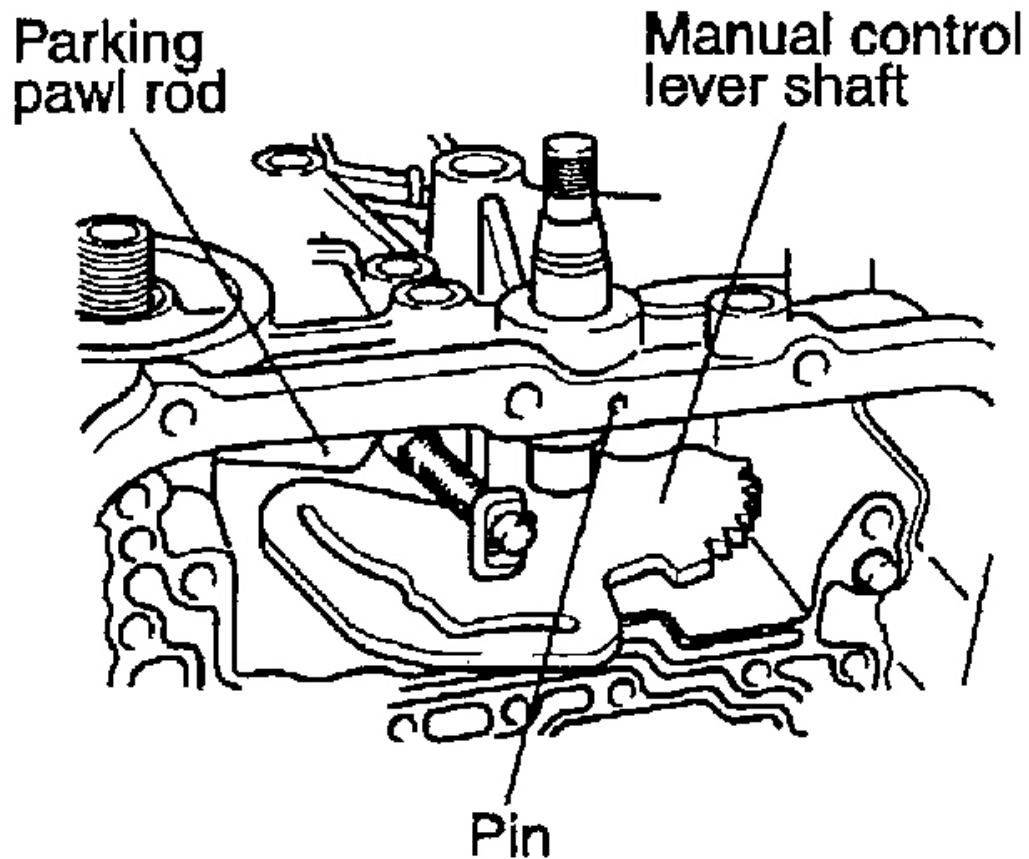
77. Connect the torque converter housing and tighten the connecting bolts (twenty) with tightening torque.



G01092564

Fig. 257: Tightening Converter Housing Bolts
Courtesy of KIA MOTORS AMERICA, INC.

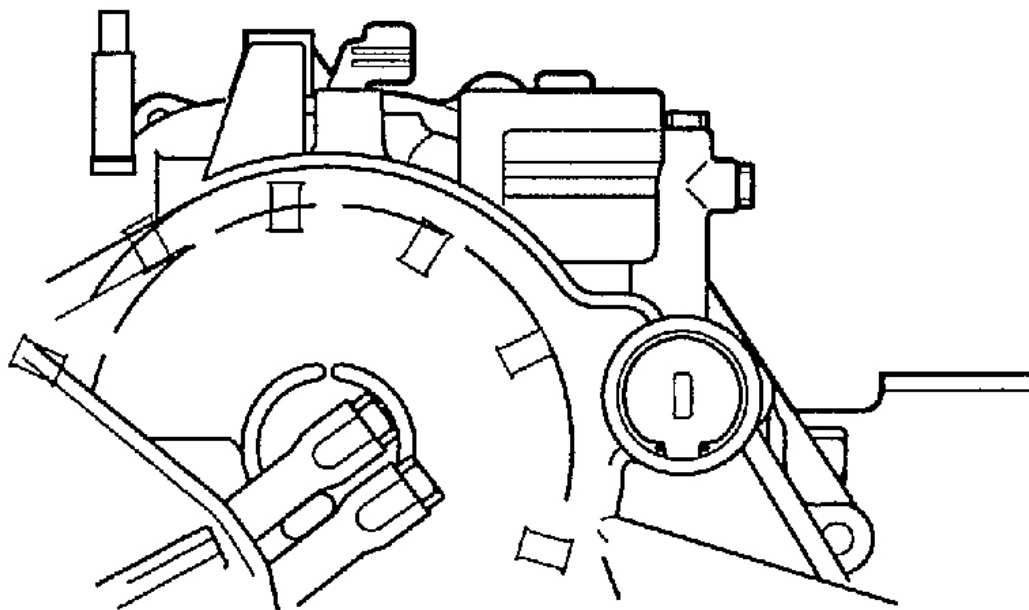
78. Install the manual control shaft and the parking pole rod.
79. Install the manual control shaft roller.



G01092565

Fig. 258: Installing The Manual Control Shaft And The Parking Pole Rod
Courtesy of KIA MOTORS AMERICA, INC.

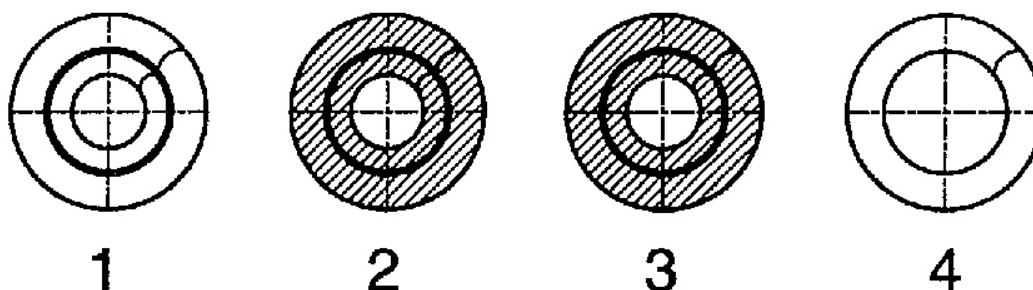
80. Install the reduction brake accumulator spring and the piston and then the snap ring.



G01092566

Fig. 259: Installing The Reduction Brake Accumulator Spring And The Piston
 Courtesy of KIA MOTORS AMERICA, INC.

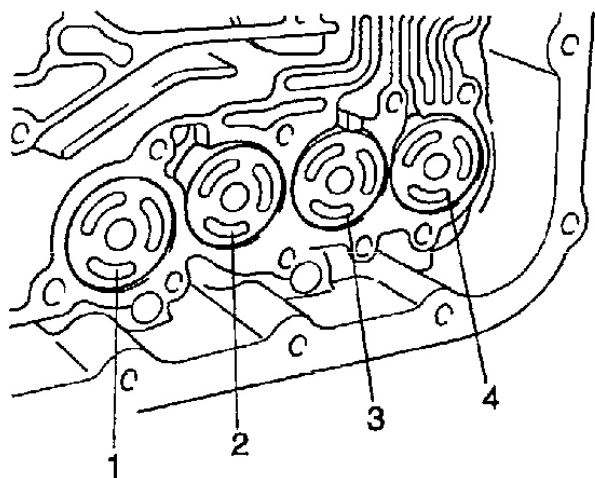
81. Install each accumulator piston, a new seal ring, and the piston. For accumulator spring identification, see **Fig. 261** .



G01092567

Fig. 260: Identifying Accumulator Pistons, A New Seal Ring, And The Piston
 Courtesy of KIA MOTORS AMERICA, INC.

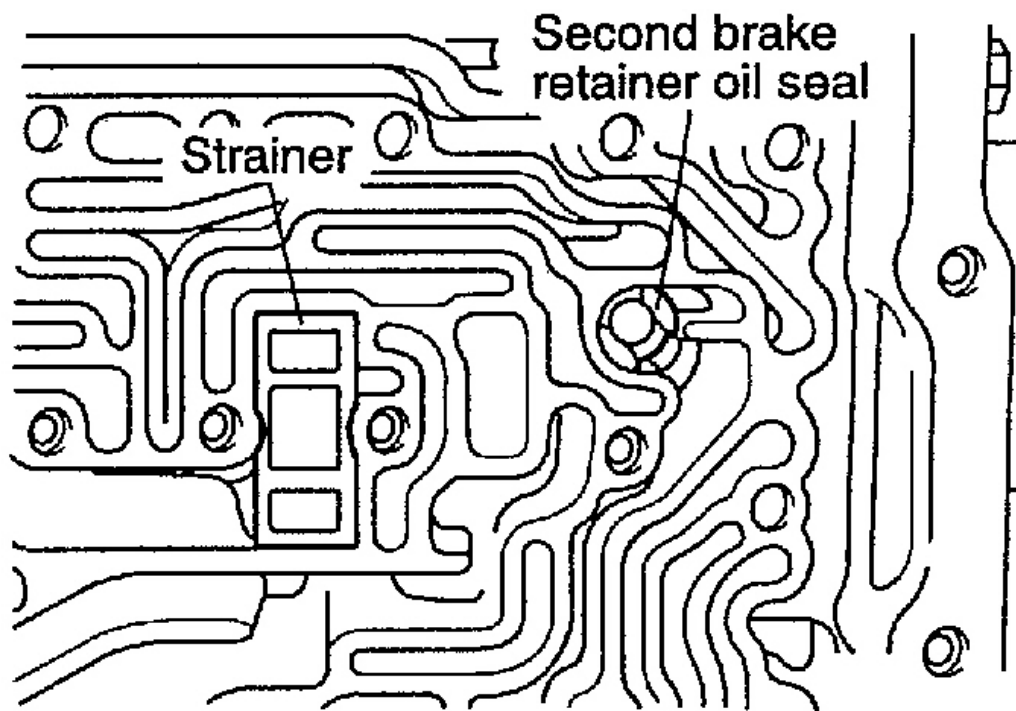
No.	Use	I.D.Color
1	LR brake	Colorless
2	UD clutch	Yellow
3	2ND brake	White
4	OD clutch	Colorless



G01092568

Fig. 261: Accumulator Spring Identification Chart
 Courtesy of KIA MOTORS AMERICA, INC.

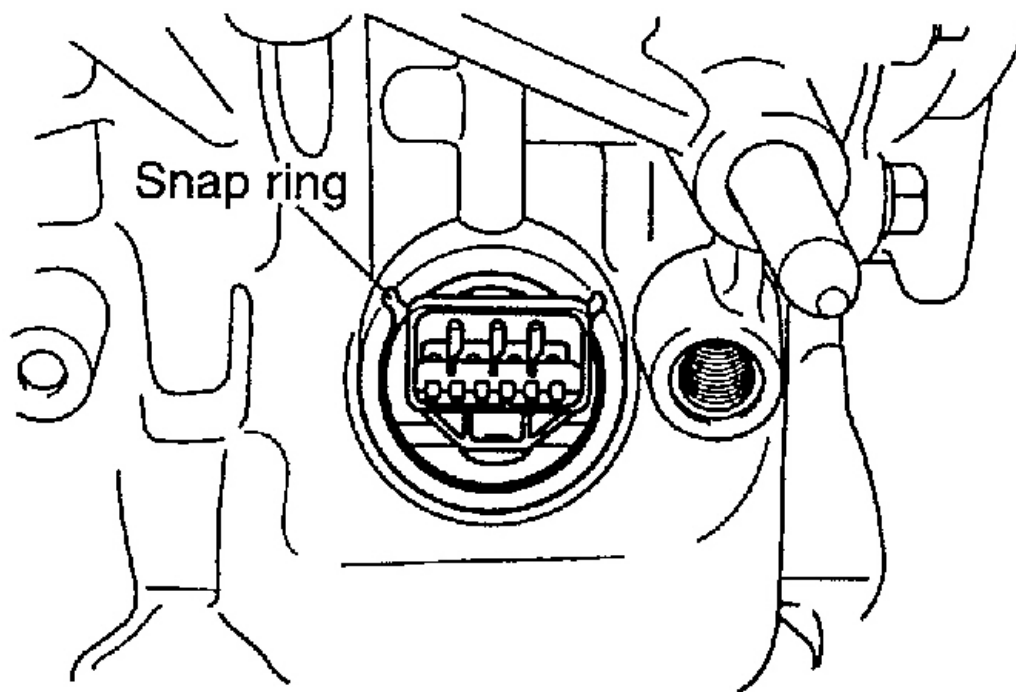
82. Install the strainer and the second brake retainer oil seal.



G01092569

Fig. 262: Installing The Strainer And The Second Brake Retainer Oil Seal
Courtesy of KIA MOTORS AMERICA, INC.

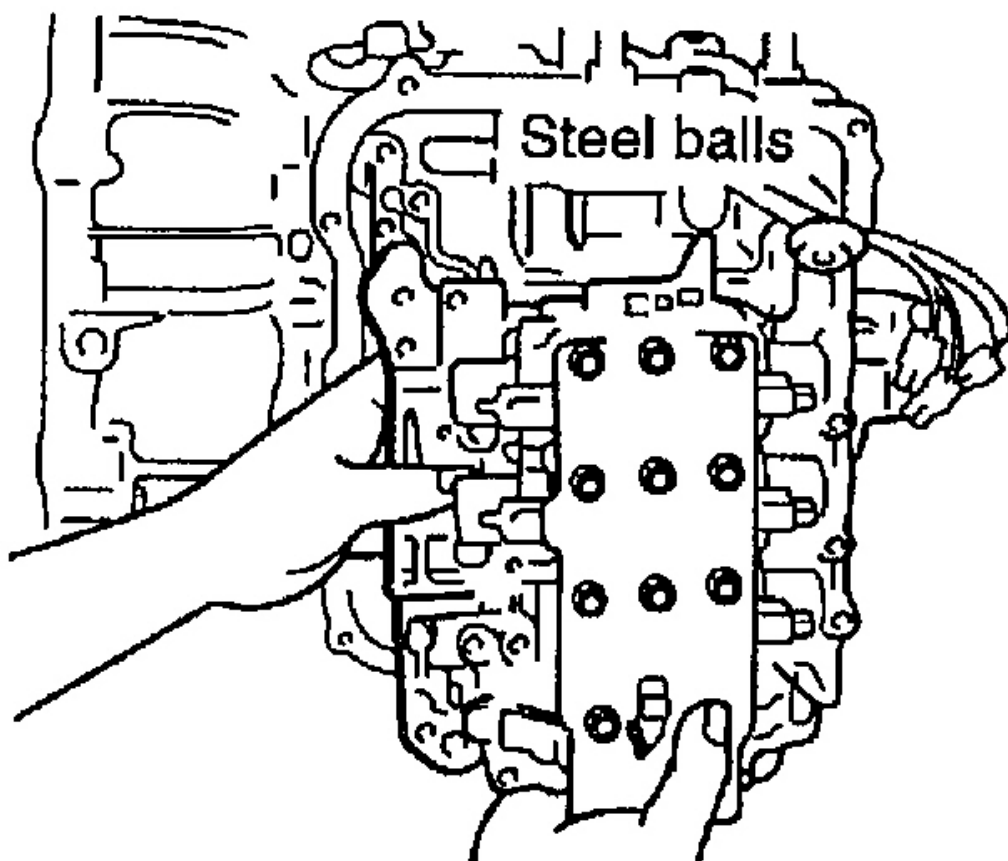
83. Install the solenoid valve harness and install the snap ring around the connector tightly.



G01092570

Fig. 263: Installing The Solenoid Valve Harness
Courtesy of KIA MOTORS AMERICA, INC.

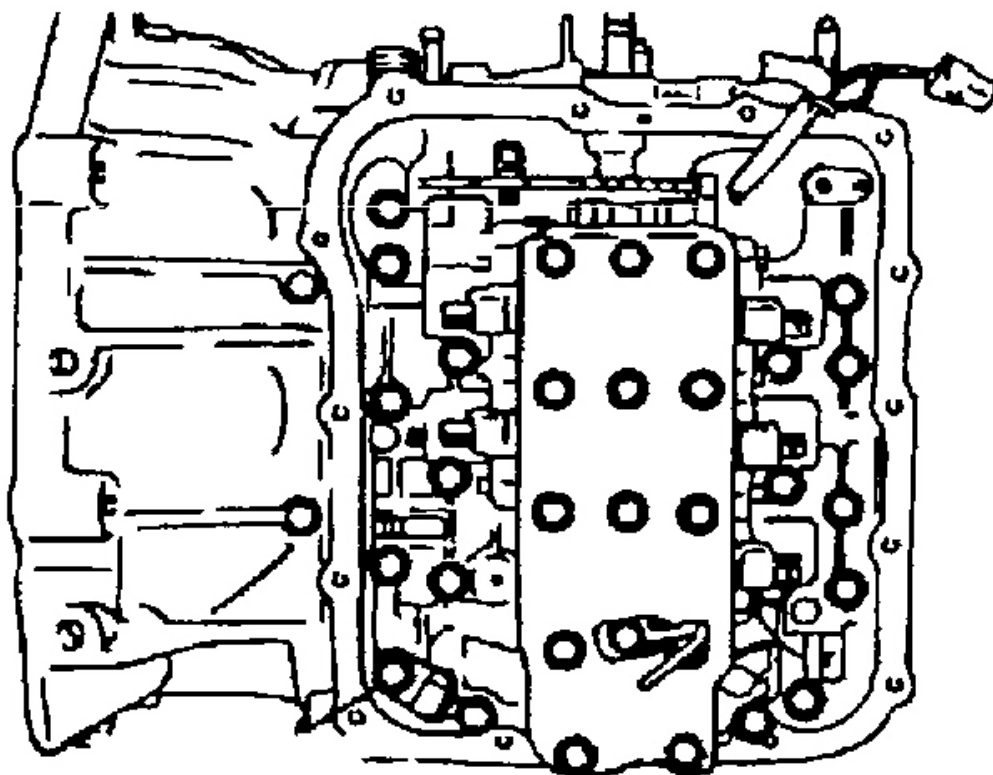
84. Install the valve body, the gasket and the steel balls (two).



G01092571

Fig. 264: Installing The Valve Body, The Gasket And The Steel Balls
Courtesy of KIA MOTORS AMERICA, INC.

85. Install the fluid temperature sensor.



Fluid temperature sensor

G01092572

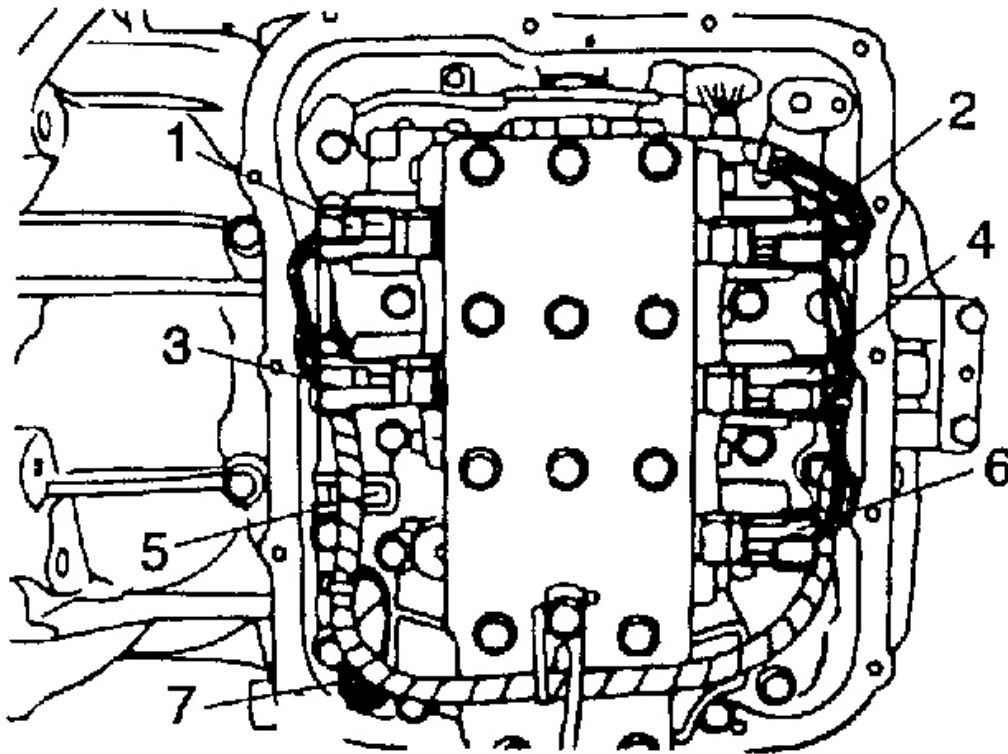
Fig. 265: Installing The Fluid Temperature Sensor
Courtesy of KIA MOTORS AMERICA, INC.

86. Install the valve body mounting bolts (twenty eight). Tighten bolts. See **TIGHTENING TORQUE** .
87. Connect the connector valve body.

No.	Connecting point	Wire color	Connector housing color
1	OD solenoid valve	Red	Black
2	UD solenoid valve	White, red, red	Black
3	LR solenoid valve	Brown, yellow	Milky white
4	2nd solenoid valve	Green, red, red	Milky white
5	RED solenoid valve	Brown, yellow, yellow	Black
6	DCC solenoid valve	Blue, yellow, yellow	Black
7	Temperature sensor	Black, red	Black

G01092573

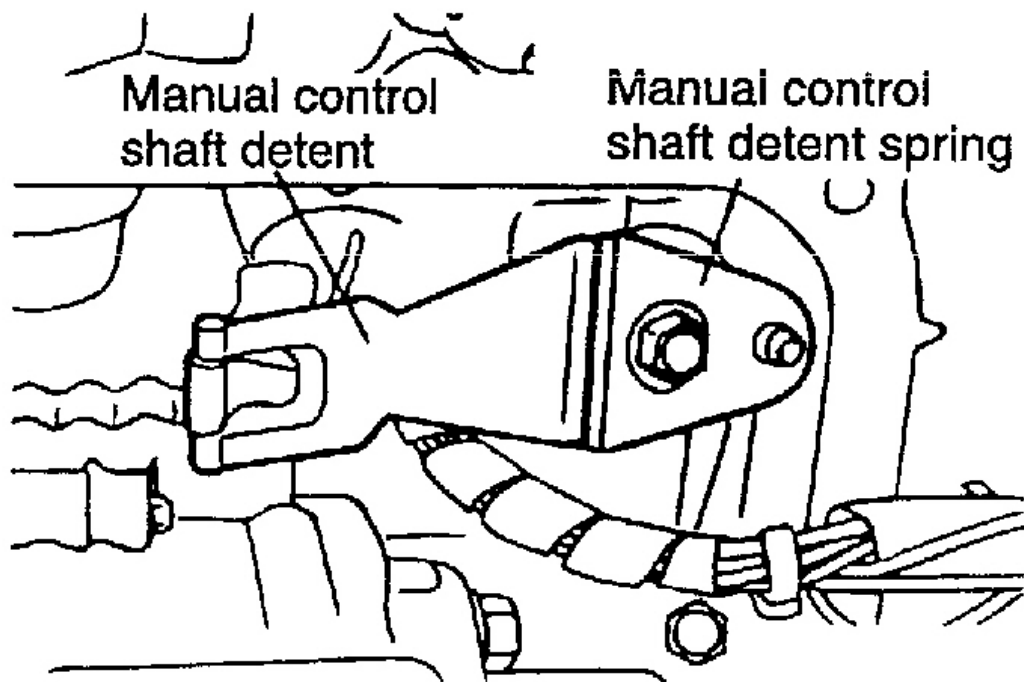
Fig. 266: Solenoid Connector Legend
Courtesy of KIA MOTORS AMERICA, INC.



G01092574

Fig. 267: Connecting Valve Body Connector
Courtesy of KIA MOTORS AMERICA, INC.

88. Install the manual control shaft detent spring and the detent.



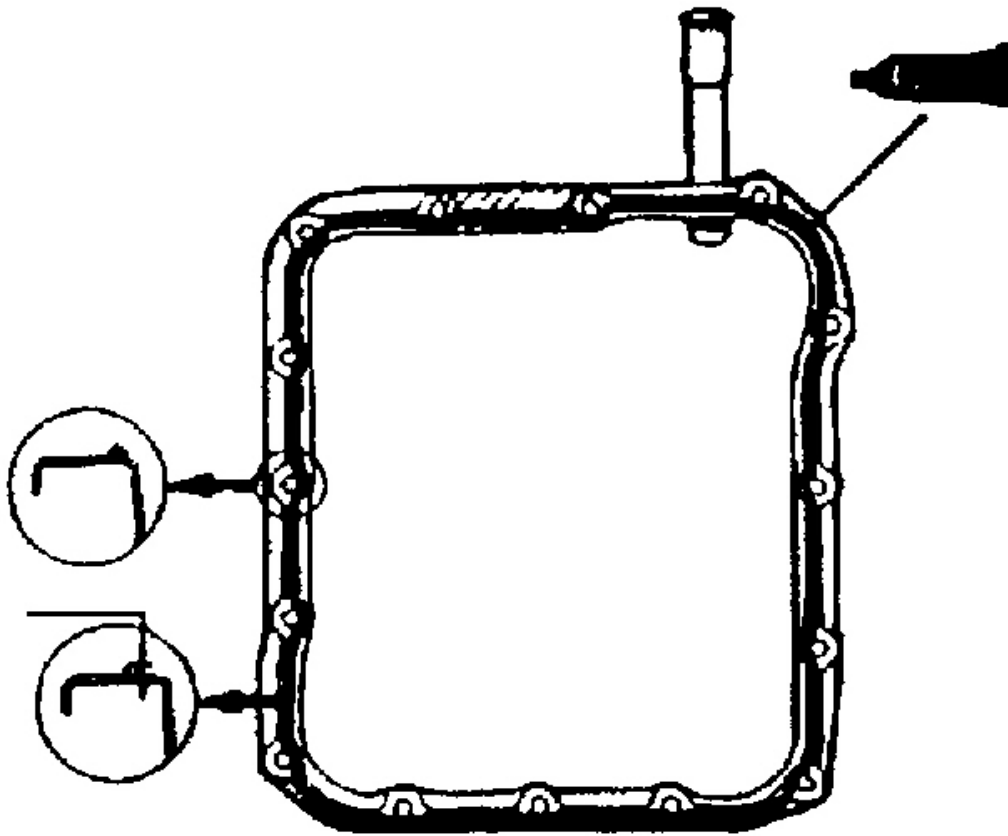
G01092575

Fig. 268: Installing The Manual Control Shaft Detent Spring And The Detent
Courtesy of KIA MOTORS AMERICA, INC.

89. Continually apply liquid gasket at the valve body at 00.098 in (2.5 mm) thickness as the figure.

Liquid gasket

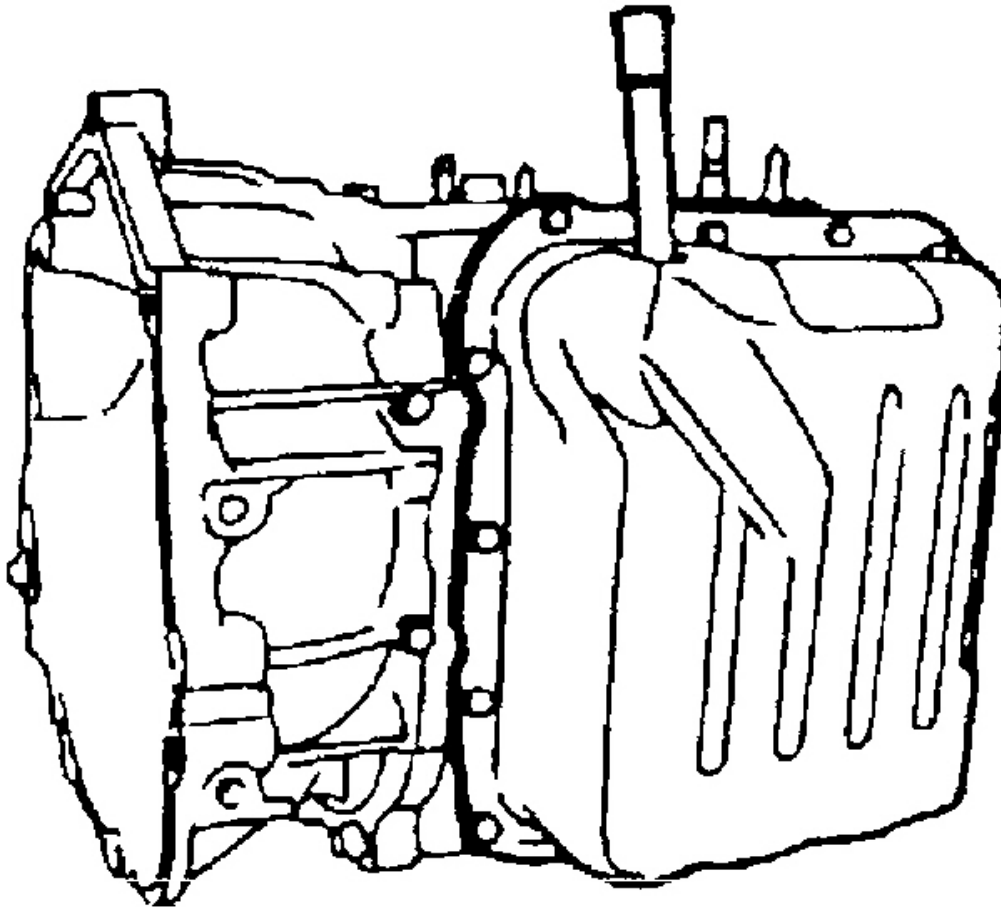
Standard sealant: Threebond 1281B or LOCTITE FMD546



G01092576

Fig. 269: Applying Liquid Gasket
Courtesy of KIA MOTORS AMERICA, INC.

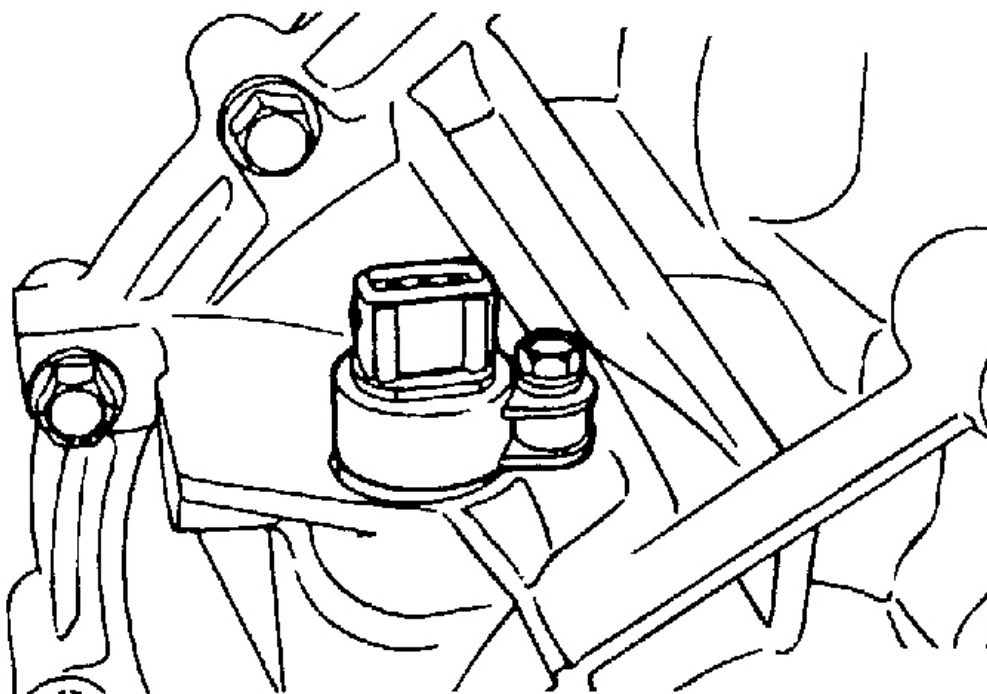
90. Install the valve body cover and tighten the mounting bolts with tightening torque.



G01092577

Fig. 270: Installing The Valve Body Cover
Courtesy of KIA MOTORS AMERICA, INC.

91. Install the speedometer gear.

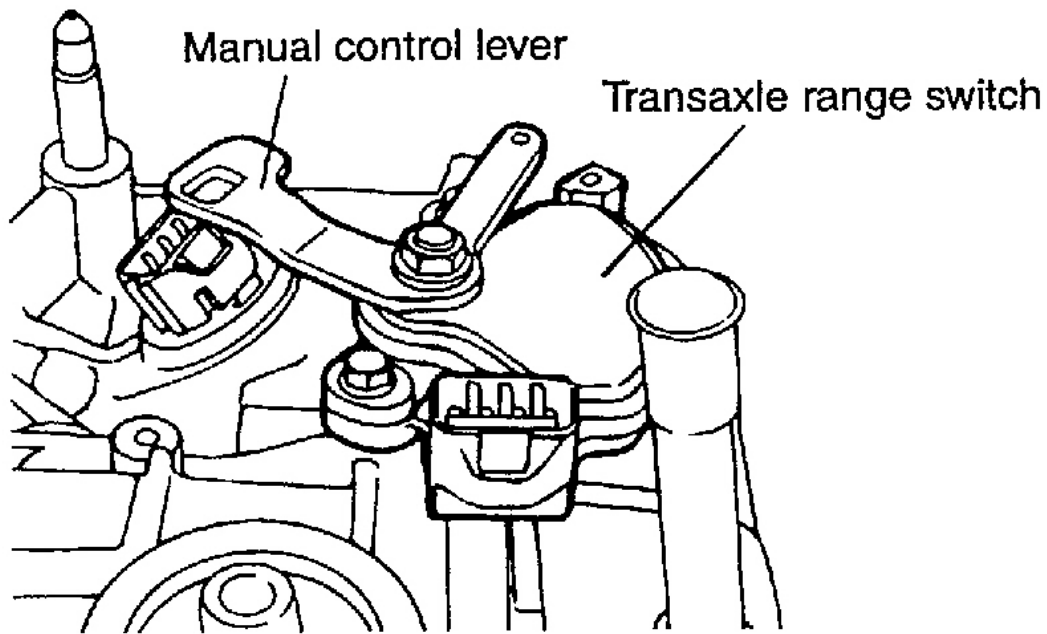


G01092578

Fig. 271: Installing The Speedometer Gear
Courtesy of KIA MOTORS AMERICA, INC.

92. Install the transaxle range switch and the manual control lever.

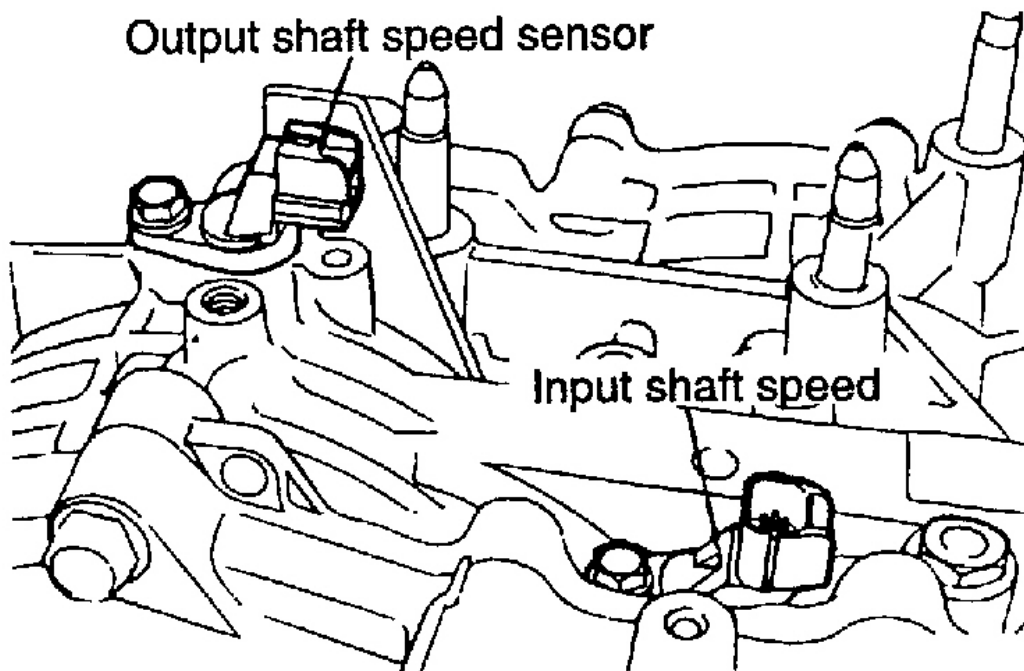
CAUTION: The transaxle range switch shall be installed with the valve body installed as it was.



G01092579

Fig. 272: Installing The Transaxle Range Switch And The Manual Control Lever
Courtesy of KIA MOTORS AMERICA, INC.

93. Install the input speed sensor and output speed sensor.



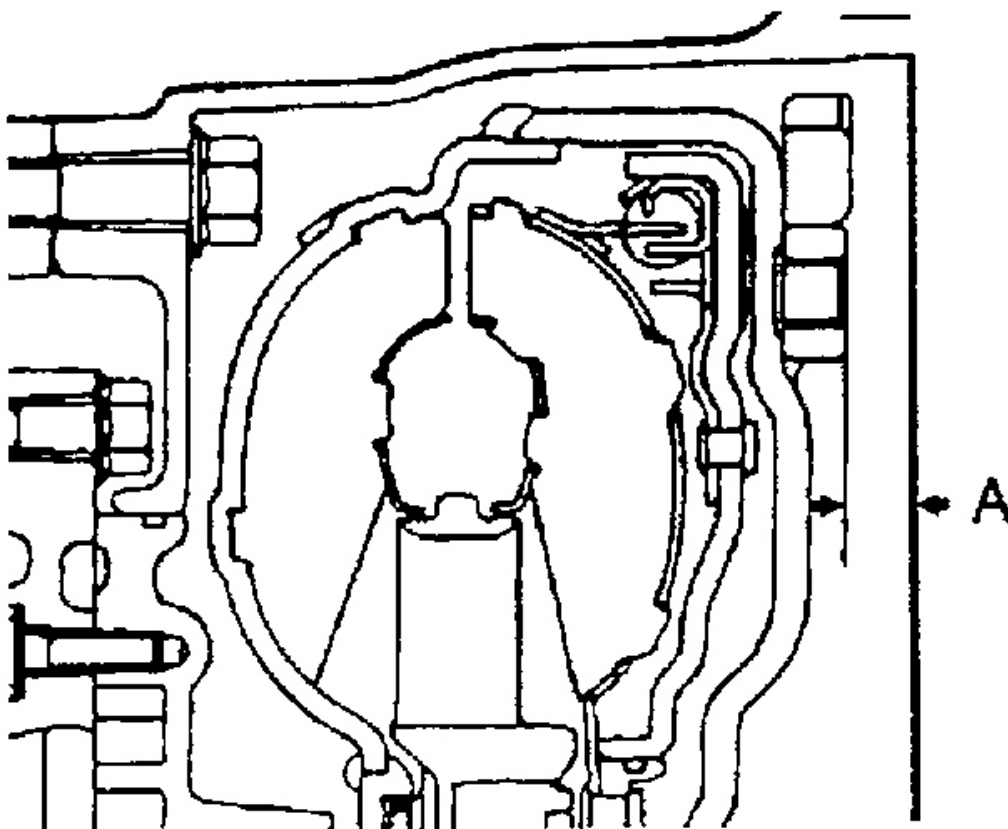
G01092580

Fig. 273: Installing The Input Speed Sensor And Output Speed Sensor
Courtesy of KIA MOTORS AMERICA, INC.

94. Install the eyebolt, a new gasket, and the oil cooler feed tube.
95. Install the fluid level gauge.
96. Install each bracket.
97. Install the torque converter and tighten it into tolerance.

Tolerance: approx. 0.37 in (9.4 mm)

CAUTION: Apply ATF to avoid damage on the torque converter shaft and the oil pump seal lip.



G01092581

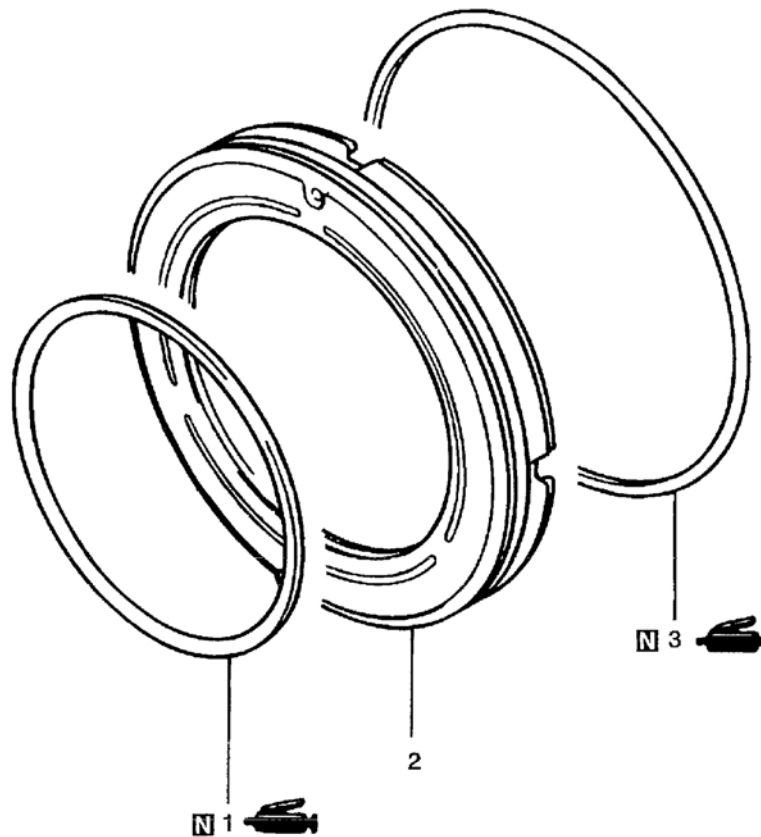
Fig. 274: Measuring Torque Converter Position
Courtesy of KIA MOTORS AMERICA, INC.

TRANSAXLE COMPONENT DISASSEMBLY, INSPECTION, REASSEMBLY

LOW REVERSE BRAKE

COMPONENTS

Apply ATF fluid on
any moving part on
installation.



Disassembly procedure

1. O-ring
2. O-ring

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3. Low and reverse brake piston

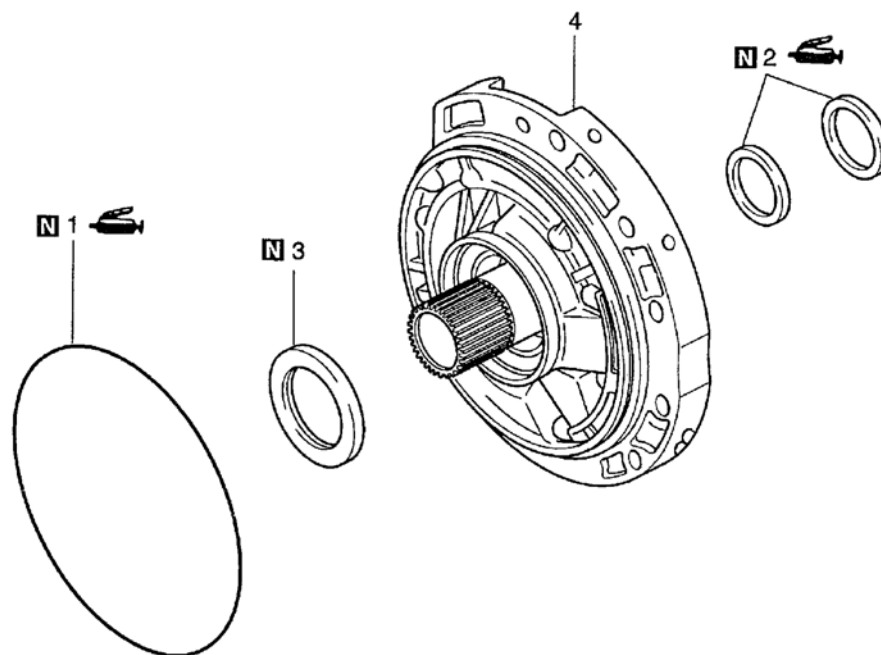
Fig. 275: Illustrating Low Reverse Brake
Courtesy of KIA MOTORS AMERICA, INC.

ASSEMBLY

Install the seal ring. Apply ATF or white vaseline on the seal ring and install it caring not to damage it.

OIL PUMP

COMPONENTS



Disassembly steps

1. O-ring
2. Seal ring

3. Oil seal
4. Oil pump assembly

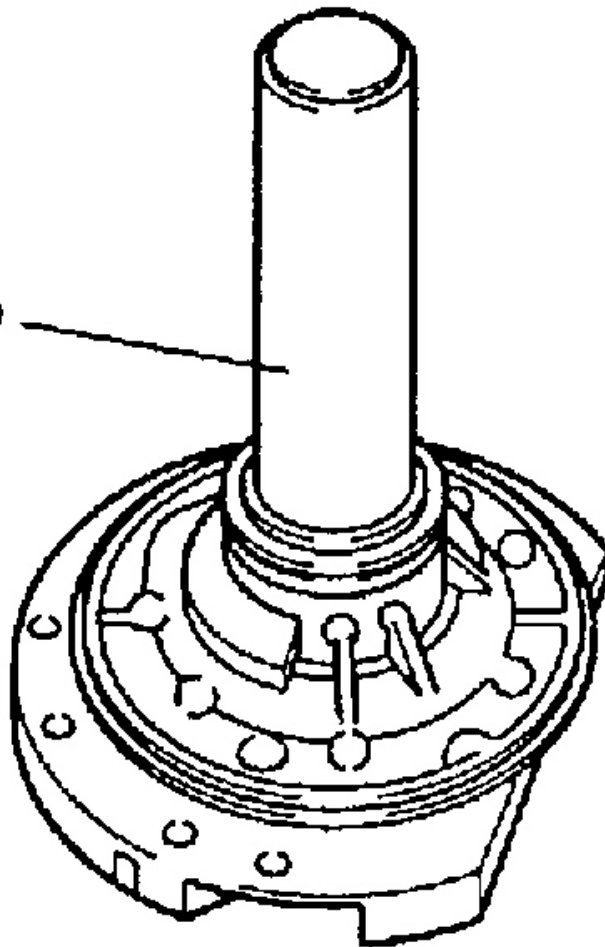
G01092583

Fig. 276: Illustrating Oil Pump
Courtesy of KIA MOTORS AMERICA, INC.

ASSEMBLY

1. Install the oil seal.

09452-21200



G01092584

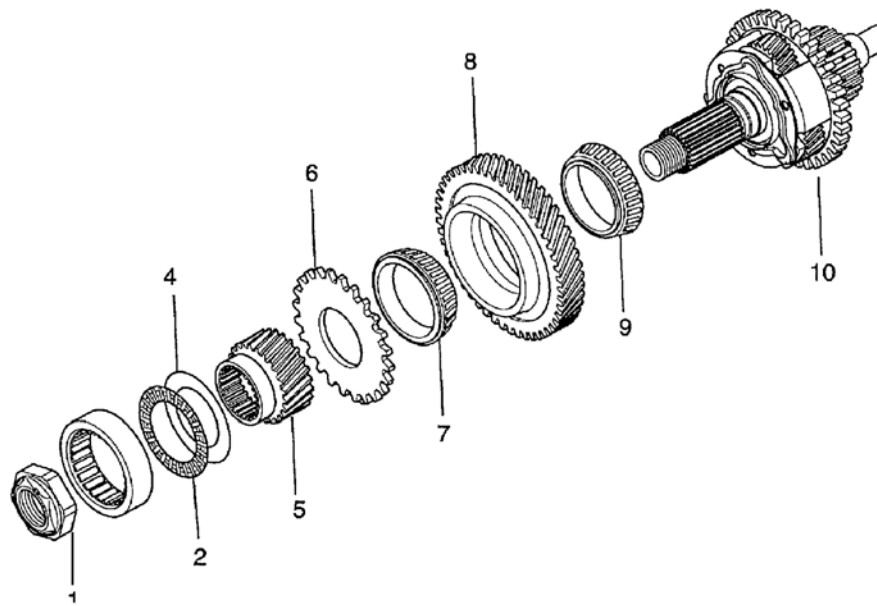
Fig. 277: Installing The Oil Seal

Courtesy of KIA MOTORS AMERICA, INC.

2. Install the O-ring. Install the new O-ring around fluid pump and apply ATF, blue mineral oil, or white vaseline around the O-ring.

PLANETARY GEAR SET

COMPONENTS



1. Lock nut
2. Roller bearing
3. Thrust bearing (#9)
4. Thrust race (#10)
5. Output gear

6. Parking brake gear
7. Taper roller bearing
8. Transfer driven gear
9. Taper roller bearing
10. Direct planetary carrier

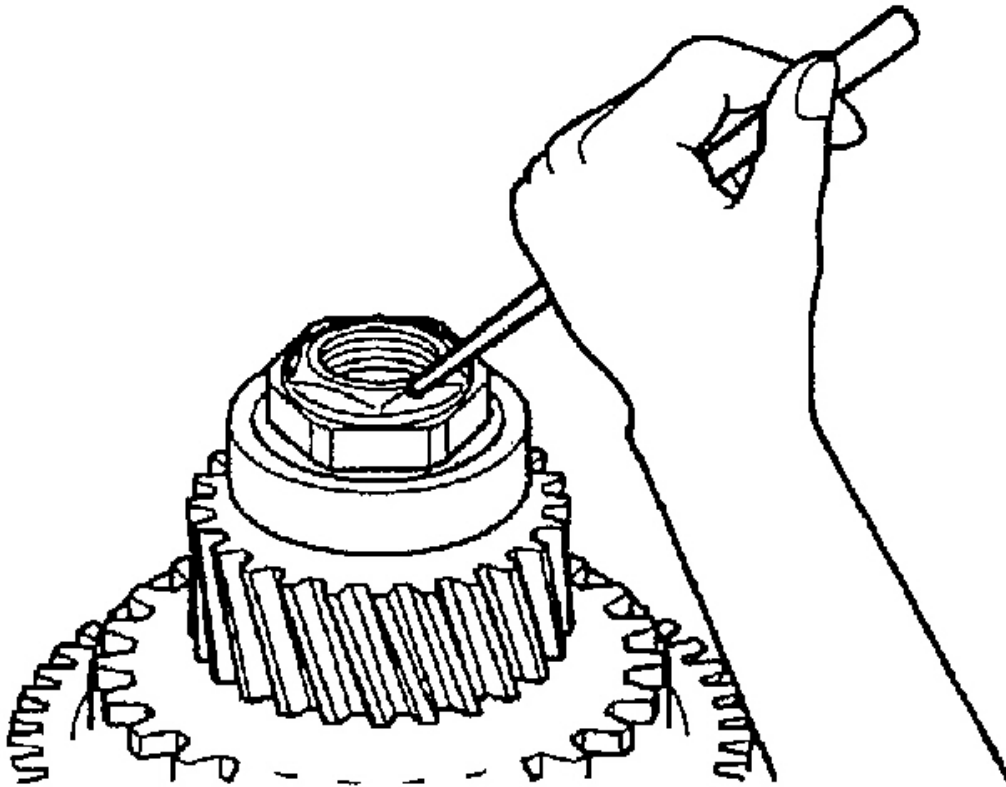
G01092585

Fig. 278: Illustrating Planetary Gear Set
Courtesy of KIA MOTORS AMERICA, INC.

PLANETARY GEAR SET

DISASSEMBLY

1. Cock the lock nut only enough to turn.

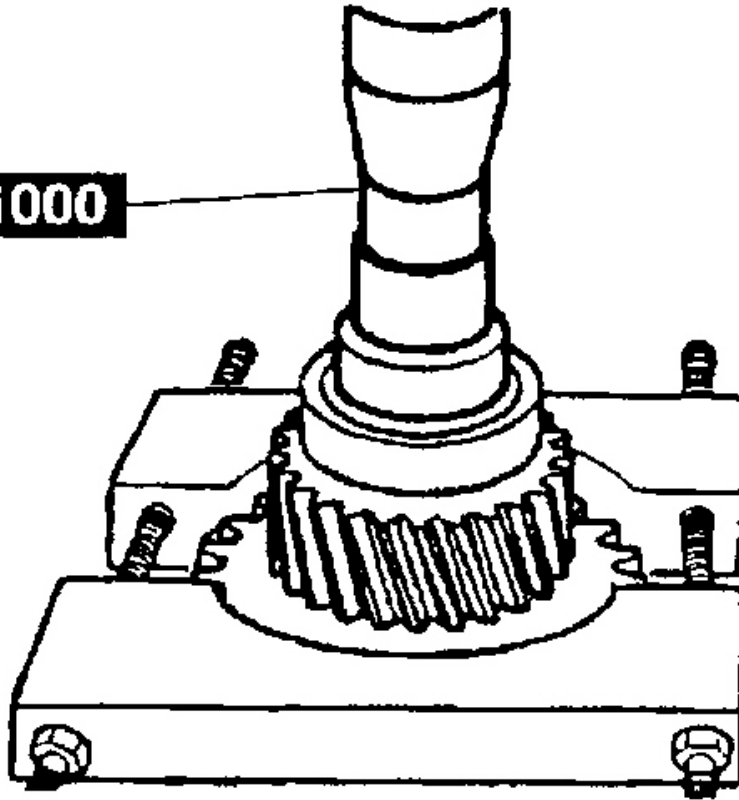


G01092586

Fig. 279: Loosening Planetary Gear Set Lock Nut
Courtesy of KIA MOTORS AMERICA, INC.

2. Remove the lock nut.
3. Remove the output gear and the parking brake gear using the special tool.

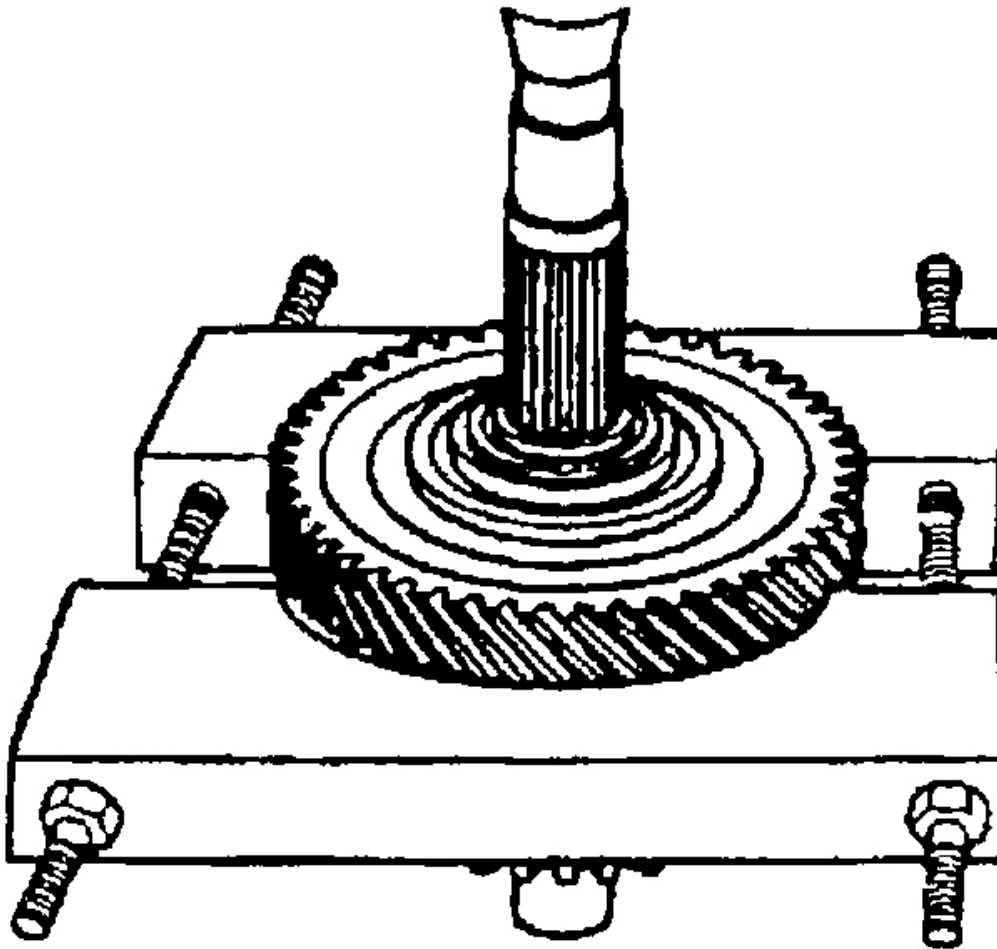
90433-21000



G01092587

Fig. 280: Removing The Output Gear And The Parking Brake Gear
Courtesy of KIA MOTORS AMERICA, INC.

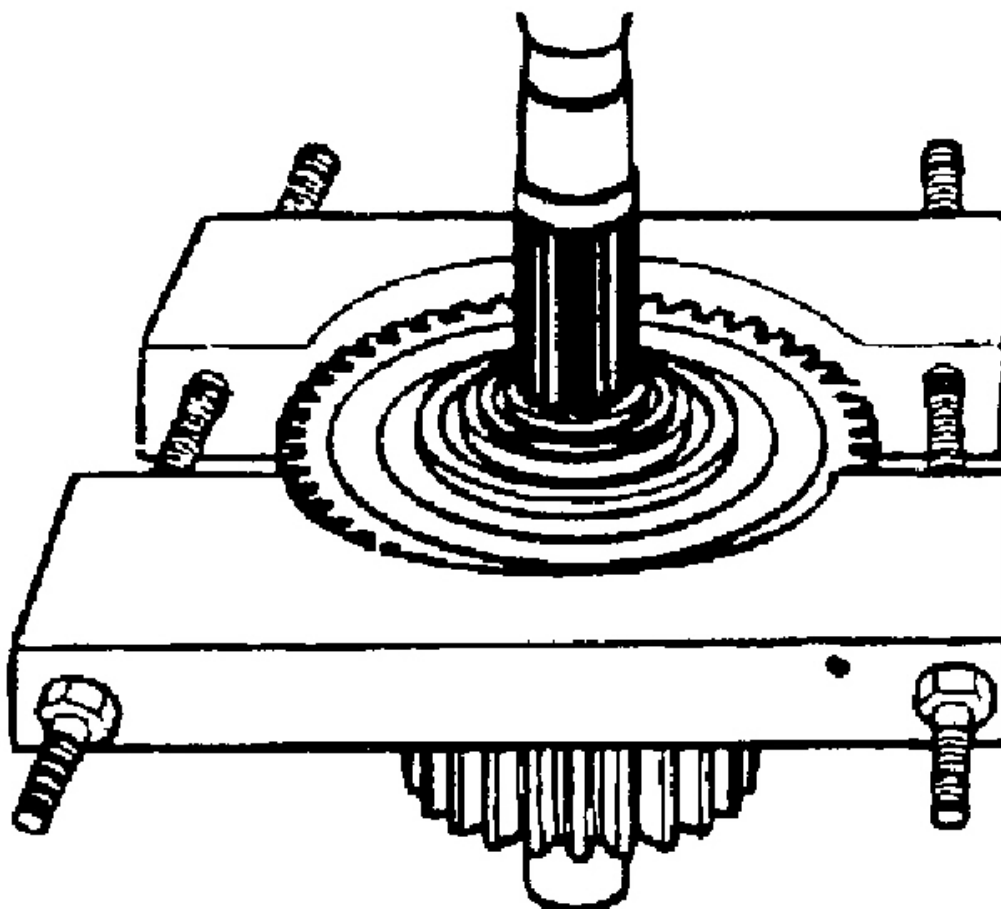
4. Remove the taper roller bearing and the transfer driven gear.



G01092588

Fig. 281: Removing The Taper Roller Bearing And The Transfer Driven Gear
Courtesy of KIA MOTORS AMERICA, INC.

5. Remove the inner taper roller bearing.

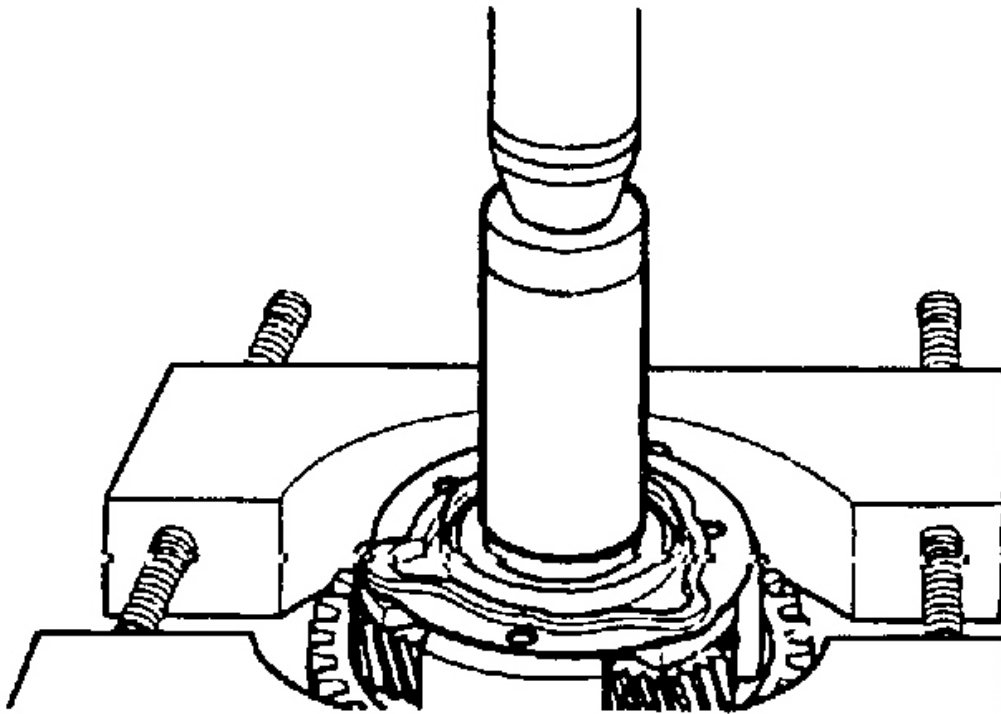


G01092589

Fig. 282: Removing The Inner Taper Roller Bearing
Courtesy of KIA MOTORS AMERICA, INC.

REASSEMBLY

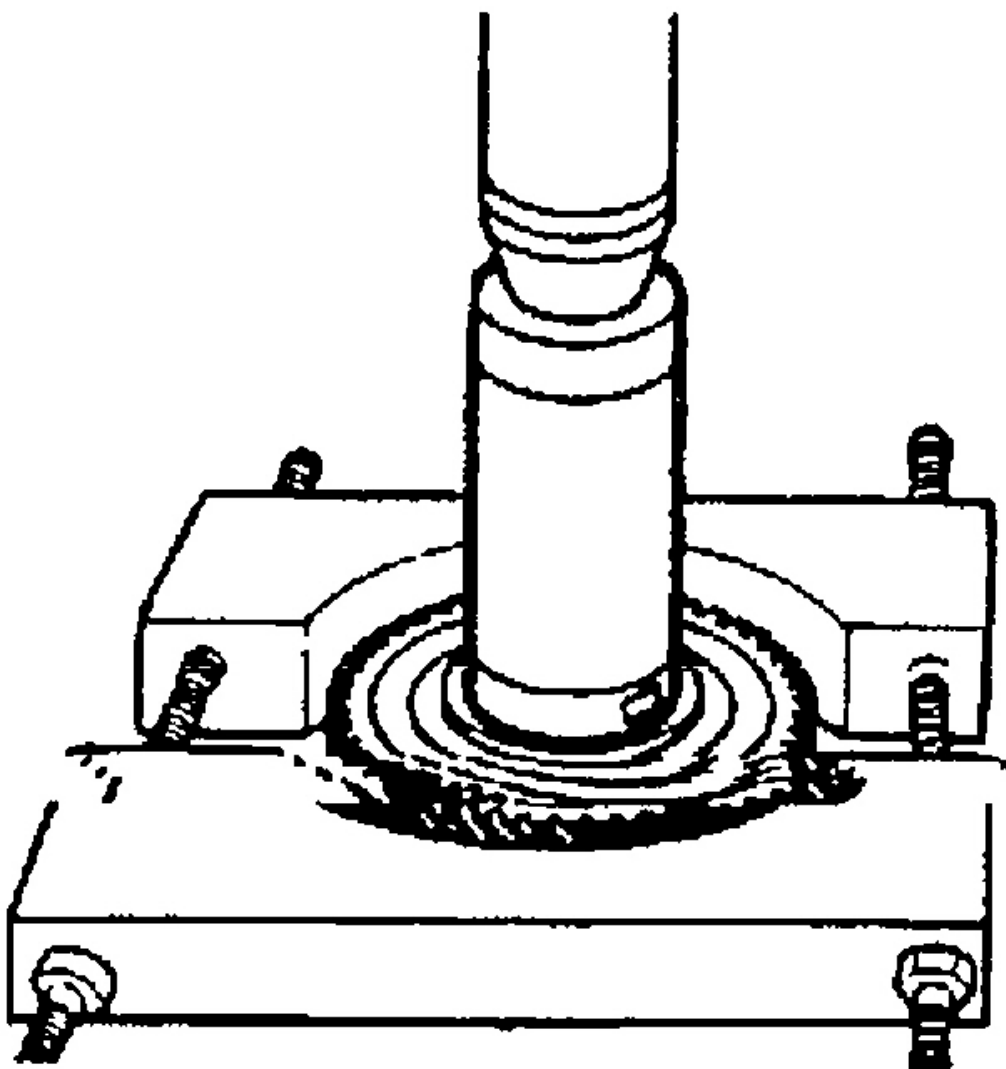
1. Install the inner taper roller bearing using the special tool.



G01092590

Fig. 283: Installing The Inner Taper Roller Bearing
Courtesy of KIA MOTORS AMERICA, INC.

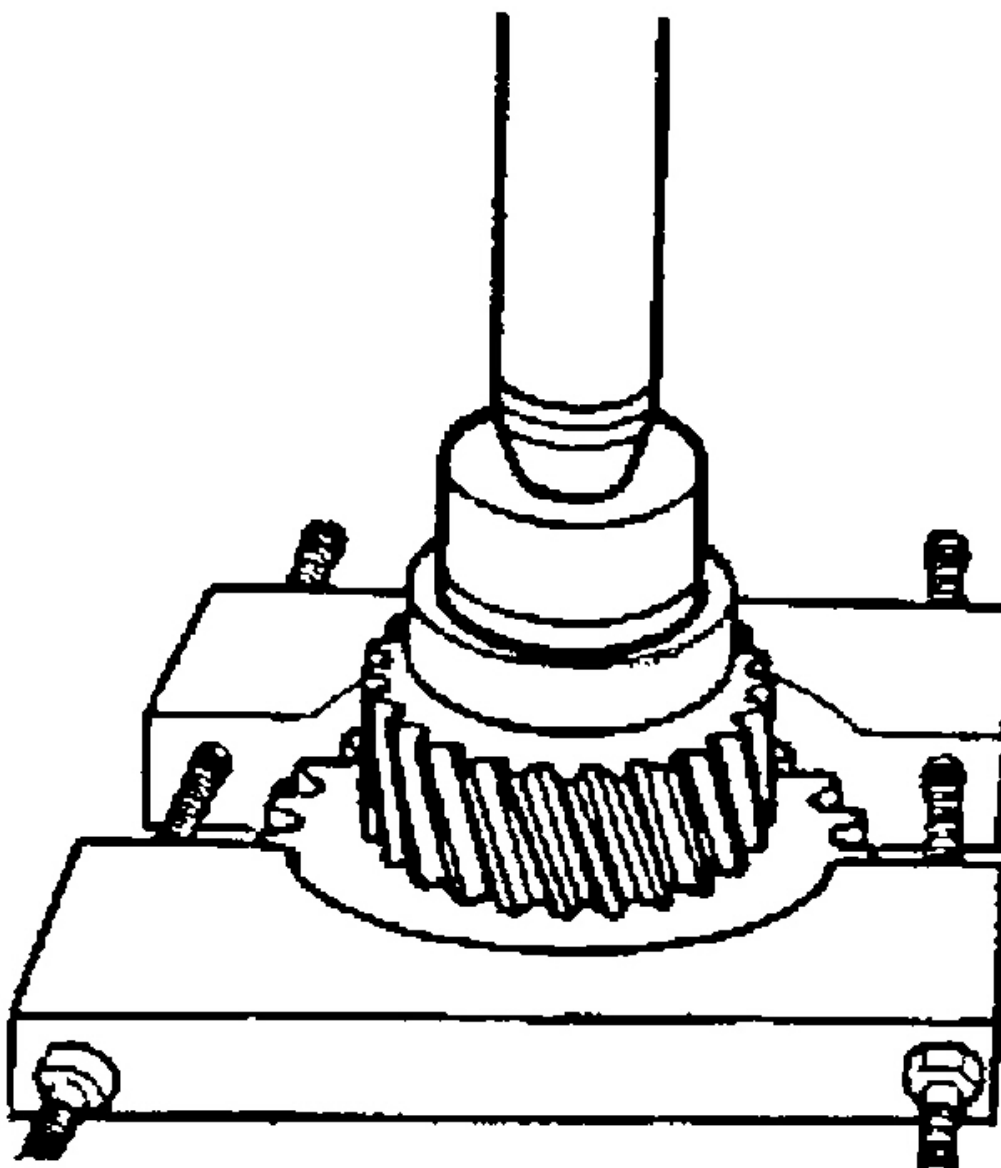
2. Install the transfer driven gear and the taper roller bearing.



G01092591

Fig. 284: Installing The Transfer Driven Gear And The Taper Roller Bearing
Courtesy of KIA MOTORS AMERICA, INC.

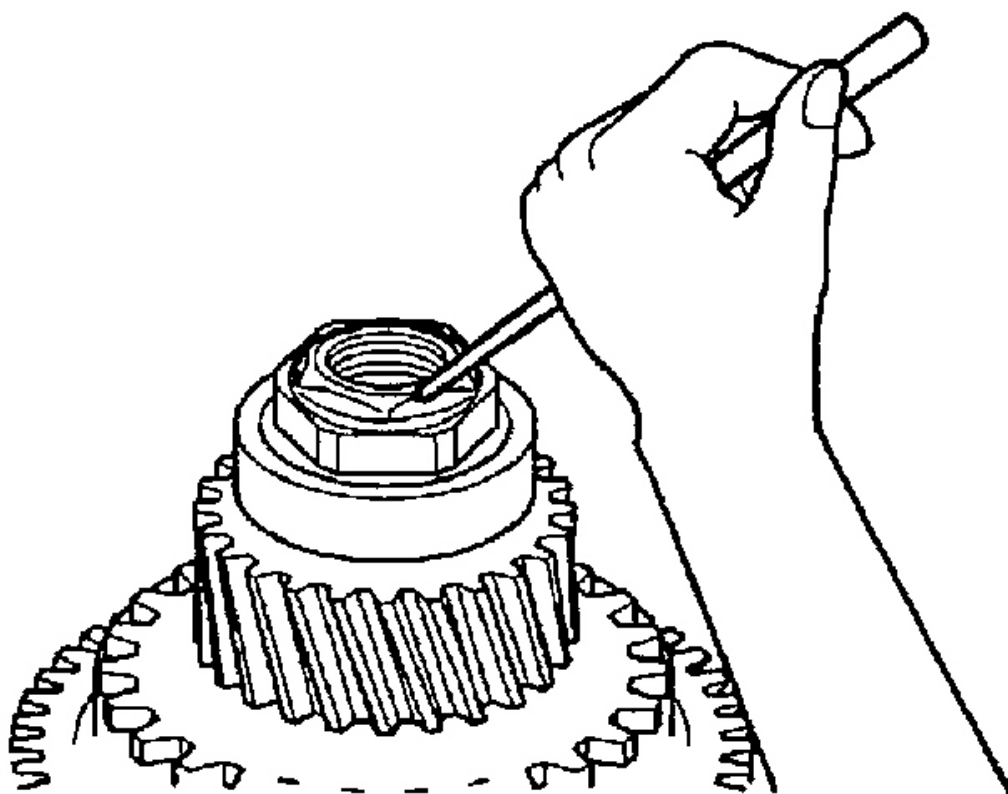
3. Install the parking brake gear and the output gear.
4. Install the roller bearing and tighten the lock nut with tightening torque.



G01092592

Fig. 285: Installing The Parking Brake Gear And The Output Gear
Courtesy of KIA MOTORS AMERICA, INC.

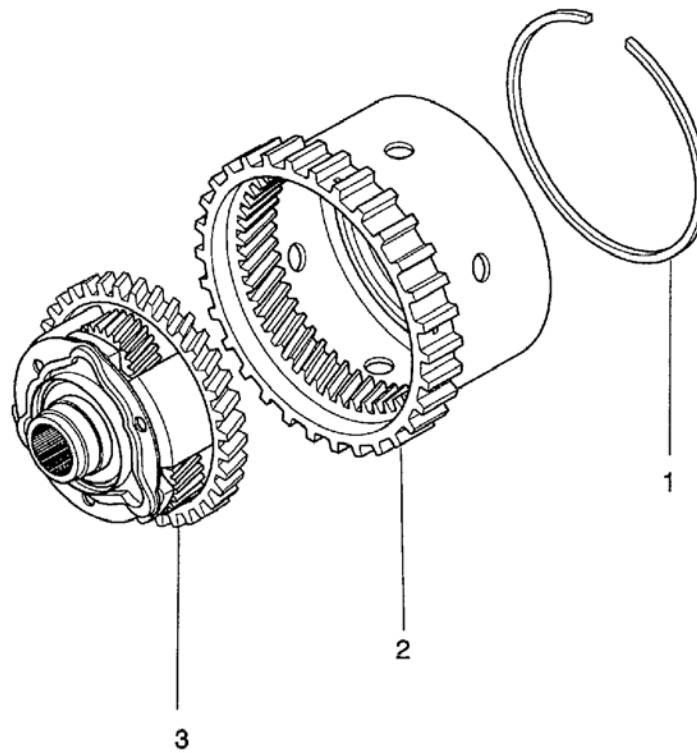
5. Stake the lock nut (two points) not to move.



G01092593

Fig. 286: Staking The Planetary Gear Set Lock Nut
Courtesy of KIA MOTORS AMERICA, INC.

OVERDRIVE PLANETARY CARRIER



Disassembly procedure

1. Snap ring
2. Overdrive planetary carrier

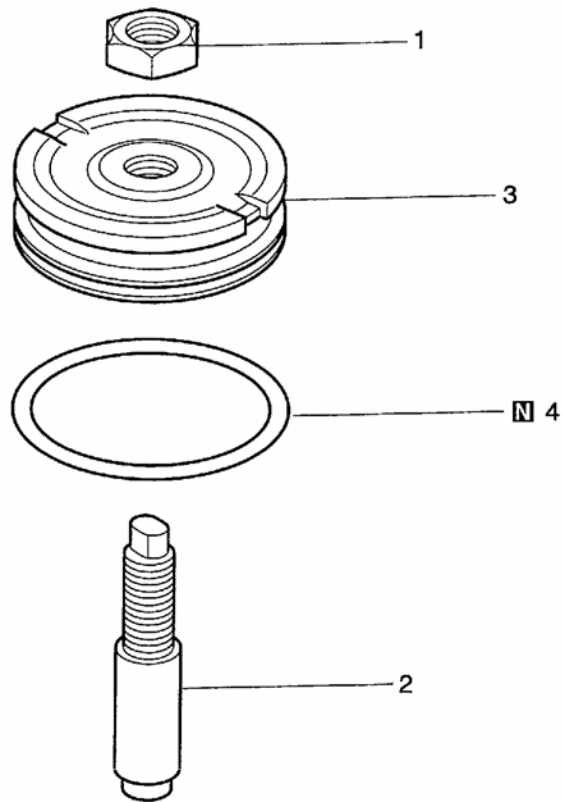
3. Overdrive annulus gear

G01092594

Fig. 287: Illustrating Overdrive Planetary Carrier
Courtesy of KIA MOTORS AMERICA, INC.

REDUCTION BRAKE PISTON

DISASSEMBLY



Disassembly procedure

1. Nut
2. Adjust rod

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3. Reduction brake piston
4. Seal ring

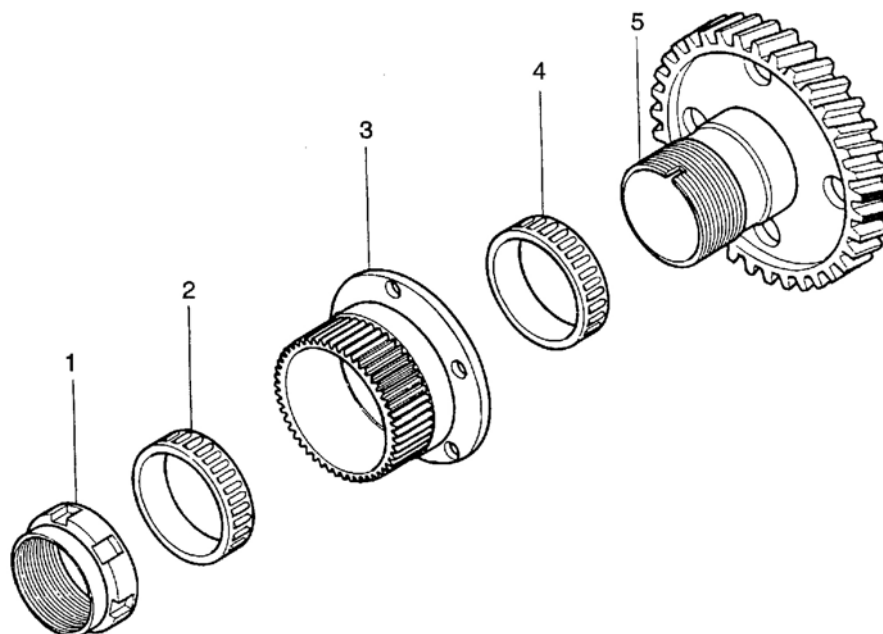
Fig. 288: Exploded View Of Reduction Brake Piston
Courtesy of KIA MOTORS AMERICA, INC.

REASSEMBLY

Install the seal ring. Apply ATF or white vaseline on the seal ring and install it caring not to damage it.

TRANSFER DRIVE GEAR

COMPONENTS



Disassembly procedure

1. Lock nut
2. Roller bearing

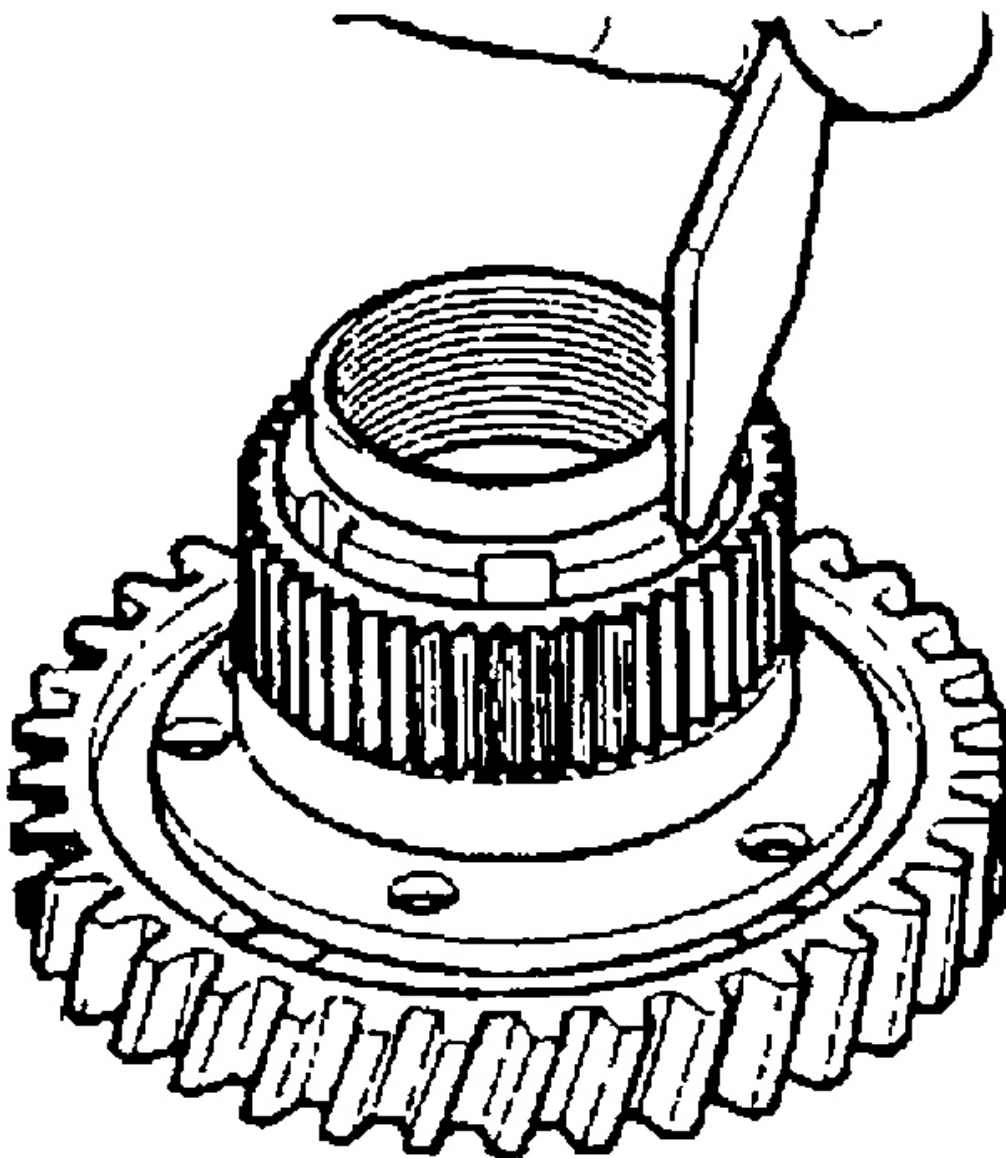
3. Transfer drive gear bearing
4. Roller bearing
5. Transfer drive gear

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Fig. 289: Illustrating Transfer Drive Gear
Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY

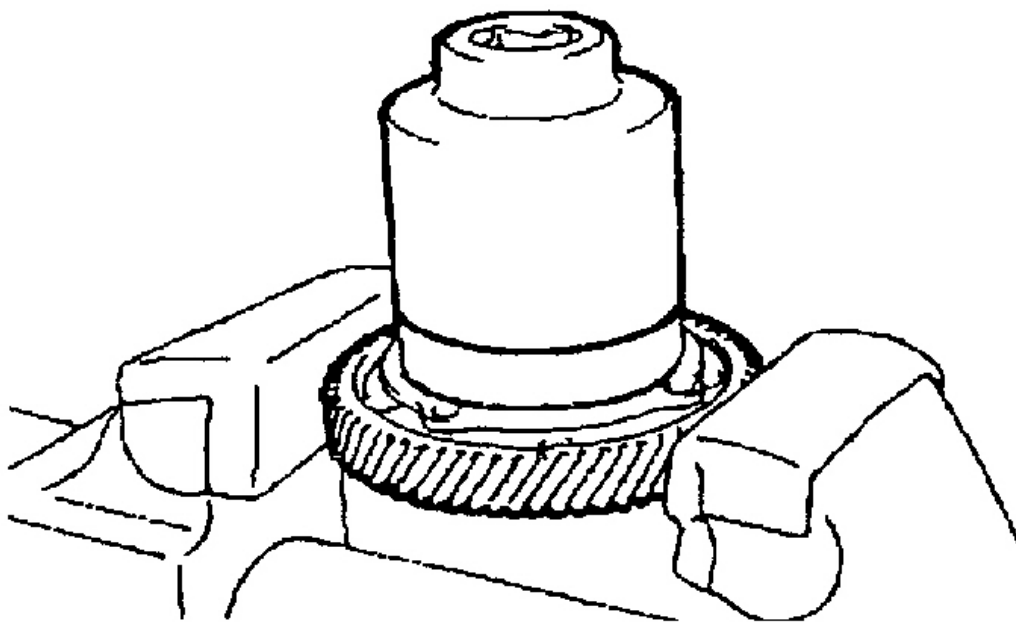
1. Cock the lock nut only enough to turn.



G01092597

Fig. 290: Loosening Transfer Drive Gear Lock Nut
Courtesy of KIA MOTORS AMERICA, INC.

2. Remove the output gear and the parking brake gear using the special tool.

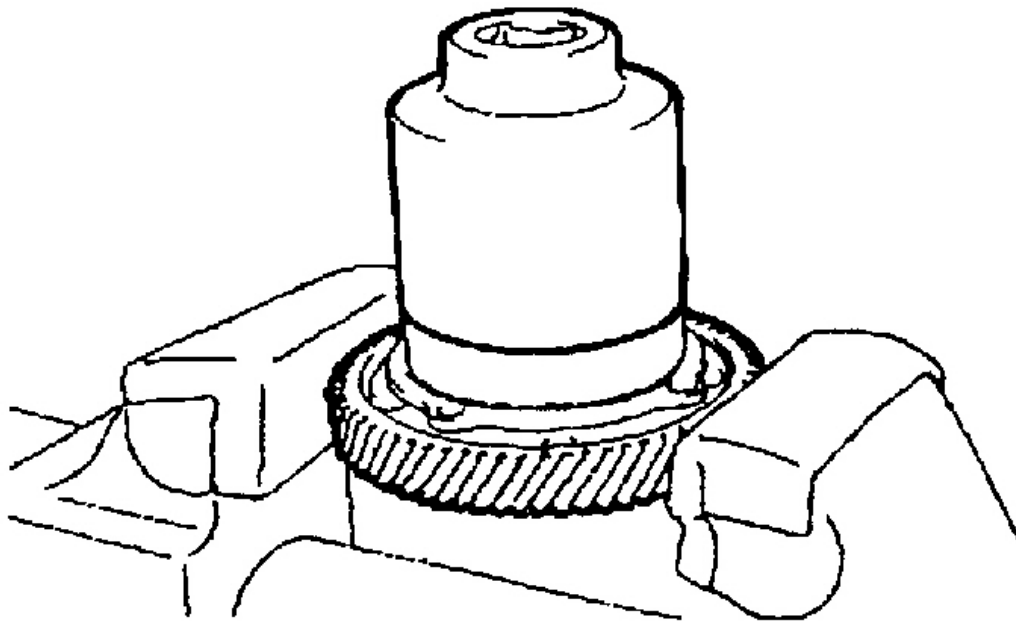


G01092598

Fig. 291: Removing The Output Gear And The Parking Brake Gear
Courtesy of KIA MOTORS AMERICA, INC.

REASSEMBLY

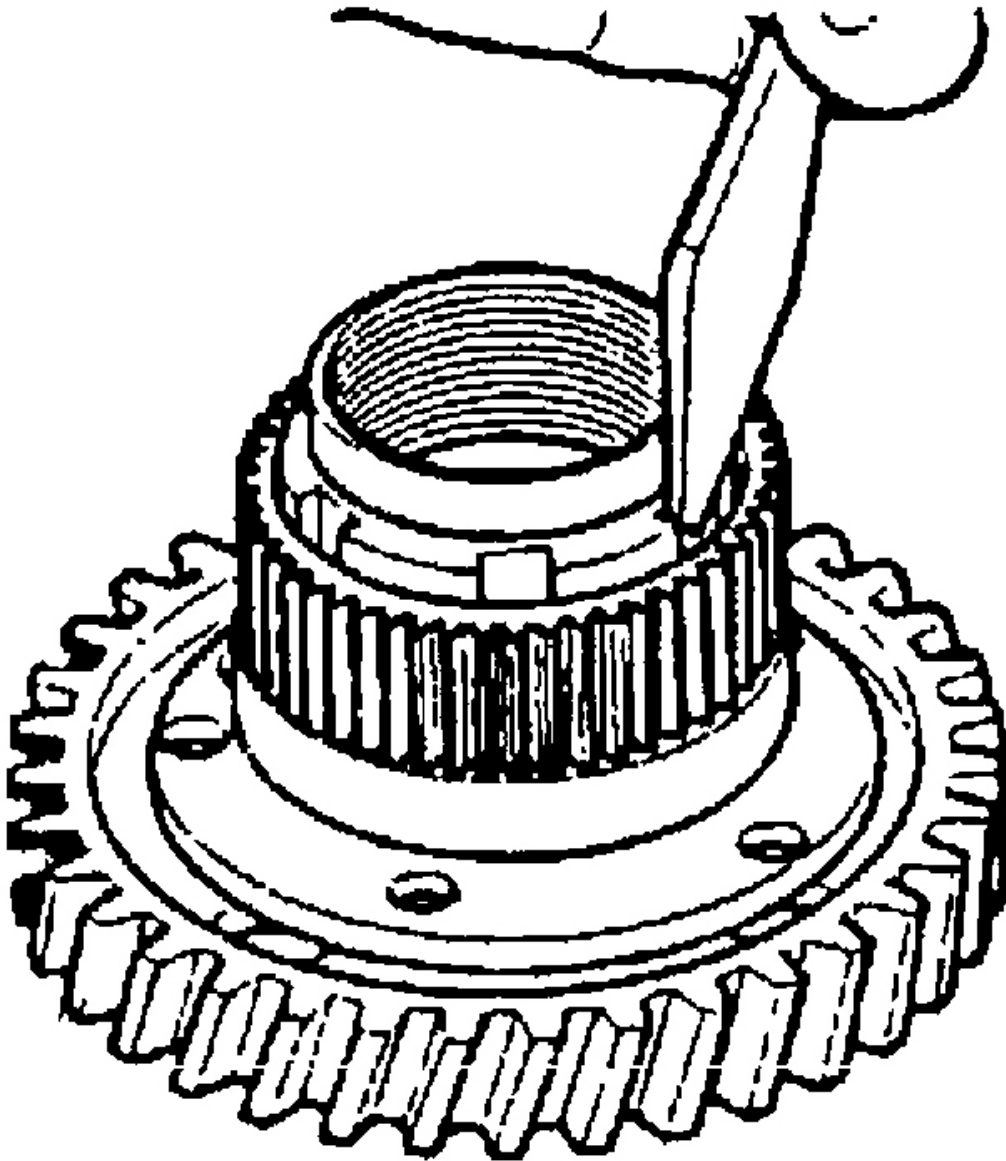
1. Assemble the transfer drive gear bearing.



G01092599

Fig. 292: Assembling The Transfer Drive Gear Bearing
Courtesy of KIA MOTORS AMERICA, INC.

2. Apply ATF on a new lock nut and tighten it with tightening torque.
Release it one revolution and retighten it with tightening torque.
3. Tighten the lock nut with punch (2 points).

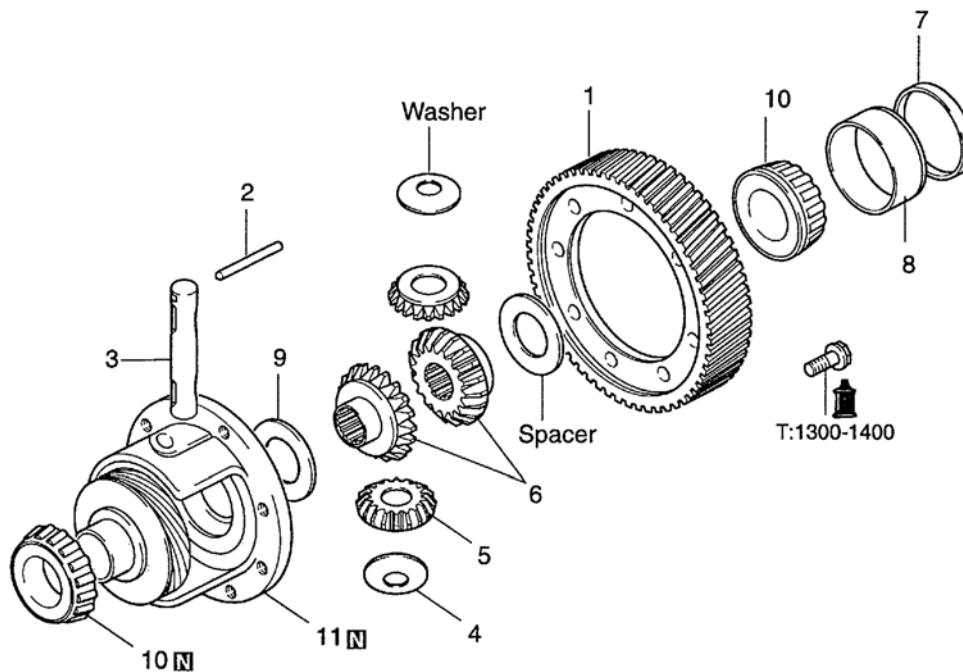


G01092600

Fig. 293: Tightening The Lock Nut With Punch
Courtesy of KIA MOTORS AMERICA, INC.

DIFFERENTIAL

COMPONENTS



1. Differential drive gear
2. Lock pin
3. Pinion shaft
4. Washer
5. Pinion gear
6. Side gear

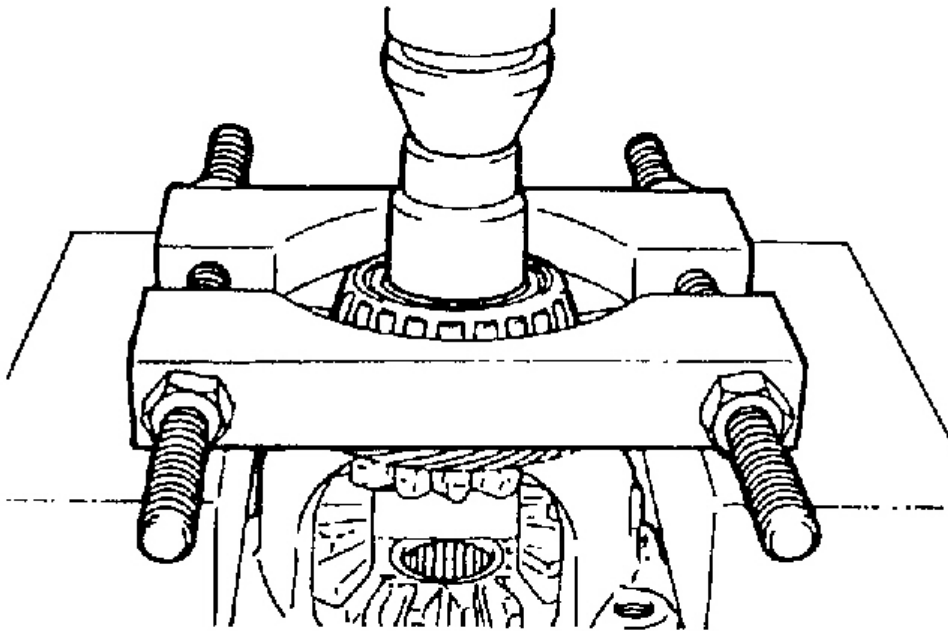
7. Spacer
8. Outer race
9. Spacer
10. Taper roller bearing
11. Differential case

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Fig. 294: Exploded View Of Differential
 Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY

Remove the taper roller bearing.



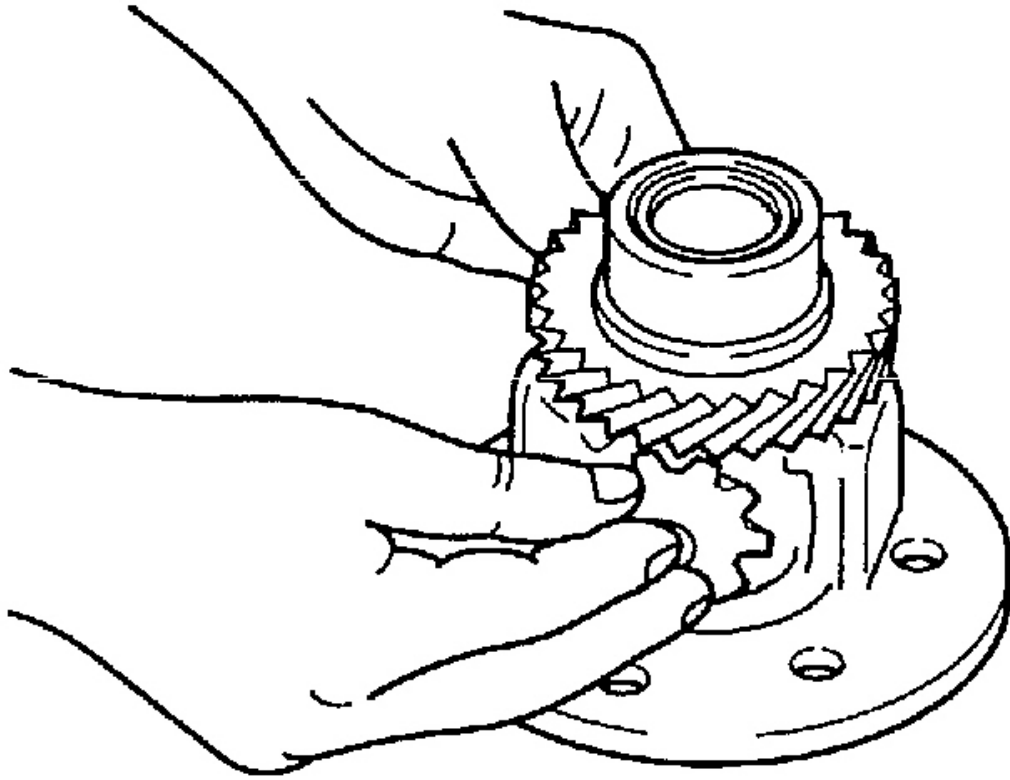
G01092602

Fig. 295: Removing The Taper Roller Bearing
Courtesy of KIA MOTORS AMERICA, INC.

REASSEMBLY

1. Remove the spacer, the side gear, the washer, the pinion and the pinion shaft.
 - Connect the side gear with the spacer, and install the side gear into differential case.

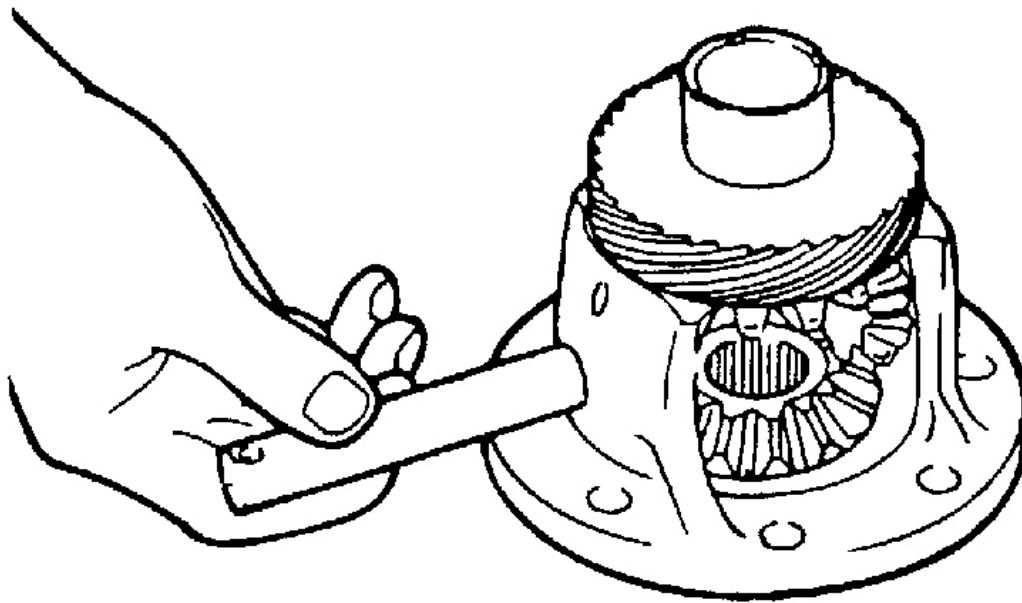
NOTE: Use a spacer of neutral thickness 0.037-0.039 in (0.93-1.00 mm) for a new side gear.



G01092603

Fig. 296: Installing The Side Gear Into Differential Case
Courtesy of KIA MOTORS AMERICA, INC.

- Connect the washer to the pinion and install them simultaneously at the point so that they may lock with the side gear.
- Install the pinion shaft.

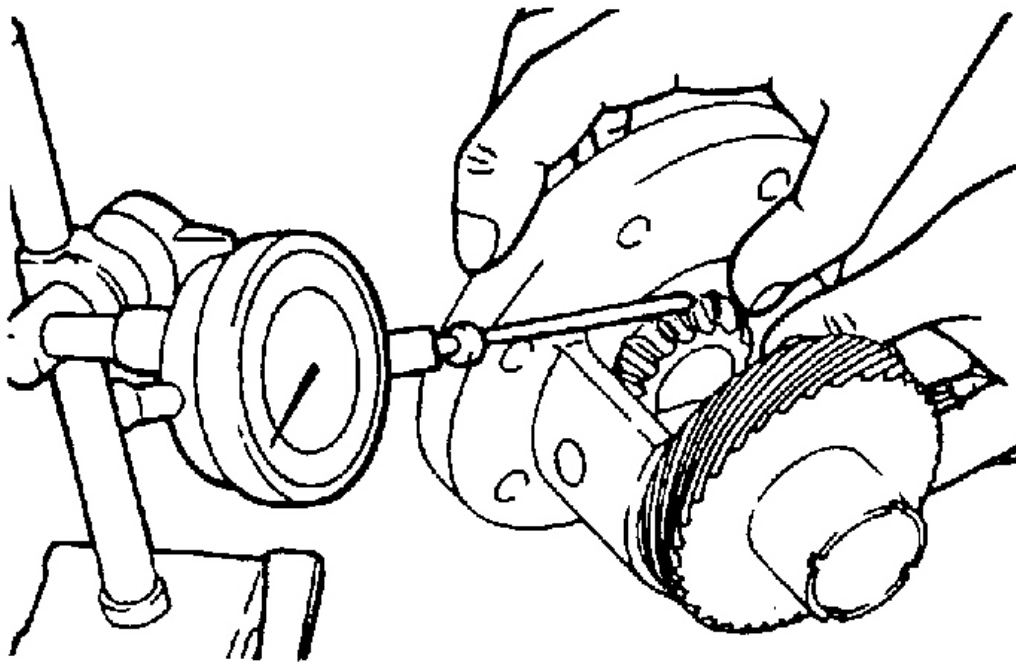


G01092604

Fig. 297: Installing The Pinion Shaft
Courtesy of KIA MOTORS AMERICA, INC.

- Check the side gear pinion backlash and install a proper spacer.

Standard value: 0.00098-0.0059 in (0.025-0.150 mm)

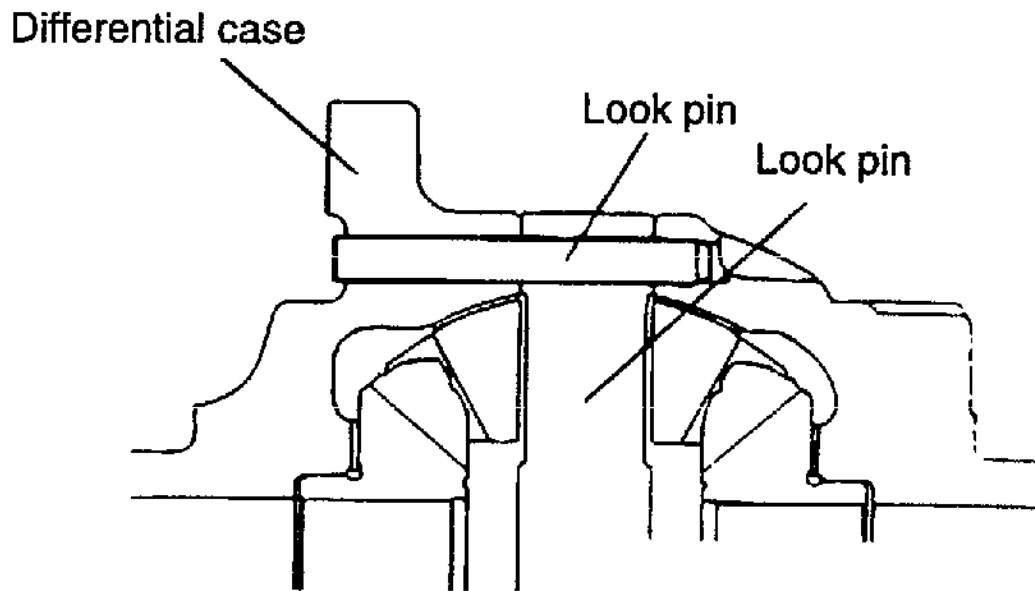


G01092605

Fig. 298: Measuring Side Gear Pinion Backlash
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Adjust backlashes at both sides to be within standard value.

2. Install the lock pin. Install the lock pin at the direction illustrated on the figure.

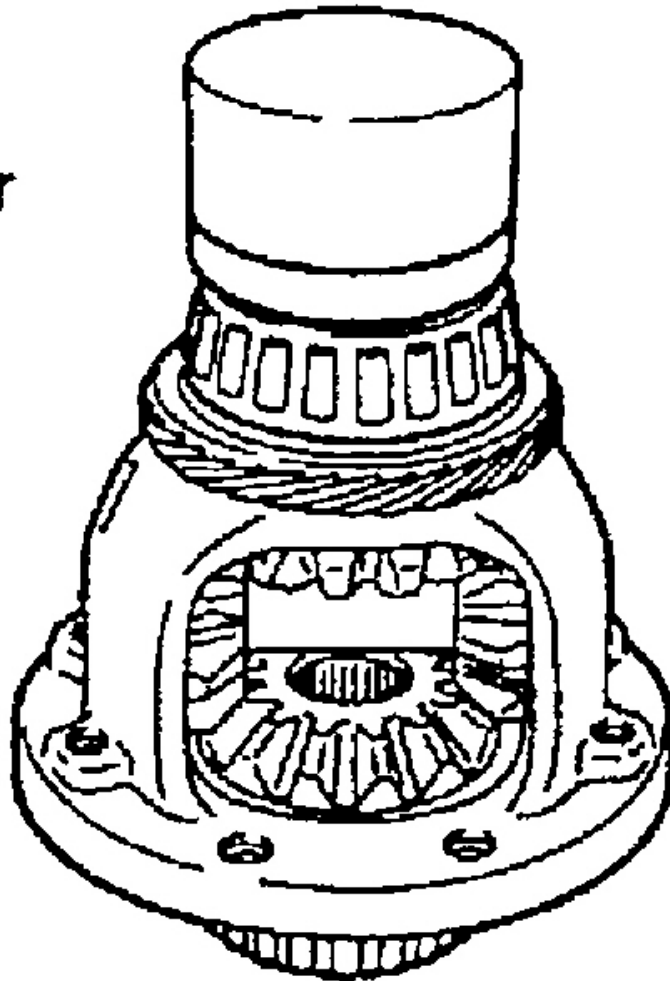


G01092606

Fig. 299: Installing The Lock Pin
Courtesy of KIA MOTORS AMERICA, INC.

3. Install the taper roller bearing.

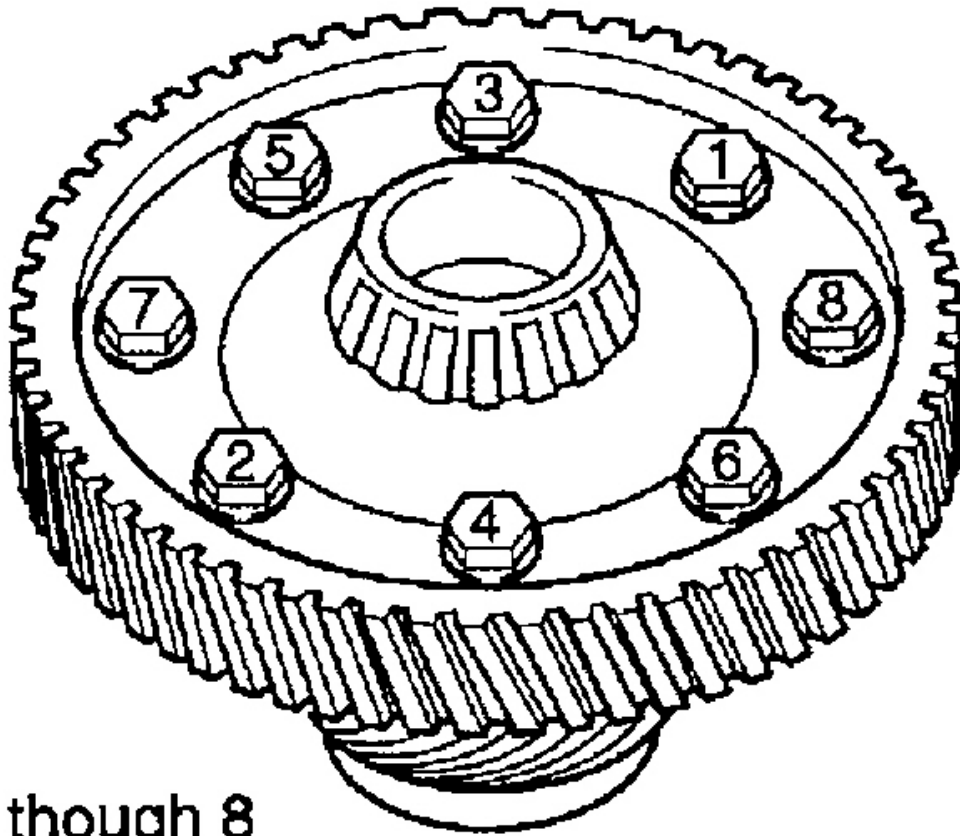
Taper roller bearing



G01092607

Fig. 300: Installing The Taper Roller Bearing
Courtesy of KIA MOTORS AMERICA, INC.

4. Install the differential drive gear.
5. Apply ATF on bolts and install them in the order illustrated on the figure and tighten them with tightening torque.



1 through 8
indicate tightening sequence

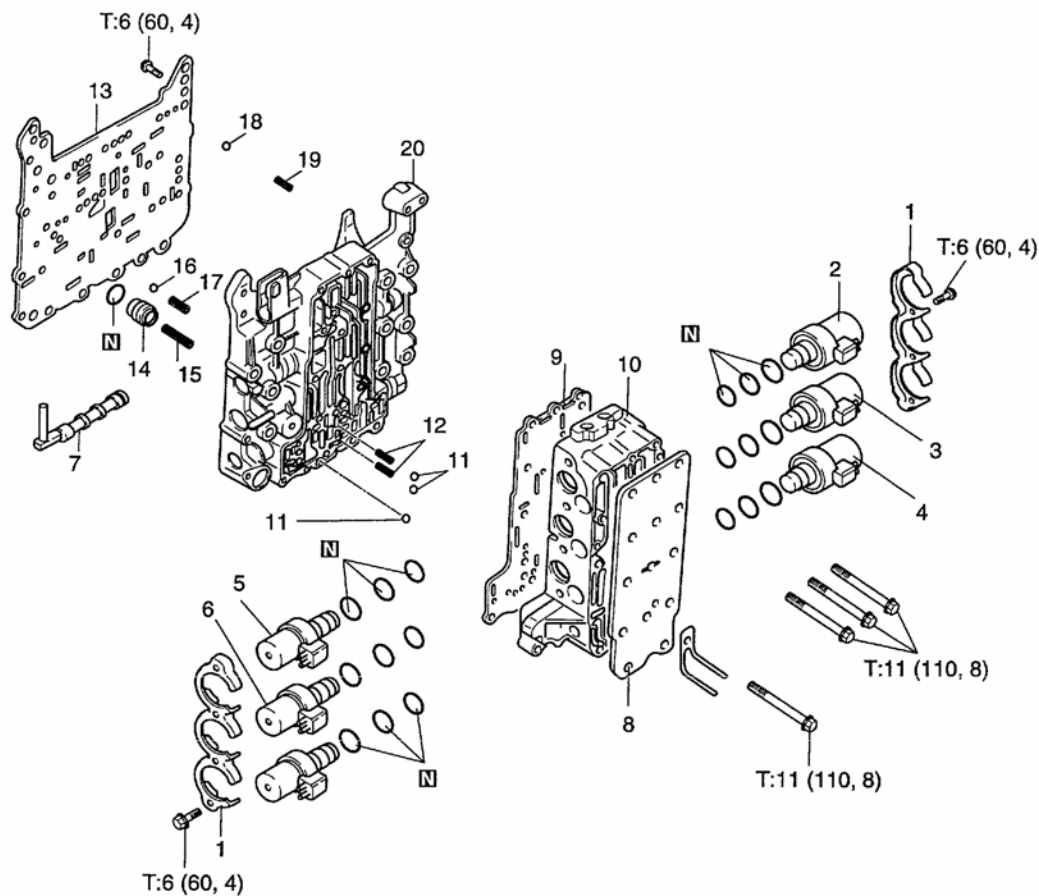
G01092608

Fig. 301: Installing The Differential Drive Gear
Courtesy of KIA MOTORS AMERICA, INC.

VALVE BODY

DISASSEMBLY

Remove each solenoid valve. Mark each installation point with white paint or so.

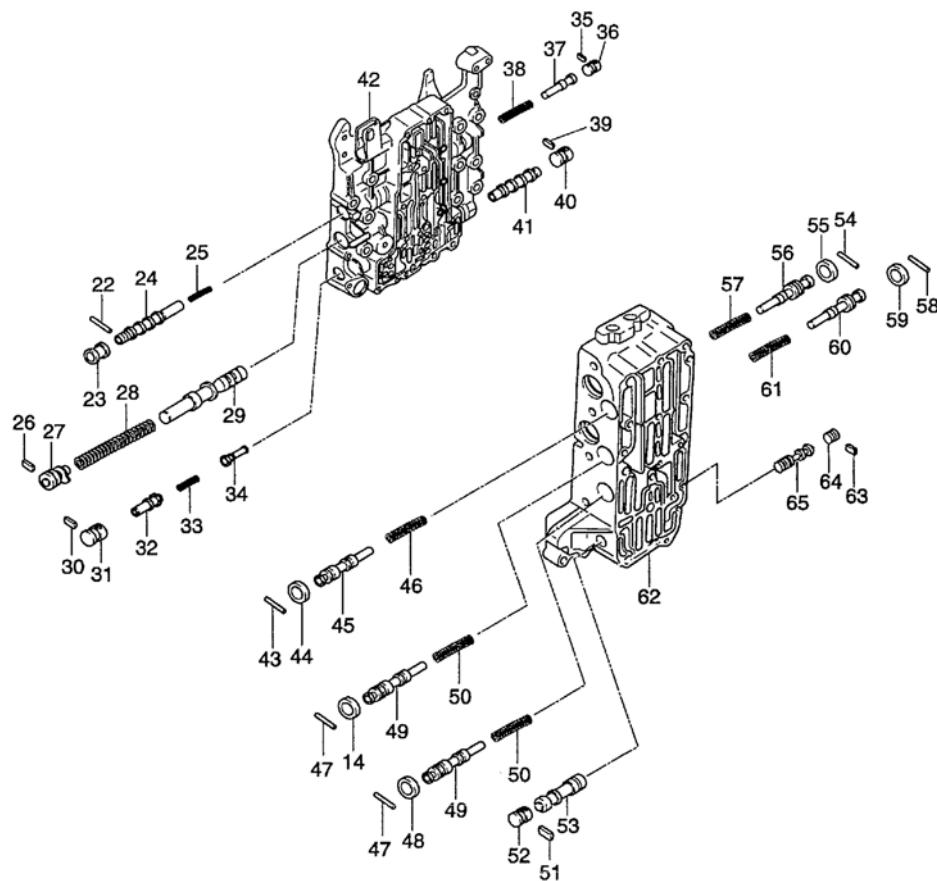


1. Solenoid valve support
2. UD clutch solenoid valve
3. 2nd brke solenoid valve
4. Damper clutch control solenoid valve
5. OD clutch solenoid valve
6. L&R brake solenoid valve
7. Manual valve
8. Cover
9. Plate
10. Outside valve body assembly

11. Still ball (Orifice check ball)
12. Spring
13. Plate
14. Damping valve
15. Damping valve spring
16. Steel ball (line relief)
17. Spring
18. Steel ball (Orifice check ball)
19. Spring
20. Inside valve body assembly

G01092609

Fig. 302: Illustrating Valve Body Disassembly Procedure (1 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.



Disassembly procedure

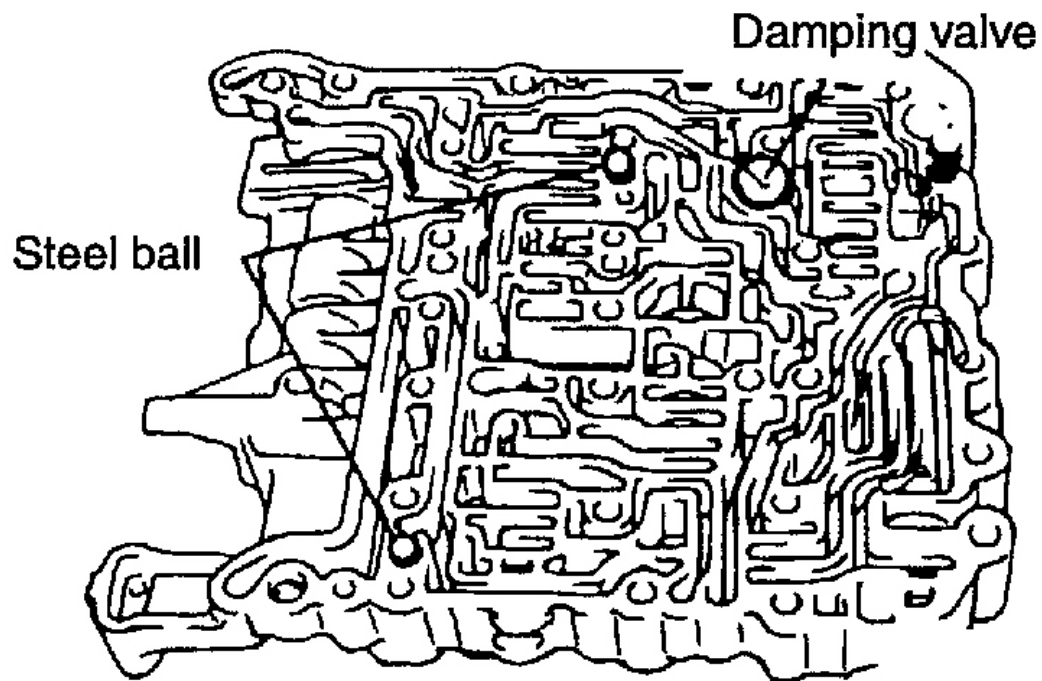
- | | | |
|--|---|--|
| 22. Roller | 40. Failsafe B sleeve | 53. Switch valve |
| 23. Damper clutch control valve sleeve | 41. Failsafe B | 54. Roller |
| 24. Damper clutch control valve | 42. Inside valve body | 55. Underdrive pressure control valve sleeve |
| 25. Damper clutch control valve spring | 43. Roller | 56. Underdrive pressure control valve |
| 26. Plate | 44. Overdrive pressure control valve sleeve | 57. Underdrive pressure control valve spring |
| 27. Screw | 45. Overdrive pressure control valve | 58. Roller |
| 28. Regulator valve spring | 46. Overdrive pressure control valve spring | 59. Second pressure control valve sleeve |
| 29. Regulator valve | 47. Roller | 60. Second pressure control valve |
| 30. Plate | 48. Low and reverse pressure control valve sleeve | 61. Second pressure control valve spring |
| 31. Failsafe valve A sleeve | 49. Low and reverse pressure control valve | 62. Outside valve body |
| 32. Failsafe valve A2 | 50. Low and reverse pressure control valve spring | 63. Plate |
| 33. Failsafe A spring | 51. Plate | 64. Failsafe valve C sleeve |
| 34. Failsafe valve A1 | 52. Plug | 65. Failsafe valve C |
| 35. Plate | | |
| 36. Plug | | |
| 37. Torque converter valve | | |
| 38. Torque converter valve spring | | |
| 39. Plate | | |

G01092610

Fig. 303: Illustrating Valve Body Disassembly Procedure (2 Of 2)
Courtesy of KIA MOTORS AMERICA, INC.

REASSEMBLY

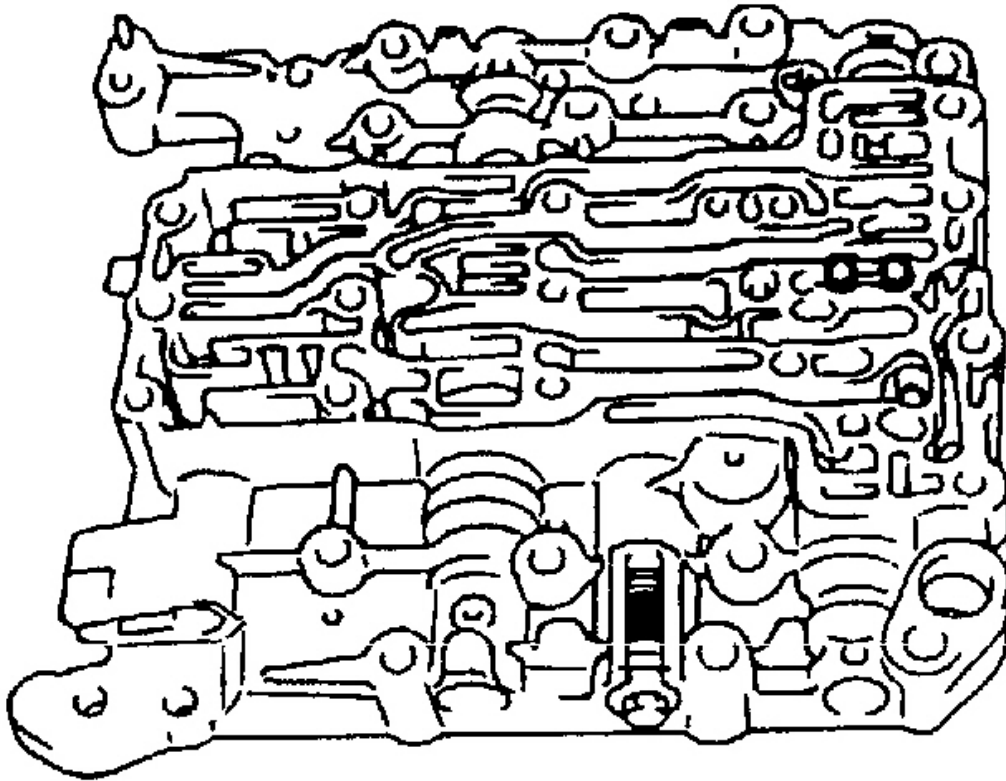
1. Install the spring/steel ball/damping valve/damping valve spring.



G01092611

Fig. 304: Installing The Spring/Steel Ball/Damping Valve/Damping Valve Spring
Courtesy of KIA MOTORS AMERICA, INC.

2. Install the spring/steel ball.



G01092612

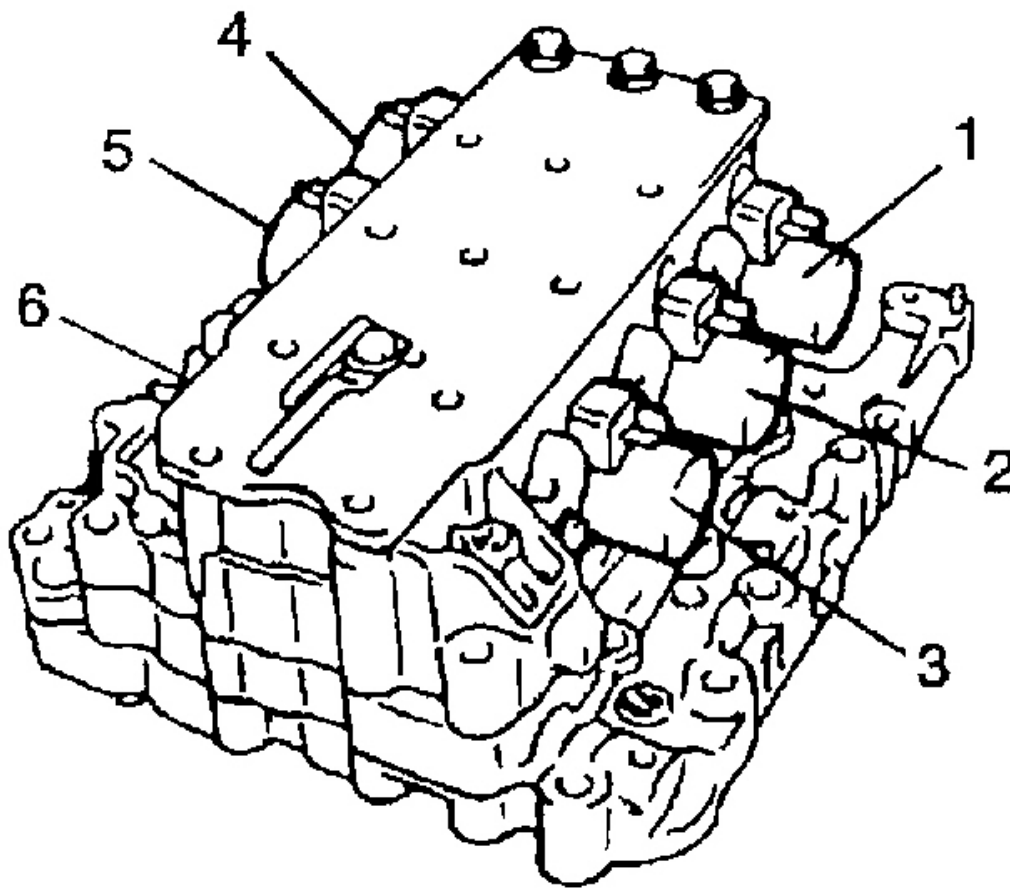
Fig. 305: Installing The Spring/Steel Ball
Courtesy of KIA MOTORS AMERICA, INC.

3. Install each solenoid valve.
 - Apply ATF or white vaseline on the O-ring and assemble it caring not to damage it.
 - Remove the marking made in disassembly and install them.

No.	Name
1	Underdrive solenoid valve
2	Second solenoid valve
3	Damper clutch control solenoid valve
4	Overdrive solenoid valve
5	Low and reverse solenoid valve
6	Reduction solenoid valve (5 A/T)

G01092613

Fig. 306: Positioning Solenoid Valves
Courtesy of KIA MOTORS AMERICA, INC.

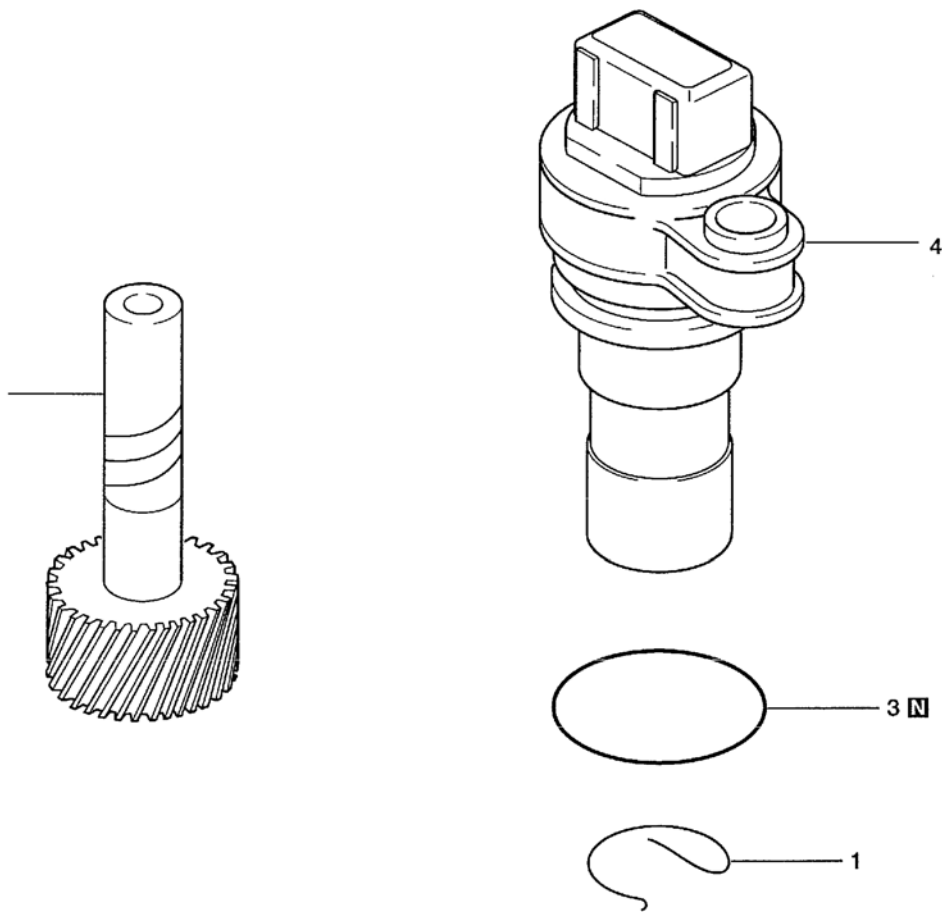


G01092614

Fig. 307: Installing Each Solenoid Valve
Courtesy of KIA MOTORS AMERICA, INC.

SPEEDOMETER CABLE

COMPONENTS



Disassembly procedure

1. E-clip
2. Speedometer driven gear

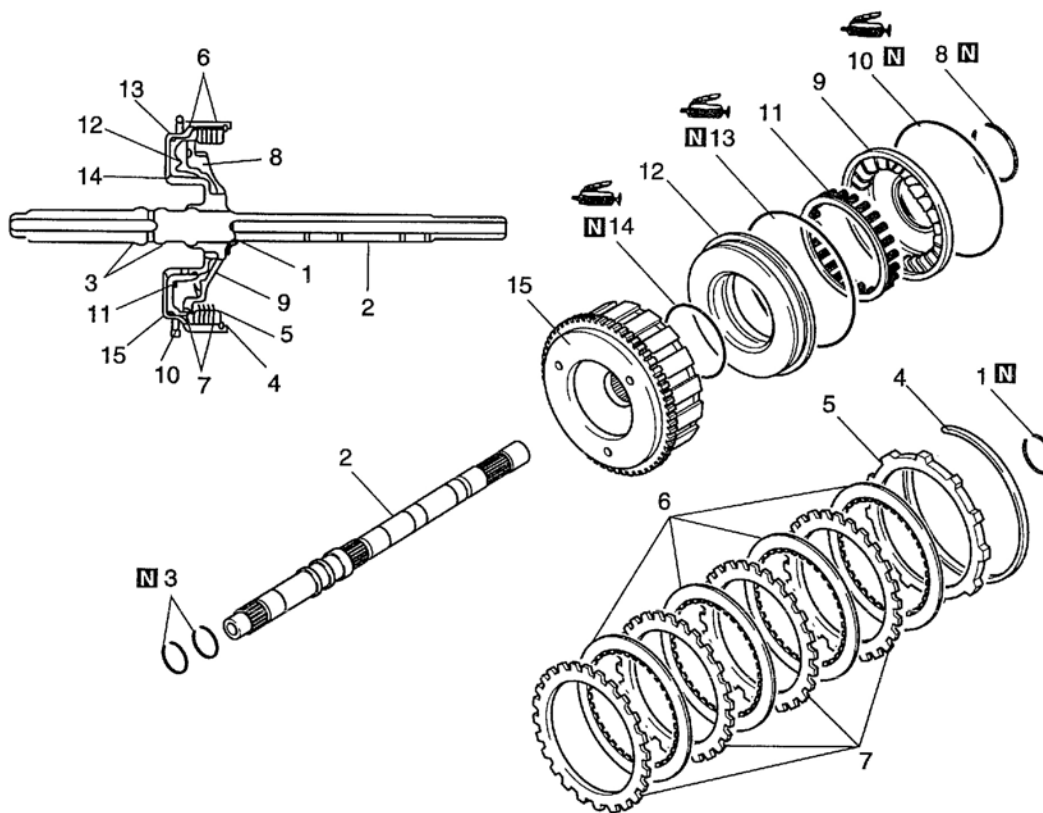
G01092615

3. O-ring
4. Sleeve

Fig. 308: Exploded View Of Speedometer Cable Drive
Courtesy of KIA MOTORS AMERICA, INC.

UNDERDRIVE CLUTCH

COMPONENTS



N Marked part shall be replaced with new part.

Disassembly procedure

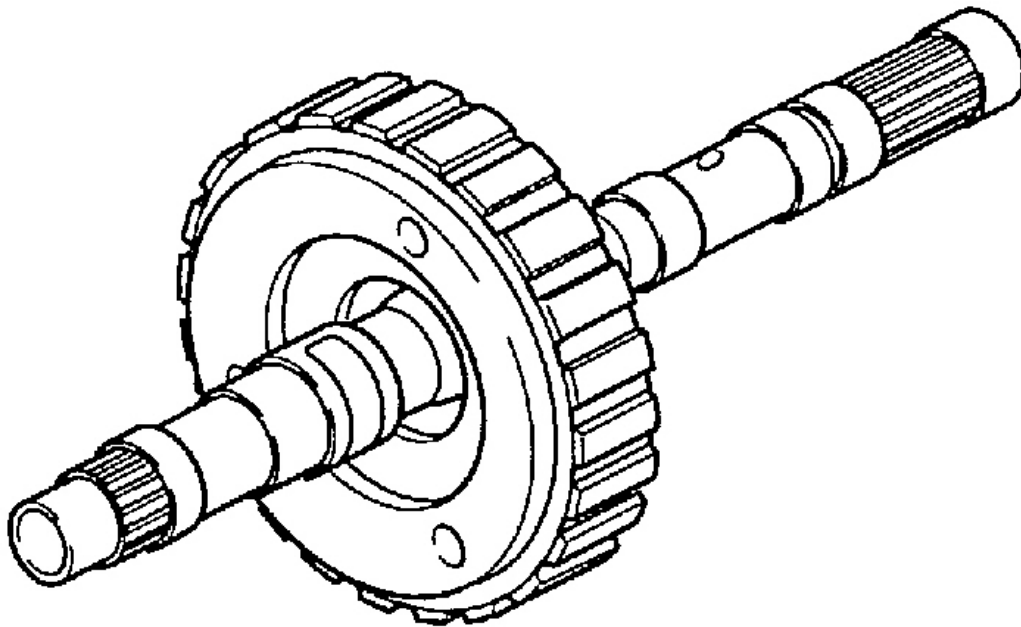
- | | |
|--------------------------|--------------------------------------|
| 1. Snap ring | 9. Underdrive clutch spring retainer |
| 2. Input shaft | 10. O-ring |
| 3. Seal ring | 11. Return spring |
| 4. Snap ring | 12. Underdrive clutch piston |
| 5. Clutch reaction plate | 13. O-ring |
| 6. Clutch disc | 14. O-ring |
| 7. Clutch plate | 15. Underdrive clutch retainer |
| 8. Snap ring | |

G01092616

Fig. 309: Exploded View Of Underdrive Clutch
Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY

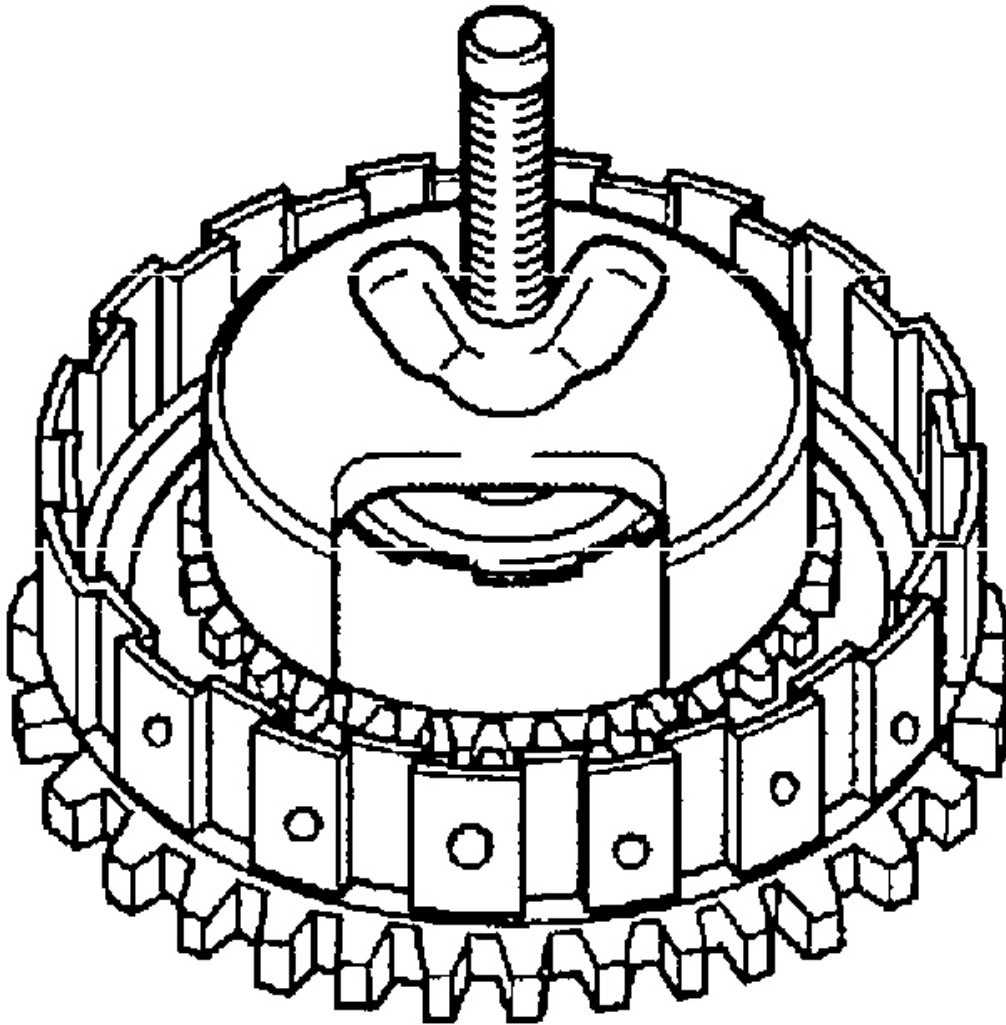
1. Remove the input shaft snap ring.



G01092617

Fig. 310: Removing The Input Shaft Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

2. Disconnect the input shaft.
3. Remove seal rings (two).
4. Remove the clutch reaction plate snap ring.
5. Disconnect the clutch reaction plate.
6. Disassemble the clutch disc (four) and plates (four).
7. Remove the under clutch piston snap ring using the special tool.



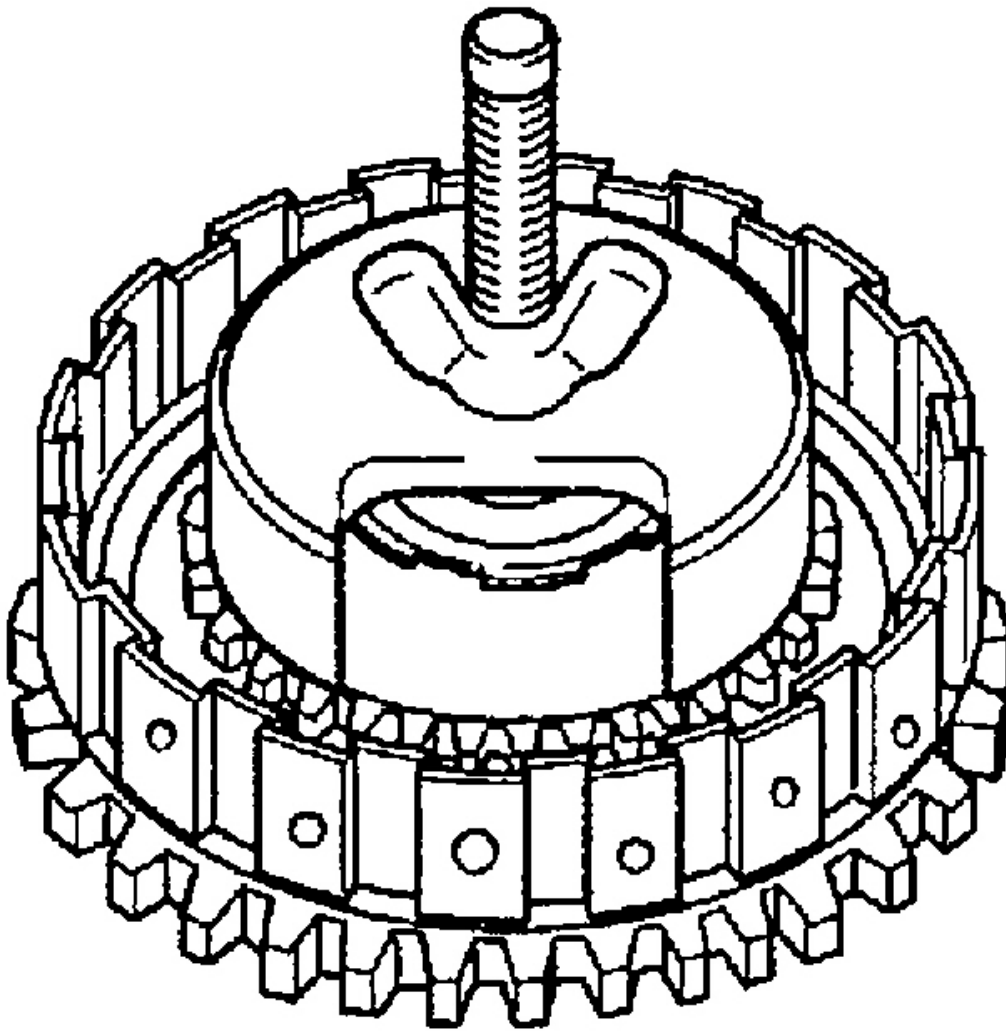
G01092618

Fig. 311: Removing The Under Clutch Piston Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

8. Remove the clutch spring retainer.
9. Remove the O-ring.
10. Remove the clutch return spring.
11. Remove the under clutch piston using compressed air.
12. Remove the O-rings (two).

REASSEMBLY

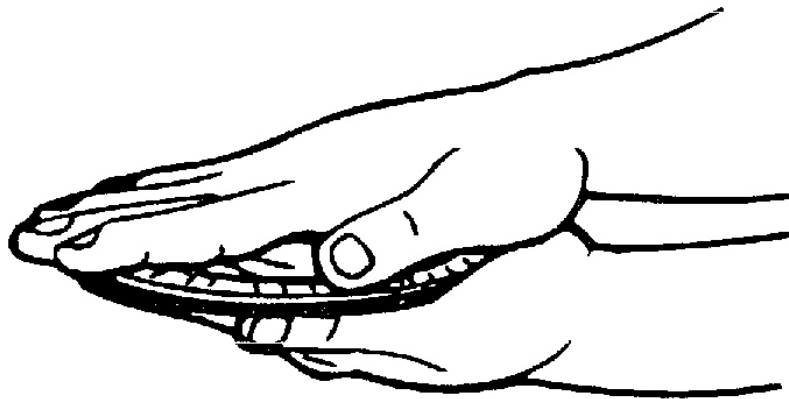
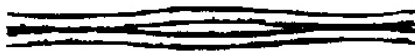
1. Install the O-ring (two).
2. Install the underdrive clutch piston.
3. Install the clutch return spring.
4. Install the O-ring.
5. Install the clutch spring retainer.
6. Install the clutch spring retainer snap ring using the special tool.



G01092619

Fig. 312: Installing The Clutch Spring Retainer Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Hold the 2 clutch discs together, and slide them a little, If there is a gap, they are wave discs.



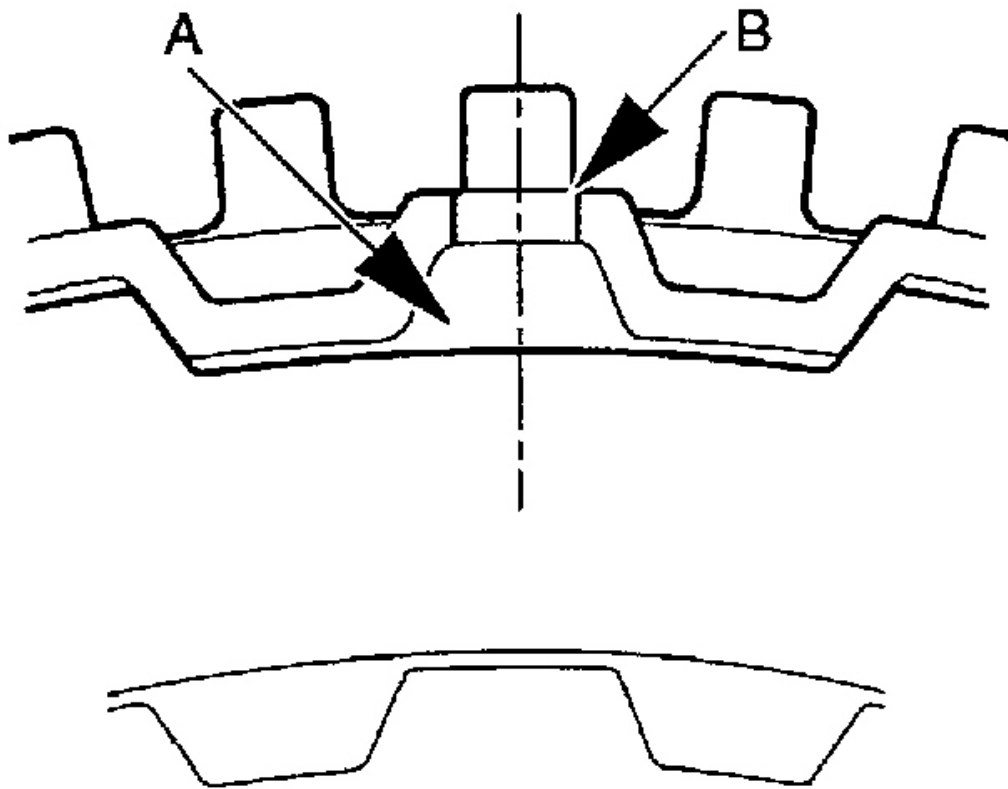
G01092620

Fig. 313: Determining Wave Discs

Courtesy of KIA MOTORS AMERICA, INC.

7. Align the teeth of the clutch plate, the clutch disc and the clutch reaction plate (**Fig. 314**), and hold the under-drive clutch (fig.B).

CAUTION: Dip the clutch disc in ATF sufficiently before assembly.



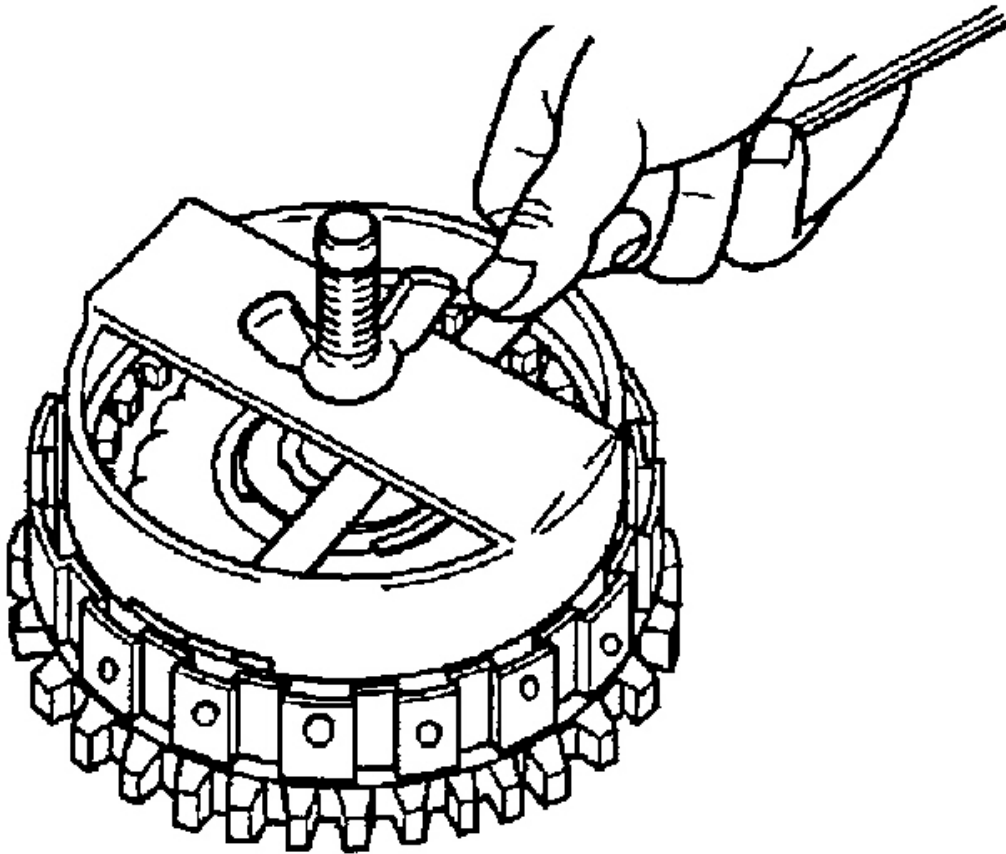
G01092621

Fig. 314: Aligning Clutch Discs

Courtesy of KIA MOTORS AMERICA, INC.

8. Install the clutch reaction plate in the direction on figure.
9. Install the snap ring.
10. Check the gap between the snap ring and the reaction plate.

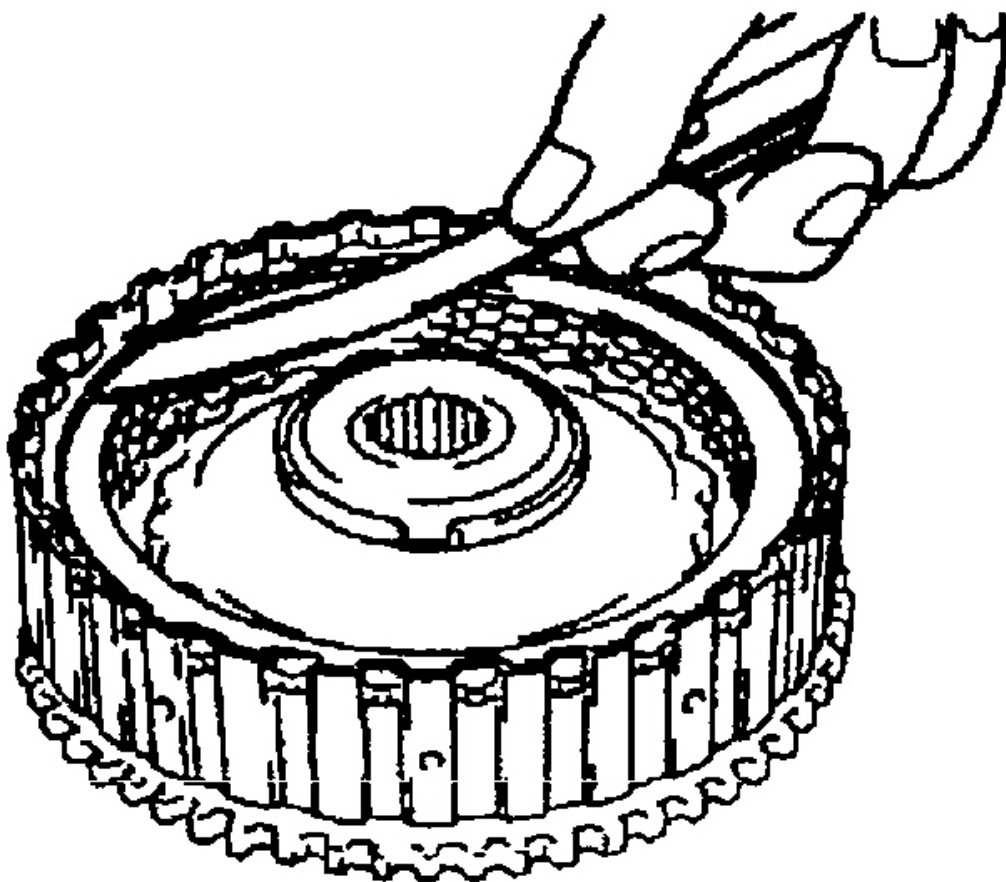
Standard value, F5A51-3: 0.063-0.071 in. (1.6-1.8mm)



G01092622

Fig. 315: Measuring Gap Between The Snap Ring And The Reaction Plate
Courtesy of KIA MOTORS AMERICA, INC.

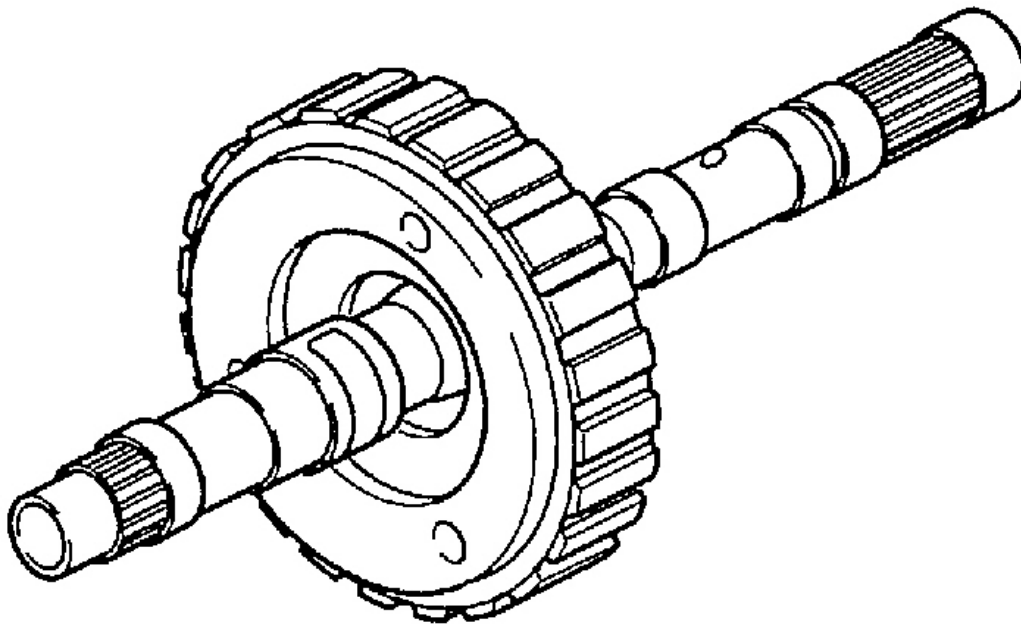
11. If the gap deviates from standard value, choose a proper snap ring (15 sizes).



G01092623

Fig. 316: Measuring Gap Between The Snap Ring And The Reaction Plate
Courtesy of KIA MOTORS AMERICA, INC.

12. Install the underdrive clutch assembly on the input shaft.



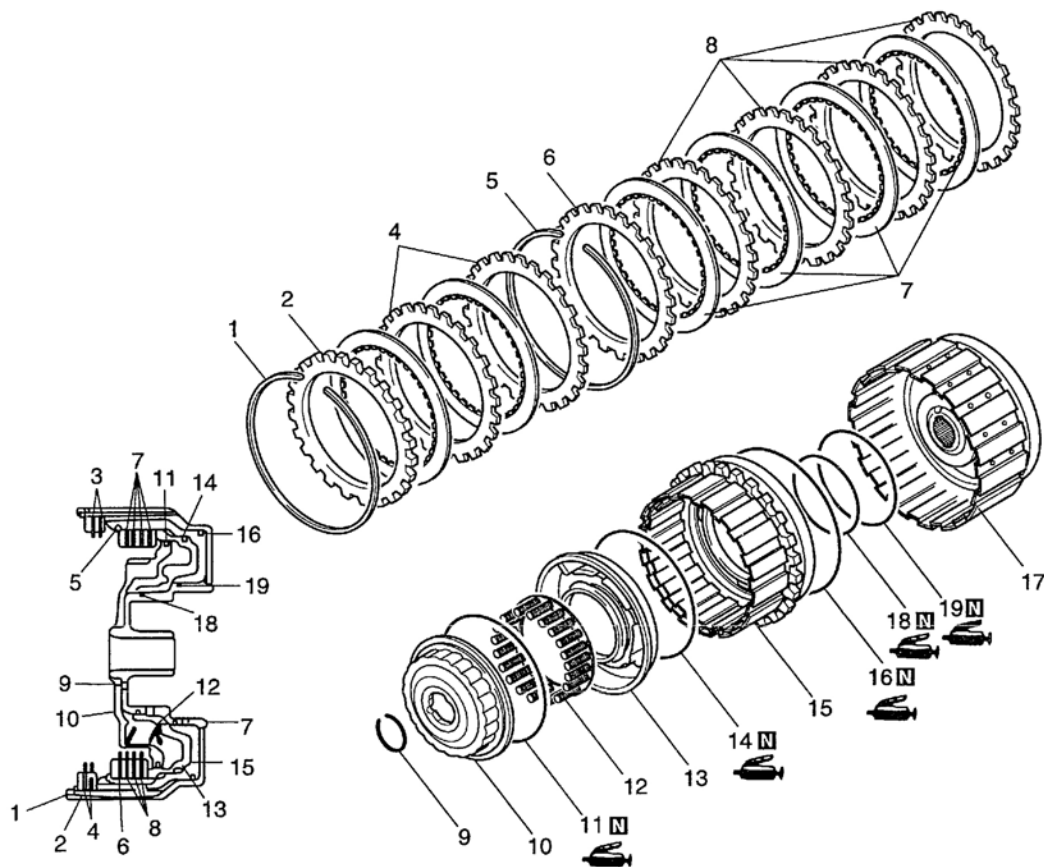
G01092624

Fig. 317: Installing The Underdrive Clutch Assembly On The Input Shaft
Courtesy of KIA MOTORS AMERICA, INC.

13. Install the snap ring on the input shaft.

REVERSE AND OVERDRIVE CLUTCH

COMPONENTS



☐ Marked part shall be replaced with new part.

Disassembly steps

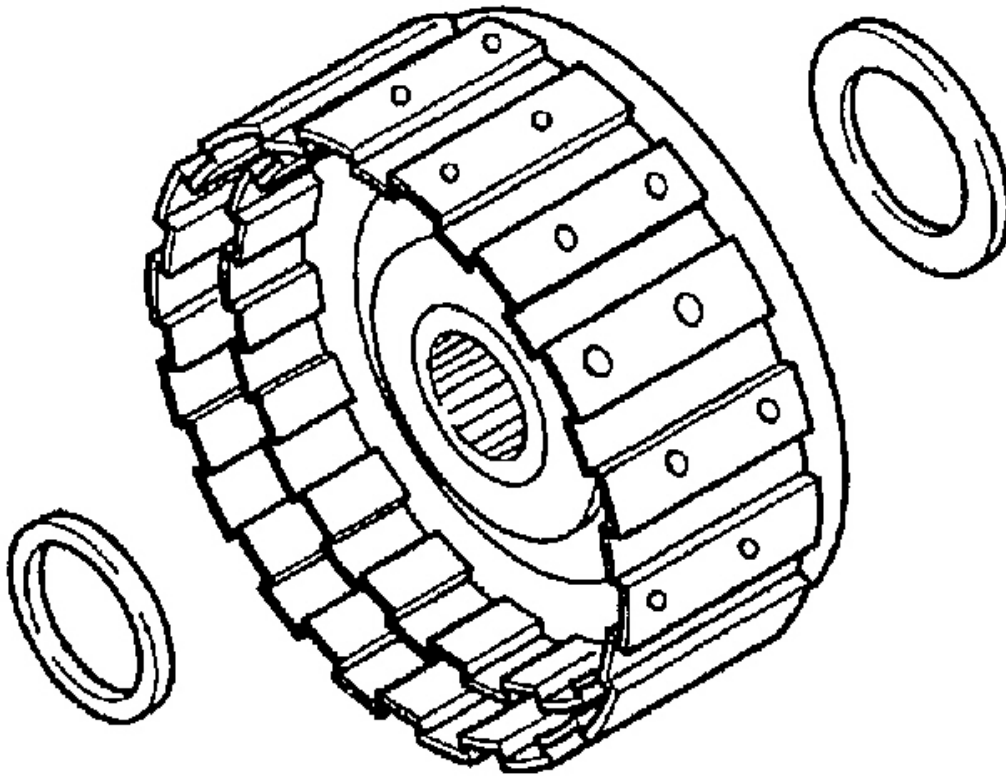
- | | |
|--------------------------|-----------------------------|
| 1. Snap ring | 11. O-ring |
| 2. Clutch reaction plate | 12. Return spring |
| 3. Clutch disc | 13. Overdrive clutch piston |
| 4. Clutch plate | 14. O-ring |
| 5. Snap ring | 15. Reverse clutch piston |
| 6. Clutch reaction plate | 16. O-ring |
| 7. Clutch disc | 17. Reverse clutch retainer |
| 8. Clutch plate | 18. O-ring |
| 9. Snap ring | 19. O-ring |
| 10. Spring retainer | |

G01092625

Fig. 318: Exploded View Of Reverse And Overdrive Clutch
Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY

1. Remove the overdrive clutch reaction plate snap ring.

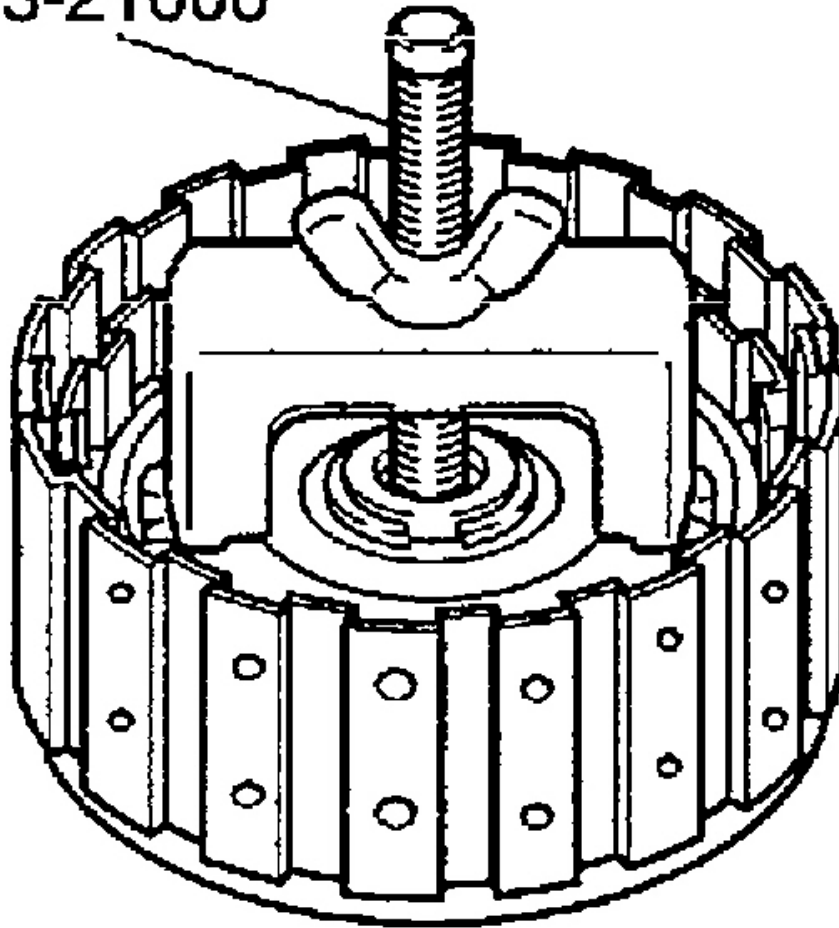


G01092626

Fig. 319: Removing The Overdrive Clutch Reaction Plate Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

2. Remove the overdrive reaction plate.
3. Remove the overdrive clutch discs (four) and the plates (four).
4. Remove the reverse clutch reaction plate snap ring.
5. Remove the reverse clutch reaction plate.
6. Remove the reverse clutch discs (two) and the plates (two).
7. Remove the clutch spring retainer snap ring using special tool.

09453-21000



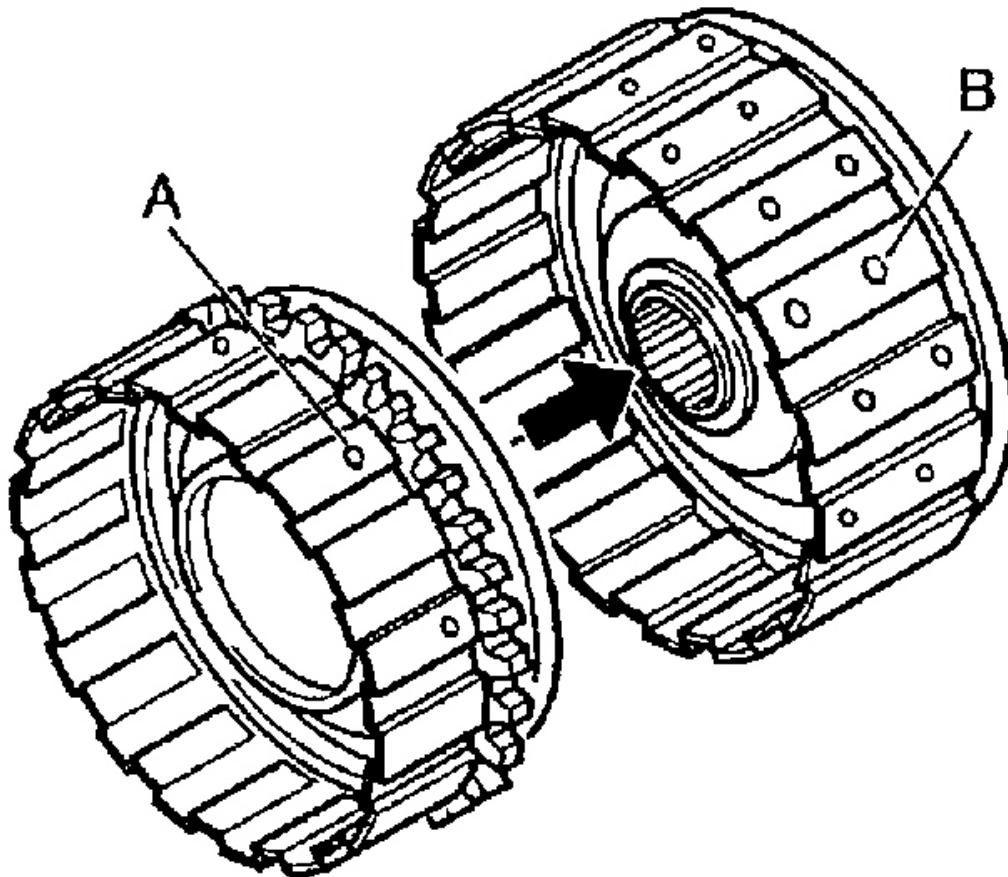
G01092627

Fig. 320: Removing The Clutch Spring Retainer Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

8. Disconnect the clutch spring retainer.
9. Remove the O-ring.
10. Remove the clutch return spring.
11. Remove the overdrive clutch piston using compressed air.
12. Remove the O-ring.
13. Remove the reverse clutch piston.
14. Remove the O-rings (three).

REASSEMBLY

1. Install the O-rings (three).
2. Connect the reverse retainer and reverse piston aligning holes A & B.



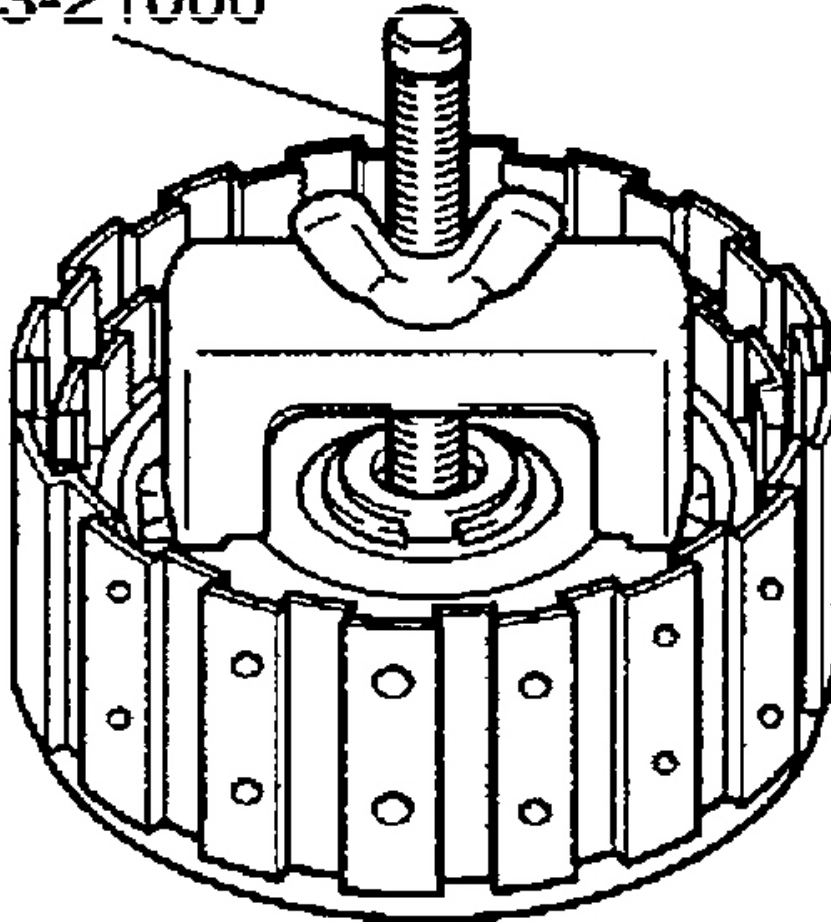
G01092628

Fig. 321: Aligning Holes A & B
Courtesy of KIA MOTORS AMERICA, INC.

3. Install the reverse clutch piston.
4. Install the O-ring.
5. Install the overdrive clutch piston.
6. Install the clutch return spring.

7. Install the O-ring.
8. Install the clutch spring retainer.
9. Install the overdrive clutch spring retainer snap ring using the special tool.

09453-21000

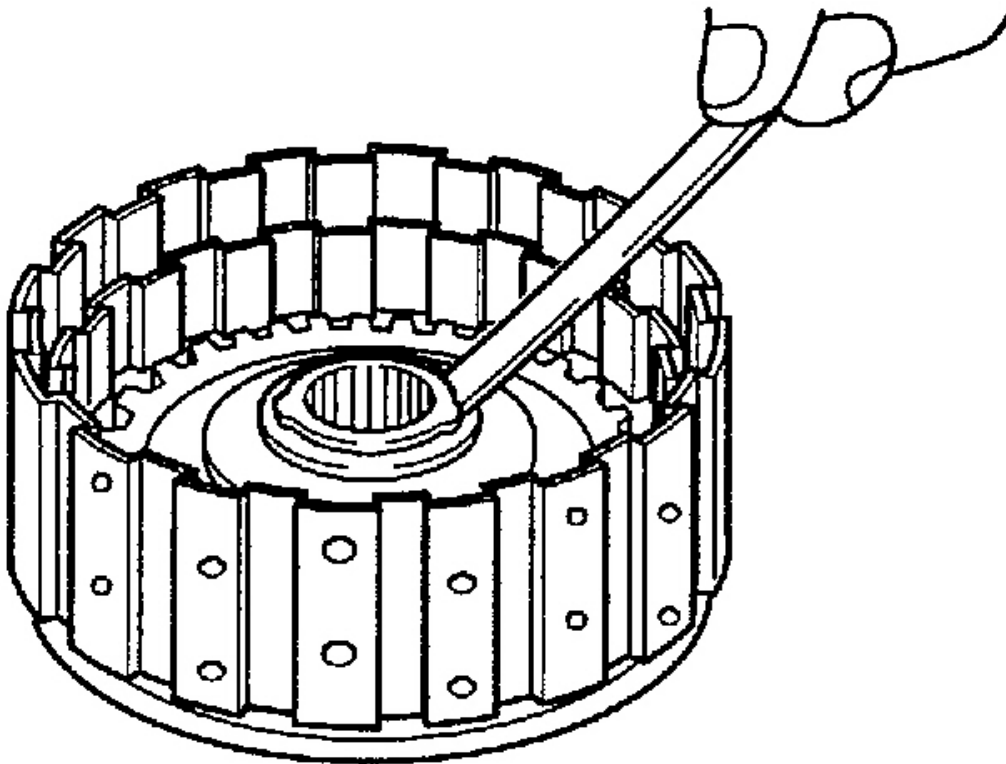


G01092629

Fig. 322: Installing The Overdrive Clutch Spring Retainer Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

10. Measure the gap with the snap rings by using special tool. If the gap deviates from standard value, use an appropriate snap ring (4 sizes).

End play: 0-0.035 in. (0.09 mm)

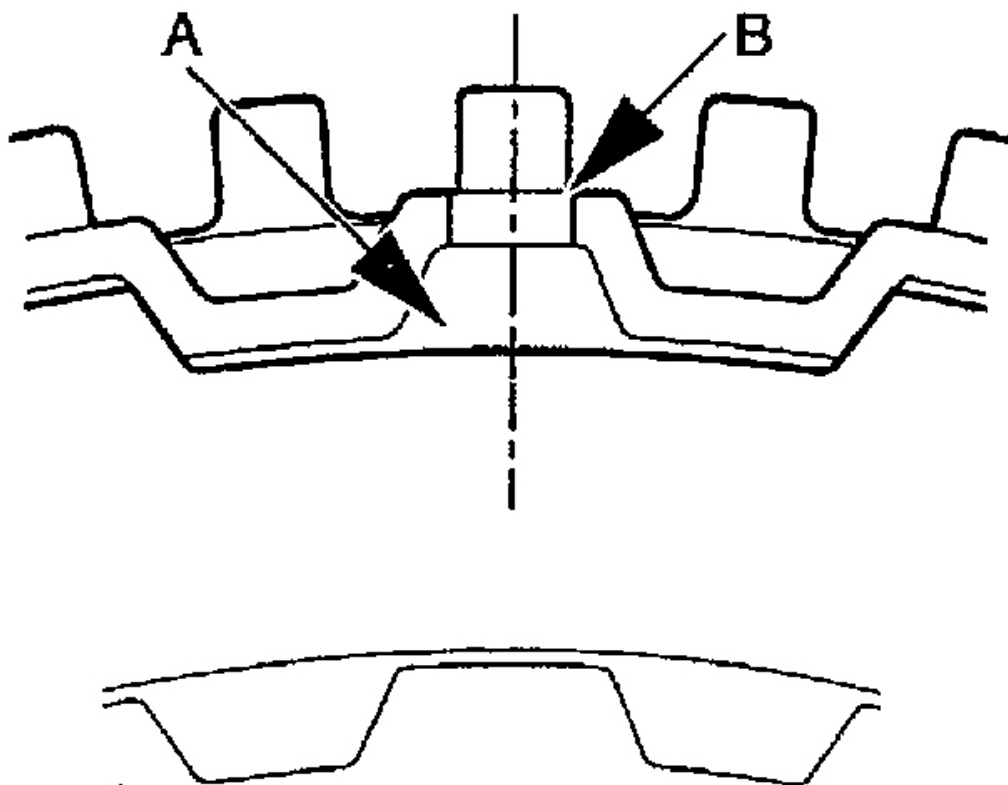


G01092630

Fig. 323: Measuring The Gap With The Snap Rings
Courtesy of KIA MOTORS AMERICA, INC.

CAUTION: Dip the clutch disc in ATF sufficiently before assembly.

11. Aligning the teeth of the clutch plate, the clutch disc, and the clutch reaction plate (A) and the reverse clutch retainer hole (B), assemble them. See **Fig. 324** .



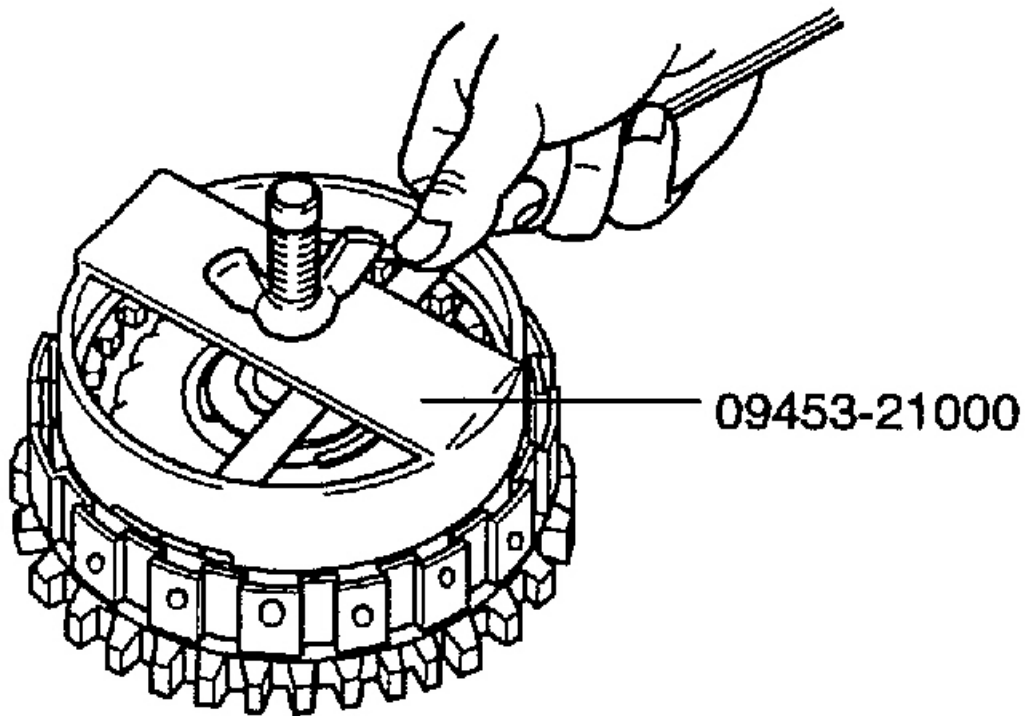
G01092631

Fig. 324: Aligning The Teeth Of The Clutch Plate
 Courtesy of KIA MOTORS AMERICA, INC.

12. Install the reverse clutch discs (two) and plates (two).
13. Install the reverse clutch reaction plate.
14. Install the snap ring.
15. Measure the gap between the reverse clutch reaction plate and the snap ring by using special tool. If the gap deviates from standard value, use an appropriate snap ring (4 sizes).

Standard value

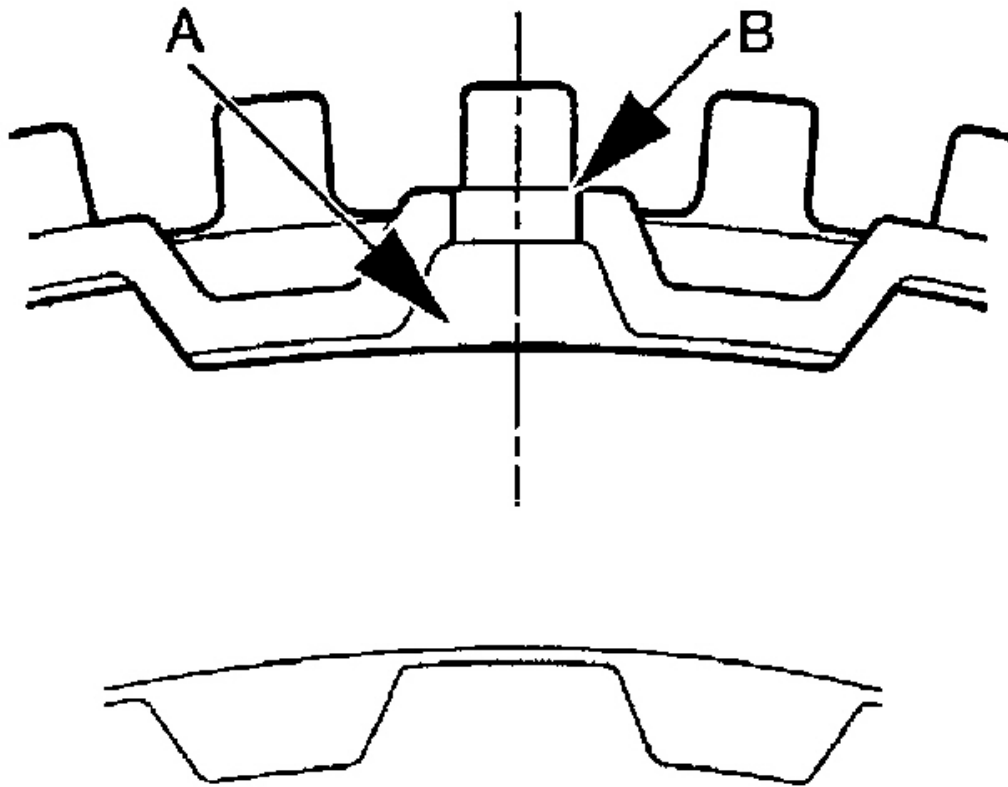
F5A51-3: 0.059-0.067 in (1.5-1.7mm)



G01092632

Fig. 325: Measuring The Gap Between The Reverse Clutch Reaction Plate And The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

16. Aligning the teeth of the clutch plate, the clutch disc, and the clutch reaction plate (A) and the overdrive clutch retainer hole (B), assemble them.



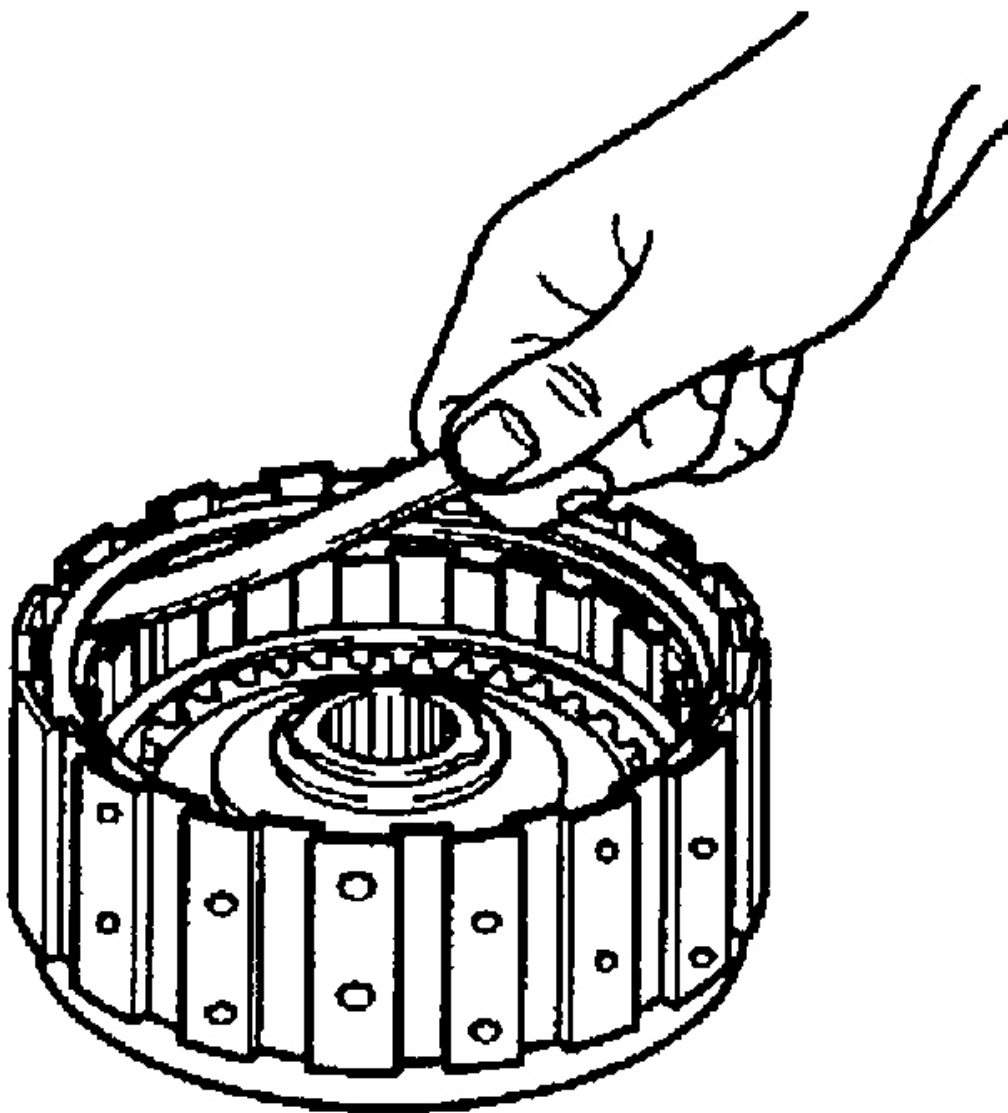
G01092633

Fig. 326: Aligning The Teeth Of The Clutch Plate, The Clutch Disc, And The Clutch Reaction Plate
Courtesy of KIA MOTORS AMERICA, INC.

17. Install the overdrive clutch discs (four) and plates (four).
18. Install the overdrive clutch reaction plate.
19. Install the snap ring.
20. Measure the gap between the overdrive reaction plate and the snap ring. If the gap deviates from standard value, use an appropriate snap ring (15 sizes).

Standard value

F5A51-3: 0.063-0.071 in (1.6-1.8 mm)

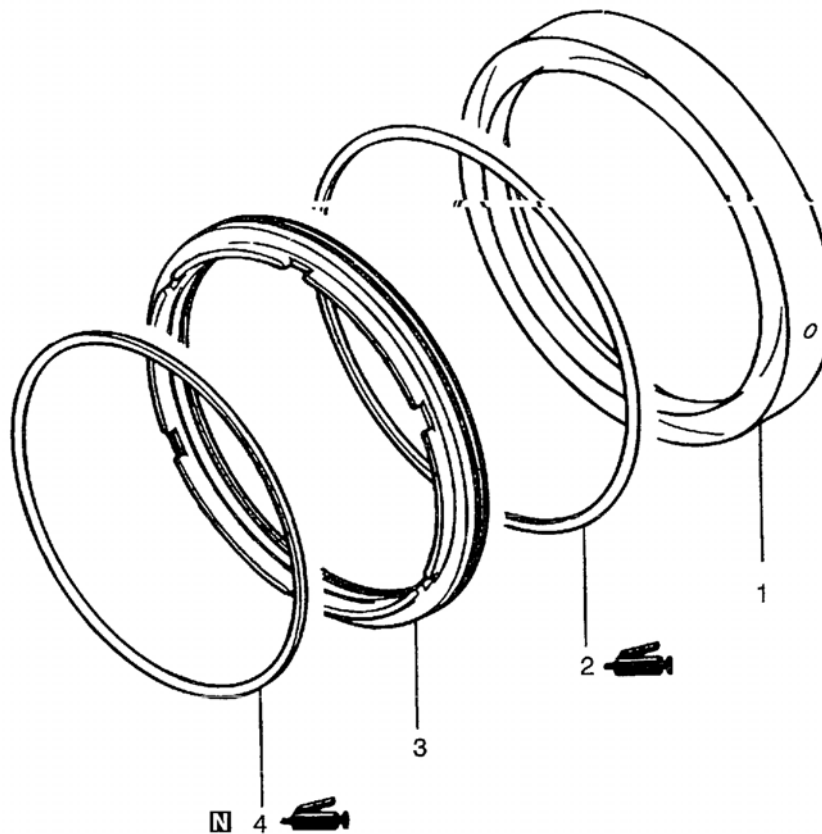


G01092634

Fig. 327: Measuring The Gap Between The Overdrive Reaction Plate And The Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

SECOND BRAKE

COMPONENTS



N Marked part shall be replaced with new part.

Disassembly procedure

1. Second brake retainer
2. O-ring

3. Second brake piston
4. O-ring

G01092635

Fig. 328: Exploded View Of Second Brake
Courtesy of KIA MOTORS AMERICA, INC.

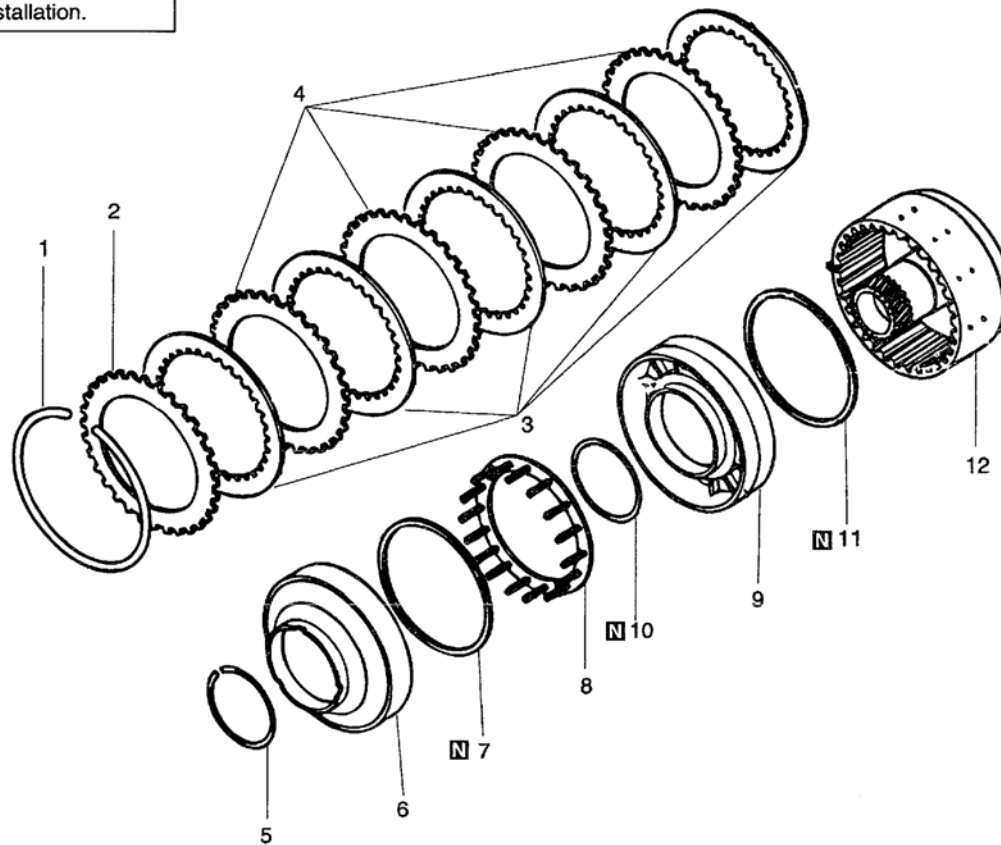
ASSEMBLY

Install the O-ring. Apply ATF or white vaseline on the seal ring and install it caring not to damage it.

DIRECT CLUTCH

COMPONENTS

Apple ATF fluid on any moving part on installation.



N Marked part shall be replaced with new part.

Disassembly procedure

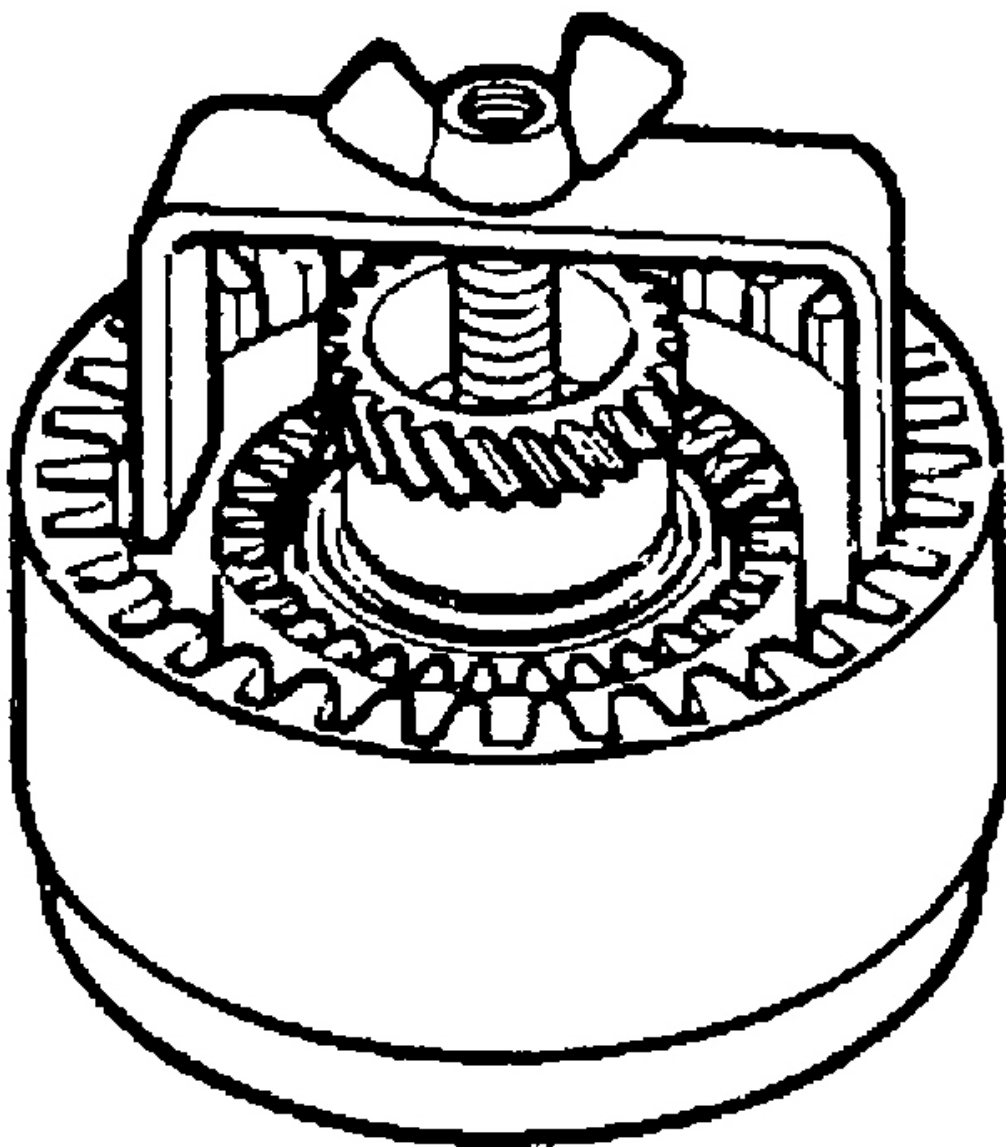
- | | |
|--------------------------|----------------------------|
| 1. Snap ring | 7. O-ring |
| 2. Clutch reaction plate | 8. Return spring |
| 3. Clutch disc | 9. Direct clutch piston |
| 4. Clutch plate | 10. O-ring |
| 5. Snap ring | 11. O-ring |
| 6. Spring retainer | 12. Direct clutch retainer |

G01092636

Fig. 329: Exploded View Of Direct Clutch
Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY

1. Remove the direct clutch snap ring.
2. Remove the clutch reaction plate.
3. Remove the clutch discs (five) and plates (five).
4. Remove the snap ring using special tool.



G01092637

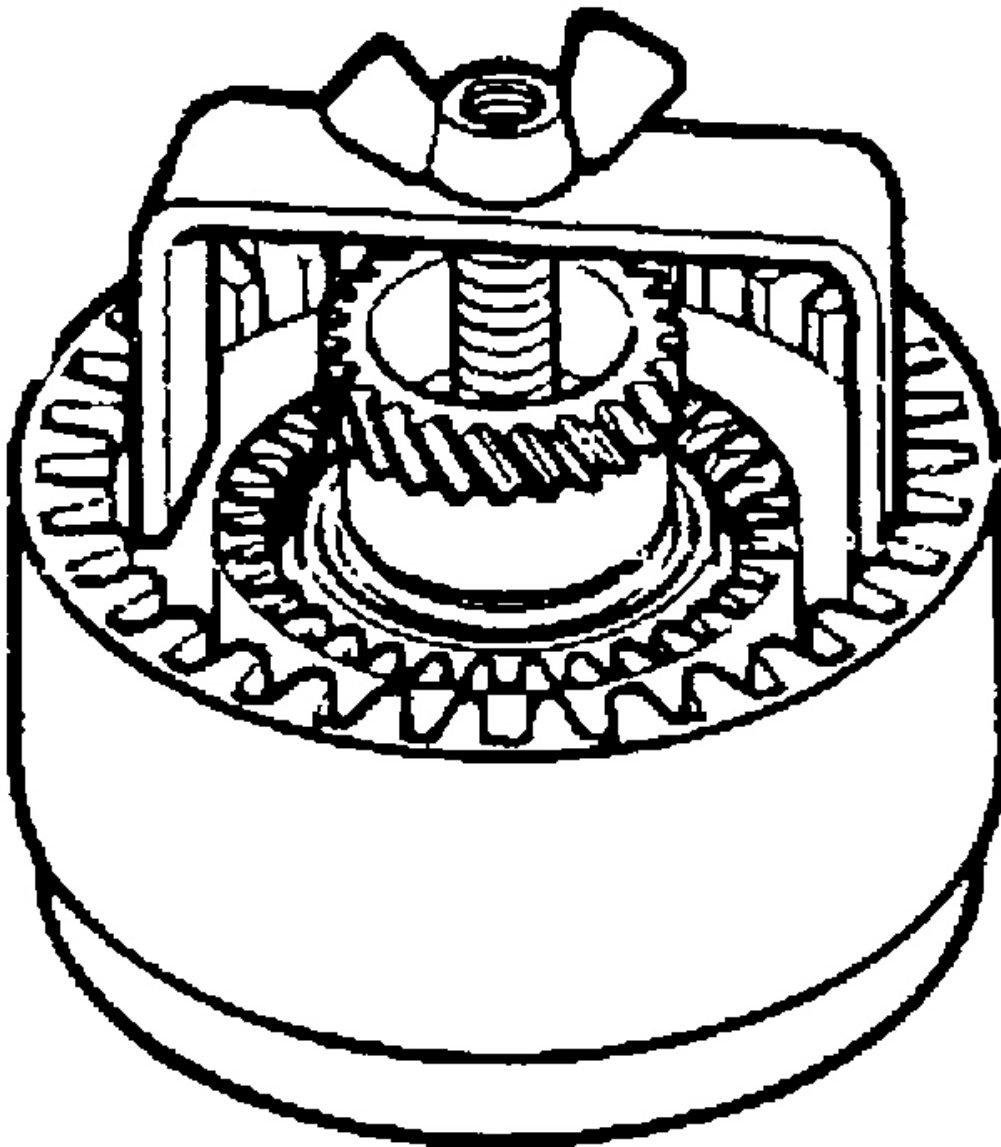
Fig. 330: Removing The Direct Clutch Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

5. Remove the direct spring retainer.
6. Remove the return spring.

7. Remove the direct clutch piston and O-ring.

REASSEMBLY

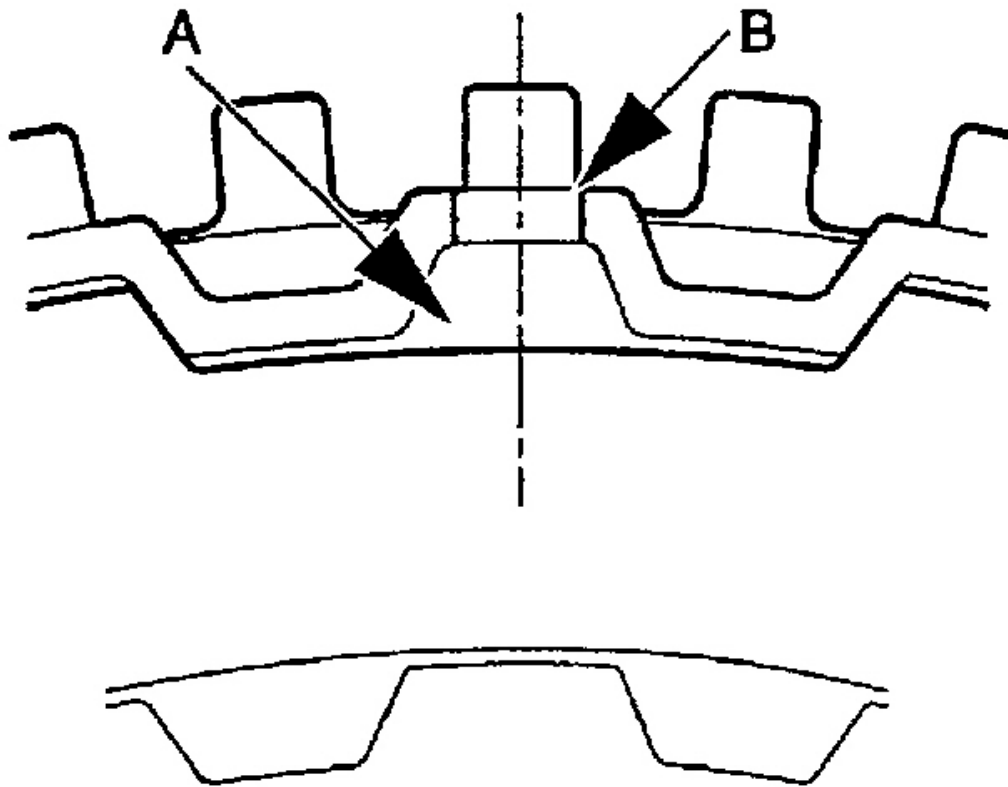
1. Install the O-rings on direct clutch retainer and piston.
2. Install the clutch piston.
3. Install the O-ring on spring retainer and install return spring and retainer.
4. Install the snap ring using the special tool.



G01092638

Fig. 331: Installing The Direct Clutch Snap Ring
Courtesy of KIA MOTORS AMERICA, INC.

5. Aligning the teeth of the clutch plate, the clutch disc, and the clutch reaction plate (A) and the direct clutch retainer hole (B), assemble them.

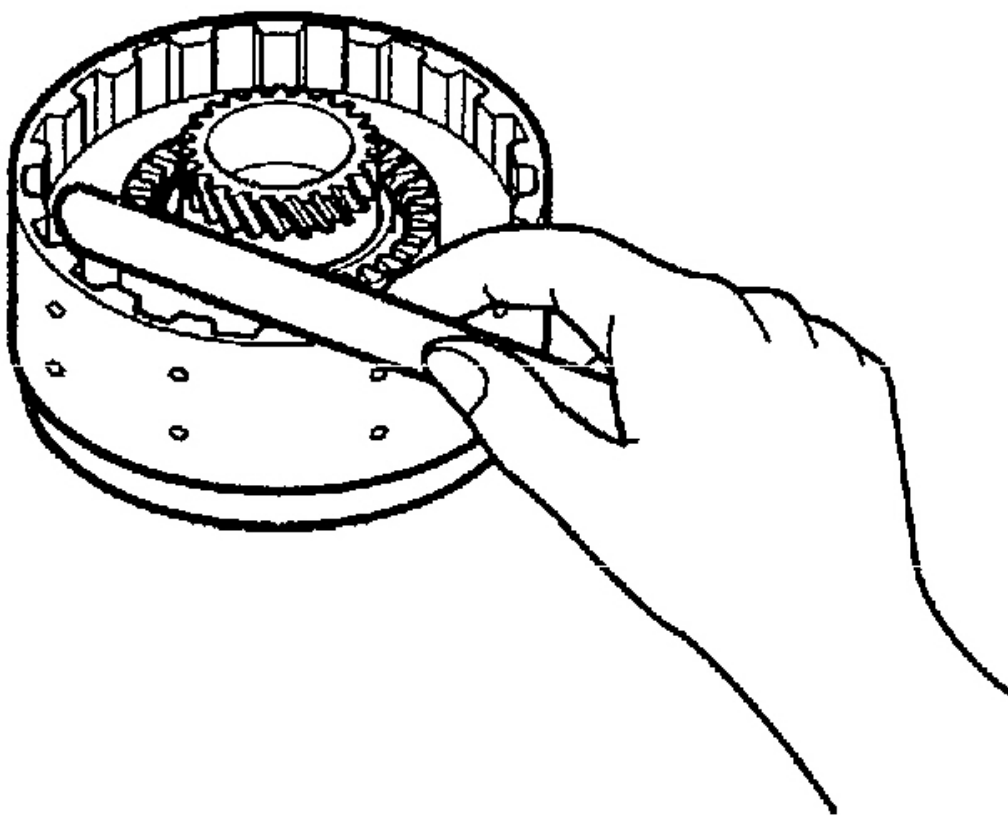


G01092639

Fig. 332: Aligning The Teeth Of The Clutch Plate, The Clutch Disc, And The Clutch Reaction Plate
Courtesy of KIA MOTORS AMERICA, INC.

6. Install the direct clutch reaction plate as illustrated on the figure below.
7. Applying force of 5kg on the direct clutch reaction plate, measure the gap with the snap ring using a gauge. If the measurement deviates from standard value, use an appropriate snap ring (12 sizes).

Standard value, F5A51-3: 0.024-0.031 in. (0.6-0.8mm)

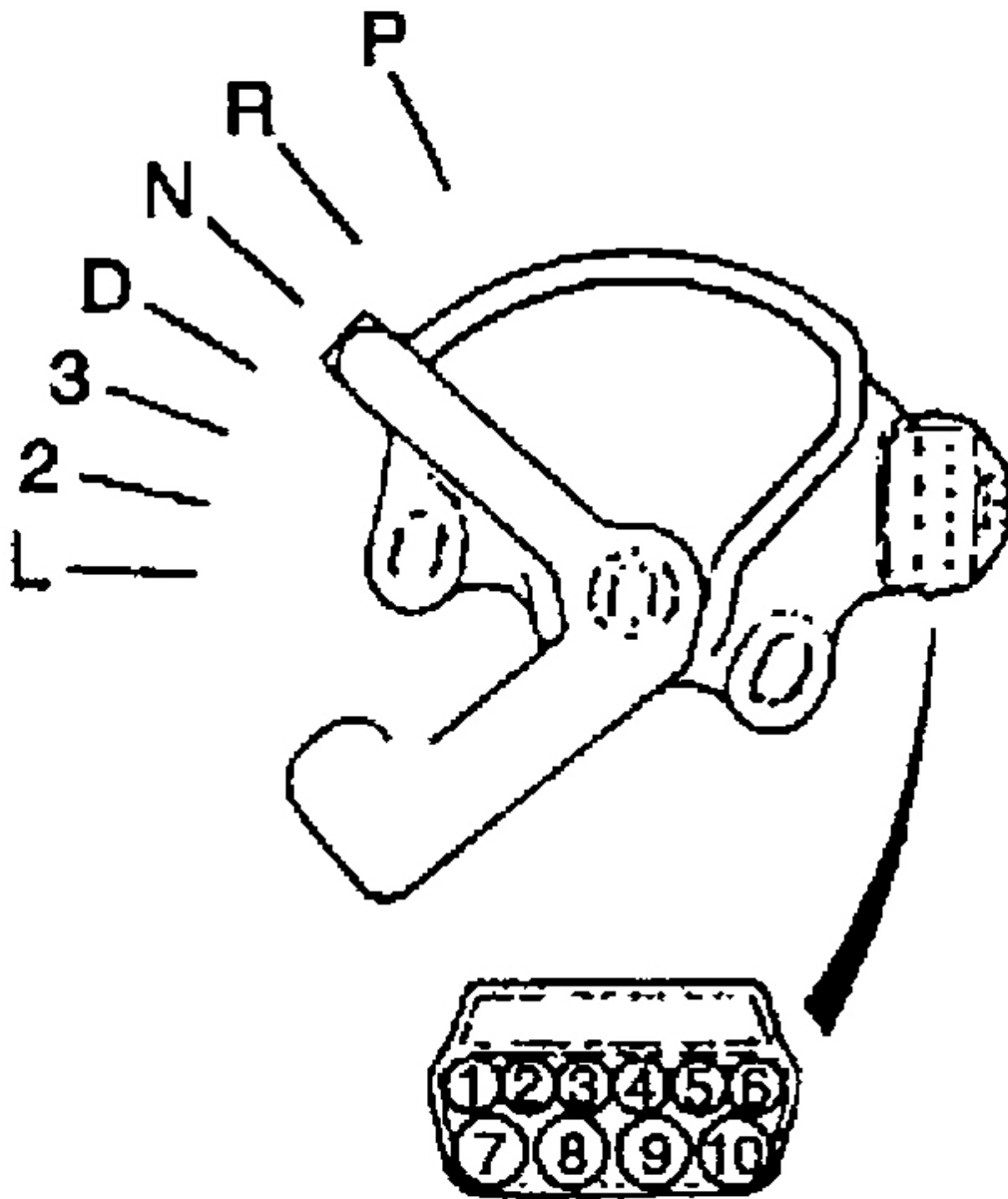


G01092640

Fig. 333: Measuring Direct Clutch Reaction Plate To Snap Ring Clearance
Courtesy of KIA MOTORS AMERICA, INC.

AUTOMATIC TRANSAXLE CONTROL SYSTEM

CHECKING TRANSAXLE RANGE SWITCH CONTINUITY



G01092642

Fig. 334: Illustrating Range Switch Continuity Connector
Courtesy of KIA MOTORS AMERICA, INC.

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

G01092641

Fig. 335: Transaxle Range Switch Continuity Chart
 Courtesy of KIA MOTORS AMERICA, INC.

CONTROL CABLE

CONTROL CABLE ADJUSTMENT

1. Move the shift lever to position "N".
2. Release the adjusting nut at the connection between the transaxle control cable and the manual control lever and separate them.

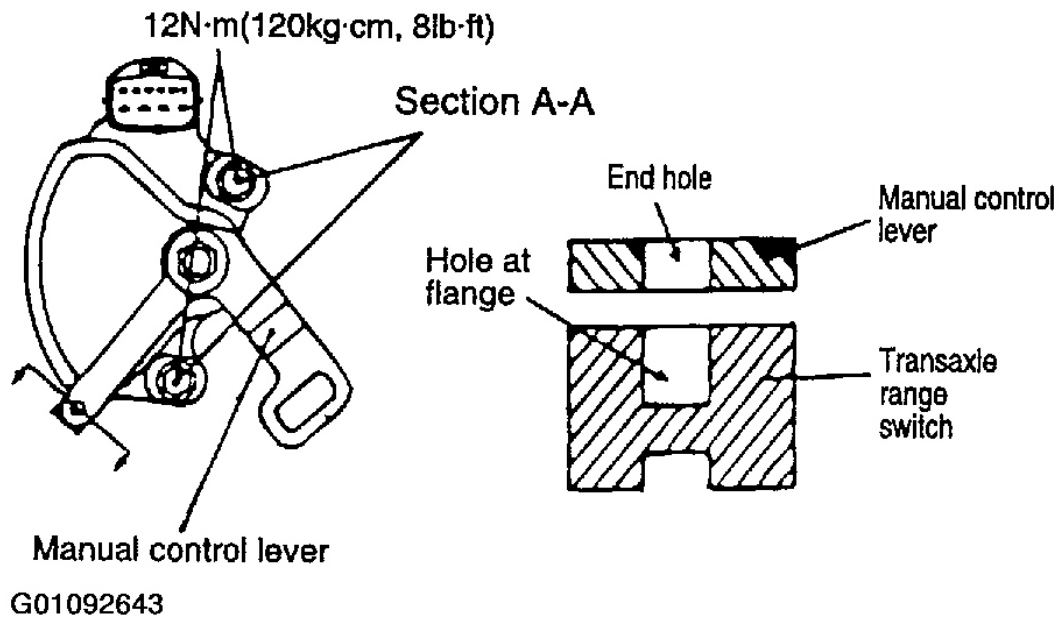
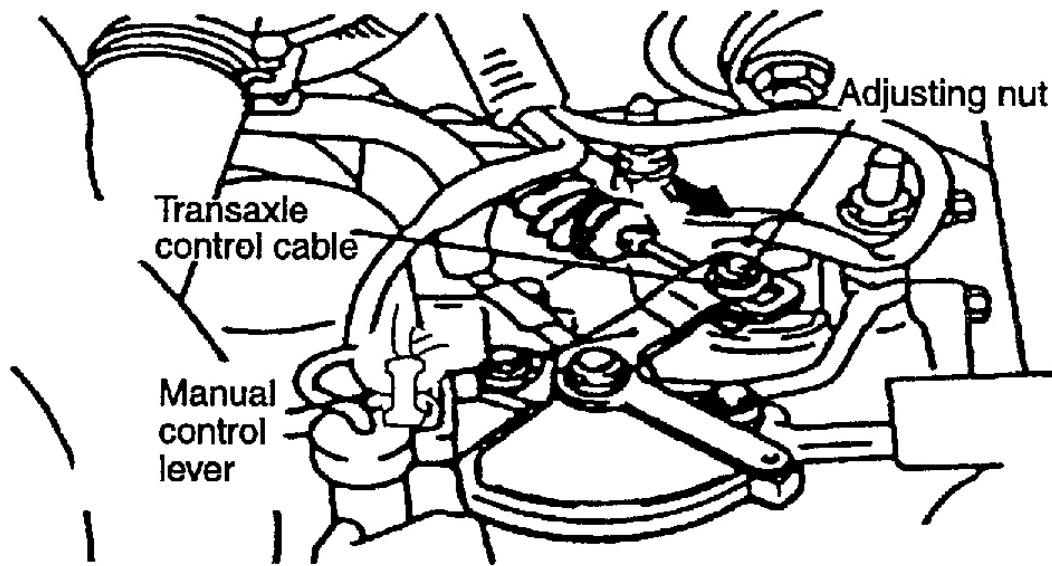


Fig. 336: Illustrating Control Cable Adjustment
Courtesy of KIA MOTORS AMERICA, INC.

3. Move the manual control lever to position "N".
4. Insert ± 0.197 in. (± 5 mm) pin into holes ± 0.197 in. (± 5 mm) transaxle range switch and the manual control lever. Adjust the transaxle range switch and manual control lever at position "N" correctly.

CAUTION: If you DO NOT insert ± 0.197 in (± 5 mm) pin, position "N" may move when tightening the adjusting nut.



G01092644

Fig. 337: Adjusting Control Cable
Courtesy of KIA MOTORS AMERICA, INC.

CONTROL CABLE CHECKING

1. Press the brake pedal and engage the parking brake completely.
2. Move the shift lever at position "R".
3. Turn the engine start switch to position "ST".
4. Move the shift lever to position "P".

If starter motor operates when it clicks, control cable is adjusted correctly.

5. With the same manner, move the shift lever to position "N". If the starter motor operates, it is correct.
6. If the starter motor operates at positions "P" and "N" as described above and does not operate at any other position, then the control cable is adjusted properly.

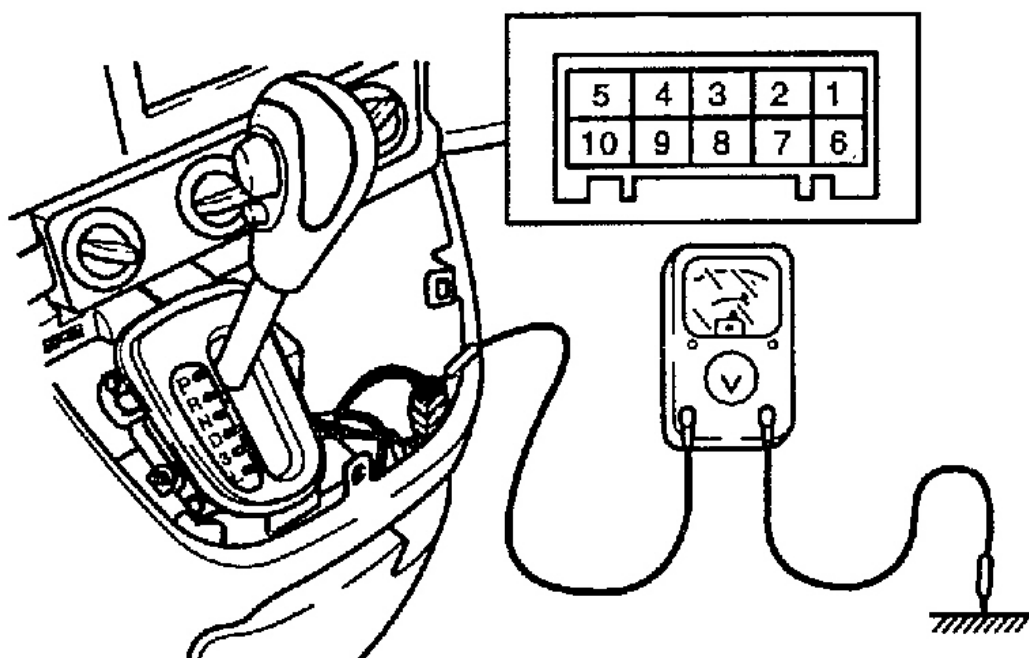
O/D SWITCH

OPERATION INSPECTION

1. Turn ignition switch ON.
2. Verify that the O/D indicator light is not illuminated. Depress O/D switch and verify that the O/D indicator light illuminates.
3. If O/D indicator light does not operate, continue with inspection of voltage test.

VOLTAGE INSPECTION

1. Remove center panel. See **REMOVAL** .
2. Turn ignition switch ON.
3. Measure voltage at O/D switch connector.



G01092646

Fig. 338: Testing O/D Switch Voltage
Courtesy of KIA MOTORS AMERICA, INC.

	Connector terminal	
	6	7
Normal (V)	O	B+
Depressed (V)	O	O

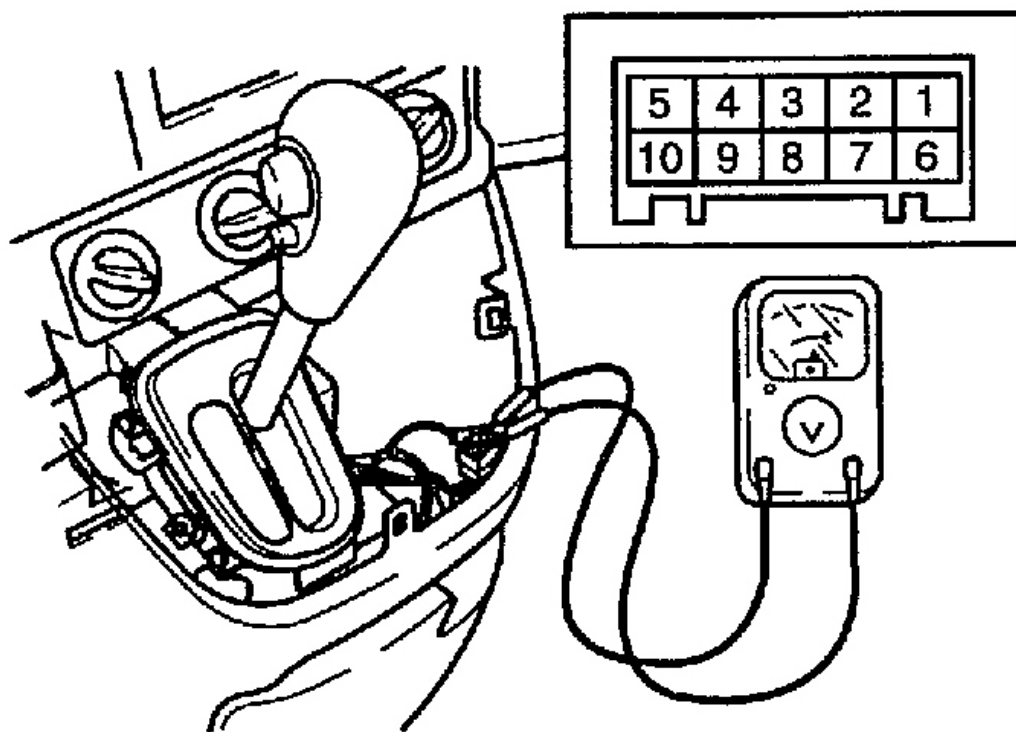
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Fig. 339: O/D Switch Voltage Chart
Courtesy of KIA MOTORS AMERICA, INC.

4. If not as specified, check for continuity at O/D switch.
5. Install center panel. See **INSTALLATION** .

CONTINUITY INSPECTION

1. Disconnect negative battery cable.
2. Disconnect O/D switch connector.
3. Check a continuity on 6 terminal and 7 terminal.



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Fig. 340: Testing O/D Switch Continuity
 Courtesy of KIA MOTORS AMERICA, INC.

Position	Connector terminal	
	6	7
Normal (V)		
Depressed (V)	O ———	————— O

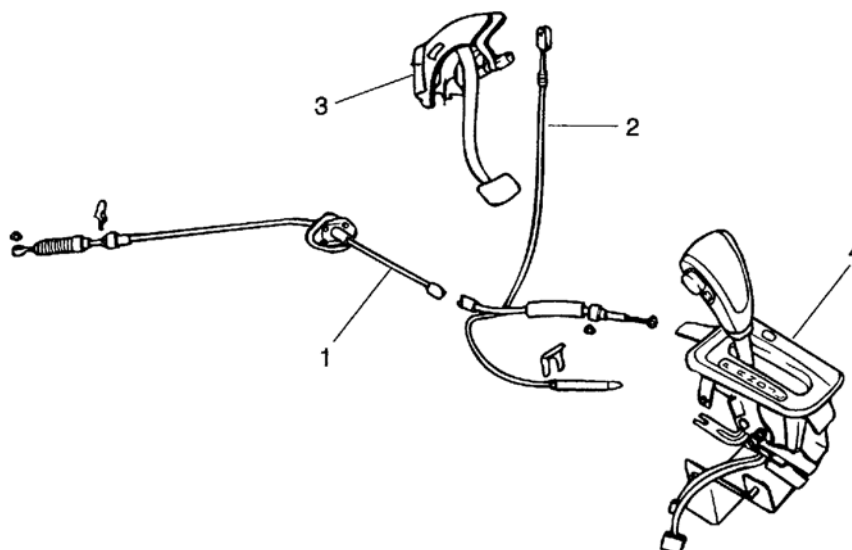
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Fig. 341: O/D Switch Continuity Chart
 Courtesy of KIA MOTORS AMERICA, INC.

4. Replace selector lever knob if not as specified.
5. Check wiring harness for continuity if switch is operating correctly (from O/D switch to ECM, and from O/D switch to ground).

SHIFT LEVER

AUTOMATIC TRANSAXLE SHIFT CONTROL



TORQUE : Kg.cm

1. Shift control cable
2. Inter lock cable

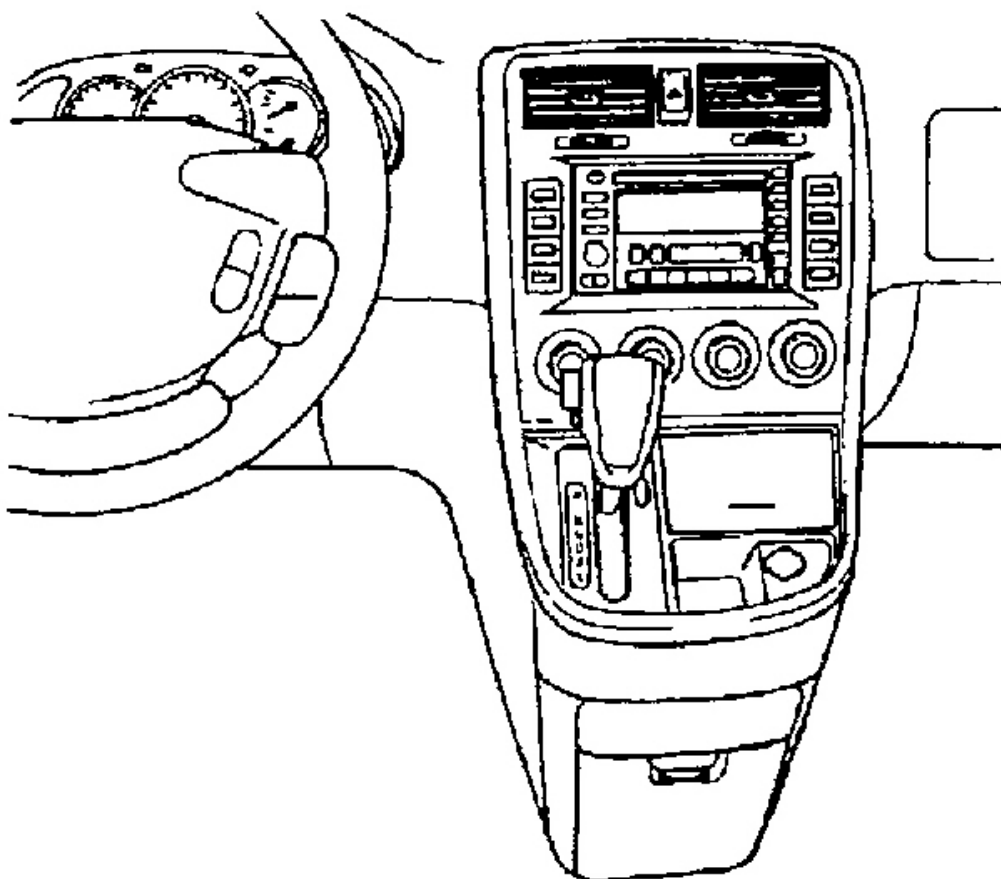
3. Brake pedal assembly
4. Shift control assembly

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Fig. 342: Illustrating Shift Lever Assembly
Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL

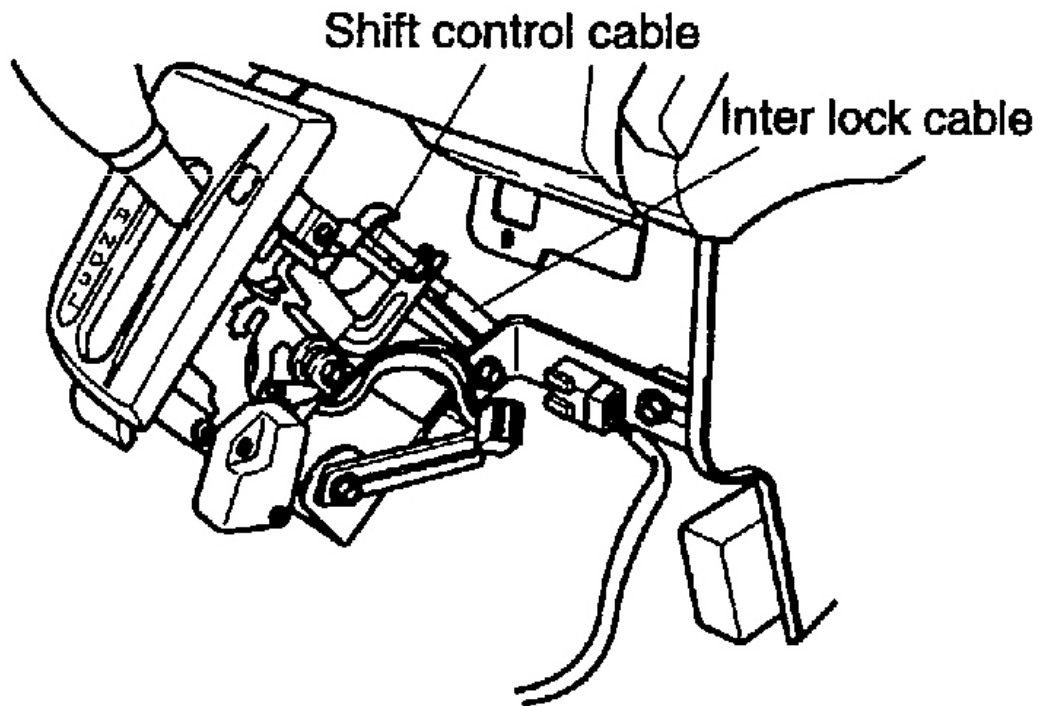
1. Remove the audio cover plate.
2. Remove the center console.



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Fig. 343: Removing The Center Console
Courtesy of KIA MOTORS AMERICA, INC.

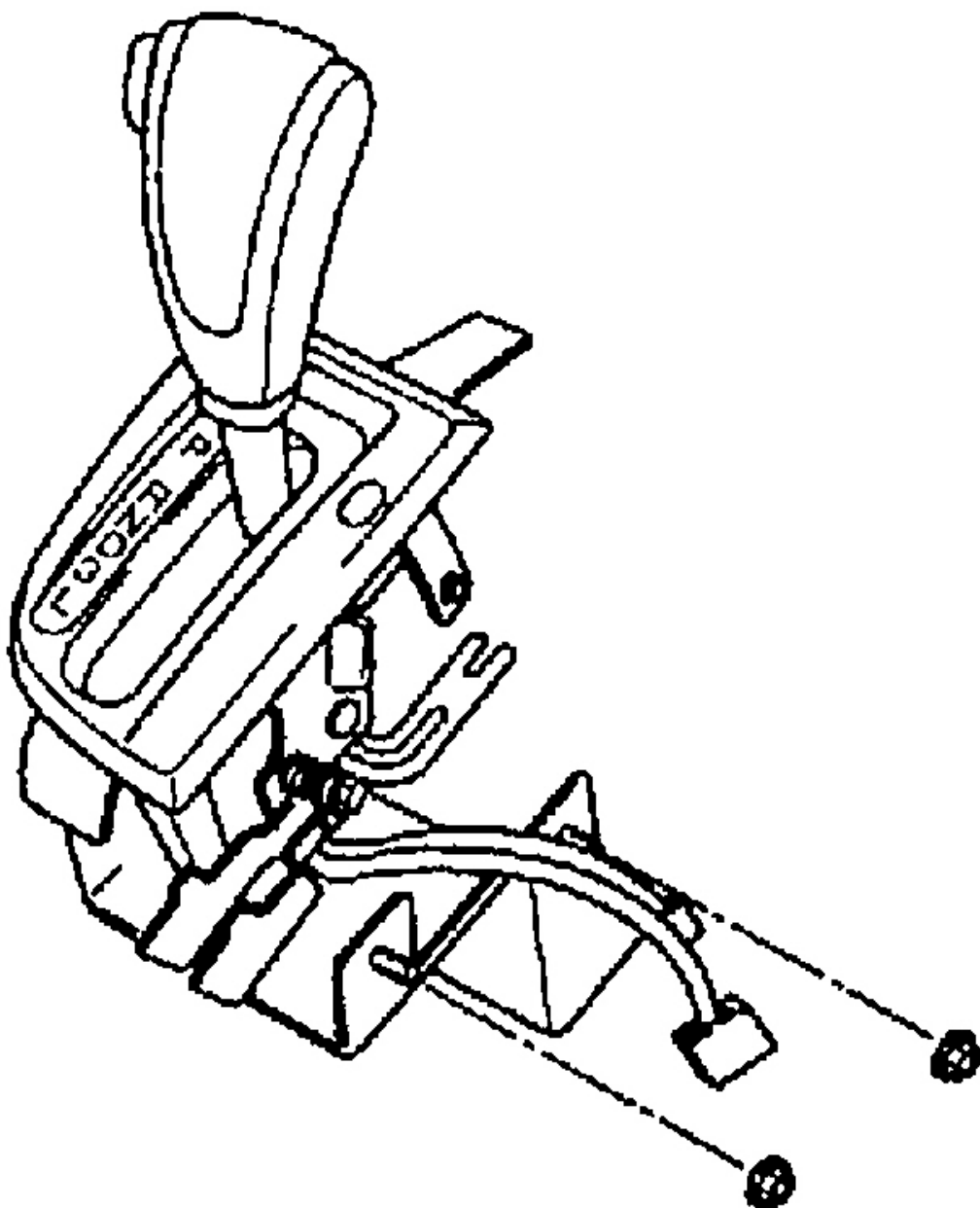
3. Remove the shift control cable.
4. Remove the inter lock cable.
5. Disconnect the harness connector.



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Fig. 344: Disconnecting The Harness Connector
Courtesy of KIA MOTORS AMERICA, INC.

6. Remove the selector lever assembly.

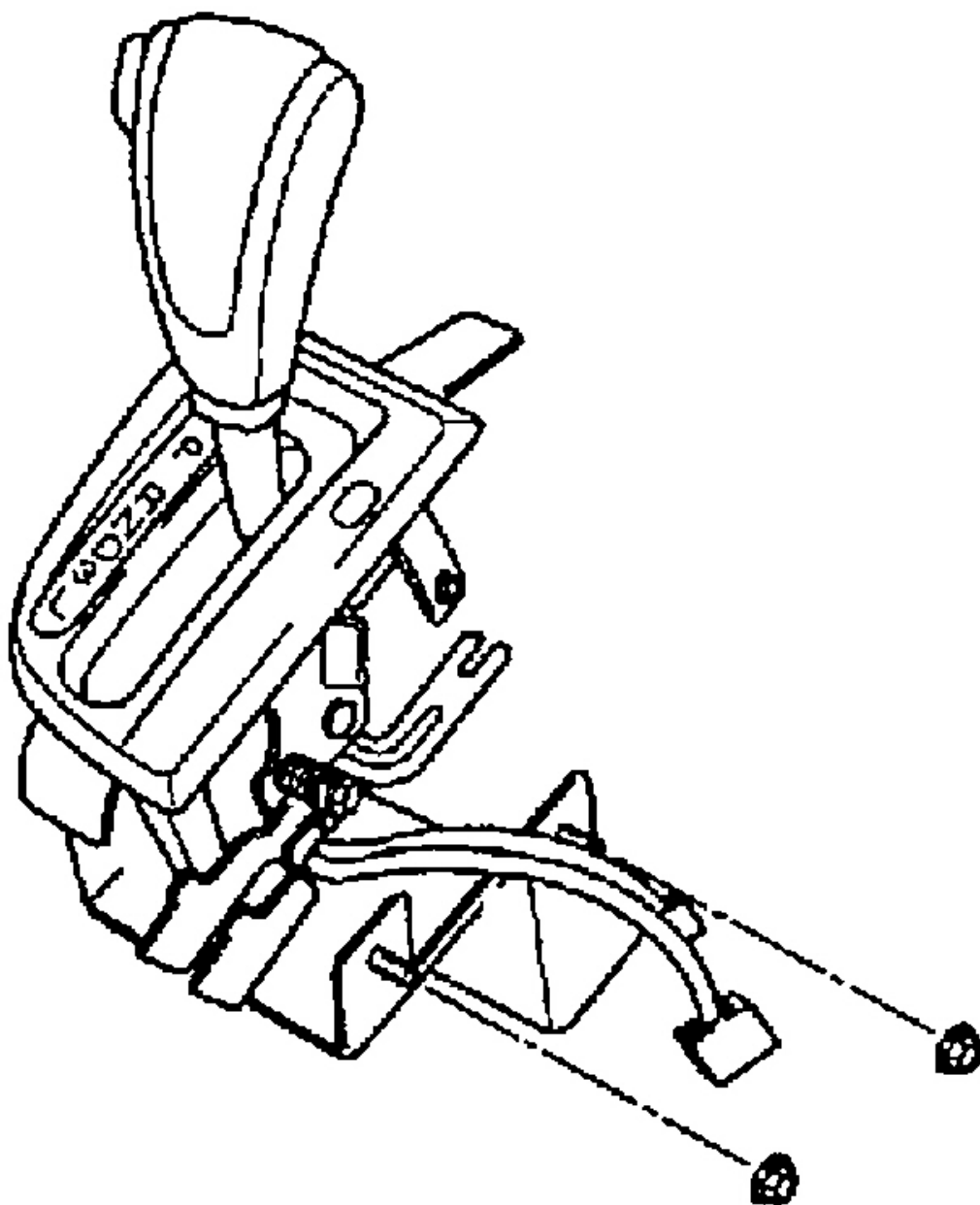


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Fig. 345: Removing The Selector Lever Assembly
Courtesy of KIA MOTORS AMERICA, INC.

1. Install the selector lever assembly with tightening torque.

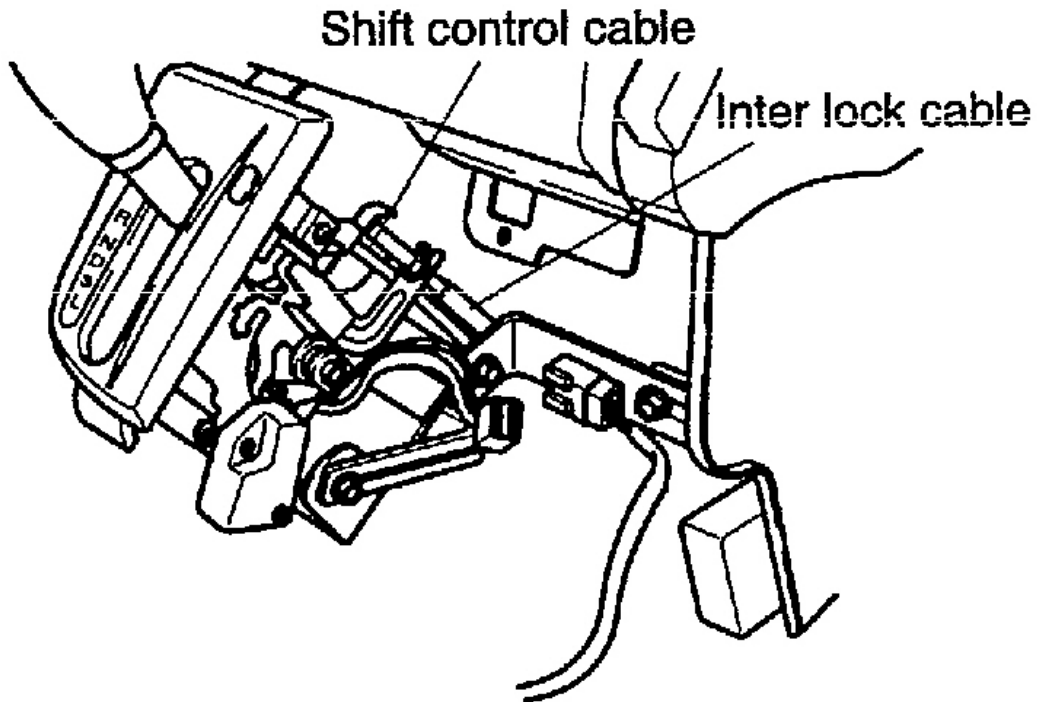
Tightening torque: 8.8-13.7 N.m (90-140 kg.Cm, 65-10.1 lb.ft)



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Fig. 346: Installing The Selector Lever Assembly
Courtesy of KIA MOTORS AMERICA, INC.

2. Install the inter lock cable.
3. Install the shift control cable.
4. Connect the harness connector.
5. After installing the inter lock cable, move the selector lever to "P" and press the brake pedal to check the inter lock cable operation.



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Fig. 347: Testing Inter Lock Cable Operation
Courtesy of KIA MOTORS AMERICA, INC.