

SECTION : 5A2

AISIN AUTOMATIC TRANSAXLE

CAUTION : *Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.*

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SPECIFICATIONS

GENERAL SPECIFICATIONS

	Definition
	1.6 DOHC
Transaxle Fluid Type	ISU DEXRON III or ESSO JWS 3309
Transaxle Fluid Capacity	5.77L (6.1 qts)

TRANSAXLE GEAR RATIO

Gear	Ratio
	1.6 DOHC
First	2.875
Second	1.568
Third	1.000
Fourth	0.697
Reverse	2.300
Counter	1.020
Differential	3.750

FLUID CAPACITY

	Capacity
	1.6 DOHC
Transaxle Fluid (dry fill)	5.77L (6.1 qts)
Transaxle Fluid (drain and refill)	2.1L (2.2 qts)

Notice : Fluid capacity (drain and refill) could be changed according to the some condition, therefore be sure to check the fluid using the oil stick guage.

LINE PRESSURE SPECIFICATION

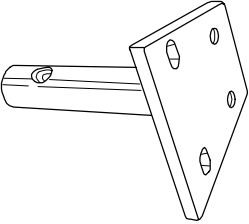
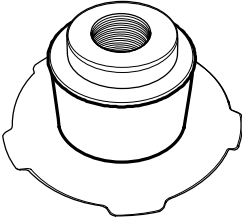
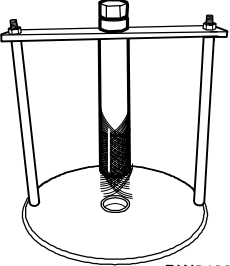
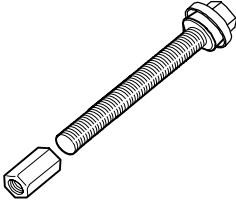
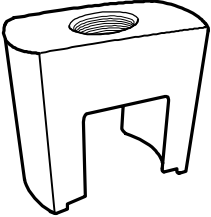
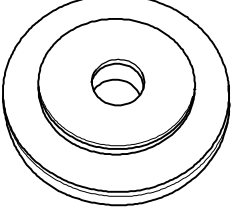
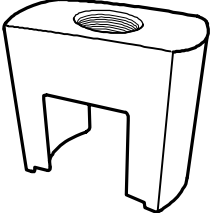
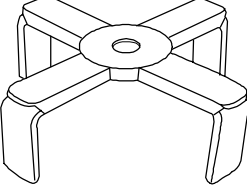
Application	Idling	Stall
At "D" range	3.9–4.2 kg/cm ² (55–60 psi)	11.3–12.5 kg/cm ² (161–178 psi)
At "R" range	6.0–6.9 kg/cm ² (85–98 psi)	16.2–18.6 kg/cm ² (230–265 psi)

FASTENER TIGHTENING SPECIFICATIONS

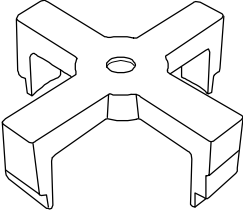
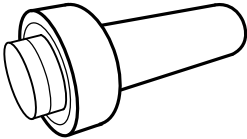
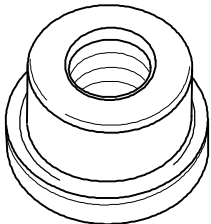
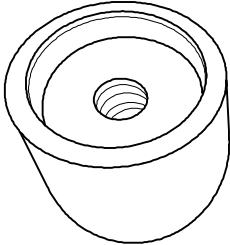
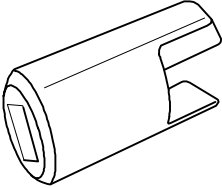
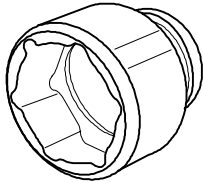
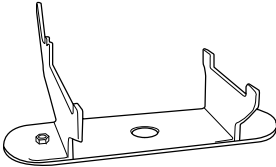
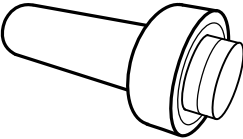
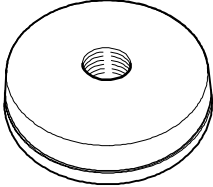
Application	N•m	Lb–Ft	Lb–In
Drain Plug	17	13	–
Control Cable Adjusting Nut	8	–	71
Shift Control Lever Assembly Mounting Bolts	8	–	71
Manual Valve Lever Shaft Nut	12	–	106
Transmission Range (TR) Switch Bolts	5.4	–	48
Input Speed Sensor Retaining Bolt	5.4	–	48
Output Speed Sensor Retaining Bolt	7.4	–	65
TCM Retaining Bolts	5	–	44
Fluid Cooler Inlet Pipe Fitting Nut	35	26	–
Fluid Cooler Inlet Pipe Bolt	9	–	80
Inlet Pipe Union Bolt	35	26	–
Fluid Cooler Rear Outlet Pipe Fitting Nut	35	26	–
Fluid Cooler Rear Outlet Pipe Clip Bolt	9	–	80
Front Outlet Pipe Union Bolt	35	26	–
Lower Transaxle–to–Engine Retaining Bolts (a)	73	54	–
Lower Transaxle–to–Engine Retaining Bolts (b)	31	23	–
Lower Transaxle–to–Engine Retaining Bolts (c)	21	15	–
Upper Transaxle–to–Engine Mounting Bolts	73	54	–
Upper Transaxle Mounting Bracket Bolts	60	44	–
Rear Mounting Bracket Bolts	60	44	–
Damping Block Connection Nut and Bolt	80	59	–
Torque Converter Bolts	45	43	–
Screw Plugs	7.4	–	65
Transaxle Apply Clamp Bolt	5.4	–	48
Oil Reservoir Lock Plate Bolts	5.4	–	48
Transaxle Case Plate Bolt	9.8	–	87
Transaxle Housing Bolts	29	22	–
Manual Detent Spring Bolt	9.8	–	87
Parking Lock Pawl Bracket Bolts	7.4	–	65
Planetary Ring Gear Nut (Standard)	9.8	–	87
Planetary Ring Gear Nut (Maximum)	29	22	–
Transaxle Rear Cover Bolts	25	18	–
Oil Pump Bolts	25	18	–
Valve Body Bolts	11	–	97
Oil Strainer Bolts	9.8	–	87
Oil Pan Bolts	7	–	62
Unions	25	18	–
Stator Shaft Bolts	25	18	–
Shift Solenoid Valve Bolts	11	–	97
Differential Case–to–Differential Ring Gear Bolt	102	75	–

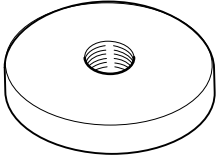
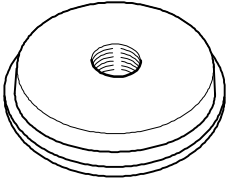
SPECIAL TOOLS

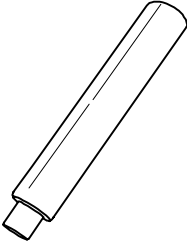
SPECIAL TOOLS TABLE

 DW260021	DW260-021-02 Automatic Transaxle Overhaul Fixture	 DW240050	DW240-050 Overdrive Brake Adapter
 DW240020	DW240-020 Brake/Clutch Spring Compressor	 DW24006A	DW240-060-01 Brake Spring Compressor Bolt/Nut
 DW240030	DW240-030 Forward Clutch Adapter	 DW24006B	DW240-060-02 Brake Spring Compressor Plate
 DW240040	DW240-040 Direct Clutch Adapter	 DW240070	DW240-070 1st/Reverse Brake Adapter

5A2 – 6 AISIN AUTOMATIC TRANSAXLE

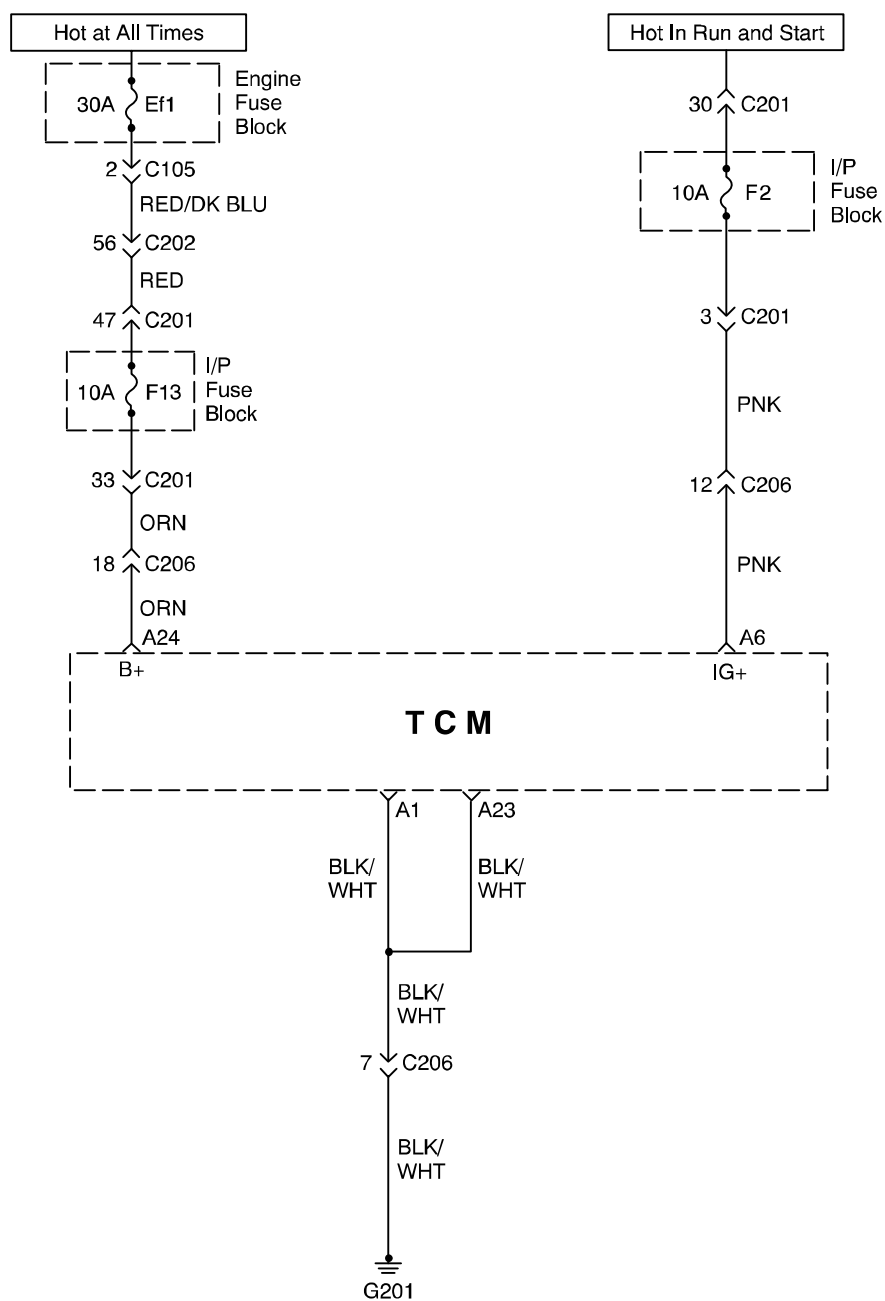
 DW240080	DW240-080 2nd Brake Adapter	 DW26003B	DW260-031-02 Tranaxle Case Oil Seal Installer
 DW240090	DW240-090 Planetary Ring Gear Remover	 DW240120	DW240-120 Measuring Terminal
 DW240100	DW240-100 Counter Drive Gear Installation Adapter	 DW240130	DW240-130 Differential Preload Adapter
 DW260041	DW260-041 Planetary Ring Gear Nut Removal/Installation Socket (52mm)	 DW260013	DW260-013 Transaxle Support Fixture
 DW26003A	DW260-031-01 Tranaxle Housing Oil Seal Installer	 DW240140	DW240-140 Transaxle Housing Side Bearing Outer Race Adapter

 DW240150	DW240-150 Transaxle Case Side Bearing Outer Race Adapter
 DW240160	DW240-160 Transaxle Case Outer Tapered Roller Bearing Race Adapter

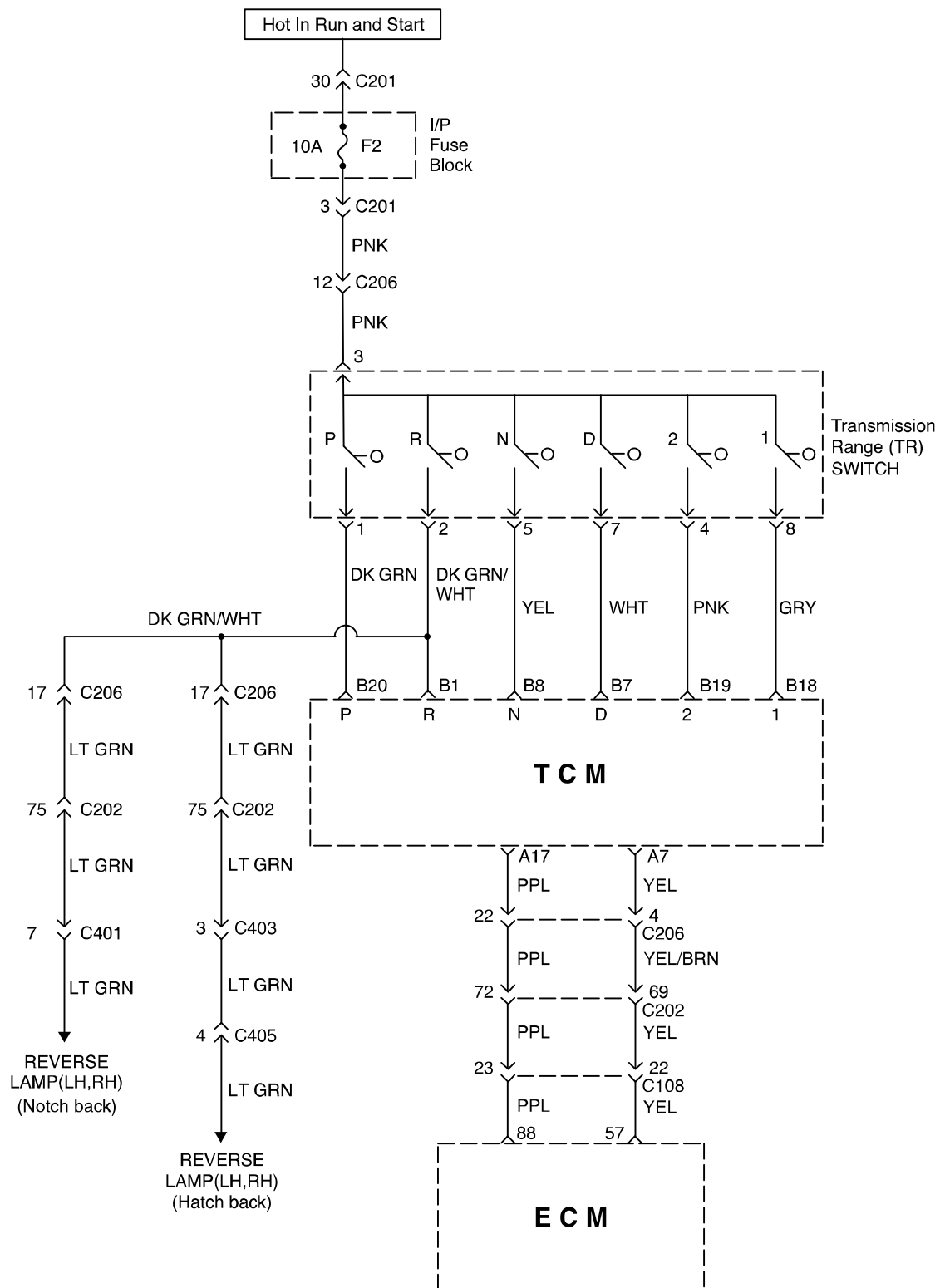
 DW240170	DW240-170 Adapter Handle
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SCHEMATIC DIAGRAMS

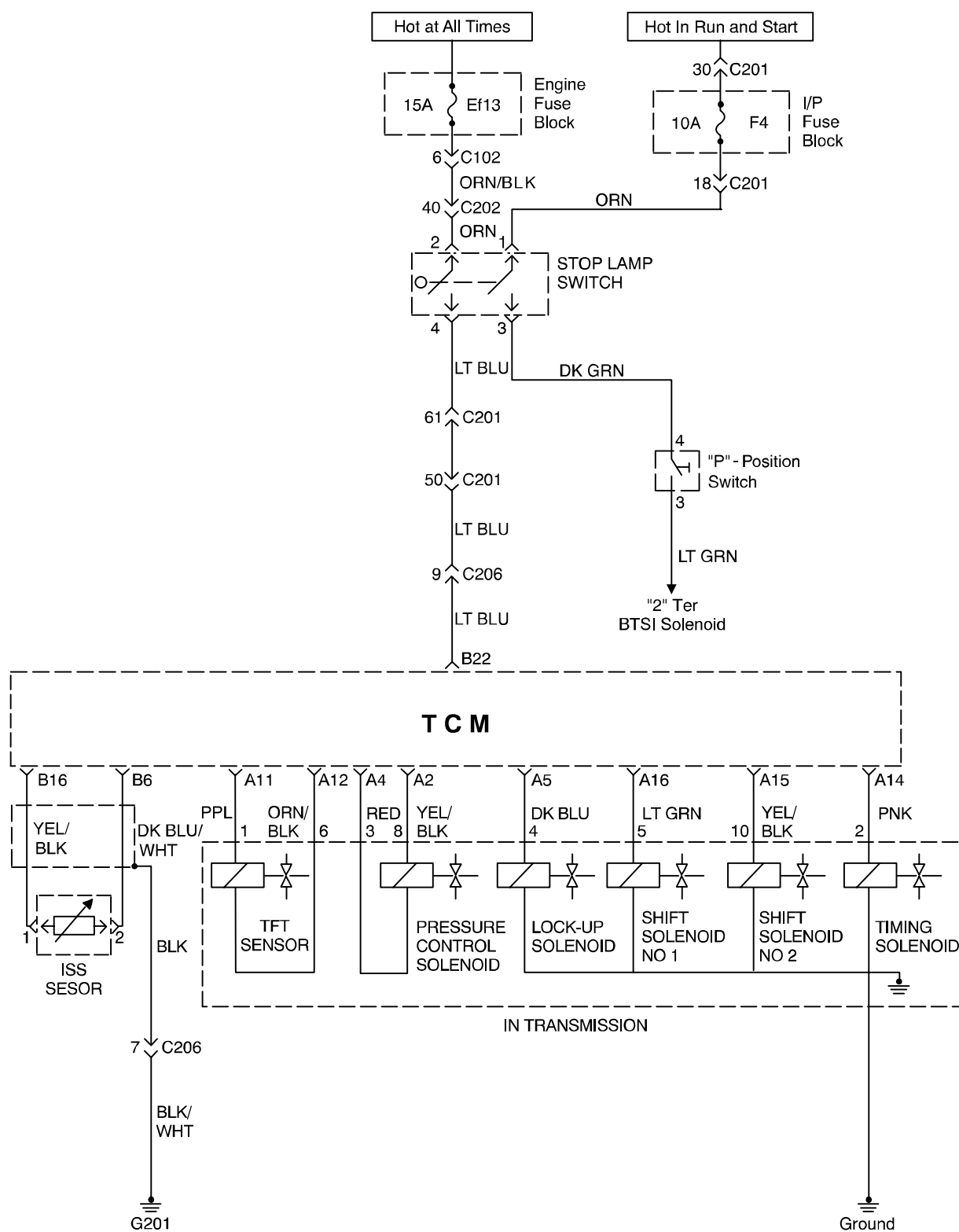
TRANSMISSION CONTROL MODULE (1 OF 4)



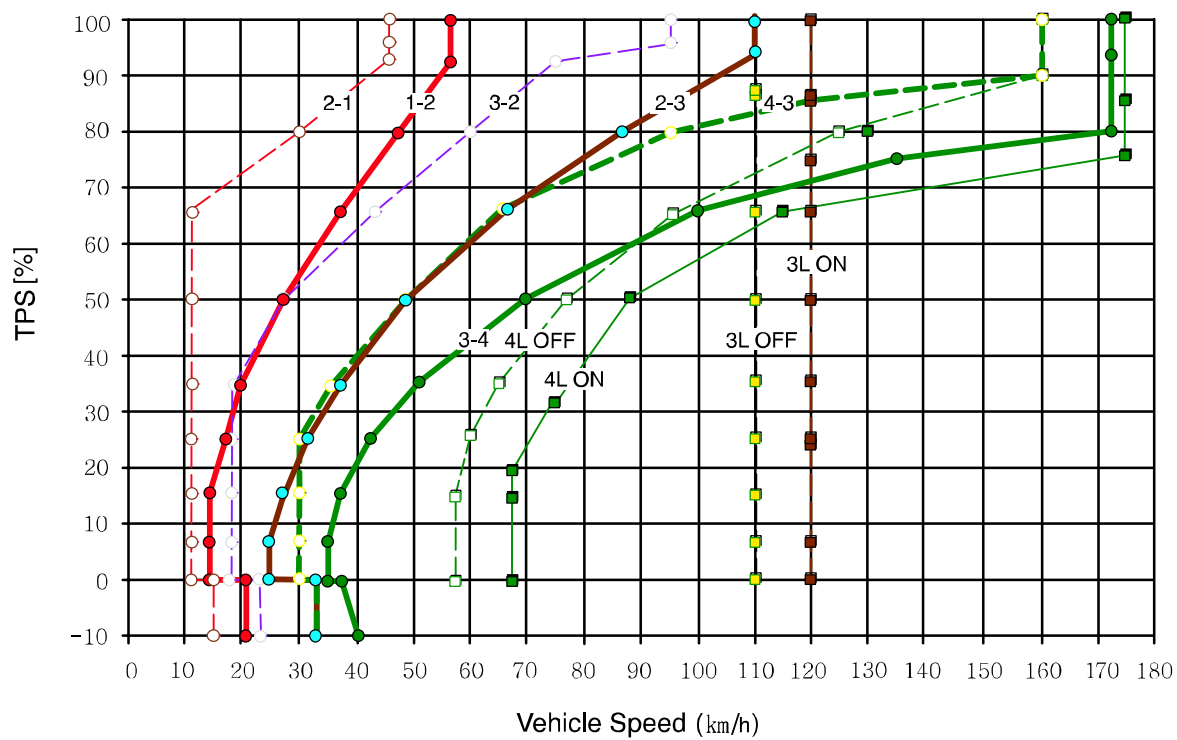
TRANSMISSION CONTROL MODULE (2 OF 4)



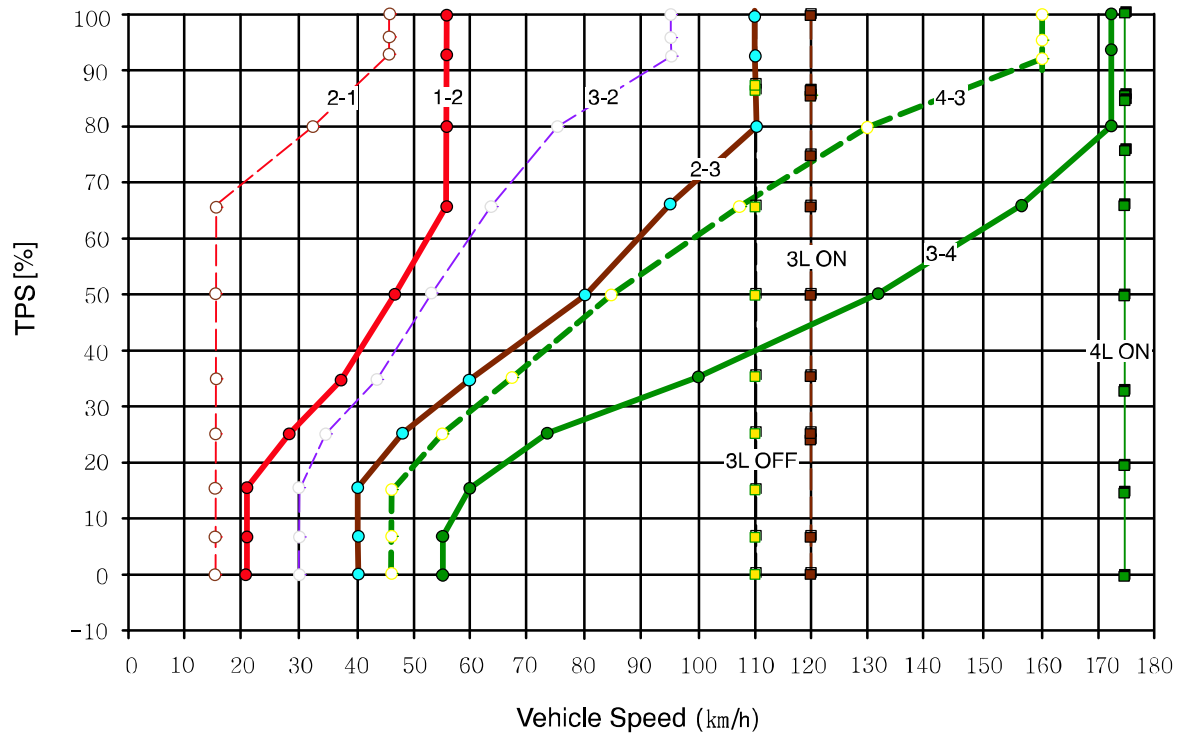
TRANSMISSION CONTROL MODULE (3 OF 4)



J3D15A52

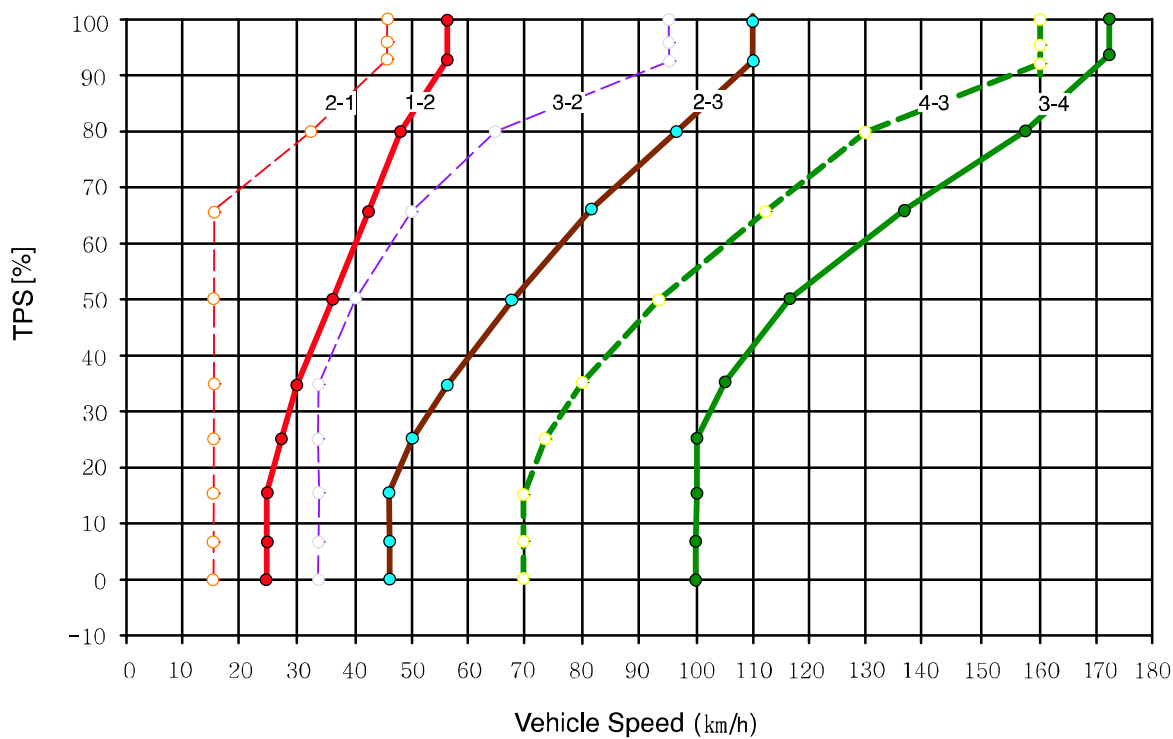
SHIFT MODE DIAGRAM**Economic Mode (1.6 DOHC)**

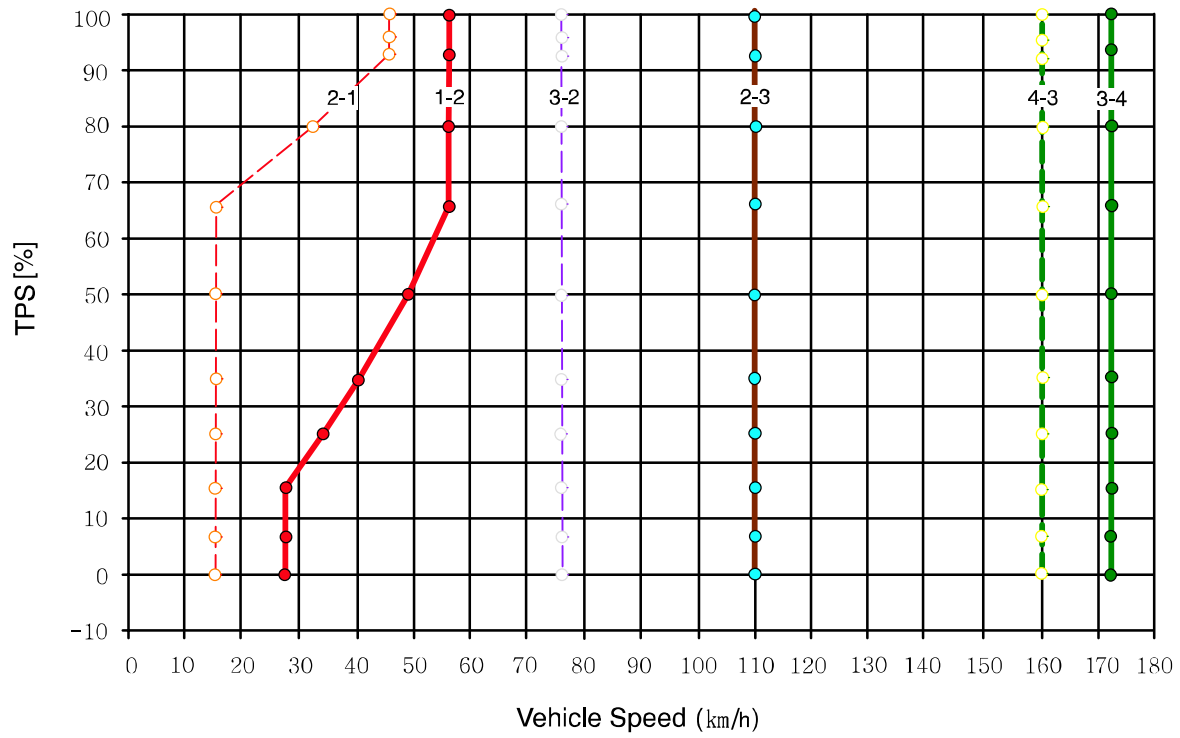
J3B15A83

Power Mode (1.6 DOHC)

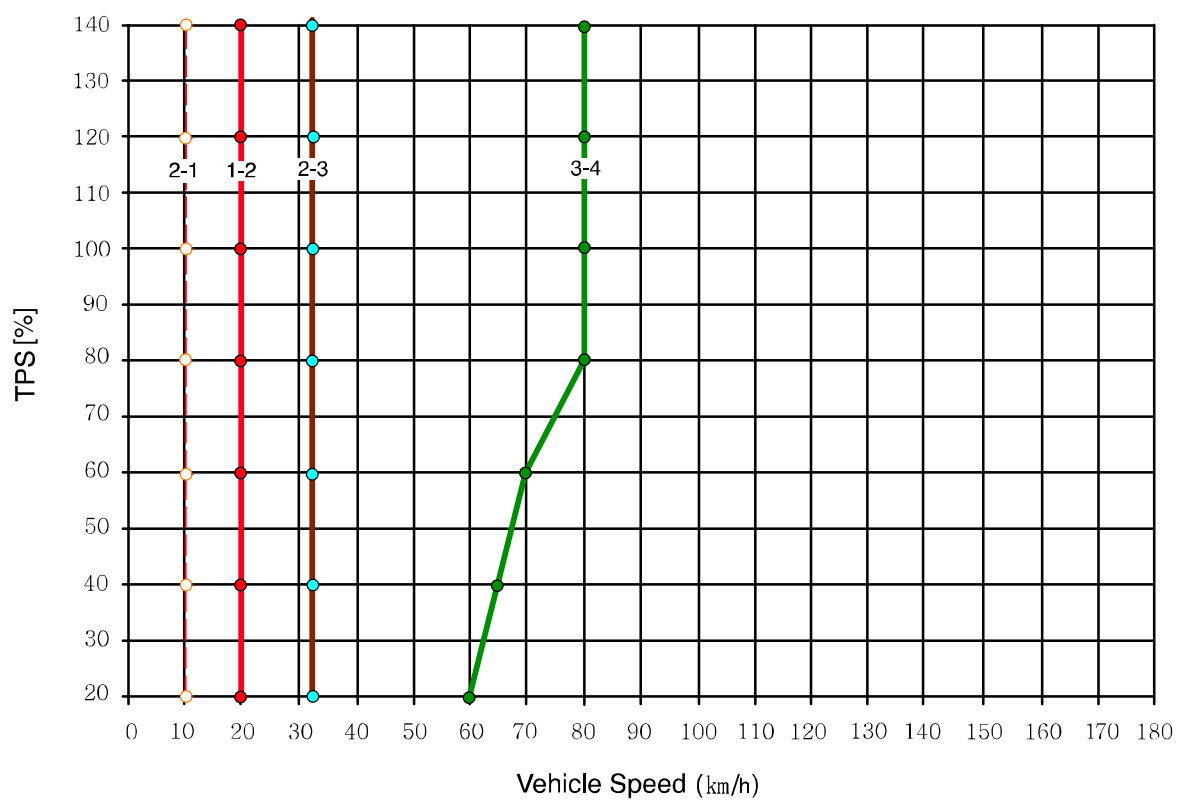
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Up-Slope 1 Mode (1.6 DOHC)



Up-Slope 2 Mode (1.6 DOHC)

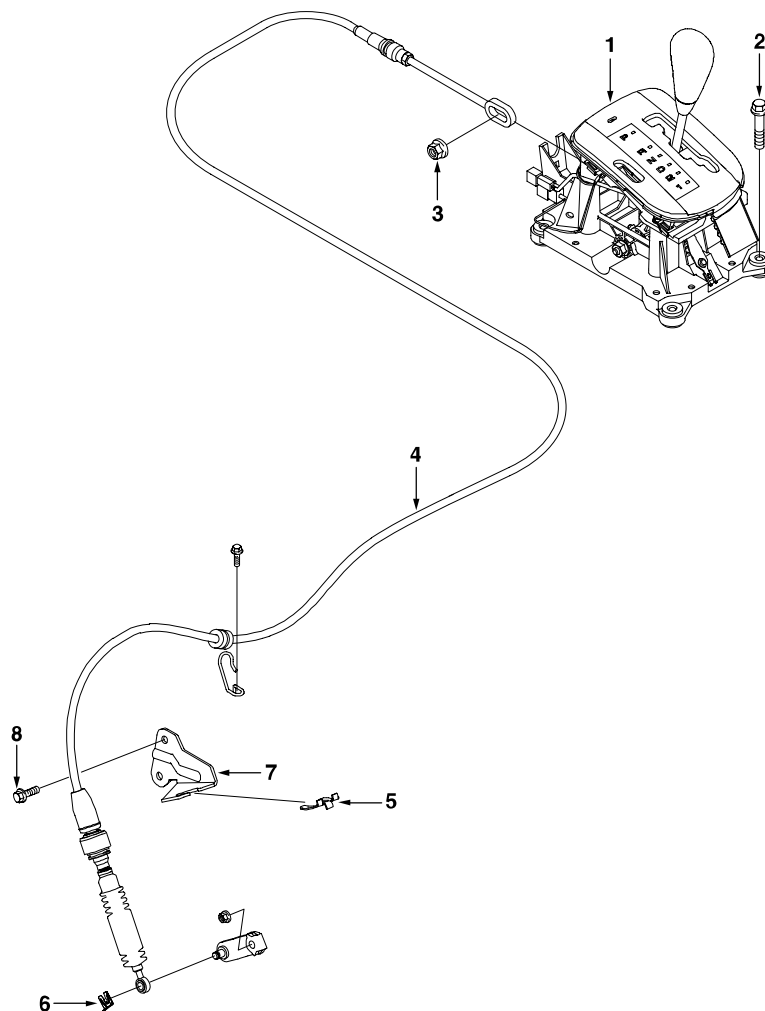
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Down-Slope Mode (1.6 DOHC)

J3B15A87

COMPONENT LOCATOR

SHIFT SELECT CONTROL

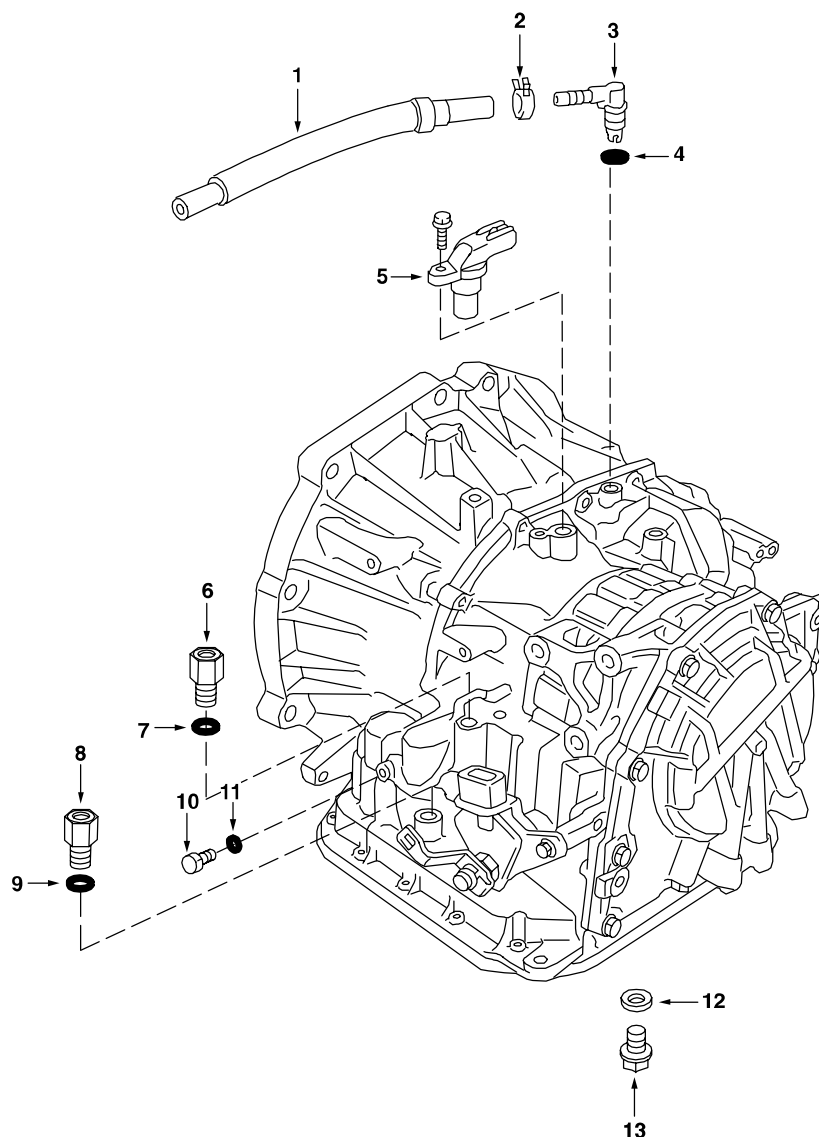


T3B15AY7

1. Select Control Lever Assembly
2. Bolt
3. Nut
4. Select Control Cable

5. Clamp
6. E-ring
7. Cable Fastener
8. Bolt

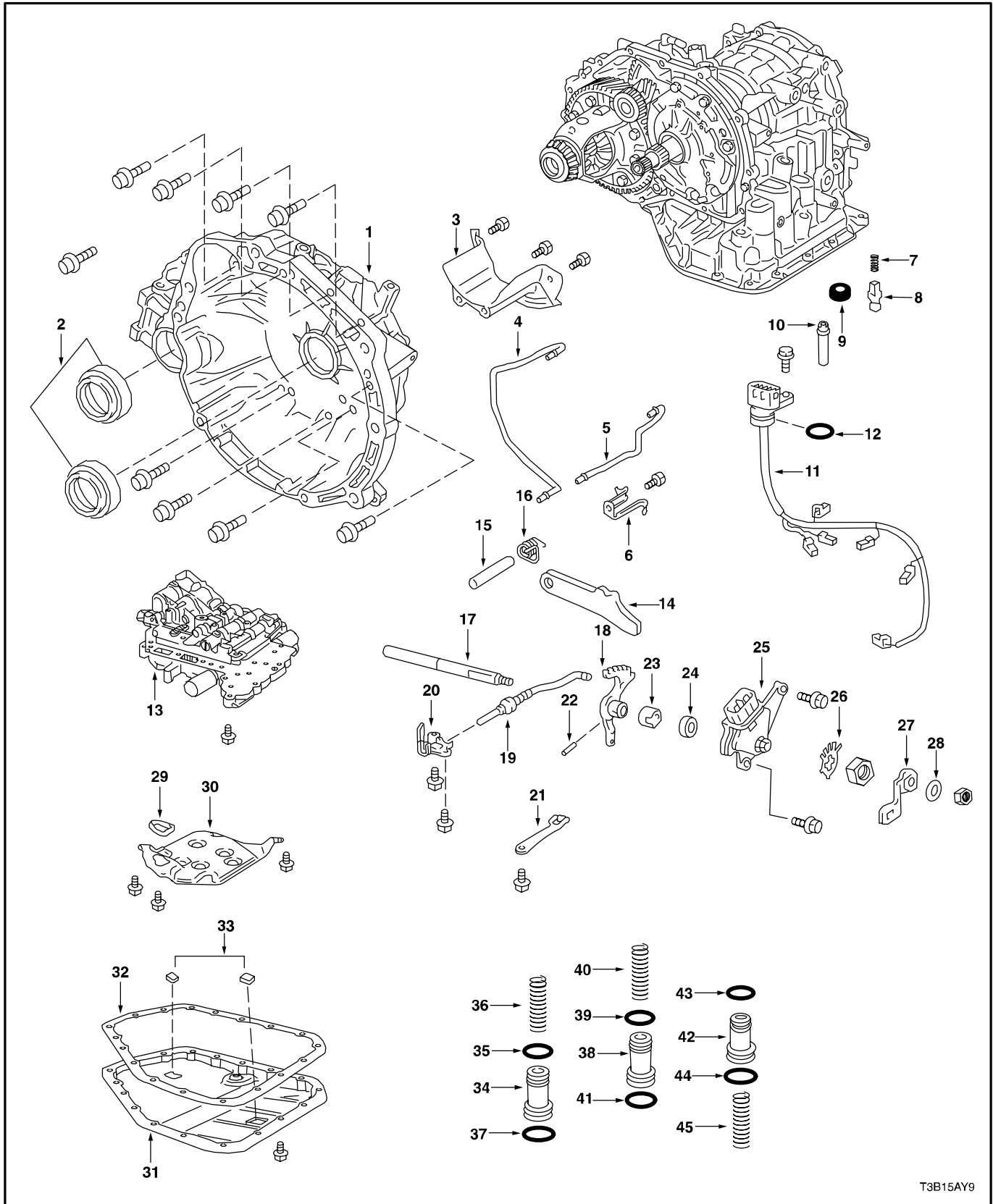
AUTOMATIC TRANSAXLE COMPONENTS



T3B15AY8

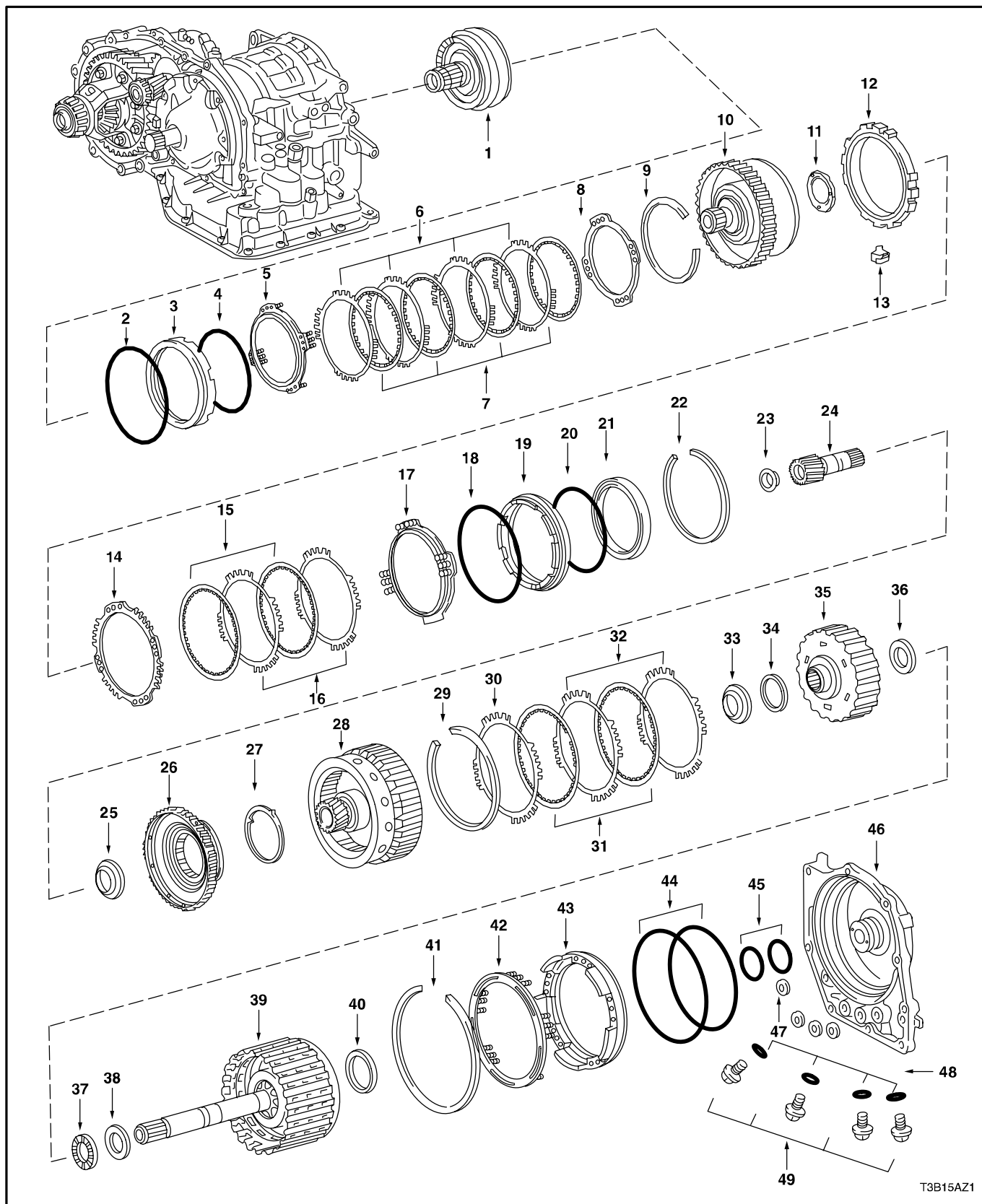
1. Breather Hose
2. Clip
3. Breather Plug
4. O-ring
5. Input Speed Sensor
6. Oil Cooler Outlet Union
7. O-ring

8. Oil Cooler Inlet Union
9. O-ring
10. Screw Plug
11. O-ring
12. Washer
13. Drain Plug



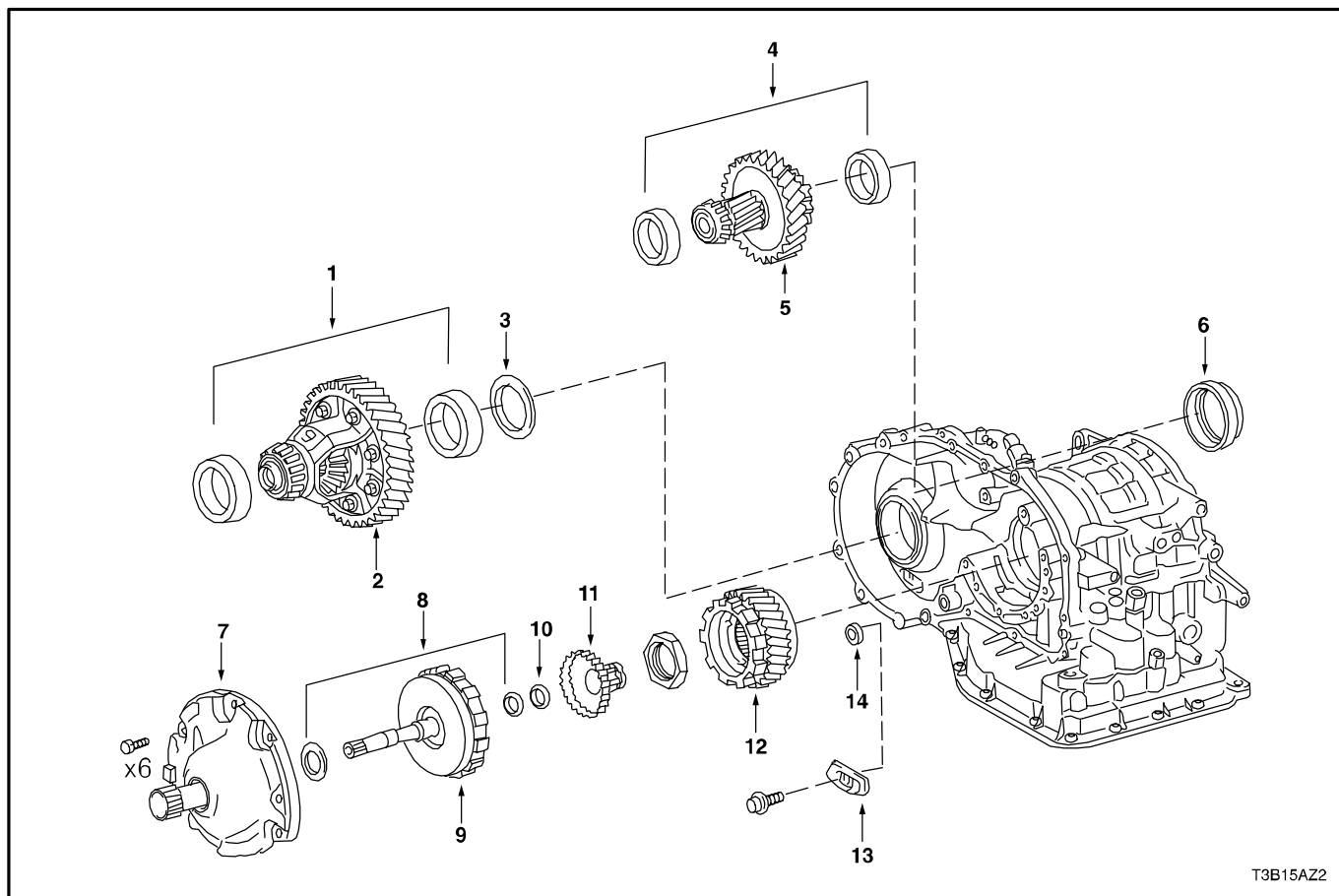
5A2 – 20 AISIN AUTOMATIC TRANSAXLE

- | | |
|-------------------------------------|--|
| 1. Transaxle Housing | 24. Oil Seal |
| 2. Oil Seal | 25. Transmission Range (TR) Switch |
| 3. Oil Reservoir Plate | 26. Lock Washer |
| 4. Transaxle Oil Apply Pipe | 27. Control Lever |
| 5. Differential Gear Oil Apply Pipe | 28. Washer |
| 6. Transaxle Oil Apply Pipe Clamp | 29. Gasket |
| 7. Spring | 30. Oil Strainer |
| 8. Check Valve Pipe Clamp | 31. Oil Pan |
| 9. Apply Gasket | 32. Gasket |
| 10. Brake Drum Gasket | 33. Magnet |
| 11. Transaxle Wire | 34. Direct Clutch Accumulator Piston |
| 12. O-ring | 35. O-ring |
| 13. Valve Body | 36. Spring |
| 14. Parking Lock Pawl | 37. O-ring |
| 15. Parking Lock Pawl Shaft | 38. Forward Clutch Accumulator Piston |
| 16. Torsion Spring | 39. O-ring |
| 17. Manual Valve lever Shaft | 40. Spring |
| 18. Manual Valve Lever | 41. O-ring |
| 19. Parking Lock Rod | 42. Overdrive Brake Accumulator Piston |
| 20. Parking Lock Pawl Bracket | 43. O-ring |
| 21. Manual Detent Spring | 44. O-ring |
| 22. Pin | 45. Spring |
| 23. Spacer | |



T3B15AZ1

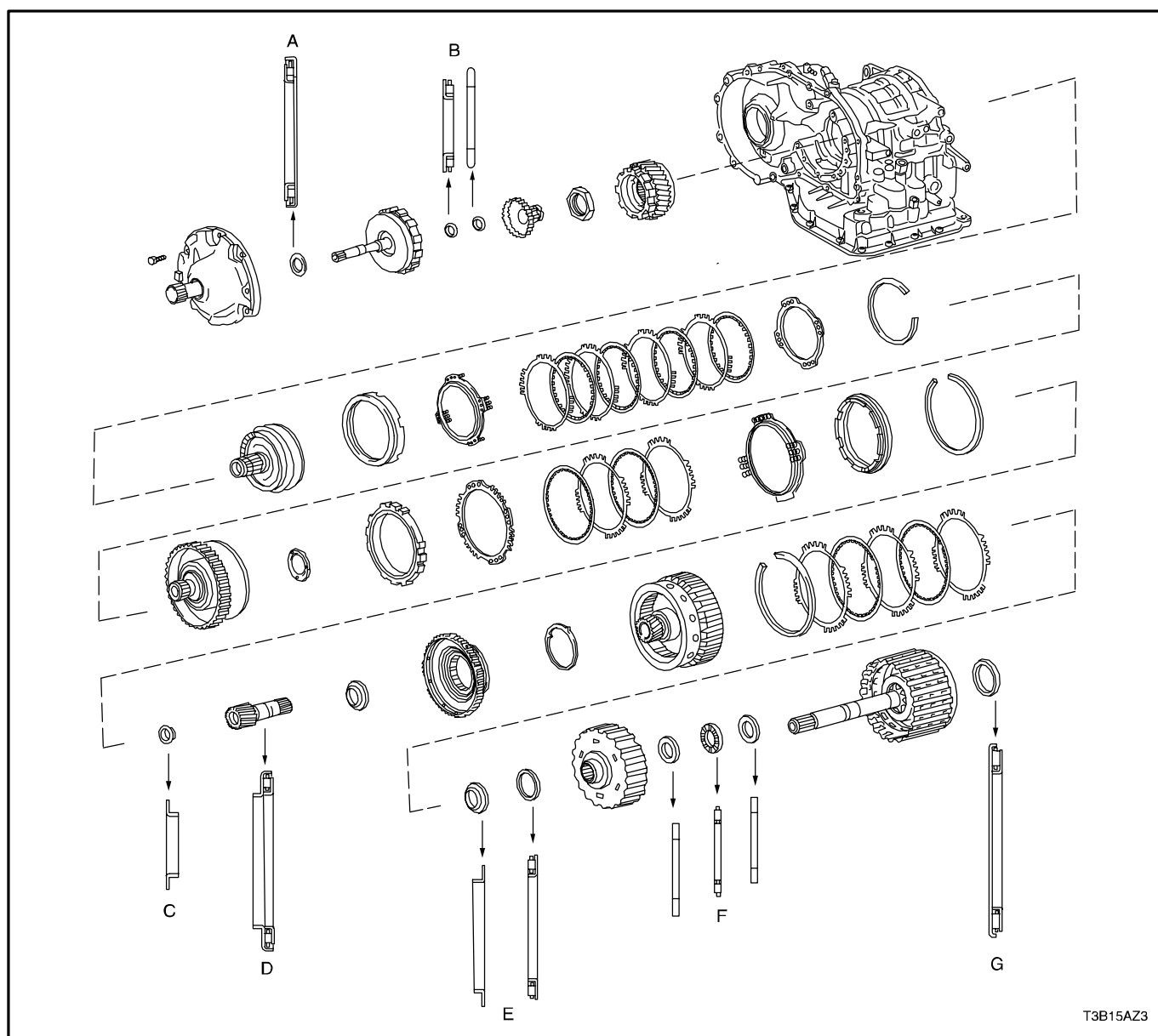
1. Planetary Ring Gear
2. O-ring
3. 1st and Reverse Brake Piston
4. O-ring
5. 1st and Reverse Brake Piston Return Spring
6. Plate
7. Disc
8. Flange
9. Snap Ring
10. Planetary Gear
11. Thrust Washer
12. No. 2 One-Way Clutch
13. Anti-Rattle Clip
14. Flange
15. Disc
16. Plate
17. 2nd Brake Piston Return Spring
18. O-ring
19. 2nd Brake Piston
20. O-ring
21. 2nd Brake Clutch Cylinder
22. Snap Ring
23. Thrust Bearing Race
24. Front Planetary Sun Gear
25. Thrust Bearing Race
26. One-Way Clutch Assembly
27. Thrust Washer
28. Rear Planetary Sun Gear
29. Snap Ring
30. Flange
31. Disc
32. Plate
33. Thrust Bearing Race
34. Thrust Needle Roller Bearing
35. Forward Clutch Hub
36. Thrust Bearing Race
37. Thrust Needle Roller Bearing
38. Thrust Bearing Race
39. Forward and Reverse Clutch Assembly
40. Thrust Needle Roller Bearing
41. Snap Ring
42. O/D Brake Return Spring
43. O/D Brake Piston
44. O-ring
45. Seal Ring
46. Transaxle Rear Cover
47. Apply Gasket
48. O-ring
49. Screw Plug



T3B15AZ2

- | | |
|--------------------------------------|---------------------------------|
| 1. Side Bearing Outer Race | 8. Thrust Needle Roller Bearing |
| 2. Differential Case | 9. Direct Clutch Assembly |
| 3. Shim | 10. Thrust Bearing Race |
| 4. Outer Tapered Roller Bearing Race | 11. Direct Clutch Hub |
| 5. Counter Driven Gear | 12. Counter Driven Gear |
| 6. Oil Seal | 13. Transaxle Case Plate |
| 7. Oil Pump | 14. Apply Gasket |

BEARING AND RACES INSTALLATION POSITION AND DIRECTION

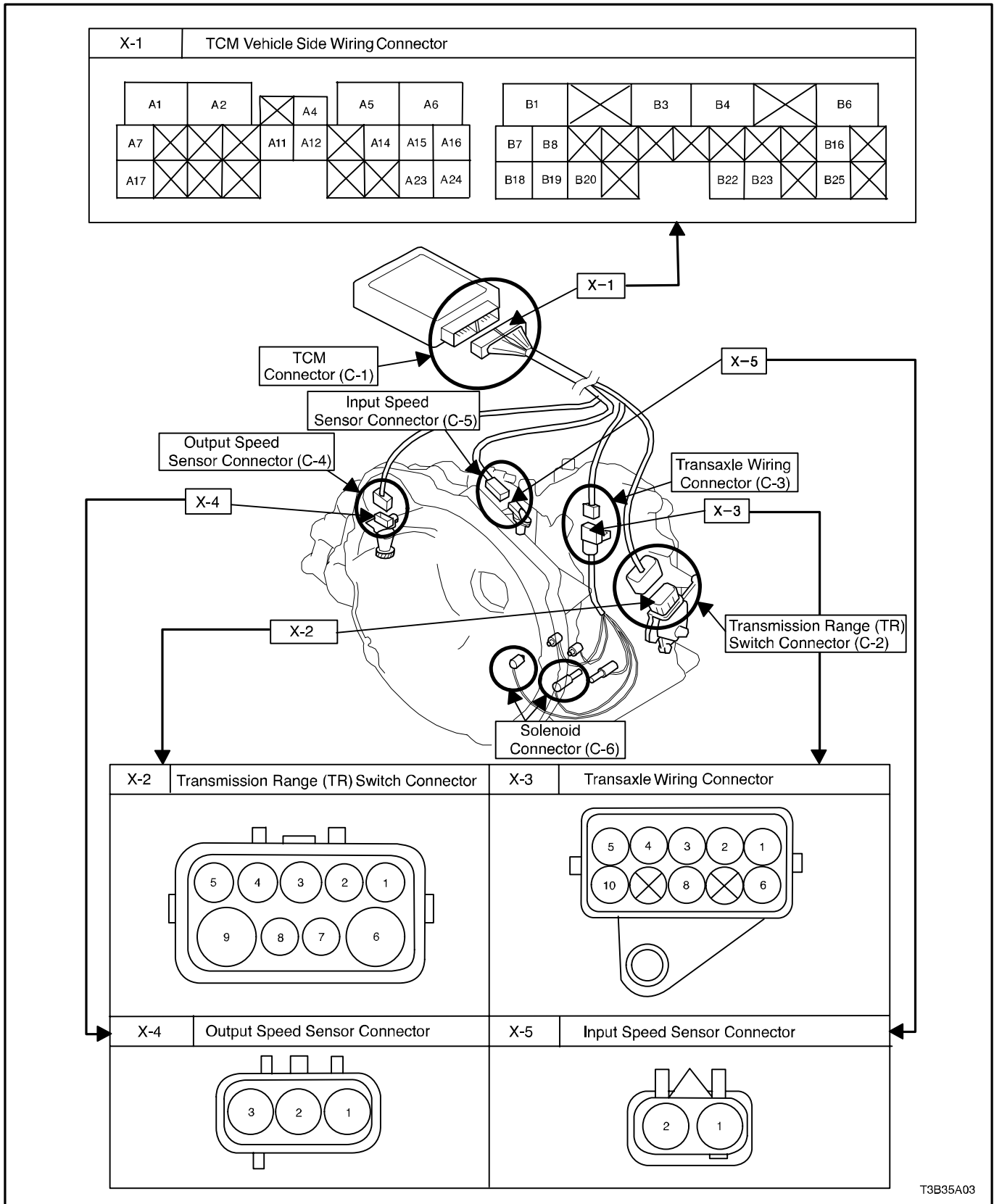


T3B15AZ3

Mark	Front Race Diameter : mm(in)		Thrust Bearing Diameter : mm(in)		Rear Race Diameter : mm(in)	
	Inside	Outside	Inside	Outside	Inside	Outside
A	—	—	32.5 (1.280)	48.5 (1.909)	—	—
B	—	—	17.8 (0.701)	30.2 (1.189)	20.5 (0.807)	32.6 (1.283)
C	19.3 (0.760)	29.0 (1.142)	—	—	—	—
D	—	—	42.5 (1.673)	57.5 (2.264)	—	—
E	34.95 (1.3670)	45.50 (1.7913)	33.3 (1.311)	46.5 (1.831)	—	—
F	19.3 (0.760)	30.6 (1.205)	18.1 (0.713)	29.6 (1.165)	18.1 (0.713)	28.2 (1.110)
G	—	—	43.2 (1.701)	62.0 (2.441)	—	—

DIAGNOSIS

ELECTRIC CONNECTOR VIEW



X-1 : TCM Vehicle Side Wiring Connector

A1	Ground	B1	R
A2	Pressure Control Solenoid Ground	B3	Clock
A4	Pressure Control Solenoid	B4	Hold
A5	Lock-Up Solenoid	B6	Input Speed Sensor
A6	Ignition (+)	B7	D
A7	CAN (Low)	B8	N
A11	Transmission Fluid Temperature Sensor	B16	Input Speed Sensor Ground
A12	Transmission Fluid Temperature Sensor Ground	B18	L
A14	Timing Solenoid	B19	2
A15	Shift Solenoid No.2	B20	P
A16	Shift Solenoid No.1	B22	Stop Lamp Switch
A17	CAN (High)	B23	DLC
A23	Ground	B25	Output Speed Sensor
A24	B+	–	–

X-2 : Transmission Range (TR) Switch Connector

1	P
2	R
3	Ground
4	2
5	N
6	ST(–)
7	D
8	1
9	ST(+)

X-4 : Output Speed Sensor Connector

1	Ignition
2	Ground
3	Output Speed Sensor

X-3 : Transaxle Wiring Connector

1	Transmission Fluid Temperature Sensor
2	Timing Solenoid
3	Pressure Control Solenoid
4	Lock-Up Solenoid
5	Shift Solenoid No.1
6	Transmission Fluid Temperature Sensor Ground
8	Pressure Control Solenoid Ground
10	Shift Solenoid No.2

X-5 : Input Speed Sensor

1	Input Speed Sensor Ground
2	Input Speed Sensor

WIRING HARNESS AND CONNECTOR INSPECTION

1. Reproducing test

Perform symptom simulation test on the basis of user's condition. Refer to the below factors.

- Occuring—road condition, speed, accelerate, reduce speed, straight, curve, air temperature, weather, etc.

2. Inspect the connection condition of between connectors.

Inspect the failure between connectors by visual check and contact pressure check.

- Connector disconnected
- Terminals rusted
- Terminals deformation or loose fit

3. Inspect the Continuity of the wiring harness.

Disconnect both ends connector of wiring harness, measure resistance between one connector terminal and other.

- Normal : 1Ω or less (No open circuit)
- Abnormal : $\infty \Omega$ (Open circuit)

Notice : Measure the resistance while slightly shaking wire harness vertically and horizontally.

It is rare case wiring harness is broken at the middle of it, and most cases occur at the connector.

4. Inspect the short circuit of the wiring harness.

Disconnect the connectors of the wiring harness at both ends, measure resistance between the applicable terminals of the connector and body earth.

- Normal : $1M \Omega$ or higher (No short circuit)
- Abnormal : Low resistance (Short circuit)

Measure the resistance between one terminal an another terminal in the same connector.(Except between power supply or between earth).

- Normal : $1M \Omega$ or higher (No short circuit)
- Abnormal : Low resistance (Short circuit)

Notice : Measure the wiring harness while slightly shaking vertically and horizontally.

It is usual case of the short circuit that wiring harness is crowded body and clamping failure.

5. Temporary connection failure of the connector.

It is thought that temporally the connection failure of the connector is cause when you can not decide cause of DTC detection.

Therefore make sure to inspect and clean the connector and delete the memorized DTC.

ROAD TEST

Road test is to diagnosis failure symptom accurately and check the failure symptom after procedure.

Confirm whether below condition before road test. Oil temperature is hot condition (50°C (122°F) ~ 80°C (176°F)).

1. D range test

- Check for up—shift, down—shift, kick—down and lock—up operation at the shift point shown in the shift schedule.
- Check for engine brake operation.
- Check for Check abnormal shock, noise and harshness.

2. "P" range test

Park vehicle on a gradient (more than 5°), shift into the "P" range and release parking brake. Then, check to see no moving vehicle by operation of parking lock pawl.

FUNCTION CHECK

Confirm whether below condition before function check.

- Oil temperature is hot condition (50°C (122°F) ~ 80°C (176°F)).
- Switch of A/C and light etc are off.

Stall Test

Stall test' purpose is to inspect overall performance of A/T and engine by measuring the stall speed in "D" and "R" range.

- Chock 4 Wheels and apply parking brake fully, lock vehicle perfectly.
- Fully pressed on foot brake pedal with left foot.
- Shift into "D" and "R" range, fully press on accelerator pedal with right foot.

Quickly read stall speed at this time.

Standards	2390 ± 150 rpm
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Notice : Do not continuously run longer than 5 sec because of extreme increasing oil temp.

Make sure to keep interval for more than 1 min between stall tests.

Result of Stall Test	Cause of Failure
Lower than standards both "D" and "R"	Less engine power Torque converter one way clutch failure
Higher than standards only "D"	Lower line pressure - Pressure control solenoid (PCS) failure - Primary regulator valve failure Forward clutch (C1) failure (Slipping) No.2 One-way clutch (F2) failure
Higher than standards only "R"	Lower line pressure - Pressure control solenoid (PCS) failure - Primary regulator valve failure Reverse clutch (C3) failure (Slipping) 1st & reverse brake (B3) failure (Slipping)
Higher than standards both "D" and "R"	Lower line pressure - Pressure control solenoid (PCS) failure - Primary regulator valve failure Oil pump failure Oil strainer failure (clogging) Oil leak for each range circuit

Time Lag Test

Time lag is time till slightly shock can be felt when shift lever is shifted "N" → "D" and "N" → "R" while engine idling.

Time lag test can inspect hydraulic condition and clutch/brake condition.

- Chock 4 Wheels and apply parking brake fully, lock vehicle perfectly.
- Measure time lag by using stop watch from moment when shift lever is shifted in "N" → "D" and "N" → "R" until moment slightly shock can be felt.

"N" → "D"	less than 0.7 sec
"N" → "R"	less than 1.2 sec

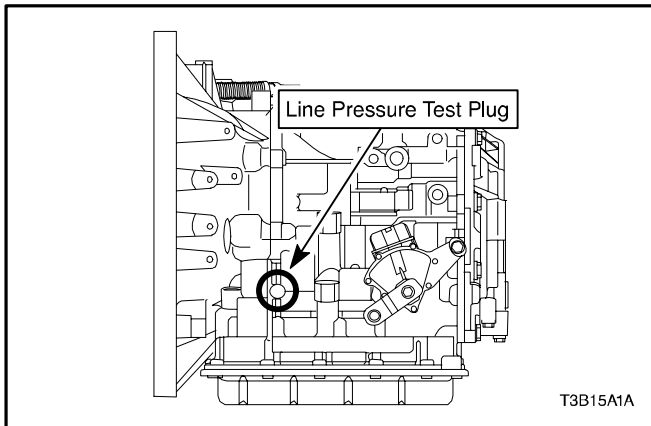
Notice : Make sure to take 3 measurement and take the average value.

Make sure to keep interval for more than 1 min between time lag tests. (That purpose is to remove clutch/brake pressure was left unfinished.)

Result of Time Lag Test	Cause of Failure
Longer than standards "N" → "D"	Lower line pressure - Pressure control solenoid (PCS) failure - Primary regulator valve failure Forward Clutch (C1) failure (Slipping) Timing solenoid failure Oil leak for "D" range circuit
Longer than standards "N" → "R"	Lower line pressure - Pressure control solenoid (PCS) failure - Primary regulator valve failure Reverse clutch (C3) failure (slipping) 1st & reverse brake (B3) failure (slipping) Oil leak for "R" range circuit

Hydraulic Test

Hydraulic test can inspect working condition inside A/T by measuring line pressure in "D" / "R" range and "idle" / "stall" condition.



- Install oil pressure gage adapter DW240-010-02 to test hole for line pressure.
- Fully pressed on foot brake pedal with left foot, shift into "D" and "R" range and measure line pressure "idle" / "stall" condition.

Line pressure Mpa (kgf/cm ²)	D	R
Engine idle	0.37 (3.9) -0.14 (4.2)	0.59 (6.0) -0.68 (6.9)
Engine stall	1.10 (11.3) -1.23 (12.5)	1.58 (16.2) -1.83 (18.6)

Notice : Do not continuously run longer than 5 sec because of extreme increasing oil temp.

Make sure to keep interval for more than 1 min between stall tests.

Make sure to check no oil leak after installing oil pressure gage adapter.

- Chock 4 Wheels and apply parking brake fully, lock vehicle perfectly.

Result of Hydraulic Test	Cause of Failure
Higher than standards both "D" and "R"	Pressure control solenoid (PCS) failure Primary regulator valve failure
Lower than standards both "D" and "R"	Pressure control solenoid (PCS) failure Primary regulator valve failure Oil pump failure Oil strainer failure (clogging) Oil leak for each range circuit
Lower than standards only "D"	"D" hydraulic circuit failure Forward clutch (C1) failure
Lower than standards only "R"	"R" hydraulic circuit failure Reverse clutch (C3) failure 1st and reverse brake (B3) failure

Manual Shifting Test

Manual shifting test is to determine whether failure symptom is within electrical failure or mechanical failure.

1. Disconnect wire harness of shift solenoid, check the range and gear positions correspond with below table when driving by manual shifting.

Range	Gear
D	3rd gear
R	Reverse

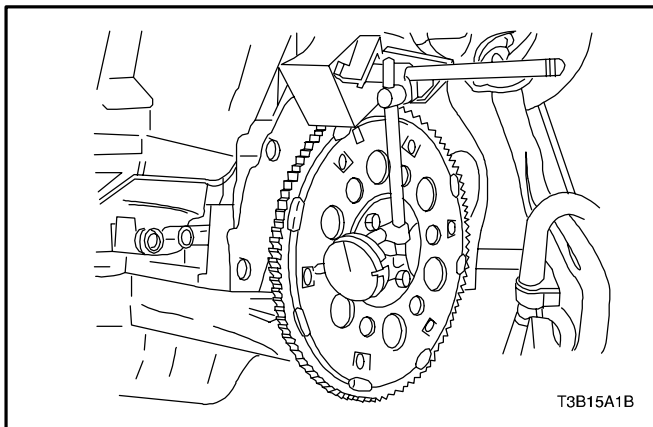
Notice : Make sure to disconnect only wire harness of shift solenoid.

UNIT INSPECTION

Drive Plate Deflection

- Inspect drive plate deflection if within standard value.

Standard Value	within 0.2mm (0.008 in)
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Action :

Standard value is not within the specified value, replace drive plate.

When "abnormal wear" or "stick" on torque converter sleeve or oil pump is found, replace torque converter and A/T.

Notice :

- When assembling torque converter and drive plate. Be sure to use correct bolt with correct length. The bolt pushes up torque converter front cover, and it damages lock-up clutch lining. As a result, it cause major failure "No move".
- Do not tighten the bolts by using impact wrench.

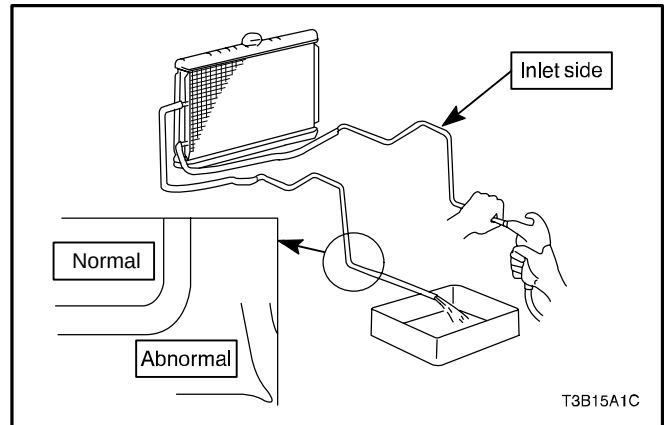
Cooler Pipe Bending and Choke

- Inspect it whether there is abnormal pipe bending in the cooler pipe, pipe deformation and small cross-section area of pipe line.

Action : Replace failure parts.

- Apply compressed air of 2kg/cm² from cooler pipe inlet side, inspect whether there is not cooler pipe choke by confirming air flow smooth.

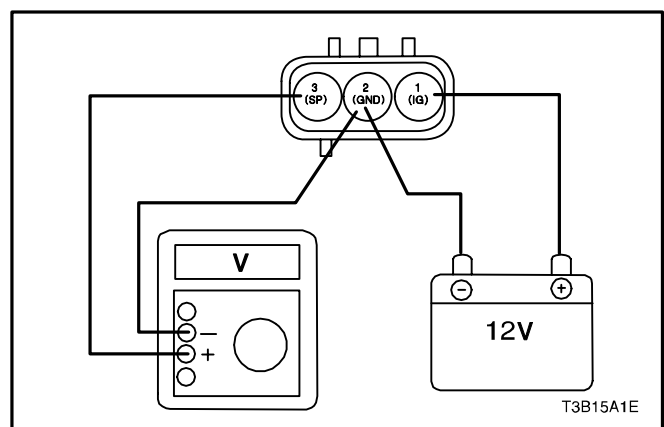
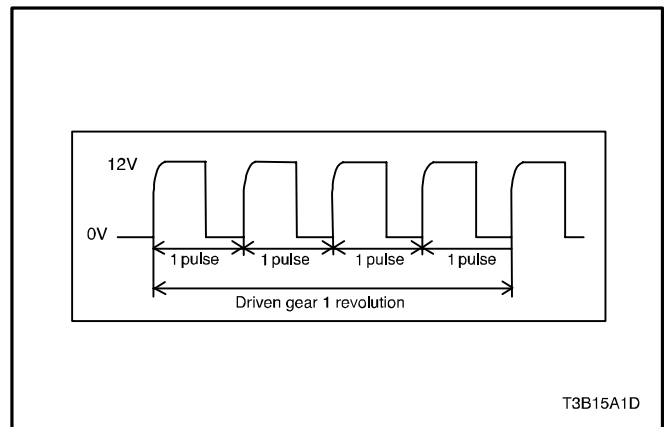
Action : Remove foreign particles and clean inside of pipe line.



Vehicle Speed Sensor

1. Remove the connector of vehicle speed sensor, connect 12V power supply and voltmeter to the terminal.(Do not mistake polarity)
2. Check voltage change from approx. 0V to 12V with vehicle speed sensor driven gear rotated.

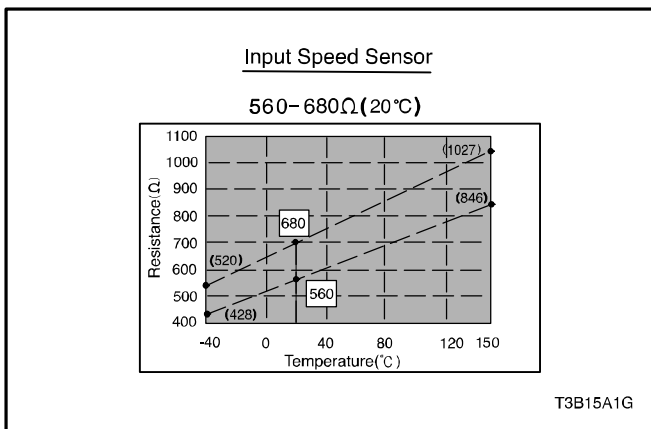
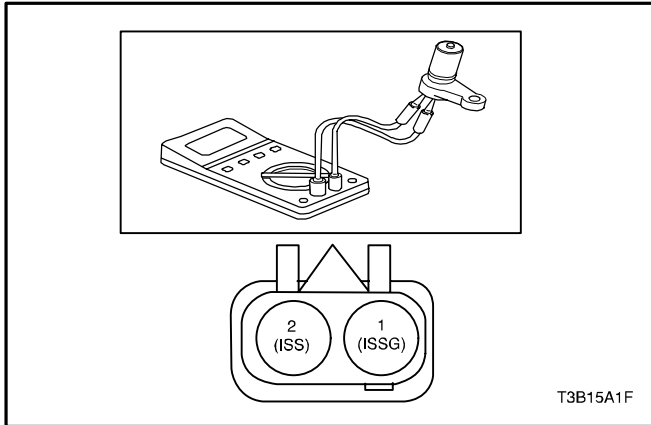
Notice : The voltage change should be 4 times for 1 revolution of the vehicle speed sensor driven gear.



Action : If the result of inspection is bad, replace the vehicle speed sensor.

Input Speed Sensor

- Inspect resistance of each input speed sensor between terminals.



Notice :

- Make sure to inspect resistance again at 20°C (68°F) when resistance differ from standards except 20°C (68°F).
- It might become infinity ohm when inspect resistance at higher temperature.

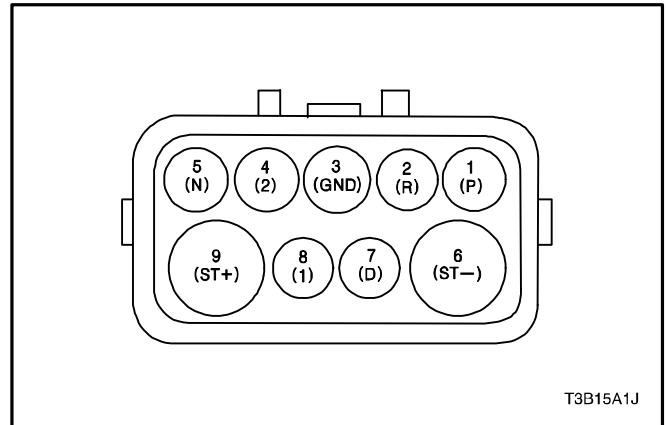
Action : If the result of inspection is bad, replace ISS.

Transmission Range (TR) Switch

- Remove TR switch connector and inspect continuity each range according to the connection chart.

Range	Starter Circuit		Indicator Circuit						
	ST+	ST-	IG	P	R	N	D	2	1
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
1			○						○
Polarity	+	-	+	-	-	-	-	-	-

T3B15A1H



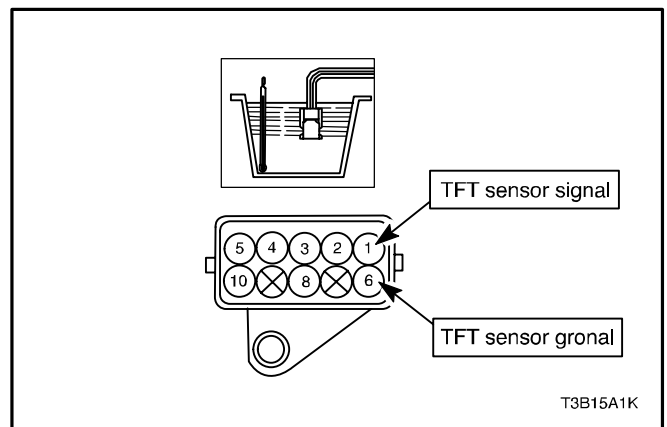
Action : If the result of inspection is bad, replace the TR switch.

Transmission Fluid Temperature Sensor

- Inspect the resistance between the terminals of TFT sensor at 10°C (50°F) and 110°C (230°F).

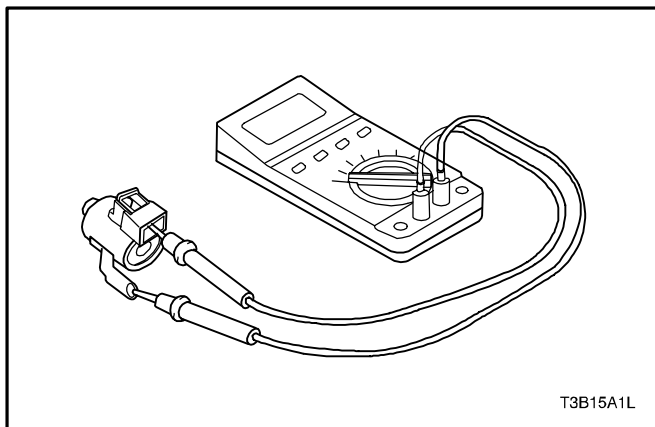
Standard Value	10°C (50°F)	110°C (230°F)
	5.80~7.09 kΩ	0.23~0.263 kΩ

Action : If the result of inspection is bad, replace the TFT sensor.

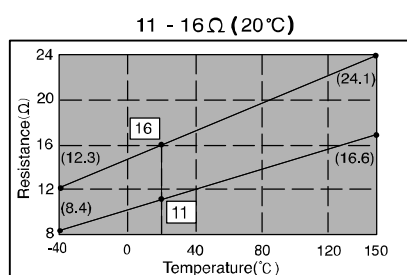


Shift Solenoid (NO.1,2), Timing Solenoid, Lock-Up Solenoid

1. Inspect the resistance of each shift solenoid between the terminal and the body earth.



SS1,SS2,Timing solenoid,Lock-up solenoid



Action : If the result of inspection is bad, replace each solenoid.

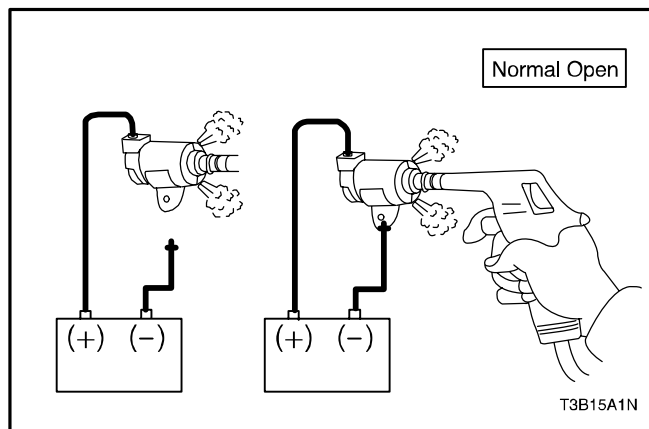
Notice :

- Make sure to inspect resistance again at 20°C (68°F) when resistance differ from standards except 20°C (68°F).
- It might become infinity ohm when inspecting resistance at higher temperature.

2. Inspect the operation of each shift solenoid.

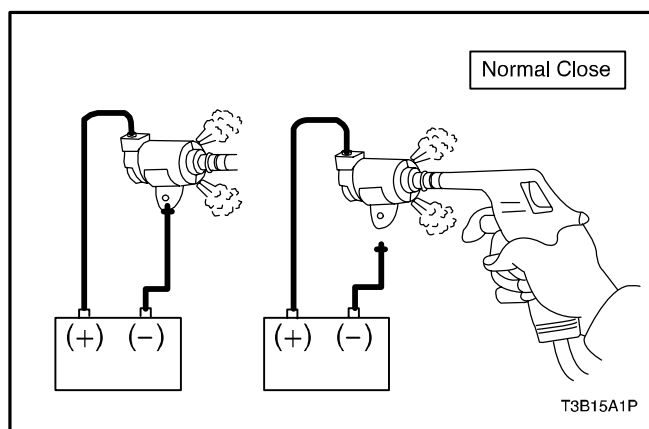
- Solenoid (No.1,2), Lock-up solenoid (Normal open type)

No battery connection	Leak air
Battery connection	No leak air



- Timing solenoid (Normal close type)

No battery connection	No leak air
Battery connection	Leak air



Action : If the result of inspection is bad, replace the each solenoid.

Notice : Do not damage the strainer on the tip of solenoid while inspecting operation.

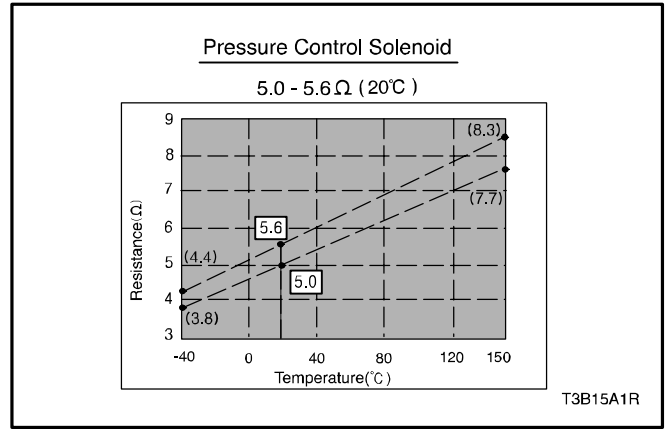
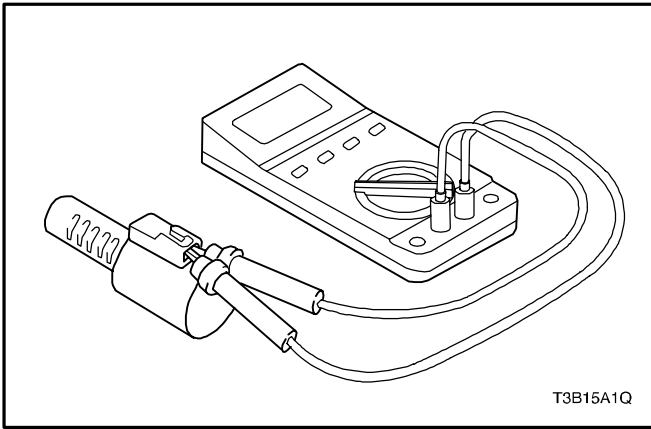
Pressure Control Solenoid

- Inspect the resistance of each pressure control solenoid between terminals.

Action : Repalce the valve body assembly. (No replacement of solenoid by itself)

Notice :

- Make sure to inspect resistance again at 20°C (68°F) when resistance differ from standards except 20°C (68°F).
- It might become infinity ohm when inspecting resistance at higher temperature.



ON-VEHICLE REPAIR (MATRIX CHART)

[illegible]

[illegible]

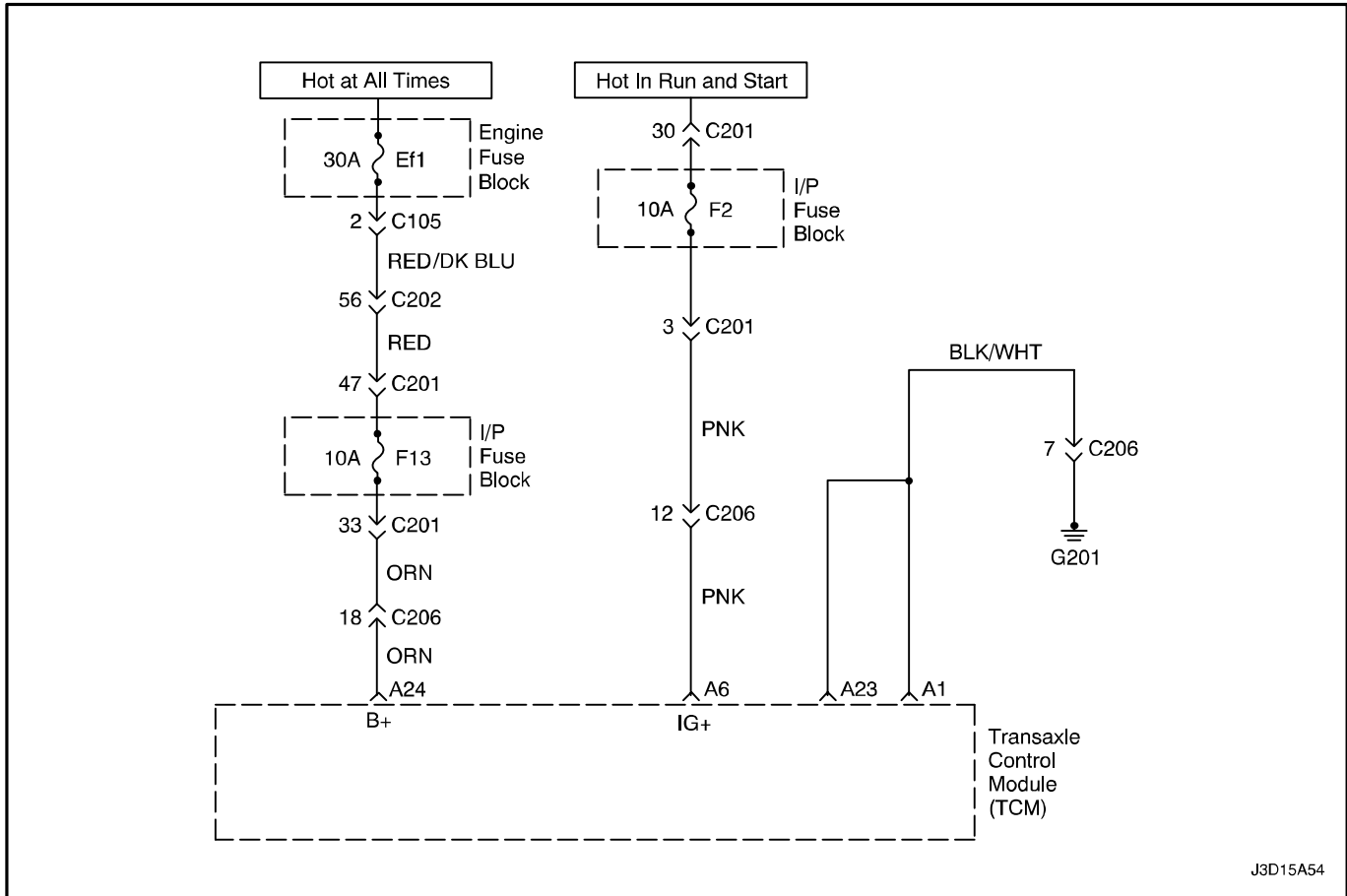
DIAGNOSTIC TROUBLE CODE DIAGNOSIS

DIAGNOSTIC TROUBLE CODE CHART

DTC	DESCRIPTION	TYPE	Illuminate MIL	Blink Hold Lamp
P0562	System Voltage Low	B	Yes	No
P0563	System Voltage High	B	Yes	No
P0601	Internal Control Module Memory Checksum Error	A	Yes	No
P0604	Internal Transmission Control Module (TCM) Random Access Memory (RAM) Error	B	Yes	No
P0705	Transmission Range (TR) Switch Circuit Malfunction	B	Yes	No
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	A	Yes	No
P0713	Transmission Fluid Temperature Sensor Circuit High Input	A	Yes	No
P0717	Input Shaft Speed (ISS) Sensor Circuit No Signal	A	Yes	No
P0722	Output Shaft Speed (OSS) sensor Circuit No Signal	A	Yes	No
P0727	Engine Speed Input Circuit No Signal	A	Yes	No
P0741	Torque Converter Clutch (TCC) Circuit Stuck Off	B	Yes	No
P0742	Torque Converter Clutch (TCC) Circuit Stuck On	B	Yes	No
P0743	Torque Converter Clutch (TCC) Electrical	B	Yes	No
P0748	Pressure Control Solenoid (PCS) Electrical	A	Yes	No
P0751	Shift Solenoid 1 (SS1) Stuck Off	B	Yes	No
P0753	Shift Solenoid 1 (SS1) Electrical	A	Yes	No
P0756	Shift Solenoid 2 (SS2) Stuck Off	B	Yes	No
P0758	Shift Solenoid 2 (SS2) Electrical	A	Yes	No
P0785	Timing Solenoid (ST) Electrical	A	Yes	No
P1781	Engine Torque Signal Error	A	Yes	No
P1791	Throttle Position Signal Error	A	Yes	No
P1792	Engine Coolant Temperature (ECT) Signal Error	D	No	No
U2105	CAN Error	A	Yes	No

* Description of Type

- Type A : TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- Type B : TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycle.
- Type D : TCM will not request the illumination of MIL or hold lamp, but will store DTC when TCM detects a failure on the first ignition cycle.



DIAGNOSTIC TROUBLE CODE (DTC) P0562

SYSTEM VOLTAGE LOW

Conditions for Setting the DTC

- System voltage is too low.
- TCM detects that voltage is less than 9 volts for 0.5 seconds continuously.
- Engine revolution is 600 rpm or greater.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycle.

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

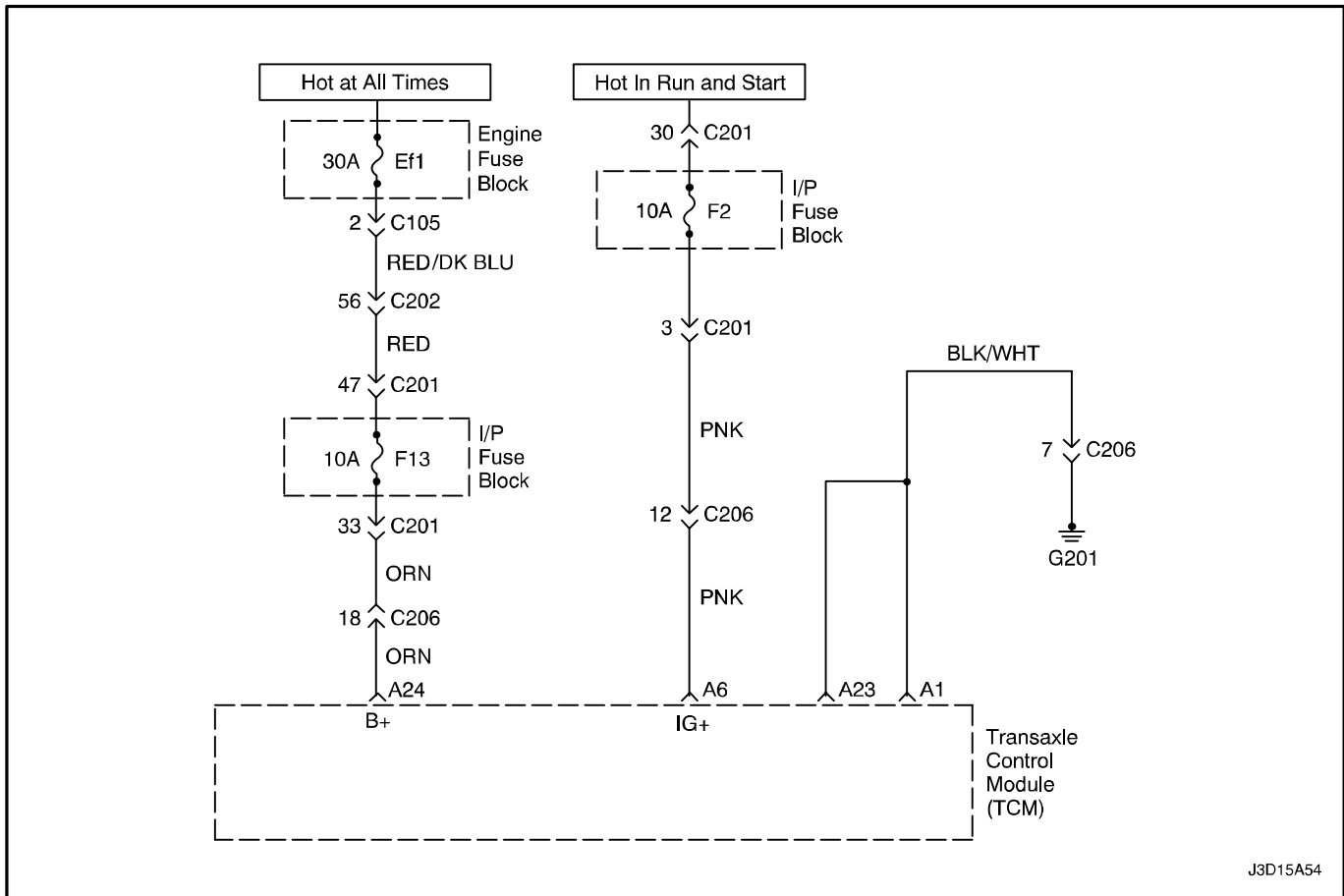
Cause of Failure

- TCM wiring harness and connectors
- Battery
- TCM

DTC P0562 System Voltage Low

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. Turn the ignition ON, with the engine OFF. 4. Run the engine to 600 rpm or greater. 5. Record then clear DTC(s). 6. Select system voltage on the scan tool. 7. Drive the vehicle and observe the scan tool for either of the flowing conditions: Is the voltage within the values shown?	9–16v	Go to <i>Step 4</i>	Go to <i>Step 2</i>
2	1. Disconnect the battery cable. 2. Measure the battery voltage. Is the voltage within the values shown?	9–16v	Go to <i>Step 4</i>	Go to <i>Step 3</i>
3	1. Replace the battery. Is the replacement completed?	–	System OK	–
4	1. Turn the headlamp ON. 2. Turn the air conditioner ON. 3. Run the engine to 600 rpm or greater. 4. Observe the scan tool for system voltage. Is the voltage within the values shown?	9–16v	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	1. Turn the ignition LOCK. 2. Repair the alternator circuit if necessary. Is the action completed?	–	System OK	–
6	Inspect the EF1,F2 fuse for an open. Was a problem found?	–	Go to <i>Step 7</i>	Go to <i>Step 8</i>
7	Inspect the EF1,F2 fuse for short. Replace the fuse if necessary. Is the replacement complete?	–	System OK	–
8	1. Turn the ignition ON. 2. Measure the voltage of EF1, F2. Is the voltage within the values shown?	9–16v	Go to <i>Step 10</i>	Go to <i>Step 9</i>
9	Repair the fuse voltage supply lines for open. Is the action completed?	–	System OK	–
10	1. Turn the ignition LOCK. 2. Disconnect the TCM wiring connector. 3. Measure the resistance between EF1 fuse and terminal A24 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	Repair the circuit (between EF1 and terminal A24) for short to ground and open. Is the repair completed?	–	System OK	–
12	1. Disconnect the C105 connector and TCM connector. 2. Turn the ignition ON. 3. Measure the voltage of the terminal A24. Is the voltage within the values shown?	9–16v	Go to <i>Step 13</i>	Go to <i>Step 14</i>
13	Repair the circuit from EF1 to terminal A24 of the TCM for short to battery. Is the repair completed?	–	System OK	–

Step	Action	Value(s)	Yes	No
14	1. Turn the ignition LOCK. 2. Disconnect the C201 connector. 3. Measure the resistance between F2 fuse and terminal A6 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to Step 17	Go to Step 15
15	Repair the circuit (between F2 and terminal A6) for short to ground and open. Is the repair completed?	–	System OK	–
16	1. Turn the ignition ON. 2. Measure the voltage of the terminal A6. Is the voltage within the values shown?	9–16v	Go to Step 17	Go to Step 18
17	Repair the circuit (between F2 and terminal A6) for short to battery. Is the repair completed?	–	System OK	–
18	1. Inspect the transaxle wiring for poor electrical connectors at the transaxle connector. 2. Look for possible bent, backed out, deformed, or damaged terminals. 3. Check for weak terminal tension. Was a condition found?	–	Verify repair and Go to Step 20	–
19	Replace the TCM. Is the replacement complete?	–	Go to Step 20	–
20	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified Exit DTC chart



DIAGNOSTIC TROUBLE CODE (DTC) P0563

SYSTEM VOLTAGE HIGH

Conditions for Setting the DTC

- System voltage is too high.
- TCM detects that voltage is greater than 18 volts for 0.5 seconds continuously.
- Engine revolution is 600 rpm or greater.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycle.

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

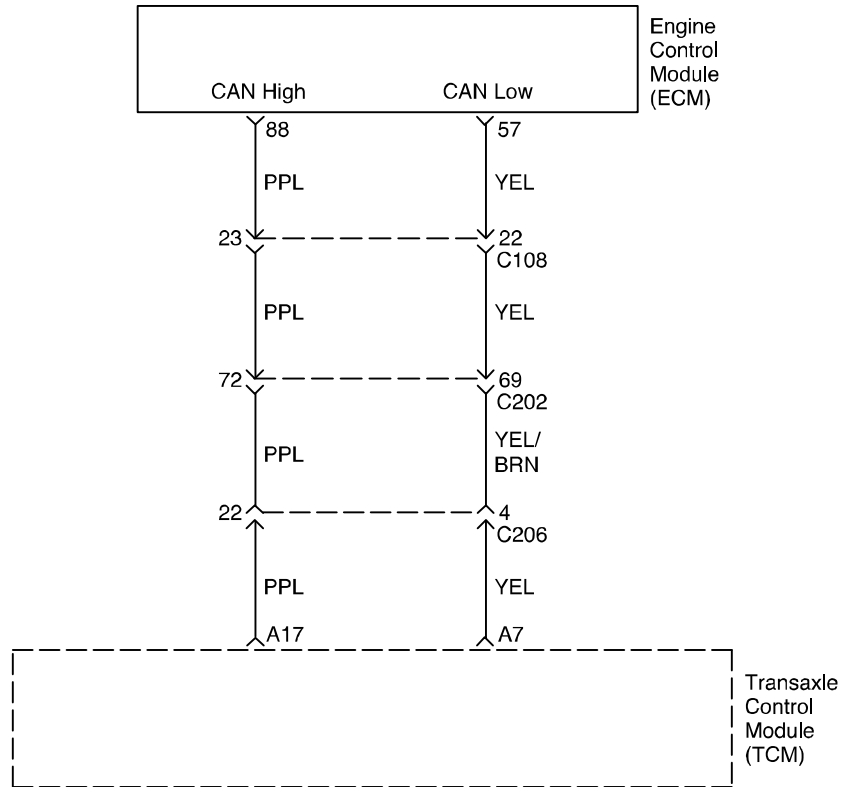
Cause of Failure

- TCM wiring harness and connectors
- Battery
- TCM

DTC P0563 System Voltage High

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. Turn the ignition ON, with the engine OFF. 4. Run the engine to 600 rpm or greater. 5. Record then clear DTC(s). 6. Select system voltage on the scan tool. 7. Drive the vehicle and observe the scan tool for either of the flowing conditions: Is the voltage within the values shown?	9–16v	Go to <i>Step 4</i>	Go to <i>Step 2</i>
2	1. Disconnect the battery cable. 2. Measure the battery voltage. Is the voltage within the values shown?	9–16v	Go to <i>Step 4</i>	Go to <i>Step 3</i>
3	1. Replace the battery. Is the replacement completed?	–	System OK	–
4	1. Turn the headlamp ON. 2. Turn the air conditioner ON. 3. Run the engine to 600 rpm or greater. 4. Observe the scan tool for system voltage. Is the voltage within the values shown?	9–16v	Go to <i>Step 6</i>	Go to <i>Step 5</i>
5	1. Turn the ignition LOCK. 2. Repair the alternator circuit if necessary. Is the action completed?	–	System OK	–
6	Inspect the EF1,F2 fuse for an open. Was a problem found?	–	Go to <i>Step 7</i>	Go to <i>Step 8</i>
7	Inspect the EF1,F2 fuse for short. Replace the fuse if necessary. Is the replacement complete?	–	System OK	–
8	1. Turn the ignition ON. 2. Measure the voltage of EF1,F2. Is the voltage within the values shown?	9–16v	Go to <i>Step 10</i>	Go to <i>Step 9</i>
9	Repair the fuse voltage supply lines for open. Is the action completed?	–	System OK	–
10	1. Turn the ignition LOCK. 2. Disconnect the TCM wiring connector. 3. Measure the resistance between EF1 fuse and terminal A24 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to <i>Step 12</i>	Go to <i>Step 11</i>
11	Repair the circuit (between EF1 and terminal A24) for short to ground and open. Is the repair completed?	–	System OK	–
12	1. Disconnect the C105 connector and TCM connector. 2. Turn the ignition ON. 3. Measure the voltage of the terminal A24. Is the voltage within the values shown?	9–16v	Go to <i>Step 13</i>	Go to <i>Step 14</i>
13	Repair the circuit from EF1 to terminal A24 of the TCM for short to battery. Is the repair completed?	–	System OK	–

Step	Action	Value(s)	Yes	No
14	1. Turn the ignition LOCK. 2. Disconnect the C201 connector. 3. Measure the resistance between F2 fuse and terminal A6 of the TCM wiring connector. Is the resistance within the values shown?	0Ω	Go to Step 17	Go to Step 15
15	Repair the circuit (between F2 and terminal A6) for short to ground and open. Is the repair completed?	–	System OK	–
16	1. Turn the ignition ON. 2. Measure the voltage of the terminal A6. Is the voltage within the values shown?	9–16v	Go to Step 17	Go to Step 18
17	Repair the circuit (between F2 and terminal A6) for short to battery. Is the repair completed?	–	System OK	–
18	1. Inspect the transaxle wiring for poor electrical connectors at the transaxle connector. 2. Look for possible bent, backed out, deformed, or damaged terminals. 3. Check for weak terminal tension. Was a condition found?	–	Verify repair and Go to Step 20	–
19	Replace the TCM. Is the replacement completed?	–	Go to Step 20	–
20	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified Exit DTC chart



J3B15A75

DIAGNOSTIC TROUBLE CODE (DTC) P0601

INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

Conditions for Setting the DTC

- The Transmission Control Module (TCM) detects a difference between the calculated checksum data and rear checksum data.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first consecutive ignition cycle.

Conditions for Clearing the DTC

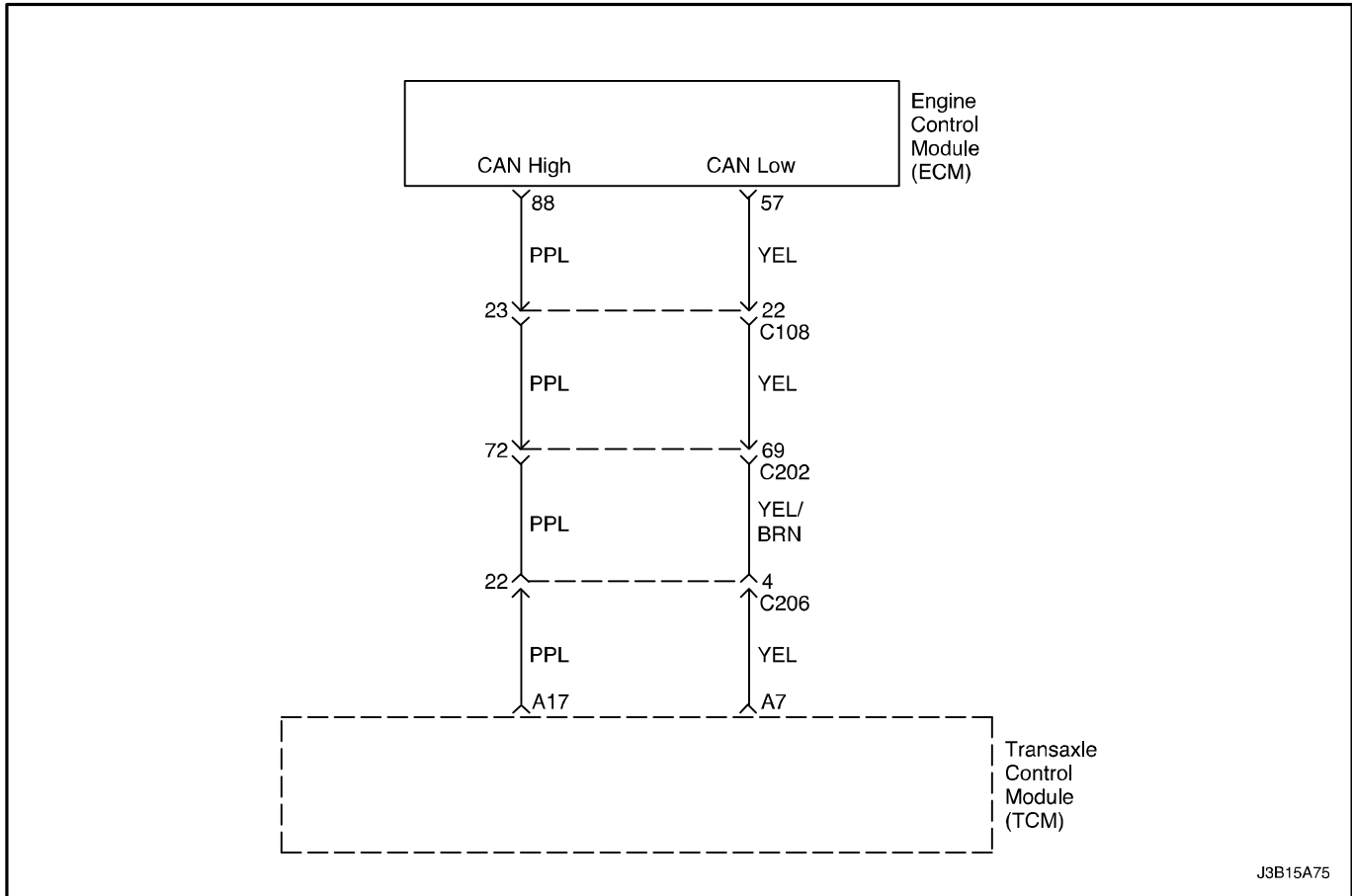
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Harness or connector between TCM and ECM
- ECM
- TCM

DTC P0601 Internal Control Module Memory Checksum Error

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Inspect Transmission Control Module (TCM) wiring harness and connector for signs of an intermittent condition. Repair as necessary.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0601 displayed?	–	Replace the Transmission Control Module (TCM)	Inspect Transmission Control Module (TCM) wiring harness and connector for signs of an intermittent condition. Repair as necessary.



DIAGNOSTIC TROUBLE CODE (DTC) P0604

INTERNAL TRANSMISSION CONTROL MODULE (TCM)

RANDOM ACCESS MEMORY (RAM) ERROR

Conditions for Setting the DTC

- The Transmission Control Module (TCM) cannot carry out the four RAM initialization routines.
- TCM detects that the RAM cannot be written and read correctly.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycle.

Conditions for Clearing the DTC

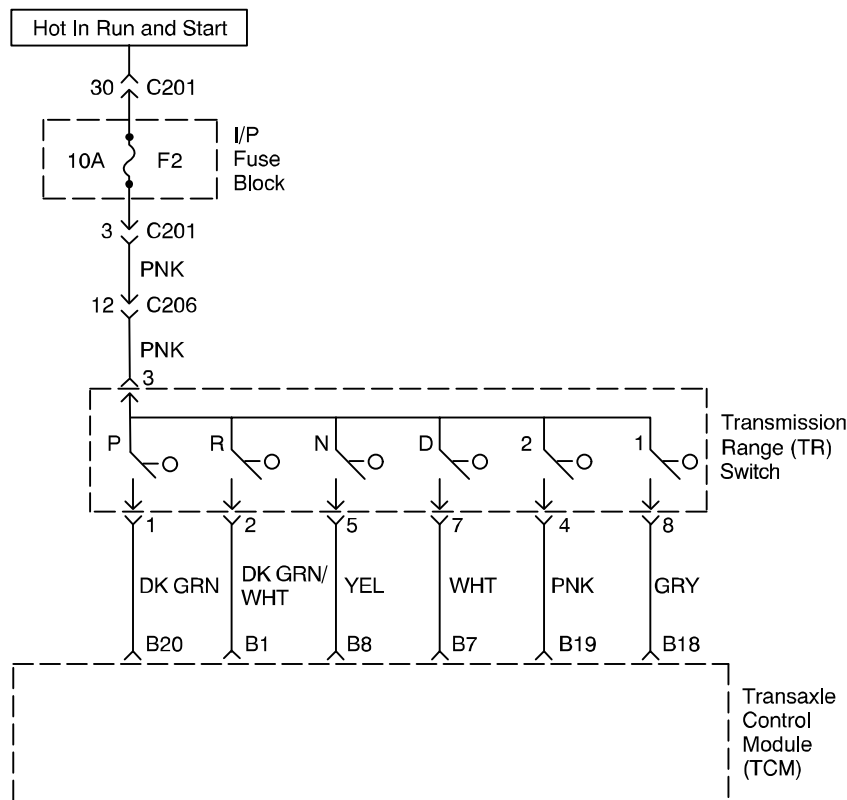
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Harness or connector between TCM and ECM
- ECM
- TCM

**DTC P0604 Internal Transmission Control Module (TCM) Random
Access Memory (RAM) Error**

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Inspect Transmission Control Module (TCM) wiring harness and connector for signs of an intermittent condition. Repair as necessary.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0604 displayed?	–	Replace the Transmission Control module (TCM)	Inspect Transmission Control Module (TCM) wiring harness and connector for signs of an intermittent condition. Repair as necessary.



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DIAGNOSTIC TROUBLE CODE (DTC) P0705

TRANSMISSION RANGE (TR) SWITCH CIRCUIT MALFUNCTION

Conditions for Setting the DTC

- TCM detects more than two equal signals from the Park/Neutral Position switch circuit for 10 seconds continuously.
- TCM detects the no signal of TR switch circuit for 2 seconds continuously.
- Vehicle speed is 30 km/h (19 mph) or greater.
- Engine revolution is 1500 rpm or greater.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycle.
- TCM judges with the priority. (D>2>1>R>N>P)
- No timing solenoid control for N-D
- No self-learning control
- No lockup

- No prevent reverse gear control

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects single "D range" signal of the TR switch.

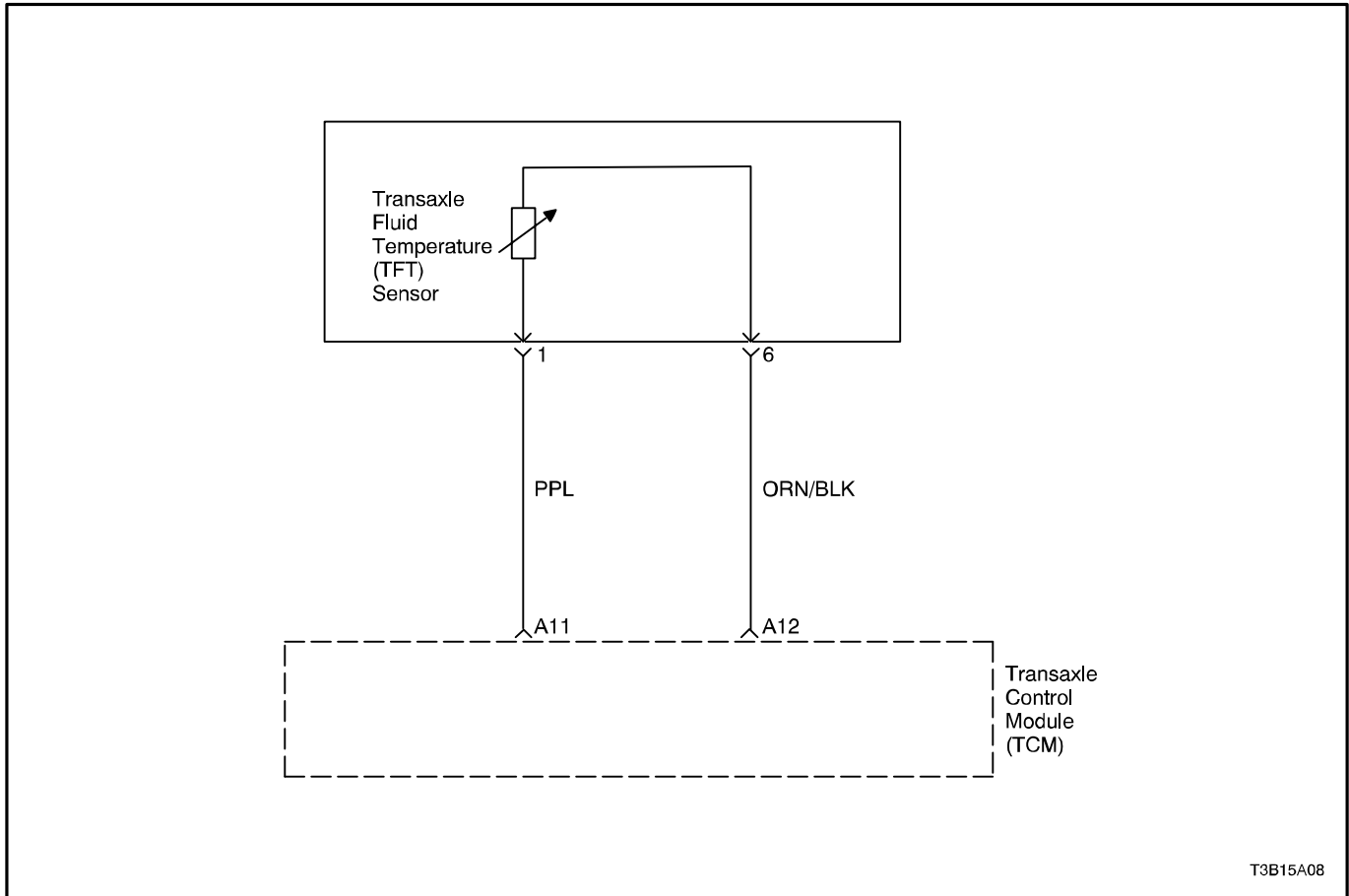
Cause of Failure

- Wiring harness or connector between TR switch and TCM
- TR switch
- TCM

DTC P0705 Transmission Range (TR) Switch Circuit Malfunction

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0705 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the continuity between the vehicle harness and the Transmission Range (TR) Switch. 3. Disconnect the TCM connector (X–1) of the vehicle harness and inspect the continuity for the each terminal according to the position of the select lever. P : B20 R : B1 N : B8 D : B7 2 : B19 1 : B18 Does the inspection OK?	–	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the TCM connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and TR switch. 2. Disconnect the connector (X–2) of the vehicle harness and inspect the continuity between the terminals. Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition of TR switch OK?	–	Go to <i>Step 7</i>	Replace the TR switch.

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section).	Replace the TCM.
7	1. Estimate the failure of the vehicle harness. 2. Inspect continuity and short circuit for the vehicle harness and inspect the connection condition between connectors (C-2). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors.



DIAGNOSTIC TROUBLE CODE (DTC) P0712

TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR CIRCUIT LOW INPUT

Conditions for Setting the DTC

- TCM detects that A/D value of Transmission Fluid Temperature sensor (TFT) signal is less than 10 for 5 minutes continuously after 1 time of this detection. (A/D VALUE 10: 24mV)

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- TCM judges the temperature of the transmission fluid is 200°C (392°F).
- No lockup control
- No 4th gear
- No self-learning control
- No timing solenoid control N-D

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the temperature of the transmission fluid is between 0°C (32°F) and 150°C (302°F) for 10 seconds continuously.

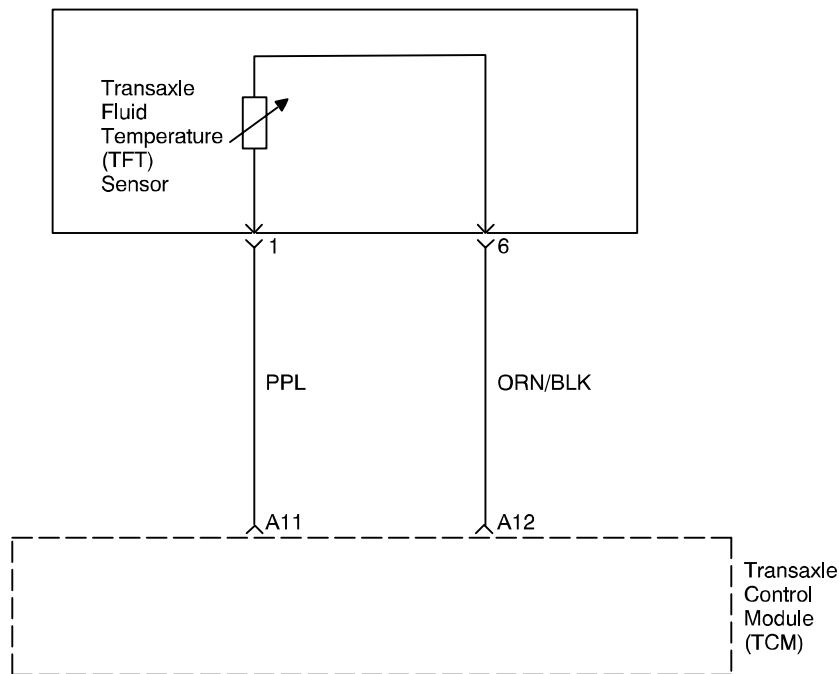
Cause of Failure

- Wiring harness or connector between Transmission Fluid Temperature (TFT) sensor and TCM
- TFT sensor
- TCM

DTC P0712 Transmission Fluid Temperature (TFT) Sensor Circuit Low Input

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0712 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Transmission Fluid Temperature (TFT) sensor. Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A11 and A12. Is the measurement within the specified value?	10°C (50°F): 5.80–7.09 kΩ 110°C (230°F): 0.231–0.263 kΩ	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and TFT sensor. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between TFT sensor connector terminal 1 and 6. Is the measurement within the specified value?	10°C (50°F): 5.80–7.09 kΩ 110°C (230°F): 0.231–0.263 kΩ	Go to <i>Step 7</i>	Go to <i>Step 8</i>

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section).	Replace the TCM.
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C–3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of TFT sensor. 2. Inspect fluid temperature. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace TFT sensor	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C–3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



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DIAGNOSTIC TROUBLE CODE (DTC) P0713

TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR CIRCUIT HIGH INPUT

Conditions for Setting the DTC

- TCM detects that A/D value of Transmission Fluid Temperature sensor (TFT) signal is less than 15 and the minimum A/D value is more than 943, when it is past 15 minutes after ignition ON. (A/D value 943 : 4.7 v)
- After 1 time of above detection.
- Gear selector position is except P and N.
- Engine revolution is 400 rpm or greater.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- TCM judges the temperature of the transmission fluid is 200°C (392°F).
- No lockup control
- No 4th gear
- No self-learning control

- No timing solenoid control N-D

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the temperature of the transmission fluid is between 0°C (32°F) and 150°C (302°F) for 10 seconds continuously.

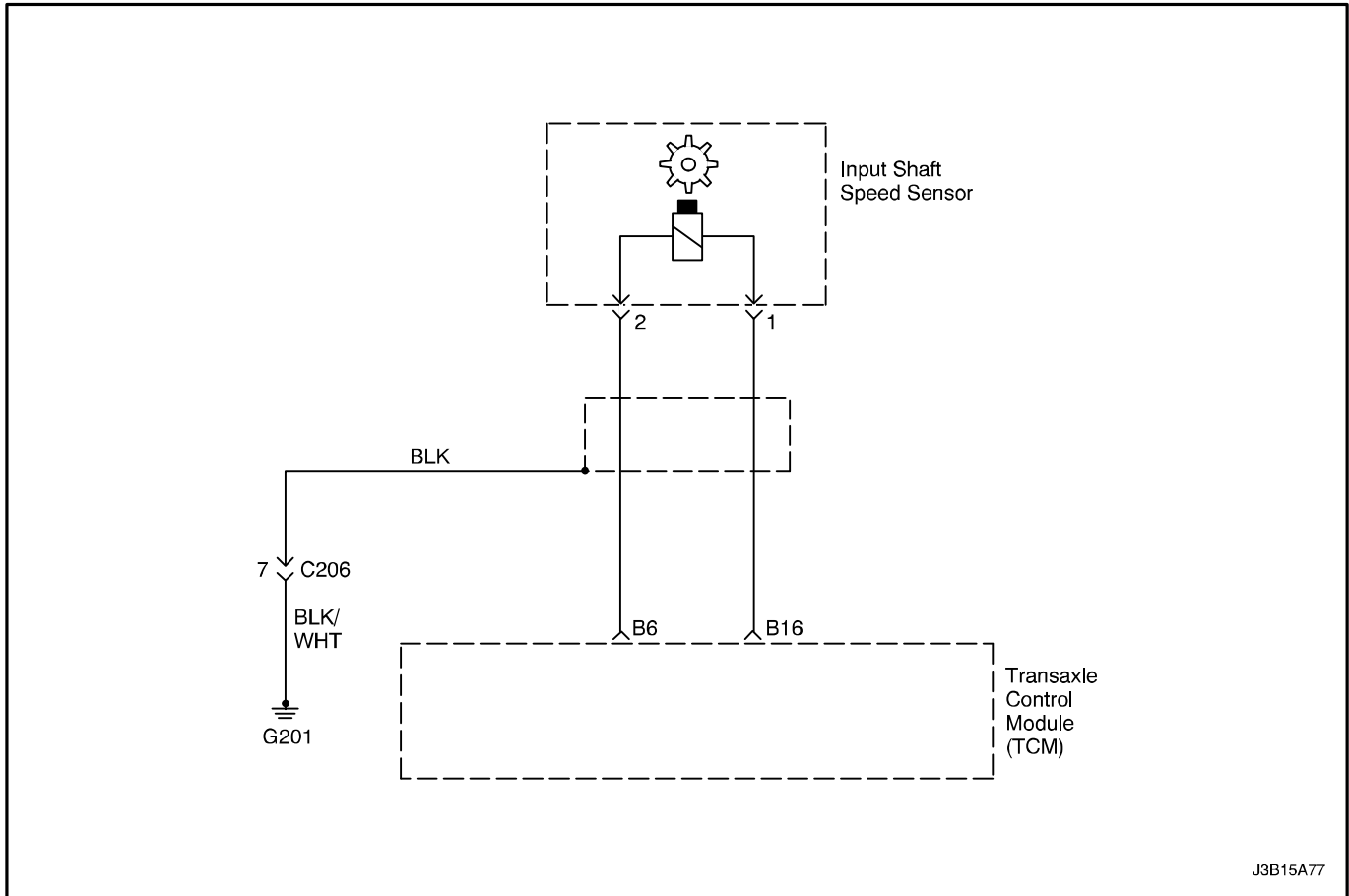
Cause of Failure

- Wiring harness or connector between Transmission Fluid Temperature (TFT) sensor and TCM
- TFT sensor
- TCM

DTC P0713 Transmission Fluid Temperature (TFT) Sensor Circuit High Input

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0713 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Transmission Fluid Temperature (TFT) sensor. Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A11 and A12. Is the measurement within the specified value?	10°C (50°F): 5.80–7.09 kΩ 110°C (230°F): 0.231–0.263 kΩ	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and TFT sensor. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between TFT sensor connector terminal 1 and 6. Is the measurement within the specified value?	10°C (50°F): 5.80–7.09 kΩ 110°C (230°F): 0.231–0.263 kΩ	Go to <i>Step 7</i>	Go to <i>Step 8</i>

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section).	Replace the TCM.
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C–3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of TFT sensor. 2. Inspect fluid temperature. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace TFT sensor	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C–3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P0717

INPUT SHAFT SPEED (ISS) SENSOR CIRCUIT NO SIGNAL

Conditions for Setting the DTC

- This DTC detects no signal of Input Shaft Speed (ISS) sensor circuit for a long period of time. (Revolution : 0 rpm ~ 10000 rpm).
- TCM detects no pulse of ISS sensor while TCM detects 4 pulses of Output Speed Sensor. This detection 1000 times continuously.
- D,2,L range selected
- Engine revolution is 400 rpm or greater.
- DTCs P0751, P0753, P0756, P0758, and P0705 are not set.
- Output revolution is 775 rpm or greater.
- 25 seconds later after Neutral to Drive shift.
- 10 seconds later after changing the gear.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- No lockup control
- No engine torque reduction control

- No engagement pressure control
- No 4th gear
- No self-learning control
- No timing solenoid control N-D

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects 250 pulses of ISS while failure detection is not achieved.

Cause of Failure

- Wiring harness or connector between Input Shaft Speed (ISS) sensor and TCM
- ISS sensor
- TCM

DTC P0717 Input Shaft Speed (ISS) Sensor Circuit No Signal

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0717 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Input Shaft Speed (ISS) sensor. Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal B6 and B16. Is the measurement within the specified value?	20°C (68°F): 560–680 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of T/M wire or between the connectors of ISS sensor. 2. Disconnect the ISS sensor connector (X–5) and inspect the resistance between terminals 1 and 2. Is the measurement within the specified value?	20°C (68°F): 560–680Ω	Go to <i>Step 7</i>	Replace the ISS sensor

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)	Replace the TCM.
7	1. Estimate the failure of T/M wire. 2. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C–5). Refer to "Wiring Harness and Connector" in this section Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors

DTC P0722 Output Shaft Speed (OSS) sensor Circuit No Signal

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0722 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the voltage between vehicle harness and the Output Shaft Speed (OSS) sensor. 3. Disconnect the connector (X–1) of the vehicle harness. 4. Connect the voltmeter to monitor the voltage between terminal B25 and ground. 5. Turn ignition ON and lift up the vehicle. 6. Check the voltage change from approximately 0 v to 12 v when the wheel is turned slowly. Does the measurement change within the specified value?	0–12 v	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of T/M wire or between the connectors of OSS sensor. 2. Inspect the OSS sensor. Refer to "Unit Inspection" in this section Is the condition of OSS sensor OK?	–	Go to <i>Step 7</i>	Replace the OSS sensor

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)	Replace the TCM.
7	1. Estimate the failure of T/M wire. 2. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C-4). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors

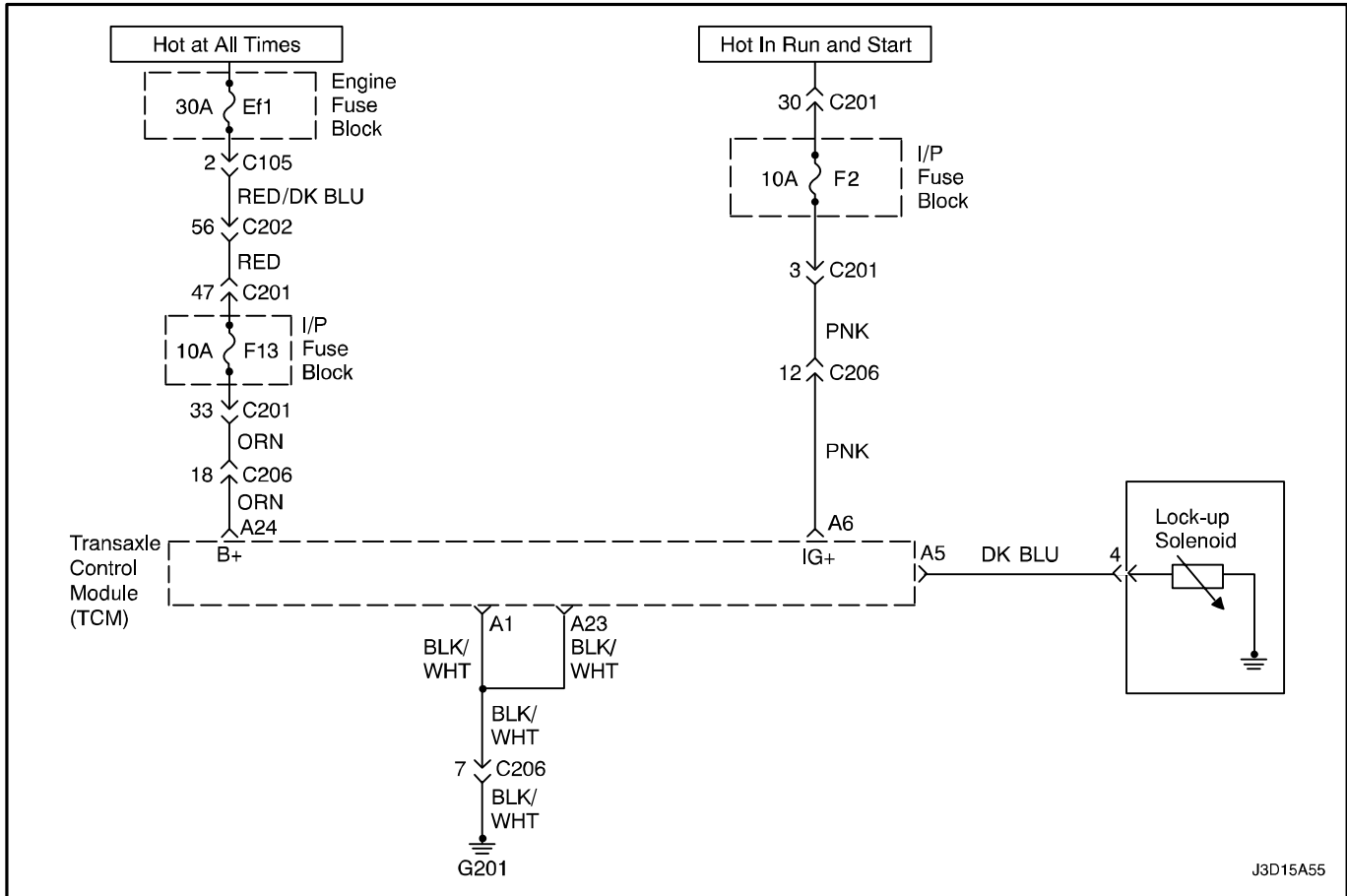
- ### Cause of Failure

DTC P0727 Engine Speed Input Circuit No Signal

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0727 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector.
3	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector and ECM wiring connector. 3. Measure the resistance between terminal A17 of the TCM wiring connector and terminal 88 of the ECM wiring connector. 4. Measure the resistance between terminal A7 of the TCM wiring connector and terminal 57 of the ECM wiring connector. Is the resistance within the values shown?	0 Ω	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
5	1. Turn the ignition ON. 2. Measure the voltage of terminal A17. 3. Measure the voltage of terminal A7. Is the voltage within the values shown?	11–14 v	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
7	1. Inspect the "Engine Speed". Refer to <i>Section 1F, Diagnosis</i> . Was a problem found?	–	Refer to <i>Section 1F, Diagnosis</i> .	Go to <i>Step 8</i>
8	1. Replace the TCM. 2. Turn the ignition OFF. 3. Turn the ignition ON. 4. Check if P0727 DTC is set. Is the DTC set?	–	Go to <i>Step 9</i>	Go to <i>Step 10</i>

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Step	Action	Value(s)	Yes	No
9	Replace the ECM. Is the action complete?	–	Go to <i>Step 10</i>	–
10	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart



DIAGNOSTIC TROUBLE CODE (DTC) P0741

TORQUE CONVERTER CLUTCH (TCC) CIRCUIT STUCK OFF

Conditions for Setting the DTC

- Lockup solenoid is stuck OFF.
- D range selected
- Engine water normal temperature
- 20 seconds have passed since the transaxle was placed in D.
- Engine revolution is 600 rpm or greater.
- No failure of input speed sensor / engine revolution / water temperature signal / solenoid electrical / ranger sensor / throttle signal

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycles.

Conditions for Clearing the DTC

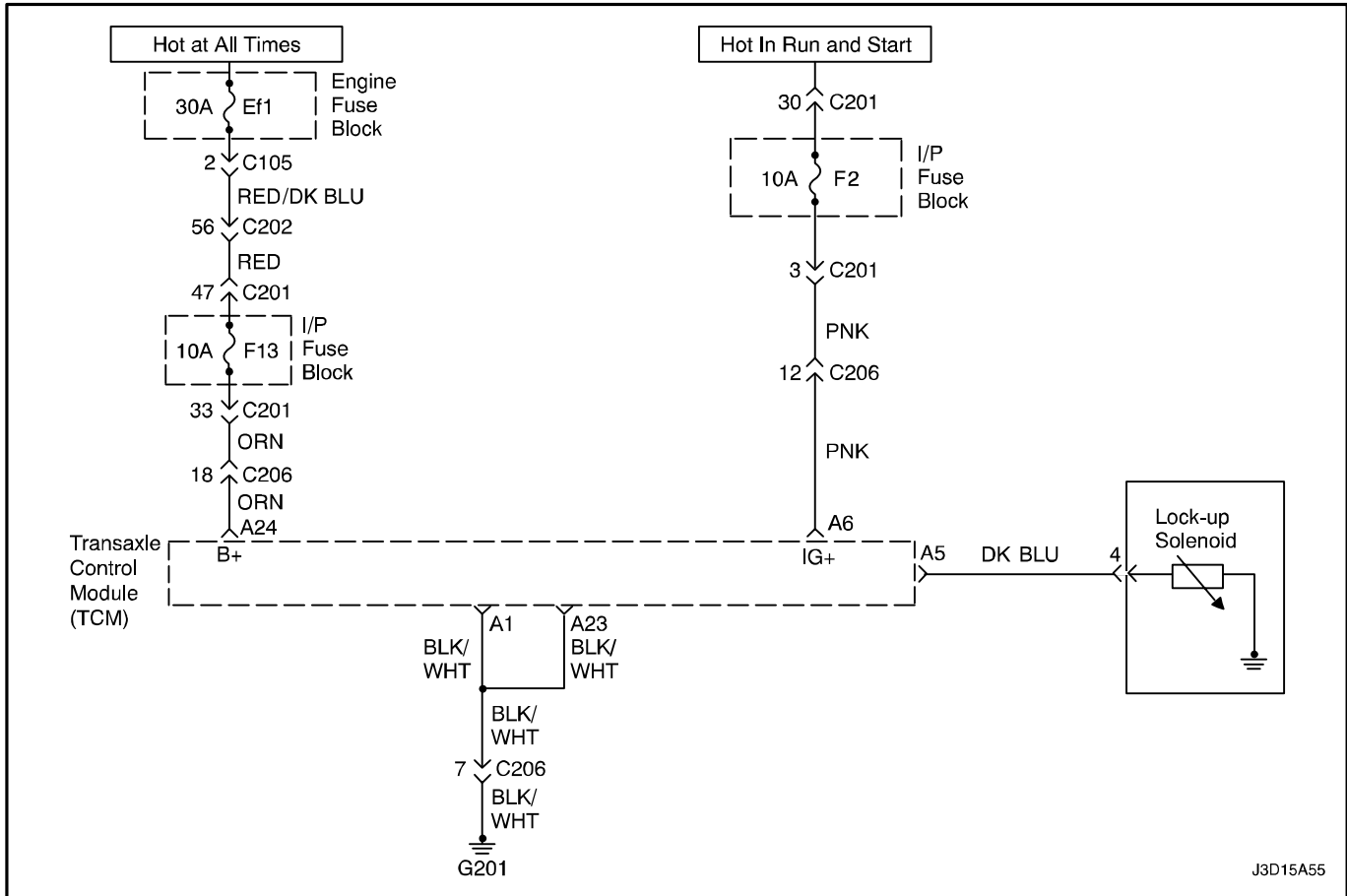
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Lockup solenoid
- Inside A/T
- Inside valve body
- TCM

DTC P0741 Torque Converter Clutch (TCC) Circuit Stuck Off

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0741 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Replace the master TCM and perform simulation test again under user condition. Is DTC P0741 reappeared?	–	Go to <i>Step 4</i>	Replace the TCM
4	1. Estimate the failure of lockup solenoid, lockup clutch or internal valve body. 2. Inspect the lockup solenoid. Refer to "Unit Inspection" in this section. Is the condition of lockup solenoid OK?	–	Go to <i>Step 5</i>	Replace lockup solenoid
5	1. Estimate the failure of lockup clutch or internal valve body. Is problem found?	–	Replace the valve body assembly	System OK



DIAGNOSTIC TROUBLE CODE (DTC) P0742

TORQUE CONVERTER CLUTCH (TCC) CIRCUIT STUCK ON

Conditions for Setting the DTC

- Lockup solenoid is stuck ON.
- D range selected
- Engine water normal temperature
- 20 seconds have passed since the transaxle was placed in D.
- Engine revolution is 600 rpm or greater.
- No failure of input speed sensor / engine revolution / water temperature signal / solenoid electrical / ranger sensor / throttle signal

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycles.

Conditions for Clearing the DTC

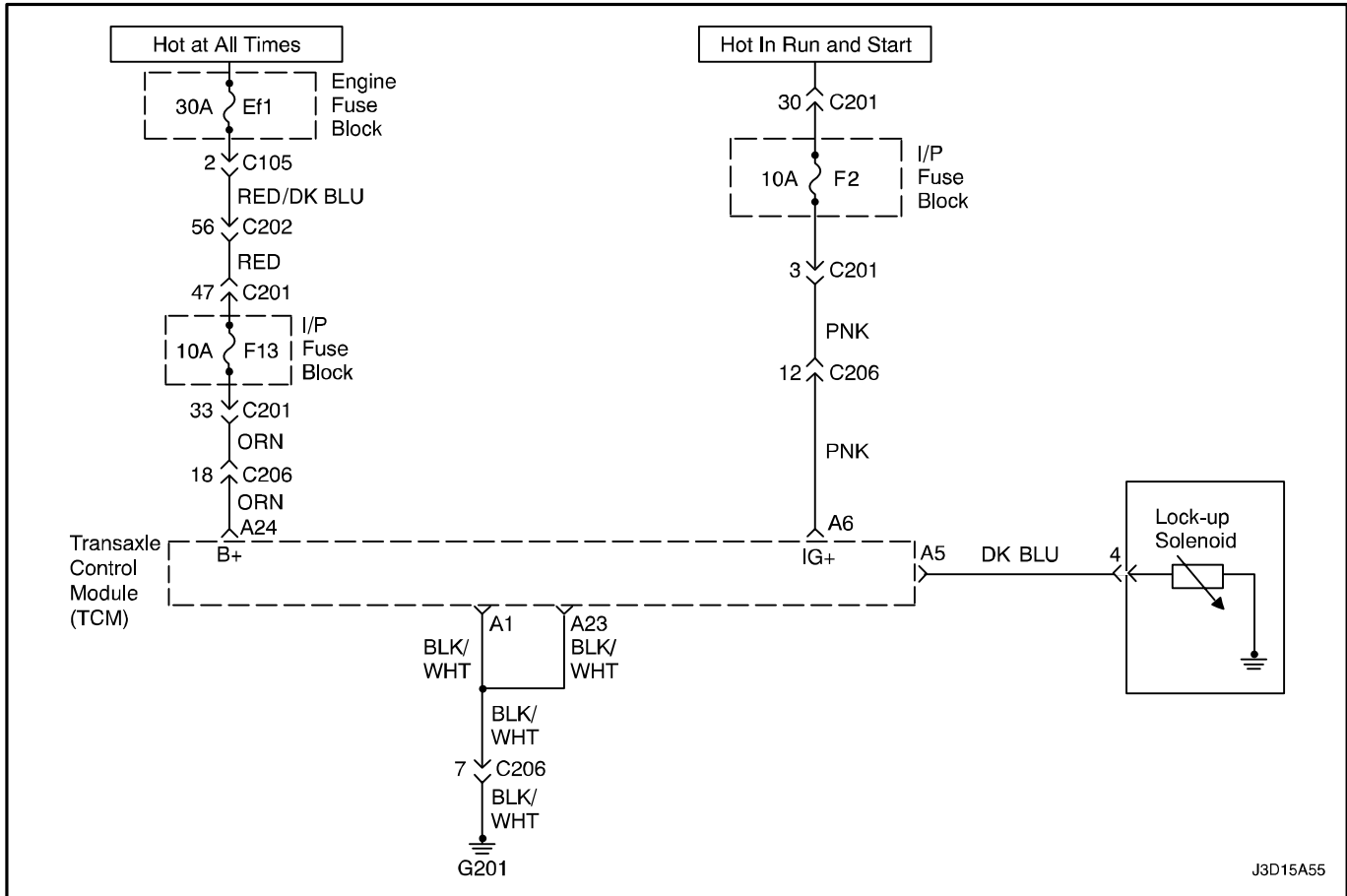
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Lockup solenoid
- Inside A/T
- Inside valve body
- TCM

DTC P0742 Torque Converter Clutch (TCC) Circuit Stuck On

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0742 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
3	1. Turn the ignition OFF. 2. Replace the master TCM and perform simulation test again under user condition. Is DTC P0742 reappeared?	–	Go to <i>Step 4</i>	Replace the TCM
4	1. Estimate the failure of lockup solenoid, lockup clutch or internal valve body. 2. Inspect the lockup solenoid. Refer to "Unit Inspection" in this section. Is the condition of lockup solenoid OK?	–	Go to <i>Step 5</i>	Replace lockup solenoid
5	1. Estimate the failure of lockup clutch or internal valve body. Is problem found?	–	Replace the valve body assembly	System OK



DIAGNOSTIC TROUBLE CODE (DTC) P0743

TORQUE CONVERTER CLUTCH (TCC) ELECTRICAL

Conditions for Setting the DTC

- TCM detects that the ON signal of the lockup solenoid monitor during 0.5 seconds when lockup solenoid driver outputs the OFF signal.(When the TCC circuit is open or short to battery).
- The above detection 2 times at shifting continuously.(When the Tcc circuit is open or short to battery).
- TCM detects that the OFF signal of the lockup solenoid monitor during 0.3 seconds when lockup solenoid driver outputs the ON signal.(When the TCC circuit is short to ground).
- The above detection 1 time at shifting continuously.(When the TCC circuit is short to ground).

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycles.
- No TCC lockup solenoid
- 1st gear fixed under the 10km/h

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the ON signal of the lockup solenoid monitor during 160 ms when lockup solenoid driver outputs the ON signal and TCM detects the OFF signal of the lockup solenoid monitor during 160 ms when lockup solenoid driver outputs the OFF signal.

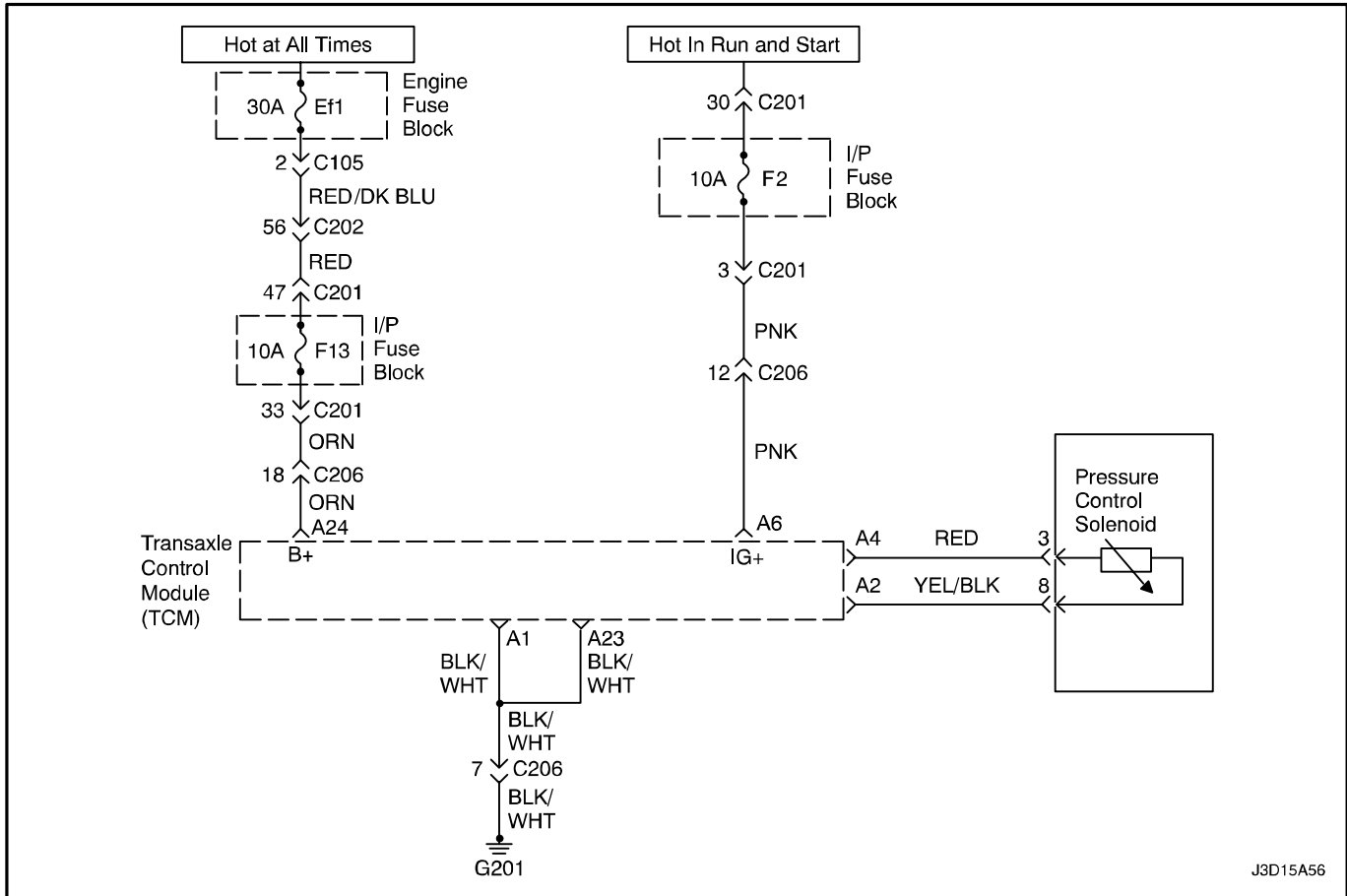
Cause of Failure

- Wiring harness or connector between lockup solenoid and TCM
- Lockup solenoid
- TCM

DTC P0743 Torque Converter Clutch (TCC) Electrical

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0743 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and lock-up solenoid. Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X-1) and inspect the resistance between the terminal A5 and A23. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C-1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and lockup solenoid. 2. Disconnect the connector (X-3) of T/M wire and inspect the resistance between lock-up solenoid connector terminal 4 and ground. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 7</i>	Go to <i>Step 8</i>
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)	Replace the TCM

Step	Action	Value(s)	Yes	No
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C-3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of lockup solenoid. 2. Inspect the lockup solenoid. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace the lockup solenoid	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C-6). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P0748

PRESSURE CONTROL SOLENOID (PCS) ELECTRICAL

Conditions for Setting the DTC

- TCM detects that the feed back voltage is greater than 4.9 volts and detects the detection 500 milliseconds continuously.(When the PCS circuit is short to battery).
- TCM detects that the feed back voltage is less than 70.mV for 70 milliseconds and detects the 12.5 seconds continuously.(When the PCS circuit is short to ground or open).

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- No lockup control
- No engine torque reduction control
- No engagement pressure control
- No 4th gear

- No self-learning control
- After failure decision : emergency mode

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the feed back voltage is between 70mV and 4.9 v for 12.5 seconds continuously.

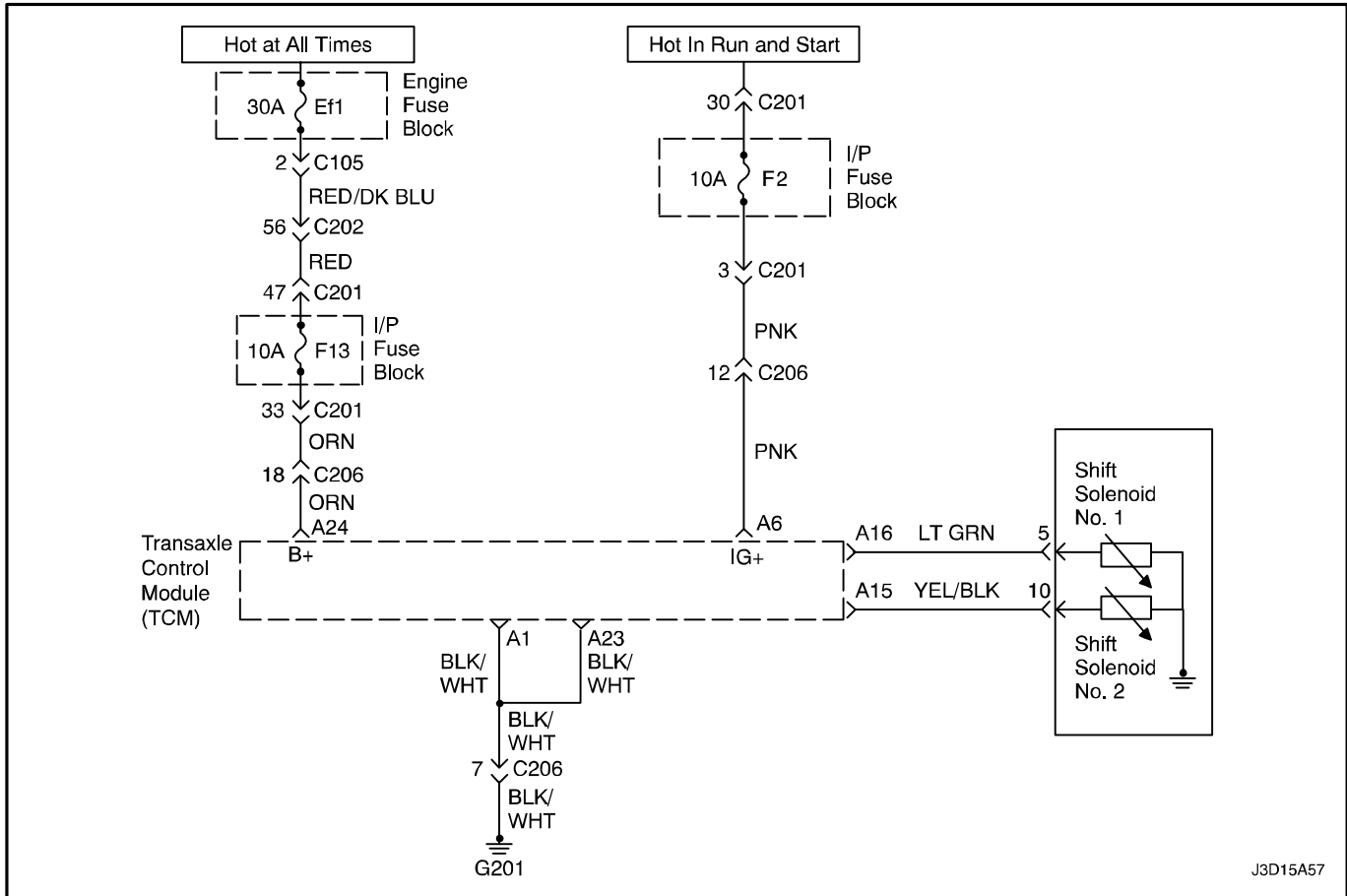
Cause of Failure

- Wiring harness or connector between Pressure Control Solenoid (PCS) and TCM
- PCS
- TCM

DTC P0748 Pressure Control Solenoid (PCS) Electrical

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0748 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Pressure Control Solenoid (PCS). Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A4 and A2. Is the measurement within the specified value?	20°C (68°F) 5.0–5.6 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and PCS. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between PCS connector terminal 3 and 8. Is the measurement within the specified value?	20°C (68°F) 5.0–5.6 Ω	Go to <i>Step 7</i>	Go to <i>Step 8</i>
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)	Replace the TCM

Step	Action	Value(s)	Yes	No
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C-3). Refer to "Wiring Harness and Connector" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of PCS. 2. Inspect the PCS. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace the valve body assembly.(No replacement PCS by itself)	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C-6). Refer to "Wiring Harness and Connector" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P0751

SHIFT SOLENOID 1 (SS1) STUCK OFF

Conditions for Setting the DTC

- Shift Solenoid 1 (SS1) is stuck ON/OFF.
- D range selected
- Engine water normal temperature
- 20 seconds have passed since the transaxle was placed in D.
- Engine revolution is 600 rpm or greater.
- No failure of output speed sensor / input speed sensor / engine revolution / water temperature signal / solenoid electrical / ranger sensor / throttle signal

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycles.

Conditions for Clearing the DTC

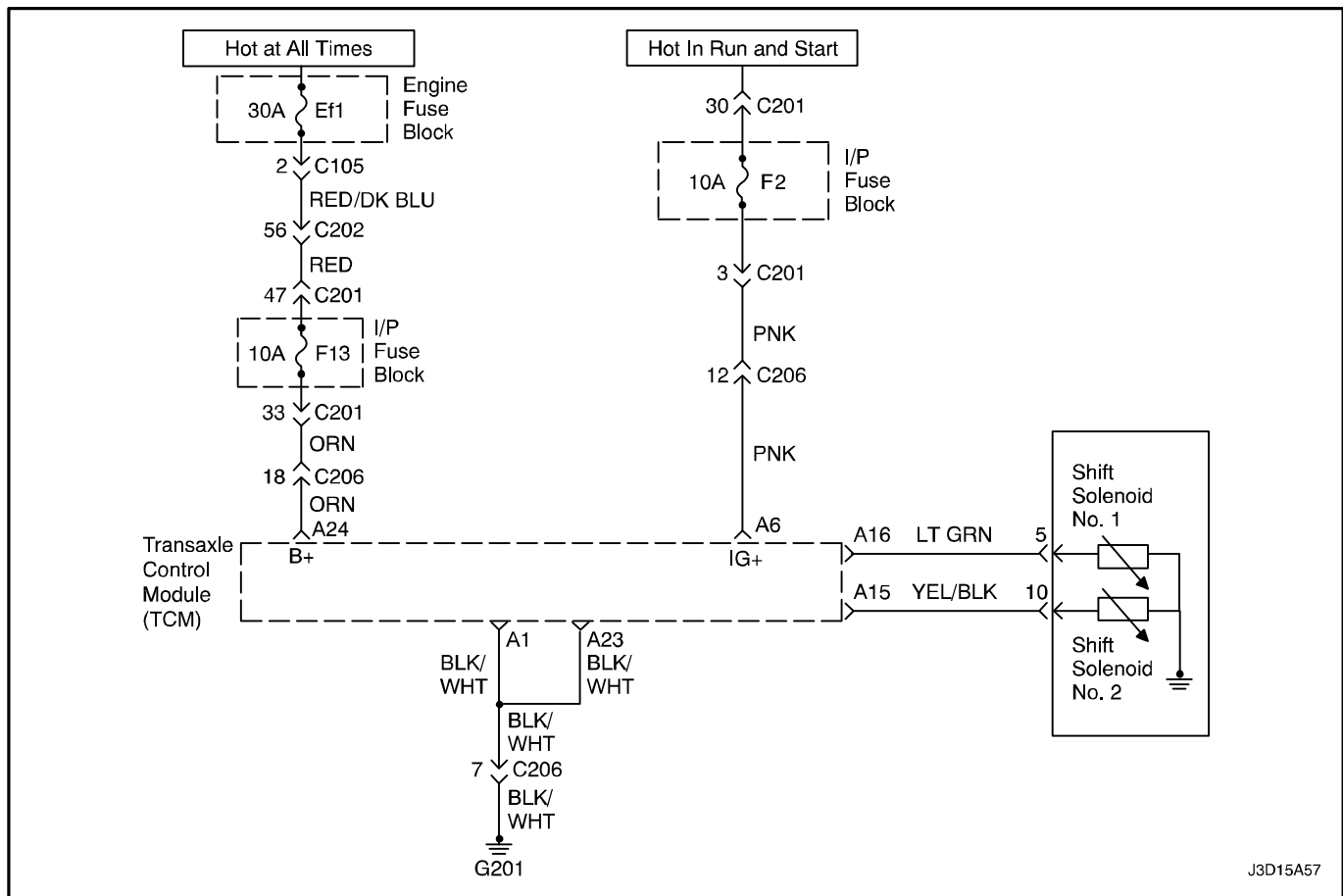
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Shift Solenoid 1 (SS1)
- Inside Valve Body
- TCM

DTC P0751 Shift Solenoid 1 (SS1) Stuck Off

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0751 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector" in this section.)
3	1. Turn the ignition OFF. 2. Replace the master TCM and perform simulation test again under user condition. Is DTC P0751 reappeared?	–	Go to <i>Step 4</i>	Replace the TCM.
4	1. Estimate the failure of Shift Solenoid 1 or internal valve body. 2. Inspect the SS1. Refer to "Unit Inspection" in this section. Is the condition of SS1 OK?	–	Replace the valve body assembly.	Replace Shift Solenoid 1 (SS1).



DIAGNOSTIC TROUBLE CODE (DTC) P0753

SHIFT SOLENOID 1 (SS1) ELECTRICAL

Conditions for Setting the DTC

- TCM detects that the ON signal of the Shift Solenoid 1 (SS1) monitor during 0.5 seconds when SS1 driver outputs the OFF signal. (When the SS1 circuit is open or short to battery).
- TCM detects that the OFF signal of the Shift Solenoid 1 (SS1) monitor during 0.3 seconds when SS1 driver outputs the ON signal. (When the SS1 circuit is short to ground).
- The above detection 2 times at shifting continuously.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- No lockup control
- No engine torque reduction control
- No engagement pressure control
- No timing solenoid control for N-D
- No self-learning control
- After failure decision : emergency mode

TCM Shifting Pattern (Range : D)

Normal			SS1 FAIL		
Gear	SS1	SS2	Gear	SS1	SS2
1 st	ON	ON	3 rd	FAIL	OFF
2 nd	ON	OFF	3 rd	FAIL	OFF
3 rd	OFF	OFF	3 rd	FAIL	OFF
4 th	OFF	ON	4 th	FAIL	ON

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the ON signal of the SS1 monitor during 160 ms when SS1 driver outputs the ON signal and TCM detects the OFF signal of the SS1 monitor during 160 ms when SS1 driver outputs the OFF signal.

Cause of Failure

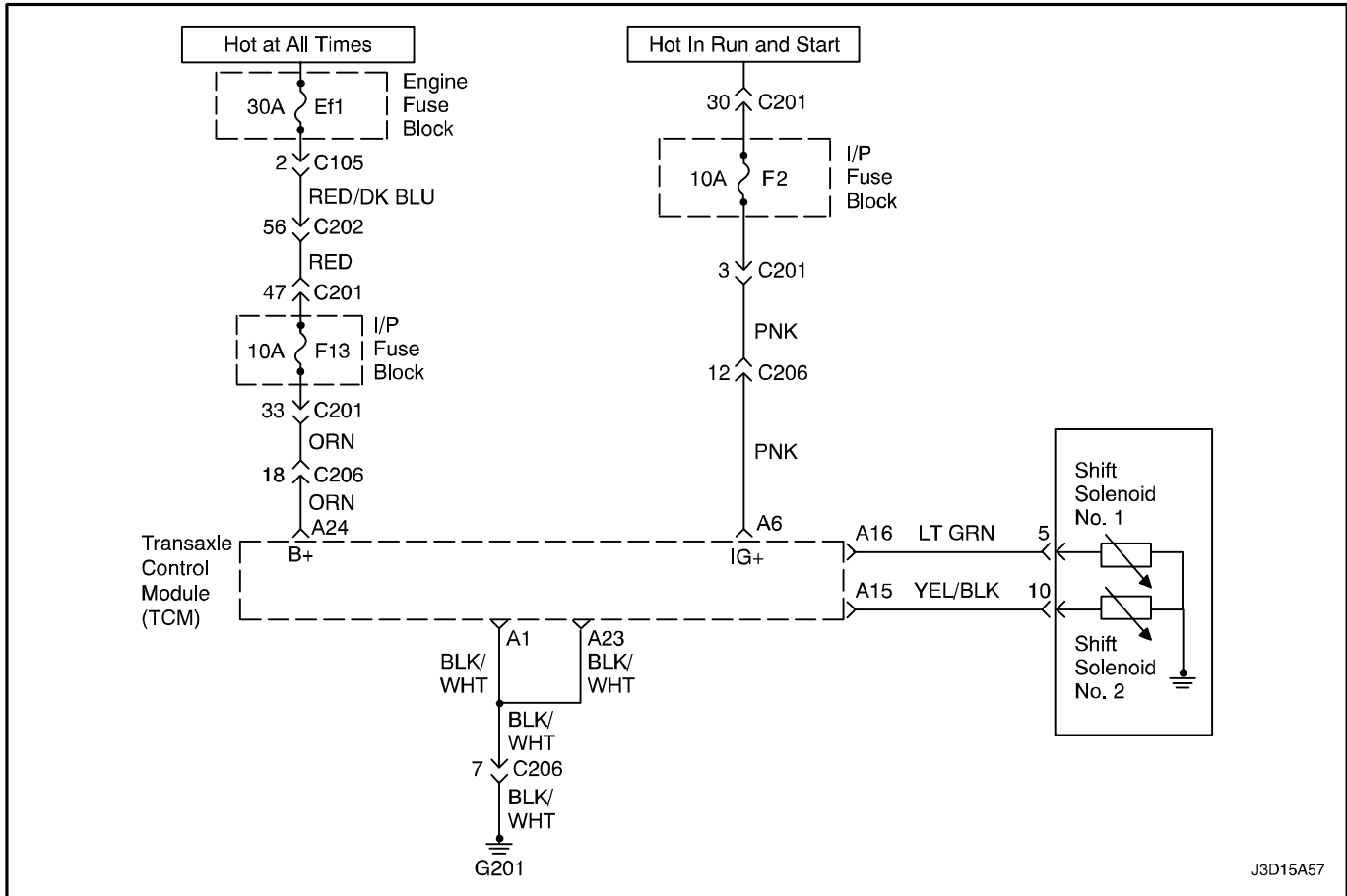
- Wiring harness or connector between Shift Solenoid 1 (SS1) and TCM

- SS1
- TCM

DTC P0753 Shift Solenoid 1 (SS1) Electrical

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0753 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Shift Solenoid 1 (SS1). Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A16 and A23. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and SS1. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between SS1 connector terminal 5 and ground. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 7</i>	Go to <i>Step 8</i>

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)	Replace the TCM
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C–3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of SS1. 2. Inspect the SS1. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace the SS1 solenoid	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. 3. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C–6). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P0756

SHIFT SOLENOID 2 (SS2) STUCK OFF

Conditions for Setting the DTC

- Shift Solenoid 2 (SS2) is stuck ON/OFF.
- D range selected
- Engine water normal temperature
- 20 seconds have passed since the transaxle was placed in D.
- Engine revolution is 600 rpm or greater.
- No failure of output speed sensor / input speed sensor / engine revolution / water temperature signal / solenoid electrical / ranger sensor / throttle signal

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects failures on two consecutive ignition cycles.

Conditions for Clearing the DTC

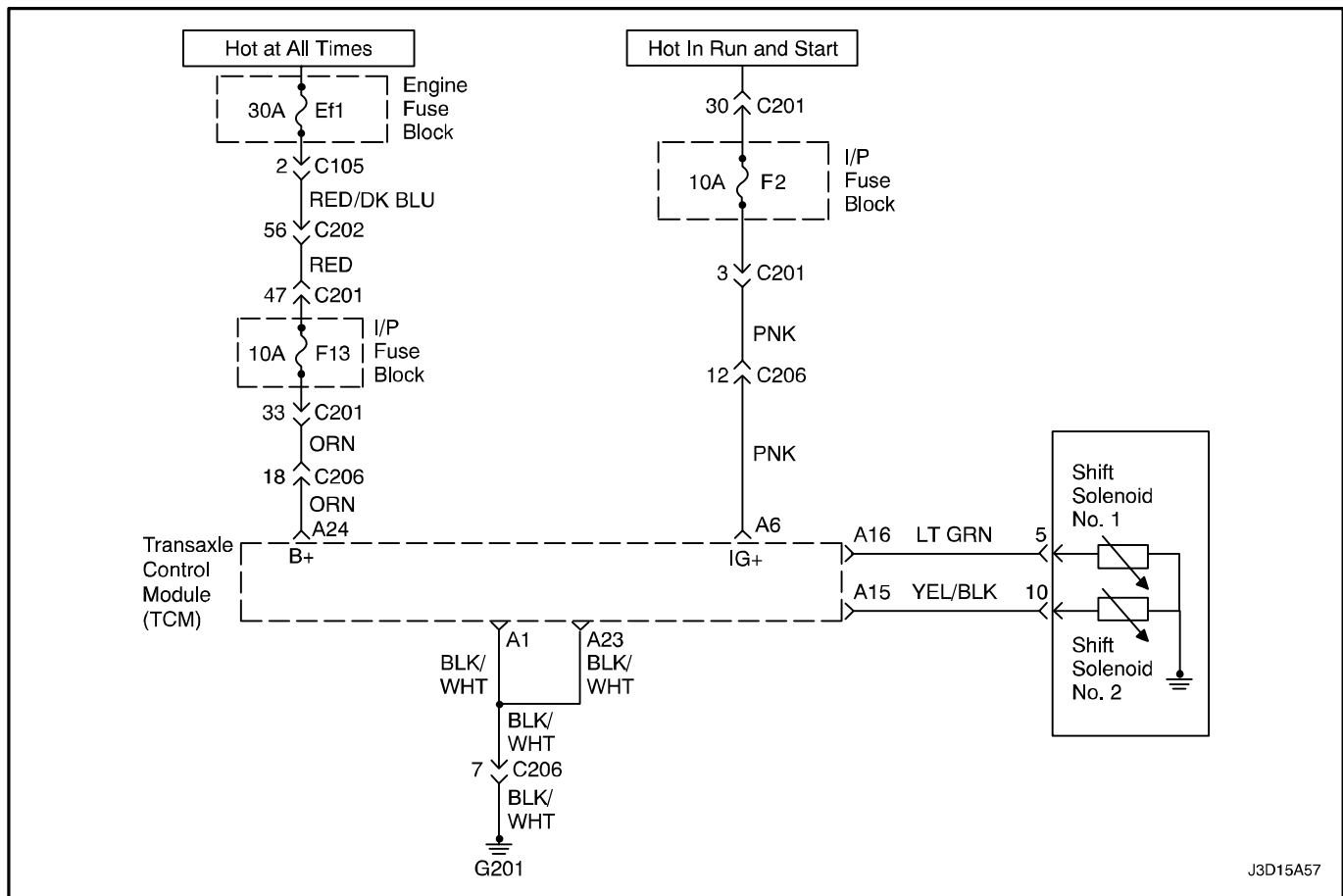
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Shift Solenoid 2 (SS2)
- Inside Valve Body
- TCM

DTC P0756 Shift Solenoid 2 (SS2) Stuck Off

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform two vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0756 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Replace the master TCM and perform simulation test again under user condition. Is DTC P0756 reappeared?	–	Go to <i>Step 4</i>	Replace the TCM.
4	1. Estimate the failure of Shift Solenoid 2 or internal valve body. 2. Inspect the SS2. Refer to "Unit Inspection" in this section. Is the condition of SS2 OK?	–	Replace the valve body assembly.	Replace Shift Solenoid 2 (SS2).



DIAGNOSTIC TROUBLE CODE (DTC) P0758

SHIFT SOLENOID 2 (SS2) ELECTRICAL

Conditions for Setting the DTC

- TCM detects that the ON signal of the Shift Solenoid 2 (SS2) monitor during 0.5 seconds when SS2 driver outputs the OFF signal. (When the SS2 circuit is open or short to battery).
- TCM detects that the OFF signal of the Shift Solenoid 2 (SS2) monitor during 0.3 seconds when SS2 driver outputs the ON signal. (When the SS2 circuit is short to ground).
- The above detection 2 times at shifting continuously.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- No lockup control
- No engine torque reduction control
- No engagement pressure control
- No timing solenoid control for N-D
- No self-learning control
- After failure decision : emergency mode

TCM Shifting Pattern (Range : D)

Normal			SS2 FAIL		
Gear	SS1	SS2	Gear	SS1	SS2
1 st	ON	ON	2 nd	ON	FAIL
2 nd	ON	OFF	2 nd	ON	FAIL
3 rd	OFF	OFF	3 rd	OFF	FAIL
4 th	OFF	ON	3 rd	OFF	FAIL

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the ON signal of the SS2 monitor during 160 ms when SS2 driver outputs the ON signal and TCM detects the OFF signal of the SS2 monitor during 160 ms when SS2 driver outputs the OFF signal.

Cause of Failure

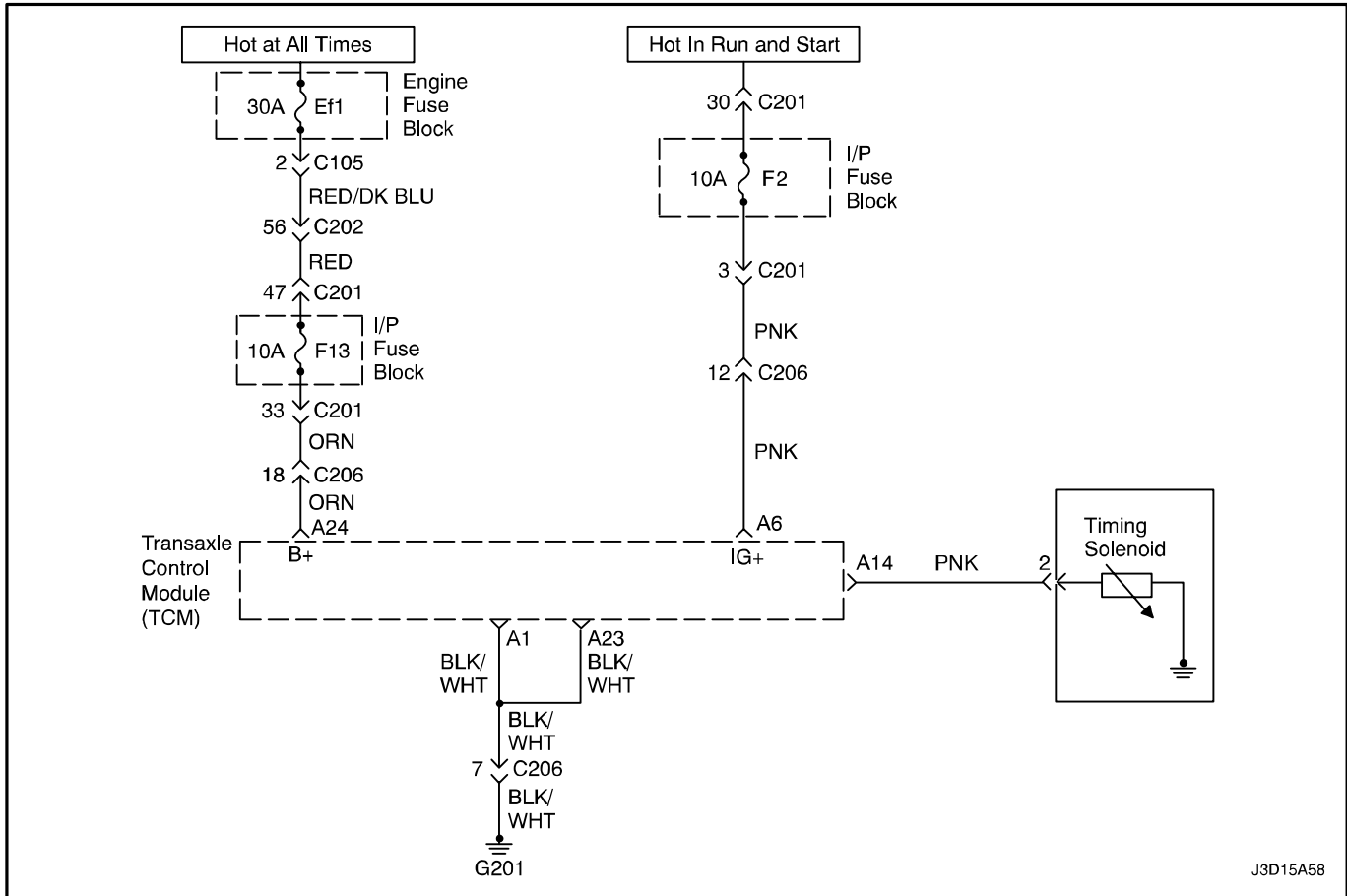
- Wiring harness or connector between Shift Solenoid 2 (SS2) and TCM

- SS2
- TCM

DTC P0758 Shift Solenoid 2 (SS2) Electrical

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0758 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Shift Solenoid 2 (SS2). Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A15 and A23. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and SS2. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between SS2 connector terminal 10 and ground. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 7</i>	Go to <i>Step 8</i>

Step	Action	Value(s)	Yes	No
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)	Replace the TCM
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C-3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of SS2. 2. Inspect the SS2. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace the SS2 solenoid	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. 3. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C-6). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P0785

TIMING SOLENOID (ST) ELECTRICAL

Conditions for Setting the DTC

- TCM detects that the ON signal of the Timing Solenoid (ST) monitor during 0.5 seconds when ST driver outputs the OFF signal. (When the ST circuit is open or short to battery).
- TCM detects that the OFF signal of the Timing Solenoid (ST) monitor during 0.1 seconds when ST driver outputs the ON signal. (When the ST circuit is short to ground).
- The above detection 3 times at shifting continuously.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- After failure decision : emergency mode

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.
- TCM detects the ON signal of the ST monitor during 100 ms when ST driver outputs the ON signal and TCM detects the OFF signal of the ST monitor during 160 ms when ST driver outputs the OFF signal.

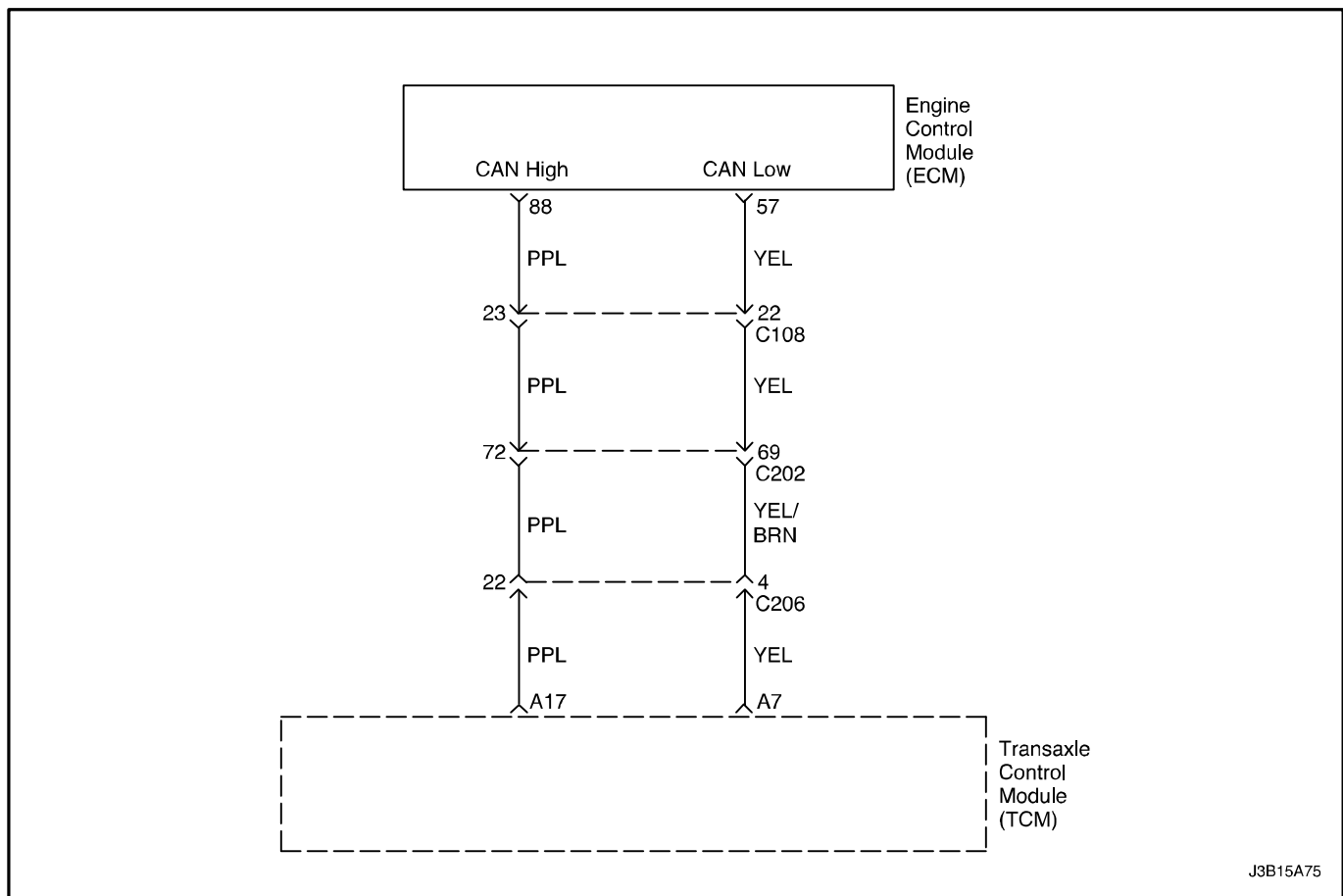
Cause of Failure

- Wiring harness or connector between Timing Solenoid (ST) and TCM
- ST
- TCM

DTC P0785 Timing Solenoid (ST) Electrical

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P0785 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)
3	1. Turn the ignition OFF. 2. Inspect the resistance between the vehicle harness and Timing Solenoid (ST). Refer to "Unit Inspection" in this section. 3. Disconnect the TCM connector (X–1) and inspect the resistance between the terminal A24 and A23. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Estimate the failure of between the vehicle wiring harness connector and TCM. 2. Inspect the connector. Refer to "Wiring Harness and Connector Inspection" in this section. 3. Inspect the connection condition between the connectors (C–1). Is the connection condition OK?	–	Go to <i>Step 6</i>	Repair the wiring harness connectors.
5	1. Estimate the failure of between the vehicle harness and ST. 2. Disconnect the connector (X–3) of T/M wire and inspect the resistance between ST connector terminal 2 and ground. Is the measurement within the specified value?	20°C (68°F) 11–16 Ω	Go to <i>Step 7</i>	Go to <i>Step 8</i>
6	1. Replace the master TCM. 2. Perform the reproducing test under user condition after confirming no DTC. Is DTC displayed?	–	Repair the temporary connection failure of connector (Refer to "Wiring Harness and Connector Inspection" in this section.)	Replace the TCM

Step	Action	Value(s)	Yes	No
7	1. Estimate the failure of the vehicle wiring harness or between connectors. 2. Inspect continuity and short circuit for the vehicle wiring harness and inspect the connection condition between connectors (C-3). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the vehicle harness or adjustment between connectors
8	1. Estimate the failure of T/M wire or between connectors of ST. 2. Inspect the ST. Refer to "Unit Inspection" in this section. Is the problem found?	–	Replace the ST	Go to <i>Step 9</i>
9	1. Estimate the failure of T/M wire. Inspect continuity and short circuit for the T/M wire and inspect the connection condition between connectors (C-6). Refer to "Wiring Harness and Connector Inspection" in this section. Is the condition OK?	–	Repair the temporary connection failure of connector	Replace the T/M wire or adjustment between connectors



DIAGNOSTIC TROUBLE CODE (DTC) P1781

ENGINE TORQUE SIGNAL ERROR

Conditions for Setting the DTC

- TCM detects that malfunction of engine speed signal for 2 seconds.
- No DTC U2105

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- No engine torque reduction control
- No engagement pressure control
- No 4th gear
- No self-learning control

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Wiring harness or connector between ECM and TCM
- ECM
- TCM

DTC P1781 Engine Torque Signal Error

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycles. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P1781 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector.
3	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector and ECM wiring connector. 3. Measure the resistance between terminal A17 of the TCM wiring connector and terminal 88 of the ECM wiring connector. 4. Measure the resistance between terminal A7 of the TCM wiring connector and terminal 57 of the ECM wiring connector. Is the resistance within the values shown?	0 Ω	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
5	1. Turn the ignition ON. 2. Measure the voltage of terminal A17. 3. Measure the voltage of terminal A7. Is the voltage within the values shown?	11–14 v	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
7	1. Inspect the "Engine Speed". Refer to <i>Section 1F, Diagnosis</i> . Was a problem found?	–	Refer to <i>Section 1F, Diagnosis</i> .	Go to <i>Step 8</i>
8	1. Replace the TCM. 2. Turn the ignition OFF. 3. Turn the ignition ON. 4. Check if P1781 DTC is set. Is the DTC set?	–	Go to <i>Step 9</i>	Go to <i>Step 10</i>

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Step	Action	Value(s)	Yes	No
9	Replace the ECM. Is the action complete?	–	Go to <i>Step 10</i>	–
10	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart



DIAGNOSTIC TROUBLE CODE (DTC) P1791

THROTTLE POSITION SIGNAL ERROR

Conditions for Setting the DTC

- TCM detects that malfunction of throttle position signal for 2 seconds continuously.
- No DTC U2105

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- TCM judges the throttle opening is 0% for shift point control.
- TCM judges the throttle opening is 100% for line pressure control.
- No lock-up
- No 4th gear
- No self-learning control

- No timing solenoid control for N-D

Conditions for Clearing the DTC

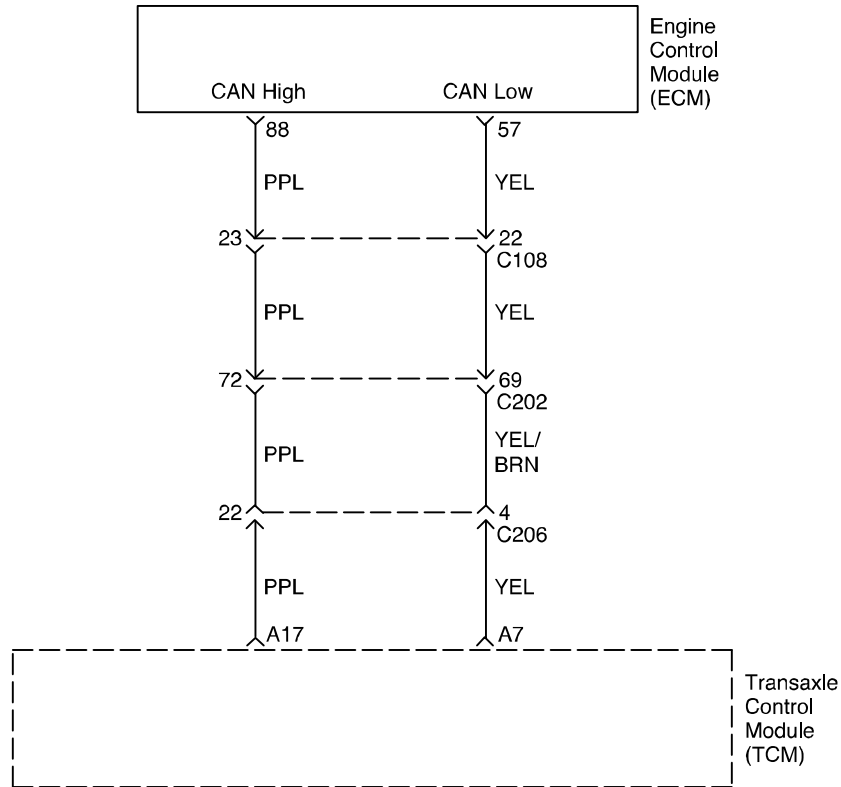
- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Wiring harness or connector between ECM and TCM
- ECM
- TCM

DTC 1791 Throttle Position Signal Error

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC P1791 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector.
3	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector and ECM wiring connector. 3. Measure the resistance between terminal A17 of the TCM wiring connector and terminal 88 of the ECM wiring connector. 4. Measure the resistance between terminal A7 of the TCM wiring connector and terminal 57 of the ECM wiring connector. Is the resistance within the values shown?	0 Ω	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
5	1. Turn the ignition ON. 2. Measure the voltage of terminal A17. 3. Measure the voltage of terminal A7. Is the voltage within the values shown?	11–14 v	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
7	1. Replace the TCM. 2. Turn the ignition OFF. 3. Turn the ignition ON. 4. Check if P1791 DTC is set. Is the DTC set?	–	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	Replace the ECM. Is the action complete?	–	Go to <i>Step 9</i>	–
9	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart



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DIAGNOSTIC TROUBLE CODE (DTC) P1792

ENGINE COOLANT TEMPERATURE (ECT) SIGNAL ERROR

Conditions for Setting the DTC

- TCM detects malfunction of Engine Coolant Temperature (ECT) signal for 2 seconds continuously.
- No DTC U2105

Action Taken When the DTC Sets

- TCM will not request the illumination of MIL, but will store DTC when TCM detects a failure on the first ignition cycle.
- TCM judges the engine coolant temperature 90 degrees when lapse 15 minutes from ignition ON.

Conditions for Clearing the DTC

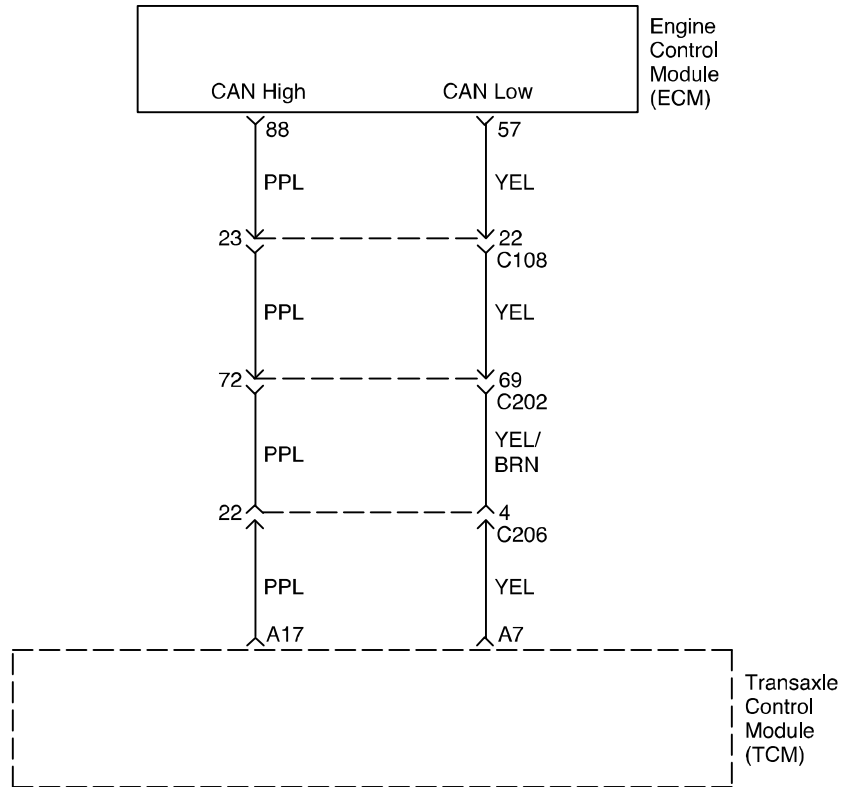
- The scan tool can clear the DTC from the TCM history.
- The TCM clears the DTC from the TCM history memory after forty consecutive warm up cycles without fault.

Cause of Failure

- Wiring harness or connector between ECM and TCM
- ECM
- TCM

DTC P1792 Engine Coolant Temperature (ECT) Signal Error

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 5. Clear DTC Information. 6. Perform one vehicle drive cycle. 7. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 8. Request DTC by Status. Is DTC P1792 displayed?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector.
2	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector and ECM wiring connector. 3. Measure the resistance between terminal A17 of the TCM wiring connector and terminal 88 of the ECM wiring connector. 4. Measure the resistance between terminal A7 of the TCM wiring connector and terminal 57 of the ECM wiring connector. Is the resistance within the values shown?	0 Ω	Go to <i>Step 4</i>	Go to <i>Step 3</i>
3	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
4	1. Turn the ignition ON. 2. Measure the voltage of terminal A17. 3. Measure the voltage of terminal A7. Is the voltage within the values shown?	11–14 v	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
6	1. Replace the TCM. 2. Turn the ignition OFF. 3. Turn the ignition ON. 4. Check if P1792 DTC is set. Is the DTC set?	–	Go to <i>Step 7</i>	Go to <i>Step 8</i>
7	Replace the ECM. Is the action complete?	–	Go to <i>Step 8</i>	–
8	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart



J3B15A75

DIAGNOSTIC TROUBLE CODE (DTC) U2105

CAN ERROR

Conditions for Setting the DTC

- TCM detects that the BUS OFF signal. This detection is continued for 0.2 seconds.
- TCM detects that nothing of ECM signal on CAN BUS for 0.2 seconds. This detection is continued for 2.0 seconds.

Action Taken When the DTC Sets

- TCM will request the illumination of MIL and store DTC when TCM detects a failure on the first ignition cycle.
- TCM judges the throttle opening is 0% for shift point and lock-up point control.
- TCM judges the throttle opening is 100% for line pressure control.
- No lock-up

- No self-learning control
- No 4th gear
- TCM judges the engine revolution is 0 rpm.

Conditions for Clearing the DTC

- The TCM turns off the MIL when no further failures detected for three consecutive ignition cycles.
- The scan tool can clear the DTC from the TCM history.
- TCM detects the BUS normal signal for 2 seconds continuously.

Cause of Failure

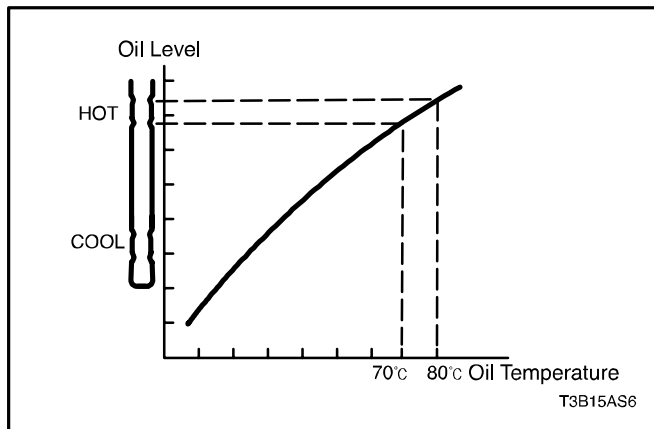
- Wiring harness or connector between ECM and TCM
- ECM
- TCM

DTC U2105 CAN Error

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF. 2. Install the Scan tool. 3. With the engine OFF, turn the ignition switch to the ON position. 4. Select Store Freeze Frame/Failure Records from the Diagnostic Trouble Codes Information menu. 5. Store Freeze Frame/Failure Records. 6. Select Clear DTC Information from the Diagnostic Trouble Codes Information menu. 7. Clear DTC Information. 8. Perform one vehicle drive cycle. Is the Malfunction Indicator Lamp (MIL) ON?	–	Go to <i>Step 2</i>	Repair the temporary connection failure of connector.
2	1. Select Request DTC by Status from the Diagnostic Trouble Codes Information menu. 2. Request DTC by Status. Is DTC U2105 displayed?	–	Go to <i>Step 3</i>	Repair the temporary connection failure of connector.
3	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector and ECM wiring connector. 3. Measure the resistance between terminal A17 of the TCM wiring connector and terminal 88 of the ECM wiring connector. 4. Measure the resistance between terminal A7 of the TCM wiring connector and terminal 57 of the ECM wiring connector. Is the resistance within the values shown?	0 Ω	Go to <i>Step 5</i>	Go to <i>Step 4</i>
4	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
5	1. Turn the ignition ON. 2. Measure the voltage of terminal A17. 3. Measure the voltage of terminal A7. Is the voltage within the values shown?	11–14 v	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	Repair the malfunctioning terminals as necessary. Is the action complete?	–	System OK	–
7	1. Replace the TCM. 2. Turn the ignition OFF. 3. Turn the ignition ON. 4. Check if U2105 DTC is set. Is the DTC set?	–	Go to <i>Step 8</i>	Go to <i>Step 9</i>
8	Replace the ECM. Is the action complete?	–	Go to <i>Step 9</i>	–
9	1. After the repair, use a scan tool "clear info" function and road test the vehicle. 2. Review the "DTC info". Has the last test failed or is the current DTC displayed?	–	Begin diagnosis again	Repair verified exit DTC chart

MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

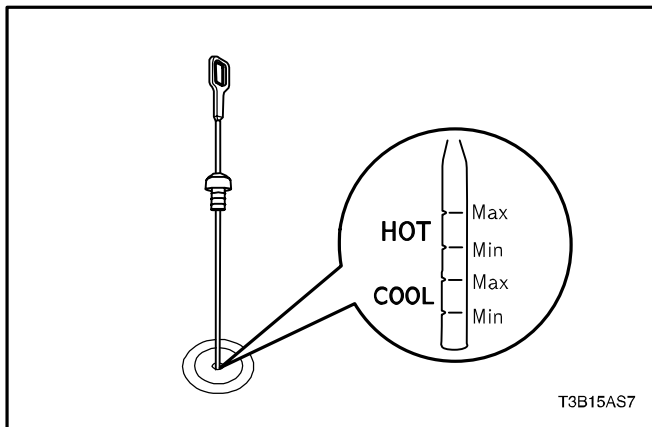


TRANSAXLE FLUID LEVEL CHECKING PROCEDURE

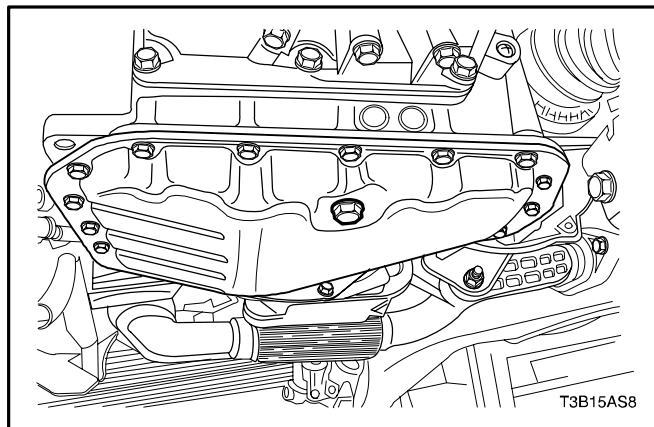
Notice : Check the fluid level when the transaxle temperature is 70°C~80°C (158°F~176°F).

Notice : During the fluid level check, the selector lever must be in position P.

Notice : When adding fluid or making a complete fluid change, always use ISU DEXRON III. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.



1. Make sure the vehicle is level.
2. Shift into all range from "P" to "1" and return to "P" with engine idling.
3. Remove the transaxle fluid dipstick and check the transaxle fluid level.
4. The correct fluid level must be between the HOT MIN and the HOT MAX notches on the dipstick.
5. If the fluid level is below the MIN notch, add transaxle fluid through the fluid filler tube and check for leaks in the transaxle.
6. If the fluid above the MAX notch, the transaxle is overfilled. Drain some of the fluid through the fluid pan drain plug. Check the transaxle fluid level.



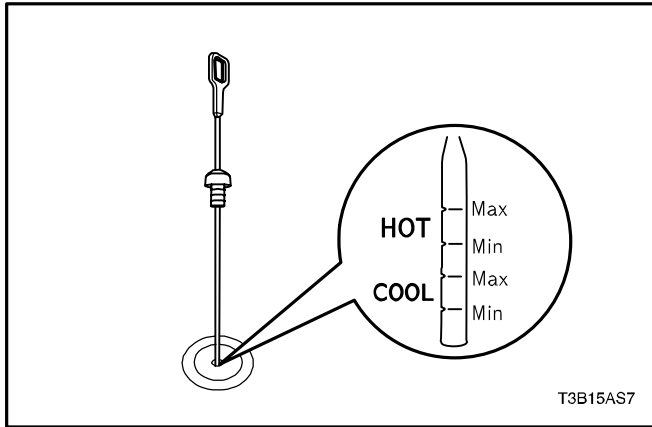
FLUID DRAIN PROCEDURE

Draining Procedure

1. Raise and support the vehicle. Refer to "Vehicle Lifting Procedures," *Section 0B, General Information*.
2. Place a suitable fluid drainage container under the transaxle.
3. Remove the fluid drain plug. allow the fluid to drain completely.
4. Clean the drain plug threads.
5. Install the fluid drain plug.

Tighten

Torque the fluid drain plug to 17 N•m (13 lb–ft).



Filling Procedure

1. Remove the drainage container and lower the vehicle.
2. Add three-fourths of the recommended amount of ISU DEXRON III.
3. Start the engine and allow it to reach normal operating temperature.
4. Shift the gear selector through all positions.
5. Check the fluid level and add fluid until the dipstick indicates a safe level.

LOCATING FLUID LEAKS

General Method

1. Verify that the material leaking is transaxle fluid.
2. Thoroughly clean the suspected leak area.
3. Allow the transaxle to reach the normal operating temperature of 176–194°F (80–90°C).
4. Park the vehicle over a clean paper or a clean cardboard.
5. Turn the engine OFF and look for fluid spots on the paper.
6. Make the necessary repairs to correct that leak.

Powder Method

1. Thoroughly clean the suspected leak area.
 2. Apply an aerosol type powder, such as foot powder, to the suspected leak area.
 3. Allow the transaxle to reach the normal operating temperature of 176–194°F (80–90°C).
 4. Turn the engine OFF.
 5. Inspect the suspected leak area and trace the leak path through the powder to find the source of the leak.
 6. Make the necessary repairs to correct the leak.
- Once the leak point is found, the source of the leak must be determined and repaired.

CASE POROSITY REPAIR

1. Determine the leak area. Refer to "Locating Fluid Leaks" in this section.
2. Clean the leak area with the solvent. Air dry.

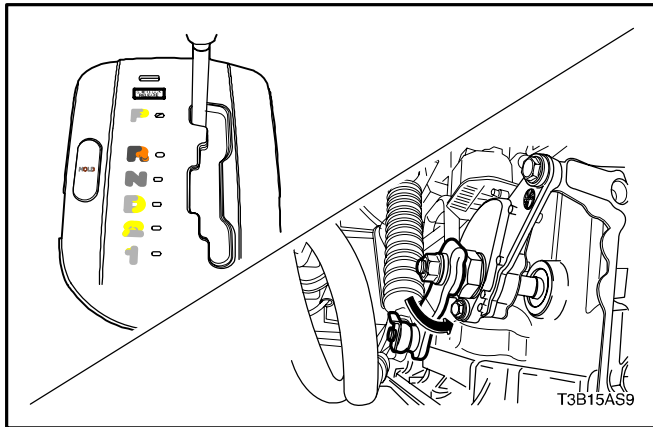
CAUTION : Epoxy cement may cause skin irritations and eye damage. Read and follow all information on the container label as provided by the manufacturer.

3. Mix a sufficient amount of epoxy cement following the manufacturer's recommendations.
4. While the transaxle case is hot, apply epoxy cement with a clean, dry soldering acid brush.
5. Allow the epoxy cement to dry for 3 hours before starting the engine.

FLUID COOLER FLUSHING

Flushing Procedure

1. Drain the fluid from the transaxle and refill the transaxle with new transaxle fluid. Refer to "Fluid Drain Procedure" in this section.
2. Let the engine idle for 5 minutes.
3. Drain the fluid from the transaxle and refill the transaxle with new transaxle fluid. Refer to "Fluid Drain Procedure" in this section.



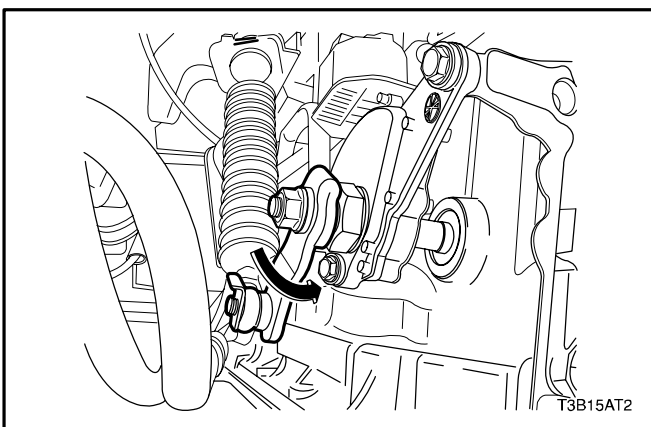
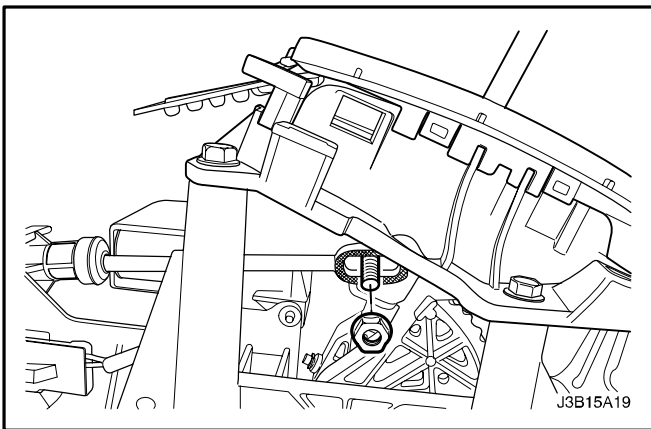
CONTROL CABLE ADJUSTMENT

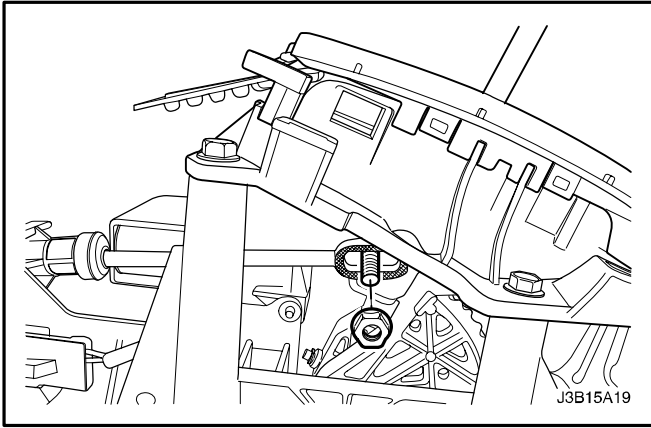
Adjustment Procedure

The various shift control cable positions must match at the shift control lever in the vehicle and at the selector lever on the transaxle to provide proper transaxle shifting.

Place the shift control lever in the PARK position and check the selector lever connection to verify that it is in the forward most position. If it is not, the following adjustment must be performed:

1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to *Section 9G, Interior Trim*.
3. Place the shift control lever in the PARK position.
4. Loosen the control cable adjusting nut.
5. Move the Transmission Range (TR) switch lever counterclockwise until stopping the lever.



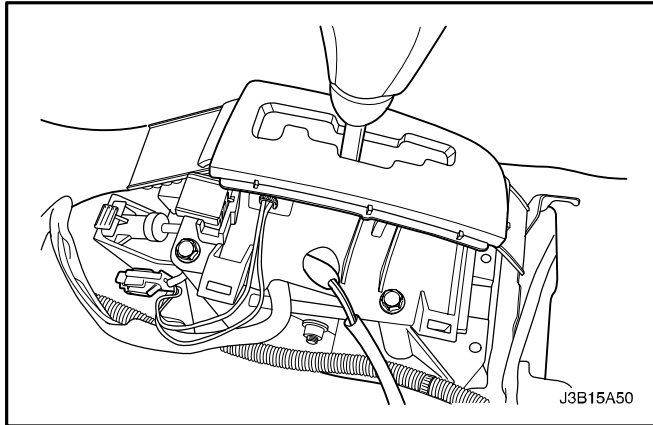


6. Pull the shift control cable until it is tight and tighten the control cable adjusting nut.

Tighten

Tighten the control cable adjusting nut to 8 N•m (71 lb-in).

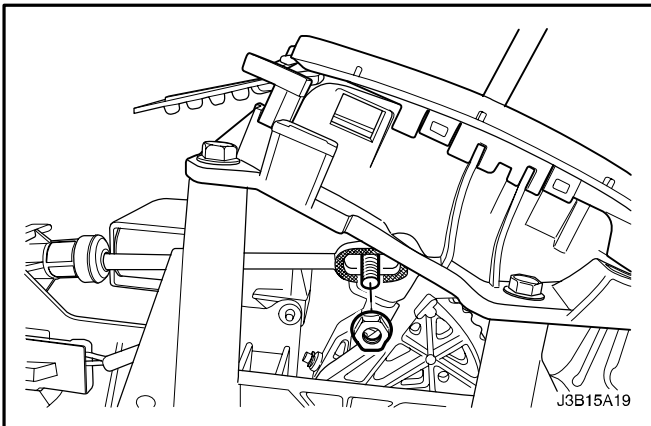
7. Install the floor console. Refer to *Section 9G, Interior Trim*.
8. Connect the negative battery cable.



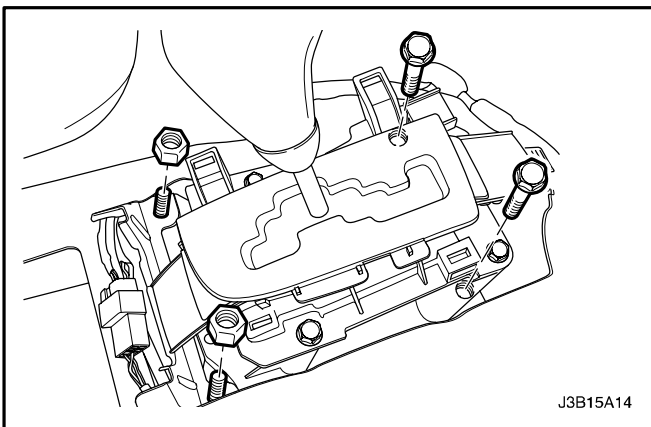
SHIFT CONTROL LEVER ASSEMBLY

Removal Procedure

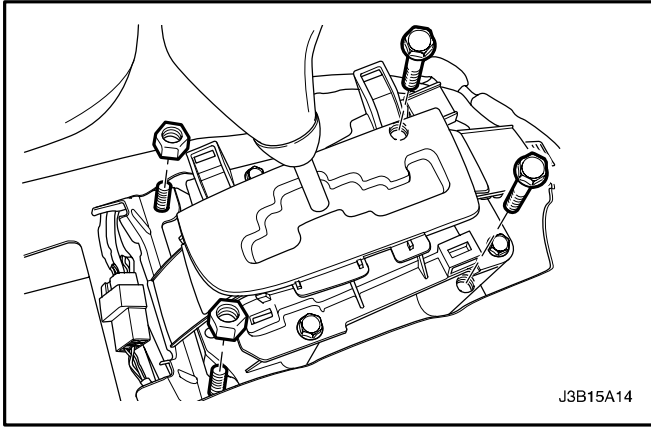
1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to *Section 9G, Interior Trim*.
3. Disconnect the wiring harness connectors from the shift control lever.



4. Loosen the control cable adjusting nut.
5. Disconnect the control cable from the shift control lever assembly.



6. Remove the shift control lever assembly mounting bolts and nuts.
7. Remove the shift control lever assembly.

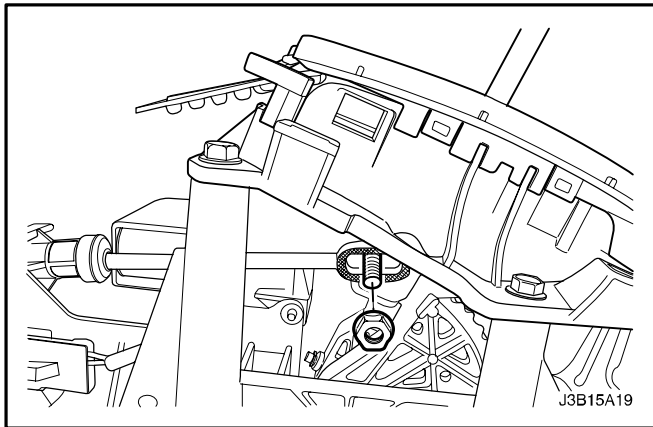


Installation Procedure

1. Install the shift control lever assembly and mounting bolts and nuts.

Tighten

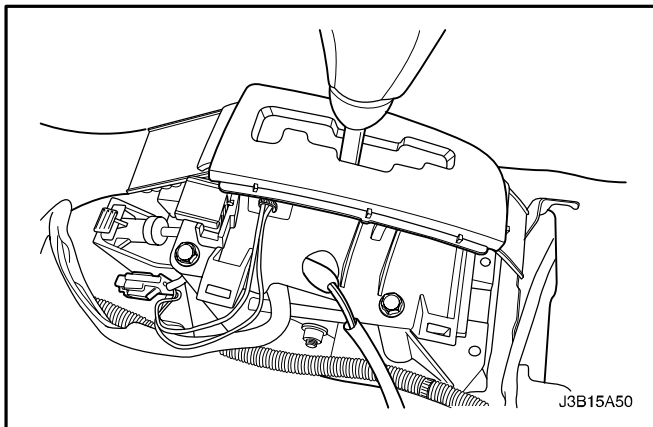
Tighten the shift control lever assembly mounting bolts and nuts to 8 N•m (71 lb-in).



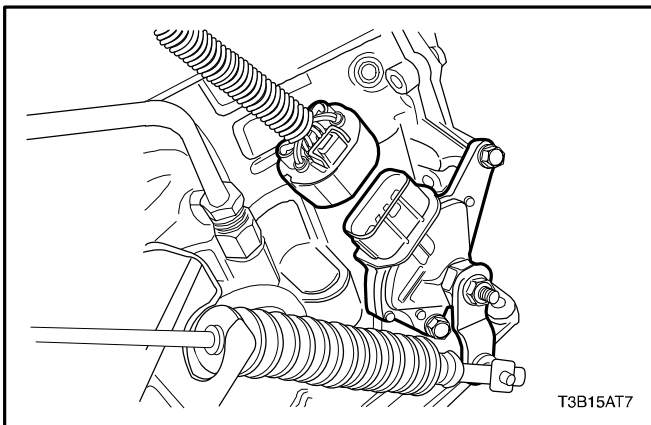
2. Connect the control cable to the shift control lever assembly.
3. Tighten the control cable adjusting nut.

Tighten

Tighten the control cable adjusting nut to 8 N•m (71 lb-in).



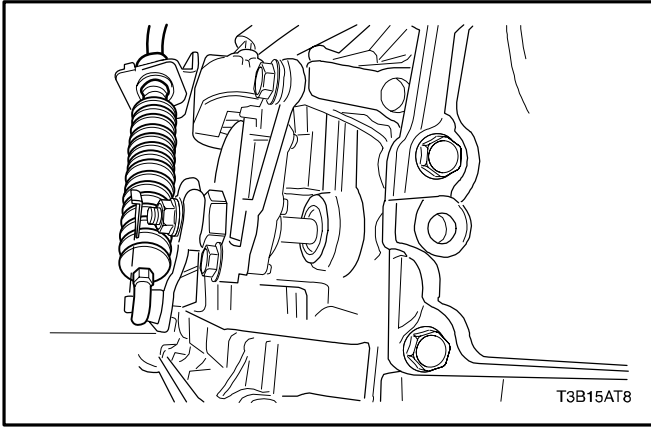
4. Connect the harness connector.
5. Adjust the control cable. Refer to "Control Cable Adjustment" in this section.
6. Install the floor console. Refer to *Section 9G, Interior Trim*.
7. Connect the negative battery cable.



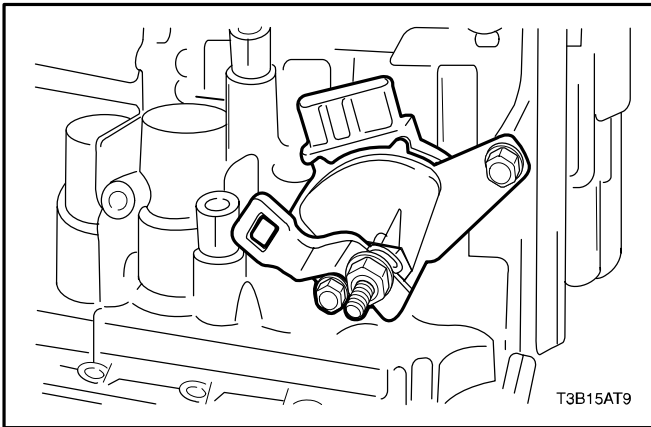
TRANSMISSION RANGE (TR) SWITCH

Removal Procedure

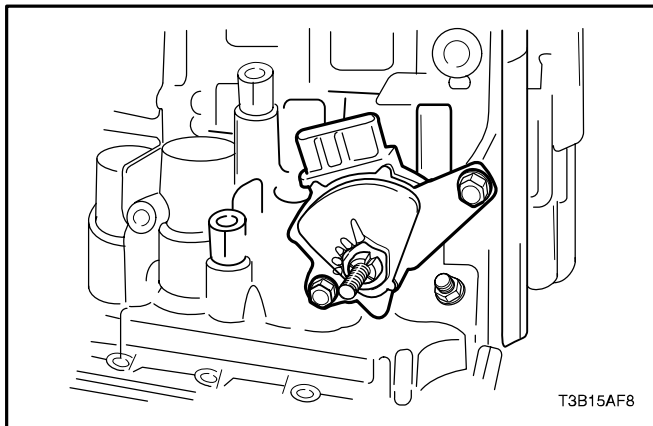
1. Disconnect the negative battery cable.
2. Disconnect the Transmission Range (TR) switch electrical connector from the wiring harness.



3. Remove the E-ring.
4. Disconnect the shift control cable from the TR switch lever.



5. Remove the retaining nut and then remove the washer and the control lever.
6. Using a driver, unstake the lock washer and remove the nut.

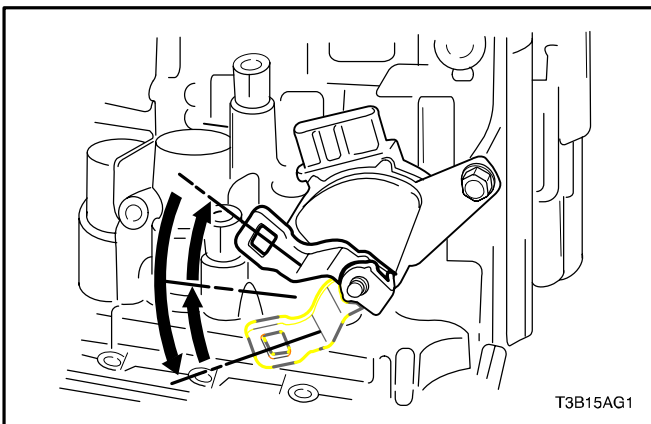


Installation Procedure

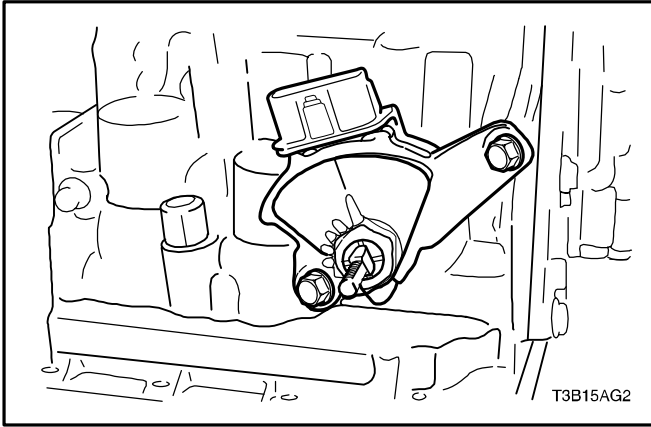
1. Install the Transmission Range (TR) switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.
2. Install the new lock washer and nuts.

Tighten

Tighten the nuts to 12 N•m (106 lb-in).



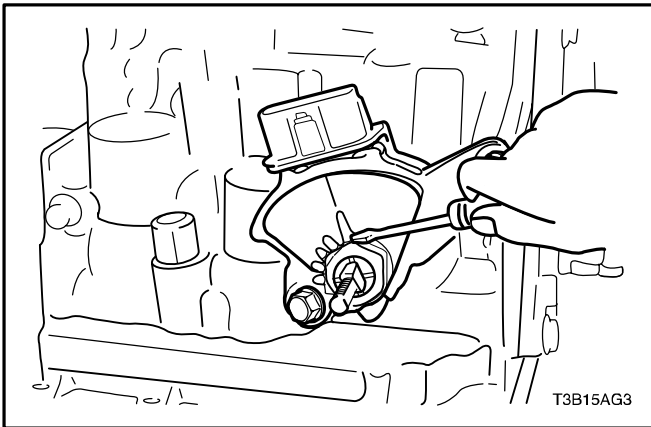
3. Temporarily install the control lever.
4. Turn the lever counterclockwise until it stops, then turn it clockwise 2 notches.
5. Remove the control lever.



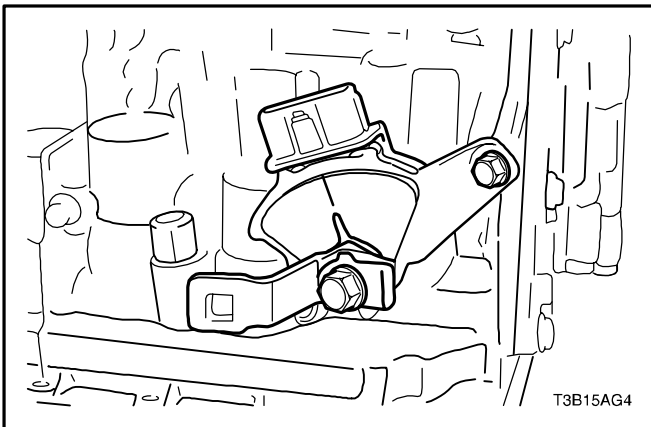
6. Align the groove with the neutral basic line, then install the 2 bolts.

Tighten

Tighten the 2 bolts to 5.4 N•m (48 lb-in).



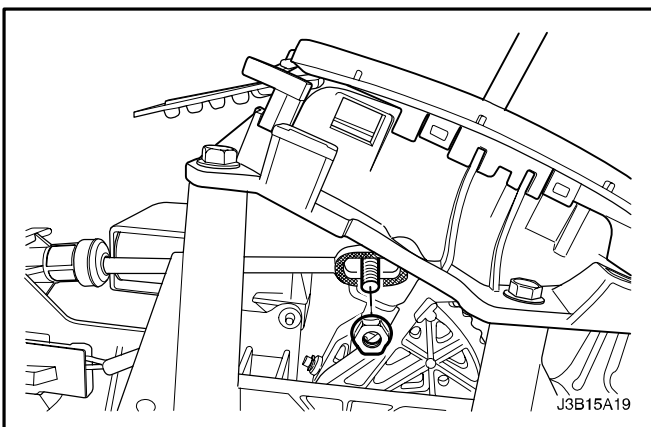
7. Using a screw driver, stake the nut with the lock washer.



8. Install the control lever, washer and nut.

Tighten

Tighten the nut to 12 N•m (106 lb-in).

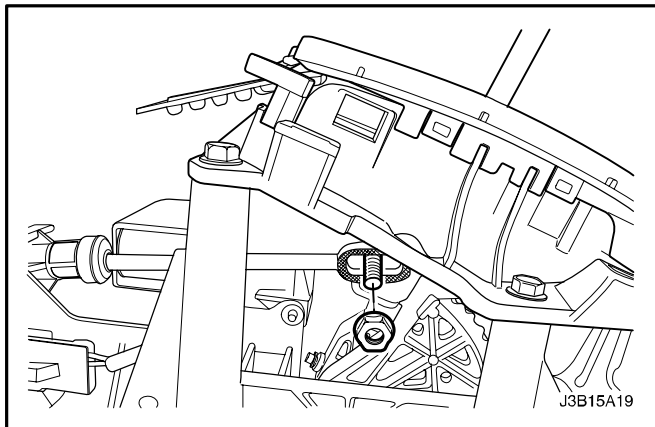


9. Connect the control cable to TR switch.
10. Connect the TR switch electrical connector.
11. Adjust the control cable. Refer to "Control Cable Adjustment" in this section.
12. Install the control cable adjusting nut.

Tighten

Tighten the control cable adjusting nut to 8 N•m (71 lb-in).

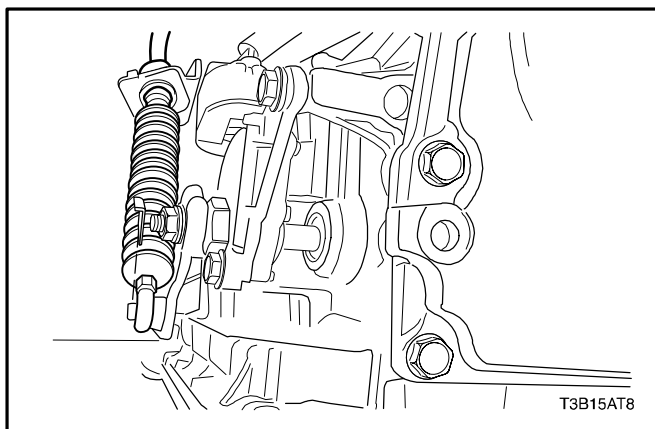
13. Connect the negative battery cable.



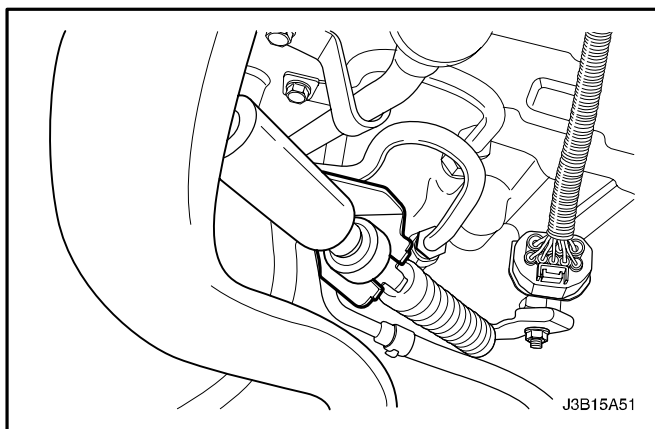
SHIFT CONTROL CABLE

Removal Procedure

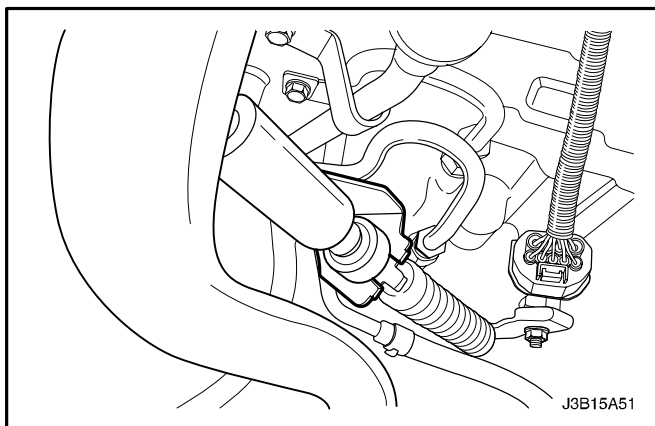
1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to *Section 9G, Interior Trim*.
3. Remove the cable adjusting nut.
4. Disconnect the shift control cable from the shift control lever assembly.



5. Remove the shift control cable retaining E-ring.
6. Disconnect the shift control cable from the TR switch.

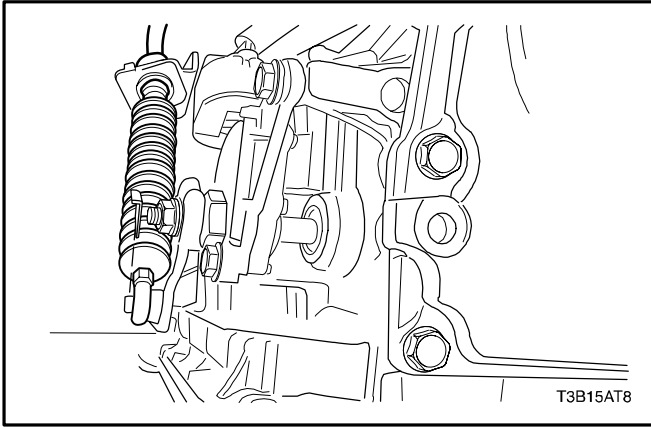


7. Remove the E-ring from the shift control cable bracket and disconnect the shift control cable.
8. Disconnect the shift control cable from the shift control cable fastener.
9. Remove the shift control cable from the vehicle.

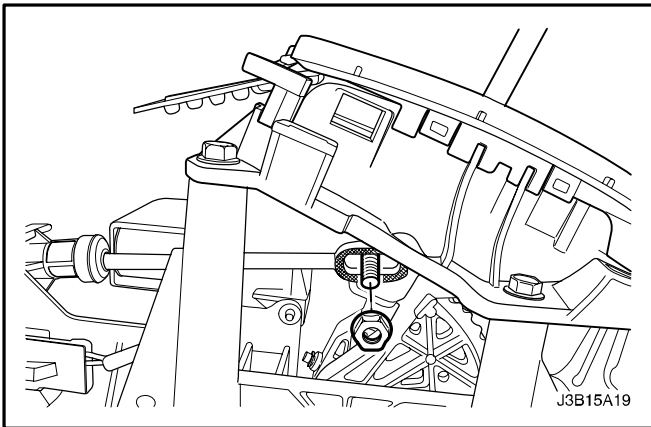


Installation Procedure

1. Install the shift control cable to the vehicle.
2. Connect the shift control cable to the shift control cable fastener.
3. Install the E-ring to the shift control cable bracket and connect the shift control cable.



4. Connect the shift control cable to the TR switch.
5. Install the shift control cable retaining E-ring.

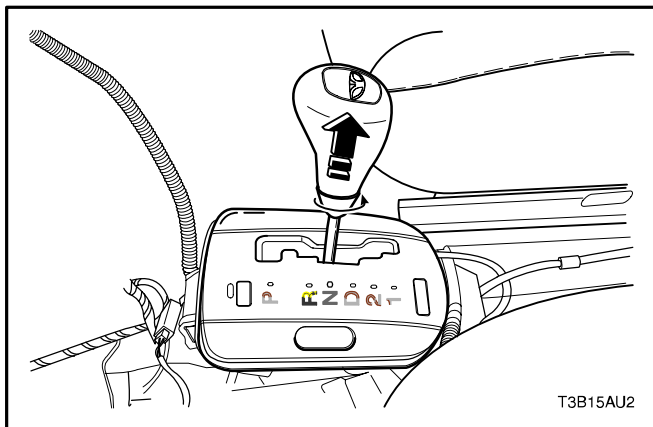


6. Connect the shift control cable to the shift control lever assembly.
7. Install the cable adjusting nut.

Tighten

Tighten the cable adjusting nut to 8 N•m (71 lb-in).

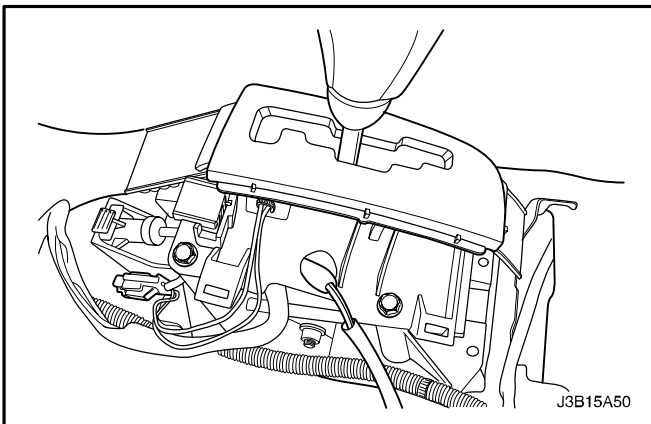
8. Install the trim panel to the floor console. Refer to *Section 9G, Interior Trim*.
9. Connect the negative battery cable.



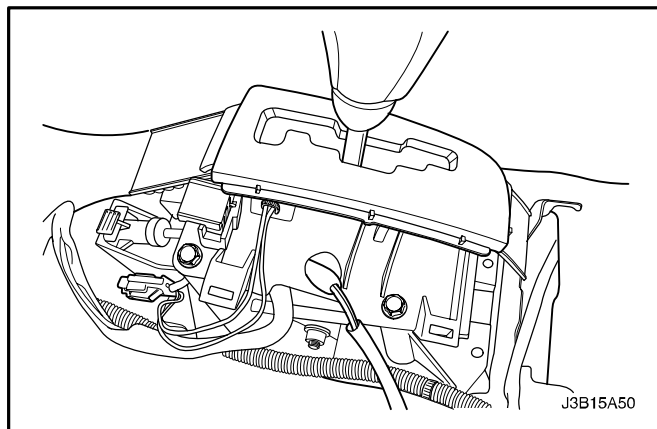
SHIFT SELECT COVER

Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to *Section 9G, Interior Trim*.
3. Remove the shift select lever knob.

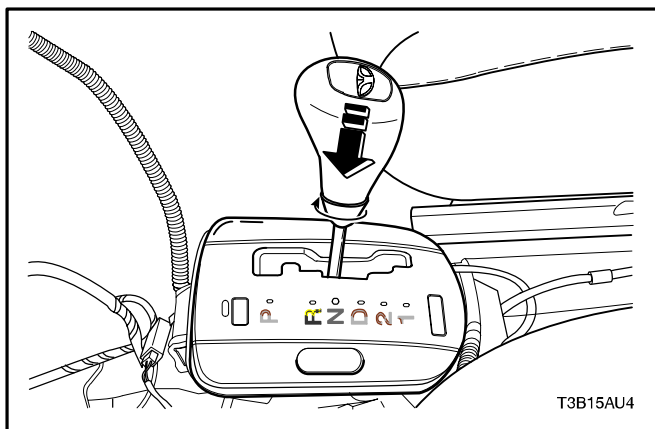


4. Disconnect the connectors.
5. Remove the shift select cover from the shift select housing.

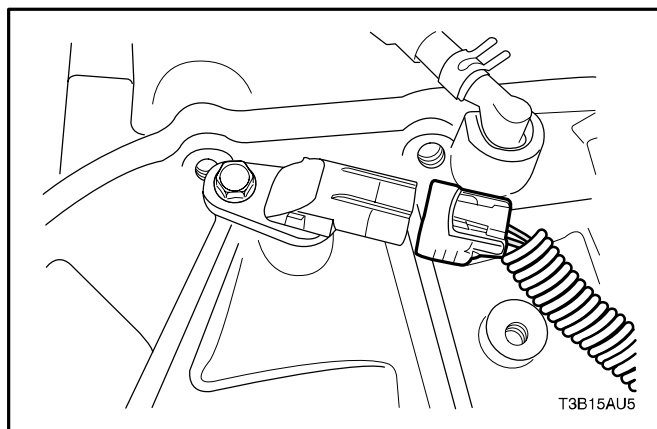


Installation Procedure

1. Connect the connectors to the shift select cover.
2. Install the shift select cover to the housing.



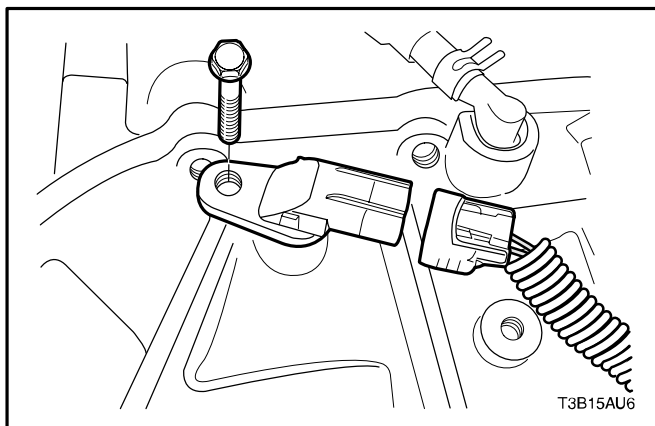
3. Install the shift select lever knob.
4. Install the floor console. Refer to *Section 9G, Interior Trim*.
5. Connect the negative battery cable.



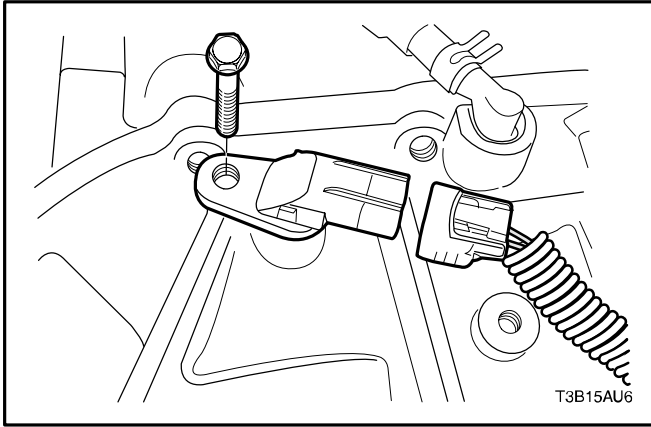
INPUT SHAFT SPEED (ISS) SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the input shaft speed (ISS) sensor electrical connector.



3. Remove the ISS sensor retaining bolt.
4. Remove the ISS sensor from the transaxle.



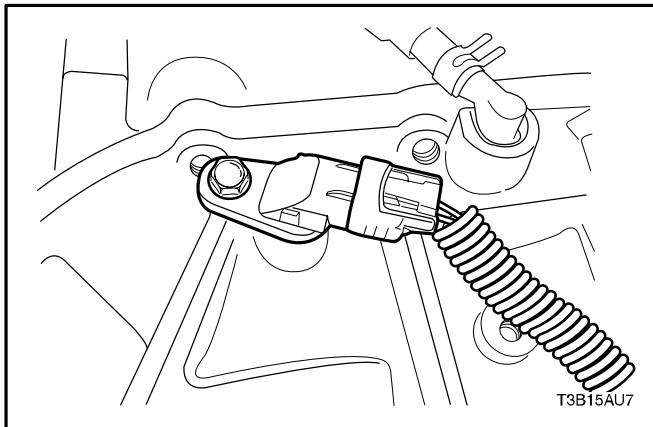
Installation Procedure

Notice : Lubricate the O-ring with ISU DEXRON III.

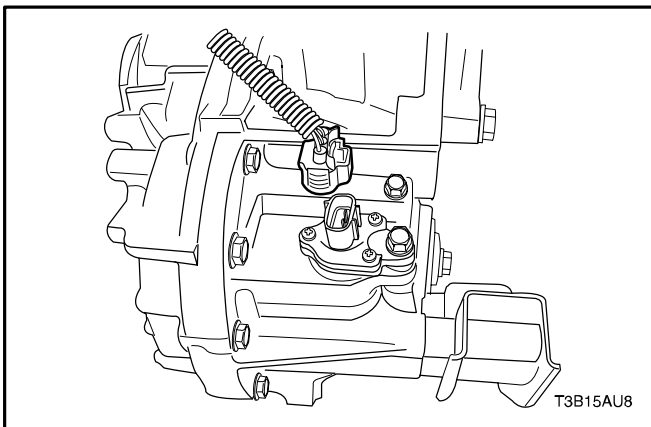
1. Install a new O-ring on the ISS sensor.
2. Install the ISS sensor and retaining bolt into the transaxle case.

Tighten

Tighten the ISS sensor retaining bolt to 5.4 N•m (48 lb-in).



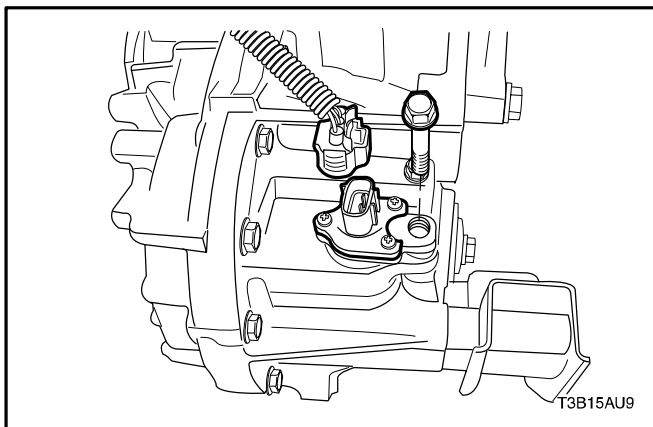
3. Connect the ISS sensor electrical connector.
4. Connect the negative battery cable.



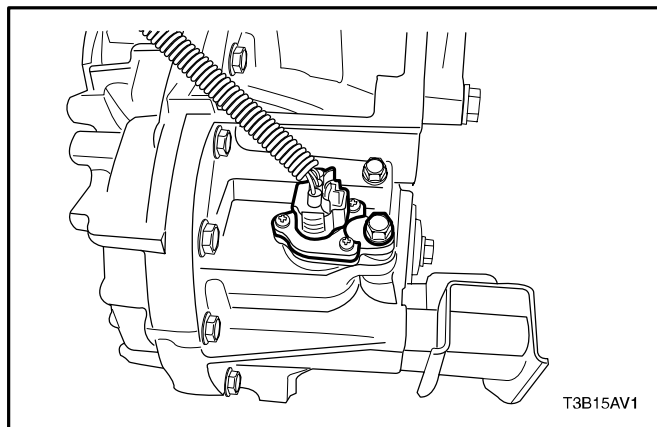
OUTPUT SHAFT SPEED (OSS) SENSOR

Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the output shaft speed (OSS) sensor electrical connector.



3. Remove the OSS sensor retaining bolt.
4. Remove the OSS sensor from the transaxle.



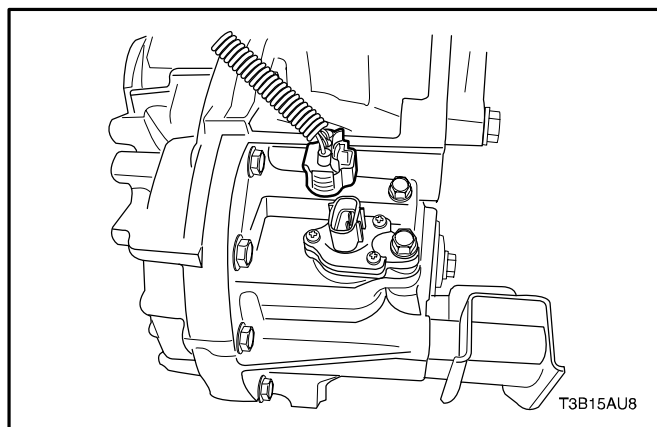
Installation Procedure

Notice : Lubricate the O-ring with ISU DEXRON III.

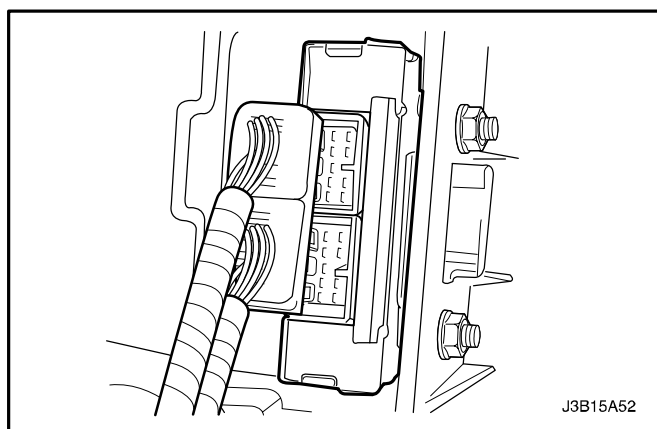
1. Install a new O-ring on the output shaft speed (OSS) sensor.
2. Install the OSS sensor and retaining bolt into the transaxle.

Tighten

Tighten the OSS sensor retaining bolt to 7.4 N•m (65 lb-in).



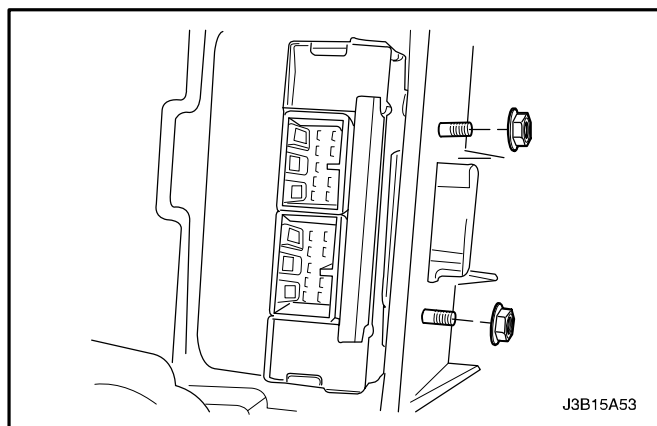
3. Connect the OSS sensor electrical connector.
4. Connect the negative battery cable.



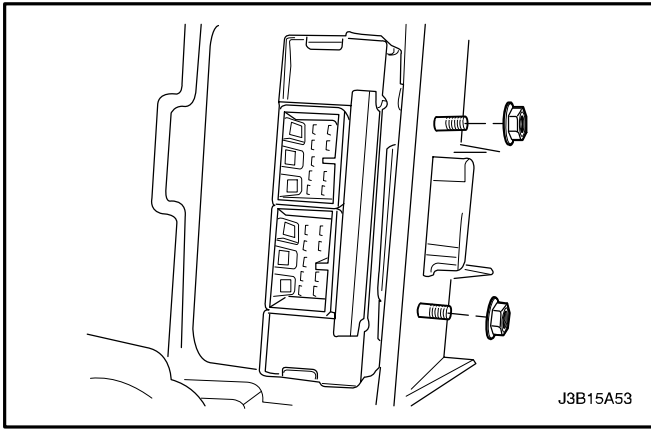
TRANSMISSION CONTROL MODULE (TCM)

Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the transmission control module (TCM) electrical connector.



3. Remove the TCM retaining bolts.
4. Remove the TCM.

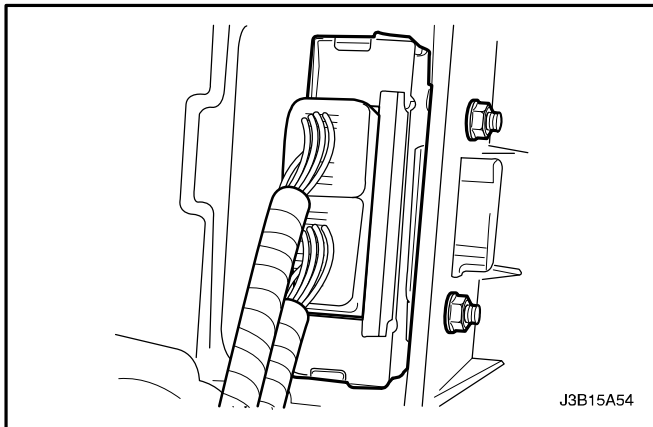


Installation Procedure

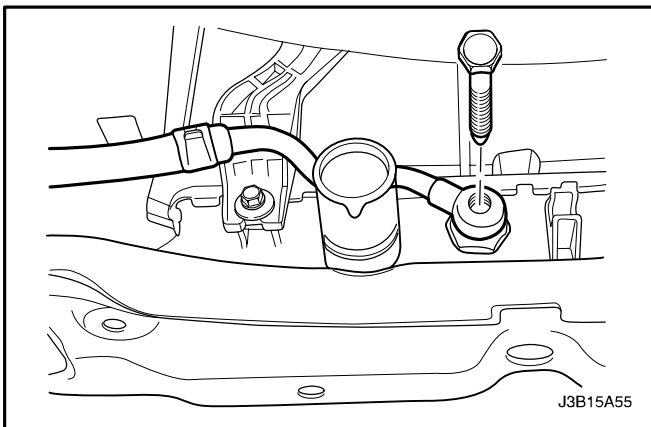
1. Connect the negative battery cable.
2. Install the TCM and retaining bolts.

Tighten

Tighten the TCM retaining bolts to 5 N•m (44 lb-in).



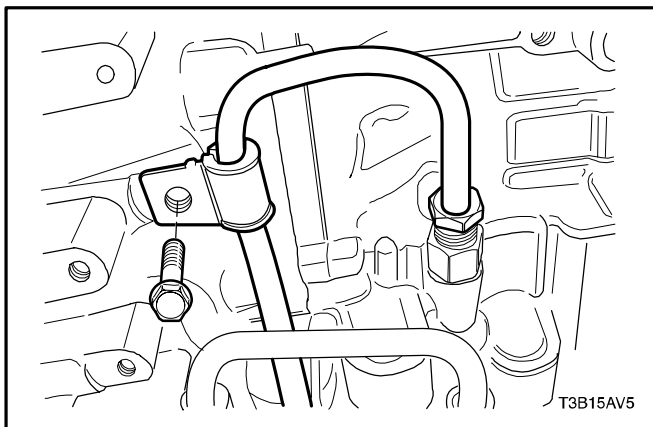
3. Connect the TCM electrical connector.
4. Connect the negative battery cable.

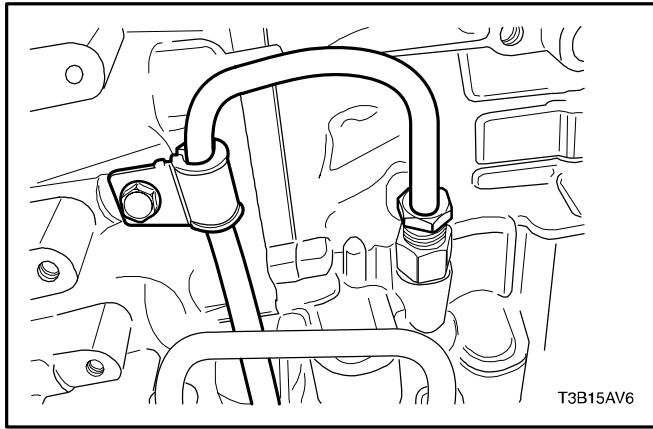


FLUID COOLER INLET PIPES AND HOSES

Removal Procedure

1. Raise and support the vehicle.
2. Drain the transaxle fluid.
3. Remove the clip from the hose, then disconnect the hose from the fluid cooler inlet pipe.
4. Remove the inlet pipe union bolt from the radiator.
5. Remove the fluid cooler inlet pipe bolt from the transaxle.
6. Remove the inlet pipe fitting nut from the transaxle.
7. Remove the fluid cooler inlet pipe and hoses.





Installation Procedure

1. Install the fluid cooler inlet pipe fitting nut into the transaxle.

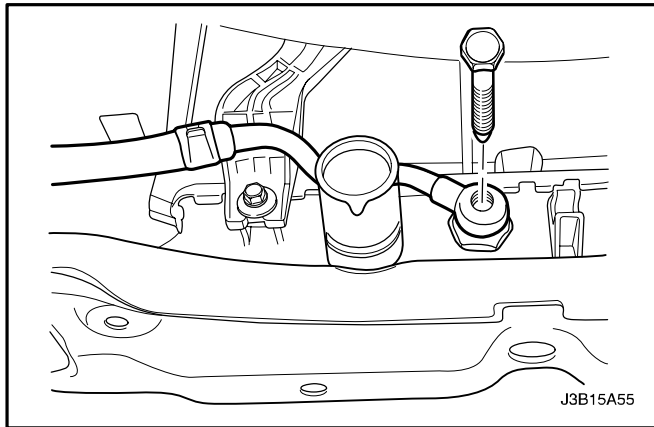
Tighten

Tighten the fluid cooler inlet pipe fitting nut to 35 N•m (26 lb–ft).

2. Install the fluid cooler inlet pipe bolt into the transaxle.

Tighten

Tighten the fluid cooler inlet pipe bolt to 9 N•m (80 lb–in).

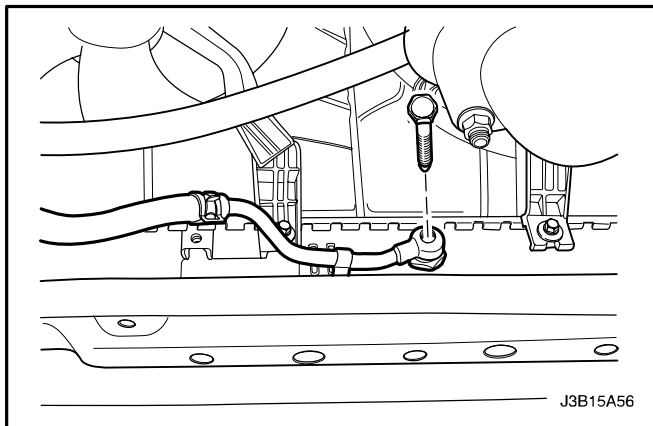


3. Install the inlet pipe union bolt into the radiator.

Tighten

Tighten the inlet pipe union bolt to 35 N•m (26 lb–ft).

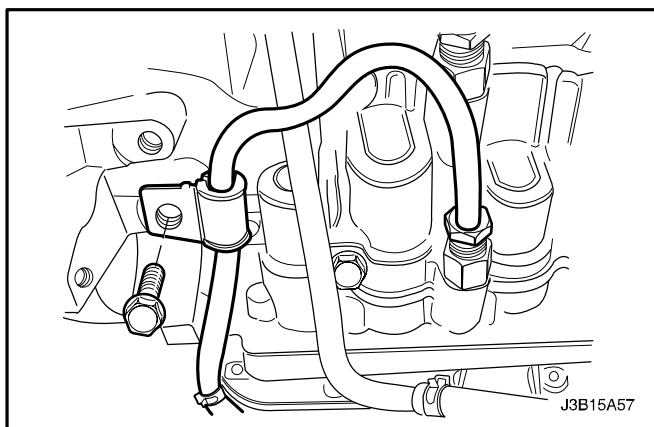
4. Connect the hose to inlet pipe and install the clip into the hose.
5. Lower the vehicle.
6. Fill the transaxle with the fluid.



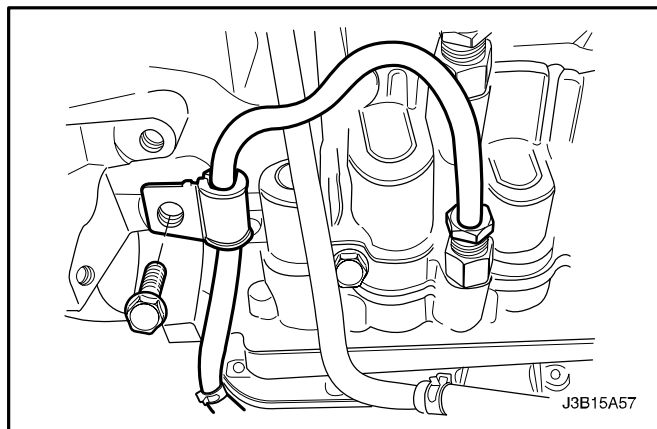
FLUID COOLER OUTLET PIPE AND HOSES

Removal Procedure

1. Drain the transaxle fluid.
2. Remove the front outlet pipe union bolt from the radiator.
3. Remove the clip from the hose.



4. Remove the rear outlet pipe clip bolt from the transaxle.
5. Remove the rear outlet pipe fitting nut from the transaxle.
6. Remove the fluid cooler outlet pipe and hoses.



Installation Procedure

1. Install the fluid cooler rear outlet pipe fitting nut.

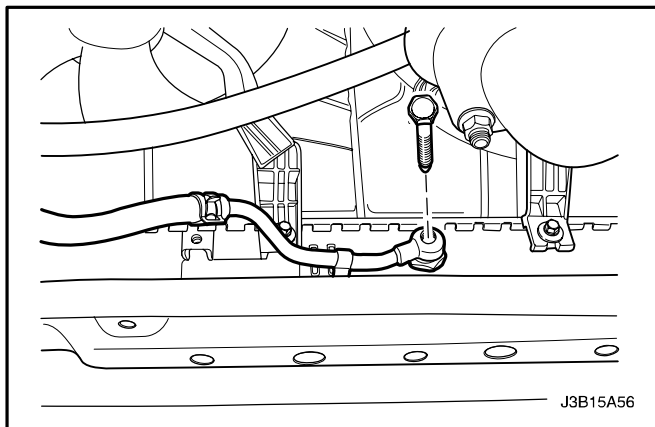
Tighten

Tighten the fluid cooler rear outlet pipe fitting nut to 35 N•m (26 lb–ft).

2. Install the fluid cooler rear outlet pipe clip bolt.

Tighten

Tighten the fluid cooler rear outlet pipe clip bolt to 9 N•m (80 lb–in).

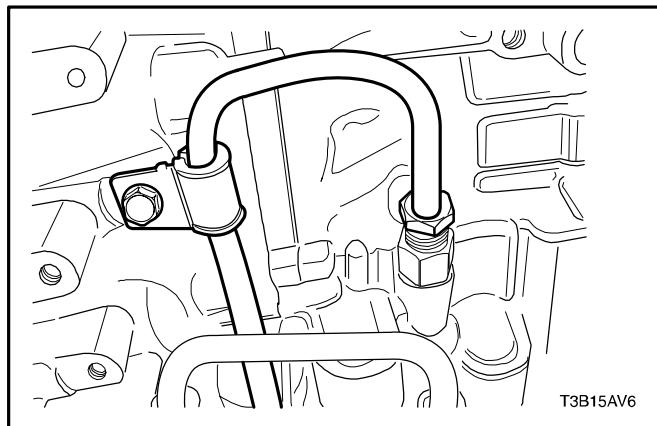


3. Install the front outlet pipe union bolt into the radiator.

Tighten

Tighten the front outlet pipe union bolt to 35 N•m (26 lb–ft).

4. Install the clip into the hose.
5. Fill the transaxle with the fluid.



TRANSAXLE ASSEMBLY

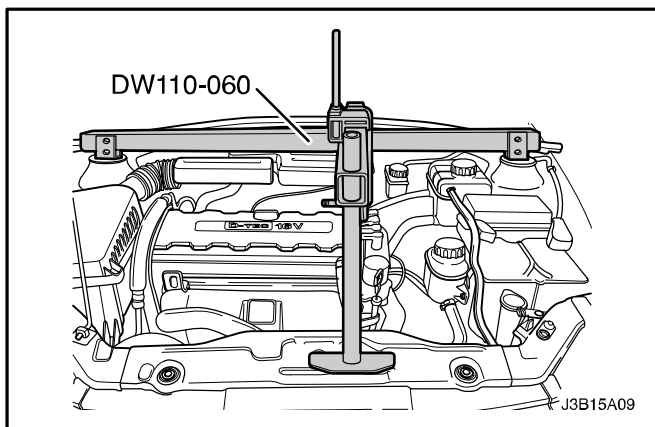
Tools Required

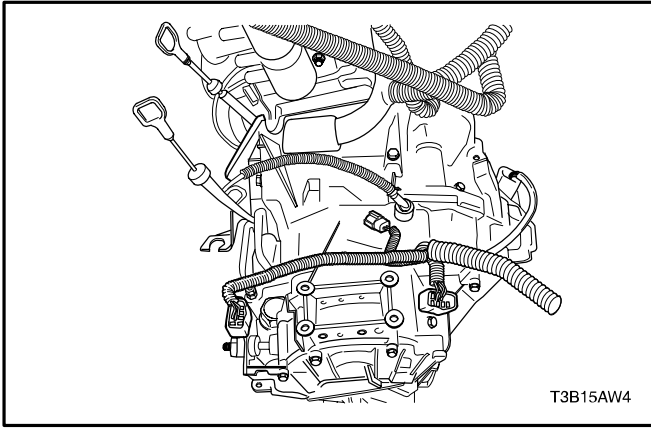
DW110–060 Engine Support Fixture

DW260–012 Transaxle Support Fixture (81–40 LE)

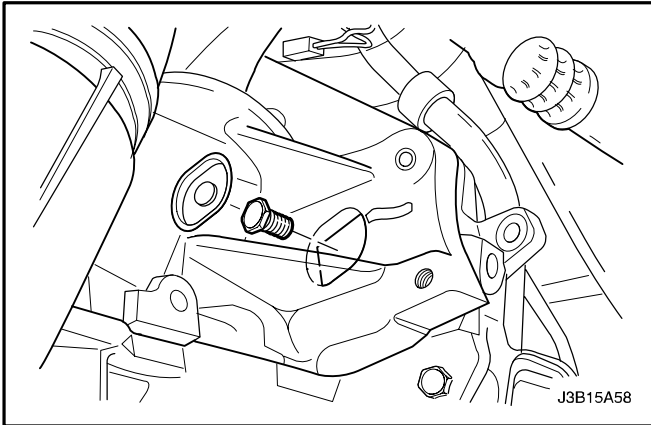
Removal Procedure

1. Remove the battery and battery tray. Refer to *Section 1E, Engine Electrical*.
2. Drain the transaxle fluid. Refer to "Fluid Drain Procedure" in this section.
3. Remove the left and right drive axle assemblies. Refer to *Section 3A, Automatic Transaxle Drive Axle*.
4. Disconnect the fluid cooler inlet and outlet pipes and hoses from the transaxle. Refer to "Fluid Cooler Inlet or Outlet Pipe and Hoses" in this section.
5. Disconnect the shift control cable from the transaxle. Refer to "Shift Control Cable" in this section.
6. Install engine support fixture DW110–060 to support the engine.

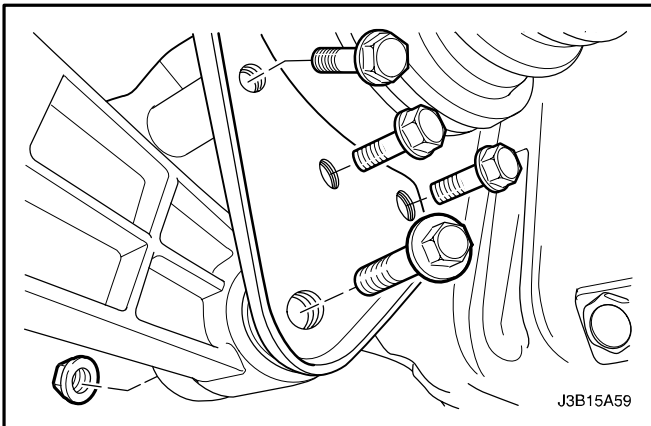




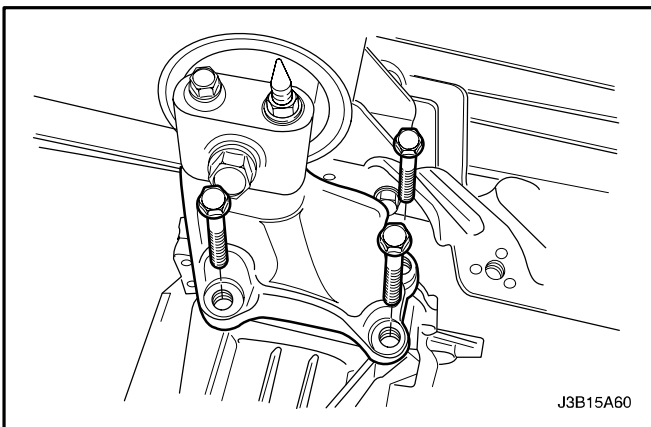
7. Disconnect the input shaft speed (ISS) sensor electrical connector.
8. Disconnect the output shaft speed (OSS) sensor electrical connector.
9. Disconnect the Transmission Range (TR) Switch electrical connector.
10. Disconnect the transaxle electrical connector.



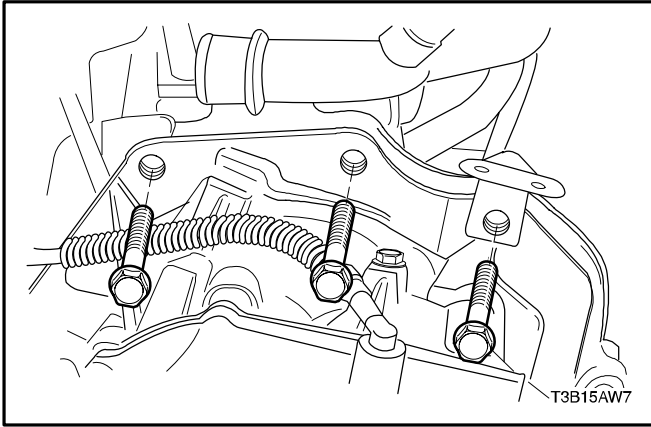
11. Remove the service hall cover.
12. Remove the three torque converter bolts.



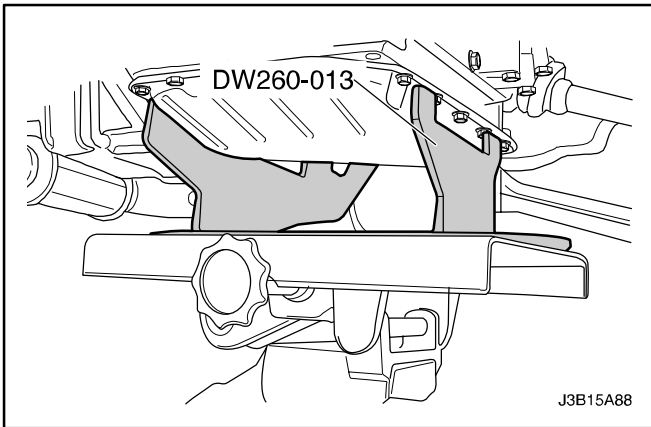
13. Remove the damping block connection nut and bolt.
14. Remove the rear mounting bracket bolts and rear mounting bracket.



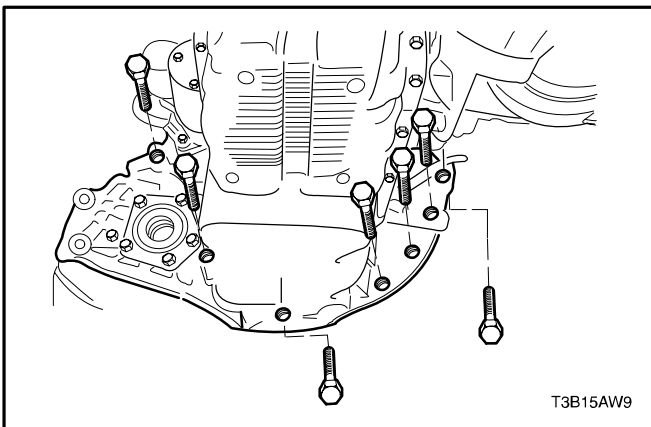
15. Remove the three upper transaxle mounting bracket bolts.



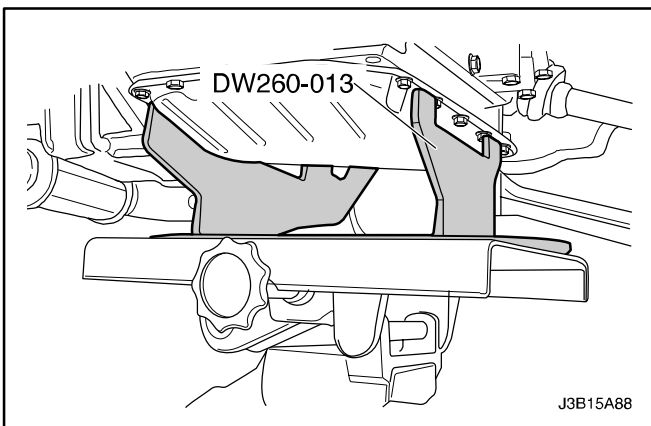
16. Remove the three upper transaxle-to-engine mounting bolts.



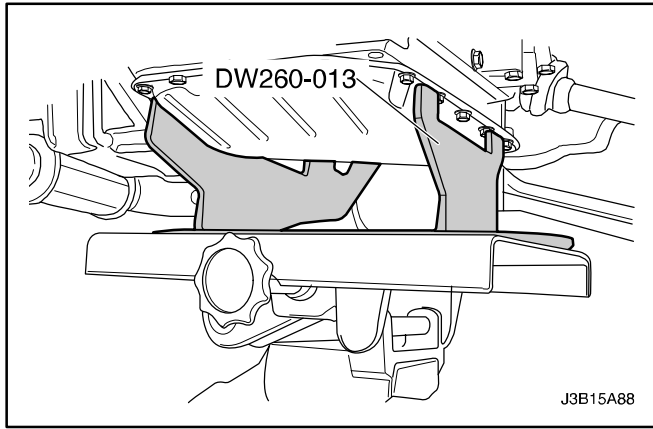
17. Secure the transaxle to a transaxle jack and transaxle support fixture DW260-013.



18. Remove the seven lower transaxle-to-engine retaining bolts.

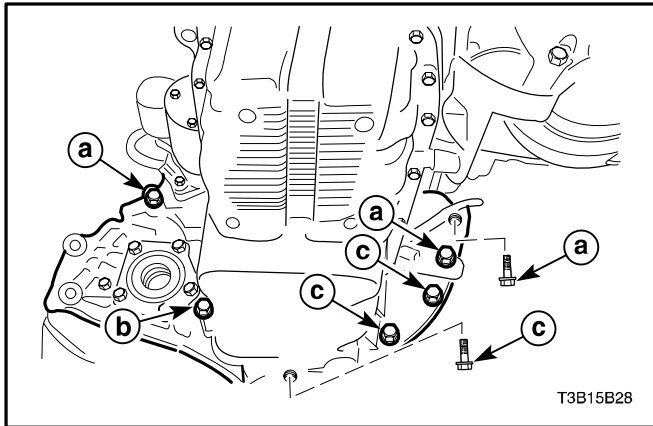


19. Carefully remove the transaxle from the vehicle.



Installation Procedure

1. Secure the transaxle to the transaxle jack, then carefully position in the vehicle.



2. Install the seven lower transaxle-to-engine retaining bolts.

Tighten

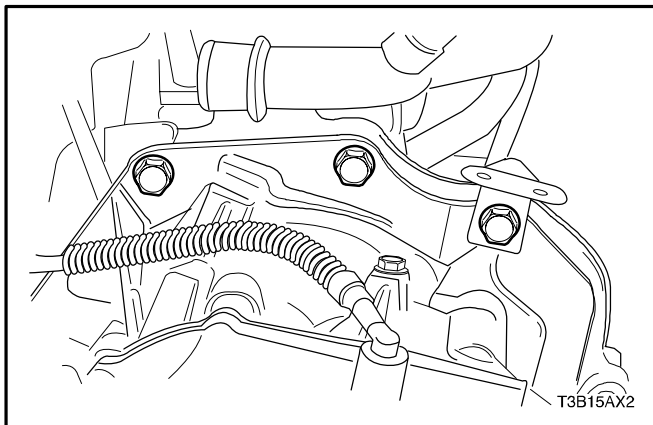
Tighten the bolts(a) to 73 N•m (54 lb–ft).

Tighten

Tighten the bolts(b) to 31 N•m (23 lb–ft).

Tighten

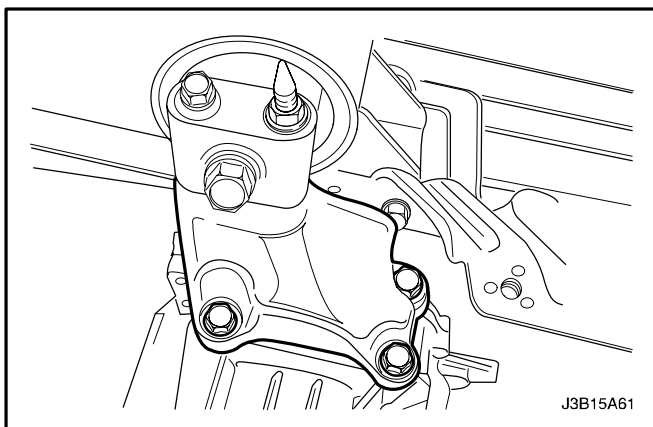
Tighten the bolts(c) to 21 N•m (15 lb–ft).



3. Install the three upper transaxle-to-engine mounting bolts.

Tighten

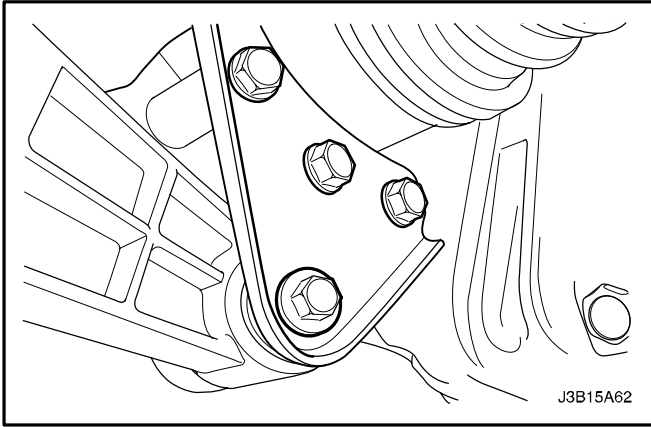
Tighten the three upper transaxle-to-engine mounting bolts to 73 N•m (54 lb–ft).



4. Install the three upper transaxle mounting bracket bolts and the bracket.

Tighten

Tighten the three upper transaxle mounting bracket bolts to 60 N•m (44 lb–ft).



5. Install the rear mounting bracket bolts and the bracket.

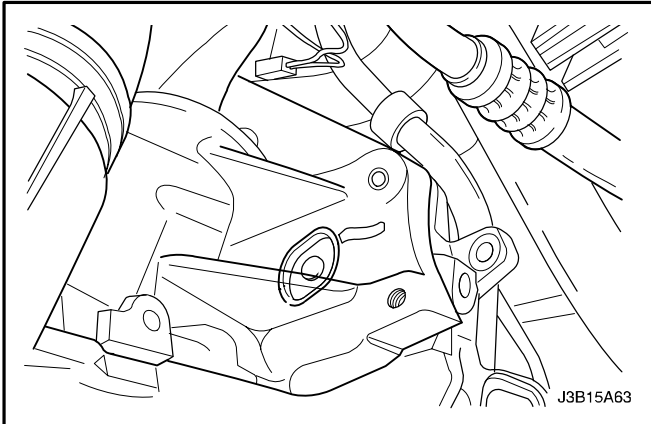
Tighten

Tighten the rear mounting bracket bolts to 60 N•m (44 lb–ft).

6. Install the damping block connection nut and bolt.

Tighten

Tighten the damping block connection nut and bolt to 80 N•m (59 lb–ft).

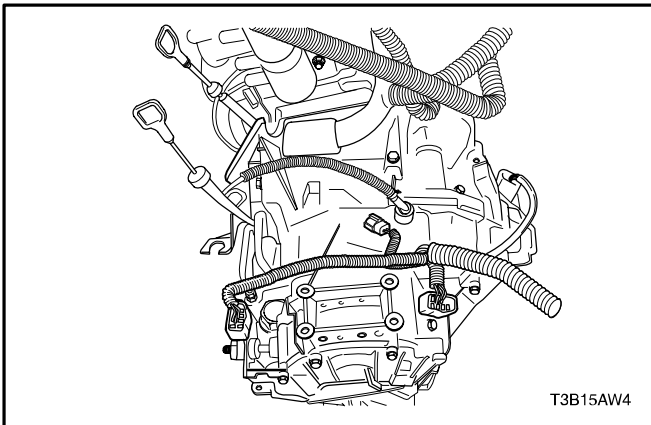


7. Install the torque converter bolts.

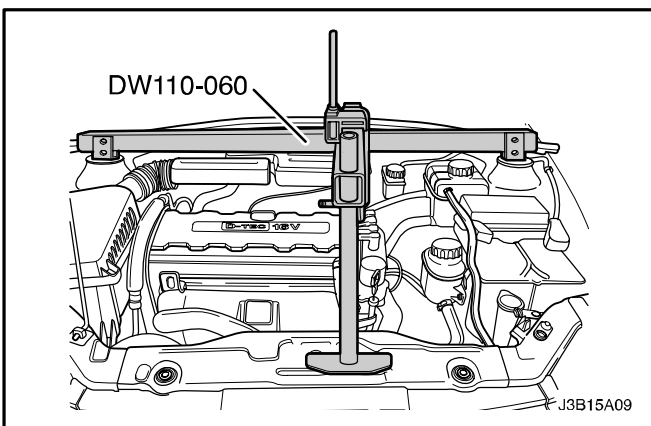
Tighten

Tighten the torque converter bolts to 45 N•m (33 lb–ft).

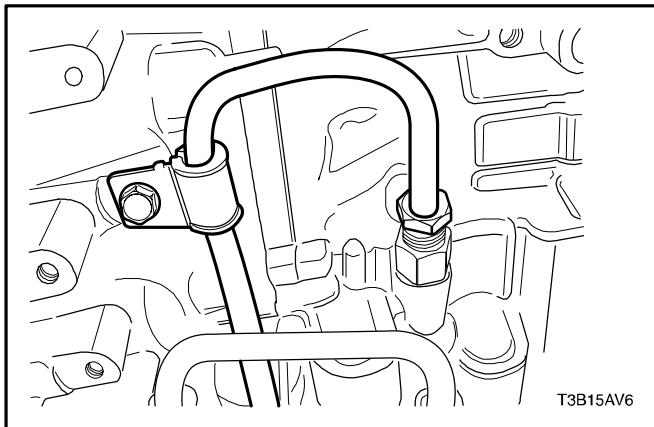
8. Install the service hall cover.



9. Connect the transaxle electrical connector.
10. Connect the TR switch electrical connector.
11. Connect the OSS sensor electrical connector.
12. Connect the ISS sensor electrical connector.

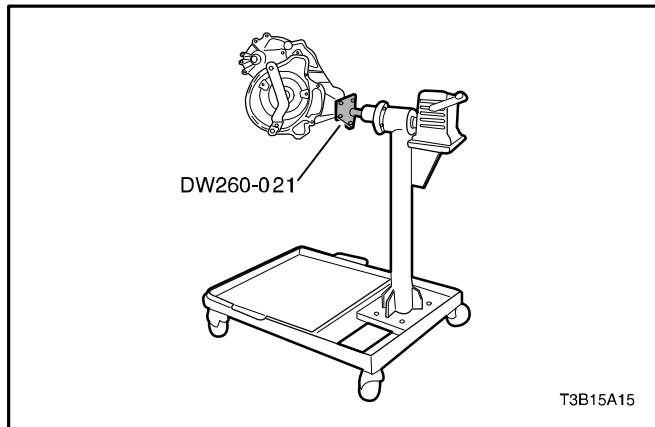


13. Remove engine support fixture DW110–060.
14. Connect the shift control cable into the transaxle.
Refer to "Shift Control Cable" in this section.



15. Connect the fluid cooler inlet and outlet pipe and hose into the transaxle. Refer to "Fluid Cooler Inlet or Outlet Pipe and Hoses" in this section.
16. Install the left and right drive axle assemblies. Refer to *Section 3A, Automatic Transaxle Drive Axle*.
17. Install the battery and battery tray. Refer to *Section 1E, Engine Electrical*.
18. Fill the transaxle with fluid. Refer to "Fluid Drain Procedure" in this section.
19. Check the fluid level. Refer to "Transaxle Fluid Level Checking Procedure" in this section.

UNIT REPAIR



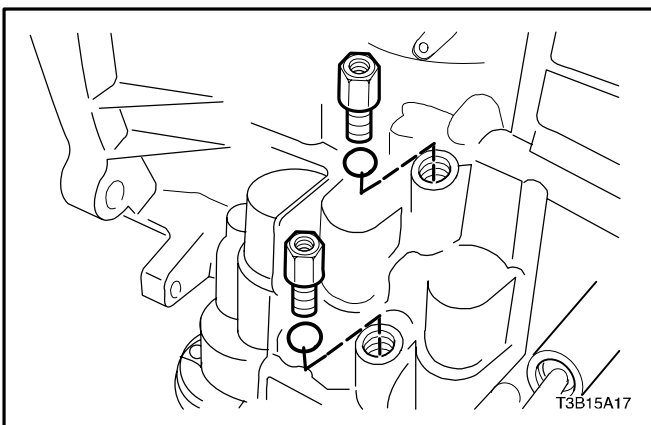
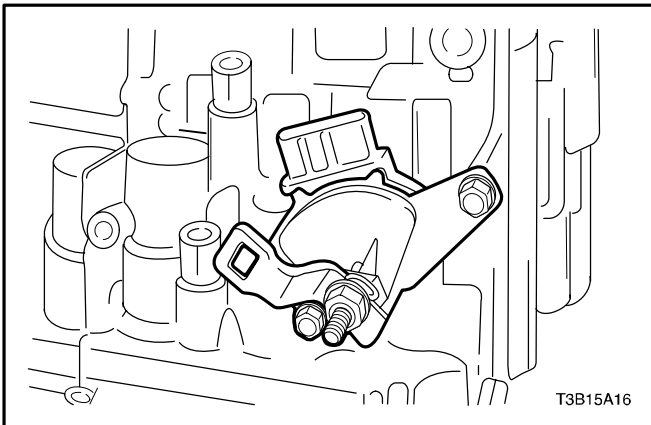
MAJOR COMPONENT DISASSEMBLY

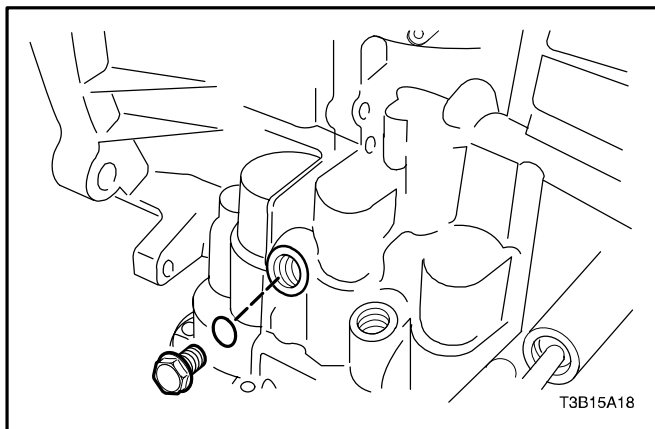
Tools Required

DW240-020 Brake/Clutch Spring Compressor
 DW240-050 Overdrive Brake Adapter
 DW240-060-01 Brake Spring Compressor Bolt/Nut
 DW240-070 1st & Reverse Brake Adapter
 DW240-080 2nd Brake Adapter
 DW240-090 Planetary Ring Gear Remover
 DW240-150 Transaxle Case Side Bearing Outer Race Adapter
 DW240-170 Adapter Handle
 DW260-021-02 Automatic Transaxle Overhaul Fixture (81-40 LE)
 DW260-041 Planetary Ring Gear Nut Removal/Installation Socket

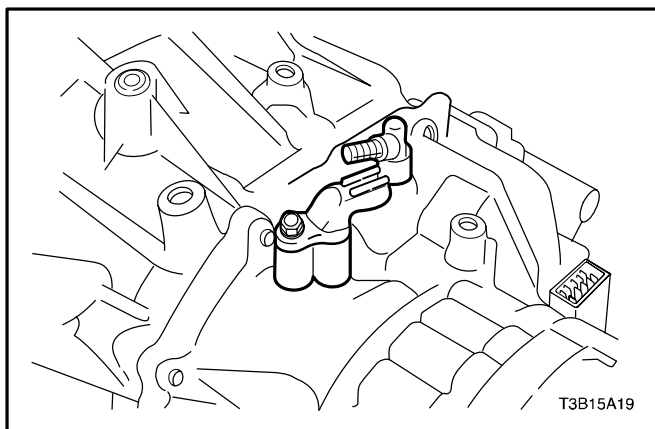
Disassembly Procedure

1. Remove the transaxle assembly from the vehicle. Refer to "Transaxle Assembly" in this section.
2. Install the transaxle assembly to the transaxle support stand using Automatic Transaxle Overhaul Fixture DW260-021-02 (81-40 LE).
3. Remove the nut, washer and control lever.
4. Using a screwdriver, unstake the lock washer.
5. Remove the two bolts and nut and pull out the transmission range (TR) switch.
6. Remove the two unions the transaxle case.
7. Remove the two O-rings from the unions.

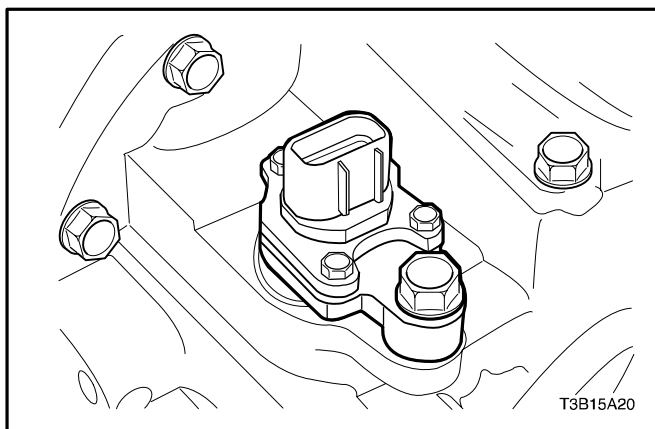




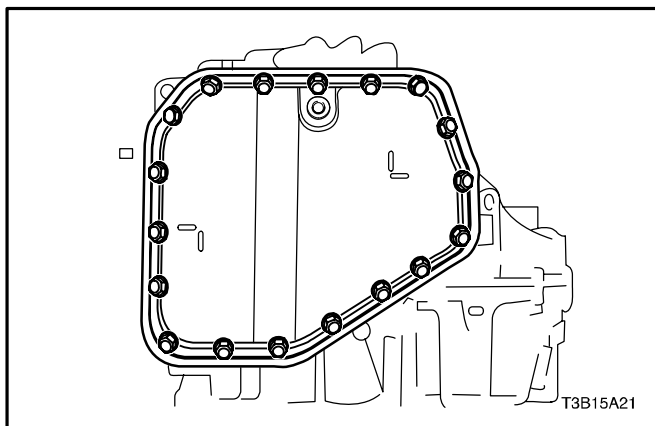
8. Remove the screw plug from the transaxle case.
9. Remove the O-ring from the screw plug.



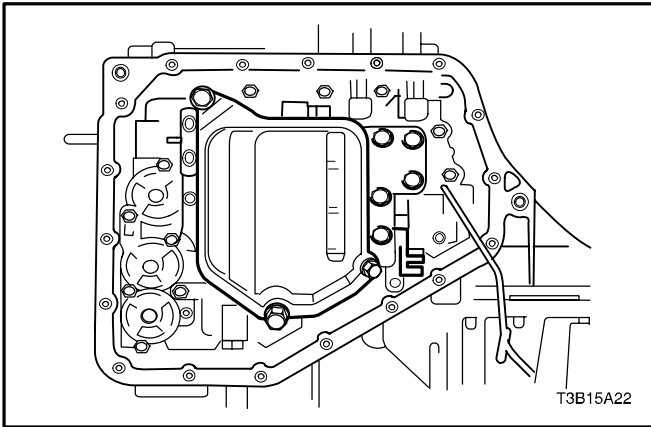
10. Remove the bolt and the input shaft speed (ISS) sensor.
11. Remove the breather plug.
12. Remove the O-ring from the breather plug.



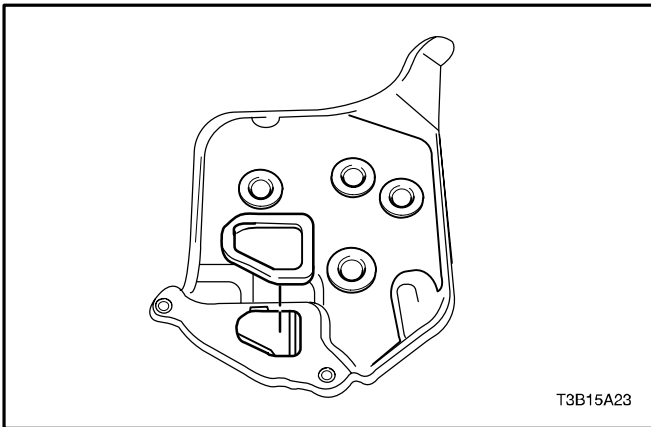
13. Remove the bolt and the output shaft speed (OSS) sensor.



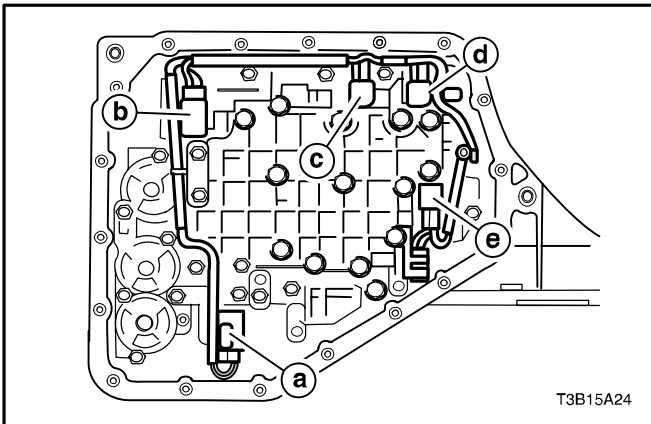
14. Remove the 18 bolts.
15. Remove the oil pan and gasket.
16. Remove the drain plug from the oil pan.



17. Remove the three bolts and oil strainer.



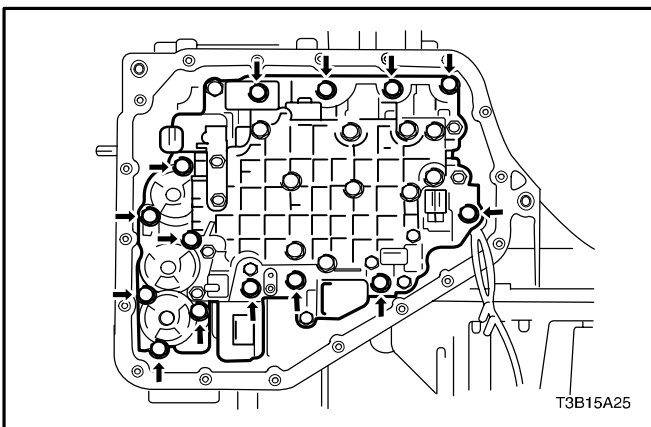
18. Remove the gasket from the oil strainer.



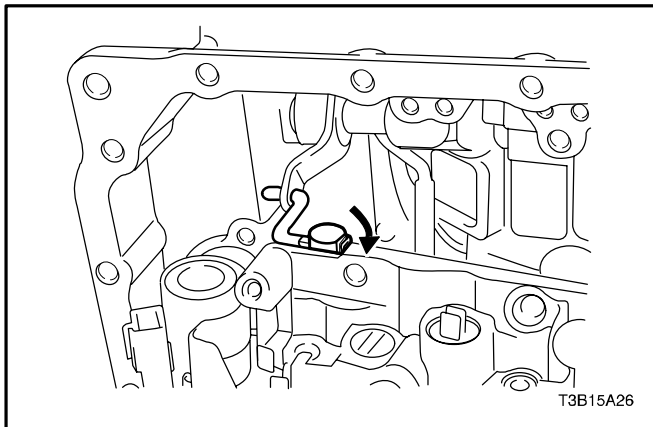
19. Remove the bolt and transmission fluid temperature sensor with the clamp.

20. Disconnect the 5 solenoid connectors.

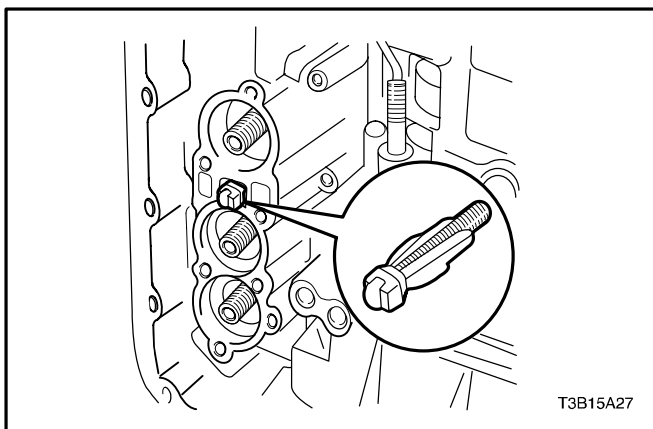
- a. Lock-up control solenoid
- b. Pressure control solenoid.
- c. No.2 shift solenoid.
- d. No.1 shift solenoid.
- e. Timing solenoid



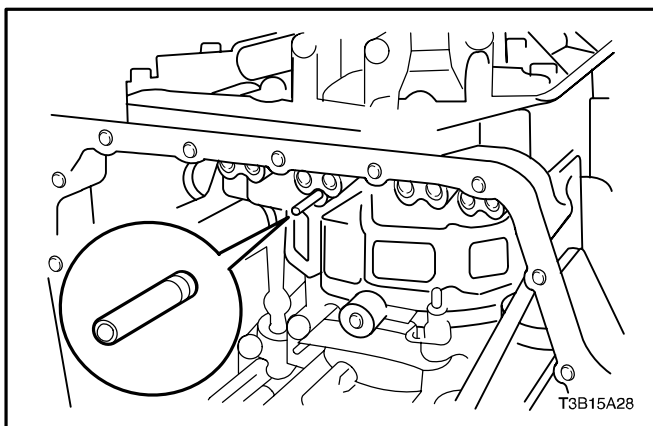
21. Support the valve body assembly and remove the 14 bolts.



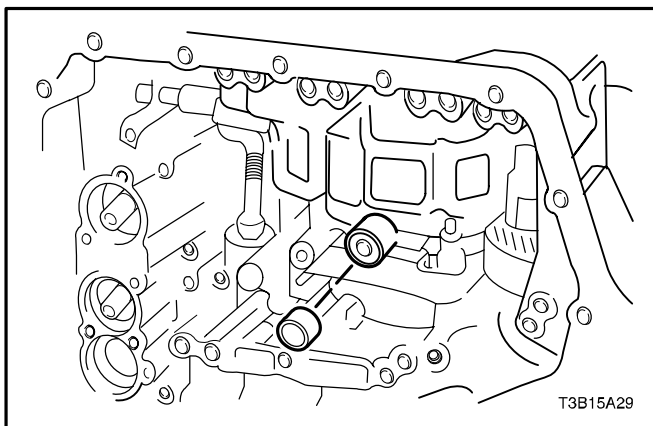
22. Disconnect the manual valve control rod from the manual valve lever, then remove the valve body assembly.



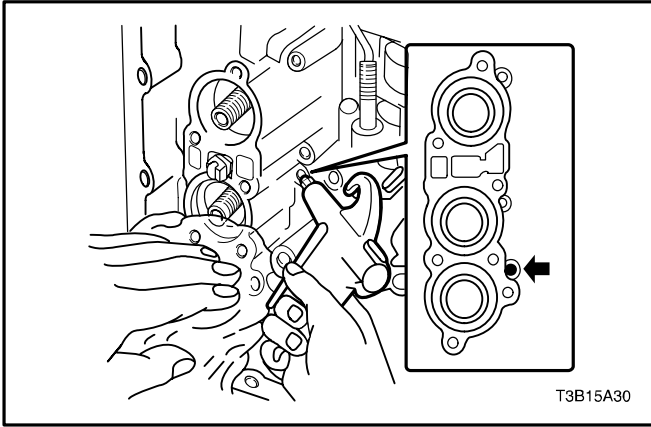
23. Remove the check valve and spring.



24. Remove the brake drum gasket.



25. Remove the apply gasket.

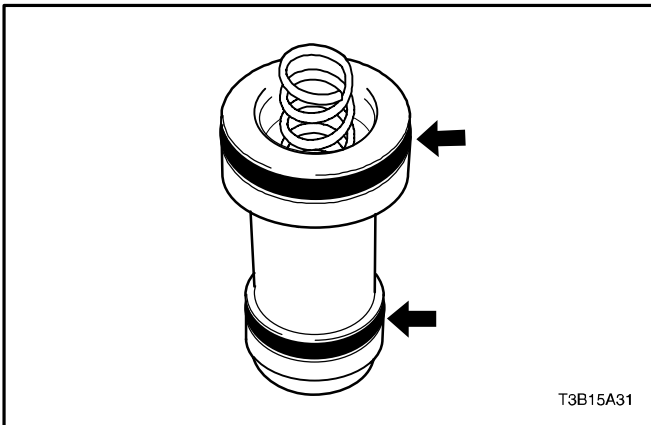


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

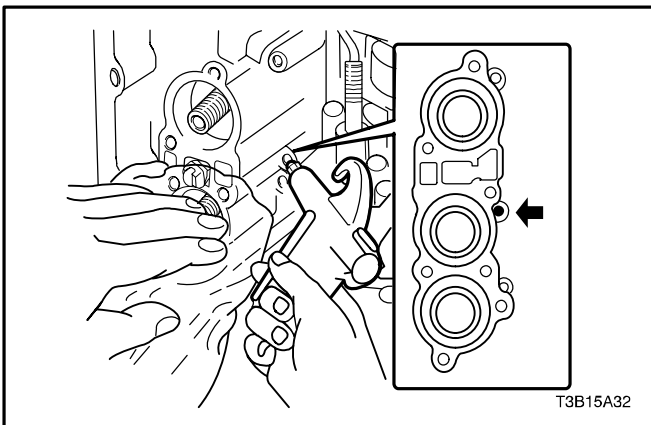
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash automatic transaxle fluid (ATF) when air-blowing.

26. Apply 392 kPa (57 psi) of compressed air to the oil hole and remove the direct clutch (C2) accumulator piston and spring.
27. Remove the spring.



28. Remove the 2 O-rings from the direct clutch (C2) accumulator piston.

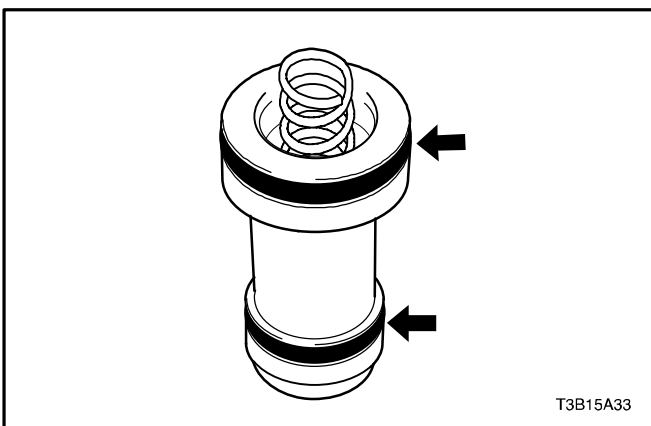


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

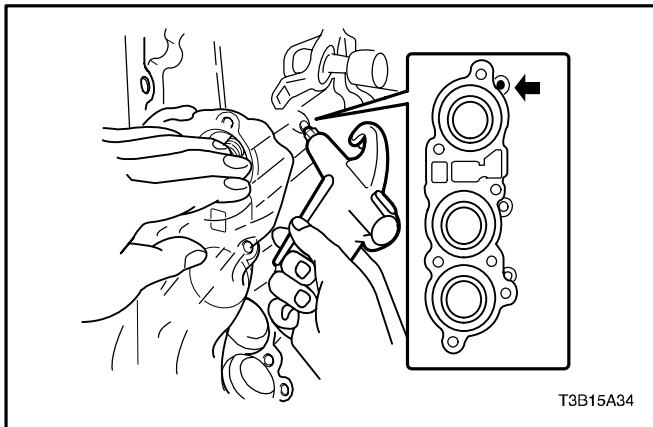
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

29. Apply 392 kPa (57 psi) of compressed air to the oil hole and remove the forward clutch (C1) accumulator piston and spring.
30. Remove the spring.



31. Remove the 2 O-rings from the forward clutch (C1) accumulator piston.

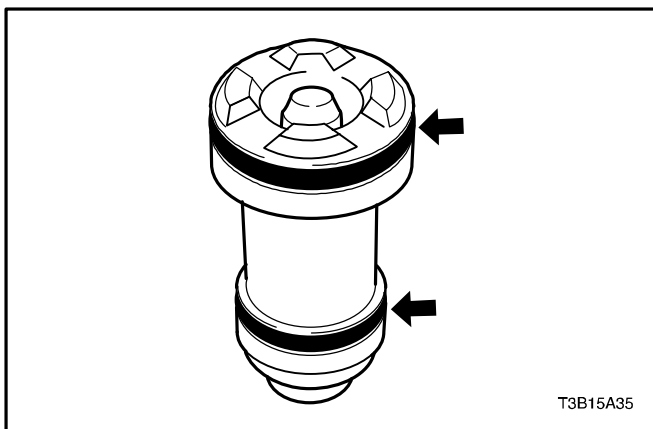


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

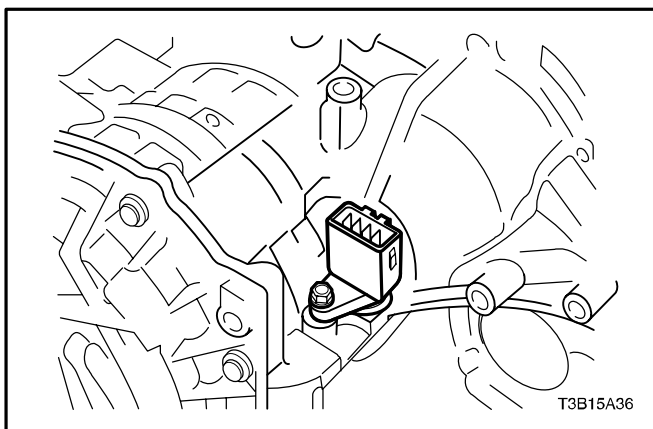
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

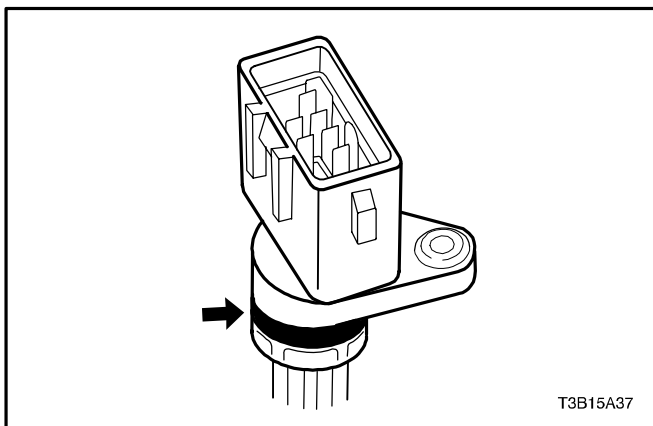
32. Apply 392 kPa (57 psi) of compressed air to the oil hole and remove the O/D & 2nd brake (B1) clutch accumulator piston and spring.



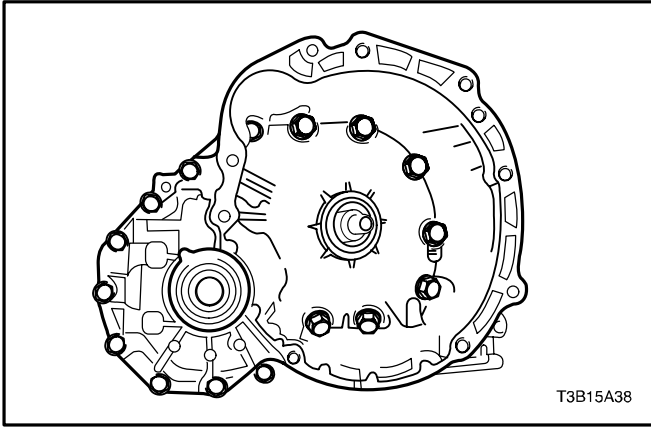
33. Remove the 2 O-rings from the O/D & 2nd brake (B1) accumulator piston.



34. Remove the bolt and the transaxle wire from the transaxle case.

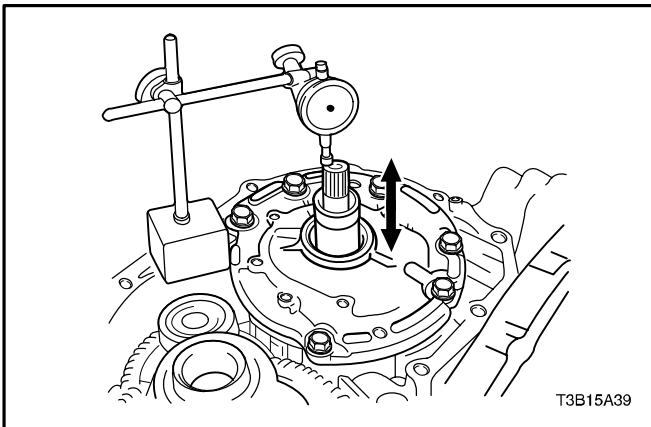


35. Remove the O-ring from the transaxle wire.

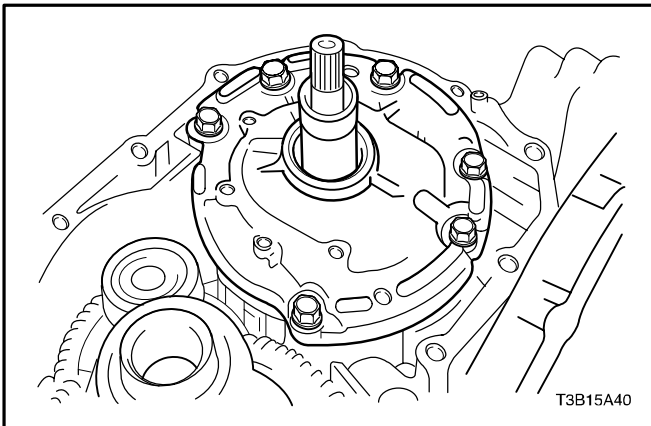


36. Remove the 16 bolts and tap on the circumference of the transaxle housing with a plastic hammer to remove the transaxle housing from the transaxle case.

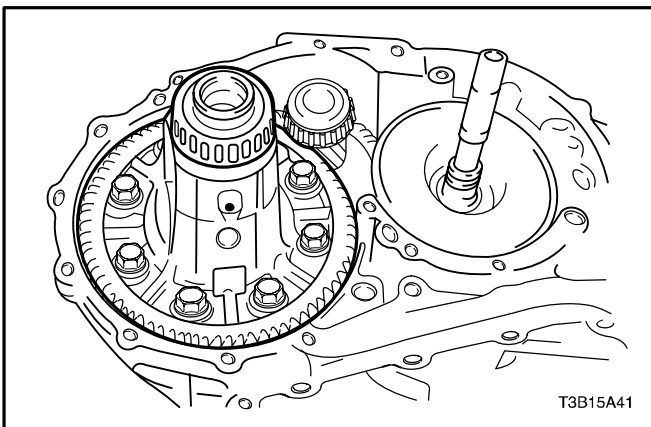
Important : Be careful not to drop the differential gear assembly when the transaxle housing is removed.



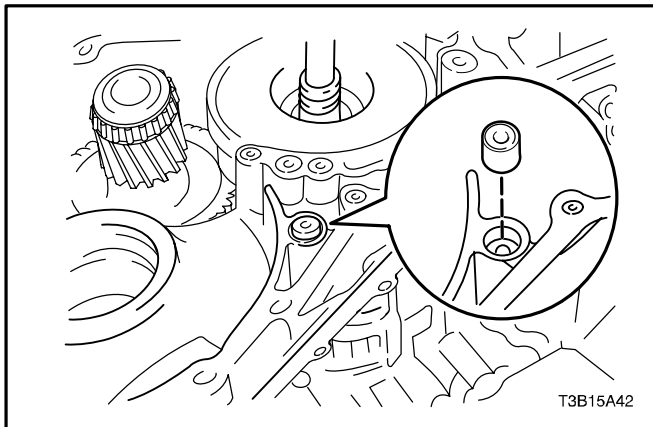
37. Using a dial indicator, measure the input shaft end play.
- End play : 0.3 – 0.9 mm (0.012–0.035 in.)



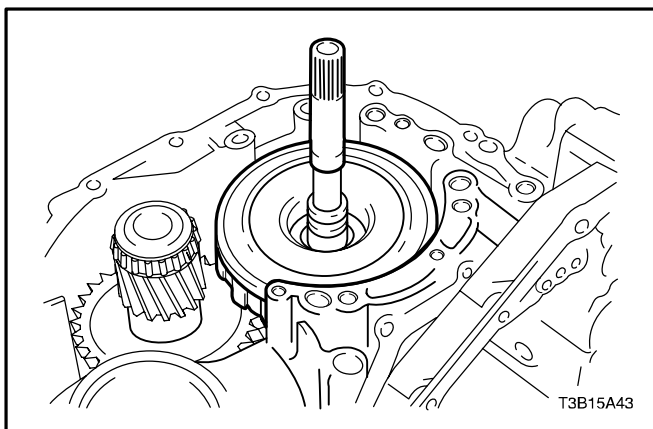
38. Remove the 6 bolts and oil pump.



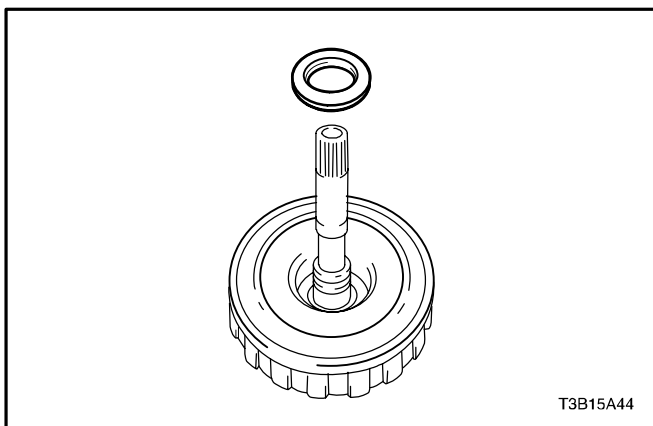
39. Remove the differential gear assembly from the transaxle case.



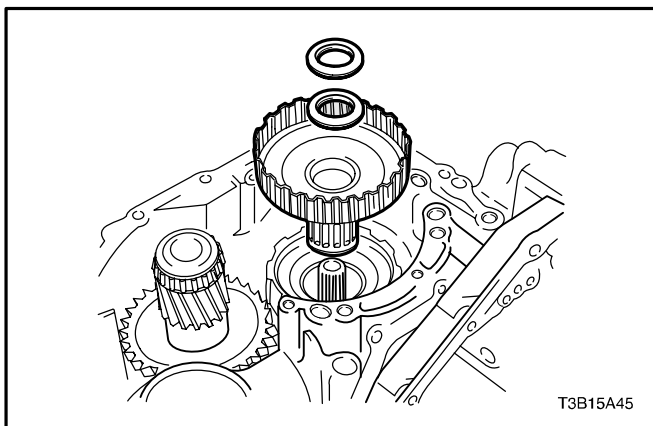
40. Remove the apply gasket.



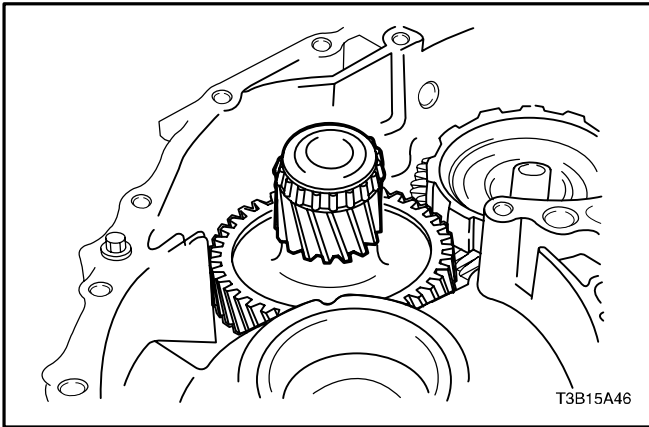
41. Remove the direct clutch (C2) assembly from the transaxle case.



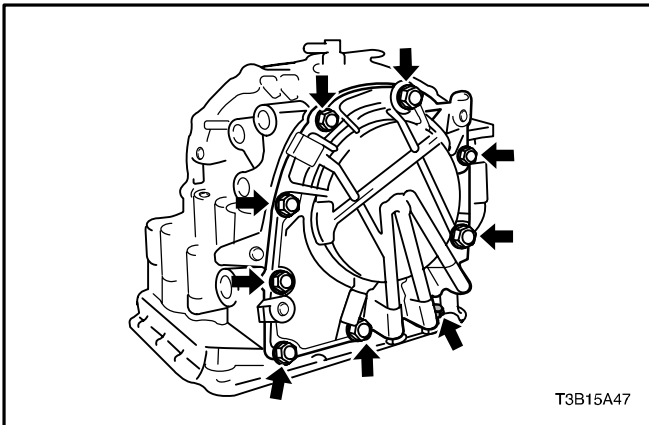
42. Remove the thrust needle roller bearing from the direct clutch assembly.



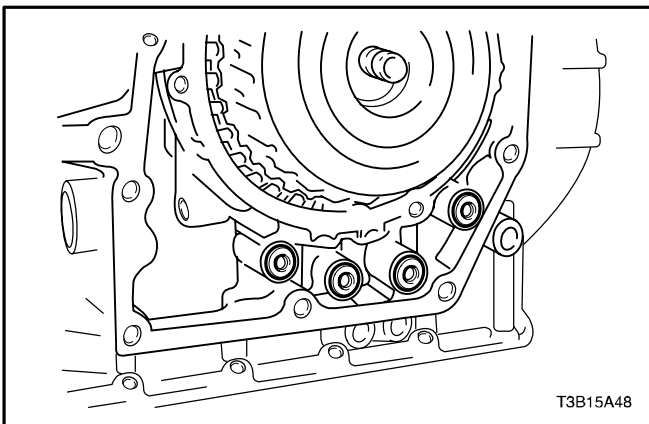
43. Remove the direct clutch (C2) hub, thrust needle roller bearing and thrust bearing race from the transaxle case.



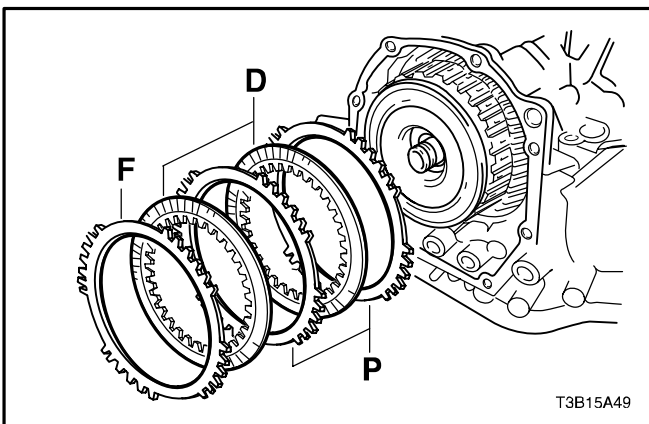
44. Remove the counter driven gear assembly from the transaxle case.



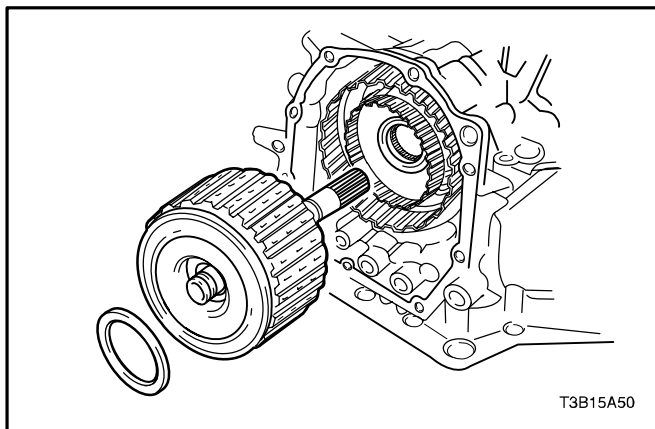
45. Remove the 9 bolts and tap on the circumference of the transaxle rear cover with a plastic hammer to remove the transaxle rear cover from the transaxle case.



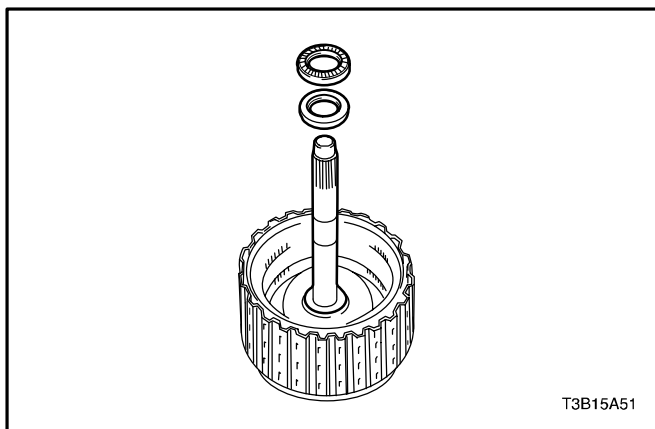
46. Remove the 4 apply gaskets.



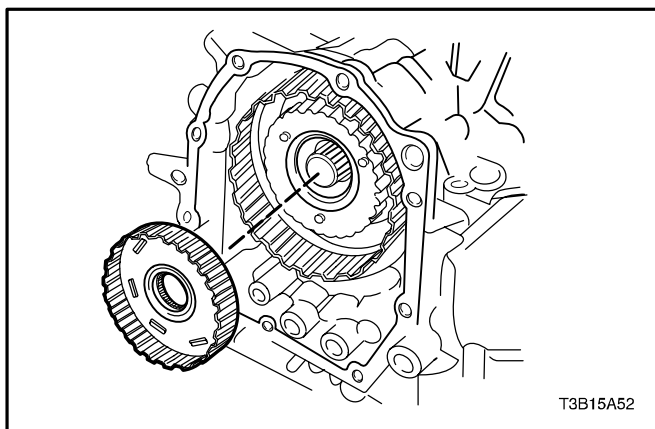
47. Remove 2nd coast & O/D brake (B1) flange, 2 discs and 2 plates from the transaxle case.



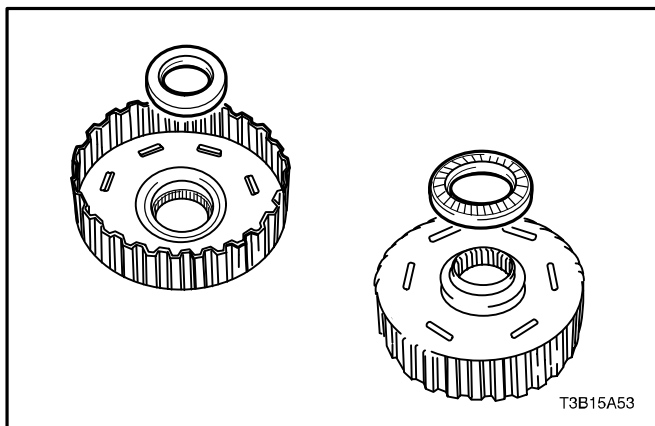
48. Remove the thrust needle roller bearing and forward & reverse clutch assembly.



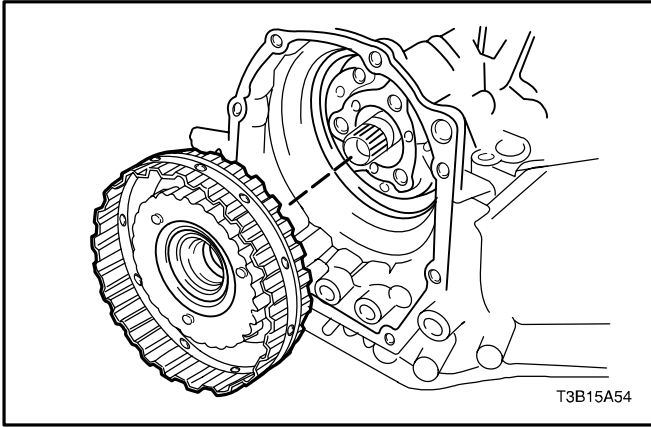
49. Remove the thrust needle roller bearing and thrust bearing race from the forward & reverse clutch assembly.



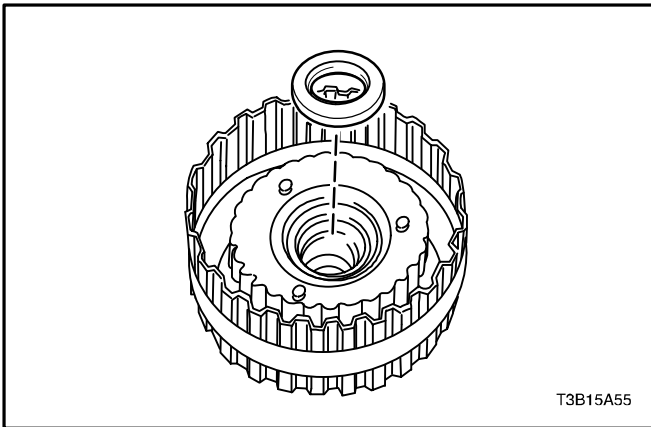
50. Remove the forward clutch hub from the transaxle case.



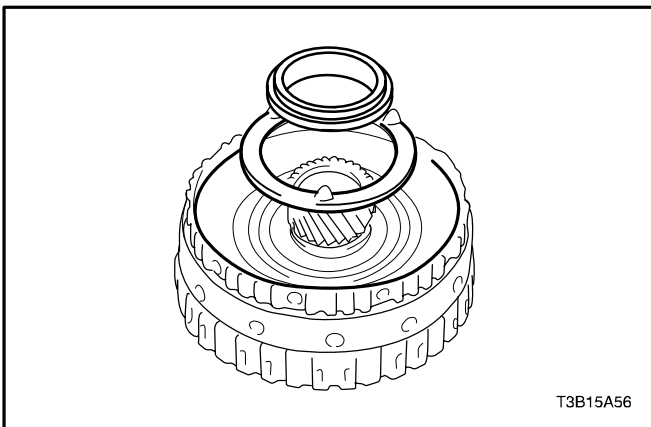
51. Remove the thrust bearing race and thrust needle roller bearing from the forward clutch hub.



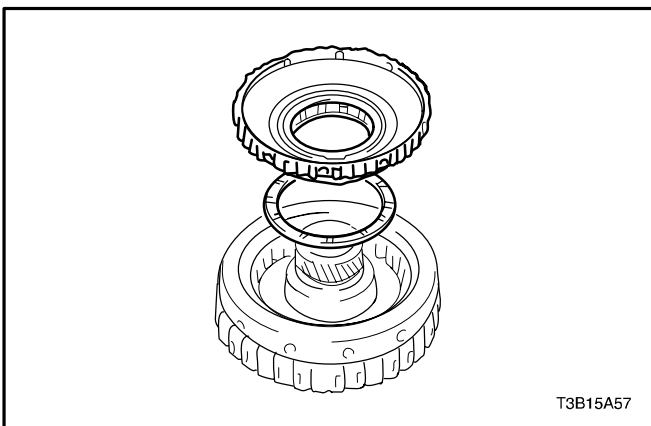
52. Remove rear planetary sun gear and one-way clutch assembly.



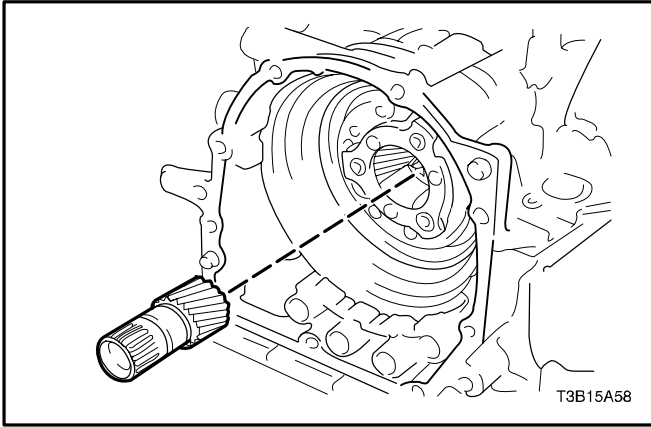
53. Remove the thrust bearing race from the rear planetary sun gear and one-way clutch assembly.



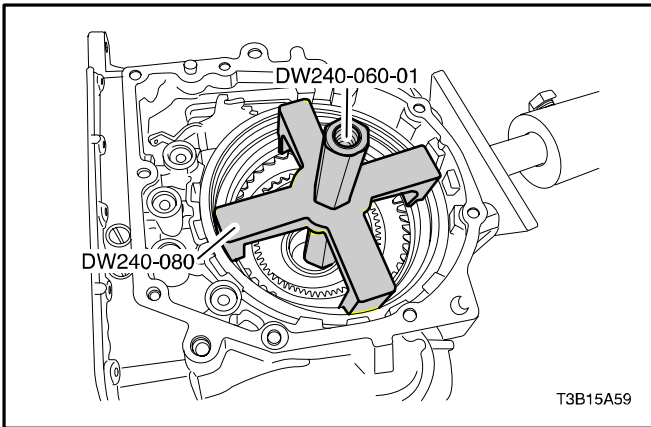
54. Remove the thrust needle roller bearing and planetary carrier thrust washer from the rear planetary sun gear and one-way clutch assembly.



55. Remove the one-way clutch assembly and thrust washer from the rear planetary sun gear.



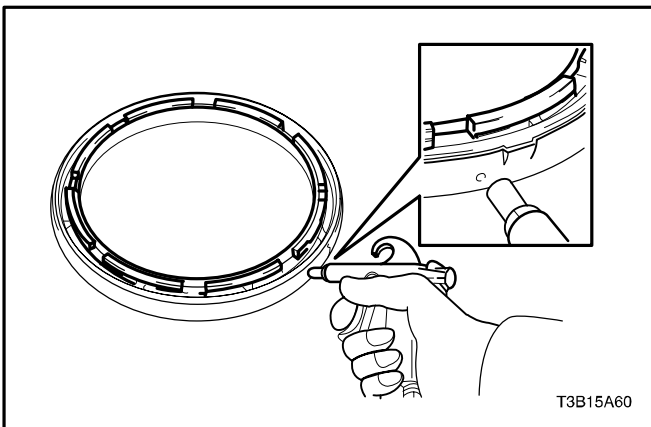
56. Remove the front planetary sun gear from the transaxle case.
57. Remove the thrust bearing race from the front planetary sun gear.



WARNING : USE CAUTION WHEN REMOVING SNAP RINGS OR PERSONAL INJURY MAY RESULT.

Notice : Stop the press when the 2nd brake is lowered 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the 2nd brake from being deformed.

58. Using brake spring compressor bolt/nut DW240–060–01 and 2nd brake adapter DW240–080, remove the 2 snap rings, 2nd brake piston and 2nd brake piston return spring.

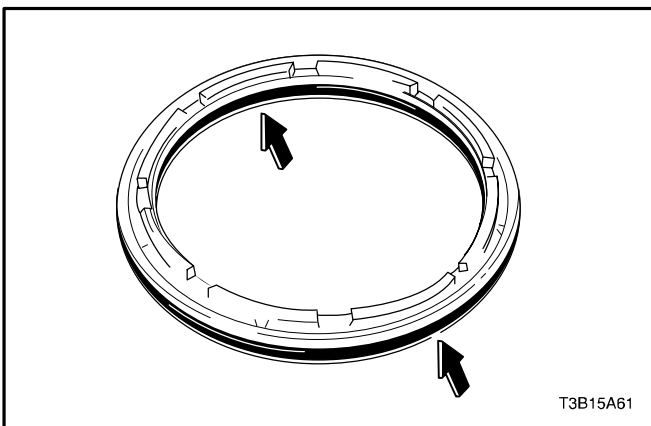


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

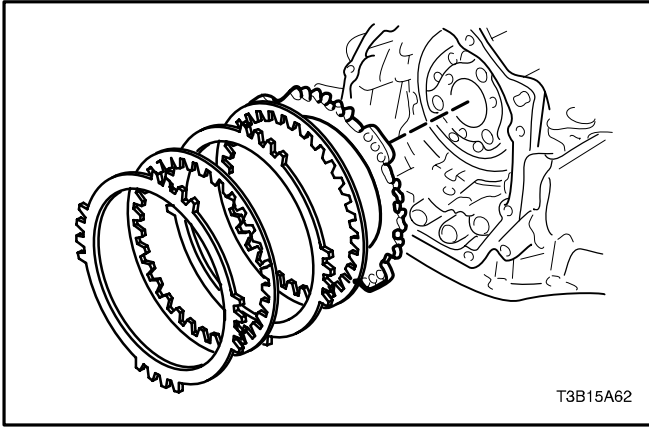
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

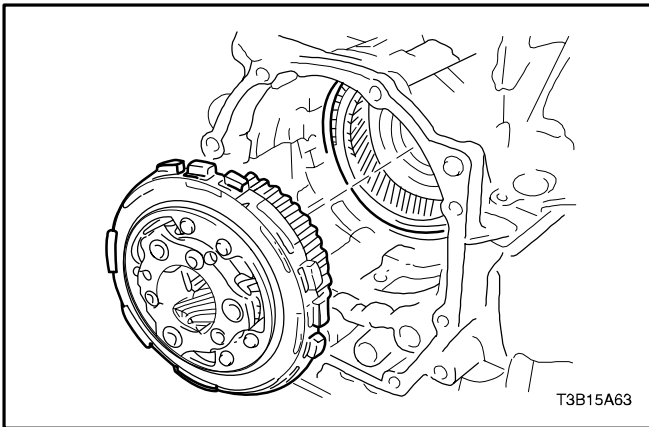
59. Apply 392 kPa (57 psi) of compressed air to the 2nd brake to remove the 2nd brake piston from the 2nd brake clutch cylinder.



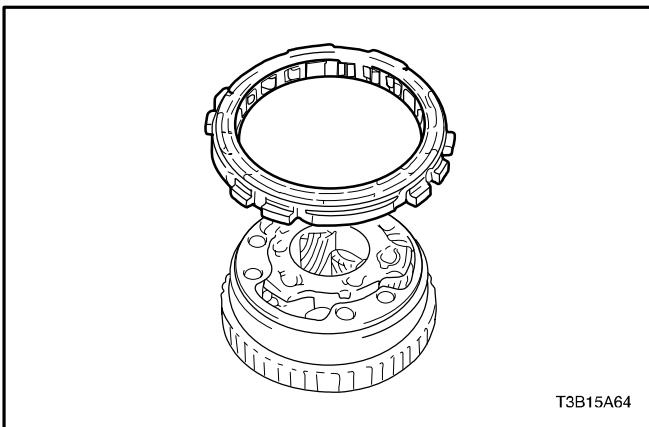
60. Remove the 2 O-rings from the 2nd brake piston.



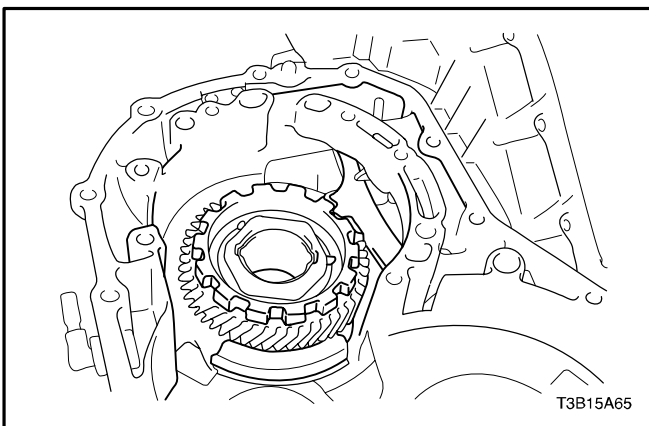
61. Remove the 2 plates, 2 discs and flange.



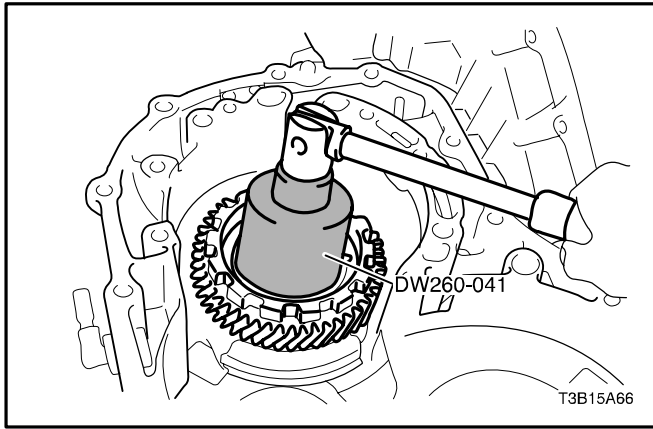
62. Remove the No. 2 one-way clutch and planetary gear from the transaxle case.



63. Remove the No. 2 one-way clutch from the planetary gear and remove the anti-rattle clip.

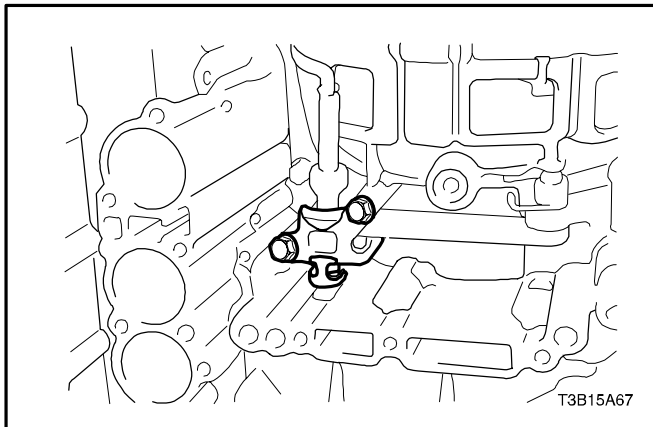


64. Fix the counter drive gear with the parking lock pawl.

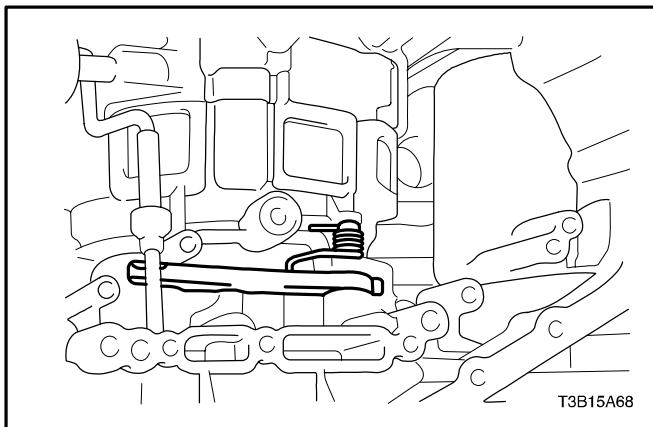


65. Remove the planetary ring gear nut using planetary ring gear nut removal/installation socket DW 260-041.

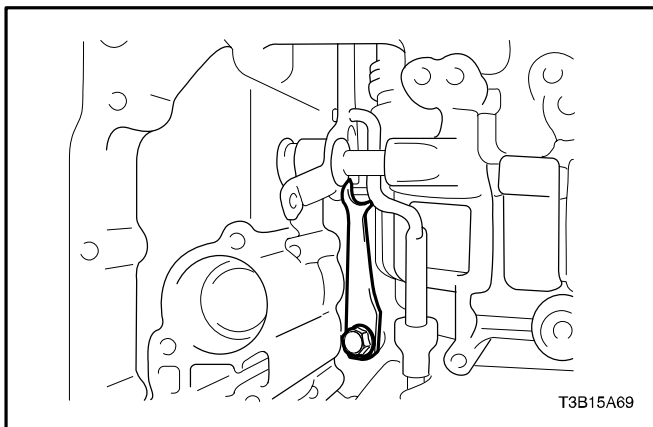
Notice : Remove the nut without unstaking the planetary ring gear. If chisel or other tool is used to unstack the planetary ring gear, such impact may damage the bearing.



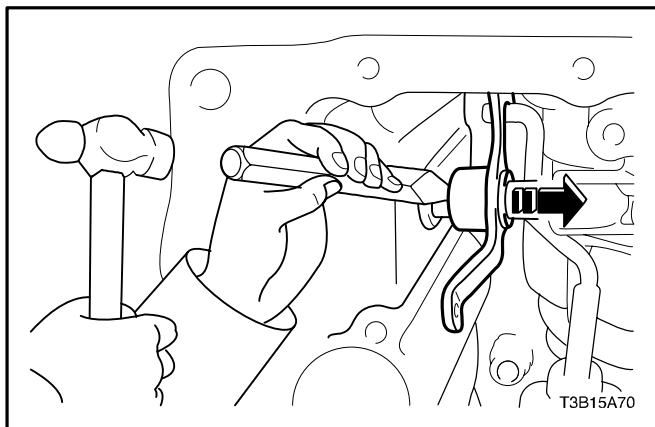
66. Remove the 2 bolts and parking lock pawl bracket.



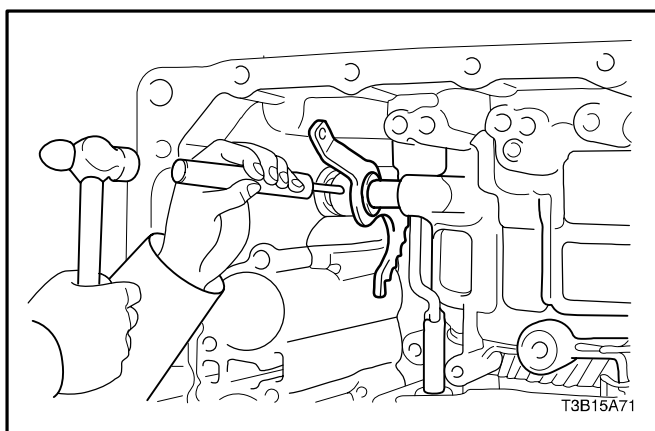
67. Remove the parking lock pawl shaft, torsion spring and parking lock pawl.



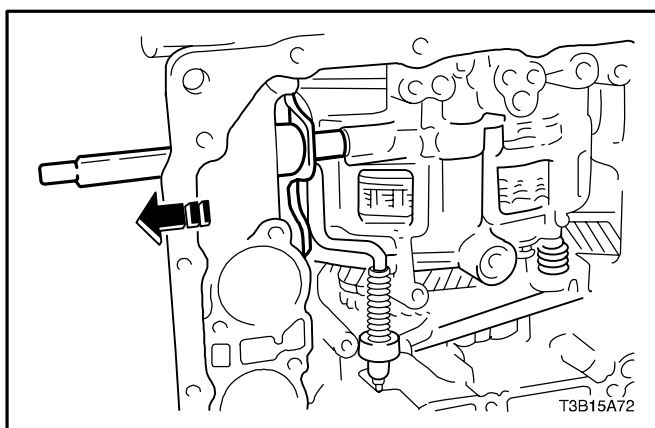
68. Remove the bolt and manual detent spring.



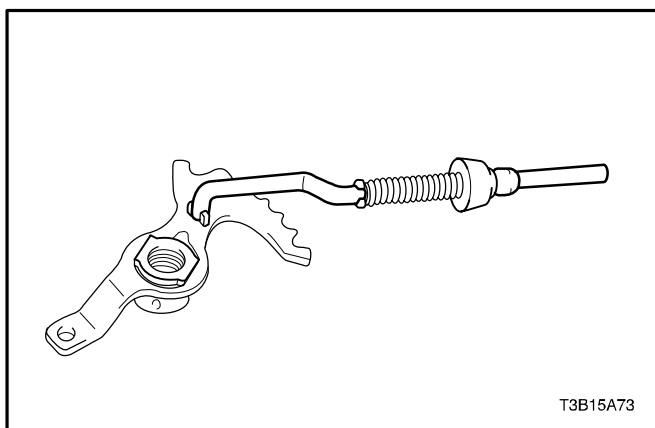
69. Using a chisel and hammer, unstake and remove the spacer.



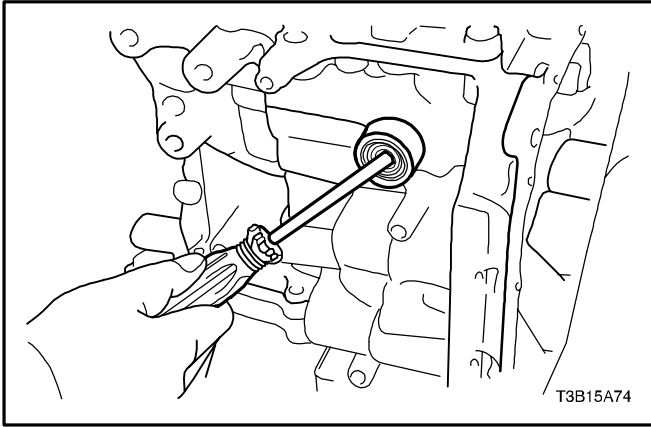
70. Using a pin punch and hammer, drive out the pin.



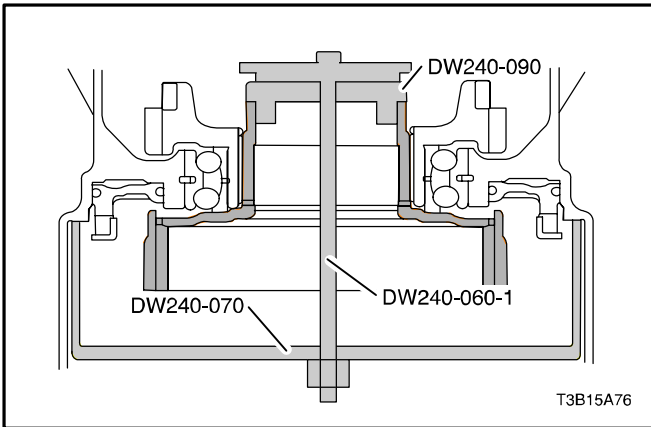
71. Remove the manual valve lever shaft and manual valve lever.



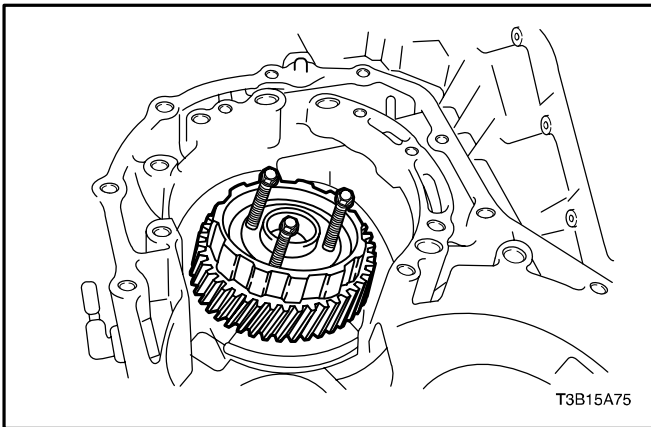
72. Remove the parking lock rod from the manual valve lever.



73. Using a screwdriver, remove the oil seal.



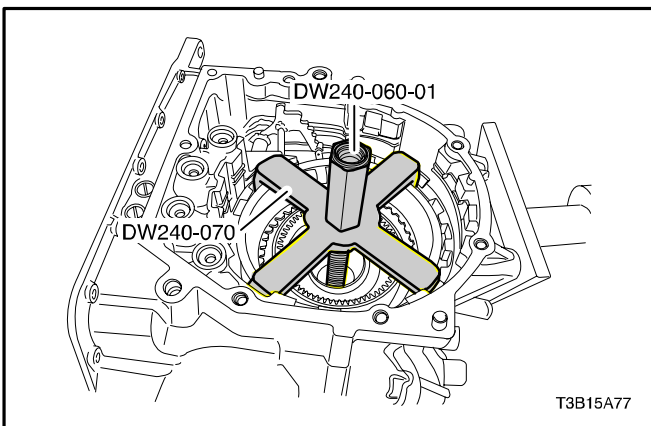
74. Using brake spring compressor bolt/nut DW240-060-01, 1st & reverse brake adapter DW240-070 and planetary ring gear remover DW240-090, remove the planetary ring gear.



75. Install the 3 bolts to the counter drive gear.

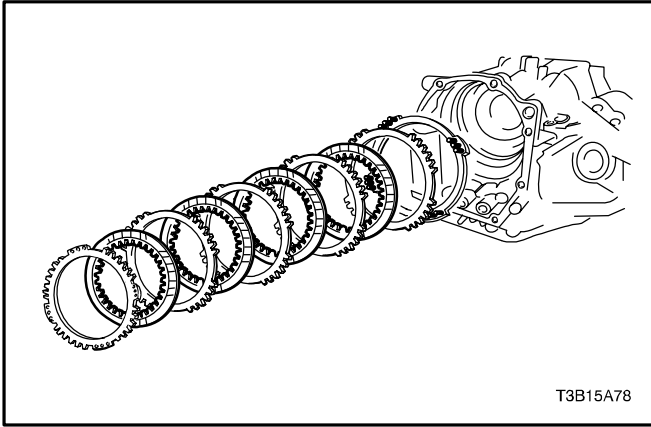
- Bolt (M6) : L= 40–80mm, Pitch = 1.0mm

76. Rotate 3 bolts in order and remove the counter drive gear and planetary ring gear.

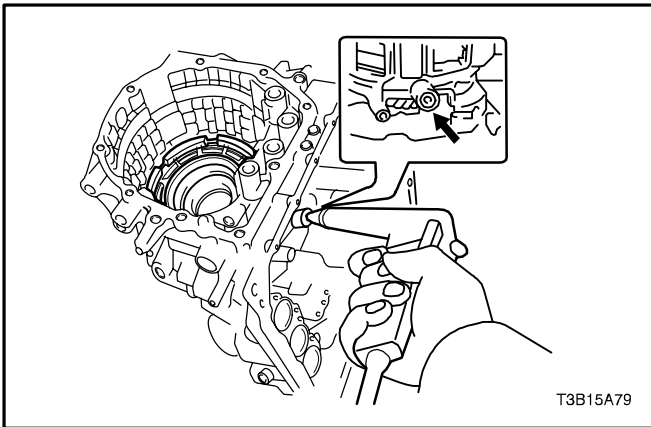


WARNING : USE CAUTION WHEN REMOVING SNAP RINGS OR PERSONAL INJURY MAY RESULT.

77. Using brake spring compressor bolt/nut DW240-060-01 and 1st & reverse brake adapter DW240-070, remove the snap ring of 1st & reverse brake.



78. Remove the flange, 4 discs, 4 plates and return spring.

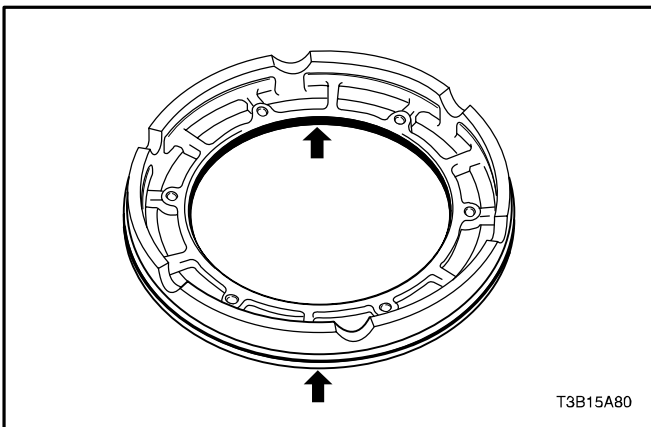


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

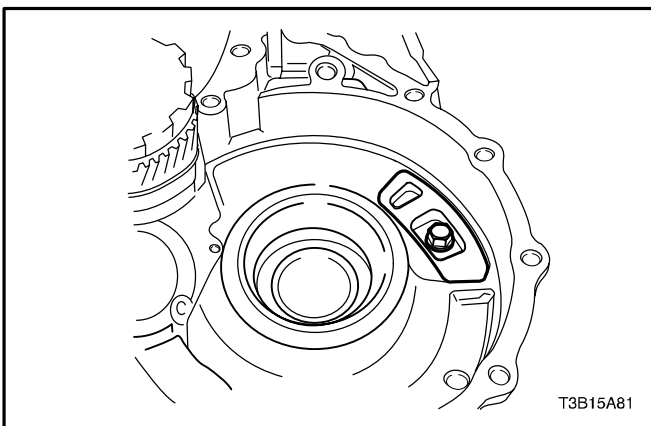
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing

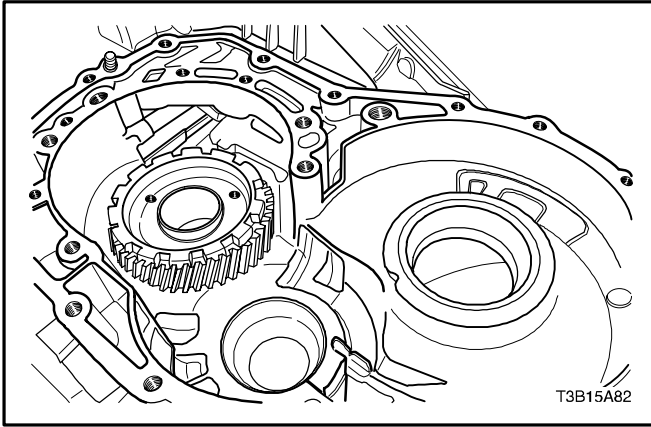
79. Apply 392 kPa (57 psi) of compressed air to the transaxle case to remove the 1st & reverse brake piston.



80. Remove the 2 O-rings from the 1st & reverse brake piston.

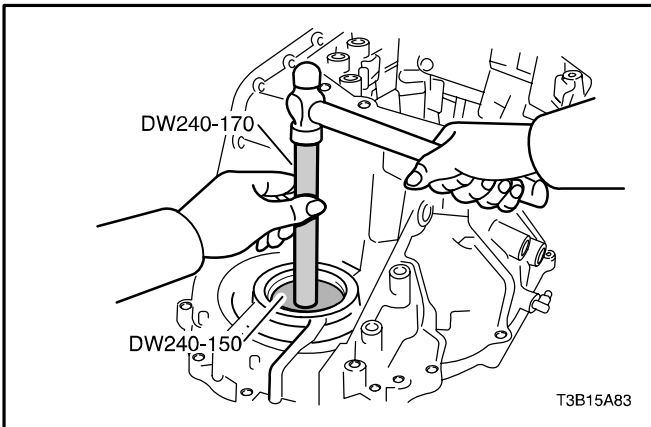


81. Remove the bolt and No.1 transaxle case plate from the transaxle case.

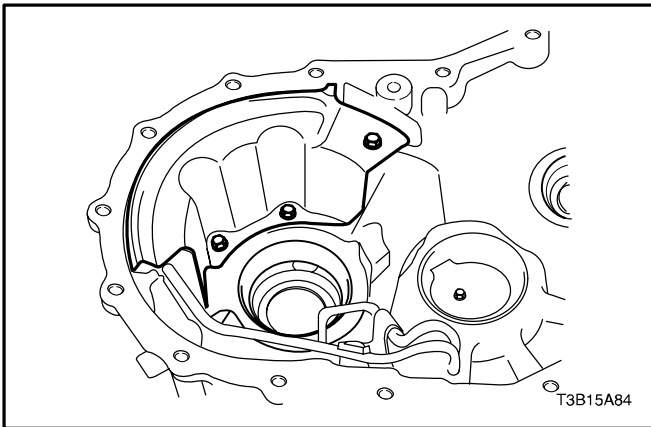


82. Using a suitable puller, remove the counter driven gear outer tapered roller bearing race and shim from the transaxle case.
83. Using a driver, remove the oil seal from the transaxle case.

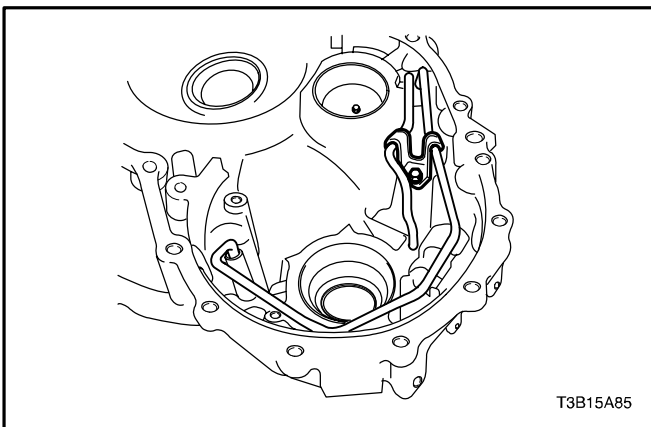
Notice : Be careful not to damage the transaxle case when removing the oil seal using a driver.



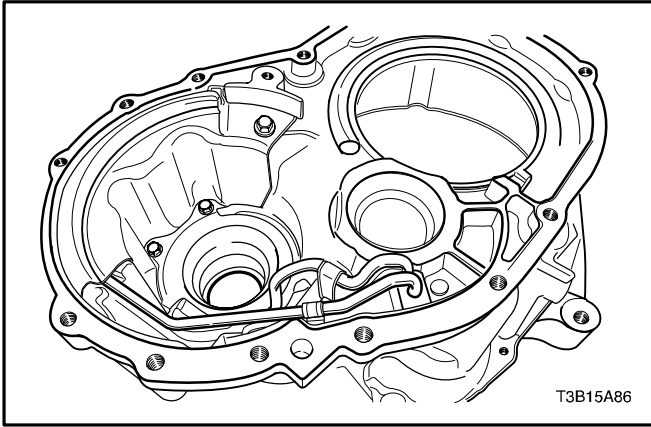
84. Using transaxle case side bearing outer race adapter DW240-150 and adapter handle DW240-170, remove the transaxle case side bearing outer race and shim.



85. Remove the 3 bolts and oil reservoir lock plate from the transaxle housing.

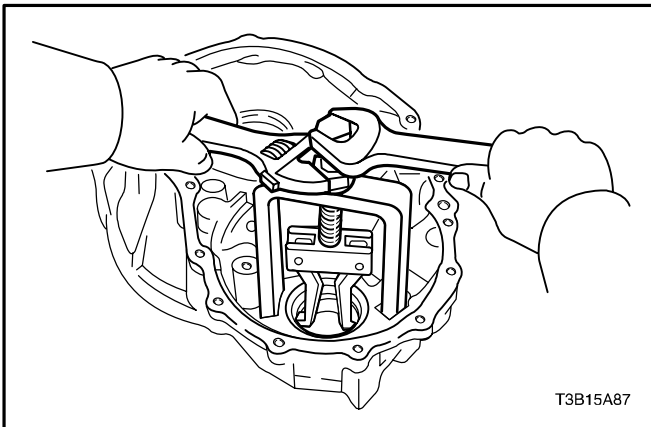


86. Remove the bolt and No.1 transaxle apply pipe clamp from the transaxle housing.
87. Remove the transaxle lube apply pipe and differential gear lube apply pipe from the transaxle housing.

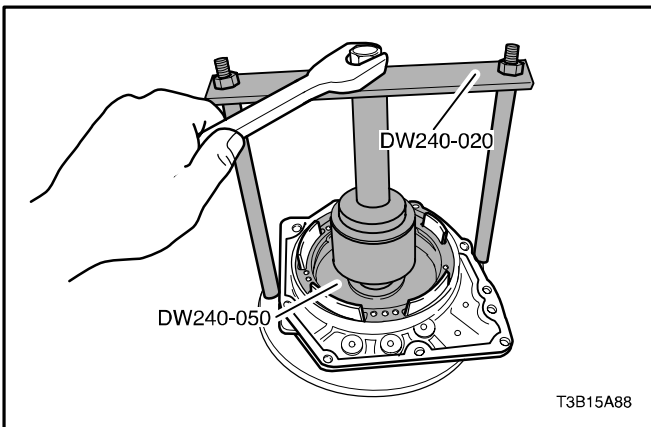


88. Using a suitable puller, remove the counter driven gear outer tapered roller bearing race from the transaxle housing.
89. Using a driver, remove the oil seal from the transaxle housing.

Notice : Be careful not to damage the transaxle housing when removing the oil seal using a driver.



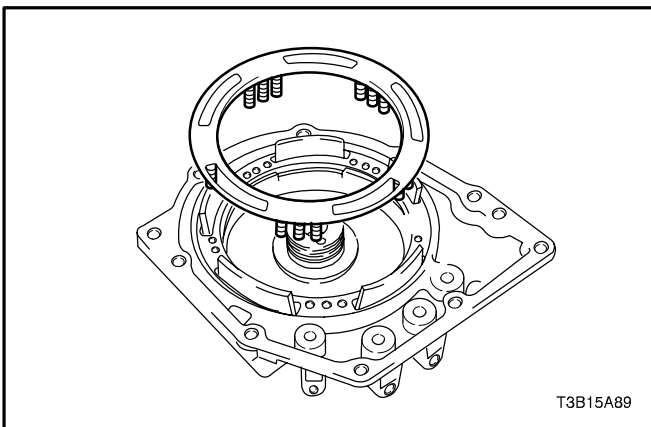
90. Using a suitable puller, remove the side bearing outer race from the transaxle housing.



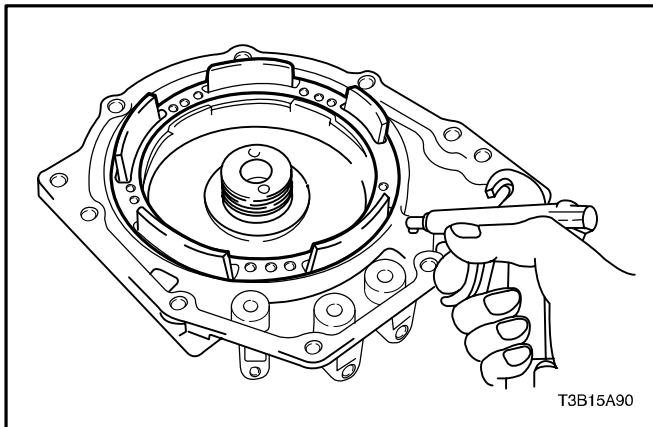
WARNING : USE CAUTION WHEN REMOVING SNAP RINGS OR PERSONAL INJURY MAY RESULT.

Notice : Stop the press when the O/D brake piston is lowered 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the O/D brake piston from being deformed.

91. Using brake/clutch spring compressor DW240-020, overdrive brake adapter DW240-050 and a driver, remove the snap ring.



92. Remove the O/D brake return spring.

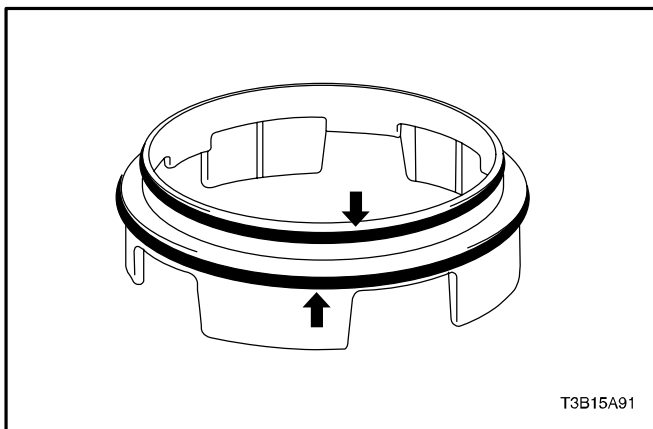


WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

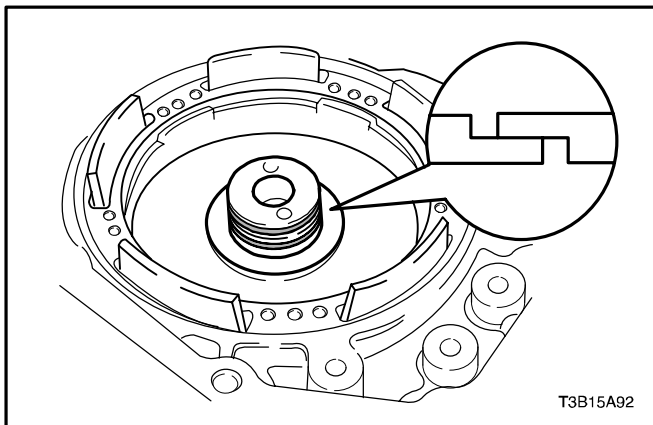
Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

93. Apply 392 kPa (57 psi) of compressed air to the transaxle rear cover to remove the O/D brake piston.

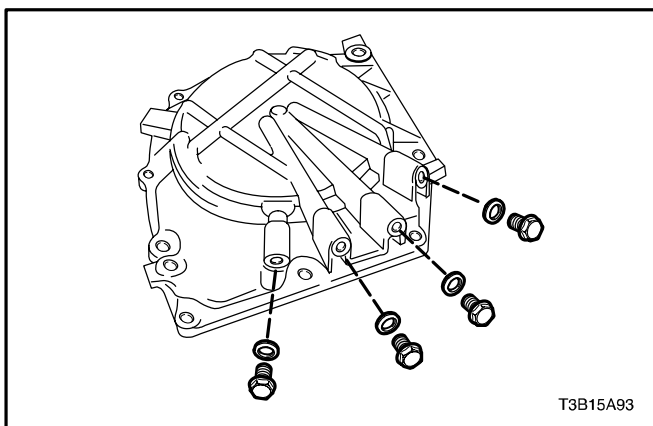


94. Remove the 2 O-rings from the O/D brake piston.

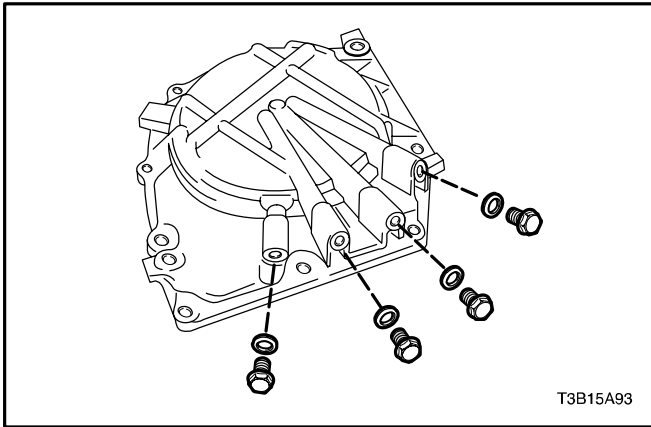


95. Remove the 2 seal rings from the transaxle rear cover.

Notice : Do not expand the seal ring excessively.



96. Remove the 4 screw plugs and 4 O-rings from the transaxle rear cover.



MAJOR COMPONENT ASSEMBLY

Tools Required

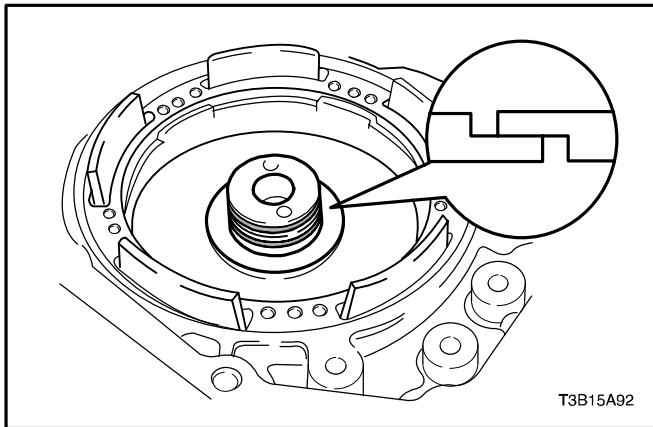
DW240-020 Brake/Clutch Spring Compressor
 DW240-050 Overdrive Brake Adapter
 DW240-060-01 Brake Spring Compressor Bolt/Nut
 DW240-060-02 Brake Spring Compressor Plate
 DW240-070 1st / Reverse Brake Adapter
 DW240-100 Counter Drive Gear Installation Adapter
 DW240-130 Differential Preload Adapter
 DW260-031-01 Transaxle Housing Oil Seal Installer
 DW260-031-02 Transaxle Case Oil Seal Installer
 DW260-041 Planetary Ring Gear Nut Removal/Installation Socket
 DW240-160 Transaxle Case Outer Tapered Roller Bearing Race Adapter
 DW240-140 Transaxle Housing Side Bearing Outer Race Adapter
 DW240-170 Adapter Handle

Assembly Procedure

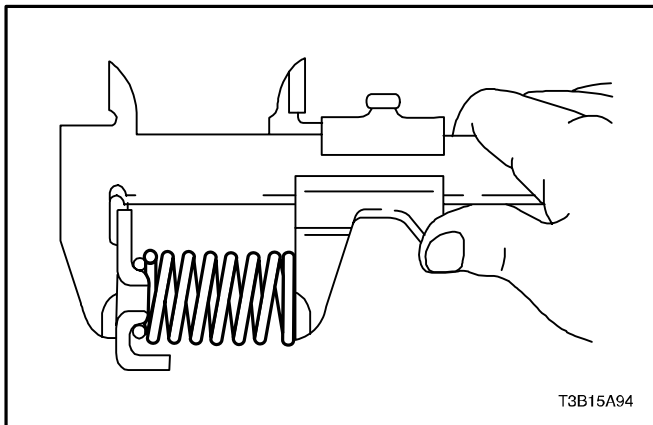
1. Install 4 new O-rings to the 4 screw plugs.
2. Install the 4 screw plugs with the O-rings to the transaxle rear cover.

Tighten

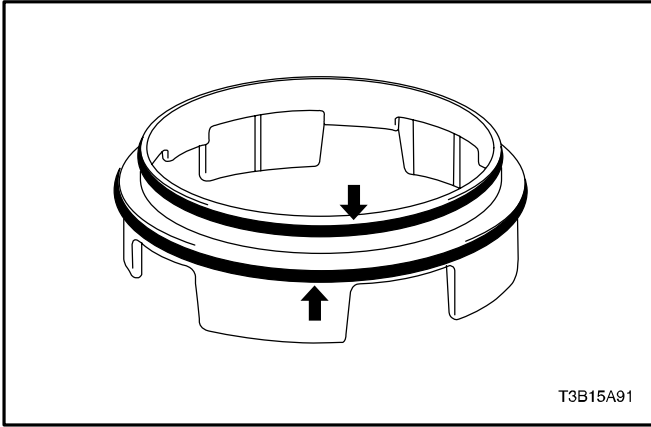
Tighten the screw plugs to 7.4 N•m (65 lb-in).



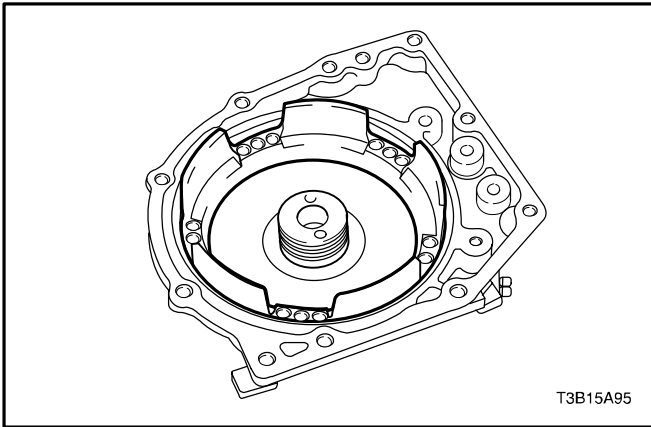
3. Install the 2 seal rings to the transaxle rear cover.



4. Using the vernier calipers, measure the free length of the O/D brake piston return spring together with the spring seat.
 - Standard free length : 18.99 mm (0.7476 in.)

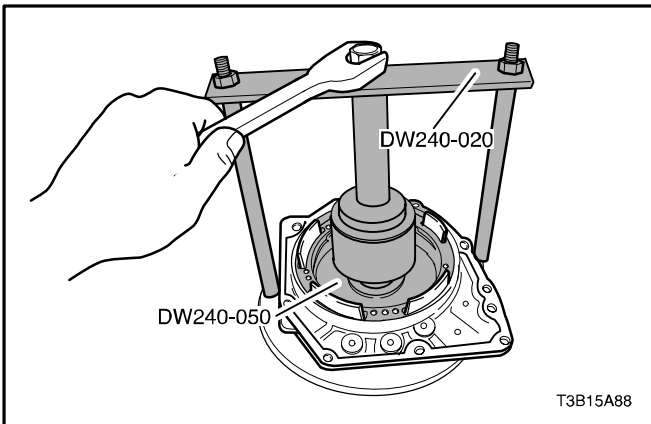


5. Coat 2 new O-rings with ATF, install them to the O/D brake piston.



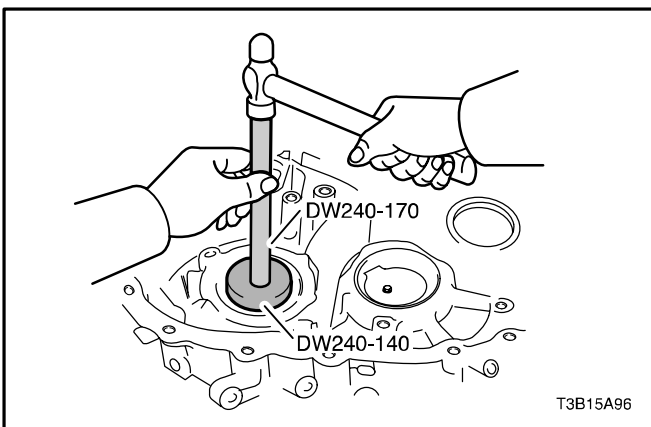
6. Coat the O/D brake piston with ATF, install it to the transaxle rear cover.

Notice : Be careful not to damage the O-rings of the O/D brake piston.

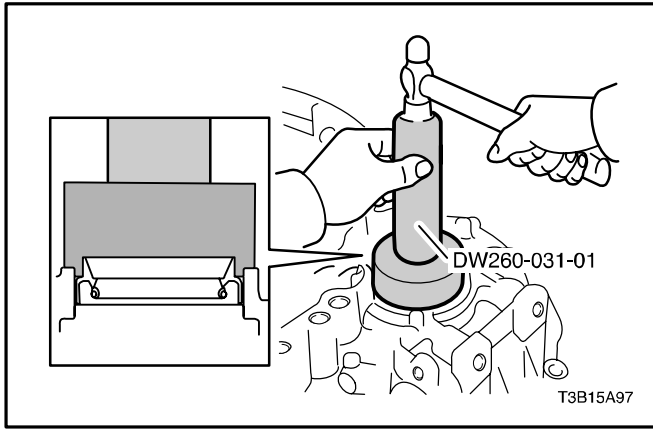


7. Using brake/clutch spring compressor DW240-020, overdrive brake adapter DW240-050 and a driver, install the O/D brake return spring and snap ring to the transaxle rear cover.

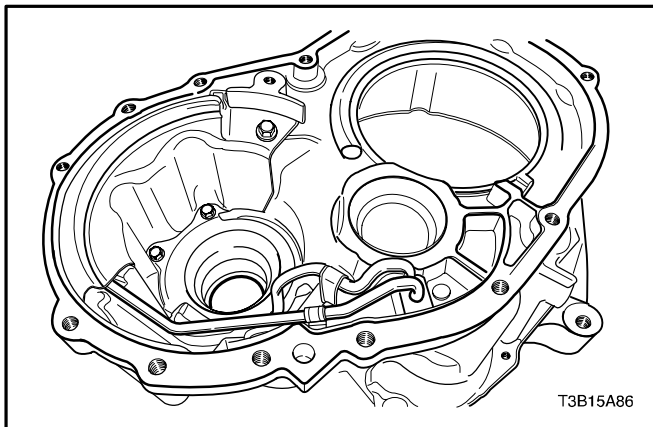
Notice : Stop the press when the O/D brake piston is lowered 1–2 mm (0.039 –0.078 in.) from the snap ring groove, preventing the O/D brake piston from being deformed.



8. Using transaxle housing side bearing outer race adapter DW240-140 and adapter handle DW240-170, install a new side bearing outer race into the transaxle housing.

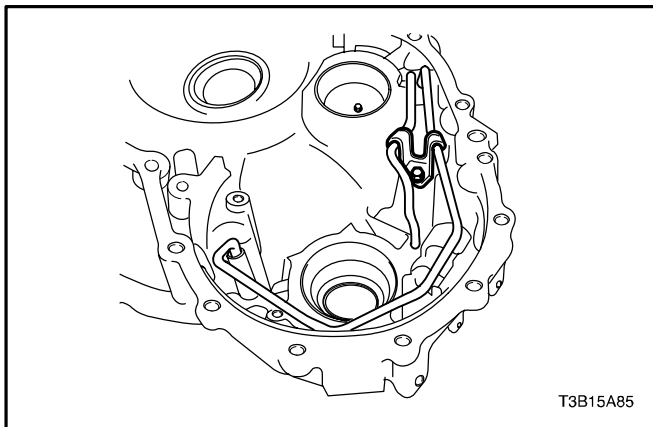


9. Using transaxle housing oil seal installer DW260-031-01 and a hammer, drive in a new transaxle housing oil seal.
 - Oil seal in depth: 3.1mm (0.122 in.)



10. Install a new outer tapered roller bearing race into the transaxle housing.

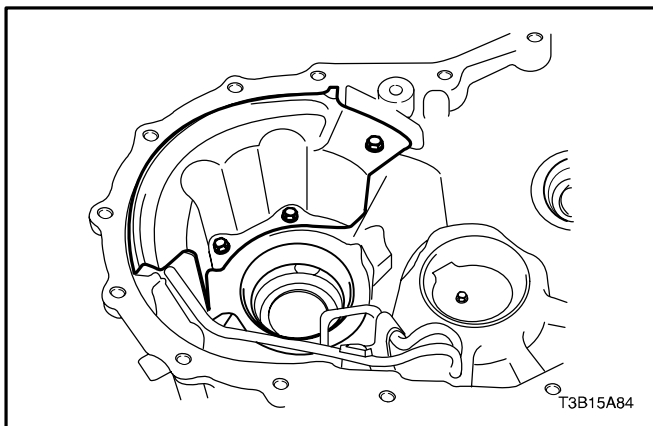
Notice : Press -fit the outer tapered roller bearing race until it contacts the transaxle housing.



11. Install the transaxle lube apply pipe and differential gear lube apply pipe to the transaxle housing.
12. Install the No.1 transaxle apply pipe clamp to the transaxle housing with the bolt.

Tighten

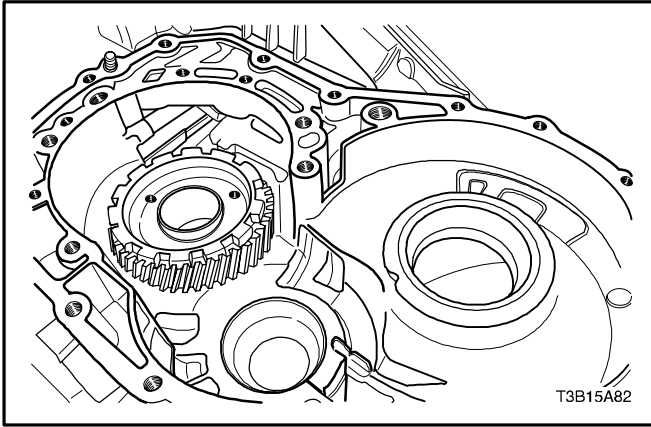
Tighten the bolt to 5.4 N•m (48 lb-in).



13. Install the oil reservoir lock plate to the transaxle housing with the 3 bolts.

Tighten

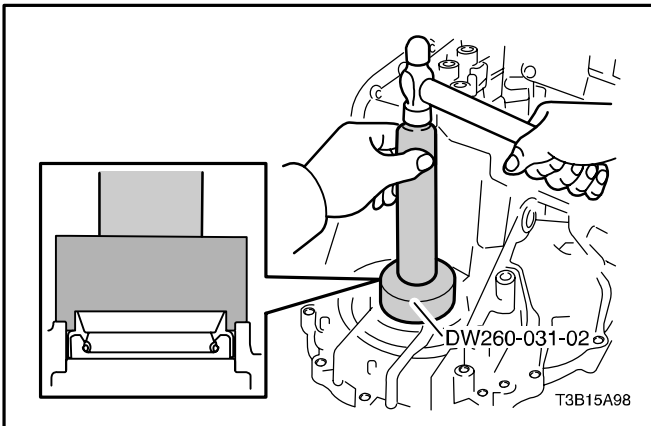
Tighten the bolts to 5.4 N•m (48 lb-in).



14. Install the shim to the transaxle case.

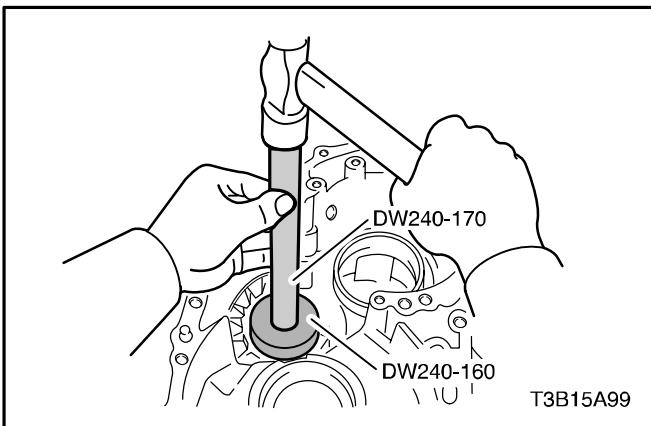
Notice : First install a shim of the same thickness as before.

15. Install a new bearing outer race into the transaxle case.



16. Using transaxle case oil seal installer DW260-031-02 and a hammer, drive in a new transaxle case oil seal.

- Oil seal in depth: 4.3 mm (0.169 in.)

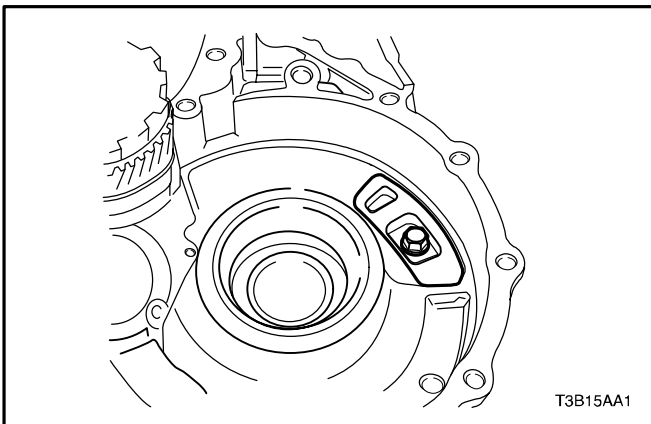


17. Install the shim to the transaxle case.

Notice : First install a shim of the same thickness as before.

18. Using transaxle case outer tapered roller bearing race adapter DW240-160 and adapter handle DW240-170, press in a new outer tapered roller bearing race into the transaxle case.

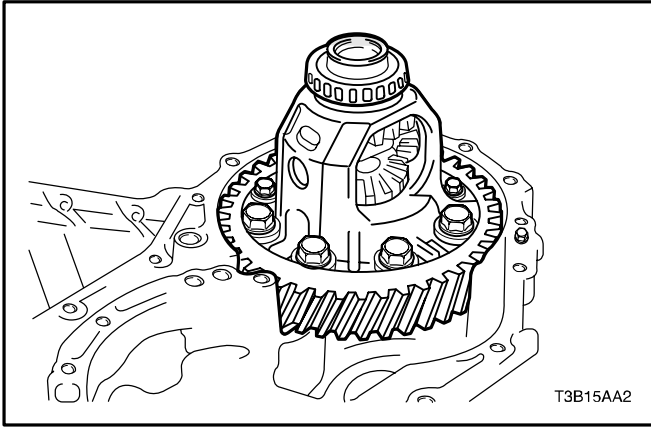
Notice : Press-fit the shim until it contacts the transaxle case.



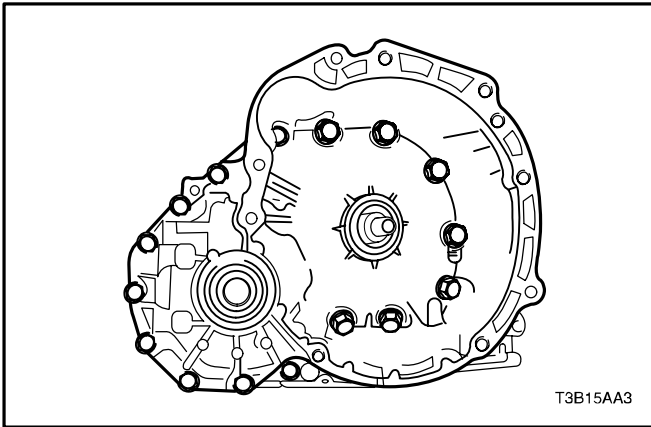
19. Install the No.1 transaxle case plate to the transaxle case with the bolt.

Tighten

Tighten the bolt to 9.8 N•m (87 lb-in).



20. Install the differential gear to the transaxle case.

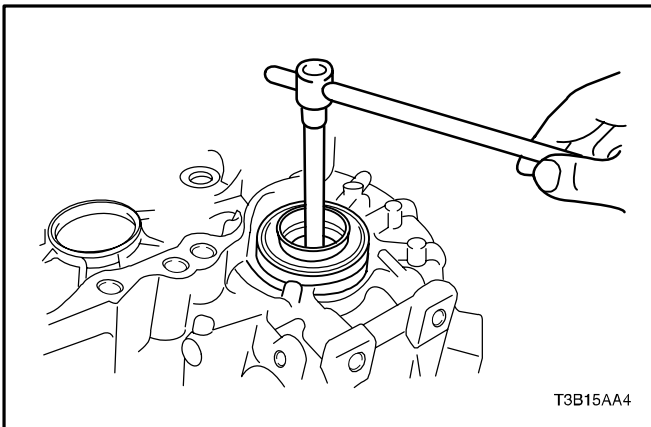


21. Install the transaxle housing and tighten the 16 bolts of the transaxle housing temporarily.

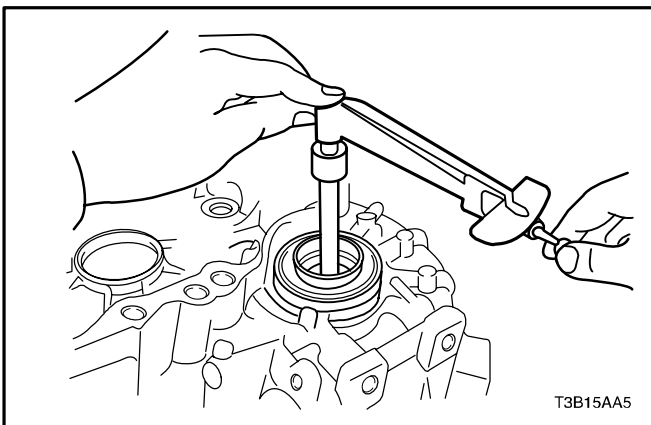
22. Tighten 8 or 9 bolts out of 16 bolts of the transaxle housing completely.

Tighten

Tighten the bolt to 29 N•m (22 lb–ft).

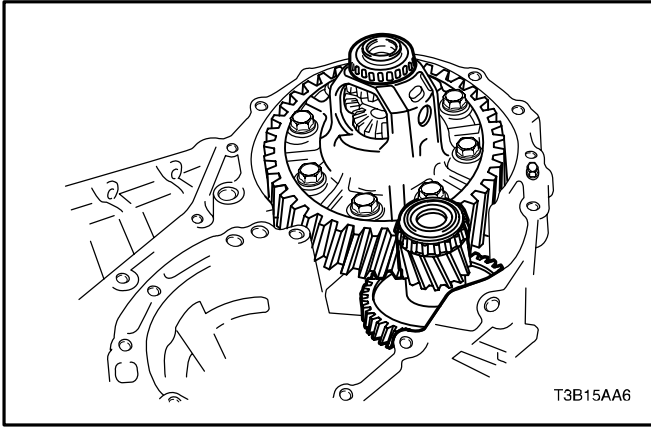


23. Using differential preload adapter DW240–130, turn the differential gear assembly right and left 2 or 3 times to allow the bearing settle.

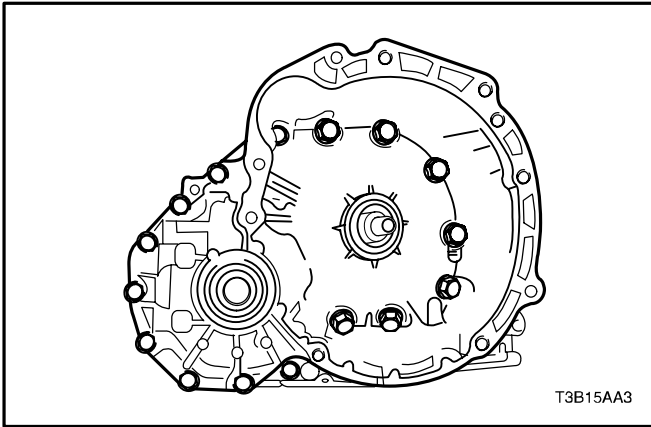


24. Using differential preload adapter DW240–130 and small torque wrench, measure the preload of the differential gear.

Notice : Note down the measured value.



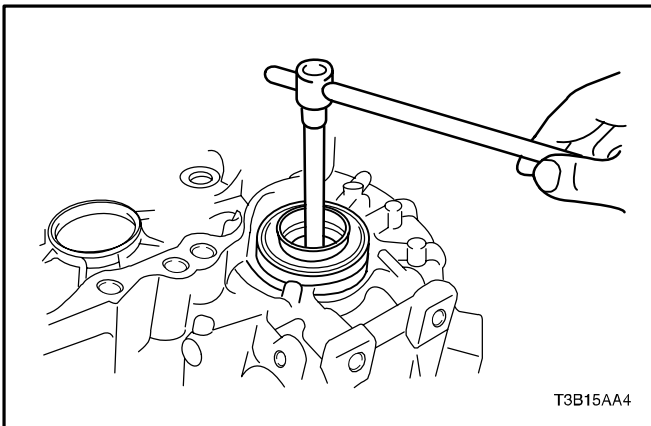
25. Remove the transaxle housing and install the counter driven gear.



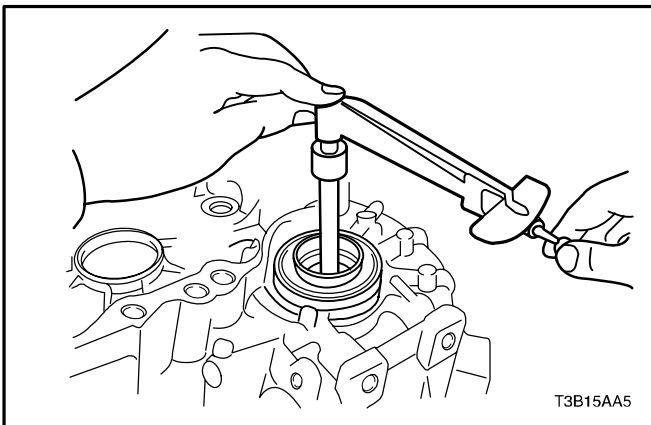
26. Install the transaxle housing and tighten the 16 bolts of the transaxle housing temporarily.
27. Tighten the bolts of the transaxle housing in the same manner as in step 22.

Tighten

Tighten the bolts to 29 N•m (22 lb-in).



28. Using differential preload adapter DW240-130, turn the differential gear assembly right and left 2 or 3 times to allow the bearing settle.



29. Using differential preload adapter DW240-130 and a small torque wrench, measure the preload of the differential gear. From this value deduct the value measured in step 23. This is the preload of the counter driven gear.

• Preload:

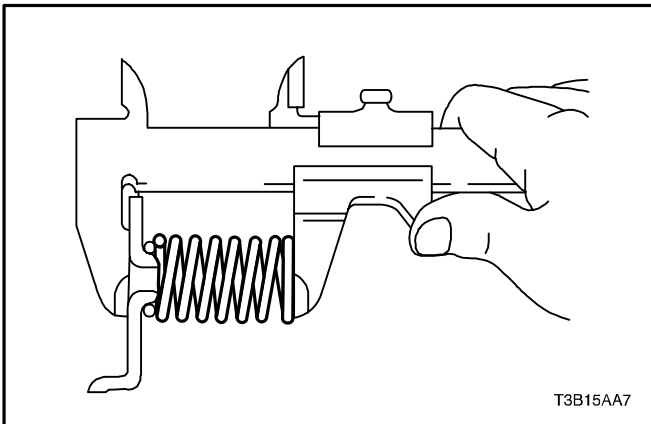
- New bearing: 0.33–0.76 N•m (3.21–6.77 lb-in)
- Used bearing: 0.17–0.38 N•m (1.48–3.39 lb-in)

If the preload of counter driven gear does not satisfy the specification, select the adjuster shim from the table below and remeasure the valve. Until the valve is within the specification, repeat the procedure.

Notice : When the preload is larger than the specification, select a thinner adjuster shim. When the preload is smaller than specification, select a thicker adjuster shim.

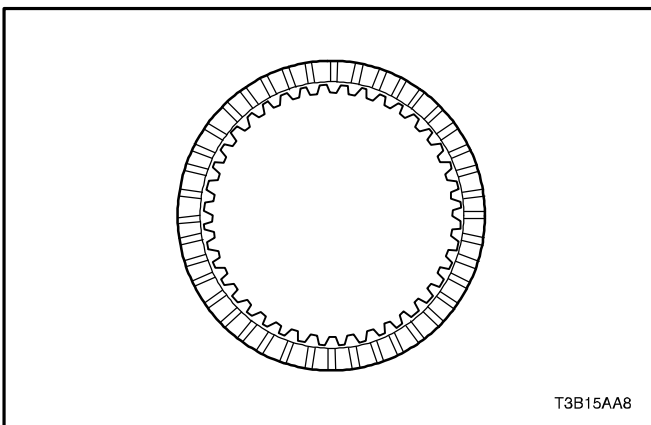
- Adjuster shim thickness: mm (in.)

Mark	Thickness	Mark	Thickness
1	1.70 (0.0669)	G	2.17 (0.0854)
2	1.75 (0.0689)	H	2.20 (0.0866)
3	1.80 (0.0709)	K	2.25 (0.0886)
4	1.85 (0.0728)	L	2.30 (0.0906)
5	1.90 (0.0748)	M	2.35 (0.0925)
6	1.93 (0.0760)	N	2.40 (0.0945)
7	1.96 (0.0772)	P	2.45 (0.0965)
A	1.99 (0.0783)	Q	2.50 (0.0984)
B	2.02 (0.0795)	R	2.55 (0.1004)
C	2.05 (0.0807)	S	2.60 (0.1024)
D	2.08 (0.0819)	U	2.65 (0.1043)
E	2.11 (0.0831)	W	2.70 (0.1063)
F	2.14 (0.0843)	—	—



30. Using the vernier calipers, measure the free length of the 1st & reverse brake piston return spring together with spring seat.

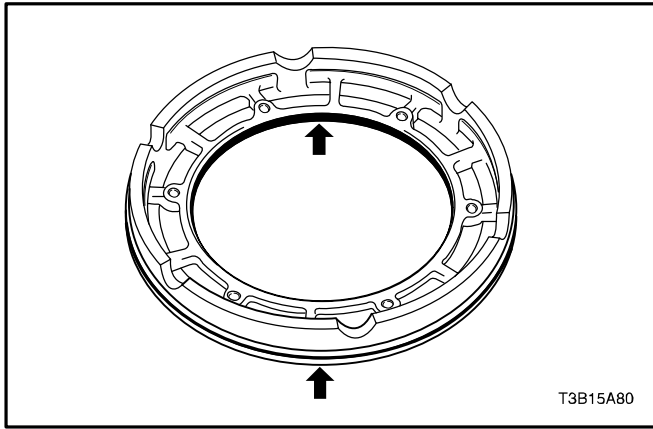
- Standard free length: 18.053 mm (0.71075 in.)



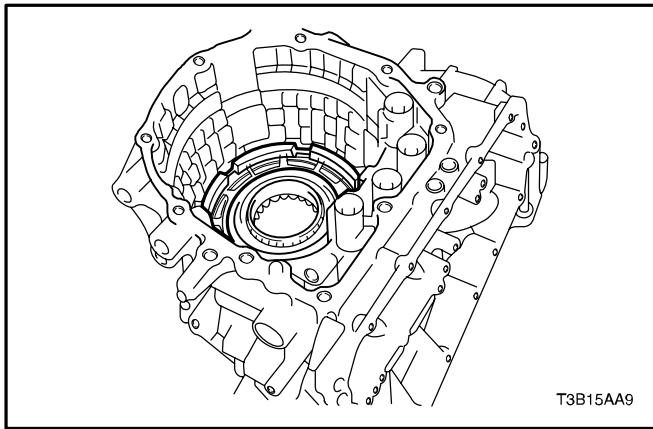
31. Check to see if the sliding surface of the disc, plate and flange of 1st & reverse brake are worn or burnt. If necessary, replace them.

Notice : If the lining of the disc is peeling off or discolored, or even if a part of the groove is defaced, replace all discs.

Notice : Before assembling new discs, soak them in ATF for at least 15 minutes.

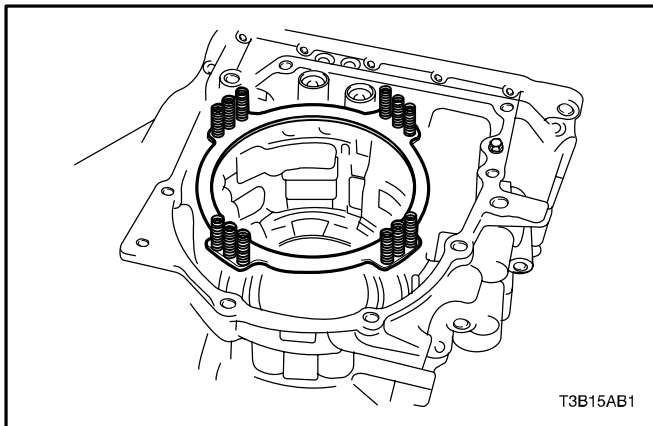


32. Coat 2 new O-rings with ATF, install them to the 1st & reverse piston.

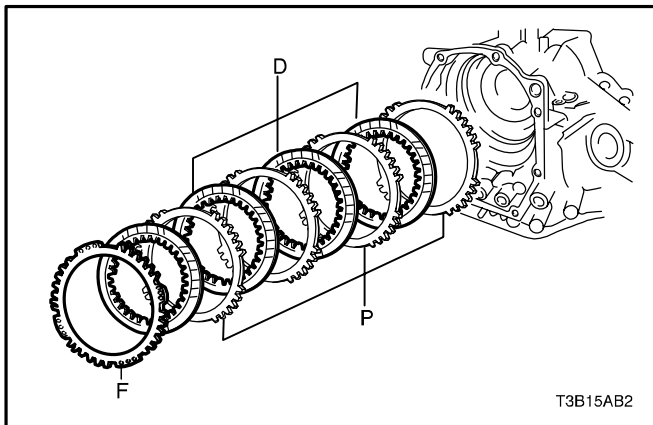


33. Install the 1st & reverse brake piston to the trans-axle case.

Notice : Be careful not to damage the O-rings of the 1st & reverse brake piston.



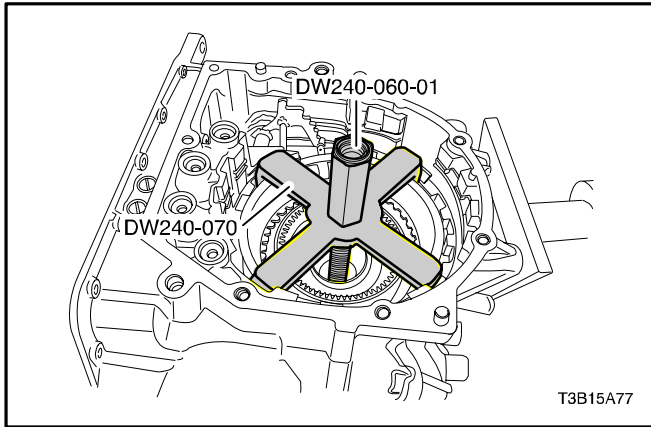
34. Install the return spring to the transaxle case.



35. Install the 4 plates, 4 discs and flange.

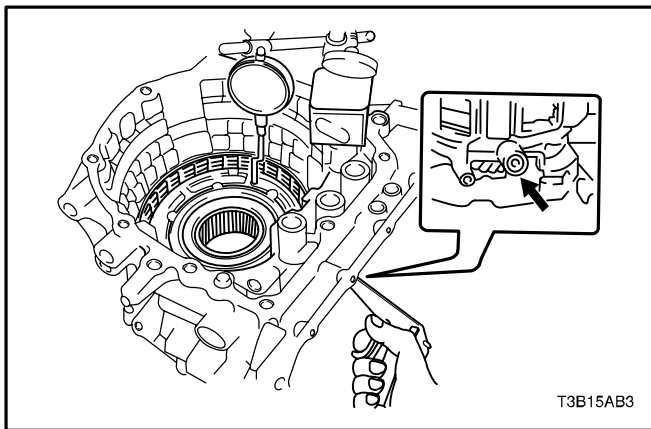
- Install in order : P – D – P – D – P – D – P – D – F

(P= Plate, D= Disc, F= Flange)



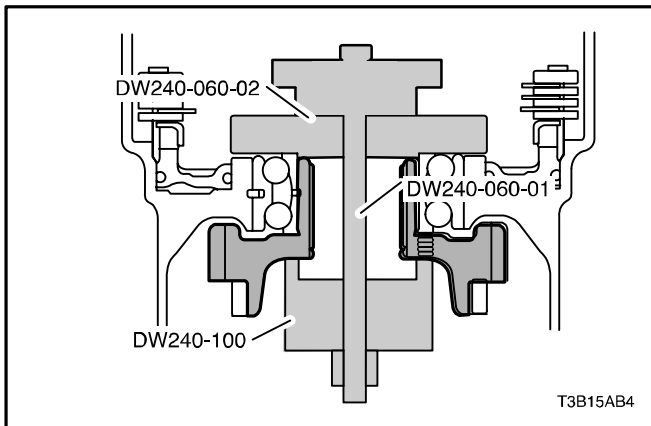
36. Using 1st & reverse brake adapter DW240-070 and brake spring compressor bolt/nut DW240-060-01, install the snap ring.

Notice : Make sure that the snap ring is installed in the groove of the transaxle case correctly.



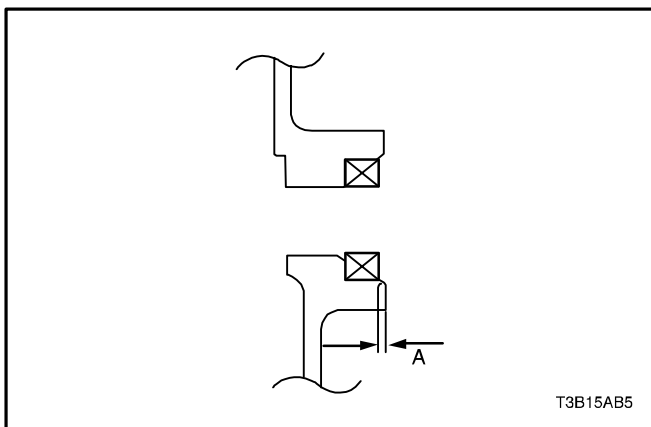
37. Using a dial indicator, measure the 1st & reverse brake piston stroke while applying and releasing 392–785 kPa (57–114 psi) of compressed air.

Notice : If the piston stroke is non-standard, inspect the discs, plates and flange. Piston stroke 0.6 – 1.3 mm (0.024 – 0.051 in.)



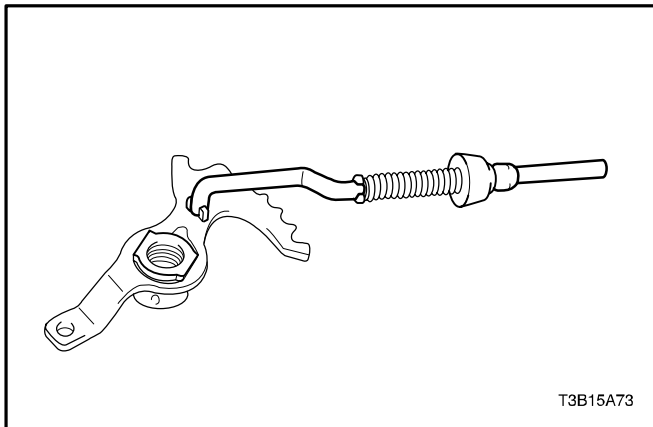
38. Using counter drive gear installation adapter DW240-100, brake spring compressor bolt/nut DW240-060-01 and brake spring compressor plate DW240-060-02, install the counter drive gear.

Notice : Be careful not to apply excessive force to the transaxle case.

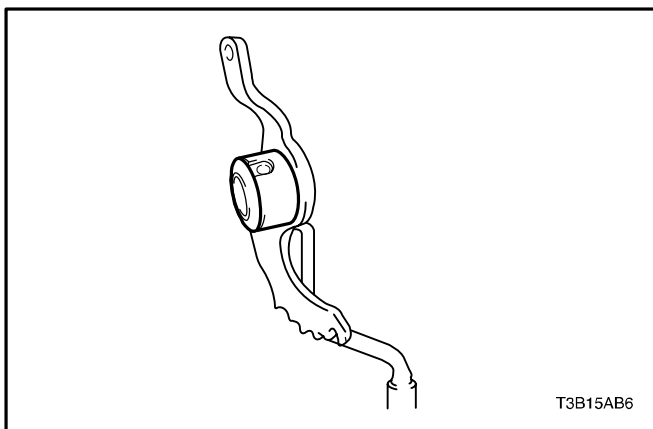


39. Coat a new oil seal with ATF.
40. Install the oil seal to the transaxle case.

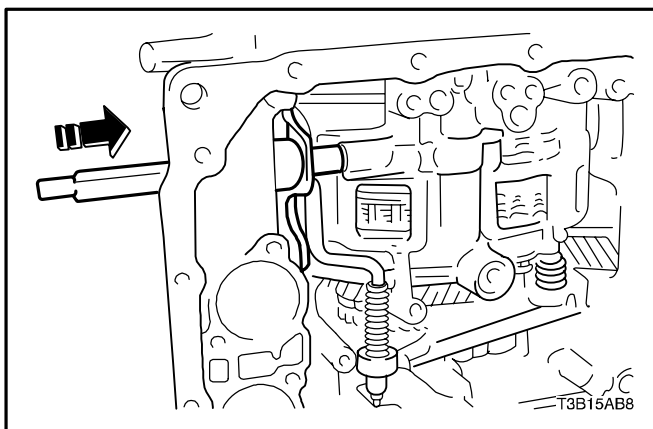
- Oil seal in depth:
A: 1 ± 0.25 mm (0.39 ± 0.0098 in.)



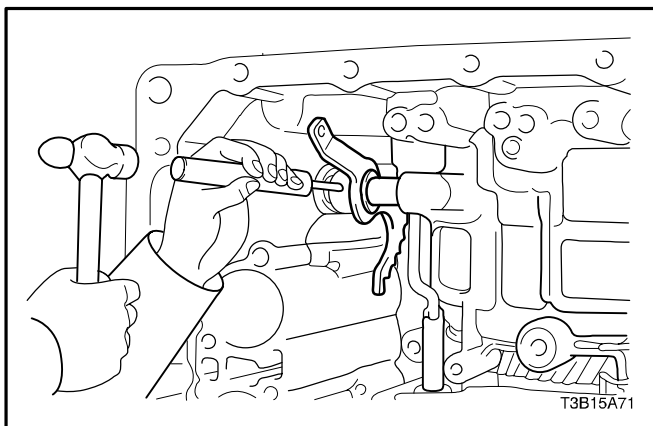
41. Install the parking lock rod to the manual valve lever.



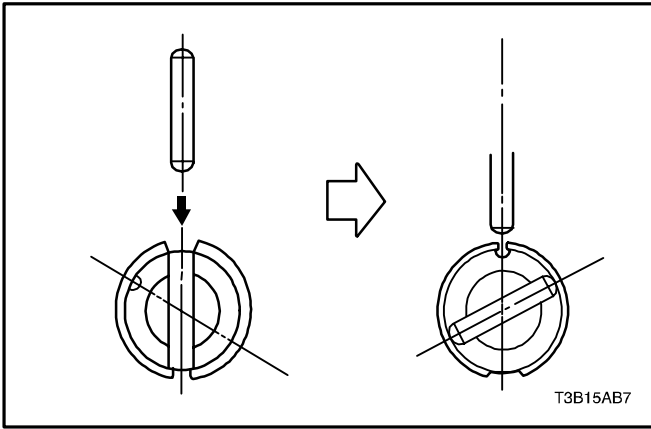
42. Install a new spacer to the manual valve lever.



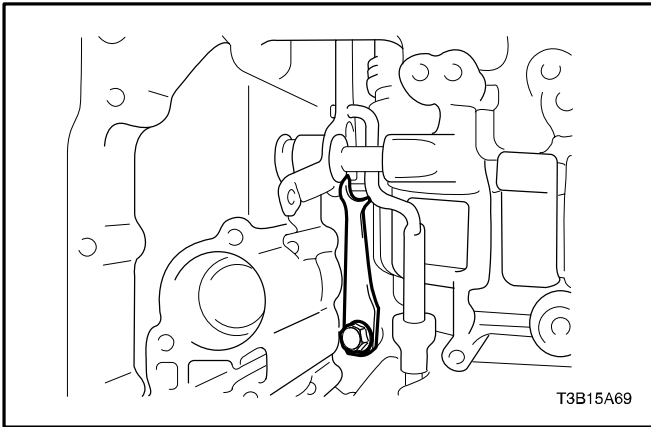
43. Install the manual valve lever shaft and manual valve lever.



44. Using a pin punch and hammer, drive in a new pin.



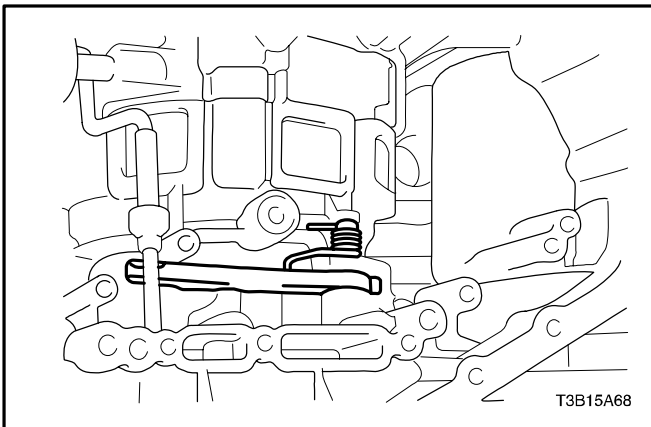
45. Turn the spacer and lever shaft to align the small hole for locating the staking position in the spacer with the staking position mark on the lever shaft.
46. Using a pin punch, stake the spacer through the small hole.
47. Check that the spacer does not turn.



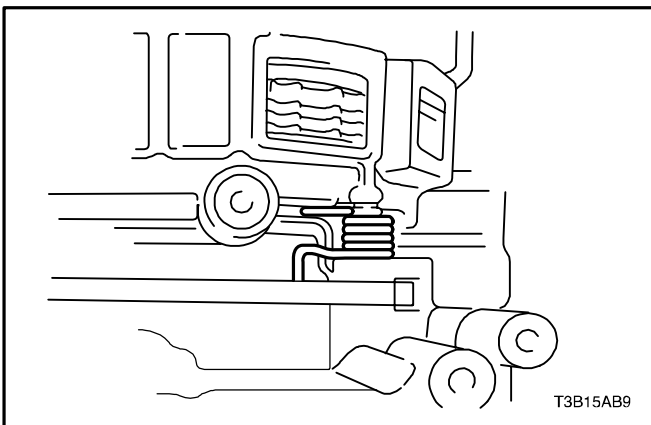
48. Install the manual detent spring with the bolt.

Tighten

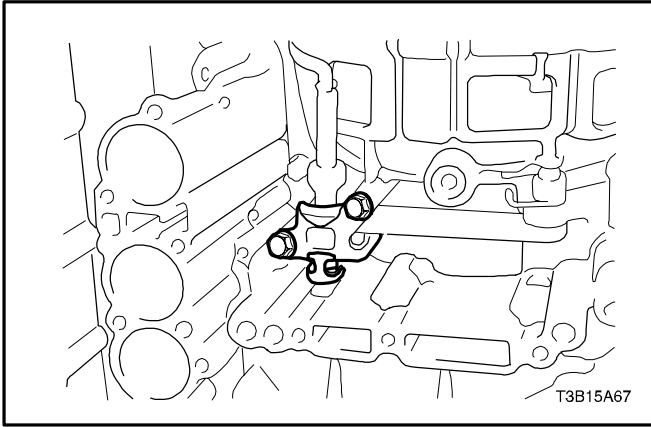
Tighten the bolts to 9.8 N•m (87 lb-in).



49. Install the parking lock shaft, torsion spring and parking lock pawl.



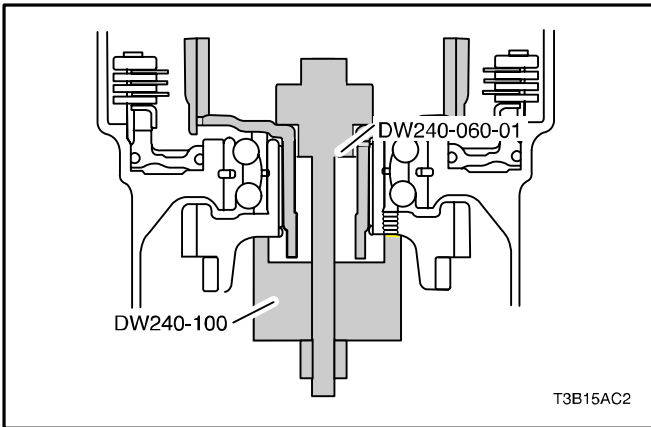
Notice : Check that the edge of torsion spring fits into the groove securely.



50. Install the parking lock pawl bracket with the 2 bolts.

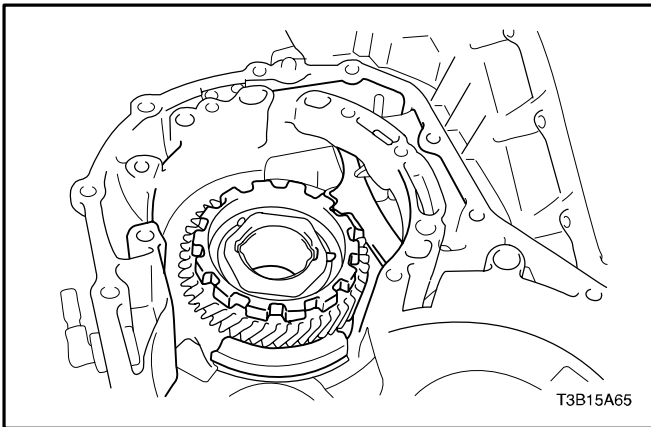
Tighten

Tighten the bolts to 7.4 N•m (65 lb-in).

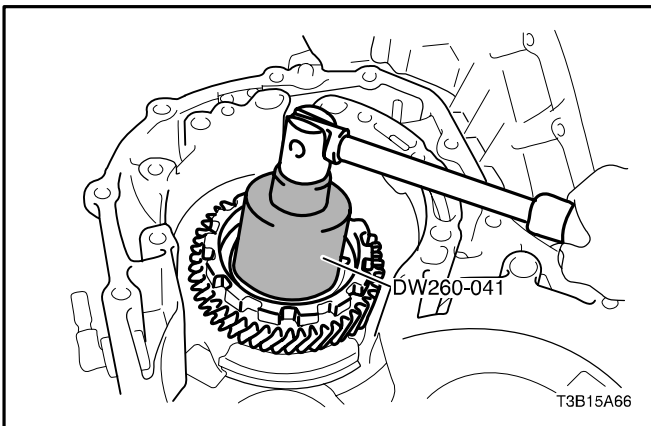


51. Using counter drive gear installation adapter DW240-100 and brake spring compressor bolt/nut DW240-060-01, install the planetary ring gear.

- Before installing the planetary ring gear, be sure to replace the planetary ring flange of the planetary ring gear with a new one.



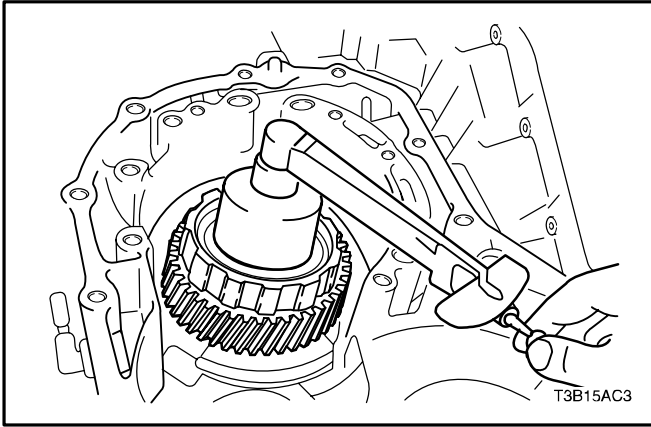
52. Fix the counter drive gear with parking lock pawl.



53. Using planetary ring gear nut removal/installation socket DW260-041, install a new nut.

Tighten

Tighten the nut to 9.8 N•m (87 lb-in).



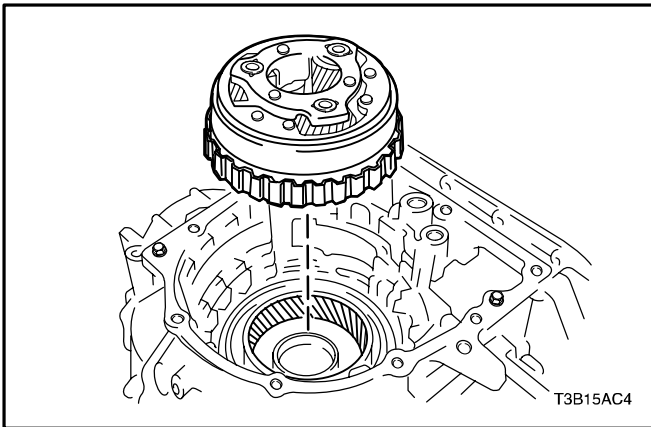
54. Using a small torque wrench, while turning to counter drive gear 100 turn per minute and measure the preload.

Notice : When the preload is smaller than the specification, tighten the nut more and adjust the preload. Preload: 0.05–0.35 N•m (0.43–3.12 lb-in)

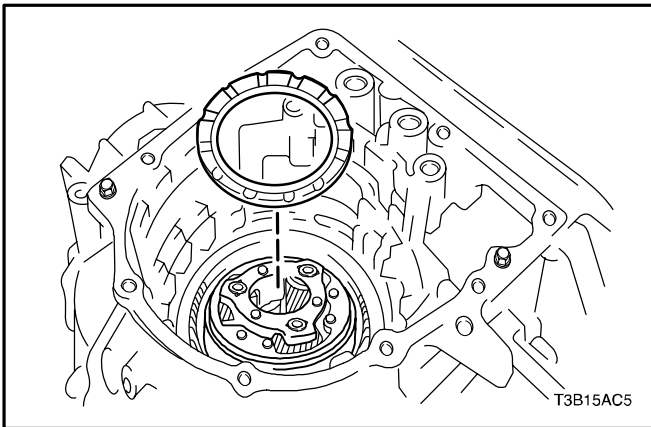
Tighten

Tighten the nut to 29 N•m (22 lb-ft) or less.

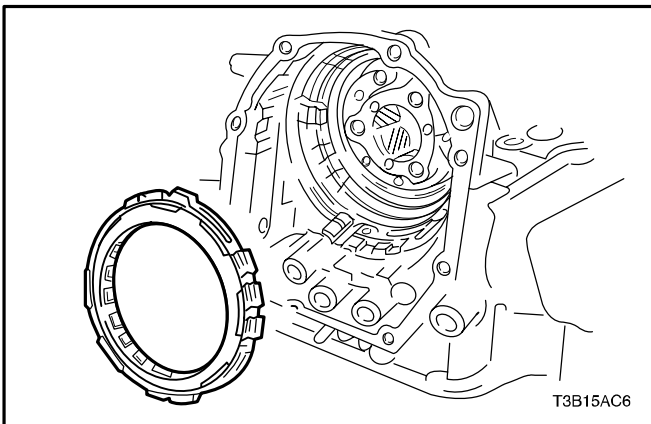
55. Stake the nut.



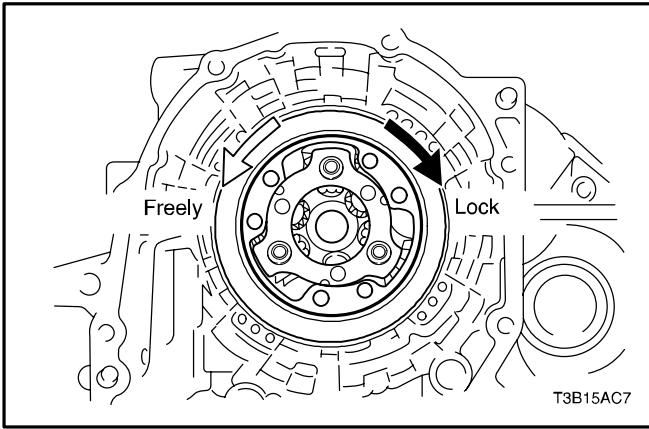
56. Install the planetary gear to the transaxle case.



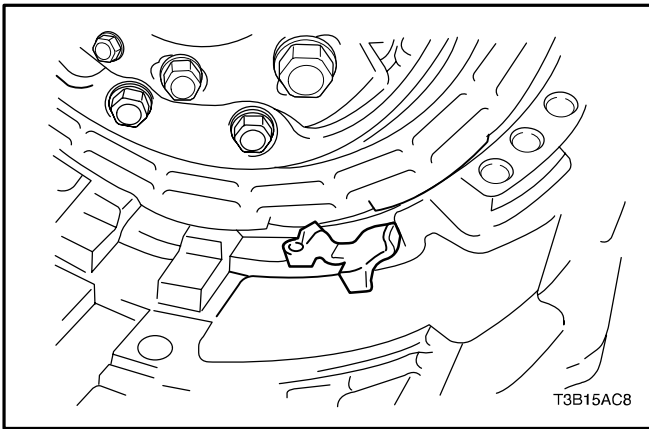
57. Coat the planetary carrier thrust washer with petroleum jelly and install it onto the planetary gear.



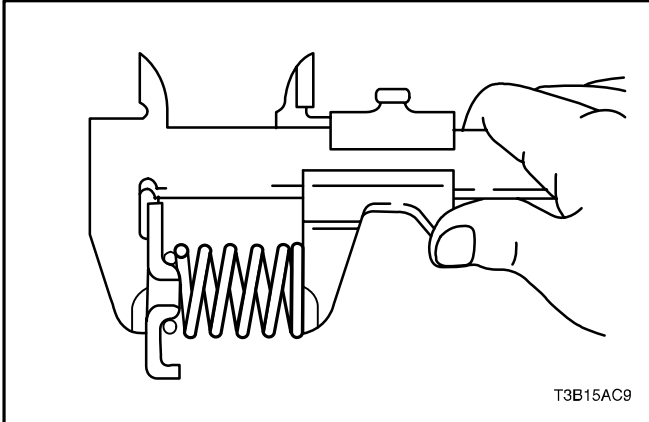
58. Install the No.2 one-way clutch to the transaxle case.



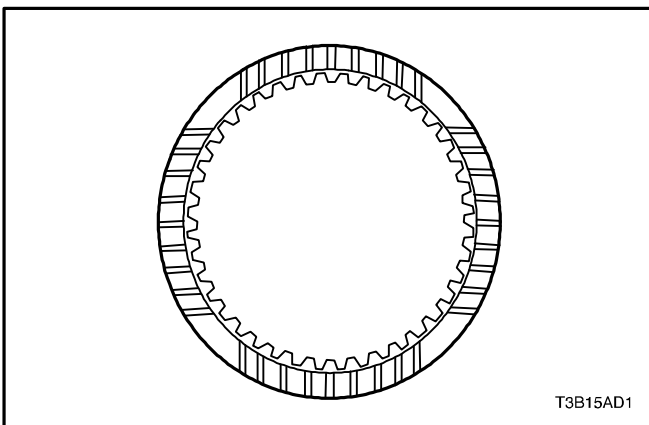
59. Check that the planetary gear turns freely counter-clockwise and locks clockwise.



60. Install the anti-rattle clip in the place shown in the illustration (the space between the No.2 one-way clutch outer race and transaxle case), push the anti-rattle clip in until you hear the "click".



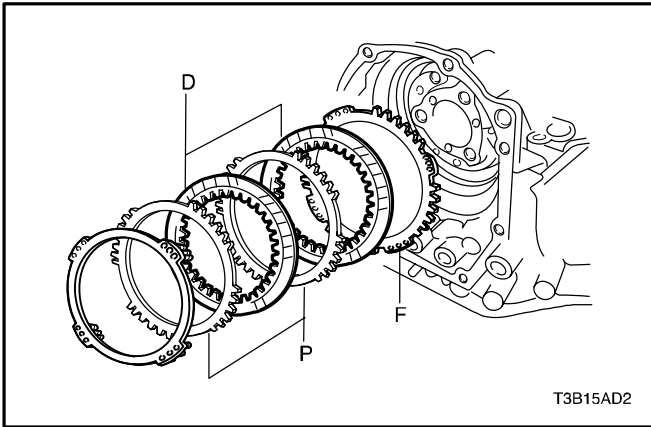
61. Using vernier calipers, measure the free length of the 2nd brake piston return spring together with spring seat.
- Standard free length: 15.85 mm (0.6240 in.).



62. Check to see if the sliding surface of the disc, plate and flange of 2nd brake are worn or burnt. If necessary, replace them.

Notice : If the lining of the disc is peeling off or discolored, or even if a part of the groove is defaced, replace all discs.

Notice : Before assembling new discs, soak them in ATF for at least 15 minutes.



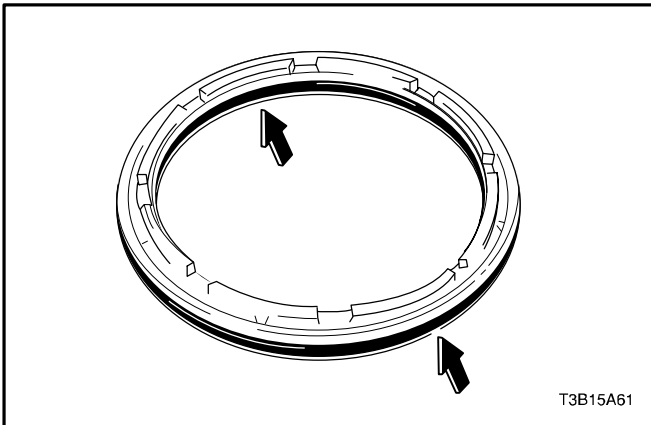
63. Install the flange, 2 discs and 2 plates.

- Install in order : F – D – P – D – P

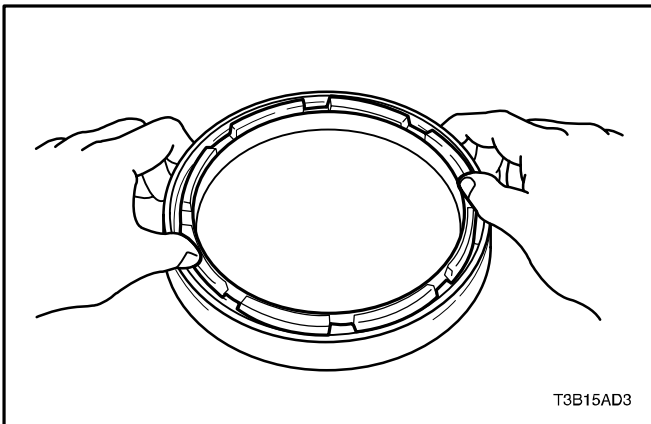
(D = Disc, P = Plate, F = Flange)

64. Install the 2nd brake return spring.

Notice : Make sure that the snap ring is installed in the groove of the transaxle case correctly.

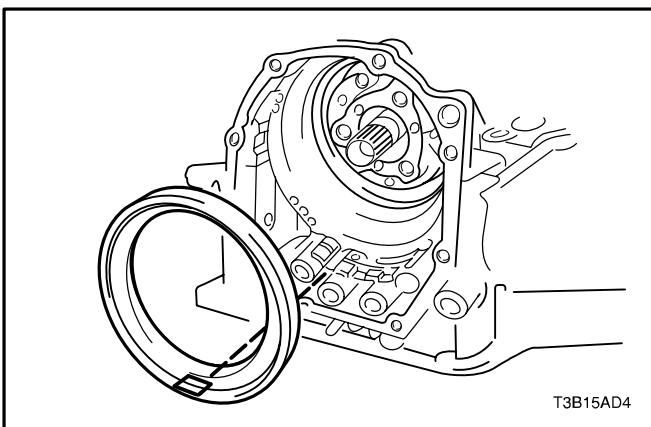


65. Coat 2 new O-rings with ATF, install them to the 2nd brake piston.

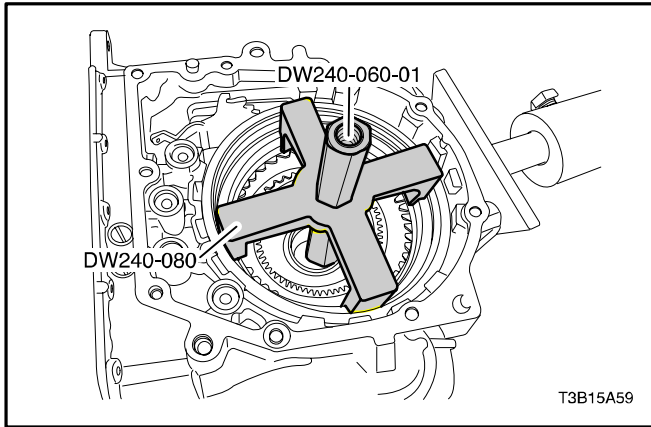


66. Install the 2nd brake piston into the 2nd brake clutch cylinder.

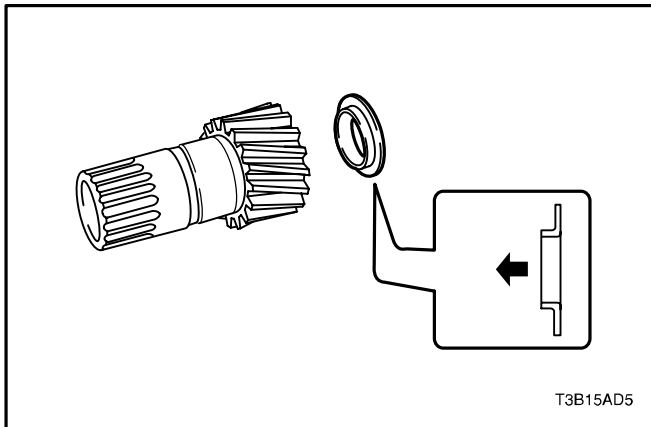
Notice : Be careful not to damage the O-rings.



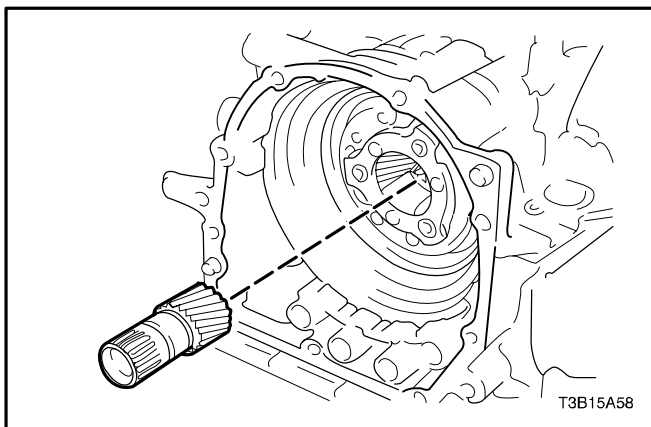
67. Install the 2nd brake clutch cylinder to the transaxle case.



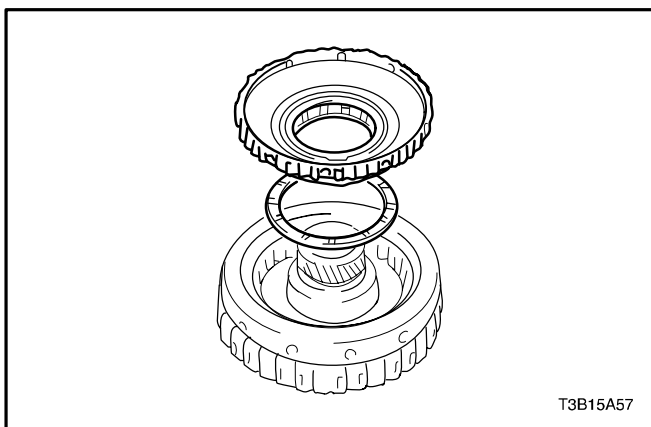
68. Using brake spring compressor bolt / nut DW240-060-01 and 2nd brake adapter DW240-080, compress the 2nd brake piston return spring.
69. Using a screwdriver, install the snap ring.
- Notice :** Make sure that the snap ring is installed in the groove of the transaxle case correctly.



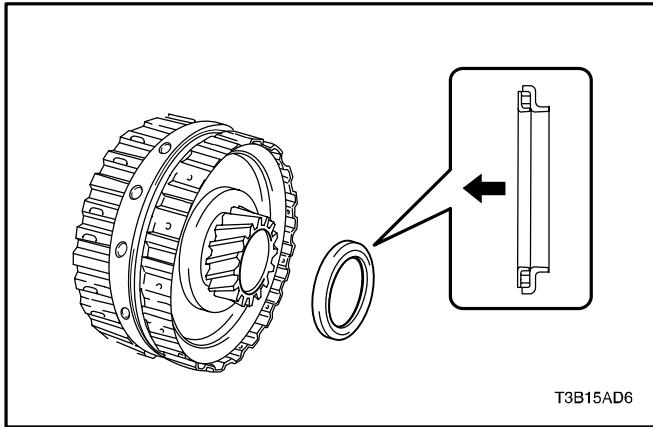
70. Coat the thrust bearing race with petroleum jelly and install it onto the front planetary sun gear.
- Race:
Inner diameter: 19.3 mm (0.760 in.)
Outer diameter : 29.0 mm (1.142 in.)



71. Install the front planetary sun gear to the transaxle case.



72. Install the thrust washer and one-way clutch assembly to the rear planetary sun gear.



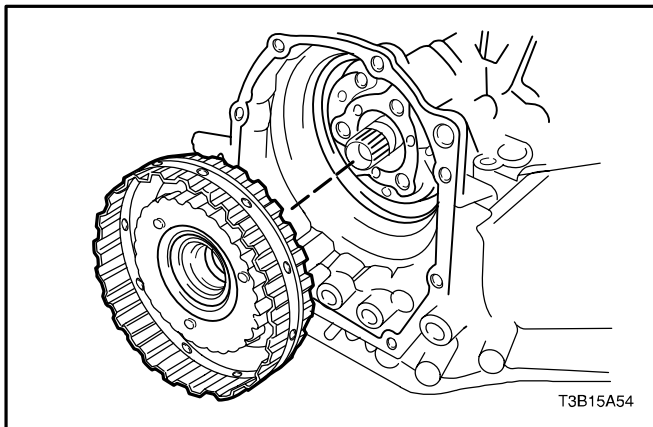
73. Coat the thrust bearing race with petroleum jelly and install it onto the rear planetary sun gear and one-way clutch assembly.

- Bearig:

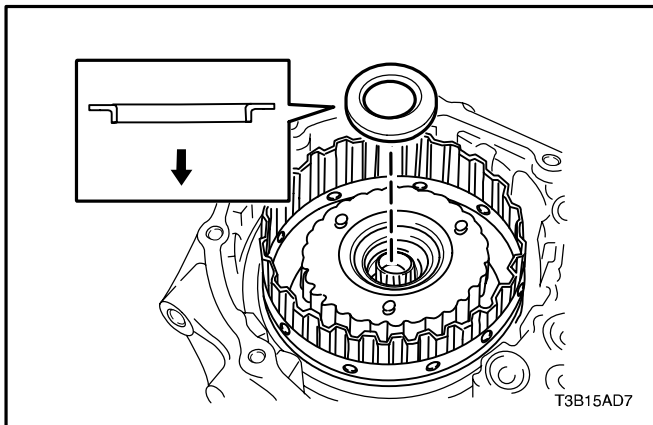
Inner diameter: 42.5 mm (1.673 in.)

Outer diameter: 57.5 mm (2.264 in.)

Notice : Check the direction of the bearing.



74. Install the rear planetary sun gear and one-way clutch assembly to the transaxle case.



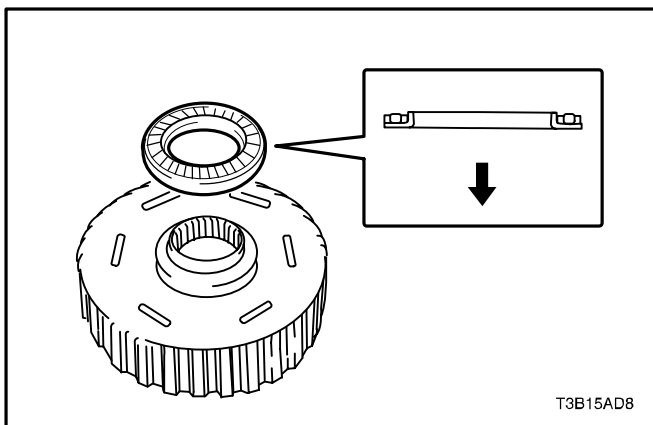
75. Coat the thrust bearing race with petroleum jelly and install it onto the transaxle case.

- Race:

Inner diameter: 34.95 mm (1.3760 in.)

Outer diameter: 45.50 mm (1.7913 in.)

Notice : Check the direction of race.



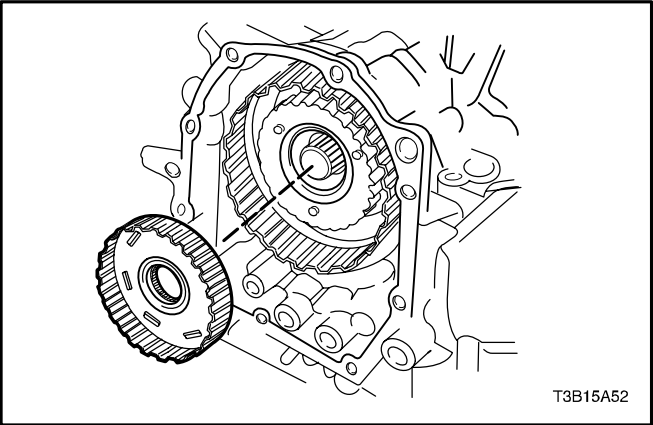
76. Coat the thrust needle roller bearing with petroleum jelly and install it onto the forward clutch hub.

- Bearig:

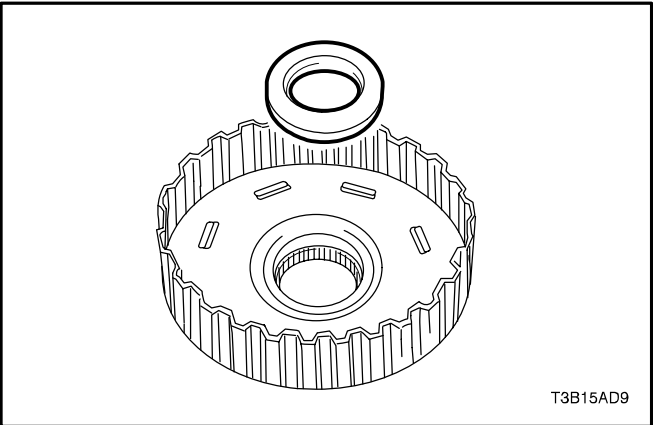
Inner diameter: 33.3 mm (1.311 in.)

Outer diameter: 46.5 mm (1.831 in.)

Notice : Check the direction of bearing.

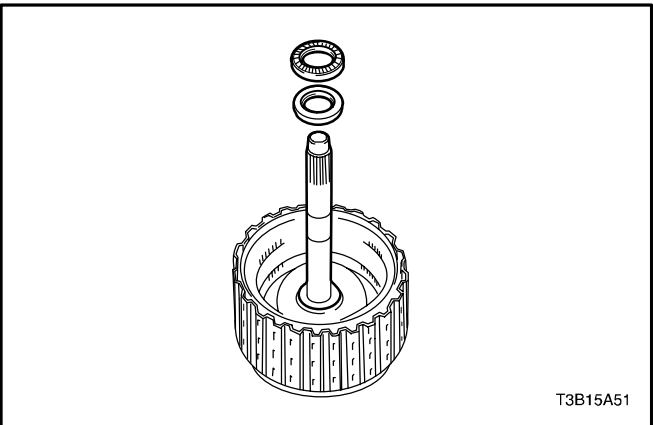


77. Install the forward clutch hub to the transaxle case.



78. Coat the thrust bearing race with petroleum jelly and install it onto the forward clutch hub.

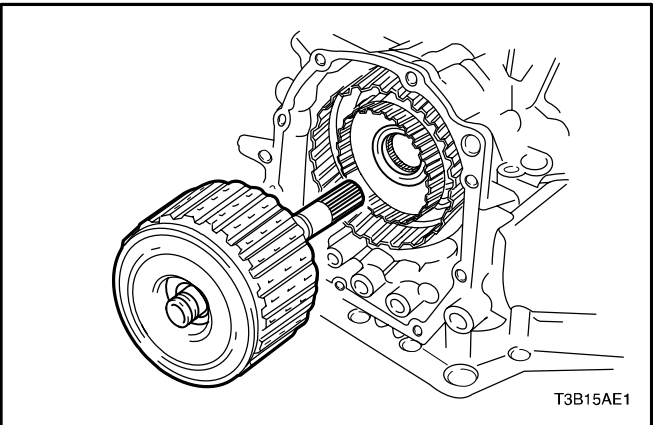
- Race:
Inner diameter: 19.3 mm (1.760 in.)
Outer diameter: 30.6 mm (1.205 in.)



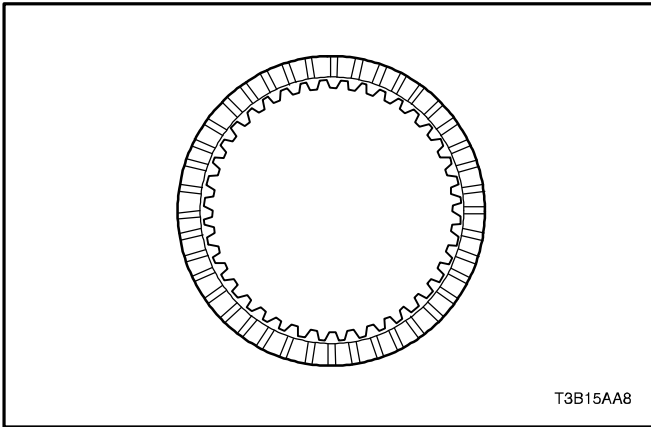
79. Install the thrust bearing race and thrust needle roller bearing to the forward & reverse clutch assembly.

- Race and bearing diameter: mm(in.)

	Inner diameter	Outer diameter
Race	18.1 (0.713)	28.2 (1.110)
Bearing	18.1 (0.713)	29.6 (1.165)



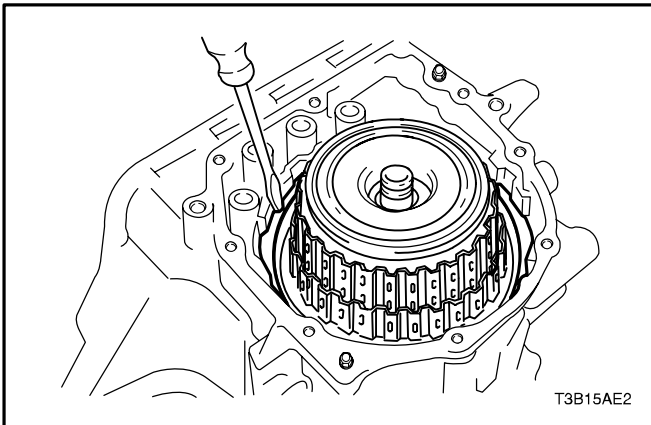
80. Install the forward & reverse clutch assembly to the transaxle case.



81. Check to see if the sliding surface of the disc, plate and flange of 2nd coast & O/D brake are worn or burnt. If necessary, replace them.

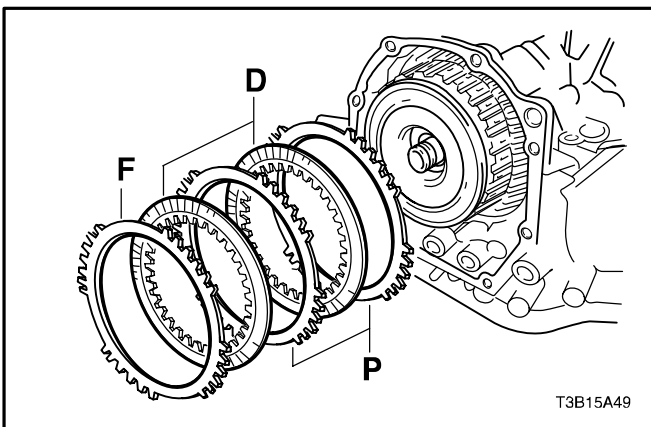
Notice : If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.

Notice : Before assembly new discs, soak them in ATF for at least 15 minutes.



82. Using a screwdriver, install the snap ring to the transaxle case.

Notice : Make sure that the snap ring is installed in the groove of the transaxle case correctly.

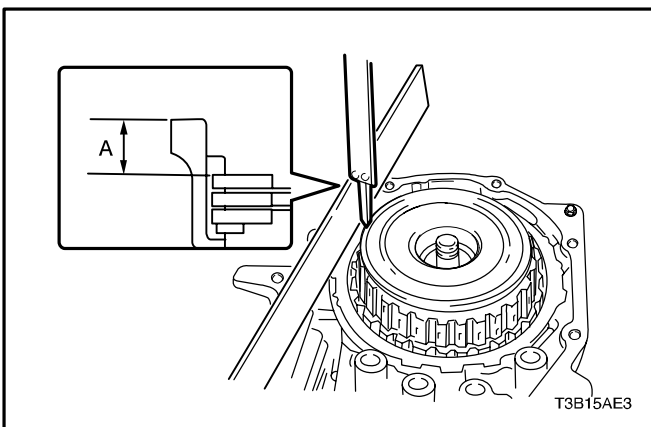


83. Install the flange, 2 discs and 2 plates to the transaxle case.

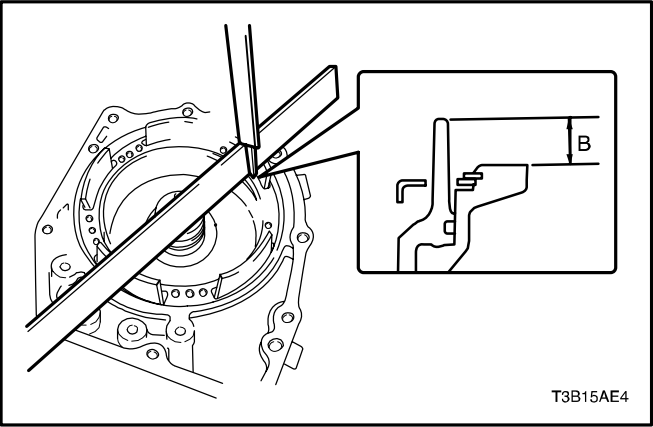
- Install in order: P – D – P – D – F

(P = Plate, D = Disc, F = Flange)

84. Clean the connected part the transaxle case and transaxle rear cover.



85. As shown in the illustration, place a straight edge on the transaxle case and measure the distance between the 2nd coast & O/D brake flange and straight edge using vernier calipers. (Dimension A).



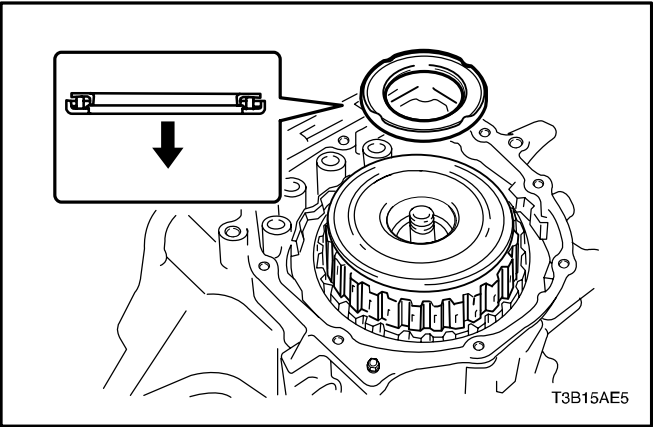
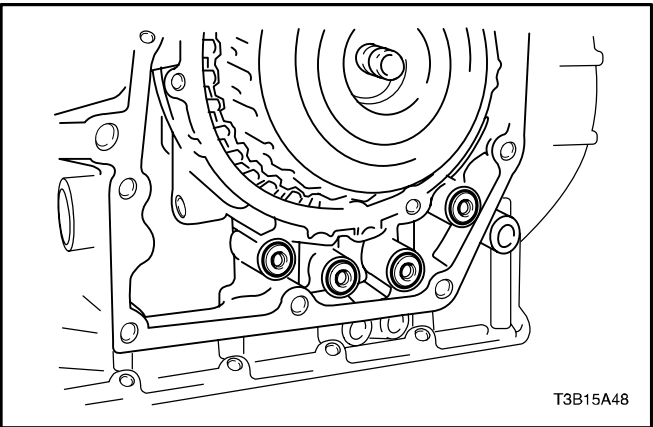
86. As shown in the illustration, place a straight edge on the O/D brake piston and measure the distance between the transaxle rear cover and straight edge using vernier calipers. (Dimension B).
87. Calculate the piston stroke value using the following formula. Select a flange which satisfies the piston stroke value and install it.

Piston stroke = Dimension A – Dimension B
Piston stroke : 0.65 – 1.05 mm (0.0256 – 0.0413 in.)

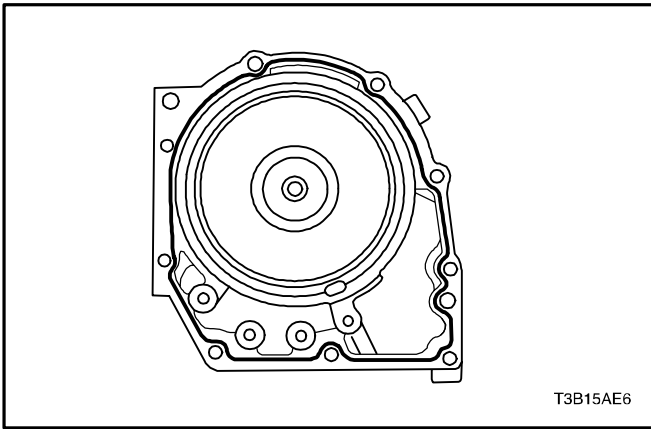
- Flange thickness : mm (in.)

Piston stroke value	Thickness	Mark
0.738 ~ 0.949 (0.02905 ~ 0.03736)	3.0 (0.118)	0
0.950 ~ 1.149 (0.03740 ~ 0.04524)	3.2 (0.126)	1
1.150 ~ 1.349 (0.04528 ~ 0.05311)	3.4 (0.134)	2
1.350 ~ 1.549 (0.05315 ~ 0.06098)	3.6 (0.142)	3
1.550 ~ 1.702 (0.06102 ~ 0.06701)	3.8 (0.150)	0

88. Install new 4 apply gaskets to the transaxle rear cover.

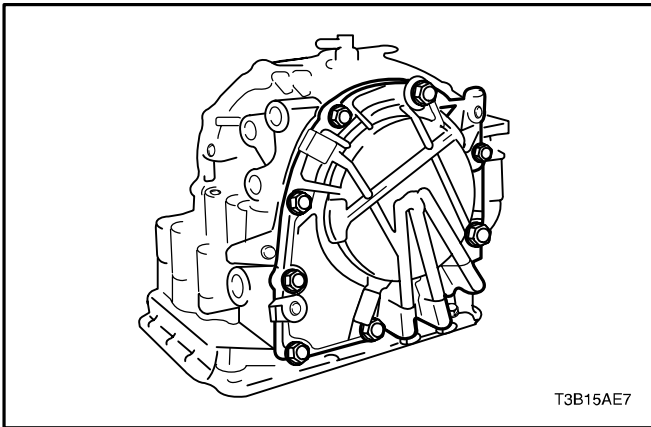


89. Coat the thrust needle roller bearing with petroleum jelly and install it onto the forward & reverse clutch assembly.
- Bearig:
 - Inner diameter: 43.2 mm (1.701 in.)
 - Outer diameter: 62.0 mm (2.441 in.)
90. Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or transaxle case.



91. Apply formed in place gasket (FIPG) to the transaxle rear cover.

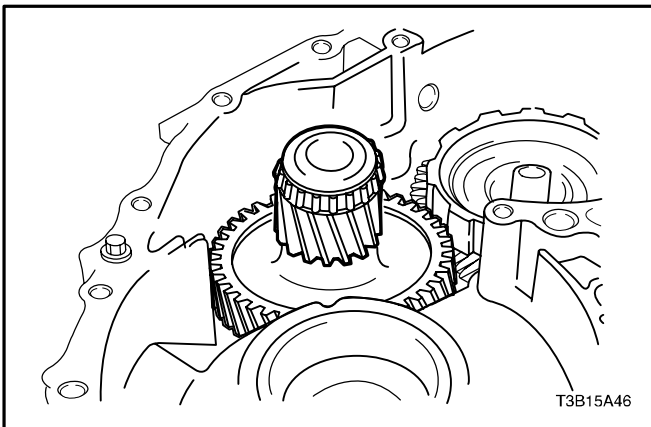
FIPG: three bond 1281 or equivalent
Seal bend width: 1.2 mm (0.047 in.)



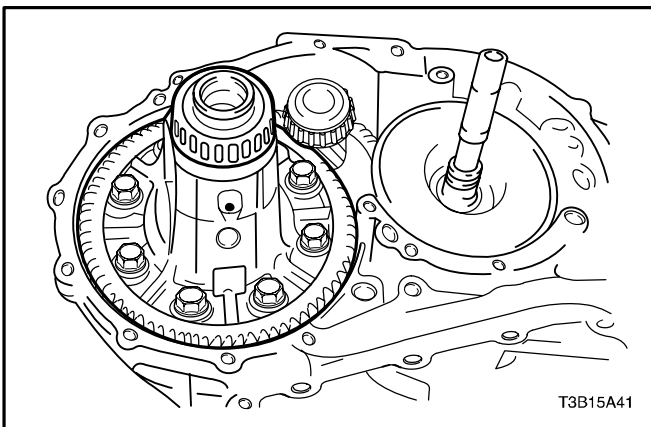
92. Install the transaxle rear cover to the transaxle case with the 9 bolts.

Tighten

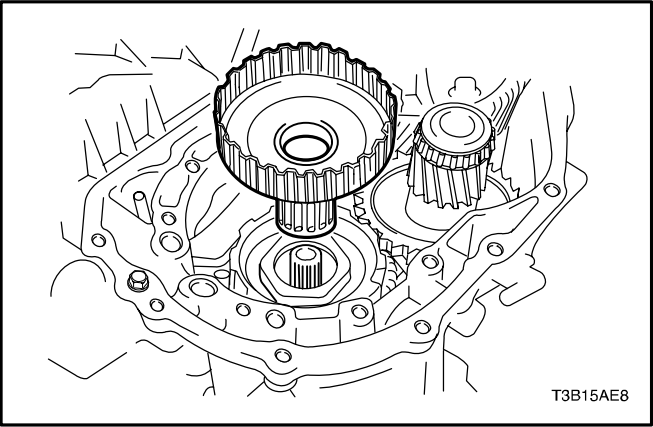
Tighten the bolts to 25 N•m (18 lb–ft).



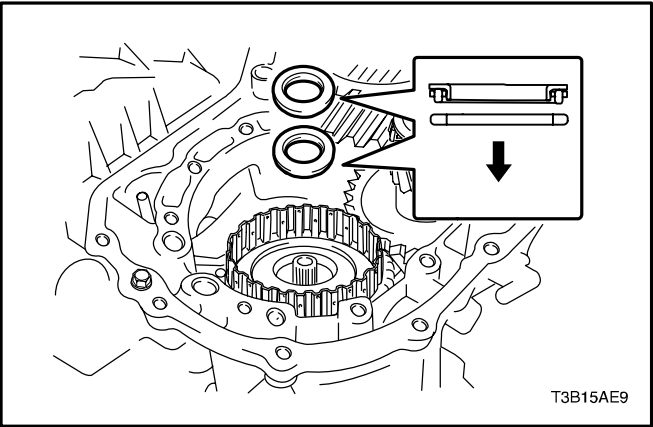
93. Install the counter driven gear assembly to the transaxle case.



94. Install the differential gear assembly to the transaxle case.



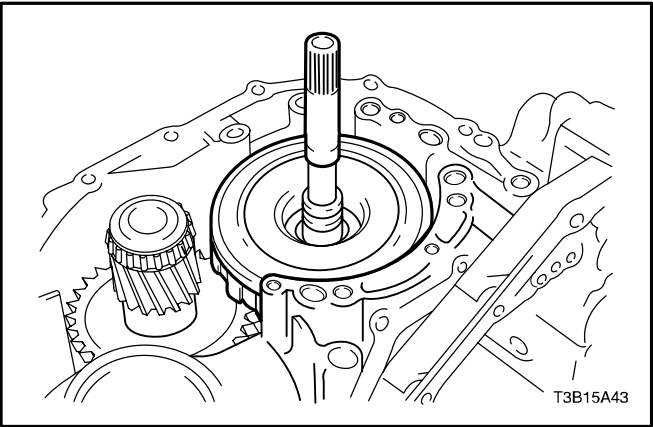
95. Install the direct clutch hub to the transaxle case.



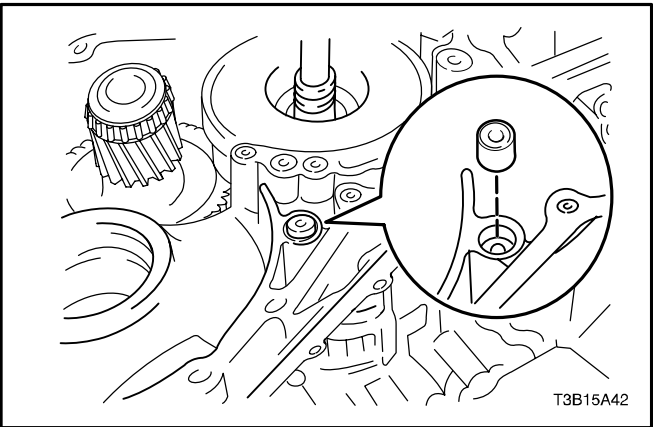
96. Install the thrust bearing race and thrust needle roller bearing to the transaxle case.

- Race and bearing: mm (in.)

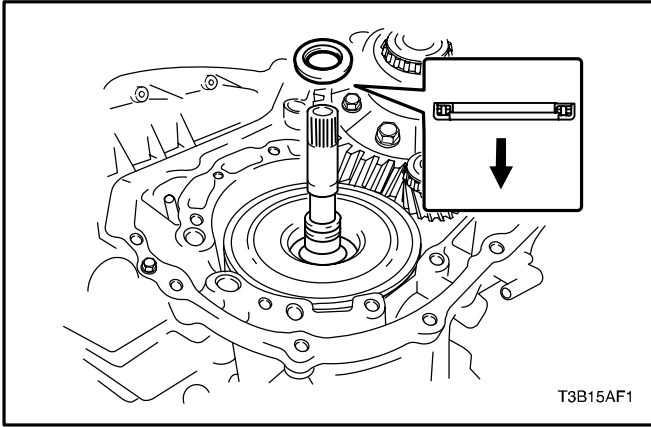
	Inner diameter	Outer diameter
Race	20.5 (0.807)	32.6 (1.283)
Bearing	17.8 (0.701)	30.2 (1.189)



97. Install the direct clutch assembly to the transaxle case.



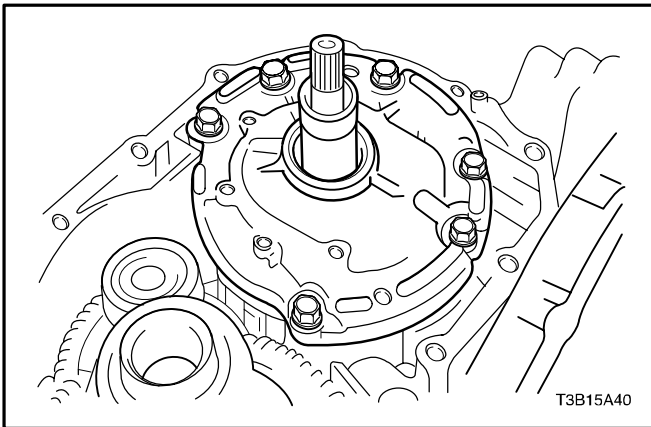
98. Install new apply gasket.



99. Install the thrust needle roller bearing to the trans-axle case.

Notice : Check the direction of the bearing.

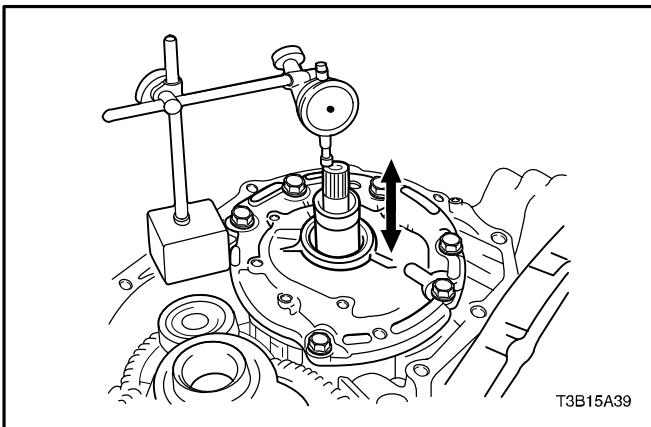
100. Place the oil pump through the input shaft, and align the bolt holes of the oil pump with the trans-axle case.



101. Install the 6 oil pump bolts.

Tighten

Tighten the bolts to 25 N•m (18 lb–ft).

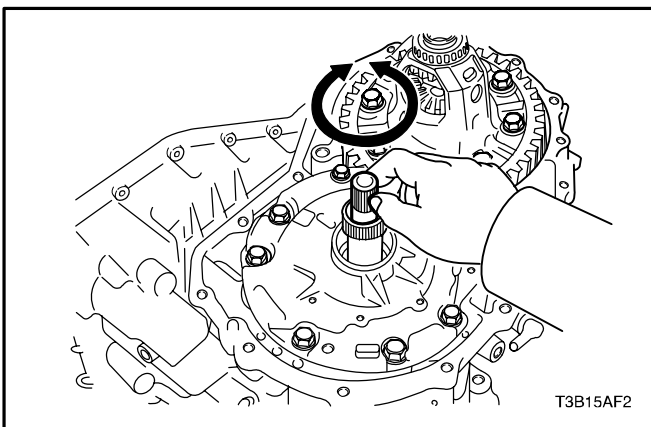


102. Measure the end play in axial direction.

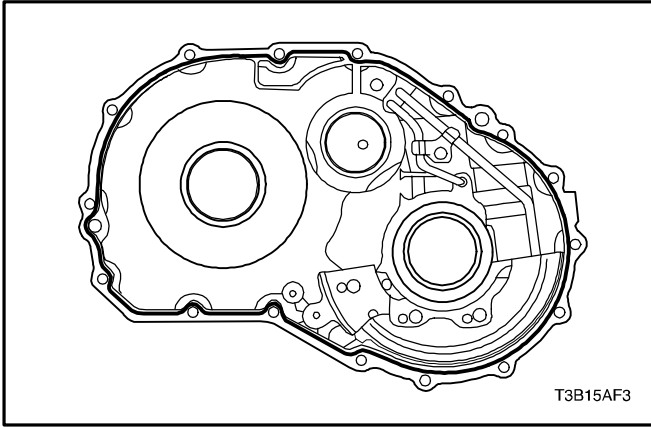
Notice : If the end play is not as specified, select and replace the thrust needle roller bearing.

- End play 0.3 – 0.9 mm (0.012 – 0.035 in.)
- Bearing: mm (in.)

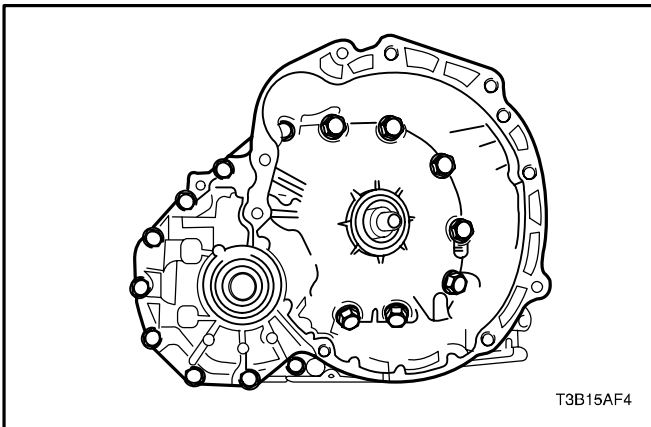
Inner diameter	Outer diameter	Thickness
32.5 (1.280)	48.5 (1.909)	4.21 (0.1657)
32.9 (1.295)	48.5 (1.909)	3.62 (0.1425)



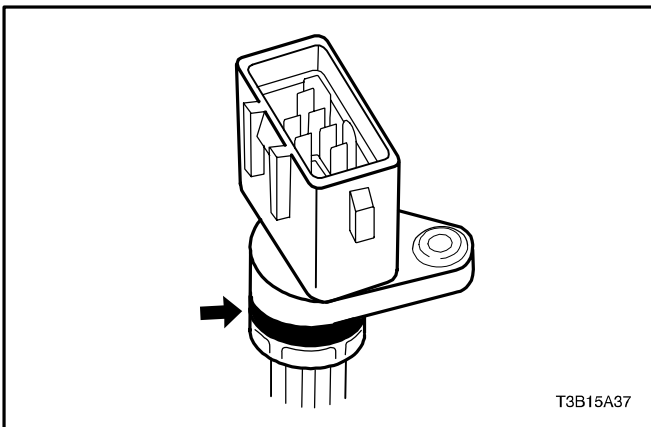
103. Make sure that the input shaft rotates smoothly.



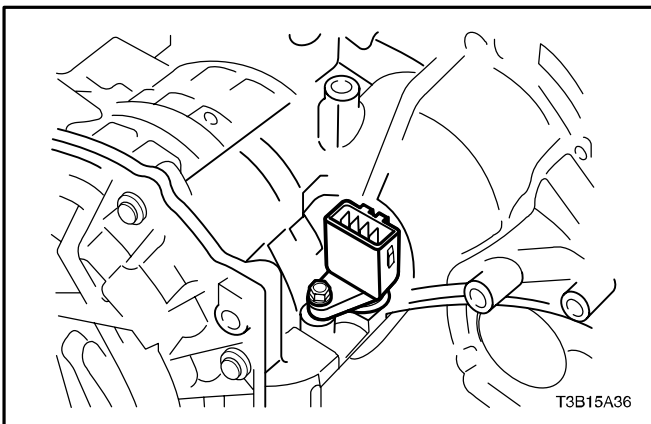
104. Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle housing or transaxle case.
105. Apply FIPG (formed in place gasket) to the transaxle housing.
FIPG: Three bond 1281 or equivalent.
Seal bend width: 1.2 mm (0.047 in.)



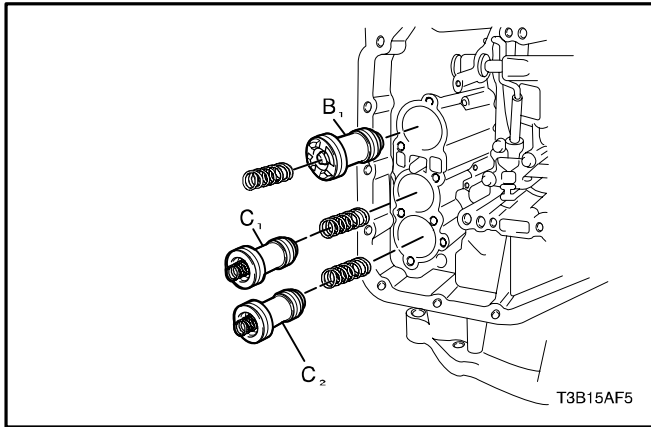
106. Install the transaxle housing to the transaxle case with the 16 bolts.
Tighten
Tighten the bolts to 29 N•m (22 lb–ft).
 - Apply seal packing or equivalent to the 3 bolts indicated by arrows.



107. Coat a new O–ring with ATF, install it to the transaxle wire.

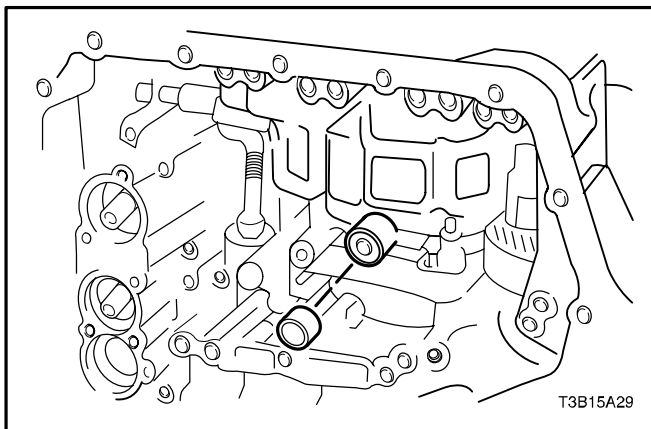


108. Install the transaxle wire the to the transaxle case with the bolt.
Tighten
Tighten the bolts to 5.4 N•m (48 lb–in).

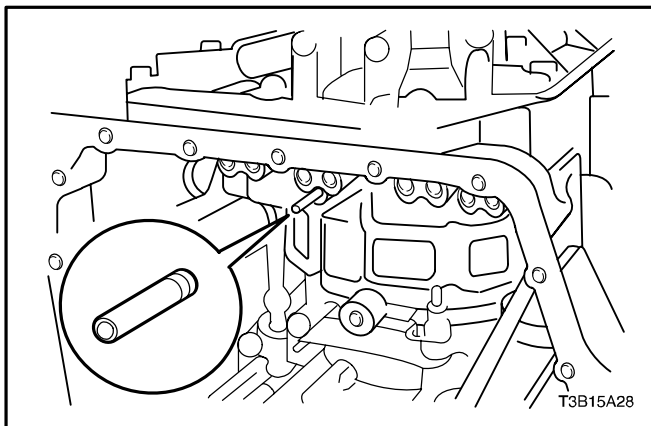


109. Coat new 6 O-rings with ATF and install them to the pistons.
110. Coat the 3 springs and 3 accumulator pistons with ATF, install them to the holes.
- Accumulator spring:

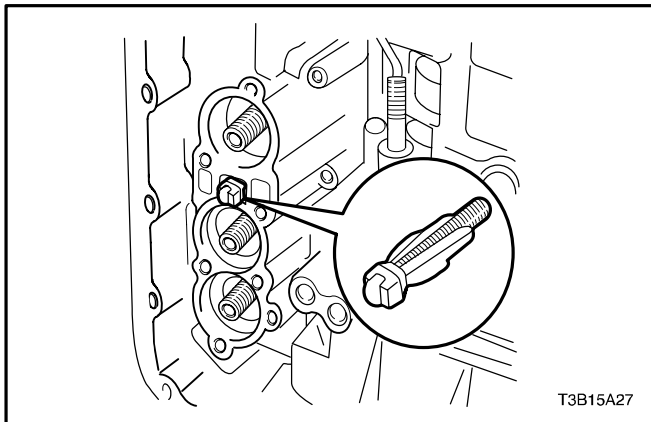
Spring	Free length Outer diameter mm(in.)	Color
B1(O/D & 2nd brake)	47.13(1.8555)/ 16.0(0.630)	Pink
C1(Forward clutch)	57.90(2.2795)/ 17.2(0.677)	—
C2(Direct clutch)	57.20(2.2520)/ 17.5(0.689)	Green



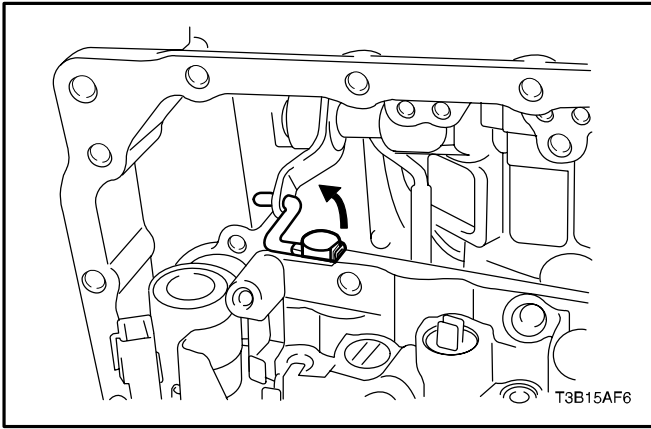
111. Coat a new apply gasket with ATF, install it to the transaxle case.



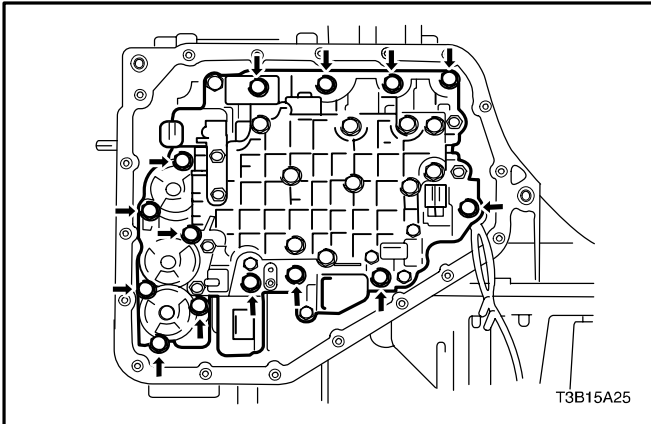
112. Coat a new brake drum gasket with ATF, install it to the transaxle case.



113. Install the spring and check valve.



114. Connect the manual valve control rod to the manual valve lever as shown in the illustration.

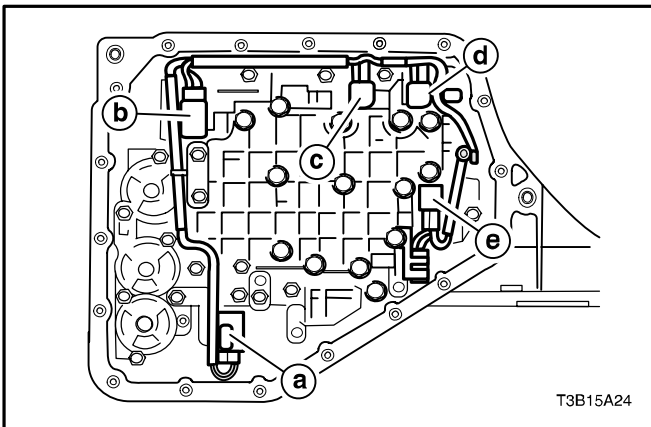


115. Install the valve body assembly to the transaxle case.

Tighten

Tighten the bolts to 11 N•m (97 lb-in).

Notice : When installing the valve body to the transaxle case, do not let each of accumulator pistons B1,C1,and C2 incline. When installing the valve body to the transaxle case, do not hold the solenoids.



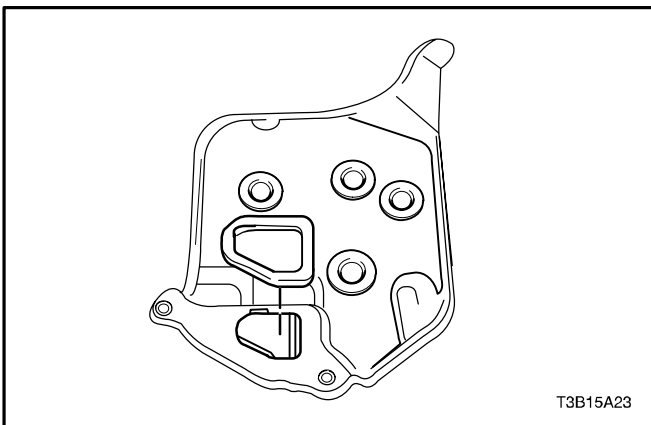
116. Connect the transaxle wire connector and harness to the valve body assembly.

117. Connect the 5 connectors.

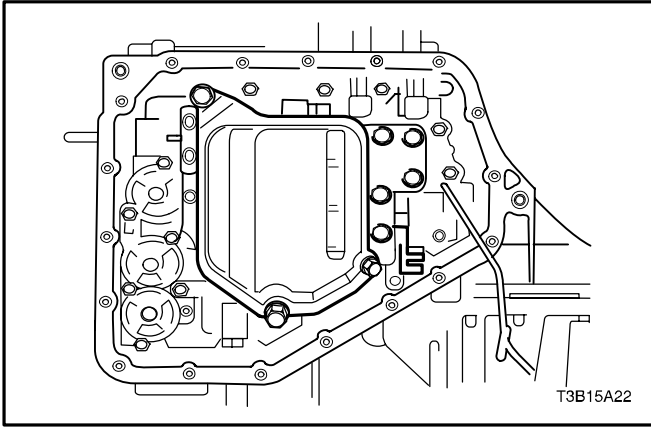
- a. Lock-up control solenoid
- b. Pressure control solenoid.
- c. No.2 shift solenoid.
- d. No.1 shift solenoid.
- e. Timing solenoid

118. Install the TFT sensor with clamp.

Notice : Make sure that the transaxle wire does not come out from the oil pan installation surface.



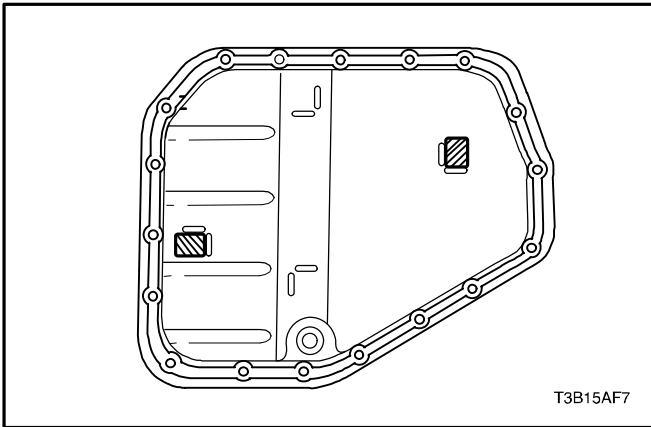
119. Install a new gasket to the oil strainer.



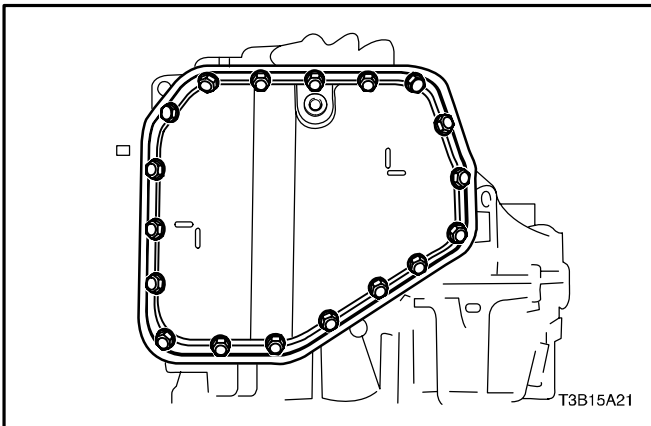
120. Install the oil strainer to the valve body with the 3 bolts.

Tighten

Tighten the bolts to 9.8 N•m (87 lb-in).



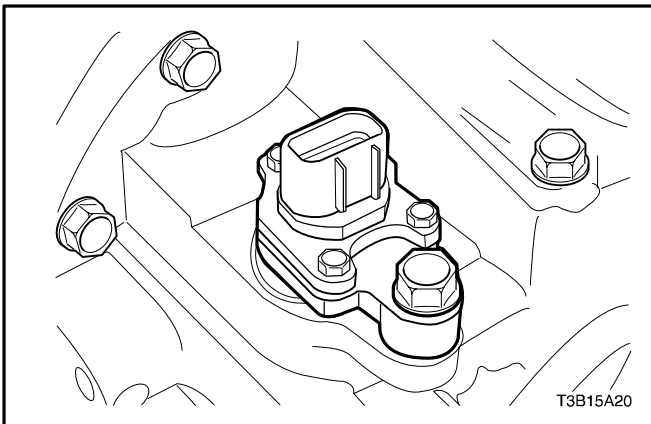
121. Install the 2 magnets in the oil pan.



122. Install a new gasket to the oil pan and install them to the transaxle case with the 18 bolts.

Tighten

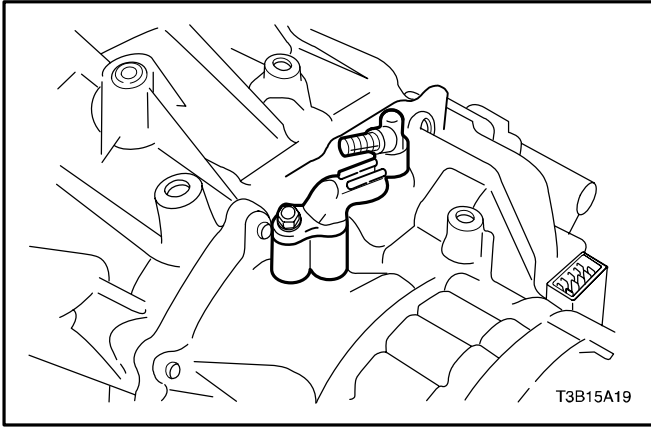
Tighten the bolts to 7 N•m (62 lb-in).



123. Install the output shaft speed (OSS) sensor.

Tighten

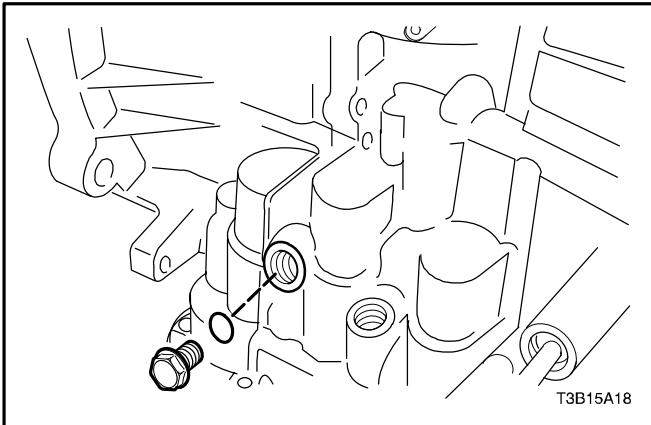
Tighten the bolt to 7.4 N•m (65 lb-in).



124. Install the No.1 breather plug.
125. Install the input shaft speed (ISS) sensor with the bolt.

Tighten

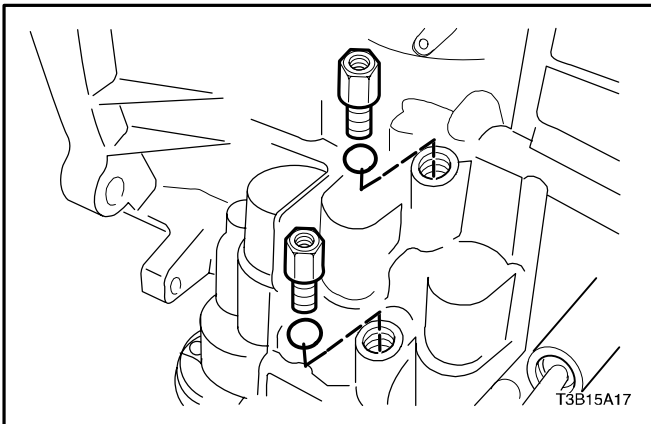
Tighten the bolts to 5.4 N•m (48 lb-in).



126. Coat a new O-ring with ATF, install it to the screw plug.
127. Install the screw plug to the transaxle case.

Tighten

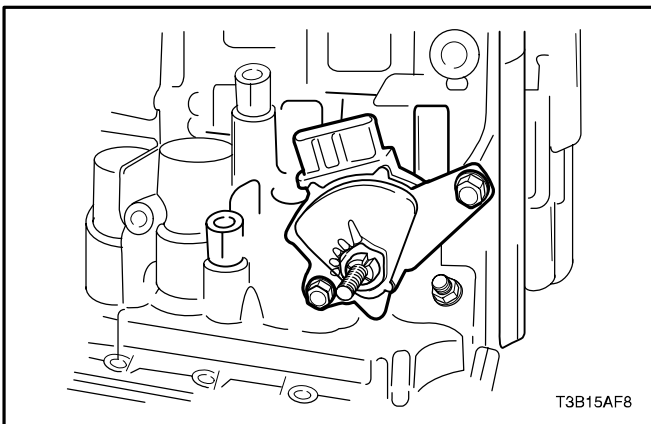
Tighten the bolts to 7.4 N•m (65 lb-in).



128. Coat new 2 O-rings with ATF, install them to the unions.
129. Install the 2 unions to the transaxle case.

Tighten

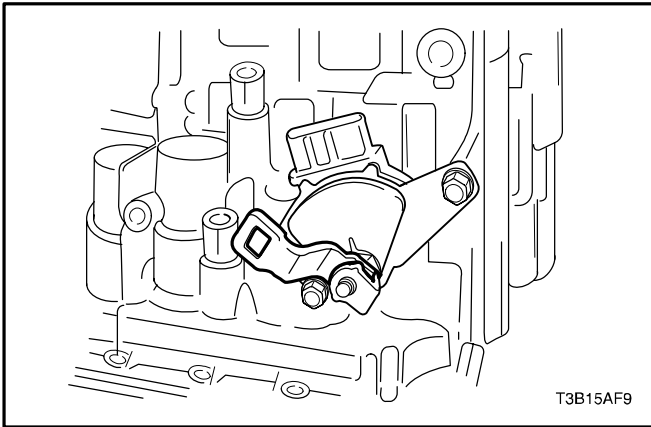
Tighten the unions to 25 N•m (18 lb-ft).



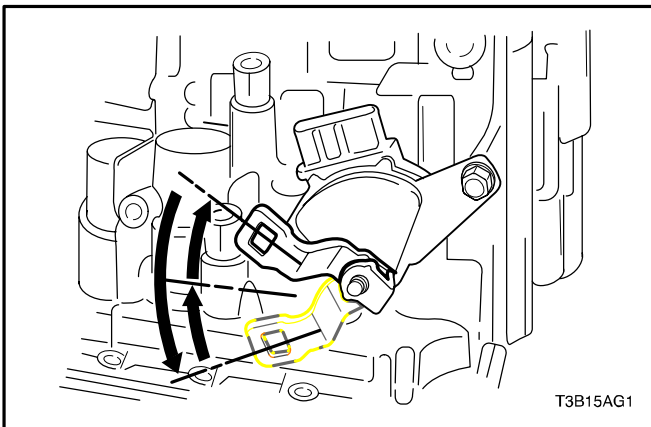
130. Install the TR switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.
131. Install a new lock washer and nuts.

Tighten

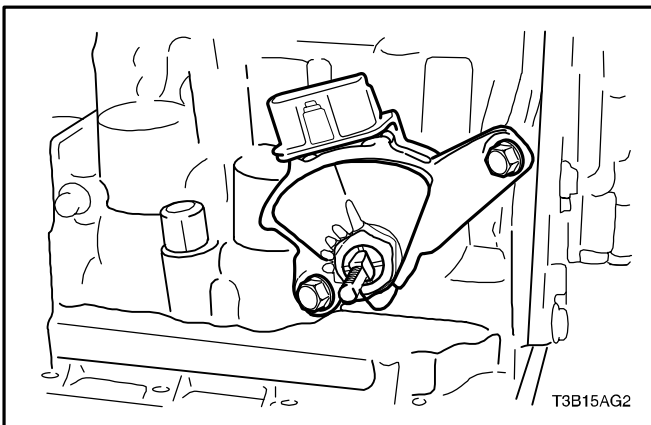
Tighten the nuts to 12 N•m (106 lb-in).



132. Temporarily install the control lever.



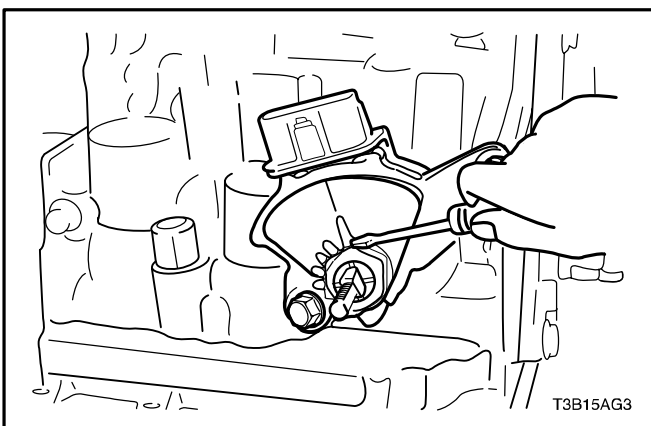
133. Turn the lever counterclockwise until it stops, then turn it clockwise 2 notches.
134. Remove the control lever.



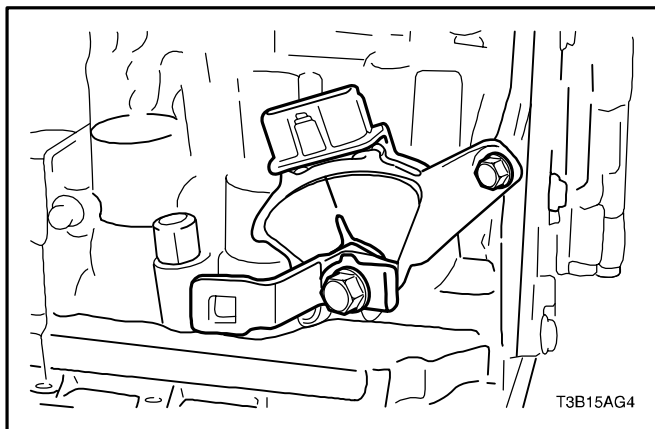
135. Align the groove with neutral basic line.
136. Tighten the 2 bolts.

Tighten

Tighten the bolts to 5.4 N•m (48 lb-in).



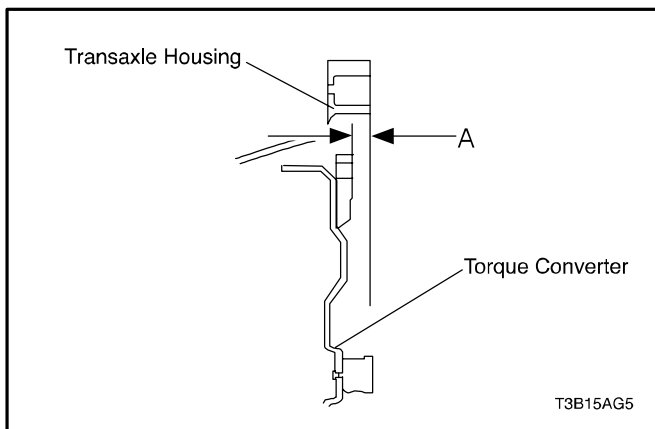
137. Using a screwdriver, stake the nut with the lock washer.



138. Install the control lever, washer and nut.

Tighten

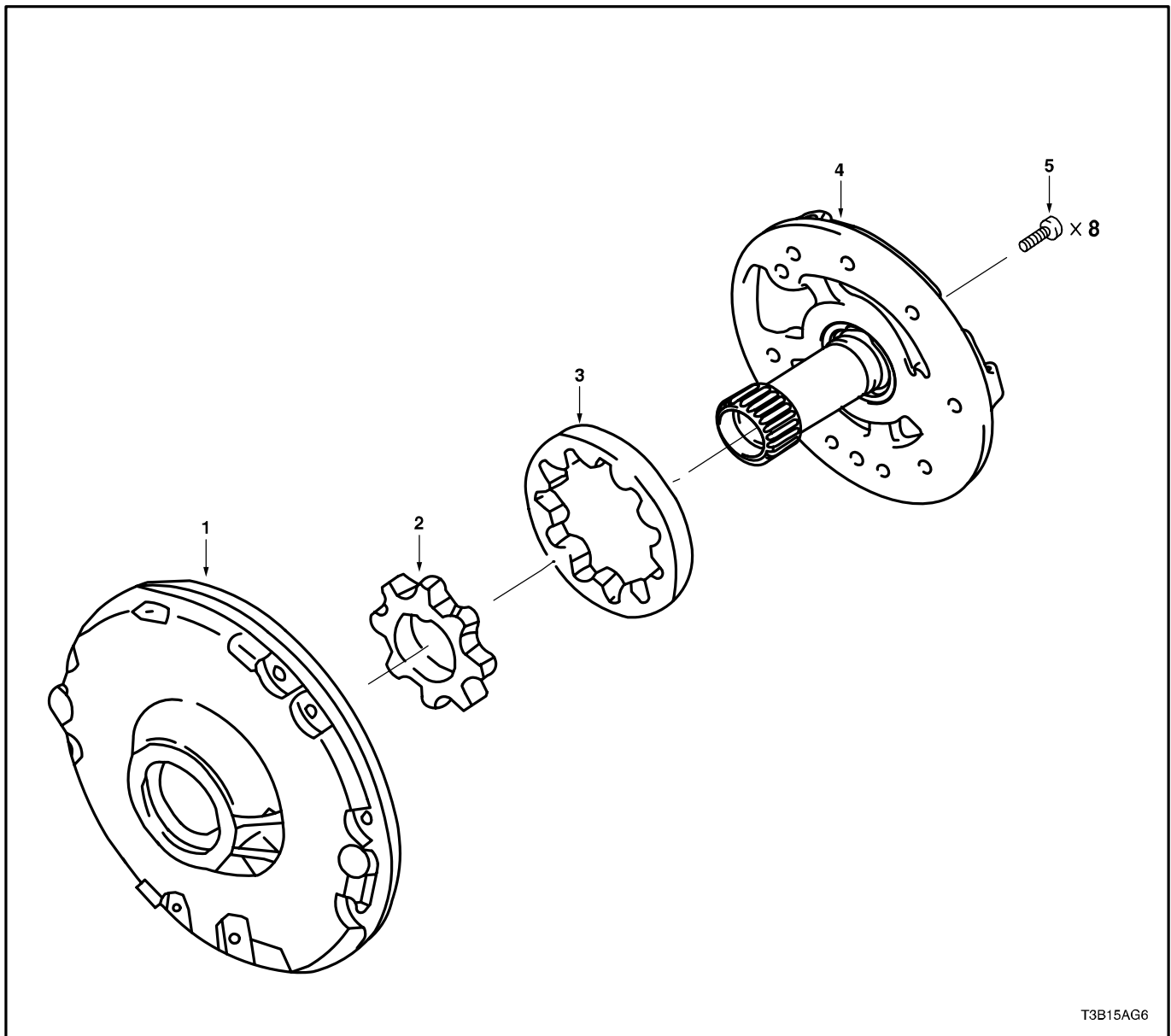
Tighten the nut to 12 N•m (106 lb-in).



139. Install the torque converter to the transaxle.

140. Measure the installation depth of the torque converter. Standard value: 11.1 mm

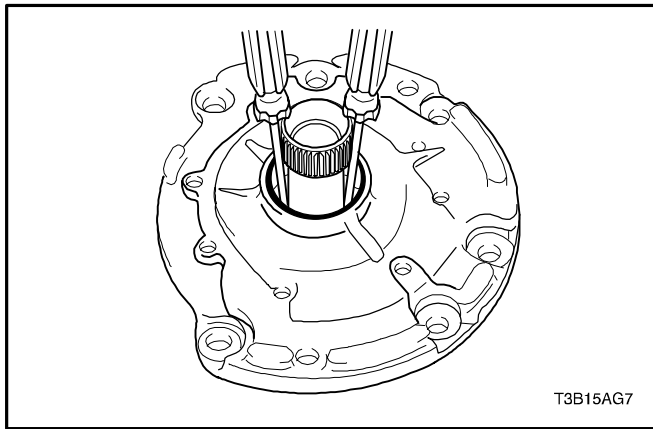
If the measured value is beyond the standard value, readjust the torque converter within the specified value.

OIL PUMP

T3B15AG6

1. Oil Pump Body
2. Oil Pump Drive Gear
3. Oil Pump Driven Gear

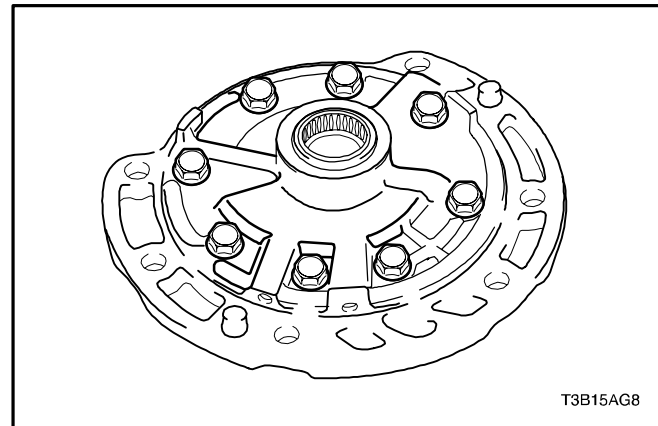
4. Stator Shaft
5. Bolt



Disassembly Procedure

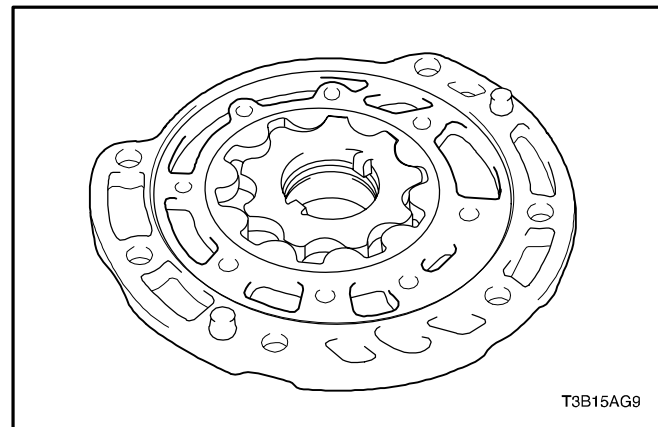
1. Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

Notice : Be careful not to damage the oil lip.

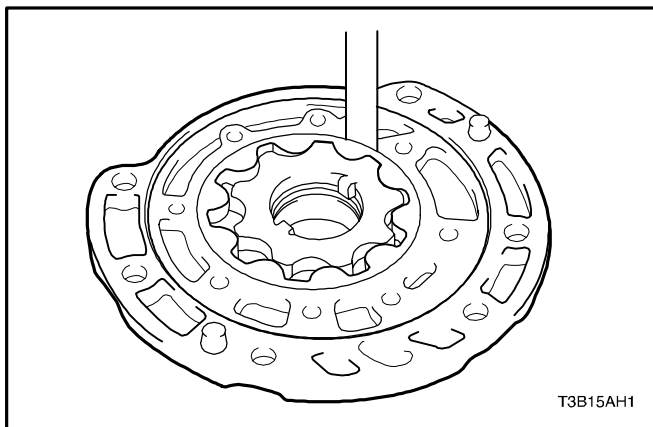


2. Remove the 8 bolts and stator shaft.

Notice : Be careful not to let the driver drop as it might come off attached to the stator shaft.



3. Remove the oil pump drive gear and driven gear from the oil pump body.



Inspection Procedure

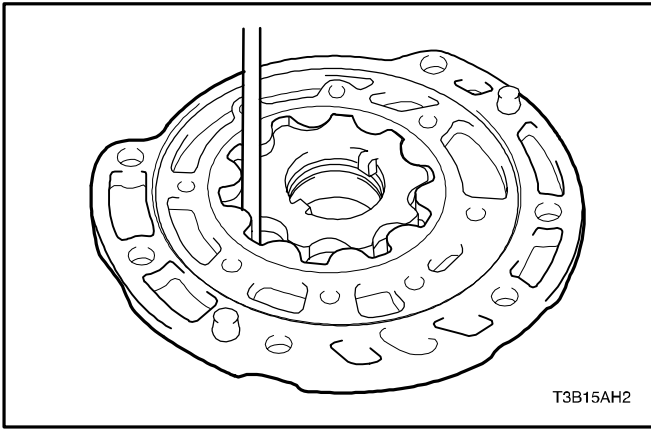
1. Push the driven gear to one of side of the body. Using a feeler gauge, measure the clearance.

- Standard body clearance:

0.10 – 0.17 mm (0.0039 – 0.0067 in.)

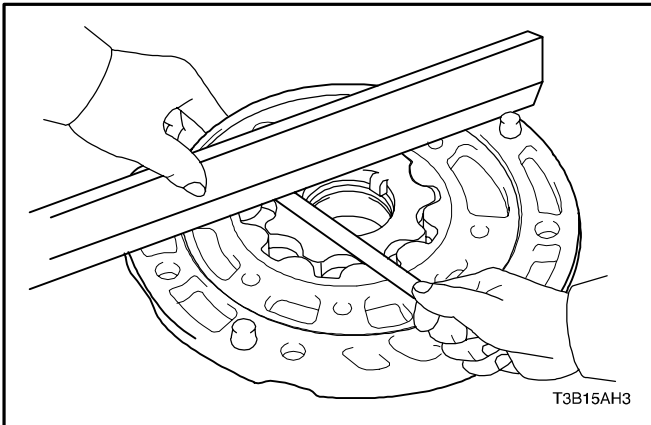
- Maximum body clearance: 0.17 mm (0.0067 in.)

If the body clearance is greater than the maximum, replace the oil pump body sub-assembly.



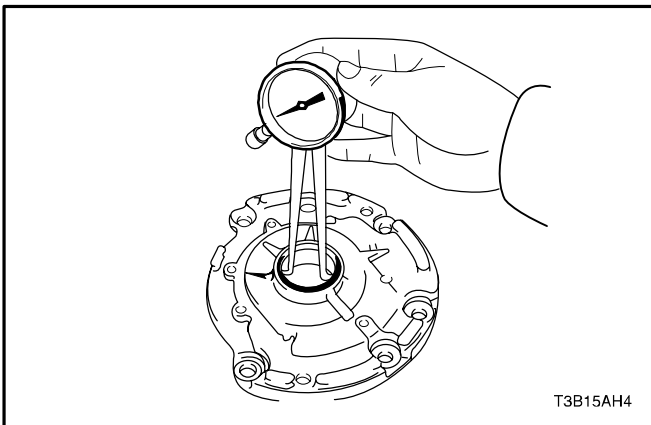
2. Measure the tip clearance between the driven gear teeth and drive gear teeth.
 - Standard tip clearance:
0.07 – 0.15 mm (0.0028 – 0.0059 in.)
 - Maximum tip clearance: 0.15 mm (0.0059 in.)

If the tip clearance is greater than the maximum, replace the oil pump body sub-assembly.



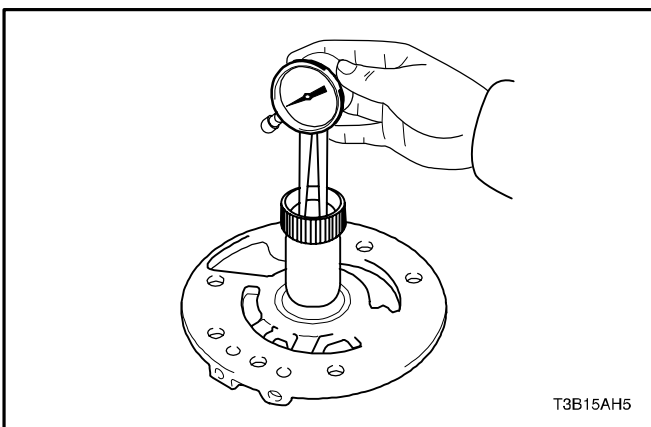
3. Using a steel straight edge and feeler gauge, measure the side clearance of both gears.
 - Standard side clearance:
0.02 – 0.05 mm (0.0008 – 0.0020 in.)
 - Maximum side clearance: 0.05 mm (0.0020 in.)

If the side clearance is greater than the maximum, replace the drive gear, driven gear or pump body.



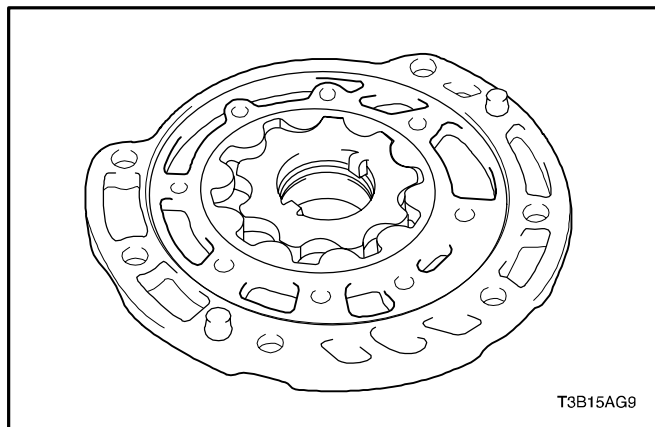
4. Using a dial indicator, measure the inside diameter of the oil pump body bushing.
 - Standard inside diameter: 38.126 mm (1.50102 in.)
 - Maximum inside diameter: 38.188 mm (1.50346 in.)

If the inside diameter is greater than the maximum, replace the oil pump body sub-assembly.



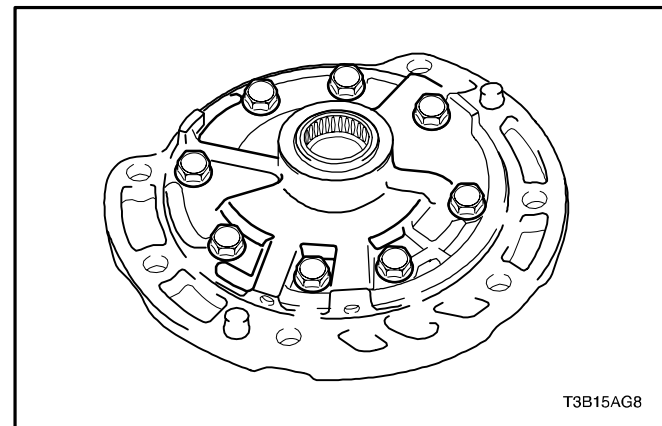
5. Using a dial indicator, measure the inside diameter of the stator shaft bushings.
 - Standard inside diameter: 18.437 mm (0.72586 in.)
 - Maximum inside diameter: 18.5 mm (0.728 in.)

If the inside diameter is greater than the maximum, replace the stator shaft.



Assembly Procedure

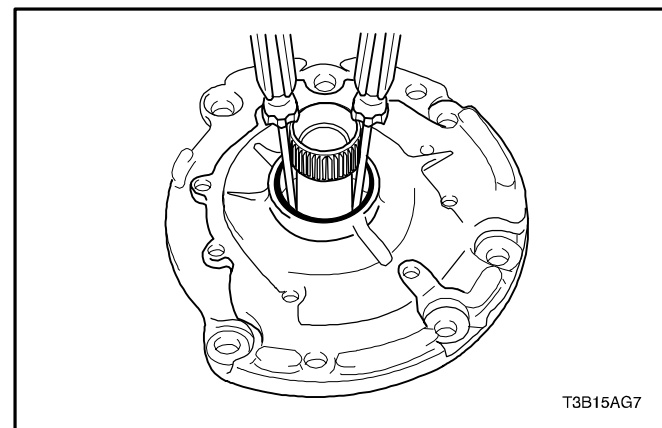
1. Install the oil pump drive gear and driven gear.



2. Align the stator shaft with each bolt hole.
3. Install the 8 bolts.

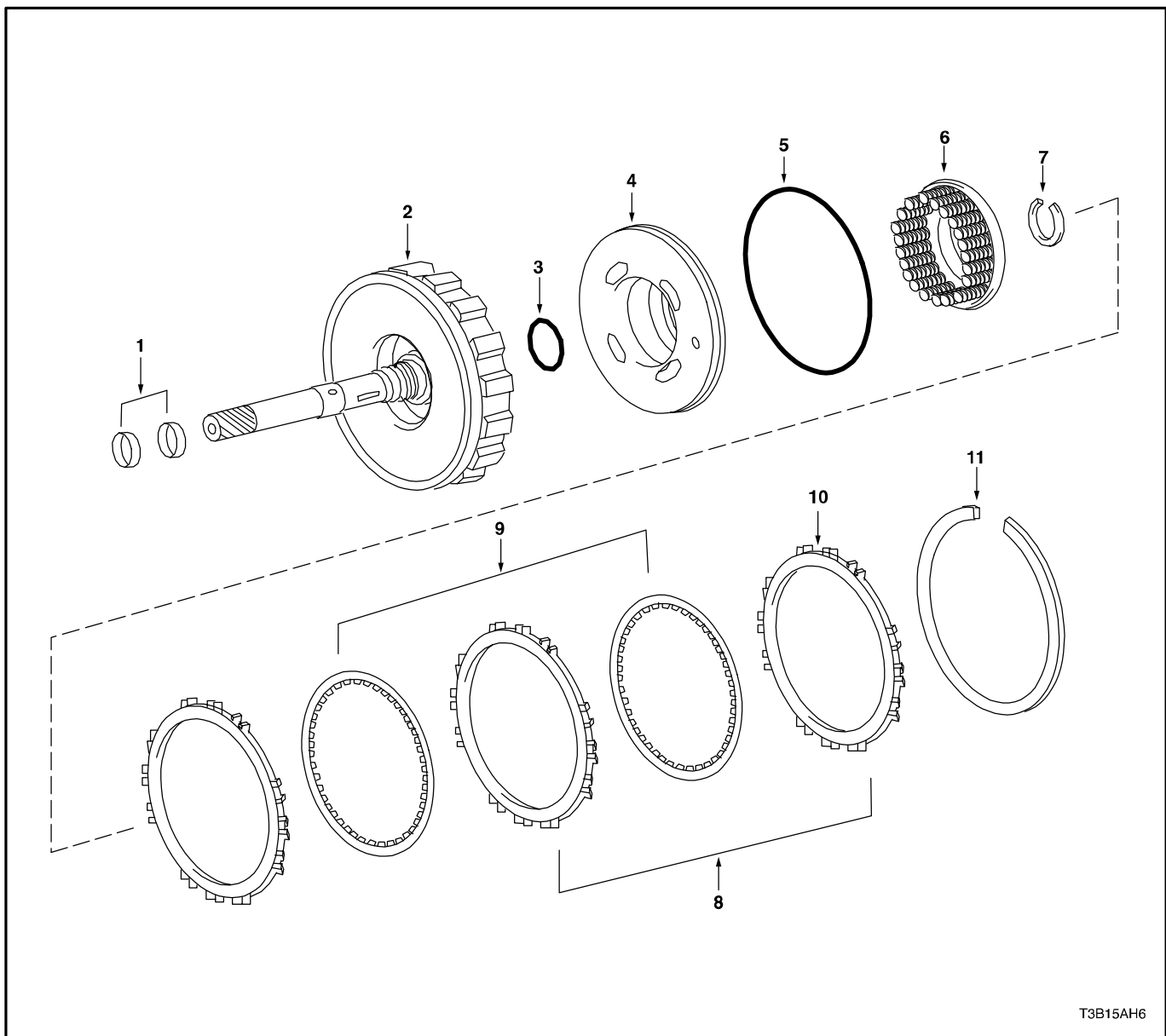
Tighten

Tighten the bolts to 9.8 N•m (87 lb-in).



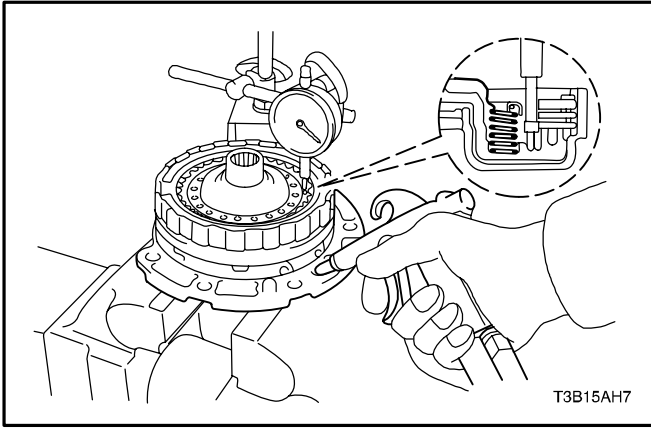
4. Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

Notice : Be careful not to damage the oil lip.

DIRECT CLUTCH

T3B15AH6

- | | |
|-----------------------------|---------------|
| 1. Seal Ring | 7. Snap Ring |
| 2. Input Shaft Sub-assembly | 8. Plate |
| 3. O-Ring | 9. Disc |
| 4. Piston | 10. Flange |
| 5. O-Ring | 11. Snap Ring |
| 6. Return Spring | |



Tools Required

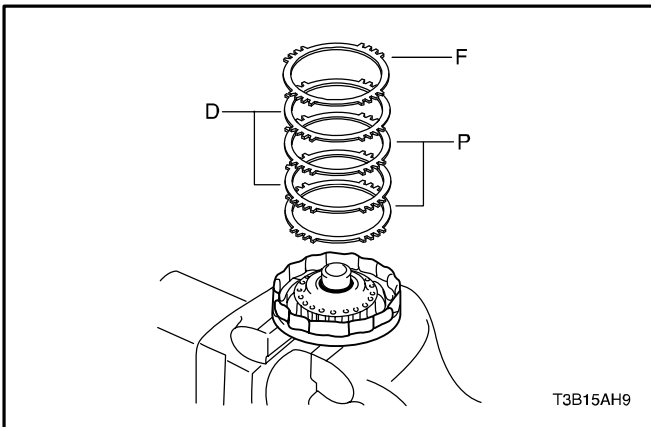
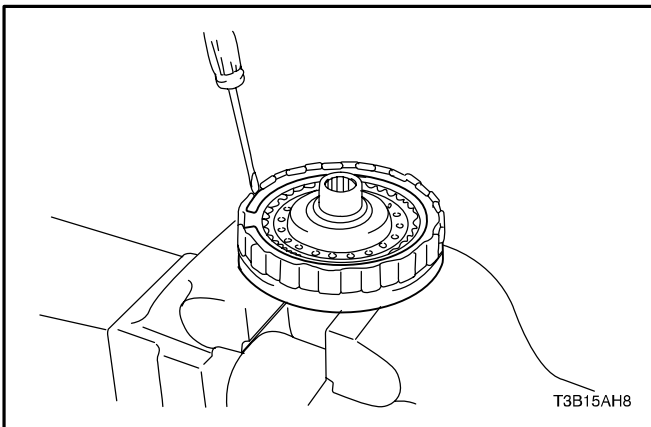
DW240-020 Brake/Clutch Spring Compressor

DW240-040 Direct Clutch Adapter

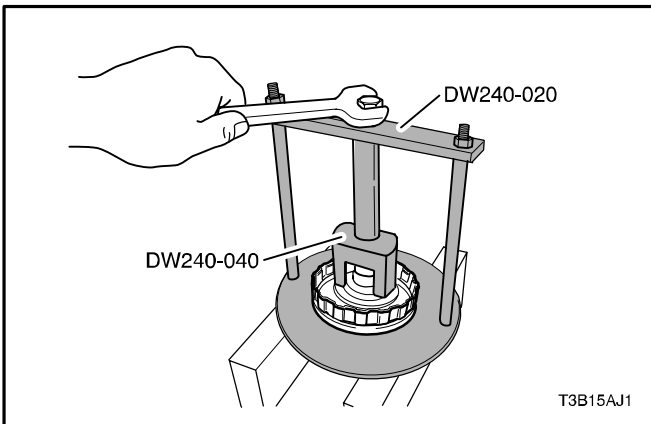
Disassembly Procedure

WARNING : USE CAUTION WHEN CHECKING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

1. Install the direct clutch and thrust needle roller bearing on the oil pump.
2. Using a dial indicator, measure the direct clutch piston stroke while applying and releasing 392 kPa (57 psi) of compressed air.
Piston stroke: 0.4 – 0.8 mm (0.016 – 0.031 in.)
If the stroke is non-standard, inspect the discs, plates and flange.
3. Using a screwdriver, remove the snap ring.



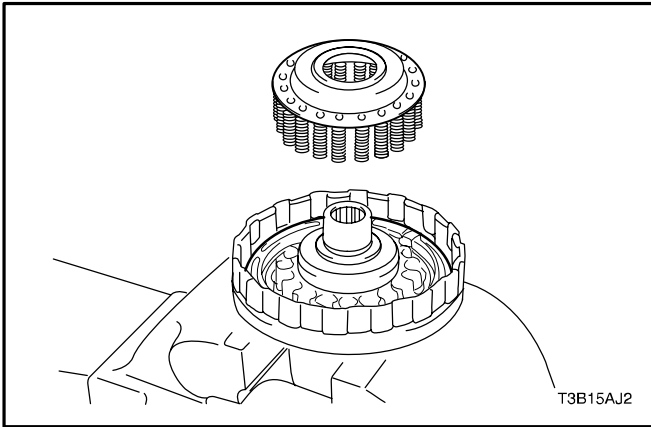
4. Remove the flange, 2 discs and 2 plates.



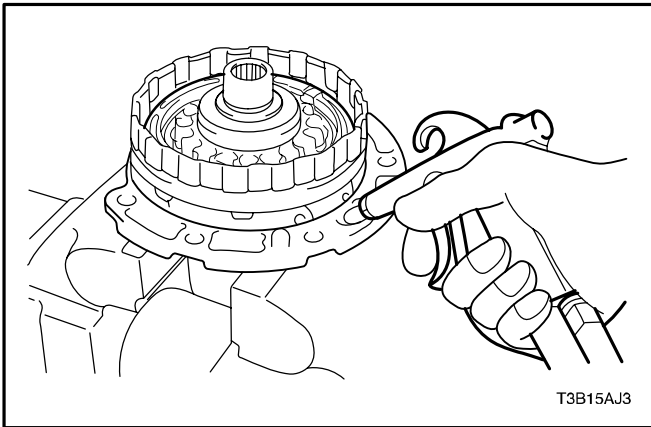
5. Place the brake/clutch spring compressor DW240-020 and direct clutch adapter DW240-040 on the direct clutch return spring and compress.
6. Using a snap ring expander, remove the snap ring.

Notice : Stop the press when the piston return spring is lowered to the place 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the piston return spring from being deformed.

Notice : Do not expand the snap ring excessively.



7. Remove the direct clutch return spring.



8. Install the direct clutch on the oil pump.

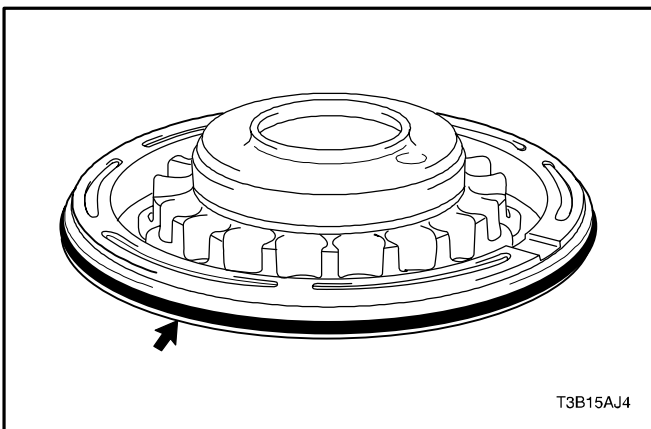
WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

Notice : Blowing off the air may cause the piston to jump out. When removing the piston, hold it with your hand using a waste cloth.

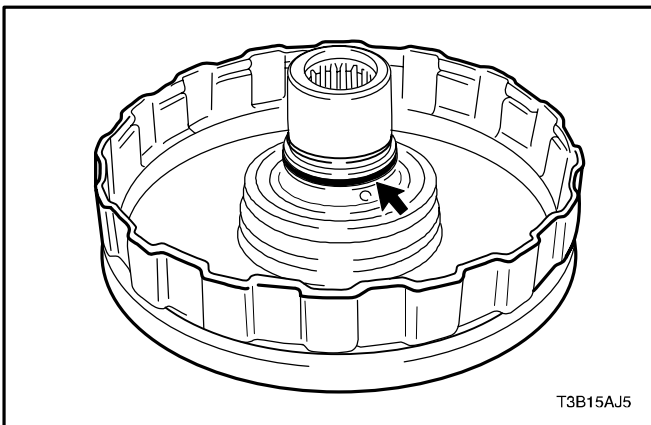
Notice : Take care not to splash ATF when air-blowing.

9. Apply 392 kPa (57 psi) of compressed air to the oil pump to remove the direct clutch piston.

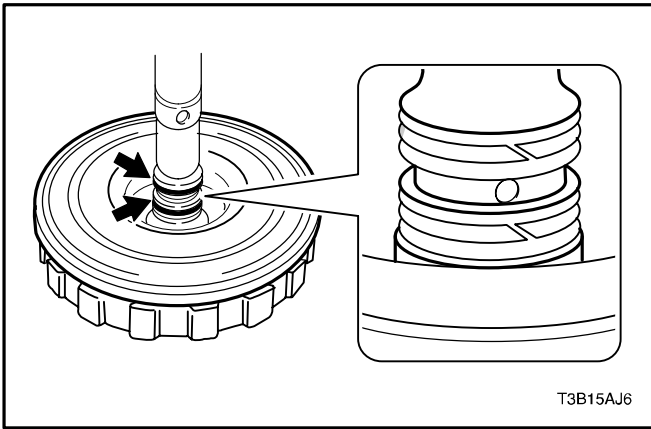
- When the piston can not be removed as it is slanted, either blow the air again with the protruding side pushed or remove the piston using needle nose pliers with vinyl tape on the tip.



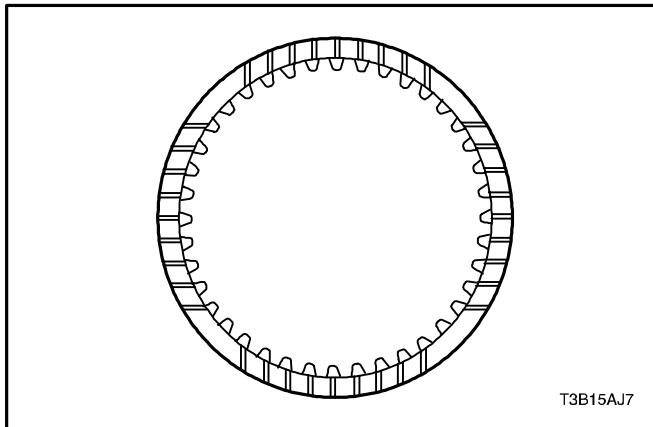
10. Using a small screwdriver, remove the O-ring from the direct clutch piston.



11. Remove the O-ring from the input shaft.

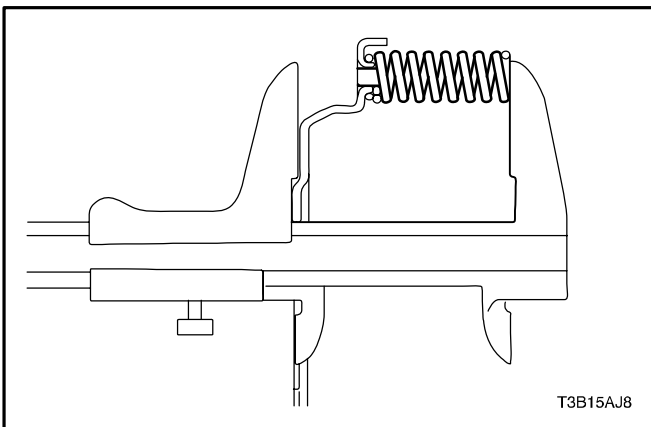


12. Remove the 2 seal rings from the input shaft.
Notice : Do not expand the ring ends excessively.

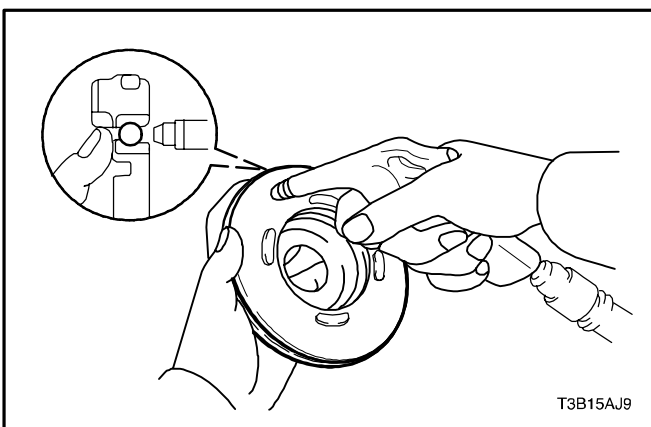


Inspection Procedure

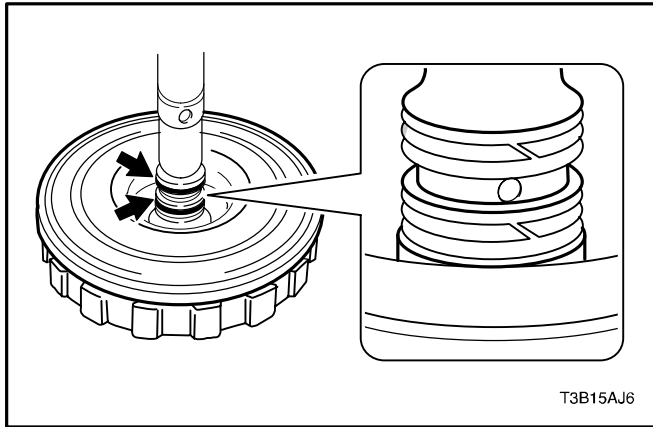
1. Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.
 - If the lining of the disc is peeling off or discolored, or even if a part of the printed number is defaced, replace all discs.
 - Before assembling new discs, soak them in ATF for at least 15 minutes.



2. Using vernier calipers, measure the free length of the direct clutch return spring together with the spring sheet.
 - Standard free length: 36.04 mm (1.4189 in.)



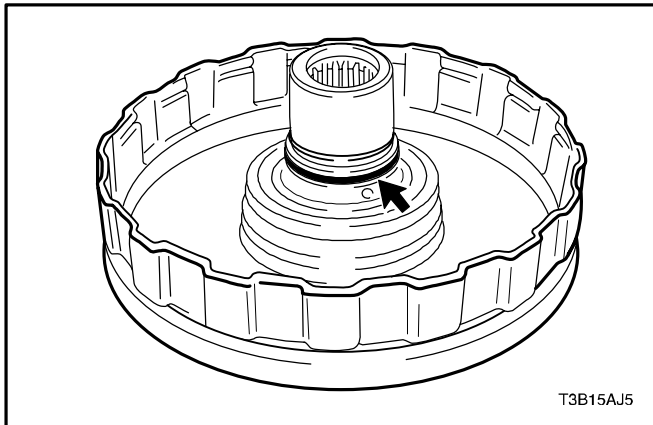
3. Check that the check ball is free by shaking the direct clutch piston.
4. Check that the valve does not leak by applying low-pressure compressed air.



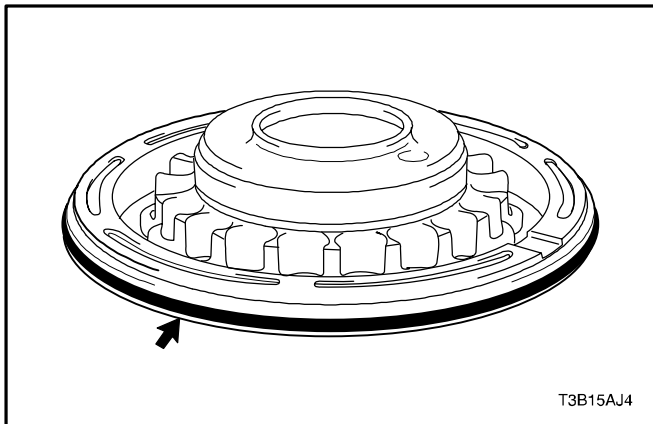
Assembly Procedure

1. Install the 2 seal rings to the input shaft.

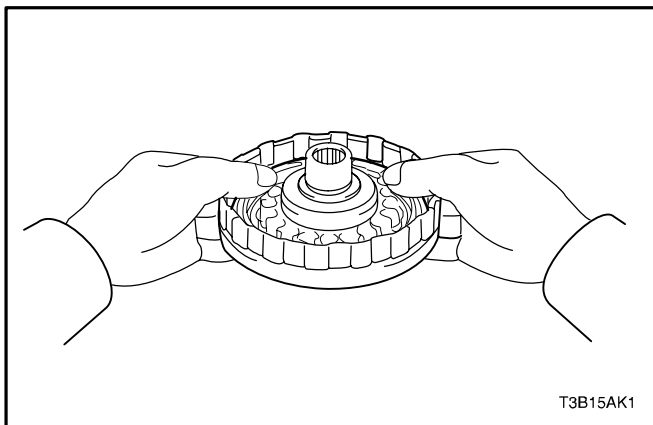
Notice : Do not expand the ring ends excessively.



2. Coat a new O-ring with ATF and install the O-ring to the input shaft.

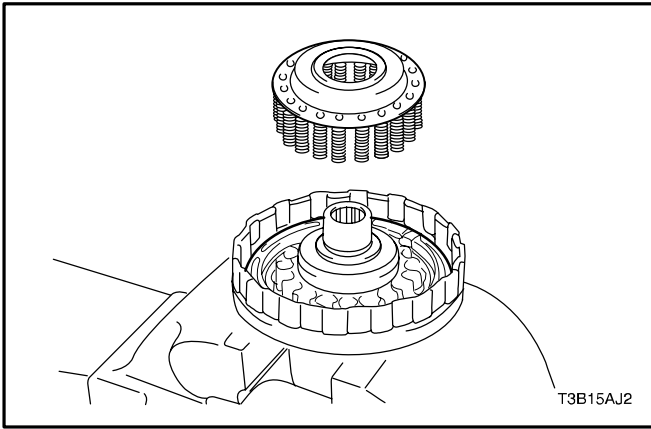


3. Coat a new O-ring with ATF and install the O-ring to the direct clutch piston.

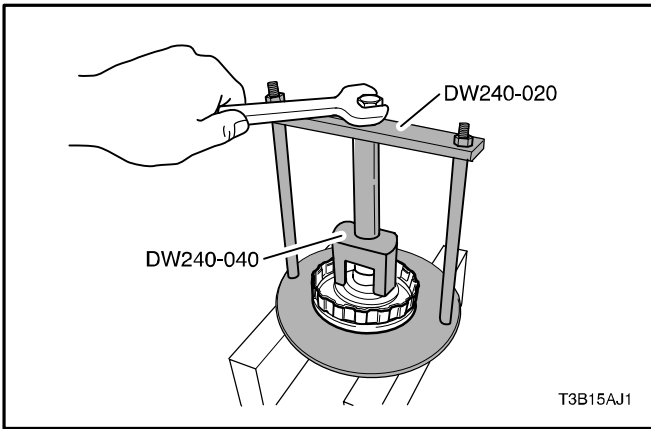


4. Coat the direct clutch piston with ATF, install it to the direct clutch drum.

Notice : Be careful not to damage the lip seal of direct clutch piston.



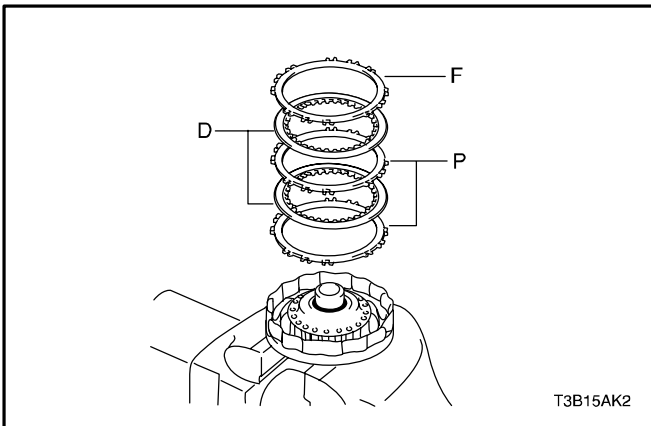
5. Install the direct clutch return spring.



6. Place brake/clutch spring compressor DW240-020 and direct clutch adapter DW240-040 on the return spring and compress.
7. Using a snap ring expander, install the snap ring.

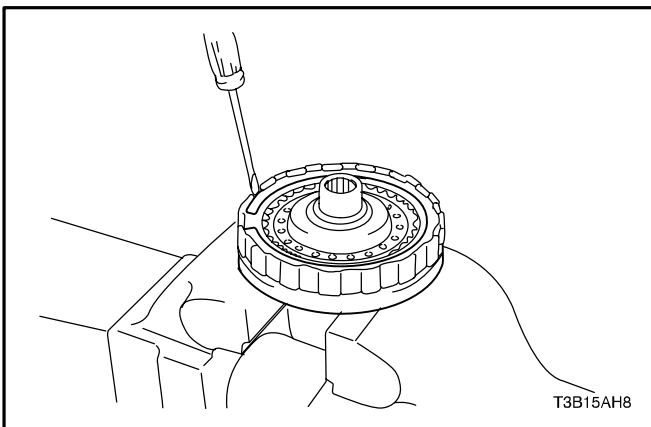
Notice : Stop the press when the piston return spring is lowered to the place 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the piston return spring from being deformed.

Notice : Do not expand the snap ring excessively.

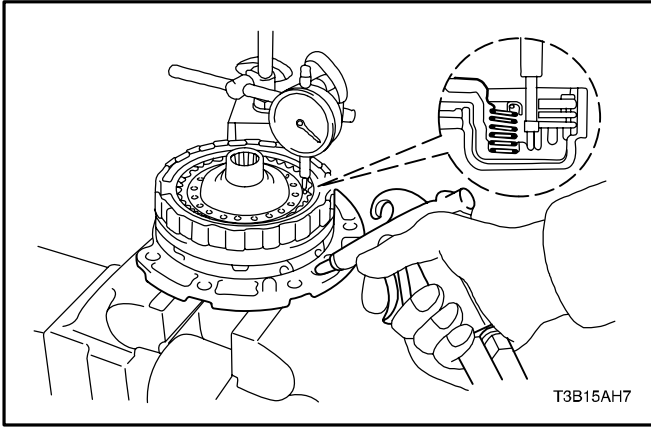


8. Install the 2 plates, 2 discs and flange.

- Before installing the discs, coat them with ATF. Install in order: P – D – P – D – F
(P = Plate, D = Disc, F = Flange)



9. Using a screwdriver, remove the snap ring.
10. Check that end gap of the snap ring is not aligned with one of the cutouts.



11. Install the direct clutch on the oil pump.

WARNING : USE CAUTION WHEN CHECKING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

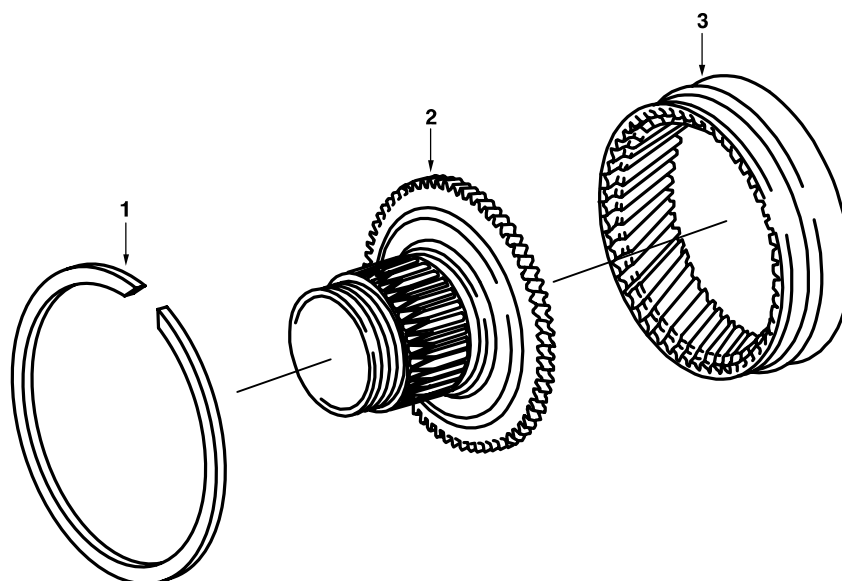
12. Using a dial indicator, measure the direct clutch piston stroke while applying and releasing 392 kPa (57 psi) of compressed air .

Piston stroke: 0.4 – 0.8 mm (0.016 – 0.031 in.)

- If the piston stroke is less than the limit of piston stroke, parts may have been assembled incorrectly, so check and reassemble again.
- If the stroke is non-standard, select another flange.
- There are 3 flanges in different thickness.
- Flange Thickness: mm (in.)

No	Thickness	No	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)		

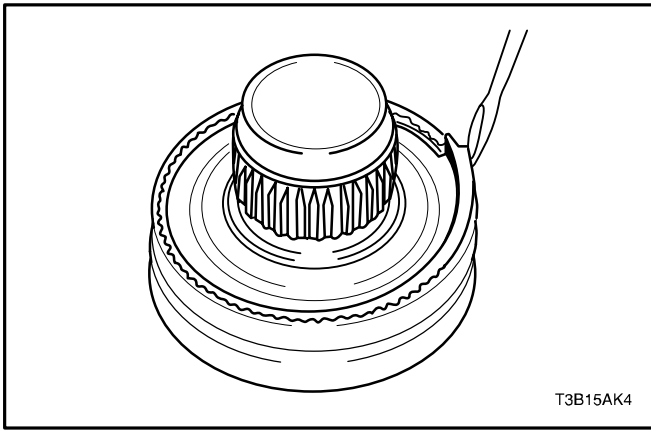
PLANETARY RING GEAR



T3B15AK3

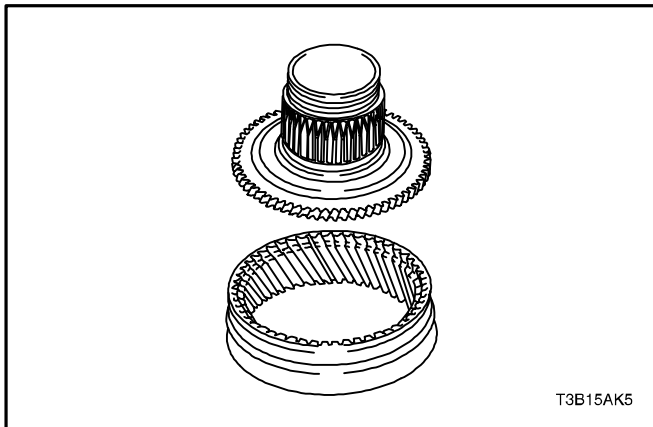
1. Snap Ring
2. Planetary Ring Gear Flange

3. Planetary Ring Gear

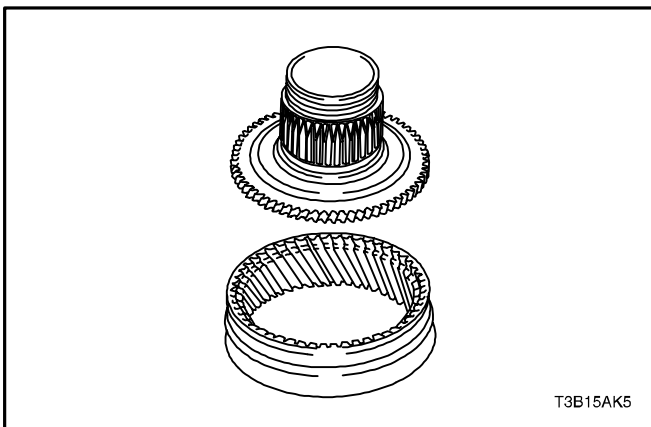


Disassembly Procedure

1. Using a screwdriver, remove the snap ring.

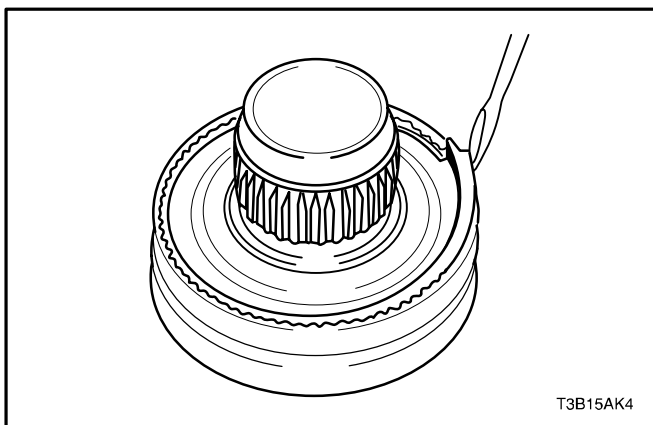


2. Remove the planetary ring gear flange from the planetary ring gear.



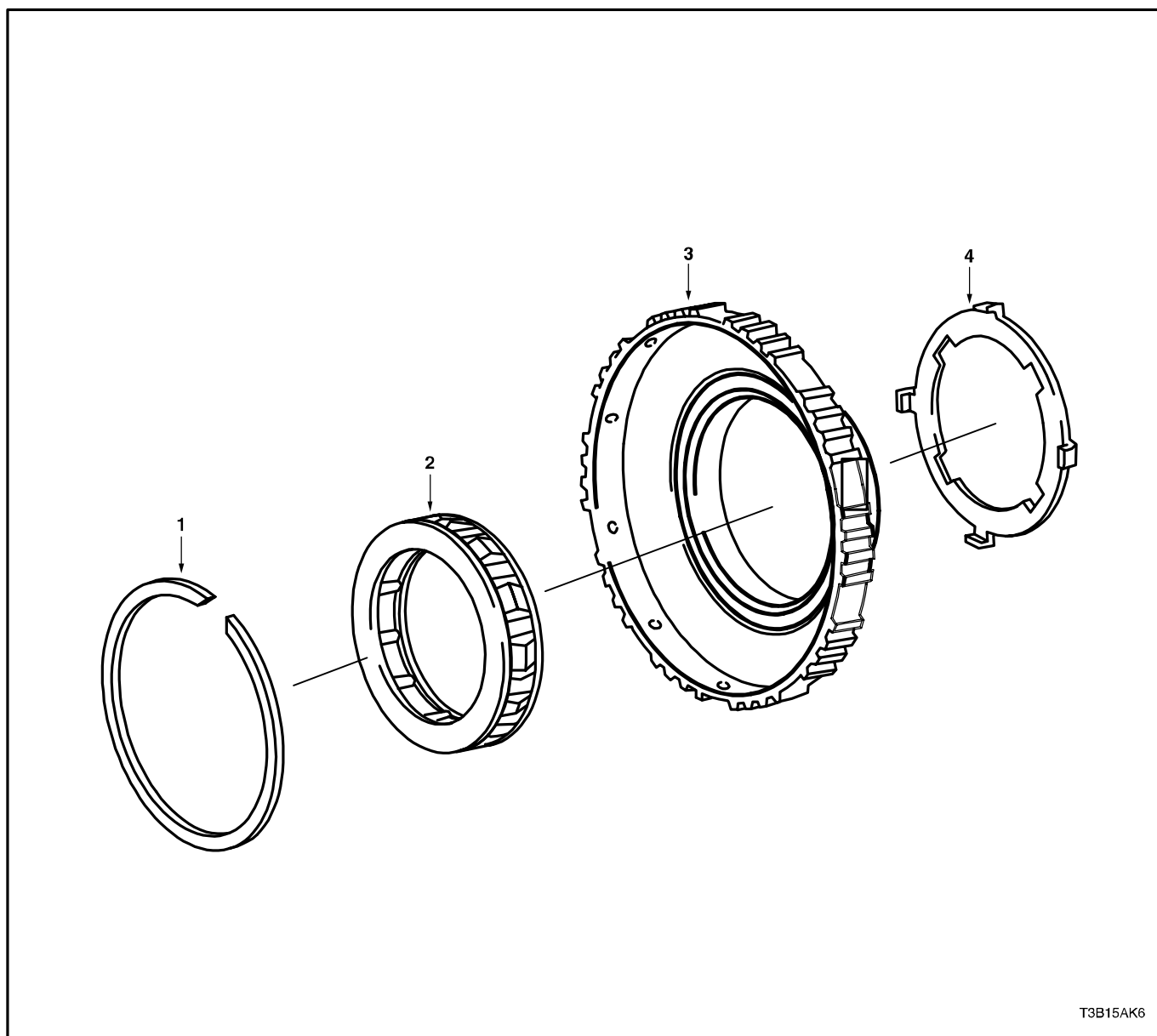
Assembly Procedure

1. Install a new planetary ring gear flange to the planetary ring gear.



2. Using a screwdriver, install the snap ring.

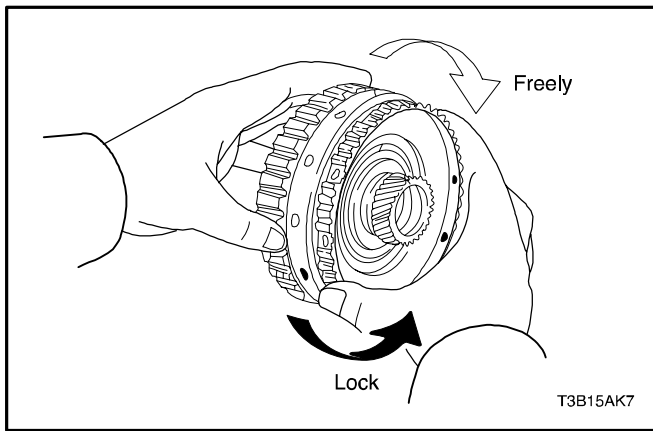
ONE-WAY CLUTCH



T3B15AK6

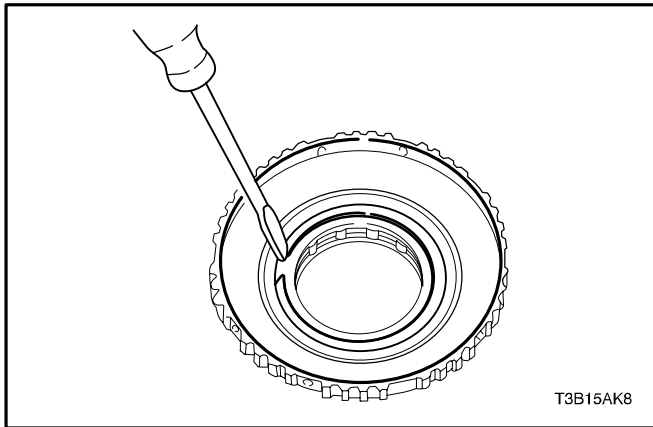
1. Snap Ring
2. One-Way Clutch

3. 2nd Brake Hub
4. Retainer

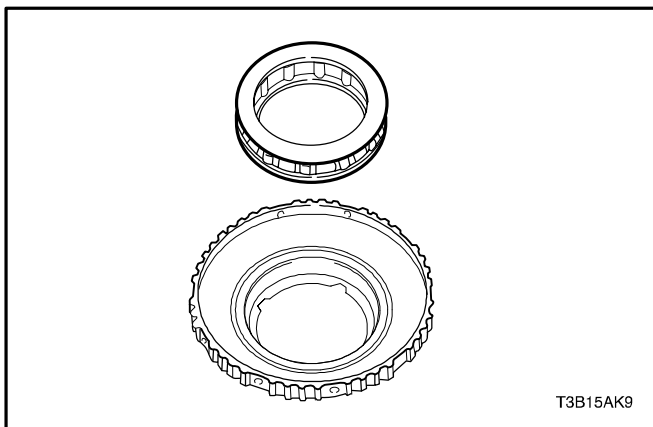


Disassembly Procedure

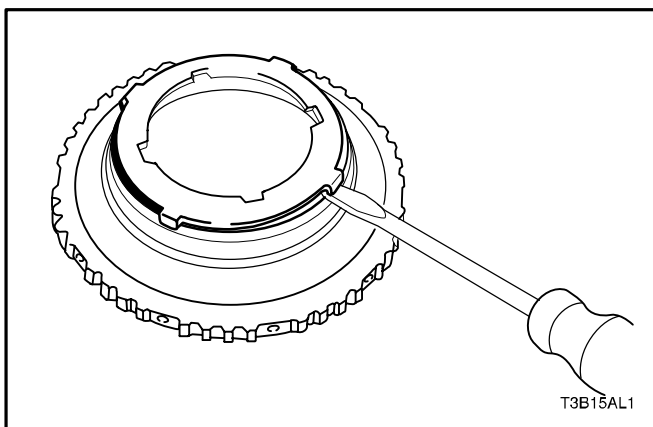
1. Install the one-way clutch and thrust washer to the rear planetary sun gear.
2. Hold the rear planetary sun gear and turn the one-way clutch. The one-way clutch should turn freely clockwise and should lock counterclockwise.



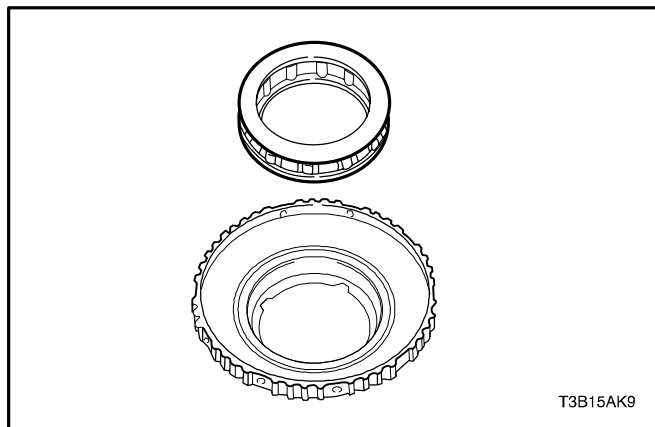
3. Using a screwdriver, remove the snap ring from the 2nd brake hub.



4. Remove the one-way clutch from the 2nd brake hub.

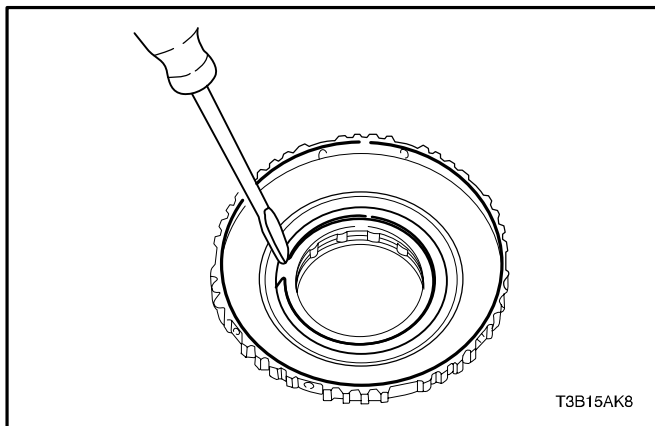


5. Using a small screwdriver, remove the retainer from the 2nd brake hub.

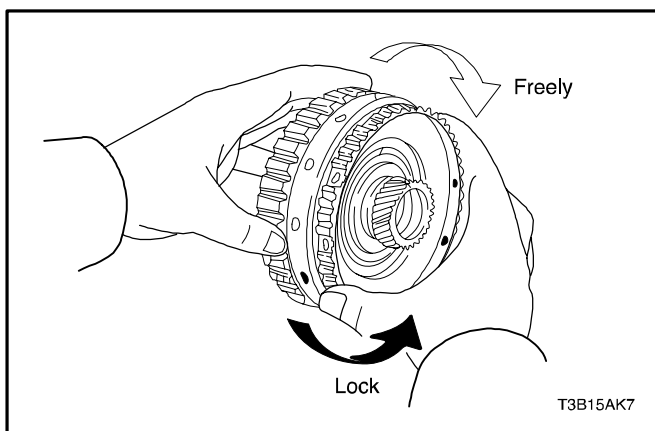


Assembly Procedure

1. Install the retainer to the 2nd brake hub.
2. Install the one-way clutch.

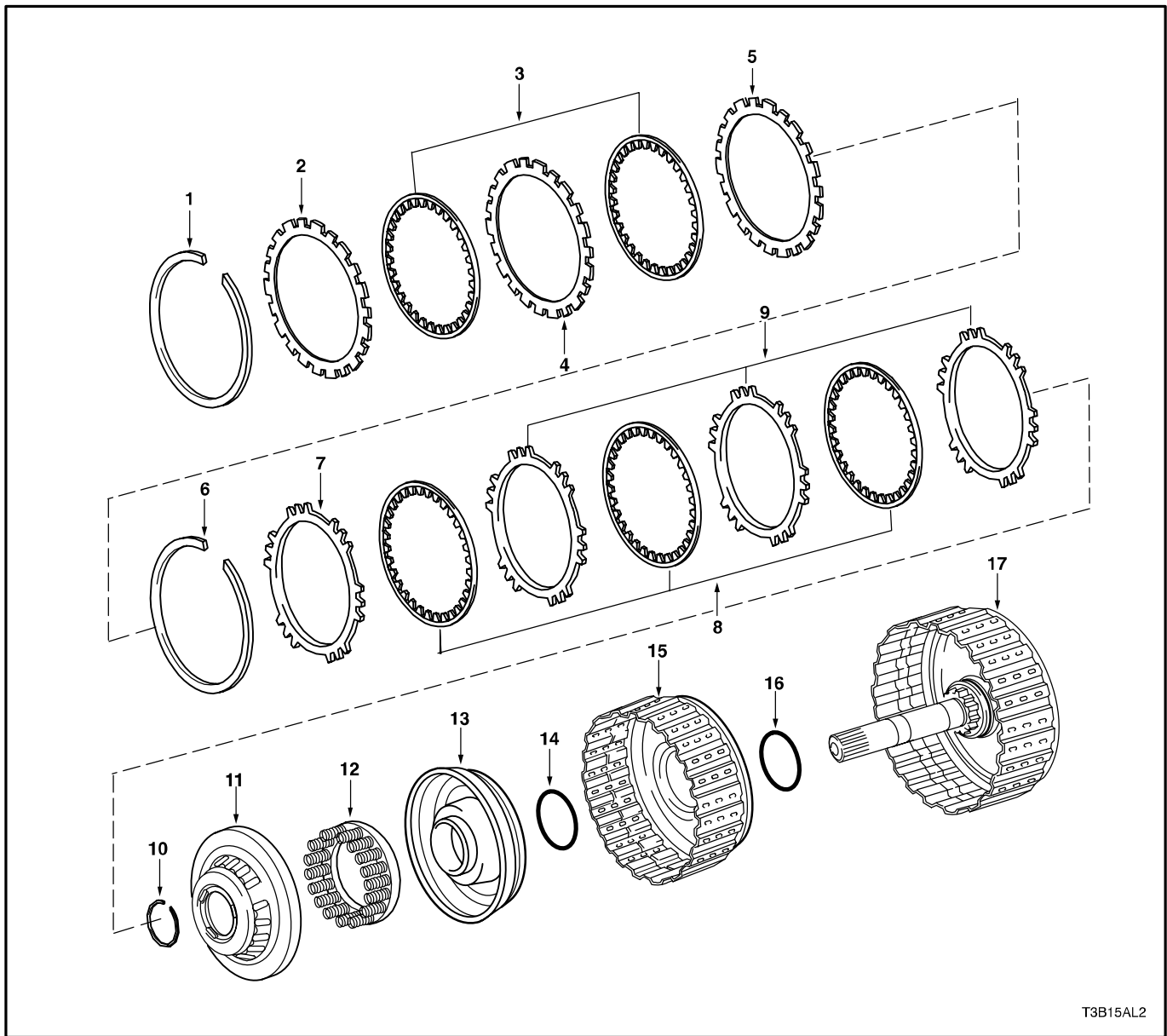


3. Using a screwdriver, install the snap ring.



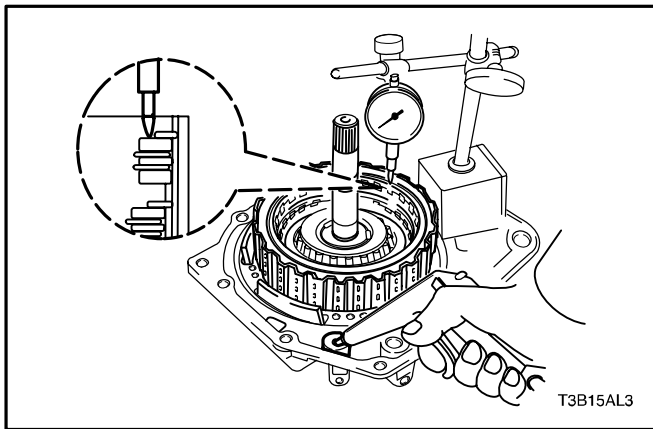
4. Install the one-way clutch and thrust washer to the rear planetary sun gear.
5. Hold the rear planetary sun gear and turn the one-way clutch. The one-way clutch should turn freely clockwise and should lock counterclockwise.

FORWARD AND REVERSE CLUTCH



T3B15AL2

- | | |
|--------------|-------------------------------------|
| 1. Seal Ring | 10. Snap Ring |
| 2. Flange | 11. Clutch Balancer |
| 3. Disc | 12. Forward Clutch Retrun Spring |
| 4. Plate | 13. Forward Clutch Piston |
| 5. Flange | 14. O-Ring |
| 6. Snap Ring | 15. Forward Clutch Drum |
| 7. Flange | 16. O-Ring |
| 8. Disc | 17. Intermediate Shaft Sub-assembly |
| 9. Plate | |



Tools Required

DW240–020 Brake/Clutch Spring Compressor

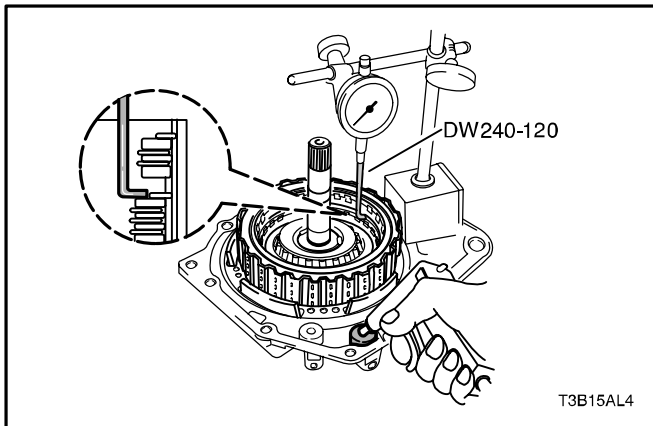
DW240–030 Forward Clutch Adapter

DW240–120 Measuring Terminal

Disassembly Procedure

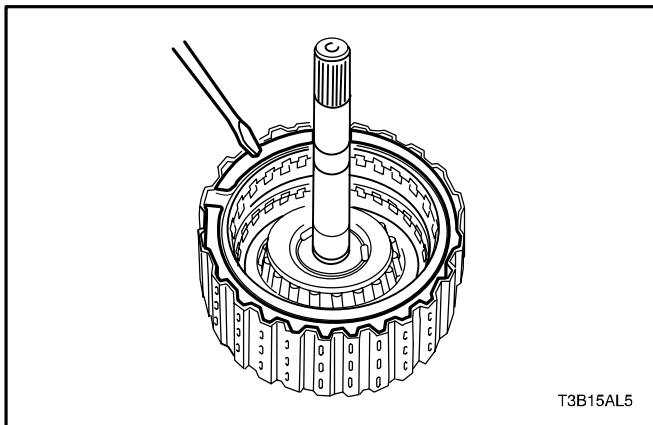
WARNING : USE CAUTION WHEN CHECKING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

1. Install the forward and reverse clutch and thrust needle roller bearing on the transaxle rear cover.
2. Using a dial indicator, measure the reverse clutch pack clearance while applying and releasing 392 kPa (57 psi) of compressed air.
 - Pack clearance: 0.40 – 1.00 mm (0.0157 – 0.0394 in.)
 - If the stroke is non–standard, inspect the discs, plates and flange.

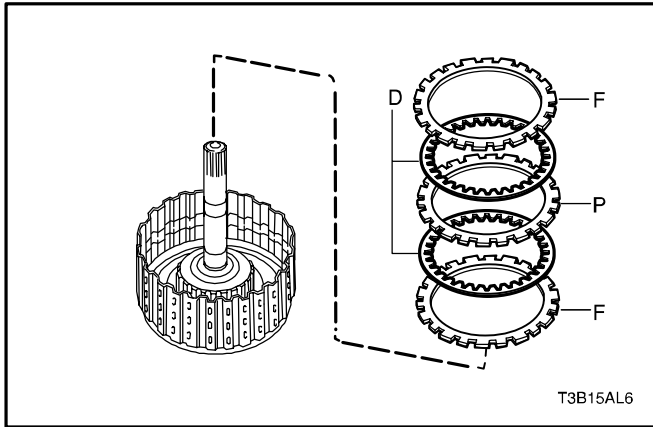


WARNING : USE CAUTION WHEN CHECKING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

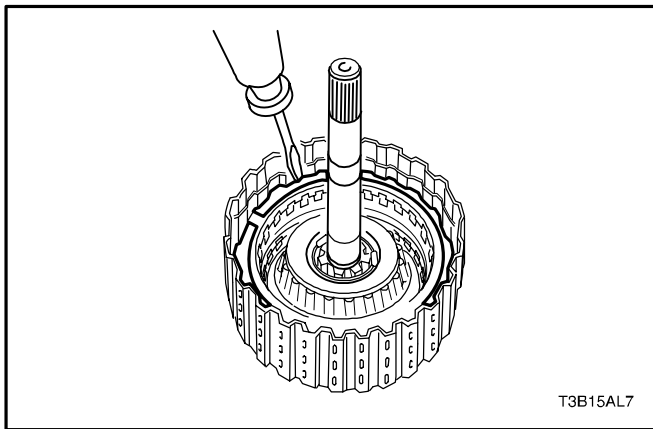
3. Install the forward and reverse clutch and thrust needle roller bearing on the transaxle rear cover.
4. Using a dial indicator and measuring terminal DW240–120, measure the forward clutch pack clearance while applying and releasing 392 kPa (57 psi). of compressed air.
 - The forward and reverse clutch will come out as you apply the compressed air. Therefore, while the checking is being done, press on the input shaft of the forward and reverse clutch using stamping machine or alike so that the pressure is not applied on the forward and reverse clutch.
 - Pack clearance: 1.1–1.5 mm (0.043 – 0.059 in.)
 - If the stroke is non–standard, inspect the discs, plates and flange.



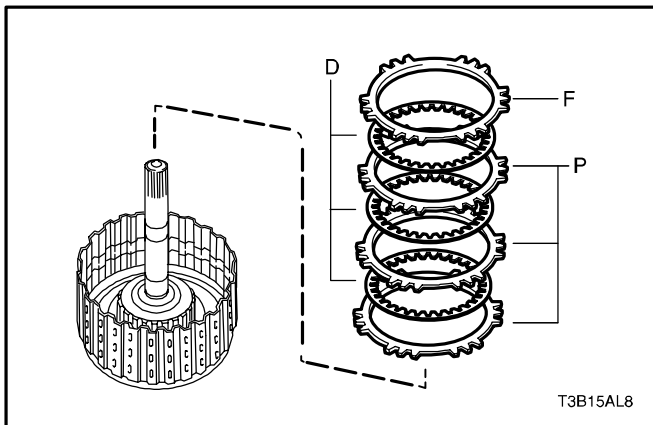
5. Using a screwdriver, remove the reverse clutch snap ring.



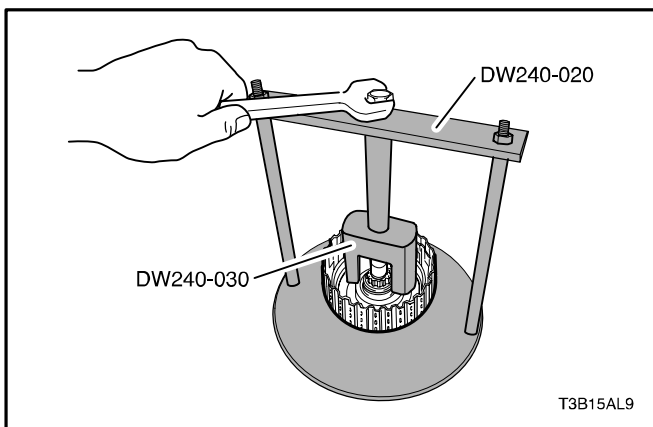
6. Remove the 2 flanges, 2 discs and plate from the reverse clutch drum.



7. Using a screwdriver, remove the snap ring.



8. Remove the flange, 3 discs and 3 plates from the forward clutch drum.

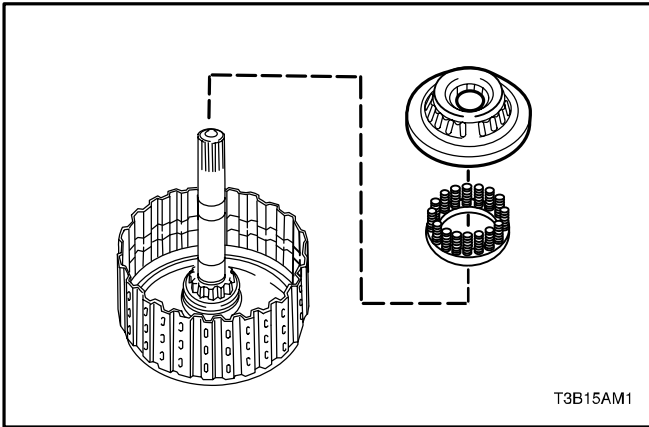


9. Using brake/clutch spring compressor DW240-020 and forward clutch adapter DW240-030, compress the spring.

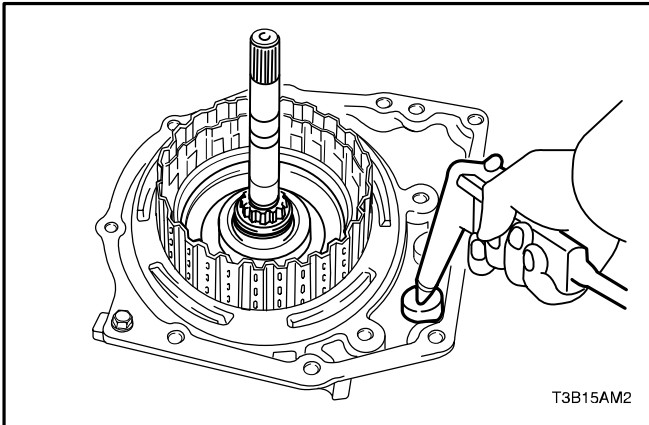
10. Using a snap ring expander, remove the snap ring.

Notice : Stop the press when the clutch balancer is lowered to the place 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the clutch balancer from being deformed.

Notice : Do not expand the snap ring excessively.



11. Remove the clutch balancer and forward clutch return spring.



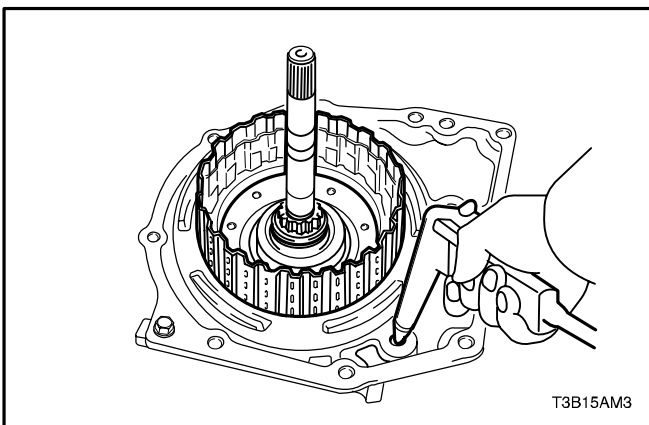
WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

12. Install the forward and reverse multiple disc clutch on the transaxle rear cover.
13. Apply 392 kPa (57 psi) of compressed air to the transaxle rear cover to remove the forward clutch piston.

Notice : Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

- When the piston can not be removed as it is slanted, either blow the air again with the protruding side pushed or remove the piston using a needle nose pliers with vinyl tape on the tip.



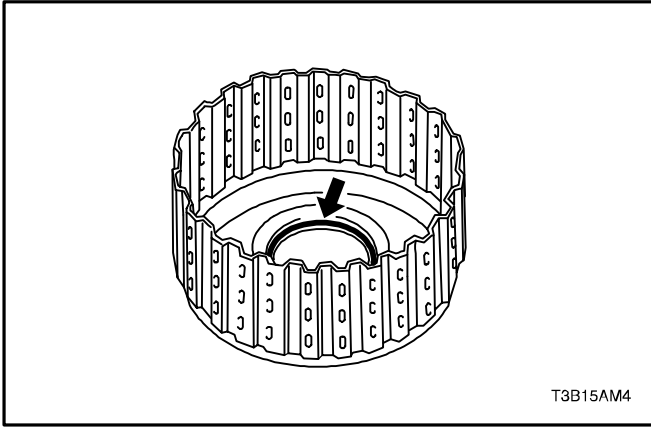
WARNING : USE CAUTION WHEN REMOVING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

14. Apply 392 kPa (57 psi) of compressed air to the transaxle rear cover to remove the forward clutch drum.

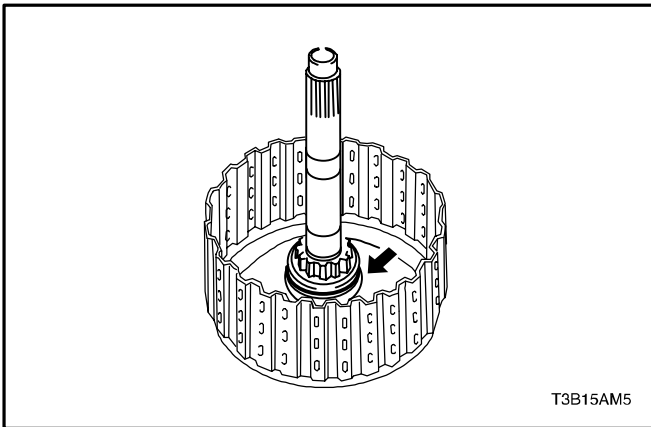
Notice : Blowing off the air may cause the drum's jump-out. When removing the drum, hold it with your hand using a waste cloth.

Notice : Take care not to splash ATF when air-blowing.

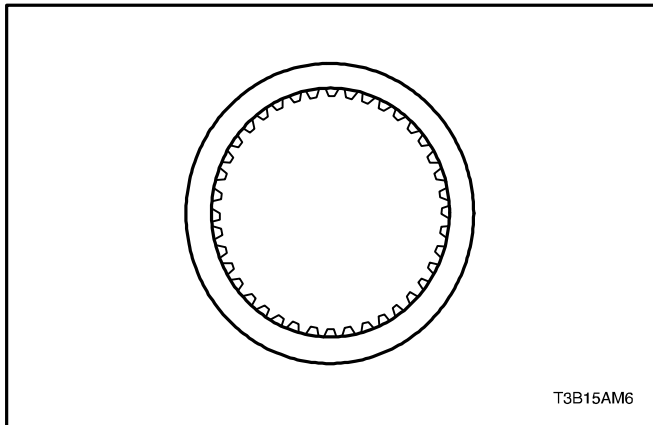
- When the drum can not be removed as it is slanted, either blow the air again with the protruding side pushed or remove the drum using a needle nose pliers with vinyl tape on the tip.



15. Using a small screwdriver, remove the O-ring from the forward clutch drum.

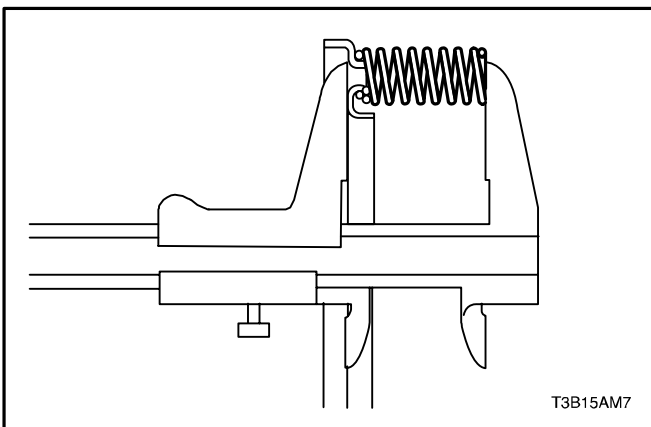


16. Using a small screwdriver, remove the O-ring from the intermediate shaft sub-assembly.

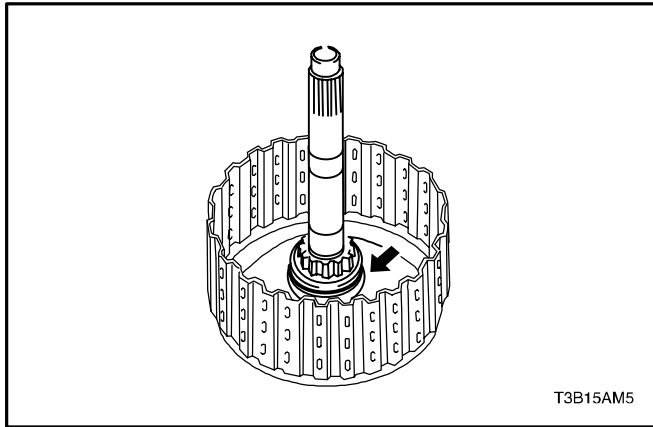


Inspection Procedure

1. Check to see if the sliding surface of the disc, plate flange are worn or burnt. If necessary, replace them.
 - If the lining of the disc is peeling off or discolored, or even if a part of the printed number is defaced, replace all discs.
 - Before assembling new discs, soak them in ATF for at least 15 minutes.

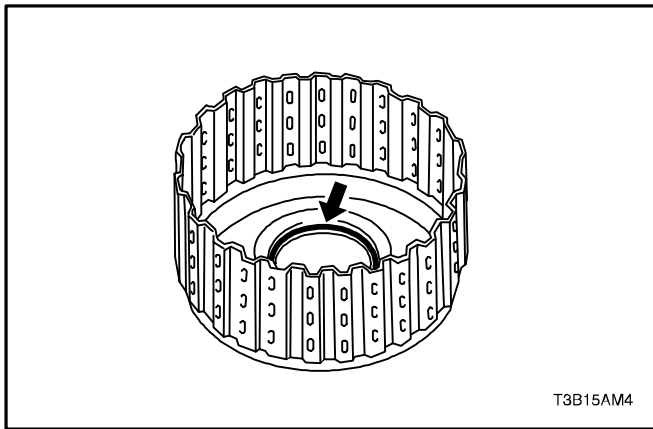


2. Using vernier calipers, measure the free length of the spring together with the spring seat.
 - Standard free length: 24.04 mm (0.9465 in.)

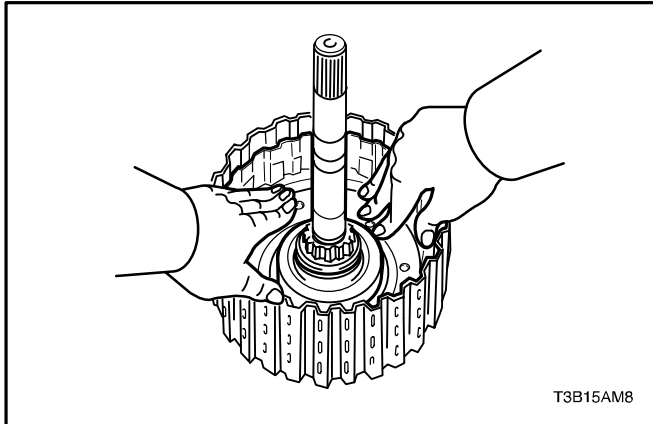


Assembly Procedure

1. Coat a new O-ring with ATF, and install it to the intermediate shaft sub-assembly.

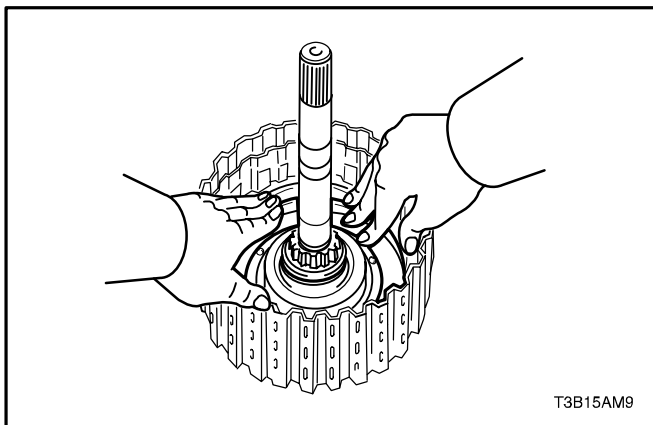


2. Coat a new O-ring with ATF, and install it to the forward clutch drum.



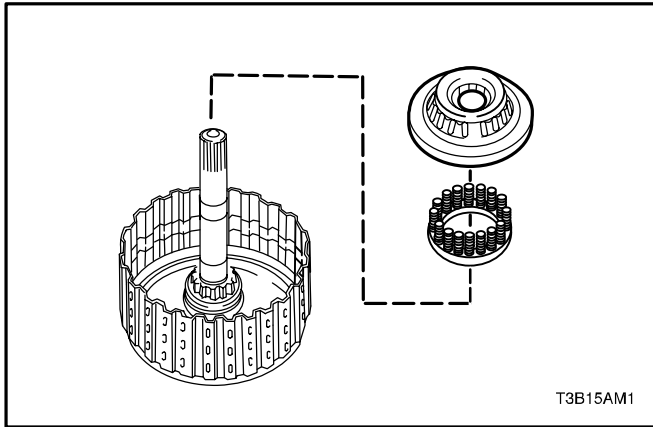
3. Coat the forward clutch drum with ATF, install the forward clutch drum.

Notice : Be careful not to damage the O-ring and lip seal of forward clutch drum.



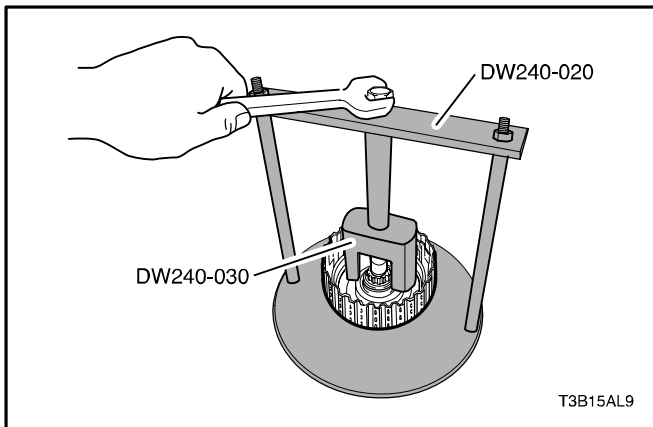
4. Coat the forward clutch piston with ATF, install the forward clutch piston.

Notice : Be careful not to damage the lip seal of forward clutch piston.



5. Install the forward clutch return spring and clutch balancer.

Notice : Be careful not to damage the lip seal of forward clutch return spring.

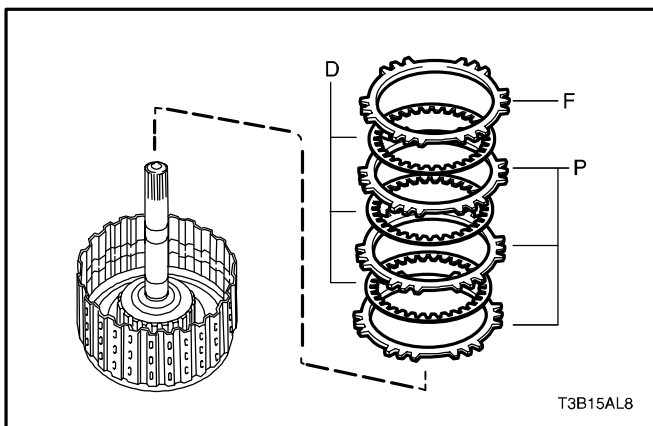


6. Place brake/clutch spring compressor DW240-020 and forward clutch adapter DW240-030 on the clutch balancer and compress the piston return spring.

7. Using a snap ring expander, install the snap ring.

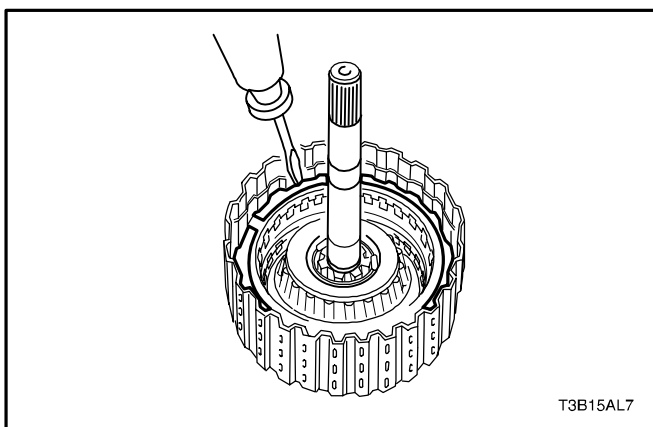
Notice : Stop the press when the clutch balancer is lowered to the place 1–2 mm (0.039–0.078 in.) from the snap ring groove, preventing the clutch balancer from being deformed.

Notice : Do not expand the snap ring excessively.



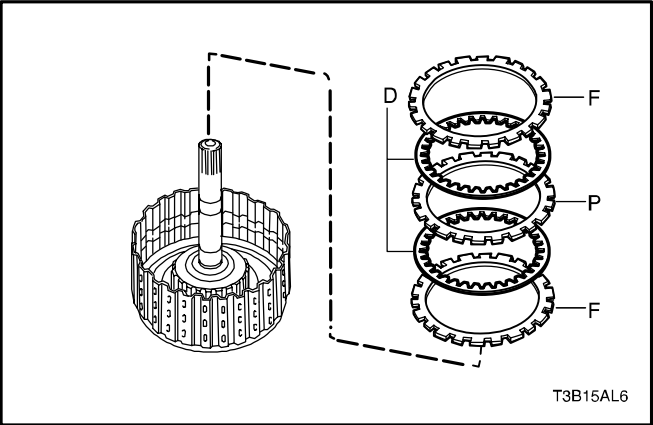
8. Install the 3 plates, 3 discs and flange.

- Install in order: P – D – P – D – P – D – F
(P = Plate, D = Disc, F = Flange)

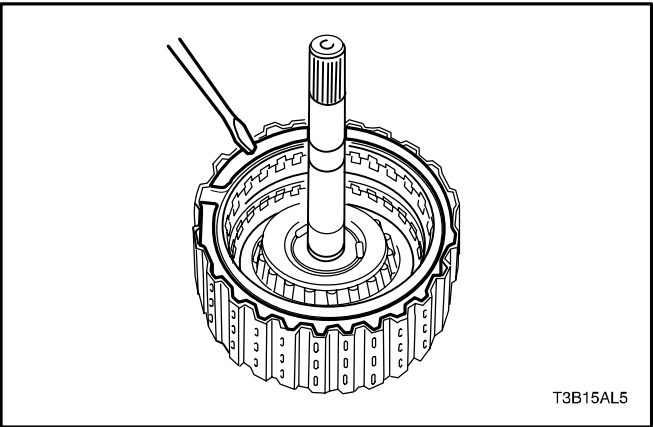


9. Using a screwdriver, install the snap ring.

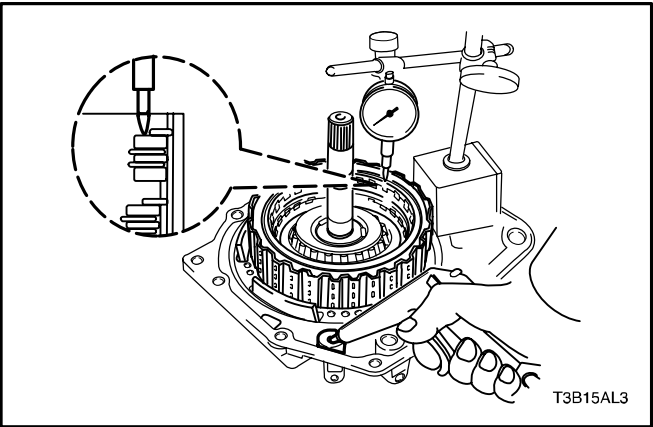
10. Check that the end gap of the snap ring is not aligned with one of the cutouts.



11. Install the plate, 2 discs and 2 flanges.
- Install in order: F – D – P – D – F
(P = Plate, D = Disc, F = Flange)



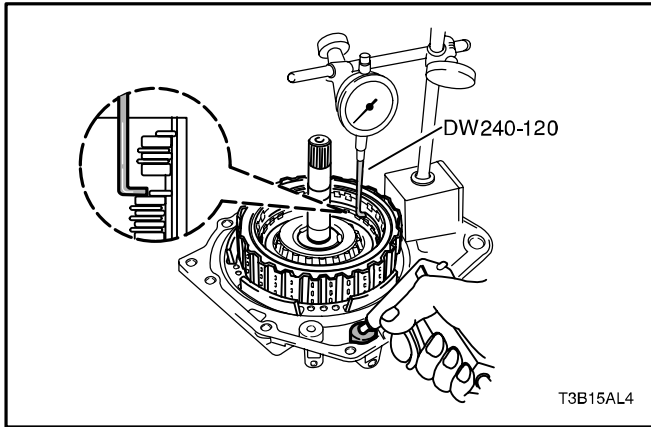
12. Using a screwdriver, install the snap ring.
13. Check that the end gap of the snap ring is not aligned with one of the cutouts.



WARNING : USE CAUTION WHEN CHECKING COMPONENTS WITH COMPRESSED AIR OR PERSONAL INJURY MAY RESULT.

14. Install the forward and reverse clutch and thrust needle roller bearing on the transaxle rear cover.
15. Using a dial indicator, measure the reverse clutch pack clearance while applying and releasing 392 kPa (57 psi) of compressed air.
- Pack clearance: 0.40 – 1.00 mm (0.0157 – 0.0394 in.) If the pack clearance is less than the limit of pack clearance, parts may have been assembled incorrectly, so check and reassemble again.
- If the pack clearance is non-standard, select another flange.
- There are 4 flanges in different thickness.
- Flange Thickness: mm (in.)

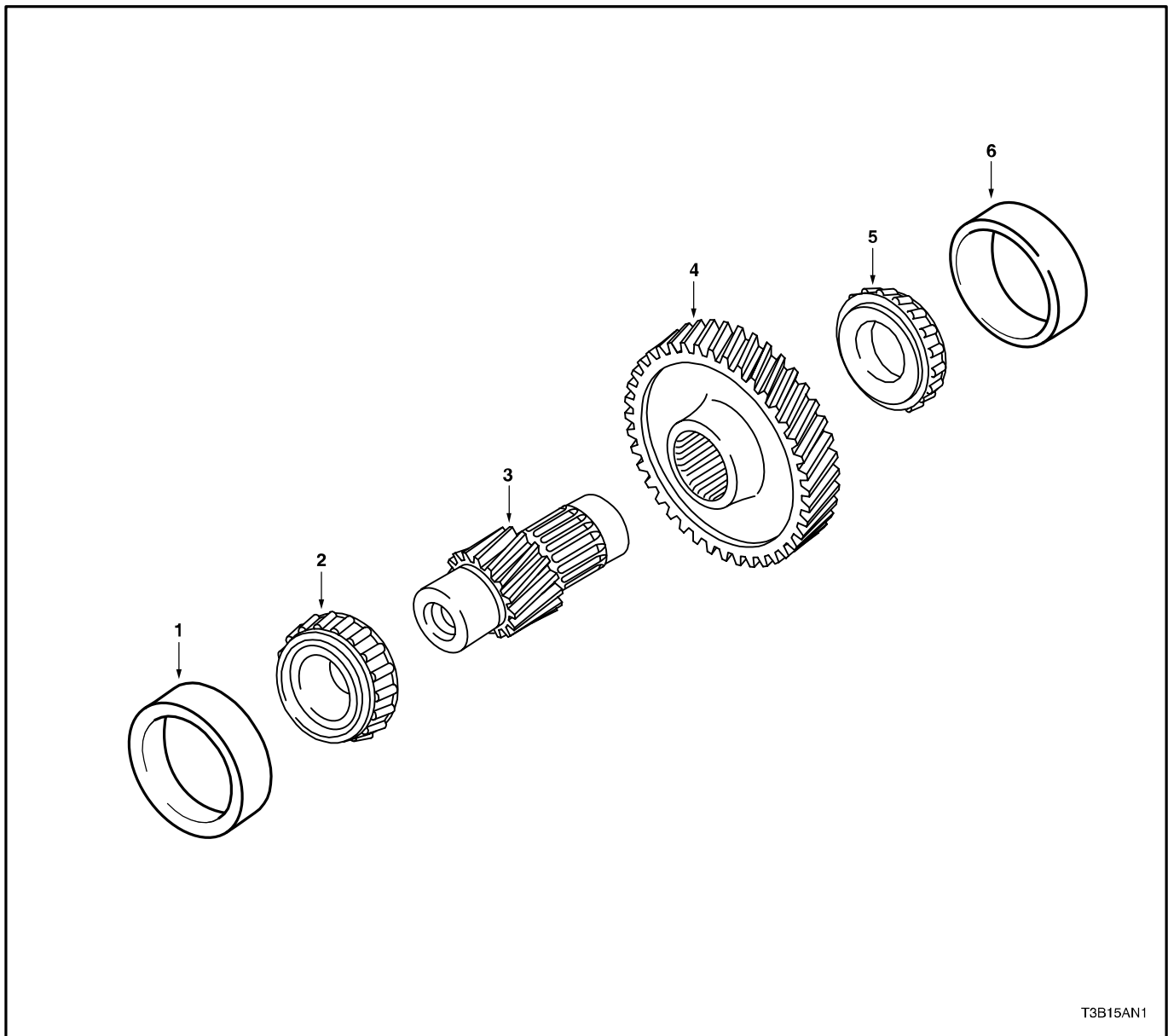
No	Thickness	No	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)	4	3.6 (0.142)



16. Install the forward and reverse clutch and thrust needle roller bearing on the transaxle rear cover.
17. Using a dial indicator and measuring terminal DW240-120, measure the forward clutch pack clearance while applying and releasing 392 kpa (57 psi) of compressed air.
 - The forward and reverse clutch will come out as you apply the compressed air. Therefore, while the checking is being done, press on the input shaft of the forward and reverse clutch using stamping machine or alike so that the pressure is not applied on the forward and reverse clutch.
 - Pack clearance: 1.1–1.5 mm (0.043 – 0.059 in.)
 If the pack clearance is less than the limit of pack clearance, parts may have been assembled incorrectly, so check and reassemble again.
 If the pack clearance is non-standard, select another flange.
 There are 4 flanges in different thickness.
 - Flange Thickness: mm (in.)

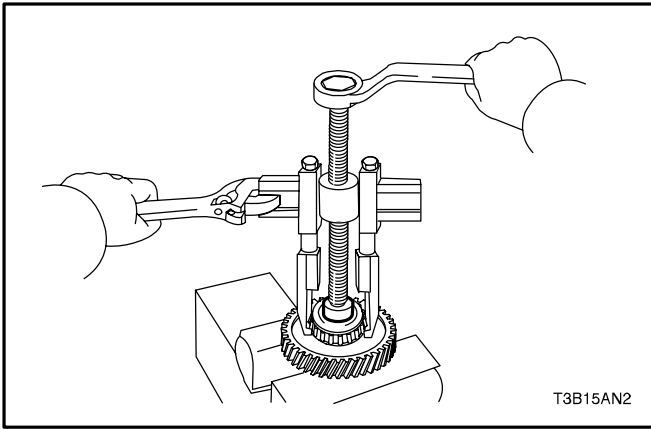
No	Thickness	No	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)	4	3.6 (0.142)

COUNTER DRIVEN GEAR



1. Outer Tapered Roller Bearing Race
2. Tapered Roller Bearing
3. Counter Drive Pinion

4. Counter Driven Gear
5. Tapered Roller Bearing
6. Outer Tapered Roller Bearing Race

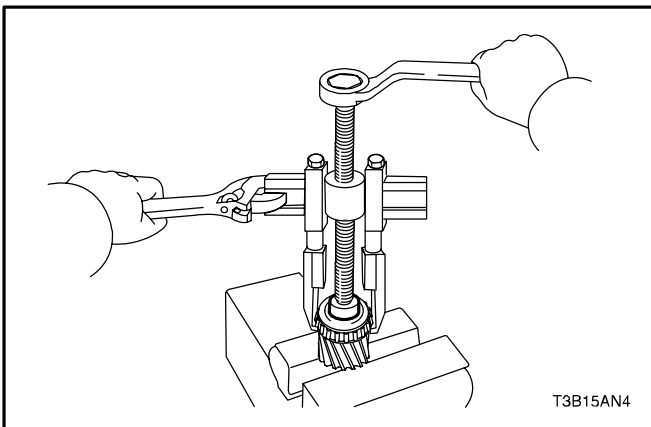
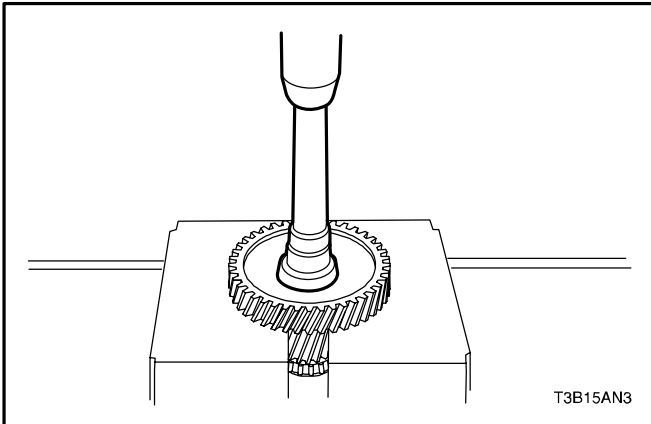


Tools Required

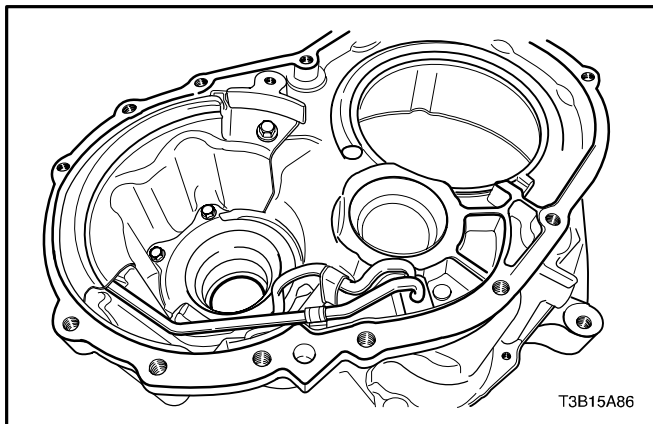
DW240–160 Transaxle Case Outer Tapered Roller Bearing Race Adapter
 DW240–170 Adapter Handle

Disassembly Procedure

1. Using a suitable puller, remove the tapered roller bearing from the transaxle case side.
2. Using a press, remove the counter driven gear.



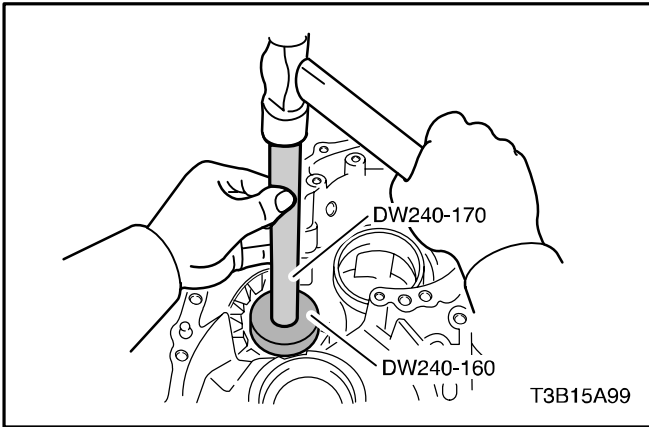
3. Using a suitable puller, remove the tapered roller bearing.
4. Using a suitable puller, remove the outer tapered roller bearing race and shim from the transaxle case.
5. Using a suitable puller, remove the outer tapered roller bearing race from the transaxle housing.



Assembly Procedure

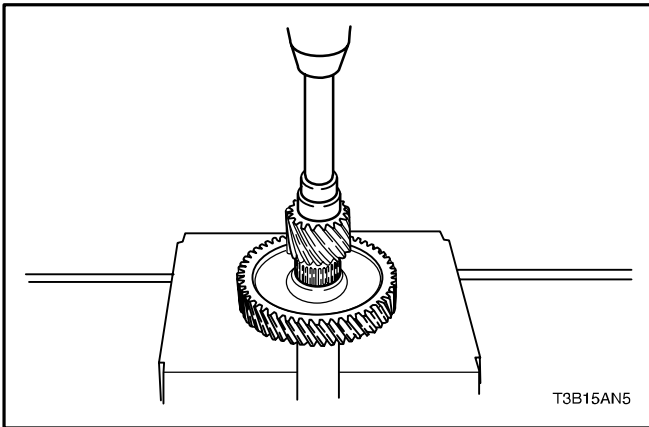
1. Install a new outer tapered roller bearing race into the transaxle housing.

Notice : Press-fit the outer tapered roller bearing race until it contacts the transaxle housing.

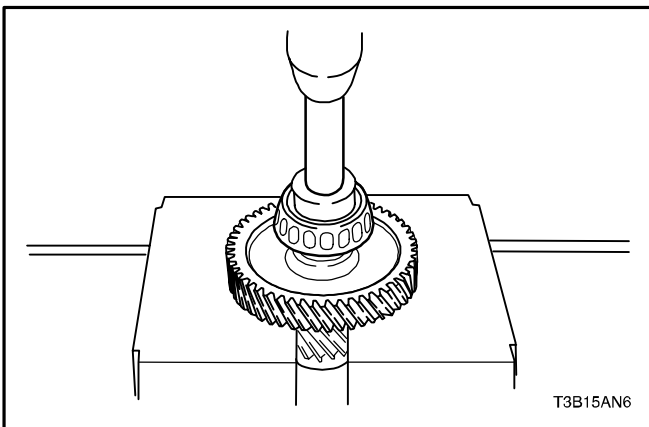


2. Install the shim to the transaxle case.
 - First install a shim of the same thickness as before.
3. Using transaxle case outer tapered roller bearing race adapter DW240-160 and adapter handle DW240-170, press in a new outer tapered roller bearing race into the transaxle case.

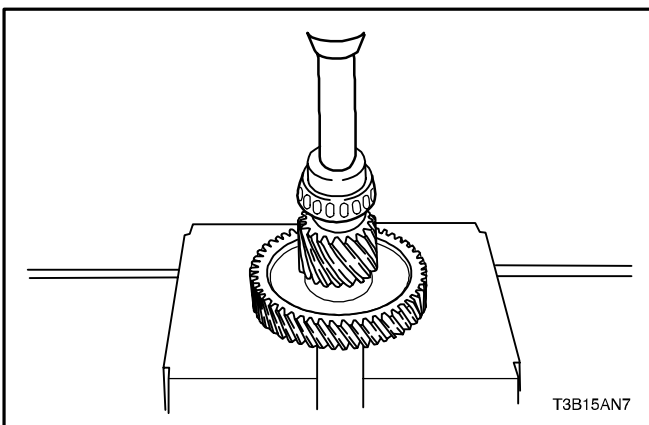
Notice : Press-fit the shim until it contacts the transaxle case.



4. Using a press, install the counter driven gear.

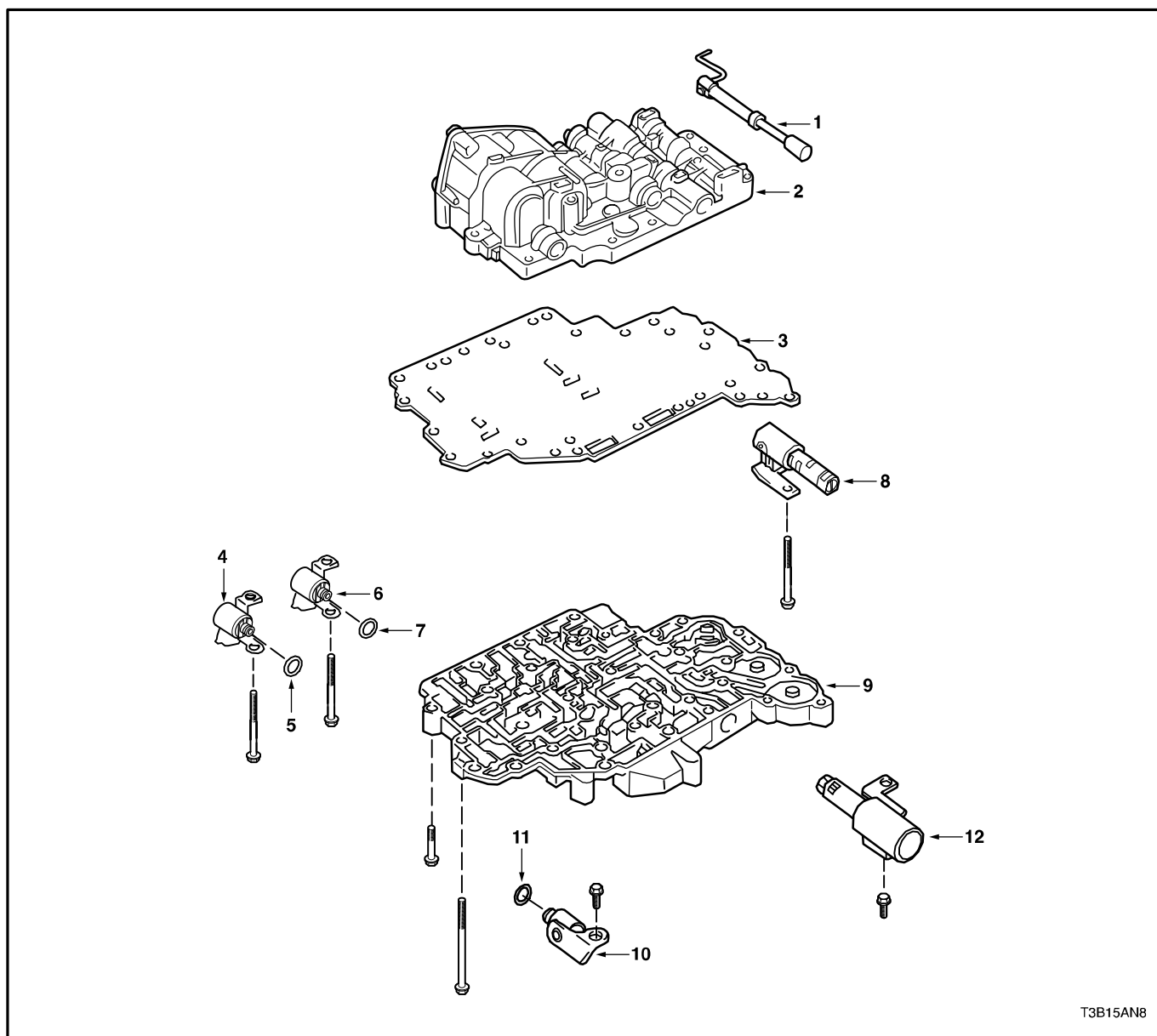


5. Using a press, install a new tapered roller bearing of the transaxle case side.



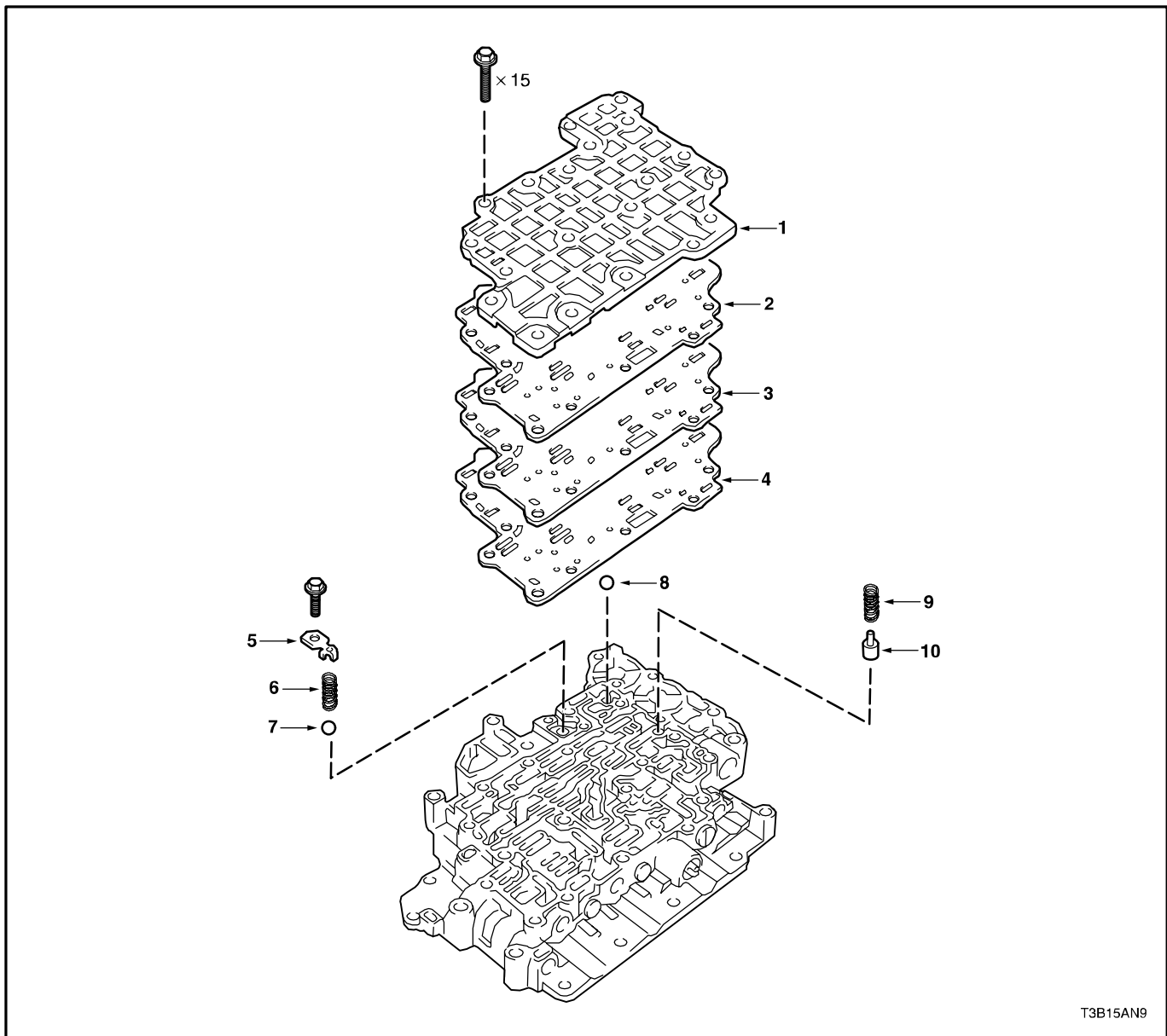
6. Using a press, install a new tapered roller bearing of the transaxle housing side.

VALVE BODY



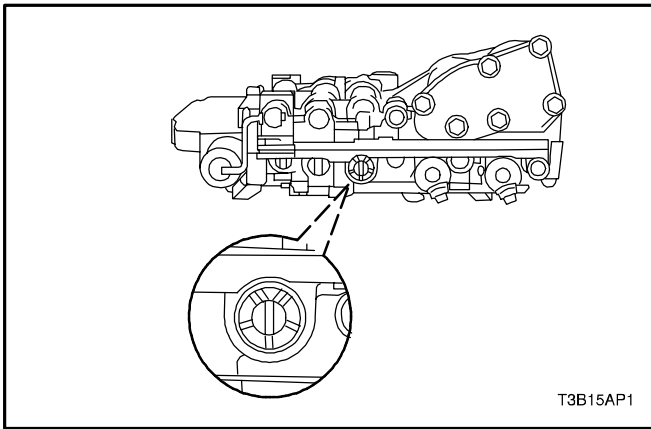
T3B15AN8

- | | |
|------------------------|------------------------------------|
| 1. Manual Valve | 7. O-Ring |
| 2. Upper Valve Body | 8. Pressure Control Solenoid Valve |
| 3. Valve Body Plate | 9. Lower Valve Body |
| 4. No1. Solenoid Valve | 10. Timing Solenoid Valve |
| 5. O-Ring | 11. O-Ring |
| 6. No2. Solenoid Valve | 12. Lock-up Solenoid Valve |



T3B15AN9

- | | |
|--------------------------------------|-----------------|
| 1. Cover | 6. Spring |
| 2. Gasket | 7. Ball |
| 3. Cover Plate | 8. Check Ball |
| 4. Gasket | 9. Spring |
| 5. Pressure Relief Valve Spring Seat | 10. Check Valve |

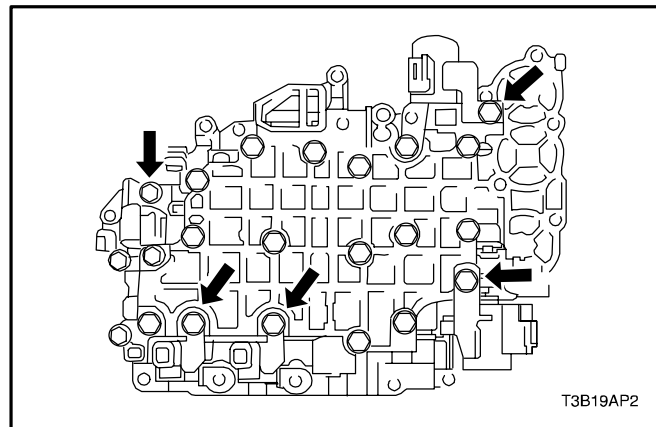


Disassembly Procedure

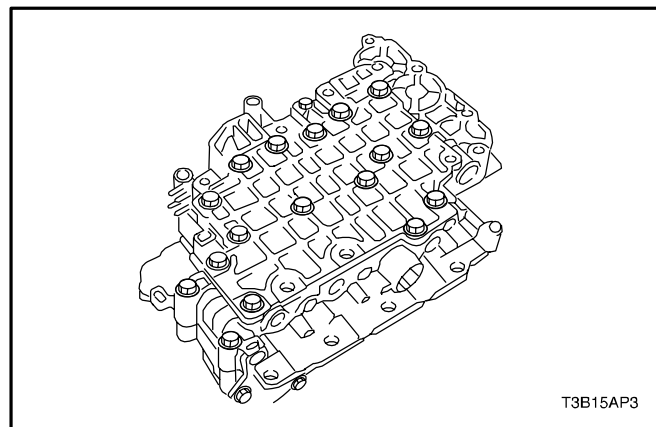
1. Write down the relative position of the primary regulator valve sleeve, plug and pin.

Notice : Because the line pressure is changed by the position of the pin and groove in the sleeve end, be sure to check the position.

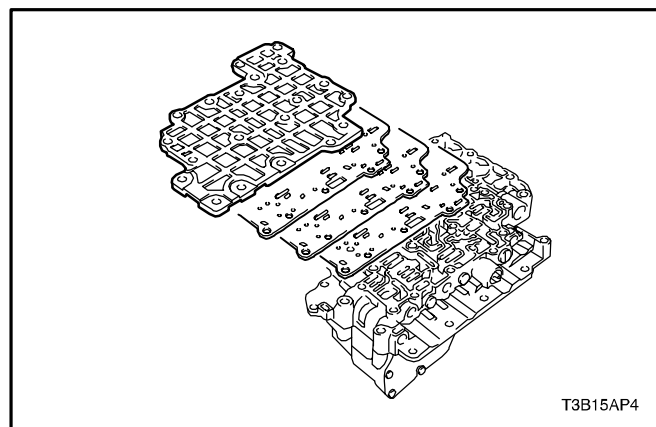
2. Remove the manual valve.



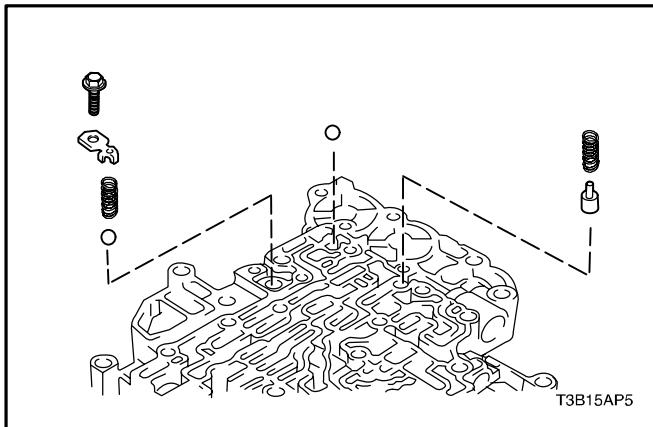
3. Remove the 5 bolts and 5 shift solenoid valves.



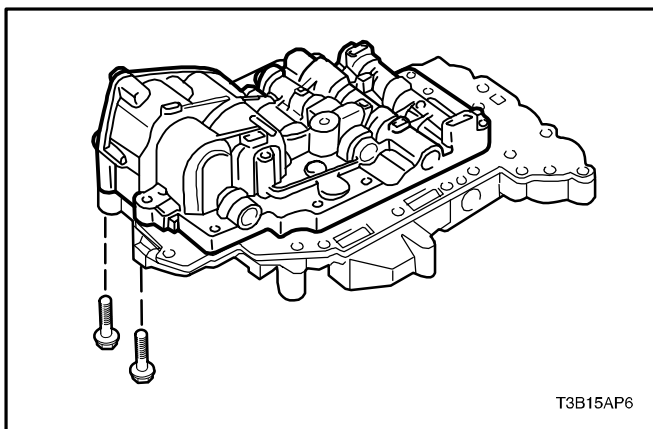
4. Remove the 15 bolts.



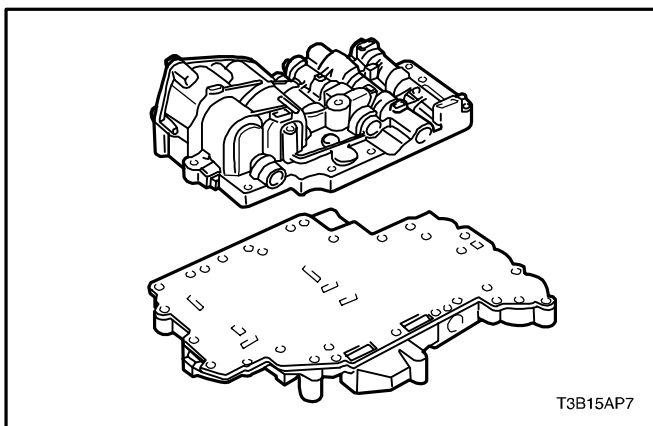
5. Remove the cover, 2 gaskets and plate.



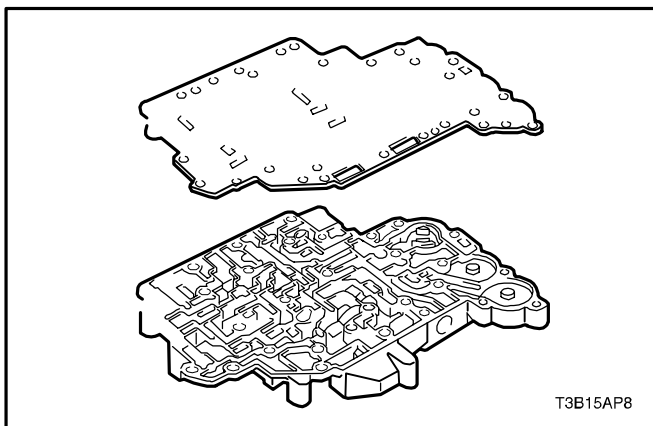
6. Remove the spring, check valve and check ball.
7. Remove the bolt, spring seat, spring and ball.
8. Turn over the valve body.



9. Remove the 2 bolts from the valve body.

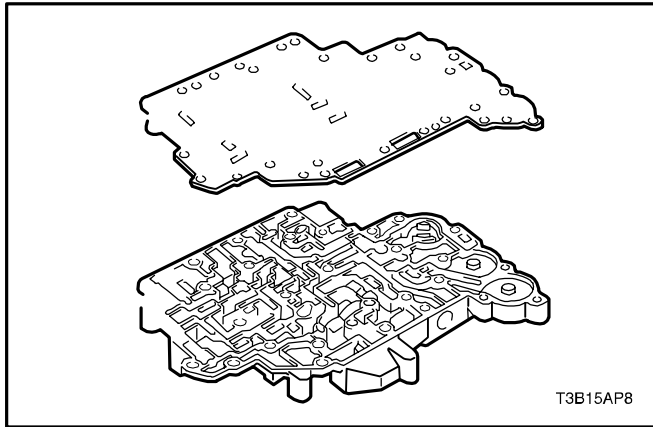


10. Remove the upper valve body from the lower valve body with plate.



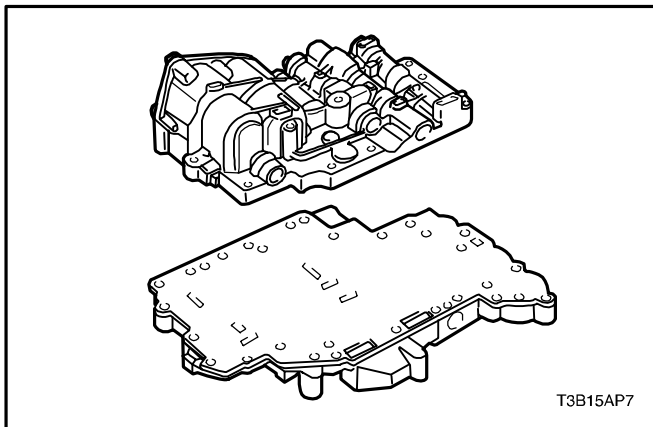
11. Remove the valve body plate from the lower valve body.

Notice : Be careful that the check balls do not fall out.

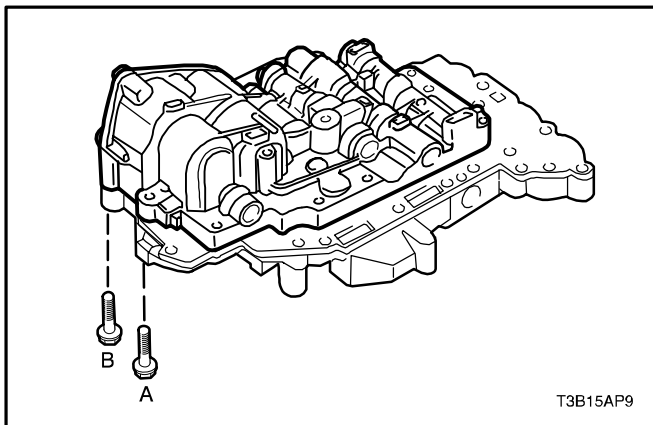


Assembly Procedure

1. Install the valve body plate to the lower valve body.



2. Install the upper valve body to the lower valve body with plate.



3. Install the 2 bolts to the valve body.

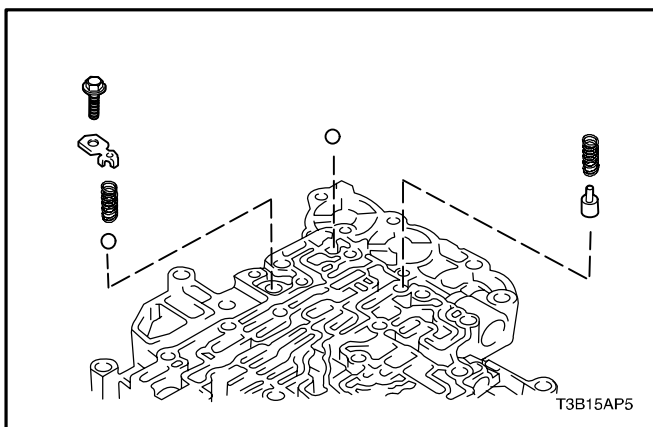
Tighten

Tighten the bolts to 11 N•m (97 lb-in).

Bolt A: 49 mm (1.93 in.)

Bolt B: 36 mm (1.42 in.)

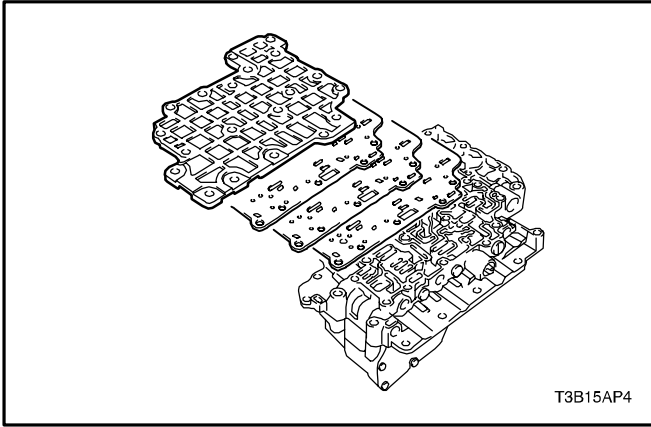
4. Turn the valve body.



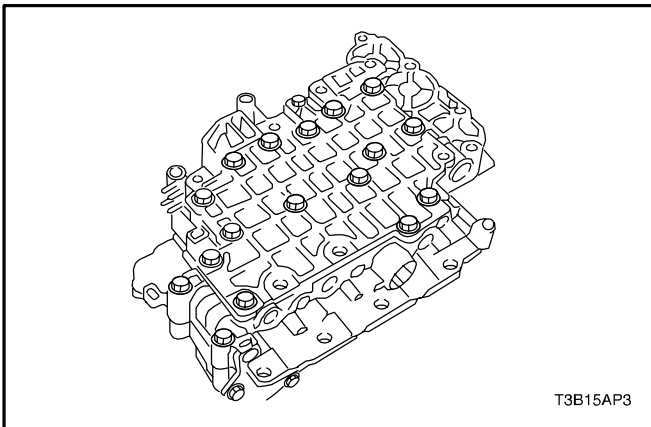
5. Install the check valve, spring and check ball.
6. Install the ball, spring, spring seat and bolt.

Tighten

Tighten the bolts to 6.5 N•m (57 lb-in).



7. Install the 2 gaskets, plate and lower valve body cover.

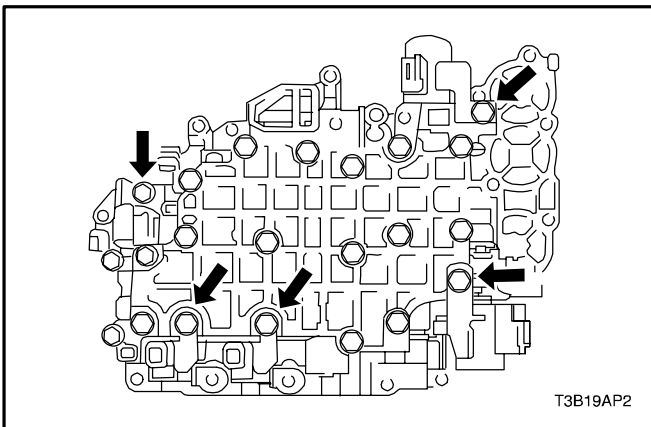


8. First, tighten the bolts indicated by arrows temporarily and then tighten the other bolts temporarily.
9. Tighten all the bolts completely.

Tighten

Tighten the bolts to 11 N•m (97 lb-in).

- Bolt length:
 Bolt A: 49 mm (1.93 in.)
 Bolt B: 20 mm (0.79 in.)
 Bolt C: 60 mm (2.36 in.)



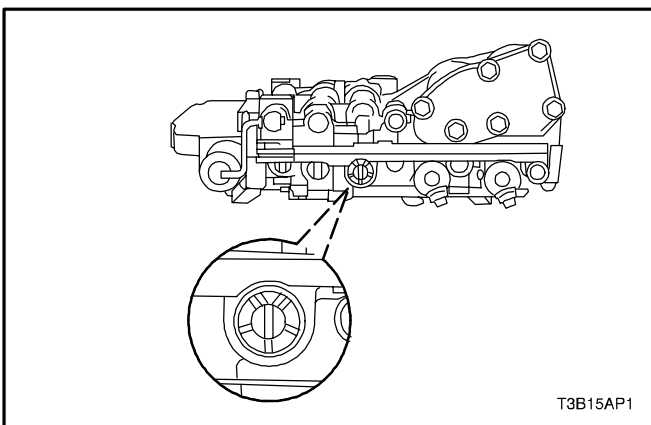
10. Install the 5 shift solenoid valves with the 6 bolts.

Tighten

Tighten the bolts to 11 N•m (97 lb-in).

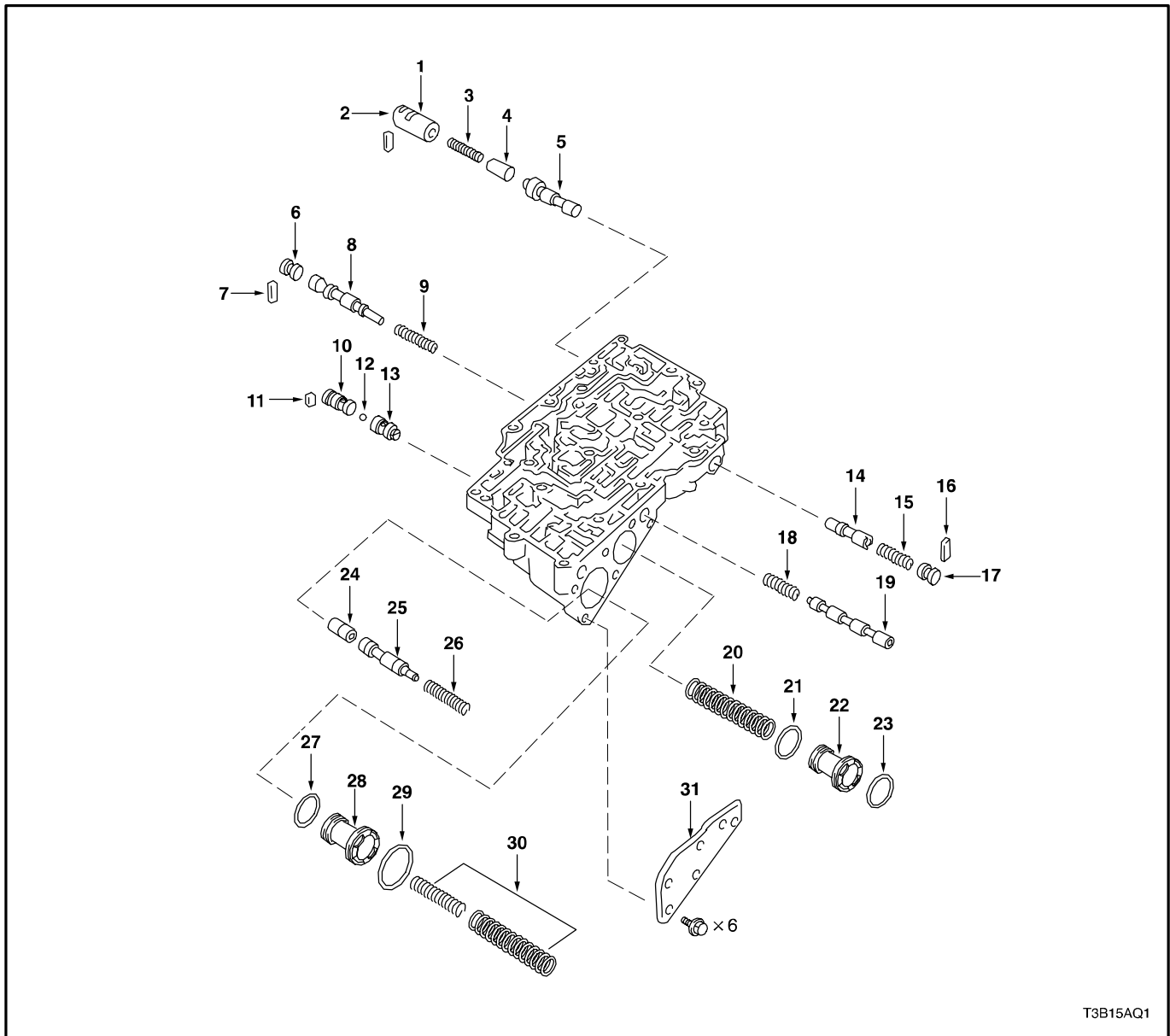
- Bolt length:
 Bolt A: 49 mm (1.93 in.)
 Bolt B: 20 mm (0.79 in.)

11. Install the manual valve.



12. Make sure that the primary regulator valve is positioned in the same place where it was removed.

Upper Valve Body

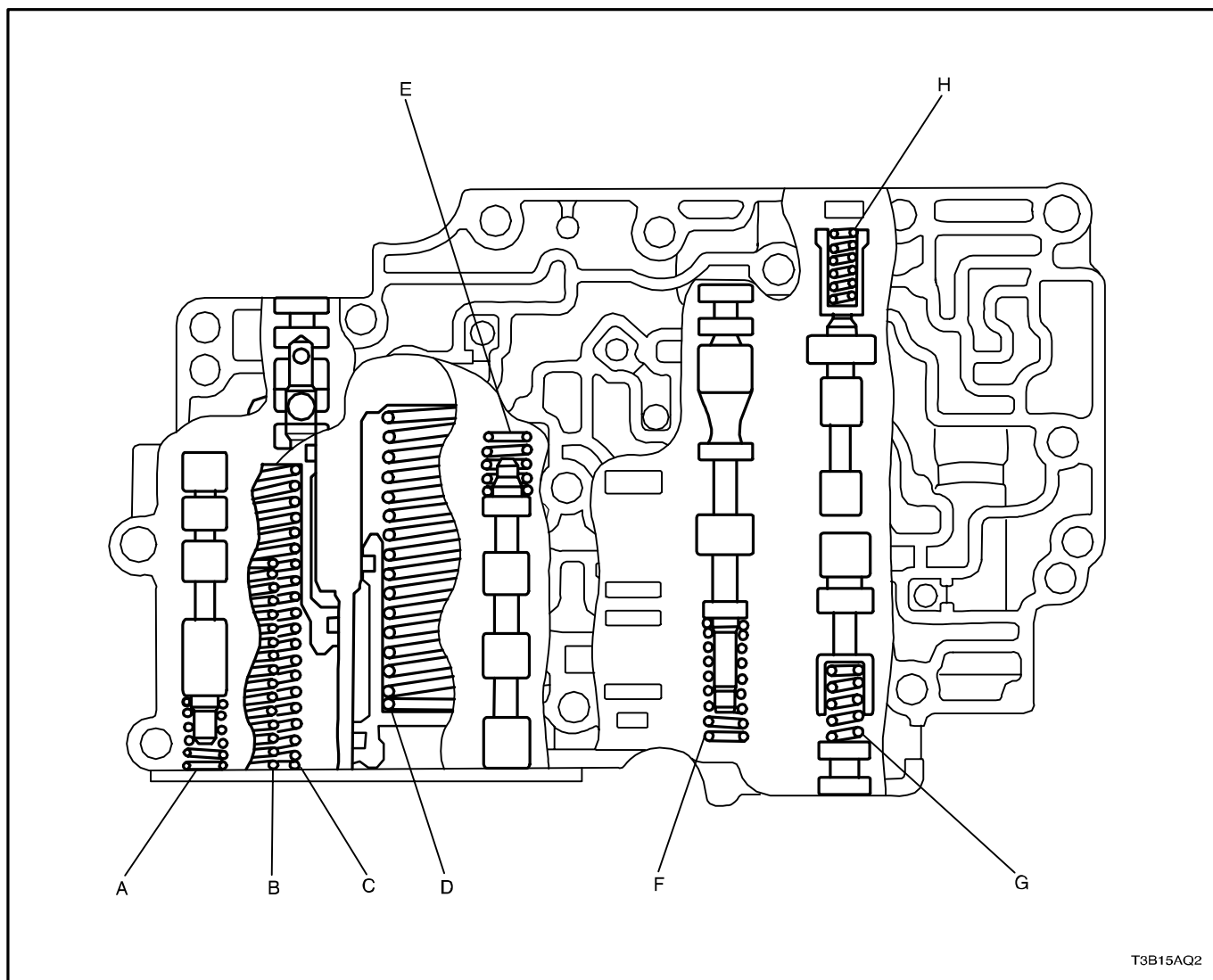


T3B15AQ1

- | | |
|------------------------------|---------------------------------------|
| 1. Sleeve | 17. Plug |
| 2. Key | 18. Spring |
| 3. Spring | 19. 3-4 Shift Valve |
| 4. Plunger | 20. Spring |
| 5. Lock-up Control Valve | 21. O-ring |
| 6. Plug | 22. Reverse Clutch Accumulator Piston |
| 7. Key | 23. O-ring |
| 8. Secondary Regulator Valve | 24. Plunger |
| 9. Spring | 25. 3-4 Shift Timing Valve |
| 10. No.2 Check Valve | 26. Spring |
| 11. Key | 27. O-ring |
| 12. Ball | 28. 2nd Brake Accumulator Piston |
| 13. No.1 Check Valve | 29. O-ring |
| 14. Reverse Control Valve | 30. Spring |
| 15. Spring | 31. Upper Valve Body Cover |
| 16. Key | |

Upper Valve Body Spring

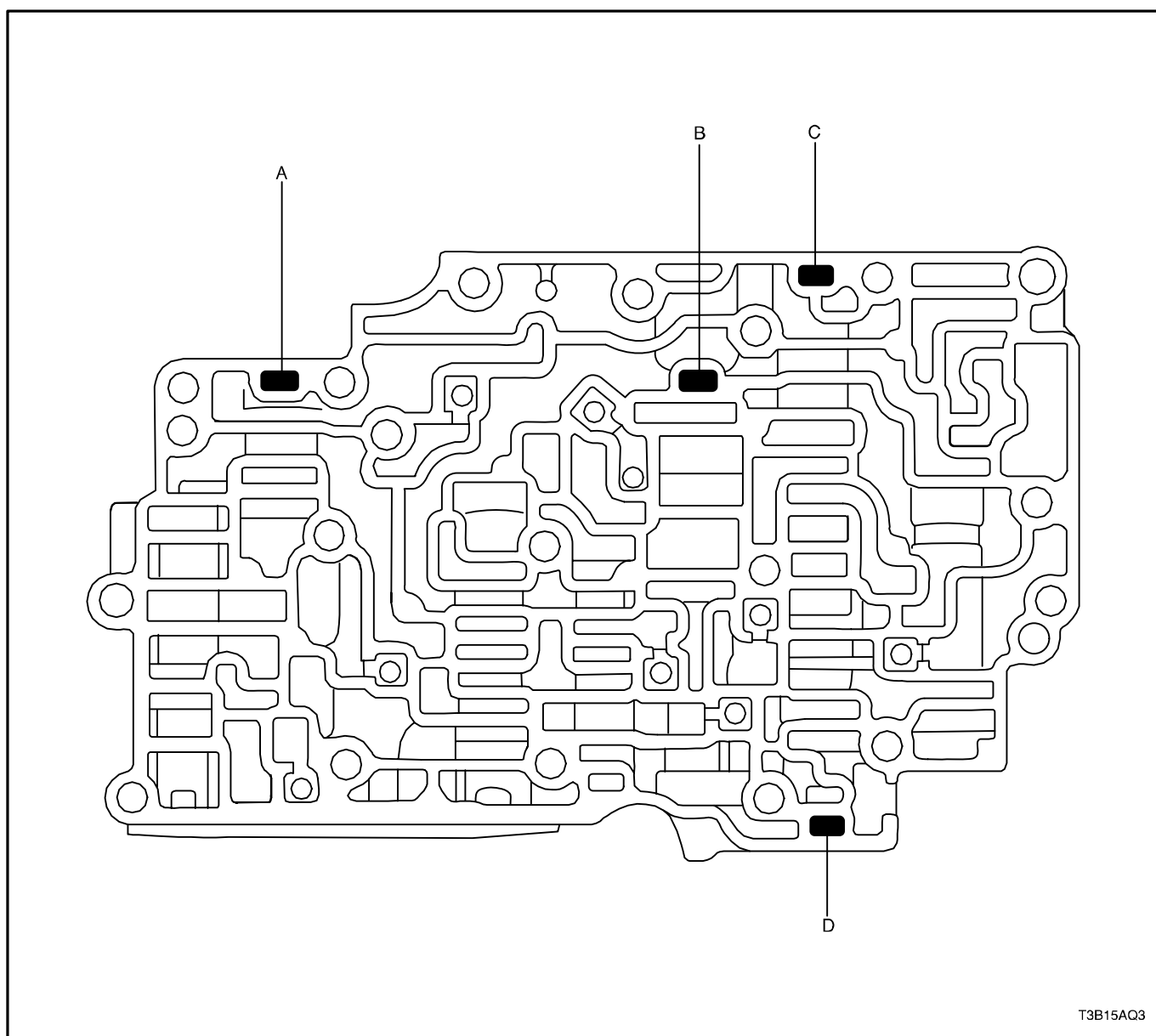
- During reassembly, please refer to the spring specifications below to help you do discriminate between the different springs.



T3B15AQ2

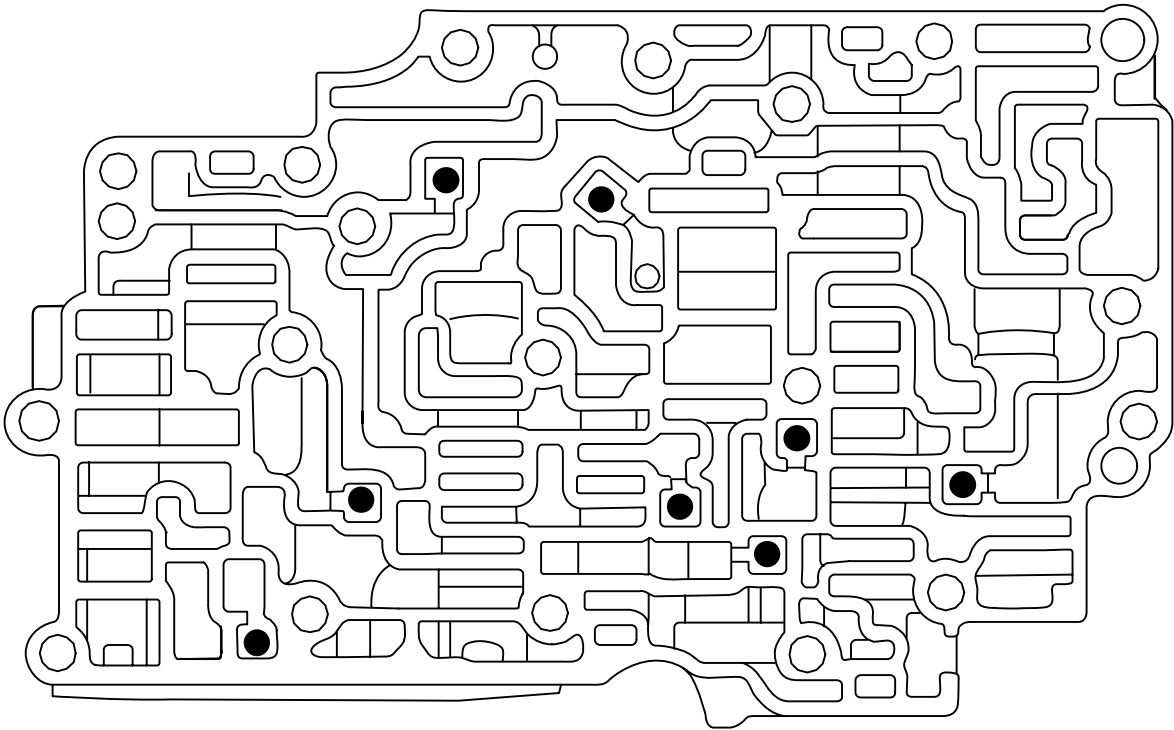
Mark	Name (Color)	Free length/Outer diameter mm (in.)	Total number of coils
A	3–4 shift timing valve (Pink)	28.41 (1.1185) / 6.4 (0.252)	10.49
B	2nd brake accumulator piston,(None) Inner	45.90 (1.8071) / 10.5 (0.413)	16.9
C	2nd brake accumulator piston,(White) Outer	69.00 (2.7165) / 16.0 (0.630)	15.1
D	Reverse clutch accumulator piston (None)	65.40(2.5748) / 17.0 (0.669)	13.7
E	3–4 shift valve (Red)	25.50 (1.0039) / 9.73 (0.3831)	7.75
F	Secondary regulator valve (White)	34.56 (1.3606) / 8.8 (0.346)	12.27
G	Reverse control valve (None)	25.58 (1.0071) / 8.64 (0.3402)	8.75
H	Lock up control valve (Yellow)	20.87 (0.8217) / 5.55 (0.2185)	11.15

Upper Valve Body Key



Mark	Retainer	Height/Width/Thickness mm (in.)
A	Check valve	11.5 (0.453) / 5.0 (0.197) / 3.2 (0.126)
B	Secondary regulator valve	16.0 (0.630) / 5.0 (0.197) / 3.2 (0.126)
C	Lock up control valve	16.0 (0.630) / 5.0 (0.197) / 3.2 (0.126)
D	Reverse control valve	11.5 (0.453) / 5.0 (0.197) / 3.2 (0.126)

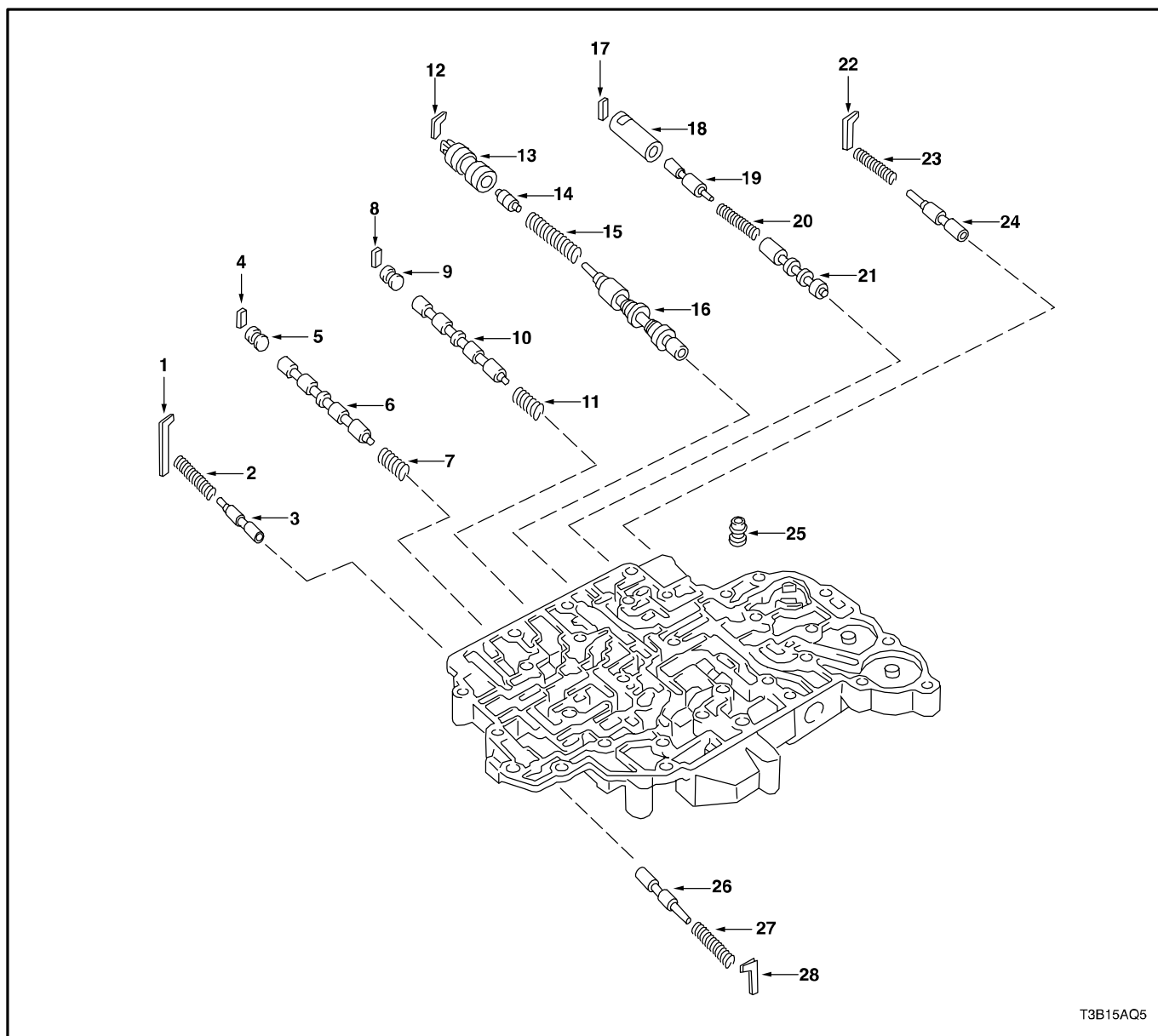
Upper Valve Body Check Ball



T3B15AQ4

Check ball mm(in).	5.535 (0.21791)
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Lower Valve Body

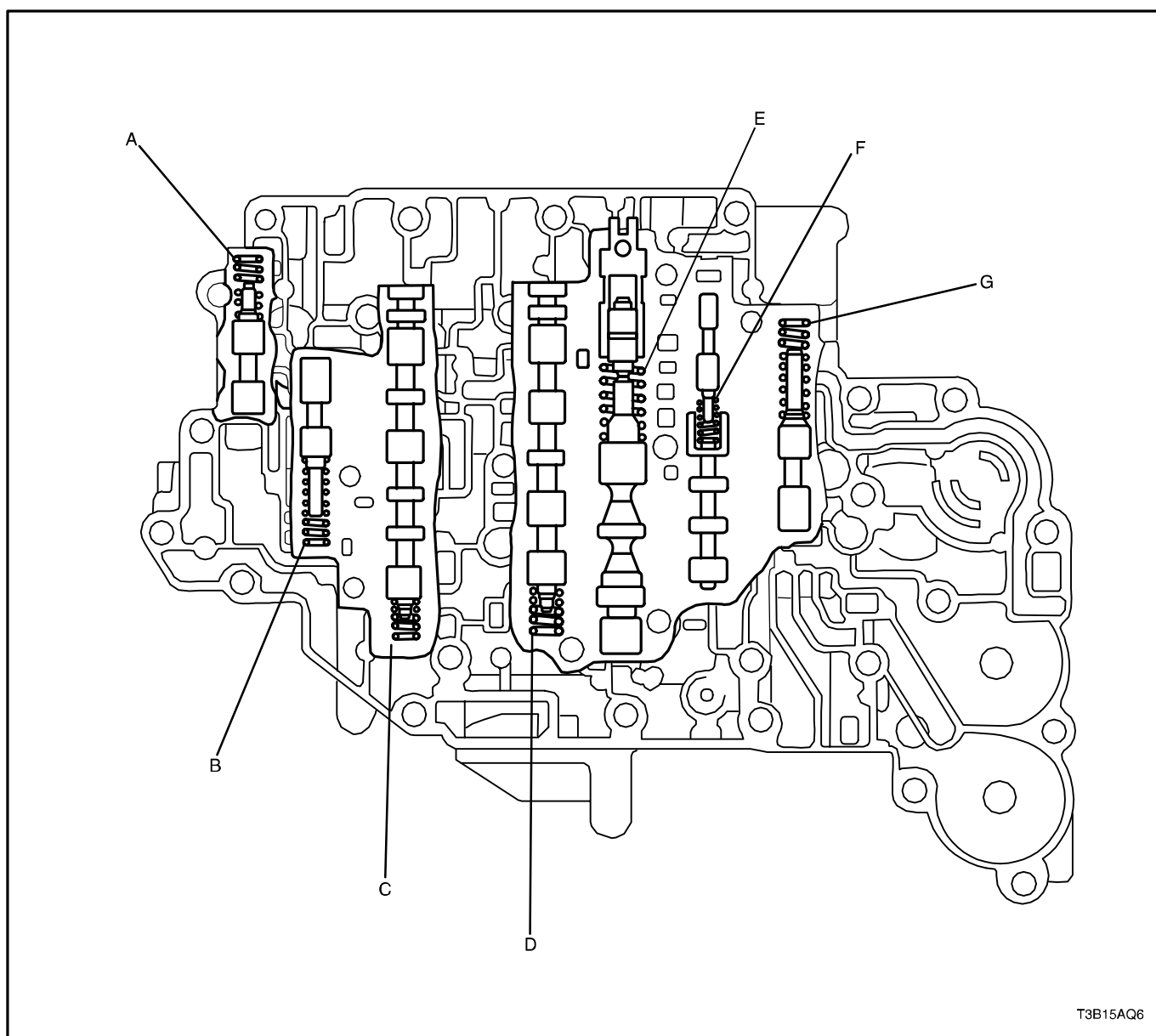


T3B15AQ5

1. Key
2. Spring
3. 4-3 Shift Timing Valve
4. Key
5. Plug
6. 2-3 Shift Valve
7. Spring
8. Key
9. Plug
10. 1-2 Shift Valve
11. Spring
12. Key
13. Sleeve
14. Plunger

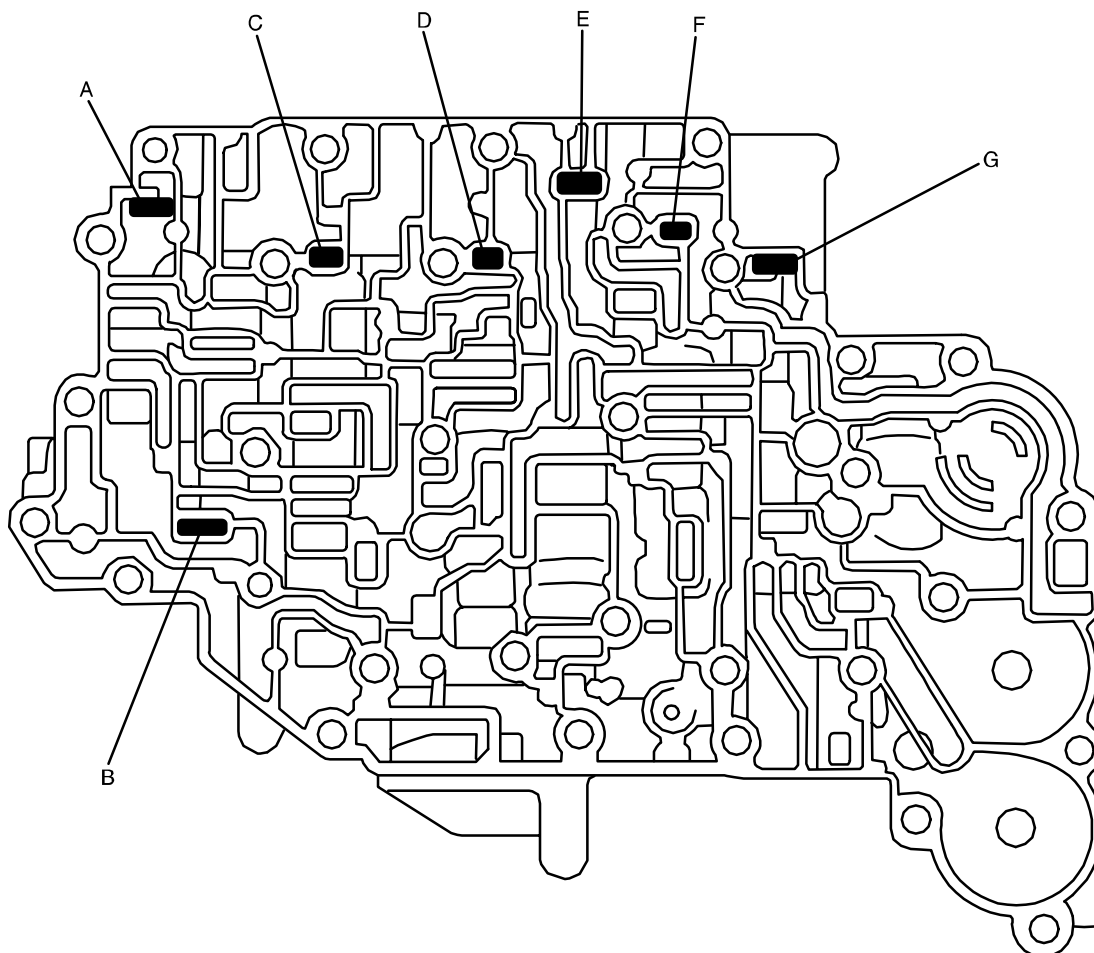
15. Spring
16. Primary Regulator Valve
17. Key
18. Sleeve
19. Plunger
20. Spring
21. Lock-up Relay Valve
22. Key
23. Spring
24. Solenoid Modulator Valve
25. Solenoid Oil Strainer
26. Lower Modulator Valve
27. Spring
28. Key

Lower Valve Body Spring



Mark	Name (Color)	Free length/Outer diameter mm (in.)	Total number of coils
A	4-3 shift timing valve No.1 (None)	33.95 (1.3366) / 8.2 (0.323)	12.5
B	Low modulator valve (None)	30.43 (1.1980) / 7.75 (0.3051)	12.72
C	2-3 shift valve (Red)	25.50 (1.0039) / 9.73 (8.1694)	7.75
D	1-2 shift valve (Red)	25.50 (1.0039) / 9.73 (8.1694)	7.75
E	Primary regulator valve (None)	50.53 (1.9894) / 13.6 (0.535)	11.07
F	Lock up relay valve (Red)	23.42 (0.9221) / 5.86 (0.2307)	12.25
G	Solenoid modulator valve (Yellow)	32.13 (1.2650) / 8.0 (0.315)	15.75

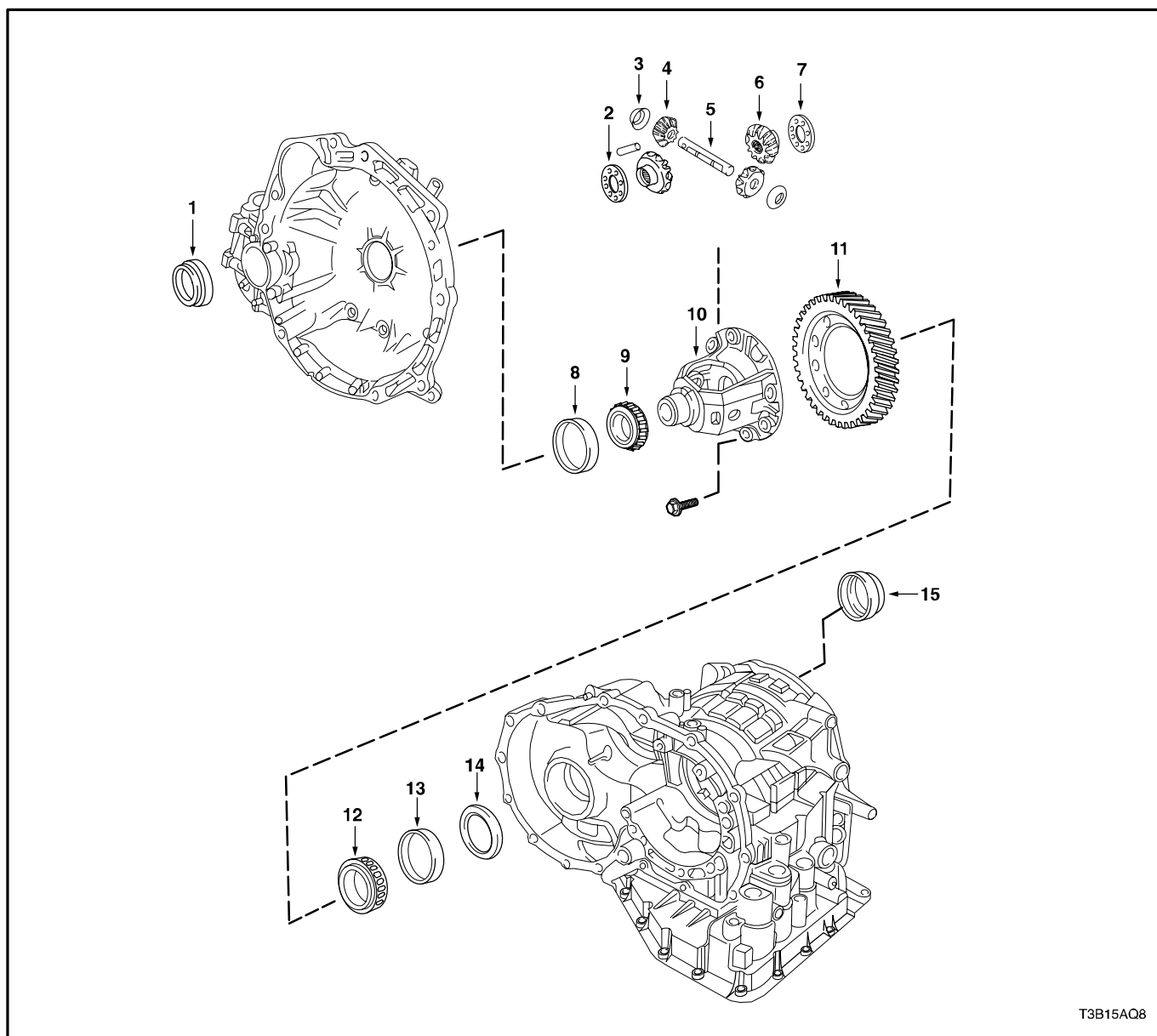
Lower Valve Body Key



T3B15AQ7

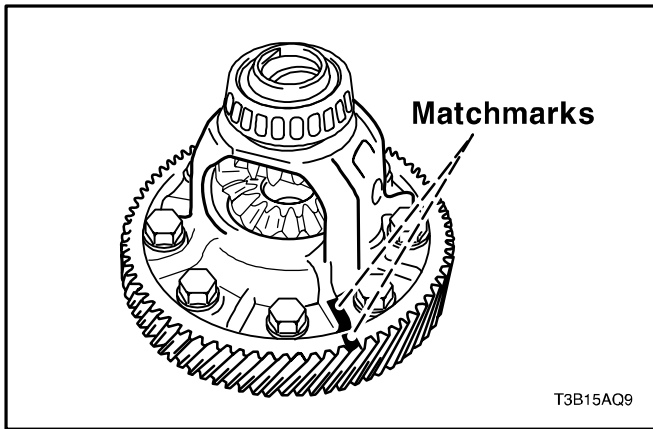
Mark	Retainer	Height/Width/Thickness mm (in.)
A	4–3 shift timing valve No.1	36.0 (1.417) / 5.0 (0.197) / 3.2 (0.126)
B	Low modulator valve	24.0 (0.945) / 5.0 (0.197) / 3.2 (0.126)
C	2–3 shift valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
D	1–2 shift valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
E	Primary regulator valve	9.8 (0.386) / 5.2 (0.205) / 3.2 (0.126)
F	Lock up relay valve	16.0 (0.630) / 5.0 (0.197) / 3.2 (0.126)
G	Solenoid modulator valve	24.0 (0.945) / 5.0 (0.197) / 3.2 (0.126)

DIFFERENTIAL CASE



T3B15AQ8

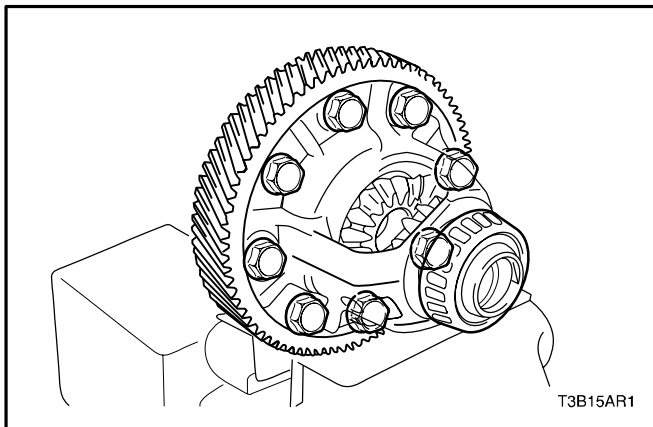
- | | |
|---|-----------------------------|
| 1. Differential Pinion Thrust Washer | 9. Tapered Roller Bearing |
| 2. Differential Pinion Gear | 10. Differential Case |
| 3. Differential Side Gear Thrust Washer | 11. Differential Ring Gear |
| 4. Differential Side Gear | 12. Tapered Roller Bearing |
| 5. Pin | 13. Side Bearing Outer Race |
| 6. Differential Pinion Shaft | 14. Shim |
| 7. Oil Seal | 15. Oil Seal |
| 8. Side Bearing Outer Race | |

**Tools Required**

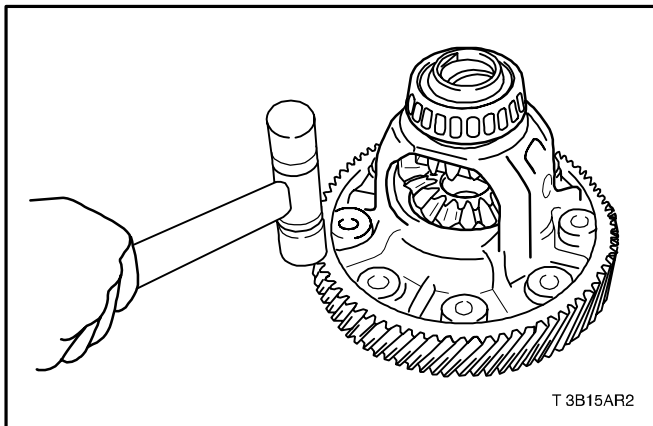
DW260–031–01 Transaxle Housing Oil Seal Installer
DW260–031–02 Transaxle Case Oil Seal Installer
DW240–150 Transaxle Case Side Bearing Outer Race Adapter
DW240–140 Transaxle Housing Side Bearing Outer Race Adapter
DW240–170 Adapter Handle

Disassembly Procedure

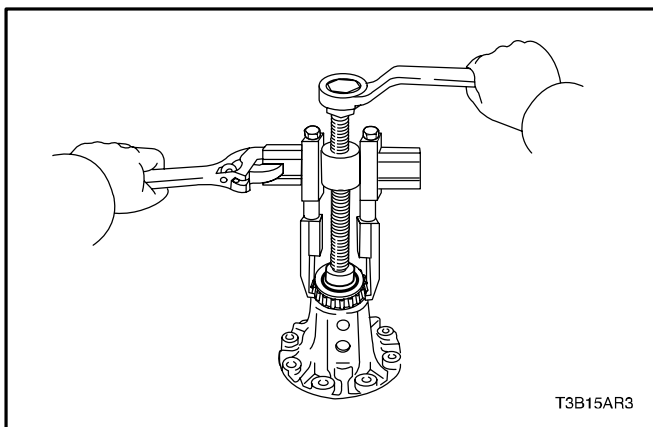
1. Place the matchmarks on the ring gear and differential case.
2. Remove the 8 bolts.

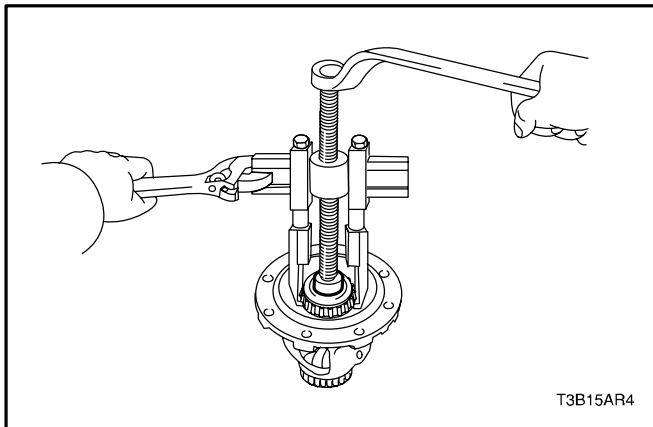


3. Using a plastic hammer, tap on the ring gear to remove it from the case.

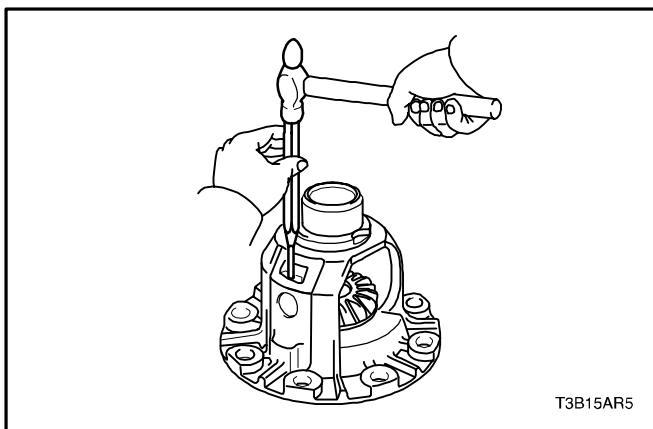


4. Using a suitable puller, remove the tapered roller bearing of transaxle housing side.

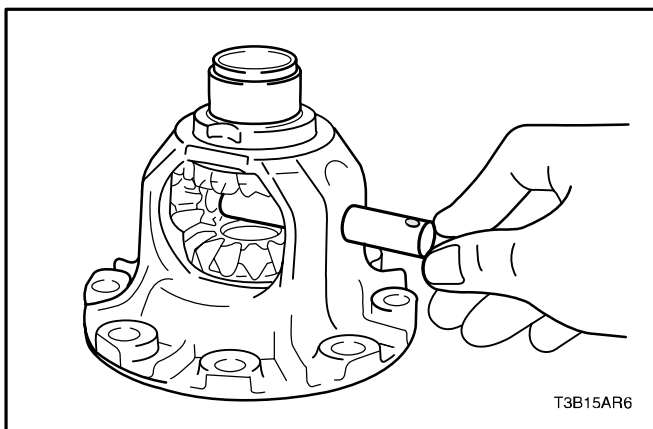




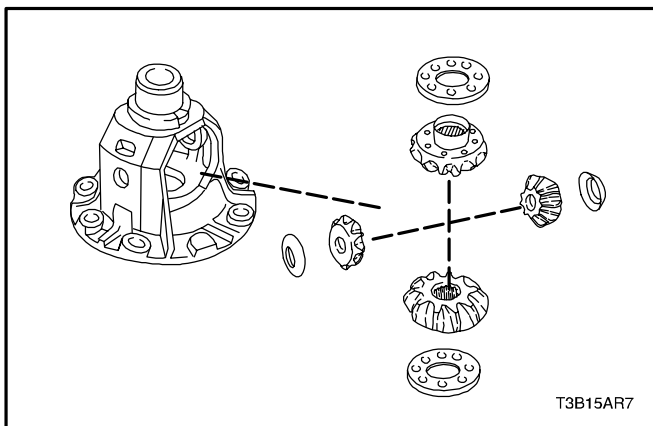
5. Using a suitable puller, remove the tapered roller bearing of transaxle case side.



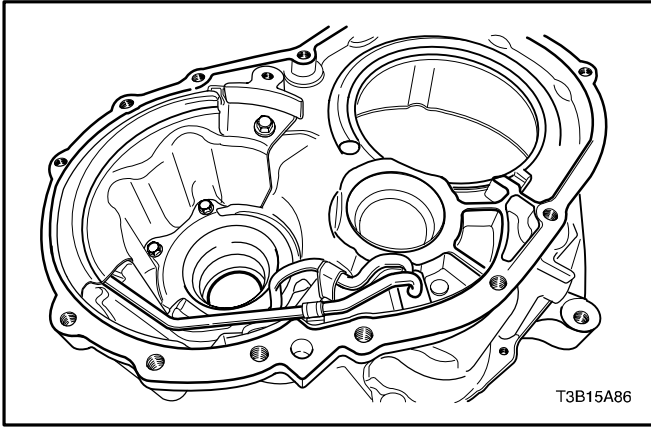
6. Using a pin punch and hammer, drive out the pin from the ring gear side.



7. Remove the differential pinion shaft from the case.

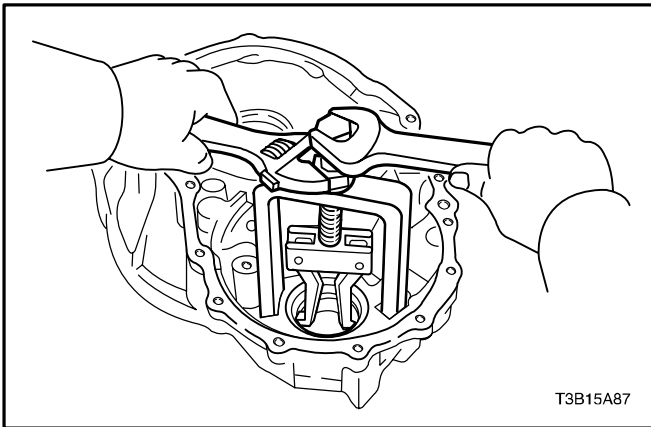


8. Remove the 2 differential pinion gears, 2 differential side gears, 2 differential pinion thrust washers and 2 differential side gear thrust washers.

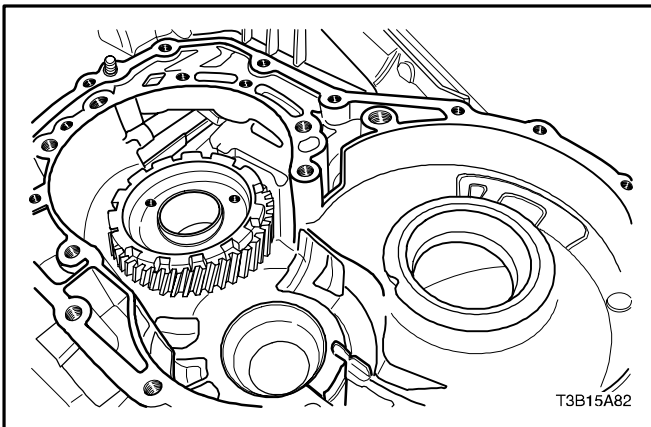


9. Using a driver, remove the oil seal from the trans-axle housing.

Notice : Be careful not to damage the transaxle housing when removing the oil seal using a driver.

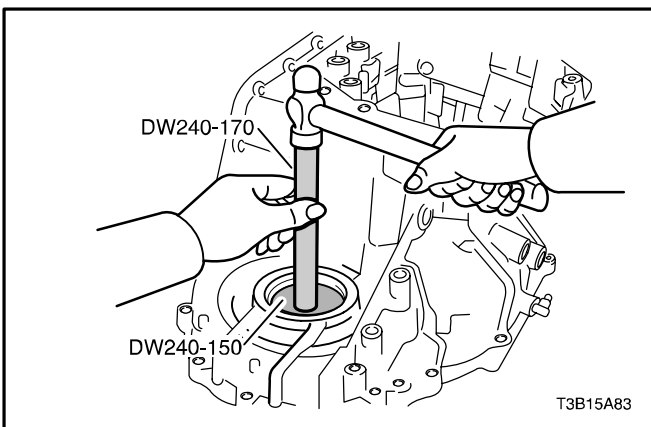


10. Using a suitable puller, remove the side bearing outer race of transaxle housing.

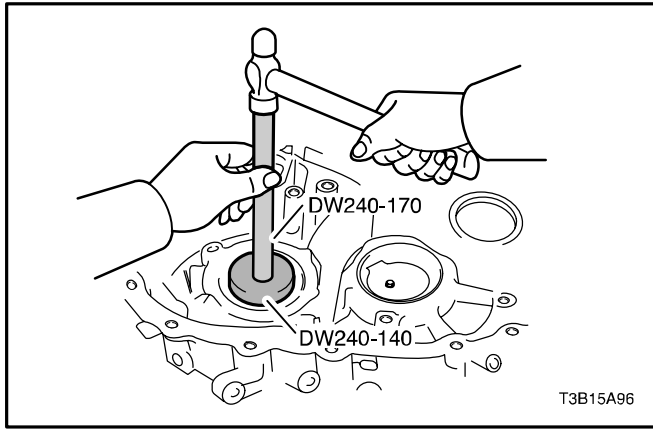


11. Using a driver, remove the oil seal of transaxle case.

Notice : Be careful not to damage the transaxle case when removing the oil seal using a driver.

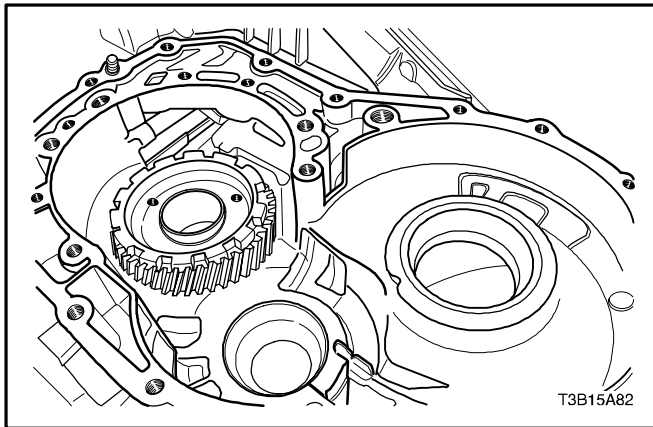


12. Using transaxle case side bearing outer race adapter DW240-150 and adapter handle DW240-170, remove the transaxle case side bearing outer race and shim.



Assembly Procedure

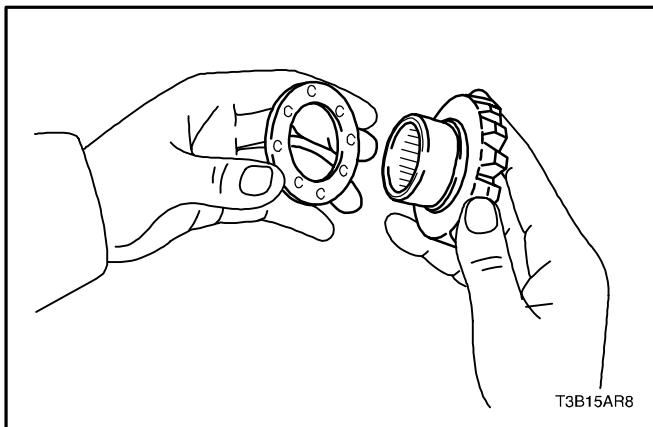
1. Using transaxle housing side bearing outer race adapter DW240-140 and adapter handle DW240-170, install a new side bearing outer race into the transaxle housing.



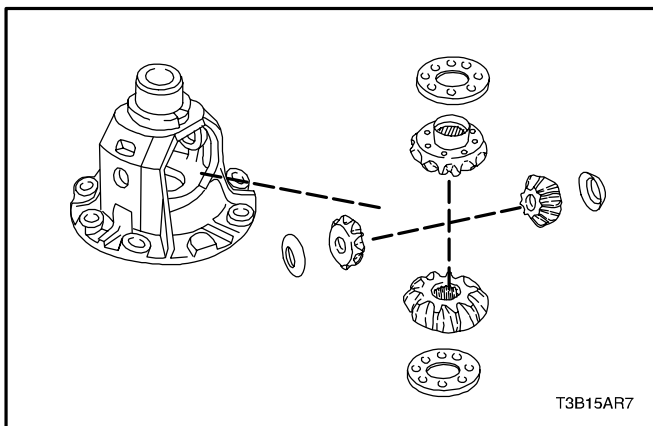
2. Install the shim to the transaxle case.

Notice : First install a shim of the same thickness as before.

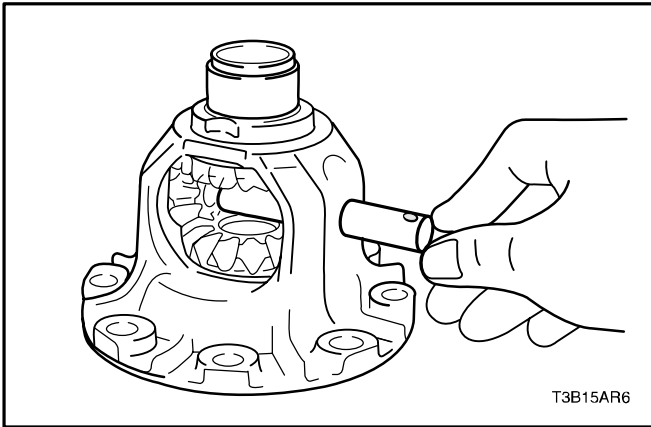
3. Install a new side bearing outer race into the transaxle case.



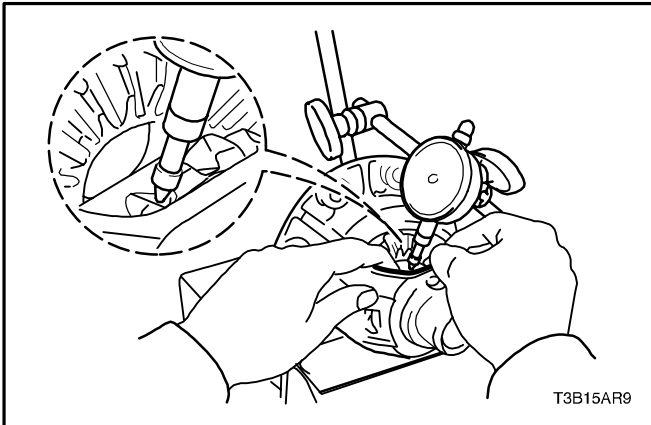
4. Coat the thrust washers, side gears, pinion gears and pinion thrust washers with ATF.
5. Install the 2 differential side gear thrust washers to 2 differential side gears.



6. Install the 2 side gears with 2 thrust washers, 2 pinion gears and 2 pinion thrust washers into the differential case.
7. Coat the pinion shaft with ATF.



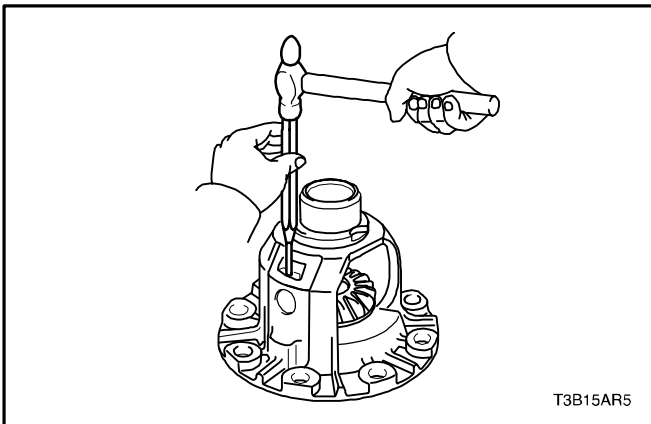
8. Install the pinion shaft so as to align the lock pin holes on the pinion shaft and differential case.



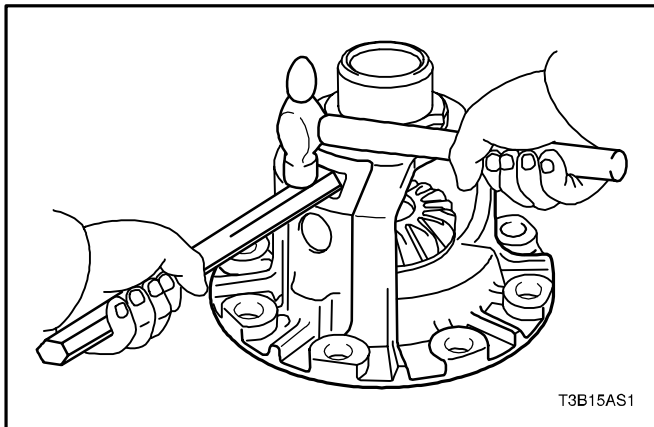
9. Measure the side gear backlash while holding 1 pinion gear toward the case.
- Standard backlash:
0.05 – 0.20 mm (0.0020–0.0079 in.)
If the backlash is out of specification, install the correct thrust washer to the side gear.
10. Referring to the table below, select thrust washers which will ensure that the backlash is within the specification.
- Try to select washers of the same size for both sides.
- Thrust washer thickness : mm (in.)

Thickness	Thickness
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

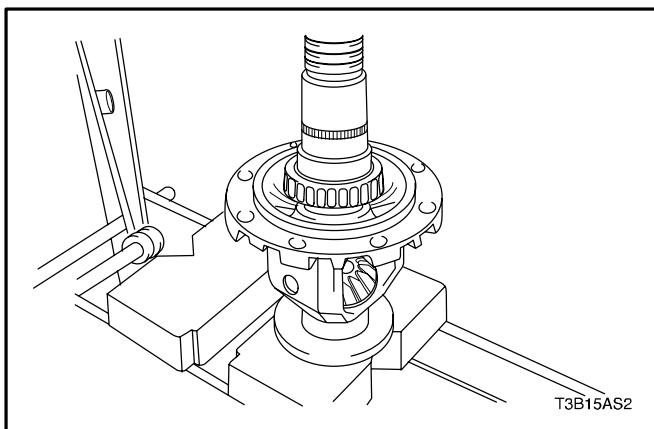
If the backlash is not within the specification, install a thrust washer of a different thickness.



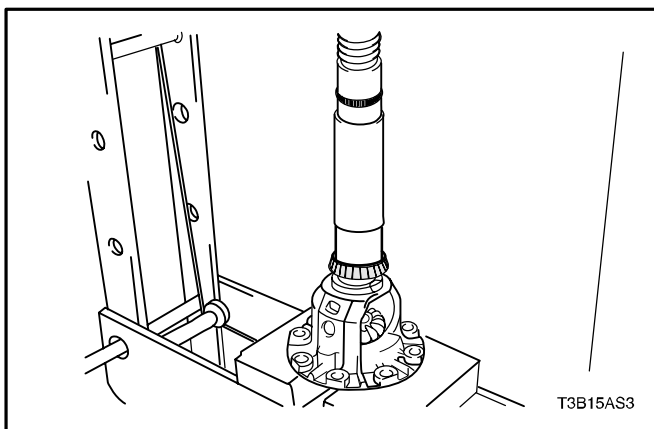
11. Using a hammer and punch, drive in the pin through the case and hole in the pinion shaft.



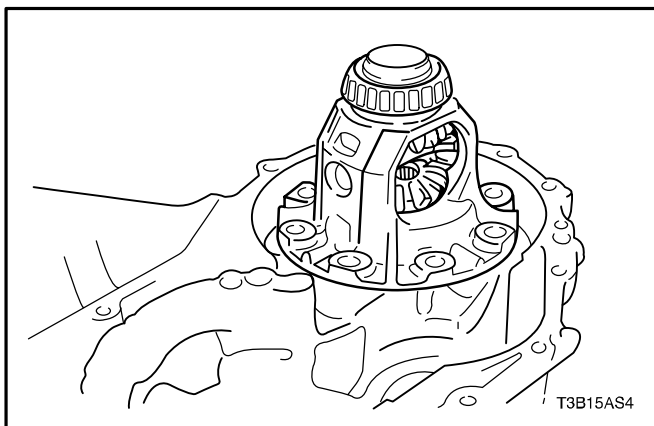
12. Using a hammer and chisel, stake the differential case.



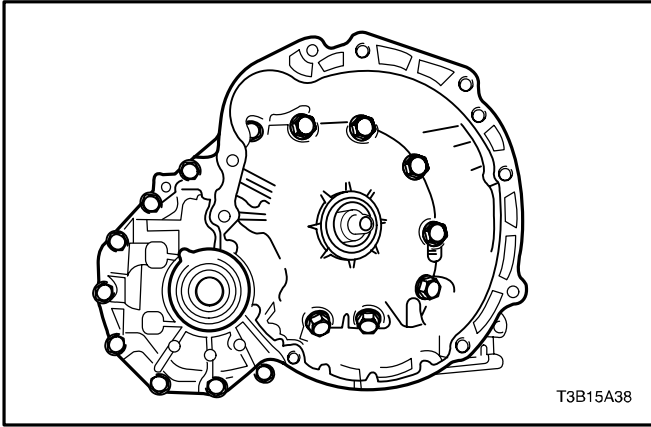
13. Using a press, install the tapered roller bearing into the differential case.



14. Using a press, install the tapered roller bearing into the differential case.
15. Remove any formed in place gasket (FIPG) material and be careful not to get oil on the contacting surfaces of the transaxle housing or transaxle case.



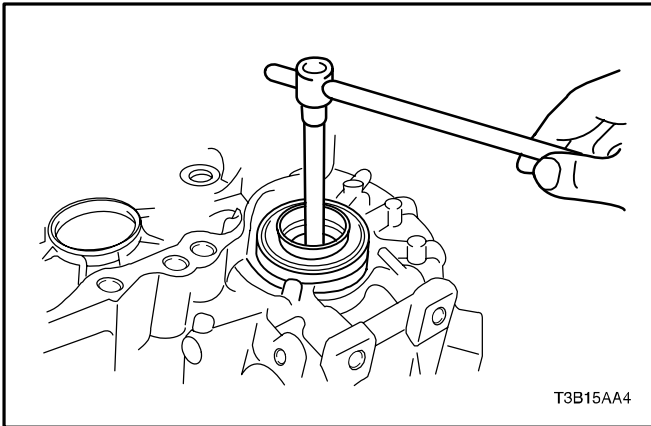
16. Install the differential to the transaxle case.



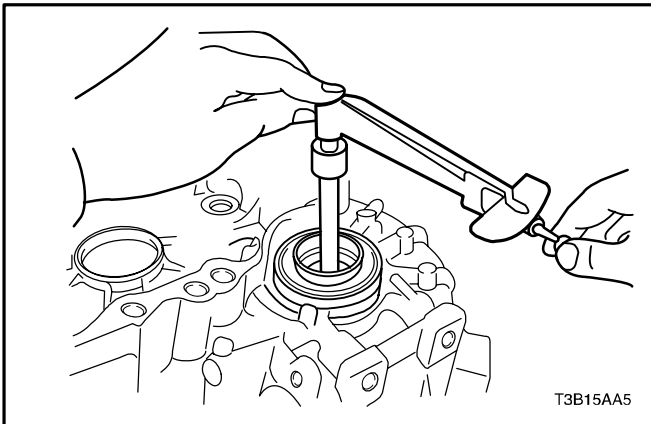
17. Install the transaxle housing and 16 bolts of the transaxle housing temporarily.
18. Tighten 8 or 9 bolts out of 16 bolts of the transaxle housing completely.

Tighten

Tighten the bolts to 29 N•m (22 lb–ft).



19. Using differential preload adapter DW240–130, turn the differential gear assembly right and left 2 or 3 times to allow the bearing settle.



20. Using differential preload adapter DW240–130 and small torque wrench, measure the preload of the differential gear.

- Preload:

New bearing: 0.78–1.37 N.m (6.9–12.2 lb –in)

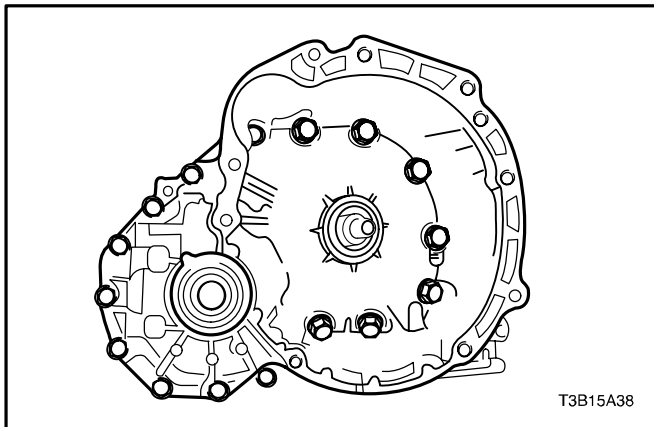
Used bearing : 0.39–0.69 N.m (3.5 – 6.1 lb–in)

If the preload is not within the specification, remove the differential from the transaxle case.

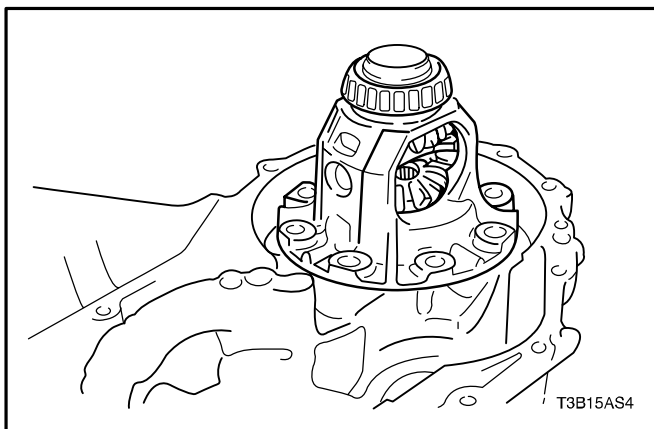
Re-select the transaxle case side adjusting shim according to the following table.

- Adjusting shim thickness :mm (in.)

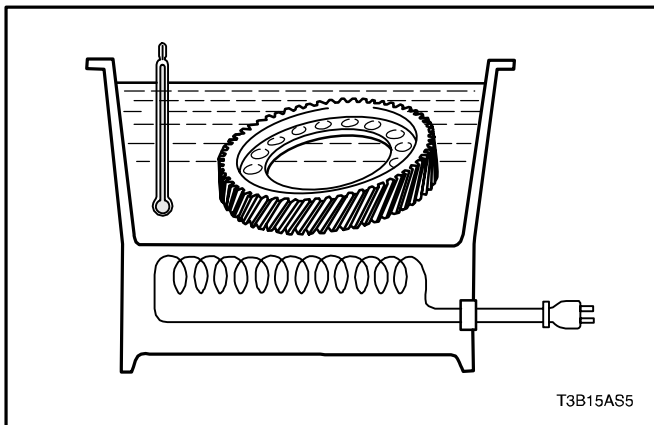
Mark	Thickness	Mark	Thickness
A	1.80 (0.0709)	N	2.26 (0.0890)
B	1.85 (0.0728)	P	2.29 (0.0902)
C	1.90 (0.0748)	Q	2.32 (0.0913)
D	1.95 (0.0768)	R	2.35 (0.0925)
E	2.00 (0.0787)	S	2.40 (0.0945)
F	2.05 (0.0807)	T	2.45 (0.0965)
G	2.08 (0.0819)	U	2.50 (0.0984)
H	2.11 (0.0831)	V	2.55 (0.1004)
J	2.14 (0.0843)	W	2.60 (0.1024)
K	2.17 (0.0854)	X	2.65 (0.1043)
L	2.20 (0.0866)	Y	2.70 (0.1063)
M	2.23 (0.0878)		



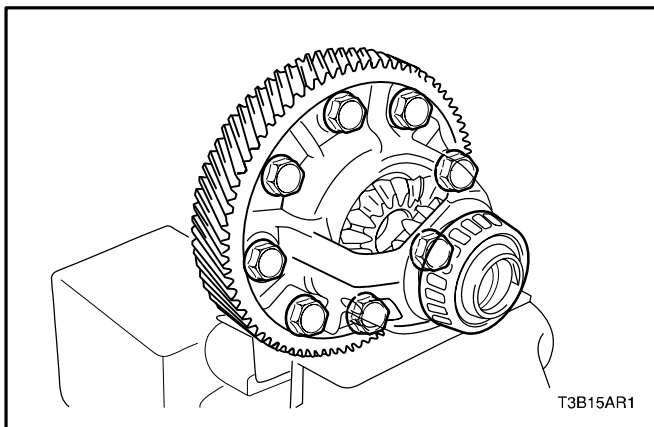
21. Using a plastic hammer, remove the 16 bolts and transaxle housing.



22. Remove the differential gear from the transaxle case.



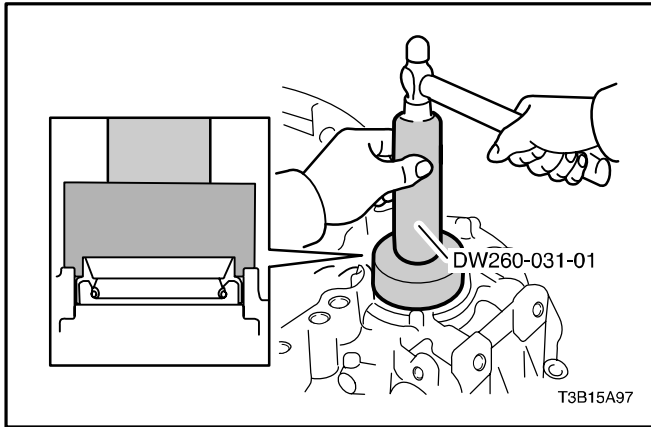
23. Clean the contact surface of the differential case.
 24. Heat the ring gear in water and boil for 10 minutes.
 25. Carefully remove the ring gear from the water.
 26. After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.



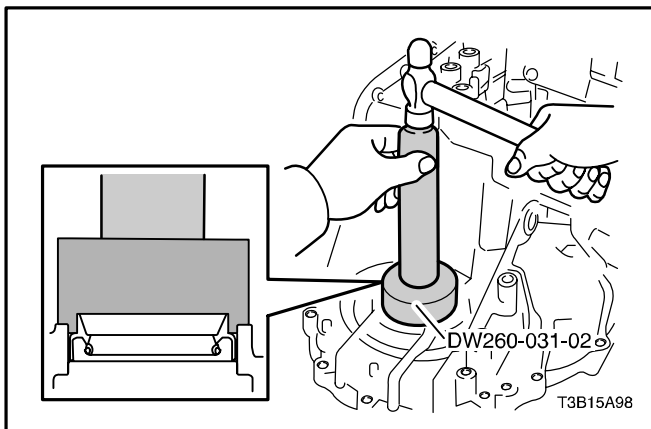
27. Install the 8 bolts.

Tighten

Tighten the bolts to 102 N•m (75 lb–ft).



28. Using transaxle housing oil seal installer DW260-031-01 and a hammer, drive in a new transaxle housing oil seal .
- Oil seal in depth : 3.1 mm (0.122 in.)



29. Using transaxle case oil seal installer DW260-031-02, drive in a new transaxle case oil seal.
- Oil seal in depth : 4.3 mm (0.169 in.)

GENERAL DESCRIPTION AND SYSTEM OPERATION

TRANSAXLE DESCRIPTION

The new automatic transmission is an electronically controlled 4-speed automatic transmission with Lock-up mechanism.

The transmission is mainly composed of the torque converter with lock up clutch, newly developed 4-speed planetary gear unit, the hydraulic control system and the electric control system.

ELECTRONICAL COMPONENTS

Transmission Control Module (TCM)

The TCM primarily controls shift points and lockup engagement. It is located on the driver side under the instrument panel.

The transmission is controlled by an electronic shift system. The Transmission Control Module (TCM) processes input signals. From the information received, the TCM controls the transmission hydraulic system.

The electronic shift system consists of the following :

- Transmission control module (TCM)
- Shift solenoids (SS1 and SS2)
- Pressure control solenoid (PCS)
- Lockup solenoid
- Input shaft speed (ISS) sensor
- Output shaft speed (OSS) sensor
- Transmission Fluid Temperature (TFT) sensor
- Transmission Range (TR) Switch

Transmission Range (TR) Switch

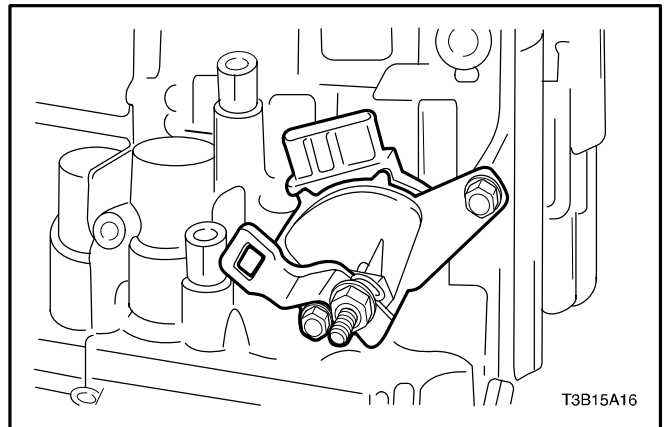
Transmission Range (TR) Switch transmits the information which range includes shift lever of A/T to Starter and TCM.

- It is possible for TR switch to start an engine in only "P" and "N". (Prevention of reckless driving)
- TR switch makes backup lamp turn on when reversing.
- It is used for TR switch to shift control.

TR switch transmits the information by combination of starter and reverse circuit to vehicle side directly without TCM.

Range	Starter Circuit		Indicator Circuit						
	ST+	ST-	IG	P	R	N	D	2	1
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
1			○						○
Polarity	+	-	+	-	-	-	-	-	-

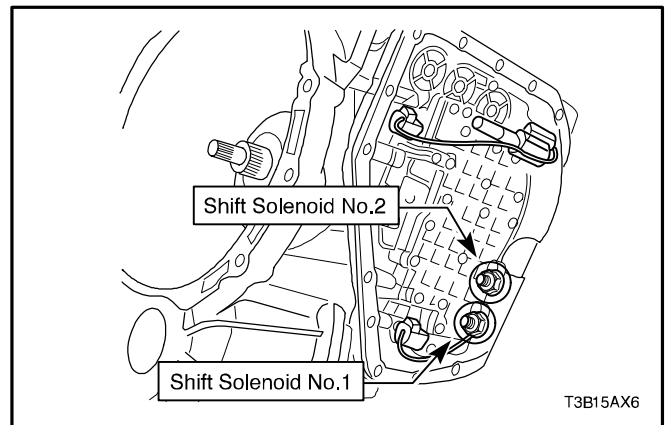
T3B15AX5



T3B15A16

Shift Solenoid No 1,2 (SS1, SS2)

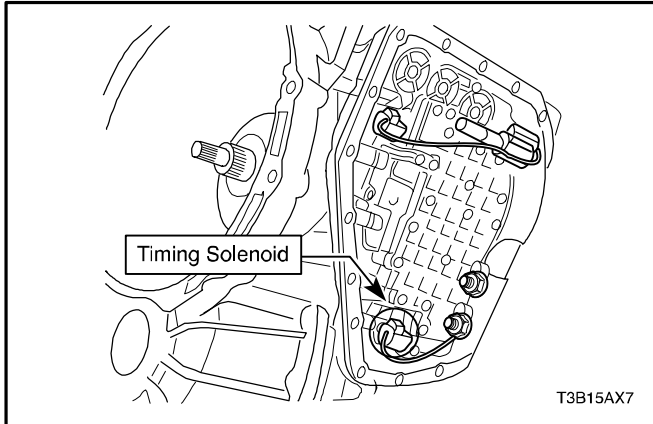
2 shift solenoids are installed directly in the valve body. The solenoids operate of ON and OFF by the control signal from TCM. Combinations of 2 solenoids, SS1 and SS2 changes gear ranges.



T3B15AX6

Timing Solenoid

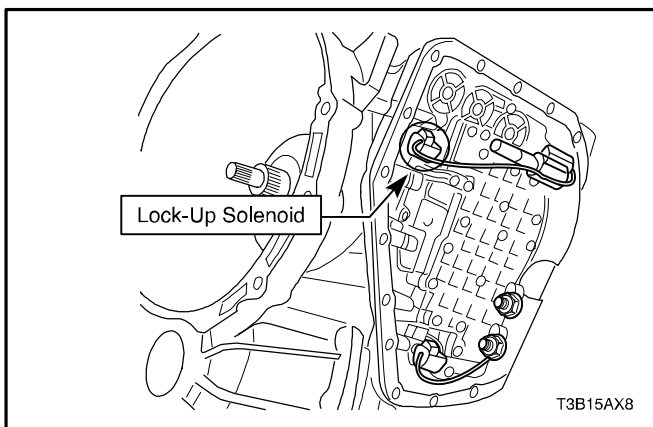
Timing solenoid is installed directly in the valve body. The solenoid operates of ON/OFF by the control signal from TCM. The solenoid change timing valve of inside the valve body, operate hydraulic control with apply and drain of forward clutch.



Lock-Up Solenoid

Lock-up solenoid is installed in the valve body. It receives control signal from TCM.

Lock-up solenoid operates the lock-up valve inside the valve body and controls the torque converter lockup function.

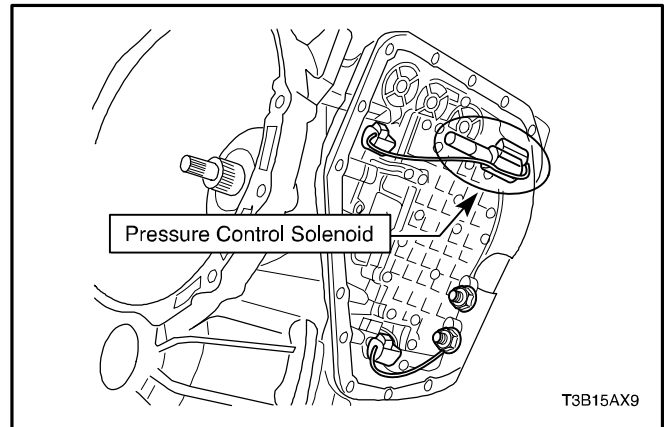


Pressure Control Solenoid (PCS)

The pressure control solenoid (PCS) is located inside the valve body and regulates the transmission's fluid pressure system. It is internally grounded in the TCM and operates when it is supplied with battery voltage from the TCM, through the PCS and back to the TCM.

The battery voltage is controlled by a varying current from the TCM.

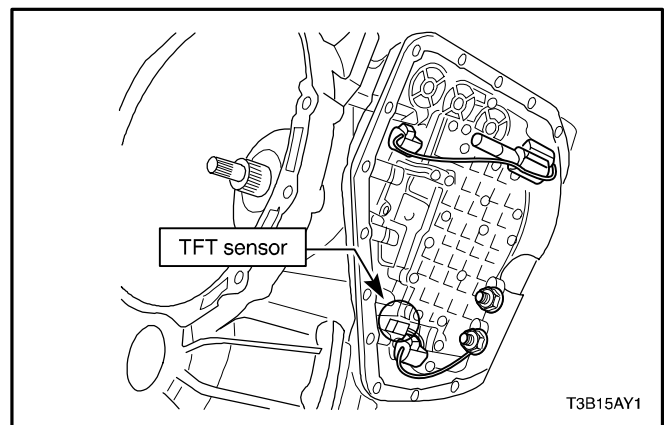
The strength of the current is a function of the throttle position.



Transmission Fluid Temperature (TFT) Sensor

TFT sensor provides TCM with information on the transmission fluid temperature.

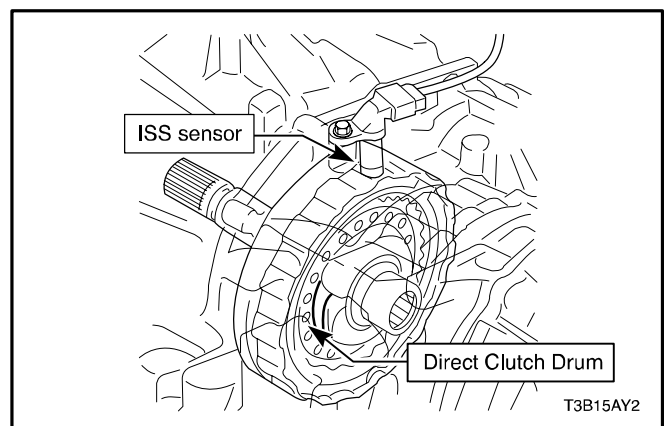
The TCM uses information from the TFT sensor to calculate the gear shift points and to engage the torque converter lockup function.



Input Shaft Speed (ISS) Sensor

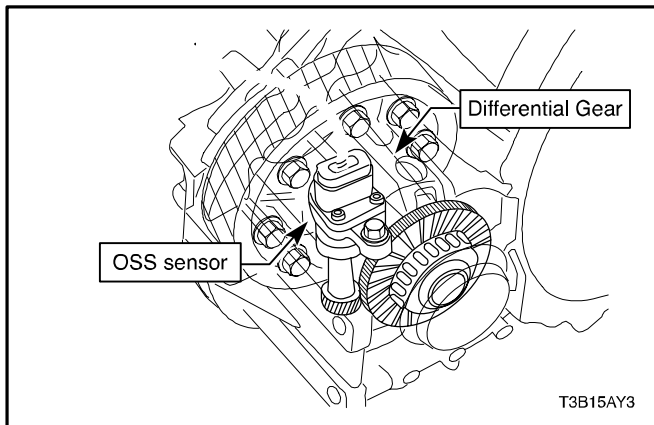
ISS sensor is located on the upper position of the transaxle and detects A/T input speed from the rotation number of the direct clutch drum.

They transmit to TCM as a signal.



Output Shaft Speed (ISS) Sensor

OSS sensor is located on the upper position of the trans-axle and detects the vehicle speed from the rotation number of the differential gear.

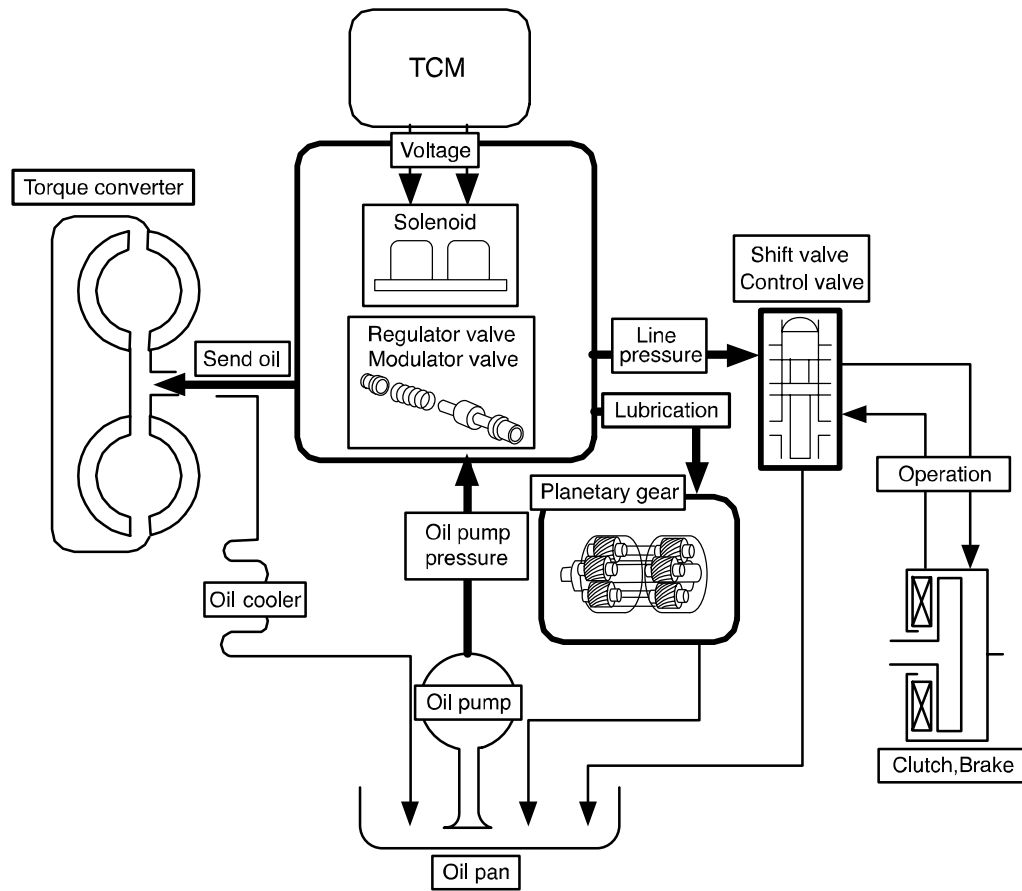


Shift Control

When the ATF is below specification (15°C), 4th up-shift is prevented.

HYDRAULIC CONTROL SYSTEM

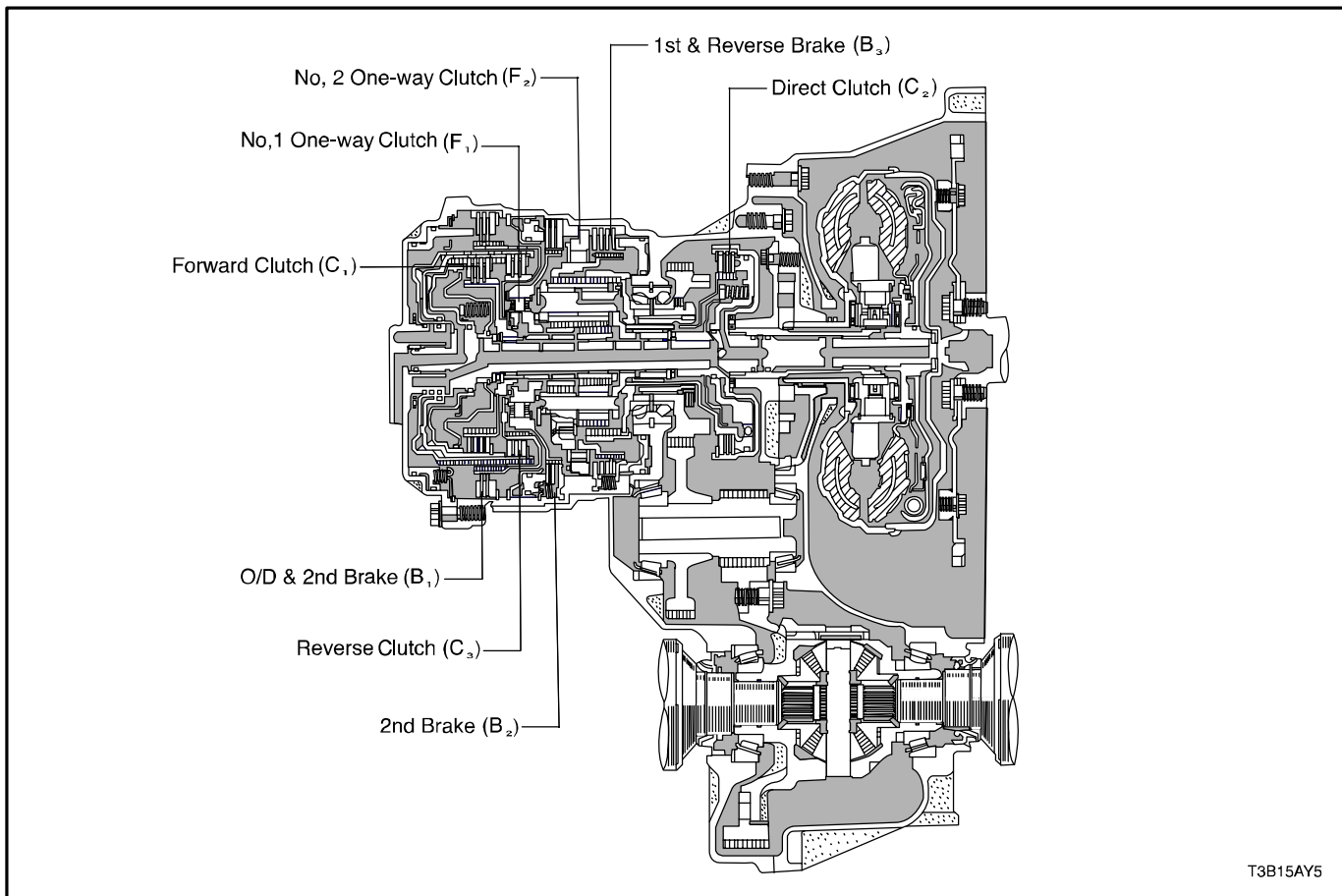
Based on the hydraulic pressure created by the oil pump, TCM sends signals to solenoid and hydraulic control system governs the hydraulic pressure acting on the torque converter, planetary gear, clutches and brakes in accordance with the vehicle driving conditions.



T3B15AY4

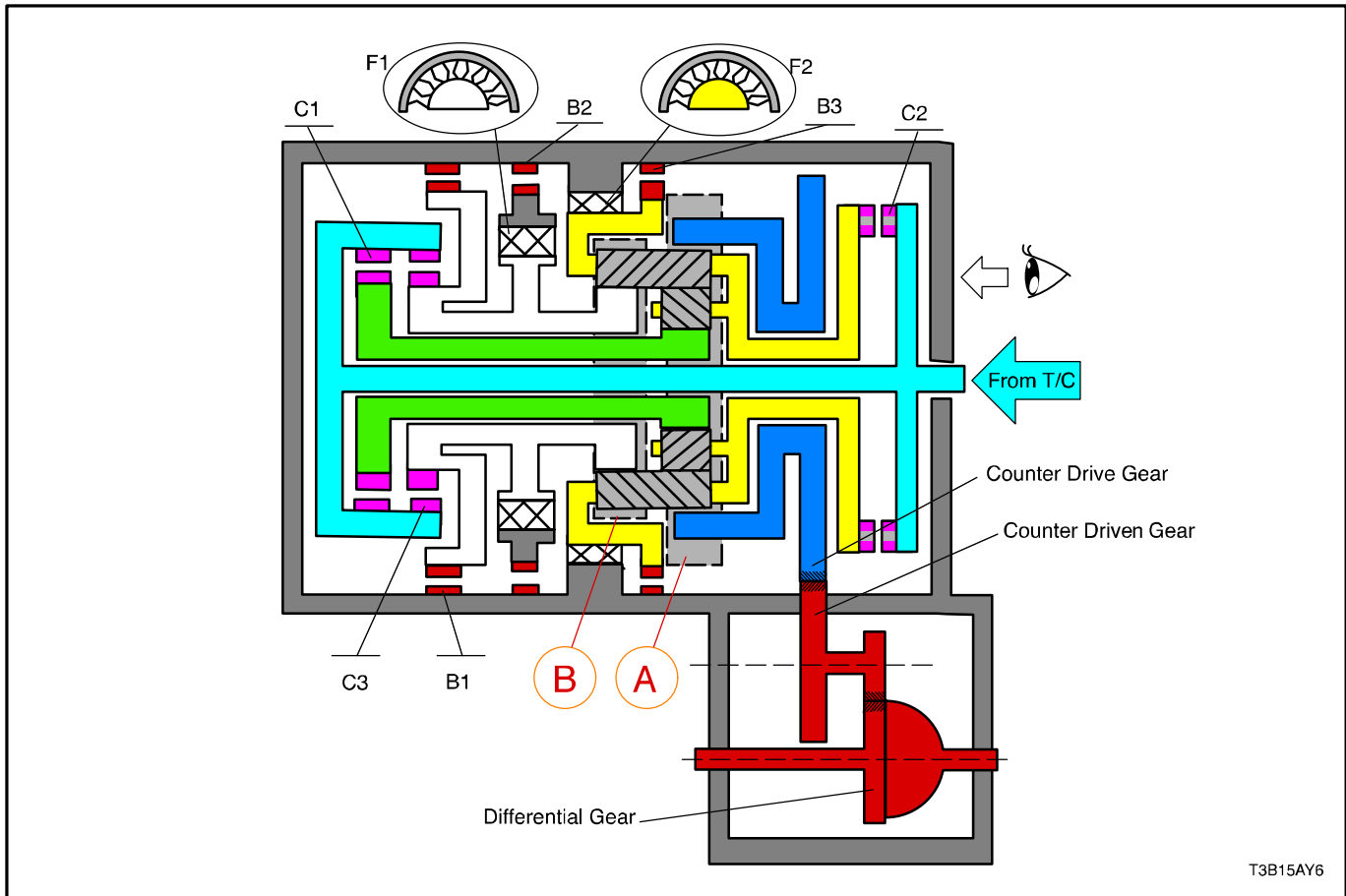
AUTOMATIC TRANSAXLE SYSTEM

Function of Components



Component		Function
C1	Forward Clutch	Connects input shaft and front sun gear.
C2	Direct Clutch	Connects input shaft and planetary carrier.
C3	Reverse Clutch	Connects input shaft and rear sun gear.
B1	O/D & 2nd Brake	Prevents rear planetary sun gear from turning either clockwise or counterclockwise.
B2	2nd Brake	Prevents outer race of F1 from turning either clockwise or counterclockwise, thus preventing the rear sun gear turning counterclockwise.
B3	1st & Reverse Brake	Prevents planetary carrier from turning either clockwise or counterclockwise.
F1	No.1 One-way Clutch	When B2 is operating, this clutch prevents rear sun gear from counterclockwise.
F2	No.2 One-way Clutch	Prevents planetary carrier from turning counterclockwise.
Planetary Gear		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

Operations of Clutches and Brakes

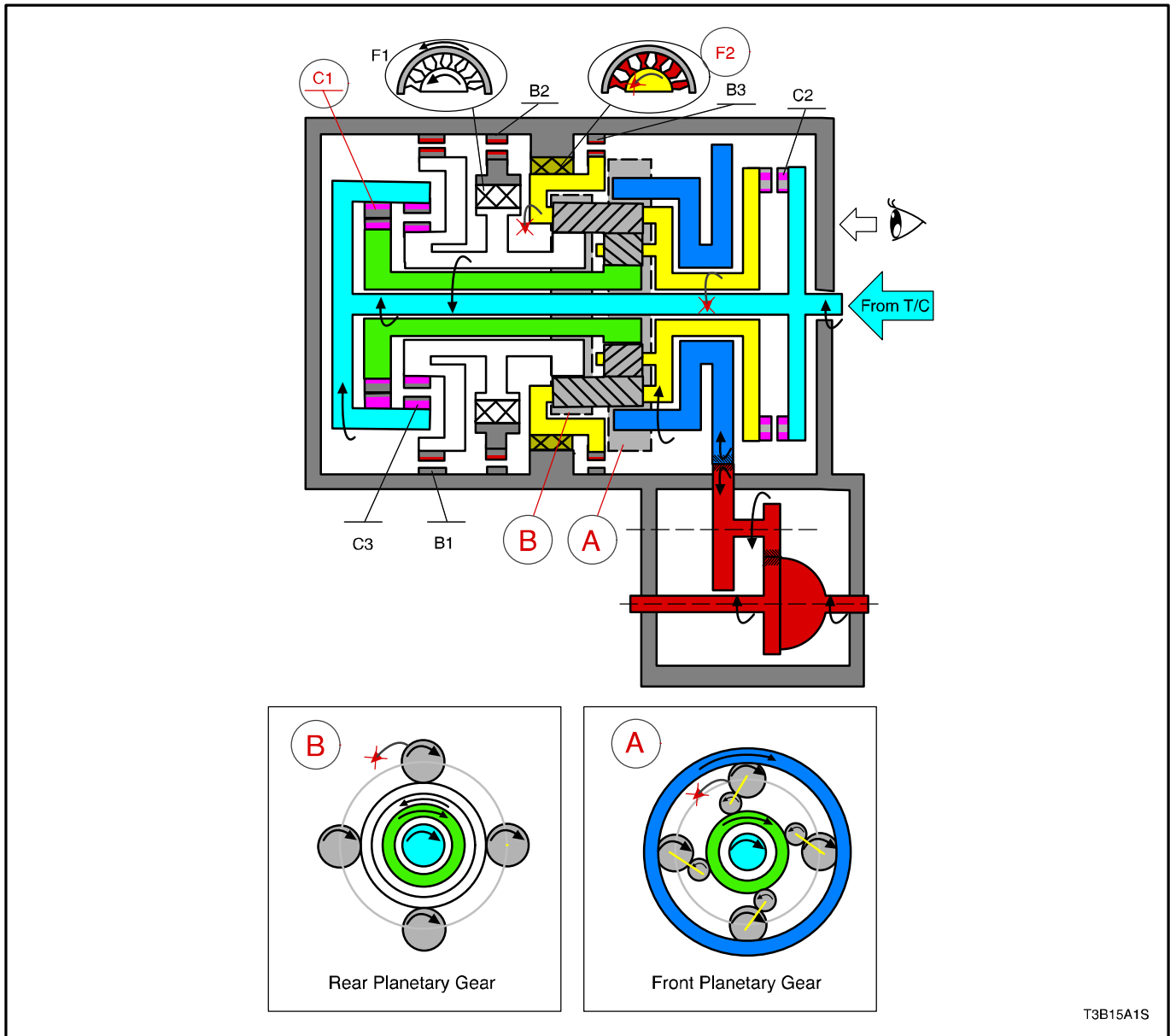


Clutch & Brake		Operation
C1	Forward Clutch	Connects intermediate shaft and front sun gear.
C2	Direct Clutch	Connects input shaft and Planetary carrier.
C3	Reverse Clutch	Connects intermediate shaft and rear sun gear.
B1	O/D & 2nd Brake	Lock rear sun gear
B2	2nd Brake	Lock rear sun gear
B3	1st & Reverse Brake	Lock Planetary carrier
F1	1way Clutch No.1	Lock counterclockwise rotation of rear sun gear, when B2 operations
F2	1way Clutch No.2	Lock counterclockwise rotation of planetary carrier

Position		Solenoid			Clutch			Brake			One-way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
P		ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OF -F	OF -F
R	V<9 Km/ h	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OF -F	OF -F
	V≥ 9K m/h	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OF -F	OF -F
N		ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OF -F	OF -F
D	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OF -F	ON
	2nd	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	OF -F
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	OF -F	OF -F
	(3↔ 4)	OFF	ON	ON↔ OFF	ON↔ OFF	ON	OFF	OFF↔ ON	ON	OFF	OF -F	OF -F
	4th	OFF	ON	OFF	OFF	ON	OFF	ON	ON	OFF	OF -F	OF -F
2	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OF -F	ON
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	ON	OF -F
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	OF -F	OF -F
1	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	OF -F	ON
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	ON	OF -F

D-1st Gear

Position		Solenoid			Clutch			Brake			1 way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
D	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OF -F	ON
1	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	OF -F	ON

**"D" – 1st Gear**

- Input shaft rotates clockwise.
 - Forward clutch (C1) operates. (Connect input shaft to front sun gear)
- Front sun gear rotates clockwise.
- Planetary short pinion rotates itself counterclockwise.
- Planetary long Pinion rotates itself clockwise.
- Planetary carrier is going to rotate counterclockwise.
 - One way clutch No.2(F2) operates. (Lock revolves counterclockwise of planetary carrier)

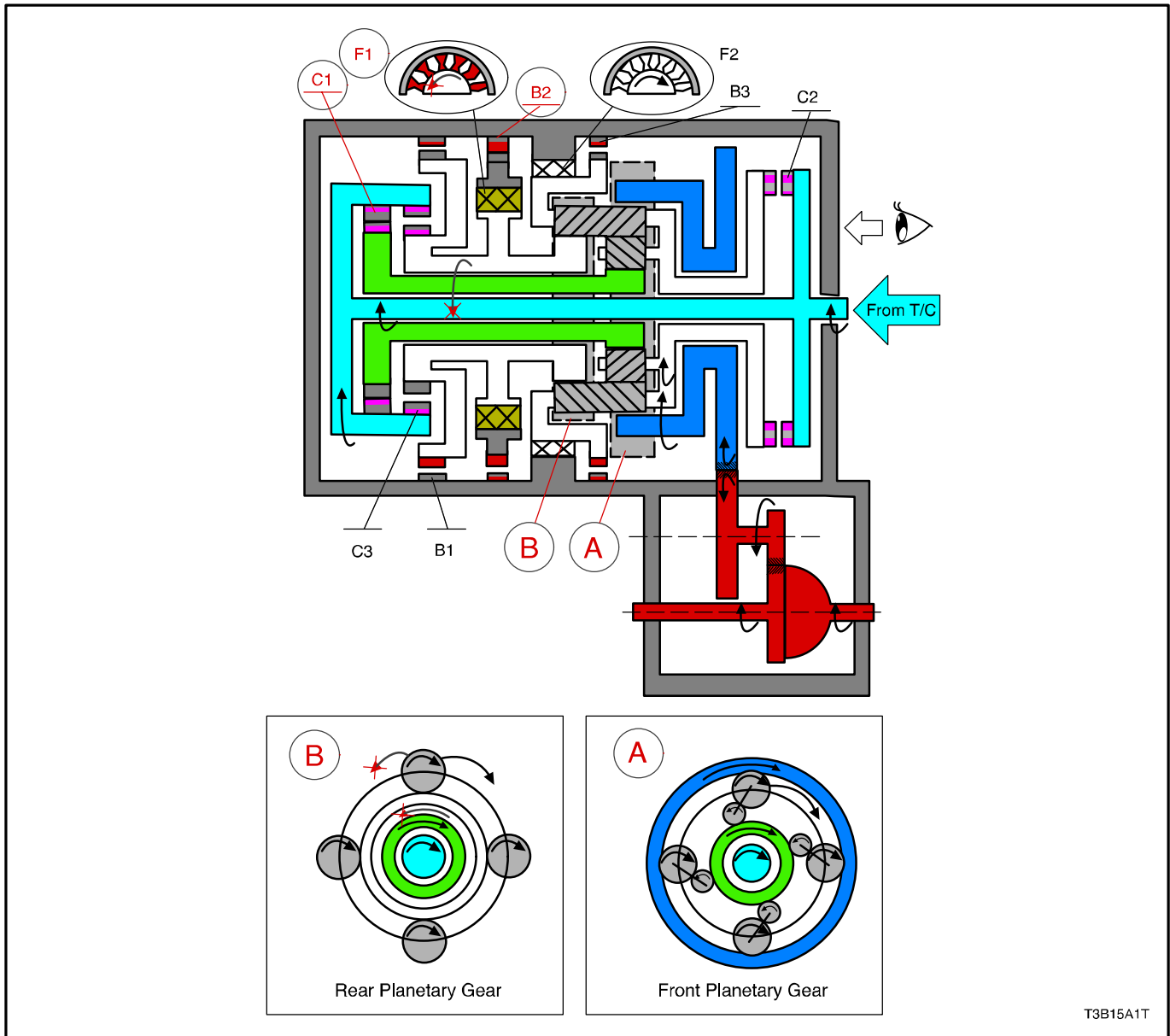
6. Ring gear rotates clockwise.
7. Counter drive gear rotates clockwise for ring gear and one.
8. Counter drive gear rotates counterclockwise
9. Differential gear drive pinion rotates counterclockwise for counter driven gear and one.
10. Differential gear rotates clockwise.

(Engine Brake)

1. Counter drive gear and Planetary ring gear rotates counterclockwise.
2. Planetary long pinion rotates itself counterclockwise.
3. Planetary short pinion rotates itself clockwise.
4. Planetary carrier revolves clockwise due to rotation itself counterclockwise of planetary long pinion, but driving force loses due to free of 1 way clutch NO.2 (F2). Therefore Engine brake does not operate.

D-2nd Gear

Position		Solenoid			Clutch			Brake			1 way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
D	2nd	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	OF -F
2	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	ON	OF -F

**"D" – 2nd Gear**

- Input shaft rotates clockwise.
 - Forward clutch (C1) operates. (Connect input shaft to front sun gear)
- Front sun gear rotates clockwise.
- Planetary short pinion rotates itself counterclockwise.
- Planetary long Pinion rotates itself clockwise.
- Rear planetary sun gear is going to rotate counterclockwise.
 - 2nd brake (B2) and 1way clutch No.1 operates. (Lock counterclockwise rotation of rear planetary sun gear)

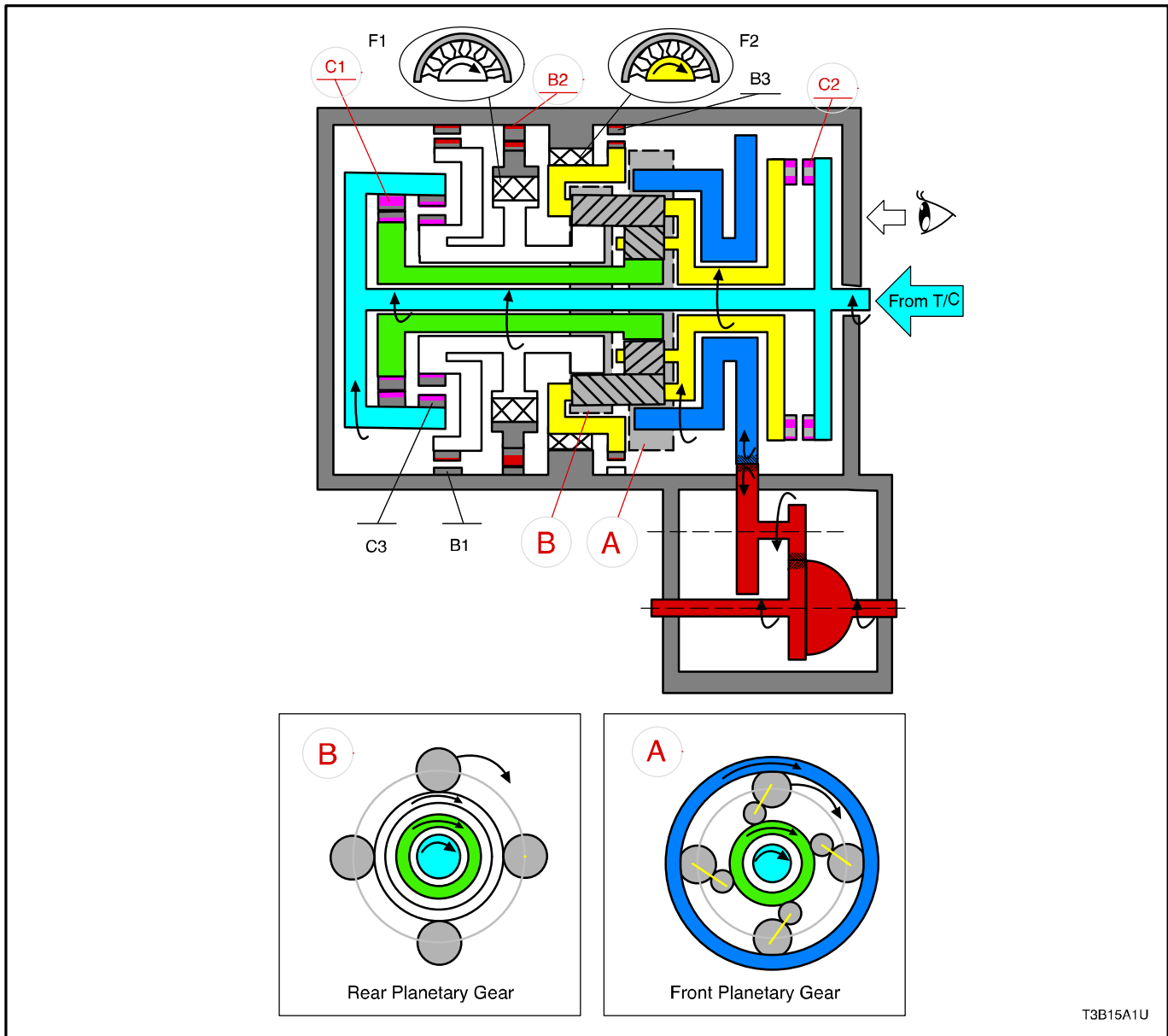
6. Planetary carrier revolves clockwise due to reaction force of planetary long pinion.
7. Ring gear rotates clockwise.
8. Counter drive gear rotates clockwise for ring gear and one.
9. Counter driven gear rotates counterclockwise
10. Differential gear drive pinion rotates counterclockwise for counter driven gear and one.
11. Differential gear rotates clockwise.

(Engine Brake)

1. Counter drive gear and planetary ring gear rotates counterclockwise.
2. Planetary long pinion rotates itself counterclockwise.
3. Planetary short pinion rotates itself clockwise.
4. Rear sun gear rotates clockwise due to rotation itself counterclockwise of planetary long pinion, but driving force loses due to free of 1 way clutch No.1(F1). Therefore Engine Brake does not operate.

D–3rd Gear

Position		Solenoid			Clutch			Brake			1 way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
D	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	OF –F	OF –F

**"D" – 3rd Gear**

- Input shaft rotates clockwise.
 - Forward clutch (C1) operates. (Connect input shaft to front sun gear)
 - Direct clutch (C2) operates. (Connect input shaft to planetary carrier)
- Planetary short pinion and planetary long pinion can not rotate itself, and planetary gear unit rotates clockwise as one.
- Counter drive gear rotates clockwise for ring gear and one.
- Counter drive gear rotates counterclockwise

5. Differential drive pinion rotates counterclockwise for counter driven gear and one.
6. Differential rotates clockwise.

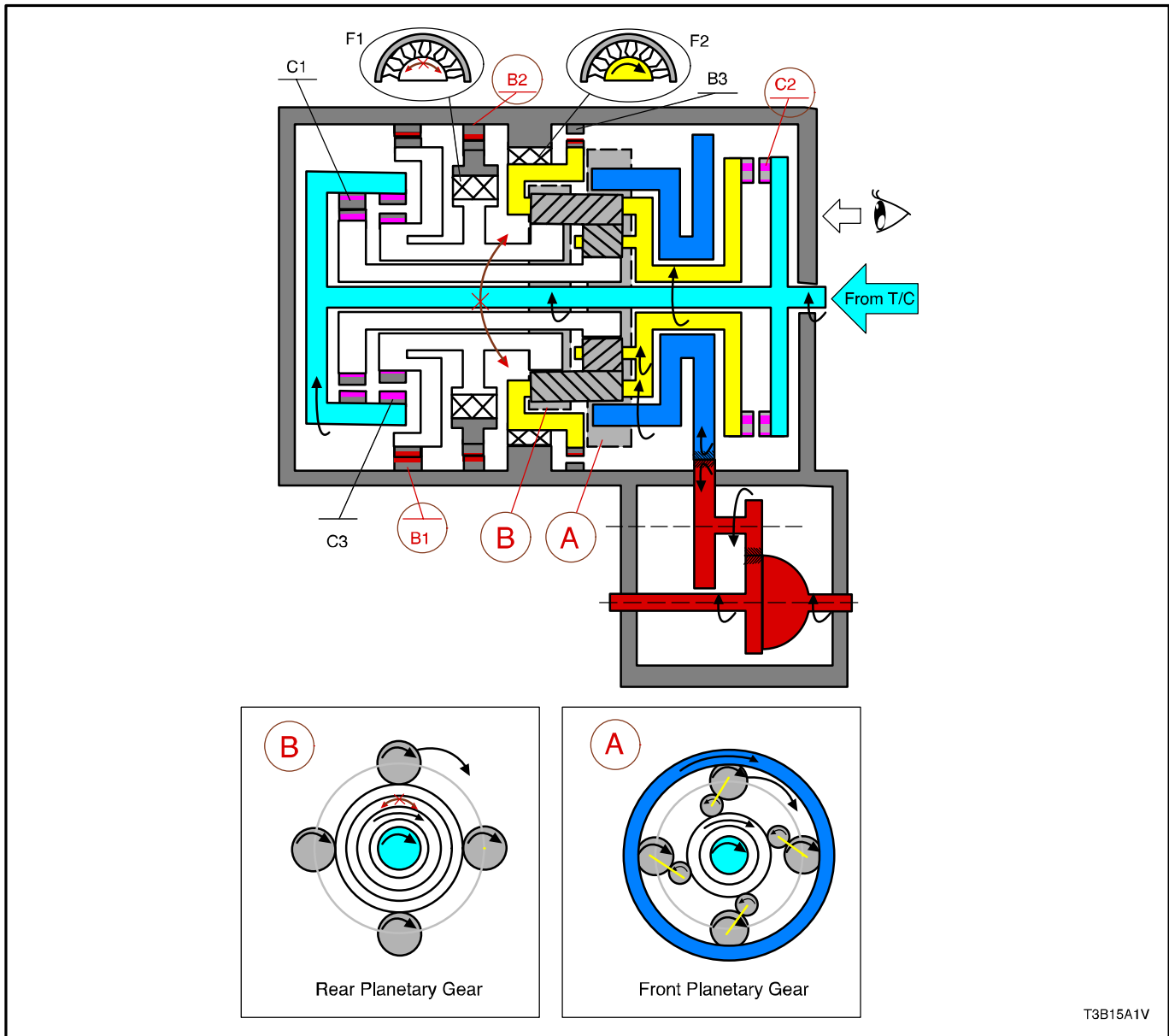
(Engine Brake)

Driving force is connected to input shaft directory without 1 way clutch.

Therefore Engine Brake operates.

D-4th Gear

Position		Solenoid			Clutch			Brake			1 way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
D	4th	OFF	ON	OFF	OFF	ON	OFF	ON	ON	OFF	OF -F	OF -F



T3B15A1V

"D" – 4th Gear

1. Input shaft rotates clockwise.
 - Direct clutch (C2) operates. (Connect input shaft to planetary carrier)
2. Planetary carrier revolves clockwise.
3. Planetary long pinion rotates itself clockwise.
4. Rear planetary sun gear is going to rotate counterclockwise.
 - O/D & 2nd brake (B1) operates. (Lock rotates planetary sun gear)
5. Planetary long pinion revolves clockwise while rotating itself clockwise.
6. Ring gear rotates clockwise.
7. Counter drive gear rotates clockwise for ring gear and one.

8. Counter driven gear rotates counterclockwise.
9. Differential gear drive pinion rotates counterclockwise for counter driven gear and one.
10. Differential gear rotates clockwise.

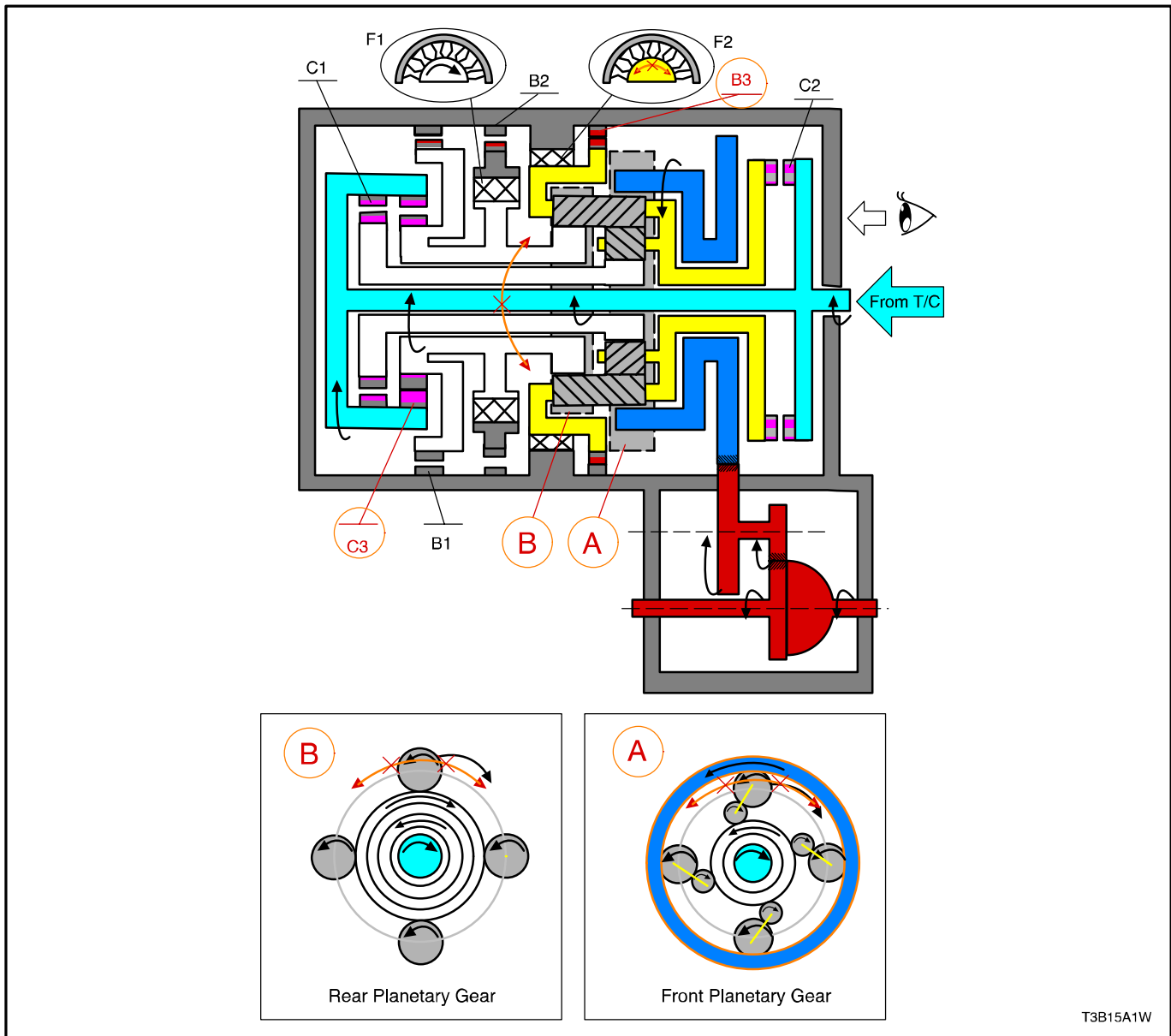
(Engine Brake)

Driving force is connected to input shaft directory without 1 way clutch.

Therefore Engine Brake operates.

Reverse Gear

Position		Solenoid			Clutch			Brake			1 way Clutch	
		Shift 1	Shift 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
R	V < 9 km/h	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OF -F	OF -F
	V ≥ 9 km/h	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OF -F	OF -F



Reverse Gear

- Input shaft rotates clockwise.
 - Reverse clutch (C3) operates.(Connect input shaft to rear planetary sun gear)
- Planetary long pinion rotates itself counterclockwise.
- 1st & reverse brake(3) operates. (Lock rotates planetary carrier)
- Ring gear rotates counterclockwise.

5. Counter drive gear rotates counterclockwise for ring gear and one.
6. Counter driven gear rotates clockwise.
7. Differential gear drive pinion rotates clockwise for counter driven gear and one.
8. Differential gear rotates counterclockwise.

(Engine Brake)

Driving force is connected to input shaft directly without 1 way clutch.

Therefore Engine Brake operates.