



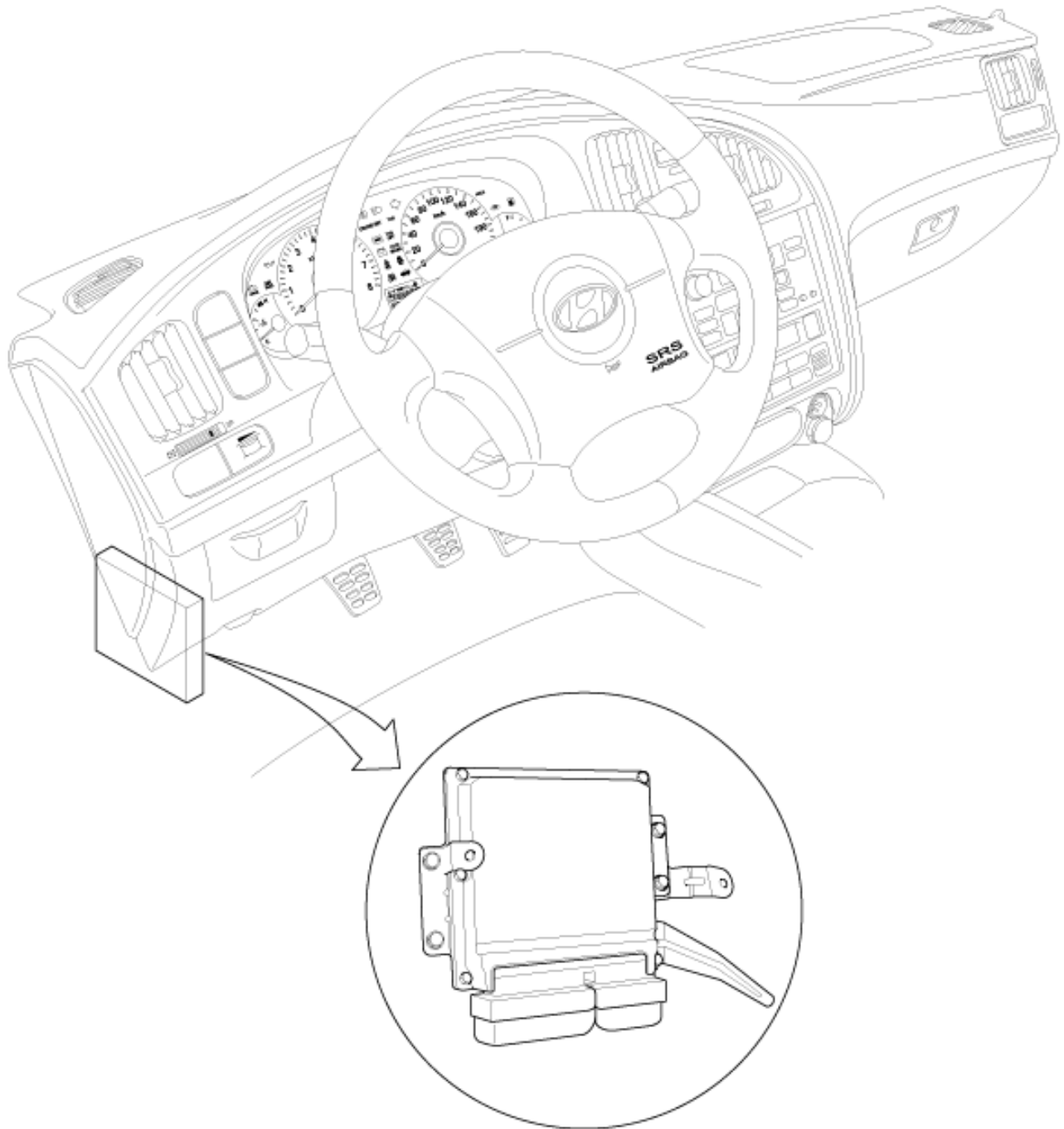
HYUNDAI

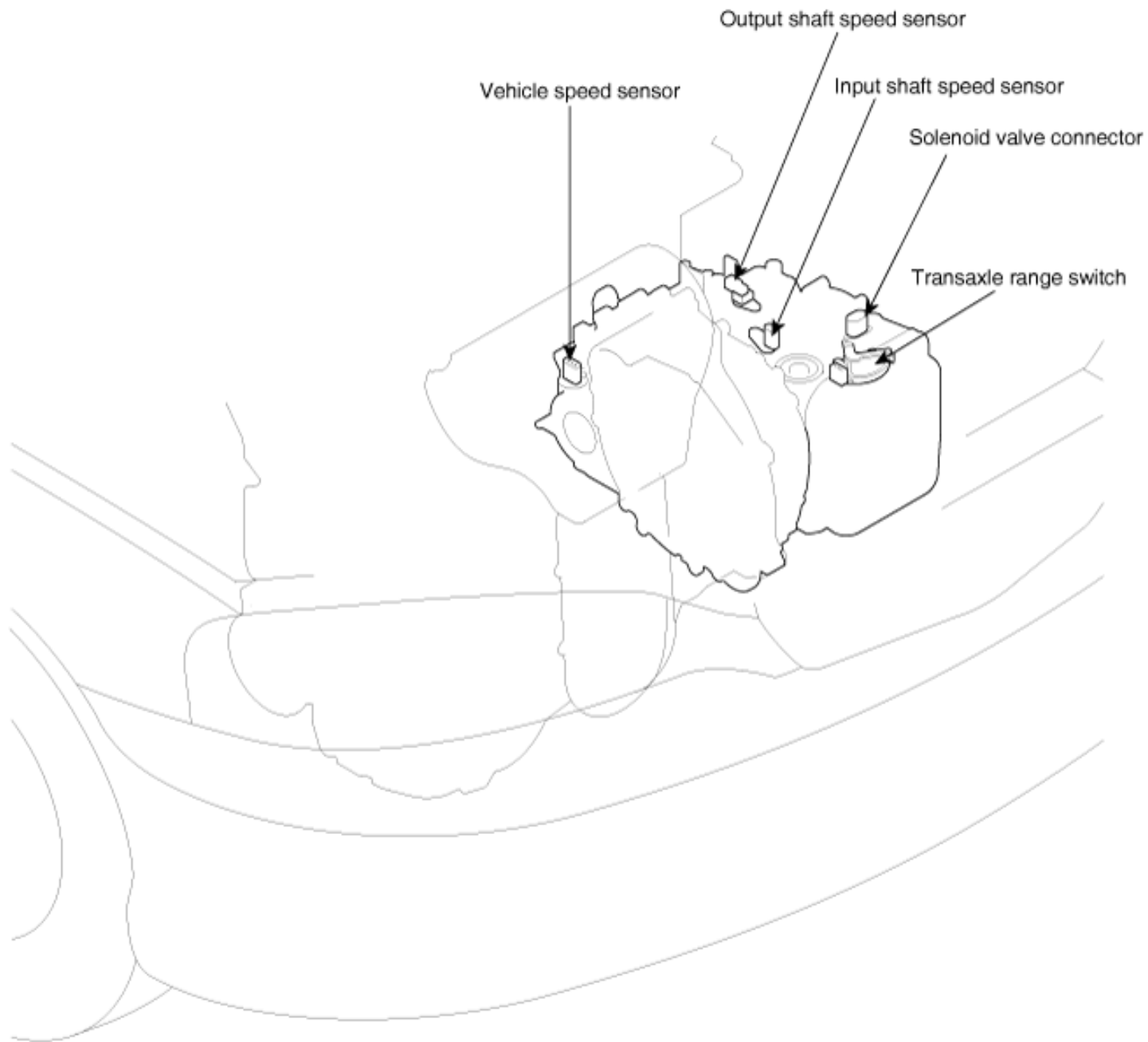
Elantra



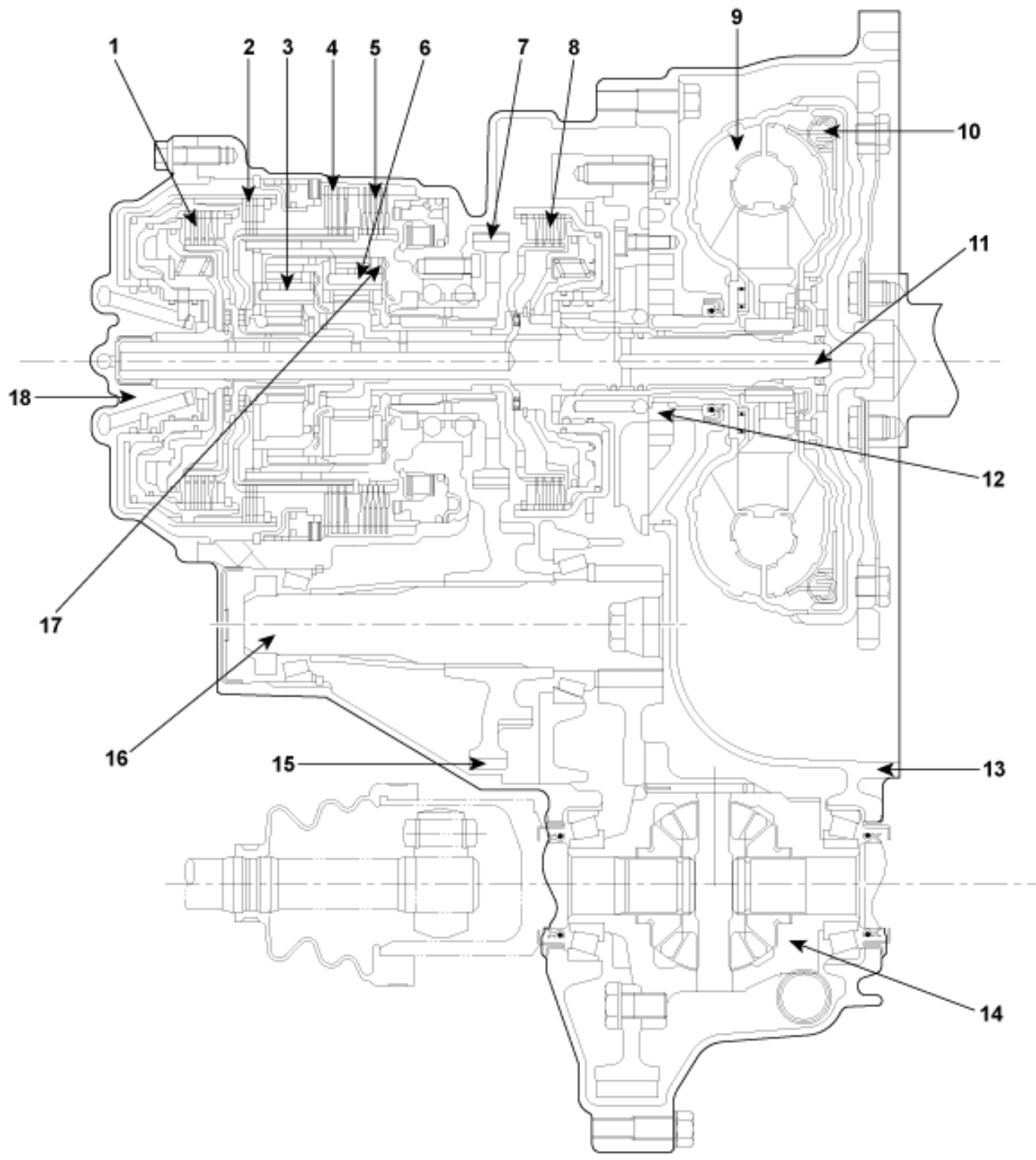
Workshop Manual
2001 - 2006

COMPONENTS





COMPONENTS



- | | |
|---------------------------------|-----------------------------|
| 1. Overdrive clutch | 10. Torque converter clutch |
| 2. Reverse clutch | 11. Input shaft |
| 3. Overdrive planetary gear set | 12. Oil pump |
| 4. Second brake | 13. Converter housing |
| 5. Low-reverse | 14. Differential |
| 6. Output planetary gear set | 15. Transfer driven gear |
| 7. Transfer drive gear | 16. Output shaft |
| 8. Underdrive clutch | 17. Oneway clutch |
| 9. Torque converter | 18. Rear cover |

DESCRIPTION OF ELEMENTS

CLUTCHES

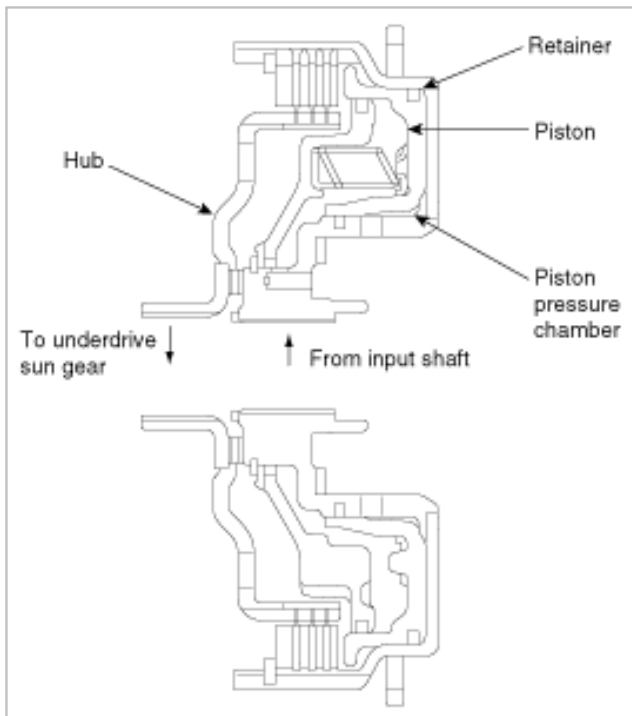
The gear changing mechanism utilizes three multi-disc clutches. The retainers of these clutches are fabricated from high-precision sheet metal for lightness and ease of production. Also, more responsive gearshifts at high engine speeds are achieved by a pressure-balanced piston mechanism that cancels out centrifugal hydraulic pressure. This mechanism replaces the conventional ball check valve.

UNDERDRIVE CLUTCH

The underdrive clutch operates in 1st, 2nd, and 3rd gears and transmits driving force from the input shaft to the underdrive sun gear.

The components comprising the under clutch are as illustrated on the below.

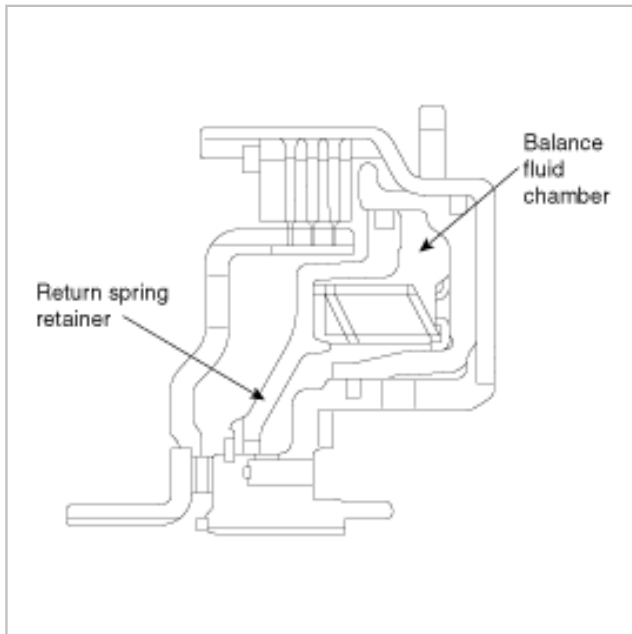
Hydraulic pressure acts in the piston pressure chamber (between the piston and retainer) and thus pushes the piston. In turn, the piston depresses the clutch discs and thereby transmits driving force from the retainer to the hub side.



At high speed, fluid remaining in the piston pressure chamber is subjected to centrifugal force and attempts to push the piston.

However, fluid in the balance fluid chamber (the space between the piston and return spring retainer) is also subjected to centrifugal force.

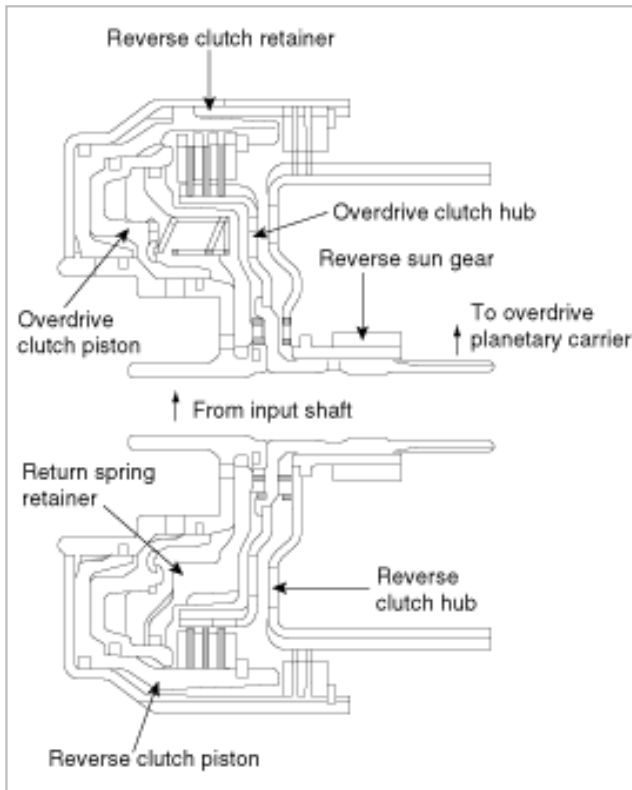
Thus, the hydraulic pressure on one side of the piston cancels out the hydraulic pressure on the other side, and the piston does not move.



REVERSE CLUTCH AND OVERDRIVE CLUTCH

The reverse clutch operates when the reverse gear is selected and transmits driving force from the input shaft to the reverse sun gear.

The overdrive clutch operates in 3rd and 4th gears and transmits driving force from the input shaft to the overdrive planetary carrier and low-reverse annulus gear.



BRAKES

The gear changing mechanism utilizes two multi-disc brakes.

LOW-REVERSE BRAKE AND SECOND BRAKE

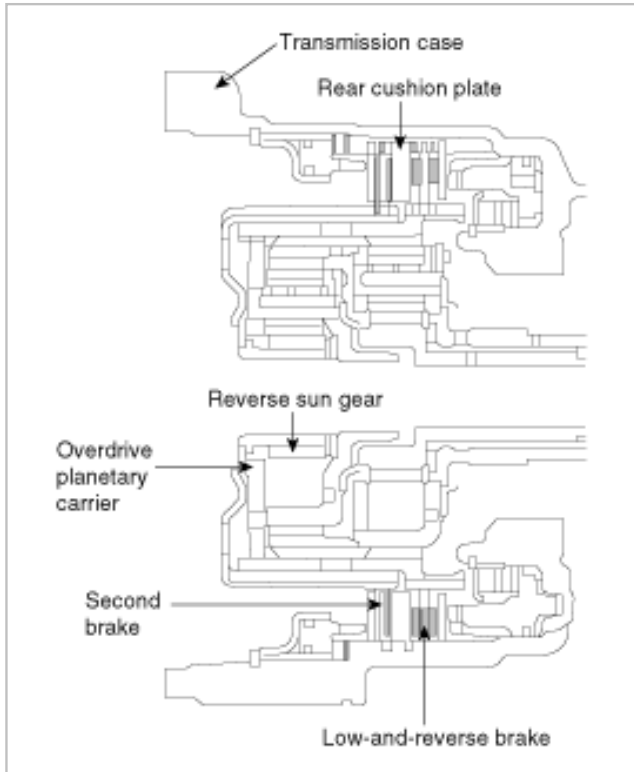
The low-reverse brake operates in 1st and reverse gears, when the vehicle is parked, and during manual operation. It locks the low-reverse annulus gear and overdrive planetary carrier to the case.

The second brake operates in 2nd and 4th gears and locks the reverse sun gear to the case.

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The components comprising the low-reverse brake and second brake are as illustrated on the below.

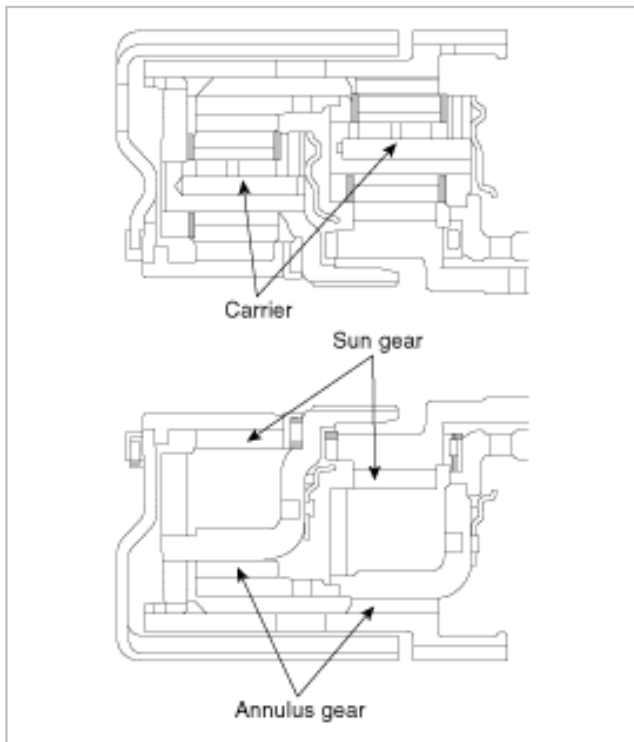
As shown, the discs and plates of the two brakes are arranged on either side of the rear cushion plate, which is itself secured to the case by a snap ring.



POWER TRAIN

The planetary gear sets have two planetary gears each. The carrier of one gear set is connected mechanically to the annulus gear of the other.

This arrangement allows the gear ratio to be varied by connecting or locking the carriers and sun gears.

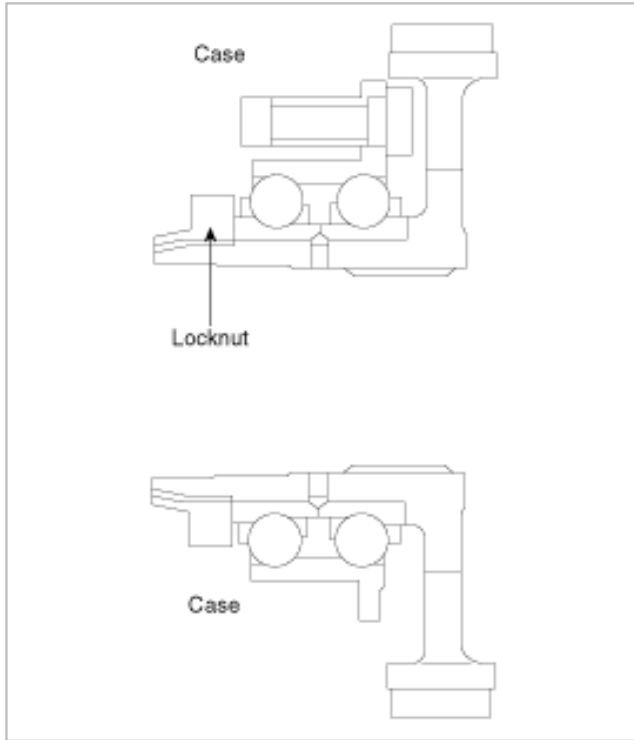


TRANSFER DRIVE GEAR

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With the transfer drive gear, increased tooth height and a higher contact ratio have reduced gear noise.

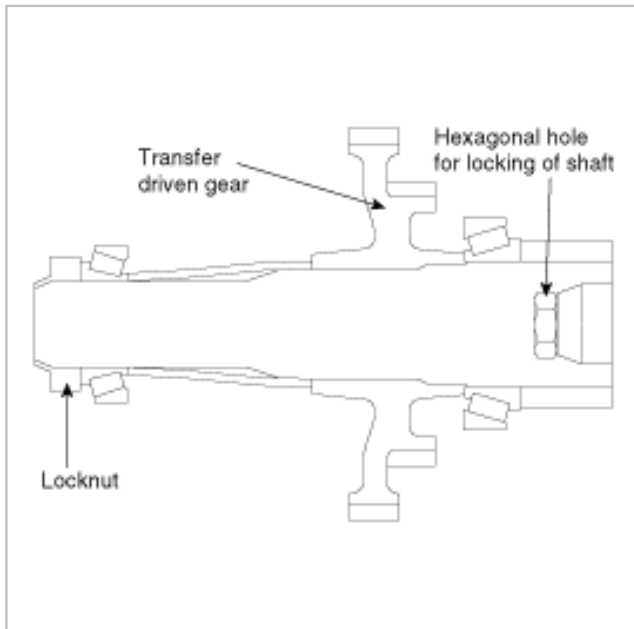
Also, the bearing that supports the drive gear is a preloaded type that eliminates rattle, and the rigidity of the gear mounting has been increased by bolting the bearing directly onto the case.



OUTPUT SHAFT/TRANSFER DRIVEN GEAR

As shown in the illustration on the below, the transfer driven gear is press-fitted onto the output shaft, and the output shaft is secured by a locknut and supported by bearings.

The locknut has a left-handed thread, and a hexagonal hole in the other end of the shaft enables the shaft to be held in position for locknut removal.



MANUAL CONTROL SYSTEM

The manual control lever is fitted to the top of the valve body and is linked to the parking roller rod and manual

control valve pin.

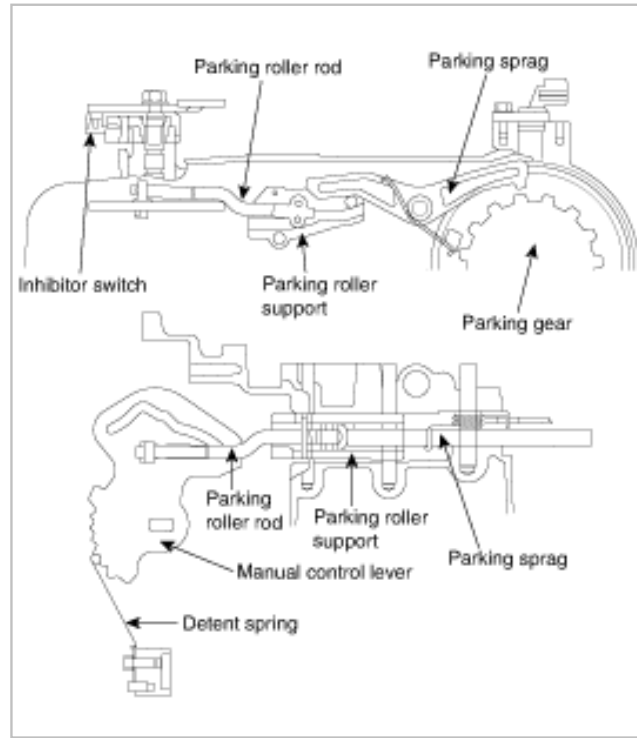
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A detent mechanism is provided to improve the gearshift feeling during manual selection.

PARKING MECHANISM

When the manual control lever is moved to the parking position, the parking roller rod moves along the parking roller support and pushes up the parking sprag.

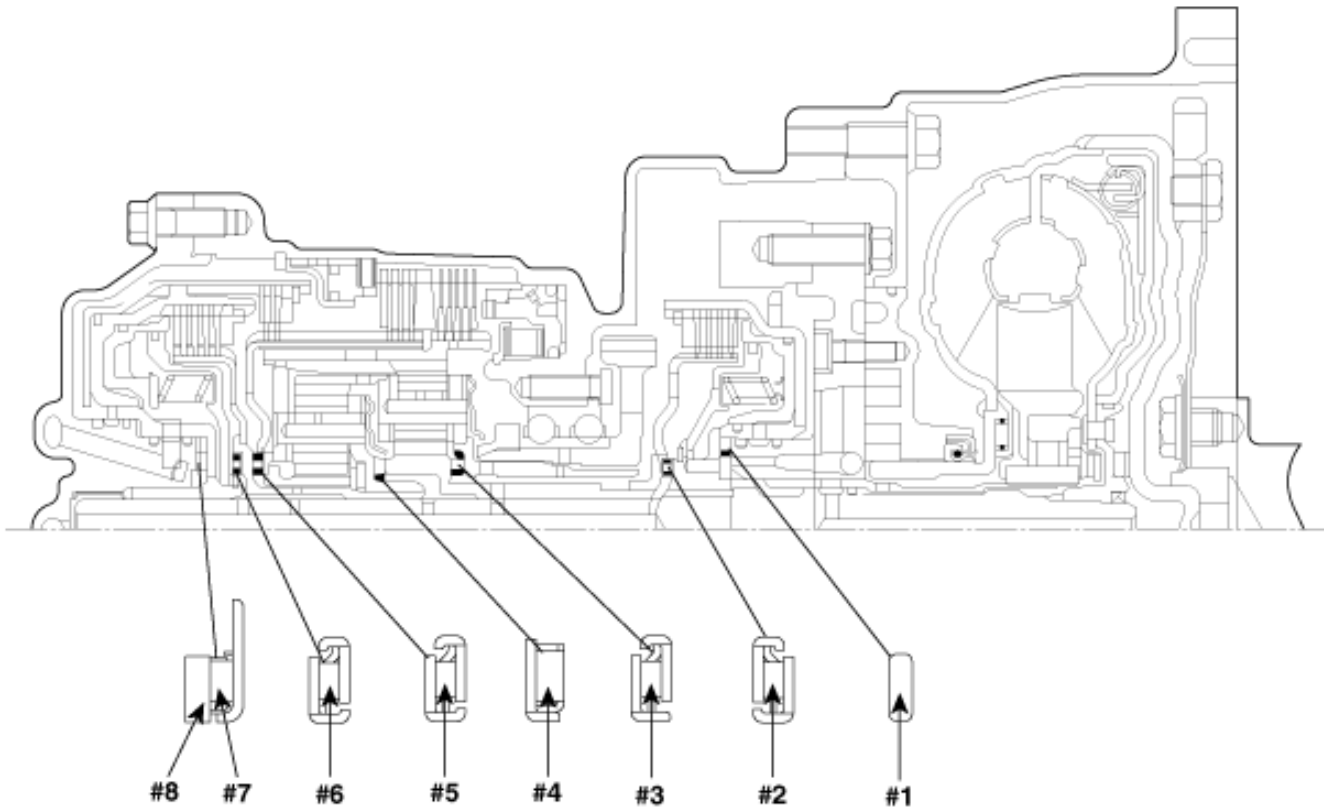
As a result, the parking sprag meshes with the transfer driven gear (parking gear), thereby locking the output shaft. To minimize the operating force required, a roller is fitted to the end of the rod.



GENERAL INFORMATION (F4A42)

Automatic transaxle overhaul section has been separated from the shop manual.

F4A42 overhaul section was included in the overhaul manual.



IDENTIFICATION OF THRUST BEARING, THRUST RACES, AND THRUST WASHERS

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

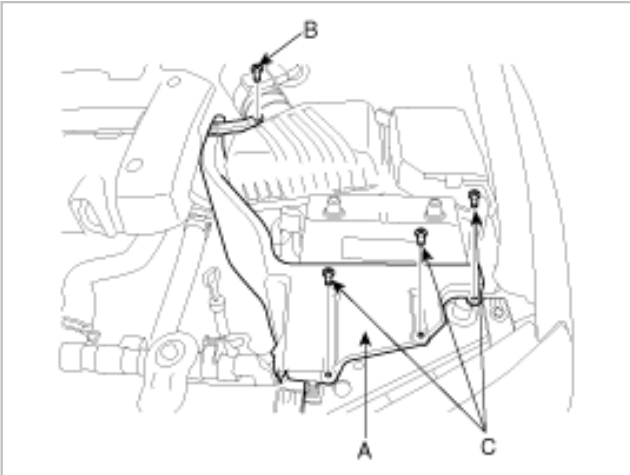
49	37	2.8	#7 Ebay User ID: reveleüs1	-	-	-
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REMOVAL

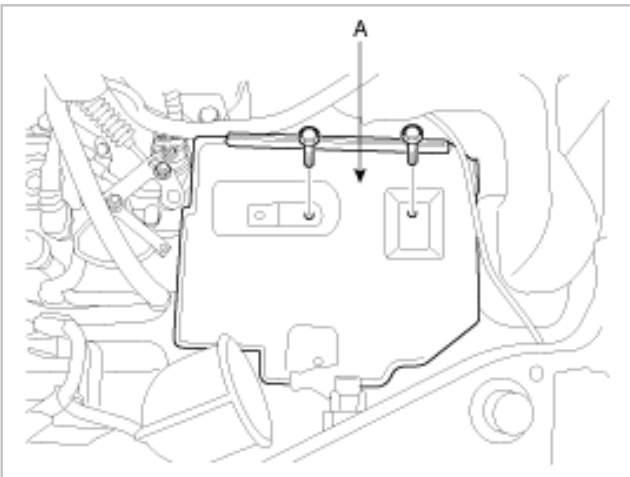
1. Remove the battery terminal ("-", "+").



2. Remove the heat shield(A). (Bolt: 1EA(B), Retainer: 3EA(C))



3. Remove the battery and the battery tray(A).

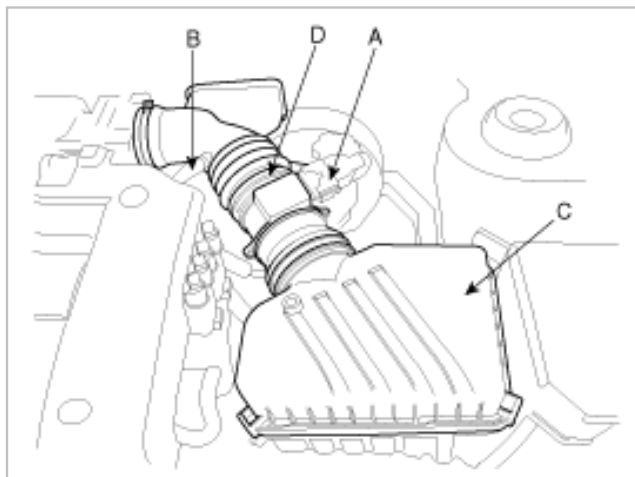


4. Removal of air cleaner and air intake hose.

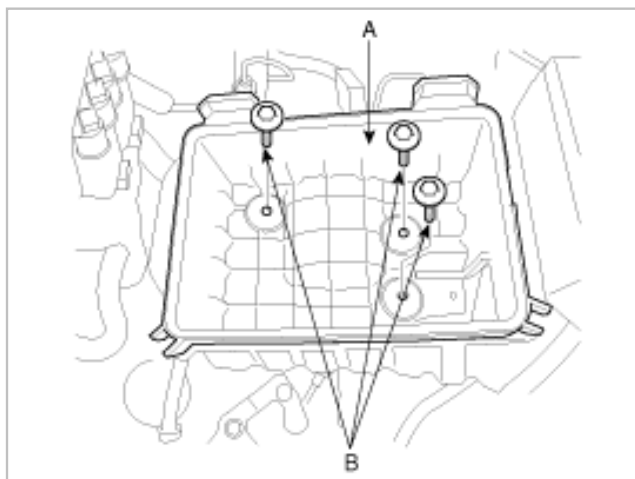
Ebay User ID: reveleus1

(1) Disconnect the air flow sensor connector(A) and breather hose(B).

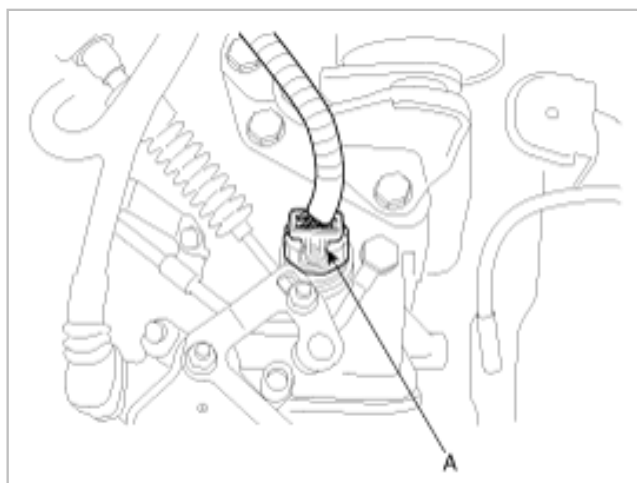
(2) Air cleaner upper cover(C) and air intake hose(D).



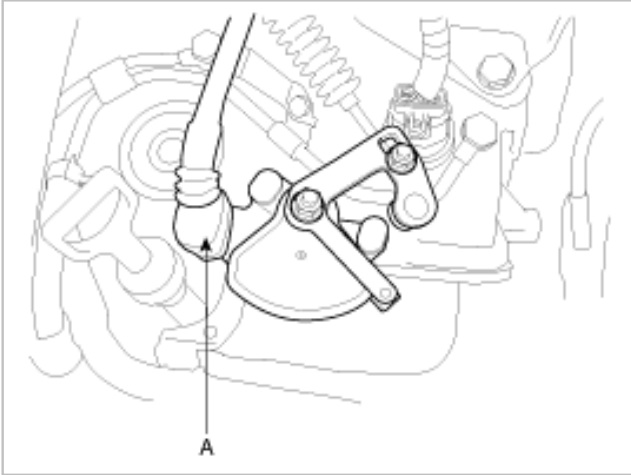
(3) Air cleaner lower(A) (Bolt: 3EA(B)).



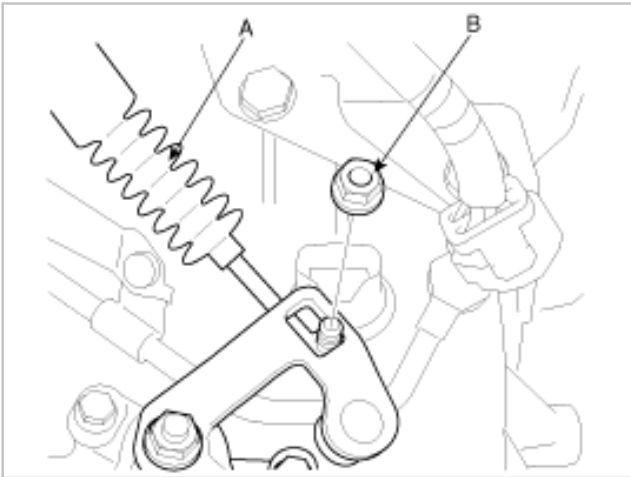
5. Remove the solenoid valve connector(A).



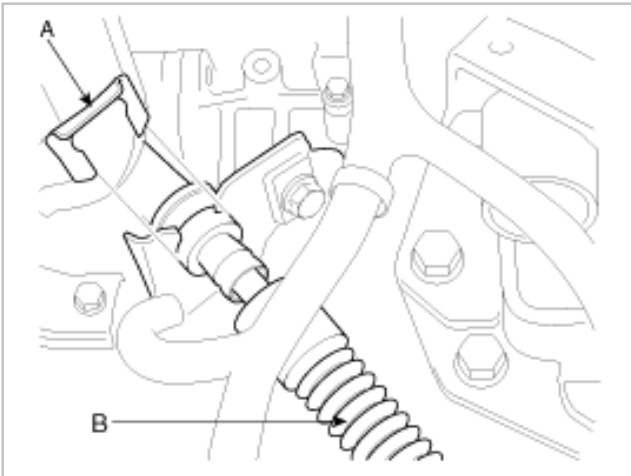
6. Remove the transaxle range switch connector(A).
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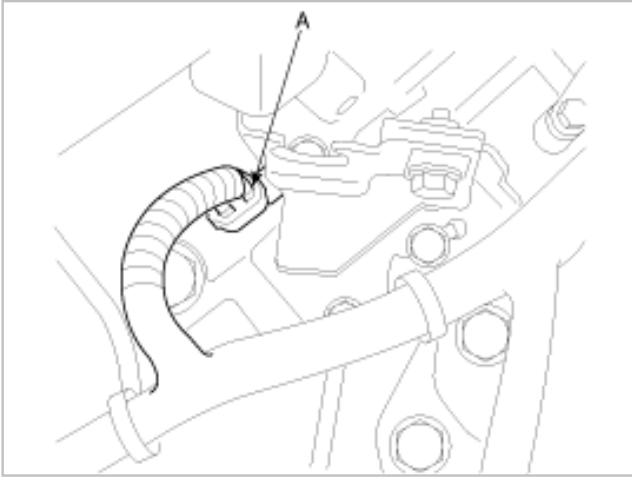
7. Remove the control cable(A) to transaxle range switch mounting nut(B).



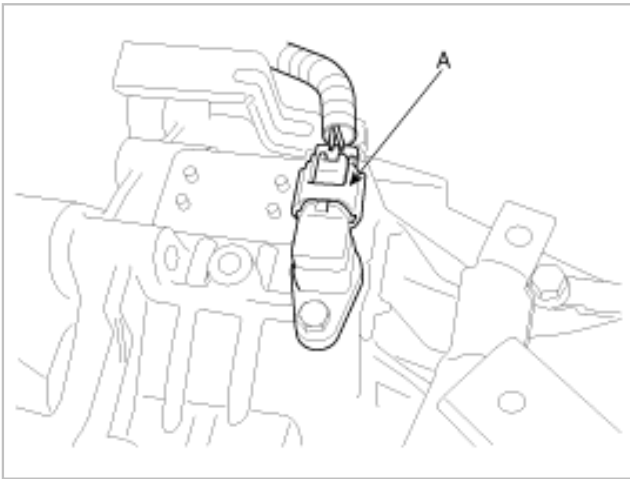
8. Remove the clip(A) of the control cable(B).



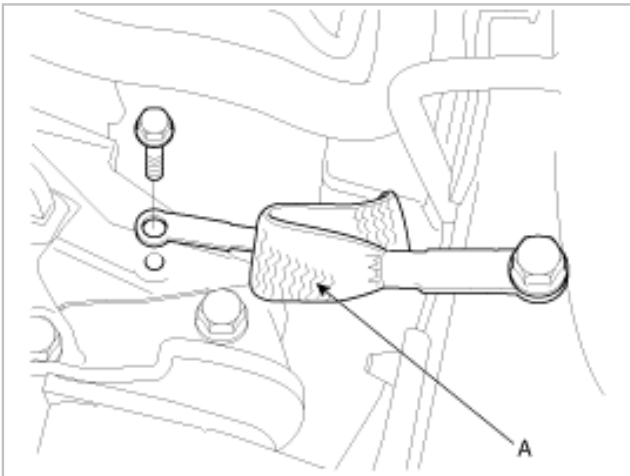
9. Remove the input shaft speed sensor connector(A).
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10. Remove the output shaft speed sensor connector(A).

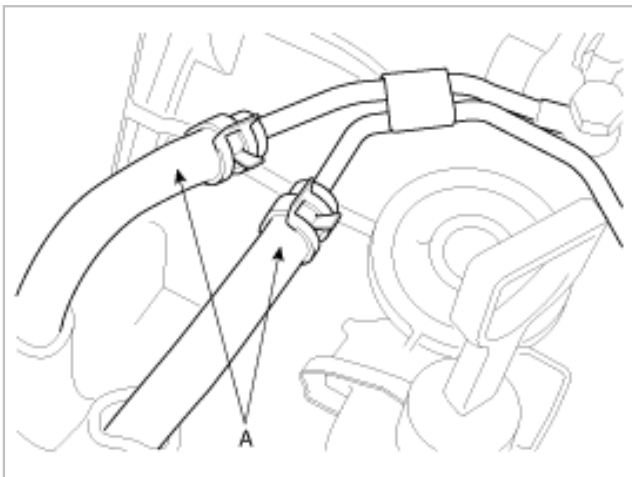


11. Remove the transaxle earth cable(A).



12. Remove the oil cooler hose(A).

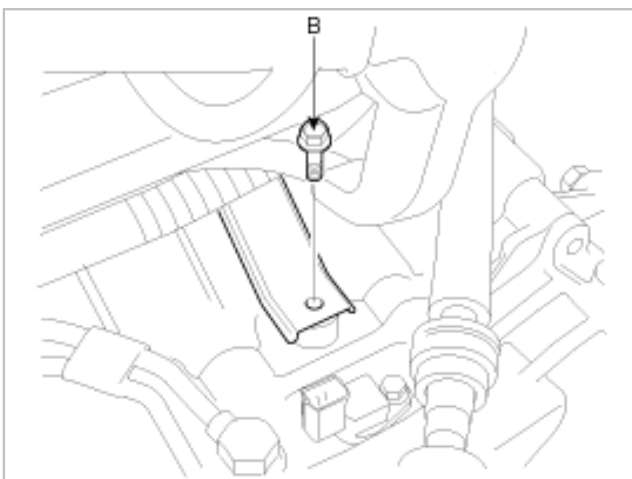
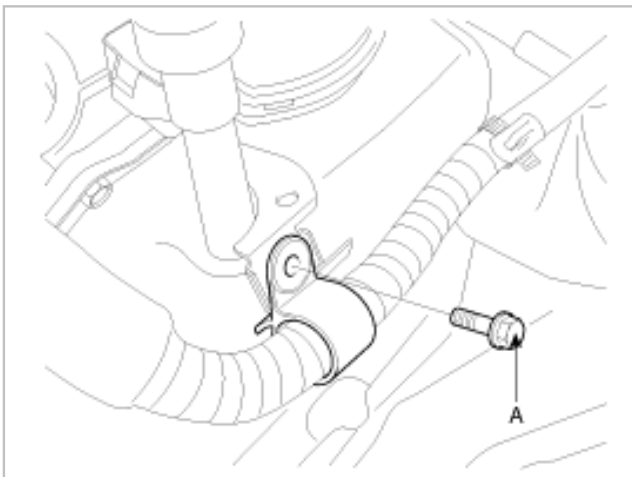
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NOTE

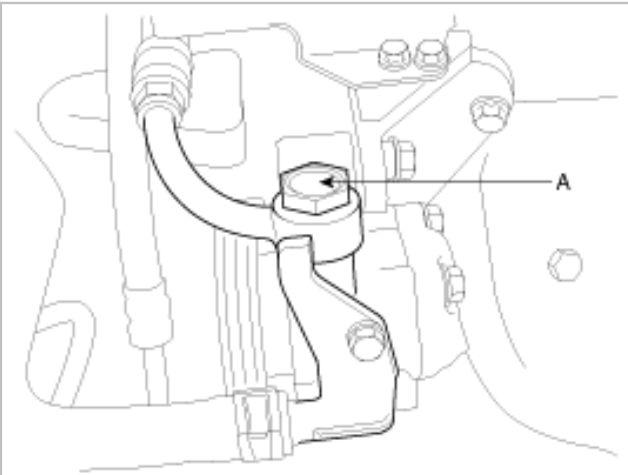
To prevent entry of dust or foreign matter, plug the disconnected hoses and transaxle fittings.

13. Remove the start motor cable mounting bolts(A, B).

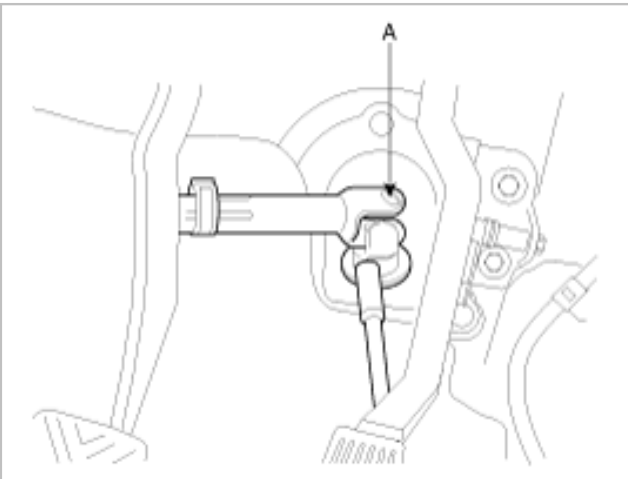


14. Remove the power steering eye bolt(A).

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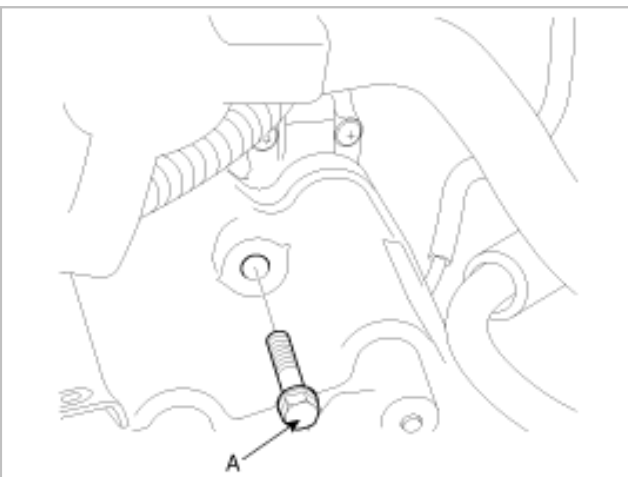
15. Remove the steering u-joint(A) mounting bolt.



NOTE

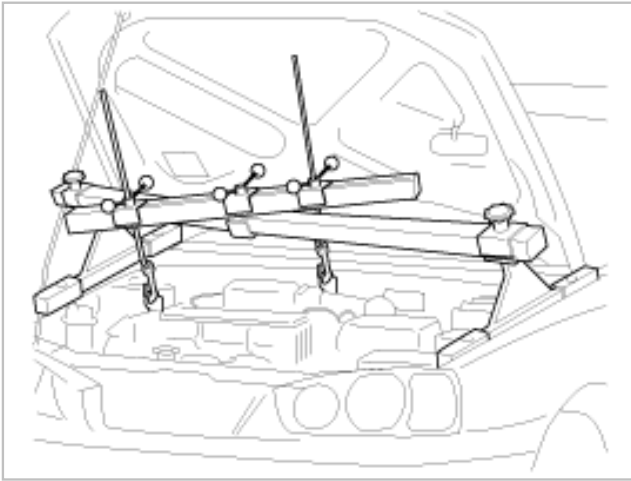
Mark a mating line on the steering column universal joint and the gear box before disassembling to make the installation easier.

16. Remove the start motor mounting bolt(A). (1EA)



17. Install the special tools (09200-38001, 09200-1C000), the engine support fixture and the adapter, on the engine assembly.

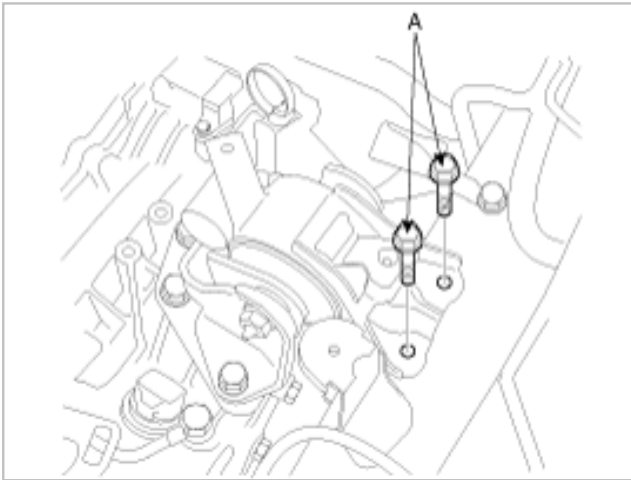
Ebay User ID: reveleus1



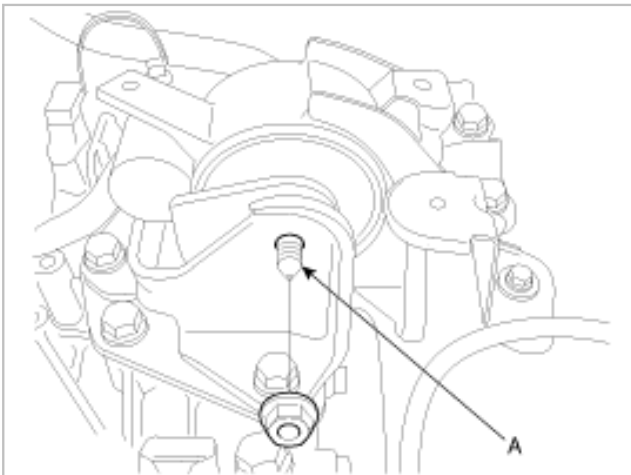
NOTE

When using the special tool, be careful that the hook holder of the special tool doesn't wear the cowl top cover.

18. Remove the transaxle-mounting bracket.
(1) Body mounting bolts(A) (Upper side)

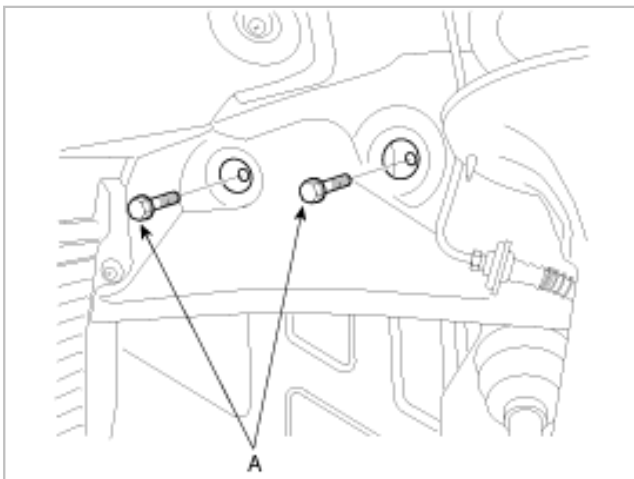


- (2) Insulator bolt(A).

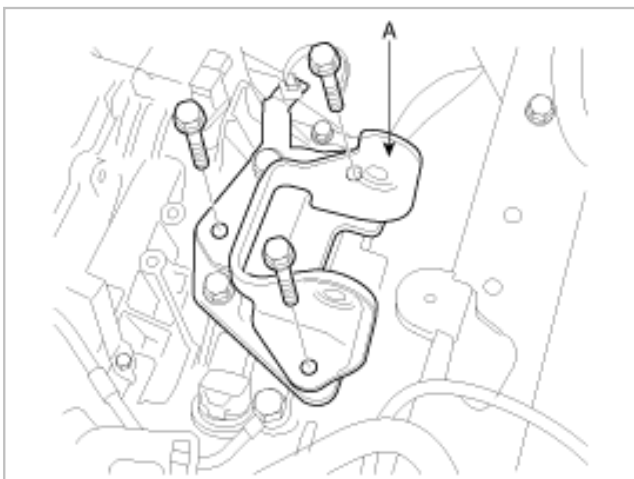


(3) Body mounting bolts(A) (Left side).

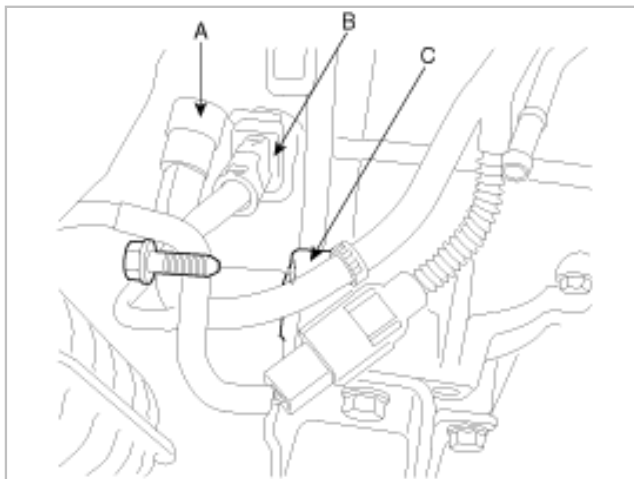
Ebay User ID: reveleus1



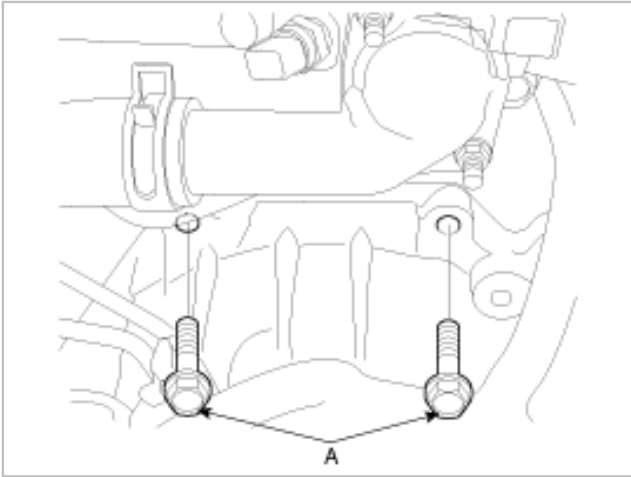
(4) Transaxle mounting bracket(A).



19. Remove front oxygen sensor, engine oil pressure switch(A), crank position sensor(B) connector mounting bracket(C).

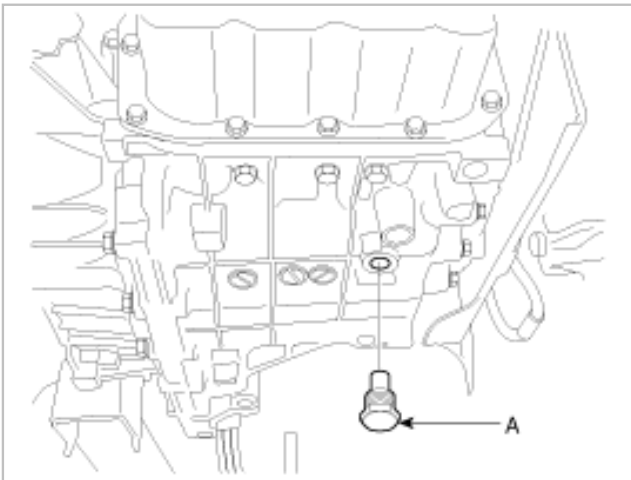


20. Remove the transaxle mounting to the engine bolts(A).
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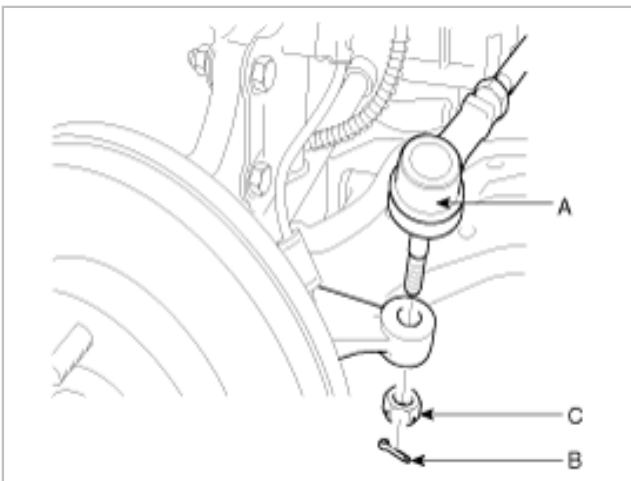
21. Lift up the vehicle.

22. Remove the drain plug(A) and drain the automatic transaxle fluid.

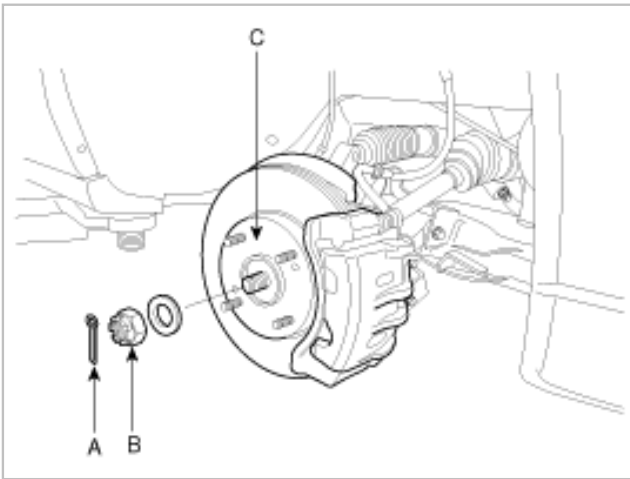


23. Remove the tire

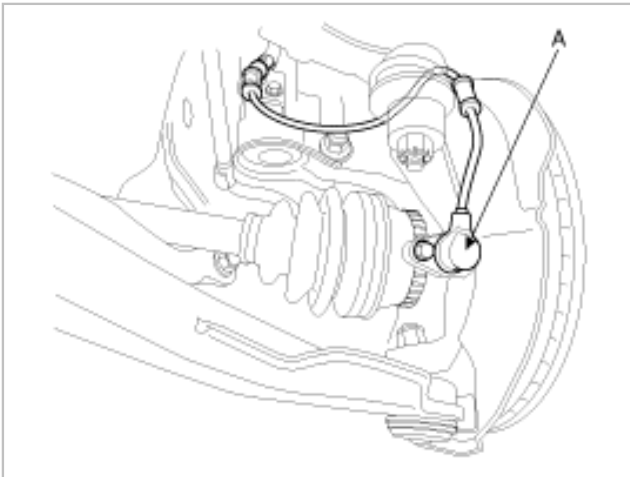
24. Separate the tie rod end(A) from the pin(B) and nut(C).



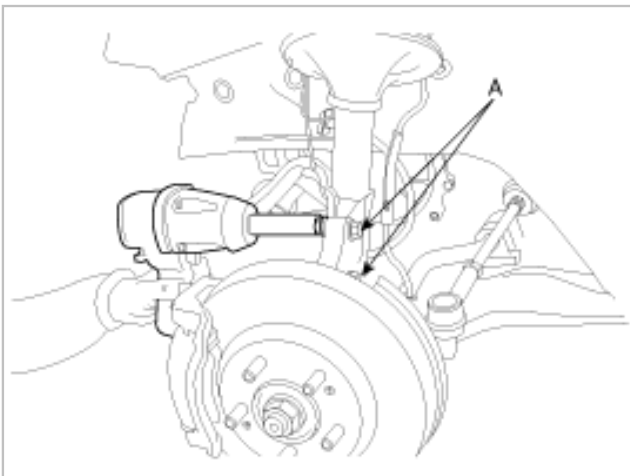
25. Remove the pin(A) and hub nut(B) from the front axle(C).
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26. Remove the ABS wheel speed sensor(A).

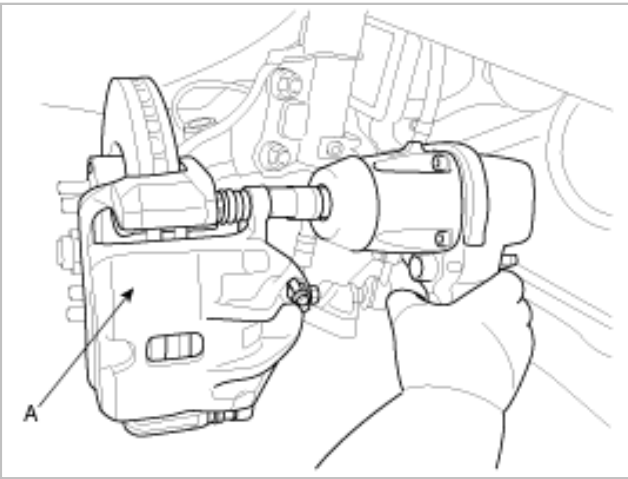


27. Remove the knuckle mounting bolts(A).

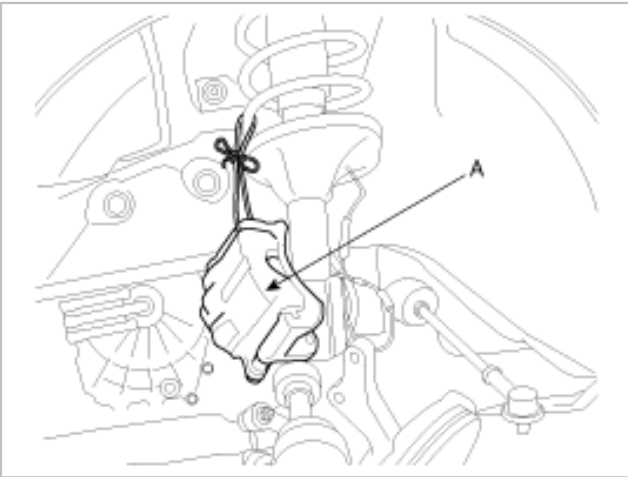


28. Remove the caliper(A).

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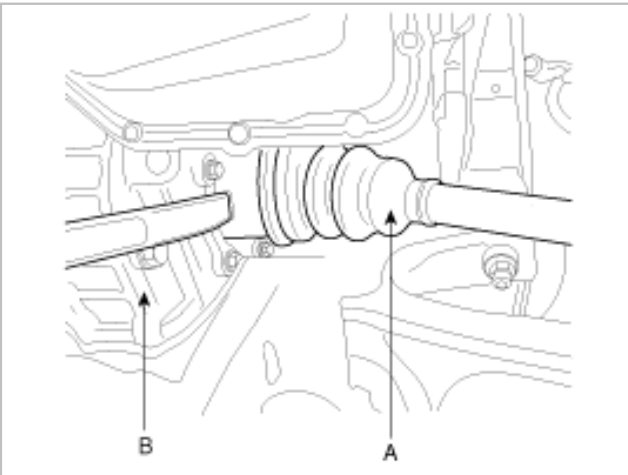


29. Hang the caliper assembly(A).



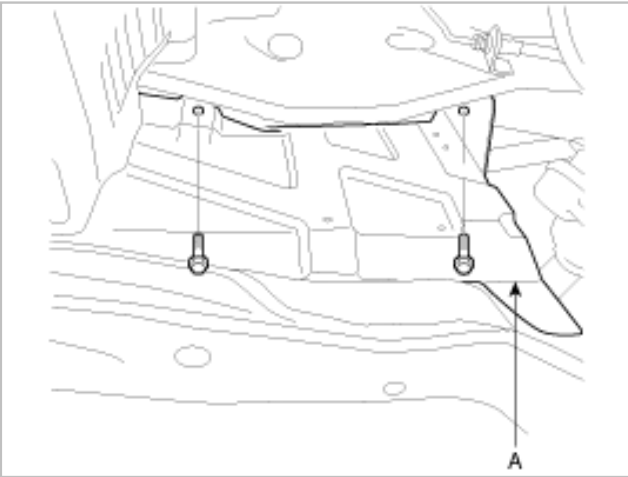
30. Remove the knuckle from the drive shaft.

31. Remove the drive shaft(A) from the transaxle(B).

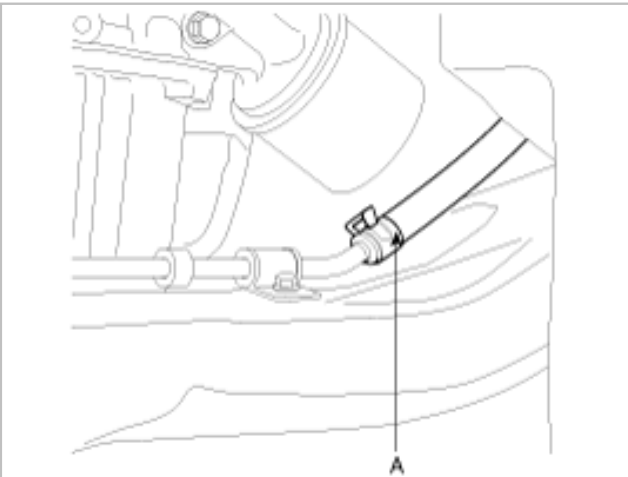


32. Remove the side cover(A).

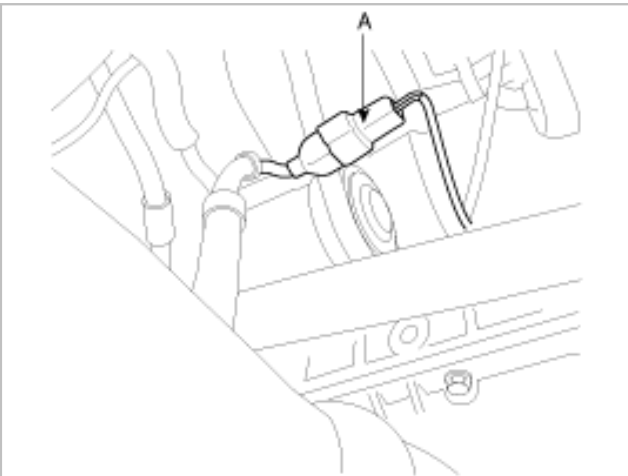
Ebay User ID: reveleus1



33. Remove the power return hose(A) and drain the power steering oil.

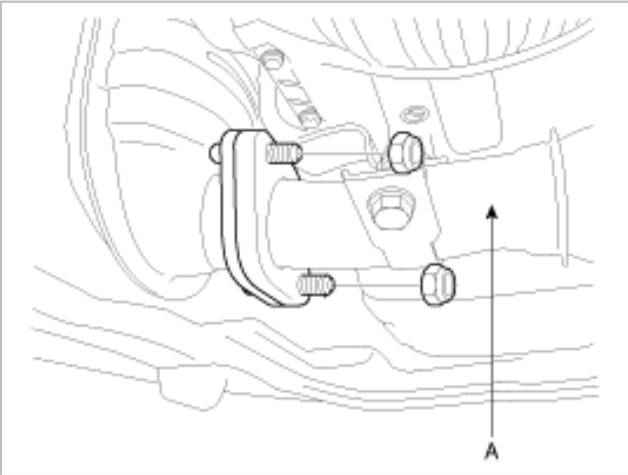


34. Disconnect the rear oxygen sensor connector(A).

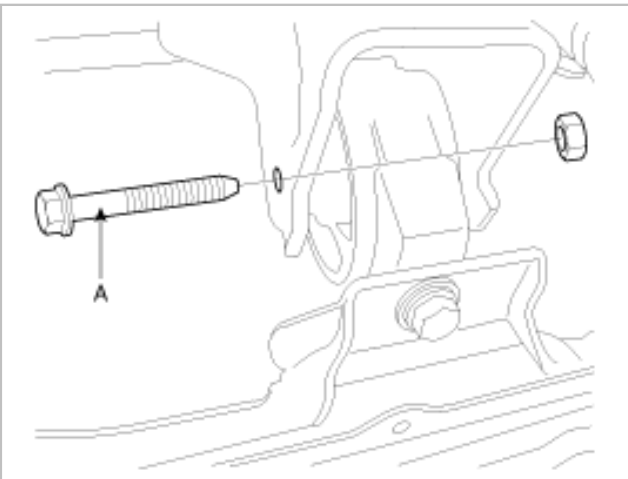


35. Remove the front muffler(A).

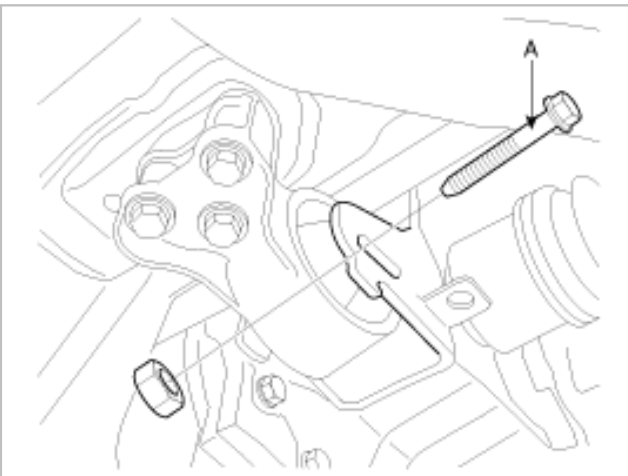
Ebay User ID: reveus1



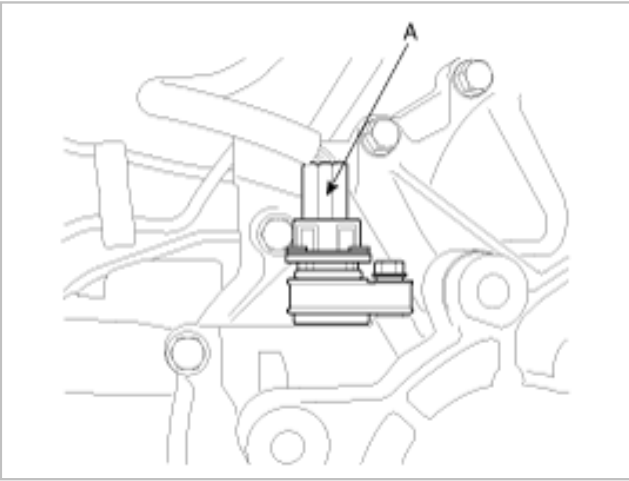
36. Remove the front roll stopper-mounting bolt(A).



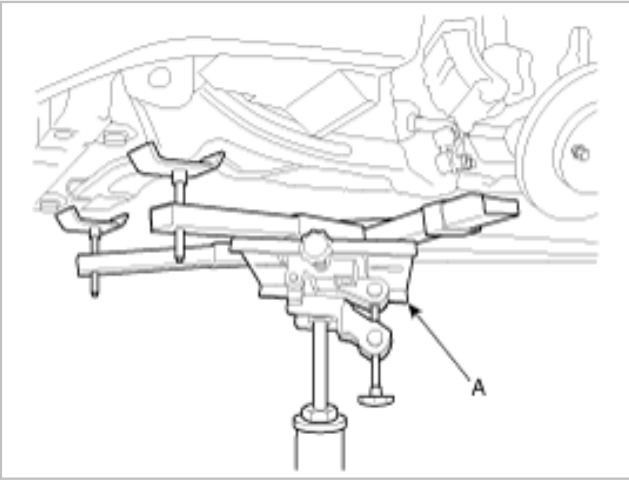
37. Remove the rear roll stopper-mounting bolt(A).



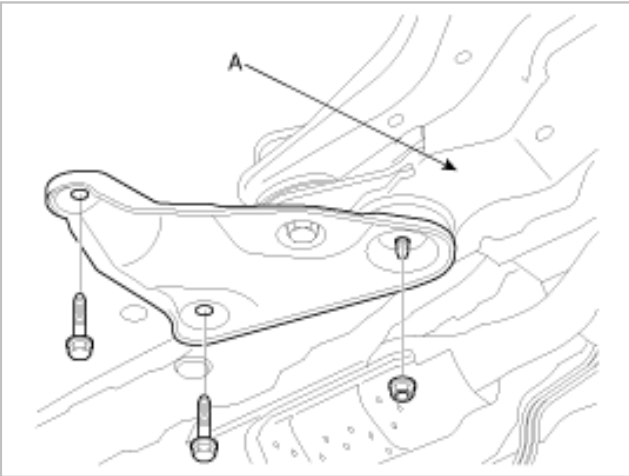
38. Remove the vehicle speed sensor connector(A).
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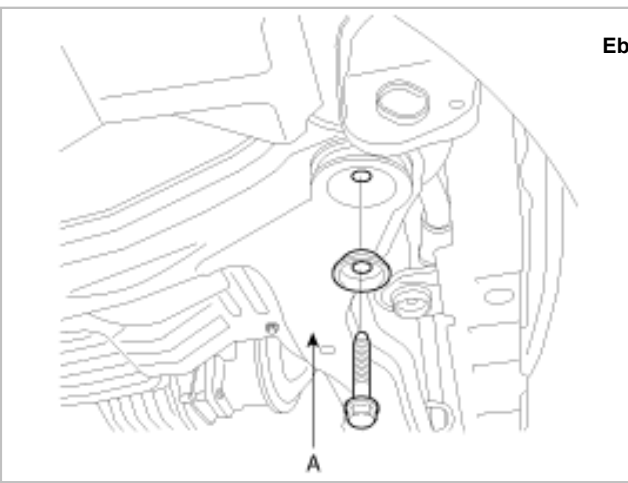


39. Install the jack(A).



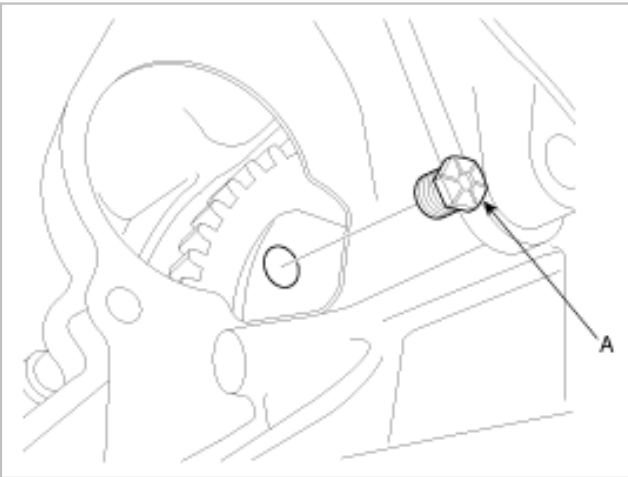
40. Remove the sub frame(A).



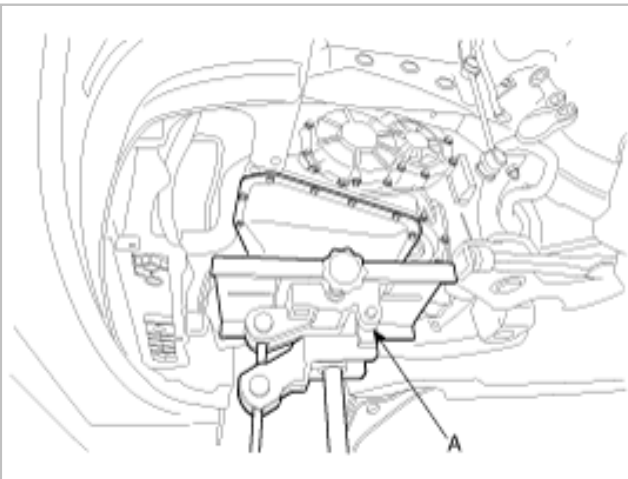


41. Remove the start motor mounting bolt.

42. Remove the engine to the torque converter mounting bolts(A). (4EA)

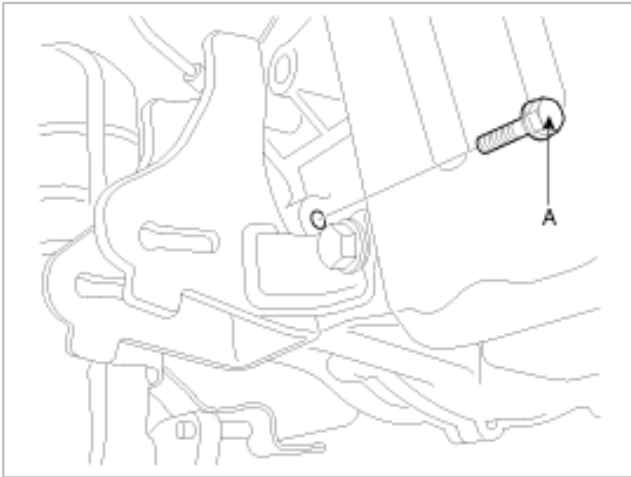


43. Install the jack(A) for supporting transaxle.

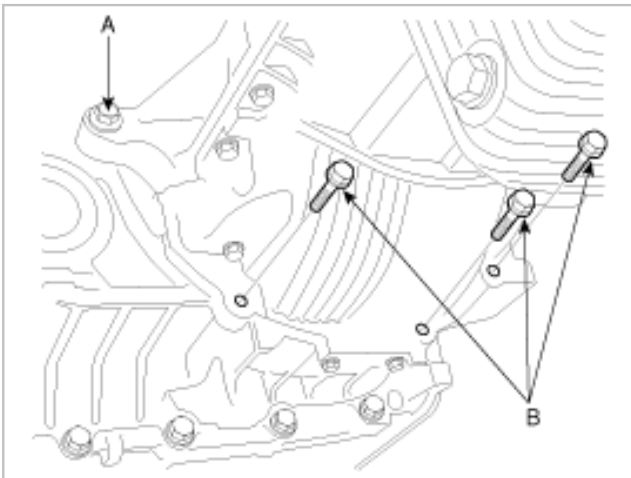


44. Remove the engine to automatic transaxle mounting bolts. Ebay User ID: reveleus1

(1) Transaxle to engine mounting bolt(A).



(2) Engine to transaxle mounting bolt(A).



(3) Engine oil pan to transaxle mounting bolts(B).

45. Remove the transaxle.

ON-VEHICLE REPAIR

DRIVE SHAFT OIL SEAL REPLACEMENT

1. Disconnect the drive shaft from the transaxle. (see to "DS" group)
2. Using a flat-tip screwdriver, remove the oil seal.

INSTALLATION

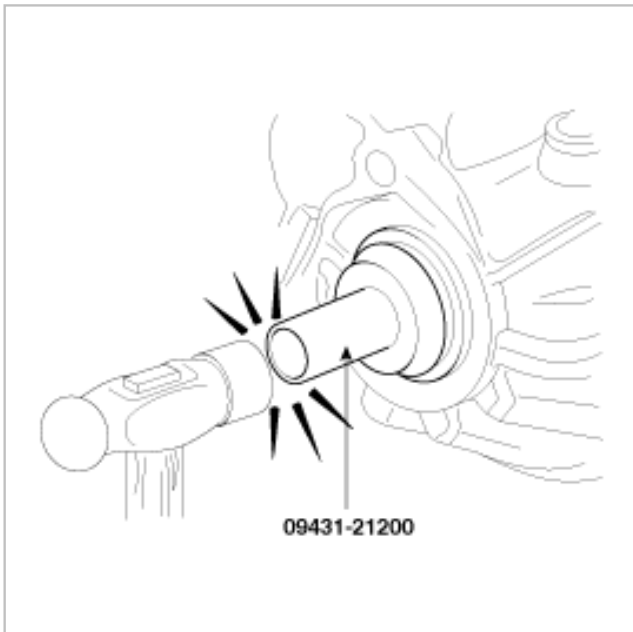
1. Apply a coating of gear oil to the lip of the oil seal.

Auto transaxle fluid :

HYUNDAI GENUINE ATF, DIAMOND ATF SP-III, SK ATF SP-III

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

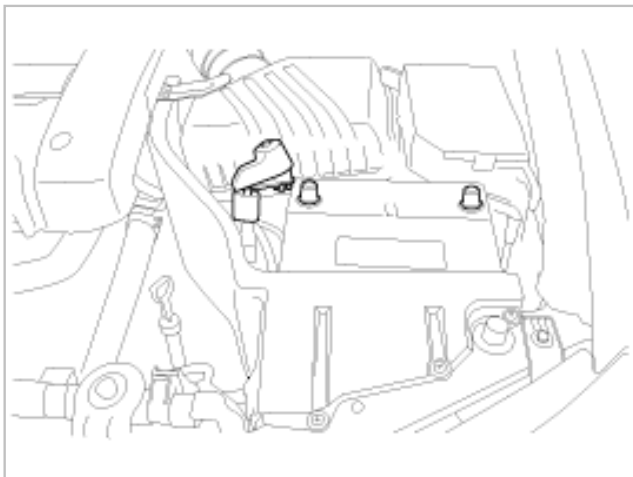
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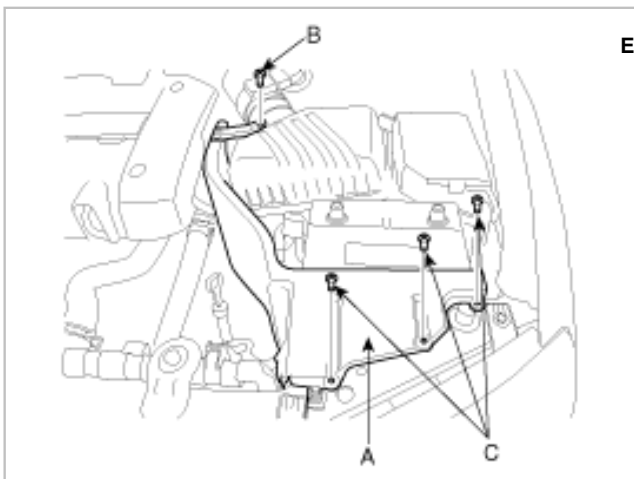
- Installation is the reverse of removal.
- Refill the transaxle fluid.
- Start engine and the transaxle range selector lever through all gear positions. Refill as necessary.

TRANSAXLE RANGE SWITCH REPLACEMENT

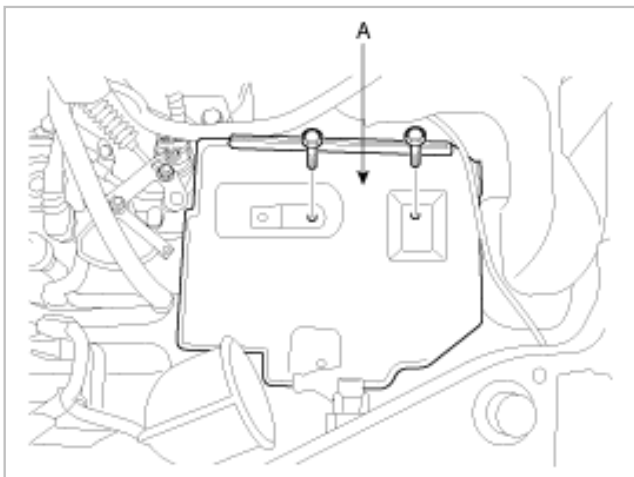
- Remove the battery terminal.



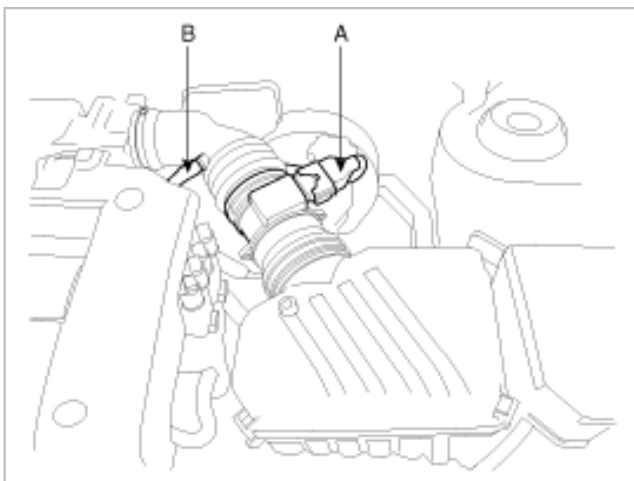
- Remove the heat shield(A) (Bolt: 1EA(B), Retainer: 3EA(C)).



3. Remove the battery and battery tray(A).

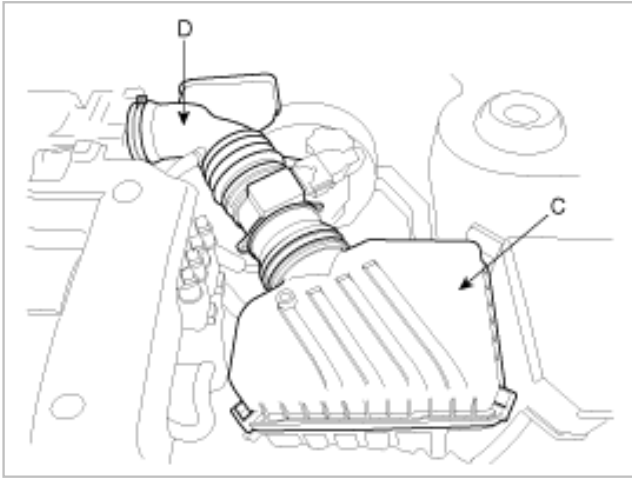


4. Disconnect the air flow sensor connector(A) and breather hose(B).

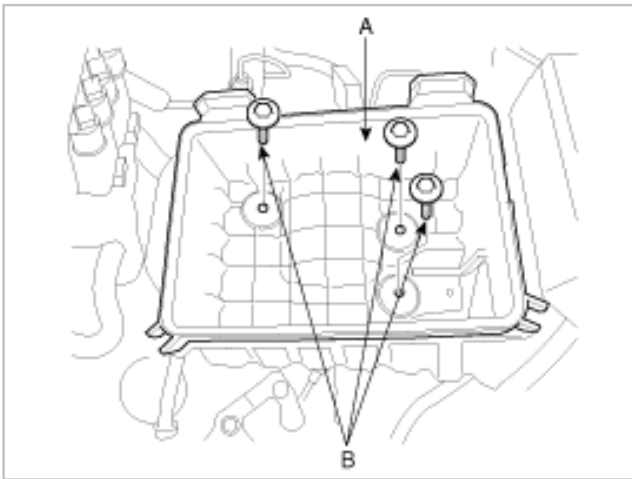


5. Removal of air cleaner and air intake hose. Ebay User ID: reveleus1

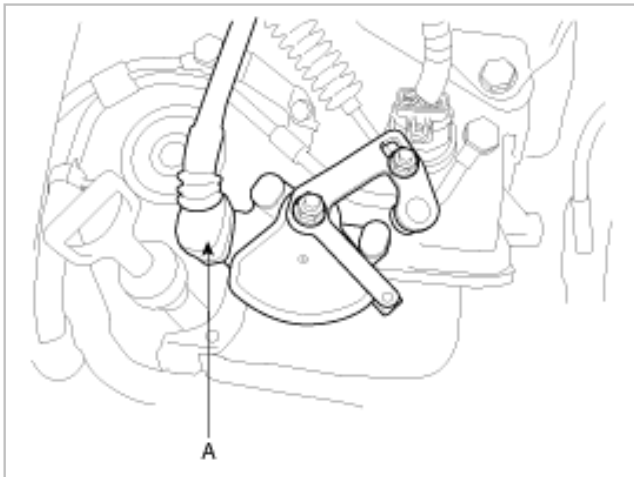
A. Air cleaner upper cover(C) and air intake hose(D).



B. Air cleaner lower(A) (Bolt: 3EA(B)).

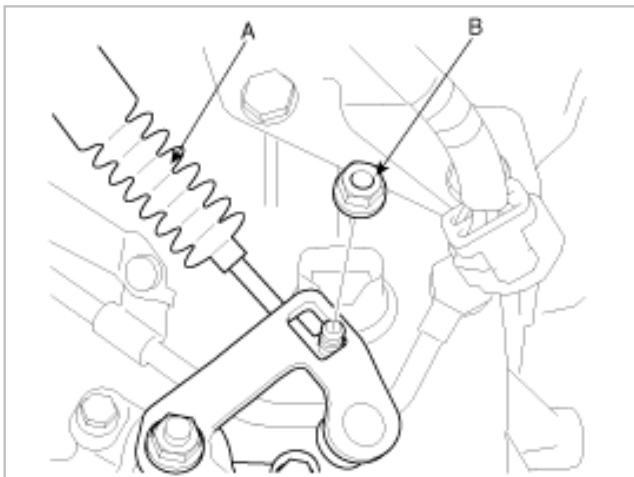


6. Remove the transaxle range switch connector(A).

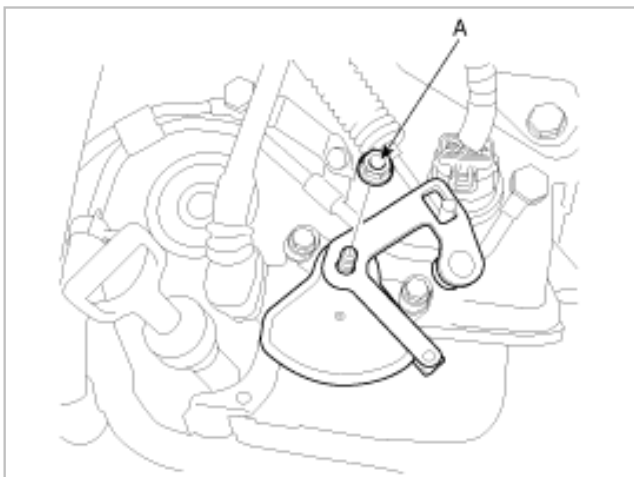


7. Remove the control cable to transaxle range switch(A) mounting nut(B).

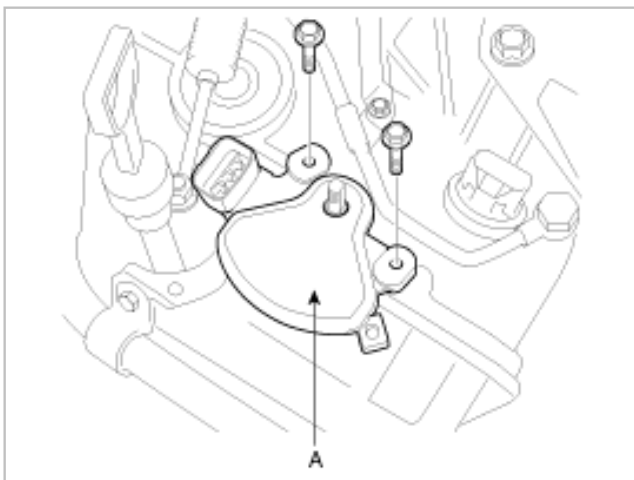
Ebay User ID: reveleust



8. Remove the transaxle range switch manual lever mounting nut(A).



9. Remove the transaxle range switch(A).



INSTALLATION

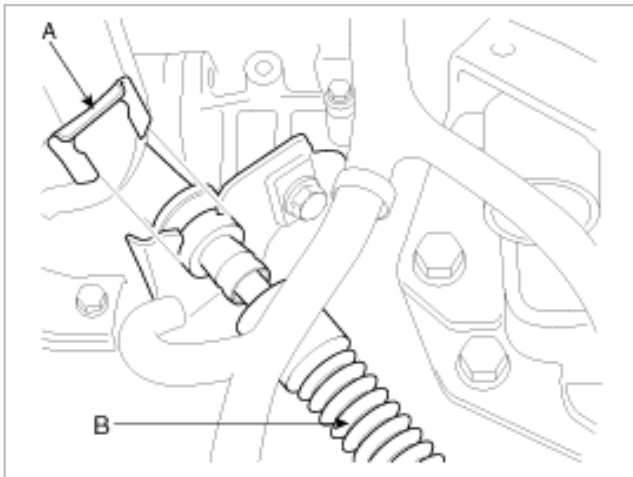
Refer to Transaxle range switch and control cable adjustment.

INPUT SHAFT SPEED SENSOR REPLACEMENT

1. Removal of the battery and air cleaner (see the page TR-119 "Transaxle range switch replacement").
2. Remove the transaxle range switch connector.
3. Remove the control cable to transaxle range switch mounting nut.

4. Remove the clip(A) of the control cable(B).

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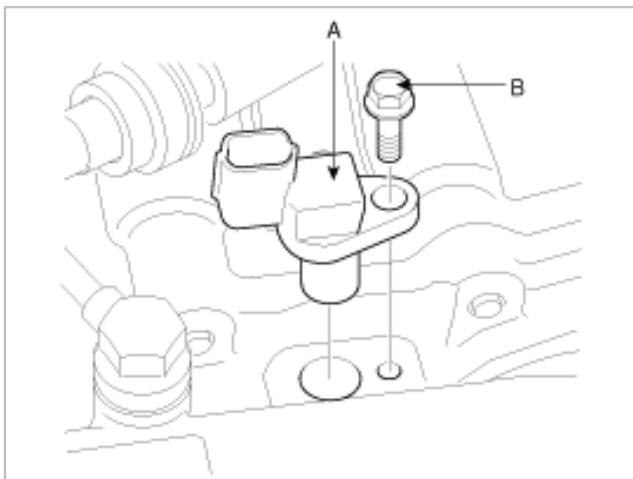


5. Remove the control cable mounting bracket.

6. Remove the input shaft speed sensor(A).

(1) Disconnect the input shaft speed sensor connector.

(2) Remove the bolt(B).



(3) Inspect the input shaft speed sensor bore.

INSTALLATION

1. Apply a light coat of automatic transaxle fluid to the O-ring seal before installation.

2. Install the input shaft speed sensor.

3. Install the control cable mounting bracket.

4. Connect the input shaft speed sensor connector.

5. Install the clip of the control cable.

6. Adjust the control cable to transaxle range switch and tight the transaxle manual lever to the control cable mounting nut. (see the page TR-27 "Transaxle range switch and control cable adjustment")

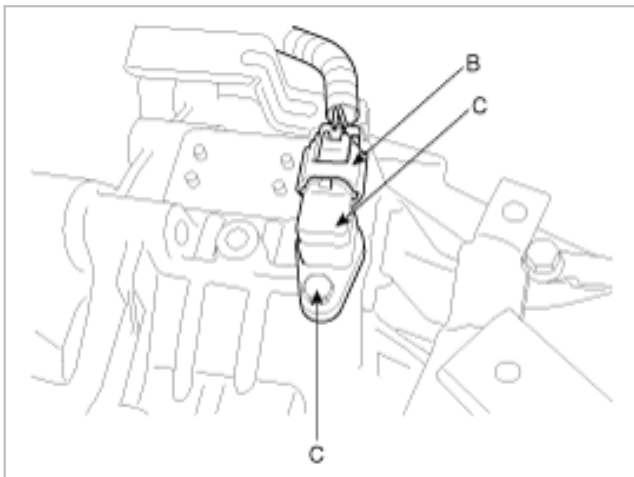
7. Installation is the reverse of removal.

OUTPUT SHAFT SPEED SENSOR REPLACEMENT

1. Removal of the battery and air cleaner. (see the page TR-119 "Transaxle range switch replacemtn")

2. Remove the output shaft speed sensor(A).

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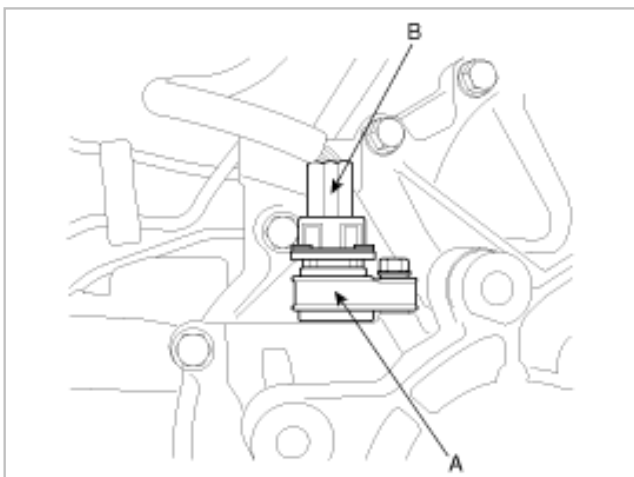
- (1) Disconnect the output shaft speed sensor connector(B).
- (2) Remove the bolt(C).
- (3) Inspect the output shaft speed sensor bore.

INSTALLATION

1. Apply a light coat of automatic transaxle fluid to the O-ring seal before installation.
2. Installation is the reverse of removal.

VEHICLE SPEED SENSOR REPLACEMENT

1. Lift up the vehicle.
2. Remove the vehicle speed sensor(A).



- (1) Disconnect the vehicle speed sensor connector(B).
- (2) Remove the bolt (10mm).
- (3) Inspect the vehicle speed sensor bore.
3. Inspect the O-ring for nicks or cut. Install a new O-ring as necessary.

INSTALLATION

1. Apply a light coat of automatic transaxle fluid to the O-ring seal before installation.
2. Install the vehicle speed sensor.
3. Connect the vehicle speed sensor connector.
4. Installation is the reverse of removal.

Purchased
from Ebay seller
Reveleus1

Thank-you for purchasing from me, it
is much appreciated.

To contact me please email
suzlever@gmail.com

ATM CONTROL CABLE REPLACEMENT

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1. Remove the control cable to transaxle range switch mounting nut. (see the page TR-119 "Transaxle range switch replacement").
2. Remove the clip of the control cable.
3. Remove the console (Screw : 6EA)
4. Remove the control cable pin.
5. Remove the clip of the control cable by pressing it with the driver.
6. Remove the control cable mounting nuts(A).



7. Remove the mounting bolts of the cable of the lower dashboard side to remove the cable.

INSTALLATION

1. See the page TR-27 "Transaxle range switch and control cable adjustment"
2. Installation is the reverse of removal.

INSTALLATION

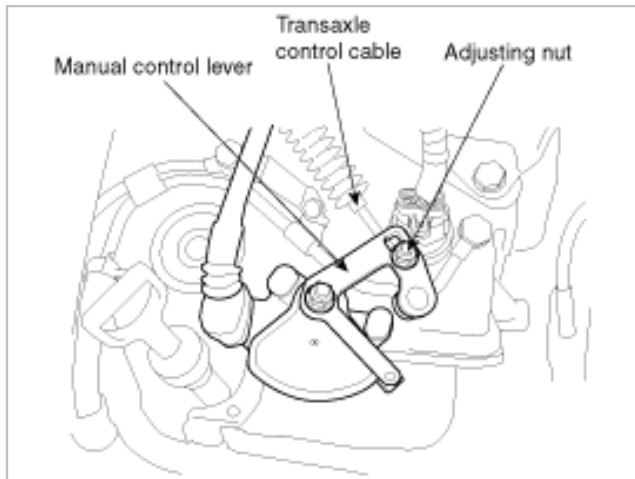
1. Attach the torque converter on the transaxle side and mount the transaxle assembly onto the engine.

CAUTION

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

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

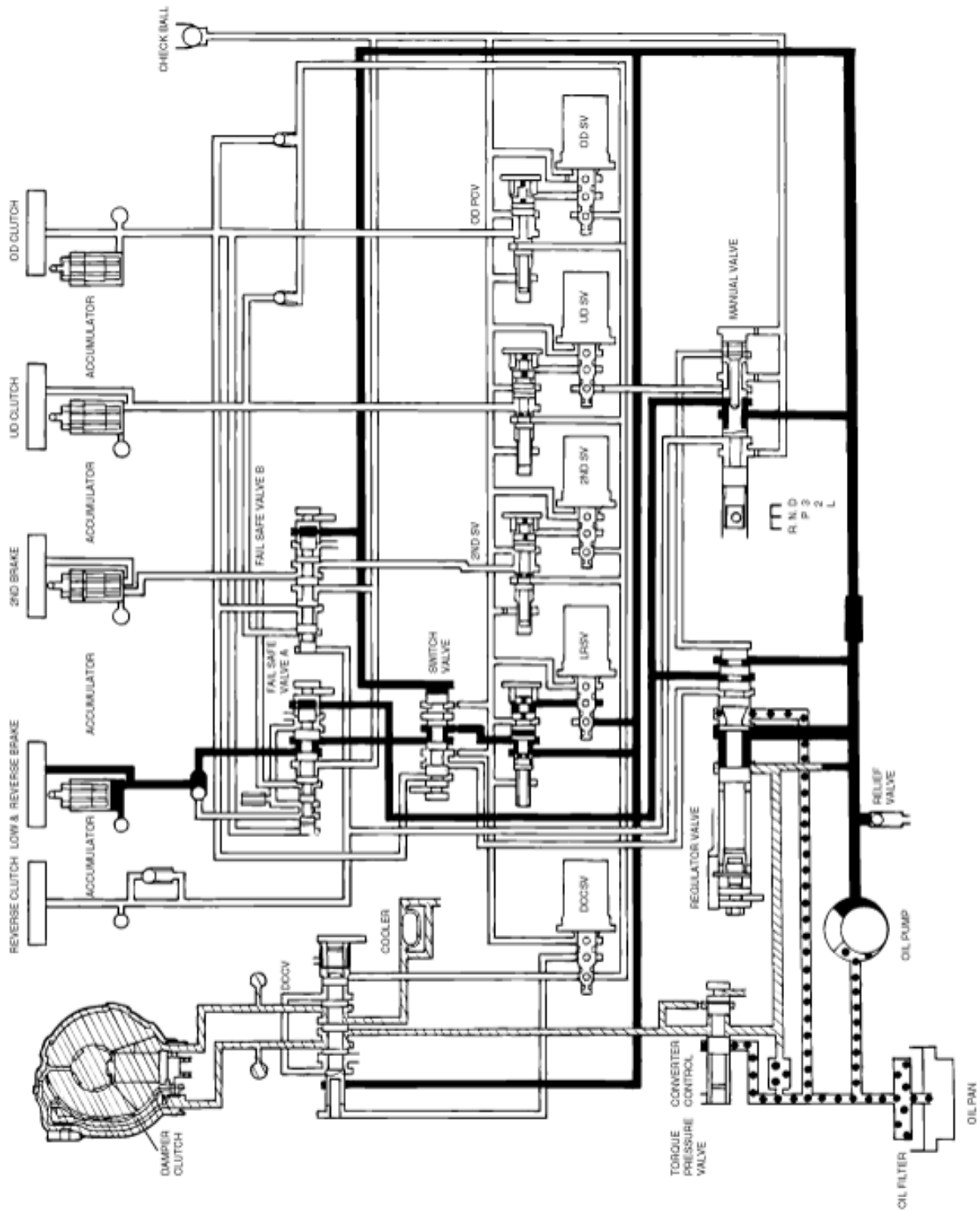
(4) Check to see that the control cable has been adjusted correctly.
Ebay User ID: reveleus1



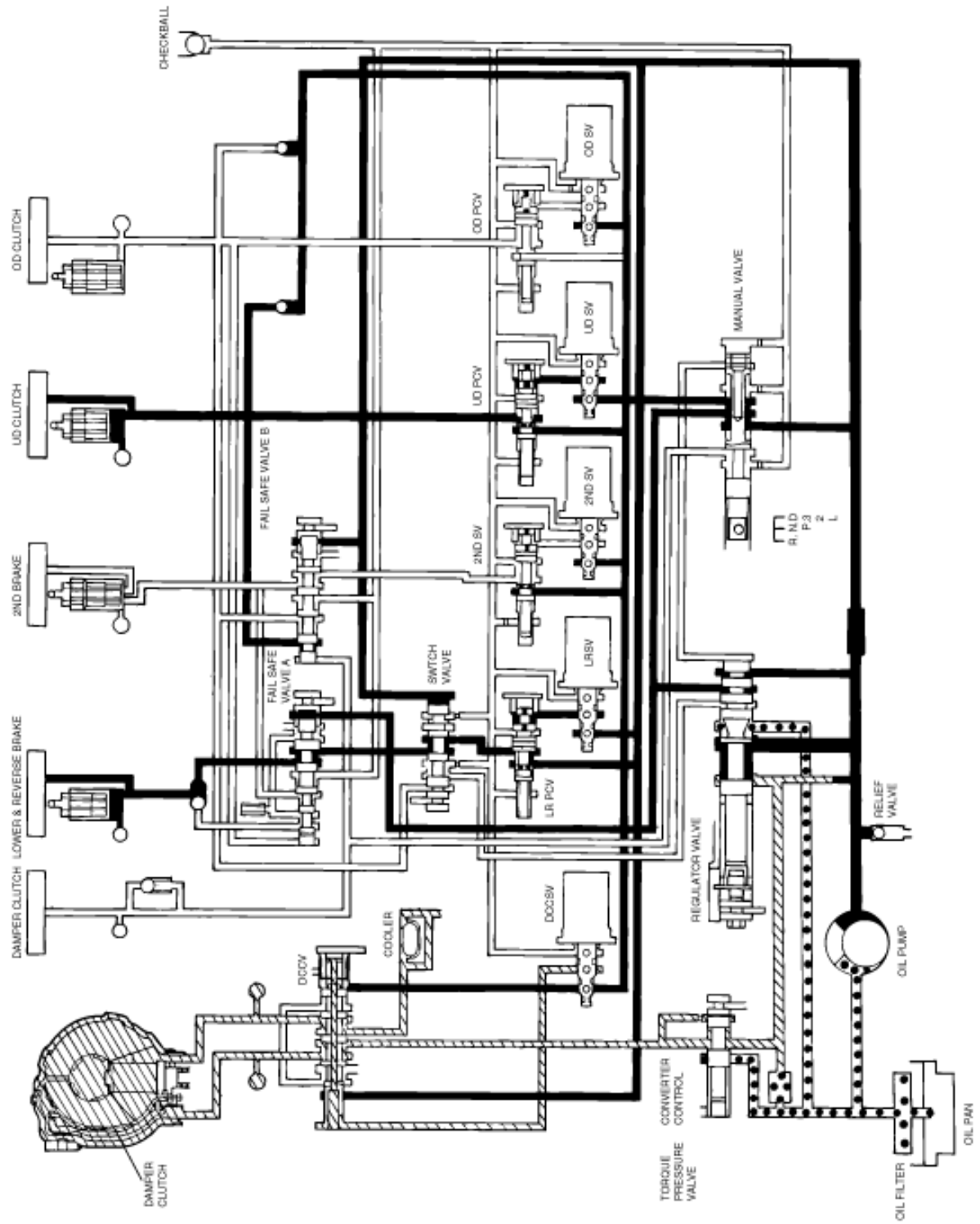
3. Installation is the reverse of removal.






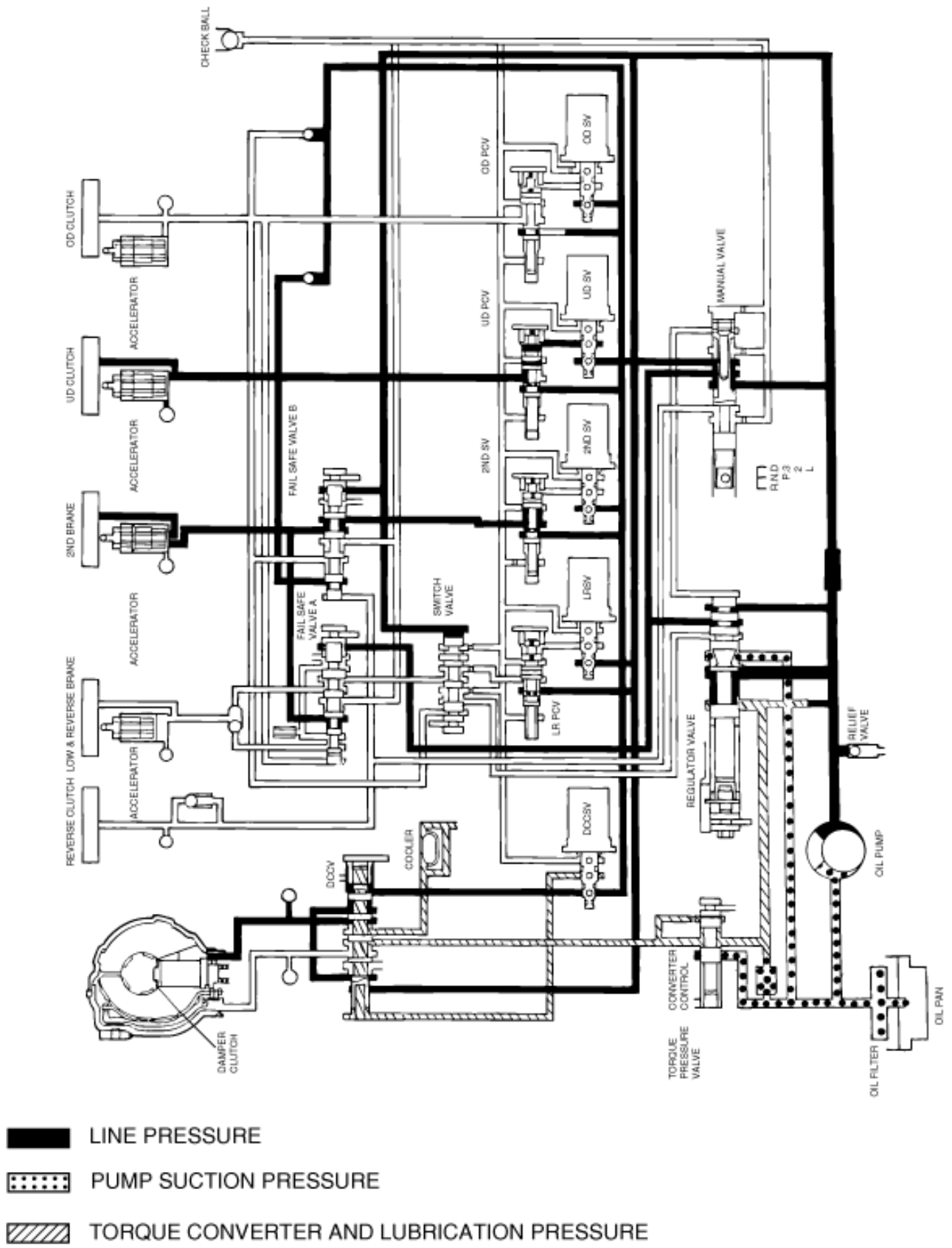
AUTOMATIC TRANSAXLE HYDRAULIC CIRCUIT (F4A42)






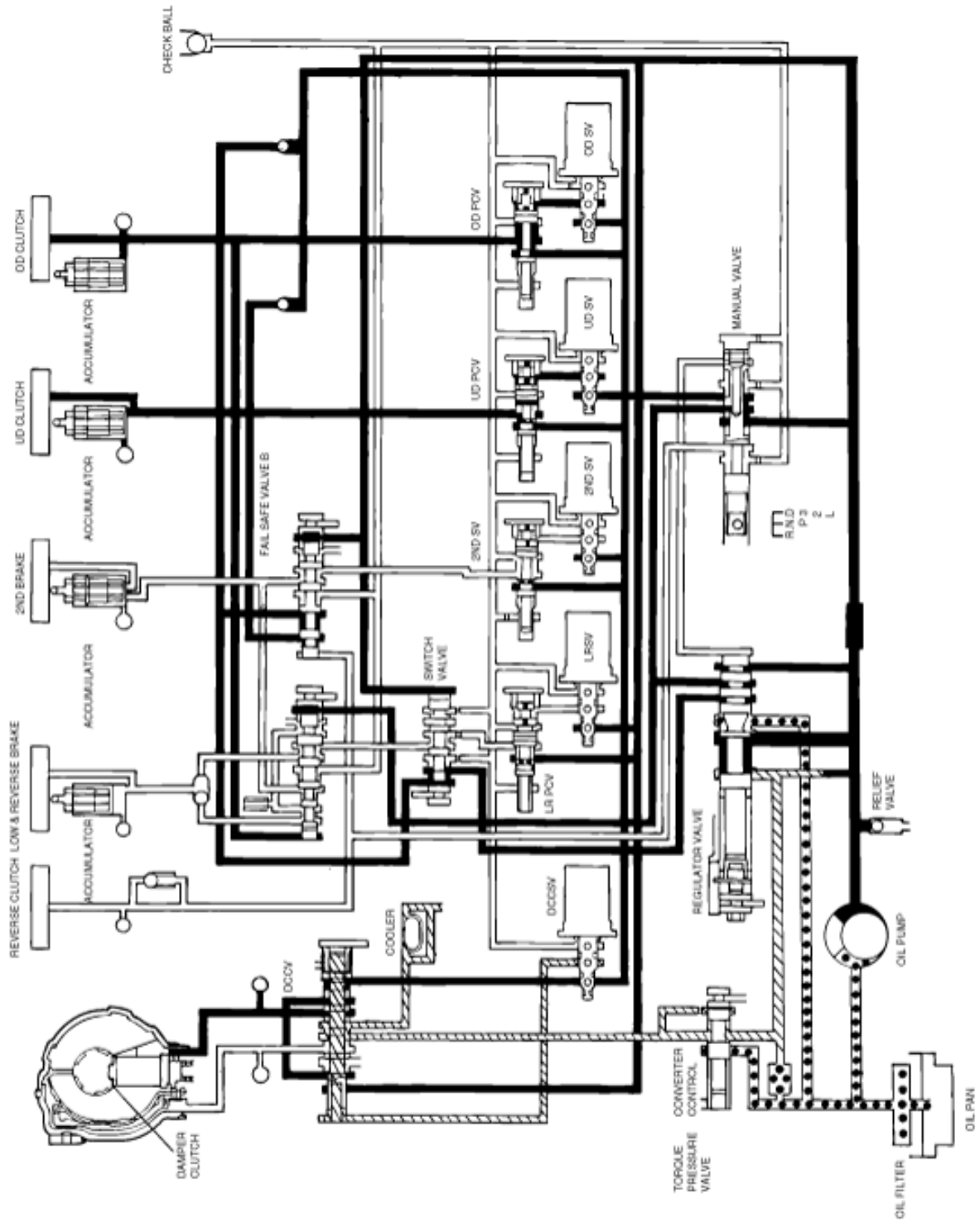
- LINE PRESSURE
- PUMP SUCTION PRESSURE
- TORQUE CONVERTER AND LUBRICATION PRESSURE






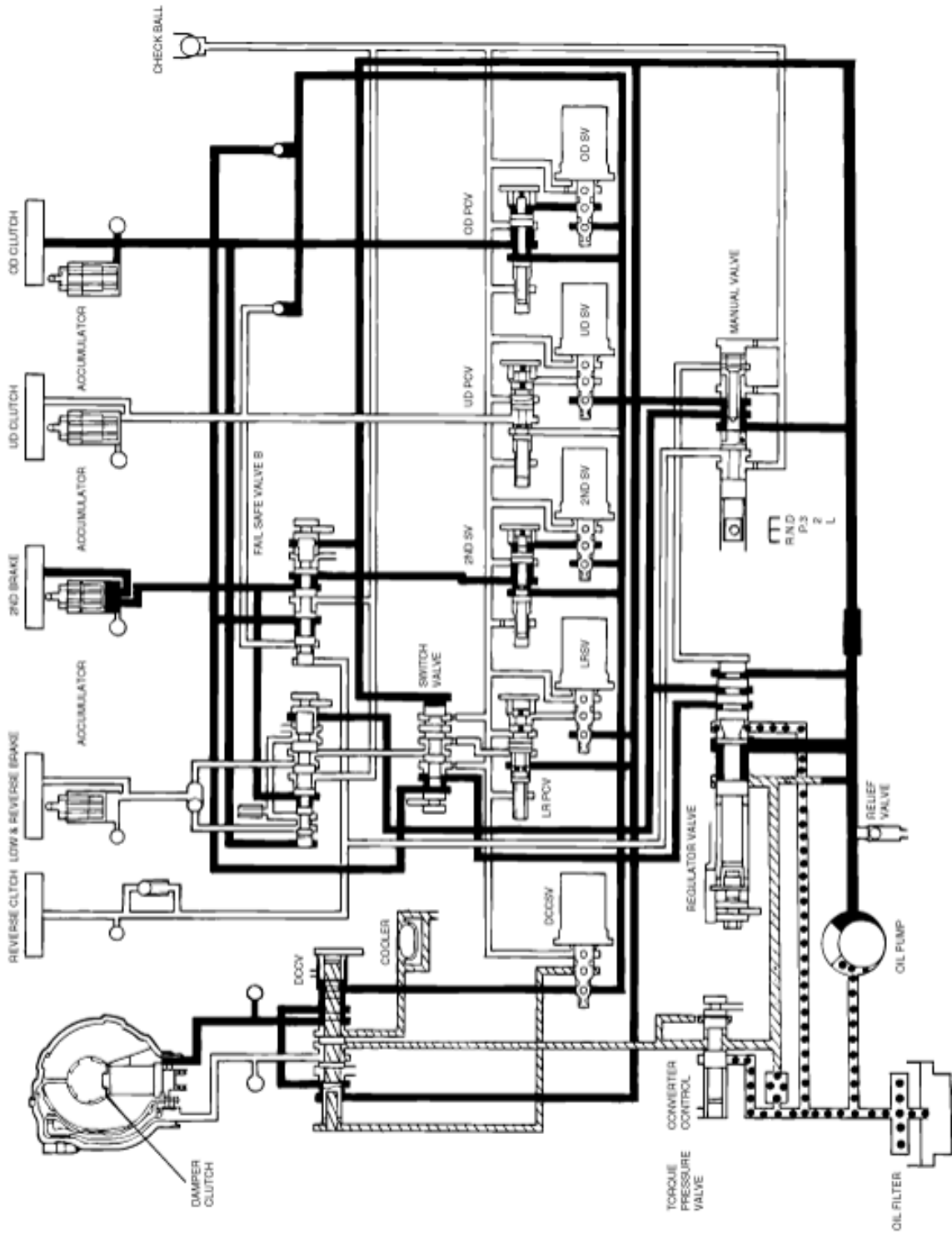
-  LINE PRESSURE
-  PUMP SUCTION PRESSURE
-  TORQUE CONVERTER AND LUBRICATION PRESSURE






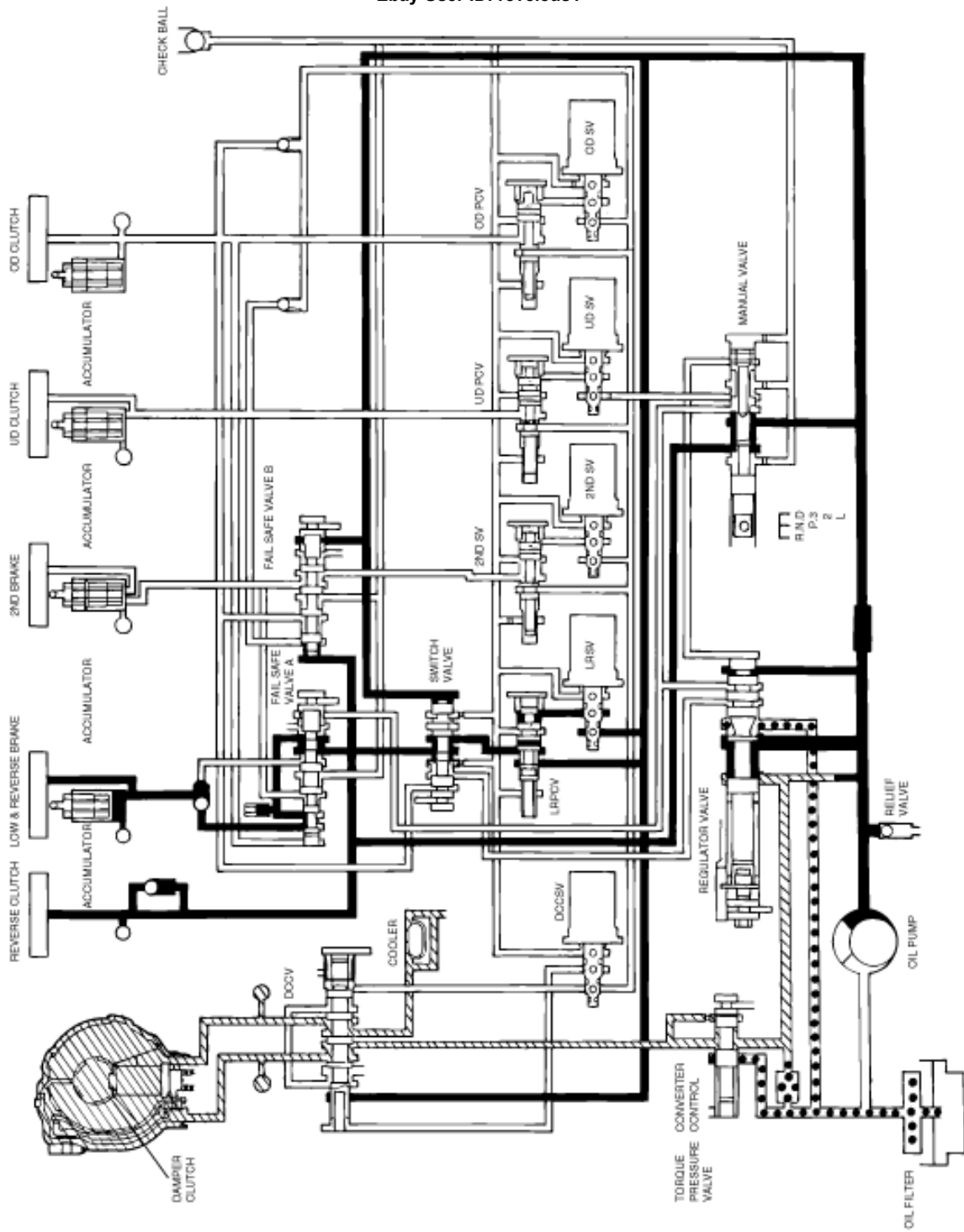
-  LINE PRESSURE
-  PUMP SUCTION PRESSURE
-  TORQUE CONVERTER AND LUBRICATION PRESSURE






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



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

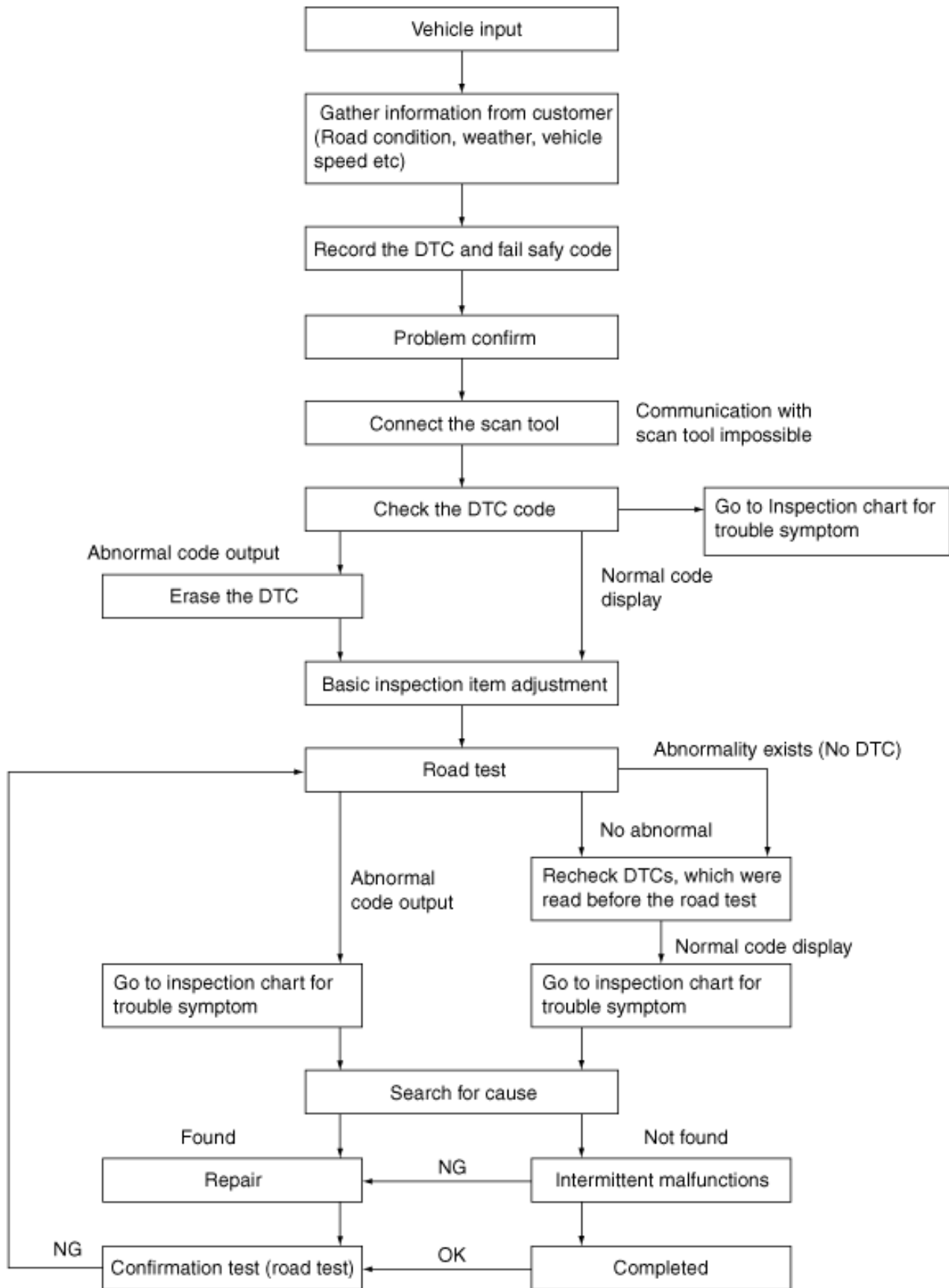


-  LINE PRESSURE
-  PUMP SUCTION PRESSURE
-  TORQUE CONVERTER AND LUBRICATION PRESSURE



AUTOMATIC TRANSAXLE (F4A42)

TROUBLESHOOTING (A/T)



DIAGNOSIS FUNCTION

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1. Connect the Hi Scan Pro to the connector for diagnosis.
2. Read the output diagnostic trouble codes. Then follow the remedy procedures according to the "DIAGNOSTIC TROUBLE CODE DESCRIPTION" on the following pages.

NOTE

- A maximum of 8 diagnostic trouble codes (in the sequence of occurrence) can be stored in the Random Access Memory (RAM) incorporated within the control module.
- The same diagnostic trouble code can be stored one time only
- If the number of stored diagnostic trouble codes or diagnostic trouble patterns exceeds 8, already stored diagnostic trouble codes will be erased in sequence, beginning with the oldest.
- Do not disconnect the battery until all diagnostic trouble codes or diagnostic trouble patterns have been read out, because all stored diagnostic trouble codes or diagnostic trouble patterns will be cancelled when the battery is disconnected.

3. If the fail-safe system is activated and the transaxle is locked in third gear, the diagnostic trouble code in the fail-safe code description will be stored in the RAM. Three of these diagnostic trouble codes can be stored.
4. The cancellation will occur if, with the transaxle locked in third gear, the ignition key is turned to the OFF position, but the diagnostic trouble code is stored in the RAM.
5. Memorization.
 - A. Up to 8 diagnosis items and 3 fail-safe items can be memorized.
 - B. If the memory capacity is exceeded, diagnosis and fail-safe items in the memory are overwritten, starting with the oldest.
 - C. No code can be memorized more than once.
6. Diagnosis Code Deletion
 - (1) Automatic Deletion.

All diagnosis codes are deleted from memory the 200th time the ATF temperature reaches 50°C after memorization of the most recent diagnosis code.
 - (2) Forced Deletion.

Memorized diagnosis codes can be deleted using the scan-tool, provided the following conditions are satisfied :

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

ROAD TEST

No.	Condition	Operation	Judgment value	Check item
1	Ignition switch : OFF	Ignition switch (1) ON	Battery voltage (mV)	Control relay
	<ul style="list-style-type: none">• Ignition switch : ON• Engine : Stopped• Selector lever position : P	Selector lever position (1) P, (2) R, (3) N, (4) D	(1) P, (2) R, (3) N, (4) D	Transaxle range switch

2		Accelerator pedal (1) Released (2) Half depressed (3) Depressed	(1) 400~1,000 mV (2) Gradually rises from (1) (3) 4,500~5,000 mV	Throttle position sensor
		Brake pedal (1) Depressed (2) Released	(1) ON (2) OFF	Brake switch
3	•Ignition switch : ST •Engine : Stopped	Starting test with lever P or N range	Starting should be possible	Starting possible or impossible
4	Warming up	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70~90°C	Gradually rises to 70~90°C	Oil temperature sensor
5	•Engine : Idling •Selector lever position : N	A/C switch (1) ON (2) OFF	(1) ON (2) OFF	Triple pressure switch
		Accelerator pedal (1) Released (2) Half depressed	(1) ON (2) OFF	Idle position switch
			(1) 600~900 rpm (2) Gradually rises from (1)	
			(1) Data changes	Communication with engine-ECU
	Selector lever position (1) N→D (2) N→R	Should be no abnormal shifting shocks Time lag should be within 2 seconds	Malfunction when starting	
6	Selector lever position : N (Carry out on a flat and straight road)	Selector lever position and vehicle speed 1. Idling in 1st gear (Vehicle stopped) 2. Driving at constant speed of 20 km/h in 1st gear 3. Driving at constant speed of 30 km/h in 2nd gear 4. Driving at 50 km/h in 3rd gear with accelerator fully closed	(2) 1st, (4) 3rd, (3) 2nd, (5) 4th	Shift condition
			(2) 0%, (4) 100%, (3) 100%, (5) 100%	Low and reverse solenoid valve
			(2) 0%, (4) 0%, (3) 0%	Underdrive solenoid valve
			(1) 100%, (2) 0%, (3) 100%	Second solenoid valve
			(2) 100%, (3) 100%, (4) 0%	Overdrive solenoid valve
			(1) 0km/h (4) 50km/h	Vehicle speed sensor

		5. Driving at constant speed of 50 km/h in 4th gear	(4) 1,800 ~ 2,100rpm (4) 1,800 ~ 2,100rpm	Input shaft speed sensor Output shaft speed sensor
7	Selector lever position : D (Carry out on a flat and straight road)	<ol style="list-style-type: none"> Accelerate to 4th gear at a throttle position sensor output of 1.5V (accelerator opening angle of 30 %). Gently decelerate to a standstill. Accelerate to 4th gear at a throttle position sensor output of 2.5 V (accelerator opening angle of 50%). While driving at 60 km/h in 4th gear, shift down to 3rd gear. While driving at 40 km/h in 3rd gear, shift down to 2nd gear. While driving at 20 km/h in 2nd gear, shift down to 1st gear. 	<p>For (1), (2) and (3), the reading should be the same as the specified output shaft torque, and no abnormal shocks should occur.</p> <p>For (4), (5) and (6), downshifting should occur immediately after the shifting operation is made.</p>	<p>Malfunction when shifting</p> <p>Displaced shift points</p> <p>Does not shift</p> <p>Does not shift from 1 to 2 or 2 to 1</p> <p>Does not shift from 2 to 3 or 3 to 2</p> <p>Does not shift from 3 to 4 or 4 to 3</p>
8	Selector lever position : N (Carry out on a flat and straight road)	Move selector lever to R range drive at constant speed of 10km/h	The ratio between input and output shaft speed sensor data should be the same as the gear ratio when reversing.	Does not shift

ELEMENTS IN USE IN EACH GEAR

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

	4th	-	-	O	-	O	-
3	1st	O	-	-	O	-	O
	2nd	O	-	-	-	O	-
	3rd	O	-	O	-	-	-
2	1st	O	-	-	O	-	O
	2nd	O	-	-	-	O	-
1	1st	O	-	-	O	-	O

OPERATING ELEMENTS AND THEIR FUNCTION

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



BASIC INSPECTION ADJUSTMENT

TRANSAXLE FLUID LEVEL INSPECTION

1. Drive the vehicle until the fluid reaches normal operating temperature [70~80°C].
2. Place the vehicle on a level surface.
3. Move the selector lever through all gear position. This will fill the torque converter and the hydraulic system with fluid and move the selector lever to the "N" (Neutral) position.
4. Before removing the oil level gauge, wipe all contaminants from around the oil level gauge. Then take out the oil level gauge and check the condition of the fluid.

NOTE

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

5. Check that the fluid level is in the "HOT" mark on the oil level gauge. If fluid level is low, add automatic transaxle fluid until the level reaches the "HOT" mark.

Auto transaxle fluid :

DIAMOND ATF SP-III, SK ATF SP-III

NOTE

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

6. Insert the oil level gauge securely.

NOTE

When new, automatic transmission fluid should be red, The red dye is added so the assembly plant can identify it as transmission fluid and distinguish it from engine oil or antifreeze. The red dye, which is not an indicator of fluid quality, is not permanent. As the vehicle is driven the transmission fluid will begin to look darker. The color may eventually appear light brown.

AUTOMATIC TRANSMISSION FLUID REPLACEMENT

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

1. Disconnect the hose, which connects the transmission and the oil cooler (inside the radiator).

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

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Running conditions : "N" range with engine idling.

CAUTION

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

3. Remove the drain plug from the bottom of the transmission case to drain the fluid.
4. Install the drain plug via the gasket, and tighten it the specified torque.

Tightening torque : 32 Nm

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

CAUTION

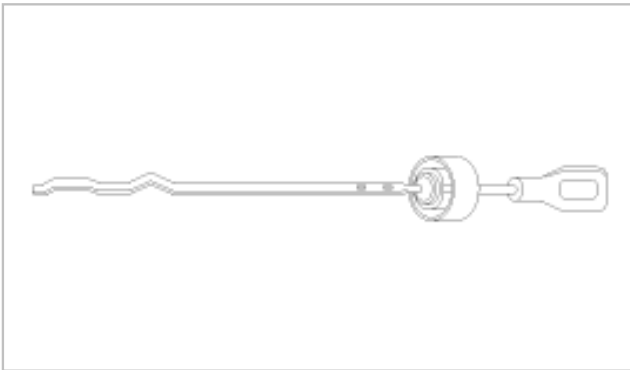
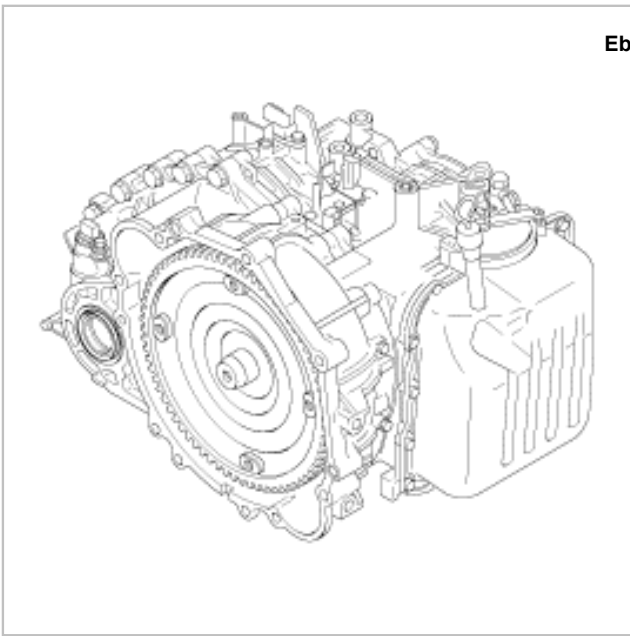
Stop pouring if the full volume of fluid cannot be poured in.

6. Repeat the procedure in step (2).

NOTE

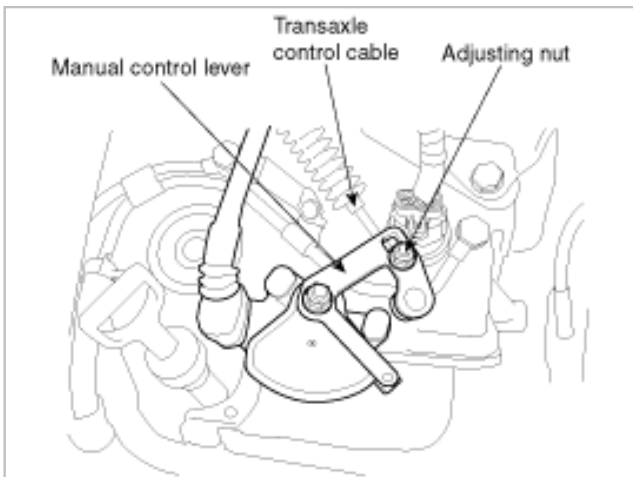
Check the old fluid for contamination. If it has been contaminated, repeat the steps (5) and (6).

7. Pour the new fluid in through the oil filler tube.
8. Reconnect the hose, which was disconnected in step (1) above, and firmly replace the oil level gauge. (In case of this "replace", this means after wiping off any dirt around the oil level gauge, insert it into the filler tube.)
9. Start the engine and run it at idle for 1~2 minutes.
10. Move the select lever through all positions, and then move it to the "N" or "P" position.
11. Drive the vehicle until the fluid temperature rises to the normal temperature (70~80C), and then check the fluid level again. The fluid level must be at the HOT mark.
12. Firmly insert the oil level gauge into the oil filler tube.



TRANSAXLE RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

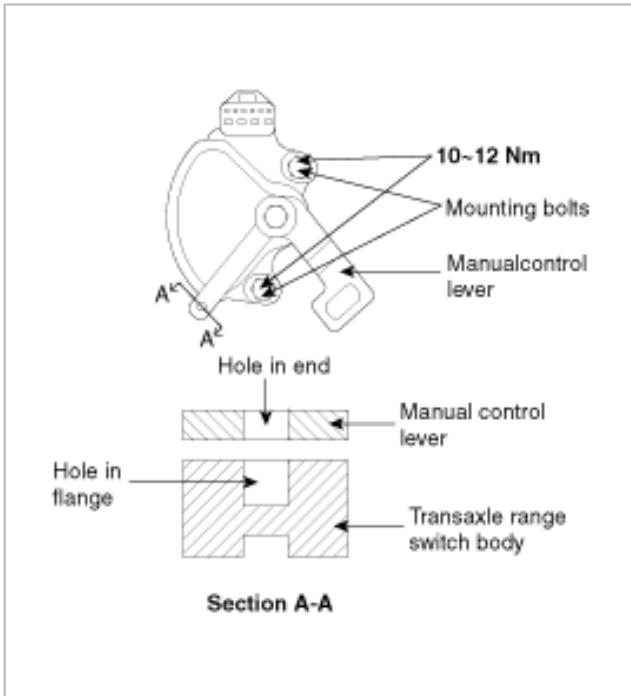
1. Set the selector lever to the "N" position.
2. Loosen the control cable to manual control lever coupling nut to free the cable and lever.
3. Set the manual control lever to the neutral position.



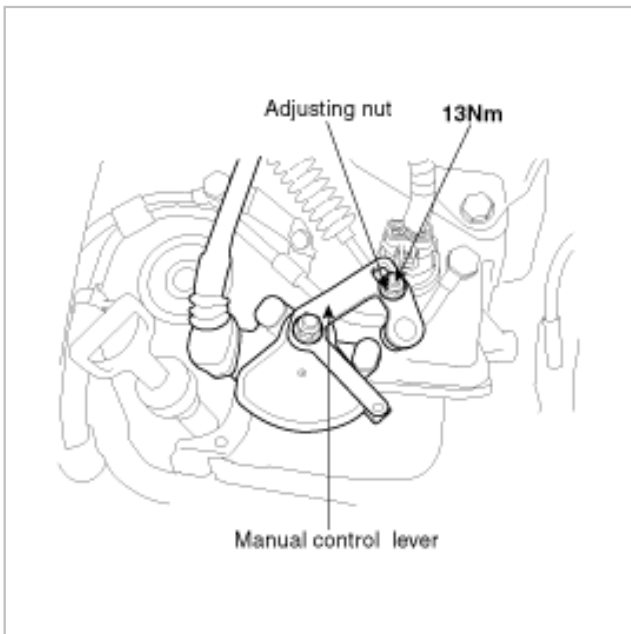
4. Loosen the transaxle range switch body mounting bolts and then turn the transaxle range switch body so the hole in the end of the manual control lever and the hole (cross section A-A in the figure) in the flange of the transaxle range switch body flange are aligned.

5. Tighten the transaxle range switch body mounting bolts to the specified torque. Make sure at this time that the position of the switch body did not move. Ebay User ID: reveleus1

Tightening torque : 10~12 Nm



6. Gently pull the transmission control cable in the direction of the arrow, and then tighten the adjusting nut.
7. Check that the selector lever is in the "N" position.
8. Check that each range on the transmission side operates and functions correctly for each position of the selector lever.



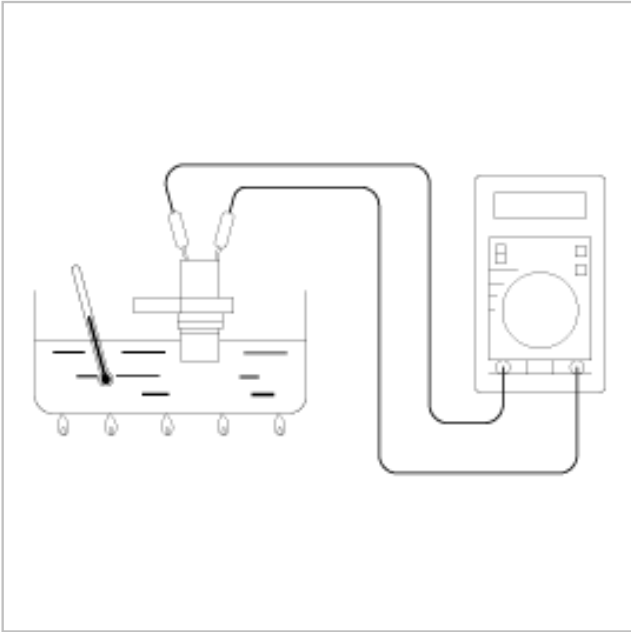
A/T CONTROL COMPONENT CHECK

1. Remove the oil temperature sensor.

2. Measure the resistance between terminals No.1 and No.2 of the oil temperature sensor connector.
Ebay User ID: reveleus1

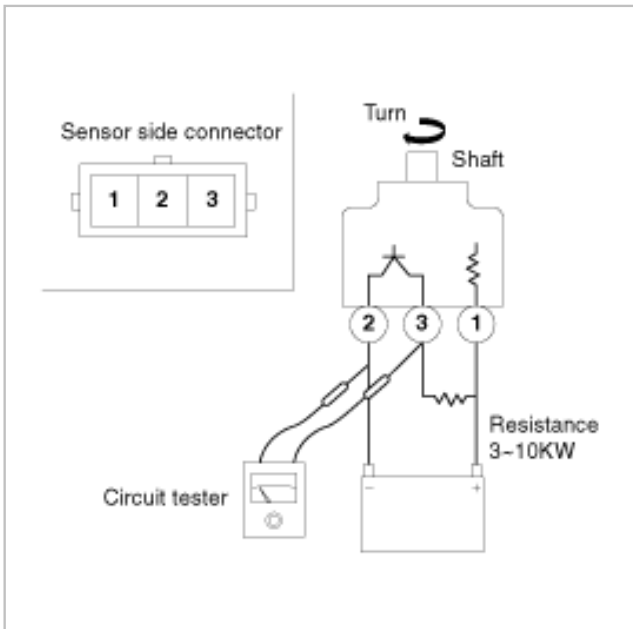
STANDARD VALUE :

Oil temperature (°C)	Resistance (K)
0	16.7 ~ 20.5
100	0.57 ~ 0.69



VEHICLE SPEED SENSOR CHECK

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



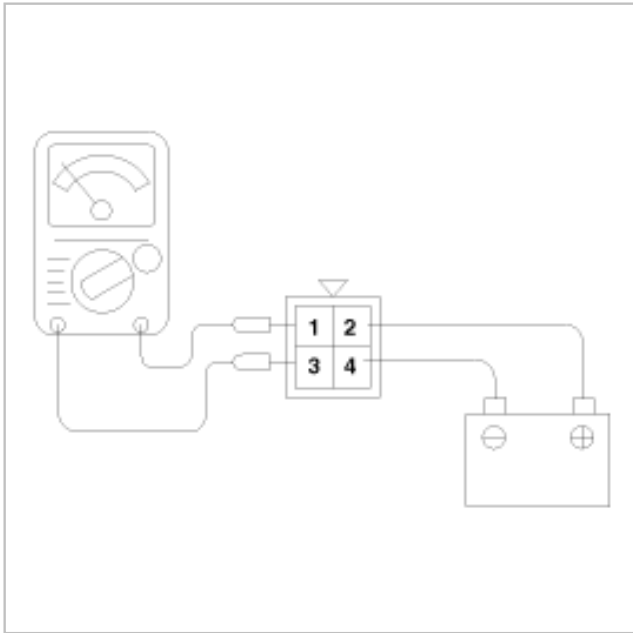
A/T CONTROL RELAY CHECK

1. Remove the A/T control relay.

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

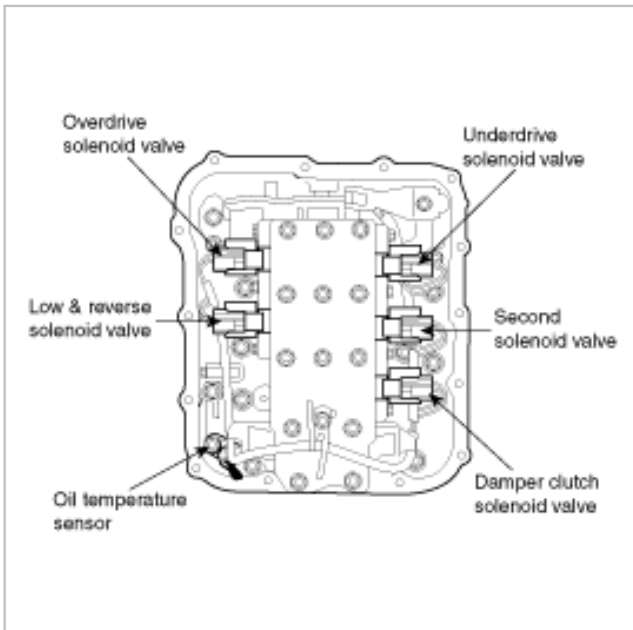
Ebay User ID: reveleus1

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



SOLENOID VALVE CHECK

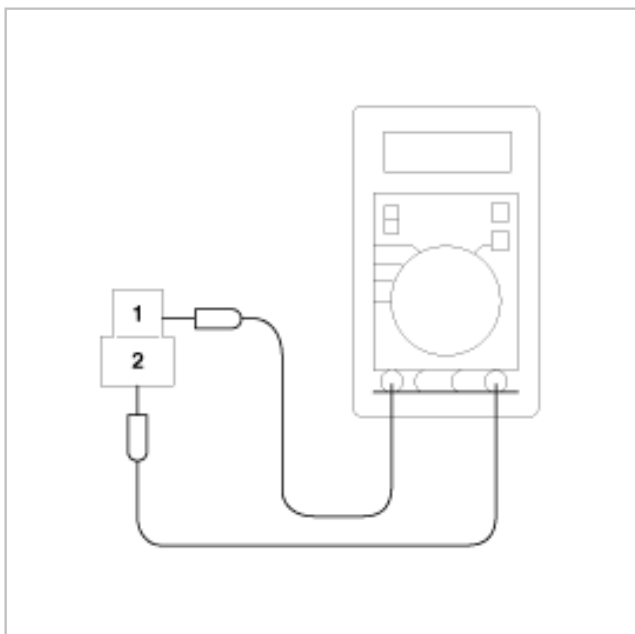
1. Remove the valve body cover.
2. Disconnect the connectors of each solenoid valve.



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

Name	Resistance
Damper clutch solenoid valve	2.7 ~ 3.4 (at 20°C)
Low and reverse solenoid valve	
Second solenoid valve	
Underdrive solenoid valve	
Overdrive solenoid valve	

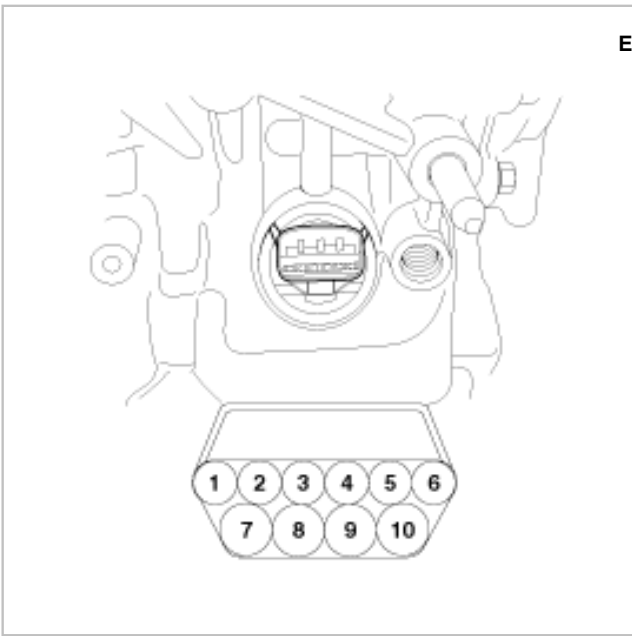


4. If the resistance is outside the standard value, replace the solenoid valve.

NOTE

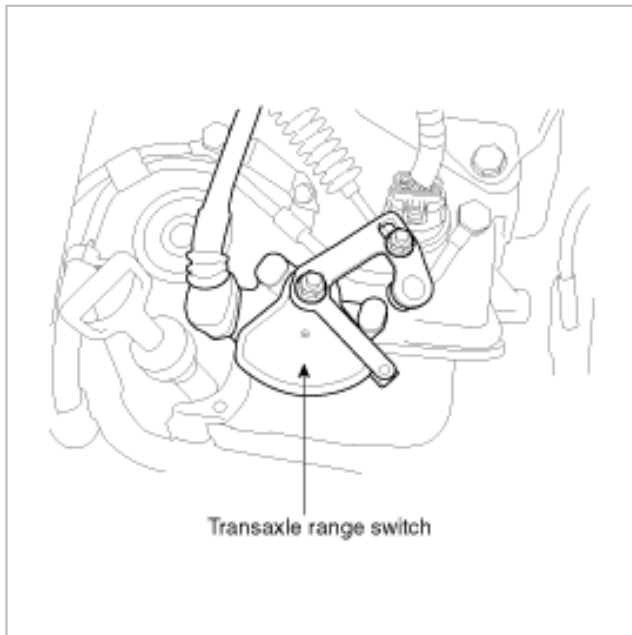
Resistance of the solenoid valve connector.

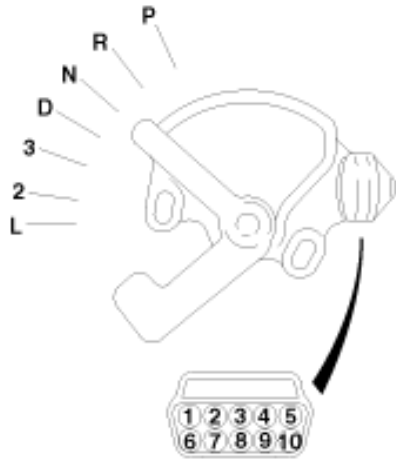
Terminal No.	Name	Resistance
7 & 10	Damper clutch solenoid valve	2.7 ~ 3.4 (at 20°C)
10 & 6	Low and reverse solenoid valve	
9 & 4	Second solenoid valve	
9 & 3	Underdrive solenoid valve	
9 & 5	Overdrive solenoid valve	



TRANSAXLE RANGE SWITCH CONTINUITY CHECK

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





IN/OUTPUT SHAFT SPEED SENSOR CHECK

	Check item	Standard value
Air gap	Input shaft speed sensor	1.3 mm
	Output shaft speed sensor	0.85 mm
Coil insulation resistance	Input shaft speed sensor	Over 1M
	Output shaft speed sensor	Over 1M
Output voltage	HIGH side	4.8 ~ 5.2V
	LOW side	Below 0.8V

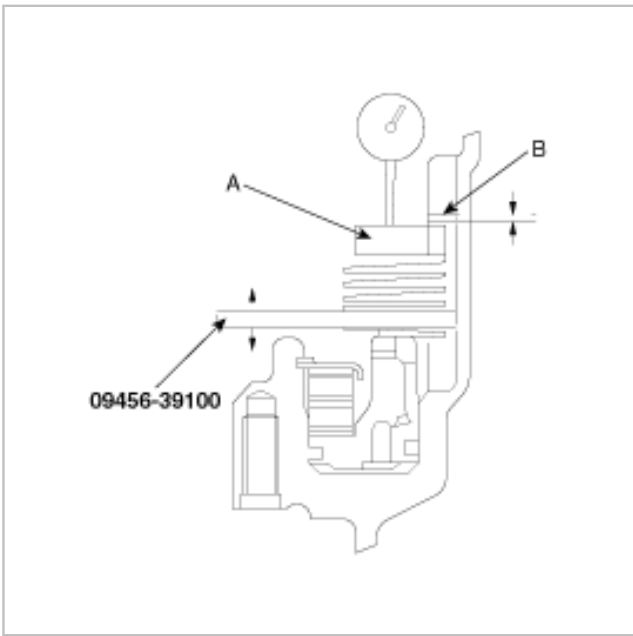
SERVICE ADJUSTMENT PROCEDURES

BRAKE REACTIONPLATE END PLAY ADJUSTMENT

Replace the pressure plate of the low-reverse brake with the special tool, and then install the brake disc, brake plate and snap ring as shown in the figure.

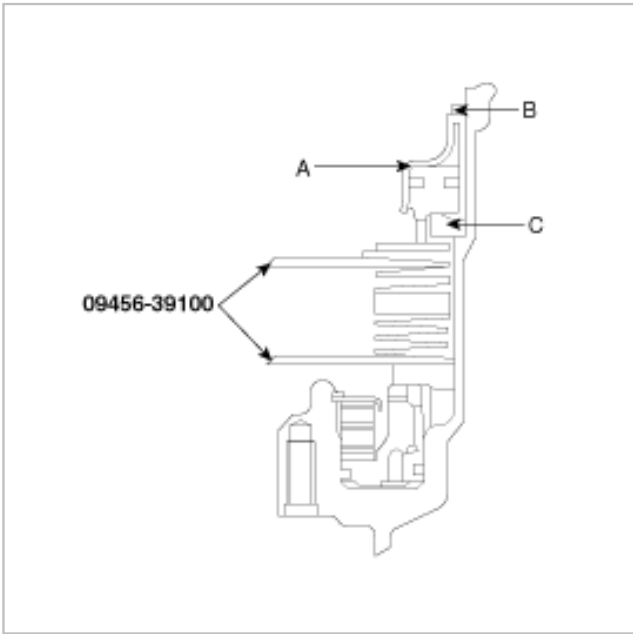
Install the reaction plate(A) and the used snap ring(B). Move the special tool to measure the end play, and then replace the snap ring to adjust the end play to standard value.

Standard value : 0~0.16mm



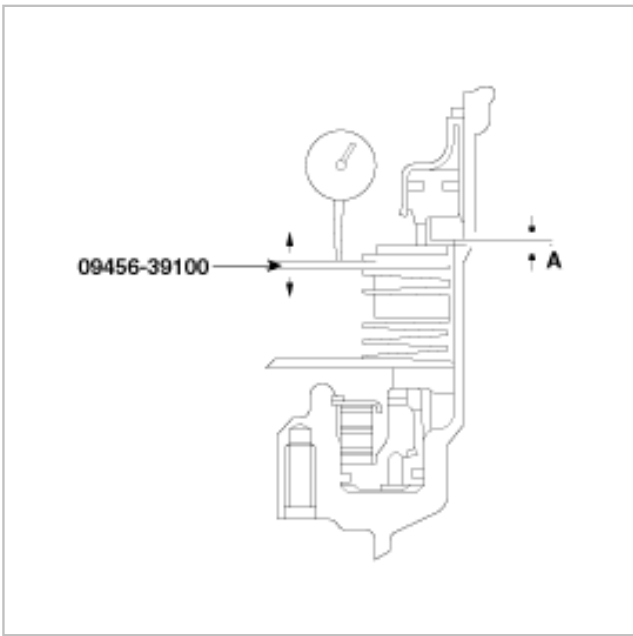
SECOND BRAKE END PLAY ADJUSTMENT

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



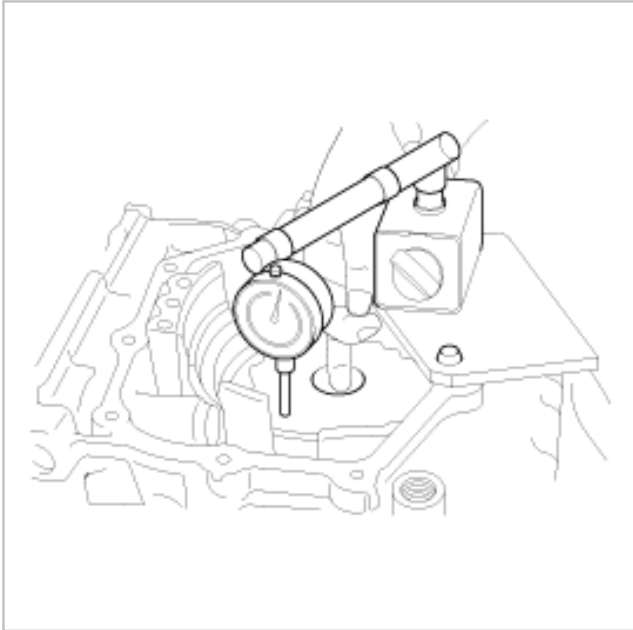
Standard value : 0.79~1.25mm

Reference Select a pressure plate whose thickness is within the following value. [A (moving amount) + thickness of the special tool - 1.25] to [A (moving amount) + thickness of the special tool - 0.79].



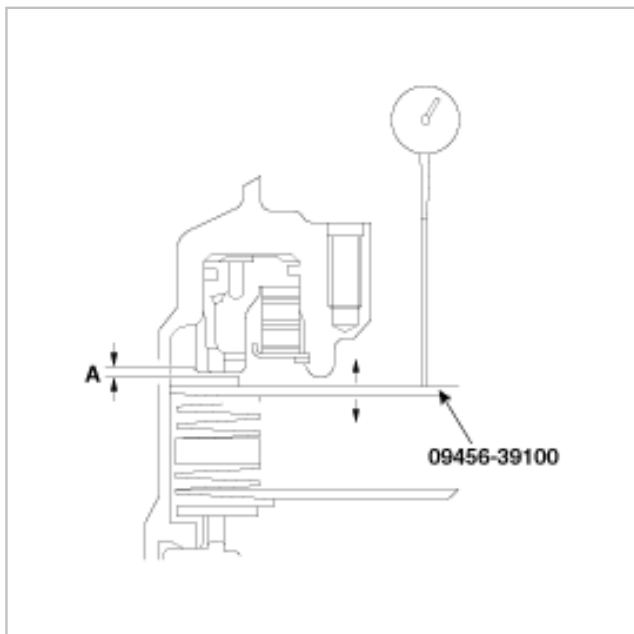
LOW-REVERSE BRAKE END PLAY ADJUSTMENT

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



Standard value : 1.35~1.81mm

Reference Select a pressure plate whose thickness is within the following value. [A (moving amount) + thickness of the special tool - 1.81] to [A (moving amount) + thickness of the special tool - 1.35].



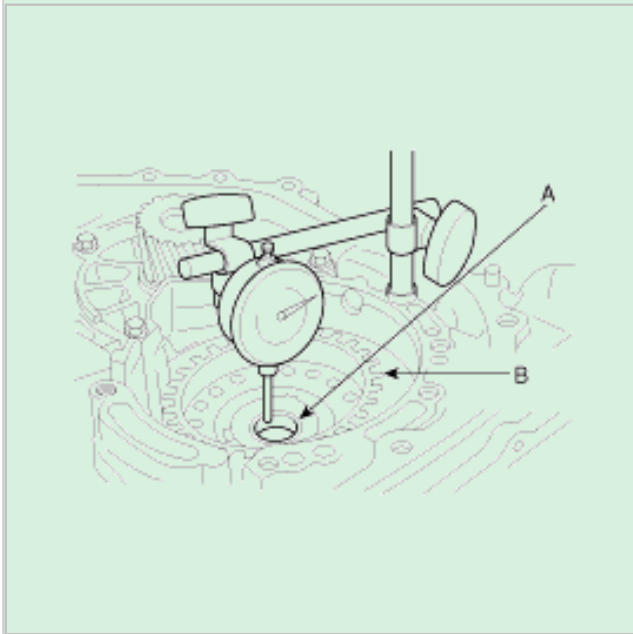
UNDERDRIVE SUN GEAR END PLAY ADJUSTMENT

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

Standard value : 0.25~1.45mm

NOTE

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



DIFFERENTIAL CASE PRELOAD ADJUSTMENT

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

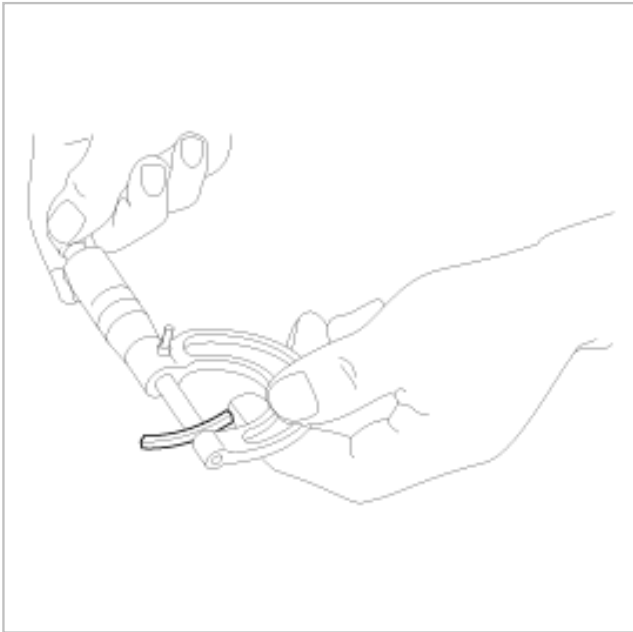
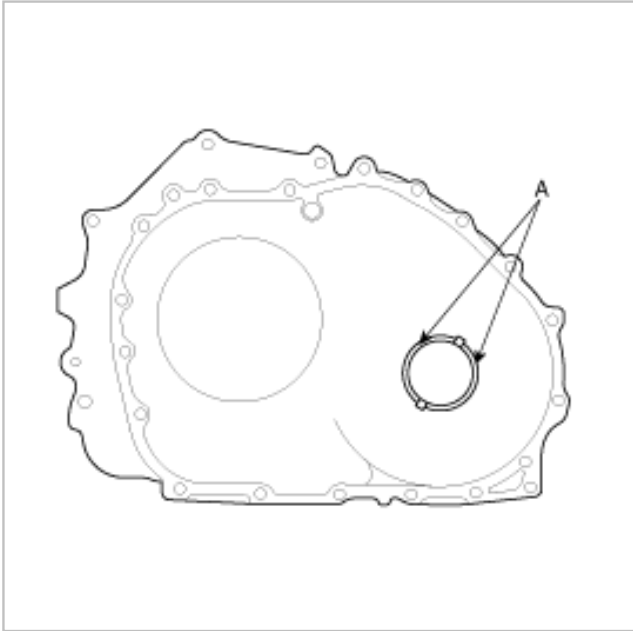
Install the torque converter housing to the transmission case without applying sealant. Tighten its mounting bolts to the specified torque. Loosen the bolts, and remove the solder(A). Use a micrometer to measure the thickness

(T) of the pressed solder(A).

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Select a-spere which thickness is within the following value.

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



BASIC INSPECTION ADJUSTMENT

TRANSAXLE FLUID LEVEL INSPECTION

1. Drive the vehicle until the fluid reaches normal operating temperature [70~80°C].
2. Place the vehicle on a level surface.
3. Move the selector lever through all gear position. This will fill the torque converter and the hydraulic system with fluid and move the selector lever to the "N" (Neutral) position.

4. Before removing the oil level gauge, wipe all contaminants from around the oil level gauge. Then take out the oil level gauge and check the condition of the fluid.

NOTE

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

5. Check that the fluid level is in the "HOT" mark on the oil level gauge. If fluid level is low, add automatic transaxle fluid until the level reaches the "HOT" mark.

Auto transaxle fluid :

DIAMOND ATF SP-III, SK ATF SP-III

NOTE

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

6. Insert the oil level gauge securely.

NOTE

When new, automatic transmission fluid should be red, The red dye is added so the assembly plant can identify it as transmission fluid and distinguish it from engine oil or antifreeze. The red dye, which is not an indicator of fluid quality, is not permanent. As the vehicle is driven the transmission fluid will begin to look darker. The color may eventually appear light brown.

AUTOMATIC TRANSMISSION FLUID REPLACEMENT

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

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

Running conditions : "N" range with engine idling.

CAUTION

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

3. Remove the drain plug from the bottom of the transmission case to drain the fluid.

4. Install the drain plug via the gasket, and tighten it the specified torque.

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Tightening torque : 32 Nm

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

CAUTION

Stop pouring if the full volume of fluid cannot be poured in.

6. Repeat the procedure in step (2).

NOTE

Check the old fluid for contamination. If it has been contaminated, repeat the steps (5) and (6).

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

8. Reconnect the hose, which was disconnected in step (1) above, and firmly replace the oil level gauge.

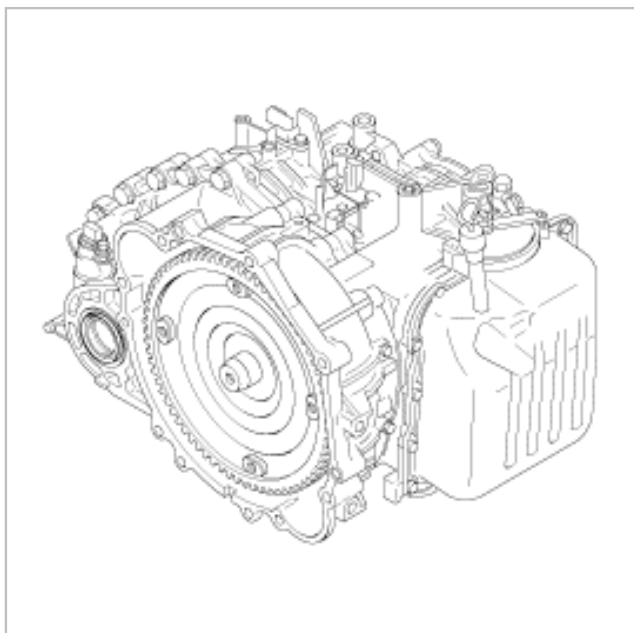
(In case of this "replace", this means after wiping off any dirt around the oil level gauge, insert it into the filler tube.)

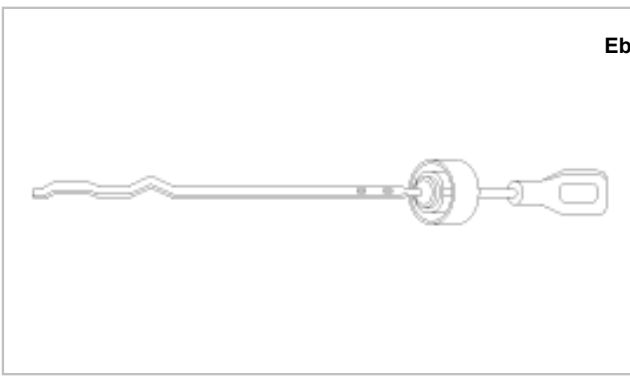
9. Start the engine and run it at idle for 1~2 minutes.

10. Move the select lever through all positions, and then move it to the "N" or "P" position.

11. Drive the vehicle until the fluid temperature rises to the normal temperature (70~80C), and then check the fluid level again. The fluid level must be at the HOT mark.

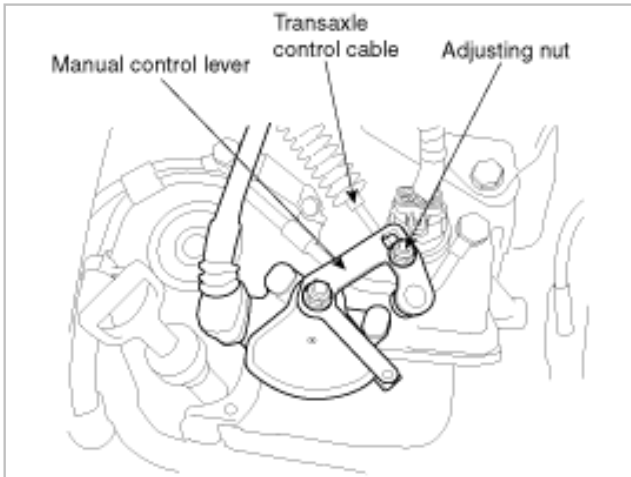
12. Firmly insert the oil level gauge into the oil filler tube.





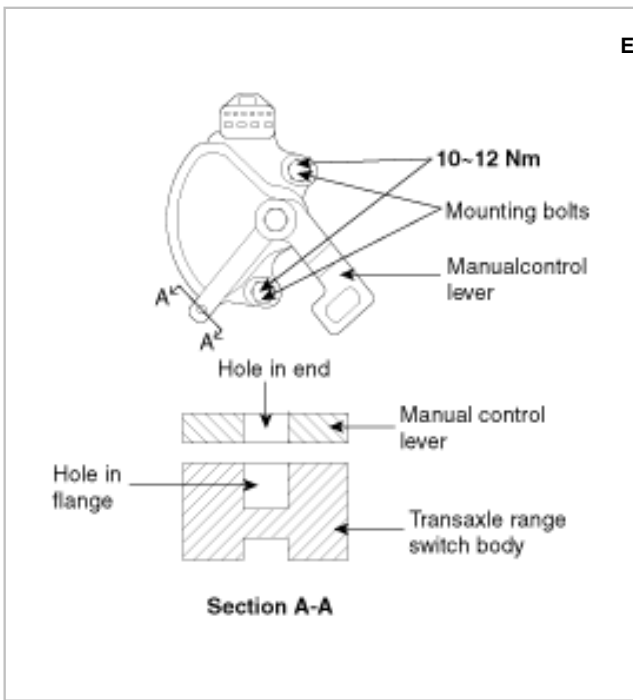
TRANSAXLE RANGE SWITCH AND CONTROL CABLE ADJUSTMENT

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

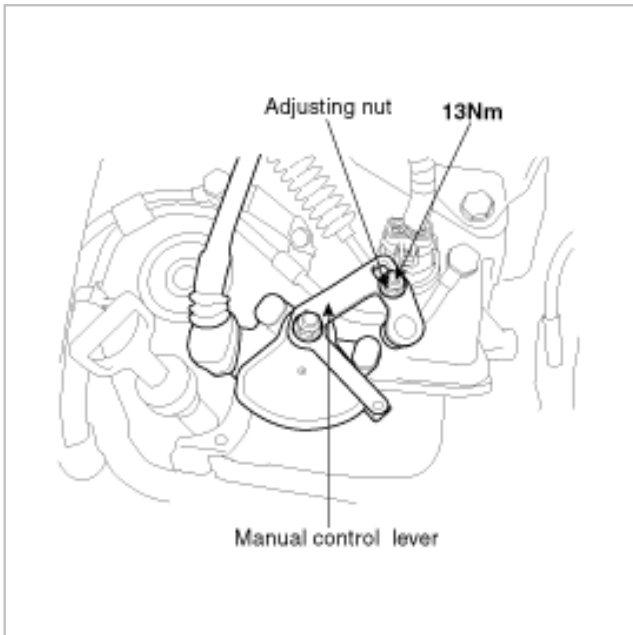


4. Loosen the transaxle range switch body mounting bolts and then turn the transaxle range switch body so the hole in the end of the manual control lever and the hole (cross section A-A in the figure) in the flange of the transaxle range switch body flange are aligned.
5. Tighten the transaxle range switch body mounting bolts to the specified torque. Make sure at this time that the position of the switch body did not move.

Tightening torque : 10~12 Nm



6. Gently pull the transmission control cable in the direction of the arrow, and then tighten the adjusting nut.
7. Check that the selector lever is in the "N" position.
8. Check that each range on the transmission side operates and functions correctly for each position of the selector lever.



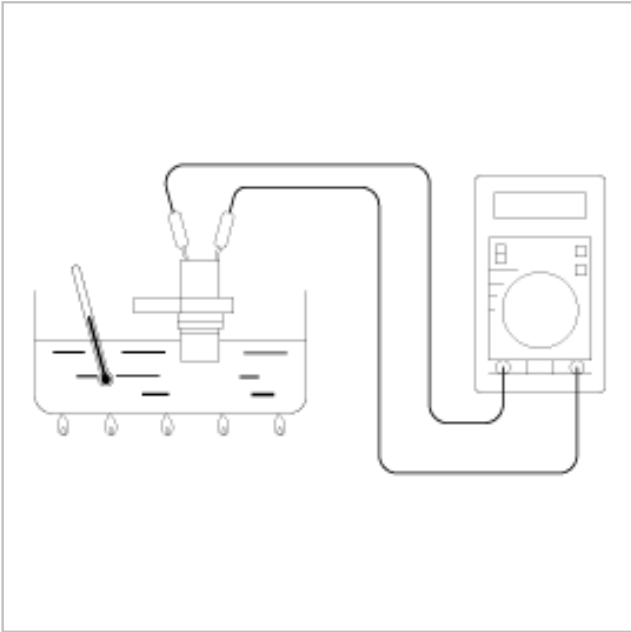
A/T CONTROL COMPONENT CHECK

1. Remove the oil temperature sensor.

2. Measure the resistance between terminals No.1 and No.2 of the oil temperature sensor connector.
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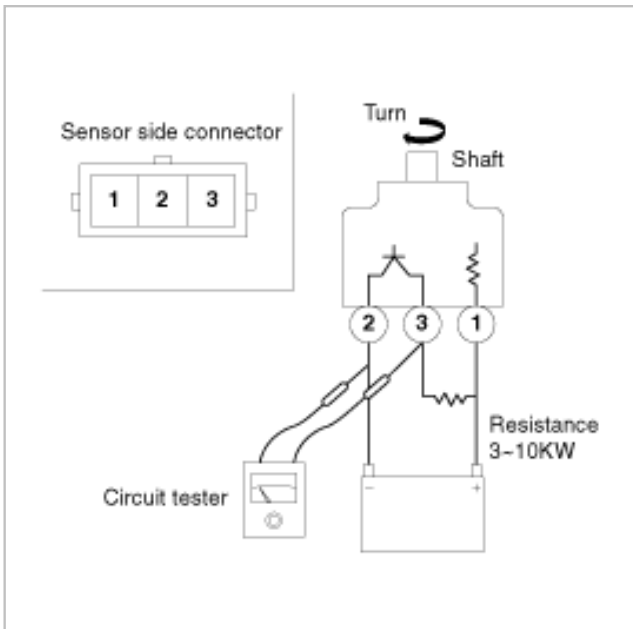
STANDARD VALUE :

Oil temperature (°C)	Resistance (K)
0	16.7 ~ 20.5
100	0.57 ~ 0.69



VEHICLE SPEED SENSOR CHECK

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



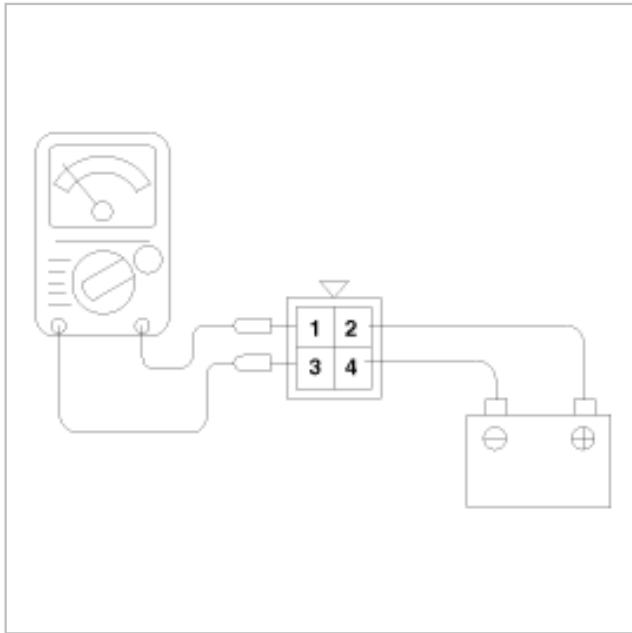
A/T CONTROL RELAY CHECK

1. Remove the A/T control relay.

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

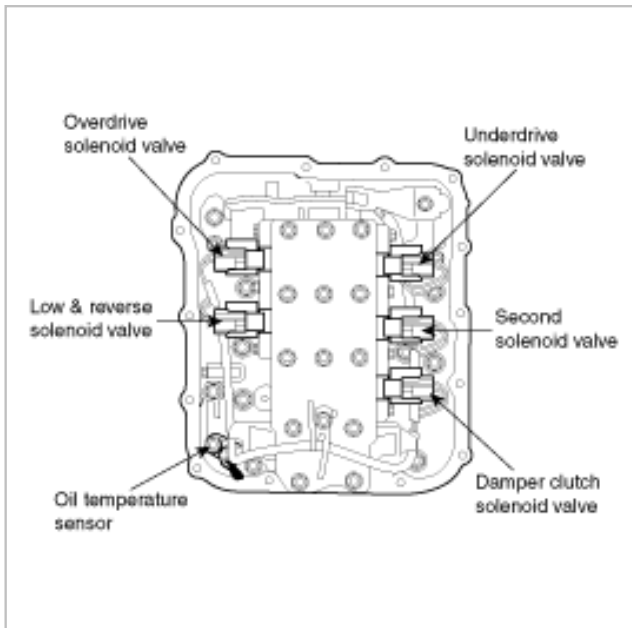
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Jumper wire	Continuity between terminal No.1
Connected	Continuity
Disconnected	No continuity



SOLENOID VALVE CHECK

1. Remove the valve body cover.
2. Disconnect the connectors of each solenoid valve.

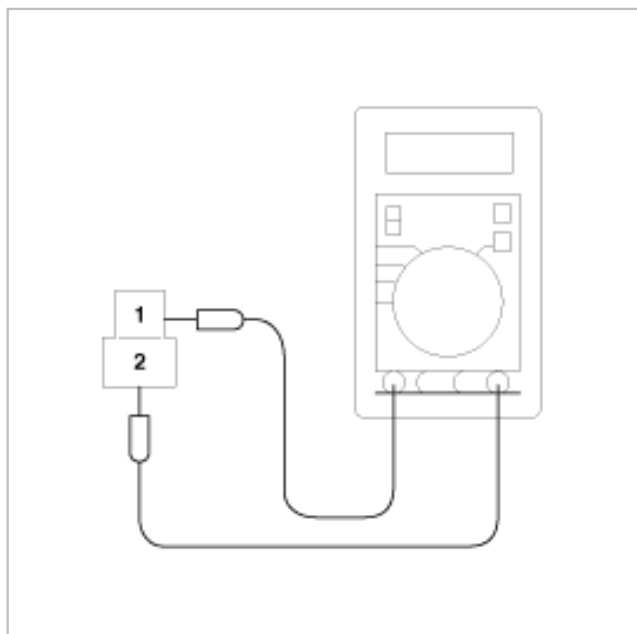


3. Measure the resistance between terminals 1 and 2 of each solenoid valve.

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Standard value :

Name	Resistance
Damper clutch solenoid valve	2.7 ~ 3.4 (at 20°C)
Low and reverse solenoid valve	
Second solenoid valve	
Underdrive solenoid valve	
Overdrive solenoid valve	

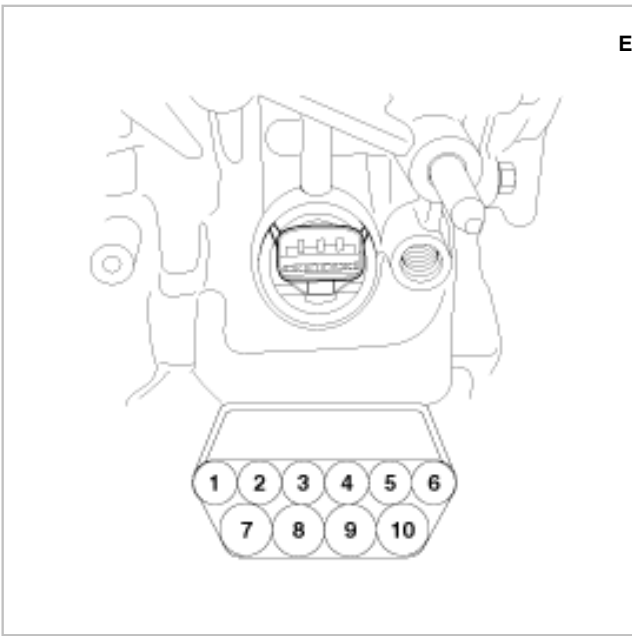


4. If the resistance is outside the standard value, replace the solenoid valve.

NOTE

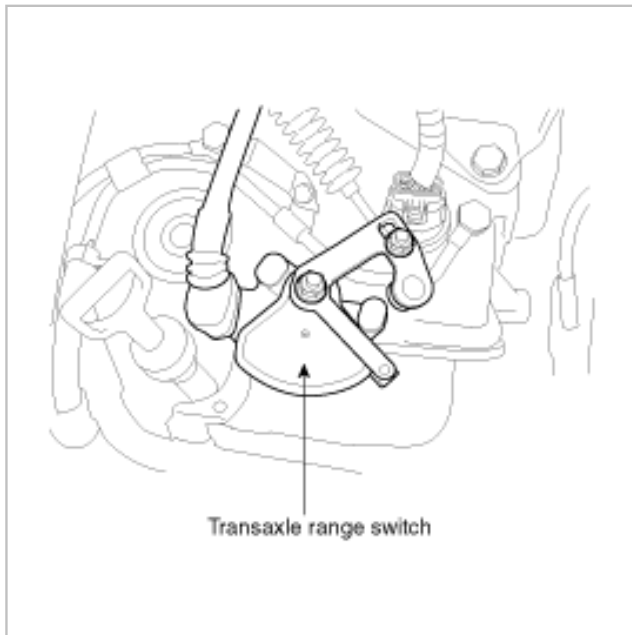
Resistance of the solenoid valve connector.

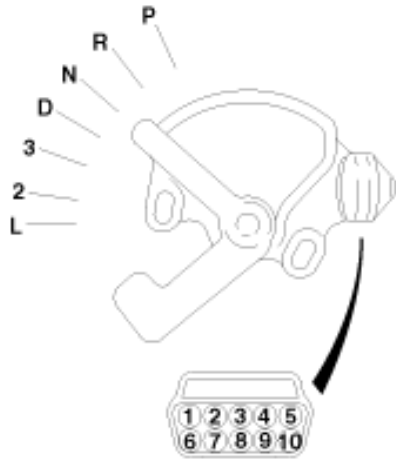
Terminal No.	Name	Resistance
7 & 10	Damper clutch solenoid valve	2.7 ~ 3.4 (at 20°C)
10 & 6	Low and reverse solenoid valve	
9 & 4	Second solenoid valve	
9 & 3	Underdrive solenoid valve	
9 & 5	Overdrive solenoid valve	



TRANSAXLE RANGE SWITCH CONTINUITY CHECK

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





IN/OUTPUT SHAFT SPEED SENSOR CHECK

	Check item	Standard value
Air gap	Input shaft speed sensor	1.3 mm
	Output shaft speed sensor	0.85 mm
Coil insulation resistance	Input shaft speed sensor	Over 1M
	Output shaft speed sensor	Over 1M
Output voltage	HIGH side	4.8 ~ 5.2V
	LOW side	Below 0.8V



INSPECTION PROCESS FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

Communication with the scan tool	Possible cause
If communication with the scan tool is not possible, the cause is probably a defective diagnostic trouble line or the PCM is not functioning.	<ul style="list-style-type: none"> -Malfunction of diagnostic trouble line -Malfunction of connector -Malfunction of the PCM

INSPECTION PROCEDURES

1. Is communication with other systems possible using the scan tool?

Yes

No

Check the diagnostic trouble line with the scan tool and repair if necessary.

2. Check the continuity and voltage of the PCM

Is the PCM normal?

Yes

No

Go to step 7

3. Check the data link connector

Is the data link connector normal?

Yes

No

Repair the connector.

4. Check the harness

1. Turn the ignition switch OFF and disconnect the PCM connector.
2. Check the continuity between the data link connector and the PCM.

Is the harness normal?

Yes

No

Repair or replace as necessary.

5. Check the trouble symptoms

Is the communication normal?

No

6. Replace the PCM**7. Check the PCM connector**

1. Turn the ignition switch OFF and disconnect the PCM connector.
2. Check that the PCM connector for loose, poor connection, bent, corrosion, contamination, deterioration, or damage.

Is the PCM connector normal?

Yes

No

Repair or replace as necessary.

8. Check the PCM harness

1. Turn the ignition switch OFF and disconnect the PCM connector.
2. Turn the ignition switch ON.
3. Check the voltage between the power supply and the PCM.
4. Check the voltage between the PCM and ground.

- **Specifications : approximately 5V**

Is the PCM harness normal?

Yes

No

Repair or replace as necessary.

9. Check the trouble symptoms

Is the communication normal?

Yes

No

Repair or replace as necessary.

10. Replace the PCM

1. Disconnect the battery (-) terminal and disconnect the PCM connector.
2. Replace the PCM.

Is the output shaft speed sensor normal?

INSPECTION PROCEDURE 2

Starting impossible	Possible 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

INSPECTION PROCEDURES**1. Is communication with other systems possible using the scan tool?**

No

Check the diagnostic trouble line with the scan tool and repair if necessary.

2. Check the torque converter

1. Check for incorrect installation (Inserted at an angle, etc) and for damaged splines.

Is the torque converter normal?



No

Repair if possible. If the splines are damaged and repairs are not possible, replace the torque converter assembly.

3. Replace the oil pump assembly (The oil pump cannot be disassembled)**INSPECTION PROCEDURE 3**

Does not move	Possible 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 pressure -Malfunction of the underdrive solenoid valve -Malfunction of the underdrive clutch -Malfunction of the valve body

1. The actuator test of the underdrive solenoid valve

Sound of operation can be heard?



No

Replace the underdrive solenoid valve

2. Hydraulic pressure test

1. Measure the hydraulic pressure for each element when in range.

Is the pressure normal?



No

Go to step 5

3. Check the Underdrive clutch system

1. Remove the transaxle assembly, valve body cover and valve body.
2. Piston should operate and pressure should be maintained when air is blown through the underdrive clutch oil hole in the transaxle case.

Is the underdrive clutch system normal?



Yes

Go to step 5

4. Check the Underdrive clutch

1. Check for burning of the facing, defective piston seal rings, and interference at the retainer.

5. Clean the valve body (Valve body disassembly, cleaning and reassembly)

1. Pay particular attention to loosening of bolts, and valve bodies.
2. If the damage cannot be repaired, replace the valve body assembly.

INSPECTION PROCEDURE 4

Does not reverse

Possible 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.

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- Abnormal reverse clutch pressure
- Abnormal low and reverse brake pressure
- Malfunction of the low and reverse solenoid valve
- Malfunction of the reverse clutch
- Malfunction of the low and reverse brake
- Malfunction of the valve body

INSPECTION PROCEDURES

1. Is communication with other systems possible using the scan tool?

Yes

No

Check the diagnostic trouble line with the scan tool and repair if necessary.

2. Check the torque converter

1. Check for incorrect installation (Inserted at an angle, etc) and for damaged splines.

Is the torque converter normal?

Yes

No

Repair if possible. If the splines are damaged and repairs are not possible, replace the torque converter assembly.

3. Replace the oil pump assembly (The oil pump cannot be disassembled)

INSPECTION PROCEDURE 5

Does not move (forward or reverse)	Possible cause
<p>If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body.</p>	<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

INSPECTION PROCEDURES

1. Hydraulic pressure test

1. Measure the hydraulic pressure for each element when moving forward and back.

Is the pressure normal?

Yes

No

Replace the transaxle.

2. Check the power train

1. If OK, replace transaxle.

INSPECTION PROCEDURE 6

Engine stalling when shifting	Possible cause
<p>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 soledoid, valve body or torque converter (torque converter clutch malfunction).</p>	<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)

INSPECTION PROCEDURES**1. Check the engine system**

1. Check the control system, ignition, fuel system and main system.

Is the engine system normal?

Yes

No

Repair

3. Replace the torque converter clutch solenoid

Have the problem?

Yes

Purchased
from Ebay seller
Reveleus1

Thank-you for purchasing from me, it
is much appreciated.

To contact me please email
suzlever@gmail.com

3. Replace the torque converter

Ebay User ID: reveleus1

INSPECTION PROCEDURE 7

Shocks when changing from N to D range and time lag	Possible 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

INSPECTION PROCEDURES

1. The actuator test of the underdrive solenoid valve

Sound of operation can be heard?

Yes

No

Replace the underdrive solenoid valve

2. When does the shock occur?

Shifting

Starting

Go to step 4

3. Hydraulic pressure test

1. Measure the hydraulic pressure when shifting from "N" to "D".

Is the hydraulic pressure normal?

No

Go to step 6

4. Replace the underdrive solenoid valve

Is the underdrive clutch system normal?

Yes

No

Go to step 6

5. Check the scan tool data

1. Turns from ON to OFF when the accelerator pedal is slightly depressed from the closed position.

Is the scan tool data normal?

Yes

6. Replace the transaxle**INSPECTION PROCEDURE 8**

Shock when changing from "N" to "R" and large time lag	Possible cause
<p>If abnormal shocks or a time lag of 2seconds 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.</p>	<ul style="list-style-type: none"> -Abnormal reverse clutch pressure -Abnormal low-reverse brake pressure -Malfunction of the low-reverse solenoid valve -Malfunction of the reverse clutch -Malfunction of the low-reverse brake -Malfunction of the valve body

INSPECTION PROCEDURES**1. The actuator test of the low-reverse solenoid valve**

Sound of operation can be heard?

Yes

No

Replace the low-reverse solenoid valve

2. When does the shock occur?

Shifting

Starting

Go to step 6

3. Hydraulic pressure test

1. Measure the reverse clutch pressure in "R" range.

Is the reverse clutch pressure normal?

Yes

No

Go to step 8

4. Check the reverse clutch system and low-reverse brake syst

1. Remove the transaxle assembly, valve body cover and valve body.
2. Piston should operate and pressure should be maintained when air is blown through the reverse clutch oil hole and reverse brake in the transaxle case.

Are the reverse clutch system and low-reverse brake system normal?

No

Yes

Go to step 8

5. Check the reverse clutch and low-reverse brake

1. Check the burning of the facing, defective piston seal rings and interference at the retainer.

Are the reverse clutch and the low-reverse brake normal?

Yes

No

Repair the reverse clutch and low-reverse brake

6. Shock sometime occur

Yes

No

Go to step 8

7. Check the scan tool data

1. Turns from ON to OFF when the accelerator pedal is slightly depressed from the fully closed position.

Is the scan tool data normal?

Yes

8. The valve body cleaning (Valve body disassembly, cleaning and reassembly)

1. Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
2. If the damage cannot be repaired, replace the valve body assembly.

INSPECTION PROCEDURE 9

Shocks when changing from "N" to "R", "N" to "D" and large time lag	Possible 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 line pressure or a malfunction of the oil pump or valve body.	<ul style="list-style-type: none"> -Abnormal line pressure -Malfunction of the oil pump -Malfunction of the valve body

INSPECTION PROCEDURES**1. Hydraulic pressure test**

1. Measure the hydraulic pressure for each element when in "D" range and "R" range.

Is the hydraulic pressure normal?

Yes

No

Replace the transaxle

2. When does the shock occur?

Shifting

Starting

Replace the transaxle

3. Replace the oil pump assembly (The oil pump cannot be disassembled)

Shocks and running up	Possible cause
<p>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, brake or clutch.</p>	<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 and each clutch

INSPECTION PROCEDURES

1. The actuator test of the low-reverse solenoid valve, underdrive solenoid valve, second solenoid valve, overdrive solenoid valve

Sound of operation can be heard?

Yes

No Replace the solenoid valve

2. Adjust the line pressure

Have the problem?

Yes

No Go to step 4

3. Check the clutch and the brake

1. Check the burning of the facing, defective piston seal rings and interference at the retainer.

4. Replace the oil pump assembly (The oil pump cannot be disassembled)

Have the problem?

Yes

5. The valve body cleaning (Valve body disassembly, cleaning and reassembly)

1. Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
 2. If the damage cannot be repaired, replace the valve body assembly.

All points (Displaced shifting points)	Possible cause
If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or a solenoid valve.	<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 PCM

INSPECTION PROCEDURES

1. Check the scan tool data of the output shaft speed sensor

- OK : Increases in proportion to vehicle speed.

Is the scan tool data normal?



No

Check the output shaft speed sensor system

2. Check the scan tool data of the throttle position sensor

- OK : Increases in proportion to accelerator pedal opening angle.

Is the scan tool data normal?



No

Check the throttle position sensor system

3. Check the scan tool data of the solenoid valve

1. Low-reverse solenoid valve duty %
2. Underdrive solenoid valve duty %
3. Second solenoid valve duty %
4. Overdrive solenoid valve duty %

- OK : Refer to the table below

Is the scan tool data of the solenoid valve normal?



No

Go to step 6

4. Adjust the line pressure

Have the problem?

Yes

5. The valve body cleaning (Valve body disassembly, cleaning and reassembly)

1. Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
2. If the damage cannot be repaired, replace the valve body assembly.

6. Replace the solenoid valve

Have the problem?

Yes

7. Replace the PCM**INSPECTION PROCEDURE 12**

Some points (Displaced shifting points)	Possible caus
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.	-Malfunction of the valve body

INSPECTION PROCEDURES

1. Do standard shifting occur normally?

No

Yes

Go to step 3

2. Does the problem occur only when the automatic transaxle fluid temperature is -29°C or lower or 125°C or higher?

Yes

No

Replace the transaxle

3. It is related to adaptive logic control and is not an abnormality.

INSPECTION PROCEDURE 13

No diagnostic trouble codes (Does not shift)	Possible 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 PCM.	<ul style="list-style-type: none"> -Malfunction of the Park/Neutral position switch -Malfunction of the PCM

INSPECTION PROCEDURES

1. Does the transaxle remain in 3rd gear with selector lever in position "D"?

Yes

No

Go to step 5

2. Is backup power being supplied to the PCM?

Yes

No

Go to step 4

3. Is power being supplied to the PCM?

No

Yes

Go to step 5

4. Check the power supply circuit

1. Pay particular attention to an open circuit in the harness or poor connector.
2. If there is a blown fuse, investigate why a short circuit has occurred and then replace the fuse.

5. The PCM input signal and selector lever position should match**INSPECTION PROCEDURE 14**

Poor acceleration	Possible cause
If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system, brake or clutch.	-Malfunction of the engine system -Malfunction of the brake or clutch

INSPECTION PROCEDURES**1. Check the DTC**

Have the DTC?



Yes

Correct condition

2. Check the engine system

1. Check the control system, ignition system, fuel system, and main system.

Have the problem?



No

Repair or replace

3. Check the brake or clutch

1. Check the burning of the facing, defective piston seal rings and interference at the retainer.

INSPECTION PROCEDURE 15

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

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- Abnormal damper clutch pressure
- Malfunction of the engine system
- Malfunction of the damper clutch control solenoid
- Malfunction of the torque converter
- Malfunction of the valve body

INSPECTION PROCEDURES

1. The actuator test of the damper clutch control solenoid valve

Sound of operation can be heard?

Yes

No

Replace the damper clutch control solenoid valve

2. Does the problem occur even when the oil temperature sensor connector is disconnected?

No

Yes

Go to step 5

3. Hydraulic pressure test

1. Measure the damper clutch pressure.

Is the hydraulic pressure normal?

No

Yes

Replace the torque converter assembly

4. The valve body cleaning (Valve body disassembly, cleaning and reassembly)

1. Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies.
2. If the damage cannot be repaired, replace the valve body assembly.

5. Check the engine system

1. Check the control system, ignition system, fuel system, and main system.



SPECIFICATIONS (A/T)

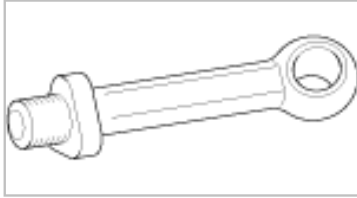
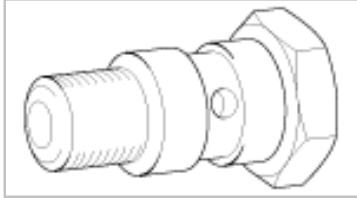

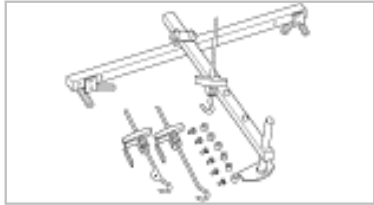
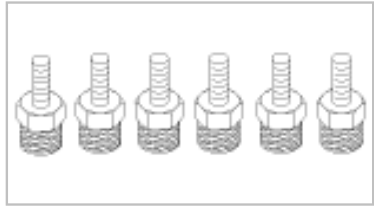
Item		F4A42
Torque converter type		3-element, 1-stage, 2-phase type
Transaxle type		4-speed forward, 1-speed reverse
Engine displacement		2.0D
Gear ratio	1st	2.842
	2nd	1.529
	3rd	1.000
	4th	0.712
	Reverse	2.480
Final gear ratio		3.770

SPECIFICATION (M/T)

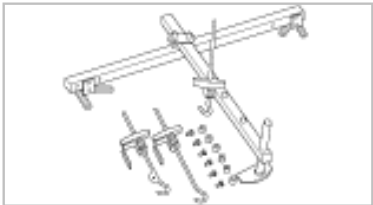
Model		M5BF2
Engine displacement		2.0 DOHC
Type		Forward 5 speed, reverse 1 speed
Gear ratio	First	3.615
	Second	2.053
	Third	1.393
	Fourth	1.061
	Fifth	0.837
	Reverse	3.250
Final gear ratio		3.650



SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09452-21001 Oil pressure gauge adapter		Measurement of the oil pressure. (Use with 09452-21002 and 09452-21500)
09452-21002 Oil pressure gauge adapter		Measurement of the oil pressure. (Use with 09452-21500 and 09452-21001)
09452-21500 Oil pressure gauge		Measurement of the oil pressure. (Use with 09452-21001 and 09452-21002)
J28467-B Engine support fixture		Removal and installation of transaxle assembly.
J28467-125 Engine support adapters		Use with J28467-B

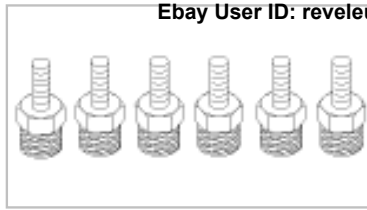
SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
J28467-B Engine support fixture		Removal and installation of transaxle assembly

J28467-125

Engine support adapters

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Use with J28467-B



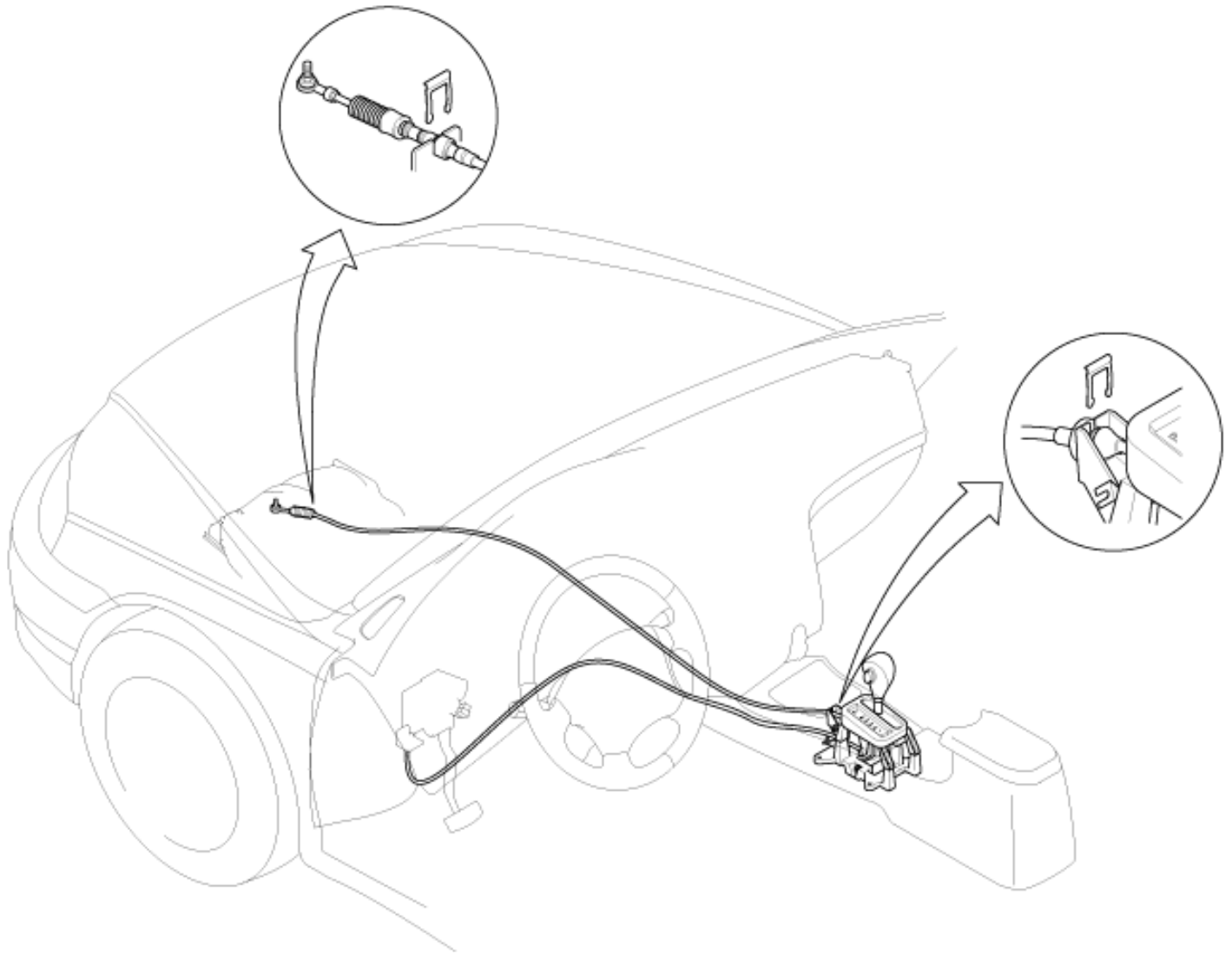
SERVICE SPECIFICATION

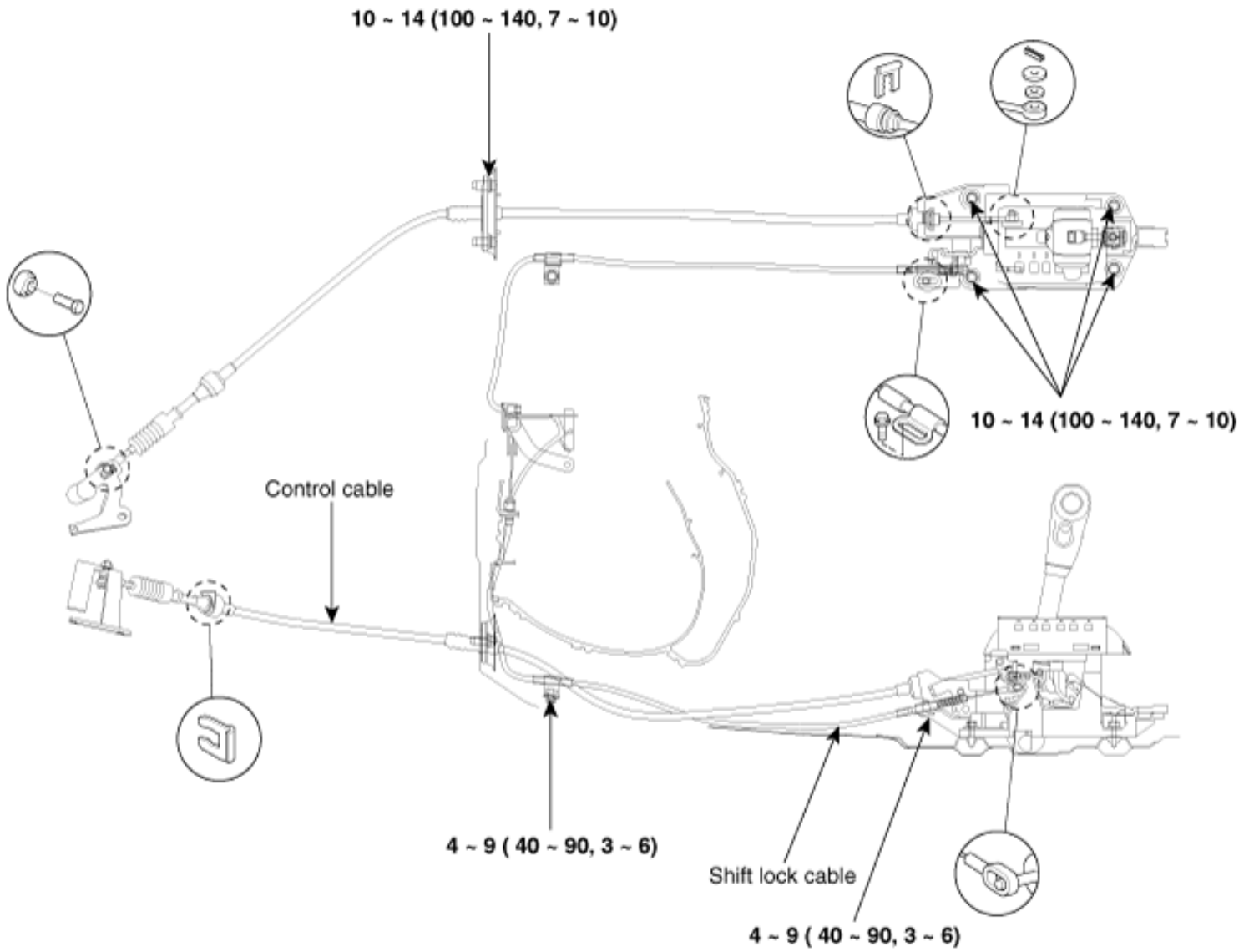
Item		Specification
Clutch & Brake End-play	Underdrive clutch	1.6~1.8
	Reverse clutch	1.5~1.7
	Overdrive clutch	1.6~1.8
	Low-reverse brake	1.35~1.81
	Second brake	0.79~1.25
	Brake reaction plate	0~0.16L
Shaft End-play	Underdrive sun gear	0.25~0.45L
	Input shaft	0.70~1.20L
	Output shaft	0.010~0.030T
	Differential (Taper bearing)	0.045~0.105T
	Differential back-lash	0.025~0.150L

LUBRICATIONS

Item	Recommended lubricant	Quantity
Manual transaxle oil	HYUNDAI GENUINE PARTS MTF 75W/90	2.15 Lit
Automatic transaxle oil	DIAMOND ATF SP-III, SK ATF SP-III	7.8 Lit

COMPONENTS

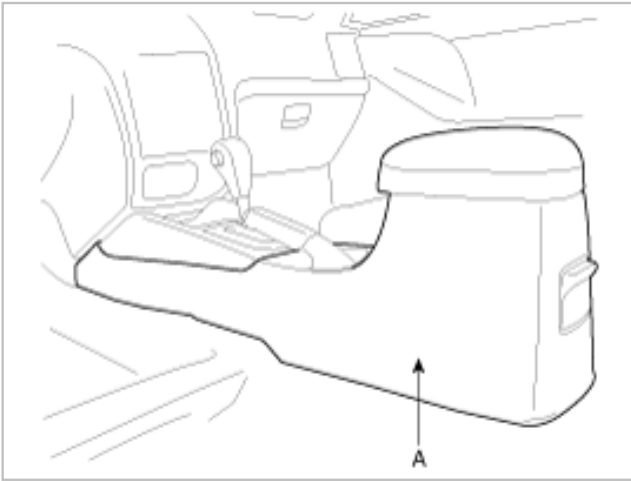




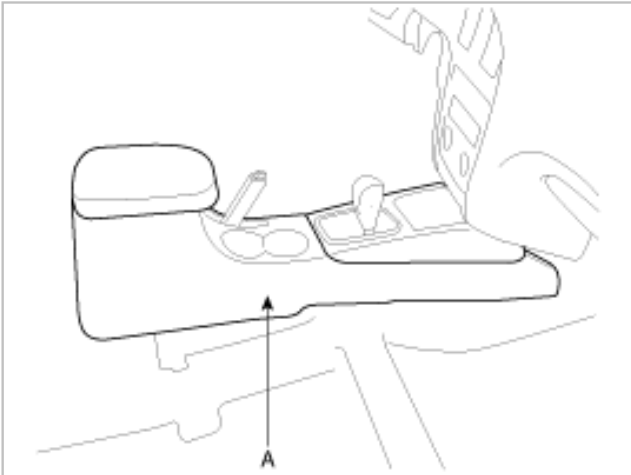
TORQUE : Nm (kg-cm, lb-ft)

REMOVAL

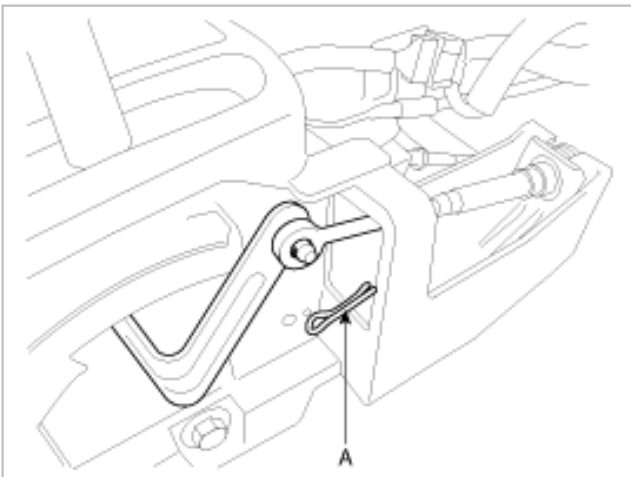
1. Remove the console(A) mounting screws (6EA).



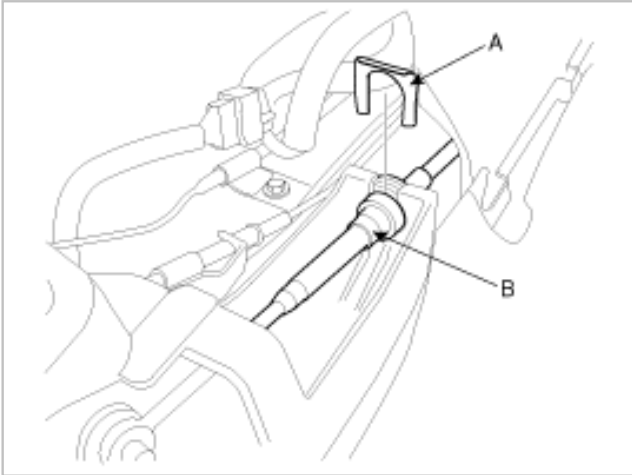
2. Remove the console(A).



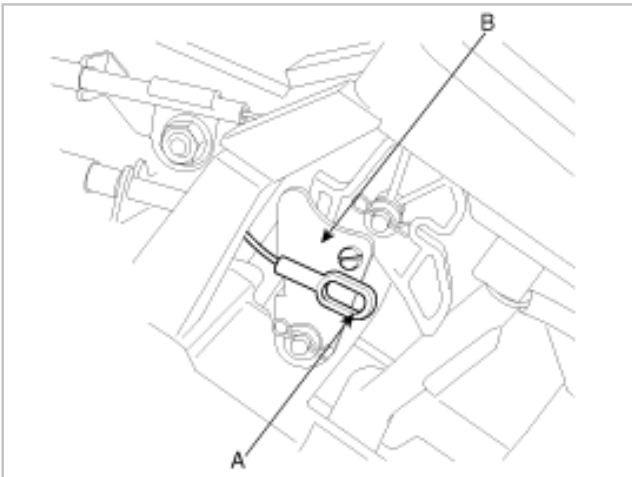
3. Remove the control cable pin(A).



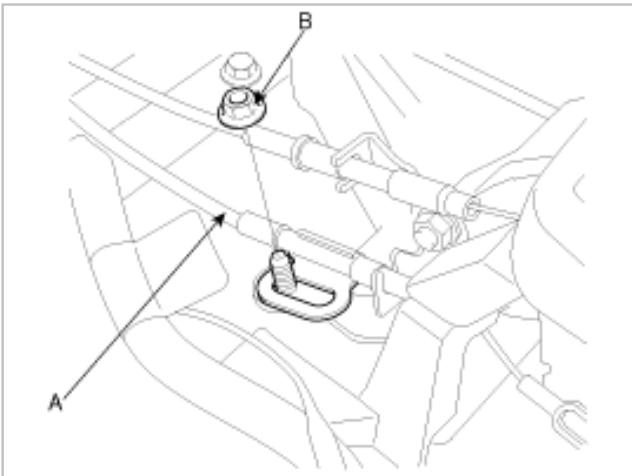
4. Remove the clip(A) of the control cable(B) by pressing it with the driver.
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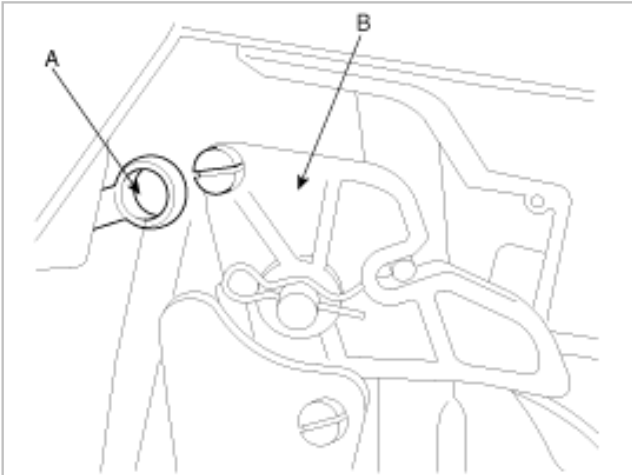
5. Separate the shift lock cable(A) from the P-lock cam(B).



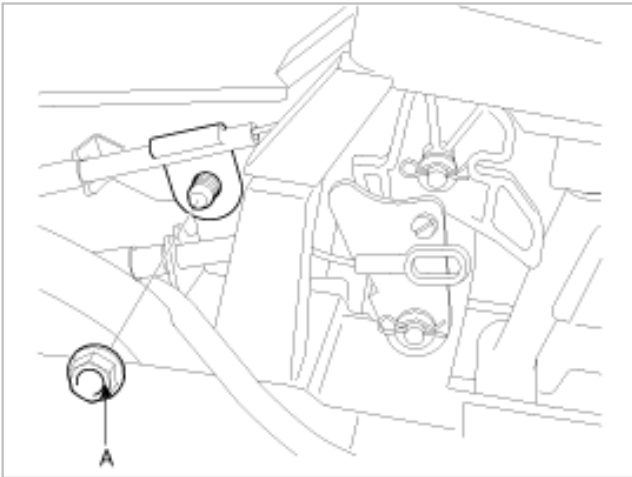
6. Remove the shift lock cable(A) mounting nut(B).



7. Remove the inter lock cable(A) from the key-lock cam(B).
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8. Remove the inter lock cable mounting bolt(A).

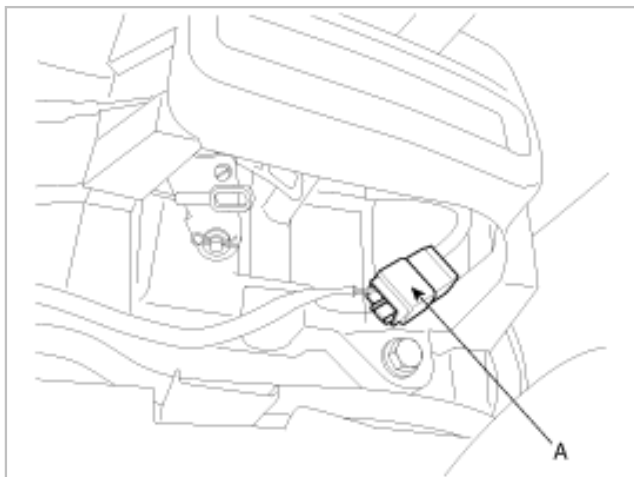


9. Remove the mounting bolts(A) of the cable of the lower dashboard side to remove the cable.

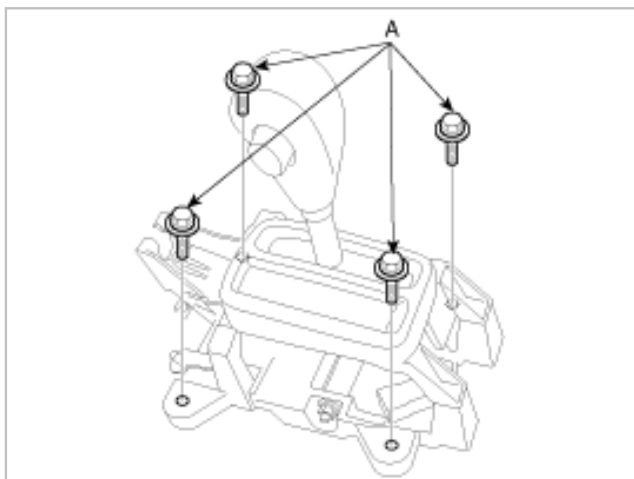


10. Remove the indicator connector(A).

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11. Remove the shift lever mounting bracket (Bolts : 4EA(A)).



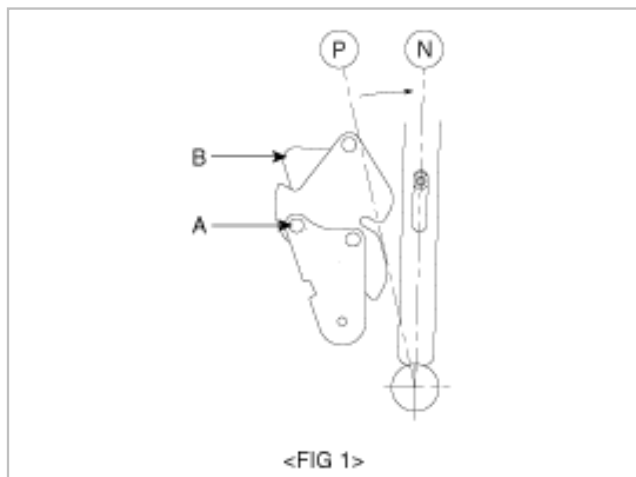
INSTALLATION

NOTE

When servicing the shift lock device, follow the service instructions and procedures described below to ensure proper operation.

1. Procedure to install the lock cam

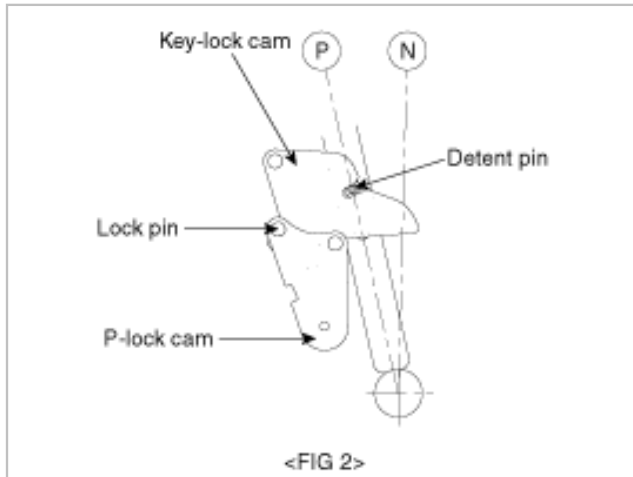
- (1) Move the P-lock cam to direction "A" and hold it by hand (Refer to figure 1).
- (2) Check that the key lock cam is located at "B" by detent pin (Refer to figure 1,2).



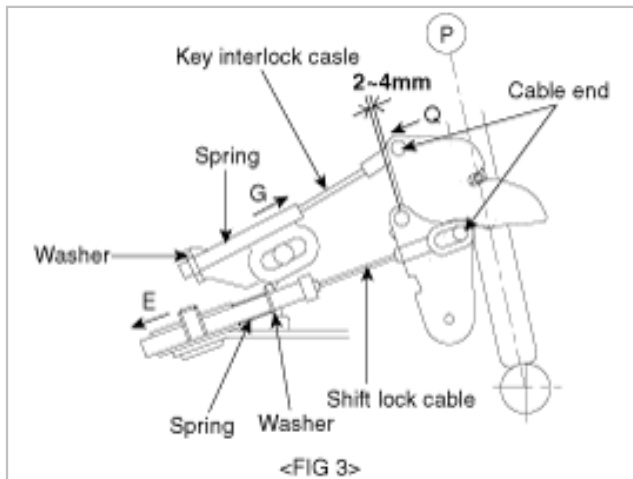
2. Procedure for adjusting the shift lock and key lock cable

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(1) Check that each lock cam is located in position as shown in figure 2.



- (2) Install the shift lock cable and key lock cable in position. In this case, the key lock cable must be fixed to the key cylinder and the shift lock cable must be fixed to the brake pedal in position.
- (3) Temporarily install each cable to the A/T lever assembly as shown in figure 3. Securely insert the cable into the fixing pin of each cam.



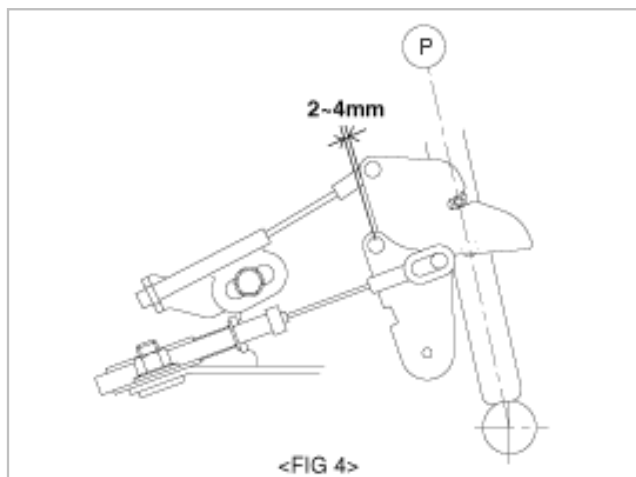
- (4) Keep a gap of 2~4mm between the key lock cam and the P-lock cam to eliminate cable slack by pulling the shift lock cable slightly in the direction of "E" (Refer to figure 3).

CAUTION

If the gap is not maintained between 2 and 4mm, the brake pedal will have to be depressed more than required when operating the push button of the shift lever.

- (5) After checking that a portion of the cable end touches cable fixing pin of the P-lock cam, fix the shift lock cable to the A/T lever with the nut and fix the shift lock cable end with the washer and snap pin.
- (6) Slightly push the key lock cam in the direction of "Q".
- (7) Performing the work of 6, slightly pull the key lock cable in the direction of "G" to stretch the cable tight and then fix it with a nut (Refer to figure 3,4).

- (8) Be sure to check whether the key lock cable is inserted into the fixing pin of the key lock cam, and then fix it with the washer and snap pin. At this time, check if the P-lock cam is fixed to the shift lock cable as shown in the figure 4.



3. Procedure for checking for correct shift lock installation

- (1) When the brake pedal is not depressed, the push button of the shift lever in the "P" position cannot operate (shift lever cannot shift to other positions from "P"). Push button can be operated at other positions except "P".
- (2) When the brake pedal stroke is 15~25mm (with shift lever in the "P" position), push button should operate without catching and the shift lever can shift smoothly out of "P".
- (3) When the brake pedal is not depressed, the shift lever should be shift smoothly to the "P" position from other positions.
Brake pedal must operate smoothly without catching in all positions.
- (4) When the ignition key is at the "LOCK" position, although brake pedal is depressed, the push button should operate.
- (5) Ignition key must not turn to the "LOCK" position, except when in "P" position.
- (6) If the shift lever is shifted to the "P" position, the ignition key must be able to turn to the "LOCK" position smoothly.

4. Caution in service

- (1) Keep the gap of 2~4MM between the key lock cam and P-lock cam by pulling the shift lock cable in the direction of "E" slightly, and then fix the cable with a nut. After this, be sure to check that the gap is within 2~4mm.

NOTE

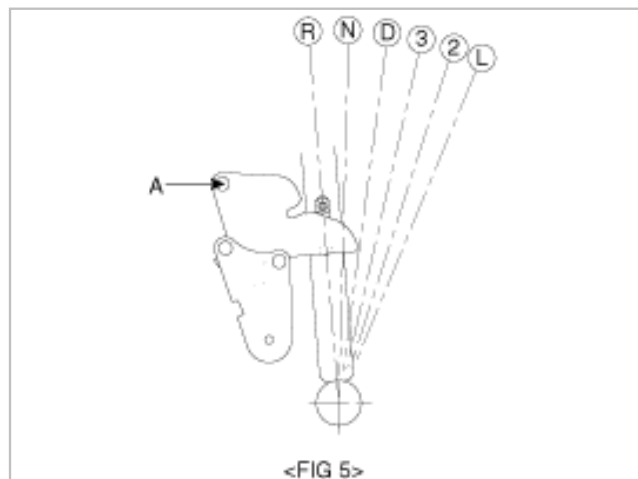
If the gap is not maintained between 2 and 4mm, the brake pedal will have to be depressed more than required in order to shift the lever from "P" to other position.

- (2) Be sure that the key lock cable slack is eliminated.

NOTE

If slack in the key lock cable is not eliminated, the ignition key can not be removed from the key cylinder and the shift lever will be able to shift from "P" to other positions, although the key is in the "LOCK" position.

- (3) Before and after the relating work, the key lock cam and P-lock cam should not be in the same condition as the figure 5 and 6.
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NOTE

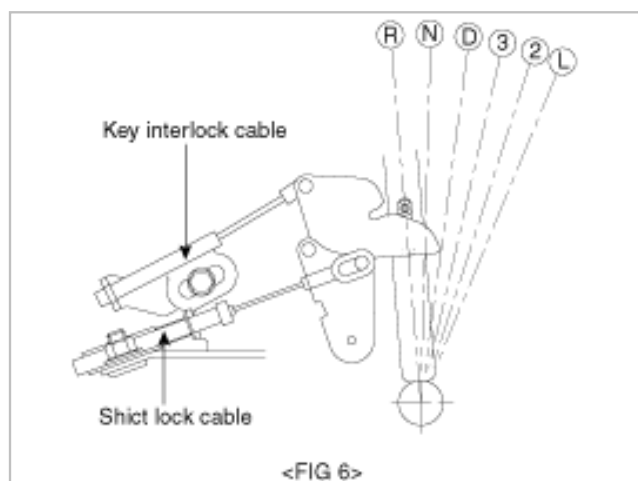
When the key lock cam and P-lock cam are in the same condition as the figure 5, shifting the shift lever from D, 2, L positions to P, R, N by force may cause a malfunction of related parts. Under the condition in figure 5, shift the shift lever from D, 2, L to P, R, N after rotating the P-lock cam in the direction of "A". Under the condition in figure 6, shift the shift lever from D, 2, L to P, R, N after rotating the P-lock cam in the direction of "A" the depressing the brake pedal.

KEY INTERLOCK DEVICE INSTALLATION

It is expected that the ignition key may not be removed from the key cylinder due to misassembly of the key interlock cable. To prevent this problem, apply the following installation instructions when servicing.

1. Assembly of key interlock cable and ignition lock

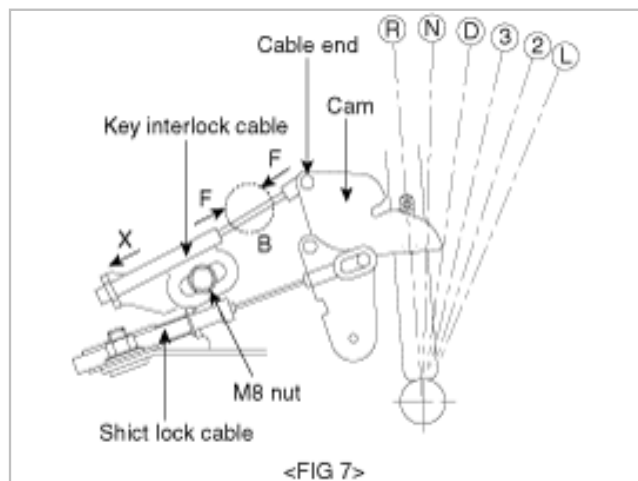
- (1) The ignition lock assembled to the steering column. Set the ignition lock to the lock position.
- (2) Assemble the key interlock cable and the ignition lock with the set screw.



2. Assembly of key interlock cable and shift lever

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- (1) Set the shift lever to the "P" position.
- (2) After setting the key interlock cable as shown in the figure 7, temporarily assemble the key interlock cable with a M8 nut just enough to move the key interlock cable plate by its spring force.



- (3) Holding the cable and the key interlock cable plate, push them into the direction of "F" so as not to create any bending or slack on the "B" point of the key interlock cable.

NOTE

Do not pull the cable in the direction of "X" to remove the slack. This may cause key not to remove from the key cylinder.

- (4) Tighten the key interlock cable with a M8 nut.

INSPECTION

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



INSPECTION CHART FOR DIAGNOSTIC TROUBLE CODES (F4A42)

DTC No	Diagnosis items		Possible cause
P0712	Fluid temperature sensor	Short to ground	OTS output voltage < 0.07V for 1 second
P0713		Open/short to battery	OTS output voltage \geq 4.59V for 1 second
P0715	Input shaft speed sensor	Open /short to battery /short to ground	No input shaft speed sensor output pulse detected at vehicle speed of \geq 30 km/h
P0720	Output shaft speed sensor	Open /short to battery /short to ground	At vehicle speed of \geq 30km/h, vehicle speed calculated base on the output shaft speed sensor is lower than 50% of vehicle speed.
P0703	Brake switch	Open /short to battery	2.24V < input voltage < 2.76V for 5 minutes continuously or brake switch is ON for 5 minutes continuously, output shaft speed \geq 240rpm
P0750	LR solenoid valve	Short to ground/open /short to battery	With relay voltage > 10V, open or short circuit is continuously for 320msec
P0755	UD solenoid valve		
P0760	2nd solenoid valve		
P0765	OD solenoid valve		
P0743	DCC solenoid val		
P0731	Synchronous error	1st	After gear shift, Input shaft speed - (Output shaft speed x each gear ratio) \geq 200rpm
P0732		2nd	
P0733		3rd	
P0734		4th	
P0736		Reverse	
P1604	CAN	No ID from ECU	No message from EMS for
P1603		CAN communication BUS OFF	CAN message transfer error for
P0741	DCC	Abnormal system	Detect 4 times the lockup clutch control duty = 100% for 4 seconds
P0742		Stuck ON	Torque converter slip rpm \leq 5rpm is continue for 10 seconds consecutively

P0885	A/T control relay	Short to ground/open	After ignition ON, A/T control relay voltage < 7V or ≥ 24.5V
P0707	Transaxle range switch	Short to ground/open	No signal is continuous for > 30 seconds
P0708		Short to battery/short to between switches	Above 2 kinds signals are continuous for 30 seconds

DIAGNOSTIC TROUBLE CODE DESCRIPTION

DTC No.	Diagnosis item	Suspect area	Remedy (See page)
P0713	<p>Fluid temperature sensor system</p> <p>If the fluid temperature sensor output voltage is 4.59 V or more even after driving for 1 second, it is judged that there is an open or a short to battery in the fluid temperature sensor and diagnosis code P0713 is set.</p>	Open/short to battery	TR-32
P0712	<p>Fluid temperature sensor system</p> <p>If the fluid temperature sensor output voltage is 0.07 V or less even after driving for 1 second, it is judged that there is a short to ground in the fluid temperature sensor and diagnosis code P0712 is set.</p>	Short to ground	TR-32
P0715	<p>Input shaft speed sensor system</p> <p>If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or a short circuit in the input shaft speed sensor and diagnosis code P0715 is set.</p>	Open/short to battery/short to ground	TR-36

P0720	<p>Output shaft speed sensor system</p> <p>If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or a short circuit in the output shaft speed sensor and diagnosis code P0720 is set.</p>	<p>Open/short to battery/short to ground</p>	<p>• Malfunction of the outputs speed sensor</p> <p>• Malfunction of connector</p> <p>• Malfunction of the PCM</p> <p>• Malfunction of the transfer drive gear or driven gear</p>	TR-39
P0703	<p>Brake switch system</p> <p>If the brake switch is ON for 5 minutes or more while driving, it is judged that there is an open or a short to battery in the brake switch and diagnosis code P0703 is set.</p>	<p>Open/short to battery</p>	<p>• Malfunction of the brake switch</p> <p>• Malfunction of connector</p> <p>• Malfunction of the PCM</p>	TR-42
P0750	<p>Low and reverse solenoid valve system</p> <p>If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short circuit or an open circuit in the solenoid valve and the respective diagnosis code P0750 is set. The transmission is locked into 3rd gear as a fail-safe measure.</p>	<p>Open/short to battery/short to ground</p>	<p>• Malfunction of solenoid valve</p> <p>• Malfunction of connector</p> <p>• Malfunction of the PCM</p>	TR-45

P0755

Underdrive solenoid valve system

If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short circuit or an open circuit in the solenoid valve and the respective diagnosis code P0755 is set. The transmission is locked into 3rd gear as a fail-safe measure.

P0760

Second solenoid valve system

If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short circuit or an open circuit in the solenoid valve and the respective diagnosis code P0760 is set. The transmission is locked into 3rd gear as a fail-safe measure.

P0765

Overdrive solenoid valve system

If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short circuit or an open circuit in the solenoid valve and the respective diagnosis code P0765 is set. The transmission is locked into 3rd gear as a fail-safe measure.

TR-51

TR-54

P0743	<p>Damper clutch control solenoid valve system</p> <p>If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short circuit or an open circuit in the solenoid valve and the respective diagnosis code P0743 is set. The transmission is locked into 3rd gear as a fail-safe measure.</p>	Open/short to battery/short to ground	<p>•Malfunction of the DCC solenoid valve</p> <ul style="list-style-type: none"> •Malfunction of connector •Malfunction of the PCM 	TR-57
P0731	<p>1st gear synchronous error</p> <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 the shift to 1st gear has been completed, diagnosis code P0731 is set. If diagnosis code P0731 is set four times, the transmission 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 •Noise generated 	TR-60	
P0732	<p>2nd gear synchronous error</p> <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 the shift to 3rd gear has been completed, diagnosis code P0732 is set. If diagnosis code P0732 is set four times, the transmission 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 overdrive clutch system •Noise generated 	TR-62	

<p>P0733</p>	<p>3rd gear synchronous error</p> <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 the shift to 3rd gear has been completed, diagnosis code P0733 is set. If diagnosis code P0733 is set four times, the transmission is locked into 3rd gear as a fail-safe measure.</p>	<p>Ebay User ID: reveleus1</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 overdrive clutch system •Noise generated 	<p>TR-64</p>
<p>P0734</p>	<p>4th gear synchronous error</p> <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 the shift to 4th gear has been completed, diagnosis code P0734 is set. If diagnosis code P0734 is set four times, the transmission 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 overdrive clutch system •Noise generated 	<p>TR-66</p>
<p>P0736</p>	<p>Reverse gear synchronous error</p> <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 the shift to reverse gear has been completed, diagnosis code P0736 is set. If diagnosis code P0736 is set four times, the transmission 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 	<p>TR-68</p>

			<ul style="list-style-type: none"> •Malfunction of the reverse clutch system •Noise generated 	
P1604	No ID from ECU <ul style="list-style-type: none"> •No message from ECU for •Input shaft speed > 1000rpm •500ms passed from relay voltage $\geq 10V$ 		<ul style="list-style-type: none"> •PCM Fail 	TR-70
P1603	CAN communication BUS OFF <ul style="list-style-type: none"> •CAN message transfer error for •Input shaft speed > 1000rpm •500ms passed from relay voltage $\geq 10V$ 		<ul style="list-style-type: none"> •PCM Fail 	TR-71
P0741	Damper clutch abnormal system <ul style="list-style-type: none"> •Detect 4 times the lockup clutch control duty = 100% for 4 seconds. •When PCM commands lockup. 	Abnormal system	<ul style="list-style-type: none"> •Malfunction of damper clutch •Malfunction of the DCC solenoid valve •Malfunction of connector •Malfunction of the PCM 	TR-72
P0742	Damper clutch stuck ON <ul style="list-style-type: none"> •Torque converter slip rpm ≤ 5rpm is continue for 10 seconds consecutively •All the other direct clutches are normal •Driving range (D, 3, 2, L) •TPS voltage > 1.5V •Output shaft speed > 1000rpm •Before "1st Lockup after IG ON" •After "5sec from the last OPEN command" 	Stuck ON	<ul style="list-style-type: none"> •Malfunction of damper clutch •Malfunction of the DCC solenoid valve •Malfunction of connector •Malfunction of the PCM 	TR-75

P0885	A/T control relay system If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay ground and diagnosis code P0885 is set. Then the transmission is locked into 3rd gear as a fail-safe measure.	Short to ground/ open	<ul style="list-style-type: none"> • Malfunction of the A/T control relay • Malfunction of connector • Malfunction of the PCM 	TR-78
P0707	Transaxle range switch No signal is continuous for > 30 seconds	Short to ground/ Open circuit	<ul style="list-style-type: none"> • Malfunction of transaxle range switch 	TR-81
P0708	Transaxle range switch Above 2 signals are continuous for > 30 seconds	Short to battery/ short between switches		TR-81

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Suspect area	Remedy (see page)
Communication with HI-SCAN is not possible If communication with the HI-SCAN is not possible, the cause is probably a defective diagnosis line or the PCM is not functioning.		Malfunction of diagnosis line	TR-84
		Malfunction of connector	
		Malfunction of the PCM	
Driving impossible	Starting impossible Starting is not possible when the selector lever is in "P" or "N" range. In such cases, the cause is probably a defective engine system, torque converter or oil pump.	Malfunction of the engine system	TR-86
		Malfunction of the torque converter	
		Malfunction of the oil pump	
	Does not move forward 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.	Abnormal line pres	TR-87
		Malfunction of the underdrive solenoid valve	
		Malfunction of the underdrive clutch	
		Malfunction of the valve body	
	Does not reverse	Abnormal reverse clutch pressure	TR-88

	<p>If the vehicle does not reverse when the selector lever is shifted from "N" to "R" range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low and reverse brake or a malfunction of the reverse clutch, low and reverse brake or valve body.</p>	<p>Abnormal low and reverse brake pressure</p> <p>Malfunction of the low and reverse brake solenoid valve</p> <p>Malfunction of the reverse clutch</p> <p>Malfunction of the low and reverse brake</p> <p>Malfunction of the valve body</p>	
	<p>Does not move (forward or reverse) If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the power train, oil pump or valve body.</p>	<p>Abnormal line pressure</p> <p>Malfunction of power train</p> <p>Malfunction of the oil pump</p> <p>Malfunction of the valve body</p>	TR-89
Malfunction when starting	<p>Engine stalling when shifting If the engine stalls when the selector lever is shifted from "N" to "D" or "R" range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch malfunction).</p>	<p>Malfunction of the engine system</p> <p>Malfunction of the damper clutch control solenoid valve</p> <p>Malfunction of the valve body</p> <p>Malfunction of the torque converter (Malfunction of the damper clutch)</p>	TR-89
	<p>Shocks when changing from "N" to "D" and large time lag If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from "N" to "D" range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body.</p>	<p>Abnormal underdrive clutch pressure</p> <p>Abnormal low and reverse brake pressure</p> <p>Malfunction of the underdrive solenoid valve</p> <p>Malfunction of the valve body</p> <p>Malfunction of the idle position switch</p>	TR-90
	<p>Shocks when changing from "N" to "R" and large time lag If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from "N" to "R" range while the engine is idling, the cause is probably abnormal reverse</p>	<p>Abnormal reverse clutch pressure</p> <p>Abnormal low and reverse brake pressure</p> <p>Malfunction of the low and reverse solenoid valve</p>	TR-92

	<p>clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body or idle position switch.</p>	<p>Malfunction of the reverse clutch</p> <p>Malfunction of the low and reverse brake</p> <p>Malfunction of the valve body</p> <p>Malfunction of the idle position switch</p>	
	<p>Shocks when changing from "N" to "D", "N" to "R" and large time lag If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from "N" to "D" range and from "N" to "R" range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.</p>	<p>Abnormal line pressure</p> <p>Malfunction of the oil pump</p> <p>Malfunction of the valve body</p>	TR-94
Malfunction when shifting	<p>Shocks and running up If shocks occur when driving due to upshifting or downshifting and the transmission speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body, brake or clutch.</p>	<p>Abnormal line pressure</p> <p>Malfunction of each solenoid valve</p> <p>Malfunction of the oil pump</p> <p>Malfunction of the valve body</p> <p>Malfunction of each brake or each clutch</p>	TR-95
Displaced shifting points	<p>All points If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or solenoid valve.</p>	<p>Malfunction of the output shaft speed sensor</p> <p>Malfunction of the throttle position sensor</p> <p>Malfunction of each solenoid valve</p> <p>Abnormal line pressure</p> <p>Malfunction of the valve body</p> <p>Malfunction of the PCM</p>	TR-96
	<p>Some points If some of the shift points are displaced while driving, the cause is probably a malfunction of the valve body, or it is related to control and is not an abnormality.</p>	<p>Malfunction of the valve body</p>	TR-98

Does not shift	No diagnosis codes If shifting does not occur while driving and no diagnosis codes are set, the cause is probably a malfunction of the transaxle range switch, or PCM	Malfunction of the transaxle range	TR-98
		Malfunction of the PCM	
Malfunction while driving	Poor a acceleration If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system, brake or clutch.	Malfunction of the engine system	TR-99
		Malfunction of the brake of clutch	
Malfunction while driving	Vibration If vibration occurs when driving at constant speed or when accelerating and deceleration in top range, the cause is probably abnormal damper clutch pressure or a malfunction of the engine system, damper clutch control solenoid valve, torque converter or valve body.	Abnormal damper clutch pressure	TR-100
		Malfunction of the engine system	
		Malfunction of the damper clutch control solenoid valve	
		Malfunction of the torque converter	
		Malfunction of the valve body	

TROUBLESHOOTING

Symptom	Suspect area	Remedy (See page)
Vibration, noise	Loose or damaged transaxle and engine mounts	Tighten or replace mounts
	Inadequate shaft end play	Correct end play
	Worn or damaged gears	Replace gear
	Inadequate grade of oil	Replace with specified oil
	Low oil level	Replenish
	Inadequate engine idle speed	Adjust idle speed
Oil leakage	Broken or damaged, oil seal or O-ring	Replace oil seal or O-ring
Hard shift	Faulty control cable	Replace control cable
	Poor contact or wear of synchronizer ring and gear cone	Correct or replace
	Weakened synchronizer spring	Replace synchronizer spring
	Inadequate grade of oil	Replace with specified oil

Jumps out of gear

Worn gear shift fork or broken poppet spring
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Replace shift fork or poppet spring

Synchronizer hub to sleeve spline clearance too large

Replace synchronizer hub and sleeve